

# **iBT-03**

## **Bluetooth Module for Audio Application**

**(  Bluetooth® Qualified QDID : B019566 )**

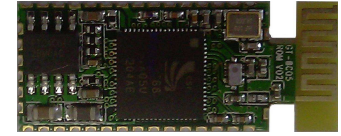
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Date : 2012-07-30  
Revision : 0.3.01

This module is limited to OEM Installation only.

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### 1. Overview

iBT-03 is a Class 2 Bluetooth module supporting Bluetooth V2.1 + EDR specification. It is implemented by using the CSR BlueCore5-Multimedia ROM chip. iBT-03 is designed for receiving audio data transmitting from a mobile device. It can also be used to control the audio playing function of the remote device



### 2. Features

- A single chip radio and baseband IC for Bluetooth applications
- Fully Qualified Bluetooth v2.1+EDR (Enhanced Data Rate)
- Class 2 power output (10 Meter minimum)
- Support for 802.11 co-existence
- High quality 95dB SNR DAC playback
- LED drivers and faders
- Supporting profiles : A2DP, AVRCP
- Build-in PCB antenna
- Supply voltage : 3.0V to 3.6V
- RoHS compliant
- Dimension: 31.0mm (L) x 12mm (W) x 2.6mm (H)

### 3. Applications

- Wireless speakers
- Stereo headset
- Hands-free car kit
- VoIP handsets
- Docking Stations

### 4. Pin Drawing

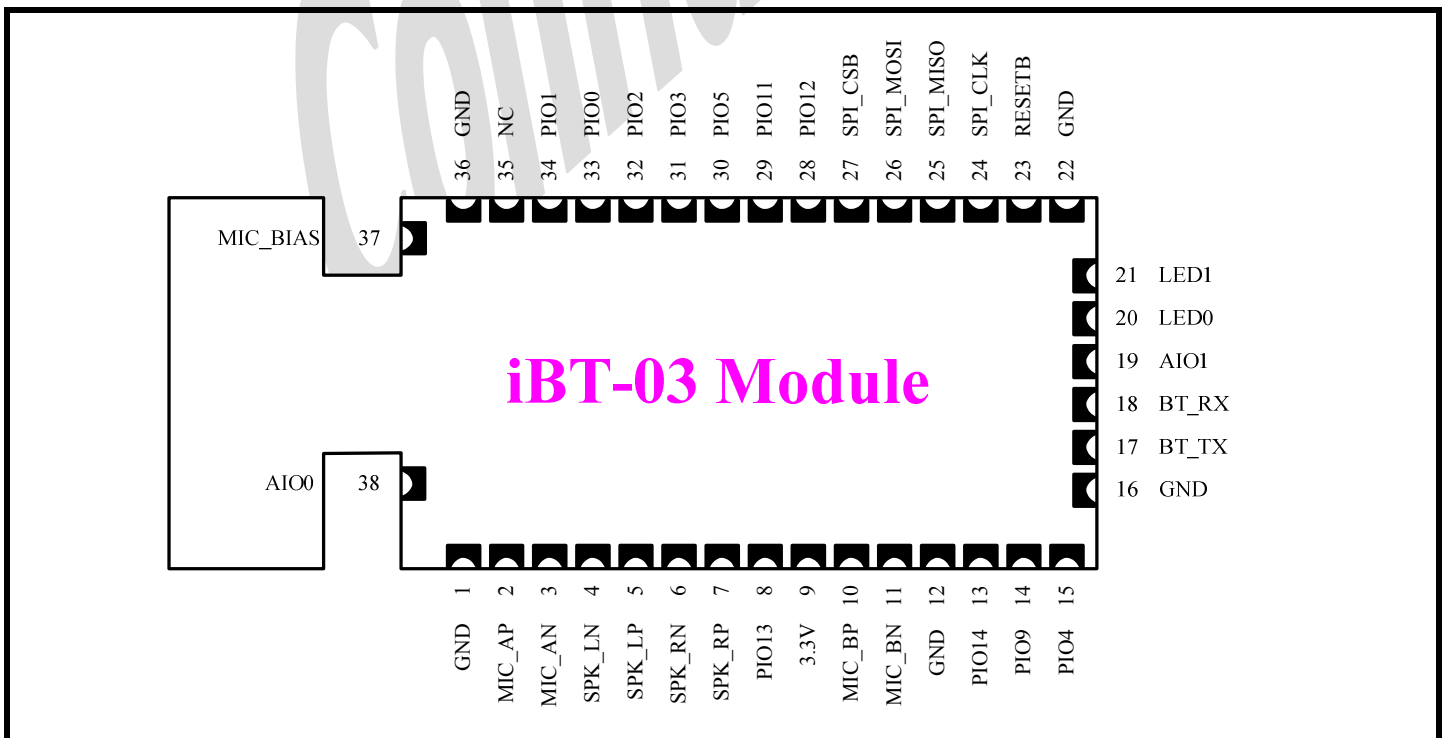


Figure 1 iBT-03 Pin Diagram

## 5. Pin Description

Pin No.	Pin Name	Application Usage	Pin Type	Pin Descriptions
1	GND	GND		Ground
2	MIC_AP		AI	Microphone A Positive Input
3	MIC_AN		AI	Microphone A Negative Input
4	SPK_LN	SPK_LN	AO	Negative Output of Left Speaker
5	SPK_LP	SPK_LP	AO	Positive Output of Left Speaker
6	SPK_RN	SPK_RN	AO	Negative Output of Right Speaker
7	SPK_RP	SPK_RP	AO	Positive Output of Right Speaker
8	PIO13	STBY / ON	I	Active High Input for ON / OFF control When iBT-03 is OFF, a high pulse in this pin will turn it ON. When iBT-03 is in ON, a high pulse in this pin will turn in OFF
9	3.3V	3.3V		3.3V Supply Input
10	MIC_BP		AI	Microphone B Positive Input
11	MIC_BN		AI	Microphone B Negative Input
12	GND	GND		Ground
13	PIO14	REV	I	Active High Input for Reverse Control
14	PIO9	PAIR	I	Perform Pair function
15	PIO4	AMP_SDB	O4	Active Low signal for shutting down the external Amplifier
16	GND	GND		Ground
17	BT_TX		O4, PU	UART Data Output
18	BT_RX		IS, PD	UART Data Input
19	AIO1		A, B	Analog / Programmable I/O
20	LED0	LED0	OD4	Open Drain LED Driver Output
21	LED1	LED1	OD4	Open Drain LED Driver Output
22	GND	GND		Ground
23	RESETB	RESETB	IS, PU	Active Low Module Reset. Must be low for > 5mS
24	SPI_CLK	SPI_CLK	IS, PD	Serial Peripheral Interface Clock
25	SPI_MISO	SPI_MISO	O4, PD	Serial Peripheral Output Data
26	SPI_MOSI	SPI_MOSI	IS, PD	Serial Peripheral Input Data
27	SPI_CSB	SPI_CSB	IS, PU	Active Low Chip Select for Serial Peripheral Interface
28	PIO12	FWD	I	Active High Input for Forward Control
29	PIO11	PLAY/PAUSE	I	Active High Input for Play / Pause Control
30	PIO5	VOL_DOWN	I	Active High Input for Volume Down Control
31	PIO3	CONNECT	I	Active High Input to activate the Bluetooth connection process
32	PIO2	VOL_UP	I	Active High Input for Volume Up Control
33	PIO0		B	Programmable I/O pin
34	PIO1		B	Programmable I/O pin
35	NC			Not Connect
36	GND	GND		Ground
37	MIC_BIAS		A	Microphone Bias
38	AIO0		A, B	Analog Input / Programmable I/O

O4 4mA output pad  
 OD Open drain output pad  
 I Input  
 IS Schmidt Trigger Input  
 B Bidirectional

SPU Strong Pull-up  
 SPD Strong Pull-down  
 WPU Weak Pull-up  
 WPD Weak Pull-down  
 A Analog

**Table 1 iBT-03 Pin Description Table**

## 6. Electrical Specification

### 6.1. Absolute Maximum Rating

Item	Symbol	Rating	Unit
Power Supply Voltage	VDD	-0.4 to 3.7	V
Peak Current	I <sub>pk</sub>	0 - 70	mA
Storage Temperature	T <sub>STG</sub>	-20 to 85	°C

### 6.2. Recommended Operating Condition

Item	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	VDD	3.0	3.3	3.6	V
RF Operating Temperature		0	25	80	°C
Operating Temperature		0	25	55	°C

### 6.3. Digital Input / Output Port Characteristics

VDD=3.3V, operating temperature = 25 °C unless specified otherwise

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Input Voltage Levels</b>						
V <sub>IL</sub>	Input low voltage		-0.3		0.25*VDD	V
V <sub>IH</sub>	Input high voltage		0.625*VDD		VDD+0.3	V
V <sub>sch</sub>	Schmitt voltage level		0.25*VDD		0.625*VDD	V
<b>Output Voltage Levels</b>						
V <sub>OL</sub>	Output low voltage	I <sub>OL</sub> = -4mA			0.125	V
V <sub>OH</sub>	Output high voltage	I <sub>OH</sub> = 4mA	0.75*VDD		VDD	V
<b>Input and Tri-state Current with</b>						
	Strong pull-up		-100	-40	-10	uA
	Strong pull-down		10	40	100	uA
	Weak pull-up		-5	-1	-0.2	uA
	Weak pull-down		0.2	1	5	uA
	I/O Pad leakage current		-1	0	1	uA
	Input Capacitance		1		5	pF

### 6.4. Operating Current

VDD=3.3V, operating temperature = 25 °C unless specified otherwise

Item	Symbol	Min	Typ	Max	Unit
Standby Mode		0.5		2	mA
Pairing Mode iBT-03 is discoverable by other devices		1.0		10.0	mA
Idle Mode iBT-03 is connectable with devices in the connected list		1.0		10.0	mA
Audio Streaming Mode		40		80.0	mA

**6.5. RF Characteristics**

VDD=3.3V, operating temperature = 20 °C unless specified otherwise

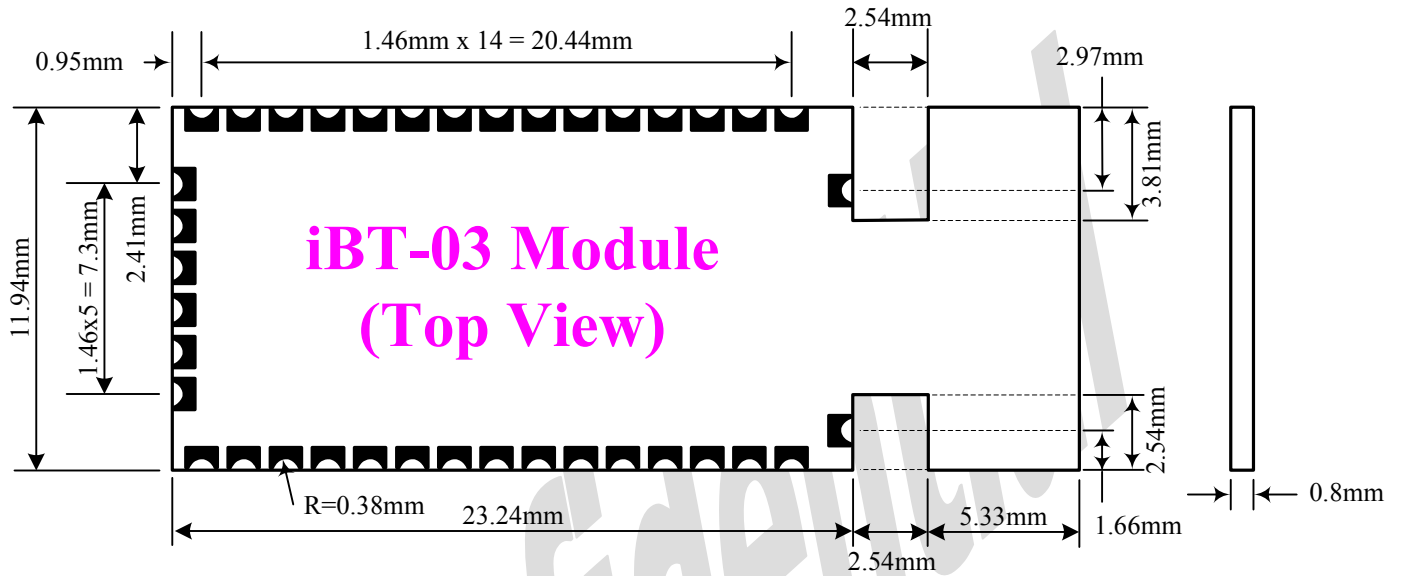
Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm		-85		≤ -70
Maximum Receiver Signal at 0.1% BER	dBm		-6		≥ -20
C/I Co-Channel	dB		10	11	≤ 11
Adjacent Channel Selectivity C/I – +/-1MHz	dB		-4	0	≤ 0
2 <sup>nd</sup> Adjacent Channel Selectivity C/I – +2Mhz	dB		-35	-30	≤ -30
2 <sup>nd</sup> Adjacent Channel Selectivity C/I – -2Mhz	dB		-21	-20	≤ -20
3 <sup>rd</sup> Adjacent Channel Selectivity C/I – +/-3Mhz	dB		-45		≤ -40

VDD=3.3V, operating temperature = 20 °C unless specified otherwise

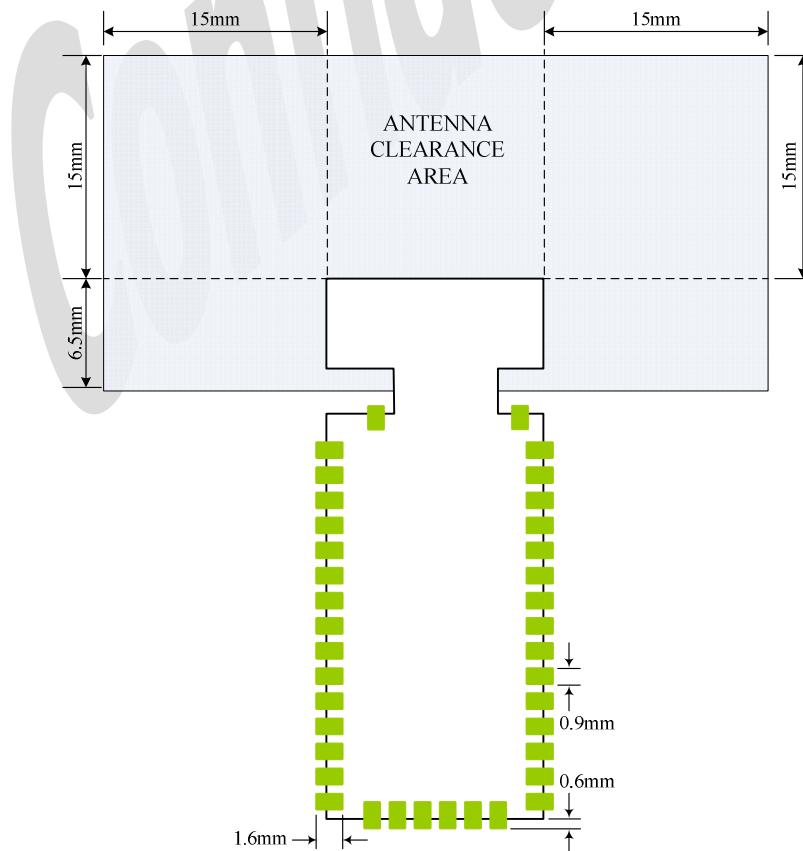
Transmitter	Units	Min	Typ	Max	Bluetooth Spec
RF Output Power	dBm	0	2	4	-6 to +4
RF Power Control Range	dB	16	35		> 16
RF Power Range Control Resolution	dB		1.8		-
20dB Bandwidth for modulated Carrier	kHz		879	1000	< 1000
2 <sup>nd</sup> Adjacent Channel Power (+/- 2Mhz)	dBm		-35	-20	≤ -20
3 <sup>rd</sup> Adjacent Channel Power (+/- 3Mhz)	dBm		-45	-40	≤ -40

## 7. Module Dimension and PCB Layout Guideline

### 7.1. Module Dimension



### 7.2. PCB Layout Guideline



## 8. FCC Statement

### NOTICE:

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.

Changes or modifications made to this equipment not expressly approved by ValenceTech Limited may void the FCC authorization to operate this equipment.

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

### Radiofrequency radiation exposure information:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. Please see the RF Exposure information. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device should be installed and operated with a minimum distance of 20cm between the antenna and all persons.

### Label requirements:

Contains Transmitter Module FCC ID: ORP-IBT-03

#### Host use instruction:

The module must install and work with a speaker,  
the speaker's manufacturer is ValenceTech Limited.

The Host model name: IBT03 BLUETOOTH SPEAKER SYSTEM

The Host Brand Name: ValenceTech

The host is a fixed device and the antenna used with this host should be installed and operated with a minimum distance of 20cm from all persons.

#### FCC RF Exposure Requirement

1. At least 20cm separation distance between the antenna and the user's body must be maintained at all times.  
And must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.
2. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed 0dBi in the 2.4G band.
3. A user manual with the end product must clearly indicate the operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

Note: If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

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## **Please be noticed following information and instructions should be placed in the end-user's operating manual**

The iBT-03 Module has been granted as limited modular approval for mobile applications. iBT-03 Module must be installed in the designated host as specified in this manual.

1. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.
2. The iBT-03 Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.
3. A label must be affixed to the outside of the end product into which the iBT-03 module is incorporated, with a statement similar to the following: For iBT-03: This device contains FCC ID: ORP-IBT-03.
4. The module shall be in non-detachable construction protection into the finished products, so that the end-user has to destroy the module while remove or install it.
5. This module is to be installed only in mobile or fixed applications. According to FCC part 2.1091(b) definition of mobile and fixed devices is:.

### **Mobile device:**

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location.

### **Portable device:**

For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

6. Separate approval is required for all other operating configurations, including portable configurations with respect to FCC Part 2.1093 and different antenna configurations.
7. A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labelled with an FCC ID: ORP-IBT-03. The OEM manual must provide clear instructions explaining to the OEM the labelling requirements, options and OEM user manual instructions that are required

For a host using a this FCC certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module:

"Contains Transmitter Module FCC ID: ORP-IBT-03" or "Contains FCC ID: ORP-IBT-03" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

8. Host product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. compliance must be
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demonstrated to regulations for other transmitter components within the host product; to requirements for unintentional radiators (Part 15B). To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. If a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, we suggest the host device to recertify part 15B to ensure complete compliance with FCC requirement: Part 2 Subpart J Equipment Authorization Procedures , KDB784748 D01 v07, and KDB 997198 about importation of radio frequency devices into the United States.

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**OEM RESPONSIBILITIES TO COMPLY WITH FCC REGULATIONS**

The iBT-03 Module has been certified for integration into products only by OEM integrators under the following conditions:

This device is granted for use in Mobile only configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

As long as the two conditions above are met, further transmitter testing will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

**IMPORTANT NOTE: In the event that these conditions cannot be met (for certain configurations or co-location with another transmitter), then the FCC and Industry Canada authorizations are no longer considered valid and the FCC ID and IC Certification Number cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC and Industry Canada authorization.**

**OEM LABELING REQUIREMENTS FOR END-PRODUCT**

The iBT-03 module is labeled with its own FCC ID Certification Number. The FCC ID certification numbers are not visible when the module is installed inside another device, as such the end device into which the module is installed must display a label referring to the enclosed module. The final end product must be labeled in a visible area with the following:

**“Contains Transmitter Module FCC ID: ORP-IBT-03”**

**or**

**“Contains FCC ID: ORP-IBT-03”**

The OEM of the iBT-03 Module must only use the approved antenna(s) listed above, which have been certified with this module.

The device iBT-03 carries FCC authorization and is marked with the FCC ID Number. Whilst any device into which this authorized module is installed will not normally be required to obtain FCC authorization, this does not preclude the possibility

that some other form of authorization or testing may be required for the finished device.

**OEM END PRODUCT USER MANUAL STATEMENTS**

The OEM integrator should not to provide information to the end user regarding how to install or remove this RF module or change RF related parameters in the user manual of the end product.

If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

**The user manual for the end product must include the following information in a prominent location:**

This device is granted for use in Mobile only configurations in which the antennas used for this transmitter must be installed to provide a separation distance of at least 20cm from all person and not be co-located with any other transmitters except in accordance with FCC and Industry Canada multi-transmitter product procedures.

The end product with an embedded FCC ID:ORP-IBT-03 Module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

**The labeling instructions of finished products refer to following requirements:**

A certified modular has the option to use a permanently affixed label, or an electronic label (see Electronic Labelling below). For a permanently affixed label, the module must be labelled with an FCC ID - Section 2.926 (see Certification (labelling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labelling requirements, options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module:

“Contains Transmitter Module FCC ID: ORP-IBT-03” or “Contains FCC ID: ORP-IBT-03” must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

Other user manual statements may apply.

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