

CORPUS CHRISTI REGIONAL TRANSPORTATION AUTHORITY

(EXHIBIT A)

SECURITY CAMERAS SEPCIFICATIONS

Project: RFP No. 2022-FP-19
Bear Lane Security Cameras

1.0 SECURITY CAMERAS

PNB-A9001 4K Network Box AI camera
PNM-7082RVD 2MP X 2 IR Outdoor Dome Camera
PNM-9031RV 15MP Panoramic Camera
QNO-7082R 4MP IR Bullet
QNV-7082R 4MP IR Vandal Dome
XNF-9010RV X series 12 MP sensor 360° Outdoor Fisheye
XNO-C6083R 2MP IR Bullet AI Camera
XNO-C8083R 6MP IR Bullet AI Camera
XNP-8250R 6MP, 25x, IR PTZ camera
PNO-A9081RLP 4K IR Bullet AI camera, License Plate reader

2.0 SECURITY CAMERAS

A. PNB-A9001 4K Network Box AI camera

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265 and H.264 – maximum of 30/25fps(60Hz/50Hz) at all resolution
 - b) MJPEG – maximum of 15/12fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9 aspect ratio: 3840 x 2160, 3072 x 1728, 2688 x 1520, 2560 x 1440, 1920 x 1080, 1280 x 720, 800 x 448, 640 x 360
 - b) 4:3 aspect ratio: 2592 x 1944, 2048 x 1536, 1600 x 1200, 1280 x 960, 1024 x 768, 800 x 600, 640 x 480
 - c) 5:4 aspect ratio: 1280 x 1024, 720 x 576
 - d) 3:2 aspect ratio: 720 x 480
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming up to 3 profiles.
 - 6) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 7) The camera shall provide WiseStream II , Dynamic GOV and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage.

- b. Camera – The camera device shall have the following physical and performance properties:
 - 1) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.03 lux at F1.2 in color mode and 0.003 lux at F1.2 in black and white mode.
 - 2) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120dB.
 - 3) The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
 - 4) The camera shall be able to configure 6 privacy masking areas with rectangle.
 - 5) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
 - 6) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
- c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.
 - 1) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
 - 2) Detection of logical events of specified conditions from the camera's video
 - a) Classified object type: Person/Face/Vehicle/License plate with attributes, Best Shot per object
 - b) Analytics events based on AI engine: Object detection, Directional detection, Virtual line Enter/Exit, Loitering, Appear/Disappear, Digital auto-tracking,
 - c) Analytics events: Defocus detection, Motion detection, Tampering, Audio detection, Sound classification, Shock detection
 - 3) Business Intelligence features based on AI engine
 - a) Classified object type: People counting, Queue management, Heatmap
 - 4) Attributes
 - a) Person Gender Female / Male Upper/Lower (color) Black / Gray / White / Red / Orange / Yellow / Green / Blue / Purple (up to 2 color at same time) Bag Wear Bag or Not
 - b) Vehicle Type Car(sedan/SUV/Van) / Bus / Truck / Motorcycle / Bicycle Color Black / Gray / White / Red / Orange / Yellow / Green / Blue / Purple (up to 2 color at same time)
 - c) Face Gender Female / Male Age Child / Young / Middle / Old Glasses Wear Glasses or Not
 - d) License plate
 - 5) Detection and classification of the following sound.
 - a) Scream
 - b) Gunshot
 - c) Explosion
 - d) Crashing glass
- d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
- e. The camera shall possess the following further characteristics:
 - 1) Built-in web server, accessed via non-plugin browsers including Google Chrome, IE11, MS Edge, Mozilla Firefox and Apple 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
 - a) Alarm notification triggers:
 - 1) Alarm input
 - 2) Motion detection
 - 3) Video & Audio analytics
 - 4) Network disconnect
 - b) Available notification means upon trigger:
 - 1) File Upload via FTP and E-mail
 - 2) Notification via E-mail
 - 3) Local storage (SD / SDHC / SDXC) or NAS recording at event triggers
 - 4) External output
 - 5) Move to D-PTZ preset
- 5) Pixel Counter available in the web viewer.
- 6) PoE capable including heater by PoE

2. DETAILED SPECIFICATIONS

- a. Video
 - 1) Imaging device 1/1.8" 8MP CMOS
 - 2) Image Pixels 3864(H)x2180(V)
 - 3) Scanning Progressive
 - 4) Minimum Illumination Color: 0.03Lux (F1.2, 1/30sec), B/W: 0 Lux (IR LED on)
- b. Lens:
 - 1) Focal length N/A
 - 2) Max. Aperture Ratio N/A
 - 3) Field of View N/A
 - 4) Min. Object Distance N/A
 - 5) Focus Control Simple focus
 - 6) Lens Type DC auto iris, P iris, Manual, I-CS
 - 7) Mount Type C mount, CS mount
- c. Operational Functions
 - 1) Camera Title Off / On (Displayed up to 85 characters)
 - a) W/W English / Numeric / Special characters
 - b) China English / Chinese / Numeric / Special characters
 - c) Common Multi-line (Max. 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto scale by resolution
 - 2) Day/Night Setting Auto (ICR) / Color / B/W / External / Schedule
 - 3) Backlight Compensation Off / BLC / WDR
 - 4) WDR 120dB
 - 5) Contrast Enhancement Off / On (SSDR)
 - 6) Digital Noise Reduction Off / On (SSNR5: 2D+3D Noise filter)
 - 7) Digital Image Stabilization Off / On (built-in Gyro sensor)
 - 8) Defog Off / Manual / Auto
 - 9) Motion Detection Off / On (8ea, 8-point polygonal)
 - 10) Privacy Masking Off / On (6 zones, rectangle)- Color: Grey / Green / Red / Blue / Black / White- Mosaic
 - 11) Gain Control Off / Low / Middle / High
 - 12) White Balance ATW / AWC / Manual / Indoor / Outdoor (Including Mercury and Sodium)
 - 13) Electronic Shutter Speed Min / Max / Anti-flicker (1/5 ~ 1/12,000sec)

- | | | |
|-----|---|--|
| 14) | Digital PTZ | Support (Preset, Group) |
| 15) | Image Rotation
view: 0° / 90° / 270° | Flip: Off / On Mirror: Off / On Hallway |
| 16) | Alarm I/O
(Max. 50mA) 1ea | Input 1ea / Output 1ea / DC 12V Power |
| 17) | Alarm Triggers
Disconnection | Alarm Input, Analytics, Network |
| 18) | Alarm Events | File Upload via FTP and E-mail,
Notification via E-mail, SD/SDHC/SDXC or NAS recording at event
triggers, Alarm output, Handover |
| 19) | Pixel Counter | Support |
| 20) | Storage
x 2 slots) | Micro SD/SDHC/SDXC 512GB (256GB |
| 21) | Intelligent Analytics with AI
(Person/Face/Vehicle/License plate with attributes, Best Shot per object),
Directional detection, Digital auto tracking, Enter/Exit, Loitering,
Appear/Disappear, Virtual line | Object detection |
| 22) | Business Intelligence with AI | People counting, Queue management,
Heatmap |
| 23) | Intelligent Analytics | Defocus detection, Motion detection,
Tampering, Audio detection, Sound classification, Shock detection |
| 24) | Video Out (Installation) | CVBS: 1.0 Vp-p / 75Ω composite,
720x480(N), 720x576(P)USB: Micro USB type B, 1280 x 720 |
| 25) | Memory | 4096MB RAM, 512MB Flash |
| d. | Video Streams | |
| 1) | Video compression | H.265, H.264, MJPEG |
| 2) | Resolution | 3840x2160, 3072x1728, 2592x1944,
2688x1520, 2560x1440, 2048x1536, 1920x1080, 1600x1200,
1280x1024, 1280x960, 1280x720, 1024x768, 800 x 600, 800 x 448, 720
x 576, 720x480, 640x480, 640x360 |
| 3) | Maximum Framerate | |
| a) | H.265 / H.264
resolutions | Max. 30/25fps(60Hz/50Hz) at all |
| b) | MJPEG | Max. 15/12fps(60Hz/50Hz) |
| 4) | Smart Codec | Manual Mode (area-based: 5EA) |
| 5) | WiseStream II | Support |
| 6) | Bitrate Control Method
VBR | H.265 / H.264: CBR or VBRMJPEG: |
| 7) | Streaming Capability | Multiple streaming (Up to 3 profiles) |
| 8) | Streaming method | Unicast / Multicast |
| 9) | Simultaneous Users | 20 maximum (Unicast) |
| 10) | Profile set | Max. 10 ea. |
| 11) | Interoperability
API), Open Platform | ONVIF Profile S / G / T, SUNAPI (HTTP |
| e. | Audio | |
| 1) | Audio In | Built in Mic / Line-in / External Mic
Supply voltage: 2.5V DC(4mA), Input impedance: 2K Ohm |
| 2) | Audio Out | Line out, Max. output level 1Vrms |
| 3) | Audio Compression | G.711 / G.726 / AAC Selectable, G.711
u-law 8KHzG.726 (ADPCM) 16 / 24 / 32 / 40Kbps at 8KHz, AAC-LC:
48Kbps at 16KHz |
| f. | Network | |
| 1) | Connectivity – RJ-45(10/100/1000BASE-T) | |
| 2) | Protocol | |
| a) | IP v4 / v6, TCP, UDP | |
| b) | Configuration: DHCP, LLDP | |

- c) Web service: HTTP, HTTPS
- d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/2c/3 – MIB-2, UPnP
- e) Media: RTP, RTCP, RTSP
- f) Multicast: IGMP
- g) Notifications: FTP, SMTP
- h) Remote Access: PPPoE
- 3) Serial Interface RS-485(Samsung-T, Pelco-D/P, Panasonic, Bosch, AD, GE, Vicon, Honeywell)
- 4) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
- 5) QoS – Layer 3 DSCP
- 6) Security Feature
 - a) User password protection
 - b) The device shall not provide a manufacture default password. Default password change shall be required to access the camera.
 - c) A minimal level of password complexity shall be required by the camera.
 - d) The camera shall not have a manufacture back-door password.
 - e) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - f) IP address filtering – List of allowed or blocked IP addresses
 - g) HTTPS(SSL) login authentication
 - h) HTTPS(SSL) secured communication
 - i) Digest login authentication
 - j) User access log
 - k) 802.1x authentication
- 7) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
- 8) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
- 9) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
- 10) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
- 11) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- g. Electrical
 - 1) Power
 - a) Input Voltage / Current PoE+ (IEEE 802.3at), DC 12V±10%
 - b) Power Consumption PoE+: Max 16.50W, typical 12.50WDC: Max 13.50W, typical 10.80W
- h. Mechanical And Environmental
 - 1) Color/Material Black / Aluminum
 - 2) Dimensions (W x H) 81(W)x67(H)x165(D)mm
(31.88x26.38x64.96")
 - 3) Weight 0.88 kg (1.94 lb.)
 - 4) Mount type Surface
 - 5) Temperature
 - a) Operating -10°C ~ +55°C (+14°F ~ +131°F)
 - b) Storage -50°C ~ +60°C (-58°F ~ +140°F)
 - 6) Humidity Less than 90% RH

B. PNM-7082RVD 2MP X 2 IR Outdoor Dome Camera

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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
 - a) H.265 and H.264: Max. frame rates to 30fps/25fps(60Hz/50Hz)
 - b) MJPEG: Max. frame rates to 30fps/25fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream per channel profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) Resolution selections: 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
 - 4) Simultaneous unicast access by up to 20 users
 - 5) Multicast or unicast capable
 - 6) Dynamic DNS (DDNS) support.
 - 7) WiseStream and Dynamic GOV to efficiently manage bitrate of the video stream.
- b. Camera – The camera device shall have the following physical and performance properties:
 - 1) IP66, IK10, NEMA4X rated for protection against impacts
 - 2) Auto day/night operation with removable IR cut filter
 - 3) 2D and 3D digital noise reduction
 - 4) Integral IR illumination, providing effective visibility of 15m(49.21ft) based on scene at 0 Lux when activated in Black & White mode
 - 5) 32 privacy masking regions utilizing quadrangle
- c. Intelligence and Analytics – The camera shall have a suite of integral intelligent operations and analytic functions to include
 - 1) Motion detection with eight definable detection areas, minimum / maximum object size definition.
 - 2) Detection of logical events of specified conditions from the camera's video input
 - a) Analytics events: Defocus detection, Motion detection, Tampering, Fog detection, Shock detection, Virtual area (Appear / Disappear)
*Support Audio detection, Sound classification via optional SPM-4210 I/O box
- d. Interoperability – The camera shall be ONVIF Profile S / T compliant.
- e. The camera shall possess the following further characteristics:
 - 1) Built-in web server, accessed via standard browsers including 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) Alarms and notifications
 - a) Alarm notification triggers:
 - 1) Alarm input via optional SPM-4210 I/O box
 - 2) Video analytics
 - 3) Network disconnect
 - b) Available notification means upon trigger:
 - 1) File upload via FTP and e-mail
 - 2) Notification via e-mail
 - 3) Record to local storage (SD/SDHC/SDXC card)
 - 4) Handover (PTZ Preset, Send message by

- d) Lens: 3 ~ 6mm (Optical 2x) motorized varifocal
 - 1) Max. Aperture Ratio: F2.2(Wide) ~ F3.1(Tele)
 - 2) FoV
 - a) H: 107°(Wide) ~ 56.3°(Tele)
 - b) V: 57°(Wide) ~ 31.5°(Tele)
 - c) D: 126°(Wide) ~ 64.3°(Tele)
 - 3) Min. Object Distance: 0.5m (1.64ft)
 - 4) Lens Type: Fixed iris
 - 5) Focus Control: Simple focus
- e) Pan /Tilt / Rotate
 - 1) 0 ~ 355 ° / 0 ~ 75 ° / 0 ~ 180 °
- f) DORI (EN62676-4 standard)
 - 1) Detect: Wide: 28.4m(93.22ft) / Tele: 71.8m(235.45ft)
 - 2) Observe: Wide: 11.4m(37.29ft) / Tele: 28.7m(94.18ft)
 - 3) Recognize: Wide: 5.7m(18.64ft) / Tele: 14.4m(47.09ft)
 - 4) Identify: Wide: 2.8m(9.32ft) / Tele: 7.2m(23.55ft)
- 2) IR Viewable Length: 25m(65.62ft) based on scene
- 3) Video Streams
 - a) The camera shall be able to produce 5 video profiles per channel, each of which may have the following properties:
 - 1) Encoding type: H.265, H.264, MJPEG
 - 2) Resolution: 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
 - 3) Frame rate
 - a) H.265 and H.264: Max. 30fps/25fps(60Hz/50Hz)
 - b) MJPEG: Max. 30fps/25fps(60Hz/50Hz)
 - 4) Smart Codec: Manual (5ea area), WiseStream II
 - 5) Bit rate control
 - a) H.265 and H.264: target bitrate level control, constant bit rate (CBR) or variable bit rate (VBR)
 - b) MJPEG: quality level control, variable bit rate (VBR)
 - 4) Number of multi-streaming profiles: 10 profiles per channel
 - 5) Simultaneous users (total): 20 maximum (unicast)
 - 6) Storage and Recording
 - a) The camera shall have onboard SD card storage.
 - 1) Card type: Micro SD/SDHC/SDXC
 - 2) Capacity: Up to 512GB (1 slot)
 - 3) Image content on the card shall have the ability to be downloaded to a selected destination.
 - b) NAS
- 7) Interoperability - Video streams shall be capable of supporting ONVIF protocol, profiles S / T.
- 8) Single Images - The camera shall support jpg file image screenshot and export.
- 9) Memory: 2GB RAM, 512MB Flash
- b. Network
 - 1) Connectivity: Metal shielded RJ-45(10/100/1000BASE-T)
 - 2) Protocols supported:
 - a) Transmission Control Protocol (TCP), Internet Protocol (IP) v4 and v6, User Datagram Protocol (UDP)
 - b) Configuration: Dynamic Host Configuration Protocol (DHCP)
 - c) Web services: Hypertext Transfer Protocol (HTTP), Secure HTTP (HTTPS)
 - d) Security: Secure Sockets Layer (SSL)/Transport Layer Security (TLS)

- e) Network services: Address Resolution Protocol (ARP), Bonjour, Domain Name System (DNS), Internet Control Message Protocol (ICMP), Link Layer Discovery Protocol (LLDP), Network Time Protocol (NTP), Protocol Independent Multicast-Sparse Mode (PIM-SM), Simple Network Management Protocol (SNMP v1/2c/3 – MIB-2), Universal Plug and Play (UPnP)
 - f) Media: Real-Time Transport Protocol (RTP), Real-Time Control Protocol, Real-Time Streaming Protocol (RTSP), Secure Real-Time Transport Protocol (SRTP)
 - g) Multicast: Internet Group Management Protocol (IGMP)
 - h) Notifications: File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP)
- 3) DDNS
 - a) The camera shall support DDNS services offered by the Manufacturer and other publicly available service offerings.
 - 4) Quality of Service (QoS)
 - a) Layer 3 DSCP
 - 5) Security features
 - a) TPM 2.0 (FIPS 140-2 level 2)
 - b) HTTPS(SSL) Login Authentication
 - c) Digest Login Authentication
 - d) IP Address Filtering
 - e) User access log
 - f) 802.1X Authentication (EAP-TLS, EAP-LEAP, EAP-PEAP MSCHAPv2)
 - g) Device Certificate (Hanwha Techwin Root CA, pre-installed)
 - h) Secure by default certificate
 - i) Secure OS/Boot/Storage, Verify firmware forgery
 - 6) Application Programming Interface
 - a) ONVIF Profile S / T, SUNAPI (HTTP API), Wisenet open platform
 - 7) Discovery
 - a) Manufacturer shall offer a discovery program to identify all devices of his manufacture on the network.
- c. Audio
 - 1) Audio In via optional SPM-4210 I/O box
 - 2) Audio Out via optional SPM-4210 I/O box
 - d. Electrical
 - 1) Input Voltage: PoE+ (IEEE802.3at, Class4)
 - 2) Power consumption
 - a) PoE+: Max 20W, Typical 15.5W
 - e. Mechanical And Environmental
 - 1) Material: Aluminum, Hard-coated dome bubble
 - 2) Dimensions (W x D x H): 215 x 135 x 93.2mm (8.46 x 5.31 x 3.67")
 - 3) Weight: 1330g (2.86lb)
 - a) Temperature And Humidity1Operating: -40°C ~ +55°C (-40°F ~ +131°F) / Less than 90% RH (Non-condensing)
 - b) Storage: -50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH (Non-condensing)
 - 4) Environmental Rating
 - a) IP66
 - b) IK10
 - c) NEMA4X
 - 5) RAL Code
 - a) RAL9003
 - 6) Compatible Conduit hole / Gang box
 - a) 3/4" (M25)

- b) single, double, 4" octagon, 4" square
- f. EMC & Safety
 - 1) FCC 47 CFR Part 15 Subpart B
 - a) ANSI C63.4-2014 Class A
 - 2) IC Regulation ICES-003 Issue 7
 - a) ANSI C63.4a-2017 Class A
 - 3) CE EMC-Directive 2014/30/EU
 - a) EN 55032:2015/A11:2020
 - b) EN 50130-4:2011
 - 4) UK EMC-Regulations 2016/1091
 - a) BS EN 55032:2015/A11:2020 Class A
 - b) BS EN 50130-4:2011/a1:2014
 - 5) NEMA 250-2014
 - 6) VCCI-CISPR 32:2016 Class A
 - 7) AS/NZS CISPR32:2015 Class A
 - 8) UL listed
 - 9) CE EN 50581:2012 (RoHS)
 - 10) BS EN 50581:2012 (RoHS)

C. PNM-9031RV 15MP Panoramic Camera

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265/H.264 – maximum of 20/20fps(60Hz/50Hz) at all resolution
 - b) MJPEG – maximum of 15fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 6720x2240, 5952x1984, 4992x1664, 3840x1280, 3072x1024, 1920x640, 1152x384
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming.
 - 6) The camera shall support multiple video streaming up to 3 profiles.
 - 7) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 8) The camera shall provide WiseStream II , Dynamic GOV and FPS to efficiently manage bit rate of the video stream and reduce storage.
- b. Camera – The camera device shall have the following physical and performance properties:
 - 1) IK10 rated for protection against impacts.
 - 2) True day/night operation with removable IR cut filter
 - a) Low light level operation to 0.1 lux at F1.6 in color mode and 0.01 lux at F1.6 in black and white mode. (F1.6, 1/30sec, 30IRE)
 - b) Black and White mode operation to 0 lux with IR LED on.
 - 3) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120dB.
 - 4) The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
 - 5) The camera shall be able to configure 6 privacy masking areas with rectangular zones.
 - 6) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle and rotation.

- c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.
 - 1) Analytics events: Motion detection, Tampering detection, Defocus detection, IVA (Virtual line, Enter, Exit, Appear/Disappear), Audio detection
 - a) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
 - 2) Business Intelligence: Heatmap
- d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
- e. The camera shall possess the following further characteristics:
 - 1) Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
 - 2) NAS recording option with configurable pre-alarm and post-alarm recording intervals
 - 3) Alarms and notifications
 - a) alarm notification triggers:
 - 1) Analytics
 - 2) Network disconnect
 - 3) Alarm input
 - 4) App event
 - 5) Time schedule
 - b) available notification means upon trigger:
 - 1) File upload(image): e-mail/FTP
 - 2) Notification: e-mail
 - 3) Recording: SD/SDHC/SDXC or NAS recording at event triggers
 - 4) Alarm output
 - 5) Handover (PTZ preset, Send message by HTTP/HTTPS/TCP)
 - 6) Audio clip playback
 - 4) Pixel Counter available in the web viewer.
 - 5) IP66, IK10, NEMA4X
 - 6) This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunderstroke, communication interruption.

2. DETAILED SPECIFICATIONS

- a. Video
 - 1) Imaging device 1/2.8" 5MP CMOS x 4
 - 2) Scanning Progressive
 - 3) Minimum Illumination Color: 0.1Lux (F1.6, 1/30sec, 30IRE), B/W: 0.004Lux (F1.6, 1/30sec, 30IRE), B/W: 0Lux (IR LED on)
- b. Lens:
 - 1) Focal length 4.3mm fixed
 - 2) Max. Aperture Ratio F1.6
 - 3) Field of View H: 192°, V: 56.6°
 - 4) Min. Object Distance 0.5m(1.64ft)
 - 5) Focus Control Fixed
- c. Pan/Tilt/Rotate Range
 - 1) Pan/Tilt/Rotate Range 0°~360° / 0°~60° / -
- d. Operational Functions
 - 1) IR Viewable Length WiselR 20m (65.6ft)
- 3. 4 independent zones with Auto/Manual level adjustment
 - 1) Camera Title Off / On (Displayed up to 85 characters)
 - 2) Day/Night Setting Auto (ICR) / Color / B/W / External / Schedule

- | | | |
|-----|--|--|
| 3) | Backlight Compensation | Off / BLC / WDR (120dB) |
| 4) | Contrast Enhancement | Off / On (SSDR) |
| 5) | Digital Noise Reduction | Off / On (SSNR V) |
| 6) | Motion Detection | Off / On (8ea, 8-point polygonal zones) |
| 7) | Privacy Masking | Off / On (6ea, rectangular zones)- Color:
Gray, Green, Red, Blue, Black, White |
| 8) | Gain Control | Off / Low / Middle / High |
| 9) | White Balance | ATW / AWC / Manual / Indoor / Outdoor |
| 10) | Electronic Shutter Speed | Min / Max / Anti-flicker (2 ~ 1/12,000sec) |
| | Prefer shutter control | |
| 11) | Image Rotation | Flip: Off / On Mirror: Off / On |
| 12) | Alarm I/O | 2 configurable I/O ports |
| 13) | Alarm Triggers | Analytics, Network disconnect, Alarm |
| | input, Time schedule | |
| 14) | Alarm Events | File upload(image): e-mail/FTP |
| | Notification: e-mail Recording: SD/SDHC/SDXC or NAS recording at event triggers Alarm output Handover (PTZ preset, Send message by HTTP/HTTPS/TCP) Audio clip playback | |
| 15) | Pixel Counter | Support |
| 16) | Storage | Micro SD/SDHC/SDXC 2slot Max. |
| | 512GB (256GB x 2) | |
| 17) | Analytics | Defocus detection, Motion detection, |
| | Appear/Disappear, Virtual line, Audio detection | Enter, Exit, Tampering, |
| 18) | Business Intelligence | Heatmap |
| 19) | Video Out (Installation) | Micro USB type B, 1280 x 720 |
| 20) | Memory | 8GB RAM, 4GB Flash |
| b. | Video Streams | |
| | 1) Video compression | H.265, H.264, MJPEG |
| | 2) Resolution | 6720x2240, 5952x1984, 4992x1664,
3840x1280, 3072x1024, 1920x640,
1152x384 |
| | 3) Maximum Framerate | |
| | a) H.265 / H.264 resolutions | Max. 20/20fps(60Hz/50Hz) at all |
| | b) MJPEG | Max. 15fps(60Hz/50Hz) |
| | 4) Smart Codec | Manual (5ea area), WiseStream II |
| | 5) Bitrate Control Method | H.265 / H.264: CBR or VBR MJPEG: |
| | VBR | |
| | 6) Streaming Capability | Multiple streaming (Up to 10profiles) |
| | 7) Streaming method | Unicast / Multicast |
| | 8) Simultaneous Users | Max. 20 users (Unicast) |
| | 9) Interoperability | ONVIF Profile S / G / T, SUNAPI (HTTP API), |
| c. | Audio | |
| | 1) Audio In | Mic-in / Line-in Supply voltage: 2.5V
DC(4mA), Input impedance: 2K Ohm |
| | 2) Audio Out | Line out, Max. output level 1Vrms |
| | 3) Audio Compression | G.711 u-law /G.726
SelectableG.726(ADPCM) 8KHz, G.711 8KHzG.726: 16Kbps, 24Kbps,
32Kbps, 40KbpsAAC-LC: 48Kbps at 16KHz |
| d. | Network | |
| | 1) Connectivity | Metal Shield RJ-45(10/100/1000BASE-T) |
| | 2) Protocol | |
| | a) IP v4 / v6, TCP, UDP | |

- b) Configuration: DHCP, LLDP
- c) Web service: HTTP, HTTPS
- d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/2c/3 – MIB-2, UPnP
- e) Media: RTP, RTCP, RTSP
- f) Unicast: SRTP
- g) Multicast: IGMP, PIM-SM
- h) Notifications: FTP, SMTP
- 3) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
- 4) QoS – Layer 3 DSCP
- 5) Security Feature
 - a) TPM 2.0 (FIPS 140-2 level 2) Validated
 - b) User password protection
 - c) The device shall not provide a manufacture default password. Initial password setting shall be required to access the camera.
 - d) A minimal level of password complexity shall be required by the camera.
 - e) The camera shall not have a manufacture back-door password.
 - f) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - g) IP address filtering – List of allowed or blocked IP addresses.
 - h) SRTP secured video communication for multicast.
 - i) Digest login authentication.
 - j) User access log.
 - k) 802.1X Authentication (EAP-TLS, EAP-LEAP)
 - l) Device Certificate (Hanwha Techwin Root CA)
 - m) HTTPS(SSL/TLS) login authentication and secured video communication with TLS v1.3
 - n) Disk encryption on SD card recording (AES-256)
 - o) File encryption on local disk recording via web browser (AES-256)
- 6) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
- 7) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
- 8) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
- 9) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
- 10) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- e. Electrical
 - 1) Power
 - a) Input Voltage / Current PoE+ (IEEE 802.3at, Class4), DC 12V
 - b) Power Consumption PoE+: Max 23.5W, typical 18.0W
12VDC: Max 20.5W, typical 16.0W
- f. Mechanical And Environmental
 - 1) Color/Material White / Aluminum, Hard-coated dome bubble
 - 2) RAL code RAL9003
 - 3) Dimensions (W x H) Ø253x170mm
 - 4) Weight 2.6Kg

- 5) Temperature
 - a) Operating Normal: -40°C ~ +55°C (-40°F ~ +131°F) Intermittent: -40°C ~ +60°C (-40°F ~ +140°F), 8Hrs* Start up should be above -30°C
 - b) Storage -50°C ~ +60°C (-58°F ~ +140°F)
- 6) Humidity
 - a) Operating Less than 95% RH (non-condensing)
 - b) Storage Less than 90% RH
- 7) Ingression Protection IP66, NEMA4X
- 8) Vandal Resistance IK10

D. QNO-7082R 4MP IR Bullet

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265 and H.264 – maximum of 30/25FPS (60Hz/50Hz)
 - b) MJPEG – maximum of 15FPS
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9 aspect ratio: 2560 x 1440, 1920x1080, 1280x720, 800x448, 640x360
 - b) 4:3 aspect ratio: 1280x960, 800x600, 640x480, 320x240
 - c) 5:4 aspect ratio: 720x576
 - d) 3:2 aspect ratio: 720x480
 - 4) The camera shall support unicast video streaming up to 6 users.
 - 5) The camera shall support multicast video streaming up to 3 profiles.
 - 6) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 7) The camera shall provide WiseStream II , Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
- b. Camera – The camera device shall have the following physical and performance properties:
 - 1) Built-in wiper is for get rid of water or dust initially
 - 2) IK10 rated for protection against impacts for camera body.
 - 3) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.1 lux at F1.6 in color mode and 0 lux in black and white mode with IR illumination on.
 - 4) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 5) The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
 - 6) The camera shall be able to configure 6 privacy masking areas with rectangular zones.
 - 7) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
 - 8) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.

	7)	Mount Type	Board-in Type
c.		Pan & Tilt & Rotate	
	1)	PTR Range	0°~350° / 0°~67° / 0°~355°
d.		Operational Functions	
	1)	IR Viewable Length	30m(98.42ft)
	2)	Camera Title	Off / On (Displayed up to 85 characters)
	3)	Day/Night Setting	Auto (ICR) / Color / B/W / Schedule
	4)	Backlight Compensation	Off / BLC / WDR
	5)	WDR	120 dB
	6)	Contrast Enhancement	SSDR
	7)	Digital Noise Reduction (DNR)	Support (SSNR V)
	8)	Digital Image Stabilization (DIS)	Support (built-in gyro sensor)
	9)	Defog	Support
	10)	Motion Detection	Off / On (4ea, 8-point polygonal)
	11)	Privacy Masking	Off / On (6 zones, rectangular)- Color: Grey / Green / Red / Blue / Black / White- Mosaic
	12)	Gain Control	Support
	13)	White Balance	ATW / AWC / Manual / Indoor / Outdoor
	14)	LDC	Support
	15)	Electronic Shutter Speed	Min / Max / Anti-flicker (2 ~ 1/12,000sec)
	16)	Image Rotation	Flip: Off / On Mirror: Off / On
	17)	Alarm I/O	Input 1ea / Output 1ea
	18)	Alarm Triggers	Analytics, Network disconnect, Alarm input
	19)	Alarm Events	File upload via FTP and e-mail, Notification via e-mail, SD/SDHC/SDXC or NAS recording at event triggers, Alarm output, Handover
	20)	Audio in	Line in
	21)	Pixel Counter	Support
	22)	Storage	Micro SD/SDHC/SDXC 128GB (1 slots)
	23)	Analytics	Defocus detection, Directional detection, Motion detection, Enter/Exit, Tampering, Virtual line
	24)	Memory	512MB RAM, 256MB Flash
e.		Video Streams	
	1)	Video compression	H.265, H.264, MJPEG
	2)	Resolution	2560x1440, 1920x1080, 1280x960, 1280x720, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
	3)	Maximum Framerate	
	a)	H.265 / H.264 (60Hz/50Hz)	H.265/H.264: Max. 30FPS/25FPS
	b)	MJPEG	Max. 15FPS
	4)	Smart Codec	Manual Mode (area-based: 5EA)
	5)	WiseStream II	Support
	6)	Bitrate Control Method	H.265 / H.264: CBR or VBR MJPEG: VBR
	7)	Streaming Capability	Multiple streaming (Up to 3 profiles)
	8)	Streaming method	Unicast / Multicast
	9)	Simultaneous Users	6 maximum (Unicast)
	10)	Profile set	Max. 10 ea.
	11)	Interoperability	ONVIF Profile S / G / T, SUNAPI (HTTP API), Open Platform
f.		Network	
	1)	Connectivity	RJ-45(10/100/1000BASE-T)
	2)	Protocol	
	a)	IP v4 / v6, TCP, UDP	

- b) Configuration: DHCP, LLDP
- c) Web service: HTTP, HTTPS
- d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/2c/3 – MIB-2, UPnP
- e) Media: RTP, RTCP, RTSP
- f) Unicast: SRTP
- g) Multicast: IGMP, PIM-SM
- h) Notifications: FTP, SMTP
- 3) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
- 4) QoS – Layer 3 DSCP
- 5) Security Feature
 - a) User password protection
 - b) The device shall not provide a manufacture default password. Default password change shall be required to access the camera.
 - c) A minimal level of password complexity shall be required by the camera.
 - d) The camera shall not have a manufacture back-door password.
 - e) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - f) IP address filtering – List of allowed or blocked IP addresses
 - g) HTTPS(SSL/TLS) login authentication
 - h) HTTPS(SSL/TLS) secured communication
 - i) Digest login authentication
 - j) User access log
 - k) 802.1X Authentication (EAP-TLS, EAP-LEAP)
- 6) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
- 7) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
- 8) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
- 9) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
- 10) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- g. Electrical
 - 1) Power
 - a) Input Voltage / Current PoE (IEEE802.3af, Class3), 12VDC
 - b) Power Consumption PoE: Max 11.4W, typical 8W12VDC: Max 9.6W, typical 7W
- h. Mechanical And Environmental
 - 1) Color/Material Dark grey / Aluminum
 - 2) Dimensions (W x H) Ø78.0 x 259.8mm (Ø3.07 x 10.23")
 - 3) Compatible Conduit hole 3/4"(M25)
 - 4) Gang box Single, Double, 4"Octagon
 - 5) Weight 900g (1.984 lb.)
 - 6) Temperature
 - a) Operating -40°C~+55° (-40°F ~ +131°F)
Start up should be done at -30°C or above
 - b) Storage -40°C~+60°C (-40°F~+140°F)
 - 7) Humidity

- | | | | |
|----|----|---------------------------|--|
| | a) | Operating
condensing) | Less than 95% RH (non- |
| | b) | Storage | Less than 95% RH (non-condensing) |
| 8) | | Ingression Protection | IP66 |
| 9) | | Vandal Resistance | IK10 |
| i. | | DORI | |
| | 1) | Detect (25PPM/ 8PPF) | Wide: 27m(89.86ft) / Tele:
129m(422.61ft) |
| | 2) | Observe (63PPM/ 19PPF) | Wide: 11m(35.95ft) / Tele:
52m(169.04ft) |
| | 3) | Recognize (125PPM/ 38PPF) | Wide: 6m(17.97ft) / Tele: 26m(84.52ft) |
| | 4) | Identify (250PPM/ 76PPF) | Wide: 3m(8.99ft) / Tele: 13m(42.26ft) |

E. QNV-7082R 4MP IR Vandel Dome

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265 and H.264 – maximum of 30/25FPS (60Hz/50Hz)
 - b) MJPEG – maximum of 15FPS
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9 aspect ratio: 2560 x 1440, 1920x1080, 1280x720, 800x448, 640x360
 - b) 4:3 aspect ratio: 1280x960, 800x600, 640x480, 320x240
 - c) 5:4 aspect ratio: 720x576
 - d) 3:2 aspect ratio: 720x480
 - 4) The camera shall support unicast video streaming up to 6 users.
 - 5) The camera shall support multicast video streaming up to 3 profiles.
 - 6) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 7) The camera shall provide WiseStream II , Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
- b. Camera – The camera device shall have the following physical and performance properties:
- 1) Built-in wiper is for get rid of water or dust initially
 - 2) IK10 rated for protection against impacts for camera body.
 - 3) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.1 lux at F1.6 in color mode and 0 lux in black and white mode with IR illumination on.
 - 4) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 5) The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
 - 6) The camera shall be able to configure 6 privacy masking areas with rectangular zones.
 - 7) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
 - 8) The camera shall provide video display on smart phone (iPhone,

- | | | | |
|----|-----|-----------------------------------|--|
| | 6) | Lens Type | No Iris |
| | 7) | Mount Type | Board-in Type |
| c. | | Pan & Tilt & Rotate | |
| | 1) | PTR Range | 0°~350° / 0°~67° / 0°~355° |
| d. | | Operational Functions | |
| | 1) | IR Viewable Length | 30m(98.42ft) |
| | 2) | Camera Title | Off / On (Displayed up to 85 characters) |
| | 3) | Day/Night Setting | Auto (ICR) / Color / B/W / Schedule |
| | 4) | Backlight Compensation | Off / BLC / WDR |
| | 5) | WDR | 120 dB |
| | 6) | Contrast Enhancement | SSDR |
| | 7) | Digital Noise Reduction (DNR) | Support (SSNR V) |
| | 8) | Digital Image Stabilization (DIS) | Support (built-in gyro sensor) |
| | 9) | Defog | Support |
| | 10) | Motion Detection | Off / On (4ea, 8-point polygonal) |
| | 11) | Privacy Masking | Off / On (6 zones, rectangular)- Color:
Grey / Green / Red / Blue / Black / White- Mosaic |
| | 12) | Gain Control | Support |
| | 13) | White Balance | ATW / AWC / Manual / Indoor / Outdoor |
| | 14) | LDC | Support |
| | 15) | Electronic Shutter Speed | Min / Max / Anti-flicker (2 ~ 1/12,000sec) |
| | 16) | Image Rotation | Flip: Off / On Mirror: Off / On |
| | 17) | Alarm I/O | Input 1ea / Output 1ea |
| | 18) | Alarm Triggers | Analytics, Network disconnect, Alarm input |
| | 19) | Alarm Events | File upload via FTP and e-mail, Notification via e-mail, SD/SDHC/SDXC or NAS recording at event triggers, Alarm output, Handover |
| | 20) | Audio in | Line in |
| | 21) | Pixel Counter | Support |
| | 22) | Storage | Micro SD/SDHC/SDXC 128GB (1 slots) |
| | 23) | Analytics | Defocus detection, Directional detection, Motion detection, Enter/Exit, Tampering, Virtual line |
| | 24) | Memory | 512MB RAM, 256MB Flash |
| e. | | Video Streams | |
| | 1) | Video compression | H.265, H.264, MJPEG |
| | 2) | Resolution | 2560x1440, 1920x1080, 1280x960, 1280x720, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240 |
| | 3) | Maximum Framerate | |
| | a) | H.265 / H.264 (60Hz/50Hz) | H.265/H.264: Max. 30FPS/25FPS |
| | b) | MJPEG | Max. 15FPS |
| | 4) | Smart Codec | Manual Mode (area-based: 5EA) |
| | 5) | WiseStream II | Support |
| | 6) | Bitrate Control Method | H.265 / H.264: CBR or VBR MJPEG: VBR |
| | 7) | Streaming Capability | Multiple streaming (Up to 3 profiles) |
| | 8) | Streaming method | Unicast / Multicast |
| | 9) | Simultaneous Users | 6 maximum (Unicast) |
| | 10) | Profile set | Max. 10 ea. |
| | 11) | Interoperability | ONVIF Profile S / G / T, SUNAPI (HTTP API), Open Platform |
| f. | | Network | |
| | 1) | Connectivity | RJ-45(10/100/1000BASE-T) |
| | 2) | Protocol | |

- a) IP v4 / v6, TCP, UDP
- b) Configuration: DHCP, LLDP
- c) Web service: HTTP, HTTPS
- d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/2c/3 – MIB-2, UPnP
- e) Media: RTP, RTCP, RTSP
- f) Unicast: SRTP
- g) Multicast: IGMP, PIM-SM
- h) Notifications: FTP, SMTP
- 3) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
- 4) QoS – Layer 3 DSCP
- 5) Security Feature
 - a) User password protection
 - b) The device shall not provide a manufacture default password. Default password change shall be required to access the camera.
 - c) A minimal level of password complexity shall be required by the camera.
 - d) The camera shall not have a manufacture back-door password.
 - e) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - f) IP address filtering – List of allowed or blocked IP addresses
 - g) HTTPS(SSL/TLS) login authentication
 - h) HTTPS(SSL/TLS) secured communication
 - i) Digest login authentication
 - j) User access log
 - k) 802.1X Authentication (EAP-TLS, EAP-LEAP)
- 6) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
- 7) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
- 8) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
- 9) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
- 10) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- g. Electrical
 - 1) Power
 - a) Input Voltage / Current PoE (IEEE802.3af, Class3), 12VDC
 - b) Power Consumption PoE: Max 11.4W, typical 8W12VDC: Max 9.6W, typical 7W
- h. Mechanical And Environmental
 - 1) Color/Material Dark grey / Aluminum
 - 2) Dimensions (W x H) Ø78.0 x 259.8mm (Ø3.07 x 10.23")
 - 3) Compatible Conduit hole 3/4"(M25)
 - 4) Gang box Single, Double, 4"Octagon
 - 5) Weight 900g (1.984 lb.)
 - 6) Temperature
 - a) Operating -40°C~+55° (-40°F ~ +131°F)
Start up should be done at -30°C or above
 - b) Storage -40°C~+60°C (-40°F~+140°F)

- | | | |
|----|------------------------------|--|
| 7) | Humidity | |
| | a) Operating | Less than 95% RH (non- |
| | condensing) | |
| | b) Storage | Less than 95% RH (non-condensing) |
| 8) | Ingression Protection | IP66 |
| 9) | Vandal Resistance | IK10 |
| i. | DORI | |
| | 1) Detect (25PPM/ 8PPF) | Wide: 27m(89.86ft) / Tele:
129m(422.61ft) |
| | 2) Observe (63PPM/ 19PPF) | Wide: 11m(35.95ft) / Tele:
52m(169.04ft) |
| | 3) Recognize (125PPM/ 38PPF) | Wide: 6m(17.97ft) / Tele: 26m(84.52ft) |
| | 4) Identify (250PPM/ 76PPF) | Wide: 3m(8.99ft) / Tele: 13m(42.26ft) |

F. XNF-9010RV 12MP 360 DEGREE FISHEYE

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265 and H.264 – maximum of 30/25fps(60Hz/50Hz) at all resolution
 - b) MJPEG – maximum of 30/25fps(60Hz/50Hz) at 1080x1080 resolution
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) Original view (1:1): Max.3008x3008 ~ Min.480x480
 - b) Double panorama (2:1): Max.3584x1792 ~ Min.640x320
 - c) Single panorama (4:1): Max.3584x896 ~ Min.640x160
 - d) Quad view: Max.3584x2688 ~ Min.640x480
 - e) Q1/Q2/Q3/Q4 (4:3): Max.1792x1344 ~ Min.640x480
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming up to 10 profiles.
 - 6) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 7) The camera shall provide WiseStream II , Dynamic GOV and Dynamic fps to efficiently manage bit rate of the video stream and reduce storage.
- b. Camera – The camera device shall have the following physical and performance properties:
- 1) IK10 rated for protection against impacts for camera body.
 - 2) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.39 lux at F2.2 in color mode and 0 lux in black and white mode with IR illumination on.
 - 3) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 4) The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
 - 5) The camera shall be able to configure 32 privacy masking areas with polygonal zones.
 - 6) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
- c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic

- functions.
- 1) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
 - 2) Detection of logical events of specified conditions from the camera's video
 - a) Defocus detection
 - b) Directional detection
 - c) Motion detection
 - d) Appear/Disappear
 - e) Enter/Exit
 - f) Loitering
 - g) Tampering
 - h) Virtual line
 - i) Audio detection
 - j) Sound classification
 - 3) Detection and classification of the following sound.
 - a) Scream
 - b) Gunshot
 - c) Explosion
 - d) Crashing glass
- d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
- e. The camera shall possess the following further characteristics:
- 1) Built-in web server, accessed via non-plugin browsers including Google Chrome, MS Edge, Mozilla Firefox and Apple Safari.
 - 2) The camera shall provide streaming to multiple smart phones with DDNS provided freely from the manufacturer. In addition, the application shall 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
 - a) alarm notification triggers:
 - 1) Analytics
 - 2) Network disconnect
 - 3) Alarm input
 - b) available notification means upon trigger:
 - 1) File Upload via FTP and E-mail
 - 2) Notification via E-mail
 - 3) Local storage (SD / SDHC / SDXC) or NAS recording at event triggers
 - 4) Alarm output
 - 5) PTZ preset
 - 6) Handover
 - 7) Audio playback
 - 6) Pixel Counter available in the web viewer.
 - 7) PoE capable
 - 8) IP66, IK10, NEMA4X
 - 9) This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunder stroke, communication interruption.
- f. Electrical
- 1) Power
 - a) Input Voltage / Current PoE (IEEE802.3af, Class3), 12VDC

- | | | | |
|----|----|------------------------------|---|
| | b) | Power Consumption | PoE: Max 12.95W, typical 11W12VDC:
Max 11W, typical 9.1W |
| g. | | Mechanical And Environmental | |
| | 1) | Color/Material | White / Aluminum and Hard-coated dome bubble |
| | 2) | RAL Code | White: RAL9003 |
| | 3) | Dimensions (W x H) | Ø 160x72mm(62.99x28.35") |
| | 4) | Weight | 1.1Kg(2.43lb) |
| | 5) | Temperature | |
| | a) | Operating | -40°C~+60° (-40°F ~ +140°F) |
| | 6) | Humidity | |
| | a) | Operating | Less than 95% RH |
| | 7) | Ingression Protection | IP66, NEMA4X |
| | 8) | Vandal Resistance | IK10 |
| h. | | DORI | |
| | 1) | Detect (25PPM/ 8PPF) | Wide: 34.9m(114.49ft) |
| | 2) | Observe (63PPM/ 19PPF) | Wide: 13.9m(45.60ft) |
| | 3) | Recognize (125PPM/ 38PPF) | Wide: 7.0m(22.96ft) |

Identify (250PPM/ 76PPF) Wide: 3.5m(11.48ft)

G. XNO-C6083R 2MP IR Bullet AI Camera

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265/H.264 – maximum of 60/50fps(60Hz/50Hz) at all resolution
 - b) MJPEG – maximum of 30/25fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9 aspect ratio: 1920 x 1080, 1280 x 720, 800 x 448, 640 x 360
 - b) 4:3 aspect ratio: 1280 x 960, 1024 x 768, 800 x 600, 640 x 480, 320 x 240
 - c) 5:4 aspect ratio: 1280 x 1024, 720 x 576
 - d) 3:2 aspect ratio: 720 x 480
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming.
 - 6) The camera shall support multiple video streaming up to 10 profiles.
 - 7) The camera shall support 3 virtual channel support.
 - 8) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 9) The camera shall provide WiseStream II /III, Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
 - 10) The camera shall provide WiseNR II that working based on AI engine for reduce noise and blur on image.
- b. Camera – The camera device shall have the following physical and performance properties:
- 1) IK10 rated for protection against impacts.
 - 2) True day/night operation with scheduling and options for external

- devices.
- a) Low light level operation to 0.01 lux(30fps/25fps) / 0.02 lux(60fps/50fps) at F1.4 in color mode, 0.001 lux(30fps/25fps) / 0.002 lux(60fps/50fps) at F1.4 in black and white mode.
 - b) Black and White mode operation to 0 lux with IR LED on.
- 3) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 150dB.
 - 4) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 5) The camera shall be able to configure 32 privacy masking areas with quadrangle zones.
 - 6) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
 - 7) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
- c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.
- 1) Analytics events based on AI engine: Object detection (Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/License plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion)
 - 2) Analytics events: Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear
 - a) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
 - b) Detection and classification of the following sound.
 - 1) Scream
 - 2) Gunshot
 - 3) Explosion
 - 4) Crashing glass
 - 3) Business Intelligence: People counting, Queue management, Heatmap (based on AI engine)
- d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
- e. The camera shall possess the following further characteristics:
- 1) Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
 - 2) NAS recording option with configurable pre-alarm and post-alarm recording intervals
 - 3) Alarms and notifications
 - a) alarm notification triggers:
 - 1) Analytics
 - 2) Network disconnect
 - 3) Alarm input
 - 4) App event
 - 5) Time schedule
 - b) available notification means upon trigger:
 - 1) File upload(image): e-mail/FTP
 - 2) Notification: e-mail
 - 3) Recording: SD/SDHC/SDXC or NAS recording at event triggers
 - 4) Alarm output
 - 5) Handover (PTZ preset, Send message by HTTP/HTTPS/TCP)
 - 6) Audio clip playback
 - 4) Pixel Counter available in the web viewer.
 - 5) IP66/IP67, IK10, NEMA4X

- 6) This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunderstroke, communication interruption.

2. DETAILED SPECIFICATIONS

a. Video

- 1) Imaging device 1/2.8" CMOS
- 2) Scanning Progressive
- 3) Minimum Illumination Color: 0.011Lux (F1.4, 1/30sec, 30IRE), 30/25fpsB/W: 0.0011Lux (F1.4, 1/30sec, 30IRE), 0Lux (IR ILED On), 30/25fpsColor: 0.022Lux (F1.4, 1/30sec, 30IRE), 60/50fpsB/W: 0.0022Lux (F1.4, 1/30sec, 30IRE), 0Lux (IR ILED On), 60/50fps
- 4) Video out USB: Micro USB Type B, 1280x720 for installation

b. Lens:

- 1) Focal length 2.8 ~ 12mm(4.3x) motorized varifocal
- 2) Max. Aperture Ratio F1.4(Wide) ~ F3.6(Tele)
- 3) Field of View H: 119.5°(Wide) ~ 27.9°(Tele), V: 62.8°(Wide) ~ 15.7°(Tele), D: 142.1°(Wide) ~ 32.0°(Tele)
- 4) Min. Object Distance 0.5m (1.64ft)
- 5) Focus Control Simple focus, Manual
- 6) Lens Type DC auto iris with hall sensor (IR corrected)

c. Operational Functions

- 1) IR Viewable Length WiseIR 40m (131.23ft)
- 2) Camera Title Off / On (Displayed up to 85 characters)
- 3) Day/Night Setting Auto (ICR) / Color / B/W / Schedule
- 4) Backlight Compensation Off / BLC / HLC / extreme WDR (150dB)
- 5) Contrast Enhancement SSSDR
- 6) Digital Noise Reduction WiseNR II (Based on AI engine), SSNR V
- 7) Digital Image Stabilization Support (built-in gyro sensor)
- 8) Defog Support
- 9) Motion Detection Off / On (8ea, 8-point polygonal)
- 10) Privacy Masking Off / On (32ea, Quadrangle zones)- Color: Gray / Green / Red / Blue / Black / White- Mosaic
- 11) Gain Control Off / Manual / Max Gain
- 12) White Balance ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor
- 13) LDC Support (Fill/stretch mode)
- 14) Electronic Shutter Speed Min / Max / Anti-flicker (2 ~ 1/12,000sec) Prefer shutter control (Based on AI engine)
- 15) Image Rotation Flip: Off / On Mirror: Off / On Hallway view (90° / 270°)
- 16) Digital PTZ Support
- 17) Alarm I/O 2 configurable I/O ports
- 18) Alarm Triggers Analytics, Network disconnect, Alarm input, App event, Time schedule
- 19) Alarm Events File upload(image): e-mail/FTP Notification: e-mail Recording: SD/SDHC/SDXC or NAS recording at event triggers Alarm output Handover (PTZ preset, Send message by HTTP/HTTPS/TCP) Audio clip playback
- 20) Pixel Counter Support
- 21) Storage Micro SD/SDHC/SDXC 1slot Max. 512GB
- 22) Analytics Analytic events based on AI engine:

- Object detection (Person/Face/Vehicle (car/truck/bus/bicycle/motorcycle)/License plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion)
- 23) Business Intelligence Based on AI engine: People counting, Queue management, Heatmap
 - 24) Analytics events Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear
 - 25) Memory 2GB RAM, 512MB Flash
- d. Video Streams
- 1) Video compression H.265, H.264, MJPEG
 - 2) Resolution 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
 - 3) Maximum Framerate
 - a) H.265 / H.264 Max. 60fps/50fps(60Hz/50Hz)
 - b) MJPEG Max. 30fps/25fps(60Hz/50Hz)
 - 4) Smart Codec Manual (5ea area), WiseStream II, WiseStream III (Based on AI engine support)
 - 5) Bitrate Control Method H.265 / H.264: CBR or VBR MJPEG: VBR
 - 6) Streaming Capability Unicast (20 users) / Multicast Multiple streaming (Up to 10 profiles, 3 virtual channel support)
 - 7) Streaming method Unicast / Multicast
 - 8) Simultaneous Users 20 maximum (Unicast)
 - 9) Profile set Max. 10 ea.
 - 10) Interoperability ONVIF Profile S / G / T, SUNAPI (HTTP API), Wisenet Open Platform
- e. Audio
- 1) Audio In Selectable (mic in / line in) Supply voltage: 2.5V DC(4mA), Input impedance: 2K Ohm
 - 2) Audio Out Line out, Max. output level 1Vrms
 - 3) Audio Compression G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
- f. Network
- 1) Connectivity Metal Shield RJ-45(10/100BASE-T)
 - 2) Protocol
 - a) IP v4 / v6, TCP, UDP
 - b) Configuration: DHCP, LLDP
 - c) Web service: HTTP, HTTPS
 - d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/v2c/v3(MIB-2), UPnP
 - e) Media: RTP, RTCP, RTSP
 - f) Unicast: SRTP
 - g) Multicast: IGMP, PIM-SM
 - h) Notifications: FTP, SMTP
 - 3) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
 - 4) QoS – Layer 3 DSCP
 - 5) Security Feature
 - a) UL-CAP Certified
 - b) User password protection
 - c) The device shall not provide a manufacture default password. Initial password setting shall be required to access the camera.

- d) A minimal level of password complexity shall be required by the camera.
 - e) The camera shall not have a manufacture back-door password.
 - f) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - g) IP address filtering – List of allowed or blocked IP addresses.
 - h) SRTP secured video communication for multicast.
 - i) Digest login authentication.
 - j) User access log.
 - k) 802.1X Authentication (EAP-TLS, EAP-LEAP)
 - l) Device Certificate (Hanwha Techwin Root CA)
 - m) HTTPS(SSL/TLS) login authentication and secured video communication with TLS v1.3
 - n) Disk encryption on SD card recording (AES-256)
 - o) File encryption on local disk recording via web browser (AES-256)
 - p) Mutual Authentication (Client Authentication) for secure communication
 - q) Secure OS and Security Boot
 - 6) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
 - 7) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
 - 8) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
 - 9) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
 - 10) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- g. Electrical
- 1) Power
 - a) Input Voltage PoE (IEEE802.3af, Class3), 12V DC
 - b) Power Consumption PoE: Max 12.95W, typical 10.8W 12VDC: Max 12.5W, typical 10.0W
- h. Mechanical And Environmental
- 1) Color/Material window White / Aluminum Hard-coated
 - 2) RAL Code RAL9003
 - 3) Dimensions (W x H) Ø93.4 x 276.6mm (Ø3.68 x 10.89")
 - 4) Weight 1.640Kg (3.62lb)
 - 5) Temperature
 - a) Operating -40°C ~ +55°C (-40°F ~ +131°F) NEMA TS-2: 74°C* Maximum temperature: +60°C (intermittent)* Start up should be done at above -20°C
 - b) Storage -50°C ~ +60°C (-58°F ~ +140°F)
 - 6) Humidity
 - a) Operating Less than 95% RH (non-condensing) * Humidity control /w GORE vent
 - b) Storage Less than 90% RH
 - 7) Ingression Protection IP66/IP67, NEMA4X
 - 8) Vandal Resistance IK10

- i. DORI
 - 1) Detect (25PPM/ 8PPF) Wide: 22.4m(73.47ft) / Tele: 154.6m(507.18ft)
 - 2) Observe (63PPM/ 19PPF) Wide: 9.0m(29.39ft) / Tele: 61.8m(202.87ft)
 - 3) Recognize (125PPM/ 38PPF) Wide: 4.5m(14.69ft) / Tele: 30.9m(101.44ft)
 - 4) Identify (250PPM/ 76PPF) Wide: 2.2m(7.35ft) / Tele: 15.5m(50.72ft)

H. XNO-C8083R 6MP IR Bullet AI Camera

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265/H.264 – maximum of 30/25fps(60Hz/50Hz) at all resolution
 - b) MJPEG – maximum of 15/12fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9+ aspect ratio: 2688x1520
 - b) 16:9 aspect ratio: 3328x1872, 3072x1728, 1920x1080, 1600x1200, 1280x720, 800x448, 640x360
 - c) 4:3 aspect ratio: 2592x1944, 1280x960, 1024x768, 800x600, 640x480, 320 x 240
 - d) 5:4 aspect ratio: 1280x1024, 720x576
 - e) 3:2 aspect ratio: 720x480
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming.
 - 6) The camera shall support multiple video streaming up to 10 profiles.
 - 7) The camera shall support 3 virtual channel support.
 - 8) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 9) The camera shall provide WiseStream II /III, Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
 - 10) The camera shall provide WiseNR II that working based on AI engine for reduce noise and blur on image.
- b. Camera – The camera device shall have the following physical and performance properties:
 - 1) IK10 rated for protection against impacts.
 - 2) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.04 lux at F1.3 in color mode, 0.004 lux at F1.3 in black and white mode.
 - b) Black and White mode operation to 0 lux with IR LED on.
 - 3) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120dB.
 - 4) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 5) The camera shall be able to configure 32 privacy masking areas with quadrangle zones.

- 6) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
- 7) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
- c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.
 - 1) Analytics events based on AI engine: Object detection (Person/Face/Vehicle(car/truck/bus/bicycle/motorcycle)/License plate), IVA (Virtual line/Area, Enter/Exit, Loitering, direction, intrusion)
 - 2) Analytics events: Defocus detection, Motion detection, Tampering, Fog detection, Audio detection, Sound classification, Shock detection, Appear/Disappear
 - a) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
 - b) Detection and classification of the following sound.
 - 1) Scream
 - 2) Gunshot
 - 3) Explosion
 - 4) Crashing glass
 - 3) Business Intelligence: People counting, Queue management, Heatmap (based on AI engine)
- d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
- e. The camera shall possess the following further characteristics:
 - 1) Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
 - 2) NAS recording option with configurable pre-alarm and post-alarm recording intervals
 - 3) Alarms and notifications
 - a) alarm notification triggers:
 - 1) Analytics
 - 2) Network disconnect
 - 3) Alarm input
 - 4) App event
 - 5) Time schedule
 - b) available notification means upon trigger:
 - 1) File upload(image): e-mail/FTP
 - 2) Notification: e-mail
 - 3) Recording: SD/SDHC/SDXC or NAS recording at event triggers
 - 4) Alarm output
 - 5) Handover (PTZ preset, Send message by HTTP/HTTPS/TCP)
 - 6) Audio clip playback
 - 4) Pixel Counter available in the web viewer.
 - 5) IP66/IP67, IK10, NEMA4X
 - 6) This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunderstroke, communication interruption.

2. DETAILED SPECIFICATIONS

- a. Video
 - 1) Imaging device 1/1.8" CMOS
 - 2) Scanning Progressive
 - 3) Minimum Illumination Color: 0.04Lux (F1.3, 1/30sec, 30IRE) B/W: 0.004Lux (F1.3, 1/30sec, 30IRE), 0Lux (IR ILED On)
 - 4) Video out USB: Micro USB Type B, 1280x720 for

- installation
- b. Lens:
- 1) Focal length 4.4 ~ 9.3mm(2.1x) motorized varifocal
 - 2) Max. Aperture Ratio F1.3(Wide) ~ F2.15(Tele)
 - 3) Field of View H: 112.1°(Wide) ~ 47.5°(Tele), V: 58.0°(Wide) ~ 26.6°(Tele), D: 137.5°(Wide) ~ 54.6°(Tele)
 - 4) Min. Object Distance 0.5m (1.64ft)
 - 5) Focus Control Simple focus, Manual
 - 6) Lens Type P-iris (IR corrected)
- c. Operational Functions
- 1) IR Viewable Length WiselR 40m (131.23ft)
 - 2) Camera Title Off / On (Displayed up to 85 characters)
 - 3) Day/Night Setting Auto (ICR) / Color / B/W / Schedule
 - 4) Backlight Compensation Off / BLC / HLC / extreme WDR (120dB)
 - 5) Contrast Enhancement SDDR
 - 6) Digital Noise Reduction WiseNR II (Based on AI engine), SSNR
V
 - 7) Digital Image Stabilization Support (built-in gyro sensor)
 - 8) Defog Support
 - 9) Motion Detection Off / On (8ea, 8-point polygonal)
 - 10) Privacy Masking Off / On (32ea, Quadrangle zones)-
Color: Gray / Green / Red / Blue / Black / White- Mosaic
 - 11) Gain Control Off / Manual / Max Gain
 - 12) White Balance ATW / Narrow ATW / AWC / Manual /
Indoor / Outdoor
 - 13) LDC Support (Fill/stretch mode)
 - 14) Electronic Shutter Speed Min / Max / Anti-flicker (2 ~ 1/12,000sec)
Prefer shutter control (Based on AI engine)
 - 15) Image Rotation Flip: Off / On Mirror: Off / On Hallway
view (90° / 270°)
 - 16) Digital PTZ Support
 - 17) Alarm I/O 2 configurable I/O ports
 - 18) Alarm Triggers Analytics, Network disconnect, Alarm
input, App event, Time schedule
 - 19) Alarm Events File upload(image): e-mail/FTP
Notification: e-mail Recording: SD/SDHC/SDXC or NAS recording at
event triggers Alarm output Handover (PTZ preset, Send message by
HTTP/HTTPS/TCP) Audio clip playback
 - 20) Pixel Counter Support
 - 21) Storage Micro SD/SDHC/SDXC 1slot Max.
512GB
 - 22) Analytics Analytic events based on AI engine:
Object detection (Person/Face/Vehicle
(car/truck/bus/bicycle/motorcycle)/License plate), IVA (Virtual line/Area,
Enter/Exit, Loitering, direction, intrusion)
 - 23) Business Intelligence Based on AI engine: People counting,
Queue management, Heatmap
 - 24) Analytics events Defocus detection, Motion detection,
Tampering, Fog detection, Audio detection, Sound classification, Shock
detection, Appear/Disappear
 - 25) Memory 4GB RAM, 512MB Flash
- d. Video Streams
- 1) Video compression H.265, H.264, MJPEG
 - 2) Resolution 3328x1872, 3072x1728, 2592x1944,
2688x1520, 1920x1080, 1600x1200, 1280x1024, 1280x960,
1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480,

- 640x360, 320x240
- 3) Maximum Framerate
 - a) H.265 / H.264 Max. 30fps/25fps(60Hz/50Hz)
 - b) MJPEG Max. 15fps/12fps(60Hz/50Hz)
 - 4) Smart Codec Manual (5ea area), WiseStream II, WiseStream III (Based on AI engine support)
 - 5) Bitrate Control Method H.265 / H.264: CBR or VBR MJPEG: VBR
 - 6) Streaming Capability Unicast (20 users) / Multicast Multiple streaming (Up to 10 profiles, 3 virtual channel support)
 - 7) Streaming method Unicast / Multicast
 - 8) Simultaneous Users 20 maximum (Unicast)
 - 9) Profile set Max. 10 ea.
 - 10) Interoperability ONVIF Profile S / G / T, SUNAPI (HTTP API), Wisenet Open Platform
- e. Audio
- 1) Audio In Selectable (mic in / line in) Supply voltage: 2.5V DC(4mA), Input impedance: 2K Ohm
 - 2) Audio Out Line out, Max. output level 1Vrms
 - 3) Audio Compression G.711 u-law /G.726 Selectable G.726 (ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
- f. Network
- 1) Connectivity Metal Shield RJ-45(10/100BASE-T)
 - 2) Protocol
 - a) IP v4 / v6, TCP, UDP
 - b) Configuration: DHCP, LLDP
 - c) Web service: HTTP, HTTPS
 - d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/v2c/v3(MIB-2), UPnP
 - e) Media: RTP, RTCP, RTSP
 - f) Unicast: SRTP
 - g) Multicast: IGMP, PIM-SM
 - h) Notifications: FTP, SMTP
 - 3) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
 - 4) QoS – Layer 3 DSCP
 - 5) Security Feature
 - a) UL-CAP Certified
 - b) User password protection
 - c) The device shall not provide a manufacture default password. Initial password setting shall be required to access the camera.
 - d) A minimal level of password complexity shall be required by the camera.
 - e) The camera shall not have a manufacture back-door password.
 - f) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - g) IP address filtering – List of allowed or blocked IP addresses.
 - h) SRTP secured video communication for multicast.
 - i) Digest login authentication.
 - j) User access log.
 - k) 802.1X Authentication (EAP-TLS, EAP-LEAP)
 - l) Device Certificate (Hanwha Techwin Root CA)
 - m) HTTPS(SSL/TLS) login authentication and secured video communication with TLS v1.3
 - n) Disk encryption on SD card recording (AES-256)

- o) File encryption on local disk recording via web browser (AES-256)
 - p) Mutual Authentication (Client Authentication) for secure communication
 - q) Secure OS and Security Boot
 - 6) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
 - 7) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
 - 8) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
 - 9) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
 - 10) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- g. Electrical
- 1) Power
 - a) Input Voltage PoE (IEEE802.3af, Class3), 12V DC
 - b) Power Consumption PoE: Max 12.95W, typical 11.2W 12VDC: Max 13.2W, typical 10.8W
- h. Mechanical And Environmental
- 1) Color/Material White / Aluminum Hard-coated window
 - 2) RAL Code RAL9003
 - 3) Dimensions (W x H) Ø93.4 x 276.6mm (Ø3.68 x 10.89")
 - 4) Weight 1.640Kg (3.62lb)
 - 5) Temperature
 - a) Operating -40°C ~ +55°C (-40°F ~ +131°F) NEMA TS-2: 74°C* Maximum temperature: +60°C (intermittent)* Start up should be done at above -20°C
 - b) Storage -50°C ~ +60°C (-58°F ~ +140°F)
 - 6) Humidity
 - a) Operating Less than 95% RH (non-condensing) * Humidity control /w GORE vent
 - b) Storage Less than 90% RH
 - 7) Ingression Protection IP66/IP67, NEMA4X
 - 8) Vandal Resistance IK10
- i. DORI
- 1) Detect (25PPM/ 8PPF) Wide: 44.8m(147.02ft) / Tele: 151.3m(496.29ft)
 - 2) Observe (63PPM/ 19PPF) Wide: 17.9m(58.81ft) / Tele: 60.5m(198.52ft)
 - 3) Recognize (125PPM/ 38PPF) Wide: 9.0m(29.4ft) / Tele: 30.3m(99.26ft)
 - 4) Identify (250PPM/ 76PPF) Wide: 4.5m(14.7ft) / Tele: 15.1m(49.63ft)

I. XNP-8250R 6MP, 25x, IR PTZ camera

a. Alternates: XNP-8300RW

1. GENERAL DESCRIPTION

- a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265 and H.264: Max. 30/25fps(60Hz/50Hz)
 - b) MJPEG: Max. 30/25fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9 aspect ratio: 3328x1872, 3072x1728, 2688x1520, 1920x1080, 1280x720, 800x448, 640x360
 - b) 4:3 aspect ratio: 2592x1944, 1600x1200, 1280x960, 1024x768, 800x600, 640x480, 320x240
 - c) 5:4 aspect ratio: 1280x1024, 720x576
 - d) 3:2 aspect ratio: 720x480
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming up to 128 users and multiple streaming up to 10 profiles.
 - 6) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 7) The camera shall provide WiseStream II , Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
- b. Camera – The camera device shall have the following physical and performance properties:
 - 1) IK10 rated for protection against impacts for camera body.
 - 2) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.1 lux at F1.6 in color mode and 0 lux in black and white mode with IR illumination on.
 - 3) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 4) The camera shall support digital noise reduction using both 2D and 3D noise reduction technology.
 - 5) The camera shall be able to configure 32 privacy masking areas with rectangular zones.
 - 6) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
 - 7) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
- c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.
 - 1) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
 - 2) Detection of logical events of specified conditions from the camera's video
 - a) Directional detection
 - b) Fog detection
 - c) Face detection
 - d) Motion detection
 - e) Appear/Disappear
 - f) Enter/Exit
 - g) Loitering
 - h) Tampering

- i) Virtual line
 - j) Shock detection
 - k) Audio detection with NW I/O Box (External Device)
 - l) Sound classification with NW I/O Box (External Device)
 - 3) Detection and classification with NW I/O Box of the following sound.
 - a) Scream
 - b) Gunshot
 - c) Explosion
 - d) Crashing glass
 - d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
 - e. The camera shall possess the following further characteristics:
 - 1) Built-in web server, accessed via non-plugin browsers including Google Chrome, MS Edge, Mozilla Firefox and Apple Safari.
 - 2) The camera shall provide streaming to multiple smart phones with DDNS provided freely from the manufacturer. In addition, the application shall 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
 - a) alarm notification triggers:
 - 1) Analytics
 - 2) Network disconnect
 - 3) Alarm input with NW I/O Box
 - b) available notification means upon trigger:
 - 1) File Upload via FTP and E-mail
 - 2) Notification via E-mail
 - 3) Local storage (SD / SDHC / SDXC) or NAS recording at event triggers
 - 4) Alarm output with NW I/O Box
 - 5) PTZ preset
 - 6) Handover
 - 6) Pixel Counter available in the web viewer.
 - 7) HPoE capable
 - 8) IP66, IK10(Body only), NEMA4X, NEMA-TS 2(2.2.8, 2.2.9)
 - 9) This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunder stroke, communication interruption.

2. DETAILED SPECIFICATIONS

- a. Video
 - 1) Imaging device: 1/2.8" CMOS
 - 2) Scanning: Progressive
 - 3) Minimum Illumination
 - a) Color: 0.1Lux (F1.6, 1/30sec)
 - b) B/W: 0Lux (IR LED On)
- b. Lens
 - 1) Focal length: 5~125mm(25X) zoom
 - 2) Digital zoom: 32x
 - 3) Max. Aperture Ratio: F1.6(Wide)~F3.73(Tele)
 - 4) Field of View
 - a) H: 57.42°(Wide)~2.71°(Tele)
 - b) V: 33.54°(Wide)~1.55°(Tele)
 - 5) Min. Object Distance: 3m(9.84ft)

- 6) Focus Control: One-shot AF, Focus save
- 7) Lens Type: DC auto iris
- c. PTR
 - 1) PAN: 360° Endless
 - 2) PAN Speed
 - a) Max. 700°/sec
 - b) Manual: 0.024°/sec~250°/sec
 - 3) TILT: 110° (-20°~90°)
 - 4) TILT Speed
 - a) Max. 500°/sec
 - b) Manual: 0.024°/sec~250°/sec
 - 5) Sequence: Preset(300ea), Swing, Group(6ea), Trace, Tour, Auto Run, Schedule
 - 6) Preset Accuracy
 - a) ±0.1° (±20°C by temperature at preset setting),
 - b) ±0.2° (the other temperature)
- d. Operational Functions
 - 1) IR Viewable Length: 200m(656.17ft), Wise IR
 - 2) Camera Title
 - a) Off / On (Displayed up to 85 characters)
 - b) W/W: English / Numeric / Special characters
 - c) Common: Multi-line (Max. 5), Color (Grey/Green/Red/Blue/Black/White), Transparency, Auto scale by resolution
 - d) Image: BMP 200x200 pixel
 - 3) Direction Indicator: Support
 - 4) Day/Night Setting: Auto (ICR) / Color / B/W / External / Schedule
 - 5) Backlight Compensation: Off / BLC / HLC / WDR
 - 6) Contrasts Enhancement: Off/On (SSDR)
 - 7) WDR: extreme WDR (120dB)
 - 8) Digital Noise Reduction (DNR): Support (SSNR ∇)
 - 9) Digital Image Stabilization (DIS) : Support (built-in gyro sensor)
 - 10) Defog: Support
 - 11) Motion Detection: Off / On (8ea, 8-point polygonal)
 - 12) Privacy Masking : Off / On (32 zones, rectangular)
 - a) Color: Grey / Green / Red / Blue / Black / White
 - b) Mosaic
 - 13) Gain Control: Support
 - 14) White Balance: ATW, NARROW ATW, Manual, AWC, OUTDOOR, INDOOR, MERCURY, SODIUM
 - 15) Electronic Shutter Speed: Min / Max / Anti-flicker (2 ~ 1/12,000sec)
 - 16) Image Rotation
 - a) Flip: Off / On
 - b) Mirror: Off / On
 - 17) Alarm I/O: Support with external NW I/O Box
 - 18) Alarm Triggers
 - a) Alarm Input (with NW I/O Box)
 - b) Analytics
 - c) Network Disconnection
 - 19) Alarm Events
 - a) File Upload via FTP and E-mail, Notification via E-mail
 - b) SD/SDHC/SDXC or NAS recording at event triggers
 - c) Alarm output with NW I/O Box
 - d) Handover
 - e) PTZ preset
 - 20) Pixel Counter: Support

- 21) Webpage Language: English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
 - 22) Storage: Micro SD/SDHC/SDXC 1TB (2 slots x 512GB)
 - 23) Analytics: Directional detection, Fog detection, Face detection, Motion detection, Appear/Disappear, Enter/Exit, Loitering, Tampering, Virtual line, Shock detection Audio detection with NW I/O Box, Sound classification with NW I/O Box
 - 24) Auto Tracking
 - a) Object auto tracking (Person/Vehicle)
 - b) Target lock tracking
 - 25) Water Removal
 - a) Spinning Dry
 - b) Heat film
 - 26) Memory: 4GB RAM, 512MB Flash
- e. Video Streams
- 1) Video compression: H.265, H.264, MJPEG
 - 2) Resolution: 3328x1872, 3072x1728, 2592x1944, 2688x1520, 1920x1080, 1600x1200, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240
 - 3) Maximum Framerate
 - a) H.265 / H.264: Max. 30fps/25fps(60Hz/50Hz)
 - b) MJPEG: Max. 30/25fps(60Hz/50Hz)
 - 4) Smart Codec
 - a) Manual Mode (area-based: 5EA)
 - b) WiseStream II
 - 5) Bitrate Control Method
 - a) H.265 / H.264: CBR or VBR
 - b) MJPEG: VBR
 - 6) Streaming Capability: Multiple streaming (Up to 10 profiles)
 - 7) Streaming method: Unicast / Multicast
 - 8) Simultaneous Users: Unicast (20 users) / Multicast (128 user)
 - 9) Profile set: Max. 10 ea.
 - 10) Interoperability: ONVIF Profile S / G / T, SUNAPI (HTTP API), Open Platform
- f. Network
- 1) Connectivity: Metal Shielded RJ-45(10/100BASE-T)
 - 2) Protocol
 - a) IP v4 / v6, TCP, UDP
 - b) Configuration: DHCP, LLDP
 - c) Web service: HTTP, HTTPS
 - d) Network Service: ARP, Bonjour, DNS, ICMP, NTP, PIM-SM, SNMP v1/2c/3 – MIB-2, UPnP
 - e) Media: RTP, RTCP, RTSP
 - f) Unicast: SRTP
 - g) Multicast: IGMP, PIM-SM
 - h) Notifications: FTP, SMTP
 - 3) DDNS – The camera shall support DDNS services offered by the manufacturer and others publicly available service offerings
 - 4) QoS – Layer 3 DSCP
 - 5) Security Feature
 - a) User password protection
 - b) The device shall not provide a manufacture default password. Default password change shall be required to access the camera.
 - c) A minimal level of password complexity shall be required by the camera.

- d) The camera shall not have a manufacture back-door password.
 - e) The manufacturer shall provide a tool that provides the ability to make password changes to multiple cameras at the same time.
 - f) IP address filtering – List of allowed or blocked IP addresses
 - g) HTTPS(SSL/TLS) login authentication
 - h) HTTPS(SSL/TLS) secured communication
 - i) Digest login authentication
 - j) User access log
 - k) 802.1X Authentication (EAP-TLS, EAP-LEAP)
 - l) Device Certificate (Hanwha Techwin Root CA)
 - 6) Discovery – The manufacturer shall offer a discovery program to identify all devices of them on the network.
 - 7) Configuration – The manufacturer shall offer a configuration program that remotely allows users to change settings on multiple cameras simultaneously.
 - 8) Firmware upgrade – The manufacturer shall offer a program capable of upgrading multiple cameras at the same time (not requiring access to individual cameras).
 - 9) Camera backup setting – The manufacturer shall provide a program that provides the ability to save multiple camera settings to a file and restore these camera settings if needed.
 - 10) Reporting – The manufacturer shall provide a tool that can generate a report including thumbnail view, MAC address, IP address, serial number and other camera settings.
- g. Electrical
- 1) Power
 - a) Input Voltage: HPoE (IEEE802.3bt, Class6, Type3, Injector included)
 - b) Power Consumption: HPoE (Camera only): Max 40W, typical 20W
- h. Mechanical And Environmental
- 1) Color/Material
 - a) Body: White / Aluminum
 - b) Head: Black / Polycarbonate
 - c) Hard-coated dome
 - 2) RAL Code
 - a) White: RAL9003
 - b) Black: RAL9005
 - 3) Dimensions (W x H): Ø158x293.3mm(6.22x11.55")
 - 4) Weight: 3.1Kg(6.84lb)
 - 5) Temperature
 - a) Operating
 - 1) Normal: -40°C~+55° (-40°F ~ +131°F)
 - 2) Intermittent: -40°C~+60°C (-40°F ~ +140°F)
 - 3) Start up should be done at above -30°C
 - 4) Maximum Temperature: +60°C(+140°F)
 - 5) Max Temperature based on NEMA-TS 2(2.2.7): +74°C(+165°F)
 - b) Storage: -50°C~+60°C (-58°F~+140°F)
 - 6) Humidity
 - a) Operating: Less than 95% RH (non-condensing)
 - b) Storage: Less than 95% RH (non-condensing)
 - 7) Ingression Protection: IP66, NEMA4X, NEMA-TS 2(2.2.8, 2.2.9)
 - 8) Vandal Resistance: IK10 (body only)
- i. DORI
- 1) Detect (25PPM/ 8PPF): Wide: 121.5m(398.7ft) / Tele: 2813.9m(9232.1ft)
 - 2) Observe (63PPM/ 19PPF): Wide: 48.6m(159.5ft)/ Tele:

- 1125.6m(3692.8ft)
 - 3) Recognize (125PPM/ 38PPF): Wide: 24.3m(79.7ft)/ Tele: 562.8m(1846.4ft)
 - 4) Identify (250PPM/ 76PPF): Wide: 12.2m(39.9ft) / Tele: 281.4m(923.2ft)
 - j. EMC & Safety
 - 1) FCC 47 CFR Part 15 Subpart B
- J. PNO-A9081RLP 4K IR Bullet AI camera, License Plate reader
 - 1. GENERAL DESCRIPTION
 - a. Video Compression and Transmission – The camera shall have 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.
 - a) H.265 and H.264: Max. 30/25FPS (60Hz/50Hz)
 - b) MJPEG: Max. 15fps/12fps(60Hz/50Hz)
 - 2) The camera shall be able to configure up to 10 independent video stream profiles with differing encoding, quality, frame rate, resolution, and bit rate settings.
 - 3) The camera shall be able to configure various resolution selections.
 - a) 16:9 aspect ratio: 3840x2160, 3328x1872, 3072x1728, 2688x1520, 1920x1080, 1280x720, 800x448, 640x360
 - b) 4:3 aspect ratio: 2592x1944, 1600x1200, 1280x960, 1024x768, 800x600, 640x480, 320x240
 - c) 5:4 aspect ratio: 1280x1024, 720x576
 - d) 3:2 aspect ratio: 720x480
 - 4) The camera shall support unicast video streaming up to 20 users.
 - 5) The camera shall support multicast video streaming.
 - 6) The camera shall support multiple video streaming up to 10 profiles.
 - 7) The camera shall support 3 virtual channel support.
 - 8) The camera shall be able to configure Dynamic DNS (DDNS). DDNS shall be provided with no additional cost by the manufacturer.
 - 9) The camera shall provide WiseStream II /III, Dynamic GOV and Dynamic FPS to efficiently manage bit rate of the video stream and reduce storage.
 - 10) The camera shall provide WiseNR II that working based on AI engine for reduce noise and blur on image.
 - b. Camera – The camera device shall have the following physical and performance properties:
 - 1) True day/night operation with scheduling and options for external devices.
 - a) Low light level operation to 0.03 lux at F1.2 in color mode, 0.003 lux at F1.2 in black and white mode.
 - 2) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range up to 120dB.
 - 3) The camera shall be able to produce clear images in highly contrast scenes with multi-exposure wide dynamic range.
 - 4) The camera shall be able to configure 32 privacy masking areas with quadrangle zones.
 - 5) The camera shall have the defog feature to remove fogginess of scene which can be triggered automatically from the fog detection event.
 - 6) The camera shall provide video display on smart phone (iPhone, Android) to adjust viewing angle, rotation and focus.
 - c. Intelligence and Analytics – The camera shall have a suite of intelligent analytic functions.
 - 1) Analytics events: Defocus detection, Motion detection, Tampering, Audio

- detection, Sound classification, Shock detection
- a) Motion detection with 8 definable detection areas with 8 point polygonal zones, and minimum/maximum object size.
- b) Detection and classification of the following sound.
 - 1) Scream
 - 2) Gunshot
 - 3) Explosion
 - 4) Crashing glass
- 2) LPR/ANPR – Wisenet Road AI application is pre-installed on camera.
 - a) License/Number Plate Recognition
 - b) Make/Model/Color Recognition
 - c) Black/White list notification
 - d) Smart Search (LP/NP, Country, brand, model, color)
- d. Interoperability – The camera shall be ONVIF Profile S / G and T compliant.
- e. The camera shall possess the following further characteristics:
 - 1) Micro SD/SDHC/SDXC memory card with configurable pre-alarm and post-alarm recording intervals
 - 2) NAS recording option with configurable pre-alarm and post-alarm recording intervals
 - 3) Alarms and notifications
 - a) alarm notification triggers:
 - 1) Analytics
 - 2) Network disconnect
 - 3) Alarm input
 - 4) App event
 - 5) Time schedule
 - b) available notification means upon trigger:
 - 1) File upload(image): e-mail/FTP
 - 2) Notification: e-mail
 - 3) Recording: SD/SDHC/SDXC or NAS recording at event triggers
 - 4) Alarm output
 - 5) Handover (PTZ preset, Send message by HTTP/HTTPS/TCP)
 - 6) Audio clip playback
 - 4) Pixel Counter available in the web viewer.
 - 5) This device has been verified using STP cable. The use of appropriate GND grounding and STP cable is recommended to effectively protect your product and property from transient voltage, thunder stroke, communication interruption.
 - 6) NDAA Compliant
- f. Lens
 - 1) 12-50mm lens with IR Cut Filter
- g. Housing
 - 1) Outdoor camera housing and associated mounting hardware for mounting defined camera.
 - 2) Ingress Protection: IP66
 - 3) Heater, blower, & defroster
 - 4) Power: PoE+(IEEE802.3at) / 12VDC
- h. Electrical
 - 1) Power
 - a) Input Voltage
 - 1) PoE (IEEE802.3af, Class3)
 - 2) 12VDC
 - b) Power Consumption
 - 1) PoE: Max 12.95W, typical 9.8W

- 2) 12VDC: Max 19W, typical 9.5W
- i. Wisenet Road AI LPR/ANPR/MMCR
 - 1) City Traffic Observation Solution
 - a) Speed Description Regular Speed
 - b) Lane Coverage Up to 2 lanes
 - c) Speed Limit Up to 100kmh(50mph)
 - d) Min. Forward Distance 16m(52ft)
 - e) Max. Forward Distance 46m(150ft)
 - f) Max. Horizontal Angle 25°
 - g) Max. Vertical Angle 25°
 - h) Horizontal Offset Up to 7m(24ft)
 - i) Camera Height Up to 7m(24ft)
 - 2) Highways Solution
 - a) Speed Description High Speed
 - b) Lane Coverage Up to 2 lanes
 - c) Speed Limit Up to 140kmh(60mph)
 - d) Min. Forward Distance 27m(90ft)
 - e) Max. Forward Distance 46m(150ft)
 - f) Max. Horizontal Angle 15°
 - g) Max. Vertical Angle 15°
 - h) Horizontal Offset Up to 4m(12ft)
 - i) Camera Height Up to 7m(24ft)
 - 3) Vehicle Recognition 70+ Makes, 600+ Models, 10 Colors
 - j. Mechanical And Environmental
 - 1) Color/Material: Black / Aluminum
 - 2) Dimensions (W x H): 81(W)x67(H)x165(D)mm(3.19x2.64x6.48"),
 - 3) Weight: 880g (1.94 lb.)
 - 4) Temperature
 - a) Operating: -10 °C ~ 55 °C (-14°F ~ +131°F)
 - b) Storage: -50°C ~ +60°C (-58°F ~ +140°F)
 - 5) Humidity
 - a) Operating: Less than 95% RH (non-condensing)
 - b) Storage: Less than 90% RH (non-condensing)
 - k. EMC & Safety
 - 1) FCC 47 CFR Part 15 Subpart B
 - a) ANSI C63.4-2017 Class A
 - 2) IC Regulation ICES-003 Issue7
 - a) CAN/CSA CISPR 32-17 Class A
 - 3) CE EMC-Directive 2014/30/EU and 2011/65/EU
 - a) EN 55032:2015/A11:2020
 - b) EN 50130-4:2011
 - c) EN 610003-2:2014
 - d) EN 610003-3:2013
 - 4) VCCI-CISPR 32:2016 Class A
 - 5) AS/NZS CISPR32:2015 Class A
 - 6) UL listed
 - 7) CE EN 50581:2012 (hazardous substances)