
FCC Test Report

Report No.: AGC04096150701FE08

FCC ID : 2AEDMSC-21A

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : Bluetooth Speaker

BRAND NAME : ESOTICA

MODEL NAME : SC-21

CLIENT : Shenzhen Caijiixin Technology Co., Ltd.

DATE OF ISSUE : Aug.04,2015

STANDARD(S) : FCC Part 15 Rules

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug.04,2015	Valid	Original Report

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1. VERIFICATION OF COMPLIANCE


Applicant	Shenzhen Caijiixin Technology Co., Ltd.
Address	4th Floor, Building 51, Bantian 3rd Industrial Zone, Longgang District, Shenzhen, Guangdong, China
Manufacturer	Shenzhen Caijiixin Technology Co., Ltd.
Address	4th Floor, Building 51, Bantian 3rd Industrial Zone, Longgang District, Shenzhen, Guangdong, China
Product Designation	Bluetooth Speaker
Brand Name	ESOTICA
Test Model	SC-21
Date of test	July 29,2015 to July 30,2015
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BLE/RF (2013-03-01)

WE HEREBY CERTIFY THAT:

The above equipment was tested by Compliance Certification Service(Shenzhen) Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Tested By 
Jerry Xiao(Xiao Wang) Aug.04,2015

Reviewed By 
Forrest Lei(Lei Yonggang) Aug.04,2015

Approved By 
Solger Zhang(Zhang Hongyi)
Authorized Officer Aug.04,2015

2.GENERAL INFORMATION

2.1PRODUCT DESCRIPTION

The EUT is designed as a “Bluetooth Speaker”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
Bluetooth Version	V4.0
Modulation	GFSK
Number of channels	40 Channel(37 Hopping Channel,3 advertising Channel)
Antenna Designation	PCB Antenna
Antenna Gain	0dBi
Hardware Version	V1.2
Software Version	V1.0
Power Supply	DC3.7V by Battery
Note: 1. The USB Port can not be used for communication with PC. It's only for charging. 2.The EUT support BLE function	

2.2 RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2AEDMSC-21A** filing to comply with Section 15.247of the FCC Part 15, Subpart C Rules.

2.3TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The test has been referenced the KDB 558074 D01 DTS Meas Guidance v03r02

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions. The EUT was tested in all three orthogonal planes and the worse case was showed.

2.4 TEST FACILITY

All measurement facilities used to collect the measurement data are located at Compliance Certification Service(Shenzhen) Inc.

No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town,Baoan Distr
FCC register No.:441872

2.5 SPECIAL ACCESSORIES

Refer to section 2.2.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.7 MEASUREMENT UNCERTAINTY

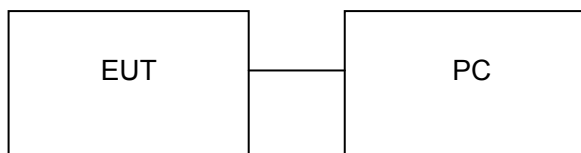
Radiation Emission: ± 3.2

Conduction Emission: ± 2.5

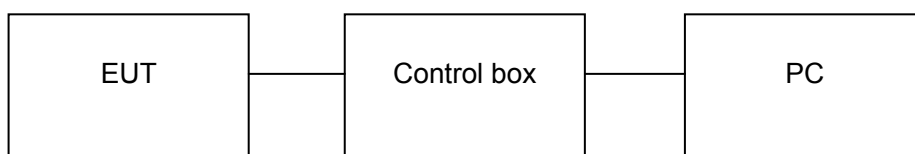
3. SYSTEM TEST CONFIGURATION

3.1 CONFIGURATION OF TESTED SYSTEM

Configuration: Normal Operating



Configuration: Continuous TX



3.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	Bluetooth Speaker	ESOTICA	SC-21	EUT
2	PC	Dell	INSPIRON	A.E
3	Control box	N/A	N/A	A.E
4	USB Cable	N/A	0.5m, unshielded	A.E
5	Audio Cable	N/A	0.6m, unshielded	A.E
6	IPOD	APPLE	A1367	A.E

3.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203	Antenna Requirement	Compliant
§15.209 §15.247(d)	Radiated Emission	Compliant
§15.247(d)	Band Edges	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247(b)	Conducted Power	Compliant
§15.247(e)	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.207	Line Conduction Emission	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been operated in one modulation: GFSK .

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal Operating (BT)

Note:

1. Only the result of the worst case was recorded in the report if no any records.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. Transmitting duty cycle >98%, The average correction factor is about -0.18
- 4.The EUT used fully-charged battery when tested.

5. ANTENNA REQUIREMENT

5.1. STANDARD APPLICABLE

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

5.2. TEST RESULT

This product has a permanent antenna, fulfill the requirement of this section.

6. TEST FACILITY

Site	Compliance Certification Service(Shenzhen) Inc.
Location	No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town,Baoan Distr
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009.

ALL TEST EQUIPMENT LIST

Radiated Emission Test Site 966(2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/01/2015	03/01/2016
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2015	03/17/2016
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2015	03/17/2016
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	07/10/2015	07/09/2016
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/01/2015	03/01/2016
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/01/2015	03/01/2016
Loop Antenna	COM-POWER	AL-130	121044	09/27/2014	09/26/2015
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/28/2015	02/27/2016
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	03/09/2015	03/08/2016
LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	03/09/2015	03/08/2016
LISN	EMCO	3825/2	8901-1459	03/09/2015	03/08/2016
Temp. / Humidity Meter	VICTOR	HTC-1	N/A	03/04/2015	03/03/2016
Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

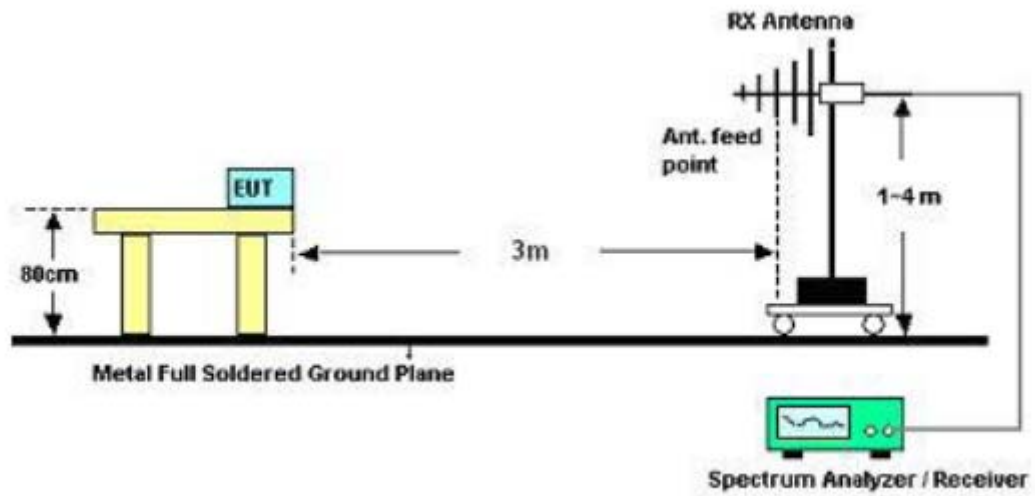
7. RADIATED EMISSION

7.1 MEASUREMENT PROCEDURE

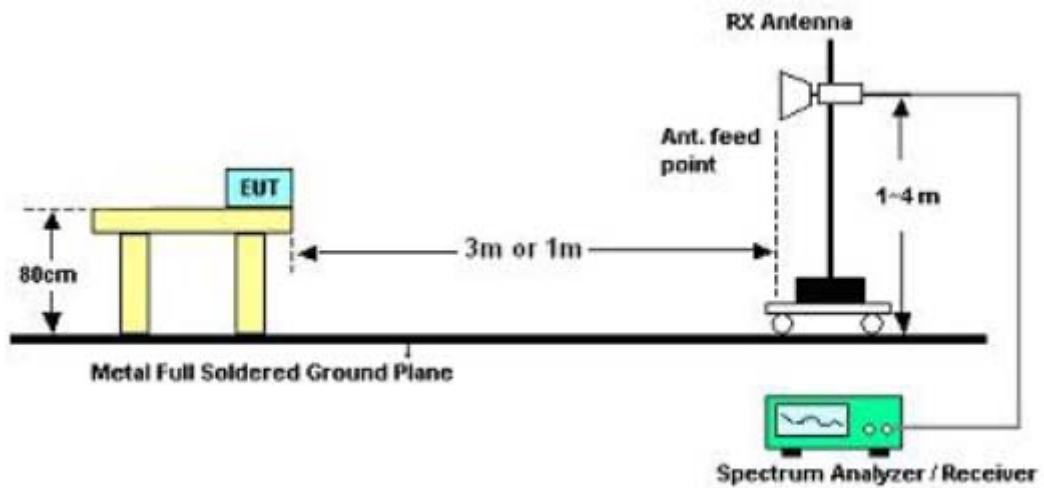
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1.5MHz VBW and RBW for peak reading. Then 1.5MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported for above 1GHz, and the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

7.2 TEST SETUP

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



7.3 LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

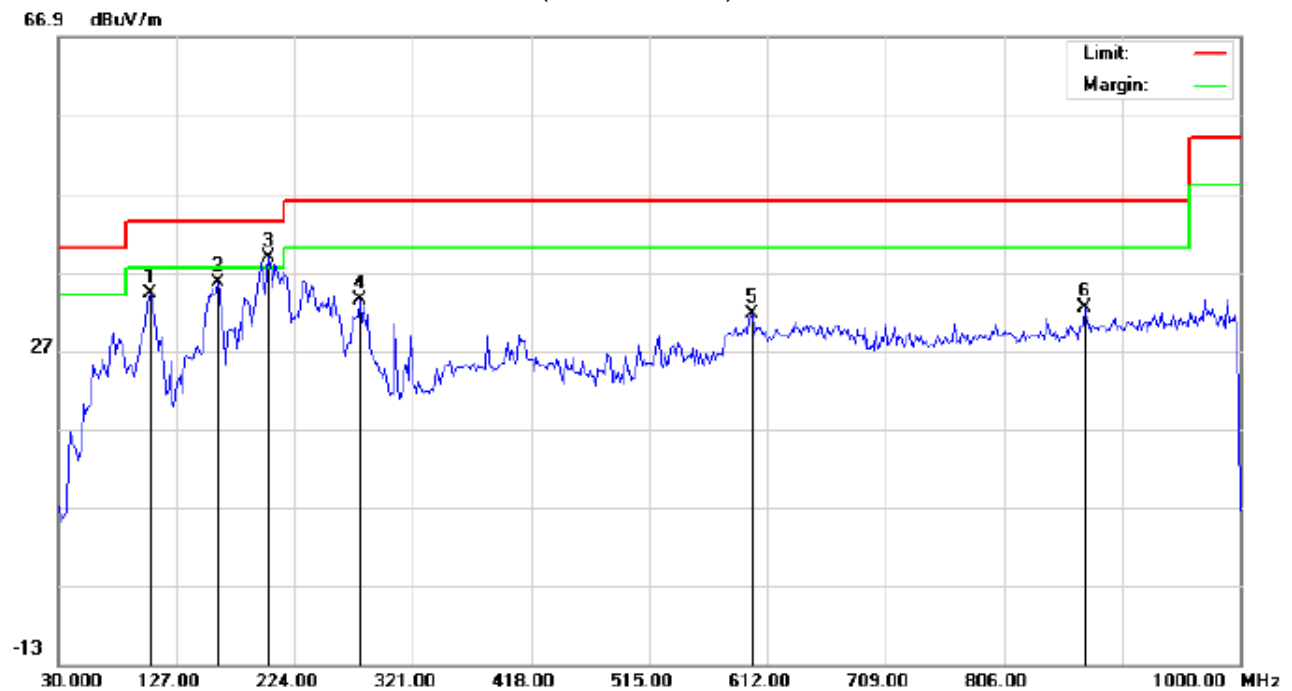
Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

7.4 TEST RESULT (Worst Modulation: GFSK)

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

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

Site: site #1

Polarization: *Horizontal*

Temperature: 24.6

Limit: FCC Class B 3M Radiation

Power:

Humidity: 57.5 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: SC-21

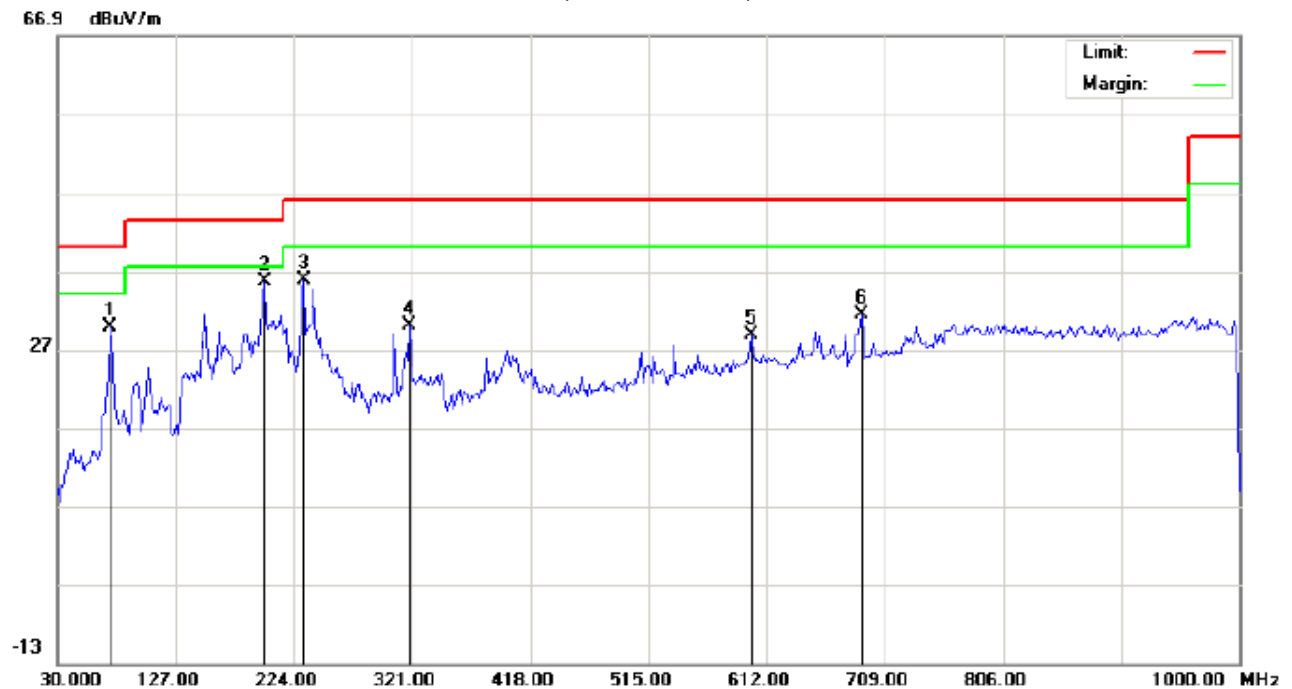
Mode: Low Channel TX

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		105.9833	23.38	10.89	34.27	43.50	-9.23	peak			
2		160.9500	20.55	15.13	35.68	43.50	-7.82	peak			
3	*	202.9833	26.77	12.11	38.88	43.50	-4.62	peak			
4		277.3500	18.63	14.73	33.36	46.00	-12.64	peak			
5		599.0667	7.87	23.71	31.58	46.00	-14.42	peak			
6		872.2833	4.50	27.89	32.39	46.00	-13.61	peak			

RESULT: PASS

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



Site: site #1

Polarization: **Vertical**

Temperature: 24.6

Limit: FCC Class B 3M Radiation

Power:

Humidity: 57.5 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: SC-21

Mode: Low Channel TX

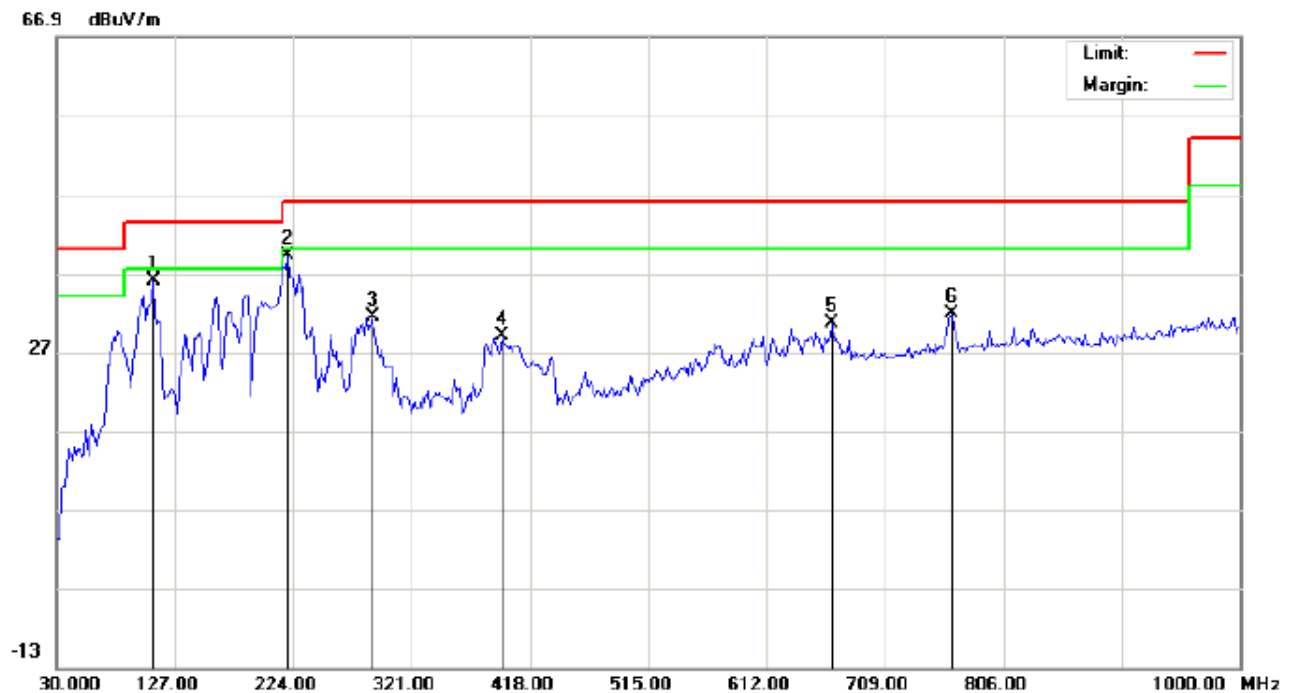
Note:

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		73.6500	26.37	3.36	29.73	40.00	-10.27	peak			
2	*	199.7500	26.52	9.06	35.58	43.50	-7.92	peak			
3		232.0833	23.67	12.14	35.81	46.00	-10.19	peak			
4		319.3833	13.24	16.70	29.94	46.00	-16.06	peak			
5		599.0667	6.10	22.73	28.83	46.00	-17.17	peak			
6		689.6000	6.53	24.91	31.44	46.00	-14.56	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: 23.8

Limit: FCC Class B 3M Radiation

Power:

Humidity: 57.5 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: SC-21

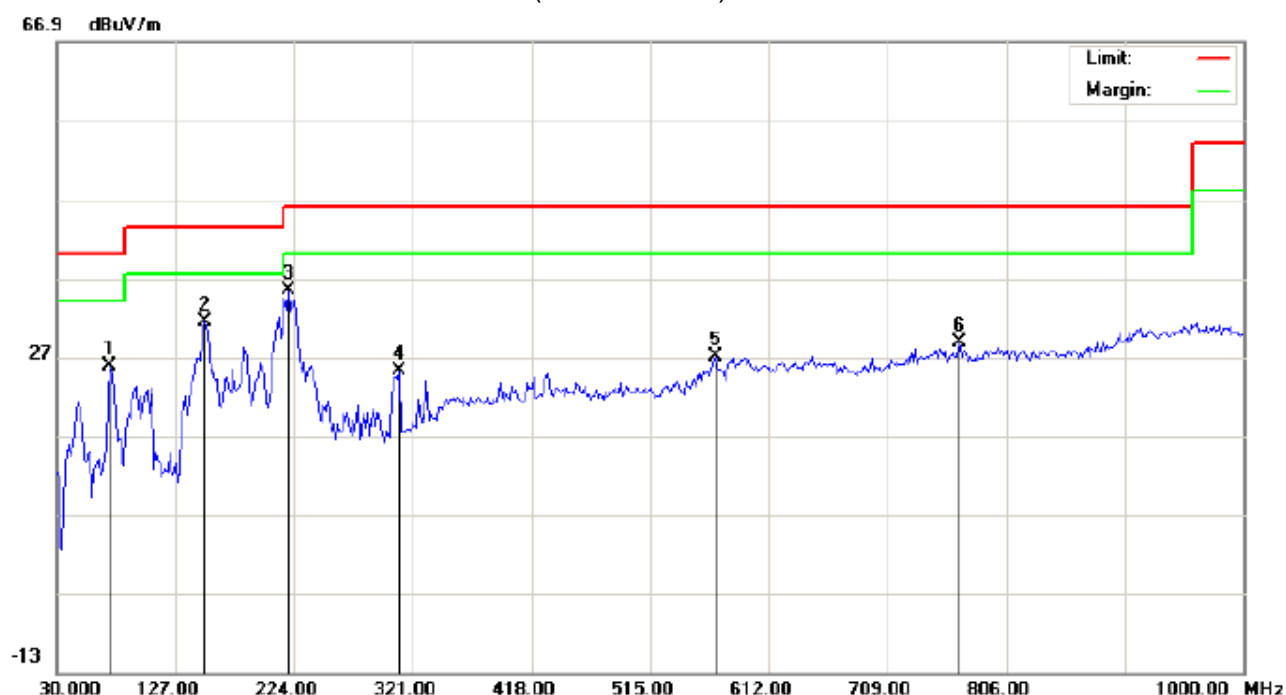
Mode: Middle Channel TX

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		109.2167	24.93	11.12	36.05	43.50	-7.45	peak			
2	*	219.1500	26.40	12.73	39.13	46.00	-6.87	peak			
3		288.6667	16.29	15.07	31.36	46.00	-14.64	peak			
4		395.3667	9.92	19.04	28.96	46.00	-17.04	peak			
5		665.3500	6.36	24.26	30.62	46.00	-15.38	peak			
6		763.9666	4.90	26.82	31.72	46.00	-14.28	peak			

RESULT: PASS

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



Site: site #1 Polarization: **Vertical** Temperature: 23.8
Limit: FCC Class B 3M Radiation Power: Humidity: 57.5 %
EUT: Bluetooth Speaker Distance: 3m
M/N: SC-21
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		73.6500	22.39	3.36	25.75	40.00	-14.25	peak			
2		151.2500	16.18	15.27	31.45	43.50	-12.05	peak			
3	*	219.1500	24.60	10.88	35.48	46.00	-10.52	peak			
4		309.6832	9.17	16.05	25.22	46.00	-20.78	peak			
5		568.3500	4.43	22.57	27.00	46.00	-19.00	peak			
6		767.2000	1.93	26.87	28.80	46.00	-17.20	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

Polarization: *Horizontal*

Temperature: 23.8

Limit: FCC Class B 3M Radiation

Power:

Humidity: 57.5 %

EUT: Bluetooth Speaker

Distance: 3m

M/N: SC-21

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		81.7333	18.59	9.73	28.32	40.00	-11.68	peak			
2		148.0166	12.80	15.25	28.05	43.50	-15.45	peak			
3	*	222.3833	22.18	12.85	35.03	46.00	-10.97	peak			
4		272.5000	16.08	14.58	30.66	46.00	-15.34	peak			
5		421.2333	7.35	19.72	27.07	46.00	-18.93	peak			
6		676.6667	4.81	24.56	29.37	46.00	-16.63	peak			

RESULT: PASS

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



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Bluetooth Speaker
M/N: SC-21
Mode: High Channel TX
Note:

Polarization: **Vertical**
Power:
Distance: 3m

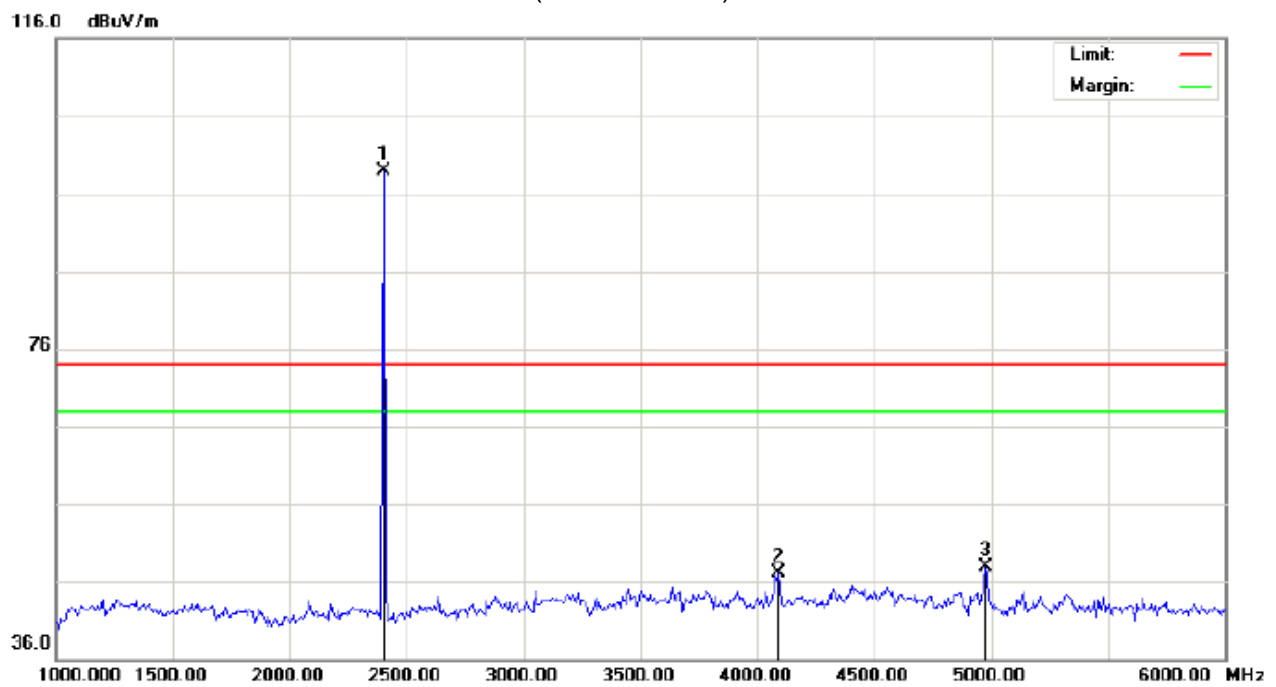
Temperature: 23.8
Humidity: 57.5 %

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		73.6500	22.15	3.36	25.51	40.00	-14.49	peak			
2		148.0166	15.28	15.25	30.53	43.50	-12.97	peak			
3	*	220.7667	25.83	11.04	36.87	46.00	-9.13	peak			
4		620.0833	4.80	23.18	27.98	46.00	-18.02	peak			
5		759.1167	2.78	26.76	29.54	46.00	-16.46	peak			
6		915.9333	0.98	29.05	30.03	46.00	-15.97	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 ABOVE 1GHZ**RADIATED EMISSION TEST- (ABOVE 1GHZ)-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: SC-21

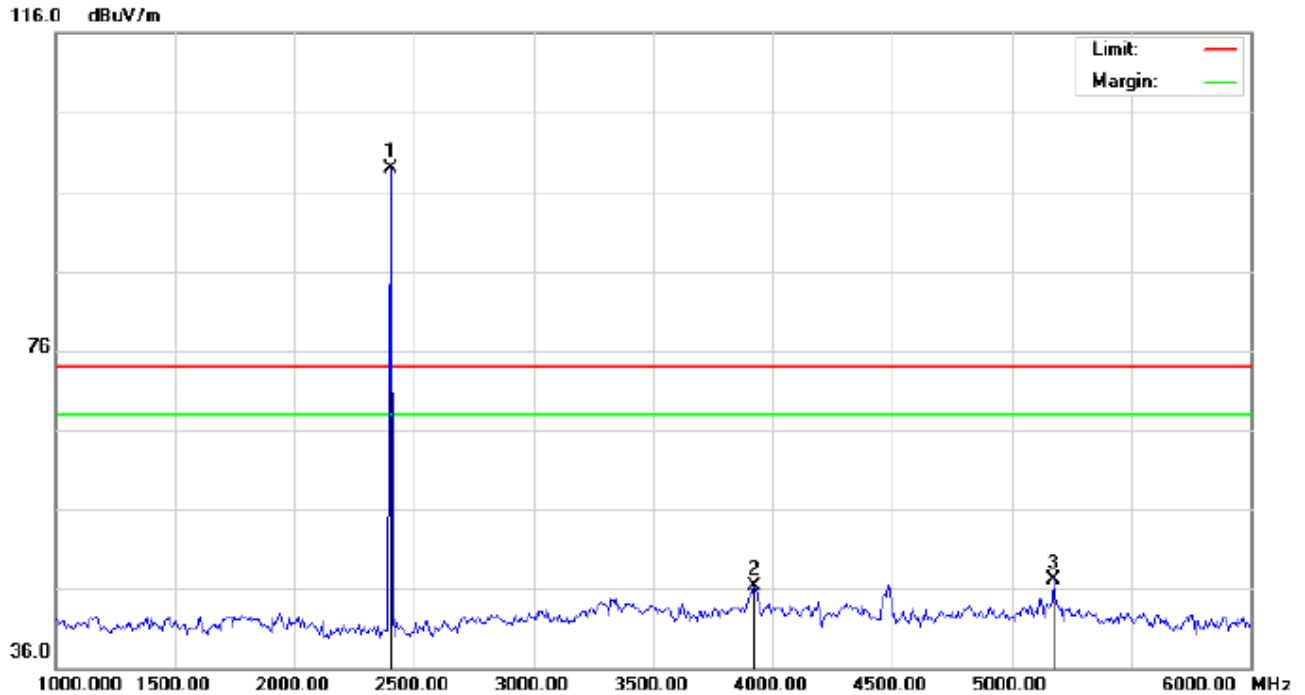
Mode: Low Channel TX

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	88.61	10.32	98.93	74.00	24.93	peak			
2		4091.667	33.42	13.67	47.09	74.00	-26.91	peak			
3		4975.000	39.81	8.13	47.94	74.00	-26.06	peak			

RESULT: PASS

RADIATED EMISSION TEST-(ABOVE 1GHZ)-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: SC-21

Mode: Low Channel TX

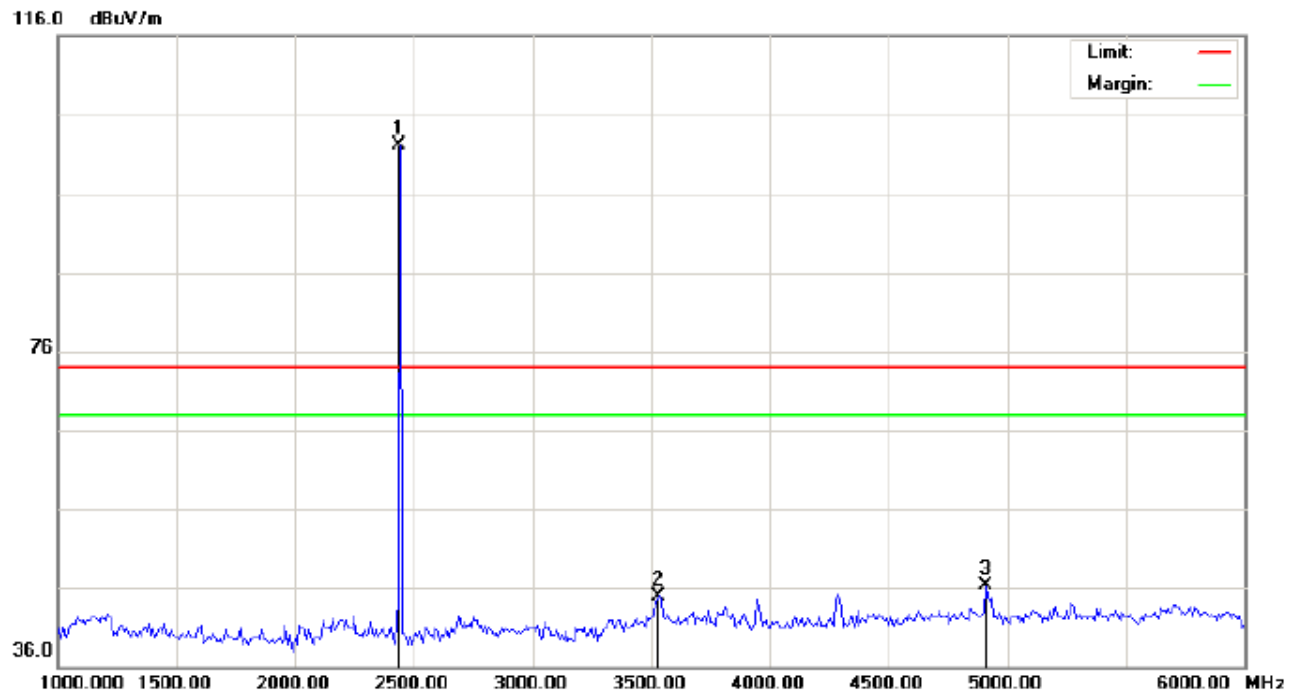
Note:

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	88.67	10.32	98.99	74.00	24.99	peak			
2		3925.000	31.67	14.73	46.40	74.00	-27.60	peak			
3		5175.000	42.33	4.70	47.03	74.00	-26.97	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-(ABOVE 1GHZ)-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: SC-21

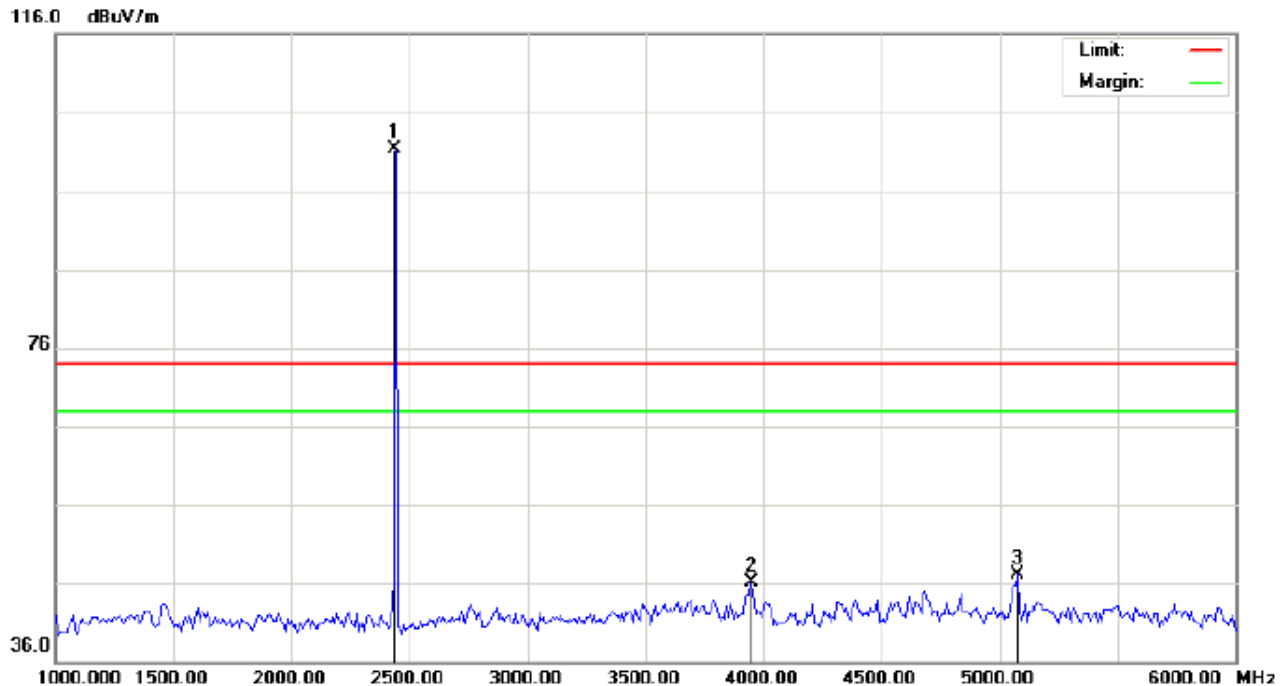
Mode: Middle Channel TX

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	91.73	10.36	102.09	74.00	28.09	peak			
2		3533.333	32.68	12.32	45.00	74.00	-29.00	peak			
3		4908.333	38.37	7.96	46.33	74.00	-27.67	peak			

RESULT: PASS

RADIATED EMISSION TEST-(ABOVE 1GHZ)-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: SC-21

Mode: Middle Channel TX

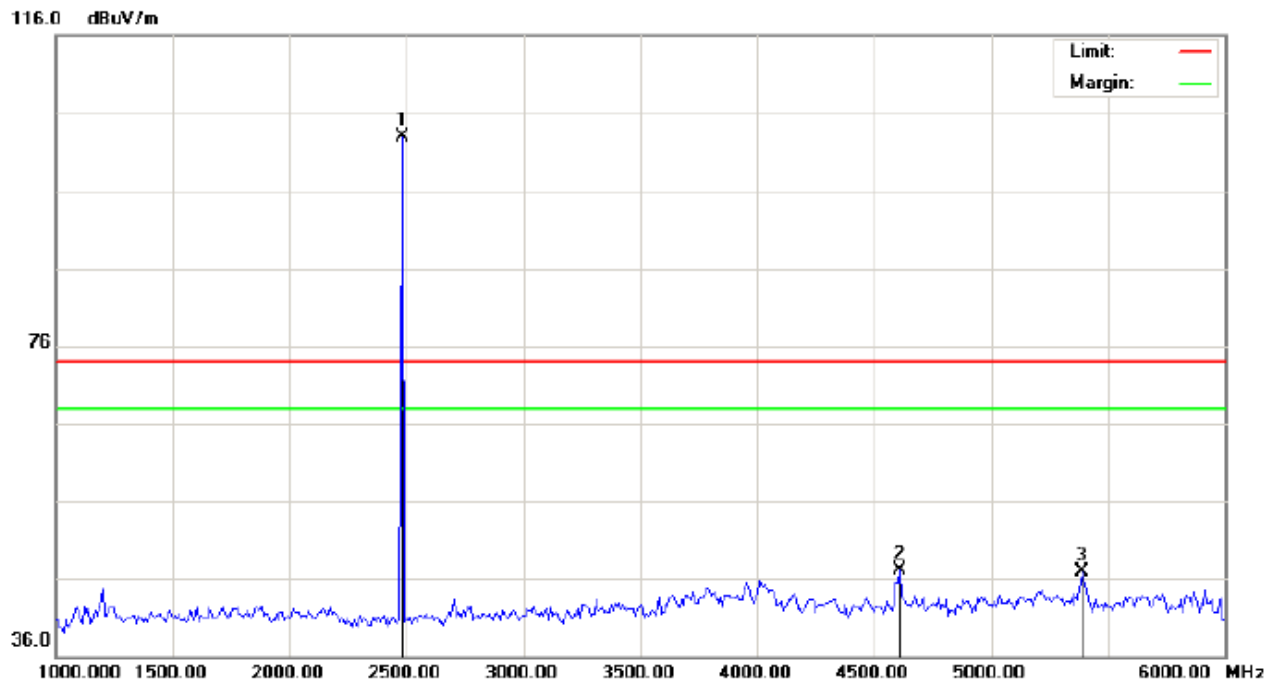
Note:

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	90.89	10.36	101.25	74.00	27.25	peak			
2		3950.000	31.24	14.88	46.12	74.00	-27.88	peak			
3		5075.000	40.32	6.70	47.02	74.00	-26.98	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-(ABOVE 1GHZ)-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: SC-21

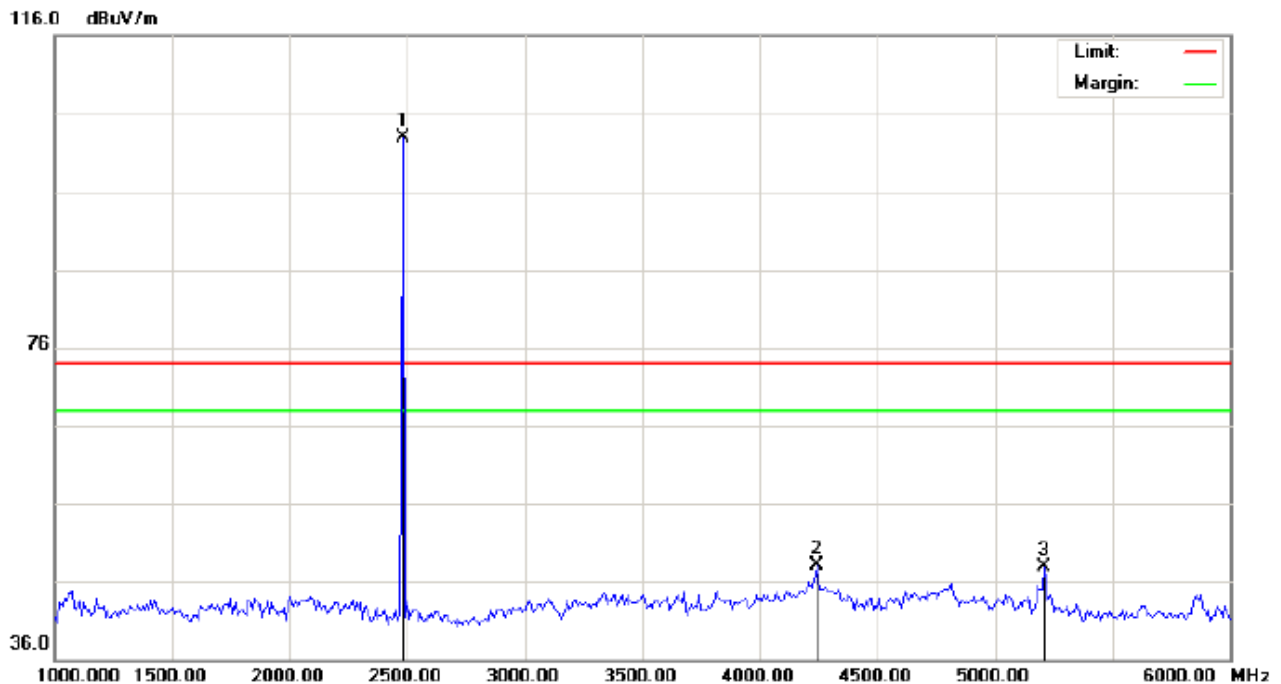
Mode: High Channel TX

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	92.43	10.41	102.84	74.00	28.84	peak			
2		4608.333	40.00	7.17	47.17	74.00	-26.83	peak			
3		5391.667	46.45	0.36	46.81	74.00	-27.19	peak			

RESULT: PASS

RADIATED EMISSION TEST-(ABOVE 1GHZ)-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: SC-21

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	92.47	10.41	102.88	74.00	28.88	peak			
2		4241.667	36.97	11.18	48.15	74.00	-25.85	peak			
3		5208.333	43.80	4.03	47.83	74.00	-26.17	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.

8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

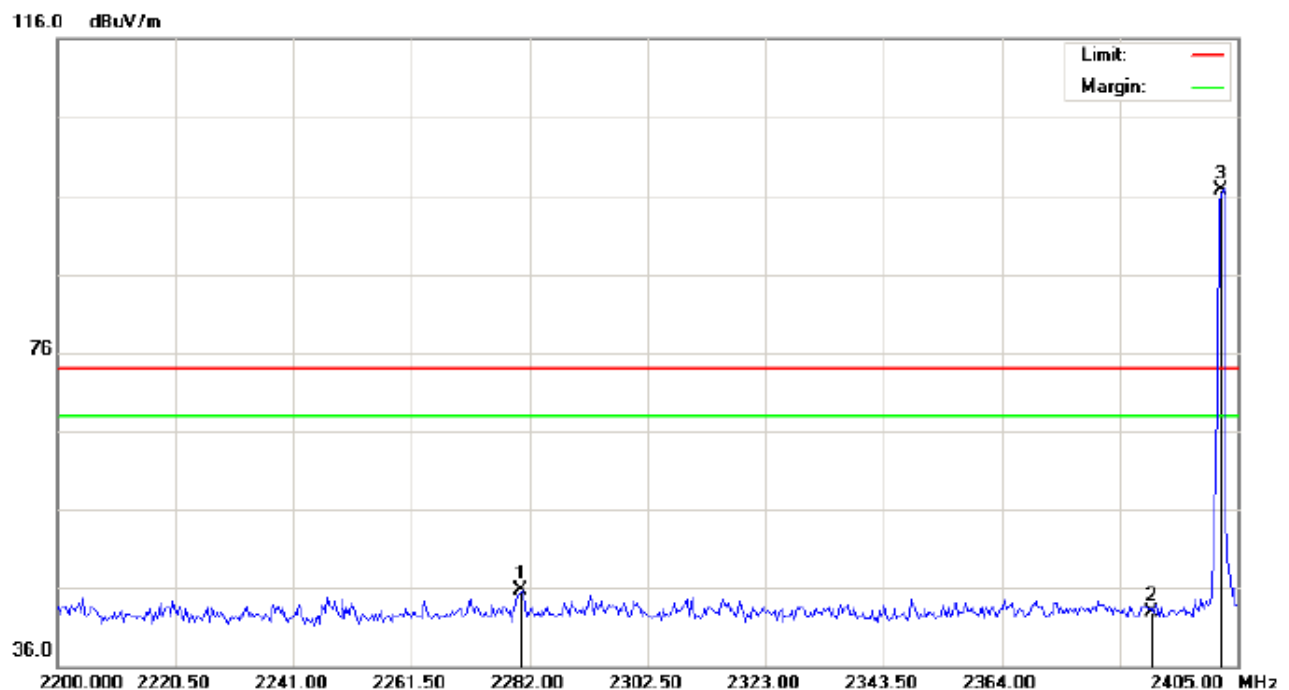
1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency=Operation Frequency, $RBW \geq 100\text{kHz}$, $VBW \geq 3 \times RBW$,
Center frequency =Operation frequency
3. The band edges was measured and recorded.

8.2. TEST SET-UP

Radiated same as 7.2

8.3. TEST RESULT

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:

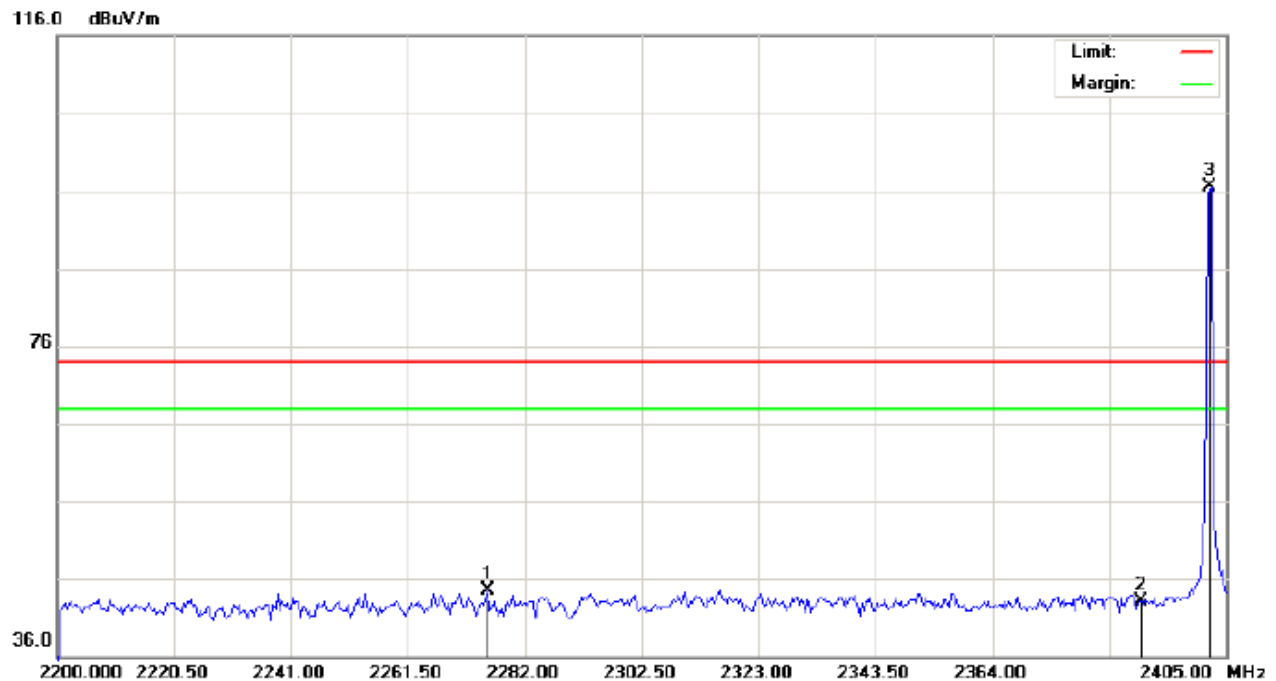
M/N: SC-21

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		2280.633	35.45	10.19	45.64	74.00	-28.36	peak			
2		2390.000	32.62	10.31	42.93	74.00	-31.07	peak			
3	*	2402.000	86.41	10.32	96.73	74.00	22.73	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: SC-21

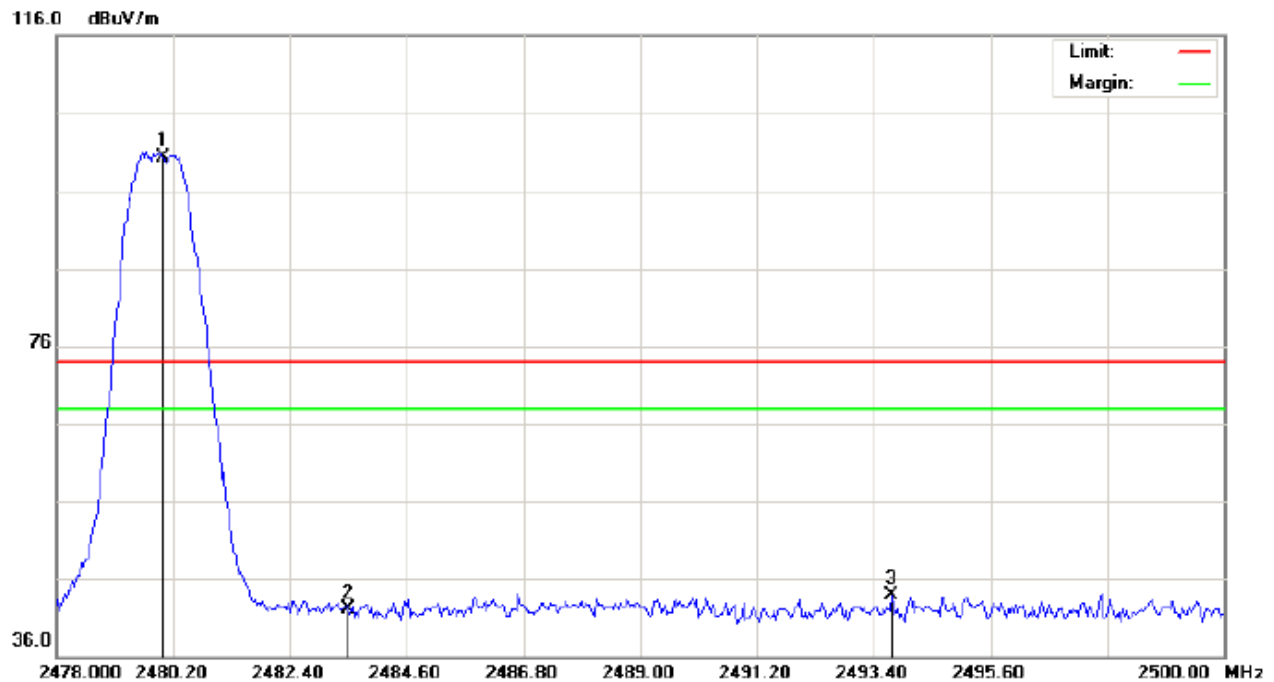
Mode: Low Channel TX

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		2275.508	34.29	10.18	44.47	74.00	-29.53	peak			
2		2390.000	32.85	10.31	43.16	74.00	-30.84	peak			
3	*	2402.000	86.26	10.32	96.58	74.00	22.58	peak			

RESULT: PASS

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:

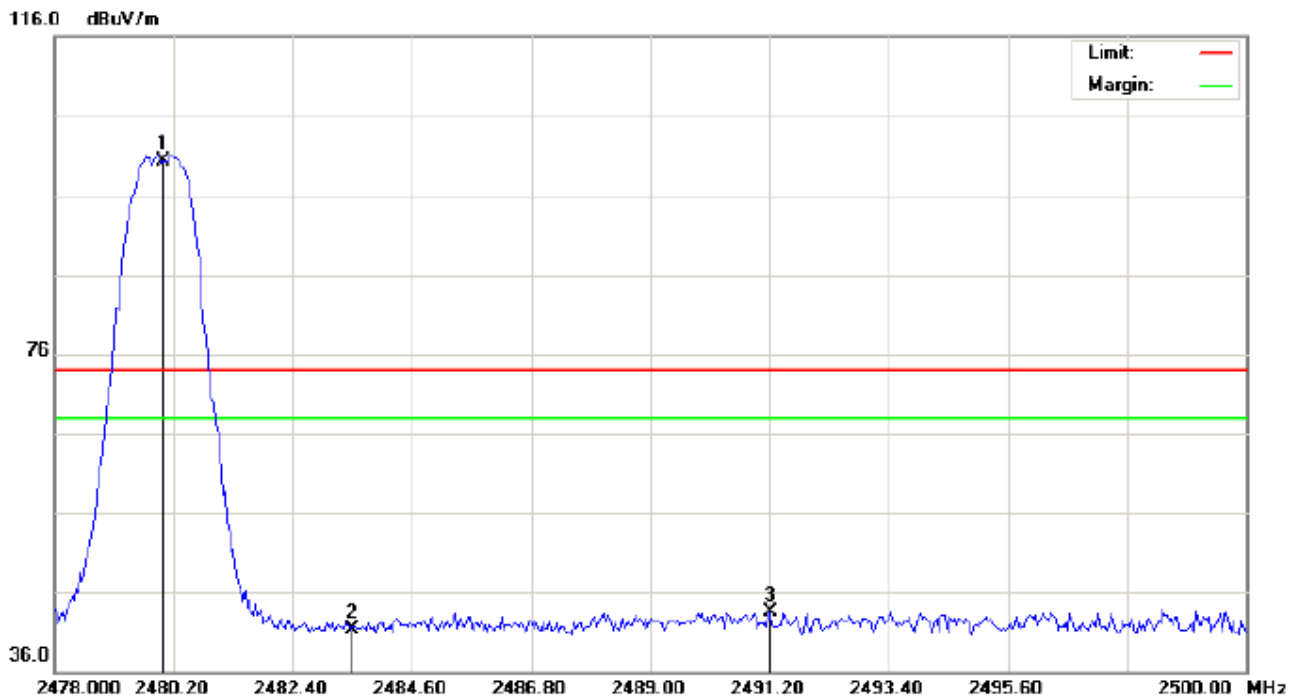
M/N: SC-21

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	89.96	10.41	100.37	74.00	26.37	peak			
2		2483.500	31.75	10.41	42.16	74.00	-31.84	peak			
3		2493.730	33.49	10.42	43.91	74.00	-30.09	peak			

TEST PLOT OF BAND EDGE FOR 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: SC-21

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	89.85	10.41	100.26	74.00	26.26	peak			
2		2483.500	30.87	10.41	41.28	74.00	-32.72	peak			
3		2491.200	33.09	10.42	43.51	74.00	-30.49	peak			

RESULT: PASS

9. 20DB BANDWIDTH

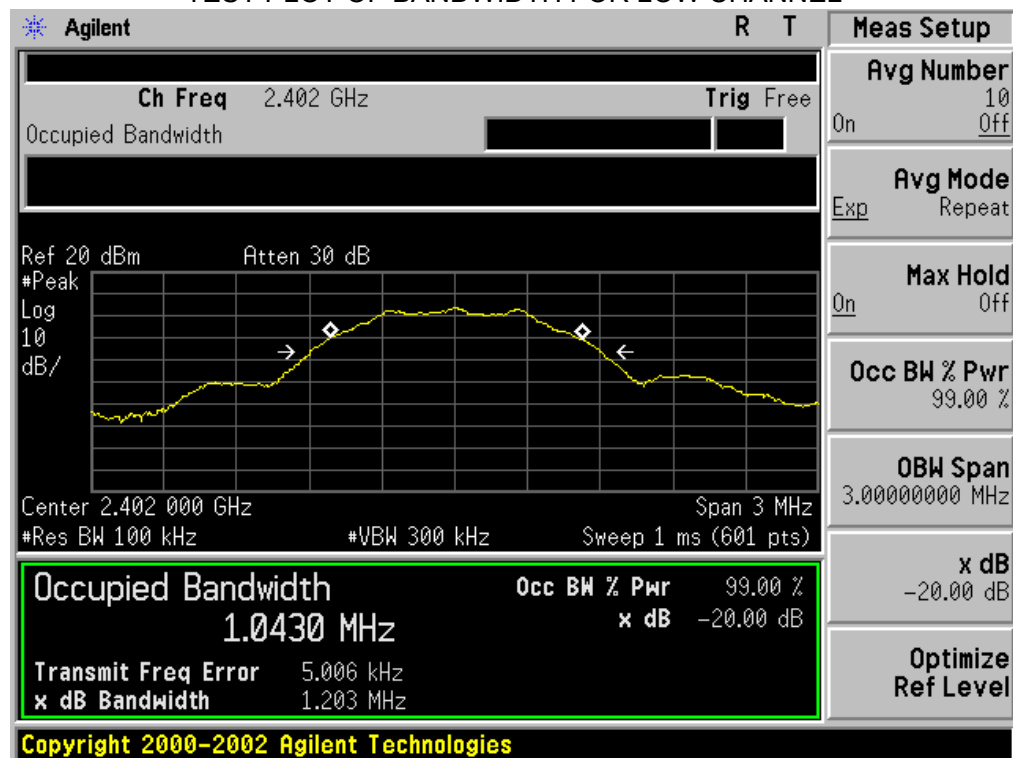
9.1. TEST PROCEDURE

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 SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW \geq 3*RBW.
4. Set SPA Trace 1 Max hold, then View.

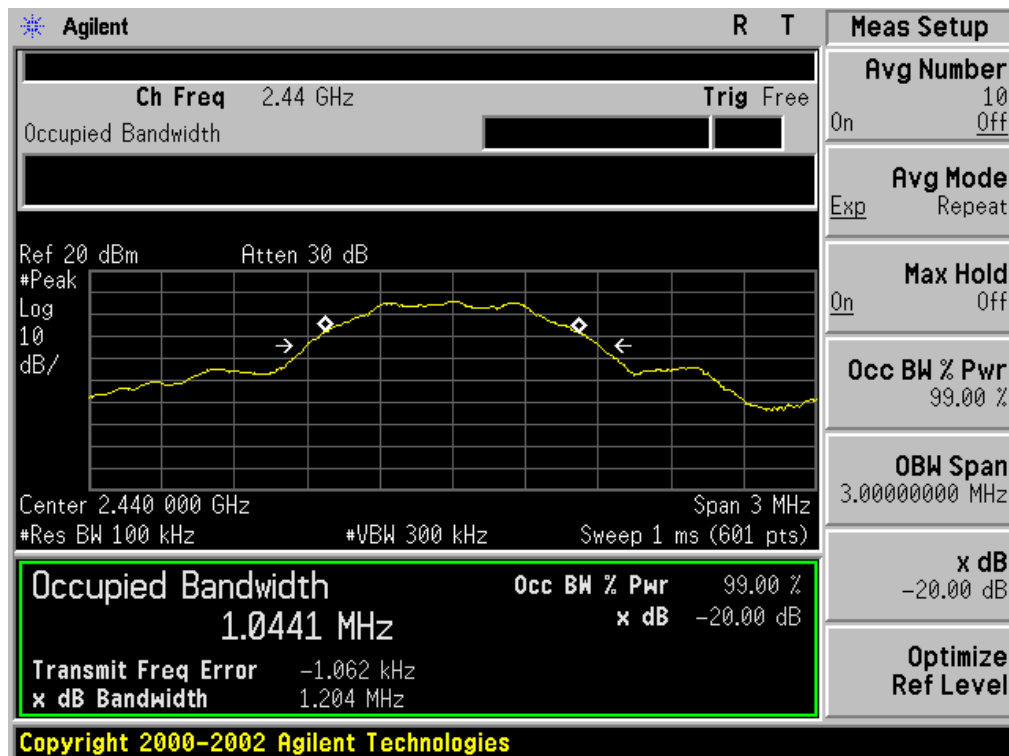
9.2. SUMMARY OF TEST RESULTS/PLOTS

Channel	20dB Bandwidth (MHz)	Minimum Limit (KHz)	Pass/Fail
Low	1.203	500KHz	Pass
Middle	1.204		Pass
High	1.205		Pass

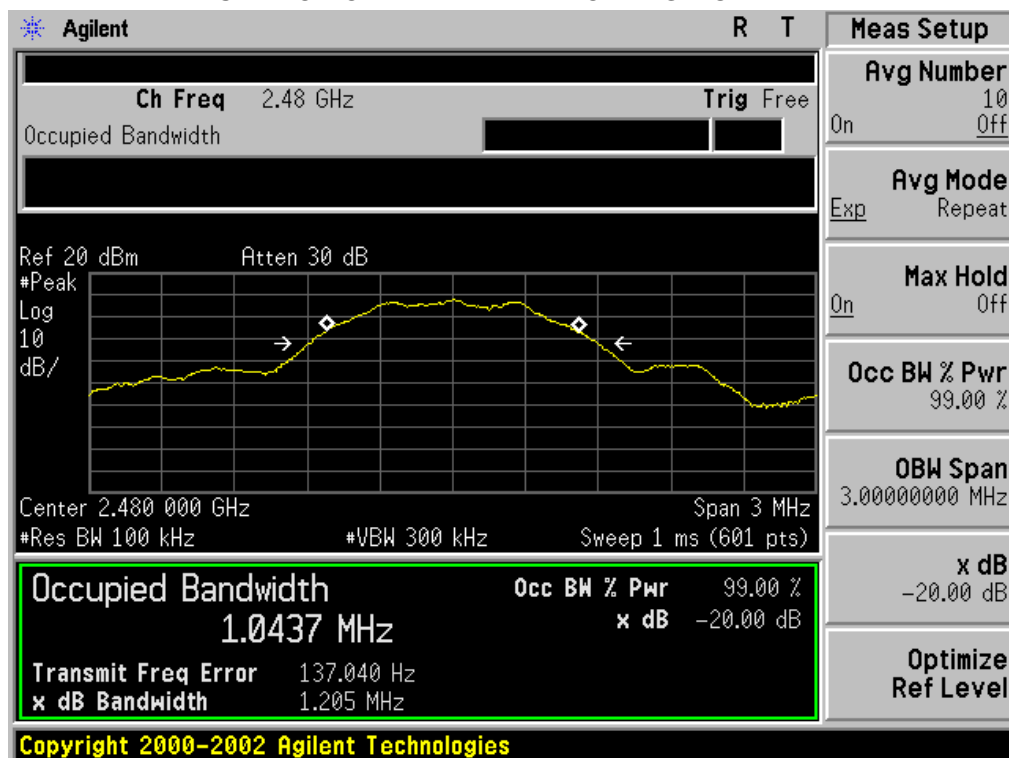
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



10. CONDUCTED OUTPUT POWER

10.1. MEASUREMENT PROCEDURE

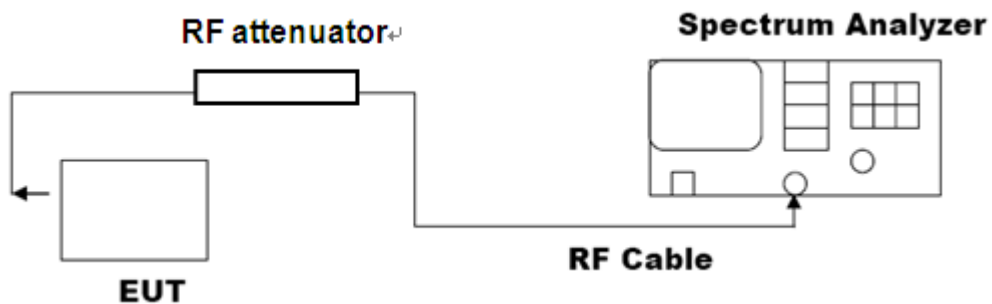
For peak power test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
3. Use the following spectrum analyzer settings:
 - a) Set the RBW \geq DTS bandwidth.
 - b) Set VBW ≥ 3 RBW.
 - c) Set span $\geq 3 \times$ RBW
 - d) Sweep time = auto couple.
 - e) Detector = peak.
 - f) Trace mode = max hold.
 - g) Allow trace to fully stabilize.
 - h) Use peak marker function to determine the peak amplitude level.
4. Allow the trace to stabilize.
5. Record the result form the Spectrum Analyzer.

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

10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

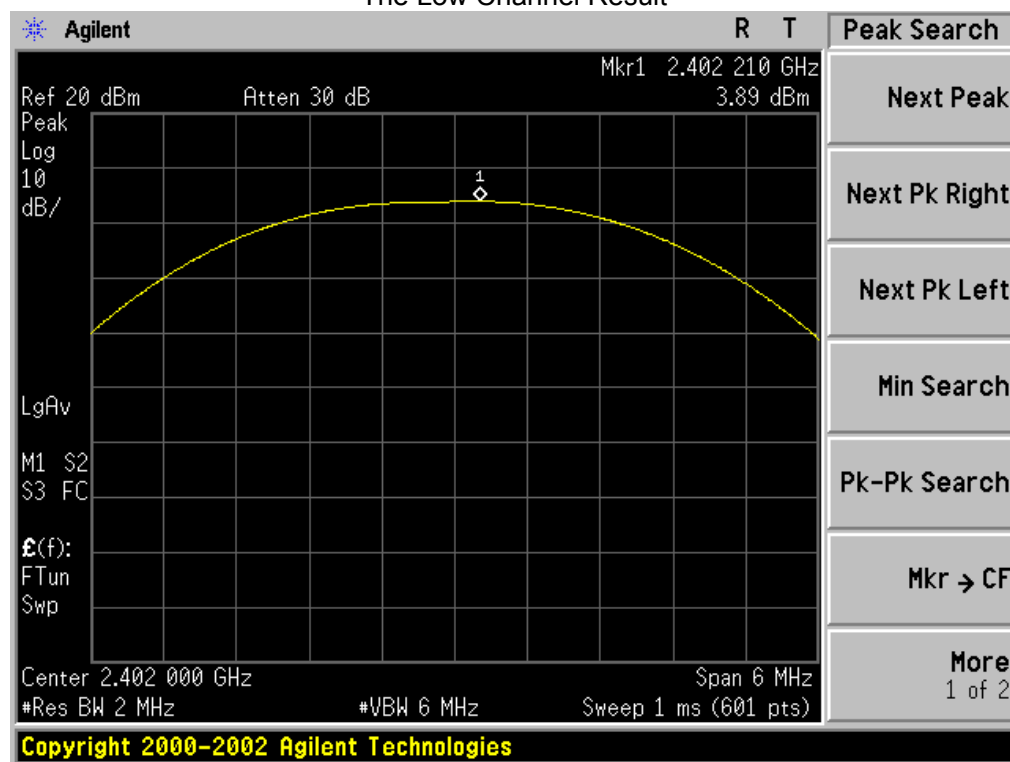
Setup Diagram for Peak Power



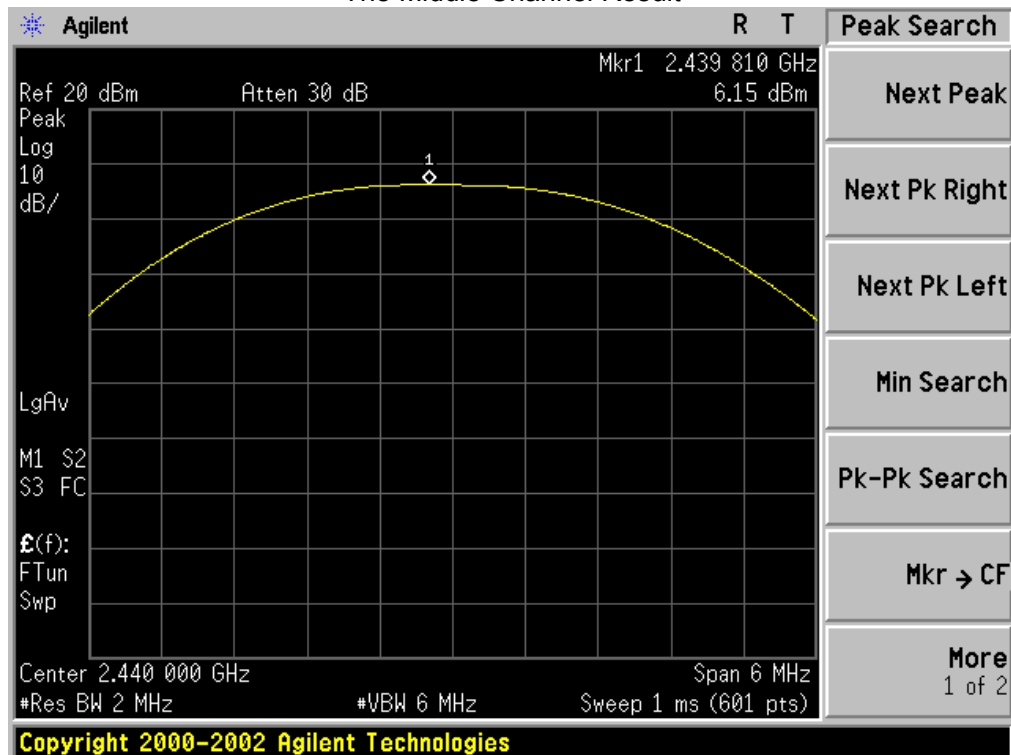
10.3. LIMITS AND MEASUREMENT RESULT

Channel	Peak Power (dBm)	Applicable Limits (dBm)	Pass/Fail
Low Channel	3.89	30	Pass
Middle Channel	6.15	30	Pass
High Channel	7.76	30	Pass

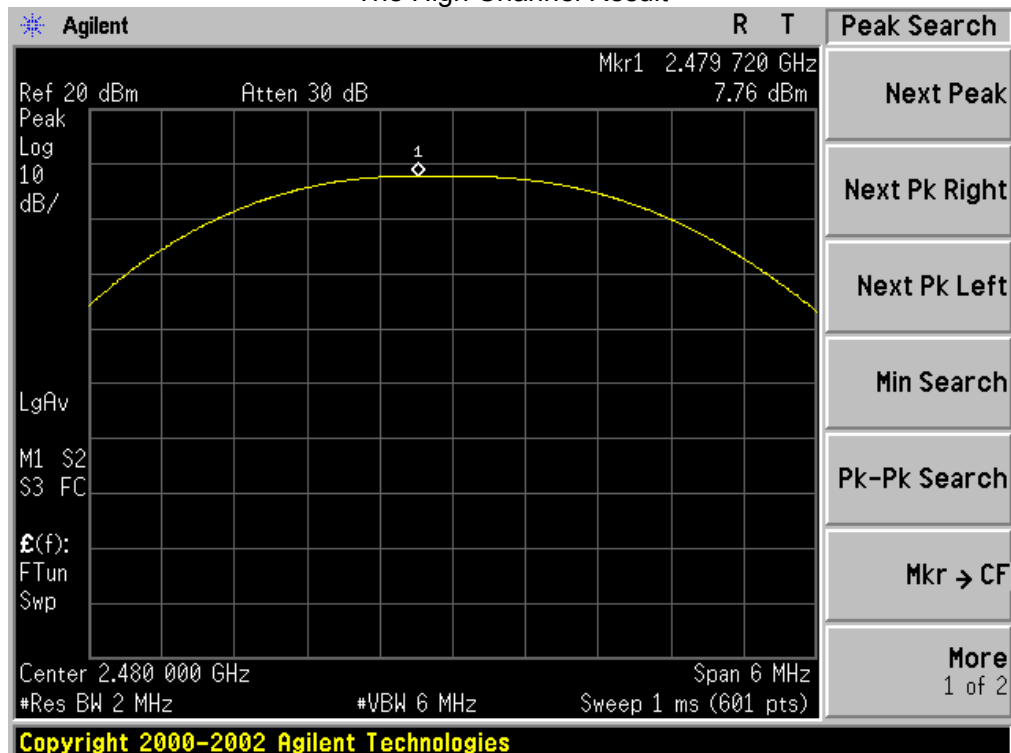
The Low Channel Result



The Middle Channel Result



The High Channel Result



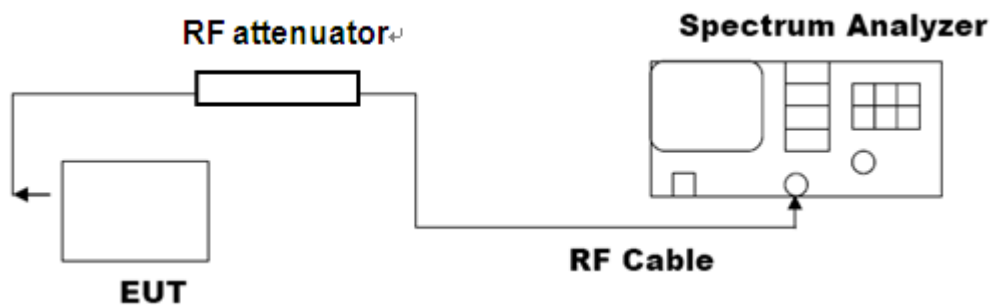
11. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

11.1 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 $\geq 3 \times \text{RBW}$
- (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.

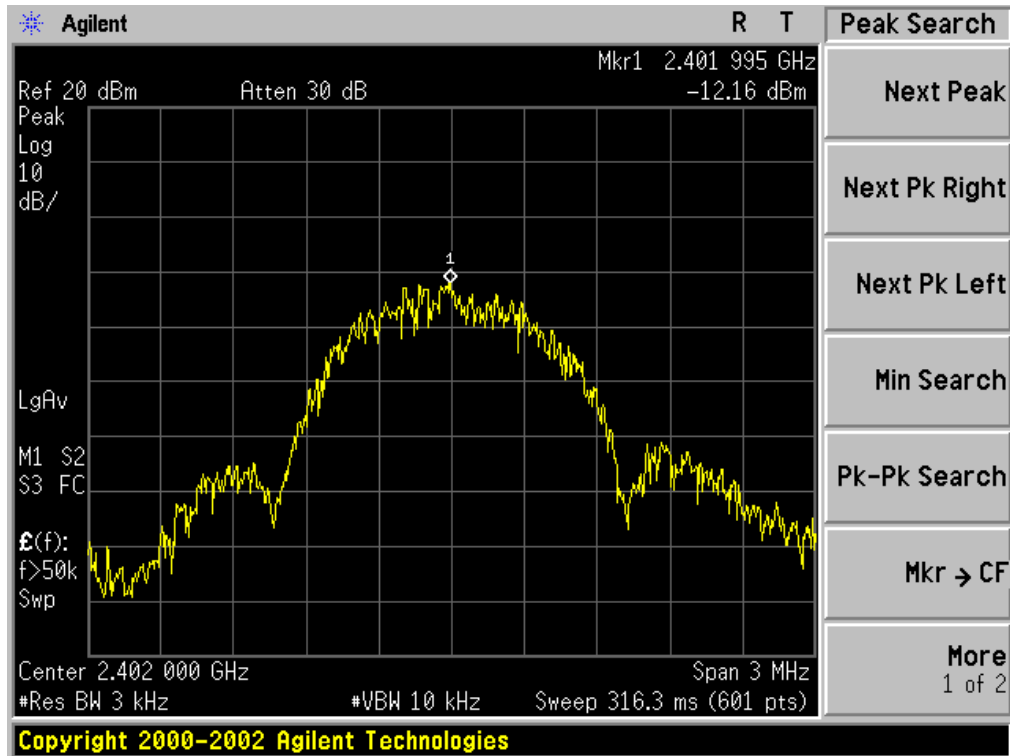
11.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



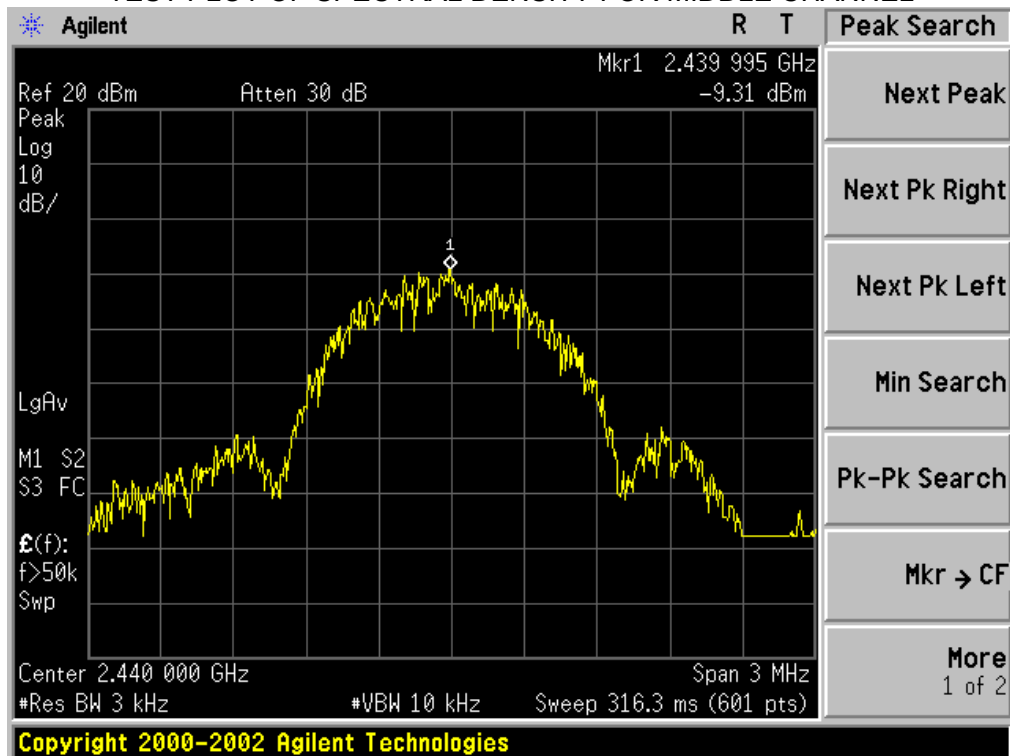
11.3 LIMITS AND MEASUREMENT RESULT

Channel No.	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
Low Channel	-12.16	8	Pass
Middle Channel	-9.31	8	Pass
High Channel	-7.68	8	Pass

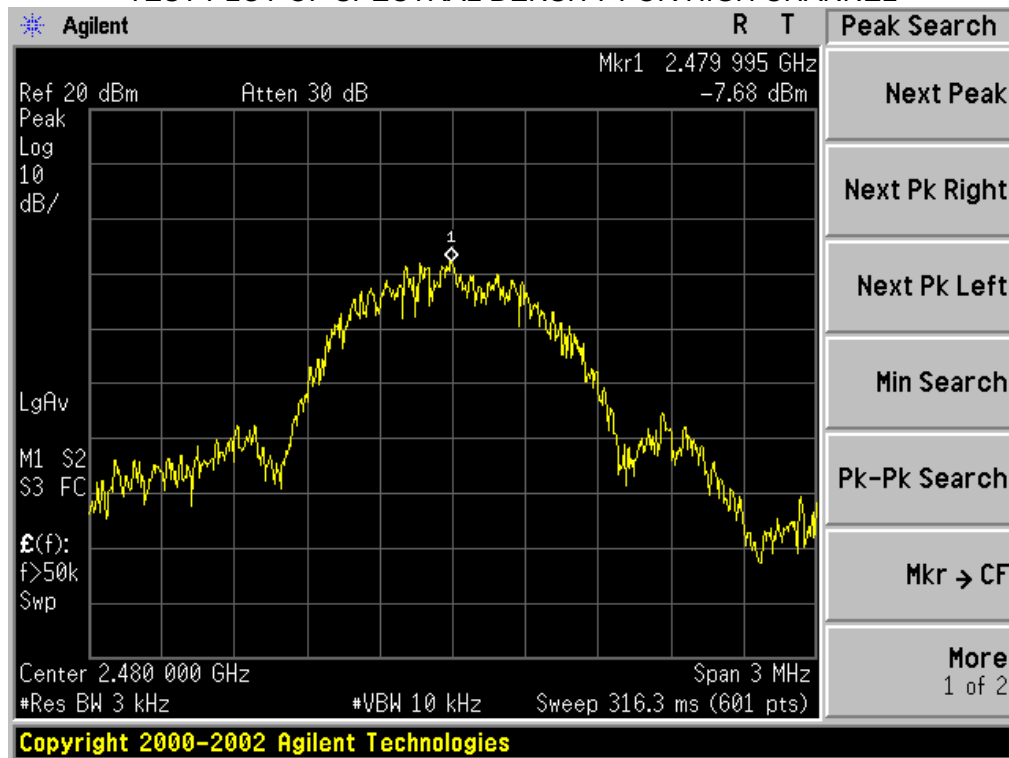
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



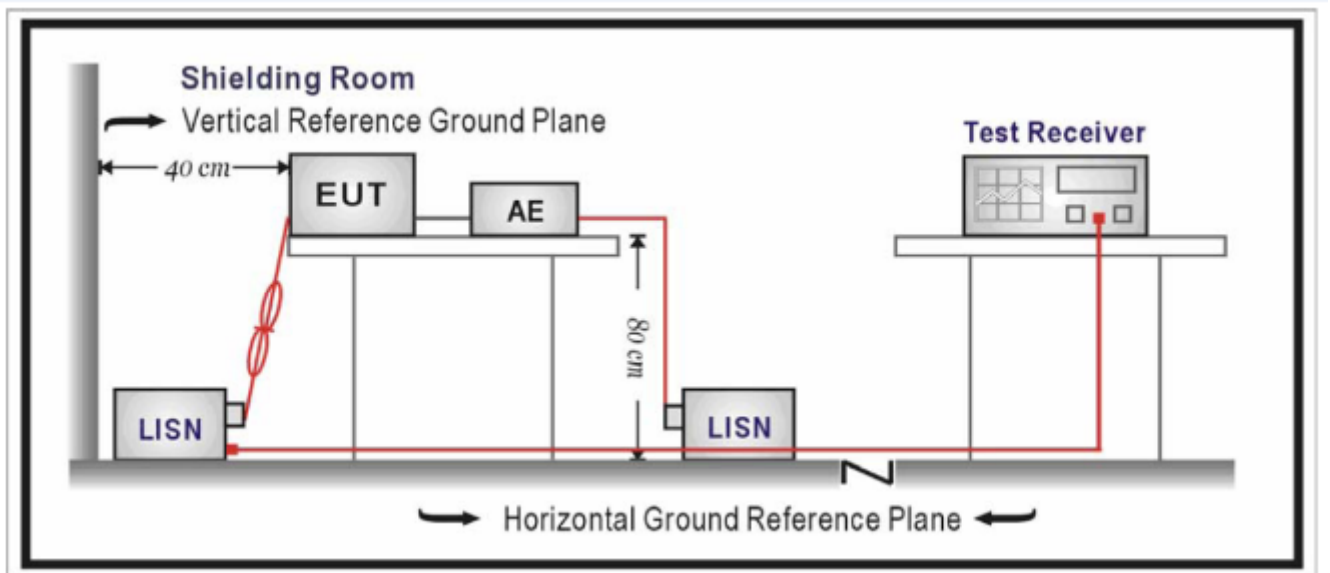
12. FCC LINE CONDUCTED EMISSION TEST

12.1 LIMITS

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

****Note:** 1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

12.2 TEST SETUP



12.3 PRELIMINARY PROCEDURE

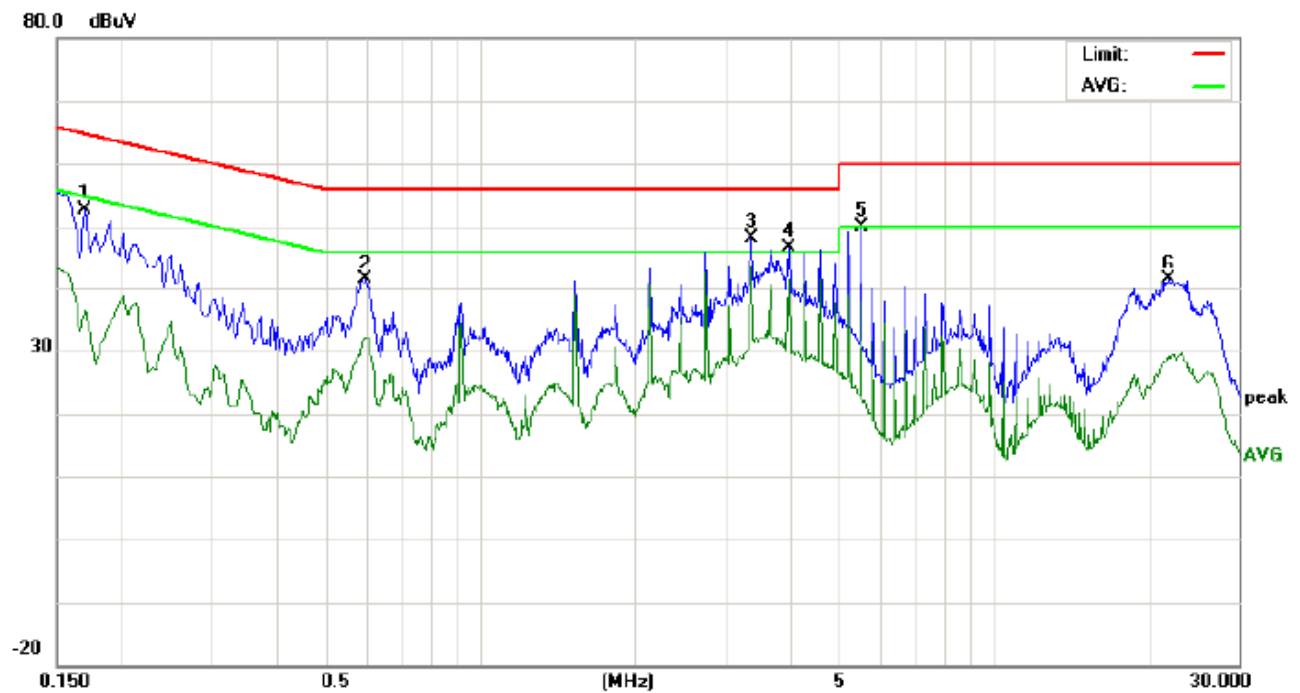
- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per ANSI C63.4.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- 4) All support equipments received AC120V/60Hz power from a LISN, if any.
- 5) The EUT received power by PC which received power by a LISN.
- 6) The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test.
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4 FINAL TEST PROCEDURE

- 10) EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 11) 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 12) 3) The test data of the worst case condition(s) was reported on the Summary Data page.

12.5 TEST RESULT OF POWER LINE

Line Conducted Emission Test Line 1-L



Site: Conduction

Phase: **L1**

Temperature: 23.3

Limit: FCC Class B Conduction(QP)

Power:

Humidity: 54.1 %

EUT: Bluetooth Speaker

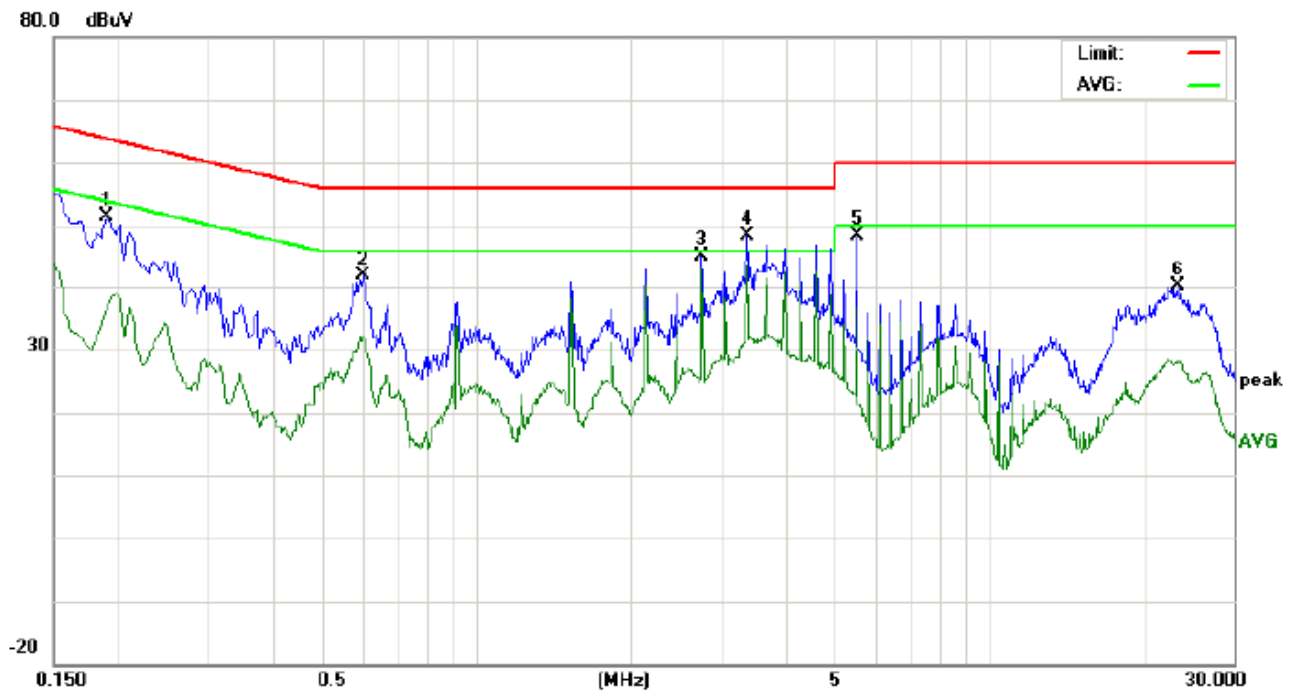
M/N: SC-21

Mode: BT Link with charging

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	0.1700	42.44		26.27	10.18	52.62		36.45	64.96	54.96	-12.34	-18.51	P	
2	0.5980	31.09		21.74	10.31	41.40		32.05	56.00	46.00	-14.60	-13.95	P	
3	3.3740	37.48		33.23	10.52	48.00		43.75	56.00	46.00	-8.00	-2.25	P	
4	3.9860	36.25		30.84	10.43	46.68		41.27	56.00	46.00	-9.32	-4.73	P	
5	5.5180	39.69		27.53	10.25	49.94		37.78	60.00	50.00	-10.06	-12.22	P	
6	21.9460	31.22		18.93	10.12	41.34		29.05	60.00	50.00	-18.66	-20.95	P	

Line Conducted Emission Test Line 2-N



Site: Conduction Phase: **N** Temperature: 23.3
Limit: FCC Class B Conduction(QP) Power: Humidity: 54.1 %
EUT: Bluetooth Speaker
M/N: SC-21
Mode: BT Link with charging
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	0.1900	41.14		26.55	10.20	51.34		36.75	64.03	54.03	-12.69	-17.28	P	
2	0.6020	31.55		21.54	10.31	41.86		31.85	56.00	46.00	-14.14	-14.15	P	
3	2.7620	34.64		32.38	10.49	45.13		42.87	56.00	46.00	-10.87	-3.13	P	
4	3.3740	37.82		33.17	10.52	48.34		43.69	56.00	46.00	-7.66	-2.31	P	
5	5.5220	38.16		26.39	10.25	48.41		36.64	60.00	50.00	-11.59	-13.36	P	
6	23.3580	30.00		18.24	10.11	40.11		28.35	60.00	50.00	-19.89	-21.65	P	

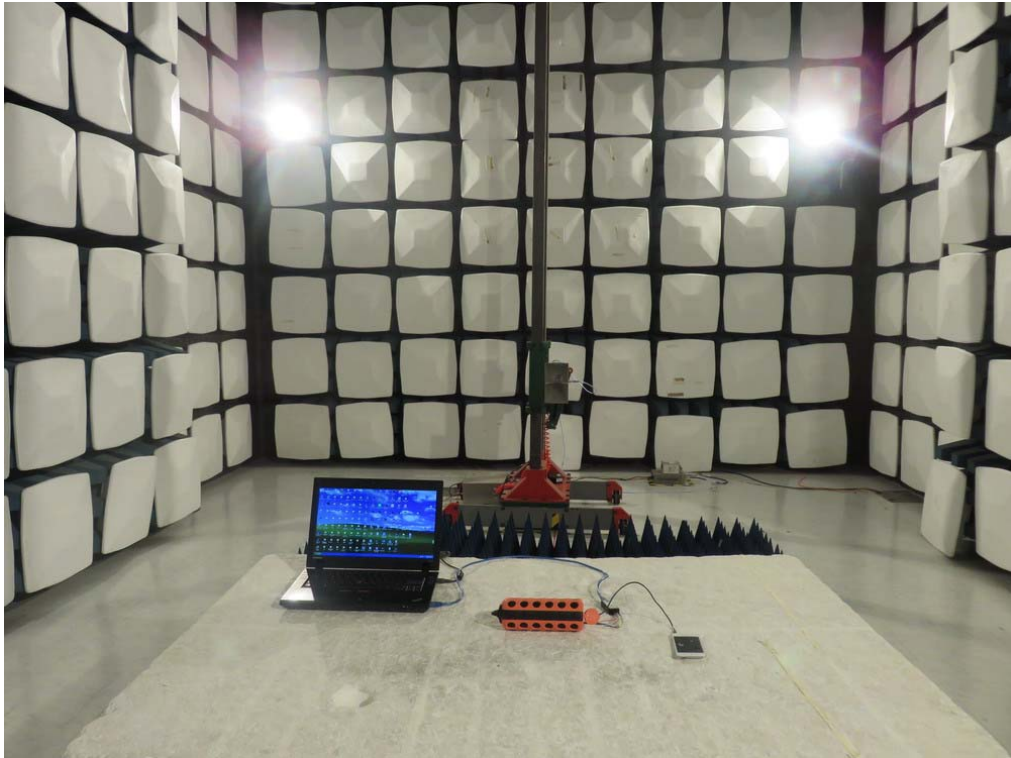
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP





APPENDIX B: PHOTOGRAPHS OF EUT

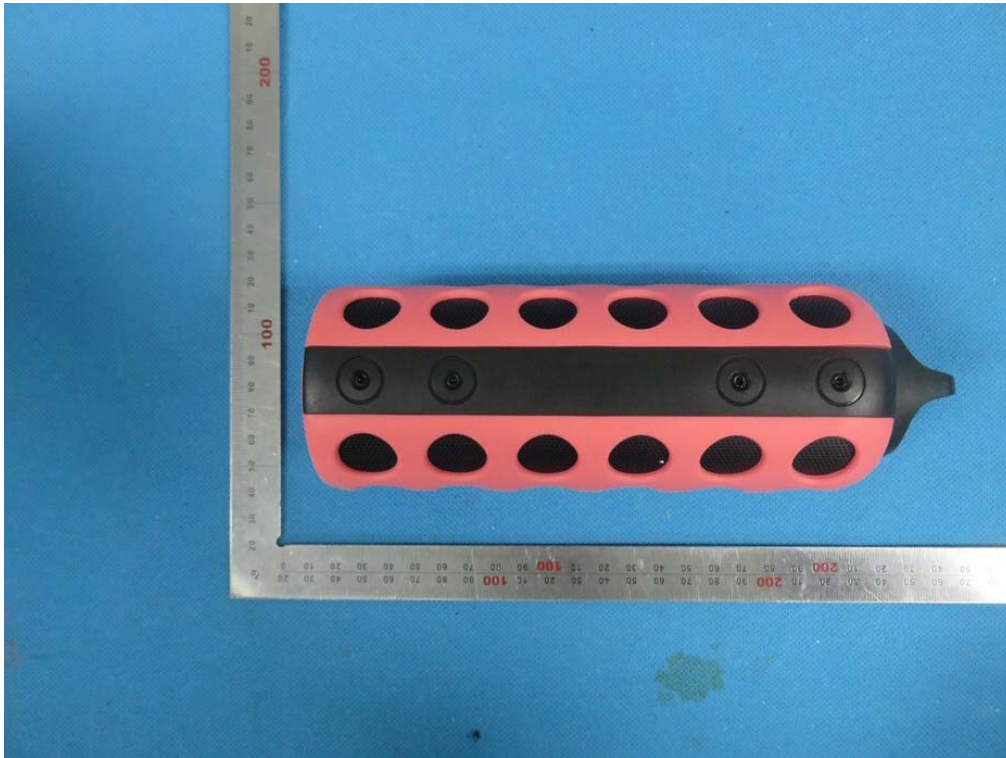
TOTAL VIEW OF EUT



TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



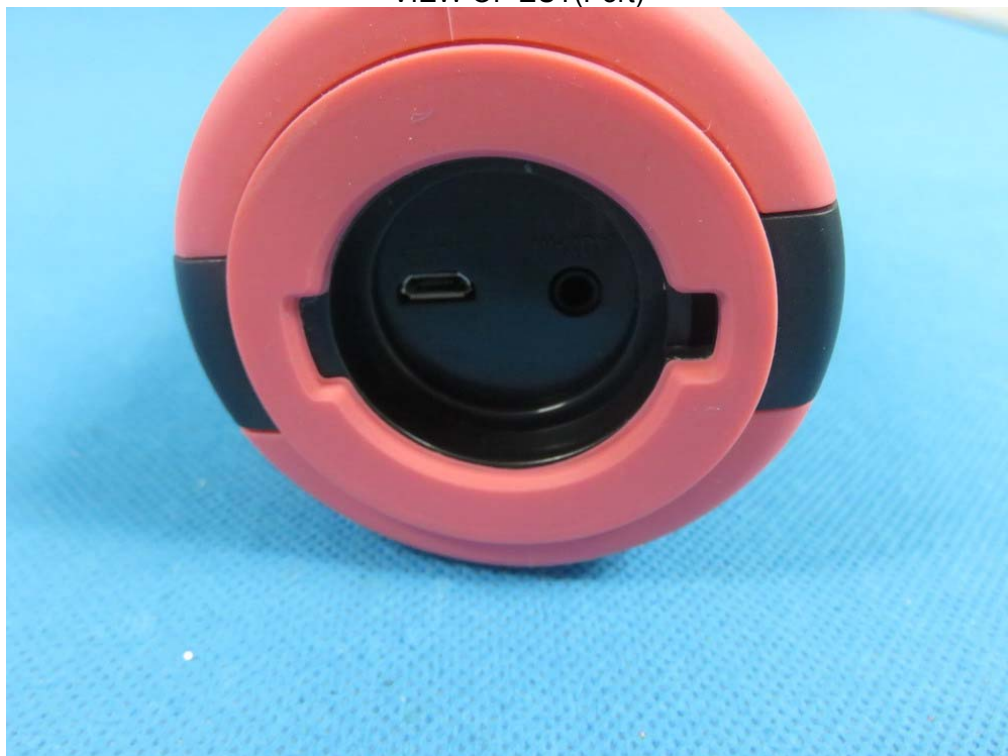
LEFT VIEW OF EUT



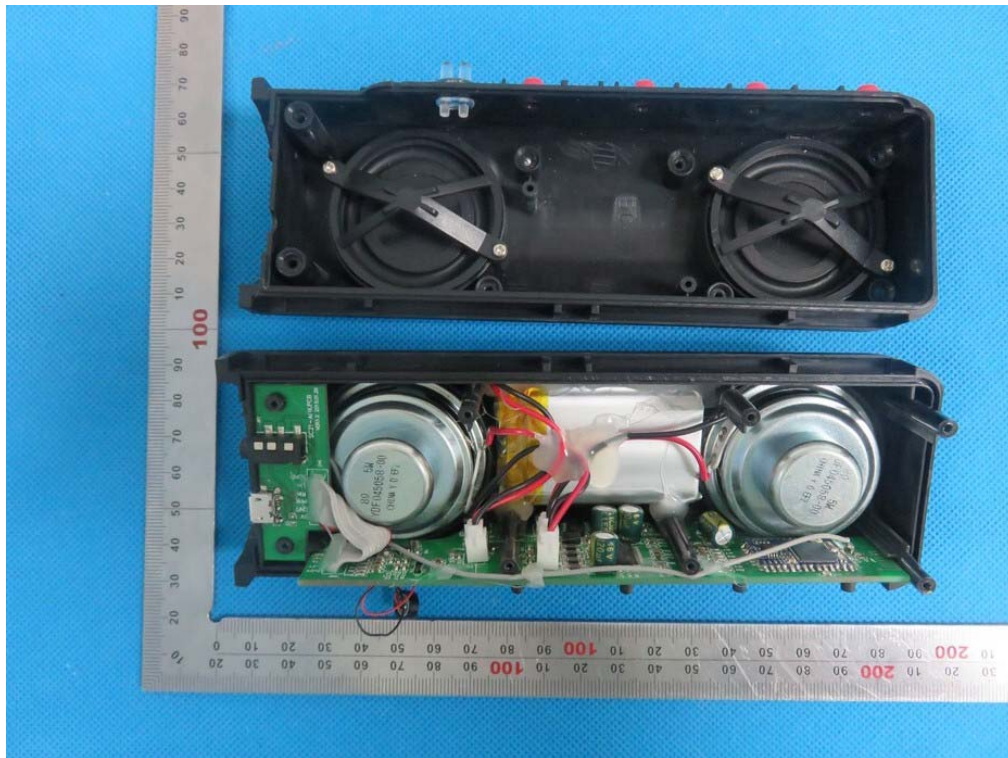
RIGHT VIEW OF EUT



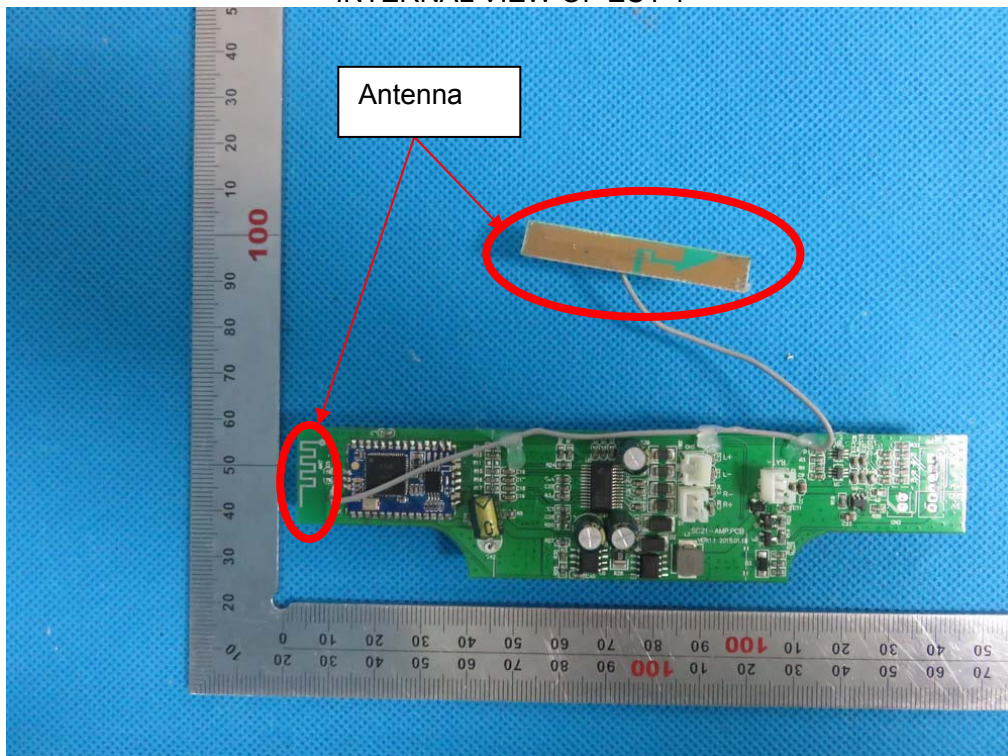
VIEW OF EUT(Port)



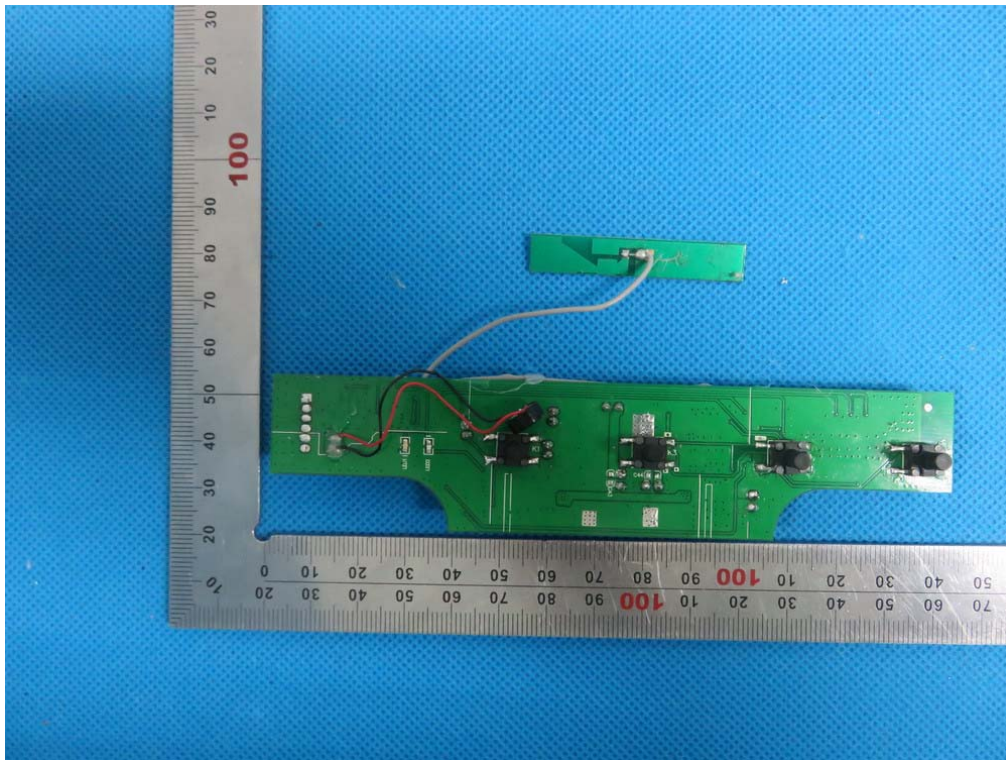
OPEN VIEW OF EUT



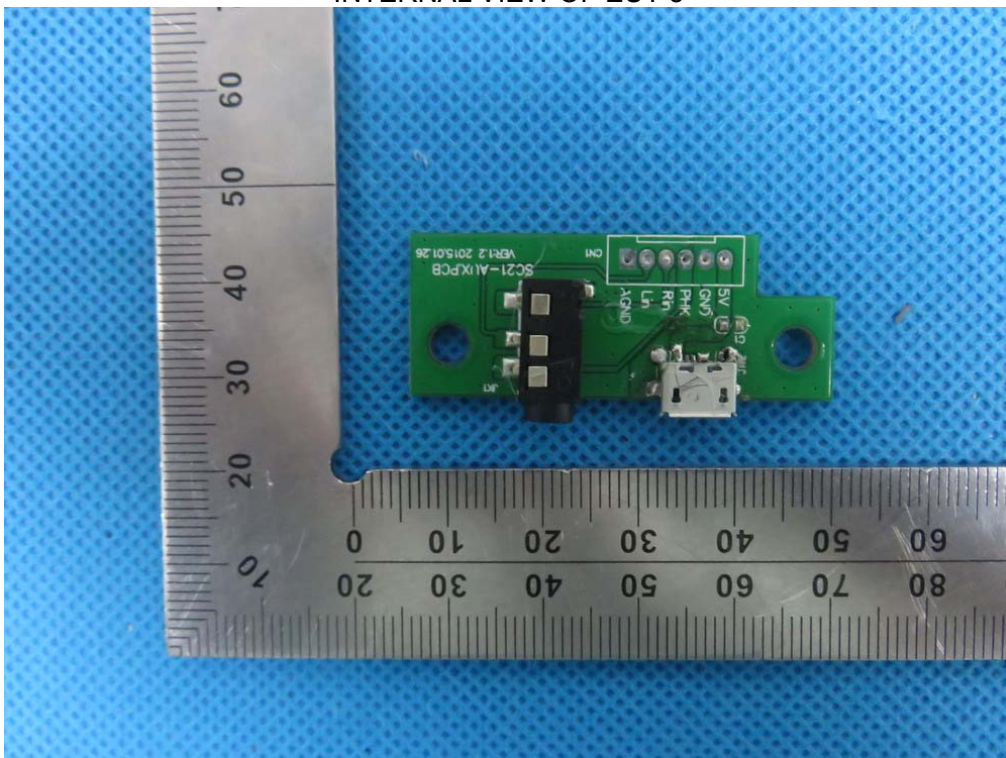
INTERNAL VIEW OF EUT-1



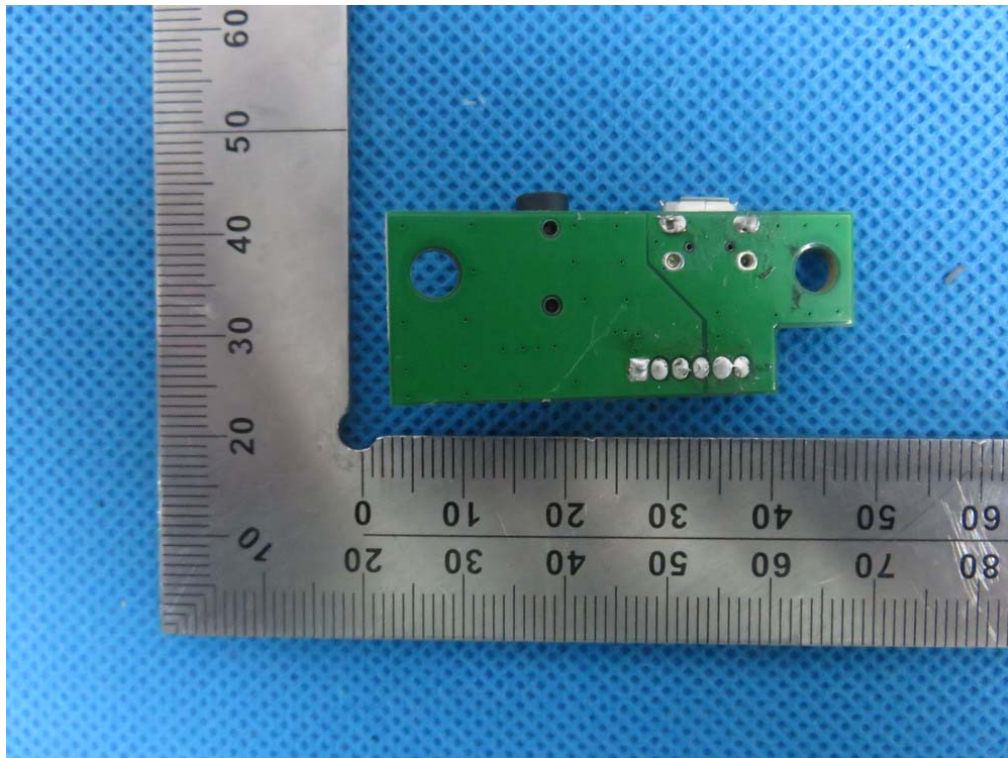
INTERNAL VIEW OF EUT-2



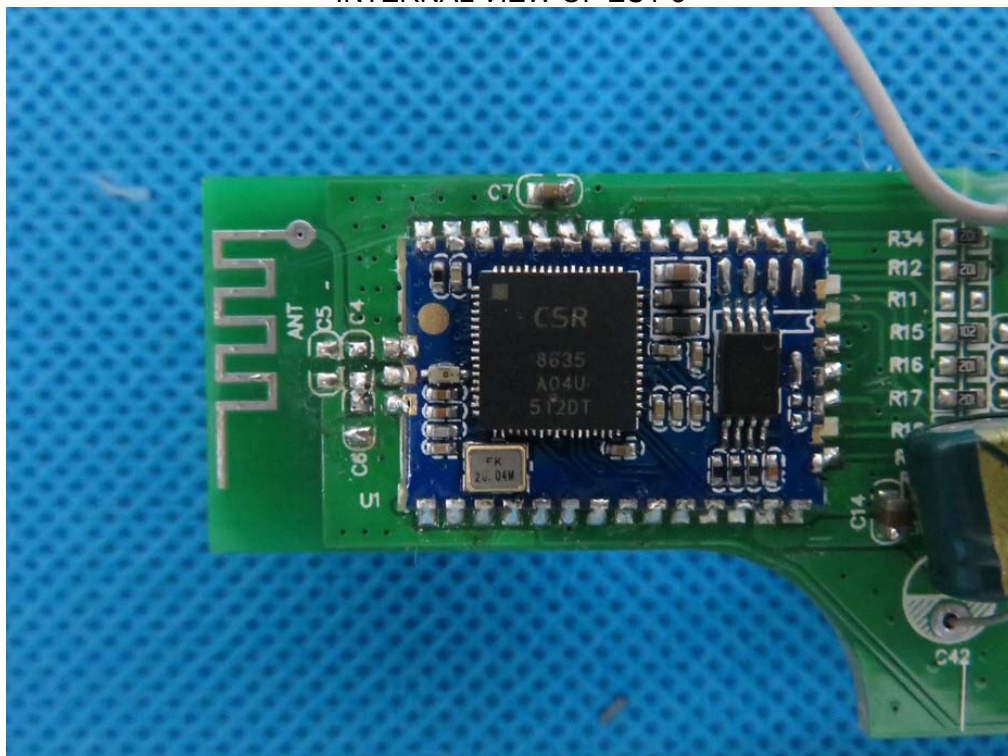
INTERNAL VIEW OF EUT-3



INTERNAL VIEW OF EUT-4



INTERNAL VIEW OF EUT-5



----END OF REPORT----