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FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.249

Report Reference No.: **CTL1508172364-WF**

Compiled by: (position+printed name+signature)	Jacky Chen (File administrators)	Jackychen
Tested by: (position+printed name+signature)	Allen Wang (Test Engineer)	Allen Wang
Approved by: (position+printed name+signature)	Tracy Qi (Manager)	Tracy Qi

Product Name.....:	Wireless Portable Speaker
Model/Type reference.....:	Sundock-100
List Model(s).....:	Moondock-100
Trade Mark......:	AcTek
FCC ID.....:	**2AFSASUNDOCK-100**
Applicant's name.....:	**AcTek Corporation Limited**
Address of applicant......:	1017 Kairui Jinzuo, Changhe Road, Binjiang District, Hangzhou, ZheJiang, China
Test Firm.....:	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm.....:	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification.....:	
Standard.....:	**FCC Part 15.249:**Operation within the bands 920-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0 - 24.25 GHz.
TRF Originator……..:	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF……:	Dated 2011-01
Date of Receipt.....:	Aug. 17, 2015
Date of Test Date.....:	Aug. 18, 2015 –Aug. 27, 2015
Data of Issue.....:	Aug. 28, 2015
Result......:	Positive

TEST REPORT

Test Report No. :	CTL1508172364-WF	Aug. 28, 2015 Date of issue

Equipment under Test	:	Wireless Portable Speaker
Model /Type	:	Sundock-100
Listed Models	:	Moondock-100
Applicant	:	**AcTek Corporation Limited**
Address	:	1017 Kairui Jinzuo, Changhe Road, Binjiang District, Hangzhou, ZheJiang, China
Manufacturer	:	**AcTek Corporation Limited**
Address	:	1017 Kairui Jinzuo, Changhe Road, Binjiang District, Hangzhou, ZheJiang, China

Test result	Pass *

* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

** Modified History **

Version	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2015-08-28	CTL1508172364-WF	Tracy Qi

Table of Contents Page

1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

ANSI C63.10:2013

ANSI C63.4: 2014: –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 40GHz Range of 9 kHz to 40GHz

1.2. Test Description

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.209	Spurious Emission	PASS
FCC Part 15.209	Band edge	PASS
FCC Part 15.215(c)	20dB bandwidth	PASS
FCC Part 15.207	Conducted Emission	PASS
FCC Part 15.203	Antenna Requirement	PASS

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 970318

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December 19, 2013.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10dB	(1)
Radiated Emission	Above 1GHz	4.32dB	(1)
Conducted Disturbance	0.15~30MHz	3.20dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Wireless Portable Speaker
Model/Type reference:	Sundock-100
Power supply:	DC 3.7V from battery
Bluetooth 3.0	
Version:	Supported BT3.0+EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	PCB Antenna
Antenna gain:	0.0dBi
Bluetooth BLE	
Supported type:	Version 4.0 for low Energy
Modulation:	GFSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	40
Channel separation:	2 MHz
Antenna type:	PCB Antenna
Antenna gain:	0.0dBi

Note: For more details, please refer to the user's manual of the EUT.

2.3. Description of Test Modes and Test Frequency

Operation Frequency BT3.0：

Channel	Frequency (MHz)
00	**2402**
01	2403
⋮	⋮
38	2440
39	**2441**
40	2442
⋮	⋮
77	2479
78	**2480**

Operation Frequency List BT4.0：

Channel	Frequency (MHz)
00	**2402**
02	2404
03	2406
⋮	⋮
19	**2440**
⋮	⋮
37	2476
38	2478
39	**2480**

The field strength of radiation emission was measured in the following position: EUT stand-up position (Yaxis), lie-down position (X, Z axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Y axis was reported.
All test performed at GFSK, π/4 DQPSK and 8DPSK mode of each test frequency and recorded worst case at GFSK DH5 mode(for BT V3.0).

2.4. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2015/06/02	2016/06/01
LISN	R&S	ESH2-Z5	860014/010	2015/06/02	2016/06/01
Bilog Antenna	Sunol Sciences Corp.	JB1	A061713	2015/06/02	2016/06/01
EMI Test Receiver	R&S	ESCI	103710	2015/06/02	2016/06/01
Spectrum Analyzer	Agilent	E4407B	MY41440676	2015/05/21	2016/05/20
Controller	EM Electronics	Controller EM 1000	N/A	2015/05/21	2016/05/20
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2015/05/19	2016/05/18
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2015/05/19	2016/05/18
Amplifier	Agilent	8349B	3008A02306	2015/05/19	2016/05/18
Amplifier	Agilent	8447D	2944A10176	2015/05/19	2016/05/18
Temperature/Humidity Meter	Gangxing	CTH-608	02	2015/05/20	2016/05/19
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	N/A	2015/05/20	2016/05/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	N/A	2015/05/20	2016/05/19
RF Cable	HUBER+SUHNER	RG214	N/A	2015/05/20	2016/05/19

The calibration interval was one year

2.5. Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for FCC ID: 2AFSASUNDOCK-100 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

2.6. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

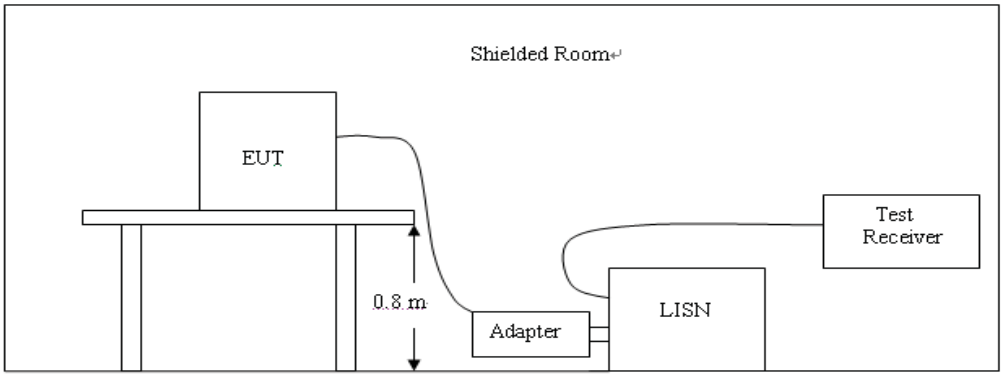
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION

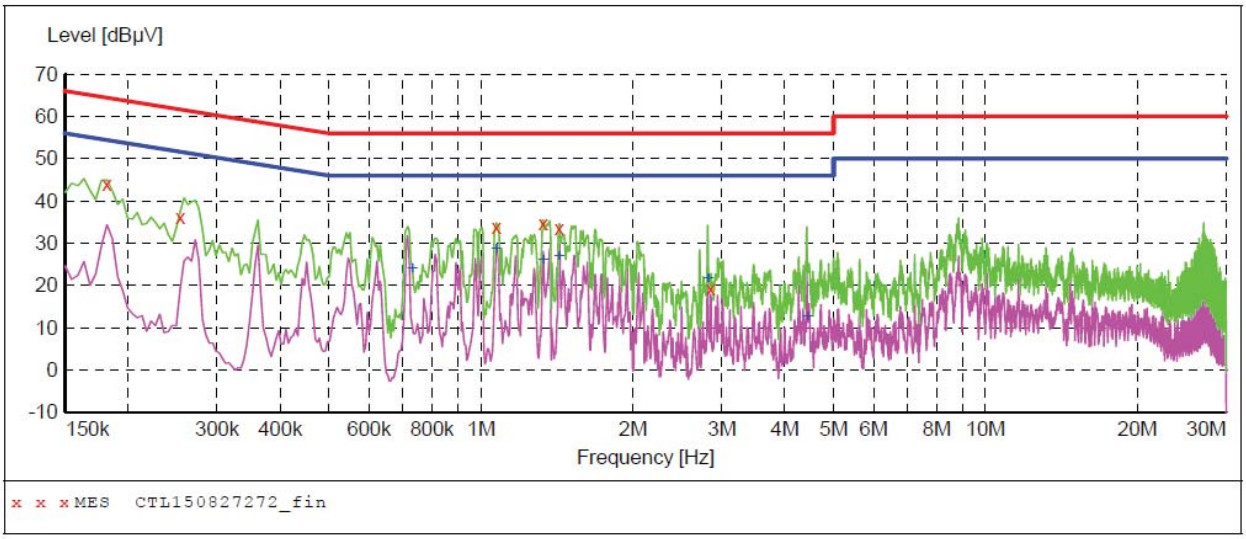


TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. 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 C63.10:2013 .
2. Support equipment, if needed, was placed as per ANSI C63.10:2013 .
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013 .
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT 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.

TEST RESULTS

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150827272_fin"

8/27/2015 5:39PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181501	44.00	10.2	64	20.4	QP	L1	GND
0.253501	36.10	10.2	62	25.5	QP	L1	GND
1.072501	33.90	10.3	56	22.1	QP	L1	GND
1.329001	34.70	10.3	56	21.3	QP	L1	GND
1.428001	33.60	10.3	56	22.4	QP	L1	GND
2.850001	19.30	10.4	56	36.7	QP	L1	GND

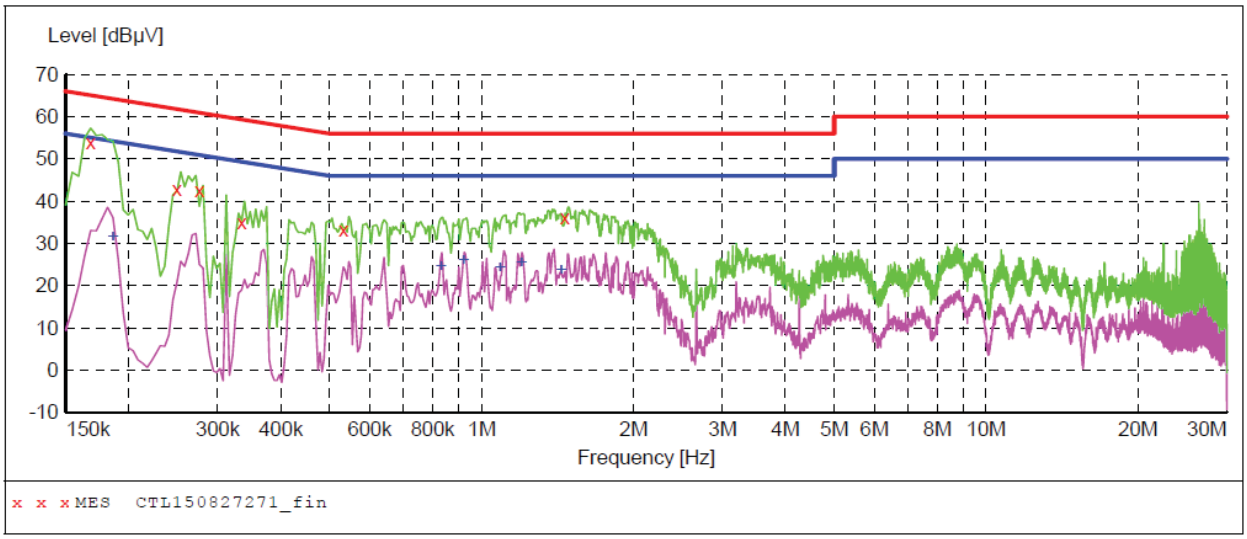
MEASUREMENT RESULT: "CTL150827272_fin2"

8/27/2015 5:39PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.730501	23.80	10.2	46	22.2	AV	L1	GND
1.072501	28.50	10.3	46	17.5	AV	L1	GND
1.329001	26.00	10.3	46	20.0	AV	L1	GND
1.428001	26.90	10.3	46	19.1	AV	L1	GND
2.818501	21.60	10.4	46	24.4	AV	L1	GND
4.443001	12.50	10.4	46	33.5	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "CTL150827271_fin"

8/27/2015 5:14PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168001	53.90	10.2	65	11.2	QP	N	GND
0.249001	42.70	10.2	62	19.1	QP	N	GND
0.276001	42.60	10.2	61	18.3	QP	N	GND
0.334501	35.00	10.2	59	24.3	QP	N	GND
0.532501	33.30	10.2	56	22.7	QP	N	GND
1.459501	36.20	10.3	56	19.8	QP	N	GND

MEASUREMENT RESULT: "CTL150827271_fin2"

8/27/2015 5:14PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.186001	31.40	10.2	54	22.8	AV	N	GND
0.829501	24.40	10.2	46	21.6	AV	N	GND
0.919501	25.90	10.3	46	20.1	AV	N	GND
1.086001	24.10	10.3	46	21.9	AV	N	GND
1.198501	25.30	10.3	46	20.7	AV	N	GND
1.437001	23.60	10.3	46	22.4	AV	N	GND

Remark: BT V3.0 and BT V4.0 low middle high channels all have been tested ,only worse case (BT V3.0 GFSK DH5 low channel) is reported .

3.2. Radiated Emissions and Band Edge

Limit

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBμV/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

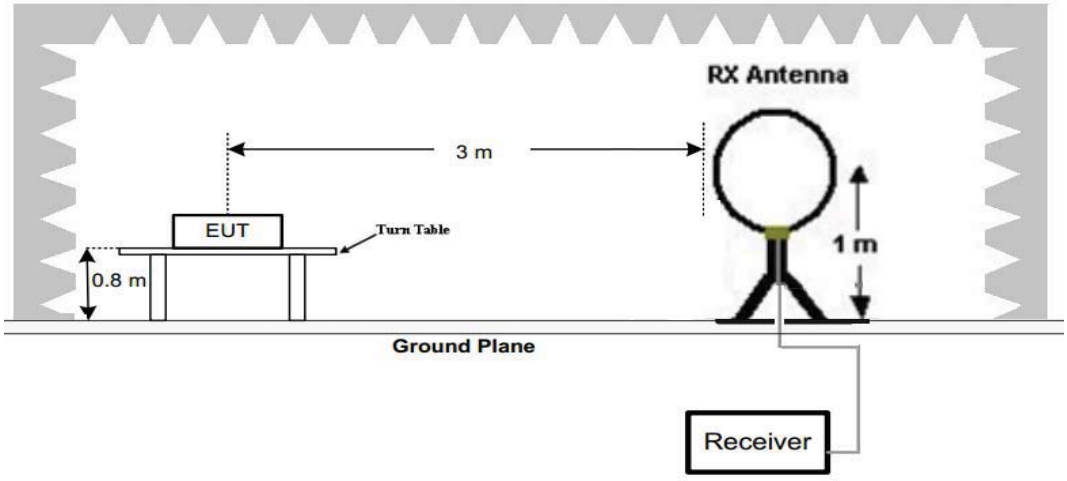
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

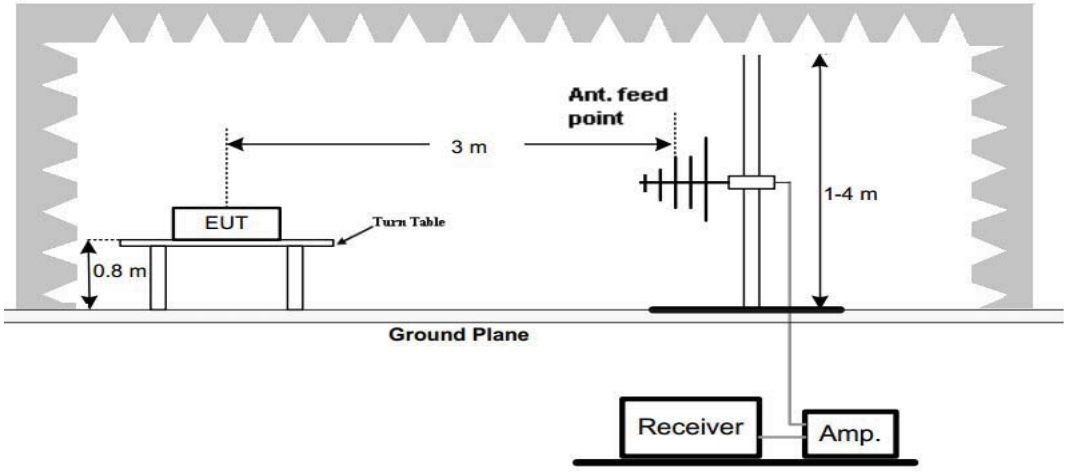
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

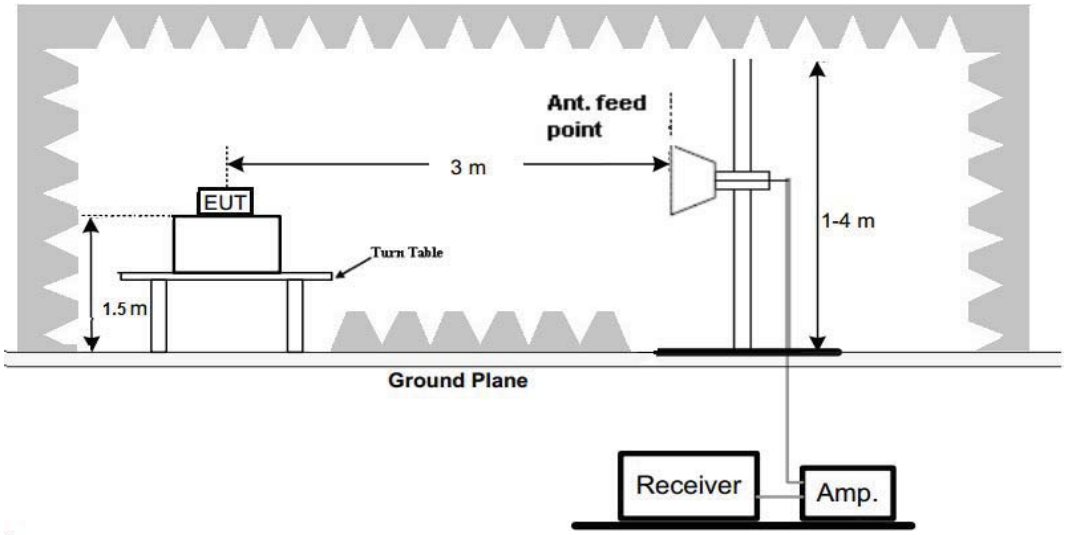
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

TEST RESULTS

Remark:
1. We measured Radiated Emission at GFSK, π/4 DQPSK and 8DPSK mode from 9 KHz to 25GHz and recorded worst case at GFSK DH5 mode.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, and test data recorded in this report.
3. For below 1GHz testing recorded worst at GFSK DH5 low channel.

For 9 KHz-30MHz

Frequency (MHz)	Corrected Reading (dBuV/m)@3m	FCC Limit (dBuV/m) @3m	Margin (dB)	Detector	Result
0.15	49.87	104.08	54.21	Peak	PASS
1.47	55.41	64.26	8.85	QP	PASS
15.79	56.65	69.54	12.89	QP	PASS
25.26	50.26	69.54	19.28	QP	PASS

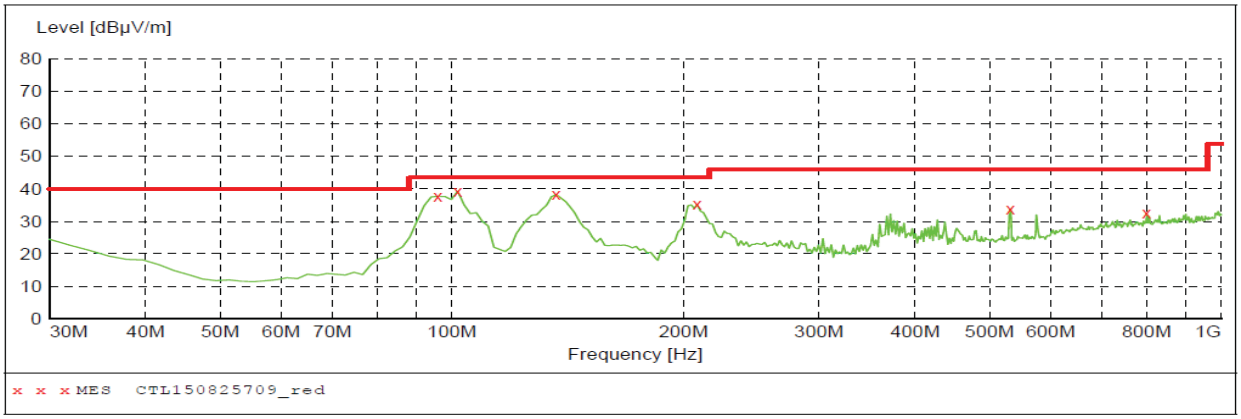
Remark: BT V3.0 and BT V4.0 low middle high channels all have been tested ,only worse case (BT V3.0 GFSK DH5 low channel) is reported .

For 30MHz-1GHz

Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL150825709_red"

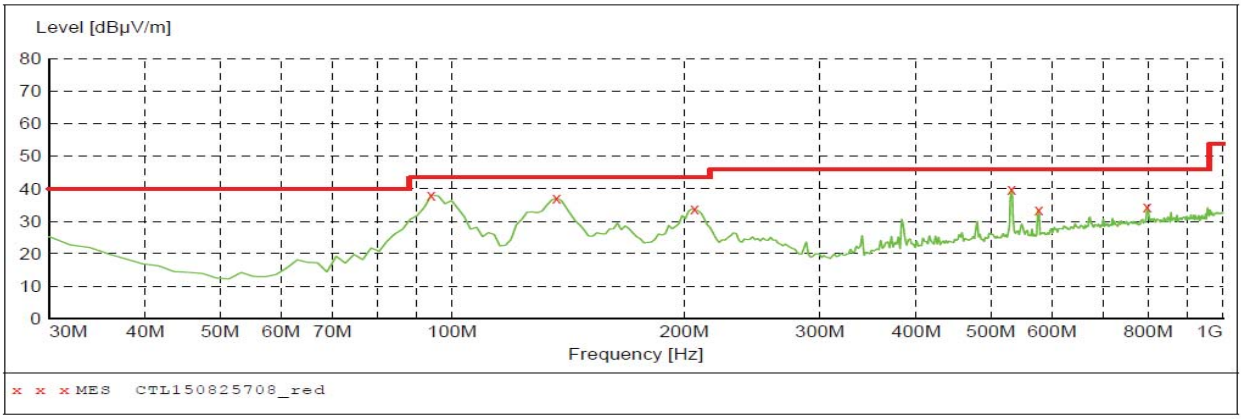
8/25/2015 8:30PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
95.960000	37.70	10.2	43.5	5.8	---	0.0	0.00	HORIZONTAL
101.780000	39.30	11.6	43.5	4.2	---	0.0	0.00	HORIZONTAL
136.700000	38.20	14.4	43.5	5.3	---	0.0	0.00	HORIZONTAL
208.480000	35.20	14.0	43.5	8.3	---	0.0	0.00	HORIZONTAL
532.460000	33.90	20.5	46.0	12.1	---	0.0	0.00	HORIZONTAL
800.180000	32.50	24.7	46.0	13.5	---	0.0	0.00	HORIZONTAL

Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	JB1



MEASUREMENT RESULT: "CTL150825708_red"

8/25/2015 8:29PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
94.020000	38.10	9.9	43.5	5.4	---	0.0	0.00	VERTICAL
136.700000	37.10	14.4	43.5	6.4	---	0.0	0.00	VERTICAL
206.540000	33.80	14.1	43.5	9.7	---	0.0	0.00	VERTICAL
532.460000	40.00	20.5	46.0	6.0	---	0.0	0.00	VERTICAL
577.080000	33.60	21.4	46.0	12.4	---	0.0	0.00	VERTICAL
798.240000	34.40	24.6	46.0	11.6	---	0.0	0.00	VERTICAL

Remark: BT V3.0 and BT V4.0 low middle high channels all have been tested ,only worse case (BT V3.0 GFSK DH5 low channel) is reported .

For 1GHz to 25GHz

BT3.0 GFSK Mode (above 1GHz)

Frequency(MHz):				2402		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	97.58	PK	114	16.42	64.18	28.78	4.61	0.00	33.40
1	2402.00	90.45	AV	94	3.55	57.05	28.78	4.61	0.00	33.40
2	2390.00	38.45	PK	74	35.55	5.13	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	45.69	PK	74	28.31	12.30	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	57.54	PK	74	16.46	53.03	33.49	6.91	35.89	4.51
4	4804.00	43.16	AV	54	10.84	38.65	33.49	6.91	35.89	4.51
5	5050.50	40.38	PK	74	33.62	33.41	34.16	7.06	34.25	6.97
5	5050.50	--	AV	54	--	--	--	--	--	--
6	7206.00	40.54	PK	74	33.46	29.43	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2402		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	97.49	PK	114	16.51	64.09	28.78	4.61	0.00	33.40
1	2402.00	90.88	AV	94	3.12	57.48	28.78	4.61	0.00	33.40
2	2390.00	37.16	PK	74	36.84	3.84	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	43.46	PK	74	30.54	10.07	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	55.78	PK	74	18.22	51.27	33.49	6.91	35.89	4.51
4	4804.00	46.24	AV	54	7.76	41.73	33.49	6.91	35.89	4.51
5	5475.25	40.98	PK	74	33.02	33.34	34.75	7.30	34.40	7.64
5	5475.25	--	AV	54	--	--	--	--	--	--
6	7206.00	46.54	PK	74	27.46	35.43	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

Frequency(MHz):				2441		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2441.00	96.98	PK	114	17.02	63.47	28.85	4.66	0.00	33.51
1	2441.00	90.21	AV	94	3.79	56.70	28.85	4.66	0.00	33.51
2	4437.75	41.12	PK	74	32.88	36.14	32.85	6.68	34.55	4.98
2	4437.75	--	AV	54	--	--	--	--	--	--
3	4882.00	55.78	PK	74	18.22	49.52	33.60	6.95	34.30	6.26
3	4882.00	48.54	AV	54	5.46	42.28	33.60	6.95	34.30	6.26
4	5125.50	40.21	PK	74	33.79	32.88	34.38	7.10	34.16	7.33
4	5125.50	--	AV	54	--	--	--	--	--	--
5	7323.00	46.74	PK	74	27.26	35.04	37.46	9.23	35.00	11.70
5	7323.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2441		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2441.00	98.65	PK	114	15.35	65.14	28.85	4.66	0.00	33.51
1	2441.00	91.47	AV	94	2.53	57.96	28.85	4.66	0.00	33.51
2	4125.50	41.14	PK	74	32.86	36.58	32.81	6.48	34.73	4.56
2	4125.50	--	AV	54	--	--	--	--	--	--
3	4882.00	55.87	PK	74	18.13	49.61	33.60	6.95	34.30	6.26
3	4882.00	48.79	AV	54	5.21	42.53	33.60	6.95	34.30	6.26
4	5250.75	42.44	PK	74	31.56	34.77	34.59	7.17	34.09	7.67
4	5250.75	--	AV	54	--	--	--	--	--	--
5	7323.00	45.20	PK	74	28.8	33.50	37.46	9.23	35.00	11.70
5	7323.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

Frequency(MHz):				2480		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	96.41	PK	114	17.59	62.79	28.92	4.70	0.00	33.62
1	2480.00	89.65	AV	94	4.35	56.03	28.92	4.70	0.00	33.62
2	2483.50	45.78	PK	74	28.22	12.15	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	40.25	PK	74	33.75	6.57	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	56.78	PK	74	17.22	51.86	33.84	7.00	35.92	4.92
4	4960.00	45.48	AV	54	8.52	40.56	33.84	7.00	35.92	4.92
5	5010.75	44.55	PK	74	29.45	37.73	34.02	7.04	34.23	6.82
5	5010.75	--	AV	54	--	--	--	--	--	--
6	7440.00	39.26	PK	74	34.74	27.31	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2480		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	98.48	PK	114	15.52	64.86	28.92	4.70	0.00	33.62
1	2480.00	90.23	AV	94	3.77	56.61	28.92	4.70	0.00	33.62
2	2483.50	45.22	PK	74	28.78	11.59	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	36.54	PK	74	37.46	2.86	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	57.74	PK	74	16.26	52.82	33.84	7.00	35.92	4.92
4	4960.00	45.66	AV	54	8.34	40.74	33.84	7.00	35.92	4.92
5	5447.80	41.25	PK	74	32.75	33.61	34.74	7.28	34.39	7.64
5	5447.80	--	AV	54	--	--	--	--	--	--
6	7440.00	40.36	PK	74	33.64	28.41	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

BT4.0 GFSK Mode (above 1GHz)

Frequency(MHz):				2402		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	88.48	PK	114	25.52	55.08	28.78	4.61	0.00	33.40
1	2402.00	78.26	AV	94	15.74	44.86	28.78	4.61	0.00	33.40
2	2390.00	36.47	PK	74	37.53	3.15	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	45.69	PK	74	28.31	12.30	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	46.71	PK	74	27.29	42.20	33.49	6.91	35.89	4.51
4	4804.00	--	AV	54	--	--	--	--	--	--
5	5250.75	43.59	PK	74	30.41	36.15	34.59	7.17	34.32	7.44
5	5250.75	--	AV	54	--	--	--	--	--	--
6	7206.00	40.42	PK	74	33.58	29.31	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2402		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2402.00	89.69	PK	114	24.31	56.29	28.78	4.61	0.00	33.40
1	2402.00	80.15	AV	94	13.85	46.75	28.78	4.61	0.00	33.40
2	2390.00	37.45	PK	74	36.55	4.13	28.72	4.60	0.00	33.32
2	2390.00	--	AV	54	--	--	--	--	--	--
3	2400.00	45.26	PK	74	28.74	11.87	28.78	4.61	0.00	33.39
3	2400.00	--	AV	54	--	--	--	--	--	--
4	4804.00	46.30	PK	74	27.7	41.79	33.49	6.91	35.89	4.51
4	4804.00	--	AV	54	--	--	--	--	--	--
5	4948.50	42.27	PK	74	31.73	35.74	33.80	6.99	34.26	6.53
5	4948.50	--	AV	54	--	--	--	--	--	--
6	7206.00	41.74	PK	74	32.26	30.63	36.95	9.18	35.03	11.11
6	7206.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

Frequency(MHz):		2440				Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2440.00	88.87	PK	114	25.13	55.36	28.85	4.65	0.00	33.51
1	2440.00	79.45	AV	94	14.55	45.94	28.85	4.65	0.00	33.51
2	4345.25	39.62	PK	74	34.38	34.77	32.84	6.62	34.60	4.85
2	4345.25	--	AV	54	--	--	--	--	--	--
3	4880.00	46.87	PK	74	27.13	40.62	33.60	6.95	34.30	6.25
3	4880.00	--	AV	54	--	--	--	--	--	--
4	5175.50	41.55	PK	74	32.45	34.06	34.49	7.13	34.13	7.49
4	5175.50	--	AV	54	--	--	--	--	--	--
5	7320.00	44.26	PK	74	29.74	32.57	37.46	9.23	35.00	11.69
5	7320.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):		2440				Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2440.00	89.65	PK	114	24.35	56.14	28.85	4.65	0.00	33.51
1	2440.00	80.65	AV	94	13.35	47.14	28.85	4.65	0.00	33.51
2	4100.50	39.15	PK	74	34.85	34.62	32.81	6.46	34.74	4.53
2	4100.50	--	AV	54	--	--	--	--	--	--
3	4880.00	46.48	PK	74	27.52	40.23	33.60	6.95	34.30	6.25
3	4880.00	--	AV	54	--	--	--	--	--	--
4	5058.75	40.20	PK	74	33.8	33.15	34.19	7.07	34.20	7.05
4	5058.75	--	AV	54	--	--	--	--	--	--
5	7320.00	44.69	PK	74	29.31	33.00	37.46	9.23	35.00	11.69
5	7320.00	--	AV	54	--	--	--	--	--	--

REMARKS:

1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

Frequency(MHz):				2480		Polarity:			HORIZONTAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	88.59	PK	114	25.41	54.97	28.92	4.70	0.00	33.62
1	2480.00	79.65	AV	94	14.35	46.03	28.92	4.70	0.00	33.62
2	2483.50	45.12	PK	74	28.88	11.49	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	38.48	PK	74	35.52	4.80	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	48.25	PK	74	25.75	43.33	33.84	7.00	35.92	4.92
4	4960.00	--	AV	54	--	--	--	--	--	--
5	5250.50	42.36	PK	74	31.64	34.92	34.59	7.17	34.32	7.44
5	5250.50	--	AV	54	--	--	--	--	--	--
6	7440.00	40.22	PK	74	33.78	28.27	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

Frequency(MHz):				2480		Polarity:			VERTICAL	
No.	Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	2480.00	89.54	PK	114	24.46	55.92	28.92	4.70	0.00	33.62
1	2480.00	79.21	AV	94	14.79	45.59	28.92	4.70	0.00	33.62
2	2483.50	45.66	PK	74	28.34	12.03	28.93	4.70	0.00	33.63
2	2483.50	--	AV	54	--	--	--	--	--	--
3	2500.00	38.66	PK	74	35.34	4.98	28.96	4.72	0.00	33.68
3	2500.00	--	AV	54	--	--	--	--	--	--
4	4960.00	49.45	PK	74	24.55	44.53	33.84	7.00	35.92	4.92
4	4960.00	--	AV	54	--	--	--	--	--	--
5	5950.75	42.30	PK	74	31.7	34.34	34.97	7.56	34.57	7.96
5	5950.75	--	AV	54	--	--	--	--	--	--
6	7440.00	40.29	PK	74	33.71	28.34	37.64	9.28	34.97	11.95
6	7440.00	--	AV	54	--	--	--	--	--	--

REMARKS:

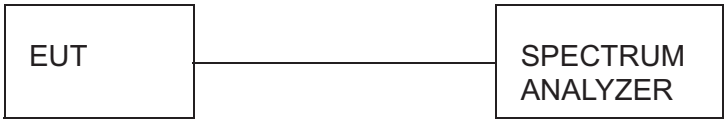
1. Emission level (dBuV/m) =Raw Value (dBuV)+Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. Margin value = Limit value- Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.
6. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
7. For fundamental frequency, RBW 3MHz VBW 3MHz Peak detector is for PK Value ; RMS detector is for AV value.

3.3. Occupied Bandwidth Measurement

Limit

N/A

Test Configuration



Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Results

BT3.0

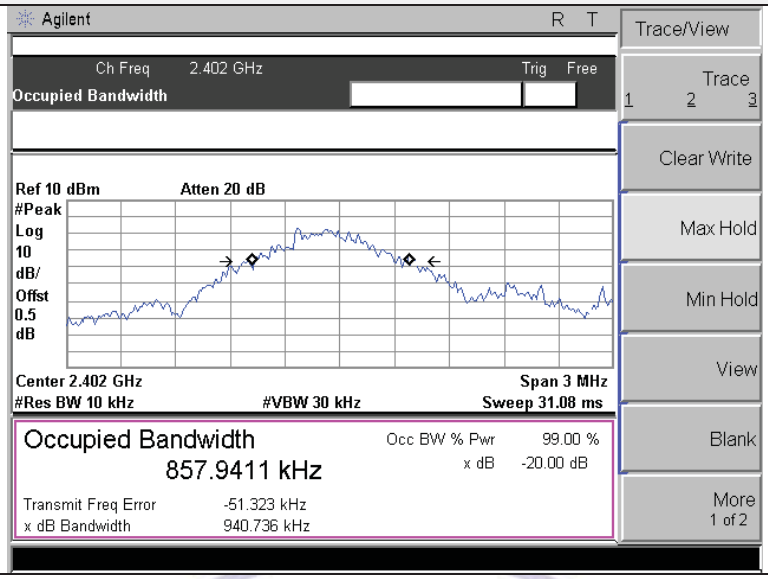
Modulation	Channel	99% OBW (MHz)	20dB bandwidth (MHz)	Result
GFSK	CH00	0.858	0.941	Pass
	CH39	0.862	0.942	
	CH78	0.864	0.941	
π/4DQPSK	CH00	1.171	1.265	
	CH39	1.169	1.222	
	CH78	1.176	1.323	
8DPSK	CH00	1.164	1.273	
	CH39	1.172	1.284	
	CH78	1.160	1.273	

BT4.0

Modulation	Channel	99% OBW (MHz)	20dB bandwidth (MHz)	Result
GFSK	CH00	1.011	1.126	Pass
	CH19	1.013	1.128	
	CH39	1.012	1.129	

Test plot as follows:

BT3.0

GFSK Modulation

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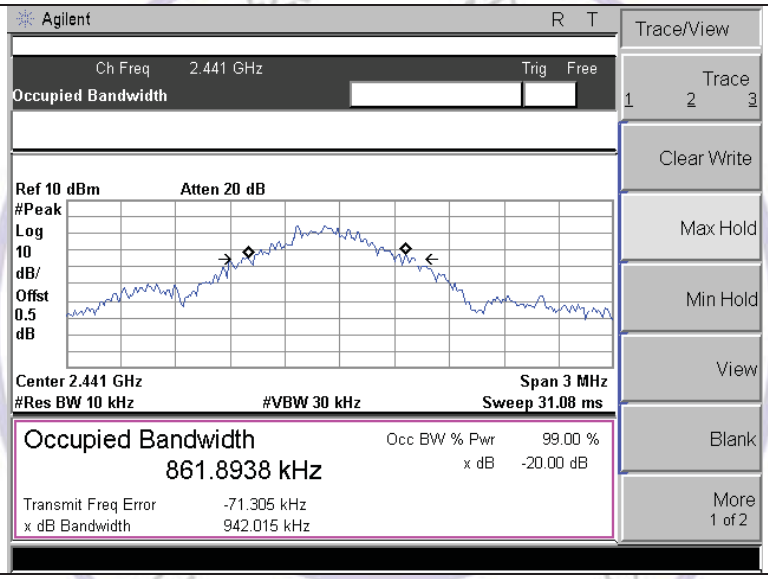
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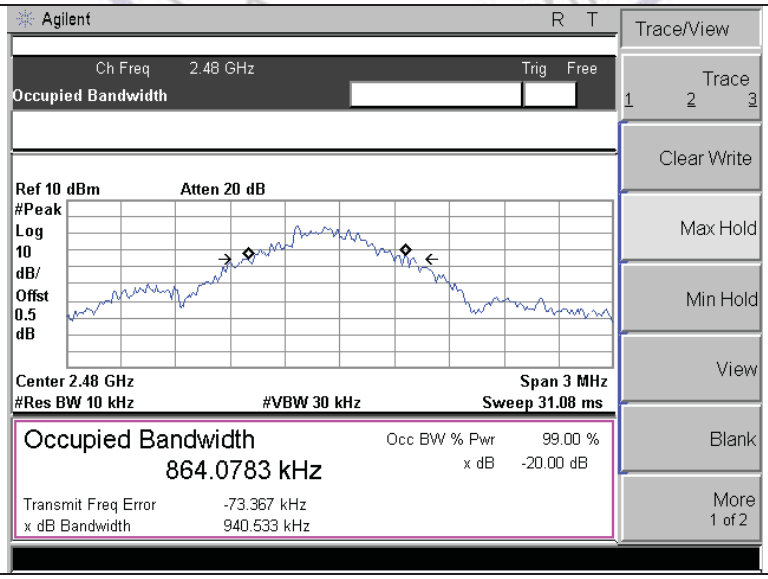
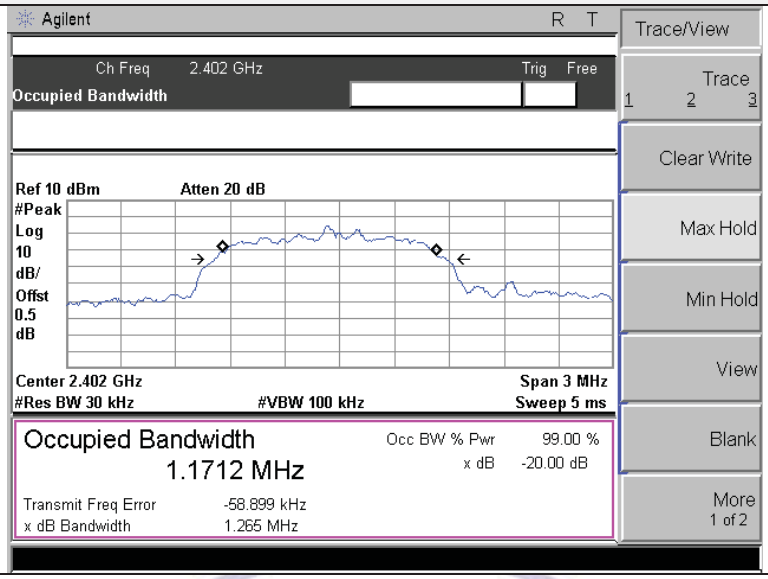

CH78

π/4 DQPSK Modulation

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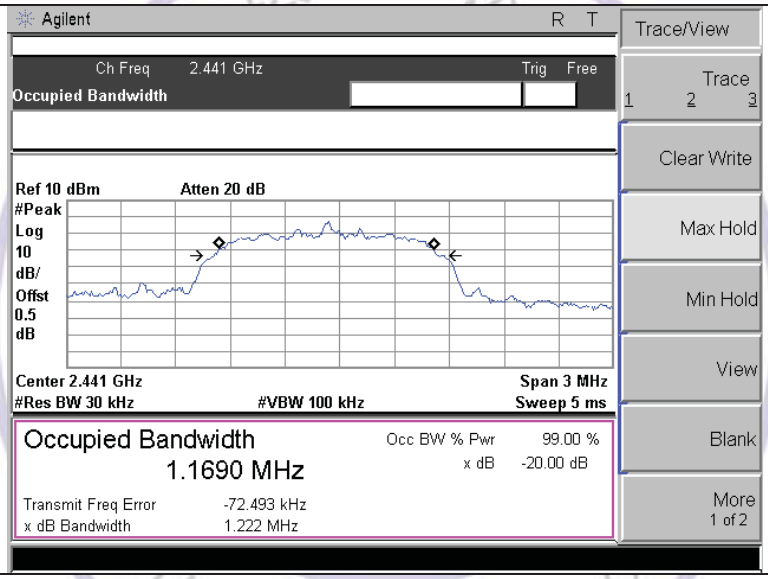
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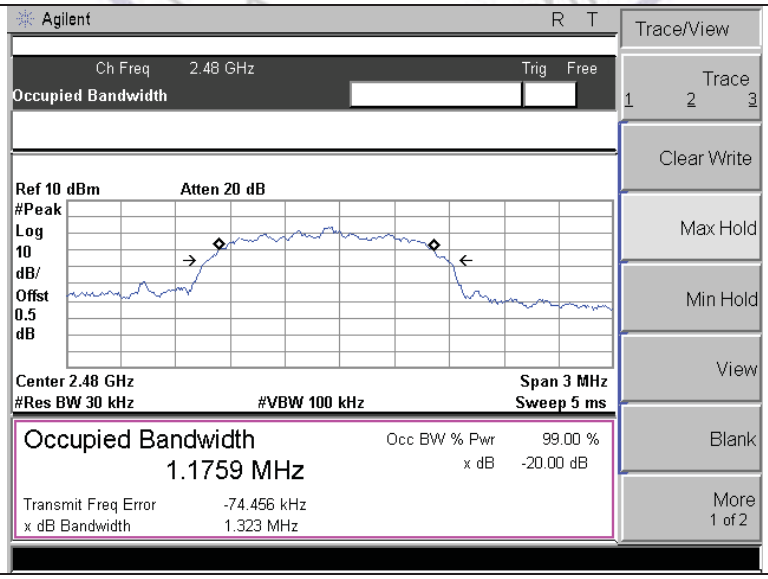
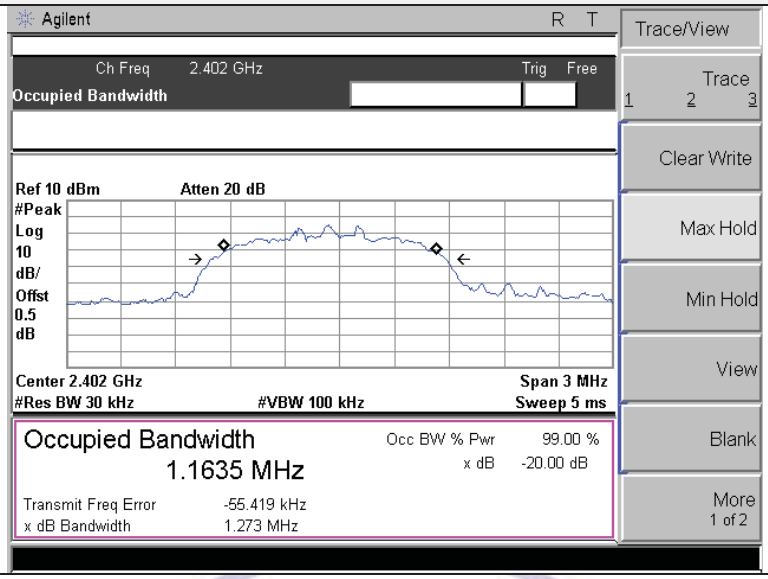

CH78

8DPSK Modulation

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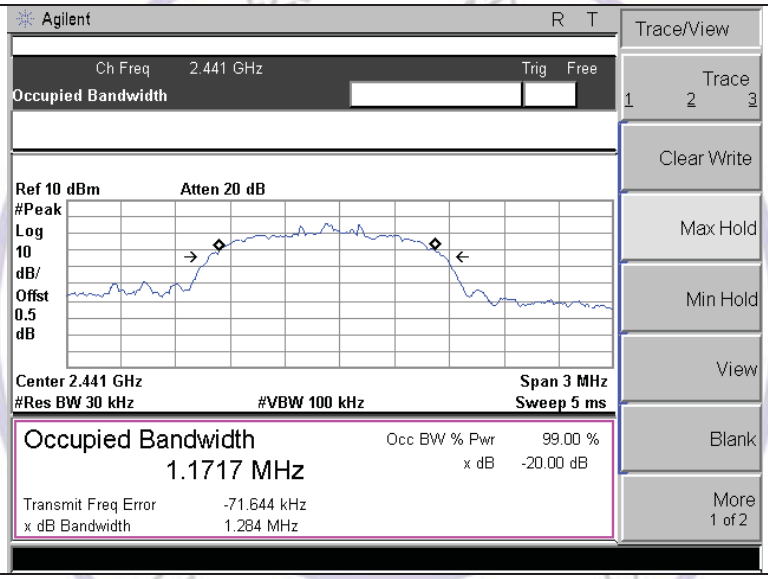
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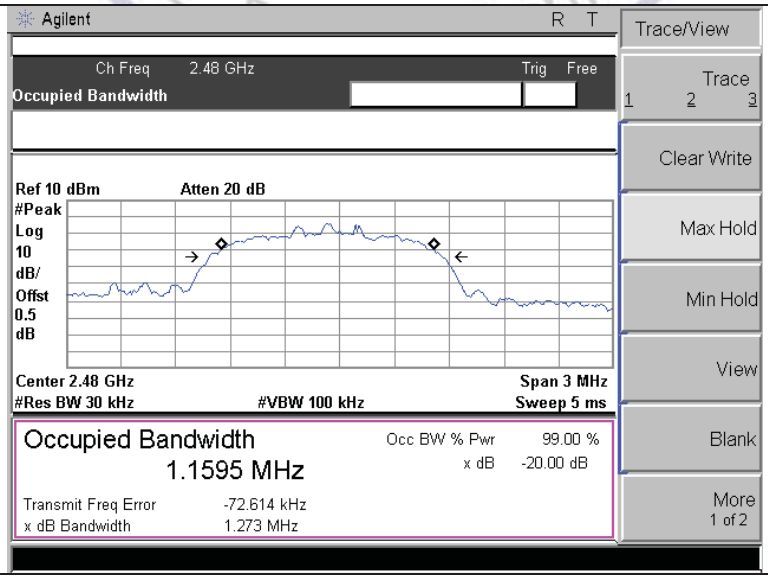
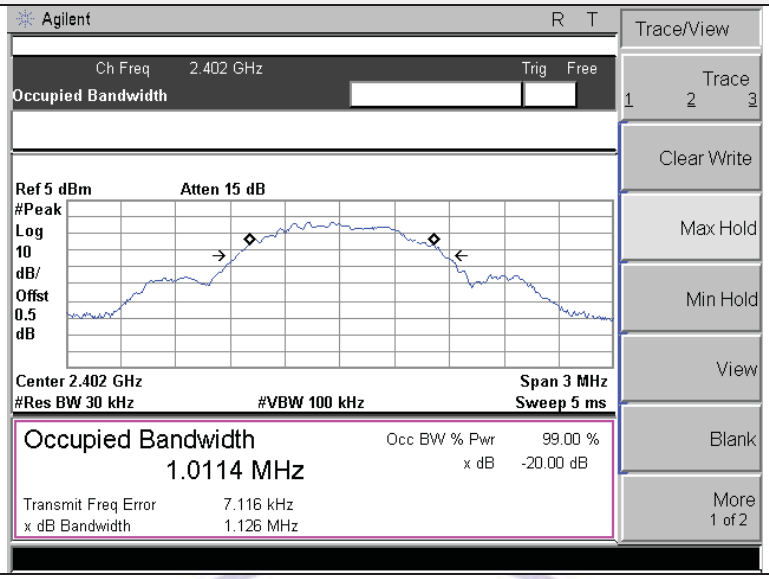

CH78

BT4.0

GFSK Modulation

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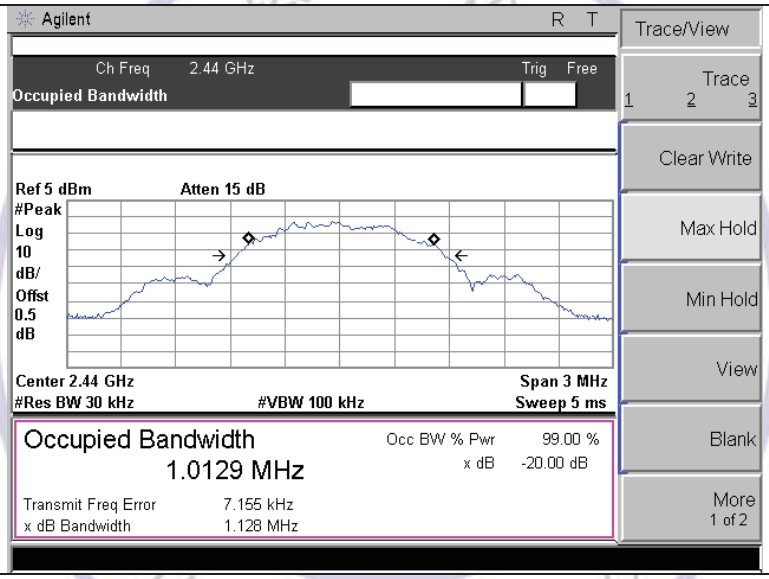
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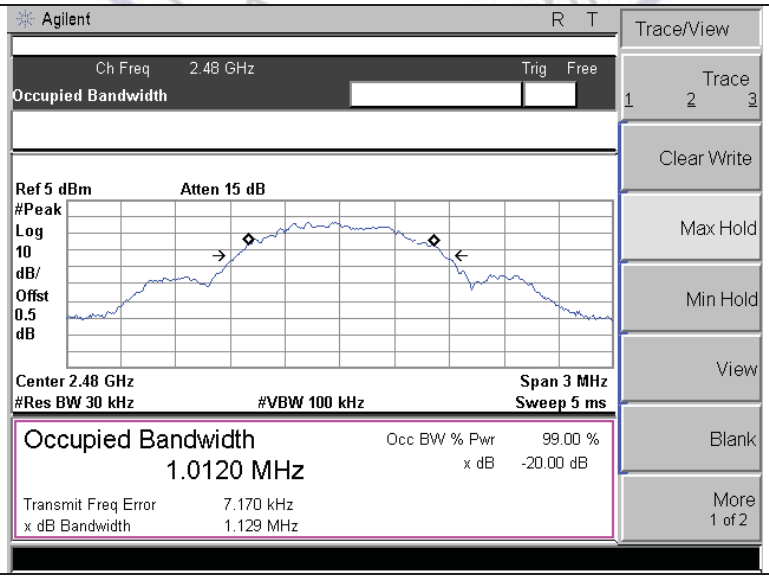

CH78

3.4. Antenna Requirement

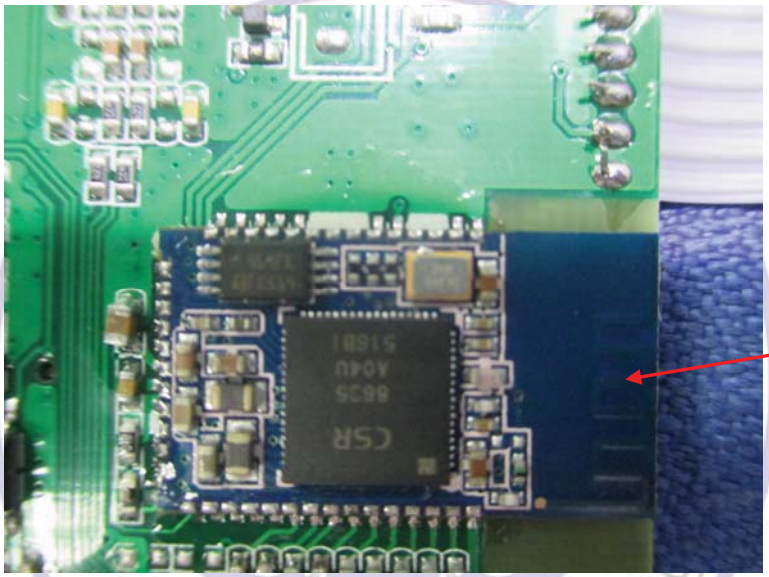
Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

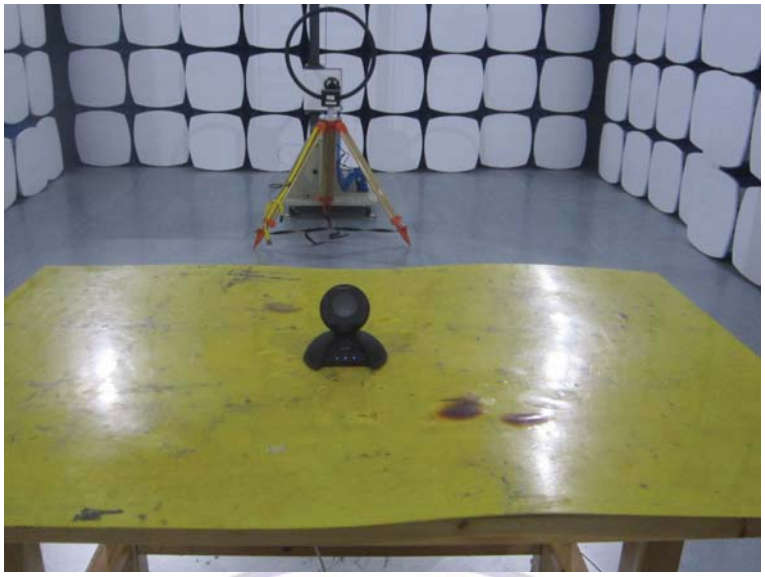
Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is an internal Antenna, The directional gains of antenna used for transmitting is 0 dBi.

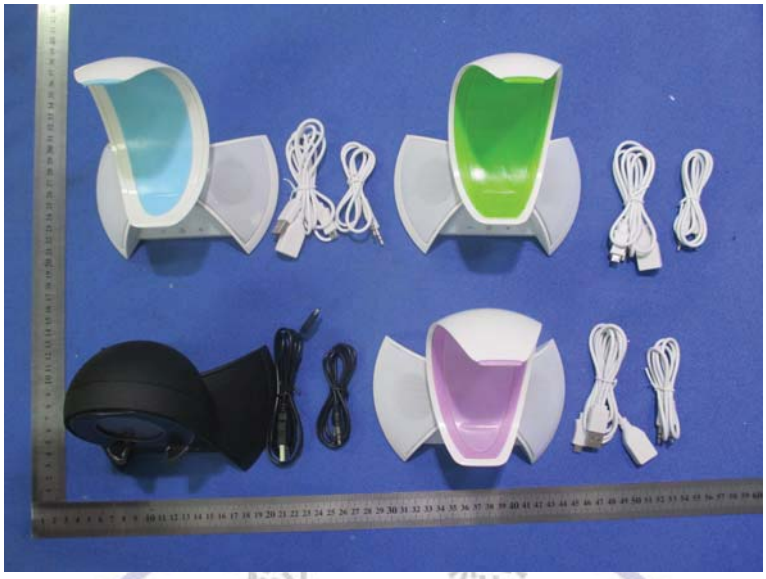


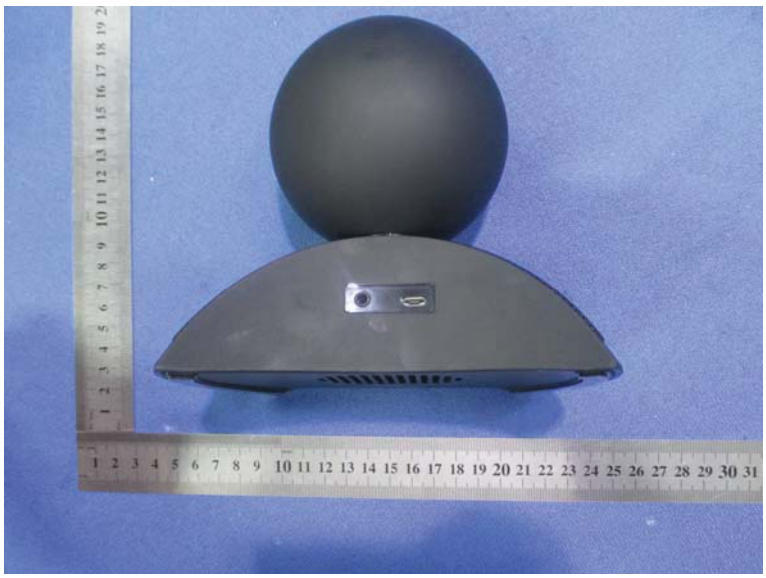
4. Test Setup Photos of the EUT

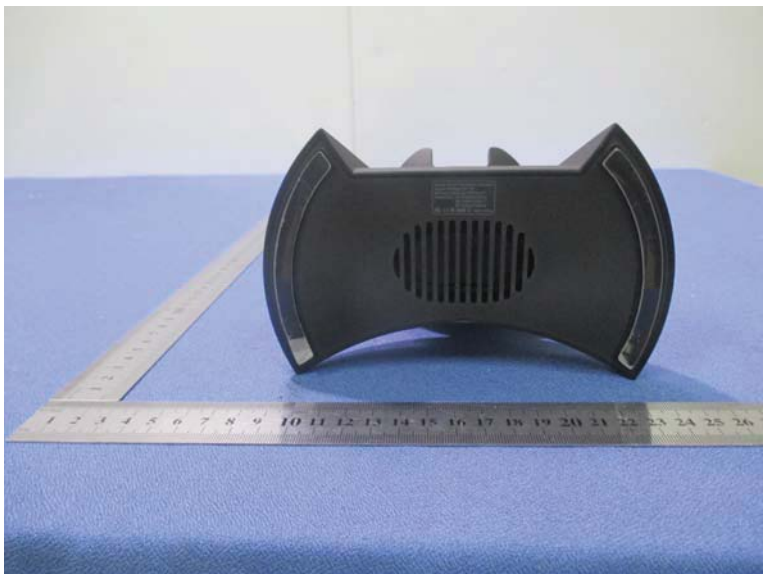


5. External and Internal Photos of the EUT

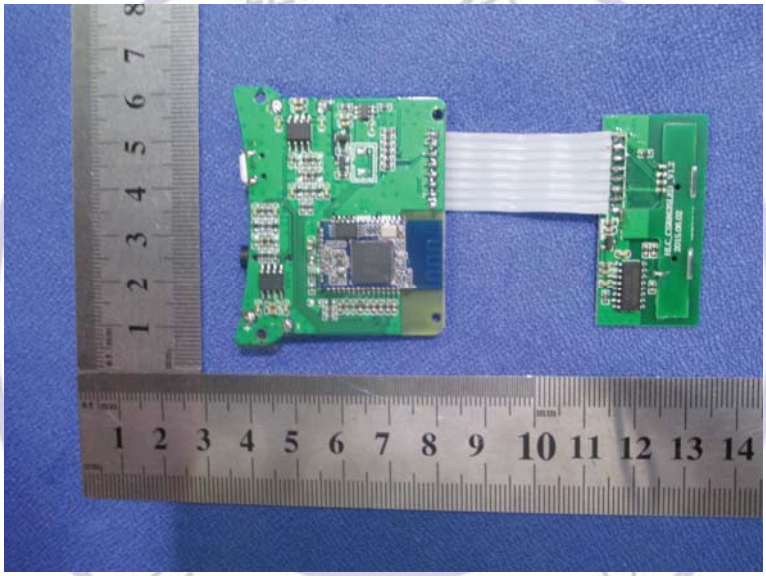
External Photos of EUT

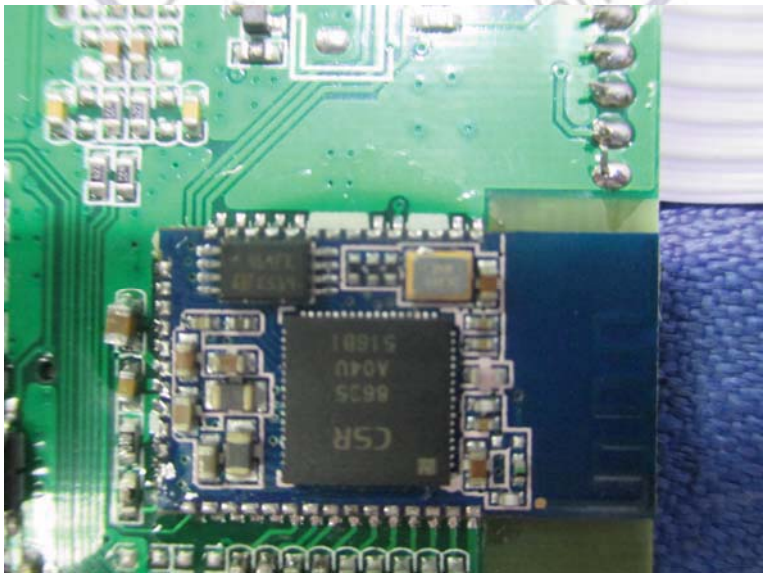


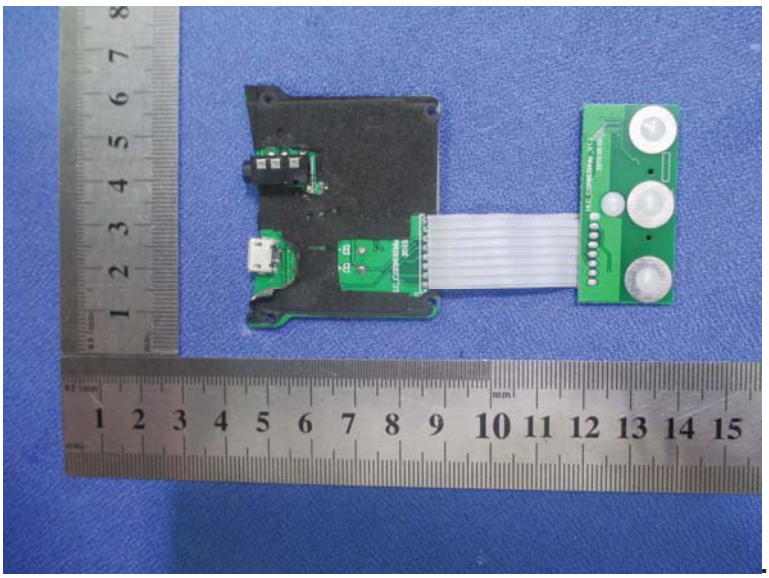


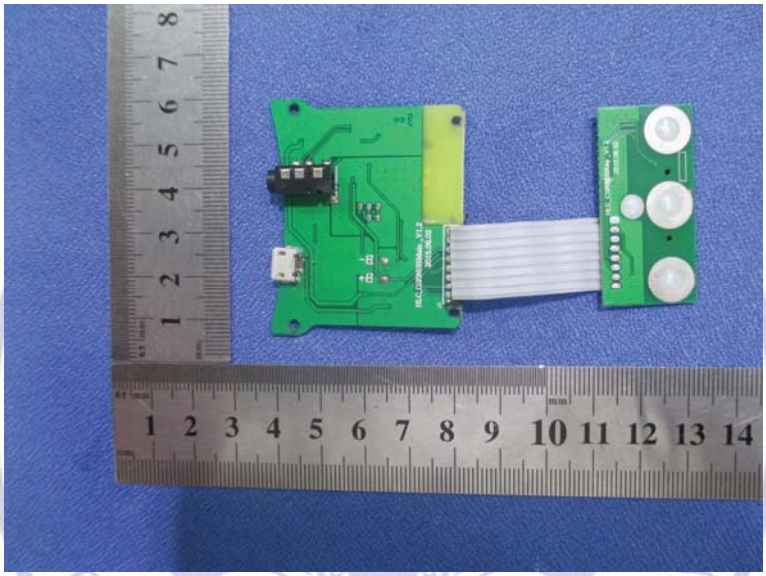


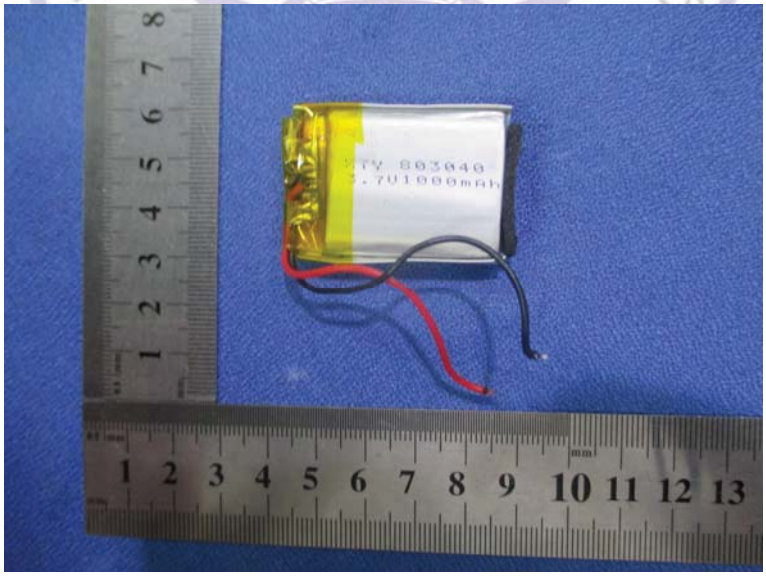
Internal Photos of EUT











********** End of Report **********