

FCC
RF
TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Bluetooth Headset

ISSUED TO
VXi Corporation

271 Locust Street, Dover NH 03820 USA



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Date 2014.7.7

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Date 2014.7.7



Report No.: BL-SZ1450056-601

EUT Type: Bluetooth Headset

Model Name: B350-XT

Brand Name: Blueparrott

Test Standard: 47 CFR Part 15 Subpart C

FCC ID: SOM-203475

Test conclusion: PASS

Test Date: 2014.05.20 – 2014.05.30

Date of Issue: 2014.07.07

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions</u>
Rev. 01	2014.06.23	Initial Issue
Rev. 02	2014.07.07	The 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	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625. 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. 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.
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	VXi Corporation
Address	271 Locust Street, Dover NH 03820 USA

2.2 Manufacturer

Manufacturer	VTech (Dongguan) Telecommunications Limited
Address	Xia Ling Bei Management Zone, Liao Bu District, Donguan, Guangdong, P.R China, Postcode: 523411

2.3 General Description for Equipment under Test (EUT)

EUT Type	Bluetooth Headset
Model Name	B350-XT
Hardware Version	V1.0
Software Version	Rev: X506
Network and Wireless connectivity	BT 3.0
About the Product	The equipment is Bluetooth Headset, it contains a BGA IC with discreet components operating at 2.4GHz ISM band.

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.	
	Carrier	Frequency Hopping Spread Spectrum
Modulation Type	Digital	GFSK, $\pi/4$ -DQPSK, 8DPSK
Antenna Type	PCB Antenna	
Antenna Gain	1.44dBi	

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	Hengtai
	Model No	PL602030
	Serial No	N/A
	Capacitance	300 mAh
	Rated Voltage	3.7V
	Extreme Voltage	Low: 2.8V / High:4.2V
Ancillary Equipment 2	AC Adapter	
	Brand Name	Csec
	Model No	CS3B050070FUUSB
	Serial No	(N/A. marked #1 by test site)
	Rated Input	~ 100-240V, 200mA, 50/60Hz
	Rated Output	= 5V, 700mA
Ancillary Equipment 3	Car Charger	
	Brand Name	N/A
	Model No	N/A
	Serial No	N/A
	Rated Input	= 12~24V
	Rated Output	= 5V,500mA

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)	3.70V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2014.05.10	2015.05.09
Spectrum Analyzer	ROHDE&SCHWARZ	FSL3	103640/003	2014.05.02	2015.05.01
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2014.05.14	2015.05.13
Power Splitter	KMW	DCPD-LDC	1305003215	2014.05.14	2015.05.13
Power Sensor	ROHDE&SCHWARZ	NRP-Z21	103971	2014.05.08	2015.05.07
Attenuator (20dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	ROHDE&SCHWARZ	HMP2020	018141664	2013.07.06	2014.07.07
Temperature Chamber	ANGELANTIONI SCIENCE	NTH64-40A	1310	2013.07.06	2014.07.07
Test Antenna-Loop(9kHz-30MHz)	SCHWARZBECK	FMZB 1519	1519-037	2013.07.02	2014.07.01
Test Antenna-Bi-Log(30MHz-3G Hz)	SCHWARZBECK	VULB 9163	9163-624	2013.07.03	2014.07.02
Test Antenna-Horn(1-18GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2014.07.01
Test Antenna-Horn(15-26.5GHz)	SCHWARZBECK	BBHA 9170	9170-305	2013.07.02	2014.07.01
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

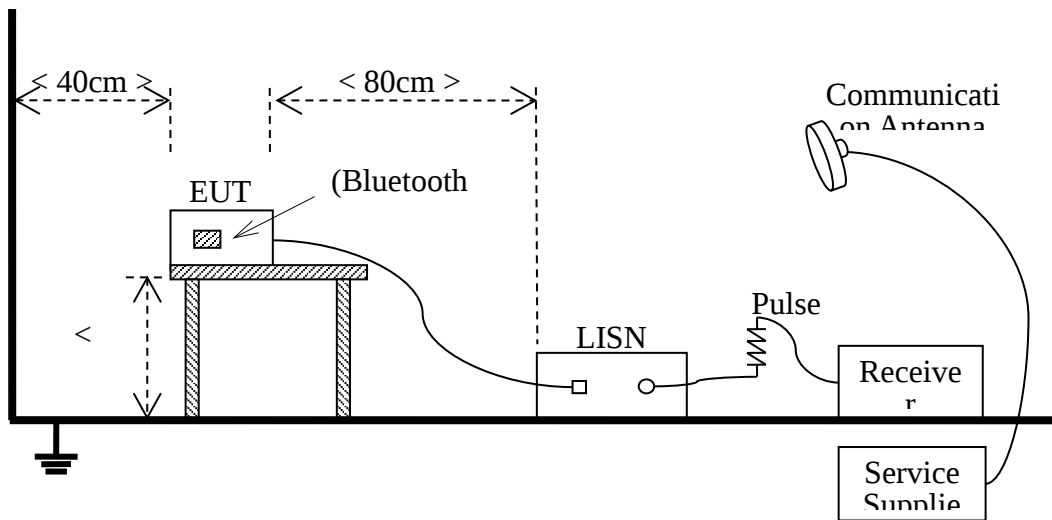
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



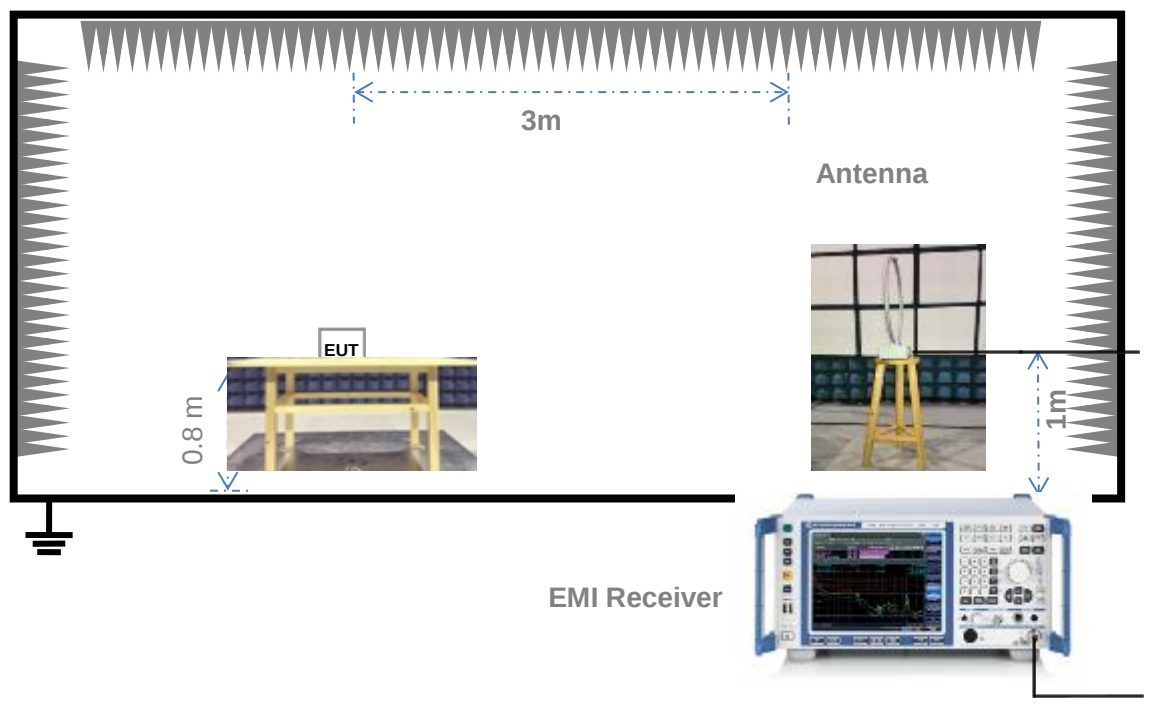
(Diagram 1)

4.4.2 For AC Power Supply Port Test



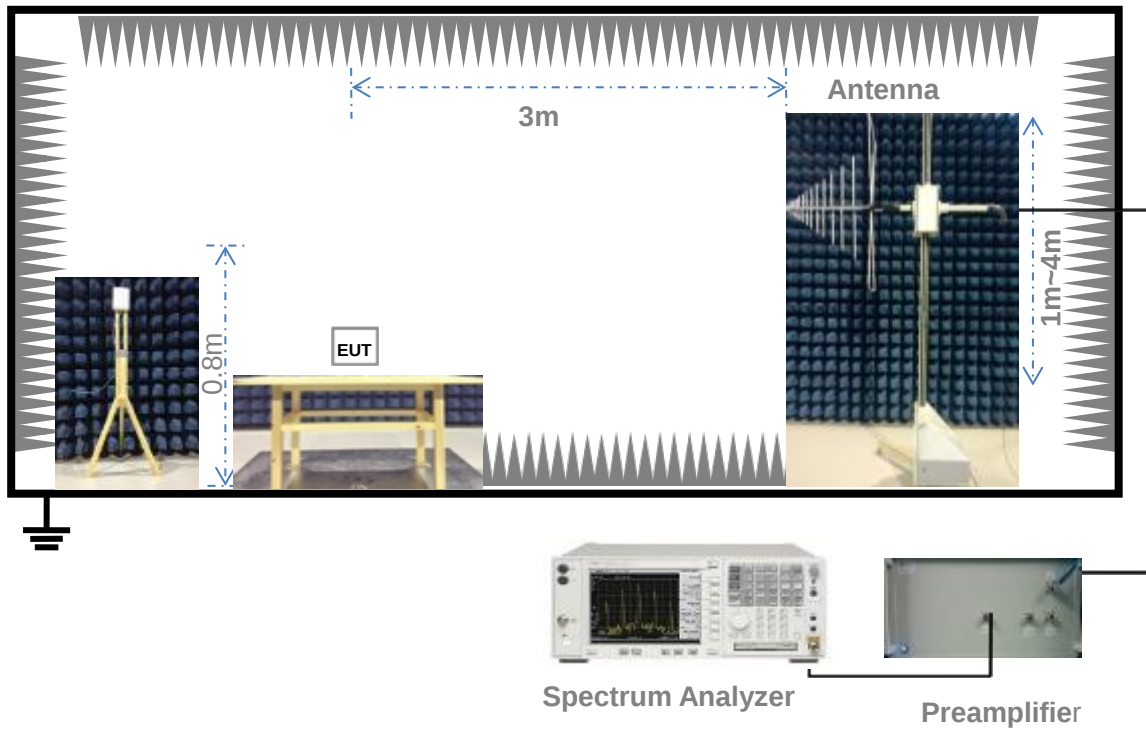
(Diagram 2)

4.4.3 For Radiated Test (Below 30MHz)



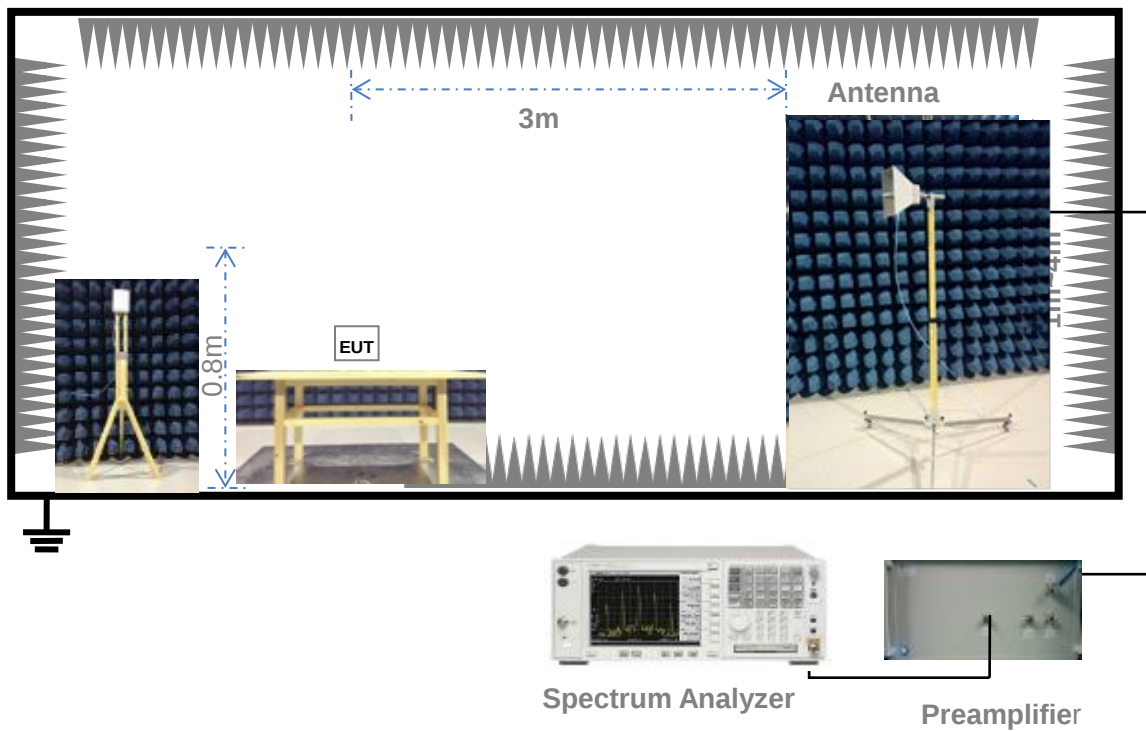
(Diagram 3)

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)

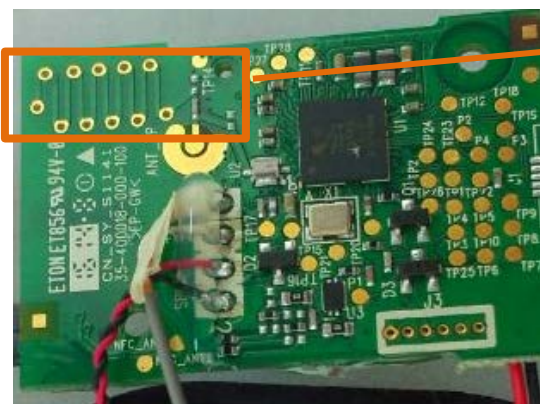
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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 ($\mu\text{V/m}$)	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.

$E \text{ [dB}\mu\text{V/m]} = UR + AT + A\text{Factor [dB]}; AT = LCable \text{ loss [dB]} - G\text{preamp [dB]}$

AT: Total correction Factor except Antenna

UR: Receiver Reading

Gpreamp: Preamplifier Gain

AFactor: Antenna Factor at 3m

ANNEX A TEST RESULT

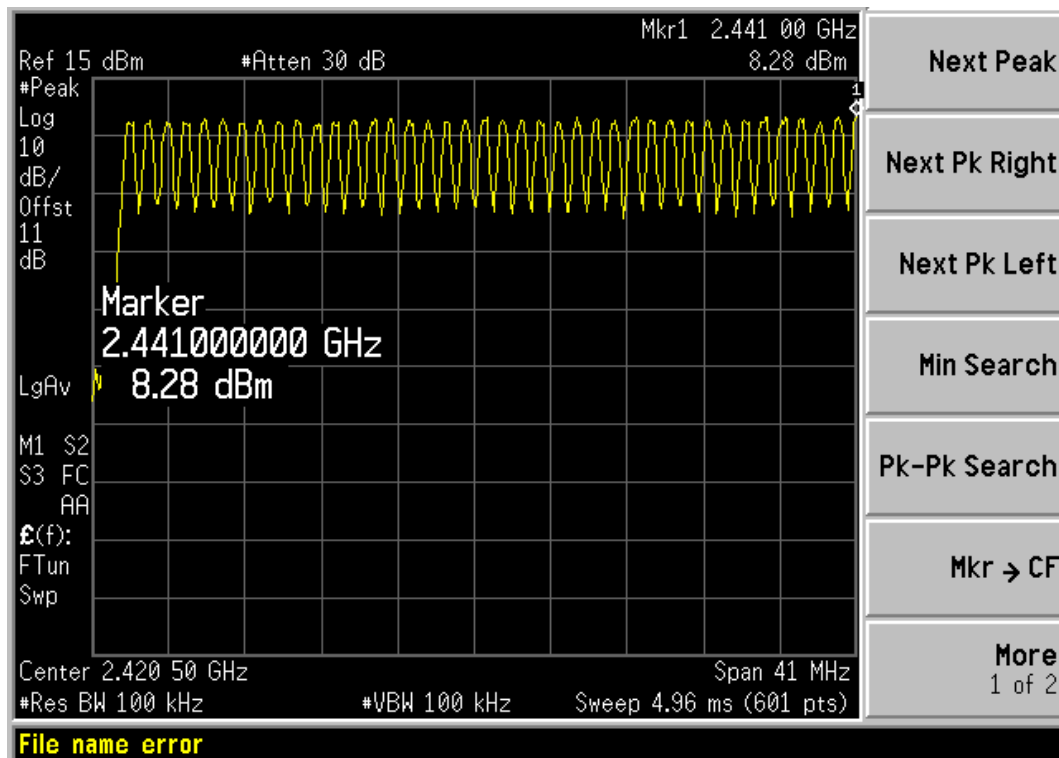
A.1 Number of Hopping Frequency

Test Data

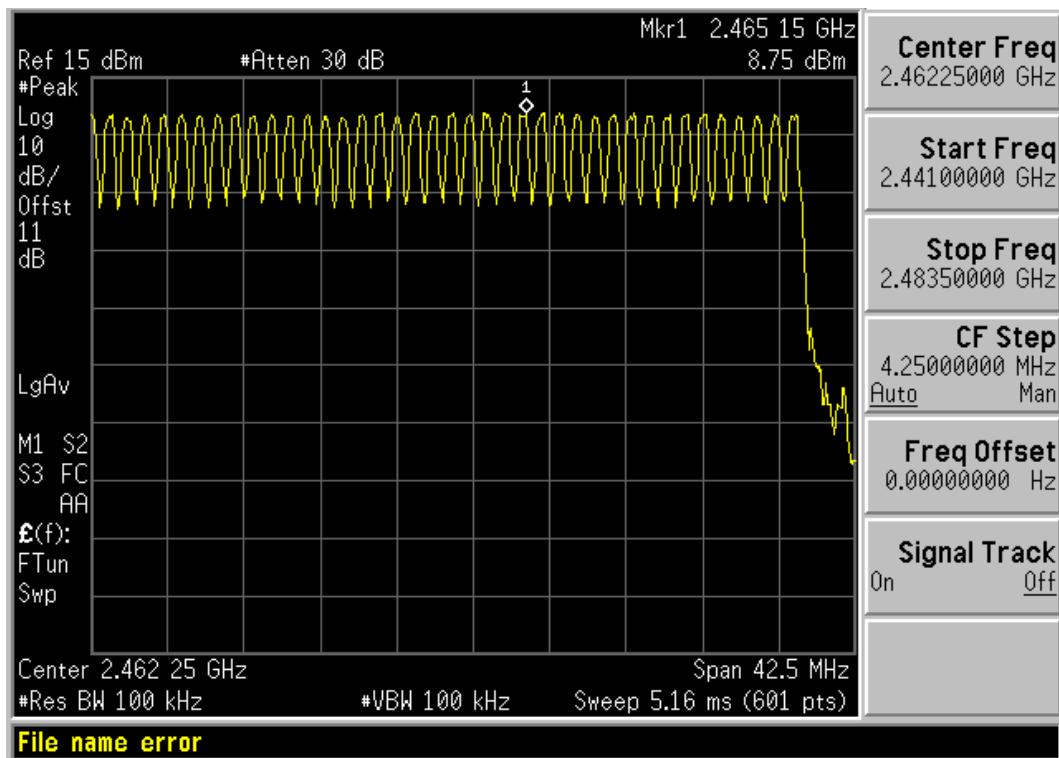
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
π/4-DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

Test plots

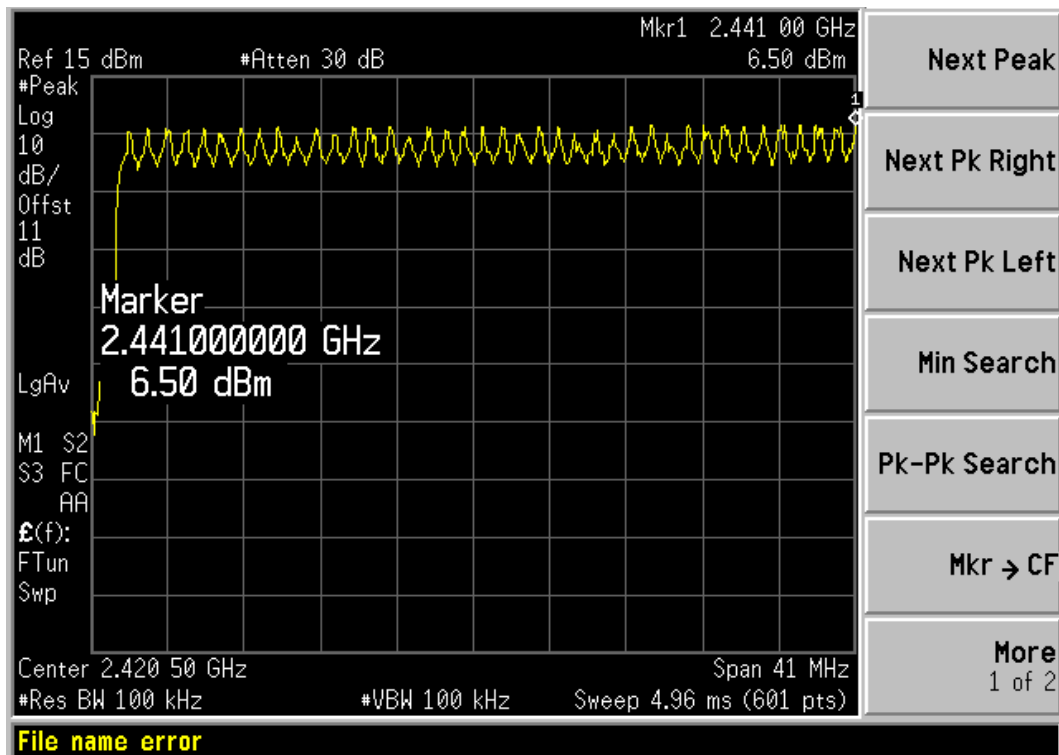
GFSK 2.4GHz~2.4415GHz



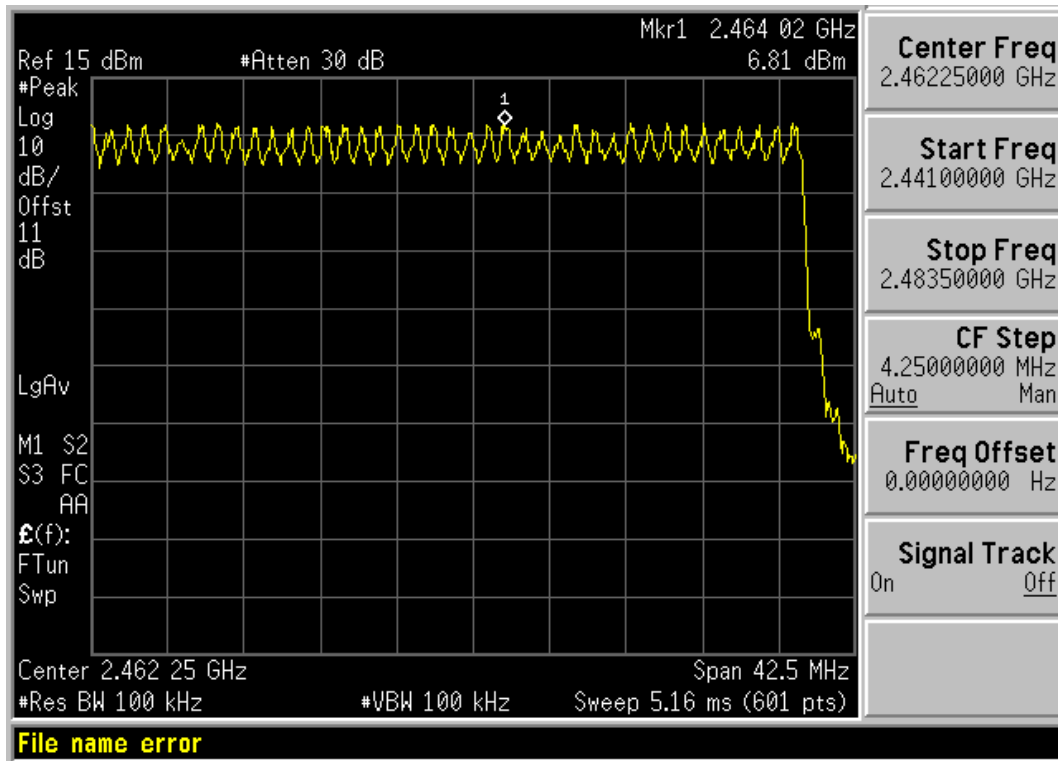
GFSK 2.4415GHz~2.4835GHz



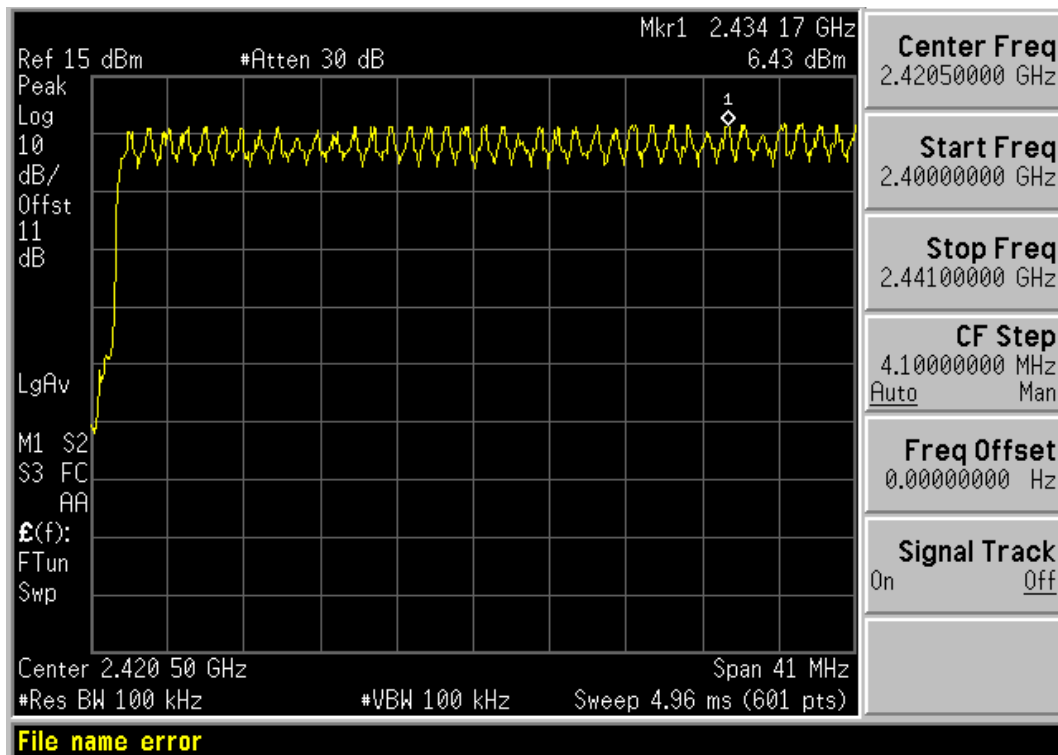
II/4-DQPSK 2.4GHz~2.4415GHz



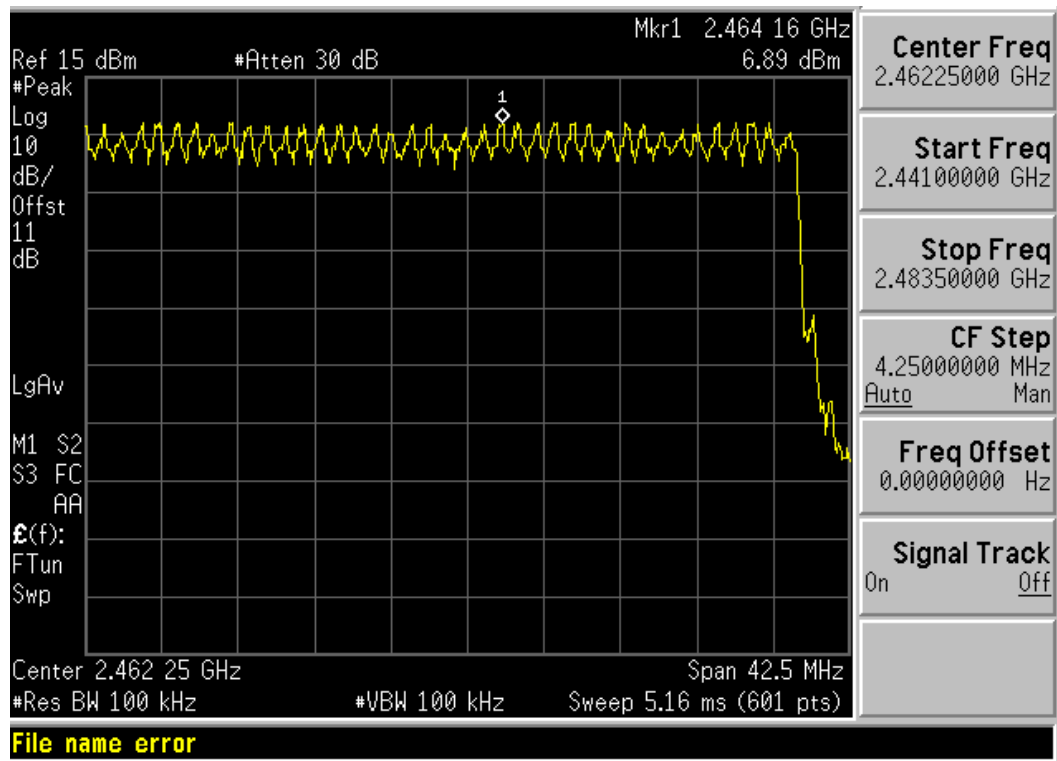
II/4-DQPSK 2.4415GHz~2.4835GHz



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	
0	2402	7.79	6.01	30	1000	PASS
39	2441	8.34	6.82			PASS
78	2480	8.63	7.29			PASS

π/4-QPSK Mode:

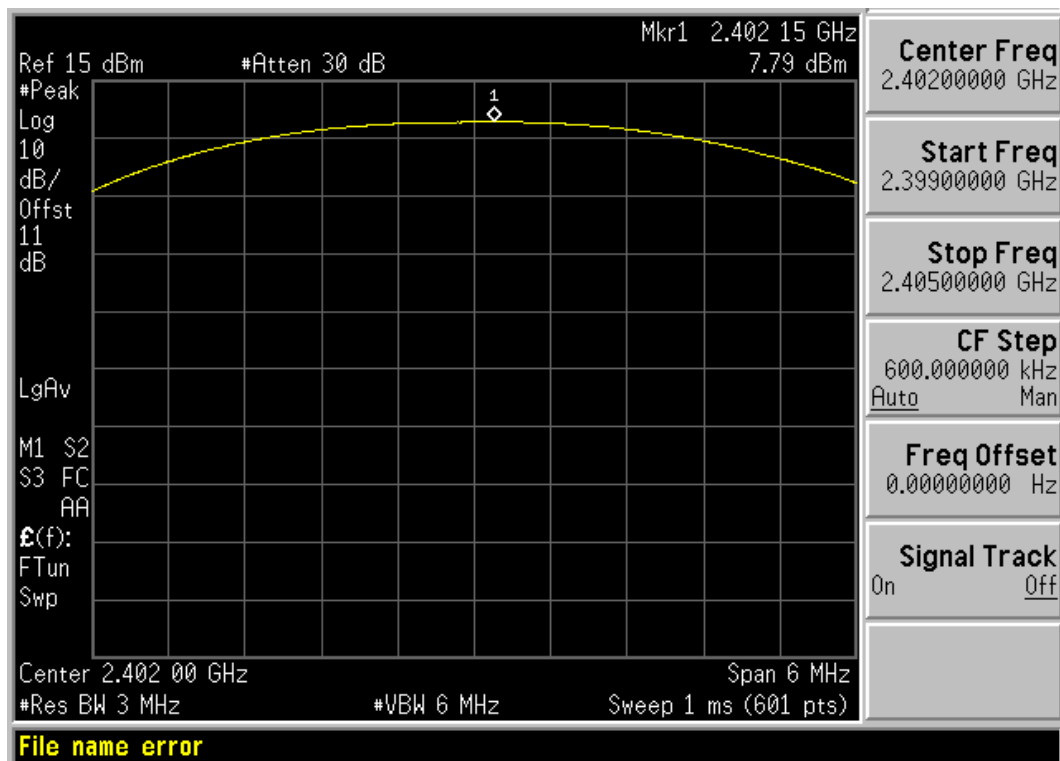
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
0	2402	6.63	4.60	30	1000	PASS
39	2441	7.61	5.77			PASS
78	2480	7.90	6.17			PASS

8-DPSK Mode:

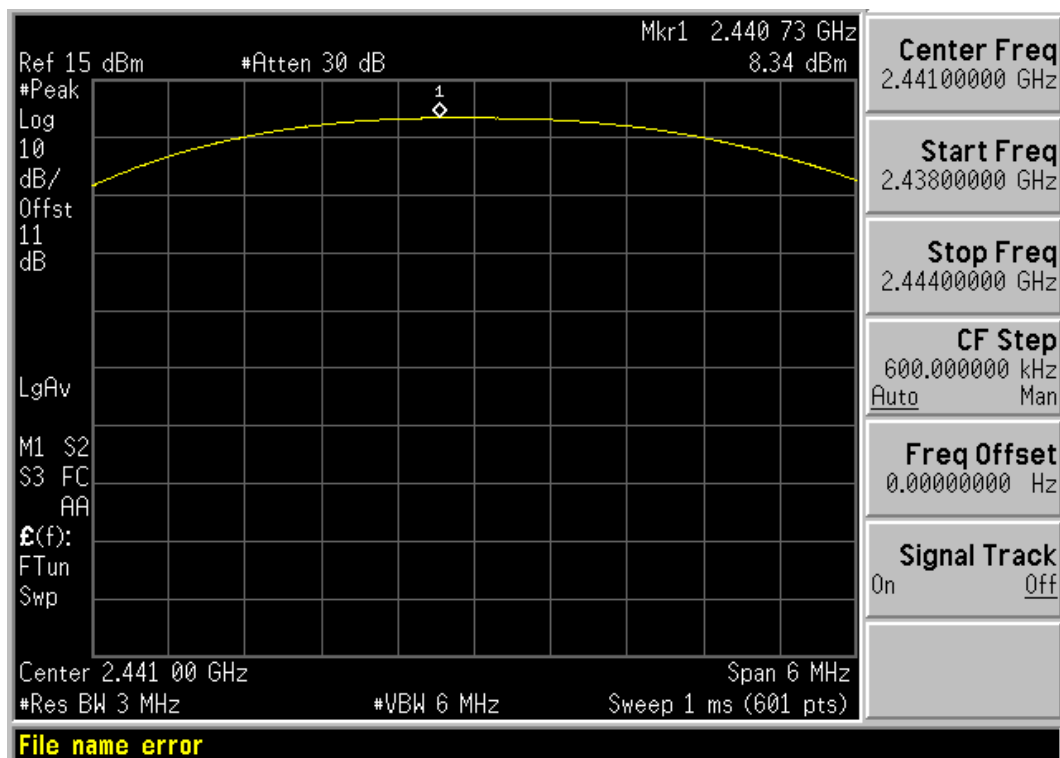
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
0	2402	6.84	4.83	30	1000	PASS
39	2441	7.76	5.97			PASS
78	2480	8.12	6.49			PASS

Test plots

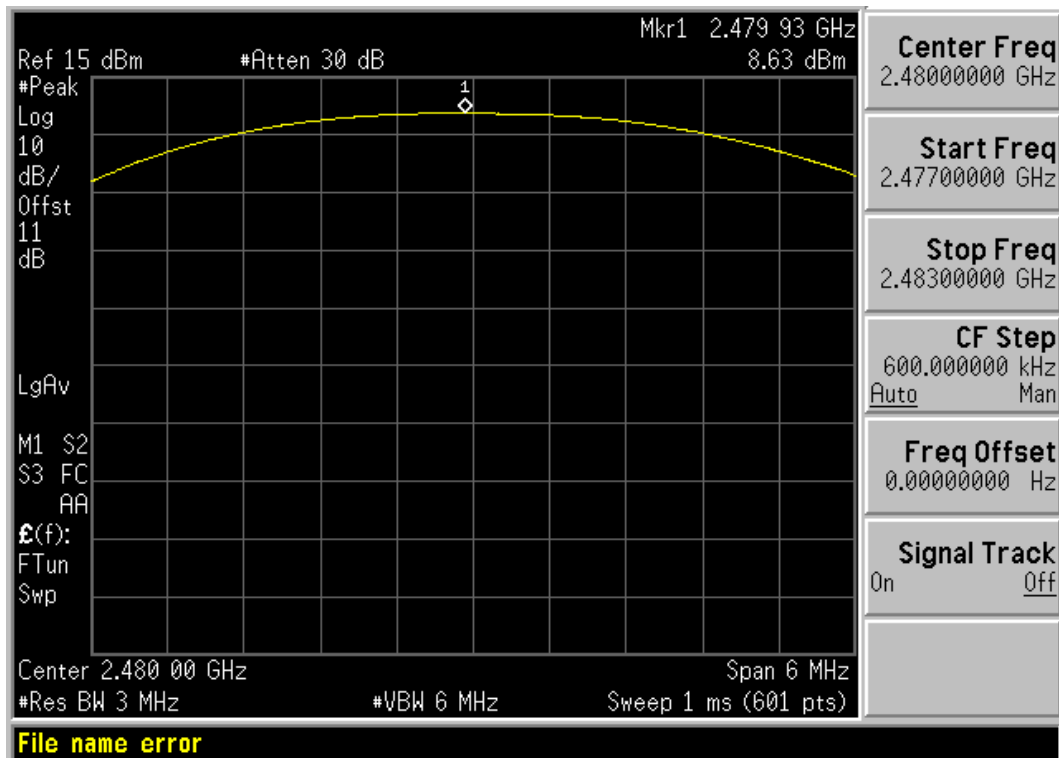
GFSK LOW CHANNEL



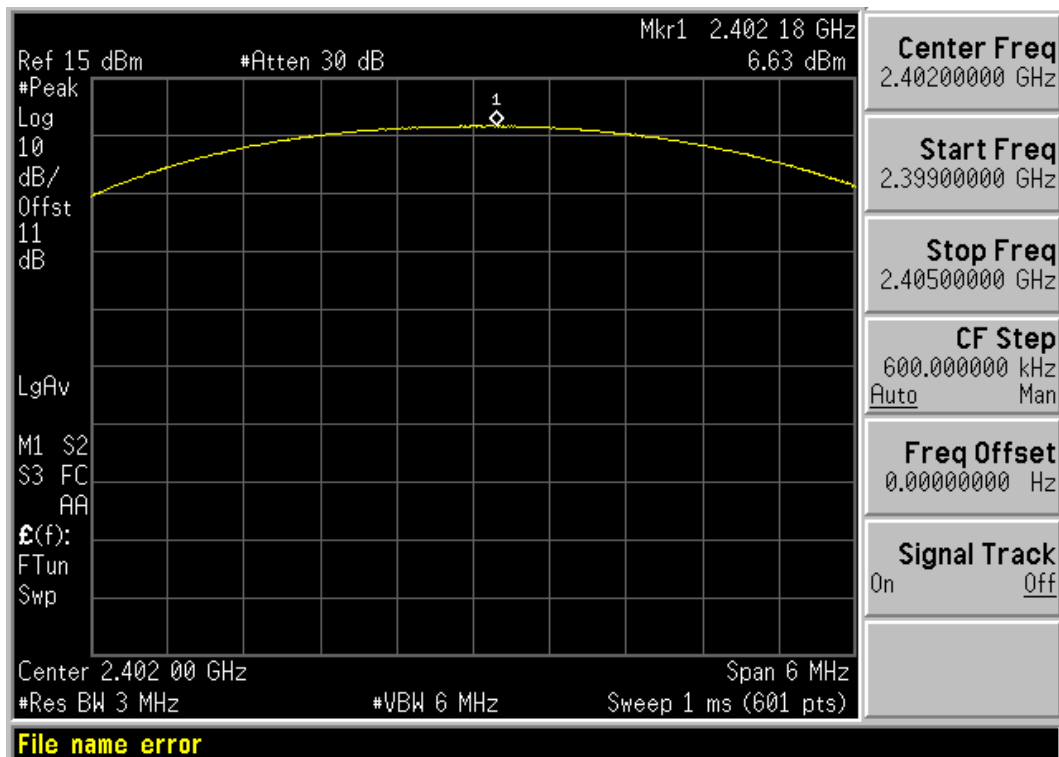
GFSK MID CHANAEL



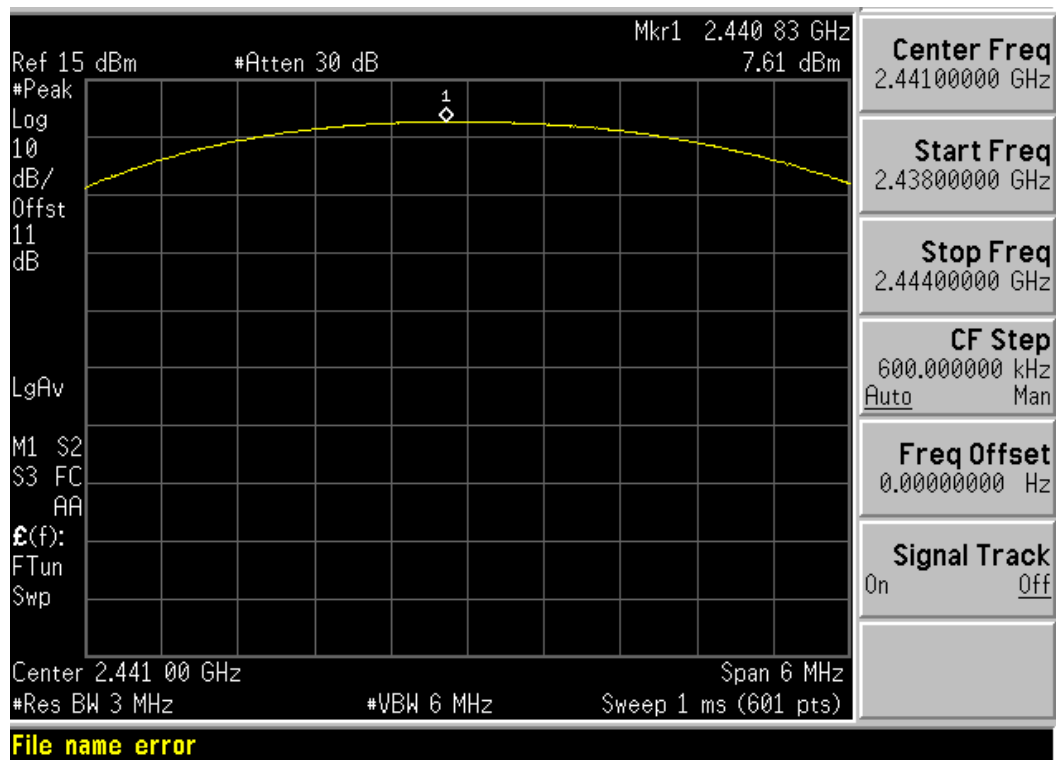
GFSK HIGH CHANNEL



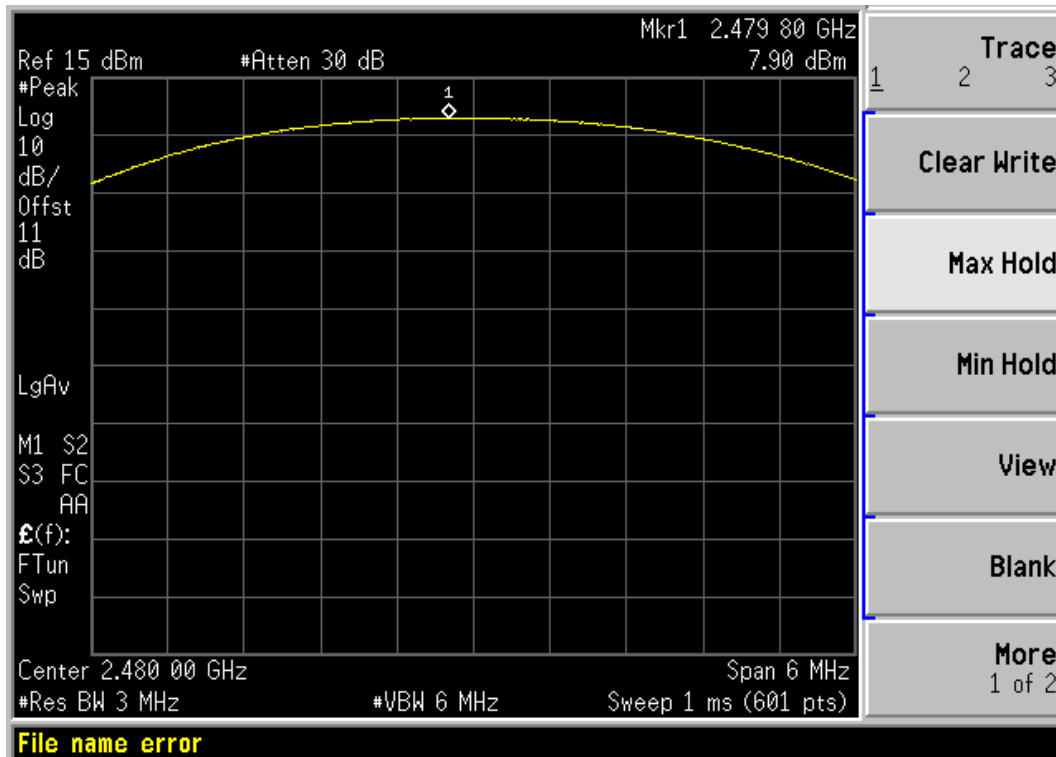
II/4-DQPSK LOW CHANNEL



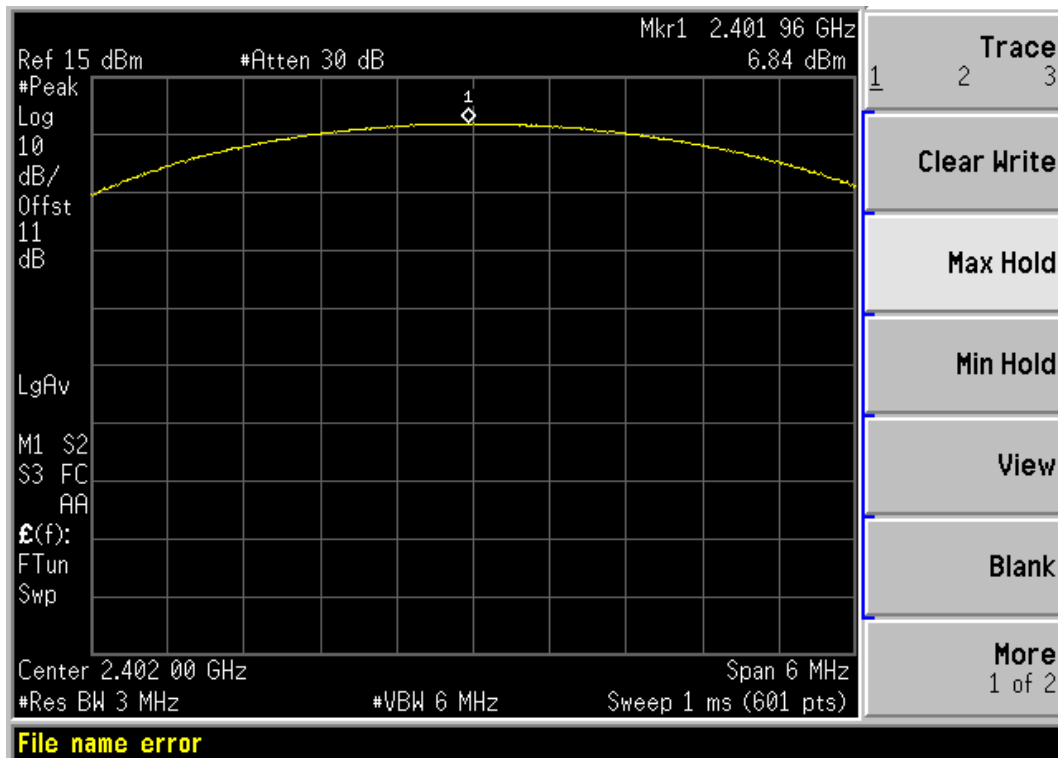
II/4-DQPSK MID CHANAEL



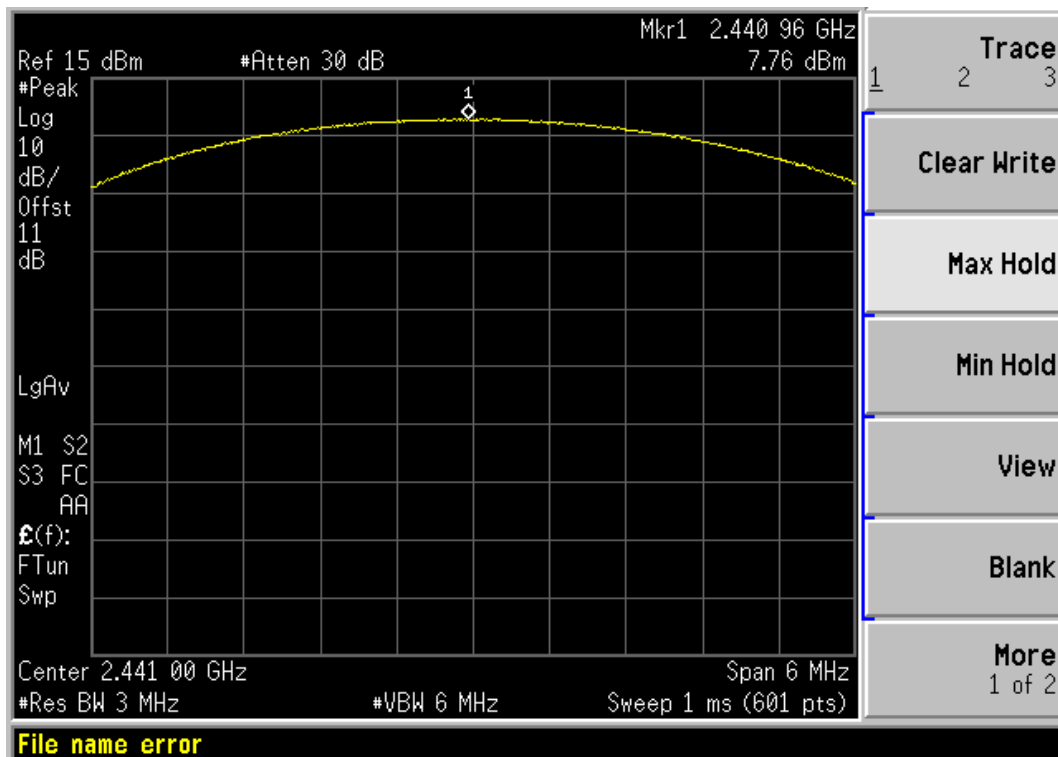
II/4-DQPSK HIGH CHANNEL



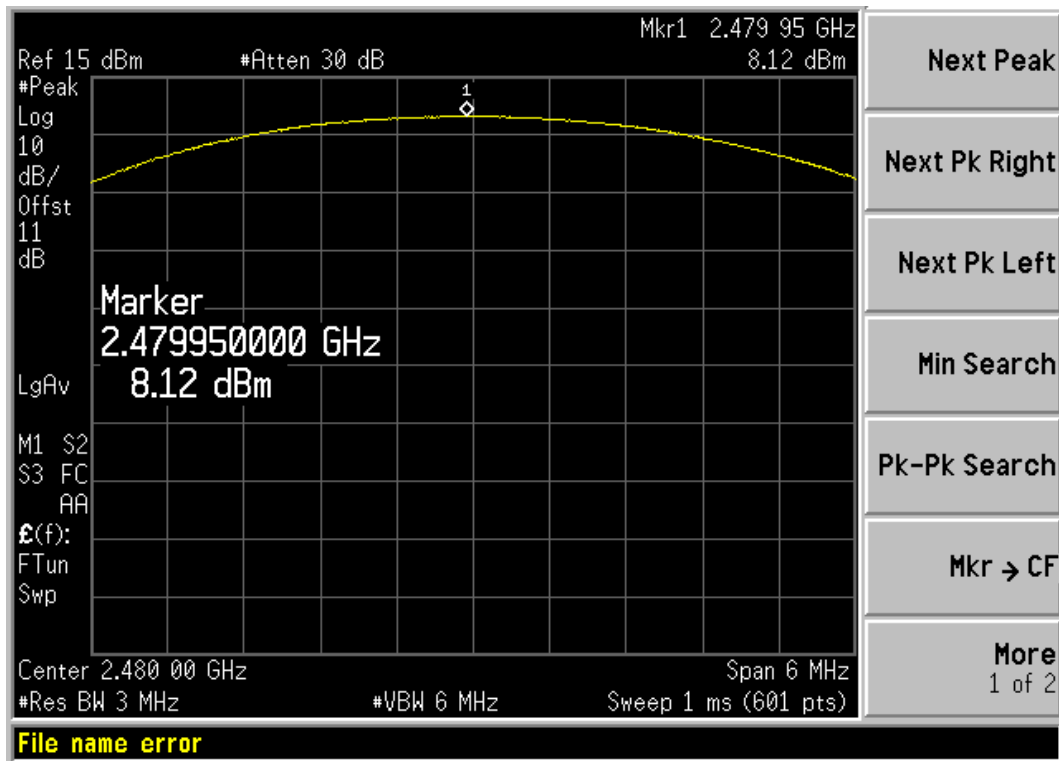
8-DPSK LOW CHANNEL



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	1.122	962.6223
Middle	2441	1.112	955.0151
High	2480	1.117	955.9568

π/4-DQPSK Mode:

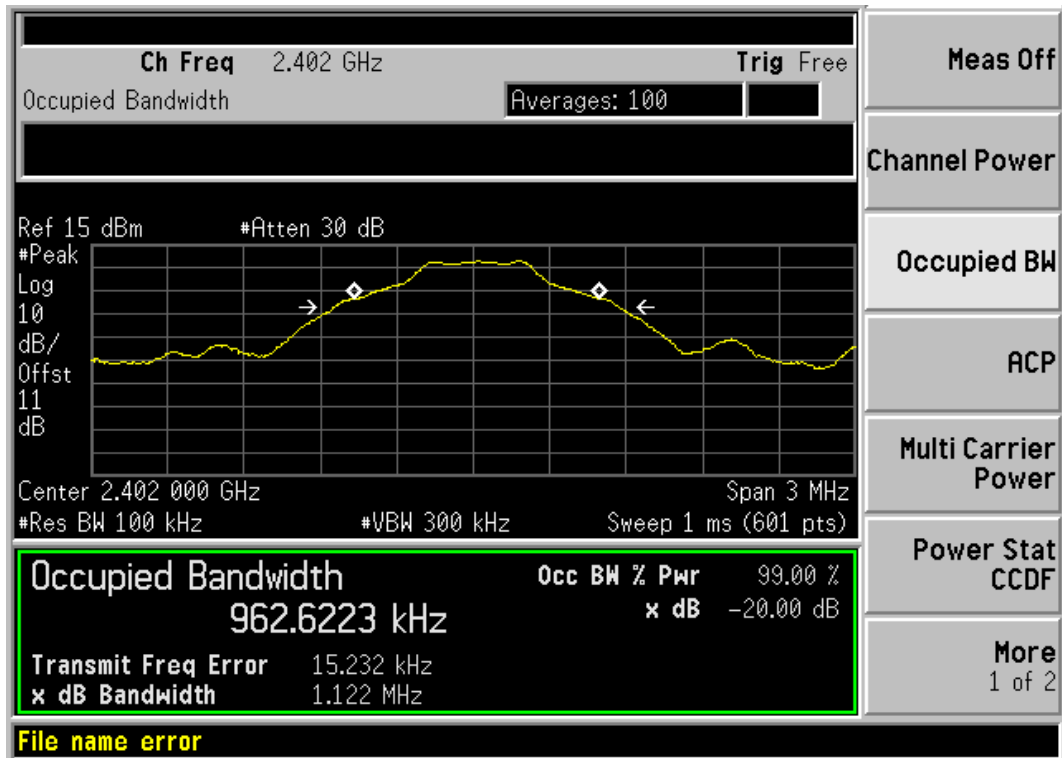
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.375	1.2093
Middle	2441	1.375	1.2151
High	2480	1.363	1.2085

8-DPSK Mode:

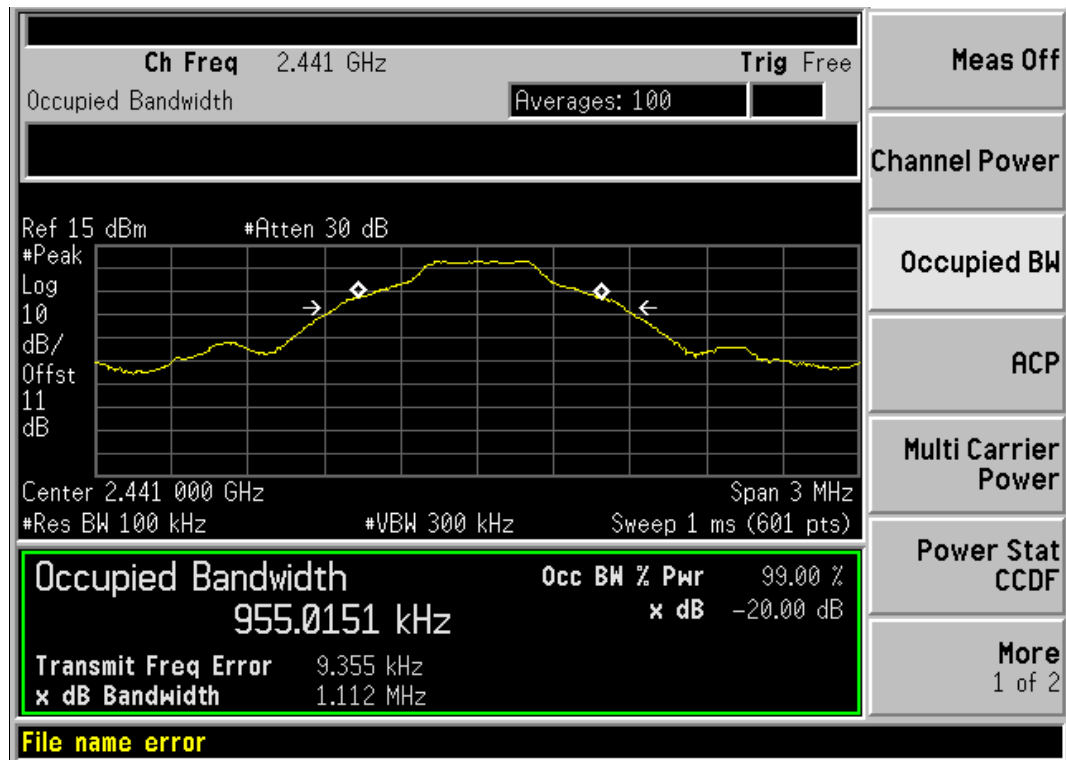
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.374	1.2174
Middle	2441	1.382	1.2178
High	2480	1.384	1.2218

Test plots

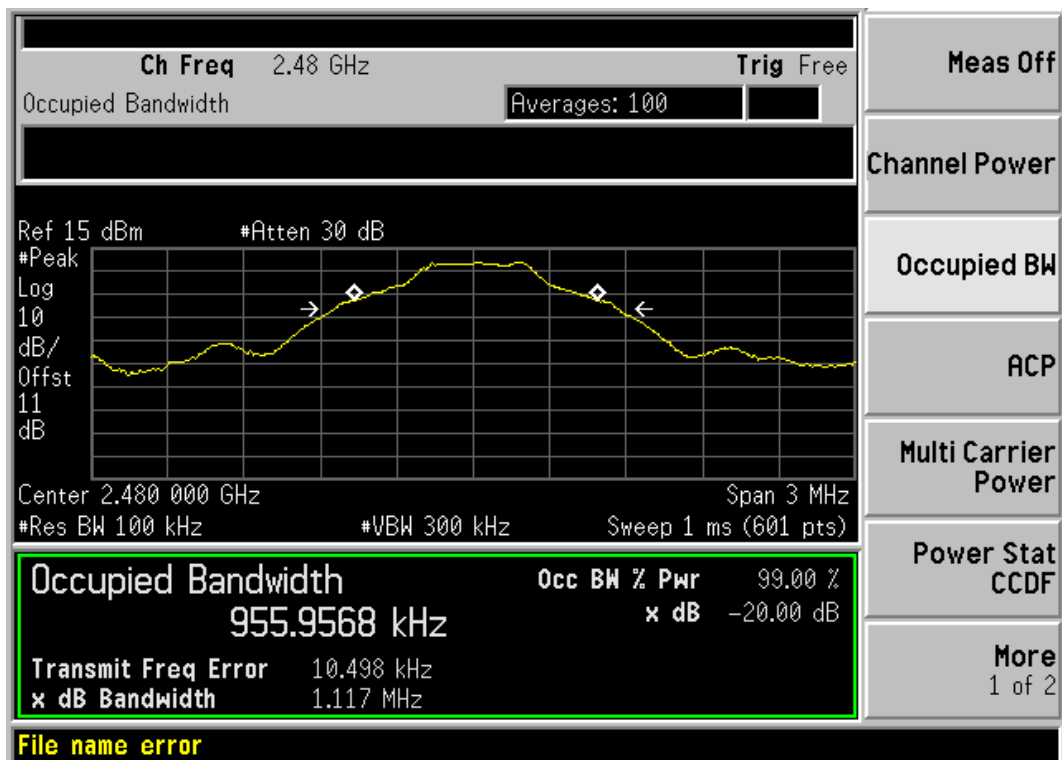
GFSK LOW CHANNEL



GFSK MID CHANAEL



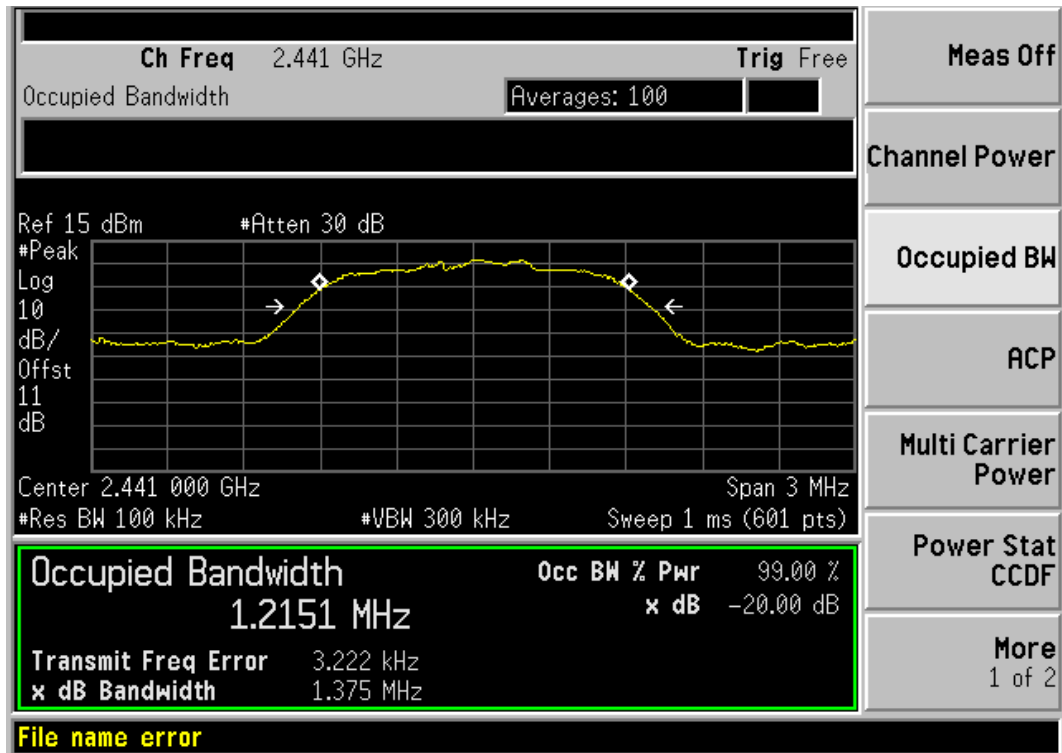
GFSK HIGH CHANNEL



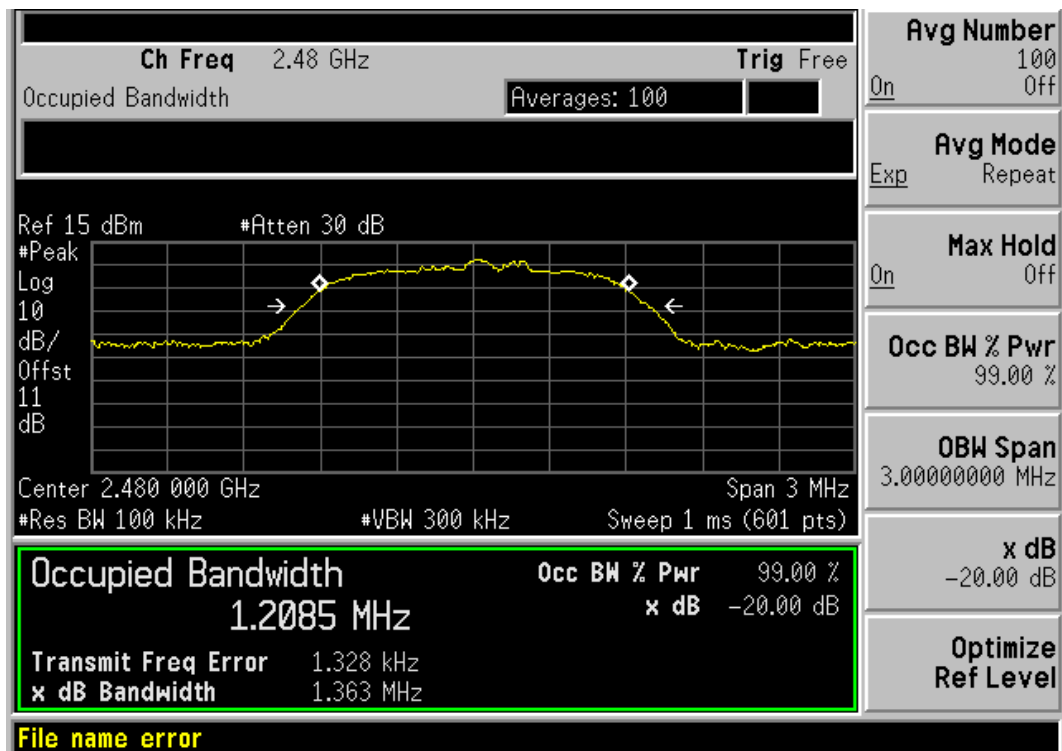
II/4-DQPSK LOW CHANNEL



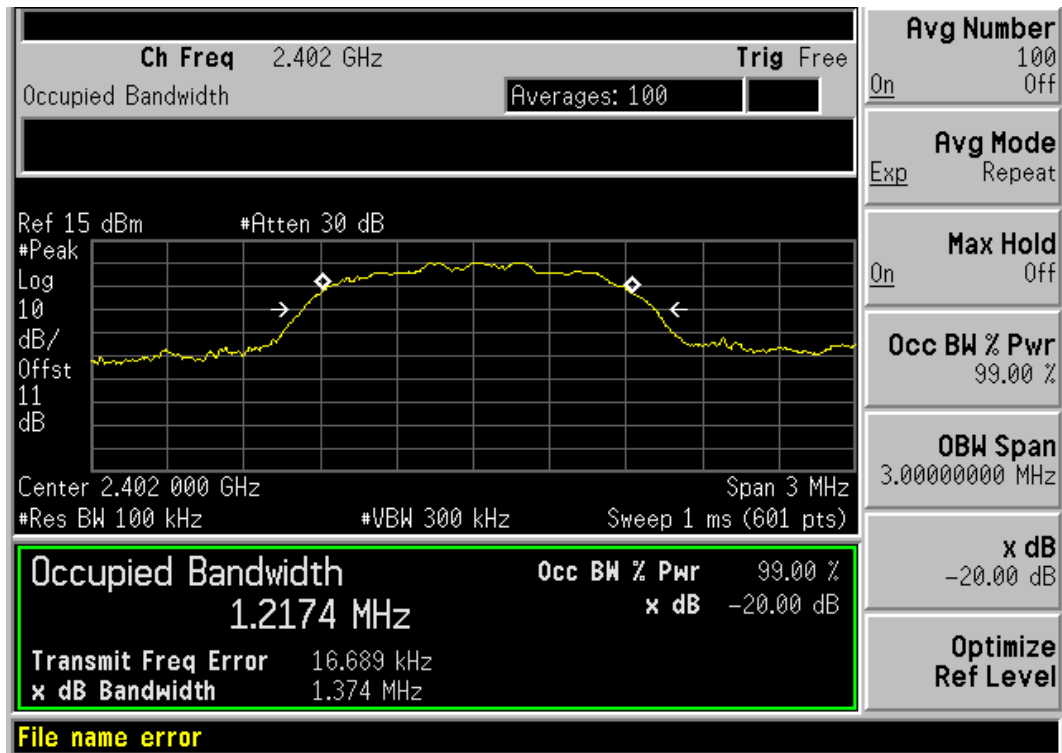
II/4-DQPSK MID CHANAEL



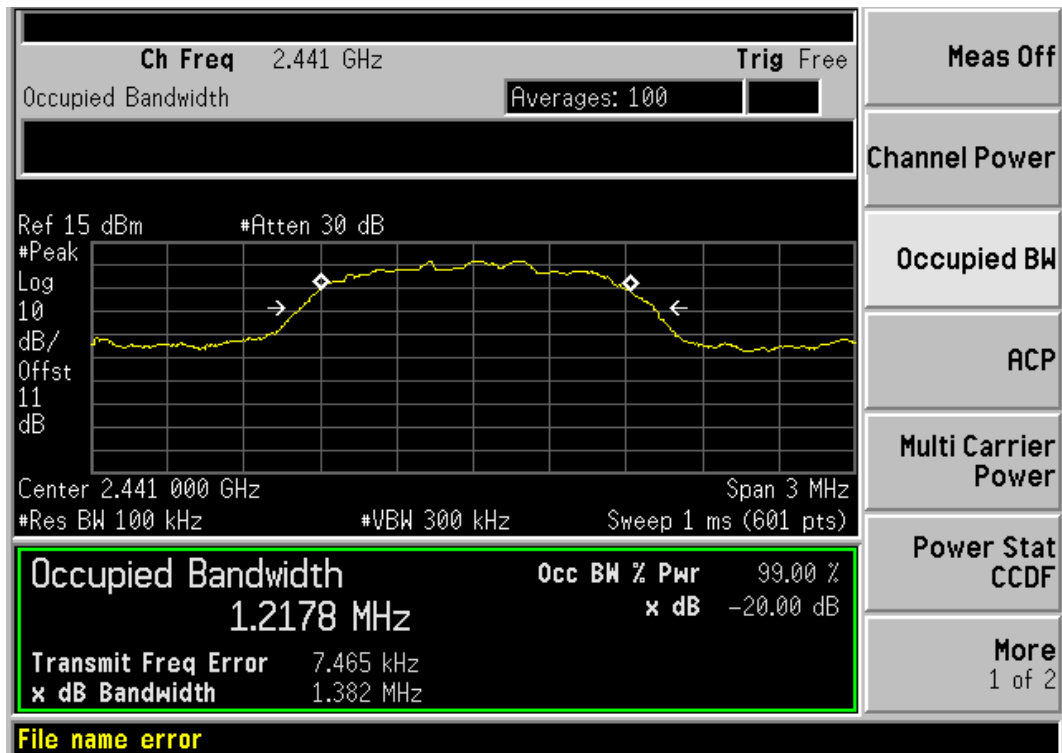
II/4-DQPSK HIGH CHANNEL



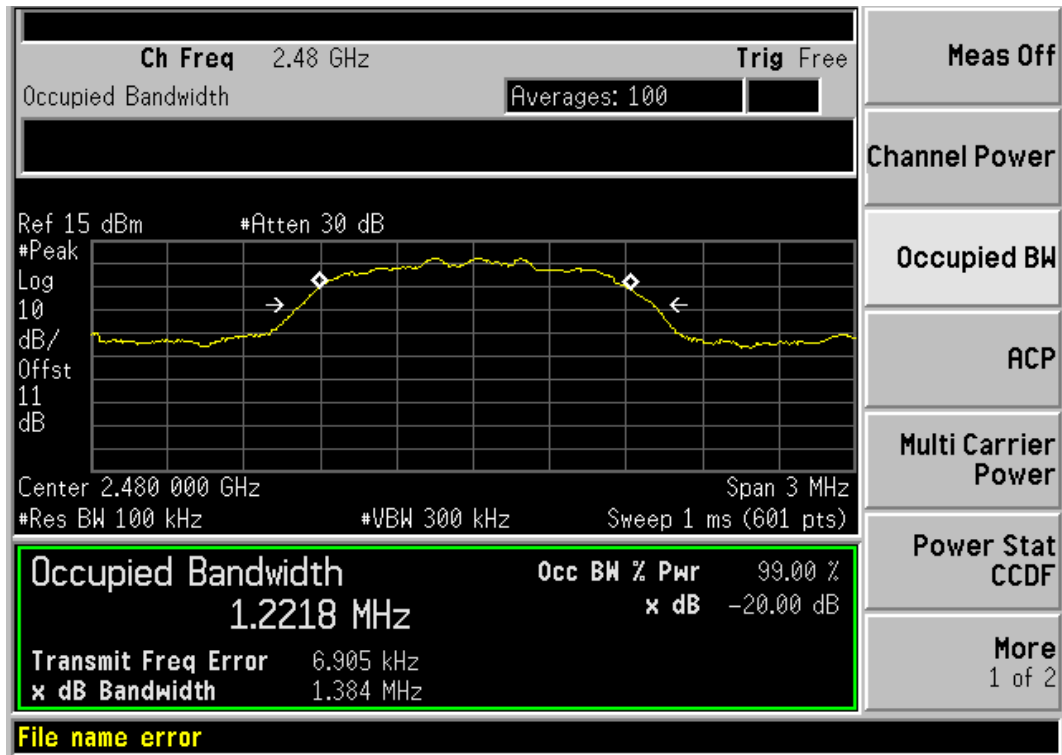
8-DPSK LOW CHANNEL



8-DPSK MID CHANAEL



8-DPSK HIGH CHANNEL

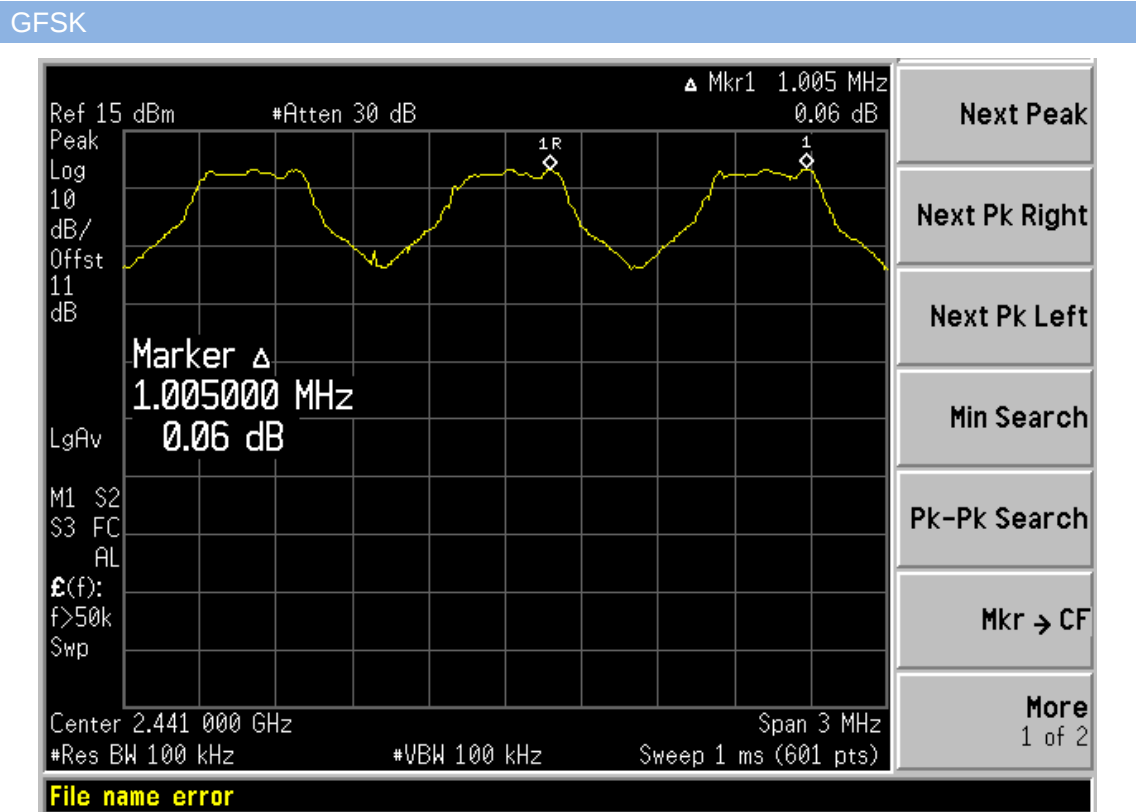


A.4 Hopping Frequency Separation

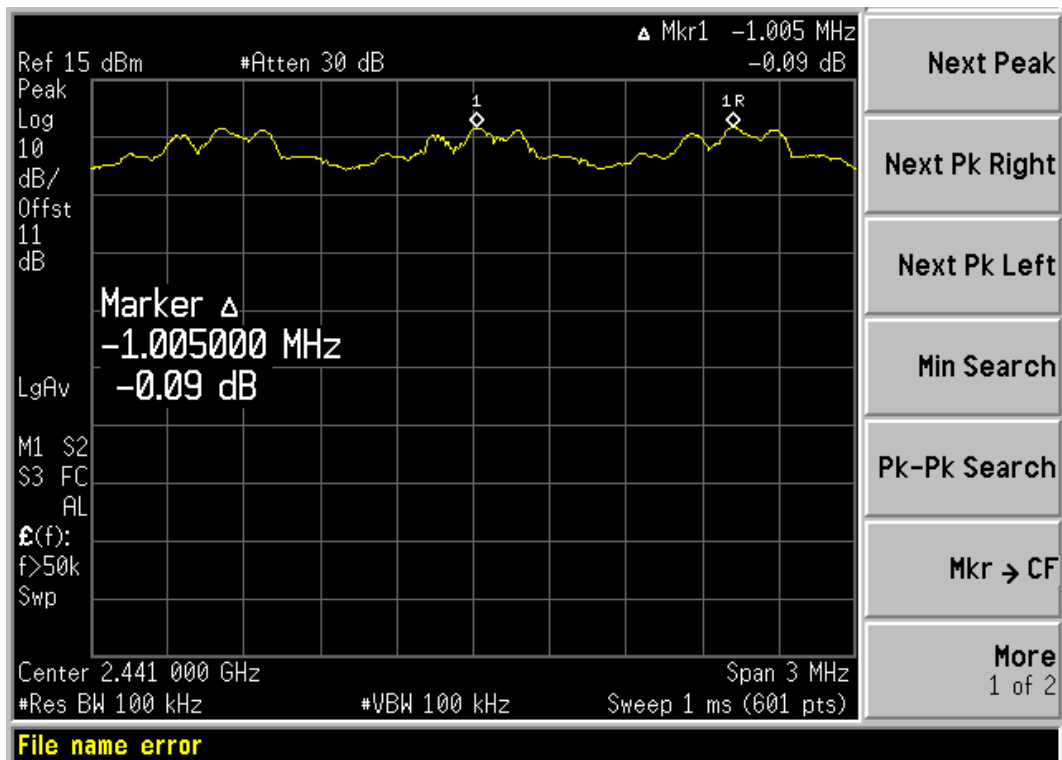
Test Data

Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Two-thirds of the 20dB bandwidth (MHz)	Verdict
GFSK	1.005	1.122	0.748	PASS
II/4-DQPSK Mode	1.005	1.375	0.917	PASS
8-DPSK Mode	1.005	1.384	0.923	PASS

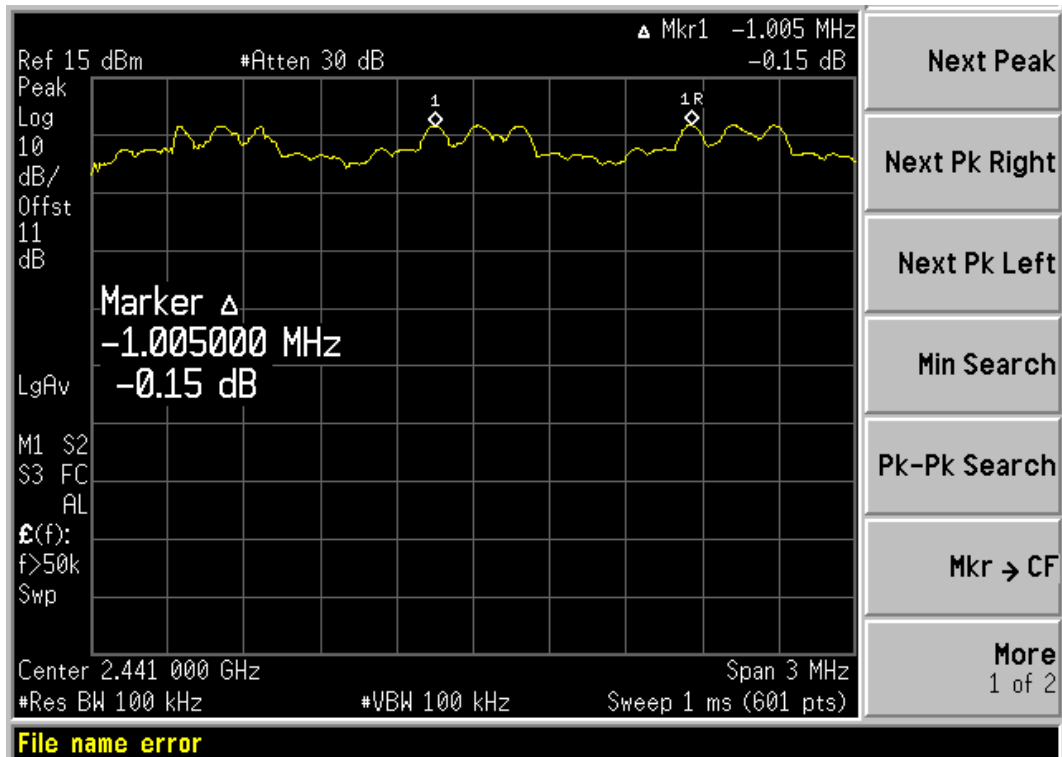
Test plots



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	0.3933	125.860	0.4	PASS
DH 3	1.640	262.408	0.4	PASS
DH 5	2.893	308.596	0.4	PASS

π/4-DQPSK Mode:

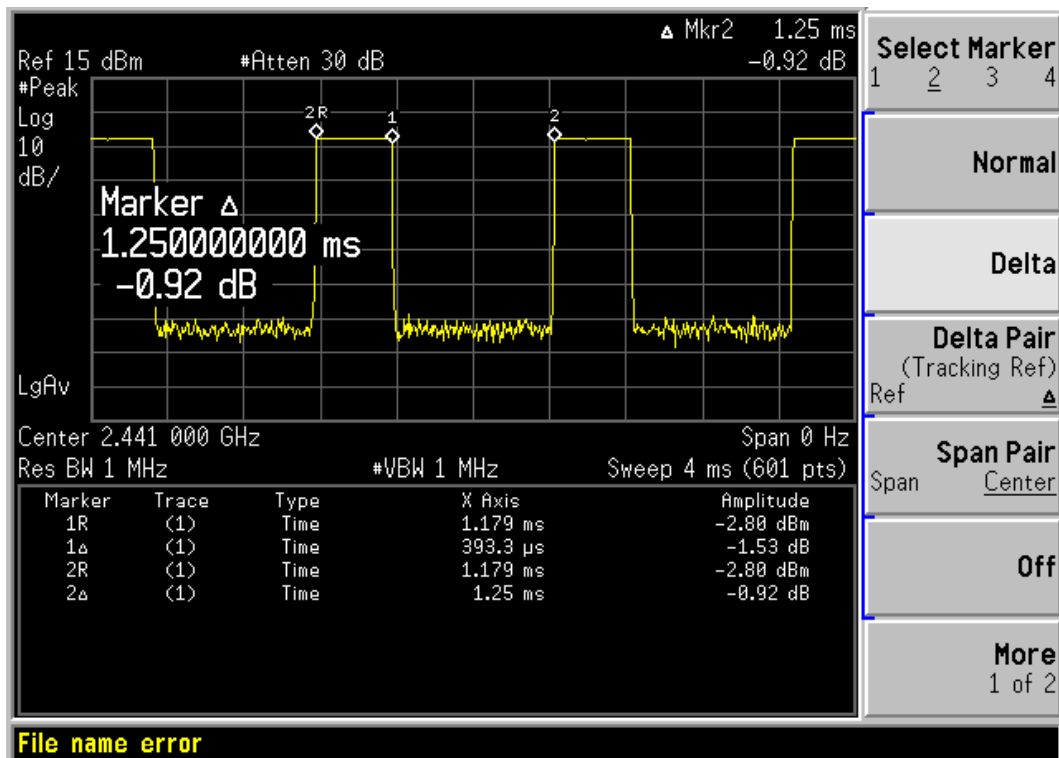
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.400	128.004	0.4	PASS
DH 3	1.660	265.608	0.4	PASS
DH 5	2.907	310.090	0.4	PASS

8-DPSK Mode:

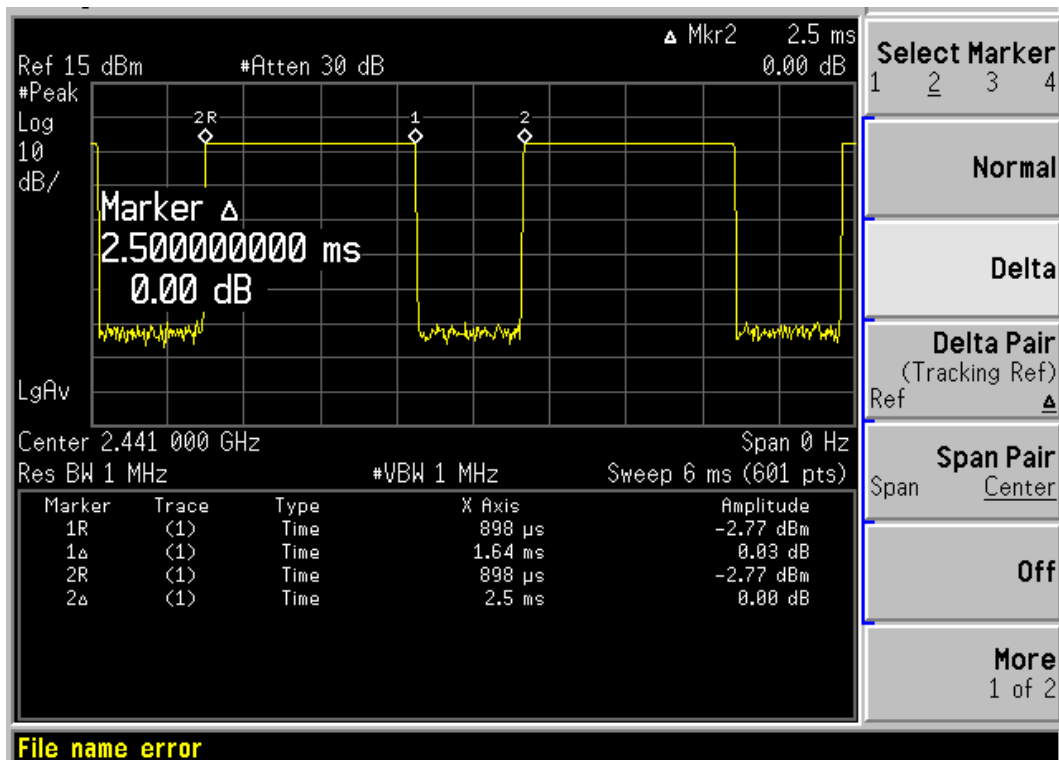
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.400	128.004	0.4	PASS
DH 3	1.660	265.608	0.4	PASS
DH 5	2.893	308.596	0.4	PASS

Test Plots

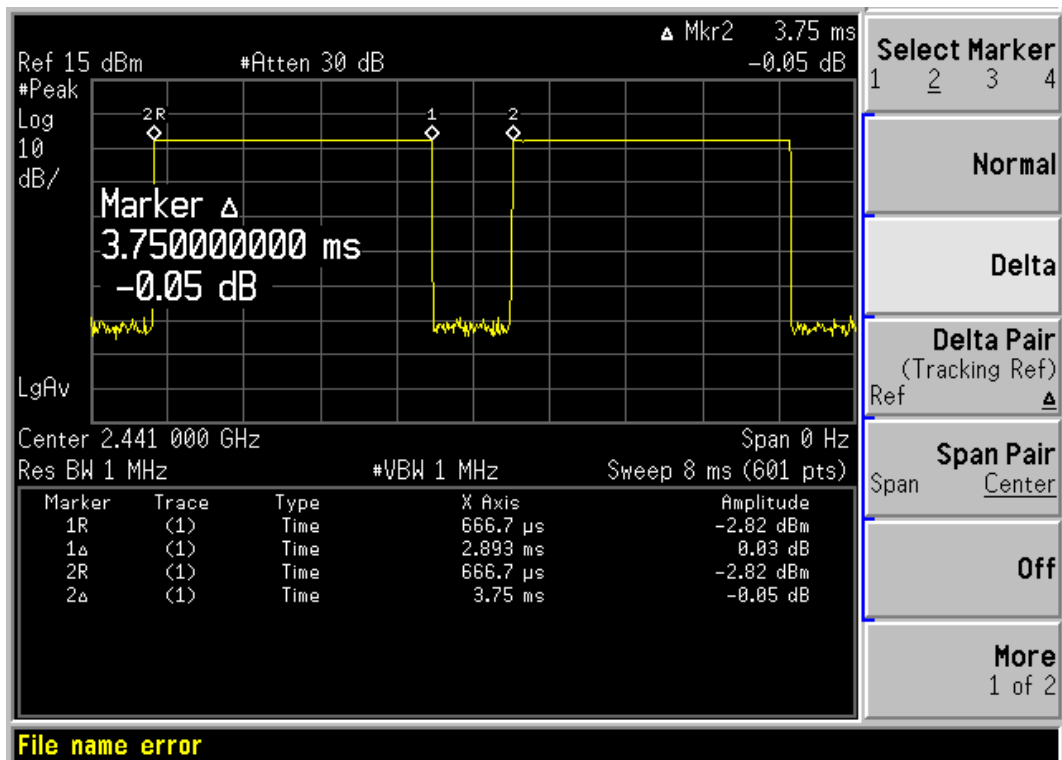
GFSK DH1



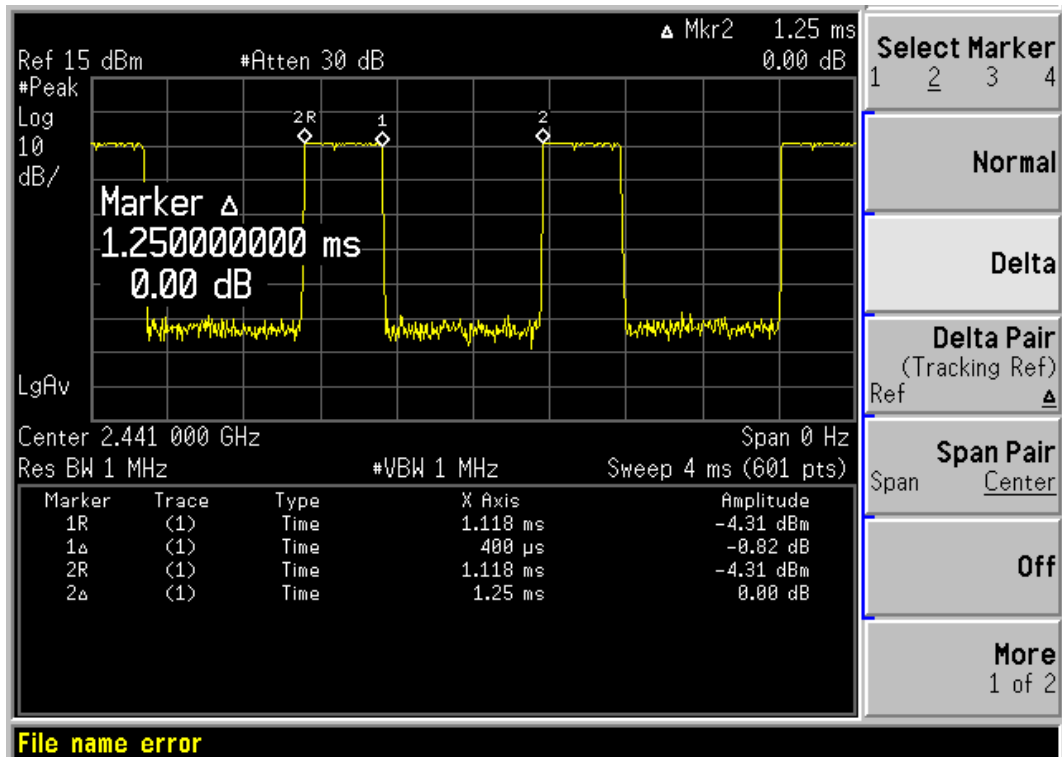
GFSK DH3



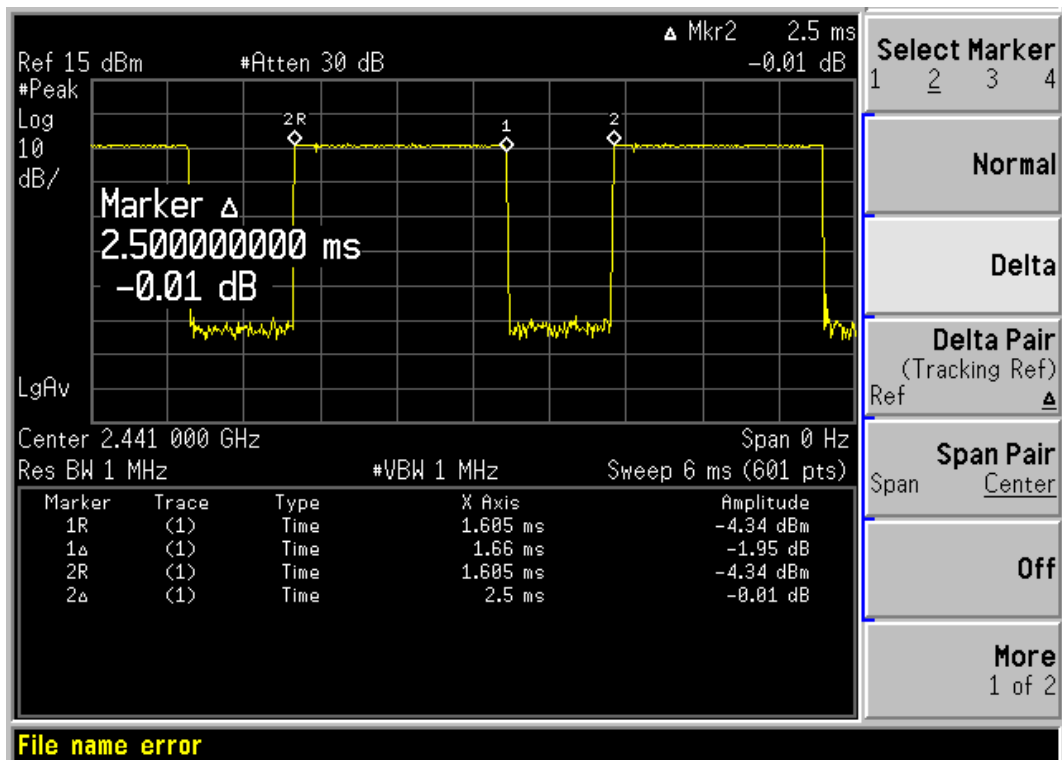
GFSK DH5



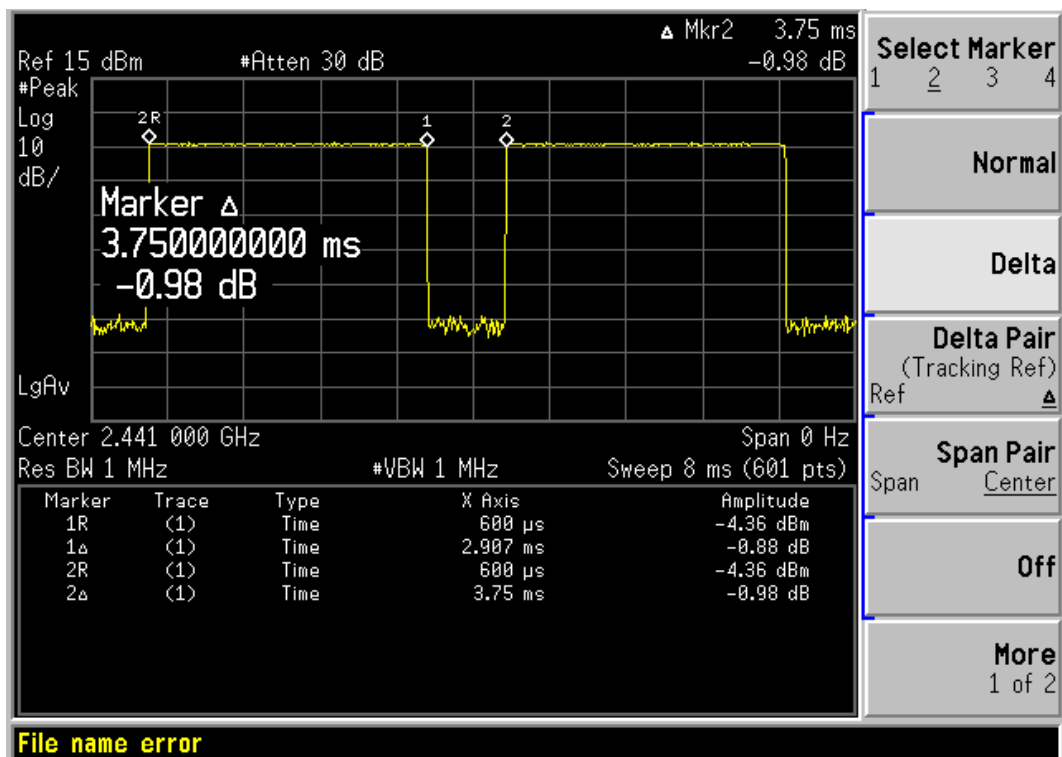
II/4-DQPSK DH1



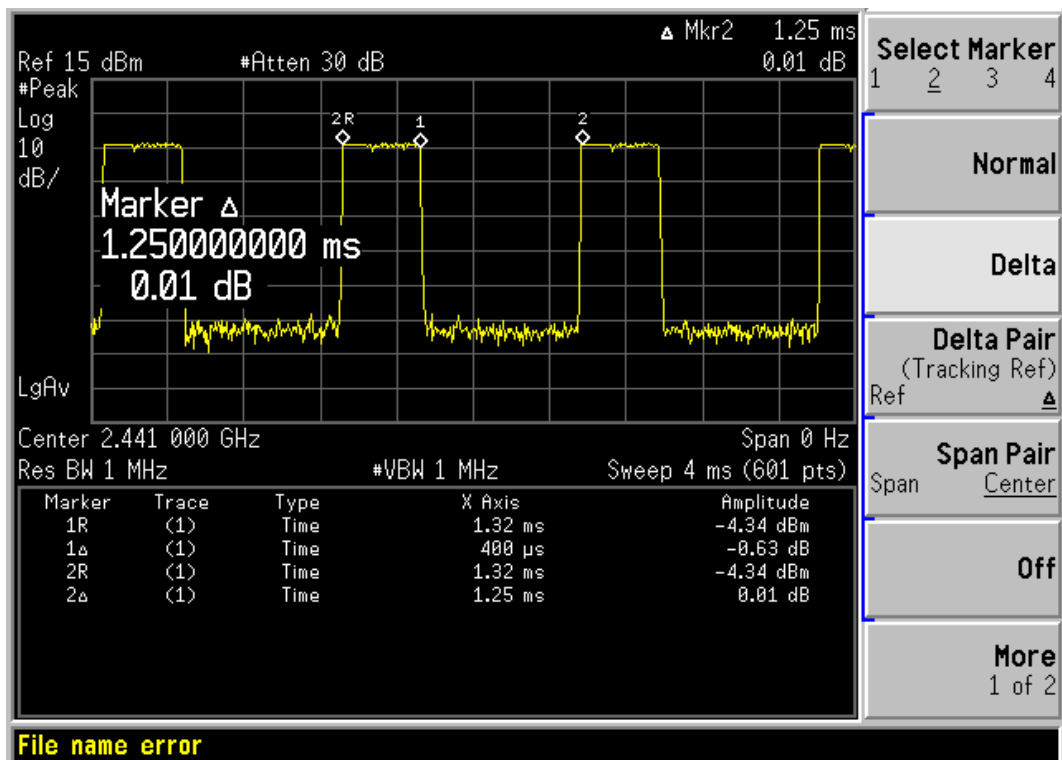
II/4-DQPSK DH3



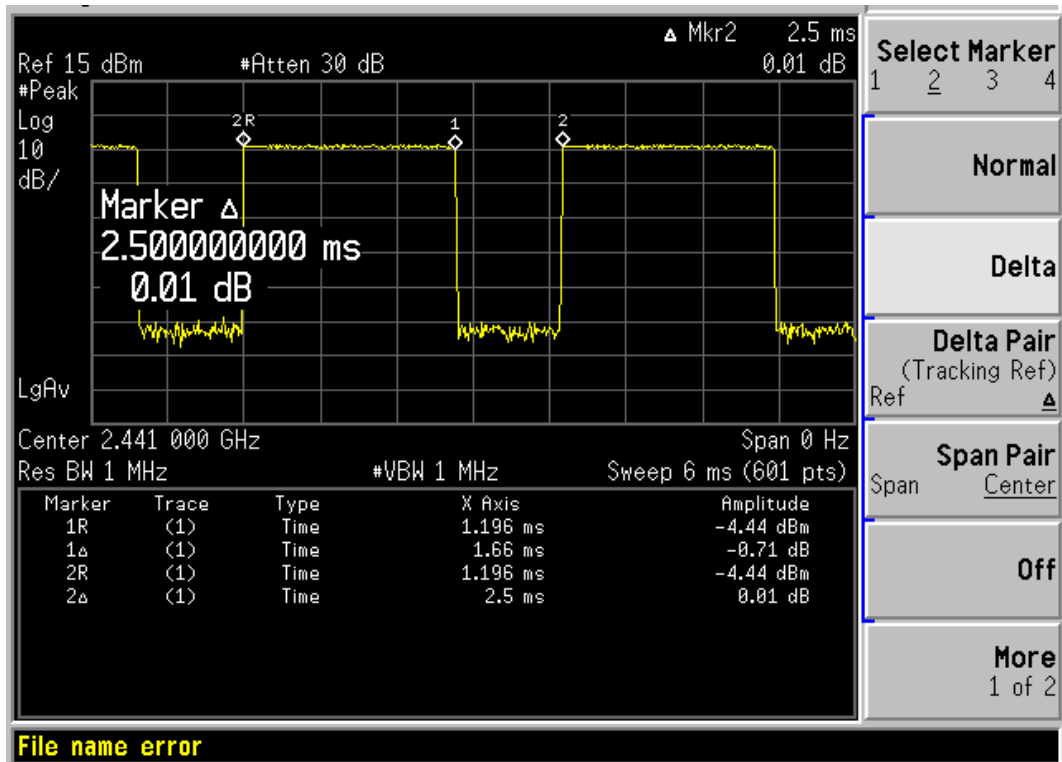
II/4-DQPSK DH5



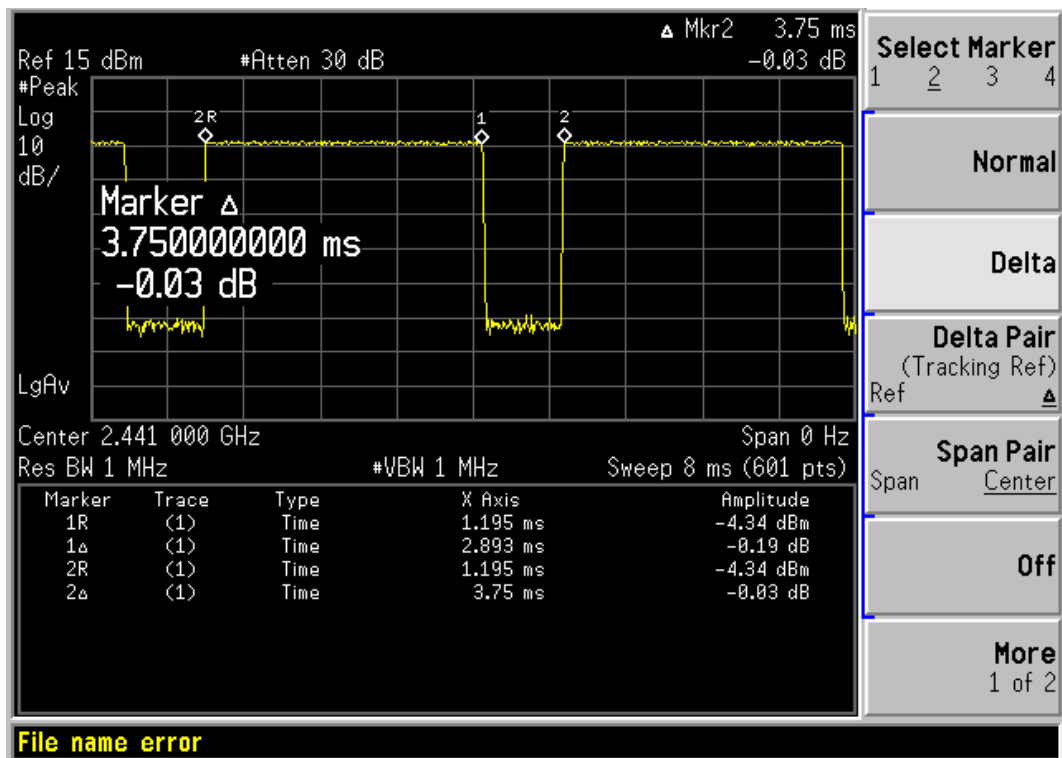
8-DPSK DH1



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	
0	2402	-43.98	7.45	-12.3	PASS
39	2441	-44.58	7.79	-12.2	PASS
78	2480	-43.99	8.23	-11.2	PASS

π/4-DQPSK Mode:

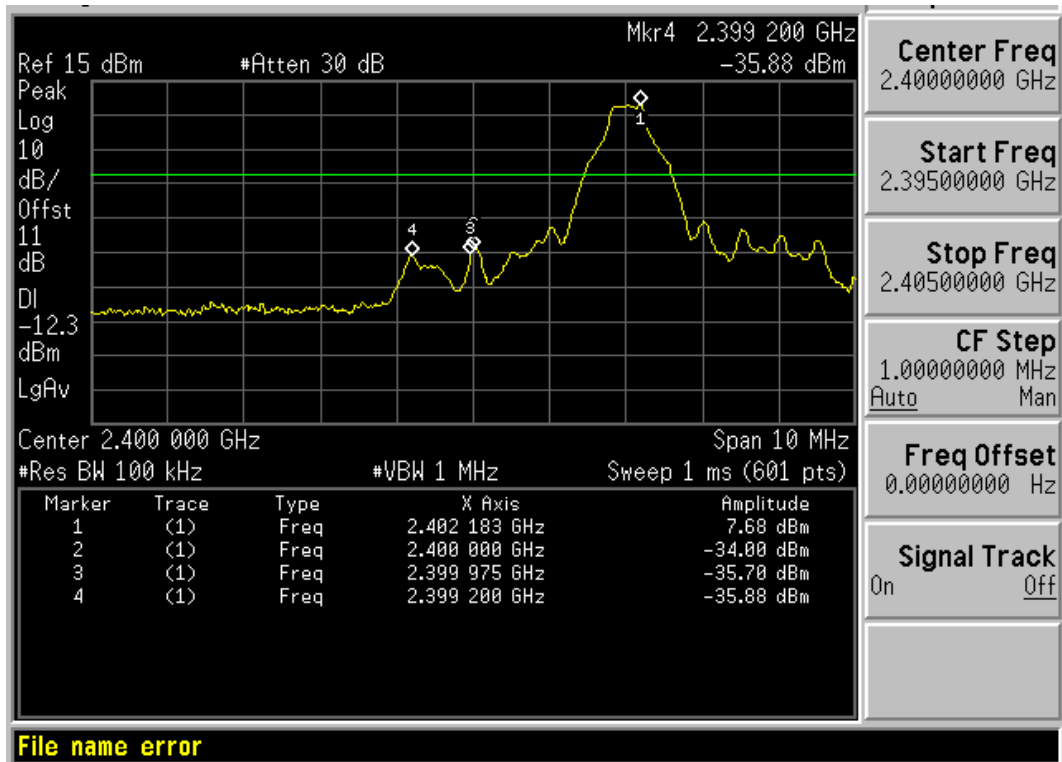
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
0	2402	-43.69	5.03	-15.0	PASS
39	2441	-44.44	6.51	-13.5	PASS
78	2480	-44.52	6.93	-13.1	PASS

8-DPSK Mode:

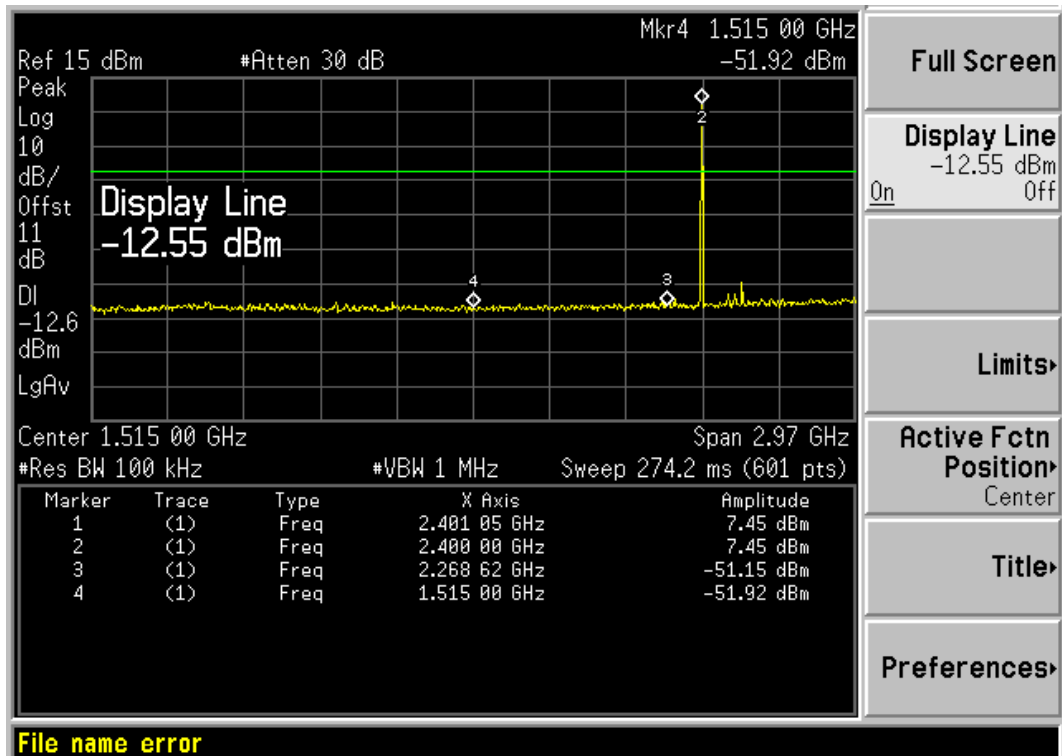
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
0	2402	-44.71	5.35	-14.7	PASS
39	2441	-44.54	6.14	-13.9	PASS
78	2480	-44.56	6.11	-13.9	PASS

Test Plots

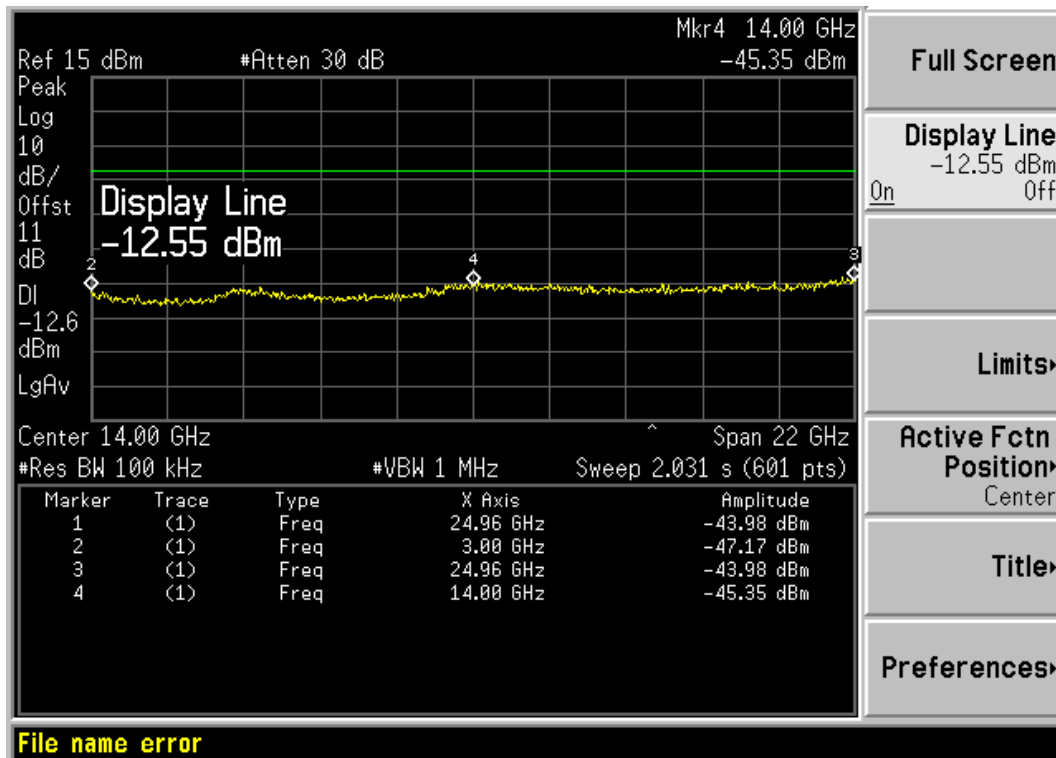
GFSK LOW CHANNEL , BANDEDGE



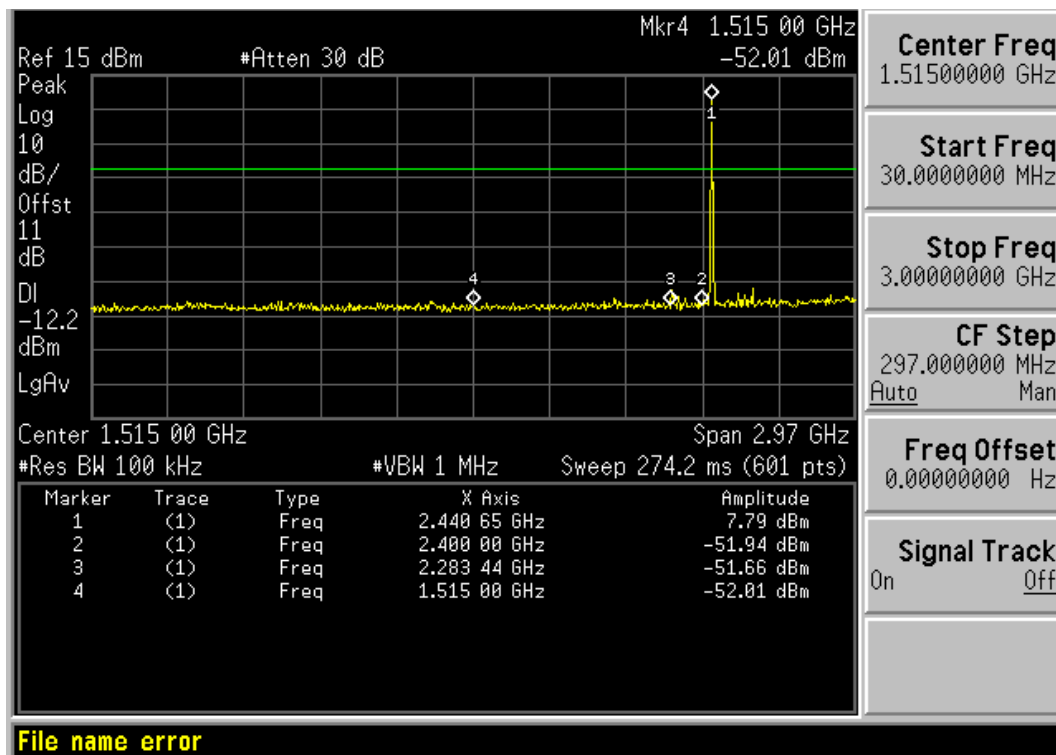
GFSK LOW CHANNEL , SPURIOUS 30MHz~3GHz



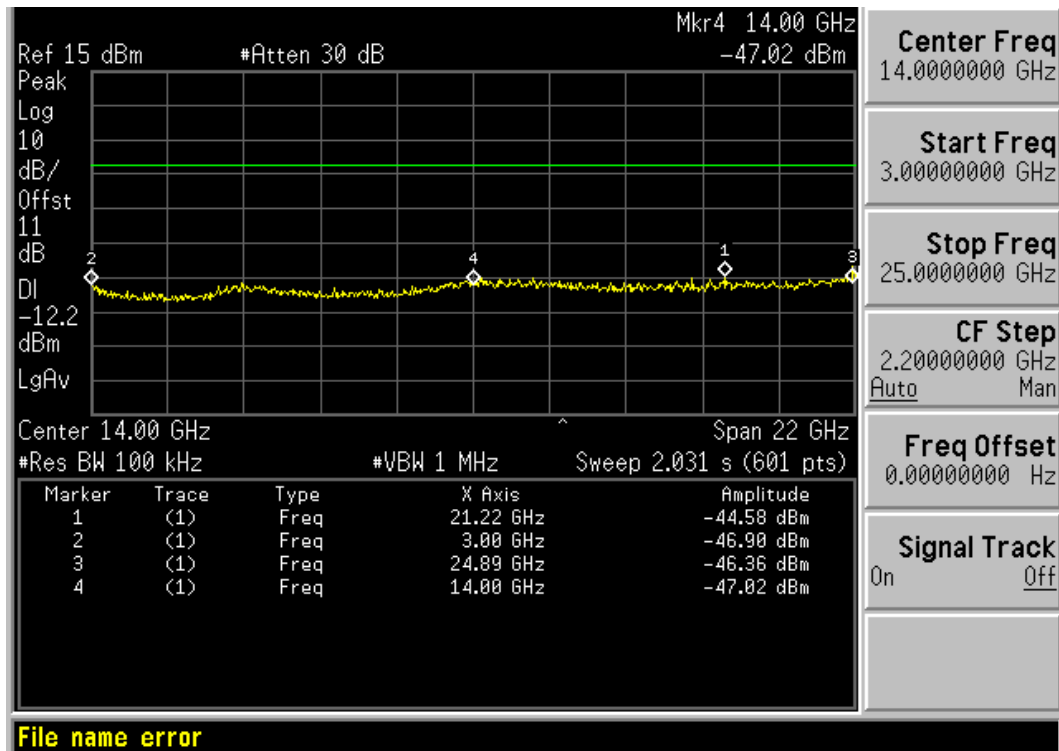
GFSK LOW CHANNEL , SPURIOUS 3GHz~25GHz



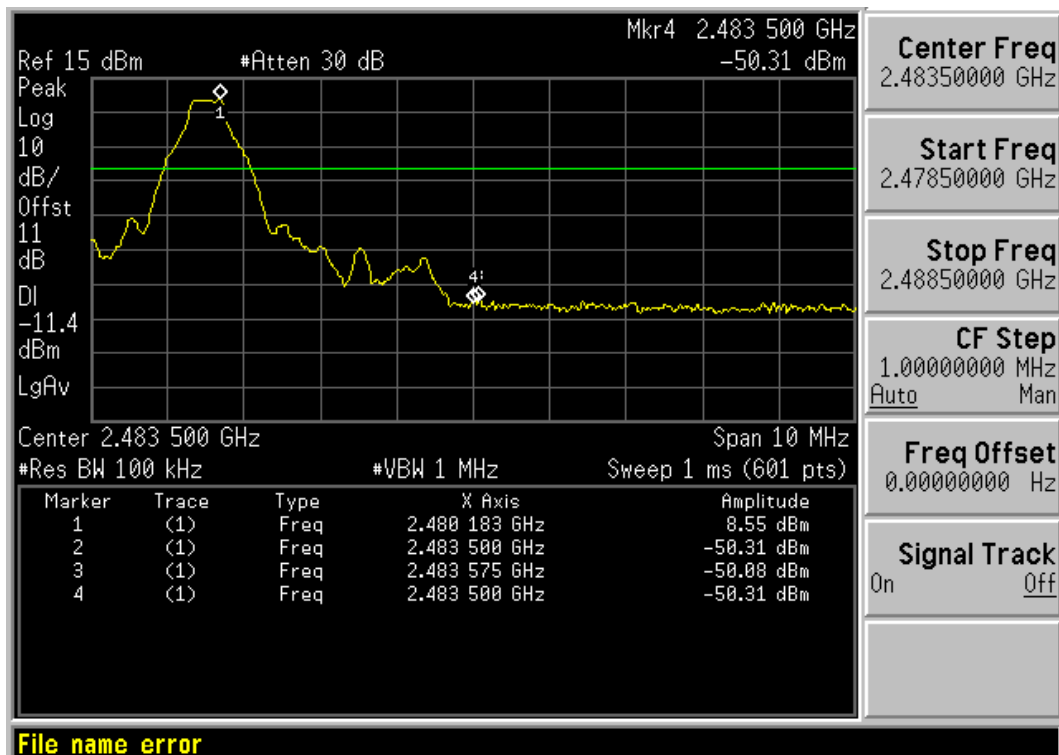
GFSK MID CHANNEL , SPURIOUS 30MHz~3GHz



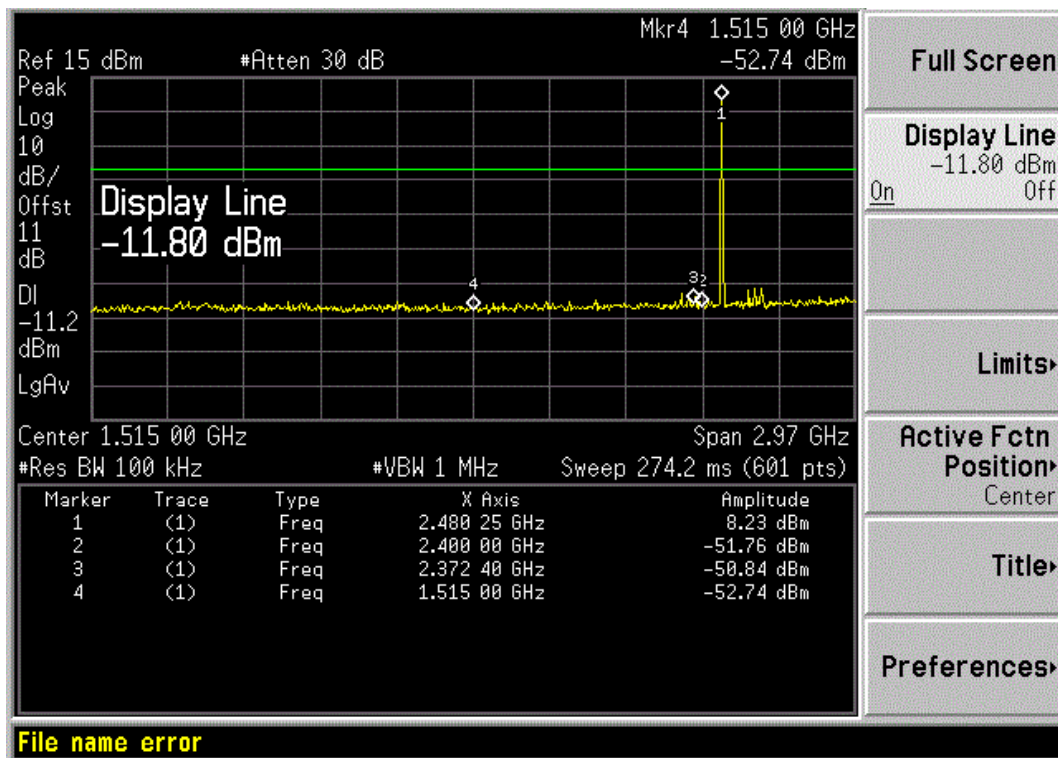
GFSK MID CHANNEL , SPURIOUS 3GHz~25GHz



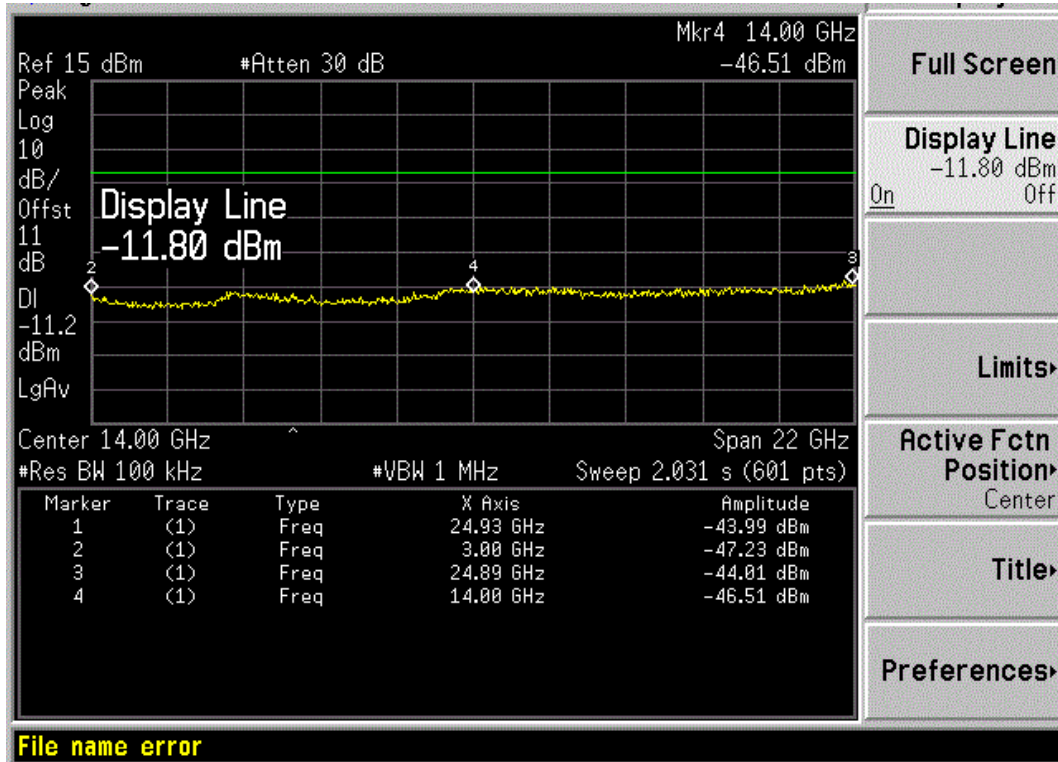
GFSK HIGH CHANNEL , BANDEDGE



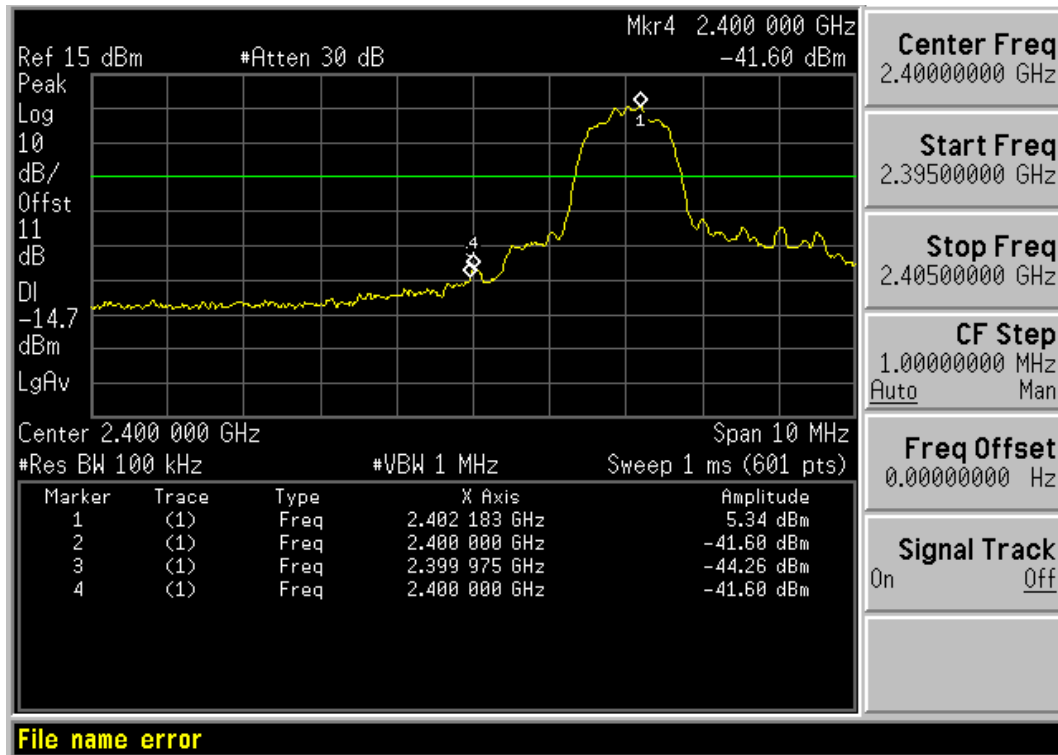
GFSK HIGH CHANNEL , SPURIOUS 30MHz~3GHz



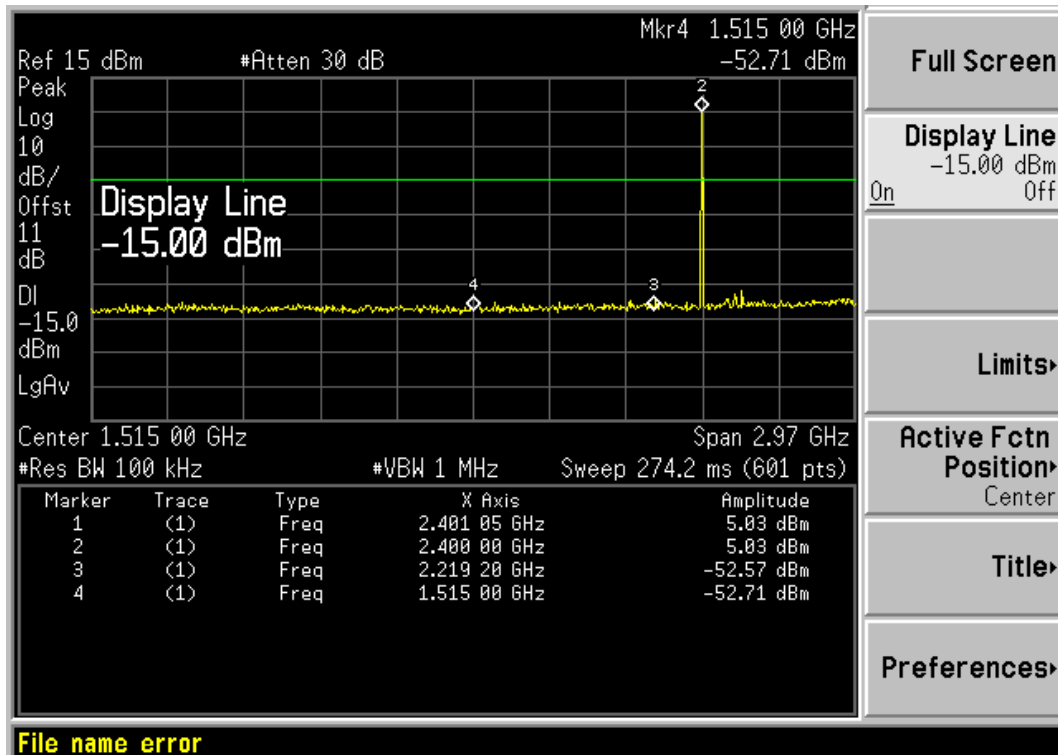
GFSK HIGH CHANNEL , SPURIOUS 3GHz~25GHz



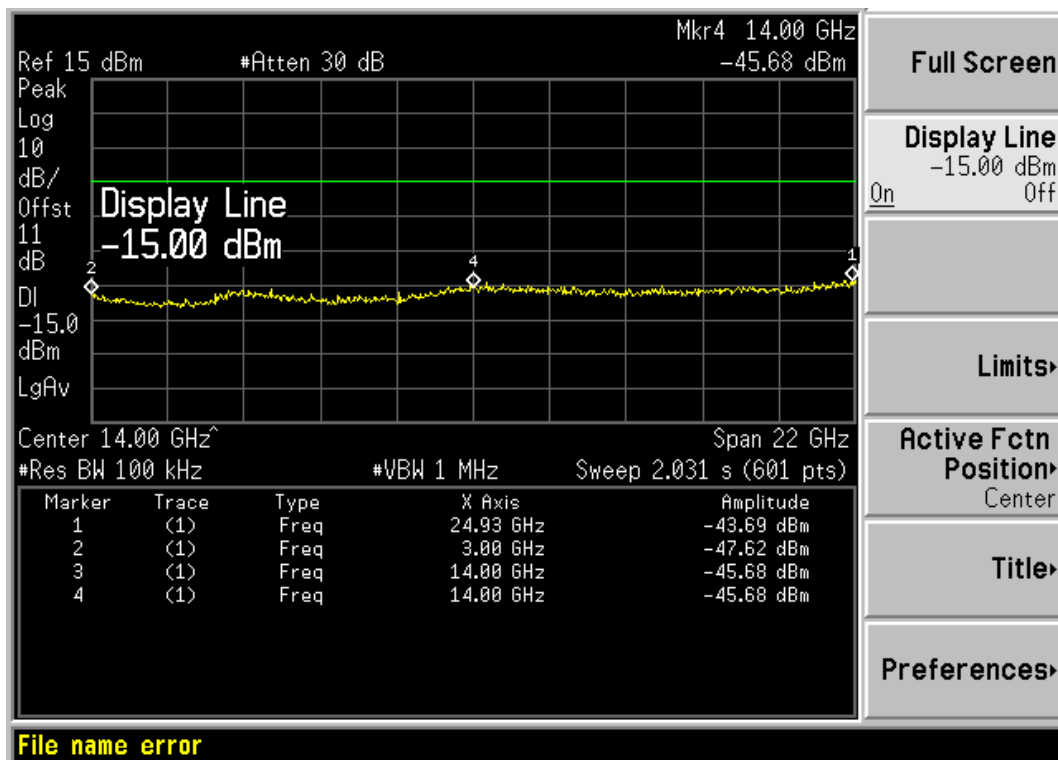
II/4-DQPSK LOW CHANNEL , BANDEDGE



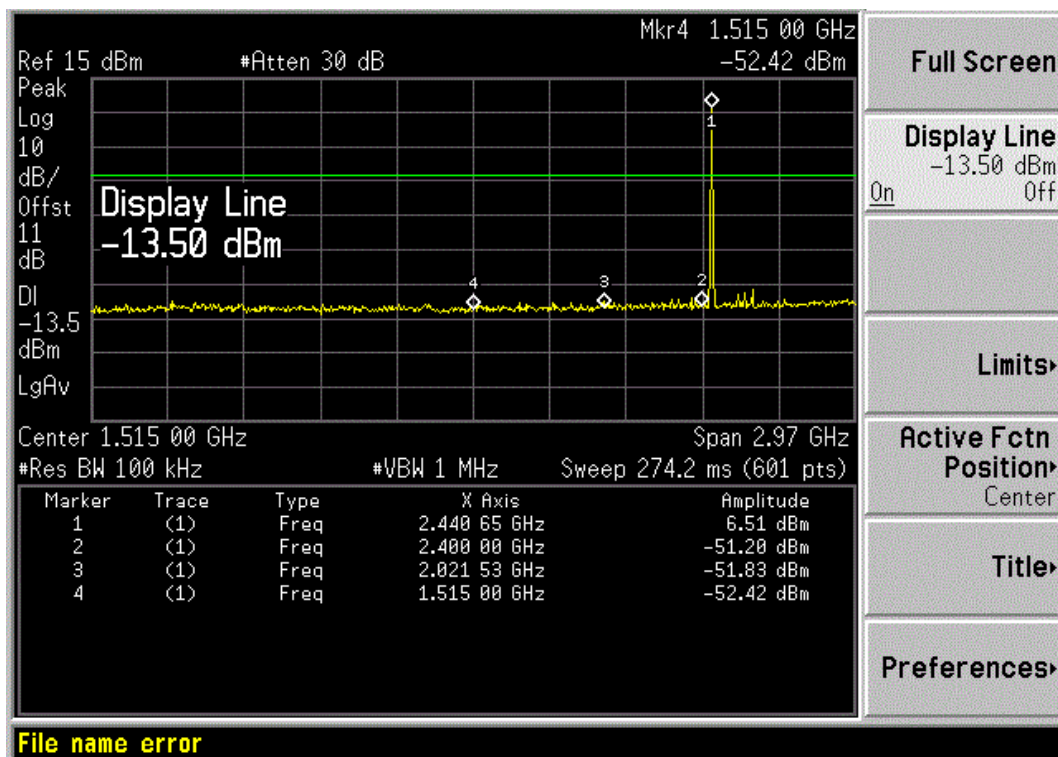
II/4-DQPSK LOW CHANNEL , SPURIOUS 30MHz~3GHz



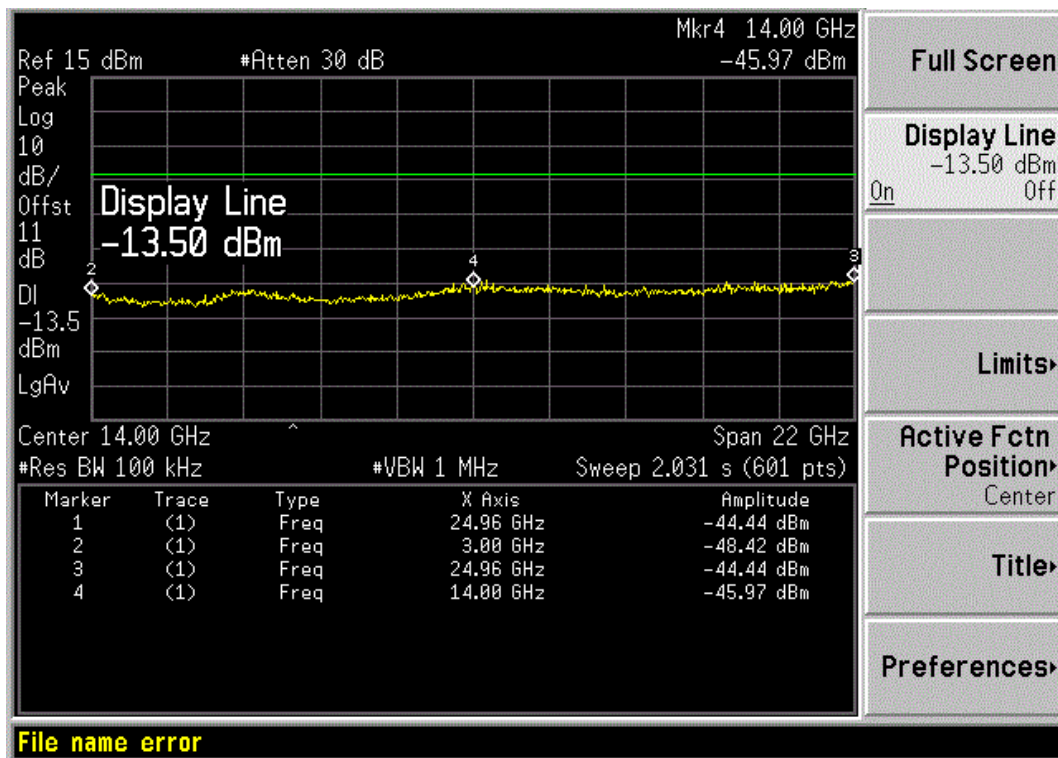
II/4-DQPSK LOW CHANNEL , SPURIOUS 3GHz~25GHz



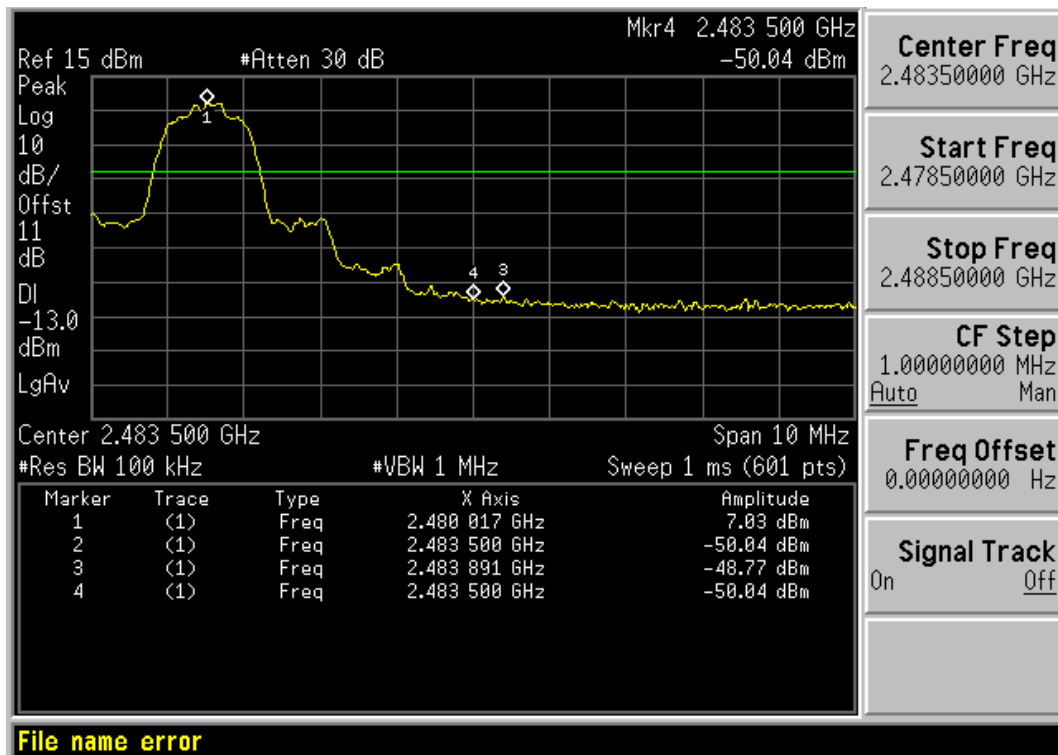
II/4-DQPSK MID CHANNEL , SPURIOUS 30MHz~3GHz



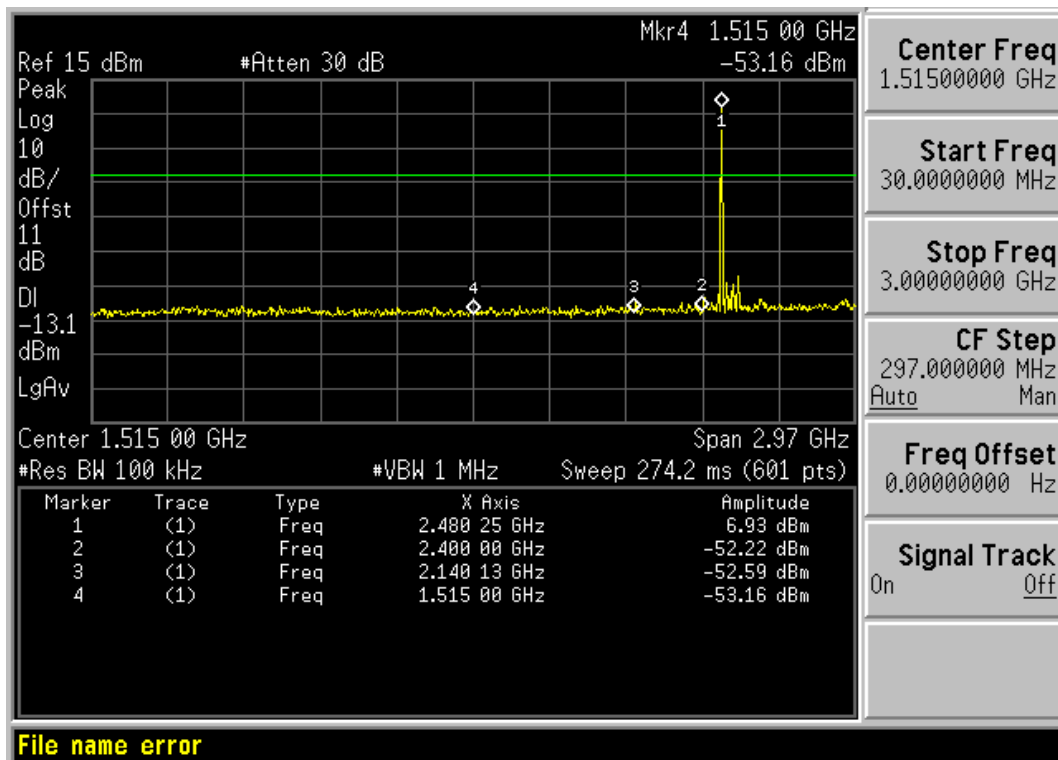
II/4-DQPSK MID CHANNEL , SPURIOUS 3GHz~25GHz



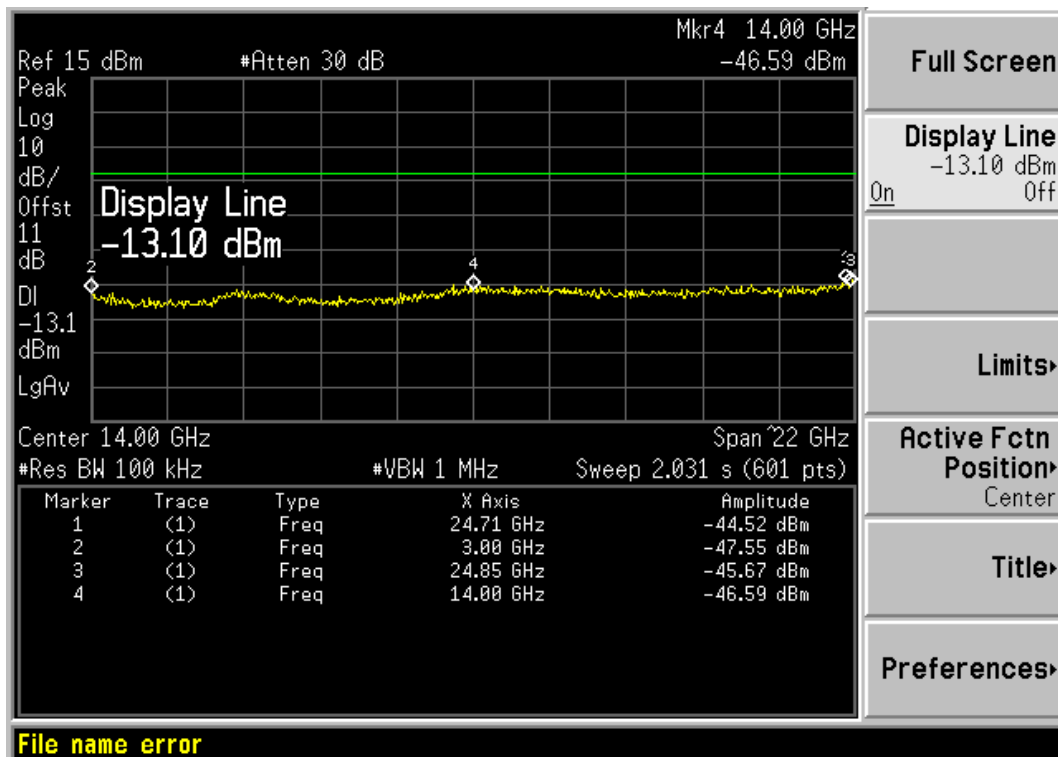
II/4-DQPSK HIGH CHANNEL , BANDEDGE



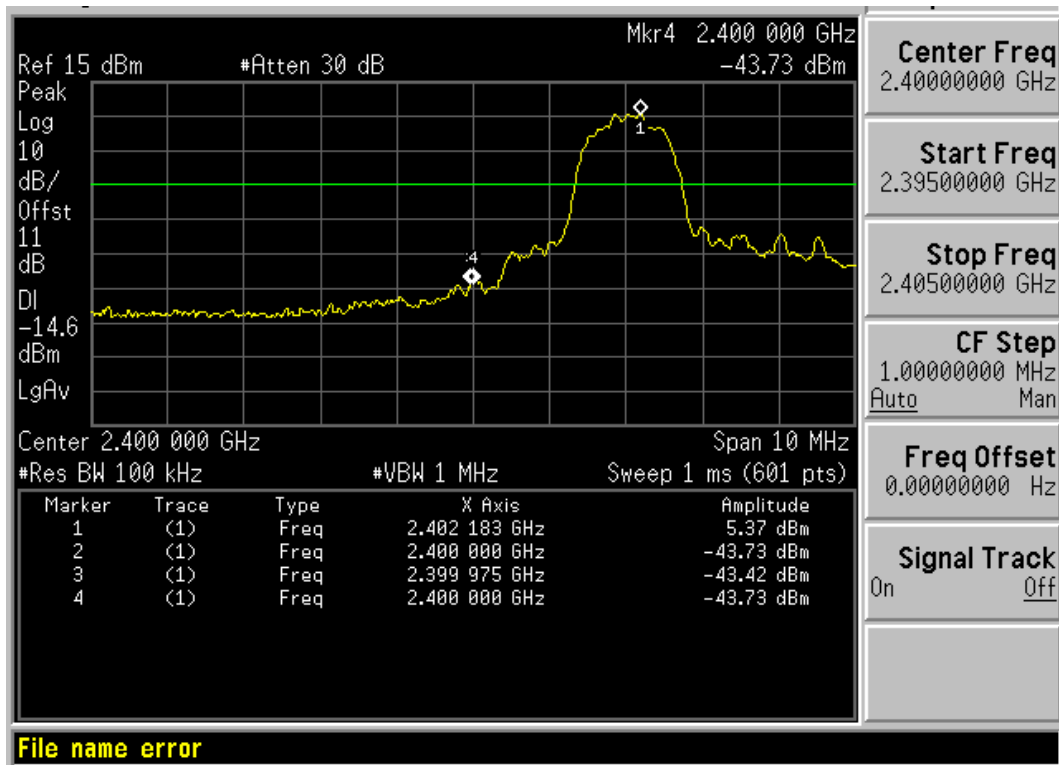
II/4-DQPSK HIGH CHANNEL , SPURIOUS 30MHz~3GHz



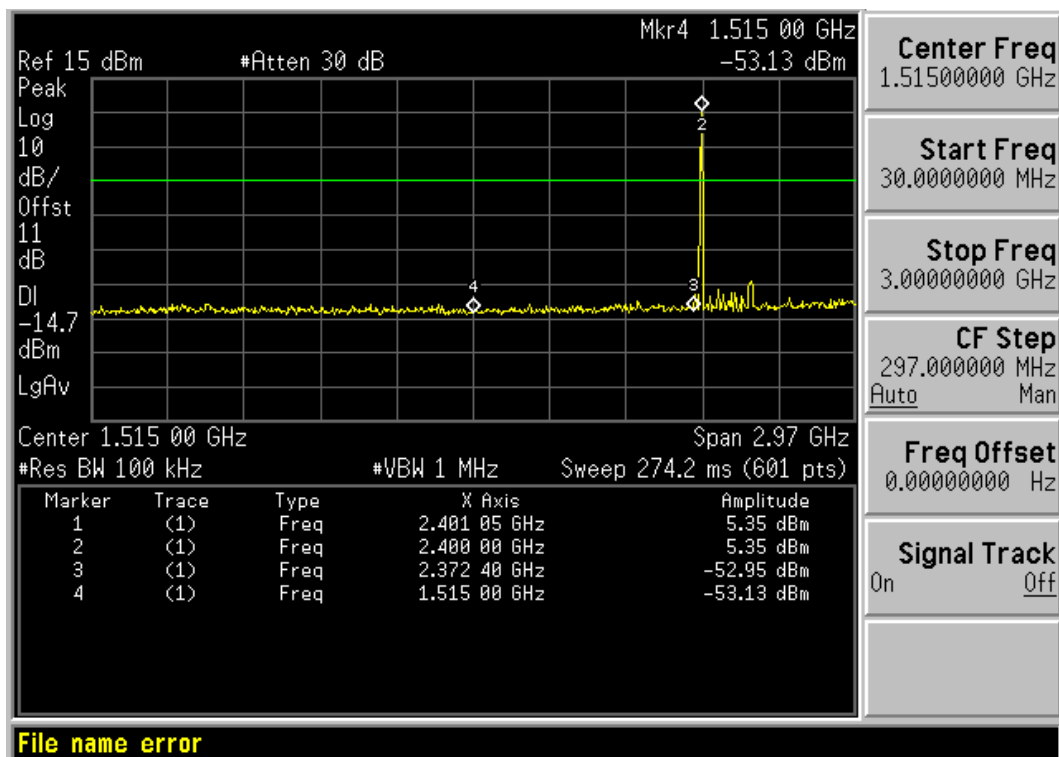
II/4-DQPSK HIGH CHANNEL , SPURIOUS 3GHz~25GHz



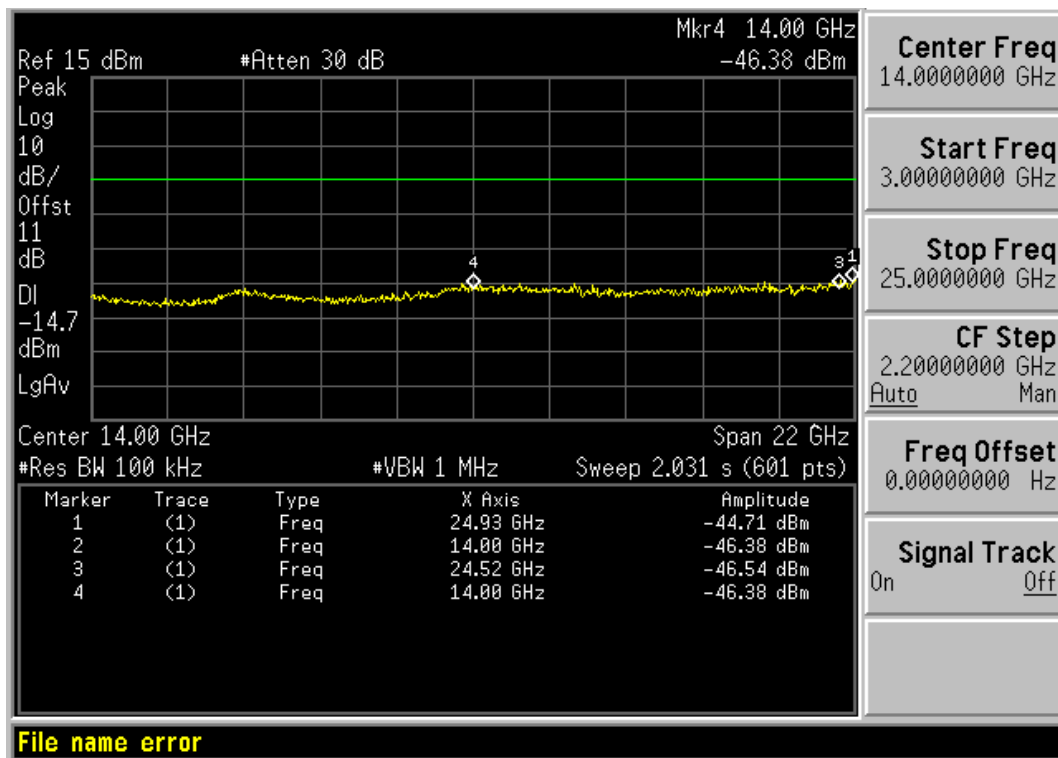
8-DPSK LOW CHANNEL , BANDEDGE



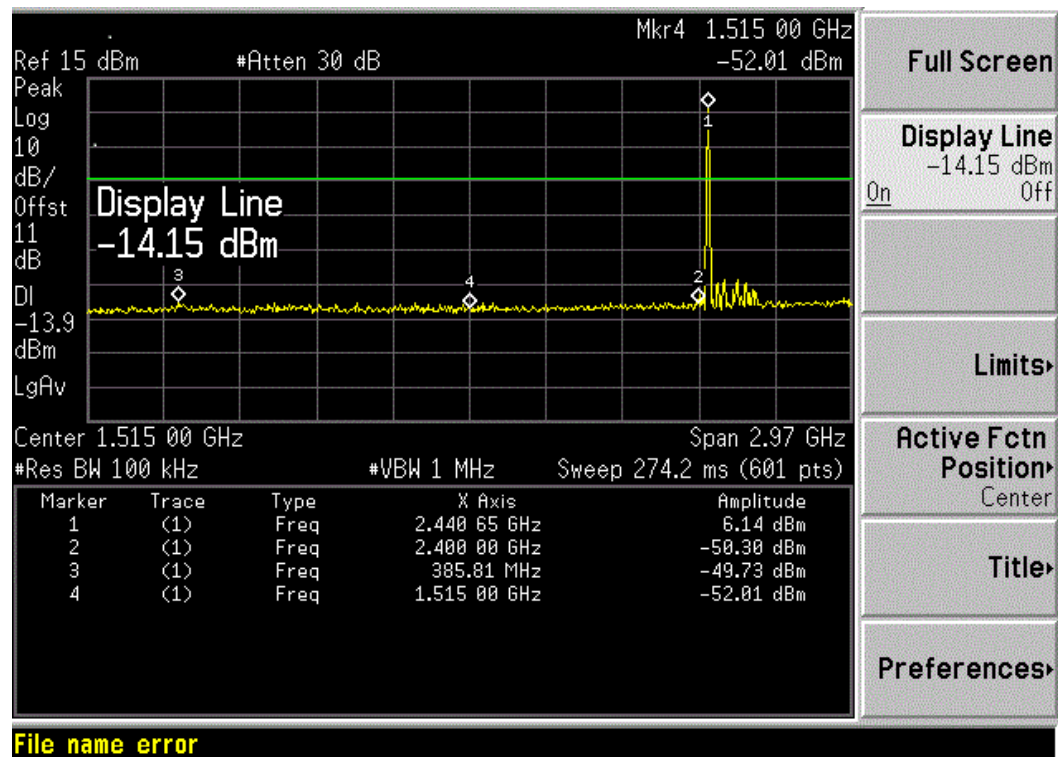
8-DPSK LOW CHANNEL , SPURIOUS 30MHz~3GHz



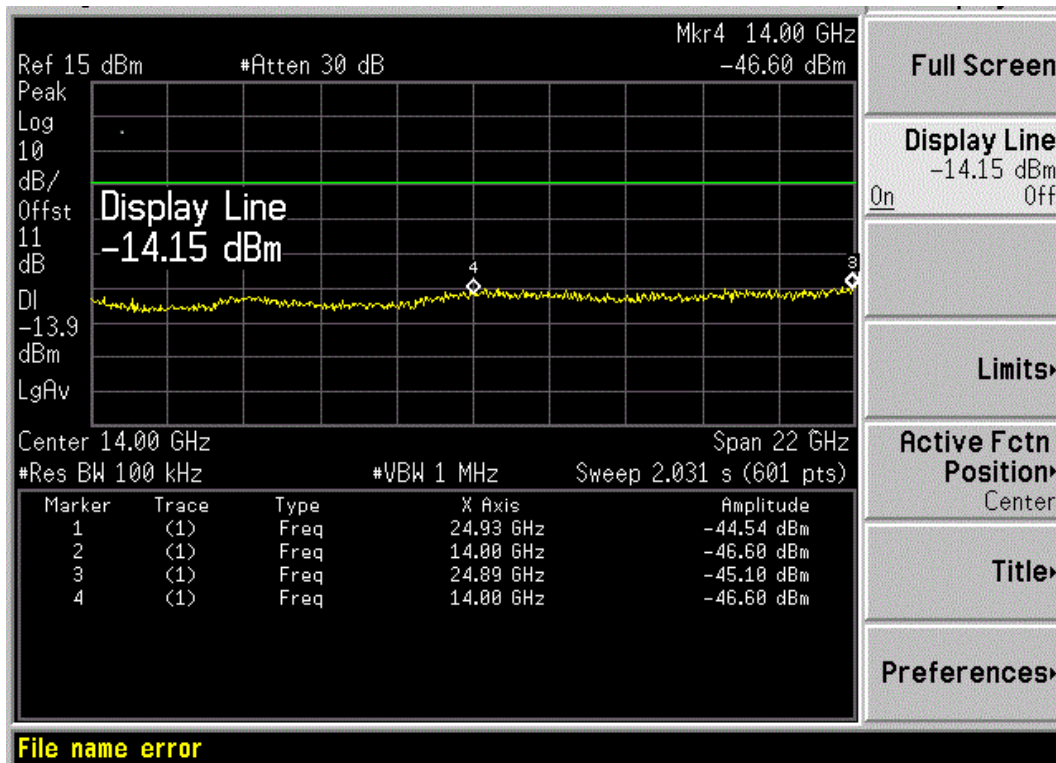
8-DPSK LOW CHANNEL , SPURIOUS 3GHz~25GHz



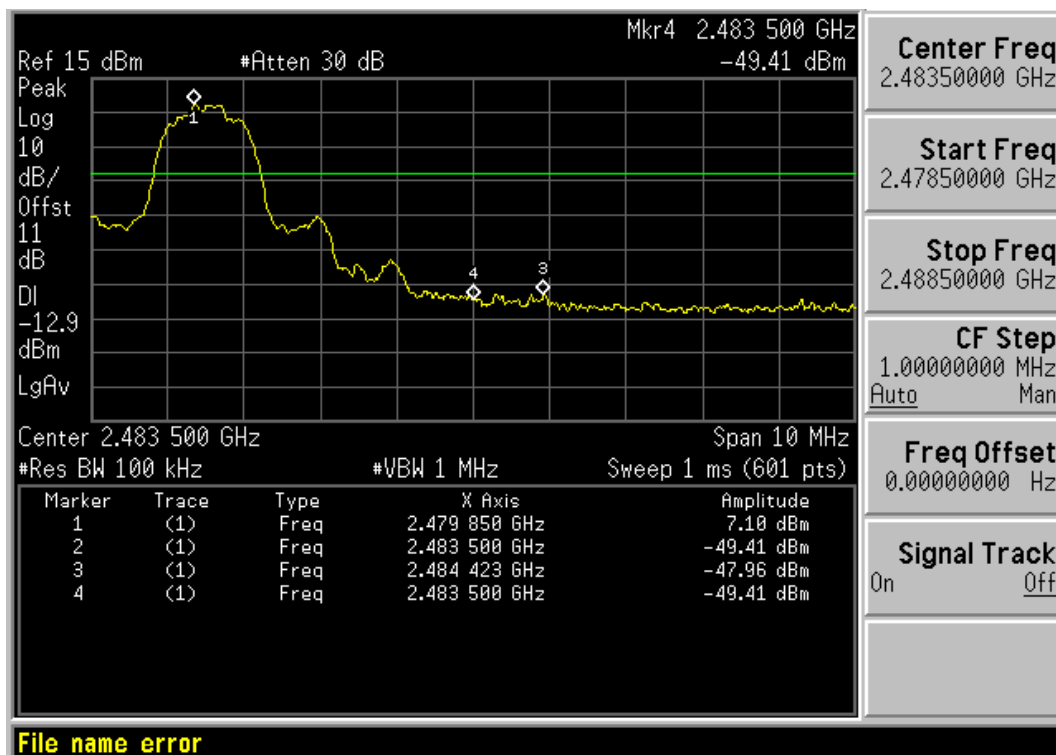
8-DPSK MID CHANNEL , SPURIOUS 30MHz~3GHz



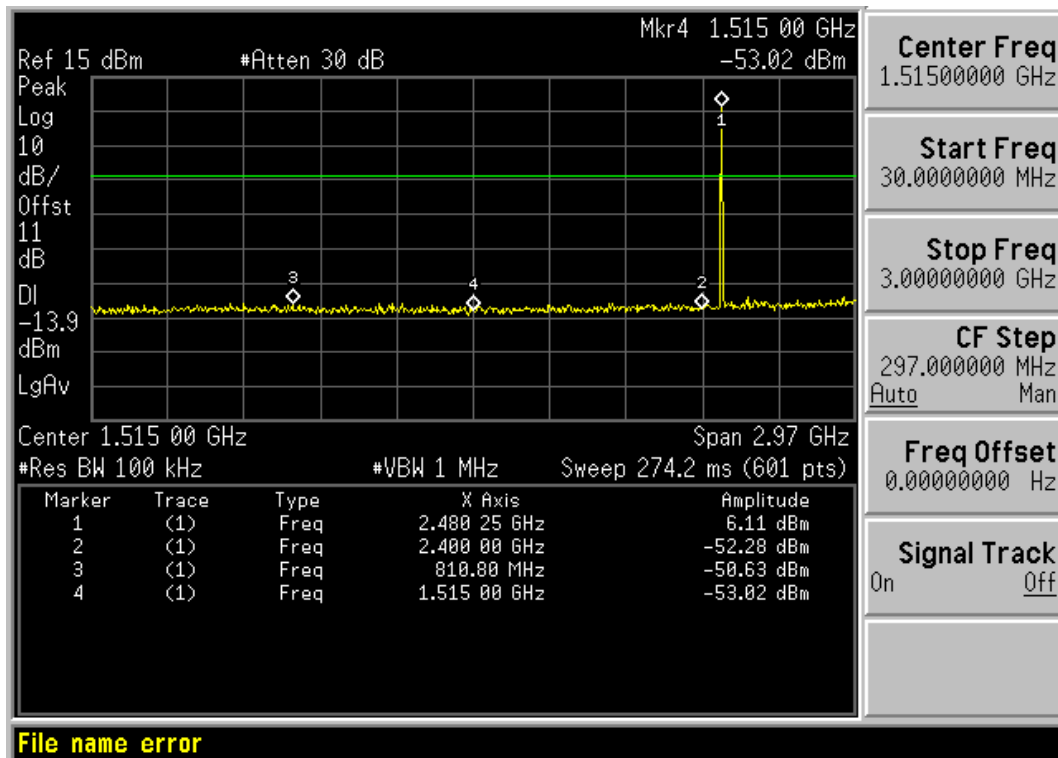
8-DPSK MID CHANNEL , SPURIOUS 3GHz~25GHz



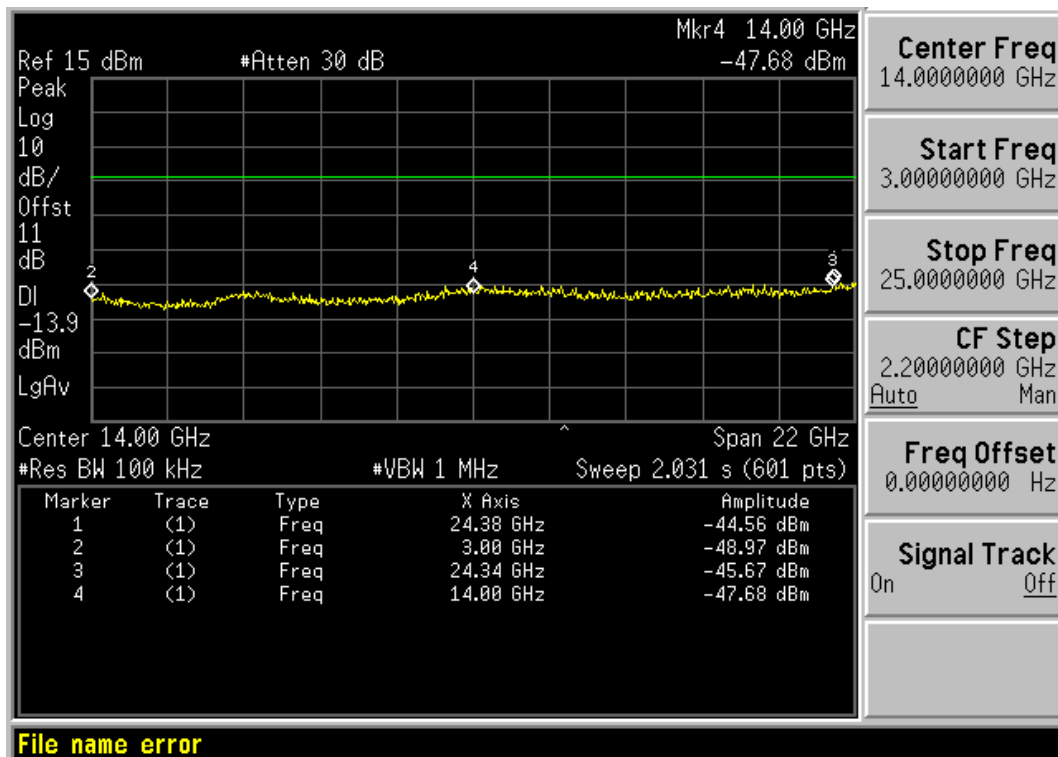
8-DPSK HIGH CHANNEL , BANDEDGE



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



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



A.7 Conducted Emissions

Test Data

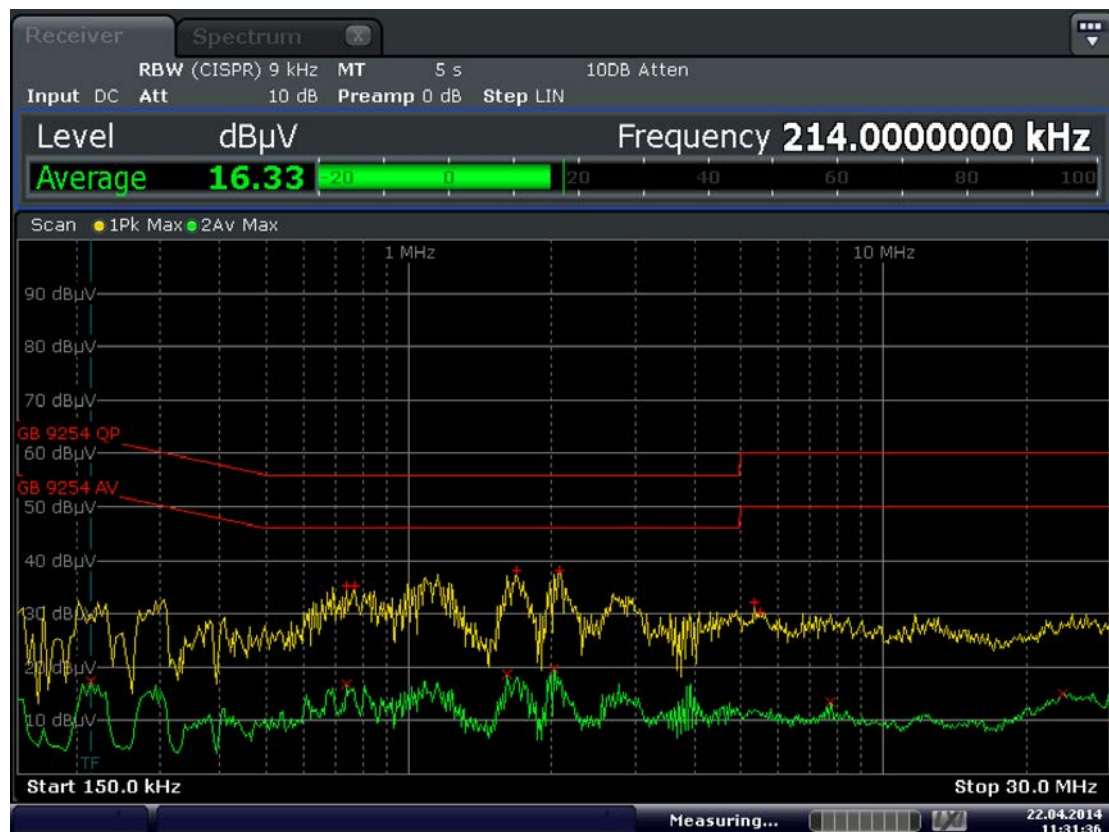
No.	Fre. (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Verdict
1	0.218	26.28	52.89	-26.61	L	AV	PASS
2	0.286	25.52	50.64	-25.12	L	AV	PASS
3	0.314	43.16	59.86	-16.70	L	QP	PASS
4	0.706	42.29	56.00	-13.71	L	QP	PASS
5	1.642	43.13	56.00	-12.87	L	QP	PASS
6	1.990	27.26	46.00	-18.74	L	AV	PASS
7	2.034	42.7	56.00	-13.30	L	QP	PASS
8	2.034	26.9	46.00	-19.10	L	AV	PASS
9	24.066	18.07	50.00	-31.93	L	AV	PASS
10	24.542	34.75	60.00	-25.25	L	QP	PASS
11	26.558	18.17	50.00	-31.83	L	AV	PASS
12	26.758	33.6	60.00	-26.40	L	QP	PASS
No.	Fre. (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Verdict
1	0.214	17.23	53.05	-35.82	N	AV	PASS
2	0.742	35.12	56.00	-20.88	N	QP	PASS
3	0.742	16.75	46.00	-29.25	N	AV	PASS
4	0.770	35.29	56.00	-20.71	N	QP	PASS
5	1.614	18.67	46.00	-27.33	N	AV	PASS
6	1.694	38.01	56.00	-17.99	N	QP	PASS
7	2.026	19.75	46.00	-26.25	N	AV	PASS
8	2.078	38.03	56.00	-17.97	N	QP	PASS
9	5.342	32.06	60.00	-27.94	N	QP	PASS
10	5.482	30.37	60.00	-29.63	N	QP	PASS
11	7.722	13.58	50.00	-36.42	N	AV	PASS
12	23.846	15.14	50.00	-34.86	N	AV	PASS

Test Plots

PHASE L



PHASE N

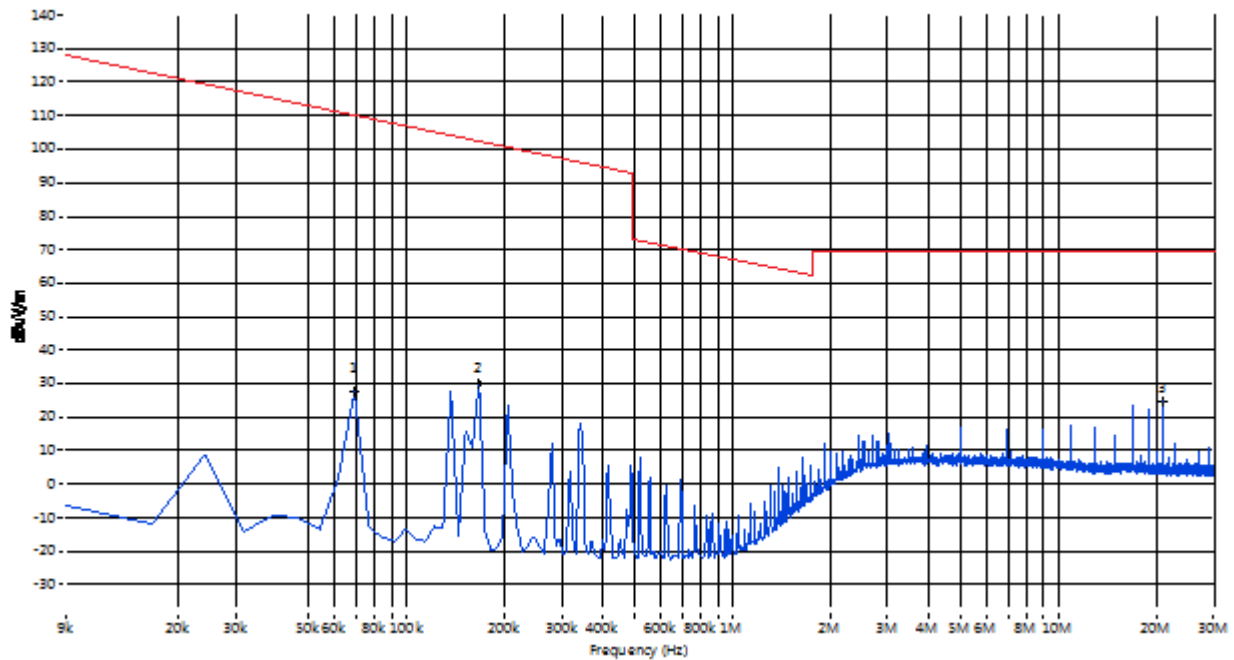


A.8 Radiated Emission

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.

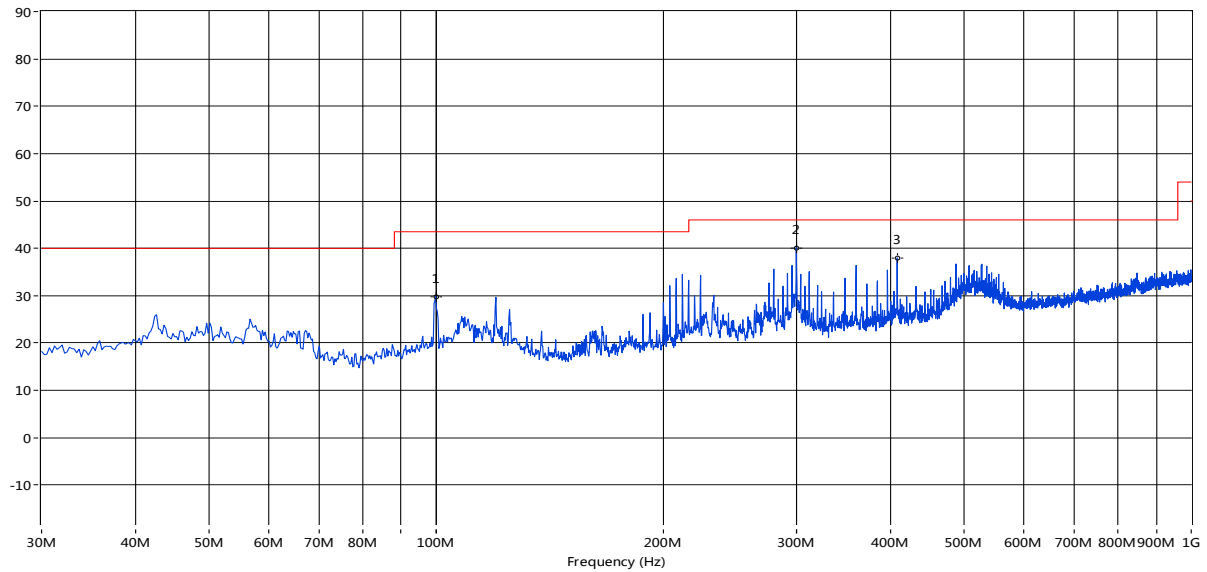
The worst data of 9 kHz to 30MHz

Below 30MHz



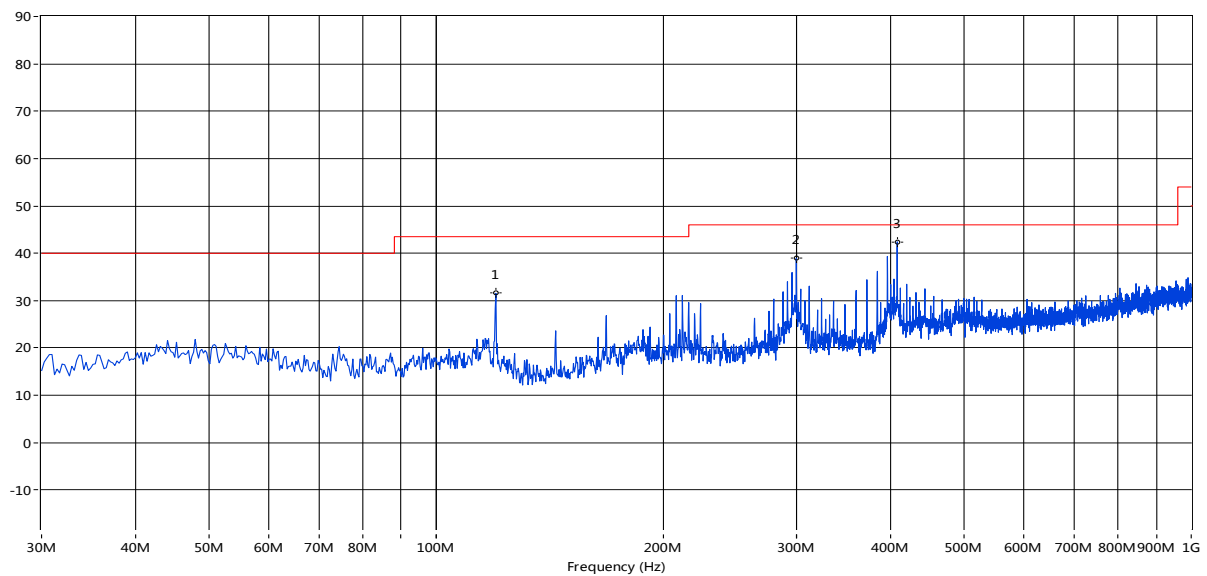
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Verdict
0.069	28.74	--	--	--	110.8	--	320.2	Pass
0.166	31.23	--	--	--	103.2	--	360	Pass
20.997	25.14	--	--	--	69.5	--	95.5	Pass

30MHz to 1GHz, ANT V



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
143.947	34.32	--	--	--	43.5	--	349.7	Vertical	Pass
233.164	29.41	--	--	--	46.0	--	-0.0	Vertical	Pass
299.593	28.91	--	--	--	46.0	--	-0.0	Vertical	Pass

30MHz to 1GHz, ANT H

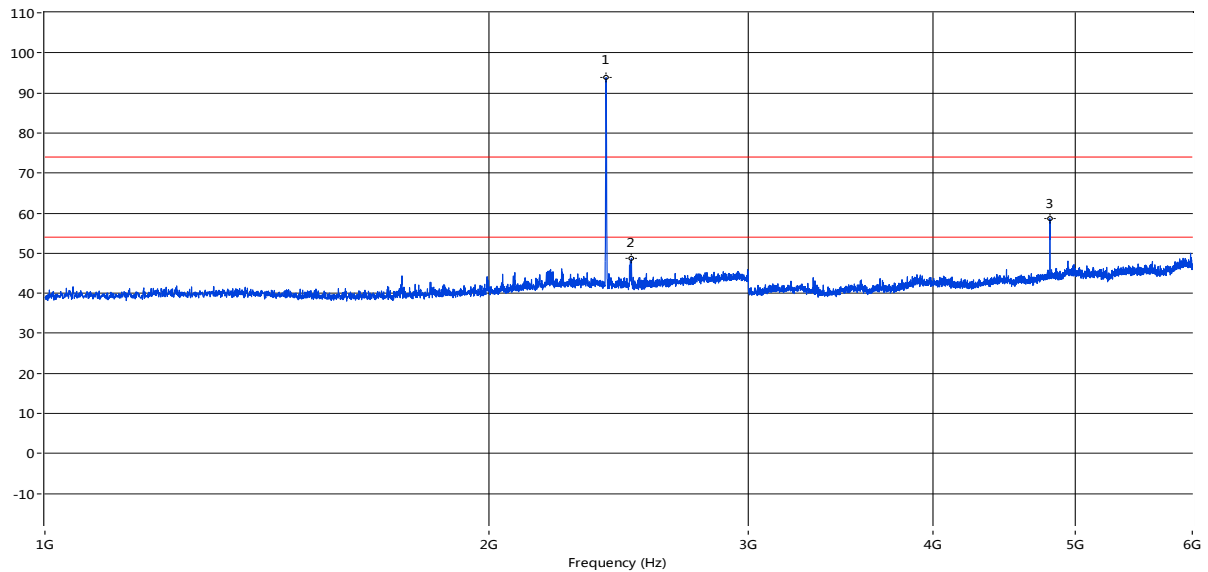


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
119.945	31.54	--	--	--	43.5	--	315.9	Horizontal	Pass
299.835	38.98	--	--	--	46.0	--	112.7	Horizontal	Pass
407.963	42.40	--	--	--	46.0	--	229.1	Horizontal	Pass

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

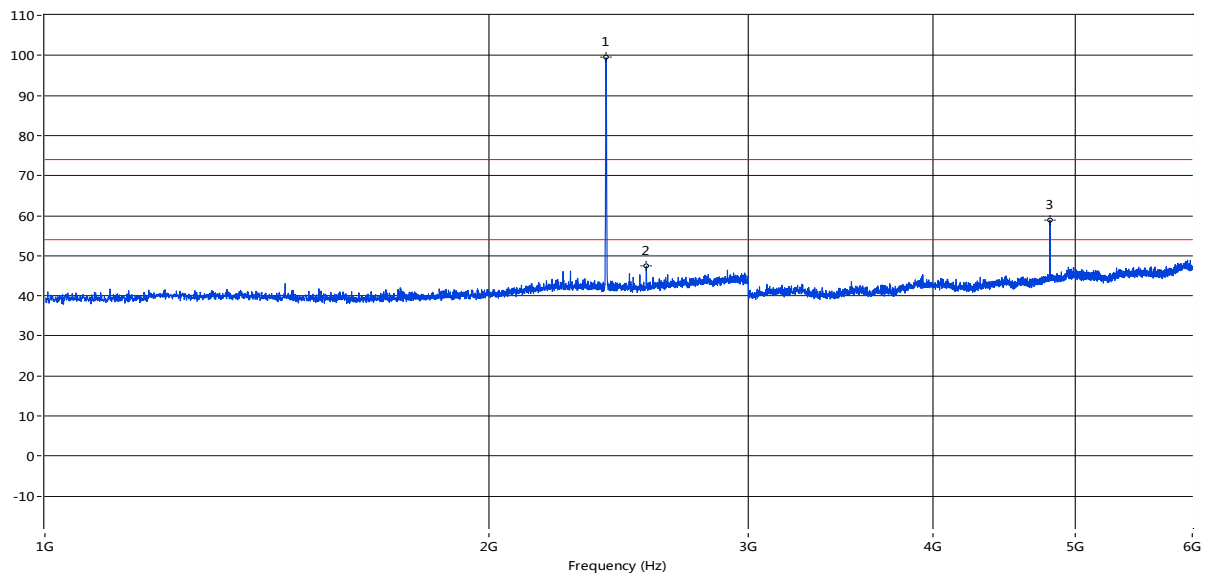
Test Data and Plots(30MHz ~ 10th Harmonic)

GFSK LOW CHANNEL 1GHz to 6GHz, ANT V



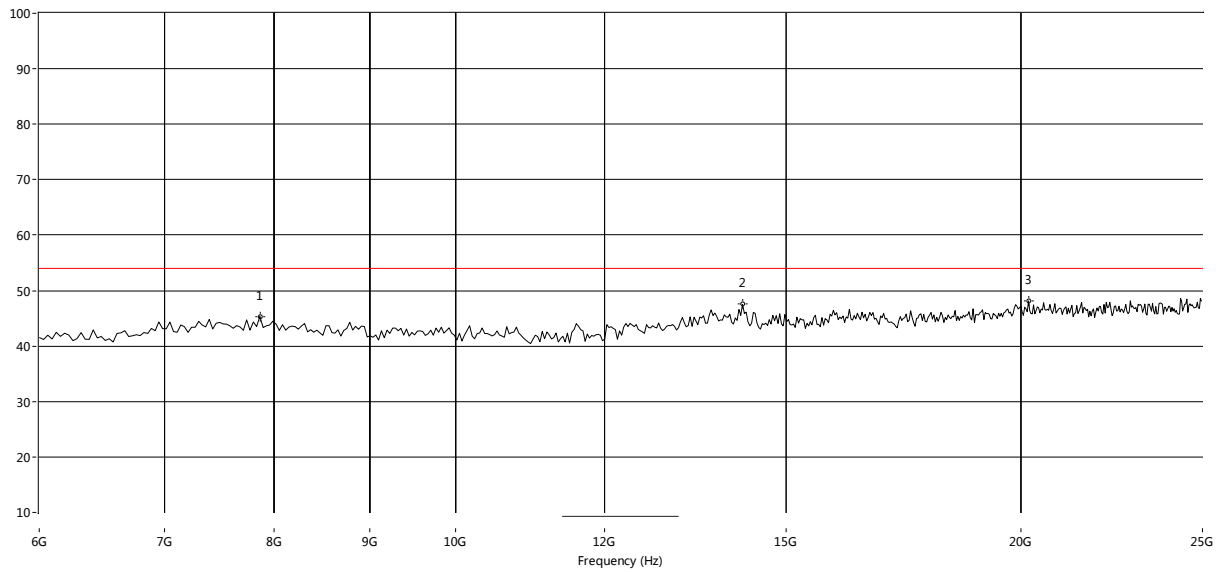
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2401.650	93.76	--	--	74.0	--	54.0	228.6	Vertical	--
2499.125	48.67	--	--	74.0	--	54.0	136.5	Vertical	Pass
4803.299	59.99	--	53.20	74.0	--	54.0	40.9	Vertical	Pass

GFSK LOW CHANNEL 1GHz to 6GHz, ANT H



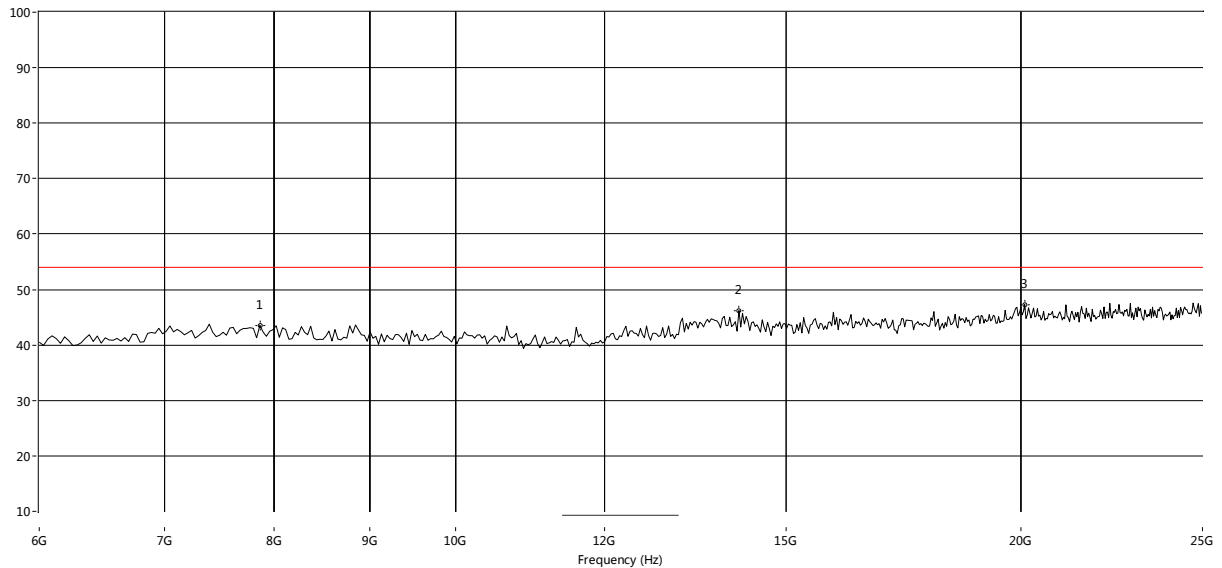
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2402.149	99.46	--	--	74.0	--	54.0	293.8	Horizontal	--
2558.110	47.43	--	--	74.0	--	54.0	291.0	Horizontal	Pass
4804.049	59.96	--	53.17	74.0	--	54.0	276.2	Horizontal	Pass

GFSK LOW CHANNEL 6GHz to 25GHz, ANT V



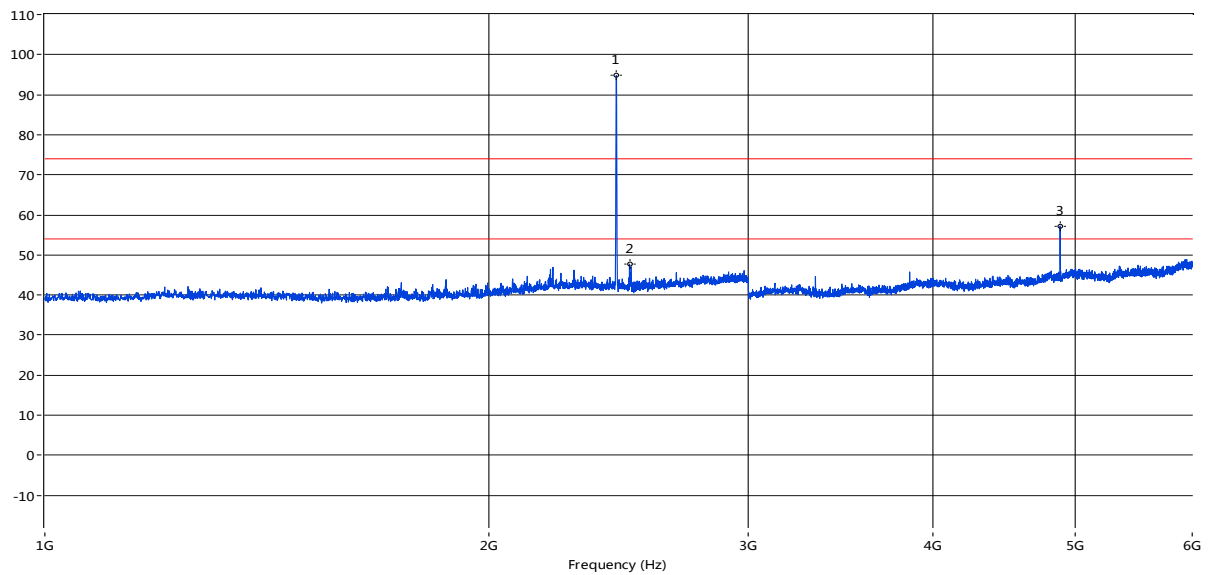
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	45.34	54.0	8.7	0.0	Vertical	PASS
14219.634	47.54	54.0	6.5	0.0	Vertical	PASS
20194.676	48.15	54.0	5.9	0.0	Vertical	PASS

GFSK LOW CHANNEL 6GHz to 25GHz, ANT H



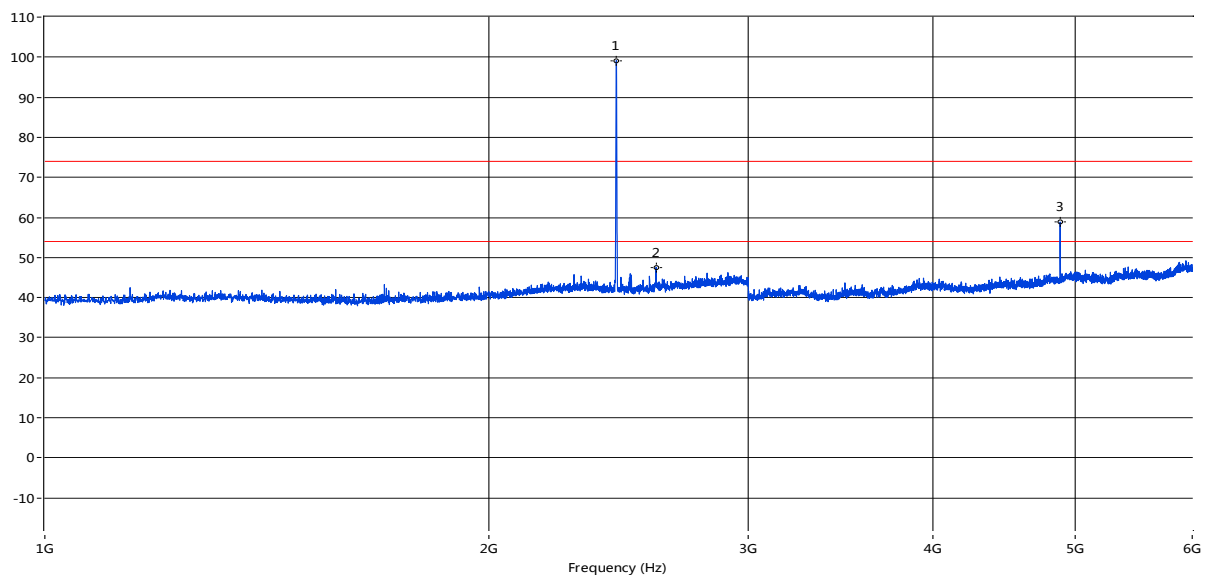
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	43.53	54.0	10.5	0.0	Horizontal	PASS
14156.406	46.22	54.0	7.8	0.0	Horizontal	PASS
20099.834	47.31	54.0	6.7	0.0	Horizontal	PASS

GFSK MID CHANNEL 1GHz to 6GHz, ANT V



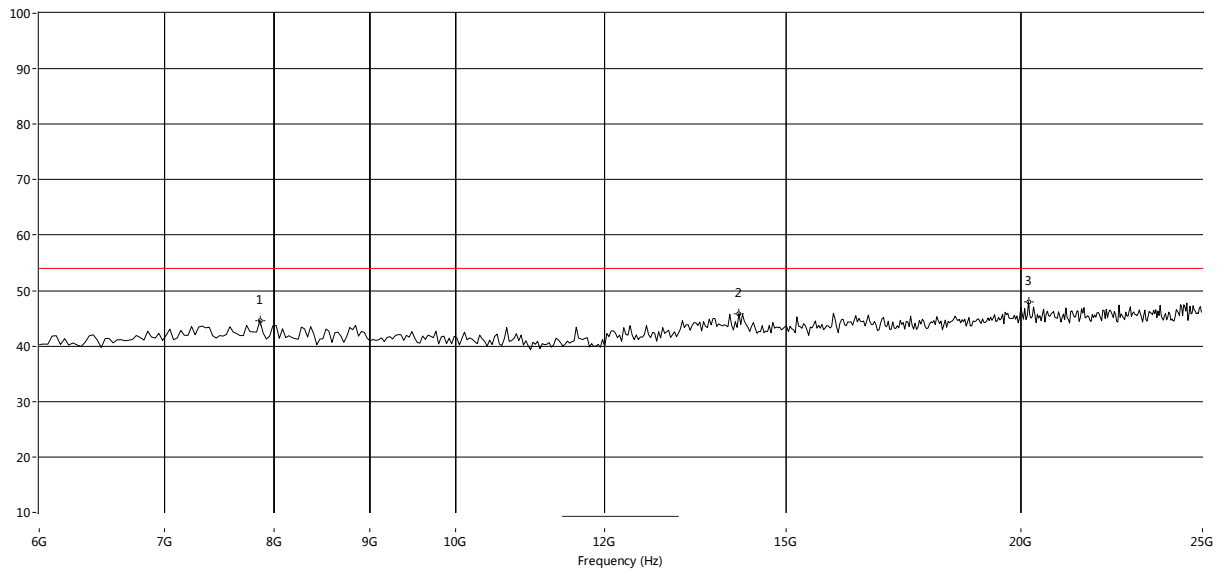
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2440.640	94.77	--	--	74.0	--	54.0	228.3	Vertical	--
2492.127	47.73	--	--	74.0	--	54.0	67.4	Vertical	Pass
4881.280	58.39	--	51.81	74.0	--	54.0	37.9	Vertical	Pass

GFSK MID CHANNEL 1GHz to 6GHz, ANT H



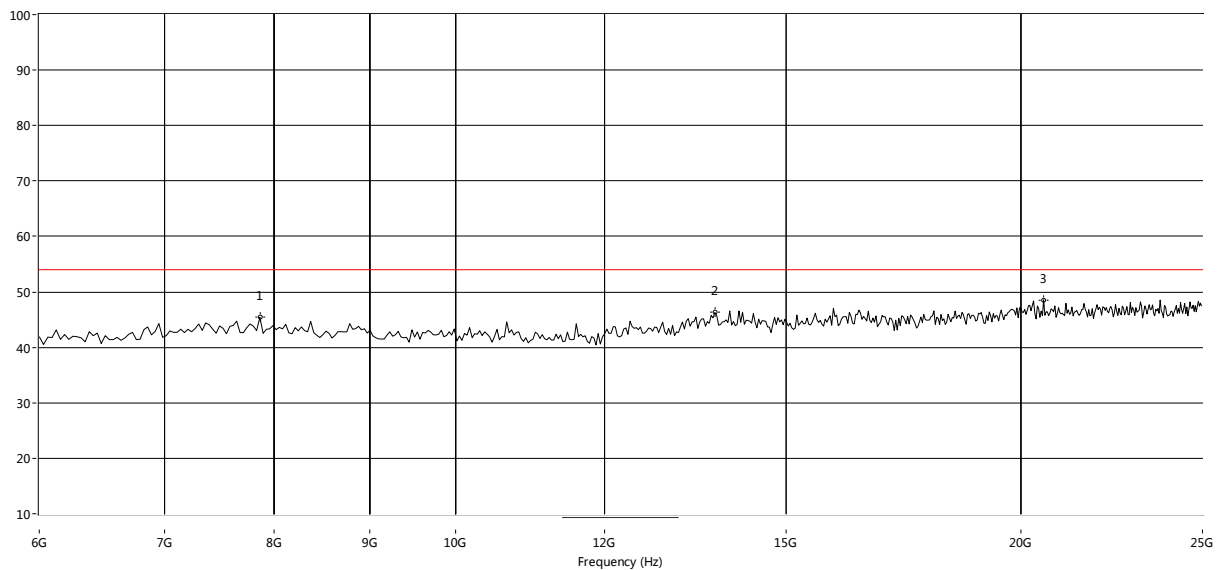
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2440.640	99.12	--	--	74.0	--	54.0	291.2	Horizontal	--
2597.101	47.57	--	--	74.0	--	54.0	278.7	Horizontal	Pass
4882.029	59.37	--	51.55	74.0	--	54.0	278.1	Horizontal	Pass

GFSK MID CHANNEL 6GHz to 25GHz, ANT V



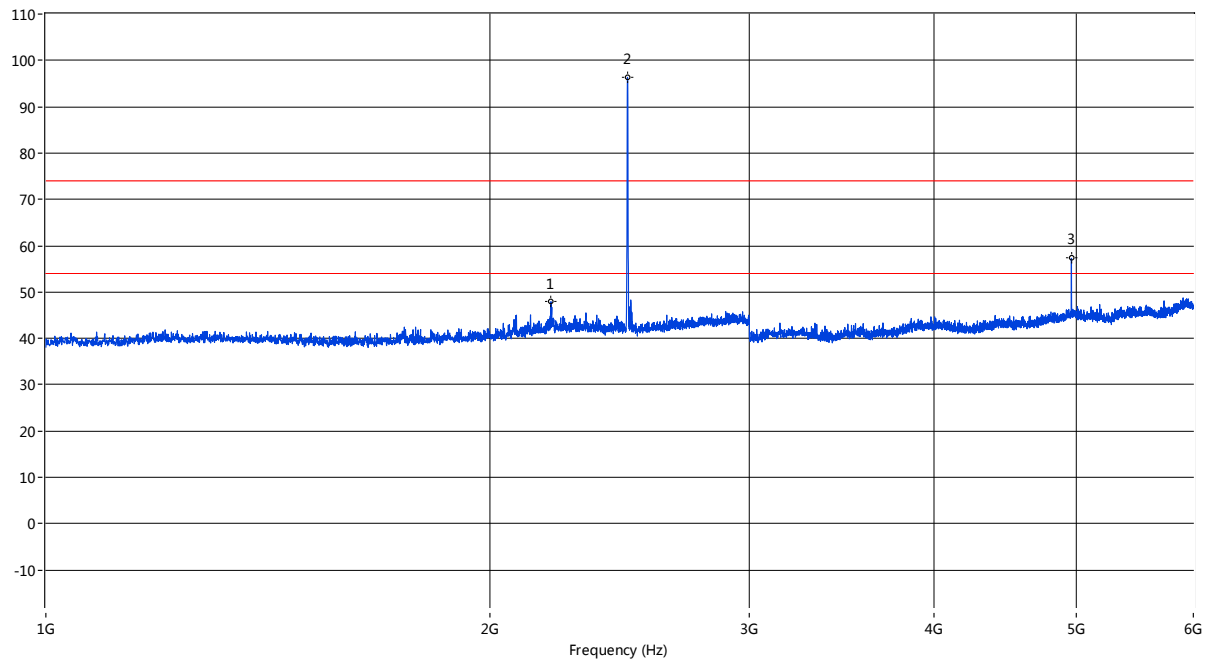
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.63	54.0	9.4	0.0	Horizontal	PASS
14156.406	45.86	54.0	8.1	0.0	Horizontal	PASS
20194.676	47.99	54.0	6.0	0.0	Horizontal	PASS

GFSK MID CHANNEL 6GHz to 25GHz, ANT H



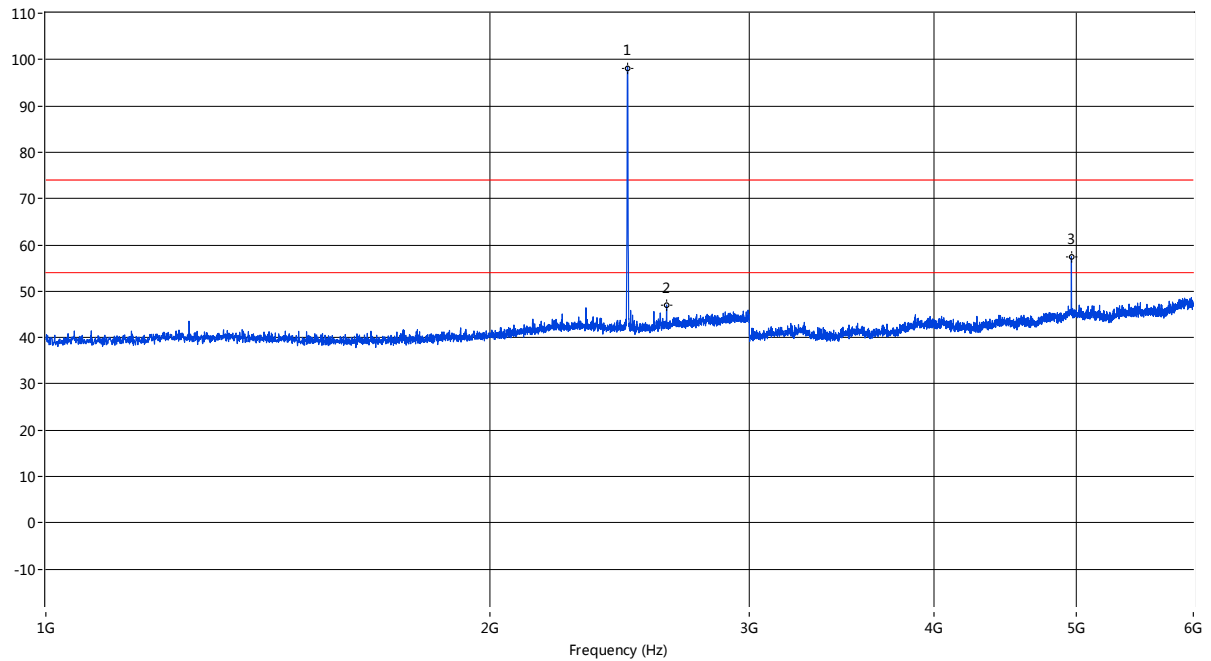
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	45.41	54.0	8.6	0.0	Vertical	PASS
13745.424	46.28	54.0	7.7	0.0	Vertical	PASS
20574.043	48.56	54.0	5.4	0.0	Vertical	PASS

GFSK HIGH CHANNEL 1GHz to 6GHz, ANT V



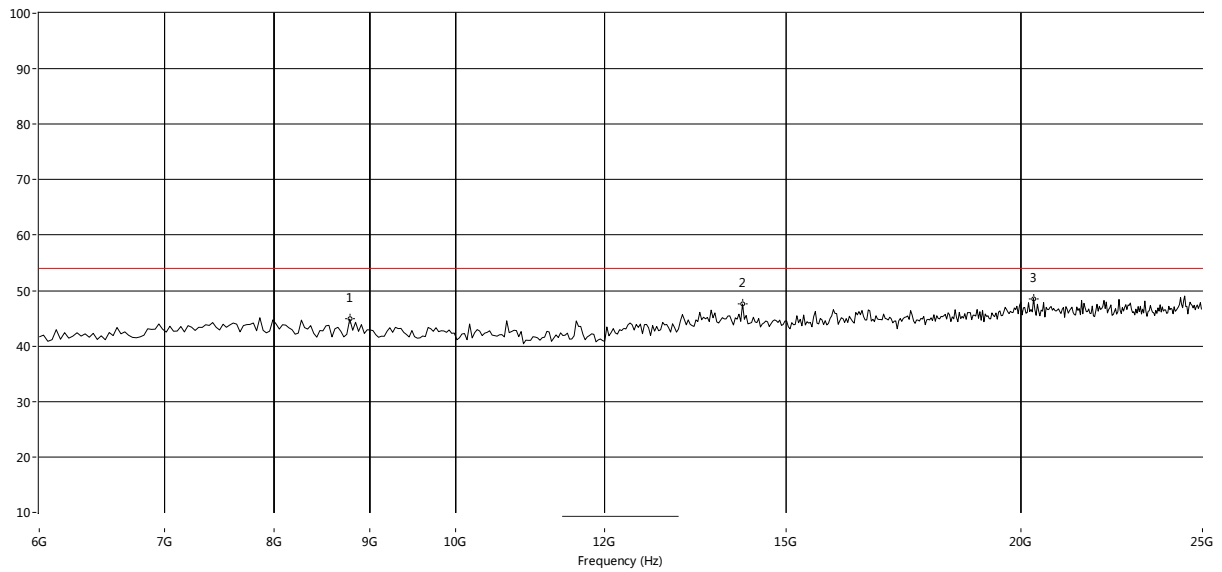
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2200.700	47.98	--	--	74.0	--	54.0	161.4	Vertical	Pass
2479.630	96.30	--	--	74.0	--	54.0	227.4	Vertical	--
4960.010	58.50	--	52.66	74.0	--	54.0	23.4	Vertical	Pass

GFSK HIGH CHANNEL 1GHz to 6GHz, ANT H



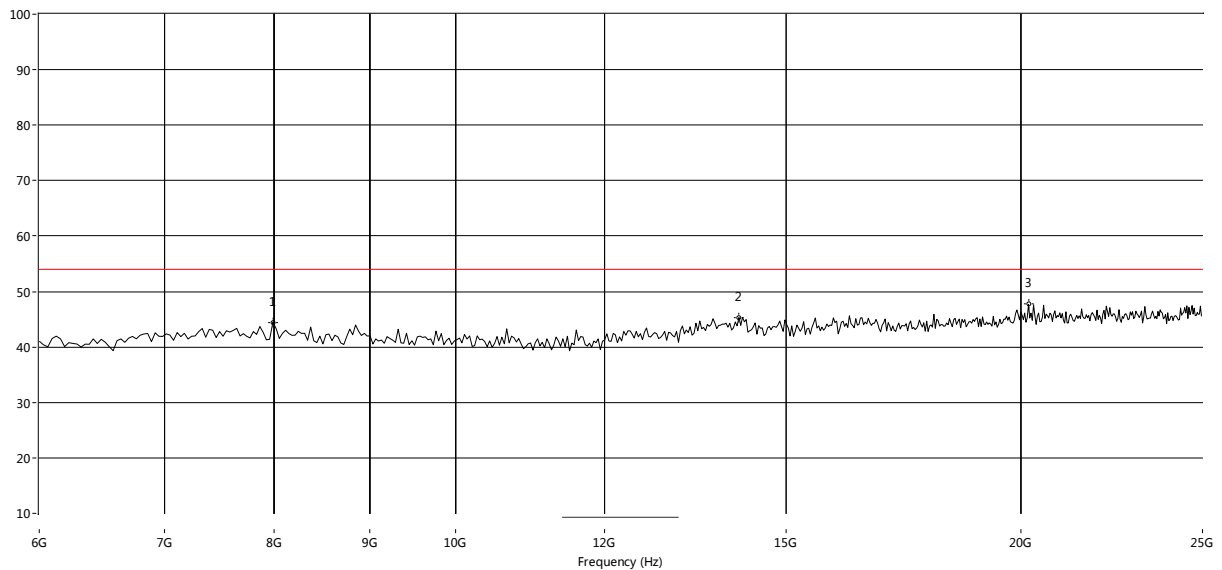
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2480.630	98.05	--	--	74.0	--	54.0	287.3	Horizontal	--
2635.591	47.00	--	--	74.0	--	54.0	247.6	Horizontal	Pass
4959.260	57.98	--	49.32	74.0	--	54.0	284.8	Horizontal	Pass

GFSK HIGH CHANNEL 6GHz to 25GHz, ANT V



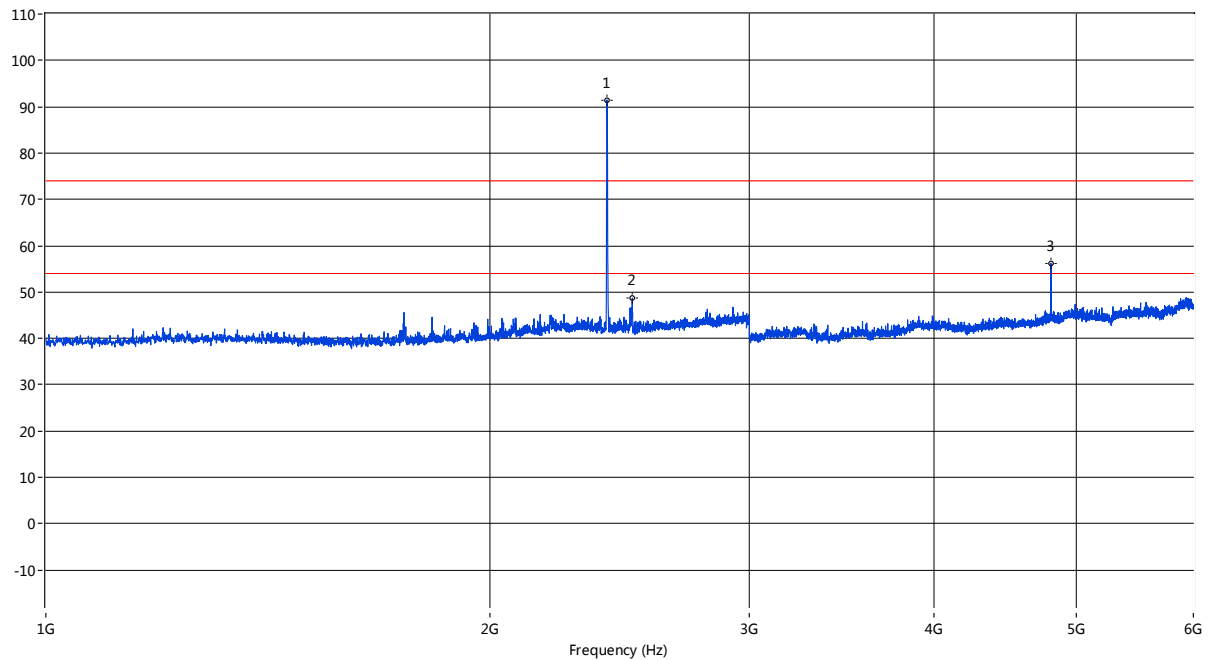
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
8782.030	44.85	54.0	9.1	0.0	Vertical	PASS
14219.634	47.59	54.0	6.4	0.0	Vertical	PASS
20321.131	48.56	54.0	5.4	0.0	Vertical	PASS

GFSK HIGH CHANNEL 6GHz to 25GHz, ANT H



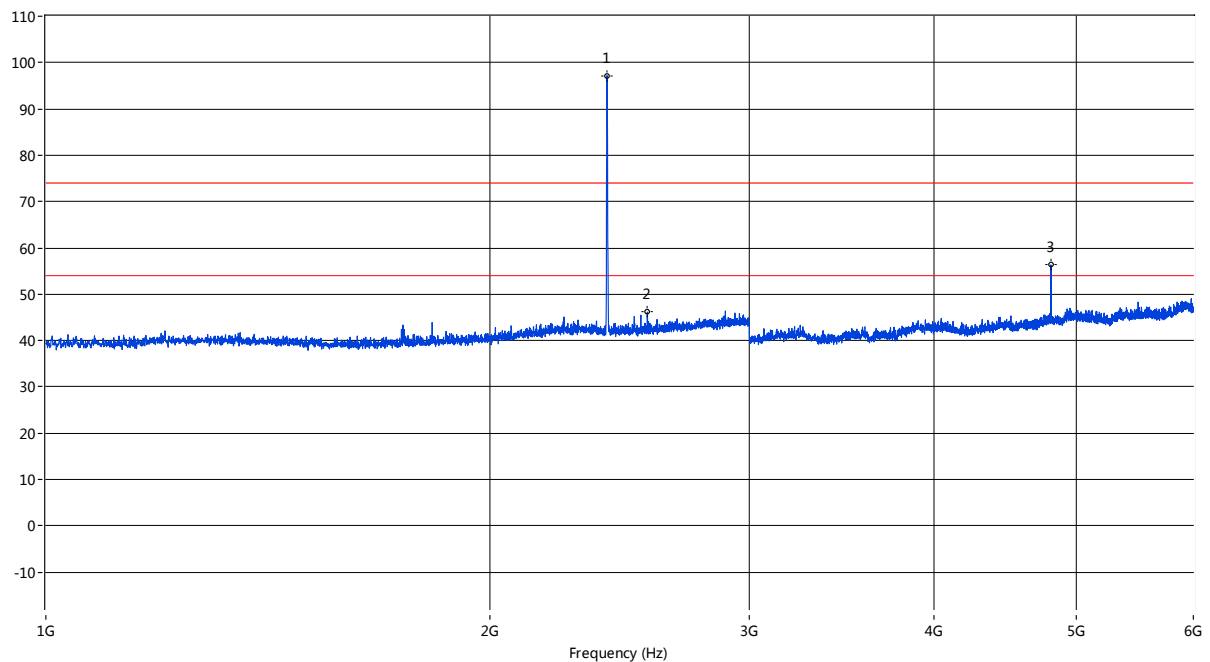
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	44.48	54.0	9.5	0.0	Horizontal	PASS
14156.406	45.33	54.0	8.7	0.0	Horizontal	PASS
20194.676	47.70	54.0	6.3	0.0	Horizontal	PASS

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



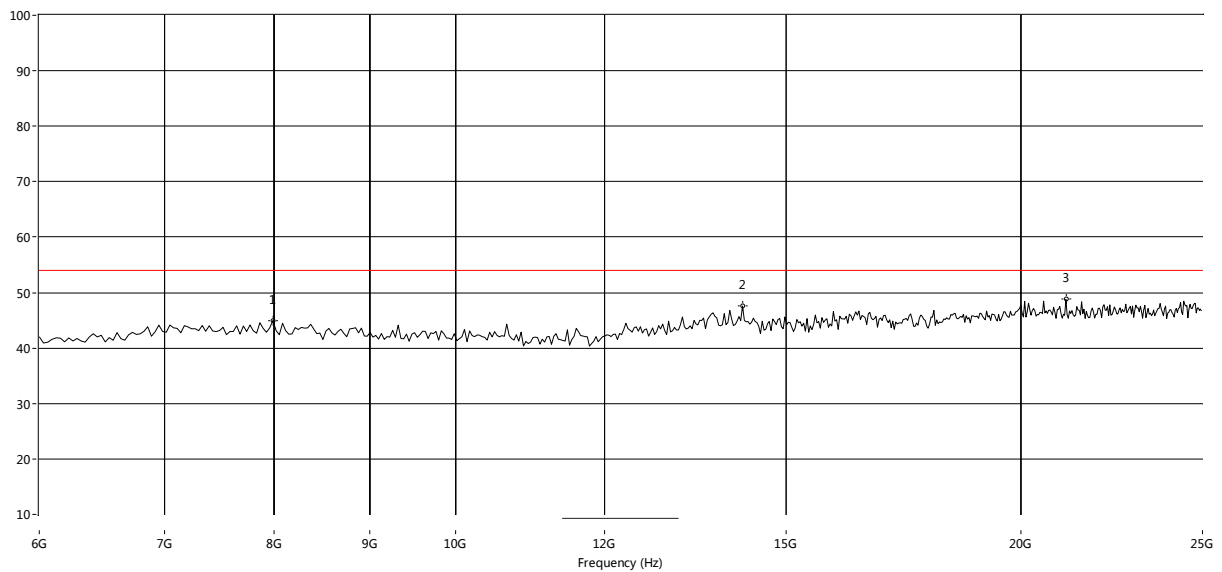
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2401.650	91.45	--	--	74.0	--	54.0	-0.4	Vertical	--
2498.625	48.69	--	--	74.0	--	54.0	137.4	Vertical	Pass
4804.049	57.60	--	48.44	74.0	--	54.0	37.8	Vertical	Pass

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



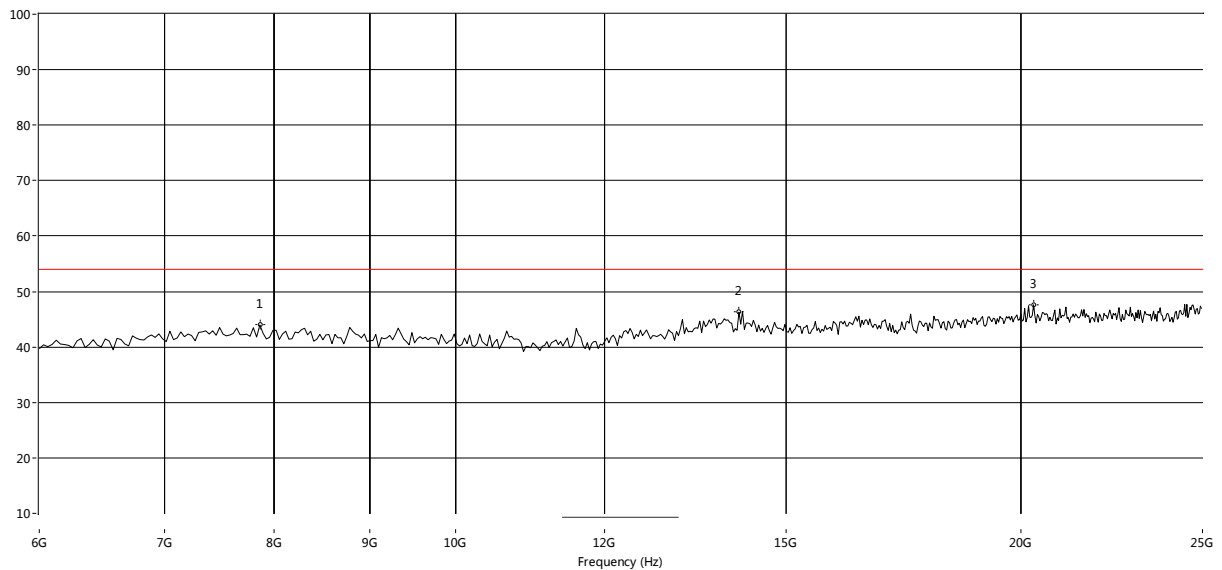
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2401.650	96.54	--	--	74.0	--	54.0	293.4	Horizontal	--
2558.110	46.15	--	--	74.0	--	54.0	301.0	Horizontal	Pass
4804.049	57.71	--	49.83	74.0	--	54.0	356.9	Horizontal	Pass

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



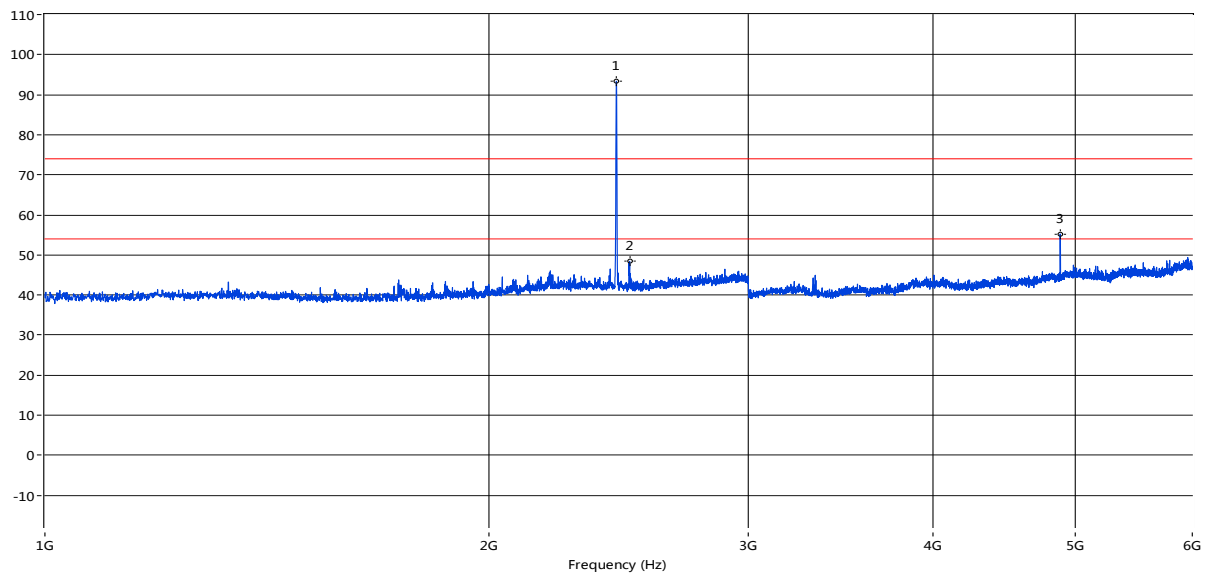
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	44.94	54.0	9.1	0.0	Vertical	PASS
14219.634	47.59	54.0	6.4	0.0	Vertical	PASS
21143.095	48.77	54.0	5.2	0.0	Vertical	PASS

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



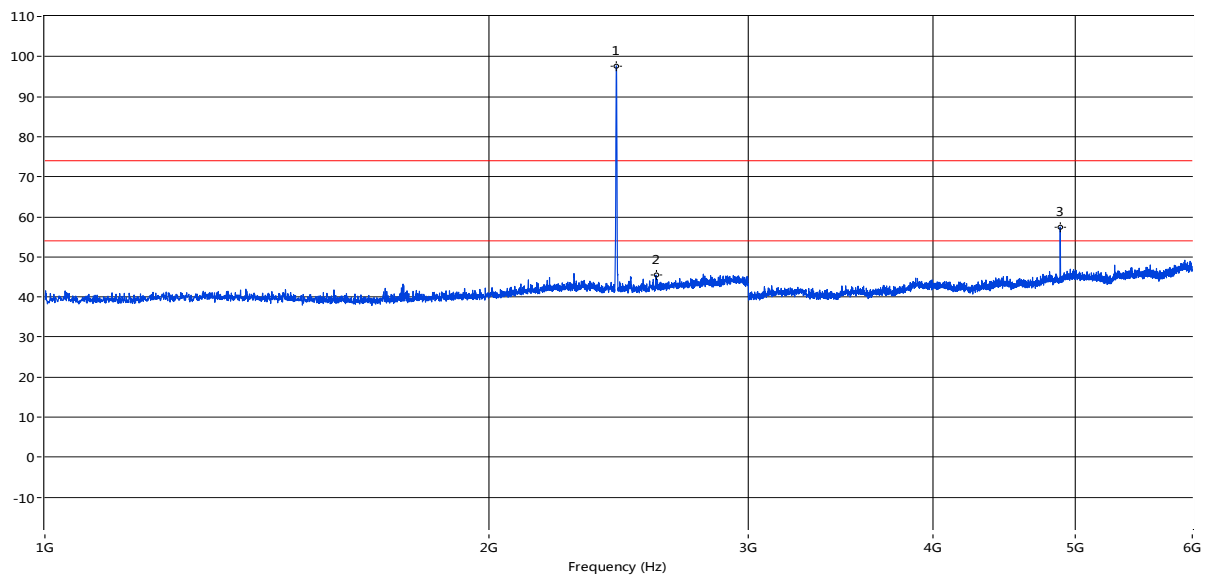
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	43.97	54.0	10.0	0.0	Horizontal	PASS
14156.406	46.28	54.0	7.7	0.0	Horizontal	PASS
20321.131	47.60	54.0	6.4	0.0	Horizontal	PASS

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



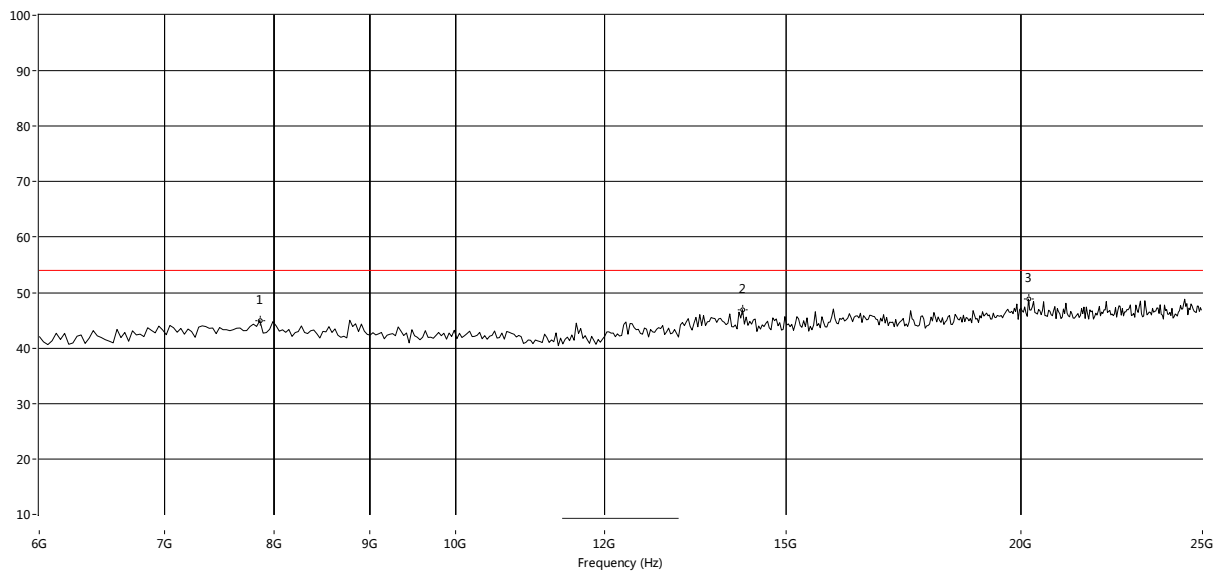
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2440.640	93.37	--	--	74.0	--	54.0	226.4	Vertical	--
2492.127	48.43	--	--	74.0	--	54.0	173.8	Vertical	Pass
4881.280	56.97	--	48.33	74.0	--	54.0	15.6	Vertical	Pass

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



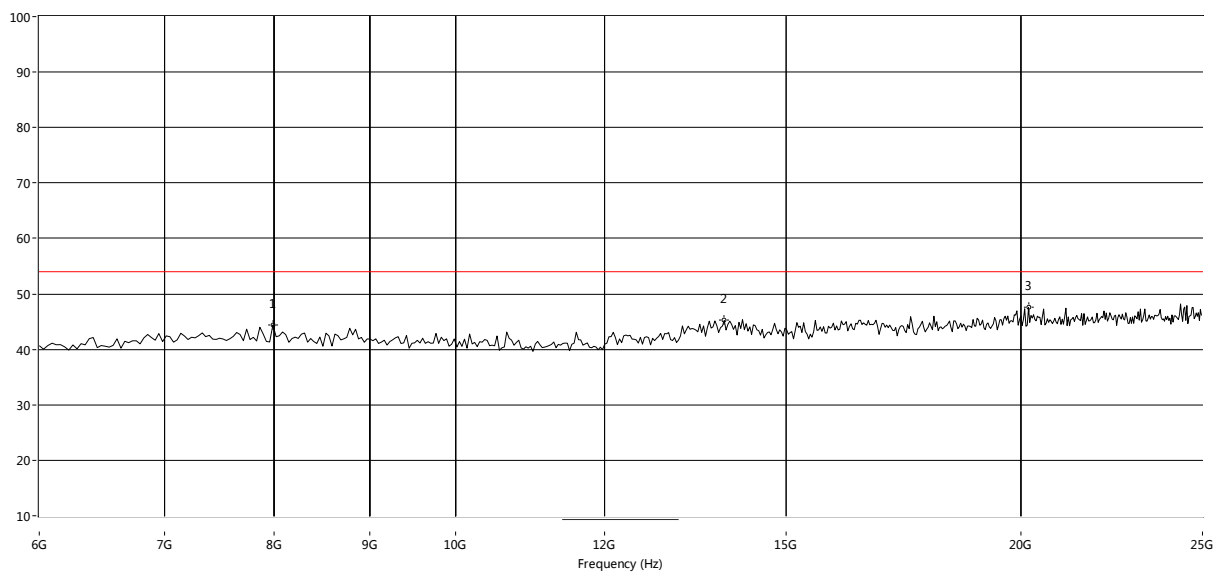
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2440.640	97.69	--	--	74.0	--	54.0	287.7	Horizontal	--
2596.601	45.47	--	--	74.0	--	54.0	265.3	Horizontal	Pass
4882.029	58.71	--	50.44	74.0	--	54.0	280.7	Horizontal	Pass

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



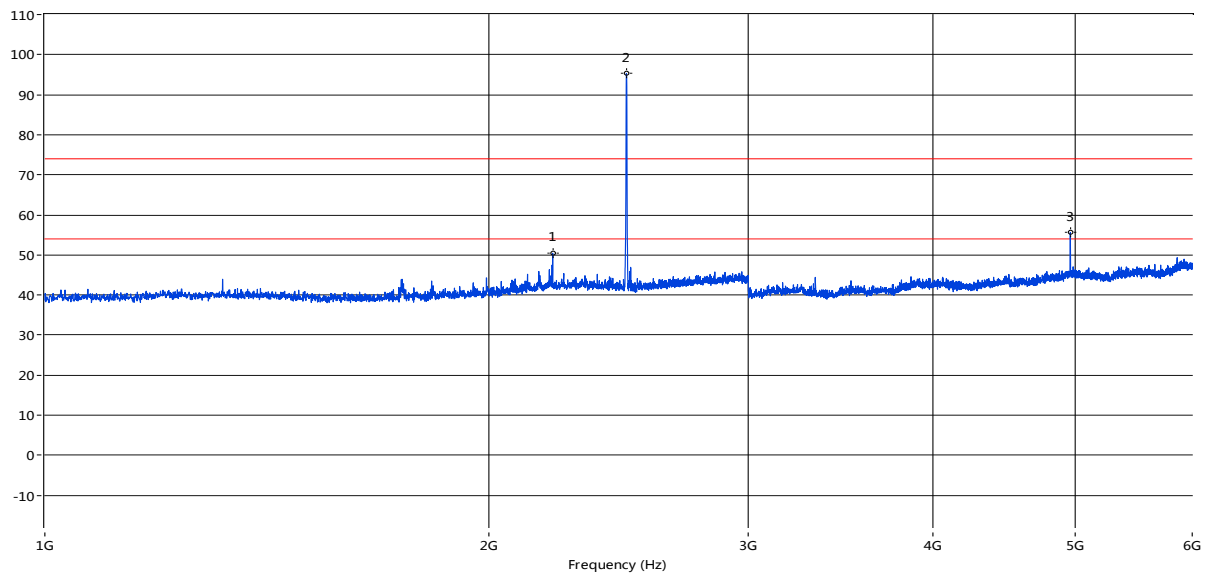
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.96	54.0	9.0	0.0	Vertical	PASS
14219.634	46.92	54.0	7.1	0.0	Vertical	PASS
20194.676	48.84	54.0	5.2	0.0	Vertical	PASS

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



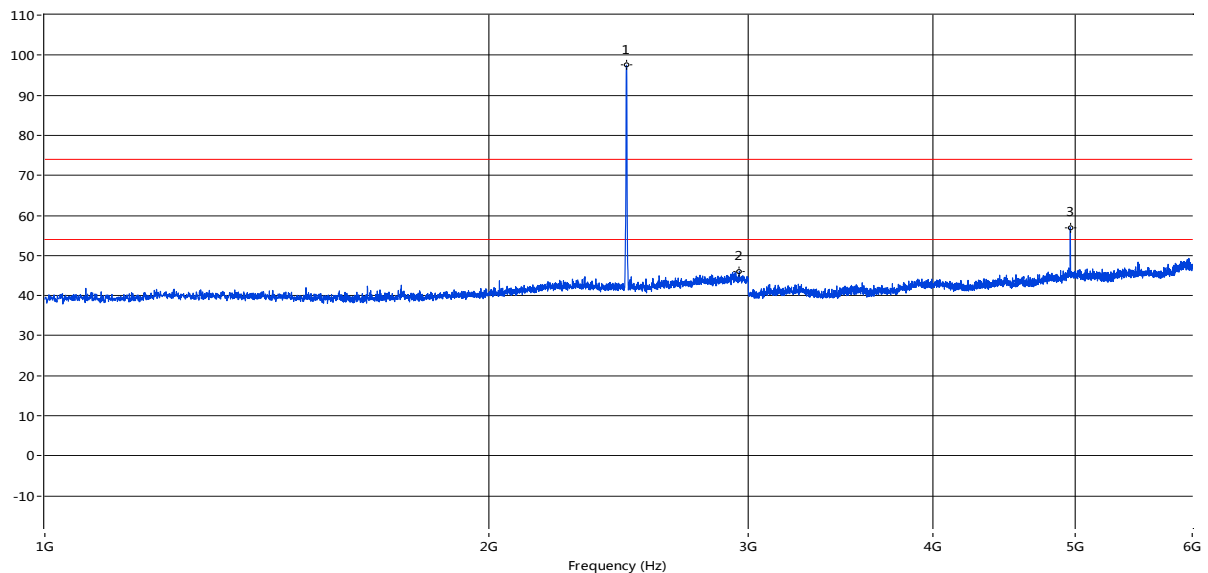
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	44.39	54.0	9.6	0.0	Horizontal	PASS
13903.494	45.20	54.0	8.8	0.0	Horizontal	PASS
20194.676	47.55	54.0	6.5	0.0	Horizontal	PASS

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



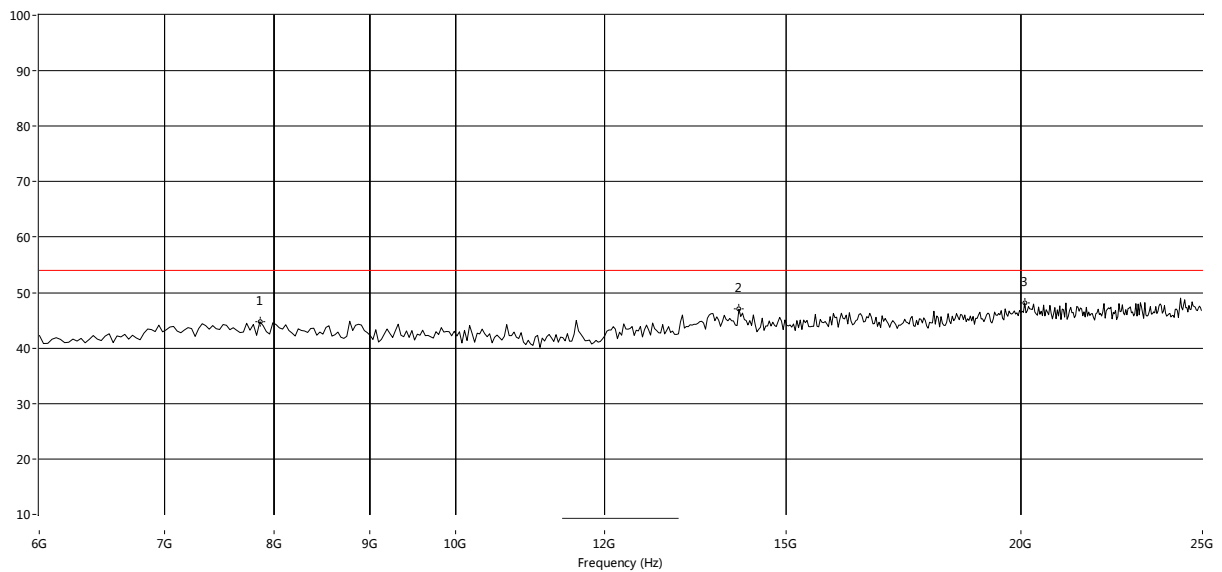
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2210.197	50.46	--	--	74.0	--	54.0	163.9	Vertical	Pass
2479.630	95.32	--	--	74.0	--	54.0	228.7	Vertical	--
4960.010	58.06	--	49.55	74.0	--	54.0	26.3	Vertical	Pass

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



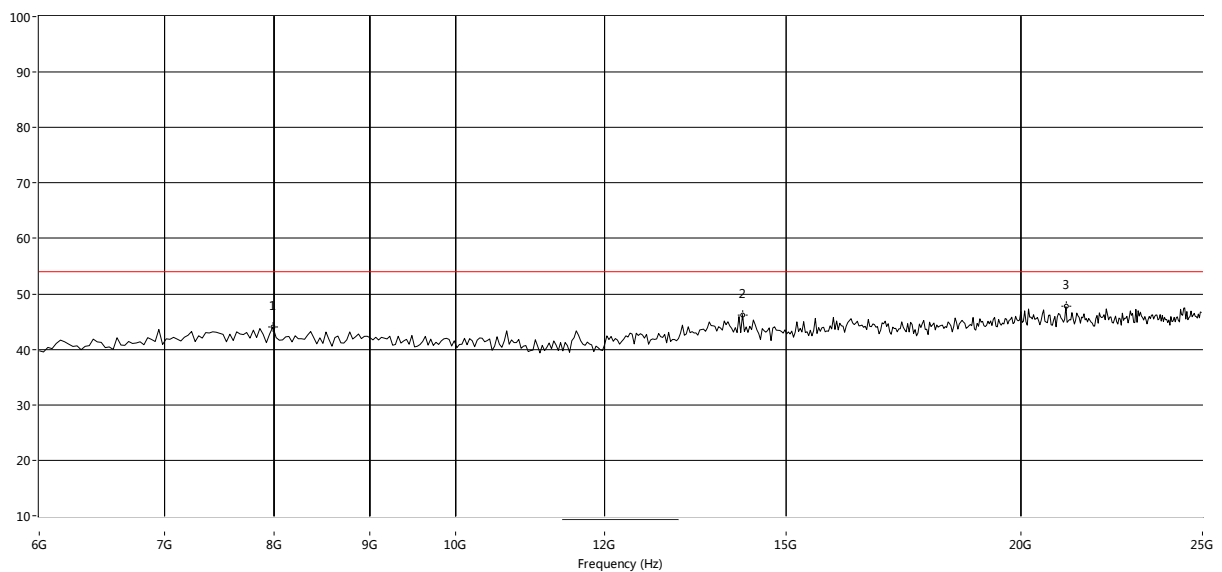
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2480.130	97.53	--	--	74.0	--	54.0	287.3	Horizontal	--
2958.010	46.08	--	--	74.0	--	54.0	269.8	Horizontal	Pass
4959.260	58.26	--	49.28	74.0	--	54.0	277.8	Horizontal	Pass

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



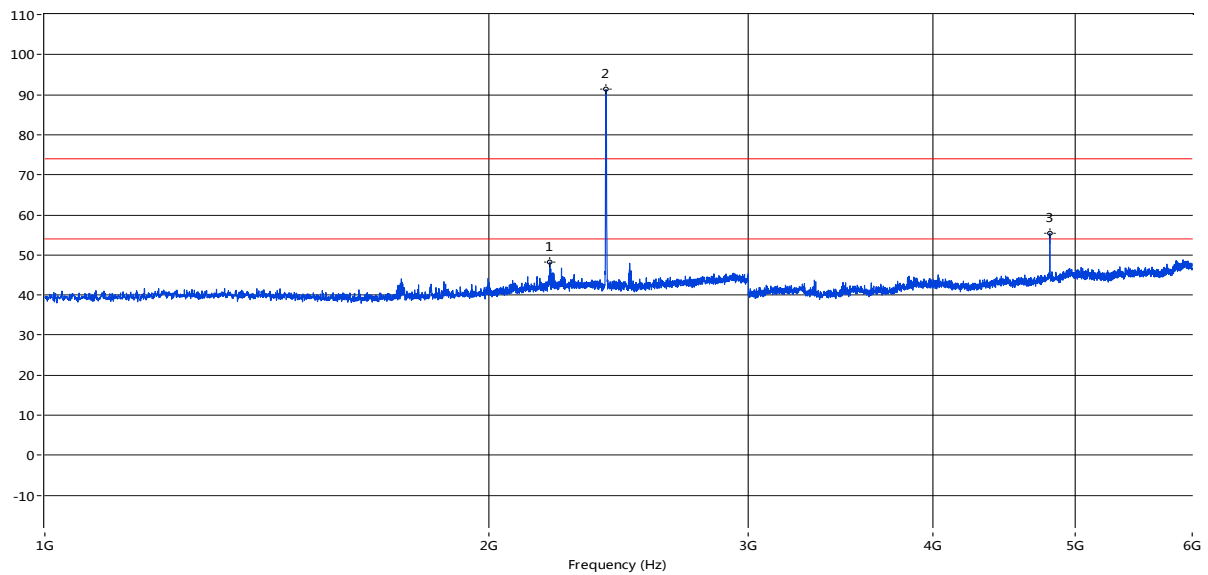
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.75	54.0	9.2	0.0	Vertical	PASS
14156.406	47.02	54.0	7.0	0.0	Vertical	PASS
20099.834	48.16	54.0	5.8	0.0	Vertical	PASS

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



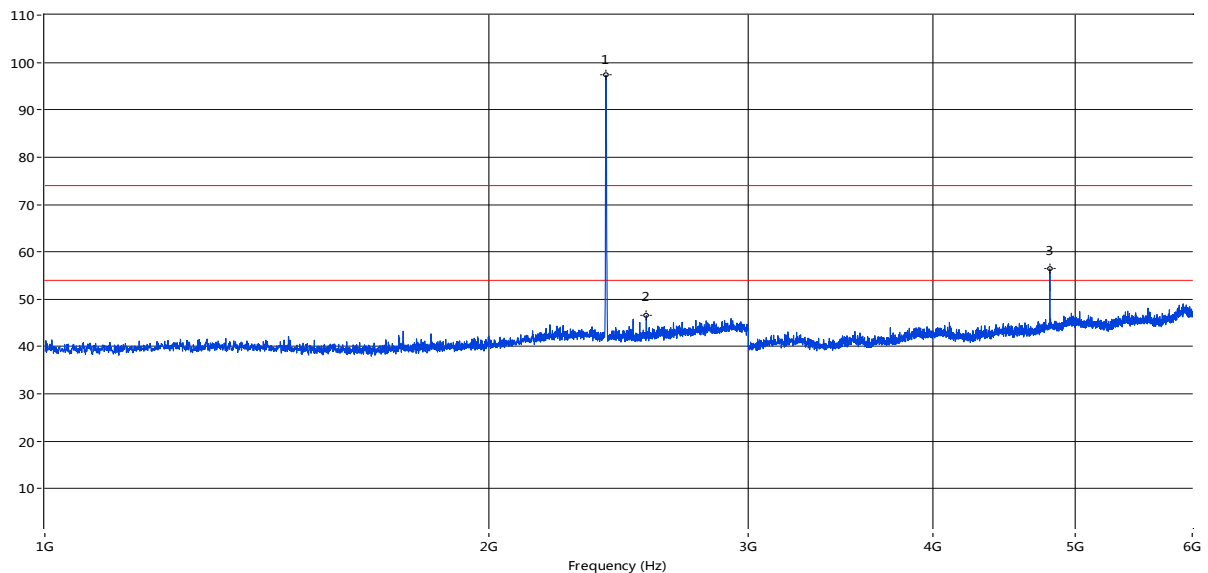
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	44.05	54.0	9.9	0.0	Horizontal	PASS
14219.634	46.26	54.0	7.7	0.0	Horizontal	PASS
21143.095	47.70	54.0	6.3	0.0	Horizontal	PASS

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



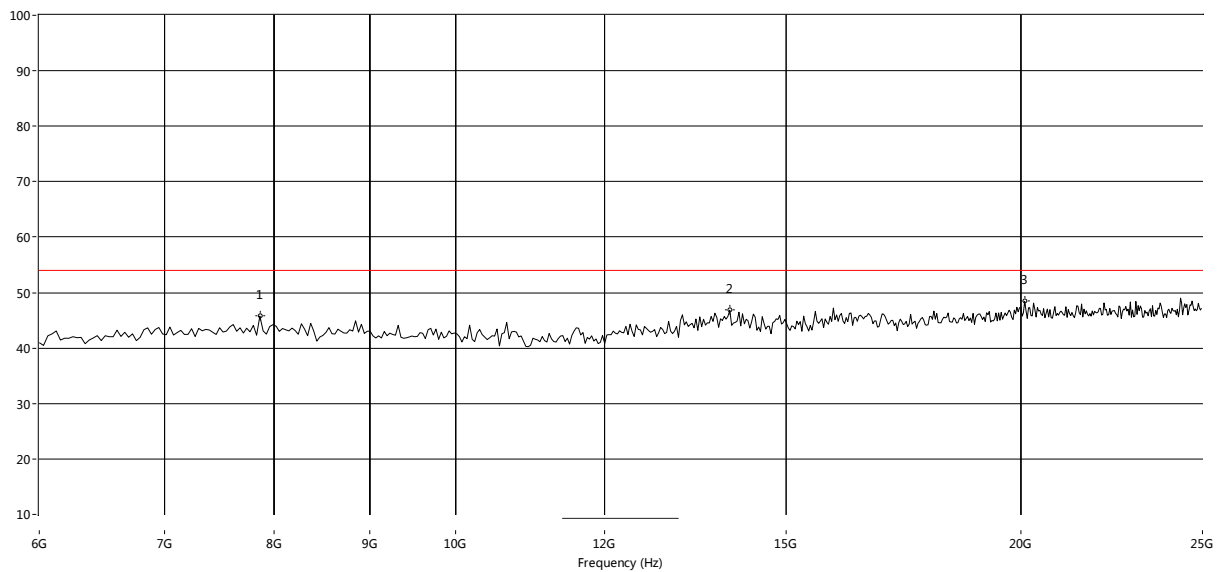
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2200.200	48.22	--	--	74.0	--	54.0	167.6	Vertical	Pass
2402.149	91.32	--	--	74.0	--	54.0	6.0	Vertical	--
4804.049	58.13	--	48.77	74.0	--	54.0	40.7	Vertical	Pass

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



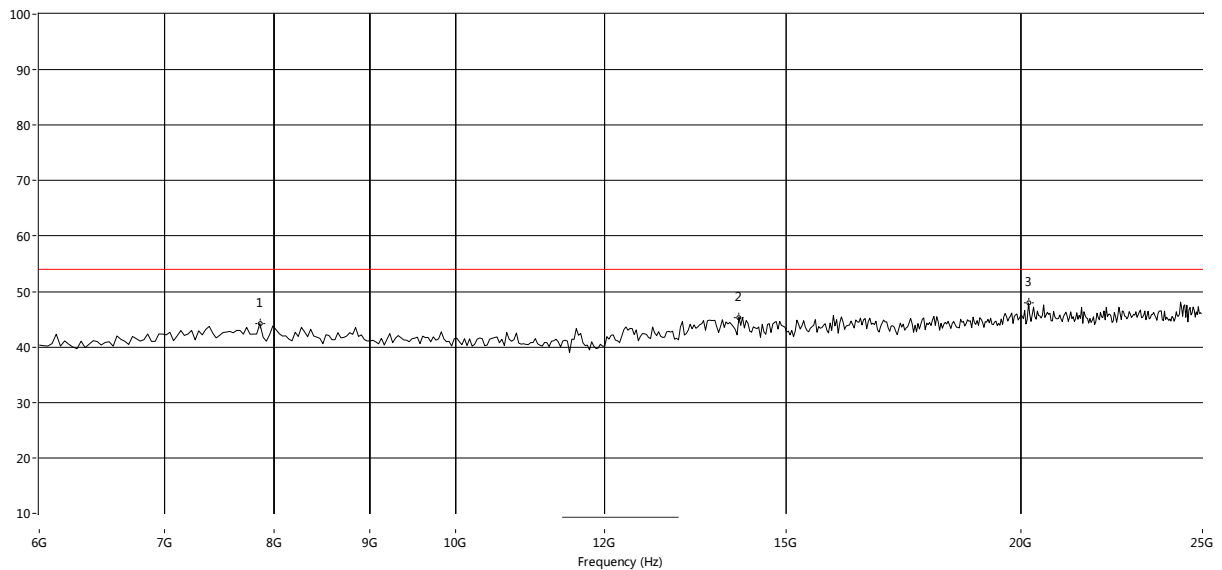
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2402.149	97.33	--	--	74.0	--	54.0	292.8	Horizontal	--
2558.110	46.54	--	--	74.0	--	54.0	359.9	Horizontal	Pass
4804.049	77.69	--	49.75	74.0	--	54.0	358.5	Horizontal	Pass

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



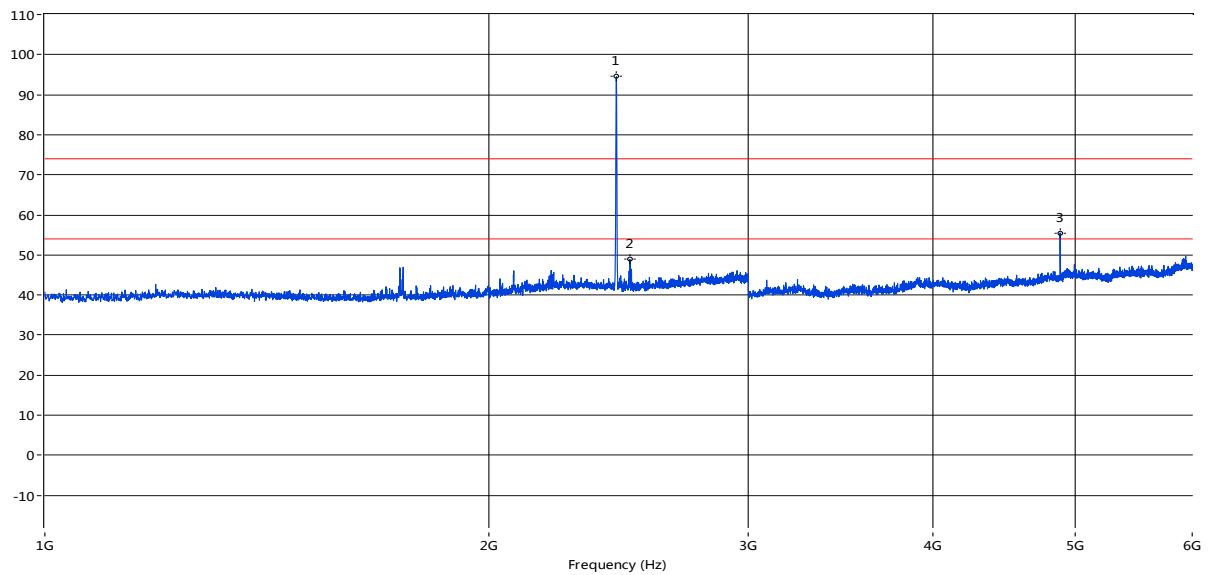
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	45.76	54.0	8.2	0.0	Vertical	PASS
13998.336	46.83	54.0	7.2	0.0	Vertical	PASS
20099.834	48.41	54.0	5.6	0.0	Vertical	PASS

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



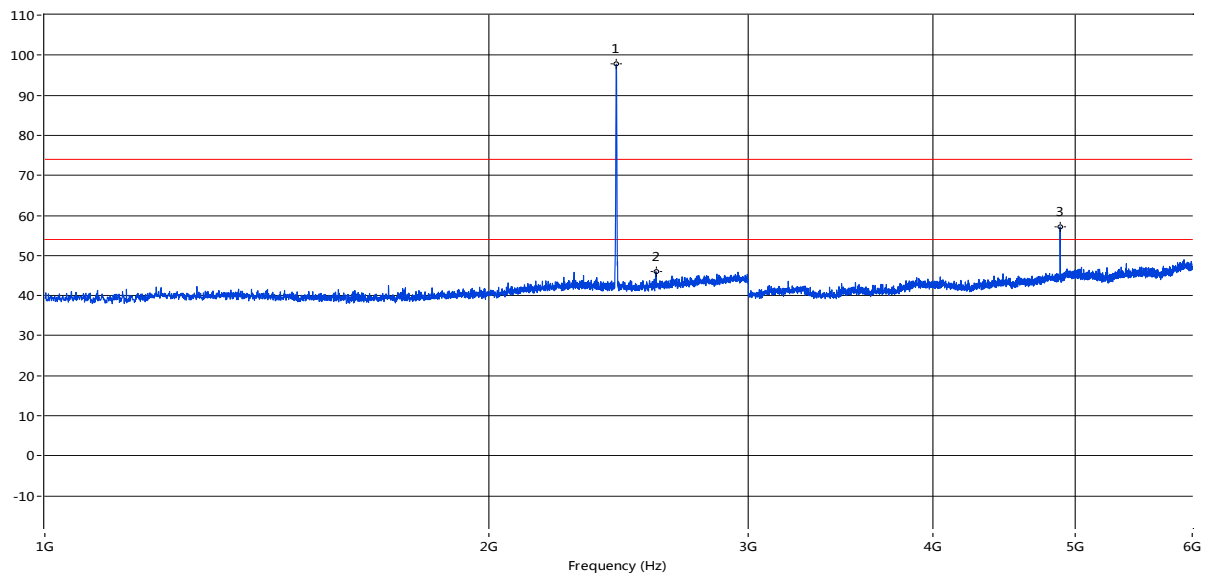
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.21	54.0	9.8	0.0	Horizontal	PASS
14156.406	45.35	54.0	8.6	0.0	Horizontal	PASS
20194.676	47.93	54.0	6.1	0.0	Horizontal	PASS

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



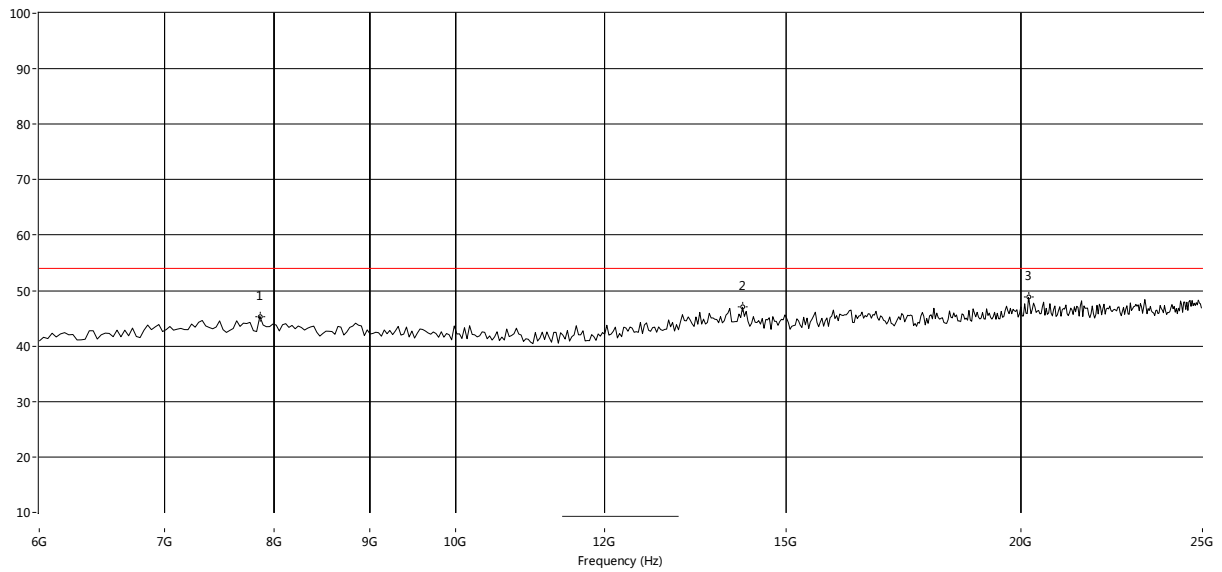
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2441.140	94.52	--	--	74.0	--	54.0	233.3	Vertical	--
2493.127	48.90	--	--	74.0	--	54.0	343.6	Vertical	Pass
4881.280	55.96	--	45.77	74.0	--	54.0	189.3	Vertical	Pass

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



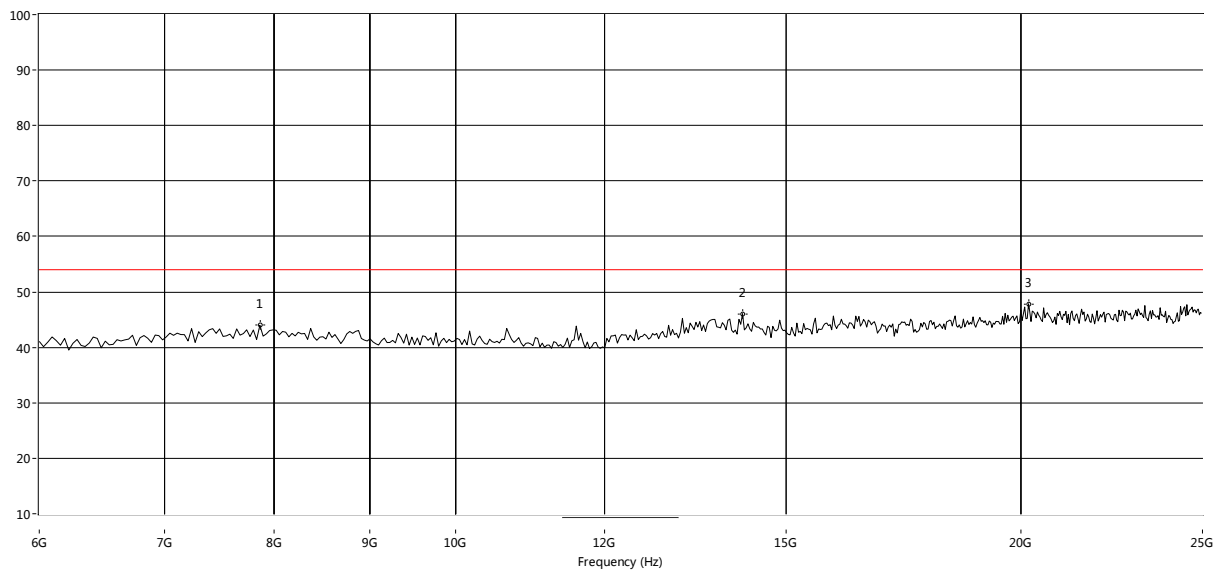
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2440.640	97.75	--	--	74.0	--	54.0	290.2	Horizontal	--
2596.601	45.99	--	--	74.0	--	54.0	282.5	Horizontal	Pass
4882.029	57.86	--	49.85	74.0	--	54.0	280.3	Horizontal	Pass

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



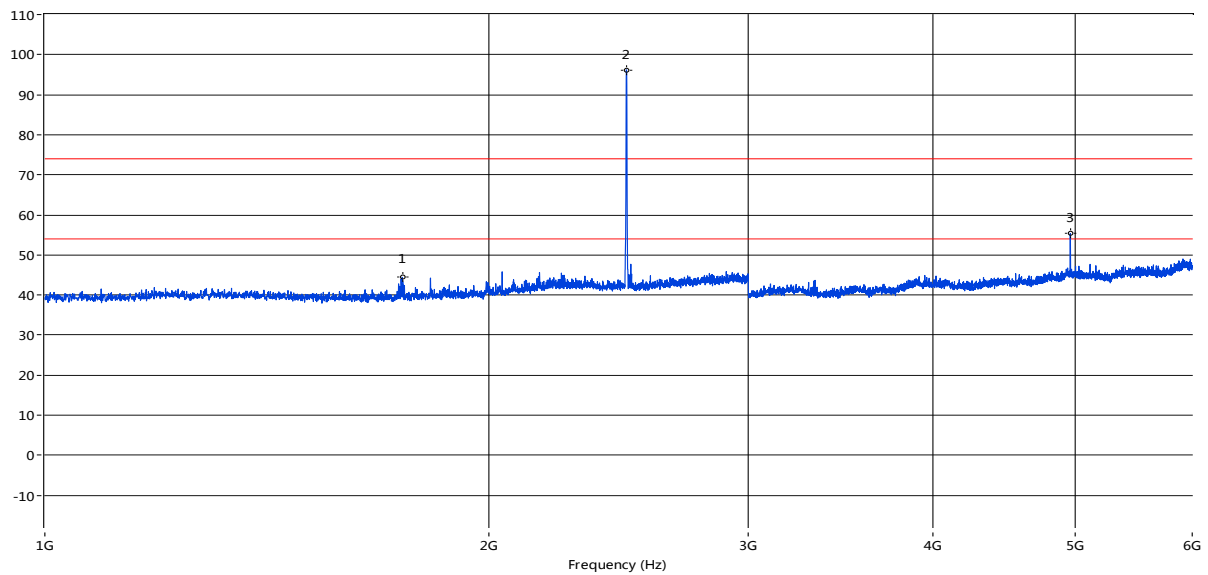
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	45.33	54.0	8.7	0.0	Vertical	PASS
14219.634	47.00	54.0	7.0	0.0	Vertical	PASS
20194.676	48.77	54.0	5.2	0.0	Vertical	PASS

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



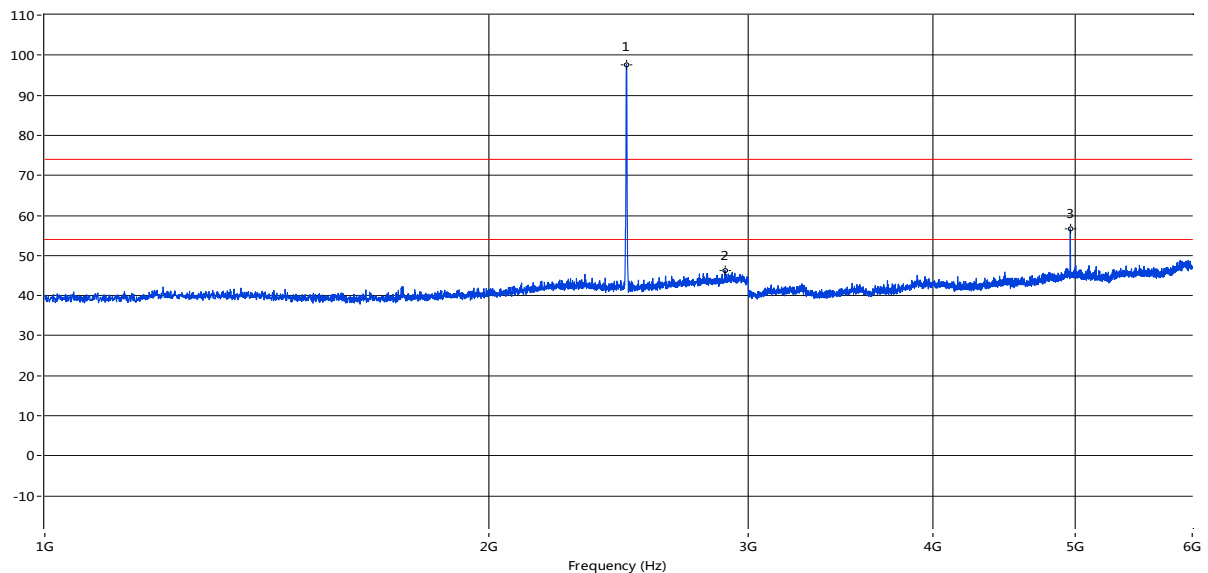
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	43.98	54.0	10.0	0.0	Horizontal	PASS
14219.634	46.07	54.0	7.9	0.0	Horizontal	PASS
20194.676	47.86	54.0	6.1	0.0	Horizontal	PASS

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



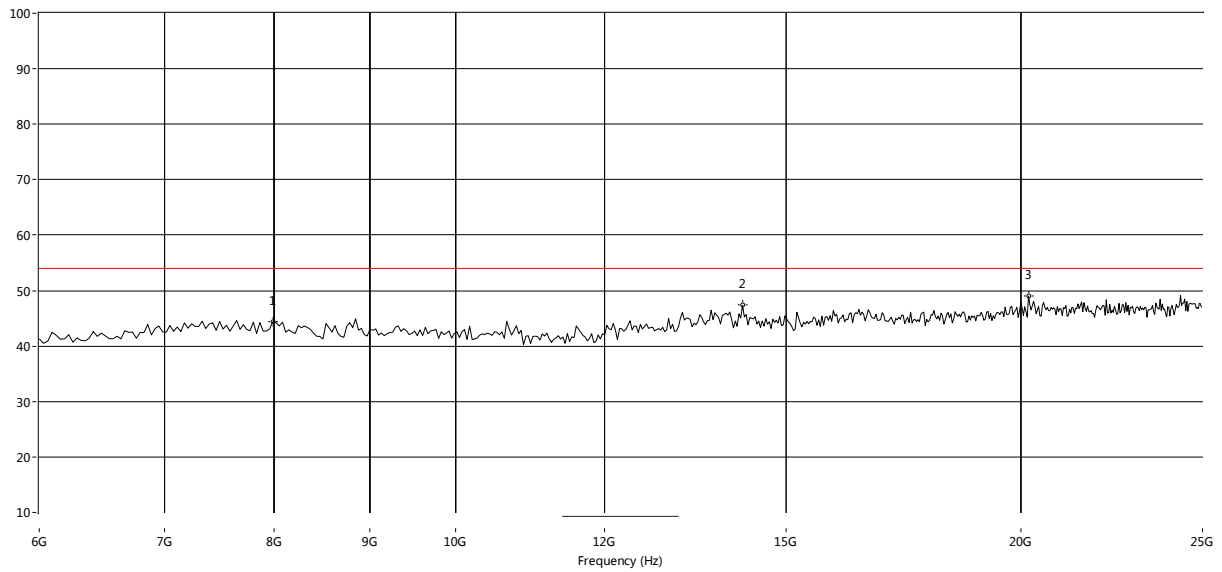
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
1747.813	44.41	--	--	74.0	--	54.0	38.7	Vertical	Pass
2479.630	96.04	--	--	74.0	--	54.0	229.6	Vertical	--
4959.260	55.47	--	50.43	74.0	--	54.0	20.2	Vertical	Pass

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



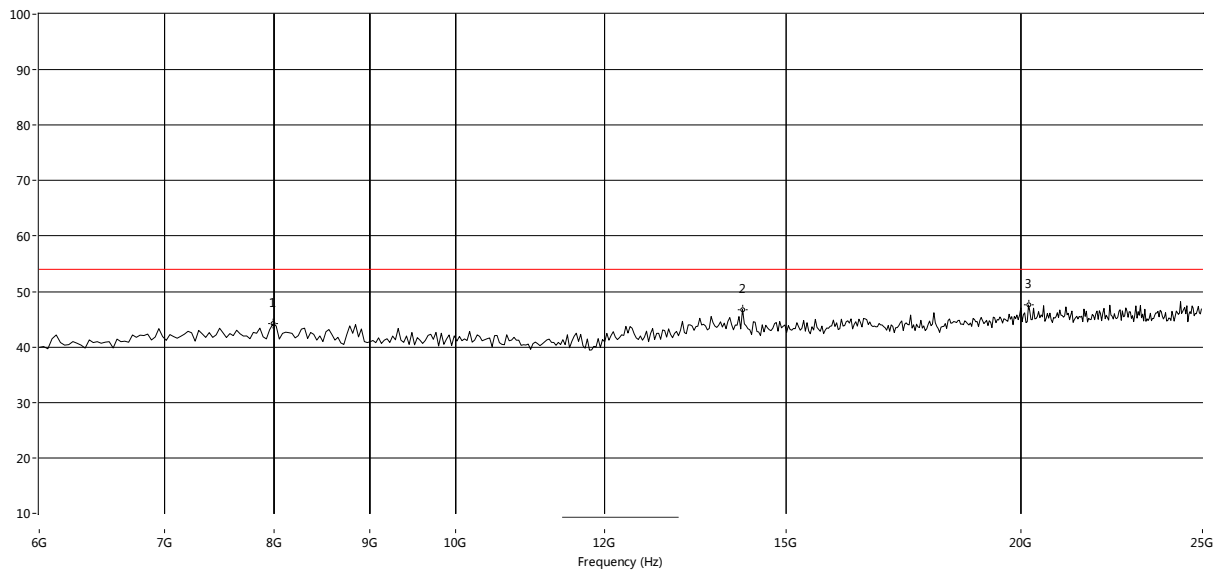
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2480.130	97.66	--	--	74.0	--	54.0	288.7	Horizontal	--
2892.527	46.29	--	--	74.0	--	54.0	357.2	Horizontal	Pass
4959.260	56.16	--	50.32	74.0	--	54.0	274.8	Horizontal	Pass

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	44.41	54.0	9.6	0.0	Vertical	PASS
14219.634	47.34	54.0	6.7	0.0	Vertical	PASS
20194.676	49.02	54.0	5.0	0.0	Vertical	PASS

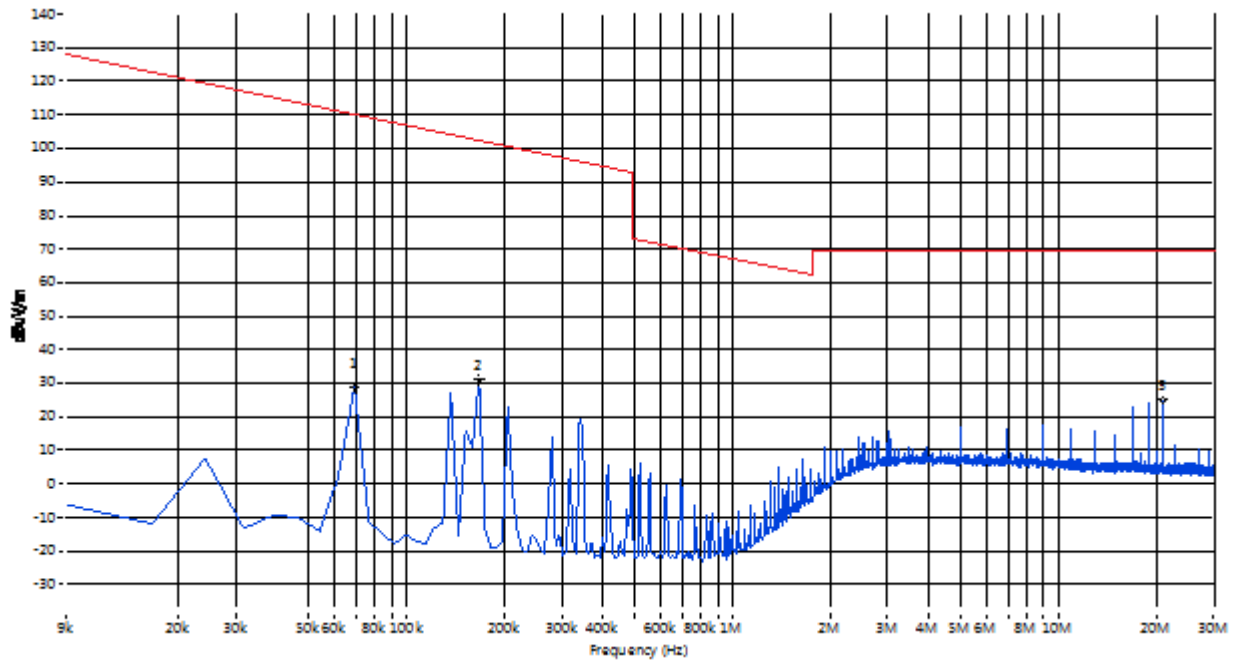
8-DPSK HIGH CHANNEL 6GHz to 25GHz, ANT H



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	44.16	54.0	9.8	0.0	Horizontal	PASS
14219.634	46.79	54.0	7.2	0.0	Horizontal	PASS
20194.676	47.59	54.0	6.4	0.0	Horizontal	PASS

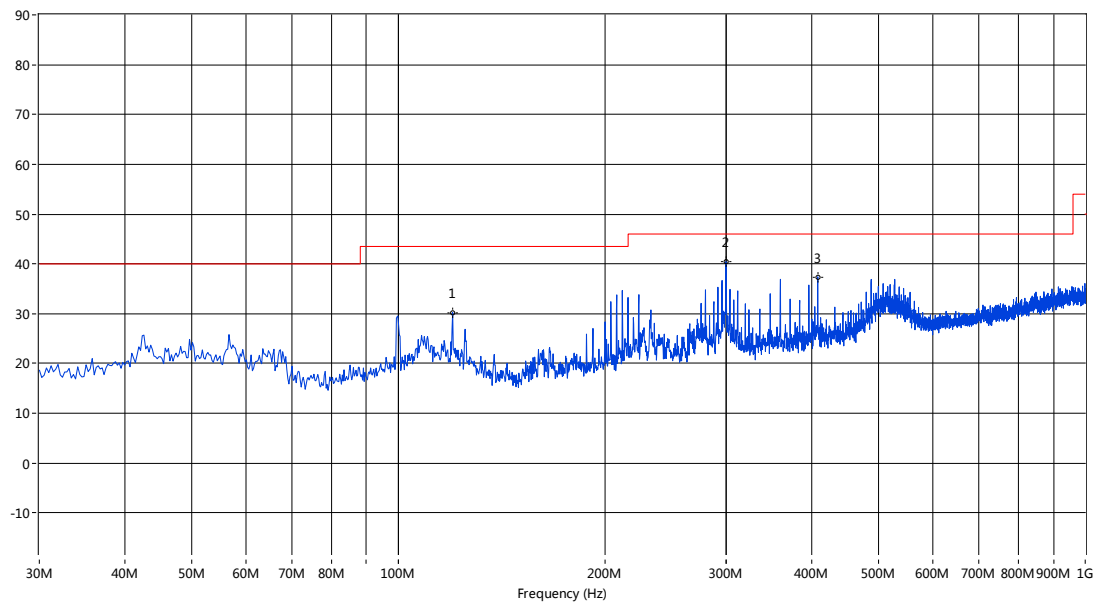
Hopping Mode:

Below 30MHz



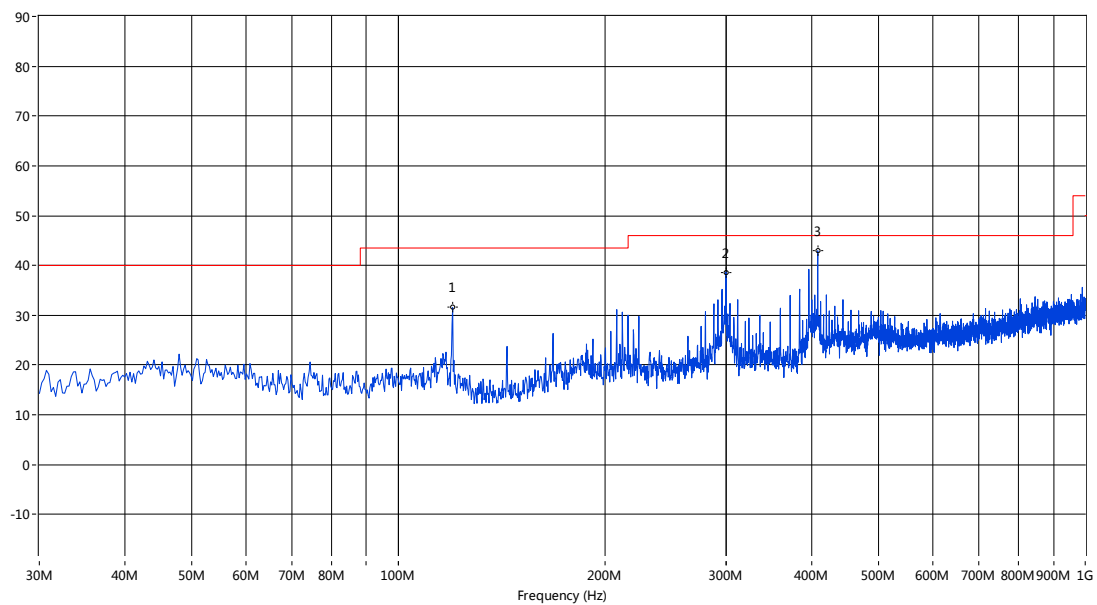
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Verdict
0.069	29.15	--	--	--	110.8	--	250.6	PASS
0.166	31.49	--	--	--	103.2	--	312.5	PASS
20.997	25.38	--	--	--	69.5	--	0.0	PASS

30MHz to 1GHz, ANT V



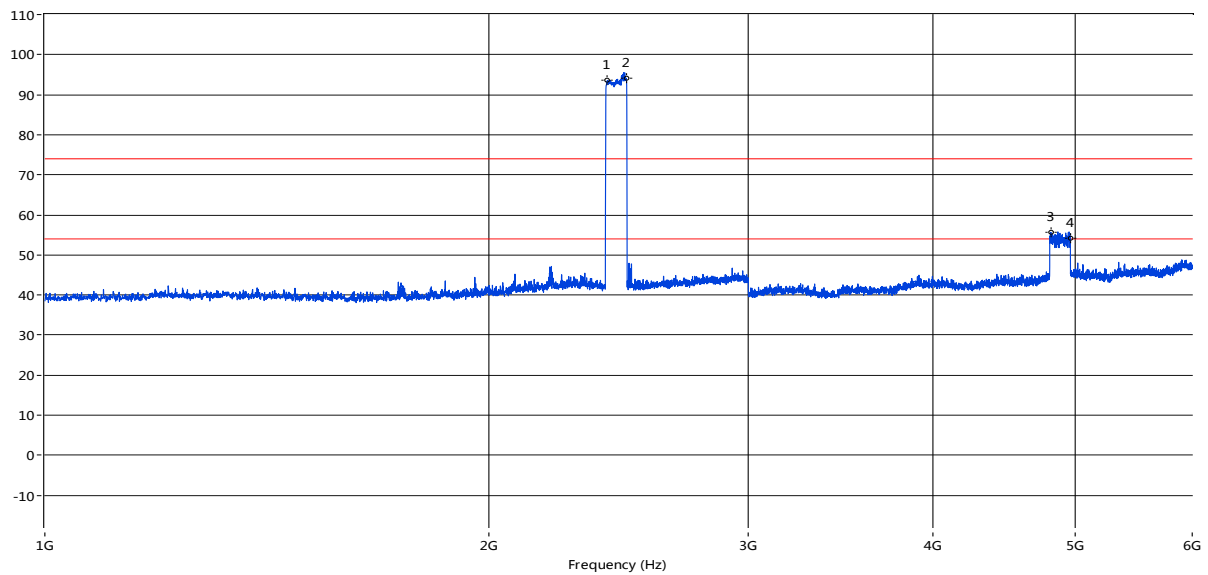
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
119.945	30.24	--	--	--	43.5	--	315.9	Vertical	Pass
299.835	40.44	--	--	--	46.0	--	112.7	Vertical	Pass
407.963	37.40	--	--	--	46.0	--	229.1	Vertical	Pass

30MHz to 1GHz, ANT H



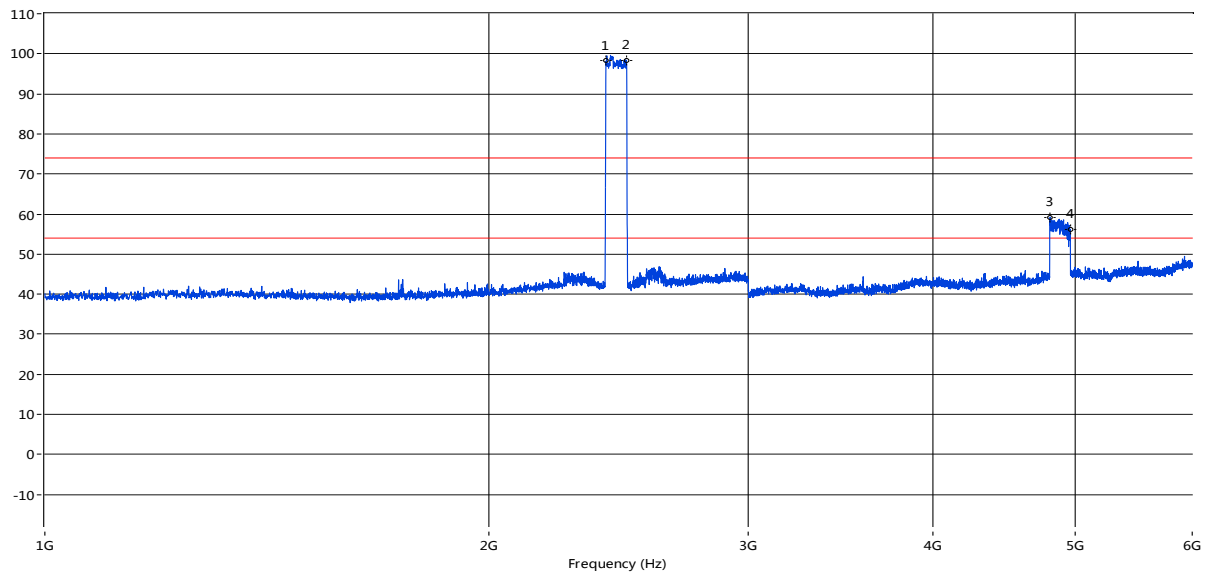
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
119.945	31.54	--	--	--	43.5	--	315.9	Horizontal	Pass
299.835	38.62	--	--	--	46.0	--	112.7	Horizontal	Pass
407.963	42.96	--	--	--	46.0	--	229.1	Horizontal	Pass

GFSK MODE 1GHz to 6GHz, ANT V



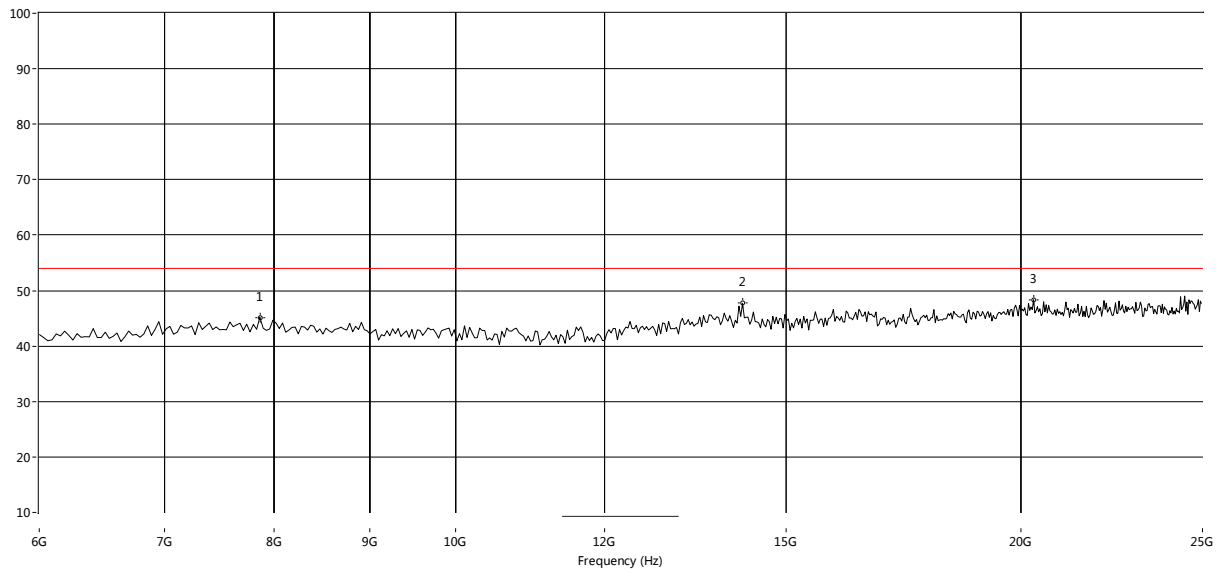
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2407.148	93.58	--	--	74.0	--	54.0	358.5	Vertical	--
2479.130	94.11	--	--	74.0	--	54.0	167.0	Vertical	--
4811.547	55.66	--	50.33	74.0	--	54.0	114.3	Vertical	Pass
4959.260	54.19	--	50.21	74.0	--	54.0	359.4	Vertical	Pass

GFSK MODE 1GHz to 6GHz, ANT H



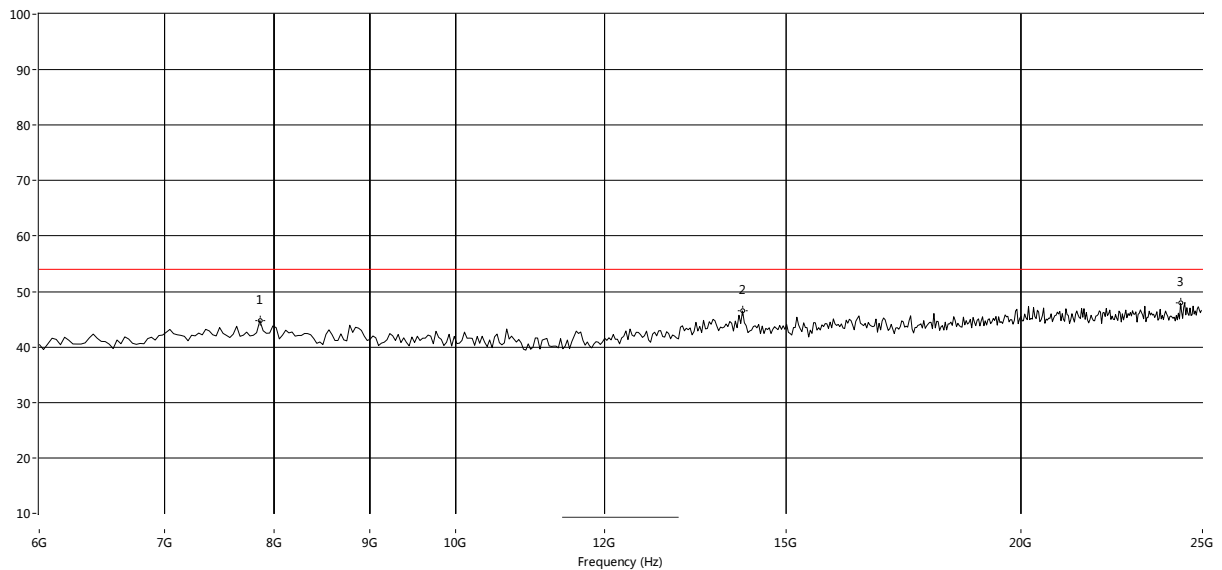
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2403.649	98.41	--	--	74.0	--	54.0	286.4	Horizontal	--
2479.130	98.30	--	--	74.0	--	54.0	286.4	Horizontal	--
4805.549	59.24	--	50.01	74.0	--	54.0	4.8	Horizontal	Pass
4960.010	56.14	--	49.35	74.0	--	54.0	275.4	Horizontal	Pass

GFSK MODE 6GHz to 25GHz, ANT V



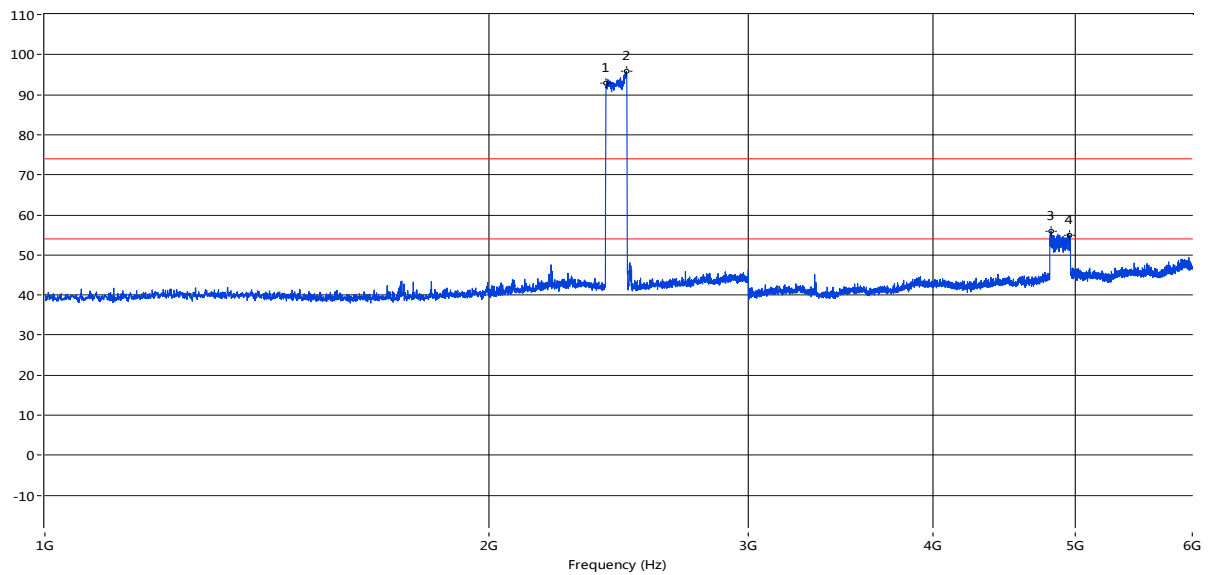
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	45.17	54.0	8.8	0.0	Vertical	PASS
14219.634	47.72	54.0	6.3	0.0	Vertical	PASS
20321.131	48.35	54.0	5.7	0.0	Vertical	PASS

GFSK MODE 6GHz to 25GHz, ANT H



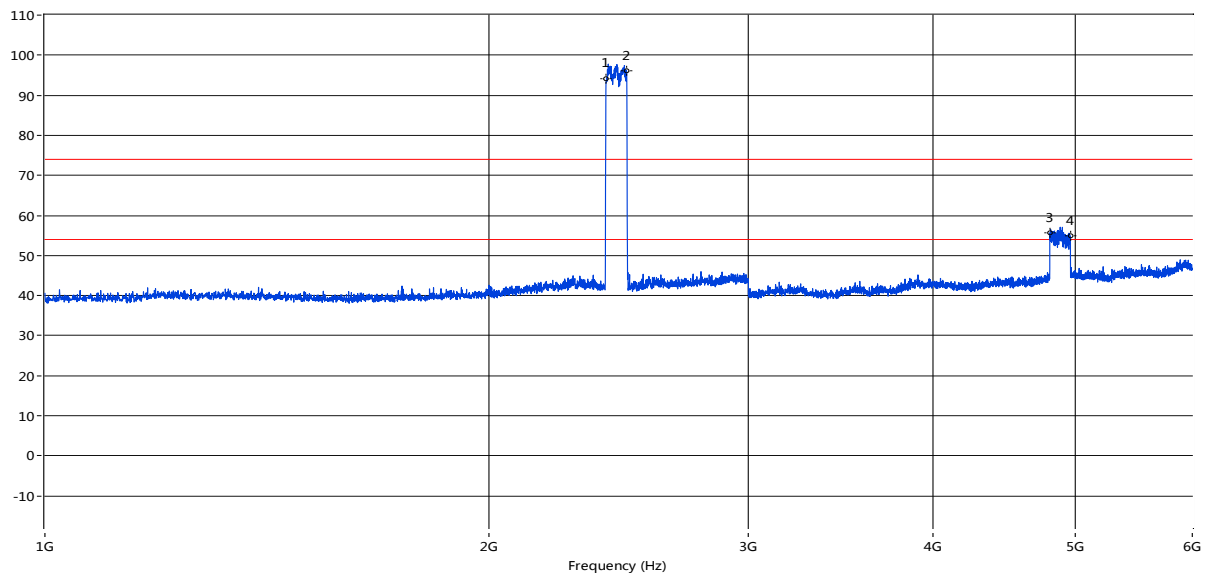
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.75	54.0	9.2	0.0	Horizontal	PASS
14219.634	46.50	54.0	7.5	0.0	Horizontal	PASS
24336.106	47.90	54.0	6.1	0.0	Horizontal	PASS

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



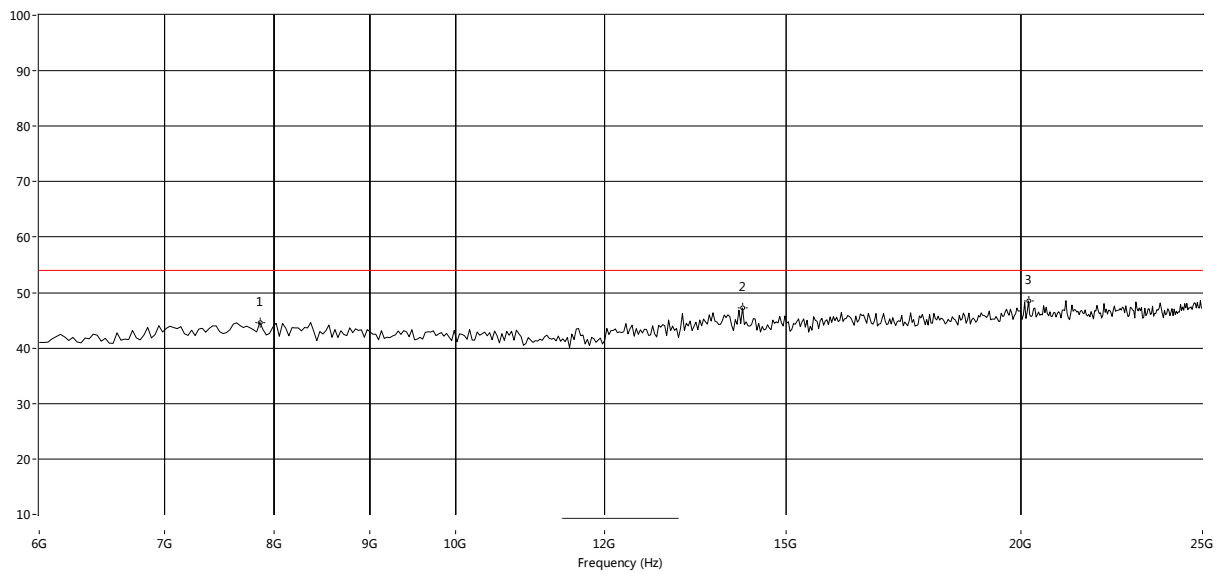
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2403.149	92.80	--	--	74.0	--	54.0	0.0	Vertical	--
2478.630	95.88	--	--	74.0	--	54.0	228.2	Vertical	--
4812.297	56.00	--	49.32	74.0	--	54.0	187.7	Vertical	Pass
4955.511	54.94	--	49.22	74.0	--	54.0	3.3	Vertical	Pass

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



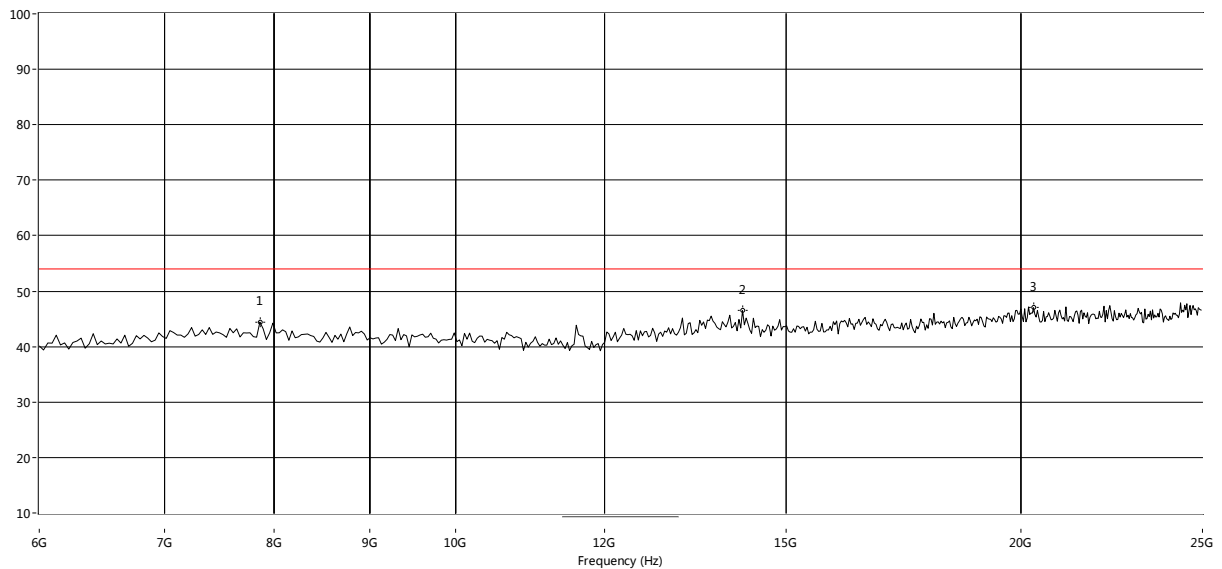
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2403.649	94.22	--	--	74.0	--	54.0	316.4	Horizontal	--
2478.630	96.09	--	--	74.0	--	54.0	263.5	Horizontal	--
4805.549	55.73	--	50.32	74.0	--	54.0	0.1	Horizontal	Pass
4957.761	54.98	--	50.21	74.0	--	54.0	276.1	Horizontal	Pass

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



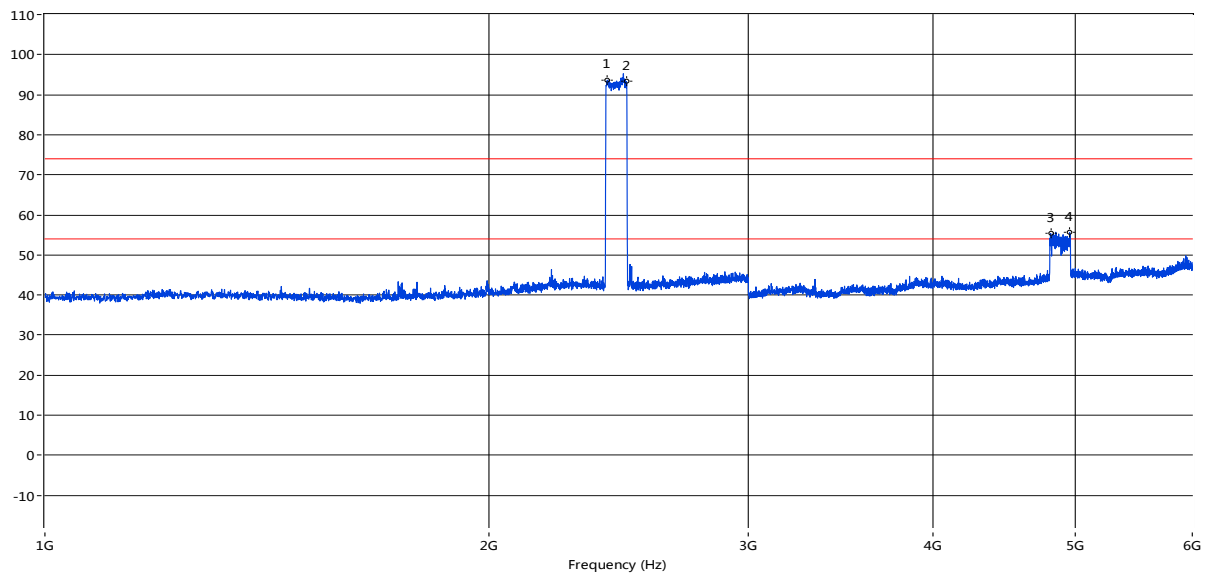
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.61	54.0	9.4	0.0	Vertical	PASS
14219.634	47.21	54.0	6.8	0.0	Vertical	PASS
20194.676	48.49	54.0	5.5	0.0	Vertical	PASS

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



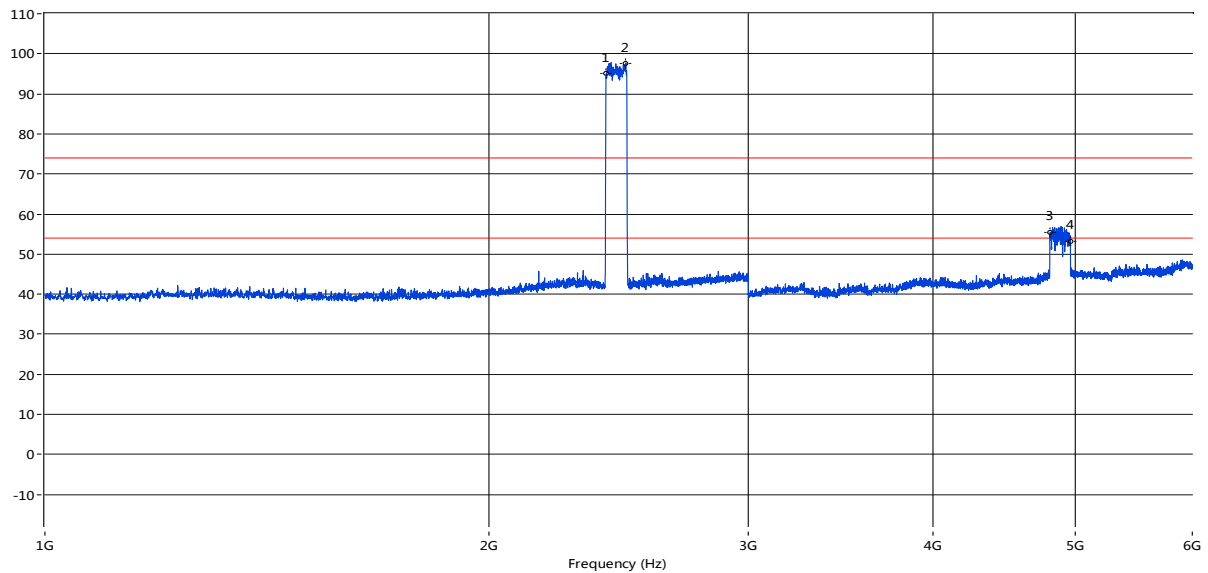
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.43	54.0	9.6	0.0	Horizontal	PASS
14219.634	46.49	54.0	7.5	0.0	Horizontal	PASS
20321.131	47.01	54.0	7.0	0.0	Horizontal	PASS

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



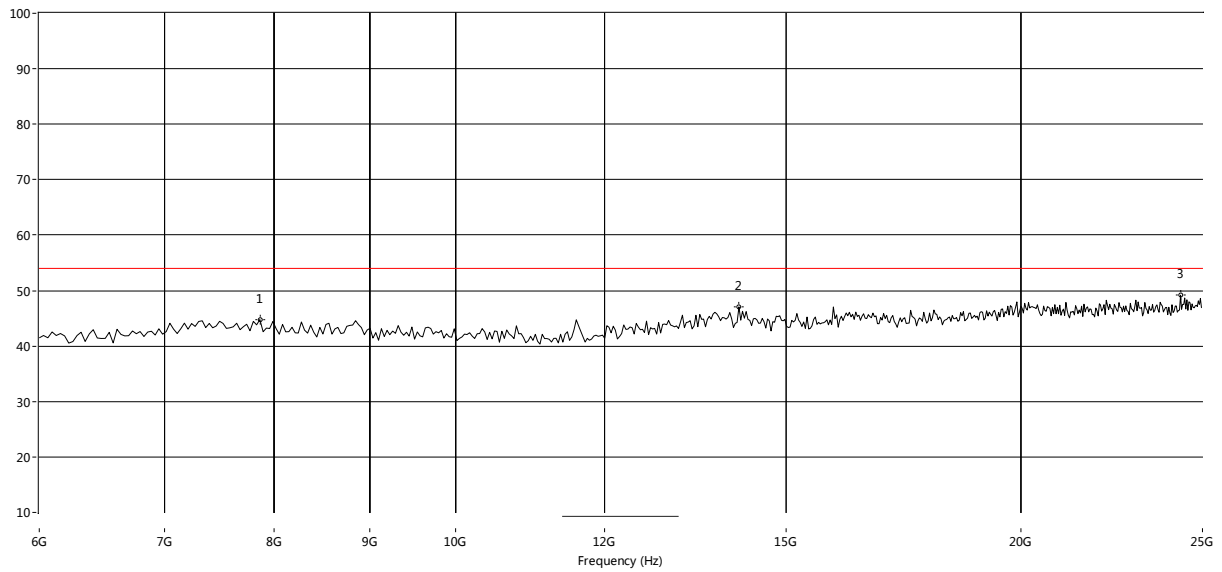
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2406.148	93.64	--	--	74.0	--	54.0	360.2	Vertical	--
2479.130	93.29	--	--	74.0	--	54.0	162.4	Vertical	--
4810.047	55.35	--	50.37	74.0	--	54.0	24.4	Vertical	Pass
4954.011	55.63	--	49.71	74.0	--	54.0	3.8	Vertical	Pass

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



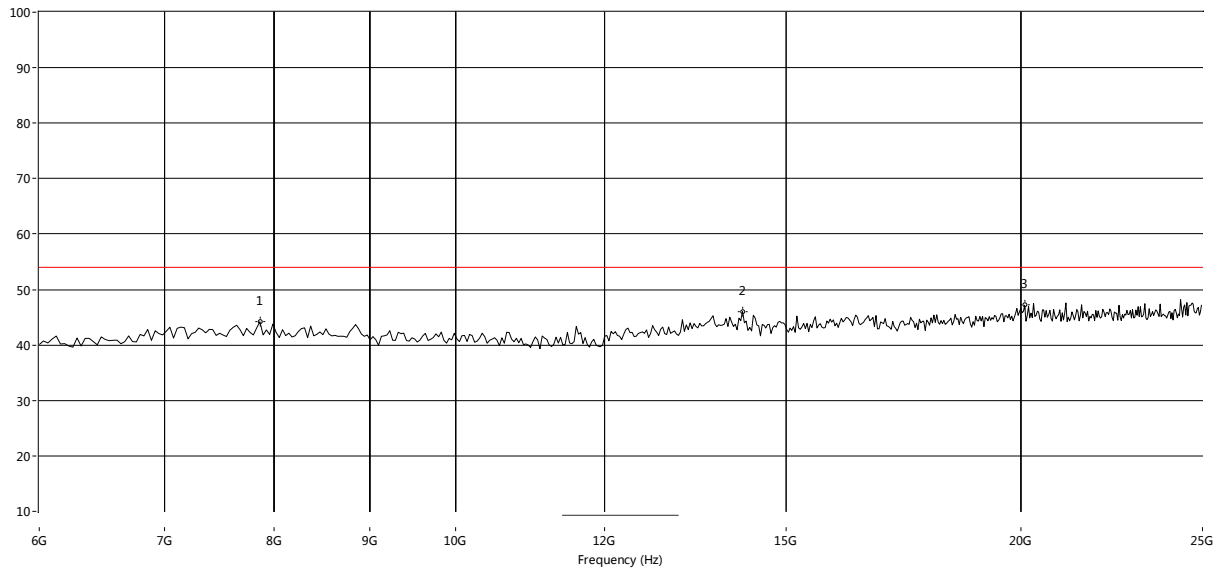
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
2403.149	95.03	--	--	74.0	--	54.0	309.1	Horizontal	--
2477.131	97.71	--	--	74.0	--	54.0	285.7	Horizontal	--
4806.298	55.49	--	50.33	74.0	--	54.0	-0.4	Horizontal	Pass
4959.260	53.25	--	49.40	74.0	--	54.0	266.2	Horizontal	Pass

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.77	54.0	9.2	0.0	Vertical	PASS
14156.406	47.07	54.0	6.9	0.0	Vertical	PASS
24336.106	49.18	54.0	4.8	0.0	Vertical	PASS

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7865.225	44.20	54.0	9.8	0.0	Horizontal	PASS
14219.634	46.09	54.0	7.9	0.0	Horizontal	PASS
20099.834	47.17	54.0	6.8	0.0	Horizontal	PASS

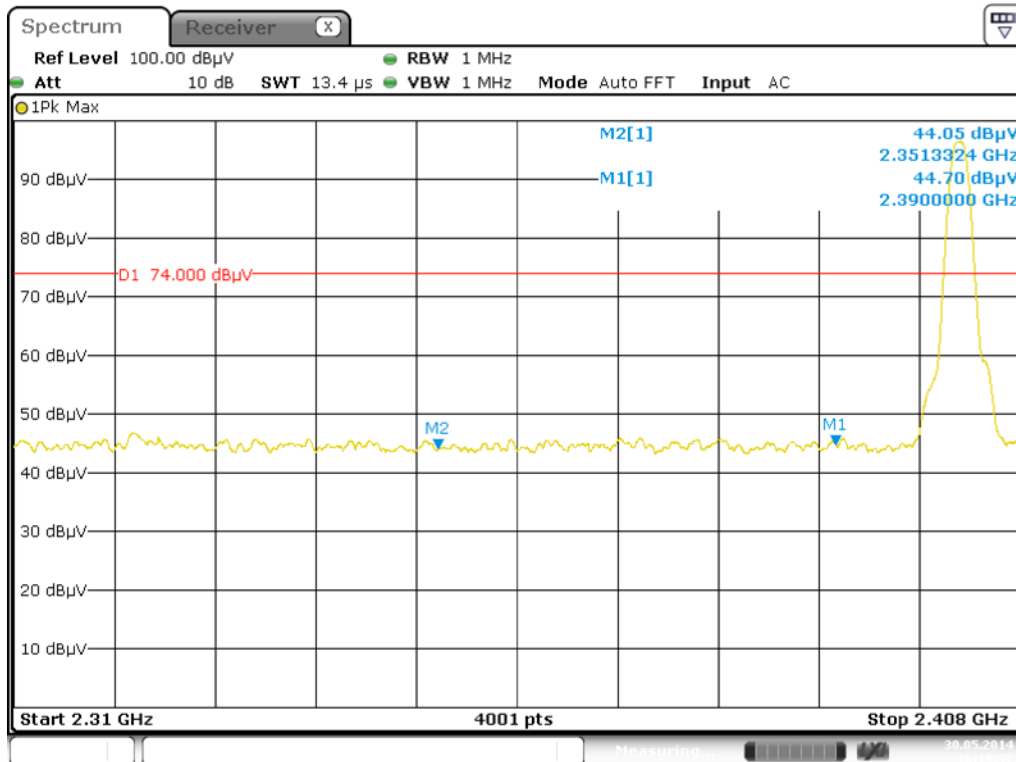
A.9 Band Edge

Test Data

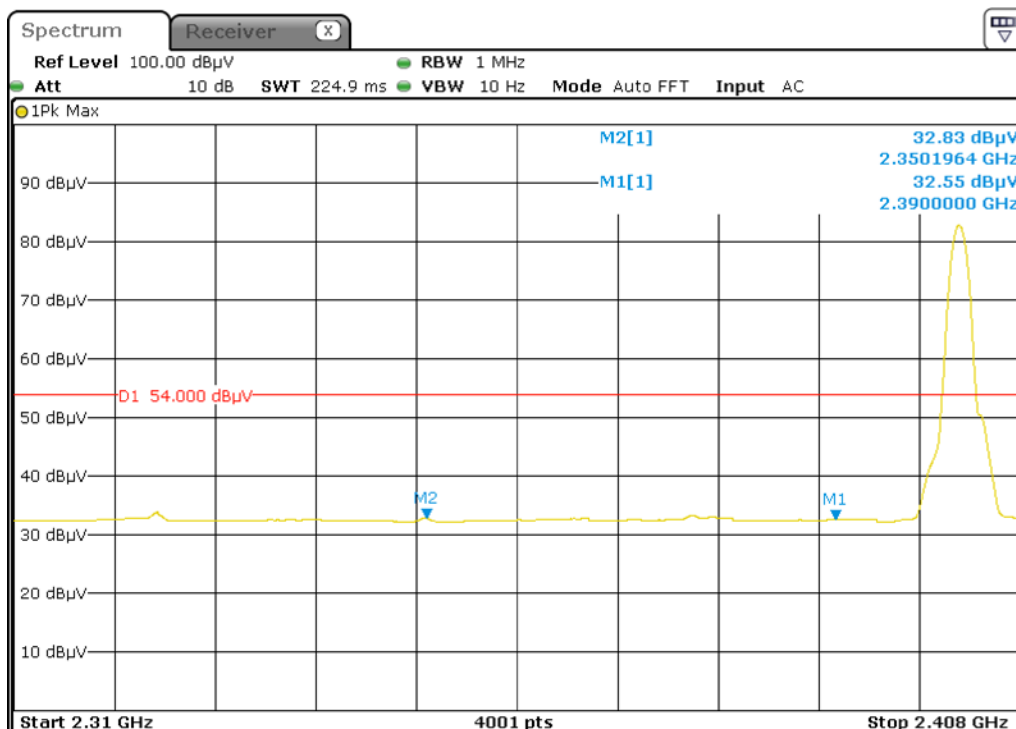
The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Test Plots

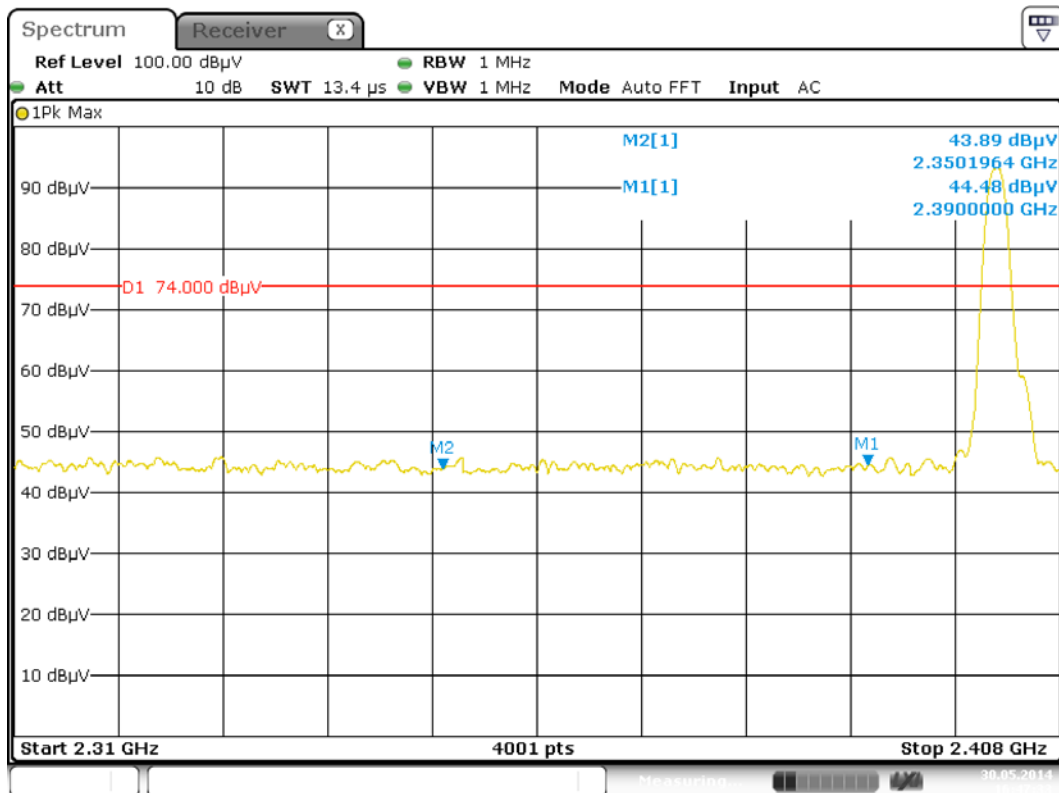
GFSK LOW CHANNEL , ANT V, PEAK



GFSK LOW CHANNEL , ANT V, AVERAGE

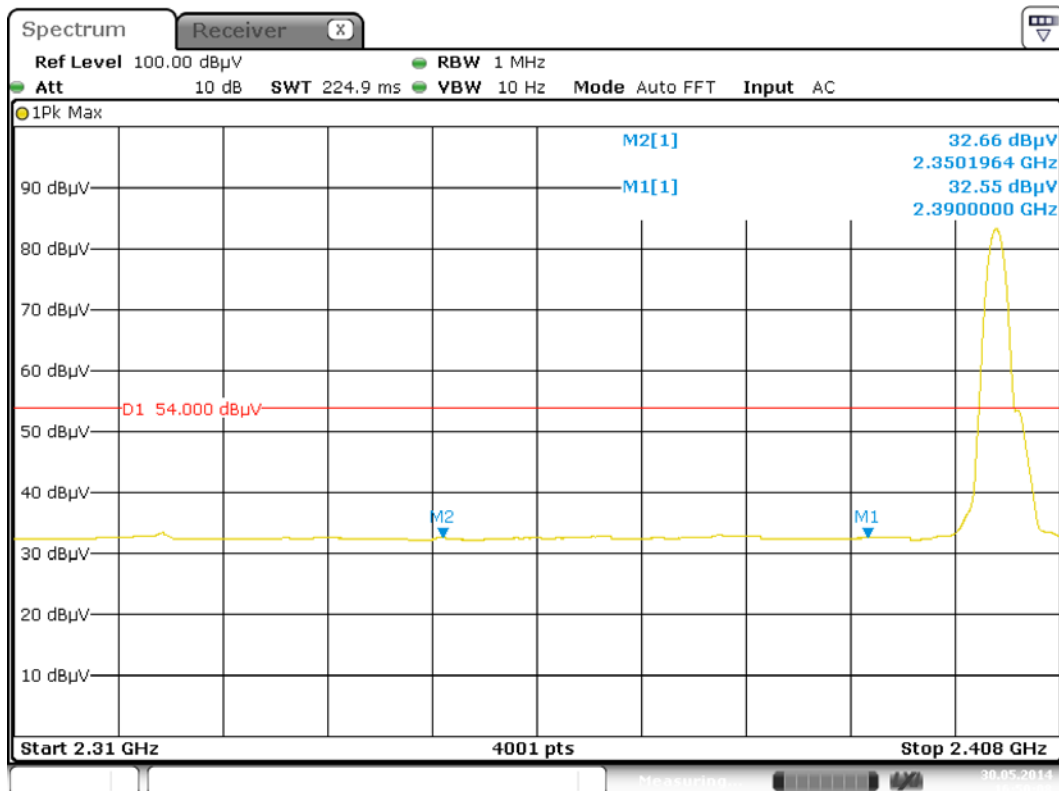


GFSK LOW CHANNEL , ANT H, PEAK



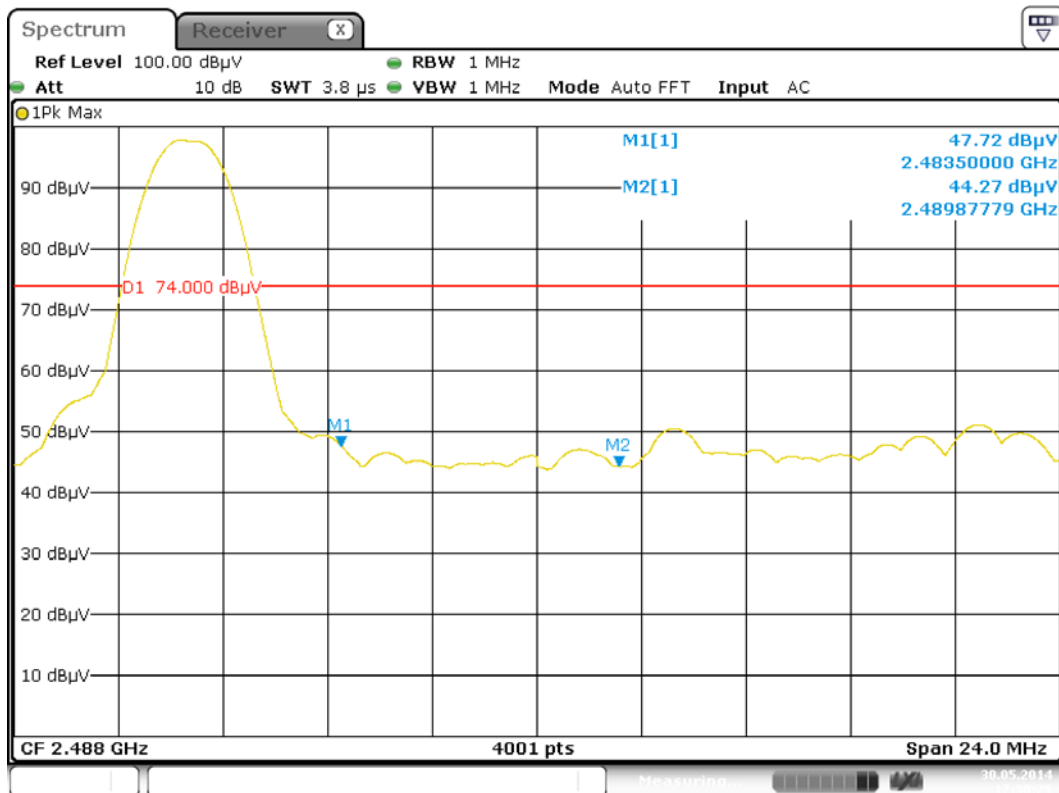
Date: 30.MAY.2014 16:47:33

GFSK LOW CHANNEL , ANT H, AVERAGE

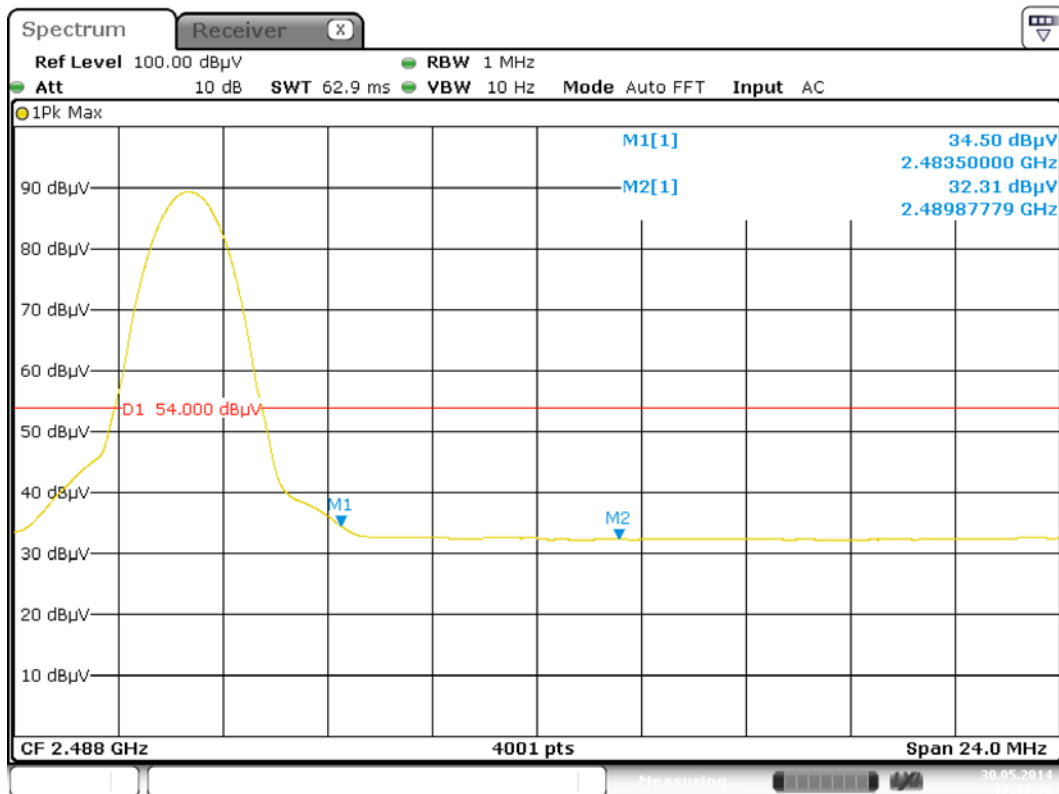


Date: 30.MAY.2014 16:50:08

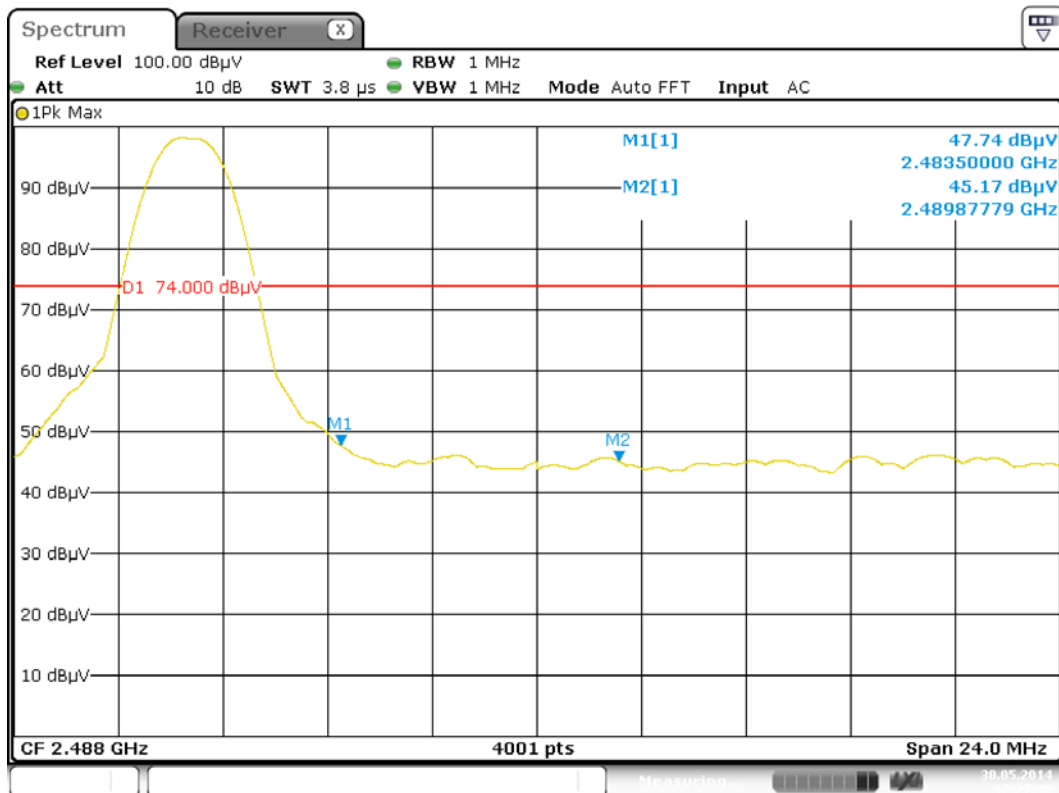
GFSK HIGH CHANNEL , ANT V, PEAK



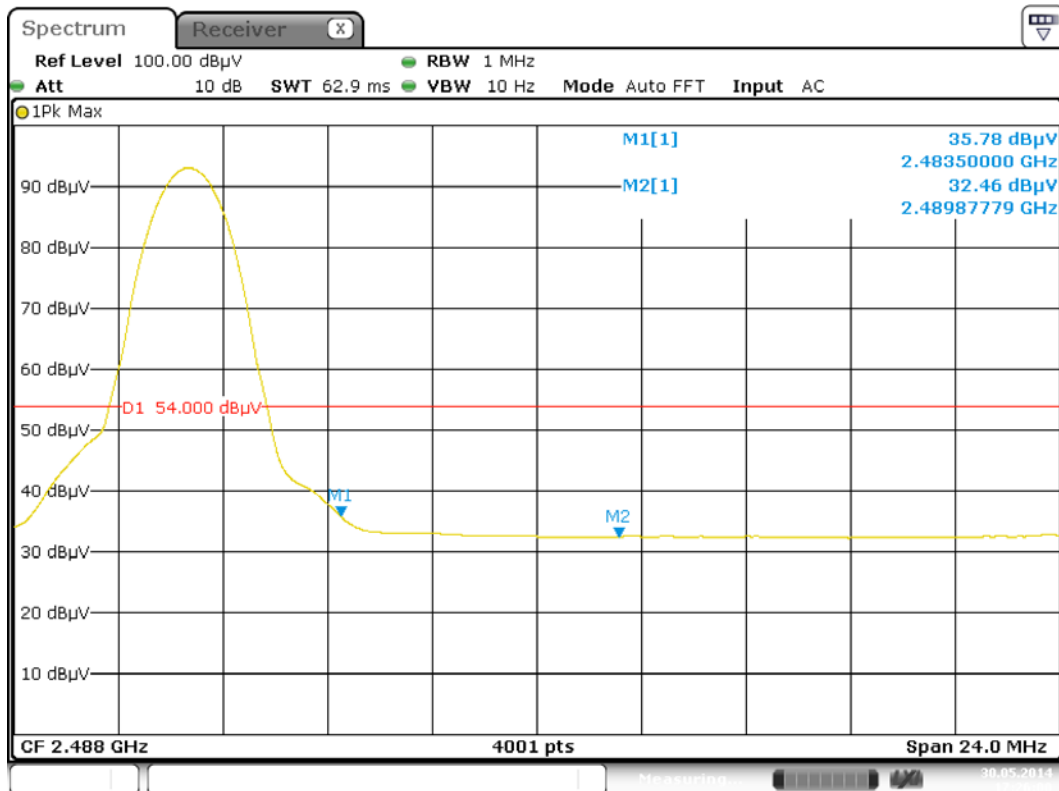
GFSK HIGH CHANNEL , ANT V, AVERAGE



GFSK HIGH CHANNEL , ANT H, PEAK



GFSK HIGH CHANNEL , ANT H, AVERAGE



The screenshot shows a Spectrum Analyzer interface. At the top, the title is "Spectrum" and the window name is "Receiver". The main display area shows a spectrum plot with a yellow trace. A red horizontal line is drawn across the plot at 74.000 dBμV, labeled "D1 74.000 dBμV". The plot has a grid with major lines every 10 dBμV on the vertical axis and every 100 MHz on the horizontal axis. The vertical axis is labeled from 10 dBμV to 90 dBμV. The horizontal axis is labeled from 2.31 GHz to 2.408 GHz. A yellow trace shows a noisy baseline around 45 dBμV, with a sharp peak at 2.3900000 GHz reaching 45.12 dBμV. Two blue markers, M2[1] and M1[1], are placed on the trace at approximately 2.35 GHz and 2.38 GHz respectively. The peak is labeled with its frequency and power: 45.12 dBμV, 2.3501964 GHz, 44.58 dBμV, and 2.3900000 GHz. The bottom status bar shows "Start 2.31 GHz", "4001 pts", and "Stop 2.408 GHz".

Receiver

Ref Level 100.00 dBμV RBW 1 MHz

Att 10 dB SWT 13.4 μs VBW 1 MHz Mode Auto FFT Input AC

1Pk Max

90 dBμV

80 dBμV

70 dBμV

60 dBμV

50 dBμV

40 dBμV

30 dBμV

20 dBμV

10 dBμV

M2[1]

M1[1]

D1 74.000 dBμV

45.12 dBμV

2.3501964 GHz

44.58 dBμV

2.3900000 GHz

Start 2.31 GHz 4001 pts Stop 2.408 GHz

Spectrum **Receiver** X

Ref Level 100.00 dBμV **RBW** 1 MHz **Att** 10 dB **SWT** 224.9 ms **VBW** 10 Hz **Mode** Auto FFT **Input** AC

1Pk Max

M2[1] 32.46 dBμV
M1[1] 32.52 dBμV
 2.3501964 GHz
 2.3900000 GHz

D1 54.000 dBμV

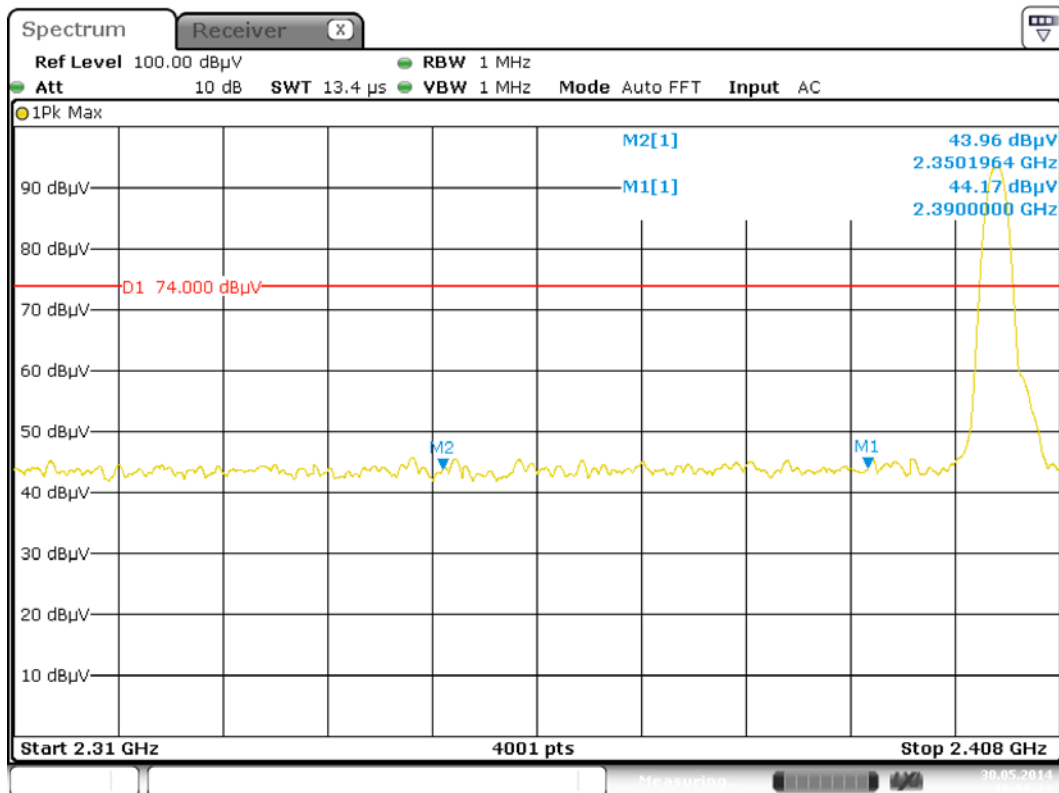
M2 **M1**

Start 2.31 GHz **4001 pts** **Stop 2.408 GHz**

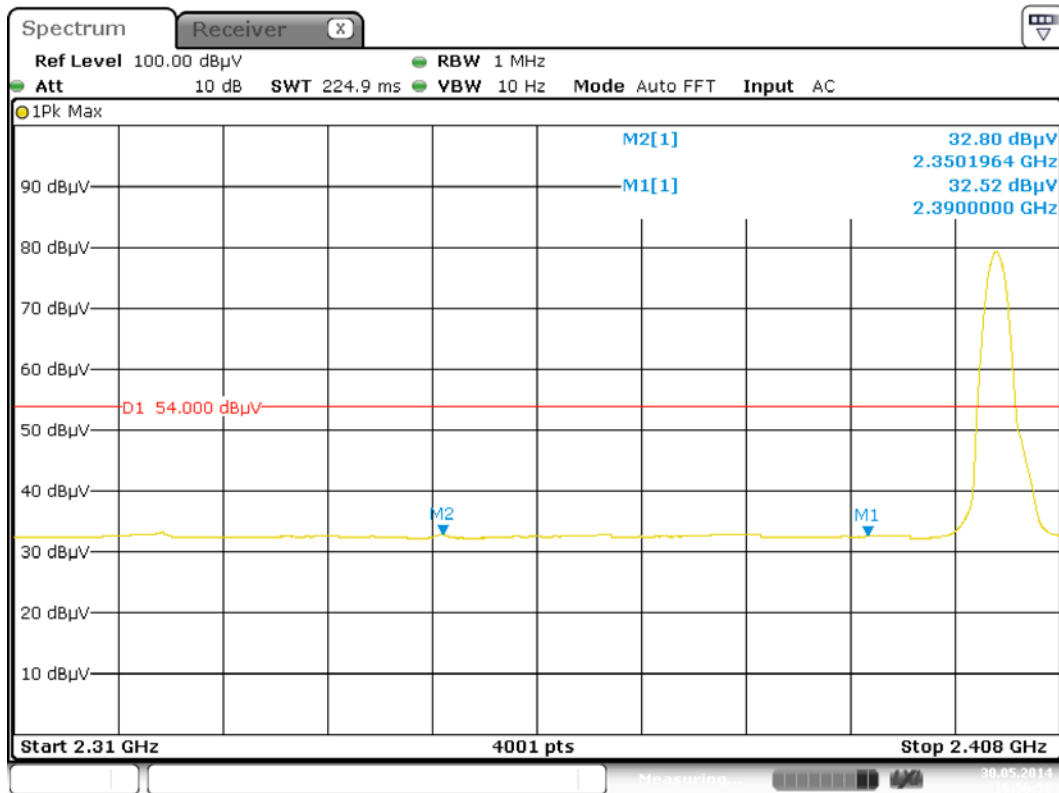
30.05.2014

96

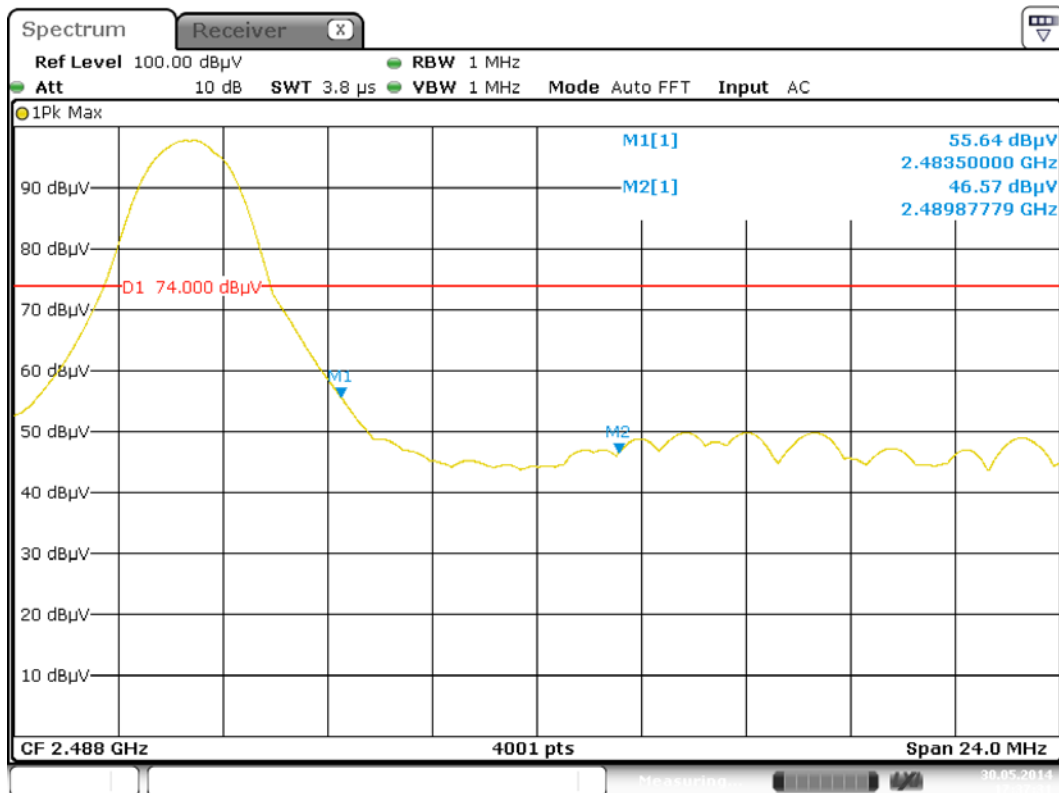
π /4DQPSK LOW CHANNEL , ANT H, PEAK



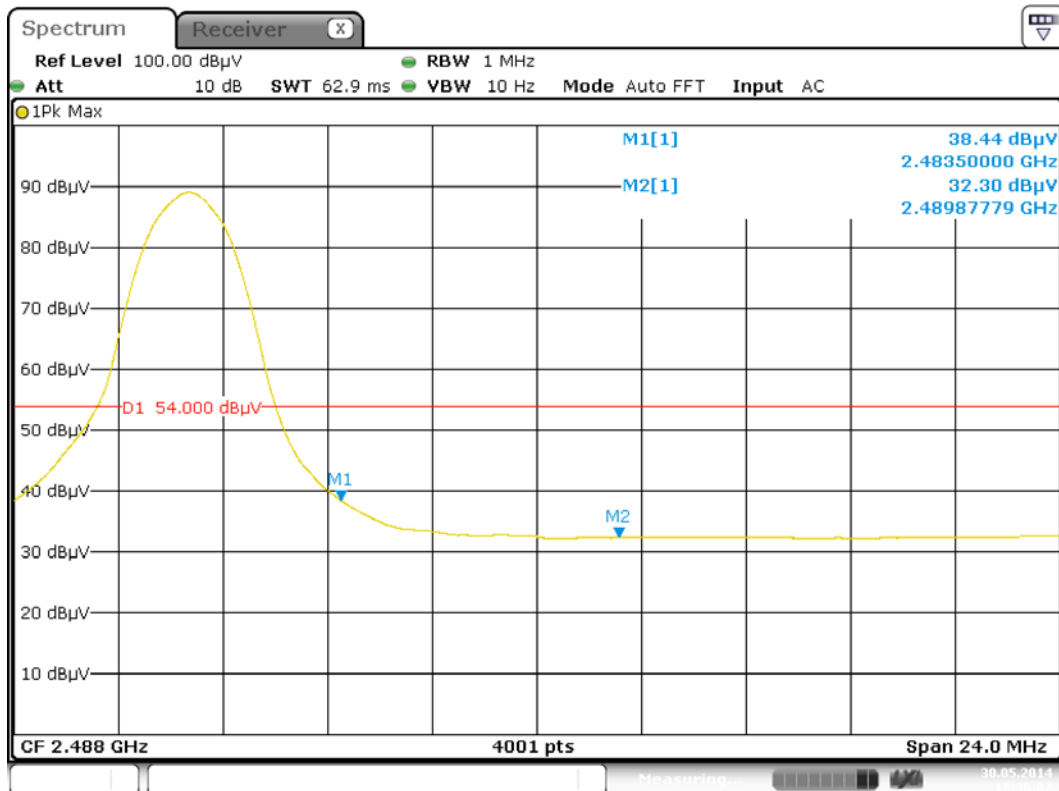
π /4DQPSK LOW CHANNEL , ANT H, AVERAGE



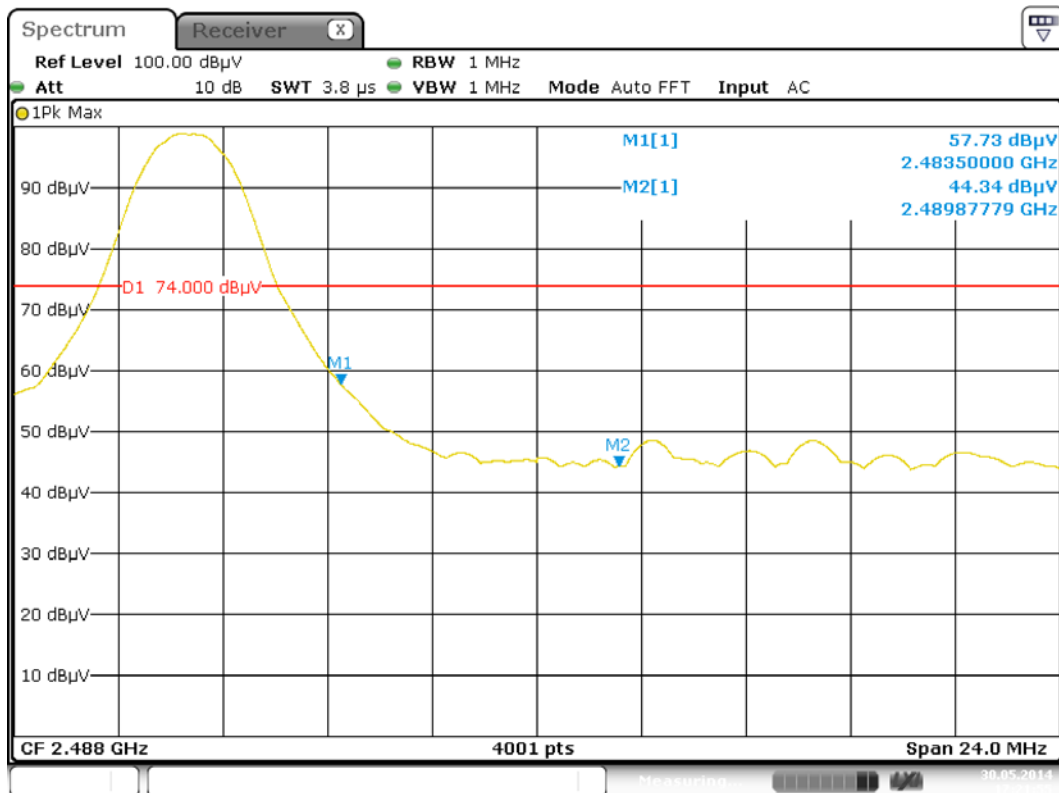
π /4DQPSK HIGH CHANNEL , ANT V, PEAK



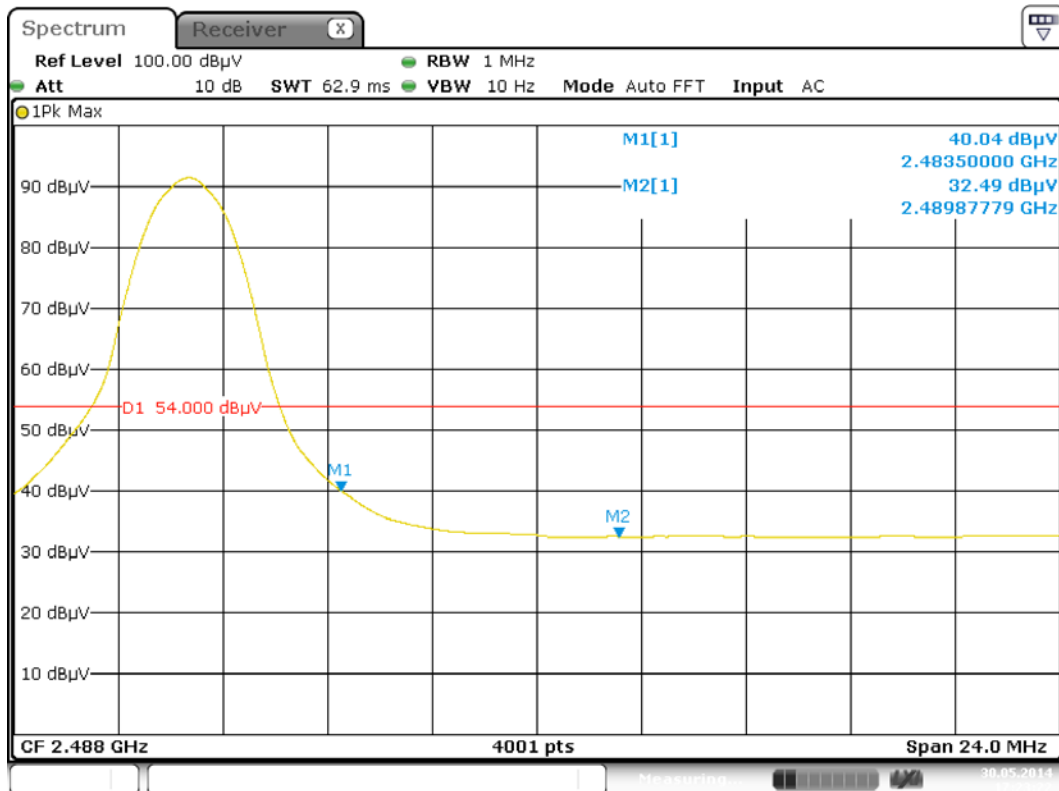
π /4DQPSK HIGH CHANNEL , ANT V, AVERAGE



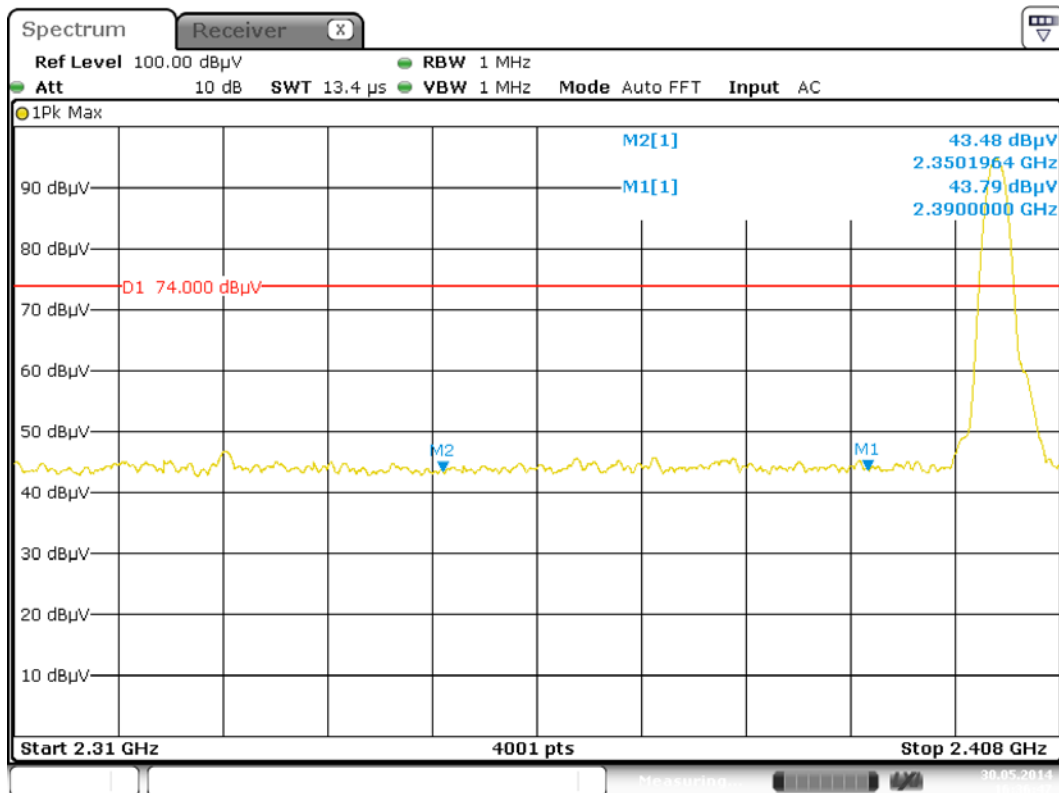
π /4DQPSK HIGH CHANNEL , ANT H, PEAK



π /4DQPSK HIGH CHANNEL , ANT H, AVERAGE

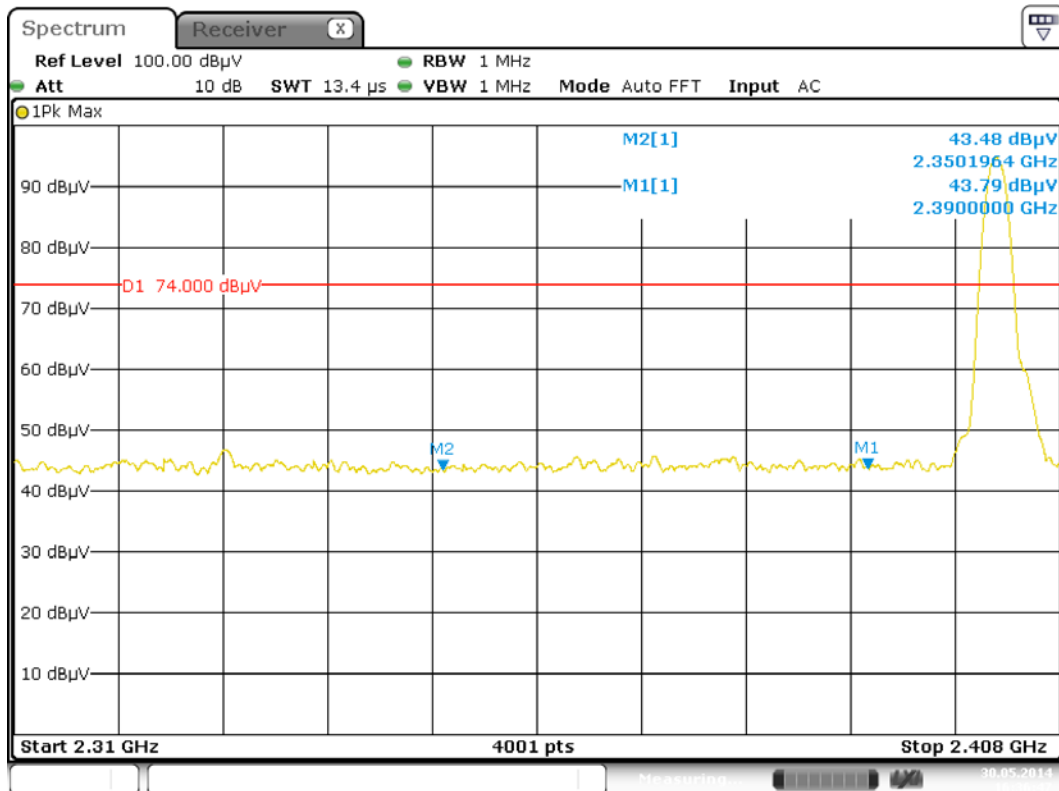


8-DPSK LOW CHANNEL , ANT V, PEAK



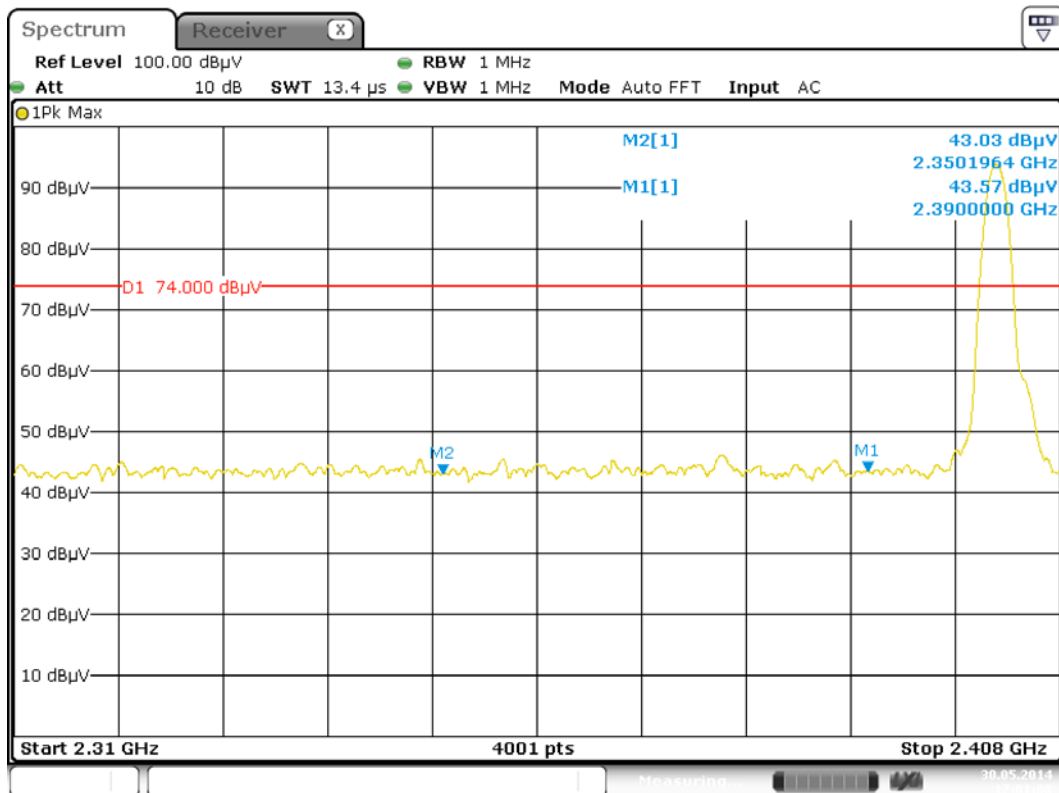
Date: 30.MAY.2014 16:36:47

8-DPSK LOW CHANNEL , ANT V, AVERAGE

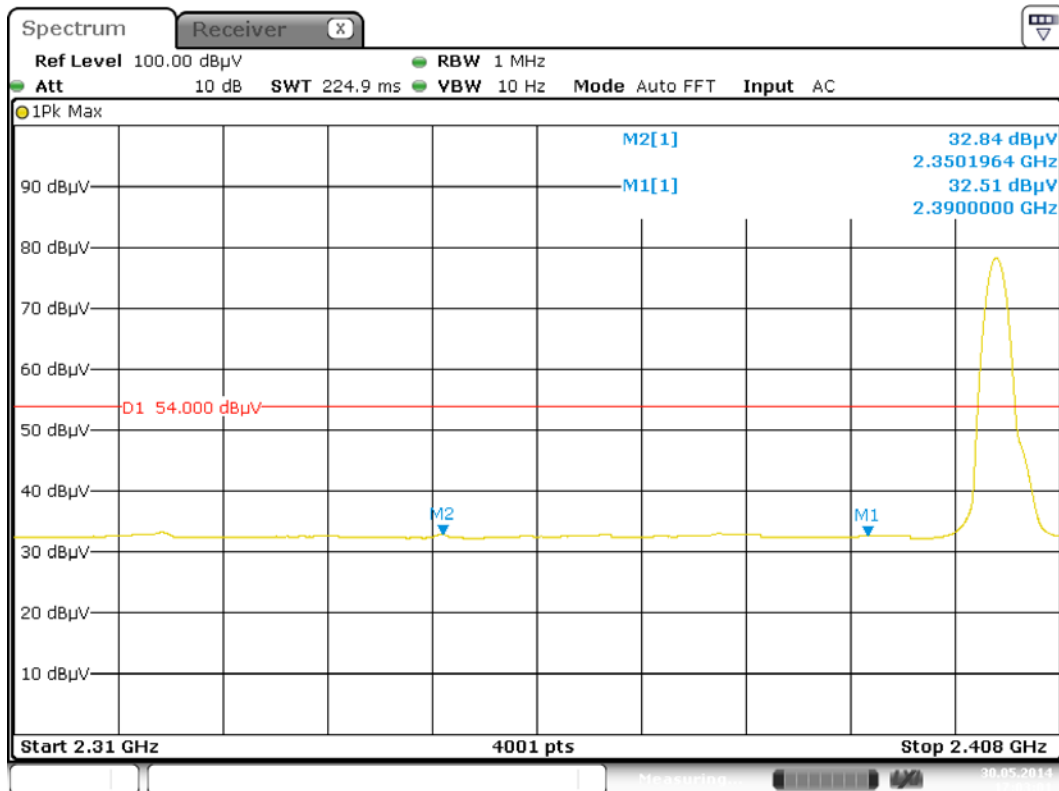


Date: 30.MAY.2014 16:36:47

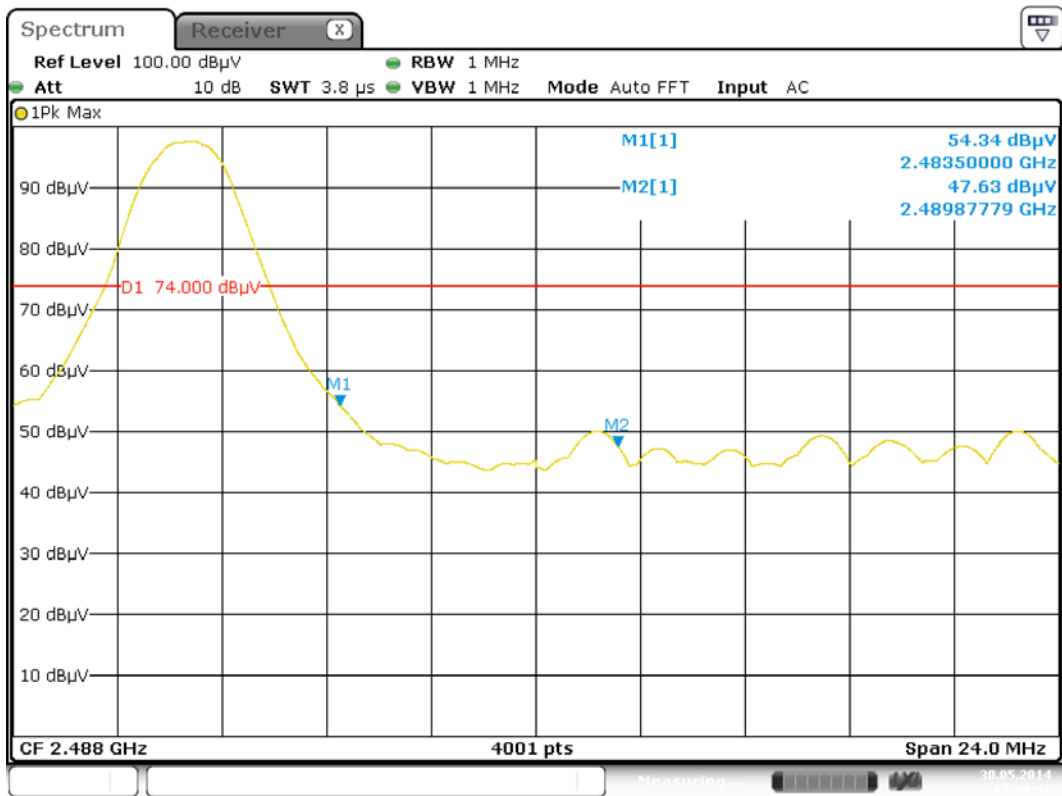
8-DPSK LOW CHANNEL , ANT H, PEAK



8-DPSK LOW CHANNEL , ANT H, AVERAGE

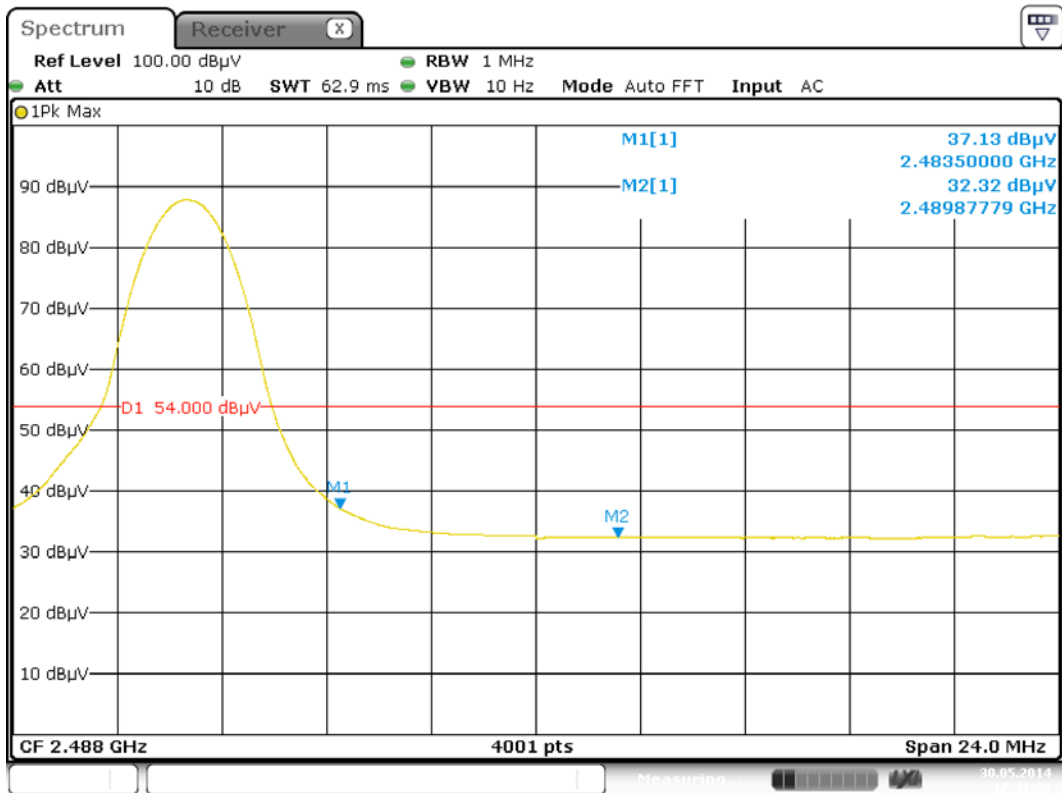


8-DPSK HIGH CHANNEL , ANT V, PEAK



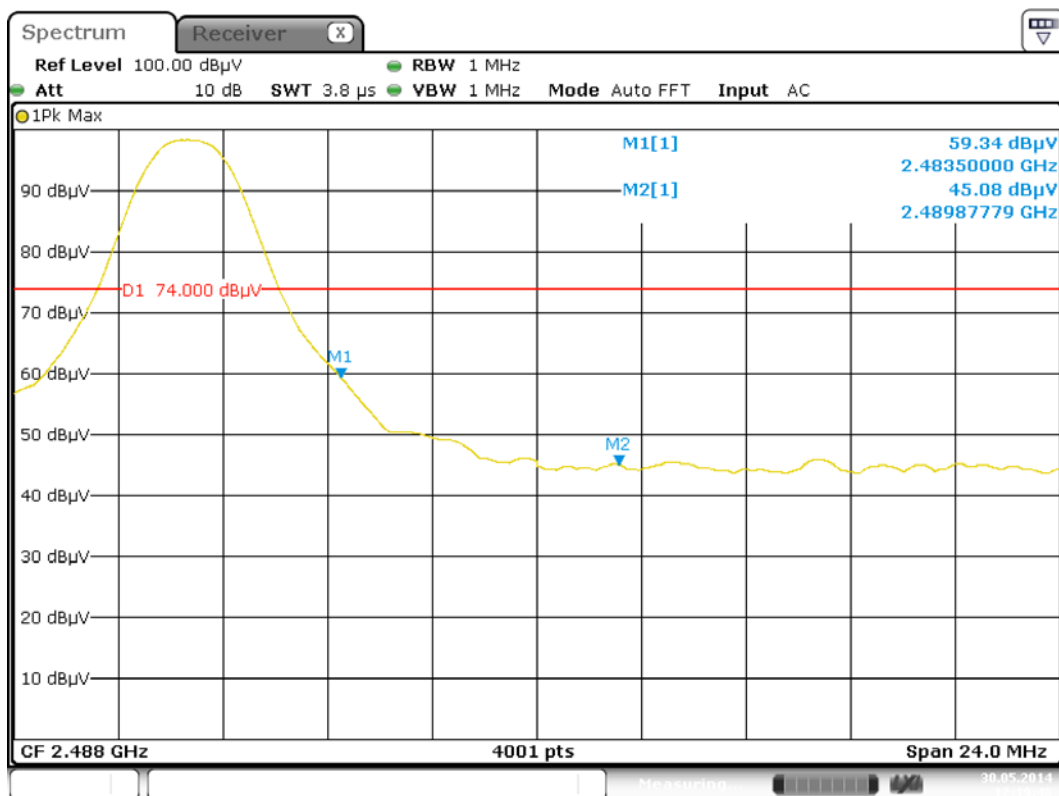
Date: 30.MAY.2014 17:39:40

8-DPSK HIGH CHANNEL , ANT V, AVERAGE

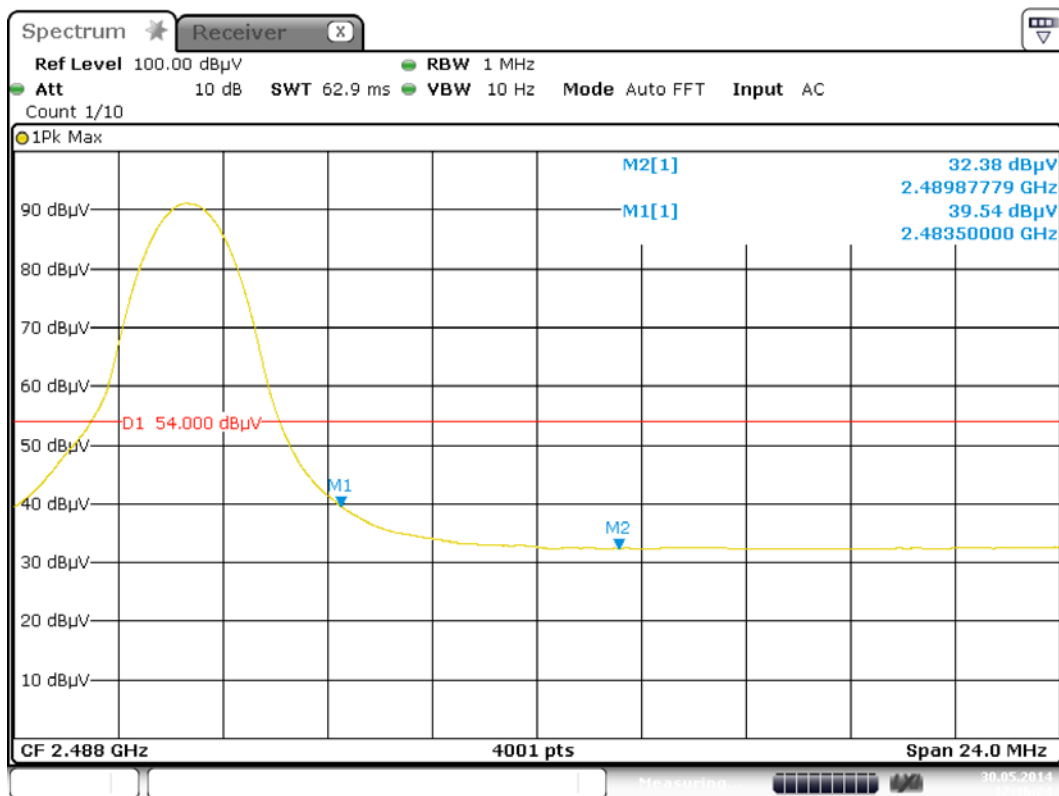


Date: 30.MAY.2014 17:41:08

8-DPSK HIGH CHANNEL , ANT H, PEAK



8-DPSK HIGH CHANNEL , ANT H, AVERAGE



ANNEX B TEST SETUP PHOTOS

B.1 Conducted Test Photo



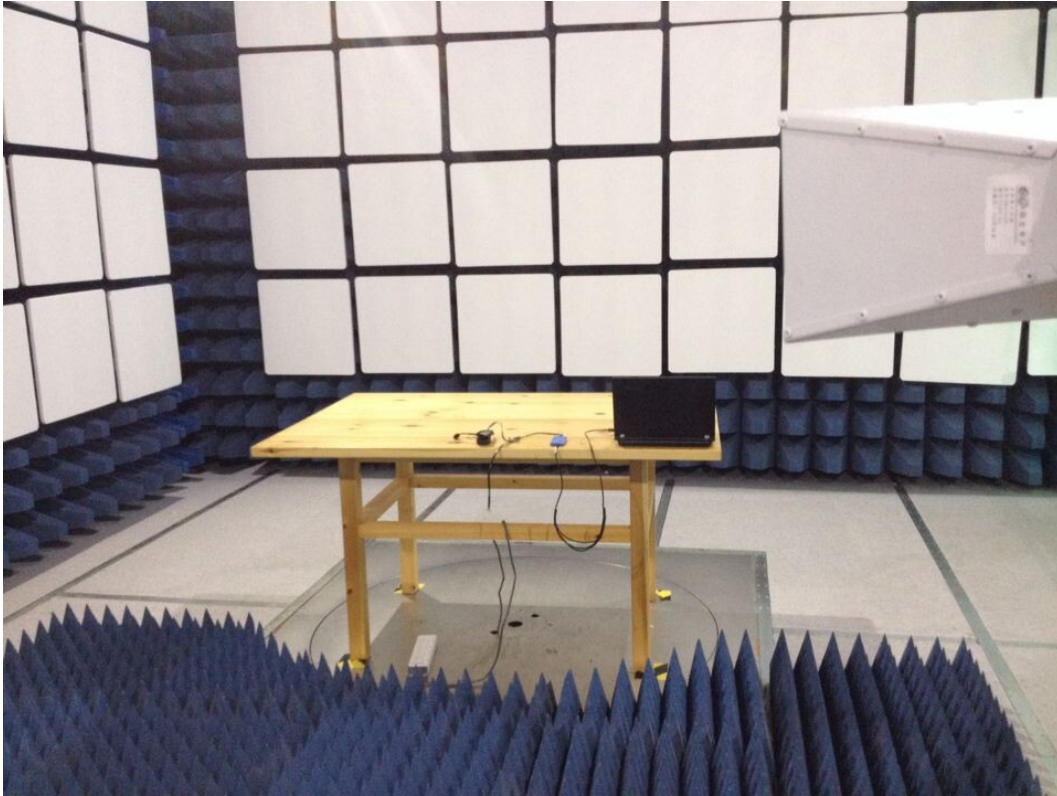
B.2 Radiated Test Photo



Below 30MHz



30MHz to 1GHz



Above 1GHz

ANNEX C EUT PHOTOS

C.1 Appearance of the EUT



THE FRONT OF EUT (1)



THE FRONT OF EUT (2)



THE DOWN OF EUT



THE UP OF EUT



THE LEFT OF EUT



THE RIGHT OF EUT



THE CHARGER OF EUT (1)



THE CHARGER OF EUT (2)

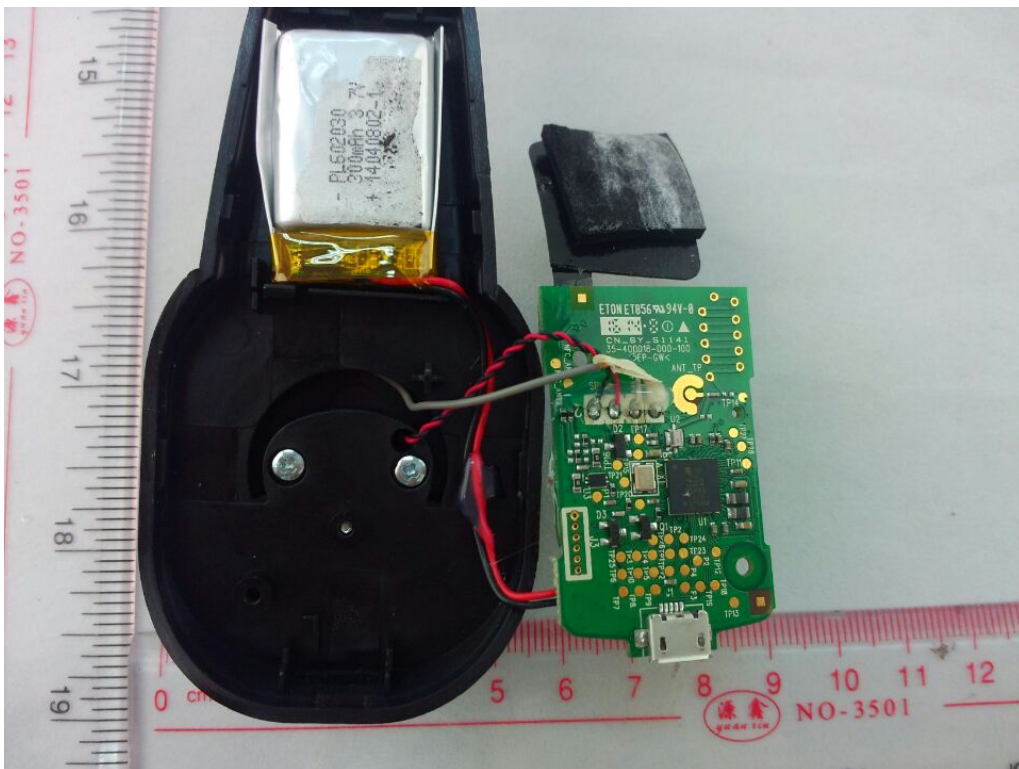


THE MICRO USB OF EUT

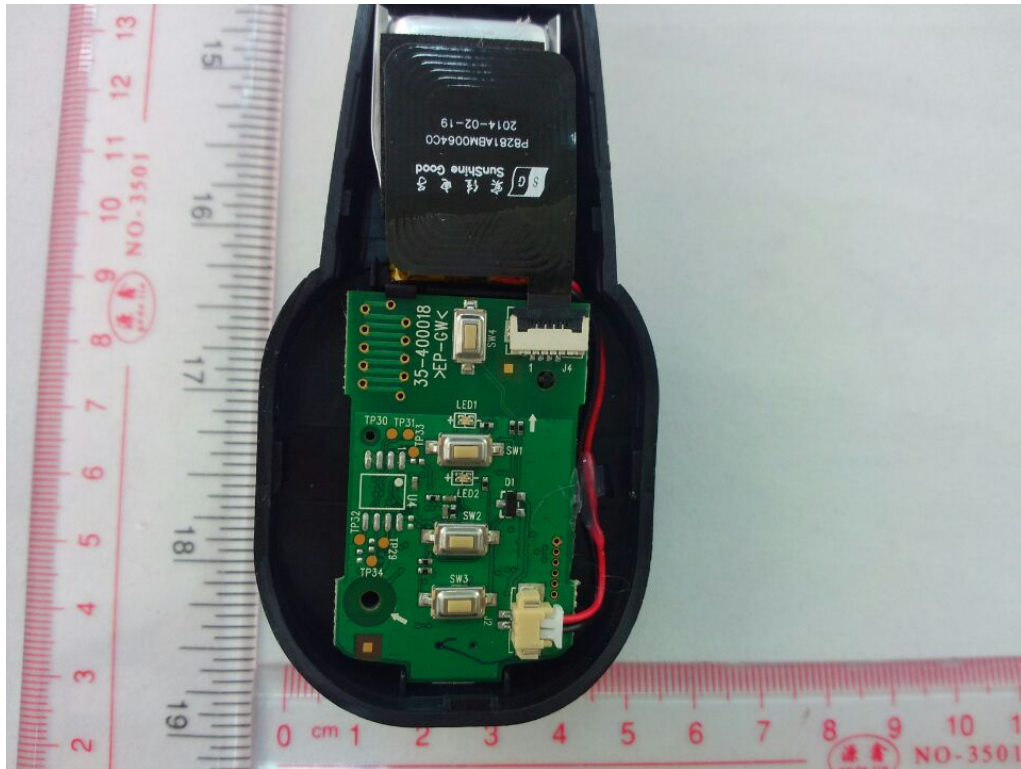
C.2 Inside of the EUT



EUT UNCOVER VIEW



MAIN BOARD TOP VIEW 1



MAIN BOARD BACK VIEW 1



BATTERY

--END OF REPORT--