FCC TEST REPORT

for

OMATE LIMITED

Bluetooth wrist watch

Model Number: OMATE X

FCC ID: 2ABF5-OMX1

Prepared for : OMATE LIMITED
Address : Room 1101,11/F San Toi Building,No.139 Connaught Road, Central District, HongKong

Prepared by : Keyway Testing Technology Co., Ltd.
Address : Building 1, Baishun Industrial Zone, Zhangmotou Town Dongguan, Guangdong, China

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Report No. : 14KWE10199507F
Date of Test : Oct. 17~23, 2014
Date of Report : Oct. 23, 2014

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Keyway Testing Technology Co., Ltd.

Applicant: **Address:**	OMATE LIMITED Room 1101,11/F San Toi Building,No.139 Connaught Road, Central District, HongKong
Manufacturer: **Address:**	OMATE LIMITED Room 1101,11/F San Toi Building,No.139 Connaught Road, Central District, HongKong
E.U.T:	Bluetooth wrist watch
Model Number:	OMATE X
Trade Name:	OMATE **Serial No.:** ------
Date of Receipt:	Oct. 17, 2014 **Date of Test:** Oct. 17~23, 2014
Test Specification:	FCC Part 15, Subpart C: 2014 ANSI C63.4:2009 KDB558074 D01 DTS Meas Guidance v03r02
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Oct. 23, 2014**

Tested by:	Reviewed by:	Approved by:
Cissy Song / Engineer	Andy Gao / Supervisor	Jade Yang/ Supervisor

Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

1. GENERAL PRODUCT INFORMATION

1.1. Product Function

Refer to Technical Construction Form and User Manual.

1.2. Description of Device (EUT)

Product Name:	Bluetooth wrist watch
Model No.:	OMATE X
Operation Frequency:	2402~2480 MHz
Modulation technology:	FHSS GFSK, Pi/4 QPSK, 8DPSK BLE:GFSK
Channel numbers:	FHSS:79 BLE:40
Channel separation:	FHSS:1MHz BLE: 2MHz
Antenna Type:	Integral Antenna
Antenna gain:	0dBi (declare by Applicant)
Power supply:	DC 3.7V DC 5V from adapter

1.3. Difference between Model Numbers

None.

1.4. Independent Operation Modes

The basic operation modes are:

1.4.1. EUT work continues TX mode and frequency as below:

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	11	2422MHz	21	2442MHz	31	2462MHz
2 ~ 19	2404MHz ~ 2418MHz	12 ~ 19	2424MHz ~ 2438MHz	22 ~ 29	2444MHz ~ 2458MHz	32 ~ 39	2464MHz ~ 2478MHz
10	2420MHz	20	2440MHz	30	2460MHz	40	2480MHz

Note: In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
Low	2402MHz
Middle	2440MHz
High	2480MHz

1.5. Test Supporting System

Adapter:	Provide: Keyway M/N:KW005 Input :AC 100~240V 50-60Hz; Output: DC 5V 1A

2. TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.205(a) 15.209 15.247(d)	PASS
Conducted Peak Output Power	15.247 (b)(3)	PASS
6dB Occupied Bandwidth	15.247 (a)(2)	PASS
Power Spectral Density	15.247 (e)	PASS
Band Edge (Radiated Emission)	15.247(d)	PASS
Antenna Requirement	15.203	PASS

3. TEST SITES

3.1. Test Facilities

Lab Qualifications : 944 Shielded Room built by ETS-Lindgren, USA
Date of completion: March 28, 2011

966 Chamber built by ETS-Lindgren, USA
Date of completion: March 28, 2011

Certificated by TUV Rheinland, Germany.
Registration No.: UA 50207153
Date of registration: July 13, 2011

Certificated by UL, USA
Registration No.: 100567-237
Date of registration: September 1, 2011

Certificated by Intertek
Registration No.: 2011-RTL-L1-31
Date of registration: October 11, 2011

Certificated by Industry Canada
Registration No.: 9868A
Date of registration: December 8, 2011

Certificated by FCC, USA
Registration No.: 370994
Date of registration: February 21, 2012

Certificated by CNAS China
Registration No.: CNAS L5783
Date of registration: August 8, 2012

Name of Firm : Keyway Testing Technology Co., Ltd.

Site Location : Building 1, Baishun Industrial Zone, Zhangmotou Town, Dongguan, Guangdong, China

3.2. List of Test and Measurement Instruments

3.2.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 27,14	Apr. 27,15
Artificial Mains Network	Rohde&Schwarz	ENV216	101315	Apr. 27,14	Apr. 27,15
Artificial Mains Network (AUX)	Rohde&Schwarz	ENV216	101314	Apr. 27,14	Apr. 27,15
RF Cable	FUJIKURA	3D-2W	944 Cable	Apr. 27,14	Apr. 27,15

3.2.2. For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr. 27,14	Apr. 27,15
System Simulator	Agilent	E5515C	GB43130245	Apr. 30,14	Apr. 30,15
Power Splitter	Weinschel	1506A	NW425	Apr. 30,14	Apr. 30,15
Bilog Antenna	ETS-LINDGREEN	3142D	135452	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	Agilent	E4411B	MY4511304	Apr. 27,14	Apr. 27,15
3m Semi-anechoic Chamber	ETS-LINDGREEN	966	KW01	Apr. 27,14	Apr. 27,15
Signal Amplifier	SONOMA	310	187016	Apr. 27,14	Apr. 27,15
Signal Amplifier	Agilent	8449B	3008A00251	Apr. 27,14	Apr. 27,15
RF Cable	IMRO	IMRO-400	966 Cable 1#	N/A	N/A
MULTI-DEVICE Controller	ETS-LINDGREEN	2090	126913	N/A	N/A
Horn Antenna	DAZE	ZN30701	11003	Apr. 27,14	Apr. 27,15
Horn Antenna	SCHWARZBECK	BBHA9170	9170-068	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	Agilent	8593E	3911A04271	Apr. 27,14	Apr. 27,15
Spectrum Analyzer	Agilent	E4408B	MY44211125	Apr. 30,14	Apr. 30,15
Signal Amplifier	DAZE	ZN3380C	11001	Apr. 27,14	Apr. 27,15
High Pass filter	Micro	HPM50111	324216	Apr. 30,14	Apr. 30,15
Filter	COM-MW	ZBSF-C836.5-25-X	KW032	Apr. 30,14	Apr. 30,15
Filter	COM-MW	ZBSF-C1747.5-75-X2	KW035	Apr. 30,14	Apr. 30,15
Filter	COM-MW	ZBSF-C1880-60-X2	KW037	Apr. 30,14	Apr. 30,15
DC Power Supply	LongWei	PS-305D	010964729	Apr. 27,14	Apr. 27,15
Constant temperature and humidity box	GF	GTH-800-40-1P	MAA9906-005	Apr. 27,14	Apr. 27,15
Universal radio communication tester	Rohde&Schwarz	CMU200	3215420	Apr. 27,14	Apr. 27,15
Splitter	Agilent	11636B	0025164	Apr. 27,14	Apr. 27,15

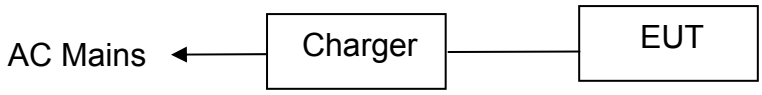
4. TEST SET-UP AND OPERATION MODES

4.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

4.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: Bluetooth wrist watch)

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4.3. Test Operation Mode and Test Software

None.

4.4. Special Accessories and Auxiliary Equipment

None.

4.5. Countermeasures to Achieve EMC Compliance

None.

5. EMISSION TEST RESULTS

5.1. Conducted Emission at the Mains Terminals Test

5.1.1. Limit 15.207 limits

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 56 60	56 to 46 46 50

5.1.2. Test Setup

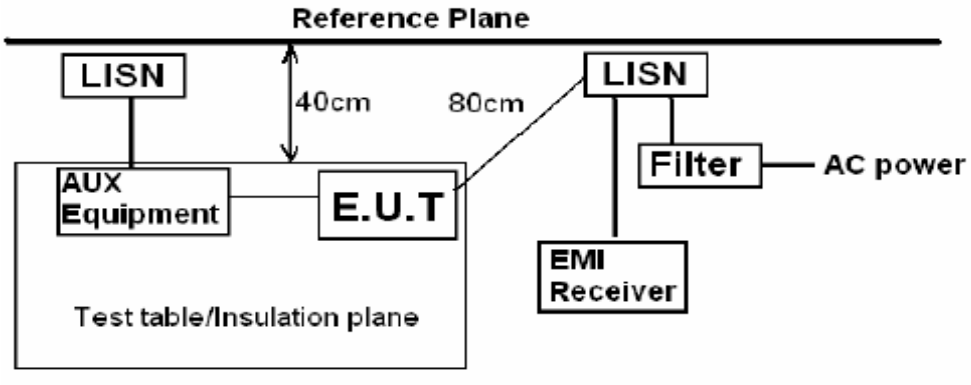
The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

The bandwidth of the test receiver was set at 9 kHz.

Pretest for all mode,The test data of the worst case condition(s) was reported on the following page.

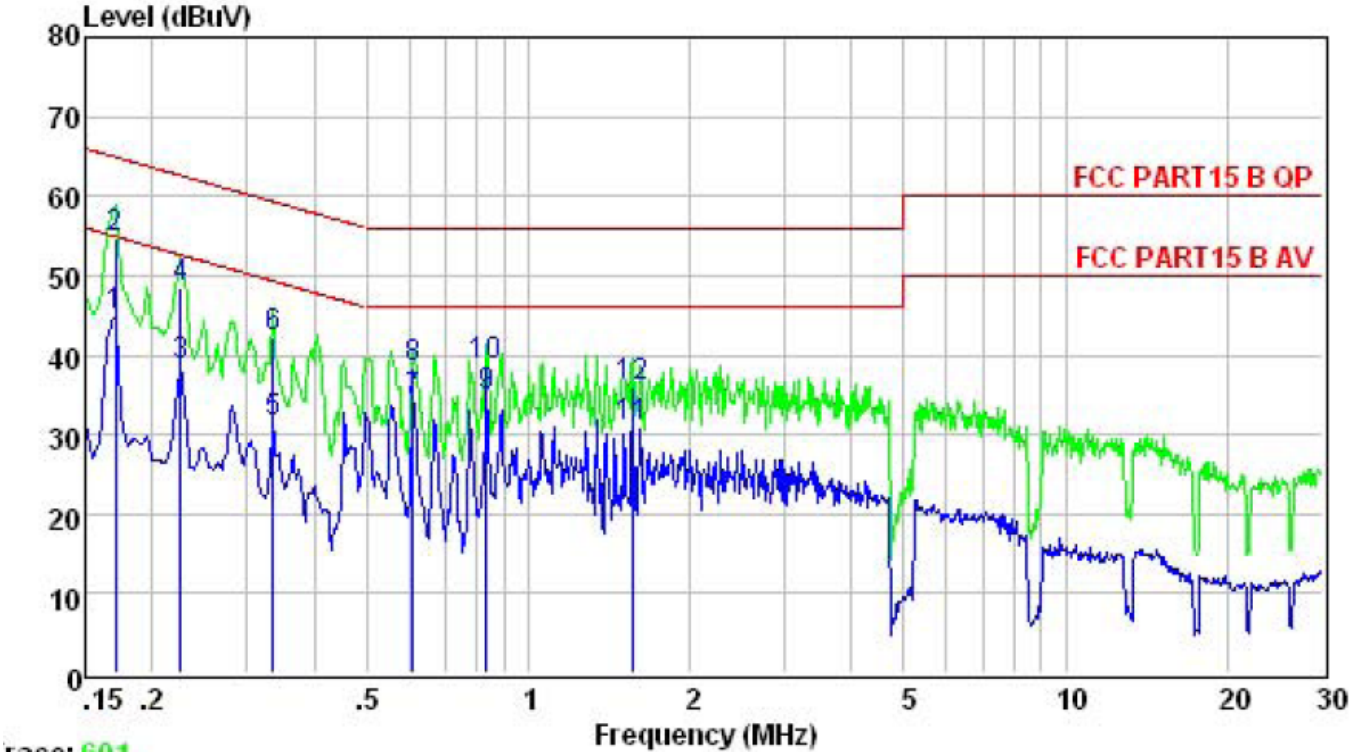


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

5.1.3. Test Mode

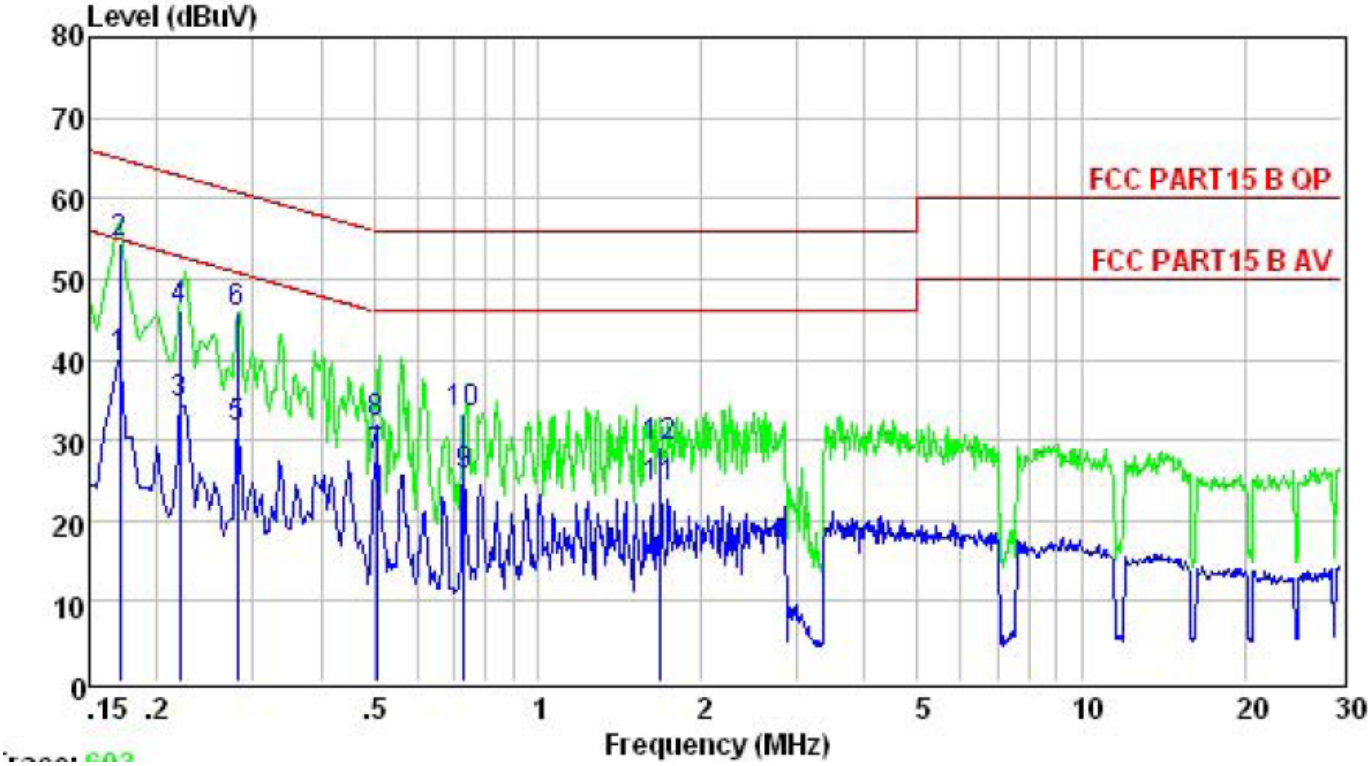
Set EUT in TX mode.

Line



	Freq	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.170	45.05	54.94	-9.89	Average
2	0.170	54.60	64.94	-10.34	QP
3	0.226	38.70	52.61	-13.91	Average
4	0.226	48.60	62.61	-14.01	QP
5	0.336	31.60	49.31	-17.71	Average
6	0.336	42.10	59.31	-17.21	QP
7	0.611	34.17	46.00	-11.83	Average
8	0.611	38.30	56.00	-17.70	QP
9	0.835	34.73	46.00	-11.27	Average
10	0.835	38.60	56.00	-17.40	QP
11	1.560	30.92	46.00	-15.08	Average
12	1.560	35.90	56.00	-20.10	QP

Neutral



	Freq	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	
1	0.170	40.28	54.94	-14.66	Average
2	0.170	54.30	64.94	-10.64	QP
3	0.220	34.46	52.83	-18.37	Average
4	0.220	45.98	62.83	-16.85	QP
5	0.280	31.42	50.81	-19.39	Average
6	0.280	45.67	60.81	-15.14	QP
7	0.505	27.89	46.00	-18.11	Average
8	0.505	32.12	56.00	-23.88	QP
9	0.731	25.43	46.00	-20.57	Average
10	0.731	33.24	56.00	-22.76	QP
11	1.680	24.11	46.00	-21.89	Average
12	1.680	29.25	56.00	-26.75	QP

5.2. Radiated Emission Test

5.2.1. Limit 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

5.2.2. Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

5.2.3. Test setup

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz.

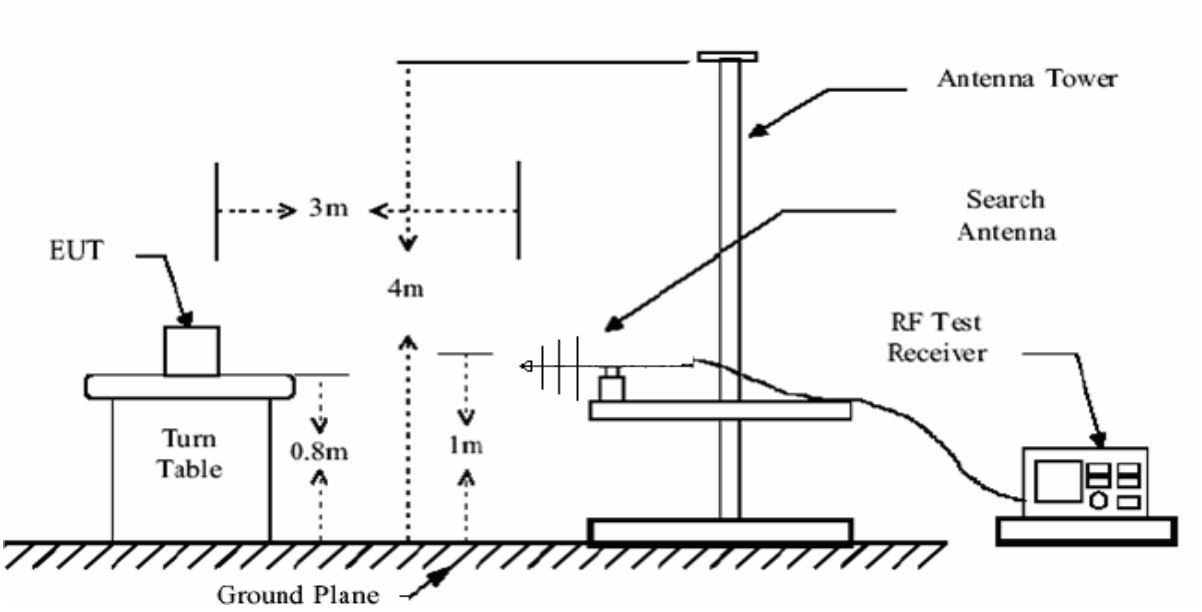
The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

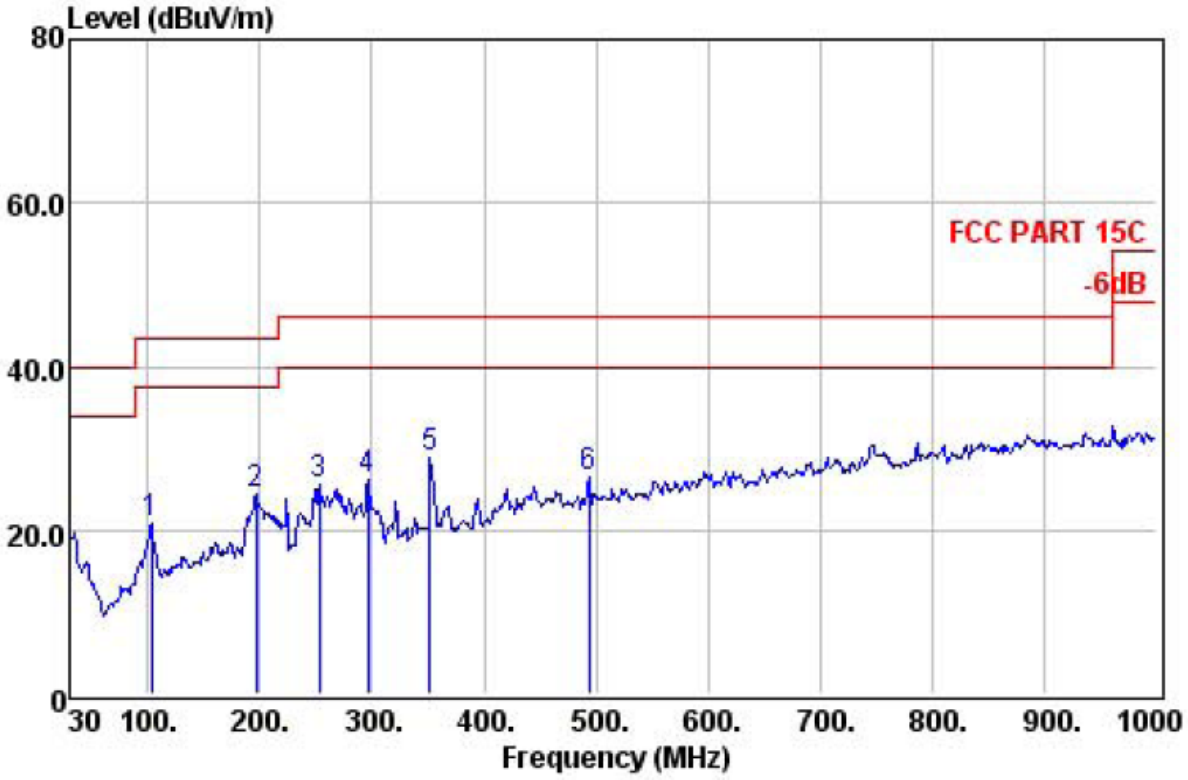
2. Measurement Uncertainty: ±3.2 dB at a level of confidence of 95%.

3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.

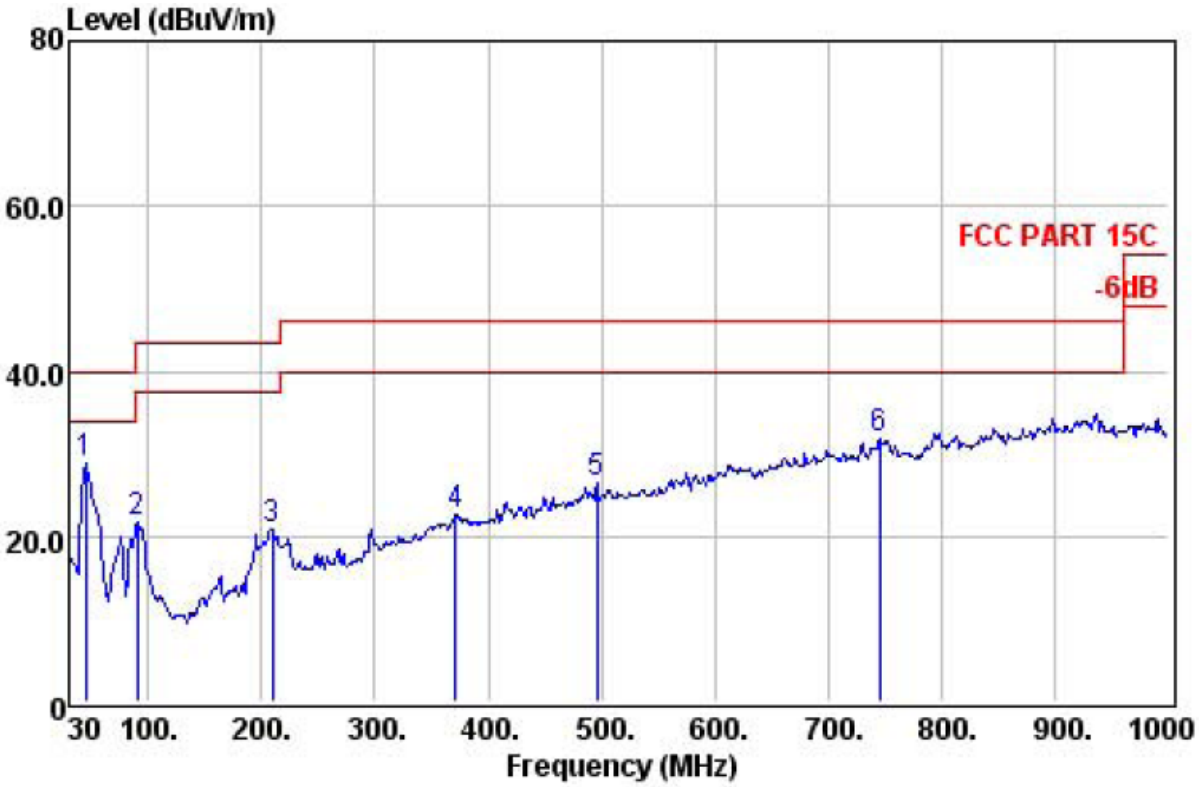


Below 1GHz
BT Mode Horizontal polarizations



	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	102.75	31.35	41.75	1.03	9.52	20.95	43.50	-22.55	QP
2	196.84	31.11	43.22	1.46	10.72	24.29	43.50	-19.21	QP
3	253.10	30.97	41.87	1.70	12.91	25.51	46.00	-20.49	QP
4	296.75	30.93	41.62	1.87	13.70	26.26	46.00	-19.74	QP
5	352.04	30.66	41.66	2.10	15.67	28.77	46.00	-17.23	QP
6	493.66	30.59	35.72	2.77	18.60	26.50	46.00	-19.50	QP

BT Mode Vertical polarizations



	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	44.55	31.40	48.64	0.56	11.03	28.83	40.00	-11.17	QP
2	90.14	31.35	43.13	0.94	9.11	21.83	43.50	-21.67	QP
3	209.45	31.08	38.99	1.53	11.45	20.89	43.50	-22.61	QP
4	371.44	30.62	34.92	2.27	16.17	22.74	46.00	-23.26	QP
5	495.60	30.59	35.54	2.77	18.63	26.35	46.00	-19.65	QP
6	745.86	30.67	35.61	4.04	22.77	31.75	46.00	-14.25	QP

Above 1GHz

GFSK 2402MHz Horizontal polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4804.00	27.49	31.76	11.96	32.94	49.17	74.00	-24.83	Peak
2	6916.00	27.88	18.12	16.60	36.98	43.82	74.00	-30.18	Peak
3	9160.00	28.46	16.44	16.89	37.59	42.46	74.00	-31.54	Peak
4	11965.00	29.00	15.48	17.36	39.43	43.27	74.00	-30.73	Peak
5	13461.00	29.29	9.83	18.75	42.84	42.13	74.00	-31.87	Peak
6	14719.00	29.51	14.30	19.83	39.69	44.31	74.00	-29.69	Peak

GFSK 2402MHz Vertical polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4804.00	27.49	32.45	11.96	32.94	49.86	74.00	-24.14	Peak
2	7307.00	27.96	14.74	16.61	37.32	40.71	74.00	-33.29	Peak
3	10520.00	28.85	14.29	17.07	39.21	41.72	74.00	-32.28	Peak
4	12084.00	29.02	11.85	17.44	39.42	39.69	74.00	-34.31	Peak
5	13427.00	29.28	10.09	18.71	42.68	42.20	74.00	-31.80	Peak
6	15705.00	29.66	12.24	20.44	39.19	42.21	74.00	-31.79	Peak

GFSK 2441MHz Horizontal polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4882.00	27.53	31.85	12.14	33.11	49.57	74.00	-24.43	Peak
2	7001.00	27.90	16.21	16.60	37.20	42.11	74.00	-31.89	Peak
3	9228.00	28.49	18.16	16.90	37.67	44.24	74.00	-29.76	Peak
4	11285.00	28.93	14.95	17.22	39.73	42.97	74.00	-31.03	Peak
5	12203.00	29.04	15.47	17.55	39.44	43.42	74.00	-30.58	Peak
6	13954.00	29.39	10.73	19.31	43.45	44.10	74.00	-29.90	Peak

GFSK 2441MHz Vertical polarizations

	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4882.00	27.53	31.57	12.14	33.11	49.29	74.00	-24.71	Peak
2	6814.00	27.86	15.71	16.60	36.71	41.16	74.00	-32.84	Peak
3	7834.00	28.07	17.44	16.65	36.73	42.75	74.00	-31.25	Peak
4	11081.00	28.91	15.77	17.18	39.57	43.61	74.00	-30.39	Peak
5	13087.00	29.22	15.45	18.32	41.10	45.65	74.00	-28.35	Peak
6	16453.00	29.88	10.12	20.95	43.09	44.28	74.00	-29.72	Peak

GFSK 2480MHz Horizontal polarizations

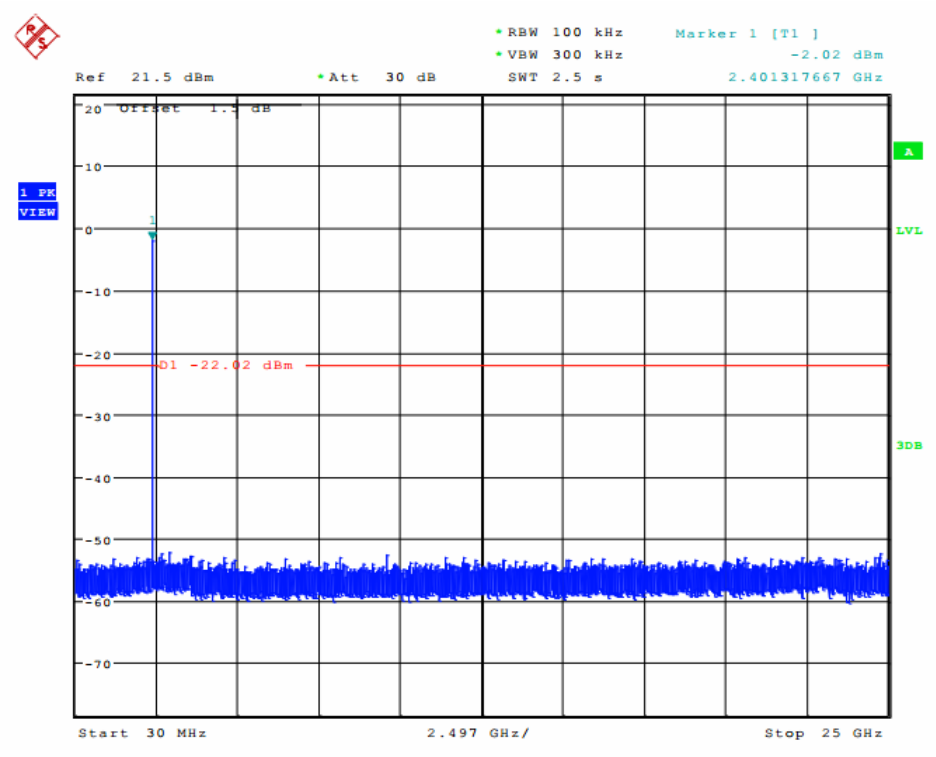
	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4960.00	27.58	31.51	12.36	33.32	49.61	74.00	-24.39	Peak
2	6967.00	27.89	16.11	16.60	37.11	41.93	74.00	-32.07	Peak
3	8803.00	28.34	15.70	16.83	37.16	41.35	74.00	-32.65	Peak
4	10350.00	28.84	11.61	17.04	38.96	38.77	74.00	-35.23	Peak
5	12509.00	29.10	11.42	17.81	39.54	39.67	74.00	-34.33	Peak
6	15144.00	29.57	14.16	20.09	38.47	43.15	74.00	-30.85	Peak

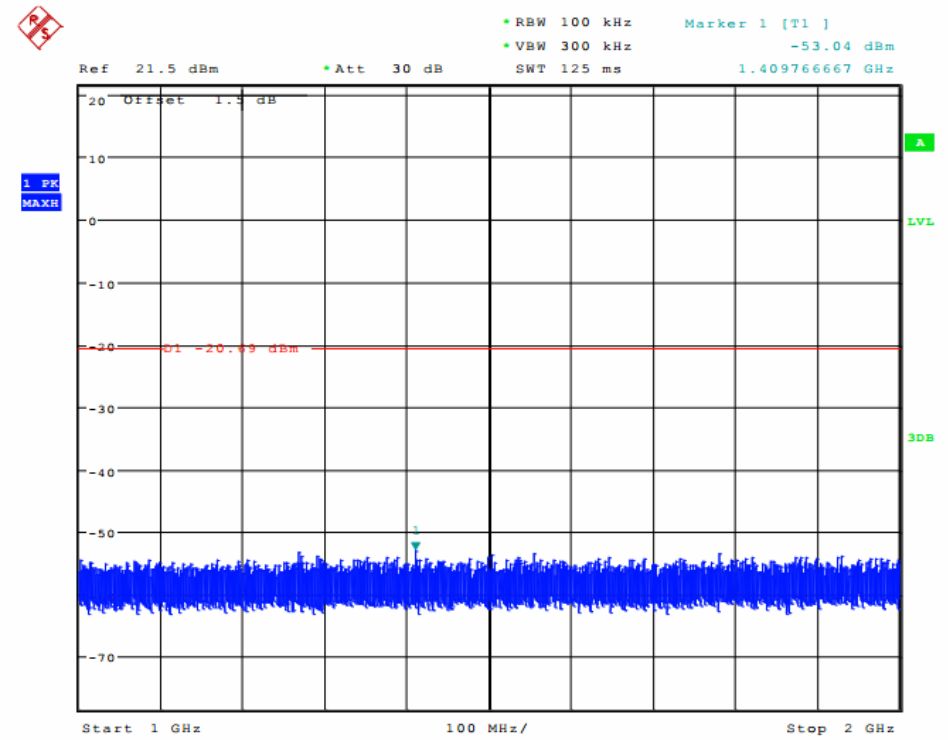
GFSK 2480MHz Vertical polarizations

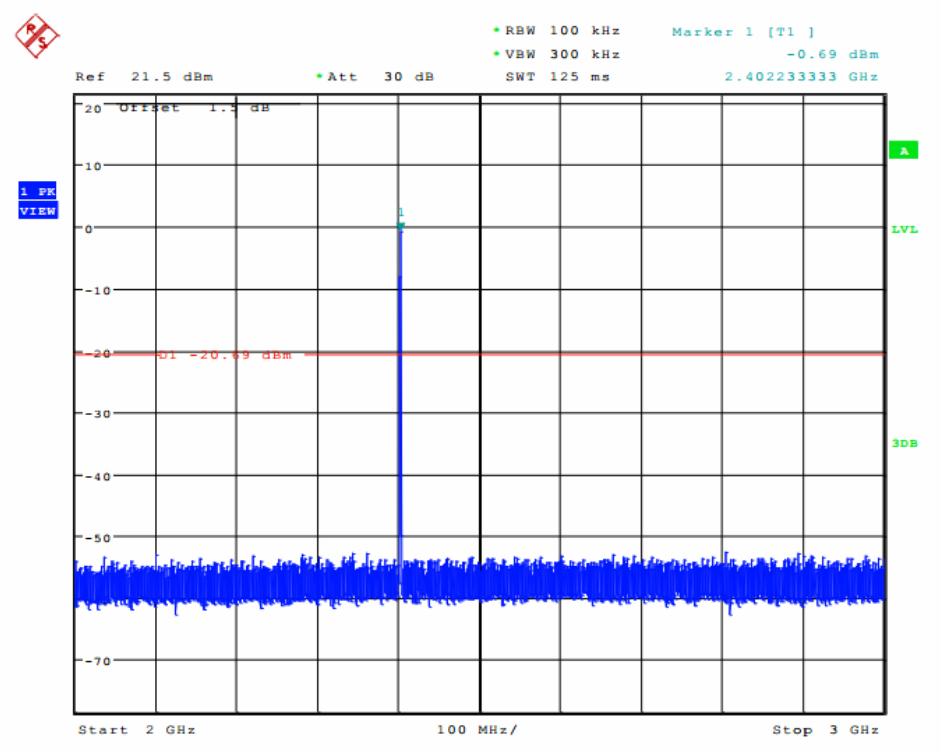
	Freq	Preamp Factor	Read Level	Cable Loss	Antenna Factor	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	4960.00	27.58	31.32	12.36	33.32	49.42	74.00	-24.58	Peak
2	6984.00	27.90	15.34	16.60	37.16	41.20	74.00	-32.80	Peak
3	8361.00	28.21	16.77	16.74	36.69	41.99	74.00	-32.01	Peak
4	10554.00	28.86	14.26	17.08	39.23	41.71	74.00	-32.29	Peak
5	13155.00	29.23	9.84	18.40	41.41	40.42	74.00	-33.58	Peak
6	15331.00	29.60	13.96	20.21	38.43	43.00	74.00	-31.00	Peak

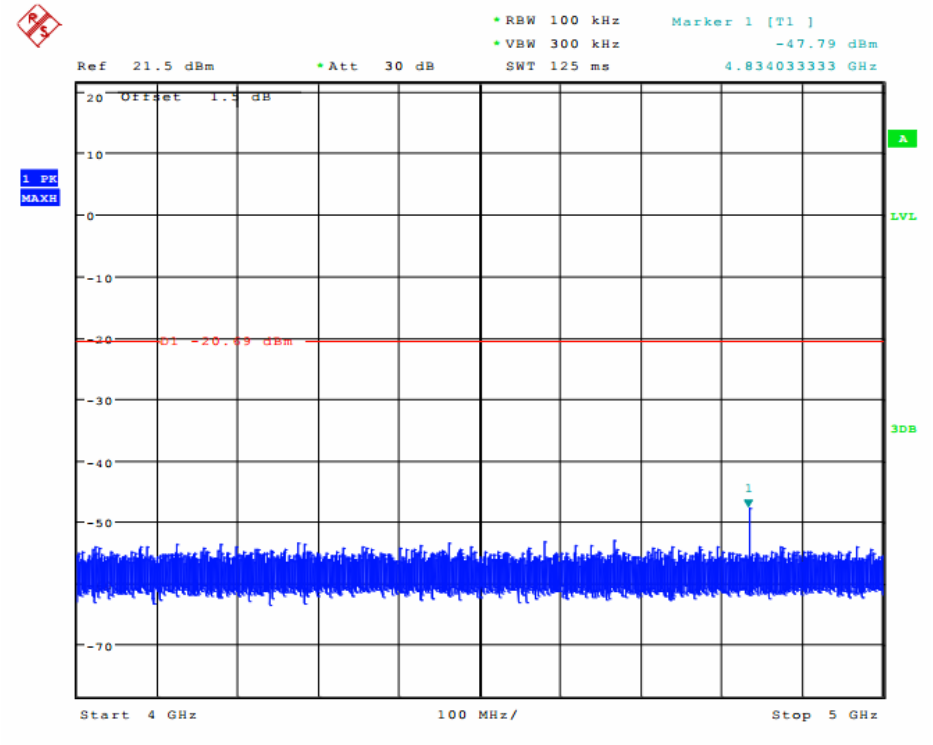
For conducted test

GFSK 2402MHz

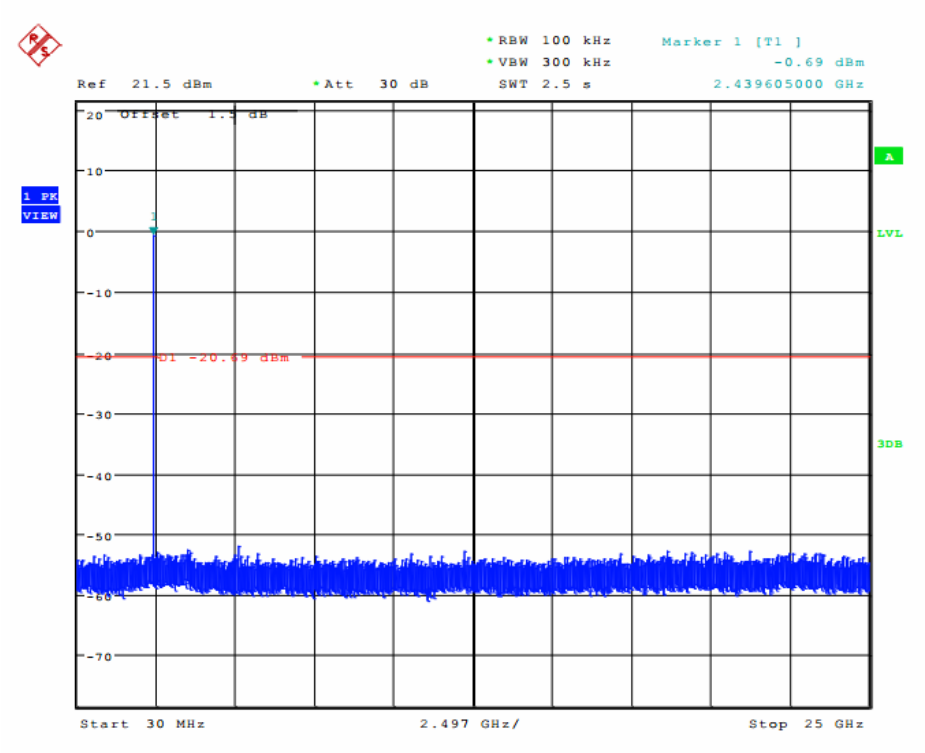


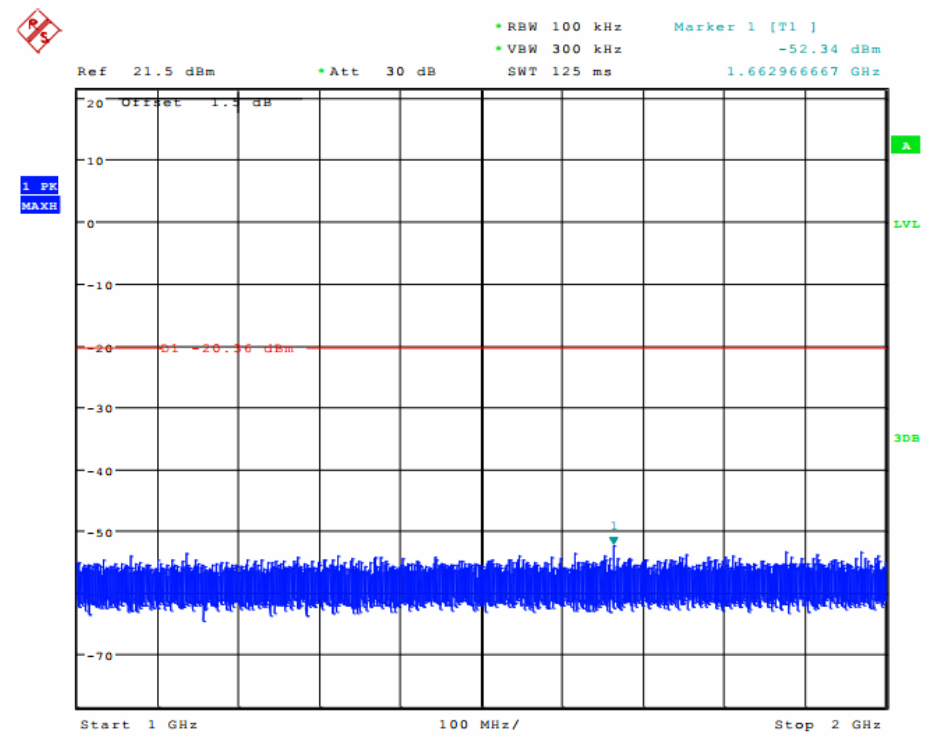


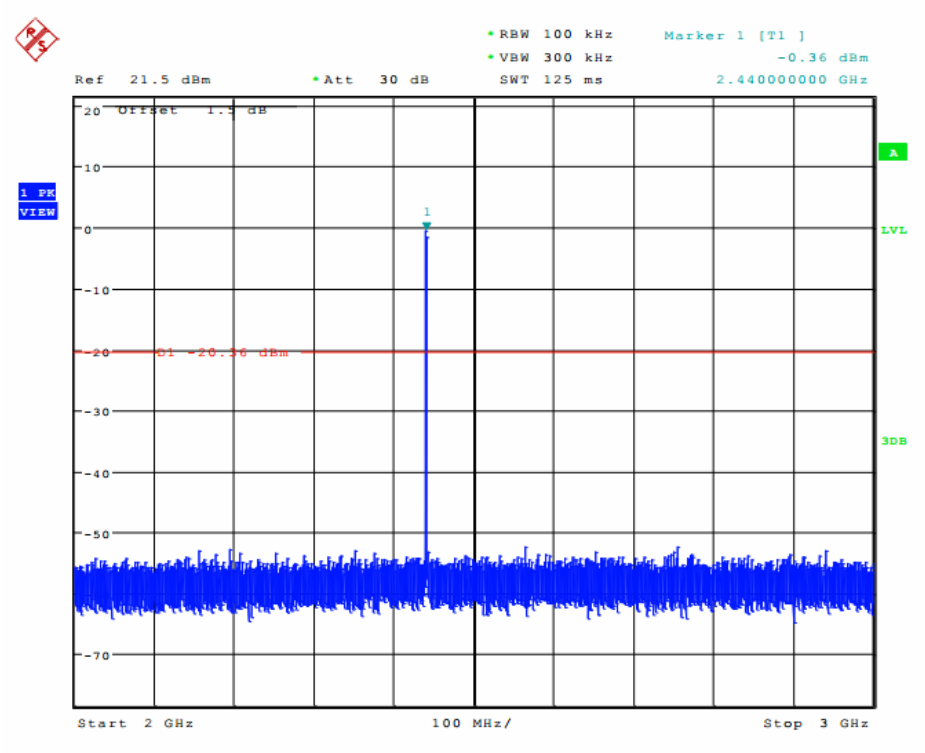

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-0.69 dBm
2.402233333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -20.69 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz

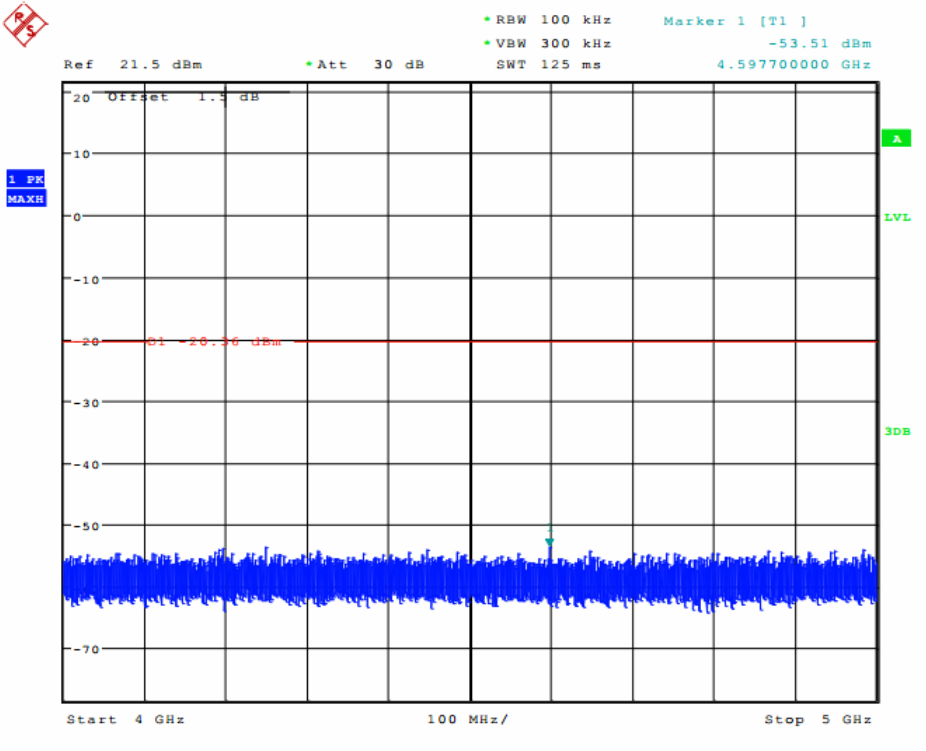

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-47.79 dBm
4.834033333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -20.69 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

GFSK 2441MHz

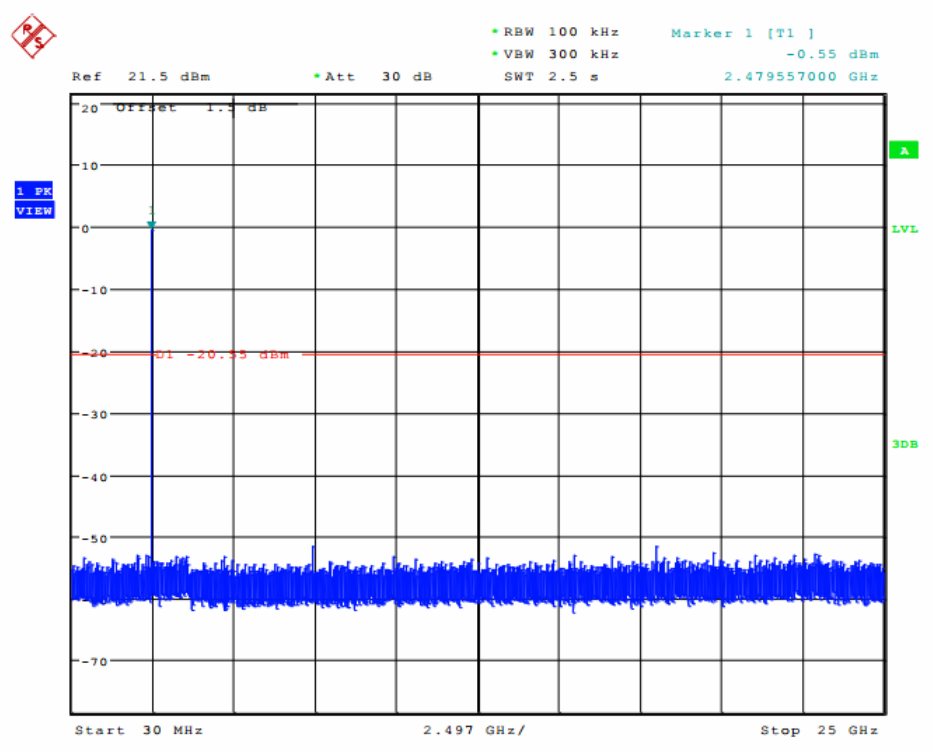


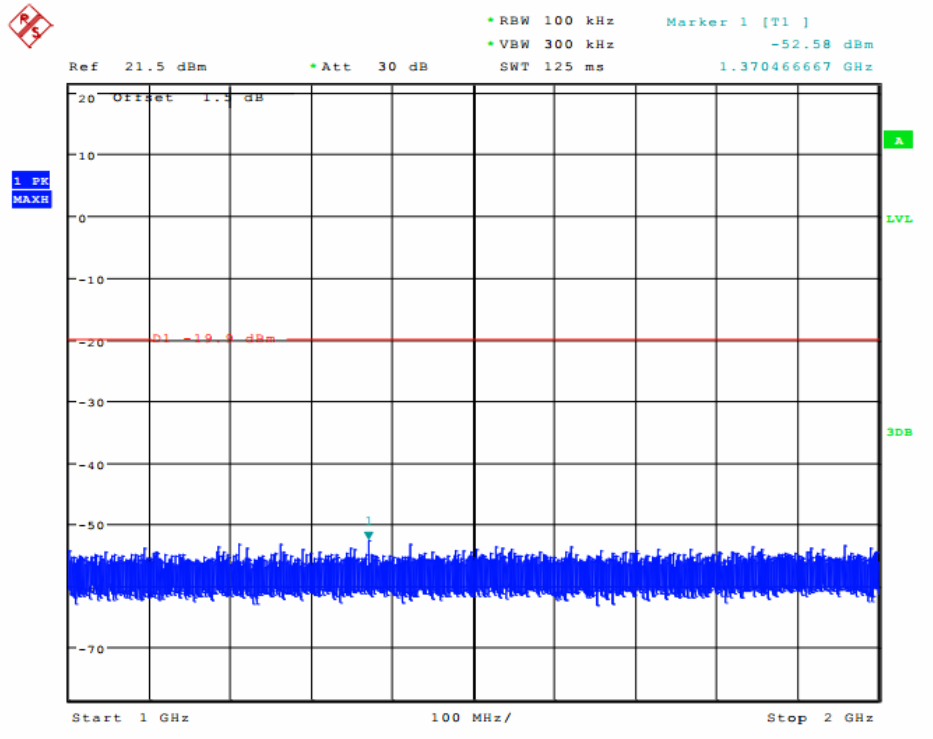


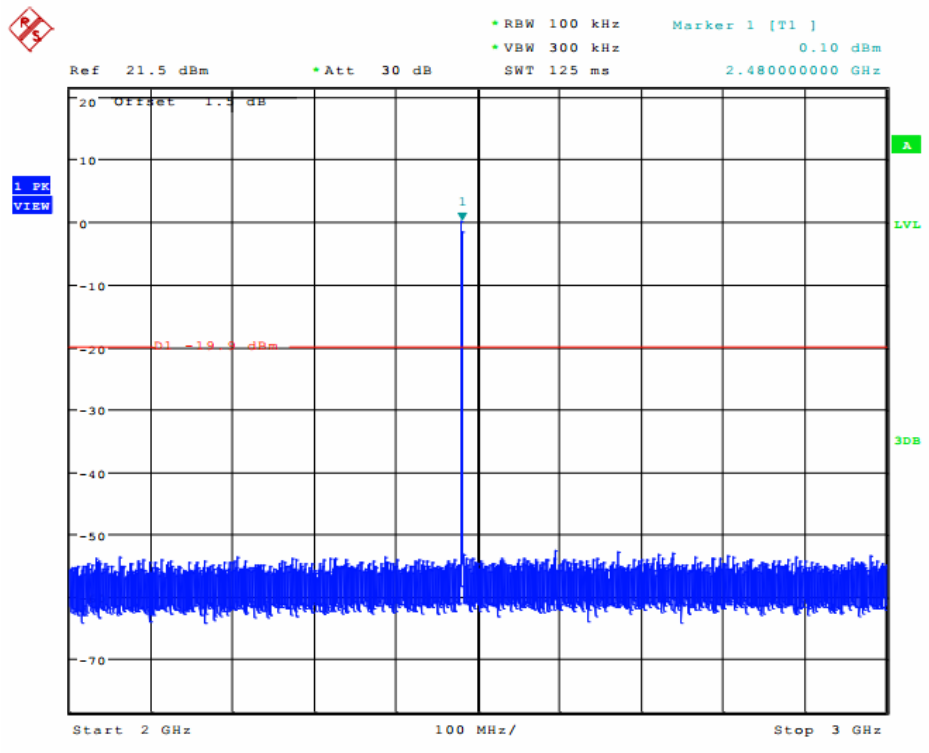

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-0.36 dBm
2.440000000 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
D1 -20.50 dBm
A
LVL
3DB
Start 2 GHz
100 MHz/
Stop 3 GHz

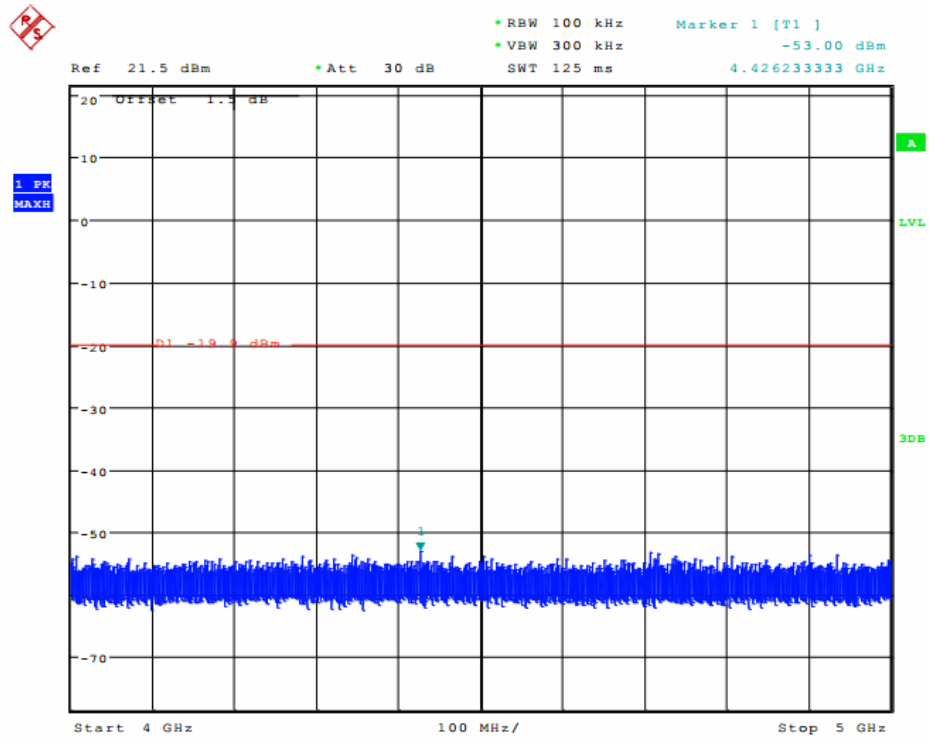

RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.51 dBm
4.597700000 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
D1 -20.50 dBm
A
LVL
3DB
Start 4 GHz
100 MHz/
Stop 5 GHz

GFSK 2480MHz






RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
0.10 dBm
2.480000000 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
VIEW
A
LVL
3DB
D1 -19.9 dBm
Start 2 GHz
100 MHz/
Stop 3 GHz


RBW 100 kHz
VBW 300 kHz
SWT 125 ms
Marker 1 [T1]
-53.00 dBm
4.426233333 GHz
Ref 21.5 dBm
Att 30 dB
Offset 1.5 dB
1 PK
MAXH
A
LVL
3DB
D1 -19.9 dBm
Start 4 GHz
100 MHz/
Stop 5 GHz

6. 6DB OCCUPY BANDWIDTH

6.1. Limits

According to FCC Section 15.247(a)(2), Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

6.2. Test setup

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the RBW =100kHz.
3. Set the VBW≥3 time RBW
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Measure and record the result in the test report.

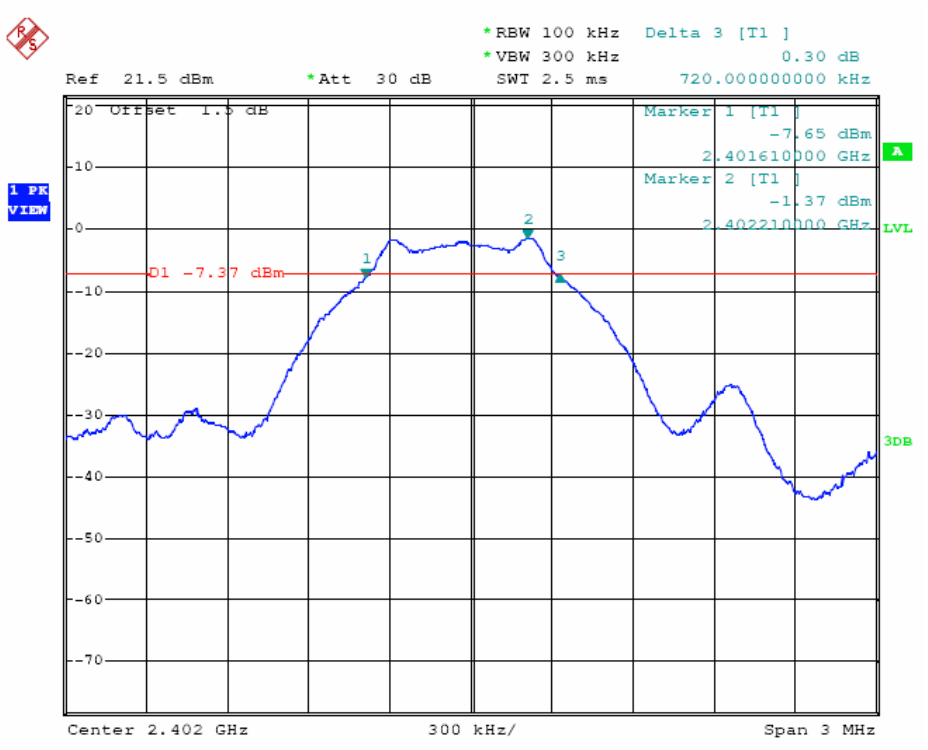
Test data:

Channel Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
2402	0.720	≥0.5	PASS
2440	0.708	≥0.5	PASS
2480	0.696	≥0.5	PASS

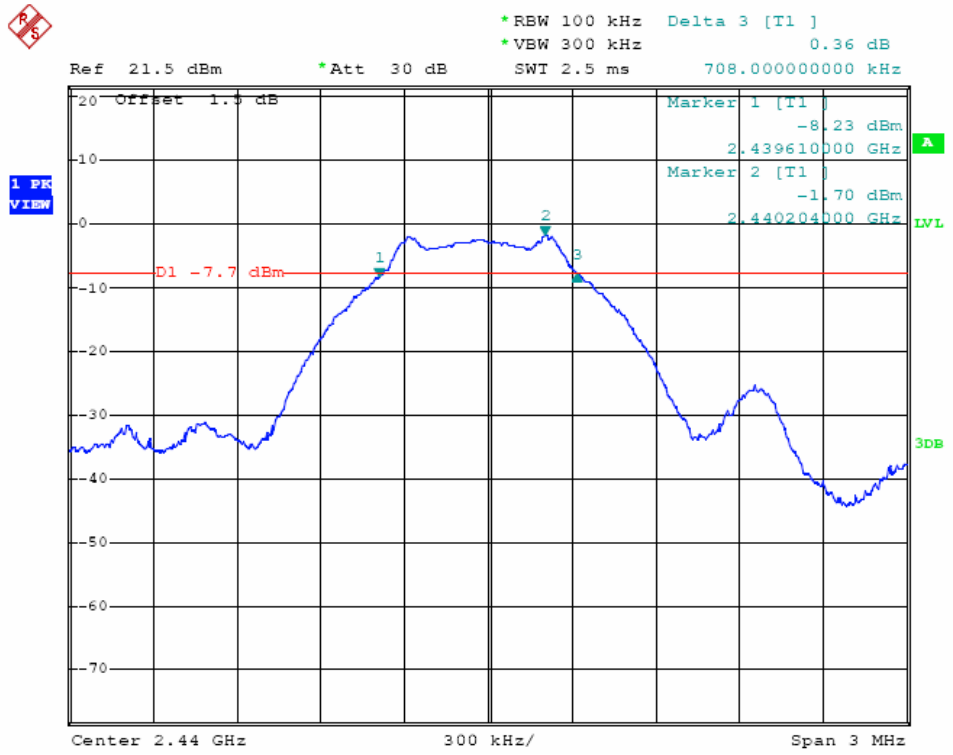
Test plot as follows:

GFSK

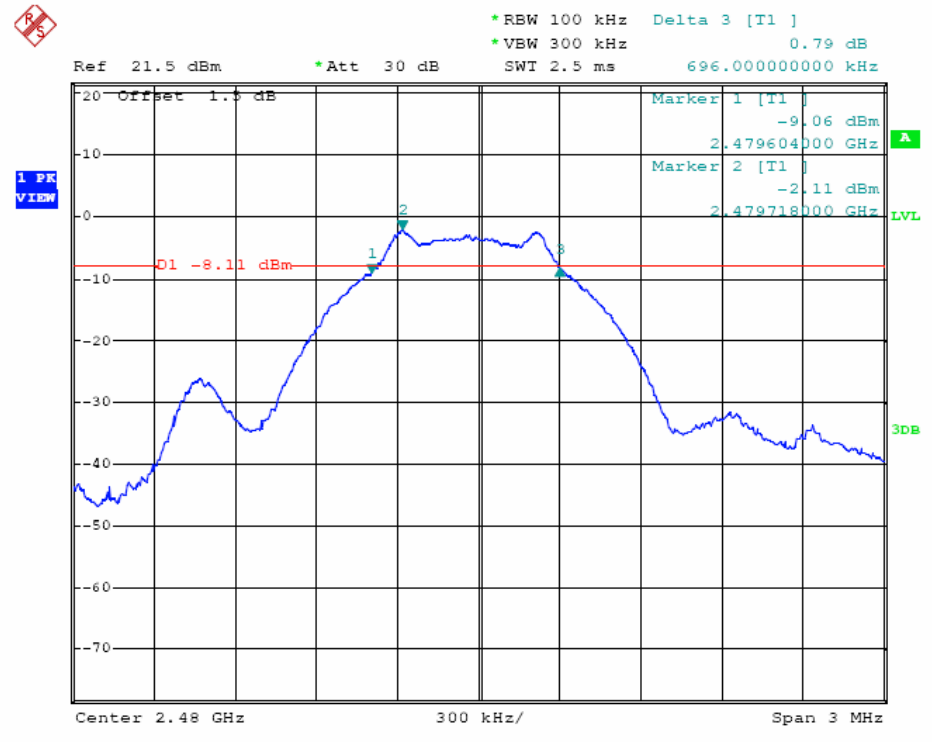
2402MHz



2440 MHz



2480 MHz


*RBW 100 kHz
*VBW 300 kHz
SWT 2.5 ms
Delta 3 [T1]
0.79 dB
696.000000000 kHz
Ref 21.5 dBm
*Att 30 dB
Offset 1.5 dB
Marker 1 [T1]
-9.06 dBm
2.479604000 GHz
Marker 2 [T1]
-2.11 dBm
2.479718000 GHz
D1 -8.11 dBm
1 PK VIEW
A
LVL
3DB
Center 2.48 GHz
300 kHz/
Span 3 MHz

7. POWER SPECTRAL DENSITY

7.1. Limits

According to FCC Section 15.247(e)(1), 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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

7.2. Test setup

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to least 1.5 times the DTS channel bandwidth.
3. Set the RBW =3kHz.
4. Set the VBW = 3 times RBW.
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 amplitude level.

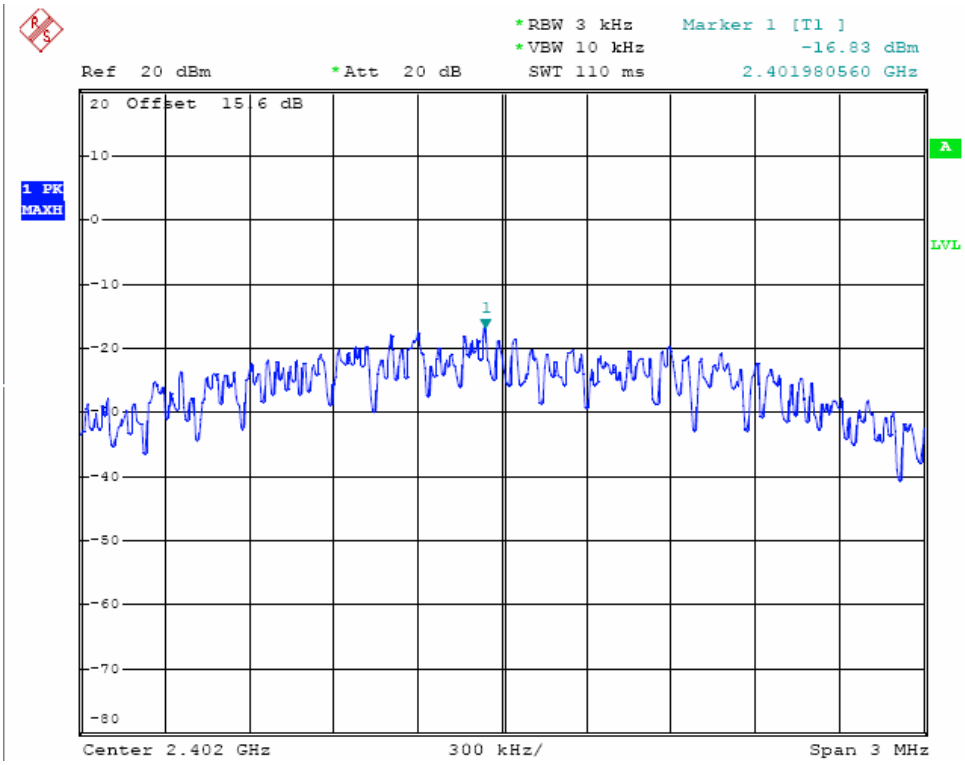
Test data:

Channel	Power Spectral Density (dBm)	Limit(dBm)	Result
2402MHz	-16.83	≤8.00	PASS
2440MHz	-17.30	≤8.00	PASS
2480MHz	-18.19	≤8.00	PASS

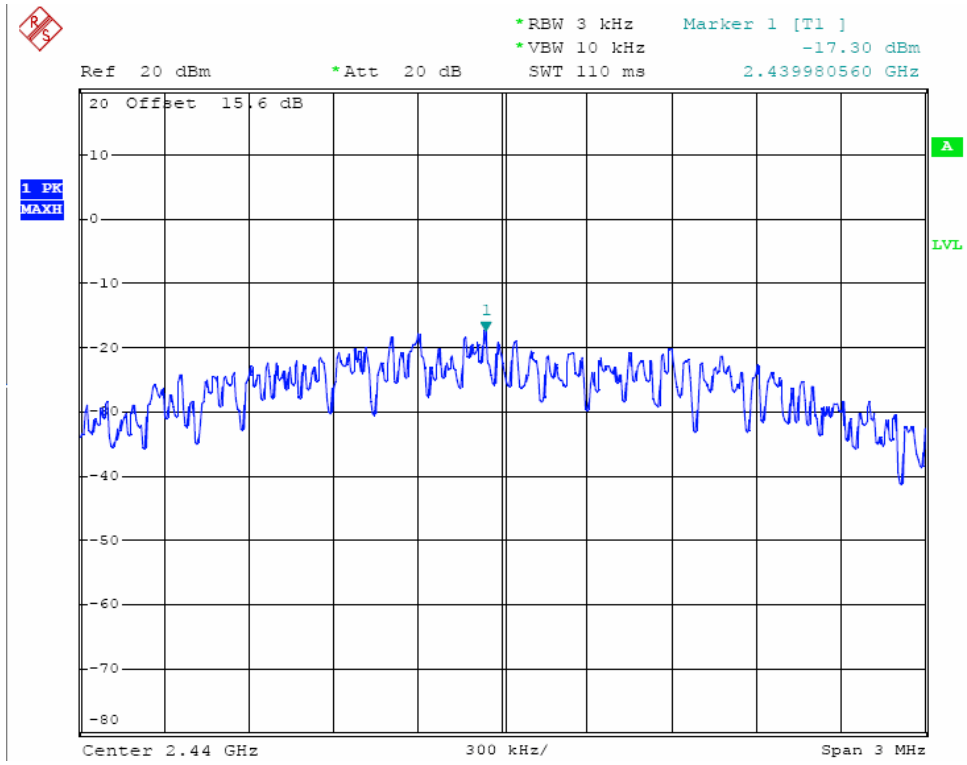
Test plot as follows:

GFSK

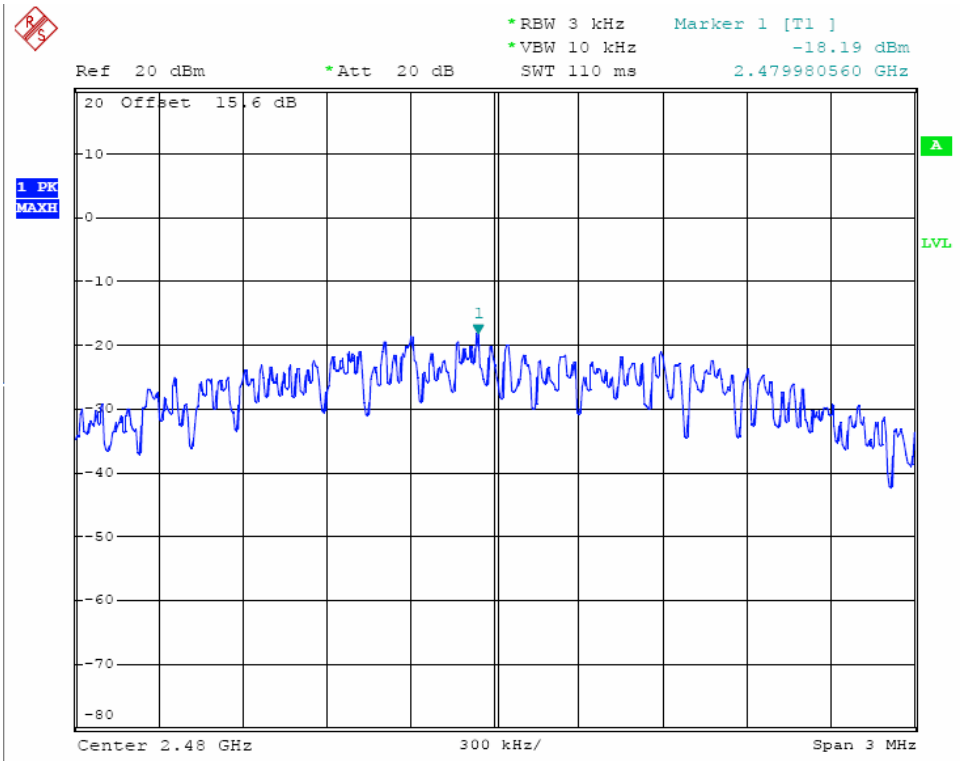
2402MHz



2440MHz



2480MHz


*RBW 3 kHz
Marker 1 [T1]
*VBW 10 kHz
-18.19 dBm
Ref 20 dBm
*Att 20 dB
SWT 110 ms
2.479980560 GHz
20 Offset 15.6 dB
1 PK
MAXH
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
300 kHz/
Span 3 MHz

8. MAXIMUM PEAK OUTPUT POWER

8.1. Limits

According to FCC Section 15.247(b)(1), For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

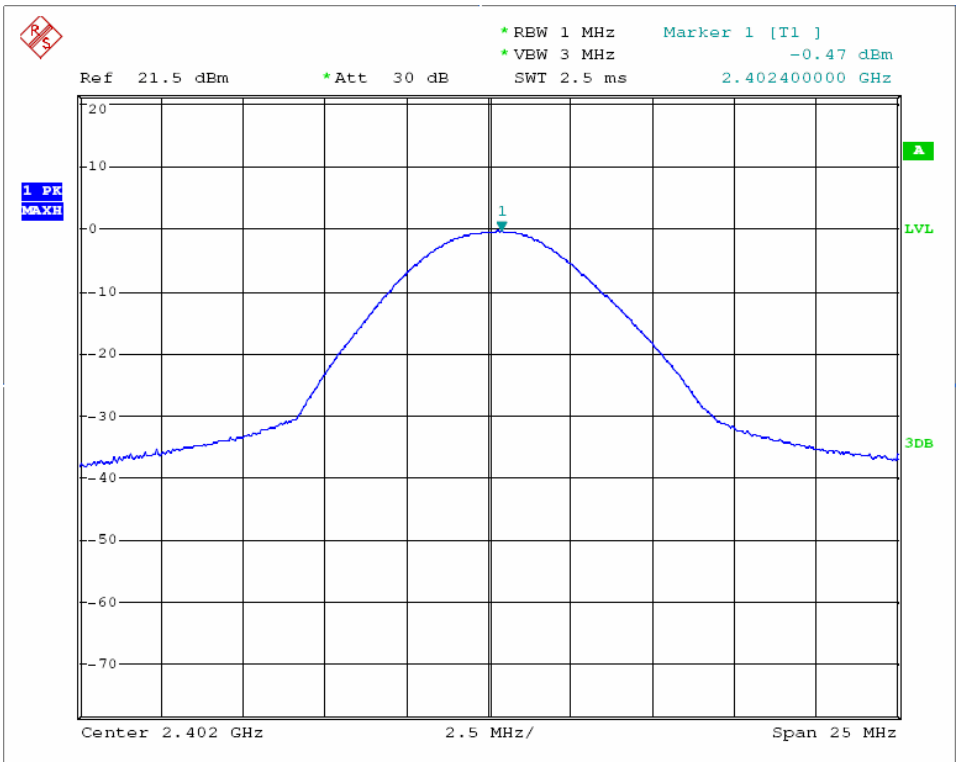
8.2. Test setup

1. This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set the RBW≥DTS bandwidth,
4. Set VBW≥3 RBW,
5. Set span≥3 RBW,
6. Sweep=auto
7. Detector =peak,
8. Trace=max hold
9. Allow trace to fully stabilize.
10. Measure the conducted output power and record the results in the test report.

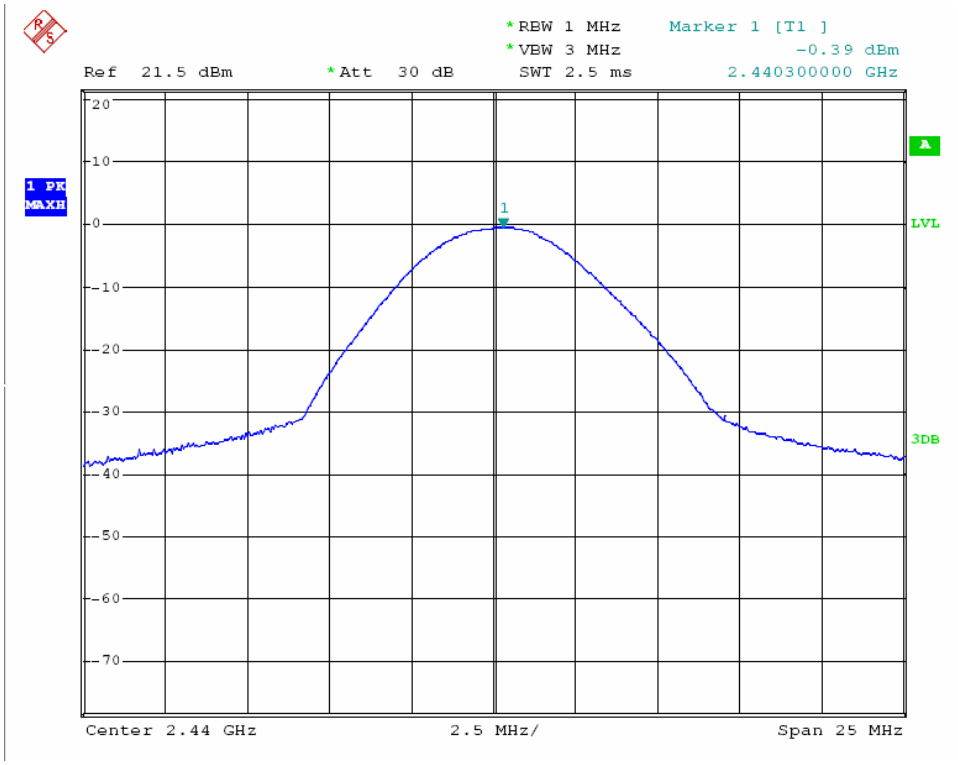
Test data:

	Channel Frequency (MHz)	Reading	Factor	Peak output Power	Limit (dBm)	Result
		dBm	dB	dBm	dBm	
GFSK	2402	-0.47	1.5	1.03	30	Pass
	2440	-0.39	1.5	1.11	30	Pass
	2480	-0.53	1.5	0.97	30	Pass

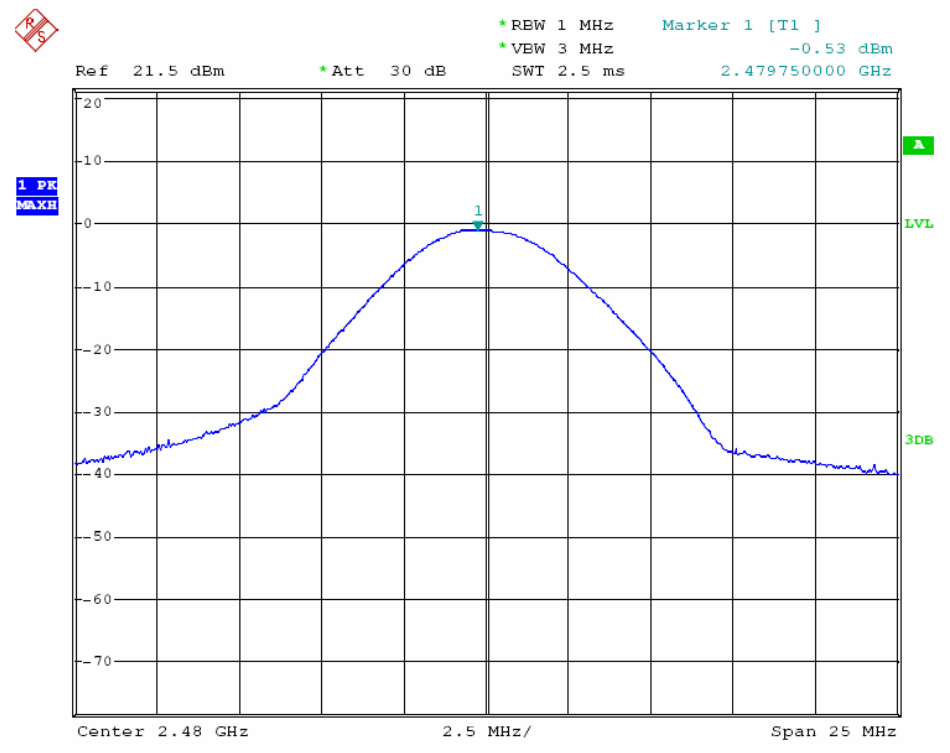
2402MHz



2440MHz



2480MHz


RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Marker 1 [T1]
-0.53 dBm
2.479750000 GHz
Ref 21.5 dBm
Att 30 dB
1 PK
MAXH
A
LVL
3DB
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.48 GHz
2.5 MHz/
Span 25 MHz

9. BAND EDGE COMPLIANCE TEST

9.1. Limits

According to FCC Section 15.247(d), 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 con-ducted or a radiated measurement

9.2. Test setup

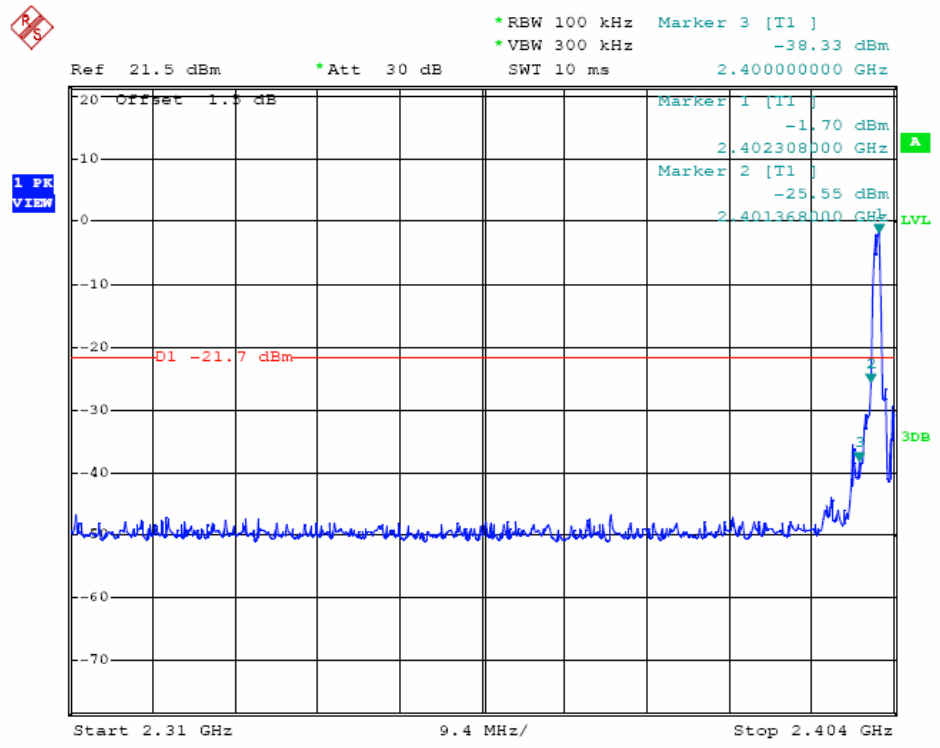
The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure.
For conduct test, VBW is set at 300kHz and RBW is set at 100kHz for measurement.
Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

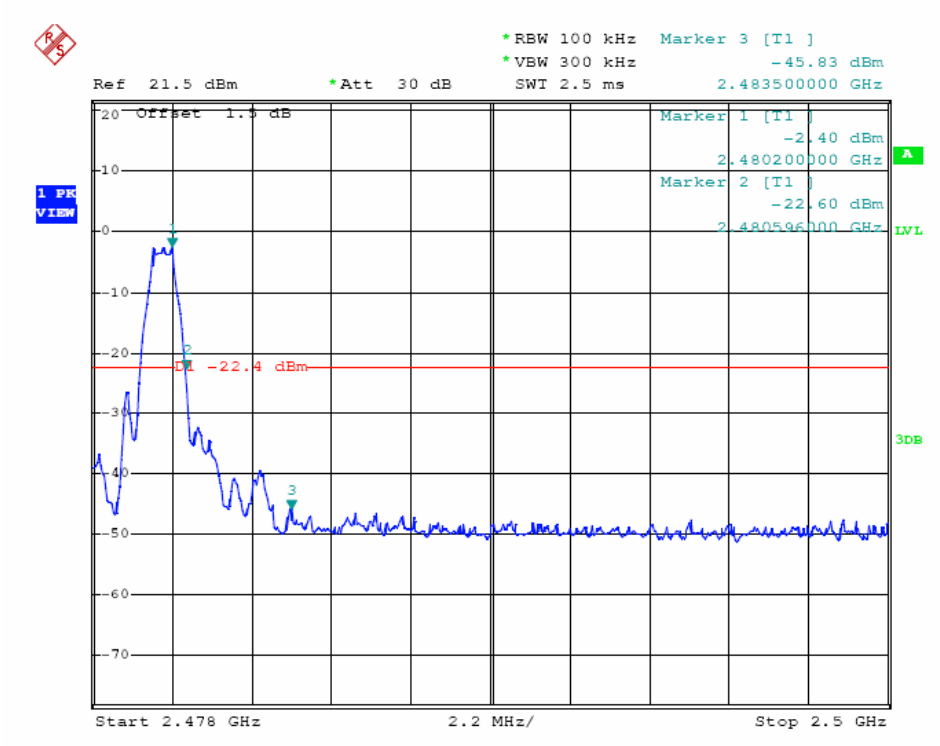
For radiated test as follows:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)	Band edge Limit (dBuV/m)	
		PK	PK	AV
<2400	H	50.48	74.00	54.00
<2400	V	49.36	74.00	54.00
>2483.5	H	50.12	74.00	54.00
>2483.5	V	49.03	74.00	54.00

For 2402MHz



For 2480MHz



10. ANTENNA REQUIREMENTS

10.1. Limits

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 (b), 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.

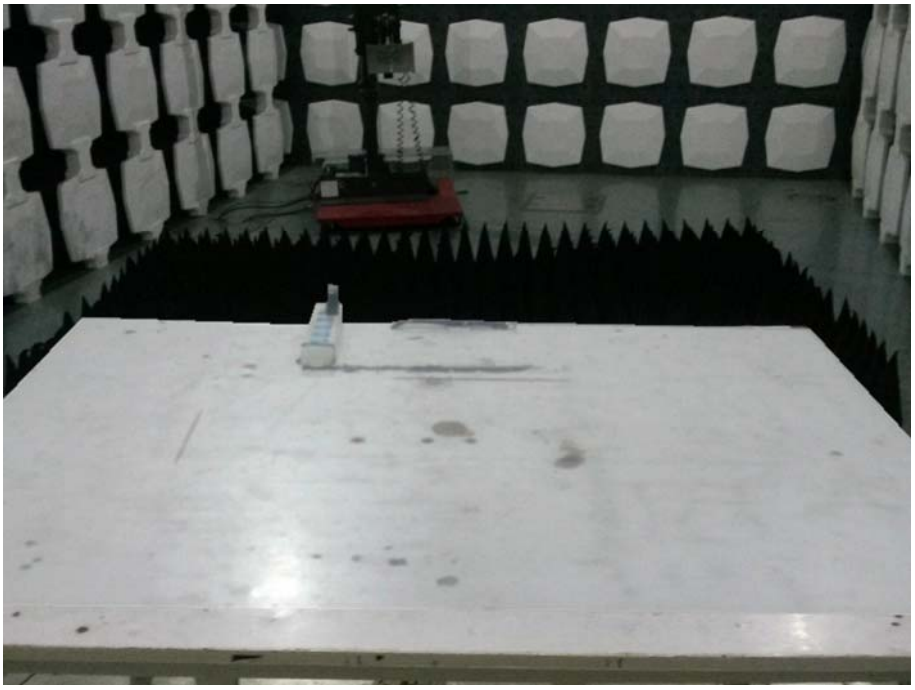
10.2. Result

The antennas used for this product are integral Patch Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.

11. PHOTOGRAPHS OF TEST SET-UP

Conducted

Radiated



12. PHOTOGRAPHS OF THE EUT

Please see annex.

END.