

Product Specification

Bluetooth v4.0 BLE Single Mode Module

[Generic & Security Tag Version]

BL-4011QAM

Version: 1.1

Revision History

[illegible]

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Technical Support Contact Information

If you encounter any technical issues while using BL-4011QAM, do not hesitate to contact us @AtechOEM. Our technical staff will help you resolve the technical issues. You can contact us by email or phone. The following is our technical contact:

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1. Overview

BL-4011QAM, Bluetooth low energy (BLE) single mode module is targeted for low power sensors and accessories. It offers GATT profile as the based lower profile. We could also provide other standard BLE profiles such as proximity, find me ... etc. The module provides flexible hardware interfaces to connect sensors, simple user interfaces – AT commands.

The single mode radio enables it to connect to the dual mode Bluetooth products already in the market, as well as other Bluetooth low energy devices/ sensors. It can be used in equipment like a heart rate sensors, pedometers, watches, blood pressure meters, weight scales, households sensors, collector devices, security tags, wireless keys, proximity sensors, HID keyboards and mice.

It can be powered directly with 1.8V ~ 3.6V power source, such as a standard 3V coin cell battery. BL-4011QAMAM only consumes a little energy in different sleep mode, for example 780nA in lowest power sleep mode.

AtechOEM provides a proprietary GATT-based profile to our customers. The profile is similar to the classic SPP (Serial Port Profile) described in Bluetooth v2.1. Customers could use this special profile to transfer raw data between GATT-based connection in their application. AtechOEM also offer **customized firmware services** to meet specific applications more tightly.

2. Typical Applications

- Home automation
- Sports & fitness
- Health care & Consumer wellness
- Sensors & Controls
- Industrial automation
- Security & Proximity
- Mobile phone accessories
- Small data transferring

3. Product Information

■ Product Number : **BL-4011QAM**

■ Product Description: **Bluetooth v4.0 Single Mode BLE Module**

■ Product Features:

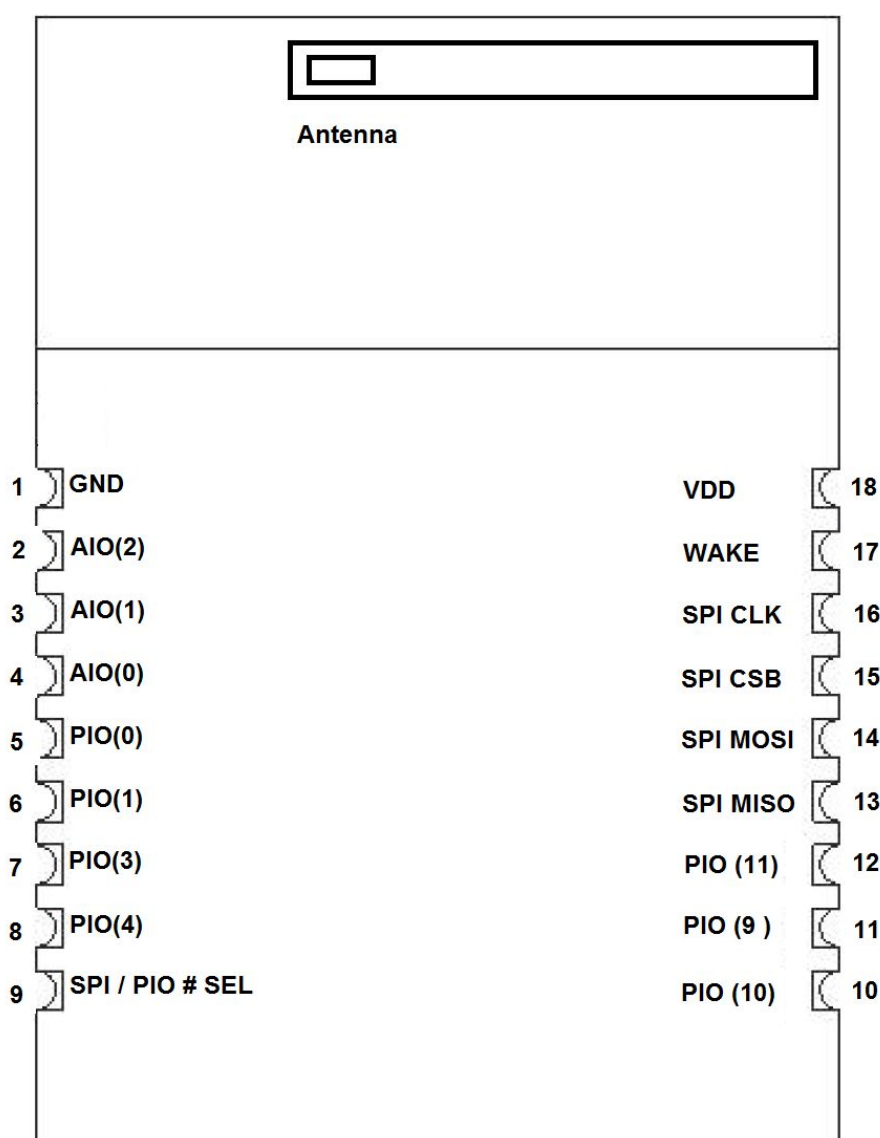
Chip	CSR1010
Standard	Bluetooth v4.0 Single mode / BLE
EEPROM	512kbits
RF band	2.4~2.4835GHz ISM band
Host Interface	UART
Debug Interface	SPI
Digital Interface	UART / GPIO / I2C
Analog Interface	AIO
RF Output Power	Up to 8.5dBm Typically
Sensitivity	>-93dBm
Antenna	Chip Antenna
Power voltage	1.8 V ~ 3.6V
Dimension	18mm x 13mm x 2.2mm

4. Hardware

BL-4011QAM is a surface-mount module designed to be integrated to a system board as a Bluetooth low energy subsystem or standalone system. The power supply ranges from 1.8VDC to 3.6 VDC, so it is suitable for battery application. Digital data (PIO) and analogue interface (AIO) are supported in BL-4011QAM. Following sections describe all hardware specifications and application reference.

4.1. Pin Assignment:

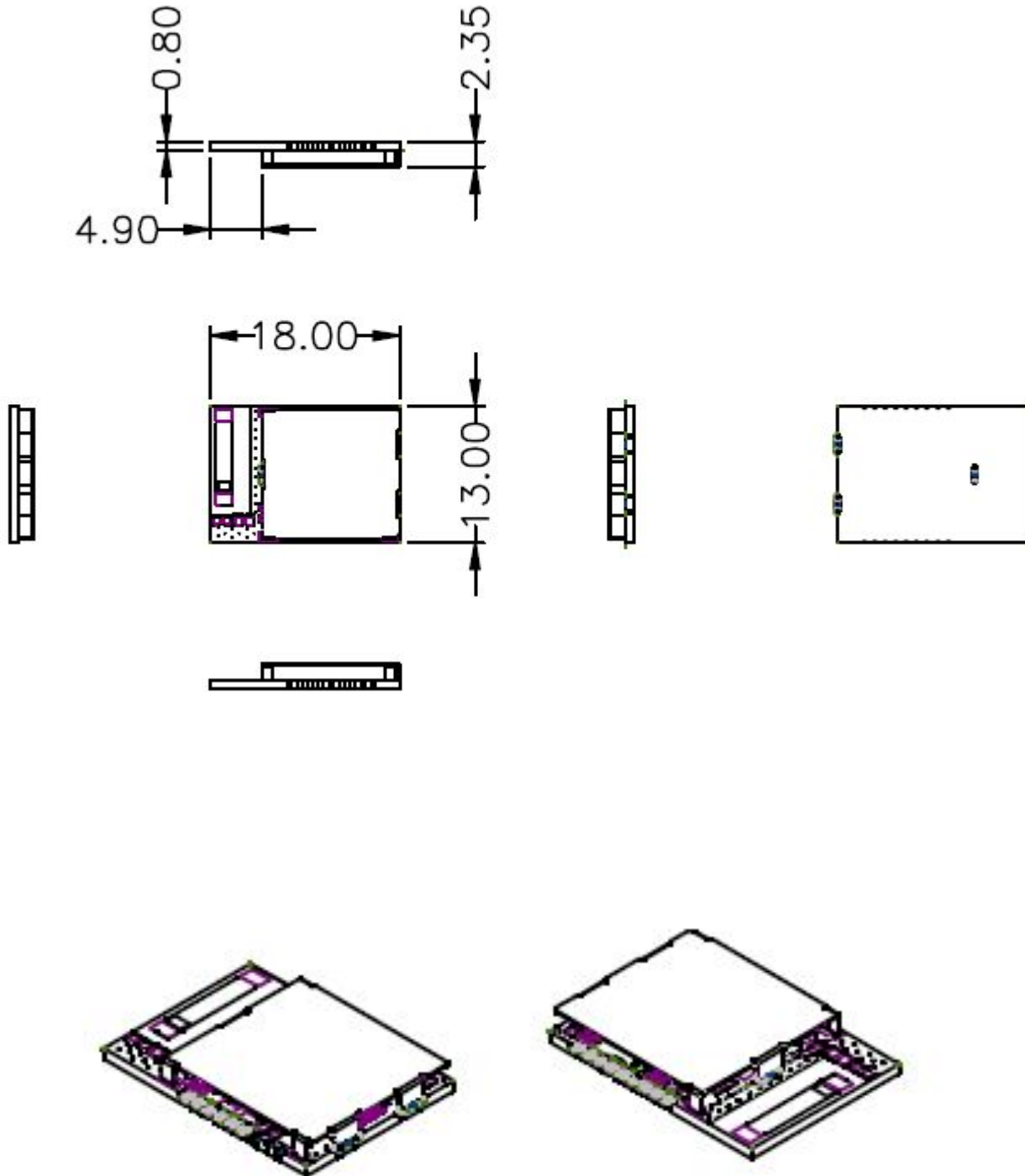
The following picture shows pinout of BL-4011QAM from the top of the module.



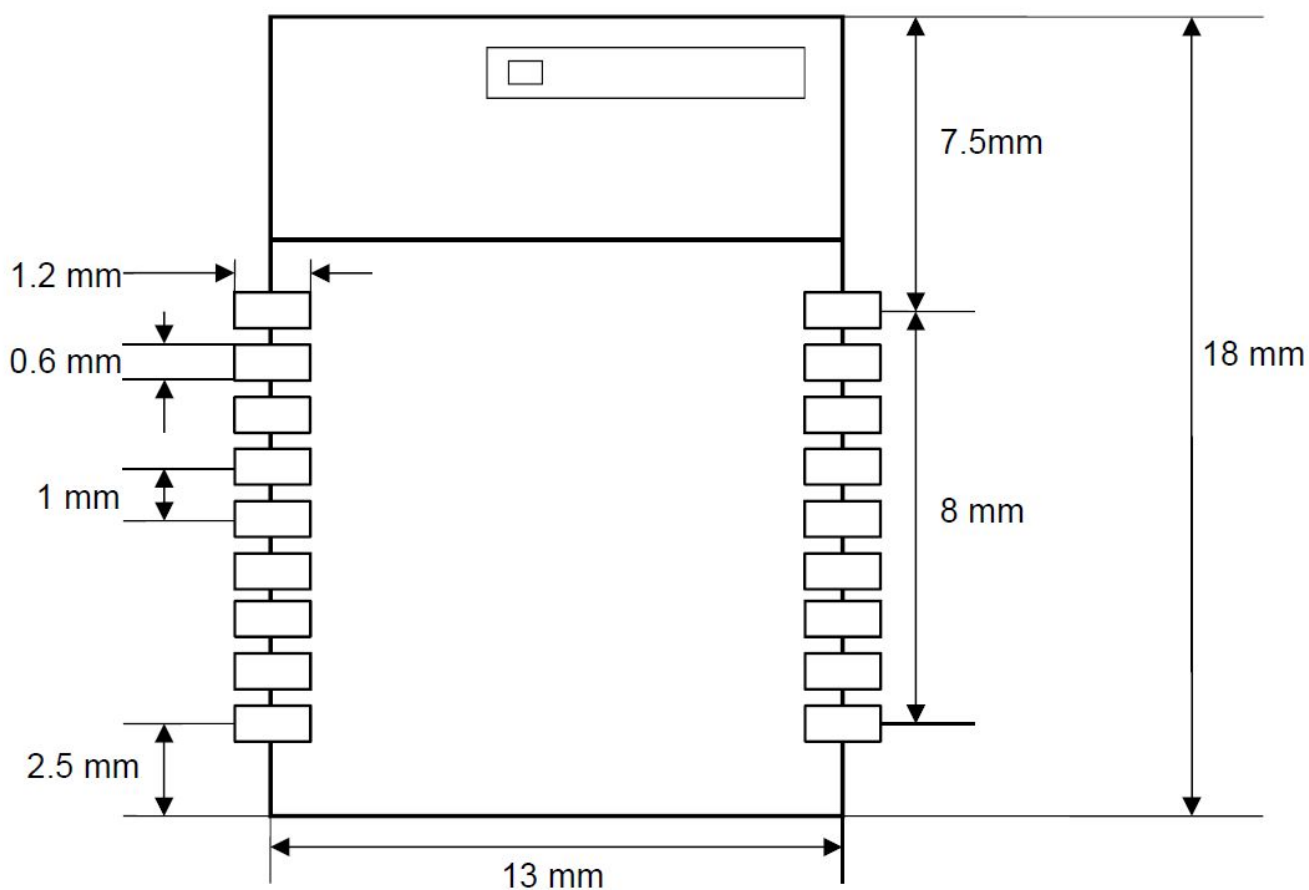
4.1 Pin Definition:

Pin	Name	Type	Note
1	GND	Passive	Ground
2	AIO2	In/Out	Analog I/O
3	AIO1	In/Out	Analog I/O
4	AIO0	In/Out	Analog I/O
5	PIO0 / UART Tx	In/Out	General Purpose I/O
6	PIO1 / UART Rx	In/Out	General Purpose I/O
7	PIO3	In/Out	General Purpose I/O
8	PIO4	In/Out	General Purpose I/O
9	SPI / PIO # SEL	In	Function Selection
10	PIO10	In/Out	General Purpose I/O
11	PIO9	In/Out	General Purpose I/O
12	PIO11	In/Out	General Purpose I/O
13	SPI MISO	In	Internal Testing Use
14	SPI MOSI	Out	Internal Testing Use
15	SPI CSB	In	Internal Testing Use
16	SPI CLK	In/Out	Internal Testing Use
17	WAKE	In	Wake upBL-4011QAMAM If in Hibernate or Dormant mode.
18	VDD	Power	Main Power Supply

4.2. Mechanical Specification



4.3. PCB Layout Footprint



4.4. Electrical Characteristics

	Min	Typ.	Max.	Unit
Supply Voltage	1.8	3.3	3.6	V
Normal Standby @ 3.3V	-	1.39	-	mA
TX (Normal mode) @ 3.3V	-	-	22.77	mA
RX (Normal mode) @ 3.3V	-	-	20.88	mA
Shallow Sleep @ 3.3V	-	-	486	uA
Deep Sleep @ 3.3V	-	-	4.9	uA
Hibernate Sleep @ 3.3V	-	-	1.9	uA
Dormant Sleep @ 3.3V	-	-	900	nA

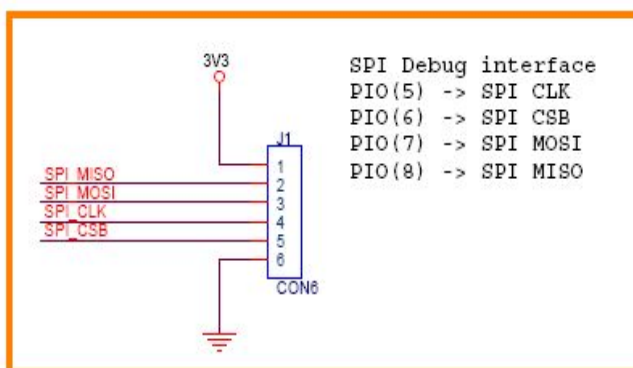
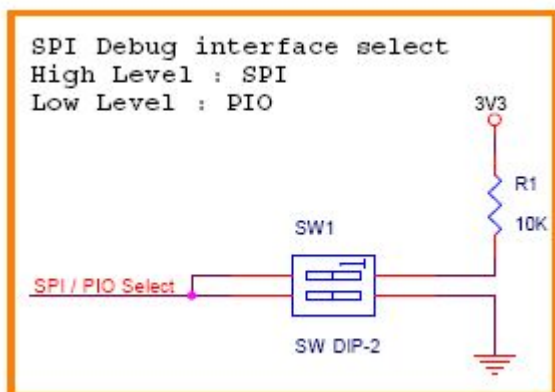
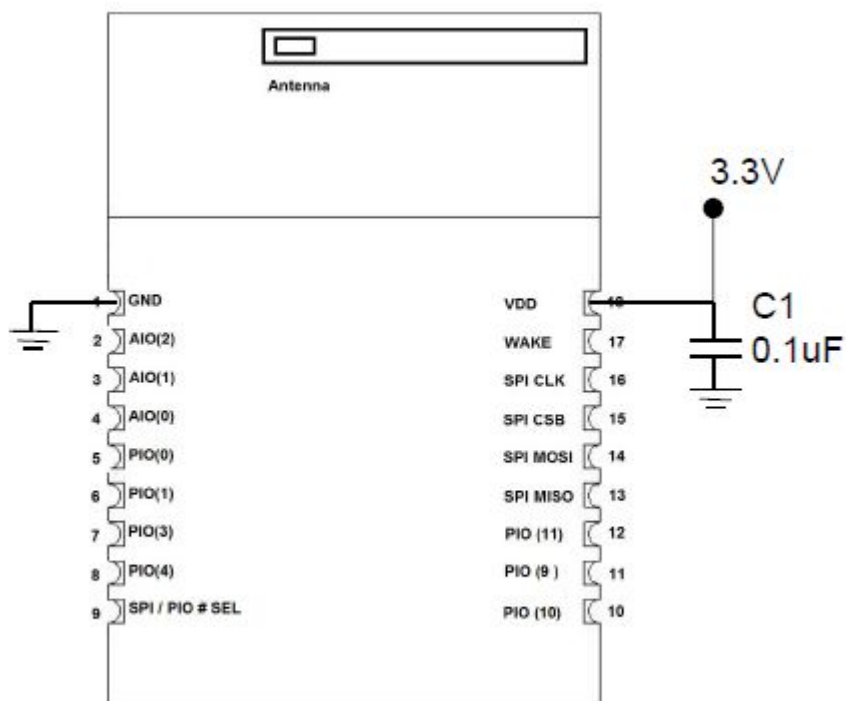
■ Operating Conditions

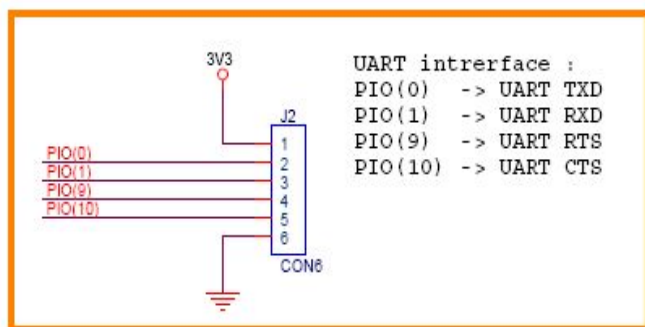
Voltage Range	1.8V ~ 3.6V
Operating Temperature Range	-30 °C ~ 85 °C
Storage Temperature Range	-40 °C ~ 85 °C
Relative Humidity (Operating)	≤90%
Relative Humidity (Storage)	≤90%

4.5. Radio Characteristics

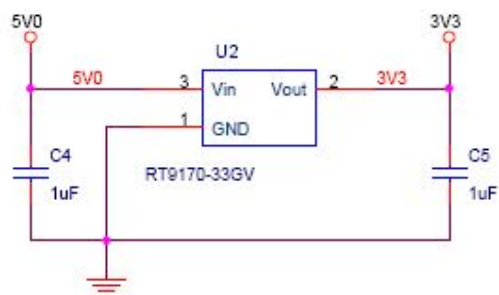
	Frequency (GHz)	Min	Typ	Max	BT Spec.	Unit
Tx Output Power (Average)	2.402	-	8.56	-	-20 ~ 10	dBm
	2.440	-	8.99	-		dBm
	2.480	-	8.99	-		dBm
Rx Sensitivity (FER)	2.402	-	-92	-	<=-70	dBm
	2.440	-	-92	-		dBm
	2.480	-	-92	-		dBm
Carrier Frequency Offset	2.402	-	±10	-	±150	kHz
	2.440	-	±10	-		kHz
	2.480	-	±10	-		kHz
Maximum Input Level	2.402	-5			FER ≤ 30.800 %	dBm
	2.440					
	2.480					
Modulation Characteristics (F1)	2.402	-	253.5	262.5	225 <	kHz
	2.440	-	260.2	265.3	F1avg	kHz
	2.480	-	255.9	262.6	< 275	kHz
Modulation Characteristics (F2)	2.402	-	225.8	214.3	≥ 185	kHz
	2.440	-	228.2	211.4		kHz
	2.480	-	222.7	211.1		kHz
PER Report Integrity	Cycle 1	-	50	-	50.0 ≤ PER ≤ 65.4	%
	Cycle 2	-	50	-		%
	Cycle 3	-	50	-		%
Antenna Gain	-	-	0.5	-	-	dBi

4.6. Application Circuit





Application for Linear LDO use



Note :

Richtek RT9170 : Maxima output current 300mA

Signal & Function

WAKE : Wake up the system from sleep or sniff mode

AIO[0-2] : Analog signal In and Output

PIO : Programble In/Out

I2C : Inter-Integrated Circuit

Important FCC notice:

In accordance with FCC Part 15C, this module is listed as a Modular Transmitter device.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The antenna of this transmitter must not be co-located or operating in conjunction with any other antenna or transmitters within a host device, except in accordance with FCC multitransmitter product approval procedures.

FCC Label Instructions

The outside of final products that contains this module device must display a label

referring to the enclosed module. This exterior label can use wording such as the

following: **"Contains Transmitter Module FCC ID: YX6BL4011QAM"** or **"Contains FCC ID:**

YX6BL4011QAM." Any similar wording that expresses the same meaning may be used.

Additionally, there must be the following sentence on the device, unless it is too small to carry it:

"This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."

USER MANUAL

The following statements should be inside the user manual of the final products that contains this module:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.