SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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Telephone: +86 (0) 21 6191 5666
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TEST REPORT

Application No. :	SHEM120100004903
Applicant:	BLUE BAMBOO HK LIMITED
FCC ID:	UWJP200
Fundamental Carrier Frequency :	2.402GHz to 2.480GHz
Equipment Under Test (EUT):	
Product Name:	Printer
Brand Name:	BLUE BAMBOO
Model No.:	P200
Standards:	FCC PART 15 SUBPART C, Section 15.247
Date of Receipt:	Jan. 19, 2012
Date of Test:	Jan. 20, 2012 to Feb 28, 2012
Date of Issue:	Feb 29, 2012

Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 2 of this report for further detail

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Jim Xu
E&E Section Head
SGS-CSTC(Shanghai) Co., Ltd.

Neil Zhang
E&E EMC Engineer
SGS-CSTC(Shanghai) Co., Ltd.

2 Test Summary

Test items	Test Requirement	Test Procedure	Result
Antenna Requirement	Section 15.247 (c)	---	PASS
Occupied Bandwidth	Section 15.247 (a)(1)	ANSI C63.10:2009 DA 00-705	PASS
Carrier Frequencies Separated	Section 15.247(a)(1)	DA 00-705	PASS
Hopping Channel Number	Section 15.247(a)(1)(iii)	DA 00-705	PASS
Dwell Time	Section 15.247(a)(1)(iii)	DA 00-705	PASS
Maximum Peak Output Power	Section 15.247(b)(1)	ANSI C63.10:2009	PASS
Conducted Spurious Emission (30MHz to 25GHz)	Section 15.207 &15.247(d)	ANSI C63.10:2009	PASS
Radiated Spurious Emission (30MHz to 25GHz)	Section 15.209 &15.247(d)	ANSI C63.10:2009	PASS
Band Edges Measurement	Section 15.247 (d) &15.205	ANSI C63.10:2009	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant:	BLUE BAMBOO HK LIMITED
Address of Applicant:	10/F COSCO TOWER GRAND MILLENNIUM PLAZA 183 QUEEN'S RAOD CENTRAL HK
Manufacturer:	BLUE BAMBOO HK LIMITED
Address of Manufacturer:	10/F COSCO TOWER GRAND MILLENNIUM PLAZA 183 QUEEN'S RAOD CENTRAL HK

4.2 General Description of E.U.T.

Product Name	Printer
Brand Name:	BLUE BAMBOO
Model:	P200
Type of Modulation	FHSS (Frequency Hopping Spread Spectrum)
Antenna Type	Internal antenna
AC Adaptor	Model: CYSB15-090100 (Input:100-240V~ 50/60 Hz, 0.5A, Output: 9.0 VDC, 1.0A) (Cable Length:1.3m)
Battery:	Li-ion Polymer Battery Model: P200-BM2-1820 7.4V/13.468WH[1820mAH]
Bluetooth support:	V 2.1 (EDR)

4.3 Description of Support Units

The EUT has been tested independently.

4.4 Standards Applicable for Testing

The standard used were FCC PART 15 Subpart C: 2009, DA 00-705, ANSI C63.10: 2009.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
No.588 West Jindu Road, Songjiang District, Shanghai, China.201612.

Tel: +86 21 6191 5666 Fax: +86 21 6191 5655

4.6 Test Facility

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3172 and C-3514 respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.

5 Equipments Used during Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2011-6-4	2012-6-3
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2011-6-4	2012-6-3
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2011-3-12	2012-3-10
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2011-6-4	2012-6-3
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2011-10-8	2012-10-7
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY—2003P	--	2011-10-14	2012-10-15
7	CLAMP METER	FLUKE	316	86080010	2011-4-22	2012-4-20
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2011-10-14	2012-10-15
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-6-17	2012-6-16
10	DC power	KIKUSUI	PMC35—3	NF100260	2011-6-16	2012-6-15
11	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2011-5-7	2012-5-6
12	Power meter	Rohde & Schwarz	NRP	101641	2011-5-5	2012-5-4
13	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2011-6-4	2012-6-3
14	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2011-4-8	2012-4-7
15	Broadband Horn ANTENNA	SCHWARZBECK	BBHA9170	9170-373	2011-6-4	2012-6-3

6 Test Results

6.1 E.U.T. test conditions

Power supply:	Input:110-240V~ 50/60 Hz, 0.5A, Output: 9.0 VDC, 1.0A
Requirements:	15.31(e) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.
Type of antenna:	Internal antenna
Operating Environment:	
Temperature:	20.0 -25.0 °C
Humidity:	38-52 % RH
Atmospheric Pressure:	992 -1010 mbar
Test frequencies:	According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. if required. reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 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

Pursuant to Part 15.31(c) For swept frequency equipment, measurements shall be made with the frequency sweep stopped at those frequencies chosen for the measurements to be reported.

Test frequency is the lowest channel: 0 channel (2402MHz), middle channel: 39 channel (2441MHz) and highest channel: 78 channel (2480MHz) with fixed at channel.

6.2 Antenna Requirement

6.2.1 Standard requirement

15.203 requirement:

For intentional device. according to 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.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed. point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

6.2.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement. The gain of the antenna is 1 dBi.

Test result: The EUT does meet the FCC requirements.

6.3 Occupied Bandwidth

Test Requirement: FCC Part 15 C Section 247 (a)(1)

Test Method: ANSI C63.10:2009;DA 00-705

Test Date: Feb 17, 2012

Test Status: Test in fixing operating frequency at lowest, Middle, highest channel.
Modulation: GFSK, π/4DQPSK, 8DPSK

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: Span = approximately 2 to 3 times the 20dB bandwidth, centered on the hopping channel;
3. Set the spectrum analyzer: RBW >= 1% of the 20dB bandwidth (set 100kHz). VBW >= RBW. Sweep = auto; Detector Function = Peak. Trace = Max Hold.
4. Mark the peak frequency and -20dB points.

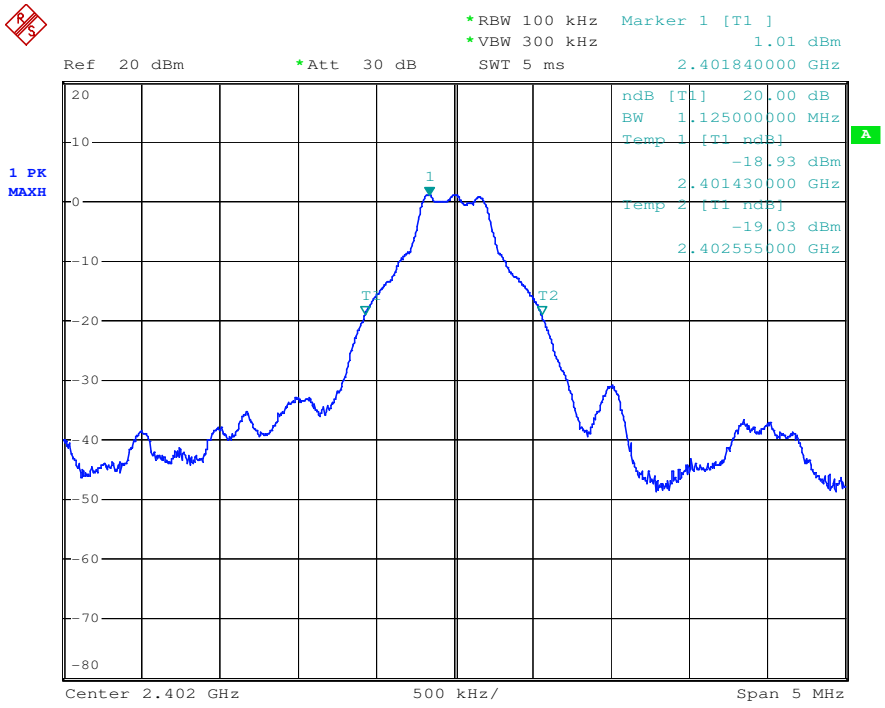
Test result: Pass

Normal mode:

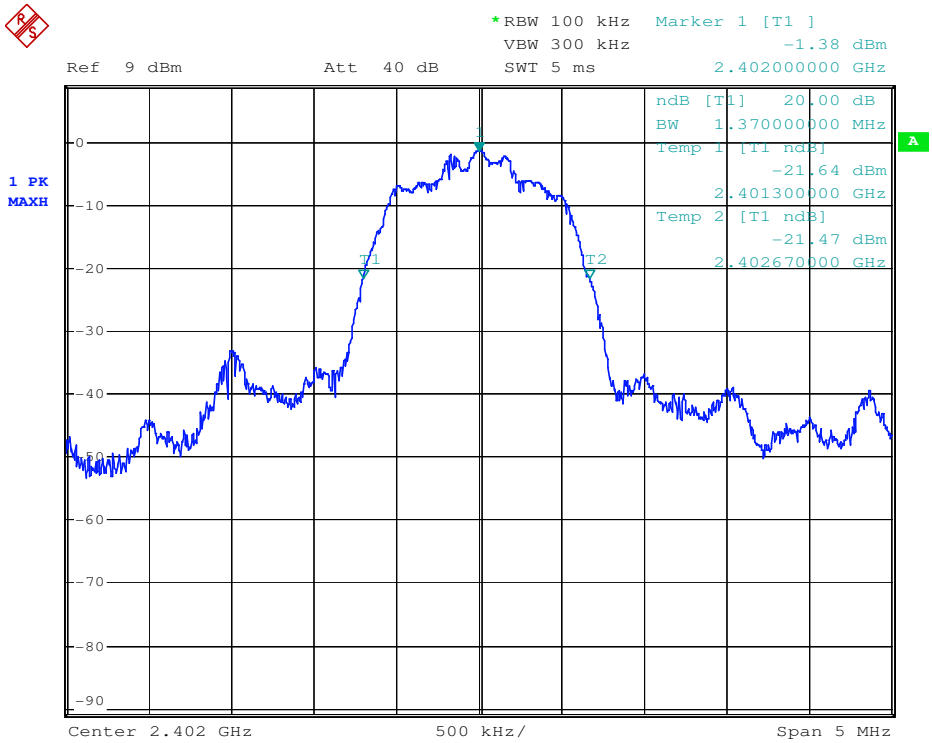
Test Channel	Modulation	Bandwidth(MHz)
Low	GFSK	1.125
	π/4DQPSK	1.370
	8-DPSK	1.380
Middle	GFSK	1.120
	π/4DQPSK	1.365
	8-DPSK	1.375
High	GFSK	1.125
	π/4DQPSK	1.360
	8-DPSK	1.385

Result plot as follows:

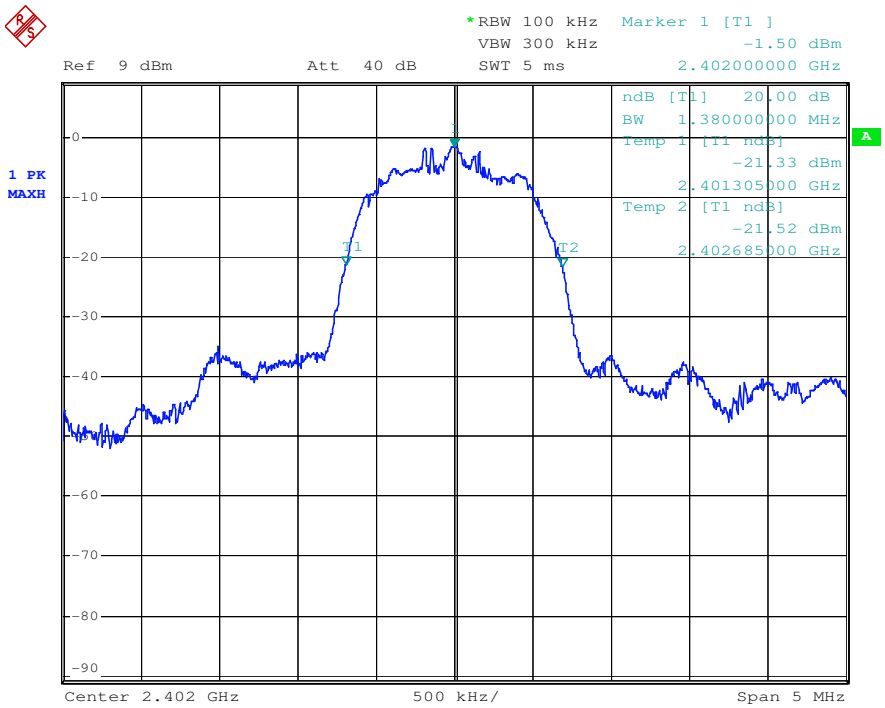
Lowest Channel – GFSK:



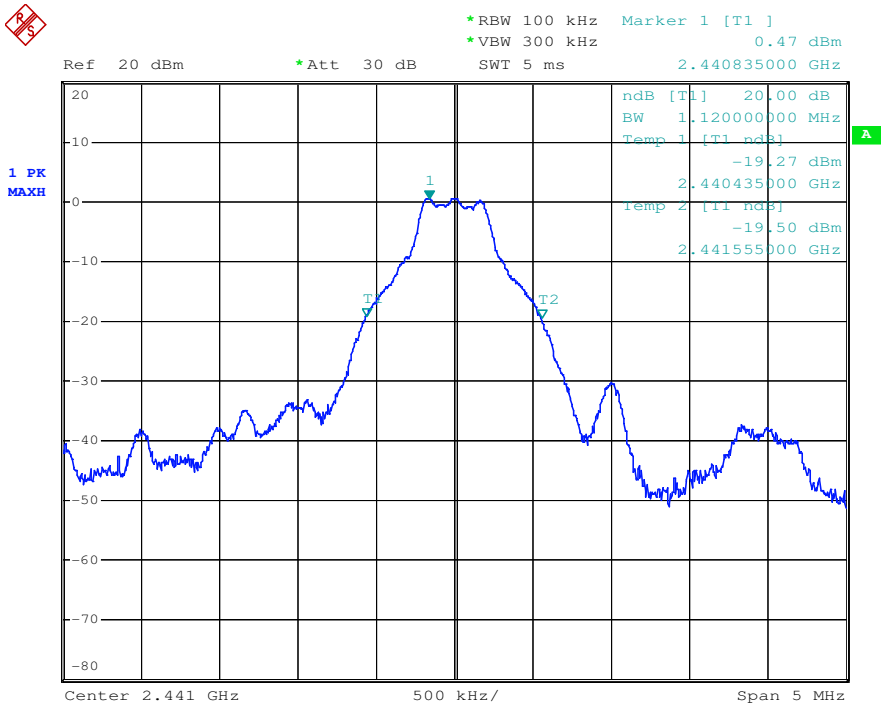
Lowest Channel –π/4-DQPSK:



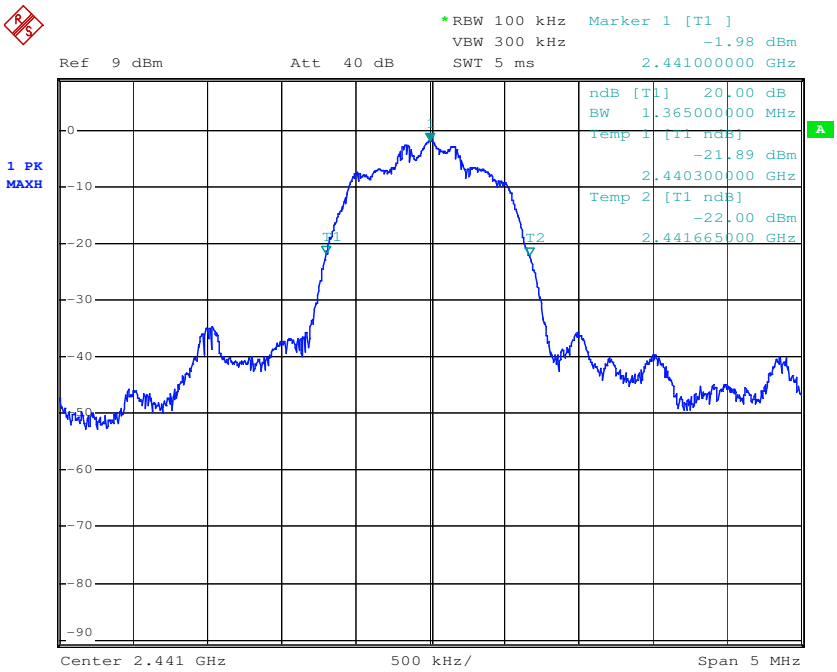
Lowest Channel – 8DPSK:



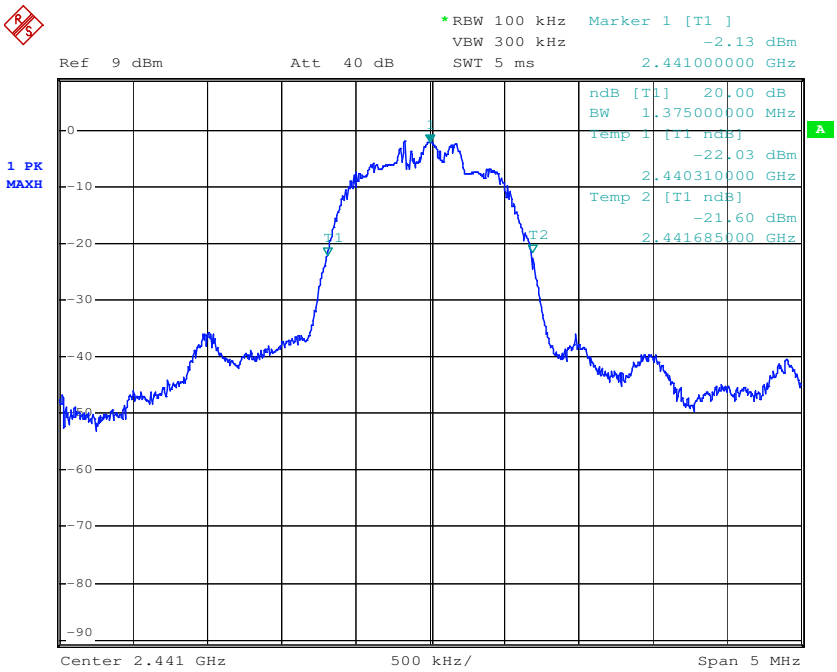
Middle Channel – GFSK:



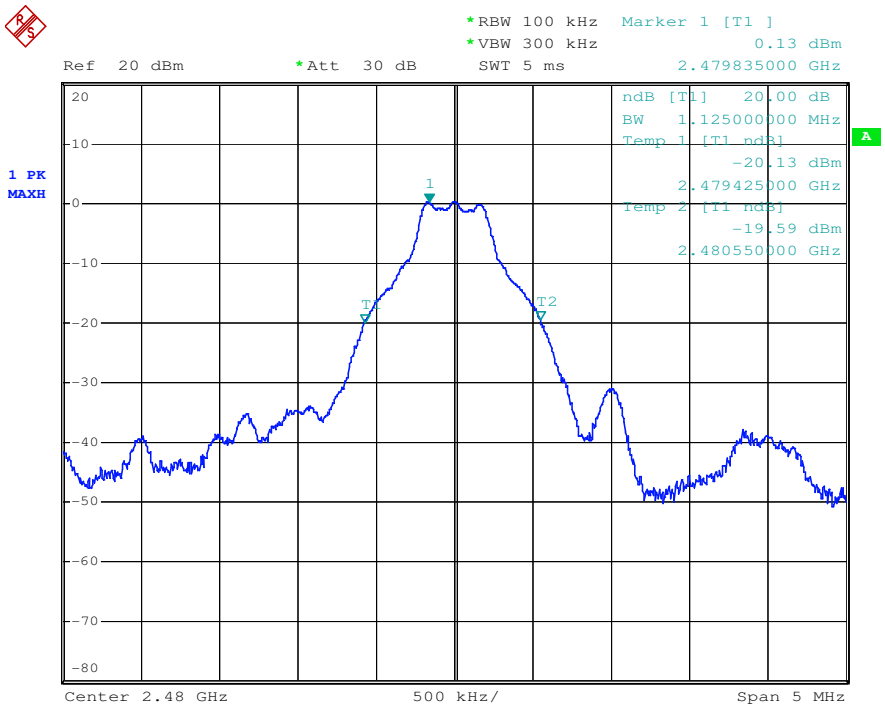
Middle Channel –π/4-DQPSK:



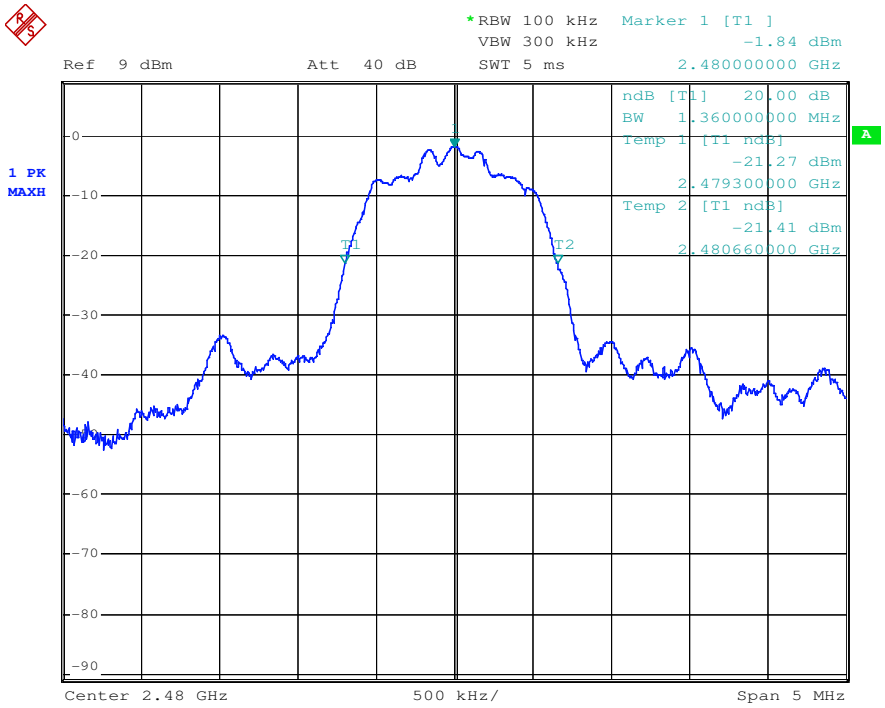
Middle Channel – 8DPSK:



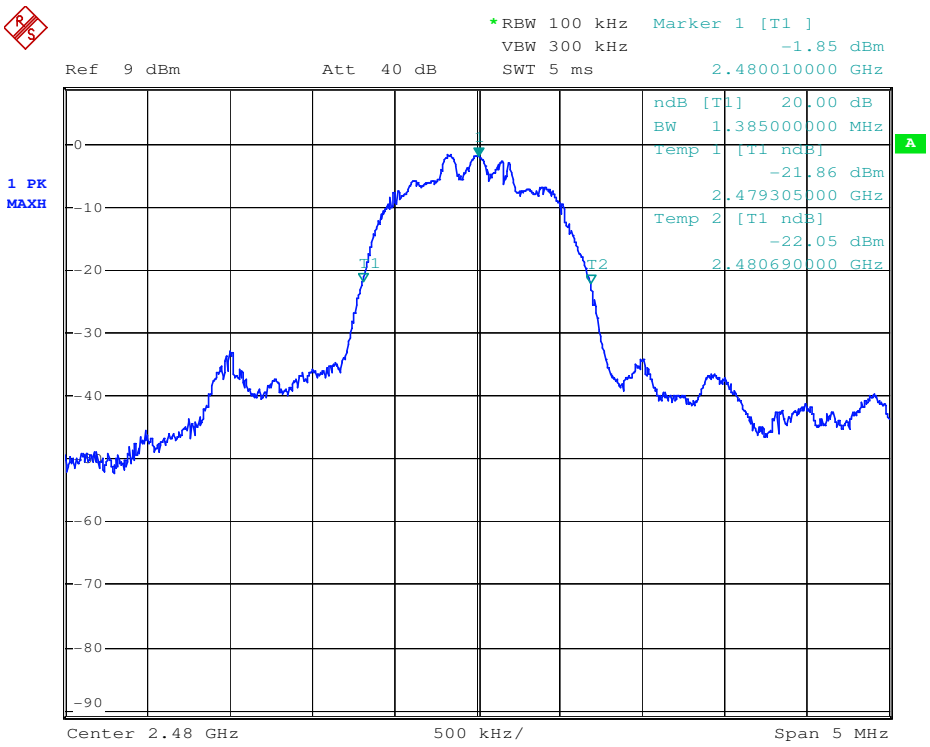
Highest Channel – GFSK:



Highest Channel –π/4-DQPSK



Highest Channel – 8DPSK:



6.4 Carrier Frequencies Separated

Test Requirement: FCC Part 15 C Section 247 (a)(1)

Test Method: Based on FCC Part15 C Section 15.247, DA 00-705

Test Date: Feb 21, 2012

Test requirements: 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 125 mW.

Test Status: Test in hopping transmitting operating mode.

Test Procedure:

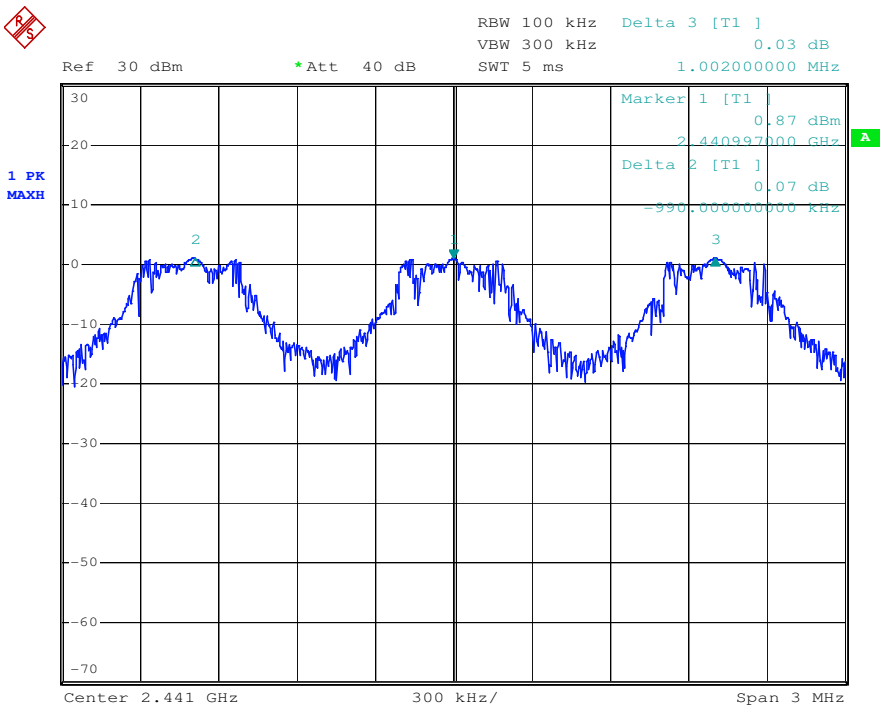
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW >= 1% of the span (set 100 kHz). VBW >= RBW , Span = 5MHz. Sweep = auto; Detector Function = Peak. Trace = Max,hold.
3. Allow the trace to stabilize. Use the marker-delta 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.

Test result: Pass

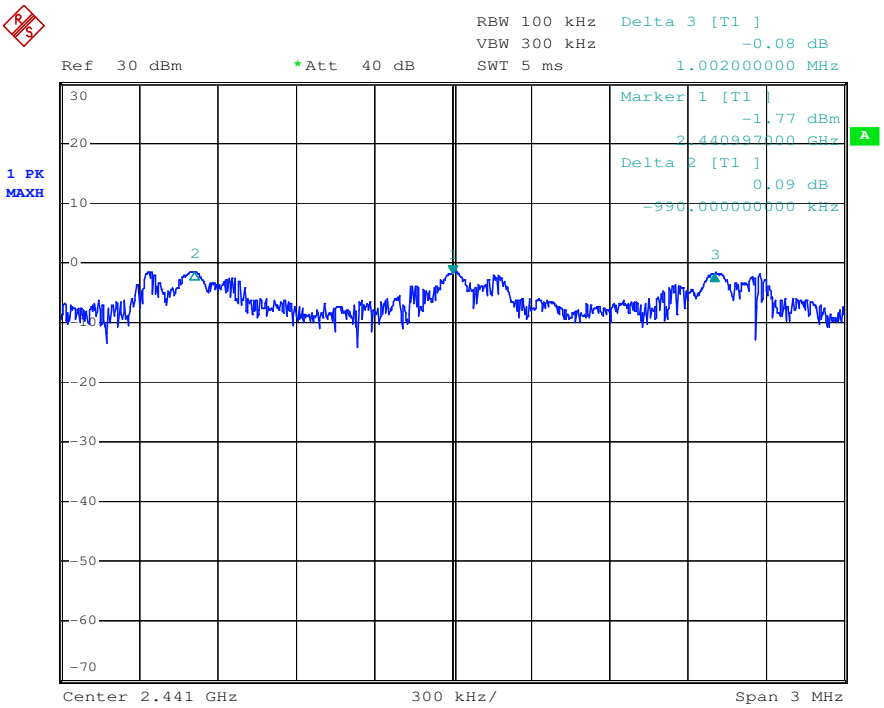
Modulation	Carrier Frequencies Separated	PASS/FAIL
GFSK (channel 39 and channel 40)	0.99MHz	PASS
π/4-DQPSK (channel 39 and channel 40)	0.99MHz	PASS
8DPSK (channel 39 and channel 40)	0.99MHz	PASS

Result plot as follows:

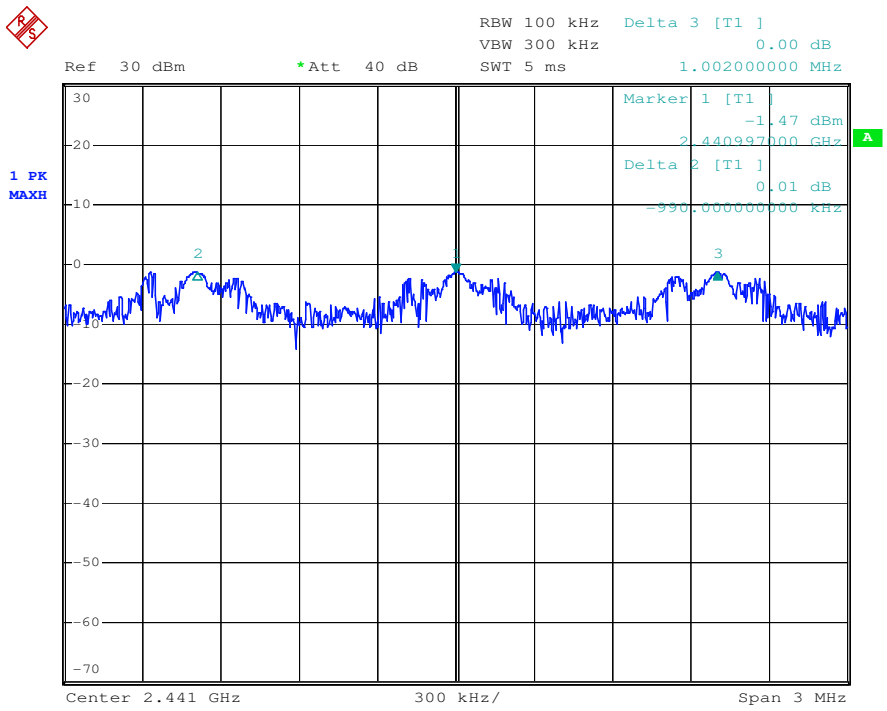
GFSK model Carrier Frequencies Separated



π/4-DQPSK model Carrier Frequencies Separated



8DPSK model Carrier Frequencies Separated



Test result: The EUT does meet the FCC requirements.

6.5 Hopping Channel Number

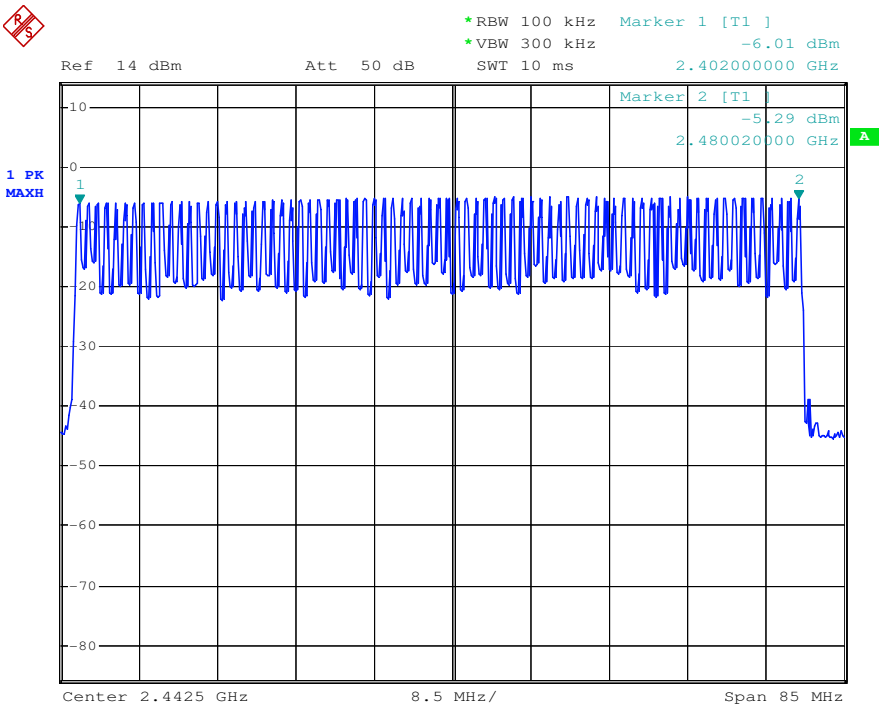
Test Requirement:	FCC Part 15 C Section 247 (a)(1)(iii)
Test Method:	Based on FCC Part15 C Section 15.247, DA 00-705
Test Date:	Feb 20, 2012
Requirements:	Regulation 15.247 (a) (1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
Test Status:	Test in hopping transmitting operating mode.

Test Procedure:

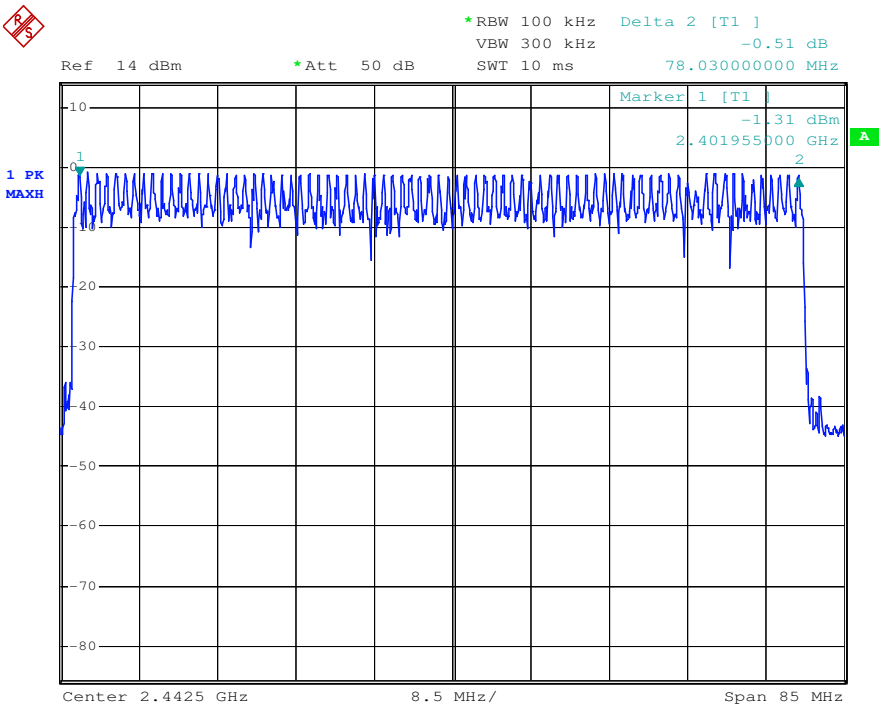
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100 kHz. VBW = 300 kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up 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: start frequency = 2400MHz. stop frequency = 2483.5MHz. Submit the test result graph.

Test result: Total channels are 79 channels. The EUT does meet the FCC requirements.

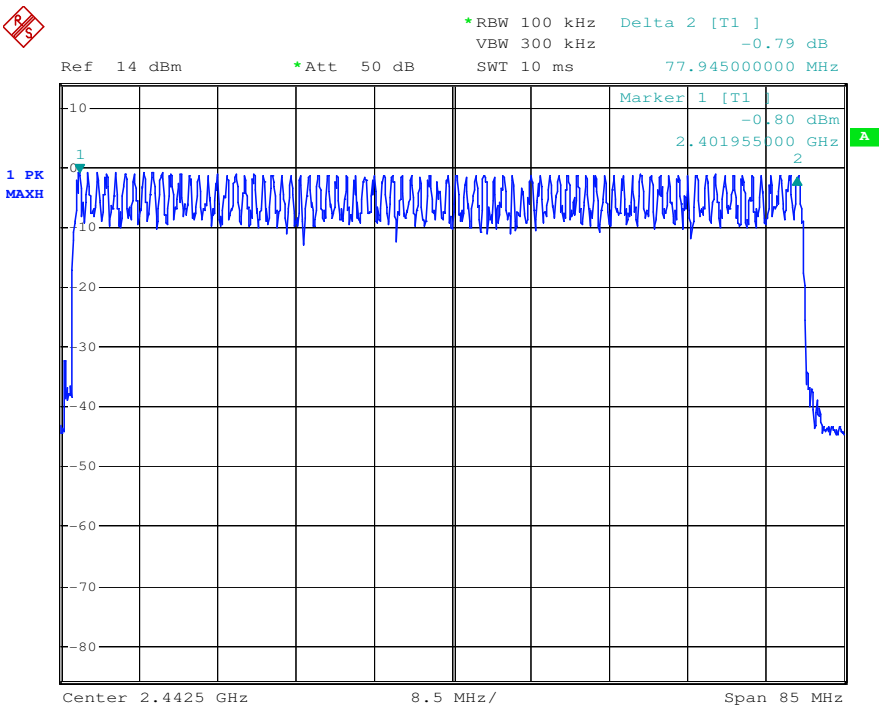
GFSK model Channel Number:



π/4DQPSK model Channel Number:



8-DPSK model Channel Number:



6.6 Dwell Time

Test Requirement: FCC Part 15 C Section 247 (a)(1)(iii)

Test Method: Based on FCC Part15 C Section 15.247, DA 00-705

Test Date: Feb 21, 2012

Test requirements: 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 Status: The test in all transmitting operating mode with DH1, DH3 and DH5 packet.

Test Procedure:

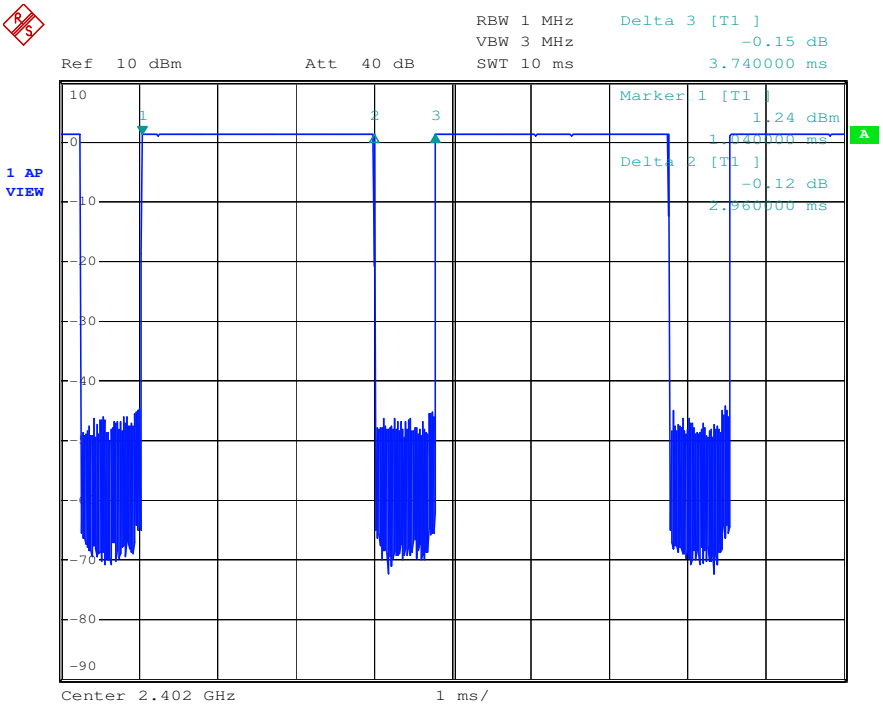
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0. centered on a hopping channel;
3. Use Emission width / No. of Hopping Channels in 31.6s to determine the dwell time.

Freqency (MHz)	Modulation	Emission Width (ms)	Number of Hopping Channel in 31.6s	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2402	GFSK	2.96	94	0.28	0.4	0.12	Pass
2402	π/4DQPSK	1.76	94	0.17	0.4	0.23	Pass
2402	8-DPSK	2.97	94	0.28	0.4	0.12	Pass
2441	GFSK	2.98	91	0.27	0.4	0.13	Pass
2441	π/4DQPSK	1.76	91	0.16	0.4	0.24	Pass
2441	8-DPSK	2.97	91	0.27	0.4	0.13	Pass
2480	GFSK	2.98	94	0.28	0.4	0.12	Pass
2480	π/4DQPSK	1.78	94	0.17	0.4	0.23	Pass
2480	8-DPSK	2.99	94	0.28	0.4	0.12	Pass

DH5 is the worst case. Below show the worst case plots:

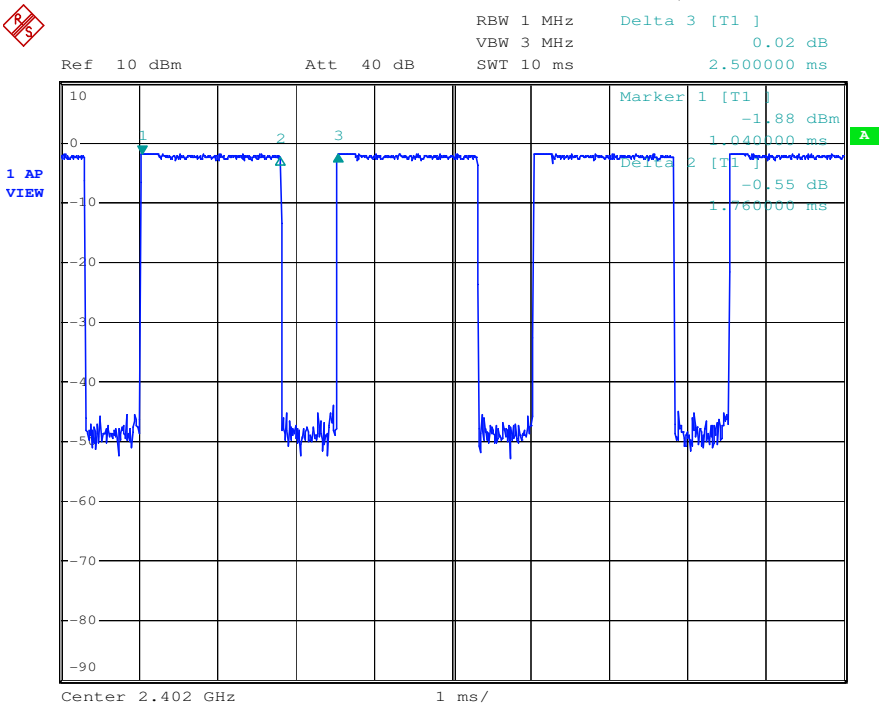
Channel: 2402MHz

Modulation: GFSK



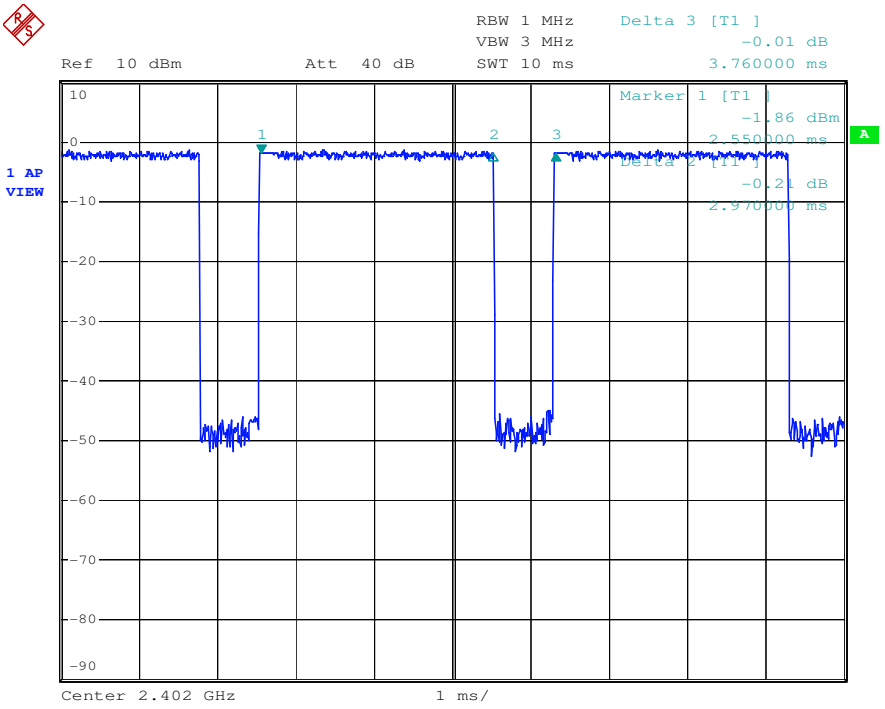
Channel: 2402MHz

Modulation: π/4DQPSK

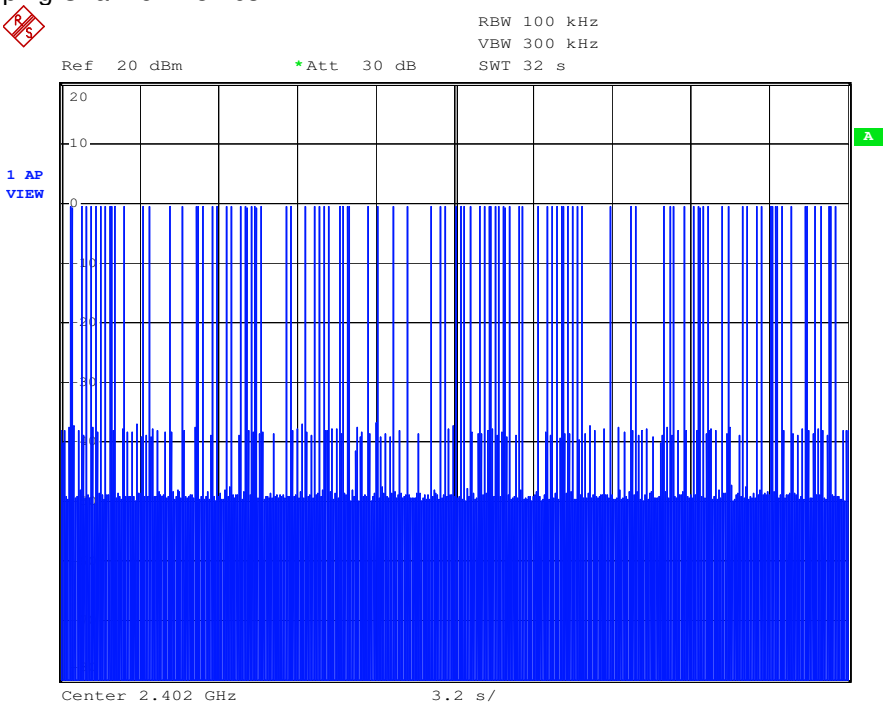


Channel: 2402MHz

Modulation: 8-DPSK

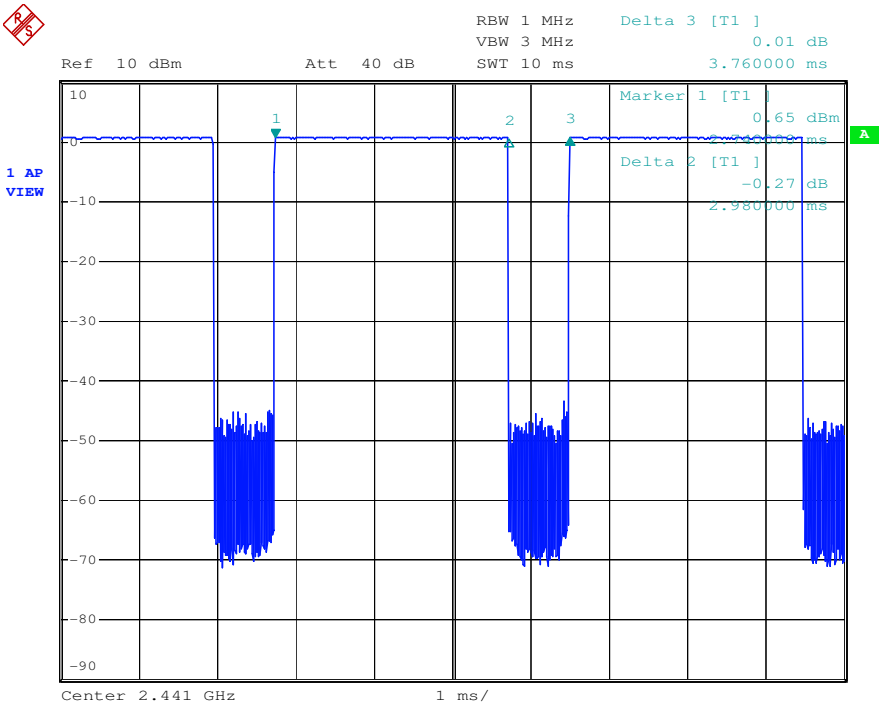


Number of Hopping Channel in 31.6s



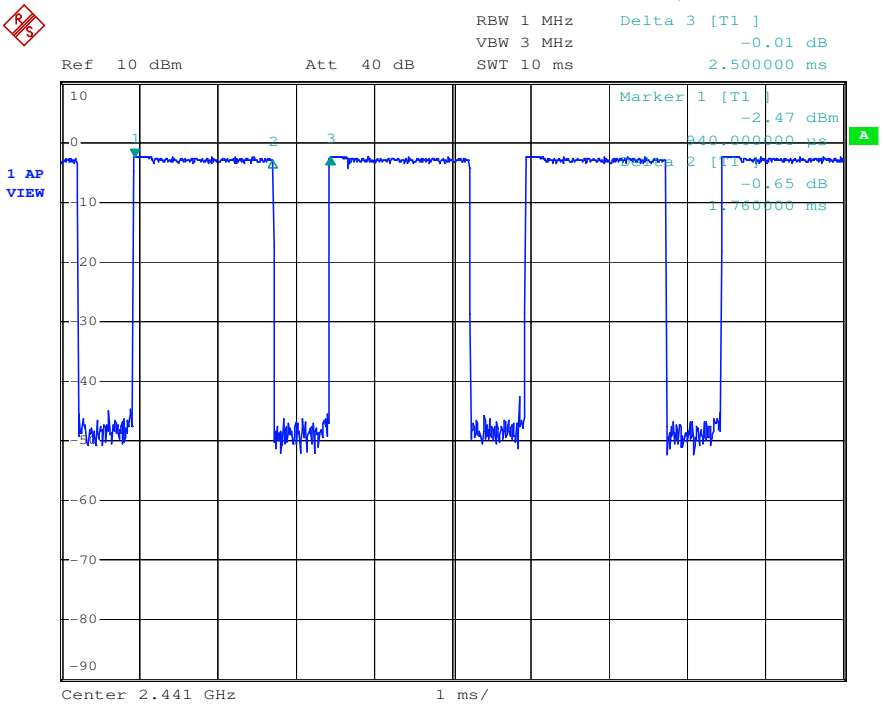
Channel: 2441MHz

Modulation: GFSK



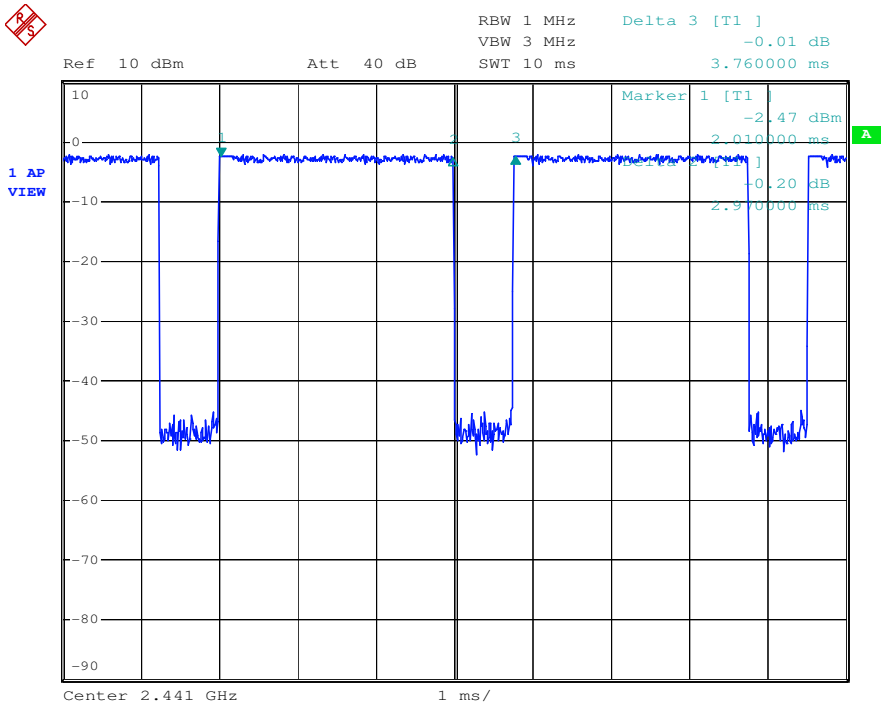
Channel: 2441MHz

Modulation: π/4DQPSK

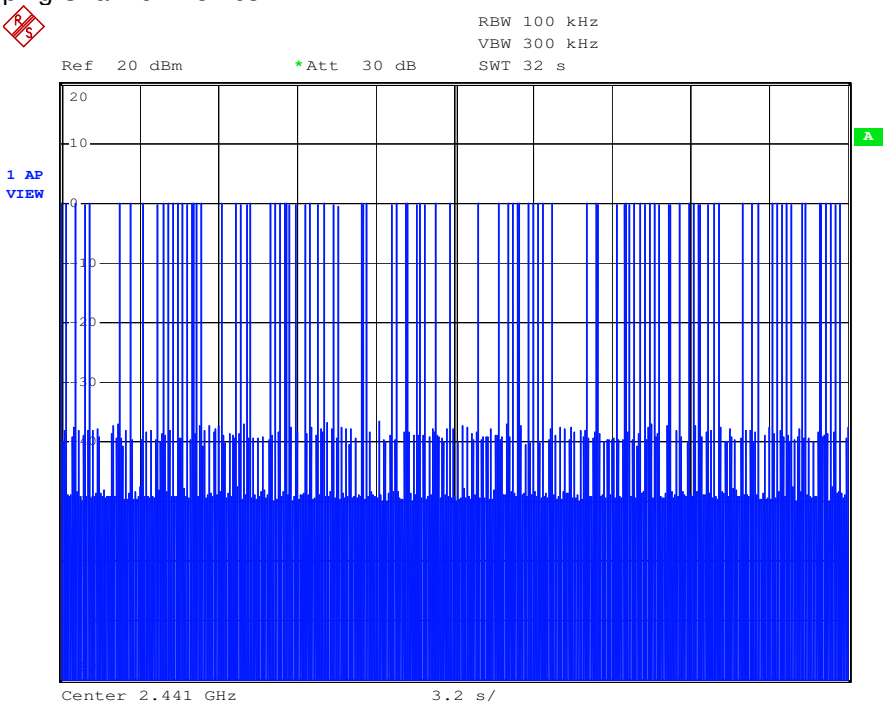


Channel: 2441MHz

Modulation: 8-DPSK

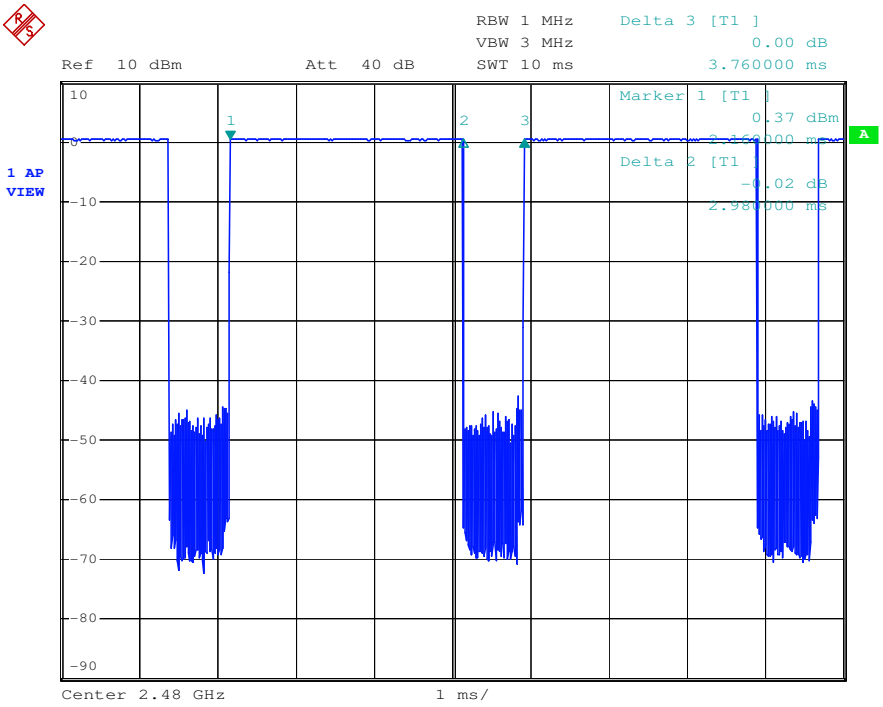


Number of Hopping Channel in 31.6s



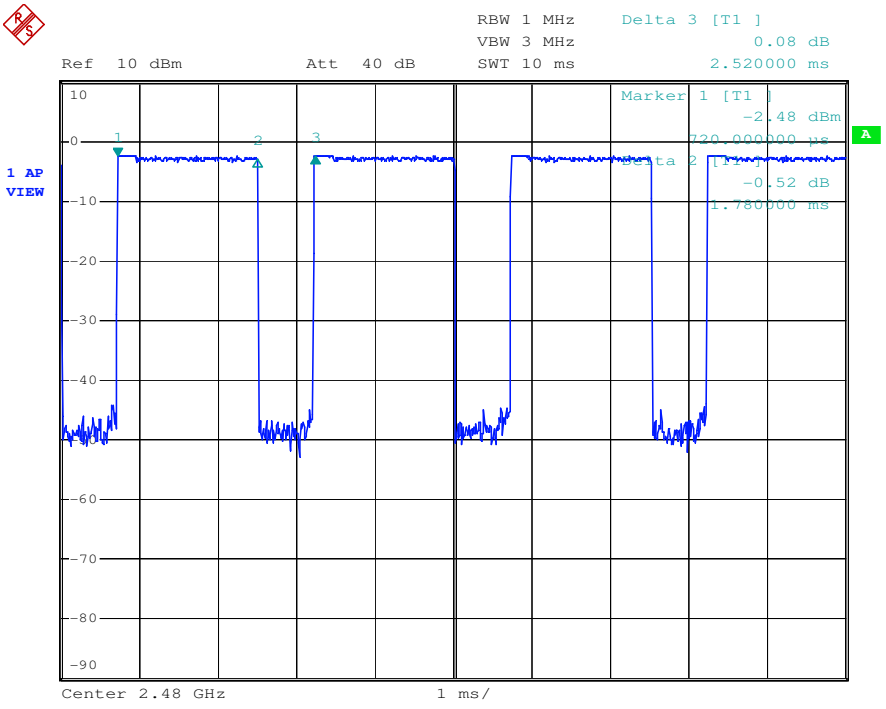
Channel: 2480MHz

Modulation: GFSK



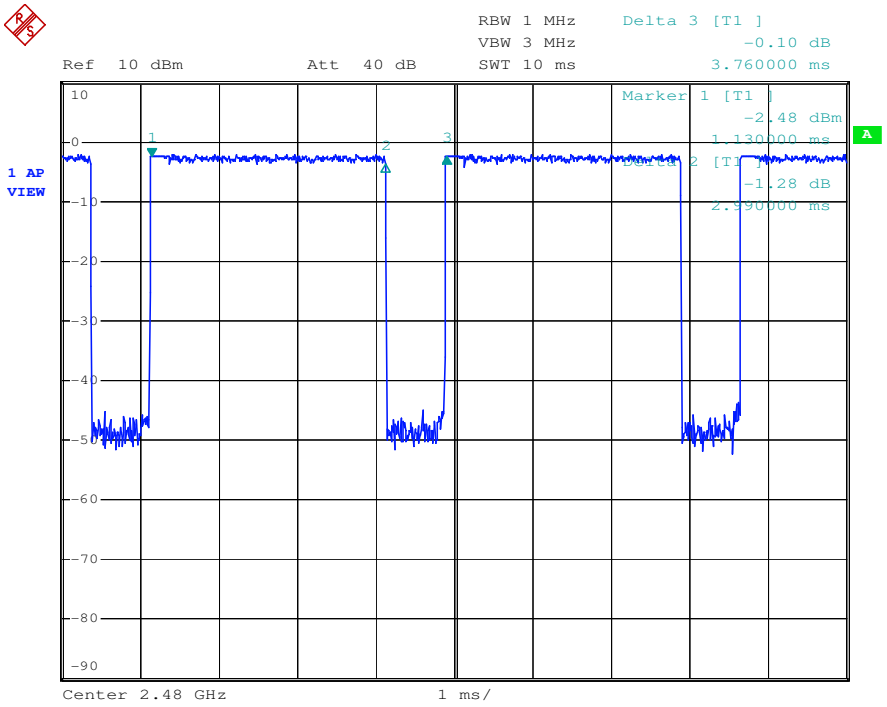
Channel: 2480MHz

Modulation: π/4DQPSK

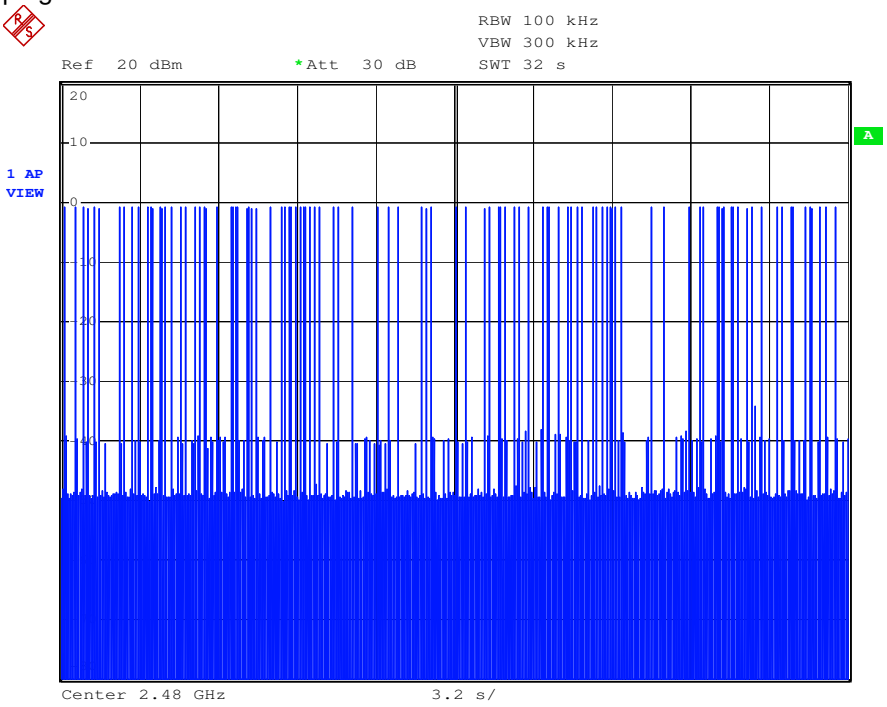


Channel: 2480MHz

Modulation: 8-DPSK



Number of Hopping Channel in 31.6s



6.7 Maximum Peak Output Power

Test Requirement: FCC Part 15 C Section 247 (b)(1)

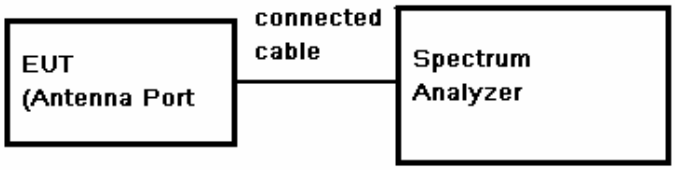
Test Method: ANSI C63.10:2009

Test Date: Feb 29, 2012

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 "Hopping channel number" of this document. The 1 watt (30.0dBm) limit applies.

Test mode: Test in fixing frequency transmitting mode.

Test Configuration:



Test Procedure:
a) Measure the EUT 6dB bandwidth of the emission. Reference section 6.3 6dB bandwidth results.
b) When the analyzer RBW is not large enough, the analyzer band power function can be used,
c) Set the RBW=3MHz, VBW=3MHz, band limits granter than 26dB bandwidth.
d) Turn averaging off, set sweep to automatic, the span just large enough to capture the emission.
e) Use peak detector on max hold. Record the measured channel power.

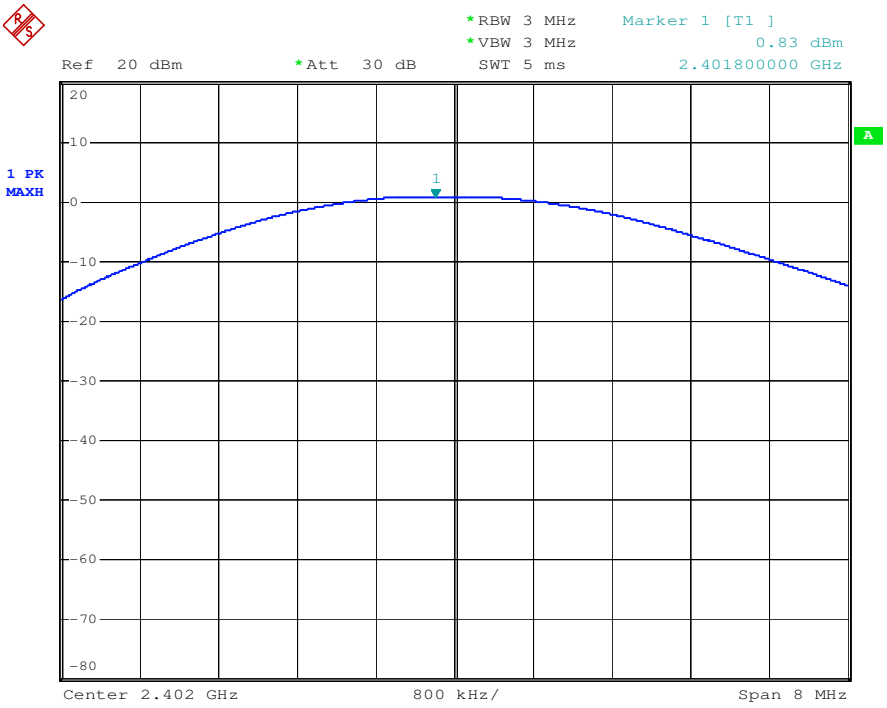
Test Result: Pass

Test Channel	Modulation	Fundamental Frequency (GHz)	Reading Power (dBm)	Cable Loss (dB)	Output Power		Limit (dBm)
					(dBm)	(mW)	
Lowest	GFSK	2.402	0.83	0.6	1.43	1.39	30
	π/4-DQPSK		-1.14	0.6	-0.54	0.88	30
	8DPSK		-0.94	0.6	-0.34	0.92	30
Middle	GFSK	2.441	0.29	0.6	0.89	1.23	30
	π/4-DQPSK		-1.73	0.6	-1.13	0.77	30
	8DPSK		-1.49	0.6	-0.89	0.81	30

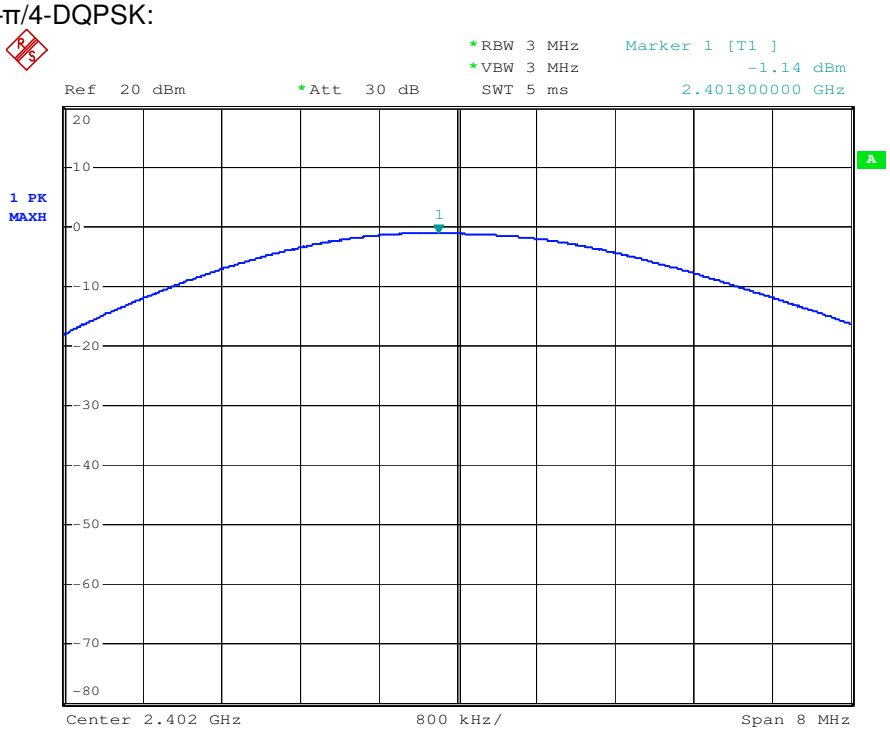
Highest	GFSK	2.480	-0.04	0.6	0.56	1.14	30
	π/4-DQPSK		-1.75	0.6	-1.15	0.77	30
	8DPSK		-1.51	0.6	-0.91	0.81	30

Test result plot as follows:

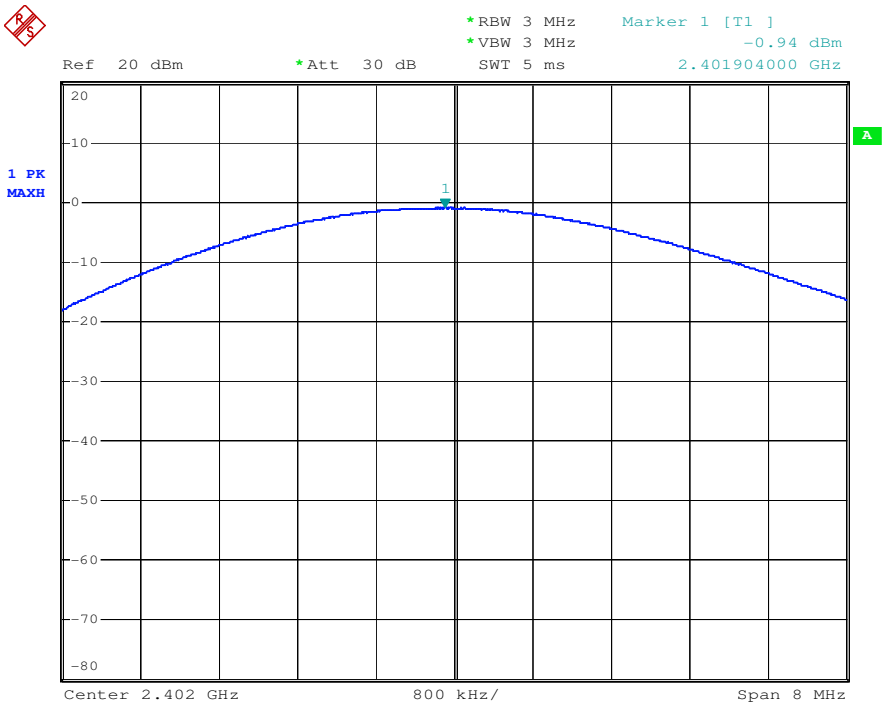
Low Channel – GFSK-DH1:



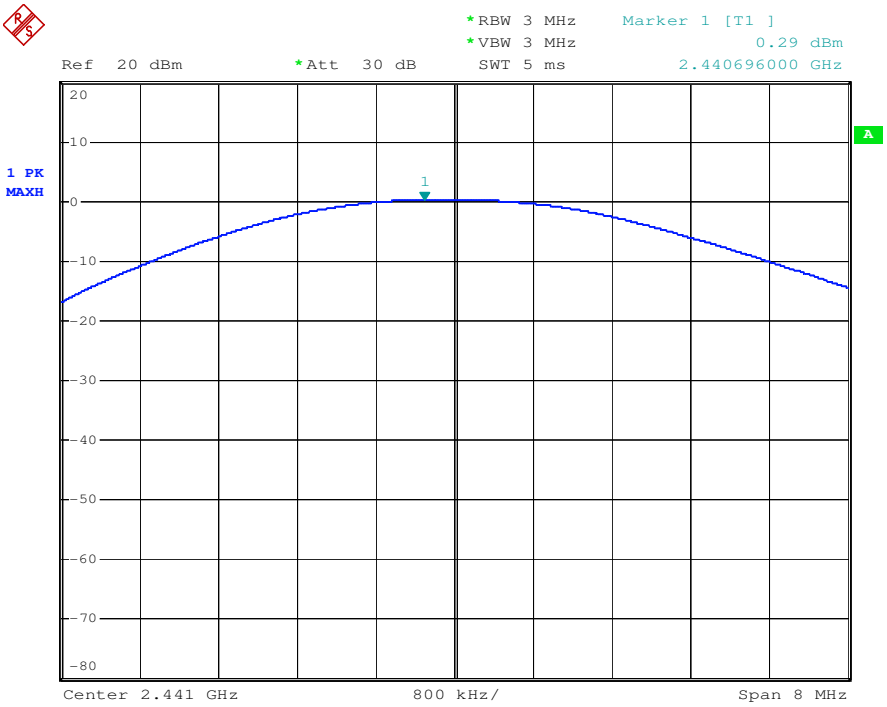
Low Channel –π/4-DQPSK:



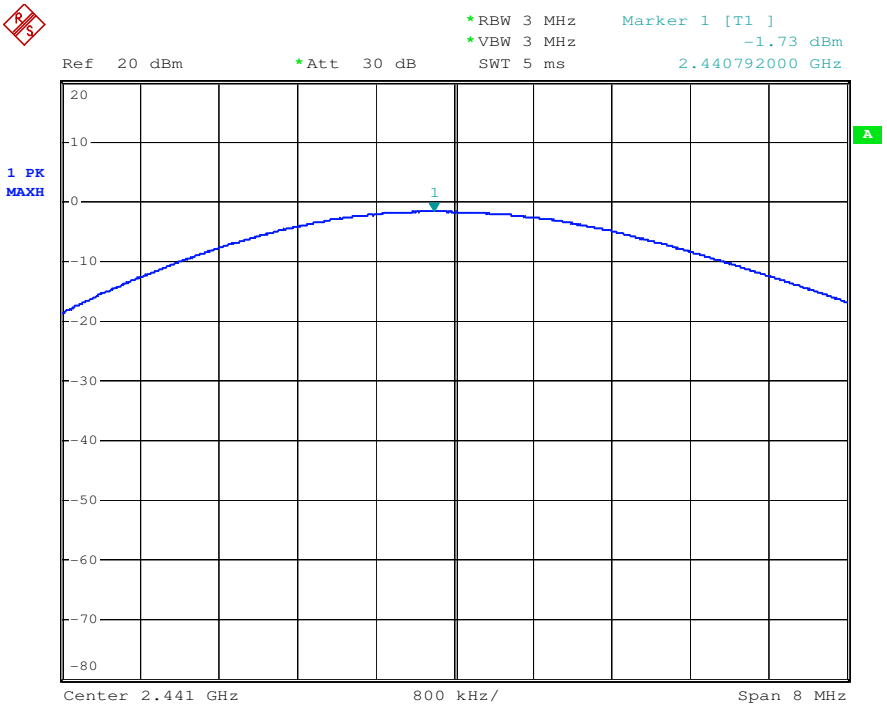
Low Channel – 8DPSK:



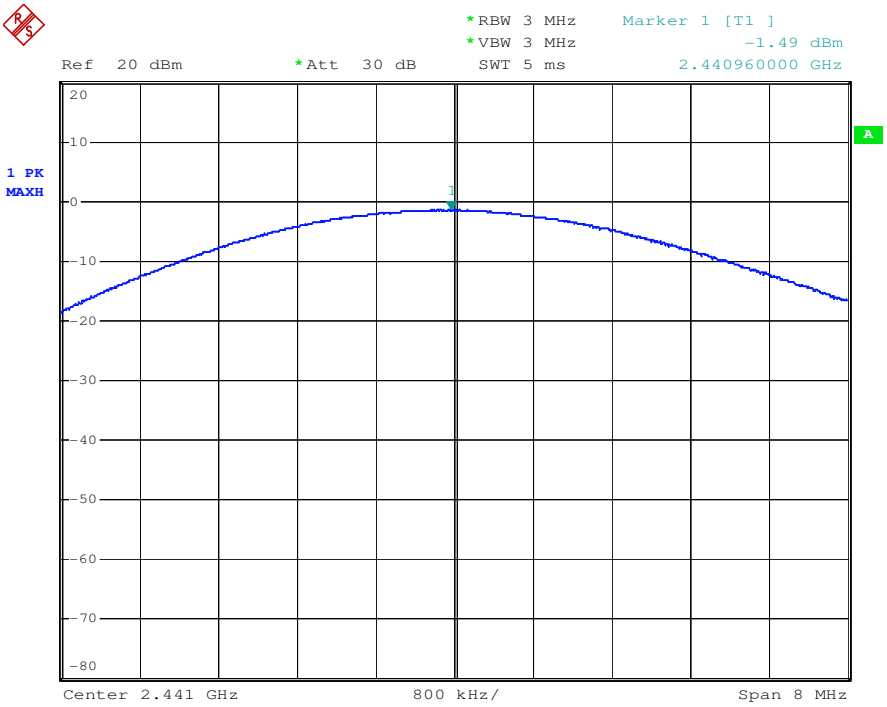
Mid Channel – GFSK:



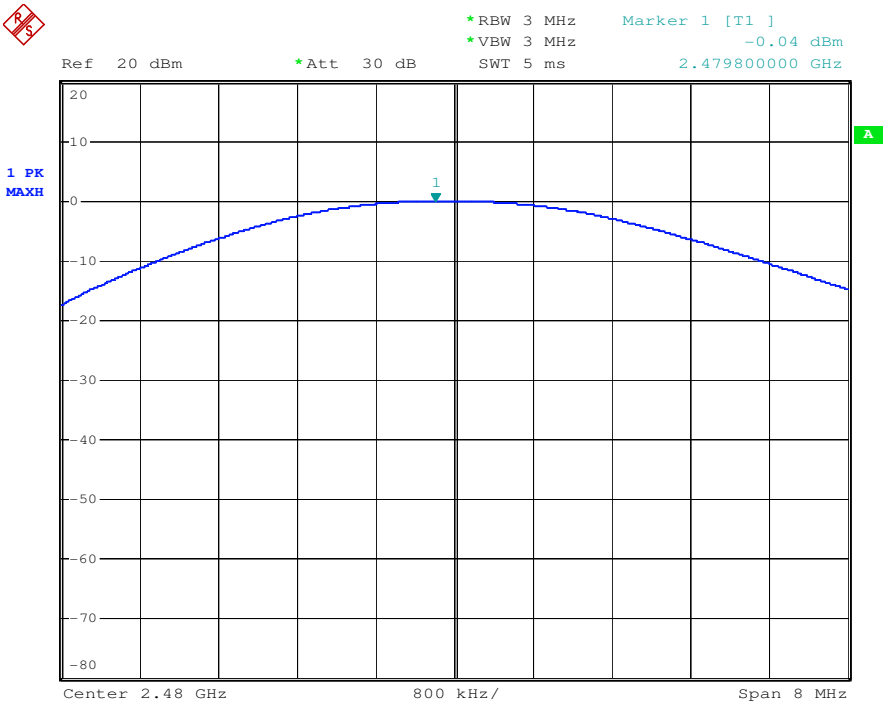
Mid Channel –π/4-DQPSK



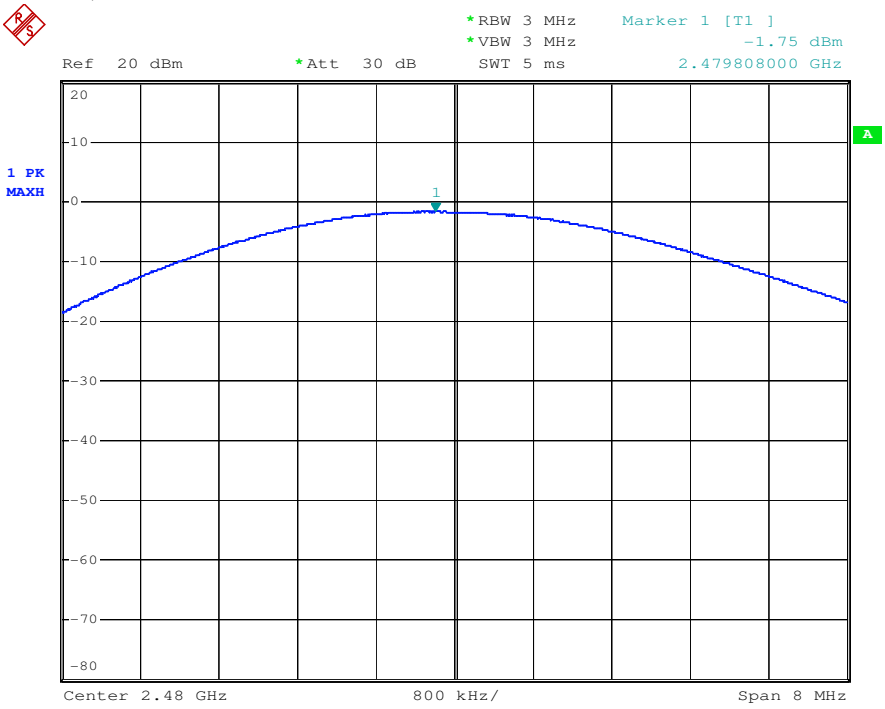
Mid Channel – 8DPSK:



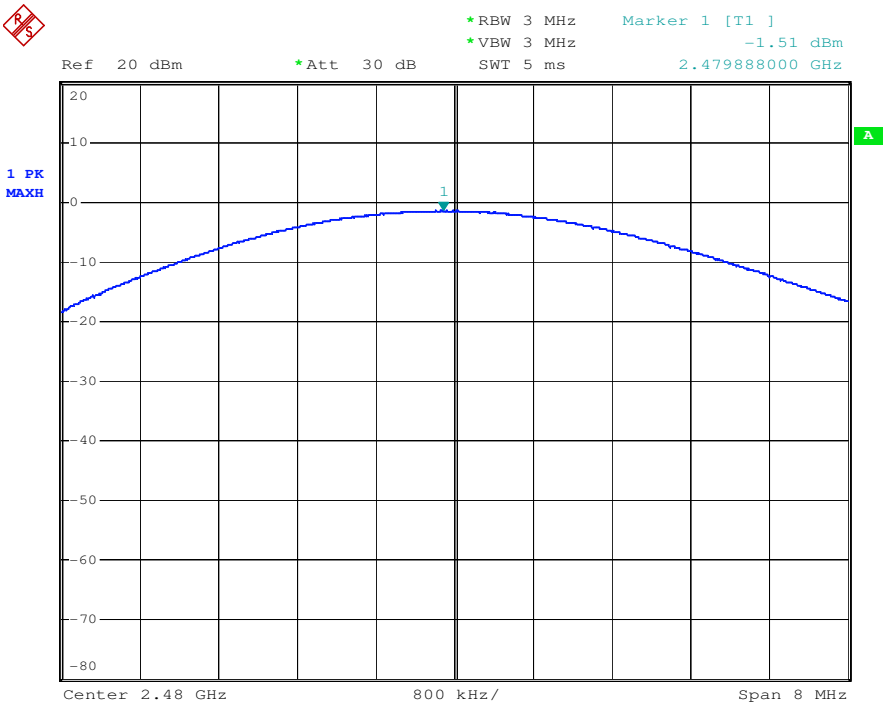
High Channel – GFSK:



High Channel –π/4-DQPSK



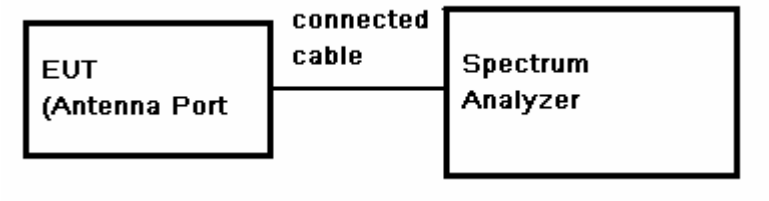
High Channel – 8DPSK:



6.8 Conducted Spurious Emissions

Test Requirement:	FCC Part 15 C Section 247 (d) & FCC Part 15 Section 207
Test Method:	ANSI 63.10: 2009.
Test Date:	Feb 21, 2012
Test requirements:	(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 conducted or a radiated measurement. provided the transmitter demonstrates compliance with the peak conducted power limits.
Test Status:	Test the lowest. Middle, highest channel under GFSK, π/4-DQPSK and 8DPSK.

Test Configuration:



Test Procedure:

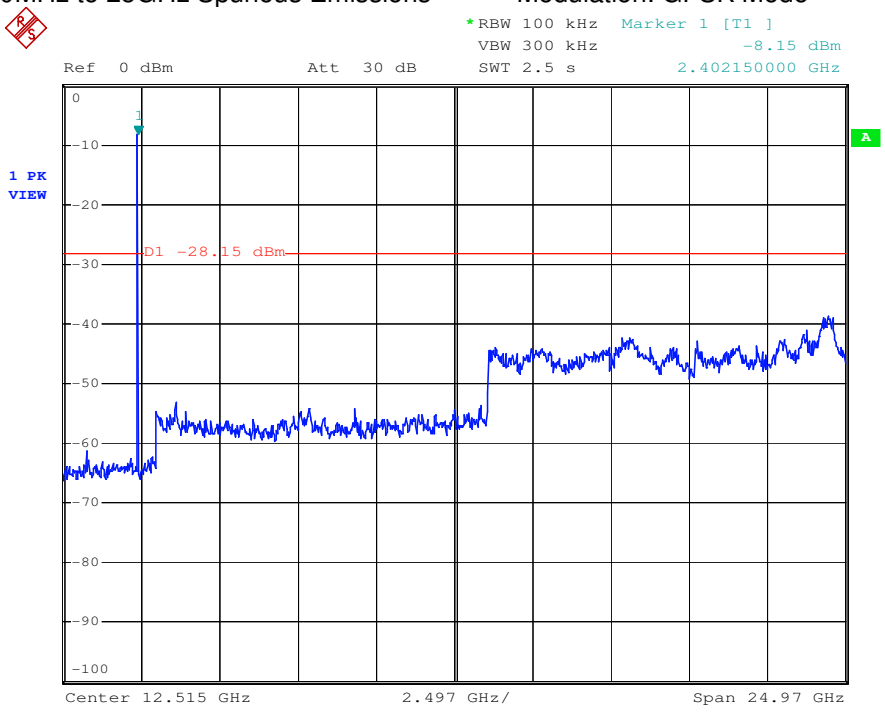
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100KHz. VBW >= RBW. Sweep = auto; Detector Function = Peak (Max. hold).

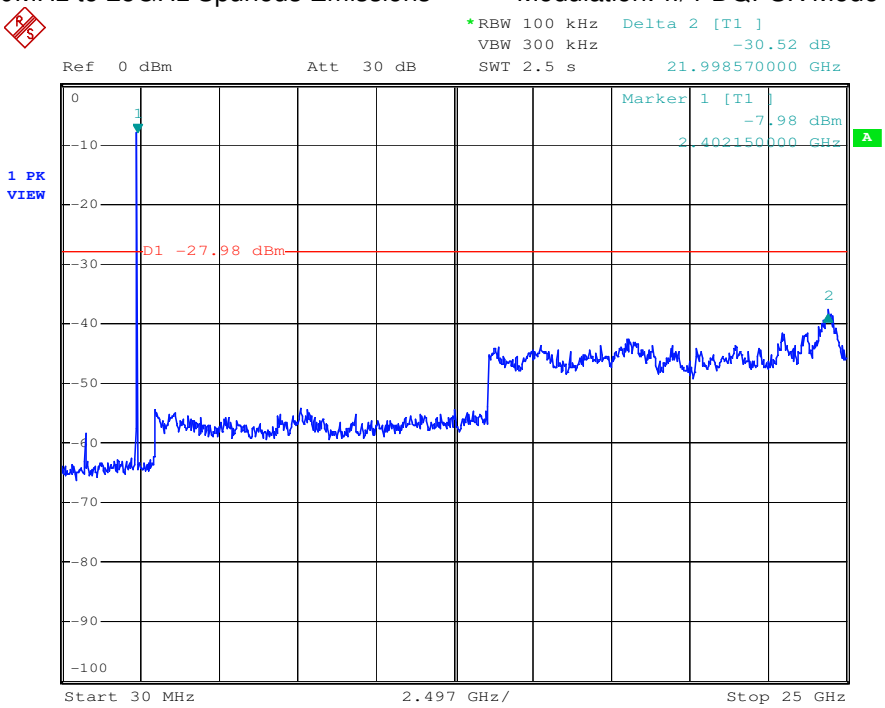
Test Results: The EUT does meet the FCC requirements.

Test result plots as follows:

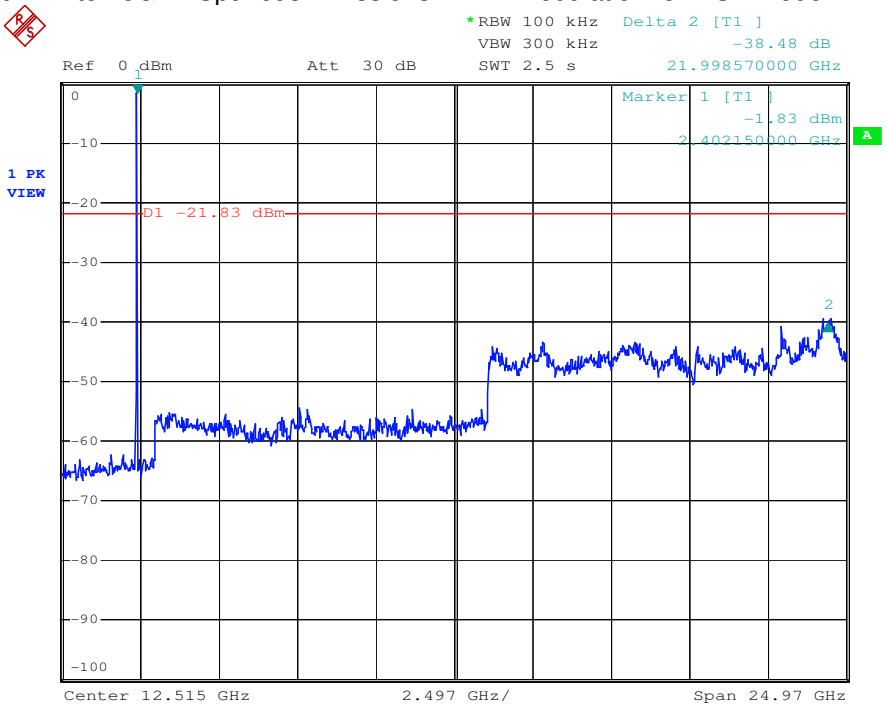
Low Channel 30MHz to 25GHz Spurious Emissions Modulation: GFSK Mode



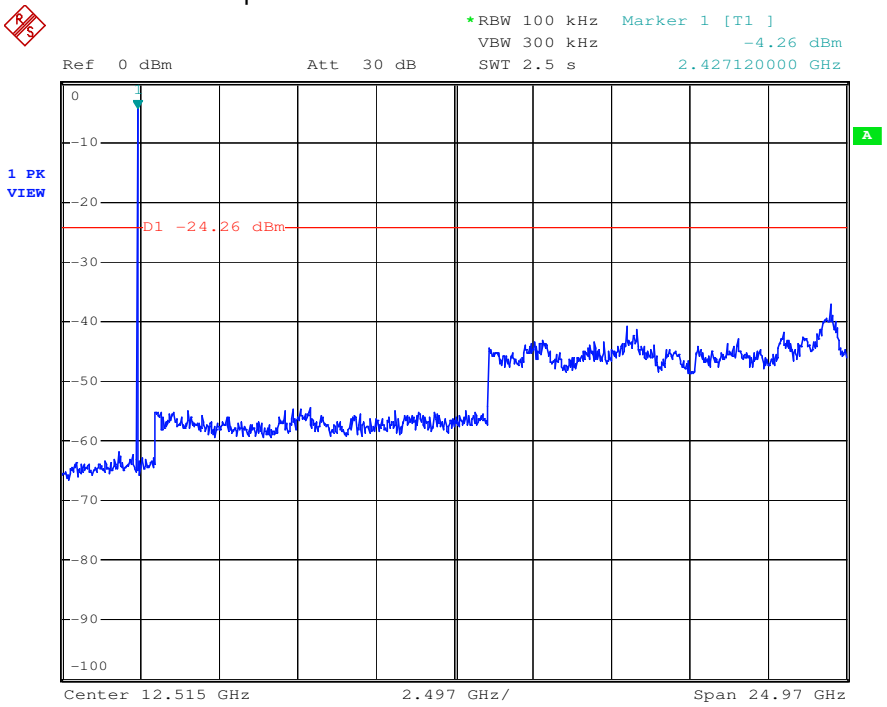
Low Channel 30MHz to 25GHz Spurious Emissions Modulation: π/4-DQPSK Mode



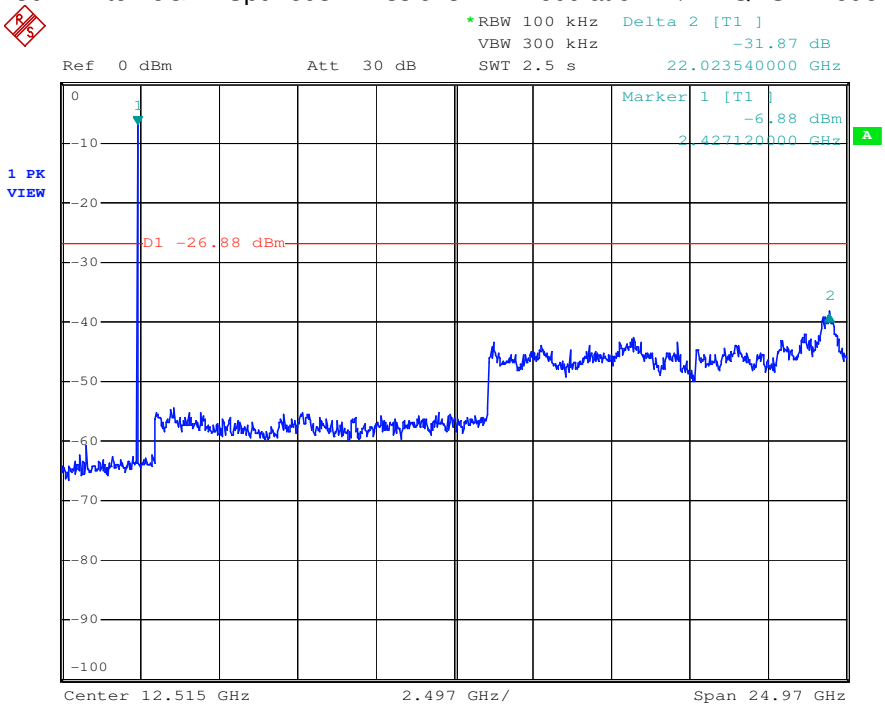
Low Channel 30MHz to 25GHz Spurious Emissions Modulation: 8DPSK Mode



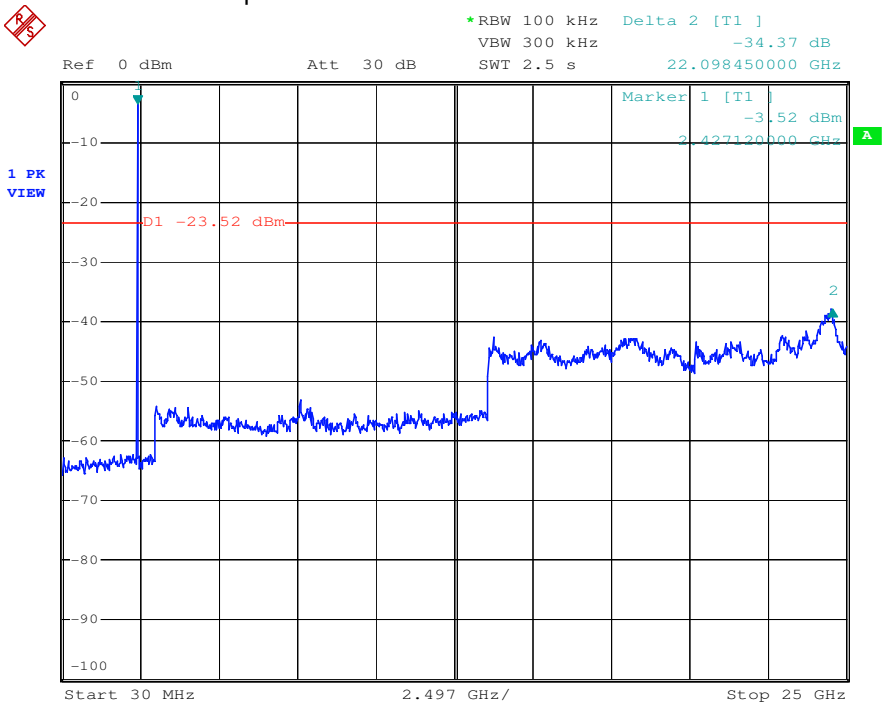
Middle Channel 30MHz to 25GHz Spurious Emissions Modulation: GFSK Mode



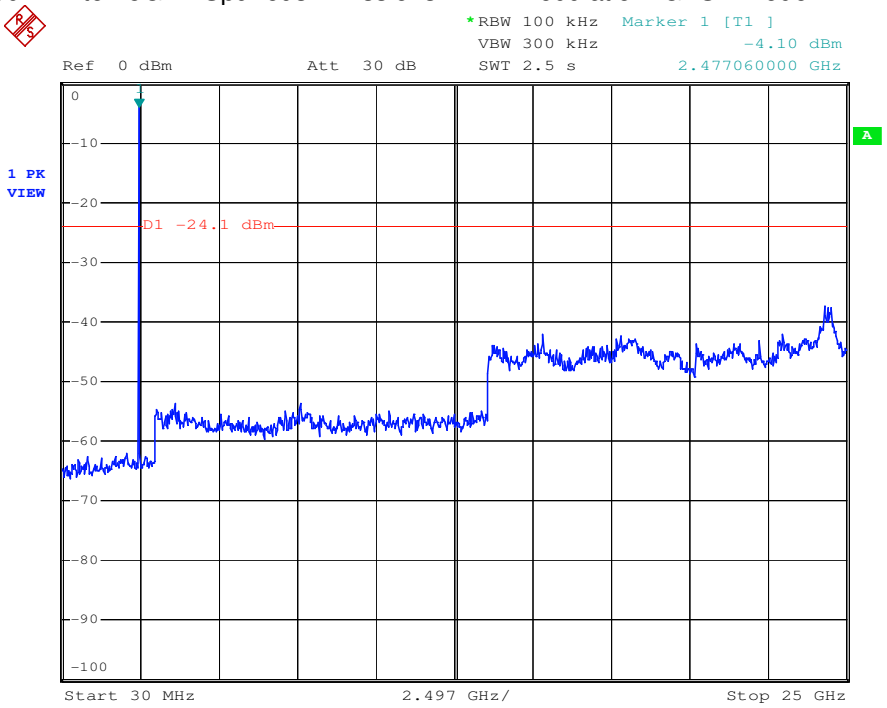
Middle Channel 30MHz to 25GHz Spurious Emissions Modulation: π/4-DQPSK Mode



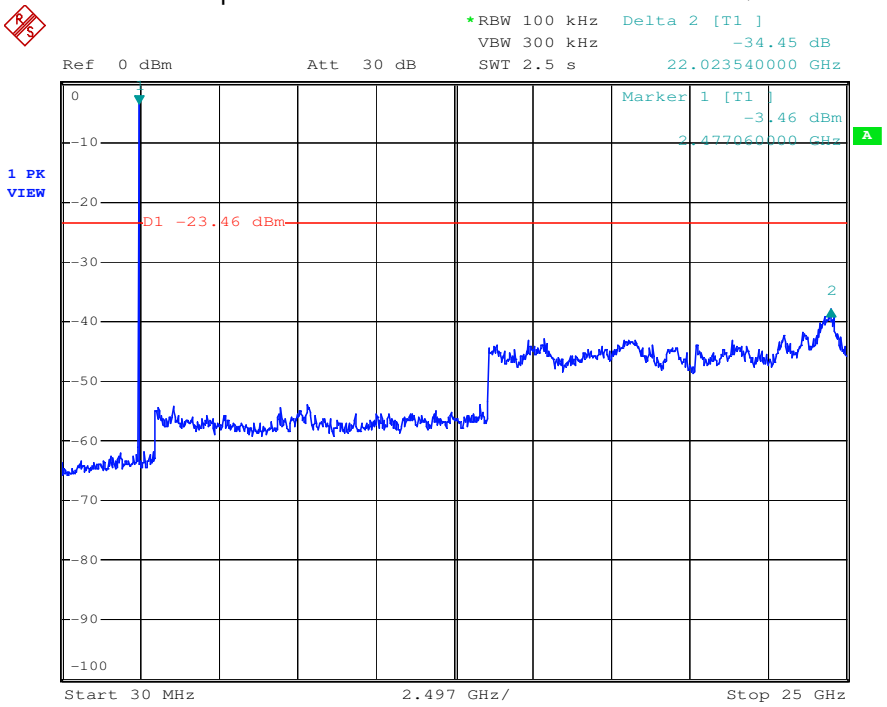
Middle Channel 30MHz to 25GHz Spurious Emissions Modulation: 8DPSK Mode



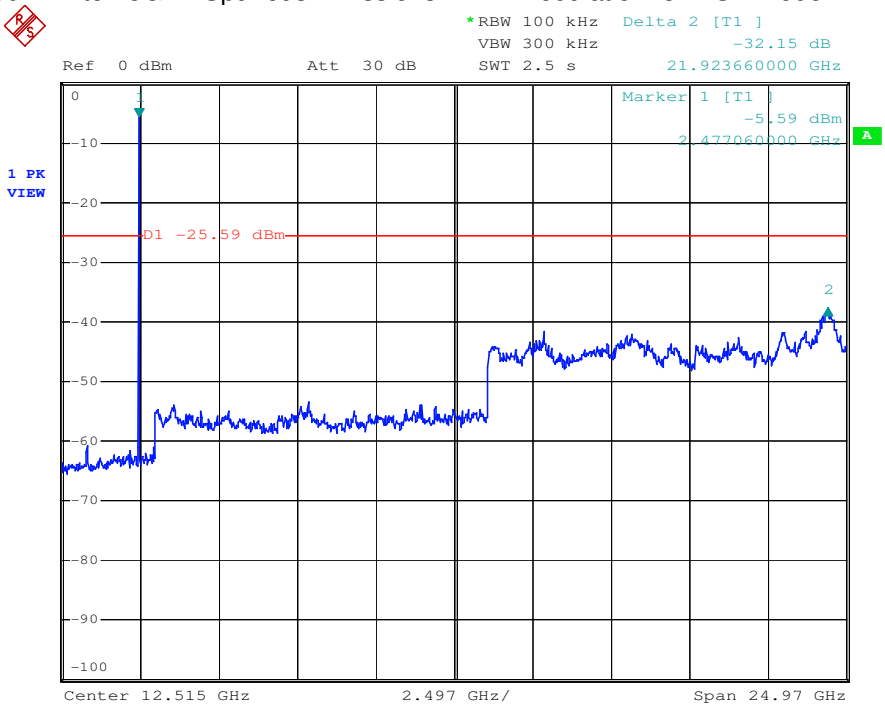
High Channel 30MHz to 25GHz Spurious Emissions Modulation: GFSK Mode



High Channel 30MHz to 25GHz Spurious Emissions Modulation: π/4-DQPSK Mode



High Channel 30MHz to 25GHz Spurious Emissions Modulation: 8DPSK Mode



6.9 Radiated Spurious Emissions

Test Requirement:	FCC Part 15 C Section 247 (d) & FCC Part 15 Section 209
Test Method:	ANSI C63.10 2009
Test Date:	Feb 22 ,2012
Test Status:	Test GFSK mode, π/4-DQPSK mode, 8DPSK mode under 79 hopping.
Test site/setup:	Measurement Distance: 3m (Semi-Anechoic Chamber) Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz). For PK value: RBW = 1 MHz for f ≥ 1 GHz VBW ≥ RBW; Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz VBW =10Hz; Sweep = auto Detector function = peak Trace = max hold Receive antenna scan height 1 m - 4 m. polarization Vertical / Horizontal
15.209 Limit:	40.0 dBμV/m between 30MHz & 88MHz 43.5 dBμV/m between 88MHz & 216MHz 46.0 dBμV/m between 216MHz & 960MHz 54.0 dBμV/m above 960MHz
15.247(d) limit:	(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 conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration:

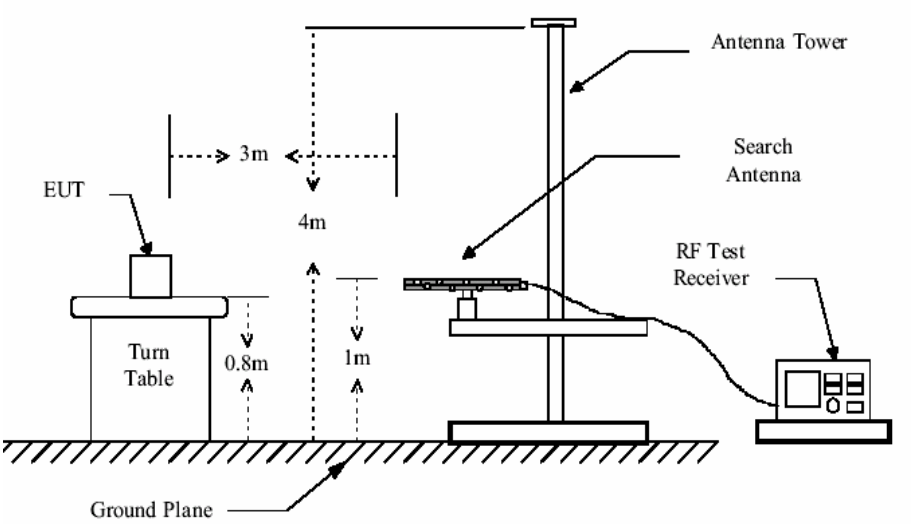


Figure 1. 30MHz to 1GHz radiated emissions test configuration

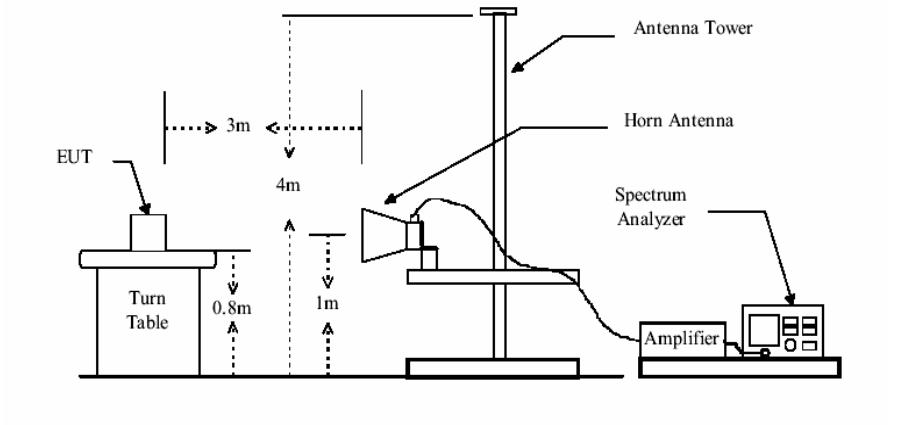


Figure 2 Above 1GHz radiated emissions test configuration

Test Procedure: The procedure used was ANSI Standard C63.10:2009. The receiver was scanned from 30MHz to 25GHz.When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Low nosie amplifier was used below 1GHz,High pass Filter was used above 3GHz.

Between 1G and 3GHz, we did not use any amplifier or filter.

Pre-test was performed on GFSK , π/4-DQPSK and 8DPSK mode under 79 hopping, Compliance test was performed on worse case (GFSK mode).

1) For this intentional radiator operates below 25 GHz. the spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the third harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 3rd harmonic.

As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

Remark:
The EUT is a portable device, so three axes (X, Y, Z) were observed while the test receiver worked as "max hold" continuously and the highest reading among the whole test procedure was recorded.

Test Results: The EUT does meet the FCC requirements.

From the pre-test appear the GFSK is worst mode.

GFSK mode Harmonics and other spurious emission test data as follows:

Transmitter:

Test in **Channel Low** in transmitting status- **Vertical** polarization

30MHz~1GHz Spurious Emission,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
40.86	14.2	0.18	24.6	27.09	16.87	40.0
154.94	10.9	0.25	24.5	31.28	17.93	43.5
952.66	22.8	0.42	24.0	32.79	32.01	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3549.5	30.8	1.2	0.5	43.4	45.75	34.85	74.0
4804.0	36.0	1.7	0.8	43.1	54.51	49.91	74.0
10857.3	37.8	2.2	0.9	43.9	47.31	44.31	74.0

Average Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3597.0	30.8	1.2	0.5	43.4	35.15	24.25	54.0
4804.0	36.0	1.7	0.8	43.1	52.83	48.23	54.0
12311.9	37.8	2.2	0.9	43.9	37.44	34.44	54.0

Remark: No other radiation has been found.

Test in **Channel Low** in transmitting status- **Horizontal** polarization

30MHz~1GHz Spurious Emissions, Quasi-Peak Measurement:

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
50.56	14.2	0.18	24.6	26.57	16.35	40.0
139.42	10.9	0.25	24.5	31.57	18.22	43.5
936.76	22.8	0.42	24.0	31.43	30.65	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3583.0	30.8	1.2	0.5	43.4	45.67	34.77	74.0
4804.5	36.0	1.7	0.8	43.1	43.05	38.45	74.0
12287.0	37.8	2.2	0.9	43.9	48.01	45.01	74.0

Average Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Filter (dB)	Preamp (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3542.0	30.8	1.2	0.5	43.4	35.42	24.52	54.0
4787.0	36.0	1.7	0.8	43.1	36.79	32.19	54.0
11055.8	37.8	2.2	0.9	43.9	37.01	34.01	54.0

Remark: No other radiation has been found.

Test in **Channel Middle** in transmitting status- **Vertical** polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
33.49	14.2	0.18	24.6	27.28	17.06	40.0
148.72	10.9	0.25	24.5	31.10	17.75	43.5
945.68	22.8	0.42	24.0	32.36	31.58	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3474.0	30.8	1.2	0.5	43.4	46.25	35.35	74.0
4882.5	36.0	1.7	0.8	43.1	47.34	42.74	74.0
10828.3	37.8	2.2	0.9	43.9	47.68	44.68	74.0

Average Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3546.0	30.8	1.2	0.5	43.4	35.42	24.52	54.0
4882.5	36.0	1.7	0.8	43.1	43.64	39.04	54.0
11057.8	37.8	2.2	0.9	43.9	37.13	34.13	54.0

Remark: No other radiation has been found.

Test in **Channel Middle** in transmitting status- **Horizontal** polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
43.19	14.2	0.18	24.6	25.80	15.58	40.0
163.08	10.9	0.25	24.5	28.53	15.18	43.5
949.94	22.8	0.42	24.0	32.50	31.72	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3573.5	30.8	1.2	0.5	43.4	45.93	35.03	74.0
5100.5	36.0	1.7	0.8	43.1	41.22	36.62	74.0
11026.7	37.8	2.2	0.9	43.9	47.95	44.95	74.0

Average Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3589.0	30.8	1.2	0.5	43.4	35.35	24.45	54.0
4882.5	36.0	1.7	0.8	43.1	32.38	27.78	54.0
11045.6	37.8	2.2	0.9	43.9	36.99	33.99	54.0

Remark: No other radiation has been found.

Test in **Channel High** in transmitting status- **Vertical** polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
32.72	14.2	0.18	24.6	26.52	16.30	40.0
149.89	10.9	0.25	24.5	30.14	16.79	43.5
952.66	22.8	0.42	24.0	33.14	32.36	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3576.5	30.8	1.2	0.5	43.4	45.83	34.93	74.0
4960.0	36.0	1.7	0.8	43.1	54.24	49.64	74.0
11767.9	37.8	2.2	0.9	43.9	47.00	44.00	74.0

Average Measurement.

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3555.5	30.8	1.2	0.5	43.4	35.26	24.36	54.0
4960.0	36.0	1.7	0.8	43.1	51.4	46.80	54.0
12312.6	37.8	2.2	0.9	43.9	36.96	33.96	54.0

Remark: No other radiation has been found.

Test in **Channel High** in transmitting status- **Horizontal** polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
38.53	14.2	0.18	24.6	27.06	16.84	40.0
132.04	10.9	0.25	24.5	30.38	17.03	43.5
949.95	22.8	0.42	24.0	32.48	31.70	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3576.0	30.8	1.2	0.5	43.4	45.94	35.04	74.0
4960.5	36.0	1.7	0.8	43.1	40.60	36.00	74.0
10721.0	37.8	2.2	0.9	43.9	47.62	44.62	74.0

Average Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Filter (dB)	Preamp factor(dB)	Emission Reading (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)
3532.0	30.8	1.2	0.5	43.4	35.74	24.84	54.0
4960.0	36.0	1.7	0.8	43.1	32.96	28.36	54.0
10935.6	37.8	2.2	0.9	43.9	37.37	34.37	54.0

Remark: No other radiation has been found.

Test Level =Receiver Reading + Antenna Factor + Cable Factor+ Filter –Preamplifier Factor.

Remark: No any other emissions level which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

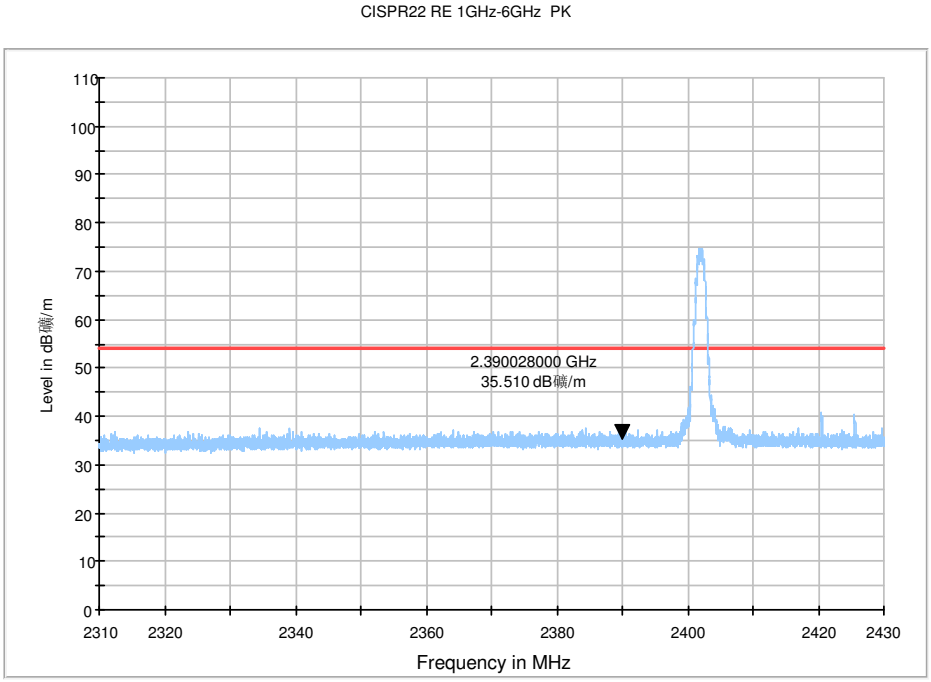
6.10 Radiated Band edge

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:	ANSI 63.10:2009
Test Date:	Feb 29, 2012
Measurement Distance:	3m (Semi-Anechoic Chamber)
Limit:	40.0 dBμV/m between 30MHz & 88MHz; 43.5 dBμV/m between 88MHz & 216MHz; 46.0 dBμV/m between 216MHz & 960MHz; AV 54.0 dBμV/m PK 74.0dBμV/m above 960MHz.
Detector:	For PK value: RBW = 1 MHz for f ≥ 1 GHz VBW ≥ RBW; Sweep = auto Detector function = peak Trace = max hold For AV value: RBW = 1 MHz for f ≥ 1 GHz VBW =10Hz; Sweep = auto Detector function = peak Trace = max hold

According to section,15.35(b) for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

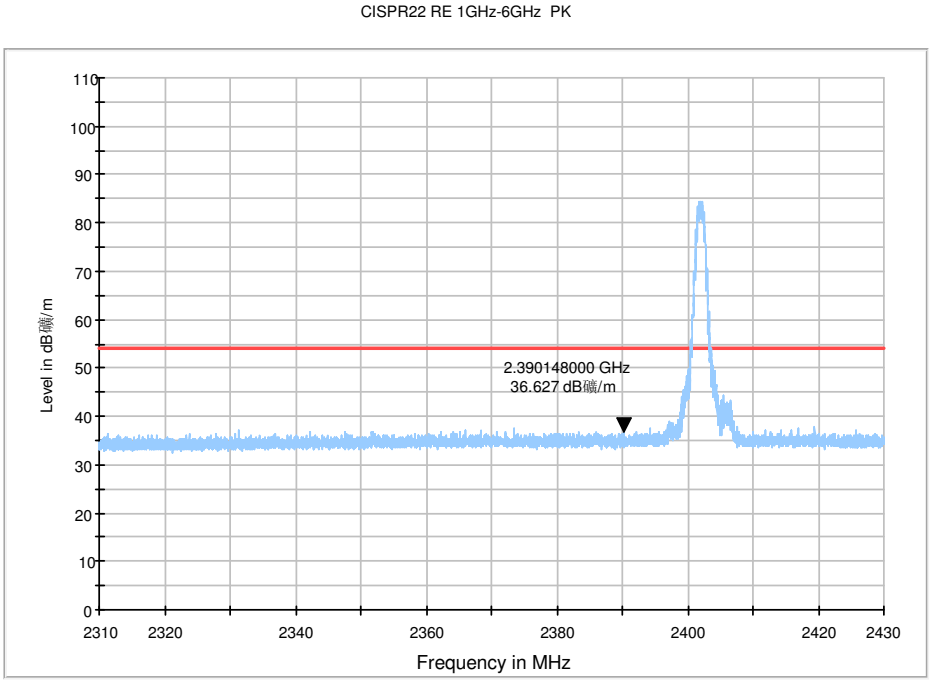
Test Result: Pass

Low Channel GFSK, Horizontal



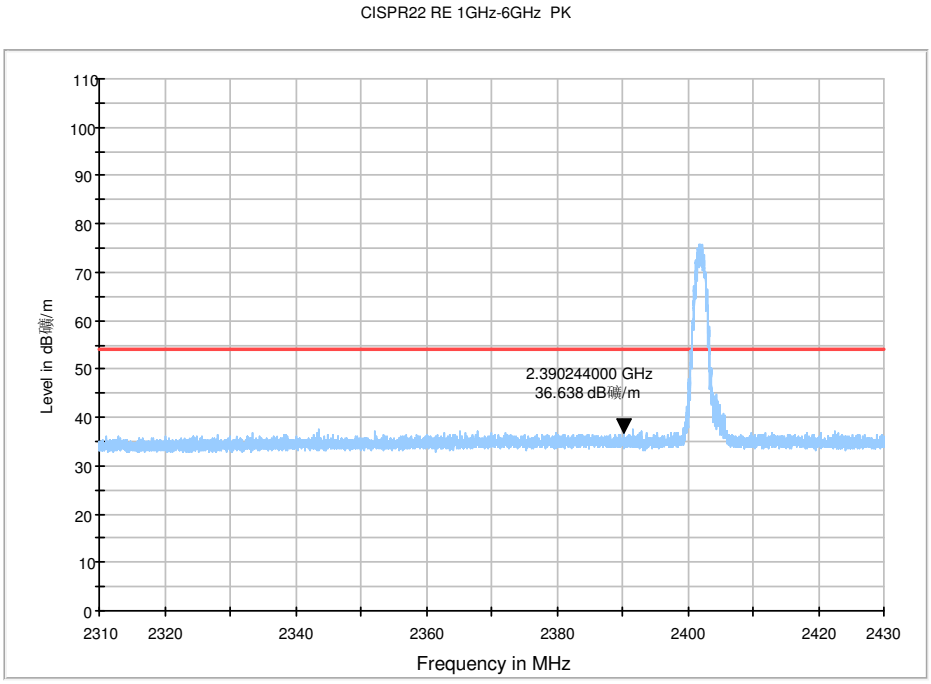
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390.02		27.28	42.50	4.82	35.51	74.00	

Low Channel GFSK, Horizontal



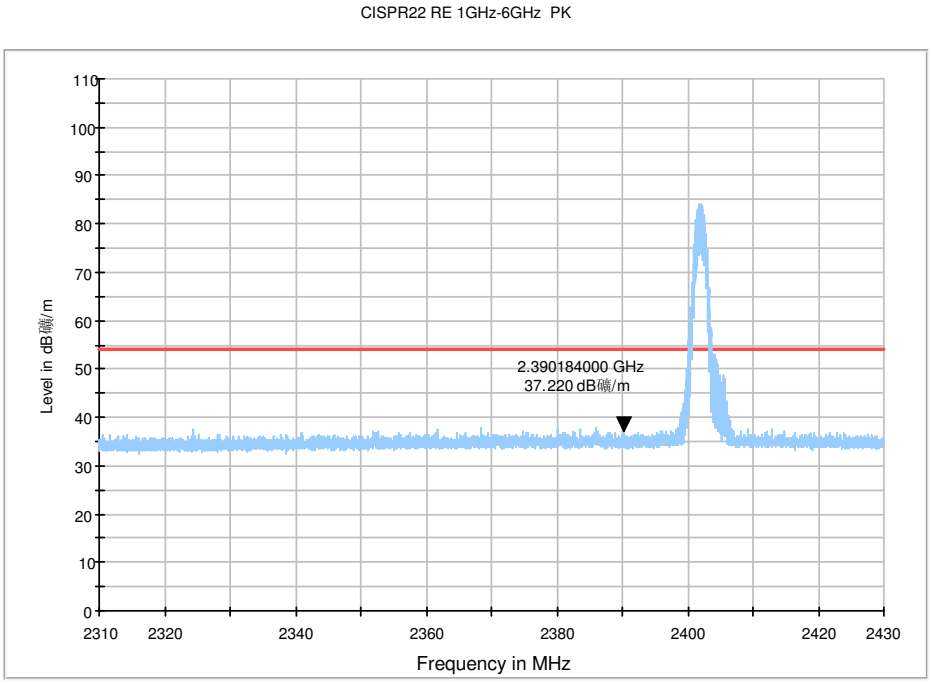
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390.15		27.28	42.50	4.82	36.63	74.00	

Low Channel π/4-DQPSK, Horizontal



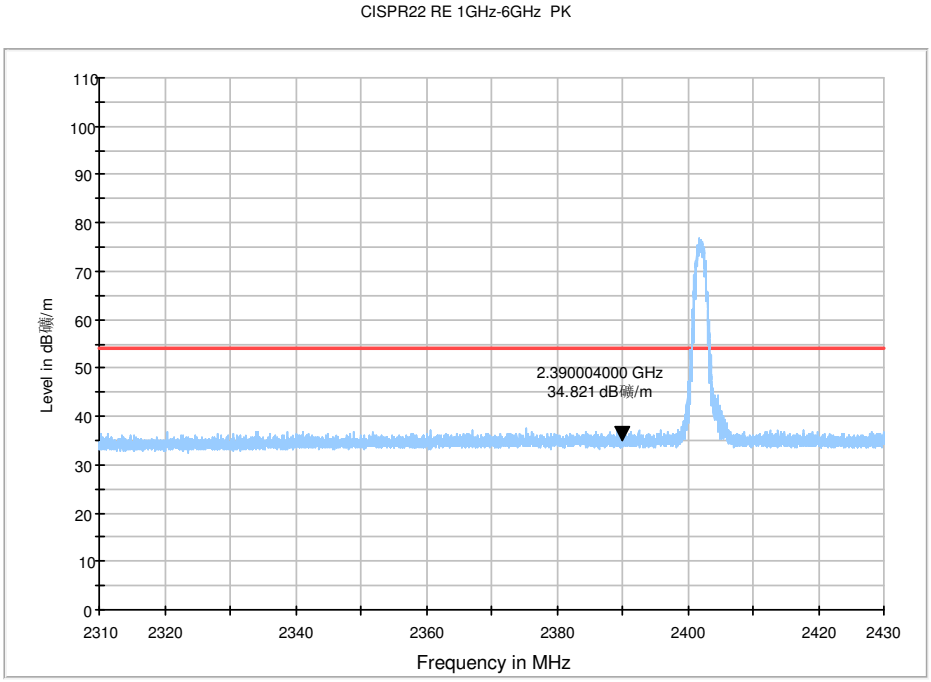
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390.24		27.28	42.50	4.82	36.64	74.00	

Low Channel π/4-DQPSK, Vertical



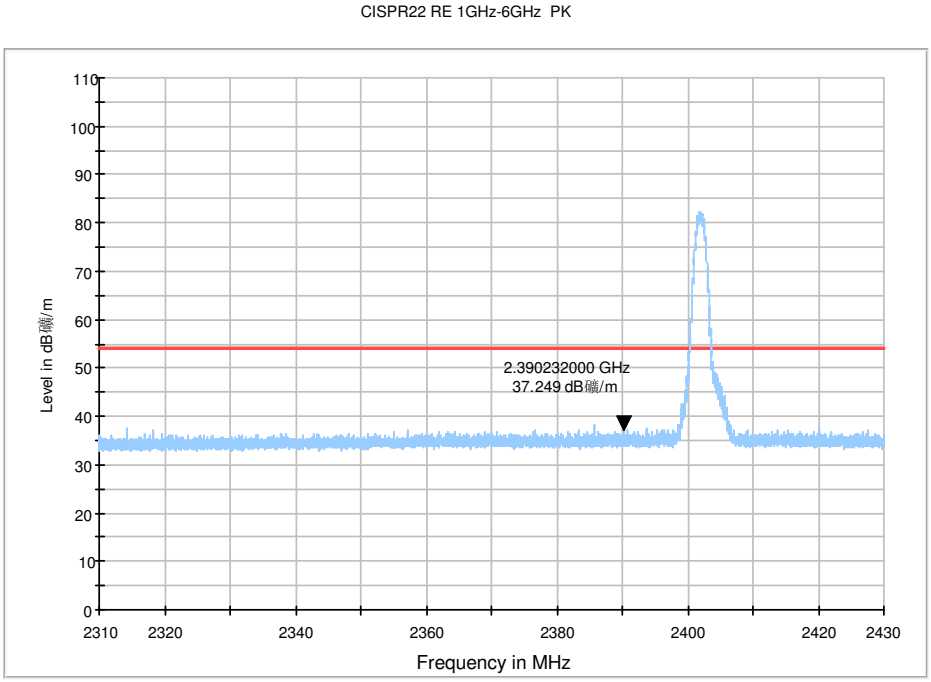
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390.18		27.28	42.50	4.82	37.22	74.00	

Low Channel 8DPSK, Horizontal



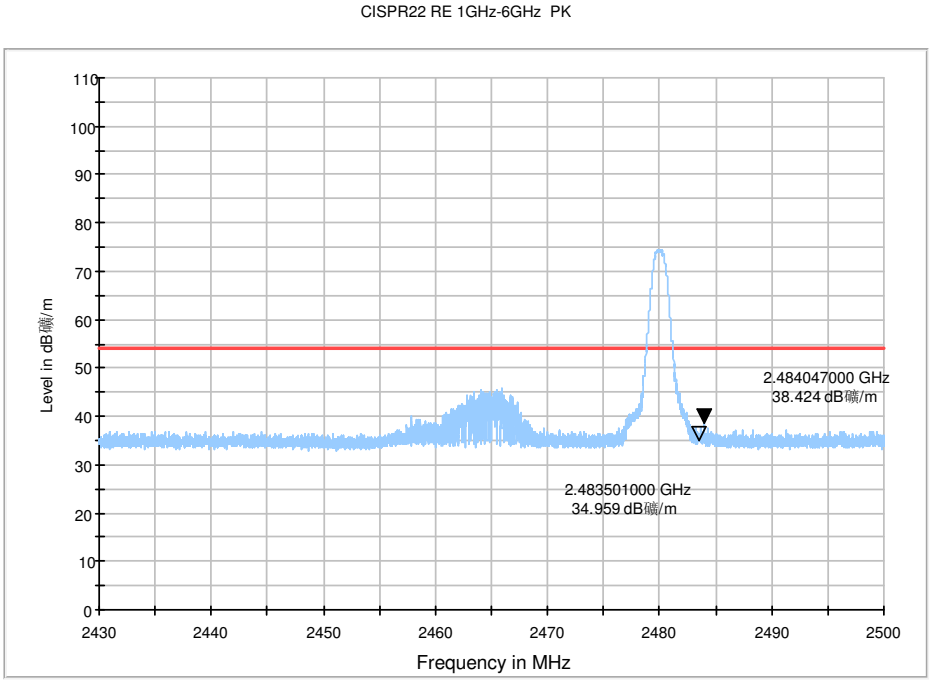
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390.00		27.28	42.50	4.82	34.82	74.00	

Low Channel 8DPSK, Vertical



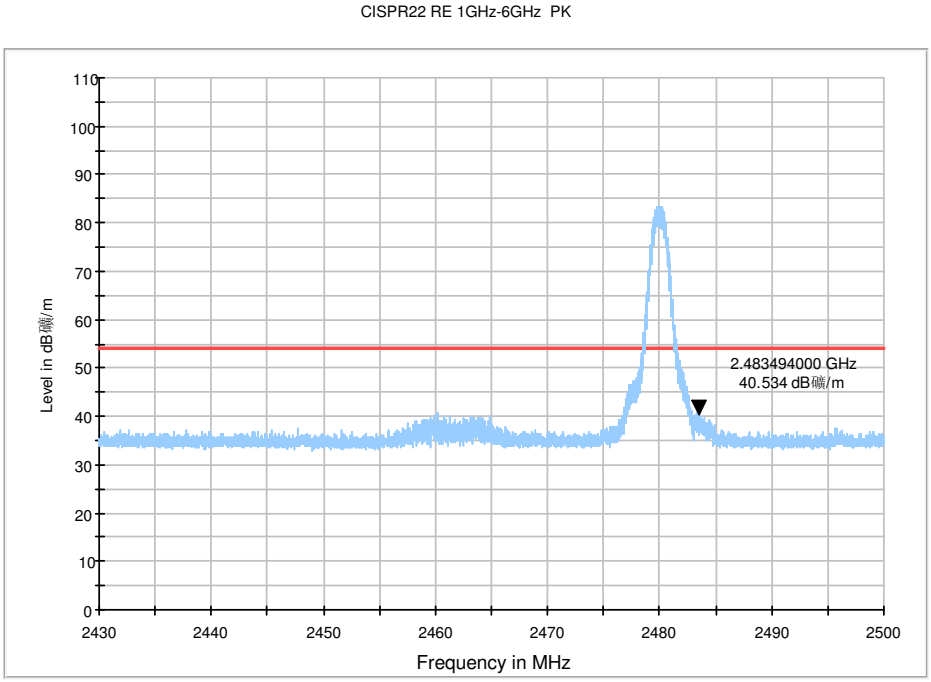
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390.23		27.28	42.50	4.82	37.25	74.00	

High Channel GFSK, Horizontal



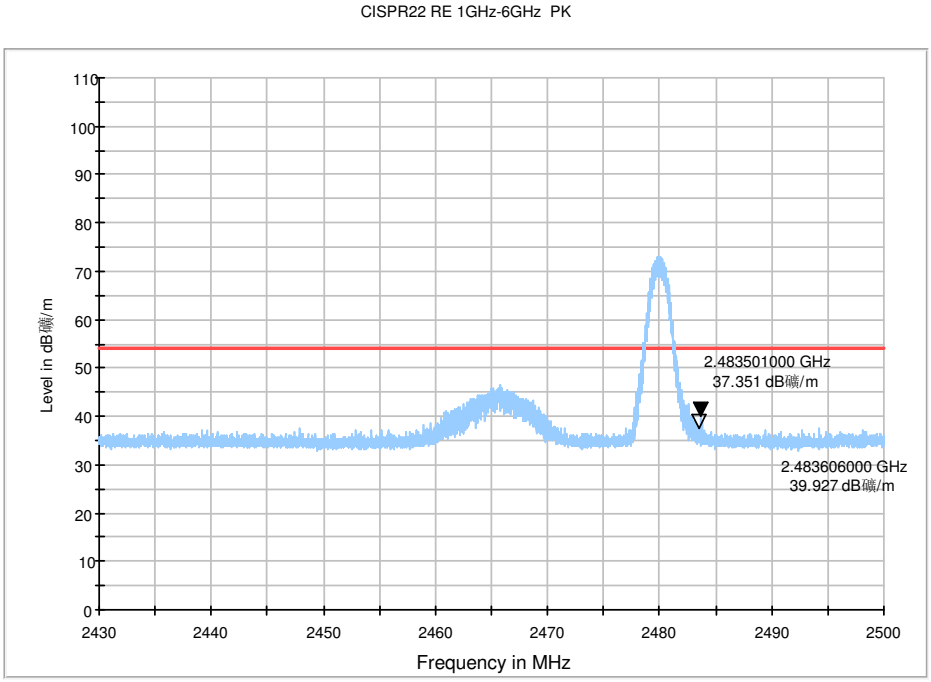
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2484.05		27.48	42.54	4.82	38.42	74.00	

High Channel GFSK, Vertical



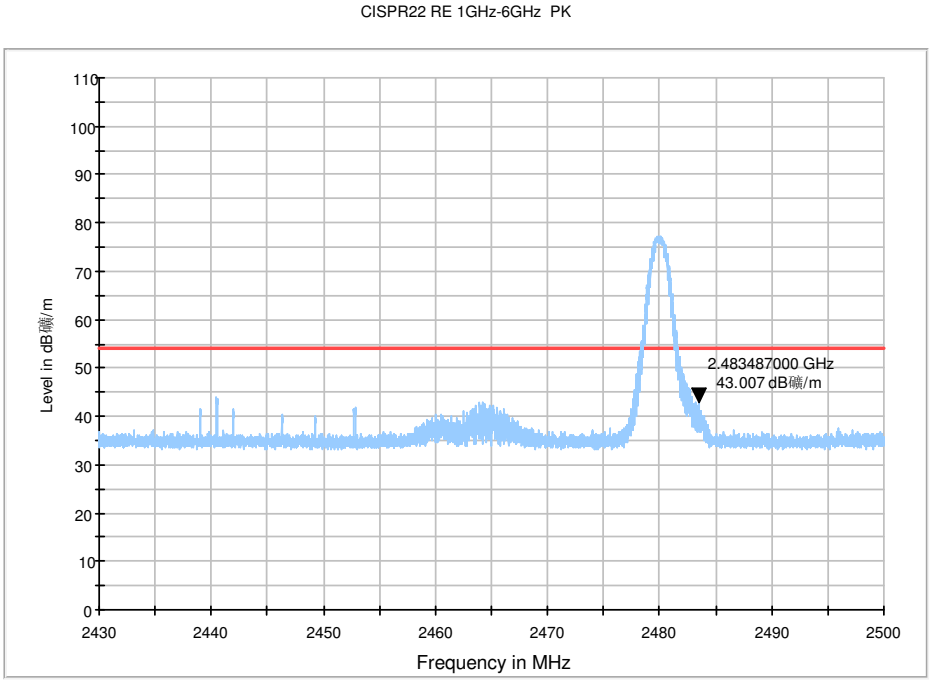
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.49		27.48	42.54	4.82	40.53	74.00	

High Channel π/4-DQPSK, Horizontal



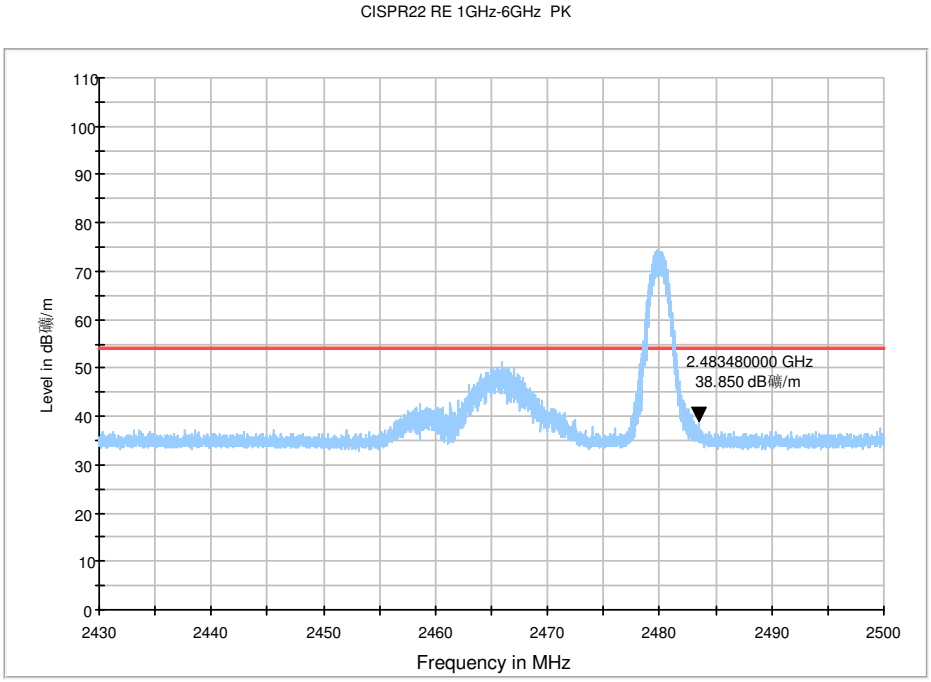
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.50		27.48	42.54	4.82	37.35	74.00	

High Channel π/4-DQPSK, Vertical



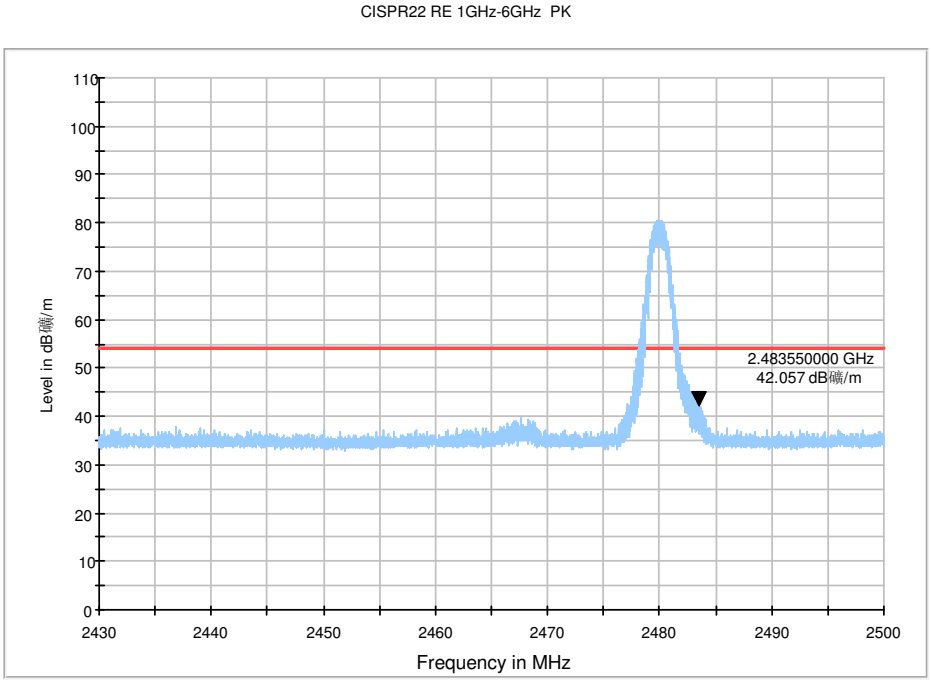
Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.49		27.48	42.54	4.82	43.01	74.00	

High Channel 8DPSK, Horizontal



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.48		27.48	42.54	4.82	38.85	74.00	

High Channel 8DPSK, Vertical



Frequency (MHz)	Peak Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.55		27.48	42.54	4.82	42.06	74.00	

Remark: 1. The Peak Level less than the AV limit, so the AV level is no greater than the AV limit.

2. No any other emission which fall in restricted bands can be detected and be reported.

Test Level = Receiver Reading + Antenna Factor + Cable Factor- Preamplifier Factor

All frequencies within the “Restricted bands” have been evaluated to compliance. Section 15.205 Restricted bands of operation.

6.11 Band Edges Requirement

Test Requirement:	FCC Part 15 C Section 247 (d) & 15.205
Test Method:	ANSI 63.10:2009
	Operation within the band 2400M – 2483.5 MHz
Test Date:	Feb 16,2012
Requirements:	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 conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. 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)).
Method of Measurement:	Set RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 300 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.

The band edges was measured and recorded Result:

The Lower Edges attenuated more than 20dB.

The Upper Edges attenuated more than 20dB.

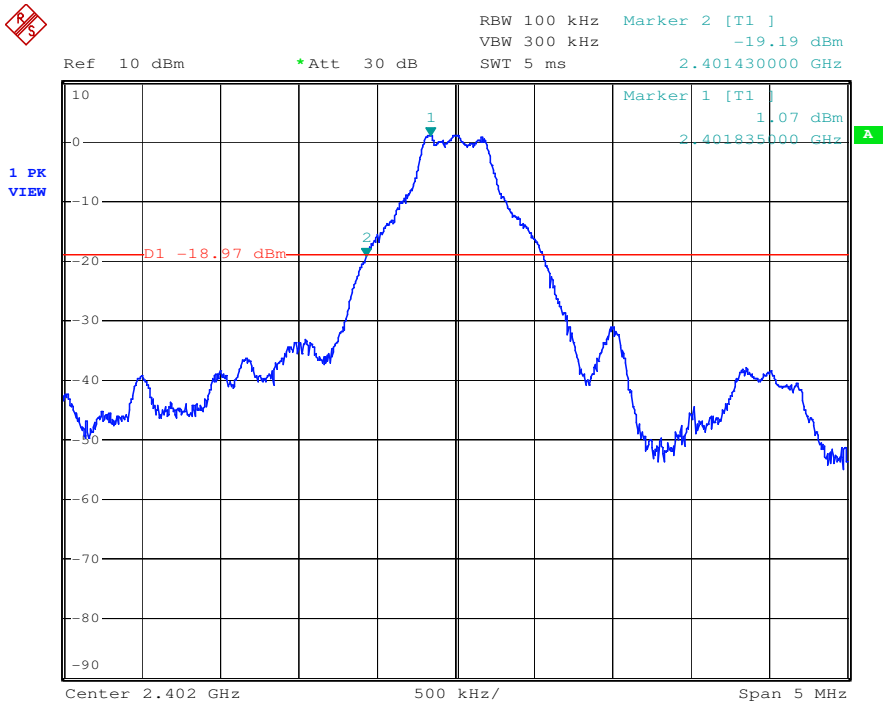
Test Result: The EUT does meet the FCC requirements.

The graph as below. represents the emissions take for this device.

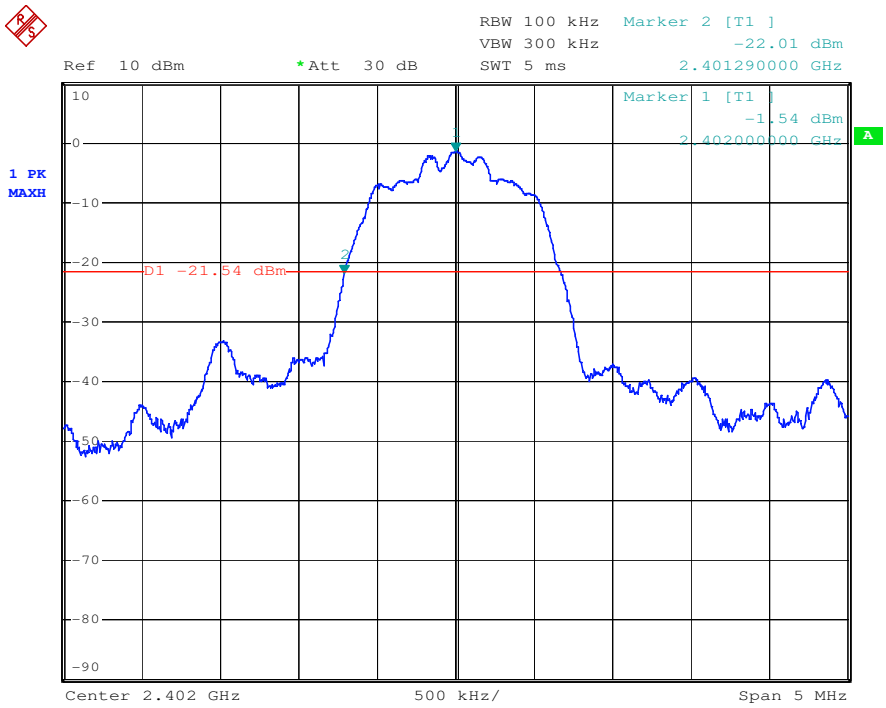
Channel	Modulation	Peak Point		-20dB Point	
		Frequency(MHz)	Power (dBm)	Frequency(MHz)	Power (dBm)
Static Low	GFSK	2401.84	1.07	2401.43	-19.19
	π/4-DQPSK	2402.00	-1.54	2401.29	-22.01
	8DPSK	2402.01	-1.54	2401.32	-21.40
Hopping Low	GFSK	2402.00	1.05	2401.44	-19.37
	π/4-DQPSK	2402.00	-1.50	2401.32	-21.97

	8DPSK	2402.01	-1.48	2401.30	-22.47
Static High	**GFSK**	2480.00	0.06	2480.56	-20.21
	π/4-DQPSK	2480.00	-2.16	2480.68	-22.72
	8DPSK	2479.84	-2.11	2480.67	-22.34
Hopping High	**GFSK**	2478.01	0.09	2480.53	-20.89
	π/4-DQPSK	2478.00	-2.14	2480.66	-22.27
	8DPSK	2478.00	-2.15	2480.65	-22.80

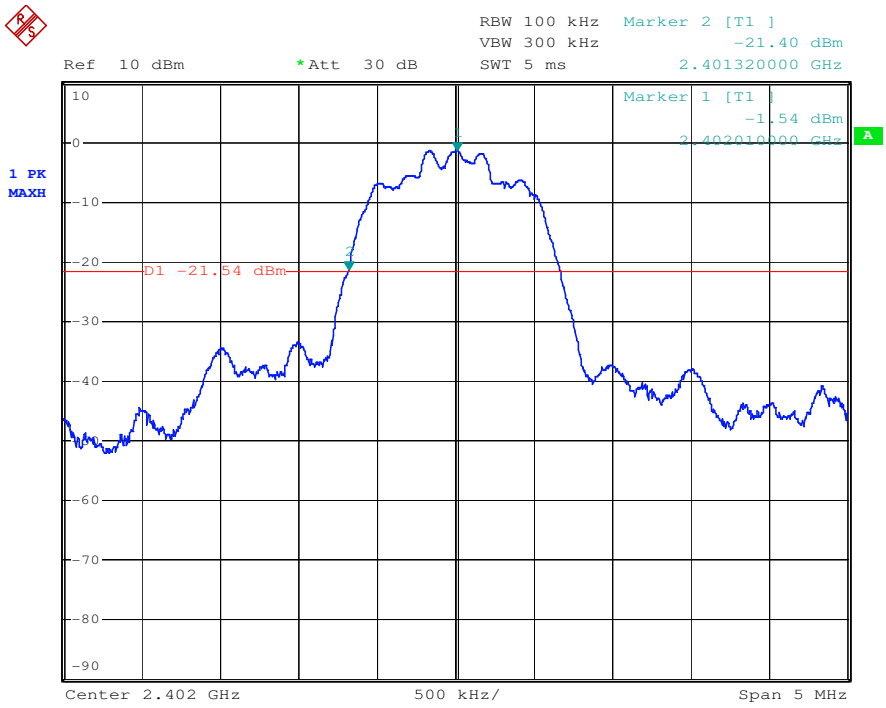
Static GFSK Low Channel:



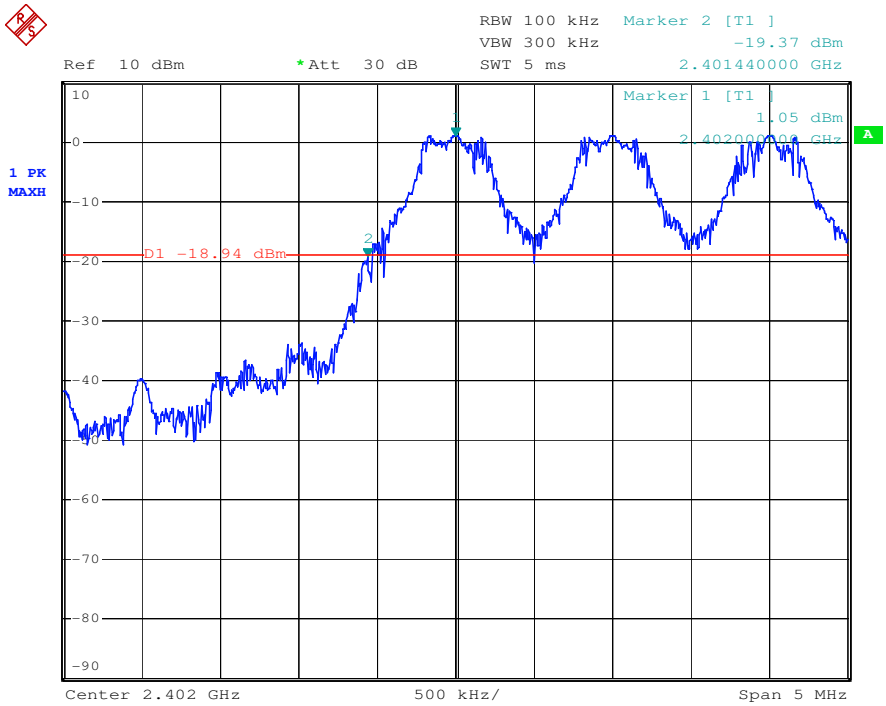
Static π/4-DQPSK Low Channel:



Static 8DPSK Low Channel:

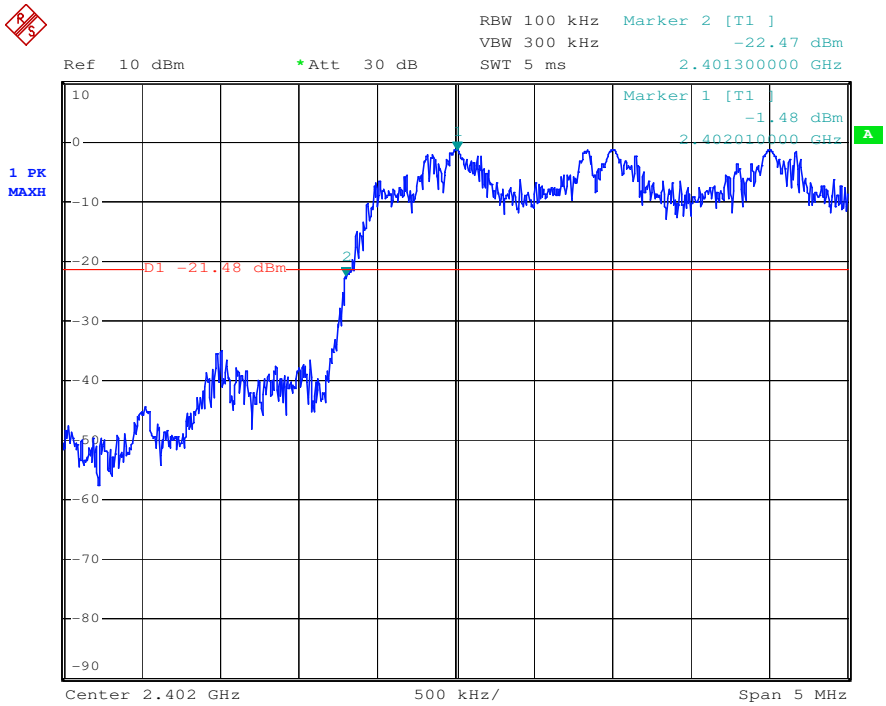


Hopping GFSK Low Channel:

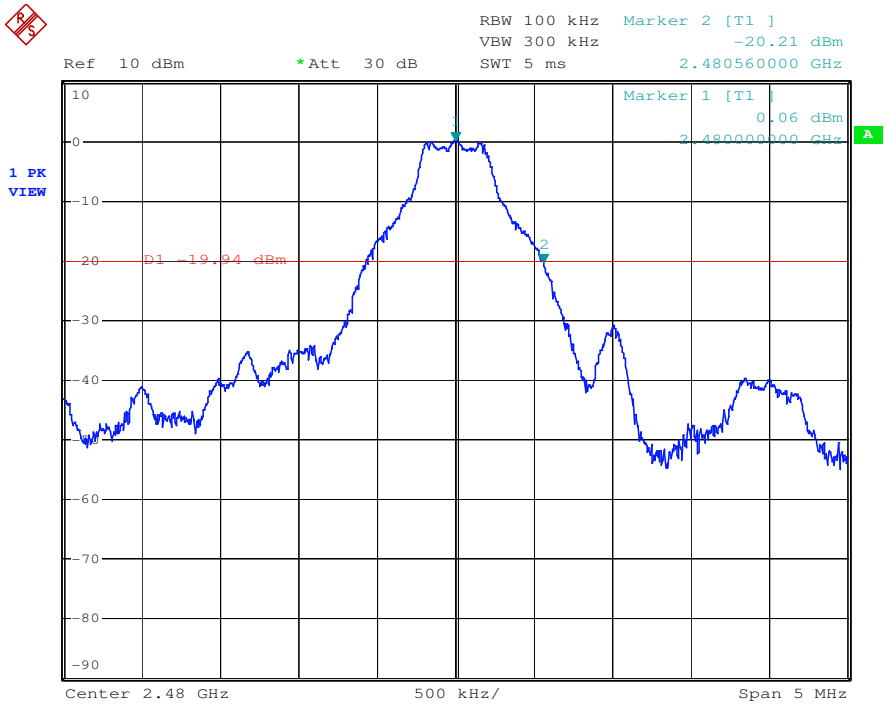


Hopping π/4-DQPSK Low Channel:

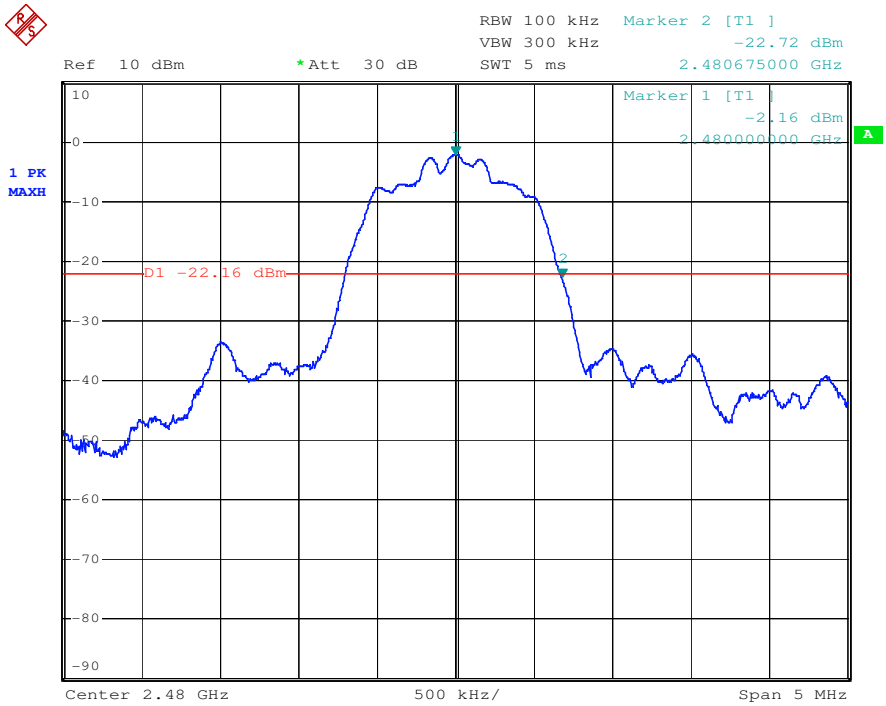
Hopping 8DPSK Low Channel:



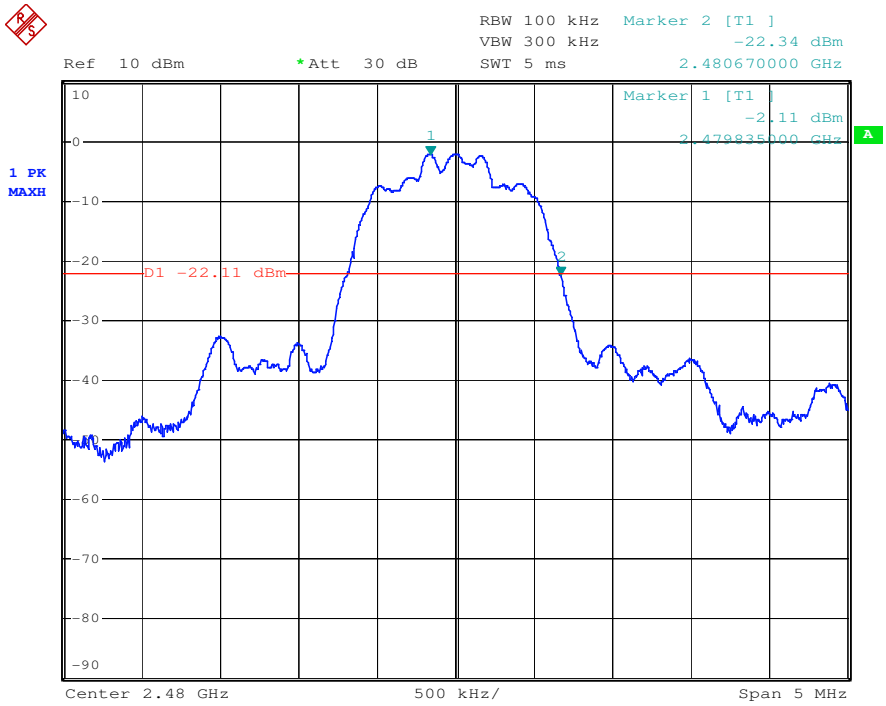
Static GFSK High Channel:



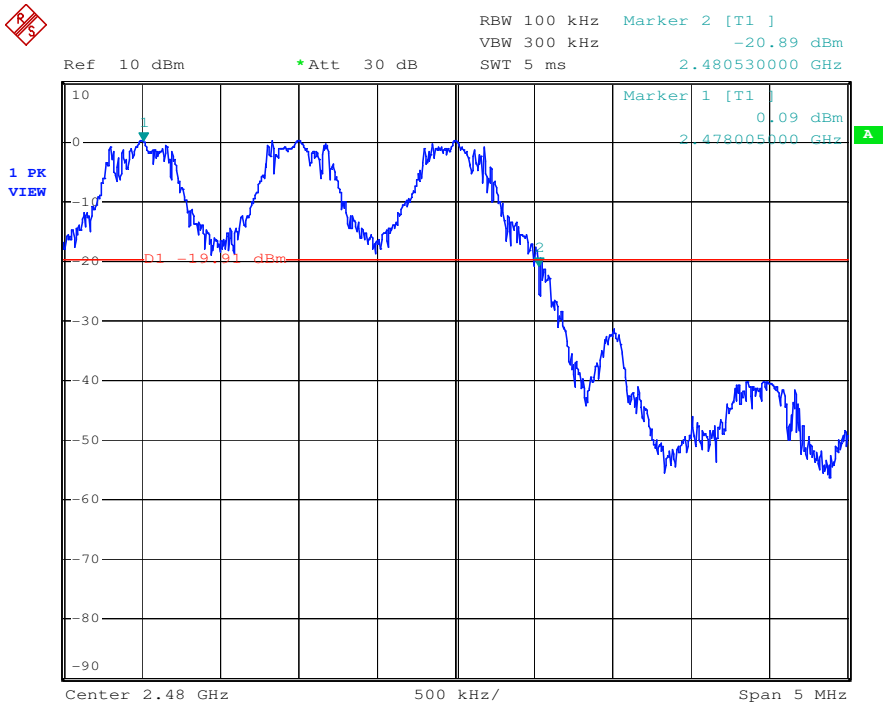
Static π/4-DQPSK High Channel:



Static 8DPSK High Channel:

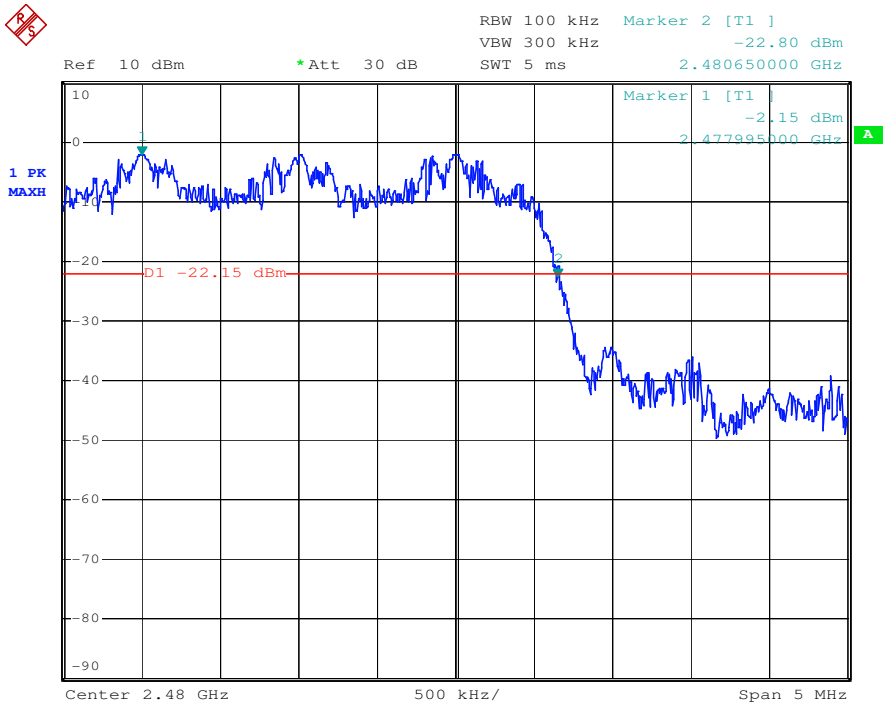


Hopping GFSK High Channel:



Hopping π/4-DQPSK High Channel:

Hopping 8DPSK static High Channel:



The end of report