

**1-Port 10/100/1000T 802.3at PoE +
Ethernet to VDSL2 Converter**

VC-231GP
User's Manual

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FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the

Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Warning

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Energy Saving Note of the Device

This power required device does not support Standby mode operation. For energy saving, please remove the power cable to disconnect the device from the power circuit. Without removing power cable, the device will still consume power from the power source. In view of Saving the Energy and reducing the unnecessary power consumption, it is strongly suggested to remove the power connection for the device if this device is not intended to be active.

WEEE Warning



To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

PLANET 1-Port 10/100/1000T 802.3at PoE + Ethernet to VDSL2 Converter User's Manual

For Model: VC-231GP

Revision: 1.0 (September 2018)






Part No.: 2350-AC0540-000

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1. Package Contents

Thank you for purchasing PLANET 1-Port 10/100/1000T 802.3at PoE + Ethernet to VDSL2 Converter, VC-231GP. Open the box of the VC-231GP and carefully unpack it. The box should contain the following items:

VC-231GP x1	User's Manual x 1
	
RJ11 Telephone Wire x 1	Splitter x 1
	
AC-DC Power Adapter (Input: 54V DC, 0.74A max) x 1	
	

If any of these are missing or damaged, please contact your dealer immediately; if possible, retain the carton including the original packing material, and use them again to repack the product in case there is a need to return it to us for repair.

2. Product Features

➤ Physical

- 1-port 10/100/1000BASE-T RJ45 with **IEEE 802.3af/802.3at PoE** Injector
- 1 RJ11, connector for VDSL port with VDSL connection
- Additional splitter for POTS connection

➤ Power over Ethernet

- Complies with IEEE 802.3at/af PoE Plus end-span PSE
- 1 IEEE 802.3at/af device powered
- Supports PoE Power up to 30.8 watts for PoE port
- Provides DC 52V power over RJ45 Ethernet cable to PD with Ethernet port
- Auto-detects IEEE 802.3at/af equipment and protects devices from being damaged by incorrect installation
- Remote power feeding up to 100m
- IEEE 802.3at/af splitter devices compatible

➤ VDSL2 Features

- Cost-effective bridge function to connect two Ethernet LANs
 - ◆ Point-to-multipoint application: Compatible with PLANET and third-party VDSL2 IP DSLAM for last-mile solution
 - ◆ Point-to-point application: LAN to LAN extension over phone wire
- Up to 150/150Mbps bandwidth (in **G.INP, Sym, 8dB** mode)
- ITU-T G.993.2 VDSL2 standard
- ITU-T G.993.5 G.Vectoring and G.INP
- DMT-based coding technology
- Additional POST splitter to share voice and data

-
- CO/CPE mode selectable via DIP switch
 - Selectable target band plan (symmetric and asymmetric) and SNR margin
 - Half duplex back pressure and IEEE 802.3x full duplex pause frame flow control
 - Voice and data communication can be shared simultaneously based on the existing telephone wire with distance up to 1.4km
 - Supports IEEE 802.1Q VLAN tag transparency
 - VDSL2 stand-alone transceiver for simple bridge modem application
 - Advantage of minimum installation time (Simply by Plug and Play)
 - Supports extensive LED indicators for network diagnosis

➤ Layer 2 Features

- Supports auto-negotiation and 10/100Mbps half/full duplex and 1000Mbps full duplex mode on RJ45 port
- Prevents packet loss with back pressure (half-duplex) and IEEE 802.3x pause frame flow control (full-duplex)

➤ Hardware Features

- Compact size, wall-mountable design
- Metal case, good for heat sinking
- Easy installation; ideal solution for space-limited locations
- Power Input: DC 54V, 0.74A power adapter
- LED Indicators
 - ◆ **System:** Power (Green)
 - ◆ **TP port:** 100BASE-TX LNK/ACT (Green), 1000BASE-T LNK/ACT (Green), PoE-in-Use (Amber)
 - ◆ **VDSL port:** CO (Green), CPE (Green), VDSL (Green)

3. Hardware Introduction

3.1 Front Panel and LED Indicators

■ VC-231GP Front Panel

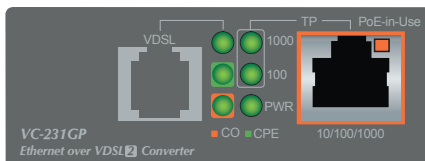


Figure 3-1-1: VC-231GP Front Panel

- ▶ 10/100/1000BASE-T RJ45 connector for Ethernet and 802.3at/af PoE injector
- ▶ RJ11 connector for VDSL2; connect to IP DSLAM or another VDSL2 equipment
- ▶ LEDs for power, Ethernet, PoE and VDSL

■ VC-231GP LED Indicators

➤ System

LED	Color	Function	
PWR	Green	Lit	Indicates that the VC-231GP has power.
		Off	Indicates that the VC-231GP has no power.

➤ VDSL

LED	Color	Function	
VDSL	Green	Lit	Indicates that the VDSL link is established.
		Fast Blink	Indicates that the VDSL link is at training status (about 10 seconds).
		Slow Blink	Indicates that the VDSL link is at idle status.
CO	Green	Lit	Indicates the VC-231GP is running in CO mode.
CPE	Green	Lit	Indicates the VC-231GP is running in CPE mode.

➤ 10/100/1000BASE-T 802.3at PoE Port

LED	Color	Function	
1000	Green	Lit	Indicates that the port is operating at 1000Mbps .
		Blink	Indicates that the VC-231GP actively sending or receiving data over that port at 1000Mbps .
		Off	Indicates that the port is link down or operating at 10/100Mbps .
100	Green	Lit	Indicates that the port is operating at 100Mbps or 10Mbps .
		Blink	Indicates that the VC-231GP is actively sending or receiving data over that port at 100Mbps or 10Mbps .
		Off	Indicates that the port is link down or operating at 1000Mbps .

PoE-in-Use	Amber	Lit	Indicates that the port is providing DC 52V to remote powered device.
		Off	Indicate that the port is not providing DC 52V to remote powered device.

3.2 Rear Panel and Mode DIP Switch

■ VC-231GP Rear Panel

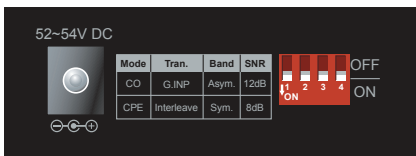


Figure 3-2-1: VC-231GP Rear Panel

- ▶ DIP switch
- ▶ DC jack (DC input) for power adapter

■ DC Power Jack

The VC-231GP requires 54V DC, 0.74A power input, which conforms to the bundled AC-DC adapter. Should you have the issue of power connection, please contact your local sales representative.



Note

The device is a power-required device, meaning it will not work till it is powered. If your networks should be active all the time, please consider using UPS (uninterrupted power supply) for your device. It will prevent you from network data loss or network downtime.



Note

In some areas, installing a surge suppression device may also help to protect your VC-231GP from being damaged by unregulated surge or current to the VC-231GP or the power adapter.

➤ DIP Switch

The VC-231GP provides 4 selective transmission modes. By switching the transmission modes, you can obtain a best transmission mode to suit with phone line quality or distance of connectivity. The following is the summary table of transmission setting, bandwidth and distance extensibility tested for AWG 24 (0.5mm) twisted-pair without noise and cross talk.

	DIP-1	DIP-2	DIP-3	DIP-4
	Mode	Transmission	Band Profile	SNR Margin
OFF	CO	G.INP	Asymmetric	12dB
ON (default)	CPE	Interleave	Symmetric	8dB

➤ DIP-1: Mode (CO / CPE)

CO (Central Office)	The Master device mode, usually the CO device, is located at the data center of ISP or enterprise to link to the backbone.
CPE (Customer Premises Equipment)	The Slave device mode, usually the CPE device, is located at branch office, home or remote side as the long reach data receiver. The CPE can be connected to the PC, IP camera or wireless access point or other network devices.



Note

When the VC-231GP in CPE mode, DIP switches 2, 3, and 4 are without function.

➤ DIP-2: Transmission (G. INP and Interleave mode)

G. INP	Method of protection against bursts from other devices or lines to impact your xDSL line.
Interleave	Method of error correction used on xDSL line. Interleave requires additional latency to improve resilience to burst of error.

➤ DIP-3: Band Profile (Asymmetric/Symmetric)

Asymmetric	Asymmetric mode provides more bandwidth than the other side. This mode provides the highest bandwidth in short range.
Symmetric	With G.997 band plan supported, symmetric mode can provide almost the same rate of downstream and upstream.

➤ DIP-4: SNR (Signal Noise Ratio) Margin

When the SNR margin is selected, the system provides 12dB/8dB SNR margin for across all usable loop lengths. Better channel noise protection is made with the higher SNR margin.



Note

By default, the four DIP switches, set at the **"ON"** position, are operated as **"CPE"**. For operating as **"CO"**, please turn DIP 1 Switch to the **"OFF"** position. Then adjust the other DIP switches accordingly to fulfill different network application demands.

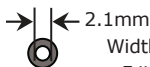


Note

Please **power off** the VC-231GP before making any transmission mode adjustment.

3.3 Power Information

The central posts of the VC-231GP's power jacks measure 2.5mm wide that require +54VDC power input. They conform to the bundled AC-DC adapter. Should you have the issue of power connection, please contact your local sales representative.



Width of DC Receptacle: 2.1mm
+54V for DC jack

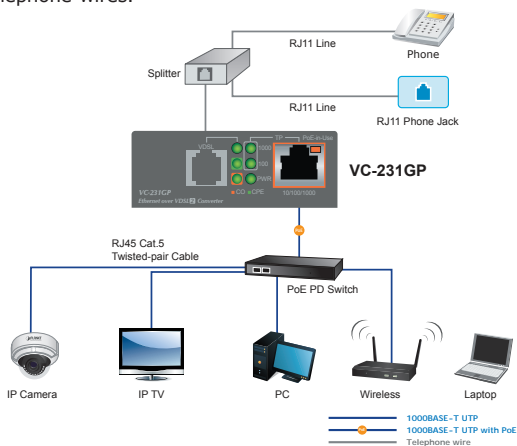


DC receptacle is 2.1mm wide that matches the central post, measuring 2.1mm wide, of the VC-231GP's DC jack. Do not install any improper unit.

4. Connecting And Using The VDSL2 Bridge

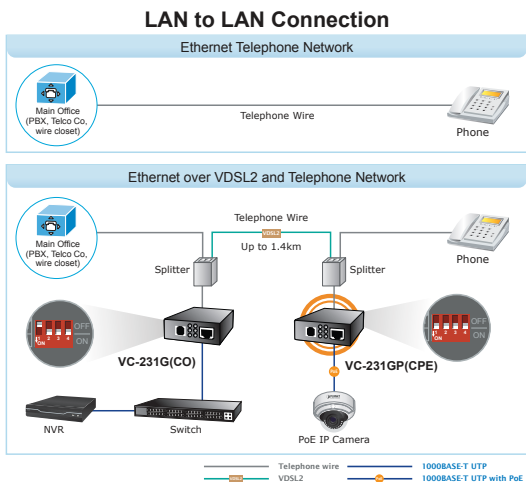
The VC-231GP does not require any software configuration. Users can immediately use any feature of this product simply by putting the plug in the receptacle and turning it on. There is some key limitation on the VC-231GP. Please check the following items:

- The device can be used for **Point-to-Point** (one **CO** device to one **CPE** device) connection or **Point-to-Multipoint** (one multi-port **CO** device to multi **CPE** devices) and allows data and voice to work on the same telephone lines.
- The VC-231GP provides only one RJ11 connector for VDSL2 port to build VDSL2 connection. For voice device connection, there is an additional splitter from the package of the VC-231GP, which is an ideal choice.
- Depending on the quality of telephone line, the maximum distance of one VDSL2 segment is 1.4km (4593ft) with AWG 24 telephone wires. The distance could vary on the quality of telephone wires.



4.1 Point-to-Point Application - LAN to LAN Connection

Two sets of the VC-231G/VC-231GP could be used to link two local Area networks that are located in a different place. Through the normal telephone line, it could be set up a **150/150Mbps** (G.INP, Sym, 8dB) symmetric backbone, but one VDSL2 Bridge must be Master (**CO mode**) and the other one is Slave (**CPE mode**).



Refer to the following procedure to set up the VC-231G/VC-231GP LAN to LAN connection.

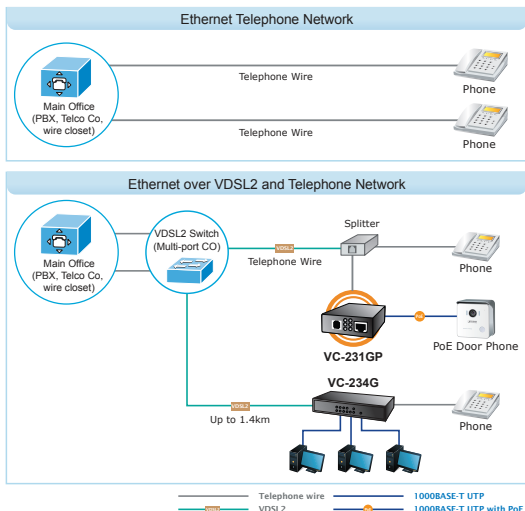
1. **[LAN1]** Set the VC-231G at LAN 1 to **CO** mode from the DIP switch.
2. **[LAN2]** Set the VC-231GP at LAN 2 to **CPE** mode from the DIP switch.
3. Power on the VC-231G CO and VC-231GP CPE at both sides by connecting its power source.
4. Power LED will illuminate.
5. Connect VDSL line from another VDSL device to RJ11 **VDSL port** of the VC-231G/VC-231GP.
6. **VDSL LNK LED** will blink to illuminate at the VC-231G/VC-231GP.
7. Connect telephone to the RJ11 **Phone port** of the VC-231G/VC-231GP.
8. Connect the VC-231G/VC-231GP Ethernet **LAN port** to other network device via regular Cat.5 UTP cable.

4.2 Point-to-Multipoint Application - Connect to IP DSLAM

To build a local Internet in apartments, hotels and campuses and hospitality environments, it requires:

- The multi-port VDSL2 IP DSLAM or VDSL2 switch (for example, PLANET VDL-2420M and VC-820M) operates as a CO Master and needs to be placed in the wiring center (MDF room) and connects to the telephone line system.
- On the other hand, it needs to install one or many CPE Slaves (the VC-231GP) on the individual client side and connect to the multi-port Master through the telephone lines.

Multi-LAN Connection



Refer to the following procedure to set up the VC-231GP to IP DSLAM connection.

1. **[Remote End]** Set the remote IP DSLAM/VDSL2 switch to **CO** mode with proper VDSL2 profile.
2. **[Local End]** Set the VC-231GP at the local end to **CPE** mode from the DIP switch.
3. Power on the VC-231GP CPEs by connecting its power source.
4. Power LED will illuminate.
5. Connect VDSL line from IP DSLAM/VDSL2 switch to RJ11 **VDSL port** of the VC-231GP.
6. **VDSL LNK LED** will blink to illuminate.
7. Connect telephone to the RJ11 **Phone port** of the VC-231GP.
8. Connect the VC-231GP Ethernet **LAN port** to other network device via regular Cat.5 UTP cable.

When deciding where to put the converter and/or prolong the operational life of the bridge, please also refer to the following points:

It is accessible and cables can be connected easily.

- Cabling is away from sources of electrical noise such as radios, transmitters, motors, power lines and fluorescent lighting fixtures.
- Do not place objects on top of any unit or stack.
- Water or moisture cannot enter the VDSL2 Bridge.
- Air flowing around the unit and through the vents on the side of the case is not restricted (We recommend that you provide a minimum of 25mm clearance.).

5. Product Specifications

Product	VC-231GP
Hardware Specifications	
LAN Port	1 10/100/1000BASE-T RJ45 auto-MDI/MDI-X port
VDSL Port	1 VDSL2 RJ11 female phone jack Twisted-pair telephone wires (AWG24 or better) up to 1.4km
Phone Port	Additional splitter for POTS connection
Dimensions (W x D x H)	97 x 70 x 26 mm
Weight	206g
Power Requirement	DC 54V, 0.74A external power
LED Indicators	System: Power (Green) TP port: 100BASE-TX LNK/ACT (Green), 1000BASE-T LNK/ACT (Green), PoE-in-Use (Amber) VDSL port: CO (Green), CPE (Green), VDSL (Green)
Housing	Metal
DIP Switch & Functionality	4-position DIP switch <ul style="list-style-type: none">• CO/CPE mode select• Selectable G.INP and interleaved mode• Selectable target Band Profile• Selectable target SNR mode

Power Over Ethernet	
PoE Standard	IEEE 802.3af Power over Ethernet IEEE 802.3at Power over Ethernet Plus
PoE Power Output	52V DC: 15.4 watts 52V DC: 30 watts
PoE Power Supply Type	End-span
Power Pin Assignment	1/2(+), 3/6(-)
PoE Power Budget	30 watts
Switch Specifications	
Switch Processing Scheme	Store-and-Forward
Address Table	2K entries
Flow Control	Back pressure for half duplex IEEE 802.3x pause frame for full duplex
Maximum Packet Size	1522bytes
System Specifications	
VDSL Compliance	VDSL-DMT <ul style="list-style-type: none"> • ITU-T G.993.1 VDSL • ITU-T G.997.1 • ITU-T G.993.2 VDSL2 (Profile 17a/30a Support) • ITU-T G.993.5 G. Vectoring • ITU-T G.998 • G.INP

ADSL Compliance	Capable of ADSL2/2+ standard <ul style="list-style-type: none"> • ITU G.992.3 G.dmt.bis • ITU G.992.5 G.dmt.bisplus Data Rate: Up to 24Mbps
Standards Conformance	
Standards Compliance	IEEE 802.3 Ethernet IEEE 802.3u Fast Ethernet IEEE 802.3ab Gigabit Ethernet IEEE 802.3x Full-duplex Flow Control IEEE 802.1p Class Of Service IEEE 802.3af Power over Ethernet IEEE 802.3at Power over Ethernet Plus ITU-T G.993.1 VDSL ITU-T G.997.1 ITU-T G.993.2 VDSL2 (Profile 17a/30a Support) ITU-T G.993.5 G.Vectoring & G.INP ITU-T G.998
Compatible Products	
VDSL2 CO Switch	VC-820M
VDSL2 CO/CPE Bridge	VC-231G VC-234G IVC-234GT VC-231

Performance Table

■ VC-231G(CO) / VC-231GP (CPE) Performance, unit: Mbps

Distance (meter)	Interleave (Downstream/Upstream)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	190/90	177/83	149/141	136/129
400m	163/64	145/57	116/115	100/101
600m	110/34	92/31	72/70	58/57
800m	73/18	59/15	45/44	42/36
1000m	49/10	44/10	26/16	23/12
1200m	39/8	32/6	26/12	23/10
1400m	25/6	22/3	29/12	17/11
Distance (meter)	G.INP (Downstream/Upstream)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	192/93	177/85	150/150	136/133
400m	159/64	144/51	114/113	97/102
600m	106/37	87/29	69/69	54/56
800m	68/19	55/15	49/39	40/35
1000m	49/8	40/8	27/24	24/22
1200m	29/8	38/8	26/12	24/9
1400m	26/6	26/4	21/11	18/12

The actual data rate will vary on the quality of the copper wire and environmental factors.

6. Troubleshooting

■ SYMPTOM:

VDSL LNK LED does not light up after wire is connected to the VDSL port.

■ CHECKPOINT:

1. Verify the length of the wire (not more than 1.4km) connected between the VC-231G and the VC-231GP. Please also try to adjust the DIP switch or the VC-231G to the other SNR mode.
2. Please note you must use one VC-231G in CO mode and the other VC-231GP in CPE mode to make connection to each other work.

■ SYMPTOM:

TP LED does not light after cable is connected to the port.

■ CHECKPOINT:

1. Verify you are using the Cat.5 or better cable with RJ45 connector to connect to the port.
2. If your device (like LAN card) supports to auto-negotiation, please try to manually set at a fixed speed of your device to solve this issue.
3. The Converter/Bridge and the connected device's power are on or not.
4. The port's cable is firmly seated in its connectors in the switch and in the associated device.
5. The connecting cable used must be the right type. The connecting device, including any network adapter, is functional.

7. FAQs

Q1: What is VDSL2?

A1: VDSL2 (Very High-Bit-Rate Digital Subscriber Line 2), G.993.2, is the newest and most advanced standard of xDSL broadband wire line communications.

Designed to support the wide deployment of Triple Play services such as voice, data, high definition television (HDTV) and interactive gaming, VDSL2 enables operators and carrier to gradually, flexibly, and cost efficiently upgrade the existing xDSL-infrastructure.

Q2: What is SNR and what's the effect?

A2: In analog and digital communications, Signal-to-Noise Ratio, often written as SNR, is a measure of signal strength relative to background noise. The ratio is usually measured in decibels (dB).

In digital communications, the SNR will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data. SNR measures the quality of a transmission channel over a network channel. The greater the ratio, the easier it is to identify and subsequently isolate and eliminate the source of noise.

Generally speaking, the higher SNR value gets, the better the line quality gets, but performance is lower.

Q3: What is the best distance for the VC-231G/VC-231GP?

A3: In order to guarantee the stability and better quality of network, we suggest the distance should not exceed 1.4 kilometers.

Q4: What is the best data rate for the VC-231G/VC-231GP?

A4: The best data rate of the VC-231G/VC-231GP is up to 190Mbps/90Mbps (downstream/upstream) in asymmetric mode and 150Mbps/150Mbps in symmetric mode over a distance of 200 meters.

8. Customer Support

Thank you for purchasing PLANET products. You can browse our online FAQ resource on PLANET Website first to check if it could solve your issue. If you need more support information, please contact PLANET converter support team.

PLANET online FAQs:

<http://www.planet.com.tw/en/support/faq.php?type=1>

Converter support team mail address:

support@planet.com.tw

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APPENDIX: Wall-mount Installation

This part describes how to install your VC-231GP and make connections to it.

Please read the following topics and perform the procedures in the order being presented.

■ Wall-mount Installation

Step 1: Please find the wall that can mount the VC-231GP.

Step 2: Screw two screws on the wall.

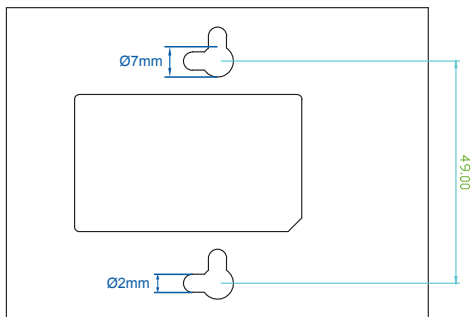
Step 3: Hang the VC-231GP on the screws from the wall.

Step 4: Refer to chapter 3.3 Power Information for power supply to the VC-231GP.

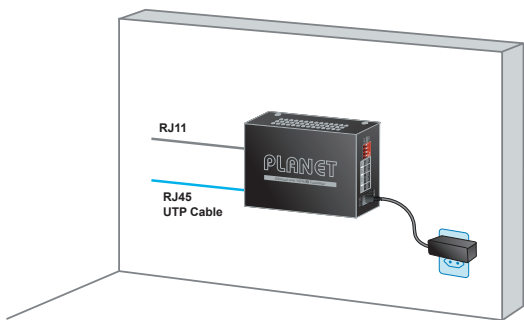


Note

Before mounting the device to the wall, please check the location of the electrical outlet and the length of the Ethernet cable.



VC-231GP Switch Bottom Side





EC Declaration of Conformity

For the following equipment:

*Type of Product : 1-Port 10/100/1000T 802.3at PoE PSE + 1-Port RJ11 VDSL2
Converter - 30a profile w/ G.vectoring

*Model Number : VC-231GP

* Produced by:

Manufacturer's Name : **Planet Technology Corp.**
Manufacturer's Address : 10F., No.96, Minquan Rd., Xindian Dist.,
New Taipei City 231, Taiwan, R.O.C.

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive on 2014/30/EU.

For the evaluation regarding the EMC, the following standards were applied:

EN 55032	(2015 + AC:2016)
EN 61000-3-2	(2014)
EN 61000-3-3	(2013)
EN 55024	(2010 + A1:2015)

Responsible for marking this declaration if the:

Manufacturer Authorized representative established within the EU

Authorized representative established within the EU (if applicable):

Company Name: Planet Technology Corp.

Company Address: 10F., No.96, Minquan Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C.

Person responsible for making this declaration

Name, Surname Kent Kang

Position / Title : Director

Taiwan
Place

Oct. 5. 2018
Date


Legal Signature

PLANET TECHNOLOGY CORPORATION