

FCC

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Bluetooth headset

ISSUED TO
ATI Electronics (Shenzhen) Co., LTD

1/F, B Tower, Shengdelan Industrial Park, Kukeng Village, Guanlan
Town, Shenzhen, China.



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Date 2014.08.27

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(Chief Engineer)
Date 2014.08.27

Report No.: BL-SZ1470120-601
EUT Type: Bluetooth headset
Model Name: SH5B, SH5, PBT86
Brand Name: N/A
Test Standard: 47 CFR Part 15 Subpart C
FCC ID: SF4-SH5B
Test conclusion: PASS
Test Date: 2014.08.01 – 2014.08.20
Date of Issue: 2014.08.27

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions</u>
Rev. 01	2014.08.22	Initial Issue
Rev. 02	2014.08.27	Second Issue

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6683 3402
Fax Number	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625.</p> <p>The laboratory has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ISO/IEC Standard 17025:2005. The accreditation certificate number is TL-588.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Test Environment Condition

Ambient Temperature	15 to 35°C
Ambient Relative Humidity	30 to 60%
Ambient Pressure	86 to 106kPa

1.4 Announce

- (1) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (2) The test report is invalid if there is any evidence and/or falsification.
- (3) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (4) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant

Applicant	ATI Electronics (Shenzhen) Co., LTD
Address	1/F, B Tower, Shengdelan Industrial Park, Kukeng Village, Guanlan Town, Shenzhen, China.

2.2 Manufacturer

Manufacturer	ATI Electronics (Shenzhen) Co., LTD
Address	1/F, B Tower, Shengdelan Industrial Park, Kukeng Village, Guanlan Town, Shenzhen, China.

2.3 General Description for Equipment under Test (EUT)

EUT Type	Bluetooth headset
Model Name	SH5B
Series Model Name	SH5B, SH5, PBT86
Description of Model name differentiation	The equipment model SH5B, SH5 and PBT86 are Bluetooth Headset, the electrical parameters and internal structure of circuit are same, only the model name is different.
Hardware Version	V 2.0
Software Version	V 1.0
Network and Wireless connectivity	BT 3.0+EDR
About the Product	The equipment is Bluetooth Headset, it contains Bluetooth Module operating at 2.4GHz ISM band which supports Bluetooth 3.0

2.4 Technical Information

TX/ RX Operating Range	2400~2483.5MHz band	
	$f_c = 2402 \text{ MHz} + N \cdot 1 \text{ MHz}$, where - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 0 to 78.	
Modulation Type	Carrier	Frequency Hopping Spread Spectrum
	Digital	GFSK, $\pi/4$ -DQPSK, 8DPSK
Antenna Type	PCB Antenna	
Antenna Gain	0dBi	

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No	501230
	Serial No	N/A
	Capacitance	110 mAh
	Rated Voltage	3.7V
	Extreme Voltage	Low: 3.3V / High:4.2V
	Rated Output	= 5V,500mA
Ancillary Equipment 2	Data Cable	

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (12-30-13 Edition)	Miscellaneous Wireless Communications Services
2	FCC PUBLIC NOTICE DA 00-705 (Mar. 30, 2000)	Filling and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
3	ANSI C63.4-2009	American National Standard for Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
4	ANSI C63.10-2009	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	--	Pass ^{Note 1}
2	Number of Hopping Frequency	15.247(a)	ANNEX A.1	Pass
3	Peak Output Power	15.247(b)	ANNEX A.2	Pass
4	Occupied Bandwidth	15.247(a)	ANNEX A.3	Pass
5	Carrier Frequency Separation	15.247(a)	ANNEX A.4	Pass
6	Time of Occupancy (Dwell time)	15.247(a)	ANNEX A.5	Pass
7	Conducted Spurious Emission	15.247(d)	ANNEX A.6	Pass
8	Conducted Emission	15.207	ANNEX A.7	Pass
9	Radiated Spurious Emission	15.209 15.247(c)	ANNEX A.8	Pass
10	Band Edge	15.247(d)	ANNEX A.9	Pass

Note 1: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity (%)	30 -60	
Atmospheric Pressure (kPa)	86-106	
Temperature	NT (Normal Temperature)	+20°C to +25°C
	LT (Low Temperature)	-20°C
	HT (High Temperature)	+55°C
Working Voltage of the EUT	NV (Normal Voltage)	3.7V
	LV (Low Voltage)	3.3V
	HV (High Voltage)	4.2V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2014.07.07	2015.07.06
Spectrum Analyzer	ROHDE&SCHWARZ	FSL3	103640/003	2014.07.07	2015.07.06
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2014.07.07	2015.07.06
Power Splitter	KMW	DCPD-LDC	1305003215	2014.07.07	2015.07.06
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2014.07.07	2015.07.06
Attenuator (20dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2014.07.07	2015.07.06
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2014.07.07	2015.07.06
Test Antenna-Loop(9kHz-30MHz)	SCHWARZBECK	FMZB 1519	1519-037	2013.07.03	2015.07.02
Test Antenna-Bi-Log(30MHz-3GHz)	SCHWARZBECK	VULB 9163	9163-624	2013.07.02	2015.07.01
Test Antenna-Horn(1-18GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2015.07.01
Test Antenna-Horn(15-26.5GHz)	SCHWARZBECK	BBHA 9170	9170-305	2013.07.02	2015.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2013.10.07	2014.10.06

4.3 Test Configurations

Test Configurations (TC) NO.	Description	
	Signal Description	Operating Frequency
Transmitter		
TC01	GFSK modulation, package type DH5, hopping on	--
TC02	GFSK modulation, package type DH5, hopping off	Ch No. 0/ 2402MHz
TC03	GFSK modulation, package type DH5, hopping off	Ch No. 39/ 2441MHz
TC04	GFSK modulation, package type DH5, hopping off	Ch No. 78/ 2480MHz
TC05	$\pi/4$ -DQPSK modulation, package type DH5, hopping on	--
TC06	$\pi/4$ -DQPSK modulation, package type DH5, hopping off	Ch No. 0/ 2402MHz
TC07	$\pi/4$ -DQPSK modulation, package type DH5, hopping off	Ch No. 39/ 2441MHz
TC08	$\pi/4$ -DQPSK modulation, package type DH5, hopping off	Ch No. 78/ 2480MHz
TC09	8DPSK modulation, package type DH5, hopping on	--
TC10	8DPSK modulation, package type DH5, hopping off	Ch No. 0/ 2402MHz
TC11	8DPSK modulation, package type DH5, hopping off	Ch No. 39/ 2441MHz
TC12	8DPSK modulation, package type DH5, hopping off	Ch No. 78/ 2480MHz

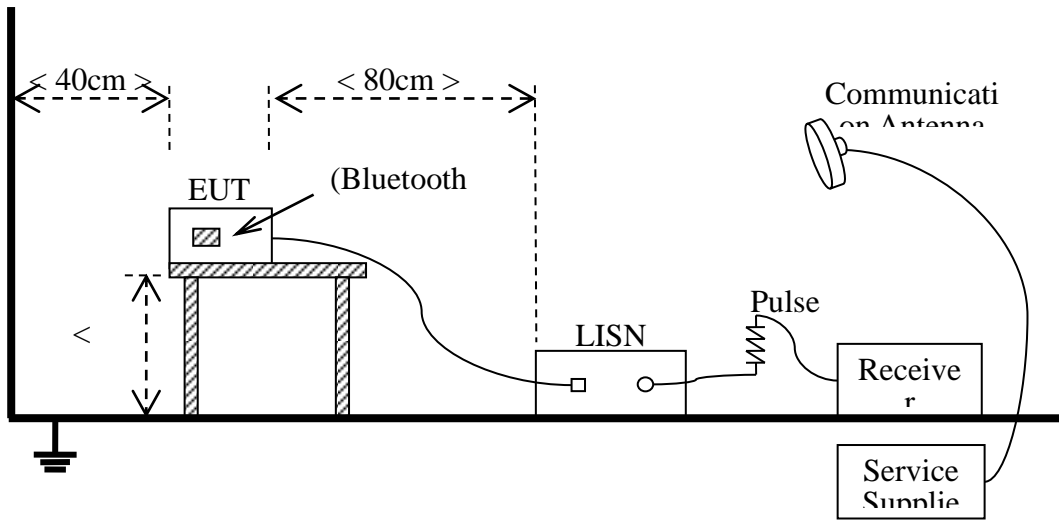
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



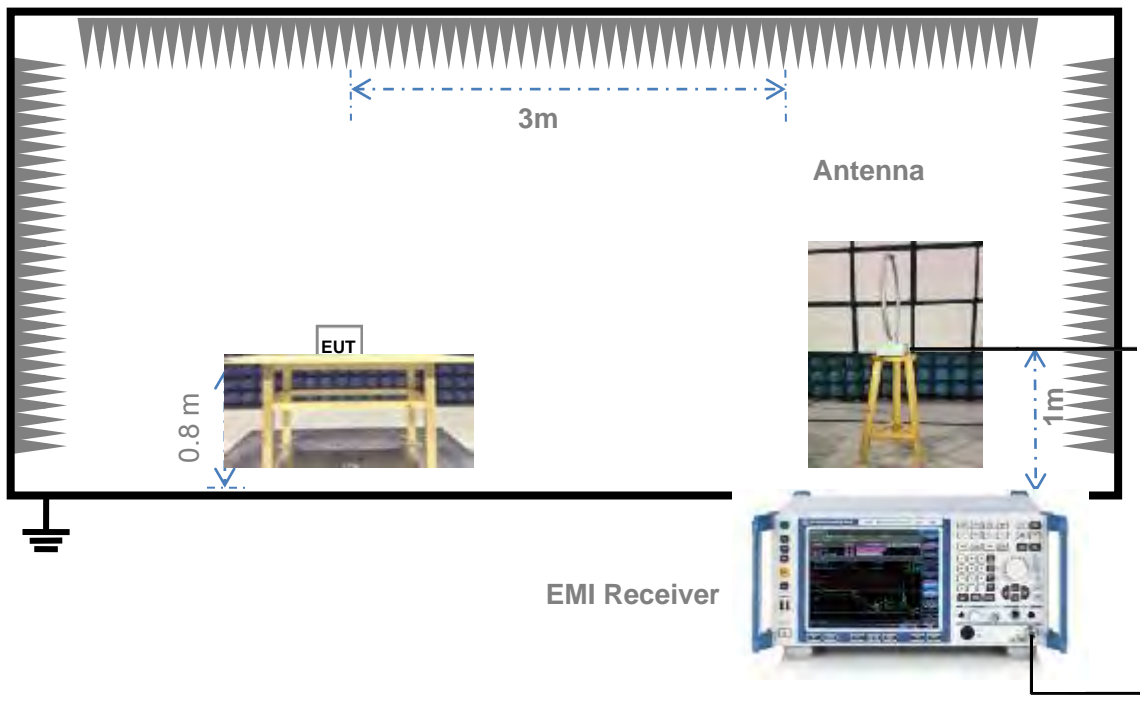
(Diagram 1)

4.4.2 For AC Power Supply Port Test



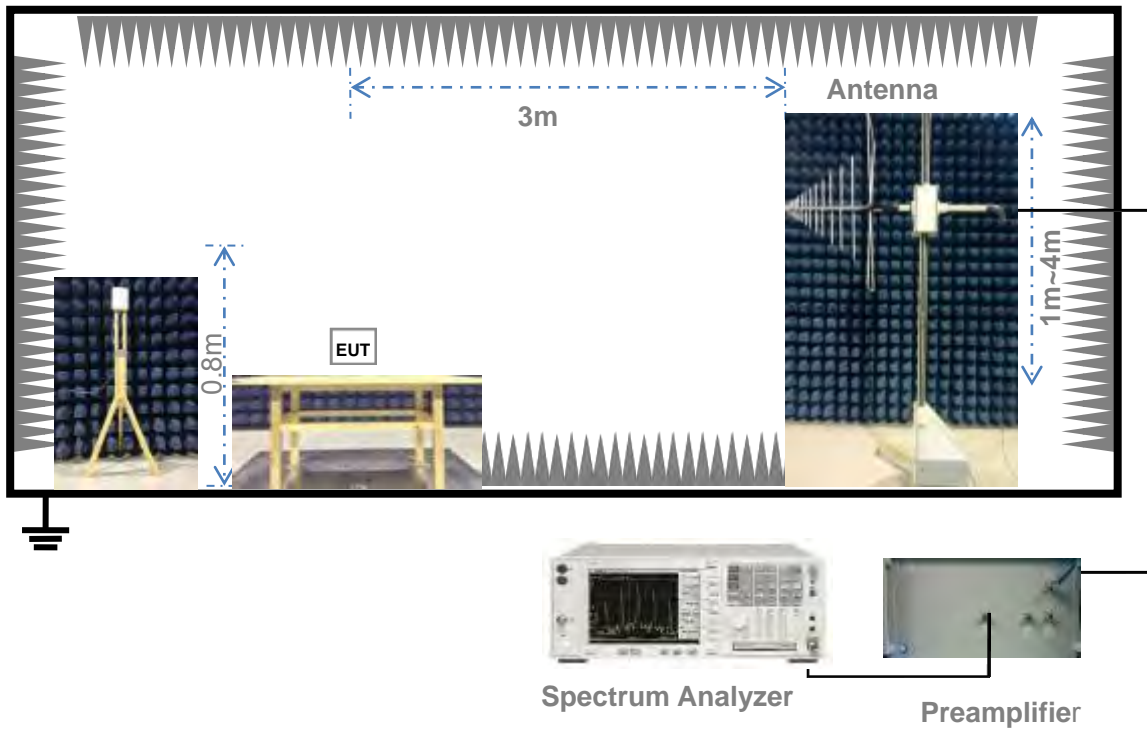
(Diagram 2)

4.4.3 For Radiated Test (Below 30MHz)



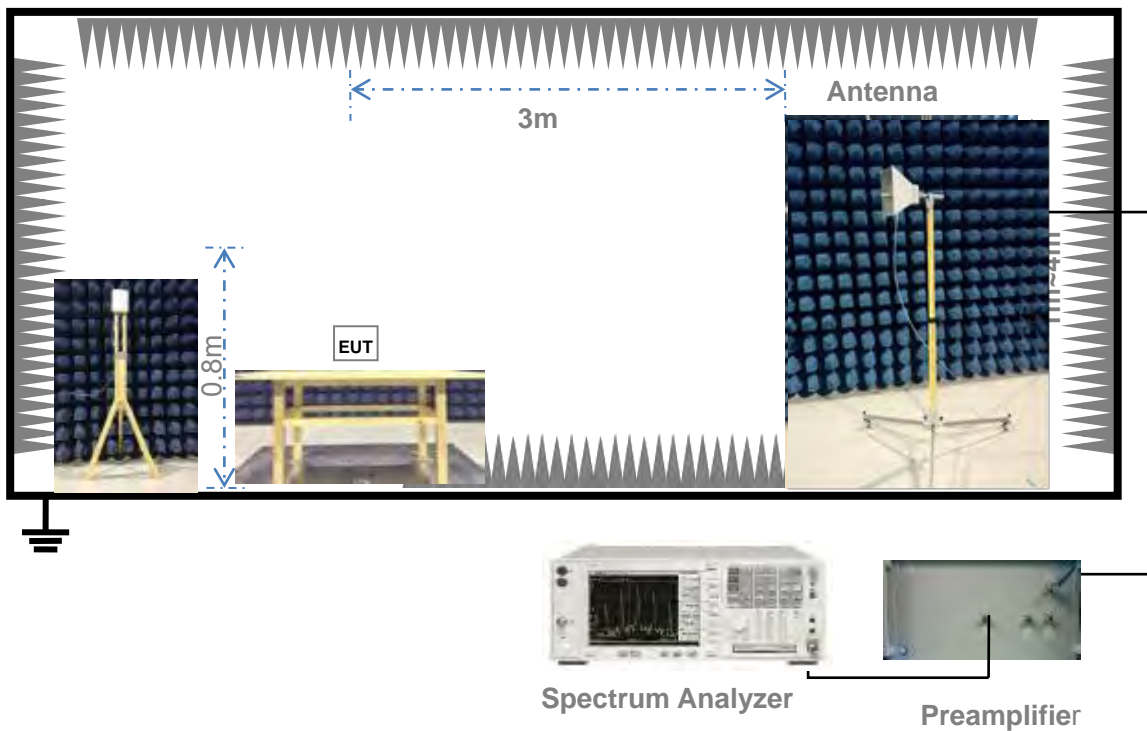
(Diagram 3)

4.4.4 For Radiated Test (30MHz-1GHz)



(Diagram 4)

4.4.5 For Radiated Test (Above 1GHz)



(Diagram 5)

4.5 Test Conditions

Test Case	Test Conditions		
	Test Env.	Test Setup ^{Note 1}	Test Configuration ^{Note 2}
Number of Hopping Frequency	NTNV	Test Setup 1	TC01, TC05, TC09
Peak Output Power	NTNV	Test Setup 1	TC02, TC03, TC04, TC06,TC07,TC08, TC10, TC11, TC12
Occupied Bandwidth	NTNV	Test Setup 1	TC03, TC07, TC011
Carrier Frequency Separation	NTNV	Test Setup 1	TC01, TC05, TC09
Time of Occupancy (Dwell time)	NTNV	Test Setup 1	TC01, TC05, TC09
Conducted Spurious Emission	NTNV	Test Setup 1	TC02, TC03, TC04, TC06,TC07,TC08, TC10, TC11, TC12
Conducted Emission	NTNV	Test Setup 2	TC02, TC03, TC04, TC06,TC07,TC08, TC10, TC11, TC12
Radiated Emission	NTNV	Test Setup 3 Test Setup 4 Test Setup 5	TC02, TC03, TC04, TC06,TC07,TC08, TC10, TC11, TC12
Band Edge	NTNV	Test Setup 5	TC02, TC04, TC06,TC08, TC10, TC12
Note: 1. Please refer to section 4.4 for test setup details. 2. Please refer to section 4.3 for test setup details.			

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Standard Applicable

FCC §15.203 & 15.247(b)

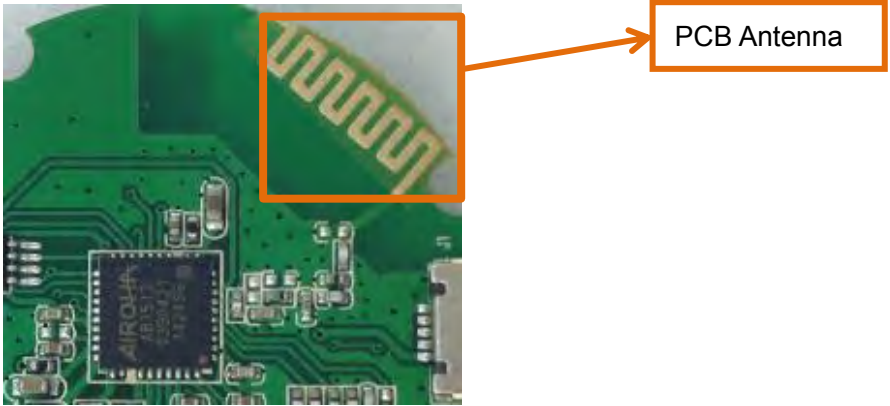
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is An embedded-in	An embedded-in antenna design is used.

Reference Documents	Item
Photo	

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 Number of Hopping Frequency

5.2.1 Limit

FCC §15.247(a)(1)(iii)

Frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

5.2.2 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW \geq 1% of the span

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.3 Peak Output Power

5.3.1 Test Limit

FCC § 15.247(b)

For frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt.

5.3.2 Test Procedure

The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.4 Occupied Bandwidth

5.4.1 Limit

FCC §15.247(a)

The 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth ($10 \cdot \log 1\% = 20\text{dB}$) taking the total RF output power.

5.4.2 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW \geq 1% of the 20 dB bandwidth

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.5 Carrier Frequency Separation

5.5.1 Limit

FCC §15.247(a)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

5.5.2 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) \geq 1% of the span

Video (or Average) Bandwidth (VBW) \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

5.6 Time of Occupancy (Dwell time)

5.6.1 Limit

FCC §15.247(a)

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

5.6.2 Test Procedure

The average time of occupancy on any channel within the Period can be calculated with formulas:

For DH1 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / 2) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4s * \{\text{Number of Hopping Frequency}\}$$

For DH3 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / 4) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4s * \{\text{Number of Hopping Frequency}\}$$

For DH5 package type

$$\{\text{Total of Dwell}\} = \{\text{Pulse Time}\} * (1600 / 6) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\}$$

$$\{\text{Period}\} = 0.4s * \{\text{Number of Hopping Frequency}\}$$

The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

5.7 Conducted Spurious Emission

5.7.1 Limit

FCC §15.247(d)

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.7.2 Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

5.8 Conducted Emission

5.8.1 Limit

FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.8.2 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

5.9 Radiated Spurious Emission

5.9.1 Limit

FCC §15.209&15.247(c)

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.9.2 Test Procedure

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.10 Band Edge

5.10.1 Limit

FCC §15.209&15.247(d)

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

5.10.2 Test Procedure

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation

RBW \geq 1% of the span

VBW \geq RBW

Sweep = auto

Detector function = peak /AV

Trace = max hold

Allow the trace to stabilize.

$E \text{ [dB}\mu\text{V/m]} = \text{UR} + \text{AT} + \text{AFactor [dB]}; \text{AT} = \text{LCable loss [dB]} - \text{Gpreamp [dB]}$

AT: Total correction Factor except Antenna

UR: Receiver Reading

Gpreamp: Preamplifier Gain

AFactor: Antenna Factor at 3m

ANNEX A TEST RESULT

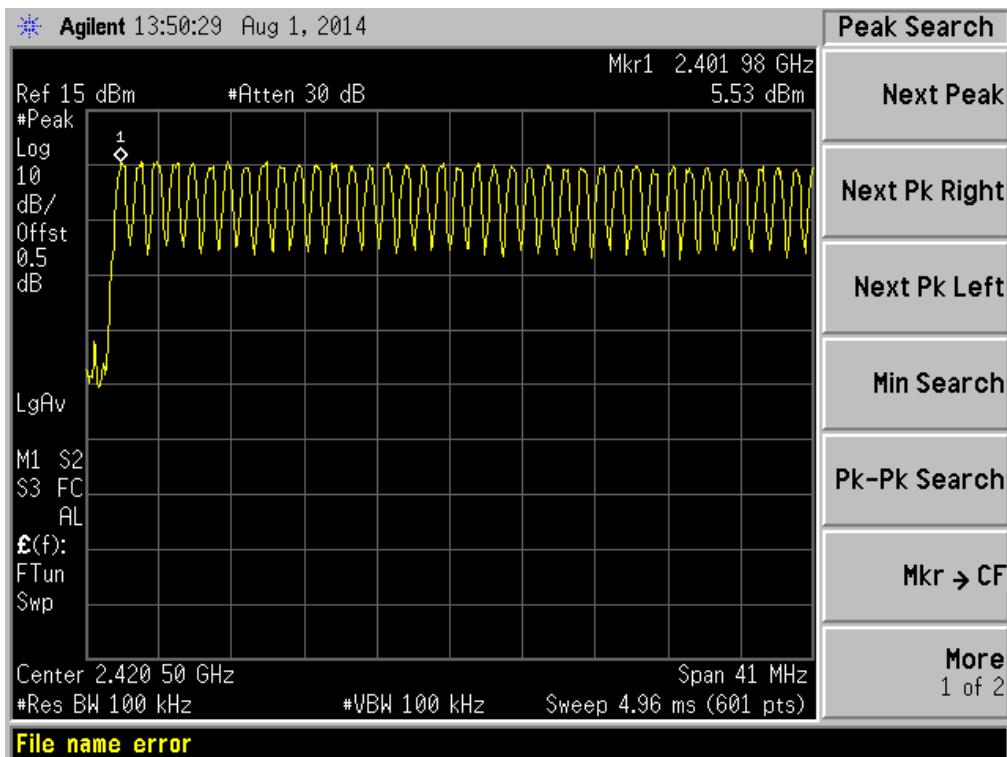
A.1 Number of Hopping Frequency

Test Data

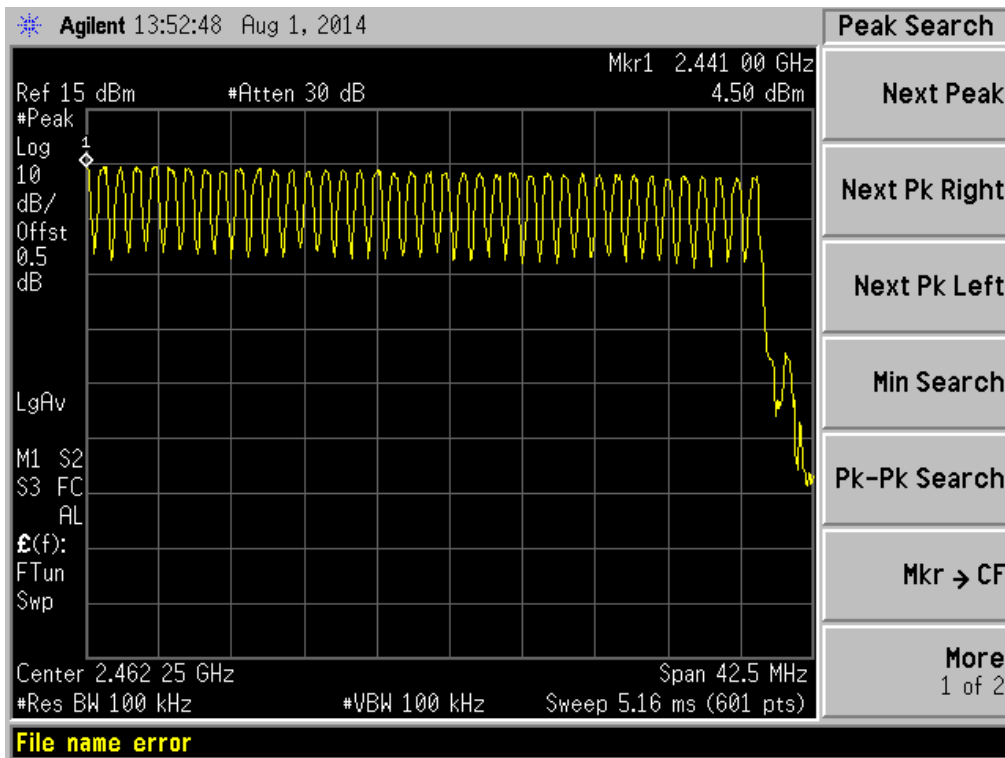
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
π/4-DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

Test plots

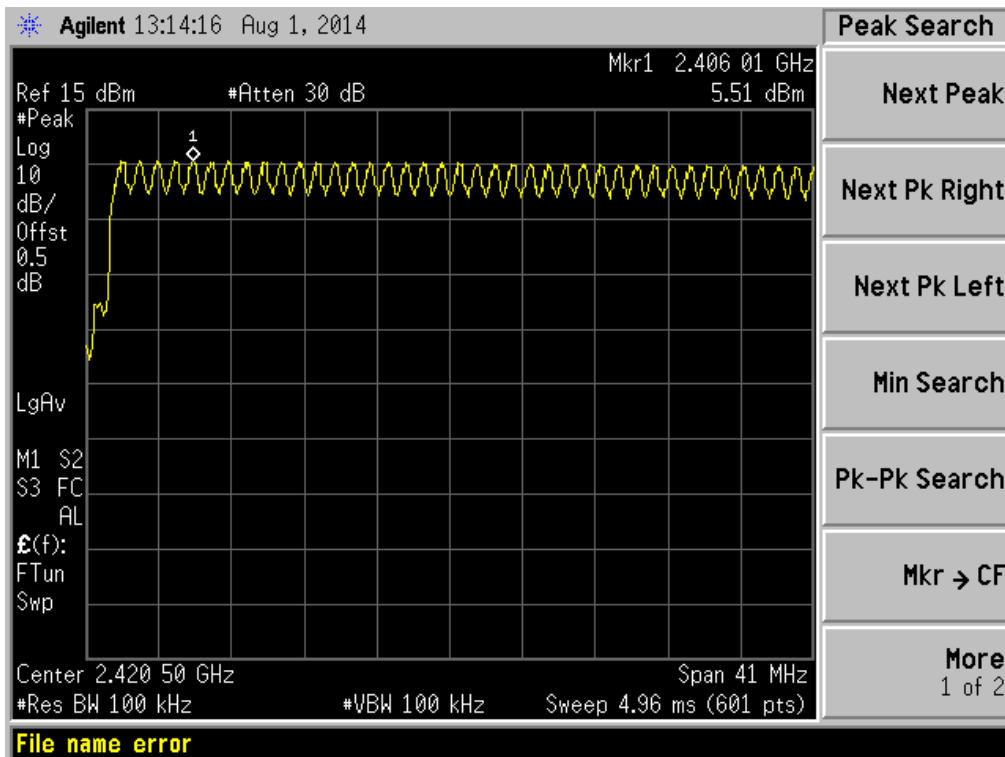
GFSK 2.4GHz~2.4415GHz



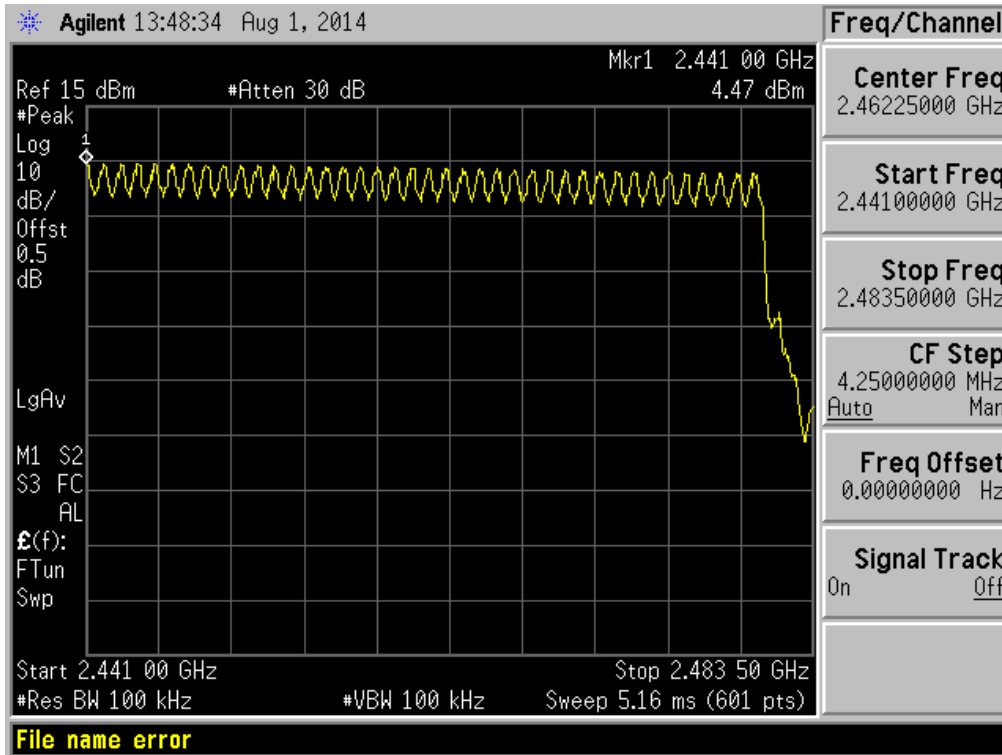
GFSK 2.4415GHz~2.4835GHz



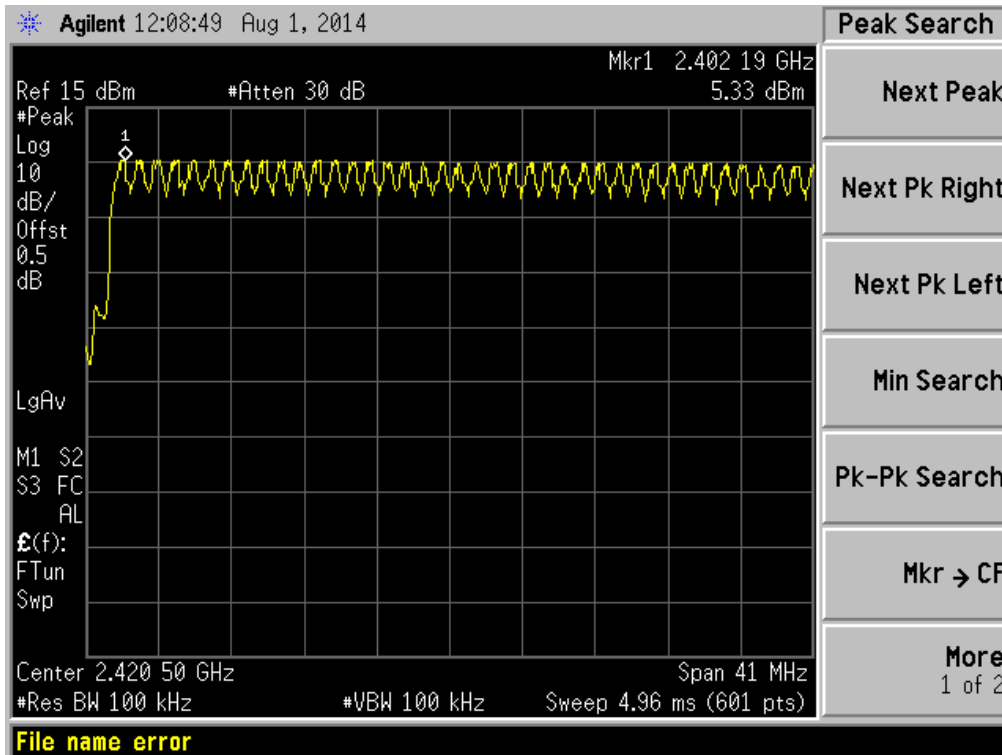
II/4-DQPSK 2.4GHz~2.4415GHz



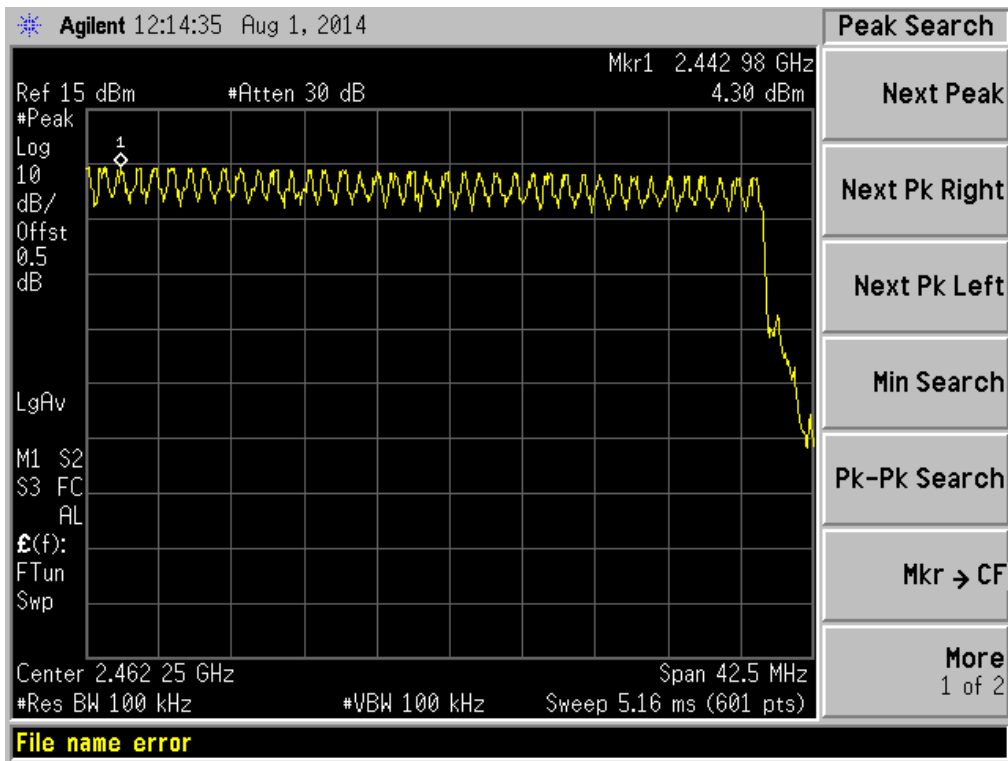
II/4-DQPSK 2.4415GHz~2.4835GHz



8-DPSK 2.4GHz~2.4415GHz



8-DPSK 2.4415GHz~2.4835GHz



A.2 Peak Output Power

Test Data

GFSK Mode:

Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
Low	2402	5.47	3.52	30	1000	PASS
Middle	2441	4.37	2.74			PASS
High	2480	2.48	1.77			PASS

π/4-DQPSK Mode:

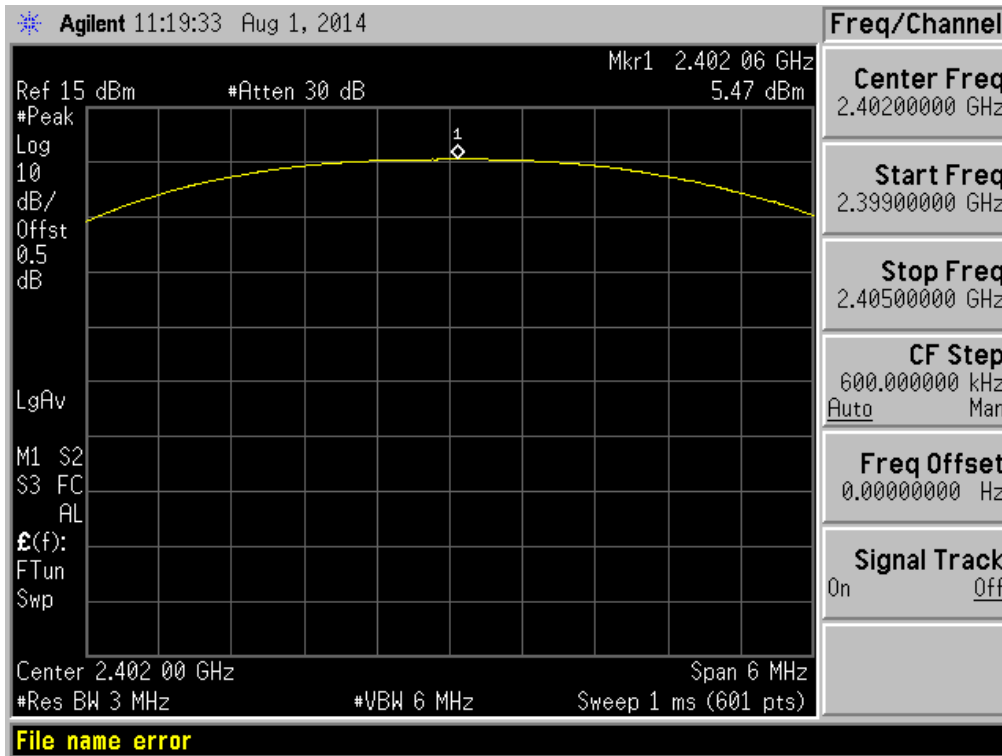
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
Low	2402	6.05	4.03	30	1000	PASS
Middle	2441	4.97	3.14			PASS
High	2480	3.05	2.02			PASS

8-DPSK Mode:

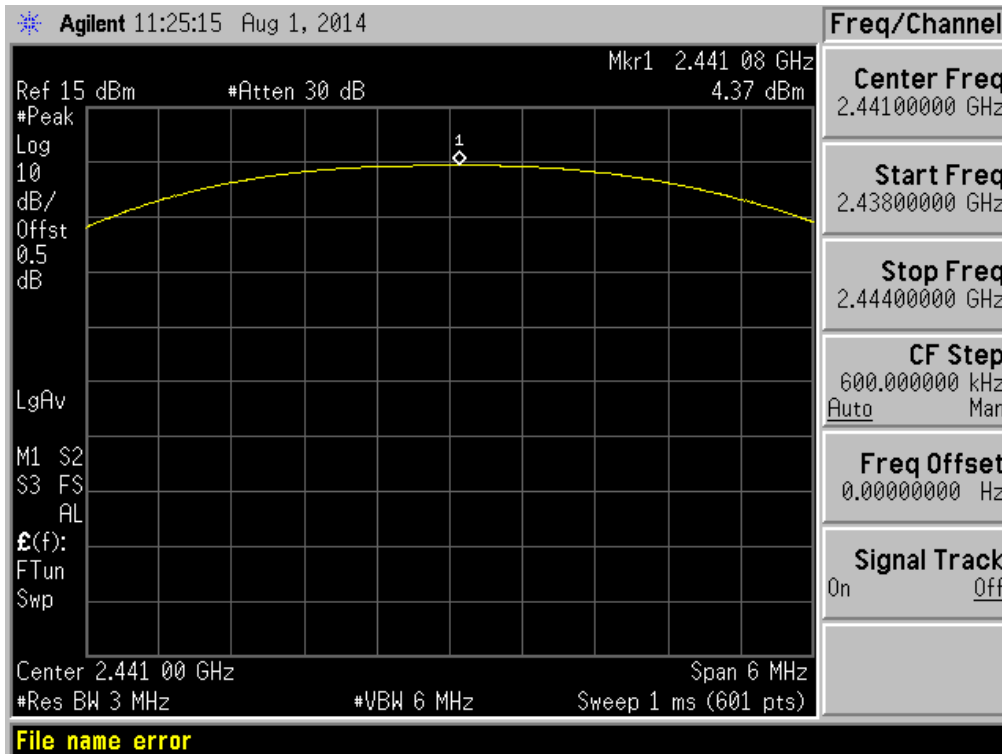
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
Low	2402	6.21	4.18	30	1000	PASS
Middle	2441	5.11	3.24			PASS
High	2480	3.21	2.09			PASS

Test plots

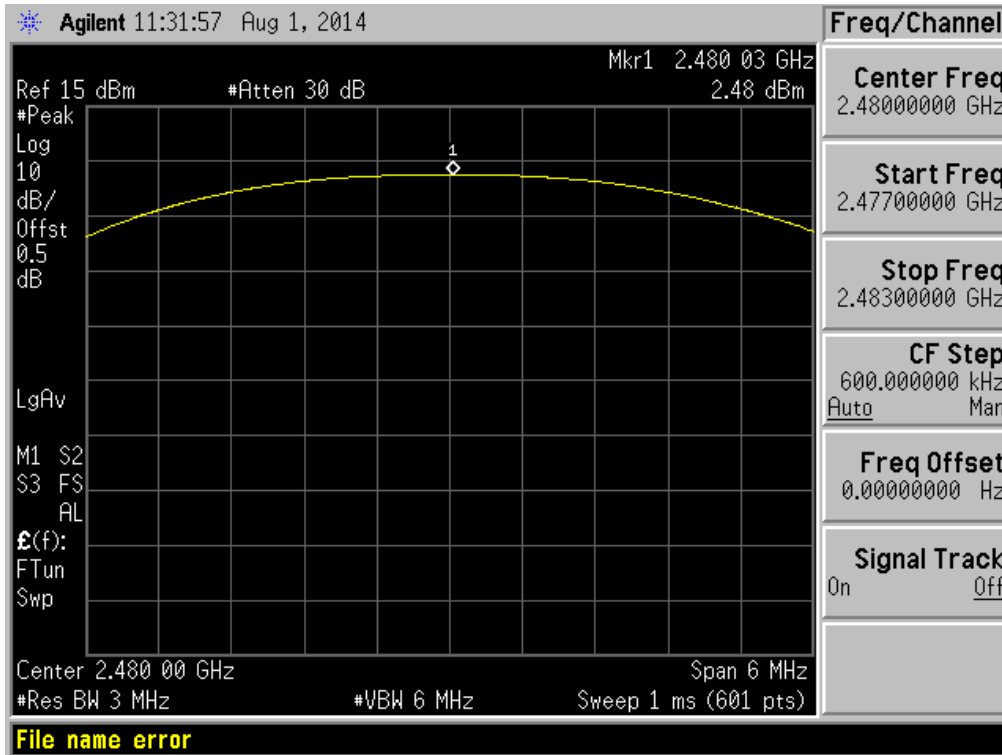
GFSK LOW CHANNEL



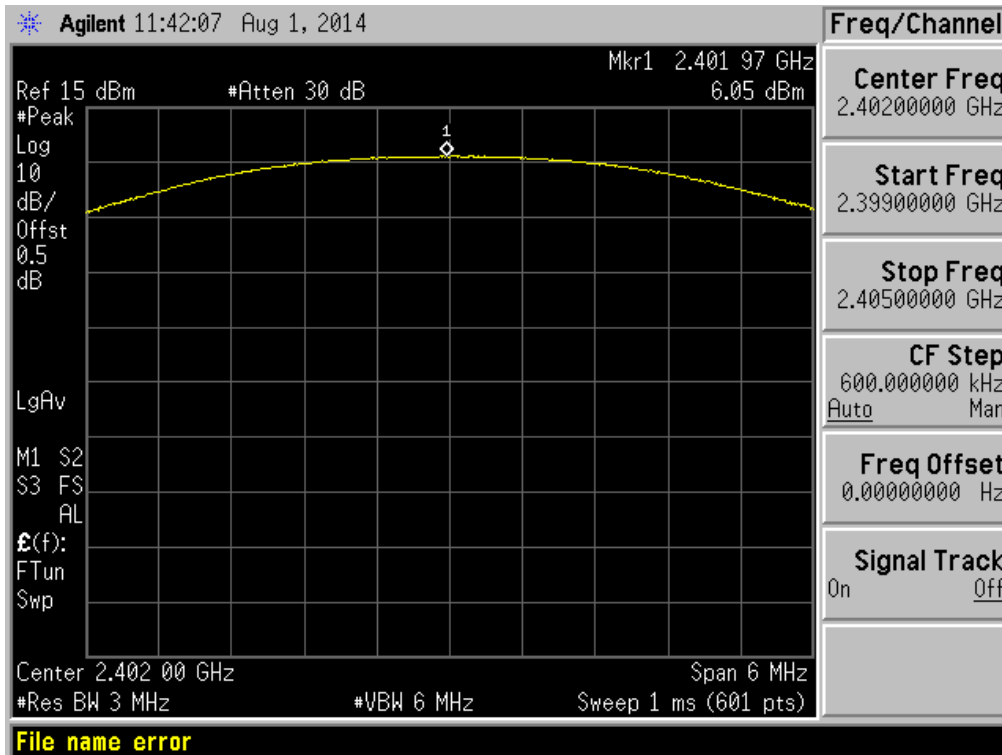
GFSK MID CHANNEL



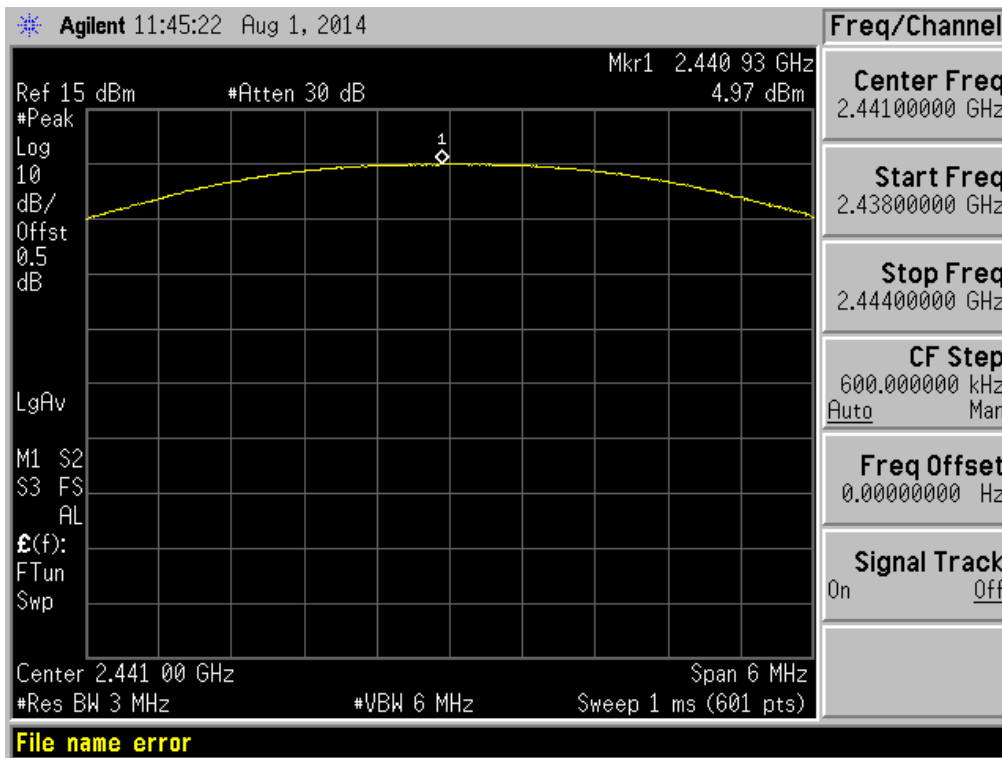
GFSK HIGH CHANNEL



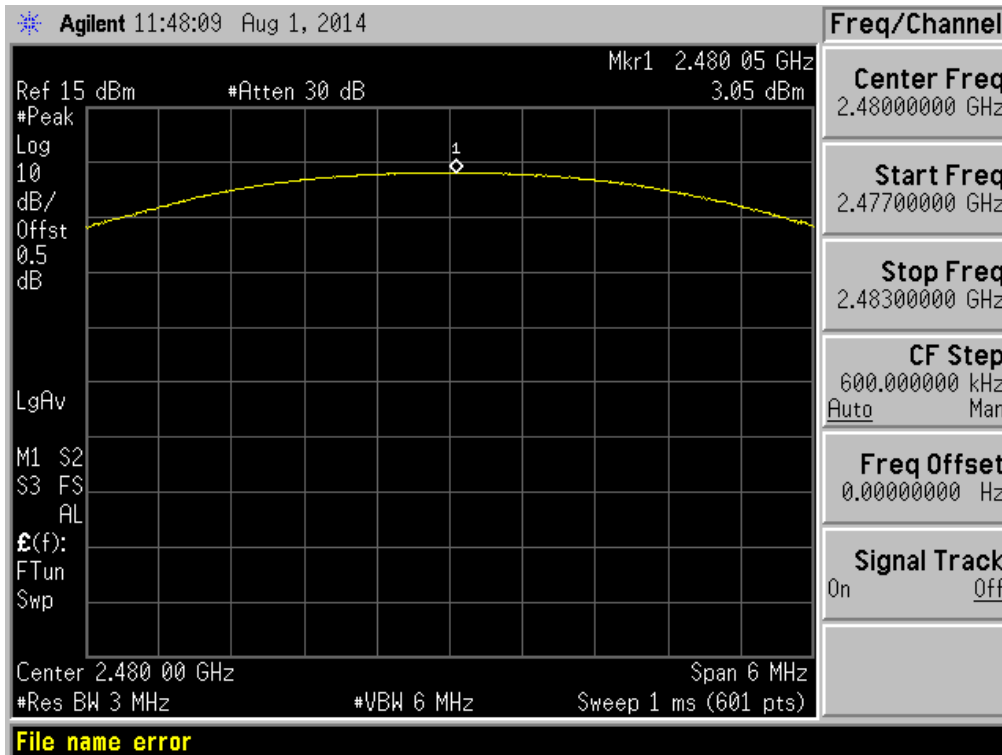
II/4-DQPSK LOW CHANNEL



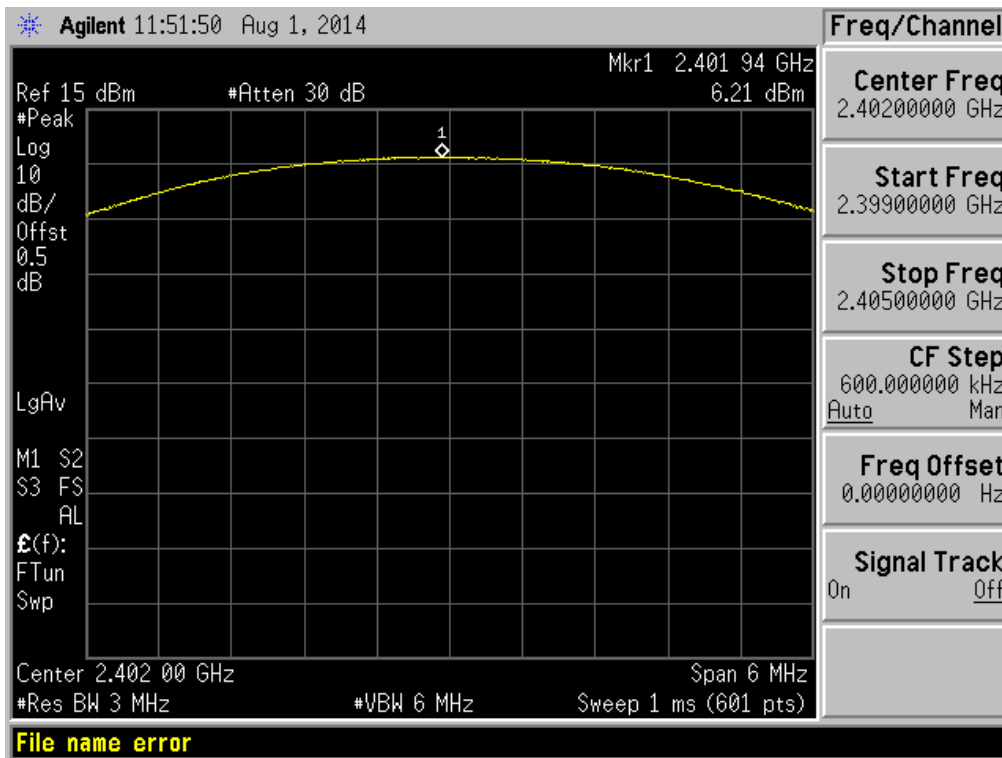
II/4-DQPSK MID CHANAEL



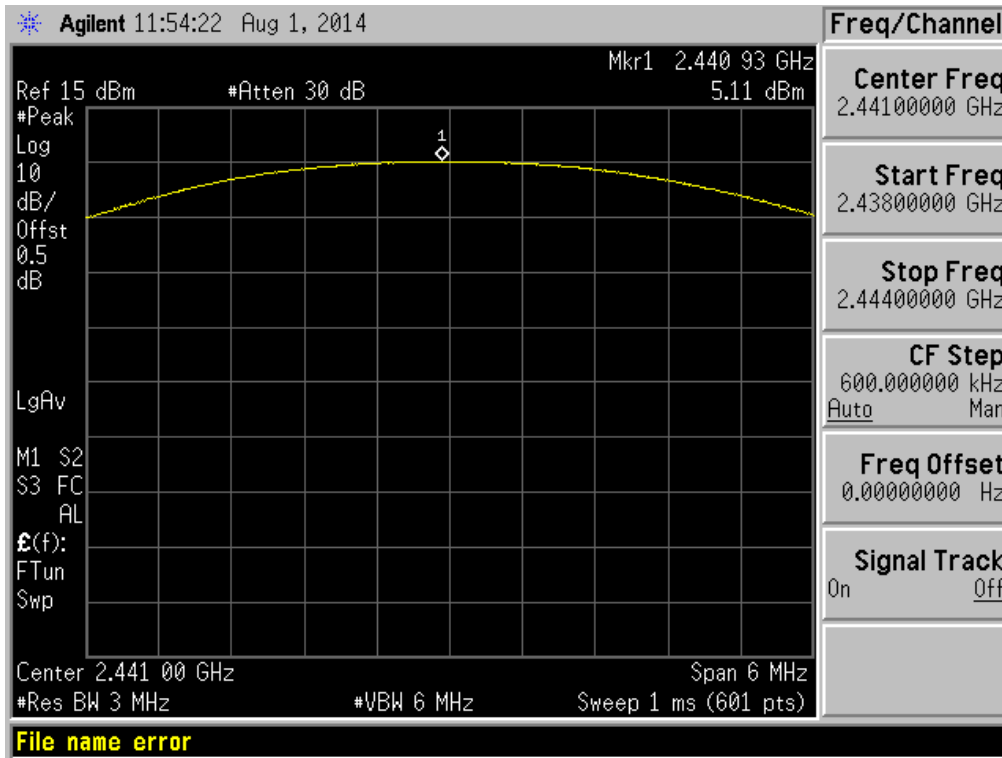
II/4-DQPSK HIGH CHANNEL



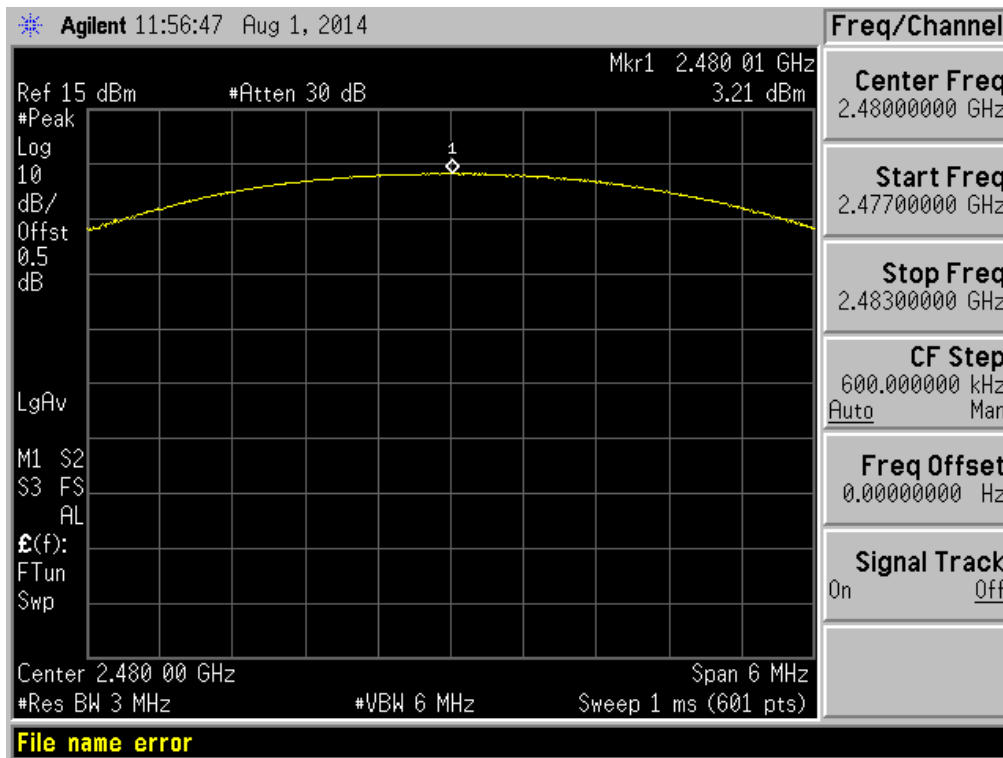
8-DPSK LOW CHANNEL



8-DPSK MID CHANAEL



8-DPSK HIGH CHANNEL



A.3 20dB and 99% bandwidth

Test Data

GFSK Mode:

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (kHz)
Low	2402	1.140	998.1461
Middle	2441	1.136	995.5241
High	2480	1.138	995.5477

π/4-DQPSK Mode:

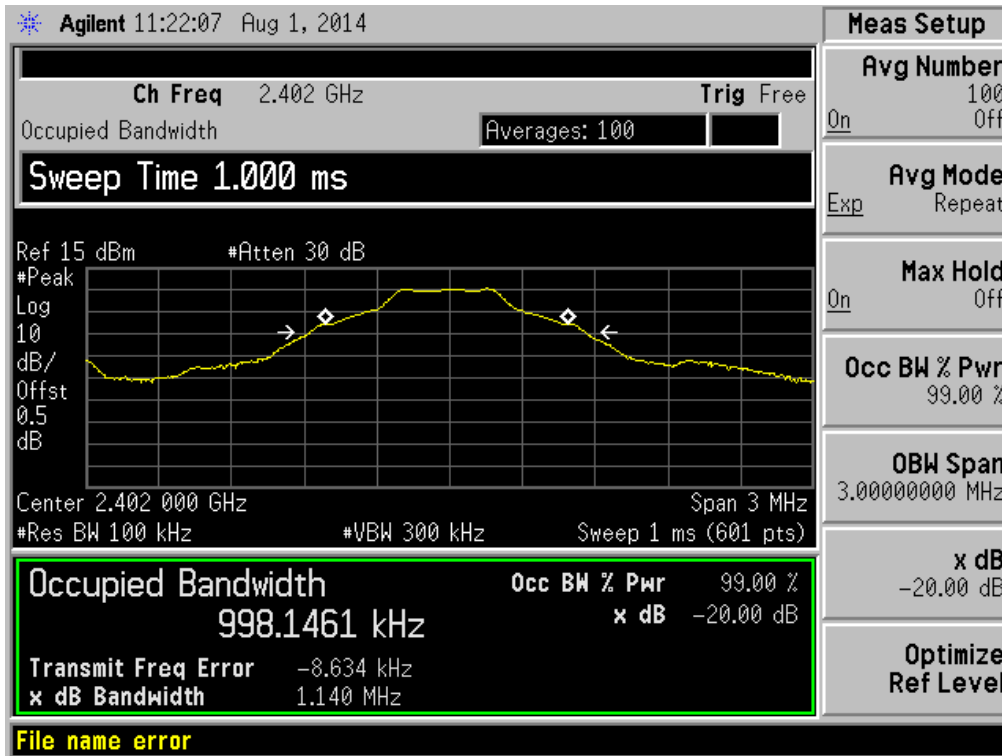
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.398	1.3078
Middle	2441	1.401	1.3025
High	2480	1.403	1.2992

8-DPSK Mode:

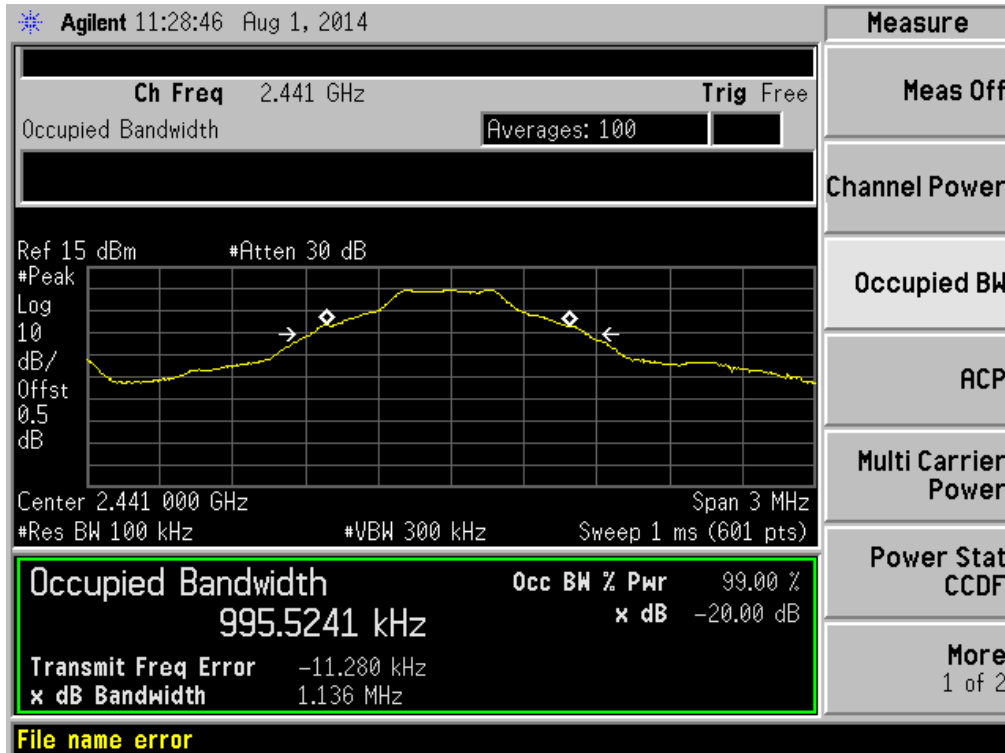
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.400	1.2816
Middle	2441	1.406	1.2957
High	2480	1.407	1.3065

Test plots

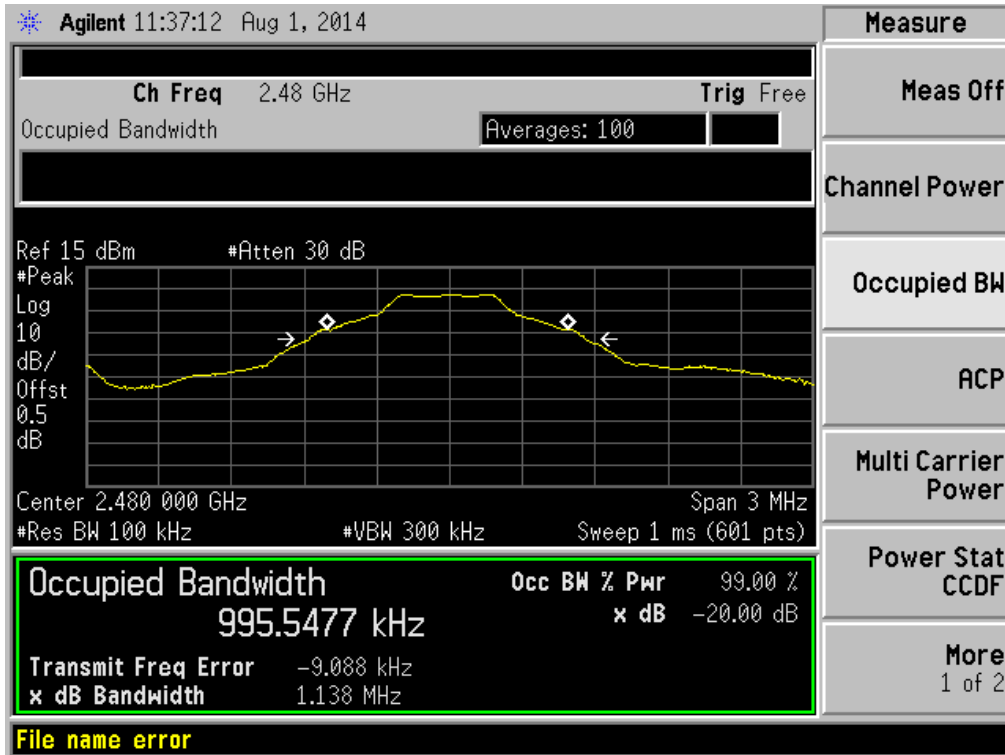
GFSK LOW CHANNEL



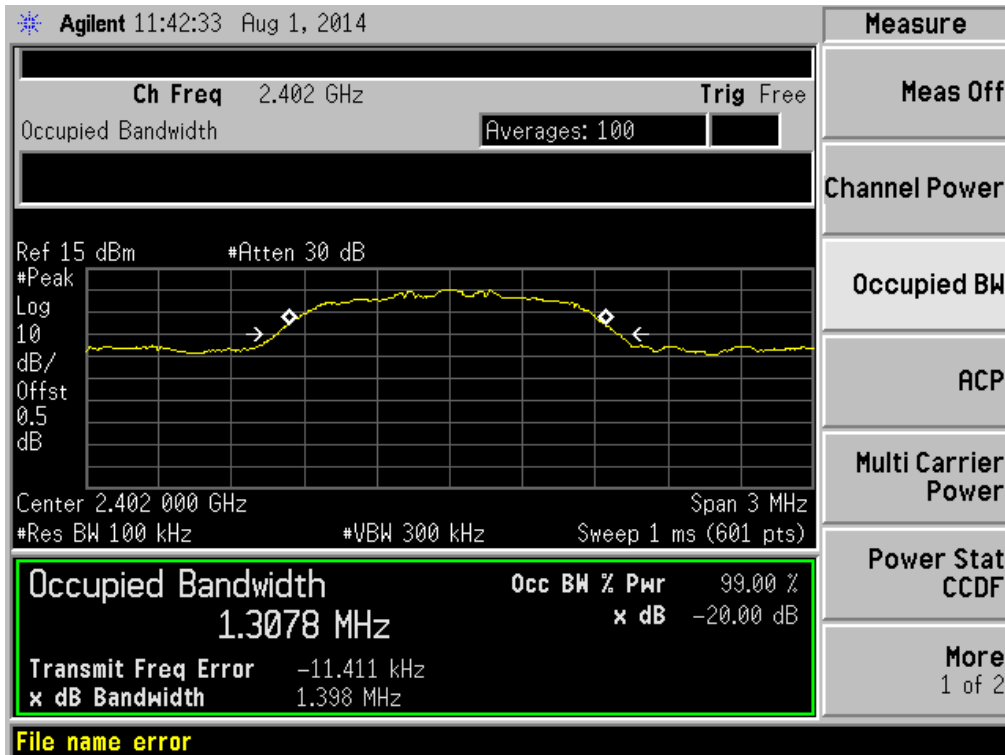
GFSK MID CHANNEL



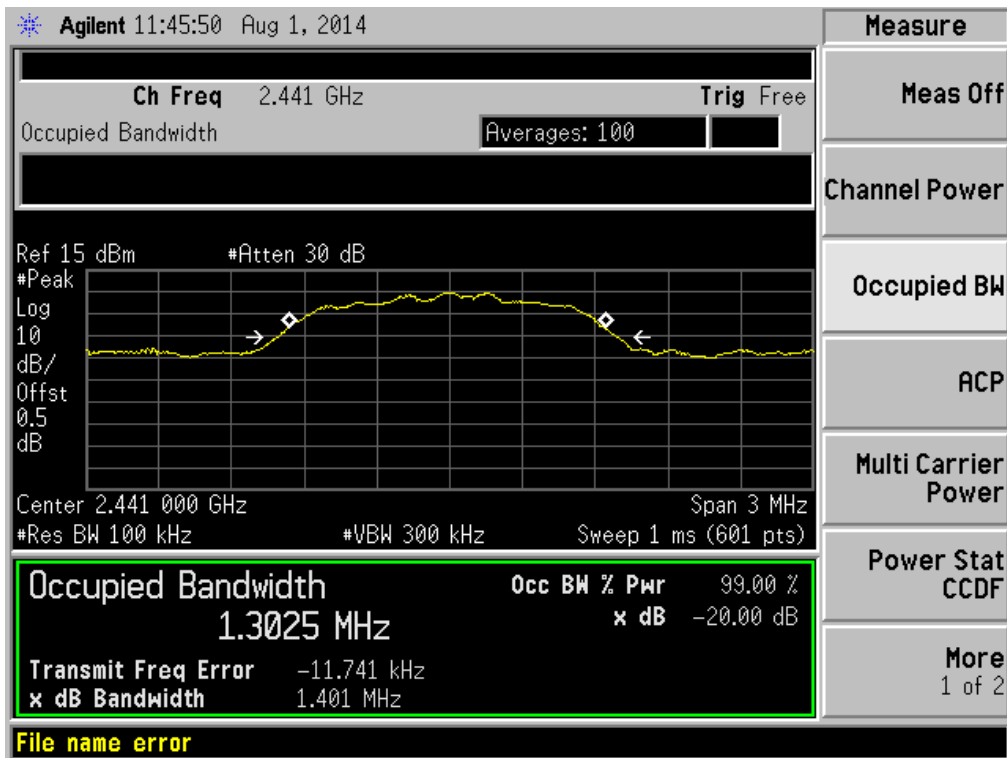
GFSK HIGH CHANNEL



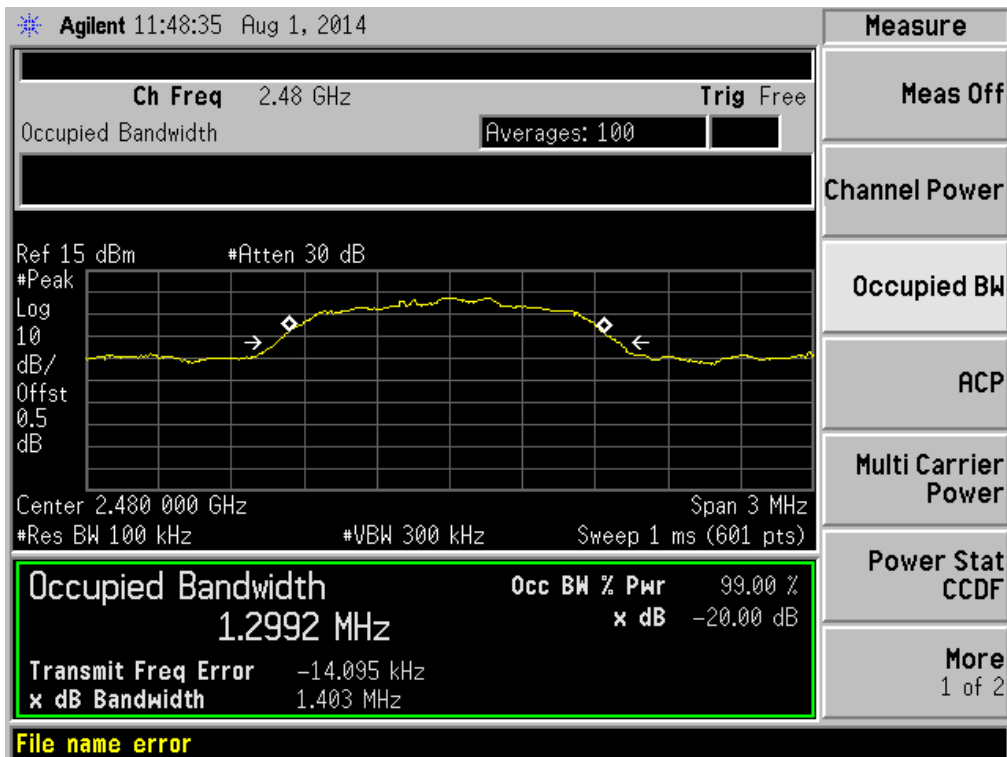
II/4-DQPSK LOW CHANNEL



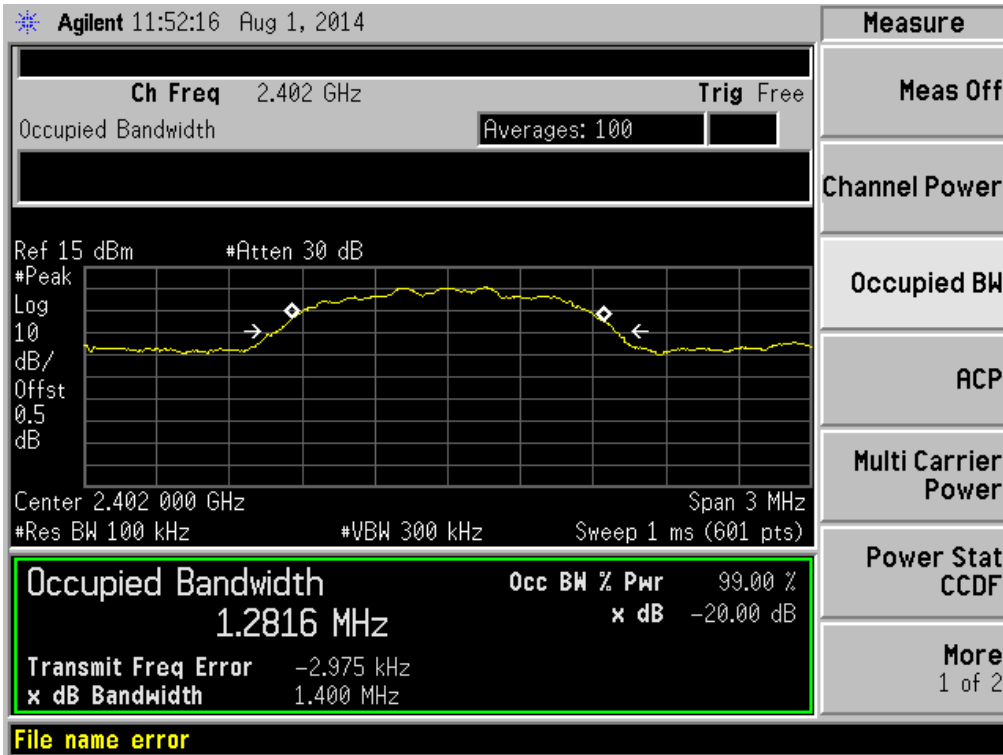
II/4-DQPSK MID CHANAEL



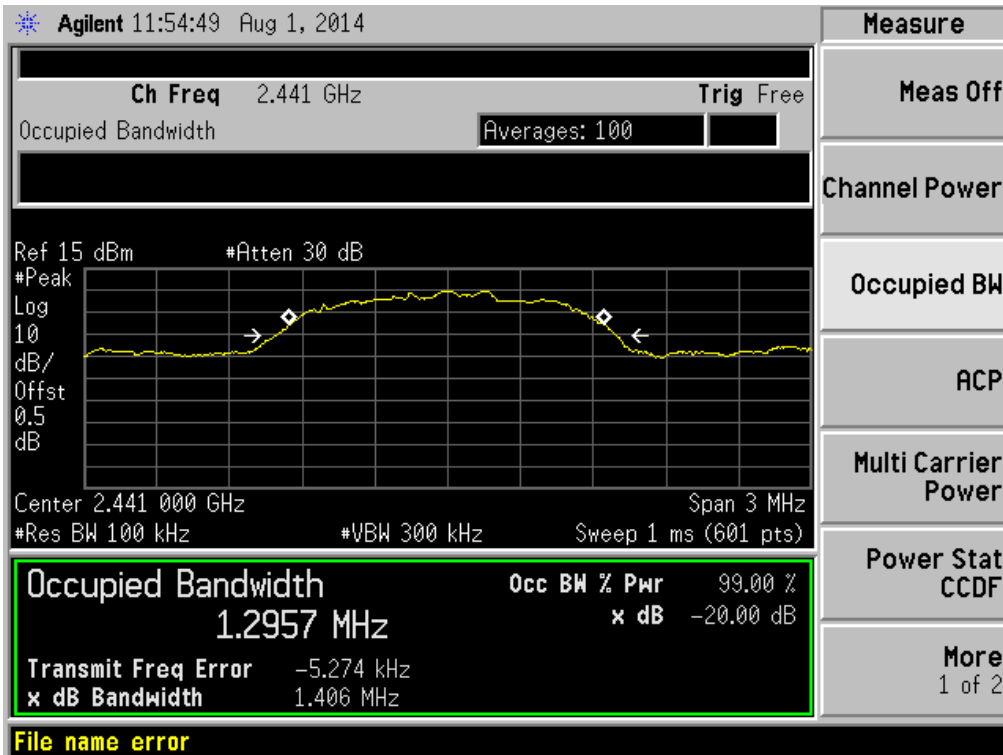
II/4-DQPSK HIGH CHANNEL



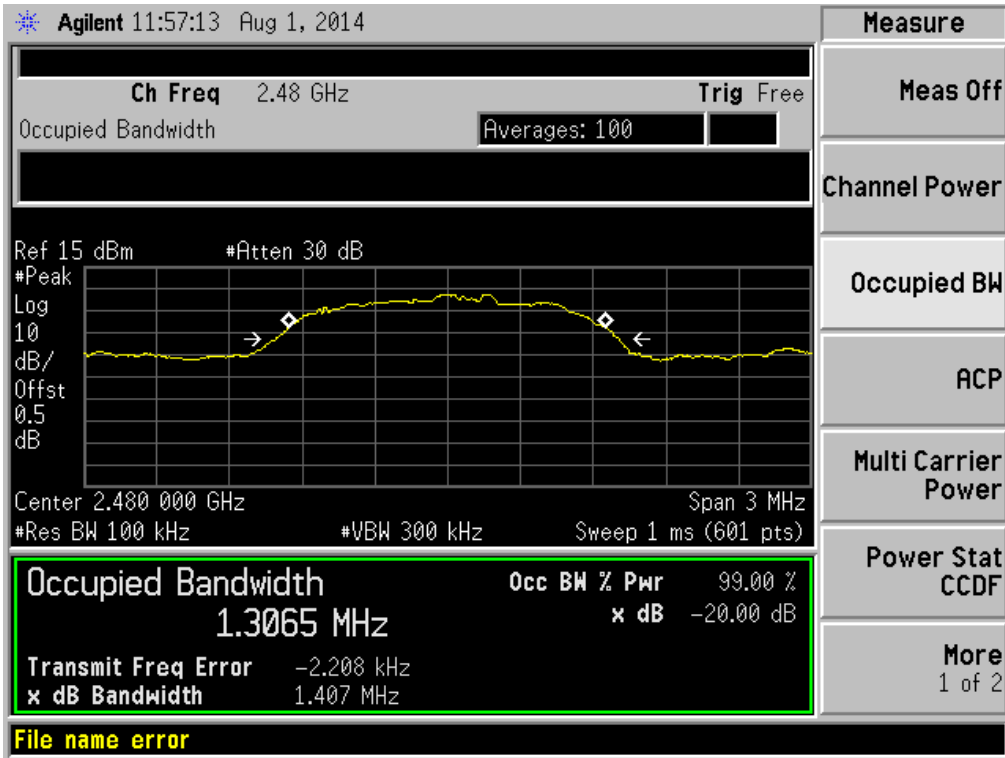
8-DPSK LOW CHANNEL



8-DPSK MID CHANAEL



8-DPSK HIGH CHANNEL



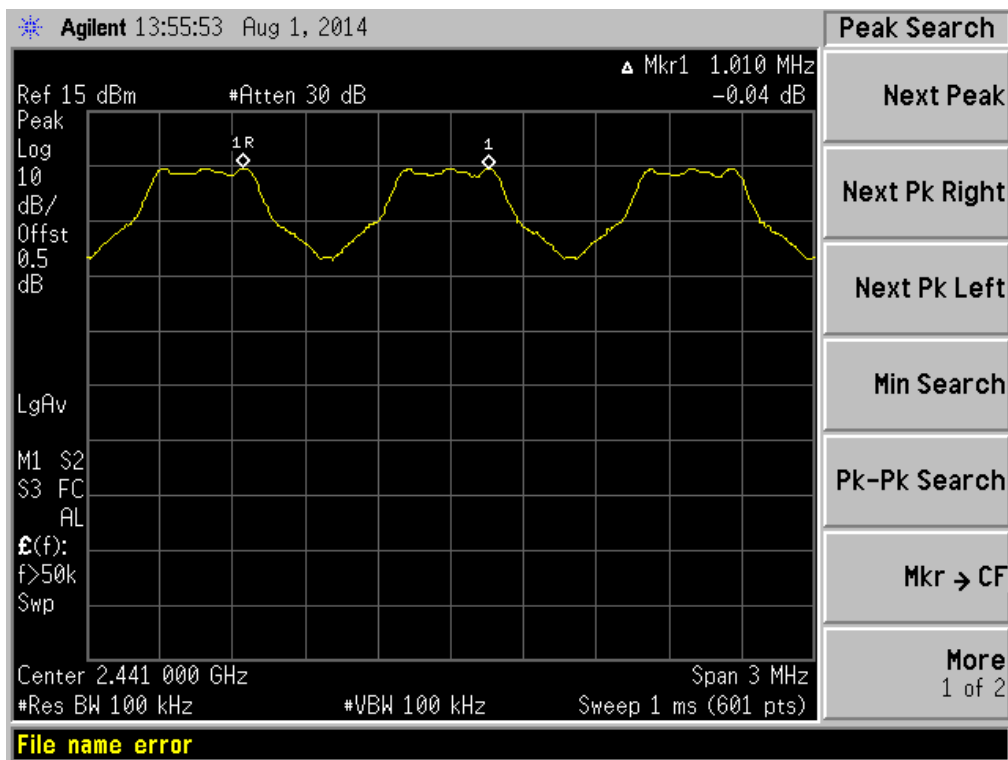
A.4 Hopping Frequency Separation

Test Data

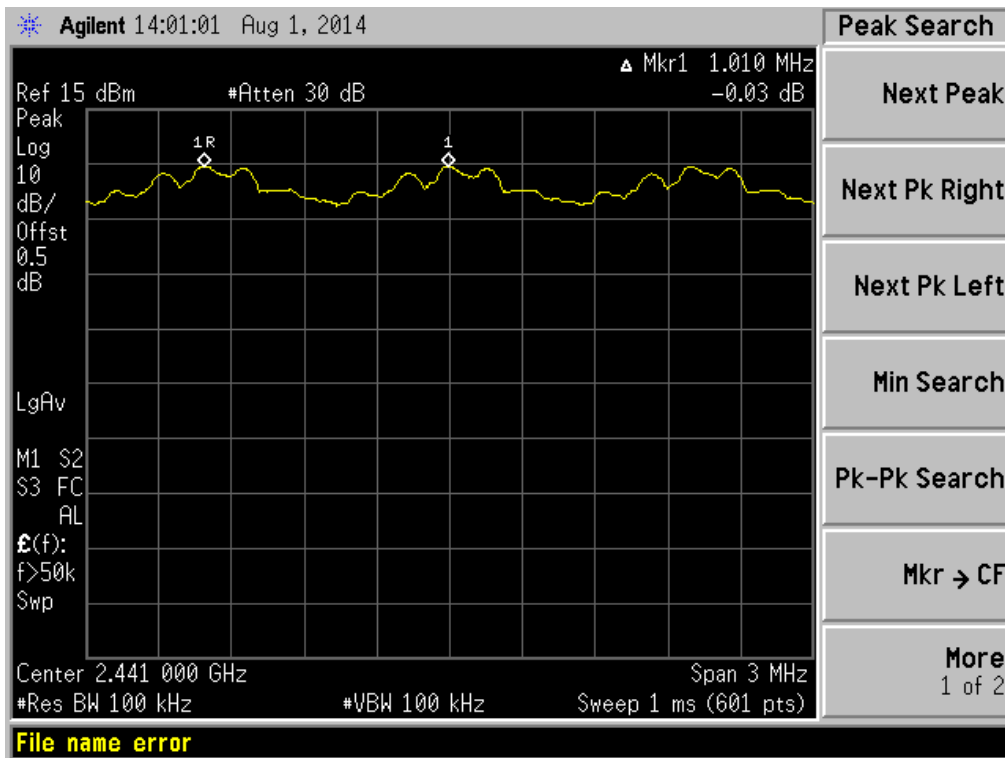
Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Two-thirds of the 20dB bandwidth (MHz)	Verdict
GFSK	1.010	1.140	0.760	PASS
Π/4-DQPSK Mode	1.010	1.403	0.935	PASS
8-DPSK Mode	1.005	1.407	0.938	PASS

Test plots

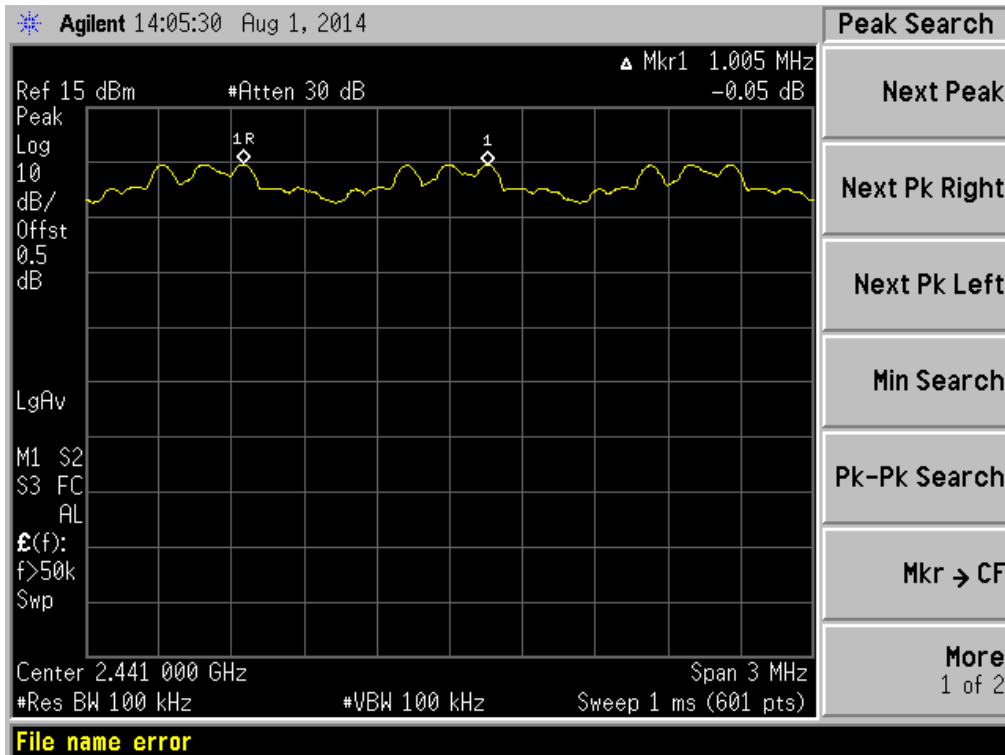
GFSK



II/4-DQPSK



8-DPSK



A.5 Average Time of Occupancy

Test Data

GFSK Mode:

DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.420	134.404	0.4	PASS
DH 3	1.667	266.728	0.4	PASS
DH 5	2.90	309.343	0.4	PASS

□/4-DQPSK Mode:

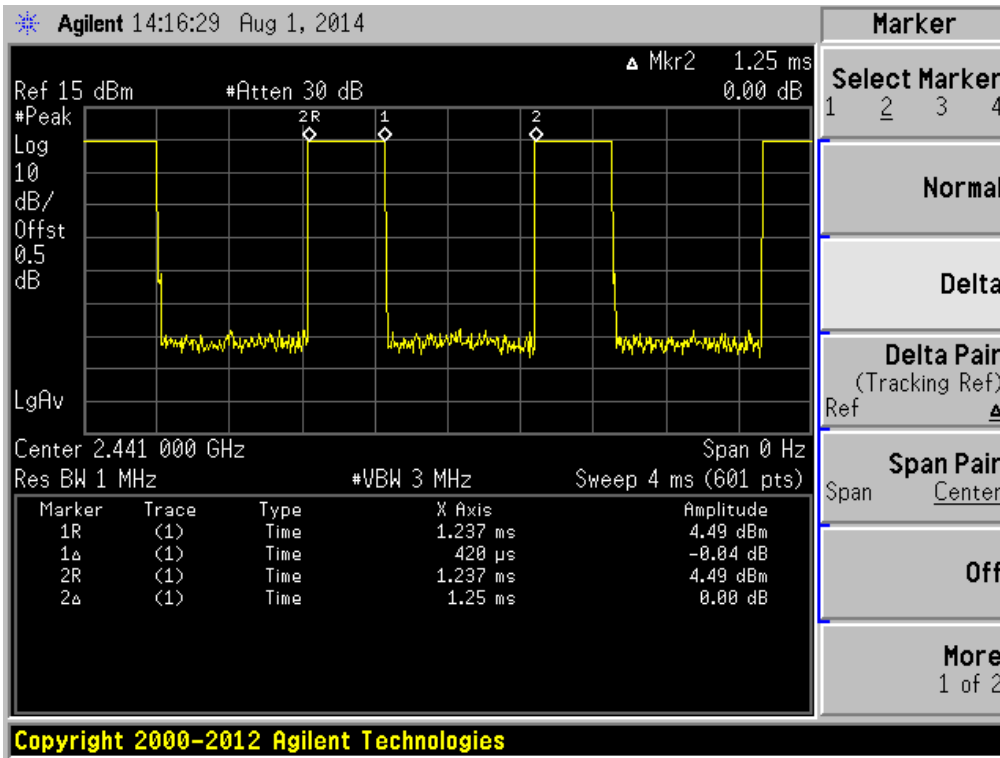
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.420	134.404	0.4	PASS
DH 3	1.667	266.728	0.4	PASS
DH 5	2.90	309.343	0.4	PASS

8-DPSK Mode:

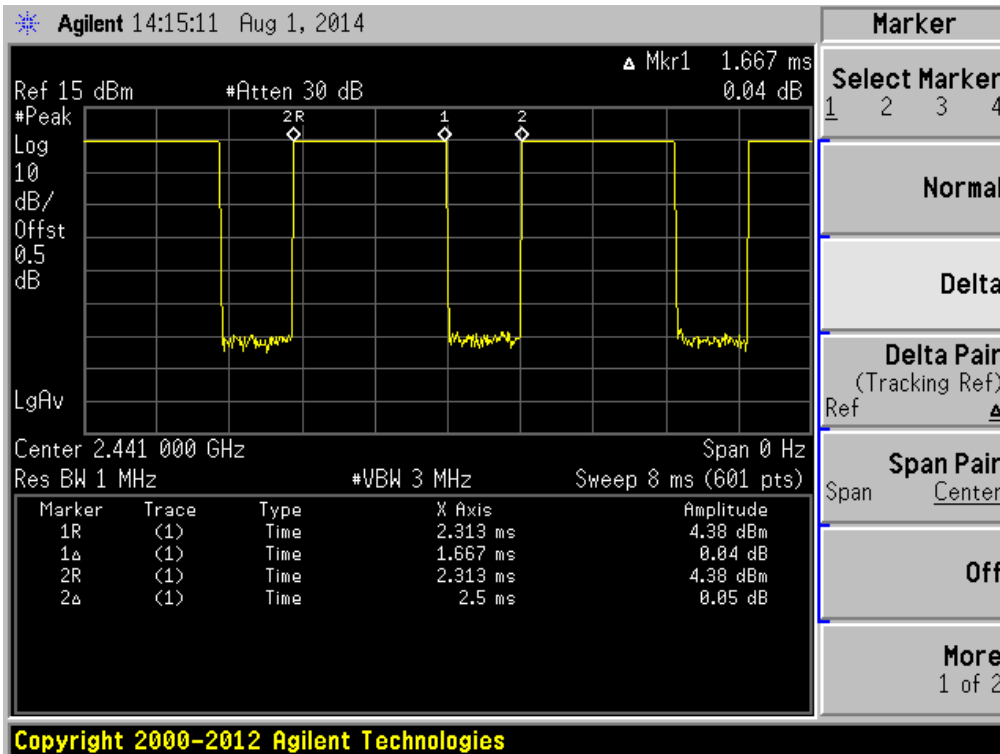
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.420	134.404	0.4	PASS
DH 3	1.667	266.728	0.4	PASS
DH 5	2.90	309.343	0.4	PASS

Test Plots

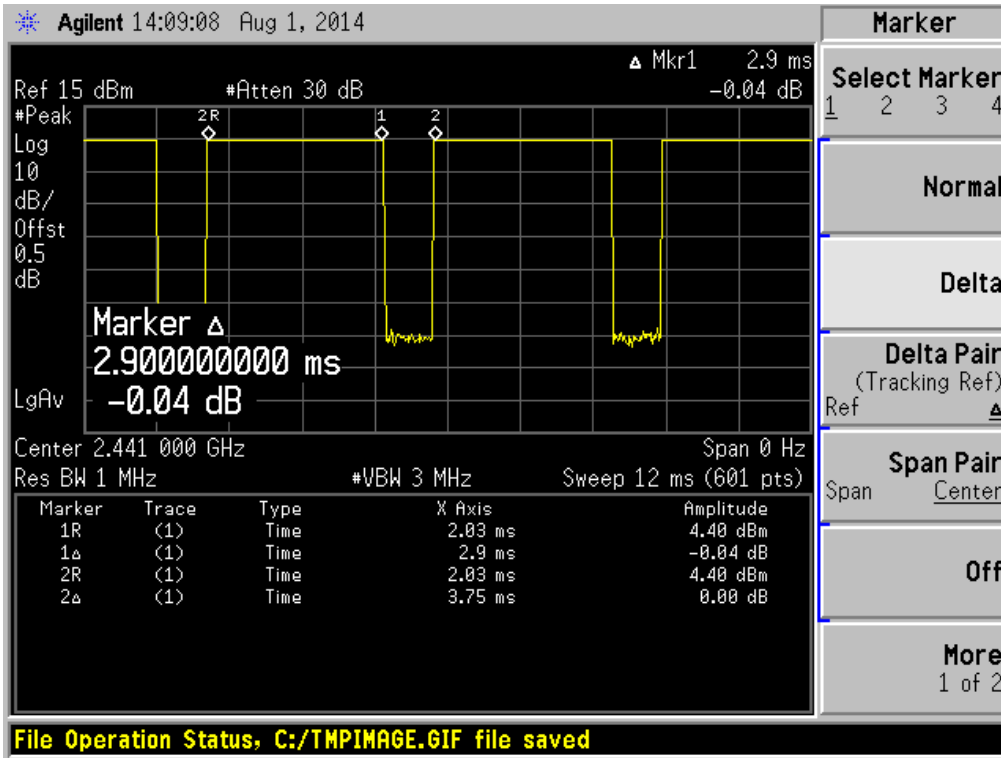
GFSK DH1



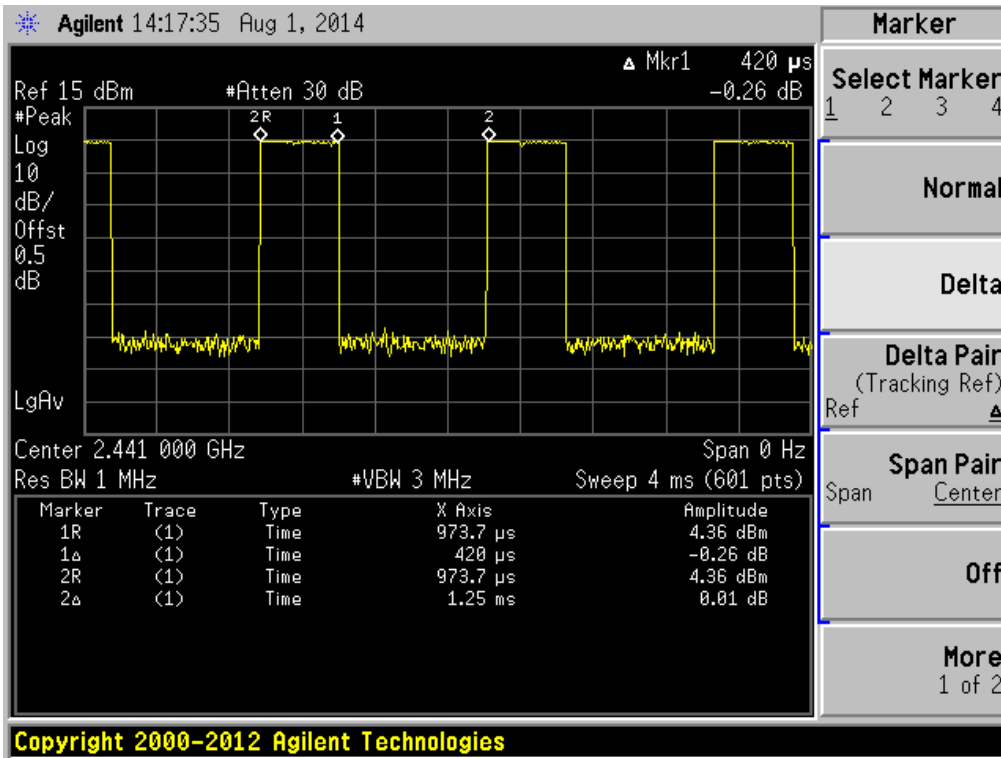
GFSK DH3



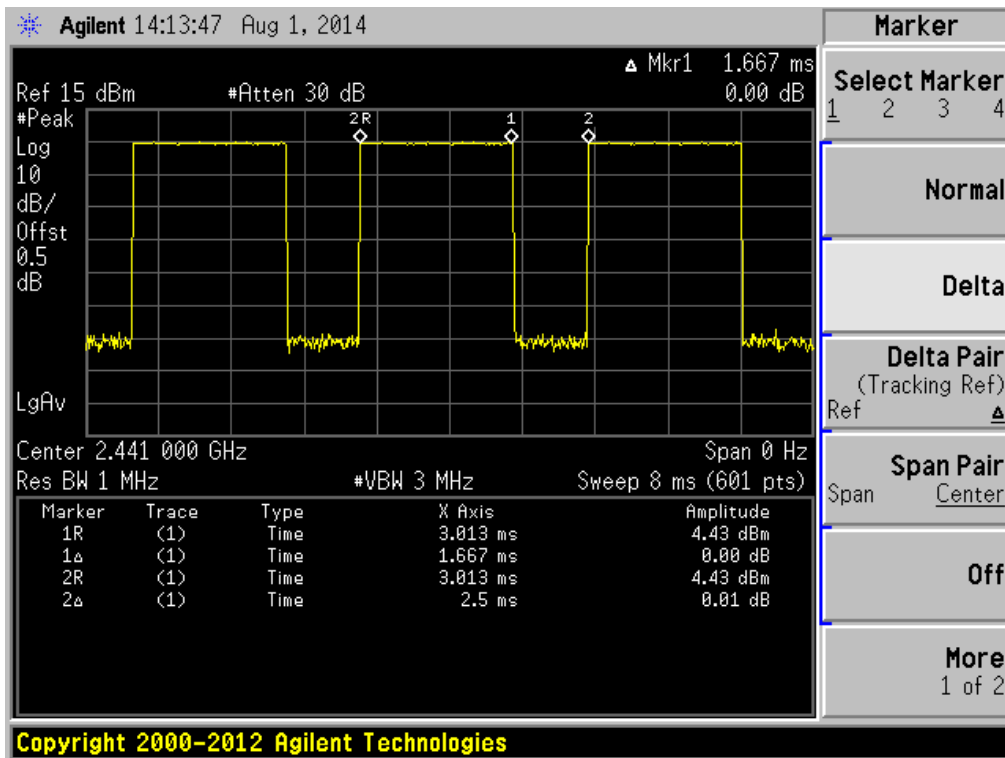
GFSK DH5



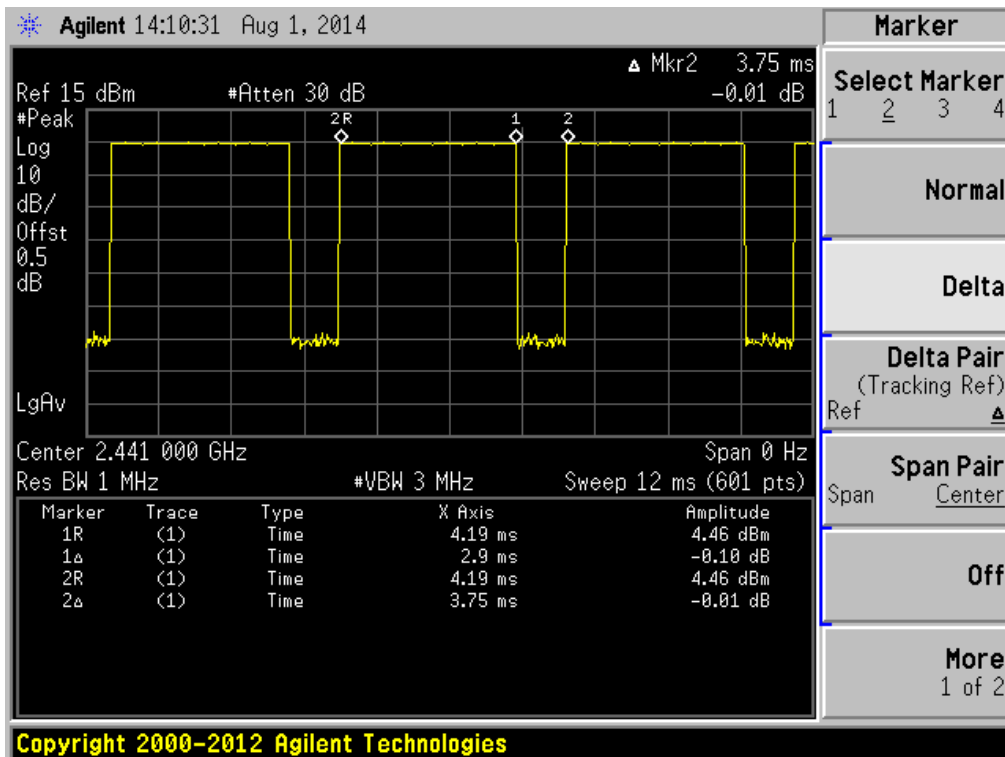
II/4-DQPSK DH1



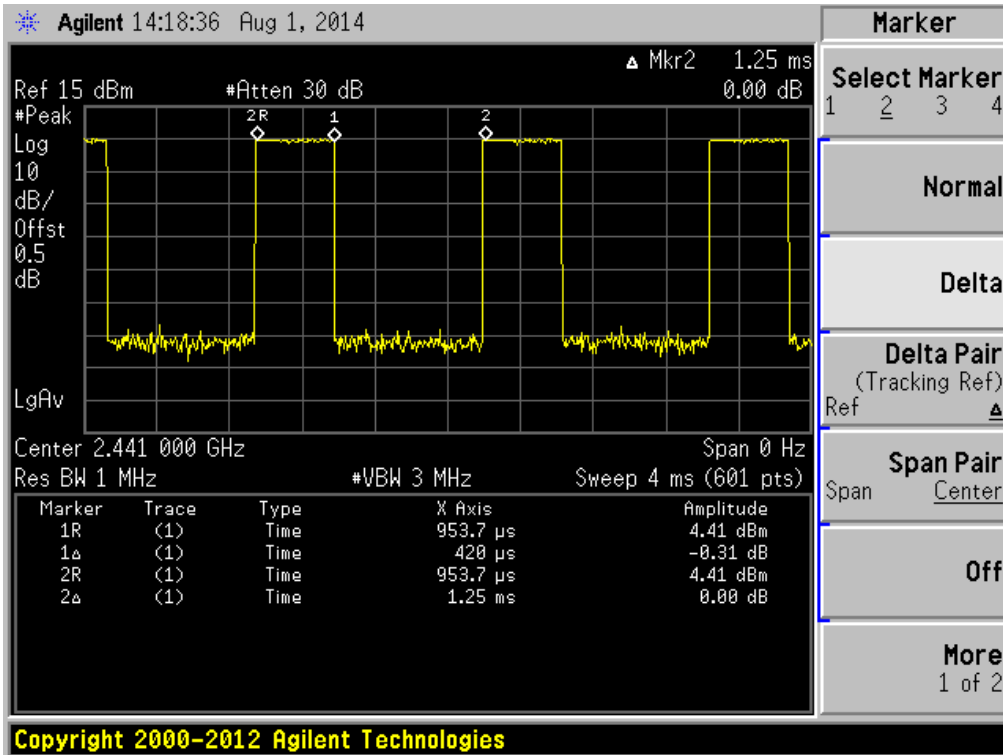
II/4-DQPSK DH3



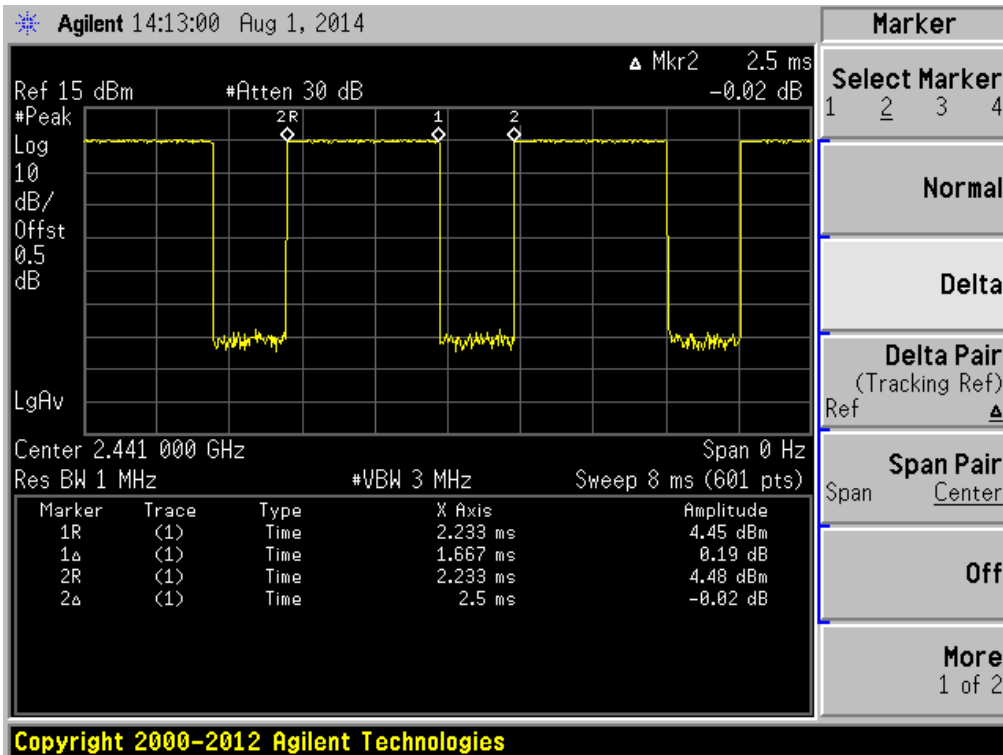
II/4-DQPSK DH5



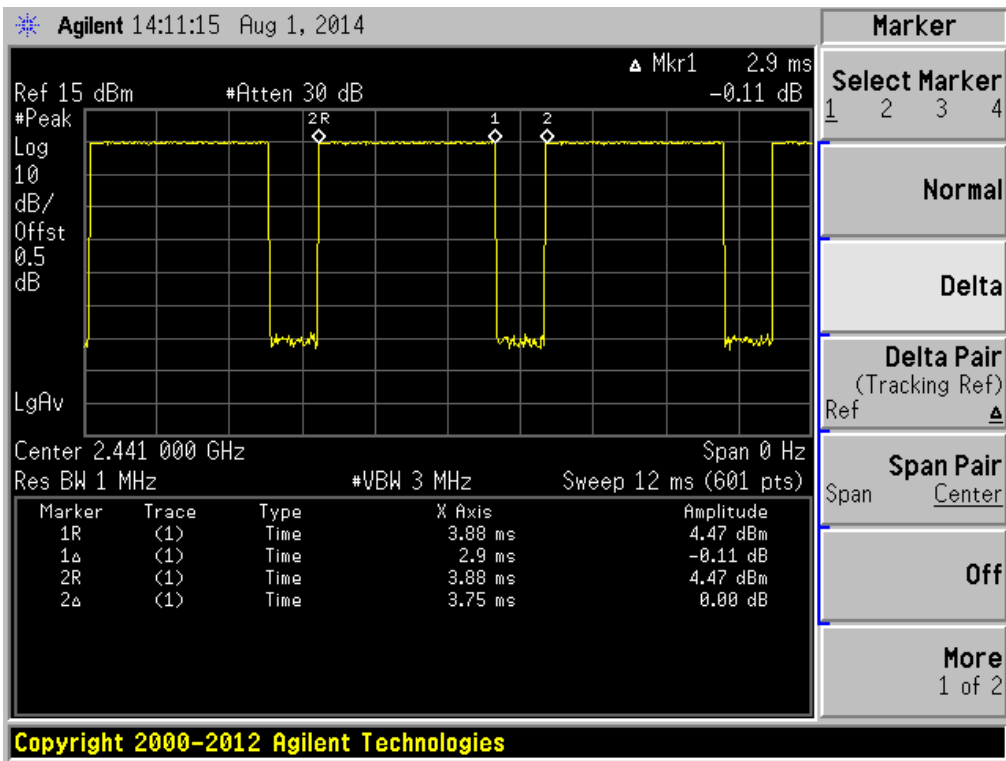
8-DPSK DH1



8-DPSK DH3



8-DPSK DH5



A.6 Conducted Spurious Emissions

Test Data

GFSK Mode:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
Low	2402	-43.73	5.13	-14.9	PASS
Middle	2441	-41.22	4.19	-15.8	PASS
High	2480	-41.90	2.03	-18.0	PASS

□/4-DQPSK Mode:

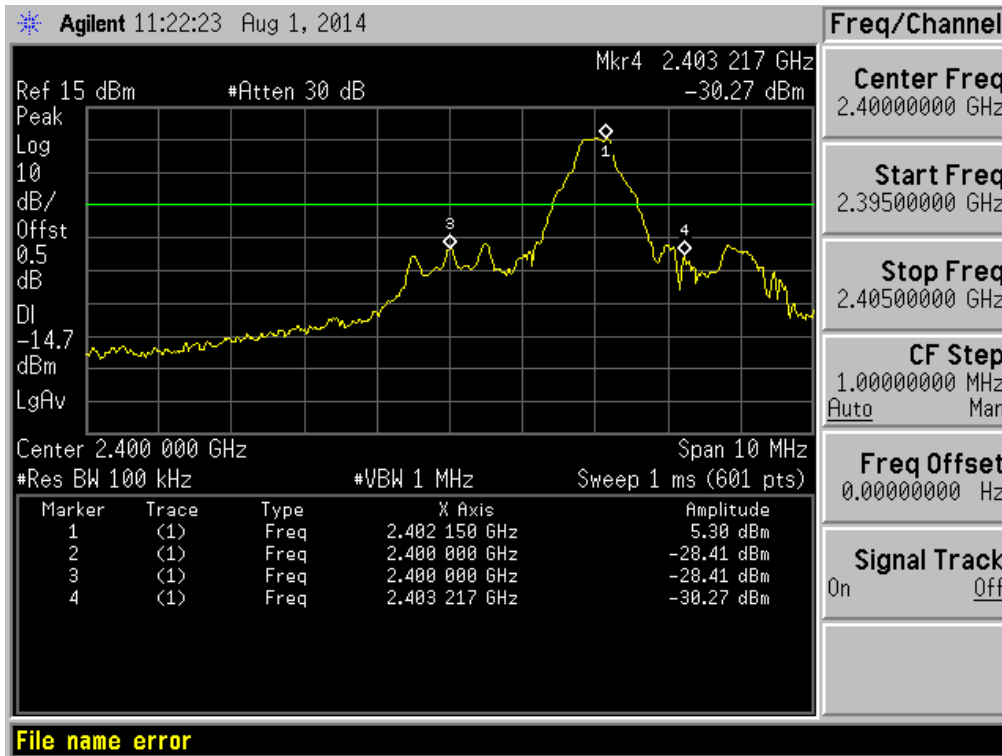
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
Low	2402	-43.62	5.10	-14.9	PASS
Middle	2441	-44.42	4.13	-15.9	PASS
High	2480	-44.64	2.30	-17.7	PASS

8-DPSK Mode:

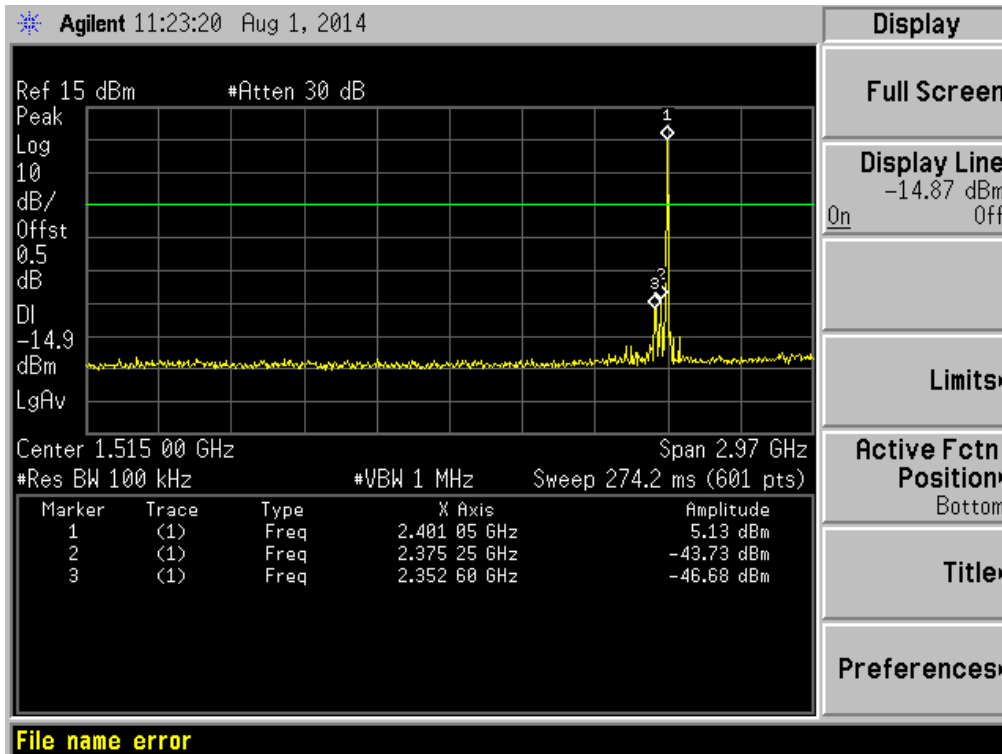
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
Low	2402	-43.37	5.22	-14.8	PASS
Middle	2441	-45.24	3.6	-17.4	PASS
High	2480	-46.00	2.41	-17.6	PASS

Test Plots

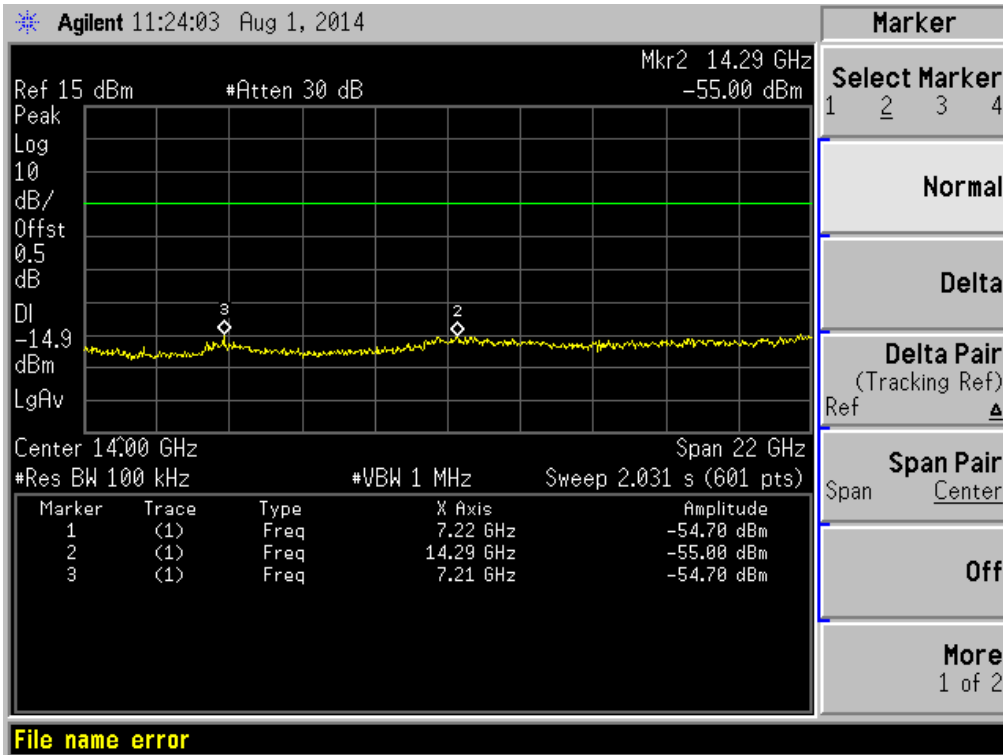
GFSK LOW CHANNEL, BANDEDGE



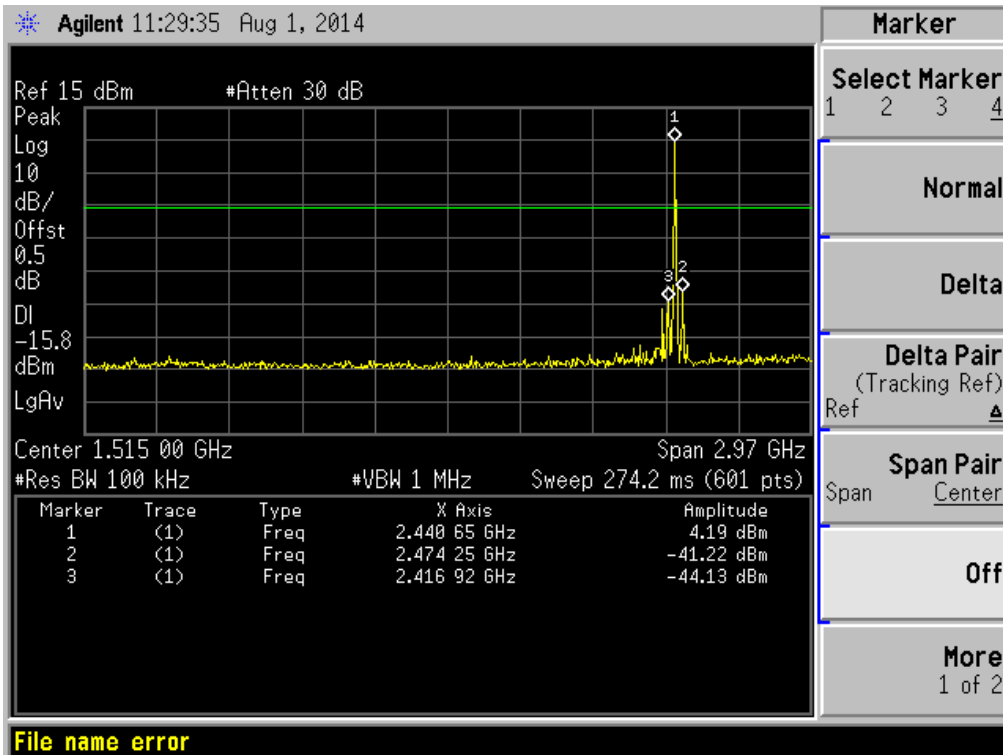
GFSK LOW CHANNEL, SPURIOUS 30MHz~3GHz



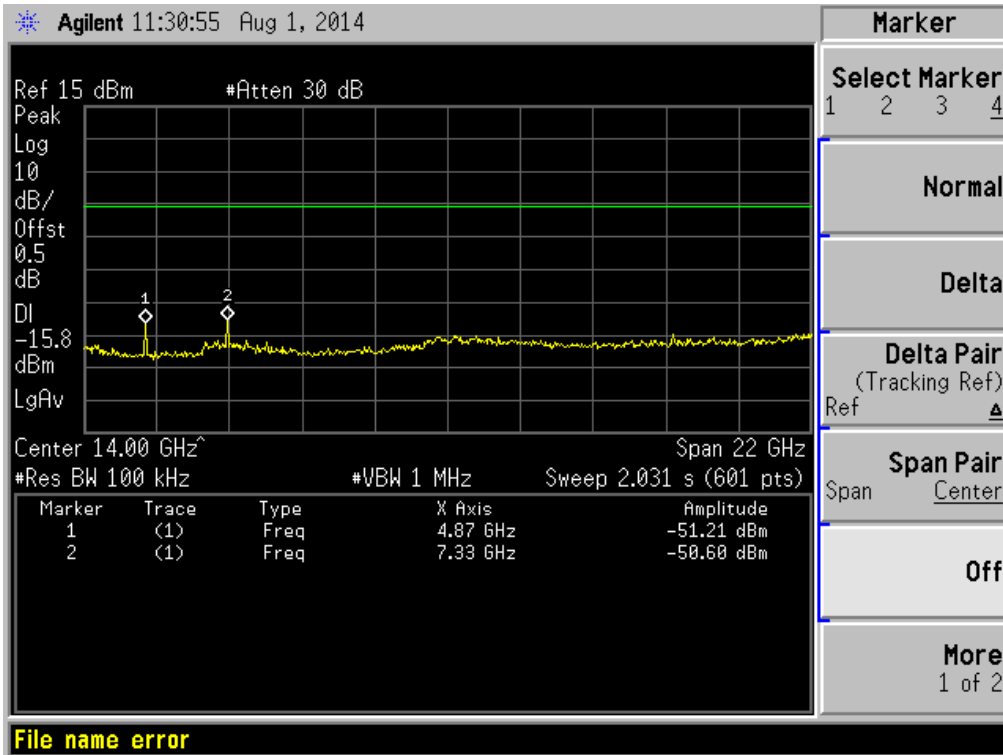
GFSK LOW CHANNEL, SPURIOUS 3GHz~25GHz



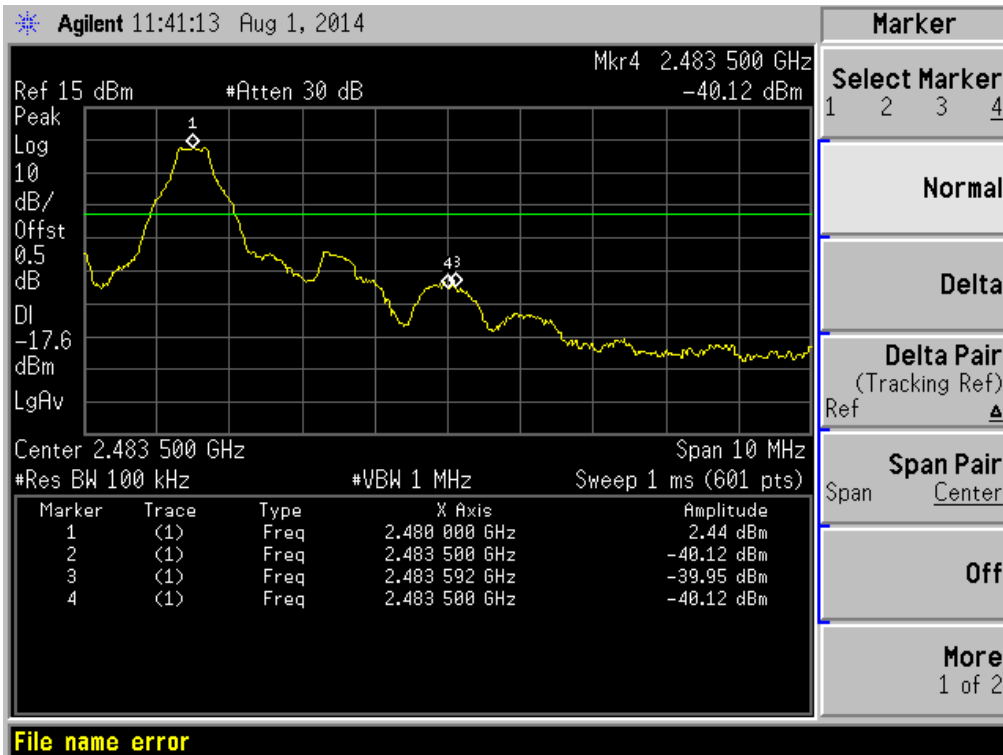
GFSK MID CHANNEL, SPURIOUS 30MHz~3GHz



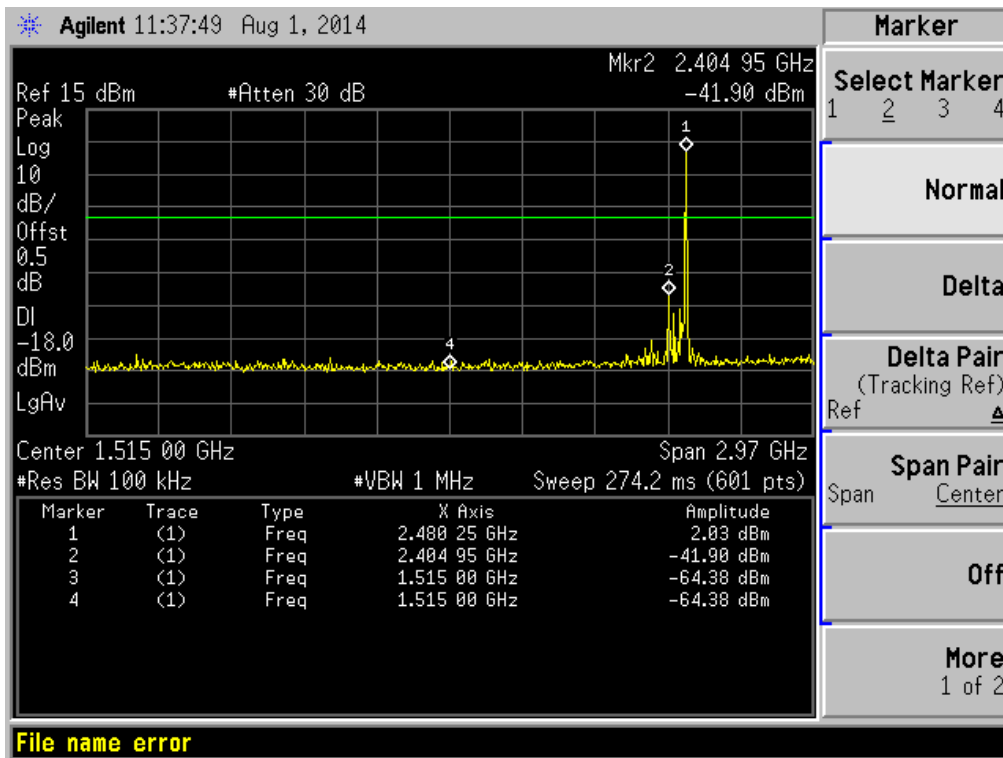
GFSK MID CHANNEL, SPURIOUS 3GHz~25GHz



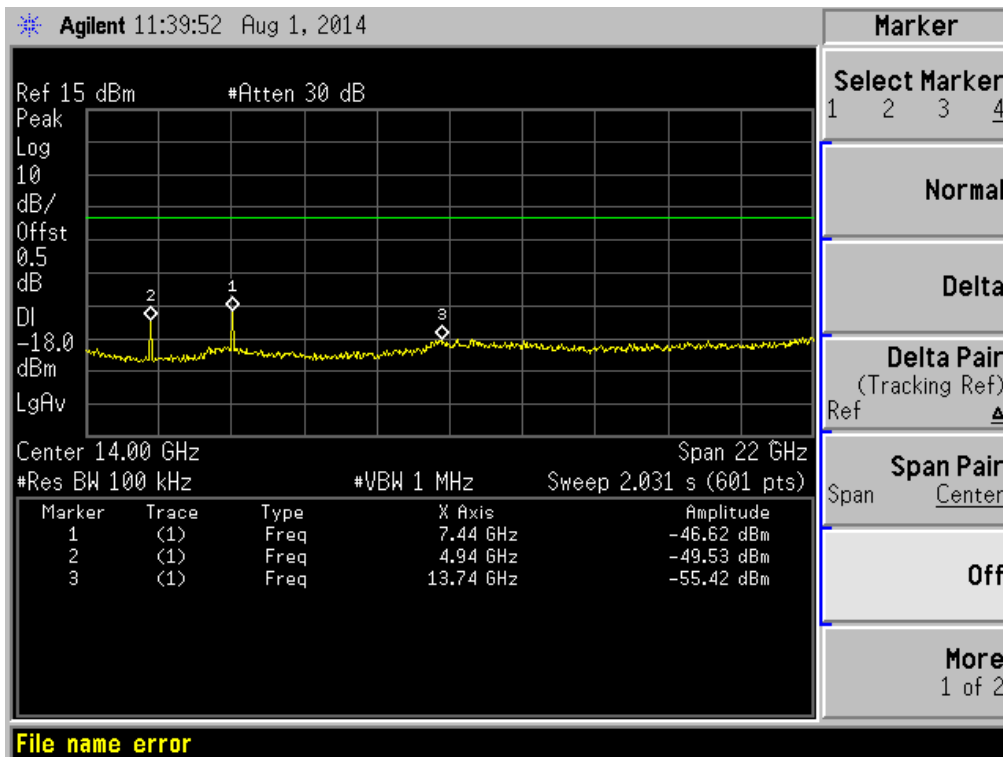
GFSK HIGH CHANNEL, BANDEDGE



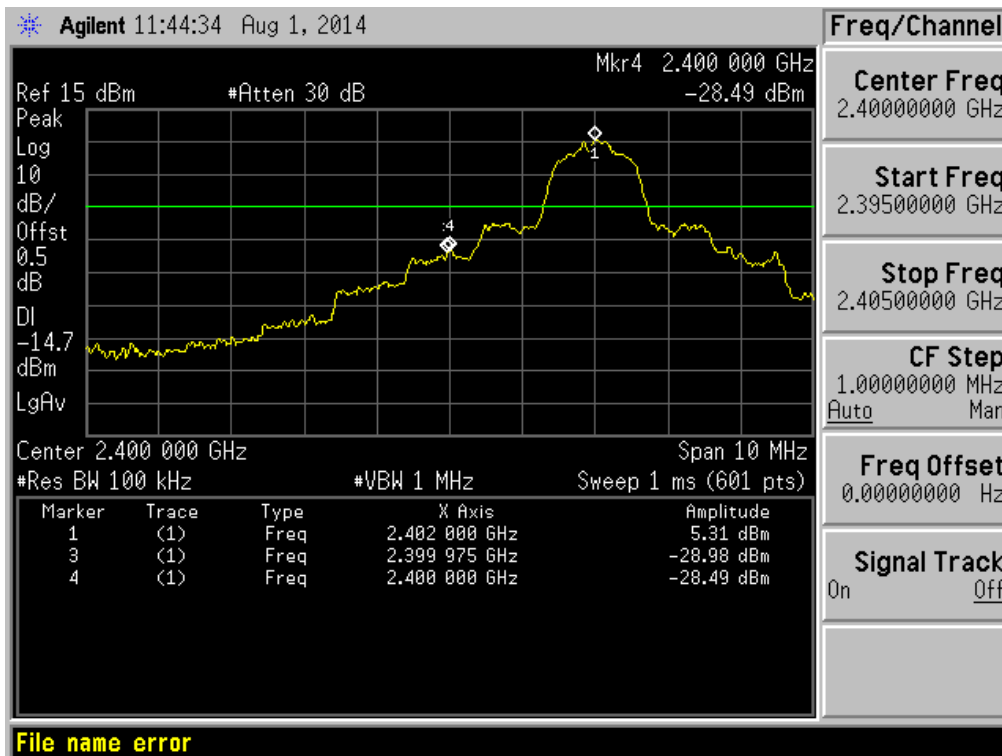
GFSK HIGH CHANNEL, SPURIOUS 30MHz~3GHz



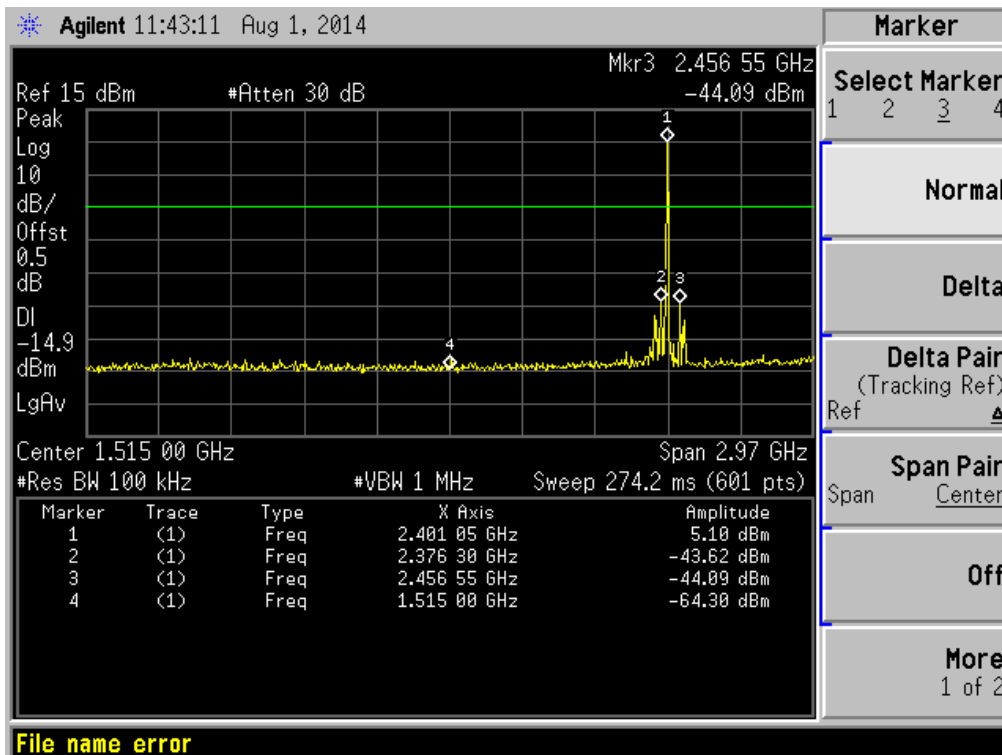
GFSK HIGH CHANNEL, SPURIOUS 3GHz~25GHz



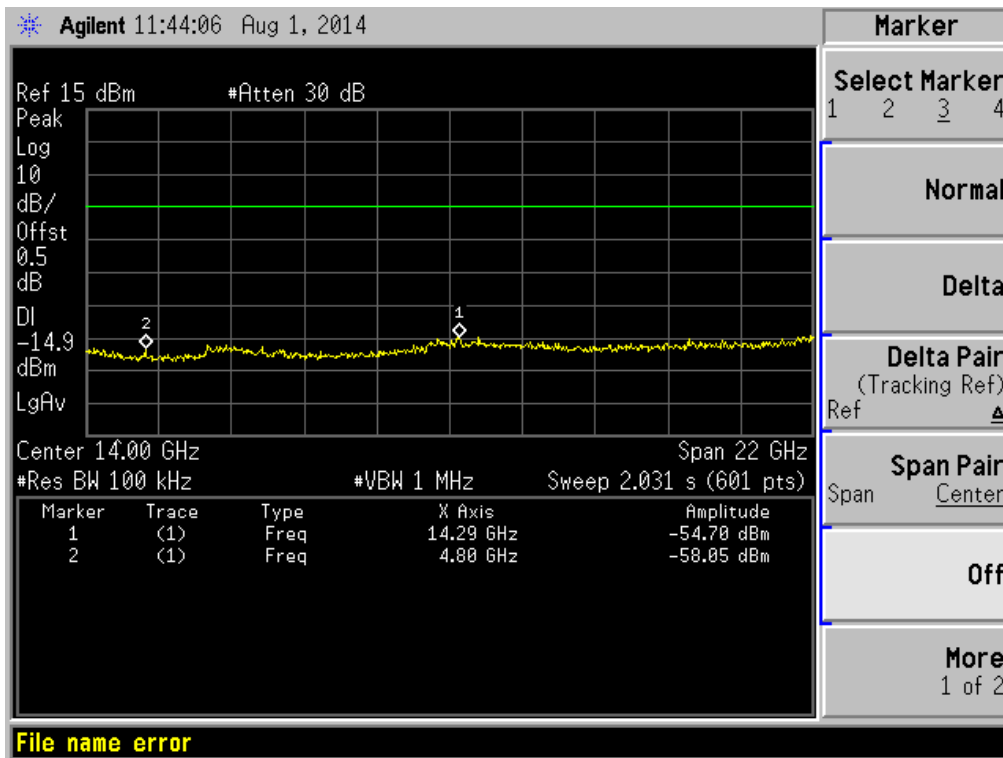
II/4-DQPSK LOW CHANNEL, BANDEDGE



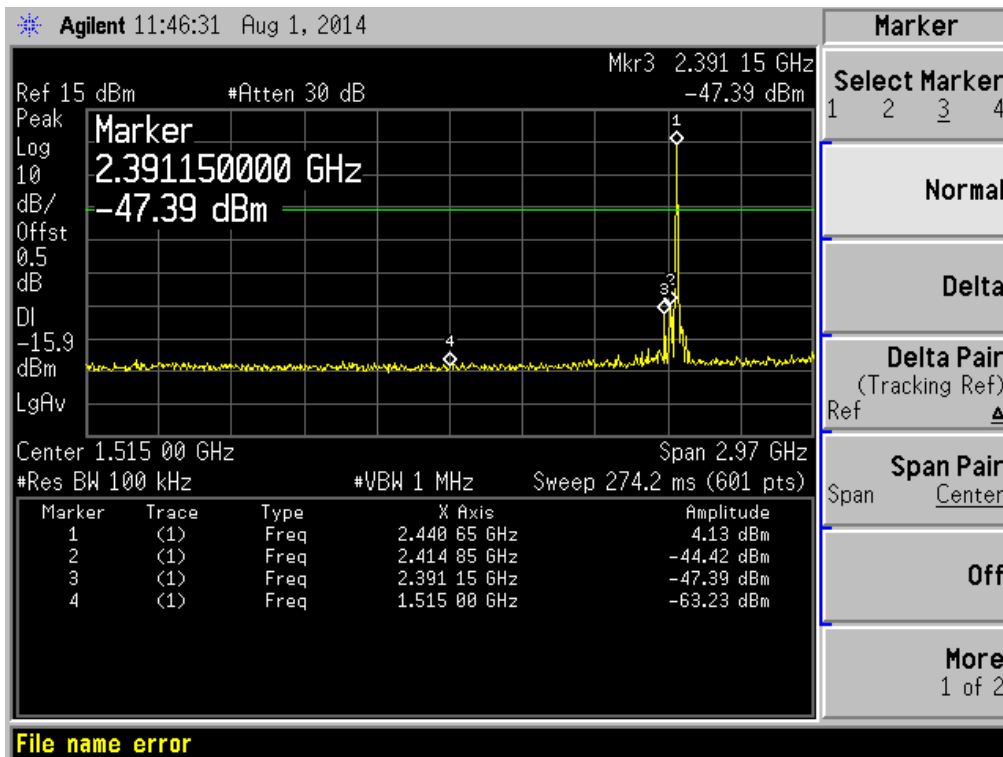
II/4-DQPSK LOW CHANNEL, SPURIOUS 30MHz~3GHz



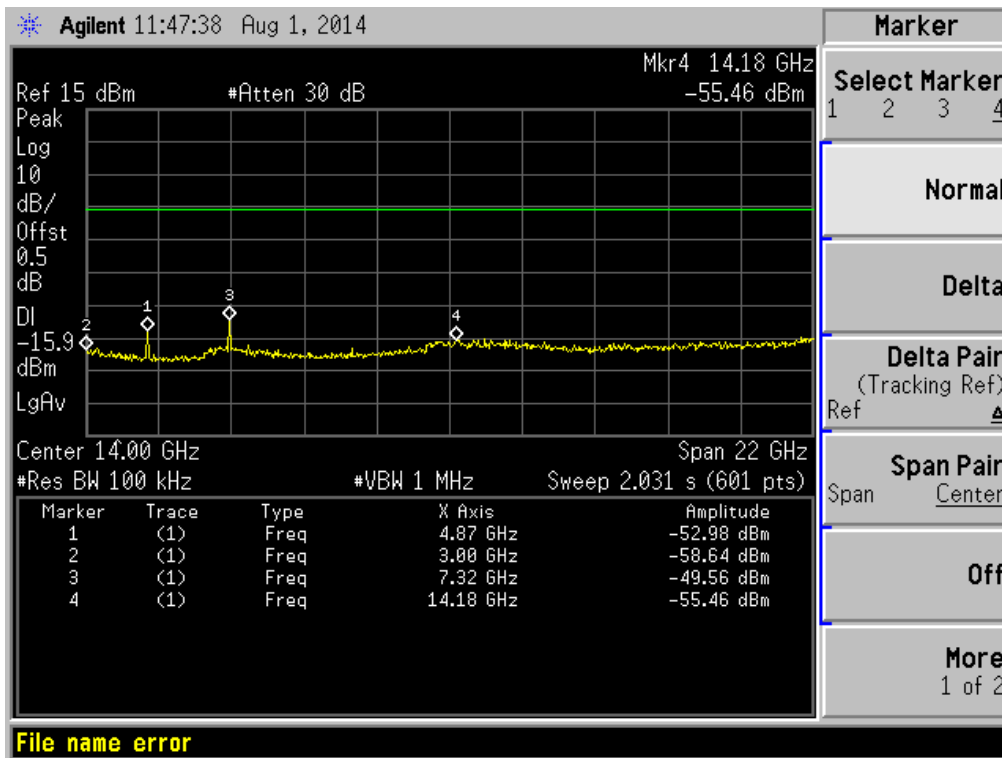
II/4-DQPSK LOW CHANNEL, SPURIOUS 3GHz~25GHz



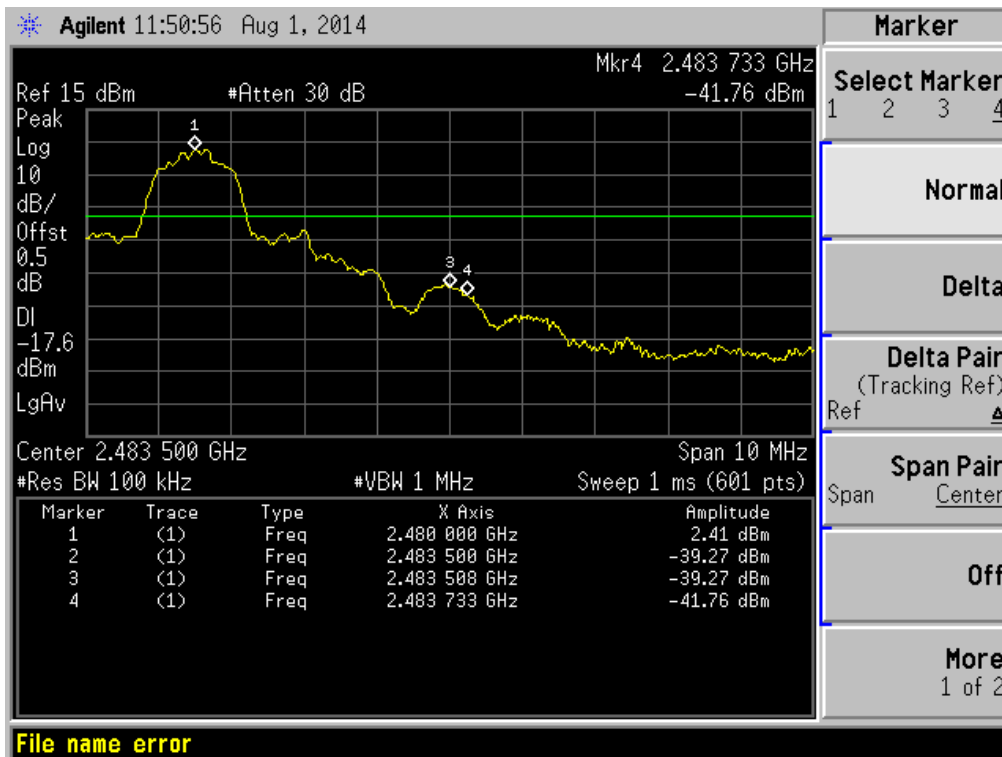
II/4-DQPSK MID CHANNEL, SPURIOUS 30MHz~3GHz



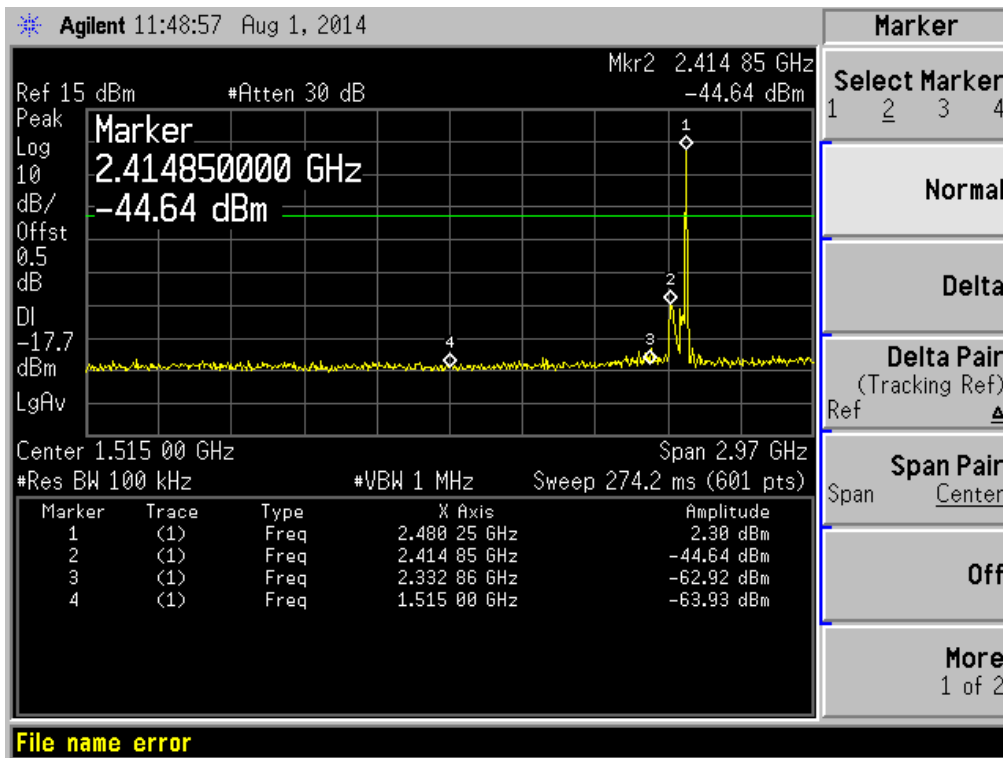
II/4-DQPSK MID CHANNEL, SPURIOUS 3GHz~25GHz



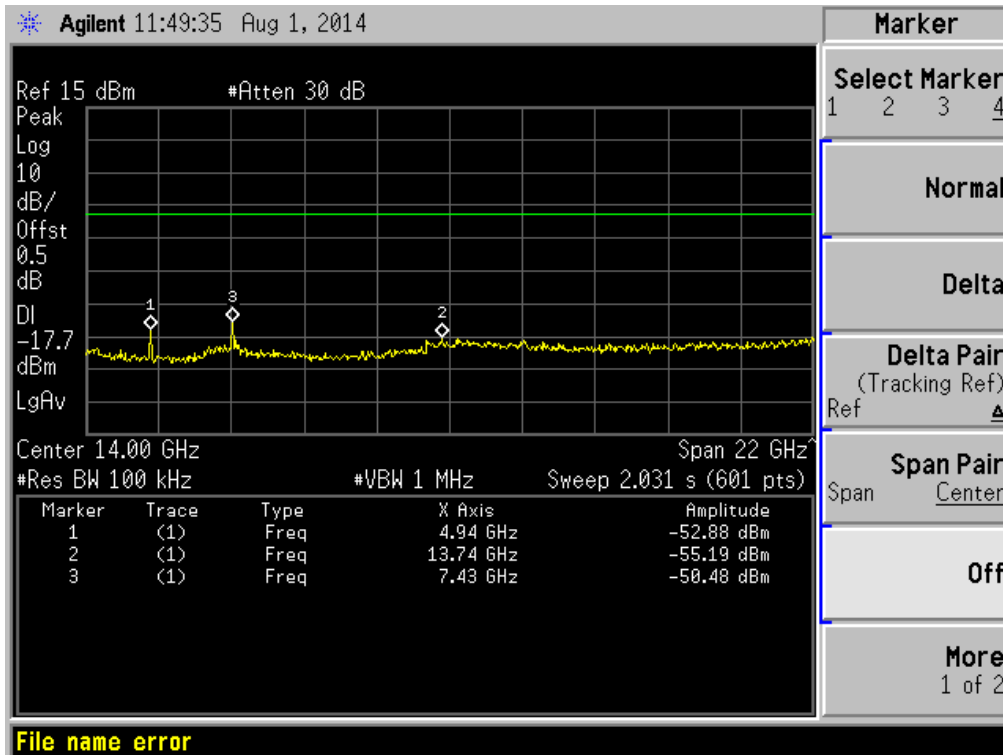
II/4-DQPSK HIGH CHANNEL, BANDEDGE



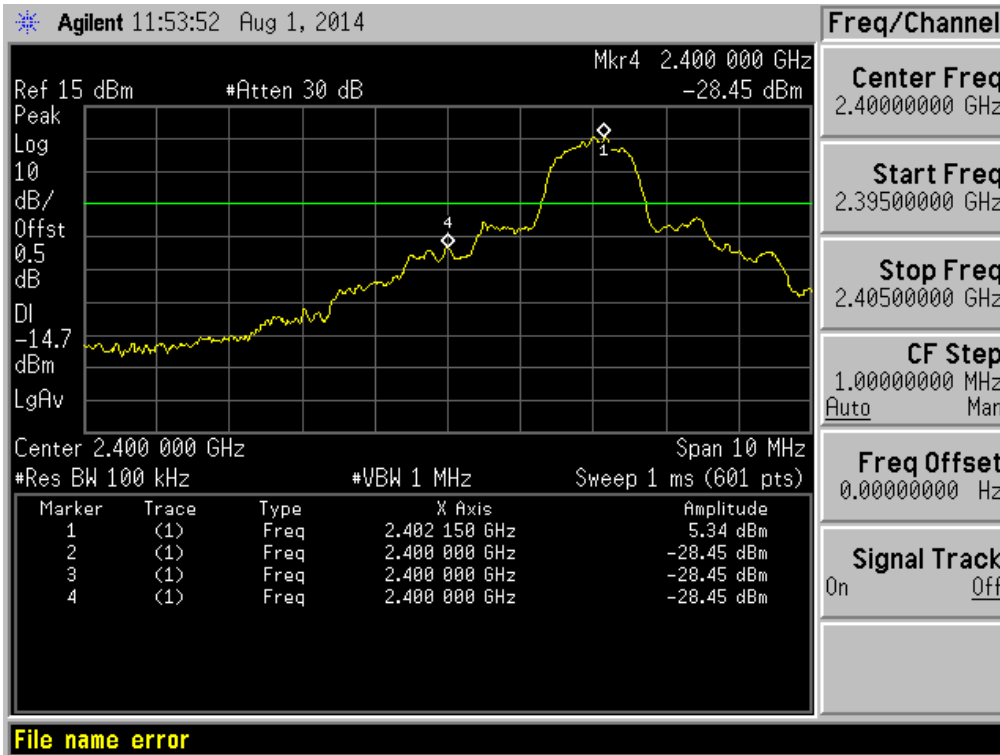
II/4-DQPSK HIGH CHANNEL, SPURIOUS 30MHz~3GHz



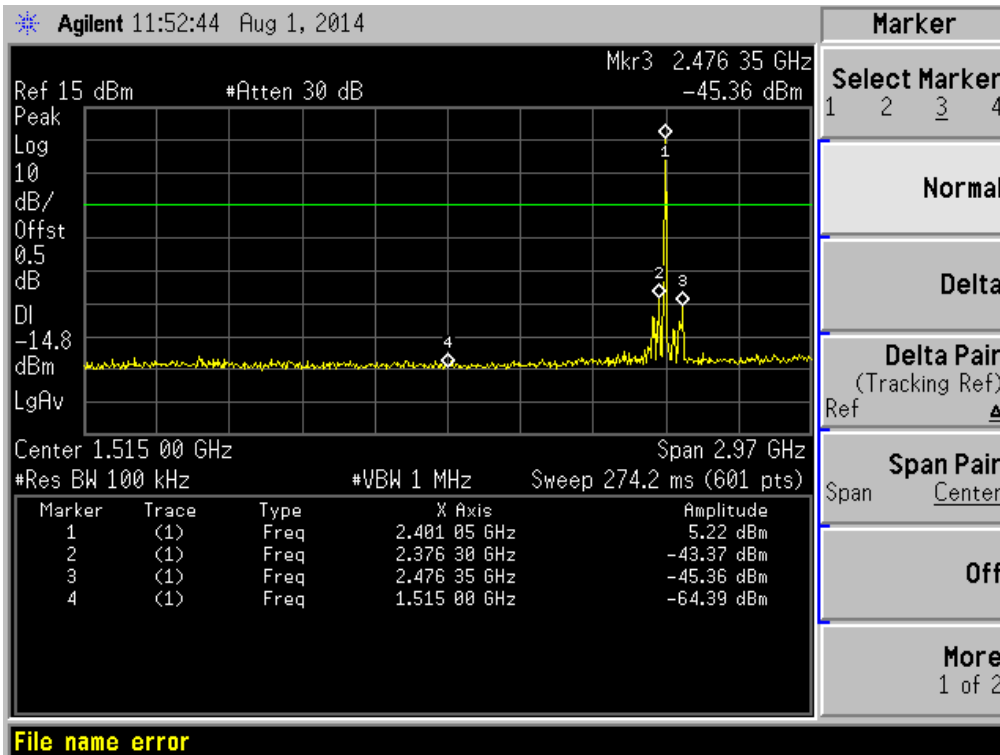
II/4-DQPSK HIGH CHANNEL, SPURIOUS 3GHz~25GHz



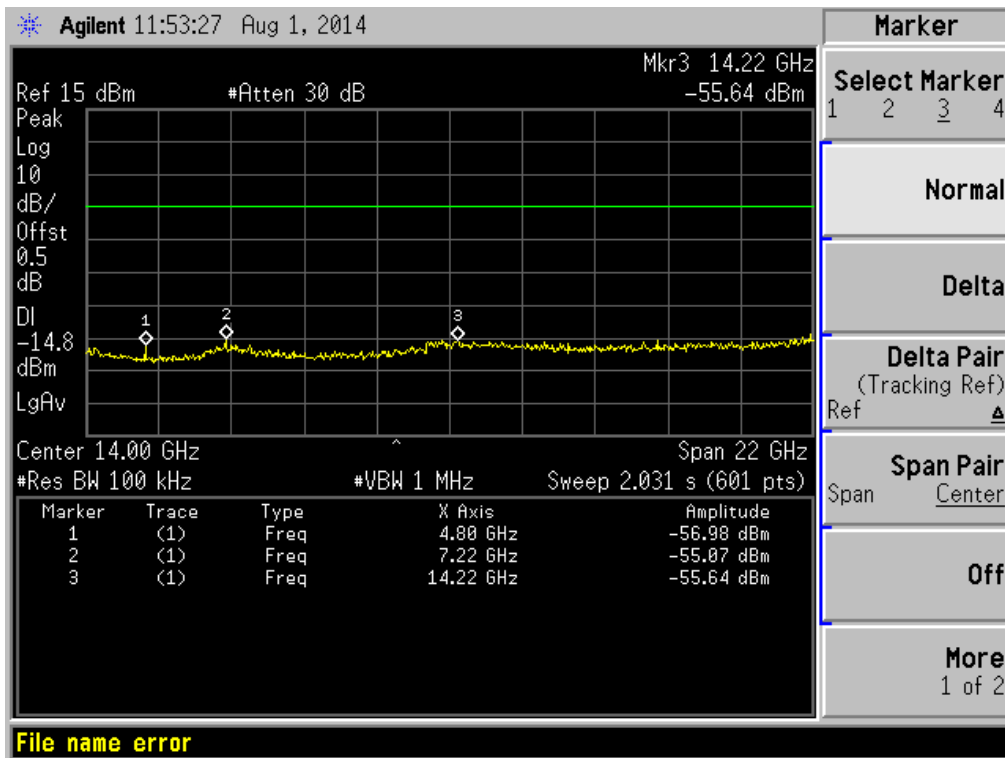
8-DPSK LOW CHANNEL, BANDEDGE



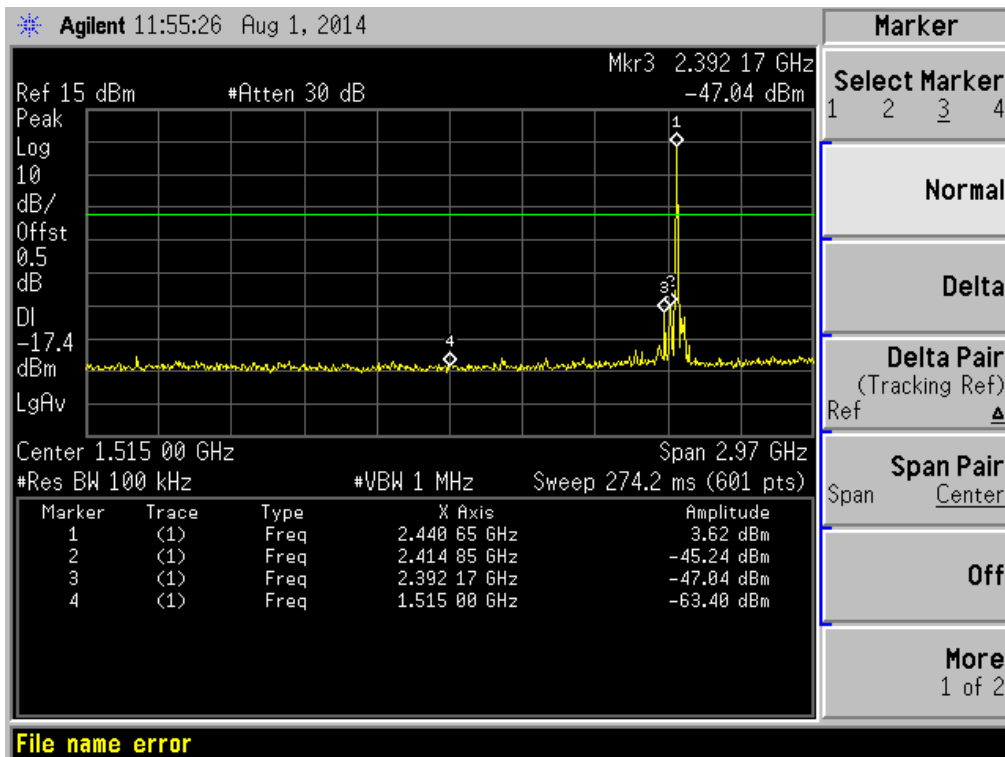
8-DPSK LOW CHANNEL, SPURIOUS 30MHz~3GHz



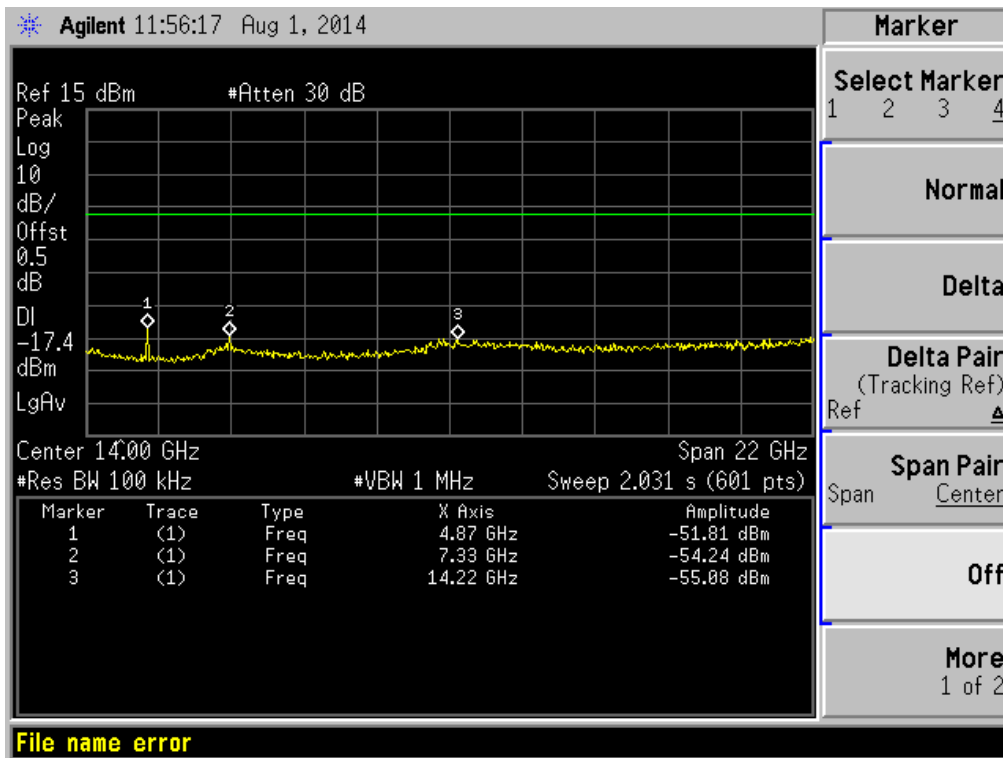
8-DPSK LOW CHANNEL, SPURIOUS 3GHz~25GHz



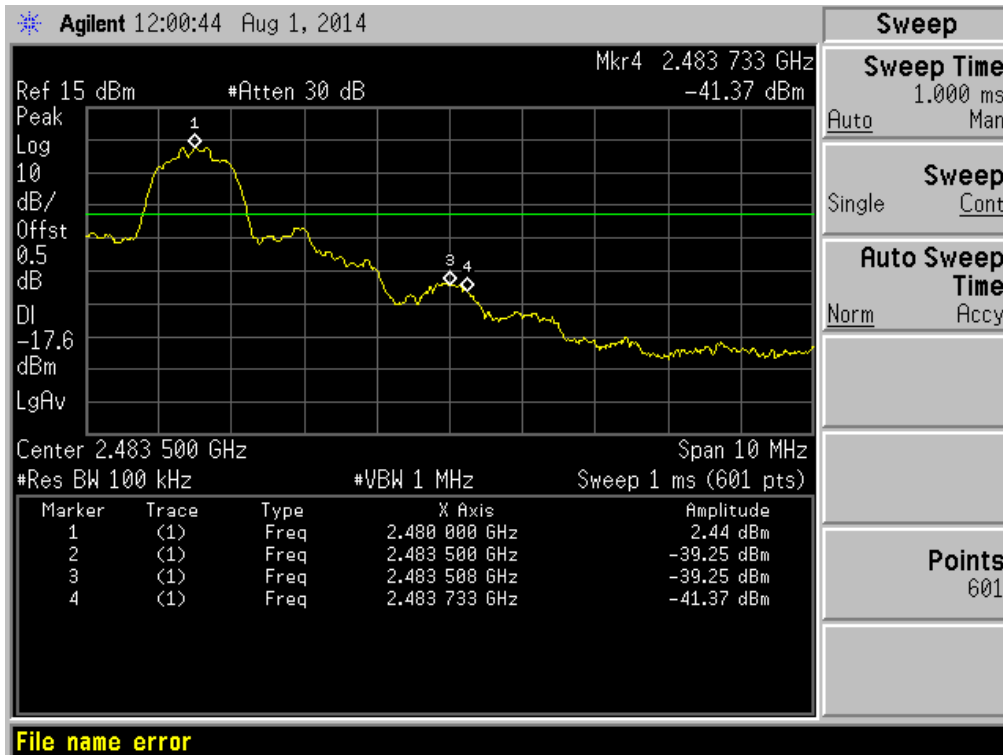
8-DPSK MID CHANNEL, SPURIOUS 30MHz~3GHz



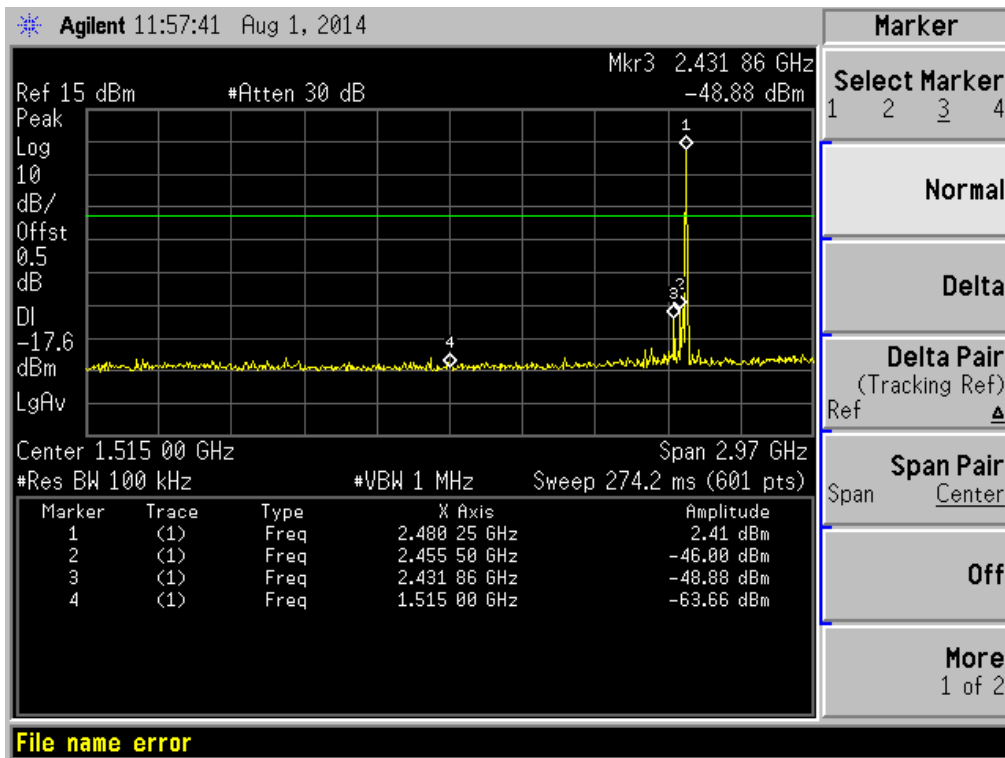
8-DPSK MID CHANNEL, SPURIOUS 3GHz~25GHz



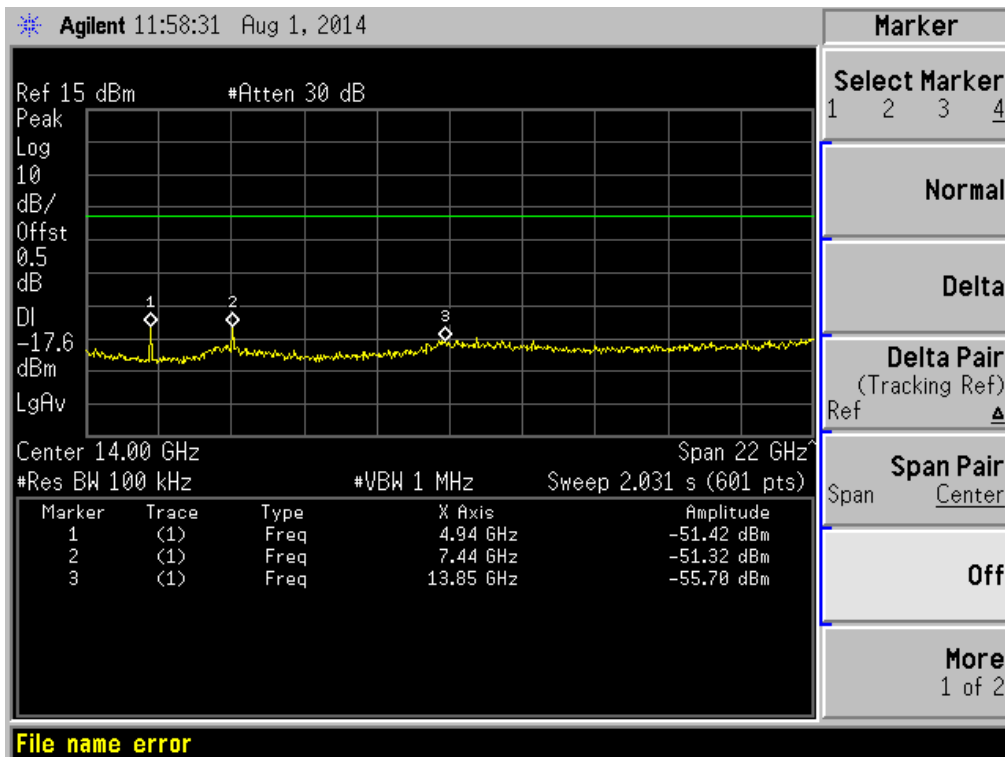
8-DPSK HIGH CHANNEL, BANDEDGE



8-DPSK HIGH CHANNEL, SPURIOUS 30MHz~3GHz



8-DPSK HIGH CHANNEL, SPURIOUS 3GHz~25GHz



A.7 Conducted Emissions

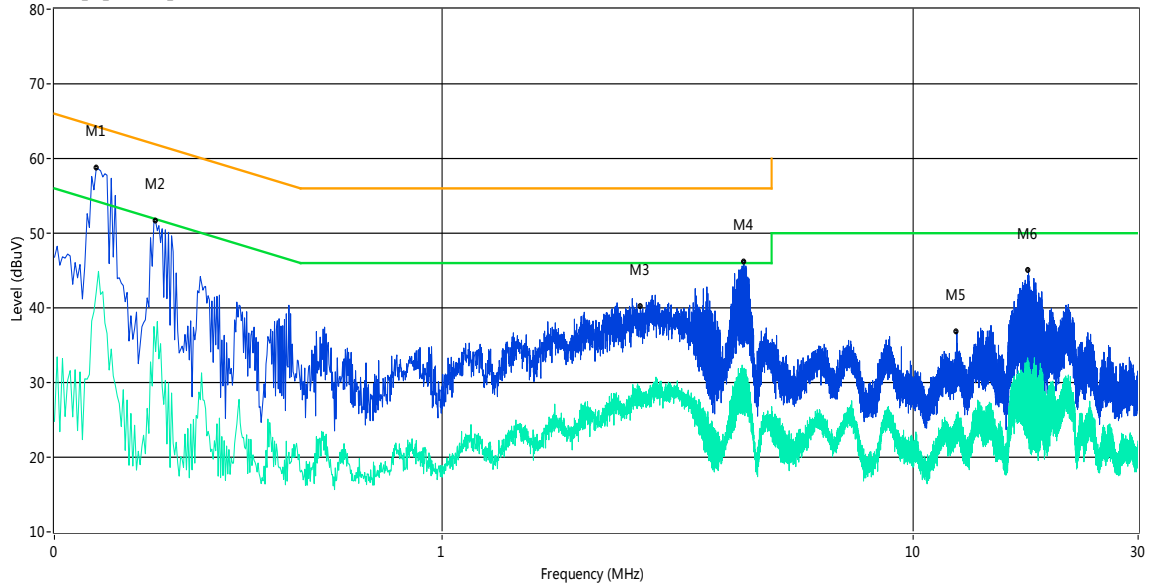
Test Data

Frequency (MHz)	Peak (dBm)	Q-peak (dBuV)	Average (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.18	58.7	--	42.1	10.00	65.0	55.0	12.90	L Line	PASS
0.25	51.6	--	34.2	10.00	63.3	53.3	19.10	L Line	PASS
2.63	40.2	--	29.2	10.00	56.0	46.0	16.80	L Line	PASS
4.36	46.2	--	31.3	10.00	56.0	46.0	14.70	L Line	PASS
12.37	36.8	--	25.1	10.00	60.0	50.0	24.90	L Line	PASS
17.55	45.0	--	32.9	10.00	60.0	50.0	17.10	L Line	PASS
Frequency (MHz)	Peak (dBm)	Q-peak (dBuV)	Average (dBuV)	Factor (dB)	QP Limit (dBuV)	AV Limit (dBuV)	Margin (dB)	Line	Verdict
0.18	54.5	--	41.0	10.00	65.2	55.2	14.20	N Line	PASS
0.23	47.9	--	30.1	10.00	63.7	53.7	23.60	N Line	PASS
0.48	37.8	--	29.3	10.00	56.5	46.5	17.20	N Line	PASS
4.24	45.1	--	30.9	10.00	56.0	46.0	15.10	N Line	PASS
6.84	33.6	--	22.3	10.00	60.0	50.0	27.70	N Line	PASS
18.04	46.2	--	35.2	10.00	60.0	50.0	14.80	N Line	PASS

Test Plots

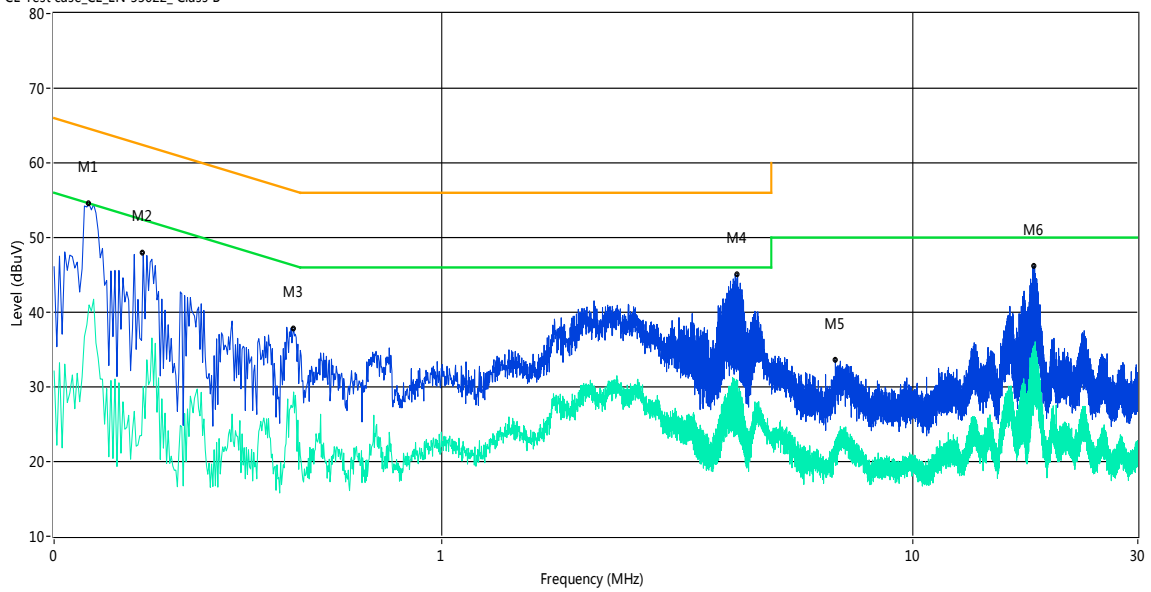
PHASE L

CE Test case_CE_EN 55022_Class B



PHASE N

CE Test case_CE_EN 55022_Class B

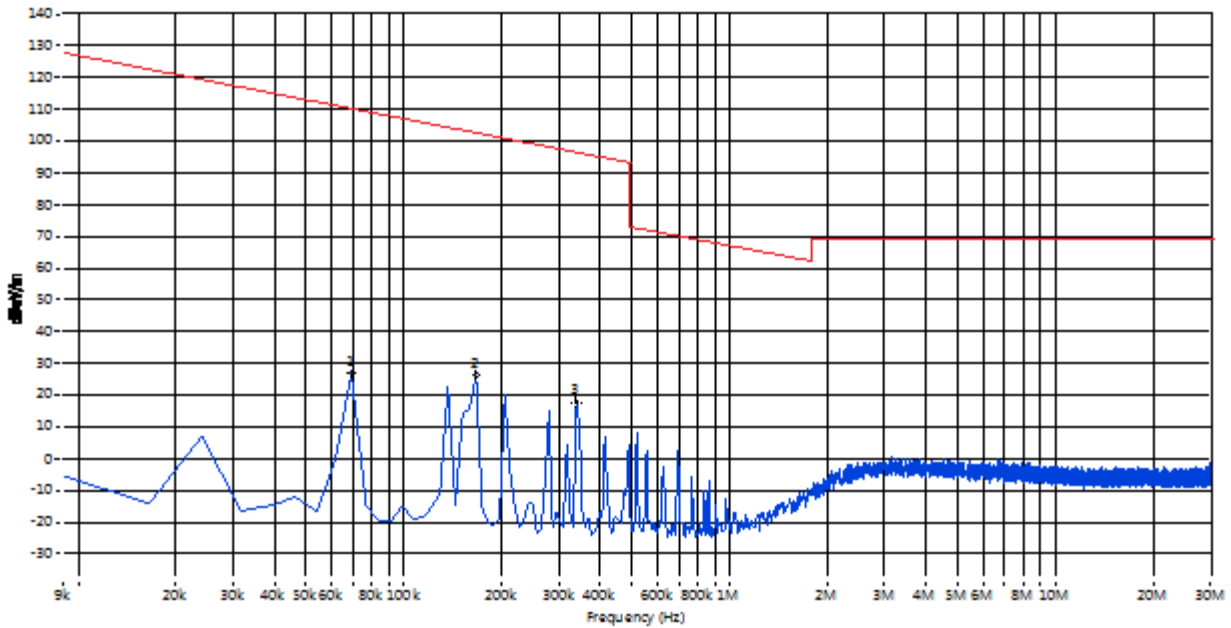


A.8 Radiated Emission

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst data of 9 kHz to 1GHz

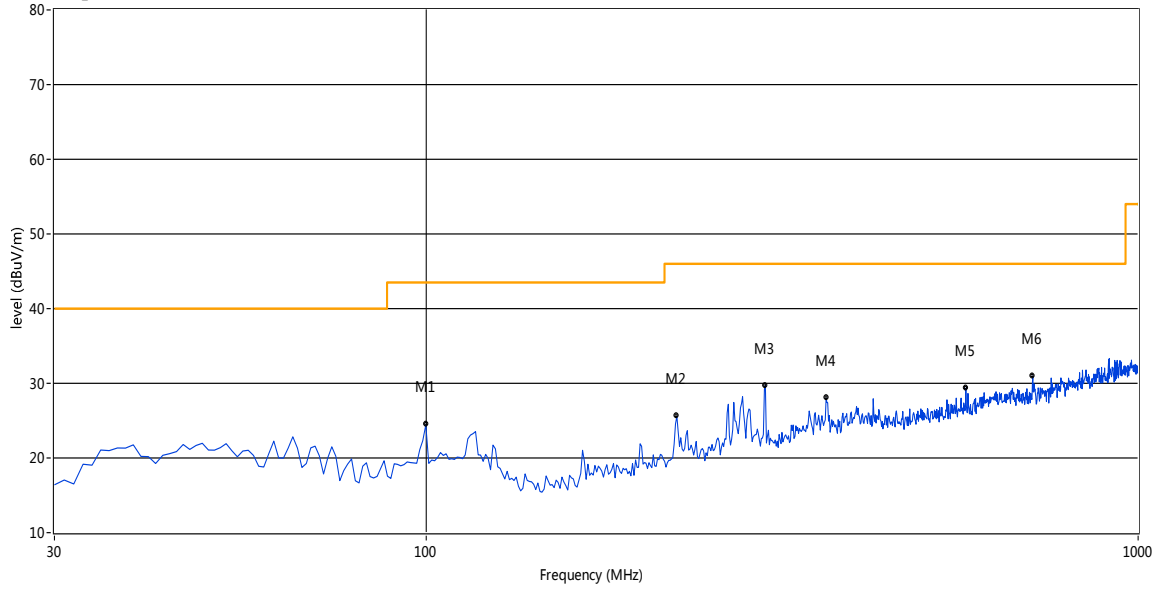
Below 30MHz



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Verdict
0.069	26.79	--	--	--	110.8	--	0.0	PASS
0.166	26.31	--	--	--	103.2	--	0.0	PASS
0.339	17.57	--	--	--	97.0	--	0.0	PASS

30MHz to 1GHz, ANT V

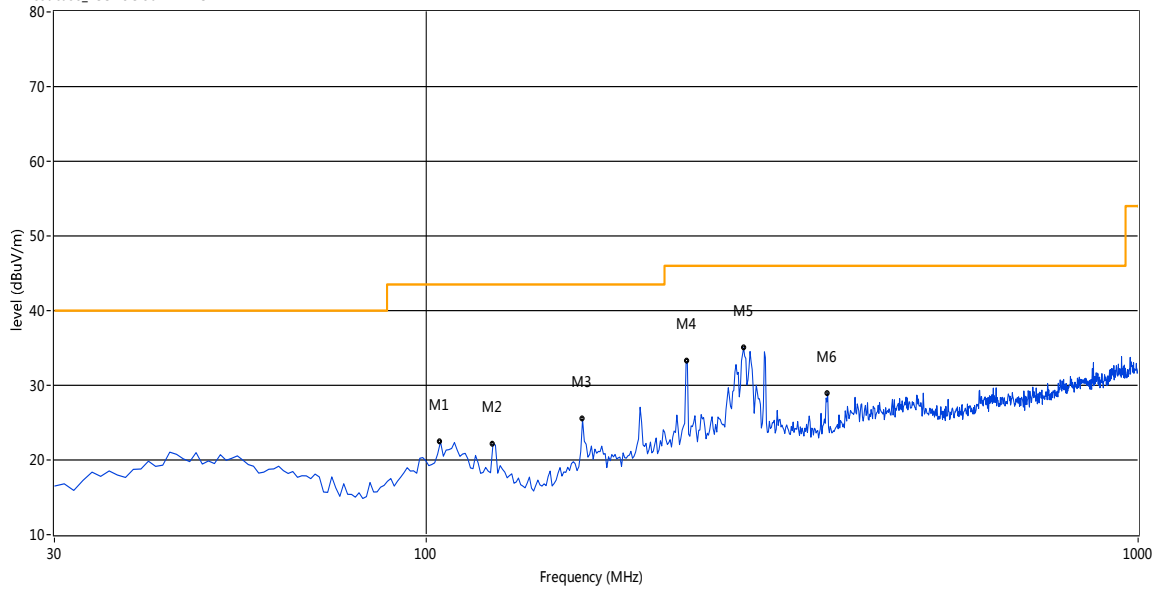
RE Test case_FCC 15C 30MHz-1GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
99.77	24.44	--	--	-19.70	--	43.5	--	19.06	356.70	100	Vertical	PASS
224.78	25.59	--	--	-19.49	--	46.0	--	20.41	241.80	100	Vertical	PASS
299.39	29.74	--	--	-17.30	--	46.0	--	16.26	255.90	100	Vertical	PASS
364.32	28.04	--	--	-15.52	--	46.0	--	17.96	2.20	100	Vertical	PASS
572.66	29.37	--	--	-11.02	--	46.0	--	16.63	28.10	100	Vertical	PASS
711.23	30.96	--	--	-8.68	--	46.0	--	15.04	350.80	100	Vertical	PASS

30MHz to 1GHz, ANT H

RE Test case_FCC 15C 30MHz-1GHz



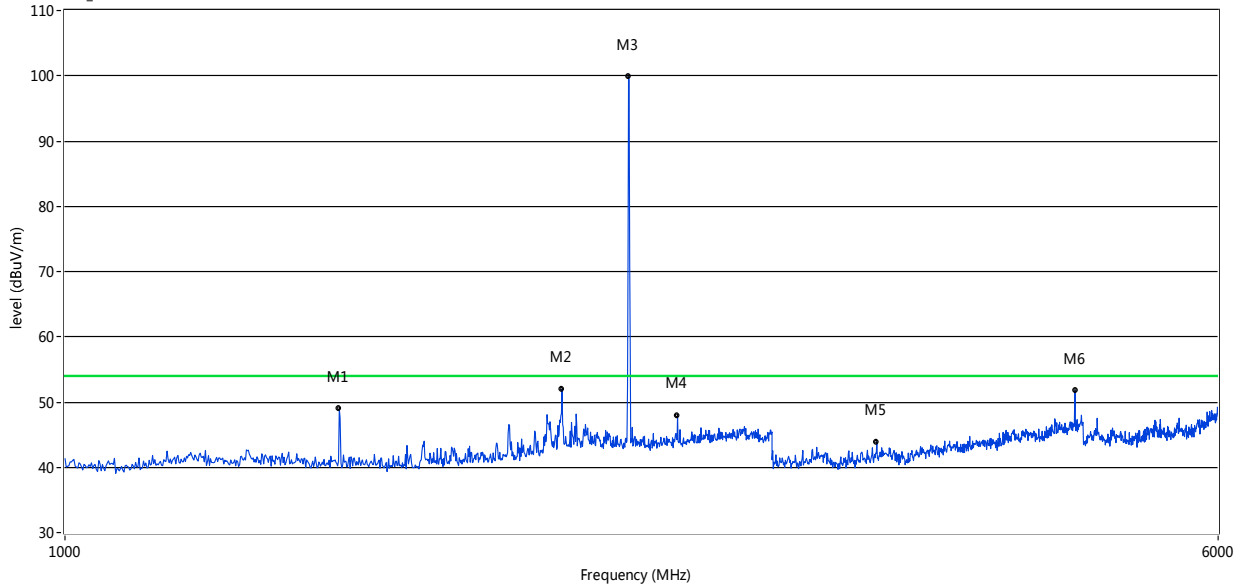
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
104.62	22.43	--	--	-19.65	--	43.5	--	21.07	201.50	100	Horizontal	PASS
124.00	22.12	--	--	-21.89	--	43.5	--	21.38	115.60	100	Horizontal	PASS
165.66	25.43	--	--	-22.32	--	43.5	--	18.07	95.20	100	Horizontal	PASS
232.53	33.24	--	--	-19.05	--	46.0	--	12.76	196.30	100	Horizontal	PASS
279.04	35.02	--	--	-17.80	--	46.0	--	10.98	166.00	100	Horizontal	PASS
366.25	28.90	--	--	-15.52	--	46.0	--	17.10	262.20	100	Horizontal	PASS

Note: The marked spikes near 2400MHz with circle should be ignored because they are Fundamental signal.

Test Data and Plots(1GHz ~ 10th Harmonic)

GFSK LOW CHANNEL 1GHz to 6GHz, ANT V

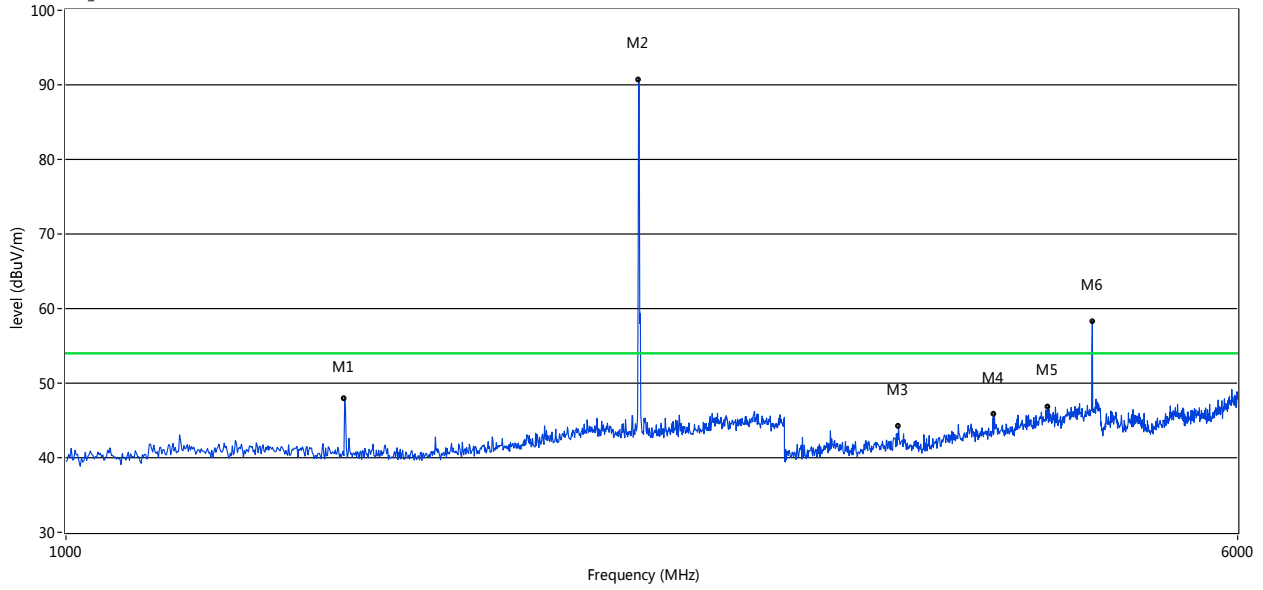
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	48.95	--	--	-4.23	74.0	--	54.0	5.05	153.80	100	Vertical	PASS
2164.84	51.99	--	--	-1.25	74.0	--	54.0	2.01	201.60	100	Vertical	PASS
2400.60	99.89	--	--	-0.67	N/A	--	N/A	N/A	98.30	100	Vertical	N/A
2590.41	47.97	--	--	0.39	74.0	--	54.0	6.03	201.60	100	Vertical	PASS
3530.47	43.91	--	--	8.83	74.0	--	54.0	10.09	311.30	100	Vertical	PASS
4804.20	51.75	--	--	12.35	74.0	--	54.0	2.25	64.40	100	Vertical	PASS

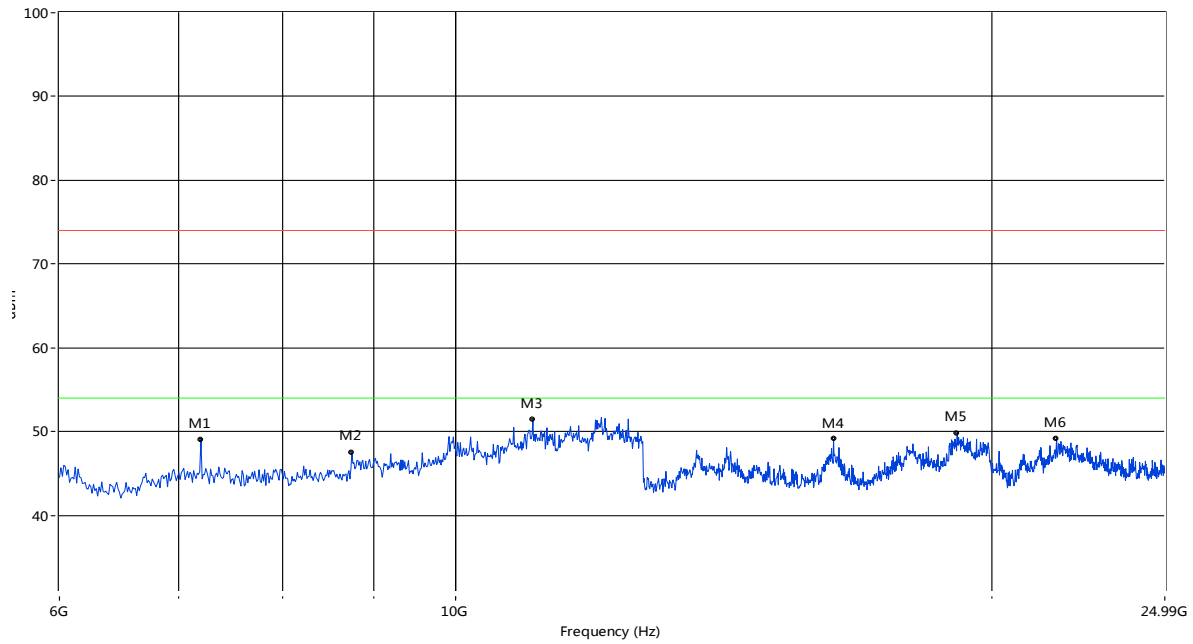
GFSK LOW CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



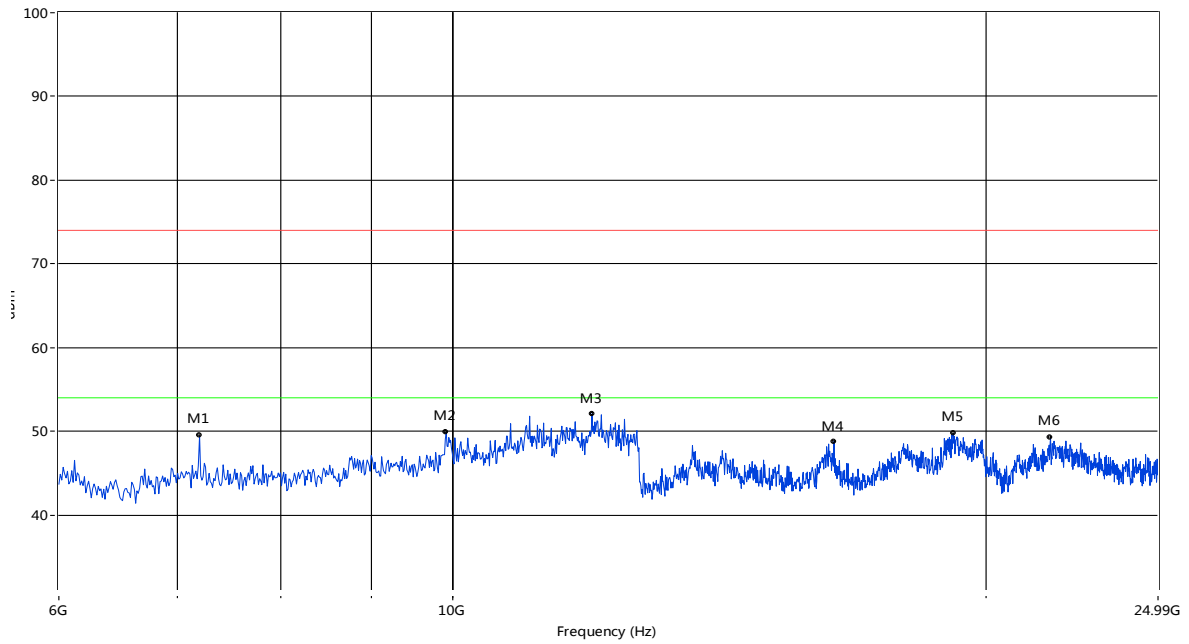
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	47.91	--	--	-4.23	74.0	--	54.0	6.09	318.30	100	Horizontal	PASS
2400.60	90.73	--	--	-0.67	N/A	--	N/A	N/A	69.20	100	Horizontal	N/A
3572.43	44.13	--	--	8.83	74.0	--	54.0	9.87	142.10	100	Horizontal	PASS
4135.86	45.88	--	--	10.09	74.0	--	54.0	8.12	360.70	100	Horizontal	PASS
4486.51	46.81	--	--	10.93	74.0	--	54.0	7.19	226.40	100	Horizontal	PASS
4804.20	58.27	--	50.10	12.35	74.0	--	54.0	3.9	241.20	100	Horizontal	PASS

GFSK LOW CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7201.75	49.06	--	--	74.0	--	54.0	24.94	265	Vertical	PASS
2	8751.66	47.47	--	--	74.0	--	54.0	26.53	268	Vertical	PASS
3	11054.08	51.43	--	--	74.0	--	54.0	22.57	227	Vertical	PASS
4	16296.17	49.08	--	--	74.0	--	54.0	24.92	44	Vertical	PASS
5	19119.80	49.80	--	--	74.0	--	54.0	24.20	55	Vertical	PASS
6	21735.44	49.11	--	--	74.0	--	54.0	24.89	253	Vertical	PASS

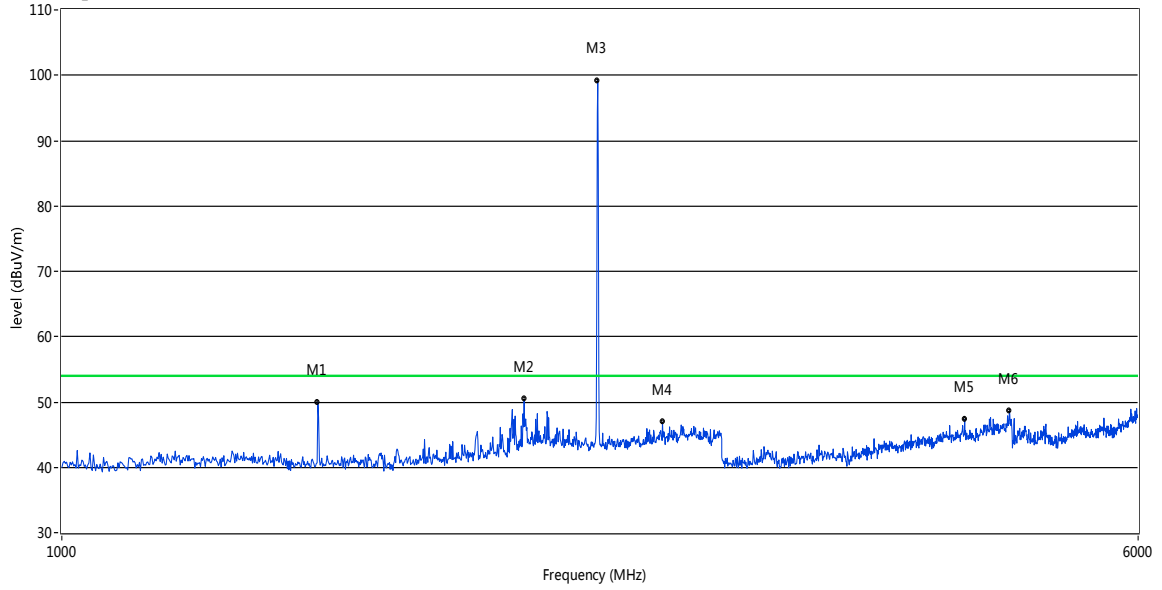
GFSK LOW CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7201.75	49.45	--	--	74.0	--	54.0	24.55	219	Horizontal	PASS
2	9919.72	49.88	--	--	74.0	--	54.0	24.12	321	Horizontal	PASS
3	11986.27	52.08	--	--	74.0	--	54.0	21.92	42	Horizontal	PASS
4	16410.57	48.78	--	--	74.0	--	54.0	25.22	152	Horizontal	PASS
5	19159.73	49.71	--	--	74.0	--	54.0	24.29	29	Horizontal	PASS
6	21735.44	49.19	--	--	74.0	--	54.0	24.81	332	Horizontal	PASS

GFSK MID CHANNEL 1GHz to 6GHz, ANT V

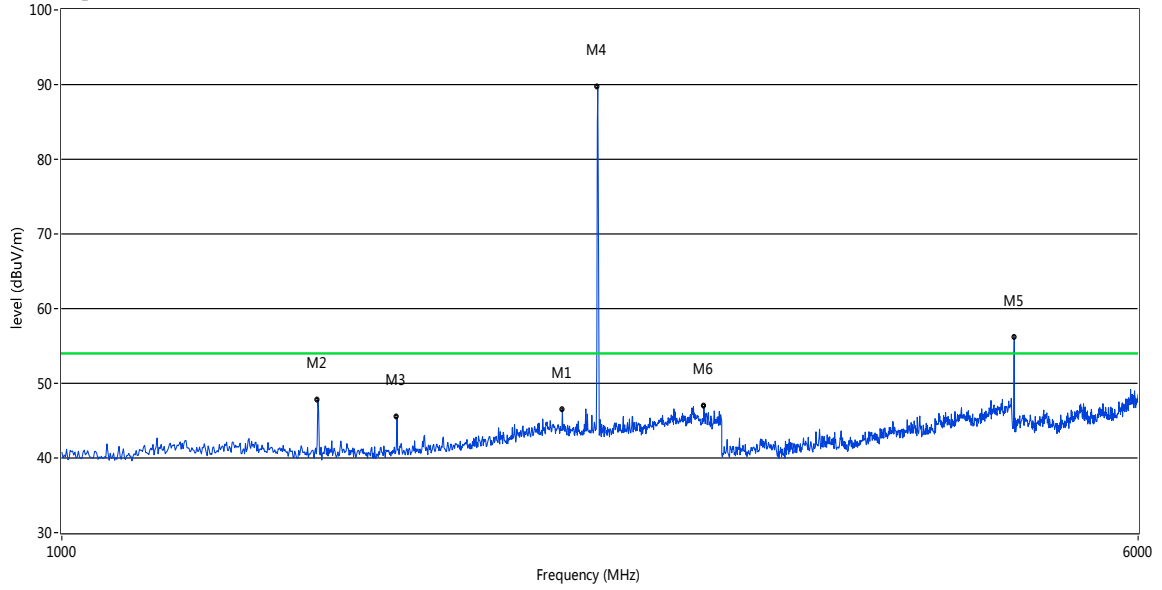
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.97	--	--	-4.23	74.0	--	54.0	4.03	159.40	100	Vertical	PASS
2158.84	50.39	--	--	-1.34	74.0	--	54.0	3.61	159.40	100	Vertical	PASS
2440.56	99.21	--	--	-0.54	N/A	--	N/A	N/A	97.20	100	Vertical	N/A
2718.28	46.91	--	--	1.06	74.0	--	54.0	7.09	249.00	100	Vertical	PASS
4495.50	47.35	--	--	10.96	74.0	--	54.0	6.65	117.70	100	Vertical	PASS
4843.16	48.63	--	--	13.03	74.0	--	54.0	5.37	320.10	100	Vertical	PASS

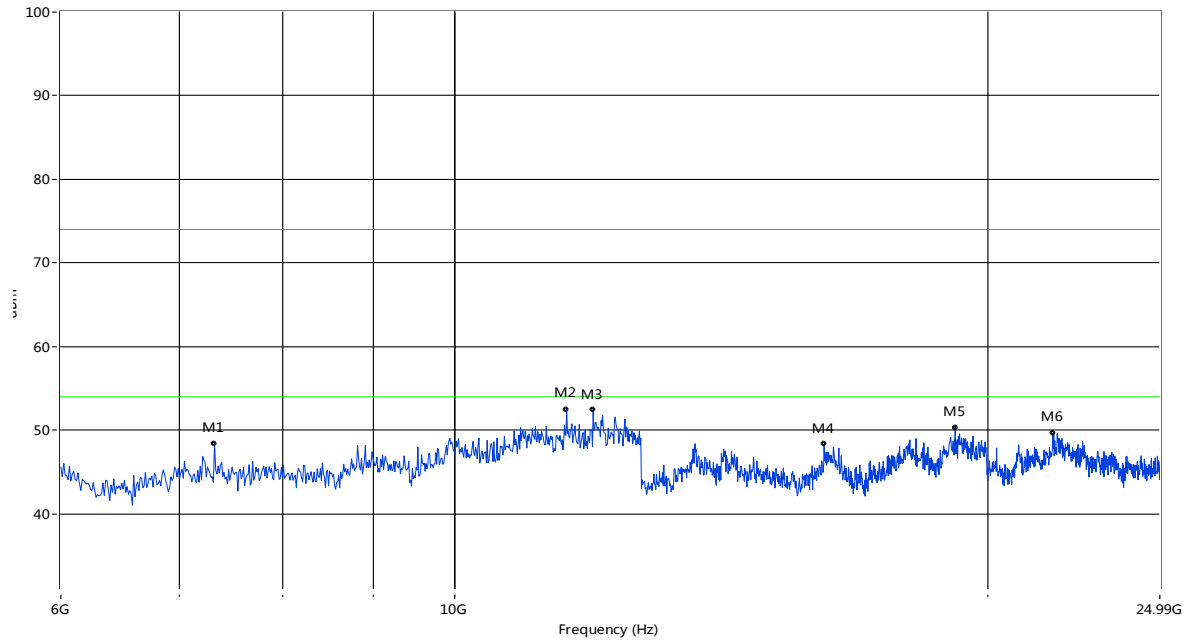
GFSK MID CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



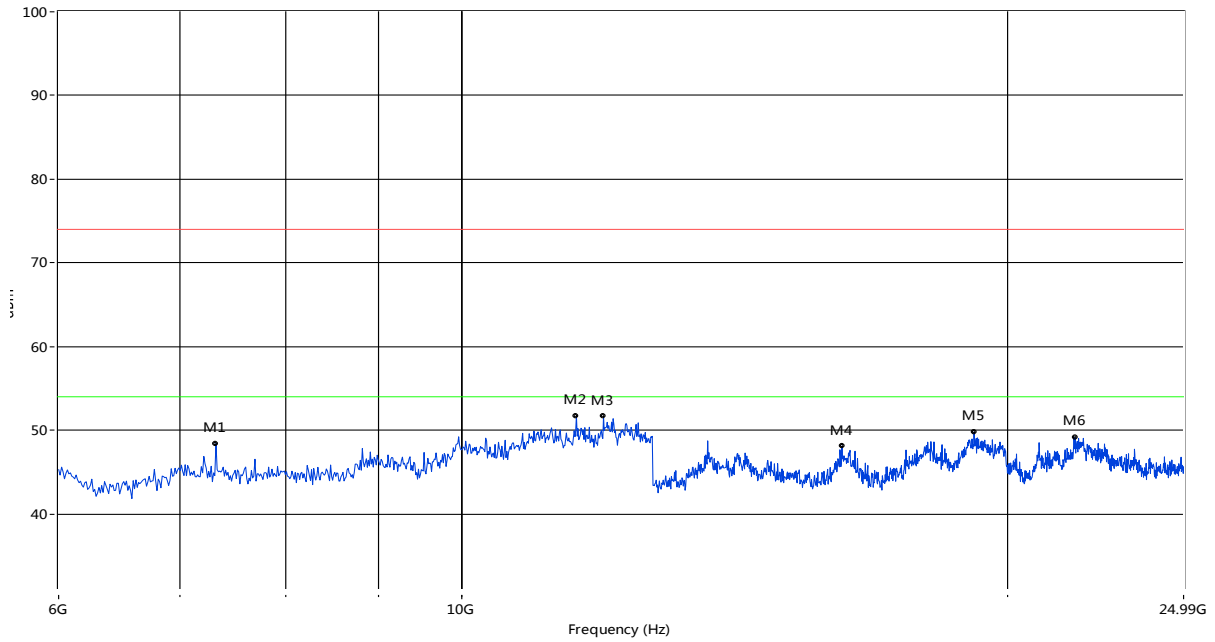
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
2300.70	46.49	--	--	-0.50	74.0	--	54.0	7.51	127.70	100	Horizontal	PASS
1531.47	47.80	--	--	-4.23	74.0	--	54.0	6.20	251.00	100	Horizontal	PASS
1747.25	45.44	--	--	-3.85	74.0	--	54.0	8.56	45.30	100	Horizontal	PASS
2440.56	89.71	--	--	-0.54	N/A	--	N/A	N/A	82.00	100	Horizontal	N/A
4882.22	56.12	--	48.47	12.34	74.0	--	54.0	5.53	3.80	141.60	Horizontal	PASS
2912.09	46.95	--	--	2.29	74.0	--	54.0	7.05	49.70	100	Horizontal	PASS

GFSK MID CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7325.29	48.38	--	--	74.0	--	54.0	25.62	212	Vertical	PASS
2	11570.72	52.41	--	--	74.0	--	54.0	21.59	90	Vertical	PASS
3	11975.04	52.43	--	--	74.0	--	54.0	21.57	169	Vertical	PASS
4	16160.98	48.33	--	--	74.0	--	54.0	25.67	359	Vertical	PASS
5	19159.73	50.33	--	--	74.0	--	54.0	23.67	180	Vertical	PASS
6	21745.42	49.61	--	--	74.0	--	54.0	24.39	159	Vertical	PASS

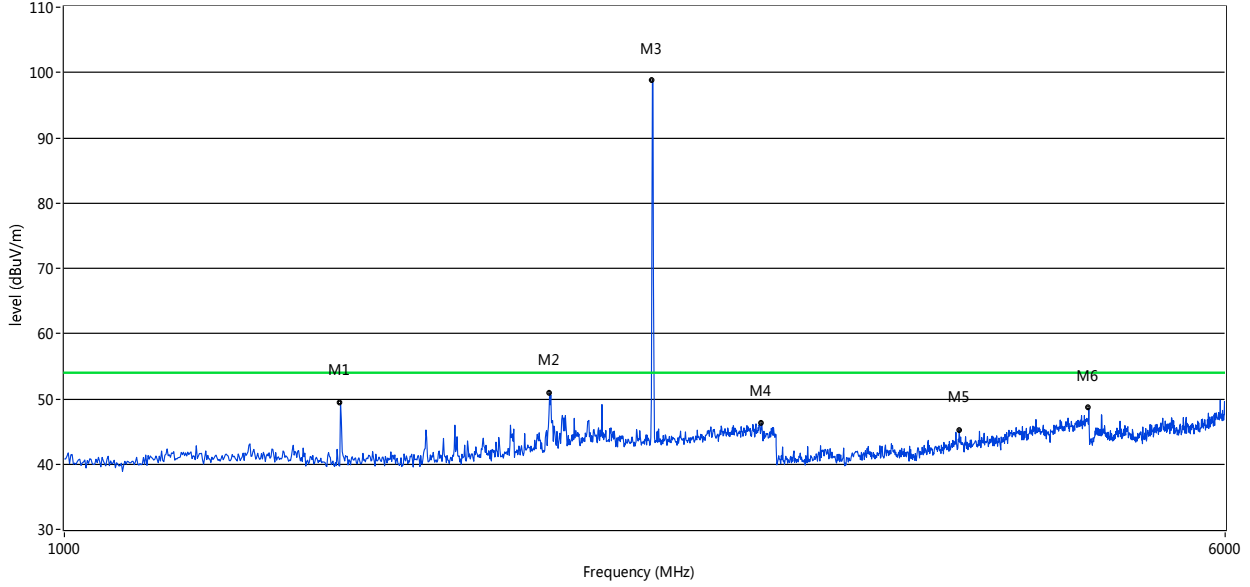
GFSK MID CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7325.29	48.41	--	--	74.0	--	54.0	25.59	103	Horizontal	PASS
2	11570.72	51.70	--	--	74.0	--	54.0	22.30	11	Horizontal	PASS
3	11975.04	51.66	--	--	74.0	--	54.0	22.34	151	Horizontal	PASS
4	16202.58	48.10	--	--	74.0	--	54.0	25.90	324	Horizontal	PASS
5	19159.73	49.79	--	--	74.0	--	54.0	24.21	230	Horizontal	PASS
6	21775.37	49.11	--	--	74.0	--	54.0	24.89	217	Horizontal	PASS

GFSK HIGH CHANNEL 1GHz to 6GHz, ANT V

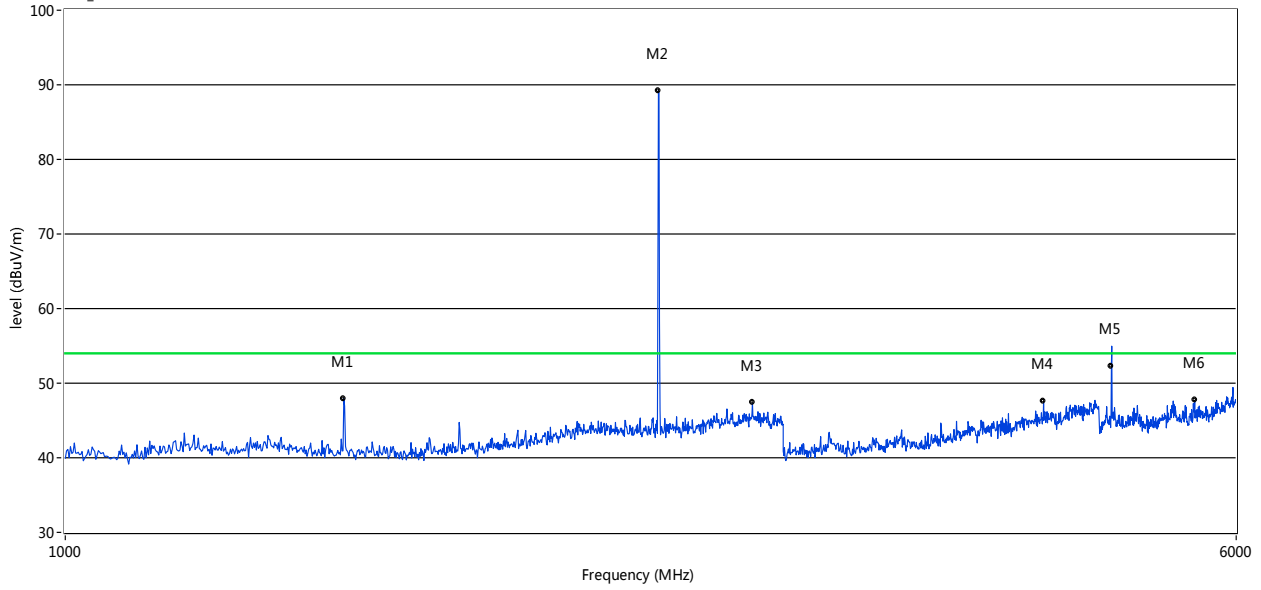
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.43	--	--	-4.23	74.0	--	54.0	4.57	159.80	100	Vertical	PASS
2114.89	50.91	--	--	-1.69	74.0	--	54.0	3.09	159.80	100	Vertical	PASS
2478.52	98.81	--	--	-0.62	N/A	--	N/A	N/A	104.70	100	Vertical	N/A
2934.07	46.21	--	--	2.36	74.0	--	54.0	7.79	351.90	100	Vertical	PASS
3980.02	45.21	--	--	10.14	74.0	--	54.0	8.79	223.90	100	Vertical	PASS
4861.14	48.53	--	--	12.35	74.0	--	54.0	5.47	356.60	100	Vertical	PASS

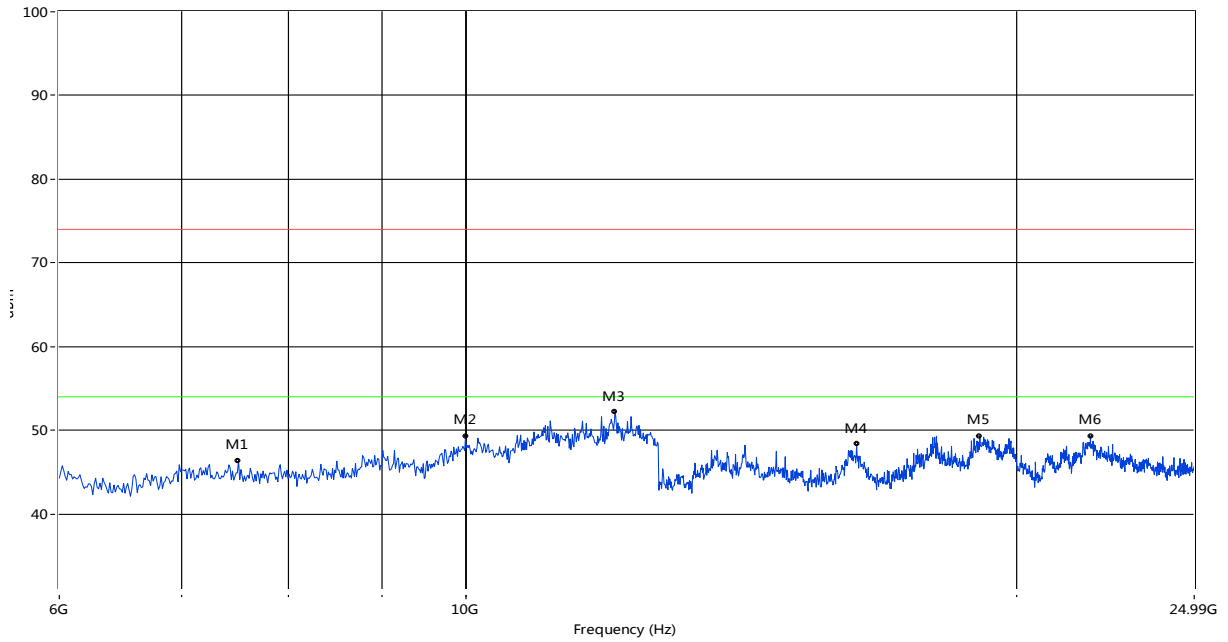
GFSK HIGH CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



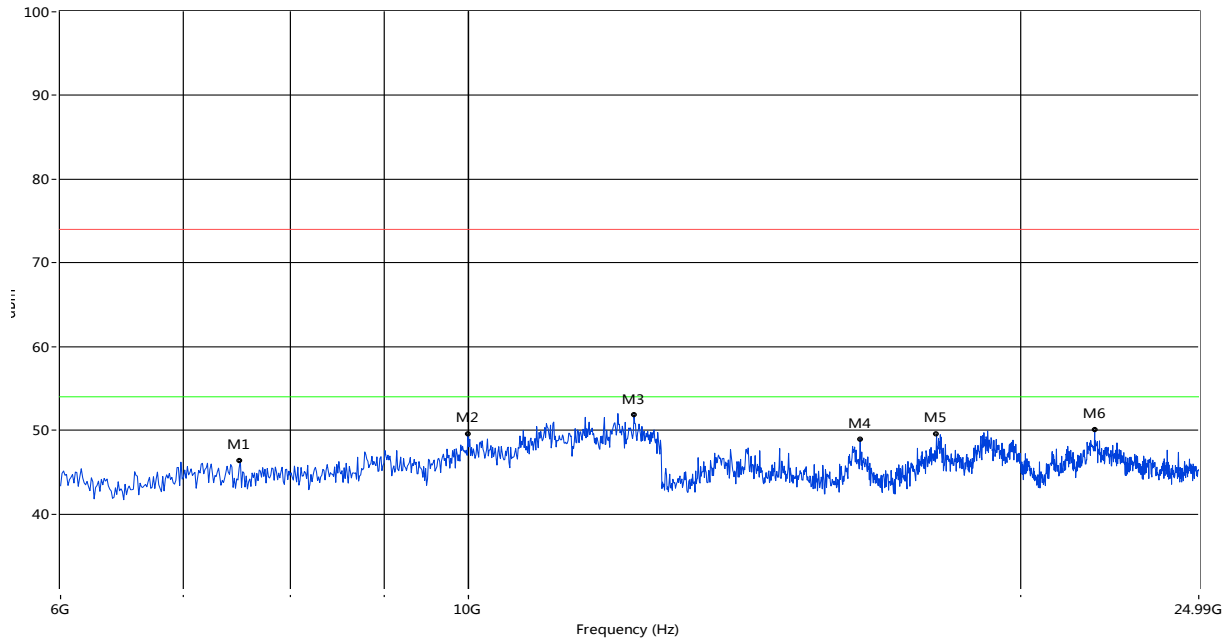
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	47.95	--	--	-4.23	74.0	--	54.0	6.05	239.60	100	Horizontal	PASS
2478.52	89.22	--	--	-0.62	N/A	--	N/A	N/A	77.00	100	Horizontal	N/A
2862.14	47.35	--	--	2.38	74.0	--	54.0	6.65	171.70	100	Horizontal	PASS
4468.53	47.52	--	--	11.04	74.0	--	54.0	6.48	219.00	100	Horizontal	PASS
4960.14	55.11	--	46.96	12.64	74.0	--	54.0	7.04	134.10	117.00	Horizontal	PASS
5631.37	47.70	--	--	14.31	74.0	--	54.0	6.30	165.40	100	Horizontal	PASS

GFSK HIGH CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7516.22	46.33	--	--	74.0	--	54.0	27.67	192	Vertical	PASS
2	9998.34	49.22	--	--	74.0	--	54.0	24.78	251	Vertical	PASS
3	12064.89	52.23	--	--	74.0	--	54.0	21.77	340	Vertical	PASS
4	16348.17	48.30	--	--	74.0	--	54.0	25.70	162	Vertical	PASS
5	19089.85	49.31	--	--	74.0	--	54.0	24.69	209	Vertical	PASS
6	21935.11	49.24	--	--	74.0	--	54.0	24.76	16	Vertical	PASS

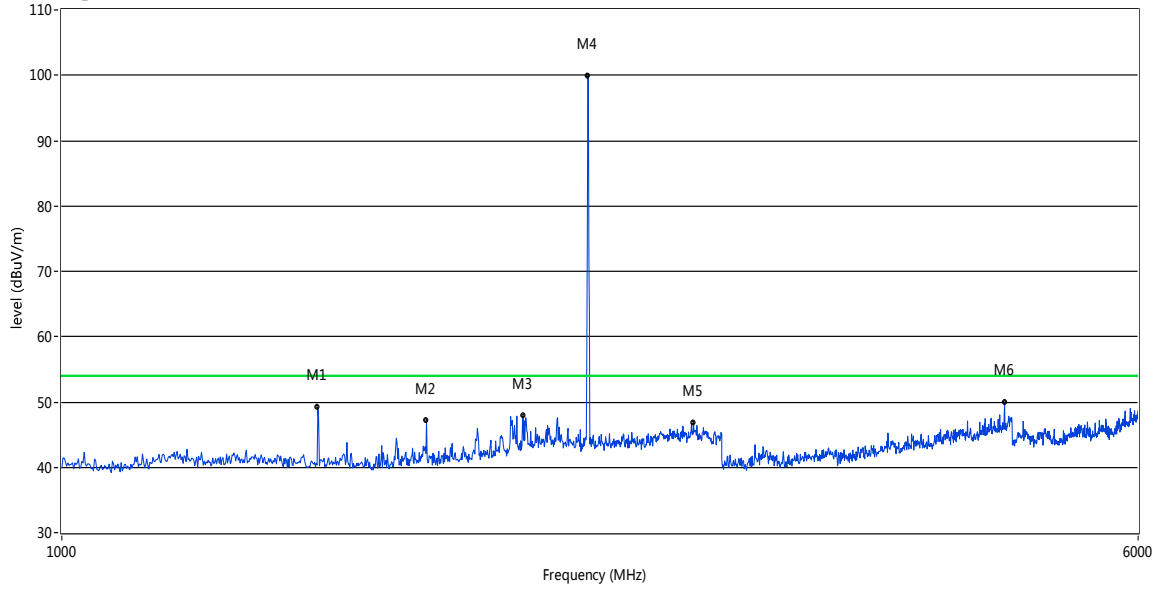
GFSK HIGH CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7516.22	46.38	--	--	74.0	--	54.0	27.62	23	Horizontal	PASS
2	9998.34	49.51	--	--	74.0	--	54.0	24.49	53	Horizontal	PASS
3	12311.98	51.86	--	--	74.0	--	54.0	22.14	170	Horizontal	PASS
4	16348.17	48.93	--	--	74.0	--	54.0	25.07	126	Horizontal	PASS
5	17991.26	49.47	--	--	74.0	--	54.0	24.53	29	Horizontal	PASS
6	21935.11	50.00	--	--	74.0	--	54.0	24.00	57	Horizontal	PASS

II/4-DQPSK LOW CHANNEL 1GHz to 6GHz, ANT V

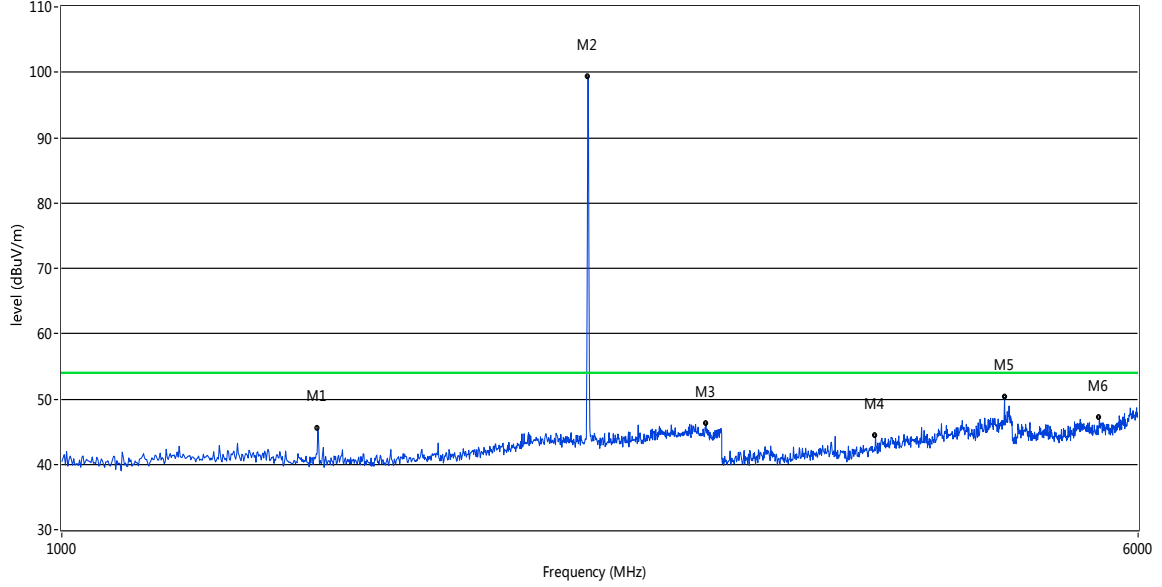
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (BuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.12	--	--	-4.23	74.0	--	54.0	4.88	160.30	100	Vertical	PASS
1835.16	47.12	--	--	-3.73	74.0	--	54.0	6.88	153.30	100	Vertical	PASS
2154.85	47.89	--	--	-1.30	74.0	--	54.0	6.11	160.30	100	Vertical	PASS
2400.60	99.87	--	--	-0.67	N/A	--	N/A	N/A	98.10	100	Vertical	N/A
2862.14	46.81	--	--	2.38	74.0	--	54.0	7.19	49.20	100	Vertical	PASS
4804.20	49.84	--	--	12.35	74.0	--	54.0	4.16	53.30	100	Vertical	PASS

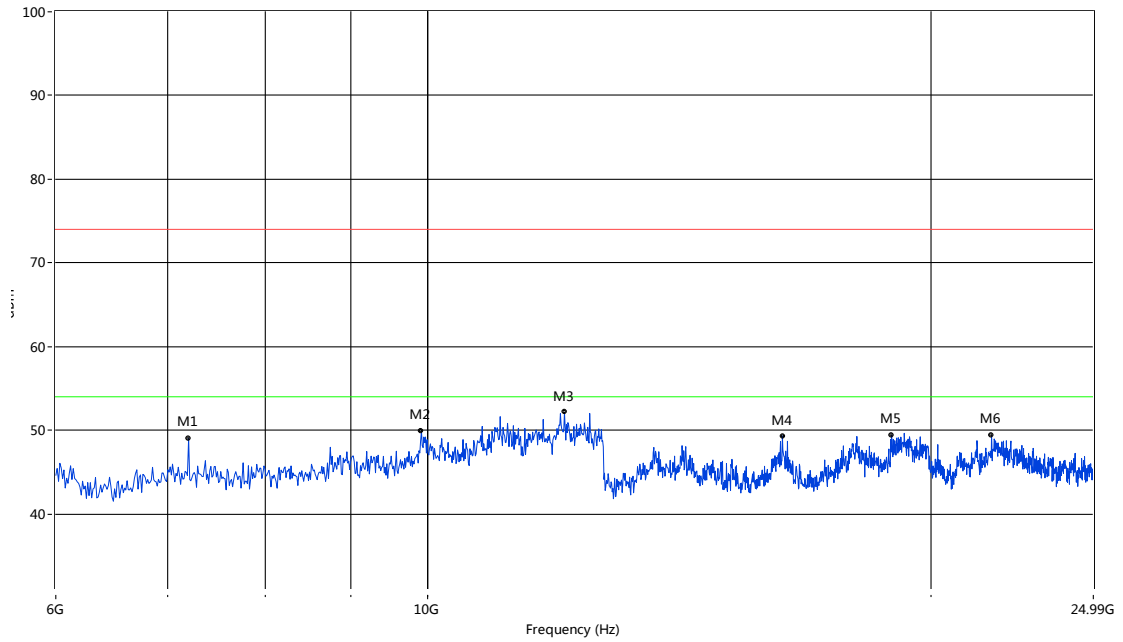
II/4-DQPSK LOW CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



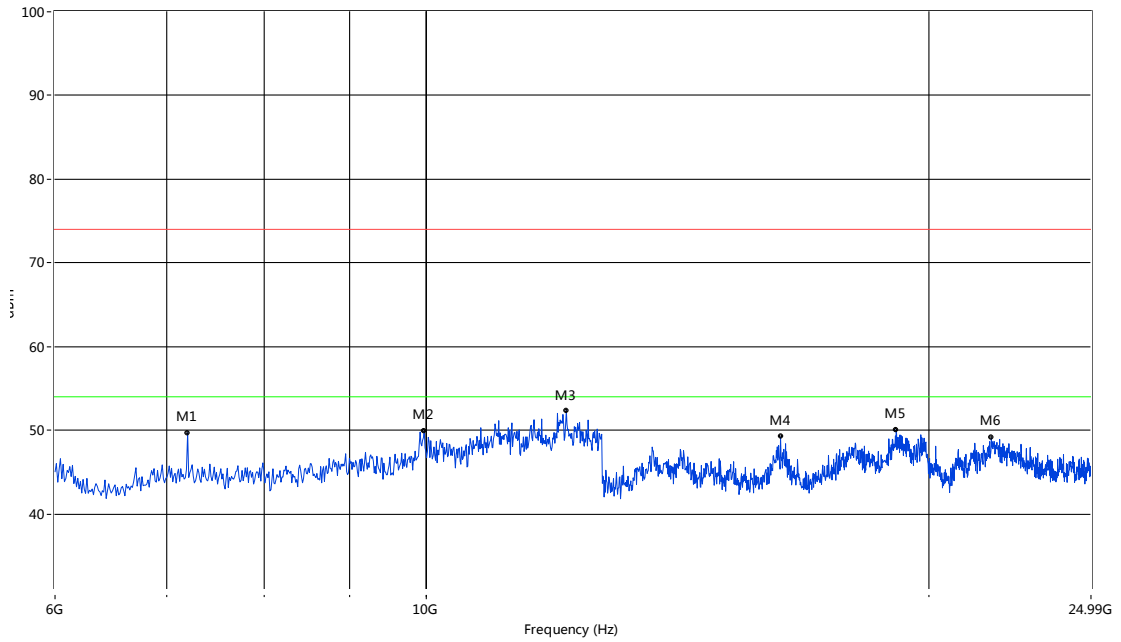
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table ()	Height (cm)	ANT	Verdict
1531.47	45.49	--	--	-4.23	74.0	--	54.0	8.51	71.00	100	Horizontal	PASS
2400.60	99.33	--	--	-0.67	74.0	--	N/A	N/A	318.50	100	Horizontal	N/A
2922.08	46.19	--	--	2.38	74.0	--	54.0	7.81	305.20	100	Horizontal	PASS
3875.12	44.30	--	--	9.83	74.0	--	54.0	9.70	38.80	100	Horizontal	PASS
4804.20	50.27	--	--	12.35	74.0	--	54.0	3.73	48.40	100	Horizontal	PASS
5625.37	47.07	--	--	14.33	74.0	--	54.0	6.93	177.40	100	Horizontal	PASS

II/4-DQPSK LOW CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7201.75	49.02	--	--	74.0	--	54.0	24.98	147	Vertical	PASS
2	9919.72	49.93	--	--	74.0	--	54.0	24.07	209	Vertical	PASS
3	12076.12	52.13	--	--	74.0	--	54.0	21.87	285	Vertical	PASS
4	16296.17	49.32	--	--	74.0	--	54.0	24.68	273	Vertical	PASS
5	18937.60	49.41	--	--	74.0	--	54.0	24.59	27	Vertical	PASS
6	21725.46	49.39	--	--	74.0	--	54.0	24.61	77	Vertical	PASS

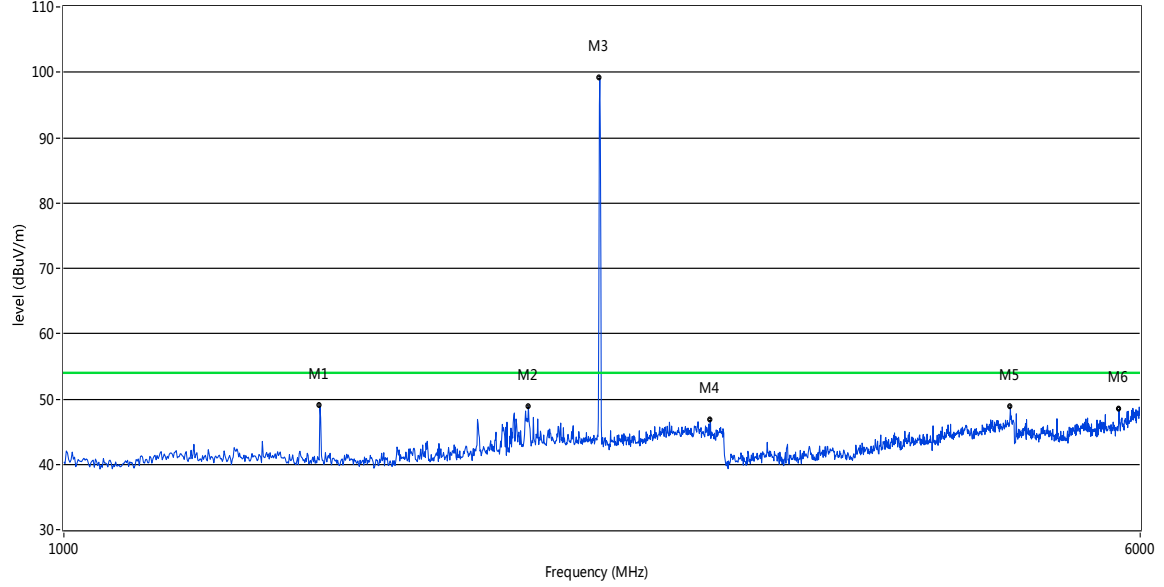
Π/4-DQPSK LOW CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7201.75	49.70	--	--	74.0	--	54.0	24.30	81	Horizontal	PASS
2	9975.87	49.92	--	--	74.0	--	54.0	24.08	92	Horizontal	PASS
3	12132.28	52.35	--	--	74.0	--	54.0	21.65	126	Horizontal	PASS
4	16296.17	49.19	--	--	74.0	--	54.0	24.81	108	Horizontal	PASS
5	19109.82	50.06	--	--	74.0	--	54.0	23.94	357	Horizontal	PASS
6	21785.36	49.07	--	--	74.0	--	54.0	24.93	203	Horizontal	PASS

II/4-DQPSK MID CHANNEL 1GHz to 6GHz, ANT V

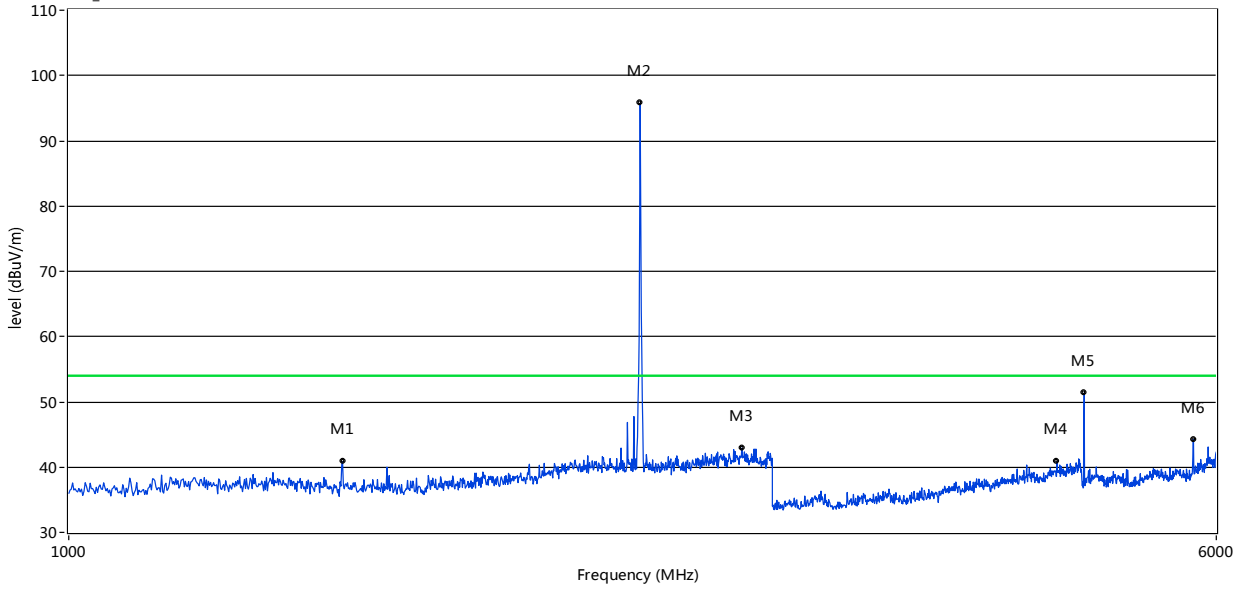
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	48.91	--	--	-4.23	74.0	--	54.0	5.09	159.90	100	Vertical	PASS
2166.83	48.82	--	--	-1.12	74.0	--	54.0	5.18	145.80	100	Vertical	PASS
2440.56	99.15	--	--	-0.54	N/A	--	N/A	N/A	111.40	100	Vertical	N/A
2934.07	46.78	--	--	2.36	74.0	--	54.0	7.22	28.30	100	Vertical	PASS
4834.17	48.72	--	--	12.94	74.0	--	54.0	5.28	264.80	100	Vertical	PASS
5793.21	48.45	--	--	14.12	74.0	--	54.0	5.55	319.00	100	Vertical	PASS

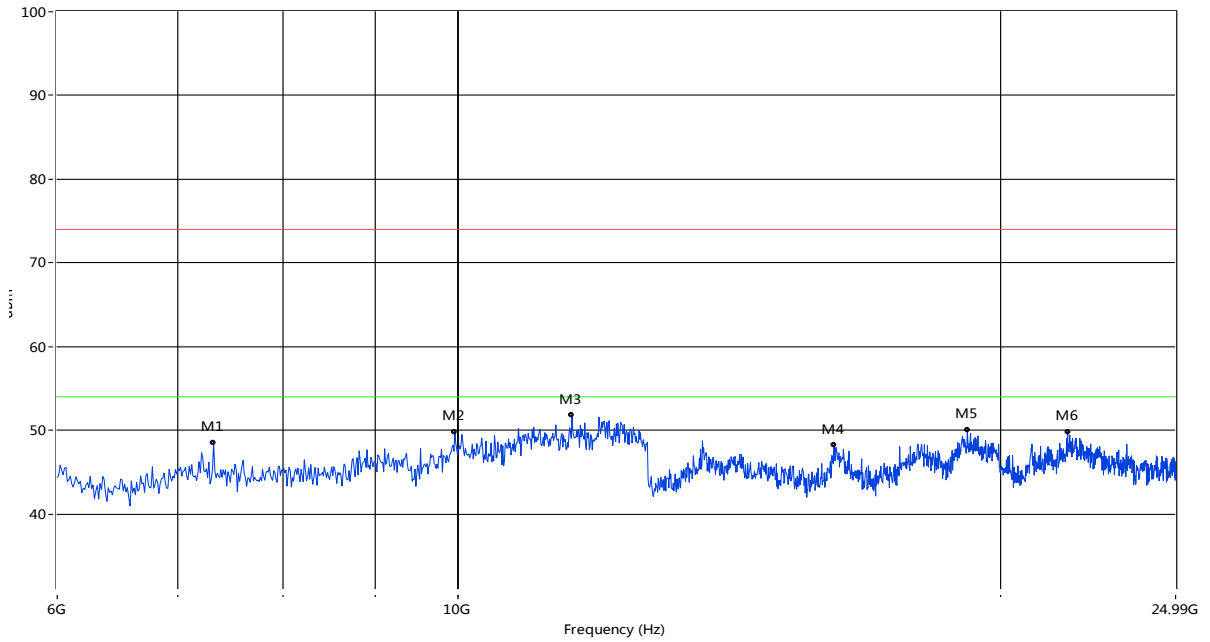
II/4-DQPSK MID CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



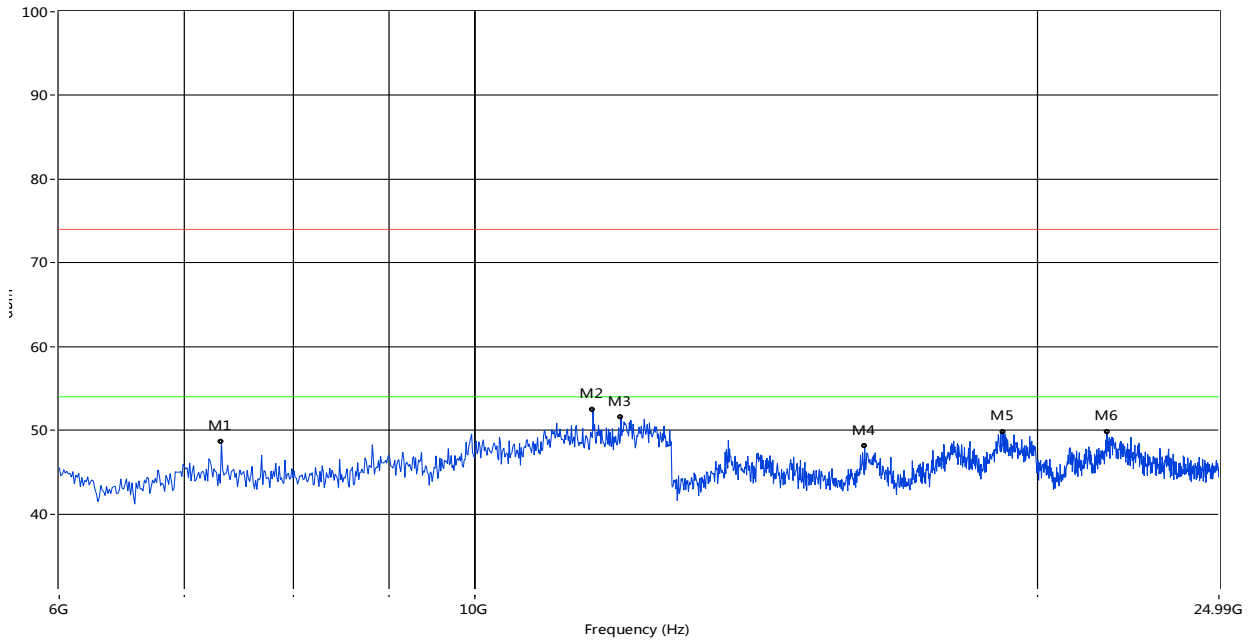
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1533.47	40.81	--	--	-4.24	74.0	--	54.0	13.19	75.10	100	Horizontal	PASS
2440.56	95.73	--	--	-0.54	N/A	--	N/A	N/A	68.50	100	Horizontal	N/A
2860.14	42.92	--	--	2.41	74.0	--	54.0	11.08	205.00	100	Horizontal	PASS
4678.32	40.84	--	--	11.48	74.0	--	54.0	13.16	82.30	100	Horizontal	PASS
4882.12	51.34	--	--	12.34	74.0	--	54.0	2.66	77.50	100	Horizontal	PASS
5790.21	44.16	--	--	14.06	74.0	--	54.0	9.84	259.00	100	Horizontal	PASS

II/4-DQPSK MID CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7325.29	48.51	--	--	74.0	--	54.0	25.49	86	Vertical	PASS
2	9964.64	49.82	--	--	74.0	--	54.0	24.18	88	Vertical	PASS
3	11570.72	51.82	--	--	74.0	--	54.0	22.18	270	Vertical	PASS
4	16160.98	48.24	--	--	74.0	--	54.0	25.76	153	Vertical	PASS
5	19159.73	50.04	--	--	74.0	--	54.0	23.96	190	Vertical	PASS
6	21775.37	49.81	--	--	74.0	--	54.0	24.19	165	Vertical	PASS

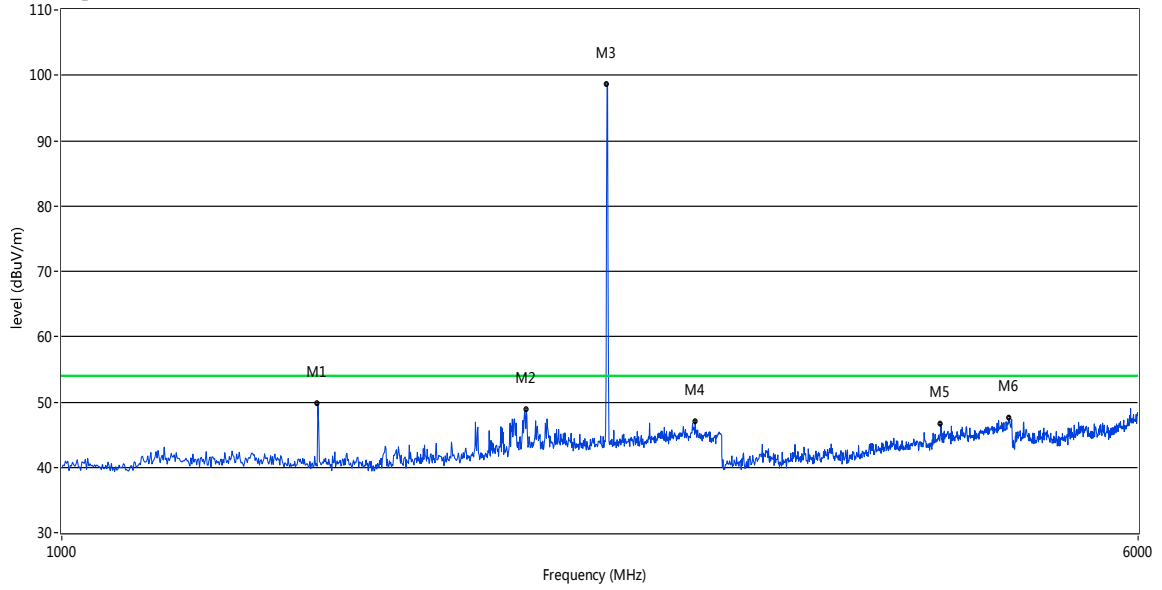
TI/4-DQPSK MID CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7325.29	48.63	--	--	74.0	--	54.0	25.37	4	Horizontal	PASS
2	11570.72	52.45	--	--	74.0	--	54.0	21.55	42	Horizontal	PASS
3	11975.04	51.49	--	--	74.0	--	54.0	22.51	258	Horizontal	PASS
4	16160.98	48.12	--	--	74.0	--	54.0	25.88	112	Horizontal	PASS
5	19159.73	49.83	--	--	74.0	--	54.0	24.17	359	Horizontal	PASS
6	21775.37	49.70	--	--	74.0	--	54.0	24.30	300	Horizontal	PASS

II/4-DQPSK HIGH CHANNEL 1GHz to 6GHz, ANT V

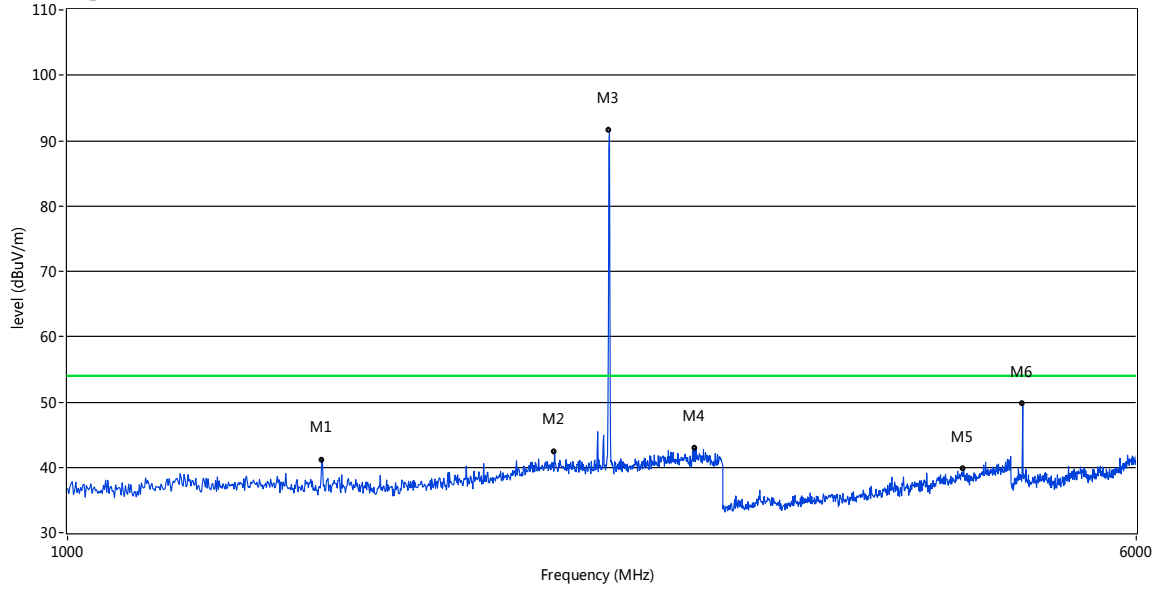
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.65	--	--	-4.23	4.0	--	54.0	4.35	158.70	100	Vertical	PASS
2166.83	48.73	--	--	-1.12	74.0	--	54.0	5.27	144.70	100	Vertical	PASS
2478.52	98.56	--	--	-0.62	N/A	--	N/A	N/A	103.50	100	Vertical	N/A
2870.13	46.99	--	--	2.19	74.0	--	54.0	7.01	55.40	100	Vertical	PASS
4321.68	46.65	--	--	10.73	74.0	--	54.0	7.35	82.60	100	Vertical	PASS
4840.16	47.44	--	--	13.03	74.0	--	54.0	6.56	28.90	100	Vertical	PASS

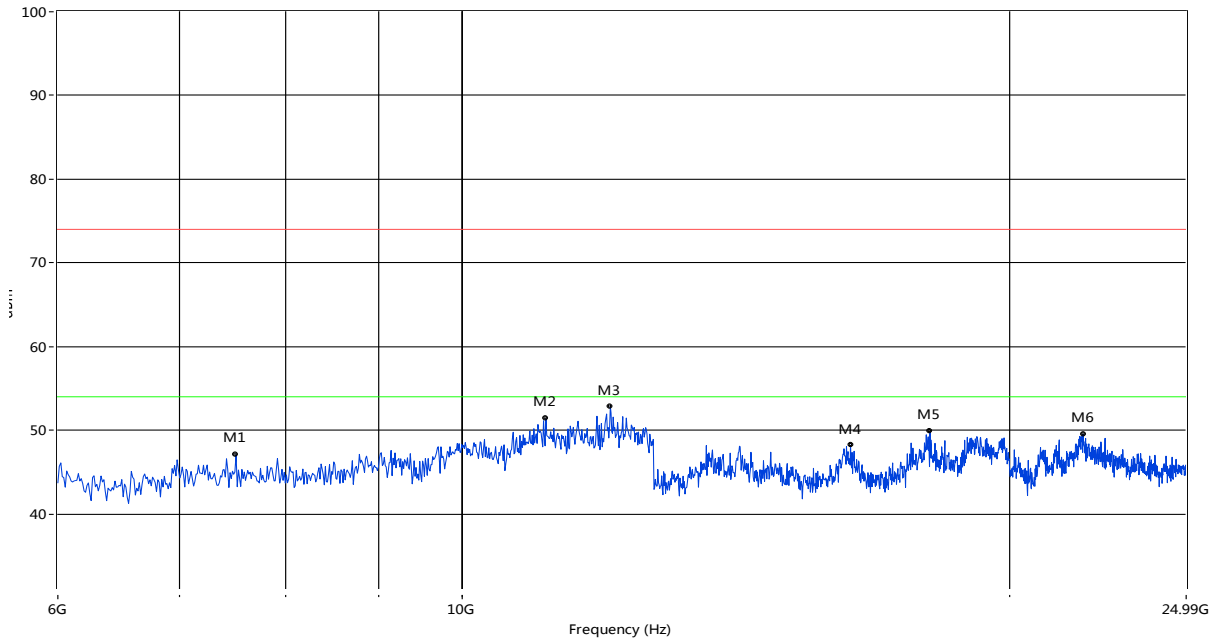
IT/4-DQPSK HIGH CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



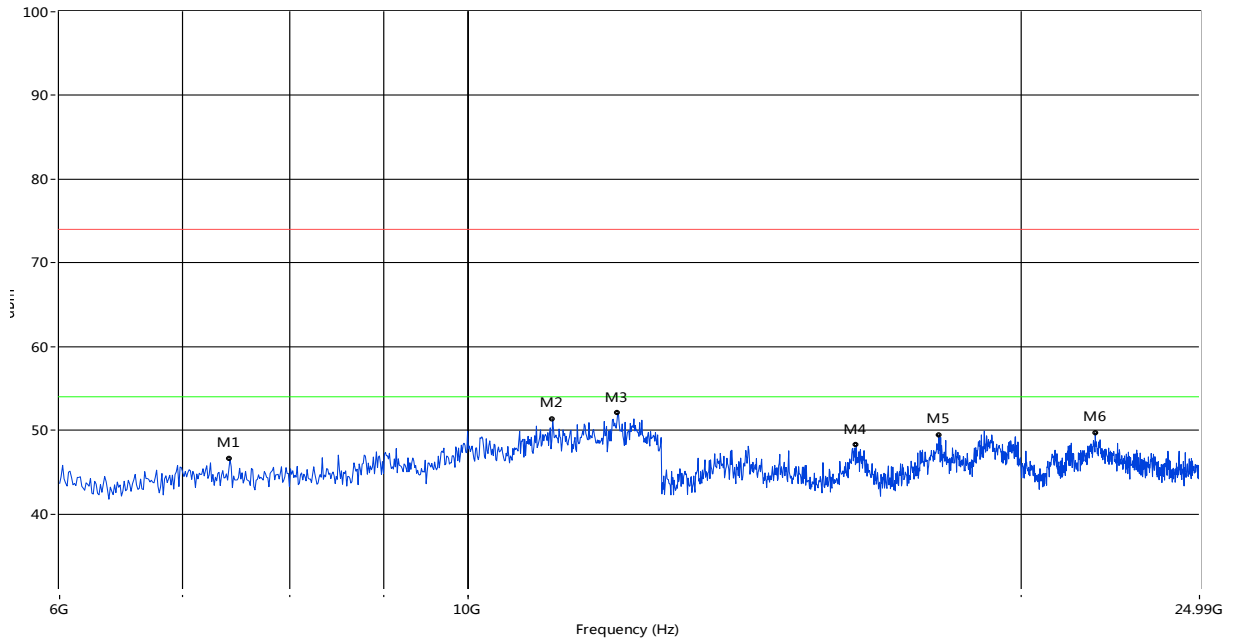
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	41.15			-4.23	74.0	--	54.	12.85	75.20	100	Horizontal	PASS
2262.74	42.44			-0.79	74.0	--	54.0	11.56	75.20	100	Horizontal	PASS
2480.52	91.50			-0.66	N/A	--	N/A	N/A	4.10	100	Horizontal	N/A
2860.14	42.93			2.41	74.0	--	54.0	11.07	360.00	100	Horizontal	PASS
4492.51	39.81			10.98	74.0	--	54.0	14.19	294.20	100	Horizontal	PASS
4960.04	49.67			12.64	74.0	--	54.0	4.33	79.20	100	Horizontal	PASS

II/4-DQPSK HIGH CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7516.22	47.08	--	--	74.0	--	54.0	26.92	44	Vertical	PASS
2	11121.46	51.37	--	--	74.0	--	54.0	22.63	313	Vertical	PASS
3	12064.89	52.85	--	--	74.0	--	54.0	21.15	173	Vertical	PASS
4	16348.17	48.24	--	--	74.0	--	54.0	25.76	293	Vertical	PASS
5	18074.46	49.84	--	--	74.0	--	54.0	24.16	294	Vertical	PASS
6	21935.11	49.53	--	--	74.0	--	54.0	24.47	196	Vertical	PASS

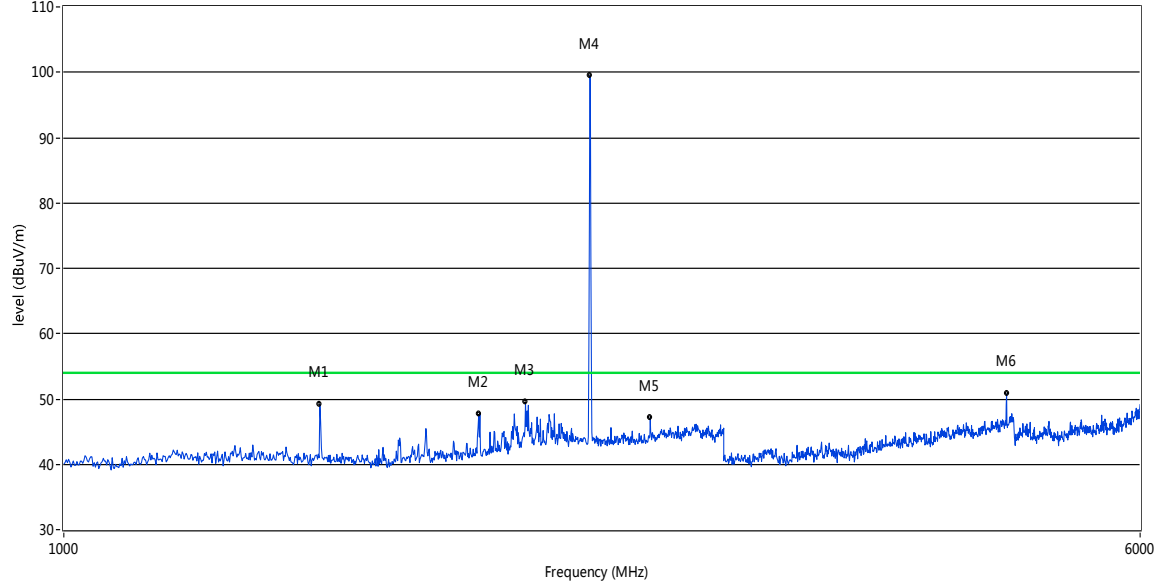
II/4-DQPSK HIGH CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7426.37	46.52	--	--	74.0	--	54.0	27.48	120	Horizontal	PASS
2	11121.46	51.25	--	--	74.0	--	54.0	22.75	149	Horizontal	PASS
3	12064.89	52.07	--	--	74.0	--	54.0	21.93	271	Horizontal	PASS
4	16264.98	48.25	--	--	74.0	--	54.0	25.75	27	Horizontal	PASS
5	18032.86	49.40	--	--	74.0	--	54.0	24.60	160	Horizontal	PASS
6	21935.11	49.60	--	--	74.0	--	54.0	24.40	314	Horizontal	PASS

8-DPSK LOW CHANNEL 1GHz to 6GHz, ANT V

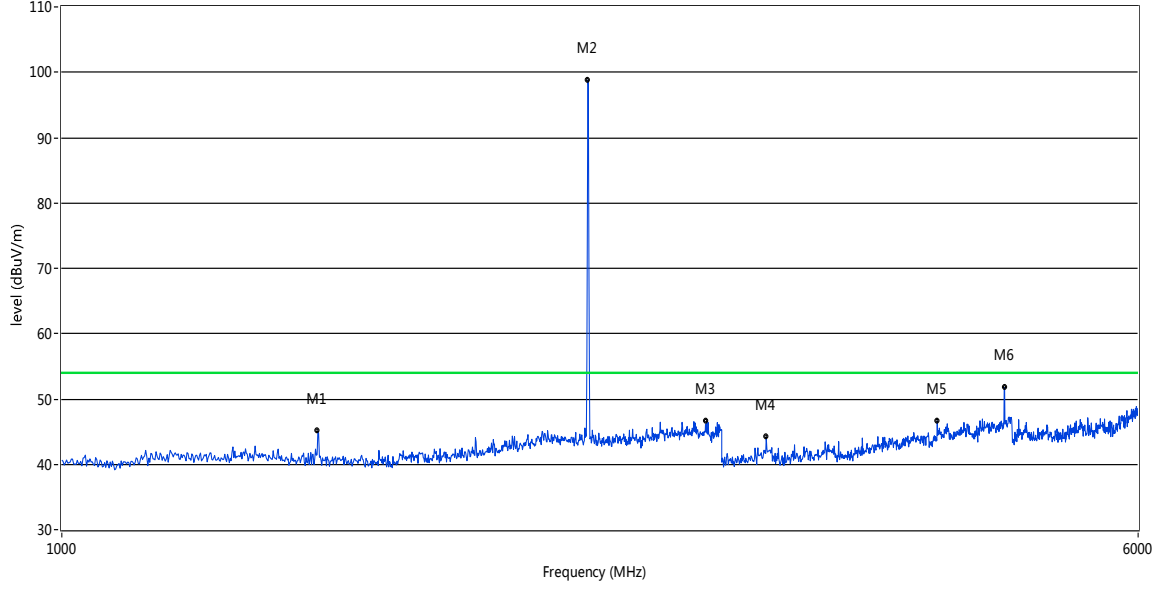
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.17	--	--	-4.23	74.0	--	54.0	4.83	159.90	100	Vertical	PASS
1995.00	47.64	--	--	-2.89	74.0	--	54.0	6.36	166.90	100	Vertical	PASS
2156.84	49.47	--	--	-1.36	74.0	--	54.0	4.53	159.90	100	Vertical	PASS
2400.60	99.49	--	--	-0.67	N/A	--	N/A	N/A	98.00	100	Vertical	N/A
2654.35	47.11	--	--	0.87	74.0	--	54.0	6.89	159.90	100	Vertical	PASS
4804.20	50.75	--	--	12.35	74.0	--	54.0	3.25	63.00	100	Vertical	PASS

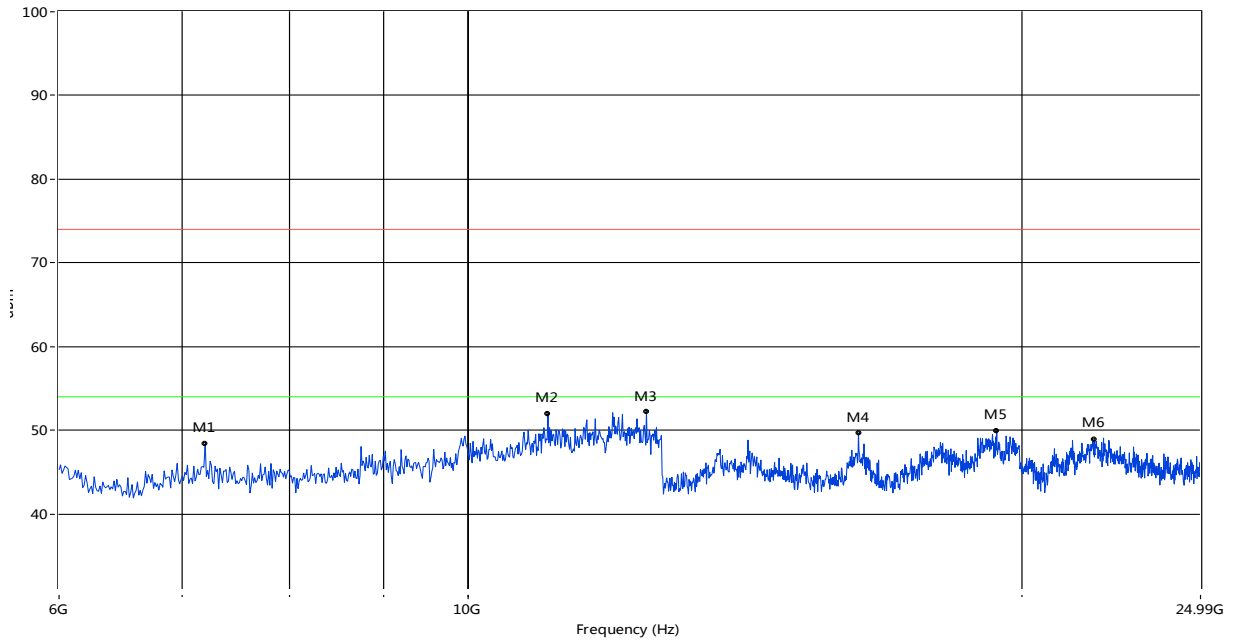
8-DPSK LOW CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



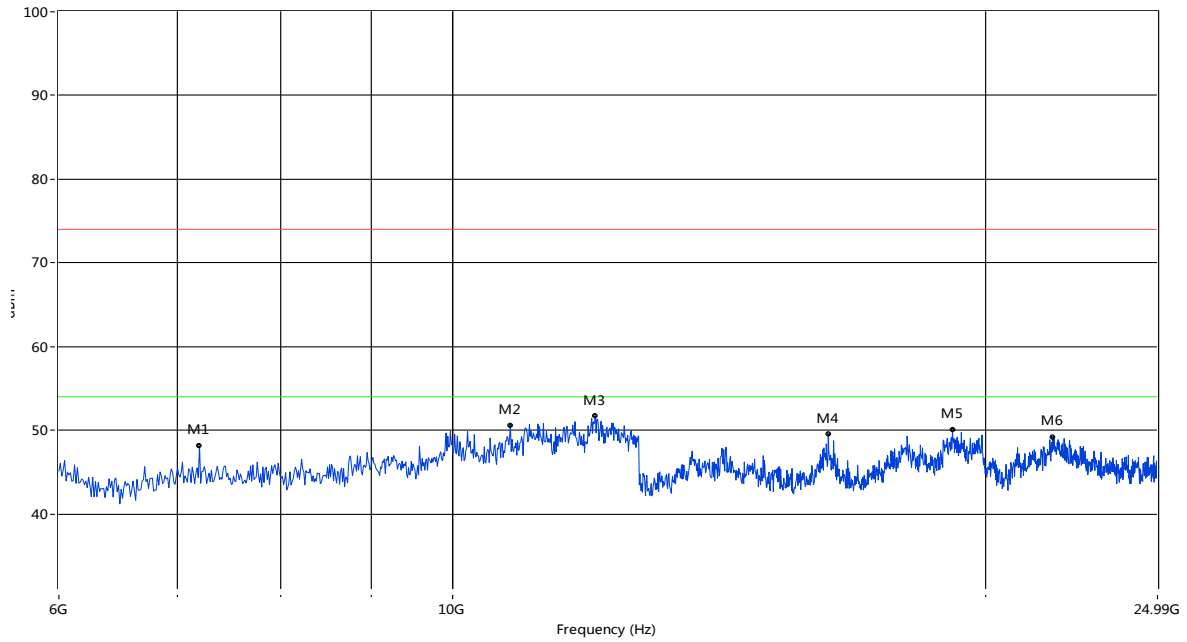
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	45.08	--	--	-4.23	74.0	--	54.0	8.92	68.60	100	Horizontal	PASS
2400.60	98.80	--	--	-0.67	N/A	--	N/A	N/A	318.50	100	Horizontal	N/A
2924.08	46.55	--	--	2.38	74.0	--	54.0	7.45	346.00	100	Horizontal	PASS
3230.77	44.18	--	--	8.24	74.0	--	54.0	9.82	191.70	100	Horizontal	PASS
4294.71	46.65	--	--	10.75	74.0	--	54.0	7.35	325.20	100	Horizontal	PASS
4804.20	51.74	--	--	12.35	74.0	--	54.0	2.26	48.90	100	Horizontal	PASS

8-DPSK LOW CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7201.75	48.39	--	--	74.0	--	54.0	25.61	17	Vertical	PASS
2	11054.08	51.98	--	--	74.0	--	54.0	22.02	28	Vertical	PASS
3	12502.91	52.21	--	--	74.0	--	54.0	21.79	254	Vertical	PASS
4	16296.17	49.66	--	--	74.0	--	54.0	24.34	25	Vertical	PASS
5	19369.38	49.93	--	--	74.0	--	54.0	24.07	171	Vertical	PASS
6	21875.21	48.85	--	--	74.0	--	54.0	25.15	42	Vertical	PASS

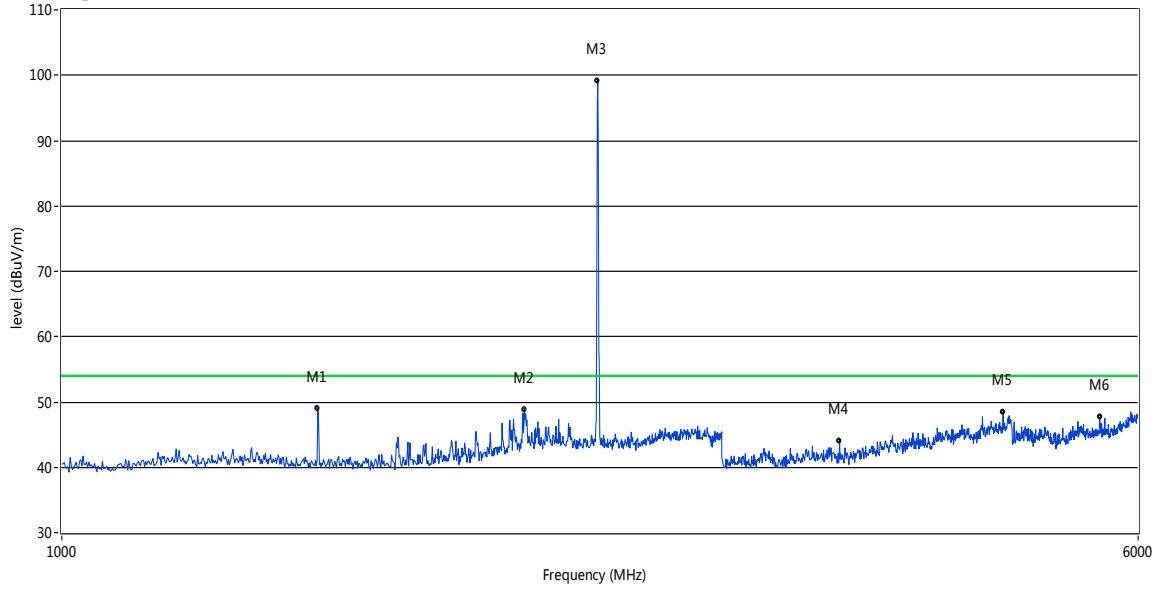
8-DPSK LOW CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7201.75	48.08	--	--	74.0	--	54.0	25.92	355	Horizontal	PASS
2	10784.53	50.58	--	--	74.0	--	54.0	23.42	173	Horizontal	PASS
3	12042.43	51.67	--	--	74.0	--	54.0	22.33	276	Horizontal	PASS
4	16296.17	49.51	--	--	74.0	--	54.0	24.49	201	Horizontal	PASS
5	19149.75	50.07	--	--	74.0	--	54.0	23.93	260	Horizontal	PASS
6	21815.31	49.18	--	--	74.0	--	54.0	24.82	183	Horizontal	PASS

8-DPSK MID CHANNEL 1GHz to 6GHz, ANT V

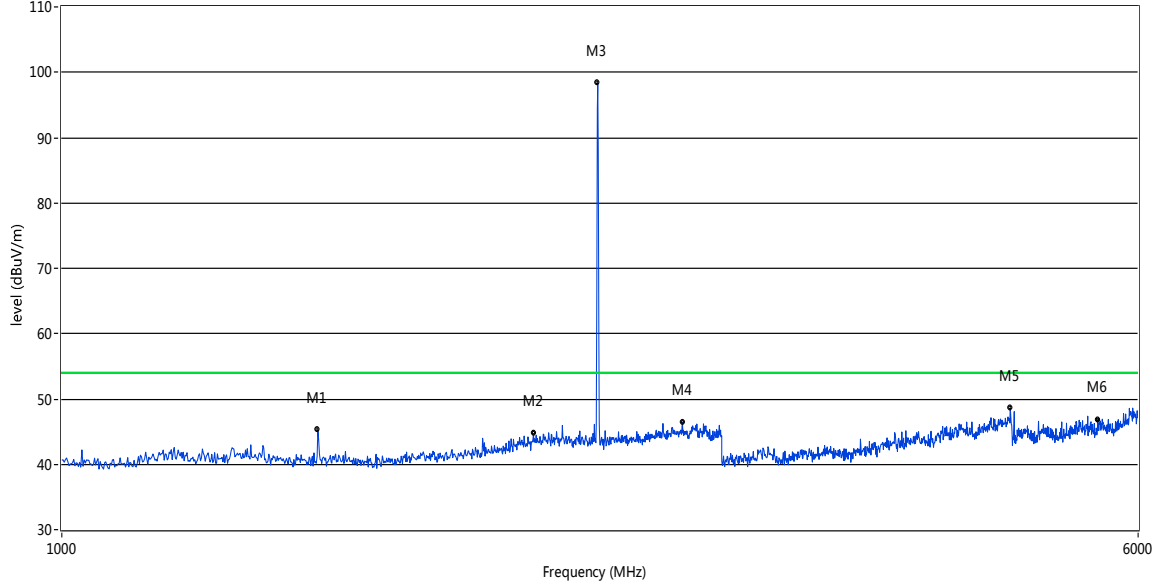
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	48.91	--	--	-4.23	74.0	--	54.0	5.09	160.30	100	Vertical	PASS
2160.84	48.74	--	--	-1.32	74.0	--	54.0	5.26	153.70	100	Vertical	PASS
2440.56	99.19	--	--	-0.54	N/A	--	N/A	N/A	98.50	100	Vertical	N/A
3650.35	44.01	--	--	8.92	74.0	--	54.0	9.99	-0.70	100	Vertical	PASS
4792.21	48.35	--	--	12.33	74.0	--	54.0	5.65	1.00	100	Vertical	PASS
5628.37	47.68	--	--	14.34	74.0	--	54.0	6.32	63.40	100	Vertical	PASS

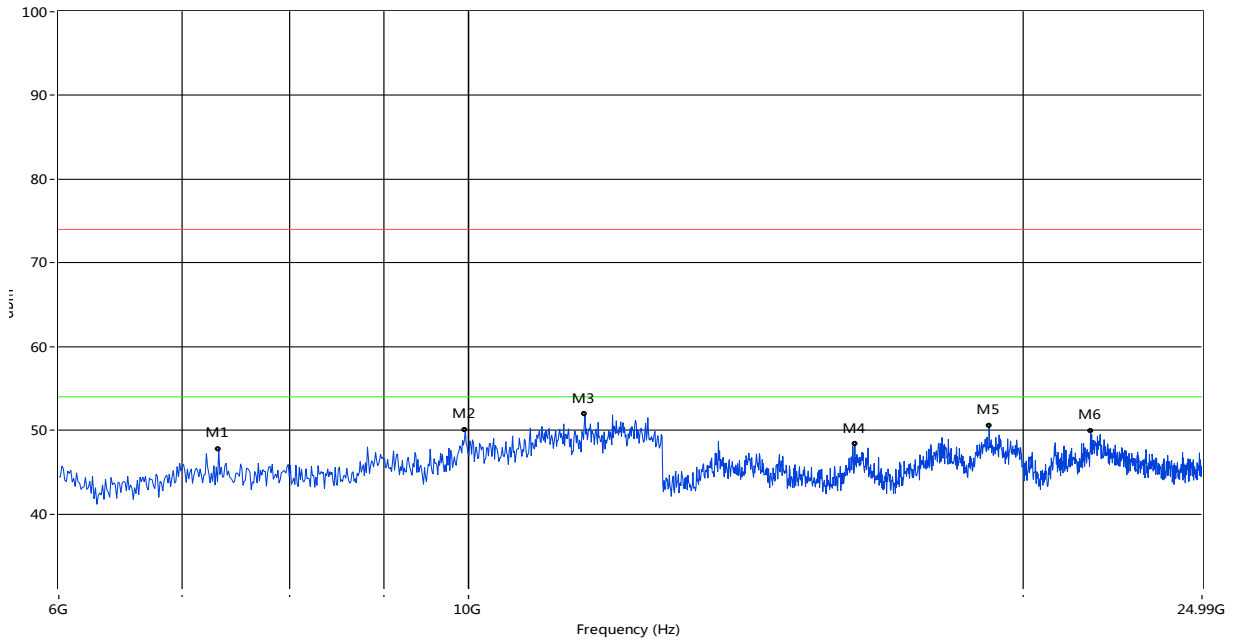
8-DPSK MID CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



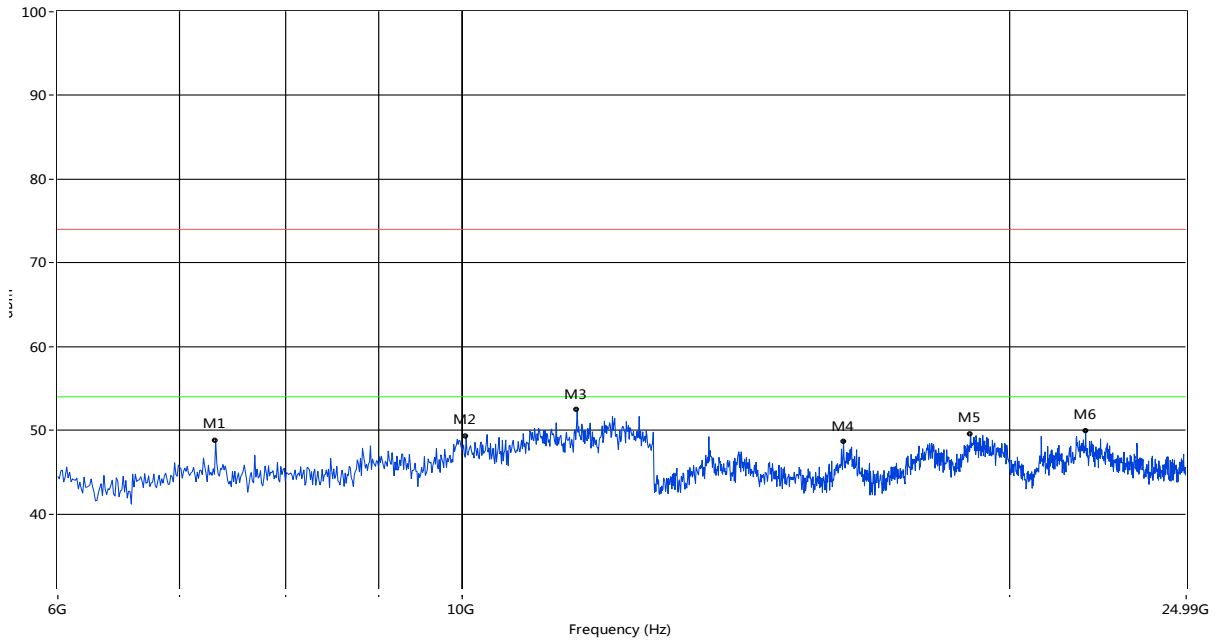
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	45.24	--	--	-4.23	74.0	--	54.0	8.76	70.90	100	Horizontal	PASS
2192.81	44.65	--	--	-0.77	74.0	--	54.0	9.35	201.30	100	Horizontal	PASS
2440.56	98.33	--	--	-0.54	N/A	--	N/A	N/A	319.00	100	Horizontal	N/A
2810.19	46.37	--	--	2.32	74.0	--	54.0	7.63	91.60	100	Horizontal	PASS
4849.15	48.53	--	--	12.81	74.0	--	54.0	5.47	53.30	100	Horizontal	PASS
5610.39	46.86	--	--	13.88	74.0	--	54.0	7.14	240.20	100	Horizontal	PASS

8-DPSK MID CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7325.29	47.77	--	--	74.0	--	54.0	26.23	8	Vertical	PASS
2	9964.64	50.01	--	--	74.0	--	54.0	23.99	54	Vertical	PASS
3	11570.72	51.87	--	--	74.0	--	54.0	22.13	142	Vertical	PASS
4	16202.58	48.33	--	--	74.0	--	54.0	25.67	85	Vertical	PASS
5	19159.73	50.54	--	--	74.0	--	54.0	23.46	52	Vertical	PASS
6	21745.42	49.84	--	--	74.0	--	54.0	24.16	280	Vertical	PASS

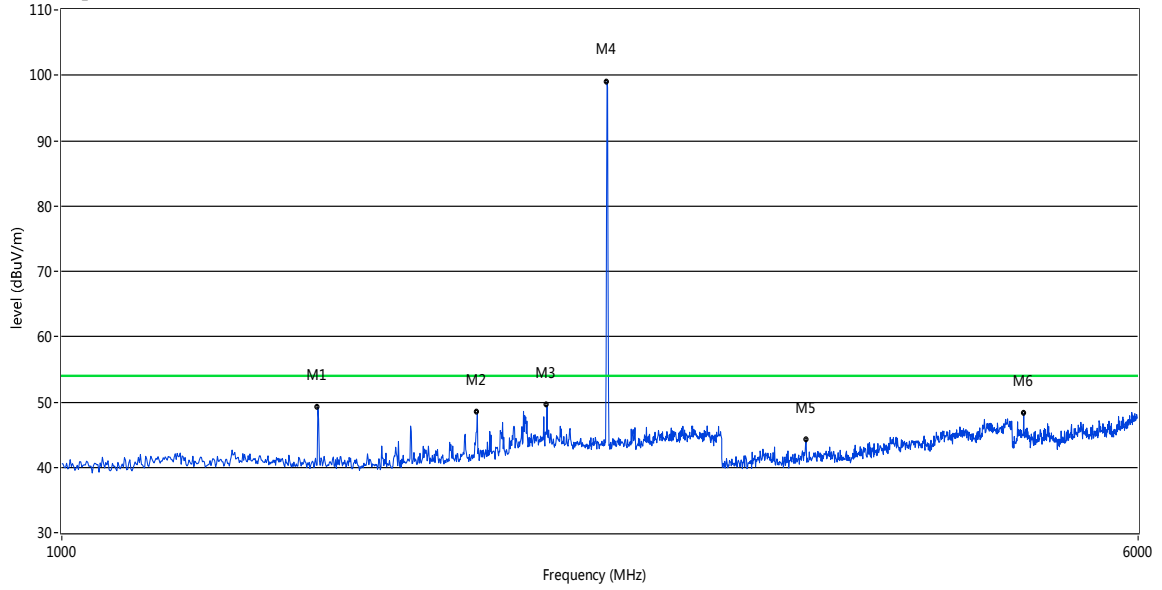
8-DPSK MID CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7325.29	48.72	--	--	74.0	--	54.0	25.28	93	Horizontal	PASS
2	10054.49	49.24	--	--	74.0	--	54.0	24.76	302	Horizontal	PASS
3	11570.72	52.42	--	--	74.0	--	54.0	21.58	279	Horizontal	PASS
4	16202.58	48.66	--	--	74.0	--	54.0	25.34	194	Horizontal	PASS
5	19029.95	49.49	--	--	74.0	--	54.0	24.51	230	Horizontal	PASS
6	22004.99	49.83	--	--	74.0	--	54.0	24.17	303	Horizontal	PASS

8-DPSK HIGH CHANNEL 1GHz to 6GHz, ANT V

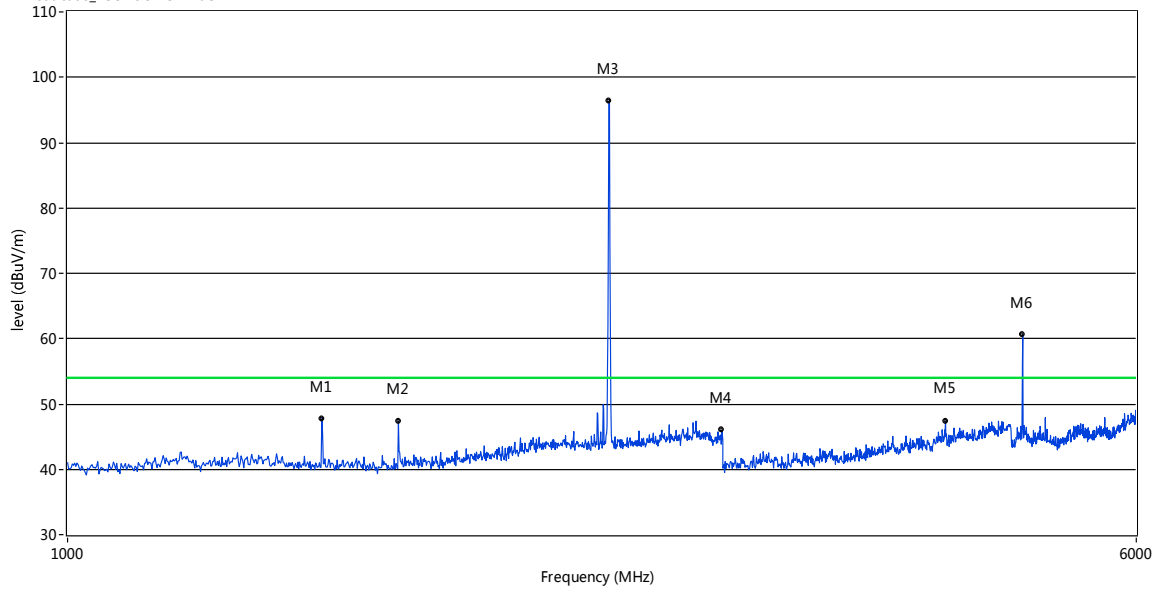
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.19	--	--	-4.23	74.0	--	54.0	4.81	152.90	100	Vertical	PASS
1997.00	48.47	--	--	-2.88	74.0	--	54.0	5.53	167.00	100	Vertical	PASS
2242.76	49.49	--	--	-0.55	74.0	--	54.0	4.51	201.80	100	Vertical	PASS
2478.52	99.01	--	--	-0.62	N/A	--	N/A	N/A	104.40	100	Vertical	N/A
3452.55	44.18	--	--	9.08	74.0	--	54.0	9.82	2.60	100	Vertical	PASS
4960.04	48.19	--	--	12.64	74.0	--	54.0	5.81	156.80	100	Vertical	PASS

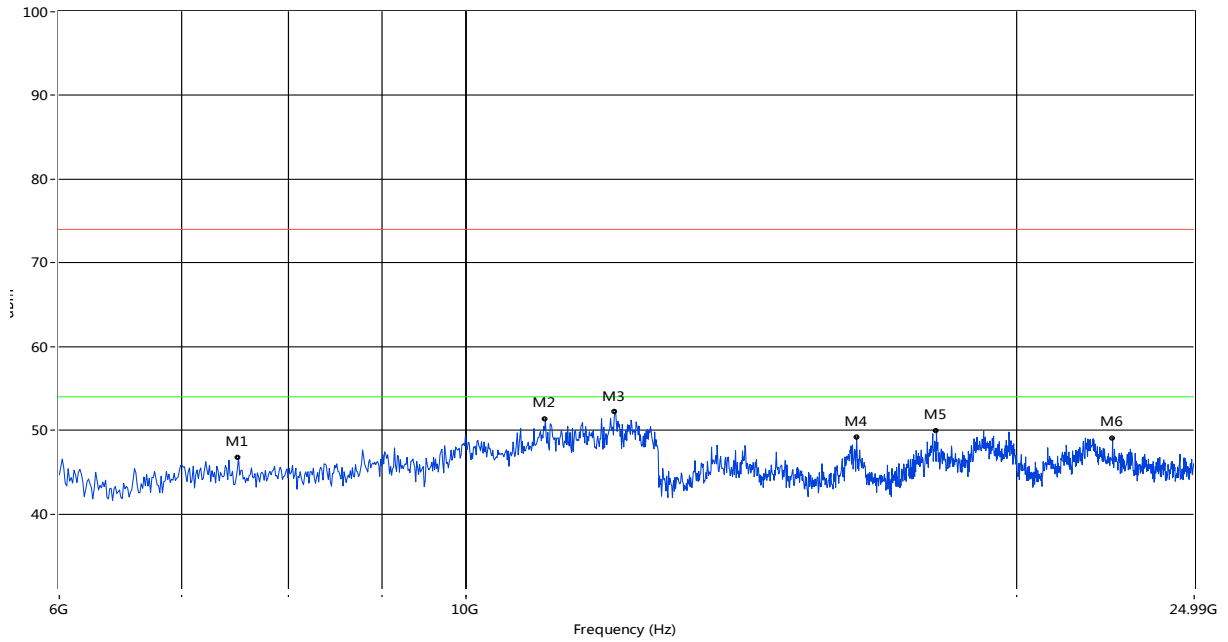
8-DPSK HIGH CHANNEL 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



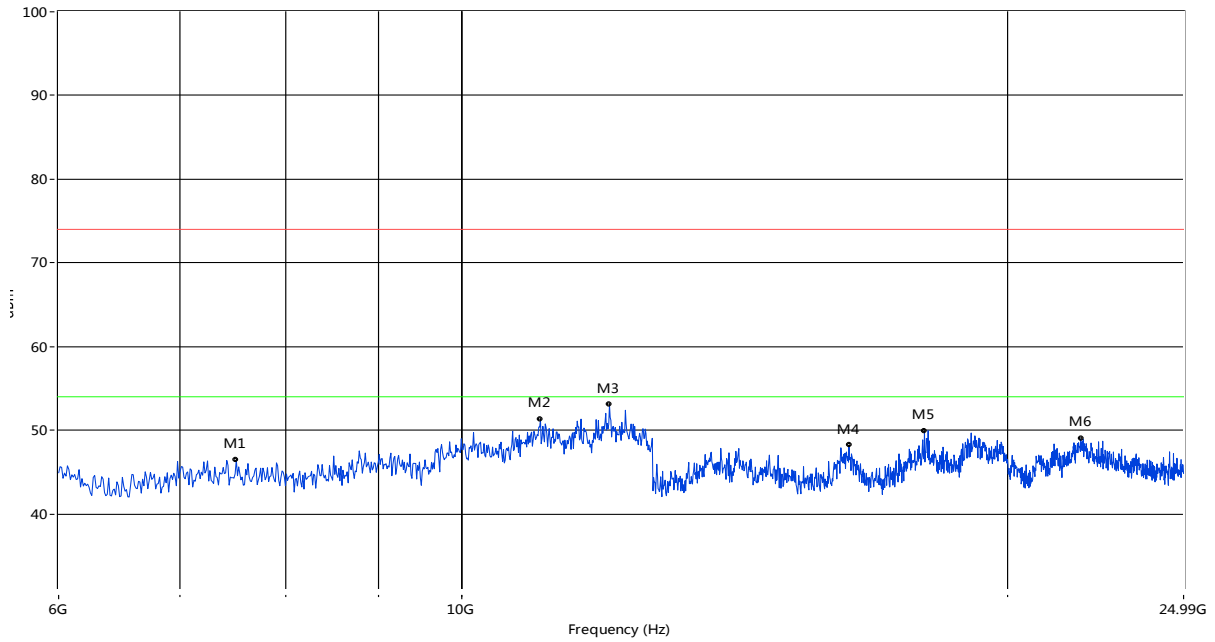
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	47.76	--	--	-4.23	74.0	--	54.0	6.24	76.80	100	Horizontal	PASS
1741.26	47.35	--	--	-4.08	74.0	--	54.0	6.65	358.00	100	Horizontal	PASS
2478.52	96.39	--	--	-0.62	N/A	--	N/A	N/A	63.10	100	Horizontal	N/A
2996.00	45.95	--	--	2.17	74.0	--	54.0	8.05	104.50	100	Horizontal	PASS
4357.64	47.40	--	--	11.05	74.0	--	54.0	6.60	171.00	100	Horizontal	PASS
4960.04	60.66	--	51.13	12.64	74.0	--	54.0	2.87	131.80	100	Horizontal	PASS

8-DPSK HIGH CHANNEL 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7516.22	46.69	--	--	74.0	--	54.0	27.31	320	Vertical	PASS
2	11054.08	51.27	--	--	74.0	--	54.0	22.73	10	Vertical	PASS
3	12064.89	52.12	--	--	74.0	--	54.0	21.88	156	Vertical	PASS
4	16348.17	49.09	--	--	74.0	--	54.0	24.91	149	Vertical	PASS
5	18074.46	49.92	--	--	74.0	--	54.0	24.08	51	Vertical	PASS
6	22554.08	49.01	--	--	74.0	--	54.0	24.99	76	Vertical	PASS

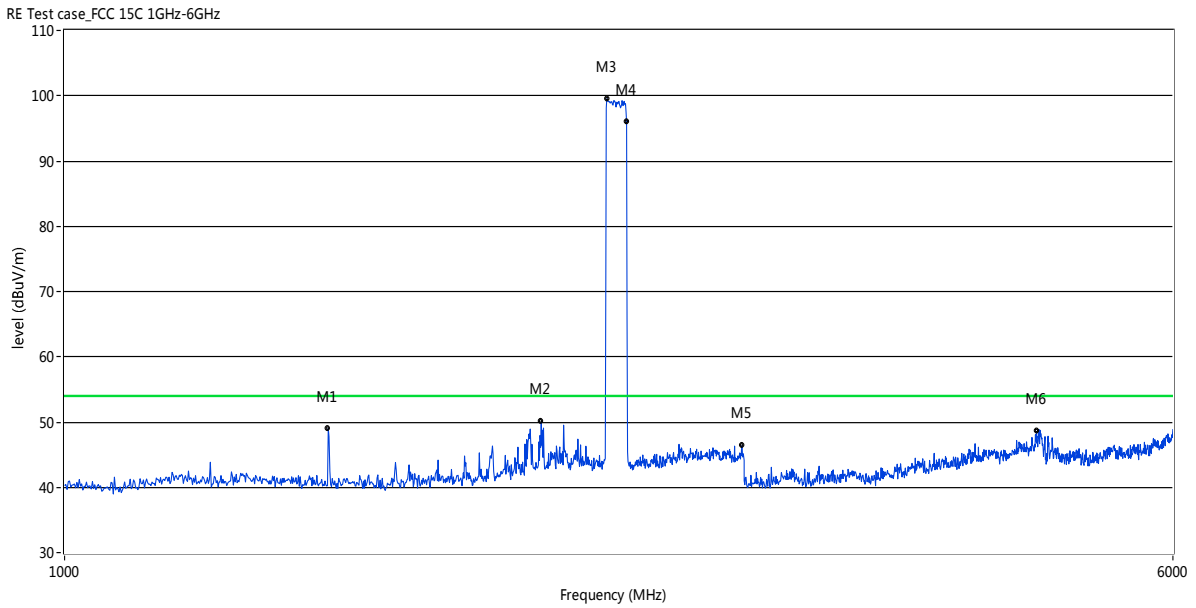
8-DPSK HIGH CHANNEL 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7516.22	46.44	--	--	74.0	--	54.0	27.56	123	Horizontal	PASS
2	11054.08	51.26	--	--	74.0	--	54.0	22.74	86	Horizontal	PASS
3	12064.89	53.03	--	--	74.0	--	54.0	20.97	183	Horizontal	PASS
4	16348.17	48.20	--	--	74.0	--	54.0	25.80	195	Horizontal	PASS
5	17991.26	49.87	--	--	74.0	--	54.0	24.13	262	Horizontal	PASS
6	21935.11	48.96	--	--	74.0	--	54.0	25.04	190	Horizontal	PASS

Hopping Mode:

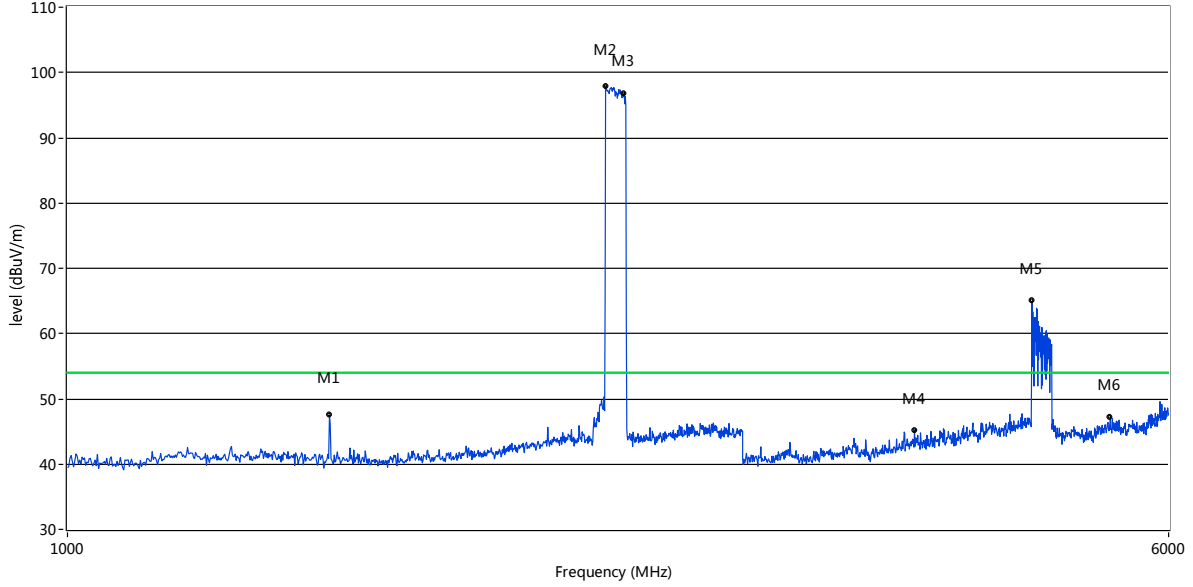
FSK MODE 1GHz to 6GHz, ANT V



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.00	--	--	-4.23	74.0	--	54.0	5.00	160.20	100	Vertical	PASS
2160.84	50.02	--	--	-1.32	74.0	--	54.0	3.98	208.70	100	Vertical	PASS
2402.60	99.52	--	--	-0.71	N/A	--	N/A	N/A	98.40	100	Vertical	N/A
2480.52	95.95	--	--	-0.66	N/A	--	N/A	N/A	98.40	100	Vertical	N/A
2988.01	46.34	--	--	2.30	74.0	--	54.0	7.66	78.40	100	Vertical	PASS
4813.19	48.59	--	--	12.43	74.0	--	54.0	5.41	68.60	100	Vertical	PASS

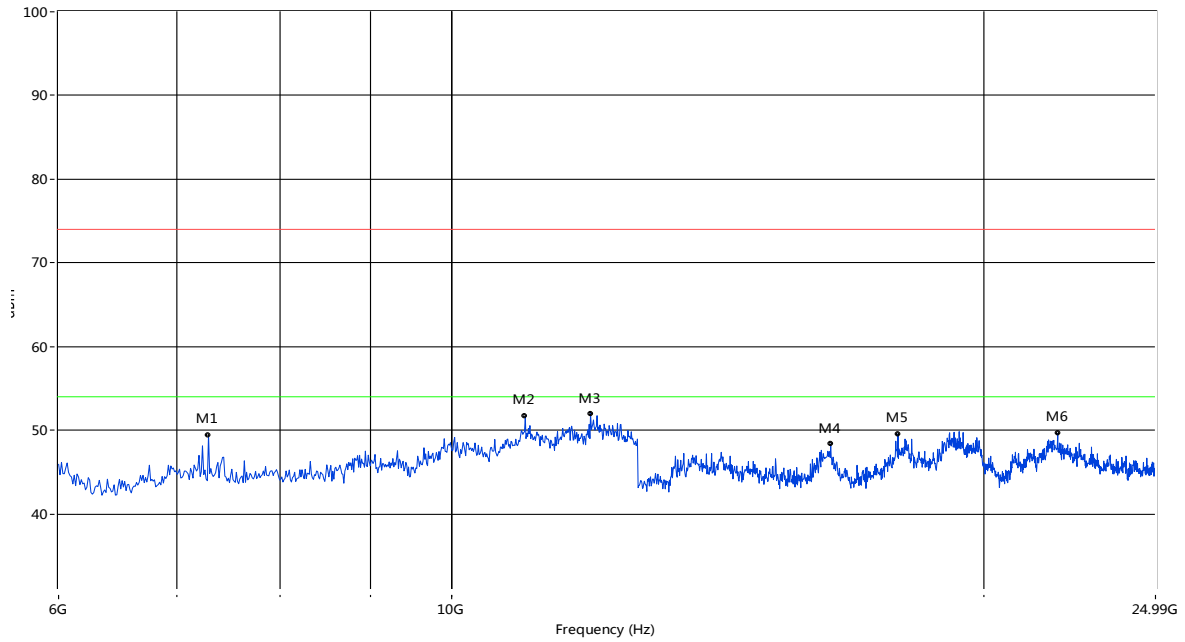
GFSK MODE 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



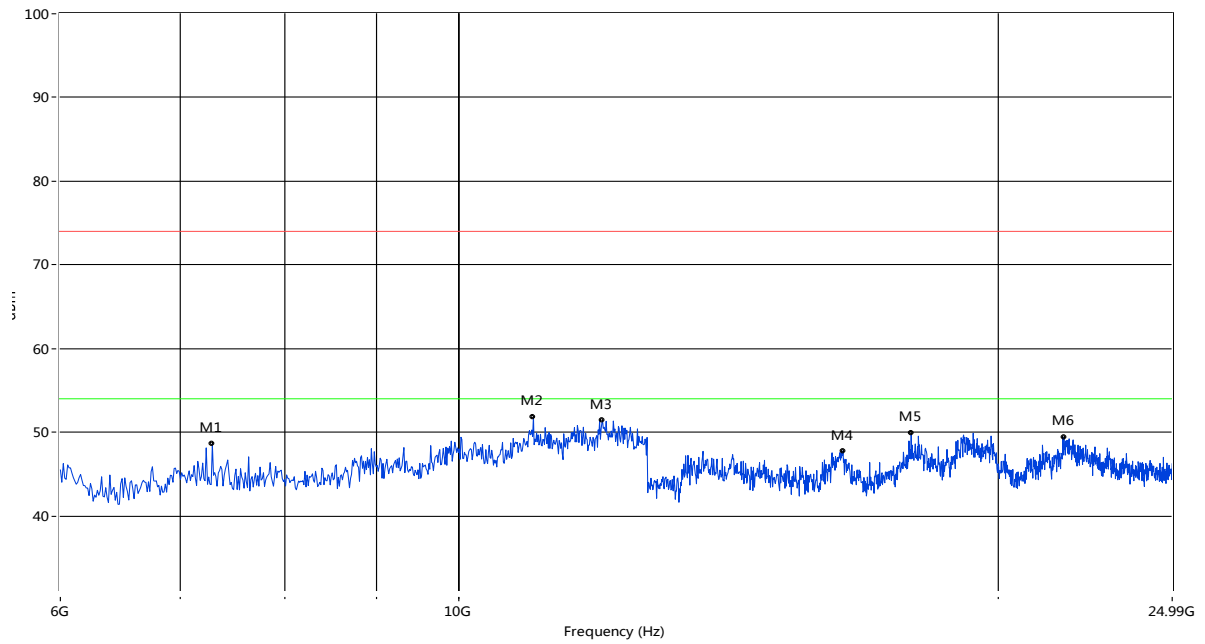
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	47.50	--	--	-4.23	74.0	--	54.0	6.50	75.60	100	Horizontal	PASS
2400.60	97.90	--	--	-0.67	N/A	--	N/A	N/A	350.40	100	Horizontal	N/A
2472.53	96.76	--	--	-0.47	N/A	--	N/A	N/A	68.50	100	Horizontal	N/A
3968.03	45.16	--	--	9.96	74.0	--	54.0	8.84	331.90	100	Horizontal	PASS
4804.30	64.90	--	39.70	12.35	74.0	--	54.0	9.10	130.20	117.10	Horizontal	PASS
5457.54	47.17	--	--	13.52	74.0	--	54.0	6.83	194.20	100	Horizontal	PASS

GFSK MODE 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7291.60	49.42	--	--	74.0	--	54.0	24.58	267	Vertical	PASS
2	11009.15	51.63	--	--	74.0	--	54.0	22.37	294	Vertical	PASS
3	11986.27	51.99	--	--	74.0	--	54.0	22.01	350	Vertical	PASS
4	16379.37	48.36	--	--	74.0	--	54.0	25.64	194	Vertical	PASS
5	17876.87	49.55	--	--	74.0	--	54.0	24.45	165	Vertical	PASS
6	22004.99	49.60	--	--	74.0	--	54.0	24.40	147	Vertical	PASS

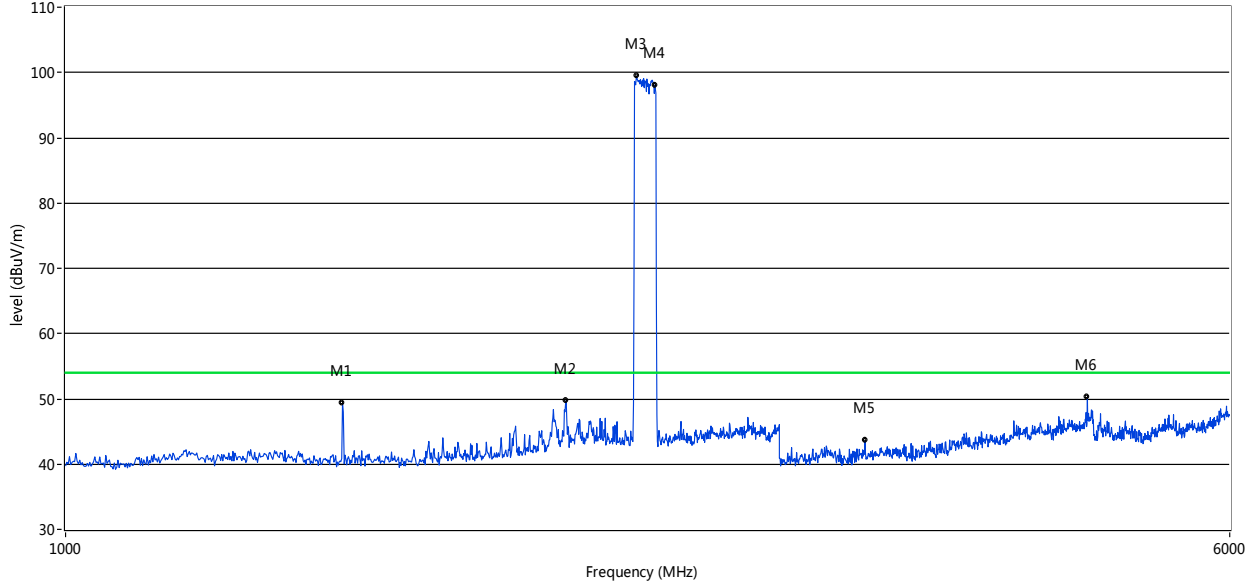
GFSK MODE 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7291.60	48.56	--	--	74.0	--	54.0	25.44	230	Horizontal	PASS
2	11009.15	51.86	--	--	74.0	--	54.0	22.14	46	Horizontal	PASS
3	12031.20	51.43	--	--	74.0	--	54.0	22.57	41	Horizontal	PASS
4	16379.37	47.77	--	--	74.0	--	54.0	26.23	204	Horizontal	PASS
5	17876.87	49.83	--	--	74.0	--	54.0	24.17	111	Horizontal	PASS
6	21745.42	49.41	--	--	74.0	--	54.0	24.59	123	Horizontal	PASS

II/4-DQPSK MODE 1GHz to 6GHz, ANT V

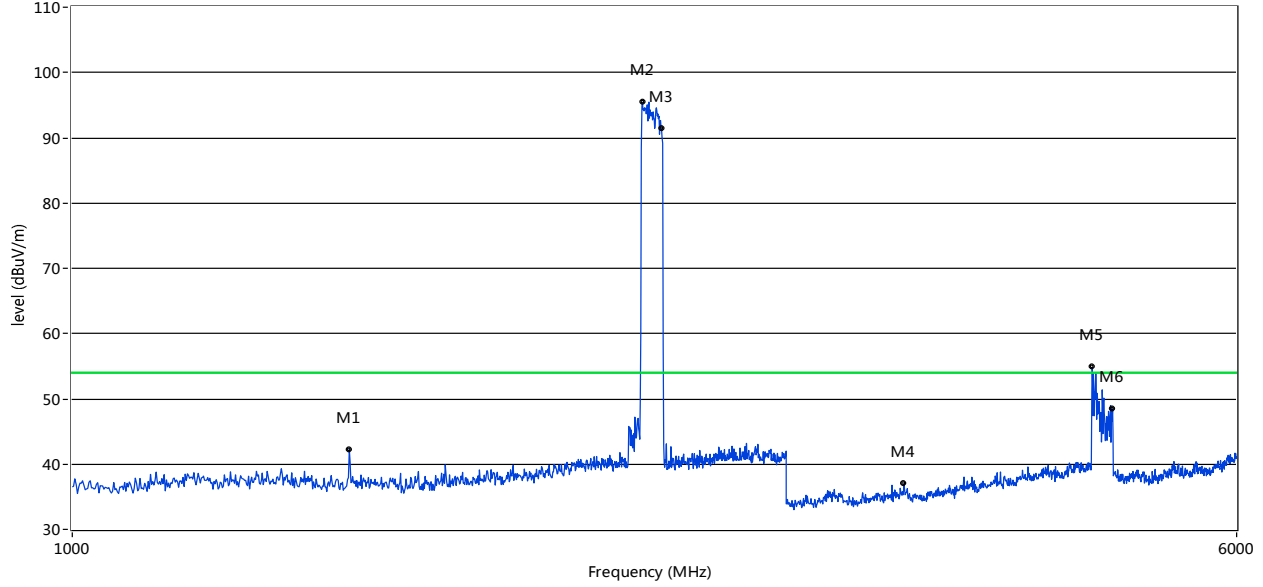
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	49.35	--	--	-4.23	74.0	--	54.0	4.65	161.20	100	Vertical	PASS
2160.84	49.70	--	--	-1.32	74.0	--	54.0	4.30	209.20	100	Vertical	PASS
2408.59	99.44	--	--	-0.81	N/A	--	N/A	N/A	105.60	100	Vertical	N/A
2476.52	97.96	--	--	-0.57	N/A	--	N/A	N/A	98.60	100	Vertical	N/A
3422.58	43.57	--	--	8.32	74.0	--	54.0	10.43	9.50	100	Vertical	PASS
4819.18	50.23	--	--	12.53	74.0	--	54.0	3.77	63.70	100	Vertical	PASS

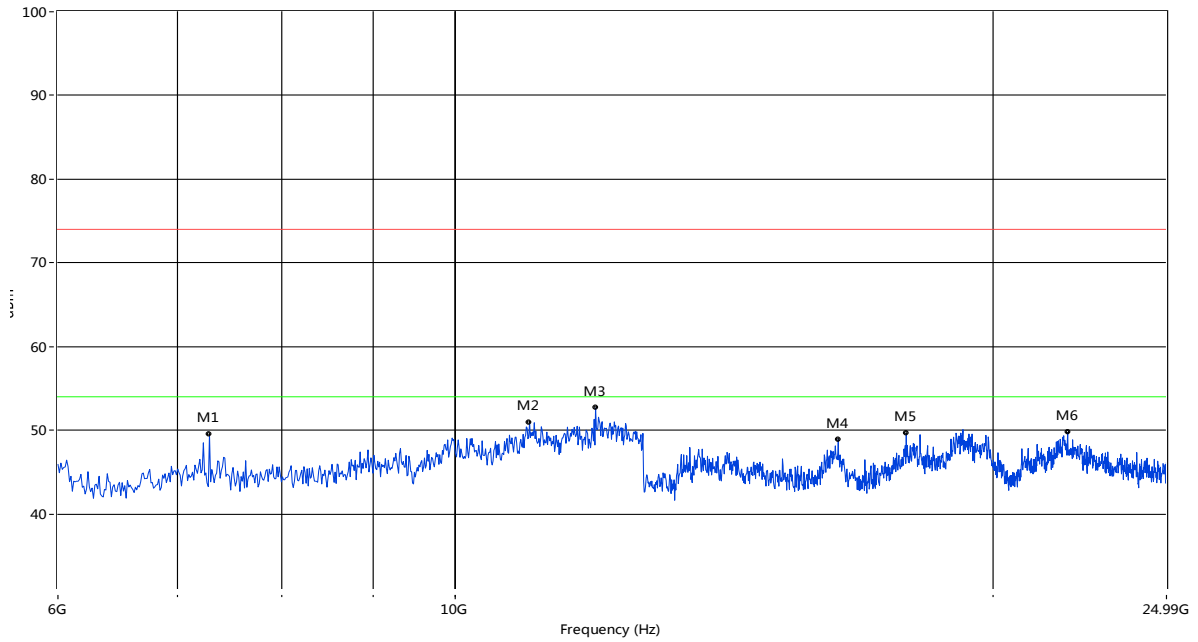
II/4-DQPSK MODE 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



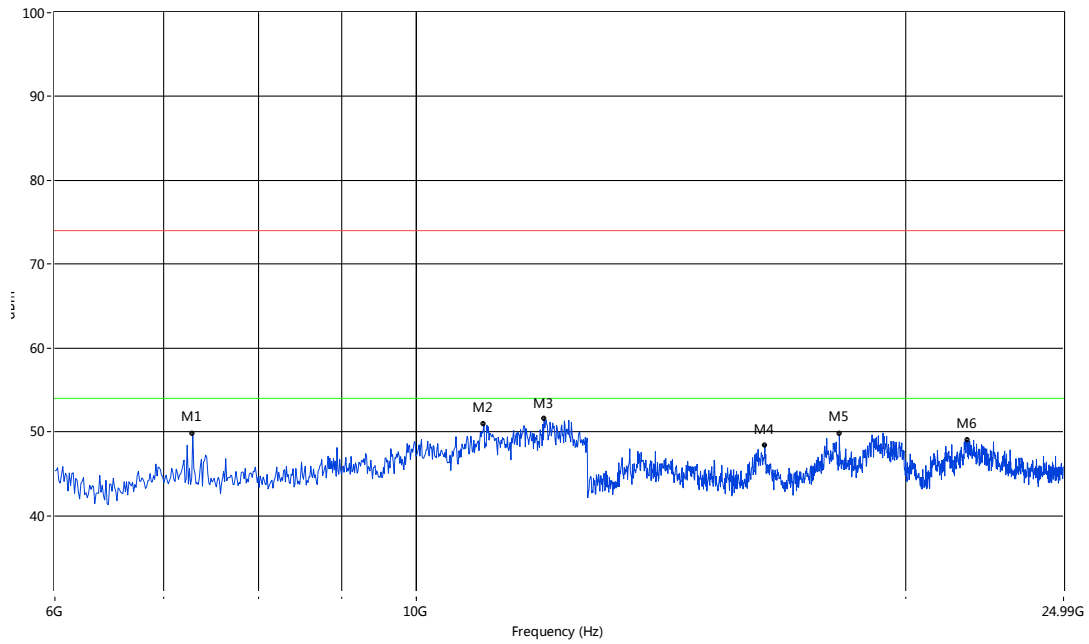
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	42.22	--	--	-4.23	74.0	--	54.0	11.78	76.00	100	Horizontal	PASS
2404.60	95.46	--	--	-0.78	N/A	--	N/A	N/A	14.40	100	Horizontal	N/A
2476.52	91.34	--	--	-0.57	N/A	--	N/A	N/A	69.00	100	Horizontal	N/A
3596.40	36.97	--	--	8.75	74.0	--	54.0	17.03	50.20	100	Horizontal	PASS
4804.20	54.82	--	40.03	12.35	74.0	--	54.0	13.97	79.50	100	Horizontal	PASS
4957.04	48.38	--	--	12.65	74.0	--	54.0	5.62	142.00	100	Horizontal	PASS

Π/4-DQPSK MODE 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7291.60	49.47	--	--	74.0	--	54.0	24.53	271	Vertical	PASS
2	11009.15	50.96	--	--	74.0	--	54.0	23.04	41	Vertical	PASS
3	11986.27	52.66	--	--	74.0	--	54.0	21.34	212	Vertical	PASS
4	16379.37	48.87	--	--	74.0	--	54.0	25.13	274	Vertical	PASS
5	17876.87	49.59	--	--	74.0	--	54.0	24.41	99	Vertical	PASS
6	22004.99	49.71	--	--	74.0	--	54.0	24.29	167	Vertical	PASS

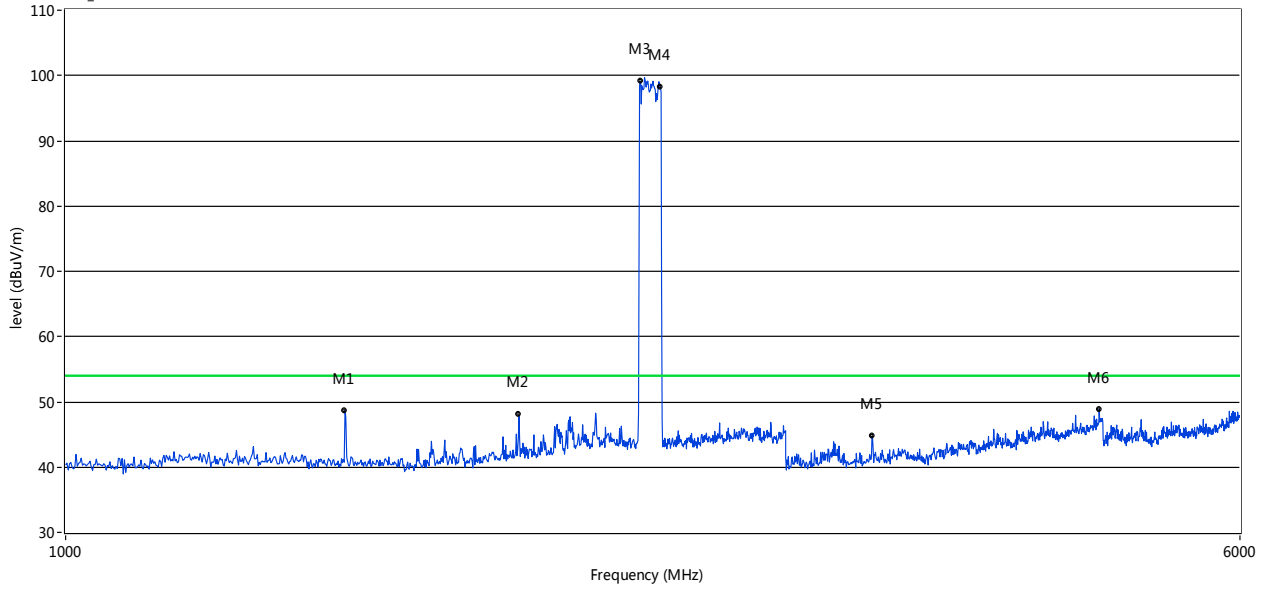
TI/4-DQPSK MODE 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7291.60	49.73	--	--	74.0	--	54.0	24.27	132	Horizontal	PASS
2	11009.15	50.96	--	--	74.0	--	54.0	23.04	304	Horizontal	PASS
3	11986.27	51.56	--	--	74.0	--	54.0	22.44	107	Horizontal	PASS
4	16379.37	48.42	--	--	74.0	--	54.0	25.58	275	Horizontal	PASS
5	18199.25	49.70	--	--	74.0	--	54.0	24.30	160	Horizontal	PASS
6	21805.32	49.02	--	--	74.0	--	54.0	24.98	84	Horizontal	PASS

8-DPSK MODE 1GHz to 6GHz, ANT V

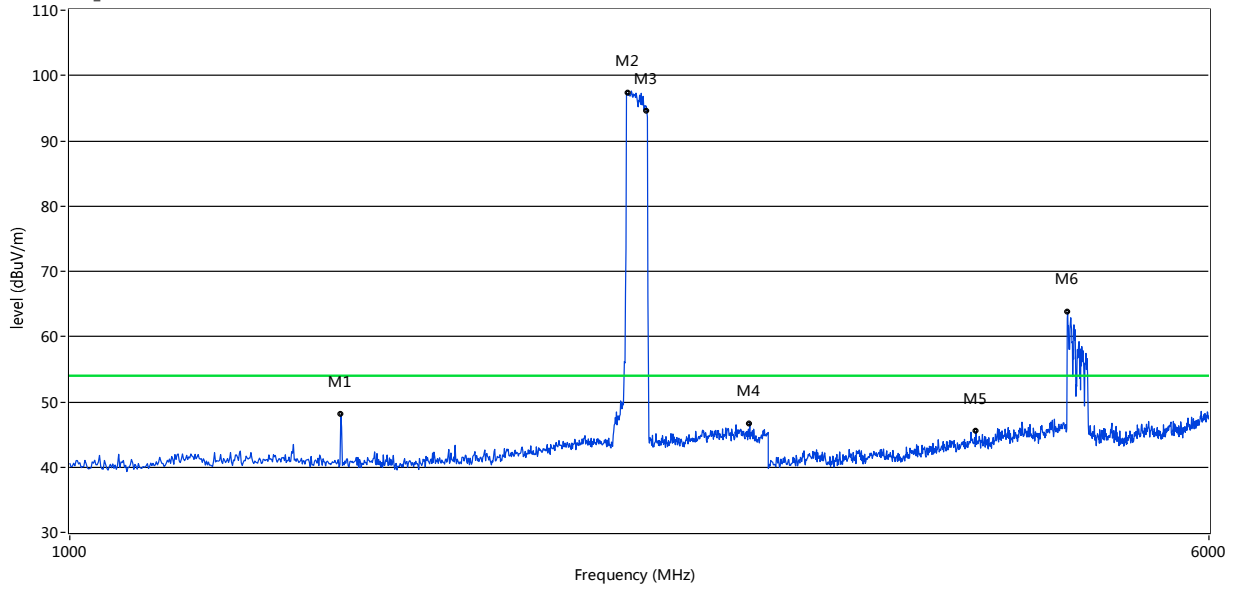
RE Test case_FCC 15C 1GHz-6GHz



Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	48.67	--	--	-4.23	74.0	--	54.0	5.33	167.10	100	Vertical	PASS
1997.00	47.99	--	--	-2.88	74.0	--	54.0	6.01	201.20	100	Vertical	PASS
2402.60	99.12	--	--	-0.71	N/A	--	N/A	N/A	111.20	100	Vertical	N/A
2478.52	98.17	--	--	-0.62	N/A	--	N/A	N/A	111.20	100	Vertical	N/A
3422.58	44.77	--	--	8.32	74.0	--	54.0	9.23	19.20	100	Vertical	PASS
4840.16	48.82	--	--	13.03	74.0	--	54.0	5.18	68.80	100	Vertical	PASS

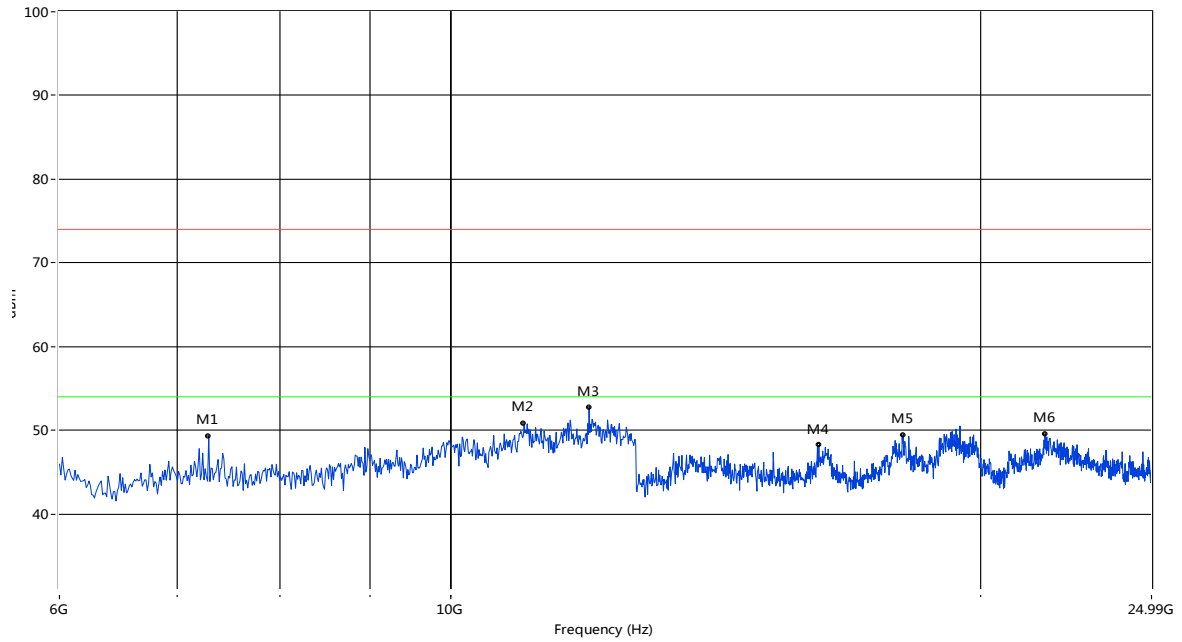
8-DPSK MODE 1GHz to 6GHz, ANT H

RE Test case_FCC 15C 1GHz-6GHz



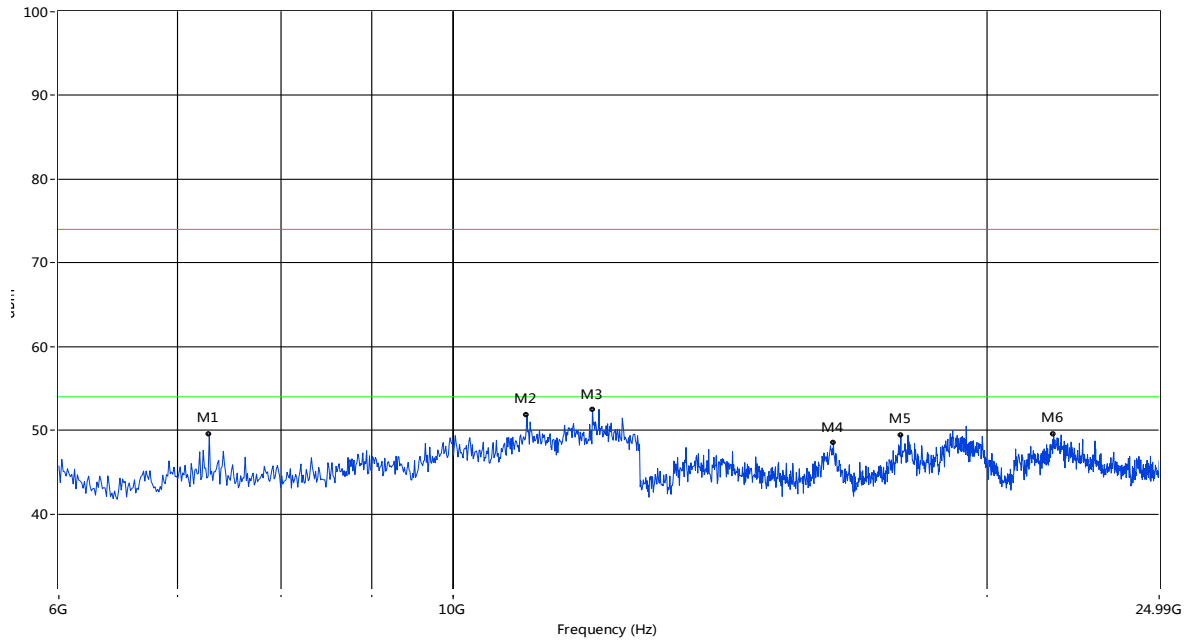
Frequency (MHz)	Peak (dBuV/m)	Q-peak (dBuV/m)	Average (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Table (o)	Height (cm)	ANT	Verdict
1531.47	47.97	--	--	-4.23	74.0	--	54.0	6.03	75.30	100	Horizontal	PASS
2404.60	97.26	--	--	-0.78	N/A	--	N/A	N/A	354.50	100	Horizontal	N/A
2478.52	94.48	--	--	-0.62	N/A	--	N/A	N/A	4.40	100	Horizontal	N/A
2914.09	46.67	--	--	2.34	74.0	--	54.0	7.33	20.70	100	Horizontal	PASS
4159.84	45.40	--	--	10.15	74.0	--	54.0	8.60	2.50	100	Horizontal	PASS
4804.30	63.93	--	39.07	12.35	74.0	--	54.0	10.07	122.30	101.00	Horizontal	PASS

8-DPSK MODE 6GHz to 25GHz, ANT V



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7291.60	49.28	--	--	74.0	--	54.0	24.72	347	Vertical	PASS
2	11009.15	50.73	--	--	74.0	--	54.0	23.27	115	Vertical	PASS
3	11986.27	52.68	--	--	74.0	--	54.0	21.32	310	Vertical	PASS
4	16181.78	48.18	--	--	74.0	--	54.0	25.82	163	Vertical	PASS
5	18064.06	49.36	--	--	74.0	--	54.0	24.64	101	Vertical	PASS
6	21745.42	49.48	--	--	74.0	--	54.0	24.52	166	Vertical	PASS

8-DPSK MODE 6GHz to 25GHz, ANT H



No.	Fre.(MHz)	Peak	Q-Peak	Average	PK Limit	QP Limit	AV Limit	Margin	Table	Polarization	Verdict
1	7291.60	49.50	--	--	74.0	--	54.0	24.50	132	Horizontal	PASS
2	11009.15	51.75	--	--	74.0	--	54.0	22.25	122	Horizontal	PASS
3	11986.27	52.38	--	--	74.0	--	54.0	21.62	141	Horizontal	PASS
4	16379.37	48.55	--	--	74.0	--	54.0	25.45	232	Horizontal	PASS
5	17876.87	49.36	--	--	74.0	--	54.0	24.64	94	Horizontal	PASS
6	21795.34	49.45	--	--	74.0	--	54.0	24.55	332	Horizontal	PASS

A.9 Band Edge

Test Data

The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Test Plots

GFSK LOW CHANNEL , ANT V, PEAK



Date: 20.AUG.2014 17:56:00

GFSK LOW CHANNEL , ANT V, AVERAGE



Date: 20.AUG.2014 17:54:30

GFSK LOW CHANNEL , ANT H, PEAK



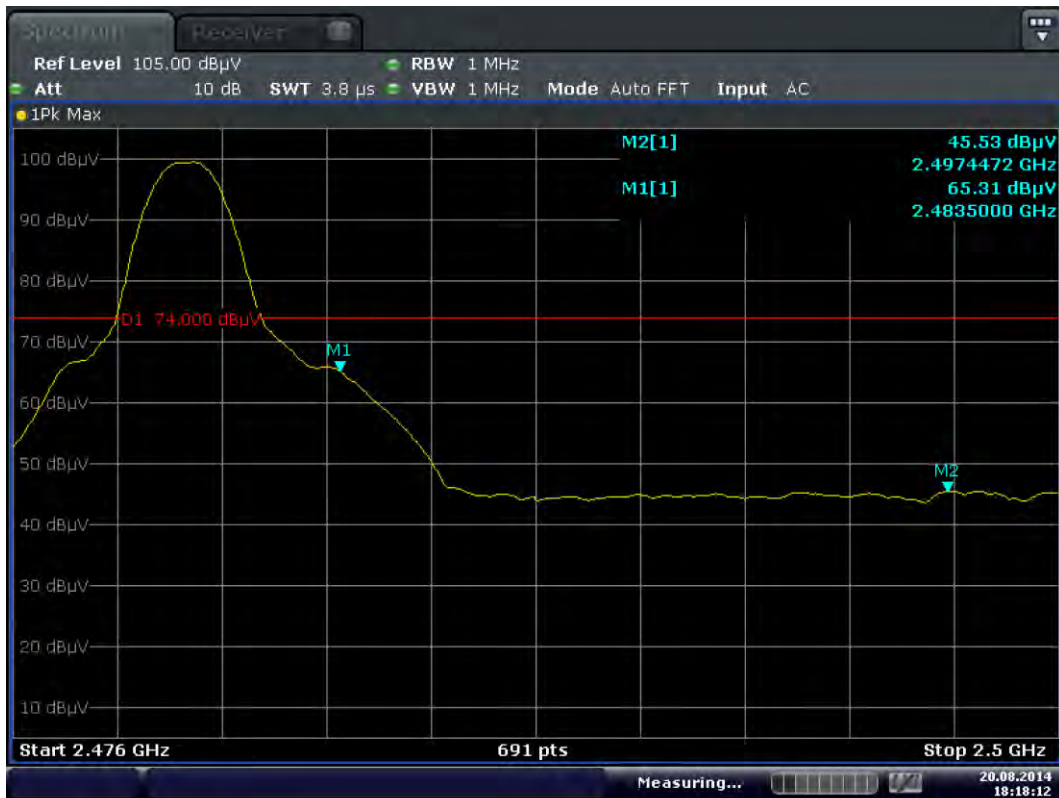
Date: 20.AUG.2014 17:14:48

GFSK LOW CHANNEL , ANT H, AVERAGE



Date: 20.AUG.2014 17:16:50

GFSK HIGH CHANNEL , ANT V, PEAK



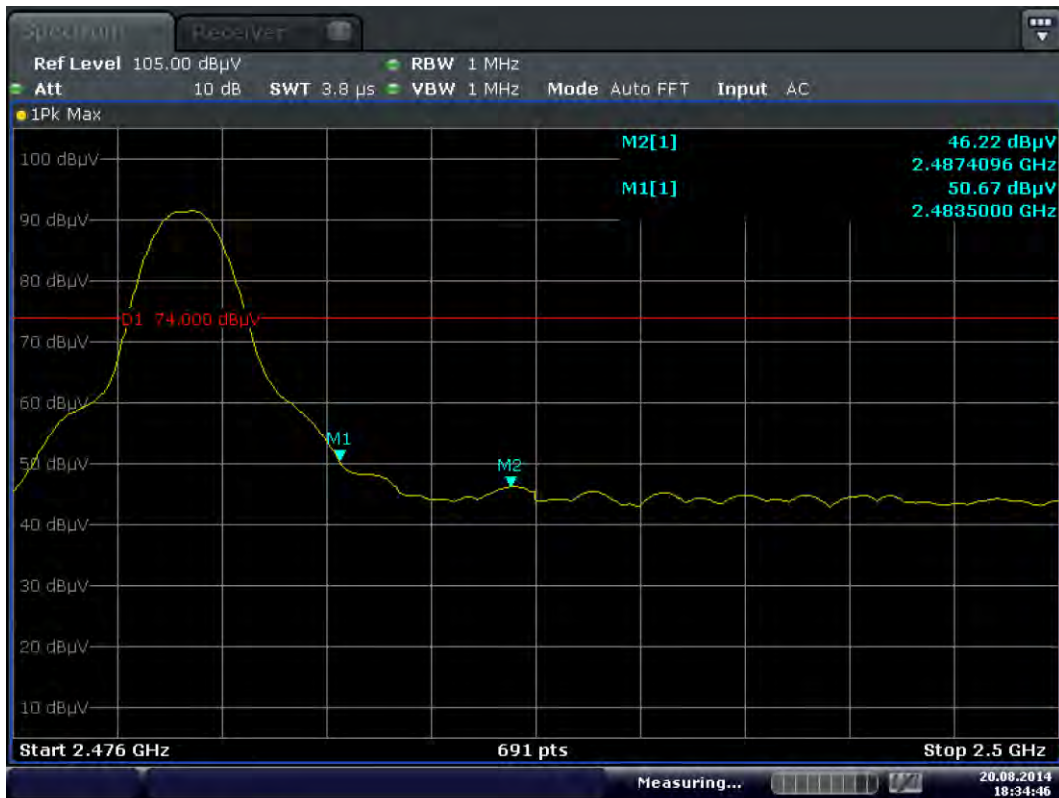
Date: 20.AUG.2014 18:18:12

GFSK HIGH CHANNEL, ANT V, AVERAGE



Date: 20.AUG.2014 18:19:17

GFSK HIGH CHANNEL, ANT H, PEAK

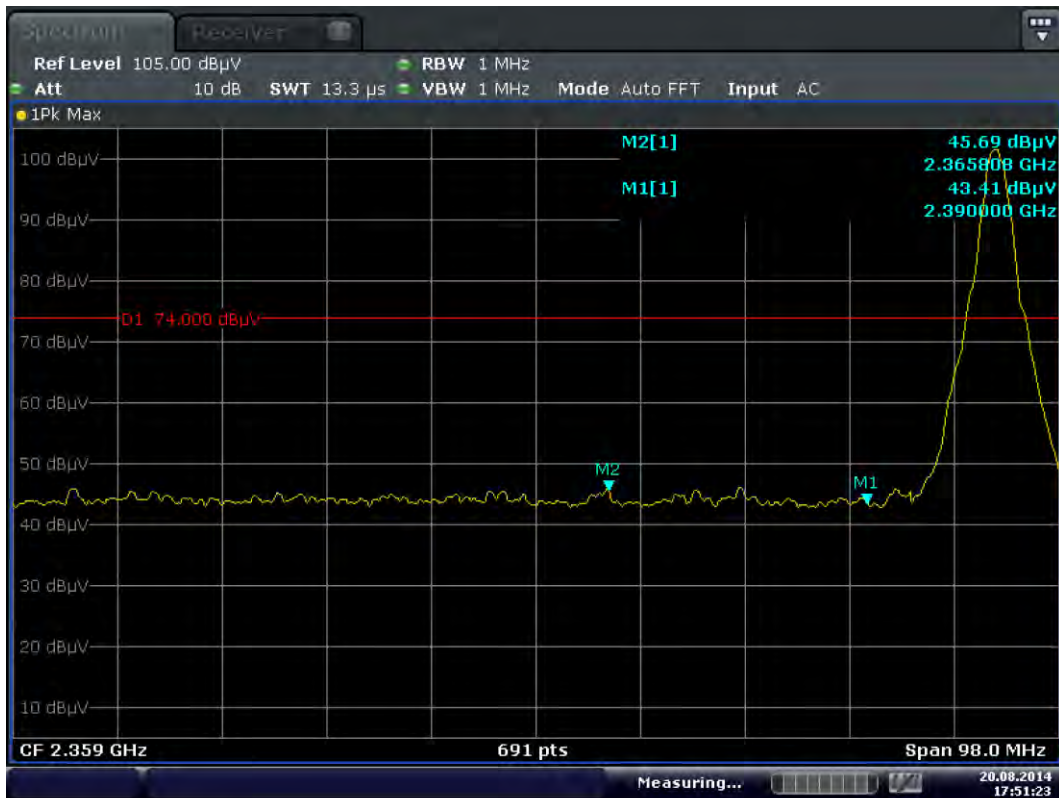


Date: 20.AUG.2014 18:34:45

GFSK HIGH CHANNEL, ANT H, AVERAGE



Date: 20.AUG.2014 18:34:00

 π /4DQPSK LOW CHANNEL, ANT V, PEAK


Date: 20.AUG.2014 17:51:23

π /4DQPSK LOW CHANNEL, ANT V, AVERAGE



Date: 20.AUG.2014 17:52:37

π /4DQPSK LOW CHANNEL, ANT H, PEAK



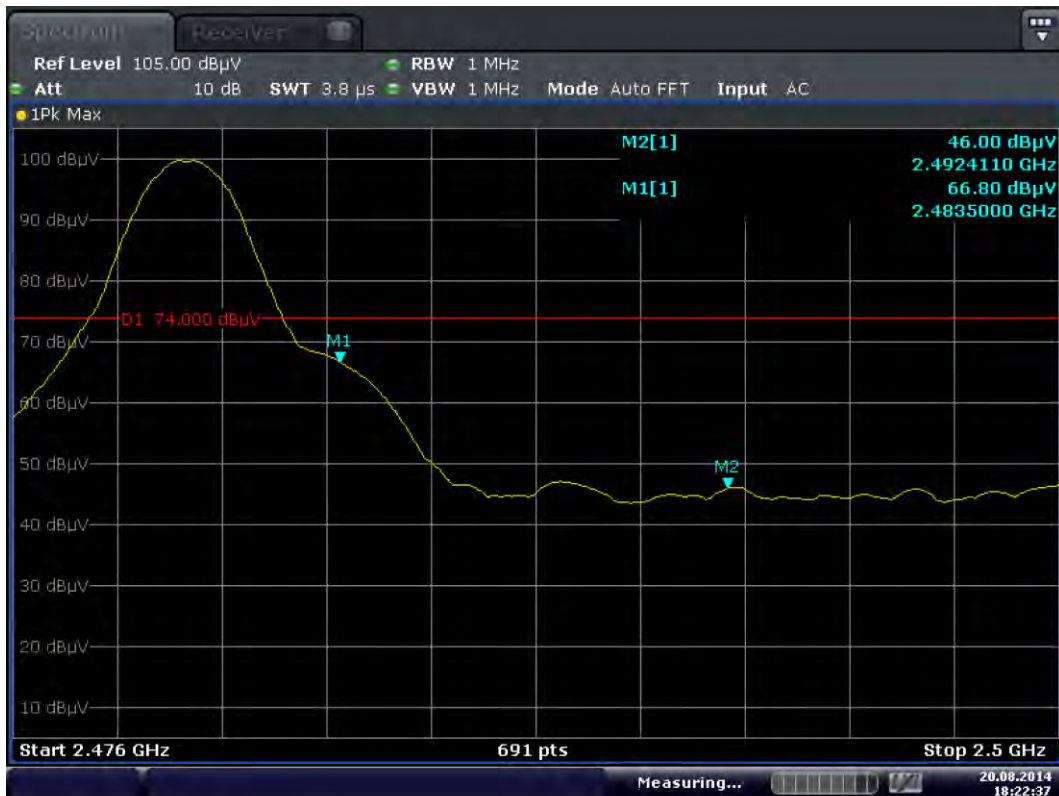
Date: 20.AUG.2014 17:20:24

π /4DQPSK LOW CHANNEL, ANT H, AVERAGE



Date: 20.AUG.2014 17:18:57

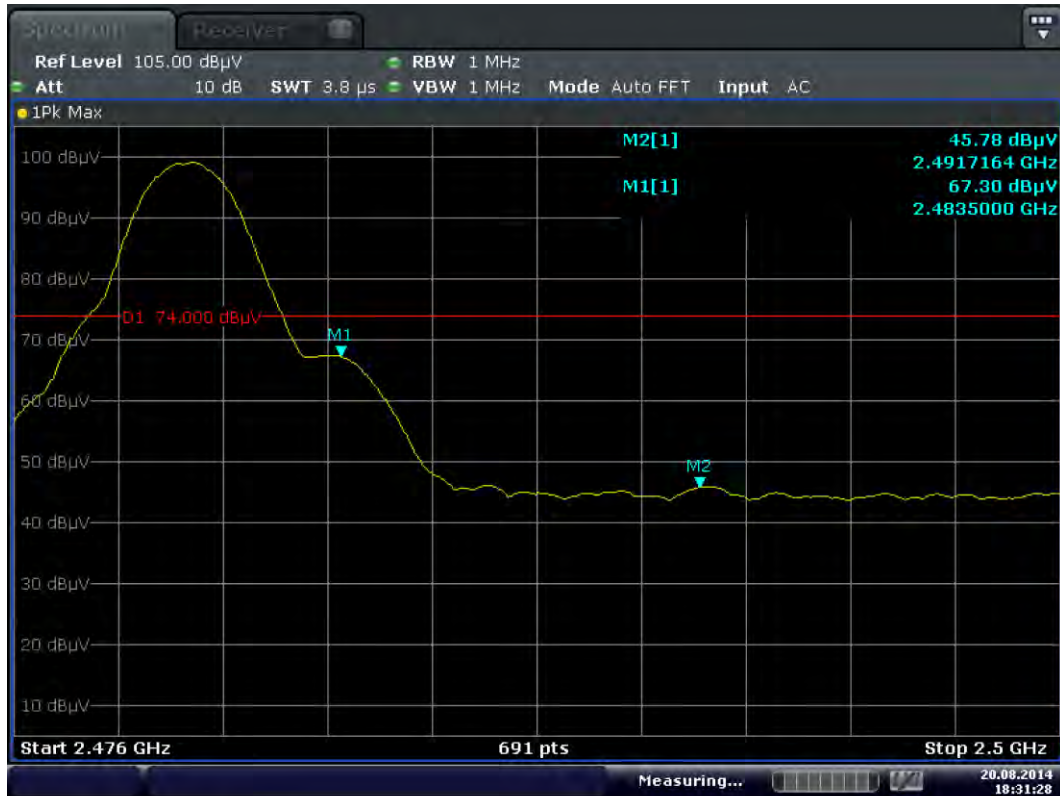
π /4DQPSK HIGH CHANNEL, ANT V, PEAK



Date: 20.AUG.2014 18:22:37

π /4DQPSK HIGH CHANNEL, ANT V, AVERAGE


Date: 20.AUG.2014 18:21:16

 π /4DQPSK HIGH CHANNEL , ANT H, PEAK


Date: 20.AUG.2014 18:31:27

π /4DQPSK HIGH CHANNEL , ANT H, AVERAGE



Date: 20.AUG.2014 18:32:30

8-DPSK LOW CHANNEL , ANT V, PEAK



Date: 20.AUG.2014 17:45:41

8-DPSK LOW CHANNEL, ANT V, AVERAGE



Date: 20.AUG.2014 17:44:25

8-DPSK LOW CHANNEL, ANT H, PEAK



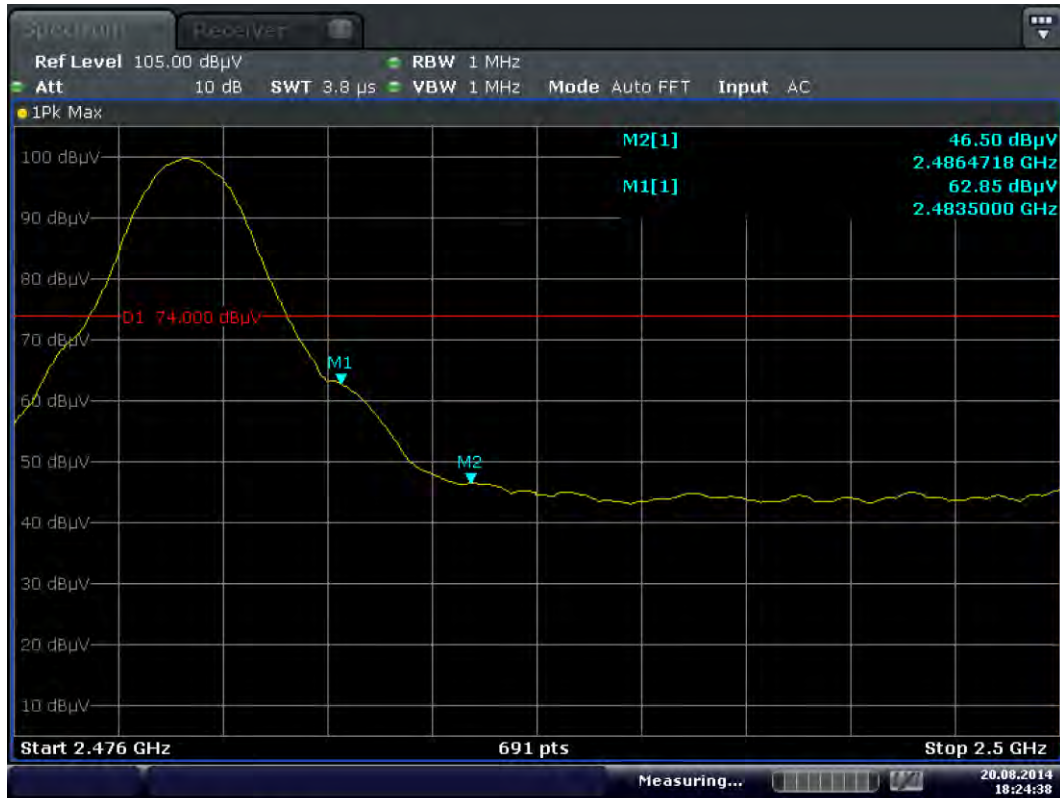
Date: 20.AUG.2014 17:38:16

8-DPSK LOW CHANNEL, ANT H, AVERAGE



Date: 20.AUG.2014 17:41:02

8-DPSK HIGH CHANNEL, ANT V, PEAK



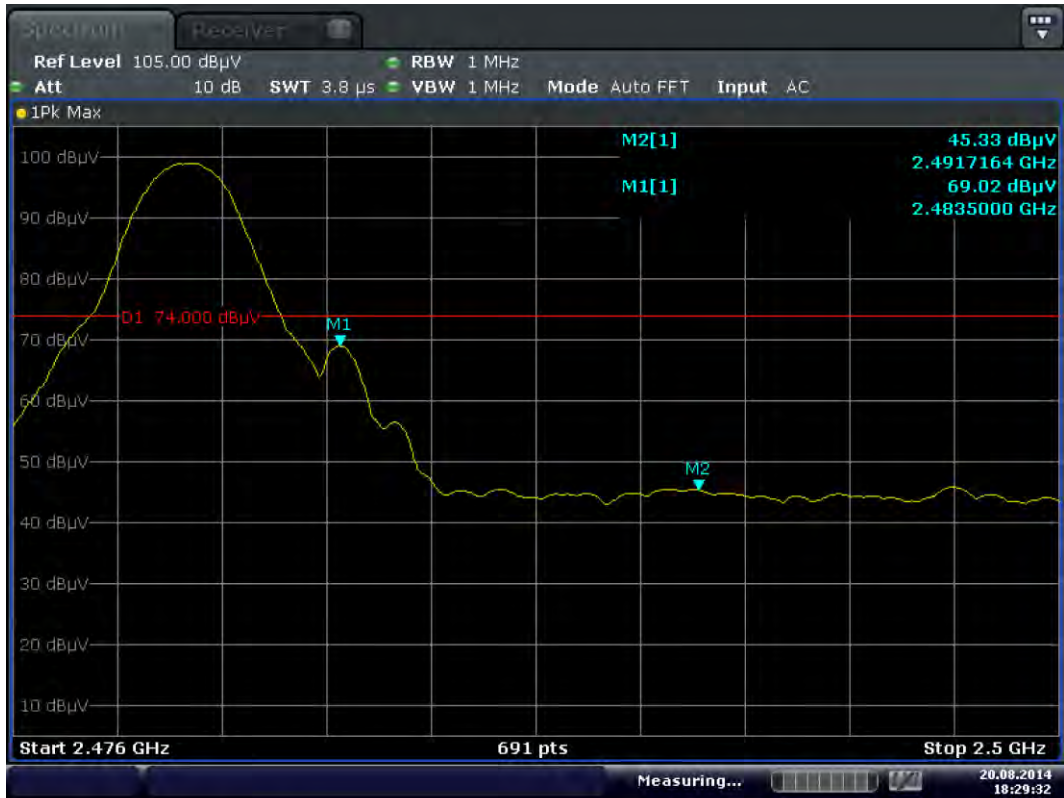
Date: 20.AUG.2014 18:24:38

8-DPSK HIGH CHANNEL, ANT V, AVERAGE



Date: 20.AUG.2014 18:26:04

8-DPSK HIGH CHANNEL, ANT H, PEAK



Date: 20.AUG.2014 18:29:32

8-DPSK HIGH CHANNEL, ANT H, AVERAGE



Date: 20.AUG.2014 18:28:33

Hopping Mode:

GFSK LOW FREQUENCY BAND, ANT V, PEAK



Date: 20.AUG.2014 17:58:09

GFSK LOW FREQUENCY BAND, ANT V, AVERAGE



Date: 20.AUG.2014 17:59:51

GFSK LOW FREQUENCY BAND, ANT H, PEAK



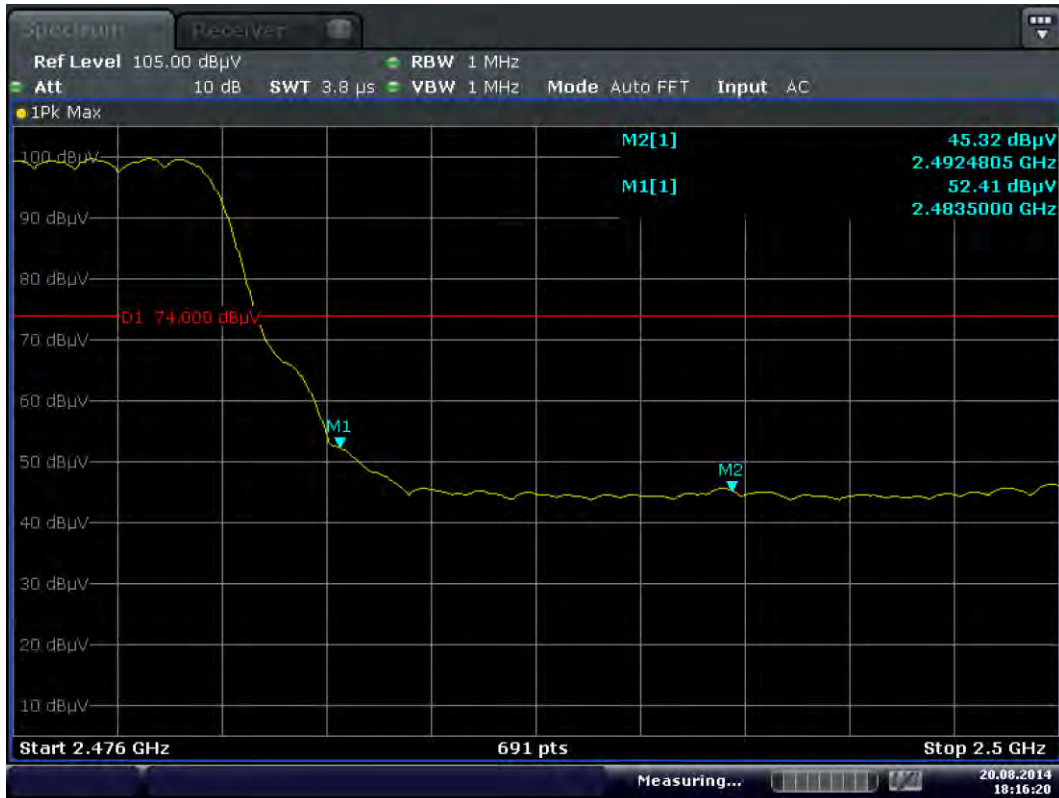
Date: 20.AUG.2014 17:35:54

GFSK LOW FREQUENCY BAND, ANT H, AVERAGE



Date: 20.AUG.2014 17:34:19

GFSK HIGH FREQUENCY BAND, ANT V, PEAK



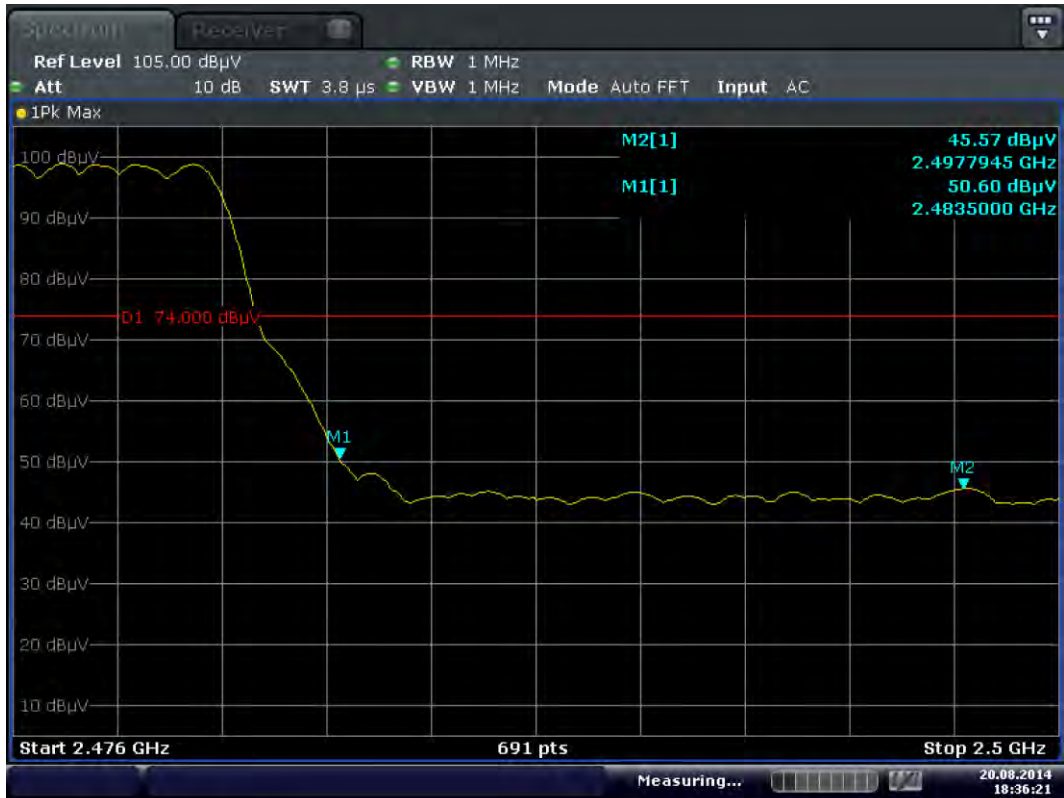
Date: 20.AUG.2014 18:16:20

GFSK HIGH FREQUENCY BAND, ANT V, AVERAGE



Date: 20.AUG.2014 18:15:16

GFSK HIGH FREQUENCY BAND, ANT H, PEAK



Date: 20.AUG.2014 18:36:21

GFSK HIGH FREQUENCY BAND, ANT H, AVERAGE



Date: 20.AUG.2014 18:37:24

π /4DQPSK LOW FREQUENCY BAND, ANT V, PEAK



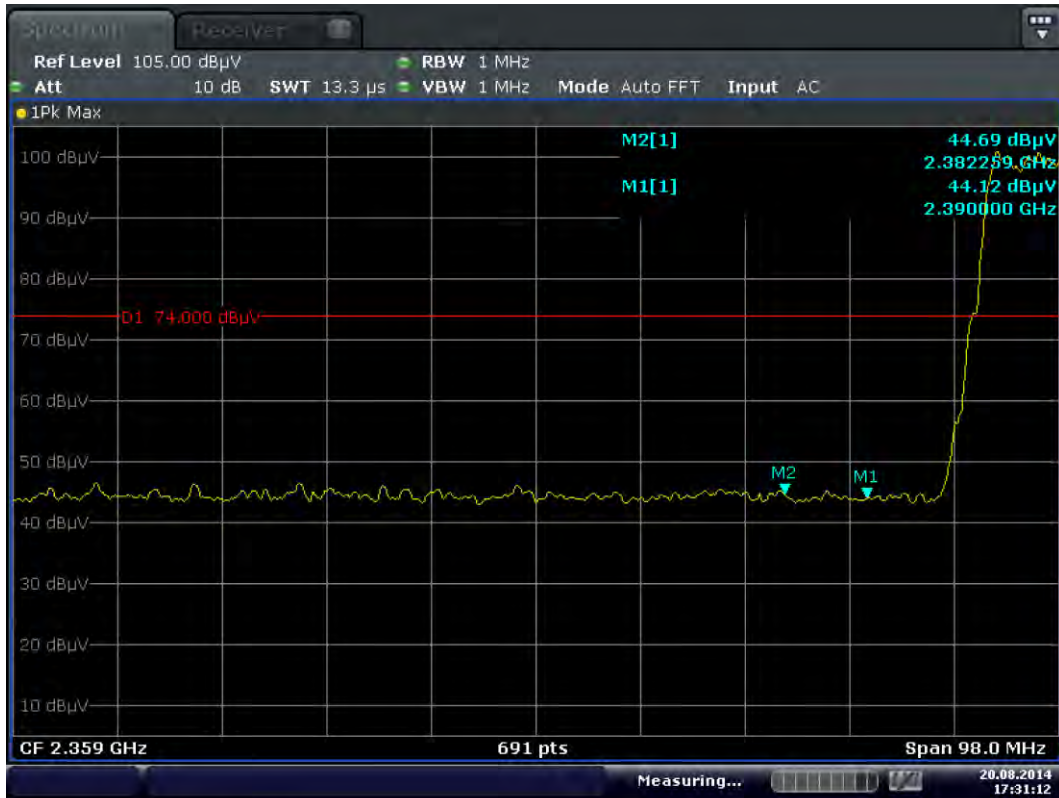
Date: 20.AUG.2014 18:03:35

π /4DQPSK LOW FREQUENCY BAND, ANT V, AVERAGE



Date: 20.AUG.2014 18:02:04

π /4DQPSK LOW FREQUENCY BAND, ANT H, PEAK



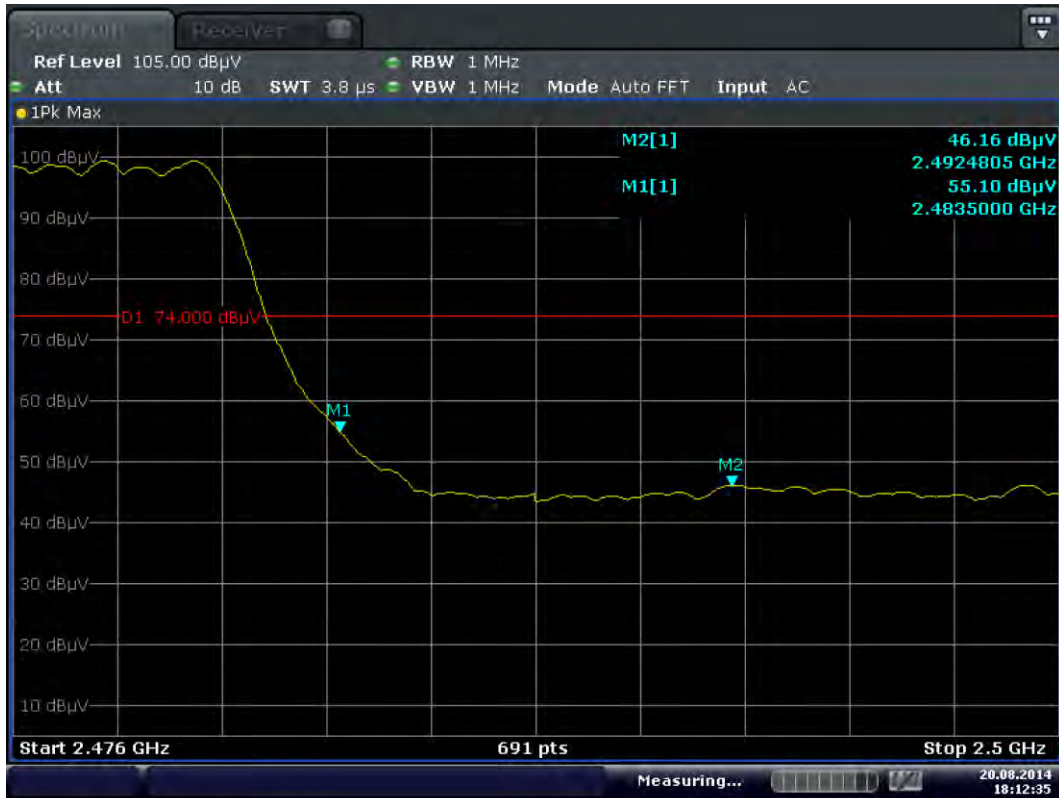
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π /4DQPSK LOW FREQUENCY BAND, ANT H, AVERAGE



Date: 20.AUG.2014 17:32:33

π /4DQPSK HIGH FREQUENCY BAND, ANT V, PEAK



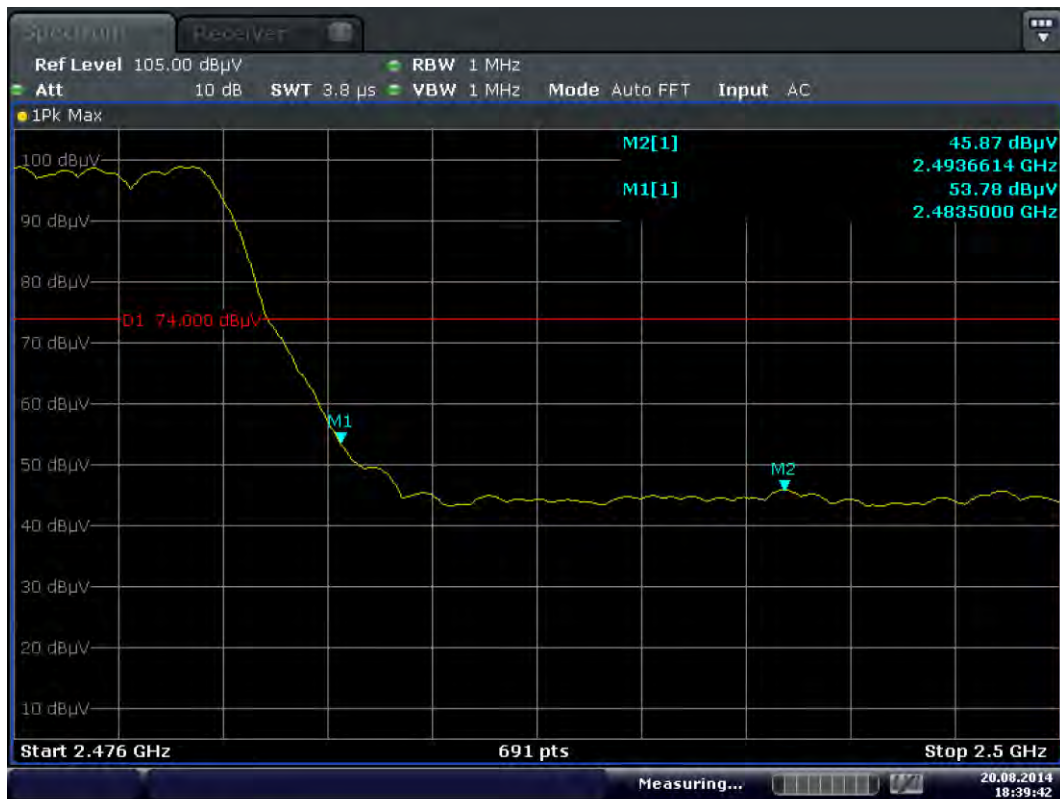
Date: 20.AUG.2014 18:12:35

π /4DQPSK HIGH FREQUENCY BAND, ANT V, AVERAGE



Date: 20.AUG.2014 18:13:31

π /4DQPSK HIGH FREQUENCY BAND, ANT H, PEAK



Date: 20.AUG.2014 18:39:42

π /4DQPSK HIGH FREQUENCY BAND, ANT H, AVERAGE



Date: 20.AUG.2014 18:38:49

8-DPSK LOW FREQUENCY BAND, ANT V, PEAK



Date: 20.AUG.2014 18:05:34

8-DPSK LOW FREQUENCY BAND, ANT V, AVERAGE



Date: 20.AUG.2014 18:06:43

8-DPSK LOW FREQUENCY BAND, ANT H, PEAK



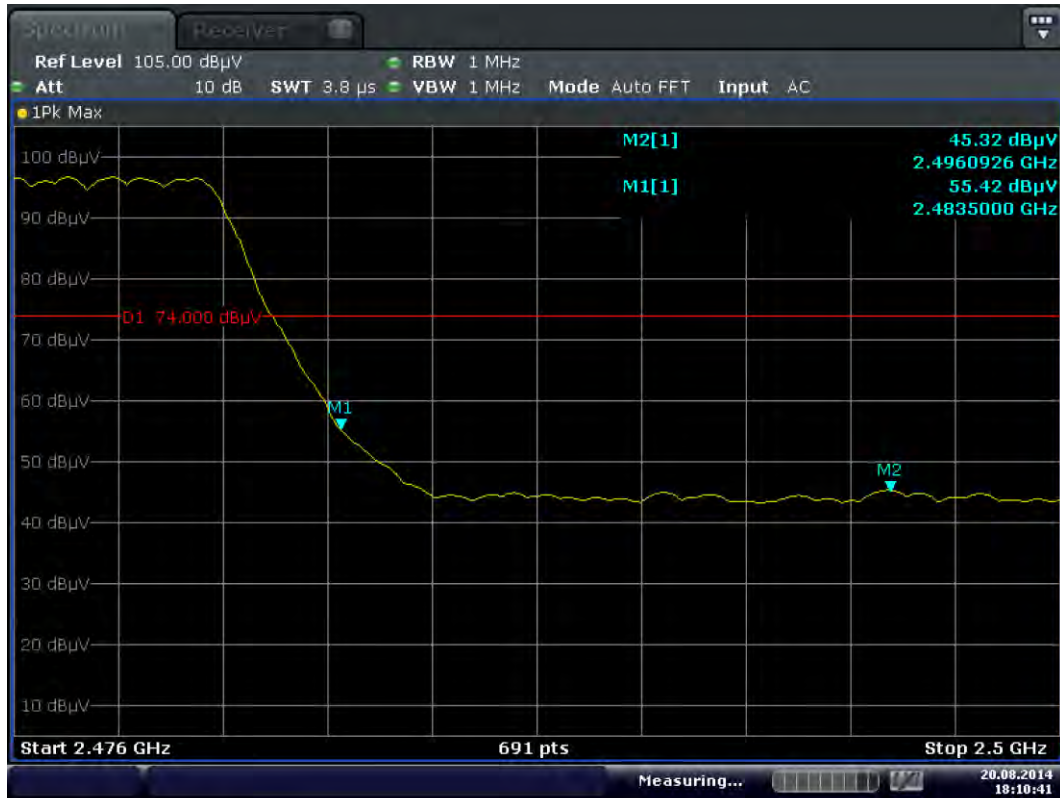
Date: 20.AUG.2014 17:28:57

8-DPSK LOW FREQUENCY BAND, ANT H, AVERAGE



Date: 20.AUG.2014 17:27:17

8-DPSK HIGH FREQUENCY BAND, ANT V, PEAK



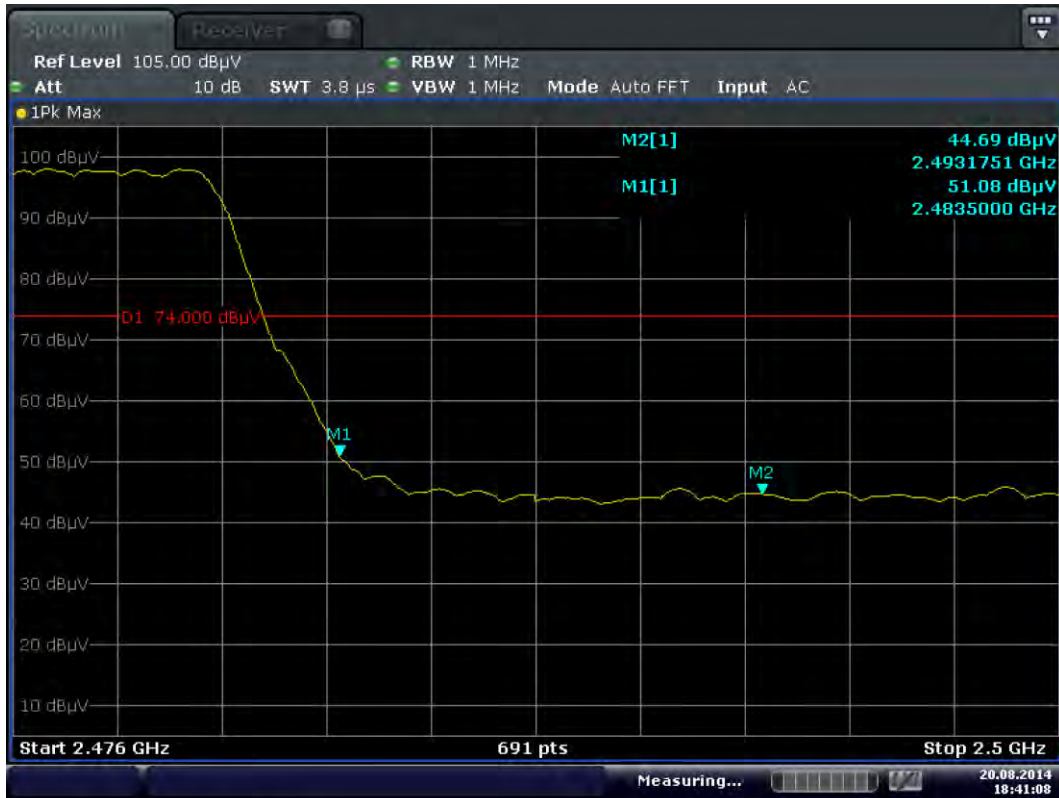
Date: 20.AUG.2014 18:10:41

8-DPSK HIGH FREQUENCY BAND, ANT V, AVERAGE



Date: 20.AUG.2014 18:09:36

8-DPSK HIGH FREQUENCY BAND, ANT H PEAK



Date: 20.AUG.2014 18:41:08

8-DPSK HIGH FREQUENCY BAND, ANT H, AVERAGE



Date: 20.AUG.2014 18:41:47

ANNEX B TEST SETUP PHOTOS

B.1 Conducted Test Photo



B.2 Conducted Emissions Test Photo



B.3 Radiated Test Photo



Below 30MHz



30MHz to 1GHz



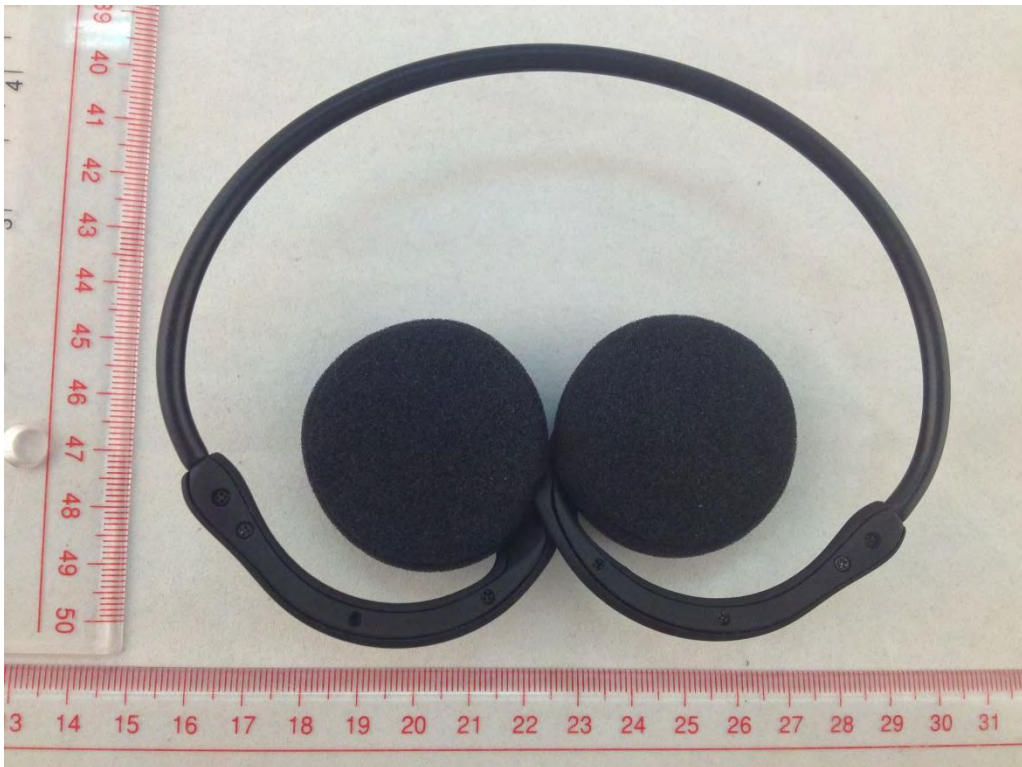
Above 1GHz

ANNEX C EUT PHOTOS

C.1 Appearance of the EUT



THE FRONT OF EUT



THE BACK OF EUT



THE DOWN OF EUT



THE UP OF EUT



THE LEFT OF EUT

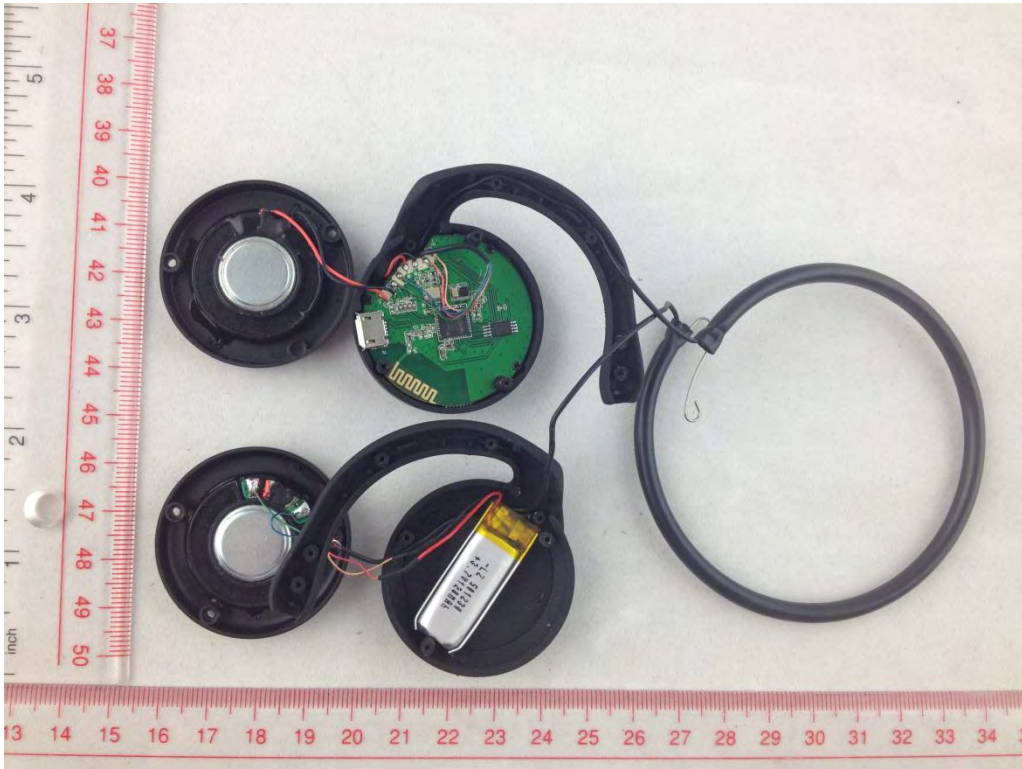


THE RIGHT OF EUT

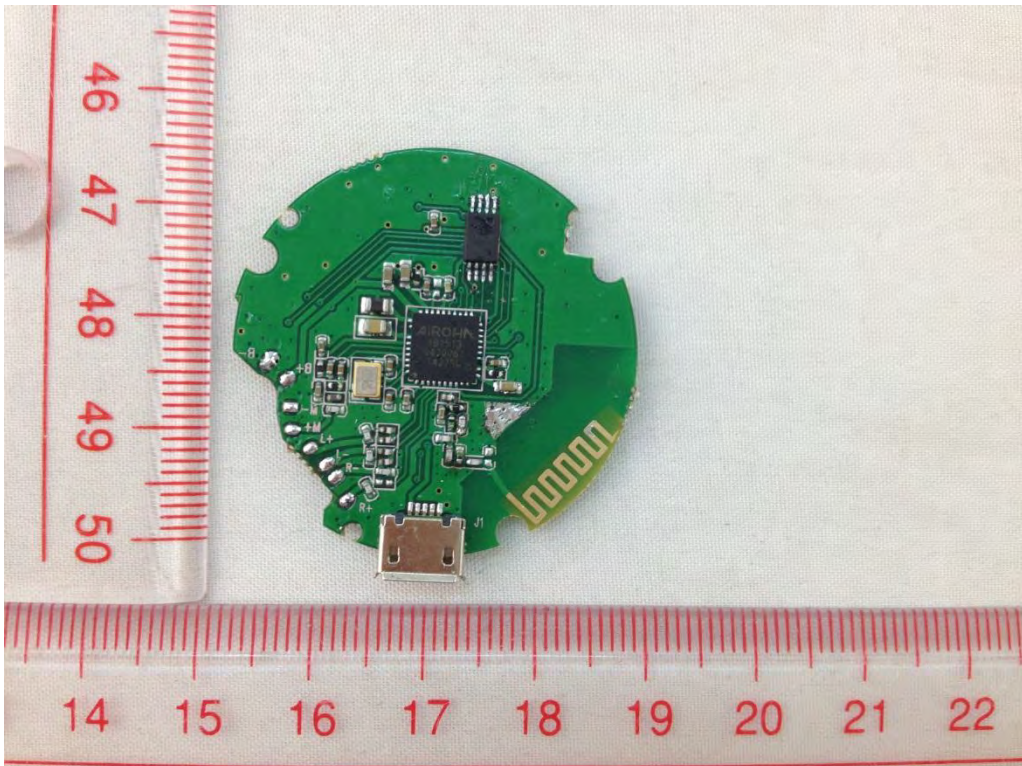


THE MICRO USB CABLE OF EUT

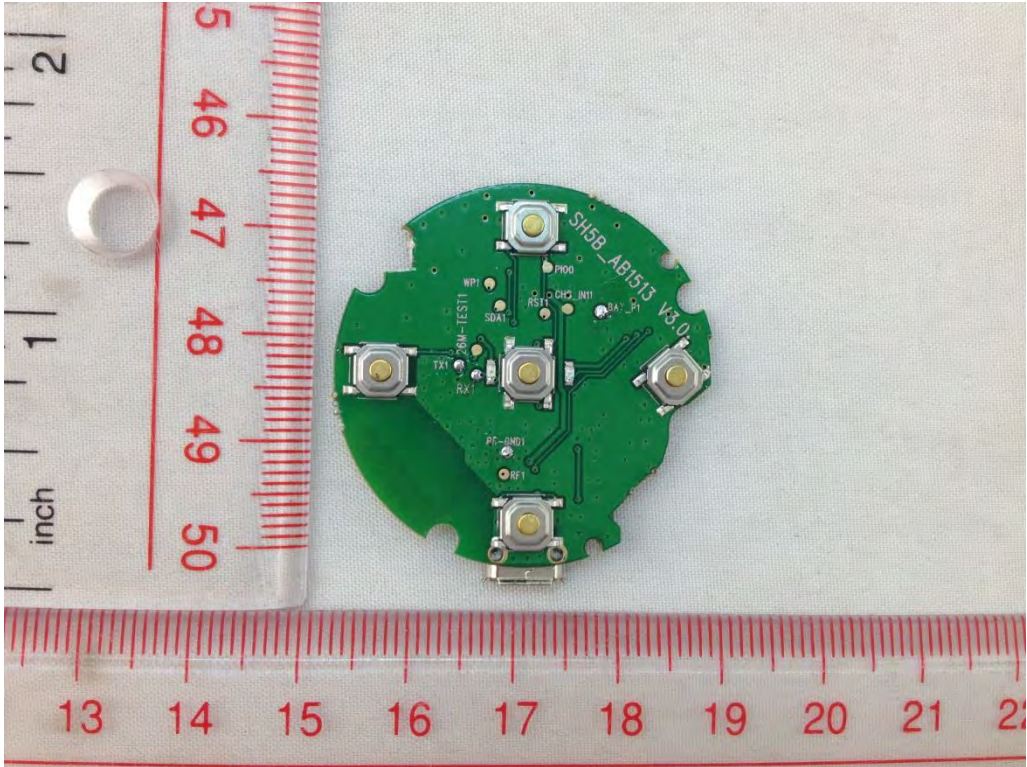
C.2 Inside of the EUT



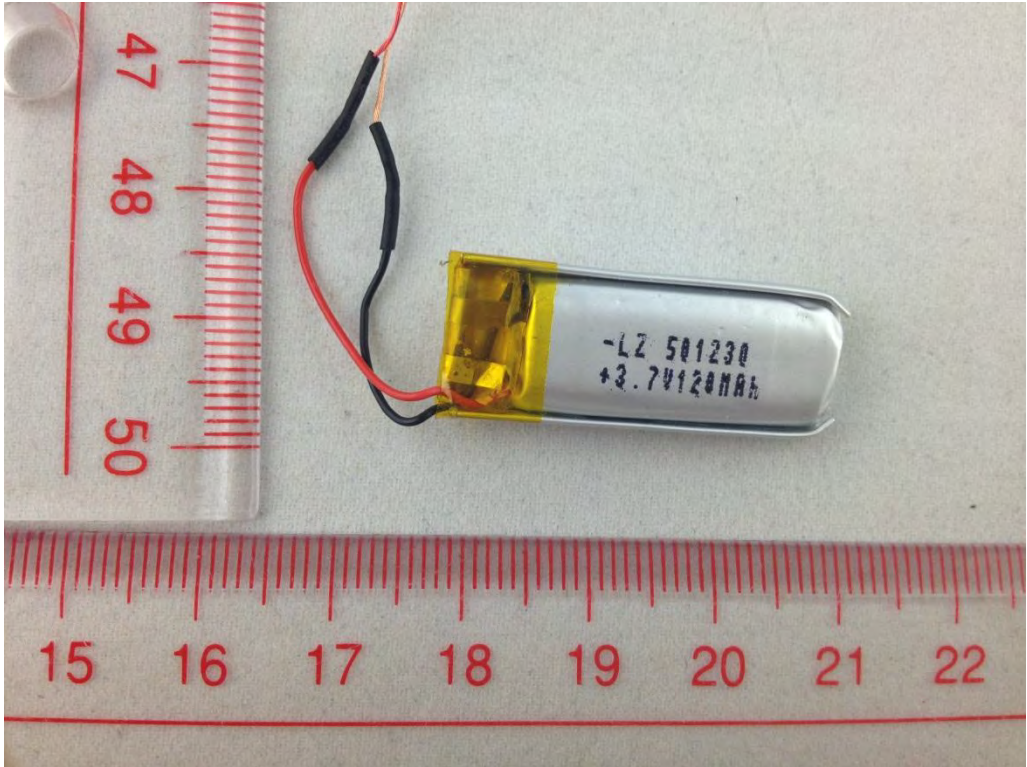
EUT UNCOVER VIEW



MAIN BOARD TOP VIEW



MAIN BOARD BACK VIEW 1



BATTERY

--END OF REPORT--