

# Telnova Technology Co.,Ltd

**This module is limited to OEM installation ONLY**

Bluetooth Module for Audio Application

## F6088 Class2 Bluetooth Module

### Features

- . Bluetooth V2.1+EDR specification support
- . A2DPv1.2
- . AVRCPv1.0
- . HFPV1.5



### Applications

- . This module applies only to the following Bluetooth speaker:

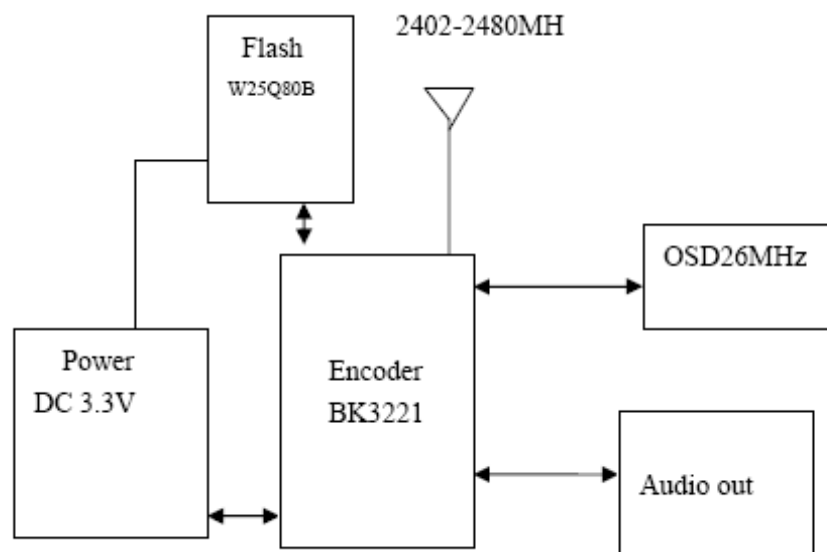
Manufacturer : Telnova Technology Co.,Ltd

Product name: Bluetooth Spesaker

Model name: MBT-80C

Brand name:N/A

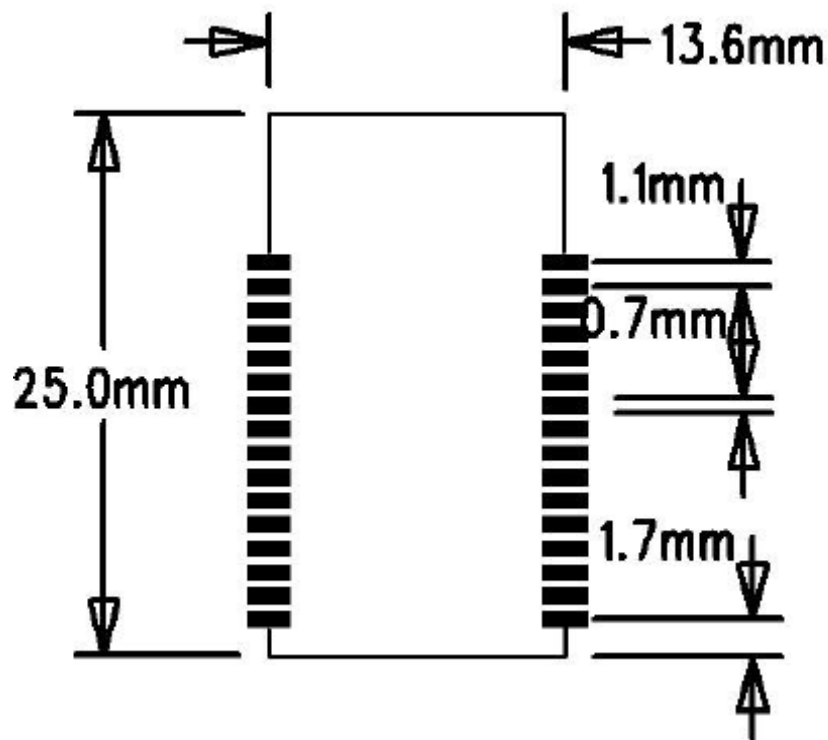
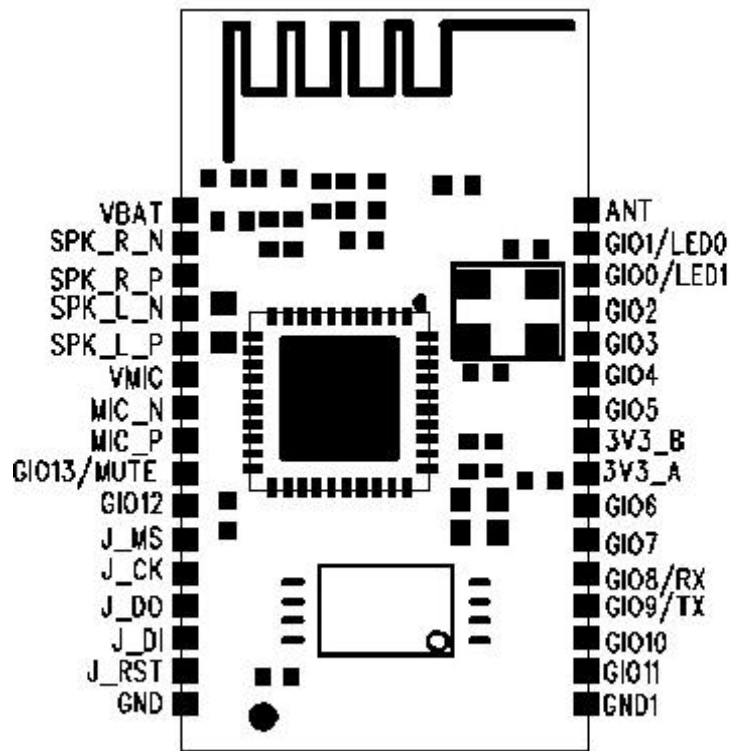
### Block Diagram



This is part circuit structure: The encoder IC BK3221(OSC26MHz), it is a single chip radio and basedand is for Bluetooth 2.4GHz systems including enhanced data rates(EDR) to 3MBPS; The FLASH W25080B, it is a single chip 8 megabit(1024X8-bit-/512kx16-bit) Flash memoy, CMos 3.0 Volt-only. The module Supports Bluetooth v2.1. the Frequency range: 2402-2480MHz. The module also has necessary balun and bandpass filters to interface with a build-in PCB antenna, which forms a very cost effective radio subsystem.

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## Physical Layout and Size



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## Pins Configurations

Pin	Symb	I/O	Description
1	VBAT	Analogue in	Check battery
2	SPK_R_N	Analogue out	Right channel audio output negative
3	SPK_R_P	Analogue out	Right channel audio output positive
4	SPK_L_N	Analogue out	Left channel audio output negative
5	SPK_L_P	Analogue out	Left channel audio output positive
6	VMIC	Analogue out	Bias for reference for audio(MIC)input
7	MIC_N	Analogue in	MIC input negative
8	MIC_P	Analogue in	MIC input positive
9	GIO13	Digital I/O	GPIO13/MUTE
10	GIO12	Digital I/O	GPIO12
11	J_MS	Digital I/O	JTAG pin
12	J_CK	Digital I/O	JTAG pin
13	J_DO	Digital I/O	JTAG pin
14	J_DI	Digital I/O	JTAG pin
15	J_RST	Digital I/O	JTAG pin
16	GND	Ground	Ground connect battery negative
17	GND1	Ground	Ground connect battery negative
18	GIO11	Digital I/O	GPIO11
19	PIO10	Digital I/O	GPIO10
20	GIO9	Digital I/O	GPIO9/TX
21	GIO8	Digital I/O	GPIO8/RX
22	GIO7	Digital I/O	GPIO7
23	GIO6	Digital I/O	GPIO6
24	3V3_A	FLASH power supply	FLASH chip power supply
25	3V3_B	Power supply pin	Whole chip power supply
26	GIO5	Digital I/O	GPIO5/NEXT
27	GIO4	Digital I/O	GPIO4/PRE
28	LED1	Digital I/O	GPIO3/VOL+
29	LED2	Digital I/O	GPIO2/VOL-
30	GIO0	Digital I/O	GPIO0/LED1
31	GIO1	Digital I/O	GPIO1/LED0
32	ANT	Bi-directional with weak	Programmable input/output

## General Electrical Specification

Absolute Maximum Ratings		
Ratings	Min.	Max.
Storage Temperature	-40 °C	+85 °C
Supply Voltage VDD	-0.4 V	3.7 V
Recommended Operating Condition		
Operating Condition	Min.	Max.
Operating Temperature range	0 °C	+55 °C
Supply Voltage VDD	3.0 V	3.6 V

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Parameter	Description	Min.	Typ.	Max.	Units
Current Consumption - Discover	Already Paired	-	TBD	-	mA
	New Pairing	-	5	-	mA
Current Consumption - Playing	Dist = 1m	-	44	-	mA
	Dist = 10m	-	50	-	mA
Current Consumption - Pause	Dist = 1m	-	8	-	mA
	Dist = 10m	-	8	-	mA
Current Consumption - Sleep		-	2	-	mA

## Radio Characteristics

Radio Characteristics, VDD = 3.3V Temperature =+20°C						
	Frequency (GHz)	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER	2.402	-	-83	-82	< - 70	dBm
	2.441	-	-83	-82		dBm
	2.480	-	-83	-82		dBm
Maximum received signal at 0.1% BER	2.402	-	-6	0	> - 20	dBm
	2.441	-	-6	0		dBm
	2.480	-	-6	0		dBm
RF transmit power <sup>1</sup>	2.402	-	+2	-	-6 to +4 <sup>2</sup>	dBm
	2.441	-	+2	-		dBm
	2.480	-	+2	-		dBm
Initial carrier frequency tolerance	2.402	-	12	20	±75	kHz
	2.441	-	10	20		kHz
	2.480	-	9	20		kHz
20dBm bandwidth for modulated carrier	2.402	-	879	1000	< 1000	kHz
	2.441	-	816	1000		kHz
	2.480	-	819	1000		kHz
Drift (single slot packet)	2.402	-	10	20	<25	kHz
	2.441	-	10	20		kHz
	2.480	-	10	20		kHz
Drift (five slot packet)	2.402	-	14	20	<40	kHz
	2.441	-	14	20		kHz
	2.480	-	14	20		kHz
Drift Rate	2.402	-	11	15	20	kHz/50µs
	2.441	-	-	15		kHz/50µs
	2.480	-	-	15		kHz/50µs
RF power control range		16	35	-		
RF power range control resolution		-	1.8	-	-	dB

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$\Delta f_{1avg}$ "Maximum Modulation"	2.402	145	165	175	140< $\Delta f_{1avg}$ <175	kHz
	2.441	145	165	175		kHz
	2.480	145	165	175		kHz
$\Delta f_{2maz}$ "Minimum Modulation"	2.402	115	150	-	115	kHz
	2.441	115	150	-		kHz
	2.480	115	150	-		kHz
C/I co-channel	-	-	10	11	$\leq 11$	dB
Adjacent channel selectivity C/I F=F0 +1 MHz <sup>3 5</sup>	-	-	-4	0	$\leq 0$	dB
Adjacent channel selectivity C/I F=F0 - 1MHz <sup>3 5</sup>	-	-	-4	0	$\leq 0$	dB
Adjacent channel selectivity C/I F=F0 +2 MHz <sup>3 5</sup>	-	-	-35	-30	$\leq -30$	dB
Adjacent channel selectivity C/I F=F0 - 2MHz <sup>3 5</sup>	-	-	-21	-20	$\leq -20$	dB
Adjacent channel selectivity C/I F>=F0 +3 MHz <sup>3 5</sup>	-	-	-45	-	$\leq -40$	dB
Adjacent channel selectivity C/I F<=F0 -5 MHz <sup>3 5</sup>	-	-	-45	-	$\leq -40$	dB
Adjacent channel selectivity C/I F=Fimage <sup>3 5</sup>	-	-	-18	-9	$\leq -9$	dB
Adjacent channel transmit power F=F0 $\pm$ 2MHz <sup>4 5</sup>	-	-	-35	-20	$\leq -20$	dBc
Adjacent channel transmit power F=F0 $\pm$ 3MHz <sup>4 5</sup>	-	-	-45	-40	$\leq -40$	dBc

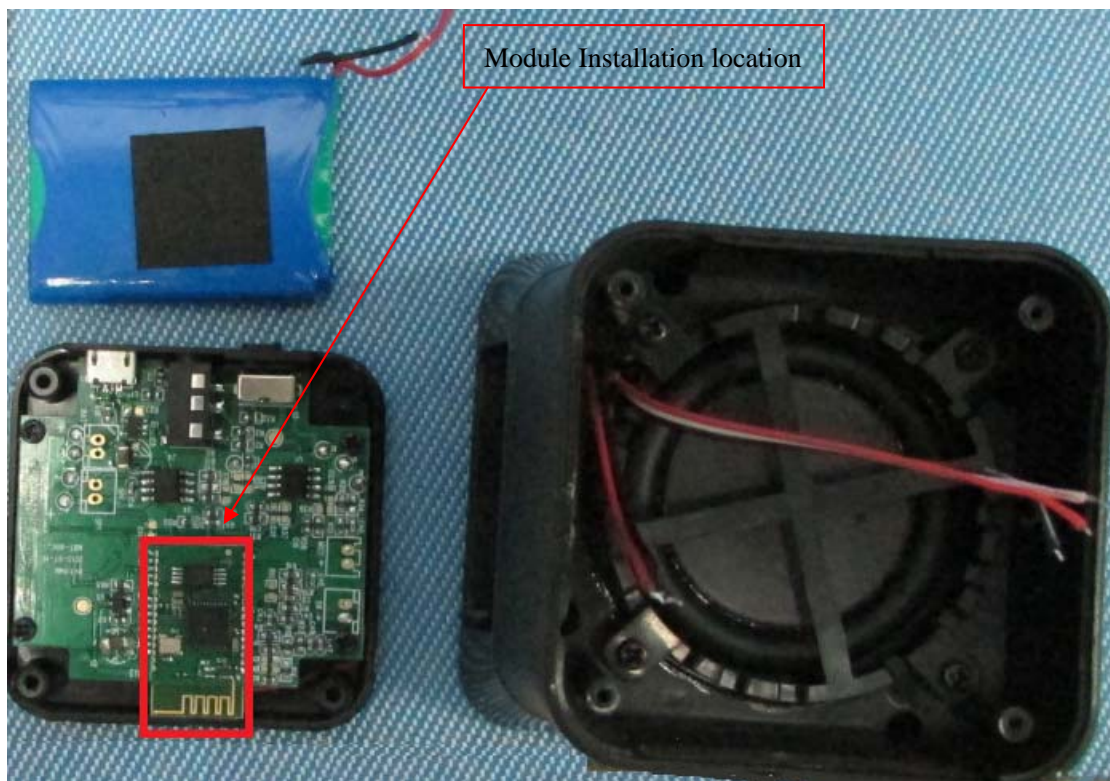
## Notes:

- 1 PSR configuration setting maintains the transmit power to be within the Bluetooth specification v2.0 limits
- 2 Class 2 RF transmit power range, Bluetooth specification v2.0
- 3 Up to five exceptions are allowed in v2.0 of the Bluetooth specification
- 4 Up to three exceptions are allowed in v2.0 of the Bluetooth specification
- 5 Measured at F0 = 2441MHz

## Installation diagram

Module Installation location(Telnova Technology Co.,Ltd MBT-80C Bluetooth

Spesaker)



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## 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: WY9-F6088

Host use instruction:

The module must install and work with a speaker,

The speaker's manufacturer is Telnova Technology Co., Ltd..

The Host mode name: MBT-80C BLUETOOTH SPEAKER

The Host Brand Name: N/A

### **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.

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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.

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

The F6088 Module has been granted as limited modular approval for BLUETOOTH SPEAKER. F6088 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 F6088 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 F6088 Module is incorporated, with a statement similar to the following: For F6088: This device contains FCC ID: WY9-F6088.
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: WY9-F6088. 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: WY9-F6088" or "Contains FCC ID: WY9-F6088" 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.

## **OEM RESPONSIBILITIES TO COMPLY WITH FCC REGULATIONS**

The F6088 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 F6088 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: WY9-F6088” OR “Contains FCC ID: WY9-F6088”

The OEM of the F6088 Module must only use the approved antenna(s) listed above, which have been certified with this module. The device F6088 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.



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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: WY9-F6088 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: WY9-F6088” or “Contains FCC ID: WY9-F6088” 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.