

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

INDUSTRY CANADA RSS-247

Test Standard	FCC Part 15.247 and IC RSS-247 issue 2
FCC ID	PPQ-WCBN4501A
ISED ID	4491A-WCBN4501A
Product name	Wi-Fi (11a/b/g/n/ac 2Tx2R)+BT (V4.1LE) USB Combo Module
Brand Name	LITE-ON
Model	WCBN4501A
Test Result	Pass

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of CCS. Inc.

The sample selected for test was production product and was provided by manufacturer.



Approved by:

Reviewed by:

A handwritten signature in black ink, appearing to read "Sam Chuang", written over a horizontal line.

Sam Chuang
Manager

A handwritten signature in black ink, appearing to read "Ed Chiang", written over a horizontal line.

Ed Chiang
Engineer

Revision History

Rev.	Issue Date	Revisions	Revised By
00	May 4, 2017	Initial Issue	Vicki Huang
01	July 18, 2017	1. Modify test lab address in P.7 2. Add EIRP power in P.20 3. Add notice for “below 1G test data” in P.45~46	Vicki Huang

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Lite-On Technology Corp. Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C
Manufacturer	LITE-ON TECHNOLOGY (Changzhou) CO., LTD A9 Building, No.88 Yanghu Road, Wujin Hi-Tech Industrial Development Zone, Changzhou City, Jiangsu Province 213100 China
Equipment	Wi-Fi (11a/b/g/n/ac 2Tx2R)+BT (V4.1LE) USB Combo Module
Model No.	WCBN4501A
Model Discrepancy	Two kinds of module design: One uses on board antenna + external antenna; the other use two external antennas.
Trade Name	LITE-ON
Received Date	March 14, 2017
Date of Test	March 15 ~ May 4, 2017
Output Power (W)	GFSK : 0.0148 8DPSK : 0.0120
Power Operation	VDC from host device.

1.2 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	1. GFSK for BR-1Mbps 2. $\pi/4$ -DQPSK for EDR-2Mbps 3. 8DPSK for EDR-3Mbps
Number of channel	79 Channels

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 and RSS-GEN Table A1 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	☒ PIFA ☐ PCB ☐ Dipole ☐ Coils					
Antenna Gain	Item	Brand	P/N	Gain (dBi)	Cable length	Remark
	1	HongBo	290-10284	2.49	300mm	External Antenna
	2	HongBo	290-10310	2.05	500mm	External Antenna
	3	HongBo	290-10479	1.81	700mm	External Antenna
	4	Walsin	RFMTA401035IMLB701	1.89	350mm	External Antenna
	5	Walsin	RFMTA401056IMLB701	1.62	560mm	External Antenna
	6	Walsin	RFMTA200700NNLB002	1.63	N/A	On Board Antenna

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 1.4003
RF output power, conducted	+/- 1.1372
Power density, conducted	+/- 1.4003
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683
3M Semi Anechoic Chamber / 40G~60G	+/- 1.8509
3M Semi Anechoic Chamber / 60G~75G	+/- 1.9869
3M Semi Anechoic Chamber / 75G~110G	+/- 2.9651
3M Semi Anechoic Chamber / 110G~170G	+/- 2.7807
3M Semi Anechoic Chamber / 170G~220G	+/- 3.6437
3M Semi Anechoic Chamber / 220G~325G	+/- 4.2982

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at
No.139, Wugong Rd., Wugu Dist., New Taipei City 24886, Taiwan (R.O.C.)-Compliance
Certification Services Inc.

Test site	Test Engineer	Remark
AC Conduction Room	Eric Lee	
Radiation	Ed Chiang	
RF Conducted	Eric Lee	

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

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	07/04/2016	07/03/2017
Power Sensor	Anritsu	MA2411B	917072	07/04/2016	07/03/2017
Spectrum Analyzer	R&S	FSV 40	101073	10/5/2016	10/04/2017

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/03/2016	07/02/2017
Horn Antenna	EMCO	3117	00055165	02/20/2017	02/19/2018
Horn Antenna	ETS LINDGREN	3116	00026370	01/12/2017	01/11/2018
Pre-Amplifier	EMCI	EMC 012635	980151	06/23/2016	06/22/2017
Pre-Amplifier	EMEC	EM330	060609	06/08/2016	06/07/2017
Spectrum Analyzer	Agilent	E4446A	US42510252	12/05/2016	12/04/2017
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R

Conducted Emission Room # B					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
LISN	R&S	ENV216	101054	05/11/2016	05/10/2017
LISN	Schwarzbeck	NSLK8128	5012	04/25/2017	04/24/2018
Receiver	R&S	ESCI	101073	08/20/2016	08/19/2017

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

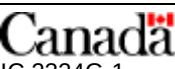
EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment					
No.	Equipment	Brand	Model	Series No.	BSMI ID
1	Notebook	Lenovo	Z51-70	N/A	R33275

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 558074 D01 v03r05, RSS-247 Issue 2 and RSS-GEN Issue 4.

1.9 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

2. TEST SUMMERY

FCC Standard Section	IC Standard Section	Report Section	Test Item	Result
15.203	-	1.2	Antenna Requirement	Pass
15.207(a)	RSS-GEN 8.8	4.1	AC Conducted Emission	Pass
15.247(a)(1)	RSS-247(5.1)(a)	4.2	20 dB Bandwidth	-
-	RSS-GEN 6.6	4.2	Occupied Bandwidth (99%)	-
15.247(b)(1)	RSS-247(5.4)(b)	4.3	Output Power Measurement	Pass
15.247(a)(1)	RSS-247(5.1)(b)	4.4	Frequency Separation	Pass
15.247(a)(1)(iii)	RSS-247(5.1)(d)	4.5	Number of Hopping	Pass
15.247(d)	RSS-247(5.5)	4.6	Conducted Band Edge	Pass
15.247(d)	RSS-247(5.5)	4.6	Conducted Emission	Pass
15.247(a)(1)(iii)	RSS-247(5.1)(d)	4.7	Time of Occupancy	Pass
15.247(d)	RSS-GEN 8.9, 8.10	4.8	Radiation Band Edge	Pass
15.247(d)	RSS-GEN 8.9, 8.10	4.8	Radiation Spurious Emission	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	GFSK for BR-1Mbps (DH5) $\pi/4$ -DQPSK for EDR-2Mbps (DH5) 8DPSK for EDR-3Mbps (DH5)
Test Channel Frequencies	GFSK for BR-1Mbps: 1.Lowest Channel : 2402MHz 2.Middle Channel : 2441MHz 3.Highest Channel : 2480MHz $\pi/4$-DQPSK for EDR-2Mbps: 1.Lowest Channel : 2402MHz 2.Middle Channel : 2441MHz 3.Highest Channel : 2480MHz 8DPSK for EDR-3Mbps: 1.Lowest Channel : 2402MHz 2.Middle Channel : 2441MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by host system.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by host system.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

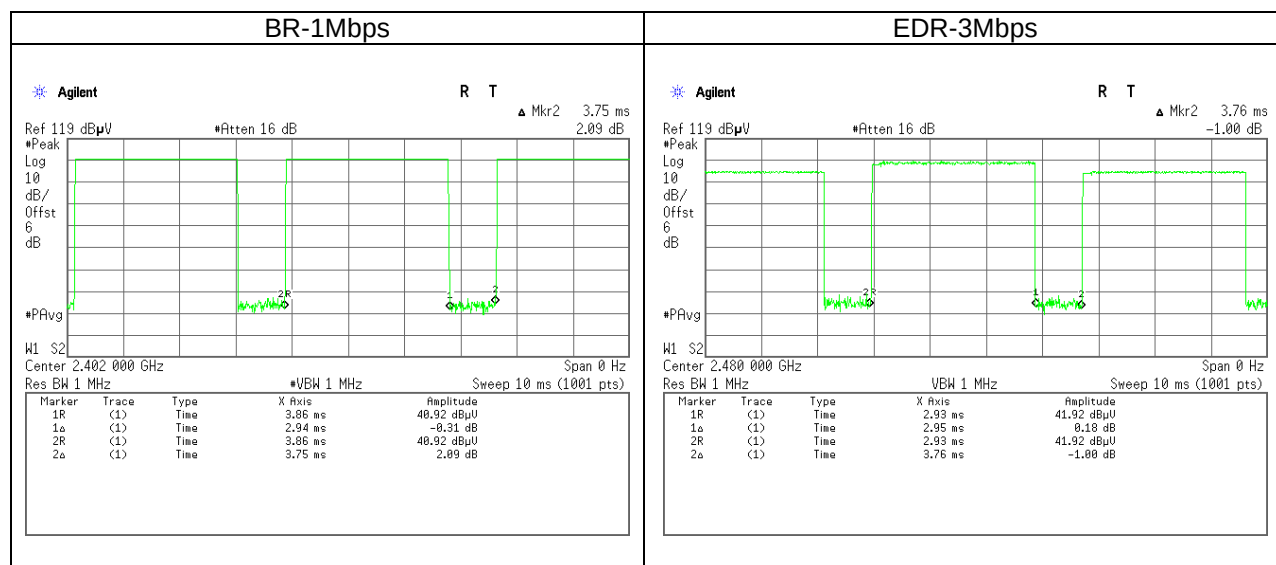
Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by host system.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☒ Placed in fixed position at Z-Plane (H-Plane)
Worst Polarity	☐ Horizontal ☒ Vertical

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case(Z-Plane and Vertical) were recorded in this report
3. For AC power line conducted emission and below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
BR-1Mbps	2.9400	3.7500	78.40%	1.06
EDR-3Mbps	2.9500	3.7600	78.46%	1.05



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

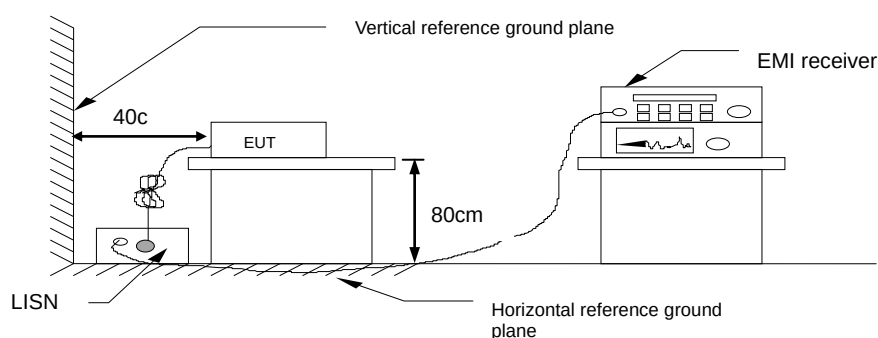
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup

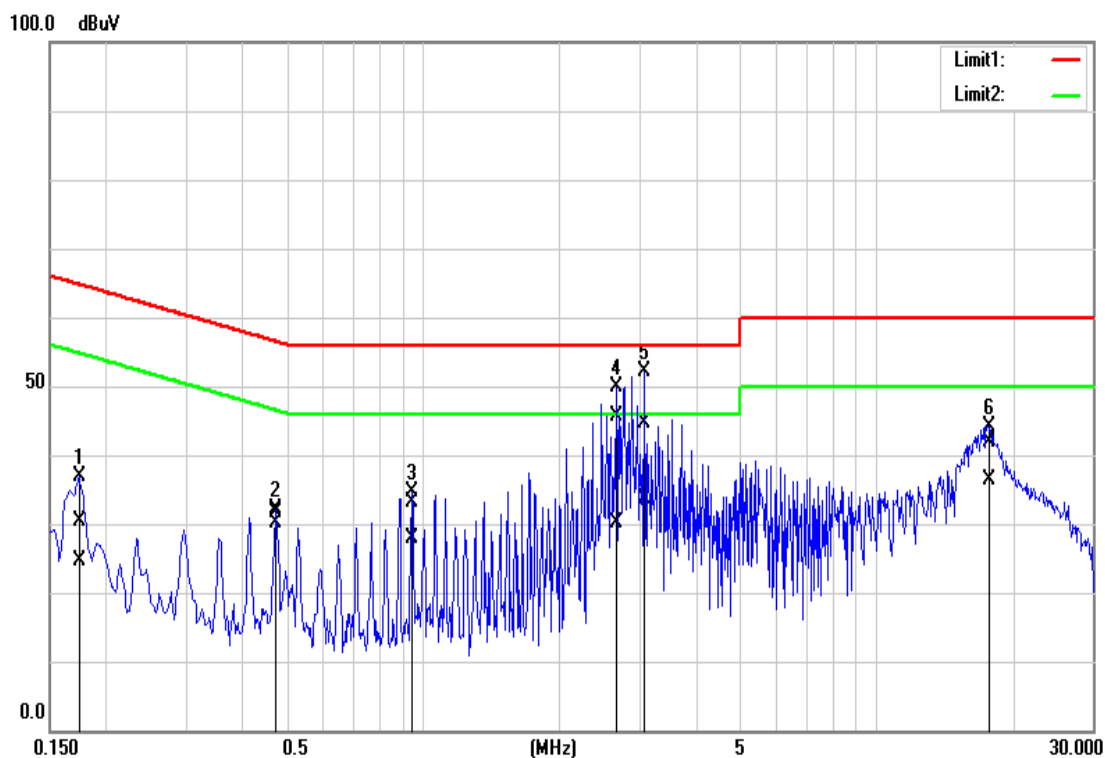


4.1.4 Test Result

PASS

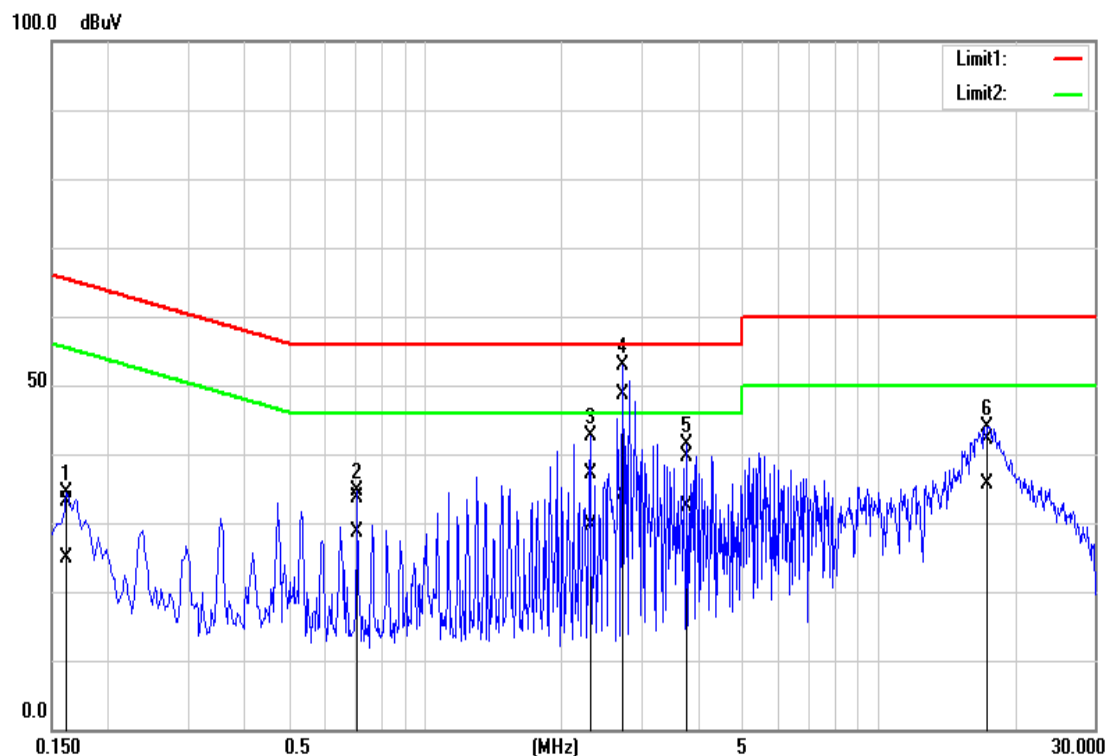
Test Data

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	120Vac / 60Hz	Test Date	May 4, 2017
Phase:	Line	Test Engineer	Eric Lee



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1740	20.62	14.81	9.70	30.32	24.51	64.77	54.77	-34.45	-30.26	Pass
0.4740	21.95	20.36	9.68	31.63	30.04	56.44	46.44	-24.81	-16.40	Pass
0.9460	23.35	18.19	9.69	33.04	27.88	56.00	46.00	-22.96	-18.12	Pass
2.6660	35.81	20.55	9.70	45.51	30.25	56.00	46.00	-10.49	-15.75	Pass
3.0780	34.85	23.91	9.71	44.56	33.62	56.00	46.00	-11.44	-12.38	Pass
17.6900	32.08	26.54	9.84	41.92	36.38	60.00	50.00	-18.08	-13.62	Pass

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	120Vac / 60Hz	Test Date	May 4, 2017
Phase:	Neutral	Test Engineer	Eric Lee



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1620	23.41	15.15	9.71	33.12	24.86	65.36	55.36	-32.24	-30.50	Pass
0.7100	23.98	19.02	9.69	33.67	28.71	56.00	46.00	-22.33	-17.29	Pass
2.3100	27.45	19.92	9.70	37.15	29.62	56.00	46.00	-18.85	-16.38	Pass
2.7220	38.88	24.38	9.70	48.58	34.08	56.00	46.00	-7.42	-11.92	Pass
3.7820	29.93	22.69	9.71	39.64	32.40	56.00	46.00	-16.36	-13.60	Pass
17.4460	32.28	25.76	9.89	42.17	35.65	60.00	50.00	-17.83	-14.35	Pass

4.2 20DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

According to §15.247(a) (1), RSS-247 section 5.1(a) and RSS-GEN 6.6,

20 dB Bandwidth : For reporting purposes only.

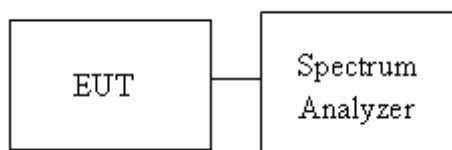
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 11.8.1,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 30kHz, VBW = 100kHz and Detector = Peak, to measurement 20 dB Bandwidth and 99% Bandwidth.
4. Measure and record the result of 20 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

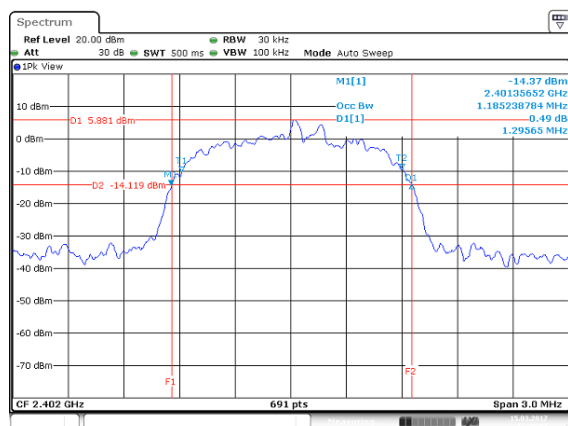
Test mode: GFSK_BR-1Mbps mode / 2402-2480 MHz			
Channel	Frequency (MHz)	OBW(99%) (MHz)	20dB BW (MHz)
Low	2402	0.9247	1.0087
Mid	2441	0.9204	0.9652
High	2480	0.9247	0.9913

Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz			
Channel	Frequency (MHz)	OBW(99%) (MHz)	20dB BW (MHz)
Low	2402	1.1852	1.2956
Mid	2441	1.1852	1.3000
High	2480	1.1852	1.3000

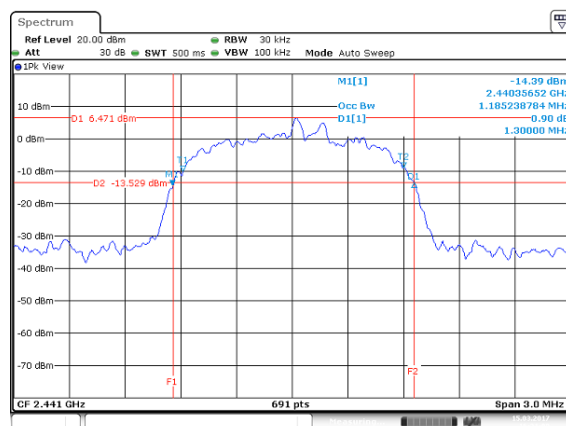
GFSK_BR-1Mbps mode

8DPSK_EDR-3Mbps mode

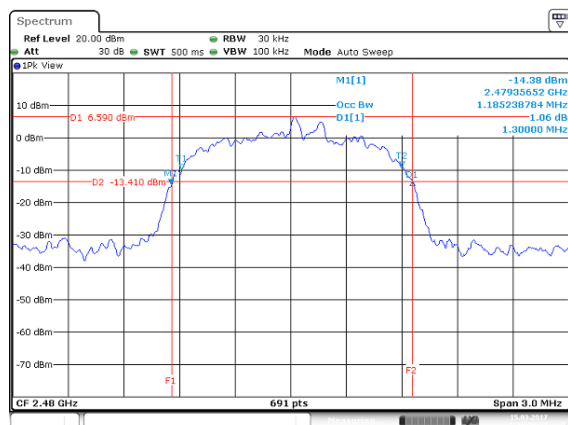
Low CH



Mid CH



High CH



4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.247(a)(1) and RSS-247 section 5.4(b)

Peak output power :

FCC

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 125 mW.

IC

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels.

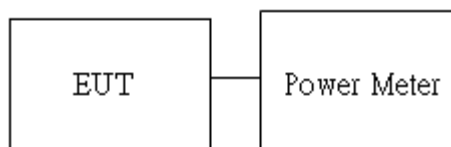
Limit	☒ Antenna not exceed 6 dBi : 21dBm ☐ Antenna with DG greater than 6 dBi : 21dBm [Limit = 30 – (DG – 6)]
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Average output power : For reporting purposes only.

4.3.2 Test Procedure

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

Peak output power :

For GFSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	11.26	0.0134	1	PASS
Mid	2441	8.24	0.0067		PASS
High	2480	11.70	*0.0148		PASS

For 8DPSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	10.49	0.0112	1	PASS
Mid	2441	10.67	0.0117		PASS
High	2480	10.79	*0.0120		PASS

Average output power :

For GFSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	EIRP Power (dBm)	EIRP Power (W)
Low	2402	11.11	0.0129	13.60	0.0229
Mid	2441	7.49	0.0056	9.98	0.0100
High	2480	11.53	0.0142	14.02	0.0252

For 8DPSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	EIRP Power (dBm)	EIRP Power (W)
Low	2402	8.20	0.0066	10.69	0.0117
Mid	2441	8.65	0.0073	11.14	0.0130
High	2480	8.76	0.0075	11.25	0.0133

4.4 FREQUENCY SEPARATION

4.4.1 Test Limit

According to §15.247(a)(1) and RSS-247 section 5.1(b)

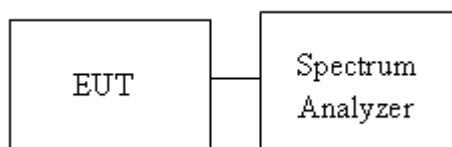
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Limit	> two-thirds of the 20 dB bandwidth
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4.4.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Sweep = auto.
Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency

4.4.3 Test Setup

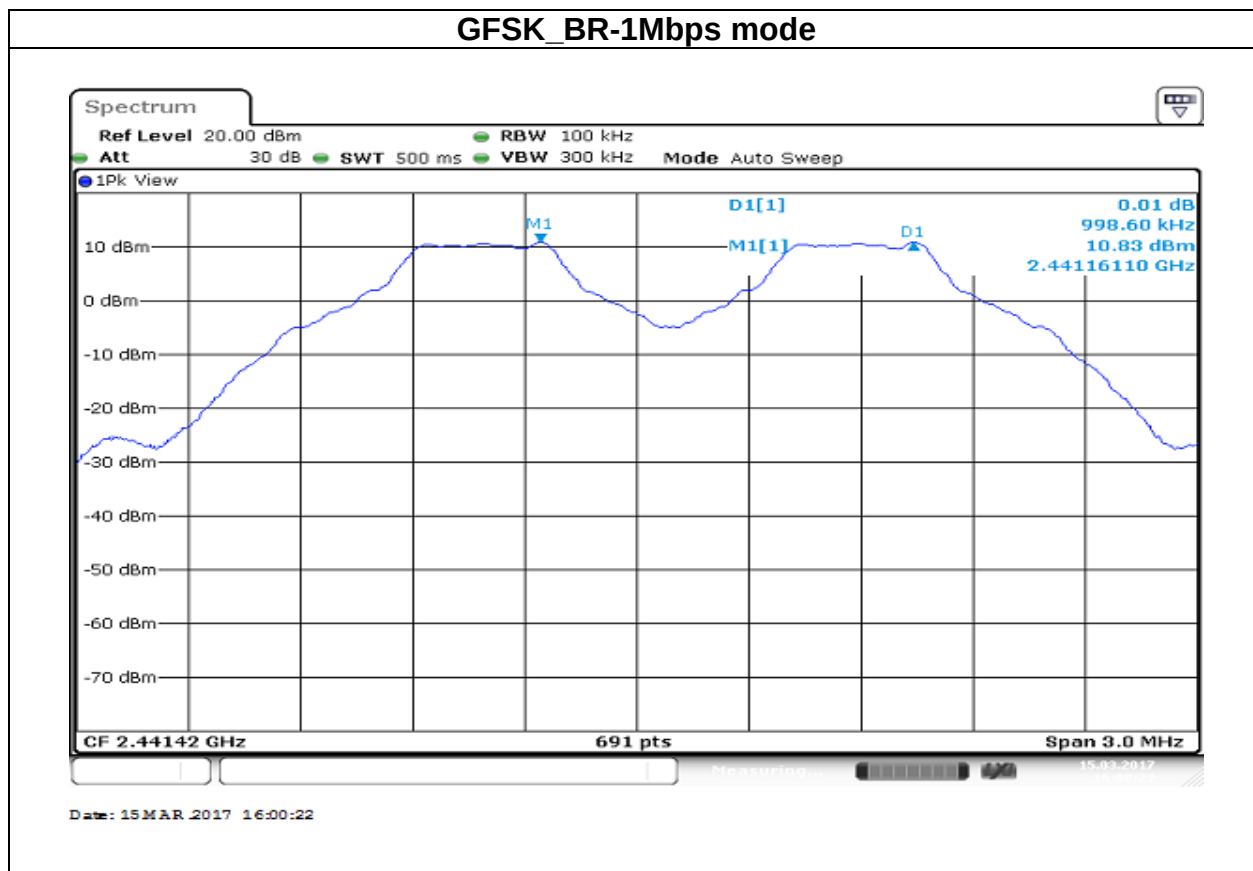


4.4.4 Test Result

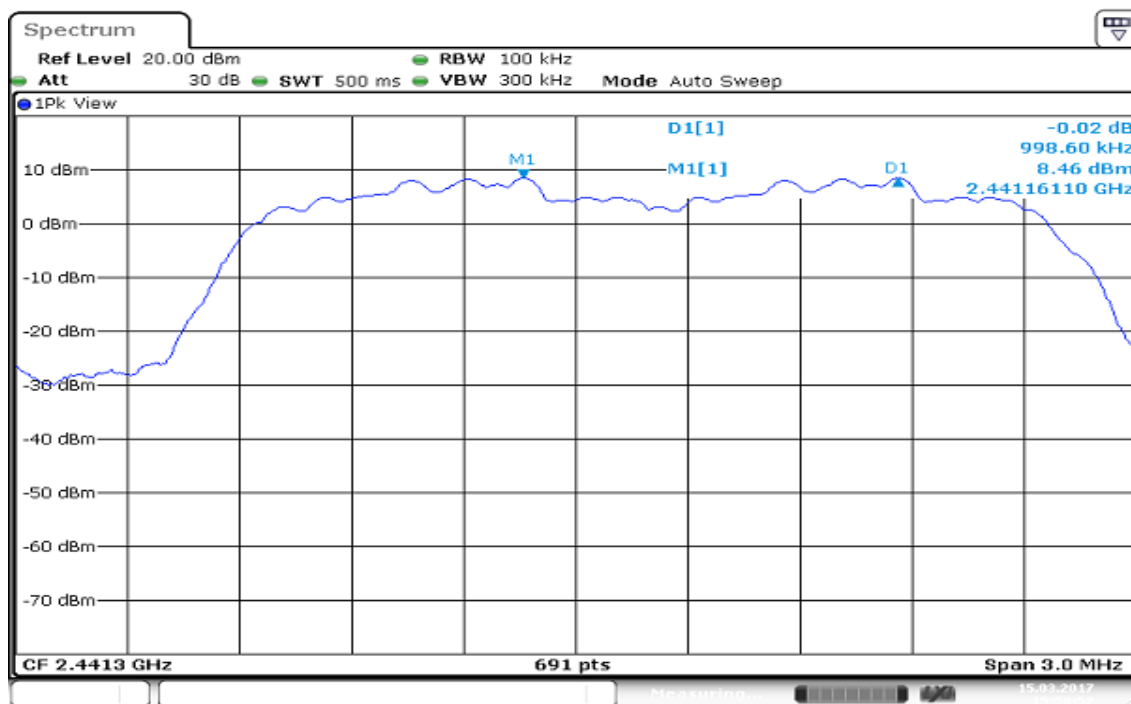
Test mode: GFSK_BR-1Mbps mode / 2402-2480 MHz				
Channel	Frequency (MHz)	Channel Separation (MHz)	Channel Separation Limits (MHz)	Result
Low	2402	0.9986	0.6725	PASS
Mid	2441	0.9986	0.6435	PASS
High	2480	0.9986	0.6609	PASS

Test mode: 8DPSK_EDR-3Mbps mode / 2402-2480 MHz				
Channel	Frequency (MHz)	Channel Separation (MHz)	Channel Separation Limits (MHz)	Result
Low	2402	0.9986	0.8637	PASS
Mid	2441	0.9986	0.8667	PASS
High	2480	0.9986	0.8667	PASS

Test Data



8DPSK_EDR-3Mbps mode



Date: 15 MAR 2017 15:58:52

4.5 NUMBER OF HOPPING

4.5.1 Test Limit

According to §15.247(a)(1)(iii) and RSS-247 section 5.1(d)

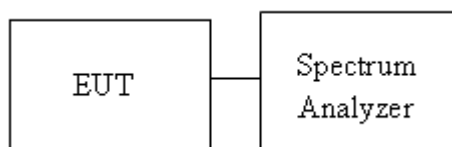
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

4.5.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 7.8.3

1. Place the EUT on the table and set it in transmitting mode.
2. EUT RF output port connected to the SA by RF cable.
3. Set spectrum analyzer Start Freq. = 2400 MHz, Stop Freq. = 2483.5 MHz, RBW = 100KHz, VBW = 300KHz.
4. Max hold, view and count how many channel in the band.

4.5.3 Test Setup



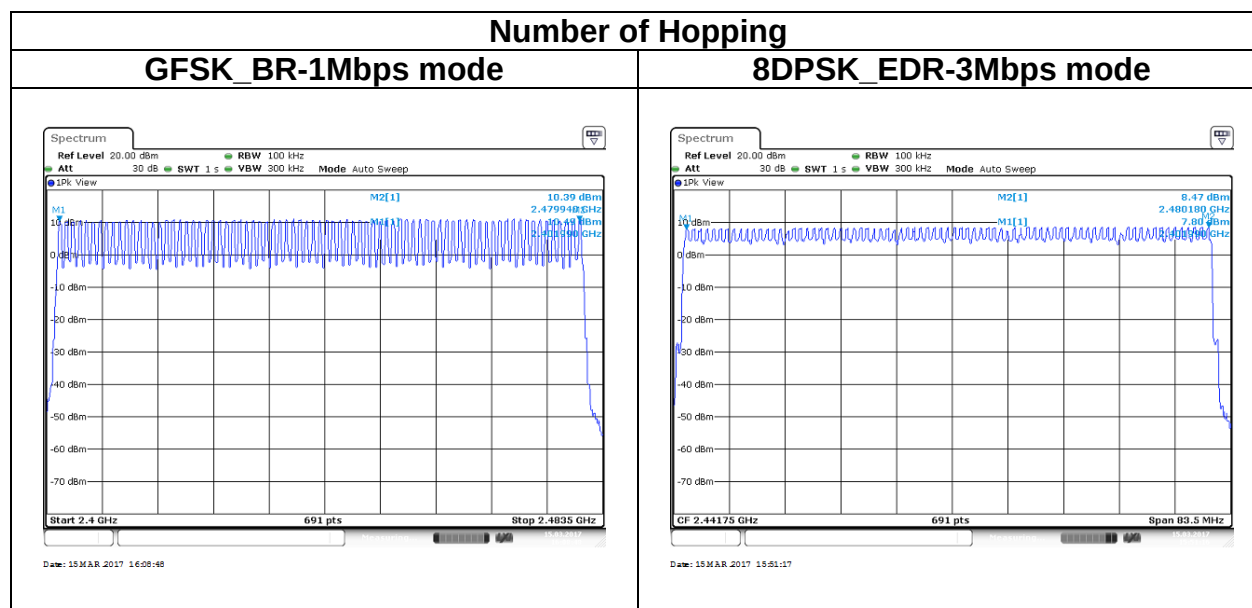
4.5.4 Test Result

Number of Hopping				
Mode	Frequency (MHz)	Hopping Channel Number	Hopping Channel Number Limits	Result
BR-1Mbps	2402-2480	79	15	Pass
EDR-3Mbps	2402-2480	79	15	

REMARK:

The frequency spectrum was broken up in to two sub-range to clearly show all of the hopping frequencies. In the AFH mode, this device operation was using 20 channels, so the requirement for minimum number of hopping channels is satisfied

Test Data



4.6 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

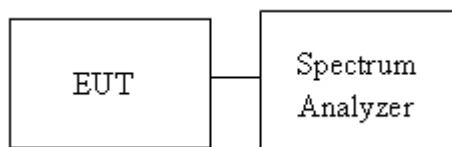
According to §15.247(d) and RSS-247 section 5.5

Limit	-20 dBc
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4.6.2 Test Procedure

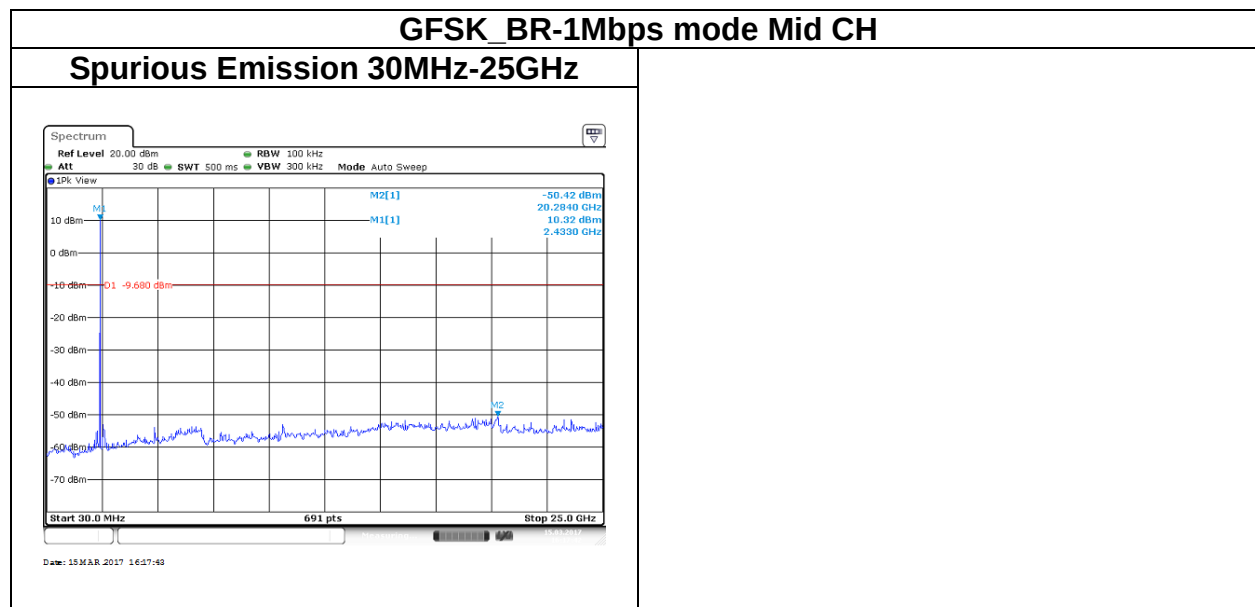
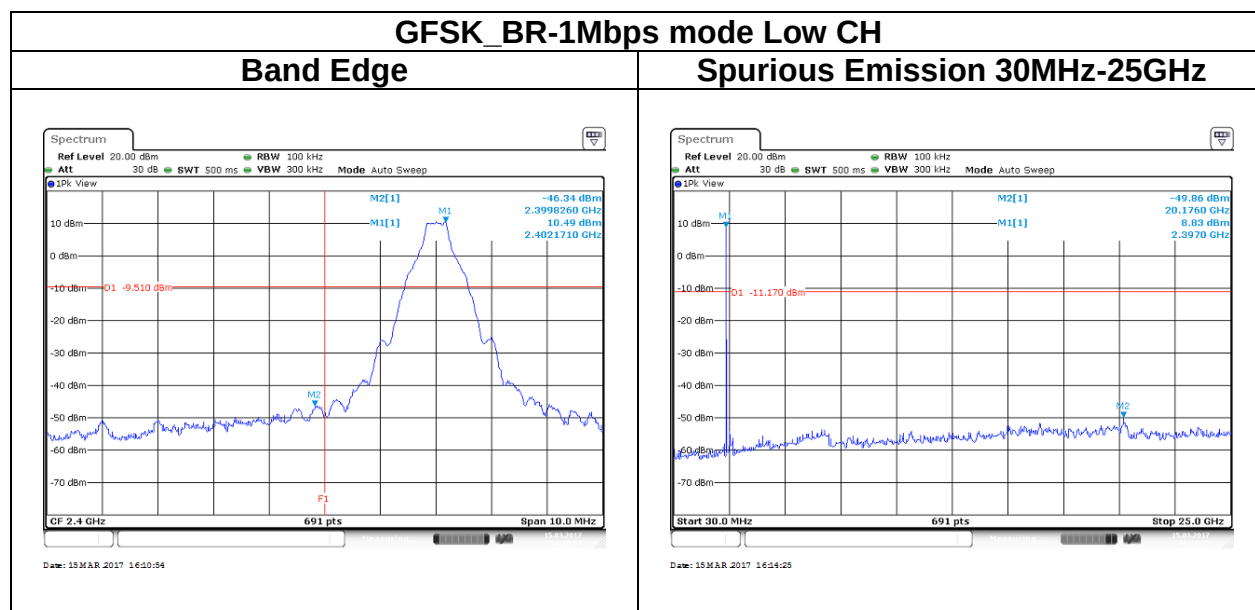
1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. The Band Edge at 2.4GHz and 2.4835GHz are investigated with normal hopping mode.

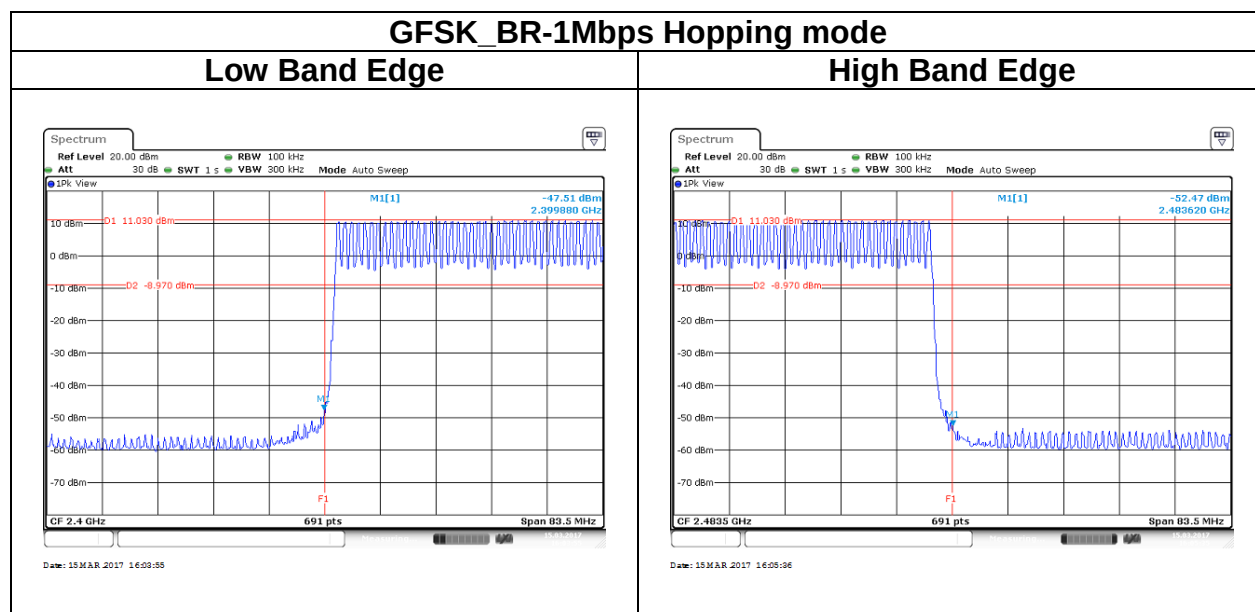
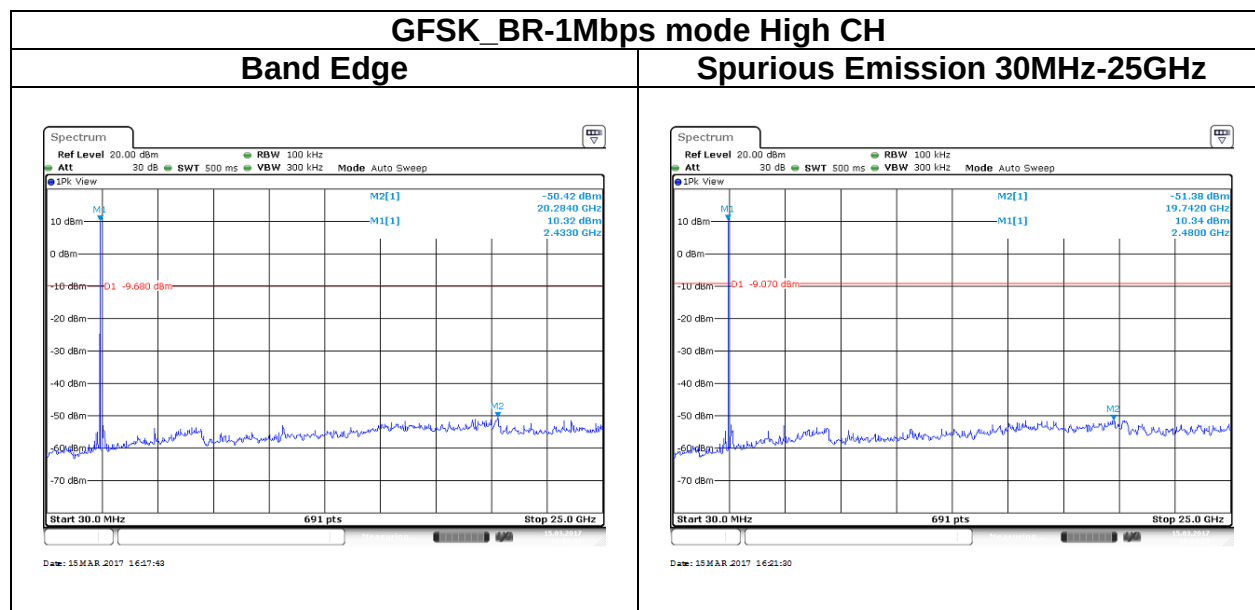
4.6.3 Test Setup



4.6.4 Test Result

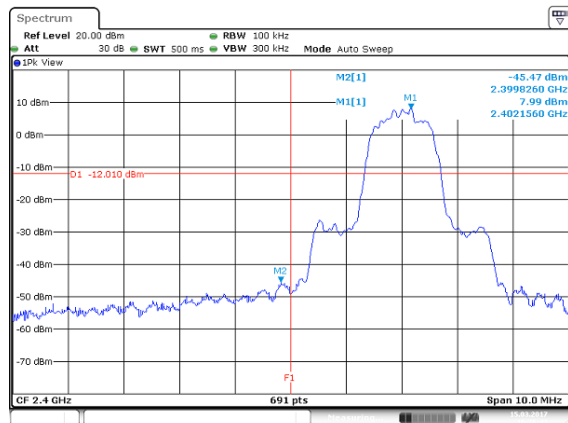
Test Data





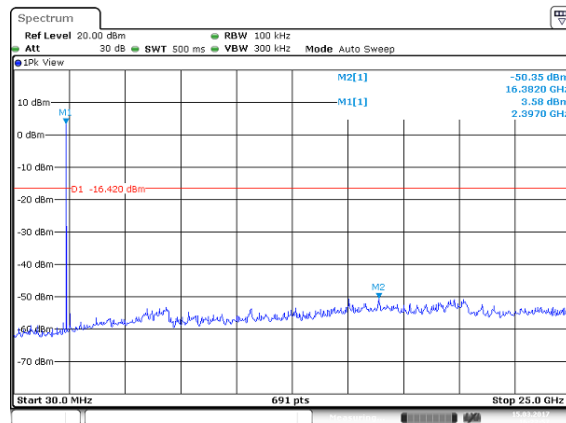
8DPSK_EDR-3Mbps mode Low CH

Band Edge



Date: 15 MAR 2017 16:26:49

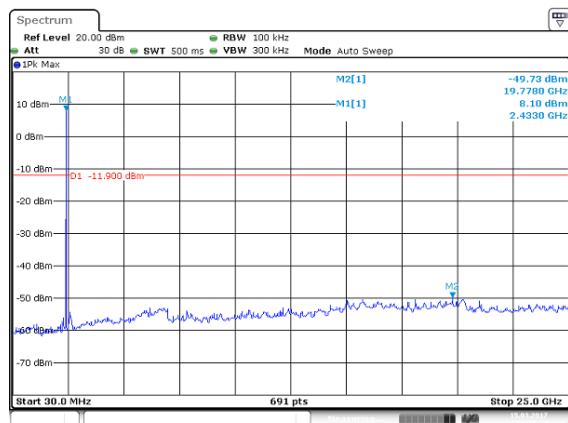
Spurious Emission 30MHz-25GHz



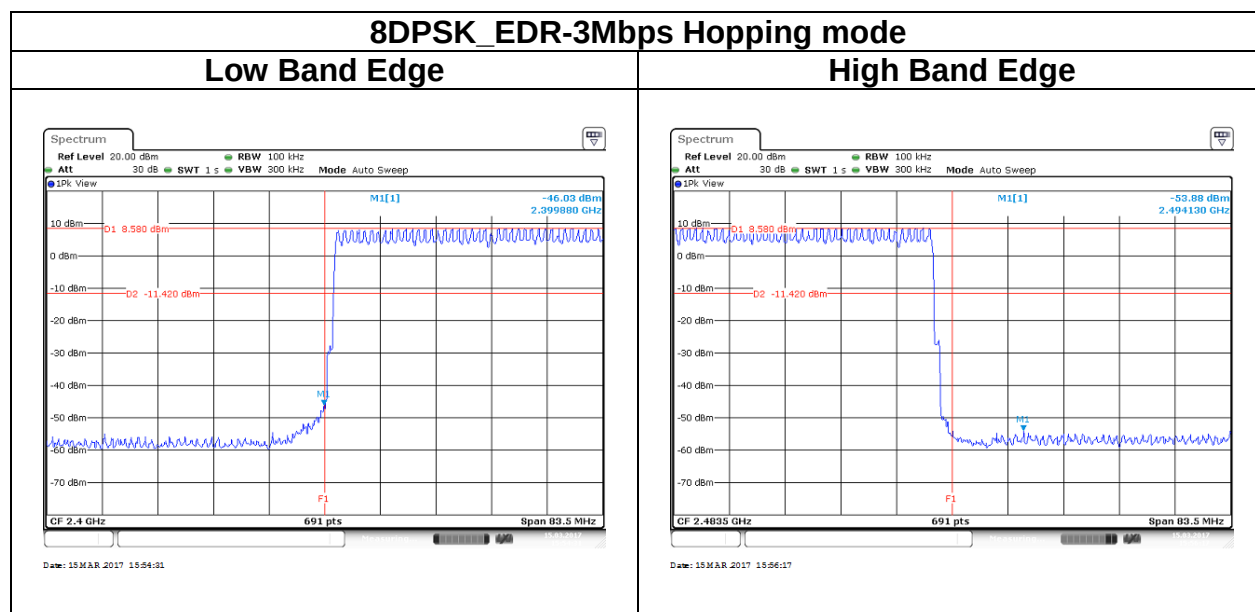
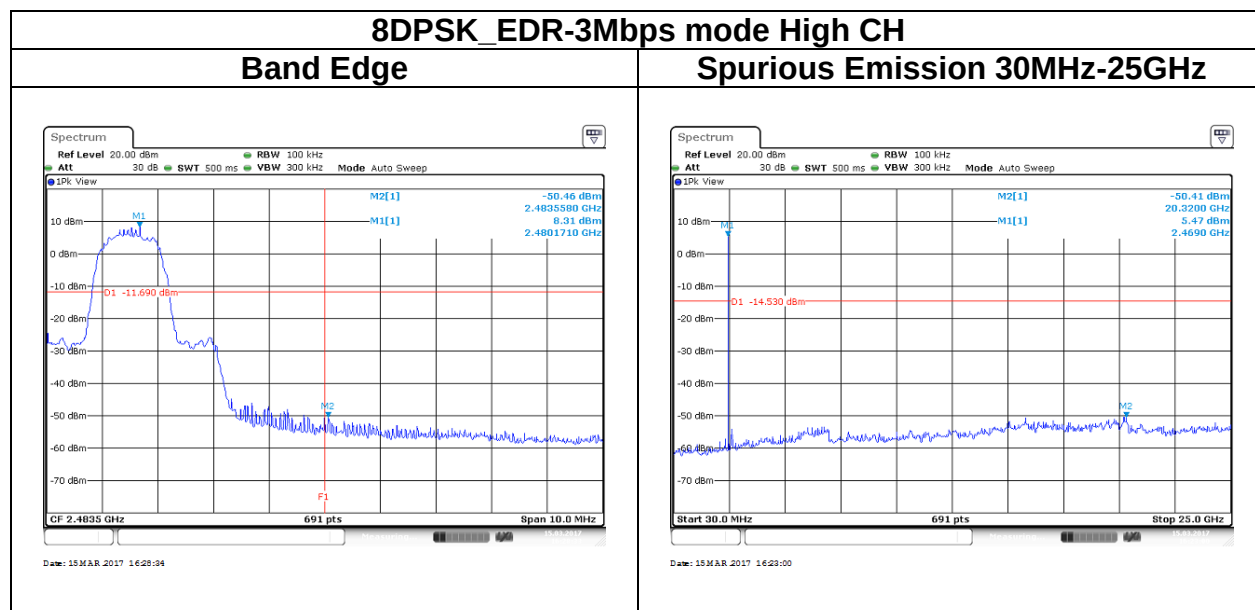
Date: 15 MAR 2017 16:29:58

8DPSK_EDR-3Mbps mode Mid CH

Spurious Emission 30MHz-25GHz



Date: 15 MAR 2017 16:25:23



4.7 TIME OF OCCUPANCY (DWEELL TIME)

4.7.1 Test Limit

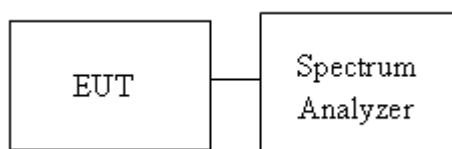
According to §15.247(a)(1)(iii) and RSS-247 section 5.1(d)

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.

4.7.2 Test Procedure

1. EUT RF output port connected to the SA by RF cable.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=1MHz, Sweep = 1 ms

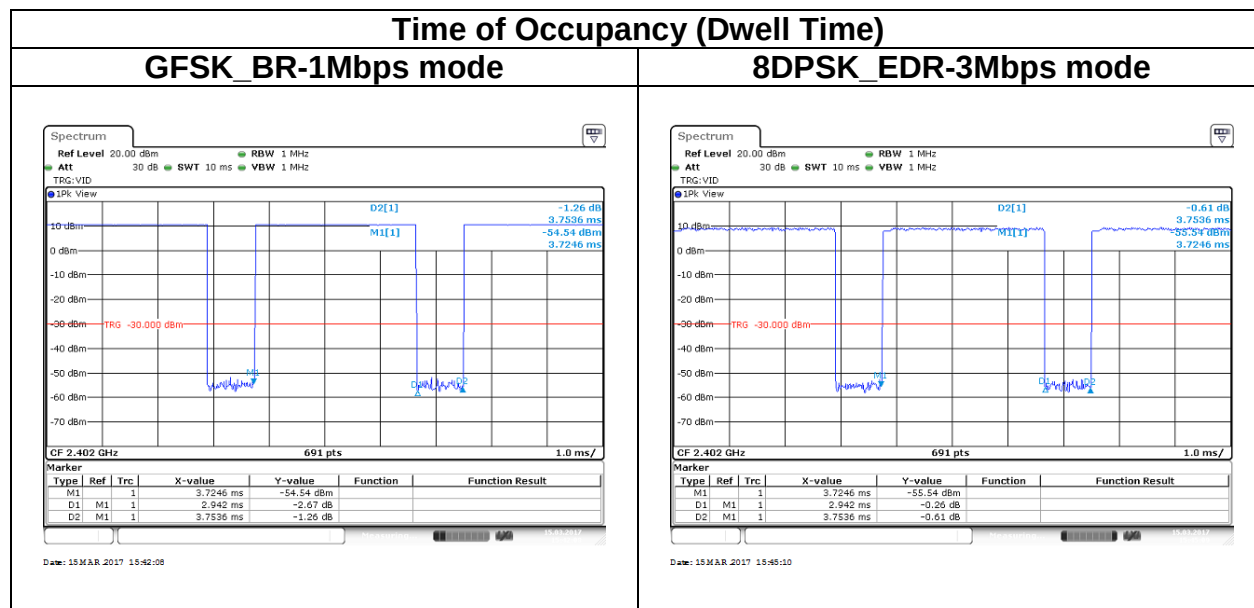
4.7.3 Test Setup



4.7.4 Test Result

Time of Occupancy (Dwell Time)							
Mode	Frequency (MHz)	Pulse Time Per Hopping (s)	Minimum Number of Hopping Freq.	Number of pulse in	Dwell Time IN	Dwell Time Limits (s)	Result
				(0.4 * N sec)	(0.4 * N sec)		
BR-1Mbps	2441	0.2942	79	106.67	0.314	0.4	Pass
EDR-3Mbps	2441	0.2942	79	106.67	0.314	0.4	
Non-AFH: DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 * 0.4 *79 = 106.6							
AFH: DH5 Packet permit maximum 800/ 20 / 6 = 6.666 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 6.666*0.4*20 = 53.33							

Test Data



4.8 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.8.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

IC according to RSS-247 section 5.5, RSS-Gen, Section 8.9 and 8.10

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

4.8.2 Test Procedure

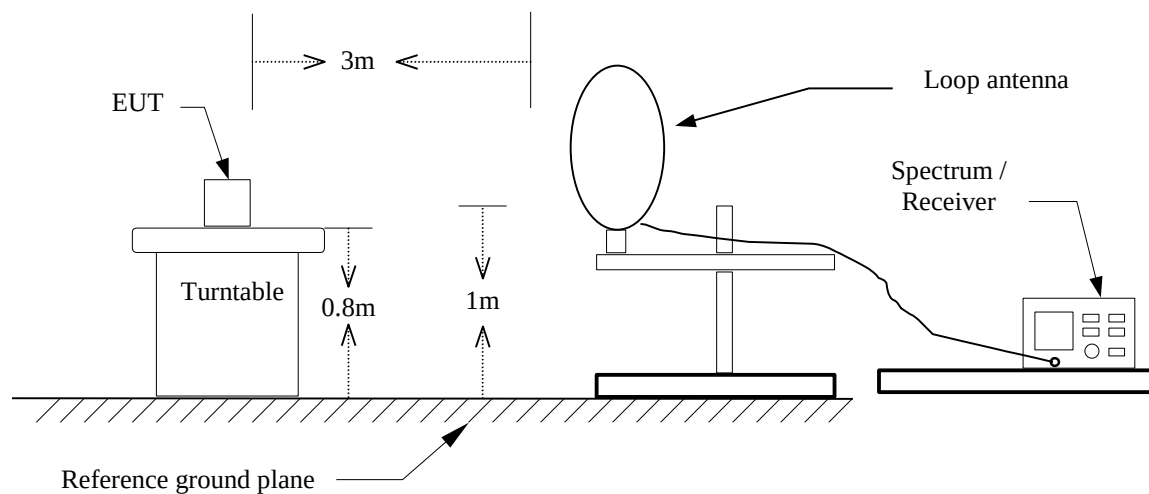
Test method Refer as KDB 558074 D01 v03r05, Section 12.1.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
4. For harmonic, the worst case of output power was BR-1Mbps. Therefore only BR-1Mbps record in the report.
5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW $\geq$ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
·If Duty Cycle $\geq$ 98%, VBW=10Hz.
·If Duty Cycle < 98%, VBW $\geq$ 1/T.

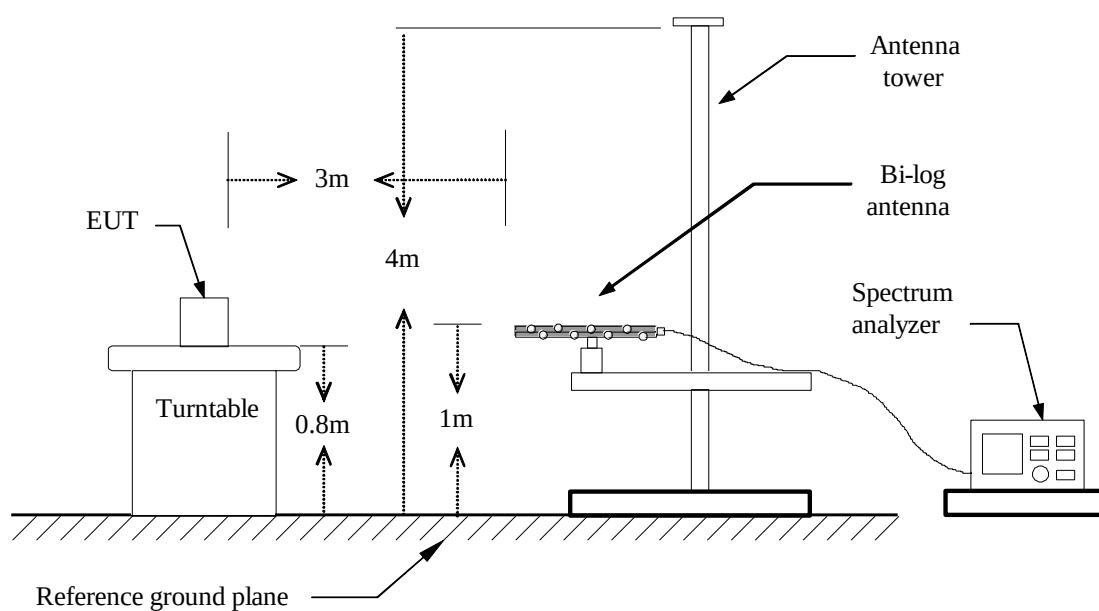
Configuration	Duty Cycle (%)	T(ms)	1/T (Hz)	VBW setting
GFSK_BR-1Mbps	78%	2.9400	340.136	360Hz
8DPSK_EDR-3Mbps	78%	2.9500	339	360Hz

4.8.3 Test Setup

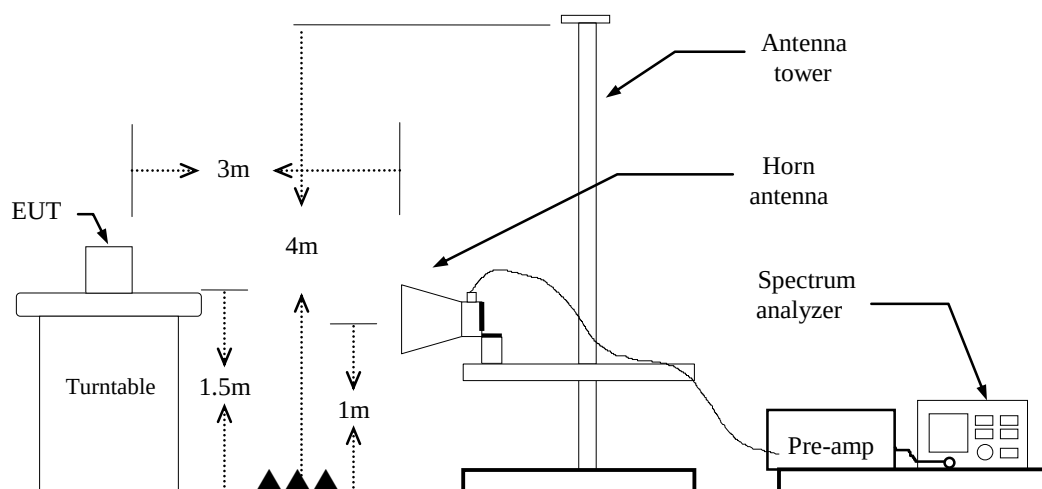
9kHz ~ 30MHz



30MHz ~ 1GHz



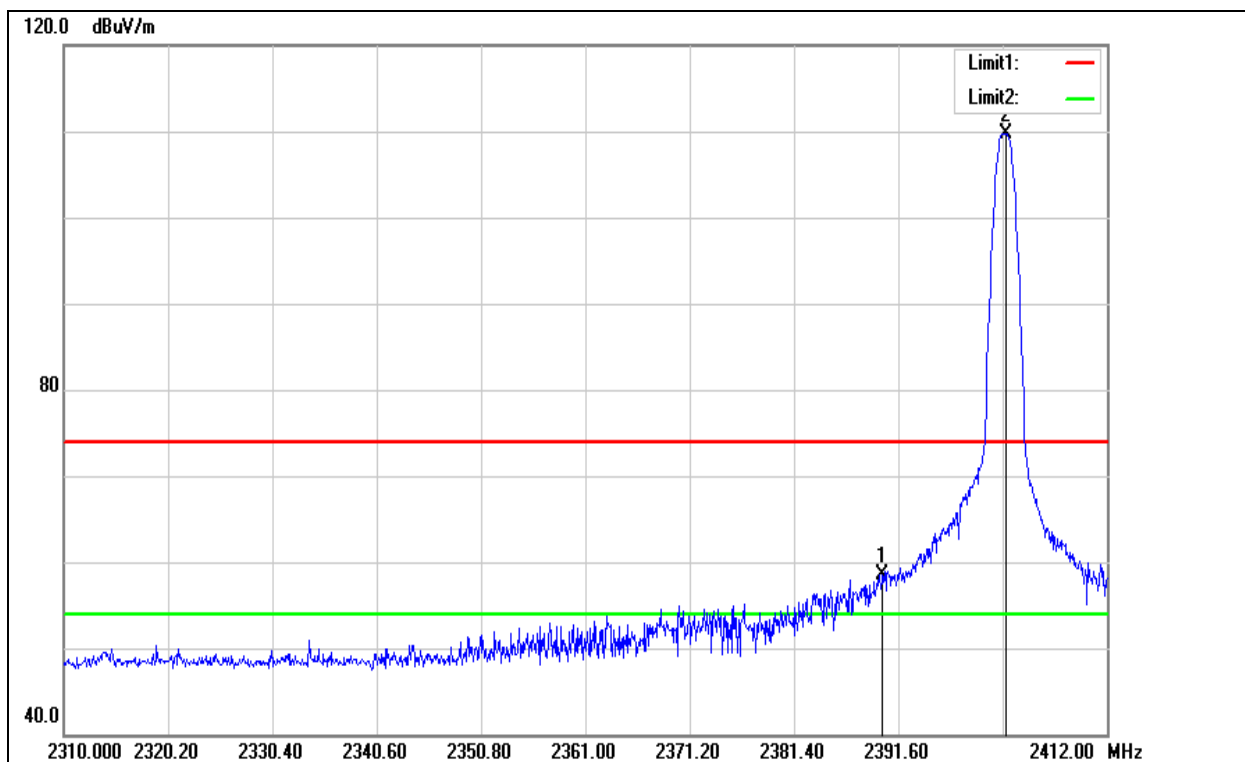
Above 1 GHz



4.8.4 Test Result

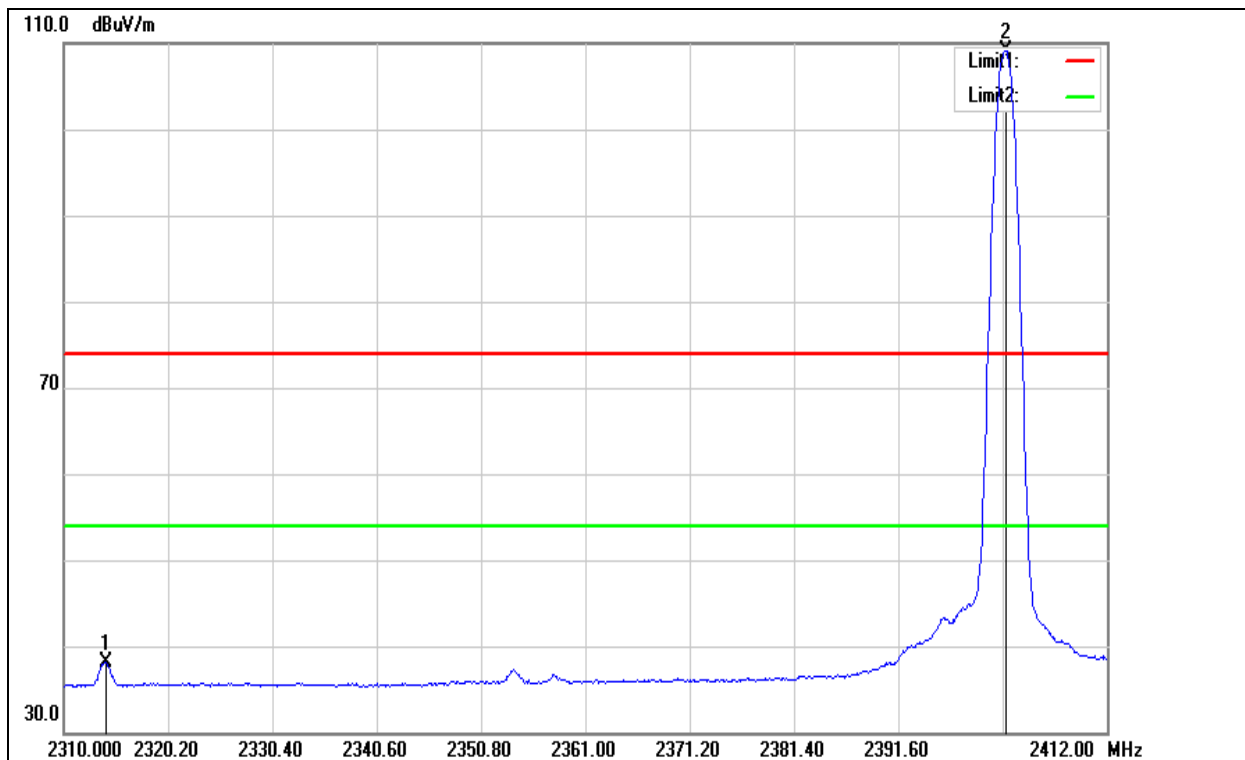
Band Edge Test Data

Test Mode:	GFSK_BR-1Mbps Low CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak		



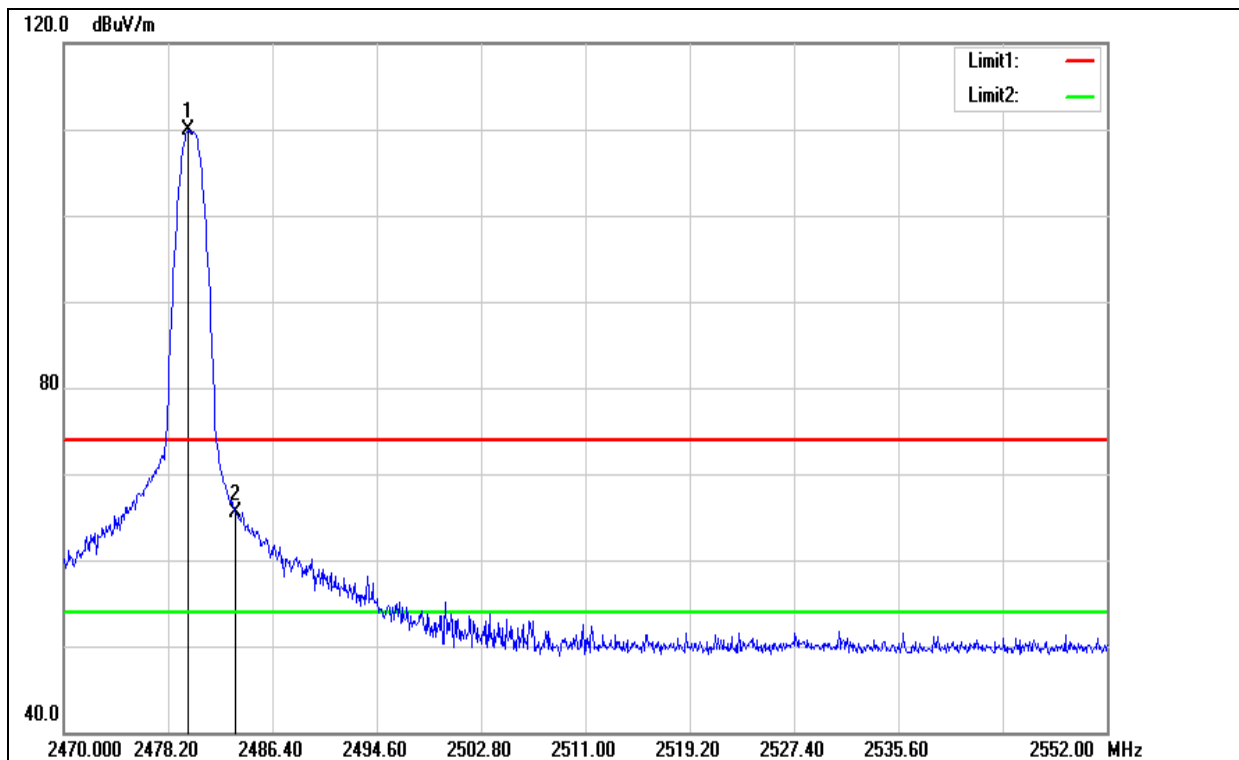
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	60.99	-2.49	58.50	74.00	-15.50	peak
2	2402.106	112.15	-2.41	109.74	--	--	peak

Test Mode:	GFSK_BR-1Mbps Low CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Average		



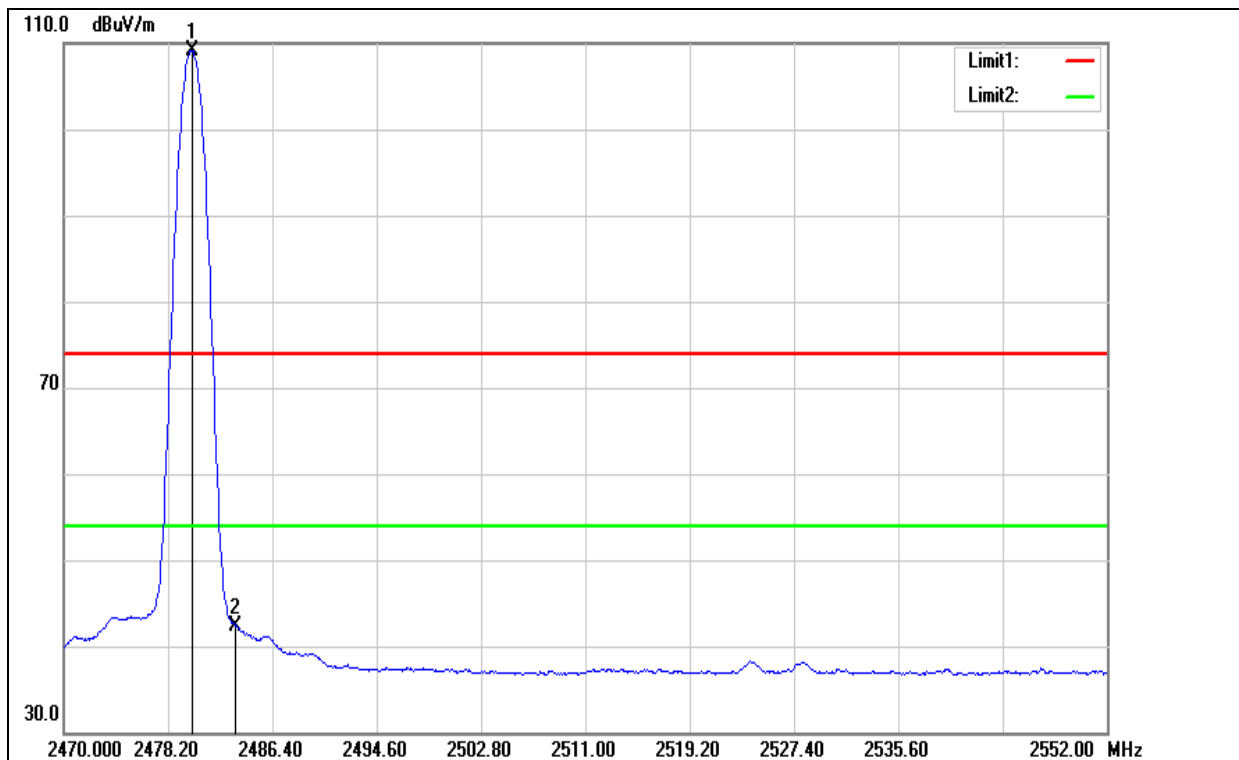
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2314.080	41.10	-2.99	38.11	54.00	-15.89	AVG
2	2402.106	111.58	-2.41	109.17	--	--	AVG

Test Mode:	GFSK_BR-1Mbps High CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak		



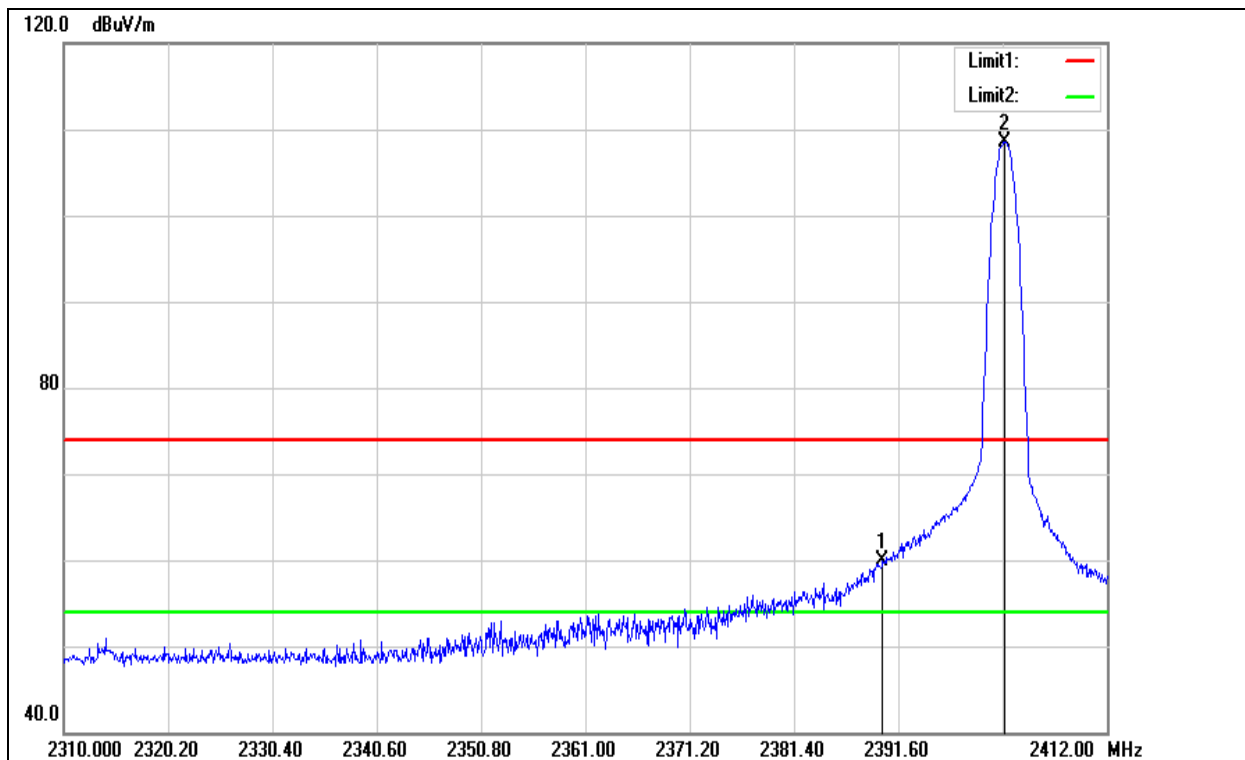
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.758	111.84	-2.03	109.81	--	--	peak
2	2483.500	67.50	-1.99	65.51	74.00	-8.49	peak

Test Mode:	GFSK_BR-1Mbps High CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Average		



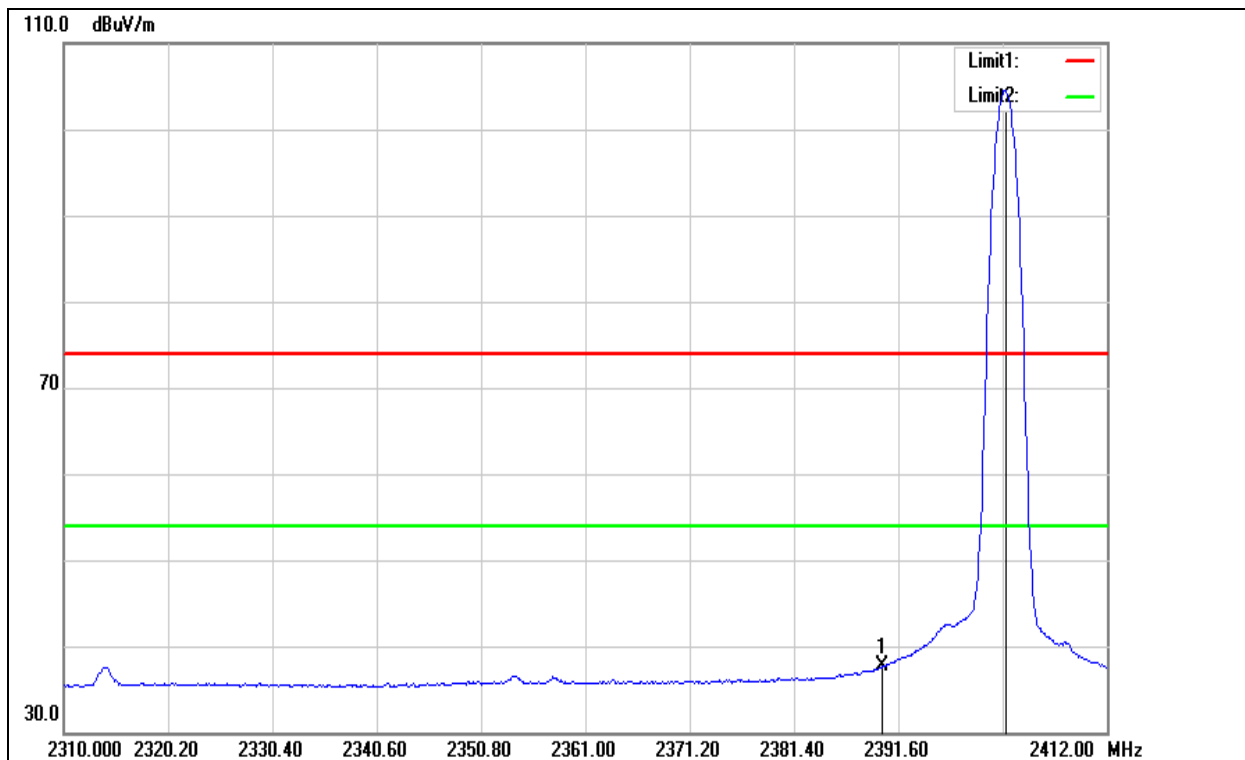
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.086	111.14	-2.03	109.11	--	--	AVG
2	2483.500	44.34	-1.99	42.35	54.00	-11.65	AVG

Test Mode:	8DPSK_EDR-3Mbps Low CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak		



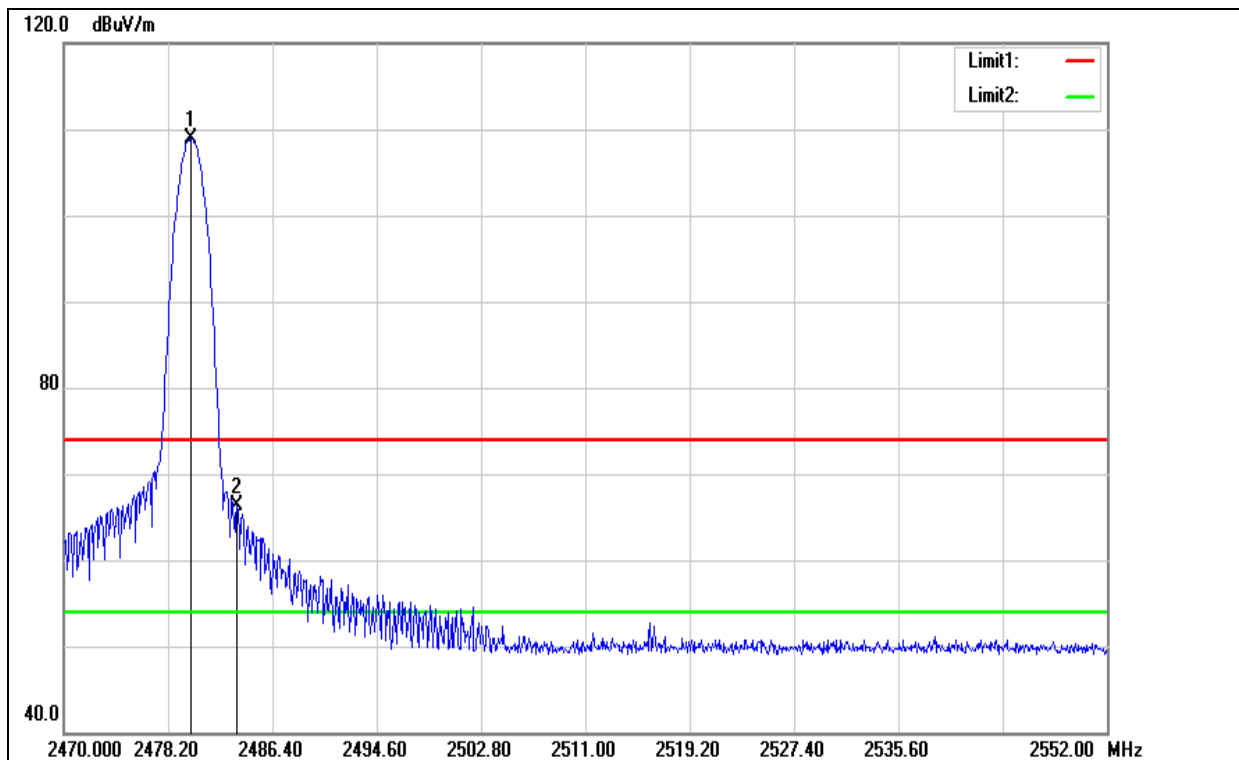
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	62.34	-2.49	59.85	74.00	-14.15	peak
2	2402.004	111.00	-2.41	108.59	74.00	34.59	peak

Test Mode:	8DPSK_EDR-3Mbps Low CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Average		



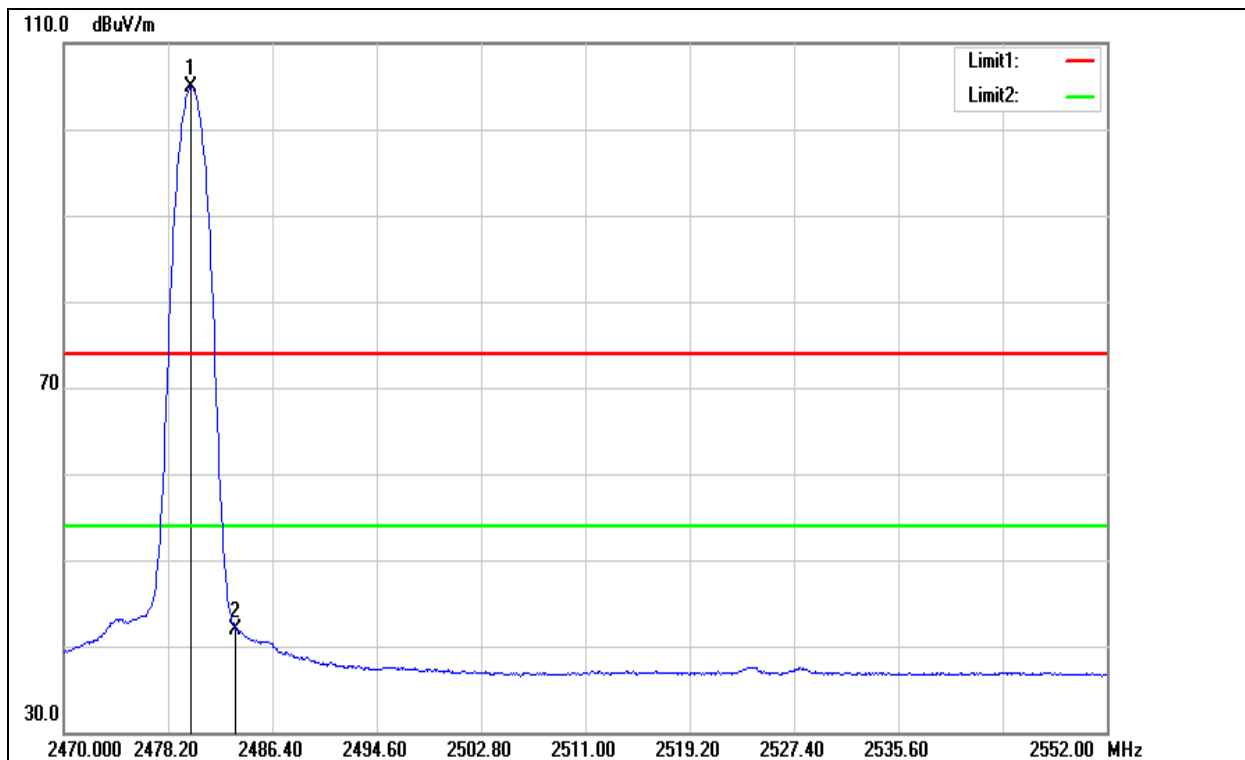
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	40.12	-2.49	37.63	54.00	-16.37	AVG
2	2402.106	106.97	-2.41	104.56	54.00	50.56	AVG

Test Mode:	8DPSK_EDR-3Mbps High CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.004	111.00	-2.03	108.97	74.00	34.97	peak
2	2483.612	68.37	-1.99	66.38	74.00	-7.62	peak

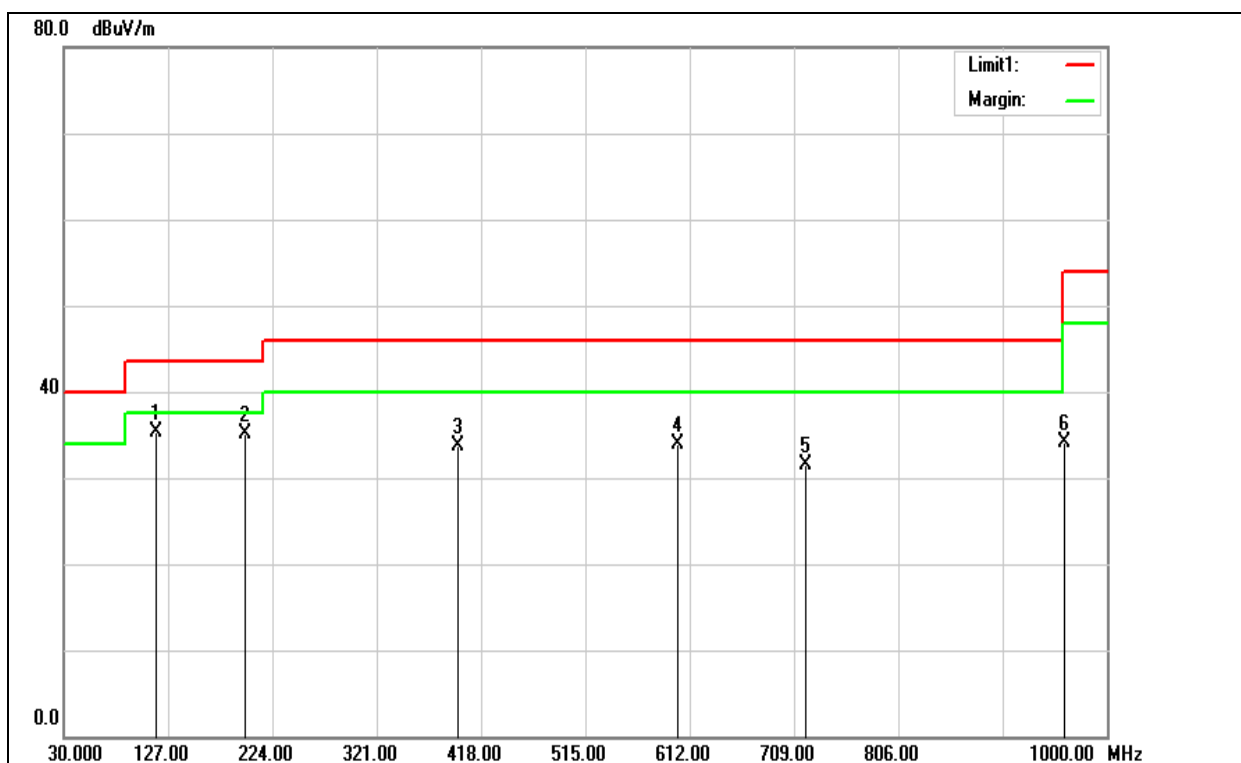
Test Mode:	8DPSK_EDR-3Mbps High CH	Temp/Hum	21(°C)/ 58%RH
Test Item	Band Edge	Test Date	March 26, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Average		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.004	106.95	-2.03	104.92	54.00	50.92	AVG
2	2483.500	43.92	-1.99	41.93	54.00	-12.07	AVG

Below 1G Test Data

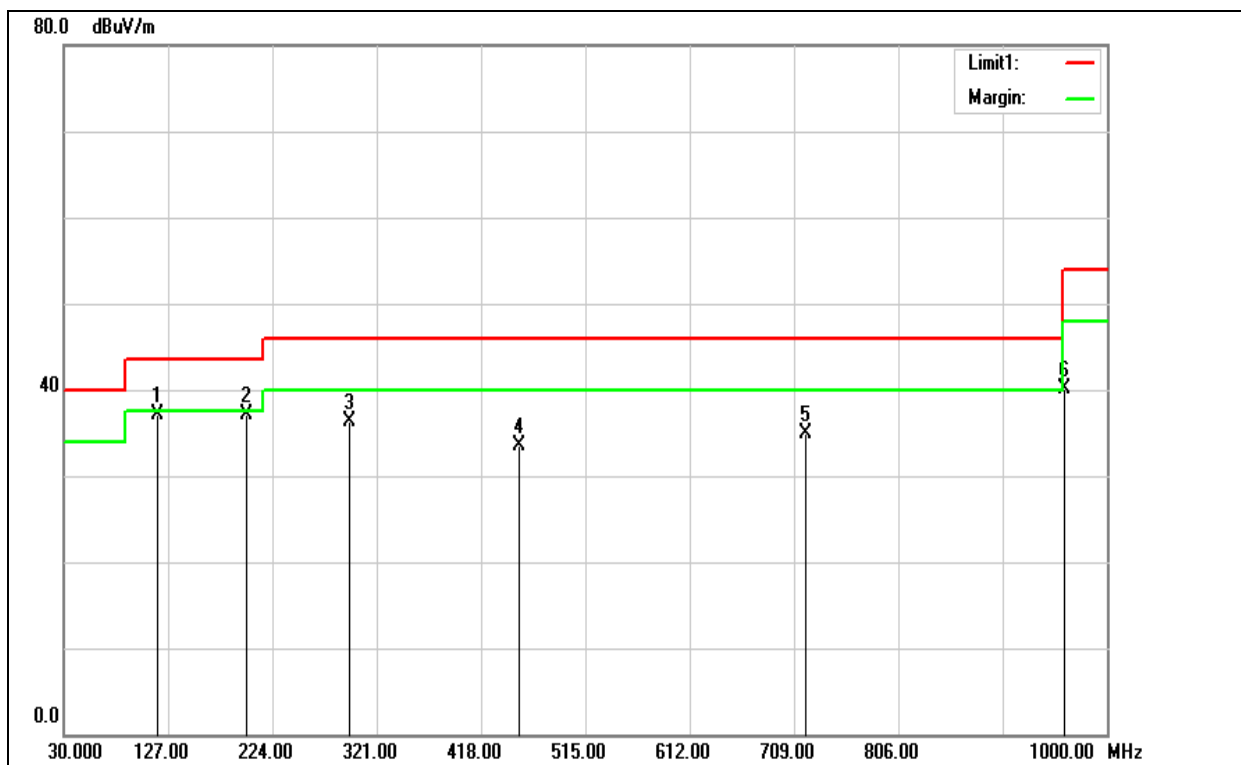
Test Mode:	BT Mode	Temp/Hum	21(°C)/ 58%RH
Test Item	30MHz-1GHz	Test Date	March 28, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	115.3600	51.64	-16.32	35.32	43.50	-8.18	peak
2	198.7800	50.74	-15.66	35.08	43.50	-8.42	peak
3	396.6600	45.58	-11.78	33.80	46.00	-12.20	peak
4	600.3600	41.73	-7.75	33.98	46.00	-12.02	peak
5	719.6700	37.16	-5.62	31.54	46.00	-14.46	peak
6	960.2300	36.43	-2.23	34.20	54.00	-19.80	peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

Test Mode:	BT Mode	Temp/Hum	21(°C)/ 58%RH
Test Item	30MHz-1GHz	Test Date	March 28, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak		

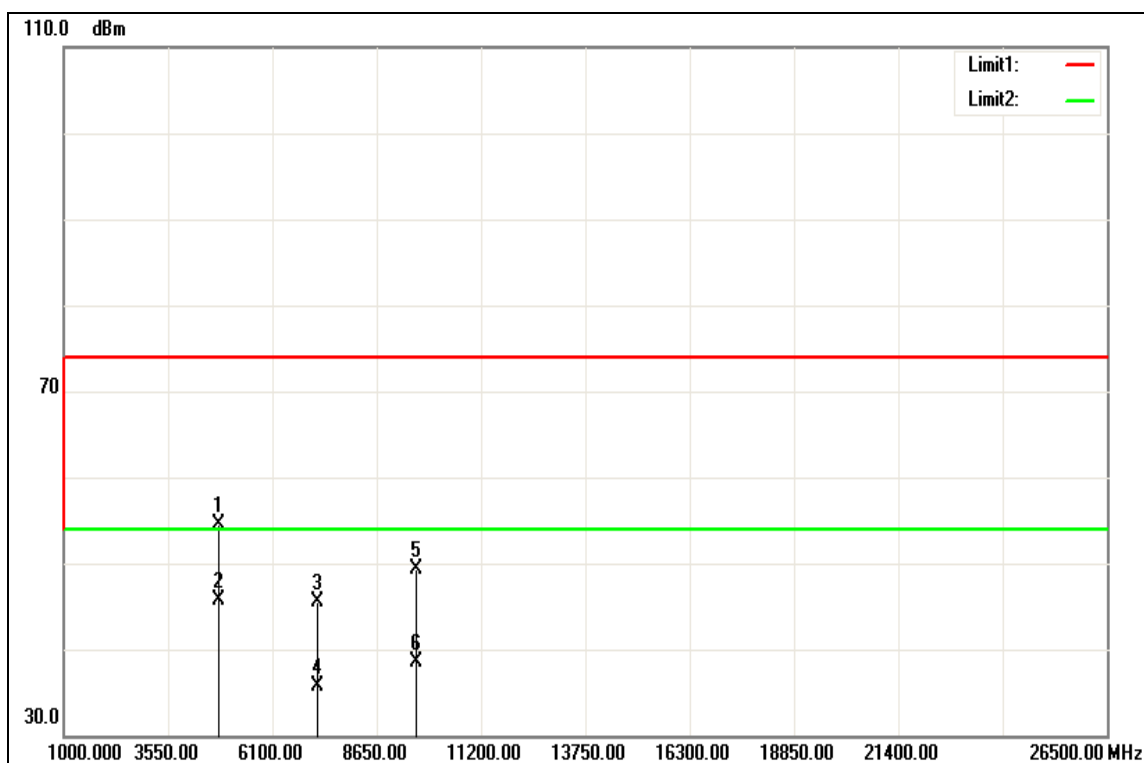


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	117.3000	53.04	-15.98	37.06	43.50	-6.44	peak
2	199.7500	52.71	-15.57	37.14	43.50	-6.36	peak
3	295.7800	50.55	-14.32	36.23	46.00	-9.77	peak
4	453.8900	43.59	-10.12	33.47	46.00	-12.53	peak
5	719.6700	40.48	-5.62	34.86	46.00	-11.14	peak
6	960.2300	42.30	-2.23	40.07	54.00	-13.93	peak

Note: No emission found between lowest internal used/generated frequency to 30MHz(9KHz~30MHz)

Above 1G Test Data

Test Mode:	GFSK_BR-1Mbps Low CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average		

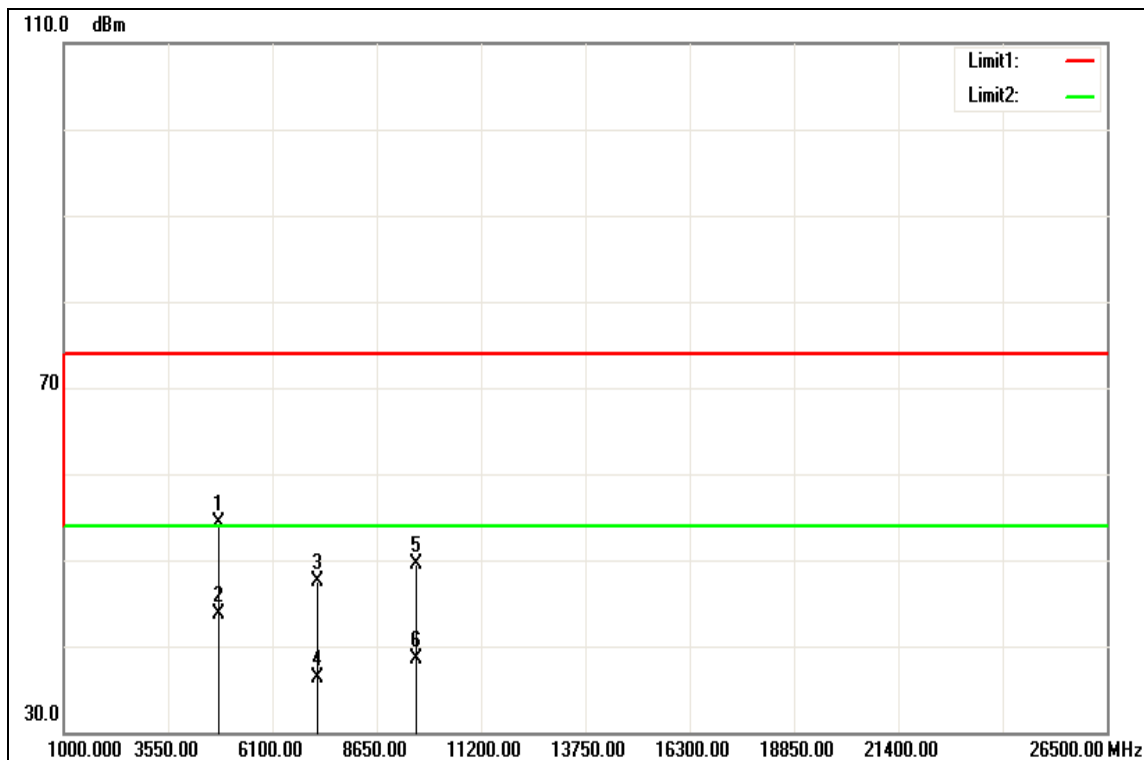


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4806.000	54.58	5.0	54.58	74.00	-19.42	peak
2	4806.000	45.61	5.05	45.61	54.00	-8.39	AVG
3	7206.000	45.58	12.62	45.58	74.00	-28.42	peak
4	7206.000	35.69	12.62	35.69	54.00	-18.31	AVG
5	9608.000	49.36	17.60	49.36	74.00	-24.64	peak
6	9608.000	38.41	17.60	38.41	54.00	-15.59	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	GFSK_BR-1Mbps Low CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average		

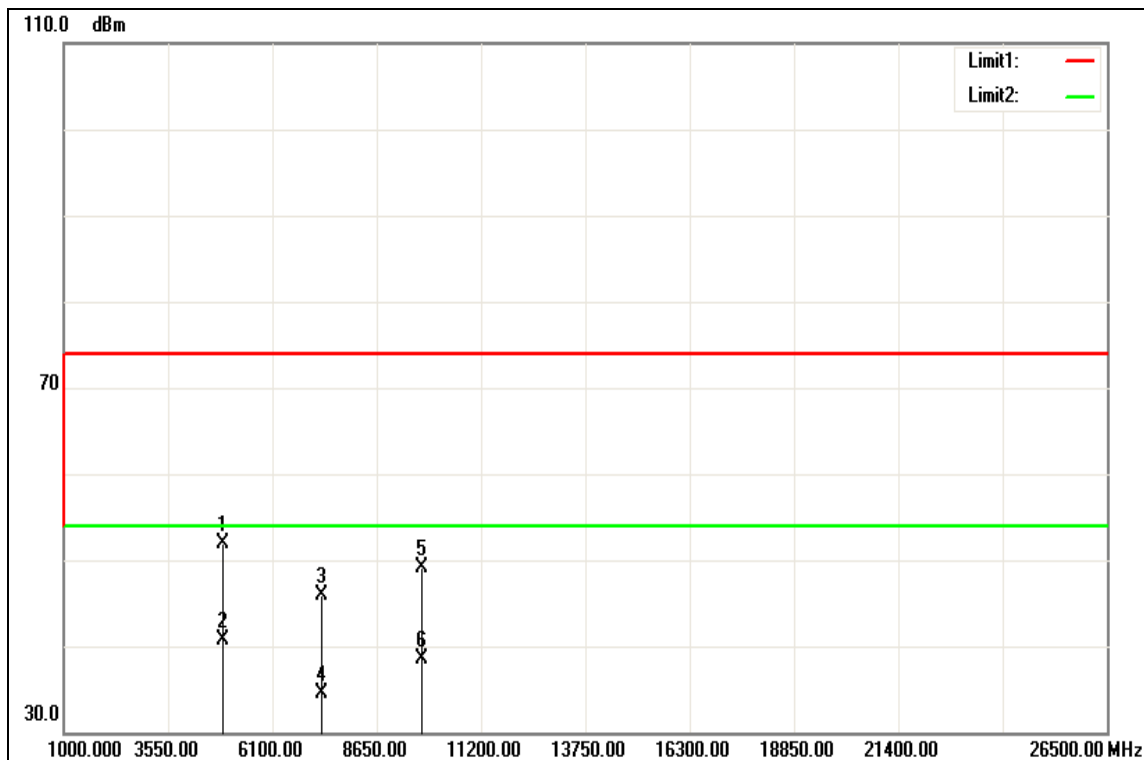


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4806.000	54.33	5.05	54.33	74.00	-19.67	peak
2	4806.000	43.62	5.05	43.62	54.00	-10.38	AVG
3	7206.000	47.54	12.62	47.54	74.00	-26.46	peak
4	7206.000	36.38	12.62	36.38	54.00	-17.62	AVG
5	9608.000	49.53	17.60	49.53	74.00	-24.47	peak
6	9608.000	38.41	17.60	38.41	54.00	-15.59	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	GFSK_BR-1Mbps Mid CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average		

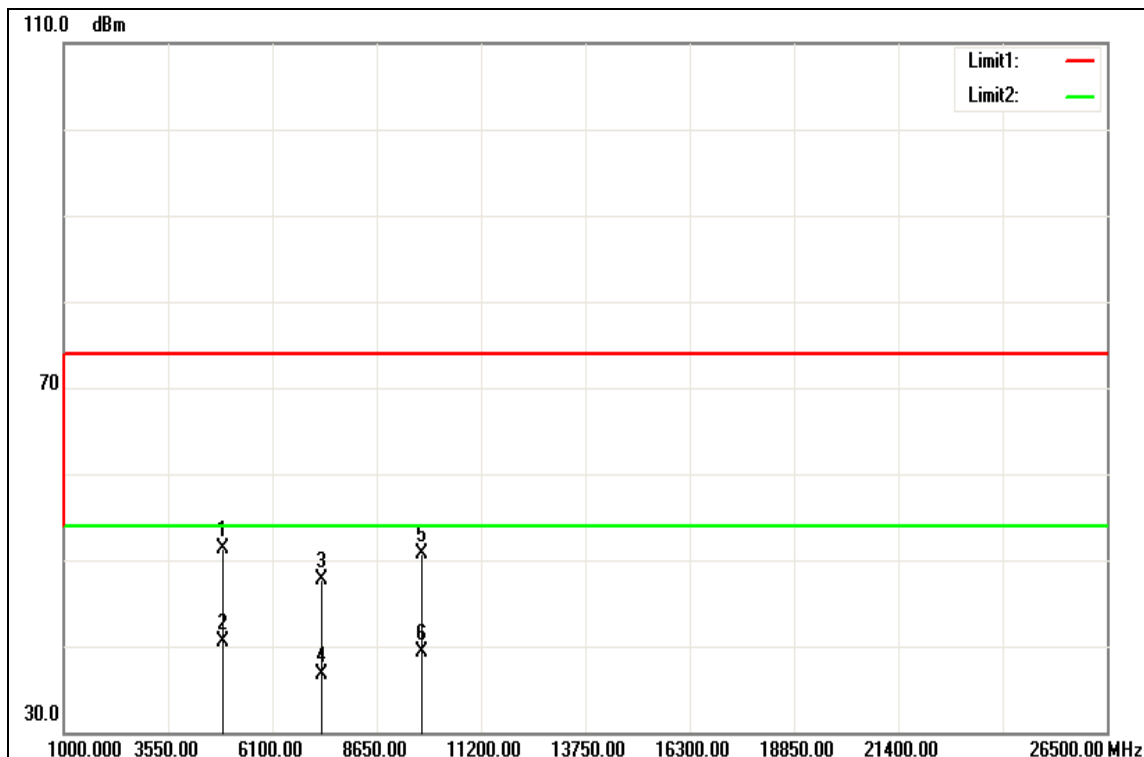


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4883.000	51.98	5.26	51.98	74.00	-22.02	peak
2	4883.000	40.77	5.26	40.77	54.00	-13.23	AVG
3	7320.000	45.86	12.97	45.86	74.00	-28.14	peak
4	7320.000	34.54	12.97	34.54	54.00	-19.46	AVG
5	9760.000	49.16	17.60	49.16	74.00	-24.84	peak
6	9760.000	38.41	17.60	38.41	54.00	-15.59	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	GFSK_BR-1Mbps Mid CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average		

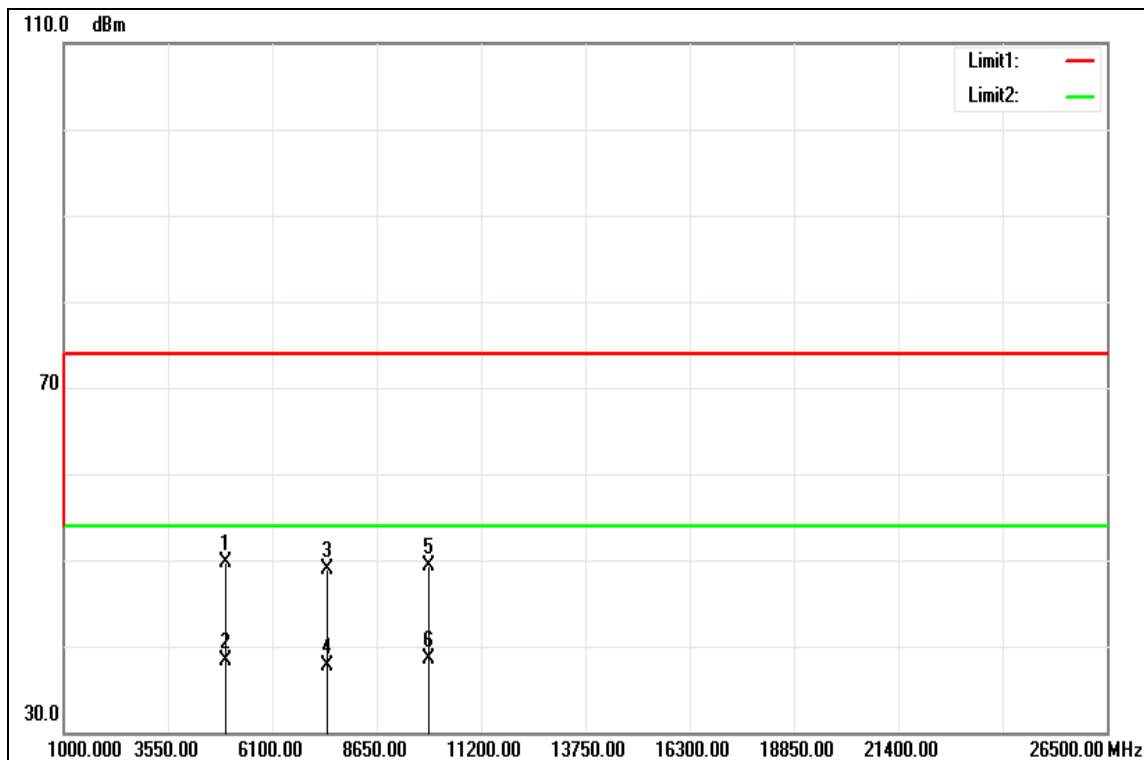


No.	Frequency (Hz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4883.000	51.21	5.26	51.21	74.00	-22.79	peak
2	4883.000	40.48	5.26	40.48	54.00	-13.52	AVG
3	7320.000	47.71	12.97	47.71	74.00	-26.29	peak
4	7320.000	36.65	12.97	36.65	54.00	-17.35	AVG
5	9760.000	50.64	17.60	50.64	74.00	-23.36	peak
6	9760.000	39.24	17.60	39.24	54.00	-14.76	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	GFSK_BR-1Mbps High CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average		

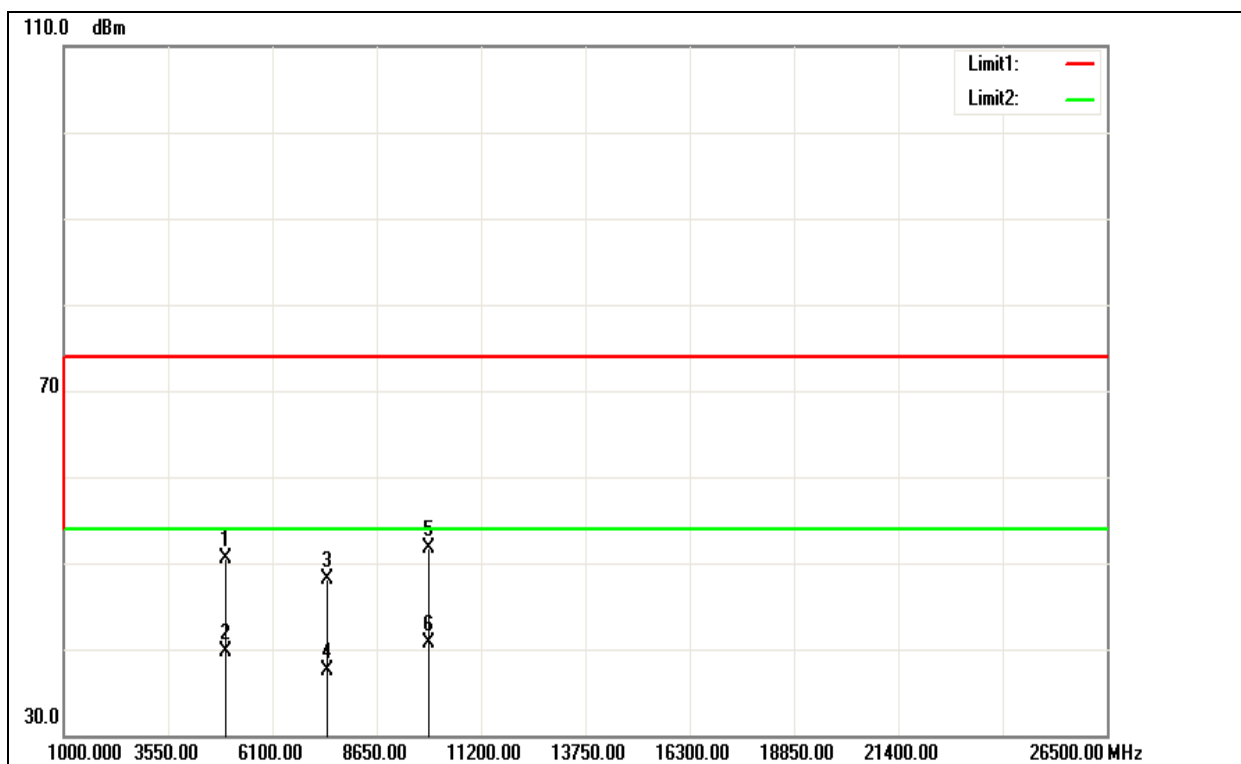


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Lim t (dBm)	Margin (dB)	Remark
1	4960.000	49.66	5.46	49.66	74.00	-24.34	peak
2	4960.000	38.23	5.46	38.23	54.00	-15.77	AVG
3	7440.000	48.89	13.33	48.89	74.00	-25.11	peak
4	7440.000	37.68	13.33	37.68	54.00	-16.32	AVG
5	9920.000	49.37	17.60	49.37	74.00	-24.63	peak
6	9920.000	38.41	17.60	38.41	54.00	-15.59	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode:	GFSK_BR-1Mbps High CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average		

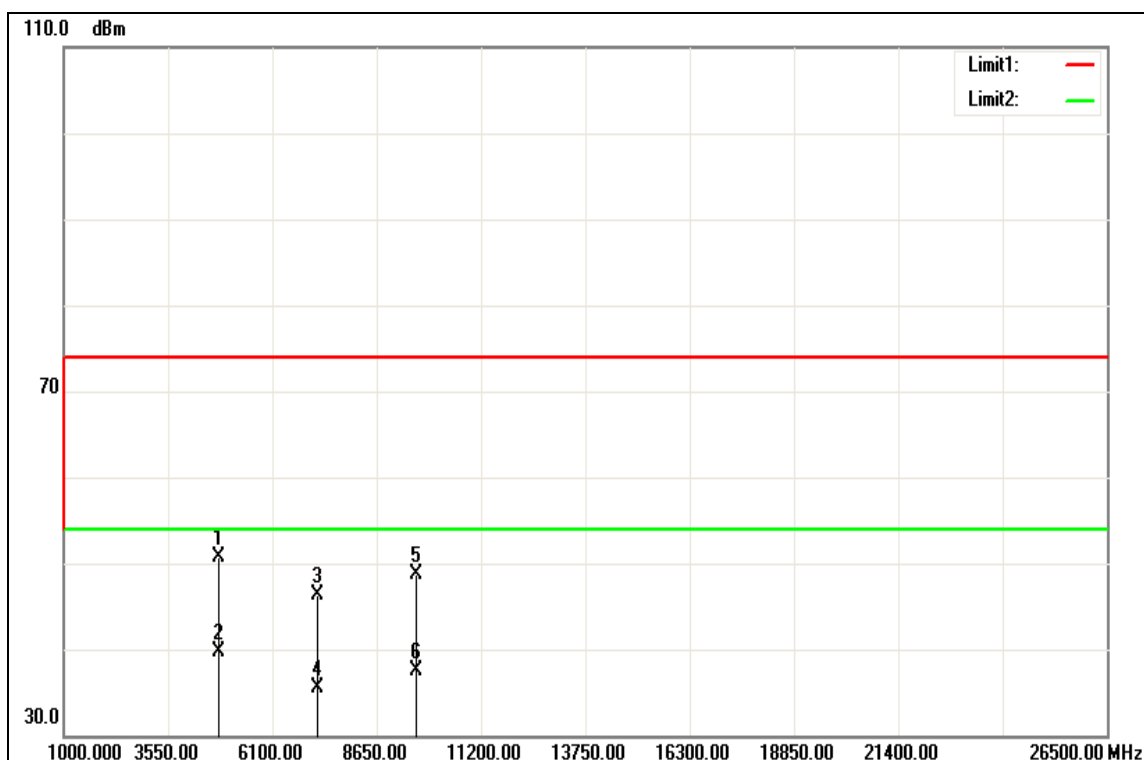


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4960.000	50.41	5.46	50.41	74.00	-23.59	peak
2	4960.000	39.68	5.46	39.68	54.00	-14.32	AVG
3	7440.000	48.16	13.33	48.16	74.00	-25.84	peak
4	7440.000	37.54	13.33	37.54	54.00	-16.46	AVG
5	9920.000	51.79	17.60	51.79	74.00	-22.21	peak
6	9920.000	40.74	17.60	40.74	54.00	-13.26	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	8DPSK_EDR-3Mbps Low CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average		

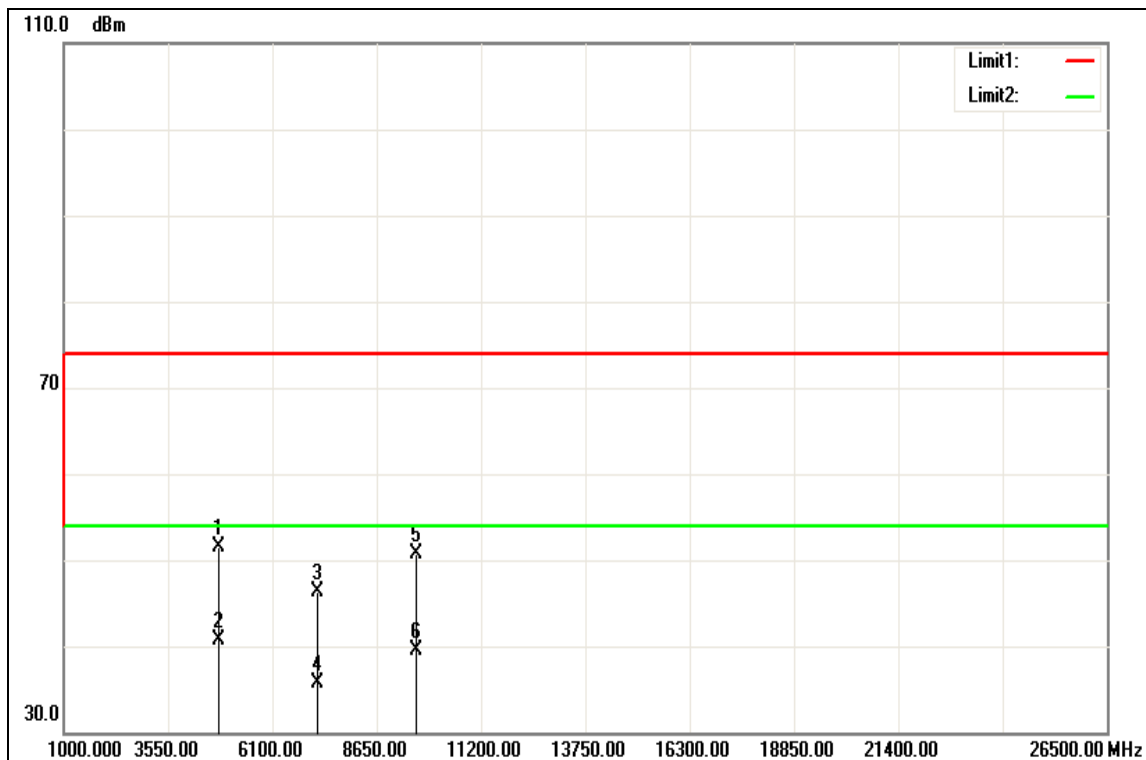


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4806.000	50.78	5.05	50.78	74.00	-23.22	peak
2	4806.000	39.67	5.05	39.67	54.00	-14.33	AVG
3	7206.000	46.29	12.62	46.29	74.00	-27.71	peak
4	7206.000	35.48	12.62	35.48	54.00	-18.52	AVG
5	9608.000	48.78	17.60	48.78	74.00	-25.22	peak
6	9608.000	37.52	17.60	37.52	54.00	-16.48	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	8DPSK_EDR-3Mbps Low CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average		

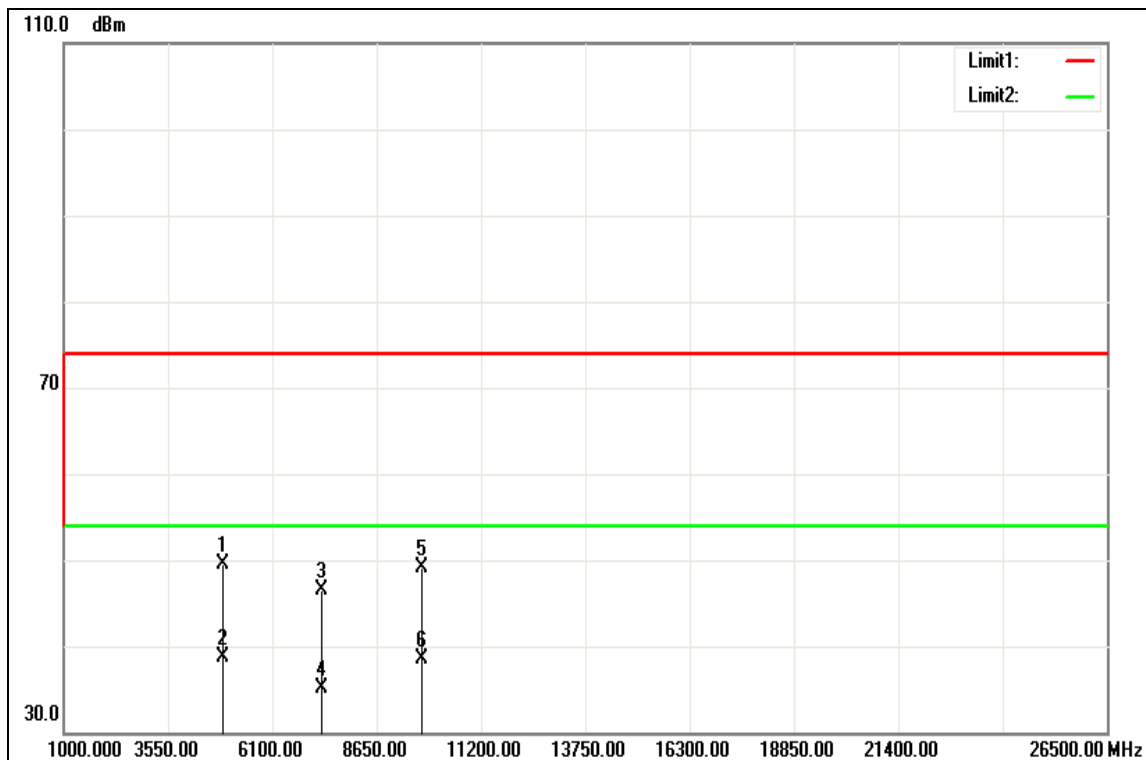


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4806.000	51.53	5.05	51.53	74.00	-22.47	peak
2	4806.000	40.79	5.05	40.79	54.00	-13.21	AVG
3	7206.000	46.38	12.62	46.38	74.00	-27.62	peak
4	7206.000	35.63	12.62	35.63	54.00	-18.37	AVG
5	9608.000	50.66	17.60	50.66	74.00	-23.34	peak
6	9608.000	39.41	17.60	39.41	54.00	-14.59	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	8DPSK_EDR-3Mbps Mid CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average		

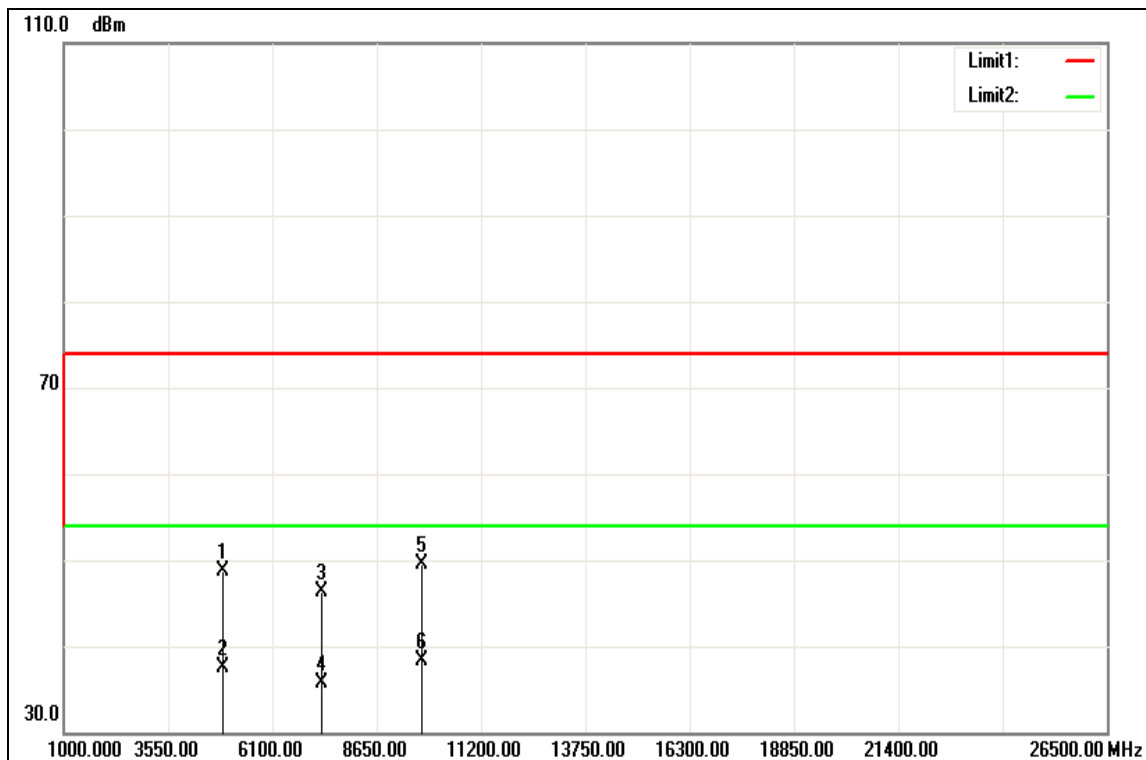


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4883.000	49.58	5.26	49.58	74.00	-24.42	peak
2	4883.000	38.66	5.26	38.66	54.00	-15.34	AVG
3	7320.000	46.49	12.97	46.49	74.00	-27.51	peak
4	7320.000	35.14	12.97	35.14	54.00	-18.86	AVG
5	9760.000	49.08	17.60	49.08	74.00	-24.92	peak
6	9760.000	38.58	17.60	38.58	54.00	-15.42	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	8DPSK_EDR-3Mbps Mid CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average		

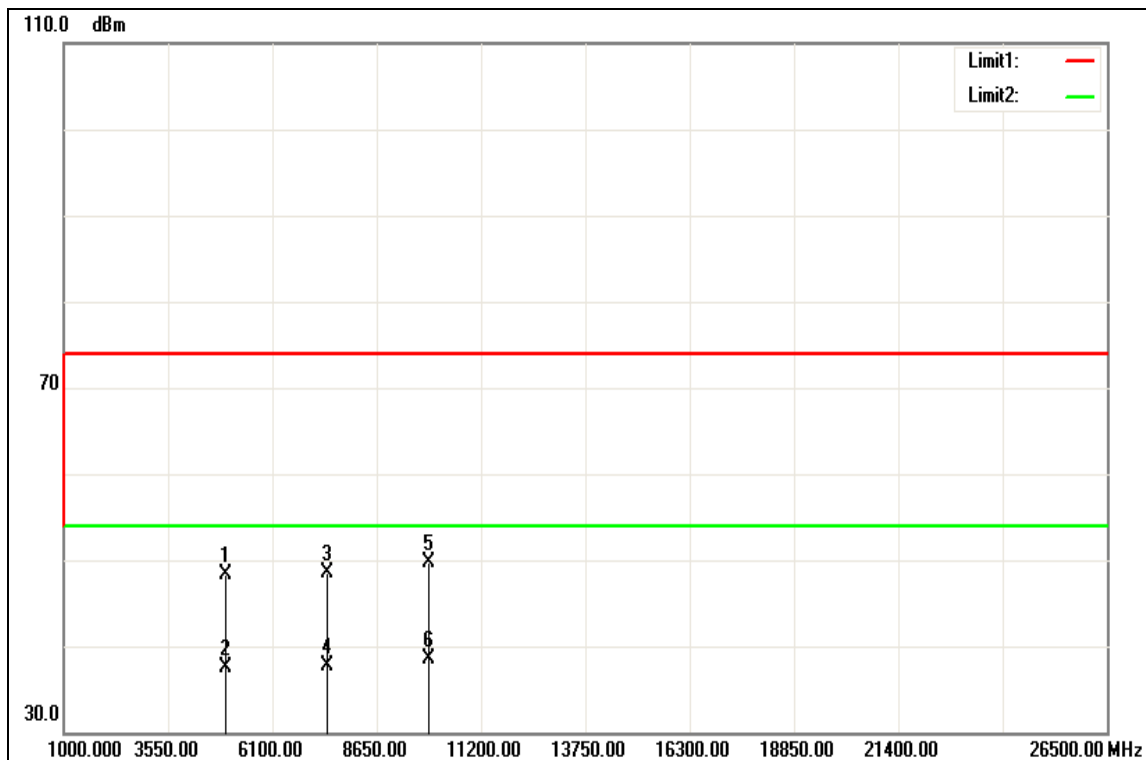


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4883.000	48.66	5.26	48.66	74.00	-25.34	peak
2	4883.000	37.48	5.26	37.48	54.00	-16.52	AVG
3	7320.000	46.22	12.97	46.22	74.00	-27.78	peak
4	7320.000	35.64	12.97	35.64	54.00	-18.36	AVG
5	9760.000	49.54	17.60	49.54	74.00	-24.46	peak
6	9760.000	38.24	17.60	38.24	54.00	-15.76	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	8DPSK_EDR-3Mbps High CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Vertical	Test Engineer	Ed Chiang
Detector	Peak and Average		

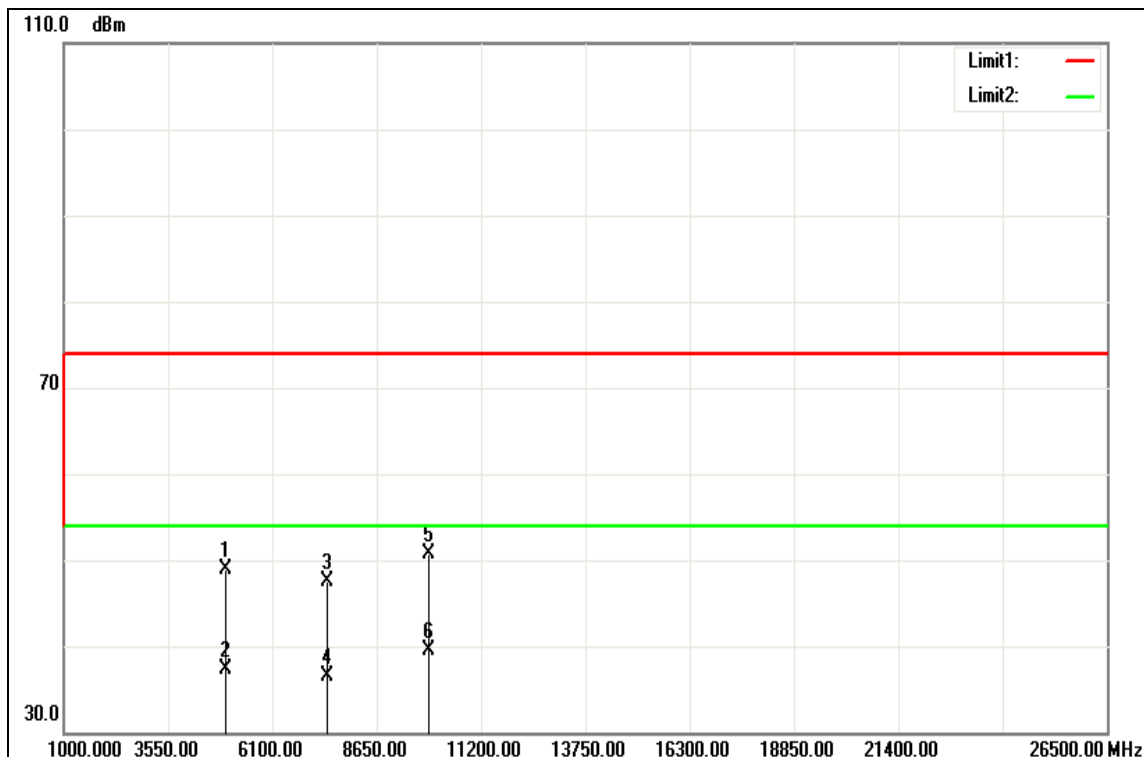


No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4960.000	48.32	5.46	48.32	74.00	-25.68	peak
2	4960.000	37.50	5.46	37.50	54.00	-16.50	AVG
3	7440.000	48.50	13.33	48.50	74.00	-25.50	peak
4	7440.000	37.62	13.33	37.62	54.00	-16.38	AVG
5	9920.000	49.69	17.60	49.69	74.00	-24.31	peak
6	9920.000	38.41	17.60	38.41	54.00	-15.59	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	8DPSK_EDR-3Mbps High CH	Temp/Hum	23.6(°C)/ 46%RH
Test Item	Harmonic	Test Date	March 27, 2017
Polarize	Horizontal	Test Engineer	Ed Chiang
Detector	Peak and Average		



No.	Frequency (MHz)	Reading (dBm)	Correct Factor(dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	4960.000	48.89	5.46	48.89	74.00	-25.11	peak
2	4960.000	37.24	5.46	37.24	54.00	-16.76	AVG
3	7440.000	47.48	13.33	47.48	74.00	-26.52	peak
4	7440.000	36.52	13.33	36.52	54.00	-17.48	AVG
5	9920.000	50.78	17.60	50.78	74.00	-23.22	peak
6	9920.000	39.48	17.60	39.48	54.00	-14.52	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit