Gigawit Bluetooth Audio module GWBMA1x Datasheet (preliminary)

1. Introduction

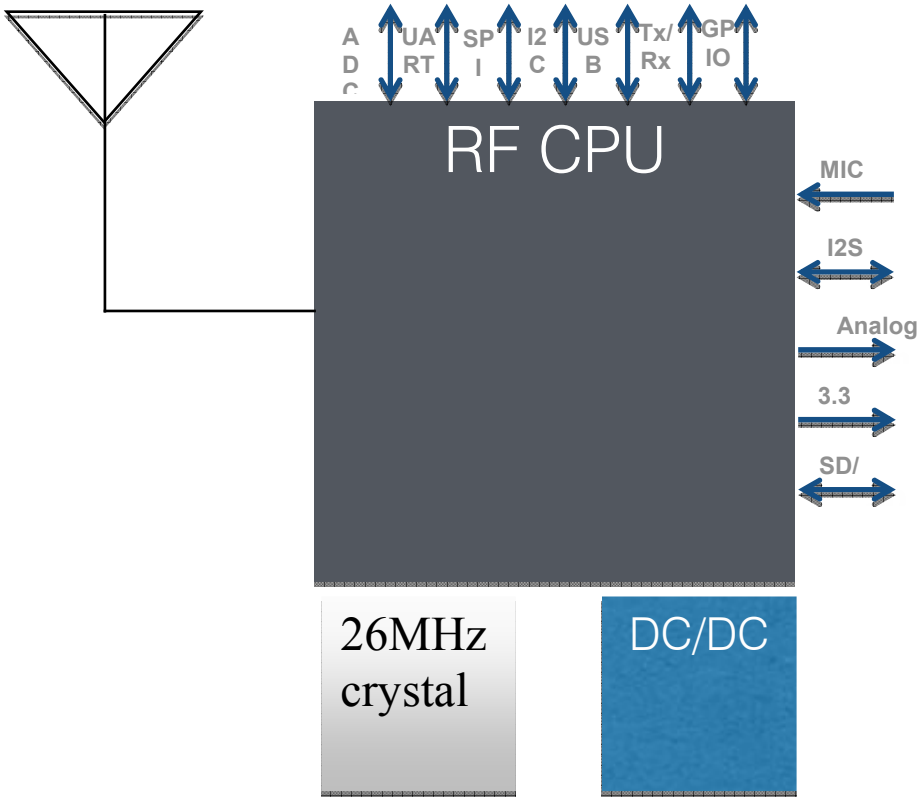
GWBMA1x BT Audio module is a low power consumption Bluetooth module for audio application. It is compatible with Bluetooth 4.2+EDR standard, providing high quality wireless audio solution to customer.

2. Feature

- Support Standby/Shutoff/Sleep modes
- Support serial ADC Keypad input
- I2S interface available for Audio codec
- UART，USB1.1，GPIO and OTG for expansion
- Support up to 48kHz/16bit DAC sampling for Bluetooth stereo audio
- Bluetooth audio transmission; Bluetooth headset feature
- Firmware pre-programmed, no software or RF engineering resource needed
- Internal codec supports WAV, MP3, WMA, JPEG Audio, ACC*

3. Application

This module can be applied for short distance audio transmission, such as wireless speaker, allowing smart device or computer to transmit audio signal to such devices.



4. Block Diagram

5. Parameters

	Item	Parameter
Wireless	Bluetooth version	Bluetooth V4.2+EDR
	protocols	HFP/HSP,OPP,A2DP/AVRCP,PBAP profiles
	modulation	PSK3bps, π/4-DQPSK，8DPSK
	frequency range	2.402GHz - 2.480GHz
	Tx power	Fulfil FCC Class2 requirement，Max Tx. power is +5dbm
	Sensitivity	-90dbm
	S/N ratio	82db
Hareware	Antenna	PCB antenna .
	Operating voltage	3.2-4.2V
	Current consumption	45mA when playing music，32mA when pause
	Operating temperature	-25℃ - 60℃
	Storage temperature	-40℃ - 135℃
	Expansion interface	USB，UART，GPIO，IIC，IIS
	I2S interface	data: 16bit; sampling rate：8KHz，16KHz，22.05KHz，44.1KHz，48KHz
	Dimension (mm)	19 x 32x 1

6. Firmware

GWBMA1x comes with standard firmware with either analog output (Pin 29 -30) or digital output (IIS). The firmware already embedded all the basic features, such as Bluetooth Audio, key input, LED control..etc. Customer needs no engineering resource on those basic features.

Internal codec firmware

GWBMA1X embedded with internal codec, which output analog signal directly. Customer can simply connect GWBMA1x analog output to earphone for audio play back, or to an audio amplifier.

External codec firmware

With this firmware, GWBMA1x will by-pass its internal codec and directly output the digital audio signal received from wireless side to I2S output, which is connected to an external codec. Customer can select different codec in order to satisfies different sound quality requirements. Beside the codec feature, any other feature of this firmware will be same as the Internal code firmware.

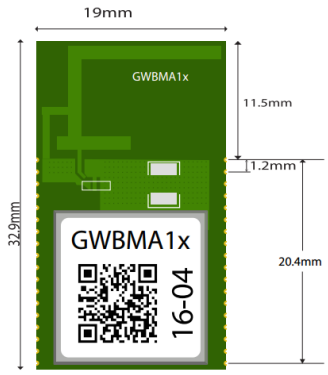
Customised firmware

GWBMA1X is a high performance and flexibility Bluetooth audio module, and there are many rooms for embedded features. It is possible to provide a customised firmware base on customer's requirement base on the module hardware. Customer may contact us through our local partners for such customisation service. NRE will be needed for customisation service.

Firmware loading

Firmware can be loaded into GWBMA1X module through pin 16 and 17 by a JTAG adaptor. A window base application will be provided for loading a GWBMA1X firmware from computer to the module.

7. GWBMA1X diagram

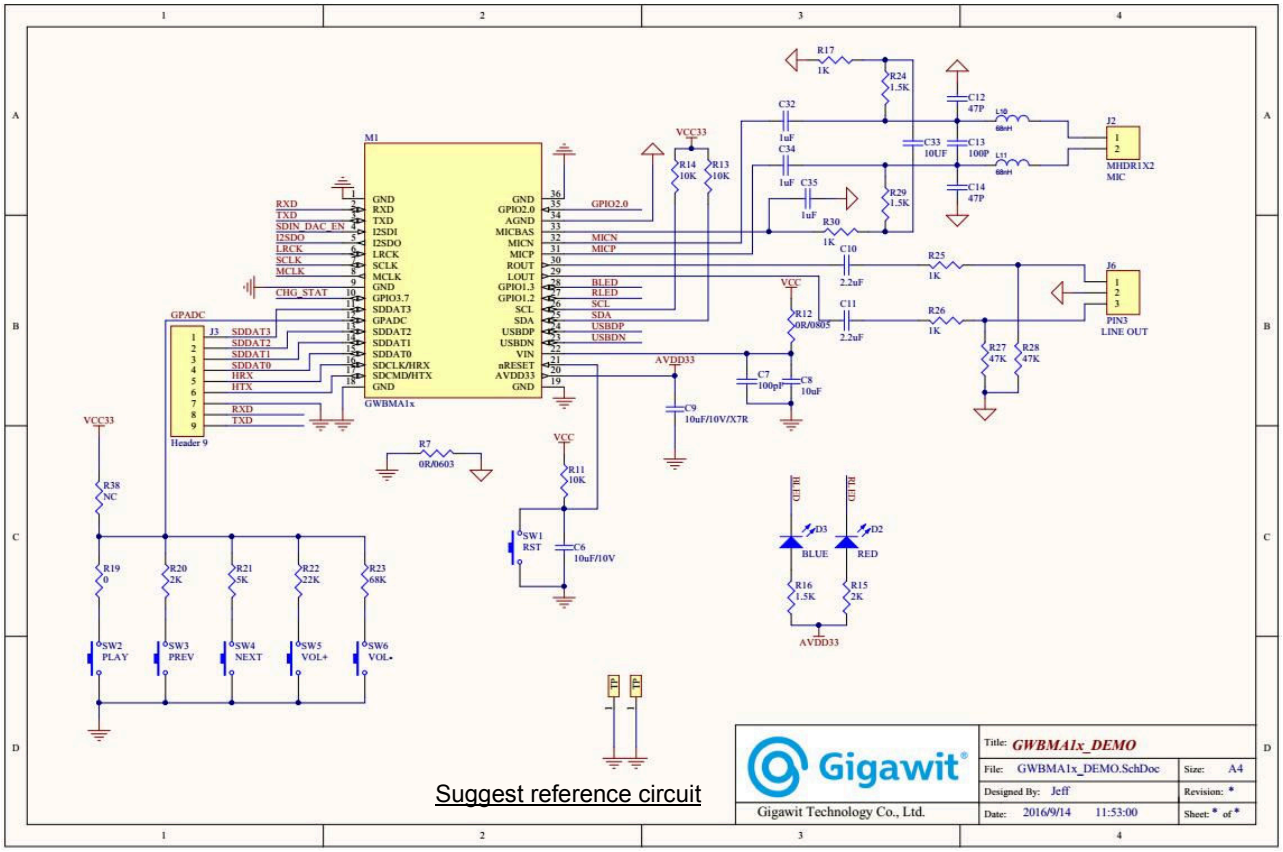


8. Pin definition

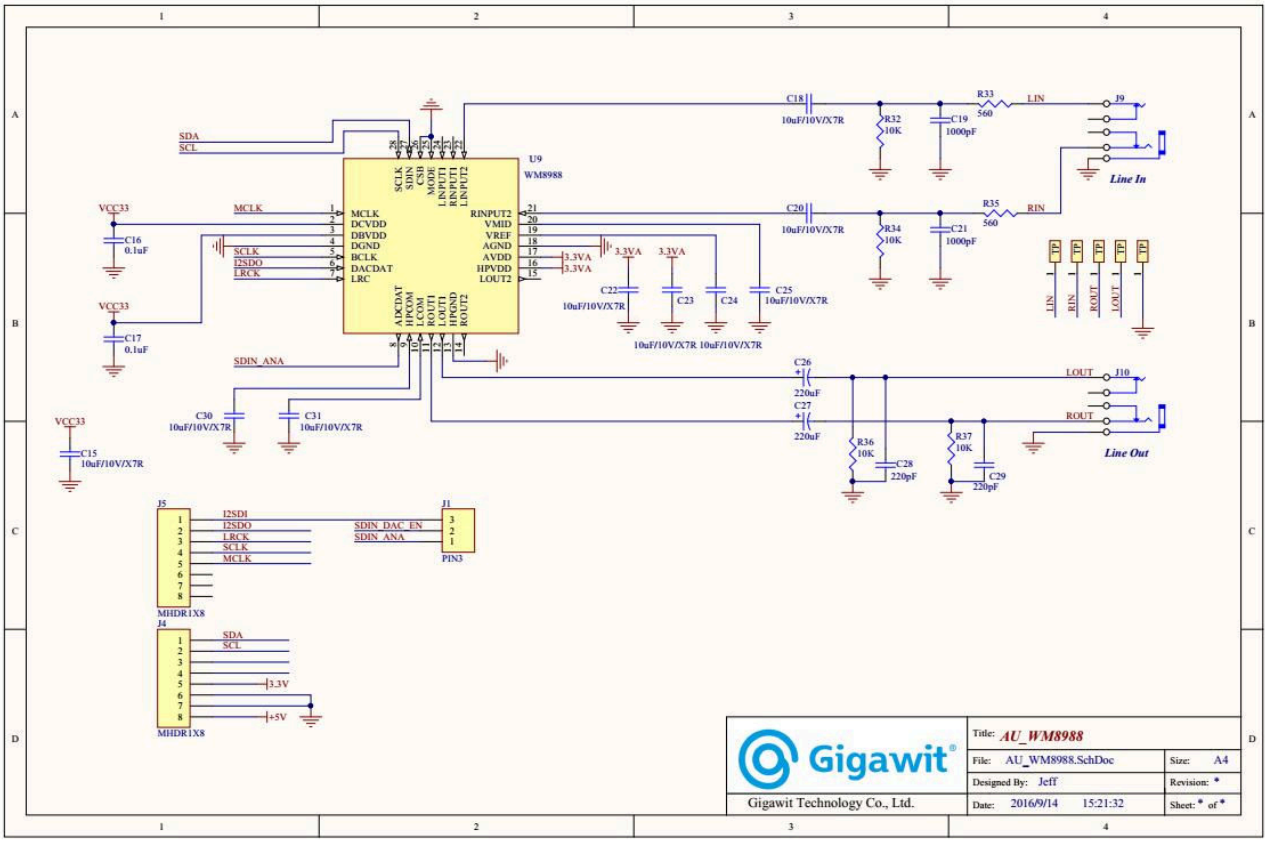
pin	name	description
1	GND	Ground
2	SDA	UART RXD
3	SCL	UART TXD
4	I2S_DI	I2S Data in
5	I2S_DO	I2S Data out
6	LRCK	I2S L/R channel clock
7	SCLK	I2S BCLK
8	MCLK	I2S Configurable Clock OUT
9	GND	Ground
10	GPIO 3.7	General purpose IO
11	SDDAT3	General purpose IO
12	ADC1	GPADC Input Channel 1
13	SDDAT2	General purpose IO
14	SDDAT1	General purpose IO
15	SDDAT0	General purpose IO
16	SDCLK/HRX	Host data rx
17	SDCMD/HTX	Host data tx
18	GND	Ground

pin	name	description
19	GND	Ground
20	AVDD33	3.3V output
21	nRESET	Chip reset
22	VIN	Power input
23	USBDN	USB D-
24	USBDP	USB D+
25	SDA	Serial Data Line
26	SCL	Serial Data Line
27	GPIO1.2	General purpose IO
28	GPIO1.3	General purpose IO
29	LOUT	Audio output Left
30	ROUT	Audio output Right
31	MICP	Mic input +
32	MICN	Mic input -
33	MICBAS	Mic bias
34	AGND	Analog ground
35	ADC0	GPADC Input Channel 1
36	GND	Ground

9. Reference design and Evaluation kit

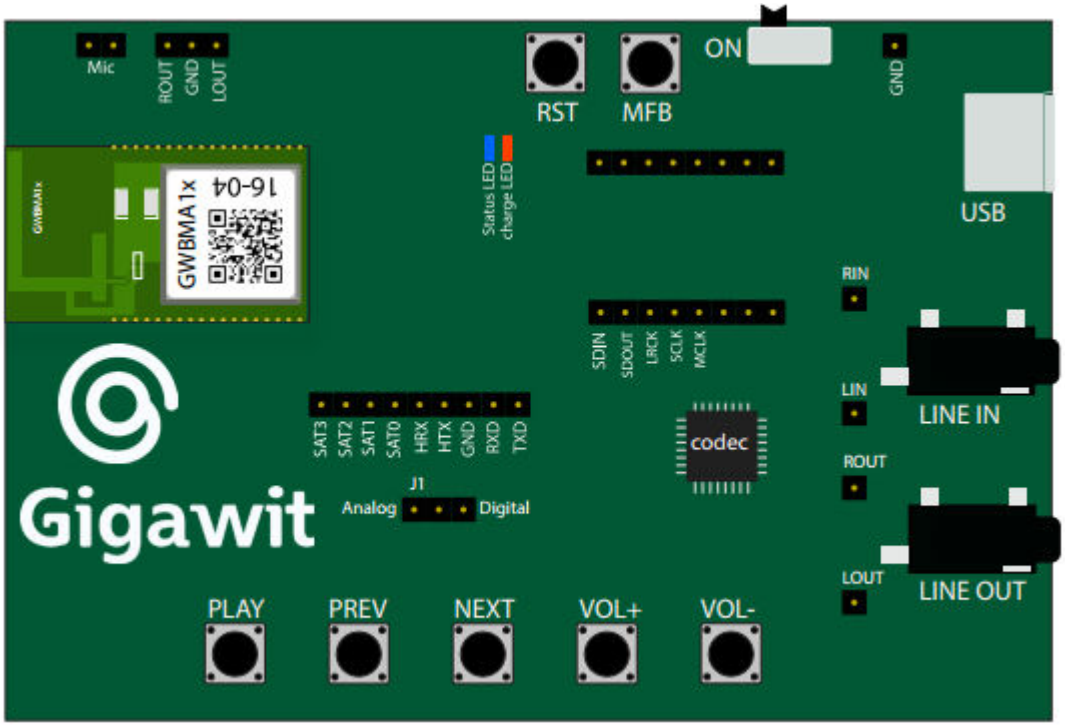


Suggest reference circuit

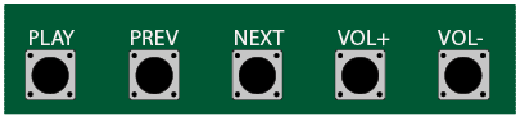

U9
WM8988
MCLK
SCLK
I2SDO
LRCK
SDA
SCL
SDIN_ANA
VCC33
3.3VA
C16 0.1uF
C17 0.1uF
C15 10uF/10V/X7R
C30 10uF/10V/X7R
C31 10uF/10V/X7R
C18 10uF/10V/X7R
C19 1000pF
C20 10uF/10V/X7R
C21 1000pF
C22 10uF/10V/X7R
C23
C24
C25 10uF/10V/X7R
C26 220uF
C27 220uF
C28 220pF
C29 220pF
R32 10K
R33 560
R34 10K
R35 560
R36 10K
R37 10K
LIN
RIN
LOUT
ROUT
J9
Line In
J10
Line Out
J5
MHDR1X8
J4
MHDR1X8
J1
PIN3
I2SDI
I2SDO
LRCK
SCLK
MCLK
SDIN_DAC_EN
SDIN_ANA
3.3V
+5V
Gigawit
Gigawit Technology Co., Ltd.
Title: AU_WM8988
File: AU_WM8988.SchDoc
Size: A4
Designed By: Jeff
Revision: *
Date: 2016/9/14 15:21:32
Sheet: * of *

10. Evaluation board

GWBMA1X evaluation board provides a complete circuit GWBMA1X where customer can evaluate each feature of the standard firmware, or any customised firmware.



Push buttons GWBMA1X evaluation board



Except the RST button (system reset), 5 push buttons for controlling the music

Play : Play, pause music and answer call

Prev : Jump to previous song

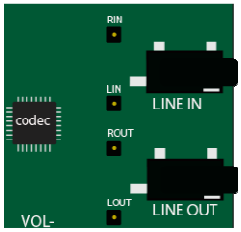
Next : Jump to next song

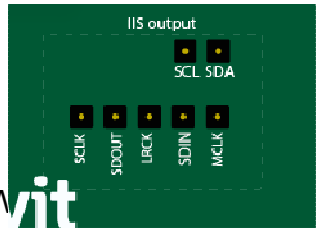
Vol+, Vol- : Volume increment/decrement

Codec output

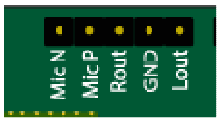
When external codec firmware loaded, the external codec on the EVK will be activated. The on board codec will then convert digital data from the module to LINE OUT and convert audio signal from LINE IN to the module.

User can also connect the I2S related signal pin to his own codec circuit.





When internal codec firmware is loaded, the module will decode the signal internally and output audio signal on the board; on the other hand, audio from MIC will also be coded in the module.



Battery charger

A Li-ion charger is also on board, customer can simply solder a 3.7V Li-ion battery to

the board. The RED LED will turn on when charging.

USB connector

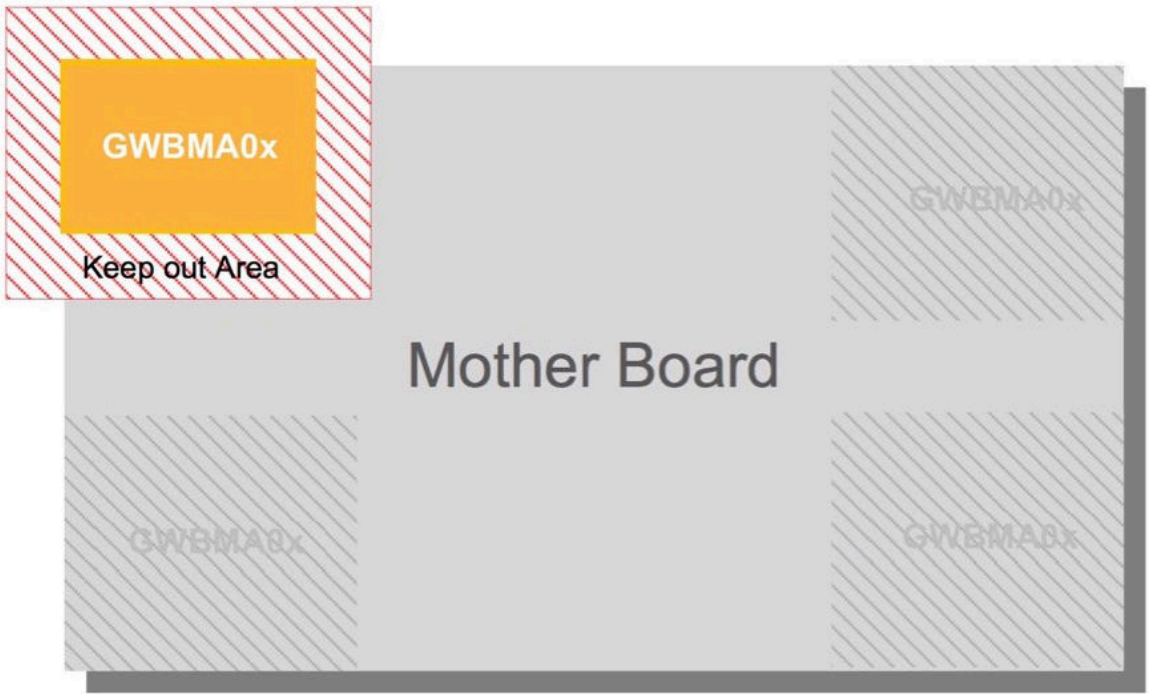
It is used as power supply of the board, and battery charging as well (if Li-ion battery connected). Data pin is also connect to GWBMA1X USB port, but is not yet enabled until future or customised firmware.

11. Layout requirement

GWBMA1X is a sensitive RF device, and it is suggestion to be put on

In order to obtain the best performance, GWBMA1X should be placed on corner of PCB, and keep certain distance from other components, especially metal components, such are speaker, transformer, battery, heat sink and metal plate.

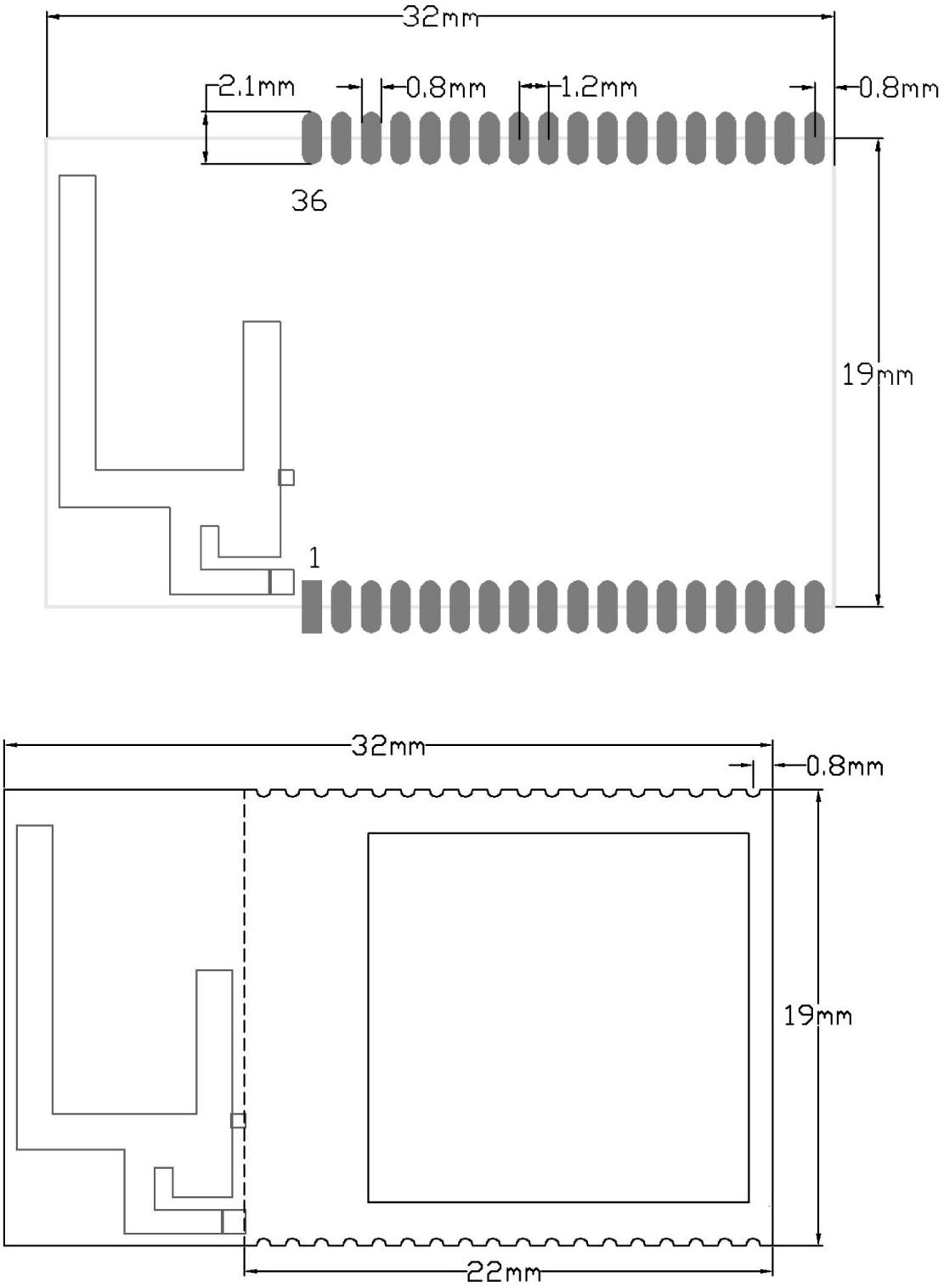
The diagram shows the layout for GWBMA1X module. Inappropriate installation may deteriorate the RF performance.



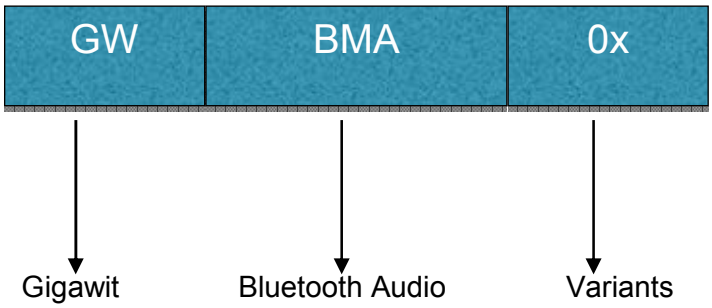
GWAPA0x layout recommendation

12. GWBMA1X dimension

Figure [11]: GWBMA1X dimension



13. Naming



14. Contact information

Head quarter:

Room 308, Building 25, Keyuan West Industrial Area, Nanshan District, Shenzhen City, Guangdong Province, China

Tel: +86-755-86329300

Fax: +86-755-86329882

E-mail: info@gigawit.com

Sales and marketing office:

Tel: +852-91983405

Fax: +852 3013 8763

E-mail: sales@k-sol.com.hk

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B (§15.107 and if applicable §15.107) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101.

Integrator is reminded to assure that these installation instructions
will not be made available to the end user of the final host device.

The final host device, into which this RF Module isintegrated" hasto be labelled
with an auxilliary lable stating the FCC IDofthe RF Module,
such as "Contains FCC ID: QECGWBMA1X"

"This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1)this devicemay not cause harmful interference, and
(2)this devicemust accept any interference received, including
interference thatmay cause undesired operation."

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.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.