JSWAM83 Module

USER Manual

Product Name	: Tri Band Module
Model Name	: JSWAM83

1. Product Description

The JSWAM83 module is a wireless audio module (60X21mm)) based on the SMSC DARR83. This module can used to build an uncompressed wireless digital audio transceiver operating in the 2.4GHz, 5.2GHz and 5.8GHz bands.

The wireless audio link supports up to two stereo audio streams and comes together with additional features such as: data encryption, pairing functionality, bi-directional control data messages, low power audio snooze mode, Automatic Frequecncy Allocation.

The DARR83 chip itself provides the basic functions of Audio Processing and buffering, Data Link Layer and Physical Layer. The WISP50S module integrates all functionality for a wireless digital and analog audio connection, comprising:

2. Features

- DARR83 Wireless Audio Processor
- 2.4GHz/ 5.2GHz/ 5.8 GHz RF Transceiver
- Embedded Antennas
- Digital audio interfaces (I^2S)
- Integrated 24 bit stereo Audio DAC + Headphone AMP
- Integrated 16 bit Audio ADC + Microphone AMP
- Built-in SPI interface Flash
- 9 pins interface connector for power, audio output, control interface and GPIOs
- Regulated 5V supply

3. JSWAM83 Block Diagram
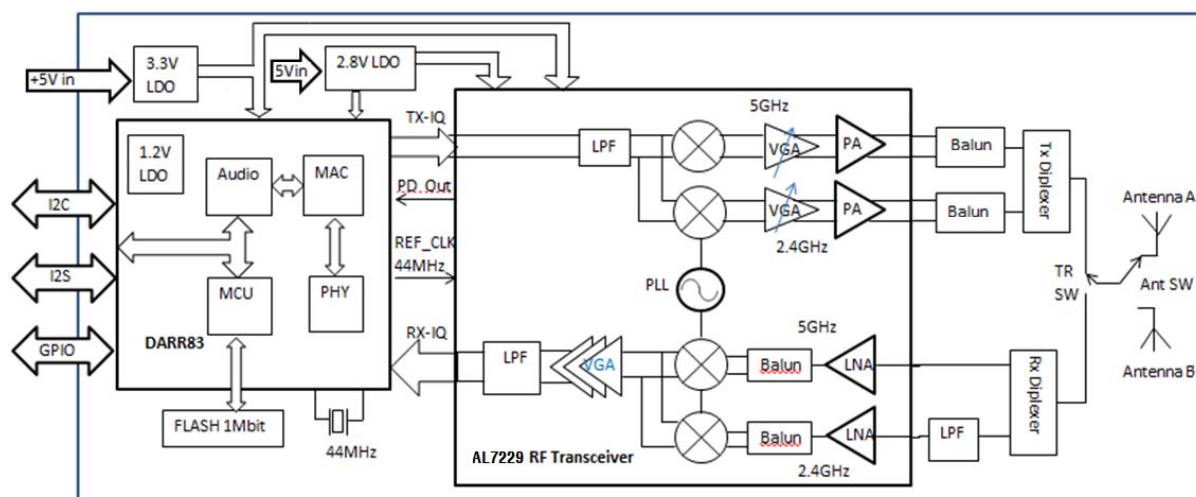
4. Description of operations

4.1 Operating Conditions (5 V ⎓ 450 mA)

Symbol	Parameter	Min.	Typ	Max	Unit
VCC	Supply Voltage	4.7	5.0	5.25	V
Temp	Operating Temperature	0	25	60	°C

4.2 RF Information

Parameter	Value	Unit
Modulation	QPSK	
RF Frequency range (band)	2400 – 2483.5 5150 – 5250 5725 – 5875	MHz
Using RF Frequency	Ch1 – 2412 Ch2 – 2436 Ch3 – 2464 Ch4 – 5180 Ch5 – 5210 Ch6 – 5240 Ch7 – 5736 Ch8 – 5726 Ch9 – 5814	MHz
Audio Latency	20ms	
Audio Bit Resolution	16bit	
Audio Sampling Rate	48ksps	

Note: Country/ Region dependent.

4.3   Receive mode

In receive mode, antenna diversity is supported. The single ended output of the TR switch is connected to the RF LNA input through Diplexer and matching networks. Filtering and amplification is all performed by the radio transceiver. The gain setting is controlled by the BB. The analog IQ outputs are sampled by the BB by its integrated 22Msps dual channel 8bit ADC. This received data is demodulated and fed to the audio processing engine controlling the audio function.

4.4   Transmit mode

In transmit mode, the audio engine transforms the audio data into packetized digital IQ signals. These are in turn pulse-shaped before conversion by a 10bits 44Msps DAC to match to the analog IQ inputs of the radio IC. The radio IC has programmable baseband filters to lower the RF spectrum side lobes

and to suppress the DAC image and the DAC spurious. The output power is programmable. A power detector (PD_out) on the radio IC enables close-loop TX power control. The differential RF PA outputs are connected via a baluns and Diplexer to a transmit/receive switch with TX diversity option to the RF connectors.

5. Clock and synthesizer frequencies

The main crystal is connected to the Baseband IC crystal oscillator. This in turn buffers this 44MHz and feeds it to the radio IC.

In standard configurations, the DARR83 based DWPCIe83 module's RF section runs at the following frequencies:

2.4GHz Band: The RF oscillator runs at 2 times the programmed RF output frequency.

Channel	RF frequency (in MHz)	VCO frequency (in MHz)
1	2412	4824
2	2438	4876
3	2464	4928

5.2GHz Band: The RF oscillator runs at 2/3 times the programmed RF output frequency.

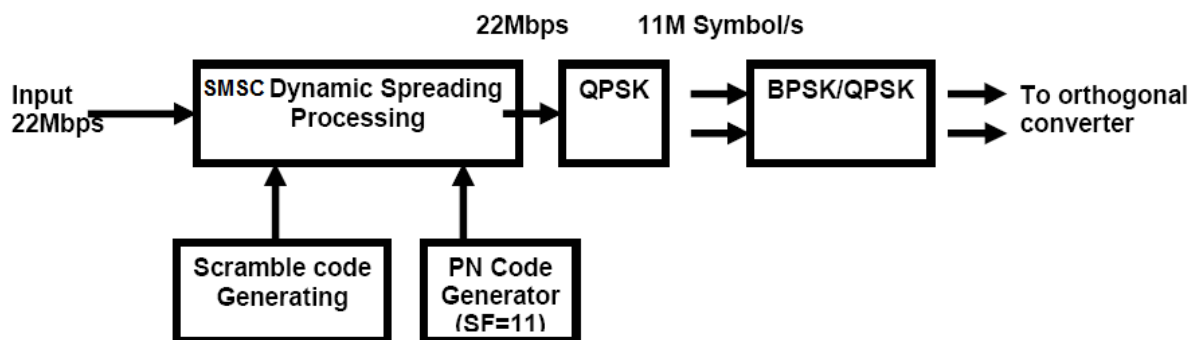| Channel	RF frequency (in MHz)	VCO frequency (in MHz)
1	5180	3453.33
2	5210	3473.33
3	5240	3493.33

5.8GHz Band: The RF oscillator runs at 2/3 times the programmed RF output frequency.

Channel	RF frequency (in MHz)	VCO frequency (in MHz)
1	5736	3824
2	5762	3841.33
3	5814	3876

6. Modulation Diagram

7. Pin out interface connector

Pin information.

Pin Number	Pin Name	I/O	Description
1	5V	PWR	Regulated 4.7V to 5.2V input
2	5V	PWR	Regulated 4.7V to 5.2V input
3	GPIO_2	I/O	PWM_RST#
4	GPIO_13	I/O	MUTE
5	GPIO_14	I/O	POWER_CTL
6	/RESET(DARR_RST)	I	Reset Darr83
7	I^{2}C_SCL_SLV	I/O	I^{2}C serial clock Slave
8	I^{2}C_SDA_SLV	I/O	I^{2}C serial data Slave
9	I^{2}C_SCL_MST	I/O	I^{2}C serial clock Master
10	I^{2}C_SDA_MST	I/O	I^{2}C serial data Master
11	MCLK	I/O	12.288MHz audio clock I/O
12	GND	GND	GND
13	BCK_W	I/O	I^{2}S port W Bit Clock
14	LRCK_W	I/O	I^{2}S port W Left Right Clock
15	GPIO_5	I/O	DAT_W
16	GPIO_11	I/O	DAT_X
17	MON_TXD	I/O	Serial sync Data, for test purposes
18	GIPO_6	I/O	FW_SEL
19	GPIO_12	I/O	IR_RST#
20	GPIO_3	I/O	ID_SET#
21	GPIO_15	I/O	RED_LED
22	GPIO_4	I/O	BLUE_LED (UART_RXD)
23	GPIO_7	I/O	IR_SD#(HW_MUTE)
24	GND	GND	GND

8.   OEM Installation

This module must be installed in a device and not allow the user to replace nor modify it.
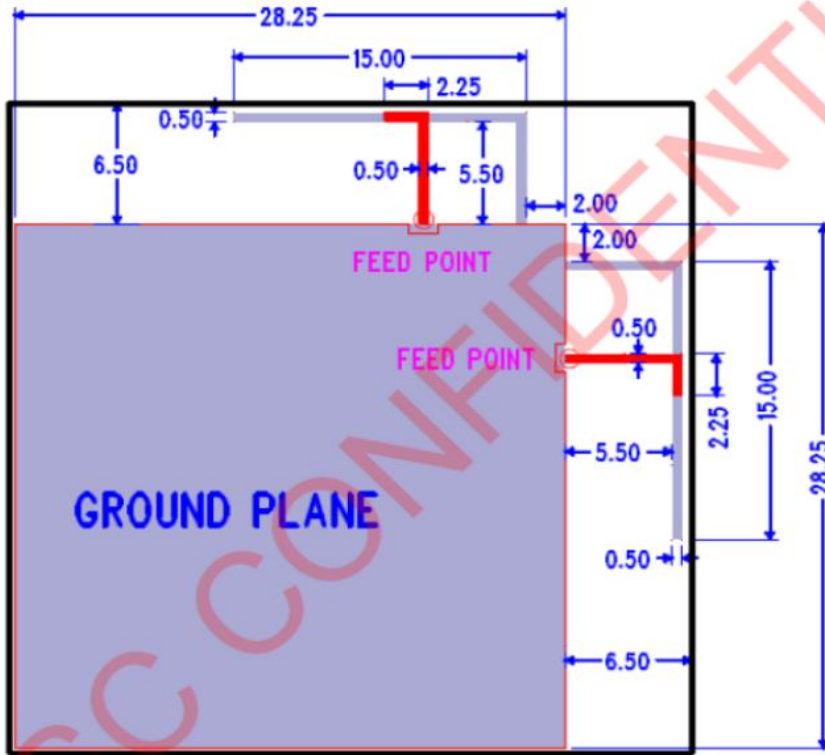
And the location of installation is as follows Figure 6-1.

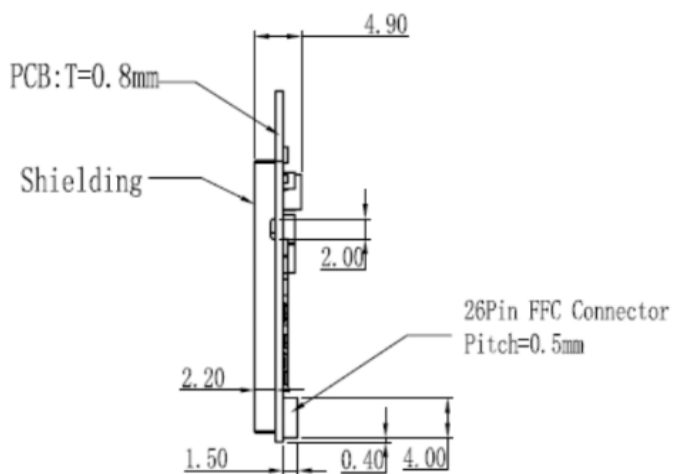Figure 6-1 The location of installation

9. Dimension

Actual size and dimension:

Note:
RED colour is Top layer
GREY colour is Bottom layer

Side View

10. Notice

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.

For product available in the USA/Canada market, only channel 1~11 can be operated and these channel assignments deal with only the 2.4 GHz range.

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

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
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 and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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 device must accept any interference received, including interference that may cause undesired operation.

Labelling Requirements

The Original Equipment Manufacturer(OEM) must ensure that FCC labelling requirement are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate JUNSUNGTECH Co., Ltd. FCC identifier for this product as well as the FCC Notice above.
The FCC identifier is FCC ID: XNKJSWAM83. In any case the end product must be labeled exterior with "Contains FCC ID: XNKJSWAM83".
If the size of the end product is larger than 8x10Cm, then the following with Part15.19 statement has to also be available on the label: This device complies with Part15 of 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.

A. Test Procedures for Design and Verification (Confidential)

JSWAM83 Product Test Process

No.	Process	Items to Control	Items to Inspect	Controlling Method			If non-conforming	Remarks
				Spec	Who should	Recording		
1	Incoming Inspection		Visual, Dimension, Constitution, Quantify, Electrical Property	In-coming Insp. Std. Accepted Drawing, Specification,	QC	Instpection Result Notification	Return the products to supplier and ask for the correction	
2	Storage	Temp. Humidity		Operational Std.	Material Sec.			
3	Prefabrication	Position, Method, Model Name, Human		Operational Std.	Manufacturing Sec.		Modify	
4	Components Mountiong	Position, Method, Model Name, Human		Operational Std. Manufacturing Spec	Manufacturing Sec.		Modify	
5	Soldering	Flux, Soldering Condition		Automatic Soldering Std.	Manufacturing Sec.	Control Table	Modify	
6	ICT	Method, Human	Visual	Operational Std.	Manufacturing Sec.	Badness Check	Modify	
7	BDM Programming Downloading	Method, Model Name, Human	Operation Test	Operational Std.	Manufacturing Sec.	Badness Check	Modify	
8	First Function Test	Method, Model Name, Human	Operation Test	Operational Std.	Manufacturing Sec.	Control Table	Modify	
9	Under Fill	Temperature, Time, Direction	Visual	Operational Std.	Manufacturing Sec.	Badness Check	Modify	
10	Manual Insert	Flux, Method, Model Name, Human	Visual, Constitution	Operational Std.	Manufacturing Sec.	Control Table	Modify	
11	Second Function Test	Method, Model Name, Human	Operation Test	Operational Std.	Manufacturing Sec.	Control Table	Modify	
12	RF Test	Method, Model Name, Human	RF Operation Test	Operational Std.	Development Sec.	Control Table	Modify	RF Test Datasheet
13	Housing Assy	Method, Model Name, Human	Visual, Constitution	Operational Std.	Manufacturing Sec.	Control Table	Modify	
14	Third Function Test	Method, Model Name, Human	Operation Test	Operational Std.	Manufacturing Sec.	Control Table	Modify	
15	Aging	Temperature, Time		Operational Std.	Manufacturing Sec.	Control Table	Modify	
16	Out Going Inspection (Board Check)	Human	Registration, Visual	Operational Std.	Manufacturing Sec.	Badness Check	Modify	
17	Input Bar Code	Human	Visual	Operational Std.	Manufacturing Sec.	Bar Code Table	Modify	
18	Unit Box Packing	Method, Model Name, Human	Visual	Operational Std.	Manufacturing Sec.		Modify	
19	Carton Box Packing	Method, Model Name, Human	Visual	Operational Std.	Manufacturing Sec.		Modify	

OQC REPORT

Draft	Check	Approval
/	/	/

1. Inspection Lot Information (Lot NO : 0312SG - 001)   **1st** 2nd 3rd

Product	3-Band Module	Customer		Inspection Day	2019.02.20	
Model	JSWAM83	Lot Size	768 EA	Inspector	R.W.I. & L.K.S.	
Method	G-II, 1 time	Sample(n)	80 EA	AQL(AC/RE)	Maj	0/1
	Maj:0.25, Min:0.4	Level	Nomal		Min	0/1
PCS/REV No.		/	Serial No.	WH03-C17-302-0025		
		/		~ WH03-C17-302-0792		
		/	NG Q'ty	Maj	0	
		/		Min	0	

2. Inspection Criteria

Function	**OK** / NG	PCB Assembly	**OK** / NG
Mechanical	**OK** / NG	Package	**OK** / NG

3. Sample Serial No.

WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0260	302-0261	302-0258	302-0264	302-0256	302-0262	302-0257	302-0259	302-0254	302-0255
WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0263	302-0253	302-0201	302-0195	302-0199	302-0203	302-0200	302-0193	302-0194	302-0196
WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0204	302-0198	302-0197	302-0107	302-0103	302-0104	302-0105	302-0106	302-0108	302-0100
WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-099	302-097	302-0102	302-0098	302-0101	302-0403	302-0404	302-0405	302-0406	302-0408
WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0360	302-0359	302-0358	302-0356	302-0355	302-0357	302-0401	302-0402	302-0398	302-0400

4. Note

Design Change	
NG Infomation	
Remark	

5. Approval

OQC REPORT

Draft	Check	Approval
/	/	/

1. Inspection Lot Information (Lot NO : 0312SG – 001)   **1st** 2nd 3rd

Product	3-Band Module	Customer		Inspection Day	2019.02.20		
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Method	G-II , 1 time	Sample(n)	80 EA	AQL(AC/RE)		Maj	0/1
	Maj:0.25, Min:0.4	Level	Nomal			Min	0/1
PCS/REV No.		/	Serial No.	WH03-C17-302-0025			
		/		~ WH03-C17-302-0792			
		/	NG Q'ty	Maj	0		
		/		Min	0		

2. Inspection Criteria

Function	**OK** / NG	PCB Assembly	**OK** / NG
Mechanical	**OK** / NG	Package	**OK** / NG

3. Sample Serial No.

WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0397	302-0399	302-0353	302-0354	302-0352	302-0350	302-0349	302-0351	302-0438	302-0436
WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0433	302-0437	302-0435	302-0434	302-0647	302-0648	302-0646	302-0645	302-0643	302-0644
WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17	WH03-C17
302-0517	302-0518	302-0520	302-0522	302-0744	302-0741	302-0740	302-0739	302-0742	302-0743

4. Note

Design Change	
NG Infomation	
Remark	

5. Approval

JUNSUNGTECH Co., Ltd.

JSWAM83 Inspection List

※ Remark (OK : ○, NG : X, No Relation : −)

Lot No		0312SG−001	Model		JSWAM83		Buyer	
		Inspection Point			**Decision**		**Criteria**	

		Inspection Point	Decision	Criteria
Appearance		Black Spot/Line, White Spots, Scratch, Dust	○	Refer to Outgoing Inspection Standard
		Visual Area of Molding Parts	○	Be compared with limit samples (MA)
		Uneven edge fitting	○	Refer to Outgoing Inspection Standard
		Gaps	○	Refer to Outgoing Inspection Standard
		Silk Screen Printing	○	Omitted or missed silk printing (MA)
		Spray	○	Be compared with limit samples (MA)
		Labeling	○	Refer to Outgoing Inspection Standard
Mechanicals	1	Key Stroke		1.8~3.5 Nf : by push−pull gauge (MA)
	2	Key Stick		1.6 Nf : by push−pull gauge (MA)
	3	Rubber Endurance		16 Nf : by push−pull gauge (MI)
	4	Headset Separation Force		8 Nf : by push−pull gauge (MI)
	5	Car Kit Separation Force		10 Nf : by push−pull gauge (MI)
	6	Charger Locking		90 degree (MI), 45 degree (MA)
Basic Function	1	Information Display		Be compared with product specifiaction (MA)
		Cofiguration		After power On/Off, hold configuration Data (MA)
		Connection		Display phone No, signal strength, battery indi.(MA)
	4	Call Display		Display incomming call No., answer call (MA)
	5	Receiver & Mic		Without noise, can hear callee's voice (MA)
	6	Long Duration Call		For 1 hour, must not broken (MI)
RF Test	1	Channel Power	○	4~7 dBm (MA)
	2	Occupied Bandwidth	○	0~26 MHz (MI)
	3	Sprious Emission	○	Pass (MI)
	4	Frequency Error	○	
PBA Condition	1	Soldering	○	Refer to Outgoing Inspection Standard
	2	Board Assembling	○	Refer to Outgoing Inspection Standard
Packing	1	Labeling	○	Refer to Outgoing Inspection Standard
	2	Contents	○	Refer to Outgoing Inspection Standard
Remark				

RF TEST DATA SHEET

1. Product Information

MODEL	JSWAM83	Measure Day	2019-02-20	Decision	OK / NG
LOT NO	0312SG001	Location	JUNSUNGTECH	Instrumnent	Spetrum Analyzer(E4404B)

2. Measure Data

No	Serial No	Channel Power 4~7 [dBm]	Occupied BW 0~26 [MHz]	Spurious Emission PASS	Freq. Error 2.41188~2.41212 [GHz]
1	WH － 03C17 － 302 － 0260	5.8	15.2	PASS	2.41197
2	WH － 03C17 － 302 － 261	4.6	15.2	PASS	2.41196
3	WH － 03C17 － 302 － 258	5.0	15.5	PASS	2.41198
4	WH － 03C17 － 302 － 264	4.5	15.1	PASS	2.41203
5	WH － 03C17 － 302 － 256	4.6	15.2	PASS	2.41200
6	WH － 03C17 － 302 － 262	4.9	15.3	PASS	2.41190
7	WH － 03C17 － 302 － 257	4.5	15.5	PASS	2.41199
8	WH － 03C17 － 302 － 259	4.7	15.3	PASS	2.41190
9	WH － 03C17 － 302 － 254	4.4	15.3	PASS	2.41198
10	WH － 03C17 － 302 － 255	4.8	15.4	PASS	2.41197
11	WH － 03C17 － 302 － 263	5.1	15.4	PASS	2.41197
12	WH － 03C17 － 302 － 253	5.7	15.2	PASS	2.41197
13	WH － 03C17 － 302 － 201	4.7	15.3	PASS	2.41199
14	WH － 03C17 － 302 － 195	5.0	15.2	PASS	2.41196
15	WH － 03C17 － 302 － 199	4.0	15.4	PASS	2.41198
16	WH － 03C17 － 302 － 203	5.2	15.0	PASS	2.41197
17	WH － 03C17 － 302 － 200	5.0	14.8	PASS	2.41199
18	WH － 03C17 － 302 － 193	4.9	15.6	PASS	2.41201
19	WH － 03C17 － 302 － 194	4.8	15.1	PASS	2.41198
20	WH － 03C17 － 302 － 196	4.9	15.6	PASS	2.41193
21	WH － 03C17 － 302 － 264	5.1	15.3	PASS	2.41197
22	WH － 03C17 － 302 － 198	5.2	15.2	PASS	2.41199
23	WH － 03C17 － 302 － 197	5.0	14.8	PASS	2.41199
24	WH － 03C17 － 302 － 107	4.9	15.2	PASS	2.41199
25	WH － 03C17 － 302 － 103	5.2	15.4	PASS	2.41198
26	WH － 03C17 － 302 － 104	5.4	15.3	PASS	2.41199
27	WH － 03C17 － 302 － 105	5.0	15.7	PASS	2.41197
28	WH － 03C17 － 302 － 106	5.1	15.1	PASS	2.41199
29	WH － 03C17 － 302 － 108	4.8	15.1	PASS	2.41198
30	WH － 03C17 － 302 － 100	5.2	15.3	PASS	2.41199
31	WH － 03C17 － 302 － 99	5.1	14.9	PASS	2.41199
32	WH － 03C17 － 302 － 97	5.2	15.2	PASS	2.41198
33	WH － 03C17 － 302 － 102	5.0	15.3	PASS	2.41196
34	WH － 03C17 － 302 － 98	4.6	15.0	PASS	2.41197
35	WH － 03C17 － 302 － 101	5.5	15.4	PASS	2.41191
36	WH － 03C17 － 302 － 403	5.2	15.3	SHESS	2.41198
37	WH － 03C17 － 302 － 404	4.6	15.2	PASS	2.41198
38	WH － 03C17 － 302 － 405	4.7	15.6	PASS	2.41201
39	WH － 03C17 － 302 － 406	4.9	15.3	PASS	2.41199

No	Serial No	Channel Power 4~7 [dBm]	Occupied BW 0~26 [MHz]	Spurious Emission PASS	Freq. Error 2.41188~2.41212 [GHz]
40	WH － 03C17 － 302 － 408	5.2	15.4	PASS	2.41197
41	WH － 03C17 － 302 － 360	4.7	15.3	PASS	2.41200
42	WH － 03C17 － 302 － 359	5.4	15.4	PASS	2.41196
43	WH － 03C17 － 302 － 358	5.1	15.3	PASS	2.41196
44	WH － 03C17 － 302 － 356	5.1	15.3	PASS	2.41198
45	WH － 03C17 － 302 － 355	4.8	15.4	PASS	2.41197
46	WH － 03C17 － 302 － 357	4.7	15.4	PASS	2.41197
47	WH － 03C17 － 302 － 401	5.1	15.2	PASS	2.41198
48	WH － 03C17 － 302 － 402	4.7	15.2	PASS	2.41200
49	WH － 03C17 － 302 － 398	4.8	15.3	PASS	2.41199
50	WH － 03C17 － 302 － 400	5.1	15.2	PASS	2.41198
51	WH － 03C17 － 302 － 397	5.2	15.2	PASS	2.41198
52	WH － 03C17 － 302 － 399	5.2	15.5	PASS	2.41196
53	WH － 03C17 － 302 － 353	4.9	15.3	PASS	2.41197
54	WH － 03C17 － 302 － 354	4.7	15.2	PASS	2.41197
55	WH － 03C17 － 302 － 352	6.7	15.4	PASS	2.41196
56	WH － 03C17 － 302 － 350	5.0	15.3	PASS	2.41199
57	WH － 03C17 － 302 － 349	4.6	15.3	PASS	2.41199
58	WH － 03C17 － 302 － 351	5.0	15.3	PASS	2.41196
59	WH － 03C17 － 302 － 438	5.0	15.5	PASS	2.41199
60	WH － 03C17 － 302 － 436	4.4	15.4	PASS	2.41198
61	WH － 03C17 － 302 － 433	5.8	15.4	PASS	2.41197
62	WH － 03C17 － 302 － 437	5.9	15.5	PASS	2.41195
63	WH － 03C17 － 302 － 435	5.6	15.7	PASS	2.41199
64	WH － 03C17 － 302 － 434	6.3	15.8	PASS	2.41199
65	WH － 03C17 － 302 － 647	5.5	15.0	PASS	2.41196
66	WH － 03C17 － 302 － 648	5.9	15.3	PASS	2.41196
67	WH － 03C17 － 302 － 646	5.7	15.6	PASS	2.41199
68	WH － 03C17 － 302 － 645	6.5	15.0	PASS	2.41196
69	WH － 03C17 － 302 － 643	6.3	15.0	PASS	2.41197
70	WH － 03C17 － 302 － 644	5.6	15.0	PASS	2.41197
71	WH － 03C17 － 302 － 517	5.7	15.3	PASS	2.41197
72	WH － 03C17 － 302 － 518	6.3	15.1	PASS	2.41194
73	WH － 03C17 － 302 － 520	5.9	15.3	PASS	2.41200
74	WH － 03C17 － 302 － 522	5.5	15.4	PASS	2.41196
75	WH － 03C17 － 302 － 744	6.8	15.4	PASS	2.41196
76	WH － 03C17 － 302 － 741	5.4	15.5	PASS	2.41197
77	WH － 03C17 － 302 － 740	6.0	15.5	PASS	2.41197
78	WH － 03C17 － 302 － 739	5.7	15.4	PASS	2.41196
79	WH － 03C17 － 302 － 742	5.7	15.6	PASS	2.41196
80	WH － 03C17 － 302 － 743	5.5	15.5	PASS	2.41195
Statistic	MIN	4.0	14.8		2.41190
	MAX	6.8	15.8		2.41203
	AVG	5.2	15.3		2.41197

특기사항

B. PCB Layout   (Confidential)

TOP
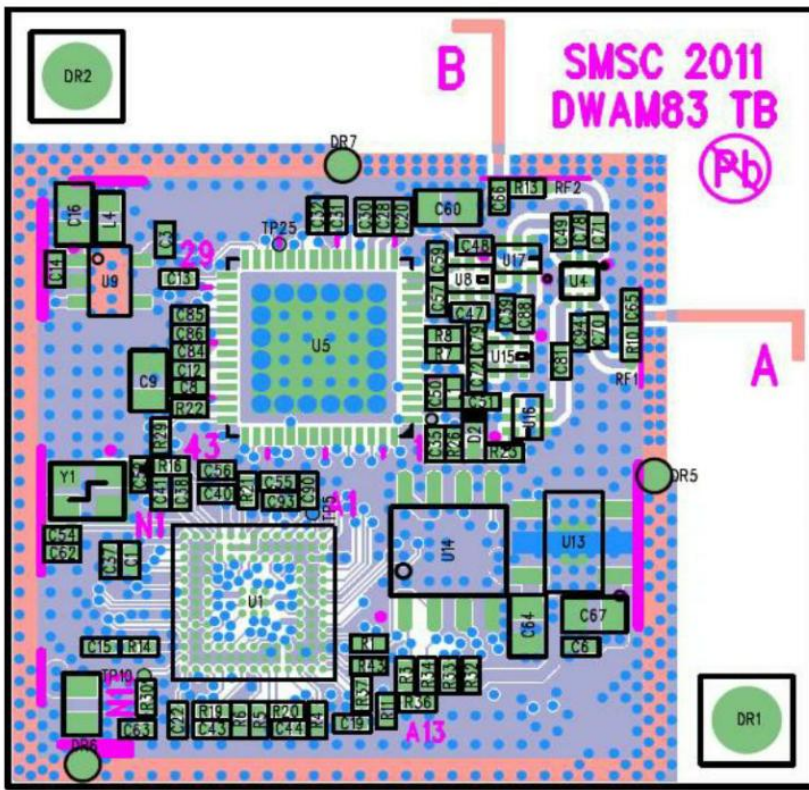
BOTTOM
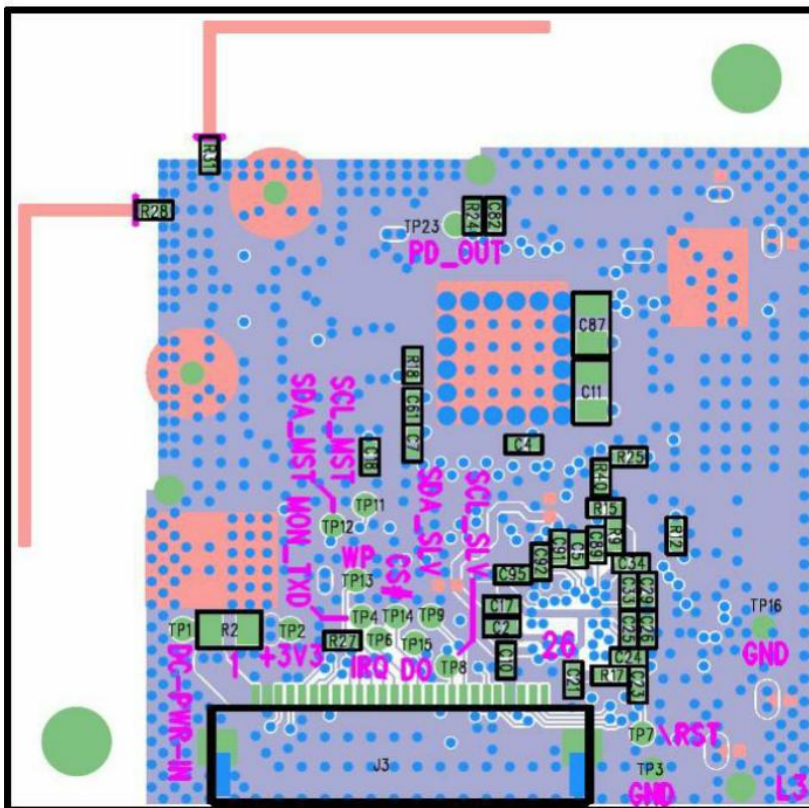
C. BOM   (Confidential)

| SN	DESCRIPTION	Reference	Part Number	MAKER	Usage
1	CAP 0.3pF 50V ±0.05pF 0402 C0G PB-FREE	C50	GJM1555C1HR30WB01	MURATA	1
2	CAP 0.5pF 50V ±0.05pF 0402 C0G PB-FREE	C57 C59	GJM1555C1HR50WB01	MURATA	2
3	CAP 1.2pF 50V ±0.25pF 0402 C0G PB-FREE	C51	GRM1555C1H1R2CZ01D	MURATA	1
4	CAP 1.8pF 50V ±0.10pF 0402 C0G PB-FREE	C35 C47 C72 C79	GRM1555C1H1R8BZ01D	MURATA	4
5	CAP 3.3pF 50V ±0.10pF 0402 C0G PB-FREE	C49 C81	GRM1555C1H3R3BA01D	MURATA	2
6	CAP 4.7pF 50V ±0.1pF 0402 C0G PB-FREE	C54 C62	GRM1555C1H4R7BZ01D	MURATA	2
7	CAP 6.8pF 50V ±0.1pF 0402 C0G PB-FREE	C88	GRM1555C1H6R8BZ01D	MURATA	1
8	CAP 8.2pF 50V ±0.25pF 0402 C0G PB-FREE	C8 C31 C70-71 C78 C94	GRM1555C1H8R2CZ01D	MURATA	6
9	CAP 10pF 50V ±5% 0402 C0G PB-FREE	C6 C12 C14 C15 C43-44	GRM1555C1H100JZ01D	MURATA	6
10	CAP 10pF 50V ±2% 0402 C0G PB-FREE	C52	GRM1555C1H100GA01B	MURATA	1
11	CAP 100pF 25V ±5% 0402 C0G PB-FREE	C63	CL05C101JA5NNNC	SAMSUNG	1
12	CAP 680pF 50V ±5% 0402 C0G PB-FREE	C82	GRM1555C1H681JA01D	MURATA	1
13	CAP 1000pF 50V ±5% 0402 C0G PB-FREE	C13	GRM1555C1H102JA01D	MURATA	1
14	CAP 10nF 16V ±10% 0402 X7R PB-FREE	C1 C17 C19 C21 C24 C30 C33-34 C95	CL05B103KO5NNNC	SAMSUNG	9
15	CAP 22nF 16V ±10% 0402 X7R PB-FREE	C4 C7 C32 C61 C86	CL05B223KO5NNNC	SAMSUNG	5
16	CAP 0.1µF 16V ±10% 0402 X7R PB-FREE	C5 C20 C22-23 C25-26 C28-29 C38-40 C48 C84-85 C89-93	CL05B104KO5NNNC	SAMSUNG	19
17	CAP 1uF 10V ±10% 0402 X5R PB-FREE	C2-3 C10 C41 C56	CL05A105KP5NNNC	SAMSUNG	5
18	CAP 10uF 6V3 ±20% 0805 X5R PB-FREE	C9 C11 C16 C60 C67 C87	GRM21BR60J106ME19L	MURATA	6
19	INDUCTOR 1.2nH ±0.1nH, 390mA	L1	LQP15MN1N2B02D	MURATA	1
20	INDUCTOR 1.2nH ±0.3nH, 300mA	R7 R8	HI1005-1C1N2SMT	ACX	2
21	Small Signal General Purpose Pin Diode	D2	BAP51-02 / NXP	SECOS /NXP	1
22	RES 0 OHM ±1% 1/16W 0402 PB-FREE	R10 R13 R23 R25 R28 R30 R31	WR04X000PTL	WALSIN	7
23	RES 2.2 OHM ±1% 1/16W 0402 PB-FREE	R14 R40	WR04X2R2FTL	WALSIN	2
24	RES 33 OHM ±1% 1/16W 0402 PB-FREE	R19-20	WR04X330FTL	WALSIN	2
25	RES 100 OHM ±1% 1/16W 0402 PB-FREE	R9 R12	WR04X1000FTL	WALSIN	2
26	RES 220 OHM ±1% 1/16W 0402 PB-FREE	R21	WR04X2200FTL	WALSIN	1
27	RES 560 OHM ±1% 1/16W 0402 PB-FREE	R26	WR04X5600FTL	WALSIN	1
28	RES 2.2k OHM ±1% 1/16W 0402 PB-FREE	R16	WR04X2201FTL	WALSIN	1
29	RES 4.7K OHM ±1% 1/16W 0402 PB-FREE	R32-33	WR04X4702FTL	WALSIN	2
30	RES 5.6k OHM ±1% 1/16W 0402 PB-FREE	R24	WR04X5601FTL	WALSIN	1
31	RES 10K OHM ±1% 1/16W 0402 PB-FREE	R1 R4-6 R18 R29	WR04X1002FTL	WALSIN	6
32	RES 12K OHM ±1% 1/16W 0402 PB-FREE	R3 R22 R27	WR04X1202FTL	WALSIN	3
33	RES 22K OHM ±1% 1/16W 0402 PB-FREE	R37	WR04X2202FTL	WALSIN	1
34	RES 0 OHM ±5% 1/10W 0603 PB-FREE	L4	WR06X000PTL	WALSIN	1
35	RES 0 OHM ±1% 1/8W 0805 PB-FREE	R2 R35	WR08X000FTL	WALSIN	2
36	0.5mm pitch FPC/FFC Connector, 26 ways	J3	C1053915AASX	CKC	1
37	SMSC Audio Baseband Chip,SMSC support	U1	DARR83	SMSC	1
38	802.11a/b/g RF IC WLAN transceiver	U5	AL7230S	Airoha	1
39	DPDT Switch for 2.4GHz and 6GHz Dual-Band	U4	uPG2164T5N	NEC	1
40	Balun 50:100, 2400 ±100MHz	U15	BL2012-10B2450T/LF	ACX	1
41	Balun, 50:50 ohm, 5512 ±363MHz	U8	LDB215G5105C-001	MURATA	1
42	DIPLEXER 2.4GHz/5GHz	U16-17	LFD212G45DF5B859	MURATA	2
43	NX3225SA, 44MHz, ±10ppm	Y1	NX3225SA, 44MHz, CL 6pF	Nol	1
44	Output voltage: 2.8V, 300mA high speed	U9	AP2125K-2.8TRE1	BCD	1
45	SPI Interface Flash 3V 4KB Uniform Sector	U14	GD25Q10TIGR	Gigadevice	1
46	PCB	PCB			1

D. Antenna Specification   (Confidential)

1) Test Condition

Test No	Board	Condition
1-1	WM-3S	Set matching(series C = 1.0pF), Marking A측정
1-2	WM-3S	Set matching(series C = 1.0pF), Marking B측정

1) Result : Test No 1-1

Frequency	Efficiency	Average Gain			Max Gain		
		Ver	Hor	Total	Ver	Hor	Total
2412.000000 MHz	50.9 %	-6.3 dBi	-5.6 dBi	-2.9 dBi	-0.5 dBi	-0.2 dBi	1.5 dBi
2438.000000 MHz	45.5 %	-8.2 dBi	-5.2 dBi	-3.4 dBi	-1.5 dBi	-0.8 dBi	0.7 dBi
2464.000000 MHz	47.5 %	-9.6 dBi	-4.4 dBi	-3.2 dBi	-2.1 dBi	-0.7 dBi	0.5 dBi
5180.000000 MHz	126.3 %	-4.7 dBi	-0.4 dBi	1.0 dBi	1.3 dBi	4.4 dBi	5.3 dBi
5210.000000 MHz	100.3 %	-5.6 dBi	-1.4 dBi	0.0 dBi	0.4 dBi	3.3 dBi	4.2 dBi
5240.000000 MHz	120.0 %	-4.7 dBi	-0.7 dBi	0.8 dBi	1.2 dBi	3.9 dBi	4.9 dBi
5736.000000 MHz	31.7 %	-8.9 dBi	-7.3 dBi	-5.0 dBi	-1.5 dBi	-1.5 dBi	0.1 dBi
5762.000000 MHz	36.7 %	-8.2 dBi	-6.7 dBi	-4.4 dBi	-0.9 dBi	-1.0 dBi	0.7 dBi
5814.000000 MHz	49.3 %	-6.7 dBi	-5.5 dBi	-3.1 dBi	0.3 dBi	0.1 dBi	2.1 dBi
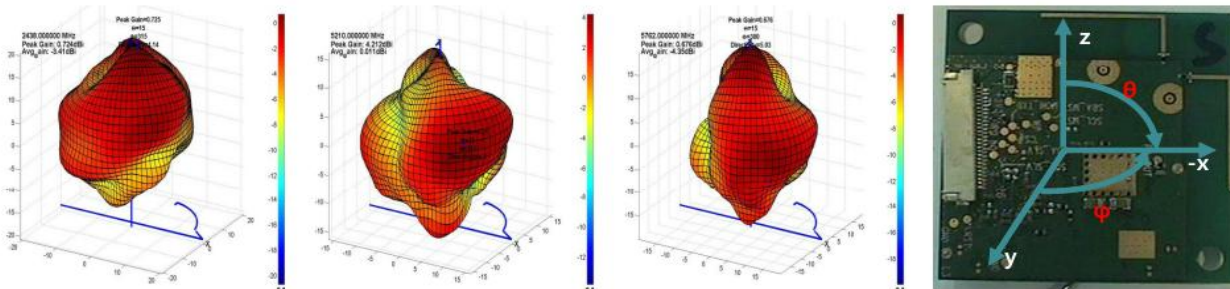
2) Result : Test No 1-2

Frequency	Efficiency	Average Gain			Max Gain		
		Ver	Hor	Total	Ver	Hor	Total
2412.000000 MHz	42.4 %	-7.6 dBi	-6.0 dBi	-3.7 dBi	-1.6 dBi	-1.2 dBi	0.5 dBi
2438.000000 MHz	39.8 %	-8.8 dBi	-5.8 dBi	-4.0 dBi	-2.8 dBi	-0.9 dBi	0.2 dBi
2464.000000 MHz	43.8 %	-9.8 dBi	-4.8 dBi	-3.6 dBi	-3.0 dBi	-0.2 dBi	0.7 dBi
5180.000000 MHz	121.4 %	-5.1 dBi	-0.4 dBi	0.8 dBi	1.0 dBi	5.1 dBi	5.2 dBi
5210.000000 MHz	96.2 %	-6.0 dBi	-1.5 dBi	-0.2 dBi	-0.1 dBi	3.9 dBi	4.1 dBi
5240.000000 MHz	115.4 %	-5.1 dBi	-0.7 dBi	0.6 dBi	0.7 dBi	4.5 dBi	4.7 dBi
5736.000000 MHz	33.7 %	-8.8 dBi	-6.9 dBi	-4.7 dBi	-1.4 dBi	-0.3 dBi	-0.1 dBi
5762.000000 MHz	38.1 %	-8.2 dBi	-6.4 dBi	-4.2 dBi	-0.7 dBi	-0.1 dBi	0.4 dBi
5814.000000 MHz	55.8 %	-6.3 dBi	-4.9 dBi	-2.5 dBi	1.2 dBi	1.0 dBi	2.3 dBi
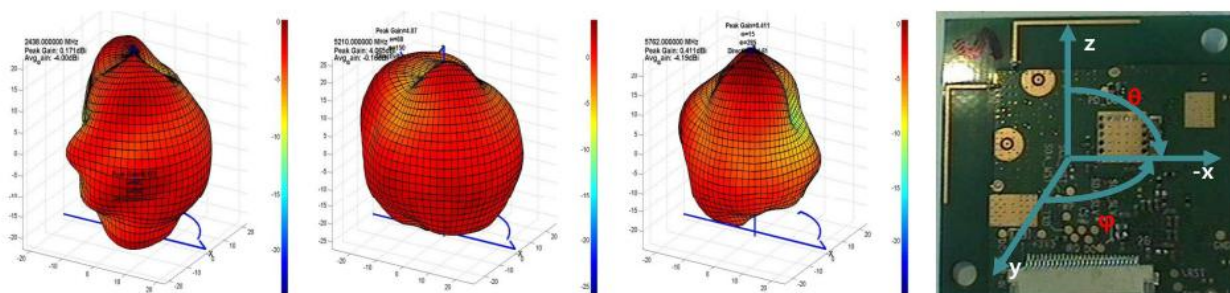
2. Test No 1-1

1) Antenna layout
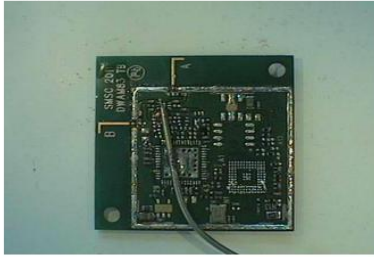
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Antenna	PIFA
Series	R = 0 Ohm
Series	C = 1.0pF
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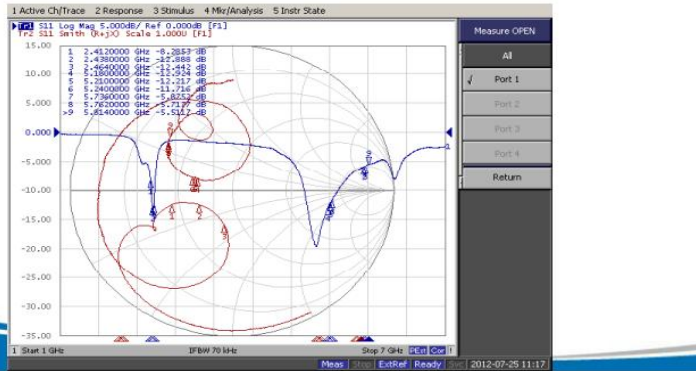
2) S-parameter

2. Test No 1-2

1) Antenna layout

Test No	1-1
Antenna	PIFA
Series	R = 0 Ohm
Series	C = 1.0pF
	default

2) S-parameter