

WAVE 4G Live Streaming Audio Video GPS unit



Wave4G is a Video, Audio, Gps store&forward unit, stereo, miniaturized and has been developed for covert surveillance use.

This unit is able to perform video surveillance in stream mode, as well as recording video at high resolution, thanks to interchangeable micro cameras, up to 5 Mpixel, allowing to optimize the video surveillance operations.

The audio features allow the live listening streaming and the stereo recording at high quality, with sampling rate up to 48Khz, low noise and high dynamic.

The GPS feature enables to know the position of the unit Wave4G, so to detect the unit when installed on a vehicle, and/or combine the GPS position to the video/audio surveillance document survey.

The Live streaming mode connection and the download of the files Video/Audio/Gps are possible connecting to the mobile network.

4G-LTE and fall-back 3G-UMTS mode, using an internal AES-128 encrypted memory up to 128GB.

Besides, it is available the connection through WI-Fi band 2.4Ghz, so to use the unit Wave4G on Wi-Fi client via local router or use the Wave4G for creating direct secure Access Point for fast and direct local connection.

The files are saved on a solid state memory, and can be downloaded and managed remotely.

Versions available:

- Wave4G SLIM Dimension: 57x63x15mm in aluminium case, without battery
- Wave4G CUBE Dimension: 57x63x30mm in aluminium case, battery inside 2000mA
- Wave4G PLANAR Dimension: 76x63x23mm in aluminium case, battery inside 2000mA



Technical specs:

- Video resolution Live Stream video high quality Mpeg4 H264 up to 1920x1080, 25 fps, and M-JPEG mode
- Live Stream audio stereo AAC 48Khz
- Codec formats supported in recording mode: AAC/FLAC/MP3
- Storing capability: internal memory 128GB, expandable with external USB Mass Storage up Tera*
- Encryption AES-128
- Connection direct to static IP to Police headquarter Server, via Open VPN or IPSEC data encrypted tunnelling
- Web Server Interface to set the unit, integrated in, to manage audio & video live streaming of the unit Wave4G
- Data connection through 4G/LTE Global band network, with transfer speed up to 50Mbps (LTE-CAT4).
- VOX audio graphic setting with threshold, and SMS alarm if the audio captured is up to the selected threshold level.
- Voice call directly to the phone number placed in the Wave4G; in this case the call is protected via DTMF code.
- Wi-Fi 2.4Ghz, to manage live audio & video and file transfer
- GNSS/GPS with tracking position through satellites GPS, Galileo and Glonass.
- Internal stereo Microphone high sensitivity
- Optional external stereo microphones' cable, water-proof version available
- Setting also through function and program via SMS, and remote HW reset.
- Accelerometer sensor with alarm via SMS *
- GPS area alarm inside and outside *
- Download of the recording through server FTP *
- Bluetooth embedded, for connecting external wireless microphone *
- Play Day function for streaming the recording file directly in the screen, selecting the time and data to see the video record file on demand.
- GPS Play data historic tracking with multimedia preview stored in the GPS track
- Battery low level alarm via SMS, and automatic Power OFF for preserving the file in safe mode
- Ethernet LAN Port optional to connect to network 10/100Mbps
- Car DC/DC 12V to 5V adapter available as optional for car use installation
- Consumption Battery Life: based on version and configuration, on average the consumption is as follows: with all services on, including GPS, recording and streaming, consumption is about 500mA. During the registration phase the consumption is 200mA

NOTE: *Software Function is Under development, the functions marked with an asterisk will be made available free of charge with subsequent software updates.

DEM SOLUTIONS SRL

Sede Legale/Legal Seat: Via Piazzzi, 58- 10129 Torino- Italia

Sede Operativa/ Office: Via Isonzo 6- Chivasso (TO)- Italia

P. I.V.A/ Vat Number: IT11563660015

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WAVE4G SYSTEM CASE CONTENT

ITEM	NUMBER OF PCS	PICTURE
WAVE 4G UNIT AUDIO VIDEO And Case bag	1	
SMA 4G/3G Antenna	1	
GPS Car Antenna	1	
Micro Camera 5Mpix	1	
USB recharging cable for WAVE4G STORE & FORWARD	1	
110/240V charger for WAVE4G unit	1	
Usb Key with user manuals and rec software	1	

WAVE4G STORE & FORWARD

The WAVE4G Store&Forward is a streaming IP unit based on 4G-LTE technology, equipped with audio video recording and GPS functions, and live streaming via mobile phone network 4G.

"Live streaming" audio listening functionality is able to detect sounds (for example: human voice, ambient noise) in a remote environment with a microphone, then transmitting them through the data connection to the mobile 4G network. So these sounds will be reproduced in real time at the local listening location.

The data connection is made via a 4G network to a remote server installed at the management centre, where a virtual machine with a Windows or Linux operating system, connects the remote unit Wave4G to the Receiver points.

The WAVE4G Store&Forward device is managed via a Web Server software contained in the WAVE4G unit. The information is displayed via WEB pages in HTML format, using a common display browser via multimedia devices connected to the remote server. To ensure the security of the data connection, the WAVE4G STORE & FORWARD uses a Gateway to create a private data network VPN, using the public Internet network.

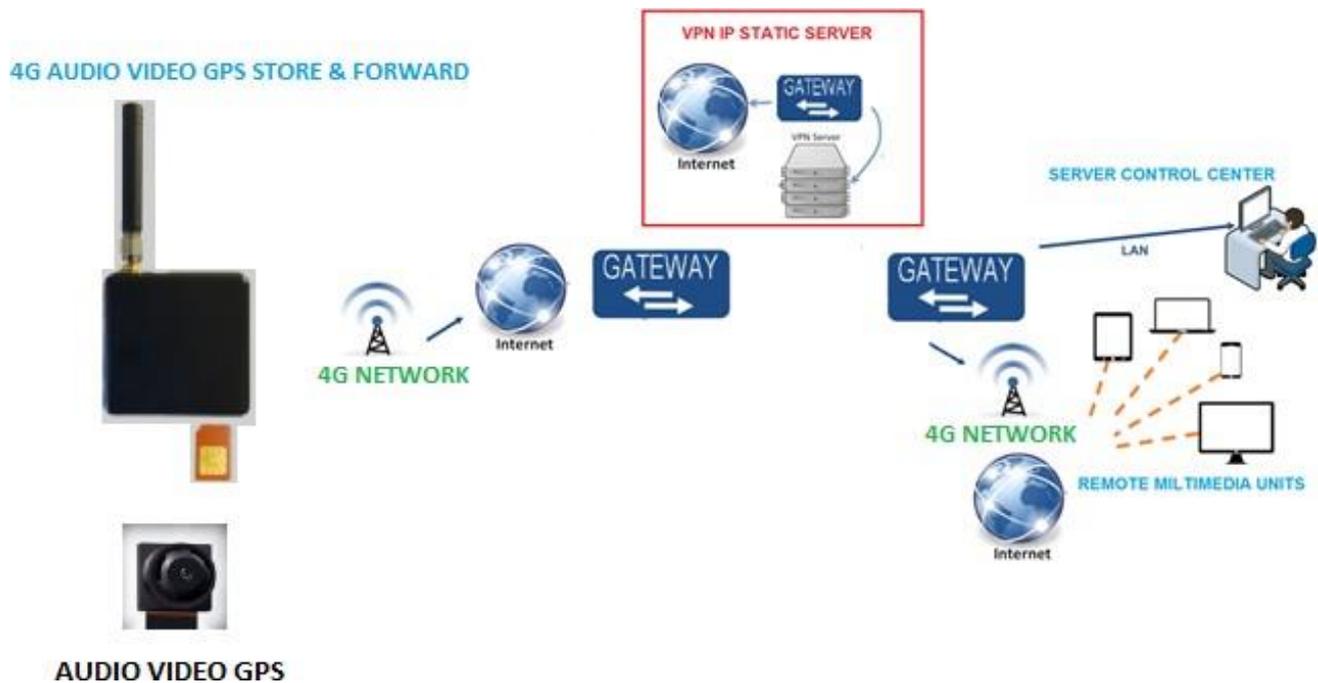




Table 3: Technical characteristics of the WAVE3G STORE & FORWARD components

Technical features	
Encryption: 128bit AES (Advanced Encryption Standard)	
Frequency band:	
LTE-TDD	B34/B38/B39/B40/B41
LTE-FDD	B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26 B28/B66
UMTS/HSPA+	B1/B2/B4/B5/B6/B8/B19
GSM/GPRS/EDGE	850/900/1800/1900MHz
Specifications for Data transfer	
<ul style="list-style-type: none"> •LTE CAT4 - Uplink up to 50Mbps - Downlink up to 150Mbps •HSPA+ - Uplink up to 5.76 Mbps - Downlink up to 42 Mbps •UMTS - Uplink/Downlink up to 384Kbps •EDGE - Uplink/Downlink up to 236.8Kbps •GPRS - Uplink/Downlink up to 85.6Kbps 	
<p>power GSM/GPRS power class:</p> <ul style="list-style-type: none"> --GSM850: 4 (2W) --EGSM900: 4 (2W) --DCS1800: 1 (1W) --PCS1900: 1 (1W) <p>EDGE power class:--GSM850: E2 (0.5W)</p> <ul style="list-style-type: none"> --EGSM900: E2 (0.5W) --DCS1800: E1 (0.4W) --PCS1900: E1 (0.4W) UMTS <p>power class: --WCDMA :3 (0.25W)</p> <ul style="list-style-type: none"> --LTE power class: 3 (0.25W) 	



Video specification:
Video compression: Mpeg4 H264
Video Resolutions up to 1920x1080p , 25 fps
Audio Specification:
16-bit uncompressed audio encoding
Audio channels: 2 stereo internal microphones, connector for external stereo microphones
Audio bandwidth up to: 22Khz @ -6db
Data compression according to the following standards: AAC, OPUS, FLAC, MP3
Sampling frequency from 8Khz / 16Khz / 32Khz / 48Khz settable by user
Internal real time clock so to be able to save the audio tracks with precise time references such as: date / hour / minutes / seconds to create each audio track (Time stamp)
Power Supply specification:
Power supply 3.7V via rechargeable Li-Po battery inside 2000mA / H
Battery recharge via 5Vcc mini USB connector
Dimension: see above description page 1
Possible Magnetic anchoring system

Wave 5MP Micro Camera Features:
<ul style="list-style-type: none">• 5MP sensor, 2592x1944 pixel• 1080p video at 30 FPS (or 60 FPS at 720p, 90 FPS at 480p)• f2.9 lens, 3.60 mm focal length• 53.50 degrees horizontal, 41.41 degrees vertical field of view• Approx. dimensions of circuit and camera: 60 x 11.4 x 5.1mm• Pixel size 1.4 μm \times 1.4 μm• Optical size 1/4"• Full-frame SLR lens equivalent 35 mm• S/N ratio 36 dB• Dynamic range 67 dB @ 8x gain• Fixed focus 1m to infinity• Sensitivity: 680 mV/lux-sec

Wifi network connection:
On-board Wireless LAN - 2.4 GHz 802.11 b/g/n encryption, such as 64/128-bit WEP, WPA and WPA2, it helps prevent from malicious attacks. Frequency band: 11b/g/n:2.400GHz ~2.4835GHz Speed: 802.11b: 1~11Mbps/ 802.11g: 6~54Mbps 802.11n(HT20): MCS0 ~MCS7 RF power: 802.11b: 17dBm \pm 2dBm@11Mbps 802.11g: 15dBm \pm 2dBm@54Mbps 802.11n HT20: 13dBm \pm 2dBm@MCS7



GPS receiver: GNSS engine (GPS, GLONASS and BD) Protocol: NMEA

4.3.1 GNSS Technical specification

Tracking sensitivity: -159 dBm (GPS) /-158 dBm (GLONASS) /-159 dBm (BD)

Cold-start sensitivity: -148 dBm

Accuracy (Open Sky): 2.5m (CEP50)

TTFF (Open Sky): Hot start <1s, Cold start<35s

Receiver Type: 16-channel, C/A Code

GPS L1 Frequency: 1575.42±1.023MHz

GLONASS: 1597.5~1605.8 MHz

BD: 1559.05~1563.14 MHz

Update rate: Default 1 Hz

GNSS data format: NMEA-0183

GNSS Current consumption: 100mA (GSM/UMTS/LTE Sleep)

Memory storage: internal 128GB or **external Memory:** possibility of expanding the memory and therefore the duration of the recordings by adding an external HDD or SD-card memory on the mini USB port accessible by user*

Memory data / time:

Video resolution in recording	Occupied memory /min	Duration of recording	Power consumption @ 3,7Vcc Li-Po battery
720P 1280x720 @200.5Kb/s	11.75MB/min	181 hours = 7.5 days	650mA/h
1080P 1920x1080 @ 452Kb/s	26.48MB/min	82 hours = 3.5 days	
3MP 2048x1536 @685.5Kb/s	40.16MB/min	54 hours	
5MP 2600x1950 @1.08Mb/s	63.28MB/min	33 hours	

Power consumption only audio recording:

Internal memory 128GB	Codec audio 48Khz Stereo	Occupied memory /min	Duration of recording	Power consumption @ 3,7Vcc Li-Po battery
	WAV	11MB/min	194 hours = 8 days	150mA/h
	OGG-Vorbis	0.825MB/min	2585 hours = 107 days	
	OPUS	0.300MB/min	7111 hours = 296 days	

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Power consumption 4G-WI-FI-Bluetooth:

Connection mode:	Speed:	Power consumption in connection mode	Power consumption connected and live Stream + REC mode
WI-FI	150Mbps	450mA	650mA
4G - LTE	50Mbps	800mA	900mA
Bluetooth	n.d.	n.d.	n.d.

Battery duration:

Battery capacity mA/H	connected to Wifi	Connected to 4G	Connected + Stream Live+REC Wifi	Connected + Stream Live+Rec 4G
2000mA	266 minutes	150 minutes	184 minutes	132 minutes

Technical features Software Web Server WAVE4G STORE & FORWARD
Compatibility: Windows / Linux mobile Phone: iPhone IOs, Android
Web browsers: supported: explorer, Firefox, Chrome
Open-VPN package support, using the OpenSSL encryption libraries and the SSLv3 / TLSv1 protocol.
Display list of audio video and GPS tracks stored
Ability to delete all audio video and gps tracks or only selected ones
Download the track through the personal computer / Tablet / Smart-Phone, selecting the track from the list, with display on the main screen of the envelope of the recorded track.
Possibility to select the exact point of the track with the mouse, during the playback phase to listen/see.
Displaying the time stamp of the audio/video track
Menu for setting the audio compression mode and sampling frequency
Menu for setting the scheduling recording function: Single day / date start time, Stop time date, or all days Single day / date start time, Stop hour date.
Setting a personalized password to access the recordings; this function allows you to protect the contents of the memory, and does not allow other operators using the same software to listen/ to convert the audio tracks contained, and access the configuration settings.

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WAVE4G VIDEO CAMERA UNIT

Standard: 70° 5Mpix or Wide Angle: 160° 5Mpix

Night vision camera: 5Mpix 70° OR 160° version, Without IR illuminator (need external)

Wave 5MP Micro Camera Features:

- 1080p video at 30 FPS
- 5MP sensor, 2592x1944 pixel
- Sensor: OmniVision OV5647
- f2.9 lens, 3.60 mm focal length
- 53.50 degrees horizontal, 41.41 degrees vertical field of view
- Approx. dimensions of circuit and camera: 60 x 11.4 x 5.1mm
- Pixel size 1.4 μm \times 1.4 μm
- Optical size 1/4"
- Full-frame SLR lens equivalent 35 mm
- S/N ratio 36 dB
- Dynamic range 67 dB @ 8x gain
- Fixed focus 1m to infinity
- Sensitivity: 680 mV/lux-sec
- Dimensions: 17x12.5x8mm



Flexible Camera for undercover installation:

- Camera Module Dimensions: 8.5mm x 8.5mm
- Sensor: OmniVision OV5647
- Angle: 70° 5Mpix
- Lens Diameter: 7.4mm
- Weight: 1.9g
- Total Length flex cable: 300mm x 0.1mm
- Cable flex optional 2 meters



POWER AND RECHARGE THE WAVE4G

BATTERY USE:

The battery autonomy of the WAVE4G S&F in max for 5 Hours connected to the 4G/3G network in recording mode and Live IP audio streaming enabled.

The autonomy depends on the intensity of the 4G signal network, if the signal is very week the battery autonomy decreases fast.

24H USE:

For long time use in recording mode and in live audio streaming, please connect the power supply charger at the WAVE4G unit, in this case is possible to use it for 24/Hours without interruption.

OPTIONALS:

- CAR DC/DC ADAPTER:

For car use installation is available the power cord adapter



- SDI to MIPI converter:

SDI input (with YUV to Bayer colour conversion). 2 MXC connectors for HD-SDI video in and loop through out.

2 CSI-2 connectors:

- SDI input (MCX): 1080p24, 1080p25, 1080p30
- loop through SDI output (MCX)
- output MIPI for Wave4G input camera Mini HDMI
- power: 6 V - 12 V

- Ethernet adapter:

- Ethernet LAN Port optional for connecting to network 10/100Mbps (optional HW on request)



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