



FCC TEST REPORT

Report No: STS1504064F03

Issued for

Shenzhen Cannice Technology Co., Ltd.

5F, B Building, Weiyulong Industrial Park, 16# North Xuegang Rd.,
Bantian Town, Longgang District, Shenzhen, Guangdong, China

Product Name:	Bluetooth speaker
Brand Name:	cannice
Model No.:	S1
FCC ID:	2ADTV-S1
Test Standard:	FCC Part 15.247

Any reproduction of this document must be done in full. No single part of this document may be reproduced without permission from STS, All Test Data Presented in this report is only applicable to presented Test sample.





TEST RESULT CERTIFICATION

Applicant's name Shenzhen Cannice Technology Co., Ltd.
Address 5F, B Building, Weiyulong Industrial Park, 16# North Xuegang Rd.,
Bantian Town, Longgang District, Shenzhen, Guangdong, China
Manufacture's Name Shenzhen Cannice Technology Co., Ltd.
Address 5F, B Building, Weiyulong Industrial Park, 16# North Xuegang Rd.,
Bantian Town, Longgang District, Shenzhen, Guangdong, China

Product description

Product name Bluetooth speaker
Band name cannice
Model and/or type S1
reference
Ratings DC 7.4V

Standards FCC Part15.247

Test procedure ANSI C63.4-2009

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of STS, this document may be altered or revised by STS, personal only, and shall be noted in the revision of the document.

Date of Test

Date (s) of performance of tests .. Apr.17,2015 to Apr.20,2015

Date of Issue Apr.21,2015

Test Result **Pass**

Testing Engineer :

(Tony Liu)

Technical Manager :

(Vita Li)

Authorized Signatory :

(Bovey Yang)





Table of Contents	Page
1. SUMMARY OF TEST RESULTS	5
1.1 TEST FACILITY	6
1.2 MEASUREMENT UNCERTAINTY	6
2. GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.1 DESCRIPTION OF TEST MODES	9
2.2 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING	9
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 DESCRIPTION OF SUPPORT UNITS	11
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	12
3. EMC EMISSION TEST	13
3.1 CONDUCTED EMISSION MEASUREMENT	13
3.1.1 POWER LINE CONDUCTED EMISSION LIMITS	13
3.1.2 TEST PROCEDURE	14
3.1.3 TEST SETUP	14
3.1.4 EUT OPERATING CONDITIONS	14
3.1.5 TEST RESULTS	15
3.2 RADIATED EMISSION MEASUREMENT	17
3.2.1 RADIATED EMISSION LIMITS	17
3.2.2 TEST PROCEDURE	18
3.2.3 DEVIATION FROM TEST STANDARD	18
3.2.4 TEST SETUP	19
3.2.5 EUT OPERATING CONDITIONS	20
3.2.6 TEST RESULTS	21
4. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY	38
4.1 MEASUREMENT PROCEDURE	38
4.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	38
4.3 LIMITS AND MEASUREMENT RESULT	38
5. BANDWIDTH TEST	40
5.1 APPLIED PROCEDURES / LIMIT	40
5.2 TEST PROCEDURE	40
5.3 TEST SETUP	40
5.4 EUT OPERATION CONDITIONS	40
5.5 TEST RESULTS	41
6. OUTPUT POWER TEST	43



Table of Contents	Page
6.1 APPLIED PROCEDURES / LIMIT	43
6.2 TEST PROCEDURE	43
6.3 TEST SETUP	43
6.4 EUT OPERATION CONDITIONS	43
6.5 TEST RESULTS	44
7. CONDUCTED SPURIOUS EMISSIONS	46
7.1 REQUIREMENT	46
7.2 TEST PROCEDURE	46
7.3 TEST SETUP	46
7.4 EUT OPERATION CONDITIONS	46
7.5 TEST RESULTS	47
8. ANTENNA REQUIREMENT	50
8.1 STANDARD REQUIREMENT	50
8.2 EUT ANTENNA	50
APPENDIX-PHOTOS OF TEST SETUP	51
APPENDIX-PHOTOS OF EUT	53



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
§ 15.203	Antenna Requirement	Compliant	
§15.209 §15.247(d)	Radiated Emission	Compliant	
§15.247(d)	Band Edges	Compliant	
§15.247	Bandwidth	Compliant	
§15.247(b)	Conducted Power	Compliant	
§15.247(e)	Maximum Conducted Output Power SPECTRAL Density	Compliant	
§15.207	Line Conduction Emission	Compliant	
§15.247(d)	Conducted Spurious Emissions	Compliant	



1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China.

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 3.18\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.71\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Bluetooth speaker
Trade Name	cannice
Model Name	S1
Channel List	Please refer to the Note 2.
Bluetooth	Frequency: 2402 – 2480 MHz Modulation: GFSK
Battery	Rated Voltage: 7.4V Charge Limit: 8.4V
Hardware version number	V0A
Software versioning number	V0A
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2.402 MHz	14	2.430MHz	28	2.458 MHz
1	2.404MHz	15	2.432 MHz	29	2.460 MHz
2	2.406 MHz	16	2.434 MHz	30	2.462 MHz
3	2.408 MHz	17	2.436 MHz	31	2.464 MHz
4	2.410 MHz	18	2.438 MHz	32	2.466 MHz
5	2.412 MHz	19	2.440 MHz	33	2.468 MHz
6	2.414 MHz	20	2.442MHz	34	2.470 MHz
7	2.416 MHz	21	2.444 MHz	35	2.472 MHz
8	2.418 MHz	22	2.446 MHz	36	2.474 MHz
9	2.420 MHz	23	2.448 MHz	37	2.476 MHz
10	2.422 MHz	24	2.450 MHz	38	2.478 MHz
11	2.424 MHz	25	2.452 MHz	39	2.480 MHz
12	2.426 MHz	26	2.454 MHz		
13	2.428 MHz	27	2.456 MHz		

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	PCB Antenna	NA	2	BT Antenna

The EUT antenna is PCB Antenna. no antenna other than that furnished by the responsible party shall be used with the device.



2.1 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Low channel TX
Mode 2	Middle channel TX
Mode 3	High channel TX

For Conducted Emission	
Final Test Mode	Description
Mode 4	keeping TX

For Radiated Emission	
Final Test Mode	Description
Mode 1	Low channel TX
Mode 2	Middle channel TX
Mode 3	High channel TX

Note:

(1)The measurements are performed at the highest, middle, lowest available channels.

2.2 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of DSSS

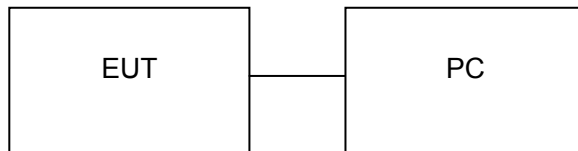
Test software Version	Test program: N/A		
Frequency	2402 MHz	2440 MHz	2480 MHz
Parameters(GFSK)	DEF	DEF	DEF

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

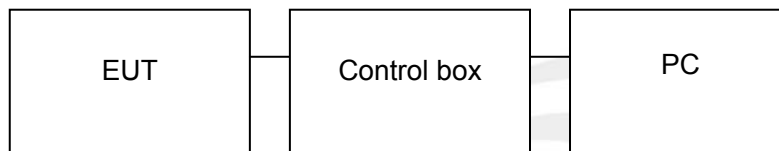
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of DSSS

Radiated Spurious Emission Test

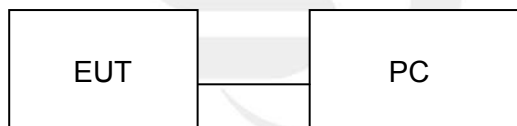
Configure 1: (Normal hopping)



Configure 2: (Control continuous TX)



Conducted Emission Test





2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1	Bluetooth speaker	cannice	S1	N/A	EUT
2	PC	FOXXN	N/A	N/A	FCC DOC approval
3	Control box	N/A	N/A	N/A	A.E

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.
- (4) N/A means not applicable.



2.5EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2014.10.25	2015.10.24
Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.27	2015.10.26
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.06	2015.06.06
Horn Antenna	R&S	9120D	152265	2014.10.27	2015.10.26
Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05
Amplifier	EM	EM-30180	060538	2014.12.22	2015.12.21
Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07
Power Meter	Anritsu	ML2495A	1204003	2014.10.25	2015.10.24
Power Sensor	Anritsu	MA2411B	100309	2014.10.25	2015.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	102086	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.06.06	2015.06.06
Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.06.06	2015.06.06
Absorbing clamp	R&S	MDS-21	100668	2014.10.27	2015.10.26



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

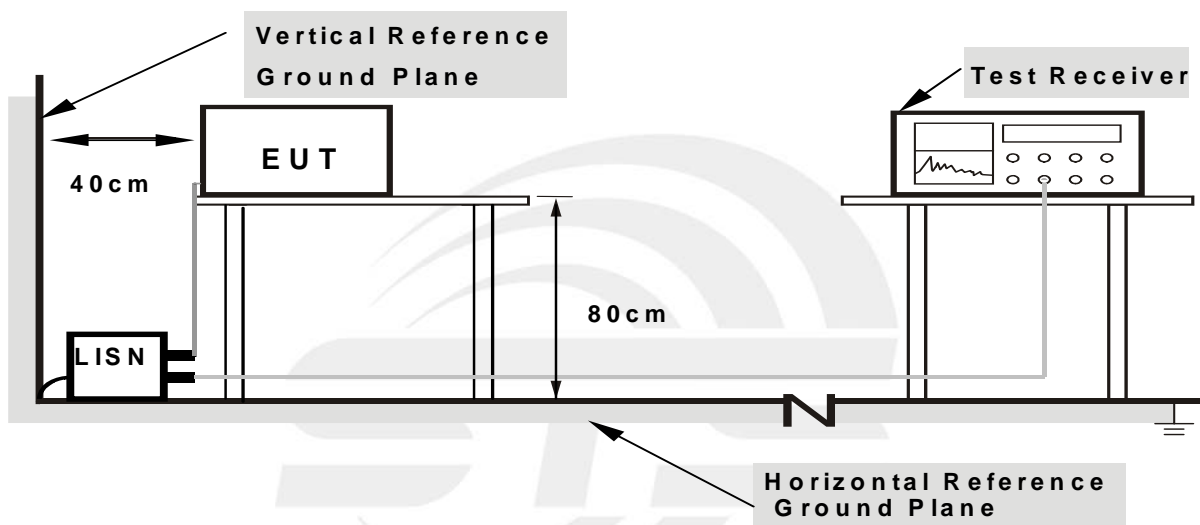
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



- Note:**
- Support units were connected to second LISN.
 - Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

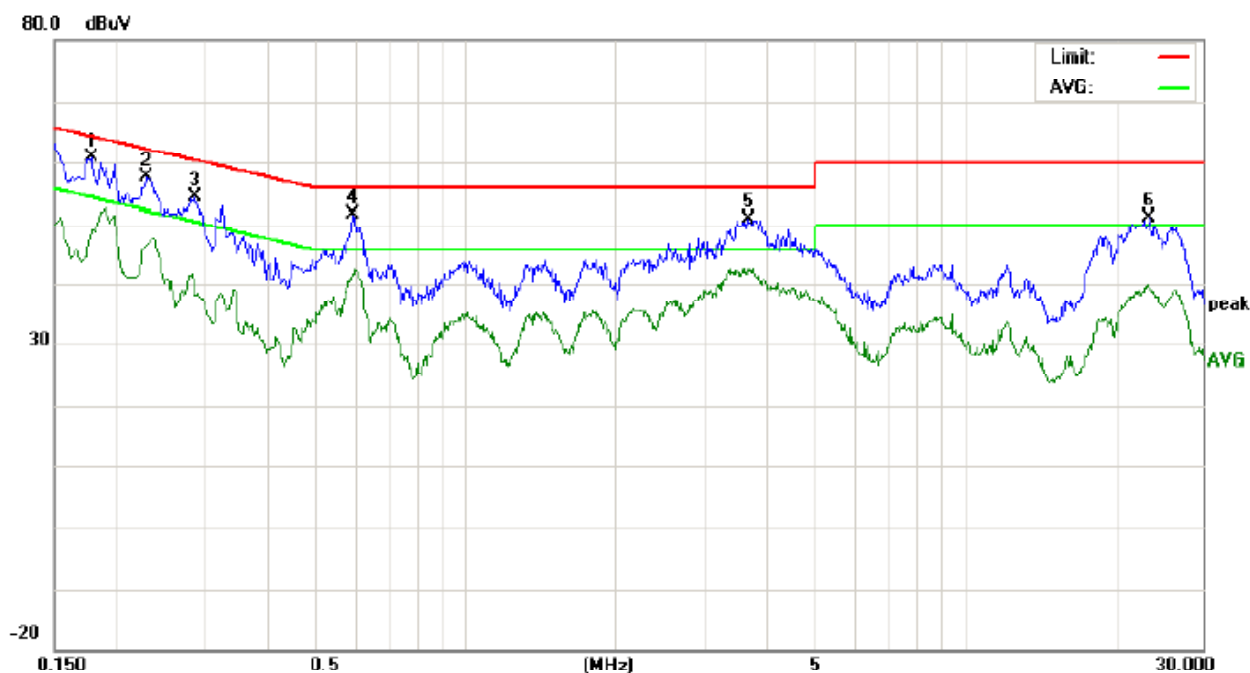
3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.5 TEST RESULTS

EUT :	Bluetooth speaker	Model Name. :	S1
Temperature :	23℃	Relative Humidity :	50%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC7.4V	Test Mode :	keeping TX



Site: Conduction

Phase: L1

Temperature: 26

Limit: FCC Class B Conduction(QP)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

M/N: S1

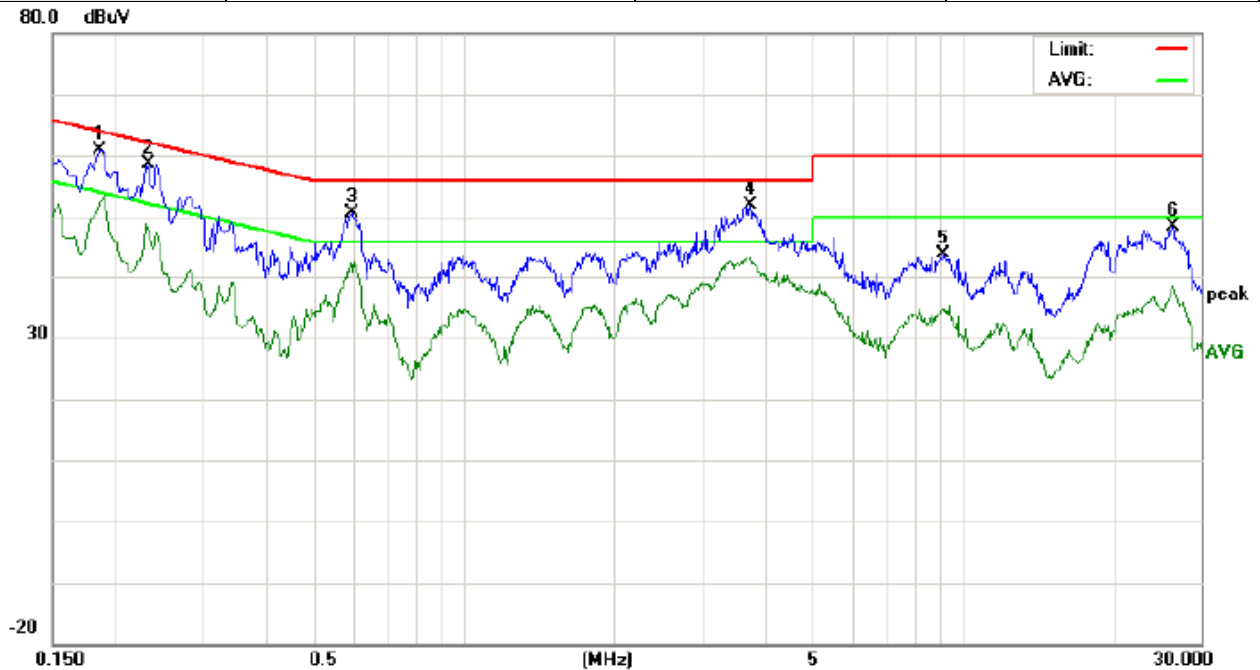
Mode: keeping TX

Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1780	50.65		38.97	10.19	60.84		49.16	64.57	54.57	-3.73	-5.41	P	
2	0.2304	47.47		36.48	10.25	57.72		46.73	62.43	52.43	-4.71	-5.70	P	
3	0.2863	44.13		27.75	10.28	54.41		38.03	60.63	50.63	-6.22	-12.60	P	
4	0.5940	41.39		31.24	10.32	51.71		41.56	56.00	46.00	-4.29	-4.44	P	
5	3.6860	40.45		31.08	10.48	50.93		41.56	56.00	46.00	-5.07	-4.44	P	
6	23.4060	41.02		29.17	10.11	51.13		39.28	60.00	50.00	-8.87	-10.72	P	



EUT :	Bluetooth speaker	Model Name. :	S1
Temperature :	23 °C	Relative Humidity :	50%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC7.4V	Test Mode :	keeping TX



Site: Conduction

Phase: **N**

Temperature: 26

Limit: FCC Class B Conduction(QP)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

M/N: S1

Mode: keeping TX

Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1860	50.77		41.84	10.20	60.97		52.04	64.21	54.21	-3.24	-2.17	P	
2	0.2340	48.43		37.39	10.25	58.68		47.64	62.30	52.30	-3.62	-4.66	P	
3	0.5980	40.43		30.37	10.31	50.74		40.68	56.00	46.00	-5.26	-5.32	P	
4	3.7420	41.52		32.87	10.47	51.99		43.34	56.00	46.00	-4.01	-2.66	P	
5	9.1260	33.73		24.44	10.25	43.98		34.69	60.00	50.00	-16.02	-15.31	P	
6	26.3740	38.25		28.22	10.11	48.36		38.33	60.00	50.00	-11.64	-11.67	P	



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&205(a), then the Part 15.247&209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (30MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower



Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	RBW 1MHz / VBW 1MHz Peak detector for Pk value RBW 1MHz / VBW 10Hz RMS detector for AV value

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

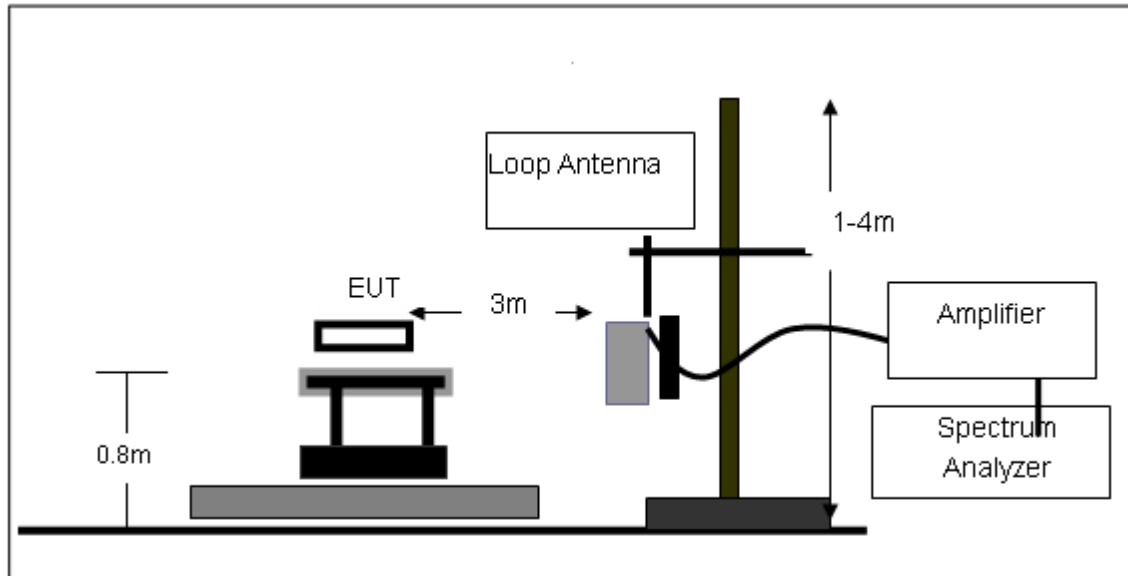
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

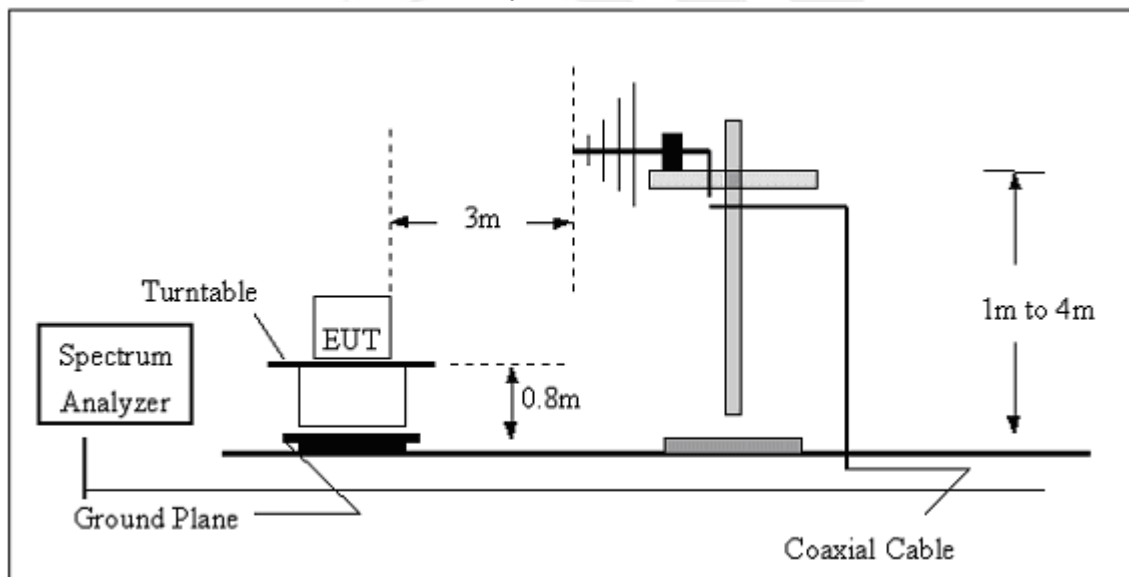
No deviation

3.2.4 TESTSETUP

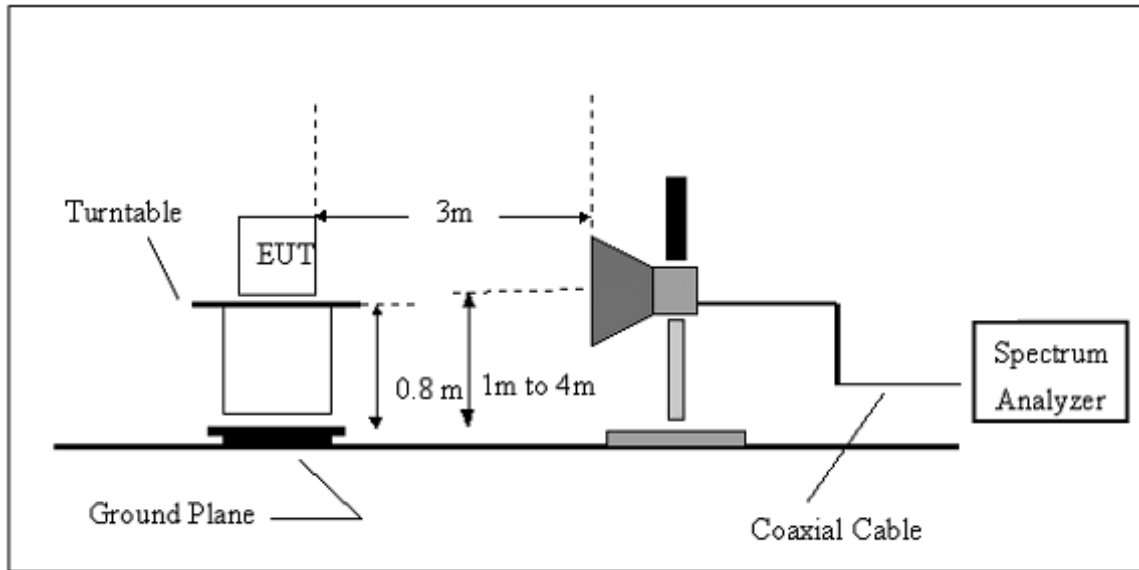
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.6 TEST RESULTS

Below 30 MHz

EUT :	Bluetooth speaker	Model Name. :	S1
Temperature :	23 °C	Relative Humidity :	50%
Pressure :	1010hPa	Polarization :	---
Test Voltage :	DC 7.4V		
Test Mode :	TX Mode		

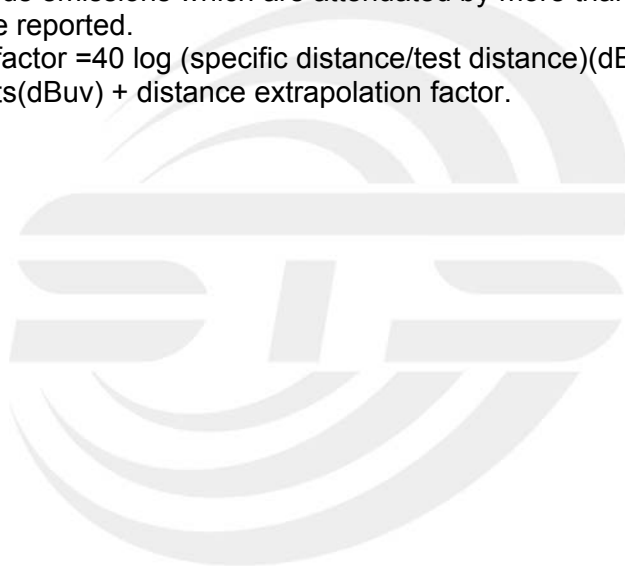
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

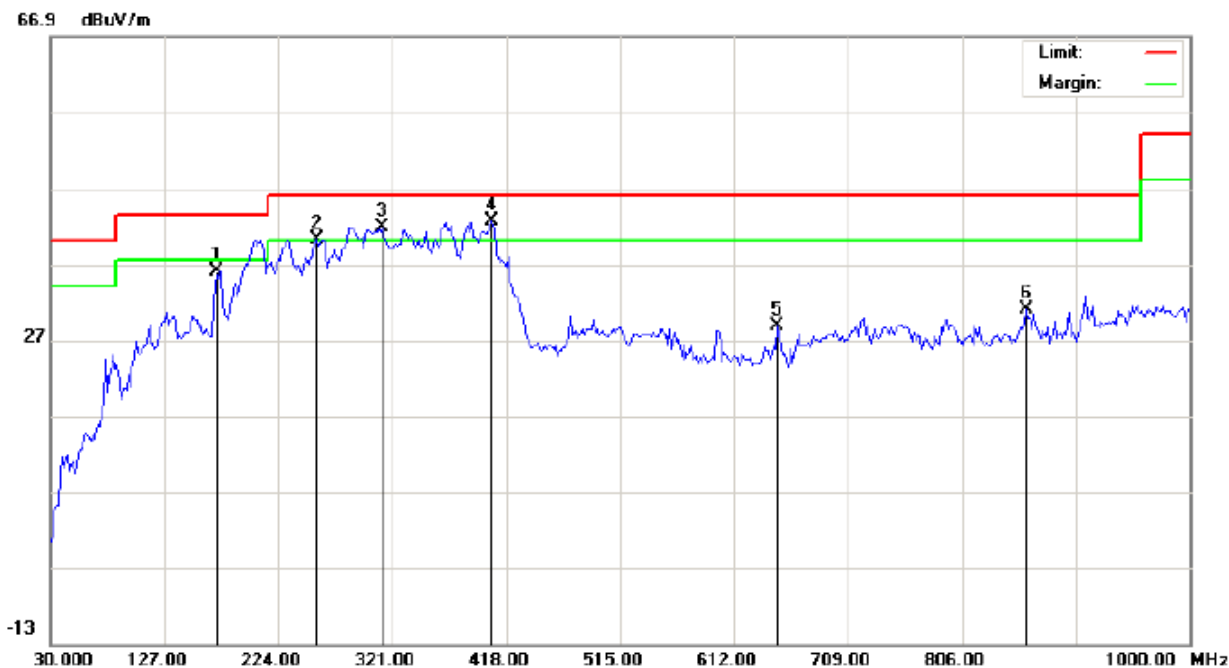
Limit line = specific limits(dBuv) + distance extrapolation factor.





Between 30MHz – 1000 MHz

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL



Site: site #1

Polarization: **Horizontal**

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: S1

Mode: Low Channel TX

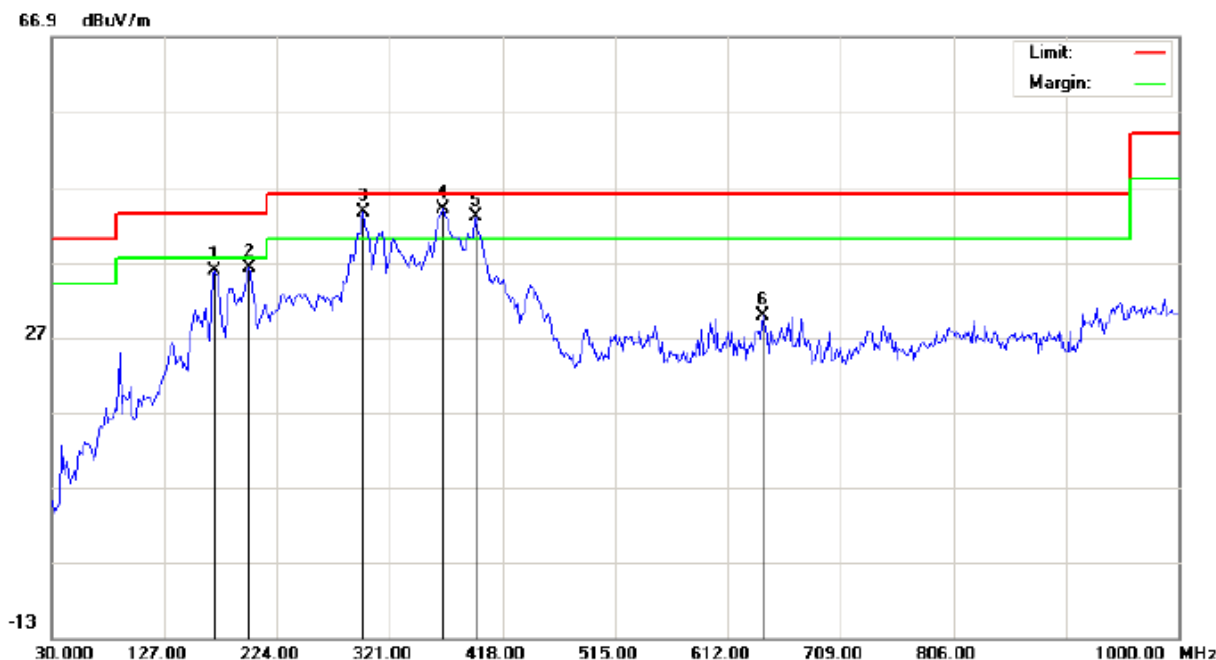
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		172.2666	23.32	12.72	36.04	43.50	-7.46	peak			
2	!	256.3333	26.08	14.09	40.17	46.00	-5.83	peak			
3	!	312.9166	25.52	16.27	41.79	46.00	-4.21	peak			
4	*	405.0667	23.40	19.22	42.62	46.00	-3.38	peak			
5		649.1833	5.02	23.85	28.87	46.00	-17.13	peak			
6		860.9664	3.46	27.59	31.05	46.00	-14.95	peak			

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1

Limit: FCC Class B 3M Radiation

EUT: Bluetooth Speaker

M/N: S1

Mode: Low Channel TX

Note:

Polarization: **Vertical**

Power:

Distance: 3m

Temperature: 26

Humidity: 60 %

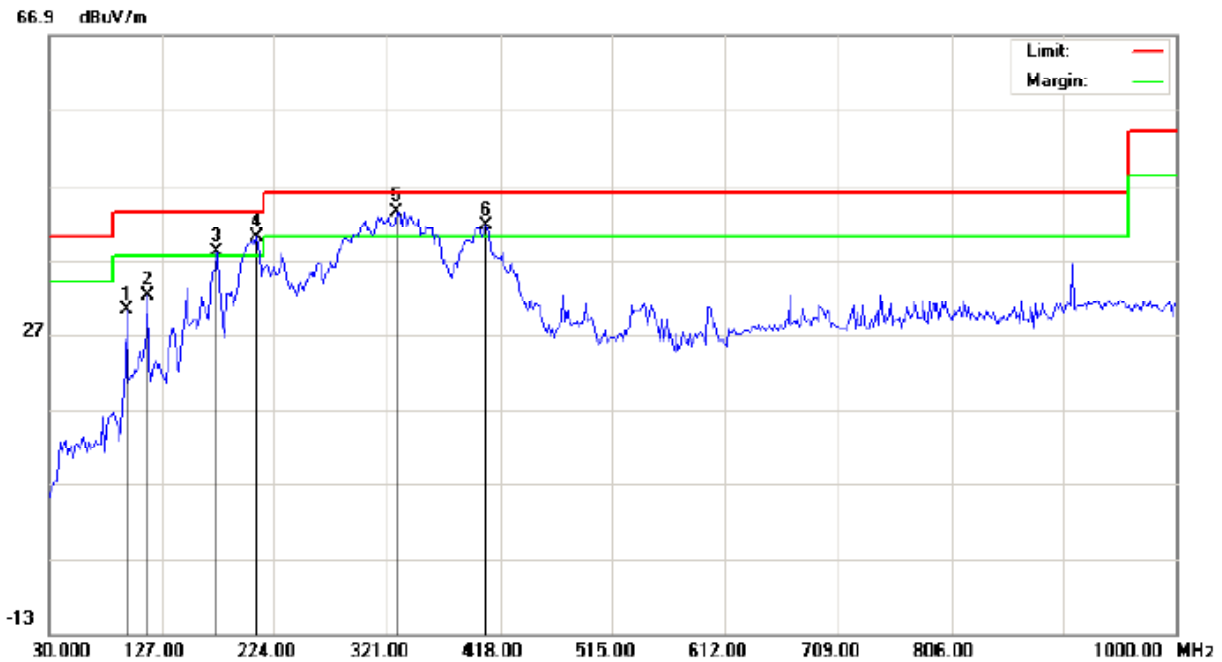
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		170.6500	21.14	14.66	35.80	43.50	-7.70	peak			
2		199.7500	27.10	9.06	36.16	43.50	-7.34	peak			
3	!	298.3666	28.27	15.36	43.63	46.00	-2.37	peak			
4	*	366.2667	25.21	18.85	44.06	46.00	-1.94	peak			
5	!	395.3666	23.91	19.04	42.95	46.00	-3.05	peak			
6		642.7164	6.10	23.69	29.79	46.00	-16.21	peak			

RESULT: PASS**Note:** 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.



RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL



Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: S1

Mode: Middle Channel TX

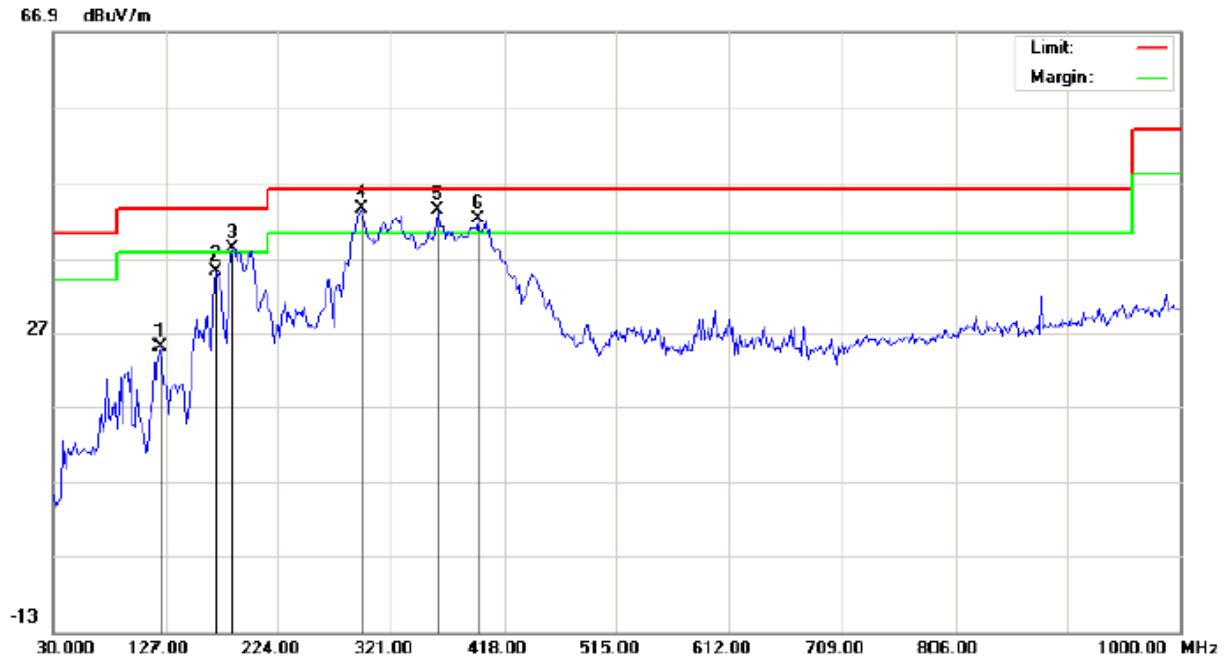
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		97.9000	20.00	10.25	30.25	43.50	-13.25	peak			
2		115.6833	20.55	11.56	32.11	43.50	-11.39	peak			
3	!	173.8831	25.71	12.37	38.08	43.50	-5.42	peak			
4	!	209.4499	27.63	12.36	39.99	43.50	-3.51	peak			
5	*	329.0833	26.06	17.35	43.41	46.00	-2.59	peak			
6	!	405.0667	22.40	19.22	41.62	46.00	-4.38	peak			

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: S1

Mode: Middle Channel TX

Note:

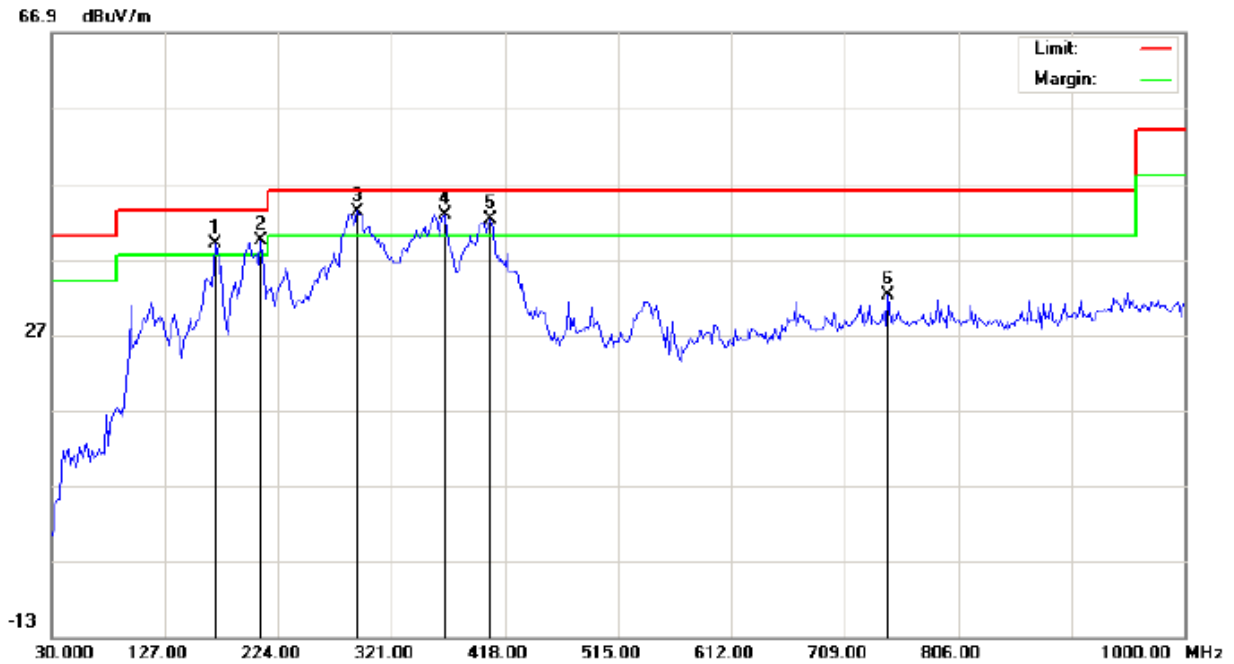
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		122.1500	17.21	7.76	24.97	43.50	-18.53	peak			
2		170.6500	20.64	14.66	35.30	43.50	-8.20	peak			
3	!	185.1999	25.16	12.75	37.91	43.50	-5.59	peak			
4	*	295.1333	28.07	15.26	43.33	46.00	-2.67	peak			
5	!	361.4166	24.43	18.81	43.24	46.00	-2.76	peak			
6	!	395.3666	22.91	19.04	41.95	46.00	-4.05	peak			

RESULT: PASS**Note:** 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.



RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL



Site: site #1

Limit: FCC Class B 3M Radiation

EUT: Bluetooth Speaker

M/N: S1

Mode: High Channel TX

Note:

Polarization: **Horizontal**

Power:

Distance: 3m

Temperature: 26

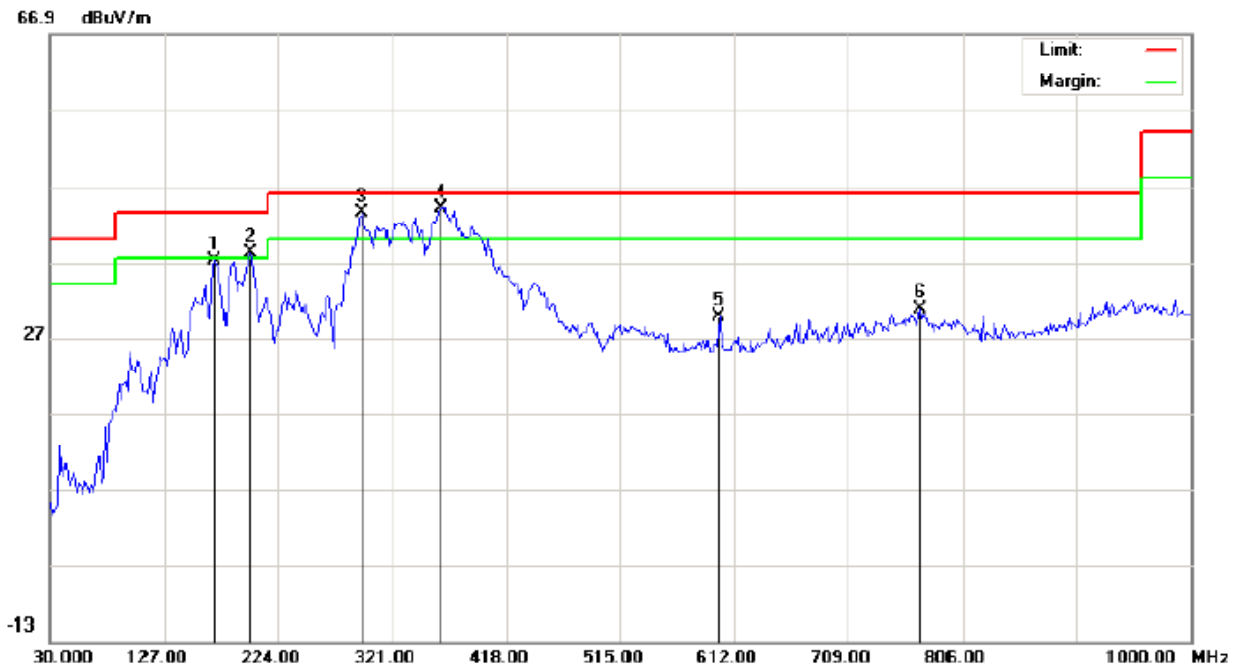
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	170.6500	25.89	13.06	38.95	43.50	-4.55	peak			
2	!	209.4499	27.13	12.36	39.49	43.50	-4.01	peak			
3	*	291.8999	28.13	15.17	43.30	46.00	-2.70	peak			
4	!	366.2667	23.95	18.85	42.80	46.00	-3.20	peak			
5	!	405.0667	22.90	19.22	42.12	46.00	-3.88	peak			
6		746.1833	5.66	26.52	32.18	46.00	-13.82	peak			

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: S1

Mode: High Channel TX

Note:

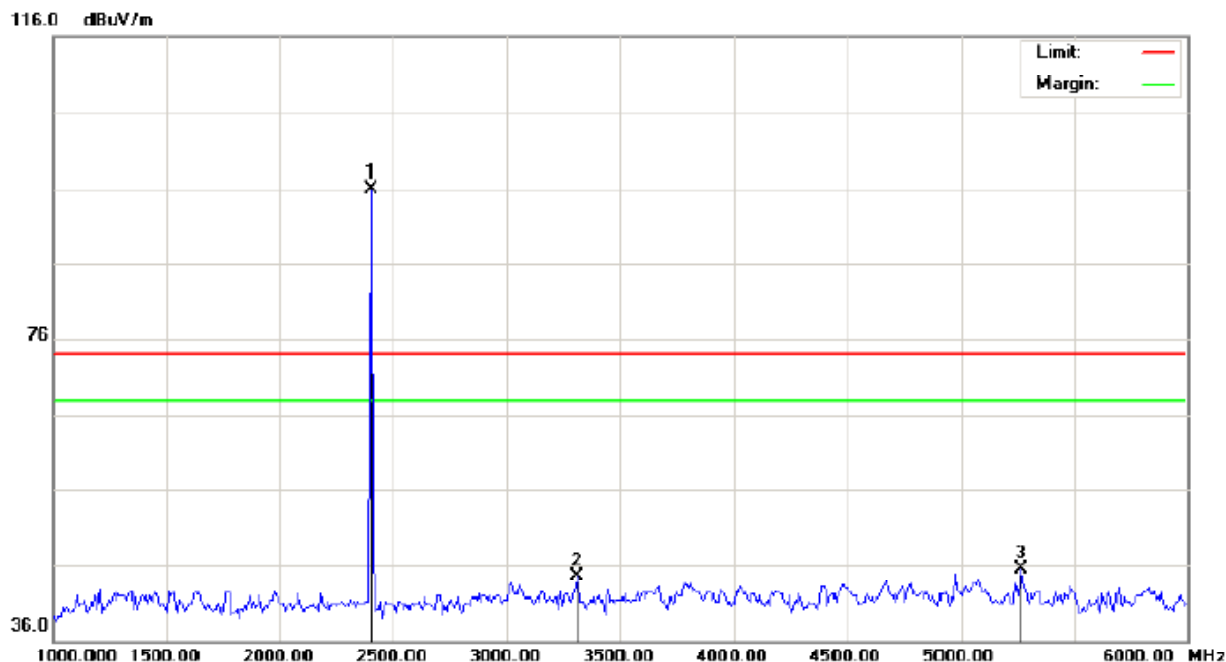
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		170.6500	22.64	14.66	37.30	43.50	-6.20	peak			
2	!	199.7500	29.10	9.06	38.16	43.50	-5.34	peak			
3	!	295.1333	28.07	15.26	43.33	46.00	-2.67	peak			
4	*	363.0332	25.26	18.83	44.09	46.00	-1.91	peak			
5		599.0665	7.11	22.73	29.84	46.00	-16.16	peak			
6		770.4333	3.88	26.91	30.79	46.00	-15.21	peak			

RESULT: PASS**Note:** 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.



Above 1000 MHz

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-LOW CHANNEL-HORIZONTAL

Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

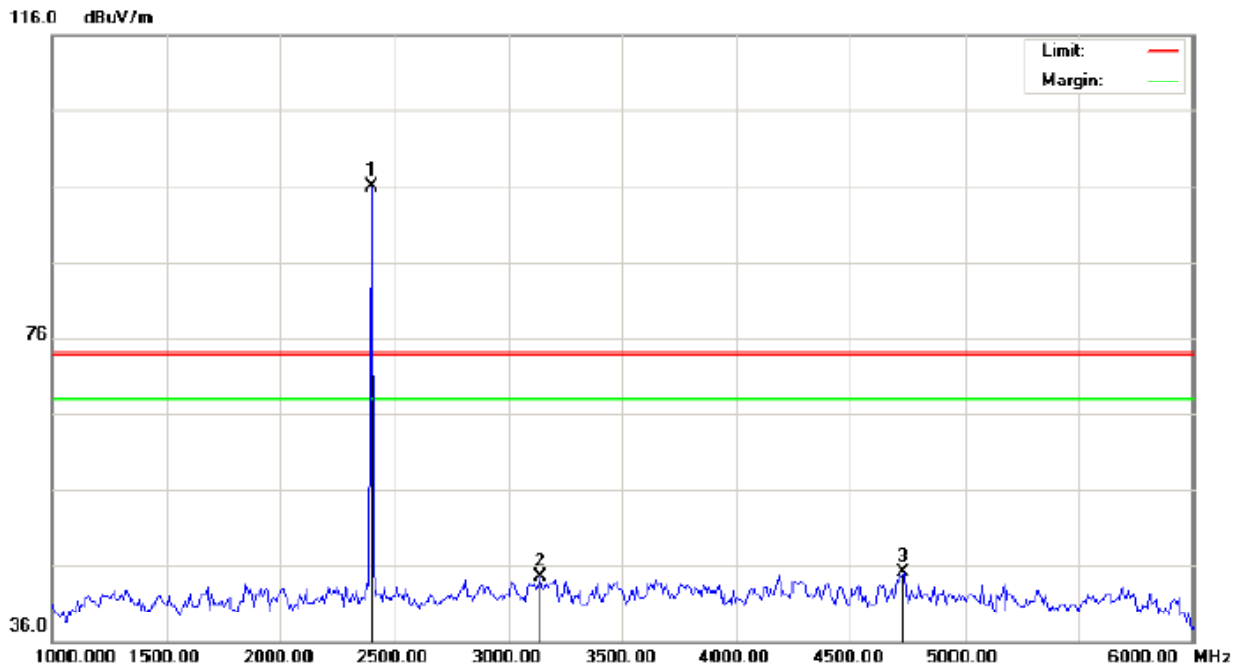
M/N: S1

Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2402.000	85.61	10.32	95.93	74.00	21.93	peak			
2		3308.333	32.53	11.93	44.46	74.00	-29.54	peak			
3		5266.667	42.66	2.86	45.52	74.00	-28.48	peak			

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-LOW CHANNEL –VERTICAL

Site: site #1

Polarization: Vertical

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

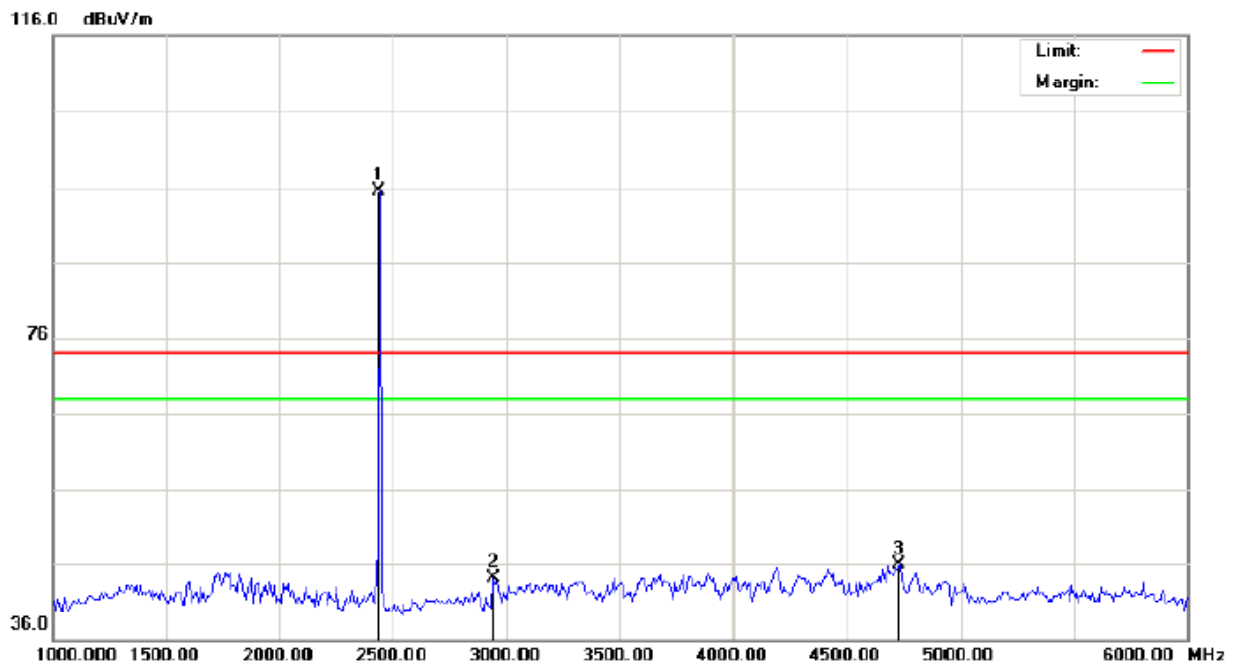
M/N: S1

Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2402.000	85.67	10.32	95.99	74.00	21.99	peak			
2		3141.667	32.73	11.77	44.50	74.00	-29.50	peak			
3		4733.333	37.62	7.50	45.12	74.00	-28.88	peak			

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-MIDDLE CHANNEL-HORIZONTAL

Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

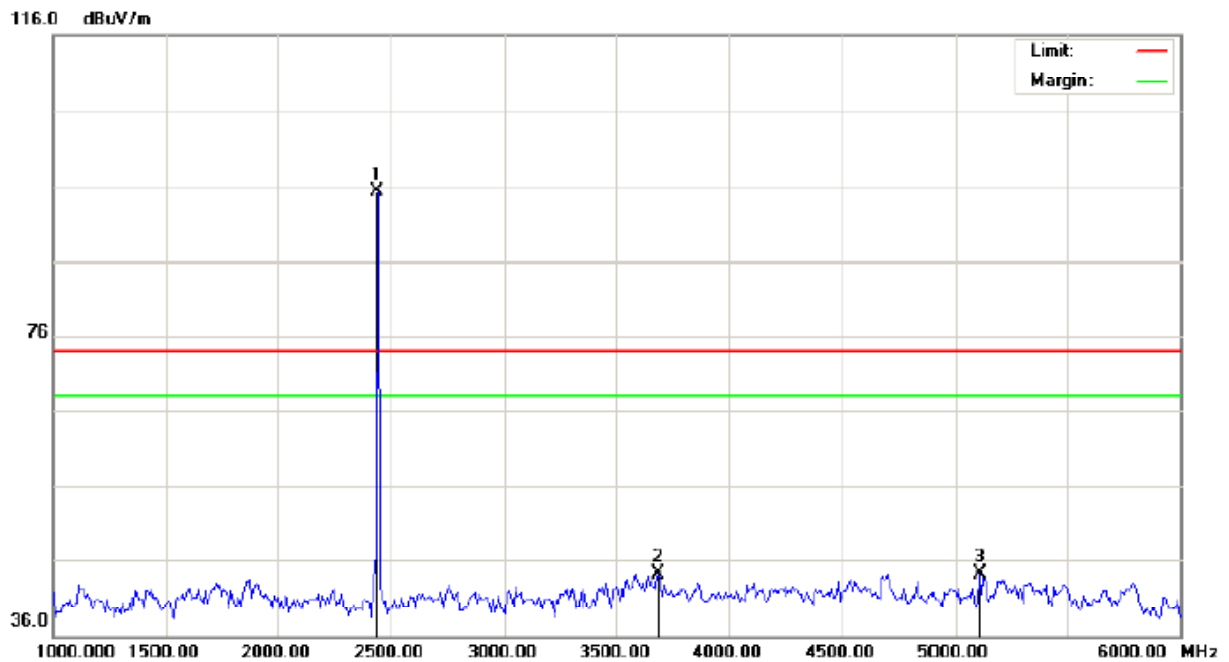
M/N: S1

Mode: Middle Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2440.000	85.23	10.36	95.59	74.00	21.59	peak			
2		2941.667	32.52	11.50	44.02	74.00	-29.98	peak			
3		4733.333	38.32	7.50	45.82	74.00	-28.18	peak			

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)- MIDDLE CHANNEL –VERTICAL

Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

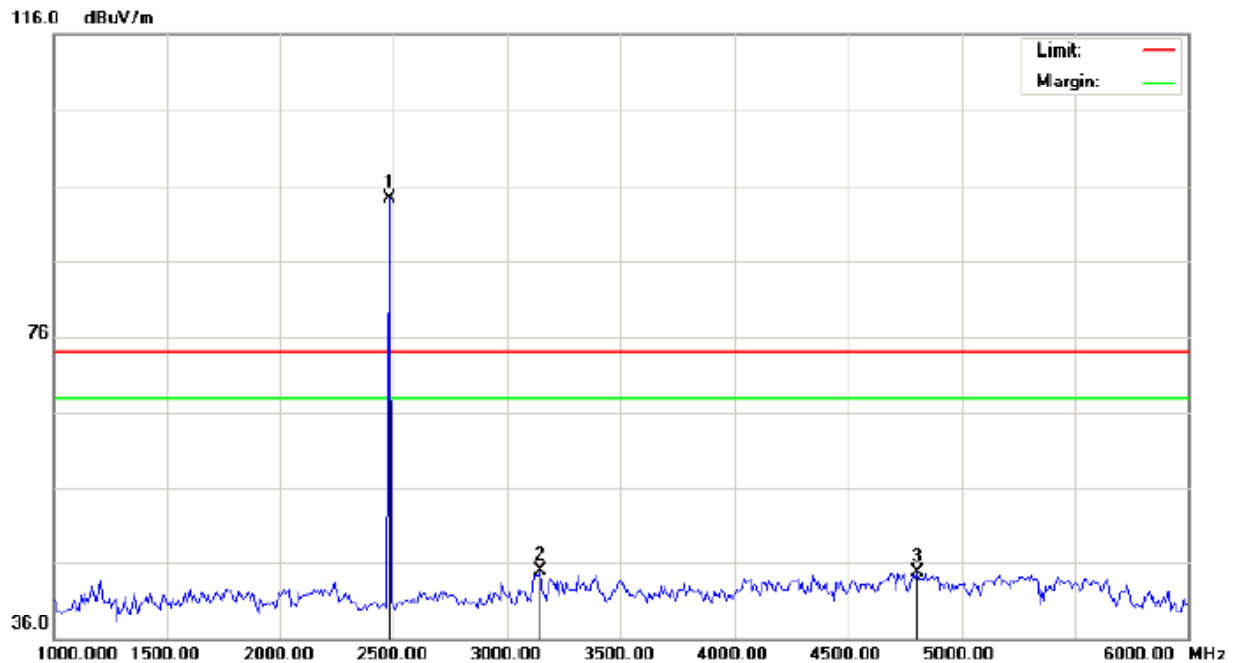
M/N: S1

Mode: Middle Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2440.000	84.89	10.36	95.25	74.00	21.25	peak			
2		3683.333	31.00	13.24	44.24	74.00	-29.76	peak			
3		5108.333	38.25	6.03	44.28	74.00	-29.72	peak			

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-HIGH CHANNEL-HORIZONTAL

Site: site #1

Polarization: Horizontal

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

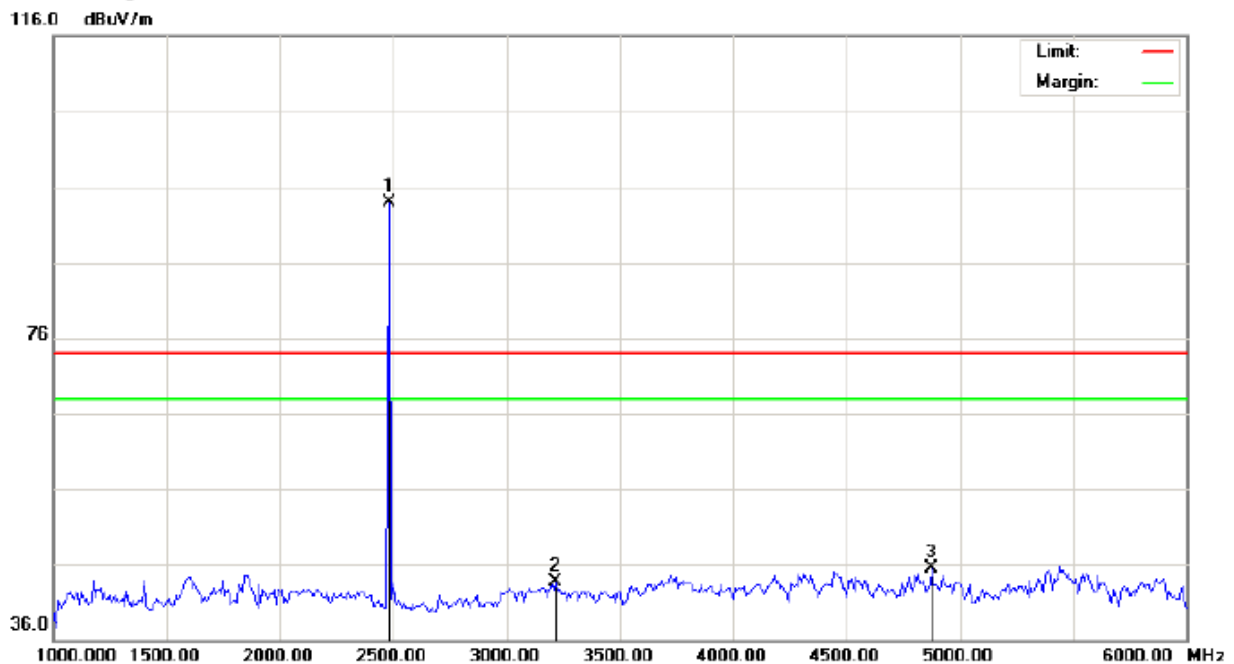
M/N: S1

Mode: High Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	83.93	10.41	94.34	74.00	20.34	peak			
2		3141.667	33.15	11.77	44.92	74.00	-29.08	peak			
3		4808.333	37.02	7.70	44.72	74.00	-29.28	peak			

RESULT: PASS

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-HIGH CHANNEL –VERTICAL

Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

M/N: S1

Mode: High Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	83.47	10.41	93.88	74.00	19.88	peak			
2		3216.667	31.88	11.84	43.72	74.00	-30.28	peak			
3		4875.000	37.71	7.87	45.58	74.00	-28.42	peak			

RESULT: PASS**Note:** 6~25GHz at least have 20dB margin. No recording in the test report.

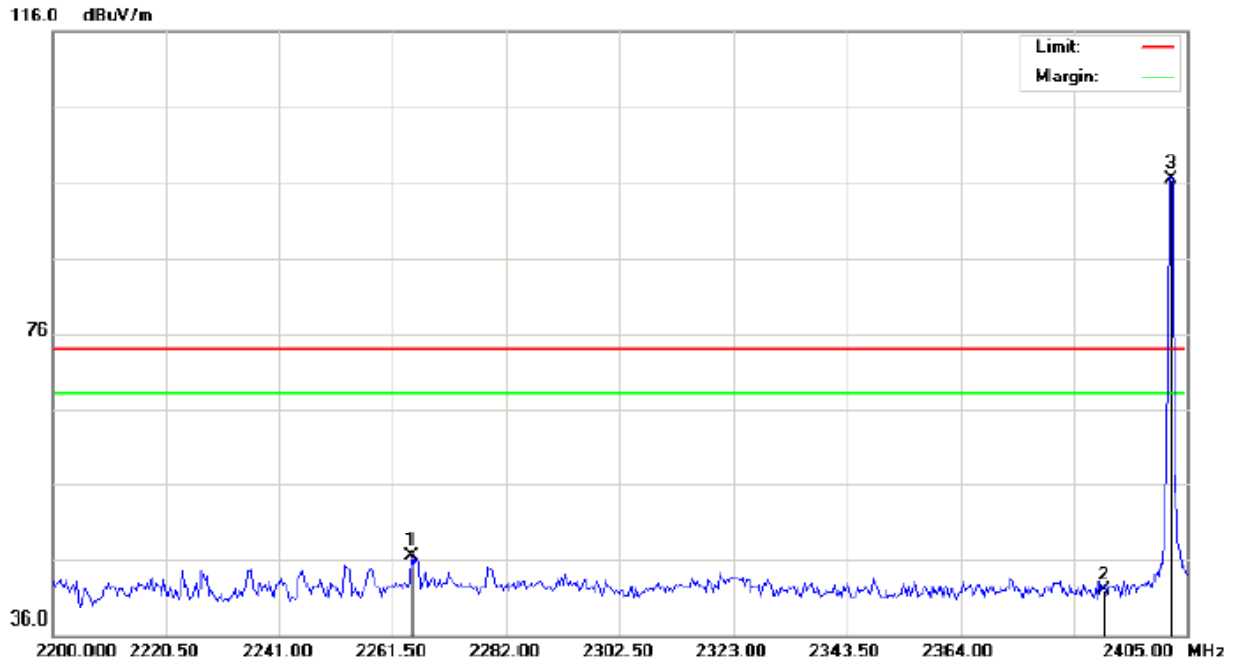
Factor=Antenna Factor+ Cable loss-Amplifier gain, Margin=Measurement-Limit.

The "Factor" value can be calculated automatically by software of measurement system.



BAND EDGE TEST

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Horizontal



Site: site #1

Polarization: **Horizontal**

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

M/N: S1

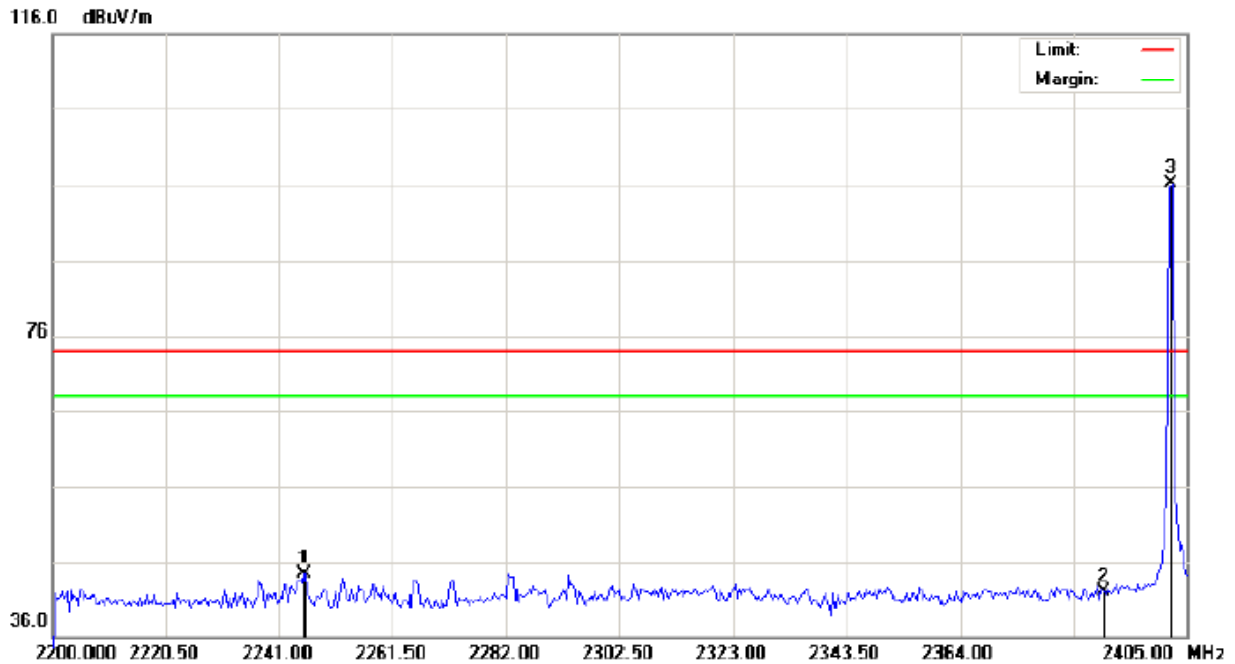
Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2264.917	36.39	10.17	46.56	74.00	-27.44	peak			
2		2390.000	31.62	10.31	41.93	74.00	-32.07	peak			
3	*	2402.000	85.91	10.32	96.23	74.00	22.23	peak			



TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical



Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

M/N: S1

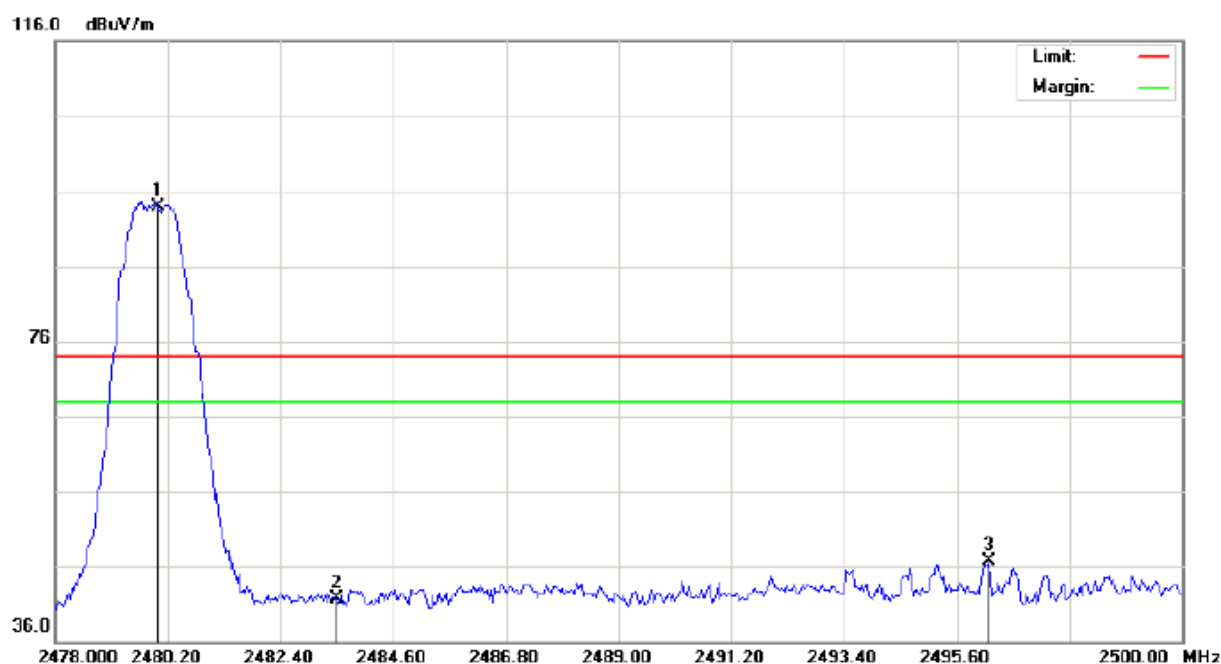
Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2245.442	34.42	10.15	44.57	74.00	-29.43	peak			
2		2390.000	31.85	10.31	42.16	74.00	-31.84	peak			
3	*	2402.000	85.76	10.32	96.08	74.00	22.08	peak			



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal



Site: site #1

Polarization: **Horizontal**

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: Bluetooth Speaker

Distance:

M/N: S1

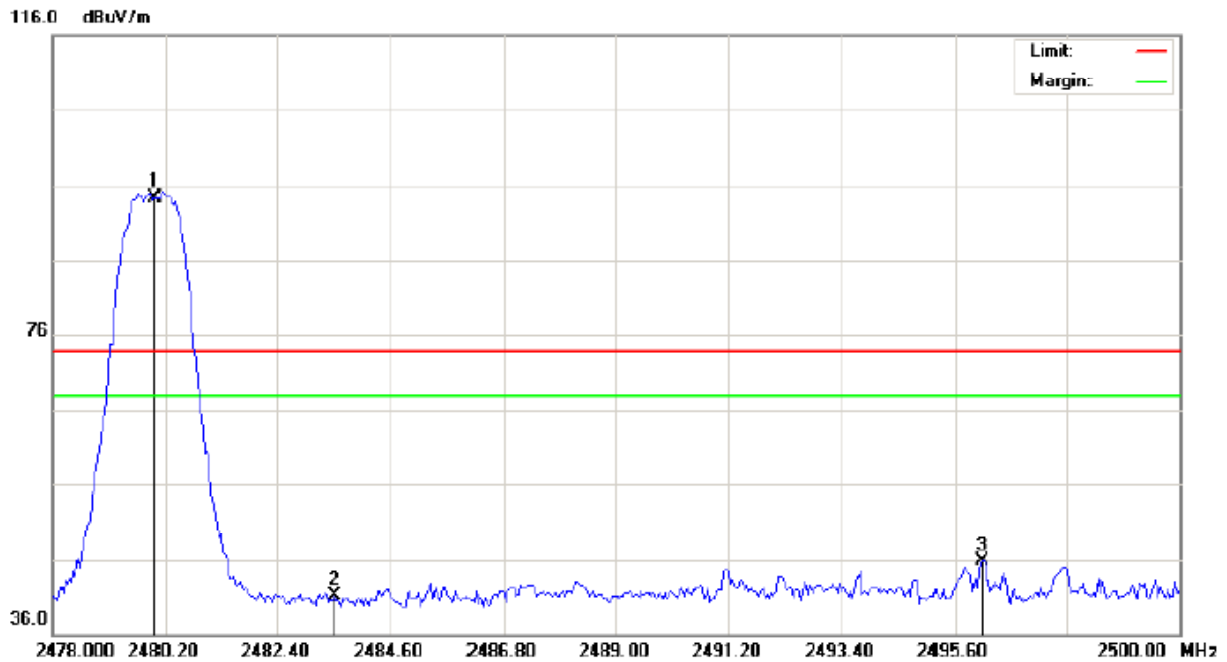
Mode: High Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	83.46	10.41	93.87	74.00	19.87	peak			
2		2483.500	31.25	10.41	41.66	74.00	-32.34	peak			
3		2496.223	36.26	10.43	46.69	74.00	-27.31	peak			



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Vertical



Site: site #1

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

EUT: Bluetooth Speaker

M/N: S1

Mode: High Channel TX

Note:

Polarization: **Vertical**

Power:

Distance:

Temperature: 26

Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	83.85	10.41	94.26	74.00	20.26	peak			
2		2483.500	30.87	10.41	41.28	74.00	-32.72	peak			
3		2496.150	35.57	10.43	46.00	74.00	-28.00	peak			

RESULT: PASS**Note:** 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

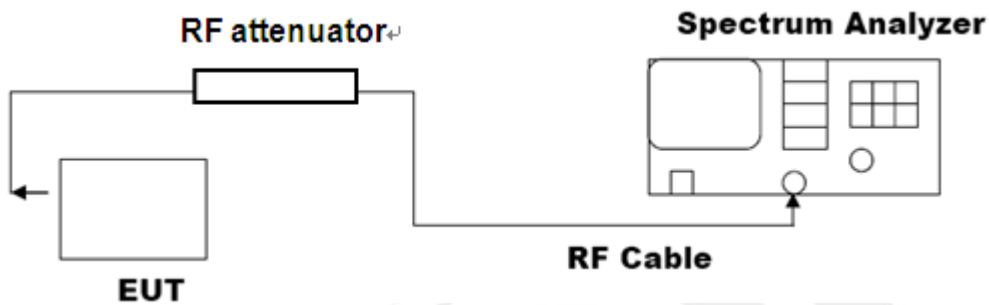
4. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

4.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set the span to 1.5times the DTS bandwidth, RBW: $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$, VBW $> 3 \times \text{RBW}$
- 4). Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

4.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

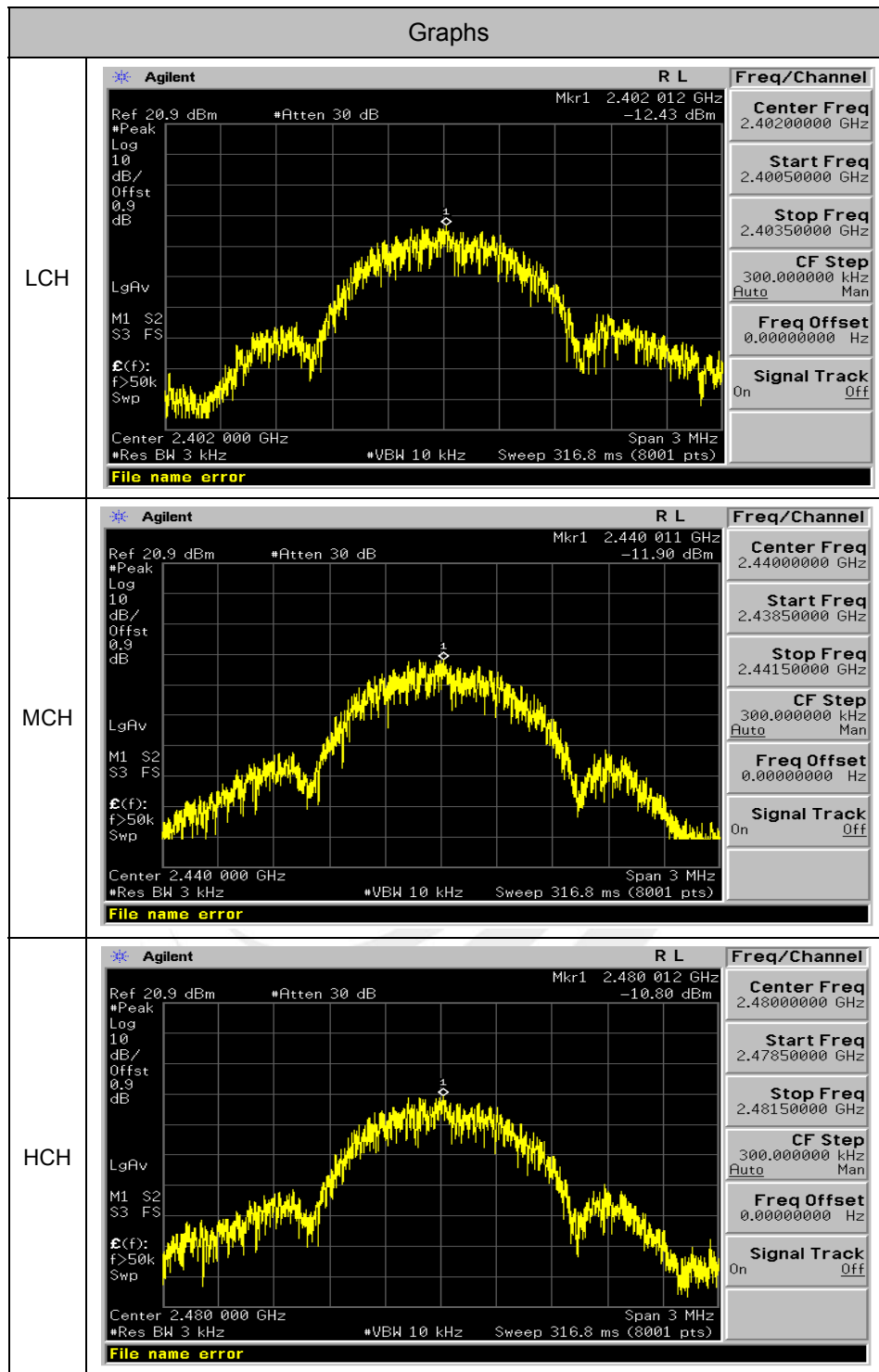


4.3 LIMITS AND MEASUREMENT RESULT

Mode	Channel	PSD [dBm/3khz]	Limit(dBm/3khz)	Verdict
BLE	LCH	-12.43	8	PASS
BLE	MCH	-11.9	8	PASS
BLE	HCH	-10.8	8	PASS



Test Graph





5. BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C

Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(2)	Bandwidth	$\geq 500\text{kHz}$	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	$>$ Measurement Bandwidth or Channel Separation
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : $\text{RBW} = 100\text{kHz}$, $\text{VBW} \geq 3 \times \text{RBW}$, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

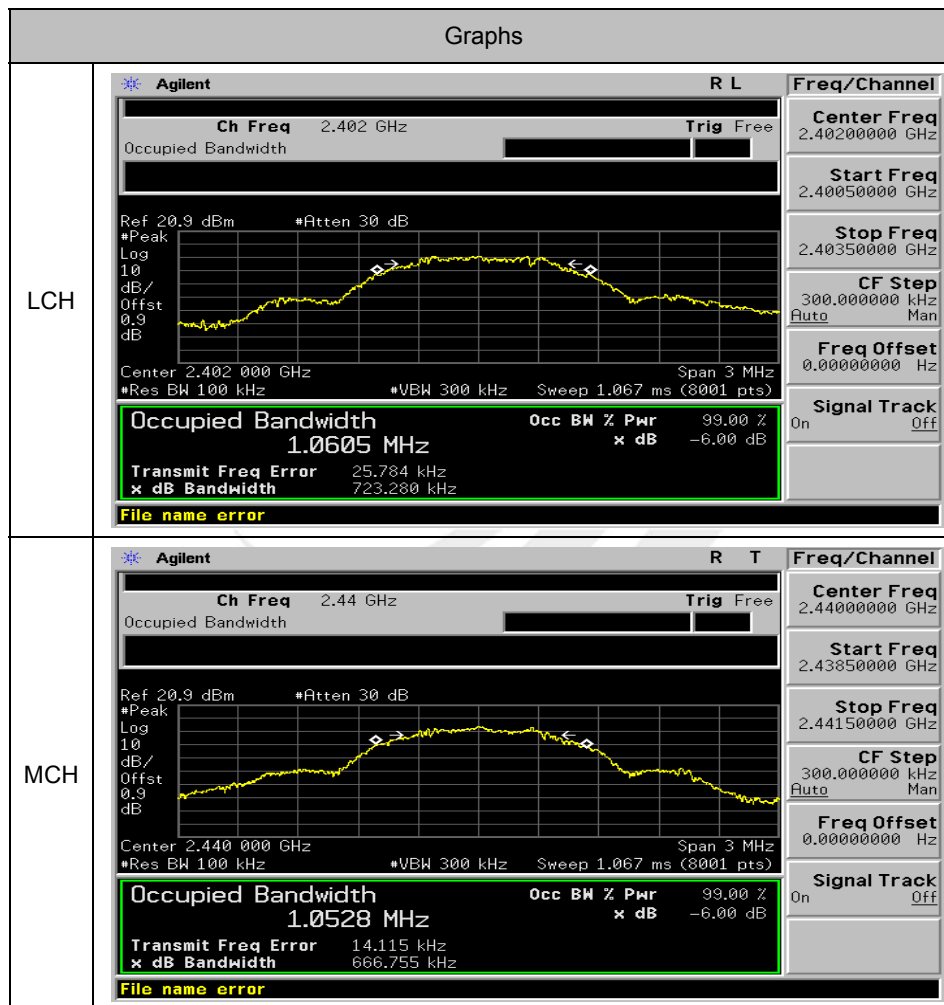
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

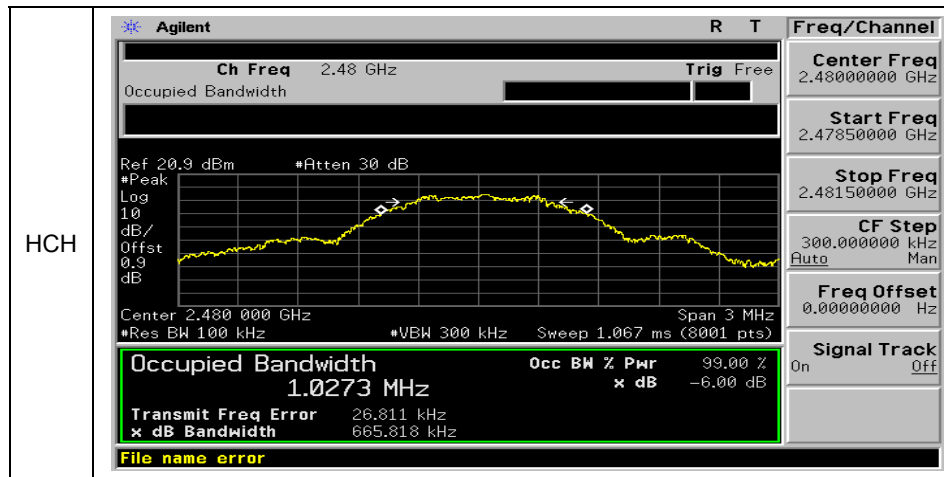


5.5 TEST RESULTS

EUT :	Bluetooth speaker	Model Name :	S1
Temperature :	25℃	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 7.4V
Test Mode :	GFSK(CH00 / CH19 /C39)		

Mode	Channel	6dB Bandwidth [MHz]	Verdict
BLE	LCH	0.723	PASS
BLE	MCH	0.667	PASS
BLE	HCH	0.666	PASS







6. OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (b)(i)	Peak Output Power	1 W or 0.125W	2400-2483.5	PASS
		Or if channel separation > 2/3 bandwidth provided the systems operate with an output power no greater than 125 mW (20.96dBm)		

6.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting :GFSK:RBW= 2MHz, VBW= 6MHz, Sweep time = Auto.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

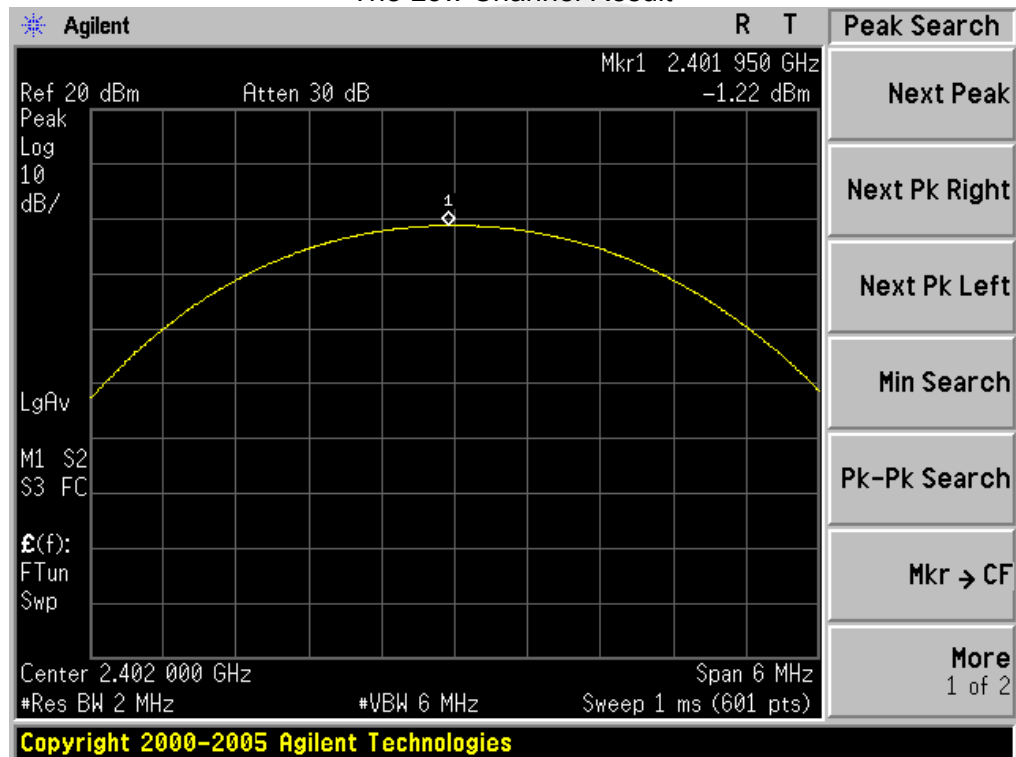


6.5 TEST RESULTS

EUT :	Bluetooth speaker	Model Name :	S1
Temperature :	25°C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 7.4V
Test Mode :	GFSK(CH00/ CH19 /CH39)		

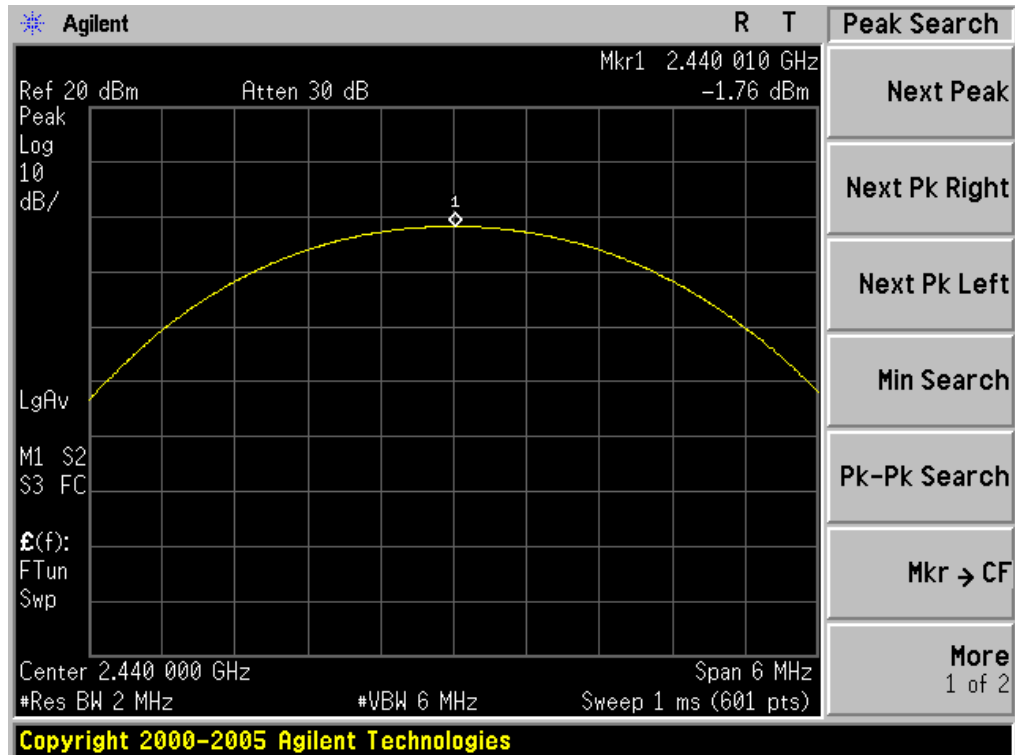
Channel	Peak Power (dBm)	Applicable Limits (dBm)	Pass/Fail
Low Channel	-1.22	30	Pass
Middle Channel	-1.76	30	Pass
High Channel	-3.13	30	Pass

The Low Channel Result

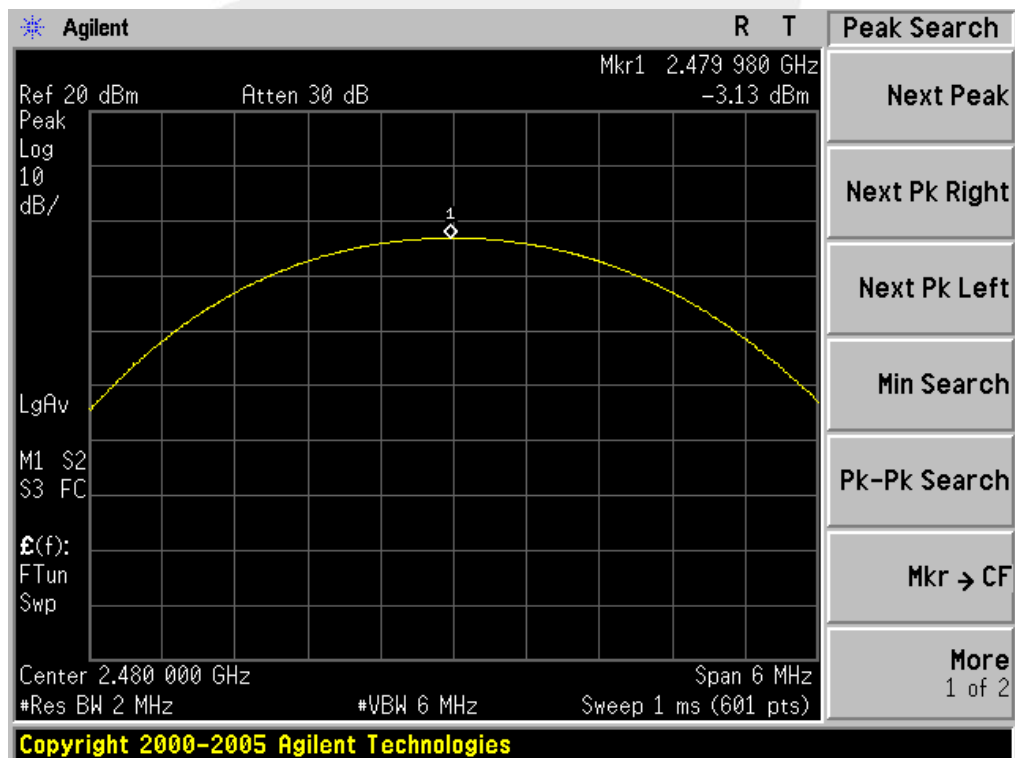




The Middle Channel Result



The High Channel Result



7. CONDUCTED SPURIOUS EMISSIONS

7.1 REQUIREMENT

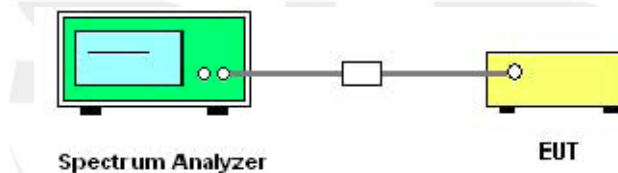
According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

7.2 TEST PROCEDURE

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/100 KHz
Trace-Mode:	Max hold

7.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

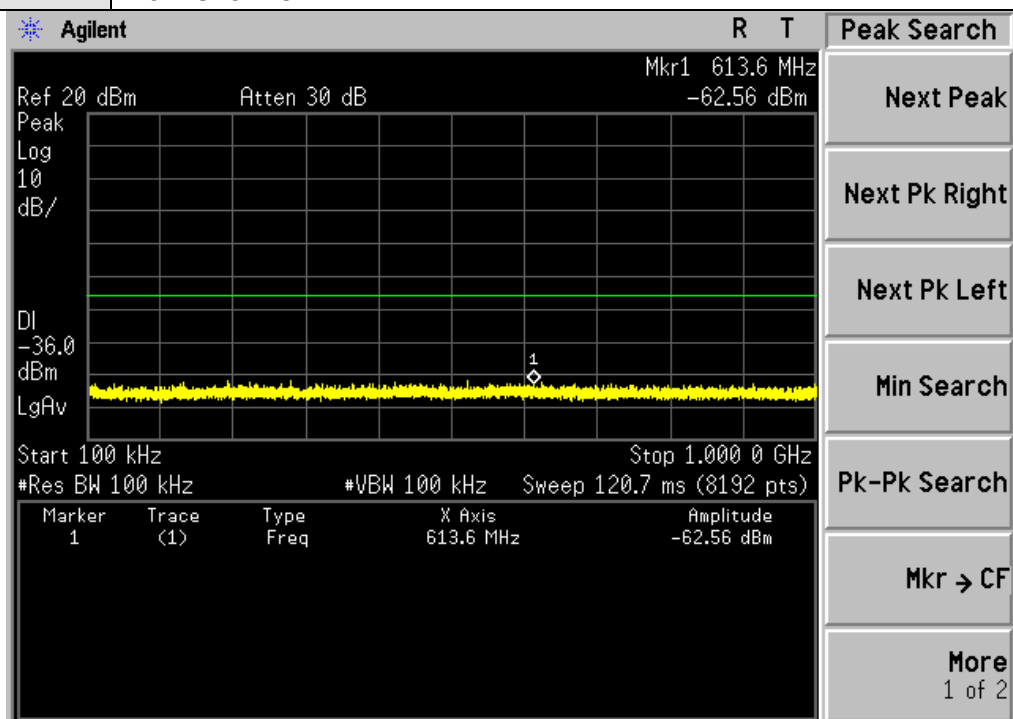
7.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

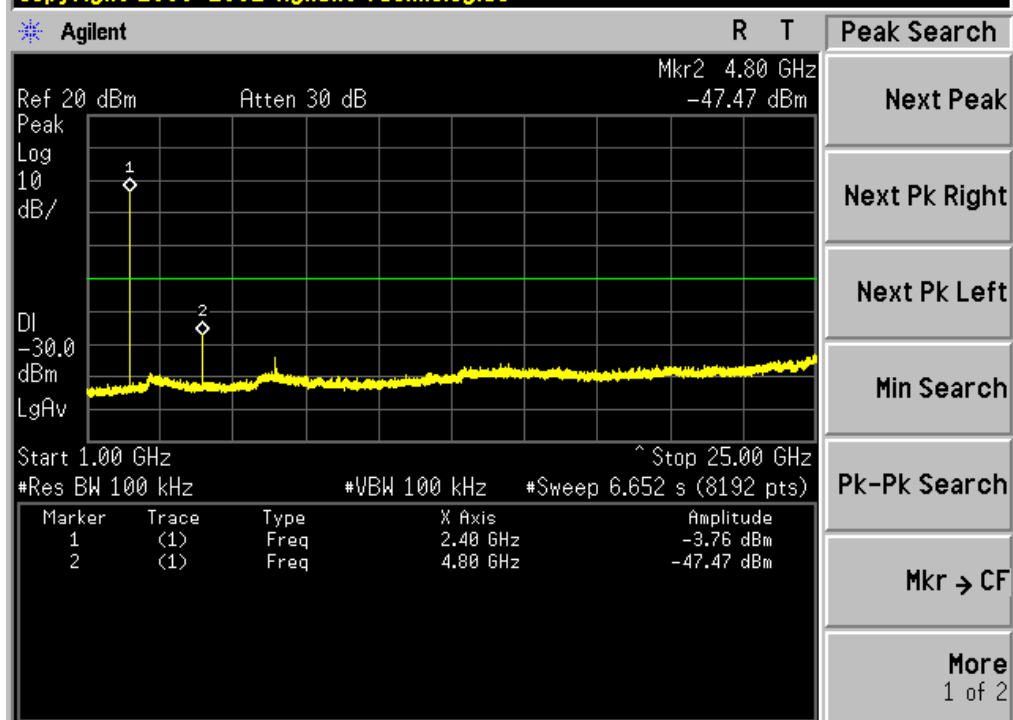


7.5 TEST RESULTS

EUT :	Bluetooth speaker	Model Name :	S1
Temperature :	25°C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 7.4V
Test Mode :	Low Channel		



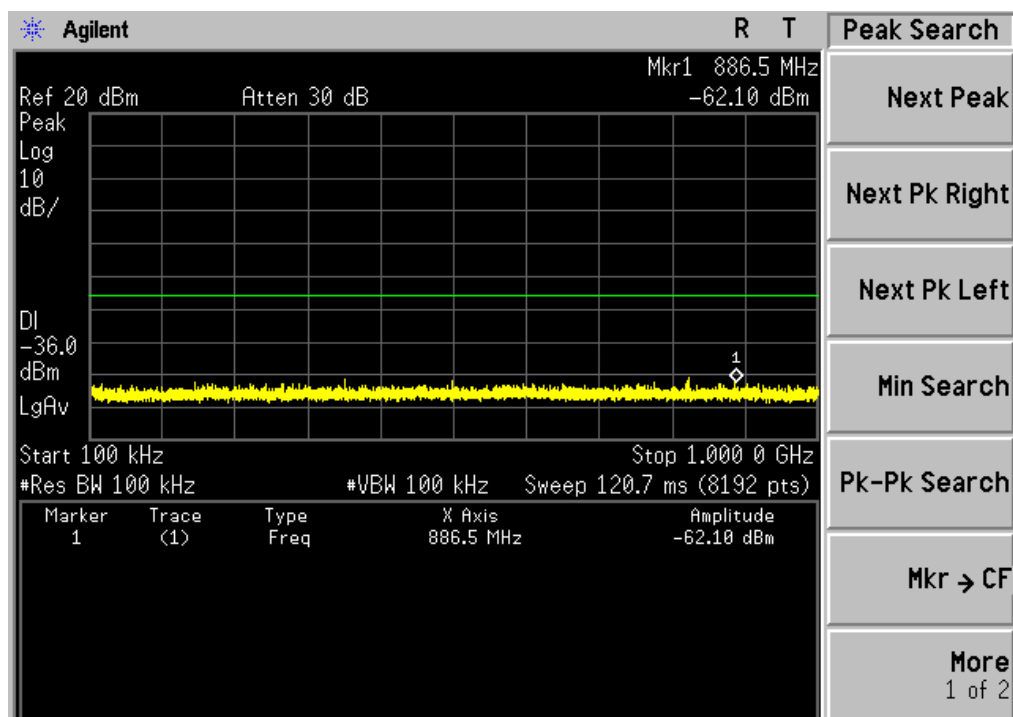
Copyright 2000-2002 Agilent Technologies



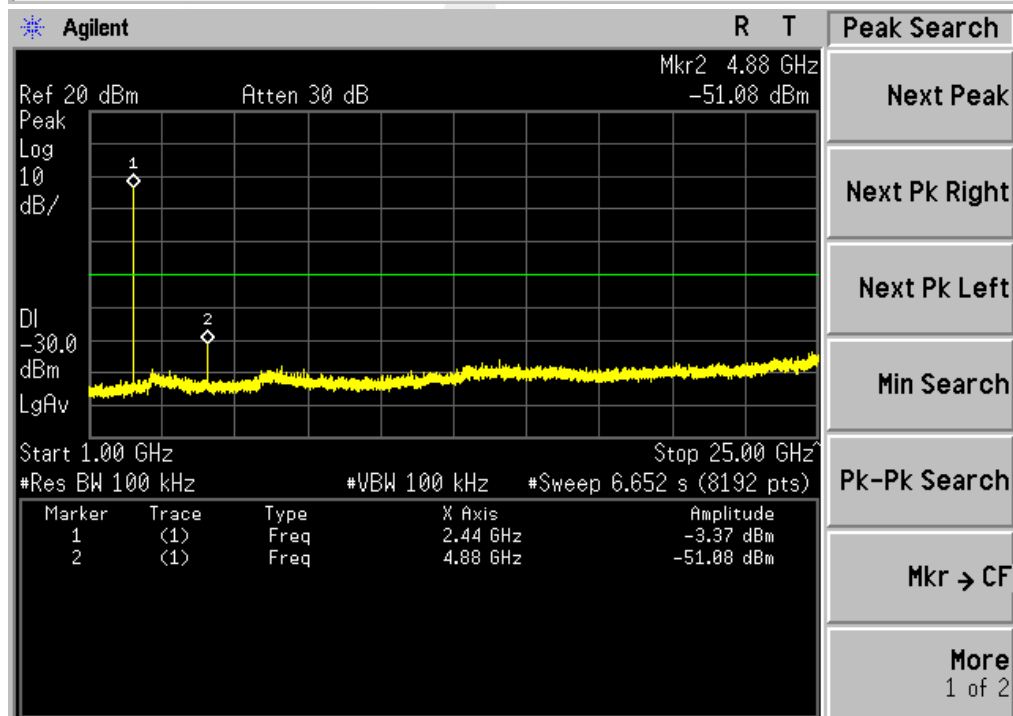
Copyright 2000-2002 Agilent Technologies



EUT :	Bluetooth speaker	Model Name :	S1
Temperature :	25°C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 7.4V
Test Mode :	Middle		



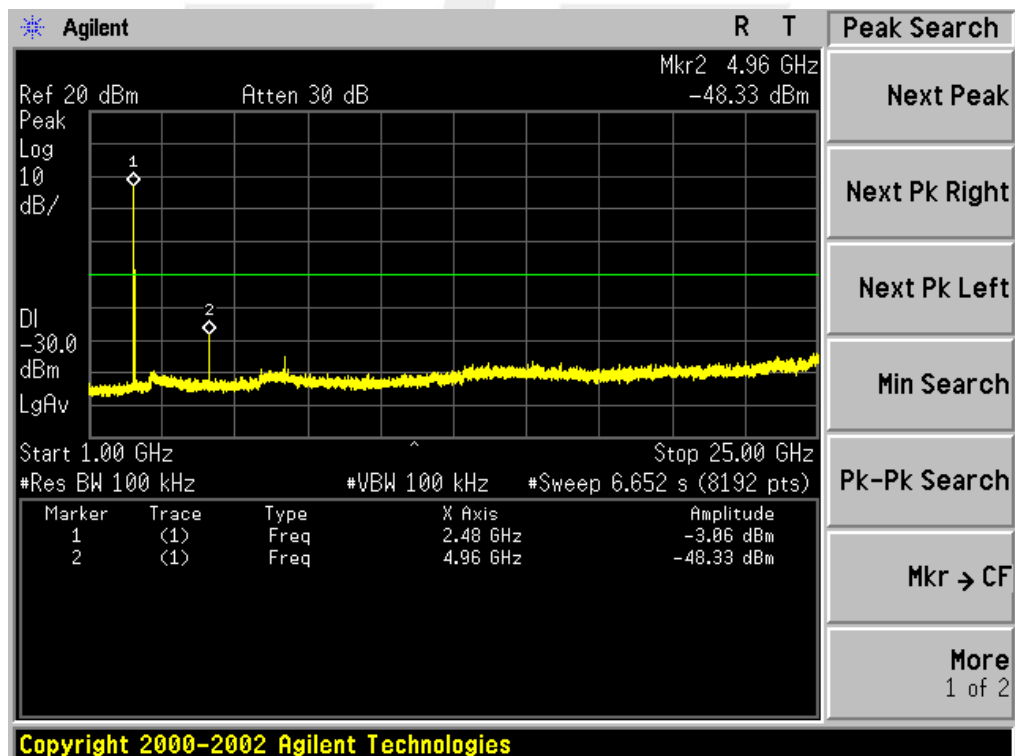
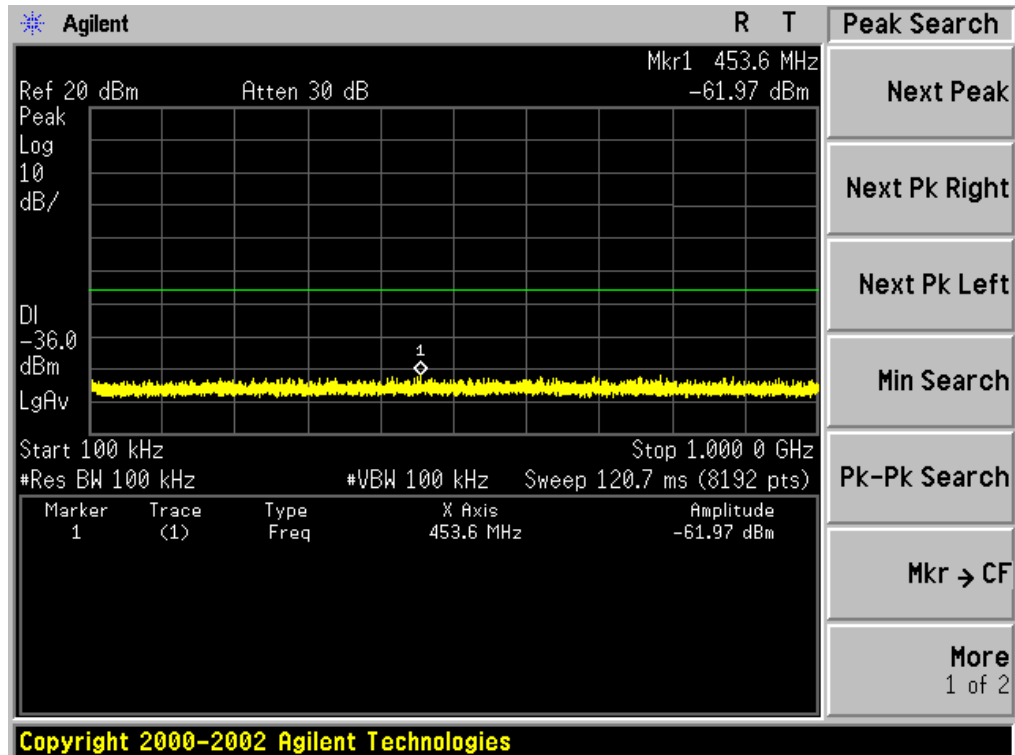
Copyright 2000–2002 Agilent Technologies



Copyright 2000–2002 Agilent Technologies



EUT :	Bluetooth speaker	Model Name :	S1
Temperature :	25°C	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 7.4V
Test Mode :	High		





8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

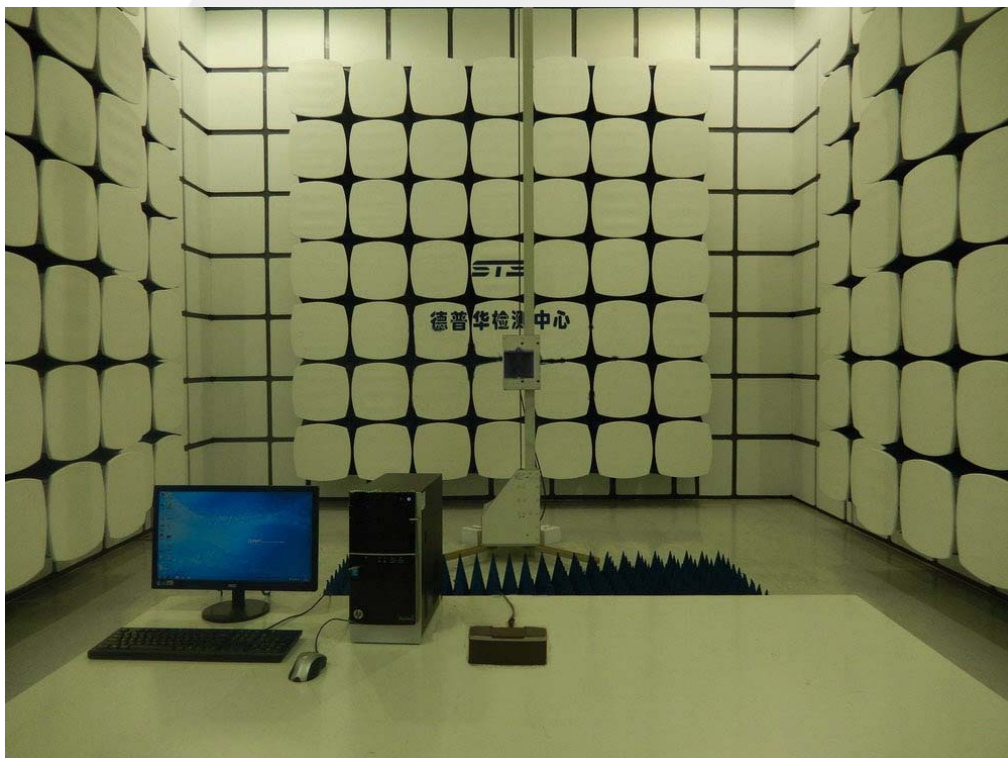
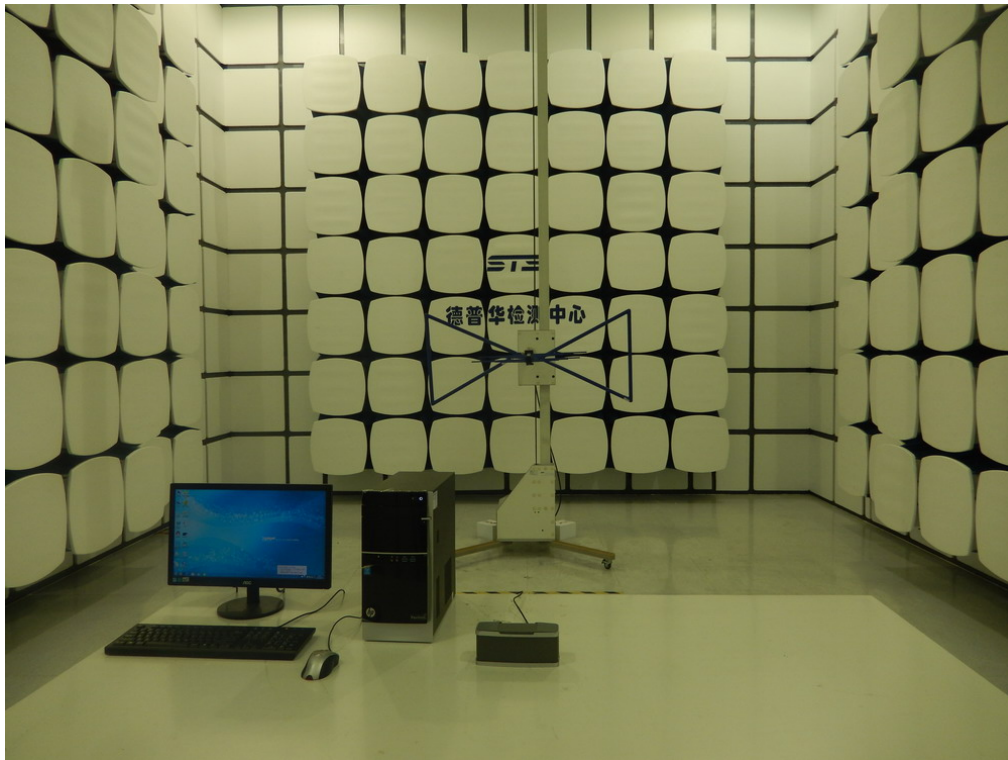
8.2 EUT ANTENNA

The EUT antenna is permanent attached antenna. It comply with the standard requirement.



APPENDIX-PHOTOS OF TEST SETUP

Radiated Measurement Photos





Conducted Measurement Photos





APPENDIX-PHOTOS OF EUT

TOP VIEW



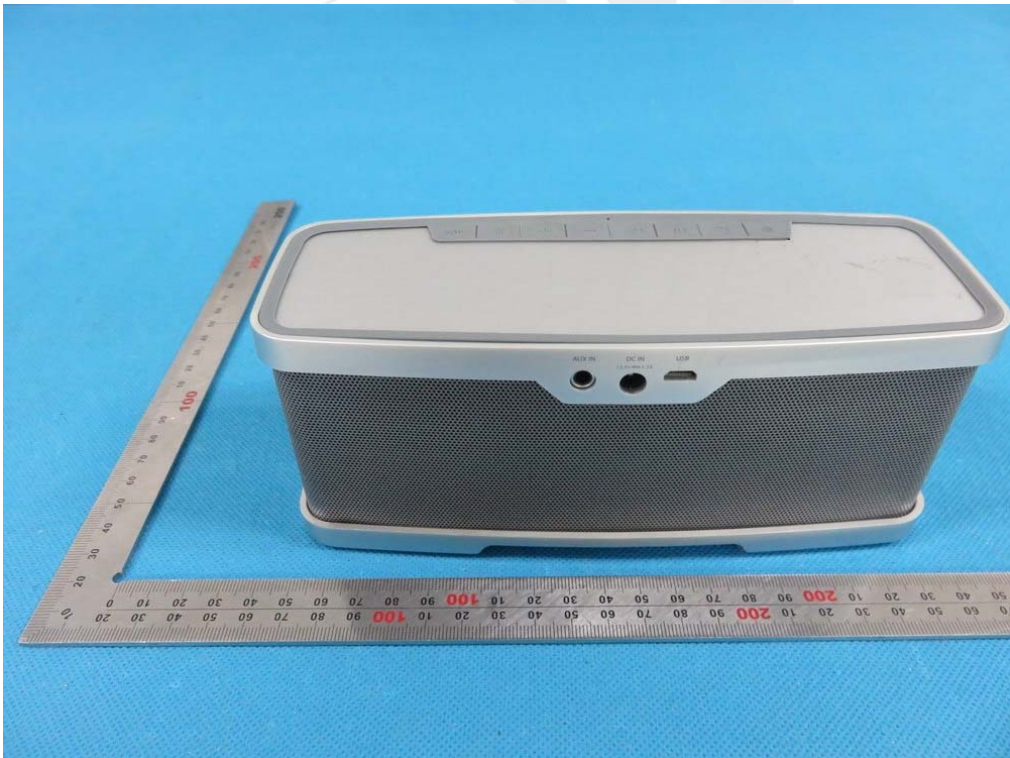
BOTTOM VIEW



FRONT VIEW



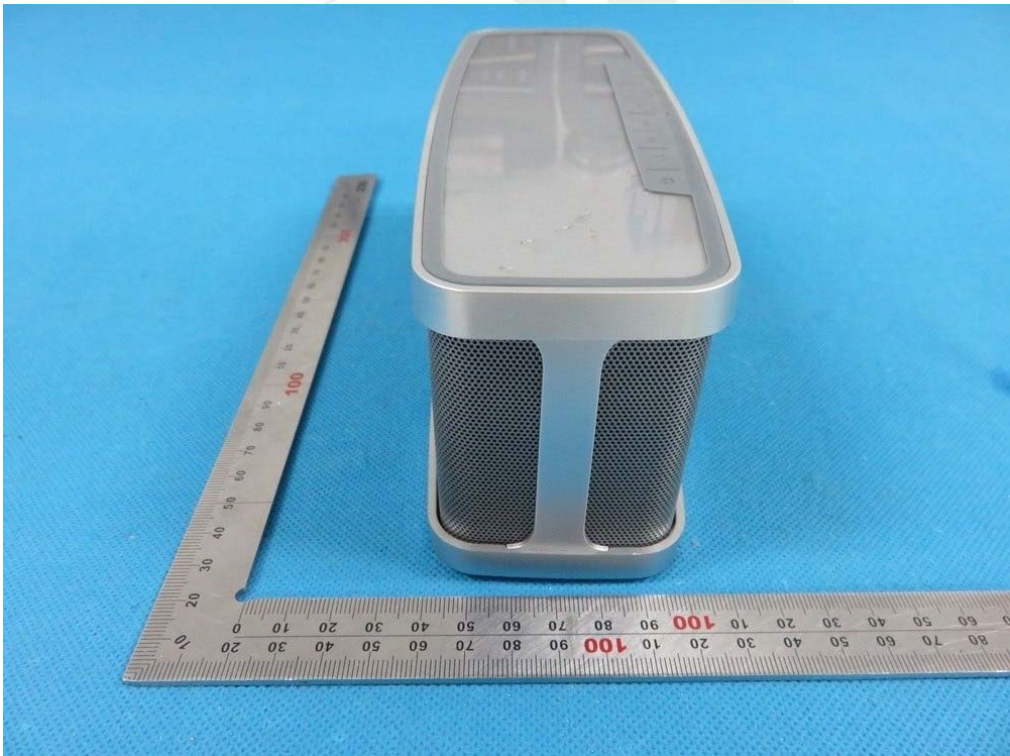
BACK VIEW



LEFT VIEW



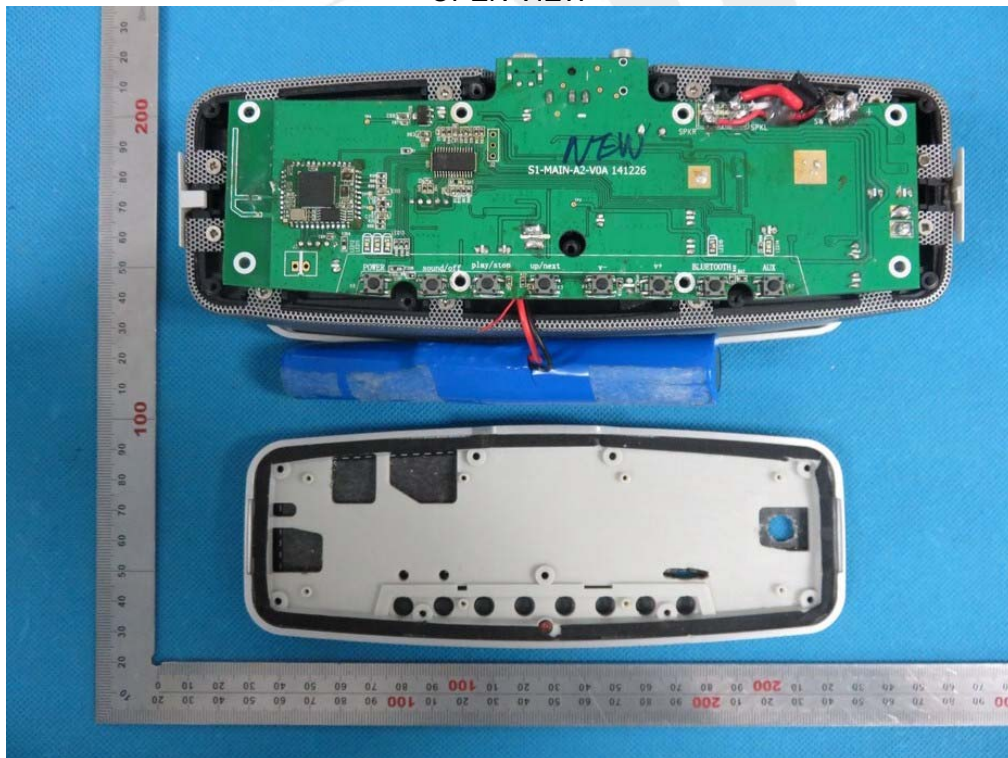
RIGHT VIEW



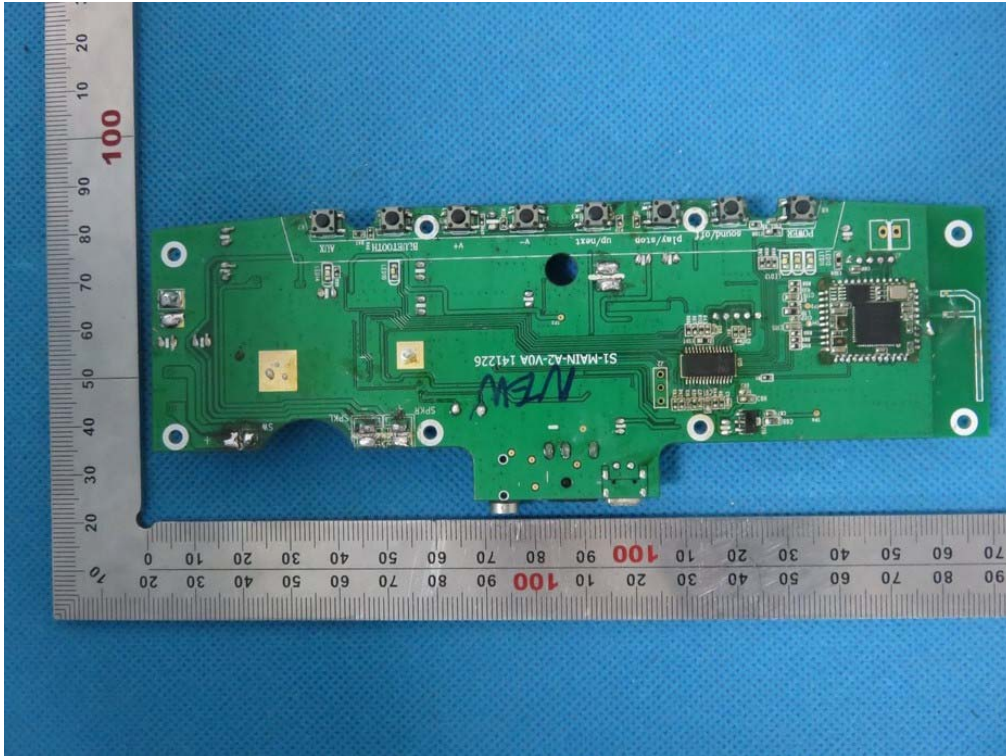
Port VIEW



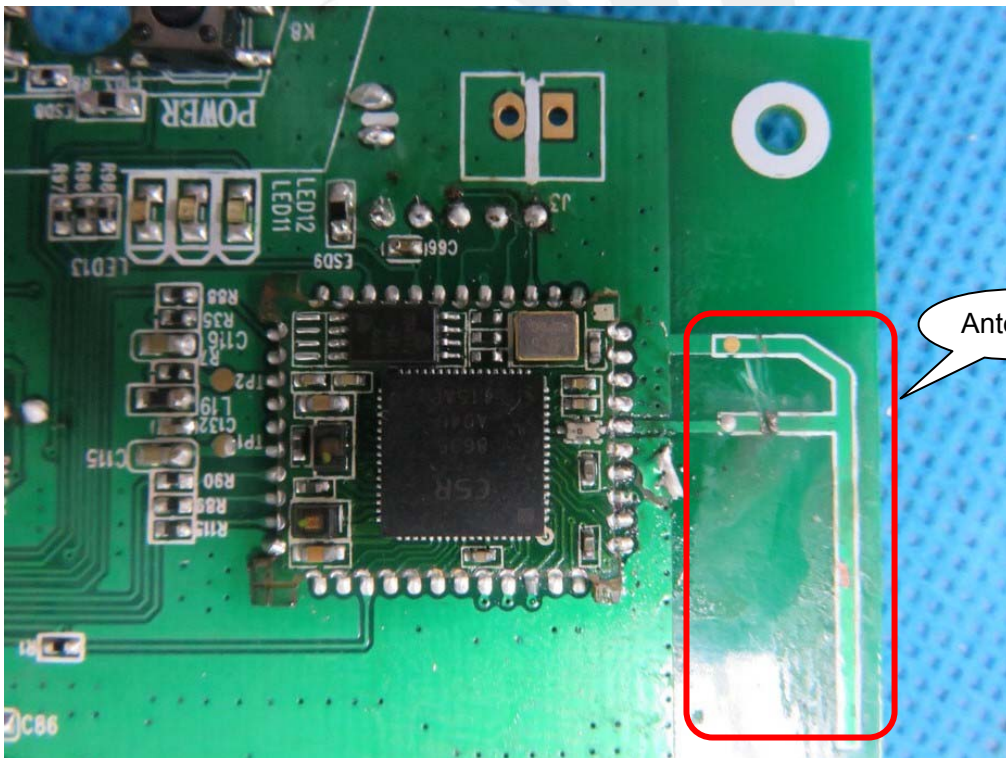
OPEN VIEW



INTERNAL VIEW -1

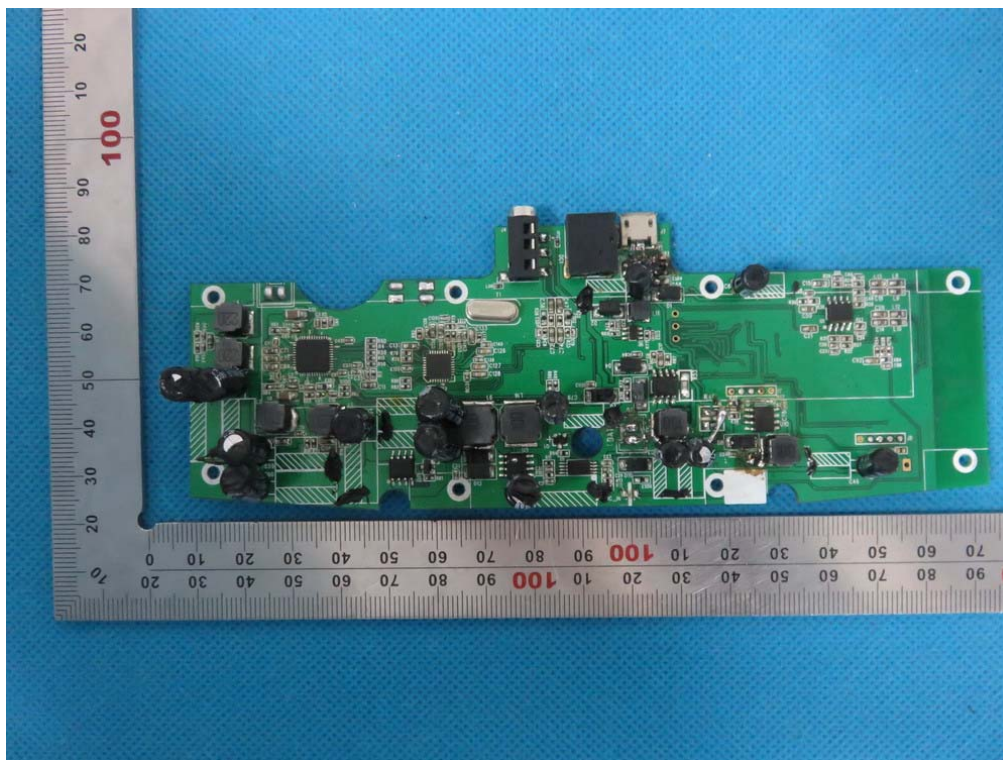


INTERNAL VIEW-2





INTERNAL VIEW-3



----END OF REPORT----

