

EB35E0x_SW 2.4GHz Wireless Subwoofer Module

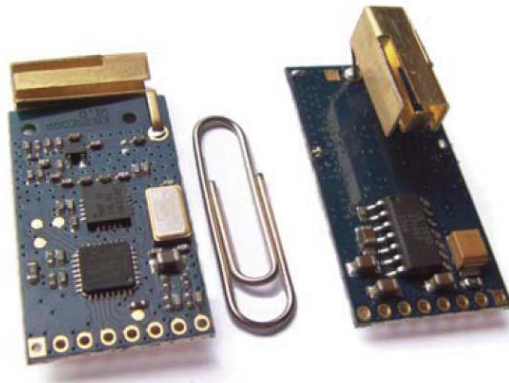
Product Description

EB35E0x_SW is the optimized module dedicated for the wireless subwoofer application, it balance well between the cost and performance by utilizing the fact of subwoofer limited frequency response bandwidth. The narrow bandwidth enables EB35E0x_SW to transmit enough redundant data to combat with the 2.4GHz interference thus maintain the good co-existence performance in the 2.4GHz ISM band.

EB35E0x_SW is ideal for the subwoofer application not only by its competitive cost, but also by its flexibility for customized functions. The SW crossover frequency can be adjusted easily by the digital filter, and the general purpose I2C can be used to control customer peripheral unit to eliminate an extra microcontroller.

Applications

- 5.1 Subwoofer Speaker
- 2.1 Subwoofer Speaker
- Soundbar Subwoofer
- DVD



Features

- 2.4GHz FHSS Solution
- Optimized for subwoofer application, 20~200Hz bandwidth
- Co-existence: small foot-print(2MHz bandwidth) enabling better 2.4GHz co-existence
- Low Power: TX: 80mA/3.3V @ 10dBm RF Output, RX: 45mA/5.0V
- RF Range: 15m+ indoor
- Pairing function to support multi TX/RX operating simultaneously
- Optional I2S digital audio interface support most audio ADCs and DACs
- 22ms low latency
- Power management function and control for green power policy
- General purpose I2C for digital amplifier control
- Flexible design, custom functions supported

Electrical Specification

	Description	Min/Typical/Max
General	Supply voltage	TX: 3.3V, RX:5V
	Supply current	TX: 80mA , RX: 45mA
	Operation temperature	-10 ~ +60°C
RF	RF Frequency	2400 ~ 2483MHZ
	Modulation	GFSK
	Data rate	2M bps
	TX Power	10dBm
	RX Sensitivity	-90dBm
	RF Channels	16
	RF Range	15m+ indoor
Audio	Input level	1.0Vrms
	Input impedance	10K
	Output level	1.0Vrms
	Output impedance	<1K Ohm
	Output/input gain	1:1
	Frequency response	20Hz ~ 200Hz (-3dB)
	Latency	22ms
	S/N ratio	80dB
	THD	< 0.1% @ 100Hz
	Dynamic range	85dB

Table [1]: Electrical Specification

Channels and Frequencies

Channel #	Frequency	Channel #	Frequency
1	2.404GHz	9	2.444GHz
2	2.409GHz	10	2.449GHz
3	2.413GHz	11	2.454GHz
4	2.419GHz	12	2.459GHz
5	2.424GHz	13	2.464GHz
6	2.429GHz	14	2.469GHz
7	2.434GHz	15	2.474GHz
8	2.439GHz	16	2.479GHz

Table [2]: Channels and frequencies

EB35E0TP_SW

EB35E0TP_SW is 2.4G wireless digital audio subwoofer transmitter . The pin assignment is as Table[2]. The EB35E0TP is frequency hopping by a random sequence, to maintain the good co-existence performance. The I2C is used to interface with external MCUs. The external MCU can act as a master to control the TX module. This is quite flexible for customer to add extra function for their special needs.

EB35E0TP_SW transmitter has two versions: EB35E0TP_SW2 and EB35E0TP_SW. EB35E0TP_SW2 has Left and Right input, it generates the subwoofer signal by add left and right signal together and feed to a digital Low pass filter with 200Hz bandwidth to get the subwoofer signal. This eliminate a external subwoofer signal circuit for the customer.

For the have a single-end SW signal, you need tie the Left and Right together, other the SW output level will be in half (as seen in Figure[2]).

EB35E0TP_SW transmitter features a Standby mode by turning off the RF if there is no music signal input exceeds than 5 minutes.

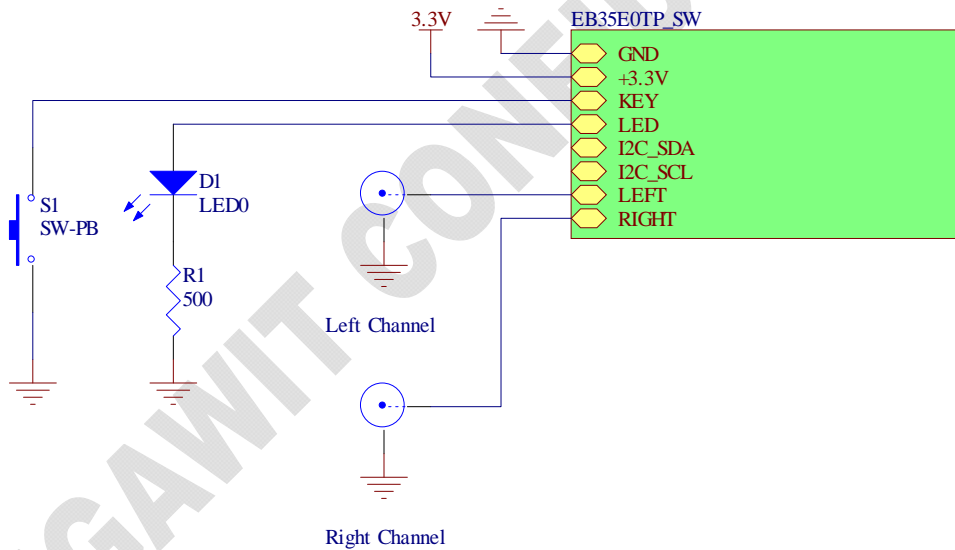


Figure [1]: EB35E0TP_SW2 Application with Left and Right Input

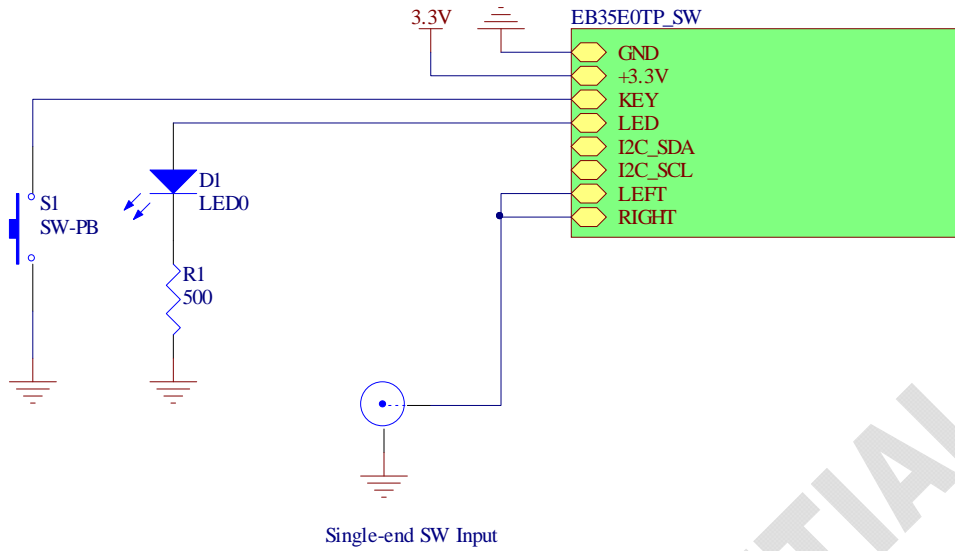


Figure [2]: EB35E0TP_SW2 Application with single-end SW input

Some application has a existed subwoofer signal and need a balance input, The EB35E0TP_SW can do this.

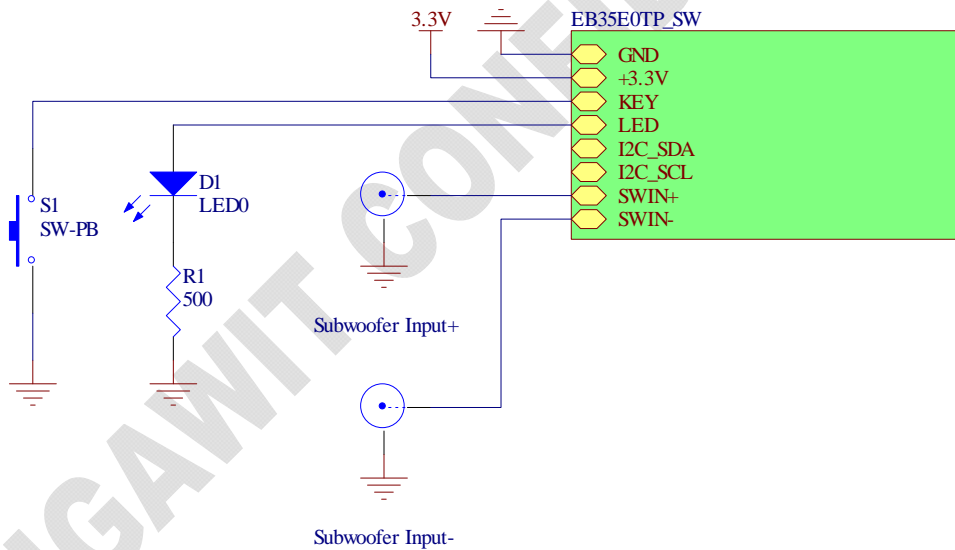


Figure [3]: EB35E0TP_SW Application with balance SW input

Pin #	Pin name	Type	Description
1	GND	P	Power ground
2	VCC	P	2.7V ~ 3.3V DC input
3	KEY	I/O	Power or pairing Key input, press long than 3s to turn on or off the module, press long than 10s to enter pairing mode.
4	LED	I/O	Status LED output

5	SDA/GPIO	I/O	General purpose I/O or I2C SDA.
6	SCL/GPIO	I/O	General purpose I/O or I2C SCL
7	SWIN+ or LEFT	I	SW positive input (EB35E0TP_SW) or Left Channel (EB35E0TP_SW2)
8	SWIN- or RIGHT	I	SW negative input (EB35E0TP_SW) or Right Channel (EB35E0TP_SW2)

Table [3]: EB35E0TP_SW2 and EB35E0TP_SW Pin Assignment

EB35E0RP_SW

The EB35E0RP_SW is 2.4G wireless digital audio subwoofer receiver. The pin assignment is as Table[3]. EB35E0RP_SW is optimized for subwoofer application with a frequency response range from 20Hz~200Hz, the crossover can be adjust by the internal digital filter in the baseband.

The EB35E0RP_SW receiver features a balance output, this is convenient for interfacing with the balance input subwoofer amplifier.

EB35E0RP has a I2C or GPIO interface, this can be used to control the digital amplifier or to assert a standby control output.

EB35E0RP_SW receiver features a Standby Output when it haven't received the TX signal longer than 5 seconds, this Output can be used to control the SW power.

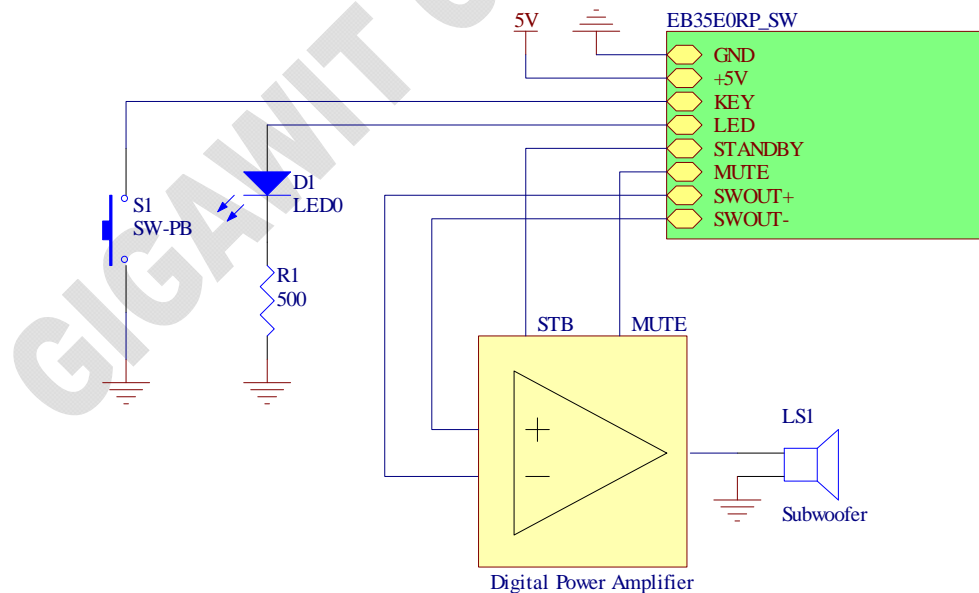


Figure [4]: EB35E0RP_SW Application

Pin #	Pin name	Type	Description
1	GND	P	Power ground
2	VCC	P	5V DC Power Supply
3	KEY	I/O	Power or pairing Key input, press long than 3s to turn on or off the module, press long than 10s to enter pairing mode.
4	LED	I/O	Status LED output
5	STB/SDA/GPIO	I/O	Standby output or I2C SDA. I2C can be both master and slave mode, this add flexibility for custom function, like to control the SW digital amplifier. For Standby mode, output High when no TX signal >5s, and low with TX signal >2s.
6	MUTE/SCL/GPIO	I/O	MUTE output or I2C SCL
7	SWOUT+	O	SW positive output
8	SWOUT-	O	SW negative output

Table [4]: EB350RP_SW Pin Assignment

Pairing

EB35E0x support ID matching to enable multi TX/RX operating in a same area. The RX will only receive the paired TX audio signals. To pair the TX and RX module, follow the below steps.

In some application, a simple pairing method can be implemented by using a slider switch with 4 positions. See the following schematic, 4 IDs can be set using the switch. To be paired, the TX/RX switch S2 should be in the same position. The module will be rebooted when the switch id changed to let the ID be effective. The whole pairing ID is a combination of above KEY/LED pairing ID (stored in EEPROM) and the switch ID(see table [5])

		±5%
1	16K	0.99
2	36K	1.65
3	91K	2.31
4	330K	2.97

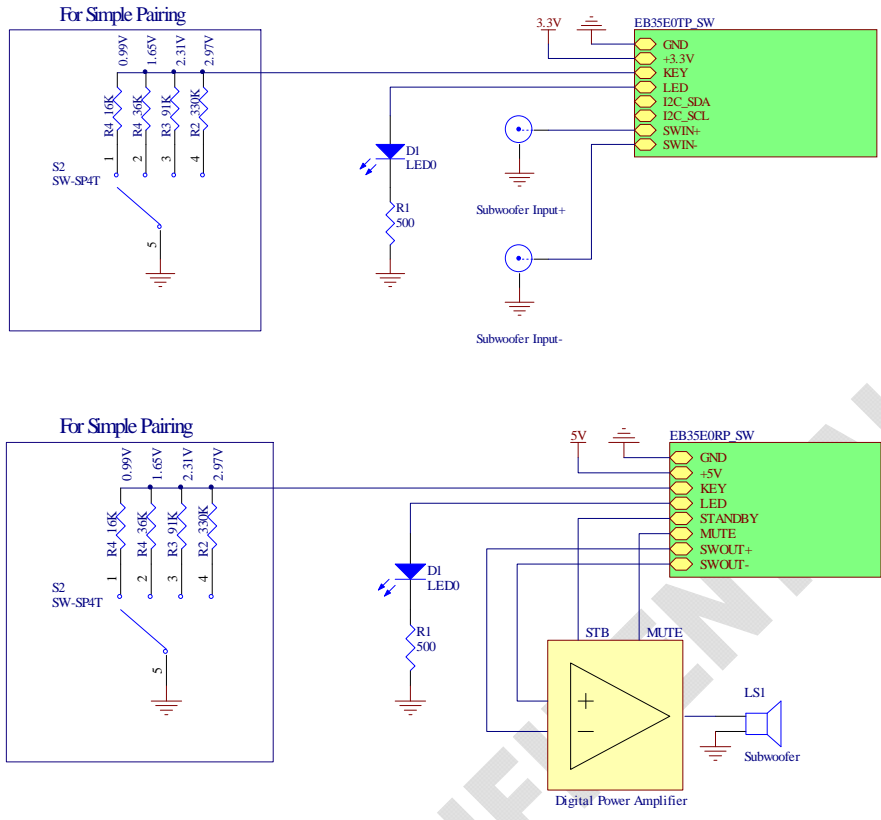


Figure [7]: Simple pairing method

Physical Dimension

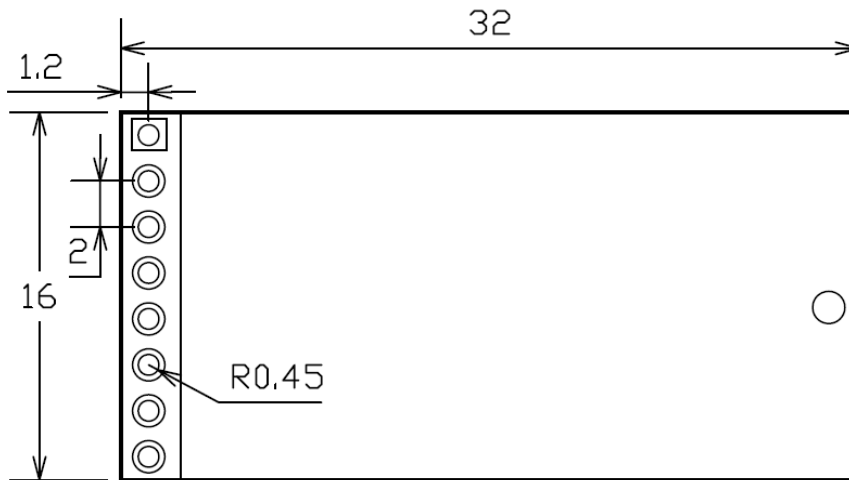


Figure [8]. EB35E0TP Module outline

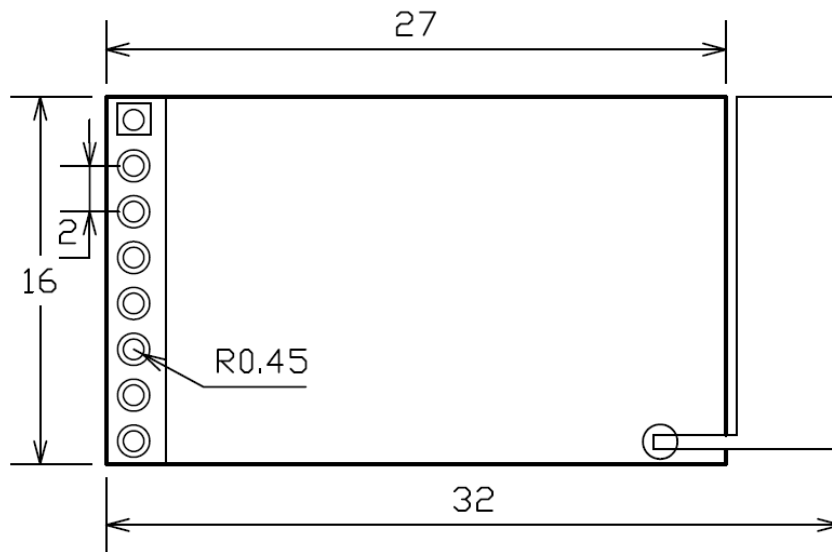


Figure [9]. EB35E0RP Module outline

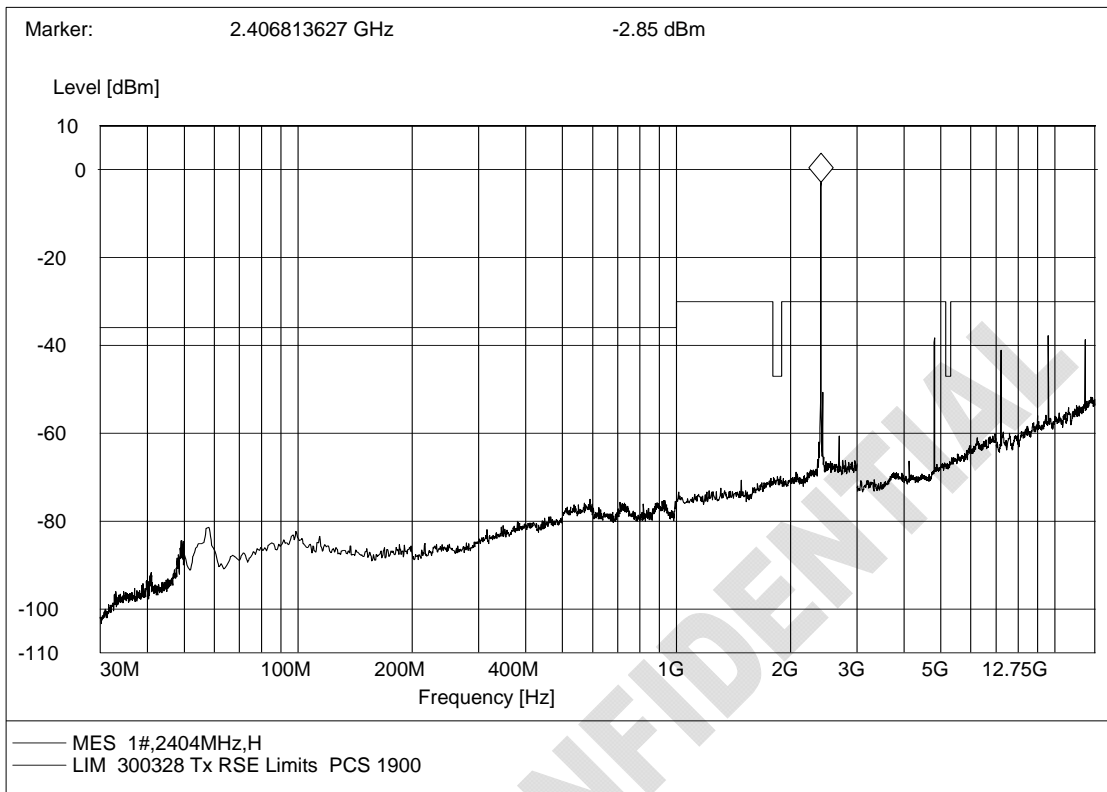


Figure [10]: RF harmonic Test (Horizontal)

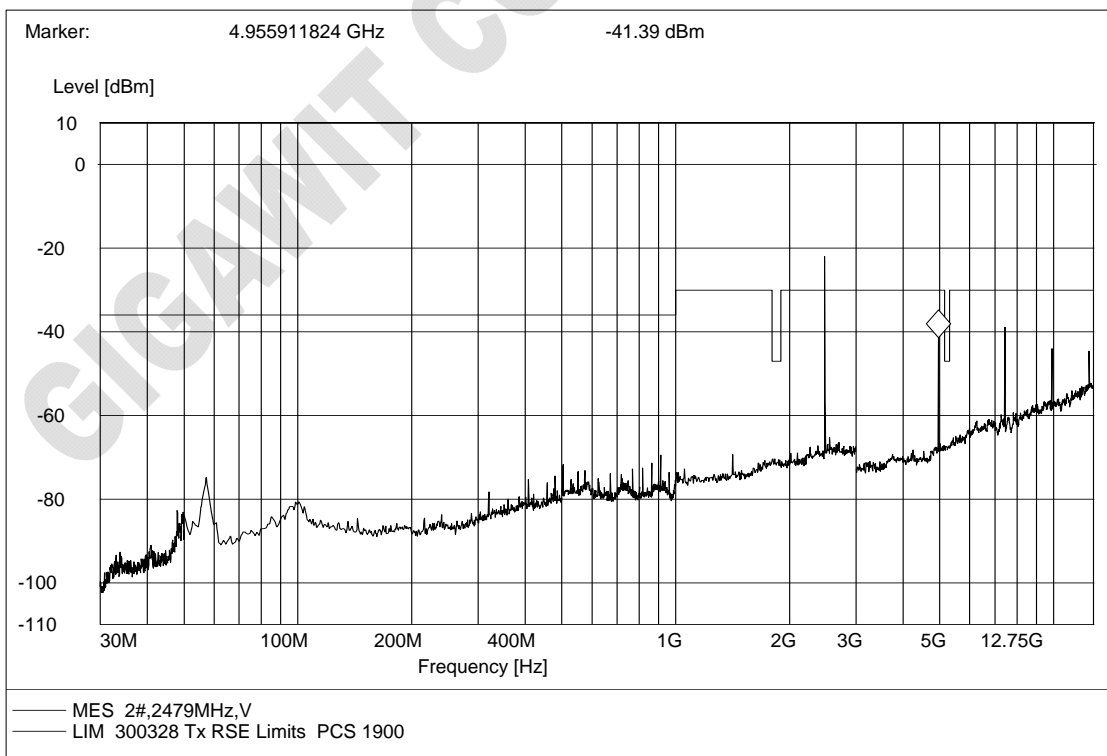


Figure [11]: RF harmonic Test (Vertical)

Ordering Information

Gigawit ID.	Description
EB35E0TP_SW2	E0 Subwoofer Transmitter Module with L/R input
EB35E0TP_SW	E0 Subwoofer Transmitter Module with balance input
EB35E0RP_SW	E0 Subwoofer Receiver Module

Contact:

捷电科技有限公司 Gigawit Electronics Limited
1003 Overseas Scholars Building, South Keyuan Road
Science Park, Nanshan District, 518057 Shenzhen, China
Tel:+86-755-86329300, Fax:+86-755-86329882
<http://www.gigawit.com>

Revision History

2008-6-10 Version 1.0, Original version
2008-10-25 Version 1.01, Update the application schematic