User Manual

Product name：Wireless Audio Module Product

Model：WL1SB23

Document No：

1. General specifications

WL1SB23 is based on IA9QH5 chipset that complied with 5.2/5.8GHz ISM Band,and it is the small size and low power module for Wireless Audio.

IA9QH5 is a system-on-chip (SOC) designed for low-power and low-cost applications. It is a highly integrated single chip transceiver, supporting multiple audio interfaces such as I2S, S/PDIF, and USB.

IA9QH5 provides dual transmitter and receiver modes, which enables the seamless and bi-directional transmission of high quality audio. In the transmitter, Tx receives digitized stereo as input, which is packetized and processed for synchronization and data integrity. In the receiver, Rx receives RF signal, demodulated and processed to restore the transmitted signal, and then streamed as digital audio output.

■ Digital I2S audio interface

■ Size : 35mm x 35mm x 4.43 mm

■ PCB Pattern Antenna

■ RF Freq.(MHz) : 5160 - 5245MHz、5730 - 5845MHz [CE/UKCA only used 5.8GHz]

■ Modulation Technique :GFSK

■ Crystal : 40MHz, 16PF, ±10PPM

■ Short delay time variation

■ Low Power Consumption

■ operating temperature 0ºC ~ 60ºC

■ working voltage 3.3V±0.15V

Block diagram
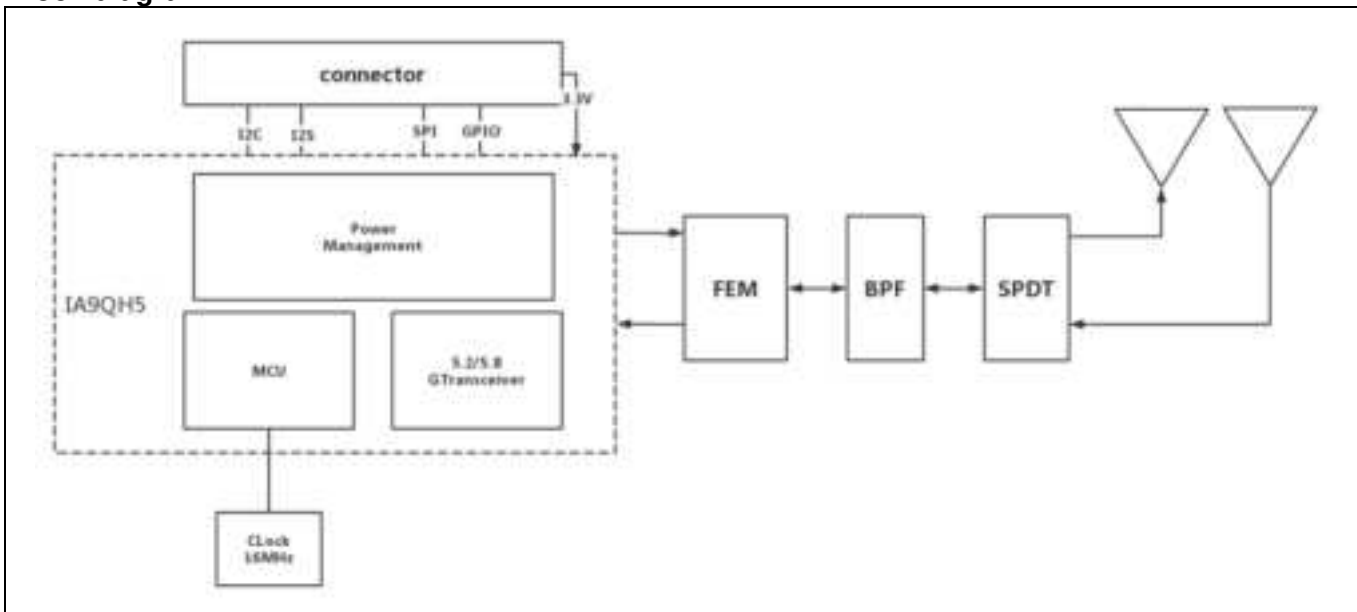
Note: Frequencies of this transmitter 5160-5245MHz & 5730-5845MHz.
Note: CE/UKCA only used 5730-5845MHz.

2. The application UI

WL1SB23 Operation description
- First: the module is powered on and started by 3.3V;
- Second: the host transmits the audio signal to the module through I2S;
- Third: THE IA9QH5 on the module decodes the I2S audio signal.
- Fourth: the IA9QH5 RF chip on the module transmits the audio through wireless transmission;
- Fifth: there is I2C communication between the module and the host, both sides obtain the status and control through I2C;
- The product automatically stops the transmission if the information fails to be transferred or the operation fails.
- WL1SB23 as the main device

WL2SB23 Operation description
- First: The module is powered on and started by 3.3V;
- Second: The IA9QH5 RF chip on the module receives the audio signal transmitted by the transmitting module through wireless transmission;
- Third: MCU IA9QH5 decodes the acquired audio signal and transmits the audio to the power amplifier on the subwoofer power amplifier board through I2S;
- Fourth: There is I2C communication between the module and the subwoofer power amplifier board, initializing the power amplifier on the subwoofer power amplifier board, and IO port communication between the module and the subwoofer power amplifier board, controlling the power amplifier switch and LED state display.
- WL2SB23 is a client device controlled by the WL1SB23.

WL1SB23 device is classified as a master device.
WL2SB23 is classified as a Client device under the control of the WL1SB23.

The product automatically stops the transmission if the information fails to be transferred or the operation fails.

ISED RSS-247 (6.4) required by the technology
When there is no information to transmit or an operation fails, the device automatically discontinue transmission. After the transmission is discontinued, the TX module enters the reconnection state until it is reconnected or the power supply is switched off passively. After the transmission is discontinued, the RX module enters the RE-connection state for one minute, IF no connection, enters the standby mode after one minute.
FCC 15.407 (c) required by the technology
The device would automatically discontinue transmission if there is no information to transmit or if the operation fails. After the transmission is discontinued, the TX module enters the reconnection state until it is reconnected or the power supply is switched off passively. After the transmission is discontinued, the RX module enters the RE-connection state for one minute, IF no connection, enters the standby mode after one minute.

WL1SB23 (TX module):
The reconnection state is TX will transmit control signal to RX for pair each other.
The TX re-try to transmit control signal to RX on complete frame or burst intervals until they connect successfully or power supply be off passively.

WL2SB23 (RX module):
The connection state is no transmit data by RX module. It's only permit to transmit the information that is repetitive codes to TX on complete frame or burst intervals.

The standby mode is enter sleep mode to save consumption power.
On this mode, the RX doesn't transmit any information or data to TX.

The module-[WL1SB23] is installed in the speaker, and the signal of the sound is provided through the HDMI or Optical ports of the TV audio products; When the speaker receive the sound signal, it will transmit the sound signal to another speaker (which is installed with the module-[WL2SB23]).

5150-5250MHz is limited to use indoor only

5150-5250MHz est limitée à une utilisation en intérieur uniquement.

RF Technical Specification

Product	Wireless Audio Module
Brand	LG
Modulation	GFSK
Data Rate	2 Mbps

Frequency Bands	5160-5245MHz
	5730-5845MHz [CE/UKCA only used 5730-5845MHz.]

RF Output Power	5160-5245MHz	11.0	dBm (AV) (FCC / IC Used)
	5730-5845MHz	15.0	dBm (AV) (FCC / IC Used)
		13.5	dBm (E.I.R.P) (EU UKCA Used)

Channels List

Channel List
U-NII Band 1

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
0	5160	9	5205
1	5165	10	5210
2	5170	11	5215
3	5175	12	5220
4	5180	13	5225
5	5185	14	5230
6	5190	15	5235
7	5195	16	5240
8	5200	17	5245

Channel List
U-NII Band 3

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
0	5730	12	5790
1	5735	13	5795
2	5740	14	5800
3	5745	15	5805
4	5750	16	5810
5	5755	17	5815
6	5760	18	5820
7	5765	19	5825
8	5770	20	5830
9	5775	21	5835
10	5780	22	5840
11	5785	23	5845

Antenna Type/Gain

No.	Antenna Part Number	Manufacturer	Antenna Type	Frequency (MHz)	Gain (dBi)
1.	WA0A-PCB (ANT 1)	Shenzhen ZTX Communication Technology Co., LTD.	PCB Printing Antenna	5150	2.64
				5200	2.55
				5250	2.66
				5700	3.49
				5750	3.30
				5800	3.07
				5850	3.21
2.	WA0A-PCB (ANT 2)	Shenzhen ZTX Communication Technology Co., LTD.	PCB Printing Antenna	5150	1.84
				5200	1.94
				5250	1.38
				5700	1.76
				5750	2.45
				5800	2.94
				5850	2.97

This device contains 2 Antennas and the device does not support MIMO and only for antenna diversity

FCC Statement
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.
● 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.

Manufacturers integrating the Radio Module into other devices should note the following:
The device is compliant with part 15.247 and 15.407 of Title 47 of the FCC rules. If the Link Module is integrated into a new host product, the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

IC Statement
This Class B digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux normes CNR exemptes de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes :
(1) cet appareil ne doit pas provoquer d'interférences et
(2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquerun fonctionnement non souhaité de l'appareil.

This Class B digital apparatus complies with Canadian ICES-003.
Cetappareilnumérique de la classe B estconforme á la norme NMB-003 du Canada.

-Label and Compliance Information
The final end product must be labeled in a visible area with the following:
"Contains FCC ID: BEJ-WL1SB23",
"Contains IC: 2703H- WL1SB23" .
The grantee's FCC ID can be used only when all FCC/ IC compliance requirements are met.

-RF exposure
The module will install into mobile device such as Sound Bar
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Information on test modes and additional testing requirements
-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, additional transmitter in the host, etc.).

The product is placed into a normal "paired" mode with another Audio device, as per the normal intended use of the product. For example, soundbar, audio equipment requirement, additional transmitter in the host etc.

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