ULC

Ultra Low rate video Codec

Real time video over bandwidth constrained networks

- Peak Rate Control
- High Resolution Snapshot Mode
- Mobile / Rugged Hardware
- Extended Field Operation Time (10 hours+)

Product application range

This product ULC is a technology that specializes in processing high-tech video transmission, and it has a wide range of applications.

Example 1: High-risk product industrial factory video transmission technology (this technology can provide radio transmission and satellite signal transmission and even use mobile phone 4G transmission to achieve transmission effects), to avoid providing real-time video to managers before any disaster occurs Correct judgment can also provide normal industrial management personnel to achieve the goal of industrial safety within a safe and controllable range.

Example 2: In the general fire scene, it can provide real-time frequency signals to the central management center to make correct decisions, so as to minimize the disaster damage. This product can be greatly used for general industrial plant fires, family houses or even forest fires to reduce damage.

Example 3: The video transmission of maritime ships can provide correct information to the ship management company in the prevention of pirate operations on merchant ships and the blind spots in the cabin, so as to achieve the effect of direct orders issued by the superior to the crew.

Application 4: All kinds of ocean-going fishing boats' fish detection equipment data and real-time video of weather and walruses can use this product to transmit real-time data to the shipowner's professionals, and make the right decision to achieve the commercial goal of catching fish.

Example 5: Real-time supervision of coastal defense lines in various countries and regions. This product can compress all kinds of weather-affected videos and transmit reliable real-time video signals to the control center.

Example 6: This product meets the quality requirements of military specifications. It can be used in tanks, military vehicles, airports, and amphibious landing and anti-terrorism hostage rescue operations to provide accurate video information and make correct judgments for superiors.

Video transmission from the battlefront

Satellite networks

Sharing vital situational awareness information with command structures using the satellite network

Tactical radio

Video transmission using the existing network infrastructure

Comparison between ULC and conventional video encoding

Ultra low rate video compression technology HEVC_ULC

HEVC-ULC (Ultra Low-rate video Codec l is a next generation video compression technology at the core of ULC. Based off H.265,the HEVC-ULC encoding algorithm offers significantly improved coding efficiency at low data rates. So when compared with the conventional codecs, such as H.264, the video compression is optimized with a bandwidth reduction rate of up to 60%.

Peak rate control

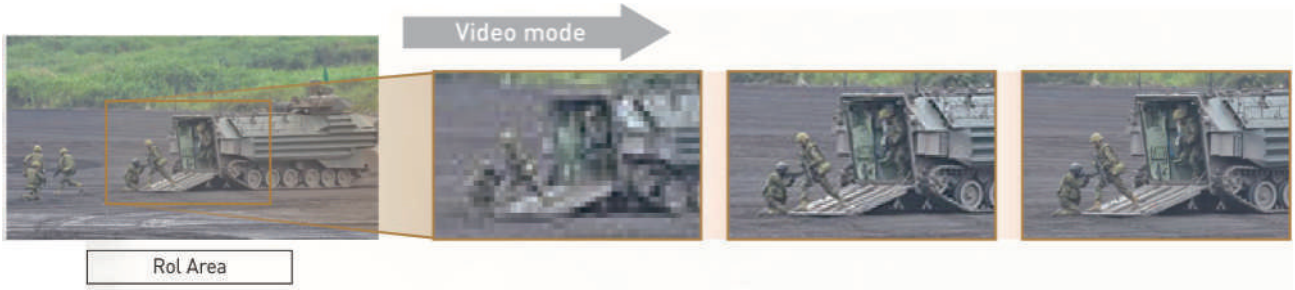
HEVC-ULC exercises peak rate control by fixing the upper limits of the data rate and then clipping any video data that exceeds this peak limitation. Peak rate control ensures the network conditions are not exceeded enabling video to be sent over even the most unstable networks without experiencing drops in video quality.

Rol (Region of Interest)

The Rol feature allows the user to select an area of interest and enhances the picture in the selected region, sharpening it to a clear image quality all whilst still maintaining peak rate control.

Snapshot mode

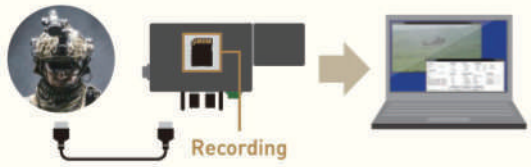
Snapshot mode is a feature that sharpens the image in a focused area to a higher picture quality by transitioning from video to a still image. The mode can also be used with an Rol area selected to improve the picture sharpness further and expanded it to the remainder of the display.



Recording and playback modes

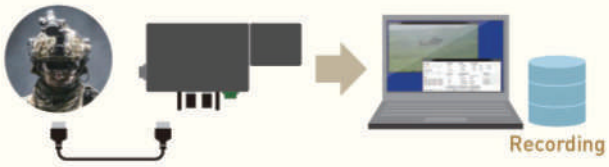
Recording Local Recording

Users can record video on local storage
and transmit over a low bandwidths



Recording Receiver Side

Receiver side users can record the live video streams
and replay in the decoder suite



Battery operation

Video can be transmitted from the field without an additional power source

Specifications

ULC encoder

ULC-E2000M

Model		ULC-E2000M
Video	Resolution	128×96~1920x1080
	Codec	HEVC_ULC®
	Framerate	0.25~30fps
	Bitrate	HEVC_ULC® : 5kbps~1Mbps
Protocol		TCP/IP、UDP/IP
I/O	Video In	1x HDMI 1x composite video (via USB port)
	Network	10/100BASE-TX
	Other	1x USB2.0 A-type
Power		DC 9V-16V Battery
Environmental		IP65 / MIL-810G (Planned)
Operating temperature / humidity		Operating Temp : -10℃ ~ +55℃ Humidity : 10% ~ 90% (Non Condensing)
Dimensions and Weight		Dimensions : W162 x H60 x D110 mm (excl. battery) Weight : Less than 1.5 kg (excl. battery)

※K-cipher2 encryption (optional)

ULC decoder suite

ULC-D2000M

Model		ULC-D2000M
Video	Resolution	128×96 ~ 1920x1080
	Codec	HEVC_ULC®
	Framerate	0.25~30fps
	Bitrate	HEVC_ULC® : 5kbps~1Mbps
Protocol		TCP/IP、UDP/IP
I/O	Video Out	1x HDMI
	Network	1x 10/100/1000BASE-T
	Other	2x USB 3.0、1x USB 2.0、1x Serial Connector、1x Display Connector (Analog RGB)、1x Headset Terminal (Mic in / Audio out)
Power		AC Adaptor (Input : AC100V~240V)
Environmental		IP65 / MIL-STD-810G
Operating temperature / humidity		Operating Temp : -10℃ ~ +50℃ Humidity : 30% ~ 90% (Non Condensing)
Dimensions and Weight		Dimensions : W313 x H46.1 x D288.4 mm Weight : 2.76kg

Real time video over bandwidth constrained networks

Video Transmission Solution for Satellite and IP Radio

Due to the limitations of communications infrastructure there are still many challenges in delivering video over wireless networks in locations worldwide.

- Satellite links have expensive data costs
- Poor video transmission quality when using mobile network
- Network latency and bandwidth congestion
- Lack of 3G/4G/LTE coverage worldwide
- Limited available bandwidth on military and tactical IP radio networks

ULC is designed to overcome these limitations. Powered by HEVC-ULC®, a codec we developed to transmit high quality real-time video over bandwidth constrained and unstable networks, it manages extreme fluctuations in bandwidth and spikes in latency to distribute video images stably in real time. So even in environments where fixed lines cannot be used, such as during military or disaster relief operations, it is possible to rapidly construct a mobile video transmission network using 3G/4G/LTE/IP radio or satellite links.

Applications

Video transmission from marine locations

In marine and coastal locations video can be transmitted over narrowband satcom networks with minimal latency. So operators in the field from the Coast Guard can maintain situational awareness even during critical operations like search and rescue misions.

When mainstream networks are down

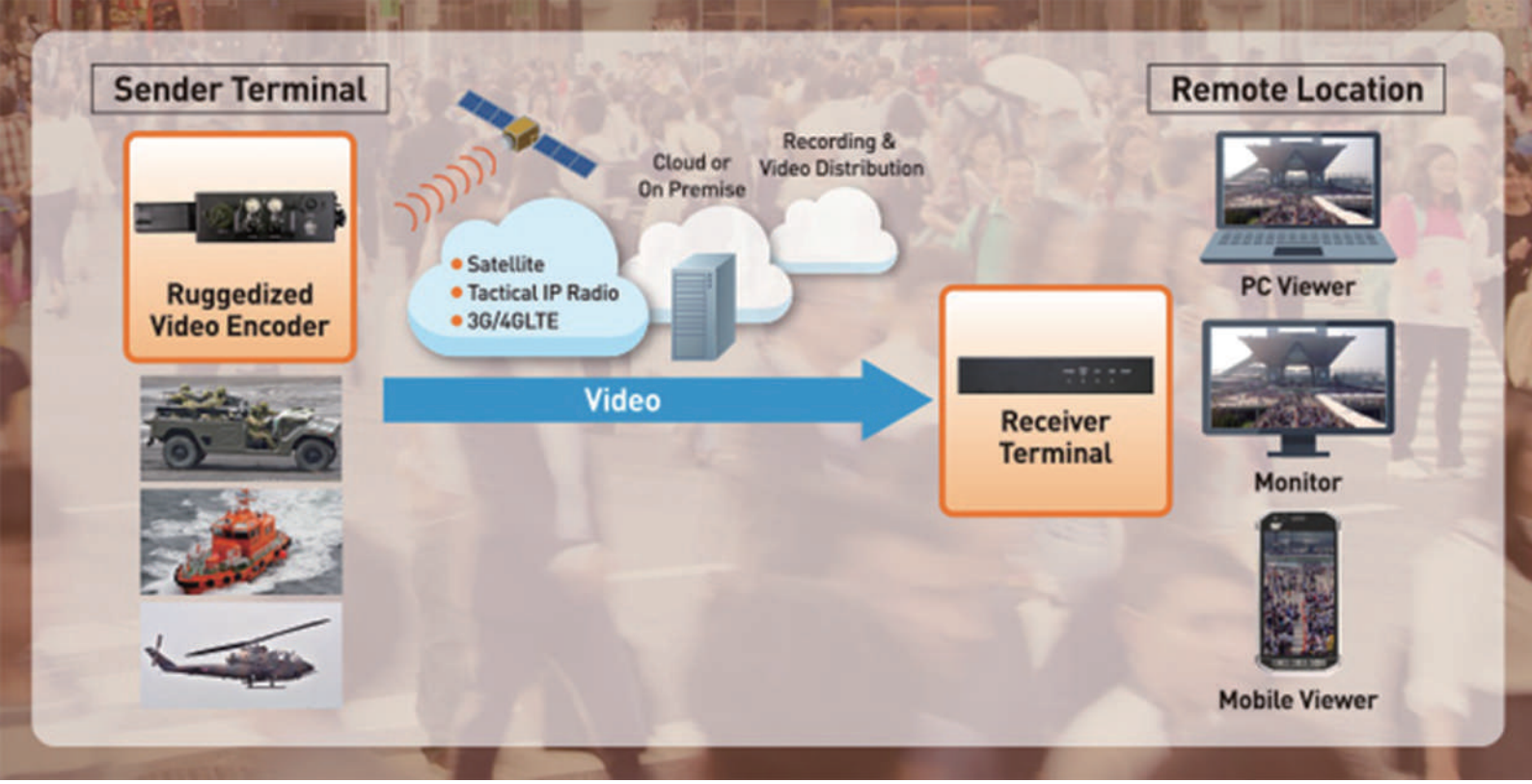
Even when mainstream networks are down due to natural disasters or the like, it is possible to transmit high-quality video using methods such as satellite and dedicated radio.

In depopulated areas that only have 3G access

High-quality video transmission is possible using narrowband lines even in depopulated areas where the only access is via 3G, such as remote mountainous and marine locations

Vehicle mounted video transmission

Stable unbroken video can be transmitted from vehicle mounted camera sources whilst on the move.



Video transmission over satellite

HEVC-ULC® s peak rate control feature allows video to be transmitted stably over satellite networks; free from both block noise and jitter issues. Codecs that use auto rate control suffer under the variable network conditions due to latency in the back channel. By the time the codec has adjusted, the available bandwidth had already changed leading to broken video feeds at mission critical moments. HEVC-ULC® uses peak rate control to fix the bandwidth parameters and buffers the packets, this protects against the extreme bandwidth fluctuations found in satellite environments.

Multi-point distribution

ULC supports multiple distribution methods including P2P (peer to peer), streaming via web server to multiple viewers, and conference distribution between three locations. Additionally, by using our VMS system; multipoint distribution, recording and image recognition are possible either via cloud or on-premise.

Packet level security

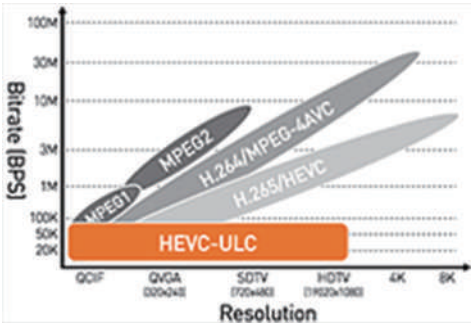
ULC uses KCipher-2, a high-speed packet level encryption cipher which can process 7 to 10 times higher than AES based algorithms. It follows the international standard, ISO/IEC 18033-4 and is recommended by the Ministry of Internal Affairs (MIC) and Communications and the Ministry of Economy. Trade and Industry (METI) in Japan. Other encryption ciphers can also be implemented to comply with national requirements.

Real-time wireless video transmission

HEVC-ULC® constantly monitors bandwidth fluctuations from the source image and feeds it back to the encoder in real time. The codec then works with this information to perform strict peak bandwidth control and image optimization without exceeding the specified bandwidth. This technology allows for stable, high-quality video communication even in severely limited wireless networks such as over satellite or dedicated military frequencies.

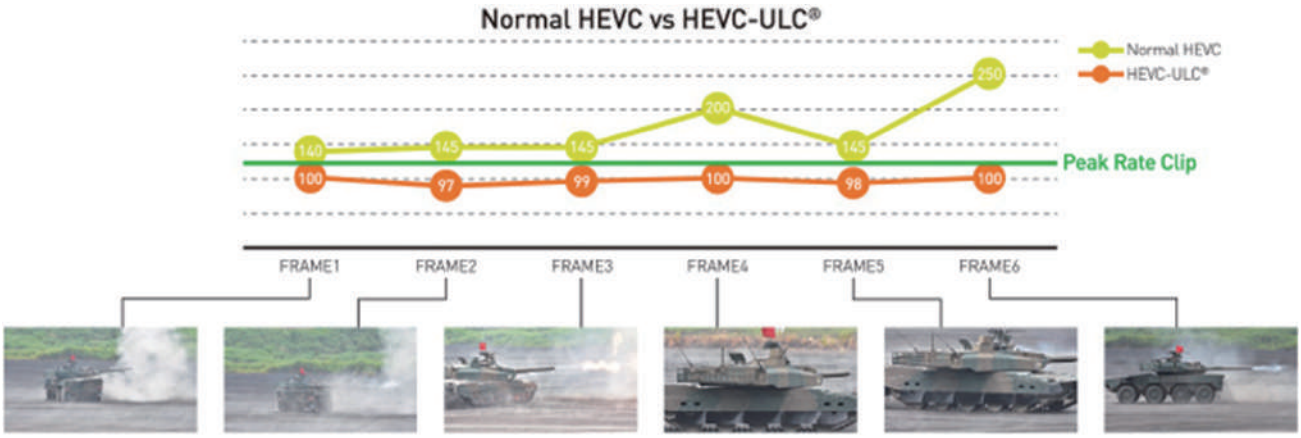
HEVC-ULC®

HEVC-ULC®[Ultra Low-rate video Codec] is our proprietary video codec technology at the core of ULC. It was developed with the aim of overcoming the limitations of sending high quality video data in bandwidth constrained and unstable networks. By optimizing video transmission at a rate of 60% bandwidth reduction on H.264 and controlling the peak of bandwidth fluctuations we can achieve stable video at data rates of less than 100kbps.



Peak Rate Control

HEVC-ULC® exercises peak rate control by fixing the upper bit rate limit and clipping the peak rate of the video transmission so the limitations of the network are not exceeded. Through this technology it is possible to send video over the network without experiencing drops in video quality. High quality video transmission can be achieved in 3G, LTE, NB-IoT and satellite networks such as Inmarsat BGAN by using HEVC-ULC® optimized video at a data rates of under 100kbps

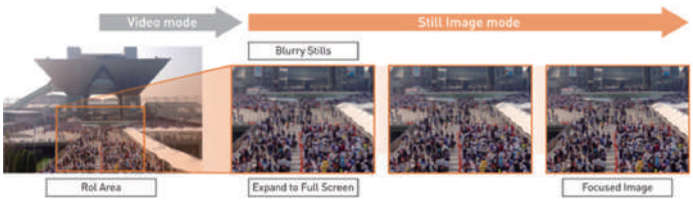


RoI (Region of Interest]

The RoI feature enhances the picture.in the selected region, sharpening it to a clear image quality whilst still maintaining bandwidth at under 100kbps. This area can be selected during operation with either KVM or touchscreen controls.

Still Image Mode

Still image transition mode is a feature that sharpens the image in a focused area to a higher picture quality by transitioning from video to a still image. The RoI area gradually improves, which can then be expanded to the remainder of the display.

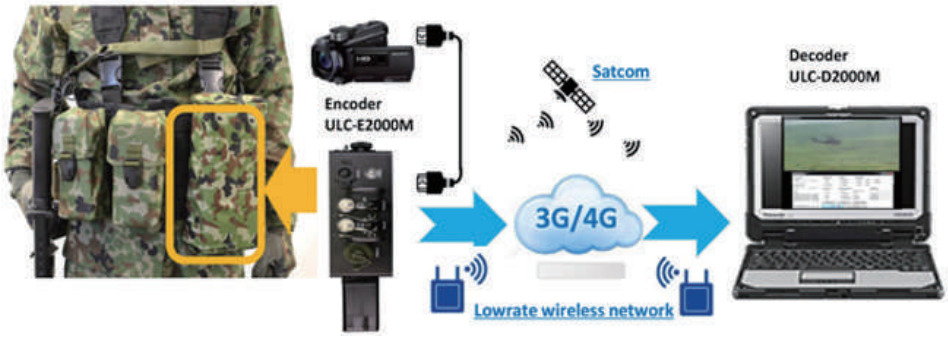


LUC-E2000M

ULC is an ultra low rate video codec designed for bandwidth constrained environments. It enables good quality actionable video to be transmitted even when networks are constrained and sufficientbandwidth cannot be secured, such as over SatComs, congested LTE lines, and other unstable wireless communication environments.

< Features >

- Good actionable video transmission even when available bandwidth is below 100 kbps
- Peak rate control: strictly controlled bandwidth use so that the peak bit rate does not exceed a set level
- Region of Interest:sharpens image quality in selectable area of interest



Specification

Model		ULC-E2000M
Video	Resolution	128×96 ~ 1920×1080
	Snapshot mode	1920×1080
	Codec	HEVC_ULC®
	Frame Rate	0.25 ~ 30fps
	Bit Rate	HEVC_ULC®: 5kbps ~ 1Mbps
SupportedProtocol		TCP/IP、UDP/IP
I/O	VideoIn	1x HDMI
	Network	10/100BASE-TX
	Other	1x USB3.0 A-type
Power		DC 24V -30V
Environmental		IP67 / MIL-810G (planned)
Operating temperature / Humidi		Operatingtemp-10℃ ~ +60℃/ Humidity 10% ~ 90% (No condensing)
Dimensions / Weight		(W)162x (H)60 x (D)110 mm (Excldbattery) less than 1.5kg (Excldbattery)

*Final spec is subject to change without warning during development

ULC-D2000M

ULC is an ultra low rate video codec designed for bandwidth constrained environments. It enables good quality actionable video to be transmitted even when networks are constrained and sufficientbandwidth cannot be secured, such as over SatComs, congested LTE lines, and other unstable wireless communication environments.

Specification

Model		ULC-D2000M *software only
Video	Resolution	128×96 ~ 1920×1080
	Snapshot mode	1920×1080
	Codec	HEVC-ULC
	Frame Rate	0.25 ~ 30fps
	Bit Rate	HEVC-ULC: 5kbps ~ 1Mbps
SupportedProtocol		TCP/IP、UDP/IP

PC Spec Minimum Requirements

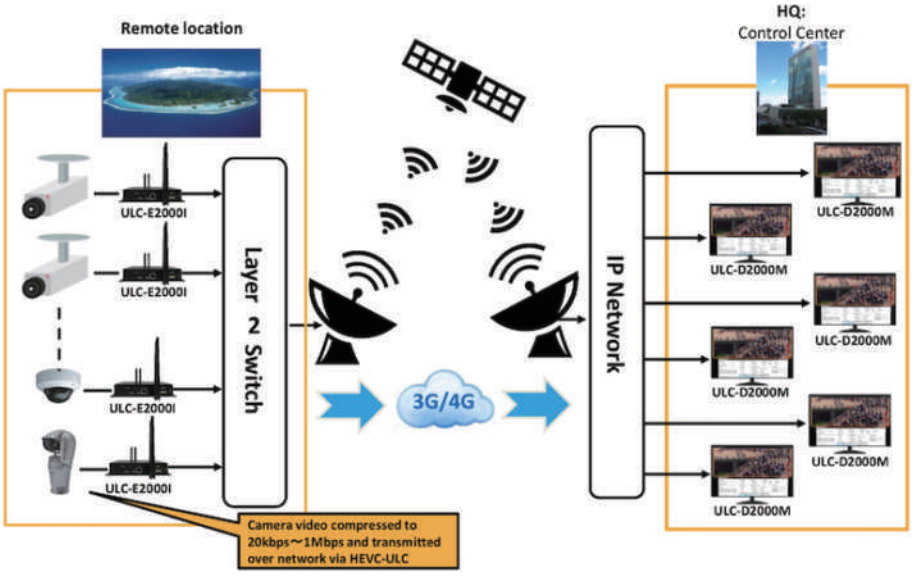
OS	Windows 10
CPU	Intel Core i5 2.4GHz
RAM	4GB
Hard Disk	20GB

GUI Settings

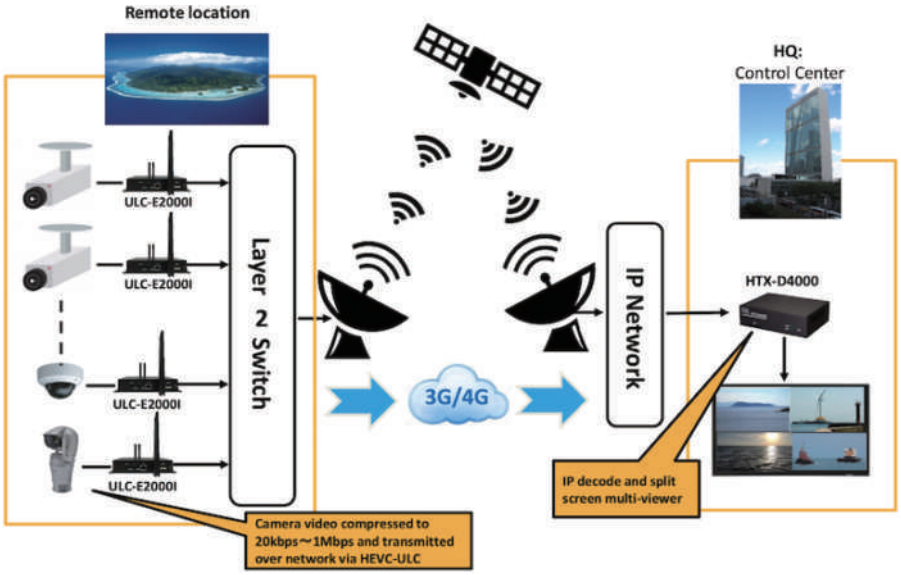
ULC-E2000I

ULC-E2000I is designed for live video streaming over constrained and narrowband networks in industrial and commercial applications. Whether you wish to transmit video over variable low throughput satellite network services, narrowband LPWANs or other bandwidth constrained environments ULC-E2000I provides the reliability. Ideal for remote locations and last mile connectivity scenarios.

Remote camera system: Point to Point



Remote camera system: Multiview



ULC-E-Mod

OEM ULC Video Encoder Module

ULC-E-Mod is a military spec ultra low rate video encoder module; a compact OEM module that supports HEVC-ULC encoding up to 1080p. The module provides an optimal platform for UAV solutions that require low latency and low bit rate for video streaming and recording applications.

< Features >

- Good quality video transmission even under 100 kbps(encoding bitrate from 5kbps ~ 1 Mbps)
- Peak Rate Control: strictly controlled upper bit-rate provides stable video over unstable networks
- Region of Interest: sharpen video to clearly view the area of interest in detail

< Application >

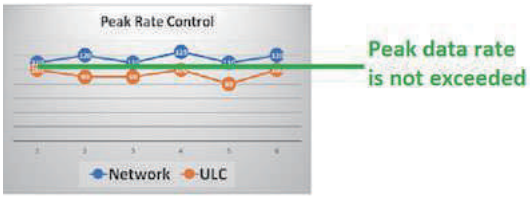
- UAV solution
- Satellite video communication
- Video security system
- Connected car
- Body worn camera
- CCTV
- LPWA video communication

< Bit Rate Control >

ULC ultra-low rate video codec has various live video streaming features that enable optimal transmission according to the network conditions. streaming and recording applications.

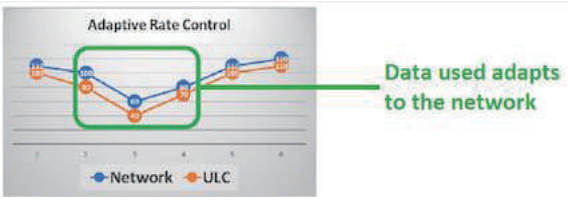
Peak Rate Control Mode (Real time video)

Data used does not exceed the preset data rate parameters



Adaptive Rate Control Mode (Real time video)

Data used adapts to match the data rate available on the network



Specification

Model		DS-BD-GUYQ4-MAIN
Video	Resolution	128×96 ~ 1920×1080
	Snapshot mode	1920×1080
	Codec	HEVC-ULC®
	Frame Rate	0.25 ~ 30fps
	Bit Rate	5kbps ~ 1Mbps
Supported Protocol		TCP/IP, UDP/IP
I/O	Video In	1x HD-SDI, 1x composite video(USB In)
	Network	100BASE-T
	Other	1x USB2.0 A-type
Power		DC +9V ~ +16V, equal or higher than 1A
Operating temperature /		-10℃ ~ +50℃/
Humidity		10% ~ 80%（Non-condensing）
Dimensions		136mm×60mm

*Final spec is subject to change without warning during development

Interface