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BTM-35

Product Name	BTM-35
version	Bluetooth V4.0

Product development Department		**DATE**
Prepared By	LI YI	2013-7-15
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Approved By	Chenshengqi	2013-7-15

BTM-68E

DATA SHEET

07 Nov 2015

PCB Version 3.0

SHENZHEN TTK TECHNOLOGY CO.,LTD.

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DESCRIPTION:

BTM-35 is the latest generation of Bluetooth Module. It provides highest level of integration With integrated 2.4GHz radio, DSP, battery Charger, stereo codec, and antenna ready. Mono and stereo audio applications. BTM-35 is also ready to support the latest Bluetooth 4.0 standard and support for secure Simple pairing.

FEATURES:

- Plug n' Play Bluetooth Solution for Stereo Audio Solutions
- 80MHz RISC MCU and 80MIPS Kalimba DSP
- Voice recognition support for answering a call Enabled hands-free use
- Bluetooth 4.0 Compliant and Integrated Antenna
- Class II Range up to 10 Meters
- Temperature range from -30C to +85C
- Multipoint A2DP connection enables a headset (A2DP) connection to 2 A2DP source devices For music playback
- Secure simple pairing,CSR's proximity pairing and CSR's proximity connections
- Supported Bluetooth Profiles: A2DP v1.2 AVRCP v1.4 HFP v1.6 HSP v1.2
- Supported 5-band EQ for music playback
- High-quality Audio 95dB SNR on DAC Playback
- SPI interface for debug

APPLICATIONS:

- High quality wireless Speakerphones
- Wireless mono headsets
- Wireless Stereo speakers
- Hands-free car kits

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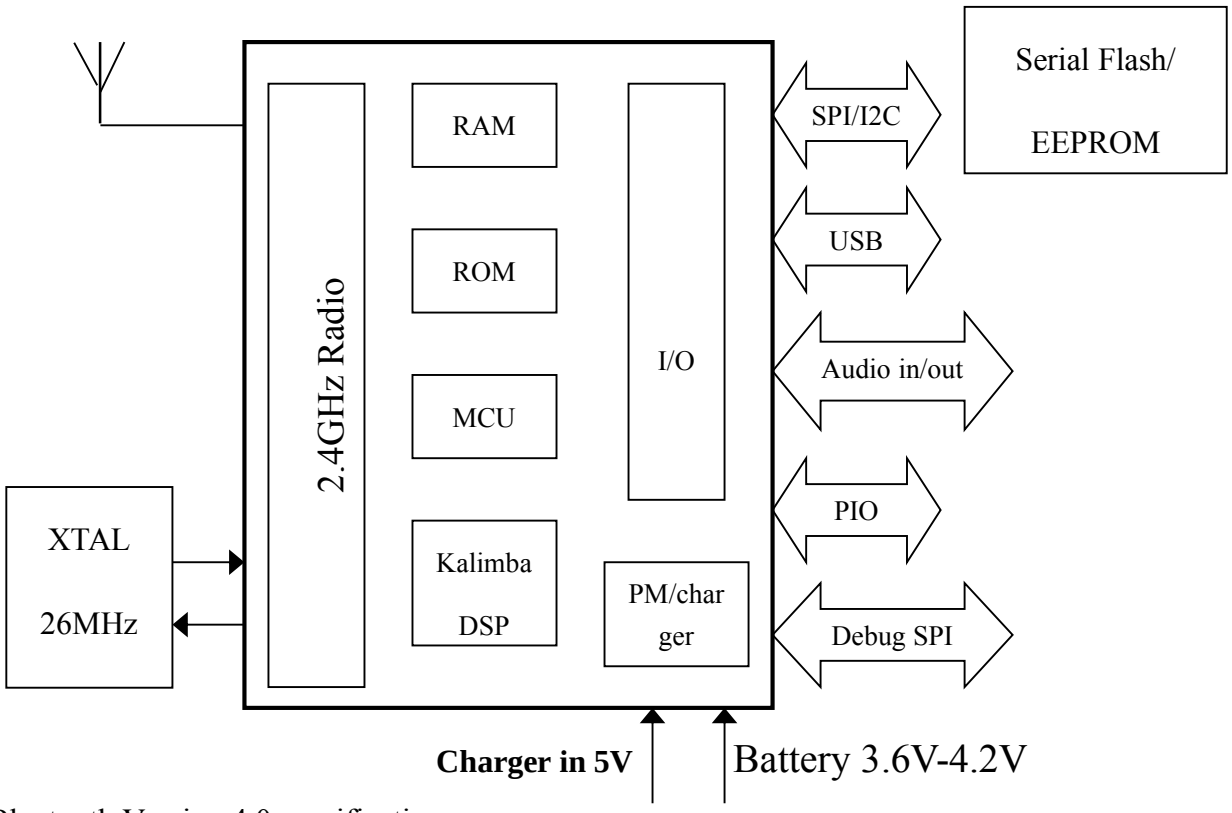
REVISION HISTORY

Version	Comment	Custom	Date
1.0	Preliminary Datasheet	zuoguoqiang	11/2013

1.0 Block Diagram



- Bluetooth Version 4.0 specification
- Operating Frequency 2.4GHz-2.48GHz ISM band
- Modulation GFSK(Gaussian Frequency Shift Keying)
- Transmit Power ≤4dBm, Class 2
- Sensitivity ≤-81dBm at 0.1% BER
- Security features Authentication and encryption
- Support profiles Hands-Free Profile v1.6 and Headset Profile v1.2

Advanced Audio Distribution Profile v1.2 and
Audio/Video Remote Control Profile V1.4

- Power 3.3V-4.2 LI-batter
- Operating Temperature －20～+70 Centigrade
- Size 20mm x 25mm x 3.0mm

Figure 1: Block diagram of BTM-68E

2.0 Electrical Characteristics

Recommended operating conditions

	Min	Typ	Max	Unit
Operating temperature	-20	20	70	℃
VDD_BAT	3.0	3.8	4.2	V
VDD_CHG	4.5	5	6.5	V
VDD_IO	1.7	1.8	1.95	V

Table 1:Recommended operating conditions

Battery charger

Charger Mode(BAT_P rising to 4.2V)		Min	Typ	Max	Unit
Supply current(a)		--	4.5	6	mA
Battery trickle charge current(b)		--	4	--	mA
Maximum battery fast charge current (I-CTRL = 15)(c) (d)	Headroom(e) > 0.7V	--	200	--	mA
	Headroom = 0.3V	--	150	--	mA
Minimum battery fast charge current (I-CTRL = 0)(c) (d)	Headroom > 0.7V	--	40	--	mA
	Headroom = 0.3V	--	35	--	mA

Trickle charge voltage threshold	--	2.9	--	V
Float voltage (with correct trim value set), VFLOAT (f)	4.10	4.15	4.2	V
Float voltage trim step size(f)	--	50	--	mV
Battery charge termination current, % of fast charge current	5	10	20	%

(a) Current into VDD_CHG does not include current delivered to battery (IVDD_CHG - IBAT_P)

(b) BAT_P < trickle charge voltage threshold

(c) Charge current can be set in 16 equally spaced steps

(d) Trickle charge threshold < BAT_P < Float voltage

(e) Where headroom = VDD_CHG - BAT_P

(f) Float voltage can be adjusted in 15 steps. Trim setting is determined in production test and must be loaded into the battery charger by firmware during boot-up sequence

Table 2: Battery charger characteristics

Reset

	Min	Typ	Max	Unit
$V_{TH,res}$ threshold voltage	0.65	0.85	1.50	V
R_{IRES} input resistance	--	220	--	KΩ
C_{IRES} input capacitance	--	220	--	nF

Table 3: Reset terminal characteristics

MUTE

BTM-35 can output a high level to control the amplifier mute. When bluetooth normal working, Module output high level to control the amplifier open. Standby, Module output low level to control the amplifier off.

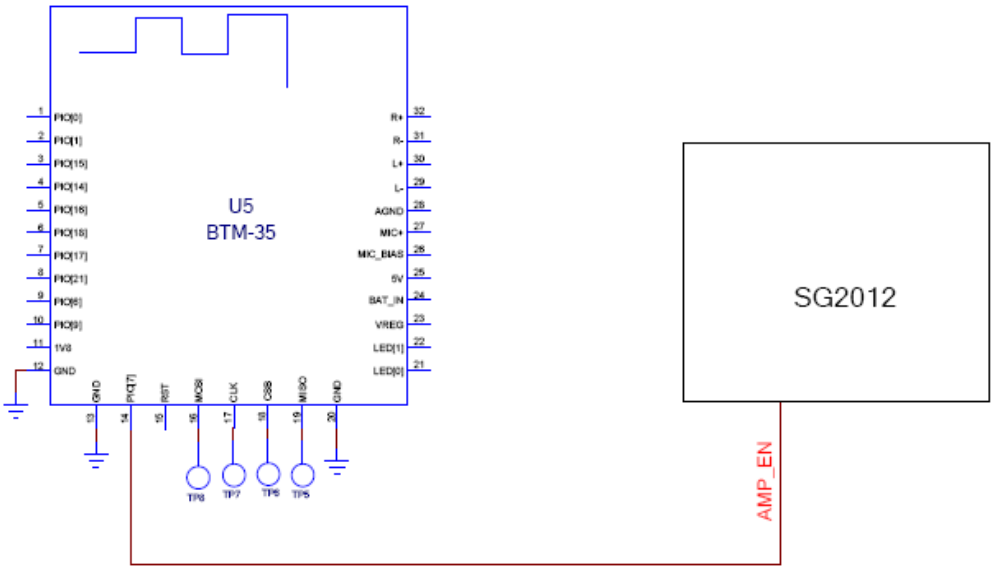
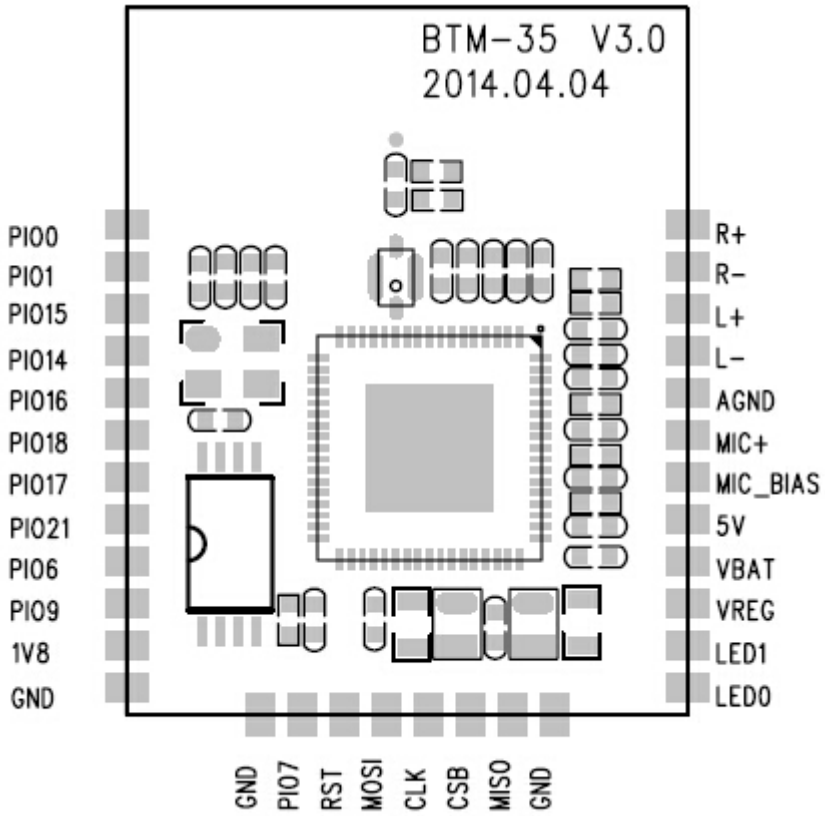


Figure 3: BTM-68E Mute contorl circuitry

.3.Device Terminal Functions：

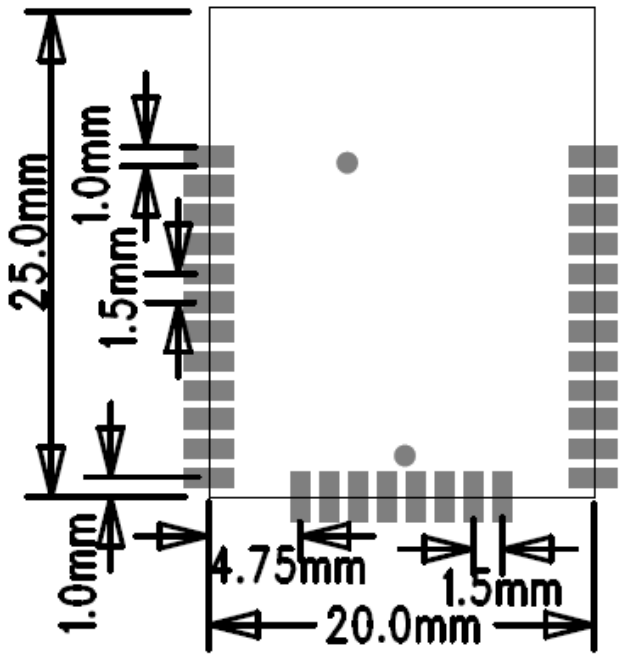


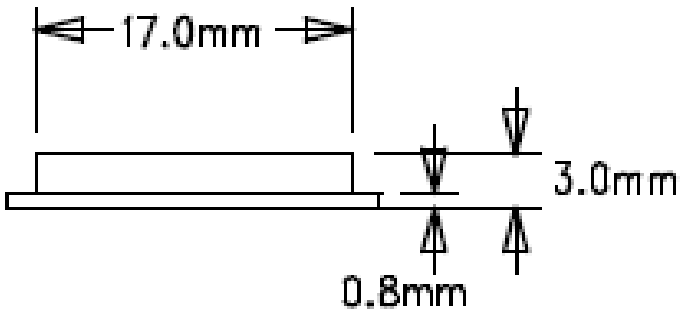
Lead	name	Function	Description
1	PIO[0]	PIO port	Programmable input/output line
2	PIO[1]	PIO port	Programmable input/output line
3	PIO[15]	PIO port	Programmable input/output line
4	PIO[14]	PIO port	Programmable input/output line
5	PIO[16]	PIO port	Programmable input/output line
6	PIO[18]	PIO port	Programmable input/output line
7	PIO[17]	PIO port	Programmable input/output line
8	PIO[21]	PIO port	Programmable input/output line
9	PIO[6]	PIO port	Programmable input/output line
10	PIO[9]	PIO port	Programmable input/output line

11	1V8	1.8V POWER	Positive supply for 1.8V regulated output
12	GND	GND	Ground
13	GND	GND	Ground
14	PIO[7]	PIO port	Programmable input/output line
15	RST	Reset	Logic low reset
16	MOSI	SPI interface	SPI data input
17	CLK	SPI interface	SPI Clock
18	CSB	SPI interface	Chip select for SPI
19	MISO	SPI interface	SPI data output
20	GND	GND	Ground
21	LED[0]	Status	LED driver
22	LED[1]	Status	LED driver
23	VREG	POWER ON/OFF	Moudle power on/off active high
24	VBAT	Power Input	Lithium ion/polymer battery positive
25	5V	5V-charger	Lithium ion/polymer battery charger input
26	MIC BIAS	MIC power	Microphone bias
27	MIC +	MIC Inpt	Microphone Input
28	AGND	AGND	Analogue ground
29	L-	L-	Speaker output, channel L negative
30	L+	L+	Speaker output, channel L positive
31	R-	R-	Speaker output, channel R negative
32	R+	R+	Speaker output, channel R positive

4.0 **Example Application Schematic**

5.0 Package Dimensions





Unit: mm

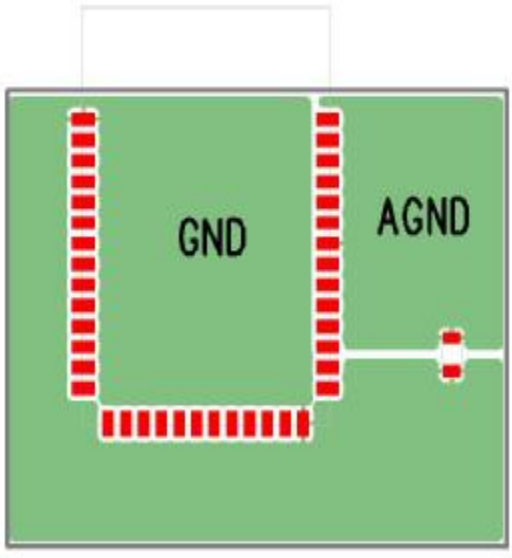
6.0 Layout Guidelines

6.0.1 **Audio Layout**

Route audio lines as differential pairs. The positive and negative signals should run parallel and close to each other until they are converted to single-ended signals. Use dedicated audio ground plane for entire audio section.

6.0.2 **Antenna Design**

Do not place GND plane or any metal directly under the antenna of BTM-35. To avoid any excess parasitic capacitance in the antenna feed line caused by the RF test pin on the bottom side of the module, the area underneath the RF test pin should also be left free from copper. Any metal in close proximity of the antenna will have an effect on the antenna performance. Thus any metal should be placed as far from the antenna as possible. The module should be placed to an edge of the PCB.



7.0 Contact Information

Sales : ttk@szttk.com chenxl@szttk.com

Technical Support: liy@szttk.com

Address: 8th Floor,Southland Building,minzhi hongshan ,

Mei long Road, long hua Town, Bao'an District,shenzhen

Website: WWW.szttk.com

Shenzhen TTK Technology CO.,LTD
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FCC WARNING

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.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Radiation Exposure Statement:

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

This transmitter must not be co-located or operating in conjunction with any other

antenna or transmitter.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.
The firmware setting is not accessible by the end user.
The final end product must be labelled in a visible area with the following:
“Contains Transmitter Module 2A6OP-BTM35”

The module can be used for Bluetooth Module with 0dBi antenna. The host manufacturer installing this module into their product must ensure that the final compost product complies with the FCC requirements by a technical assessment or evaluation 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. The end user manual shall include all required regulatory information/warming as show in this manual.

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See alsoSection 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C (15.247).itSpecifically identified AC Power Line Conducted Emission,Radiated Spurious emissions,Band edge and RF Conducted Spurious Emissions,Conducted Peak Output Power,Bandwidth,Power Spectral Density,Antenna Requirement.

Summarize the specific operational useconditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT has one PCB antenna, the antenna can't be replaced by other authorized antennas.

2.3 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer isresponsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited

module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.
This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited
module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.
Explanation: The module is a single module.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 2A6OP-BTM35.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type")).
For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has one PCB antenna, the antenna can't be replaced by other authorized antennas.

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This
includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2A6OP-BTM35.

2.9 Information on test modes and additional testing requirements5

Additional guidance for testing host products is given in KDBPublication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: **Hangzhou Soundlive Electronic Co., Ltd.**
can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart Bdisclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product

as being Part 15
Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.