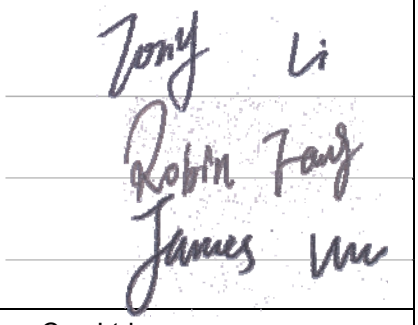
FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.247

Report Reference No......:	**A1411096076-BLE**
FCC ID..... :	**2ACWO-HC7-M**
Compiled by (position+printed name+signature)..:	File administrators Tony Li
Supervised by (position+printed name+signature)..:	Technique principal Robin Fang
Approved by (position+printed name+signature)..:	Manager James Wu
Date of issue.....:	Nov,28 2014



Representative Laboratory Name ....:	Shenzhen CTL Electron Technology Co., Ltd.
Address .....:	A0402, Block 1, Kefa Industrial District, Huanguan Nan Rd, Xintian community, Guanlan, Baoan, Shenzhen, China
Testing Laboratory Name.....:	Dongguan Dongdian Testing Service Co.,Ltd
Address .....:	No.17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China
Applicant's name.....:	**AURA TECHNOLOGY LIMTED**
Address .....:	FLAT/RM810, Star House, 3 Salisbury Road, Tsimshatsui, Hong Kong
Test specification .....**:**	
Standard .....:	**FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz**
TRF Originator.....:	Shenzhen CTL Electron Technology Co., Ltd.
Master TRF.....:	Dated 2012-06

Test item description .....:	Telpad
Trade Mark .....:	/
Model/Type reference.....:	HC7
Listed Models .....:	/
Manufacturer .....:	**SHENZHEN KWANG SUNG ELECTRONICS CO.,LTD**
Modulation Type .....:	GFSK
Operation Frequency.....:	From 2402MHz to 2480MHz
Rating .....:	DC 3.70V
Result.....:	**PASS**

T E S T R E P O R T

Test Report No. : A1411096076-BLE	Nov,28 2014 Date of issue

Equipment under Test	:	Telpad
Model /Type	:	HC7
Listed Models	:	/
Applicant	:	**AURA TECHNOLOGY LIMTED**
Address	:	FLAT/RM810, Star House, 3 Salisbury Road, Tsimshatsui, Hong Kong
Manufacturer	:	**SHENZHEN KWANG SUNG ELECTRONICS CO.,LTD**
Address	:	Shitoushan Industrial Zone, Shi Yan Town, Baoan District, Shenzhen, PRC

Test Result:	**PASS**

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.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Nov 14, 2014
Testing commenced on	:	Nov 14, 2014
Testing concluded on	:	Nov 26, 2014

2.2. Product Description

The **AURA TECHNOLOGY LIMTED**'s Model: HC7 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Telpad
Model Number	HC7
FCC ID	2ACWO-HC7-M
WLAN	Supported 802.11b/802.11g/802.11n
Bluetooth	Supported BT 4.0+EDR
Antenna Type	Internal
WLAN FCC Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
Bluetooth FCC Operation frequency	2402MHz-2480MHz
WLAN Modulation	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Bluetooth Modulation	EDR(GFSK,8DPSK,π/4DQPSK)/BLE(GFSK)
Android Version	Android 4.2.2

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	120V / 60 Hz	○	115V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.70V/DC 5.0V Adapter from AC 120V/60Hz

2.4. Short description of the Equipment under Test (EUT)

2.4GHz (Telpad (M/N: HC7))

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

2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX (Duty Cycle >98%)

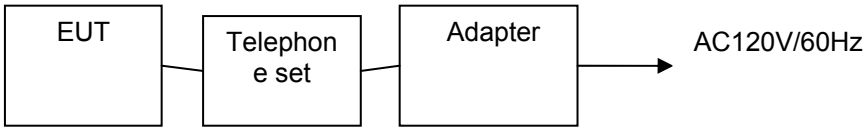
for testing meet KDB558074 test requirement.

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continous transmitting and receiving mode for testing. There are 40 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel .

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	**2402**	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	**2440**	**39**	**2480**

2.6. Block Diagram of Test Setup

Fig. 2-1 Configuration of Tested System



Adapter:

MODEL:SA/18PA/05FUS056300
INPUT:100-240V～50/60Hz 0.3A
OUTPUT: 5.6V DC 3A
Power Cable: 60cm
◇ Shielded ◆ Unshielded

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

This submittal(s) (test report) is intended for **FCC ID: 2ACWO-HC7-M** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

2.9. NOTE

1. The EUT is a Telpad with WLAN and Bluetooth function,The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN	FCC Part 15 Subpart C	A1411096076-WLAN
Bluetooth-EDR	FCC Part 15 Subpart C	A1411096076-EDR
Bluetooth-BLE	FCC Part 15 Subpart C	A1411096076-BLE
JBP	FCC Part 15 Subpart B	A1411096076-JBP
SAR	FCC Per 47 CFR 2.1093(d)	A1411096076-SAR

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
EUT	√	—	—	—

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Dongguan Dongdian Testing Service Co.,Ltd

No.17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2003) and CISPR Publication 22.

3.2. Test Facility

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

IC Registration No.: 10288A-1

The 3m alternate test site of Dongguan Dongdian Testing Service Co.,Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 10288A-1 on Mar, 2012.

FCC-Registration No.: 270092

Dongguan Dongdian Testing Service 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 270092, Mar 06, 2012.

3.3. Environmental conditions

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

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

FCC PART 15 15.247		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.247(a)(2)	6dB Bandwidth	PASS
FCC Part 15.247(d)	Spurious RF Conducted Emission	PASS
FCC Part 15.247(b)	Maximum Peak Output Power	PASS
FCC Part 15.247(e)	Power Spectral Density	PASS
FCC Part 15.109/ 15.205/ 15.209	Radiated Emissions	PASS
FCC Part 15.247(d)	Band Edge	PASS
FCC Part 15.203/15.247 (b)	Antenna Requirement	PASS
FCC Part1.1307 (b)	RF Exposure Evaluation	PASS

Remark: The measurement uncertainty is not included in the test result.

3.5. 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 Dongguan Dongdian Testing Service 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 Dongguan Dongdian Testing Service Co.,Ltd laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)

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

3.6. Equipments Used during the Test

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	462	2014/11/01
2	EMI TEST Receiver	Rohde&Schwarz	ESU8	100316	2014/11/01
3	EMI TEST Software	Audix	E3	N/A	N/A
4	Horn Anternna	EMCO	3116	00060095	2014/11/02
5	Pre-Amplifer	Rohde&Schwarz	SCU-01	10049	2014/11/01
6	Pre-Amplifer	A.H.	PAM0-0118	360	2014/11/02
7	Pre-Amplifer	A.H.	PAM-1840VH	562	2014/11/02
8	Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100265	2014/11/01
9	Active Loop Antenna	Schwarz beck	FMZB1519	0.38	2014/11/01
10	Loop Antenna	Rohde&Schwarz	HFH2-Z2	100020	2014/10/02
11	TURNTABLE	MATURO	TT2.0	----	N/A
12	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
13	Spectrum Analyzer	R&S	FSU26	1166.1660.26	2014/11/01
14	EMI TEST Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A

Maximum Peak Output Power / 20dB Bandwidth / Number of hopping frequency& Time of Occupancy / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission/ Frequency Separation					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Power Sensor	Rohde&Schwarz	NRP-Z81	102638	2014/11/02
2	Spectrum Analyzer	R&S	FSU26	1166.1660.26	2014/11/01
3	Spectrum Analyzer	Aglient	E4407B	MY44210775	2014/11/01

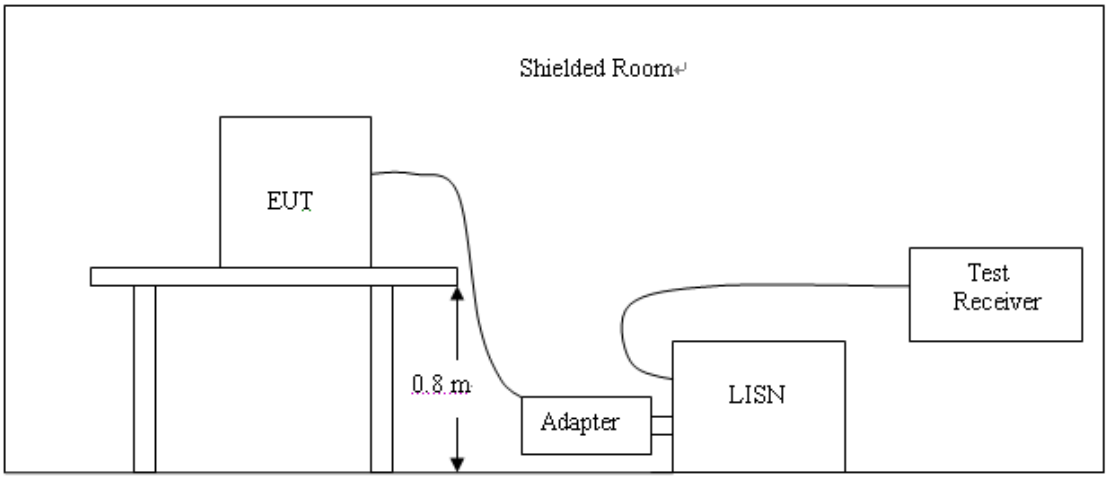
AC Power Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Artificial Mains	Rohde&Schwarz	ENV216	100316	2014/11/02
2	EMI Test Receiver	Rohde&Schwarz	ESU8	100316	2014/11/02
3	Pulse Limiter	Rohde&Schwarz	ESH3-Z2	101242	2014/11/02
4	EMI Test Software	Rohde&Schwarz	ES-K1 V1.71	N/A	N/A

The Cal.Interval was one year

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

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 C63.10-2009.
2 Support equipment, if needed, was placed as per ANSI C63.10-2009
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2009
4 The EUT received DC5V power from PC, the adapter of PC 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.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

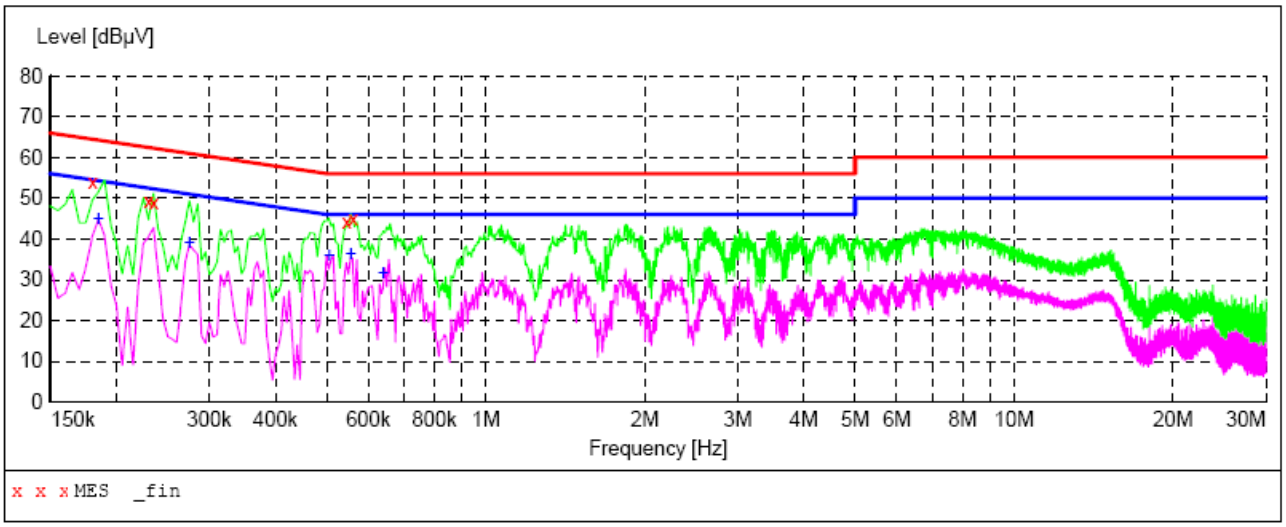
Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

The AC Power Conducted Emission measurement are performed each channel (low/mid/high) at TX and RX mode, the datum recorded below (middle channel and TX mode) is the worst case for all the test modes and channels.

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



MEASUREMENT RESULT:

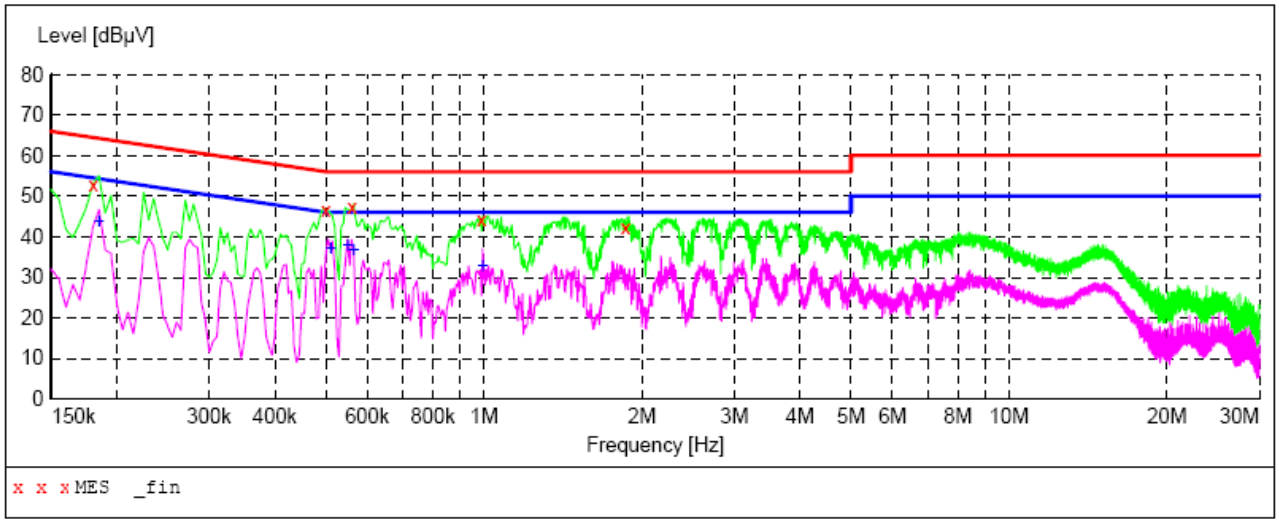
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.180000	54.10	12.1	65	10.4	QP	L1	GND
0.230000	49.30	11.2	62	13.1	QP	L1	GND
0.235000	48.80	11.2	62	13.5	QP	L1	GND
0.545000	44.30	10.5	56	11.7	QP	L1	GND
0.560000	45.10	10.5	56	10.9	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.185000	44.90	11.9	54	9.4	AV	L1	GND
0.275000	39.20	11.0	51	11.8	AV	L1	GND
0.505000	35.90	10.5	46	10.1	AV	L1	GND
0.555000	36.50	10.5	46	9.5	AV	L1	GND
0.640000	31.70	10.4	46	14.3	AV	L1	GND

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

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.180000	52.70	12.1	65	11.8	QP	N	GND
0.500000	46.70	10.5	56	9.3	QP	N	GND
0.560000	47.50	10.5	56	8.5	QP	N	GND
0.990000	44.10	10.5	56	11.9	QP	N	GND
1.860000	42.40	10.4	56	13.6	QP	N	GND

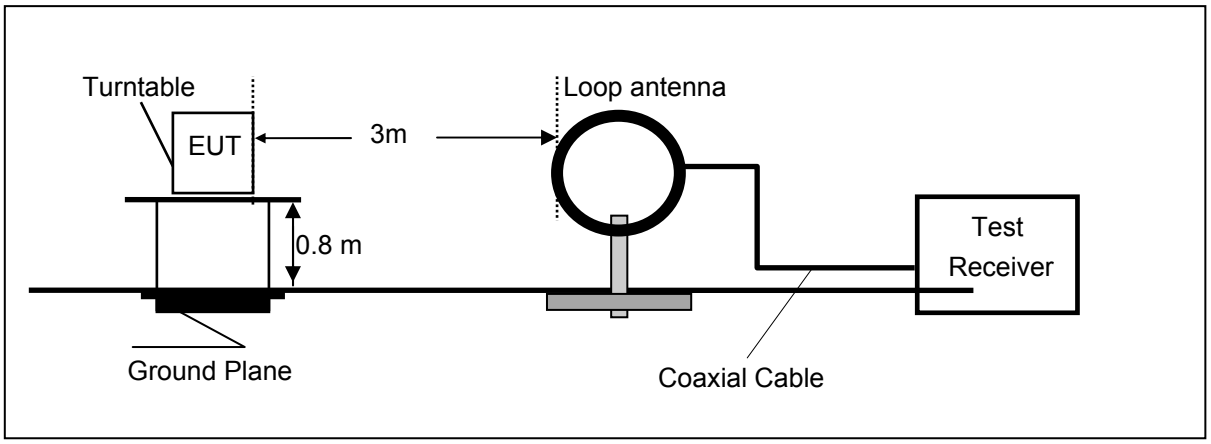
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.185000	43.80	11.9	54	10.5	AV	N	GND
0.510000	37.30	10.5	46	8.7	AV	N	GND
0.550000	38.00	10.5	46	8.0	AV	N	GND
0.565000	37.00	10.5	46	9.0	AV	N	GND
0.995000	32.80	10.5	46	13.2	AV	N	GND

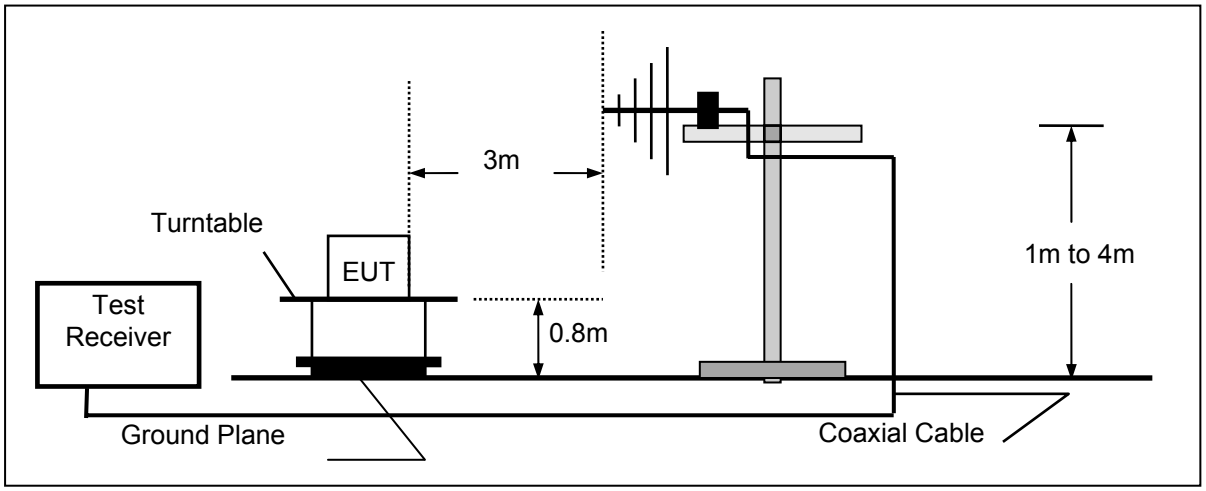
4.2. Radiated Emission

TEST CONFIGURATION

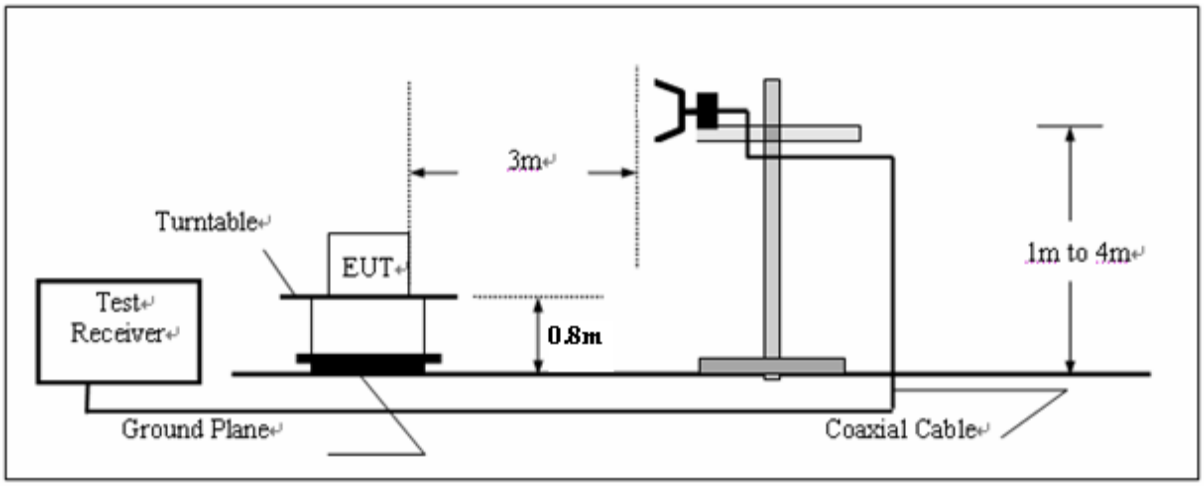
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m 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.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values. The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

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 RESULTS

Remark: 1. We tested three positions and recorded worst case.

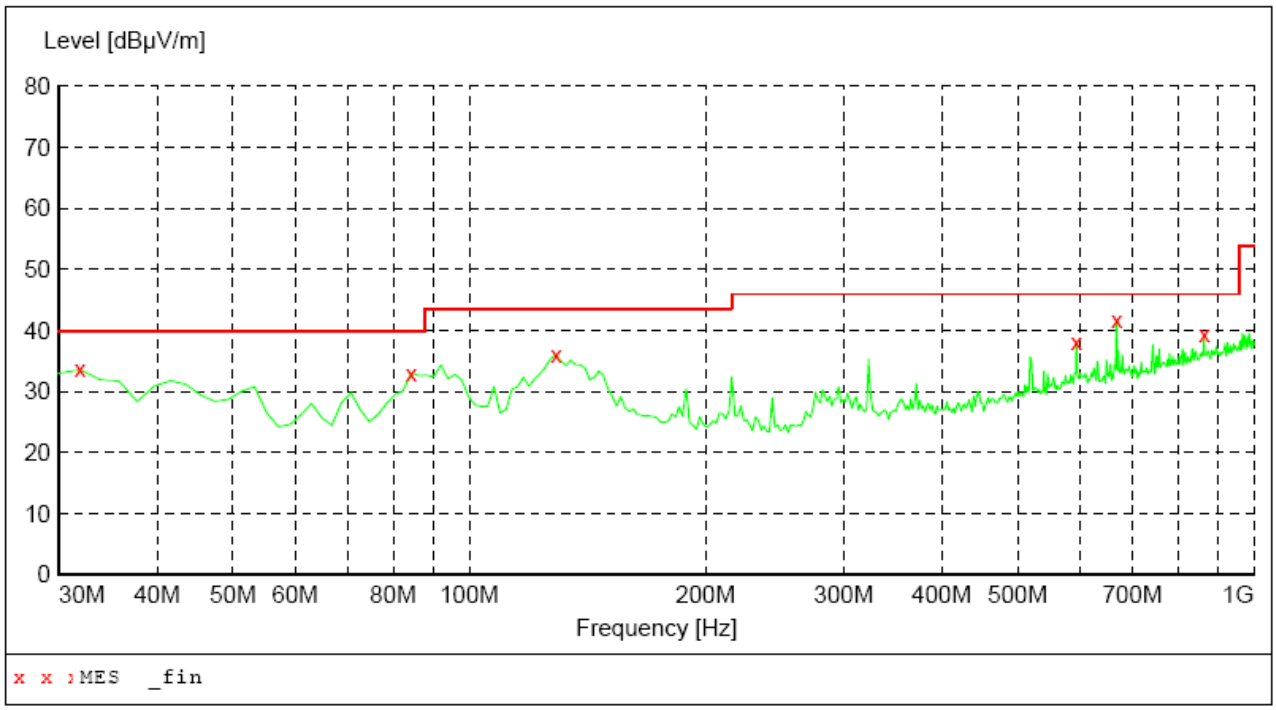
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
12.00	46.41	69.54	23.13	QP	PASS
24.00	49.82	69.54	19.72	QP	PASS

For 30MHz to 1000MHz

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	Coupled	100 kHz	VULB9163 NEW

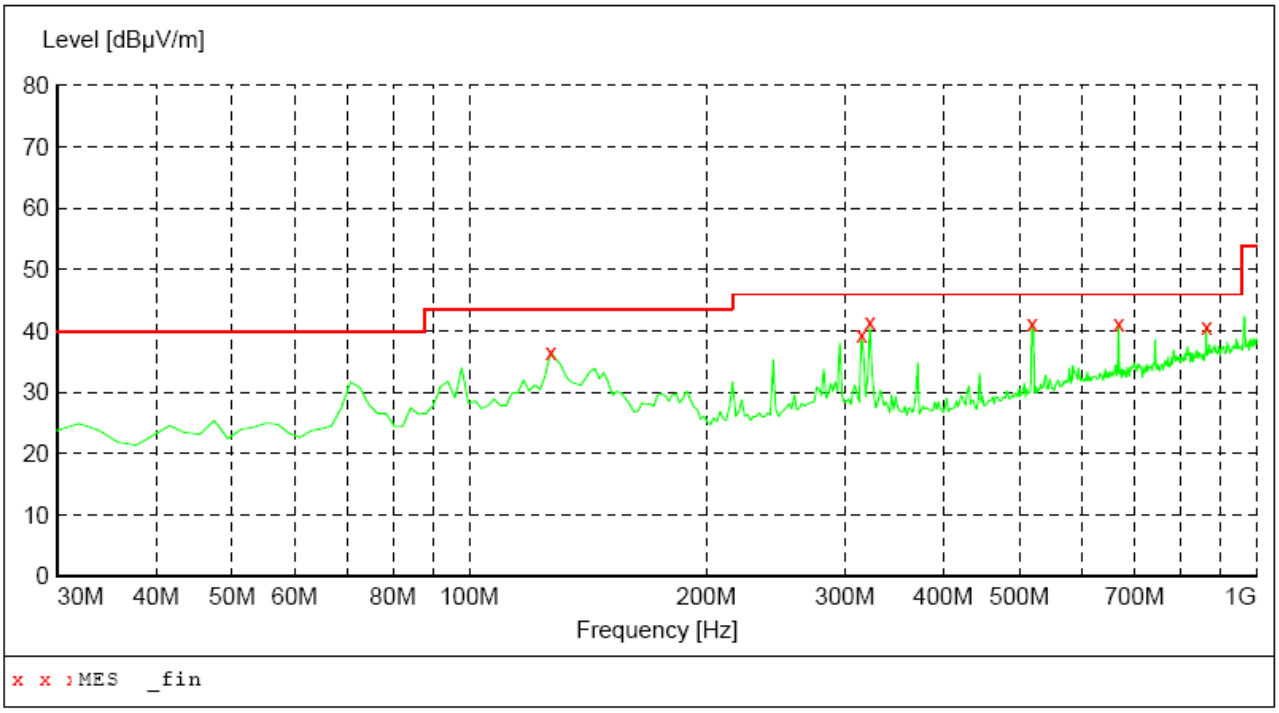


MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
31.940000	33.60	14.4	40.0	6.4	QP	100.0	15.00	VERTICAL
84.320000	33.00	14.1	40.0	7.0	QP	100.0	124.00	VERTICAL
128.940000	36.00	13.9	43.5	7.5	QP	100.0	60.00	VERTICAL
594.540000	38.20	26.3	46.0	7.8	QP	100.0	238.00	VERTICAL
668.260000	41.80	27.2	46.0	4.2	QP	100.0	325.00	VERTICAL
864.200000	39.30	30.6	46.0	6.7	QP	100.0	75.00	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	Coupled	100 kHz	VULB9163 NEW



MEASUREMENT RESULT:

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
127.000000	36.60	14.1	43.5	6.9	QP	300.0	25.00	HORIZONTAL
315.180000	39.40	19.1	46.0	6.6	QP	100.0	30.00	HORIZONTAL
322.940000	41.50	19.3	46.0	4.5	QP	100.0	125.00	HORIZONTAL
518.880000	41.30	24.4	46.0	4.7	QP	100.0	350.00	HORIZONTAL
668.260000	41.20	27.2	46.0	4.8	QP	100.0	272.00	HORIZONTAL
864.200000	40.80	30.6	46.0	5.2	QP	100.0	105.00	HORIZONTAL

For 1GHz to 25GHz

Low Channel @ Channel 00 @ 2402 MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4804.00	56.28	PK	74.00	17.72	1.00	125	54.20	31.58	7.00	36.5	2.08
2	4804.00	43.16	AV	54.00	10.84	1.00	125	41.08	31.58	7.00	36.5	2.08
3	7206.00	58.79	PK	74.00	15.21	1.00	311	48.13	37.06	8.90	35.3	10.66
4	7206.00	44.22	AV	54.00	9.78	1.00	311	33.56	37.06	8.90	35.3	10.66

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4804.00	53.85	PK	74.00	20.15	1.00	128	51.77	31.58	7.00	36.5	2.08
2	4804.00	41.09	AV	54.00	12.91	1.00	128	39.01	31.58	7.00	36.5	2.08
3	7206.00	55.73	PK	74.00	18.27	1.00	45	45.07	37.06	8.90	35.3	10.66
4	7206.00	41.66	AV	54.00	12.34	1.00	45	31.00	37.06	8.90	35.3	10.66

Middle Channel @ Channel 39 @ 2440 MHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4880.00	57.23	PK	74.00	16.77	1.00	214	55.09	31.04	7.60	36.5	2.14
2	4880.00	44.51	AV	54.00	9.49	1.00	214	42.37	31.04	7.60	36.5	2.14
3	7320.00	59.02	PK	74.00	14.98	1.00	350	47.88	37.84	8.60	35.3	11.14
4	7320.00	45.75	AV	54.00	8.25	1.00	350	34.61	37.84	8.60	35.3	11.14

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4880.00	54.16	PK	74.00	19.84	1.00	265	52.02	31.04	7.60	36.5	2.14
2	4880.00	41.75	AV	54.00	12.25	1.00	265	39.61	31.04	7.60	36.5	2.14
3	7320.00	55.98	PK	74.00	18.02	1.00	150	44.84	37.84	8.60	35.3	11.14
4	7320.00	41.80	AV	54.00	12.20	1.00	150	30.66	37.84	8.60	35.3	11.14

High Channel @ Channel 78 @ 2480 MHz

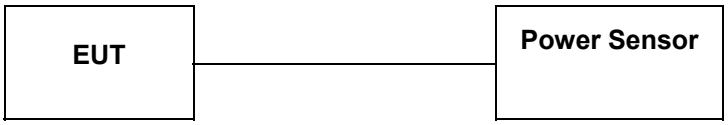
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4960.00	57.88	PK	74.00	16.12	1.00	118	55.45	31.63	7.00	36.2	2.43
2	4960.00	44.73	AV	54.00	9.27	1.00	118	42.30	31.63	7.00	36.2	2.43
3	7340.00	59.64	PK	74.00	14.36	1.00	124	48.04	38.40	8.50	35.3	11.60
4	7340.00	45.97	AV	54.00	8.03	1.00	124	34.37	38.40	8.50	35.3	11.60

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M												
No.	Frequency (MHz)	Emssion Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1	4960.00	54.77	PK	74.00	19.23	1.00	189	52.34	31.63	7.00	-36.2	2.43
2	4960.00	41.93	AV	54.00	12.07	1.00	189	39.50	31.63	7.00	-36.2	2.43
3	7340.00	56.45	PK	74.00	17.55	1.00	257	44.85	38.40	8.50	-35.3	11.60
4	7340.00	42.04	AV	54.00	11.96	1.00	257	30.44	38.40	8.50	-35.3	11.60

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. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. The average measurement was not performed when the peak measured data under the limit of average detection.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Measurement Guidance Section 9.1 Maximum peak conducted output power,9.1.1. The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

LIMIT

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

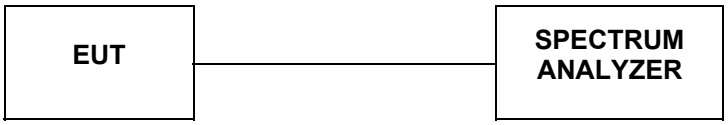
A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
00	2402	-2.12	30	PASS
19	2440	-1.97	30	PASS
39	2480	-2.01	30	PASS

Note: 1.The test results including the cable lose.

4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

1.Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2.Set the RBW ≥ 3 kHz.
3.Set the VBW ≥ 3× RBW.
4.Set the span to 1.5 times the DTS channel bandwidth.
5.Detector = peak.
6.Sweep time = auto couple.
7.Trace mode = max hold.
8.Allow trace to fully stabilize.
9.Use the peak marker function to determine the maximum power level.
10.If measured value exceeds limit,reduce RBW(no less than 3 kHz)and repeat.
11.The resulting peak PSD level must be 8 dBm.

LIMIT

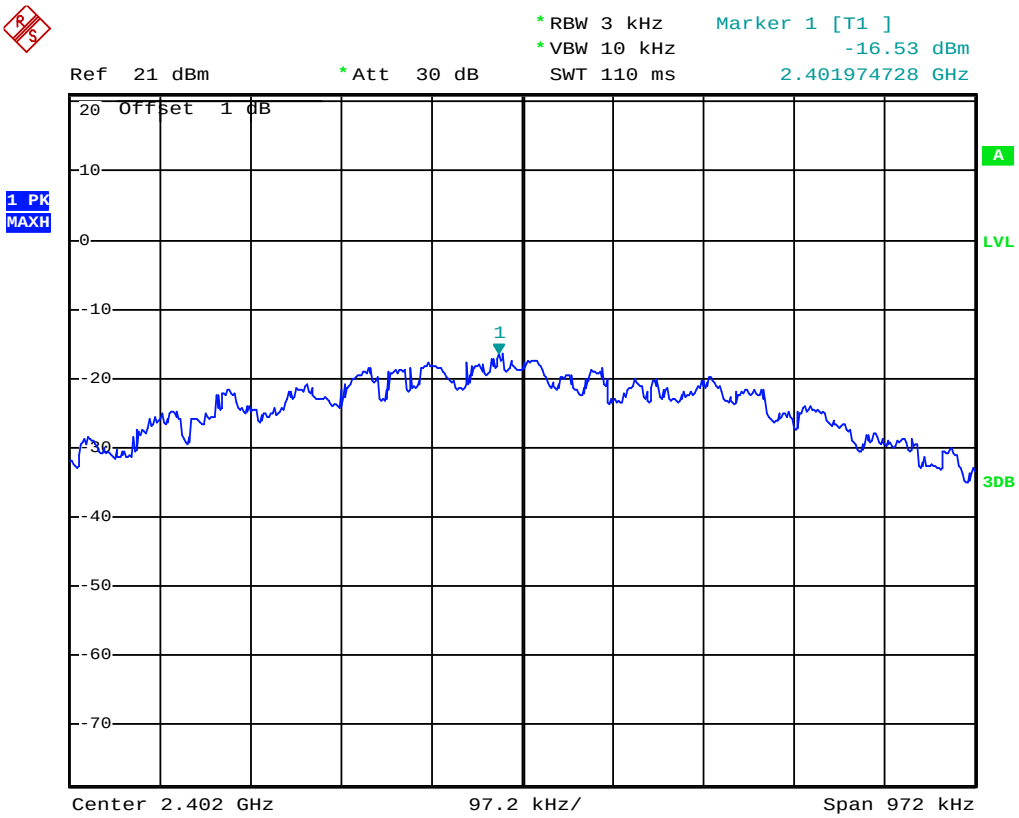
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST RESULTS

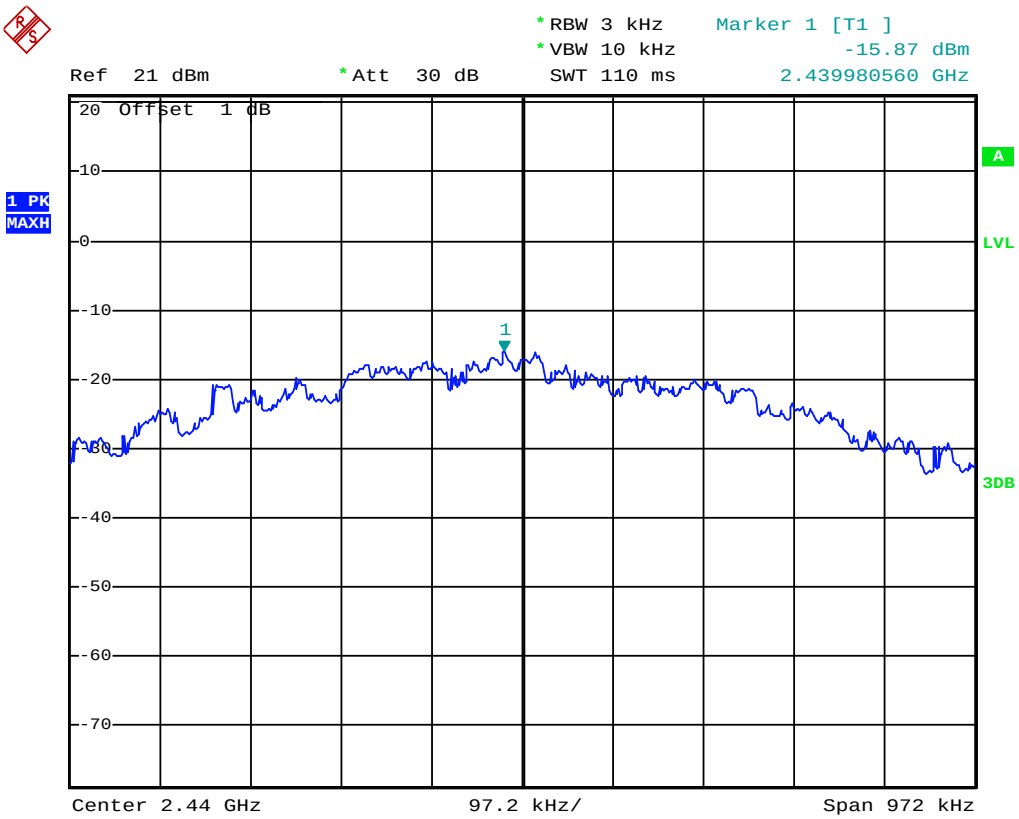
A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/3kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
00	2402	-16.53	Plot 4.4.1 A	8	PASS
19	2440	-15.87	Plot 4.4.1 B	8	PASS
39	2480	-16.35	Plot 4.4.1 C	8	PASS

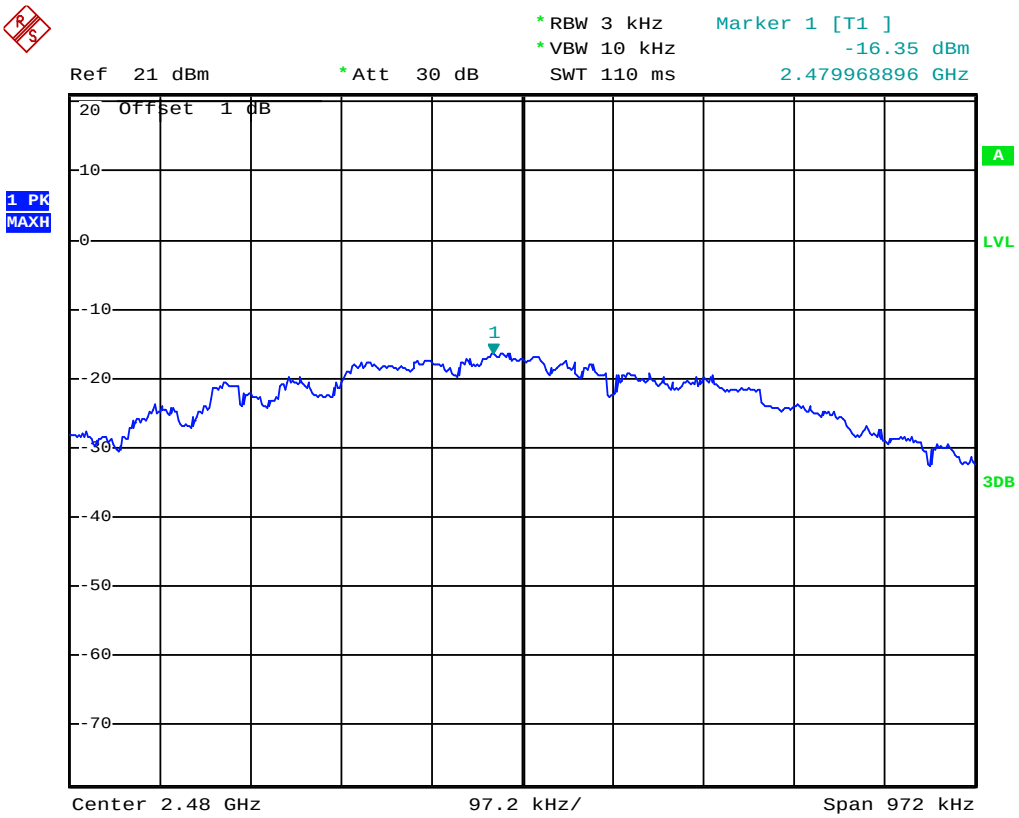
B. Test Plots



(Plot 4.4.1 A : Channel 00: 2402MHz @ GFSK)



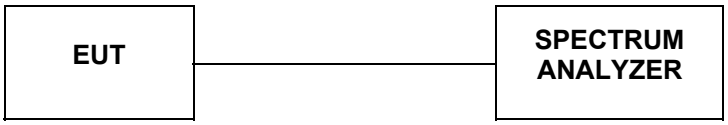
(Plot 4.4.1 B : Channel 19: 2440MHz @ GFSK)



(Plot 4.4.1 C : Channel 39: 2480MHz @ GFSK)

4.5. 6dB Bandwidth

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 RBW=100 KHz and VBW=300KHz.
The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.
According to KDB558074 D01 V03 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

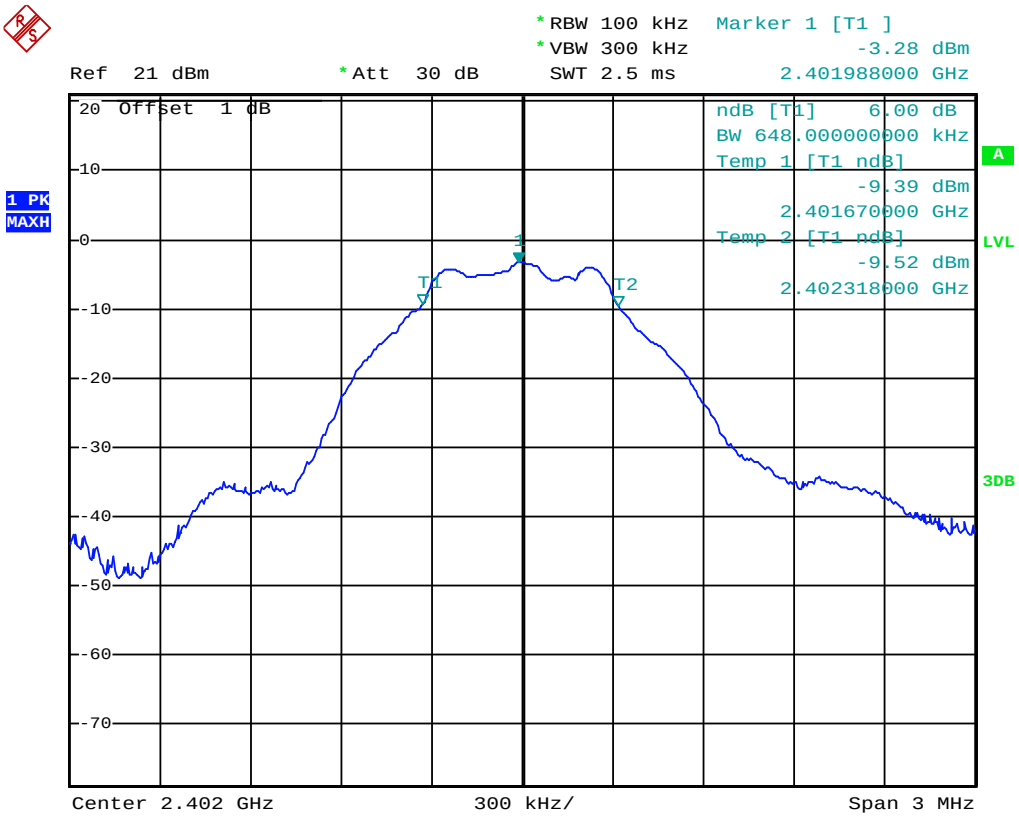
TEST RESULTS

A. Test Verdict

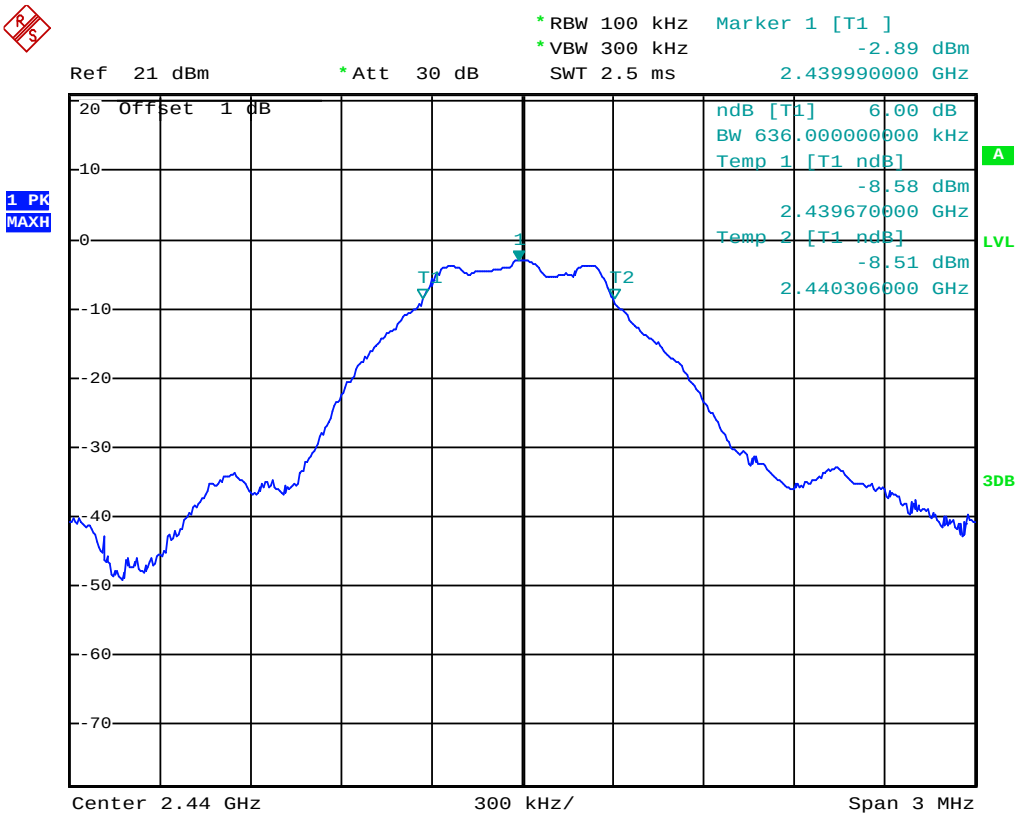
Channel	Frequency (MHz)	6 dB Bandwidth (KHz)	Refer to Plot	Limits (kHz)	Verdict
00	2402	468.00	Plot 4.5.1 A	≥500	PASS
19	2440	636.00	Plot 4.5.1 B	≥500	PASS
39	2480	642.00	Plot 4.5.1 C	≥500	PASS

Note: 1.The test results including the cable lose.

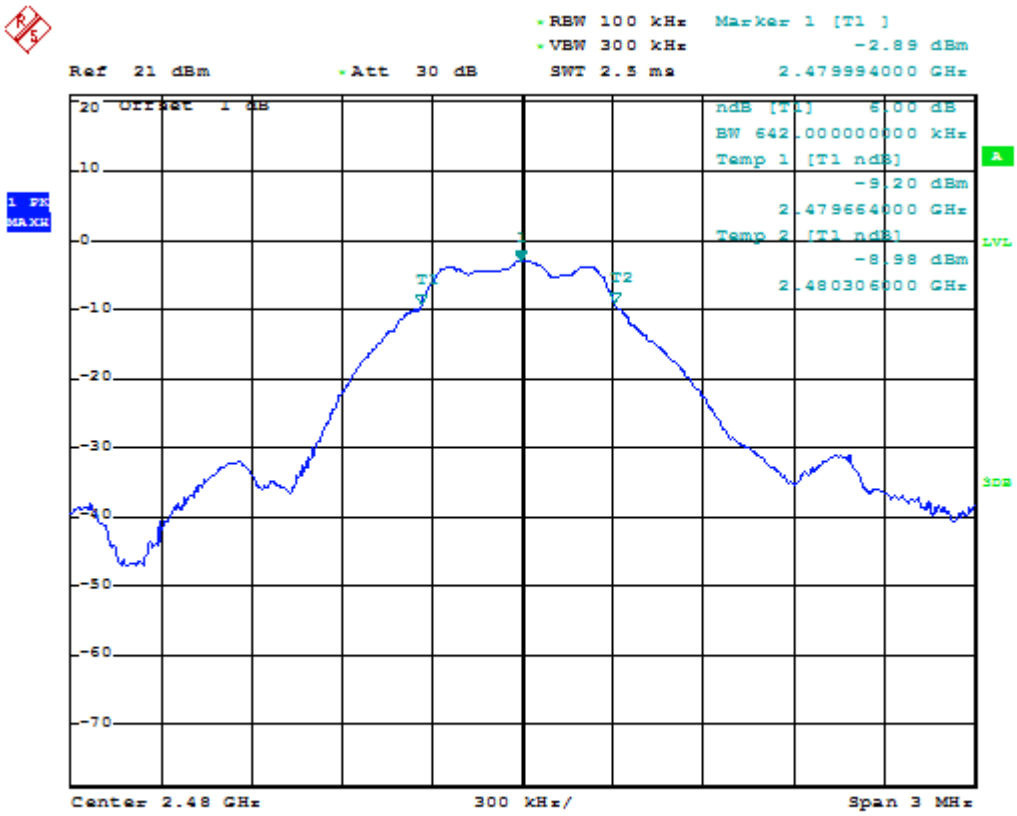
B. Test Plots



(Plot 4.5.1 A: Channel 00: 2402MHz @ GFSK)



(Plot 4.5.1 B: Channel 19: 2440MHz @ GFSK)



(Plot 4.5.1 C: Channel 39: 2480MHz @ GFSK)

4.6. Band Edge Compliance of RF Emission

TEST REQUIREMENT

In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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) (see §15.205(c)).

TEST PROCEDURE

According to KDB 558074 D01 V03 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.
6. Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8. Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9. For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
10. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
    $E = EIRP – 20\log D + 104.8$

where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.

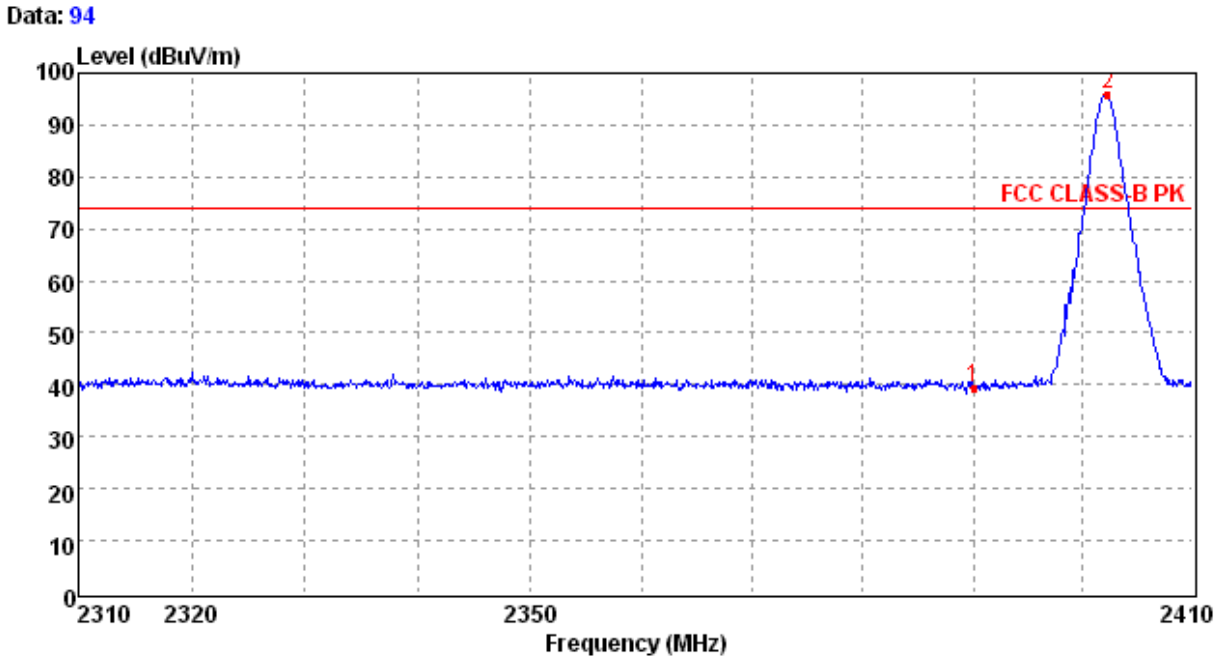
11. Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.
12. Compare the resultant electric field strength level to the applicable regulatory limit.
13. Perform radiated spurious emission test dures until all measured frequencies were complete.

LIMIT

Below -20dB of the highest emission level in operating band.
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)

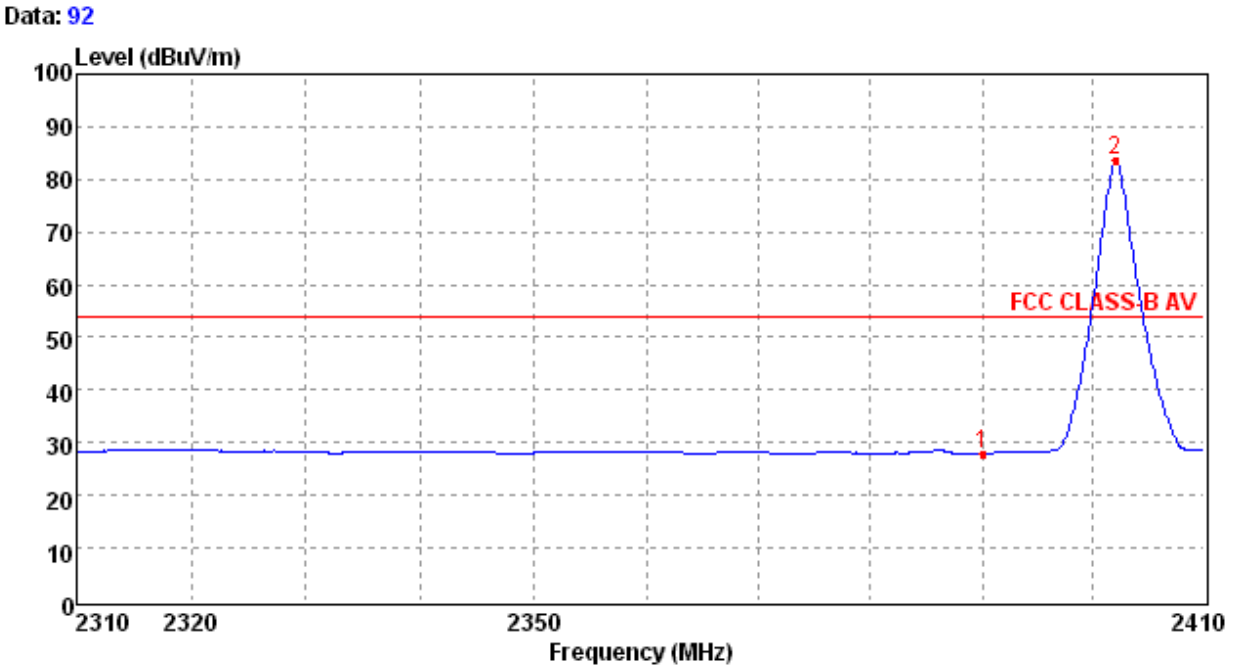
TEST RESULTS

Radiated Band Edge emissions (GFSK, Horizontal/Vertical,2402MHz,Peak)



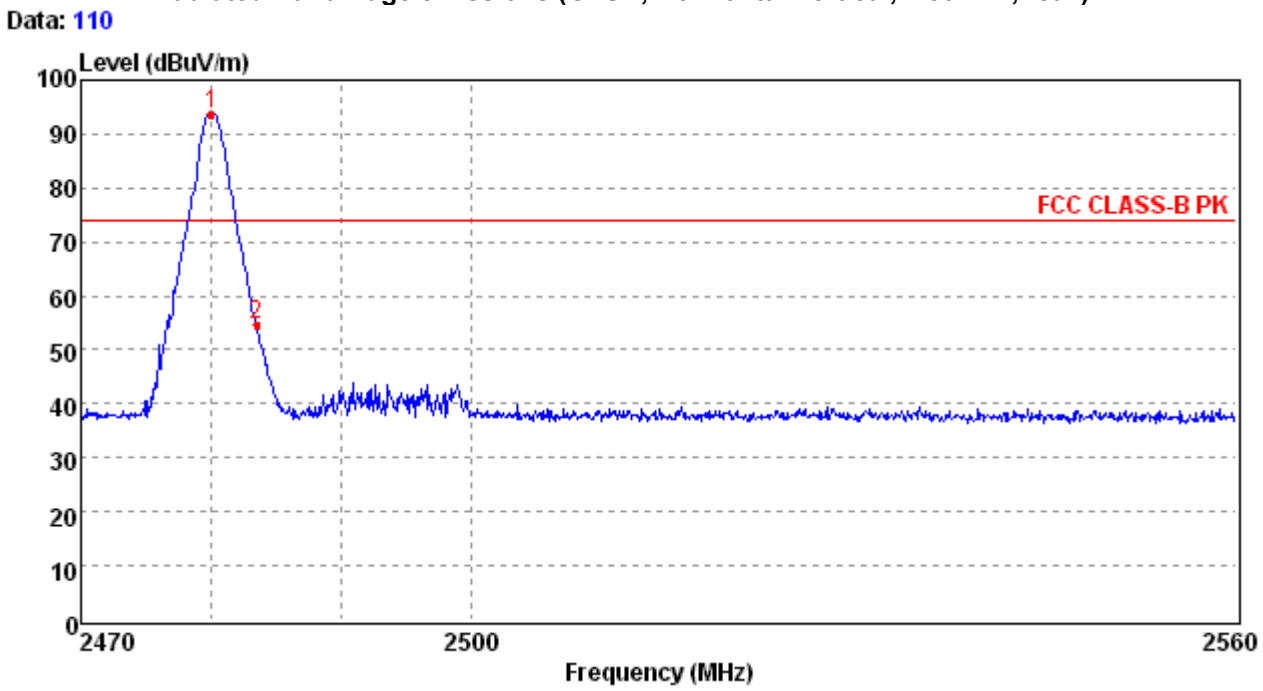
Mark	Frequency (MHz)	Level (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Reading Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization	Detector
1	2390.00	39.35	3.32	27.49	36.12	44.63	74.00	34.65	Ver	Peak
2	**2402.25**	**95.75**	**3.32**	**27.49**	**36.12**	**101.06**	**74.00**	**-21.75**	**Ver**	**Peak**

Radiated Band Edge emissions (GFSK, Horizontal/Vertical,2402MHz,Average)



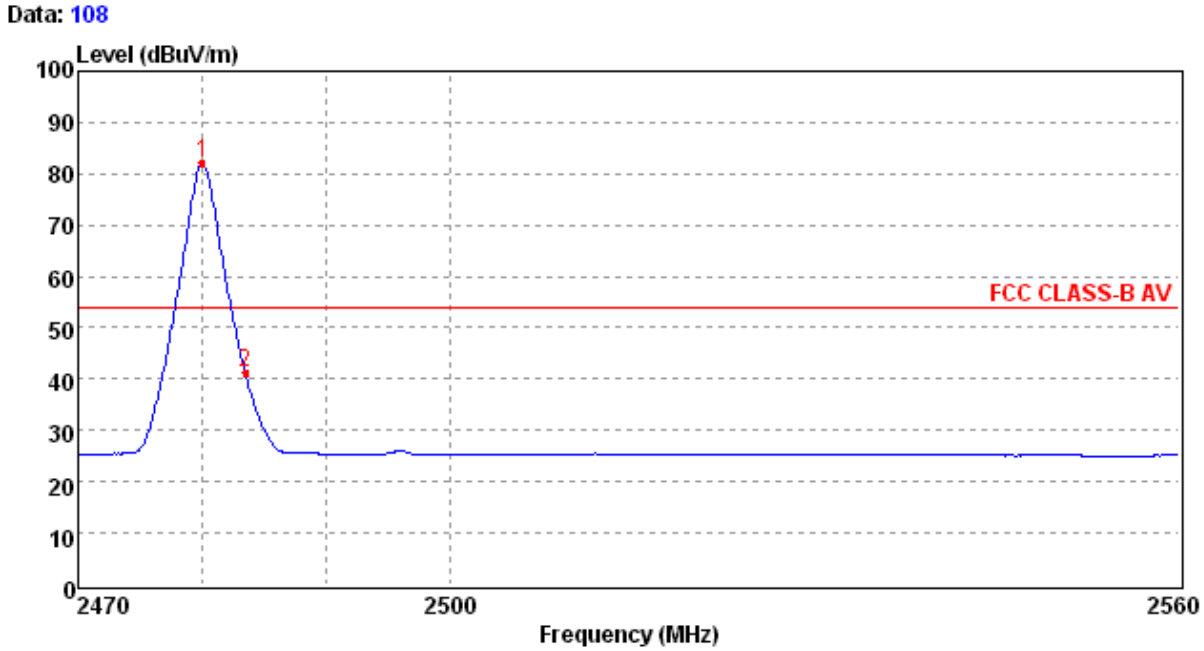
Mark	Frequency (MHz)	Level (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Reading Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization	Detector
1	2390.00	27.98	3.32	27.49	36.12	33.26	54.00	26.02	Hor	Average
2	**2402.05**	**83.54**	**3.32**	**27.49**	**36.12**	**88.85**	**54.00**	**-29.54**	**Ver**	Average

Radiated Band Edge emissions (GFSK, Horizontal/Vertical,2480MHz,Peak)



Mark	Frequency (MHz)	Level (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Reading Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization	Detector
1	**2480.05**	**93.78**	**3.88**	**27.45**	**36.55**	**99.00**	**74.00**	**-19.78**	**Ver**	**Peak**
2	2483.50	54.58	3.88	27.45	36.55	59.80	74.00	19.42	Ver	Peak

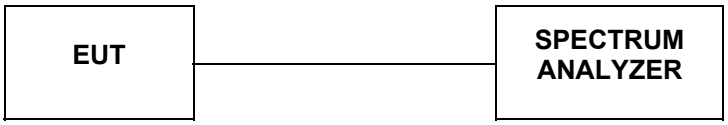
Radiated Band Edge emissions (GFSK, Horizontal/Vertical,2480MHz,Average)



Mark	Frequency (MHz)	Level (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Reading Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polarization	Detector
1	**2480.05**	**81.97**	**3.88**	**27.45**	**36.55**	**87.19**	**54.00**	**-27.97**	**Ver**	**Average**
2	2483.50	41.17	3.88	27.45	36.55	46.39	54.00	12.83	Hor	Average

4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and mwasure frequeny range from 30MHz to 26.5GHz.

LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

TEST RESULTS

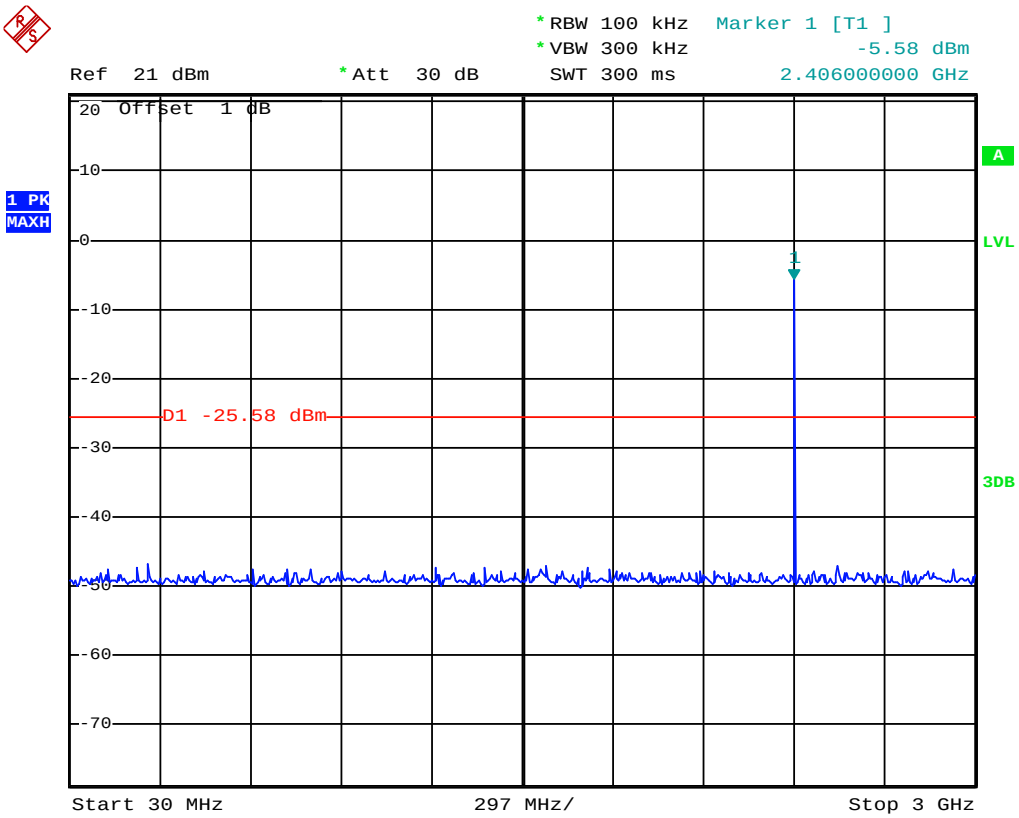
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

A. Test Verdict

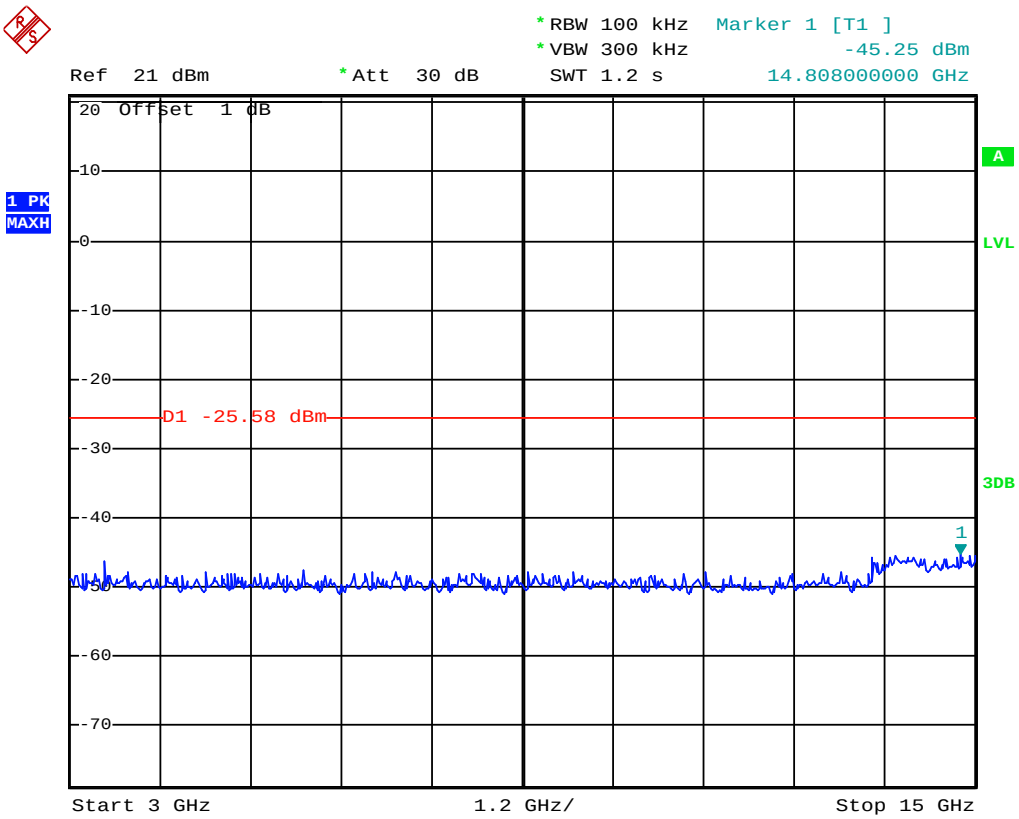
Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
00	2402	30MHz-3GHz	Plot 4.7.1 A1	-20	PASS
		3GHz-15GHz	Plot 4.7.1 A2	-20	PASS
		15GHz-25GHz	Plot 4.7.1 A3	-20	PASS
19	2440	30MHz-3GHz	Plot 4.7.1 B1	-20	PASS
		3GHz-15GHz	Plot 4.7.1 B2	-20	PASS
		15GHz-25GHz	Plot 4.7.1 B3	-20	PASS
39	2480	30MHz-3GHz	Plot 4.7.1 C1	-20	PASS
		3GHz-15GHz	Plot 4.7.1 C2	-20	PASS
		15GHz-25GHz	Plot 4.7.1 C3	-20	PASS

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-43.86	Peak	-20	Plot 4.7.1 D	PASS
2495.60	-33.88	Peak	-20	Plot 4.7.1 E	PASS

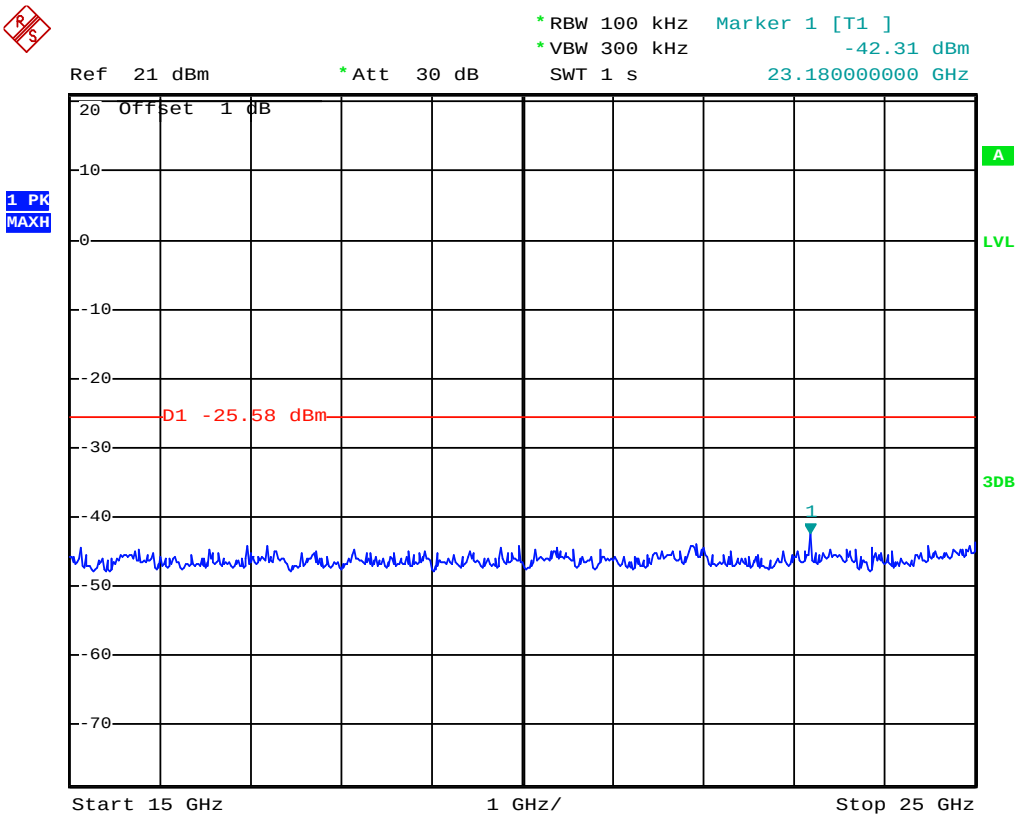
B. Test Plots



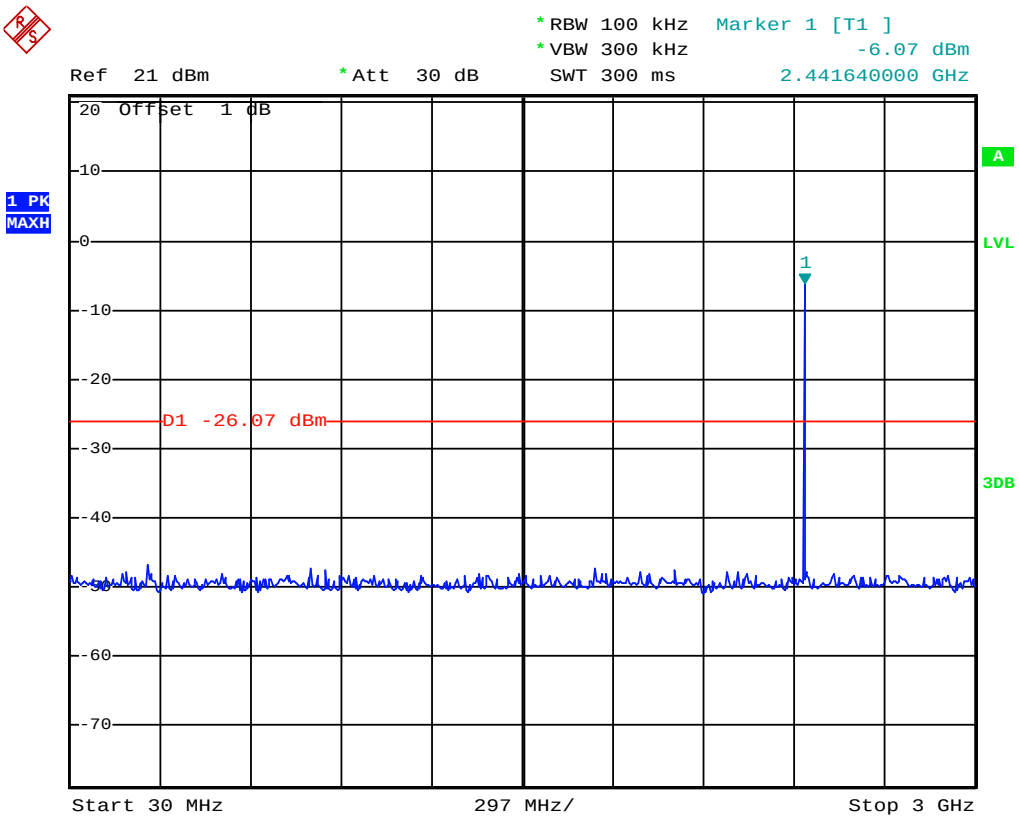
(Plot 4.7.1 A1: Channel 00: 2402MHz @ GFSK)



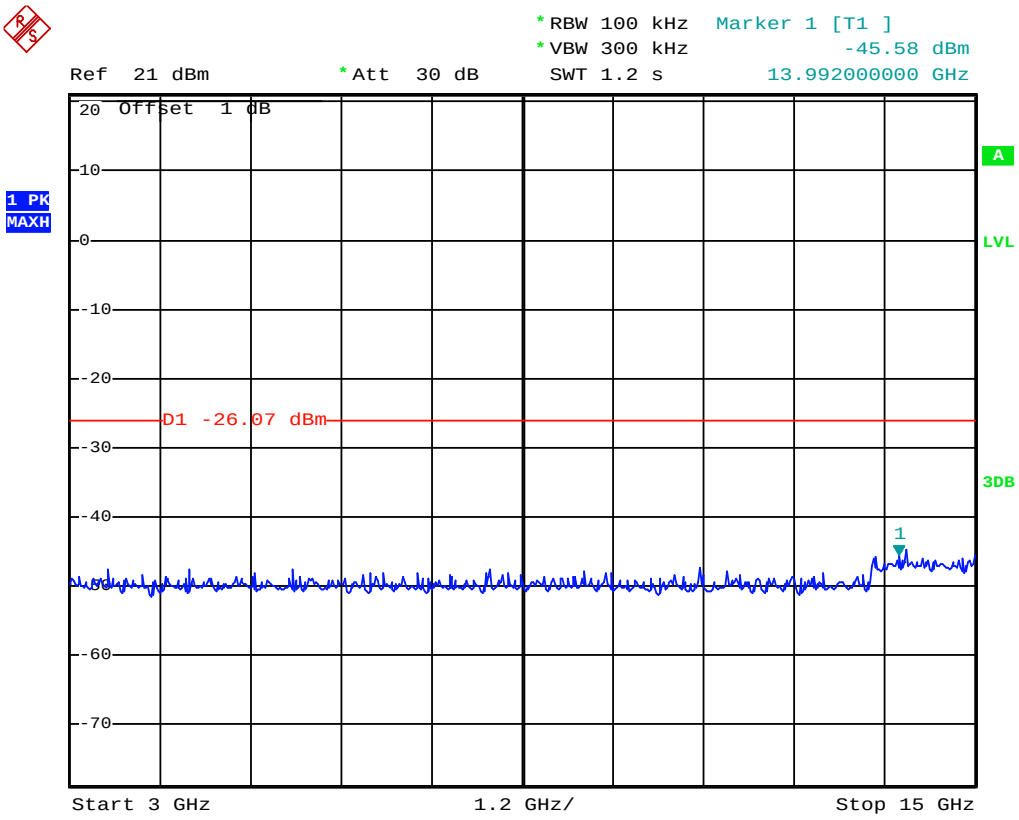
(Plot 4.7.1 A2: Channel 00: 2402MHz @ GFSK)



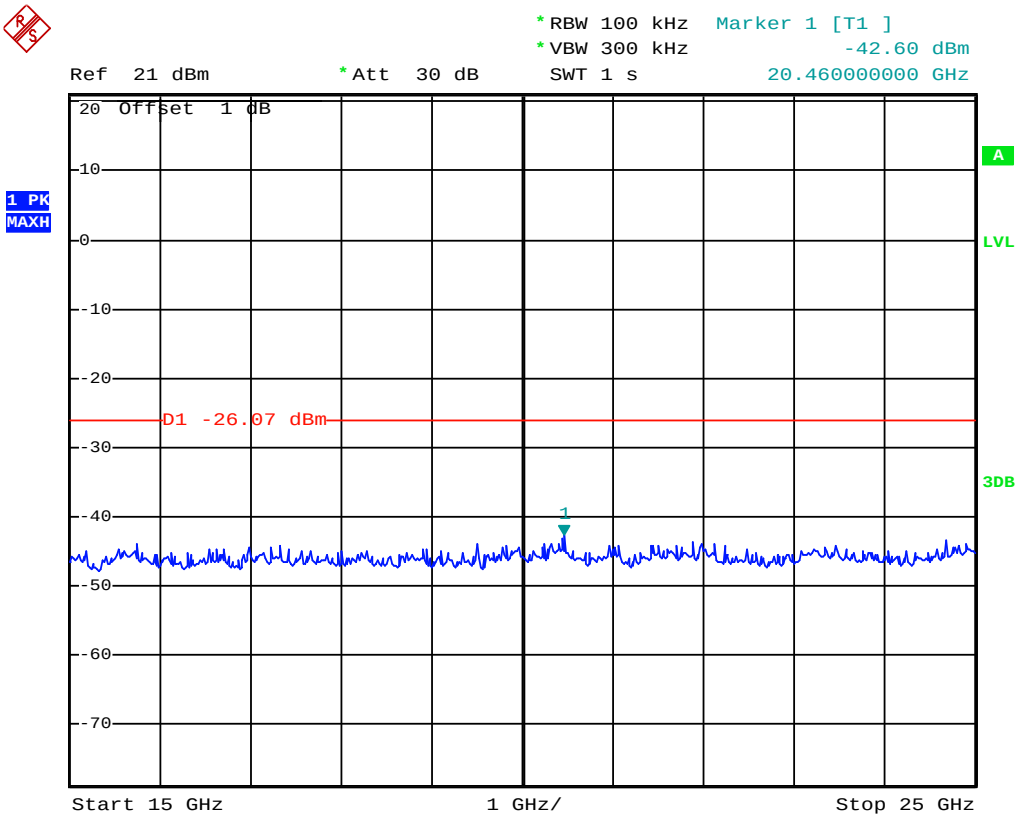
(Plot 4.7.1 A3: Channel 00: 2402MHz @ GFSK)



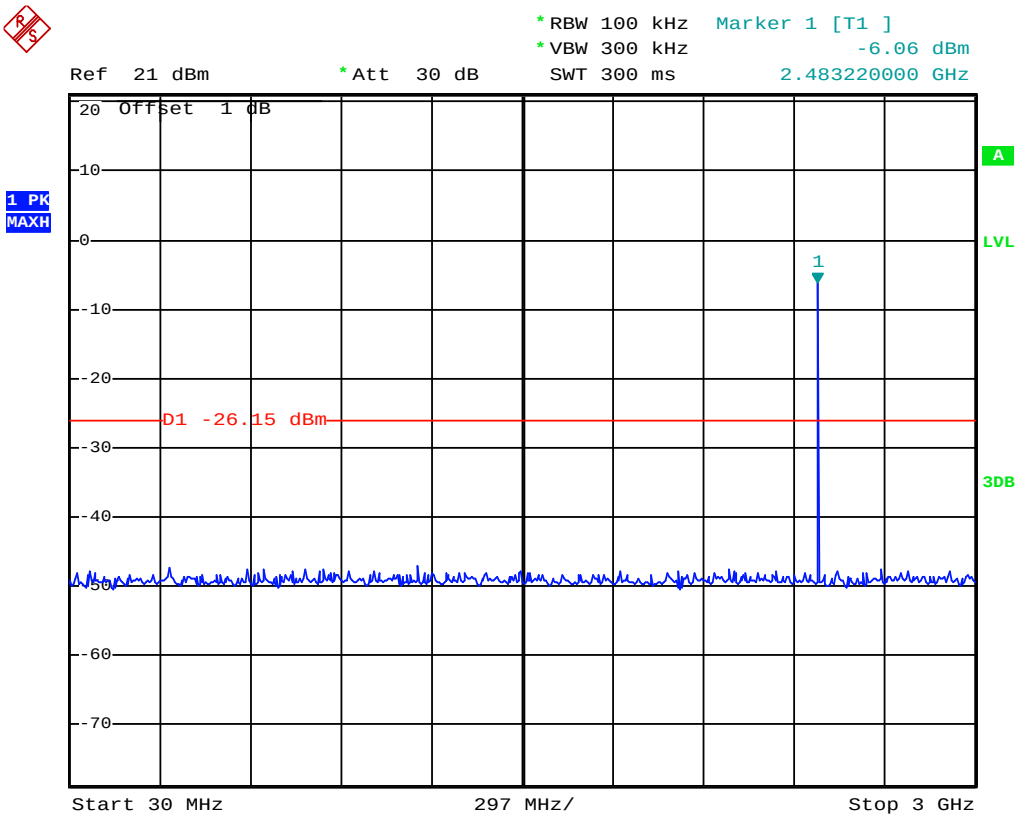
(Plot 4.7.1 B1: Channel 19: 2440MHz @ GFSK)



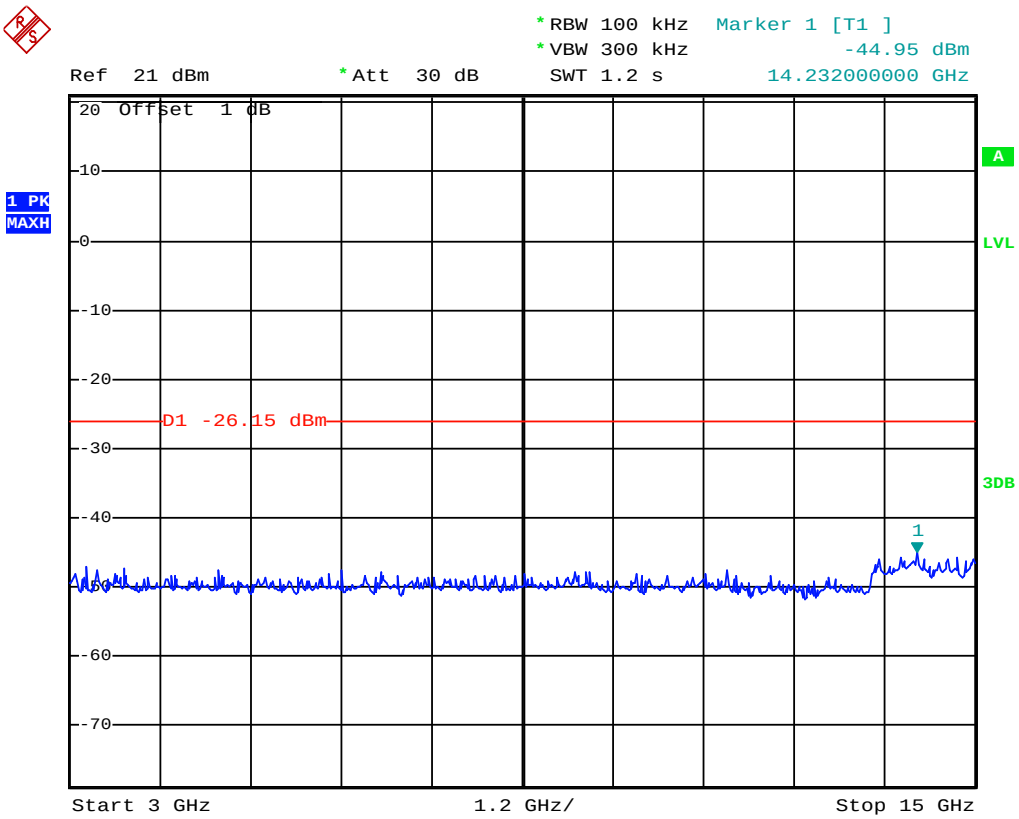
(Plot 4.7.1 B2: Channel 19: 2440MHz @ GFSK)



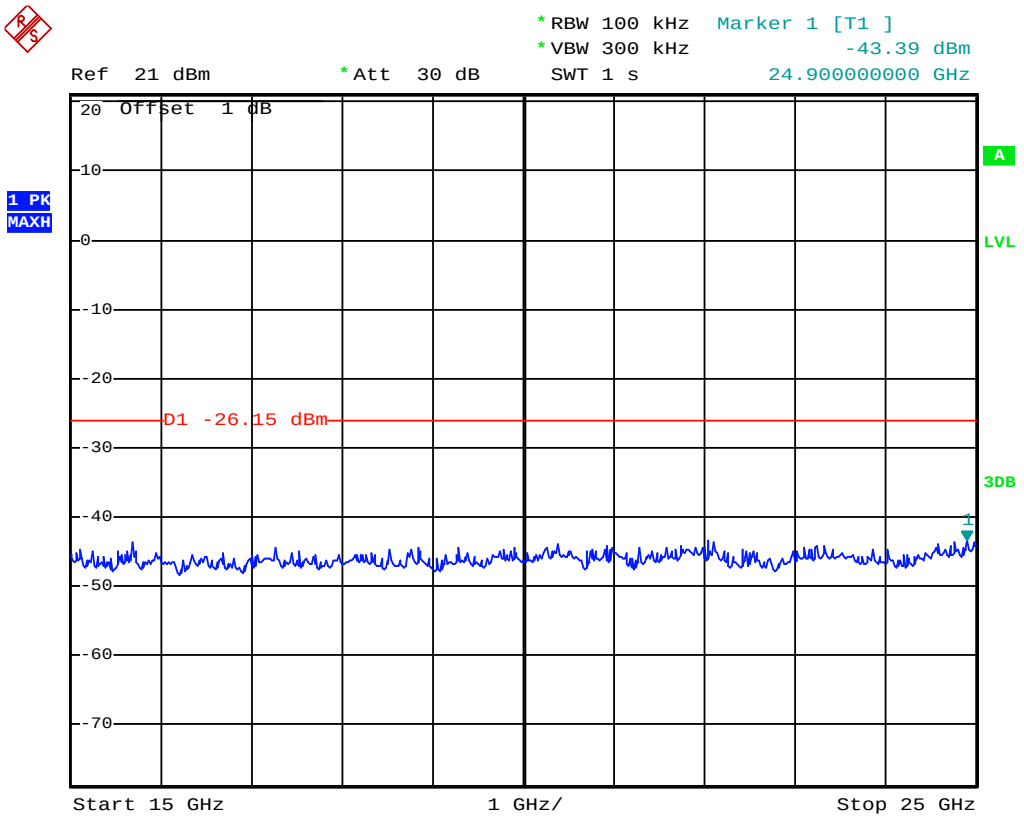
(Plot 4.7.1 B3: Channel 19: 2440MHz @ GFSK)



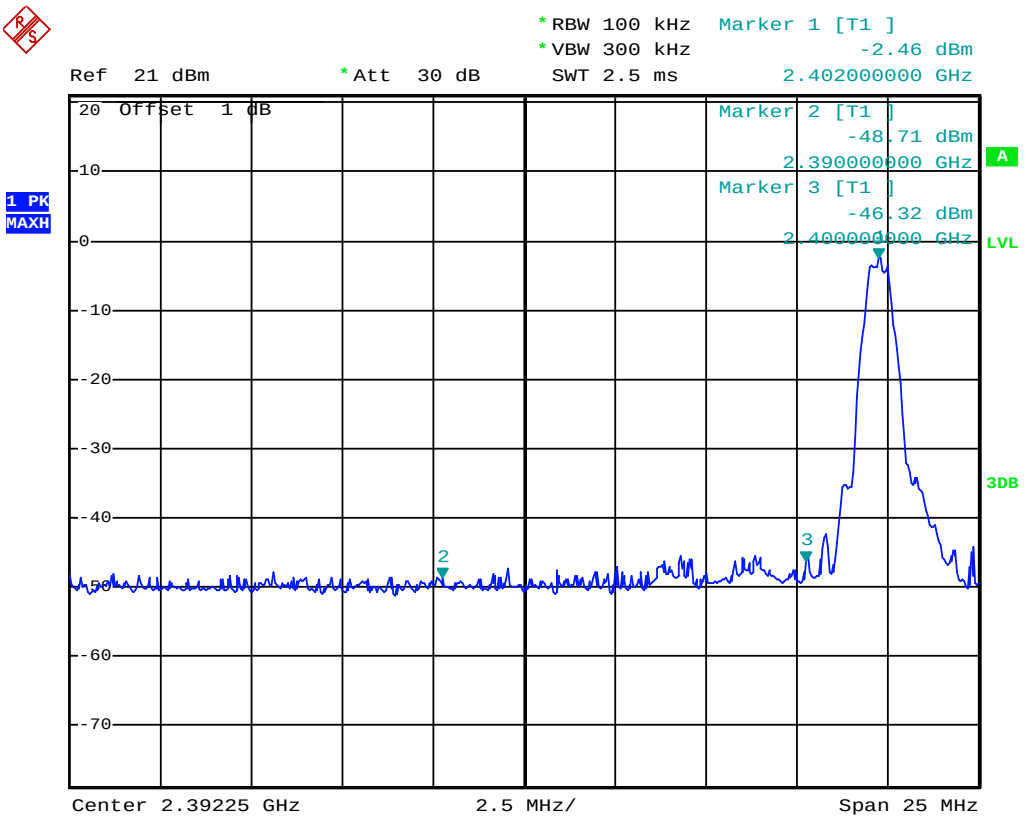
(Plot 4.7.1 C1: Channel 39: 2480MHz @ GFSK)



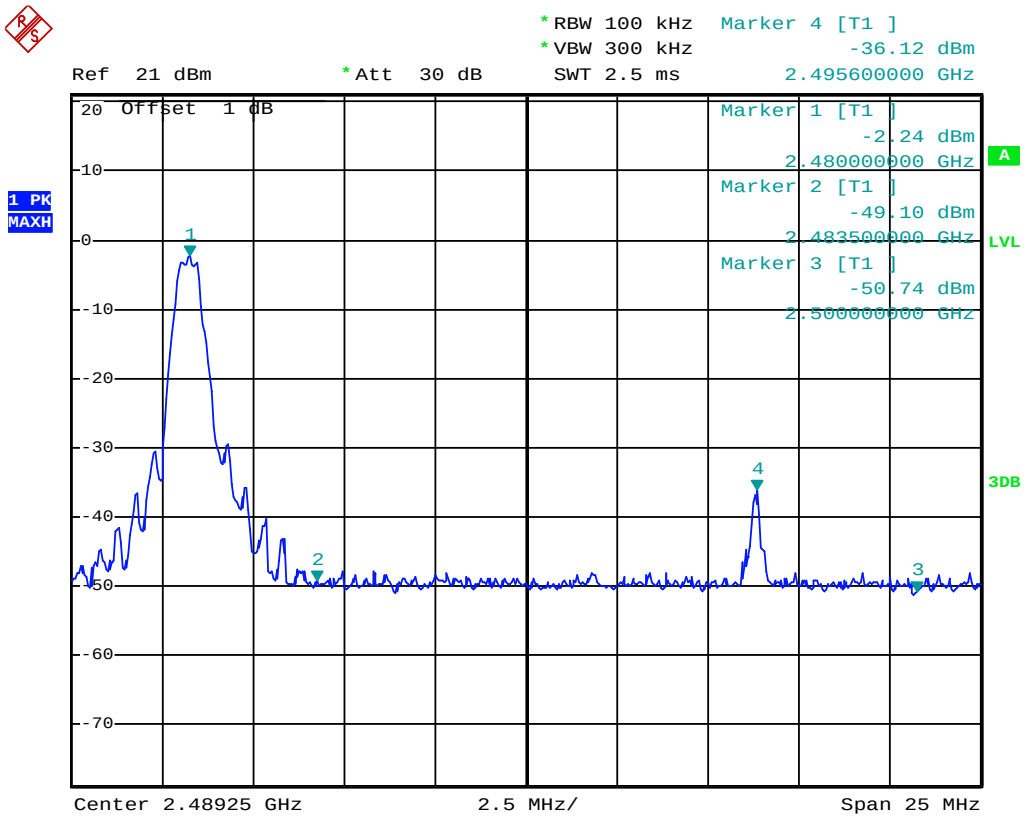
(Plot 4.7.1 C2: Channel 39: 2480MHz @ GFSK)



(Plot 4.7.1 C3: Channel 39: 2480MHz @ GFSK)



(Plot 4.7.1 D: Channel 1: 2402MHz @ GFSK)



(Plot 4.7.1 E: Channel 39: 2480MHz @ GFSK)

4.8. 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.

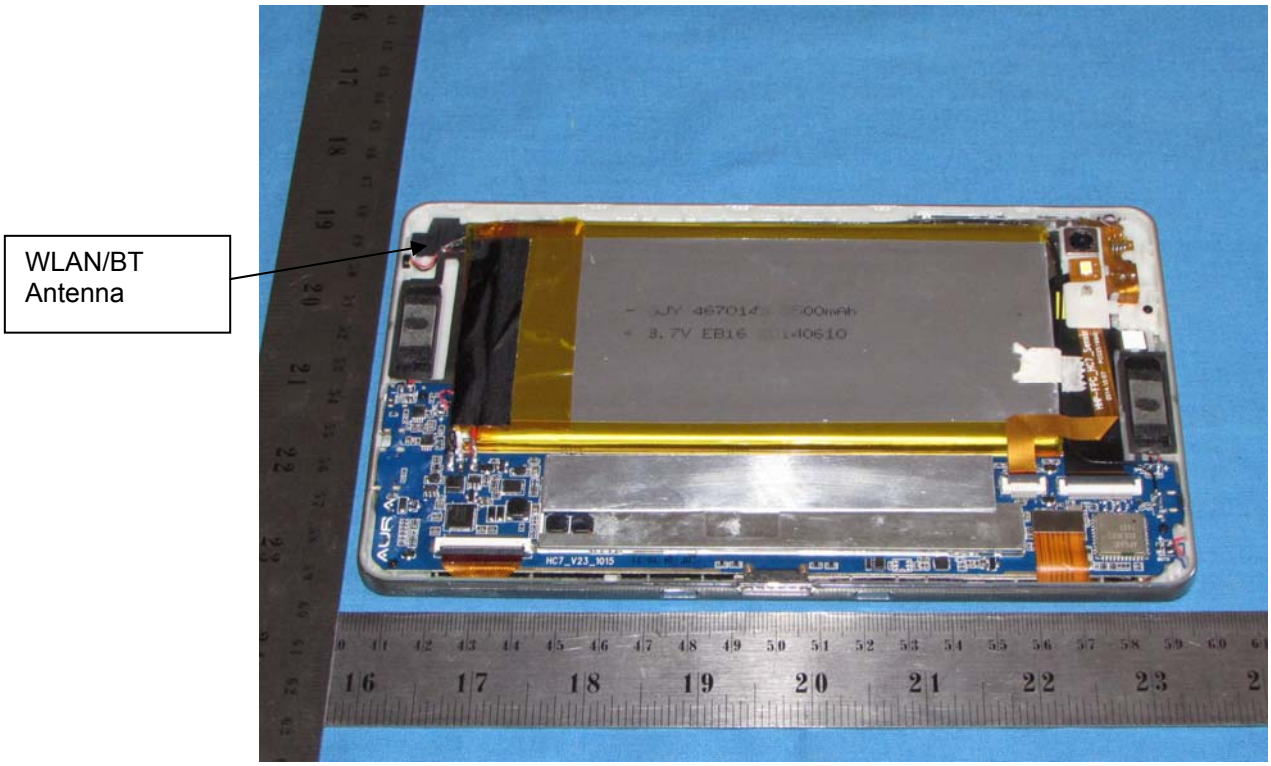
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

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

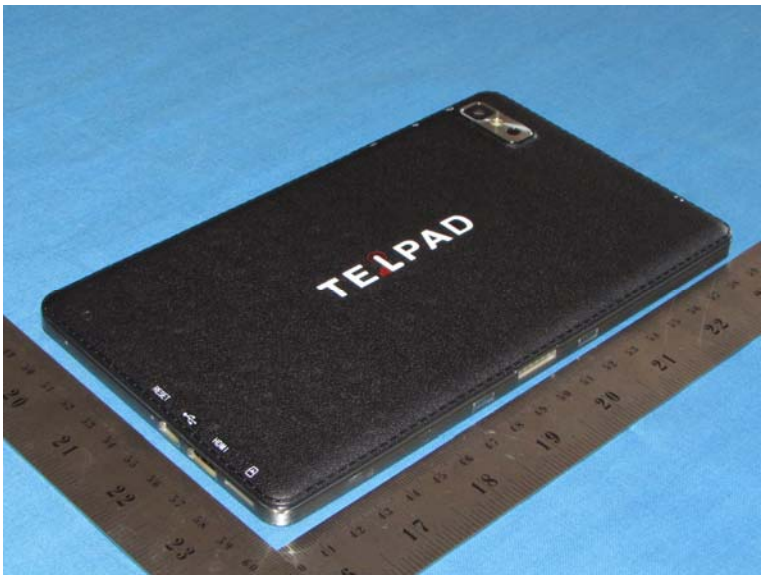
The WLAN and BT share same antenna and the maximum gain of WLAN antenna was 0.00 dBi.

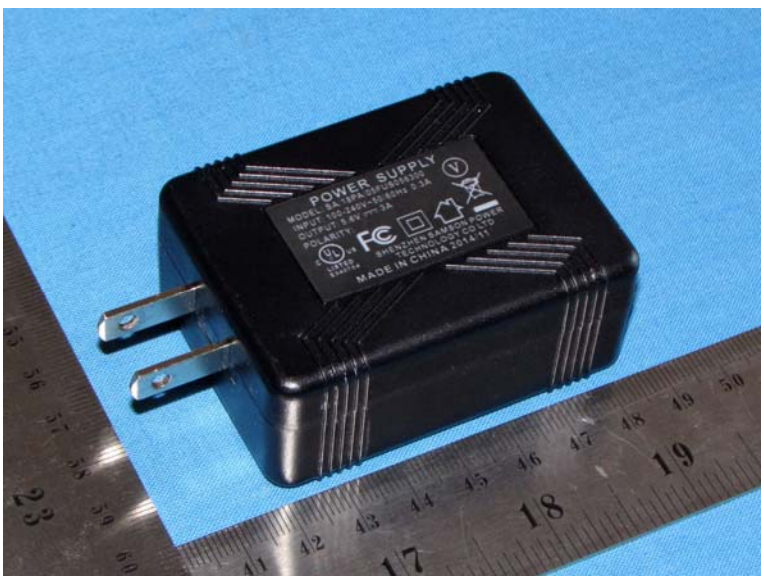


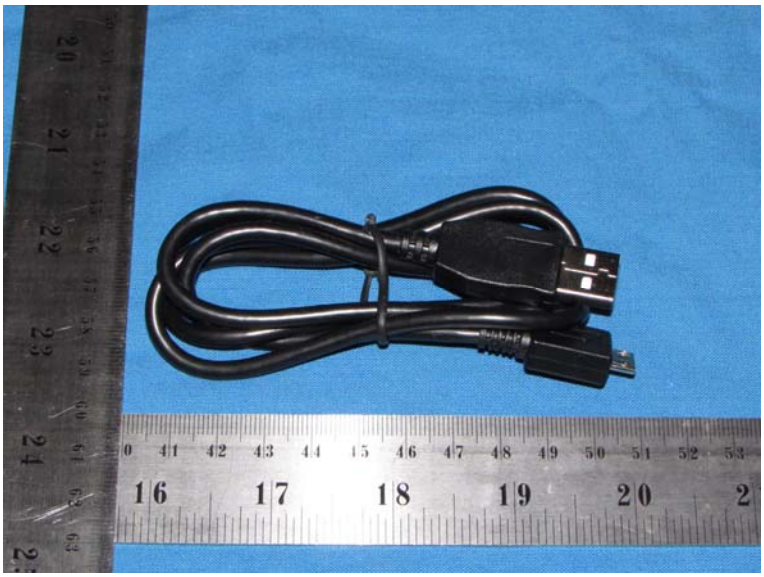
5. Test Setup Photos of the EUT

6. External and Internal Photos of the EUT

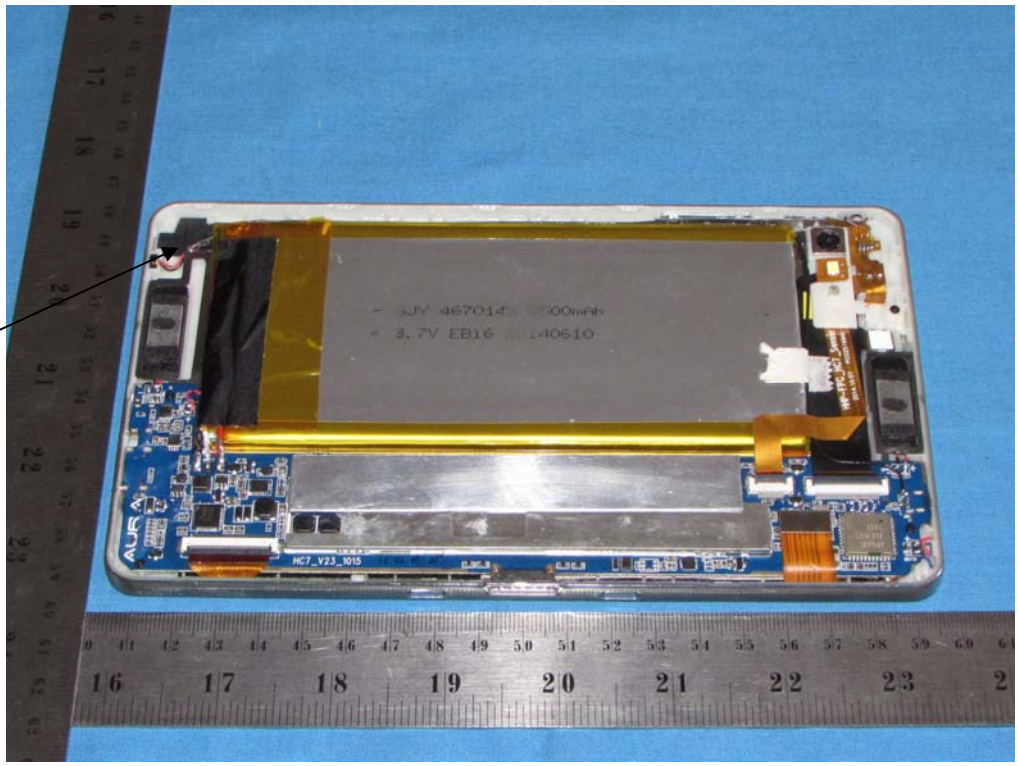
External Photos

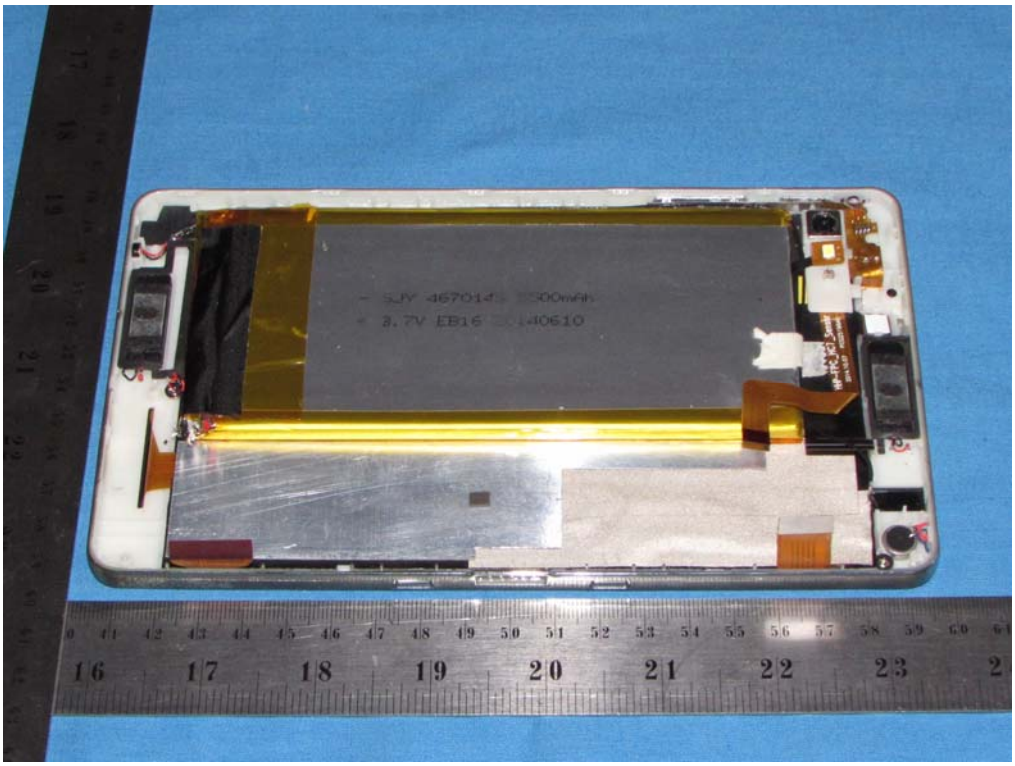


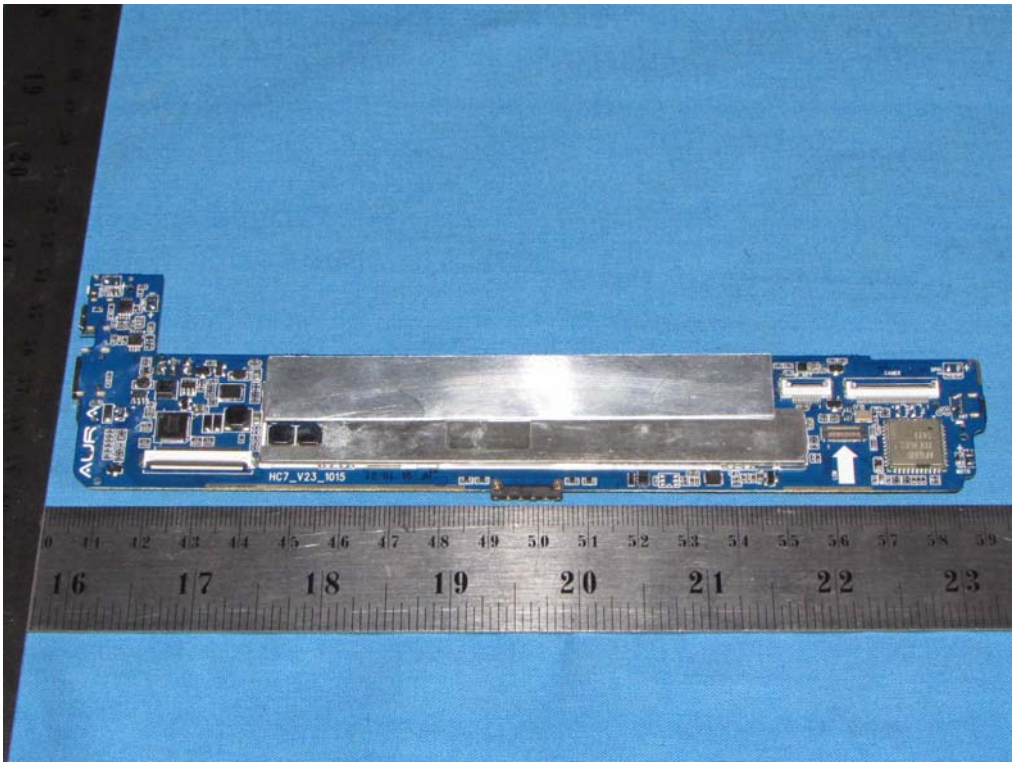


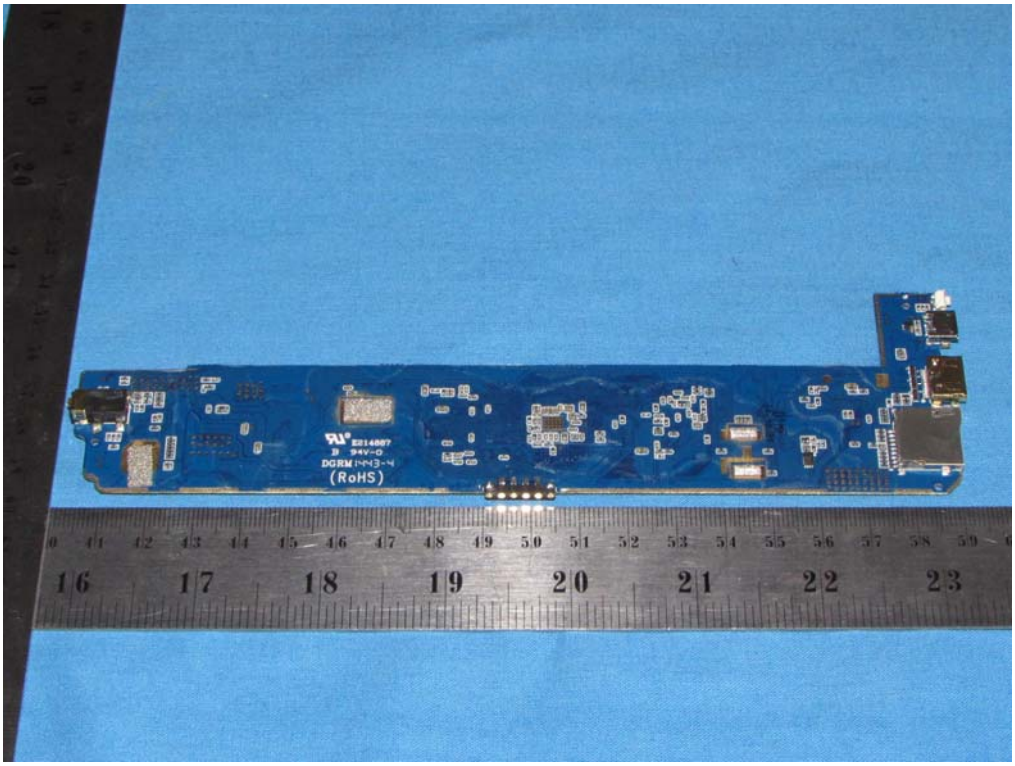


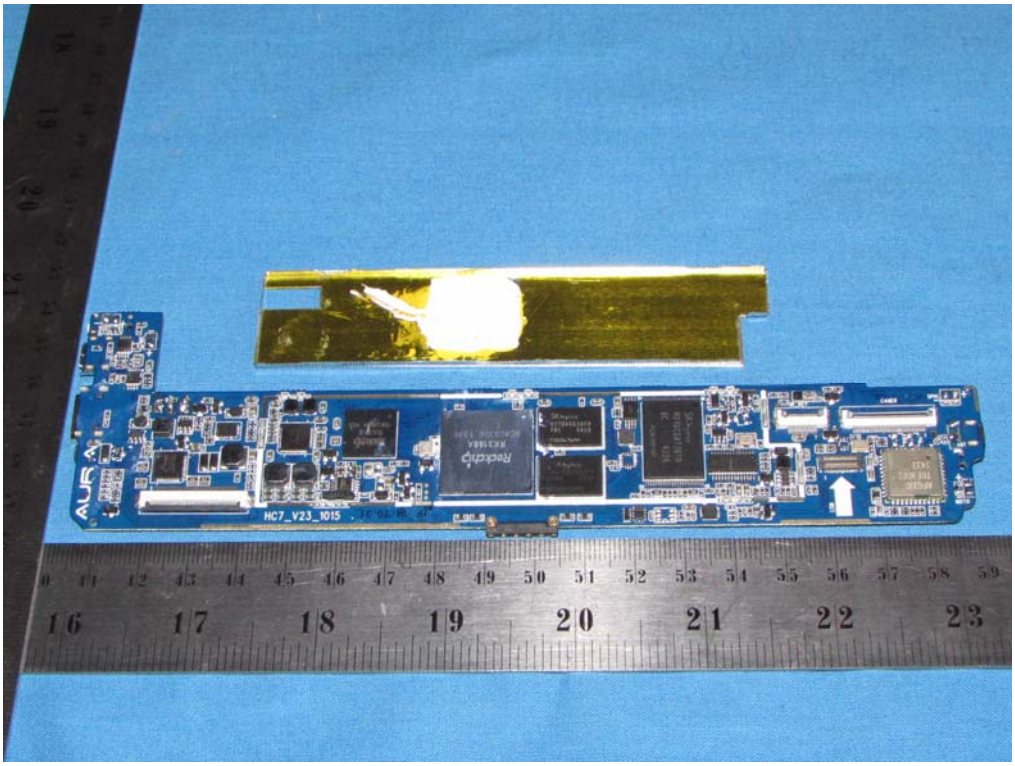
Internal Photos

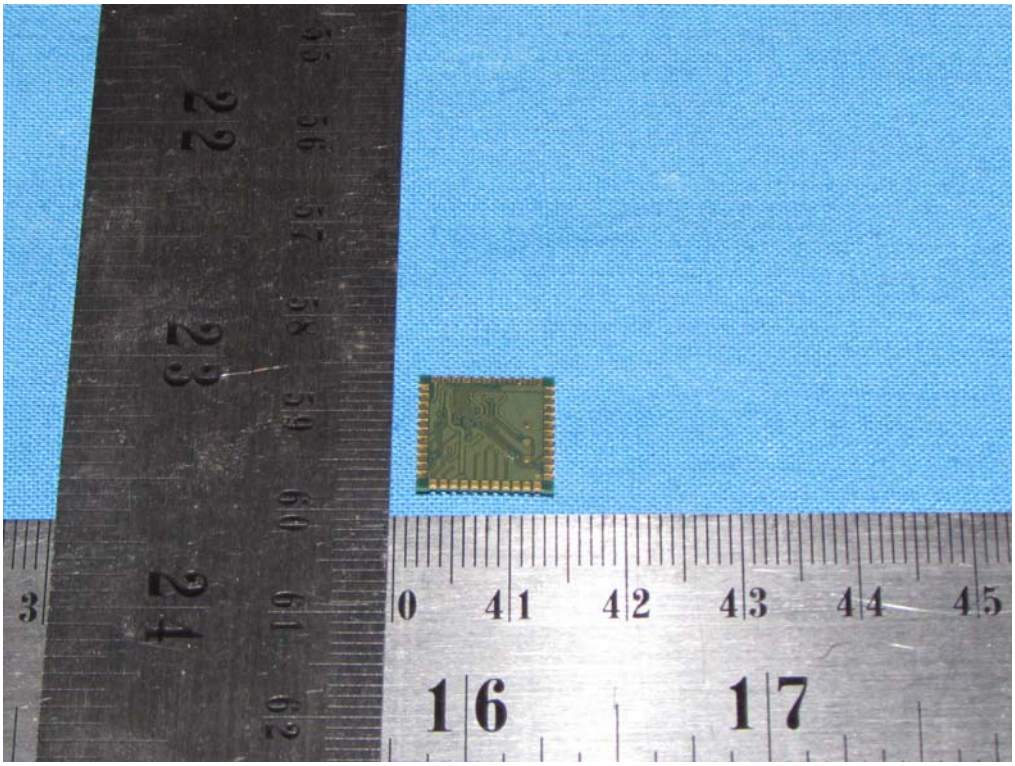


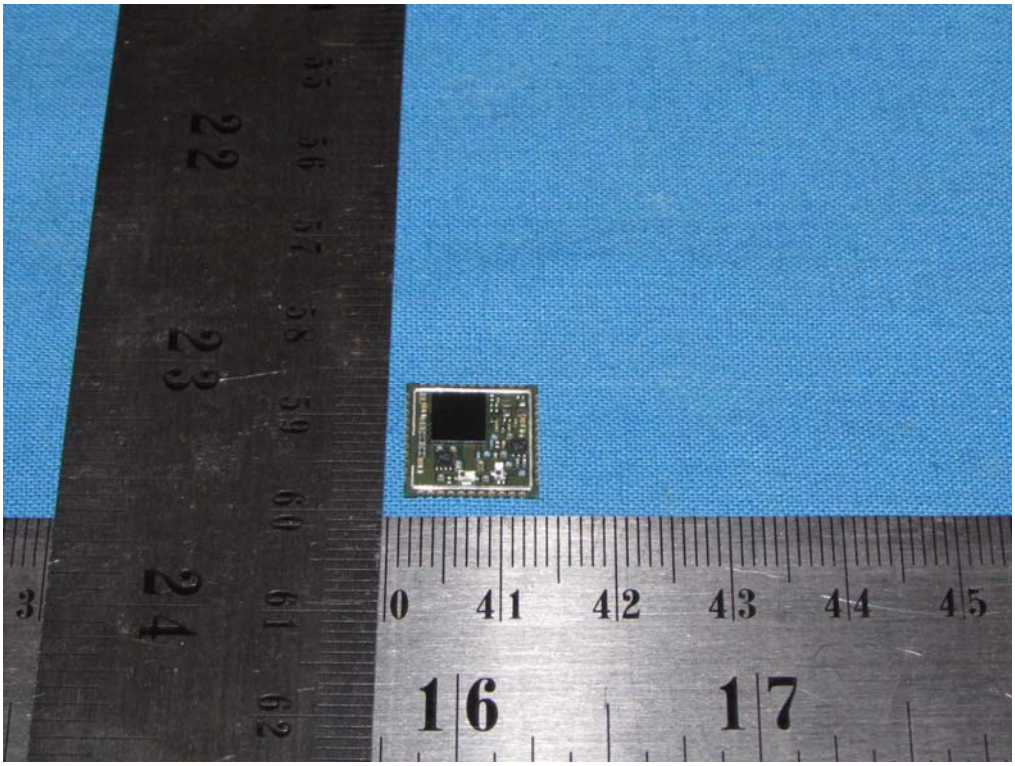



HC7_V23_1015


(RoHS)


HC7_V23_1015
16 17 18 19 20 21 22 23


0 41 42 43 44 45
16 17



.....End of Report.....