Features： **Bluetooth 3.0 Audio Module, Class 2**

Bluetooth Qualified

Version: V1.0

Mar 2012

The BT3GMD-A30P offers the following features:

● A2DP1.2 using SBC decoder for streaming audio over Bluetooth and AVRCP 1.4 for remote control functionality

● Configurable seven-band speaker equalization as well as ten presets allowing multiple music listening styles

● High quality 96 dB SNR DACs with 44.1 and 48 kHz sample rates for high-fidelity playback

● Single-chip Bluetooth 3.0 transceiver supporting Bluetooth 2.1 + Enhanced Data Rate (EDR) and Bluetooth 2.0, 1.2, and 1.1 backward compatibility

● Best-in-class Bluetooth radio with up to 8 dBm transmit power and -91dBm receive sensitivity

● Support for side tone and digital microphones

● Supports microphone and speaker HW equalization

● automatic volume control (AVC)

● Switching regulator, battery charger, and power management unit

● Supports fast charging, power dissipation monitoring, and optional charger voltage regulation

● Dual high quality 8 kHz and 16 kHz audio MIC inputs

● Multilanguage voice prompt

● Voice command recognition

Product Description:

The BT3GMD-A30P is a Bluetooth 3.0 Module solution integrating common components required for cost and performance-optimized stereo headset designs.

The BT3GMD-A30P also delivers differentiating features including enhanced audio quality, reduced charging times, A2DP, and multipoint connections through the integration of various noise suppression technologies, noise and echo reduction headset, for high-end

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and cost and performance-optimized stereo headsets.

The BT3GMD-A30P supports Bluetooth SIG-compliant wideband speech implementation to greatly enhance the audio quality with both PCs and cell phones.

The BT3GMD-A30P supports the Bluetooth 3.0 standard, adding enhanced power control, simple and secure pairing, and enhanced inquiry response as value-added features for Bluetooth headsets. All major functional blocks required for a Bluetooth stereo headset, including switcher, charger, and stereo audio codec are

The module includes EEPROM, crystal, and PCB antenna.

Applications:

- High-End Stereo Wireless Headsets
- High-END Mono Headsets
- Hands-Free Car Kits
- Wireless Speakers

Functional Block Diagram:

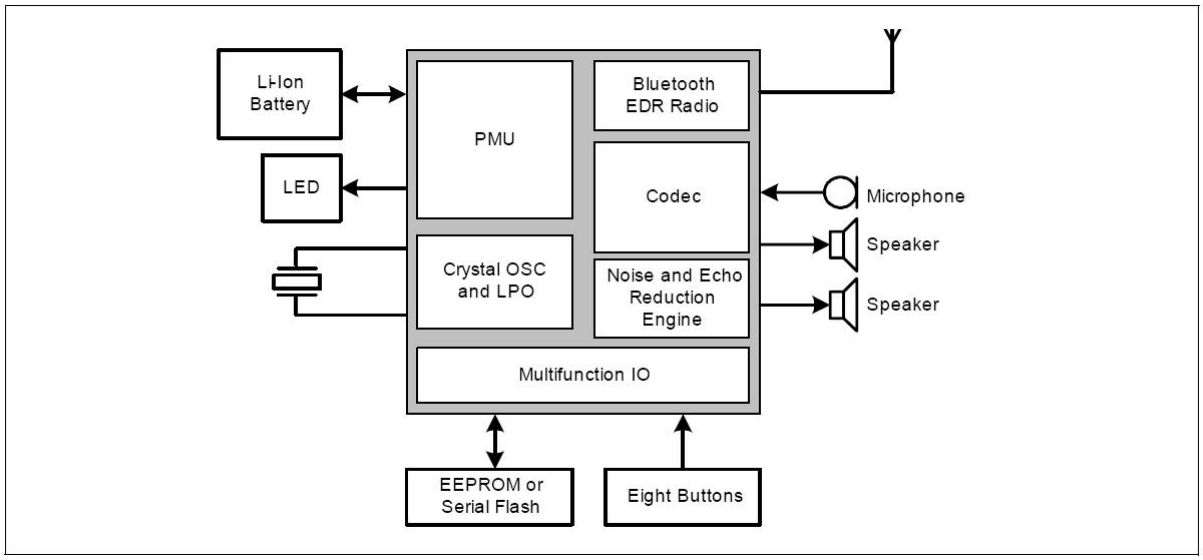

Figure 1: BT30MD-A30P Block Diagram

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Physical Description:

The BT30MD-A30P is a 13.5mm×22mm FR4 PCB with 30 pads located around the perimeter.

Table 1 shows the pinout diagram of the module.

PIN	Signal	PIN	Signal	PIN	Signal	PIN	Signal
1	GND	2	MICBAIS	3	MIC1_P	4	MIC1_N
5	NC	6	NC	7	SPKL_N	8	SPKL_P
9	SPKR_N	10	SPKR_P	11	RST	12	TXD
13	RXD	14	REV	15	FWD	16	VOUT
17	VBATT	18	NPNCNTL	19	VCHGAUX	20	VCHG
21	WAKEUP	22	LED2	23	LED1	24	Shutdown
25	VOL-	26	VOL+	27	LED3	28	MFB
29	PLAY	30	GND				

Table 1 Pin Location

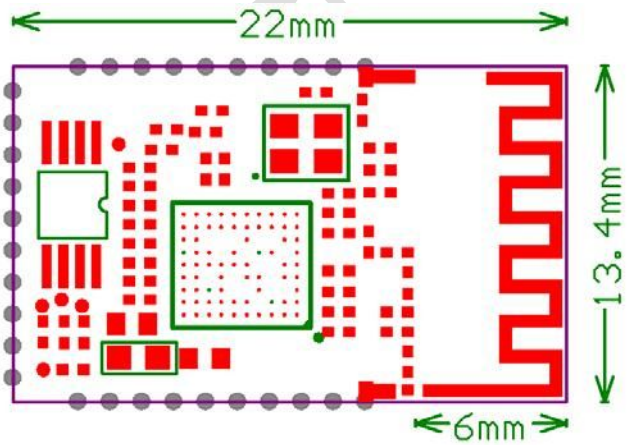

Figure 2: Module PCB Top View

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Table 2 Pin Function Descriptions

Pin Number	Pin Name	I/O	Power Domain	Description
1	GND	I	GND	Digital radio ground.
2	MICBAIS	O	MICAVDD	Microphone bias output.
3	MIC1_P	I	AUD_AVDD	Audio codec microphone differential positive input channel. Mic1 P.
4	MIC1_N	I	AUD_AVDD	Audio codec microphone differential negative input channel. Mic1 N.
5	NC			
6	NC			
7	SPKL_N	O	SPKAVDD	Speaker differential negative output channel 1.
8	SPKL_P	O	SPKAVDD	Speaker differential positive output channel 1.
9	SPKR_N	O	SPKAVDD	Speaker differential negative output channel 2.
10	SPKR_P	O	SPKAVDD	Speaker differential positive output channel 2.
11	RST	I	VDDO	Power-on reset, active low.
12	TXD	I/O	VDDO	General-purpose I/O.
13	RXD	I/O	VDDO	General-purpose I/O.
14	REV	I/O	VDDO	General-purpose I/O.
15	FWD	I/O	VDDO	General-purpose I/O.
16	VOUT	O	AVDD	3.3V Voltage output.
17	VBATT	I	VBAT	3.1-4.2V Input voltage.
18	NPNCNTL	O	VCHG	Base control for external PNP driver transistor through an NPN transistor,
19	VCHGAUX	I	VCHG	Power to the charger control system.
20	VCHG	I	VCHG	Charger supply input.
21	WAKEUP	I	AVDD_OUT	PMU wake-up and shut-down pin. MIA-LITE wakeup/system power-down signal.
22	LED2	O	VBAT	Connect the cathode of LED2. Anode can be connected to HVLDO.
23	LED1	O	VBAT	Output driver for LED. Connect the cathode of LED1. Anode can be connected to HVLDO.
24	Shutdown	I/O	VDDO	General-purpose I/O.
25	VOL-	I/O	VDDO	General-purpose I/O.
26	VOL+	I/O	VDDO	General-purpose I/O.
27	LED3	I/O	VDDO	General-purpose I/O.
28	MFB	I/O	VDDO	General-purpose I/O.
29	PLAY	I/O	VDDO	General-purpose I/O.
30	GND	I	GND	Digital radio ground.

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Supporting Documentions:

Reference Schematic:

The most recent schematic , bill of materil ,and layout file are available from the WLINK TECHNOLOGY LTD.. Contact your WLINK representative for details.

Layout Considerations:

The BT30MD-A30P module is placed at the location where the antenna is away from the power supply(i.e.,BT1 Battery contacts)and any digital signal traces.. The antenna keep-out area which is 5mm around the parameter of the module region is shown in the red dotted box. PCB material and signal traces should not be placed within the antenna keep-out area to assure optimum antenna performance.

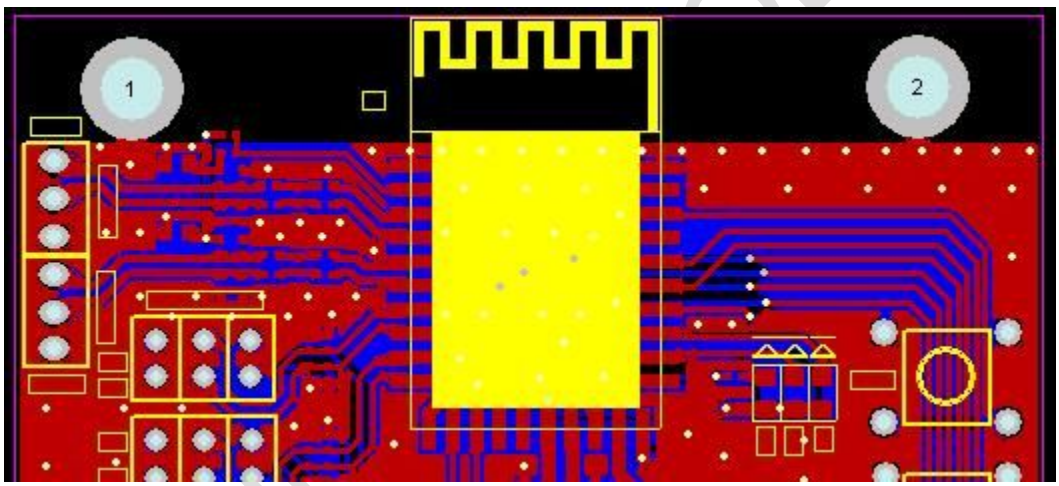

Figure 3: Design reference

Electrical Characteristics:

Table 3: Maximum Electrical Rating

Rating	*Symbol*	*Value*	*Unit*
Maximum DC supply voltage for I/O	VDDO	3.8	V
Maximum DC supply voltage for charger	VCHG	6.5	V
Maximum voltage on input or output pin	Vimax	Domain supply voltage [a] + 10%	V
Maximum transient voltage on input or output pin, 10% maximum duty time	Vimaxt	4.1	V
Minimum voltage on input or output pin	Vimin	VSS – 0.3v	V
Maximum voltage on LED	VLED-max	4.1	V
Storage temperature range	Tstg	–40 to +125	°C
Maximum battery input voltage	VBAT	4.5	V
Maximum charger power dissipation	Pmax (VCHG – VBAT)	390	mW

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Table 4:Power Supply Current (with a Nominal 3.7V Battery Voltage)

Operating Mode	*Typical*	*Unit*
Narrowband Speech Active mode (with 500 ms sniff interval)		
• HV3	9.1	mA
• 2EV3	8.0	mA
• EV3	8.9	mA
A2DP Active mode		
• 44.1kHz sampling rate, SBC (stereo, 8 sub bands, 16 blocks, 53 bit pool), 2DH5 packet type with 118 byte frame size	11.3	mA
Standby mode		
• Single HFP Sniff (640 ms interval)	200	µA
• Single HFP Sniff (500 ms interval)	207	µA
• Dual HFP Sniff (640 ms interval)	327	µA
• Dual HFP Sniff (500 ms interval)	332	µA
Deep Sleep (off) mode	3.0	µA

Notes:

- The currents are measured without an audio signal present.
- The currents are measured with Broadcom generic MMI, and LEDs are off.
- The standby current is measured with the device operating in Slave mode.

Table 5: Audio DAC Path Performance Specifications, 8 kHz and 16 kHz Sample Rate

Property	*Conditions*	*Minimum*	*Typical*	*Maximum*	*Unit*
Full-scale output signal level	0 dB driver gain 1 kHz tone at 0 dBFS 32Ω line load	–	3.2	–	Vppd
Output driver capability	0 dB driver gain 1 kHz tone at 0 dBFS 32Ω load	–	30	–	mW (rms)
Output load impedance	Nominal speaker load	16	32	–	Ω
Driver gain range	Adjustable gain	–18	–	0	dB
Driver step sizes	–	–	3	–	dB
Absolute gain error	Over 0 to –18 dB driver gain 1 kHz tone	–	1	–	dB
Idle channel tone	0 dB driver gain, no signal 32Ω load	–	–	–105	dBc
SNR	0 dB driver gain A-weight 20 kHz BW 32Ω load	90	96	–	dB
Dynamic range	0 dB driver gain A-weight, 20 kHz BW 1 kHz tone at –60 dBFS 32Ω load	–90	–96	–	dB
Total harmonic distortion (THD) + N	Po= 24 mW 0 dB driver gain A-weight, 20 kHz BW 32Ω load	–	–	–70	dB
	Po= 3 mW, 0 dB driver gain A-weight 20 kHz BW 32Ω load	–	–	–62	dB

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RF Specification:

Table 6 : Receiver RF Specifications

Property	*Minimum*	*Typical*[a]	*Maximum*[b]	*Unit*
Receiver Section				
Frequency range	2402	–	2480	MHz
Rx Sensitivity				
GFSK, 0.1% BER, 1 Mbps	–	–89.5	–	dBm
pi/4-DQPSK, 0.01% BER, 2Mbps	–	–91.5	–	dBm
8-DPSK, 0.01% BER, 3 Mbps	–	–85.5	–	dBm
Maximum input	–	–	–10.0[c]	dBm
Interference Performance				
C/I co-channel (GFSK, 0.1% BER)	–	–	11.0	dB
C/I 1 MHz adjacent channel (GFSK, 0.1% BER)	–	–	0.0	dB
C/I 2 MHz adjacent channel (GFSK, 0.1% BER)	–	–	–30.0	dB
C/I ≥ 3 MHz adjacent channel (GFSK, 0.1% BER)	–	–	–40.0	dB
C/I image channel (GFSK, 0.1% BER)	–	–	–9.0	dB
C/I 1 MHz adjacent to image channel (GFSK,0.1% BER)	–	–	–20.0	dB
C/I co-channel (pi/4-DQPSK, 0.1% BER)	–	–	13.0	dB
C/I 1 MHz adjacent channel (pi/4-DQPSK, 0.1% BER)	–	–	0.0	dB
C/I 2 MHz adjacent channel (pi/4-DQPSK, 0.1% BER)	–	–	–30.0	dB
C/I ≥ 3 MHz adjacent channel (8-DPSK, 0.1% BER)	–	–	–40.0	dB
C/I image channel (pi/4-DQPSK, 0.1%BER)	–	–	–7.0	dB
C/I 1 MHz adjacent to image channel (pi/4-DQPSK,0.1% BER)	–	–	–20.0	dB
C/I co-channel (8-DPSK, 0.1% BER)	–	–	21.0	dB
C/I 1 MHz adjacent channel (8-DPSK, 0.1% BER)	–	–	5.0	dB
C/I 2 MHz adjacent channel (8-DPSK, 0.1% BER)	–	–	–25.0	dB
C/I ≥ 3 MHz adjacent channel (8-DPSK, 0.1% BER)	–	–	–33.0	dB
C/I image channel (8-DPSK, 0.1% BER)	–	–	0.0	dB
C/I 1 MHz adjacent to image channel (8-DPSK,0.1% BER)	–	–	–13.0	dB

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Table7: Transmitter RF Specifications

Property	*Minimum*	*Typical*	*Maximum*	*Unit*
Transmitter Section				
Frequency range	2402	–	2480	MHz
Maximum output power (Class 2 with V12 pin power to VDDTF pin, with TCA and TSSI)	–3	2	4	dBm
Maximum output power (Class 1 with 3.3V to VDDTF pin, with TCA and TSSI)[b]	5	8	12	dBm
In-Band Spurious Emission				
±500 kHz	–	–	–20.0	dBc
1.0 MHz < |M – N| < 1.5 MHz (EDR only)	–	–	–26.0	dBc
1.5 MHz < |M – N| < 2.5 MHz (EDR only)	–	–	–20.0	dBm
|M – N| > 2.5 MHz (EDR only)	–	–	–40.0[c]	dBm
Out-of-Band Spurious Emission				
30 MHz to 1 GHz	–	–80.0	–36.0[d]	dBm
1 GHz to 12.75 GHz	–	–	–30.0[e]	dBm
1.8 GHz to 1.9 GHz	–	–80.0	–47.0	dBm
5.15 GHz to 5.3 GHz	–	–90.0	–47.0	dBm
GPS Band Spurious Emissions and Noise Floor[f]				
1572.92 MHz to 1577.92 MHz (without SAW filter)	–	–150	–124	dBm/Hz
1572.92 MHz to 1577.92 MHz (with SAW filter)	–	–162	–146	dBm/Hz
Out-of-Band Noise and Spurious Emission without Band-pass Filter at Front End[f]				
746 MHz to 764 MHz (CDMA)	–	– 78	–	dBm
851 MHz to 894 MHz (CDMA)	–	– 68	–	dBm
925 MHz to 960 MHz (GSM)	–	– 68	–	dBm
1805 MHz to 1880 MHz (GSM)	–	– 70	–	dBm
1930 MHz to 1990 MHz (CDMA)	–	– 73	–	dBm
2110 MHz to 2170 MHz (WCDMA)	–	– 73	–	dBm
Out-of-Band Spurious Emission Noise Floor[f]				
746 MHz to 764 MHz	–	–140	–130	dBm/Hz
851 MHz to 894 MHz	–	–140	–130	dBm/Hz
925 MHz to 960 MHz	–	–140	–130	dBm/Hz
1805 MHz to 1880 MHz	–	–140	–130	dBm/Hz
1930 MHz to 1990 MHz	–	–140	–130	dBm/Hz

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Application Examples:

·Stereo Headphones

·Wireless stereo speakers

·Soundbars

·Mono Headsets

·Handsets

·and more…

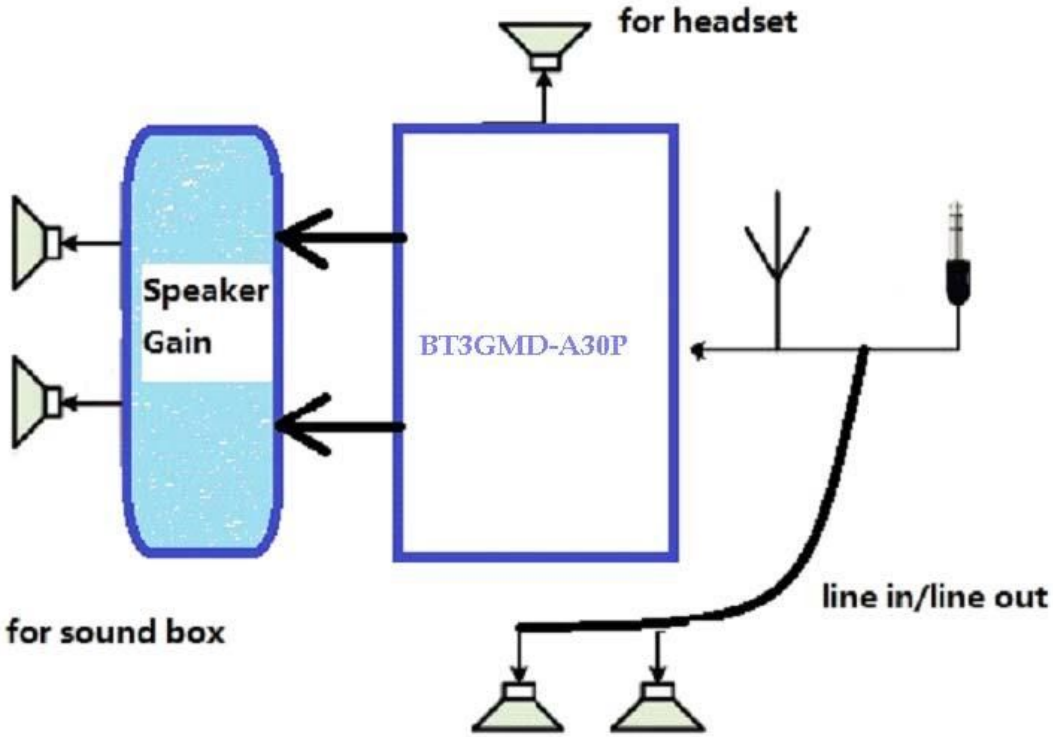

Figure 4 : Application

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Mechanical Specification:

Weight:

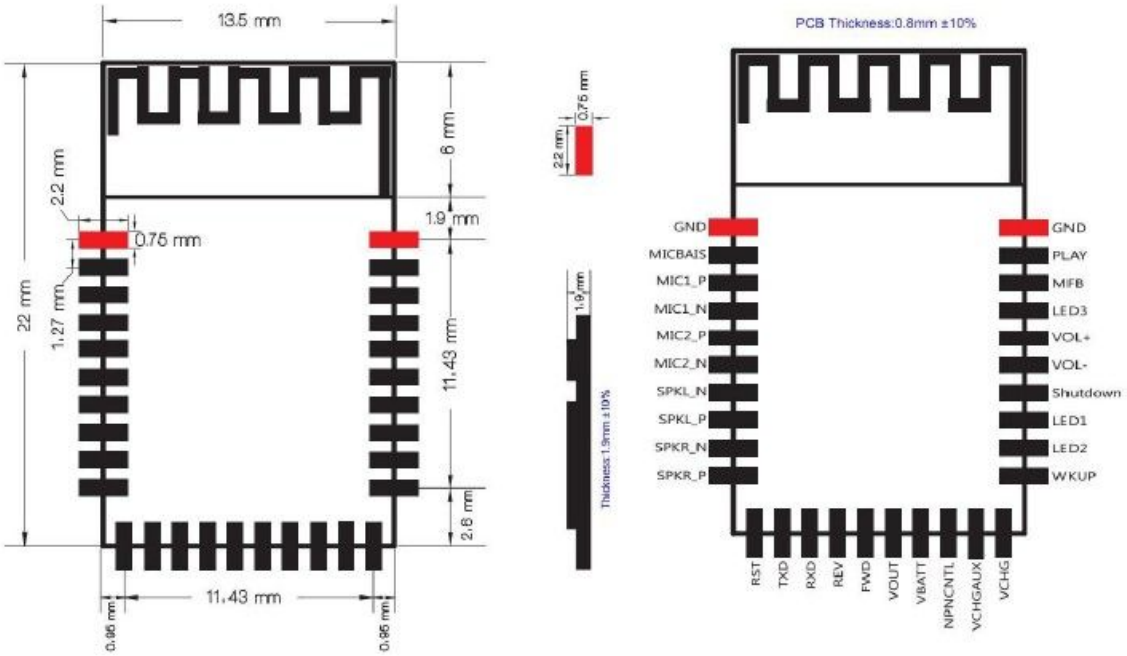

Figure 5: BT3GMD-A30P Module PCB Layout

Federal Communication Commission Interference Statement

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 of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

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- 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. 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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

Declaration the Restriction of this Limited Module Approval:

According to FCC Part 15 Subpart C Section 15.212, the radio elements of the modular transmitter must have their own shielding. However, due to there is no shielding for this Bluetooth Module, this module is granted as a Limited Modular Approval. When this Bluetooth Module is installed into the End Prouduct by a specific manufacturer, this specific manufacturer should re-evaluate that End Product for the Spurious Emission Test to ensure the full compliance of 15.247 requirements.

End Product Labelling

The final end product must be labelled in a visible area with the following" Contains FCC ID: OZJBT3GMD-A30P ". The FCC part 15.19 statement below has to also be available on the label: This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this

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device must accept any interference received, including interference that may cause undesired operation.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

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