SECTION 28 13 53

VIDEO SECURITY SURVEILLANCE MANAGEMENT SYSTEM

Display hidden notes to specifier. (Don't know how? [Click Here](http://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* Hanwha Techwin; video surveillance products.  
This section is based on the products of Hanwha Techwin, which is located at:  
500 Frank W. Burr Blvd.  
Teaneck, NJ 07666  
Toll Free Tel: 877-213-1222  
Fax: 201-373-0124  
Email: [request info (customerservice@hanwha.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Hanwha+Techwin&coid=51234&rep=&fax=201-373-0124&message=RE:%20Spec%20Question%20(13702han):%20%20&mf=)  
Web: <https://www.hanwhasecurity.com>   
 [ [Click Here](http://www.arcat.com/arcatcos/cos51/arc51234.html) ] for additional information.  
Hanwha Techwin America is a precision technology company that has demonstrated stable growth for over 40 years, and is part of the Hanwha Group, a Fortune 500 company and one of the largest conglomerates in South Korea. The Hanwha Group has accumulated manufacturing expertise over 60 years of operation, gaining in-depth market knowledge and experience in producing the highest quality, precision products that serve the aerospace, defense, energy and security industries.  
As a leading manufacturer in the security industry, Hanwha offers video surveillance products including IP cameras, storage devices and management software founded on world-class optical design, manufacturing and image processing technologies. We offer end-to-end security solutions and have achieved global success across a wide range of industry verticals including retail, transportation, education, banking, healthcare, hospitality and airports. Hanwha's recently introduced Wisenet line of innovative security products demonstrates the value, technology and commitment we bring to market including 12 MP cameras, intelligent video analytics and H.265 support. Explore our solutions and see how we can go further together.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Video Management Systems:
       1. Server application.
       2. Desktop application.
       3. Mobile application.
       4. Cloud application.
    2. Servers:
       1. Desktop.
       2. Rackmount.
    3. Client workstations.
    4. IP security cameras.
    5. VMS software licenses.
    6. Network video recorders.
    7. Encoders and decoders.
    8. Controller systems.
    9. Accessory products.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Division 26 - Electrical.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. Code of Federal Regulations (CFR).
    2. Institute of Electrical and Electronics Engineers (IEEE):
       1. 802.3 Ethernet Standards.
    3. International Electrotechnical Commission (IEC).
    4. International Organization for Standardization (ISO):
       1. ISO / IEC 10918 - Information technology - Digital compression and coding of continuous-tone still images: Requirements and guidelines; JPEG.
       2. ISO / IEC 14496-10 - Information Technology - Coding Of Audio-Visual Objects - Part 10: Advanced Video Coding; MPEG-4 Part 10 ( ITU H.264).
       3. ISO / IEC 23008-2 - High Efficiency Coding And Media Delivery In Heterogeneous Environments - Part 2: High Efficiency Video Coding; MPEG-H Part 2 (ITU H.265, HEVC).
    5. European Standard (EN):
       1. EN 50121 - Railway Applications. Electromagnetic Compatibility.
       2. EN 50155 - Railway applications - Rolling stock - Electronic equipment.
       3. EN 50130-4 - Alarm Systems. Electromagnetic Compatibility. Product Family Standard: Immunity Requirements For Components Of Fire, Intruder, Hold Up, CCTV, Access Control And Social Alarm Systems.
       4. CE EN 50581 - Technical Documentation For The Assessment Of Electrical And Electronic Products With Respect To The Restriction Of Hazardous Substances.
       5. EN 55022 Class A - Information Technology Equipment - Radio Disturbance Characteristics - Limits And Methods Of Measurement.
       6. EN 61000-3-2-A2 - Electromagnetic Compatibility (EMC) - Part 3-2: Limits - Limits For Harmonic Current Emissions (Equipment Input Current: 16 A Per Phase).
       7. EN 61000-3-3 - Electromagnetic Compatibility (EMC) - Part 3-3: Limits - Limitation Of Voltage Changes, Voltage Fluctuations And Flicker In Public Low-Voltage Supply Systems, For Equipment With Rated Current less than or equal to 16 A Per Phase And Not Subject To Conditional Connection.
    6. European Union Safety Standards (CE).
    7. Federal Communications Commission (FCC):
       1. FCC Rules and Regulation of Title 47 of CFR Part 15 Subpart B Class A.
    8. Open Network Video Interface Forum (ONVIF):
       1. ONVIF - Profiles S Specification.
    9. Underwriters Laboratories (UL):
       1. UL listed.
    10. United States Military Standard (MIL-STD):
        1. MIL-STD-810F - Environmental Engineering Considerations and Laboratory Tests.
  1. DEFINITIONS
     1. Abbreviations:
        1. ARP - Address Resolution Protocol.
        2. DHCP - Dynamic Host Configuration Protocol.
        3. DNR - Digital Noise Reduction.
        4. DDNS - Dynamic Domain Name Server.
        5. fps - frames per second.
        6. GUI - Graphical User Interface.
        7. HDD - Hard Disk Drive.
        8. HTTP - Hypertext Transfer Protocol.
        9. ICMP - Internet Control Message Protocol.
        10. IGMP - Internet Group Management Protocol
        11. IP - Internet Protocol.
        12. iSCSI - Internet Small Computer System Interface.
        13. JBOD - Just a Bunch of Disks.
        14. JPEG - Joint Photographic Experts Group.
        15. MJPEG - Motion JPEG.
        16. MP - Megapixel.
        17. MPEG - Moving Pictures Experts Group.
        18. NAS - Network Attached Storage.
        19. NTP - Network Time Protocol.
        20. POS - Point of Sale.
        21. PPPoE - Pont to Point Protocol over Ethernet.
        22. RAID - Redundant Array of Independent Disks (Drives).
        23. RTP - Real-Time Transport Protocol.
        24. RTCP - Real-Time Control Protocol.
        25. RTSP - Real-Time Streaming Protocol.
        26. SMTP - Simple Mail Transfer Protocol.
        27. SNMP - Simple Network Management Protocol.
        28. SSL - Secure Sockets Layer.
        29. TCP - Transmission Control Protocol.
        30. UDP - User Datagram Protocol.
        31. UPnP - Universal Plug and Play.
        32. VMS - Video Management System.
        33. PoS - Point of Sales.
        34. VA - Video Analytics.
        35. PnP - Plug and Play.
        36. ARB - Auto Recovery Backup.
        37. NVR - Network Video Recorder.
        38. RAID - Redundant Array of Independent Disks.
     2. Definitions:
        1. JBOD: A collection of hard disks that have not been configured to act as a redundant array of independent disks (RAID) array.
        2. GOV (Group of Video object planes): A set of video frames for H.264 and H.265 compression, indicating a collection of frames from the initial I-Frame (key frame) to the next I-Frame. GOV consists of 2 kinds of frames: I-Frame and P-Frame.
        3. WiseStream: Smart Codec that controls quantization parameter in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required.
        4. Dynamic GOV: Dynamic assignment of GOV length based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required.
        5. Dynamic fps: Dynamic assignment of frames per second based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required.
        6. ARB (Auto Recovery Backup): Automatic backup mechanism that enables WiseNet cameras to store videos on to SD card during failures and stream it to the storage device after recovery.
        7. Failover: A feature that automatically switches to a redundant or standby device upon failure or unexpected shutdown of an active device.
  2. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Solution Proposal: System Integrator shall submit the Solution Proposal.
     3. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Manufacturer's printed or electronic data sheets.
        2. Manufacturer's installation and operation manuals.
        3. Warranty documentation.
     4. Shop Drawings: Include details of construction, interface of equipment, and relationship with adjacent construction.
  3. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
     2. System Integrator shall provide the following as part of the System Solution:
        1. Complete product and technical data specification sheets that include all material and equipment and shall be available freely online.
        2. List of all equipment with part numbers, manufacturer, firmware, and assigned IP addresses.
        3. Locations and details for all components to be installed under this scope of work.
        4. Placement Diagram showing the proposed location of all system hardware devices.
        5. System Calculation of all network bandwidth and storage requirements for System Servers to ensure proper planning of computing and networking infrastructure.
     3. Installer Qualifications: Minimum 2 year experience installing similar products. Installers shall be trained and authorized by the Manufacturer to install, integrate, test, and commission the system.
  4. PRE-INSTALLATION MEETINGS
     1. Convene minimum two weeks prior to starting work of this section.
  5. DELIVERY, STORAGE, AND HANDLING
     1. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
     2. Handling: Handle materials to avoid damage.
  6. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  7. SEQUENCING
     1. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
  8. WARRANTY
     1. The security system VMS software and labor furnished by the System Integrator including wiring, software, hardware and third party products shall be fully warranted for parts, materials and labor for a minimum of 1 year from date of the final acceptance of the Video Surveillance System.
     2. Manufacturer shall provide a limited 3 year warranty for the product to be free of defects in material and workmanship.
     3. Software Licensing and Warranty:
        1. Software licensing should be on a per device basis (e.g. 1 x license for 1 IP Camera or I/O device) with no base license for additional features or capabilities.
        2. The VMS Software should be completely free for live streaming or playback of offline media files (images, videos).
        3. Lifetime software upgrades shall be provided by the Manufacturer without cost and without the need for an annual maintenance agreement.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Hanwha Techwin, which is located at: 500 Frank W. Burr Blvd.; Teaneck, NJ 07666; Toll Free Tel: 877-213-1222; Fax: 201-373-0124; Email: [request info (customerservice@hanwha.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Hanwha+Techwin&coid=51234&rep=&fax=201-373-0124&message=RE:%20Spec%20Question%20(13702han):%20%20&mf=); Web: <https://www.hanwhasecurity.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. VIDEO MANAGEMENT SYSTEMS (VMS)
     1. Video Management Systems: For remote devices and sensors.
        1. Software: Wisenet Wave v3.1 as manufactured by Hanwha Techwin America.
        2. System Requirements:
           1. Open video platform designed for use in any video application.
           2. Specified Software: To include, free of charge, any API or SDKs necessary to integrate third party devices and systems.
           3. Specified Video Management Solution's Architecture: To include Desktop, Media Server, Mobile, and Cloud applications.
        3. Software Components Characteristics: Four applications working seamlessly together.
           1. Cloud Application: Enables simple remote connectivity, viewing, and management of an unlimited number of systems and users.
           2. Media Server Application: Responsible for discovering, connecting to, and managing system users, devices, and associated data.
           3. Desktop Application: Capable of acting as a stand-alone media player or as a client application for connecting to and managing systems.
           4. Mobile Application: For iOS and Android devices that allows users to connect to, view, search, and control IP cameras over Wifi or Data networks.
        4. Built-In Developer and Integration Tools: Accessible from System Server's Web Admin Interface (compatible with all major browsers).
           1. Generic Events Generator: Tool which builds HTTP Generic Event calls; a method of sending events from third party systems to the VMS, which can be used to trigger system actions in the VMS.
           2. Server API: SUNAPI implementation giving developers the ability to access every system feature available.
           3. API Change Log: List of breaking changes in API from version to version.
           4. Video Source Integration SDK: Integrate virtually any live or recorded video source (IP Cameras, NVRs, DVRs, etc.) into the VMS with methods for discovering, displaying, analyzing and recording video, as well as integrating device I/O ports and related motion detection information.
           5. Storage SDK: Integrate potential storage into System. Allow developers to read from or write to any storage location; local, remote, or cloud-based. Require implementing standard functions such as: I/O stream, if file exists, delete file, list of files in the folder, etc. Capable of using an FTP server as a storage location.
        5. System Architecture:
           1. Server Hive Architecture:

System servers are equal synchronizing system databases in real-time.

Users can connect to any system server to see and manage entire system.

Servers support automatic camera failover ensuring limited loss of video recording in event of hardware or network failure.

Servers use SQLite, a free database technology, included in installation package.

* + - * 1. One-click System Wide Updates:

System Administrators Capabilities:

Upgrade entire system via single button in Desktop Application.

Upgrade on demand to latest release or specific builds with specific functionality or bug fixes.

Apply an OTA (over-the-air) update.

Generate a URL to download a portable system-specific update package in ' Zip' file format which can be used to update servers without an active Internet connection.

* + - * 1. Use secure technologies for inter-application communication and security.

OpenSSL for Network Connections: Deprecated and insecure protocols and use only TLS v1plus.

Email Server: Client (Mobile, Desktop, Web) Communications - HTTPS Email - TLS / SSL - TLS; default option.

Salted/Hashed Passwords: Local credentials protected using a salted MD5 hash, cloud credentials should use a complex multi-level hash.

* + - * 1. The VMS will not require any licenses to increase the number of supported devices, users, or servers.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. VMS Server Application:
       1. Runs on the Following Operating Systems:
          1. Microsoft:

Windows 7 or later.

Windows Server 2008 or later.

Windows 10 Enterprise Solutions.

* + - * 1. Ubuntu Linux:

Ubuntu 14.04 LTS: Trusty Tahr.

Ubuntu 16.04 LTS: Xenial Xerus.

* + - 1. Minimum Compatible Computing Hardware:
         1. Any hardware able to run a compatible operating system.
         2. Capable of recording 128 dual-streaming IP cameras (256 streams) on a single core of an Intel Core i3 processor.
      2. Initial Installation and Setup:
         1. Installer: Not to exceed 100 MB (megabytes).
         2. Publicly available, free download.
         3. No prerequisite proprietary or 3rd party software and database technologies required during installation.
         4. Installation Process: No user input once initiated.
         5. After Installation is Complete: Setup process will allow system administrators to create a new system or to merge newly installed servers with existing systems.
      3. Performance:
         1. Automatically discover, stream, and record any ONVIF Profile S IP camera located on same subnet as server application.
         2. Manually discover, stream, and record RTSP, HTTP, or UDP (multicast, unicast) streams.
         3. Concurrent TCP Connections: 1000.
         4. Record and Stream Video: Any resolution and frame rate, limited only by hardware.
         5. Automatic camera failover without any additional licenses.
         6. Unlimited number of users and custom user roles.
         7. Any type of storage medium - HDDs, SSDs, SD cards, DAS, NAS, or other network-attached storage devices or locations.
         8. User Login Credential Management: LDAP / Active Directory / Open LDAP integration.
         9. Record and Stream

Video: H.264, H.265, and MJPEG.

Audio: AAC, PCM (Mu-Law, A-law), g726, and MP3.

* + - * 1. Transcode Streams on Demand: For delivery to 3rd party system devices.

Codecs: H.265, H.264, MJPEG or WebM.

* + - * 1. Pass-through high-res or low-res HLS streams from connected devices.
        2. Store archive indices in same location as recorded video files.
        3. Re-Index Archive Feature: Allow system administrators to recover archives from any storage medium.
        4. Boolean Events Engine: Allow operators to program and trigger system actions based on system, connected device, or HTTP events sent from 3rd party system or device.
        5. Send HTTP PUT or GET requests to 3rd party systems or devices.
        6. Support Addressing: IPv4 or IPv6.
        7. Operators to set custom network routing configurations for system servers to optimize network routing and usage.
        8. Allow operators to monitor CPU, RAM, NIC, and HDD usage in real time.
        9. Track all operator actions to allow audits.
        10. Generate automatic crash files for every crash of the Server application.
        11. Operator ability to change size of reserved disk space for storage drives.
        12. Automatically disable any system drive (drive containing the operating system) in computing hardware with more than one drive to ensure operating system drive does not become full.
        13. Configuration and events from binary I/O contacts on supported devices including IP cameras and I/O devices.
        14. Send email notifications via SMTP using TLS, SSL or unsecured connections.
        15. Scheduled backup of recording archives to local, networked, or cloud storage locations.
        16. On-demand backup of recording archives to local, networked, or cloud storage locations.
        17. Concurrent-recording of all connected cameras / streams to two servers in real-time.
        18. Server-side, CPU-based motion analysis for all connected IP cameras with no perceptible increase, less than 3 percent, in CPU usage.
        19. Require no dedicated GPU in order to perform at maximum capacity.
        20. Web Administration Interface Allowances:

System administrators to view real-time server health monitoring statistics; CPU, NIC, and HDD usage.

Hidden advanced page giving system administrators ability to modify advanced system settings.

Users to view live or recorded video from a single camera at a time in high or low resolutions.

Users to view all available servers in system.

Operators to disconnect the VMS Server from the VMS cloud application.

Operators to switch between server interfaces.

Must support any RAID configuration of storage medium.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. VMS Desktop Application:
       1. Runs on the Following Operating Systems:
          1. Microsoft:

Windows 7 or later.

Windows Server 2008 or later.

Windows 10 Enterprise Solutions.

* + - * 1. Ubuntu Linux:

Ubuntu 14.04 LTS: Trusty Tahr.

Ubuntu 16.04 LTS: Xenial Xerus.

Apple / Mac.

OSX 10.11: El Capitan.

OSX 10.12: Sierra.

OSX 10.13: High Sierra.

* + - 1. Minimum Compatible Computing Hardware:

Any hardware able to run a compatible operating system with a CPU that supports OpenGL 2.1 and Intel HD Graphics 3000 (or higher).

* + - * 1. Will not require any dedicated graphics drive to work at full capacity; 64 streams on a 64 bit OS, 24 streams on a 32 bit OS, and use the CPU for all video decoding and rendering.
      1. Installation and Configuration of VMS Client Application:
         1. Installer not exceed 100 MB (megaybytes).
         2. Publicly available, free download.
         3. No prerequisite proprietary or 3rd party software and database technologies required during installation.
         4. Installation Process: No user input once initiated.
      2. Performance and Basis Structure:
         1. Navigation Panel: Main menu button, an interactive cloud-login icon, tabbed layouts, minimize and maximize icons, a contextual help icon, and a close application icon.
         2. Resource Panel (Left): Contains all system resources (Servers, Devices, Users, Layouts, Offline files, etc.) with collapsible structure and a keyword search mechanism to allow operators to quickly search for a display live streams / cameras, offline video and image files, or any combination thereof.
         3. Notifications Panel (Right): Shows all system or rules-engine generated notifications which can be clicked on to display relevant resource in the viewing grid.
         4. Timeline Panel (Bottom): Allows for navigation and search of recorded video files.
         5. Viewing Grid (Main Viewing Area): A flexible adaptive grid interface which allows operators to create and share customized layouts of system resources.
      3. Operation: Allow operators to do the following.
         1. View and interact with the following types of media:

Live Streams: H.265, H.264, MJPEG.

Offline Media: AVI, MKV, MP4, MOV, TS, M2TS, MPEG, MPG, FLV, WMV, 3GP, JPG, PNG, GIF, BMP, and TIFF.

I/O Devices: Status and triggers.

Servers: Real-time server health monitoring status.

* + - * 1. Scroll to and zoom in on any zone of viewing grid.
        2. Drag and drop to reassign cameras from one server to another server.
        3. Via a flexible timeline, view dates of any and all archived video in the System for a specific camera, or groups of cameras.
        4. Manually Create Bookmarks: With start time, end time, name, description, and tags, for later search. Bookmarks must also be able to be created using the Rules engine.
        5. Create Soft Triggers: Programmable, customizable buttons which sit on top of streams in Viewing Grid, to trigger any available system action.
        6. Icons Located on the Top of Live Camera Streams: Dewarp fisheye cameras, control PTZ cameras, apply client-side image enhancement, execute smart motion search, create zoom windows, rotate items to any orientation, and activate stream or file info.
        7. Create Zoom Windows: 63 zoom windows on a single item in a 64 bit OS, 23 zoom windows in a 32 bit OS; a magnified view of a part of a live stream, recorded videos, or static images.
        8. Execute a Smart Motion Search: By selecting a subset of a live camera stream with results shown in red on the flexible timeline. Smart Motion search should be able to search a year (12 months, 365 days) of archived video in less than one second.
        9. Search live cameras by name, manufacturer, IP address, MAC address, and status (e.g. live).
        10. Search video archives by date and time with a responsive, adaptive timeline.
        11. Operators to customize the background image of the application with supported image types.
        12. Support digital mapping by allowing operators to add and customize background images including opacity and number of grid points.
        13. Utilize adaptive scaling technology to automatically switch between high and low resolution streams during live and recording playback to optimize CPU and network usage.
        14. Log in to the Cloud application in order to quickly connect to any shared system.
        15. Quickly switch between previously connected or cloud-accessible systems using searchable tiles that show system name and status.
        16. Using a Storage Analytics feature analyze storage capacity of the system based on available drives and real-time and historical bandwidth analysis.
        17. Management and configuration of all system devices, users, and resources in a single unified interface.
        18. Fast-forward and fast-reverse of archived video up to 16x normal speed.
        19. Show operators which system server they are connected to.
        20. Connect to previous versions by automatically downloading and switching to compatible versions.
        21. Automatically discover available systems on the same network as the computer running the Desktop application.
        22. Automatically recover and reconnect to a system in the instance the server the operator is connected to becomes inaccessible for any reason.
        23. Show or hide adaptive thumbnails in the timeline panel.
        24. Synchronize all items on a layout or disable synchronization to view live and recorded video at the same time.
        25. Adaptive settings dialogs, to switch dialog content while the dialog is open by clicking on a resource.
        26. Batch configuration of camera recording schedules, fps, and quality.
        27. Drag and drop multiple system resources onto the Viewing Grid at the same time.
        28. Modify time synchronization settings for the system to utilize online resources (NTP servers) or to set a dedicated local time server.
        29. View a full list of system cameras and devices in a single dialog.
        30. View, Search and Export:

All system events.

All system bookmarks.

System logs.

Audit trail of operator actions and replay related video.

* + - * 1. Backup and restore system database.
        2. Create an unlimited number of custom user roles.
        3. Create and share lockable layouts.
        4. Update layouts in real time.
        5. Record their screen in full resolution and up to 30 fps.
        6. Add a local folder to add local files for search and playback.
        7. A Video Wall mode to control the application remotely.
        8. A Media Player mode to use the application as a media player.
        9. Remember past system connections and user credentials and will allow operators to quickly search for and switch between systems.
        10. Adjust aspect ratio and streaming quality (high resolution or low resolution) of items displayed on the viewing grid.
        11. Display I/O devices as an individual item on the viewing grid create custom names for inputs and output.
        12. Customize the layout of I/O panels on the item in the viewing grid including indicators for inputs and buttons for outputs.
        13. De-warp any fisheye lens using automatic calibration or manual calibration without the need for any third party SDKs.
        14. Create fully customizable viewing tours which include any combination of live video streams, offline videos, images, websites (or URLs), I/O devices, and Server health monitoring status.
        15. Modify and save a shared layout to affect an instantaneous change to that layout on the VMS Desktop application of any user connected to the system viewing that layout (when the system administrator saves the layout the layout will update in real time for any user viewing that layout).
        16. Support two-way audio between operators and supported devices.
        17. Support audio alerts as an action that can be played on users' computers or connected system devices.
        18. Support PTZ presets and tours.
        19. Support PTZ presets and tours in fisheye cameras using de-warp mode.
        20. Schedule recording for connected cameras and devices with options to force minimum and maximum storage durations.
        21. Configure pre and post recording for motion events.
        22. Optimize camera streaming quality from connected devices automatically using low, medium, high, best quality selectors or manually in the camera.
        23. Export video by selecting an area on the timeline and right clicking to export.
        24. Support single video export in .avi, .mp4, or .mkv formats and will offer the option to transcode any client-side effects (image enhancement, de-warping, time stamps) as part of the exported video.
        25. Support multi-video export in an executable format to create a fully portable version of the VMS Desktop application including all exported video files.
        26. A rapid review export feature which will allow operators to compress any length of video into a short video (e.g. export 8 hours of archives into a 30 second video clip).
        27. Activate or deactivate system licenses on Internet connected systems.
        28. Force open an alarm layout triggered by any system or 3rd party event with one or many associated cameras or resources.
        29. A hidden configurable method of increasing the amount of items allowed on the viewing grid.
        30. Adjust configuration of devices.
        31. Utilize Hanwha Wisenet X Series analytics integration.
        32. Force users to set the camera's initial password upon enrollment for best cyber security practices.

\*\* NOTE TO SPECIFIER \*\* Delete if not required for project.

* + 1. VMS Mobile Application:
       1. Runs on the Following Operating Systems:
          1. Google Android.
          2. Android 4.0: Ice Cream Sandwich.
          3. Android 4.1, 4.2, 4.3: Jelly Bean.
          4. Android 4.4: KitKat.
          5. Android 5.0: Lollipop.
          6. Android 6.0: Marshmallow.
          7. Android 7.0 7.1: Nougat.
          8. Android 8.0 8.1: Oreo.
          9. Apple iOS: 5, 6, 7, 8, 9, 10, and 11.
       2. Installation: Application to be available as a free download from Google Play or Apple iTunes stores.
       3. Performance:
          1. Automatically discover available Systems on a local area network (LAN).
          2. Store past system connections and credentials and allow users to quickly search for switch between systems.
          3. Adaptive streaming and automatically adjust stream being displayed based on network speed.
       4. User Capabilities:
          1. Adjust streaming resolutions manually.
          2. Search for cameras by name.
          3. Fisheye de-warping of any fisheye lens without 3rd party SDK.
          4. View live video from one system.
          5. Log in to VMS Cloud layer to view and access systems shared with a user.
          6. Control the display of any connected "Lite Clients" in the system.
          7. Utilize a custom media player to render and display live thumbnails and video.
          8. Search video using a calendar.
          9. Search video using a flex timeline.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. VMS Cloud Application:
       1. Supported Browsers: Allow users to log in from any modern web browser. (Google Chrome, Mozilla Firefox, Microsoft Edge, Opera, etc) from any type of device (mobile, PC, etc.)
       2. Performance:
          1. An optional add-on to VMS requiring no additional licensing.
          2. Will first attempt a direct connection to system servers using NAT Traversal technology and be able to proxy traffic to ensure access to a system in case of ISP or routing issues.
          3. Unlimited number of connected users and systems with no additional licensing.
          4. Utilize secure networking technologies (OpenSSL, HTTPS) and a complex Salted MD5 hash for any stored.
          5. Users to connect an unlimited number of systems to a single user account.
       3. User Capabilities:
          1. System Administrators:

Share access to a system using only an email address.

Assign custom user roles when sharing system access.

* + - * 1. Users: Quickly search for and connect to cloud-connected systems by name.
        2. Operators: View live or recorded video from one camera at a time on any cloud-connected system.
        3. Passwords.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. SERVERS
     1. Desktop Servers:

\*\* NOTE TO SPECIFIER \*\* Delete desktop server model option not required.

* + - 1. Wisenet Wave WRT-3301 Mini Tower Network Video Recorder ("NVR"):
         1. Record Video and Audio: 170 Mbps.
         2. Send data from video cameras to hard disk arrays of 1 to 4 HDDs n a Mini Tower format. Enable playback of video and audio from the hard disk array.
         3. Pre-Configuration: Wisenet WAVE VMS. Preloaded with four professional licenses ensuring quick and easy development with minimum setup time.
         4. Remote monitoring environment for video and audio over the network using a remote computer.
         5. SQLite, a free database technology included in installation package.
         6. General Properties:

Capability to search network for connected compatible cameras via Onvif Profile S or Hanwha Techwin's native driver.

Cameras are Searched or Discovered:

Each camera will be automatically registered and current camera information (fps, days of recording) displayed.

Ability to selectively register as many cameras as can be found.

Support WiseStream, Wisestream II and Dynamic GOV, a smart codec used by WiseNet IP cameras.

Support dual monitor out.

Support server backup if multiple servers are in the hive for failover for redundancy.

* + - * 1. Recording and Playback Functions:

Support recording 128 dual streams (256 streams) from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

470 Mbps network camera recording throughput.

Simultaneous playback capability up to 128 video channels.

Compression Support: H.265, H.264, and MJPEG.

Record and Stream: AAC, PCM, g726, and MPS audio.

View status of internal connected storage hardware.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event, analytics based in Wisenet Cameras.

Motion detection.

Video loss detection.

Available Recording Settings by Channel for Standard and Event-Based Recording Types:

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available Actions Upon Reaching Full HDD Storage Capacity:

Stop recording.

Overwrite.

Search recorded data by time, event trigger, motion alarms, events.

Storage: Four, 8 TB HDDs in JBOD configuration for a maximum of 32 TB.

USB connection for memory/storage device for video clip backup and settings export.

* + - * 1. Live View:

Remote monitoring using Wisenet WAVE supplied viewer.

Streams: H.265, H.264, and MJPEG.

Offline Media: AVI, MKV, MP4, MOV, TS, M2TS, MPEG, MPG, FLV, WMV, 3GP, JPG, PNG, GIF, BMP, and TIFF.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

* + - * 1. Remote Access:

Multicast and unicast: Simultaneous access is unlimited.

Mobile Device:

Supported Platforms:

Android.

IOS.

Supported Remote Users: Unlimited amount either live or playback.

Dynamic DNS (DDNS) support.

* + - * 1. VGA and High Definition (HDMI) local monitor outputs live viewing, playback, and backup functions.
        2. ONVIF Profile S compliance.
        3. Alarm Connections: None on server.

Use of I/O software module to support I/O control.

* + - * 1. System:

Processor: Intel Core i3-7101E 3.9 GHz.

Memory: 4 GB DDR4.

Operating Systems: Windows 10 IoT Enterprise.

USB Ports: 4x USB 3.0 (rear), 1x USB 3.0 Type-C (rear), 2x USB 2.0 (front).

Video Output: 2x HDMI (rear), 1x DVI (rear).

Wi-Fi: IEEE 802.11ac.

Other Ports: 1x PS2, 2x Wi-Fi Antennas, 3.5 mm audio in/out, 1x SPDIF out.

Keyboard: Included.

Mouse: Included.

RAID Support: None.

* + - * 1. Video Compression: H.265, H.264, and MJPEG.
        2. Recording:

Channel Capability: No limit but recommended to use Wisenet WAVE Calculator for maximum.

Bit Rate: Up to 170 Mbps.

Resolution Range: 352 x 288 to 4000 x 3000.

* + - * 1. Events and Response Actions:

Triggers:

Motion.

Video loss.

Event defined by camera.

Response Actions:

Record.

E-mail.

Activate PTZ preset.

Event Trigger program.

Sound output.

* + - * 1. Playback:

Number of simultaneous channels: Not limited.

Bandwidth: 170 Mbps.

* + - * 1. OS Drive: OS Drive Bays 1, 64 GB SSD internally mounted.
        2. Storage:

Internal:

Number of HDDs bays: 1.

Capacity per HDD: 1 to 8 TB.

External; Acceptable Types: USB HDD/Flash drive for backup of video clips, firmware update, settings backup/restore, log export.

* + - * 1. Network:

Connectivity: 1000 Base-T Ethernet, 2 x RJ-45 connectors.

Protocols Supported:

Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP).

Configuration: Dynamic Host Configuration Protocol (DHCP).

Web Services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS).

Network Services: Address Resolution Protocol (ARP), Domain Name System (DNS), Internet Control Message Protocol (ICMP), Network Time Protocol (NTP), Simple Network Management Protocol (SNMP v1/2c/3 - MIB-2), Universal Plug and Play (UPnP).

Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP).

Multicast: Internet Group Management Protocol (IGMP).

Notifications: Simple Mail Transfer Protocol (SMTP).

Remote Access: Point-to-Point Protocol over Ethernet (PPPoE).

DDNS: Support DDNS services offered by Manufacturer and other publicly available service offerings.

Security Features:

User password protection with group restrictions.

IP address filtering, list of allowed or blocked IP addresses.

HTTPS(SSL) login authentication.

User access log.

Authentication: 802.1x.

Restriction of all network access/web viewer access.

Discovery: Manufacturer to offer a discovery program to identify all devices of his manufacture on the network, as well as ONVIF Profile S conformant devices.

* + - * 1. Alarm/Sensor Interface:

Input (0): NO or NC, selectable.

Output (0): NO or NC, selectable.

Use of I/O software module to support I/O control.

* + - * 1. Audio:

Direction: Bi-directional.

Compression: AAC (16/48 KHz), G.711 u-law, G.726 selectable.

Output: Line level (RCA).

* + - * 1. Electrical:

Power: 100 to 240 VAC.

Power Supply: 250 W.

* + - * 1. Mechanical And Environmental:

Color: Black, Silver / Metal.

Front panel with lock.

Form Factor Mini-Tower.

Mouse and Keyboard: Included.

Dimensions (W x H x D): 7.87 x 10.63 x 12.2 inch (200 x 270 x 310 mm)

Weight: 15.4 lbs (7 kg).

Temperature; Operating and Storage: 32 to 122 degrees F (0 to 50 degrees C).

Humidity: 5 to 85 percent, RH non-condensing.

* + - 1. Wisenet WAVE Desktop Server WRT-5301L Network Video Recorder ("NVR"):
         1. Record Video and Audio: 470 Mbps.
         2. Send data from video cameras to a hard disk array of 1 to 4 HDDs within a Mini Tower format. Enable playback of video and audio from the hard disk array.
         3. Pre-configured with Wisenet WAVE VMS and preloaded with four professional licenses ensuring quick and easy development with minimum setup time.
         4. Remote monitoring environment for video and audio over the network using a remote computer.
         5. SQLite, a free database technology included in the installation package.
         6. General Properties:

Camera Search and Discovery:

Capable of searching network for connected compatible cameras via Onvif Profile S or Hanwha Techwin's native driver.

Cameras are Searched or Discovered:

Camera automatically registered and current camera information (fps, days of recording) displayed.

Able to selectively register as many as cameras can be found.

Support WiseStream, Wisestream II and Dynamic GOV, a smart codec used by WiseNet IP cameras.

Support dual monitor out.

Support server backup if multiple servers are in the hive for failover for redundancy.

Recording and Playback Functions:

Support recording 128 dual streams (256 streams) from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

470 Mbps network camera recording throughput.

Simultaneous playback capability up to 128 video channels.

Compression Support: CoH.265, H.264, and MJPEG.

NVR able to record and stream AAC, PCM, g726, and MPS audio.

View status of internal connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor input detection.

Camera event, analytics based in Wisenet Cameras.

Motion Detection.

Video loss detection.

Available recording settings by channel for standard and event-based recording types:

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity:

Stop recording.

Overwrite.

Search recorded data by time, event trigger, motion alarms, events.

Storage: Four, 8 TB HDDs in JBOD configuration; maximum of 32 TB.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Remote monitoring using Wisenet WAVE supplied viewer.

Streams: H.265, H.264, MJPEG.

Offline Media: AVI, MKV, MP4, MOV, TS, M2TS, MPEG, MPG, FLV, WMV, 3GP, JPG, PNG, GIF, BMP, and TIFF.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Multicast or Unicast: Simultaneous access is unlimited.

Mobile Device:

Supported Platforms:

Android.

IOS.

Supported Remote Users:

Unlimited amount either live or playback.

Dynamic DNS (DDNS) support.

VGA and High Definition (HDMI) local monitor outputs live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections: None on server.

Use of I/O software module to support I/O control.

* + - * 1. System:

Processor: Intel Core in-7500 3.4 GHz.

Memory: 8 GB DDR4.

Operating Systems: Windows 10 IoT Enterprise.

USB Ports: 4x USB 3.0(rear), 1x USB 3.0 Type-C (rear), 2x USB 2.0(front).

Video Output: 2x HDMI (rear), 1x DVI (rear).

Wi-Fi: IEEE 802.11ac.

Other Ports: 1x PS2, 2x Wi-Fi Antennas, 3.5 mm audio in/out, 1x SPDIF out.

Keyboard and Mouse: Included.

RAID Support: None.

* + - * 1. Video Compression: H.265, H.264, and MJPEG
        2. Recording:

Channel Capability: No limit but recommended to use Wisenet WAVE Calculator for maximum.

Bit Rate: 470 Mbps.

Resolution range: 352 x 288 to 4000 X 3000

* + - * 1. Events and Response Actions:

Triggers:

Motion.

Video loss.

Event defined by camera.

Response Actions:

Record.

E-mail.

Activate PTZ preset.

Event trigger program.

Sound output.

* + - * 1. Playback:

Number of simultaneous channels: Not limited.

Bandwidth: 470 Mbps.

* + - * 1. OS Drive: OS Drive Bays1 - 256 GB SSD internally mounted.
        2. Storage:

Internal:

Number of HDDs bays: 1 to 4 Bays.

Capacity: 1 to 8 TB per HDD.

External Types: USB HDD/Flash drive for backup of video clips, firmware update, settings backup/restore, log export.

* + - * 1. Network:

Connectivity: 1000 Base-T Ethernet, 2 x RJ-45 connectors.

Protocols Supported:

Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP).

Configuration: Dynamic Host Configuration Protocol (DHCP).

Web Services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS).

Network Services: Address Resolution Protocol (ARP), Domain Name System (DNS), Internet Control Message Protocol (ICMP), Network Time Protocol (NTP), Simple Network Management Protocol (SNMP v1/2c/3 - MIB-2), Universal Plug and Play (UPnP).

Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP).

Multicast: Internet Group Management Protocol (IGMP).

Notifications: Simple Mail Transfer Protocol (SMTP).

Remote Access: Point-to-Point Protocol over Ethernet (PPPoE).

DDNS: Support DDNS services offered by the Manufacturer and other publicly available service offerings.

Security Features:

User password protection with group restrictions.

IP address filtering; list of allowed or blocked IP addresses.

HTTPS(SSL) login authentication.

User access log.

802.1x authentication.

Restriction of network access/web viewer access.

Discovery: Manufacturer to offer a discovery program to identify all devices of his manufacture on network, as well as ONVIF Profile S conformant devices.

* + - * 1. Alarm/Sensor Interface:

Input (0): NO or NC, selectable.

Output (0): NO or NC, selectable.

Use of I/O software module to support I/O control.

* + - * 1. Audio:

Direction: Bi-directional.

Compression: AAC (16/48 KHz), G.711 u-law, G.726 selectable.

Output: Line level (RCA).

* + - * 1. Electrical:

Power: 100 to 240 VAC.

Power Supply: 250 W.

* + - * 1. Mechanical And Environmental:

Color: Black, silver / metal.

Front panel with lock.

Form Factor Mini-Tower.

Mouse and Keyboard: Included.

Dimensions (W x H x D): 7.87 x 10.63 x 12.2 inch (200 x 270 x 310 mm)

Weight: 15.4 lbs. (7 kg).

Temperature; Operating and Storage: 32 to 122 degrees F (0 to 50 degrees C).

Humidity: 5 to 85 percent, RH non-condensing.

\*\* NOTE TO SPECIFIER \*\* Delete rackmount servers if not required.

* + 1. Rackmount Servers:

\*\* NOTE TO SPECIFIER \*\* Delete rackmount server model option not required.

* + - 1. Wisenet WAVE WRR-5301 Network Video Recorder ("NVR"):
         1. Record Video and Audio: 470 Mbps.
         2. Send data from video cameras to a hard disk array of 1 to 8 HDDs within a rack mountable format and enable playback of video and audio from the hard disk array.

Pre-configured with Wisenet WAVE VMS.

Preloaded with four professional licenses ensuring quick and easy development minimizing setup time.

Remote monitoring environment for video and audio over network using a remote computer.

SQLite, a free database technology included in the installation package.

* + - * 1. General Properties:

Camera Search and Discovery: Search network for connected compatible cameras via Onvif Profile S or Hanwha Techwin's native driver.

Cameras are Searched or Discovered:

Cameras automatically registered and current camera information (fps, days of recording) displayed.

Ability to selectively register as many as cameras can be found.

Support WiseStream, Wisestream II and Dynamic GOV, a smart codec used by WiseNet IP cameras.

Support dual monitor out.

Support server backup if multiple servers are in the hive for failover for redundancy.

Recording and Playback Functions:

Support recording 128 dual streams (256 streams) from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

470 Mbps network camera recording throughput.

Simultaneous Playback Capability: 128 video channels.

Compression Support: H.265, H.264, and MJPEG.

NVR to record and stream AAC, PCM, g726, and MPS audio.

View status of internal connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor (input) detection.

Camera event, analytics based in Wisenet Cameras.

Motion Detection.

Video loss detection.

Available recording settings by channel for standard and event-based recording types:

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity:

Stop recording.

Overwrite.

Search recorded data by time, event trigger, motion alarms, events.

Storage: Four, 8 TB HDDs in JBOD configuration for a maximum of 32 TB.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Remote monitoring using Wisenet WAVE supplied viewer.

Streams: H.265, H.264, MJPEG.

Offline Media: AVI, MKV, MP4, MOV, TS, M2TS, MPEG, MPG, FLV, WMV, 3GP, JPG, PNG, GIF, BMP, and TIFF.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Multicast or Unicast: Simultaneous access is unlimited.

Mobile Device:

Supported Platforms:

Android.

IOS.

Supported Remote Users: Unlimited amount either live or playback.

Dynamic DNS (DDNS) support.

VGA and High Definition (HDMI) local monitor outputs live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections: None on server. Use of I/O software module to support I/O control.

* + - * 1. System:

Processor: Intel Core i5-7500 3.4 GHz.

Memory: 8 GB DDR4.

Operating Systems: Windows 10 IoT Enterprise.

USB Ports: 4x USB 3.0(rear), 1x USB 3.0 Type-C (rear), 2x USB 2.0(front).

Video Output: 2x HDMI (rear), 1x DVI (rear).

Wi-Fi: IEEE 802.11ac.

Other Ports: 1x PS2, 2x Wi-Fi Antennas, 3.5 mm audio in/out, 1x SPDIF out.

Keyboard and Mouse: Included.

* + - * 1. RAID Support: None.
        2. Video Compression: H.265, H.264, and MJPEG.
        3. Recording:

Channel Capability: No limit but recommended to use Wisenet WAVE Calculator.

Bit Rate: 470 Mbps.

Resolution Range: 352 x 288 to 4000 X 3000.

* + - * 1. Events and Response Actions:

Triggers:

Motion.

Video loss.

Event defined by camera.

Response Actions:

Record.

E-mail.

Activate PTZ preset.

Event Trigger program.

Sound output.

* + - * 1. Playback:

Number of simultaneous channels: Not limited.

Bandwidth: 470 Mbps.

* + - * 1. OS Drive: OS Drive Bays: 1, 256 GB SSD internally mounted.
        2. Storage:

Internal:

Number of HDDs Bays: 1 to 8 Bays.

Capacity: 1 to 8 TB per HDD.

External Types: USB HDD/Flash drive for backup of video clips, firmware update, settings backup/restore, log export.

* + - * 1. Network:

Connectivity: 1000 Base-T Ethernet, 2 x RJ-45 connectors.

Protocols Supported:

Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP).

Configuration: Dynamic Host Configuration Protocol (DHCP).

Web Services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS).

Network Services: Address Resolution Protocol (ARP), Domain Name System (DNS), Internet Control Message Protocol (ICMP): Network Time Protocol (NTP), Simple Network Management Protocol (SNMP v1/2c/3 - MIB-2), Universal Plug and Play (UPnP).

Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP).

Multicast: Internet Group Management Protocol (IGMP).

Notifications: Simple Mail Transfer Protocol (SMTP).

Remote Access: Point-to-Point Protocol over Ethernet (PPPoE).

DDNS: Support DDNS services offered by the Manufacturer and other publicly available service offerings.

Security Features:

User password protection with group restrictions.

IP address filtering, list of allowed or blocked IP addresses.

HTTPS(SSL) login authentication.

User access log.

802.1x authentication.

Restriction of network access/web viewer access.

Discovery: Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network, as well as ONVIF Profile S conformant devices.

* + - * 1. Alarm/Sensor Interface:

Input (0): NO or NC, selectable.

Output (0): NO or NC, selectable.

Use of I/O software module to support I/O control.

* + - * 1. Audio:

Direction: Bi-directional.

Compression: AAC (16/48 KHz), G.711 u-law, G.726 selectable.

Output: Line level (RCA).

Output: Line level (RCA).

* + - * 1. Electrical:

Power:100 to 240 VAC.

Power Supply: 800 W Redundant.

* + - * 1. Mechanical and Environmental:

Color: Black / metal.

Front Bezel and lock.

Form Factor 2U Rack Mount Chassis. Sliding rails included.

Mouse and Keyboard: Included.

Dimensions (W x H x D): 17.2 x 3.5 x 26 inch (438 x 87.0 x 660 mm).

Weight: 30.86 lbs. (14 kg).

Temperature; Operating and Storage: 32 to 122 degrees F (0 to 50 degrees C).

Humidity: 5 to 85 percent, RH non-condensing.

* + - 1. Wisenet Wave WRR-5501 Network Video Recorder ("NVR"):
         1. Record Video and Audio: 470 Mbps
         2. Send data from video cameras to a hard disk array of 1 t 12 HDDs within a rack mountable format and enable playback of video and audio from the hard disk array.

Pre-configured with Wisenet WAVE VMS.

Preloaded with four professional licenses ensuring quick and easy development minimizing setup time.

Remote monitoring environment for video and audio over network using a remote computer.

SQLite, a free database technology included in the installation package.

* + - * 1. General Properties:

Camera Search and Discovery: Search network for connected compatible cameras via Onvif Profile S or Hanwha Techwin's native driver.

Cameras are Searched or Discovered:

Cameras automatically registered and current camera information (fps, days of recording) displayed.

Ability to selectively register as many as cameras can be found.

Support WiseStream, Wisestream II and Dynamic GOV, a smart codec used by WiseNet IP cameras.

Support dual monitor out.

Support server backup if multiple servers are in the hive for failover for redundancy.

Recording and Playback Functions:

Support recording 128 dual streams (256 streams) from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

470 Mbps network camera recording throughput.

Simultaneous Playback Capability: 128 video channels.

Compression Support: H.265, H.264, and MJPEG.

NVR to record and stream AAC, PCM, g726, and MPS audio.

View status of internal connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor (input) detection.

Camera event, analytics based in Wisenet Cameras.

Motion Detection.

Video loss detection.

Available recording settings by channel for standard and event-based recording types:

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity:

Stop recording.

Overwrite.

Search recorded data by time, event trigger, motion alarms, events.

Storage:

Twelve, 8 TB HDDs in JBOD configuration for a maximum of 96 TB.

RAID Support: RAID 0/1/5/6/10/50/60 plus BBU (backup battery unit).

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Remote monitoring using Wisenet WAVE supplied viewer.

Streams: H.265, H.264, MJPEG.

Offline Media: AVI, MKV, MP4, MOV, TS, M2TS, MPEG, MPG, FLV, WMV, 3GP, JPG, PNG, GIF, BMP, and TIFF.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Multicast or Unicast: Simultaneous access is unlimited.

Mobile Device:

Supported Platforms:

Android.

IOS.

Supported Remote Users: Unlimited amount either live or playback.

Dynamic DNS (DDNS) support.

VGA and High Definition (HDMI) local monitor outputs live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections: None on server. Use of I/O software module to support I/O control.

* + - * 1. System:

Processor: Intel Core i5-7500 3.4 GHz.

Memory: 8 GB DDR4

Operating Systems: Windows 10 IoT Enterprise.

USB Ports: 6x USB 3.0 (rear), 2x USB 3.0 (front).

Video Output: 1x Display Port (rear), 1x HDMI (rear), 1x DVI (rear).

Other ports: 3.5 mm audio in/out, 1x SPDIF out.

Keyboard and Mouse: Included.

Sliding Rail Kit: Included.

* + - * 1. Video Compression: H.265, H.264, MJPEG.
        2. Recording:

Channel Capability: No limit but recommended to use Wisenet WAVE Calculator.

Bit Rate: 470 Mbps.

Resolution Range: 352 x 288 to 4000 X 3000.

* + - * 1. Events and Response Actions:

Triggers:

Motion.

Video loss.

Event defined by camera.

Response Actions:

Record.

E-mail.

Activate PTZ preset.

Event Trigger program.

Sound output.

* + - * 1. Playback:

Number of simultaneous channels: Not limited.

Bandwidth: 470 Mbps.

* + - * 1. OS Drive: OS Drive Bays: 1 to 256 GB SSD internally mounted.
        2. Storage:

Internal:

Number of HDDs Bays: 1 to 12 Bays.

Capacity per HDD: 1 to 8 TB.

RAID 0/1/5/6/10/50/60 plus BBU (backup battery unit).

External Types: USB HDD/Flash drive for backup of video clips, firmware update, settings backup/restore, log export.

* + - * 1. Network:

Connectivity: 1000 Base-T Ethernet, 2 x RJ-45 connectors.

Protocols Supported:

Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP).

Configuration: Dynamic Host Configuration Protocol (DHCP).

Web Services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS).

Network Services: Address Resolution Protocol (ARP), Domain Name System (DNS), Internet Control Message Protocol (ICMP): Network Time Protocol (NTP), Simple Network Management Protocol (SNMP v1/2c/3 - MIB-2), Universal Plug and Play (UPnP).

Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP).

Multicast: Internet Group Management Protocol (IGMP).

Notifications: Simple Mail Transfer Protocol (SMTP).

Remote Access: Point-to-Point Protocol over Ethernet (PPPoE).

DDNS: Support DDNS services offered by the Manufacturer and other publicly available service offerings.

Security Features:

User password protection with group restrictions.

IP address filtering, list of allowed or blocked IP addresses.

HTTPS(SSL) login authentication.

User access log.

802.1x authentication.

Restriction of network access/web viewer access.

Discovery: Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network, as well as ONVIF Profile S conformant devices.

* + - * 1. Alarm/Sensor Interface:

Input (0): NO or NC, selectable.

Output (0): NO or NC, selectable.

Use of I/O software module to support I/O control.

* + - * 1. Audio:

Direction: Bi-directional.

Compression: AAC (16/48 KHz), G.711 u-law, G.726 selectable.

Output: Line level (RCA).

Output: Line level (RCA).

* + - * 1. Electrical:

Power:100 to 240 VAC.

Power Supply: 800 W Redundant.

* + - * 1. Mechanical and Environmental:

Color: Black / metal.

Front Bezel and lock.

Form Factor 2U Rack Mount Chassis. Sliding rails included.

Mouse and Keyboard: Included.

Dimensions (W x H x D): 17.2 x 3.5 x 26 inch (438 x 87.0 x 660 mm).

Weight: 30.86 lbs. (14 kg).

Temperature; Operating and Storage: 32 to 122 degrees F (0 to 50 degrees C).

Humidity: 5 to 85 percent, RH non-condensing.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. CLIENT WORKSTATIONS
     1. Wisenet WAVE WWT-5301 Client Workstation.
        1. Record video and audio up to 170 Mbps.
        2. Send data from video cameras to a hard disk array of 1 to 4 HDDs within a Mini Tower format. Enable playback of video and audio from the hard disk array.
        3. Pre-configured with Wisenet WAVE VMS ensuring quick and easy development with minimum setup time.
        4. Remote monitoring environment for video and audio over the network.
        5. SQLite, a free database technology included in the installation package.
        6. General Properties:
           1. Camera search and Discovery:

Capable of searching network of Wisenet Network Video Recorders for connected cameras.

Cameras are Searched or Discovered:

Camera will be automatically viewed and current camera information (fps, days of recording) displayed.

* + - * 1. Support WiseStream, Wisestream II and Dynamic GOV, a smart codec used by WiseNet IP cameras.
        2. Support dual monitor out.
        3. Recording and Playback Functions:

Simultaneous playback capability up to 128 video channels of resolutions of (4 cif to 12 MPS).

Compression Support: CoH.265, H.264, and MJPEG.

View AAC, PCM, g726, and MPS audio.

View status of internal connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor (input) detection.

Camera event, analytics based in Wisenet Cameras.

Motion detection.

Video loss detection.

Available recording settings that can be set up or changed by channel for standard and event-based recording types:

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Search recorded data by time, event trigger, motion alarms, events

* + - * 1. Storage: Four, 8 TB HDDs for a maximum of 32 TB.

USB connection for export device for video clip backup and settings export.

* + - * 1. Live View:

Remote monitoring using Wisenet WAVE supplied viewer.

Streams: H.265, H.264, MJPEG.

Offline Media: AVI, MKV, MP4, MOV, TS, M2TS, MPEG, MPG, FLV, WMV, 3GP, JPG, PNG, GIF, BMP, and TIFF.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

* + - * 1. Two High Definition (HDMI) local monitor outputs live viewing, playback, and backup functions.
        2. ONVIF Profile S compliance.
        3. Alarm Connections: None on workstation.
      1. System:
         1. Processor: Intel Core i5-7500 3.4 GHz.
         2. Memory: 8 GB DDR4.
         3. Operating Systems: Windows 10 IoT Enterprise.
         4. USB Ports: 4x USB 3.0(rear), 1x USB 3.0 Type-C (rear), 2x USB 2.0(front).
         5. Video Output: 2x HDMI (rear), 1x DVI (rear).
         6. Wi-Fi: IEEE 802.11ac.
         7. Other Ports: 1x PS2, 2x Wi-Fi Antennas, 3.5 mm audio in/out, 1x SPDIF out.
         8. Keyboard and Mouse: Included.
         9. RAID Support: None.
      2. Video Compression: H.265, H.264, and MJPEG.
      3. Events and Response Actions:
         1. Triggers:

Motion.

Video loss.

Event defined by camera.

* + - * 1. Response Actions:

Record.

E-mail.

Activate PTZ preset.

Event trigger program.

Sound output.

* + - 1. Playback:
         1. Number of simultaneous channels: Not limited.
      2. OS Drive: OS Drive Bays. 1 to 256 GB SSD internally mounted.
      3. Storage:
         1. Internal:

Number of HDDs Bays: 1 to 4 Bays.

Capacity : 1 to 8 TB per HDD.

* + - * 1. External Types: USB HDD/Flash drive for backup of video clips, firmware update, settings backup/restore, log export.
      1. Network:
         1. Connectivity: 1000 Base-T Ethernet, 2 x RJ-45 connectors.
         2. Protocols Supported:

Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP).

Configuration: Dynamic Host Configuration Protocol (DHCP).

Web Services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS).

Network Services: Address Resolution Protocol (ARP), Domain Name System (DNS), Internet Control Message Protocol (ICMP), Network Time Protocol (NTP), Simple Network Management Protocol (SNMP v1/2c/3 - MIB-2), Universal Plug and Play (UPnP).

Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP).

Multicast: Internet Group Management Protocol (IGMP).

Notifications: Simple Mail Transfer Protocol (SMTP).

Remote Access: Point-to-Point Protocol over Ethernet (PPPoE).

* + - * 1. DDNS: Support DDNS services offered by the Manufacturer and other publicly available service offerings.
        2. Security Features:

User password protection with group restrictions.

IP address filtering - list of allowed or blocked IP addresses.

HTTPS(SSL) login authentication.

User access log.

802.1x authentication.

Restriction of all network access/web viewer access.

* + - * 1. Discovery: Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network, as well as ONVIF Profile S conformant devices.
      1. Alarm/Sensor Interface:
         1. Input (0): NO or NC, selectable.
         2. Output (0): NO or NC, selectable.
      2. Audio:
         1. Direction: Bi-directional.
         2. Compression: AAC (16/48 KHz), G.711 u-law, G.726 selectable.
         3. Output: Line level (RCA).
      3. Electrical:
         1. Power: 100 to 240 VAC.
         2. Power Supply: 250 W.
      4. Mechanical And Environmental:
         1. Color: Black, Silver / metal.
         2. Front panel with lock.
         3. Form Factor Mini-Tower.
         4. Mouse and Keyboard: Included.
         5. Dimensions (W x H x D): 7.87 x 10.63 x 12.2 inch (200 x 270 x 310 mm).
         6. Weight: 15.4 lbs (7 kg).
         7. Temperature; Operating and Storage: 32 to 122 degrees F (0 to 50 degrees C).
         8. Humidity: 5 to 85 percent, RH non-condensing.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. IP SECURITY CAMERAS

\*\* NOTE TO SPECIFIER \*\* Delete IP Cameras not required for project.

* + 1. Wisenet X Series 5 MP Fisheyes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: XNF 8010RVM as manufactured by Hanwha Techwin America.
      2. Model: XNF-8010RV as manufactured by Hanwha Techwin America.
      3. Model: XNF-8010R as manufactured by Hanwha Techwin America.
      4. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 15 fps

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections in four view modes.

Original View: 2048 x 2048, 1280 x 1280, 1080 x 1080, 960 x 960, 768 x 768, 720 x 720, 640 x 640, and 480 x 480.

Single Panorama: 2048 x 512, 1920 x 480, 1280 x 320, 640 x 160, and 704 x 176.

Double Panorama: 2048 x 1024, 1920 x 960, 1280 x 640, 640 x 320, and 704 x 352.

Quad View: 2048 x 1536, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 704 x 576.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps. Efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface: Stream video to a smart phone for installation purposes. Smart phone application to be available in iOS and Android free of charge with search keyword, ' Wisenet Installation.'

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
        2. Day and Night Operation:

Automated, manual, scheduled, or externally triggered with infrared cut filter.

Images available in color or black and white.

Low Light Level Operation: Color Mode: 0.1 lux (F1.6). Black and White Mode: 0 (IR LED on).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 32 Configurable regions utilizing a polygon.
        3. Defog Feature: Remove fogginess of scene. Triggered automatically from fog detection event.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection:

Eight definable detection areas with eight point polygonal zones, minimum and maximum object size.

Hand-Over to PTZ Cameras. Calls a preset of PTZ camera when motion event is triggered.

* + - * 1. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Virtual line.

Enter/Exit.

(Dis)Appear.

Audio detection.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - * 1. Business Intelligence:

People Counting.

Heatmap.

Queue Management.

* + - 1. Interoperability: ONVIF Profile S and G compliant. Allow users to install third party applications from manufacturer's partners through Open Platform. List of available applications and partners to be available from manufacturer's homepage.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for both iOS and Android, free of charge with search keyword, ' Wisenet Mobile.'
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video and audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD / SDHC / SDXC) or NAS.

External output.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 5 MP Indoor Domes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: XND-8080RV as manufactured by Hanwha Techwin America.
      2. Model: XND-8040R as manufactured by Hanwha Techwin America.
      3. Model: XND-8030R as manufactured by Hanwha Techwin America.
      4. Model: XND-8020R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 30 fps

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio of 16:9: 2560 x 1440, 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360.

Aspect Ratio of 4:3: 2560 x 1920, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Impact Protection: IK08 rated.
         2. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.07 lux at F1.3 for XND-8080RV.

Color Mode: 0.16 lux at F1.6 for XND-8040R, XND-8030R, XND-8020R.

Black and White Mode: 0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR Illumination: Effective visibility of 98.43 ft (30 m) at 0 Lux when activated in Black and White mode.
        3. Configurable privacy masking regions utilizing a 4 point polygon
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus via a direct USB connection and/or Wi-Fi dongle for model XND-8080RV.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot

Explosion

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 5 MP Indoor Dome Flush Mount:
       1. Model: XND-8020F as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 30 fps

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

2560 x 1920, 2560 x 1440, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps) to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi Interface: Stream video to smart phones for installation purposes. Smart phone application available in iOS and Android for free of charge with search keyword, ' Wisenet Installation'.
         2. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
         3. Electrical day/night operation with scheduling and options for external devices.

Low light level operation to 0.16 lux at F1.6 (1/30 sec) in color mode and black and white mode.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 32 Configurable regions utilizing a polygon.
        3. Cabling: RJ45 to reduce installation effort.

Audio Input: Built-in MIC and alarms received and sent through Ethernet cable.

Power: Supplied by PoE and CVBS often required for installers to be replaced by aforementioned Wi-Fi interface.

* + - * 1. Magnetic Dome Cover: Easy physical installation requiring no screw on camera body except temper screw, available optionally.
        2. Design: Compact with minimum exposure of camera body and minimum effect on design of surroundings. Dome cover is the only part of whole camera body exposed.

\*\* NOTE TO SPECIFIER \*\* custom colors are available. Contact manufacturer for more detailed information. Delete color options not required.

Color: Ivory

Color: Black

Color: White

Color: \_\_\_\_\_\_\_\_.

* + - 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection:

Eight definable detection areas with eight point polygonal zones, minimum and maximum object size.

Hand-Over to PTZ Cameras. Calls a preset of PTZ camera when motion event is triggered.

* + - * 1. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit.

(Dis)Appear.

Face detection.

Motion detection.

Digital auto tracking.

Heat map.

People counting.

Queue management.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream

Gunshot

Explosion

Crashing glass

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for both iOS and Android, free of charge with search keyword, ' Wisenet Mobile.'
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Alarms and Notifications:

Alarm Notification Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available notification means upon trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 5 MP Outdoor Domes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: XNV-8080R as manufactured by Hanwha Techwin America.
      2. Model: XNV-8040R as manufactured by Hanwha Techwin America.
      3. Model: XND-8030R as manufactured by Hanwha Techwin America.
      4. Model: XND-8020R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 30 fps

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio of 16:9: 2560 x 1440, 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360.

Aspect Ratio of 4:3: 2560 x 1920, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Protection: IK10 rated.
         3. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.07 lux at F1.3 for XNV-8080R.

Color Mode: 0.16 lux at F1.6 for XNV-8030R.

Black and White Mode: 0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR Illumination: Effective visibility at 0 Lux when activated in black and white mode.

XNV-8080R: 164.04 ft (50 m).

XNV-8020R and XNV-8030R: 98.43 ft (30 m).

* + - * 1. Configurable privacy masking regions utilizing a 4 point polygon
        2. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus via a direct USB connection and/or Wi-Fi dongle for XNV-8080R.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 5 MP Outdoor Dome Stainless Steel:
       1. Model: XNV-8080RS as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 30 fps

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

MJPEG: 30 fps is available

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio of 16:9: 2560 x 1440, 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360.

Aspect Ratio of 4:3: 2560 x 1920, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Protection: IK10 rated.
         3. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.07 lux at F1.3

Black and White Mode: 0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR Illumination: Effective visibility at 0 Lux when activated in black and white mode; 164.04 ft (50 m).
        3. Configurable privacy masking regions utilizing a 4 point polygon
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 5 MP Bullets:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: XNO-8080R as manufactured by Hanwha Techwin America.
      2. Model: XNO-8040R as manufactured by Hanwha Techwin America.
      3. Model: XNO-8030R as manufactured by Hanwha Techwin America.
      4. Model: XNO-8020R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 30 fps

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

MJPEG: 30 fps is available

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio of 16:9: 2560 x 1440, 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360.

Aspect Ratio of 4:3: 2560 x 1920, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Protection: IK10 rated.
         3. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation

Color Mode: 0.07 lux at F1.2 for XNO-8080R

Color Mode: 0.16 lux at F1.6 for XNO-8040R, XNO-8030R, XNO-8020R

Black and White Mode: 0 lux with IR LED on

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination: Effective visibility.

Black and White Mode: 164.04 ft (50 m) at 0 Lux for XNO-8080R

Black and White Mode: 98.43 ft (30 m) at 0 Lux for XNO-8040R, XNO-8030R, XNO-8020R.

* + - * 1. Configurable privacy masking regions utilizing a 4 point polygon
        2. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 5 MP Box:
       1. Model: XNB-8000 as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions

MJPEG: Maximum of 30 fps

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

MJPEG: 30 fps is available

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio of 16:9: 2560 x 1440, 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360.

Aspect Ratio of 4:3: 2560 x 1920, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation

Color Mode: 0.07 lux at F1.2

Black and White Mode: 0.007 lux

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable privacy masking regions utilizing a 4 point polygon
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus via a direct USB connection and/or Wi-Fi dongle.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP PTZ 37X Zoom with IR:
       1. Model: XNP-6370RH as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 15 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Simultaneous unicast access by up to 15 users.

Multicast and unicast capable.

* + - * 1. Dynamic DNS (DDNS) support.
        2. Smart Codec, Dynamic GOV and Dynamic fps to efficiently manage bitrate of the video stream.
        3. Wi-Fi dongle is required for Wi-Fi connection.
      1. Camera Physical and Performance Properties:
         1. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.05 lux.

Black and White Mode: 0 lux.

* + - * 1. Integral IR illumination: Effective visibility of 1148.29 ft (350 m).
        2. Digital Noise Reduction: 2D and 3D technology.
        3. Privacy Masking Regions: 16 regions utilizing a polygon with 6 different colorings as listed below.

Grey, green, red, blue, black, and white.

Zoom ratio option for mask mode

* + - * 1. True WDR: 120 dB.
        2. Hallway view with rotatable lens.
        3. Wi-Fi interface: Stream video to a smart phone for installation purposes. Smart phone application to be available in iOS and Android free of charge with search keyword, ' Wisenet Installation'.
        4. Built-in gyro sensor to enhance DIS (Digital Image Stabilization). Greatly reduces false alarm triggered by change in a scene rather than movement of camera itself.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Crossing.

Enter and exit.

Appear/disappear.

Audio detection.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Intelligent video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Preset.

* + - * 1. Pixel Counter available in the plug-in web viewer.
    1. Wisenet X Series 2 MP PTZ 32x Zoom:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XNP-6320H as manufactured by Hanwha Techwin America.
      2. Model: XNP-6320 as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streaming: Three independent video types using unicast protocol.

Multicast and unicast capable.

* + - * 1. Dynamic DNS (DDNS) at no additional cost by the manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to camera without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi Interface: Stream video to a smart phone for installation purposes. Smart phone application to be available in iOS and Android for free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 150 dB.
        2. Enhanced Digital Image Stabilization (DIS) with built-in gyro sensor. The gyro sensor greatly reduces false alarm triggered by scene changes.
        3. Automated, manual, scheduled, or externally triggered day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.05 lux (F1.6).

Black and White Mode: 0.005 lux (F1.6).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 24 configurable regions utilizing a rectangle.
        3. Defog Feature: Removes fogginess of scene.
        4. Azimuth Feature: Display compass points on screen. The available points are east, west, south, north, northeast, southeast, northwest, and southwest.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Tampering.

Loitering.

Directional detection

Fog detection.

Virtual line.

Enter and exit.

Appear(Disappear).

Audio detection.

Face detection.

Motion detection.

Sound classification.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
         1. Allow users to install third party applications from manufacturer's partners through open platform. List of available applications and partners to be available from the manufacturer's homepage.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals
         5. Alarms and notifications

Triggers:

Alarm input.

Motion detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File Upload via FTP and e-mail

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

PTZ presets.

* + - * 1. Pixel Counter available in the web viewer.
    1. Wisenet X Series 2 MP PTZ 32X Zoom Stainless Steel:
       1. Model: XNP-6320HS as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streaming: Three independent video types using unicast protocol.

Multicast and unicast capable.

* + - * 1. Dynamic DNS (DDNS) at no additional cost by the manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to camera without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi Interface: Stream video to a smart phone for installation purposes. Smart phone application to be available in iOS and Android for free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 150 dB.
        2. Enhanced Digital Image Stabilization (DIS) with built-in gyro sensor. The gyro sensor greatly reduces false alarm triggered by scene changes.
        3. Automated, manual, scheduled, or externally triggered day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.05 lux (F1.6).

Black and White Mode: 0.005 lux (F1.6).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 24 configurable regions utilizing a rectangle.
        3. Defog Feature: Removes fogginess of scene.
        4. Azimuth Feature: Display compass points on screen. The available points are east, west, south, north, northeast, southeast, northwest, and southwest.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Tampering.

Loitering.

Directional detection

Fog detection.

Virtual line.

Enter and exit.

Appear(Disappear).

Audio detection.

Face detection.

Motion detection.

Sound classification.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
         1. Allow users to install third party applications from manufacturer's partners through open platform. List of available applications and partners to be available from the manufacturer's homepage.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals
         5. Alarms and notifications

Triggers:

Alarm input.

Motion detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File Upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

PTZ presets.

* + - * 1. Pixel Counter available in the web viewer.
    1. Wisenet X Series 2 MP PTZ 12X Zoom Outdoor:
       1. Model: XNP-6120H as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streaming: Three independent video types using unicast protocol.

Multicast and unicast capable.

* + - * 1. Dynamic DNS (DDNS) at no additional cost by the manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to camera without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi Interface: Stream video to a smart phone for installation purposes. Smart phone application to be available in iOS and Android for free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 150 dB.
        2. Enhanced Digital Image Stabilization (DIS) with built-in gyro sensor. The gyro sensor greatly reduces false alarm triggered by scene changes.
        3. Automated, manual, scheduled, or externally triggered day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.05 lux (F1.6).

Black and White Mode: 0.005 lux (F1.6).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 24 configurable regions utilizing a rectangle.
        3. Defog Feature: Removes fogginess of scene.
        4. Azimuth Feature: Display compass points on screen. The available points are east, west, south, north, northeast, southeast, northwest, and southwest.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Tampering.

Loitering.

Directional detection

Fog detection.

Virtual line.

Enter and exit.

Appear(Disappear).

Audio detection.

Face detection.

Motion detection.

Sound classification.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
         1. Allow users to install third party applications from manufacturer's partners through open platform. List of available applications and partners to be available from the manufacturer's homepage.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals
         5. Alarms and notifications

Triggers:

Alarm input.

Motion detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File Upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

PTZ presets.

* + - * 1. Pixel Counter available in the web viewer.
    1. Wisenet X Series 2 MP PTZ 4X Zoom Outdoor:
       1. Model: XNP-6040H as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streaming: Three independent video types using unicast protocol.

Multicast and unicast capable.

* + - * 1. Dynamic DNS (DDNS) at no additional cost by the manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to camera without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi Interface: Stream video to a smart phone for installation purposes. Smart phone application to be available in iOS and Android for free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range. Stream video with 2 MP resolution at 30 fps while producing 150 dB WDR.
        2. Enhanced Digital Image Stabilization (DIS) with built-in gyro sensor. The gyro sensor greatly reduces false alarm triggered by scene changes.
        3. Dustproof, waterproof, and IP66 rated.
        4. Impact Rating: IK10.
        5. True day/night operation with scheduling and options for external devices.

Low Light Level Operation:

Color Mode: 0.015 lux (F1.4, 1/30 sec)

Black and White Mode: 0.0015 (F1.4, 1/30 sec) .

* + - * 1. Optical Zoom: 4.3x. Focal length ranges from 2.8 to 12 mm. Focus control available via remote control with the following options.

Auto, manual, and one-push.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 24 configurable regions utilizing a polygon.
        3. Defog Feature: Removes fogginess of scene.
        4. Graphical interface to users to allow PTZ control with mouse on the scene. Store five locations from mouse control.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. Camera to be able to call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video and Audio Input:

Tampering.

Loitering.

Directional detection

Fog detection.

Virtual line.

Enter and exit.

Appear(Disappear).

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals
         5. Alarms and notifications

Triggers:

Alarm input.

Audio detection.

Motion detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File Upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

Move to presets.

External output.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Indoor Domes without Analytics:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XND-L6080V as manufactured by Hanwha Techwin America.
      2. Model: XND-L6080RV as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio 16:9: 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360

Aspect Ratio 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof and waterproof.
         2. Impact Rating: IK08.
         3. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation

Color Mode: 0.3 lux XND-L6080V.

Black and White Mode: 0.3 lux XND-L6080RV.

Black and White Mode: 0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. XND-L6080RV: Integral IR illumination, providing effective visibility of 65.62 ft (20 m) at 0 Lux when activated in Black and White mode.
        3. Configurable a privacy masking regions utilizing a 32 point polygon.
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable including heater by PoE.
    1. Wisenet X Series 2 MP Indoor Domes with Analytics, Motorized Lens:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XND-6080V as manufactured by Hanwha Techwin America.
      2. Model: XND-6080RV as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 60 fps at all resolutions

MJPEG: Maximum of 30 fps

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448, 640 x 360

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Impact Rating: IK08
         2. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.015 lux at F1.4

Black and White Mode: 0 lux with IR LED on for XND-6080RV

Black and White Mode: 0.0015 lux for XND-6080V.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. XND-6080RV: Integral IR illumination, providing effective visibility of 98.4 ft (30 m) at 0 Lux when activated in Black and White mode.
        3. Configurable privacy masking regions utilizing a 4 point polygon
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus via a direct USB connection and/or Wi-Fi dongle.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Indoor Domes with Analytics, Fixed Lens:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XND-6020R as manufactured by Hanwha Techwin America.
      2. Model: XND-6010 as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 15 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: Able to configure various selections.

Aspect Ratio 16:9: 1920 x 1080, 1280 x 720, 800 x 448, and 640 x 360

Aspect Ratio 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of video stream.
      1. Camera Physical and Performance Properties:
         1. Impact Rating: IK08.
         2. True Day/Night Operation: Removable IR cut filter.

Low Light Level Operation

Color Mode: 0.055 lux at F2.0 for XND-6010.

Color Mode: 0.015 lux at F1.4 for XND-6020R.

Black and White mode: 0.0055 lux at F2.0.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable privacy masking regions utilizing a 4 point polygon.
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus using a direct USB connection and/or Wi-Fi dongle.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection.

Fog detection.

Motion detection with metadata.

Face detection.

Virtual Area Based Event:

Intrusion.

Enter or exit.

Appear or disappear.

Loitering.

Virtual Line Based Event:

Directional detection.

Crossing.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Tampering detection.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

External output.

Move to DPTZ preset.

* + - * 1. Pixel counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Indoor Domes Flush Mount:
       1. Model: XND-6011F as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available in iOS and Android free of charge with search keyword, ' Wisenet Installation'.
         2. Magnetic dome cover to provide easy physical installation requiring no screw on camera body except temper screw which is available optionally.

Only require cabling of RJ45 to reduce installation effort.

The need for cabling of audio input is removed by using a built-in MIC and alarms to be received and sent through Ethernet cable. Power to be supplied by PoE and CVBS which is often required for installers will be replaced by the aforementioned Wi-Fi interface.

* + - * 1. Compact design with minimum exposure of camera body and to have a minimum effect on design of surroundings. The color of dome cover which is only part of whole camera body that is exposed.

\*\* NOTE TO SPECIFIER \*\* Delete color options not required.

Color: Ivory.

Color: Black.

Color: White.

Color: \_\_\_\_\_\_\_\_.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
        2. Electrical day/night operation with scheduling and options for external devices.

Low light level operation to 0.055 lux at F2.0 (1/30 sec) in color mode and black and white mode.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 32 Configurable utilizing a polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

Sound classification.

People counting.

Heat map.

Queue management.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Outdoor Domes w/12X Zoom:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XNV-6120R as manufactured by Hanwha Techwin America.
      2. Model: XNV-6120 as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 20 independent stream types using unicast protocol.

Multicast or unicast capable.

* + - * 1. Dynamic DNS (DDNS) support.
        2. Smart Codec, Dynamic GOV and Dynamic FPS to efficiently manage bitrate of the video stream.
        3. Digital Zoom: 24x for XNV-6120.
      1. Camera Physical and Performance Properties:
         1. XNV-6120: Low Light Level Operation:

Color Mode: 0.03 lux.

Black and White Mode: 0.003 lux.

* + - * 1. XNV-6120R: True day/night operation with removable IR cut filter. Low Light Level Operation:

Color Mode: 0.03 lux.

Black and White Mode: 0 lux.

Integral IR Illumination: Effective visibility of 229.66 ft (70 m) for XNV-6120R.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: 32 utilizing a polygon with 6 different coloring as below.

Grey, green, red, blue, black, and white.

Mosaic.

* + - * 1. True WDR up to 150 dB
        2. Hallway view with rotatable lens.
        3. Built-in gyro sensor to enhance DIS (Digital Image Stabilization) greatly reducing false alarms triggered by change in a scene rather than the movement of camera itself.
        4. Wi-Fi interface which can stream video to a smart phone for installation purposes. Smart phone application shall be available in iOS and Android for free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Face detection.

Motion detection with link to other cameras.

Sound classification.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Intelligent audio and video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

NAS recording.

External output.

Preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Outdoor Domes W/12X Zoom Stainless Steel:
       1. Model: XNV-6120RS as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available in iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 150 dB.
        2. Built-in gyro sensor to enhance DIS (Digital Image Stabilization) greatly reducing false alarms triggered by change in a scene rather than the movement of camera itself.
        3. Lens distortion correction which corrects curviness caused by distortion at the edges of images.
        4. Automated, manual, scheduled, or externally triggered day and night operation with infrared cut filter. Images are available in color or black and white.

Color Mode: 0.03 lux (F1.6).

Black and White Mode: 0 lux (IR-LED on).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Privacy Masking Regions: Configurable 32 privacy masking regions utilizing a polygon.
        3. Hallway View Mode: Rotates images to 90 or 270 degrees so that the view is more suitable for hallways.
        4. Defog Feature: Remove fogginess of scene which can be triggered automatically from fog detection event.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Allow users to install third party applications from the manufacturer's partners through Open Platform. The list of available applications and partners will be available on the manufacturer's homepage.
      3. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for both iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Bi-directional audio.
         6. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

Presets.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable
    1. Wisenet X Series 2 MP Outdoor Domes w/Analytics Motorized Lens:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XNV-6080R as manufactured by Hanwha Techwin America.
      2. Model: XNV-6080 as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.015 lux at F1.4.

XNV-6080 in Black and White Mode: 0.0015 lux at F1.4.

XNV-6080R in Black and White Mode: 0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 64.04 ft (50 m) at 0 Lux when activated in black and white mode for XNV-6080R.
        3. Configurable privacy masking regions utilizing a 4 point polygon.
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus using a direct USB connection and/or Wi-Fi dongle.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection

Fog detection

Motion detection with metadata

Face detection

Virtual area based event (intrusion, enter/exit, appear/disappear, loitering)

Virtual line based event (directional detection, crossing)

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

tampering detection.

Alarm input.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE
    1. Wisenet X Series 2 MP Outdoor Domes without Analytics Motorized Lens:
       1. Model: XNV-L6080R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof and waterproof
         2. Impact Rating: IK08.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.03 lux.

Black and White Mode: 0 lux with IR-LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 98.43 ft (30 m) at 0 Lux when activated in black and white mode.
        3. Configurable privacy masking regions utilizing a 32 point polygon
        4. Provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Outdoor Domes without Analytics Motorized Lens:
       1. Model: XNV-L6080 as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof and waterproof
         2. Impact Rating: IK08.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.3 lux.

Black and White Mode: 0.03 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 98.43 ft (30 m) at 0 Lux when activated in black and white mode.
        3. Configurable privacy masking regions utilizing a 32 point polygon
        4. Provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Outdoor Domes W/Analytics Stainless Steel:
       1. Model: XNV-6080RS as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Rating: IK10-Plus.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.015 lux at F1.4.

Black and White Mode: 0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 164.04 ft (50 m) at 0 Lux when activated in black and white mode.
        3. Configurable privacy masking regions utilizing a 4 point polygon
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection

Fog detection

Motion detection with metadata

Face detection

Virtual area based event (intrusion, enter/exit, appear/disappear, loitering)

Virtual line based event (directional detection, crossing)

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including MS Internet Explorer, Firefox, Chrome and Safari.
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

Alarm input.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable
    1. Wisenet X Series:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: 2 MP Vandal-Resistance Network Dome Camera XNV-6085 as manufactured by Hanwha Techwin America.
      2. Model: 2 MP Bullet IR Network Camera XNO-6085R as manufactured by Hanwha Techwin America.
      3. Model: 2 MP Network Dome Camera XND-6085V as manufactured by Hanwha Techwin America.
      4. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available in iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Built-in gyro sensor to enhance DIS (Digital Image Stabilization) greatly reducing false alarms triggered by change in a scene rather than the movement of camera itself.
        2. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range. Stream video with 2 MP resolution at 30 fps while producing 150 dB WDR.
        3. Dustproof, waterproof and IP67 rated.
        4. NEMA 4X rated enclosures and protections again dusts, water, and formation of corrosion and ice on the enclosure.
        5. Impact Rating: IK10.
        6. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Node: 0.004 lux (F0.94, 1/30 sec).

Black and White Mode: 0.0004 (F0.94, 1/30 sec).

* + - * 1. optical Zoom: 4x with focal length ranges from 4.1 to 16.4 mm. Focus control available via remote control with the following options.

Simple focus.

Manual.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable 32 privacy masking regions utilizing a polygon
        3. Defog feature to remove fogginess of scene using advanced image processing algorithms.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. The camera shall possess the following further characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. Application to be available for both iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Alarms and notifications

Triggers:

Alarm input.

Motion detection.

Video and audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Outdoor Domes Vandal with Fixed 4 mm Lens:
       1. Model: XNV-6020R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.055 lux.

Black and White Mode: 0.055 lux.

* + - * 1. Integral IR illumination, providing effective visibility of 0.66 ft (0.2 m).
        2. Digital Noise Reduction: 2D and 3D technology.
        3. Privacy Masking Regions: 32 utilizing a polygon with 6 different coloring as below.

Grey, green, red, blue, black, white.

Mosaic.

* + - * 1. Capture high contrast scenes with 150 dB multi-exposure wide dynamic range.
        2. Hallway view with rotatable lens
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

Sound classification.

Heat map.

People counting.

Queue management.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Two slots for micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals. Maximum capacity for each slot is 512 GB.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Intelligent audio and video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

NAS recording.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet X Series 2 MP Outdoor Domes Compact Dome and White:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XNV-6011 as manufactured by Hanwha Techwin America.
      2. Model: SNV-6011W as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Digital noise reduction using both 2D and 3D noise reduction technology.
        2. Configurable 32 privacy masking regions utilizing a polygon.
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

Heat map.

People counting.

Queue management.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. The camera shall possess the following further characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Alarms and notifications

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage

Move to DPTZ preset

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series 2 MP Outdoor Domes Vandal with Fixed 2.4 mm Lens:
       1. Model: XNV-6010 as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.055 lux at F2.0.

Black and White Mode: 0.055 lux at F2.0.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable privacy masking regions utilizing a 4 point polygon.
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus using a direct USB connection and/or Wi-Fi dongle.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection

Fog detection

Motion detection with metadata

Face detection

Virtual area based event (intrusion, enter/exit, appear/disappear, loitering)

Virtual line based event (directional detection, crossing)

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

Alarm input.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE.
    1. Wisenet X Series 2 MP Outdoor Domes Mobile Camera w/Fixed 2.4 mm Lens:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XNV-6012 as manufactured by Hanwha Techwin America.
      2. Model: SNV-6012M as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.04 lux at F2.0.

Black and White Mode: 0.04 lux at F2.0.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable privacy masking regions utilizing a 32 point polygon
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Loitering.

Directional detection.

Fog detection.

Virtual line.

Enter and exit.

Appear and disappear

Audio detection.

Face detection.

Digital auto tracking.

Sound classification with external MIC.

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE
    1. Wisenet X Series 2MP Outdoor Domes Mobile Camera w/Fixed 3.6 mm Lens:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: XNV-6022R as manufactured by Hanwha Techwin America.
      2. Model: XNV-6022RM as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.04 lux at F2.0.

Black and White Mode: 0.0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 49.21 ft (15 m) at 0 Lux when activated in black and white mode.
        3. Configurable privacy masking regions utilizing a 32 point polygon.
        4. video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas with 8 point polygonal zones, minimum / maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Loitering.

Directional detection.

Fog detection.

Virtual line.

Enter and exit.

Appear and disappear

Audio detection.

Face detection.

Digital auto tracking.

Sound classification with external MIC.

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE
    1. Wisenet X Series 2MP Outdoor Domes Mobile Camera Outside Vehicle:
       1. Model: XNV-6013M as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.04 lux at F2.0.

Black and White Mode: 0.04 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable privacy masking regions utilizing a 32 point polygon
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas with 8 point polygonal zones, minimum / maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Loitering.

Directional detection.

Fog detection.

Virtual line.

Enter and exit.

Appear and disappear

Audio detection.

Face detection.

Digital auto tracking.

Sound classification with external MIC.

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE
    1. Wisenet X Series 2MP Bullets w/12x Zoom:
       1. Model: XNO-6120R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.03 lux.

Black and White Mode: 0.0 lux.

* + - * 1. Integral IR illumination, providing effective visibility of 229.66 ft (70 m).
        2. Digital Noise Reduction: 2D and 3D technology.
        3. Privacy Masking Regions: 32 utilizing a polygon with 6 different coloring as below.

Grey, green, red, blue, black, white.

Mosaic.

* + - * 1. True WDR up to 150 dB.
        2. Hallway view with rotatable lens.
        3. Built-In Gyro Sensor: Enhance DIS (Digital Image Stabilization) greatly reducing false alarms triggered by change in a scene rather than the movement of camera itself.
        4. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available for iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit.

Appear and disappear

Audio detection.

Face detection.

Motion detection with link to other cameras.

Sound classification.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Intelligent audio and video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

NAS recording.

External output.

Preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE
    1. Wisenet X Series 2MP Bullets Without Analytics:
       1. Model: XNO-L6080R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 5 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 5 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof and waterproof.
         2. Impact Rating: IK08.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.3 lux.

Black and White Mode: 0.0 lux with IR LED on.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 65.62 ft (20 m) at 0 Lux when activated in black and white mode.
        3. Configurable privacy masking regions utilizing a 32 point polygon.
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas with 8 point polygonal zones, minimum / maximum object size.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

Pixel Counter available in the web viewer.

PoE capable including heater by PoE

* + 1. Wisenet X Series 2MP Bullets w/Analytics:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: XNO-6080R as manufactured by Hanwha Techwin America.
      2. Model: XNO-6020R as manufactured by Hanwha Techwin America.
      3. Model: XNO-6010R as manufactured by Hanwha Techwin America.
      4. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera - The camera device shall have the following physical and performance properties:
         1. Dustproof, waterproof, and IP67 rated.
         2. Impact Rating: IK10.
         3. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.015 lux at F1.4 for XNO-6080R and XNO-6020R.

Color Mode: 0.055 lux at F2.0 for XNO-6010R

Black and White Mode: 0.0 lux with IR LED on for all.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 164.04 ft (50 m) at 0 Lux for XNO-6080R; 98.43 ft (30 m) at 0 Lux for XNO-6020R when activated in black and white mode.
        3. Configurable privacy masking regions utilizing a 4 point polygon.
        4. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus by using a direct USB connection and/or Wi-Fi dongle for XNO-6080R.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas with 8 point polygonal zones, minimum / maximum object size.
         2. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection

Fog detection

Motion detection with metadata

Face detection

Virtual area based event (intrusion, enter/exit, appear/disappear, loitering)

Virtual line based event (directional detection, crossing)

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

Alarm input.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE.
    1. Wisenet X Series 2MP Box w/Extreme Low Light:
       1. Model: XNB-6005 as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available for iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Built-In Gyro Sensor: To enhance DIS (Digital Image Stabilization) greatly reducing false alarms triggered by change in a scene rather than the movement of camera itself.
        2. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range. Stream video with 2MP resolution at 30 fps while producing 150 dB WDR.
        3. True day/night operation with scheduling and options for external devices.

Low Light Level Operation:

Color Mode: 0.006 lux (F1.2, 1/30 sec).

Black and White Mode: 0.0006 lux (F1.2, 1/30 sec).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable 32 privacy masking regions utilizing a polygon
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. The application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable
    1. Wisenet X Series 2MP Box ATM Covert Camera:
       1. Model: XNB-6001 as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available for iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
        2. Electrical day/night operation.

Low light level operation shall depend on specifications of lens modules. Compatible modules will be provided by the manufacturer. Available lens modules are following, and detailed specifications can be found in section 2.04 Detailed Specifications.

SLA-T2480, SLA-T2480V, SLA-T4680, SLA-T4680V.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable 24 privacy masking regions utilizing a polygon
        3. Defog feature to remove fogginess of scene which can be triggered automatically with fog detection event.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Allow users to install third party applications from manufacturer's partners through Open Platform. List of available applications and partners available on manufacturer's homepage.
      3. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. The application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series - Box w/Analytics:
       1. Model: XNB-6000 as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 60 fps is available at all resolutions.

MJPEG: 30 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Configurable Resolution Selections:

Aspect Ratio of 16:9: 1920 x 1080, 1280 x 720, 800 x 448,and 640 x 360.

Aspect Ratio of 4:3: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Aspect Ratio of 5:4: 1280 x 1024 and 720 x 576.

Aspect Ratio of 3:2: 720 x 480.

* + - * 1. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: Dynamic GOV, and Dynamic fps to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. True day/night operation with removable IR cut filter

Low Light Level Operation:

Color Mode: 0.01 lux at F1.2.

Black and White Mode: 0.001 lux at F1.2.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable privacy masking regions utilizing a 4 point polygon
        3. Video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas with 8 point polygonal zones, minimum / maximum object size.
         2. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection

Fog detection

Motion detection with metadata

Face detection

Virtual area based event (intrusion, enter/exit, appear/disappear, loitering)

Virtual line based event (directional detection, crossing)

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Dual edge recording slot like Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         3. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         4. Bi-directional audio.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

Alarm input.

Defocus detection.

Fog detection.

Face detection.

Audio detection.

Video and audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

Move to DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable including heater by PoE.
    1. Wisenet X Series - ATM Kit Camera:
       1. Model: XNB-H6241A as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.
        3. Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

* + - * 1. DDNS Configurable: At no additional cost by manufacturer.
        2. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available for iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

* + - * 1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
        2. Electrical day/night operation.

Low light level operation shall depend on specifications of lens modules. Compatible modules will be provided by the manufacturer. Available lens modules are following, and detailed specifications can be found in section 2.04 Detailed Specifications.

SLA-T2480, SLA-T2480V, SLA-T4680, SLA-T4680V.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable 24 privacy masking regions utilizing a polygon
        3. Defog feature to remove fogginess of scene which can be triggered automatically with fog detection event.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.
         2. Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.
         3. Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital auto tracking.

* + - * 1. Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Streaming to multiple smart phones with DDNS provided freely from the manufacturer. The application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.
         3. Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
         4. NAS recording option with configurable pre-alarm and post-alarm recording intervals.
         5. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

DPTZ preset.

* + - * 1. Pixel Counter available in the web viewer.
        2. PoE capable.
    1. Wisenet X Series - Pinhole w/Height Strip Housing:

\*\* NOTE TO SPECIFIER \*\* Delete model option if not required.

* + - 1. Model: XNB-H6461H 2 MP as manufactured by Hanwha Techwin America.
         1. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.

Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.

Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

DDNS Configurable: At no additional cost by manufacturer.

Smart Codec: WiseStream II

* + - * 1. Camera Physical and Performance Properties:

Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.

Images are available in color or black and white.

Color Mode: 0.06 lux (F2.5).

Black and White Mode: 0.06 lux (F2.5).

Digital Noise Reduction: 2D and 3D technology.

Privacy Masking: 32 ea, polygonal zones.

Defog: off/auto/manual

* + - * 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:

Motion Detection: Eight definable detection areas with 8 point polygonal zones, handover.

Motion detection hand-over to PTZ cameras.

Logical Events Detection from Camera Video and Audio Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog & dust detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Digital detection.

Digital auto tracking.

People counting.

Heat map.

Queue management.

* + - * 1. Interoperability: ONVIF Profile S and G compliant.
        2. Camera Characteristics:

Supported OS: Windows 7, 8.1, 10, Mac OSX 10, 10, 10.11, 10.12.

Non-plugin Web viewer:

Google Chrome 6.1, MS Edge 40. Mozilla Firefox 56 (Window 64 bit only), Apple Safari 10 (Mac OS X only).

Plug-in Web viewer:

Supported browser: MS Internet Explorer 11, Apple Safari 10 (Max OS X only)

SD/SDHC/SDXC memory card

NAS recording, Local PC for instant recording.

Alarms and Notifications:

Triggers:

Motion detection.

Video & Audio analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

DTPZ Presets.

Pixel Counter: support.

PoE capable.

\*\* NOTE TO SPECIFIER \*\* Delete model option if not required.

* + - 1. Model: XNZ-6320 as manufactured by Hanwha Techwin America.
         1. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.

Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 60 fps at all resolutions.

MJPEG: 30 fps at all resolutions

Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.

Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

Video Streams: 10 independent stream types using unicast protocol.

Multicast and unicast video streaming.

DDNS Configurable: At no additional cost by manufacturer.

Smart Codec: WiseStream II, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.

* + - * 1. Camera Physical and Performance Properties:

Wi-Fi interface which can stream video to a smart phone for installation purposes. The smart phone application to be available for iOS and Android free of charge with search keyword, ' Wisenet Installation'.

Wi-Fi dongle is required for Wi-Fi connection.

Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 150 dB.

Built-In Gyro Sensor: To enhance DIS (Digital Image Stabilization) greatly reducing false alarms triggered by change in a scene rather than the movement of camera itself.

Automatic, manual, scheduled day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.05 lux (F1.6).

Black and White Mode: 0.005 lux (F1.6).

Digital Noise Reduction: 2D and 3D technology.

Configurable 24 privacy masking regions utilizing a rectangle.

Defog feature to remove fogginess of scene which can be triggered automatically from fog detection event.

* + - * 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:

Motion Detection: Eight definable detection areas with 8 point polygonal zones, minimum and maximum object size.

Motion detection hand-over to PTZ cameras. The camera will call a preset of PTZ camera when motion event is triggered.

Logical Events Detection from Camera Video Input:

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter and exit

(Dis) Appear.

Audio detection.

Face detection.

Motion detection.

Logical Events Detection from Camera Audio Input:

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - * 1. Interoperability: ONVIF Profile S and G compliant.
        2. Camera Characteristics:

Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari

Streaming to multiple smart phones with DDNS provided freely from the manufacturer. The application to be available for iOS and Android, free of charge with search keyword, ' Wisenet Mobile'.

Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals

NAS recording option with configurable pre-alarm and post-alarm recording intervals.

Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage (SD / SDHC / SDXC) or NAS recording at event triggers.

External output.

Presets.

Pixel Counter available in the web viewer.

PoE capable.

* + 1. Wisenet Q Series 4 MP Indoor Domes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: QND-7080R as manufactured by Hanwha Techwin America.
      2. Model: QND-7030R as manufactured by Hanwha Techwin America.
      3. Model: QND-7020R as manufactured by Hanwha Techwin America.
      4. Model: QND-7010R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions.

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 20 fps at 4 M and 30 fps at 2 M or under.

MJPEG: Max. 15 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 2592 x 1520, 2560 x 1440 (16 : 9), 2304 x 1296, 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240
        3. Simultaneous unicast access by up to 6 users
        4. Multicast or unicast capable
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. QND-7030R, QND-7020R, QND-7010R:

Impact Rating: IK08.

* + - * 1. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode For QND-7080R: 0.15 lux.

Color Mode For QND-7030R: 0.3 lux.

Color Mode For QND-7020R: 0.4 lux.

Color Mode For QND-7010R: 0.5 lux.

Black and White Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 65.62 ft (20 m) at 0 Lux when activated in black and White mode.
        3. Privacy Masking regions: 6 utilizing a 4 point polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Logical Events Detection from Camera Video Input:

Camera tamper (scene change).

Defocus detection

Motion detection with metadata

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet Q Series 4 MP Outdoor Domes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: QNV-7080R as manufactured by Hanwha Techwin America.
      2. Model: QNV-7030R as manufactured by Hanwha Techwin America.
      3. Model: QNV-7020R as manufactured by Hanwha Techwin America.
      4. Model: QNV-7010R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 20 fps at 4 M and 30 fps at 2 M or under.

MJPEG: Max. 15 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 2592 x 1520, 2560 x 1440 (16 : 9), 2304 x 1296, 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240
        3. Simultaneous unicast access by up to 6 users
        4. Multicast or unicast capable
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Rating: IK10.
         3. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode For QNV-7080R: 0.15 lux.

Color Mode For QNV-7030R: 0.4 lux.

Color Mode For QNV-7020R: 0.4 lux.

Color Mode For QNV-7010R: 0.5 lux.

Black and White Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination: At 0 Lux activated in black and white mode.

Effective Visibility QNV-7080R: 98.4 ft (30 m).

Effective Visibility QNV-7030R: 98.4 ft (30 m).

Effective Visibility QNV-7020R: 82 ft (25 m).

Effective Visibility QNV-7010R: 65.62 ft 25(20 m).

* + - * 1. Privacy Masking Regions: 6 utilizing a 4 point polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card).

External output.

* + - * 1. Pixel Counter available in the plug-in viewer.
        2. POE capable.
    1. Wisenet Q Series 4 MP Turret Flat Glass Vandal:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: QNE-7080RVW as manufactured by Hanwha Techwin America.
      2. Model: QNE-7080RV as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps.

MJPEG: 15 fps

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 20 fps at 4 M and 30 fps at 2 M or under.

MJPEG: 15 fps maximum.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 2592 x 1520, 2560 x 1440 (16 : 9), 2304 x 1296, 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240
        3. Simultaneous unicast access by up to 6 users
        4. Multicast or unicast capable
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Rating: IK10.
         3. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.2 lux.

Black and White Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, providing effective visibility of 98.4 ft (30 m) at 0 lux when activated in black and white mode.
        3. Privacy Masking regions: 6 utilizing a 4 point polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card).

External output.

* + - * 1. Pixel Counter available in the plug-in viewer.
        2. POE capable.
    1. Wisenet Q Series 4 MP Bullets:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: QNO-7080R as manufactured by Hanwha Techwin America.
      2. Model: QNO-7030R as manufactured by Hanwha Techwin America.
      3. Model: QNO-7020R as manufactured by Hanwha Techwin America.
      4. Model: QNO-7010R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 20 fps at 4 M and 30 fps at 2 M or under.

MJPEG: Max. 15 fps.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 2592 x 1520, 2560 x 1440 (16 : 9), 2304 x 1296, 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240
        3. Simultaneous unicast access by up to 6 users
        4. Multicast or unicast capable
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Impact Rating: IK08 for QNO-7030R, QNO-7020R, and QNO-7010R.
         2. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode For QNO-7080R: 0.15 lux.

Color Mode For QNO-7030R: 0.3 lux.

Color Mode For QND-7020R: 0.4 lux.

Color Mode For QND-7010R: 0.5 lux.

Black and White Mode: 0 lux.

* + - * 1. 2D and 3D digital noise reduction.
        2. Integral IR illumination, providing effective visibility of 65.61 ft (20 m) at 0 Lux when activated in black and white mode.
        3. Privacy Masking regions: 6 utilizing a 4 point polygon
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas, minimum / maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Detection of logical events of specified conditions from the camera's video input

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet Q Series 2MP Indoor Domes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: QND-6070R as manufactured by Hanwha Techwin America.
      2. Model: QND-6030R as manufactured by Hanwha Techwin America.
      3. Model: QND-6020R as manufactured by Hanwha Techwin America.
      4. Model: QND-6010R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions.

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

MJPEG: 15 fps is available at all resolutions.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Simultaneous unicast access by up to 6 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Impact Rating: IK08.
         2. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode For QND-6070R: 0.95 lux.

Color Mode For QND-6030R: 0.15 lux.

Color Mode For QND-6020R: 0.15 lux.

Color Mode For QND-6010R: 0.15 lux.

Black and White Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, effective visibility: At 0 lux when activated in black and white mode.

QND-6070R: (30 m)

QND-6030R: (20 m).

QND-6020R: (20 m).

QND-6010R: (20 m).

* + - * 1. Privacy Masking Regions: 6 utilizing a 4 point polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet Q Series 2MP Outdoor Domes:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: QNV-6070R as manufactured by Hanwha Techwin America.
      2. Model: QNV-6030R as manufactured by Hanwha Techwin America.
      3. Model: QNV-6020R as manufactured by Hanwha Techwin America.
      4. Model: QNV-6010R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

MJPEG: 15 fps is available at all resolution.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Simultaneous unicast access by up to 6 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Rating: IK10
         3. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode For QNV-6070R: 0.95 lux.

Color Mode For QNV-6030R: 0.15 lux.

Color Mode For QNV-6020R: 0.15 lux.

Color Mode For QNV-6010R: 0.15 lux.

Black and White Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, effective visibility: At 0 lux when activated in black and white mode.

QNV-6070R: 98.42 ft (30 m)

QNV-6030R: 98.42 ft (30 m).

QNV-6020R: 82 ft (25 m).

QNV-6010R: 65.6 ft (20 m).

* + - 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet Q Series 2MP Turret Flat Glass Vandal:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: QNE-6080RVW as manufactured by Hanwha Techwin America.
      2. Model: QNE-6080RV as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Simultaneous unicast access by up to 6 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Rating: IK10
         3. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.2 lux.

Black and White: 0 lux.

* + - * 1. Noise reduction.
        2. Integral IR illumination, providing effective visibility of 98.4 ft (30 m) at 0 Lux when activated in black and white mode.
        3. Privacy Masking regions: 6 utilizing a 4 point polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas, minimum and maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet Q Series 2MP Bullets:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: QNO-6070R as manufactured by Hanwha Techwin America.
      2. Model: QNO-6030R as manufactured by Hanwha Techwin America.
      3. Model: QNO-6020R as manufactured by Hanwha Techwin America.
      4. Model: QNO-6010R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

Maximum frame rates are available at selected resolutions:

H.265 and H.264: 30 fps is available at all resolutions.

MJPEG: 15 fps is available at all resolutions.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Simultaneous unicast access by up to 6 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
        6. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. Impact Rating: IK10
         3. True day and night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode for QNO-6070R: 0.095 lux.

Color Mode for QNO-6030R: 0.15 lux.

Color Mode for QNO-6020R: 0.15 lux.

Color Mode for QNO-6010R: 0.15 lux.

Black and White Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Integral IR illumination, effective visibility: At 0 lux when activated in black and white mode.

QNO-6070R: 98.42 ft (30 m)

QNO-6030R: 98.42 ft (30 m).

QNO-6020R: 82 ft (25 m).

QNO-6010R: 65.6 ft (20 m).

* + - * 1. Privacy Masking Regions: 6 utilizing a 4 point polygon.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas, minimum / maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Events Detection from Camera Video and Audio Input:

Camera tamper (scene change).

Defocus detection.

Motion detection with metadata.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals.
         3. Uni-directional audio.
         4. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

NAS error.

Alarm input.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card) or NAS storage.

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet L Series - 2MP - Indoor Dome:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: LND-6071R as manufactured by Hanwha Techwin America.
      2. Model: LND-6013R as manufactured by Hanwha Techwin America.
      3. Model: LND-6021R as manufactured by Hanwha Techwin America.
      4. Model: LND-6011R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps maximum.

* + - * 1. Video Stream Profiles: Able to configure 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Simultaneous unicast access by up to 6 users.
        4. Multicast or unicast capable.
        5. Configurable Dynamic DNS (DDNS) provided with no additional cost by the manufacturer.
        6. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
         2. Lens distortion correction which corrects curviness caused by distortion at the edges of images.
         3. Automated or manual day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.18 lux (F2.0).

Black and White Mode: 0 lux (IR LED on).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable six privacy masking regions utilizing a polygon.
        3. Hallway View Mode: Rotates images 90 or 270 degrees so view is more suitable for hallways.
        4. PoE capable.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas with rectangular zones, and minimum/maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering.

Motion detection.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

Available Notification Means Upon Trigger:

File Upload Via FTP and e-mail.

Local storage (SD / SDHC) recording at event triggers.

Notification via e-mail.

* + 1. Wisenet L Series - 2MP - Outdoor Dome:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: LNV-6071R as manufactured by Hanwha Techwin America.
      2. Model: LNV-6031R as manufactured by Hanwha Techwin America.
      3. Model: LNV-6021R as manufactured by Hanwha Techwin America.
      4. Model: LNV-6011R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 3 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Multicast and unicast video streaming. Allow six users at unicast mode.
        4. Configurable Dynamic DNS (DDNS) provided with no additional cost by the manufacturer.
        5. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
         2. Lens distortion correction which corrects curviness caused by distortion at the edges of images.
         3. Automated or manual day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.18 lux (F2.0).

Black and White Mode: 0 lux (IR LED on).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable six privacy masking regions utilizing a polygon.
        3. Hallway View Mode: Rotates images 90 or 270 degrees so view is more suitable for hallways.
        4. PoE capable.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas with rectangular zones, and minimum/maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering.

Motion detection.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

Available Notification Means Upon Trigger:

File Upload Via FTP and e-mail.

Local storage (SD / SDHC) recording at event triggers.

Notification via e-mail.

* + 1. Wisenet L Series - 2MP - Bullets:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: LNO-6071R as manufactured by Hanwha Techwin America.
      2. Model: LNO-6031R as manufactured by Hanwha Techwin America.
      3. Model: LNO-6021R as manufactured by Hanwha Techwin America.
      4. Model: LNO-6011R as manufactured by Hanwha Techwin America.
      5. Video Compression and Transmission: Cameras to have the following properties relating to video signals they produce.
         1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: 30 fps at all resolutions.

MJPEG: 15 fps at all resolutions

* + - * 1. Video Stream Profiles: Able to configure 3 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.
        3. Multicast and unicast video streaming. Allow six users at unicast mode.
        4. Configurable Dynamic DNS (DDNS) provided with no additional cost by the manufacturer.
        5. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage while producing video quality that is visually equal to the one without smart codec.
      1. Camera Physical and Performance Properties:
         1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
         2. Lens distortion correction which corrects curviness caused by distortion at the edges of images.
         3. Automated or manual day and night operation with infrared cut filter. Images are available in color or black and white.

Low Light Level Operation:

Color Mode: 0.18 lux (F2.0).

Black and White Mode: 0 lux (IR LED on).

* + - * 1. Digital Noise Reduction: 2D and 3D technology.
        2. Configurable six privacy masking regions utilizing a polygon.
        3. Hallway View Mode: Rotates images 90 or 270 degrees so view is more suitable for hallways.
        4. PoE capable.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas with rectangular zones, and minimum/maximum object size.
         2. Logical Events Detection from Camera Video Input:

Tampering.

Motion detection.

* + - 1. Interoperability: ONVIF Profile S and G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, MS Edge, Firefox, Chrome and Safari.
         2. Micro SD/SDHC memory card with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Motion detection.

Tampering detection.

SD card error.

Available Notification Means Upon Trigger:

File Upload Via FTP and e-mail.

Local storage (SD / SDHC) recording at event triggers.

Notification via e-mail.

* + 1. Wisenet III or S Series 5 Megapixel Network 360 Degrees Fisheye Cameras:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: SNF-8010 as manufactured by Hanwha Techwin America.
      2. Model: SNF-8010VM as manufactured by Hanwha Techwin America.
      3. Model: SNF-8010RW as manufactured by Hanwha Techwin America.
      4. Equipment and Materials: Standard components regularly manufactured and used in manufacturer's system.
      5. Systems and Components:
         1. Thoroughly tested and proven in actual use.
         2. Toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) from manufacturer. Immediate assistance for the dealer/installer or end user at no charge as long as products are installed.
      6. Dome type suitable for internal installation. Ivory in appearance.
      7. Lens: 1.14 mm lens; 187 degree horizontal and vertical field of view.
      8. Resolution: 5 Mega Pixel at 20 fps.
      9. Electrical Specifications:
         1. Input Voltage and Current: 12 VDC plus or minus 10 percent, PoE (IEEE 802.3af class 3)
         2. Power Consumption: Max 10.2 W (PoE, Class 3), Max 7.8 W (12 VDC).
      10. Camera:
          1. Imaging Device: 1/1.8 inch 6 M PS CMOS (IMX 178).
          2. Total Pixels (Horizontal x Vertical): 6 megapixel / 5.2 M (2560 x 2048).
          3. Scanning System: Progressive.
          4. Minimum Illumination:

Color: 0.9 lux (1/30 sec, F2.5, 50IRE).

Color: 0.015 lux (2 sec, F2.5, 30IRE).

Black and White: 0.09 lux (1/30 sec, F2.5, 50IRE).

Black and White: 0.0015 lux (2 sec, F2.5, 30IRE)

Video Out CVBS: 1.0 Vpp / 75 Ohm composite.

* + - 1. Lens:
         1. Focal length: 0.045 inch (1.14 mm) fixed.
         2. Maximum Aperture Ratio: F2.5
         3. Angular Field of View:

Horizontal:187 degrees.

Vertical : 187 degrees.

Depth: 187 degrees.

* + - * 1. Min Object Distance: 1 ft (0.3 m) to Infinity / Manual
        2. Focus control: Manual.
        3. Lens Type: Fixed focal.
        4. Mount Type: Board type (M12).
      1. Operational Specifications:
         1. Camera Title: On, off (displays up to 15 characters).
         2. True day and night.
         3. Backlight Compensation (BLC).
         4. Contrast Enhancement: SSDR(Samsung Super Dynamic Range) (Off/On).
         5. Digital Noise Reduction: SSNRIII (2D and 3D noise filter) (Off/On).
         6. Motion Detection: On, Off (4 ea 4 points polygonal zones).
         7. Privacy Masking: On, Off (32 ea zones with 4 points of polygonal).
         8. Gain Control: Off, low, medium, and high.
         9. White Balance ATW: AWC, manual, indoor, outdoor, and mercury.
         10. Electronic Shutter Speed: 2 sec to 1/12,000 sec.
         11. Digital Zoom: 16x, Digital PTZ (Preset, Group)
         12. Flip and Mirror: On, Off
         13. Intelligent Video Analytics Tampering: Virtual line, enter and exit, Disappear, and audio detection
         14. Alarm I/O: Input: 1 ea. Output: 1 ea.
         15. Alarm Triggers:

Motion detection.

Tampering.

Audio detection.

Alarm input.

Network disconnection.

* + - * 1. Alarm Events:

File upload via FTP and e-mail.

Notification via e-mail, TCP and HTTP.

* + - * 1. Local storage (SD/SDHC/SDXC) recording at network disconnected and event (Alarm triggers), External output.
      1. Network:
         1. Ethernet RJ-45 (10/100BASE-T): Female type, SNF-8010 VM: M12 connector type
         2. Video Compression: H.264 (MPEG-4 part 10/AVC), MJPEG
         3. Resolution:

Fisheye(Original): Less than 5.3 M original greater than: 2560 x 2048, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 720 x 480, 640 x 480, and 320 x 240.

Single Rectangle: 800 x 600, 640 x 480, and 320 x 240.

Quad View: 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Double Panorama: 2048 x 1536, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, and 320 x 240.

Single Panorama: 2048 x 768, 1600 x 600, 1280 x 480, 1024 x 384, 800 x 300, 640 x 240, and 320 x 120.

* + - * 1. Maximum Frame Rate(Raw): MJPEG.

Source View:

15 fps: 2560 x 2048, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, and 1024 x 768.

20 fps: 800 x 600, 720 x 480, 640 x 480, and 320 x 240.

Single Panorama View:

15 fps: 800 x 600.

20 fps: 800 x 600.

Double Panorama View:

15 fps: 800 x 600.

20 fps: 800 x 600.

Quad View:

15 fps: 800 x 600.

20 fps: 800 x 600.

Single Rectangle View All:

Ground and Ceiling Mode: 20 fps; 800 x 600

Wall Mode: 15 fps; 800 x 600

* + - * 1. Viewing Composition:

Camera Side 360 View:

Single panorama.

Double panorama.

Single panorama plus 3 rectangle.

View - 360 plus 3 rectangle.

Quad view.

Single rectangle.

Single panorama plus 2 rectangle.

View - 360 plus 8 rectangle.

CMS Side 360 View:

Single panorama.

Double panorama.

Quad view.

Single rectangle.

View - 360 plus 3 rectangle.

Single panorama plus 2 rectangle.

* + - * 1. Video Quality Adjustment"

Compression Level: H.264 Target bitrate level control.

Quality Level Control: MJPEG.

* + - * 1. Bitrate Control Method:

H.264VBR or CBR

MJPEGVBR

* + - * 1. Streaming Capability:

Multiple streaming (Up to 3 profiles).

Multiple streaming (Up to 5 profiles) regardless of codec type

* + - * 1. Audio In Maximum Output Level : 1 Vrms, Supply voltage: 2.5 VDC, 4 mA, Input Impedance: Approx. 2K Ohm. SNF-8010: Selectable (Mic in / Line in).
        2. Audio Out Line Out: 3.5 mm stereo mini jack.
        3. Audio Compression Format:

G.711 u-law.

G.726 selectable.

G.726 (ADPCM) 8 KHz.

G.711 8 KHz.

G.726: 16 Kbps, 24 Kbps, 32 Kbps, 40 Kbps.

AAC (16 Khz/48 Khz).

* + - * 1. Audio Communication: Bi-directional.
        2. IPIPv4, IPv6
        3. Network Protocol: TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1, v2c, v3 (MIB-2), ARP, DNS, DDNS, QoS, UPnP, and Bonjour
        4. Security:

HTTPS (SSL) login authentication.

Digest login authentication.

IP Address filtering.

User access log, 802.1x authentication

* + - * 1. Streaming Method: Unicast or Multicast
        2. Maximum User Access: 15 users at Unicast.
        3. Edge Storage: Micro SD/SDHC/SDZC memory slot. Motion images recorded in SDX/SDHC/SD memory card can be downloaded.
        4. Application Programming Interface:

ONVIF profile S.

SUNAPI (Samsung protocol).

SVNP 1.2.

* + - * 1. Webpage Language: English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Finnish, and Norwegian.
        2. Web Viewer Operating System: Windows XP, Windows Vista, Windows 7, 8, MAC OS X 10.7.

Supported Browsers: Microsoft Internet Explorer (Ver. 8 to 11), Mozilla Firefox (Ver. 9 to 19), Google Chrome (Ver. 15 to 25), Apple Safari (Ver. 6.0.2 (Mac OS X 10.8, 10.7 only), 5.1.7) and Mac OS X.

* + - * 1. Central Management Software: SSM, Smart Viewer, iPOLiS mobile.
      1. Environmental Specifications:
         1. Operating Temperature and Relative Humidity:

SNF-8010: 14 to 131 degrees F (minus 10 to 55 degrees C); relative humidity less than 90 percent.

SNF-8010VM: Minus 22 to 131 degrees F (minus 30 to 55 degrees C); relative humidity less than 90 percent

Start Up Temperature: Above minus 13 degrees F (minus 25 degrees C).

* + - * 1. Storage Temperature: Minus 22 to 141 degrees F (minus 30 to 60 degrees C); relative humidity less than 90 percent
      1. Physical Specifications:
         1. SNF-8010:

Diameter: 5.74 inch (146 mm)

Height: 1.95 inch (50 mm)

Weight: 1.72 lbs (780 g).

* + - * 1. SNF-8010VM:

Diameter: 5.74 inch (146 mm)

Height: 2.46 inch (62.5 mm)

Weight: 1.76 lbs (800 g).

* + - * 1. Color: Ivory
        2. Material: Aluminum.
      1. Certifications:
         1. UL listed.
         2. CE mark.
         3. FCC mark.
      2. Warranty: 3 years
    1. Wisenet S Series - PTZ 32X: 2MP:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: SNP-6320 as manufactured by Hanwha Techwin America.
      2. Model: SNP-6320H as manufactured by Hanwha Techwin America.
      3. Model: SNP-6321 as manufactured by Hanwha Techwin America.
      4. Model: SNP-6321H as manufactured by Hanwha Techwin America.
      5. Support multi-streaming technologies, transferring real-time high resolution images at 60 fps with video compression in H.264 and MJPEG codec.
      6. Optical Zoom: 32x, 0.175 to 5.614 inches(4.44 to 142.6 mm)
      7. Digital Zoom: 16x
      8. PoE plus,
      9. SD memory,
      10. Bi-directional audio.
      11. Operation and Configuration Menus: English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Finnish, and Norwegian.
      12. Electrical Specifications:
          1. Input Voltage:

SNP-6320: 24 VAC, PoE plus (IEEE 802.3af class 3).

SNP-6320H: 24 VAC, PoE plus (IEEE 802.3af class 3).

SNP-6321: 24 VAC, PoE plus (IEEE 802.3af class 3).

SNP-6321H: 24 VAC plus or minus 10 percent, PoE plus (IEEE802.3af class 4).

* + - * 1. Power Consumption:

SNP-6320: Max. 20 W PoE plus.

SNP-6320H: Max. 20 W PoE plus.

SNP-6321: Max. 20 W PoE plus.

SNP-6321H: Max. 25 W (24 VAC heater off / PoE heater on).

* + - 1. Camera:
         1. Imaging Device: 1/2.8 inch 2 M PS CMOS
         2. Total Pixels:

Horizontal: 1,952.

Vertical: 1,236.

* + - * 1. Effective Pixels: 2.38 M pixels

Horizontal: 1,944.

Vertical: 1,224.

* + - * 1. Scanning System: Progressive.
        2. Minimum Illumination:

Color: 0.3 lux (1/30 sec, F1.6, 50IRE).

B/W: 0.03 lux (1/30 sec, F1.6, 50IRE).

* + - * 1. S / N Ratio: 50 dB.
        2. Video Output CVBS: 1.0 Vp-p.

NTSC: 704 x 480, for installation.

PAL: 704 x 576, for installation.

* + - 1. Pan, Tilt, Rotate for SNP-6321H:
         1. Pan, Tilt Range: 360 degree endless. Rotate: 210 degrees (minus 15 to 195 degrees).
         2. Pan / Tilt Speed Preset: 700 degrees per sec. Manual: 0.024 to 120 degrees per sec.
         3. Sequence Preset: 255 each.
         4. Swing, Group: 6 each.
         5. Trace, Tour: 1 each.
         6. Auto run.
         7. Schedule.
         8. Preset Accuracy: Plus or minus 0.2 degrees.
         9. Azimuth: Yes (E, W, S, N, NE, NW, SE, and SW).
      2. Lens:
         1. Focal Length: 0.175 to 5.614 inch (4.44 to 142.6 mm). Zoom Ratio: 32x.
         2. Angular Field of View

Horizontal: 62.8 degrees wide to 2.23 degrees Telemetry.

Vertical: 36.8 degrees wide to 1.26 degrees Telemetry.

* + - * 1. Aperture Ratio: F1.6 wide, F4.4 telemetry maximum.
        2. Object Distance: Minimum.

Wide: 4.92 ft (1.5 m).

Telemetry: 6.56 ft (2 m).

* + - * 1. Focus Control: Auto, manual, and one push.
        2. Lens Type: DC auto iris.
        3. Mount Type: Board-in.
      1. Operational specification:
         1. Camera Title: On, Off (displays up to 45 characters).
         2. Day and Night: Auto (ICR), Color and Black and white.
         3. Backlight Compensation: BLC, HLC, Off, and WDR.
         4. Wide Dynamic Range: 120 dB.
         5. Contrast Enhancement: SSDR (Samsung Super Dynamic Range) (Off/On).
         6. Digital Noise Reduction: SSNRIII (2D and 3D noise filter) (Off/On).
         7. Digital Image Stabilization: Off or on.
         8. Defog: Off, auto, manual.
         9. Motion Detection: On, off (4 each rectangle zone).
         10. Privacy Masking: On, off (32 zones of rectangle zone).
         11. Gain Control: Off, low, middle, high.
         12. White Balance: ATW, AWC, manual, indoor, outdoor, mercury, and sodium
         13. Electronic Shutter Speed: Minimum, maximum, and anti-flicker (2 to 1/12,000 sec.
         14. Digital Zoom: 16x.
         15. Flip and Mirror: Off, on.
         16. Intelligent Video Analytics:

Tampering.

Virtual line.

Enter / Exit.

Appear / Disappear.

Audio detection.

Face detection.

* + - * 1. Alarm:

I/O Input: 4 each.

I/O Output 2 each (relay).

* + - * 1. Remote Control Interface: RS-485.
        2. RS-485 Protocol: Samsung-T/E, Pelco-P/D, Sungjin, Panasonic, Honeywell, AD, Vicon, Bosch, and GE.
        3. Alarm Triggers: Motion detection, tampering, audio detection, face detection, video analytics, alarm input, and network disconnection.
        4. Alarm Events: File upload via FTP and e-mail, Notification via e-mail, TCP and HTTP, local storage (SD/SDHC/SDXC) recording at network disconnected and event (Alarm triggers), External output.
      1. Network:
         1. Ethernet: RJ-45 (10/100 Base-T)
         2. Video Compression: H.264 (MPEG-4 part 10 / AVC) and MJPEG.
         3. Resolution: 1920 x 1080p

Full HD: 1280 x 1024, 1280 x 960, 1280 x 720.

HD: 1024 x 768, 800 x 600, 800 x 450, 640 x 480, 640 x 360, 320 x 240, 320 x 180.

* + - * 1. Frame Rate:

H.264 Maximum 60 fps at all resolutions.

MJPEG:

Maximum 15 fps: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768.

Maximum 30 fps: 800 x 600, 800 x 450, 640 x 480, 640 x 360, 320 x 240, 320 x 180.

* + - * 1. Video Quality Adjustment:

H.264 Compression level, Target bit rate level control.

MJPEG quality level control.

* + - * 1. Bitrate Control Method:

H.264VBR or CBR.

MJPEGVBR.

* + - * 1. Streaming: 10 profiles.
        2. Audio In: Selectable (Mic in / Line in).
        3. Supply Voltage: 2.5 VDC (4 mA).
        4. Input Impedance: Approximately 2 K Ohms.
        5. Audio out: Line Out: 3.5 mm mono jack. Max Output Level: 1 Vrms
        6. Audio Compression Format: G.711 u-law, G.726 selectable, G.726 (ADPCM) 8 KHz, G.711 8 KHz, G.726: 16 Kbps, 24 Kbps, 32 Kbps, and 40 Kbps.
        7. Audio Communication: Bi-directional audio.
        8. IPIPv4, IPv6
        9. Protocol: TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, and Bonjour.
        10. Security: HTTPS(SSL) login authentication, Digest login authentication, IP address filtering, User access log, 802.1x authentication
        11. Streaming Method: Unicast and Multicast.
        12. User Access: 15 users at Unicast
        13. Memory Slot:

SD/SDHC/SDXC:

SNP-6320: Micro SD,

SNP-6320H: SD

Motion Images recorded in SD/SDHC/SDXC memory card can be downloaded. NAS (Network Attached Storage).

* + - * 1. Application Programming Interface: ONVIF profile S, SUNAPI 2.0, SVNP 1.2.
        2. Webpage Language: English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Finnish, and Norwegian.
        3. Web Viewer:

Supported OS: Windows XP, VISTA 7 and 8 or higher, MAC OS X 10.7.

Supported Browser: Microsoft Internet Explorer (Ver. 8 to 11), Mozilla Firefox (Ver. 9 to 19), Google Chrome (Ver. 15 to 25), Apple Safari (Ver. 6.0.2 (Mac OS X 10.8, 10.7 only), 5.1.7), Mac OS X only

* + - * 1. Central Management Software: Smart Viewer, SSM.
      1. Environmental Specifications:
         1. Operating Temperature:

SNP-6320: 14 to 131 degrees F (minus 10 to 55 degrees C).

SNP-6321H: 14 to 131 degrees F (minus 10 to 55 degrees C).

SNP-6320H: Minus 4 to 158 degrees F (minus 20 to 70 degrees C).

* + - * 1. Operating Humidity: Less than 90 percent RH.
        2. Storage Temperature and Humidity: Minus 22 to 140 degrees F (minus 30 to 60 degrees C); less than 90 percent RH.
        3. Ingress Protection:

SNP-6320: N/A.

SNP-6321H: N/A.

SNP-6320H: IP66.

* + - * 1. Vandal Resistance: IK10 (With SHP-3701H for SNP-6320 for SNP-6321H)
      1. Physical Specifications:
         1. Dimension: 5.98 inch (152 mm).
         2. Height: 8.58 inch (218 mm).
         3. Weight: 4.85 lbs (2.2 kg).
         4. Color: Ivory.
         5. Material: Plastic and metal.
      2. Certifications:
         1. UL Listed.
         2. CE mark.
         3. FCC mark.
      3. Warranty: 3 years.
    1. Wisenet S Series - PTZ 32X w/IR - 2MP:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: SNP-6320RH as manufactured by Hanwha Techwin America.
      2. Model: SNP-L6233RH as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Camera to have the following properties relating to the video signals it produces.
         1. Compression: H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264: Frame rates 30 fps.

MJPEG: Frame rates 30 fps.

Maximum frame rates are available at selected resolutions.

H.264: 30 fps is available at all resolutions

MJPEG: 30 fps available up to and including 800 x 600 resolution. 15 fps at all higher resolutions.

* + - * 1. Configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1080p (1920 x 1080)

Full HD: 720p (1280 x 720)

HD: 1280 x 1024, 1280 x 960, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 640 x 480, 640 x 360, 320 x 240, 320 x 180

* + - * 1. Simultaneous unicast access by up to 15 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. Composite Video Output Signal: 1 V peak-peak at camera for setup and diagnostics.
      1. Camera; Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color: 0.15 lux.

Black and White: 0.015 lux.

* + - * 1. Wide Dynamic Range: 100 dB multi-exposure, providing a wide range between dark and light areas visible at the same time.
        2. Digital Noise Reduction: 2D and 3D.
        3. Integral IR Illumination: Effective visibility of 328.08 ft (100 m) at 0 Lux when activated in black and white mode.
        4. Digital zoom.
        5. Privacy Masking Regions: 32 utilizing a 4 point polygon.
        6. Digital image stabilization.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas, minimum / maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Detection of logical events of specified conditions from the camera's video input.

Line crossing (passing).

Appear/disappear.

Audio detection.

Camera tamper (scene change).

Enter/exit a predefined zone.

* + - * 1. Face detection used to create an event whenever there is a face or multiple faces in the image. 32 faces simultaneously.
        2. Audio detection above a specified threshold.
        3. Smart Codec Operation: Adaptively alters video compression for a region of interest or a detected face to improve the quality of video in the area specified.

Definable up to 5 regions of interest.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals
         3. Bi-directional audio.
         4. Alarms and Notifications:

Physical Alarm Inputs: 4. Physical Alarm Outputs: 3.

Triggers:

Intelligent video analytics.

Motion detection.

Network disconnection.

Physical alarm input.

Event from embedded third party application.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card).

Record to network storage.

External output.

* + - * 1. POE capable.
    1. Wisenet S Series - PTZ 23X:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: SNP-L6233 as manufactured by Hanwha Techwin America.
      2. Model: SNP-L6233H as manufactured by Hanwha Techwin America.
      3. Video Compression and Transmission: Camera to have the following properties relating to the video signals it produces.
         1. Compression: H.264 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264: Frame rates 30 fps.

MJPEG: Frame rates 30 fps.

Maximum frame rates are available at selected resolutions.

H.264: 30 fps is available at all resolutions

MJPEG: 30 fps available up to and including 800 x 600 resolution. 15 fps at all higher resolutions.

* + - * 1. Configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 1080p (1920 x 1080)

Full HD: 720p (1280 x 720)

HD: 1280 x 1024, 1280 x 960, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 640 x 480, 640 x 360, 320 x 240, 320 x 180

* + - * 1. Simultaneous unicast access by up to 10 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. Composite Video Output Signal: 1 V peak-peak at camera for setup and diagnostics.
      1. Camera; Physical and Performance Properties:
         1. Dustproof, waterproof, and IP66 rated.
         2. True day/night operation with removable IR cut filter.

Low Light Level Operation:

Color: 0.15 lux.

Black and White: 0.015 lux.

* + - * 1. Wide Dynamic Range: 100 dB multi-exposure, providing a wide range between dark and light areas visible at the same time.
        2. Digital Noise Reduction: 2D and 3D.
        3. Digital zoom.
        4. Privacy Masking Regions: 32 utilizing a 4 point polygon.
        5. Digital image stabilization.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with four definable detection areas, minimum / maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Detection of logical events of specified conditions from the camera's video input.

Line crossing (passing).

Appear/disappear.

Audio detection.

Camera tamper (scene change).

Enter/exit a predefined zone.

* + - * 1. Face detection used to create an event whenever there is a face or multiple faces in the image. 32 faces simultaneously.
        2. Audio detection above a specified threshold.
        3. Smart Codec Operation: Adaptively alters video compression for a region of interest or a detected face to improve the quality of video in the area specified.

Definable up to 5 regions of interest.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals
         3. Bi-directional audio.
         4. Alarms and Notifications:

Physical Alarm Inputs: 4. Physical Alarm Outputs: 2.

Triggers:

Video analytics.

Motion detection.

Tampering.

Audio detection.

Face detection.

Network disconnection.

Physical alarm input.

Event from embedded third party application.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD card).

Record to network storage.

External output.

* + - * 1. POE capable.
    1. Wisenet S Series - Indoor Domes - 2MP w/Motorized Lens:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: SND-6084R as manufactured by Hanwha Techwin America.
      2. Model: SND-6084 as manufactured by Hanwha Techwin America.
      3. Color: Ivory.
      4. Construction: Plastic body.
      5. Adaptive Infrared illumination System (SND 6084R only): 12 LEDs giving a viewable distance of 49.2 ft (15 m) in complete darkness.
      6. Video Compression Dual Codec: H.264 and MJPEG.
      7. Resolution: 2 Megapixel; 16:9 format.
      8. Defog and WDR.
      9. Audio, Face and Motion detection.
      10. Memory slot for SD, SDHC and SDXC.
      11. Multi-crop streaming.
      12. Bi-directional audio.
      13. Operation and Configuration Menu Languages: English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Norwegian, and Finnish.
      14. Camera:
          1. Imaging Device: 1/2.8 inch 2.38 M CMOS (IMX136 for SND 6084R).
          2. Total Pixels:

Horizontal: 1,952.

Vertical: 1,116.

* + - * 1. Effective Pixels:

Horizontal: 1,944.

Vertical: 1,104.

* + - * 1. Scanning System: Progressive.
        2. Minimum Illumination:

Color; SND 6084R: 0.1 lux (F1.2, 50 IRE).

Color; SND 6084R: 0.0017 lux (2 sec, F1.2, 50 IRE).

Color; SND 6084: 0.001 lux (2 sec, 50 IRE).

Color; SND 6084: 0.03 lux (F1.2, 30 IRE).

Black and White; SND 6084R: 0 lux (F1.2, 50 IRE, IR LED on).

Black and White; SND 6084R: 0 lux (F1.2, 30 IRE, IR LED on).

Black and White; SND 6084: 0.01 lux (F1.2, 50 IRE).

Black and White; SND 6084: 0.002 lux (F1.2, 30 IRE).

* + - * 1. S/N Ratio: 50 dB.
        2. Video Output CVBS: 1.0 Vpp / 75 Ohm composite.

SND 6084R: 704 x 480 (N), 704 x 576 (P), for installation.

SND 6084: 720 x 480 (N), 720 x 576 (P), for installation DIP connector type.

* + - 1. Lens Type:
         1. Focal Length, Zoom Ratio: 3 to 8.5 mm, 2.8x motorized varifocal.
         2. Aperture Ratio: F1.2 maximum.
         3. Angular Field of View:

Horizontal: 105.5 degrees wide; 37.1 degrees (Tele).

Vertical: 57.5 degrees wide; 21.0 degrees (Tele).

* + - * 1. Object Distance: 1.64 ft (0.5 m) minimum.
        2. Lens Type: DC auto iris, P-iris.
        3. Mount Type: Board-in type
        4. Focus Control:

Simple focus (motorized V/F).

Manual remote control via network (manual, simple focus).

* + - 1. Pan, Tilt, Rotate:
         1. Pan Range: 0 to 354 degrees.
         2. Tilt Range: 0 to 67 degrees.
         3. Rotate Range: 0 to 355 degrees.
      2. Operation:
         1. IR LEDSND 6084R: 12 each.
         2. Viewable Length; SND 6084R: 49.21 ft (15 m).
         3. Camera Title: Off / On (displays up to 45 characters).
         4. Day and Night: Auto (ICR), color, B/W, external, and schedule.
         5. Backlight Compensation: Off / BLC.
         6. Wide Dynamic Range: 120 dB.
         7. Contrast Enhancement: SSDR (Samsung Super Dynamic Range) (Off / On).
         8. Digital Noise Reduction: SSNRIII (2D and 3D noise filter) (Off / On).
         9. Digital Image Stabilization: Off / On.
         10. Defog: Off, auto, and manual.
         11. Motion Detection: Off / On (4 each with 4 point polygonal zones)
         12. Privacy Masking: Off / On (32 zones with 4 point of polygons)
         13. Gain Control: Off, low, middle, and high.
         14. White Balance: ATW, AWC, manual, indoor, and outdoor.
         15. Electronic Shutter Speed: Minimum, maximum, and anti-flicker.
         16. Flip and Mirror: Off / On
         17. Intelligent Video Analytics: Tampering, virtual line, enter / exit, (dis)appear, audio detection, and face detection.
         18. Alarm: I/O Input: 1 each. I/O Output: 1 each.
         19. Alarm Triggers: Motion detection, tampering, audio detection, face detection, video analytics, network disconnection, alarm input, network disconnection.
         20. Alarm Events: File upload via FTP and e-mail notification via e-mail. Local Storage: (SD/SDHC/SDXC) or NAS recording at event (alarm triggers) external output
      3. Network Protocol:
         1. Ethernet: RJ-45 (10/100BASE-T).
         2. Video Compression Format: H.264 (MPEG-4 part 10/AVC), MJPEG.
         3. Resolution: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 640 x 480, 640 x 360, 320 x 240, and 320 x 180.
         4. Framerate: Maximum.

H.264 Max. 60 fps at all resolutions

MJPEG Max. 30 fps at: 800 x 600, 800 x 450, 640 x 480, 640 x 360, 320 x 240, and 320 x 180

MJPEG Max. 15 fps at: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, and 1024 x 768.

* + - * 1. Video Quality Adjustment:

H.264 Compression level, target bitrate level control.

MJPEG quality level control.

* + - * 1. Bitrate Control Method:

H.264 CBR or VBR.

MJPEG VBR.

* + - * 1. Streaming Capability: 10 profiles
        2. Audio In: Selectable (Mic in / Line in). Max output level: 1 Vrms. Supply Voltage: 2.5 VDC, 4 mA. Input Impedance: Approx. 2K Ohm.
        3. Audio Out: Line out; 3.5 mm stereo mini jack.
        4. Audio Compression Format: G.711 u-law, G.726 selectable, G.726 (ADPCM) 8 KHz, G.711 8 KHz, G.726: 16 Kbps, 24 Kbps, 32 Kbps, and 40 Kbps
        5. Audio Communication: Bi-directional audio.
        6. IPIPv4, IPv6.
        7. Protocol: TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP,RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, and Bonjour
        8. Security: HTTPS(SSL) login authentication, Digest login authentication, IP address filtering, User access log, and 802.1x authentication.
        9. Streaming Method: Unicast and Multicast.
        10. User Access: 15 users in unicast mode.
        11. Edge Storage: SD/SDHC/SDXC. Motion Images recorded in the SD/SDHC/SDXC memory card can be downloaded. NAS (Network Attached Storage).
        12. Application Programming Interface: ONVIF profile S and G, HTTP API (SUNAPI) 2.0 SVNP 1.2.
        13. Webpage Language: English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatian, Hungarian, Greek, Norwegian, and Finnish.
        14. Web Viewer:

Supported OS: Windows XP, VISTA, 7, 8, 8.1, MAC OS X 10.7

Supported Browsers:

Microsoft Internet Explorer (Ver. 11 to 8).

Mozilla Firefox (Ver. 19 to 9), Windows only.

Google Chrome (Ver. 25 to 15), Windows only.

Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 only), 5.1.7), Mac OS X only.

* + - * 1. Central Management Software: Smart Viewer.
      1. Electrical:
         1. Voltage: 12 VDC plus or minus 10 percent, PoE (IEEE802.3af).
         2. Consumption:

SND 6084R: Max. 9 W.

SND 6084: Max. 8.79 W (12 VDC), Max. 9.57 W (PoE, Class 3).

* + - 1. Environmental Specifications:
         1. Operating Temperature / Humidity: 14 to 131 degrees F (minus 10 to 55 degrees C / Less than 90 percent RH.
         2. Storage Temperature / Humidity: Minus 22 to 140 degrees F (minus 30 to 60 degrees C / Less than 90 percent RH.
      2. Physical Specifications:
         1. Dimension
         2. Diameter: 5.2 inch (132 mm).
         3. Height: 4.24 inch (108 mm).
         4. Weight:

SND 6084R: 1.16 lbs (525 g).

SND 6084: 1.11 lbs (505 g).

* + - * 1. Color: Ivory.
        2. Material: Polycarbonate.
      1. Certifications:
         1. CE mark.
         2. FCC mark.
         3. UL mark.
      2. Warranty: Manufacturer to provide a limited 3 year warranty for product to be free of defects in material and workmanship.
    1. Wisenet P Series 2 MP/5 MP Modular Multi-Sensor:
       1. Model: PNM-9000VQ as manufactured by Hanwha Techwin America.
       2. Multi directional view and produce video in various view mode.
       3. Lenses (2 M/5 M) to be selectable depending on customer's requirement at site.
       4. Hallway View: Available on CH 1, 2, 3, and 4.
       5. Each Channel supports SD card.
       6. One single power supply for all multi-channels
       7. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder. Capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 60 fps at all resolutions.

MJPEG: Maximum of 30 fps.

* + - * 1. Independent Configurable Video Stream Profiles: 10 with differing encoding, quality, frame rate, resolution, bit rate, and other video settings.
        2. Four lenses, and one PTZ. Each lens to provide the following resolutions.

2 MP: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240

5 MP: 2560 x 1920, 2560 x 1440, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.

* + - * 1. Simultaneous unicast access to 20 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality that is visually equal to one without smart codec.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10.
         2. Protection Against Dust and Water: IP66
         3. Digital Noise Reduction: 2D and 3D.
         4. Privacy Masking Regions: 32 utilizing polygons.
         5. Capture high contrast scenes with 150 dB for 2MP and 120 dB for 5 MP multi-exposure wide dynamic range.
         6. Supporting digital image stabilization, measure movements in three axes and accurately enhance images from distortions caused by instability.
      2. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Send meta-data to NVR or VMS to allow users to search for motion events and generate video summary.
         3. Logical Detection of Events: Of specified conditions from camera's video input.

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter/exit.

Appear/disappear.

Face detection.

* + - * 1. Motion detection.
      1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

NAS recording at event triggers.

* + - * 1. Pixel Counter available in the plug-in web viewer.
    1. Wisenet P Series 2 MP/5 MP Multi Sensor:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: PNM-9080VQ as manufactured by Hanwha Techwin America.
      2. Model: PNM-9081VQ as manufactured by Hanwha Techwin America.
      3. Field of View: 360-degree and producing video in quad view mode.
         1. Digital PTZ along with automated video analytics to allow users to efficiently monitor large visual fields with capability to focus on certain areas when suspicious activity is observed.
      4. Video Compression and Transmission: The following properties relating to the video signals it produces.
         1. H.265, H.264 and MJPEG compression, each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 30 fps at all resolutions.

MJPEG: Maximum of 30 fps.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, bit rate, and other video settings.
        2. Four lenses: Each lens providing the following resolutions.

PNM-9081VQ: 2560 x 1920 (5 M), 2560 x 1440, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.

PNM-9080VQ: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 640 x 480, 640 x 360, and 320 x 240.

* + - * 1. Simultaneous Unicast Access: 20 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to one without smart codec.

Viewing Composition: Quad view.

* + - 1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. Auto day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.07 lux.

Black and Wite Mode: 0.007 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Privacy Masking Regions: 32 utilizing polygons.
        3. Capture high contrast scenes with 120 dB for PNM-9081VQ and 150 dB for PNM-9080VQ multi-exposure wide dynamic range.
        4. One touch (Simple) or manual focus controllable remotely via network.

Motorized varifocal lens.

* + - * 1. Built in Gyro Sensor: for advanced digital image stabilization.

Measure movements in three axes. Accurately enhance images from distortions caused by instability.

* + - 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Send meta-data to NVR or VMS to allow users to search for motion events and generate video summary.
         3. Logical Detection of Events: Of specified conditions from camera's video input.

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter/exit.

Appear/disappear.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card and NAS recording options, with configurable pre-alarm and post-alarm recording intervals
         3. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection

Video analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

NAS recording at event triggers.

* + - * 1. Pixel Counter available in the plug-in web viewer.
    1. Wisenet P Series 2 MP/5 MP Modular Multi-Sensor w/PTZ:
       1. Model: PNM-9320VQP as manufactured by Hanwha Techwin America.
       2. Multi-directional view and produce video in various view modes.
       3. Lenses (2 M/5 M) to be selectable depending on customer's requirement at site.
       4. Smart Handover Available: PTZ is interconnected to CH 1, 2, 3, 4. When MD occurs in certain channel, handover in PTZ is executed into area predefined in channel.
       5. Hallway View: Available on CH 1, 2, 3, and 4.
       6. Each Channel supports SD card.
       7. SFP module slot is supported so video transmission will be sent to the client at distance.
       8. One single power supply for all multi-channels including PTZ in the middle.
       9. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.265, H.264 and MJPEG. Each derived from a dedicated encoder. Capable of being streamed independently and simultaneously.

H.265 and H.264: Maximum of 60 fps at all resolutions.

MJPEG: Maximum of 30 fps.

* + - * 1. Independent Configurable Video Stream Profiles: 10 with differing encoding, quality, frame rate, resolution, bit rate, and other video settings.
        2. Four lenses, and one PTZ. Each lens to provide the following resolutions.

2 MP: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240

5 MP: 2560 x 1920, 2560 x 1440, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 720 x 576, 720 x 480, 640 x 480, and 320 x 240.

* + - * 1. Simultaneous unicast access to 20 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality that is visually equal to one without smart codec.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. Digital Noise Reduction: 2D and 3D.
         4. Privacy Masking Regions: 32 utilizing polygons.
         5. Capture high contrast scenes with 150 dB for 2 MP and 120 dB for 5 MP multi-exposure wide dynamic range.
         6. Digital Image Stabilization: Able to measure movements in three axes and accurately enhance images from distortions caused by instability.
      2. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Send meta-data to NVR or VMS to allow users to search for motion events and generate video summary.
         3. Logical Detection of Events: Of specified conditions from camera's video input.

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter/exit.

Appear/disappear.

Face detection

Motion detection

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Motion detection.

Video analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

NAS recording at event triggers.

* + - * 1. Pixel Counter available in the plug-in web viewer.
    1. Wisenet P Series 2MP Dual Camera:
       1. Model: PNM-7000VD as manufactured by Hanwha Techwin America.
       2. Multi directional view and produce video in various view modes.
          1. Digital PTZ along with automated video analytics to allow users to efficiently monitor large visual fields with capability to focus on certain areas when suspicious activity is observed.
       3. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps at all resolutions.

MJPEG: Maximum of 30 fps.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, bit rate, and other video settings.
        2. Four Lenses: Each lens providing the following resolutions: 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 640 x 480, 640 x 360, and 320 x 240.
        3. Simultaneous Unicast Access: 20 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
        6. Smart Codec: WiseStream II, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to one without smart codec.
        7. Viewing composition: Quad view.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. Auto day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.07 lux.

Black and Wite Mode: 0.007 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Privacy Masking Regions: 32 utilizing polygons.
        3. Capture high contrast scenes with 150 dB multi-exposure wide dynamic range.
        4. One touch (Simple) or manual focus controllable remotely via network.

Motorized varifocal lens.

* + - * 1. Built in Gyro Sensor: for advanced digital image stabilization.

Measure movements in three axes. Accurately enhance images from distortions caused by instability.

* + - 1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Send meta-data to NVR or VMS to allow users to search for motion events and generate video summary.
         3. Logical Detection of Events: Of specified conditions from camera's video input.

Tampering.

Loitering.

Directional detection.

Defocus detection.

Fog detection.

Virtual line.

Enter/exit.

Appear/disappear.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
    1. Wisenet P Series 8 MP Panoramic:
       1. Model: PNM-9020V as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: Maximum 30 fps at all resolutions.

MJPEG: 15 fps.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections:

Panorama: 4096 x 1800, 3584 x 1576, 3072 x 1352, 2560 x 1124, 2048 x 900, 1536 x 676, 1024 x 452, 512 x 224, and 720 x 576.

Half View: 2048 x 1536, 1600 x 1200, 1024 x 768, and 800 x 600.

* + - * 1. Simultaneous Unicast Access: 15 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
        5. Multi-senor to produce video streams in the following view composition

Single panorama.

Panorama plus 3 PTZ

3D view.

* + - * 1. Pixel counter to count number of pixels in a selected area.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. Low light operation in color mode with minimum illumination up to 0.3 lux.
         4. Digital Noise Reduction: 2D and 3D.
         5. Privacy Masking Regions: 16 utilizing rectangles. Available colors are grey, green, red, blue, black, and white.
      2. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Link motion events to PTZs so they can move to the location where motion is originated (hand-over).
         3. Detection of logical events of specified conditions from the camera's video input.

Camera tamper (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Defocus detection.

Digital auto tracking.

* + - * 1. Business intelligence

Heat map which measures the frequency of appearance with different color ratings.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Audio detection.

Network disconnect.

Tampering (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Defocus detection.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE-plus capable.

MJPEG: Frame rates to 15 fps.

* + 1. Wisenet P Series 20 MP Panoramic:
       1. Model: PNM-9030V as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps at all resolutions

MJPEG: Maximum of 15 fps at under 2 MP.

* + - * 1. Select the panoramic mode between 180 and 220 degrees.
        2. Support panoramic stitching, original and crop view channels at the same time.
        3. Configurable Independent Video Stream Profiles: 5 at 180 degrees, or 3 at 220 degrees, per channel with differing encoding, quality, frame rate, resolution, and bit rate settings.
        4. Resolution Selections:

Mode, 180 Degree: 6096 x 2540, 5760 x 2400, 5472 x 2280, 5184 x 2160, 4800 x 2000, 4560 x 1900, 4096 x 1704, 3840 x 1600, 2688 x 1120, 2560 x 1064, 2048 x 852, 1920 x 800, 1280 x 532, and 640 x 264.

Mode, 220 Degree: 7744 x 1936, 6096 x 1524, 5760 x 1440, 5472 x 1368, 5184 x 1296, 4800 x 1200, 4560 x 1140, 4096 x 1024, 3840 x 960, 2688 x 672 x 2560 x 640, 2048 x 512, 1920 x 480, 1280 x 320, and 640 x 160.

* + - * 1. Unicast Video Streaming: 15 users.
        2. Configurable Dynamic DNS (DDNS). Provided with no additional cost by the manufacturer.
        3. Smart Codec: WiseStream II, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality visually equal to one without smart codec.
      1. Camera, Physical and Performance Properties:
         1. Produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120 dB.
         2. Digital noise reduction using 2D and 3D technology.
         3. Privacy Masking Regions: 16 utilizing rectangles.
         4. Defog Feature: Removes fogginess of scene which can be triggered automatically from the fog detection event.
      2. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion detection with eight definable detection areas with eight point polygonal zones, and minimum/maximum object size.
         2. Motion detection handover to call a preset of PTZ camera when motion event is triggered.
         3. Detection of logical events of specified conditions from the camera's video input.

Tampering.

Loitering.

Directional detection.

Virtual line.

Enter/Exit.

(Dis)Appear.

Audio detection.

Motion detection.

Sound classification.

Heat map.

* + - * 1. Detection and classification of the following sound.

Scream.

Gunshot.

Explosion.

Crashing glass.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Audio detection.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

* + - * 1. Pixel Counter available in the plug-in web viewer.
        2. POE-plus capable.
        3. IP66, IK10 capable.
    1. Wisenet P Series 4 K Fisheye:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: PNF-9010RVM as manufactured by Hanwha Techwin America.
      2. Model: PNF-9010RV as manufactured by Hanwha Techwin America.
      3. Model: PNF-9010R as manufactured by Hanwha Techwin America.
      4. Ultra-wide angle lens that produces videos in wide angels of view and provides on-board dewarping to convert hemispherical images into rectangular images which are more suitable for human eyes.
      5. Video Compression and Transmission: Properties relating to the video signals it produces.
         1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps.

MJPEG - 15 fps.

Maximum frame rates available at selected resolutions:

H.265 and H.264: Maximum 20 fps at 12 M and max. 25 fps at 2992 x 2992 or under.

MJPEG: max. 15 fps.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections:

Fisheye: 4000 x 3000, 2992 x 2992, 2560 x 2560, 2048 x 2048, 1280 x 1280, and 640 x 640

Double Panorama: 2560 x 1280, 1920 x 960, 1280 x 640, 704 x 352, and 640 x 320

Single Panorama: 2560 x 640, 1920 x 480, 1280 x 320, 704 x 176, and 640 x 160

Quad View: 2944 x 2208, 2560 x 1920, 2048 x 1536, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 704 x 576, and 640 x 480

* + - * 1. Simultaneous Unicast Access: 15 users for PNF-9010RVM and PNF-9010RV; 20 users for PNF-9010R.
        2. Multicast or unicast capable/
        3. Dynamic DNS (DDNS) support.
        4. Smart Codec: WiseStream, Dynamic GOV, and Dynamic fps to efficiently manage bit rate of video stream and reduce storage while producing video quality that is visually equal to one without smart codec.
        5. On-board dewarping.
        6. Viewing Composition:

Camera Side: Fisheye, Single panorama, Double panorama, Fisheye plus 4 PTZ, Quad view, Fisheye plus 8 PTZ.

* + - * 1. Digital Zoom: 16x.
        2. Digital PTZ with preset and group.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated for PNF-9010RVM and PNF-9010RV.
         3. Auto day/night operation with removable IR cut filter

Low Light Level Operation:

Color Mode: 0.3 lux.

Black and Wite Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Integral IR Illumination: Effective visibility of 49.2 ft (15 m) at 0 lux when activated in black and white mode.
        3. Privacy Masking Regions: 8 utilizing polygons.
        4. 120 dB WDR.
        5. One touch (Simple) or manual focus controllable remotely via network.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Business Intelligence:

People Counting: Counts people passing virtual lines or staying in zones.

Heat Map: Display frequency of appearance using different color levels.

* + - * 1. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Defocus detection.

Digital auto tracking with metadata for PNF-9010RVM and PNF-9010RV.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Audio detection.

Network disconnect.

SD card error.

NAS error.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

NAS recording at event triggers.

* + - * 1. Pixel counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet P Series 4 K Indoor Domes:
       1. Model: PND-9080R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps.

MJPEG - 15 fps.

Maximum frame rates available at selected resolutions:

H.265 and H.264: Maximum 20 fps at 12 M and max. 30 fps at 4096 x 2160 or under.

MJPEG: Maximum 2 fps at 12 M and 15 fps at 2 M or under.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections:

8 M Mode: 4096 x 2160, 3840 x 2160, 2592 x 194, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

12 M Mode: 4000 x 3000, 3840 x 2160, 2592 x 1944, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

* + - * 1. Simultaneous Unicast Access: 20 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK08
         2. Auto day/night operation with removable IR cut filter.

Low Light Level Operation

Color Mode: 0.01 lux.

Black and Wite Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Integral IR Illumination: Effective visibility of 131.2 ft (40 m) at 0 lux when activated in black and white mode.
        3. Privacy Masking Regions: 16 utilizing polygons.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Defocus detection.

Digital auto tracking with metadata.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Audio detection.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

NAS recording at event triggers.

* + - * 1. Pixel counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet P Series 4 K Outdoor Dome:
       1. Model: PNV-9080R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps.

MJPEG - 15 fps.

Maximum frame rates available at selected resolutions:

H.265 and H.264: Maximum 20 fps at 12 M and max. 30 fps at 4096 x 2160 or under.

MJPEG: Maximum 2 fps at 12 M and 15 fps at 2 M or under.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections:

8 M Mode: 4096 x 2160, 3840 x 2160, 2592 x 194, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

12 M Mode: 4000 x 3000, 3840 x 2160, 2592 x 1944, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

* + - * 1. Simultaneous Unicast Access: 20 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 and IP67 rated.
         3. Auto day/night operation with removable IR cut filter.

Low Light Level Operation:

Color Mode: 0.01 lux.

Black and Wite Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Integral IR Illumination: Effective visibility of 131.2 ft (40 m) at 0 lux when activated in black and white mode.
        3. Privacy Masking Regions: 16 utilizing polygons.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Defocus detection.

Digital auto tracking with metadata.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Audio detection.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

NAS recording at event triggers.

* + - * 1. Pixel counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet P Series 4 K Bullets:
       1. Model: PNO-9080R as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps at all resolutions.

MJPEG - 15 fps at all resolutions.

Maximum frame rates available at selected resolutions:

H.265 and H.264: Maximum 20 fps at 12 M and max. 30 fps at 4096 x 2160 or under.

MJPEG: Maximum 2 fps at 12 M and 15 fps at 2 M or under.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections:

8 M Mode: 4096 x 2160, 3840 x 2160, 2592 x 194, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

12 M Mode: 4000 x 3000, 3840 x 2160, 2592 x 1944, 2592 x 1464, 1920 x 1080, 1600 x 1200, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 448, 720 x 576, 720 x 480, 640 x 480, 640 x 360, and 320 x 240.

* + - * 1. Simultaneous Unicast Access: 20 users.
        2. Multicast or unicast capable.
        3. Dynamic DNS (DDNS) support.
        4. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. Auto day/night operation with removable IR cut filter.

Low Light Level Operation

Color Mode: 0.01 lux.

Black and Wite Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Integral IR Illumination: Effective visibility of 131.2 ft (40 m) at 0 lux when activated in black and white mode.
        3. Privacy Masking Regions: 16 utilizing polygons.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection.

Defocus detection.

Digital auto tracking with metadata.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video analytics.

Audio detection.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

NAS recording at event triggers.

* + - * 1. Pixel counter available in the plug-in web viewer.
        2. POE capable.
    1. Wisenet P Series 4 K PTZ with IR:
       1. Model: PNP-9200RH as manufactured by Hanwha Techwin America.
       2. Video Compression and Transmission: Properties relating to the video signals it produces.
          1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps at all resolutions.

MJPEG - 15 fps at all resolutions.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Stream up to three different profiles.
        3. Resolution Selections: 3840 x 2160, 2592 x 1944, 2592 x 1464, 1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 800 x 450, 720 x 576, 640 x 480, 640 x 360, 320 x 240, and 320 x 180.
        4. Simultaneous Unicast Access: 15 users.
        5. Multicast or unicast capable.
        6. Dynamic DNS (DDNS) support.
        7. WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. IR Corrected Lens: Synchronizes focus location for short (Blue) to long (IR) wavelengths such that, when mixed day-time visible light and night-time IR lights are present, it does not deteriorate (no blurring effect due to out-of-focus).
         4. Auto day/night operation with removable IR cut filter.

Low Light Level Operation

Color Mode: 0.0005 lux.

Black and Wite Mode: 0 lux.

* + - * 1. Digital Noise Reduction: 2D and 3D.
        2. Mechanical anti-vibration for image stabilization.
        3. True WDR up to 120 dB.
        4. Integral IR Illumination: Effective IR viewable length of 656.2 ft (200 m).
        5. Privacy Masking Regions: 16 utilizing polygons with six different coloring.
      1. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Virtual line.

Enter/exit.

Appear/disappear.

Audio detection with metadata.

* + - 1. Interoperability: ONVIF Profile S compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. Micro SD/SDHC/SDXC memory card options, with configurable pre-alarm and post-alarm recording intervals.
         3. Bi-directional audio.
         4. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Intelligent video analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Record to local storage (SD/SDHC/SDXC card).

External output.

NAS recording at event triggers.

PTZ preset.

* + - * 1. Pixel counter available in the plug-in web viewer.
        2. Azimuth that indicates the following directions as OSD.

East, West, South, North, Northeast, Southeast, Northwest, and Southwest.

* + 1. Wisenet T Series - Thermal - Bullet without Base:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model: TNO-4041T as manufactured by Hanwha Techwin America.
      2. Model: TNO-4051T as manufactured by Hanwha Techwin America.
      3. Metal housing which can prevent any inside sparks caused by electronic components from igniting gases and conductive dust and causing explosion in a hazardous area.
      4. Video Compression and Transmission: Properties relating to the video signals it produces.
         1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps at all resolutions.

MJPEG: 30 fps maximum.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 640 x 480, 640 x 360, and 320 x 240.
        3. Simultaneous Unicast Access: 20 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. NEMA 4X
         4. Privacy Masking Regions: 32 utilizing polygons with zoom threshold mosaic option.
      2. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Loitering.

Directional detection.

Audio detection.

Motion detection.

Sound classification.

Shock detection.

Temperature change detection.

* + - 1. Interoperability: ONVIF Profile S / G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. NAS recording.
         3. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video / audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage or NAS recording at event triggers.

External output.

* + 1. Wisenet T Series - Thermal - Bullet with Base:

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model: TNO-4030T as manufactured by Hanwha Techwin America.
      2. Model: TNO-4040T as manufactured by Hanwha Techwin America.
      3. Model: TNO-4050T as manufactured by Hanwha Techwin America.
      4. Metal housing which can prevent any inside sparks caused by electronic components from igniting gases and conductive dust and causing explosion in a hazardous area.
      5. Video Compression and Transmission: Properties relating to the video signals it produces.
         1. Compression: H.264, H.265 and MJPEG. Each derived from a dedicated encoder and capable of being streamed independently and simultaneously.

H.264 and H.265: 30 fps at all resolutions.

MJPEG: 30 fps maximum.

* + - * 1. Configurable Video Streams: 10 independent profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
        2. Resolution Selections: 640 x 480, 640 x 360, and 320 x 240.
        3. Simultaneous Unicast Access: 20 users.
        4. Multicast or unicast capable.
        5. Dynamic DNS (DDNS) support.
      1. Camera, Physical and Performance Properties:
         1. Impact Rating: IK10
         2. Dust proof and water proof; IP66 rated.
         3. NEMA 4X
         4. Privacy Masking Regions: 32 utilizing polygons with zoom threshold mosaic option.
      2. Intelligence and Analytics: A suite of integral intelligent operations and analytic functions to include:
         1. Motion Detection: Eight definable detection areas, minimum/maximum object size definition and a learning algorithm that ignores false alarms such as trees and waves on water.
         2. Logical Detection of Events: Of specified conditions from camera's video input.

Camera tamper (scene change).

Loitering.

Directional detection.

Audio detection.

Motion detection.

Sound classification.

Shock detection.

Temperature change detection.

* + - 1. Interoperability: ONVIF Profile S / G compliant.
      2. Camera Characteristics:
         1. Built-in web server, accessed via standard browsers including Internet Explorer, Firefox, Chrome and Safari.
         2. NAS recording.
         3. Alarms and Notifications:

Triggers:

Alarm input.

Motion detection.

Video / audio analytics.

Network disconnect.

Available Notification Means Upon Trigger:

File upload via FTP and e-mail.

Notification via e-mail.

Local storage or NAS recording at event triggers.

External output.

\*\* NOTE TO SPECIFIER \*\* Delete article not required.

* 1. VMS SOFTWARE LICENSES

\*\* NOTE TO SPECIFIER \*\* Delete licenses options not required.

* + 1. Model: WAVE-PRO-01 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 1x IP Camera License.
    2. Model: WAVE-PRO-04 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 4x IP Camera License.
    3. Model: WAVE-PRO-08 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 8x IP Camera License.
    4. Model: WAVE-PRO-16 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 16x IP Camera License.
    5. Model: WAVE-PRO-24 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 24x IP Camera License.
    6. Model: WAVE-PRO-32 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 32x IP Camera License.
    7. Model: WAVE-VW-02 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, Video Wall License.
    8. Model: WAVE-ENC-04 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, 4 Channel Encoder License.
    9. Model: WAVE-IO-01 as manufactured by Hanwha Techwin America.
       1. Description: WAVE, I/O Module License.
    10. Model: WAVE-EMB-4 as manufactured by Hanwha Techwin America.
        1. Description: WAVE, 4 Channel Embedded Recorder.
    11. Model: WAVE-EMB-8 as manufactured by Hanwha Techwin America.
        1. Description: WAVE, 8 Channel Embedded Recorder.
    12. Model: WAVE-EMB-16 as manufactured by Hanwha Techwin America.
        1. Description: WAVE, 16 Channel Embedded Recorder.
    13. Model: WAVE-EMB-32 as manufactured by Hanwha Techwin America.
        1. Description: WAVE, 32 Channel Embedded Recorder.
    14. Model: WAVE-EMB-64 as manufactured by Hanwha Techwin America.
        1. Description: WAVE, 64 Channel Embedded Recorder.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. NETWORK VIDEO RECORDERS

\*\* NOTE TO SPECIFIER \*\* Delete recorders not required for project.

* + 1. Four Channel NVR:

\*\* NOTE TO SPECIFIER \*\* Delete four channel NVR model option not required.

* + - 1. Model: XRN-410S as manufactured by Hanwha Techwin America.
         1. Record video and audio from up to four network video cameras to a hard disk. Enable playback of video and audio.
         2. Manufacturer is responsible for rigorous testing of NVR's reliability.

Provide list of compatible hard disks that have been tested to guarantee reliable recording.

List to be available on manufacturer's home page.

* + - * 1. Auto Recovery Backup (ARB): Transfer video recorded on network camera's SD cards during failures to hard disk drive.

Allow users to set transfer speed or bandwidth dedicated for ARB in three levels; low, middle, high.

If bit-rate of video to be transferred exceeds the set bandwidth, the NVR will transfer video in the order of channel number until transfer is finished or video becomes more than 24 hours old based on NVR's current time.

Handle the Following Failures:

Network disconnection between cameras and NVR.

Unexpected shutdown of NVR.

* + - * 1. Receive text data from external devices and overlay it on live as well as recorded video. Provide search for text data and list all video with previews that is relevant to the search queries. The text shall include but not limited to the following.

Text from PoS devices; namely the texts printed on the receipt of transactions.

Text from automatic number plate recognition software.

Text from automated teller machines (ATM).

* + - * 1. Provide a remote monitoring environment for video and audio over the network using a remote computer. The remote monitoring software allows users to receive live streams, search for recoded videos, and configure devices.
        2. P2P Service: Provide easy configuration of mobile viewer. The mobile viewer to be freely available and connection with established by simply scanning QR code from a mobile device.
        3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If four or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than four cameras are searched or discovered, provide the ability to selectively register up to four cameras.

Smart Codec: Support WiseStream and Dynamic GOV used by WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Monitor Support: Dual monitor out from VGA and HDMI ports. Provide users options to choose display mode of each monitors. The options Include:

Expand Mode: Monitors from VGA and HDMI ports display two independent videos. VGA port supports resolutions up to 1080p and HDMI up to 4K.

Clone Mode: Monitors from VGA and HDMI display identical video.

Built-in PoE Switch and Support PnP Mode. In PnP mode, supply power to connected cameras and finish configuration without any necessary actions required from users.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 3264 X 2448 (8 MP) per channel.

Network Camera Recording Throughput: 50 Mbps.

Simultaneous Playback: Four video channels.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Enter and exit.

Storage: 6 TB HDD in JBOD configuration.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 4.

Outputs: 2.

Allow users to select contact states of sensor inputs. Available Options:

NC (Normally Closed).

NO (Normally Open).

* + - 1. QRN-Series Four Channel Network Video Recorders:

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - * 1. Model: QRN-410S as manufactured by Hanwha Techwin America.
        2. Model: QRN-410 as manufactured by Hanwha Techwin America.
        3. Record video and audio from up to four network video cameras to a hard disk. Enable playback of video and audio.
        4. Manufacturer is responsible for rigorous testing of NVR's reliability.

Provide list of compatible hard disks that have been tested to guarantee reliable recording.

List to be available on manufacturer's home page.

* + - * 1. Auto Recovery Backup (ARB): Transfer video recorded on network camera's SD cards during failures to hard disk drive.

Allow users to set transfer speed or bandwidth dedicated for ARB in three levels; low, middle, high.

If bit-rate of video to be transferred exceeds the set bandwidth, the NVR will transfer video in the order of channel number until transfer is finished or video becomes more than 24 hours old based on NVR's current time.

Handle the Following Failures:

Network disconnection between cameras and NVR.

Unexpected shutdown of NVR.

* + - * 1. Receive text data from external devices and overlay it on live as well as recorded video. Provide search for text data and list all video with previews that is relevant to the search queries. The text shall include but not limited to the following.

Text from PoS devices; namely the texts printed on the receipt of transactions.

Text from automatic number plate recognition software.

Text from automated teller machines (ATM).

* + - * 1. Provide a remote monitoring environment for video and audio over the network using a remote computer. The remote monitoring software allows users to receive live streams, search for recoded videos, and configure devices.
        2. P2P Service: Provide easy configuration of mobile viewer. The mobile viewer to be freely available and connection with established by simply scanning QR code from a mobile device.
        3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If four or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than four cameras are searched or discovered, provide the ability to selectively register up to four cameras.

Smart Codec: Support WiseStream and Dynamic GOV used by WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Monitor Support for QRN-410S: One monitor out, an HDMI port displaying resolution up to 4K.

Monitor Support for QRN-410: Dual monitor out from both VGA and HDMI ports. Provide users options to choose display mode of each monitors. The options include:

Expand Mode: Monitors from VGA and HDMI ports display two independent videos. VGA port supports resolutions up to 1080p and HDMI up to 4K.

Clone Mode: Monitors from VGA and HDMI display identical video.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 3264 X 2448 (8 MP) per channel.

QRN-410S: 40 Mbps network camera recording throughput.

QRN-410: 50 Mbps network camera recording throughput

Simultaneous playback capability up to four video channels

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

QRN-410: Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Enter and exit.

Storage: 6 TB HDD in JBOD configuration.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: High Definition (HDMI) for live viewing, playback, and backup functions

ONVIF Profile S compliance.

Alarm Connections: For QRN-410.

Inputs: 4.

Outputs: 2.

Allow users to select contact states of sensor inputs. Available Options:

NC (Normally Closed).

NO (Normally Open).

* + 1. Eight Channel NVR:
       1. Model: XRN-810S. As manufactured by Hanwha Techwin America.
          1. Record video and audio from up to eight network video cameras to an array of 1 to 2 HDDs. Enable playback of video and audio.
          2. Manufacturer is responsible for rigorous testing of NVR's reliability.

Provide list of compatible hard disks that have been tested to guarantee reliable recording.

List to be available on manufacturer's home page.

* + - * 1. Auto Recovery Backup (ARB): Transfer video recorded on network camera's SD cards during failures to hard disk drive.

Allow users to set transfer speed or bandwidth dedicated for ARB in three levels; low, middle, high.

If bit-rate of video to be transferred exceeds the set bandwidth, the NVR will transfer video in the order of channel number until transfer is finished or video becomes more than 24 hours old based on NVR's current time.

Handle the Following Failures:

Network disconnection between cameras and NVR.

Unexpected shutdown of NVR.

* + - * 1. Receive text data from external devices and overlay it on live as well as recorded video. Provide search for text data and list all video with previews that is relevant to the search queries. The text shall include but not limited to the following.

Text from PoS devices; namely the texts printed on the receipt of transactions.

Text from automatic number plate recognition software.

Text from automated teller machines (ATM).

* + - * 1. Provide a remote monitoring environment for video and audio over the network using a remote computer. The remote monitoring software allows users to receive live streams, search for recoded videos, and configure devices.
        2. P2P Service: Provide easy configuration of mobile viewer. The mobile viewer to be freely available and connection with established by simply scanning QR code from a mobile device.
        3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If eight or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than eight cameras are searched or discovered, the NVR shall provide the ability to selectively register up to eight cameras.

Smart Codec: Support WiseStream and Dynamic GOV used by WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Dual monitor out from both VGA and HDMI ports. Provide users options to choose display mode of each monitors. The options include:

Expand Mode: Monitors from VGA and HDMI ports display two independent videos. VGA port supports resolutions up to 1080p and HDMI up to 4K.

Clone Mode: Monitors from VGA and HDMI display identical video.

Built-in PoE Switch and Support PnP Mode. In PnP mode, supply power to connected cameras and finish configuration without any necessary actions required from users.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 3264 X 2448 (8 MP) per channel.

Network Camera Recording Throughput: 100 Mbps

Simultaneous playback capability up to eight video channels.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Enter and exit.

Storage: 2, 6 TB HDDs in JBOD configuration.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 4.

Outputs: 2.

Allow users to select contact states of sensor inputs. Available Options:

NC (Normally Closed).

NO (Normally Open).

* + 1. Sixteen Channel NVR:

\*\* NOTE TO SPECIFIER \*\* Delete model if not required.

* + - 1. Model: XRN Series.

\*\* NOTE TO SPECIFIER \*\* Delete XRN-1610S or XRN-1610 or both if not required.

* + - * 1. XRN-1610S as manufactured by Hanwha Techwin America.
        2. XRN-1610 as manufactured by Hanwha Techwin America.
        3. Record video and audio from up to 16 network video cameras to a hard disk array of 1 to 8 HDDs and enable playback of video and audio from the hard disk array.
        4. Remote monitoring environment for video and audio over the network using a remote computer.
        5. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If 16 or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than 16 cameras are searched or discovered, the NVR shall provide the ability to selectively register up to 16 cameras.

Smart Codec: Support WiseStream and Dynamic GOV, used by WiseNet IP cameras.

Dual monitor out.

Support ARB.

Built-in PoE switch and support PnP mode.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

Network Camera Recording Throughput: 180 Mbps.

Simultaneous playback capability up to 16 video channels.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, or heat map

Storage: 8, 6 TB HDDs in JBOD configuration.

Support for Network Attached Storage (iSCSI).

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 8.

Outputs: 4.

\*\* NOTE TO SPECIFIER \*\* Delete model QRN-1610S if not required.

* + - 1. Model: QRN-1610S, with PoE Switch as manufactured by Hanwha Techwin America.
         1. Record video and audio from up to 16 network video cameras to a hard disk and enable playback of video and audio.
         2. The manufacturer is responsible for rigorous testing of NVR's reliability.

Provide a list of compatible hard disks that have been tested to guarantee reliable recording.

List to be available on manufacturer's home web page.

* + - * 1. Auto Recovery Backup (ARB): Transfer video recorded on network camera's SD cards during failures to hard disk drive.

Allow users to set transfer speed or bandwidth dedicated for ARB in three levels; low, middle, high.

If bit-rate of video to be transferred exceeds the set bandwidth, the NVR will transfer video in the order of channel number until transfer is finished or video becomes more than 24 hours old based on NVR's current time.

Handle the Following Failures:

Network disconnection between cameras and NVR.

Unexpected shutdown of NVR.

* + - * 1. Receive text data from external devices and overlay it on live as well as recorded video. Provide search for text data and list all video with previews that is relevant to the search queries. The text shall include but not limited to the following.

Text from PoS devices; namely the texts printed on the receipt of transactions.

Text from automatic number plate recognition software.

Text from automated teller machines (ATM).

* + - * 1. Provide a remote monitoring environment for video and audio over the network using a remote computer. The remote monitoring software allows users to receive live streams, search for recoded videos, and configure devices.
        2. P2P Service: Provide easy configuration of mobile viewer. The mobile viewer to be freely available and connection with established by simply scanning QR code from a mobile device.
        3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If sixteen or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than sixteen cameras are searched or discovered, the NVR shall provide the ability to selectively register up to sixteen cameras.

Smart Codec: Support WiseStream and Dynamic GOV used by WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Monitor Support: Dual monitor out from VGA and HDMI ports. Provide users options to choose display mode of each monitors. The options Include:

Expand Mode: Monitors from VGA and HDMI ports display two independent videos. VGA port supports resolutions up to 1080p and HDMI up to 4K.

Clone Mode: Monitors from VGA and HDMI display identical video.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 3264 X 2448 (8 MP) per channel.

Network Camera Recording Throughput: 128 Mbps.

Simultaneous Playback: eight video channels in local and sixteen video channels in network

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Enter and exit.

Storage: 6 TB HDDs in JBOD configuration.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 4.

Outputs: 2.

* + 1. Mobile Network NVR, 816 Channel:

\*\* NOTE TO SPECIFIER \*\* Delete Mobile Network NVR model option not required.

* + - 1. Model: TRM-1610S as manufactured by Hanwha Techwin America.
         1. Record video and audio from up to 16 network video cameras to 1 to 2 HDDs (or SSDs) and enable playback of such media.

Storage and Capacities: Non-RAID or RAID-1.

HDD, non-RAID: 2 TB

HDD, RAID-1: 1 TB

SSD, non-RAID: 4 TB

SSD, RAID-1: 2 TB

* + - * 1. The manufacturer shall be responsible for rigorous testing of NVR's reliability.

Provide a list of compatible hard disks that have been tested to guarantee reliable recording

List to be available in the manufacturer's home web page.

If unexpectedly shutdown, will automatically try to reboot and come back to its normal status.

When error persists, automatically notify operators by sounds, alarm outs, icons on the screen, text messages, emails, or software events to VMS so that user can take necessary actions to repair.

* + - * 1. Receive tracking information from GPS antenna including coordinates and speed.

GPS antenna and display interface provided from the manufacturer to be included in package.

GPS Interface: Provide geographic information systems, one of which shall be Google Maps.

* + - * 1. Built-in Wi-Fi Interface: Allow automatic back-up to servers installed in a control room without the necessity of manually detaching HDD (or SSD) and connecting it to a server.

Support IEEE 801.11n (2.4 GHz) and 802.11ac (5 GHZ) dual antenna MIMO and provide the maximum of 150 Mbps of transmission assuming no interference.

Transmission bandwidth to be equivalent to finishing approximately 18 hours of recording from 16 cameras within 6 hours of backup time with the following manufacturer's camera settings.

Resolution: 2MP. 30 fps, variable bitrate control with maximum bitrate of 2.5 mbps, GOV 30, highly complex scene.

* + - * 1. Shutdown Delay and Web Command: Remotely shutdown from VMS developed by Hanwha Techwin as well as others. Shutdown delay and web command to help conserve batteries required for aforementioned archive.
        2. Fan-less and maintenance free. Able to operate without failure in temperature range specified in EN-50155.

SSD Installed: Minus 40 to 158 degrees F (minus 40 to 70 degrees C)

HDD Installed: Minus 13 to 131 degrees F (minus 25 to 55 degrees C).

* + - * 1. Meet MIL STD-810F (US Military Standard) on robustness to vibration. The relevant category is US highway truck vibration exposures and it is equivalent to ' Transportation by large truck or tractor-trailer combination ranging from 1988.4 to 3976.8 miles (3200 to 6400 km) over improved or paved highways.
        2. Input Voltage Range: 9 to 36 VDC to utilize vehicle power supply.
        3. Two types of software for remote control of the mobile NVR.

Web Viewer: Built-in web server to allow users to view live video, search for recordings, and change settings of equipment.

SSM Transportation: Video Management Software (VMS) features.

Automatic Backup: When within range of Wi-Fi or VMS is able to detect the presence of the mobile NVR, the VMS will automatically start archiving videos recorded in the mobile NVR. The archive can be continued the next time or at the next archiving station, if archive is not finished, and the users will be able to access the archive organized in a single time line regardless of when or where it is stored.

Real-time Tracking: Send tracking information including coordinates and speed on maps specified by users. The transmission will be over cellular network including 3G, 4G and LTE.

Live: Send live images, over cellular network, to VMS in JPEG format and the frame rate will be one frame per second.

Emergency Notification: Mobile NVR and VMS will have features to notify emergencies inside the vehicle. The panic button (or emergency button) which is included in the package, will give notifications to operators on the map as well as in logs. Moreover, the gyro sensor which is built inside the panic button will measure movements of the mobile NVR and hence the vehicle so that when the vehicle is in unusual orientation, it shall automatically trigger alarms and send live images to operators

* + - * 1. General Properties of NVR:

Install Wizard: Easy installation feature with plug and play allowing users to minimize installation effort and time.

Support PoE/PoE-Plus.

Cameras: DHCP configuration out of box.

Setup in cameras, mobile NVR, with the install wizard feature will finish powering cameras, ID/PW settings, date/time settings, language settings, network settings, camera registration, live and recording settings within four steps when the mobile NVR is powered on for the first time.

Camera Search and Discovery: Capable of searching network for connected compatible cameras manufactured by Hanwha Techwin and others.

If sixteen or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than sixteen cameras are searched or discovered, the NVR shall provide the ability to selectively register up to sixteen cameras.

Able to assign IP address and password for the manufacturer's cameras by its proprietary protocol.

Smart Codec: Support WiseStream, Dynamic GOV, and Dynamic fps, used by Hanwha Techwin's WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Built-in PoE-switch: Four PoE/PoE-Plus ports. Expandable up to two PoE modules, each having eight PoE/PoE-Plus ports.

Display: 16 channels in 2MP resolution, each at 30 fps. Provide automatic profile change based on number of tiles on the screen. In full screen mode, automatically display video in highest resolution the relevant camera supports.

Dewarping of video produced from fish-eye cameras via VMS or web viewer.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

Network Camera Recording Throughput: 128 Mbps.

Simultaneous Playback: 16 video channels.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Enter and exit.

Storage:

Up to 2 TB HDDs in JBOD configuration.

Up to 4 TB SSDs in JBOD configuration.

Up to 1 TB HDDs in RAID-1 configuration.

Up to 2 TB SSDs in RAID-1 configuration.

USB connection for memory/storage device for video clip backup and settings export

Detachable storage socket that allows manually connecting HDDs and SSDs to PC.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format or SEC format, a proprietary video format provided from the manufacturer with options for password protection and forgery detection.

Remote Access:

Simultaneous unicast access live: 10 users

Simultaneous multicast access live: 20 users

Simultaneous remote access search: 3 users

Mobile Device:

Supported platforms: Android and IOS

Supported Remote Users:

Live unicast: 10.

Live multicast: 20.

Playback: 3.

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections: Alarm block containing 16 Alarm-In's and six Alarm-Out's

NC (Normally closed).

NO (Normally open).

* + - 1. Model: TRM-1610M, as manufactured by Hanwha Techwin America.
         1. Record video and audio from up to 16 network video cameras to 1 to 2 HDDs (or SSDs) and enable playback of such media.

Storage and Capacities: Non-RAID or RAID-1.

HDD, non-RAID: 2 TB

HDD, RAID-1: 1 TB

SSD, non-RAID: 4 TB

SSD, RAID-1: 2 TB

* + - * 1. The manufacturer shall be responsible for rigorous testing of NVR's reliability.

Provide a list of compatible hard disks that have been tested to guarantee reliable recording

List to be available in the manufacturer's home web page.

If unexpectedly shutdown, will automatically try to reboot and come back to its normal status.

When error persists, automatically notify operators by sounds, alarm outs, icons on the screen, text messages, emails, or software events to VMS so that user can take necessary actions to repair.

* + - * 1. Receive tracking information from GPS antenna including coordinates and speed.

GPS antenna and display interface provided from the manufacturer to be included in package.

GPS Interface: Provide geographic information systems, one of which shall be Google Maps.

* + - * 1. Built-in Wi-Fi Interface: Allow automatic back-up to servers installed in a control room without the necessity of manually detaching HDD (or SSD) and connecting it to a server.

Support IEEE 801.11n (2.4 GHz) and 802.11ac (5 GHZ) dual antenna MIMO and provide the maximum of 150 Mbps of transmission assuming no interference.

Transmission bandwidth to be equivalent to finishing approximately 18 hours of recording from 16 cameras within 6 hours of backup time with the following manufacturer's camera settings.

Resolution: 2MP. 30 fps, variable bitrate control with maximum bitrate of 2.5 mbps, GOV 30, highly complex scene.

* + - * 1. Shutdown Delay and Web Command: Remotely shutdown from VMS developed by Hanwha Techwin as well as others. Shutdown delay and web command to help conserve batteries required for aforementioned archive.
        2. Fan-less and maintenance free. Able to operate without failure in temperature range specified in EN-50155.

SSD Installed: Minus 40 to 158 degrees F (minus 40 to 70 degrees C)

HDD Installed: Minus 13 to 131 degrees F (minus 25 to 55 degrees C).

* + - * 1. Meet MIL STD-810F (US Military Standard) on robustness to vibration. The relevant category is US highway truck vibration exposures and it is equivalent to ' Transportation by large truck or tractor-trailer combination ranging from 1988.4 to 3976.8 miles (3200 to 6400 km) over improved or paved highways.
        2. Input Voltage Range: 9 to 36 VDC to utilize vehicle power supply.
        3. Allow M12 connector to provide circular lock for stable cabling of network.
        4. Two types of software for remote control of the mobile NVR.

Web Viewer: Built-in web server to allow users to view live video, search for recordings, and change settings of equipment.

SSM Transportation: Video Management Software (VMS) features.

Automatic Backup: When within range of Wi-Fi or VMS is able to detect the presence of the mobile NVR, the VMS will automatically start archiving videos recorded in the mobile NVR. The archive can be continued the next time or at the next archiving station, if archive is not finished, and the users will be able to access the archive organized in a single time line regardless of when or where it is stored.

Real-time Tracking: Send tracking information including coordinates and speed on maps specified by users. The transmission will be over cellular network including 3G, 4G and LTE.

Live: Send live images, over cellular network, to VMS in JPEG format and the frame rate will be one frame per second.

Emergency Notification: Mobile NVR and VMS will have features to notify emergencies inside the vehicle. The panic button (or emergency button) which is included in the package, will give notifications to operators on the map as well as in logs. Moreover, the gyro sensor which is built inside the panic button will measure movements of the mobile NVR and hence the vehicle so that when the vehicle is in unusual orientation, it shall automatically trigger alarms and send live images to operators

* + - * 1. General Properties of NVR:

Install Wizard: Easy installation feature with plug and play allowing users to minimize installation effort and time.

Support PoE/PoE-Plus.

Cameras: DHCP configuration out of box.

Setup in cameras, mobile NVR, with the install wizard feature will finish powering cameras, ID/PW settings, date/time settings, language settings, network settings, camera registration, live and recording settings within four steps when the mobile NVR is powered on for the first time.

Camera Search and Discovery: Capable of searching network for connected compatible cameras manufactured by Hanwha Techwin and others.

If sixteen or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than sixteen cameras are searched or discovered, the NVR shall provide the ability to selectively register up to sixteen cameras.

Able to assign IP address and password for the manufacturer's cameras by its proprietary protocol.

Smart Codec: Support WiseStream, Dynamic GOV, and Dynamic fps, used by Hanwha Techwin's WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Built-in PoE-switch: Four PoE/PoE-Plus ports. Expandable up to two PoE modules, each having eight PoE/PoE-Plus ports.

Display: 16 channels in 2MP resolution, each at 30 fps. Provide automatic profile change based on number of tiles on the screen. In full screen mode, automatically display video in highest resolution the relevant camera supports.

Dewarping of video produced from fish-eye cameras via VMS or web viewer.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

Network Camera Recording Throughput: 128 Mbps.

Simultaneous Playback: 16 video channels.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Storage:

Up to 2 TB HDDs in JBOD configuration.

Up to 4 TB SSDs in JBOD configuration.

Up to 1 TB HDDs in RAID-1 configuration.

Up to 2 TB SSDs in RAID-1 configuration.

USB connection for memory/storage device for video clip backup and settings export

Detachable storage socket that allows manually connecting HDDs and SSDs to PC.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format or SEC format, a proprietary video format provided from the manufacturer with options for password protection and forgery detection.

Remote Access:

Simultaneous unicast access live: 10 users

Simultaneous multicast access live: 20 users

Simultaneous remote access search: 3 users

Mobile Device:

Supported platforms: Android and IOS

Supported Remote Users:

Live unicast: 10.

Live multicast: 20.

Playback: 3.

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections: Alarm block containing 16 Alarm-In's and six Alarm-Out's

NC (Normally closed).

NO (Normally open).

* + 1. Thirty-Two Channel Network NVR
       1. Model: XRN-2011 as manufactured by Hanwha Techwin America.
          1. Record video and audio from up to 32 network video cameras to a hard disk array of 1 to 8 HDDs and enable playback of video and audio from the hard disk array.
          2. Remote monitoring environment for video and audio over the network using a remote computer.
          3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If 32 or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) displayed.

If more than 32 cameras are searched or discovered, the NVR shall provide the ability to selectively register up to 32 cameras.

Smart Codec: Support WiseStream and Dynamic GOV, used by WiseNet IP cameras.

Dual monitor out.

Support ARB and N-Plus-1 failover for redundancy.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

Network Camera Recording Throughput: 256 Mbps.

Simultaneous playback capability up to 16 video channels.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set up triggered recording based on:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, or heat map

Storage:

Up to 8, hot-swap 6TB HDDs in RAID 5 configuration.

Up to 8, 6TB HDDs in JBOD configuration.

Support for Network Attached Storage (iSCSI).

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 8.

Outputs: 4.

* + 1. Sixty-Four Channel Network NVR:

\*\* NOTE TO SPECIFIER \*\* Delete sixty-four channel network NVR model options not required.

* + - 1. Model XRN-3010 as manufactured by Hanwha Techwin America.
         1. Record video and audio from up to 64 network video cameras to an array of 1 to 8 HDDs and enable playback of video and audio.
         2. The manufacturer is responsible for rigorous testing of NVR's reliability.

Provide a list of compatible hard disks that have been tested to guarantee reliable recording.

List to be available on manufacturer's home web page.

* + - * 1. Support N-Plus-1 failover and allow up to 32 active NVRs and one standby. Upon failure of an active NVR, a standby NVR will register all cameras once registered to the active NVR to itself and start recording video.
        2. Auto recovery backup (ARB) to transfer video that is recorded on network camera's SD cards during failures to the hard disk drive.

Allow users to set transfer speed or bandwidth dedicated for ARB in three levels; low, middle, high.

If bit-rate of video to be transferred exceeds the set bandwidth, the NVR shall transfer video in the order of channel number until transfer is finished or the video becomes more than 24 hours old based on NVR's current time.

Handle the following failures.

Network disconnection between cameras and NVR.

Unexpected shutdown of NVR.

* + - * 1. Receive text data from external devices and overlay it on live as well as recorded video. Provide search for text data and list all video with previews that is relevant to the search queries. The text shall include but not limited to the following.

Text from PoS devices; namely the texts printed on the receipt of transactions.

Text from automatic number plate recognition software.

Text from automated teller machines (ATM).

* + - * 1. Provide a remote monitoring environment for video and audio over the network using a remote computer. The remote monitoring software allows users to receive live streams, search for recoded videos, and configure devices.
        2. P2P Service: Provide easy configuration of mobile viewer. The mobile viewer to be freely available and connection with established by simply scanning QR code from a mobile device.
        3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If 64 or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than 64 cameras are searched or discovered, the NVR shall provide the ability to selectively register up to 64 cameras.

Smart Codec: Support WiseStream and Dynamic GOV used by WiseNet IP cameras. Produces visually equal video quality while reducing storage required.

Monitor Support: Dual monitor out from VGA and HDMI ports. Provide users options to choose display mode of each monitors. The options Include:

Expand Mode: Monitors from VGA and HDMI ports display two independent videos. VGA port supports resolutions up to 1080p and HDMI up to 4K.

Clone Mode: Monitors from VGA and HDMI display identical video.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

Network Camera Recording Throughput: 300 Mbps.

Compression Support: H.265, H.264, and MJPEG.

View status of connected storage hardware.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, text, ARB events, or smart search. Smart search includes options for:

Virtual line (in/out/both).

Enter and exit.

Storage: Eight, 8 TB HDDs in JBOD configuration.

USB connection for memory/storage device for video clip backup and settings export.

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB joystick.

Capture and save snapshot images.

Record current video in AVI format.

Remote Access:

Simultaneous Unicast Access: 10 users.

Simultaneous Multicast Access: 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 8.

Outputs: 4.

Allow users to select contact states of sensor inputs. The following options are available.

NC (Normally Closed).

NO (Normally Open).

* + - 1. Model SRN-4000 as manufactured by Hanwha Techwin America. 64CH 400 Mbps NVR.
      2. Model SRN-1000 as manufactured by Hanwha Techwin America. 64CH 100 Mbps NVR.
      3. Model PRN-4011 as manufactured by Hanwha Techwin America.
         1. Record video and audio from up to 64 network video cameras to a hard disk array of 1 to 12 HDDs and enable playback of video and audio from the hard disk array.
         2. Remote monitoring environment for video and audio over the network using a remote computer.
         3. General Properties of NVR:

Camera Search and Discovery: Capable of searching network for connected compatible cameras.

If 64 or fewer cameras are searched or discovered, each camera will be automatically registered and current camera information (fps, days of recording) will be displayed.

If more than 64 cameras are searched or discovered, the NVR shall provide the ability to selectively register up to 64 cameras.

Smart Codec: Support WiseStream and Dynamic GOV, used by WiseNet IP cameras to efficiently manage bandwidth.

Dual monitor out in clone and expanded modes.

Support ARB and N-Plus-1 failover for redundancy.

Recording and Playback Functions:

Support recording from 352 x 288 (CIF) up to 4000 X 3000 (12 MP) per channel.

Network Camera Recording Throughput: 400 Mbps.

Simultaneous playback capable of 16 video channels available in both local and remote.

Compression Support: H.265, H.264, and MJPEG.

View status of internal connected storage hardware with alarm features in case of malfunctioning.

Set recording schedules.

Set Up Triggered Recording Based On:

Sensor (input) detection.

Camera event (sensor, motion detection, video analytics, defocus).

Video loss detection.

Available Recording Settings by Channel: For standard and event-based recording types.

Compression type.

Resolution.

Images per second.

Quality.

Data transfer limit.

Pre-event and post-event record duration.

I-frame and full frame recording.

Available actions upon reaching full HDD storage capacity, with automatic notifications to users.

Stop recording.

Overwrite.

Search recorded data by time, event, or heat map

Storage:

Up to 12, hot-swap 8 TB HDDs in RAID 5 and RAID 6 configuration.

Up to 12, 8 TB HDDs in JBOD configuration.

Support for Network Attached Storage (iSCSI)

USB connection for memory/storage device for video clip backup and settings export.

Automatic backup based on schedule set in SSM (Techwin's VMS).

Live View:

Live, remote monitoring using Windows Network Viewer or manufacturer supplied viewer.

Configure and exercise functions for connected PTZ cameras, including functionality with compatible USB and network joystick and VMS.

Capture and save snapshot images.

Record current video in AVI format.

Record current video in SEC format with measures to prove authenticity of video.

Remote access:

Simultaneous unicast access by up to 10 users.

Simultaneous multicast access by up to 20 users.

Mobile Device Supported Platforms: Android and IOS.

Supported Remote Users:

Live Unicast: 10.

Live Multicast: 20.

Playback: 3.

Dynamic DNS (DDNS) support.

Local Monitor Outputs: VGA and High Definition (HDMI) for live viewing, playback, and backup functions.

ONVIF Profile S compliance.

Alarm Connections:

Inputs: 4 inputs (terminal block); 1 alarm reset,

Outputs: 4 outputs (terminal block).

Relay Out 1 (NO/NC/COM).

Relay Out 2: 4 (NO/COM).

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. ENCODERS AND DECODERS

\*\* NOTE TO SPECIFIER \*\* Delete encoders/decoders not required for project.

* + 1. Encoders:
       1. Model SPE-1610 as manufactured by Hanwha Techwin America. 16 Channel AHD, CVI, TVI, SD Encoder.
          1. Equipment and Materials Used: Standard components regularly manufactured and used in manufacturer's system.
          2. Systems and Components: Thoroughly tested and proven in actual use.
          3. Technical Assistance: Available toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) from manufacturer allowing immediate technical assistance for the dealer, installer, and end user at no charge long as the product is in service.
       2. Model SPE-410 as manufactured by Hanwha Techwin America. 4 Channel AHD, CVI, TVI, SD Encoder.
          1. Equipment and Materials Used: Standard components regularly manufactured and used in manufacturer's system.
          2. Systems and Components: Thoroughly tested and proven in actual use.
          3. Technical Assistance: Available toll-free (U.S. and Canada), 24-hour technical assistance program (TAP) from manufacturer allowing immediate technical assistance for the dealer, installer, and end user at no charge long as the product is in service.
       3. Model SPE-100 1CH as manufactured by Hanwha Techwin America. :
          1. Maximum of 30 fps at NTSC, and 35 fps at PAL, with 4 CIF resolution.
          2. Simultaneous Transmission of Multiple Codec: H.264, MPEG-4 and MJPEG.
          3. Memory: PoE, SD, and bi-directional audio support, and ethernet transfer of 10/100 Base-T.
          4. Electrical Specifications:

Input Voltage: 12 VDC, PoE (IEEE802.3af).

Power Consumption, max.4 W.

* + - * 1. Operational Specifications:

Video InCVBS: 1.0 Vp-p / 75 Ohm composite, NTSC/PAL auto-detection.

Video OutCVBS: 1.0 Vp-p / 75 Ohm composite, loop out.

De-Interlacing Filter: Built in.

Event trigger motion detection, alarm input, video loss.

Alarm I/O Input: 1 each; Output, 1 each (relay).

Remote Control Interface: 1 each RS-485 (half duplex).

RS-485 Protocol: Samsung-T/E, Pelco-P/D.

* + - * 1. Network Specifications:

Ethernet: RJ-45 (10/100 Base-T).

Video Compression: H.264, MPEG-4, MJPE.

Resolution:

NTSC: 704 x 480, 640 x 480, 352 x 240, and 320 x 240.

PAL: 704 x 576, 640 x 480, 352 x 288, and 320 x 240.

Framerate:

NTSC: 30 fps maximum.

PAL: 25 fps maximum.

Video Quality Compression Level:

Target Bitrate Level Control: H.264, MPEG-4.

Quality Level Control: MJPEG.

Bitrate Control: H.264, MPEG-4 VBR, CBR, or MJPEGVBR.

Streaming: 10 profiles.

Audio I/O1 each line in, 1 each line out.

Audio Compression Format: G.711 u-law.

Audio Communication: Bi-directional audio.

IPIPv4, IPv6.

Network Protocol: TCP/IP, UDP/IP, RTP (UDP), RTP (TCP), RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1, v2c, v3 (MIB-2), ARP, DNS, DDNS, and ONVIF.

Security: HTTPS (SSL) login authentication, Digest login authentication, IP Address filtering, User access log.

Streaming Method: Unicast and multicast.

User Access: 10 users at unicast.

Memory Slot: SD/SDHC.

ONVIF conformance.

Web Viewer:

Supported OS: Windows XP, Windows Vista, Windows 7, and MAC OS.

Supported Browser: MS Internet Explorer 6.0 or higher, Firefox, Chrome, and Safari.

Central Management Software: NET-i viewer.

* + - * 1. Environmental Specifications:

Operating Temperature: 14 to 122 degrees F (minus 10 to 50 degrees C).

Operating Humidity: 20 to 80 percent relative humidity.

* + - * 1. Physical Specifications:

Dimensions: 5.04 x 1.72 x 3.43 inch (128 x 44 x 87 mm).

Weight: 0.87 lbs (391 g).

Color: Silver.

Material: Metal.

* + 1. Decoders:
       1. Model SPD-150 49 Channel Decoder as manufactured by Hanwha Techwin America.
          1. Receive video from 48 analog cameras converting input to digital formats. Available Formats: H.265, H.264, and MJPEG.
          2. Ports for Simultaneous Display: HDMI, VGA, and CVBS.
          3. Maximum resolution of video from HDMI port to be up to 4K and VGA up to 1080p.

Available Resolutions:

12 MP.

8 MP.

5 MP.

3 MP.

1080 p.

720 p.

4 CIF.

* + - * 1. Hallway view modes for hallway view cameras.
        2. Allow set up and display of live video channels in the following layouts or sequence configurations.

HDMI: 1 / 4 / 6 / 8 / 9 / 13 / 16 / 25 / 36 / 2V / 3V.

VGA: 1 / 4 / 6 / 8 / 9 / 13 / 16.

* + - * 1. AAC audio codec for capturing sound in high frequency that is suitable for sound classifications.
        2. Storage Device: Provide graphical user interface available locally.
        3. PoE capable.
      1. Detailed Specifications:
         1. Operating System: Linux.
         2. Output:

HDMI: 1 ea (up to 4K resolution).

VGA: 1 ea (DB15).

CVBS: 1 ea (BNC).

* + - * 1. External:

Ethernet: 1 ea (10/100/1000 BASE-T).

USB: USB 2.0, 2 each.

Audio Out: 1 out.

* + - * 1. Power: 12 VDC, PoE.
        2. Temperature: 32 to 104 degrees F (0 to 40 degrees C)
        3. Relative Humidity: 0 to 90 percent.
        4. Video:

Codec: H.265, H.264, and MJPEG.

Maximum channel 48 at D1.

* + - * 1. Decoding: Maximum 30 fps at 8 to 12 MP.
        2. Division:

HDMI: 1 / 4 / 6 / 8 / 9 / 13 / 16 / 25 / 36 (32) / 2V / 3V.

VGA: 1 / 4 / 6 / 8 / 9 / 13 / 16.

Layout: Up to 20.

Audio Codec: G.711 / G.726 / AAC.

* + - * 1. Management: Local GUI.
        2. Time Setting: NTP and Manual.

\*\* NOTE TO SPECIFIER \*\* 19 to 32 inches (483 to 813 mm). Resolutions from 1280 x 1024 to 1366 x 768. Delete article if not required.

* 1. CONTROLLER SYSTEMS
     1. Model: SPC-7000 as manufactured by Hanwha Techwin America.
        1. Joystick: Detachable 3D (3-axis twist zoom) to control Techwin's network products including network cameras and SSM.
        2. Jog shuttle to control playback of videos.
        3. Display: 5 inch (127 mm) TFT touch LCD on which users can change settings and control PTZ.
        4. USB port to connect to a PC with SSM.
        5. Camera-tile mapping.
        6. Configuration: Import or export.
        7. Available Camera Control:
           1. PTZ.
           2. Focus.
           3. Auto focus.
           4. Preset.
           5. Group.
           6. Tour.
           7. Swing.
           8. Trace.
           9. Auto tracking.
           10. Alarm off/on.
           11. Freeze.
        8. Available Video Wall Control:
           1. Camera-tile (Channel) mapping.
           2. Layout (Display division mode) change.
        9. Take snapshots in a jpg format and store to storage device connected to its USB port.
        10. Upgrade firmware from storage device connected to its USB port.
        11. Control 255 network cameras and 1 SSM.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. ACCESSORIES

\*\* NOTE TO SPECIFIER \*\* Refer to manufacturer's literature for accessories typically required for cyber security systems. Delete accessories not required.

* + 1. Accessory Products: Provide the following, as applicable to the system selected and as scheduled on the Drawings.
       1. Motorized zoom lenses.
       2. Vari-focal lenses.
       3. Megapixel lenses.
       4. Explosion proof accessories.
       5. Backbox mounting.
       6. Smoked dome covers.
       7. Box camera housings.
       8. PTZ/Dome housings.
       9. PTZ/Dome mounts.
       10. Box camera mounts.
       11. HD CCTV accessories.
       12. Network cameras POE injectors accessories.
       13. UTP video devices.
       14. Monitor stands.

1. EXECUTION
   1. PREPARATION
      1. System Integrator: Confirm the solution proposal planning and design with the installing contractor.
      2. The network design and configuration to be verified for compatibility and performance with the input/output devices.
      3. Network Configuration: Tested and qualified by Contractor prior to remote device installation.
      4. Equipment to be tested and configured in accordance with instructions provided by the System Integrator prior to installation.
      5. All firmware found in products to be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the Video Management Application (VMA).
      6. All equipment requiring users to log on using a password to be configured with user/site-specific password/passwords. No system/product default passwords shall be allowed.
      7. Confirm hardware will be stored in an environment where temperature and humidity are in the range specified by the Manufacturer.
   2. INSTALLATION
      1. Install products per manufacturer's recommendations and approved submittals.
         1. Comply with documentation provided by the System Integrator to insure all steps have been taken to provide a reliable, easy-to-operate system.
      2. Contractor personnel must comply with all applicable state and local licensing requirements.
      3. Before permanent installation of the system, the Contractor will test the system in conditions simulating the final installed environment witnessed by the System Integrator. Adjust as required until proper operation is achieved.

END OF SECTION