

TEST REPORT

Reference No. : WTD15S1240262E
FCC ID : PVB-GETTOGETHER
Applicant : The House of Marley. LLC
Address : 3000 Pontiac Trail Commerce Township, MI 48390 USA
Manufacturer : Shenzhen 3nod Digital Technology Co., Ltd.
Address : Building D Park 8# Road Tangxiayong Village, Industrial Zone
Songgang Town, Baoan District, Shenzhen City, China
Product Name : Bluetooth Speaker (Get together)
Model No. : EM-JA006-BH, EM-JA006-DN, EM-JA006-BK, EM-JA006-TN, EM-
JA006-CE, EM-JA006-MI
Standards : FCC CFR47 Part 15 Section 15.247:2015
Date of Receipt sample : Jul. 25, 2013
Date of Test : Jul. 30~Aug. 06, 2013; Dec.24~30, 2015
Date of Issue : Jan. 06, 2016
Test Result : **Pass**
Remark..... : This report is based on the original report WTD13S0706106E for add
model names, appearance photographs and change adapter.

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

Waltek Services (Shenzhen) Co., Ltd.

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen,
Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Compiled by:

Lake Xie

Lake Xie / Test Engineer

Approved by:

Philu Zhong

Philu Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	PASS
Spurious Radiated Emissions	15.205(a) 15.209 15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
20dB Bandwidth	15.247(a)(1)	PASS
Maximum Peak Output Power	15.247(b)(1)	PASS
Frequency Separation	15.247(a)(1)	PASS
Number of Hopping Frequency	15.247(a)(1)(iii)	PASS
Dwell time	15.247(a)(1)(iii)	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

3 Contents

	Page
1 COVER PAGE.....	1
2 TEST SUMMARY	2
3 CONTENTS	3
4 GENERAL INFORMATION.....	5
4.1 GENERAL DESCRIPTION OF E.U.T.	5
4.2 DETAILS OF E.U.T.	5
4.3 CHANNEL LIST.....	5
4.4 TEST MODE.....	6
4.5 TEST FACILITY.....	6
5 EQUIPMENT USED DURING TEST	7
5.1 EQUIPMENTS LIST	7
5.2 MEASUREMENT UNCERTAINTY	7
5.3 TEST EQUIPMENT CALIBRATION	8
6 CONDUCTED EMISSION	9
6.1 E.U.T. OPERATION	9
6.2 EUT SETUP.....	9
6.3 CONDUCTED EMISSION TEST RESULT	9
7 RADIATED EMISSIONS.....	14
7.1 EUT OPERATION.....	14
7.2 TEST SETUP	14
7.3 SPECTRUM ANALYZER SETUP	16
7.4 TEST PROCEDURE	16
7.5 CORRECTED AMPLITUDE & MARGIN CALCULATION	17
7.6 SUMMARY OF TEST RESULTS.....	18
8 BAND EDGE MEASUREMENT	20
8.1 TEST PROCEDURE	20
8.2 TEST RESULT:.....	21
9 20 DB BANDWIDTH MEASUREMENT	25
9.1 TEST PROCEDURE:	25
9.2 TEST RESULT:.....	25
10 MAXIMUM PEAK OUTPUT POWER	31
10.1 TEST PROCEDURE:.....	31
10.2 TEST RESULT:	31
11 HOPPING CHANNEL SEPARATION	37
11.1 TEST PROCEDURE:.....	37
11.2 TEST RESULT:	37
12 NUMBER OF HOPPING FREQUENCY.....	43
12.1 TEST PROCEDURE:.....	43
12.2 TEST RESULT:	43
13 DWELL TIME	45
13.1 TEST PROCEDURE:.....	45
13.2 TEST RESULT:	45
14 ANTENNA REQUIREMENT	61
15 RF EXPOSURE.....	62

- 15.1 REQUIMENTS: 62
- 15.2 TEST RESULT 62
- 16 PHOTOGRAPHS – TEST SETUP 63**
- 16.1 CONDUCTED EMISSIONS 63
- 16.2 RADIATED EMISSIONS 64
- 17 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS 67**
- 17.1 EUT – EXTERNAL VIEW 67
- 17.2 EUT – INTERNAL VIEW..... 84
- 17.3 EUT – RF MODULE VIEW 87

4 General Information

4.1 General Description of E.U.T.

Product Name	: Bluetooth Speaker (Get together)
Model No.	: EM-JA006-BH, EM-JA006-DN, EM-JA006-BK, EM-JA006-TN , EM-JA006-CE, EM-JA006-MI
Model Description	: Only different for model names and appearance
Operation Frequency	: 2402-2480MHz, 79(EDR) Channels in total
Type of Modulation	: GFSK, Pi/4DQPSK, 8DPSK
Antenna installation	: PCB Printed Antenna

4.2 Details of E.U.T.

Technical Data	: Output: 15 V, 1.5 A (powered by external AC adapter) Input: 100-240 VAC, 50/60 Hz, 0.6 A USB Output: DC 5 V , 1000mA
Adapter 1#	: Manufacturer: Kuantech (Beihai) Co., Ltd. M/N: KSASB0241500150HU
Adapter 2#	: Manufacturer: Kuantech (Beihai) Co., Ltd. M/N: KSASB0241500150D5

4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2402	2	2403	3	2404	4	2405
5	2406	6	2407	7	2408	8	2409
9	2410	10	2411	11	2412	12	2413
13	2414	14	2415	15	2416	16	2417
17	2418	18	2419	19	2420	20	2421
21	2422	22	2423	23	2424	24	2425
25	2426	26	2427	27	2428	28	2429
29	2430	30	2431	31	2432	32	2433
33	2434	34	2435	35	2436	36	2437
37	2438	38	2439	39	2440	40	2441
41	2442	42	2443	43	2444	44	2445
45	2446	46	2447	47	2448	48	2449
49	2450	50	2451	51	2452	52	2453
53	2454	54	2455	55	2456	56	2457
57	2458	58	2459	59	2460	60	2461
61	2462	62	2463	63	2464	64	2465
65	2466	66	2467	67	2468	68	2469
69	2470	70	2471	71	2472	72	2473
73	2474	74	2475	75	2476	76	2477
77	2478	78	2479	79	2480	-	-

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Table 1 Tests Carried Out Under FCC part 15.247

Bluetooth mode	Test mode	Low channel	Middle channel	High channel
EDR	Transmitting	2402MHz	2441MHz	2480MHz

Table 2 Tests Carried Out Under FCC part 15.207 and 15.209

Test Item	Test Mode
Radiated Emissions	Communication
Conducted Emissions	Communication

4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration 7760A-1, October 15, 2015

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) 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 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) 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 328995, December 3, 2014.

5 Equipment Used during Test

5.1 Equipments List

3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.14,2015	Sep.13,2016
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.14,2015	Sep.13,2016
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.18,2015	Apr.17,2016
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.14,2015	Sep.13,2016
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.18,2015	Apr.17,2016
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.18,2015	Apr.17,2016
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.16,2015	Mar.15,2016
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.09,2015	Apr.08,2016
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Sep.14,2015	Sep.13,2016
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.14,2015	Sep.13,2016
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.14,2015	Sep.13,2016
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.14,2015	Sep.13,2016
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.14,2015	Sep.13,2016
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.14,2015	Sep.13,2016
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.14,2015	Sep.13,2016

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)

	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

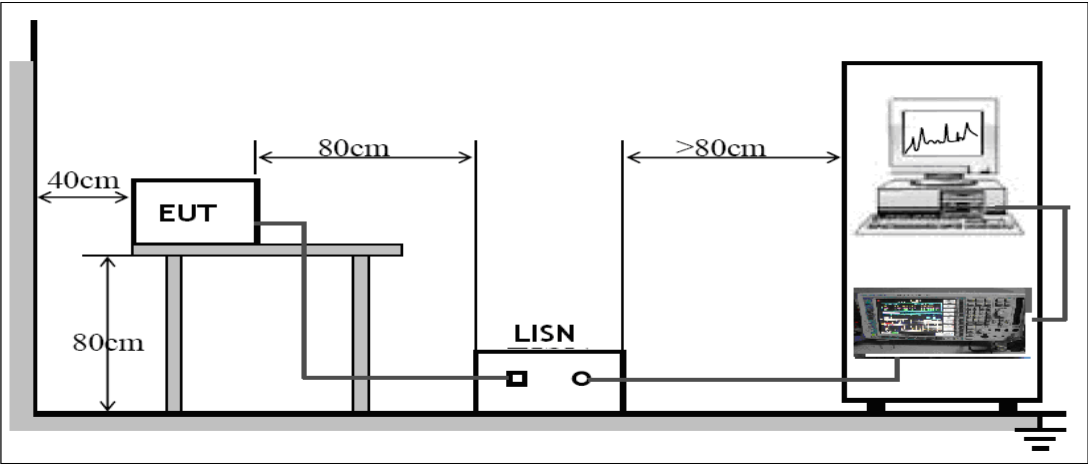
6.1 E.U.T. Operation

Operating Environment:
Temperature: 25.5 °C
Humidity: 51 % RH
Atmospheric Pressure: 1012 mbar

EUT Operation:
The test was performance on bluetooth linking mode, the test data shown in the report.
The EUT was tested according to ANSI C63.4. The frequency spectrum from 150kHz to 30MHz was investigated.
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.2 EUT Setup

The EUT was placed on the test table in shielding room.

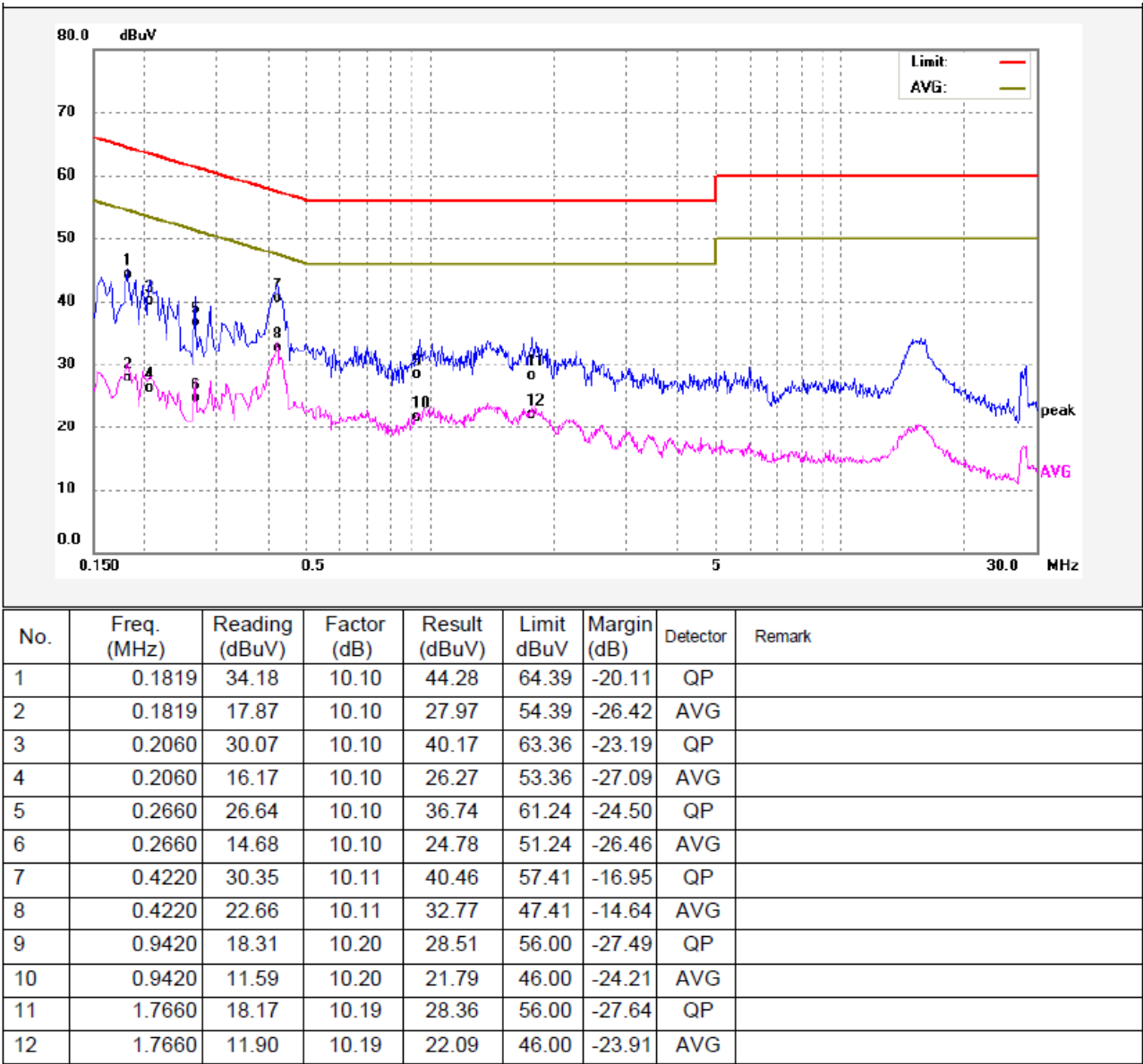


6.3 Conducted Emission Test Result

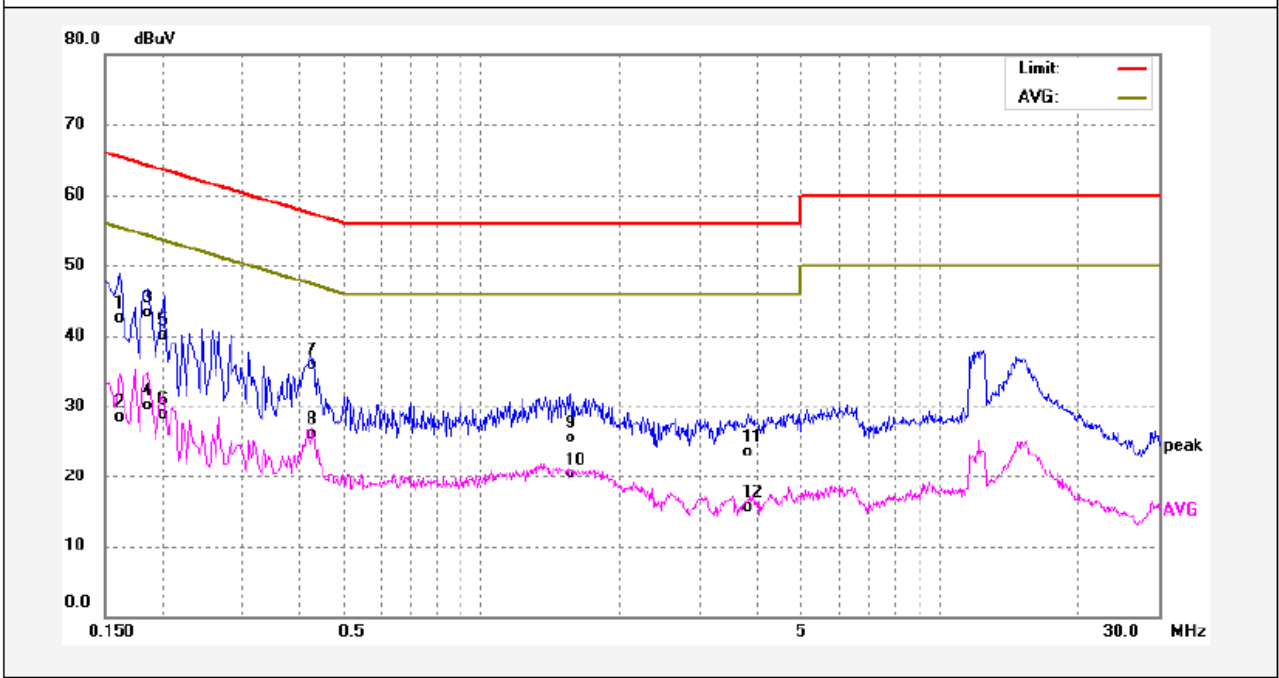
An initial pre-scan was performed on the live and neutral lines.

Adapter 1#:

Live line:



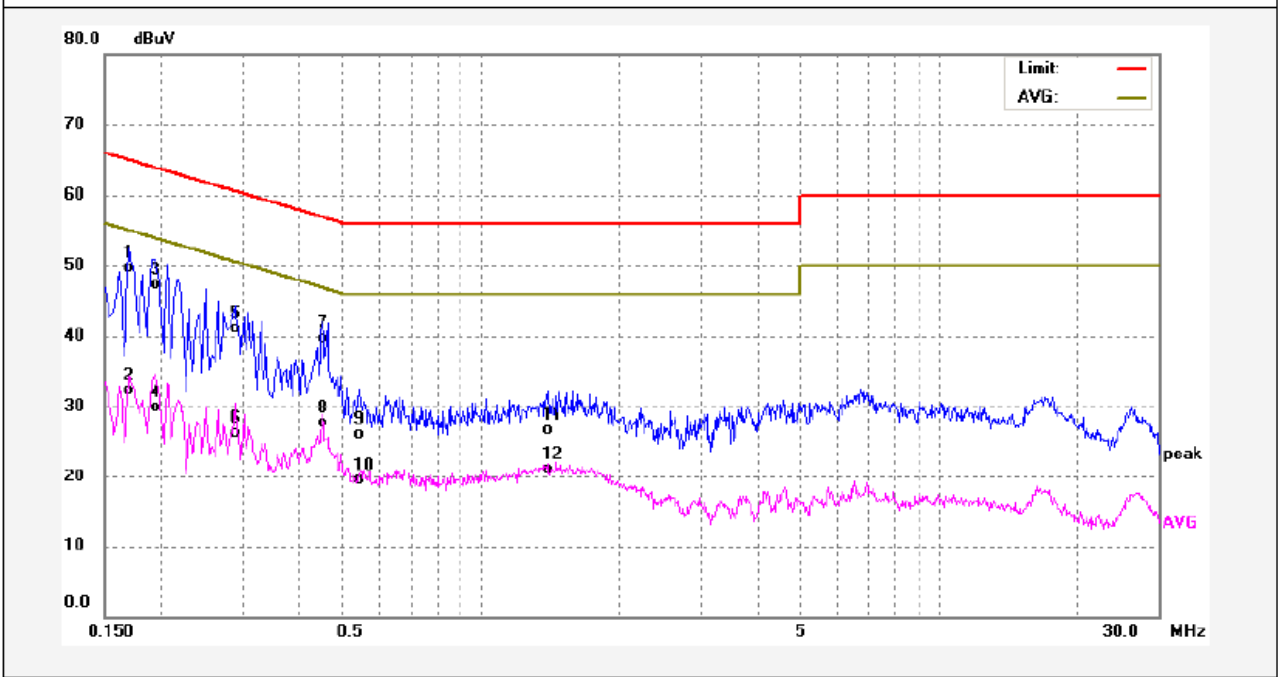
Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1620	32.36	10.10	42.46	65.36	-22.90	QP	
2	0.1620	18.41	10.10	28.51	55.36	-26.85	AVG	
3	0.1860	33.11	10.10	43.21	64.21	-21.00	QP	
4	0.1860	20.01	10.10	30.11	54.21	-24.10	AVG	
5	0.2020	30.01	10.10	40.11	63.52	-23.41	QP	
6	0.2020	18.71	10.10	28.81	53.52	-24.71	AVG	
7	0.4220	25.85	10.11	35.96	57.41	-21.45	QP	
8	0.4220	16.05	10.11	26.16	47.41	-21.25	AVG	
9	1.5620	15.21	10.20	25.41	56.00	-30.59	QP	
10	1.5620	10.04	10.20	20.24	46.00	-25.76	AVG	
11	3.8140	13.33	10.23	23.56	56.00	-32.44	QP	
12	3.8140	5.25	10.23	15.48	46.00	-30.52	AVG	

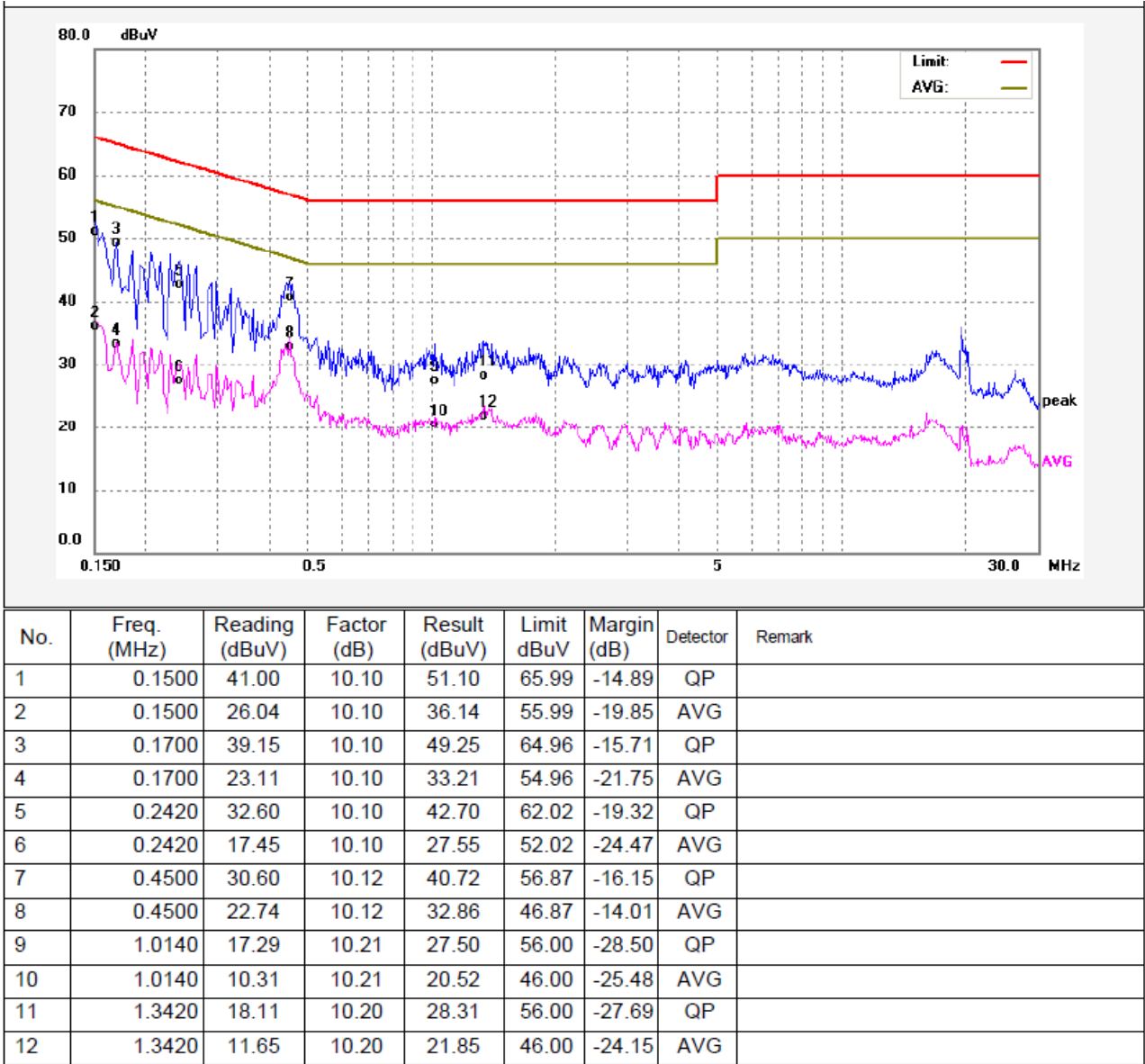
Adapter 2#:

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	39.60	10.10	49.70	64.96	-15.26	QP	
2	0.1700	22.11	10.10	32.21	54.96	-22.75	AVG	
3	0.1940	37.27	10.10	47.37	63.86	-16.49	QP	
4	0.1940	19.81	10.10	29.91	53.86	-23.95	AVG	
5	0.2900	30.94	10.11	41.05	60.52	-19.47	QP	
6	0.2900	16.12	10.11	26.23	50.52	-24.29	AVG	
7	0.4500	29.66	10.12	39.78	56.87	-17.09	QP	
8	0.4500	17.49	10.12	27.61	46.87	-19.26	AVG	
9	0.5420	16.01	10.13	26.14	56.00	-29.86	QP	
10	0.5420	9.31	10.13	19.44	46.00	-26.56	AVG	
11	1.3940	16.41	10.20	26.61	56.00	-29.39	QP	
12	1.3940	10.91	10.20	21.11	46.00	-24.89	AVG	

Neutral line:



7 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.4:2003

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

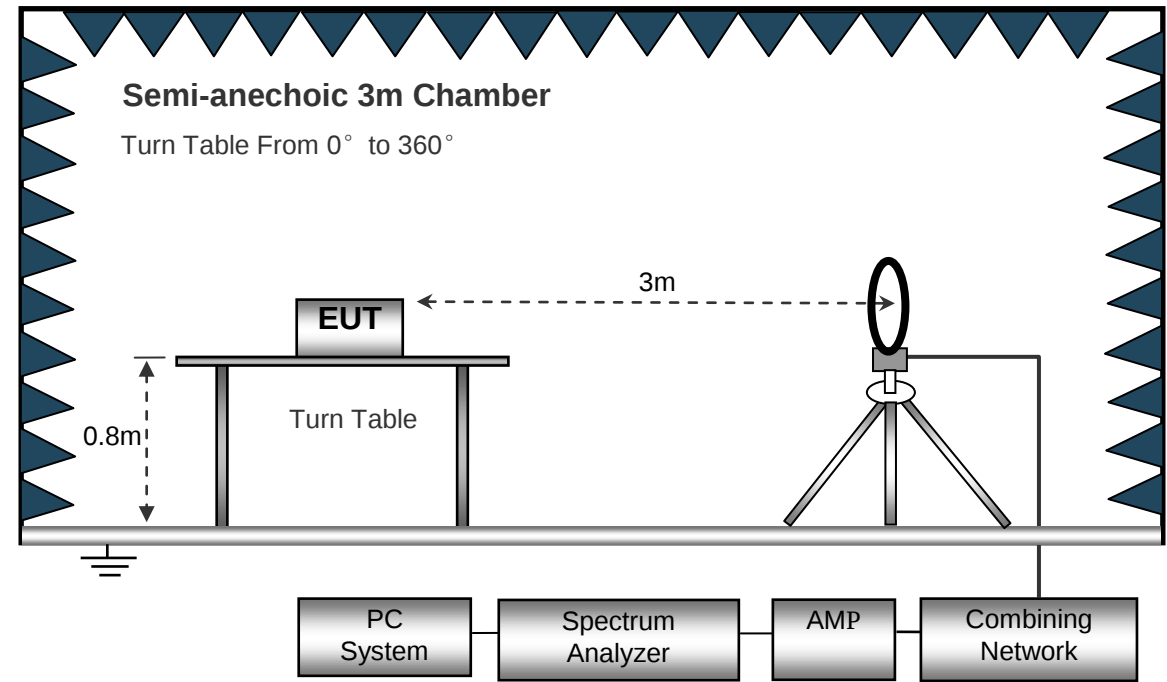
EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

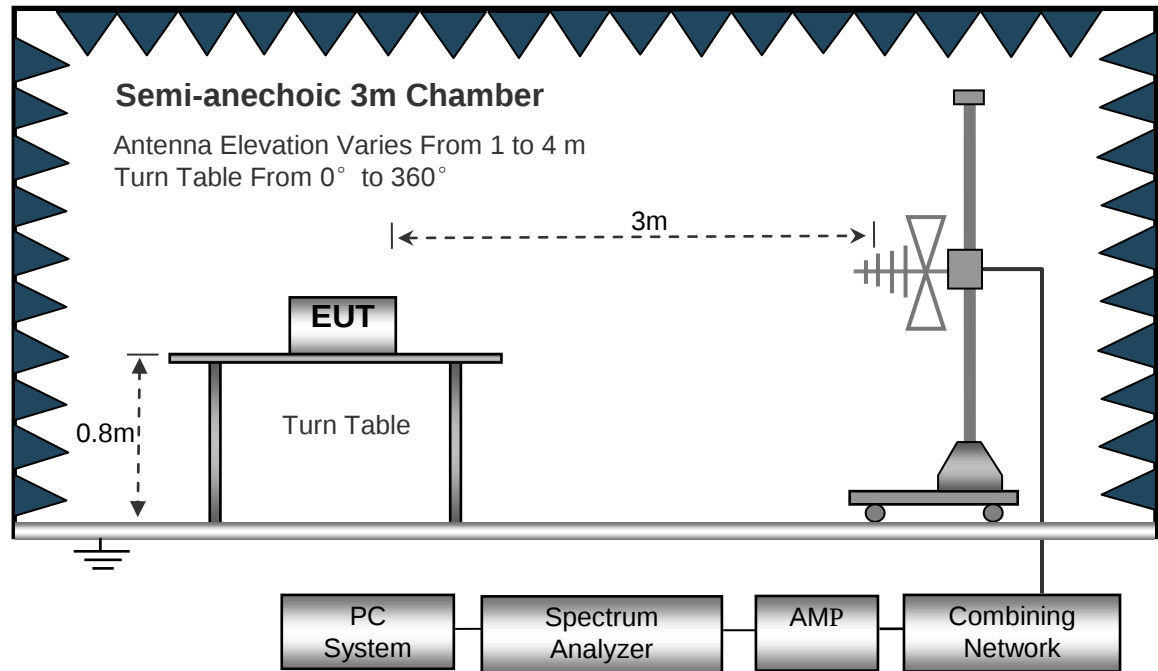
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

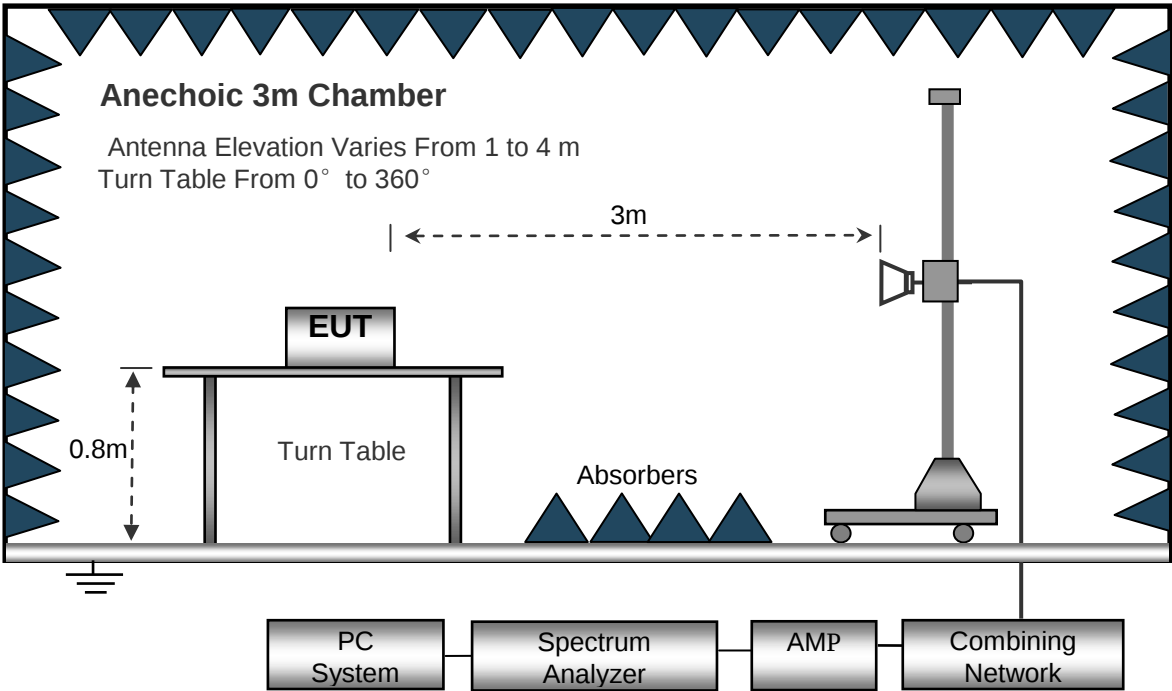
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed Auto
IF Bandwidth.....10kHz
Video Bandwidth.....10kHz
Resolution Bandwidth.....10kHz

30MHz ~ 1GHz

Sweep Speed Auto
DetectorPK
Resolution Bandwidth.....100kHz
Video Bandwidth.....300kHz

Above 1GHz

Sweep Speed Auto
DetectorPK
Resolution Bandwidth.....1MHz
Video Bandwidth.....3MHz
DetectorAve.
Resolution Bandwidth.....1MHz
Video Bandwidth.....10Hz

7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

7.6 Summary of Test Results

Test Frequency : Below 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Low Channel 2402MHz									
175.66	21.11	QP	205	1.1	H	10.59	31.70	43.53	-11.83
175.66	19.30	QP	326	1.9	V	10.59	29.89	43.53	-13.64
4804.00	54.53	PK	26	1.5	V	-1.08	53.45	74.00	-20.55
4804.00	41.76	Ave	26	1.5	V	-1.08	40.68	54.00	-13.32
7206.00	53.17	PK	225	1.8	H	1.34	54.51	74.00	-19.49
7206.00	42.19	Ave	225	1.8	H	1.34	43.53	54.00	-10.47
2317.83	45.87	PK	156	1.5	V	-13.20	32.67	74.00	-41.33
2317.83	37.42	Ave	156	1.5	V	-13.20	24.22	54.00	-29.78
2375.72	43.19	PK	258	1.7	H	-13.12	30.07	74.00	-43.93
2375.72	38.82	Ave	258	1.7	H	-13.12	25.70	54.00	-28.30
2495.00	42.46	PK	150	1.7	V	-13.02	29.44	74.00	-44.56
2495.00	38.08	Ave	150	1.7	V	-13.02	25.06	54.00	-28.94

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK Center Channel 2441MHz									
175.66	21.08	QP	34	1.8	H	10.59	31.67	43.53	-11.86
175.66	19.43	QP	327	1.0	V	10.59	30.02	43.53	-13.51
4882.00	50.63	PK	104	1.4	V	-0.62	50.01	74.00	-23.99

4882.00	40.58	Ave	104	1.4	V	-0.62	39.96	54.00	-14.04
7323.00	54.38	PK	108	1.1	H	2.21	56.59	74.00	-17.41
7323.00	42.03	Ave	108	1.1	H	2.21	44.24	54.00	-9.76
2343.57	45.93	PK	102	1.3	V	-13.19	32.74	74.00	-41.26
2343.57	39.80	Ave	102	1.3	V	-13.19	26.61	54.00	-27.39
2360.39	42.26	PK	55	1.8	H	-13.14	29.12	74.00	-44.88
2360.39	36.25	Ave	55	1.8	H	-13.14	23.11	54.00	-30.89
2484.13	42.55	PK	111	1.2	V	-13.08	29.47	74.00	-44.53
2484.13	36.22	Ave	111	1.2	V	-13.08	23.14	54.00	-30.86

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
GFSK High Channel 2480MHz									
175.66	20.33	QP	108	1.9	H	10.59	30.92	43.53	-12.61
175.66	20.26	QP	113	2.0	V	10.59	30.85	43.53	-12.68
4960.00	53.67	PK	270	1.5	V	-0.24	53.43	74.00	-20.57
4960.00	41.89	Ave	270	1.5	V	-0.24	41.65	54.00	-12.35
7440.00	50.75	PK	196	1.6	H	2.84	53.59	74.00	-20.41
7440.00	43.66	Ave	196	1.6	H	2.84	46.50	54.00	-7.50
2336.22	46.78	PK	30	1.3	V	-13.19	33.59	74.00	-40.41
2336.22	38.47	Ave	30	1.3	V	-13.19	25.28	54.00	-28.72
2359.70	42.80	PK	18	1.4	H	-13.14	29.66	74.00	-44.34
2359.70	37.73	Ave	18	1.4	H	-13.14	24.59	54.00	-29.41
2486.25	42.07	PK	294	1.6	V	-13.08	28.99	74.00	-45.01
2486.25	36.90	Ave	294	1.6	V	-13.08	23.82	54.00	-30.18

8 Band Edge Measurement

Test Requirement:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	DA 00-705
Limit:	40.0 dBuV/m between 30MHz & 88MHz; 43.5 dBuV/m between 88MHz & 216MHz; 46.0 dBuV/m between 216MHz & 960MHz; 54.0 dBuV/m above 960MHz. 74.0 dBuV/m for peak above 1GHz 54.0 dBuV/m for AVG above 1GHz

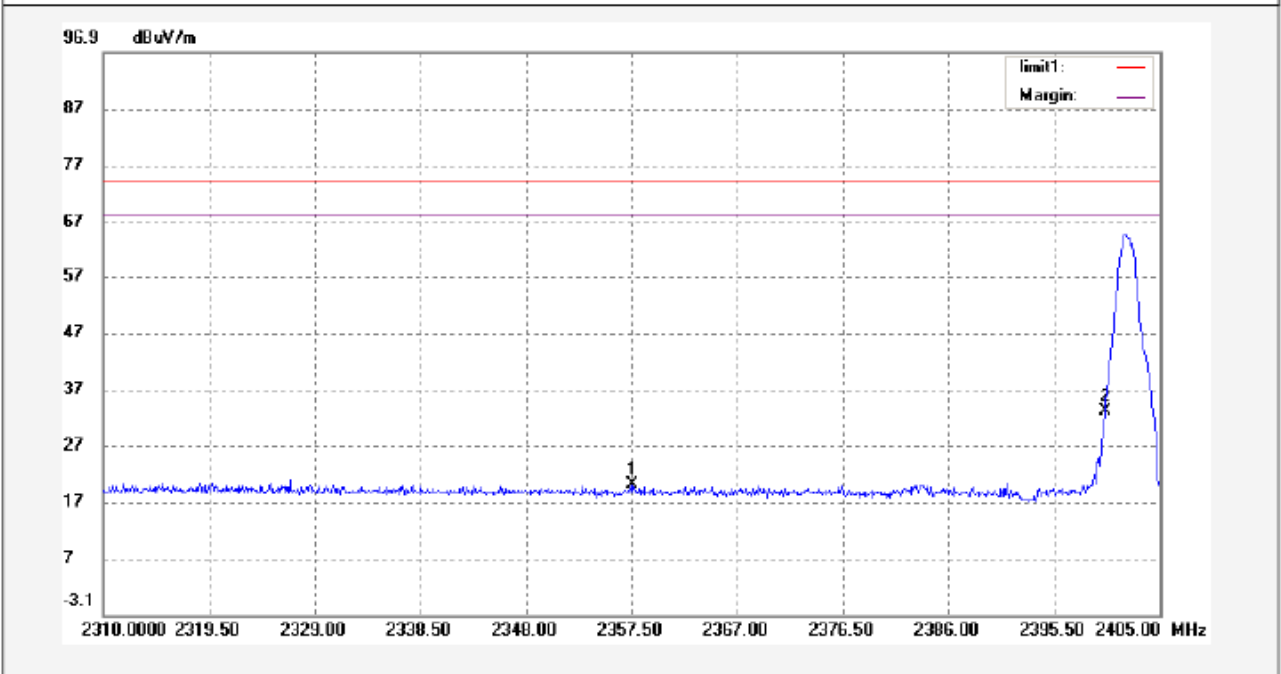
8.1 Test Procedure

1. The EUT was placed on a turntable which is 0.8m above ground plane
2. Measurement Distance is 3m
3. Detector:
 - For Peak value:
RBW = 1 MHz for $f \geq 1$ GHz
VBW $\geq$ RBW; Sweep = auto
Detector function = peak
Trace = max hold
 - For AVG value:
RBW = 1 MHz for $f \geq 1$ GHz
VBW = 10Hz; Sweep = auto
Detector function = AVG
Trace = max hold
- 4.continuous transmitting

8.2 Test Result:

All the modulation modes were tested, the data of the worst mode (GFSK) were recorded in the following pages.

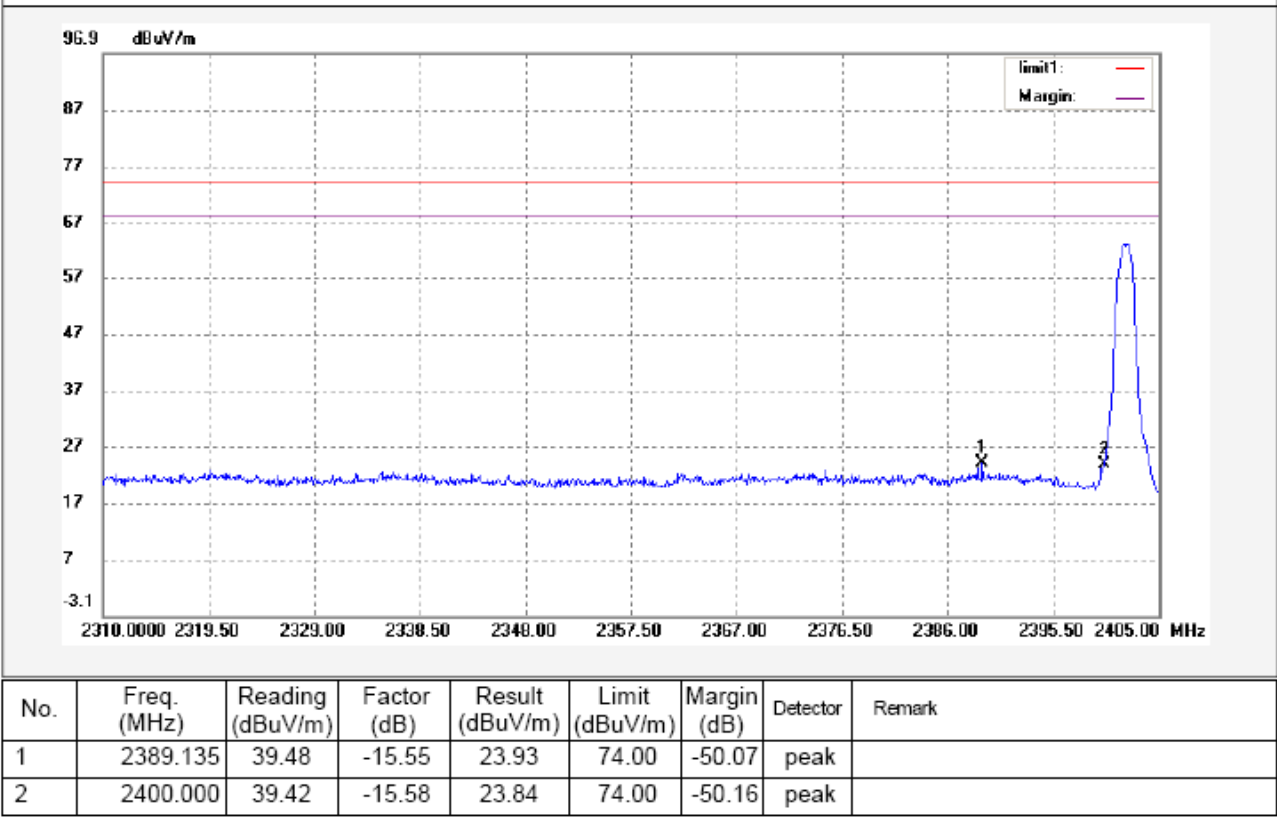
Modulation: GFSK
Lower Channel – Peak, Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2357.595	35.58	-15.45	20.13	74.00	-53.87	peak	
2	2400.000	48.69	-15.58	33.11	74.00	-40.89	peak	

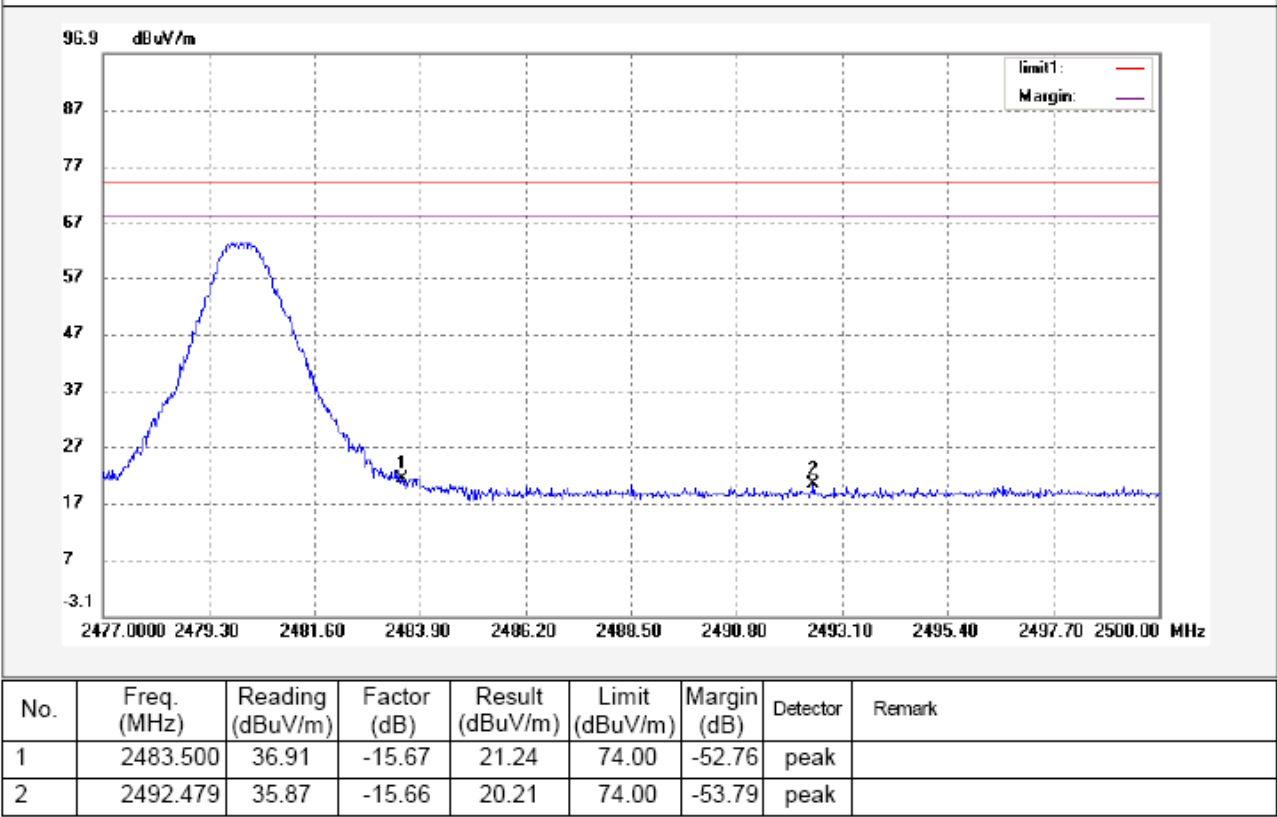
No.	Freq. (MHz)	Duty Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2357.000	-9	11.13	54.00	-42.87	AV	
2	2400.000	-9	24.11	54.00	-29.89	AV	

Lower Channel – Peak, Horizontal



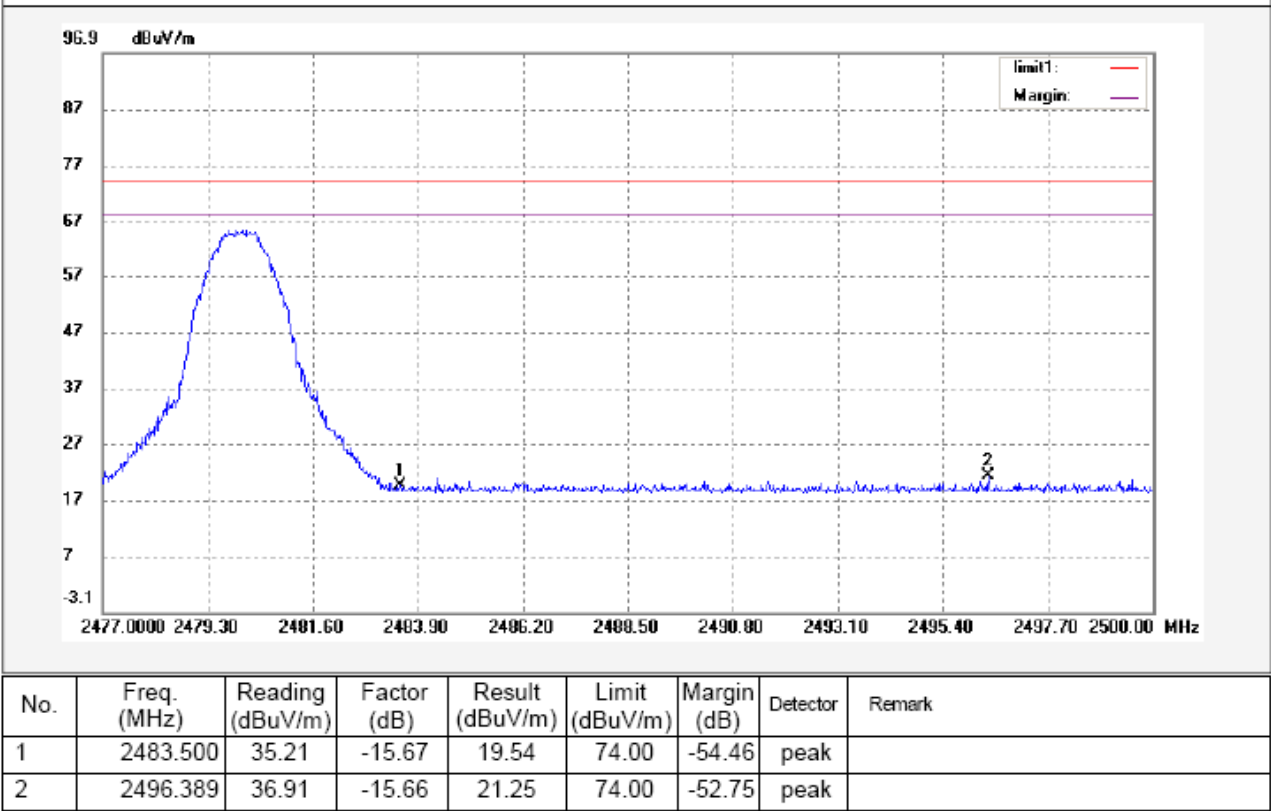
No.	Freq. (MHz)	Duty Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2389.000	-9	14.93	54.00	-39.07	AV	
2	2400.000	-9	14.84	54.00	-39.16	AV	

Upper Channel – Peak, Vertical



No.	Freq. (MHz)	Duty Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2483.500	-9	12.24	54.00	-41.76	AV	
2	2492.479	-9	11.21	54.00	-42.79	AV	

Upper Channel – Peak, Horizontal



No.	Freq. (MHz)	Duty Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2483.500	-9	10.54	54.00	-43.46	AV	
2	2496.389	-9	12.25	54.00	-41.75	AV	

9 20 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: DA 00-705

Test Mode: Test in fixing operating frequency at low, Middle, high channel.

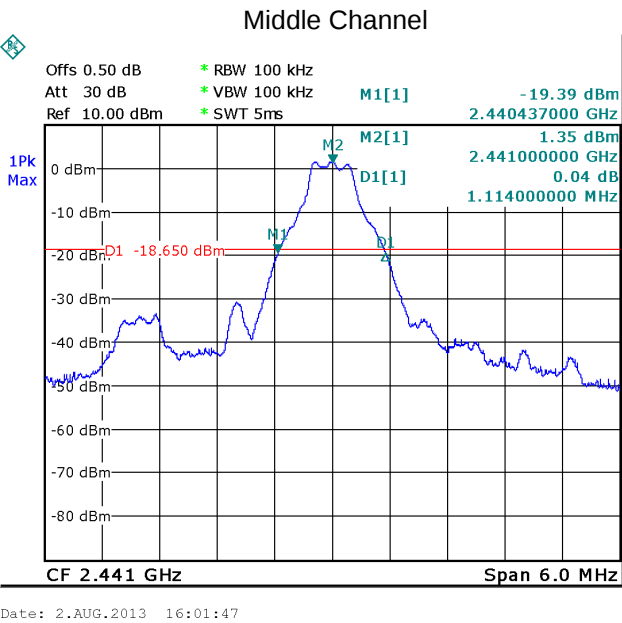
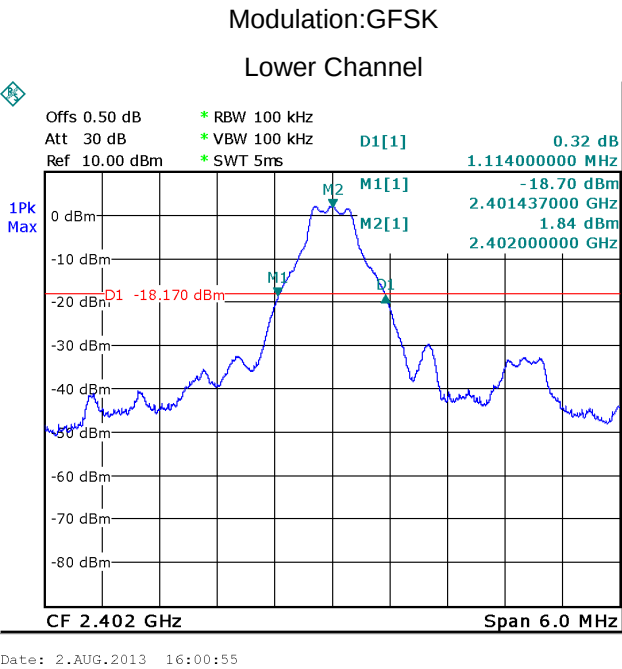
9.1 Test Procedure:

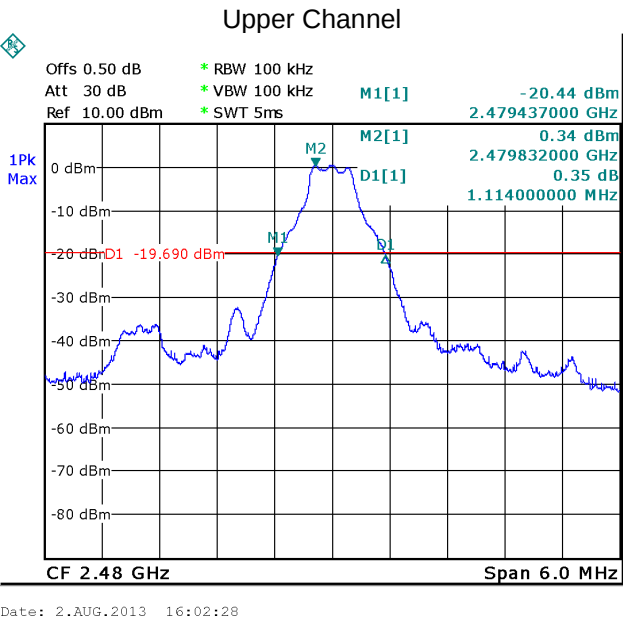
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 100kHz

9.2 Test Result:

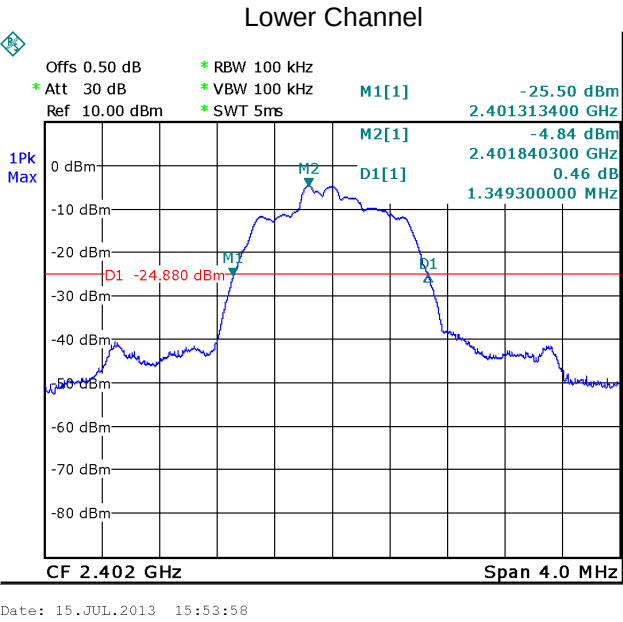
Modulation	Test Channel	Bandwidth(MHz)
GFSK	Lower	1.114
	Middle	1.114
	Upper	1.114
Pi/4DQPSK	Lower	1.349
	Middle	1.349
	Upper	1.333
8DPSK	Lower	1.377
	Middle	1.353
	Upper	1.353

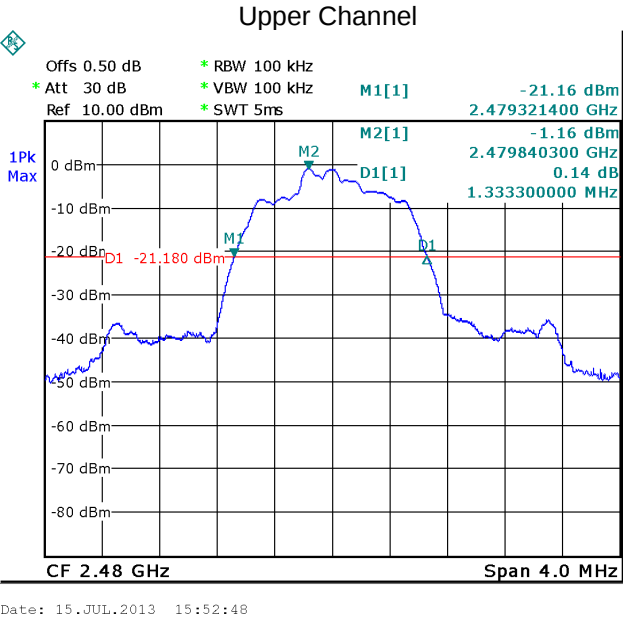
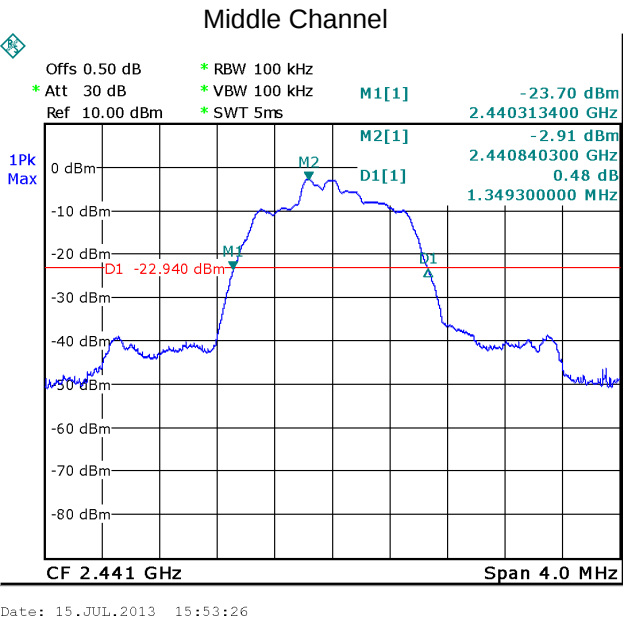
Test result plot as follows:





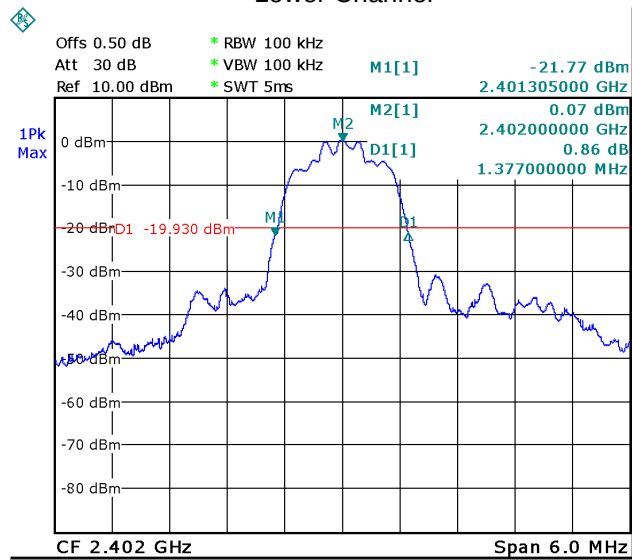
Modulation: Pi/4DQPSK





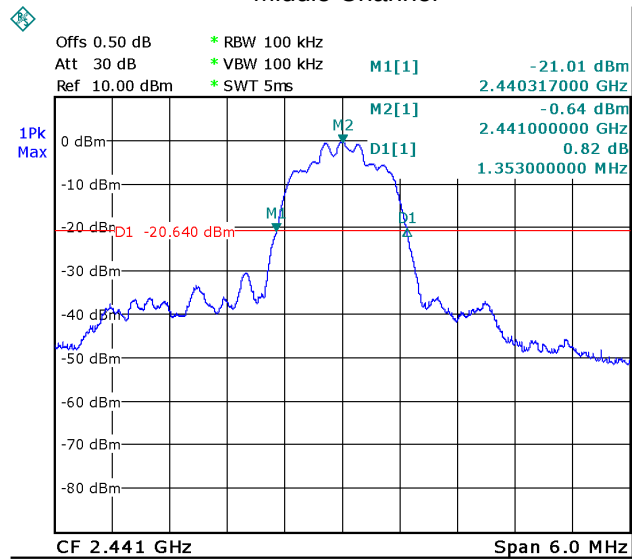
Modulation: 8DPSK

Lower Channel

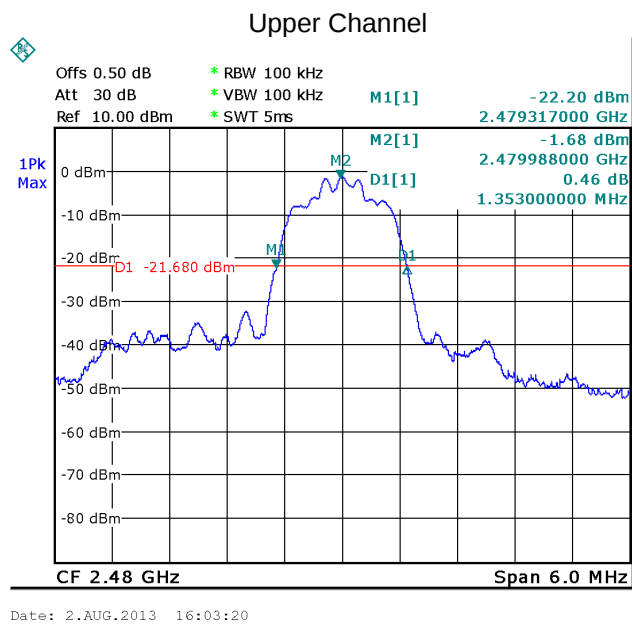


Date: 2.AUG.2013 16:05:12

Middle Channel



Date: 2.AUG.2013 16:04:25



10 Maximum Peak Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	DA 00-705
Test Limit:	Regulation 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. Refer to the result "Number of Hopping Frequency" of this document. The 1watts (30 dBm) limit applies.
Test mode:	Test in fixing frequency transmitting mode.

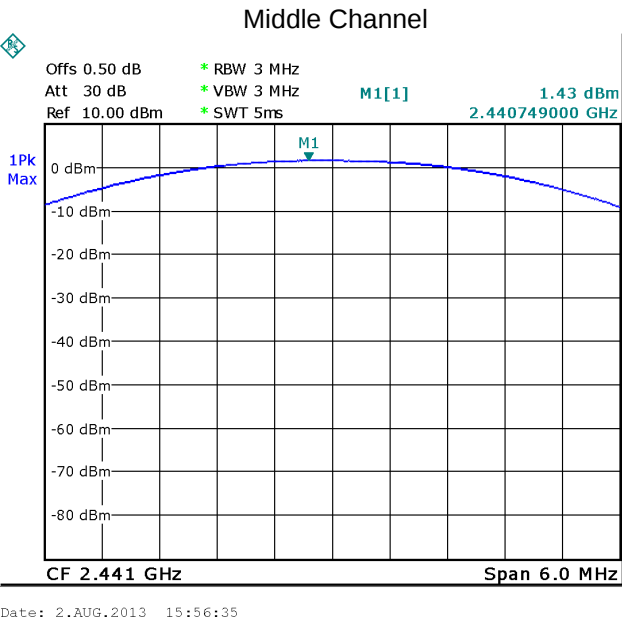
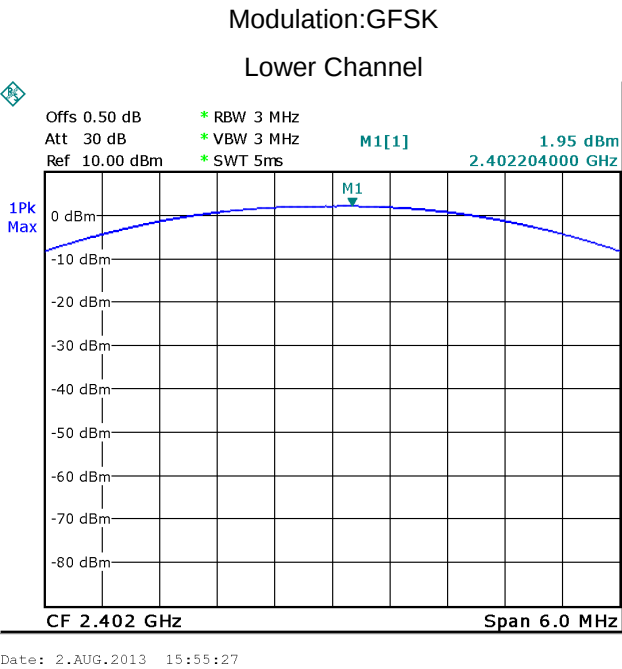
10.1 Test Procedure:

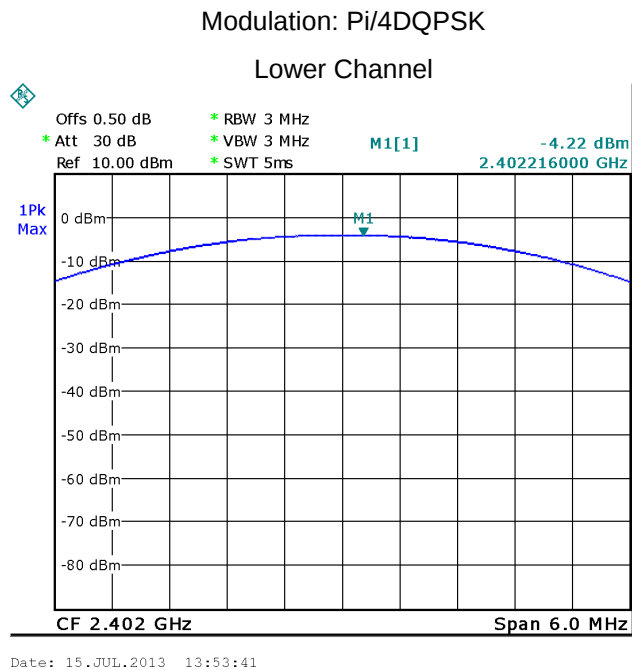
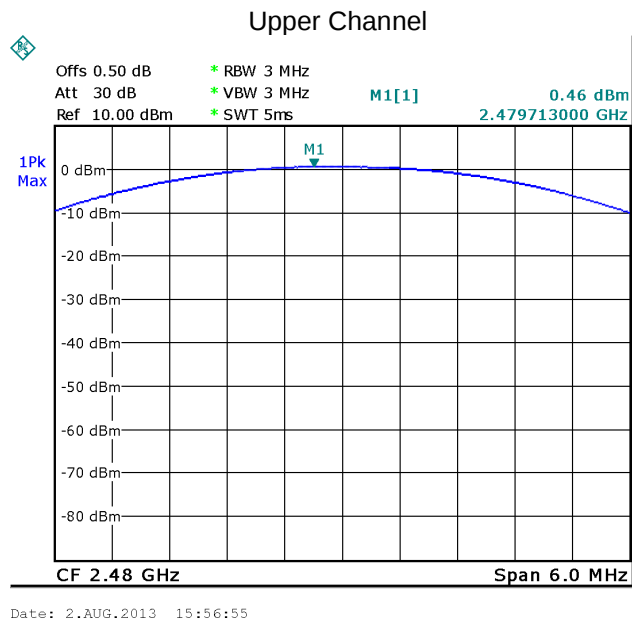
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3 MHz. VBW =3 MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

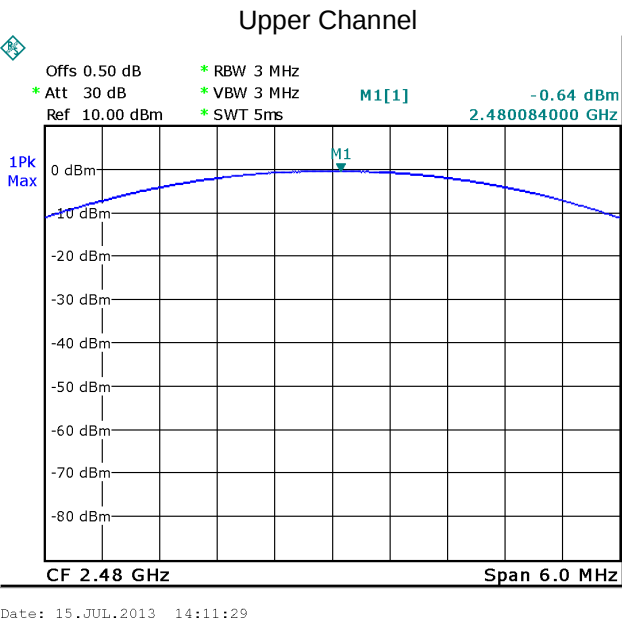
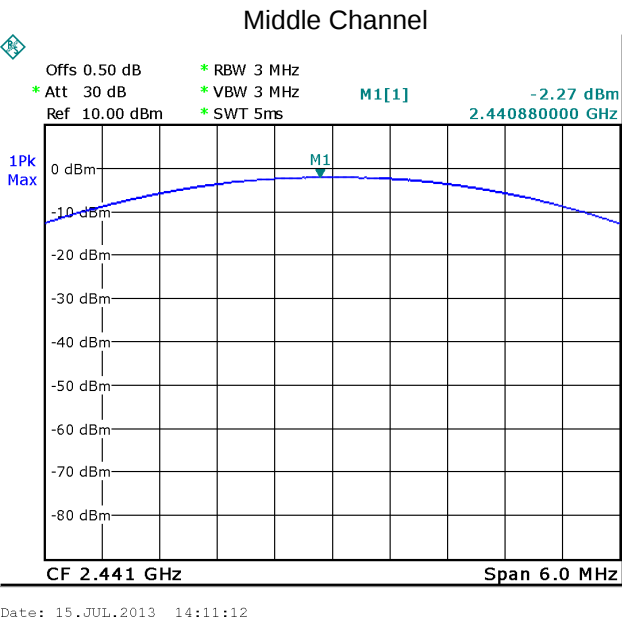
10.2 Test Result:

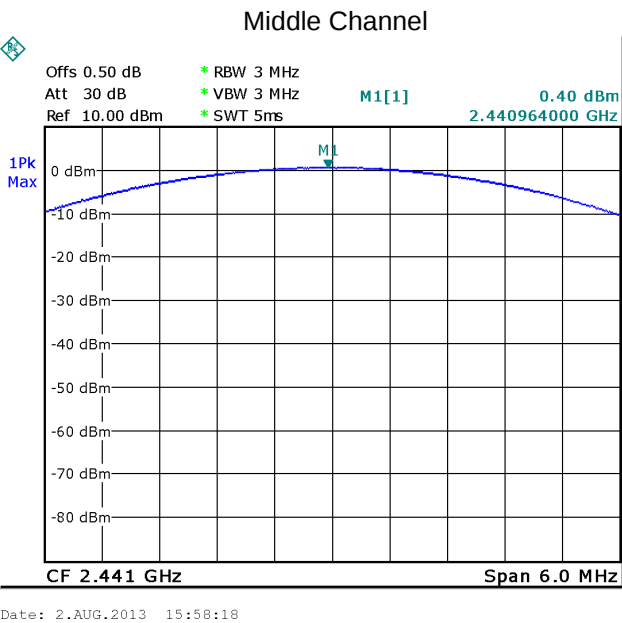
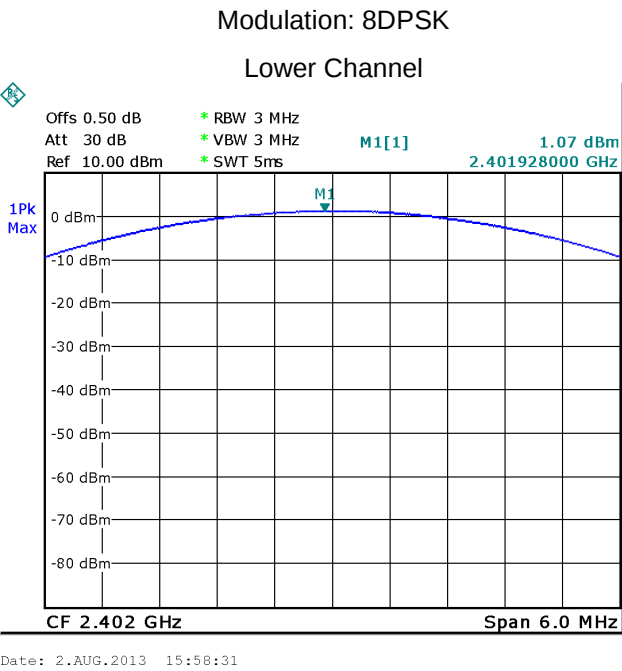
Modulation	Test Channel	Output Power (dBm)	Limit (dBm)
GFSK	Lower	1.95	20.97
	Middle	1.43	20.97
	Upper	0.46	20.97
Pi/4DQPSK	Lower	-4.22	20.97
	Middle	-2.27	20.97
	Upper	-0.64	20.97
8DPSK	Lower	1.07	20.97
	Middle	0.40	20.97
	Upper	-0.48	20.97

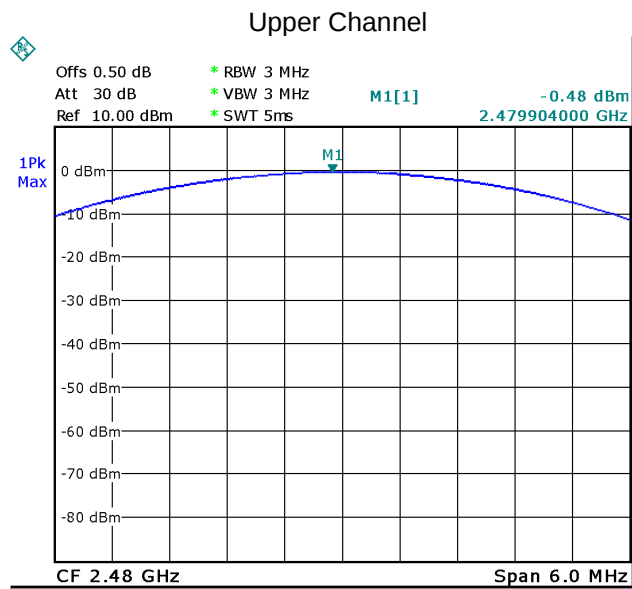
Test result plot as follows:











Date: 2.AUG.2013 15:57:59

11 Hopping Channel Separation

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: DA 00-705

Test Limit: Regulation 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 1W.

Test Mode: Test in hopping transmitting operating mode.

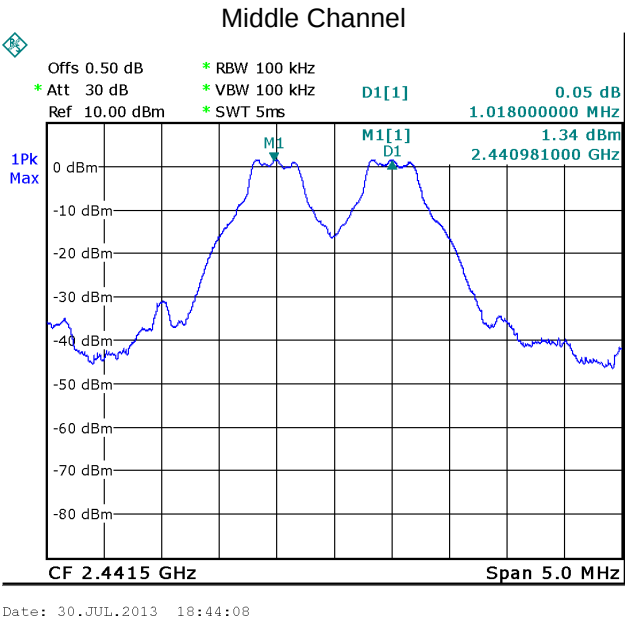
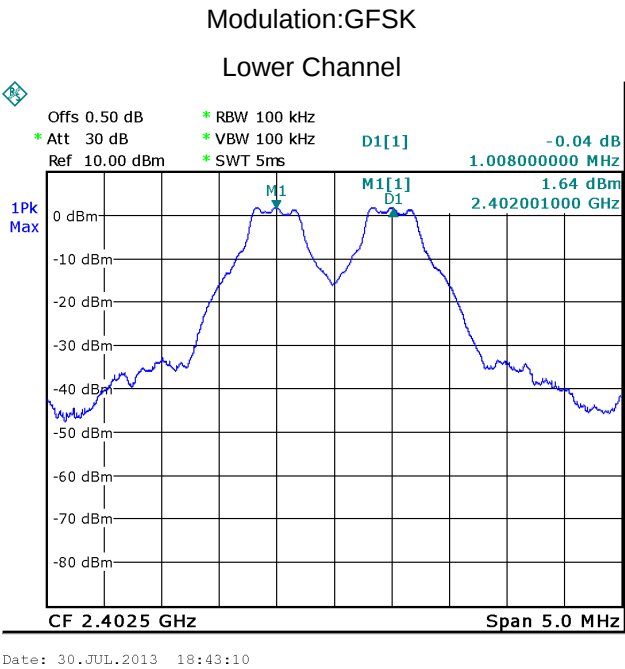
11.1 Test Procedure:

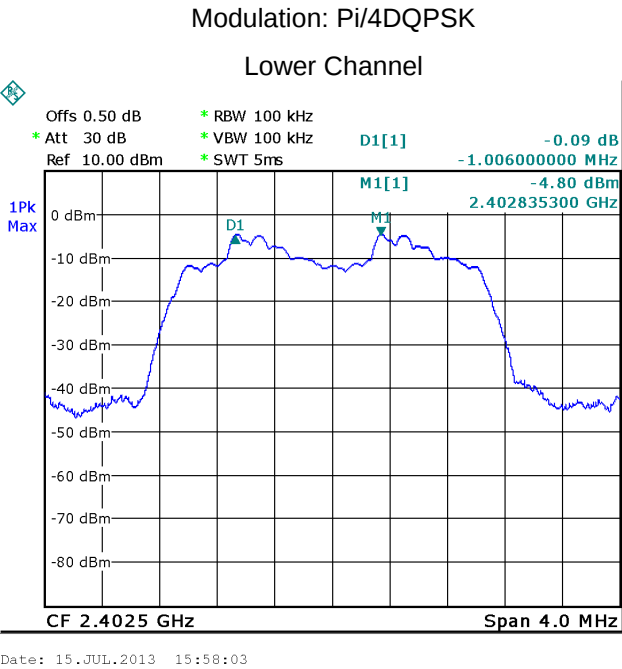
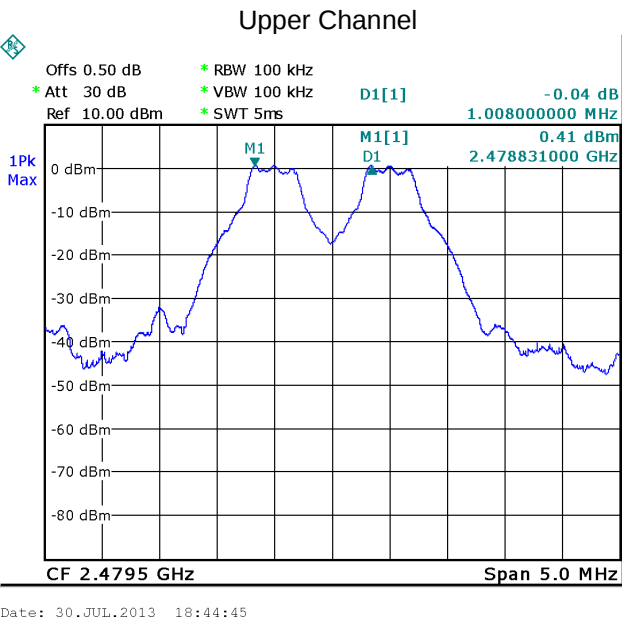
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100KHz. VBW = 100KHz , Span = 6MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section
Submit this plot.

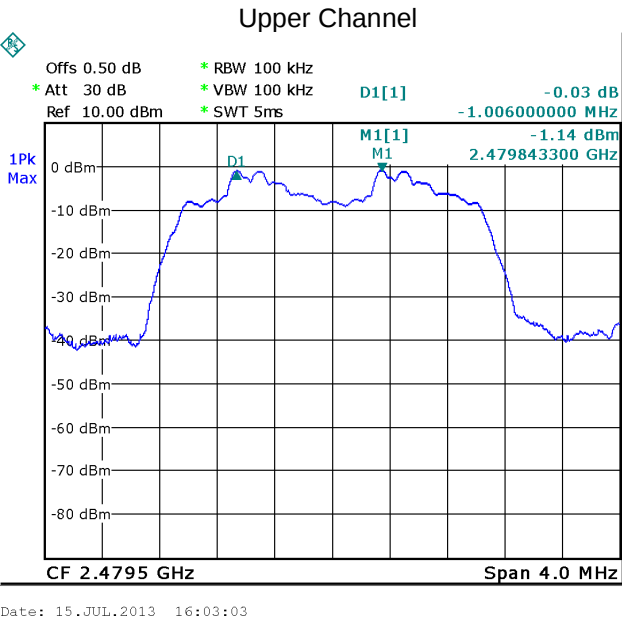
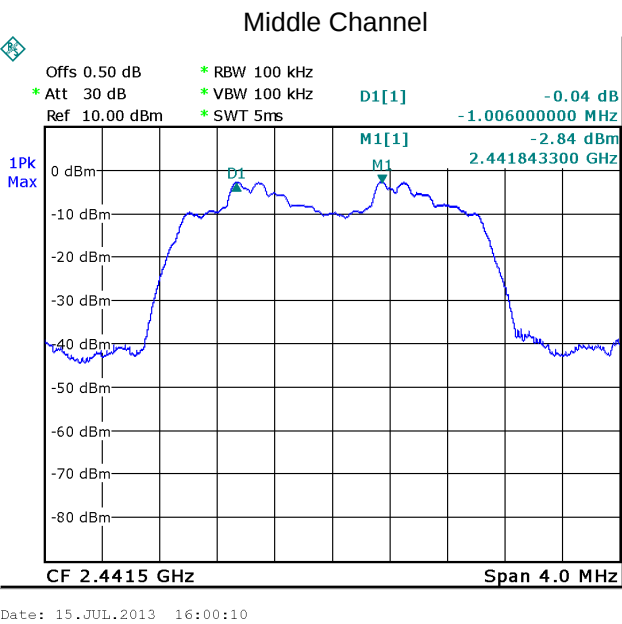
11.2 Test Result:

Modulation	Test Channel	Separation (MHz)
GFSK	Lower	1.008
	Middle	1.018
	Upper	1.008
Pi/4DQPSK	Lower	1.006
	Middle	1.006
	Upper	1.006
8DPSK	Lower	1.008
	Middle	1.008
	Upper	1.008

Test result plot as follows:

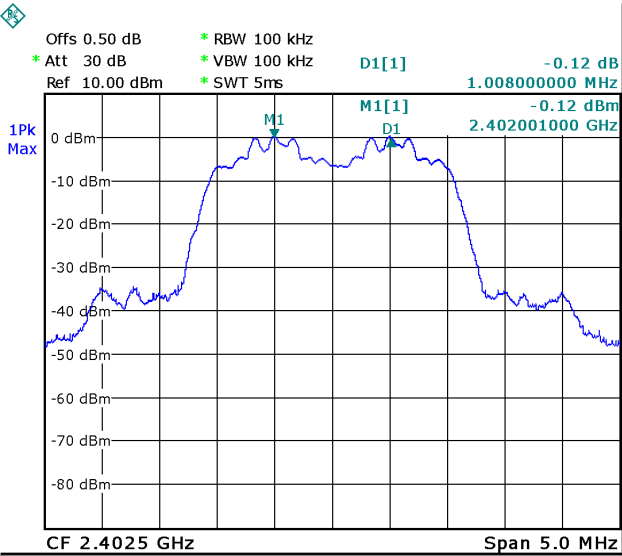






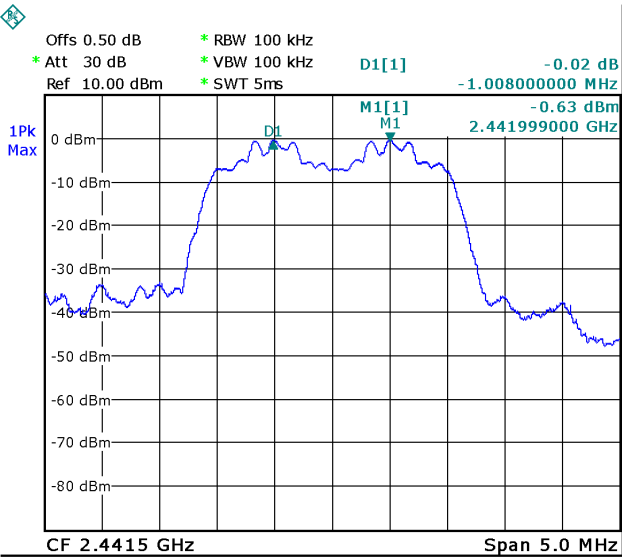
Modulation: 8DPSK

Lower Channel

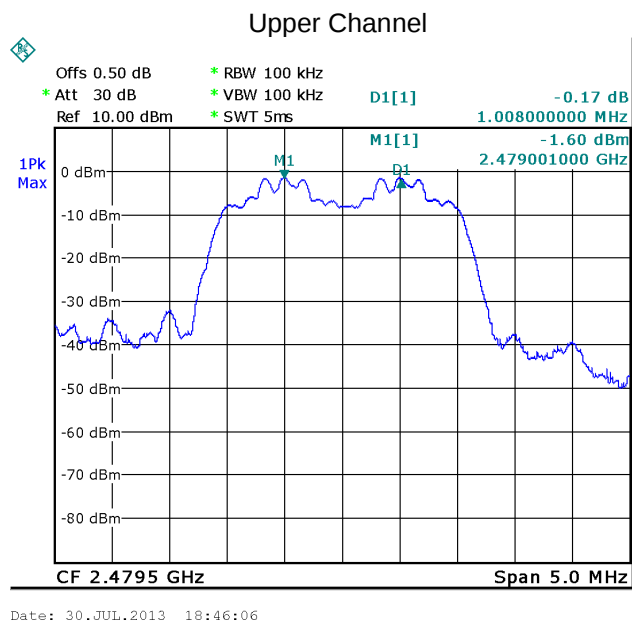


Date: 30.JUL.2013 18:48:02

Middle Channel



Date: 30.JUL.2013 18:47:22



12 Number of Hopping Frequency

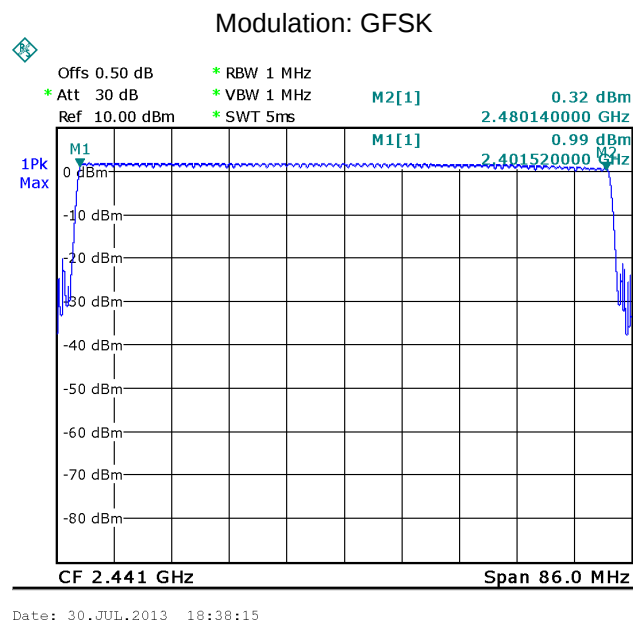
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	DA 00-705
Test Limit:	Regulation 15.247 (a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
Test Mode:	Test in hopping transmitting operating mode.

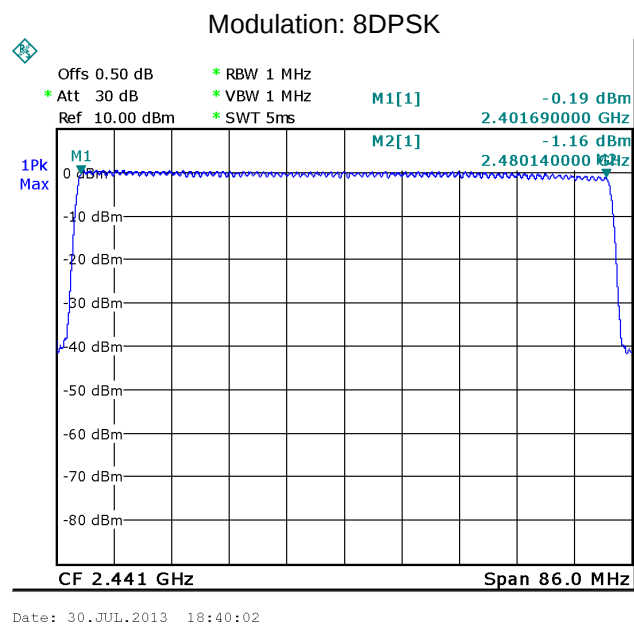
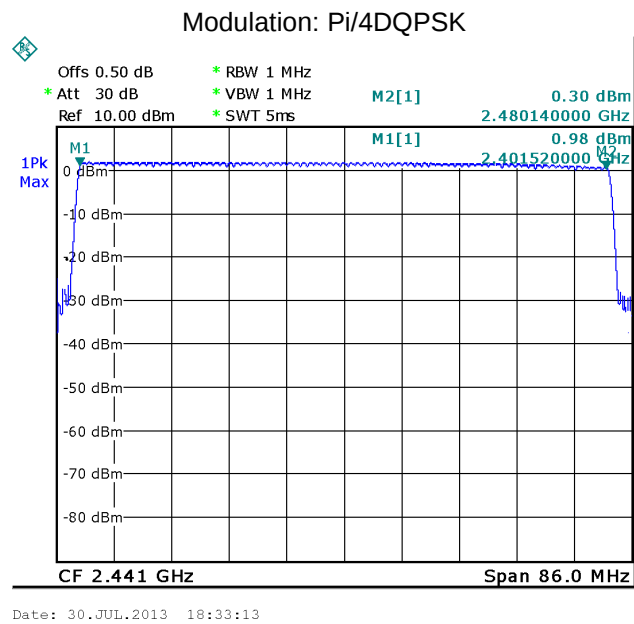
12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1MHz. VBW = 1MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Centre Frequency = 2.441GHz, Span = 86MHz. Sweep=auto;

12.2 Test Result:

Total Channels are 79 Channels.





13 Dwell Time

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	DA 00-705
Test Limit:	Regulation 15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Mode:	Test in hopping transmitting operating mode.

13.1 Test Procedure:

- 1.Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
- 2.Set spectrum analyzer span = 0. centred on a hopping channel;
- 3.Set RBW = 1MHz and VBW = 1MHz. Sweep = as necessary to capture the entire dwell time per hopping channel.
- 4.Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

13.2 Test Result:

Dwell time = Pulse wide x (Hopping rate / Number of channels) x Period

The test period: $T = 0.4(s) * 79 = 31.6 (s)$

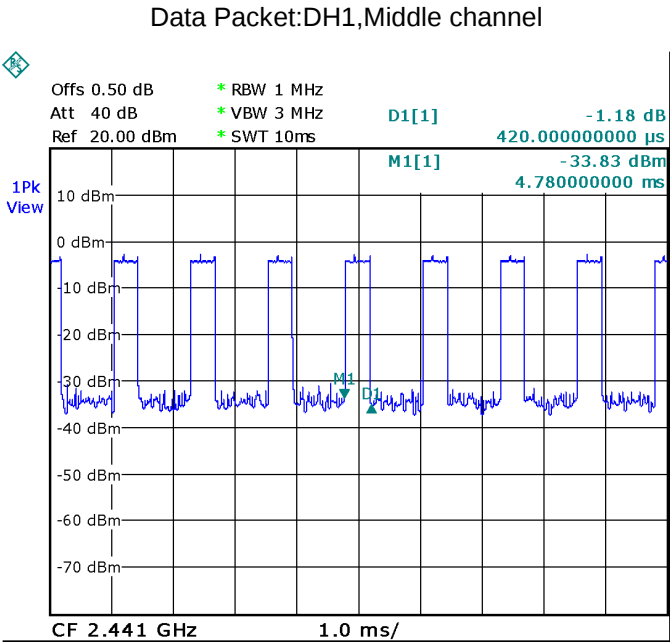
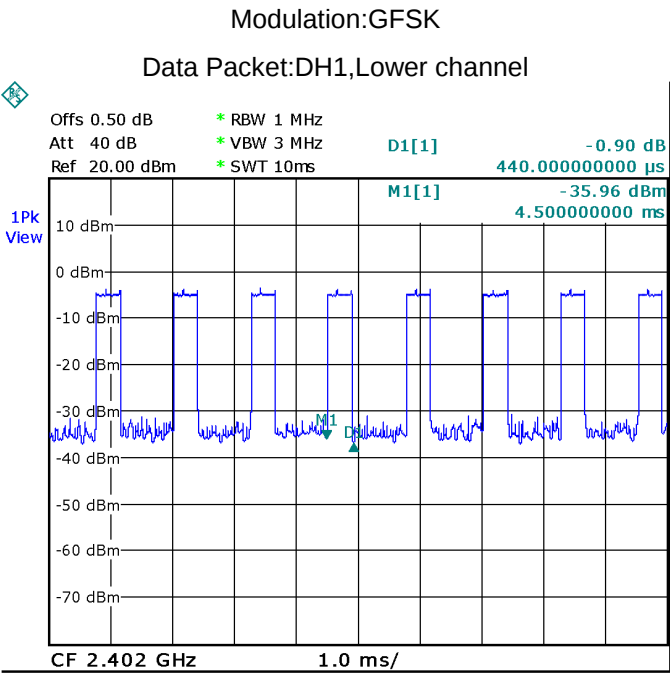
DH5 Packet permit maximum $1600 / 79 / 6$ hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum $1600 / 79 / 4$ hops per second in each channel (3 time slots RX, 1 time slot TX).

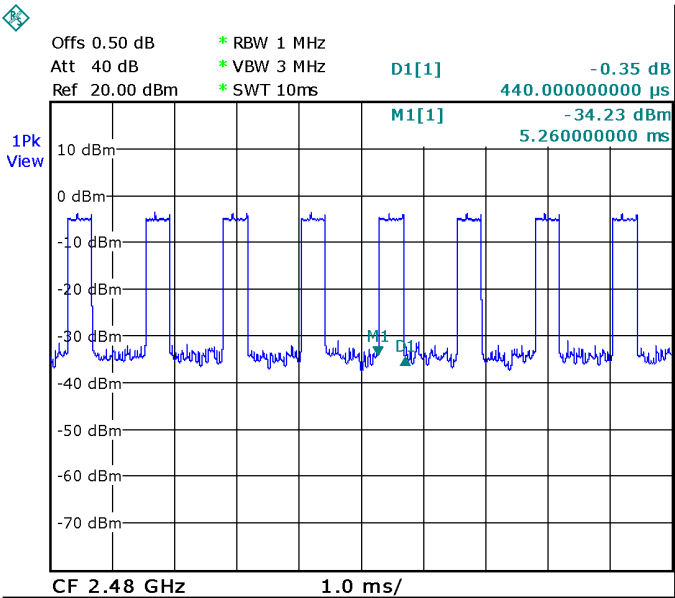
DH1 Packet permit maximum $1600 / 79 / 2$ hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

Data Packet	Dwell Time(s)
DH5	$1600/79/6*31.6*(MkrDelta)/1000$
DH3	$1600/79/4*31.6*(MkrDelta)/1000$
DH1	$1600/79/2*31.6*(MkrDelta)/1000$
Remark	Mkr Delta is single pulse time.

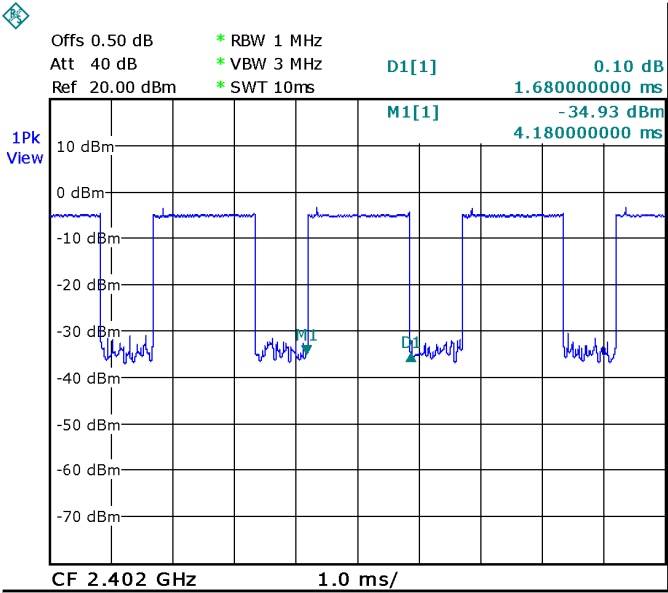
Modulation	Frequency	Data Packet	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
GFSK	Lower channel	DH1	0.440	0.1408	0.400
	Middle channel		0.420	0.1344	0.400
	Upper channel		0.440	0.1408	0.400
	Lower channel	DH3	1.680	0.2688	0.400
	Middle channel		1.680	0.2688	0.400
	Upper channel		1.700	0.2720	0.400
	Lower channel	DH5	2.940	0.3136	0.400
	Middle channel		2.980	0.3179	0.400
	Upper channel		2.940	0.3136	0.400
Pi/4DQPSK	Lower channel	DH1	0.480	0.1536	0.400
	Middle channel		0.520	0.1664	0.400
	Upper channel		0.480	0.1536	0.400
	Lower channel	DH3	1.720	0.2752	0.400
	Middle channel		1.740	0.2784	0.400
	Upper channel		1.740	0.2784	0.400
	Lower channel	DH5	2.960	0.3157	0.400
	Middle channel		3.020	0.3221	0.400
	Upper channel		3.000	0.3200	0.400
8DPSK	Lower channel	DH1	0.460	0.1472	0.400
	Middle channel		0.460	0.1472	0.400
	Upper channel		0.440	0.1408	0.400
	Lower channel	DH3	1.820	0.2912	0.400
	Middle channel		1.760	0.2816	0.400
	Upper channel		1.700	0.2720	0.400
	Lower channel	DH5	3.020	0.3221	0.400
	Middle channel		3.020	0.3221	0.400
	Upper channel		2.980	0.3179	0.400



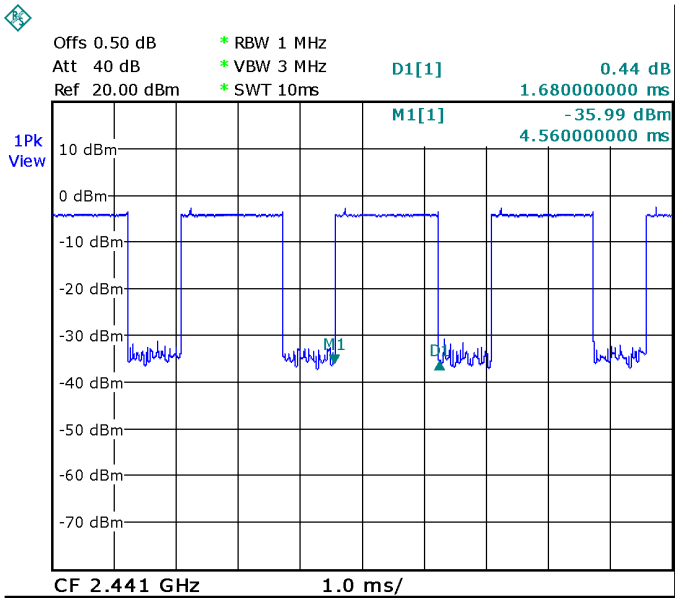
Data Packet:DH1,Upper channel



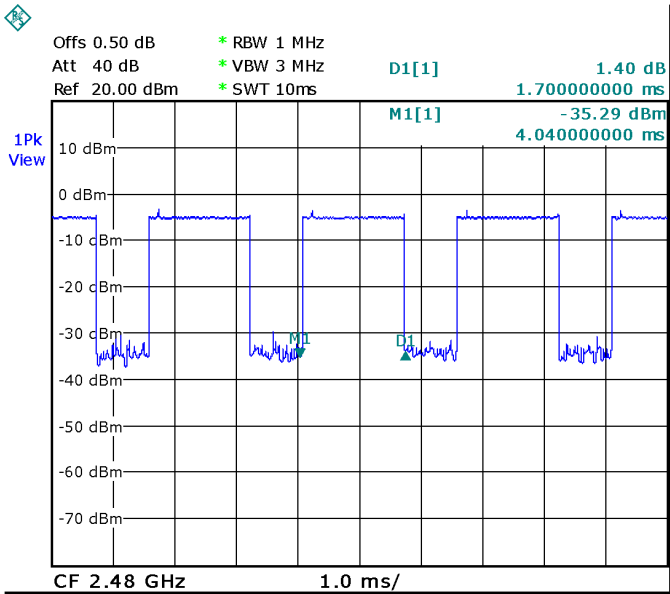
Data Packet:DH3,Lower channel



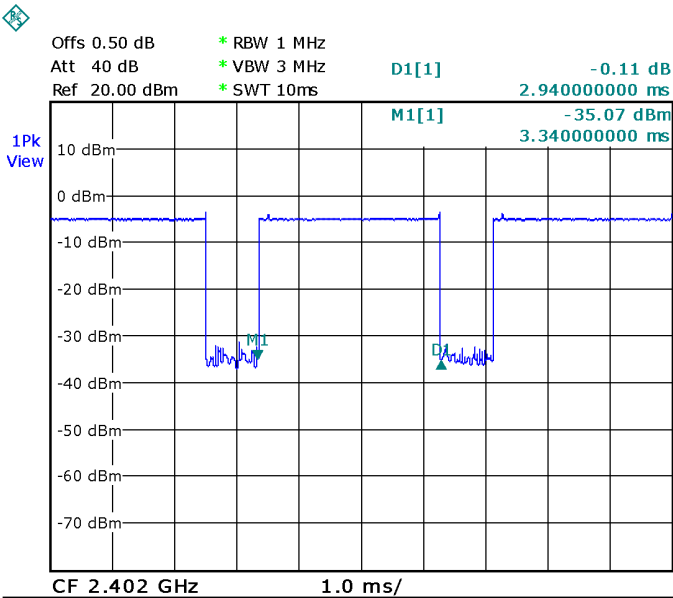
Data Packet:DH3,Middle channel



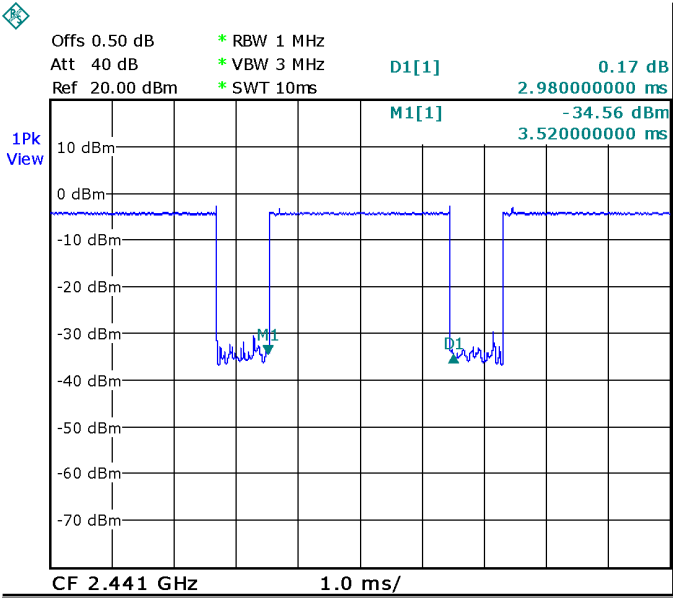
Data Packet:DH3,Upper channel



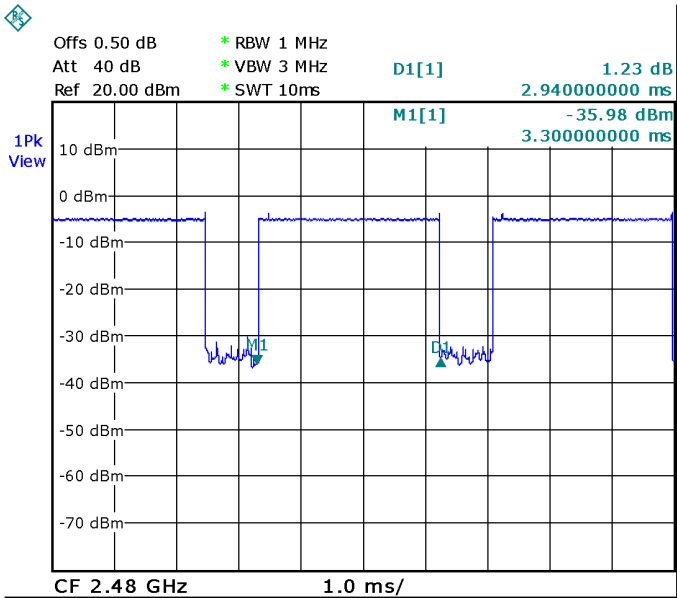
Data Packet:DH5,Lower channel



Data Packet:DH5,Middle channel

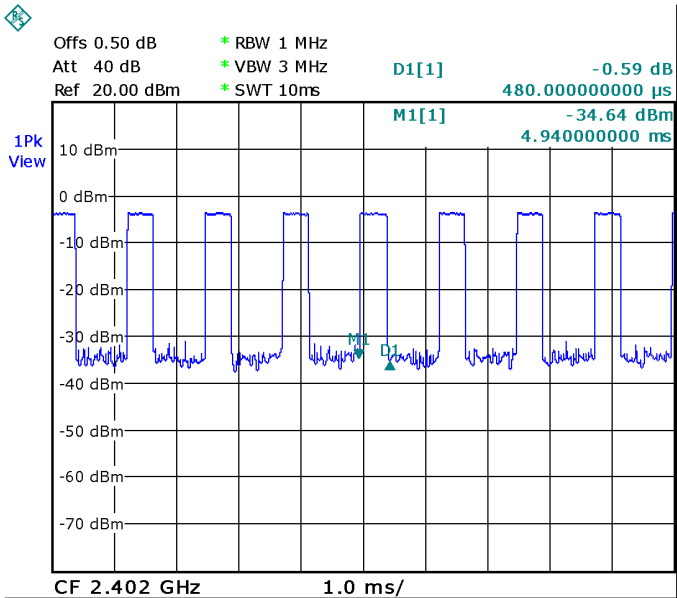


Data Packet:DH5,Upper channel

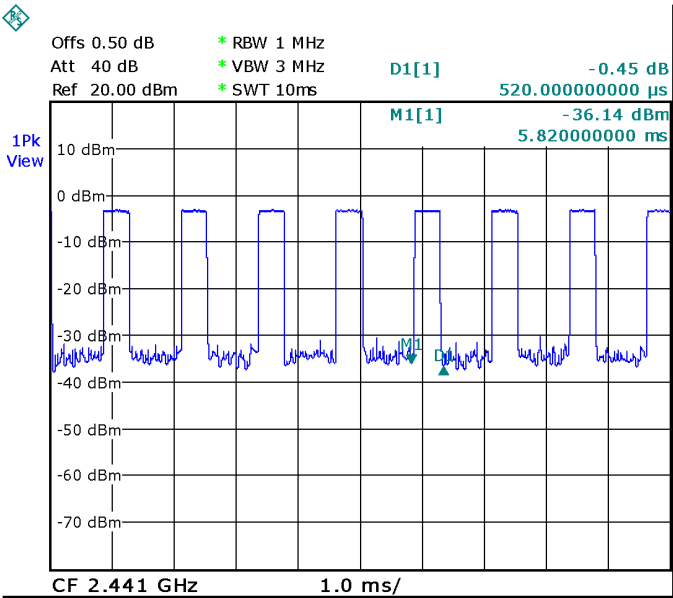


Modulation: Pi/4DQPSK

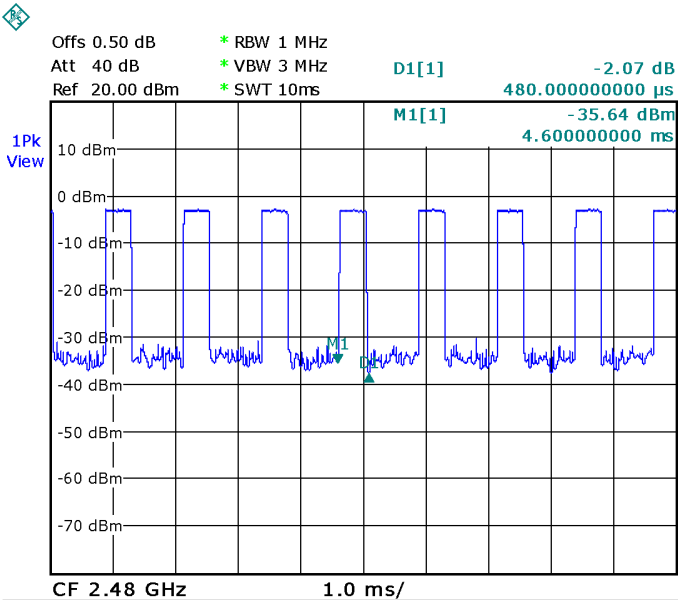
Data Packet:DH1,Lower channel



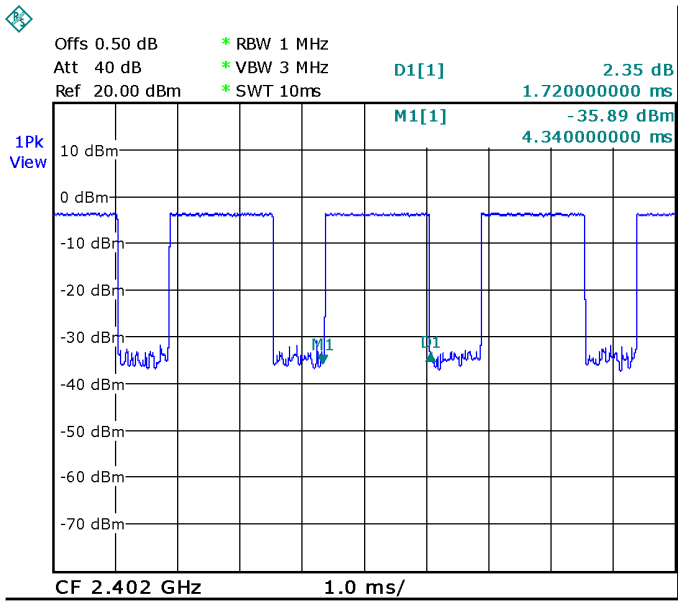
Data Packet:DH1,Middle channel



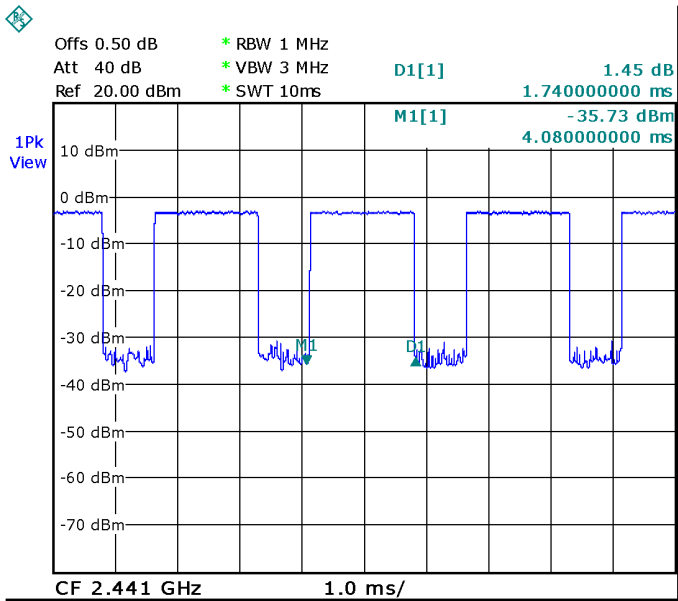
Data Packet:DH1,Upper channel



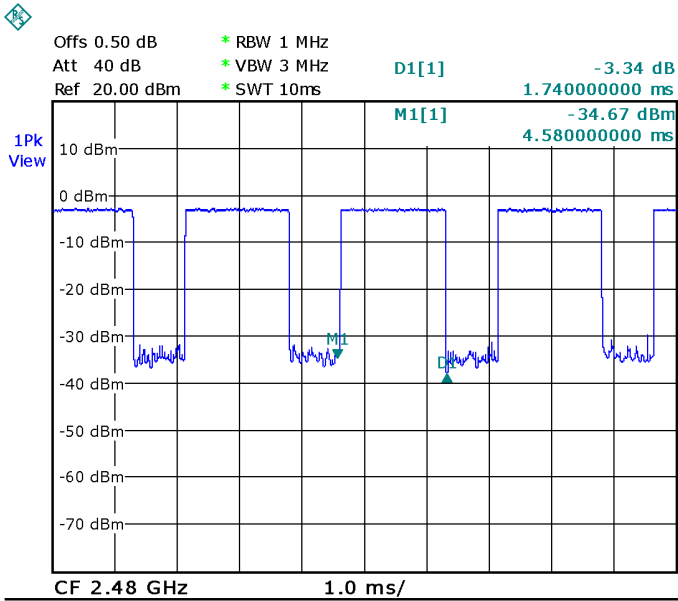
Data Packet:DH3,Lower channel



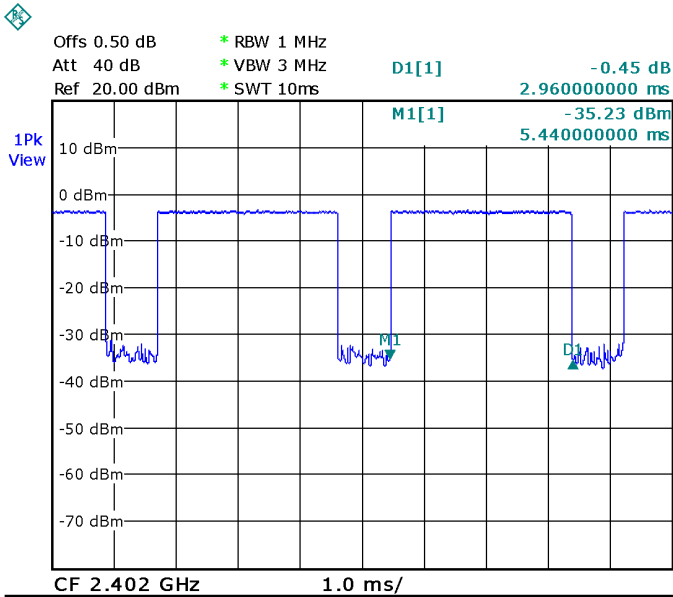
Data Packet:DH3,Middle channel



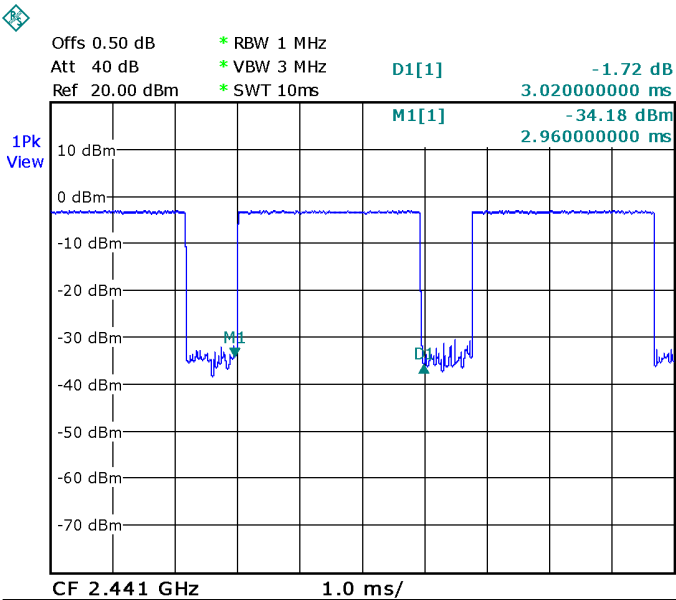
Data Packet:DH3,Upper channel



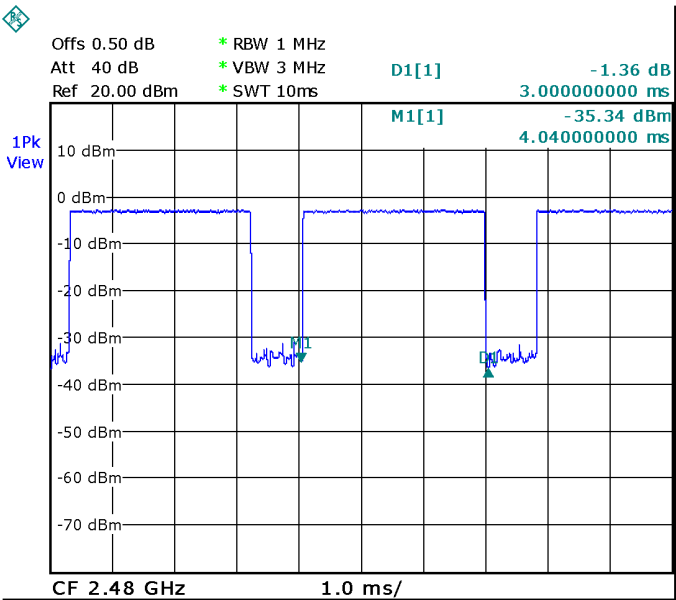
Data Packet:DH5,Lower channel



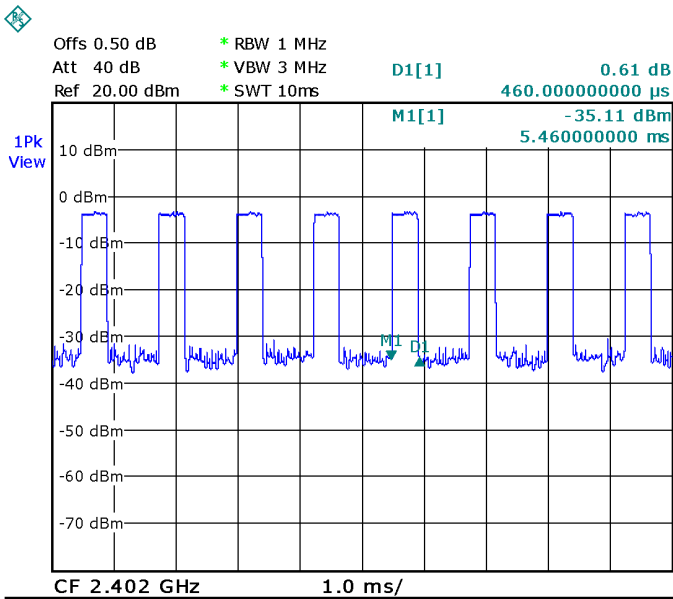
Data Packet:DH5,Middle channel



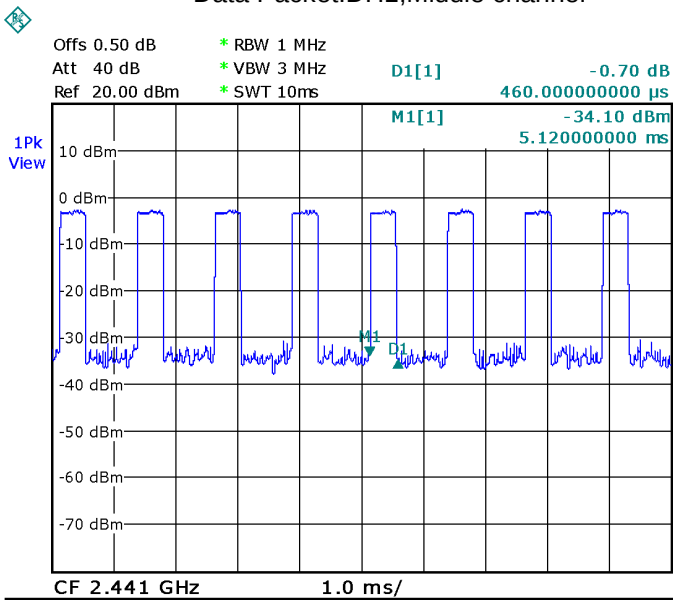
Data Packet:DH5,Upper channel



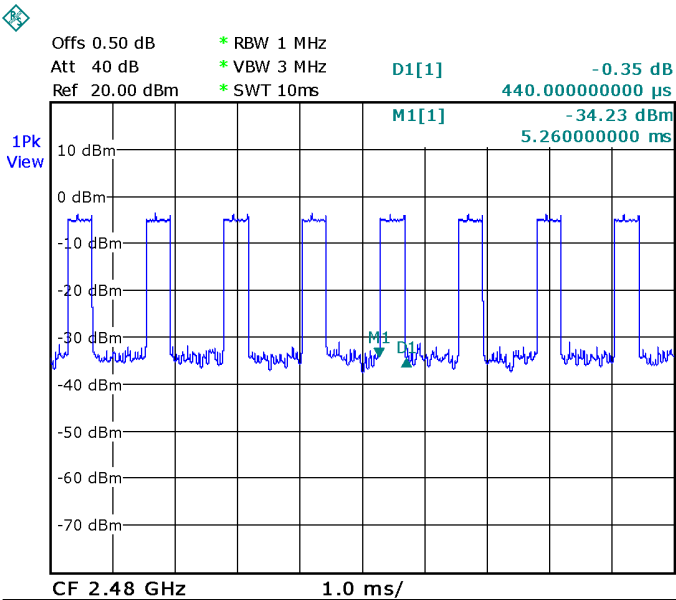
Modulation: 8DPSK
Data Packet:DH1,Lower channel



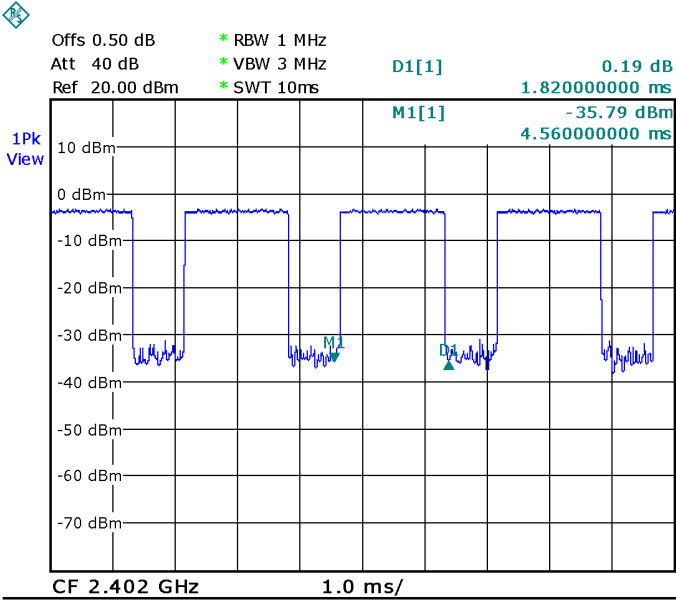
Data Packet:DH1,Middle channel



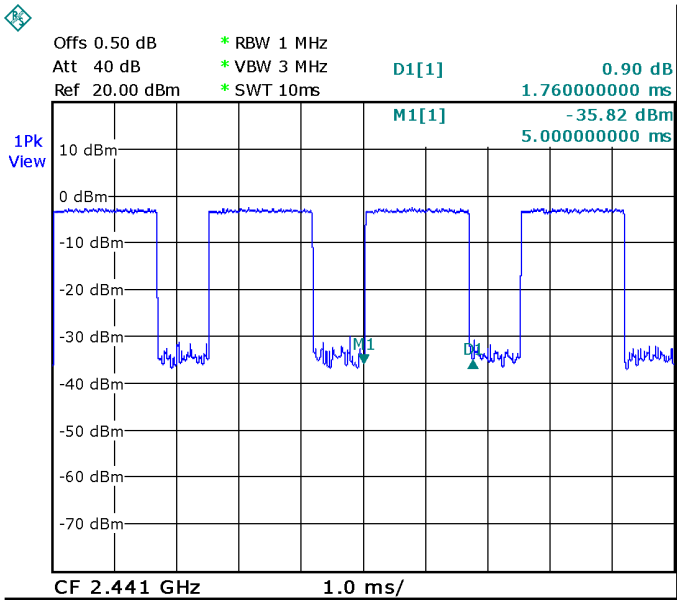
Data Packet:DH1,Upper channel



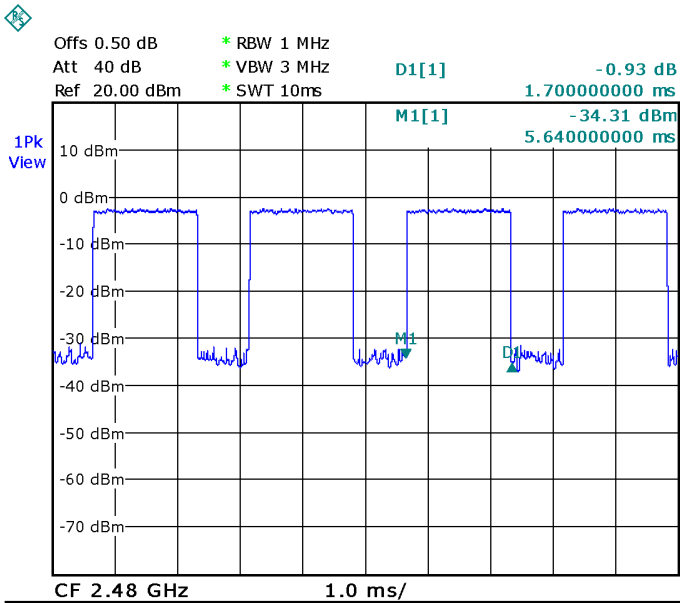
Data Packet:DH3,Lower channel



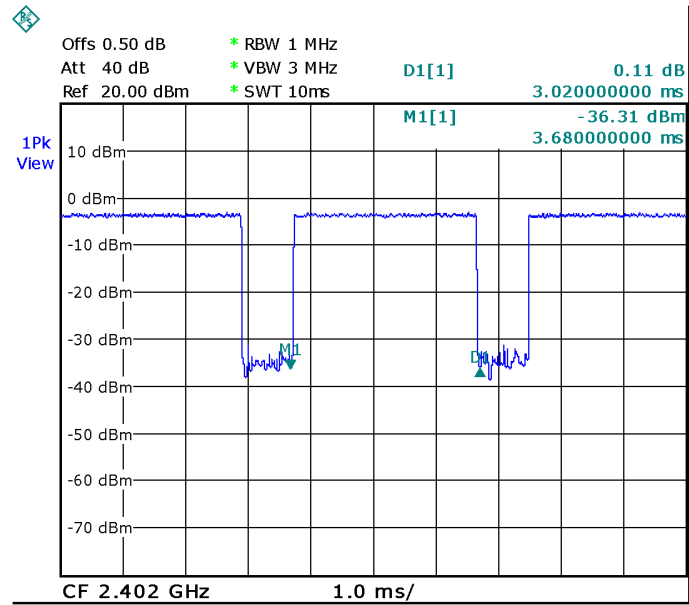
Data Packet:DH3,Middle channel



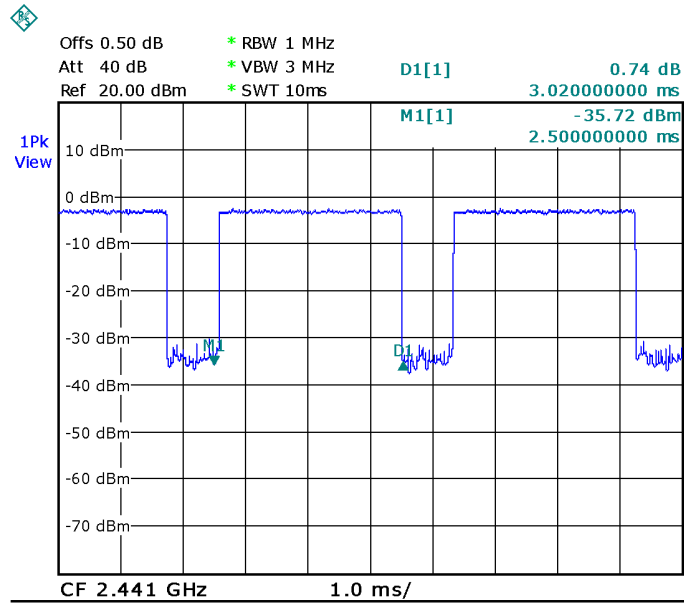
Data Packet:DH3,Upper channel



Data Packet:DH5,Lower channel



Data Packet:DH5,Middle channel



1Pk View

Offs 0.50 dB
Att 40 dB
Ref 20.00 dBm

* RBW 1 MHz
* VBW 3 MHz
* SWT 10ms

D1[1] -0.74 dB
2.980000000 ms
M1[1] -34.15 dBm
3.280000000 ms

10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm

CF 2.48 GHz 1.0 ms/

14 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product has a PCB printed antenna, fulfill the requirement of this section.

15 RF Exposure

Test Requirement:	FCC Part 1.1307
Test Method	KDB 447498 D01 General RF Exposure Guidance v05
Test Mode:	The EUT work in test mode(Tx).

15.1 Requirments:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

15.2 Test Result

Conducted Peak power(mW)	Source-based time-averaged maximum conducted output power(mW)	Minimum test separation distance required for the exposure conditions (mm)	SAR Test Exclusion Thresholds(mW)
1.567	0.49	5	10

Remark:Duty factor is 34%,refer to section 9 for more details.

Calculation formula: Source-based time-averaged maximum conducted output power(mW)
 =Conducted peak power(mW)*Duty factor

16 Photographs – Test Setup

16.1 Conducted Emissions

Adapter 1#

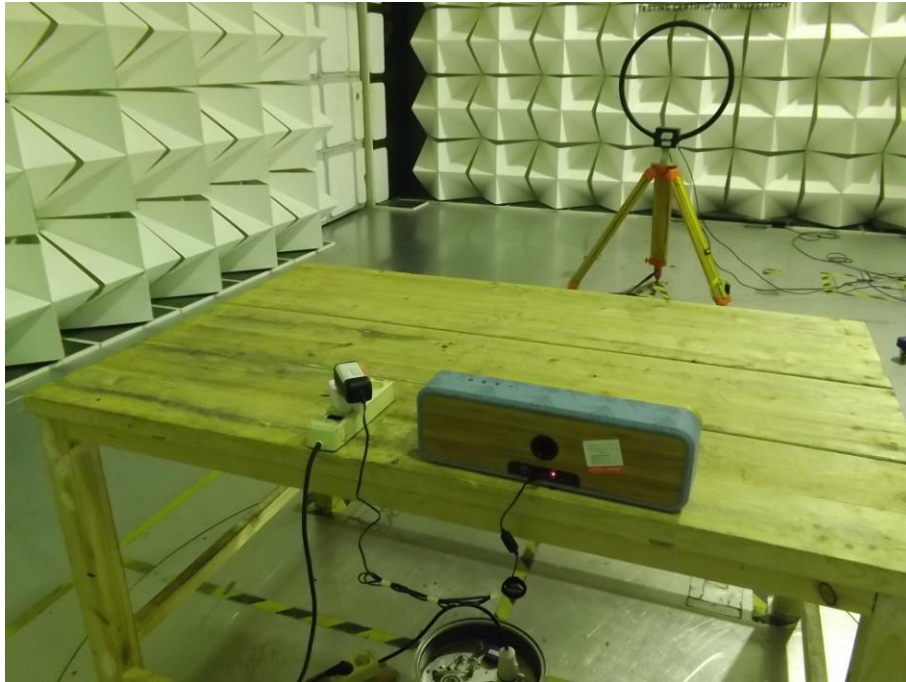


Adapter 2#

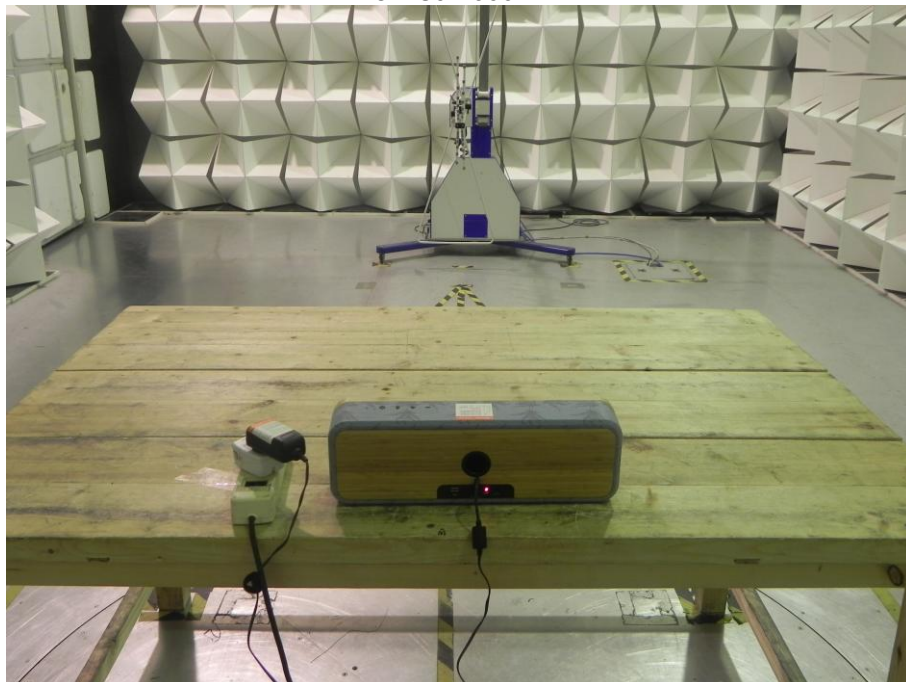


16.2 Radiated Emissions

Adapter 1#:
Below 30MHz



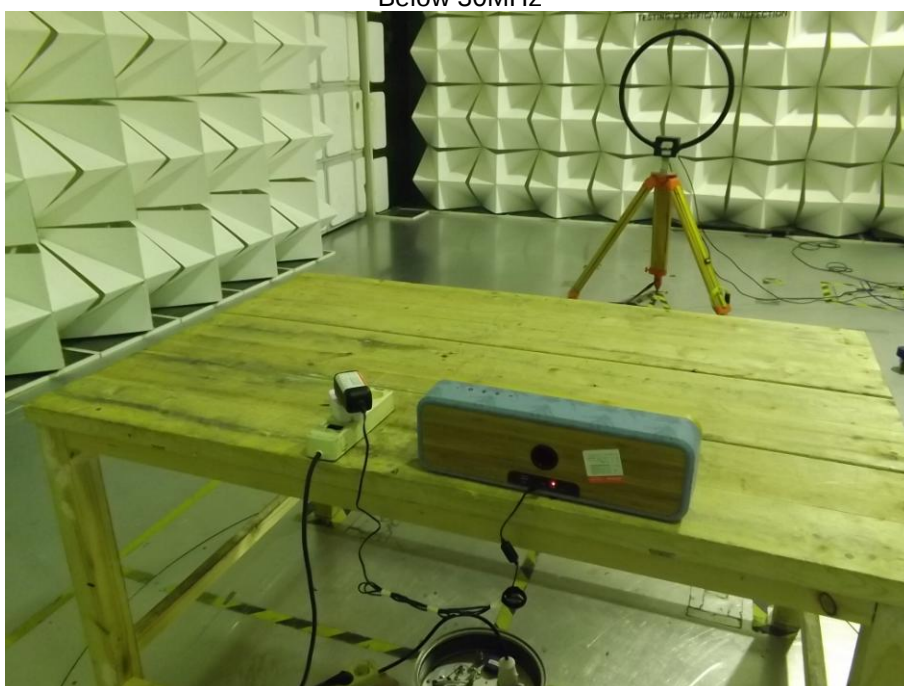
From 30-1000MHz



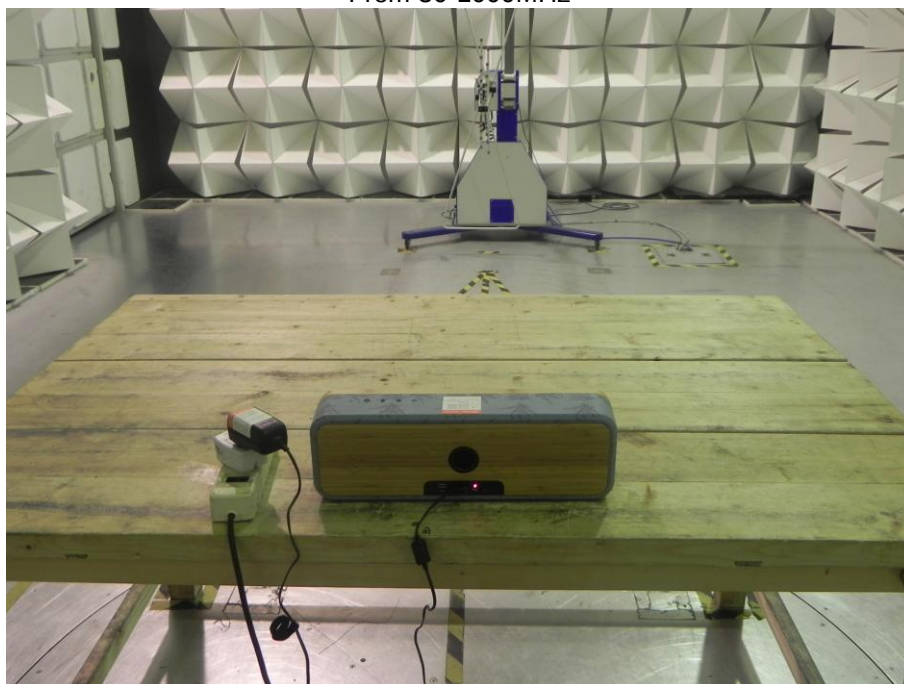
Above 1GHz



Adapter 2#:
Below 30MHz



From 30-1000MHz



Above 1GHz



17 Photographs - Constructional Details

17.1 EUT – External View

Model :EM-JA006-MI







GET TOGETHER

Designed By Marley In Michigan. EM-JA006-MI

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IC: 10613A-GETTOGETHER

FCC ID: PVB-GETTOGETHER

Input: 15V 1.5A

Lithium Ion Battery: 11.1V, 1800 mAh

USB Output: DC5V 1000mA

Made in China. Outer: 40% Polyester/60% Mixed Fibers. Liner: 100% Cotton. Not to be removed until delivered to the customer. This label is affixed in compliance

해당 무선설비는 운용중 전파혼신 가능성이 있음

1614



MARLEY
SATISFY YOUR SOUL



Model: EM-JA006-BH







Model: EM-JA006-BK









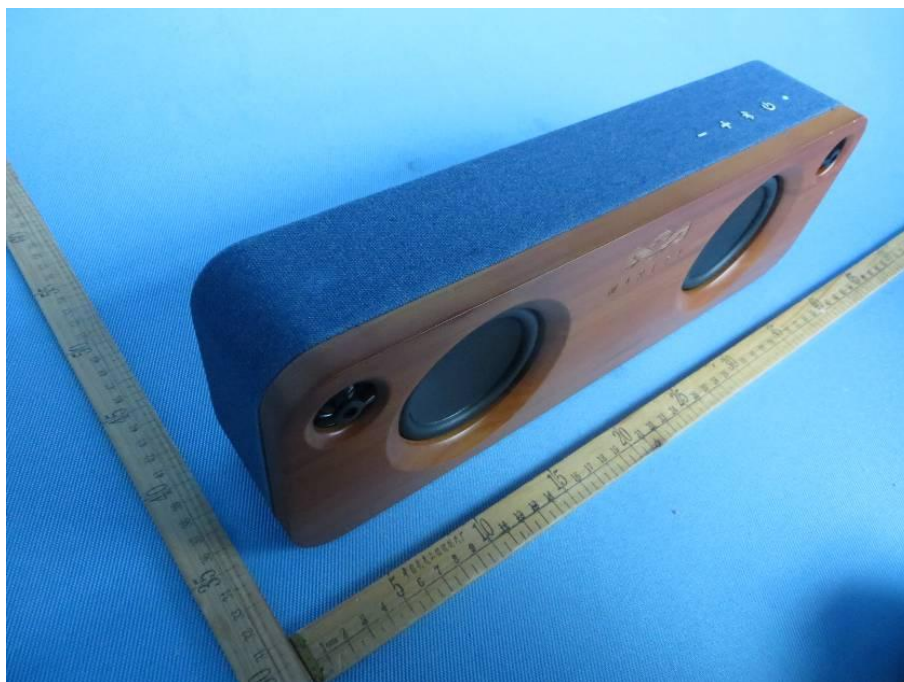
Model: EM-JA006-CE





Model: EM-JA006-DN





Model: EM-JA006-TN



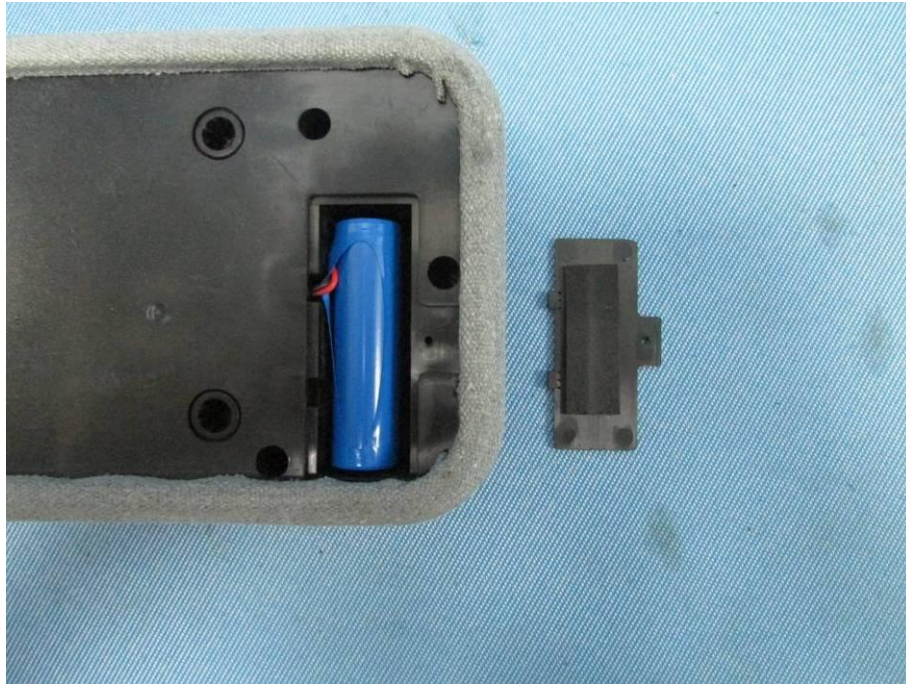


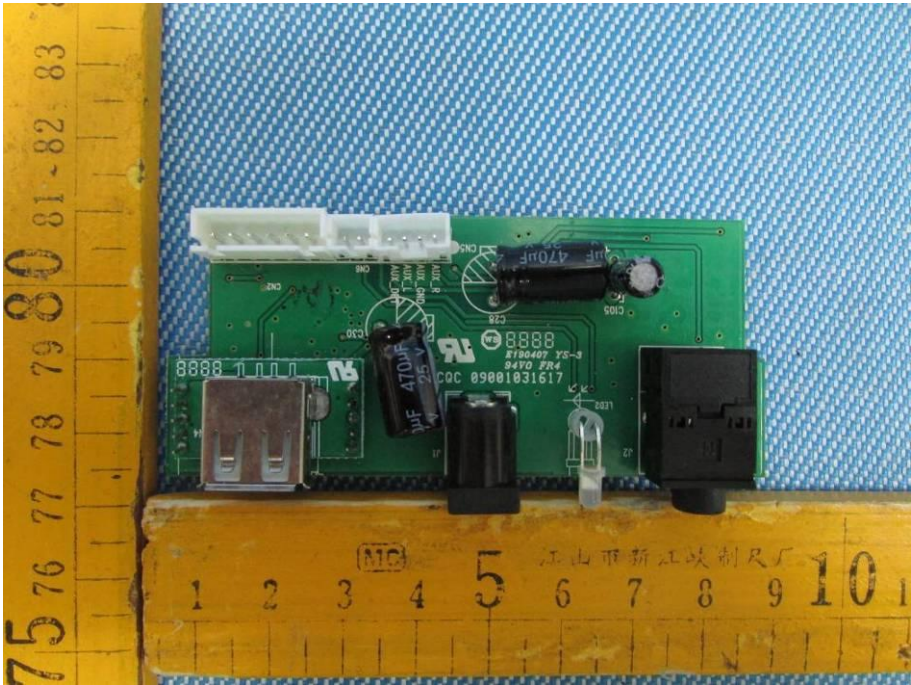


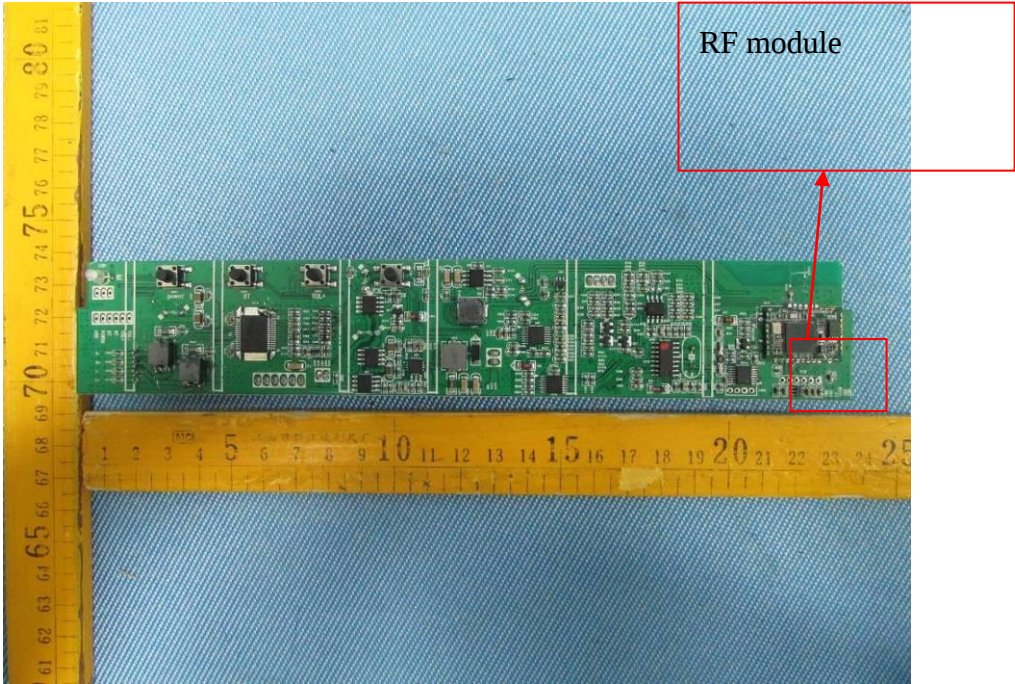
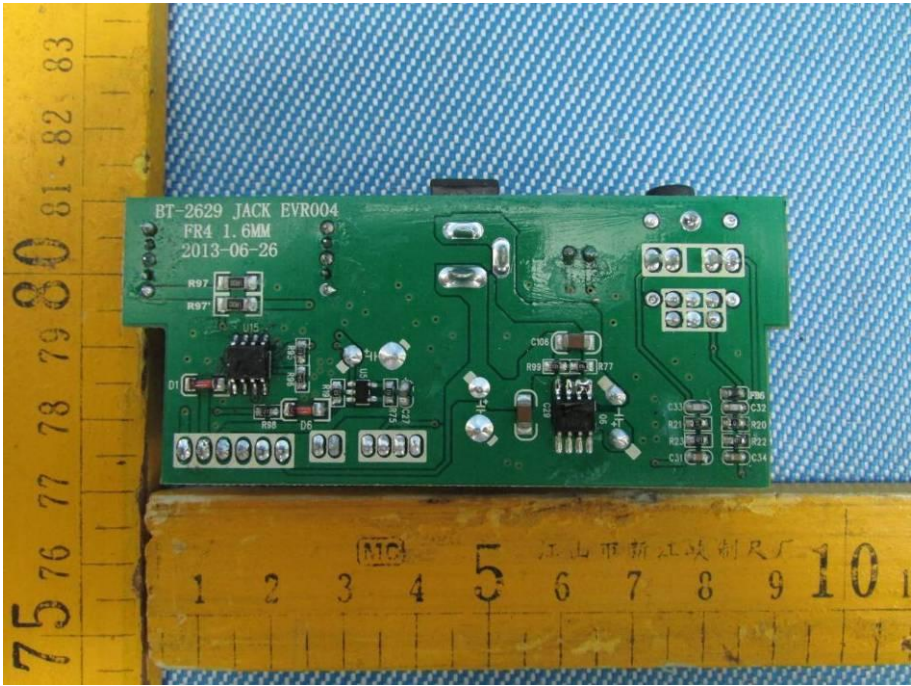


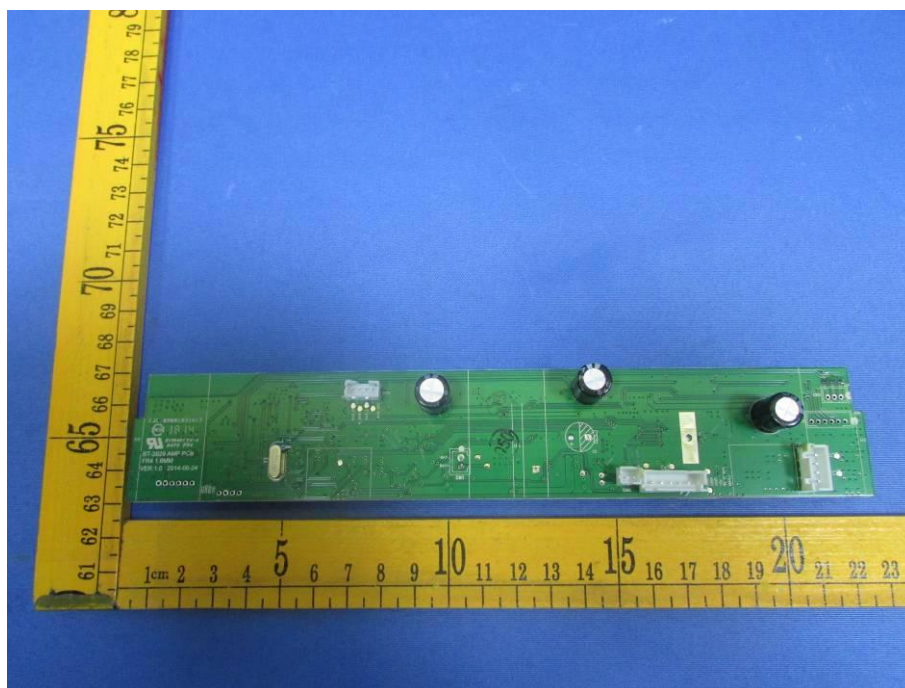
17.2 EUT – Internal View

Model :EM-JA006-MI

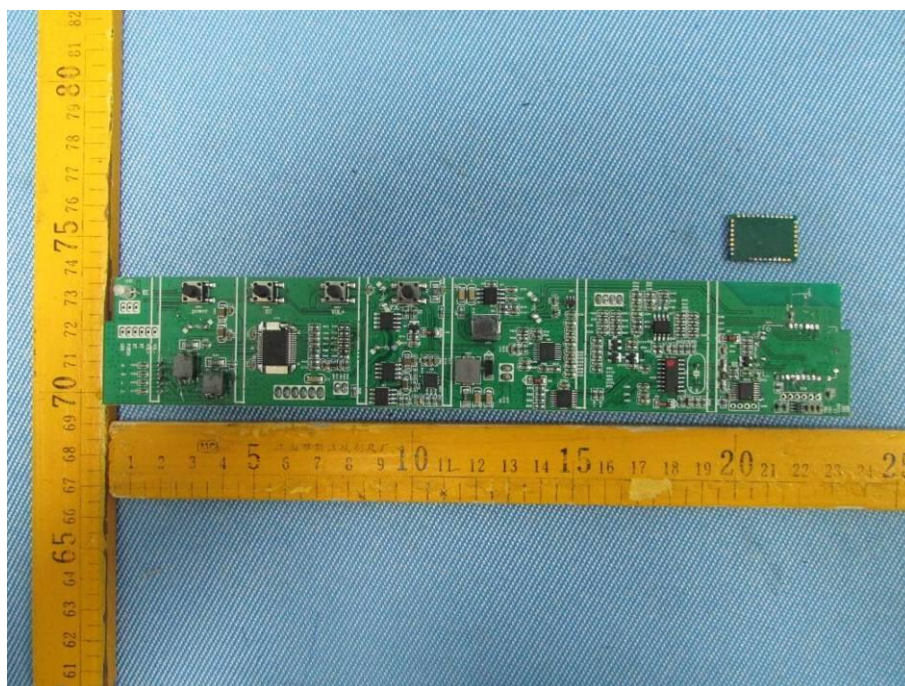


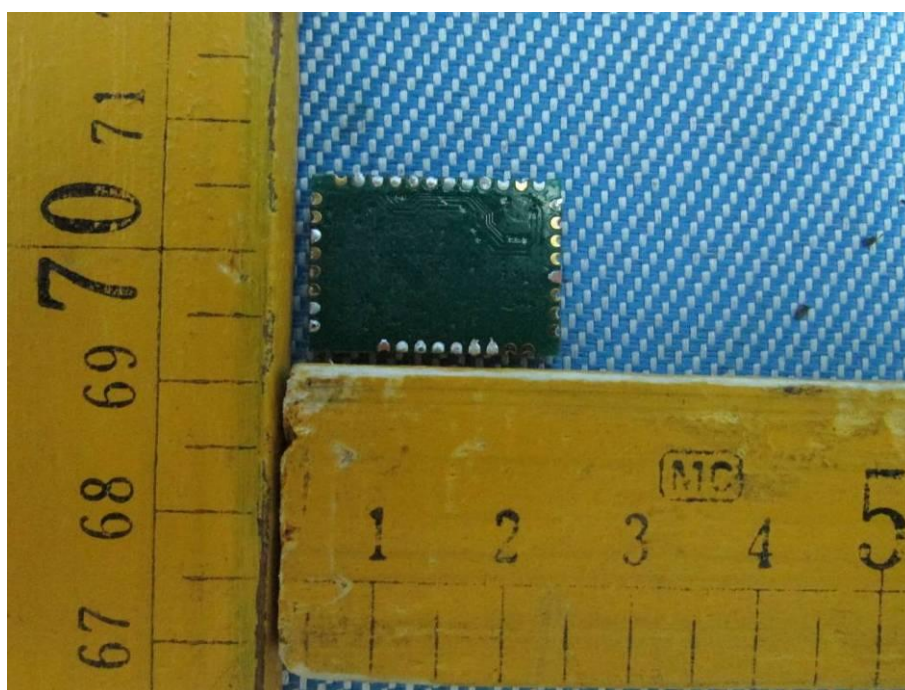
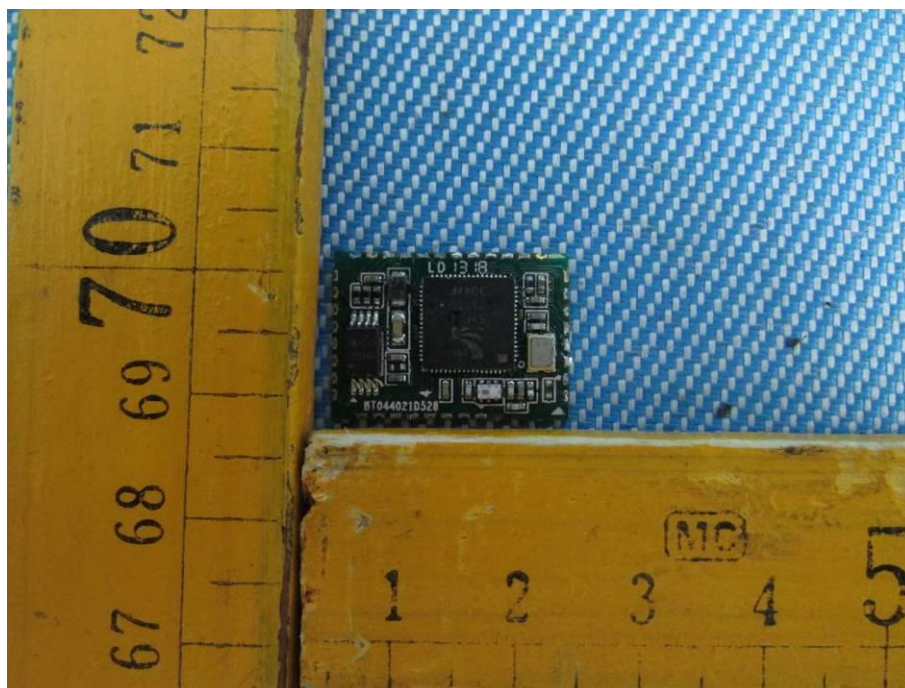






17.3 EUT – RF Module View





==End of test report==