

FCC

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR

WCDMA digital mobile phone

ISSUED TO

Power Idea Technology Limited.

4th Floor, A Section , Languang Science & technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, ShenZhen, China.



Prepared by:



Approved by:

Report No.: BL-SZ1440063-603
EUT Type: WCDMA digital mobile phone
Model Name: RG700, RG970, APEX PRO
Brand Name: N/A
Test Standard: 47 CFR Part 15 Subpart C
FCC ID: ZLE-RG700RG970
Test conclusion: PASS
Test Date: May 7, 2014 ~ May 21, 2014
Date of Issue: May 24, 2014

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Revision History

Version	Issue Date	Revisions
Rev. 01	May 24, 2014	Initial 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 106 kPa

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	Power Idea Technology Limited.
Address	4th Floor, A Section, Languang Science & technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, Shenzhen, China.

2.2 Manufacturer

Manufacturer	Power Idea Technology Limited.
Address	4th Floor, A Section, Languang Science & technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, Shenzhen, China.

2.3 General Description for Equipment under Test (EUT)

EUT Type	WCDMA digital mobile phone
Model Name	RG700
Series Model Name	RG700, RG970, APEX PRO
Description of Model name differentiation	The equipment model RG700, RG970 and APEX PRO are WCDMA digital mobile phone, the electrical parameters and internal structure of circuit are same, only the model is different.
Hardware Version	P2
Software Version	N/A
Network and Wireless connectivity	BT 3.0+EDR
About the Product	The EUT is a WCDMA digital mobile phone, 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 $f_c = 2402 \text{ MHz} + N * 1 \text{ MHz}$, 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	PIFA Antenna	
Antenna Gain	0dBi	

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	Ruide
	Model No	HD506083PL
	Serial No	(N/A. marked #1 by test site)
	Capacitance	3000mAh
	Rated Voltage	3.7V
	Extreme Voltage	Low: 3.5V / High:4.2V
Ancillary Equipment 2	AC Adapter (Charger for Battery)	
	Brand Name	Ruide
	Model No	71822258R
	Serial No	(N/A. marked #1 by test site)
	Rated Input	~ 100-240V, 200mA, 50/60Hz
Ancillary Equipment 3	Stereo Headset	
	USB 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 15.247(b)	--	Pass
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: Please refer to section 5.1

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)		3.5V
	HV (High Voltage)		4.2V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2014.05.10	2015.05.09
Spectrum Analyzer	ROHDE&SCHWARZ	FSL3	103640/003	2014.05.02	2015.05.01
Bluetooth Tester	ROHDE&SCHWARZ	CBT	101005	2014.05.11	2015.05.10
Power Splitter	KMW	DCPD-LDC	1305003215	2014.05.11	2015.05.10
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	VULB 9163	9163-624	2013.07.03	2014.07.02
Test Antenna-Bi-Log(30MHz-3GHz)	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2014.07.01
Test Antenna-Horn(1-18GHz)	SCHWARZBECK	BBHA 9170	9170-305	2013.07.02	2014.07.01
Test Antenna-Horn(15-26.5GHz)	SCHWARZBECK	FMZB 1519	1519-037	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

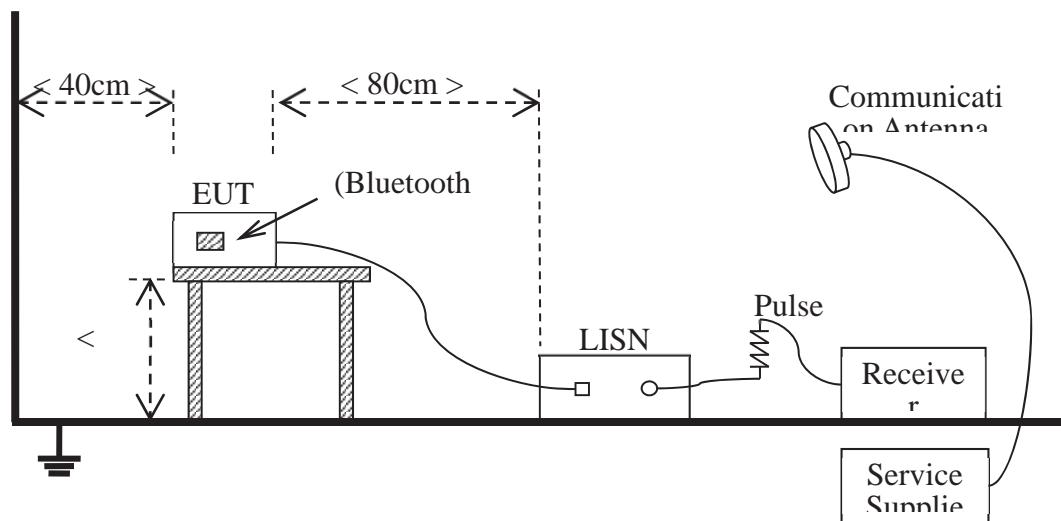
4.4 Description of Test Setup

4.4.1 For Antenna Port Test



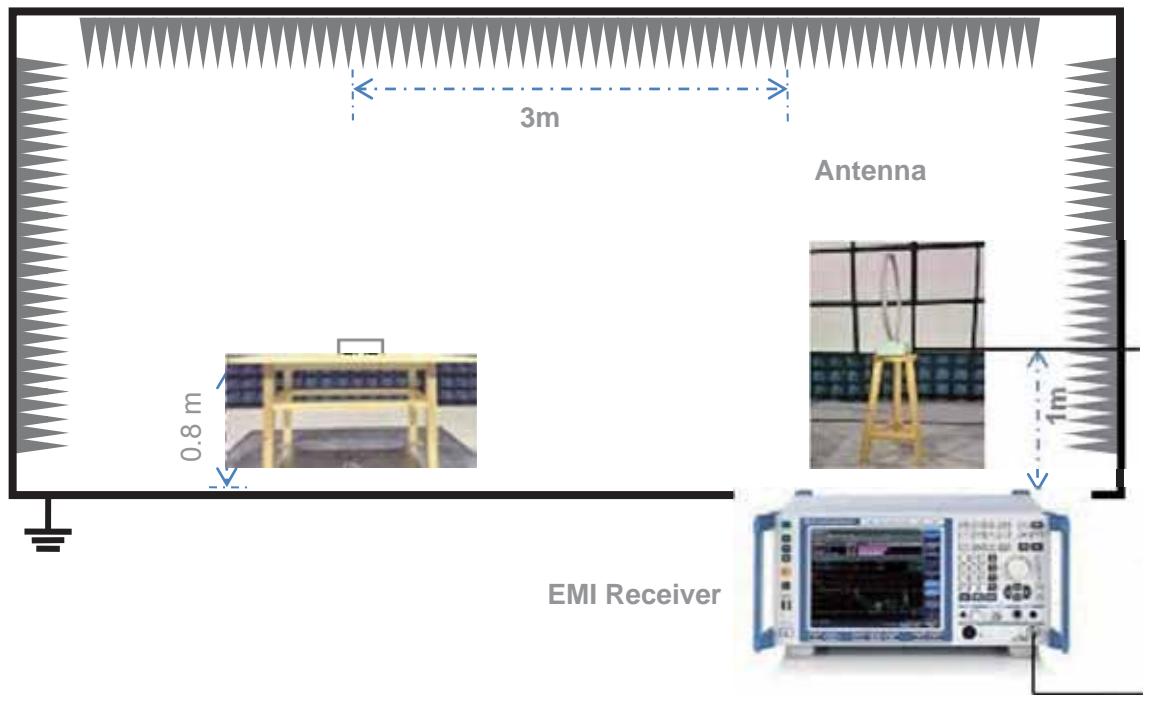
(Diagram 1)

4.4.2 For AC Power Supply Port Test



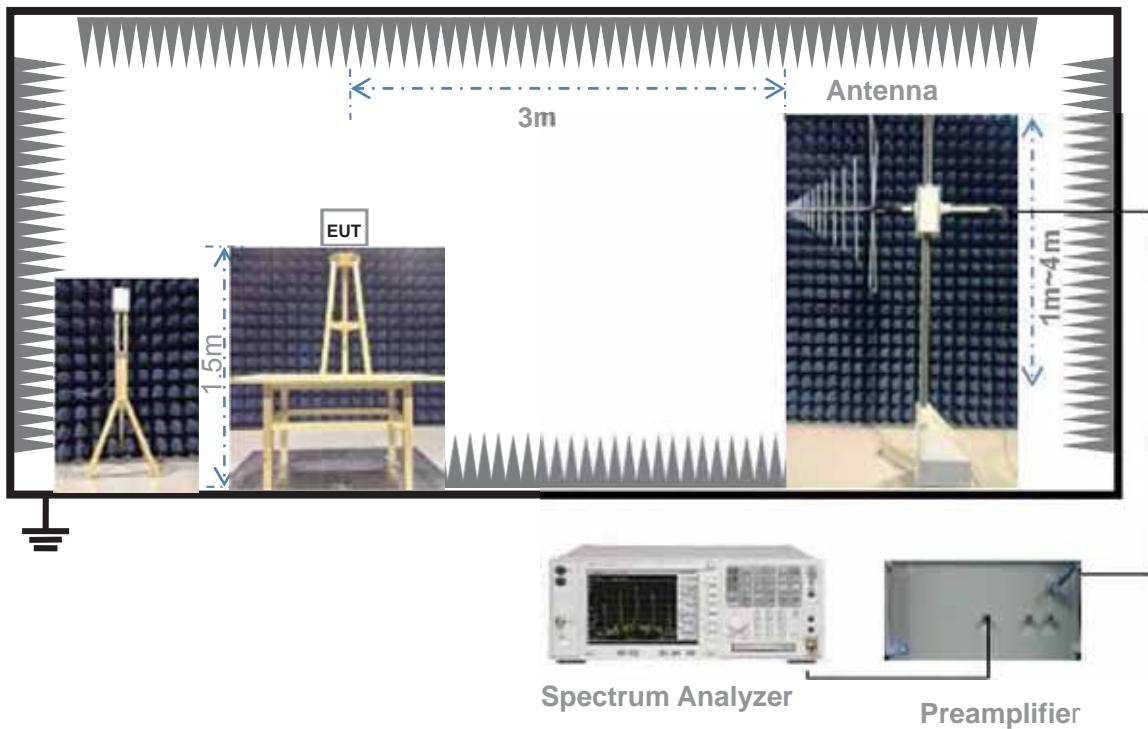
(Diagram 2)

4.4.3 For Radiated Test (Below 30MHz)



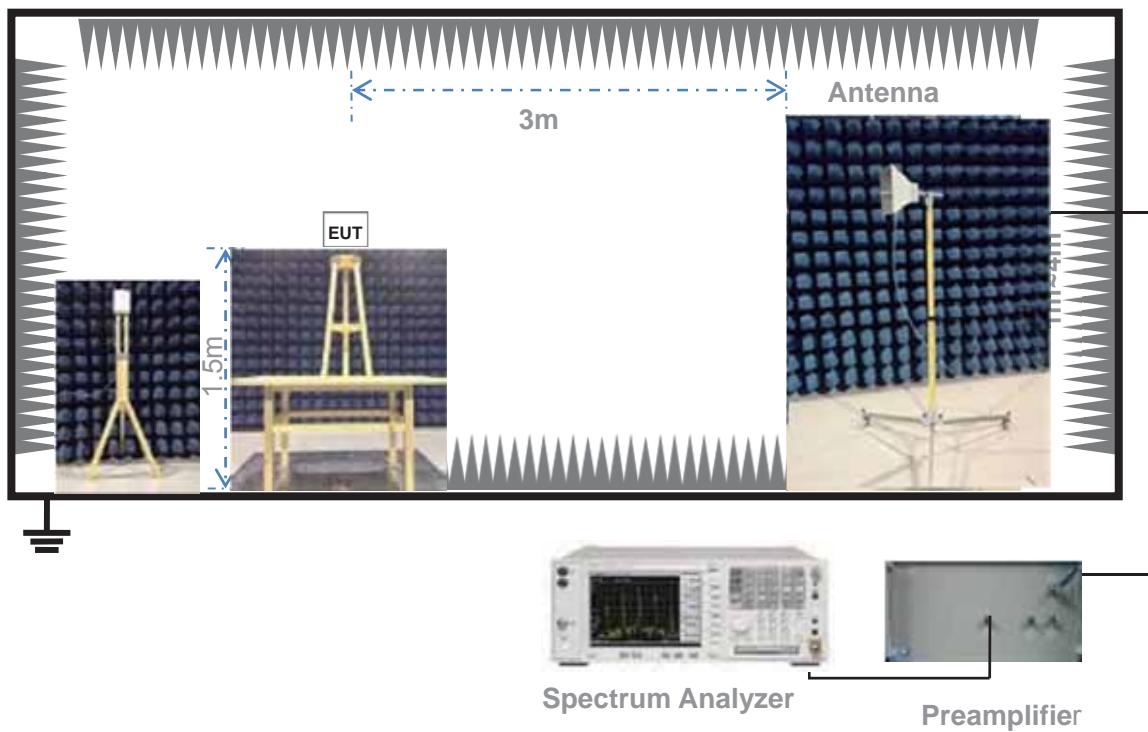
(Diagram 3)

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)

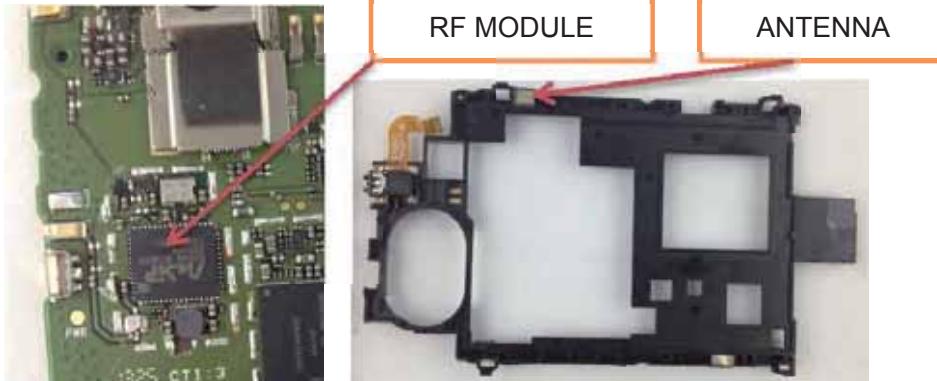
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply 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. The lowest, middle and highest channel were tested by Power meter.

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 ($10 \log 1\% = 20\text{dB}$) 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

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

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

For DH3 package type

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

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

For DH5 package type

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

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

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 (μ 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: 54dB_{AV}/m@3m (AV) and 74dB_{PK}/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.

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

AT: Total correction Factor except Antenna

UR: Receiver Reading

Gpreamplifier Gain

AFactor: Antenna Factor at 3m

ANNEX A TEST RESULT

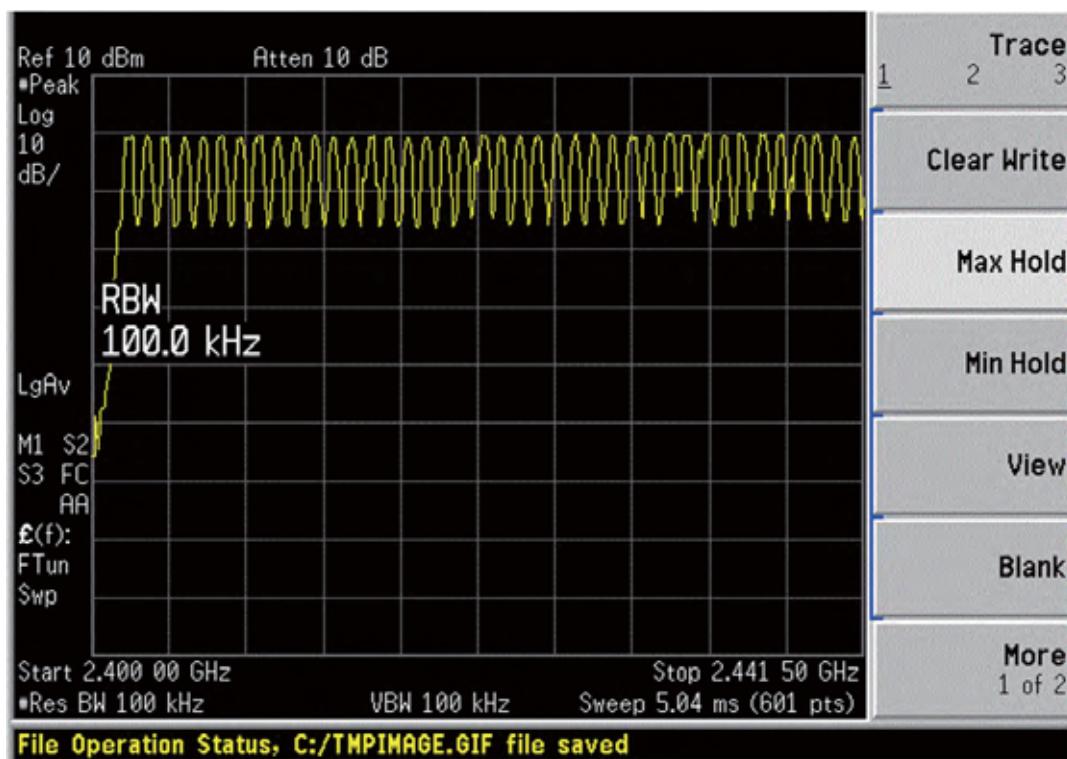
A.1 Number of Hopping Frequency

Test Data

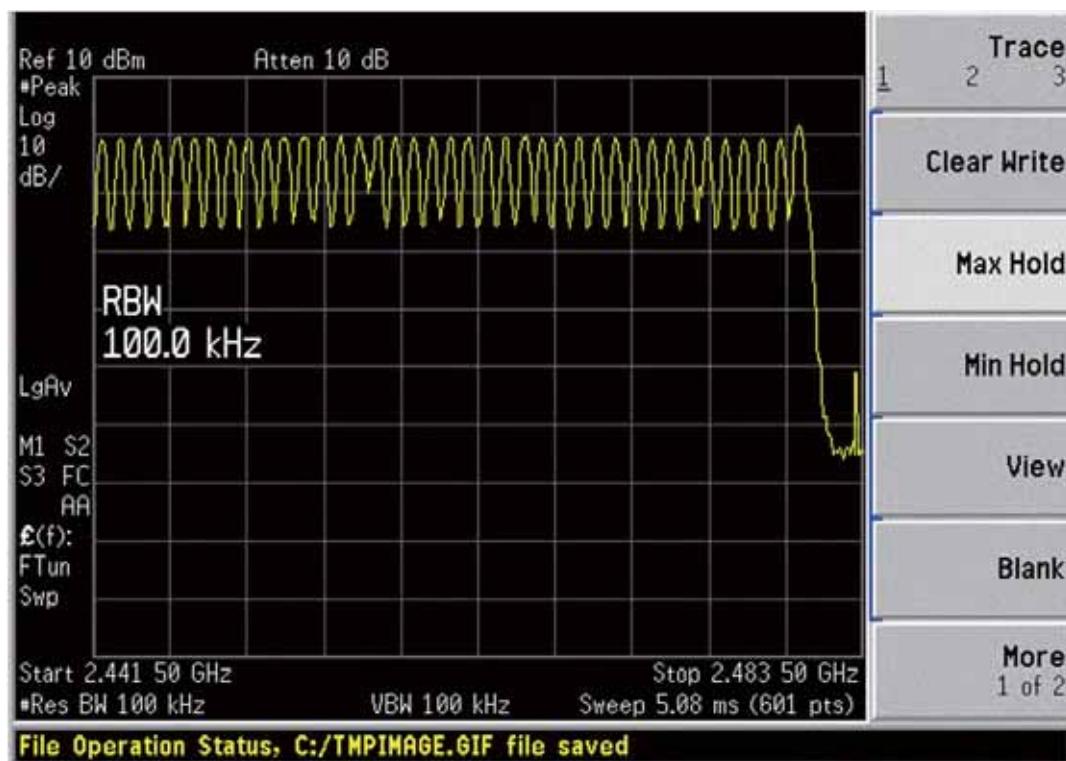
Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Verdict
GFSK	2400 - 2483.5	79	15	PASS
$\pi/4$ -DQPSK	2400 - 2483.5	79	15	PASS
8-DPSK	2400 - 2483.5	79	15	PASS

Test plots

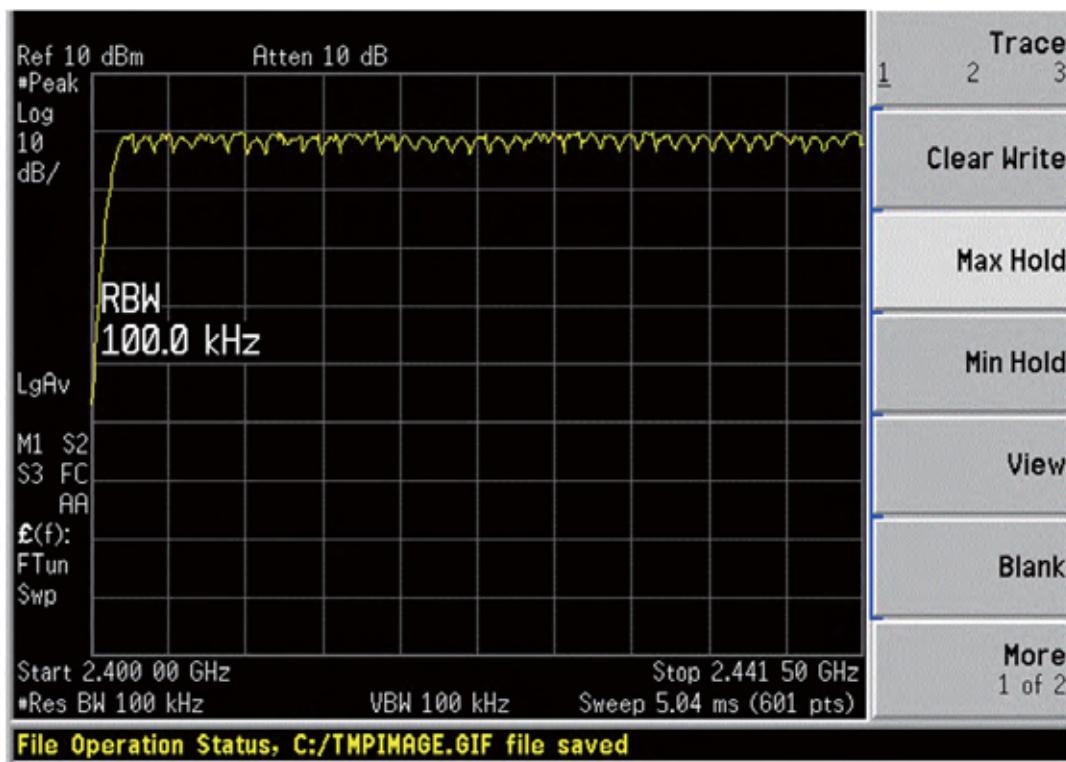
GFSK 2.4GHz~2.4415GHz



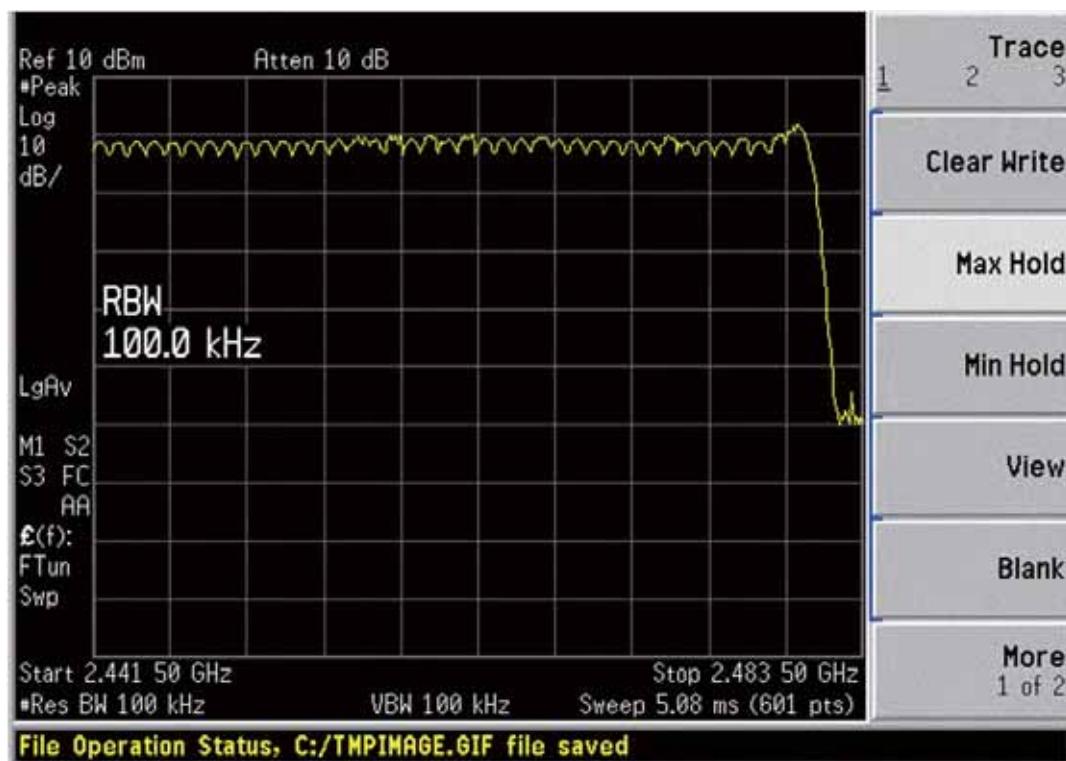
GFSK 2.4415GHz~2.4835GHz



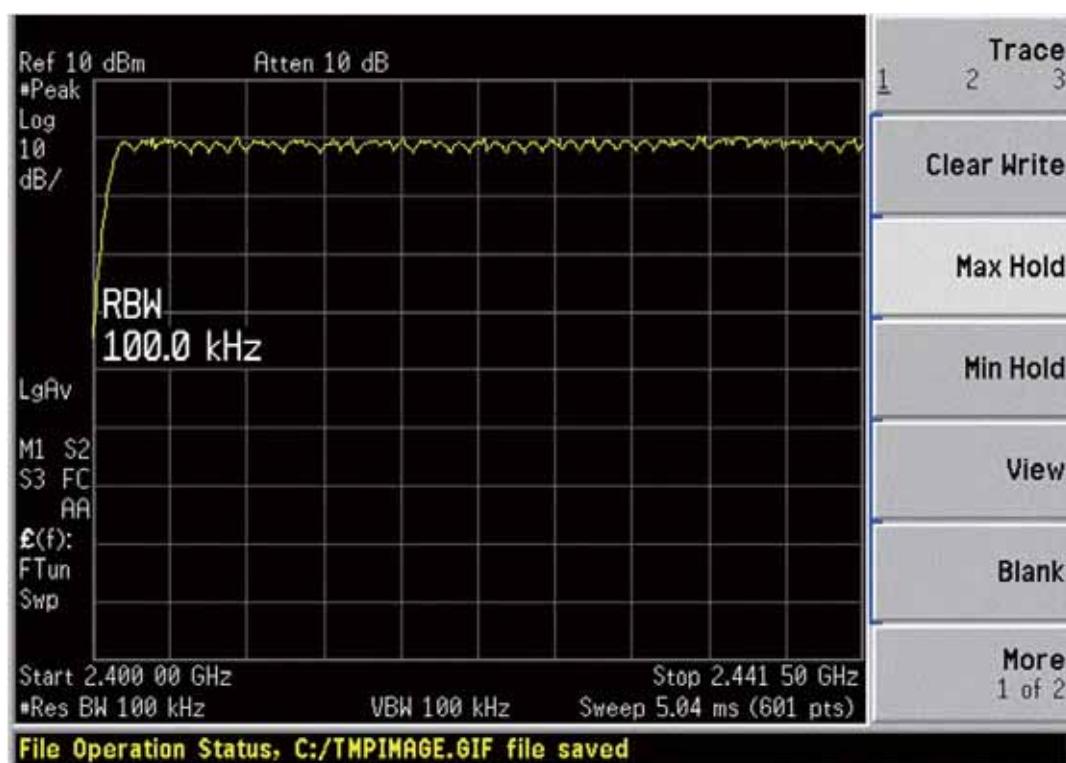
zΠ/4-DQPSK 2.4GHz~2.4415GHz



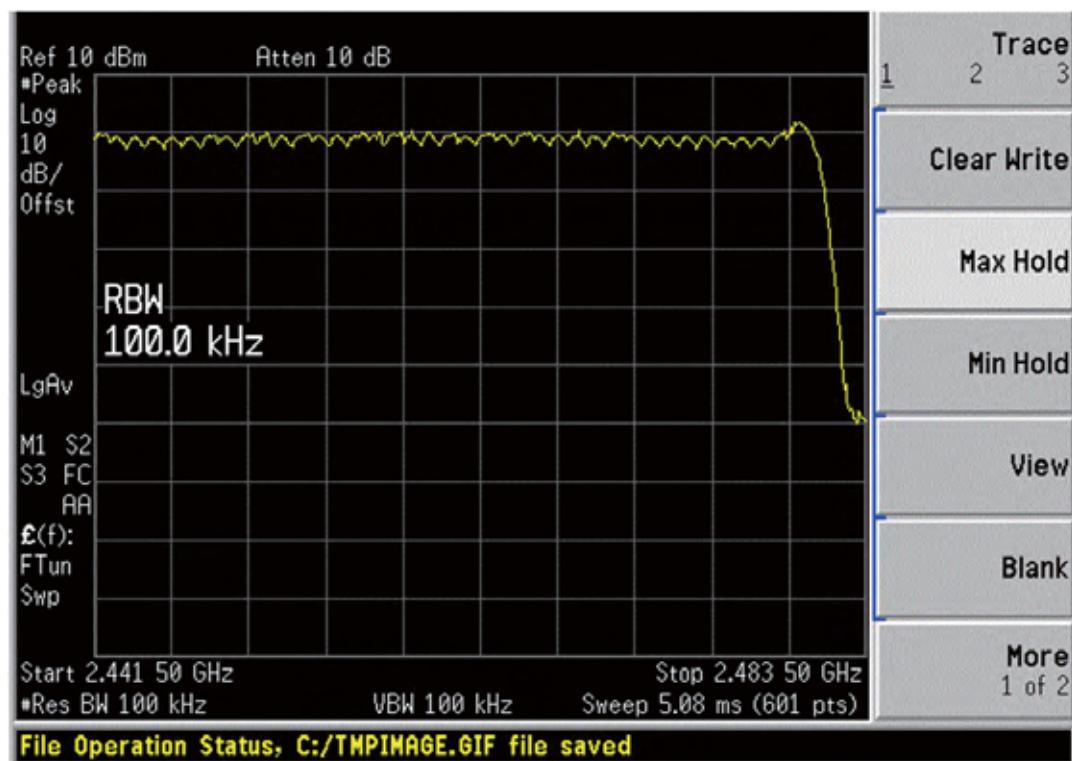
zΠ/4-DQPSK 2.4415GHz~2.4835GHz



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	5.36	3.44	30	1000	PASS
39	2441	5.50	3.55			PASS
78	2480	5.14	3.27			PASS

π/4-DQPSK Mode:

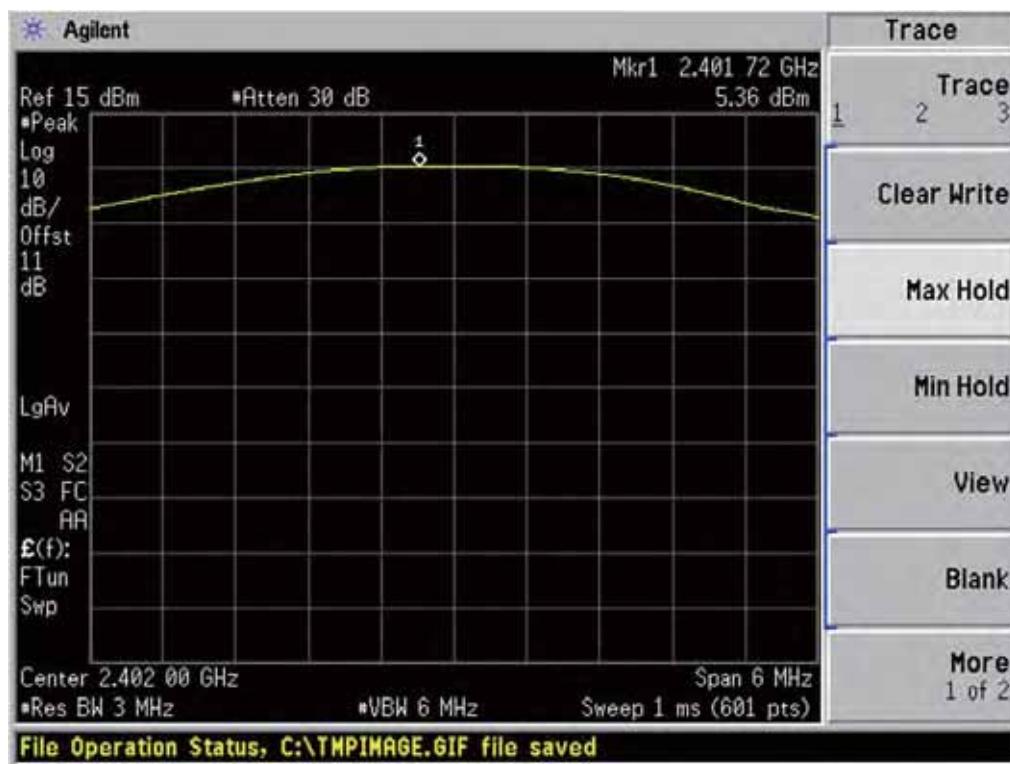
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
0	2402	4.24	2.65	30	1000	PASS
39	2441	4.46	2.79			PASS
78	2480	4.08	2.56			PASS

8-DPSK Mode:

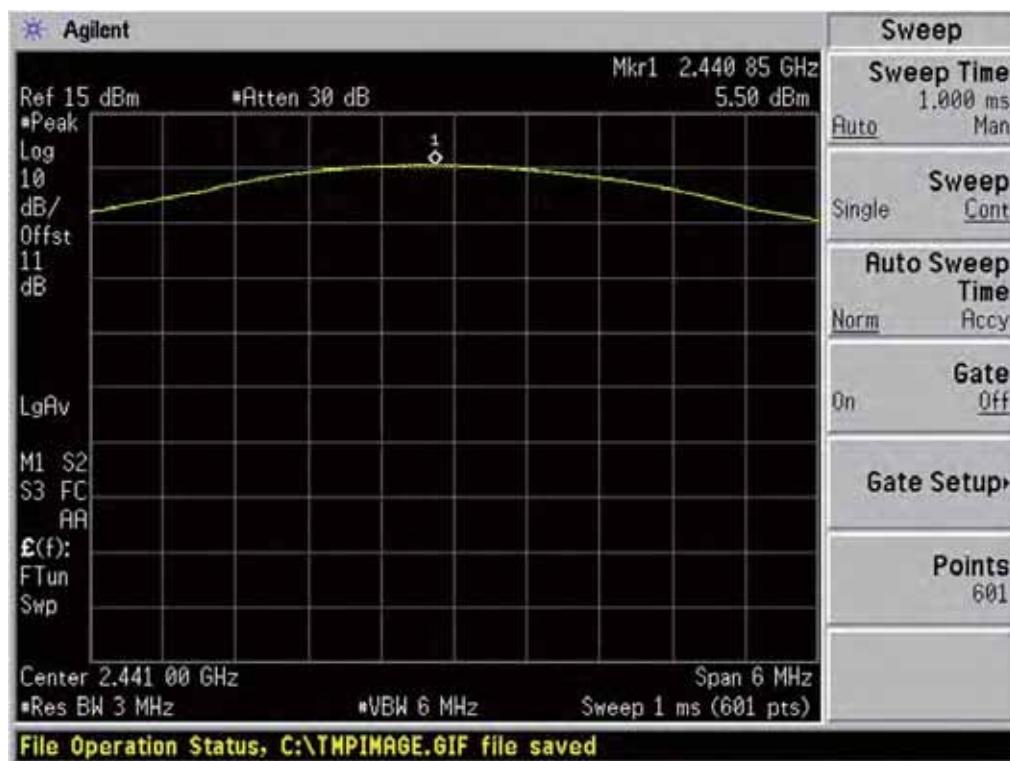
Channel	Frequency (MHz)	Measured Output Peak Power		Limit		Verdict
		dBm	mW	dBm	mW	
0	2402	4.28	2.68	30	1000	PASS
39	2441	3.63	2.31			PASS
78	2480	4.70	2.95			PASS

Test plots

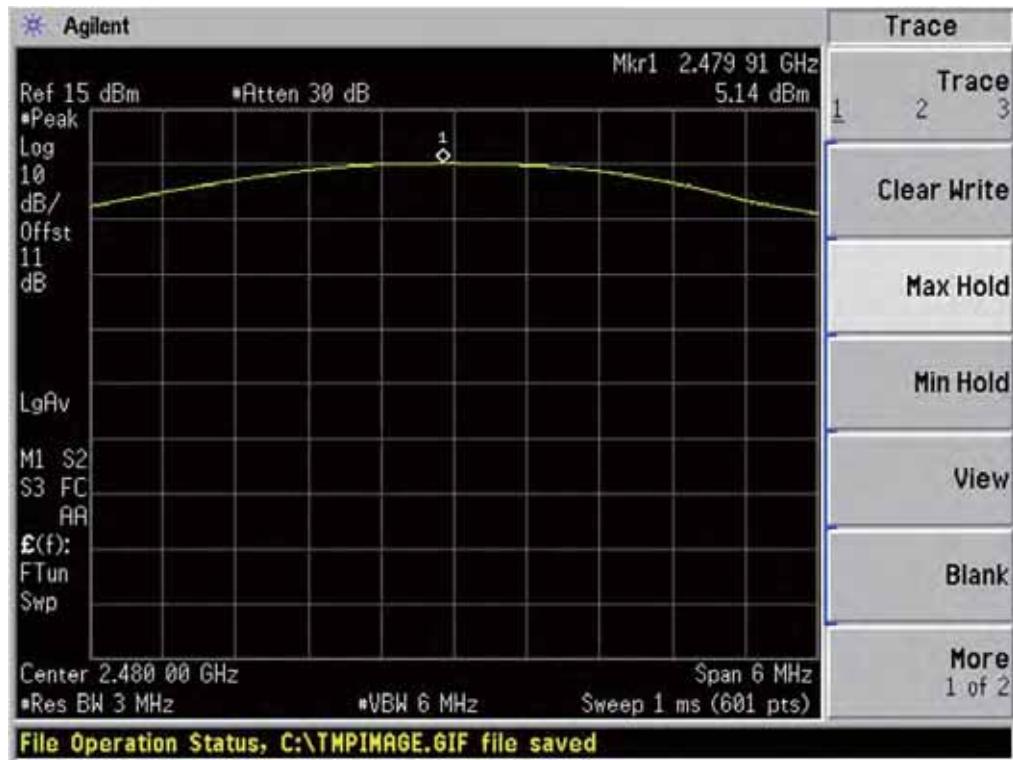
GFSK LOW CHANNEL



GFSK MID CHANNEL



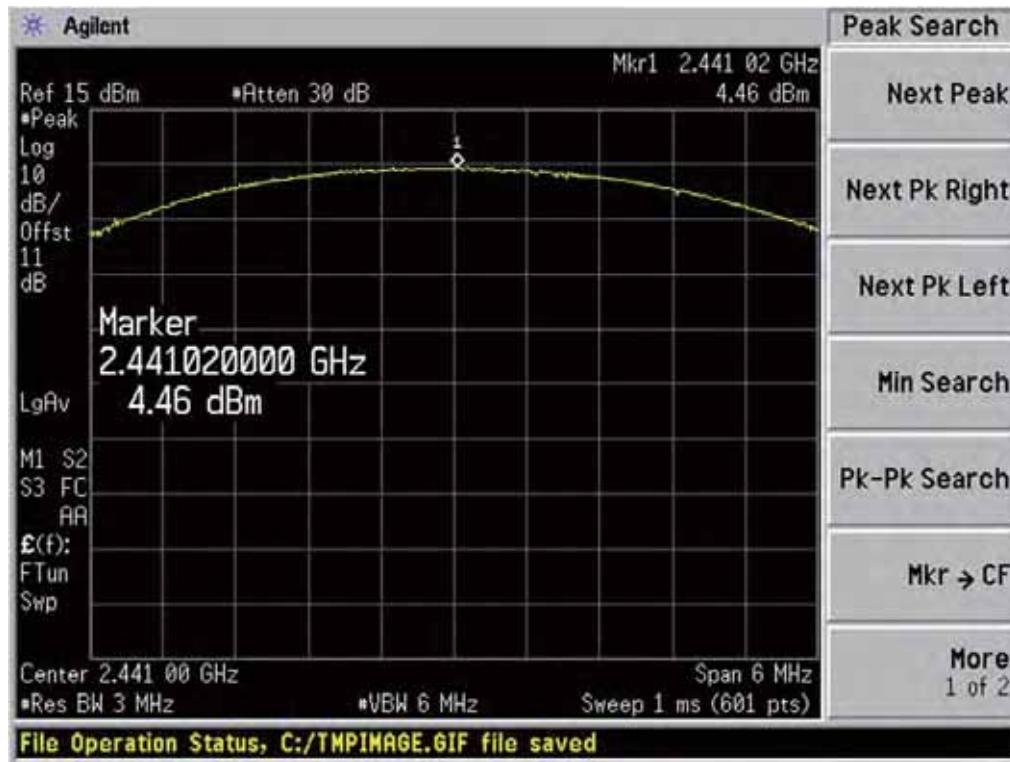
GFSK HIGH CHANNEL



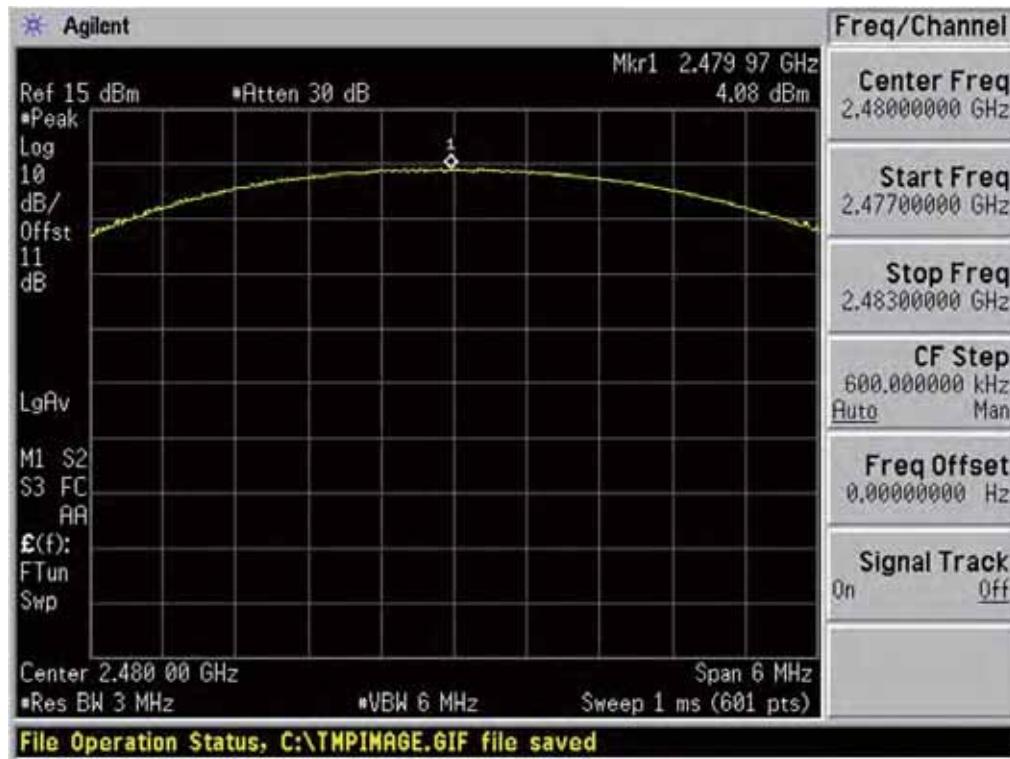
II/4-DQPSK LOW CHANNEL



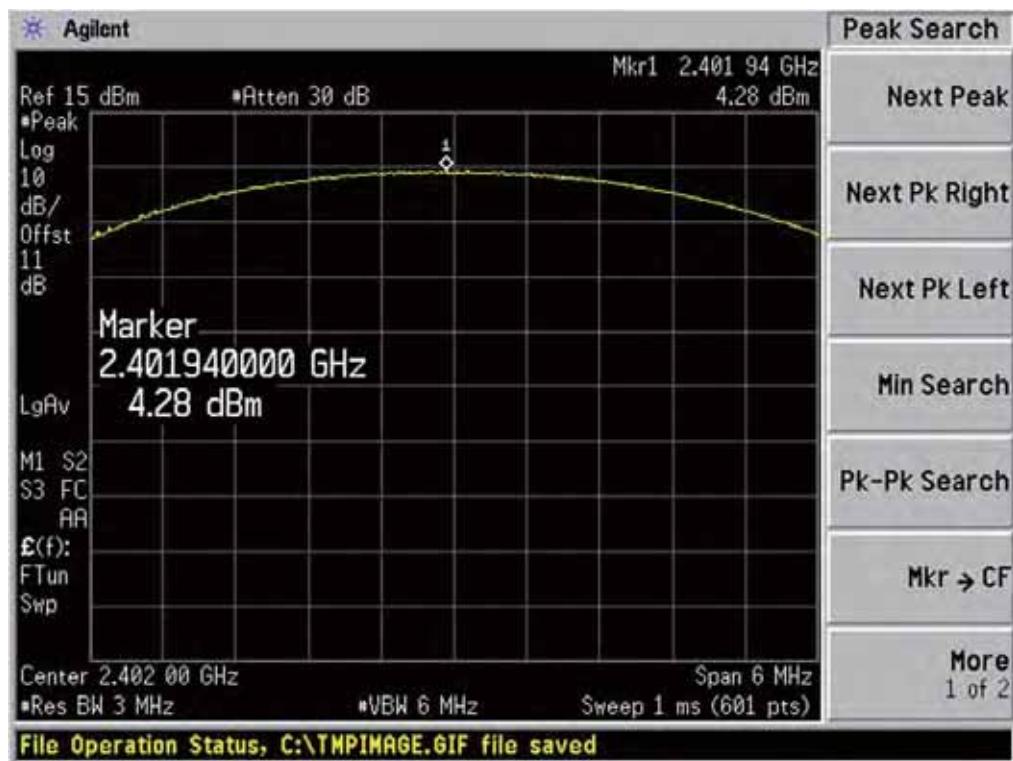
II/4-DQPSK MID CHANNEL



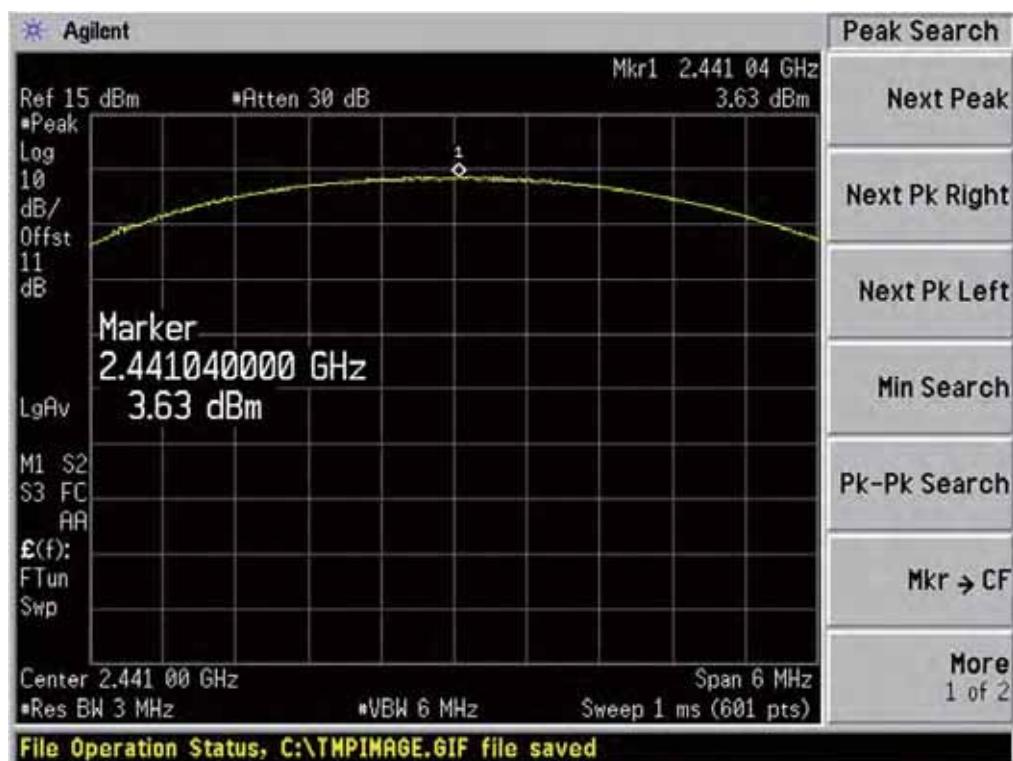
II/4-DQPSK HIGH CHANNEL



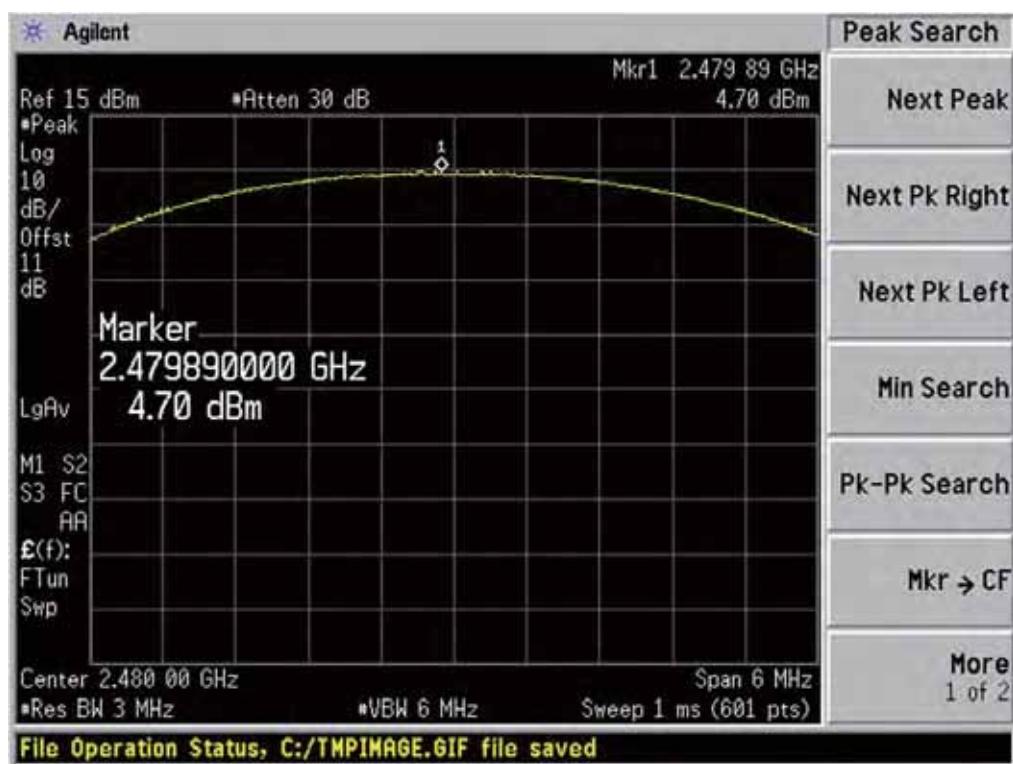
8-DPSK LOW CHANNEL



8-DPSK MID CHANAL



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	1.087	972.4845
Middle	2441	1.088	973.1781
High	2480	1.085	973.2449

π/4-DQPSK Mode:

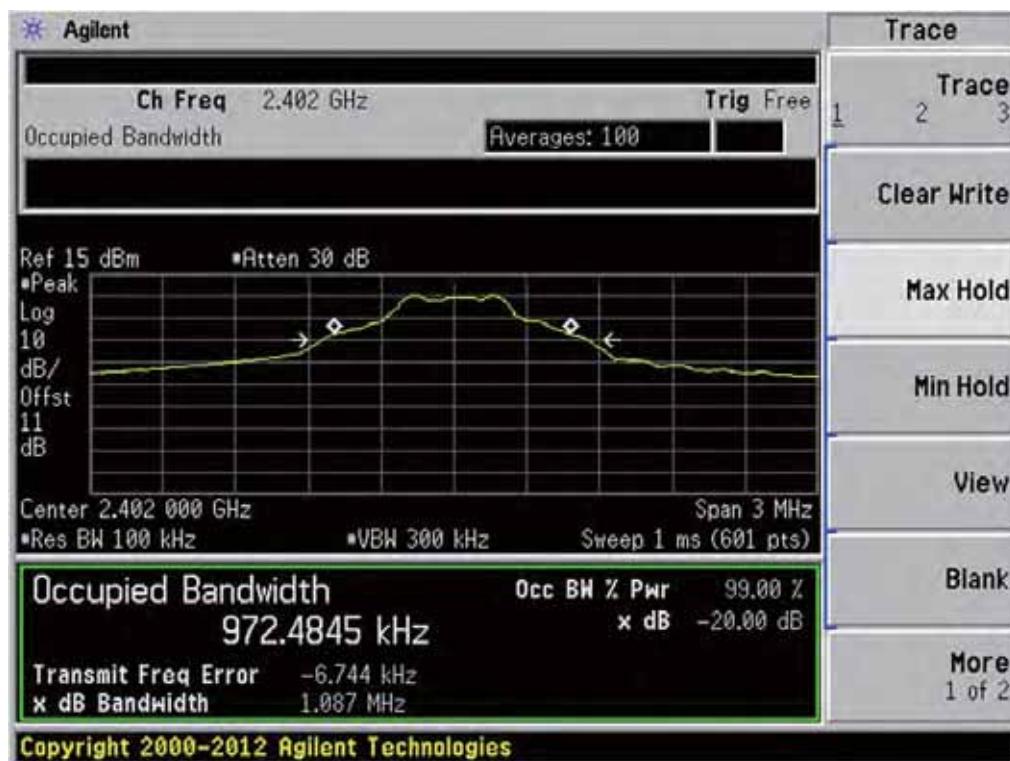
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.276	1.1601
Middle	2441	1.266	1.1607
High	2480	1.276	1.1612

8-DPSK Mode:

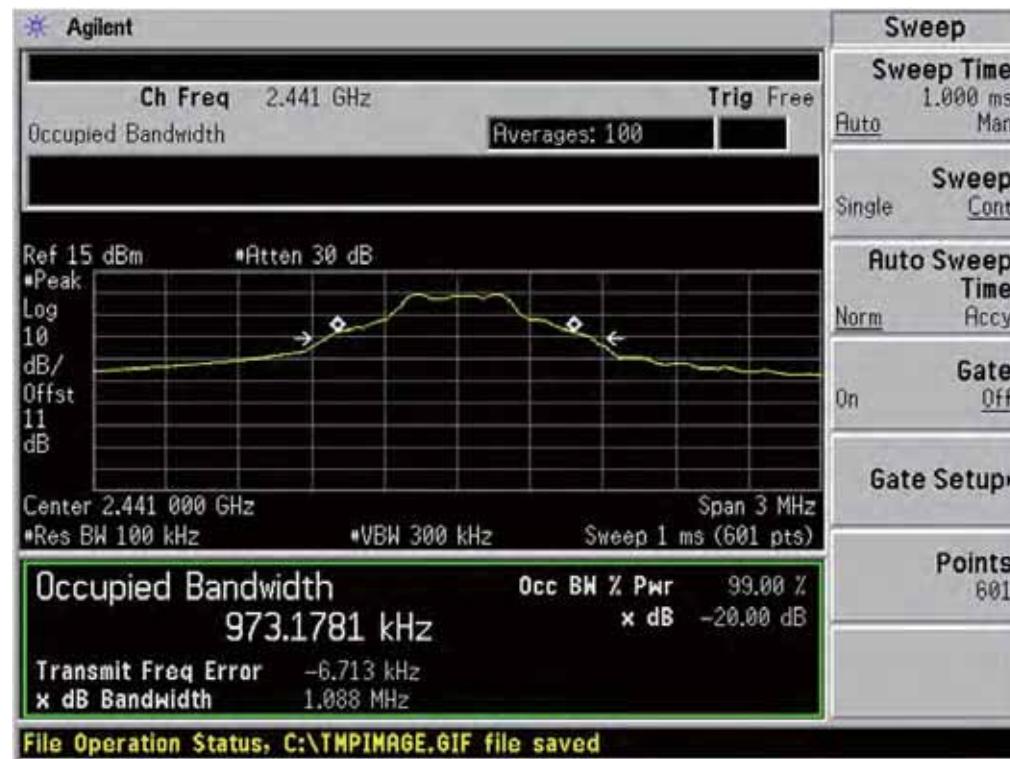
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.281	1.1440
Middle	2441	1.278	1.1456
High	2480	1.278	1.1460

Test plots

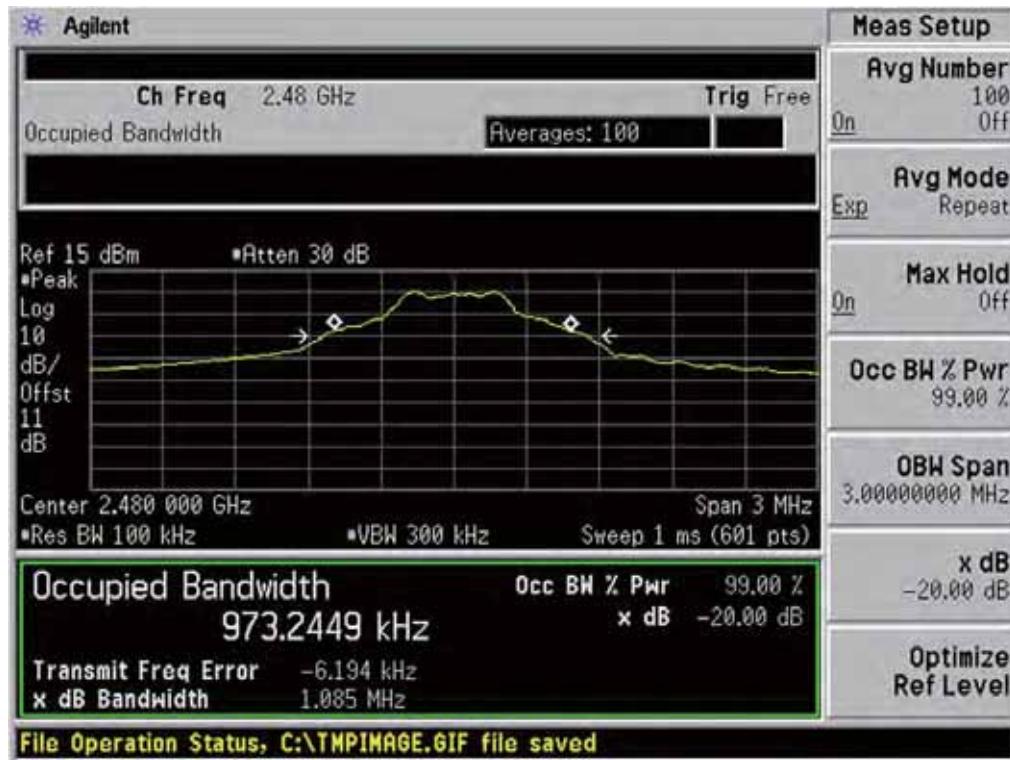
GFSK LOW CHANNEL



GFSK MID CHANNEL



GFSK HIGH CHANNEL



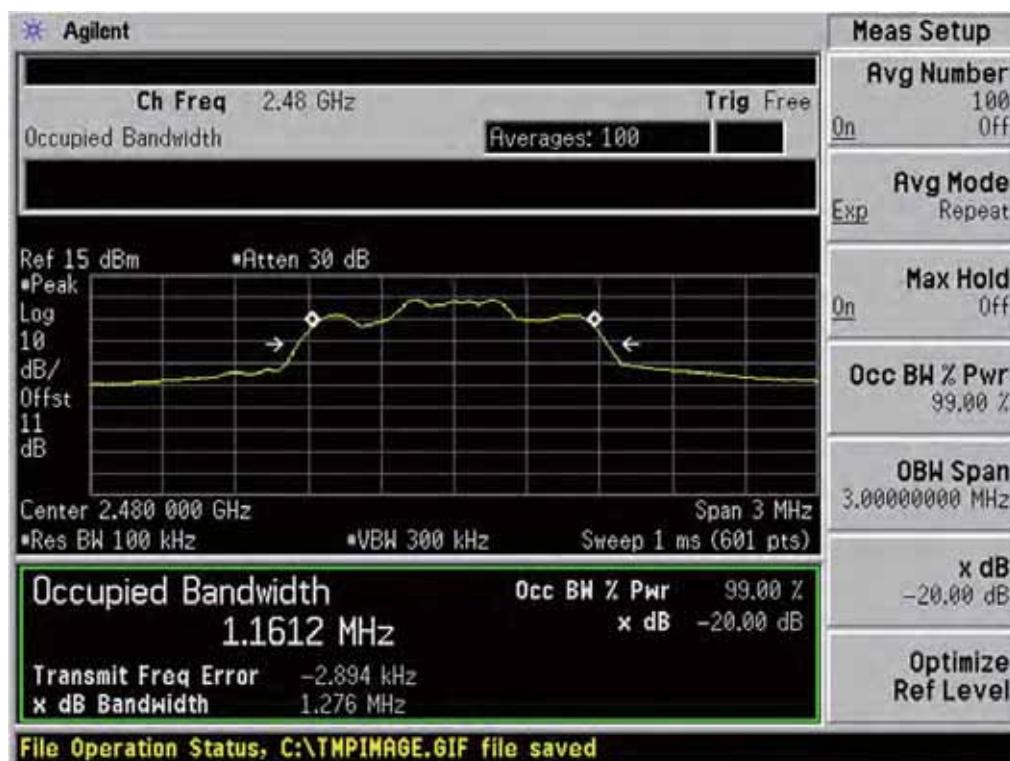
II/4-DQPSK LOW CHANNEL



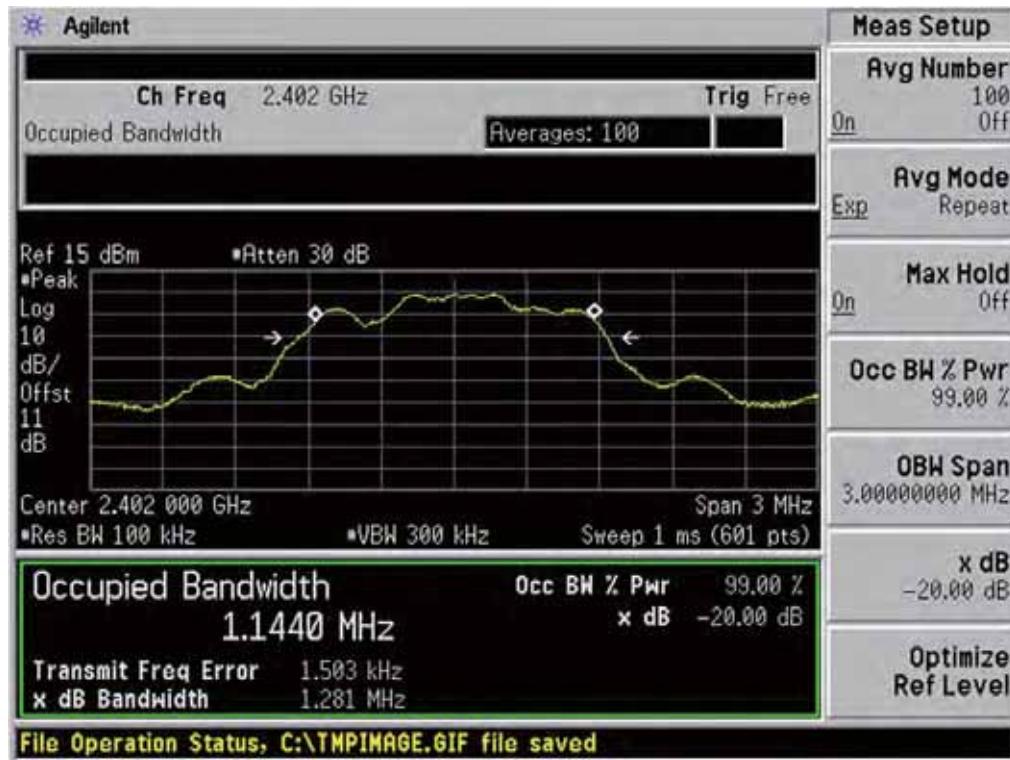
II/4-DQPSK MID CHANNEL



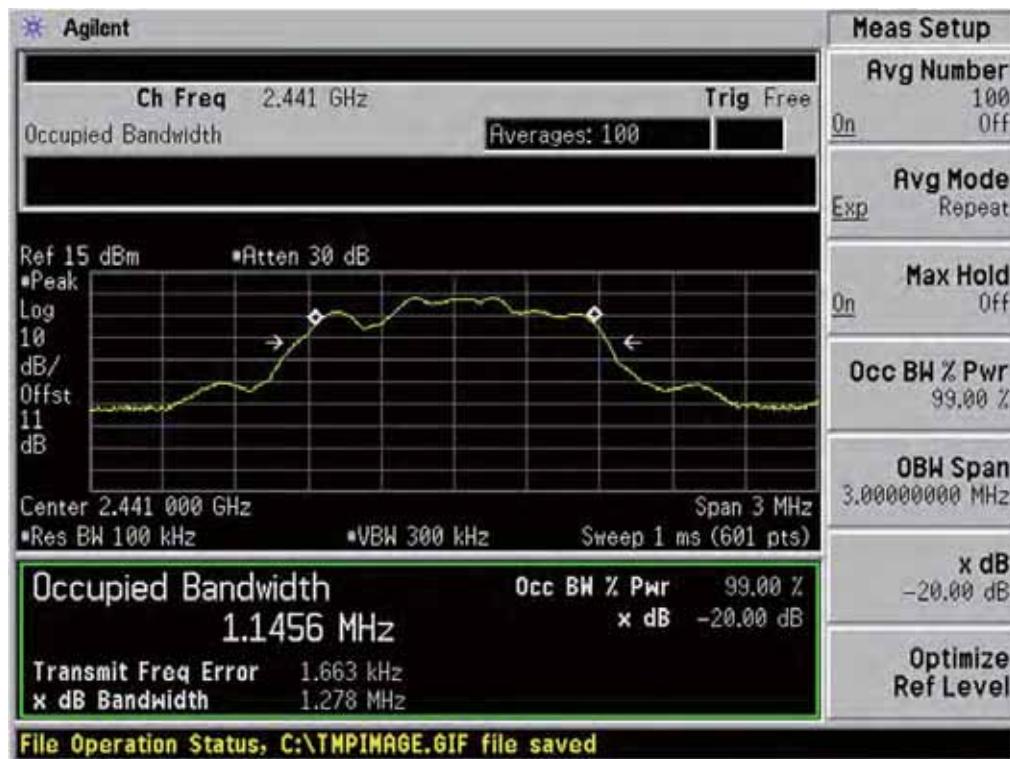
II/4-DQPSK HIGH CHANNEL



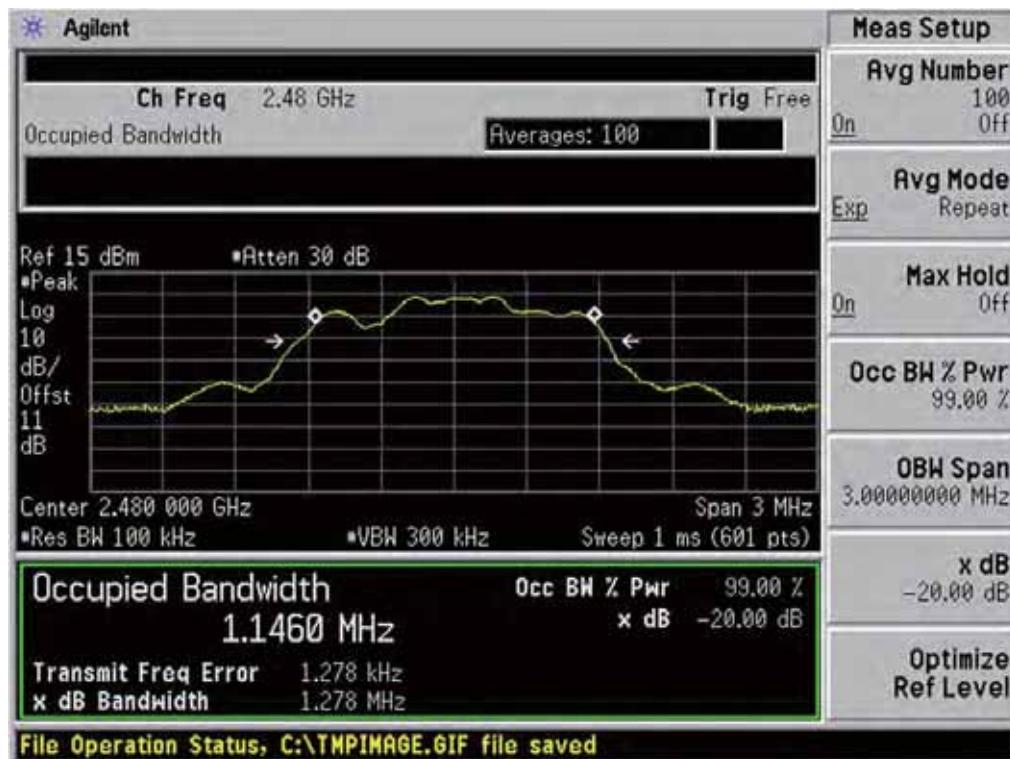
8-DPSK LOW CHANNEL



8-DPSK MID CHANNEL



8-DPSK HIGH CHANNEL



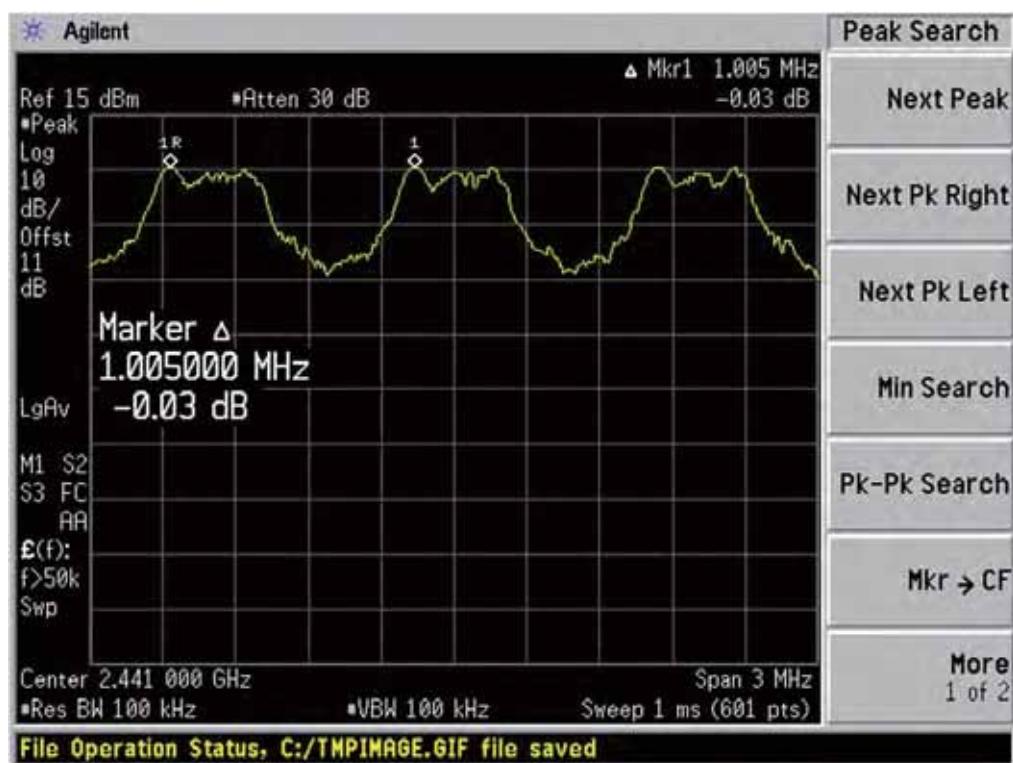
A.4 Hopping Frequency Separation

Test Data

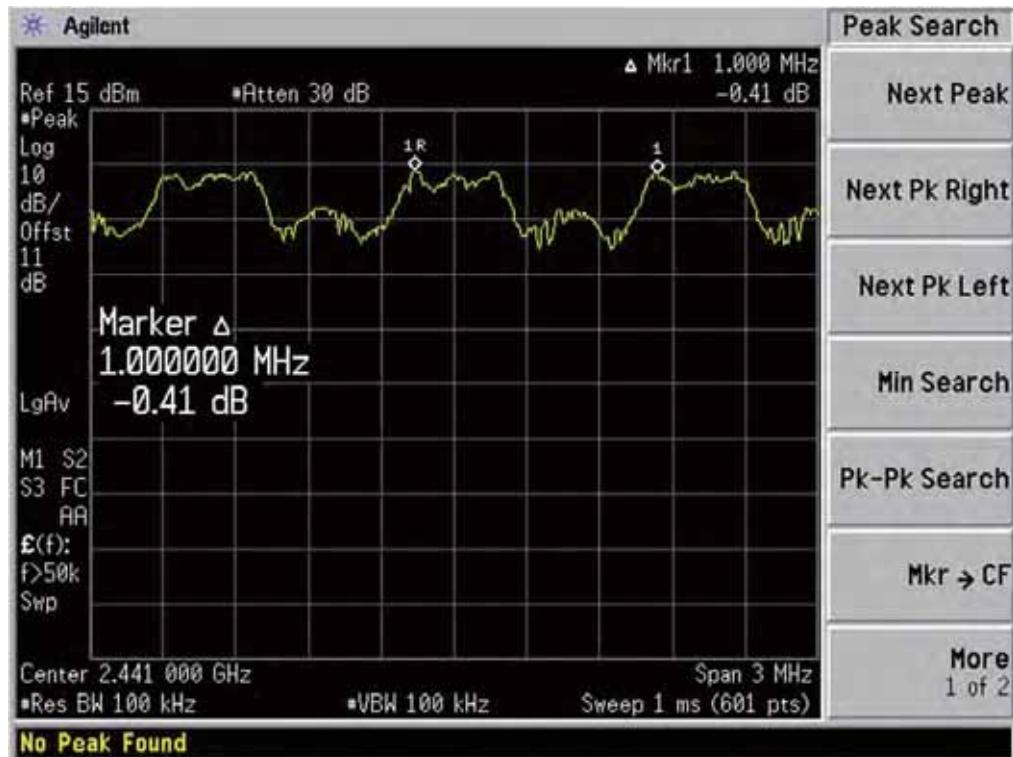
Mode	Frequency separation (MHz)	Max 20 dB Bandwidth (MHz)	Two-thirds of the 20dB bandwidth (MHz)	Verdict
GFSK	1.010	1.005	0.754	PASS
π/4-DQPSK Mode	1.005	1.000	0.886	PASS
8-DPSK Mode	1.010	1.010	0.883	PASS

Test plots

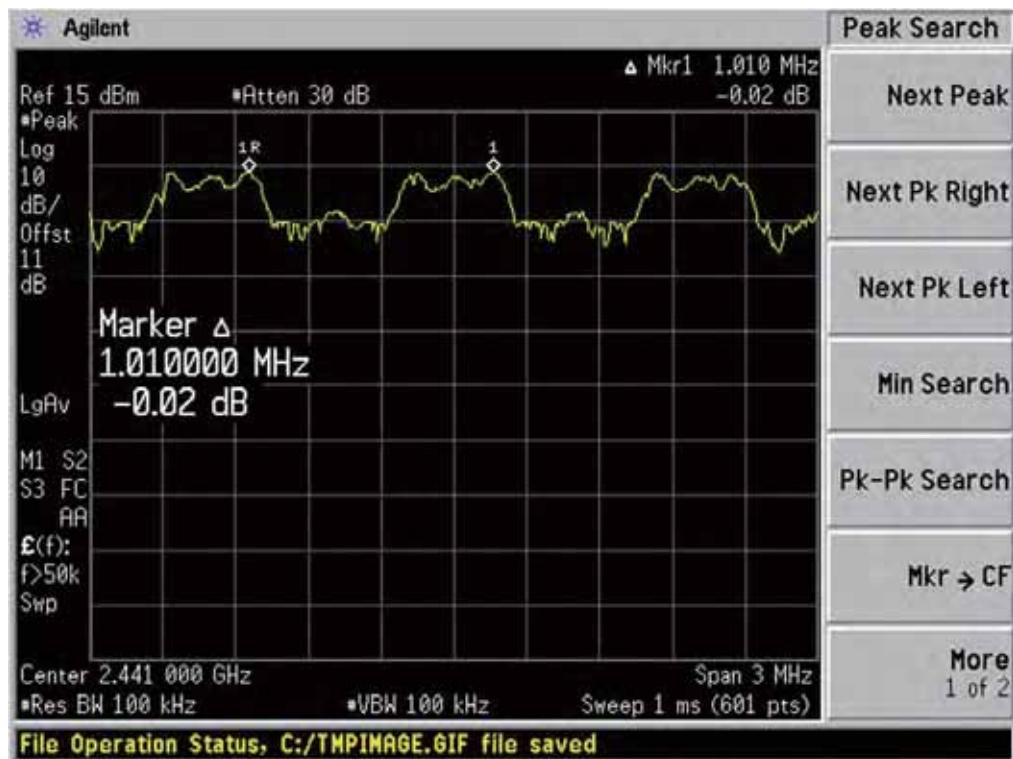
GFSK



Π/4-DQPSK



8-DPSK



A.5 Average Time of Occupancy

Test Data

GFSK Mode:

DH Packet	Pulse Width (msec)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.373	39.79	0.4	PASS
DH 3	1.620	172.80	0.4	PASS
DH 5	2.840	302.93	0.4	PASS

π/4-DQPSK Mode:

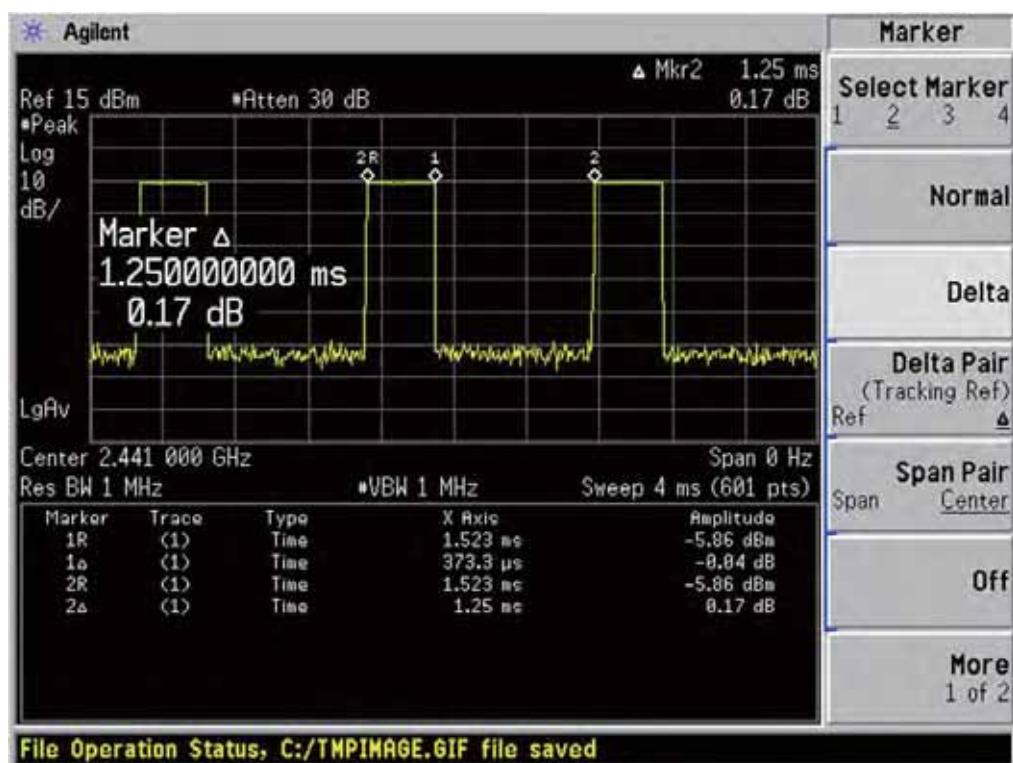
DH Packet	Pulse Width (msec)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.374	39.89	0.4	PASS
DH 3	1.613	172.05	0.4	PASS
DH 5	2.880	307.20	0.4	PASS

8-DPSK Mode:

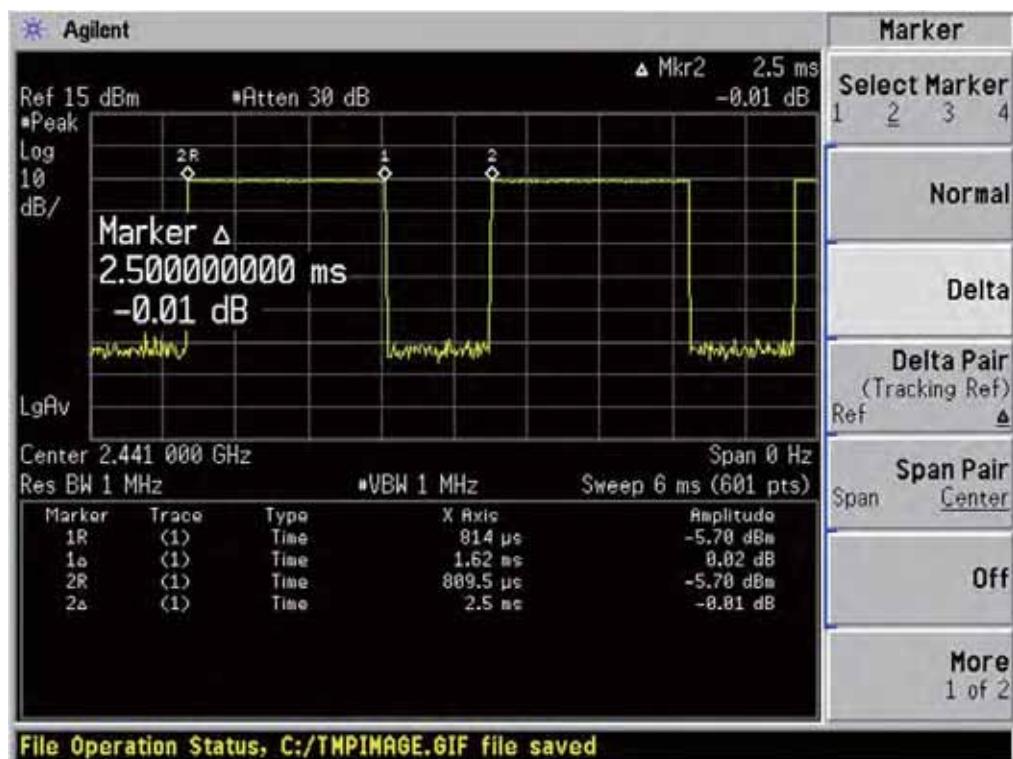
DH Packet	Pulse Width (msec)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.367	39.15	0.4	PASS
DH 3	1.613	172.05	0.4	PASS
DH 5	2.880	307.20	0.4	PASS

Test Plots

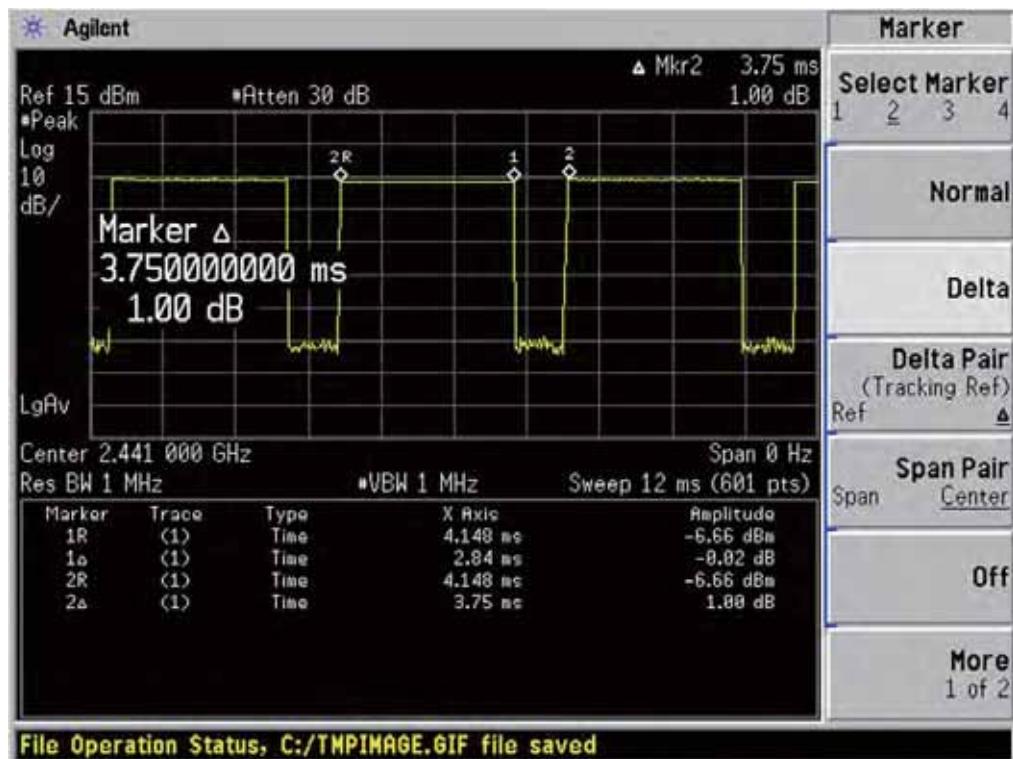
GFSK DH1



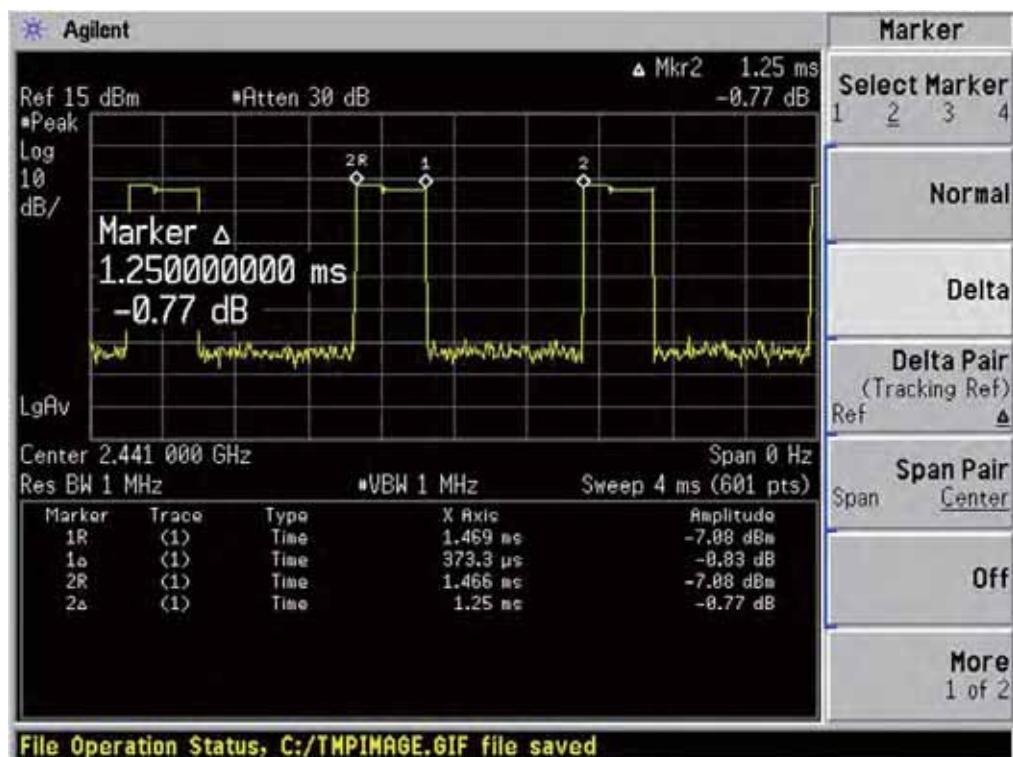
GFSK DH3



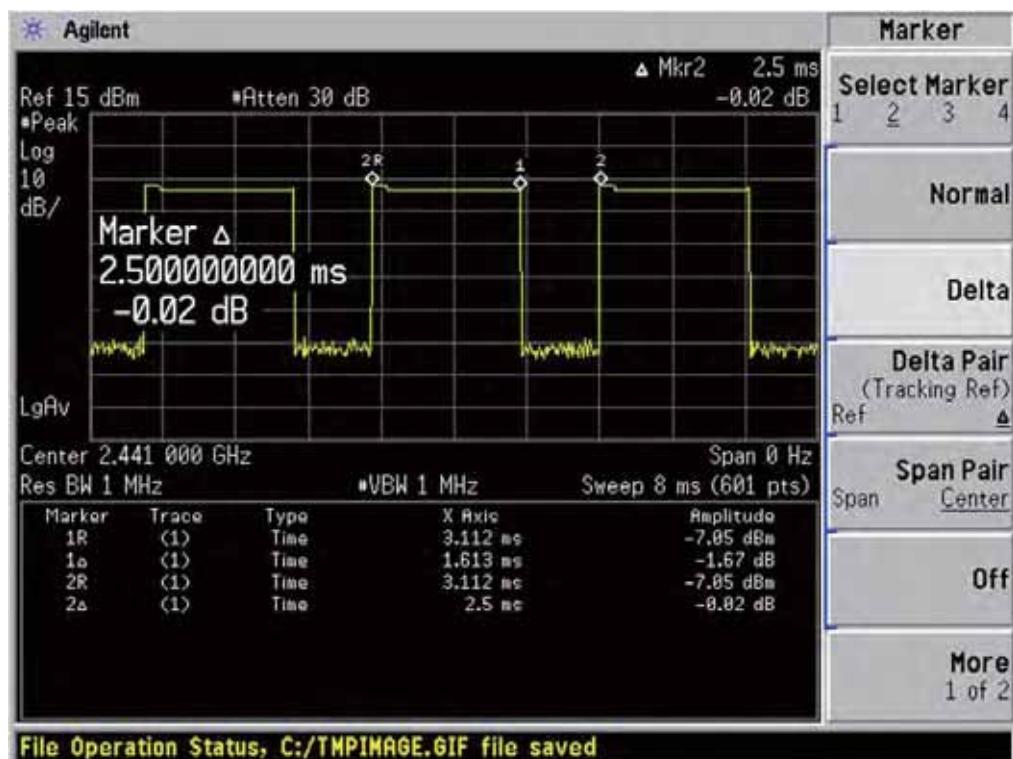
GFSK DH5



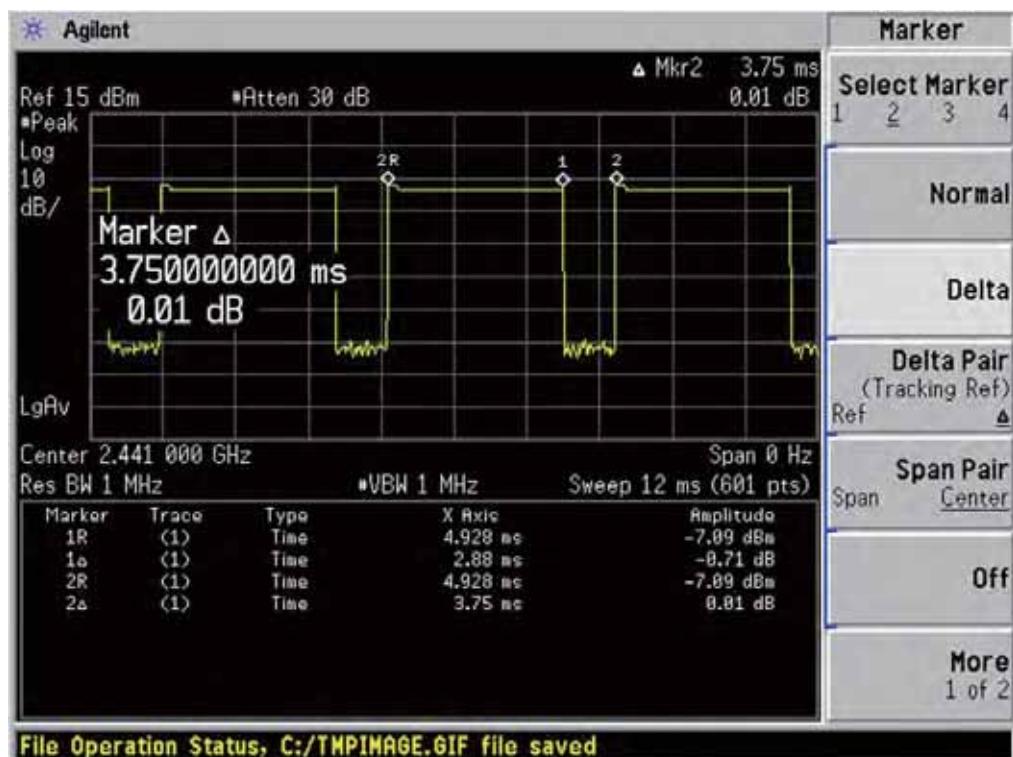
II/4-DQPSK DH1



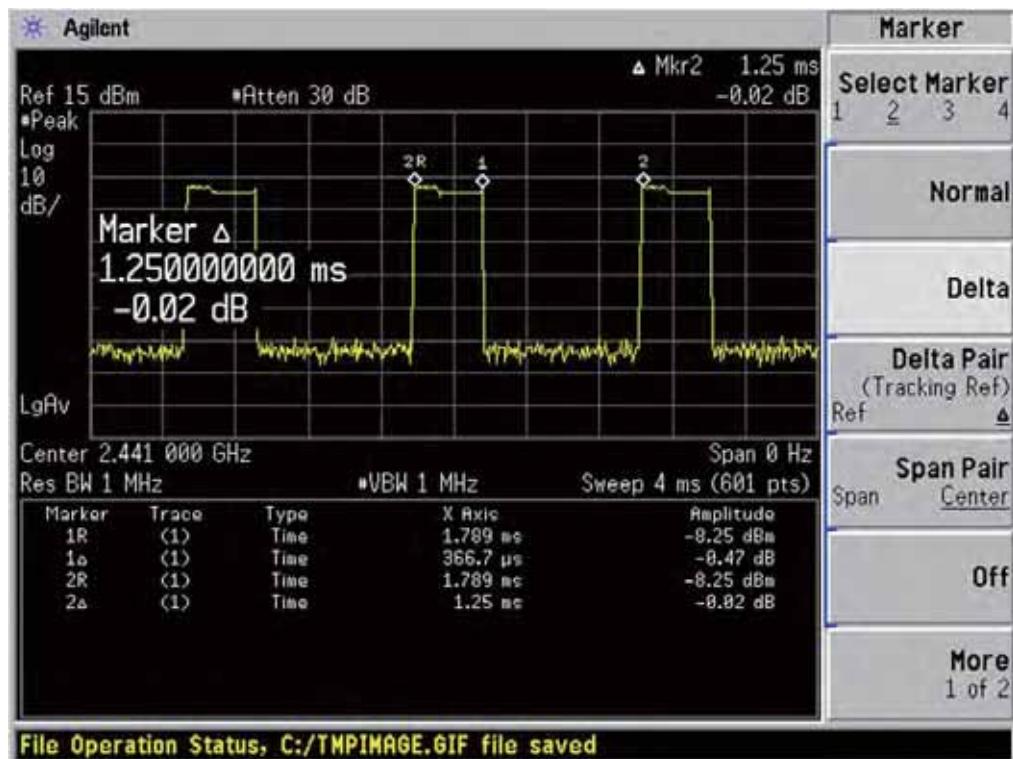
II/4-DQPSK DH3



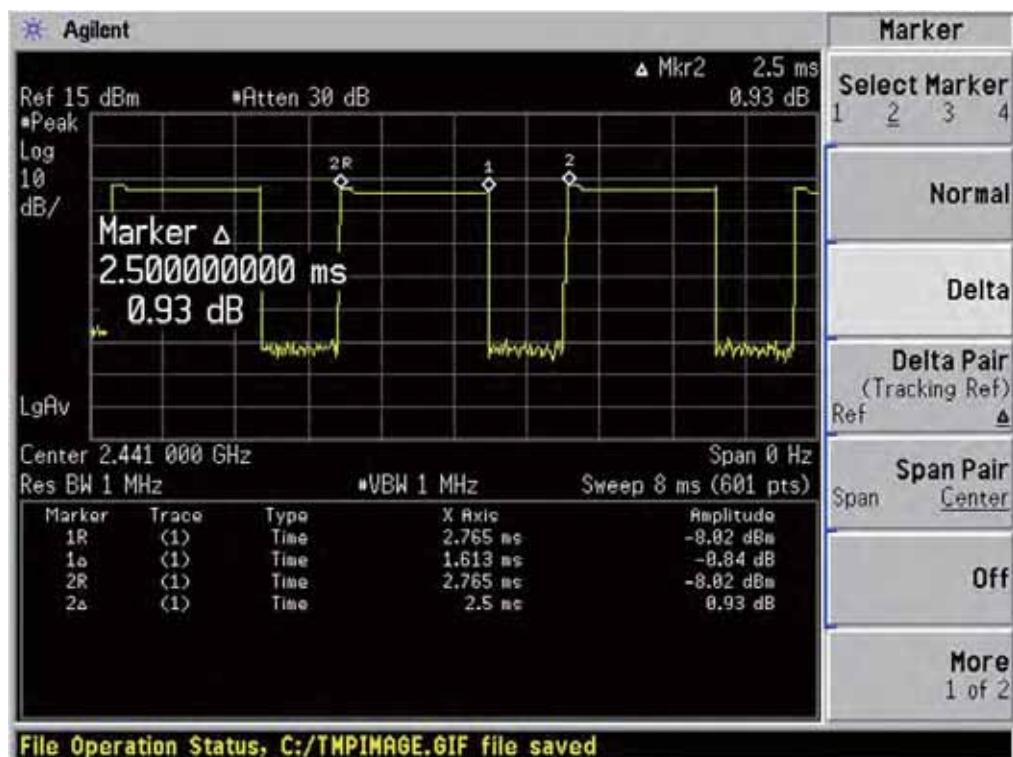
II/4-DQPSK DH5



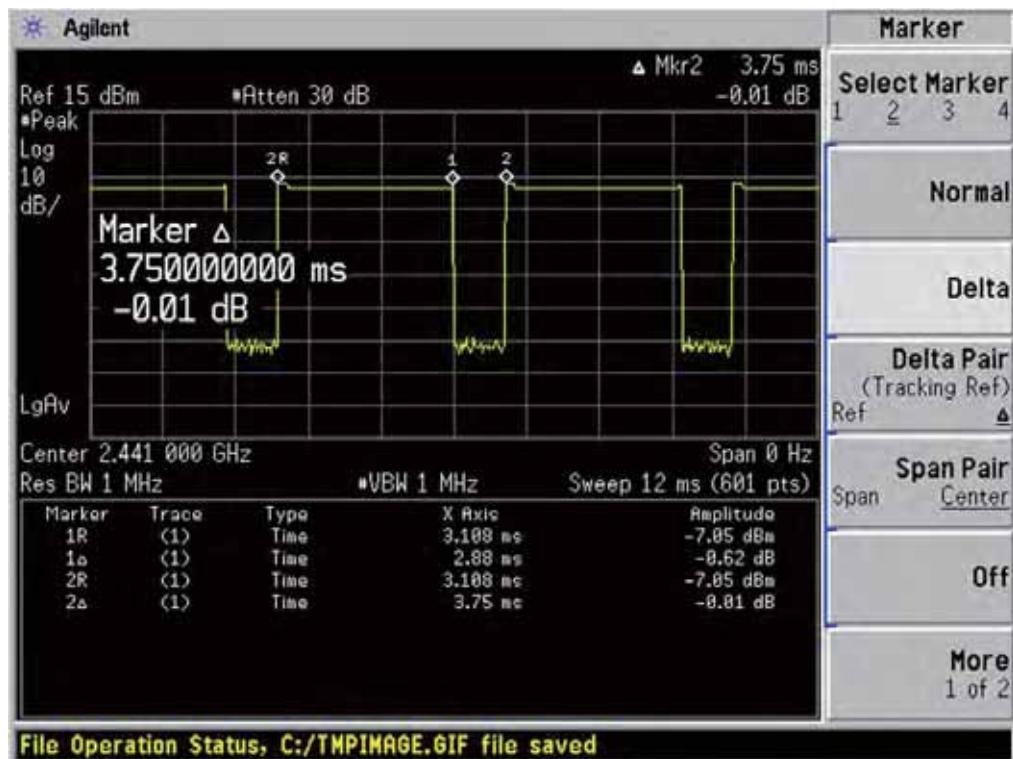
8-DPSK DH1



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	-43.99	5.21	-14.8	PASS
39	2441	-44.09	5.32	-14.7	PASS
78	2480	-44.23	4.86	-15.1	PASS

π/4-DQPSK Mode:

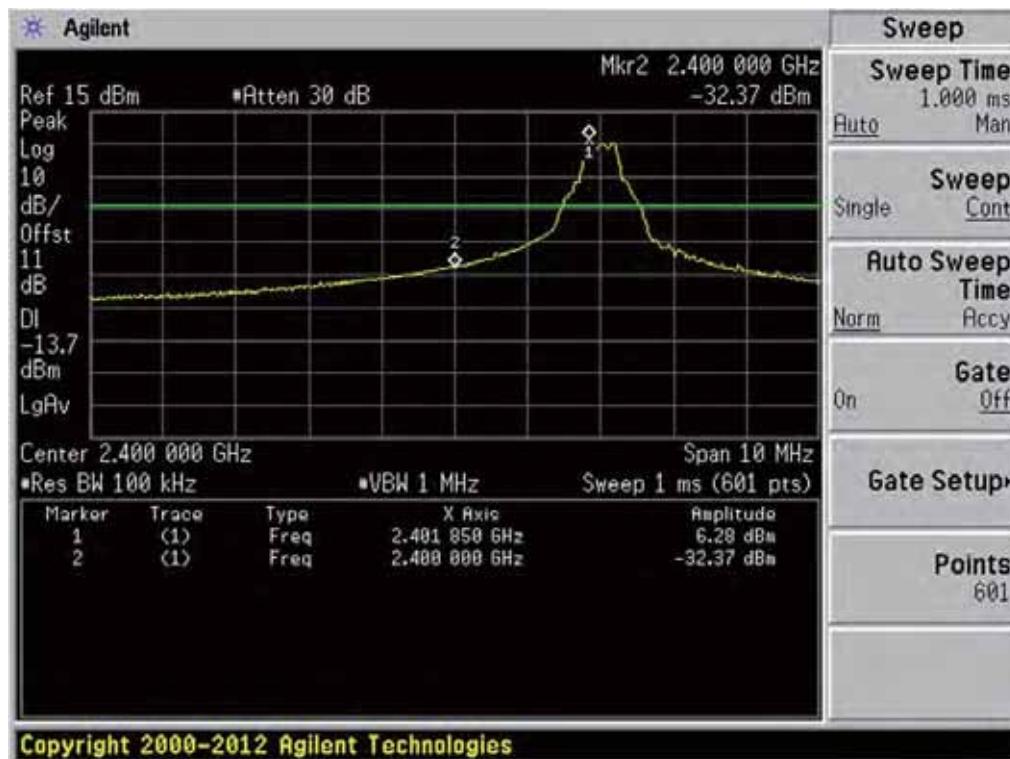
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
0	2402	-44.48	2.05	-17.9	PASS
39	2441	-44.05	1.45	-18.6	PASS
78	2480	-44.19	1.97	-18.0	PASS

8-DPSK Mode:

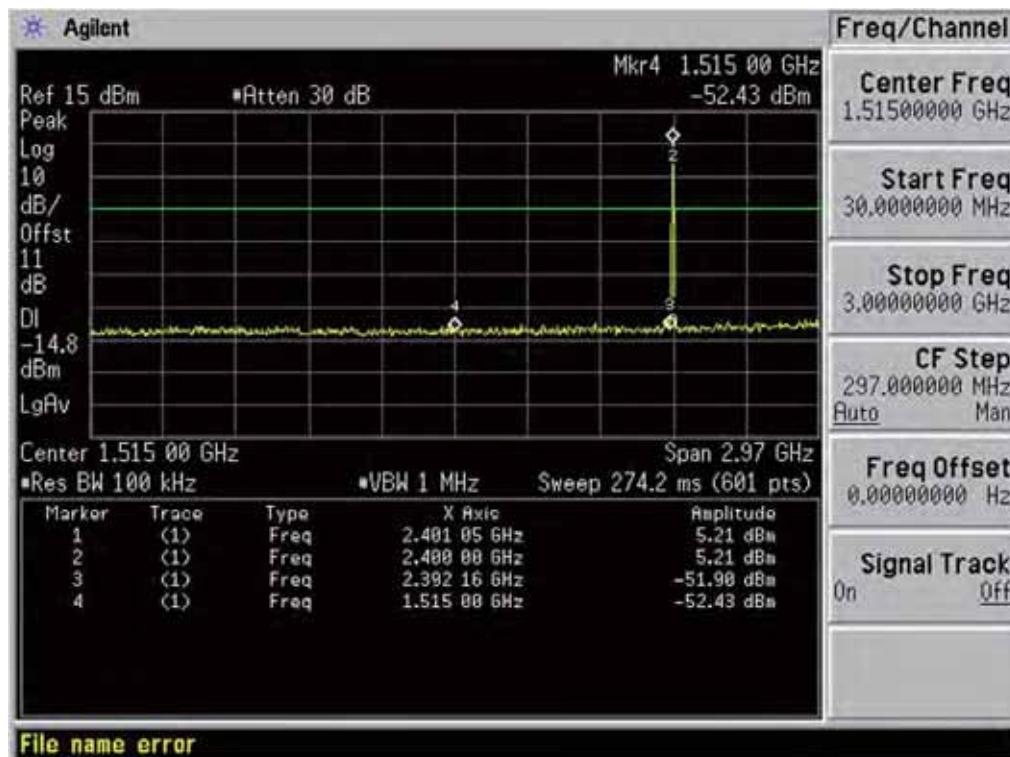
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
			Carrier Level	Calculated 20 dBc Limit	
0	2402	-42.60	3.02	-17.0	PASS
39	2441	-44.01	2.86	-17.1	PASS
78	2480	-44.49	1.82	-18.2	PASS

Test Plots

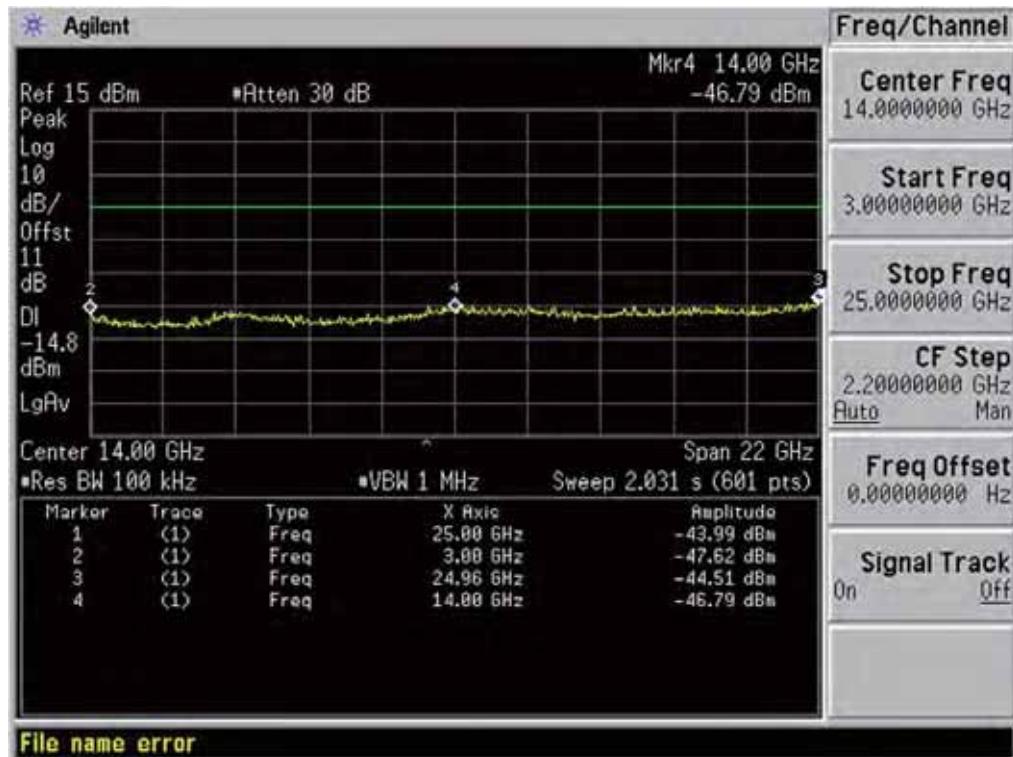
GFSK LOW CHANNEL , BANDEDGE



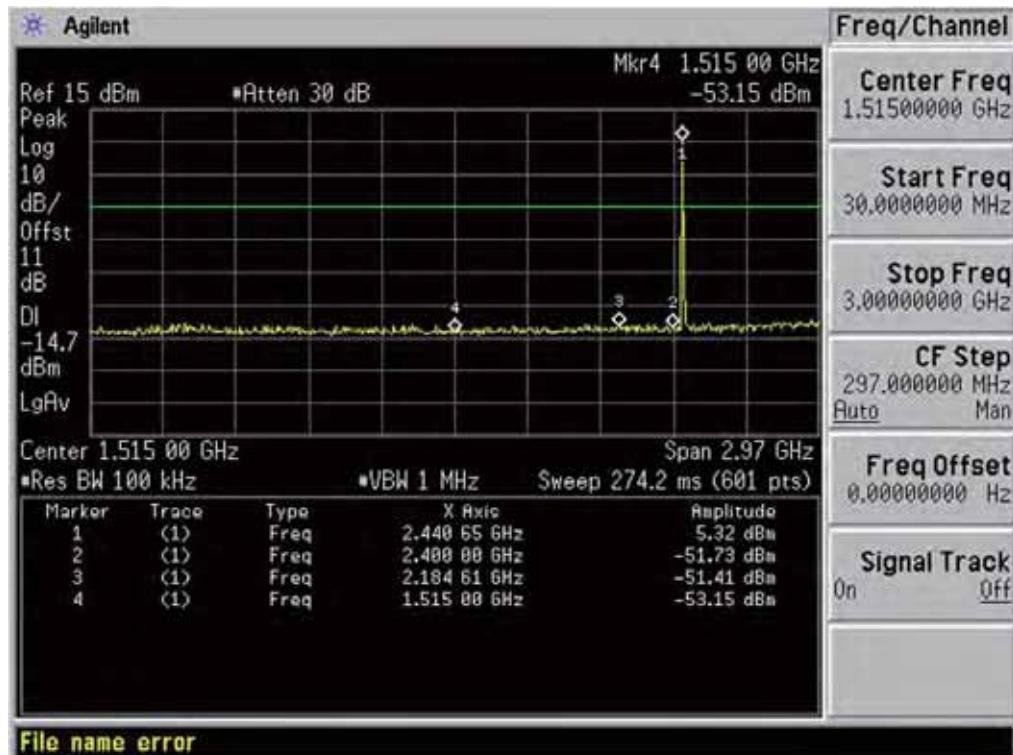
GFSK LOW CHANNEL , SPURIOUS 30MHz~3GHz



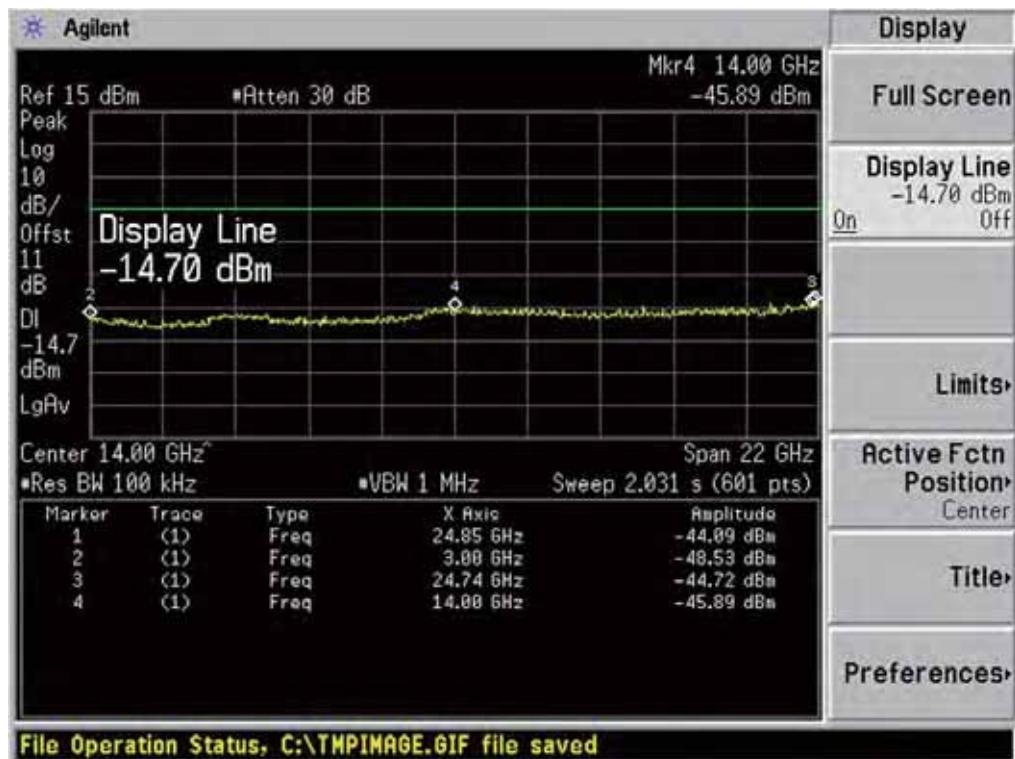
GFSK LOW CHANNEL , SPURIOUS 3GHz~25GHz



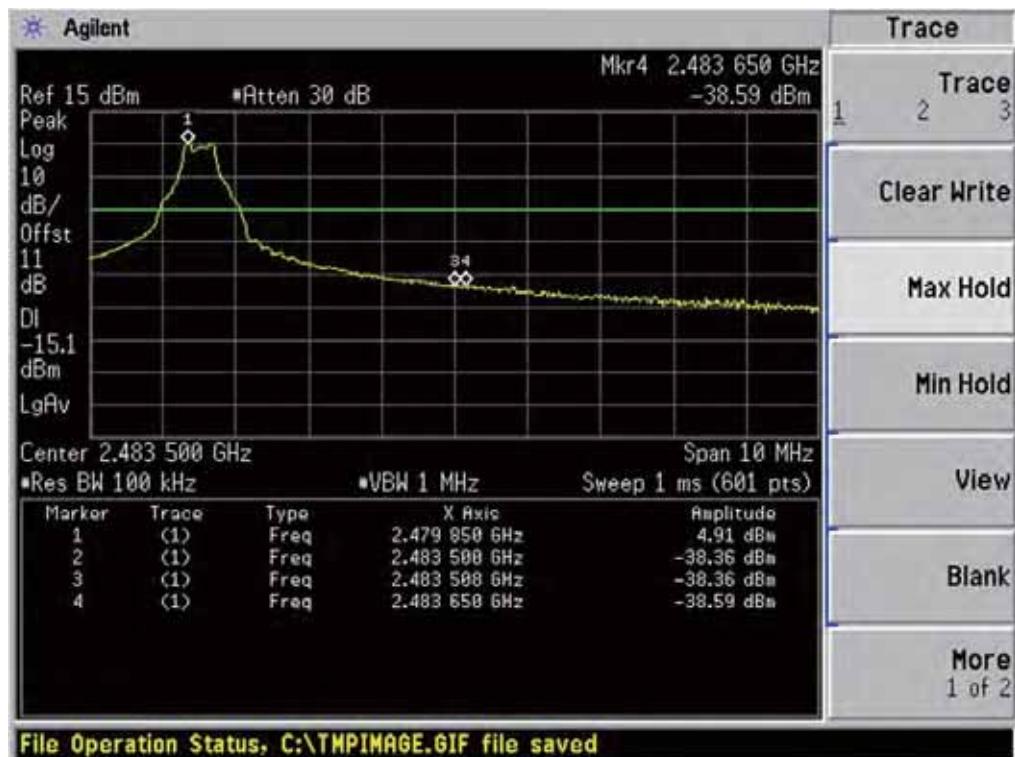
GFSK MID CHANNEL , SPURIOUS 30MHz~3GHz



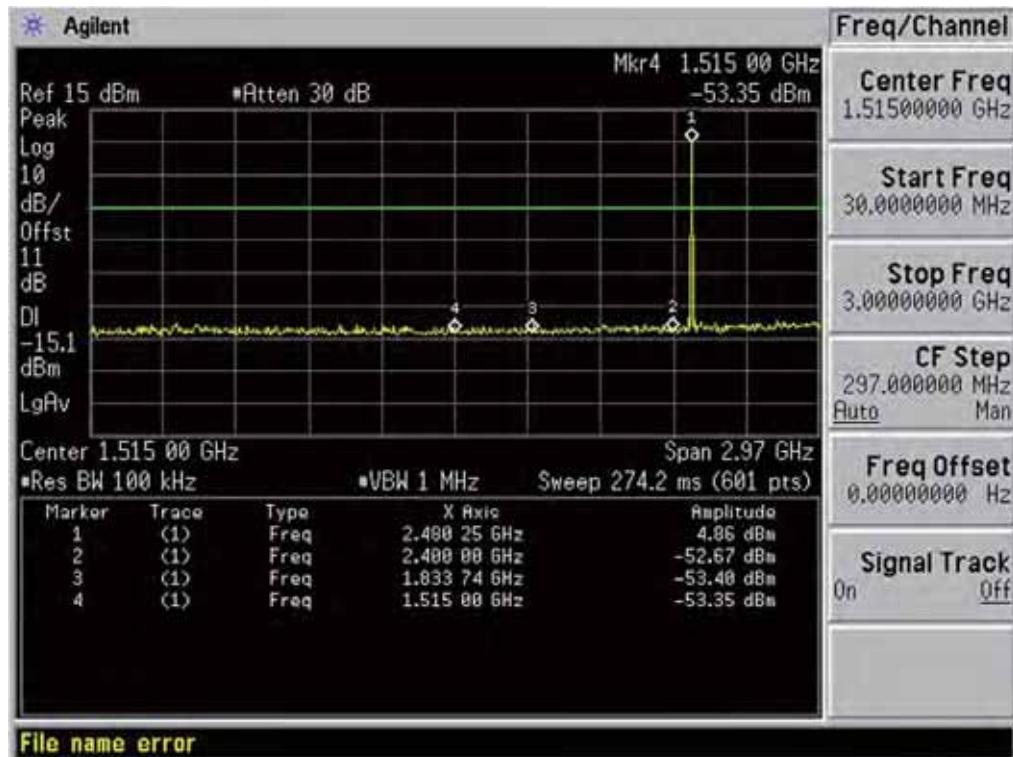
GFSK MID CHANNEL , SPURIOUS 3GHz~25GHz



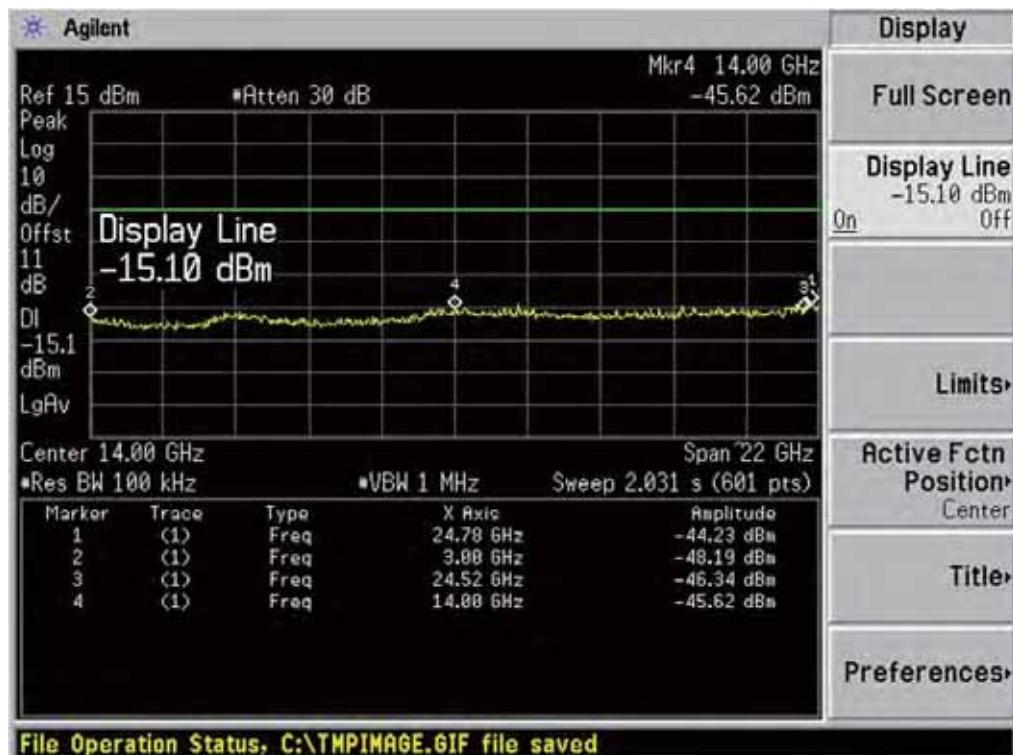
GFSK HIGH CHANNEL , BANDEDGE



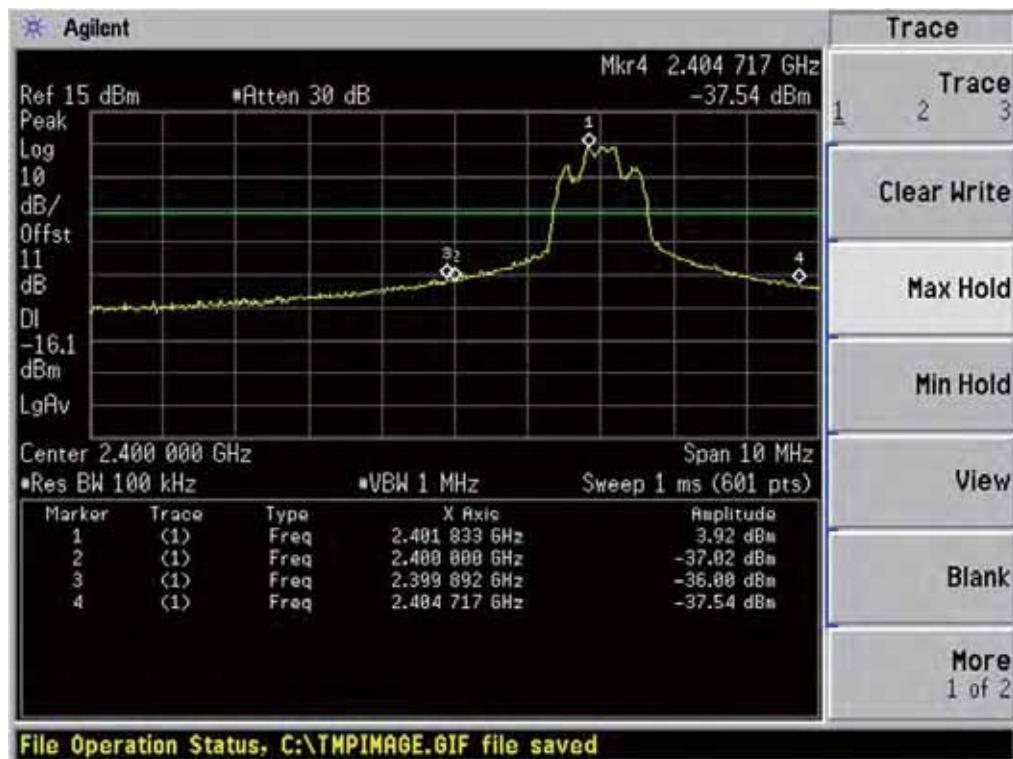
GFSK HIGH CHANNEL , SPURIOUS 30MHz~3GHz



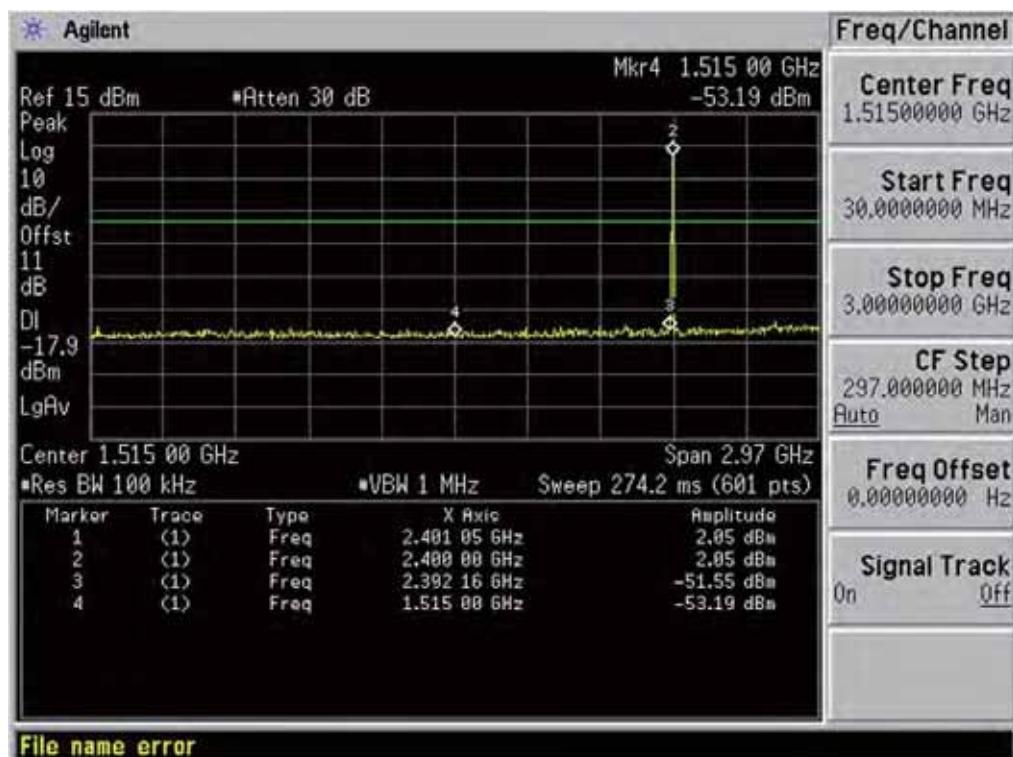
GFSK HIGH CHANNEL , SPURIOUS 3GHz~25GHz



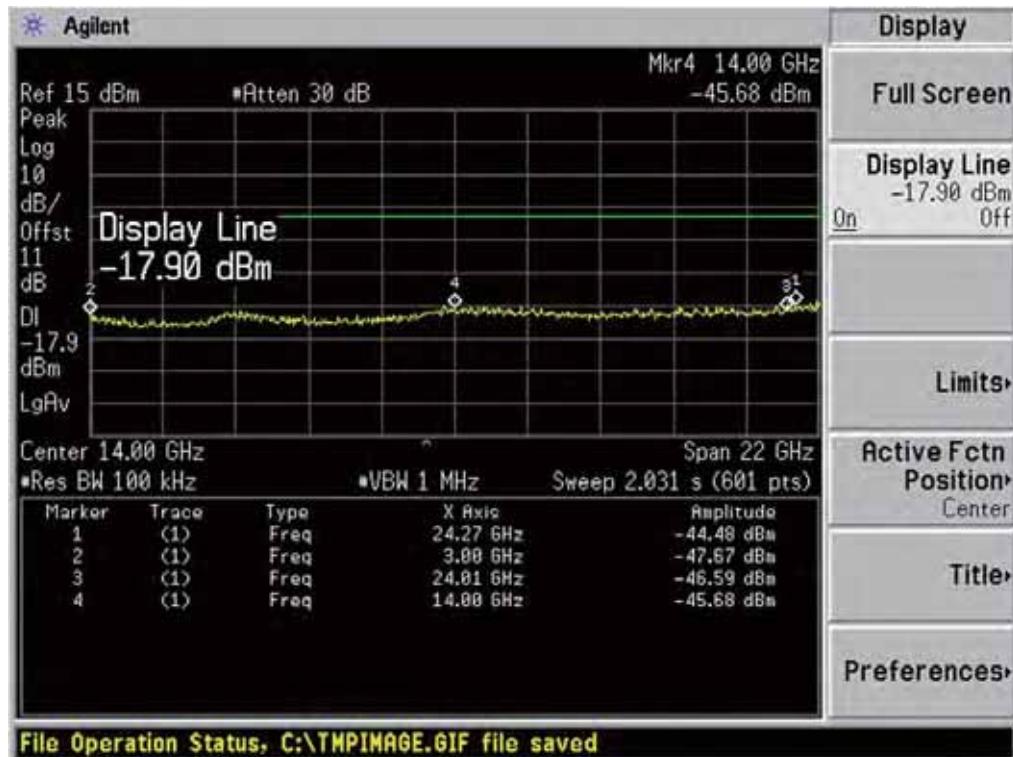
II/4-DQPSK LOW CHANNEL , BANDEDGE



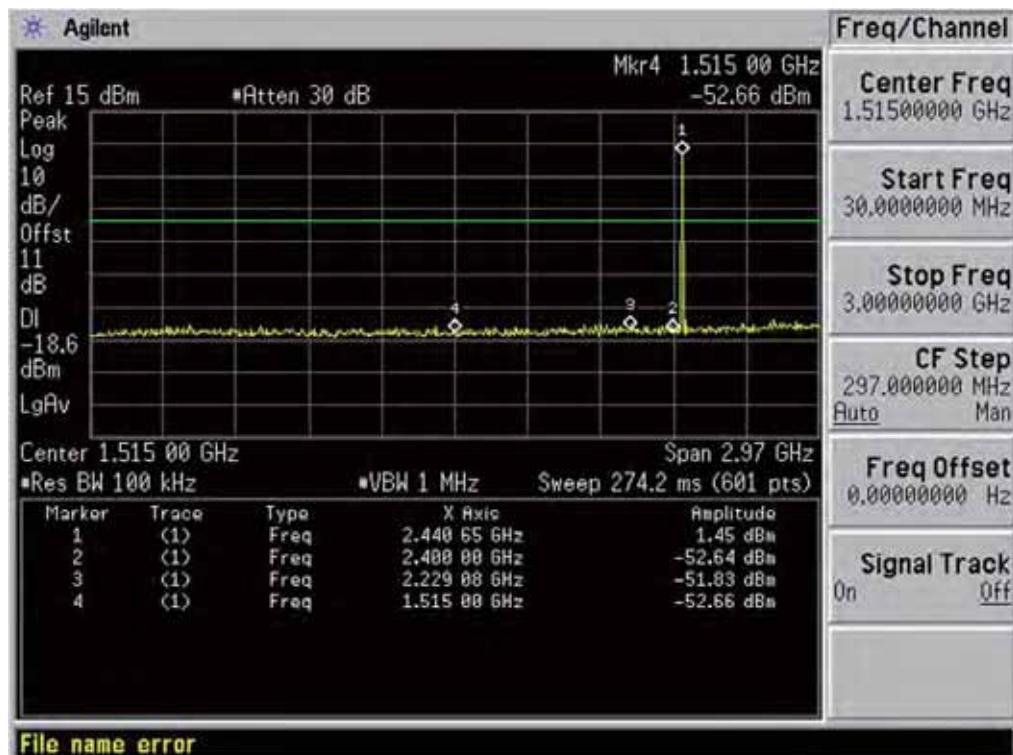
II/4-DQPSK LOW CHANNEL , SPURIOUS 30MHz~3GHz



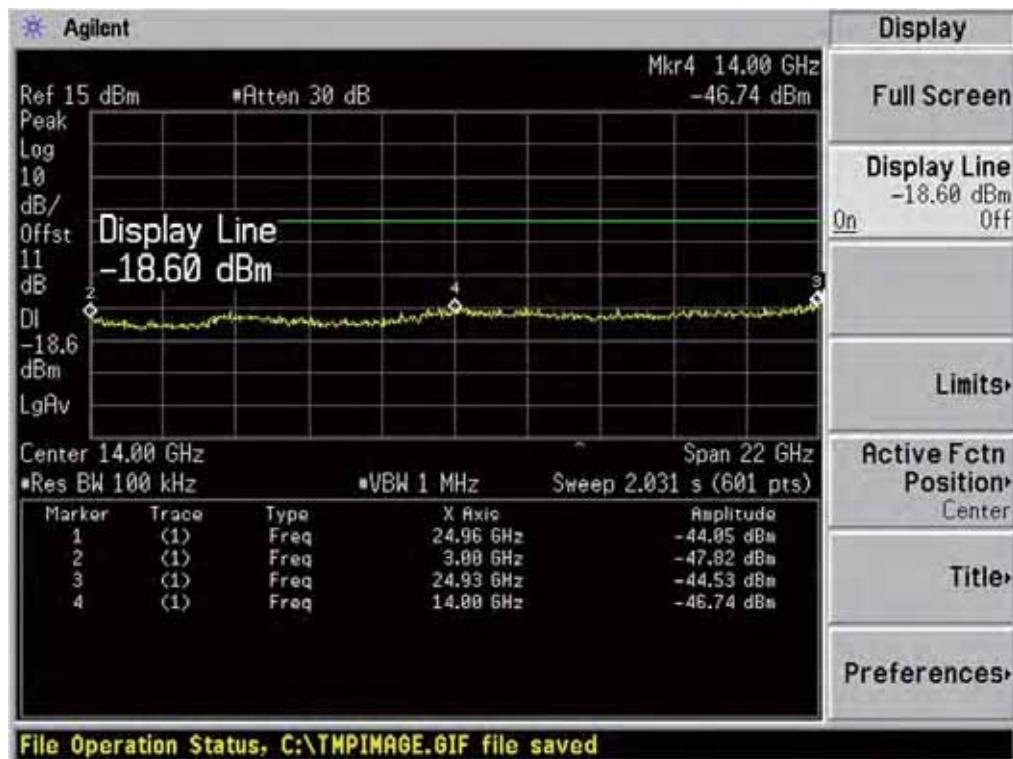
II/4-DQPSK LOW CHANNEL , SPURIOUS 3GHz~25GHz



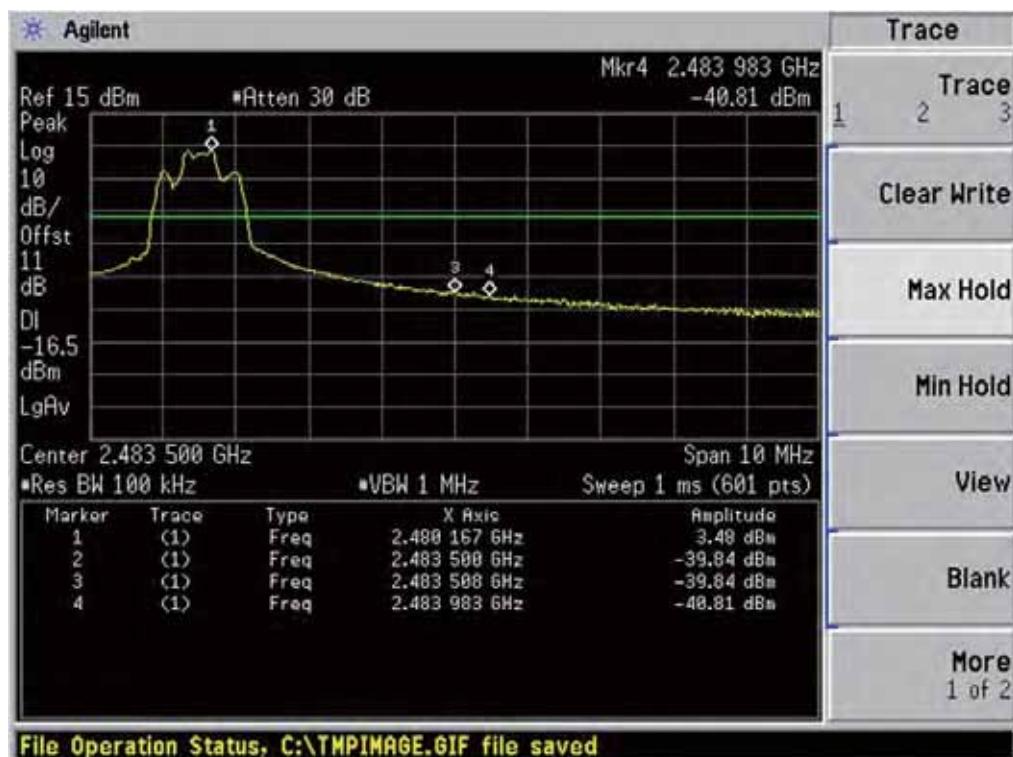
II/4-DQPSK MID CHANNEL , SPURIOUS 30MHz~3GHz



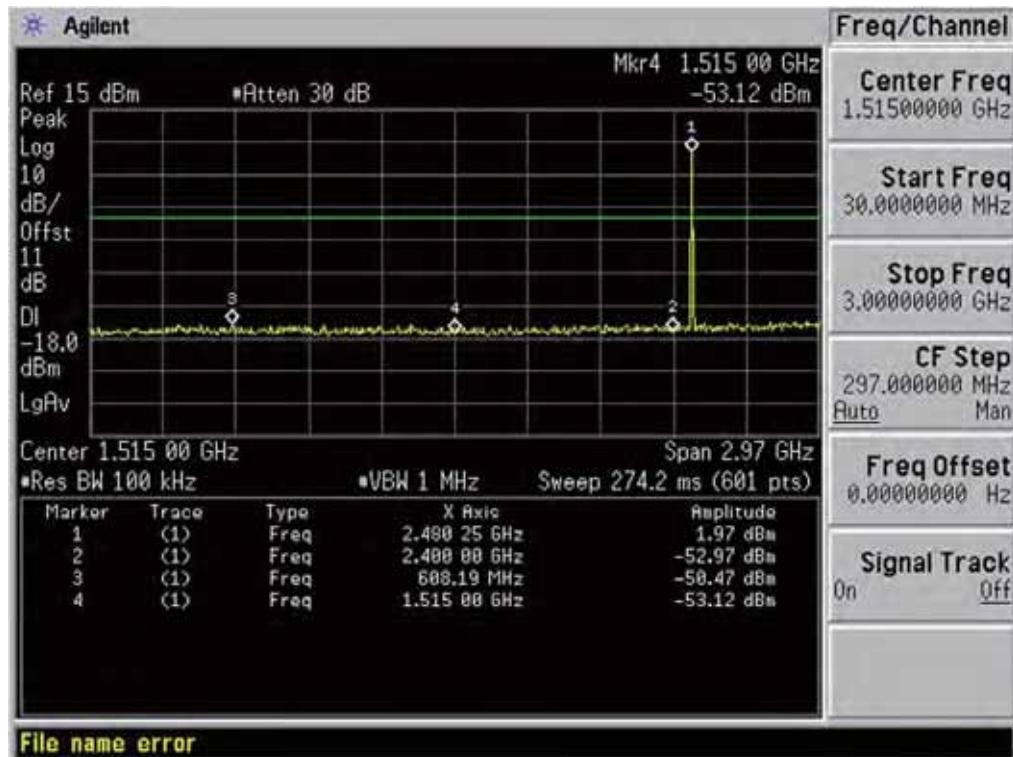
II/4-DQPSK MID CHANNEL , SPURIOUS 3GHz~25GHz



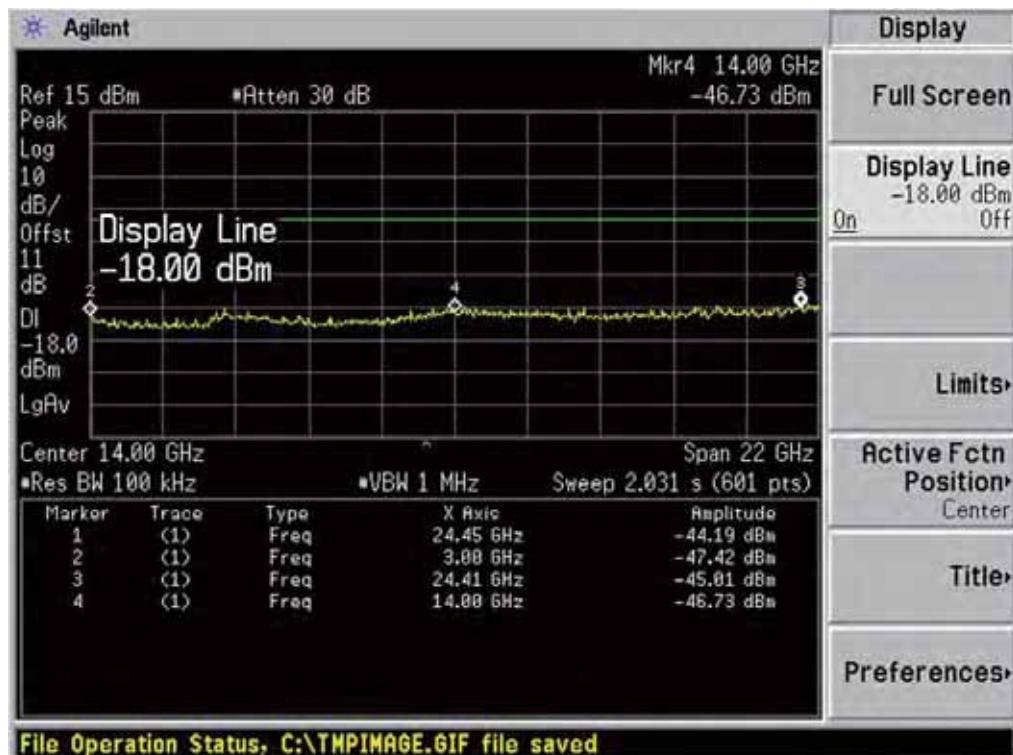
II/4-DQPSK HIGH CHANNEL , BANDEDGE



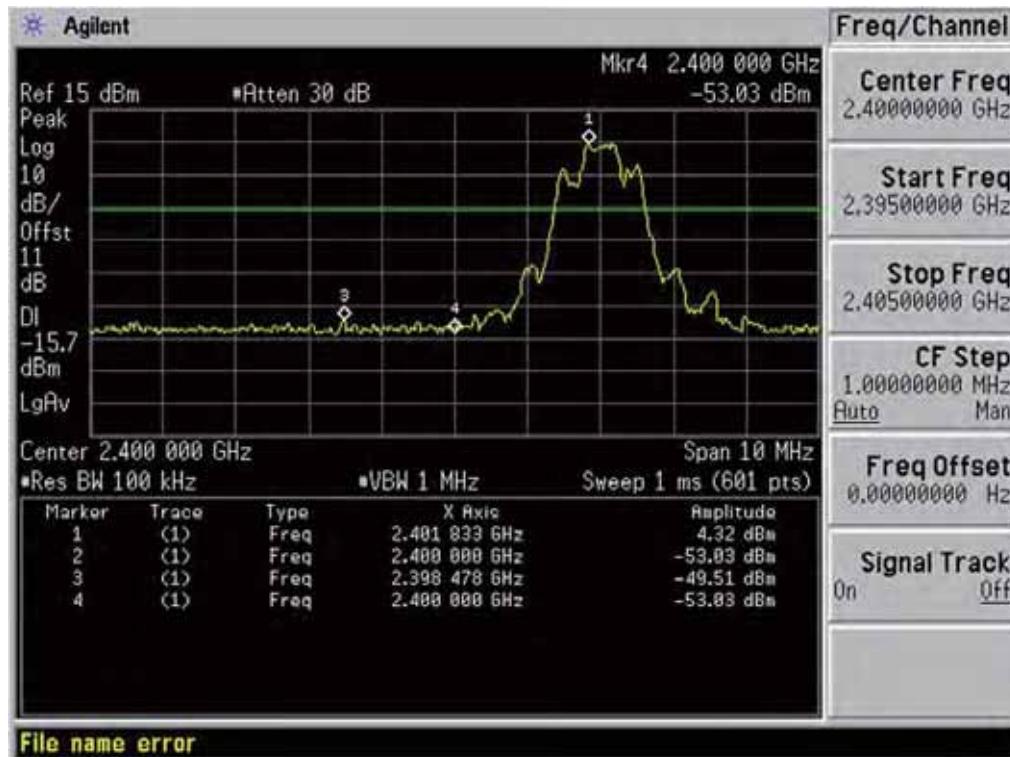
II/4-DQPSK HIGH CHANNEL , SPURIOUS 30MHz~3GHz



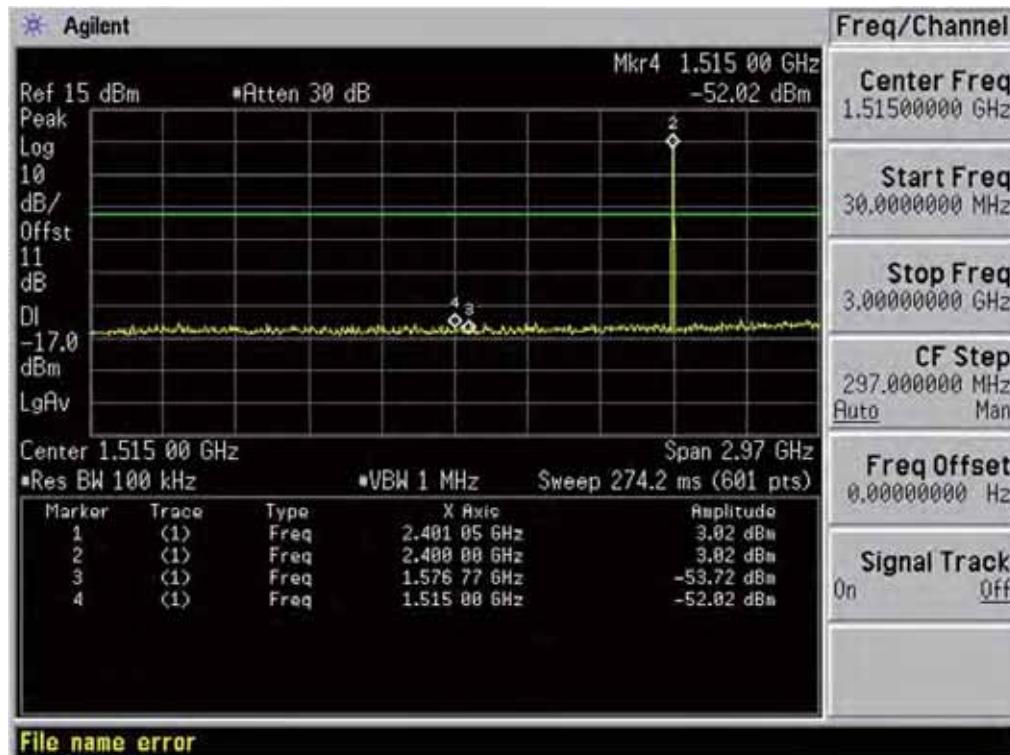
II/4-DQPSK HIGH CHANNEL , SPURIOUS 3GHz~25GHz



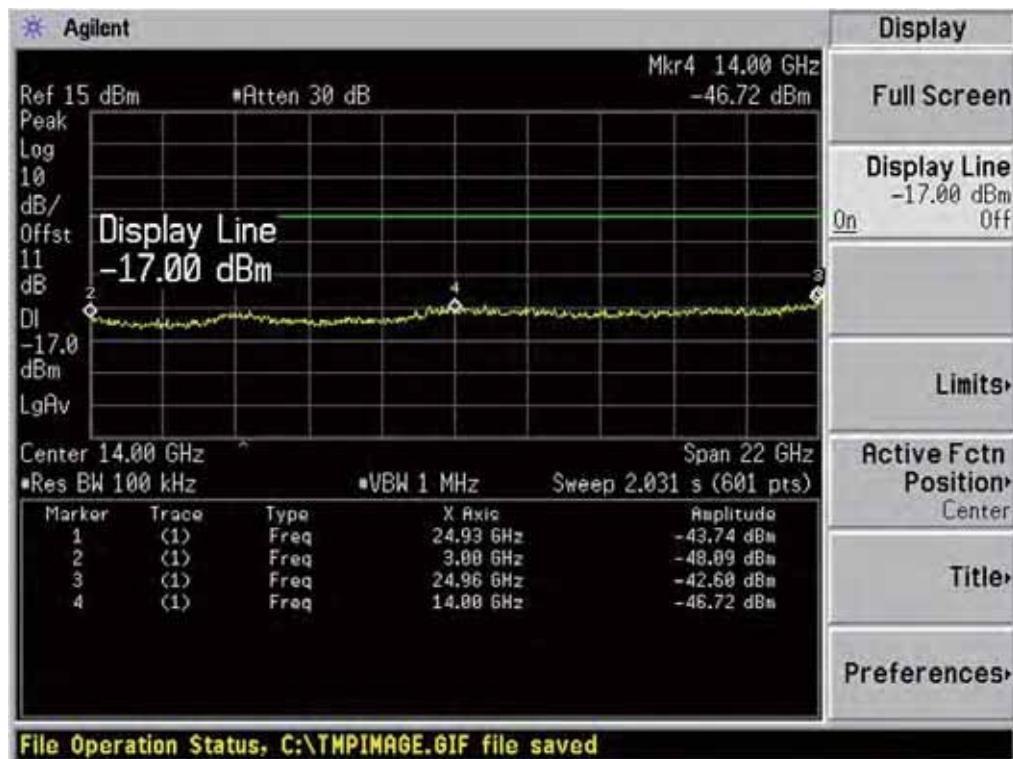
8-DPSK LOW CHANNEL , BANDEDGE



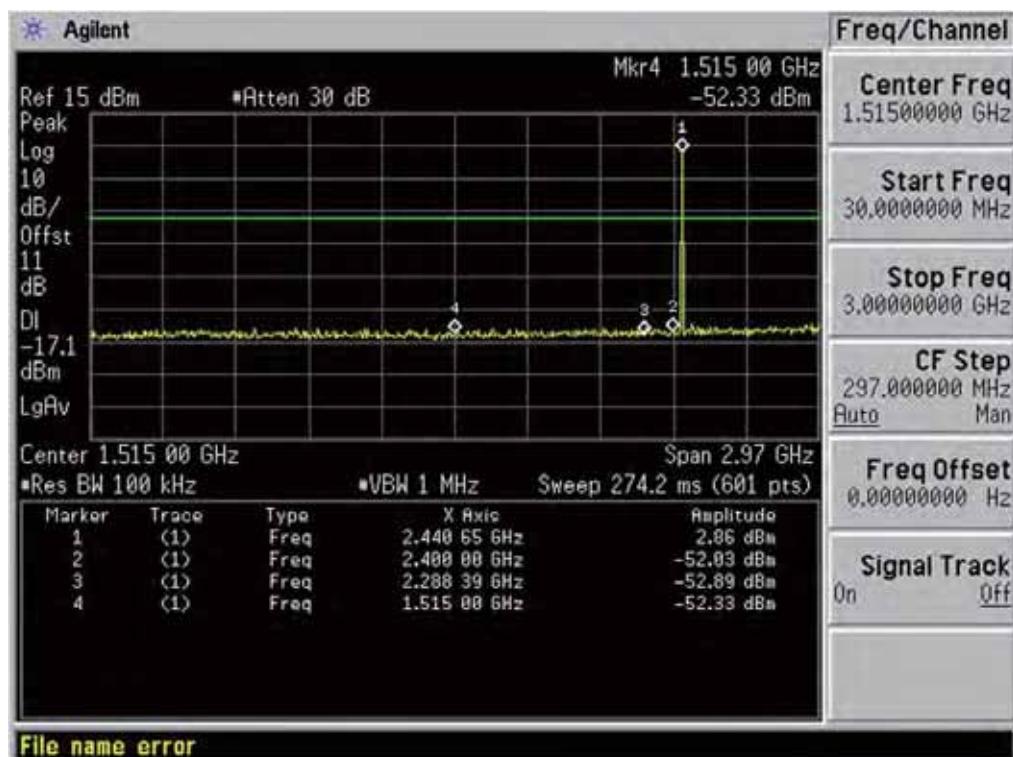
8-DPSK LOW CHANNEL , SPURIOUS 30MHz~3GHz



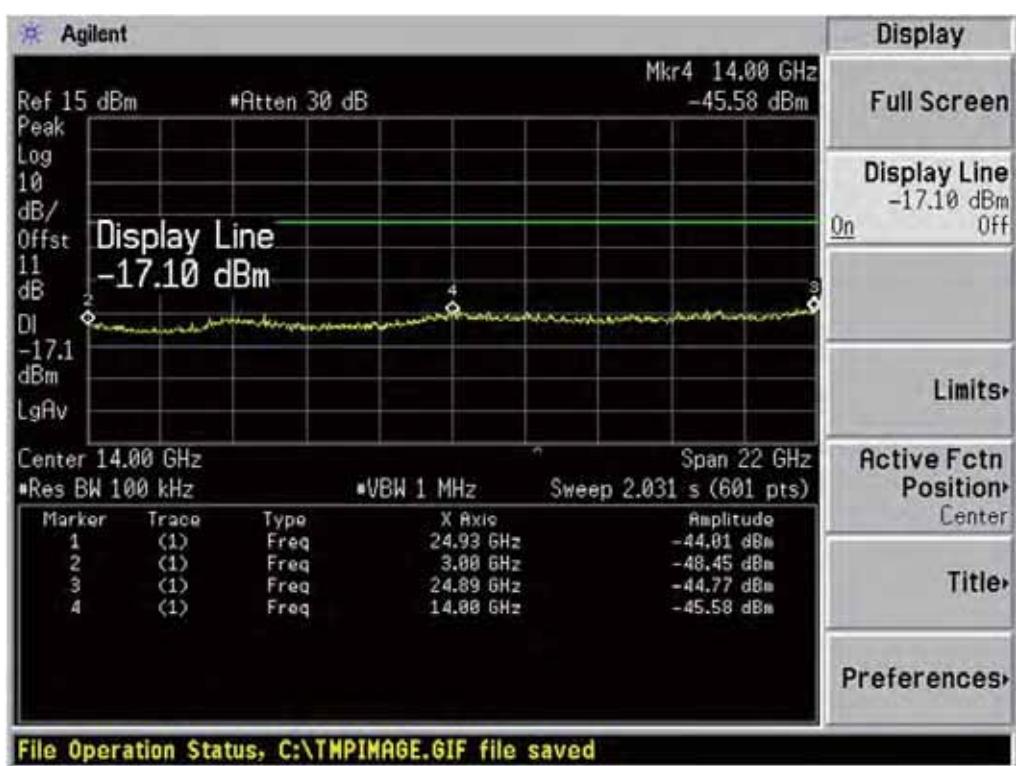
8-DPSK LOW CHANNEL , SPURIOUS 3GHz~25GHz



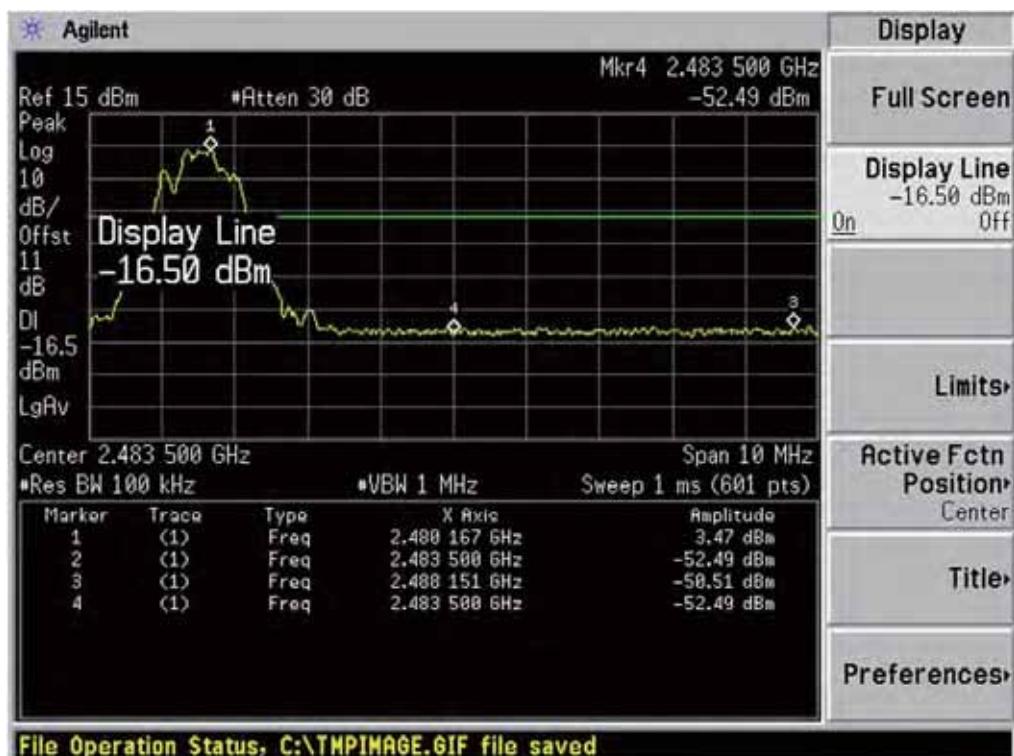
8-DPSK MID CHANNEL , SPURIOUS 30MHz~3GHz



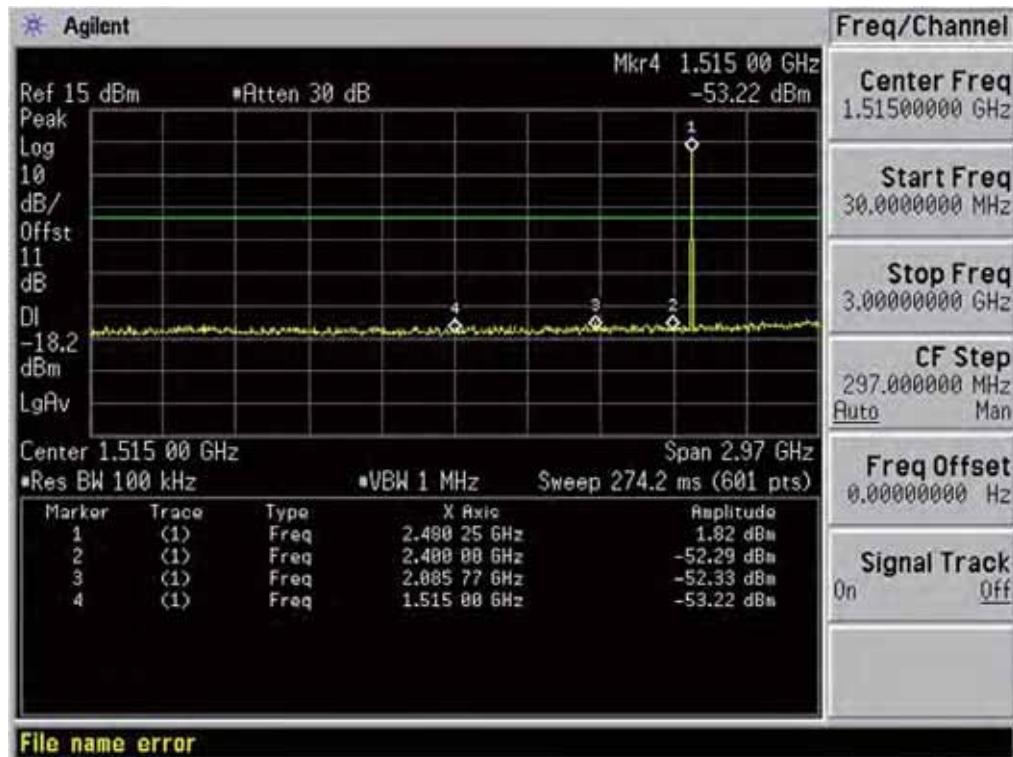
8-DPSK MID CHANNEL , SPURIOUS 3GHz~25GHz



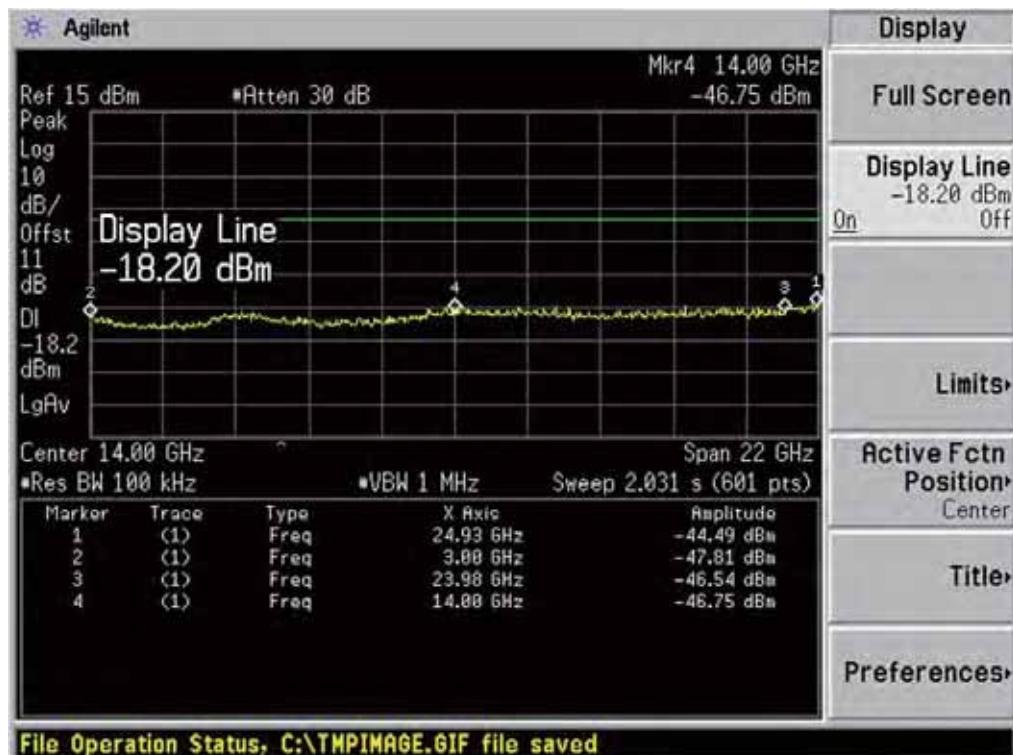
8-DPSK HIGH CHANNEL , BANDEDGE



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



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



A.7 Conducted Emissions

Test Data

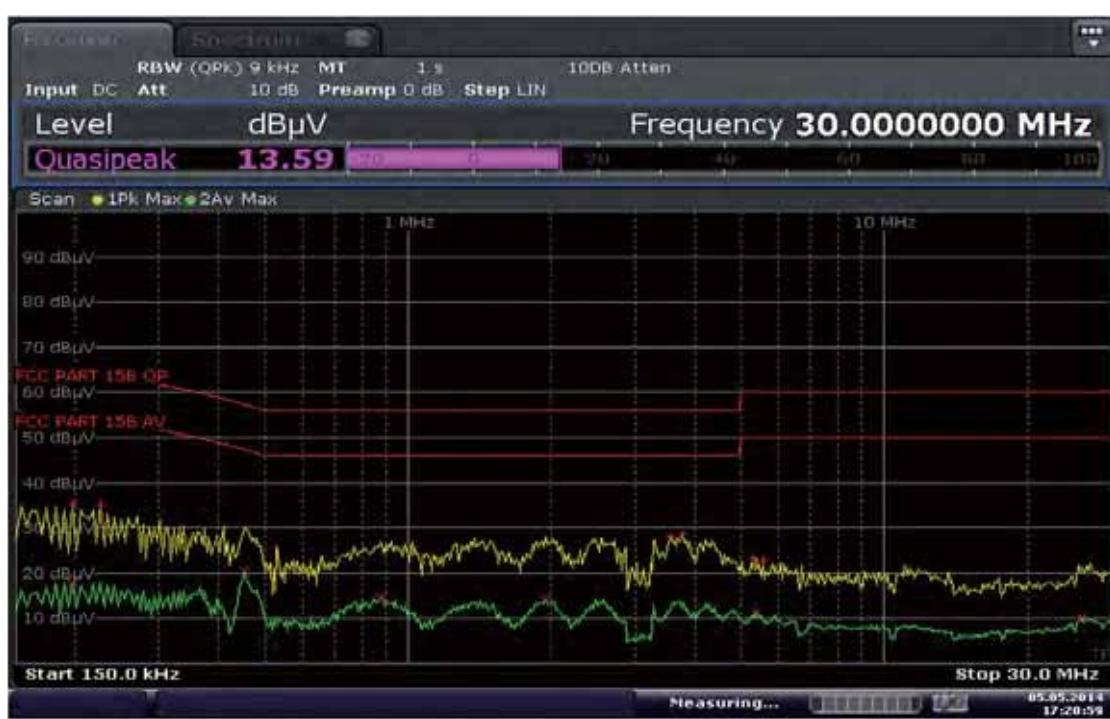
No.	Fre. (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Verdict
1	0.154	45.36	65.89	-20.53	L	QP	PASS
2	0.154	29.48	55.89	-26.41	L	AV	PASS
3	0.186	47.31	64.97	-17.66	L	QP	PASS
4	0.186	34.81	54.97	-20.16	L	AV	PASS
5	4.110	42.71	56.00	-13.29	L	QP	PASS
6	4.110	26.84	46.00	-19.16	L	AV	PASS
7	4.186	42.94	56.00	-13.06	L	QP	PASS
8	4.186	26.95	46.00	-19.05	L	AV	PASS
9	12.974	39.68	60.00	-20.32	L	QP	PASS
10	13.094	39.73	60.00	-20.27	L	QP	PASS
11	13.234	27.99	50.00	-22.01	L	AV	PASS
12	15.738	26.58	50.00	-23.42	L	AV	PASS
No.	Fre. (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Verdict
1	0.198	35.23	64.63	-29.40	N	QP	PASS
2	0.198	17.99	54.63	-36.64	N	AV	PASS
3	0.226	35.22	63.83	-28.61	N	QP	PASS
4	0.454	20.34	47.31	-26.97	N	AV	PASS
5	0.878	14.48	46.00	-31.52	N	AV	PASS
6	1.946	14.27	46.00	-31.73	N	AV	PASS
7	3.554	28.01	56.00	-27.99	N	QP	PASS
8	3.774	28.66	56.00	-27.34	N	QP	PASS
9	5.322	23.23	60.00	-36.77	N	QP	PASS
10	5.390	11.49	50.00	-38.51	N	AV	PASS
11	5.590	22.86	60.00	-37.14	N	QP	PASS
12	26.094	10.2	50.00	-39.80	N	AV	PASS

Test Plots

A.7.1, PHASE L



A.7.2, PHASE N

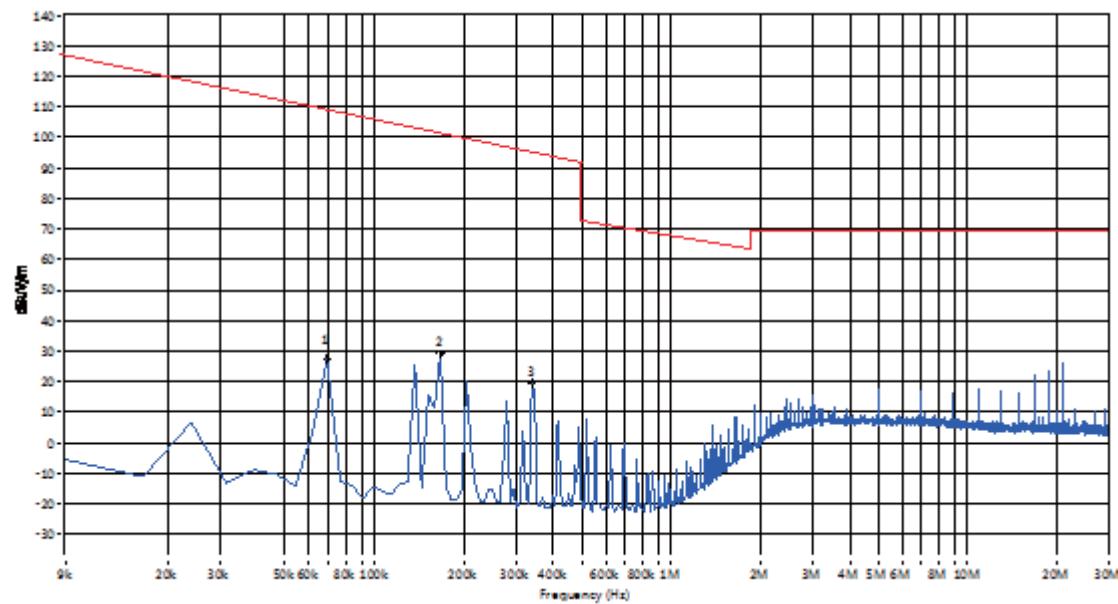


A.8 Radiated Emission

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

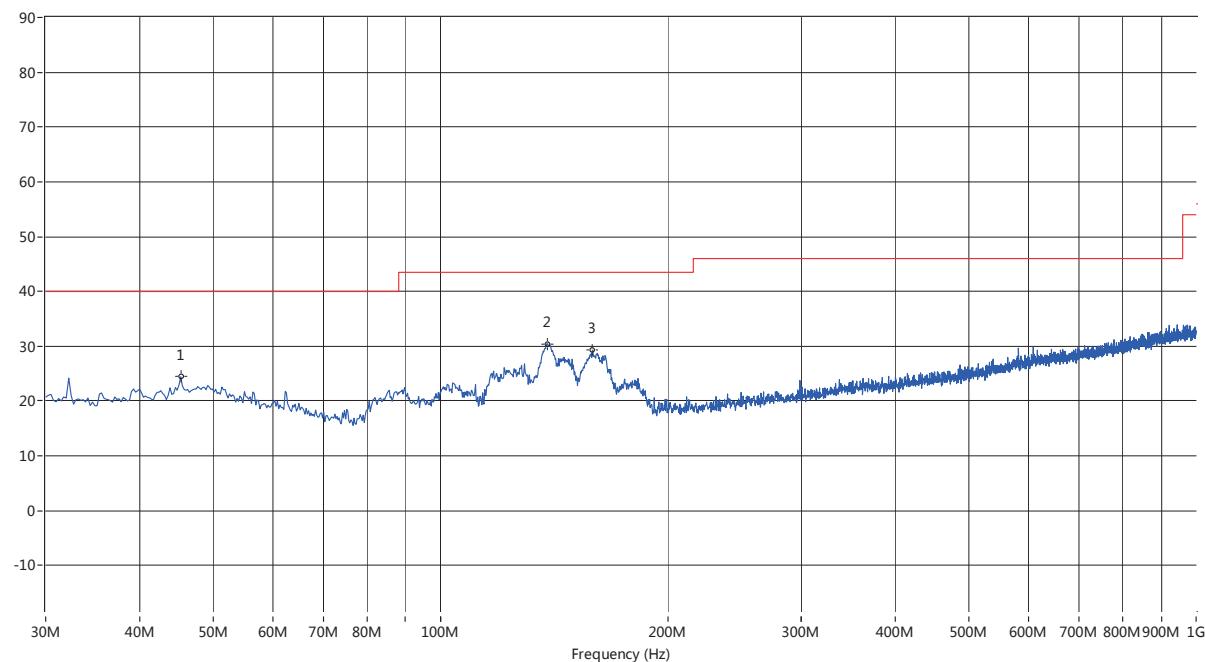


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Verdict
0.069	28.30	--	--	--	110.8	--	0.0	PASS
0.166	30.11	--	--	--	103.2	--	0.0	PASS
0.339	19.60	--	--	--	97.0	--	0.0	PASS

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

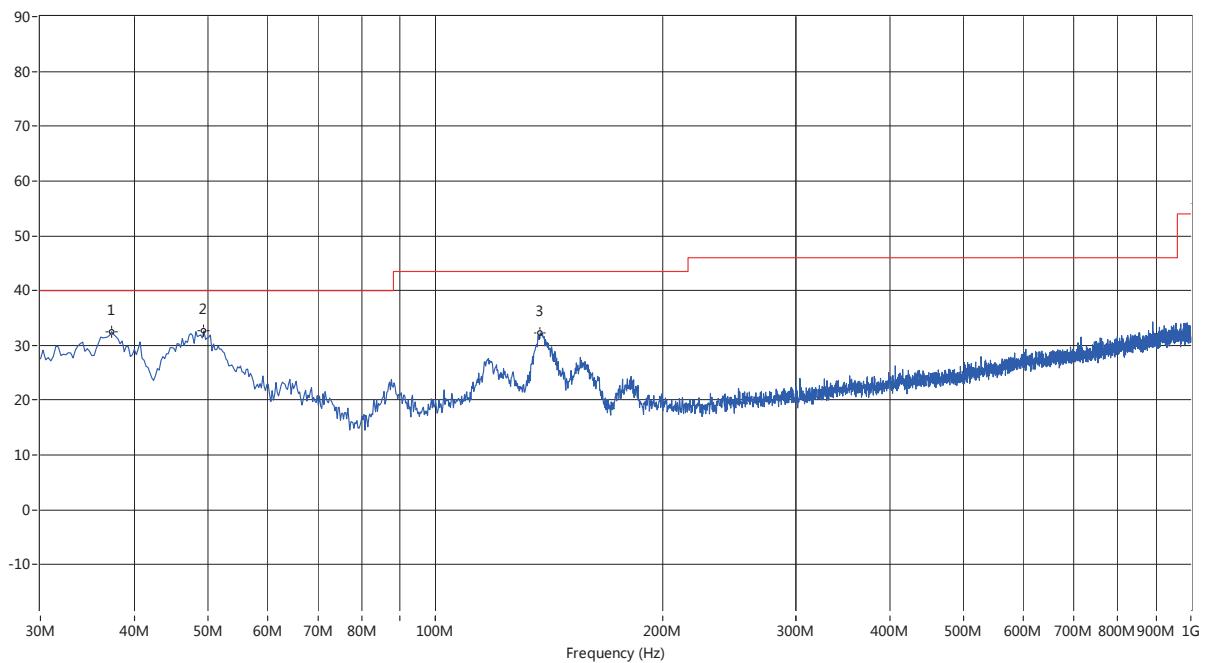
Test Plots

GFSK LOW CHANNEL 30MHz to 1GHz, ANT V



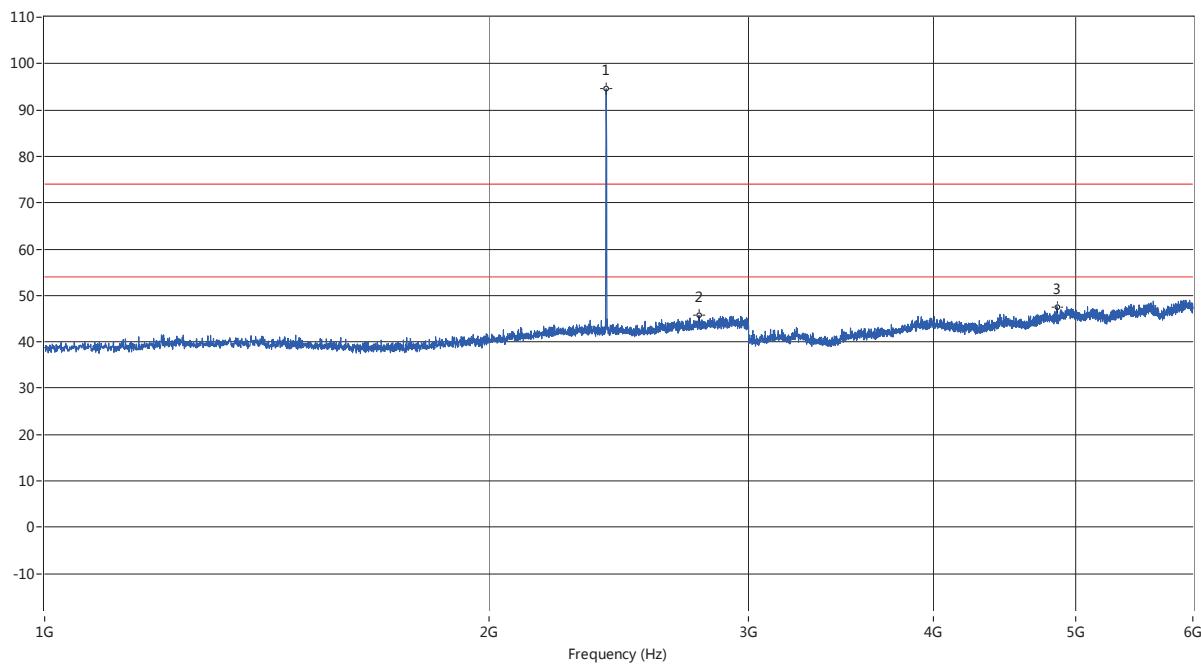
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.44	--	--	--	40.0	--	152.6	Vertical	pass
138.370	30.47	--	--	--	43.5	--	210.1	Vertical	pass
158.735	29.30	--	--	--	43.5	--	242.3	Vertical	pass

GFSK LOW CHANNEL 30MHz to 1GHz, ANT H



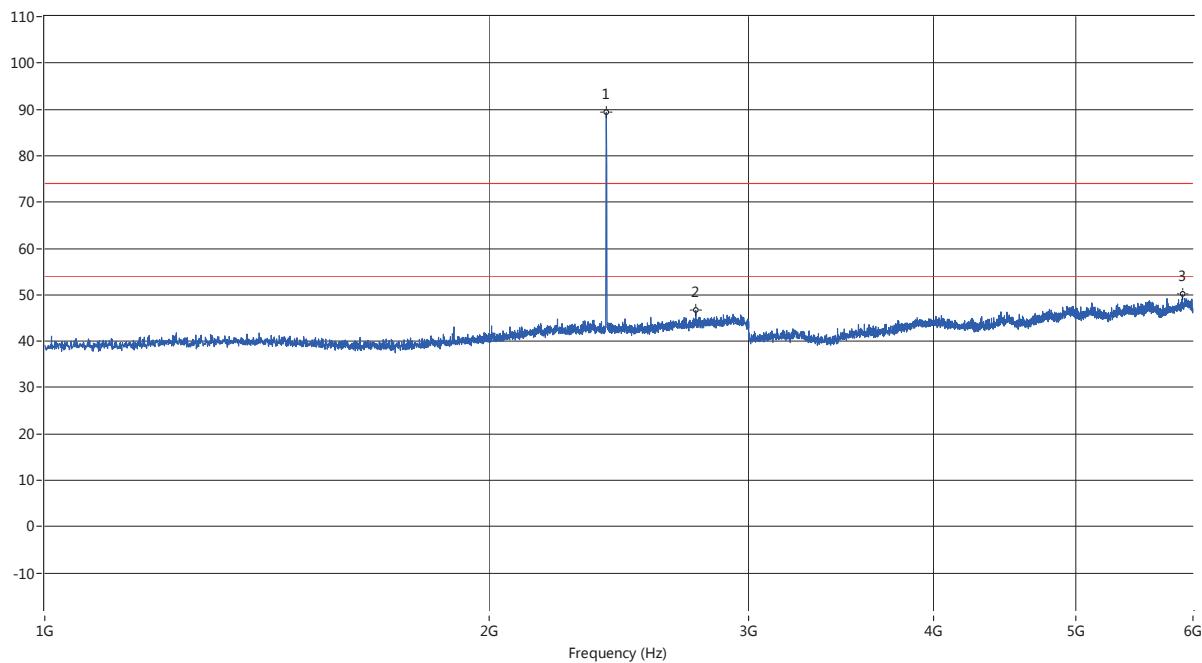
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.273	32.50	--	--	--	40.0	--	245.8	Horizontal	pass
49.395	32.67	--	--	--	40.0	--	286.3	Horizontal	pass
137.643	32.27	--	--	--	43.5	--	58.5	Horizontal	pass

GFSK LOW CHANNEL 1GHz to 6GHz, ANT V

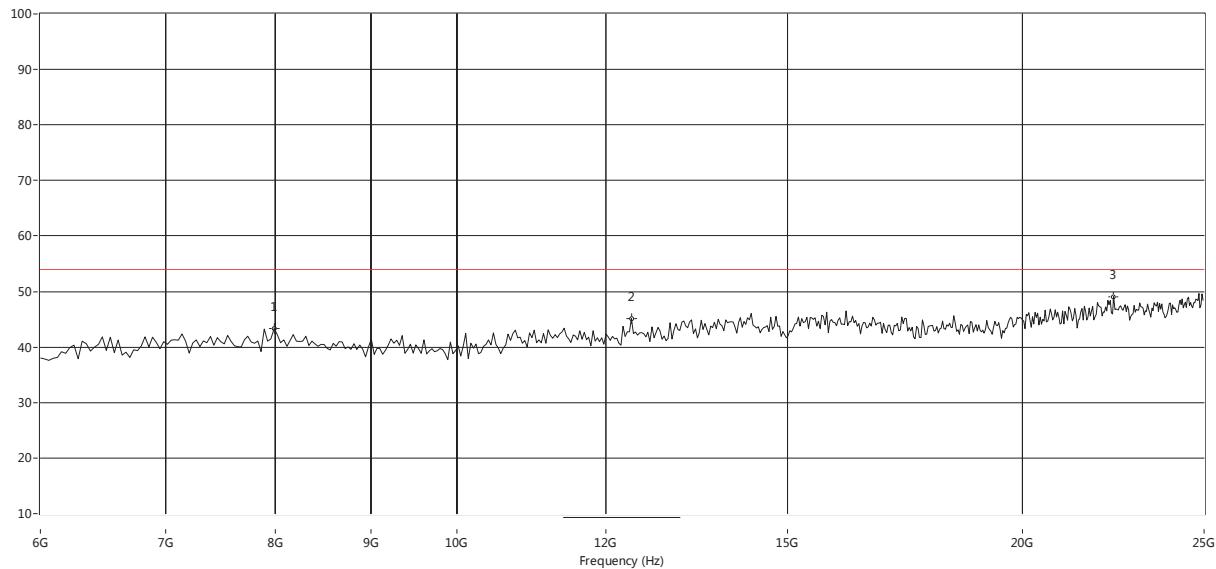


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2401.650	94.57	--	--	74.0	--	54.0	315.3	Vertical	--
2776.556	45.72	--	--	74.0	--	54.0	240.1	Vertical	pass
4853.537	47.58	--	--	74.0	--	54.0	4.7	Vertical	pass

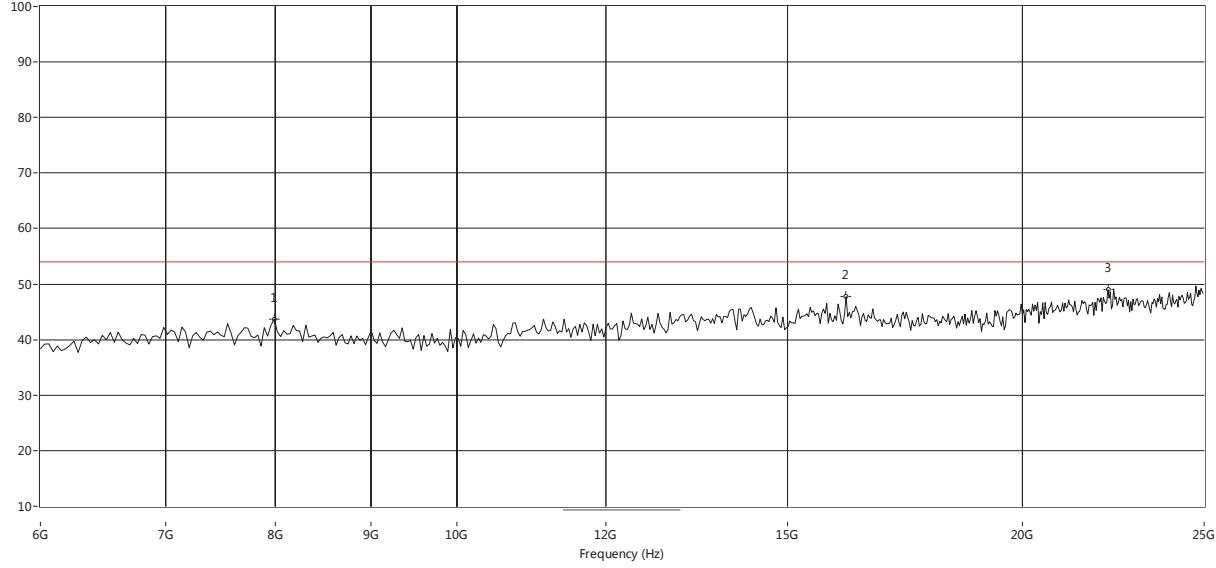
GFSK LOW CHANNEL 1GHz to 6GHz, ANT H



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2401.650	93.76	--	--	74.0	--	54.0	346.3	Horizontal	--
2506.123	49.63	--	--	74.0	--	54.0	353.9	Horizontal	pass
4804.049	51.97	--	--	74.0	--	54.0	331.6	Horizontal	pass

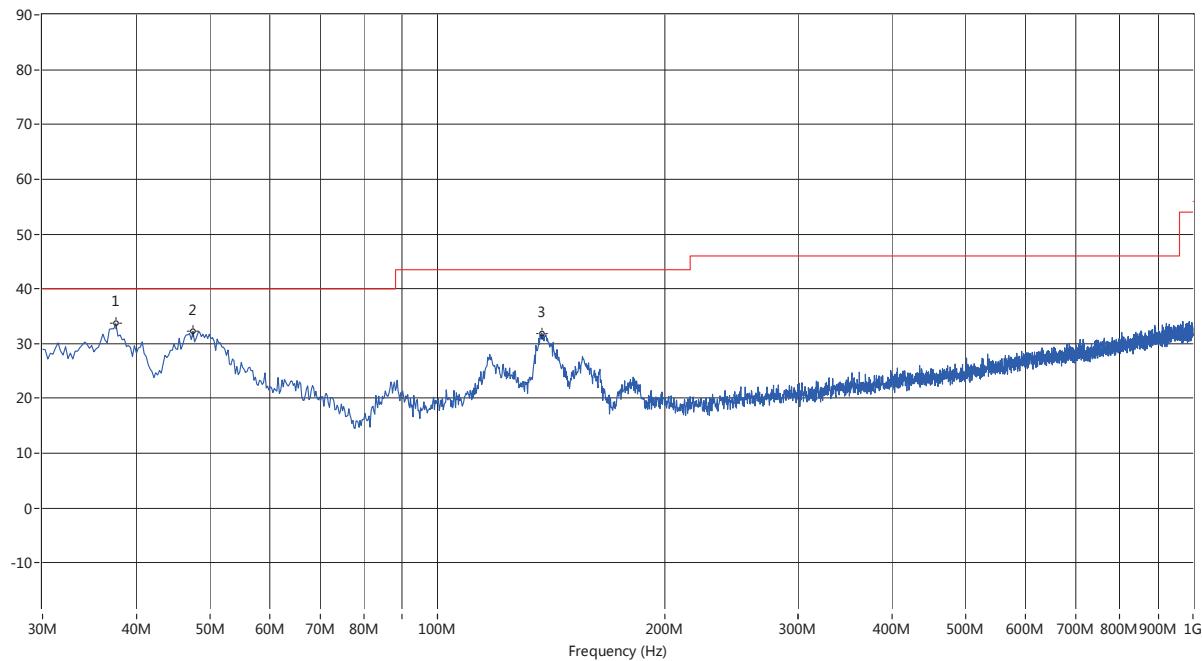
GFSK LOW CHANNEL 6GHz to 25GHz, ANT V


Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.33	54.0	10.7	0.0	Vertical	PASS
12386.023	45.16	54.0	8.8	0.0	Vertical	PASS
22376.040	49.08	54.0	4.9	0.0	Vertical	PASS

GFSK LOW CHANNEL 6GHz to 25GHz, ANT H


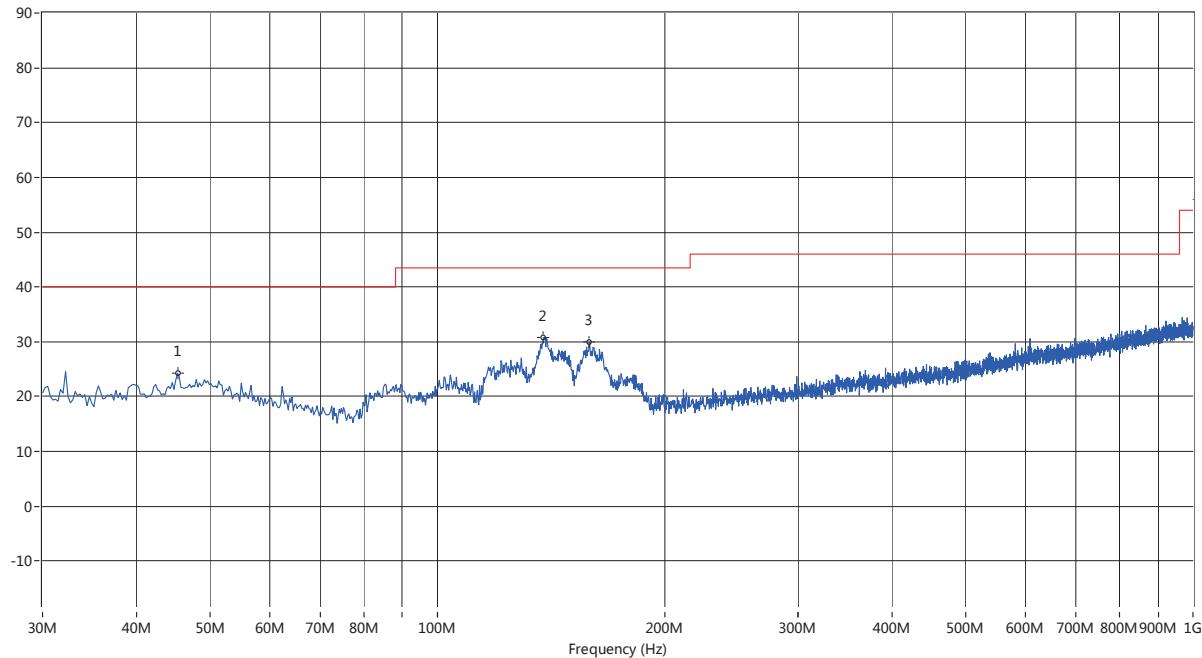
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.69	54.0	10.3	0.0	Horizontal	PASS
16116.473	47.75	54.0	6.3	0.0	Horizontal	PASS
22217.970	49.00	54.0	5.0	0.0	Horizontal	PASS

GFSK MID CHANNEL 30MHz to 1GHz, ANT V



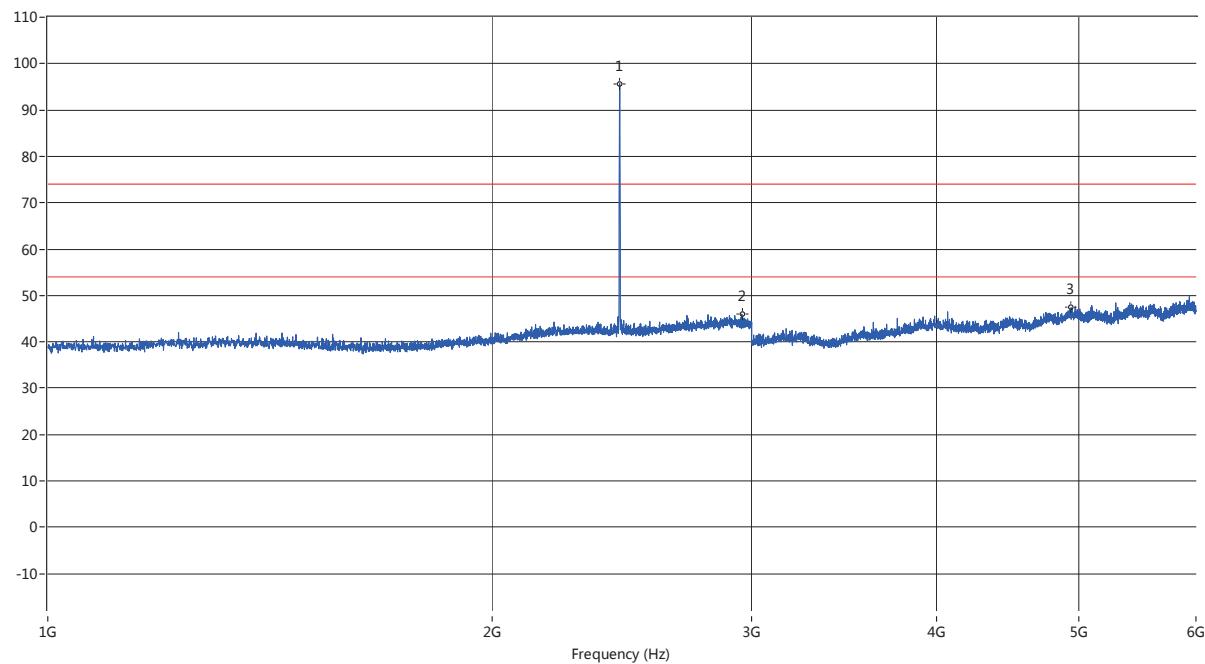
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	33.65	--	--	--	40.0	--	187.7	Vertical	pass
47.456	32.25	--	--	--	40.0	--	290.4	Vertical	pass
137.401	31.95	--	--	--	43.5	--	278.9	Vertical	pass

GFSK MID CHANNEL 30MHz to 1GHz, ANT H



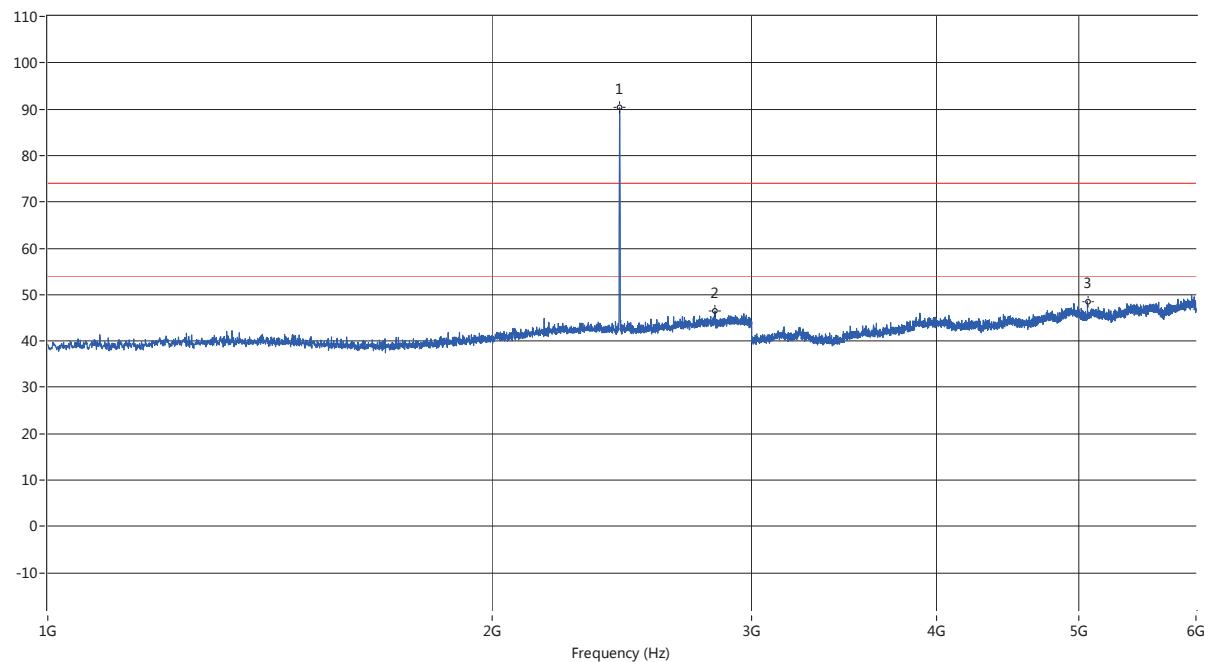
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.24	--	--	--	40.0	--	142.5	Horizontal	pass
138.128	30.77	--	--	--	43.5	--	104.0	Horizontal	pass
158.735	29.97	--	--	--	43.5	--	148.0	Horizontal	pass

GFSK MID CHANNEL 1GHz to 6GHz, ANT V



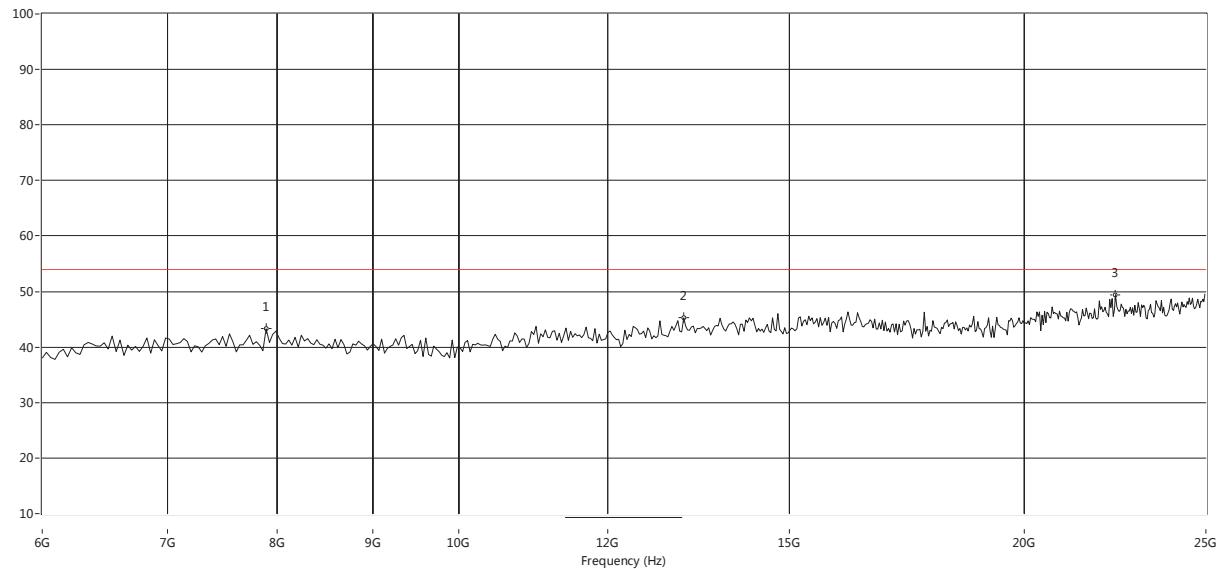
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2440.640	95.72	--	--	74.0	--	54.0	310.1	Vertical	--
2954.011	46.00	--	--	74.0	--	54.0	307.1	Vertical	pass
4937.516	47.38	--	--	74.0	--	54.0	13.3	Vertical	pass

GFSK MID CHANNEL 1GHz to 6GHz, ANT H



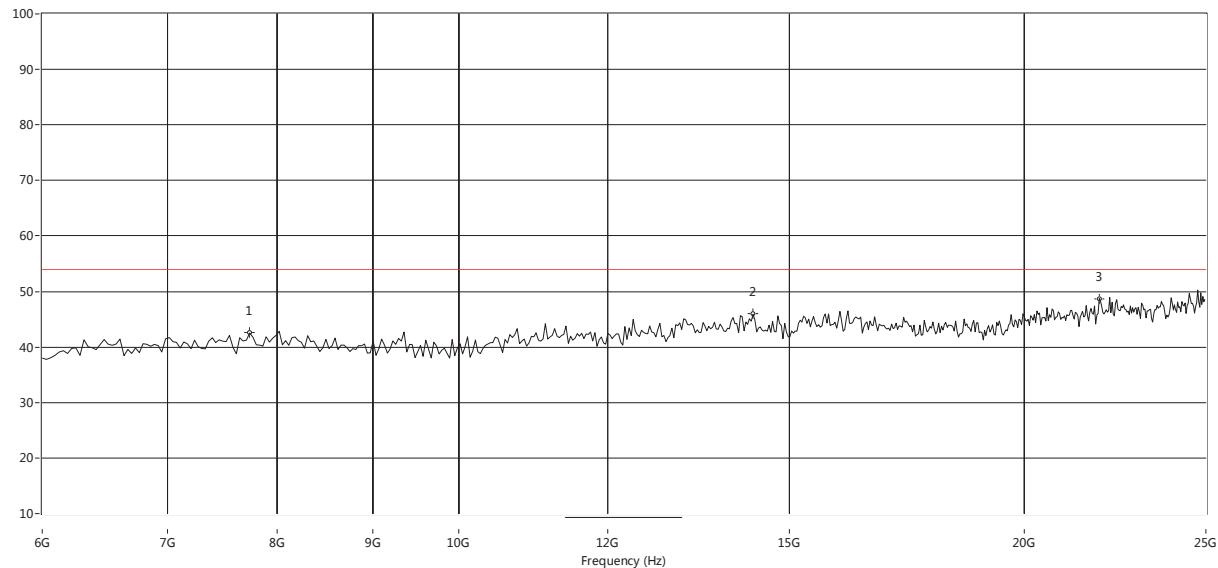
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2440.640	90.33	--	--	74.0	--	54.0	355.5	Horizontal	--
2832.042	46.47	--	--	74.0	--	54.0	184.5	Horizontal	pass
5065.734	48.55	--	--	74.0	--	54.0	268.9	Horizontal	pass

GFSK MID CHANNEL 6GHz to 25GHz, ANT V



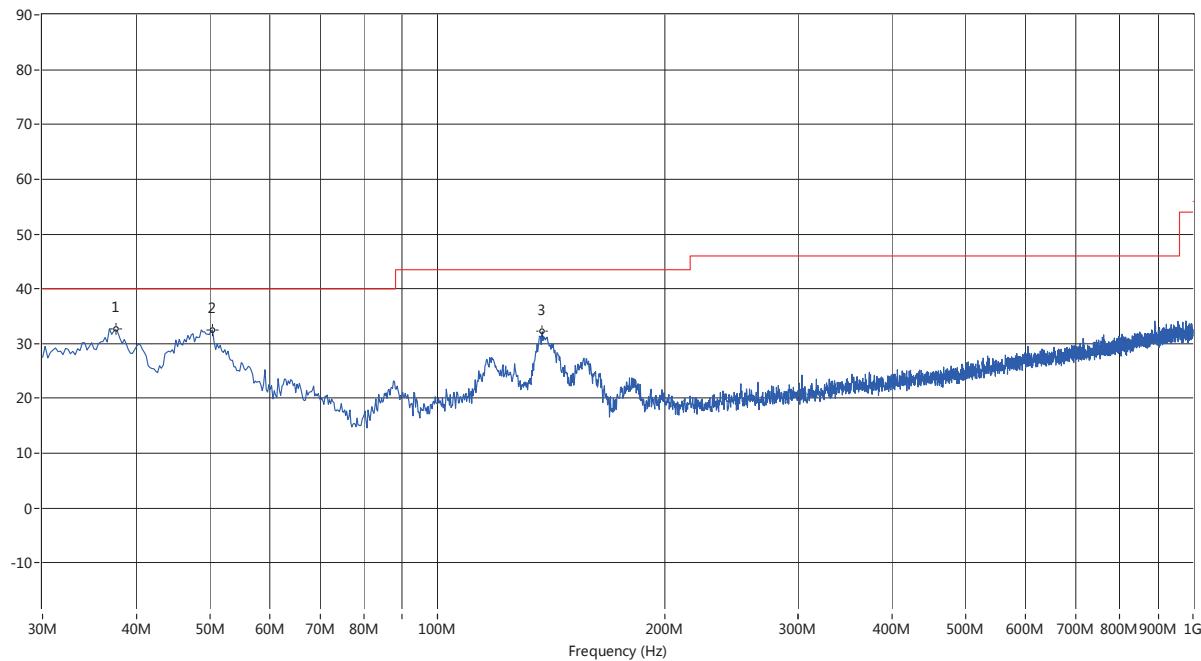
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7896.839	43.28	54.0	10.7	0.0	Vertical	PASS
13176.373	45.24	54.0	8.8	0.0	Vertical	PASS
22376.040	49.43	54.0	4.6	0.0	Vertical	PASS

GFSK MID CHANNEL 6GHz to 25GHz, ANT H



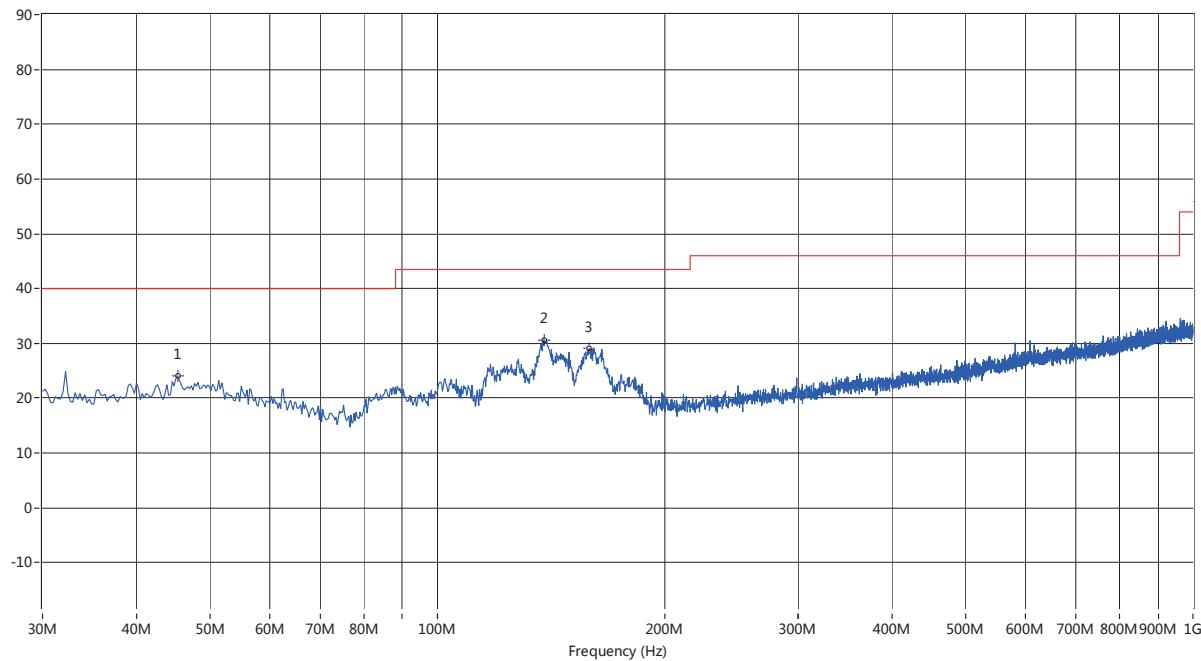
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7738.769	42.53	54.0	11.5	0.0	Horizontal	PASS
14346.090	45.92	54.0	8.1	0.0	Horizontal	PASS
21933.444	48.74	54.0	5.3	0.0	Horizontal	PASS

GFSK HIGH CHANNEL 30MHz to 1GHz, ANT V



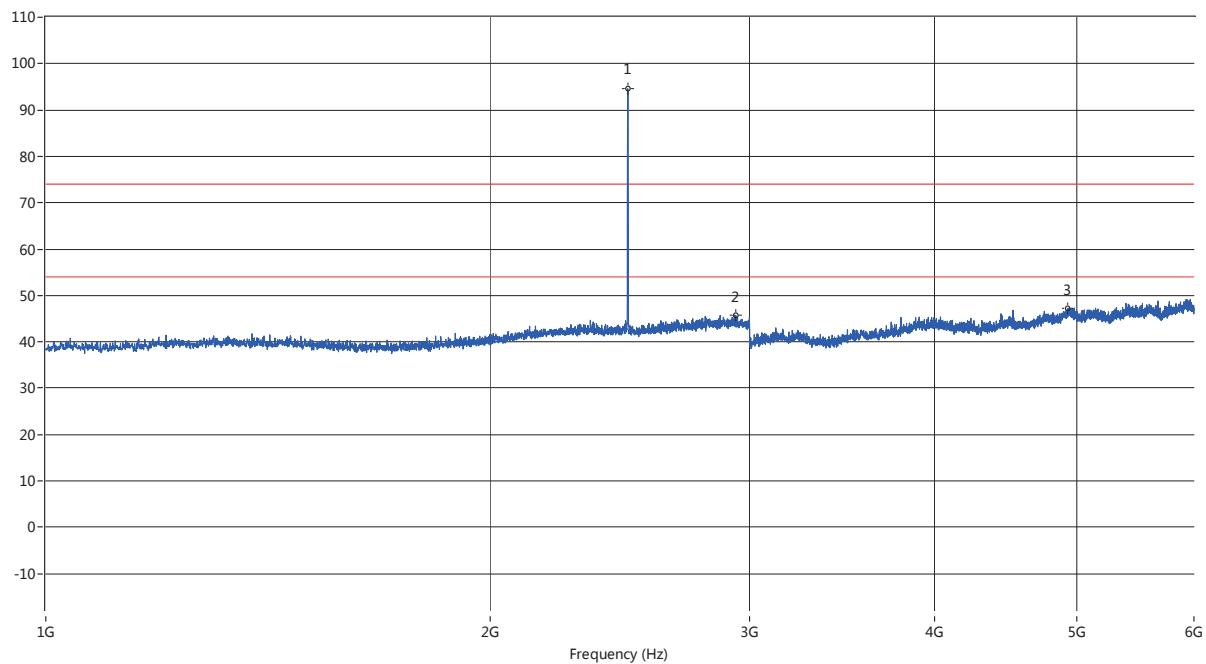
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	32.60	--	--	--	40.0	--	187.7	Vertical	pass
50.365	32.52	--	--	--	40.0	--	54.2	Vertical	pass
137.643	32.19	--	--	--	43.5	--	58.5	Vertical	pass

GFSK HIGH CHANNEL 30MHz to 1GHz, ANT H



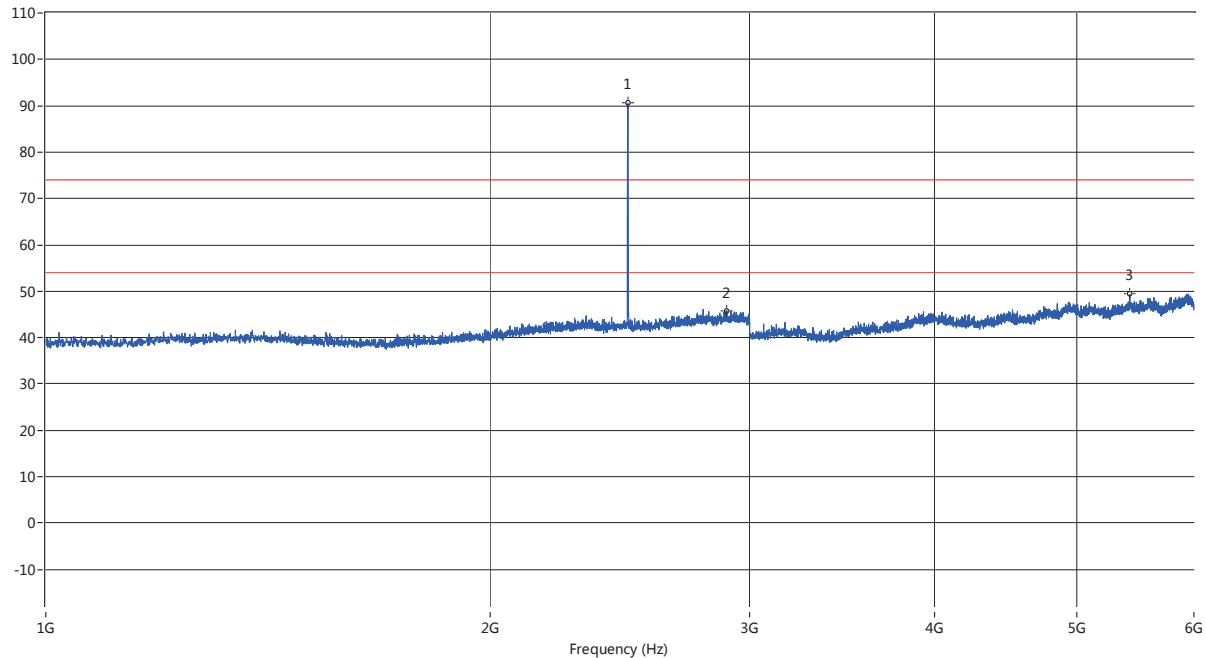
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.11	--	--	--	40.0	--	142.5	Horizontal	pass
138.370	30.69	--	--	--	43.5	--	316.2	Horizontal	pass
158.735	29.06	--	--	--	43.5	--	148.0	Horizontal	pass

GFSK HIGH CHANNEL 1GHz to 6GHz, ANT V

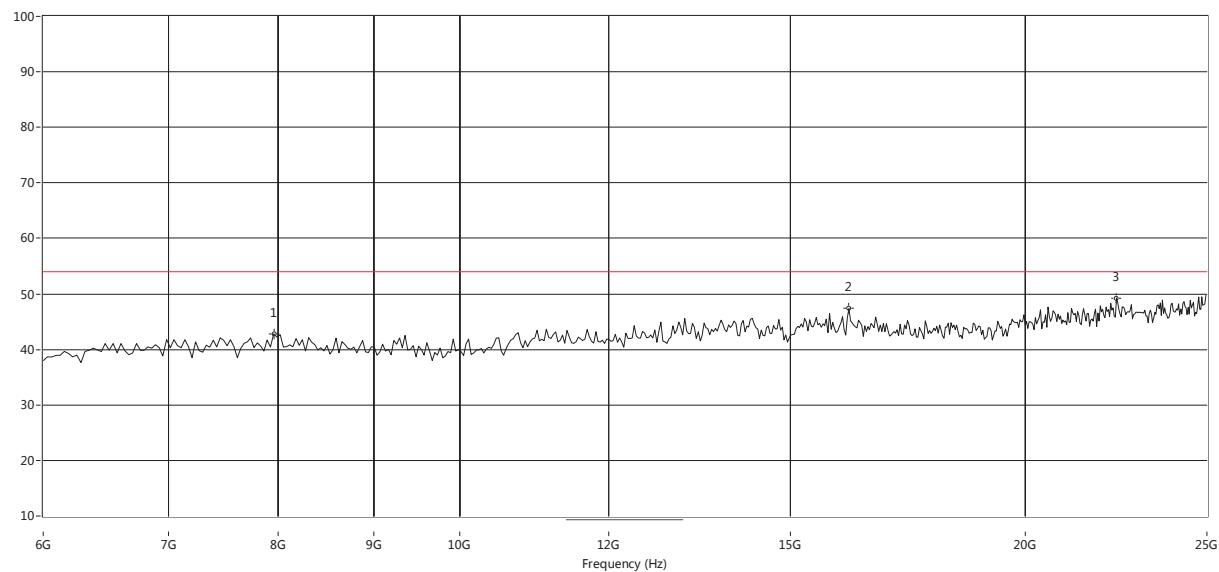


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2479.630	94.63	--	--	74.0	--	54.0	320.5	Vertical	--
2935.016	45.73	--	--	74.0	--	54.0	11.4	Vertical	pass
4928.518	47.16	--	--	74.0	--	54.0	-0.1	Vertical	pass

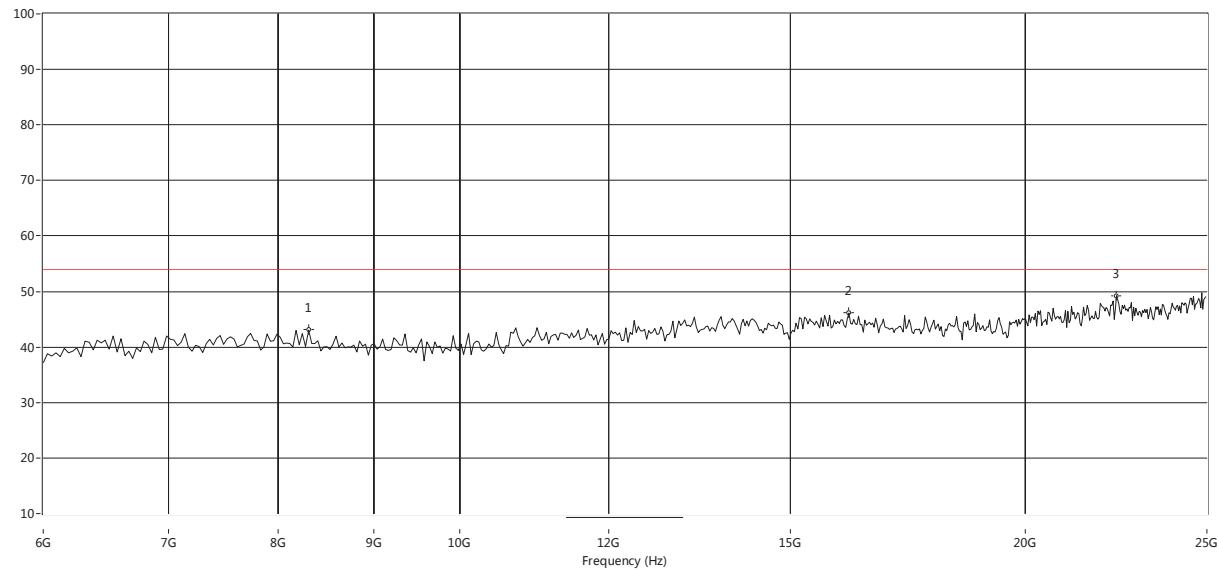
GFSK HIGH CHANNEL 1GHz to 6GHz, ANT H



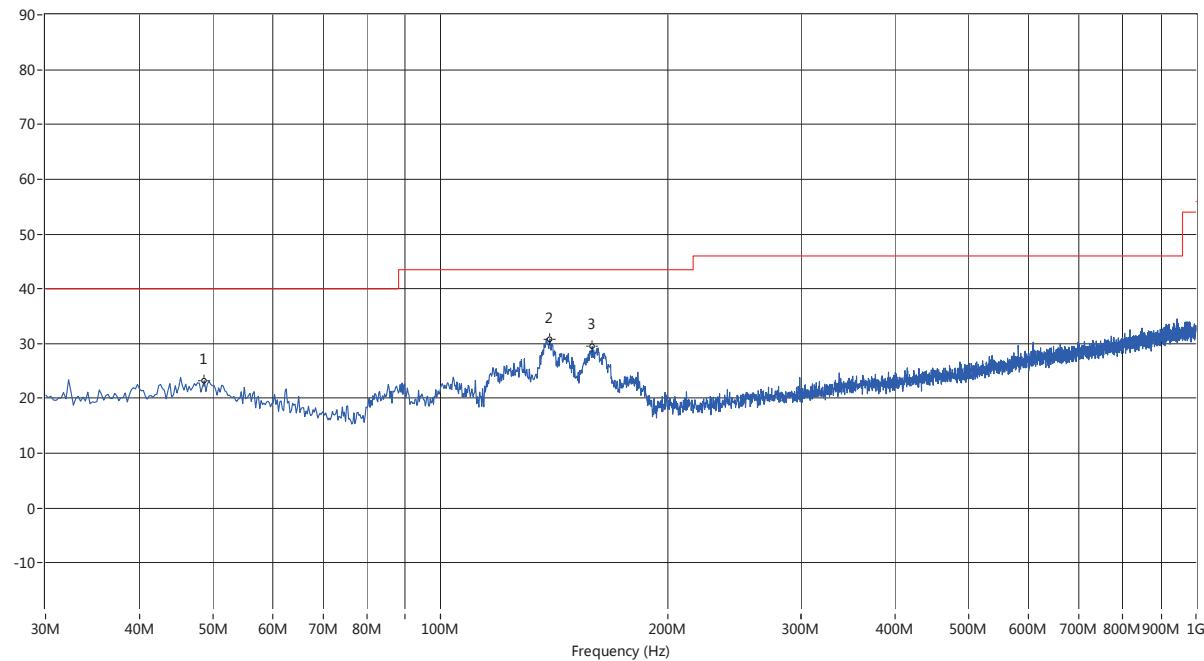
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2479.630	90.53	--	--	74.0	--	54.0	352.4	Horizontal	--
2894.026	45.85	--	--	74.0	--	54.0	359.4	Horizontal	pass
5427.893	49.35	--	--	74.0	--	54.0	352.4	Horizontal	pass

GFSK HIGH CHANNEL 6GHz to 25GHz, ANT V


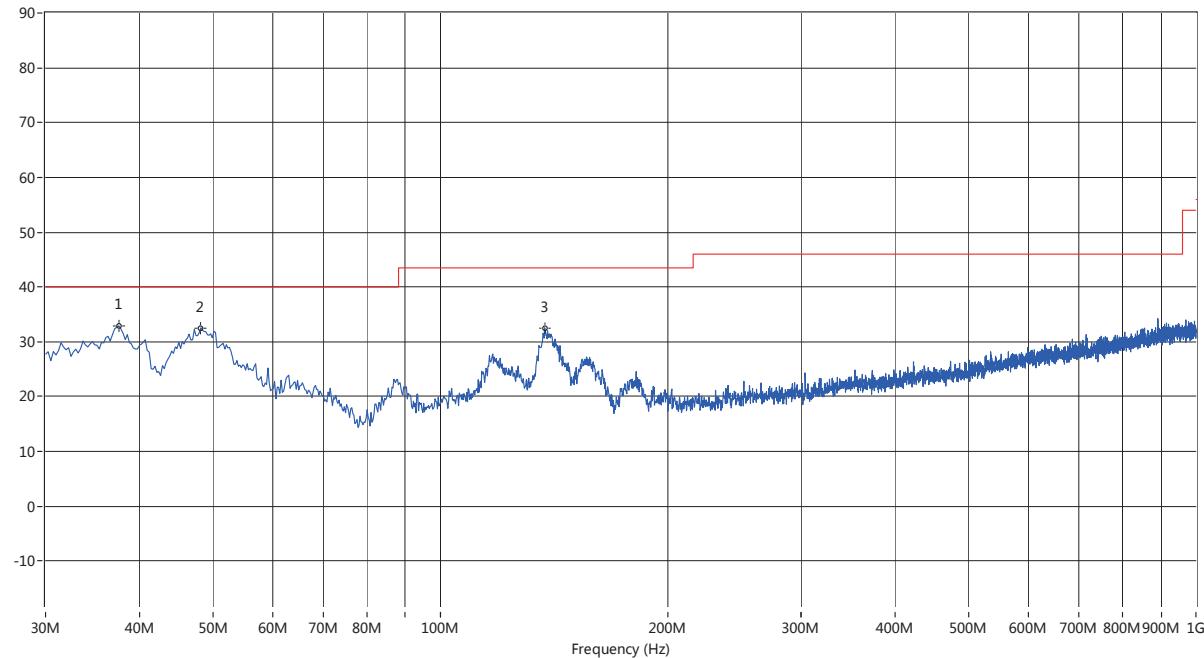
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7960.067	42.81	54.0	11.2	0.0	Vertical	PASS
16116.473	47.38	54.0	6.6	0.0	Vertical	PASS
22376.040	49.26	54.0	4.7	0.0	Vertical	PASS

GFSK HIGH CHANNEL 6GHz to 25GHz, ANT H


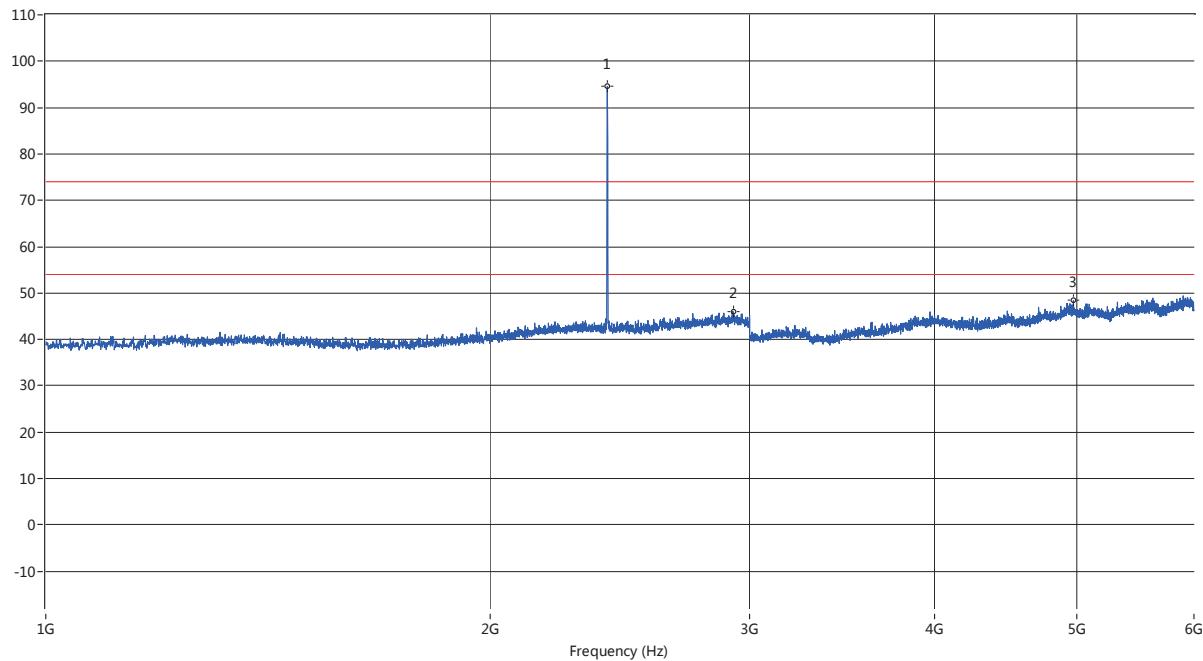
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
8307.820	43.07	54.0	10.9	0.0	Horizontal	PASS
16116.473	46.15	54.0	7.9	0.0	Horizontal	PASS
22376.040	49.24	54.0	4.8	0.0	Horizontal	PASS

Π/4-DQPSK LOW CHANNEL 30MHz to 1GHz, ANT V


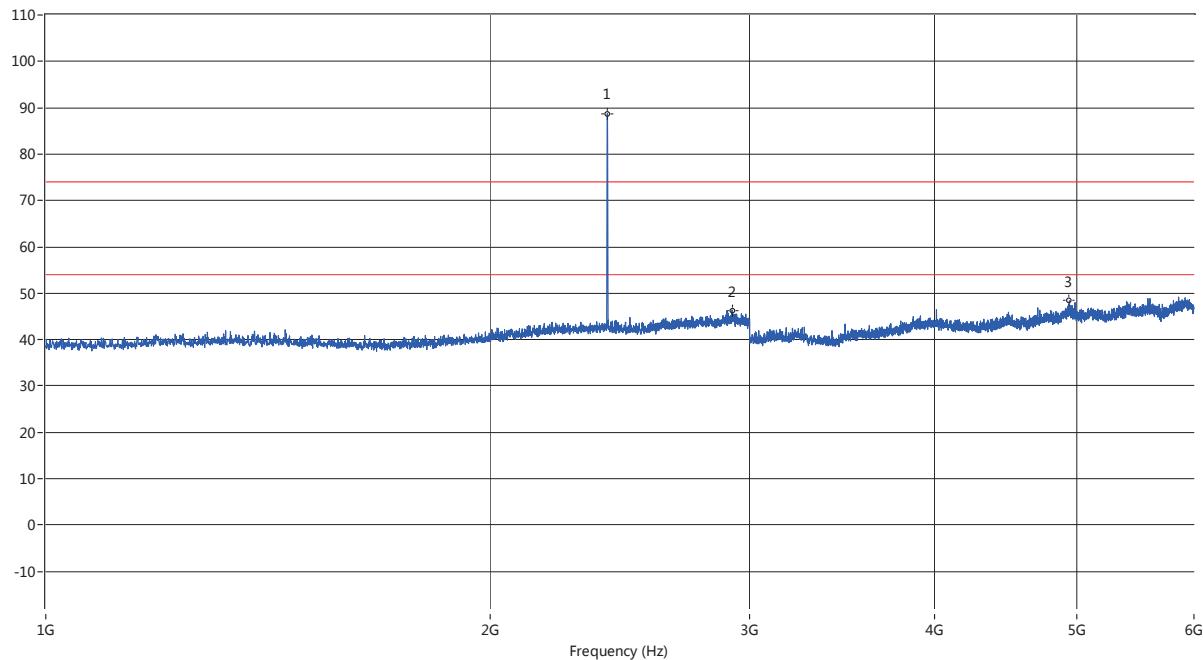
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-A	Degree	Antenna	Verdical
48.668	23.25	--	--	--	40.0	--	78.1	Vertical	pass
139.583	30.88	--	--	--	43.5	--	357.8	Vertical	pass
158.735	29.49	--	--	--	43.5	--	148.0	Vertical	pass

Π/4-DQPSK LOW CHANNEL 30MHz to 1GHz, ANT H


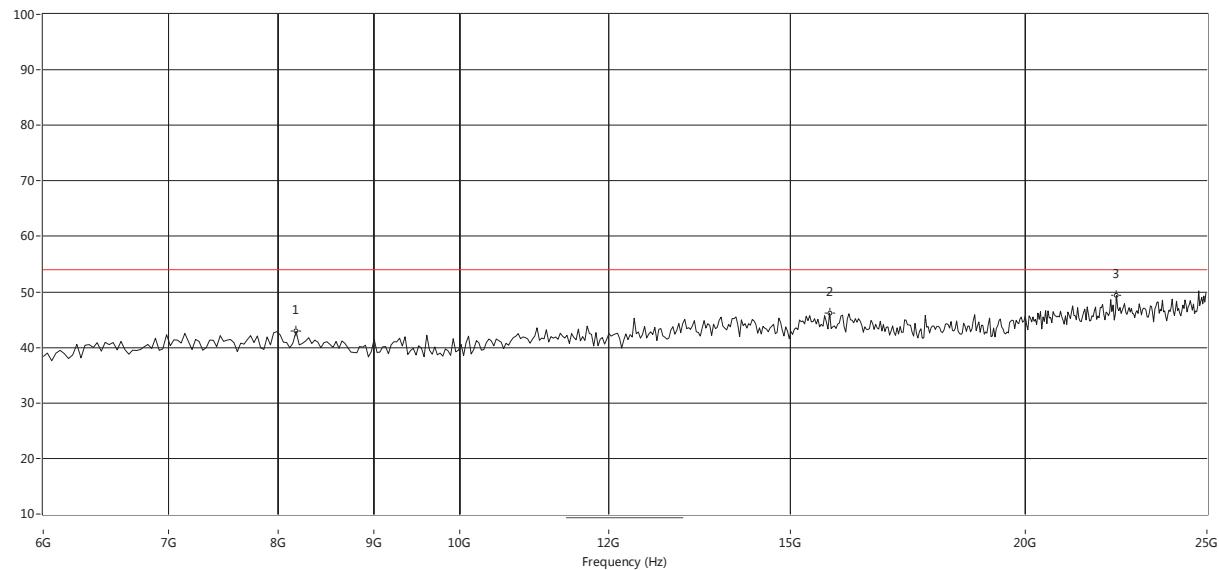
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	32.92	--	--	--	40.0	--	187.7	Horizontal	pass
48.183	32.56	--	--	--	40.0	--	353.6	Horizontal	pass
137.401	32.57	--	--	--	43.5	--	278.9	Horizontal	pass

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


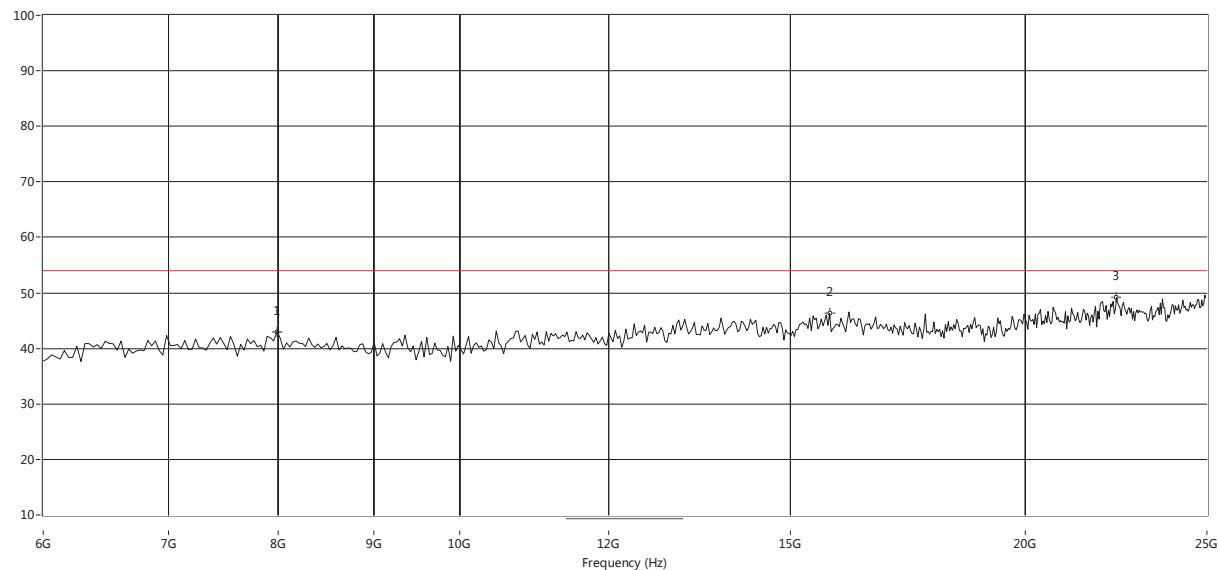
Fre. (MHz)	Pk	QP	V	L mit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2401.650	94.55	--	--	74.0	--	54.0	317.5	Vertical	--
2922.519	46.07	--	--	74.0	--	54.0	103.2	Vertical	pass
4971.257	48.39	--	--	74.0	--	54.0	333.5	Vertical	pass

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


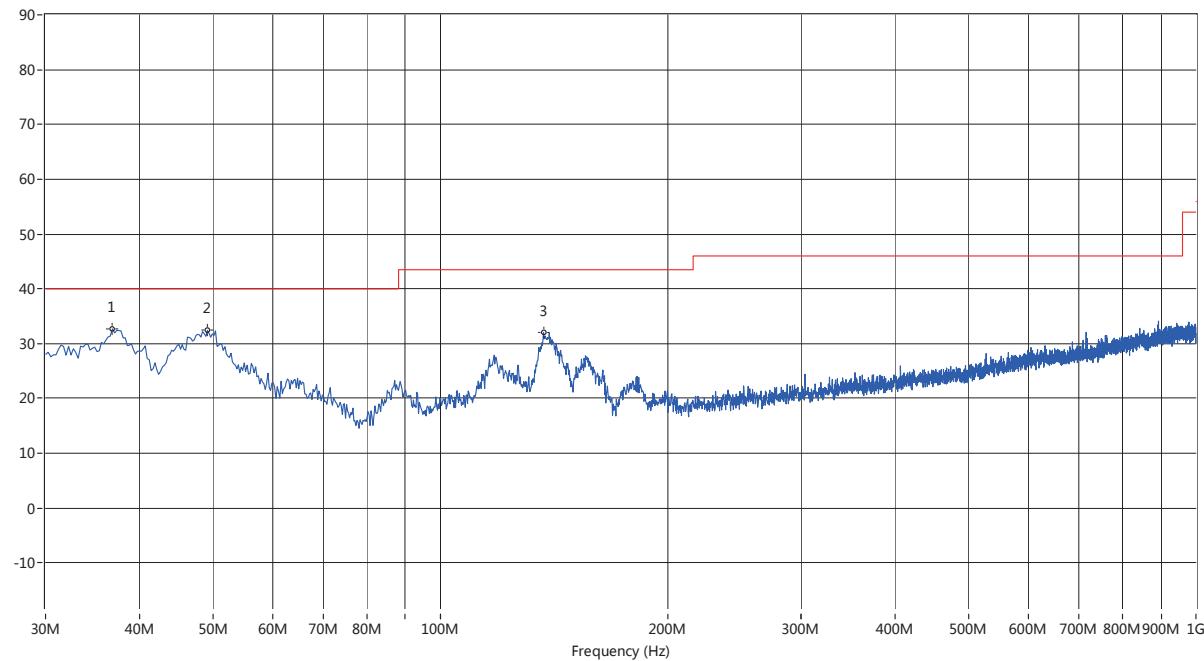
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2401.650	88.74	--	--	74.0	--	54.0	185.2	Horizontal	--
2918.020	46.35	--	--	74.0	--	54.0	359.8	Horizontal	pass
4939.765	48.38	--	--	74.0	--	54.0	114.6	Horizontal	pass

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


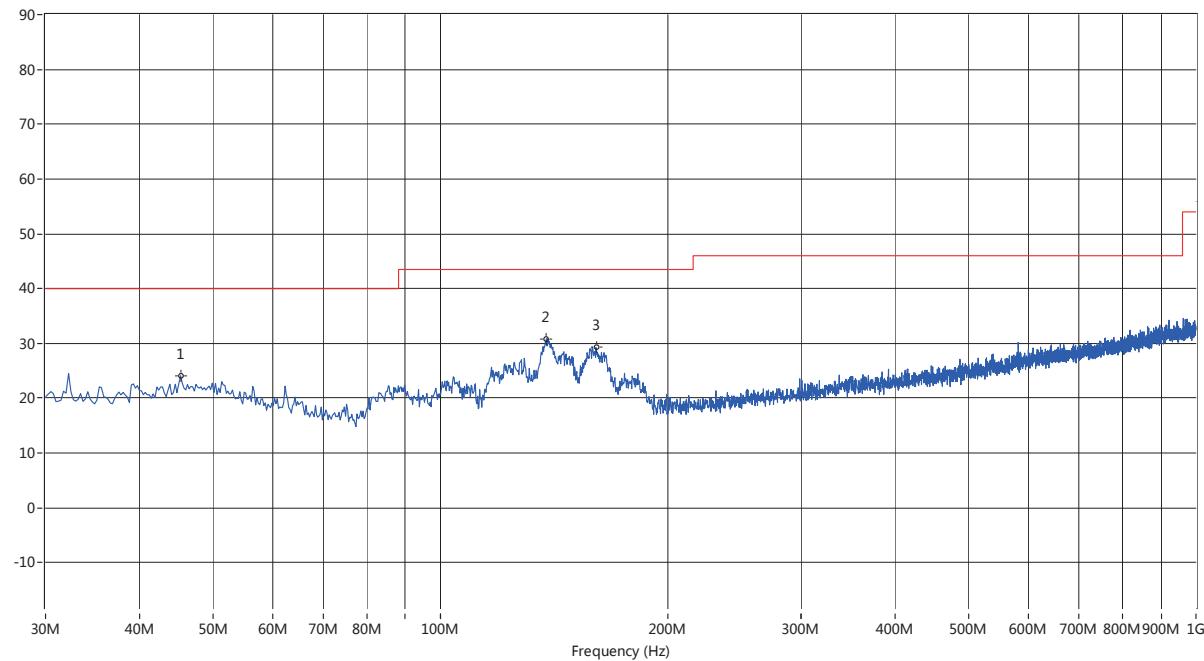
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
8181.364	42.90	54.0	11.1	0.0	Vertical	PASS
15737.105	46.20	54.0	7.8	0.0	Vertical	PASS
22376.040	49.37	54.0	4.6	0.0	Vertical	PASS

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


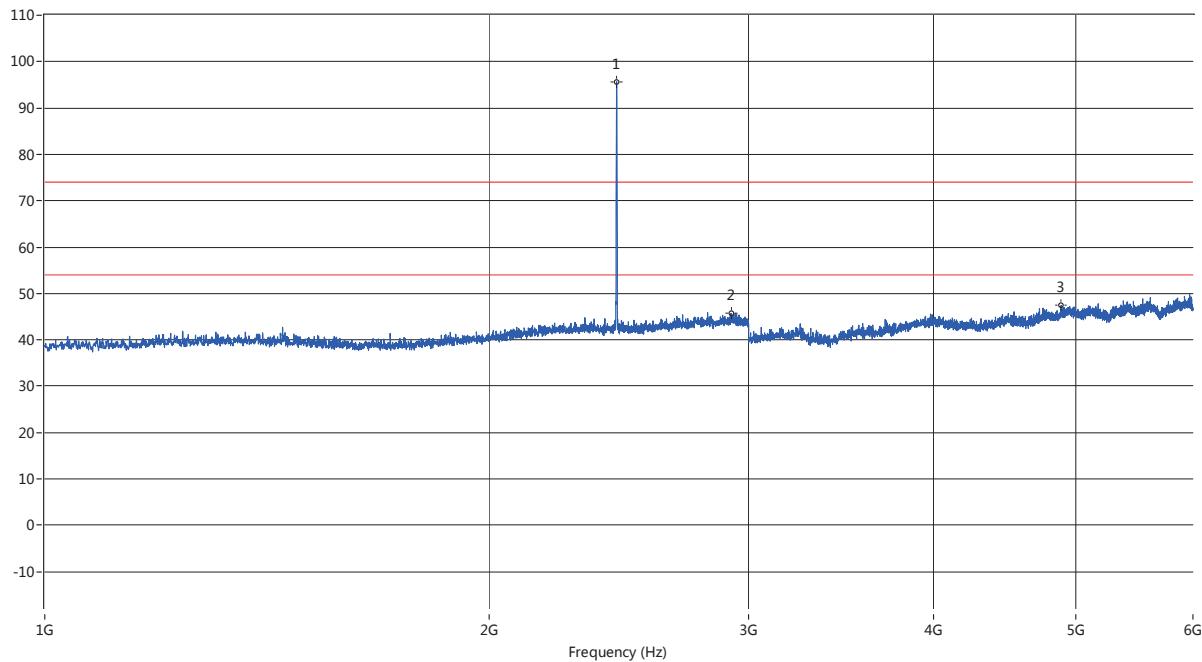
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.04	54.0	11.0	0.0	Horizontal	PASS
15737.105	46.32	54.0	7.7	0.0	Horizontal	PASS
22376.040	49.19	54.0	4.8	0.0	Horizontal	PASS

Π/4-DQPSK MID CHANNEL 30MHz to 1GHz, ANT V


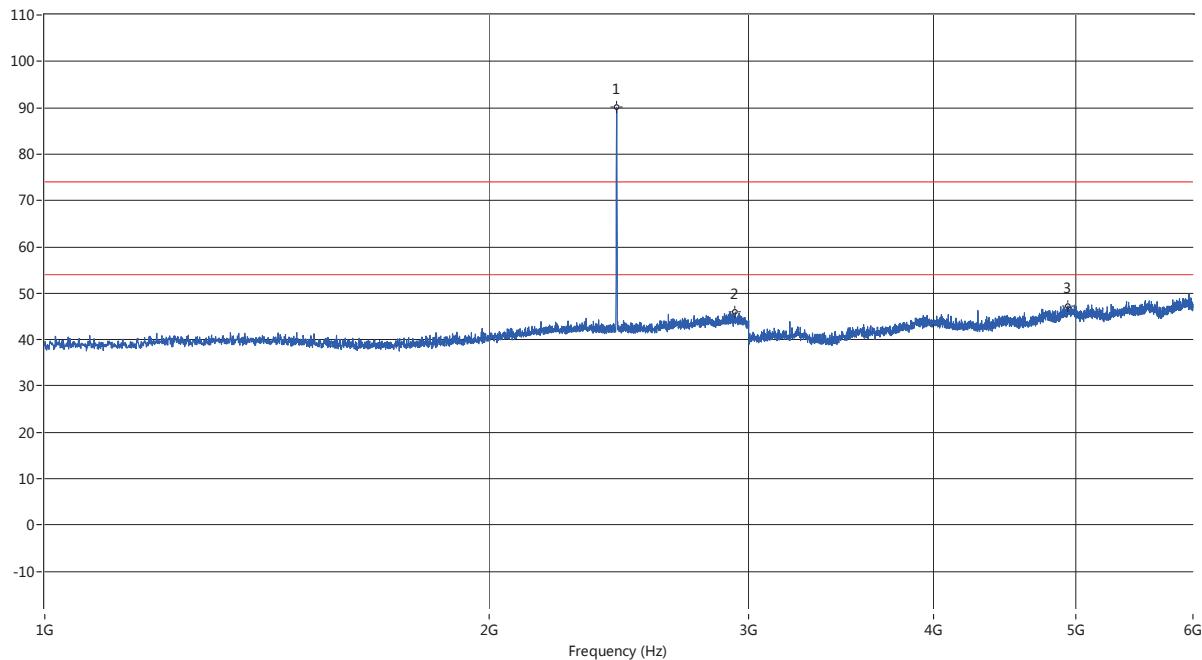
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
36.788	32.70	--	--	--	40.0	--	332.3	Vertical	pass
49.153	32.41	--	--	--	40.0	--	286.3	Vertical	pass
136.916	32.05	--	--	--	43.5	--	315.8	Vertical	pass

Π/4-DQPSK MID CHANNEL 30MHz to 1GHz, ANT H


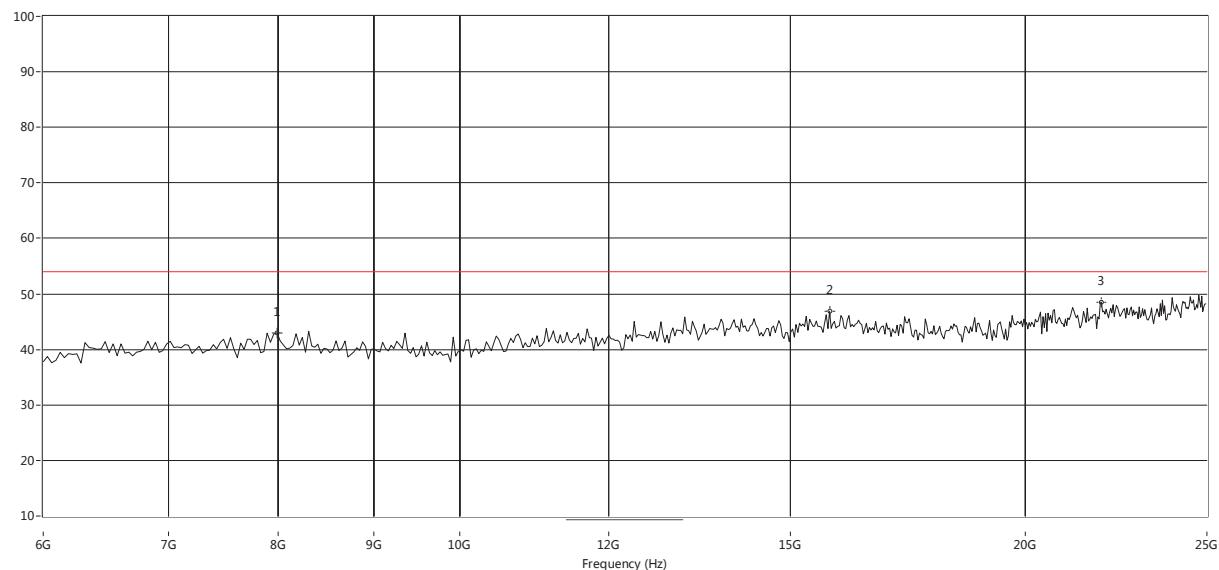
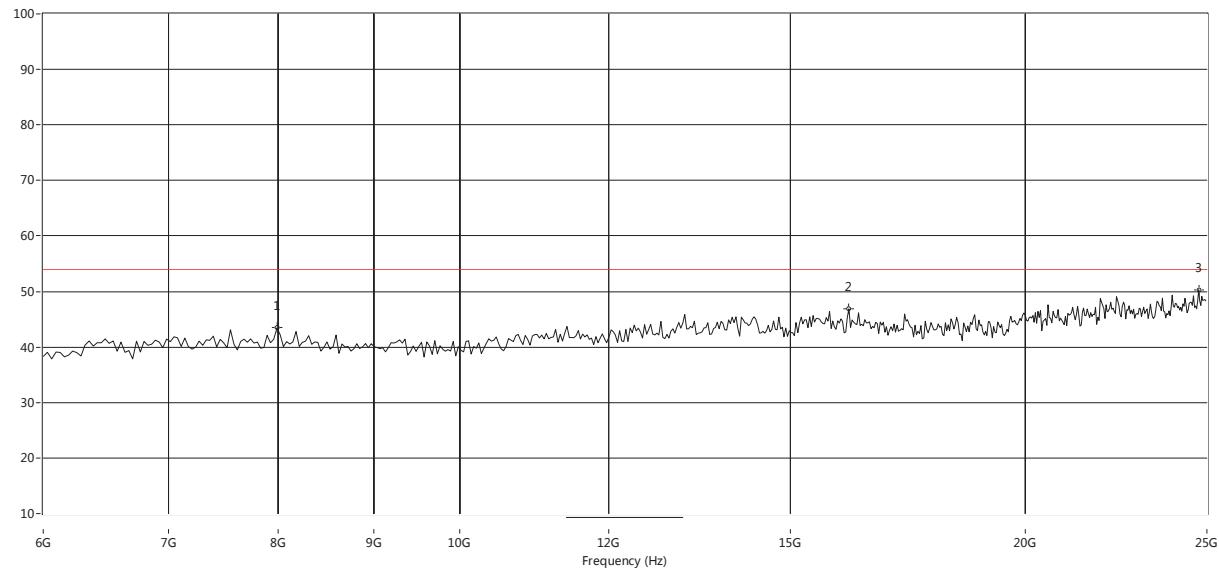
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.11	--	--	--	40.0	--	142.5	Horizontal	pass
138.128	30.86	--	--	--	43.5	--	104.0	Horizontal	pass
160.675	29.26	--	--	--	43.5	--	142.5	Horizontal	pass

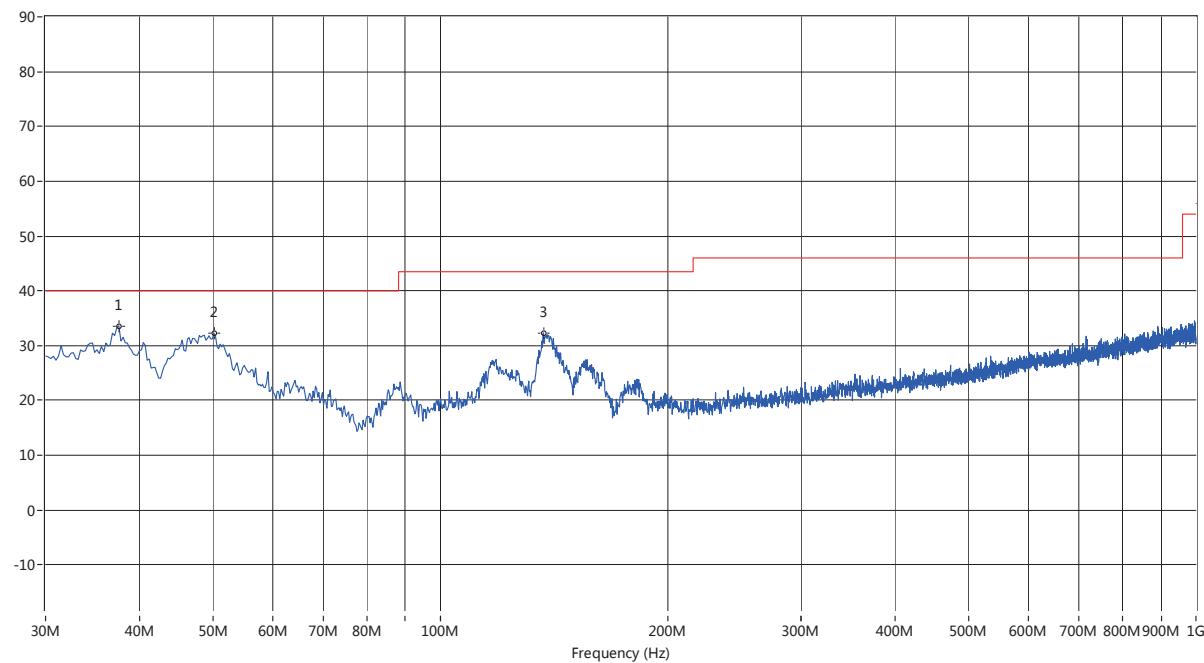
Π/4-DQPSK MID CHANNEL 1GHz to 6GHz, ANT V


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2440.640	95.70	--	--	74.0	--	54.0	312.5	Vertical	--
2918.020	45.66	--	--	74.0	--	54.0	2.7	Vertical	pass
4884.279	47.40	--	--	74.0	--	54.0	1.1	Vertical	pass

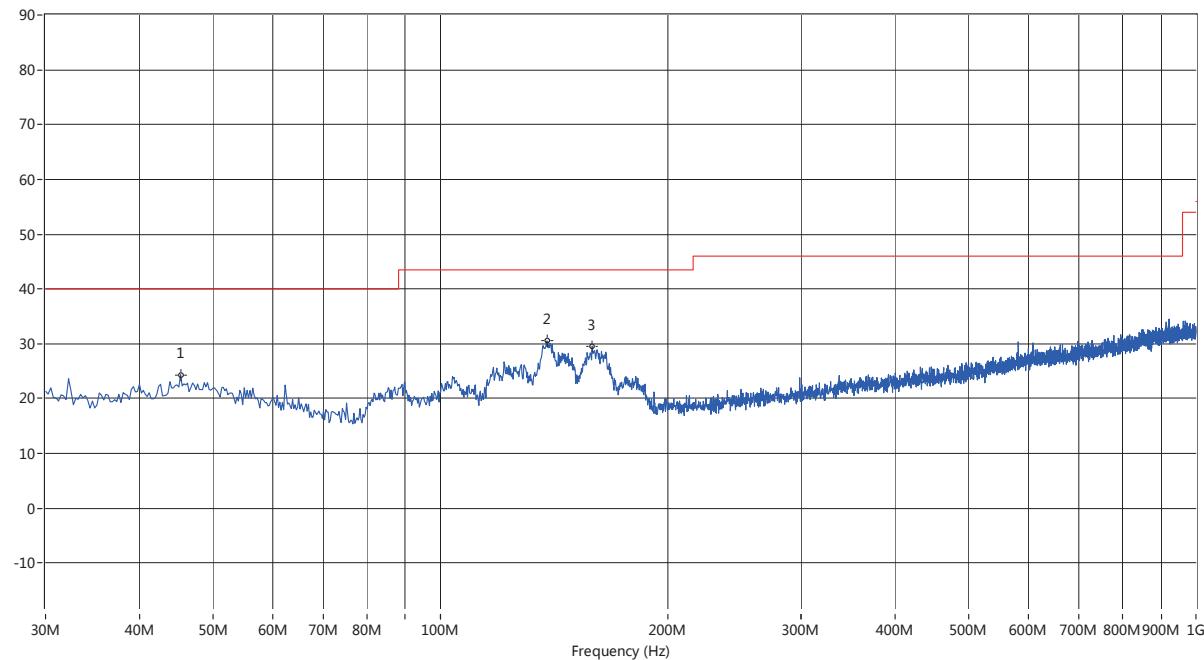
Π/4-DQPSK MID CHANNEL 1GHz to 6GHz, ANT H


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2440.640	90.11	--	--	74.0	--	54.0	356.5	Horizontal	--
2938.015	45.96	--	--	74.0	--	54.0	213.7	Horizontal	pass
4936.016	47.27	--	--	74.0	--	54.0	230.2	Horizontal	pass

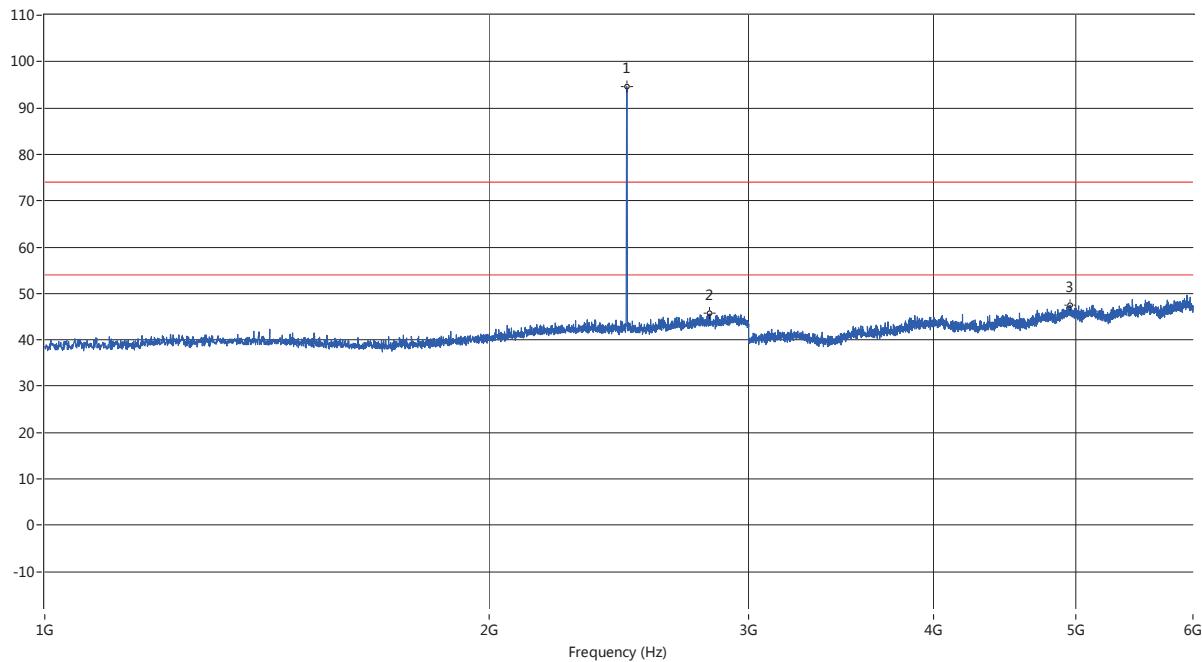
Π/4-DQPSK MID CHANNEL 6GHz to 25GHz, ANT V

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


Π/4-DQPSK HIGH CHANNEL 30MHz to 1GHz, ANT V


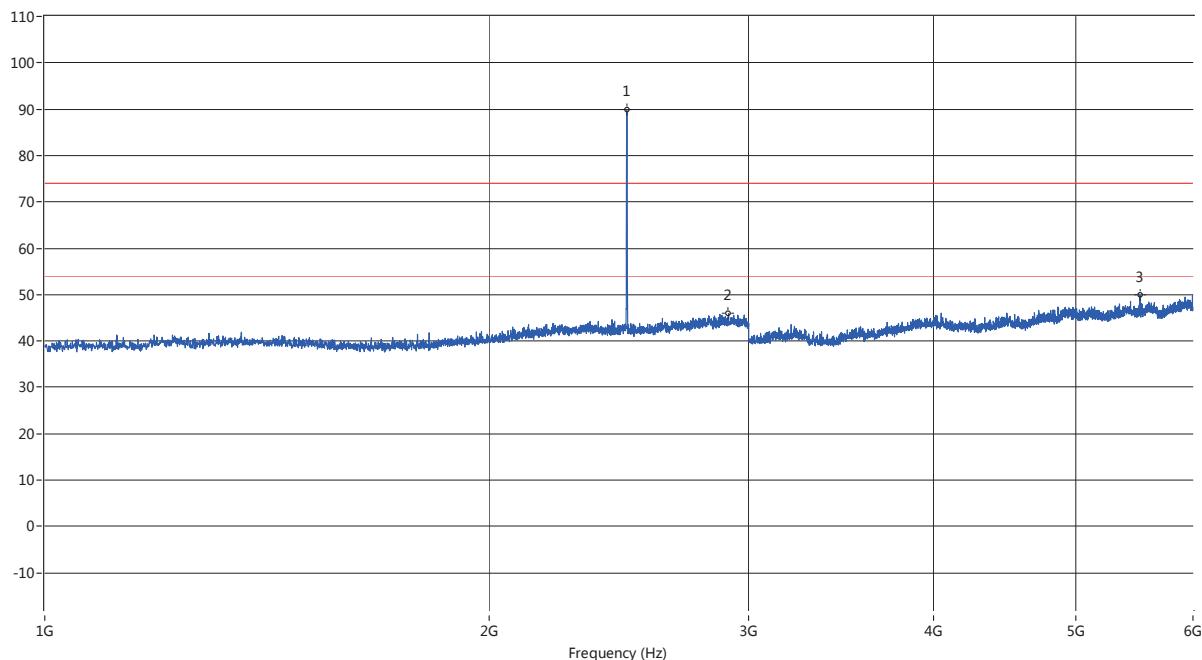
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Li	it-AV	Degree	Antenna	Verdical
37.516	33.61	--	--	--	40.0	--	--	187.7	Vertical	pass
50.122	32.24	--	--	--	40.0	--	--	295.9	Vertical	pass
136.916	32.33	--	--	--	43.5	--	--	315.8	Vertical	pass

Π/4-DQPSK HIGH CHANNEL 30MHz to 1GHz, ANT H


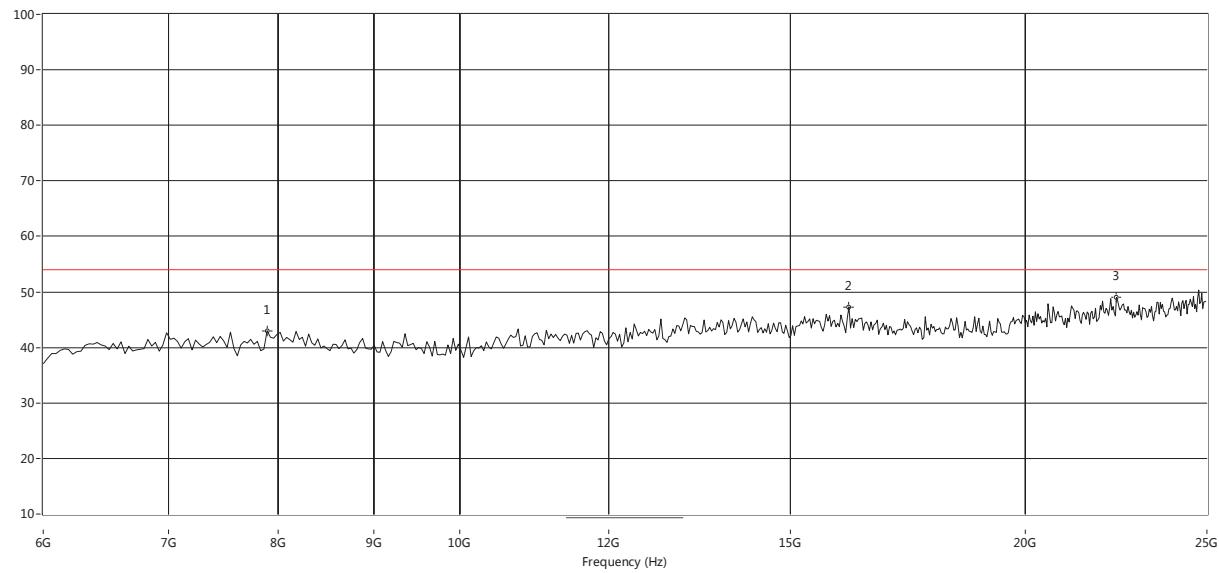
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenn	Verdical	
45.274	24.38	--	--	--	40.0	--	--	142.5	Horizontal	pass
138.613	30.50	--	--	--	43.5	--	--	140.6	Horizontal	pass
158.735	29.60	--	--	--	43.5	--	--	148.0	Horizontal	pass

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


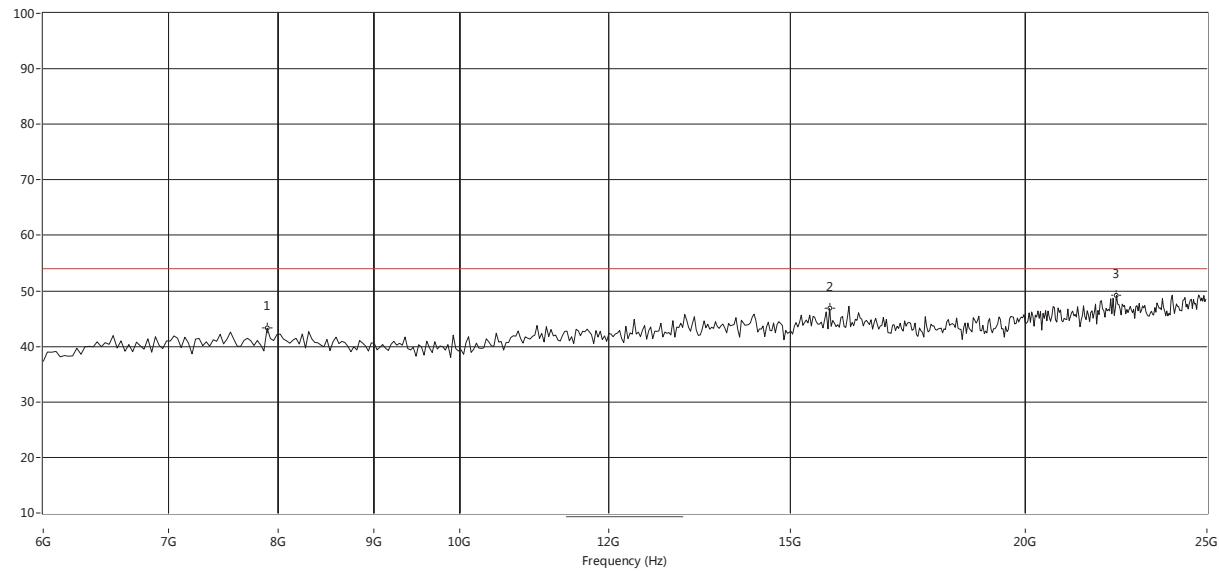
Fre. (MHz)	P	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2479.630	94.65	--	--	74.0	--	54.0	319.3	Vertical	--
2823.544	45.65	--	--	74.0	--	54.0	171.2	Vertical	pass
4953.262	47.49	--	--	74.0	--	54.0	-0.3	Vertical	pass

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


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2479.630	89.83	--	--	74.0	--	54.0	354.0	Horizontal	--
2906.523	45.91	--	--	74.0	--	54.0	278.2	Horizontal	pass
5523.869	49.86	--	--	74.0	--	54.0	197.9	Horizontal	pass

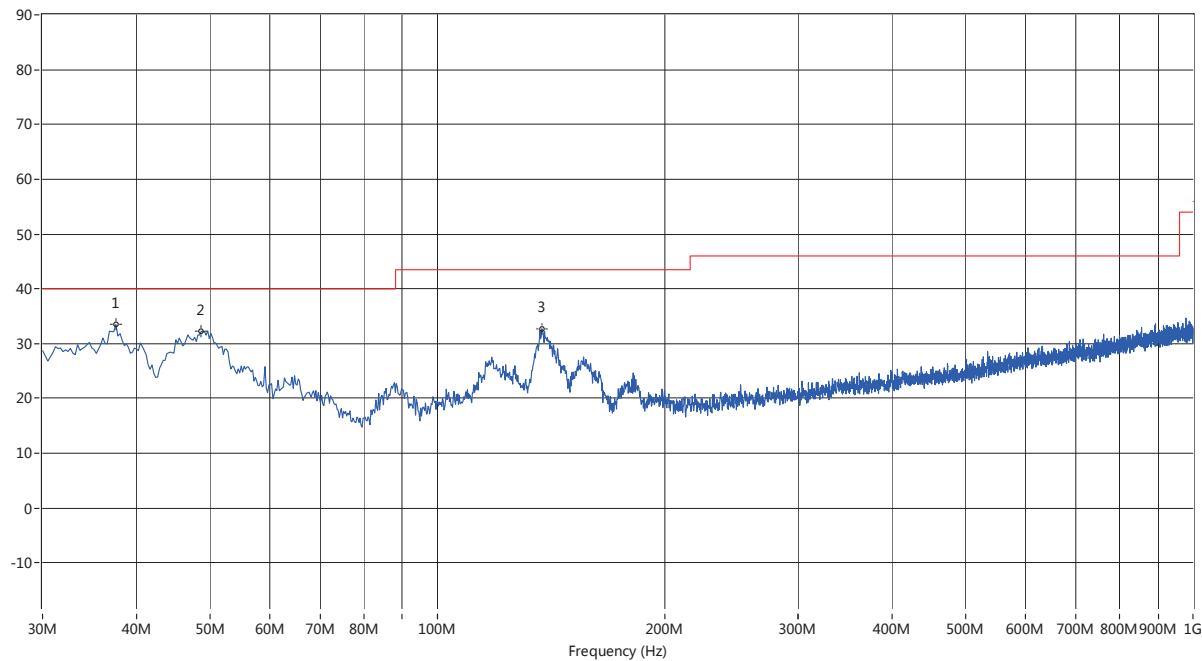
Π/4-DQPSK HIGH CHANNEL 6GHz to 25GHz, ANT V


Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7896.839	43.02	54.0	11.0	0.0	Vertical	PASS
16116.473	47.30	54.0	6.7	0.0	Vertical	PASS
22376.040	48.98	54.0	5.0	0.0	Vertical	PASS

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


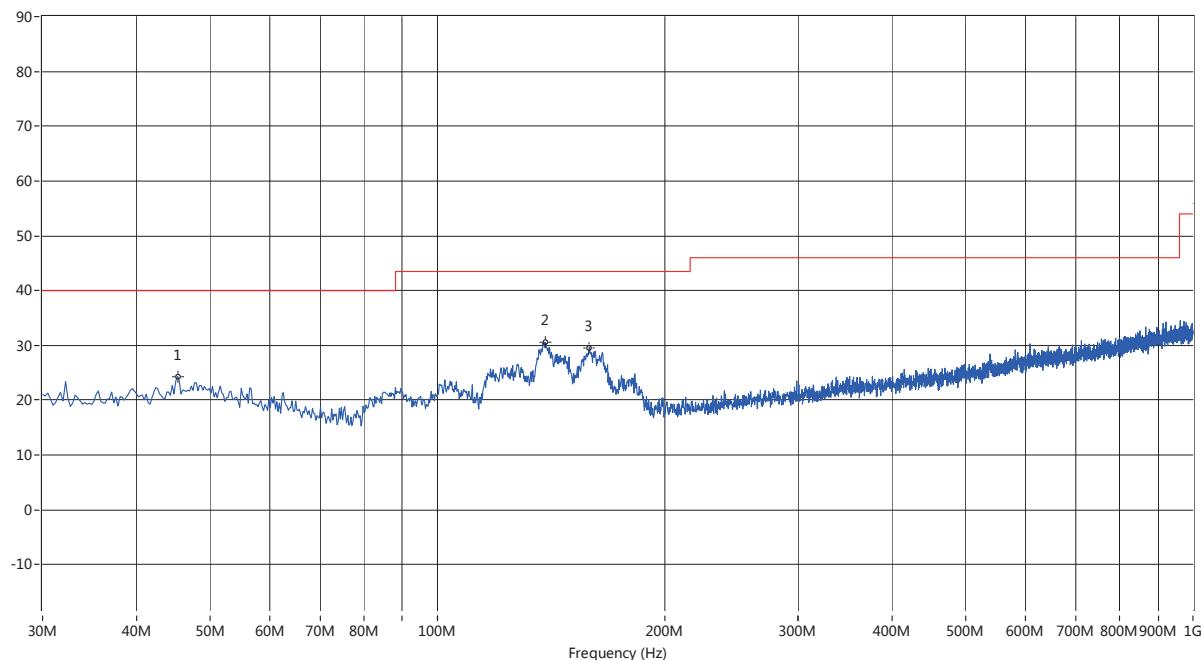
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7896.839	43.28	54.0	10.7	0.0	Horizontal	PASS
15737.105	46.81	54.0	7.2	0.0	Horizontal	PASS
22376.040	49.15	54.0	4.9	0.0	Horizontal	PASS

8-DPSK LOW CHANNEL 30MHz to 1GHz, ANT V



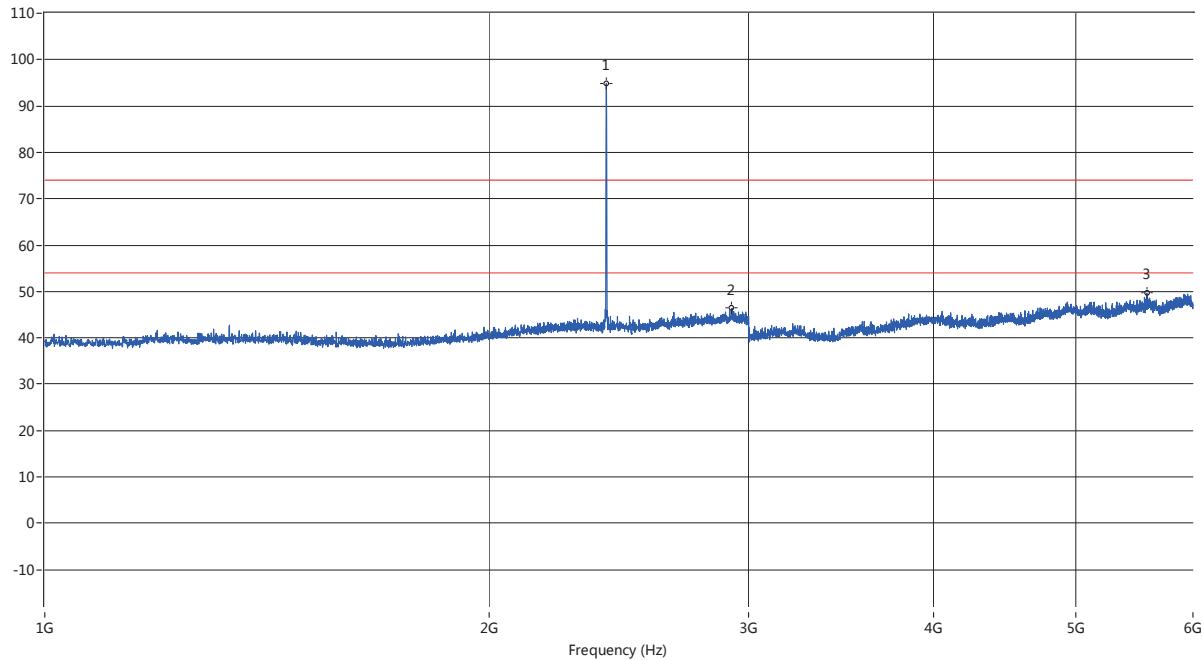
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	33.48	--	--	--	40.0	--	187.7	Vertical	pass
48.668	32.28	--	--	--	40.0	--	145.0	Vertical	pass
137.401	32.72	--	--	--	43.5	--	278.9	Vertical	pass

8-DPSK LOW CHANNEL 30MHz to 1GHz, ANT H



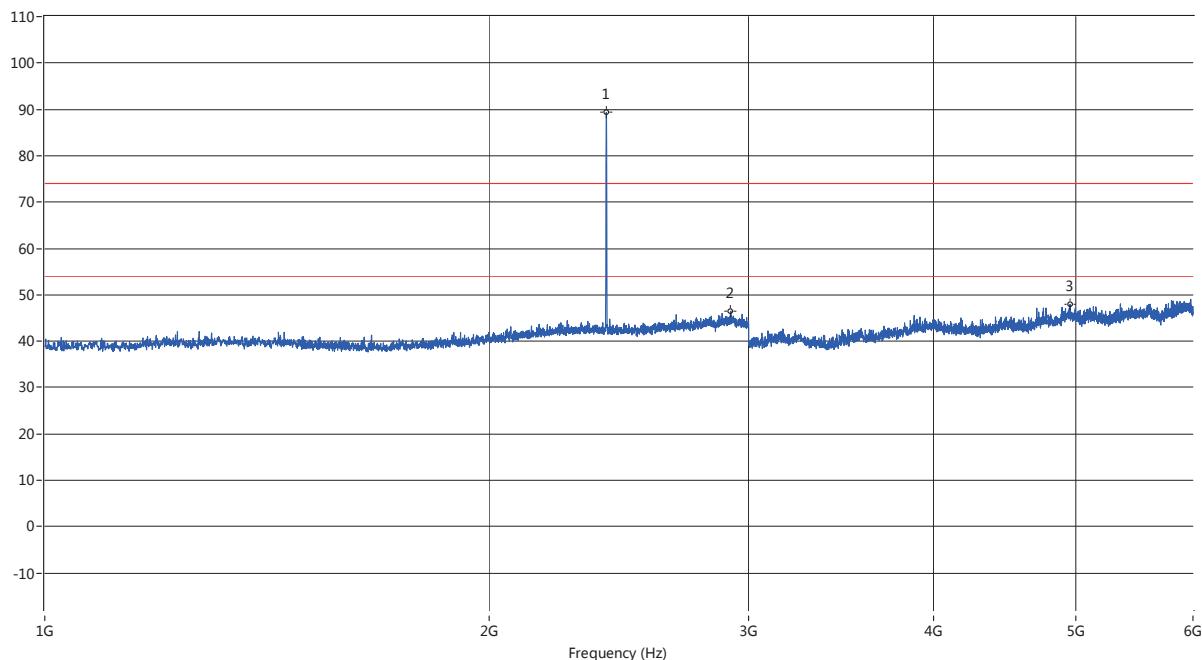
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.35	--	--	--	40.0	--	142.5	Horizontal	pass
138.855	30.58	--	--	--	43.5	--	140.6	Horizontal	pass
158.735	29.64	--	--	--	43.5	--	148.0	Horizontal	pass

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



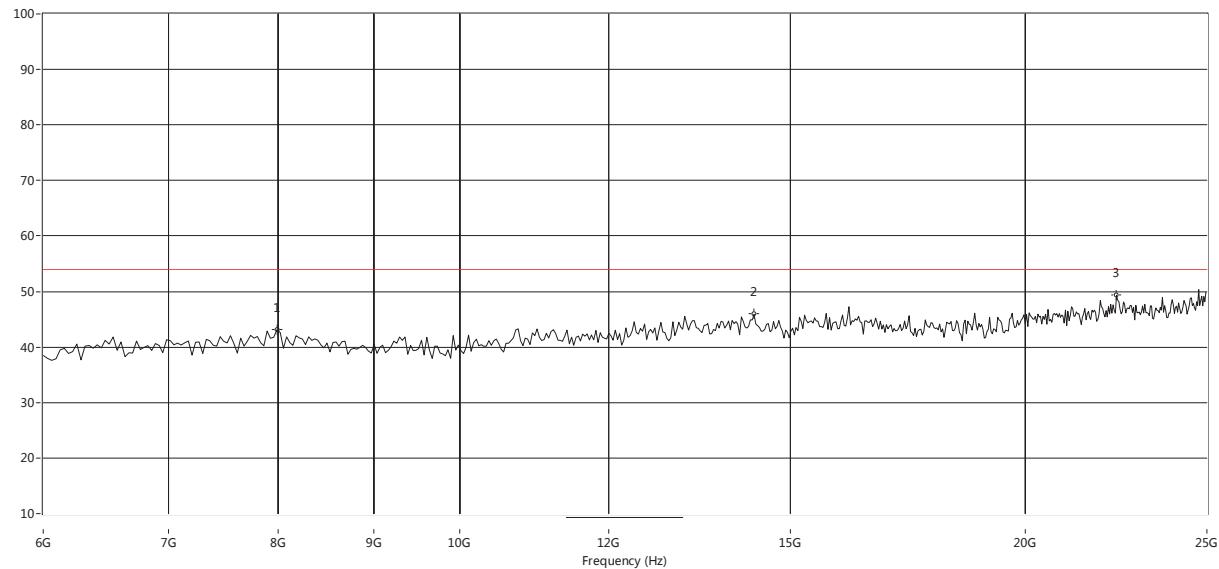
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2401.650	94.86	--	--	74.0	--	54.0	314.9	Vertical	--
2922.019	46.37	--	--	74.0	--	54.0	253.3	Vertical	pass
5583.854	49.60	--	--	74.0	--	54.0	224.9	Vertical	pass

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



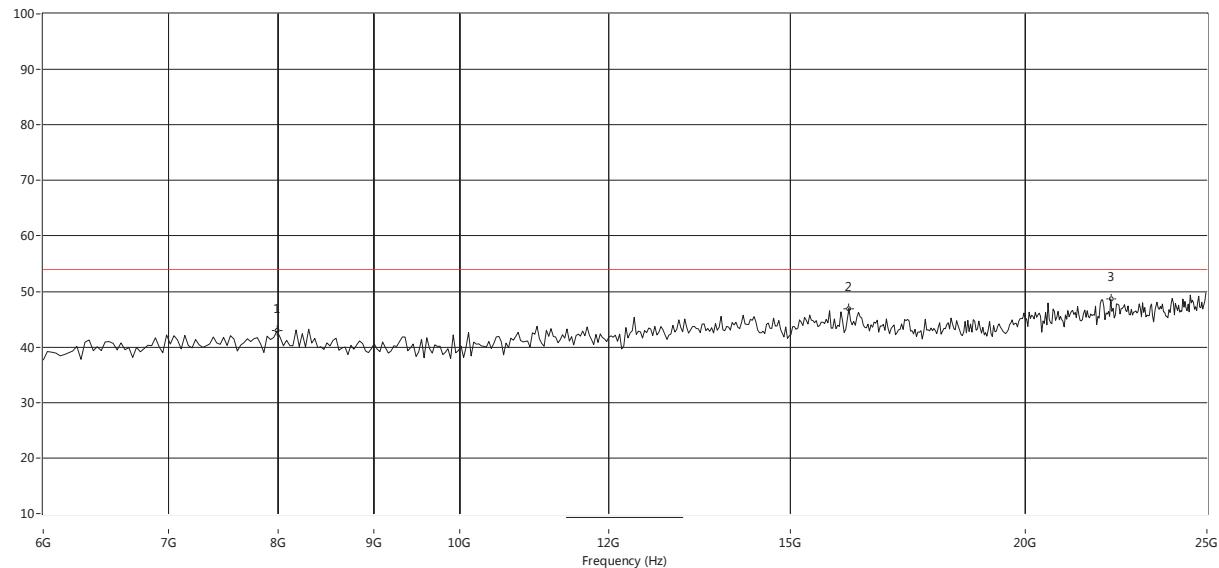
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2402.149	89.35	--	--	74.0	--	54.0	162.5	Horizontal	--
2916.521	46.48	--	--	74.0	--	54.0	98.0	Horizontal	pass
4953.262	47.98	--	--	74.0	--	54.0	3.7	Horizontal	pass

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



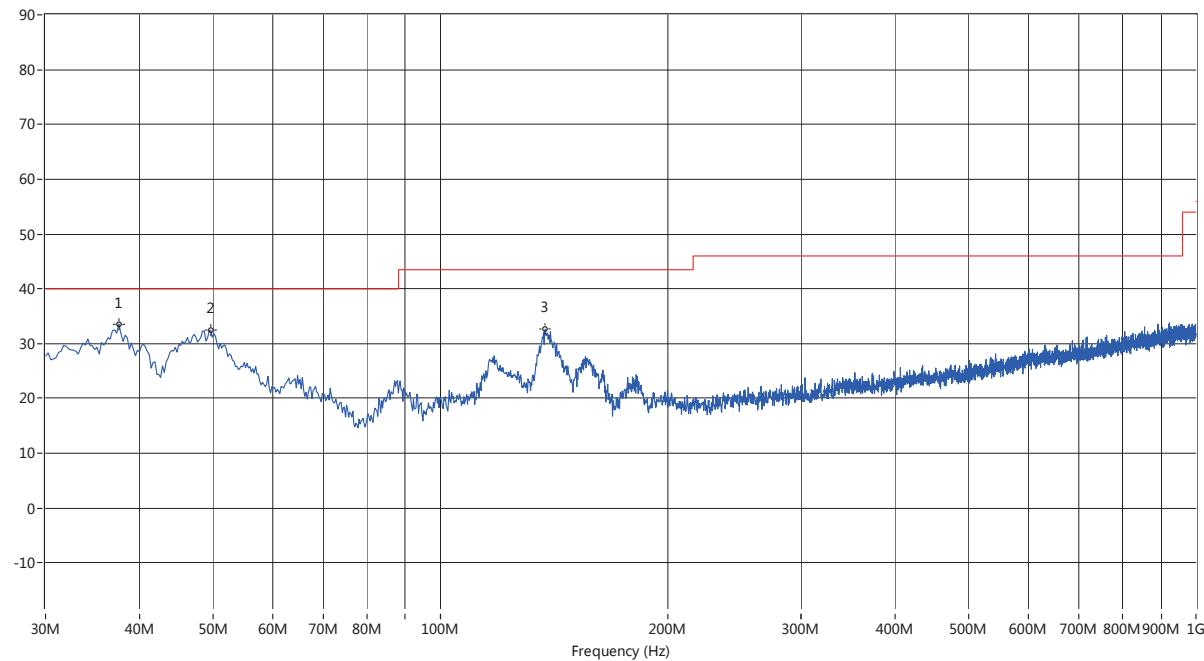
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.13	54.0	10.9	0.0	Vertical	PASS
14346.090	45.92	54.0	8.1	0.0	Vertical	PASS
22376.040	49.33	54.0	4.7	0.0	Vertical	PASS

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



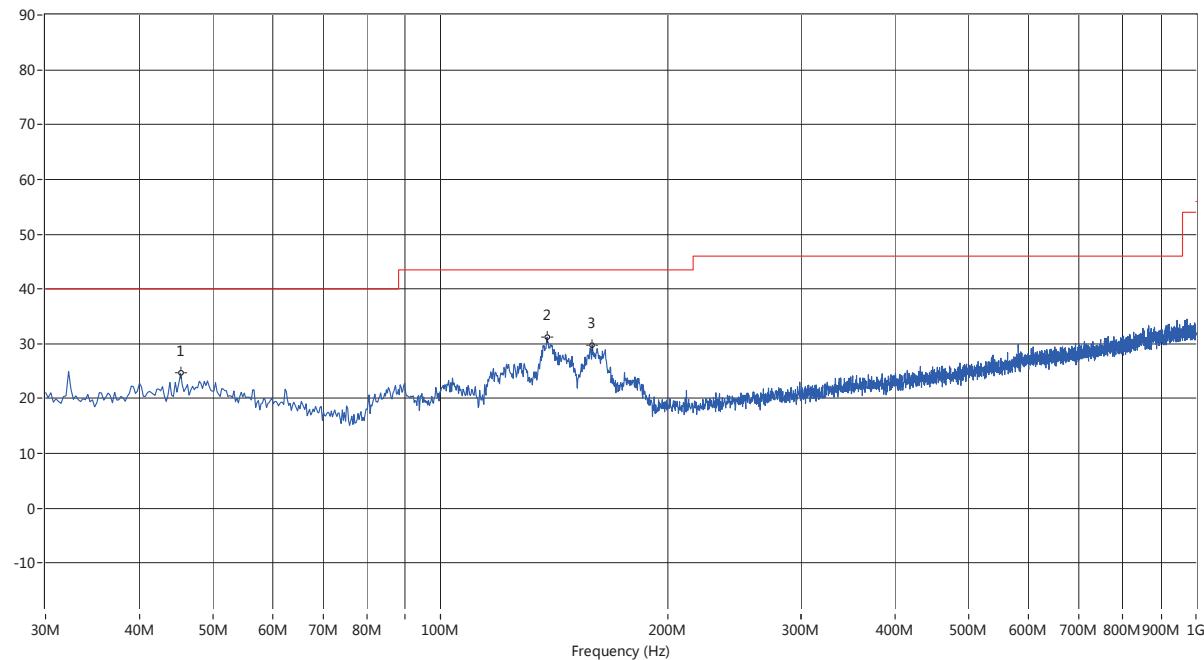
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	42.90	54.0	11.1	0.0	Horizontal	PASS
16116.473	46.96	54.0	7.0	0.0	Horizontal	PASS
22217.970	48.66	54.0	5.3	0.0	Horizontal	PASS

8-DPSK MID CHANNEL 30MHz to 1GHz, ANT V



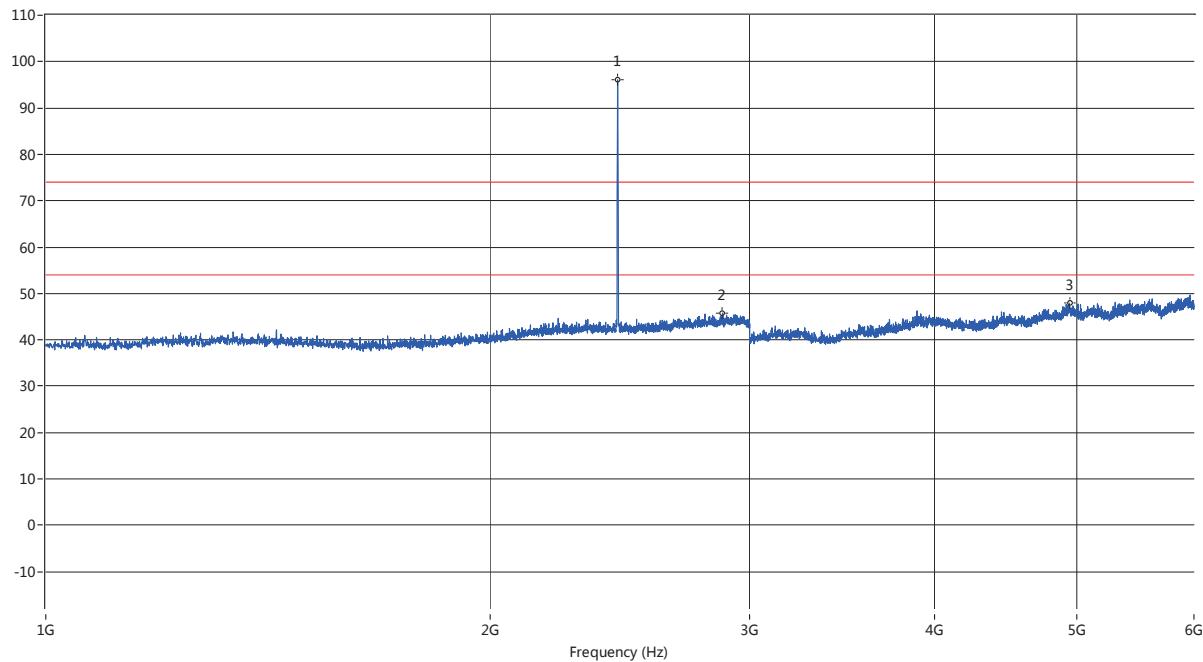
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	33.60	--	--	--	40.0	--	187.7	Vertical	pass
49.638	32.45	--	--	--	40.0	--	84.2	Vertical	pass
137.643	32.65	--	--	--	43.5	--	58.5	Vertical	pass

8-DPSK MID CHANNEL 30MHz to 1GHz, ANT H



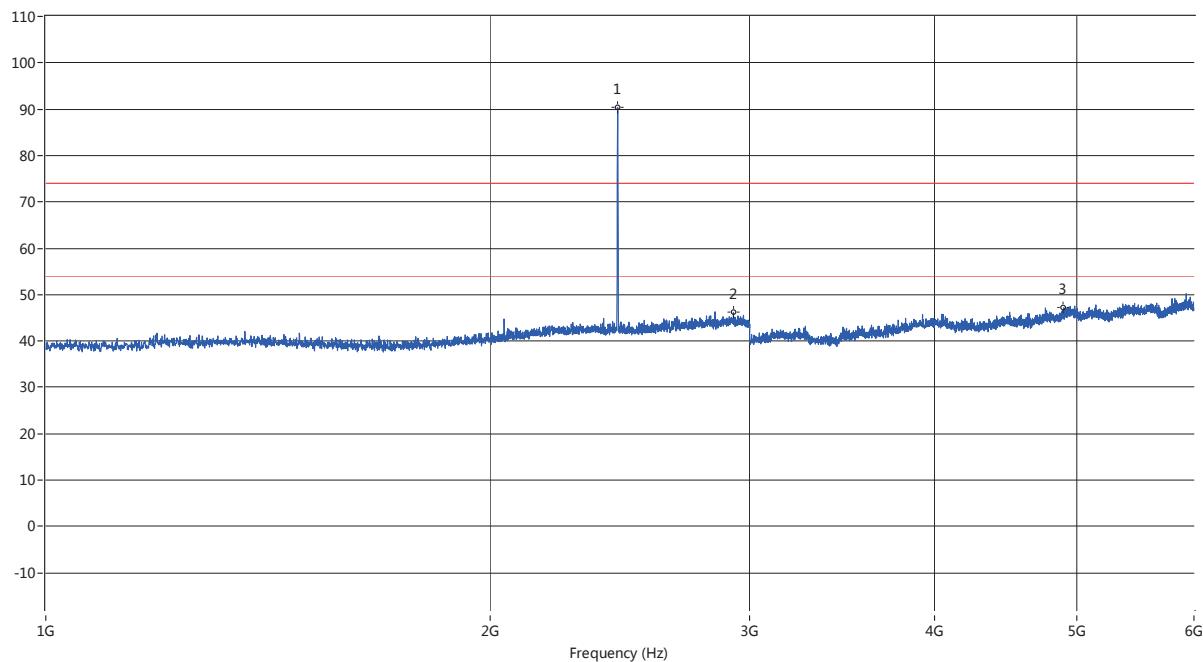
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.61	--	--	--	40.0	--	142.5	Horizontal	pass
138.370	31.21	--	--	--	43.5	--	316.2	Horizontal	pass
158.735	29.84	--	--	--	43.5	--	148.0	Horizontal	pass

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



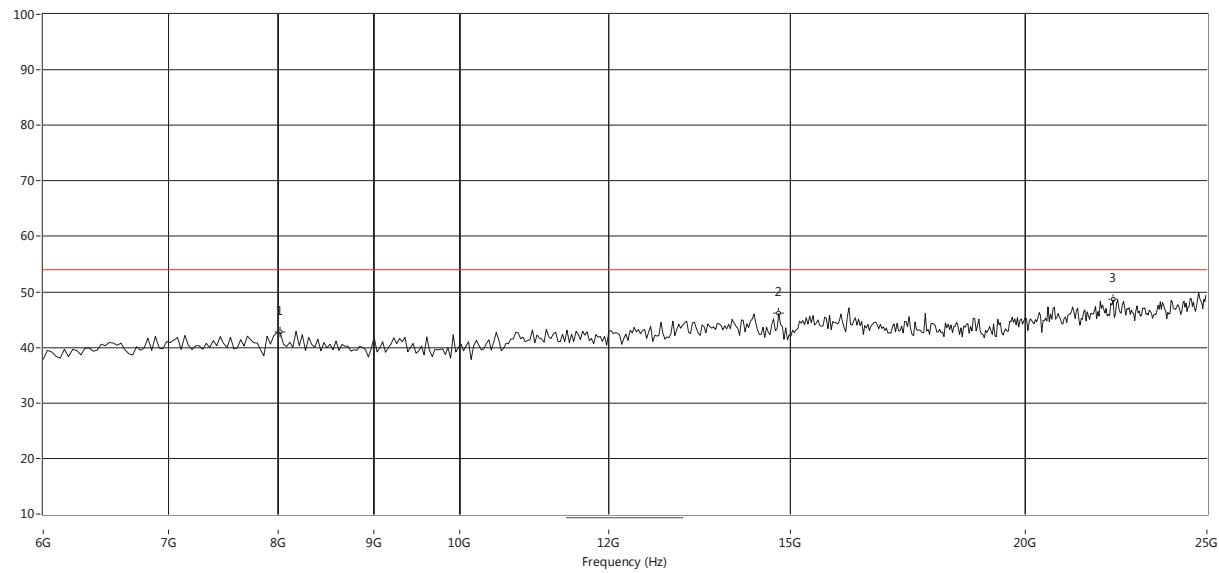
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2440.640	96.08	--	--	74.0	--	54.0	316.7	Vertical	--
2875.031	45.79	--	--	74.0	--	54.0	348.6	Vertical	pass
4940.515	47.91	--	--	74.0	--	54.0	261.5	Vertical	pass

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



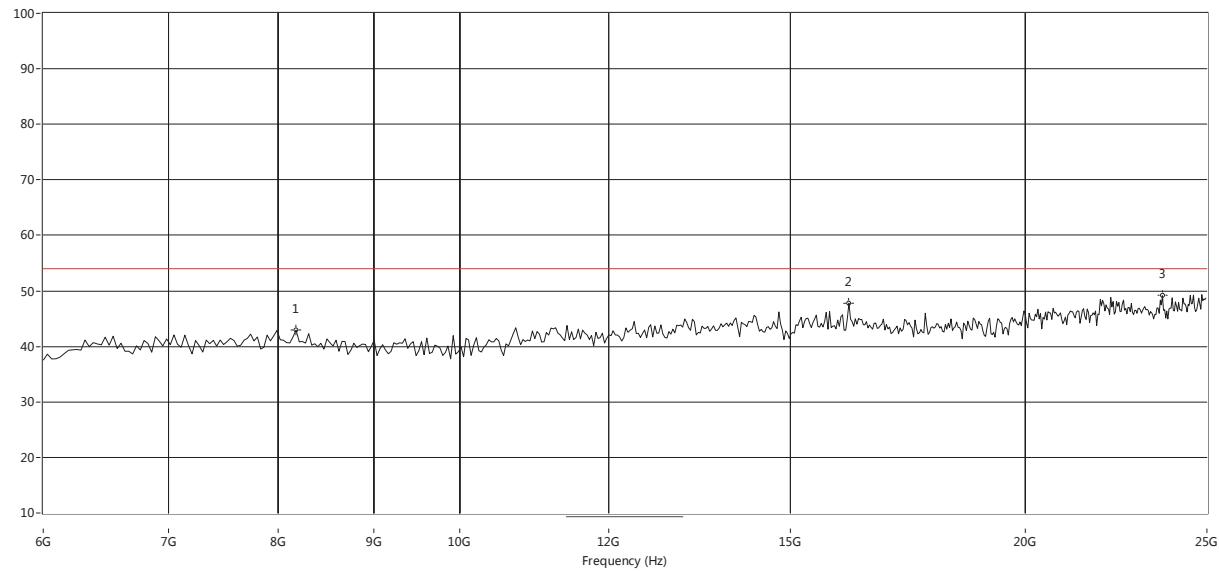
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2440.640	90.36	--	--	74.0	--	54.0	357.2	Horizontal	--
2924.519	46.13	--	--	74.0	--	54.0	31.1	Horizontal	pass
4895.526	47.18	--	--	74.0	--	54.0	310.6	Horizontal	pass

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



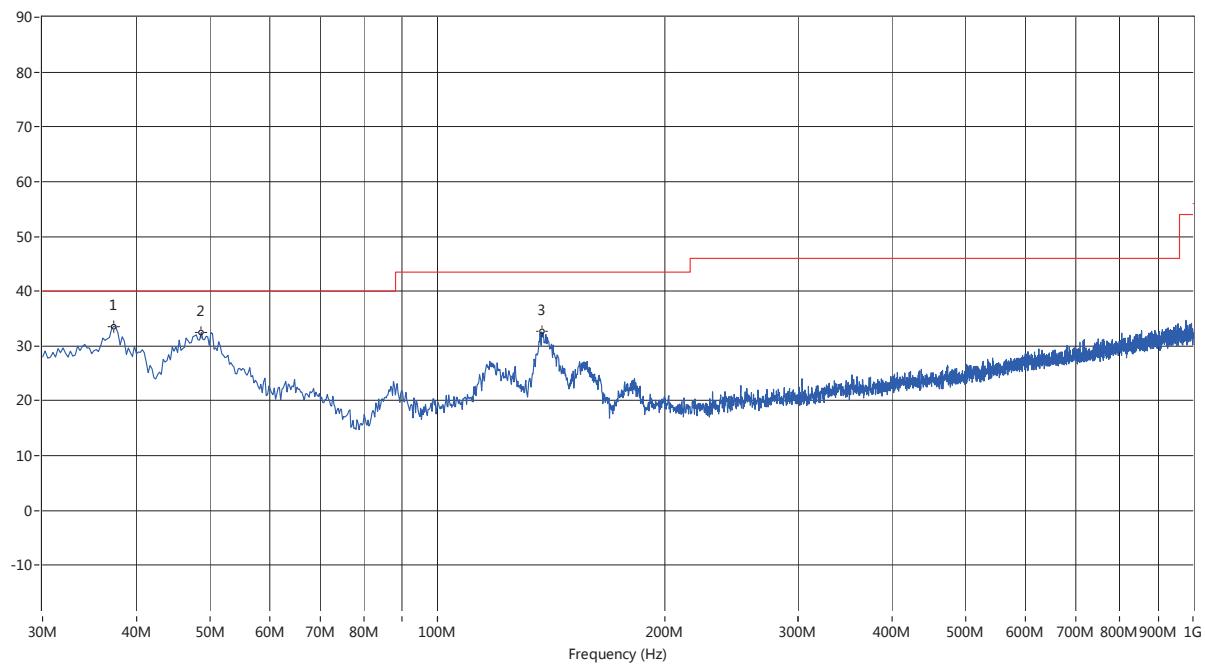
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
8023.295	42.71	54.0	11.3	0.0	Vertical	PASS
14788.686	46.10	54.0	7.9	0.0	Vertical	PASS
22281.198	48.59	54.0	5.4	0.0	Vertical	PASS

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



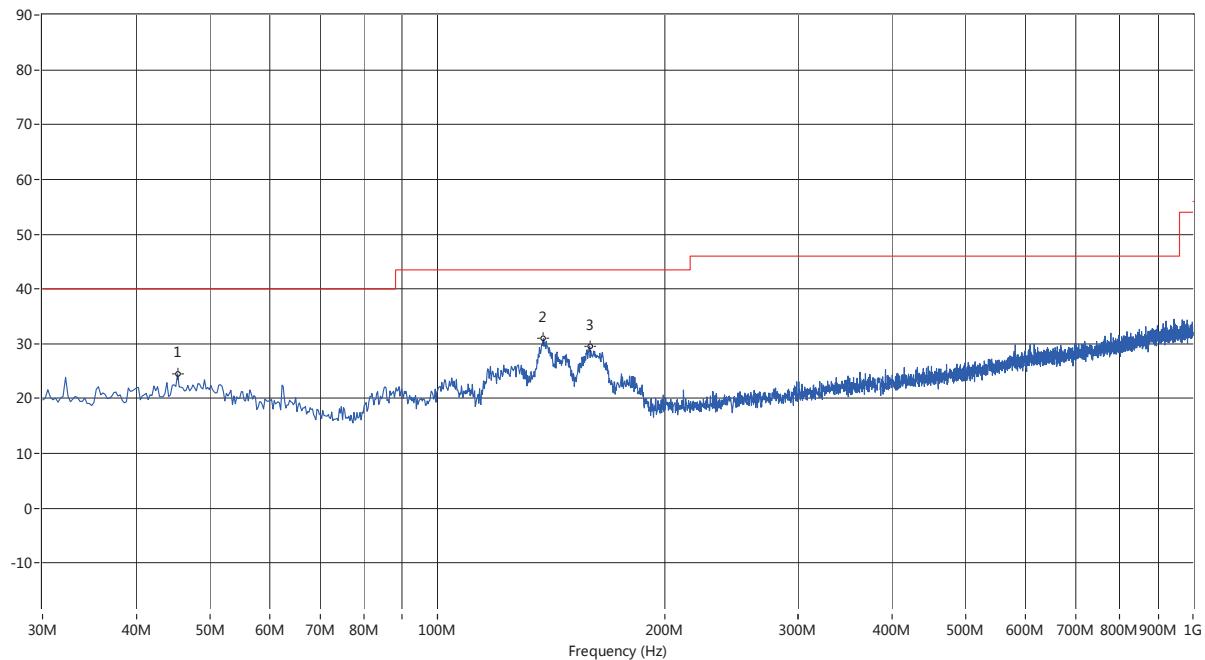
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
8181.364	42.94	54.0	11.1	0.0	Horizontal	PASS
16116.473	47.77	54.0	6.2	0.0	Horizontal	PASS
23672.213	49.14	54.0	4.9	0.0	Horizontal	PASS

8-DPSK HIGH CHANNEL 30MHz to 1GHz, ANT V



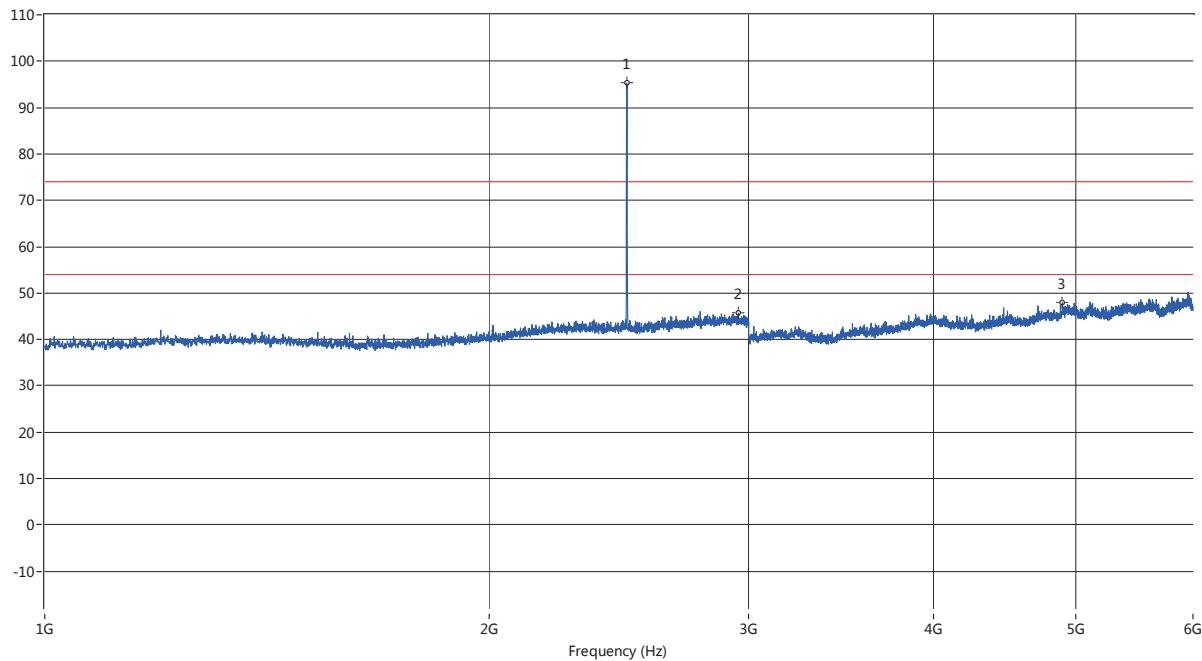
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.273	33.62	--	--	--	40.0	--	245.8	Vertical	pass
48.668	32.48	--	--	--	40.0	--	145.0	Vertical	pass
137.401	32.61	--	--	--	43.5	--	278.9	Vertical	pass

8-DPSK HIGH CHANNEL 30MHz to 1GHz, ANT H



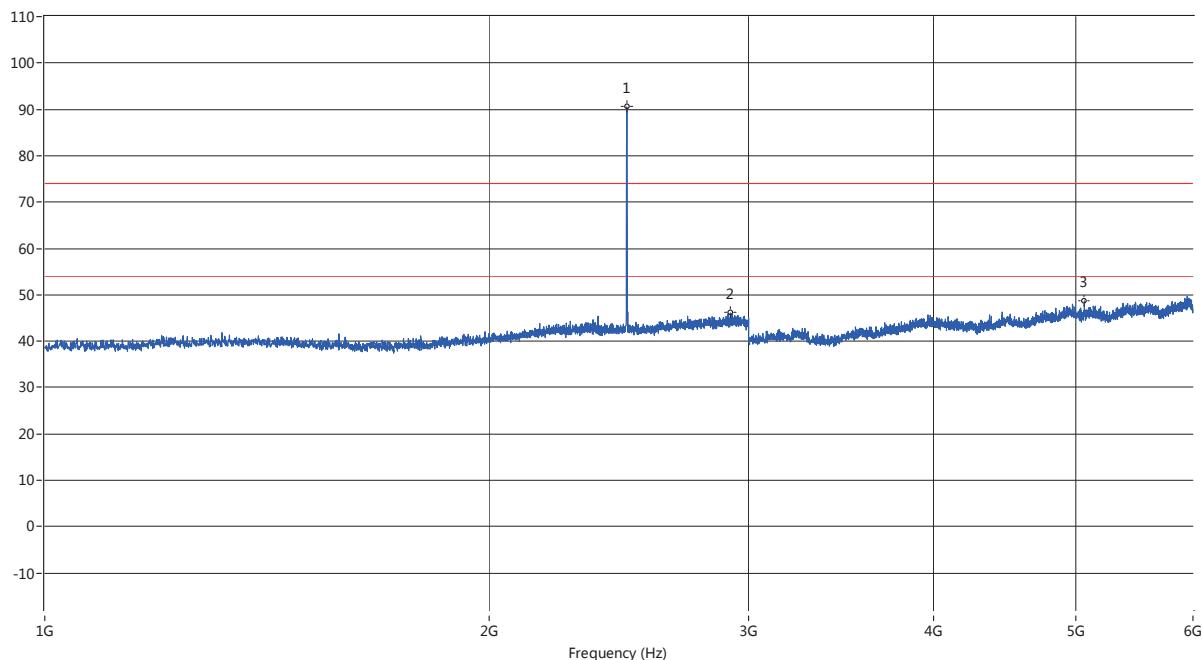
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.53	--	--	--	40.0	--	142.5	Horizontal	pass
138.128	30.93	--	--	--	43.5	--	104.0	Horizontal	pass
158.978	29.58	--	--	--	43.5	--	64.5	Horizontal	pass

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



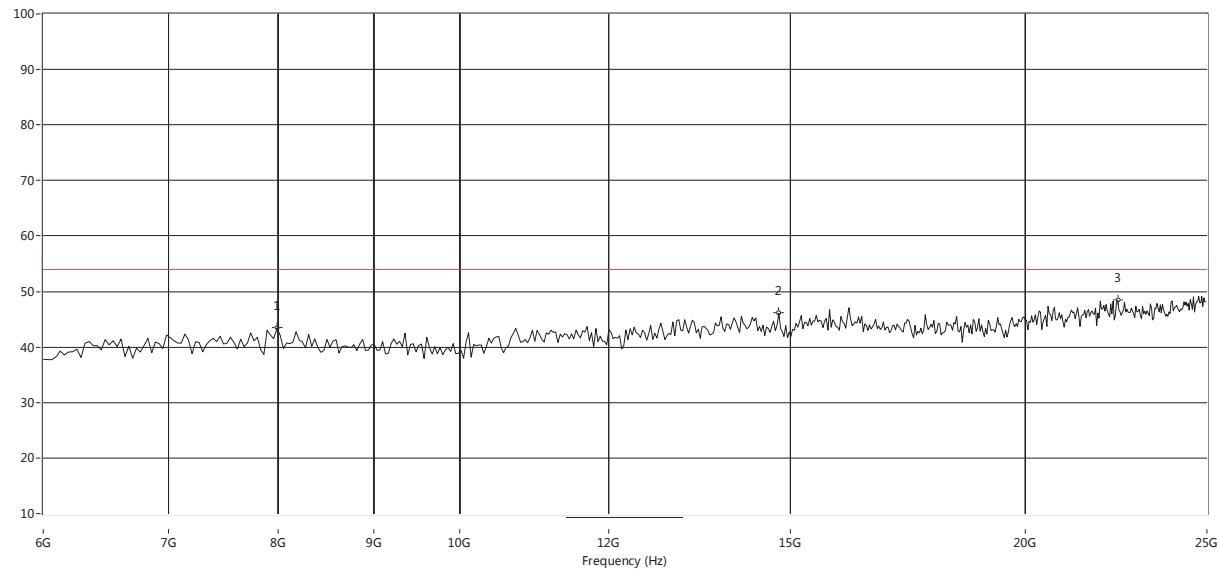
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2479.630	95.25	--	--	74.0	--	54.0	318.6	Vertical	--
2952.512	45.72	--	--	74.0	--	54.0	359.2	Vertical	pass
4894.026	47.99	--	--	74.0	--	54.0	234.3	Vertical	pass

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



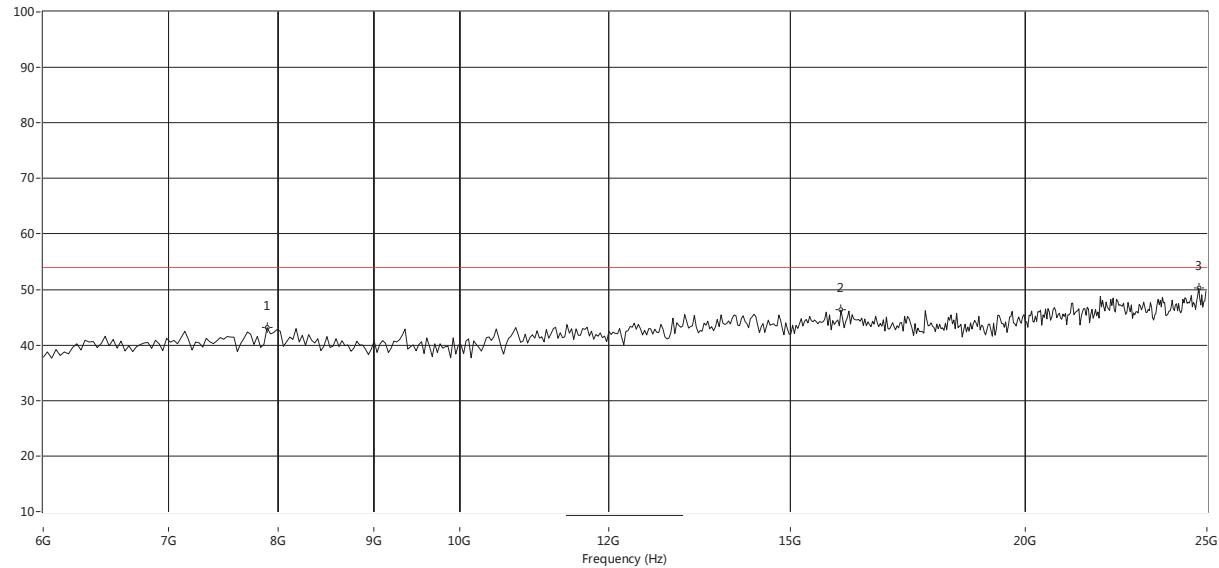
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2479.630	90.54	--	--	74.0	--	54.0	356.0	Horizontal	--
2915.521	46.12	--	--	74.0	--	54.0	337.4	Horizontal	pass
5064.984	48.67	--	--	74.0	--	54.0	3.7	Horizontal	pass

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.43	54.0	10.6	0.0	Vertical	PASS
14788.686	46.10	54.0	7.9	0.0	Vertical	PASS
22281.198	48.30	54.0	5.7	0.0	Vertical	PASS

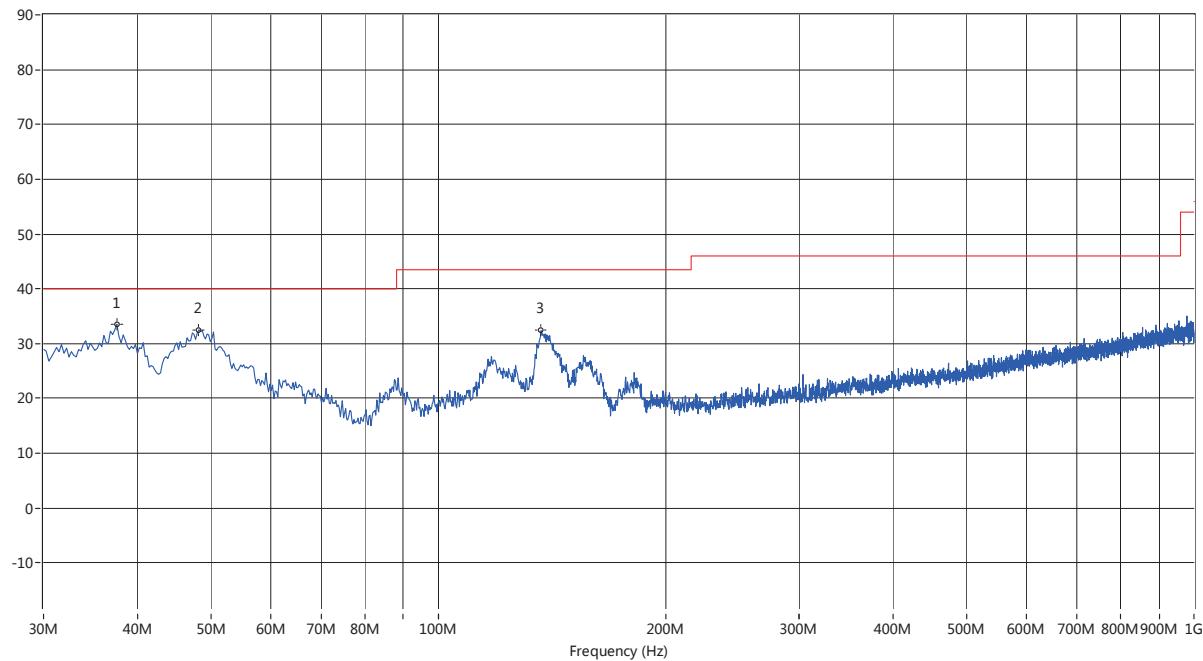
8-DPSK HIGH CHANNEL 6GHz to 25GHz, ANT H



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7896.839	43.13	54.0	10.9	0.0	Horizontal	PASS
15958.403	46.28	54.0	7.7	0.0	Horizontal	PASS
24747.088	50.28	54.0	3.7	0.0	Horizontal	PASS

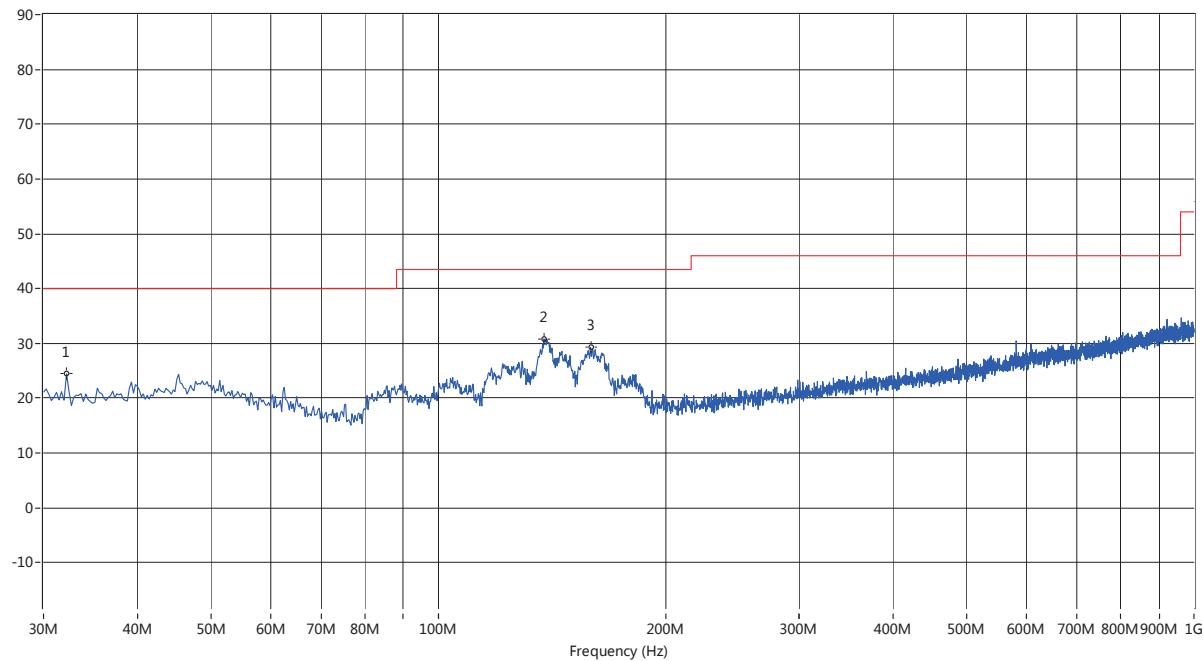
Hopping Mode

GFSK 30MHz to 1GHz, ANT V



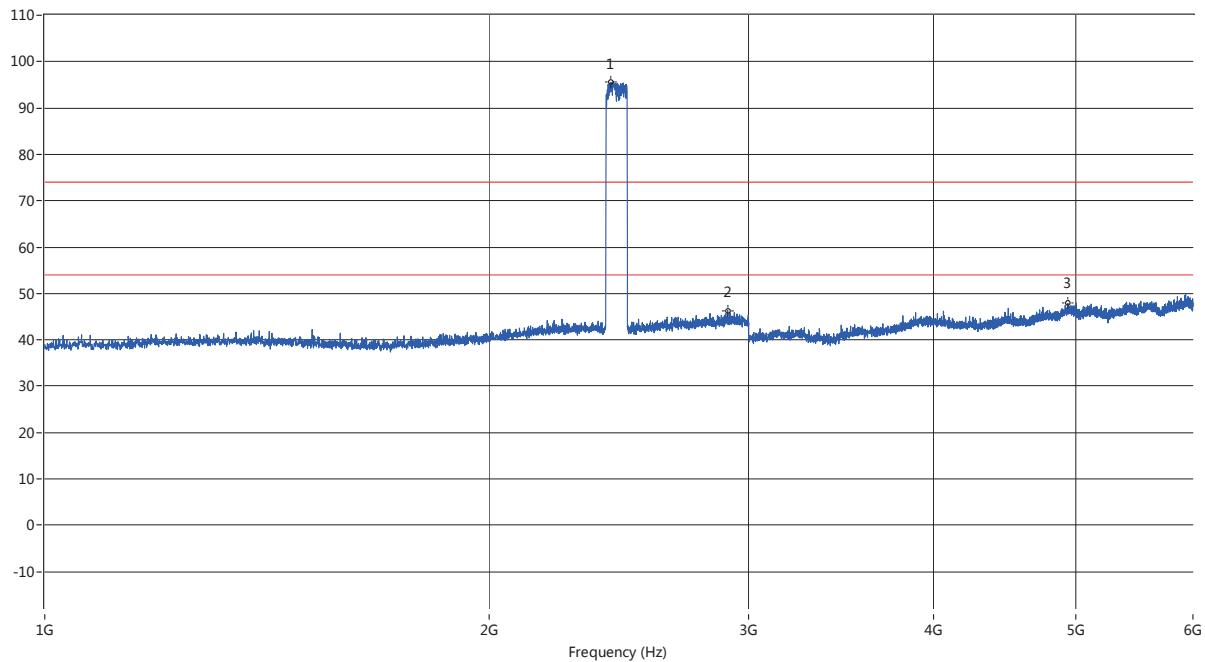
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	33.56	--	--	--	40.0	--	187.7	Vertical	pass
48.183	32.55	--	--	--	40.0	--	353.6	Vertical	pass
136.673	32.41	--	--	--	43.5	--	42.9	Vertical	pass

GFSK 30MHz to 1GHz, ANT H



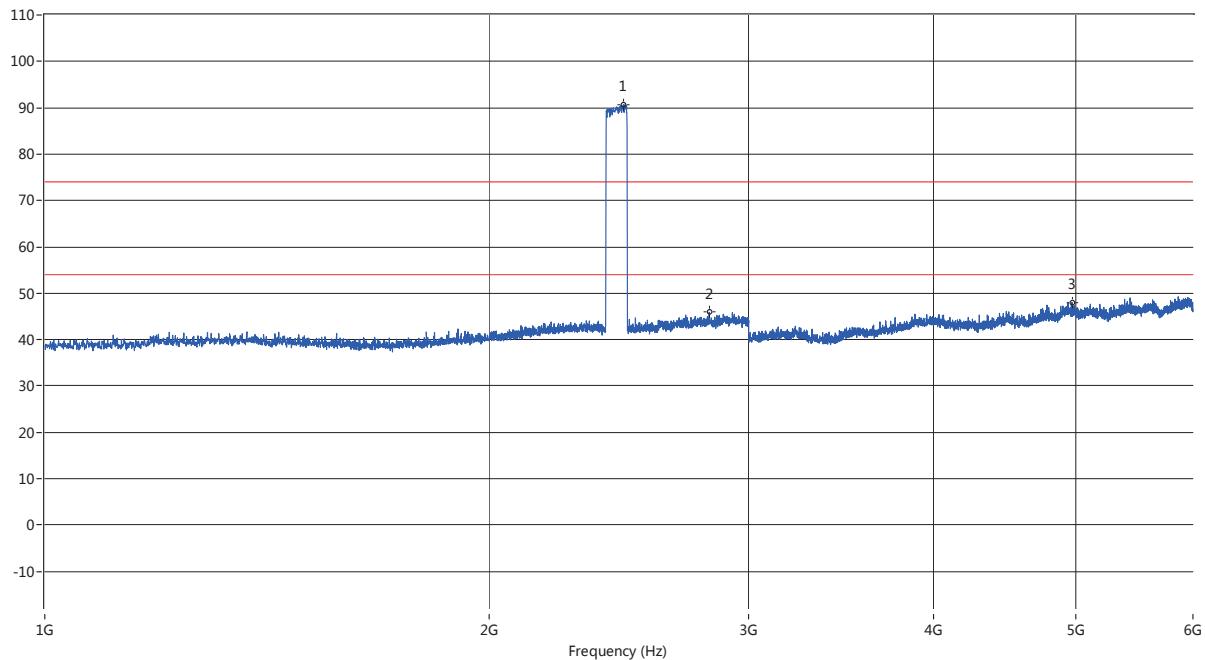
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
32.182	24.43	--	--	--	40.0	--	273.0	Horizontal	pass
137.886	30.86	--	--	--	43.5	--	142.5	Horizontal	pass
158.978	29.24	--	--	--	43.5	--	64.5	Horizontal	pass

GFSK 1GHz to 6GHz, ANT V

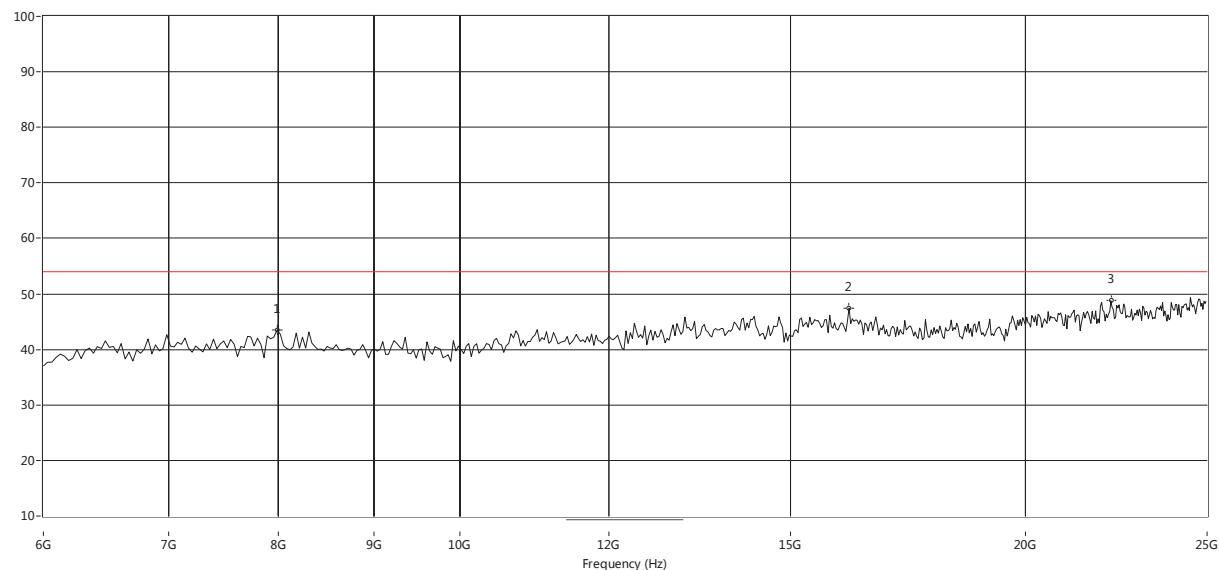
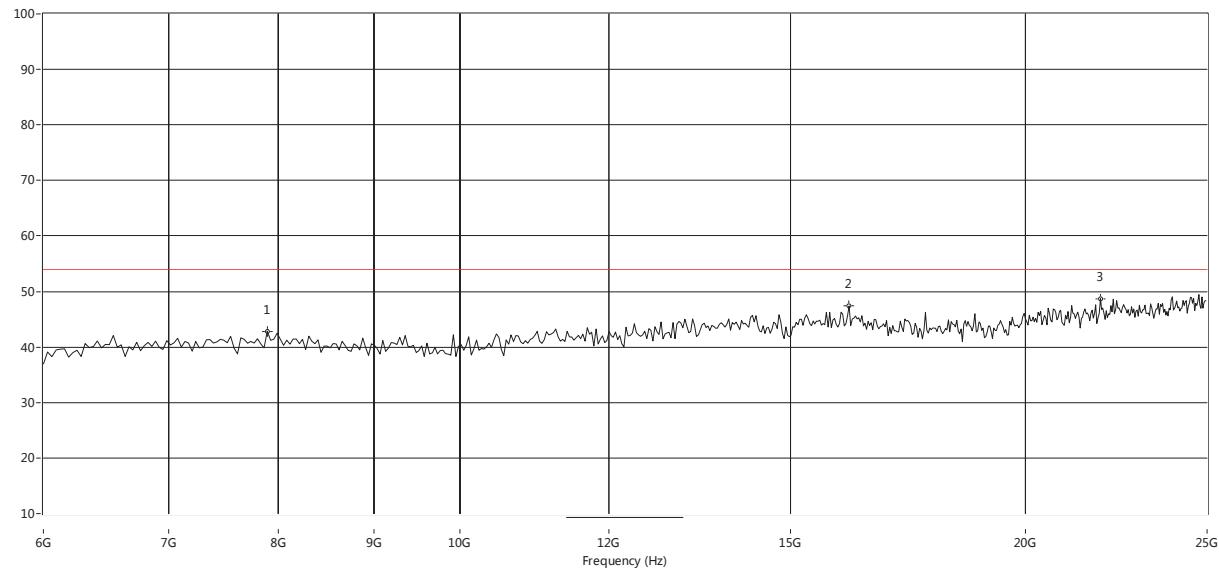


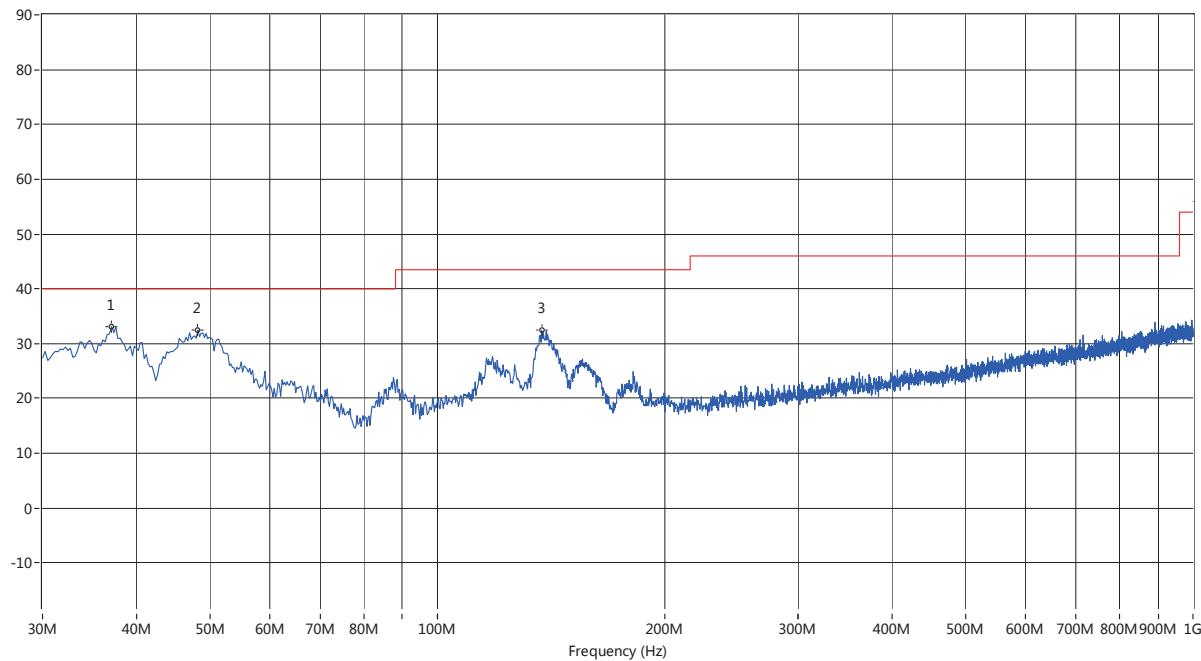
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2418.645	95.50	--	--	74.0	--	54.0	318.6	Vertical	--
2902.524	46.35	--	--	74.0	--	54.0	28.0	Vertical	pass
4936.766	47.85	--	--	74.0	--	54.0	356.8	Vertical	pass

GFSK 1GHz to 6GHz, ANT H

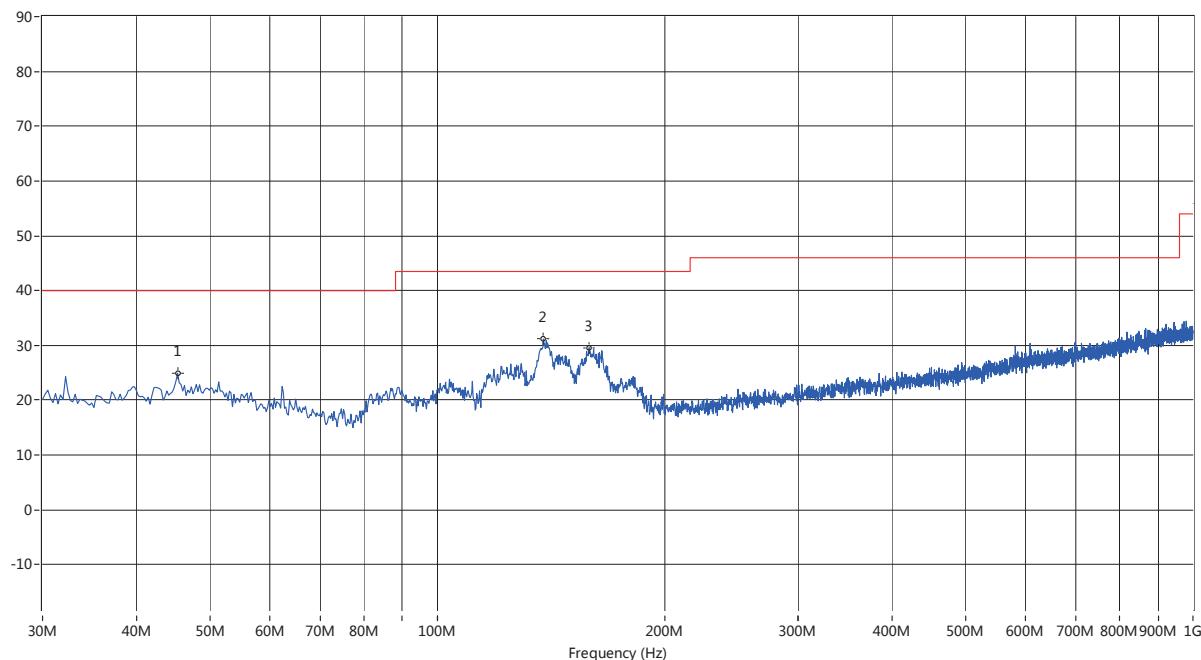


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2467.633	90.73	--	--	74.0	--	54.0	351.1	Horizontal	--
2820.545	45.92	--	--	74.0	--	54.0	1.9	Horizontal	pass
4966.758	48.01	--	--	74.0	--	54.0	1.7	Horizontal	pass

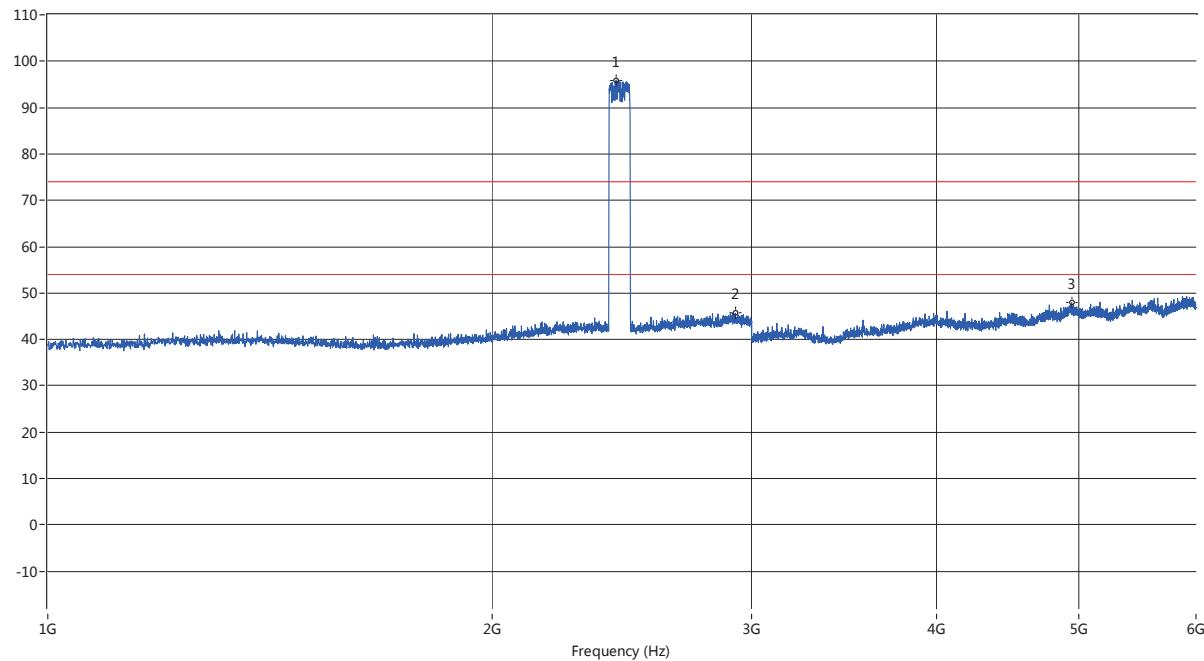
GFSK 6GHz to 25GHz, ANT V

GFSK 6GHz to 25GHz, ANT H


Π/4-DQPSK 30MHz to 1GHz, ANT V


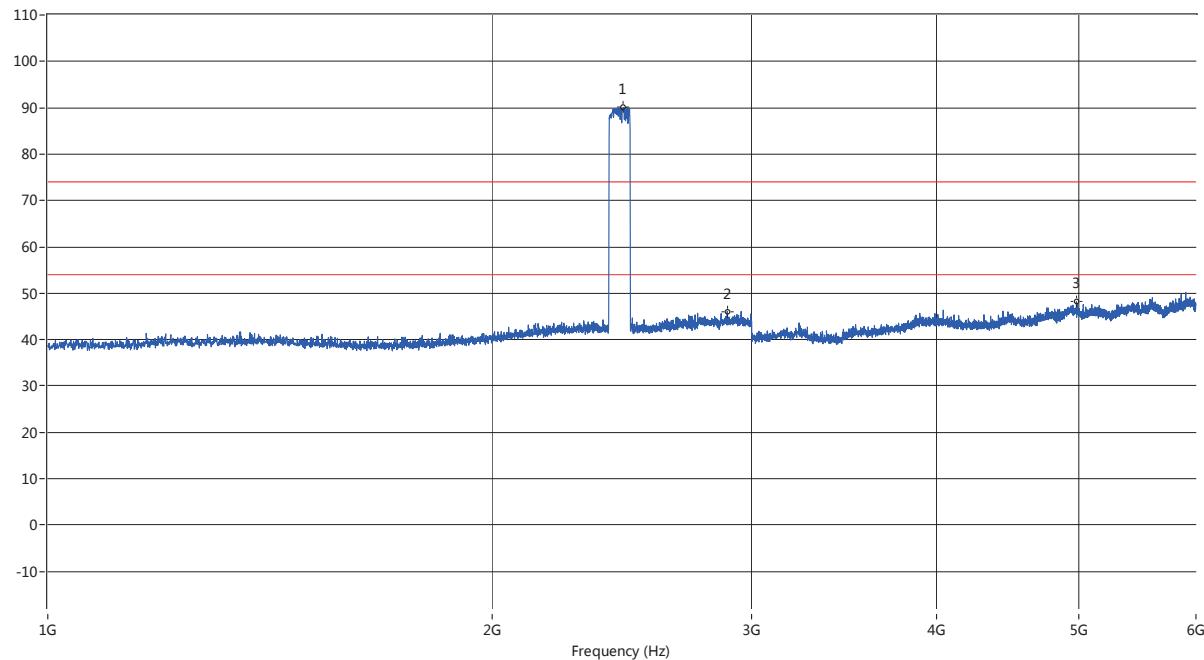
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-A	Degree	Antenna	Verdical
37.031	33.13	--	--	--	40.0	--	110.5	Vertical	pass
48.183	32.49	--	--	--	40.0	--	353.6	Vertical	pass
137.401	32.41	--	--	--	43.5	--	278.9	Vertical	pass

Π/4-DQPSK 30MHz to 1GHz, ANT H


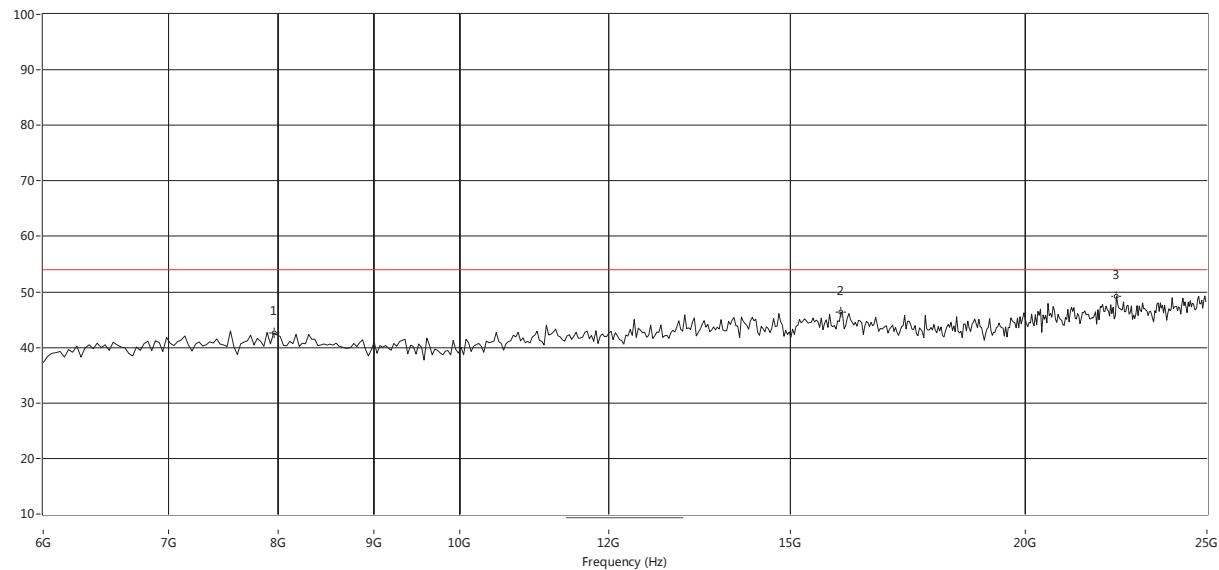
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.93	--	--	--	40.0	--	356.0	Horizontal	pass
138.128	31.15	--	--	--	43.5	--	247.7	Horizontal	pass
158.735	29.60	--	--	--	43.5	--	127.8	Horizontal	pass

Π/4-DQPSK 1GHz to 6GHz, ANT V


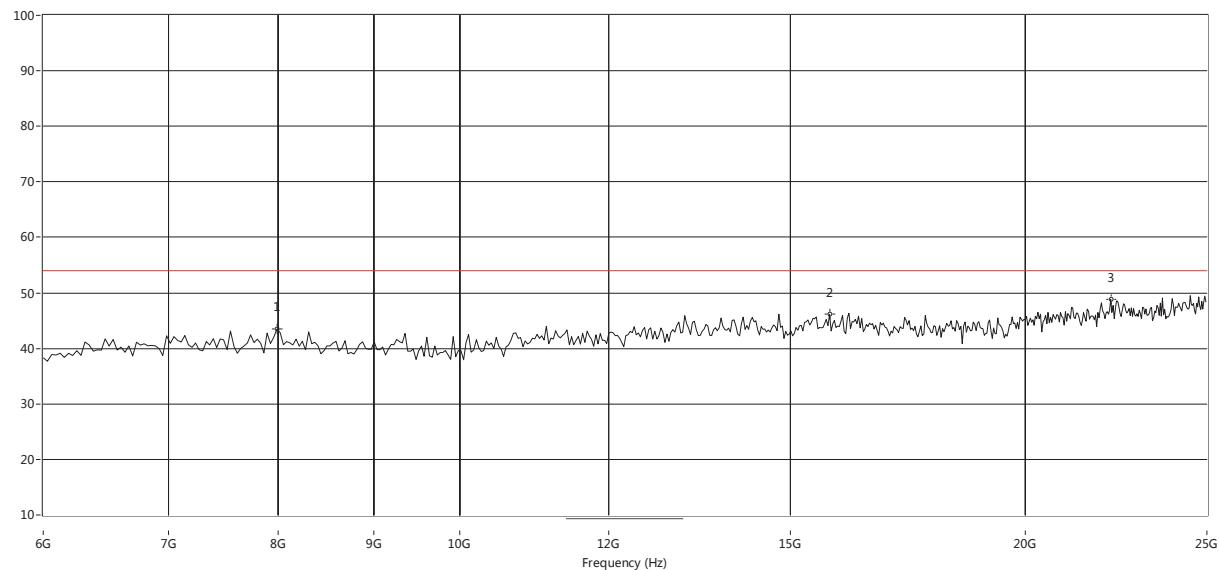
Fre. (MHz)	Pk	QP	V	Limit-PK	Limit-QP	Limit	AV	Degree	Antenna	Verdical
2427.643	95.96	--	--	74.0	--	54.0	315.7	Vertical	--	
2924.019	45.64	--	--	74.0	--	54.0	149.1	Vertical	pass	
4942.014	47.96	--	--	74.0	--	54.0	221.6	Vertical	pass	

Π/4-DQPSK 1GHz to 6GHz, ANT H


Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2454.636	90.03	--	--	74.0	--	54.0	355.5	Horizontal	--
2887.028	46.08	--	--	74.0	--	54.0	161.5	Horizontal	pass
4978.755	48.26	--	--	74.0	--	54.0	338.8	Horizontal	pass

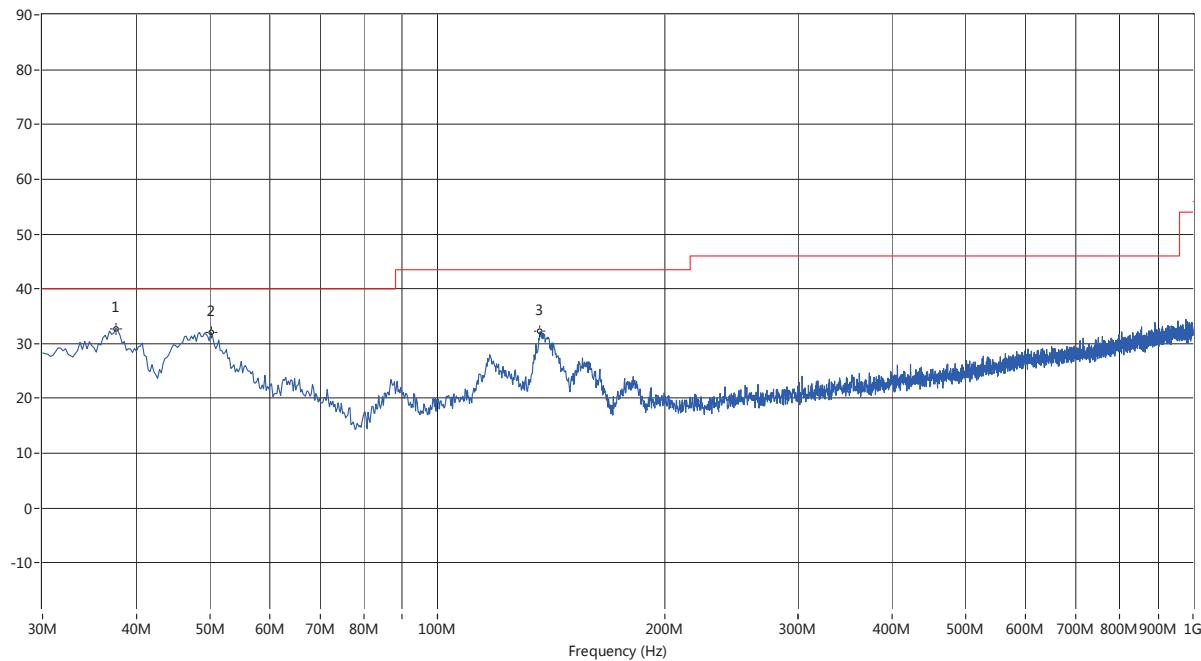
Π/4-DQPSK 6GHz to 25GHz, ANT V


Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7960.067	42.61	54.0	11.4	0.0	Vertical	PASS
15958.403	46.37	54.0	7.6	0.0	Vertical	PASS
22376.040	49.24	54.0	4.8	0.0	Vertical	PASS

Π/4-DQPSK 6GHz to 25GHz, ANT H


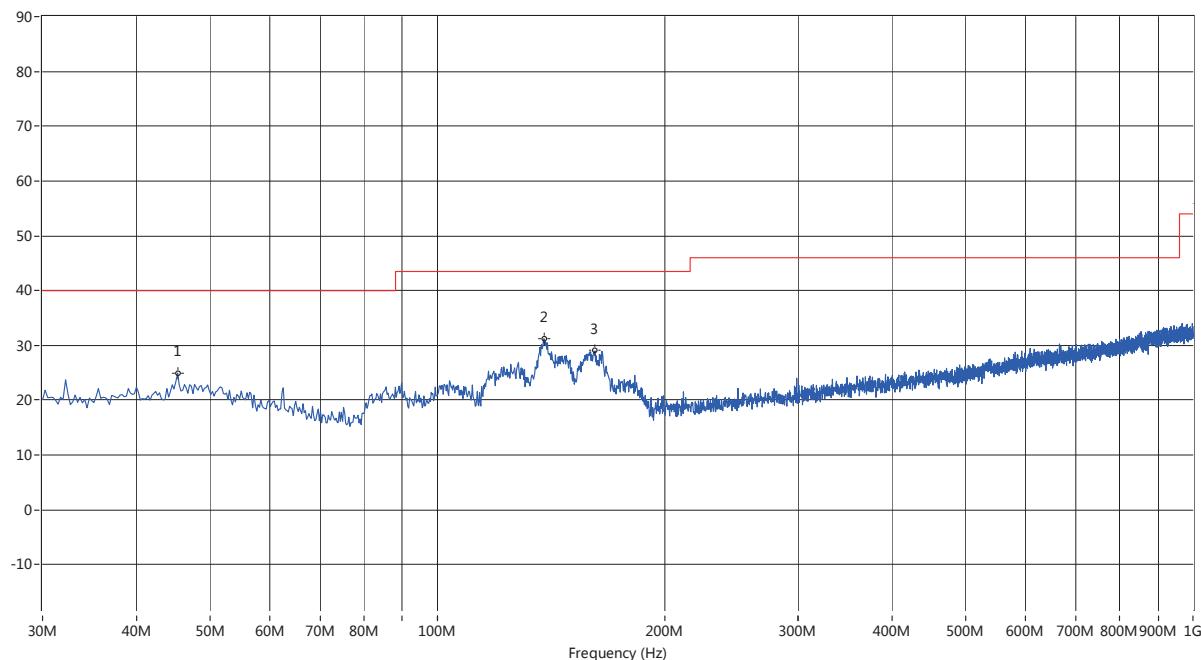
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.51	54.0	10.5	0.0	Horizontal	PASS
15737.105	46.16	54.0	7.8	0.0	Horizontal	PASS
22217.970	48.83	54.0	5.2	0.0	Horizontal	PASS

8-DPSK 30MHz to 1GHz, ANT V



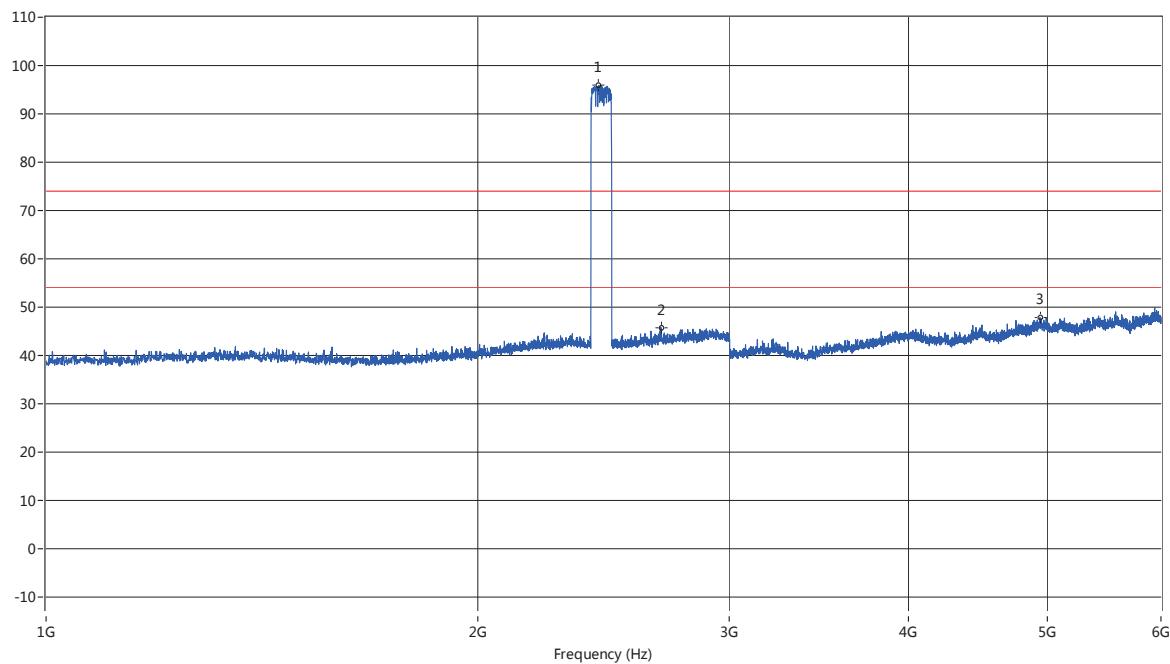
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
37.516	32.78	--	--	--	40.0	--	187.7	Vertical	pass
50.122	32.08	--	--	--	40.0	--	295.9	Vertical	pass
136.673	32.22	--	--	--	43.5	--	42.9	Vertical	pass

8-DPSK 30MHz to 1GHz, ANT H



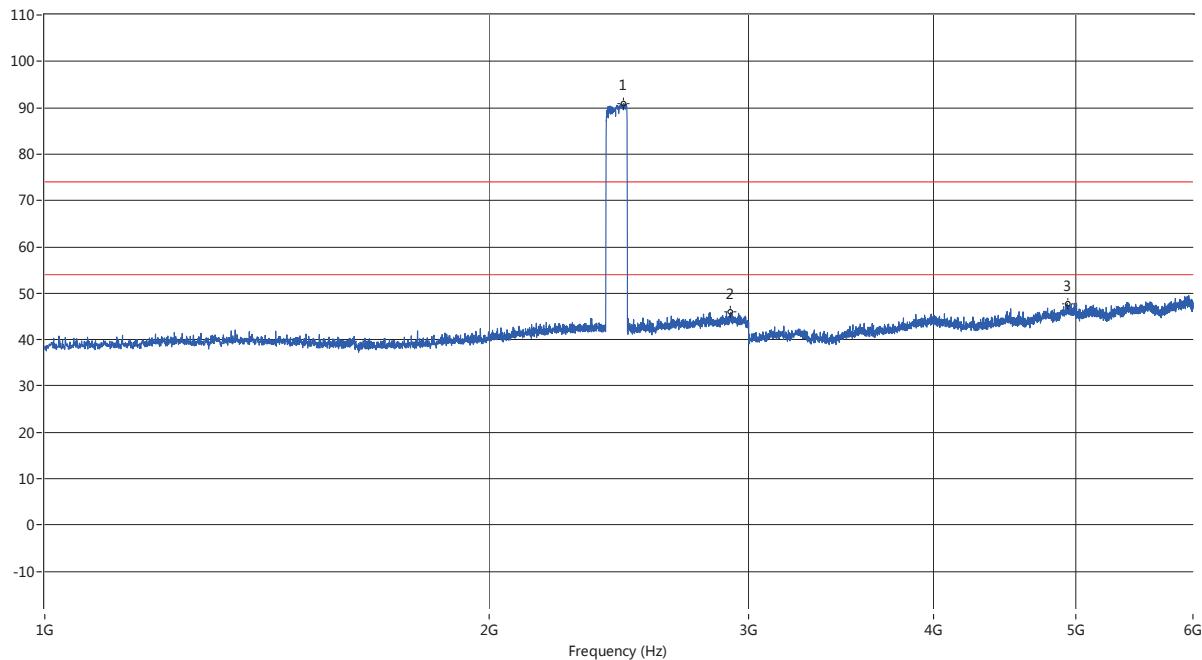
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
45.274	24.97	--	--	--	40.0	--	356.0	Horizontal	pass
138.370	31.25	--	--	--	43.5	--	97.7	Horizontal	pass
161.645	29.03	--	--	--	43.5	--	127.8	Horizontal	pass

8-DPSK 1GHz to 6GHz, ANT V



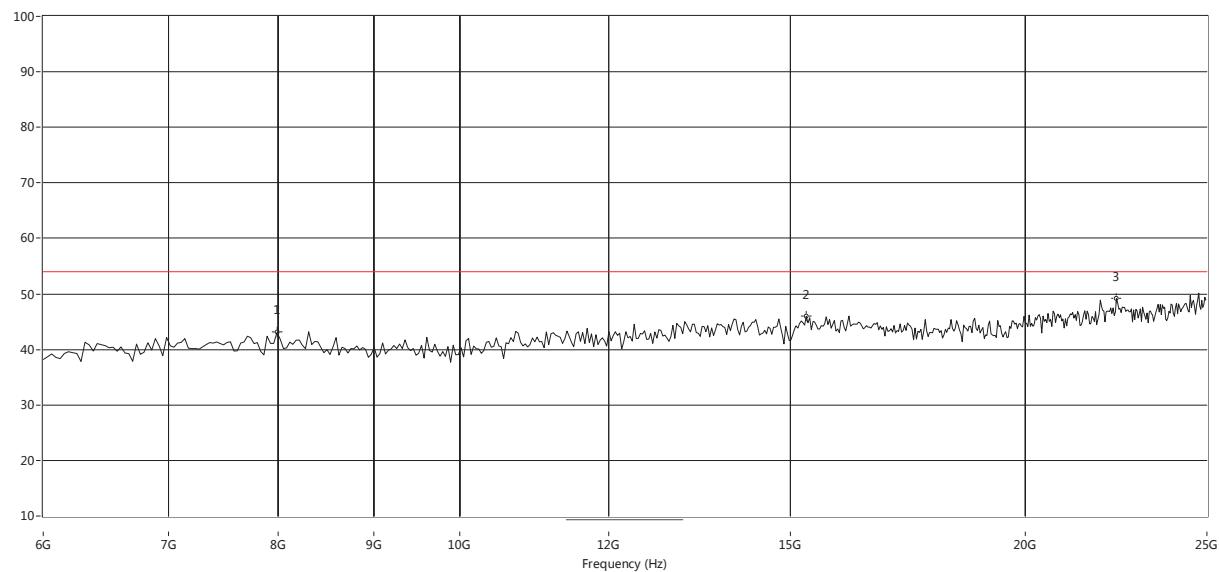
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2430.642	95.86	--	--	74.0	--	54.0	314.1	Vertical	--
2687.578	45.70	--	--	74.0	--	54.0	123.8	Vertical	pass
4939.765	47.84	--	--	74.0	--	54.0	156.7	Vertical	pass

8-DPSK 1GHz to 6GHz, ANT H



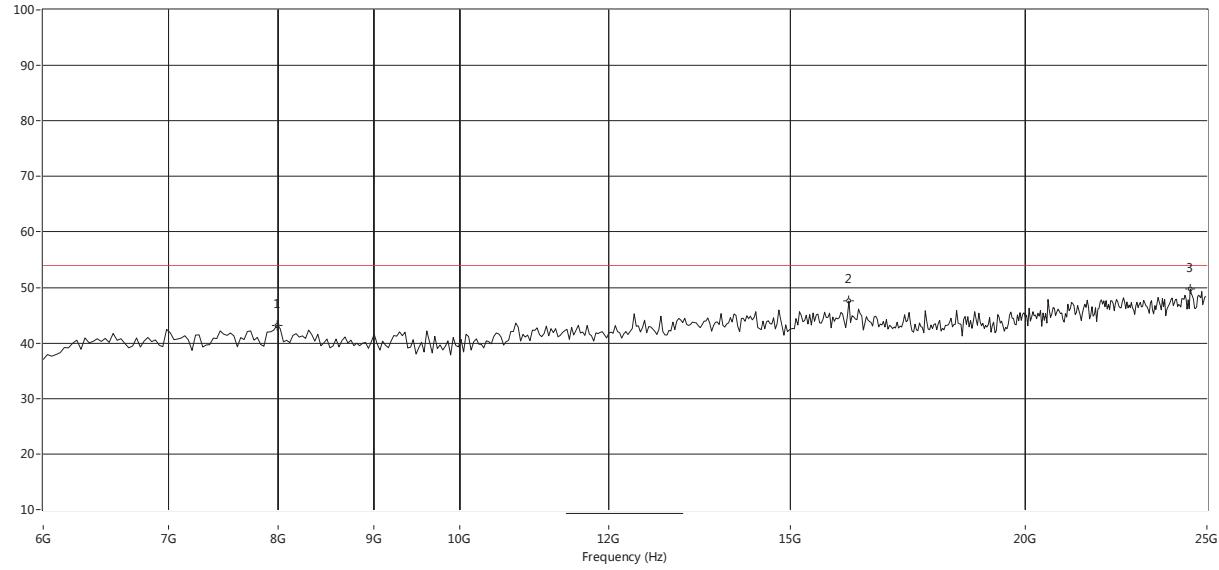
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdical
2465.634	90.85	--	--	74.0	--	54.0	353.5	Horizontal	--
2917.021	45.91	--	--	74.0	--	54.0	181.1	Horizontal	pass
4932.267	47.76	--	--	74.0	--	54.0	253.0	Horizontal	pass

8-DPSK 6GHz to 25GHz, ANT V



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.06	54.0	10.9	0.0	Vertical	PASS
15294.509	45.96	54.0	8.0	0.0	Vertical	PASS
22376.040	49.16	54.0	4.8	0.0	Vertical	PASS

8-DPSK 6GHz to 25GHz, ANT H



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
7991.681	43.22	54.0	10.8	0.0	Horizontal	PASS
16116.473	47.54	54.0	6.5	0.0	Horizontal	PASS
24494.176	49.72	54.0	4.3	0.0	Horizontal	PASS

A.9 Band Edge

Test Data

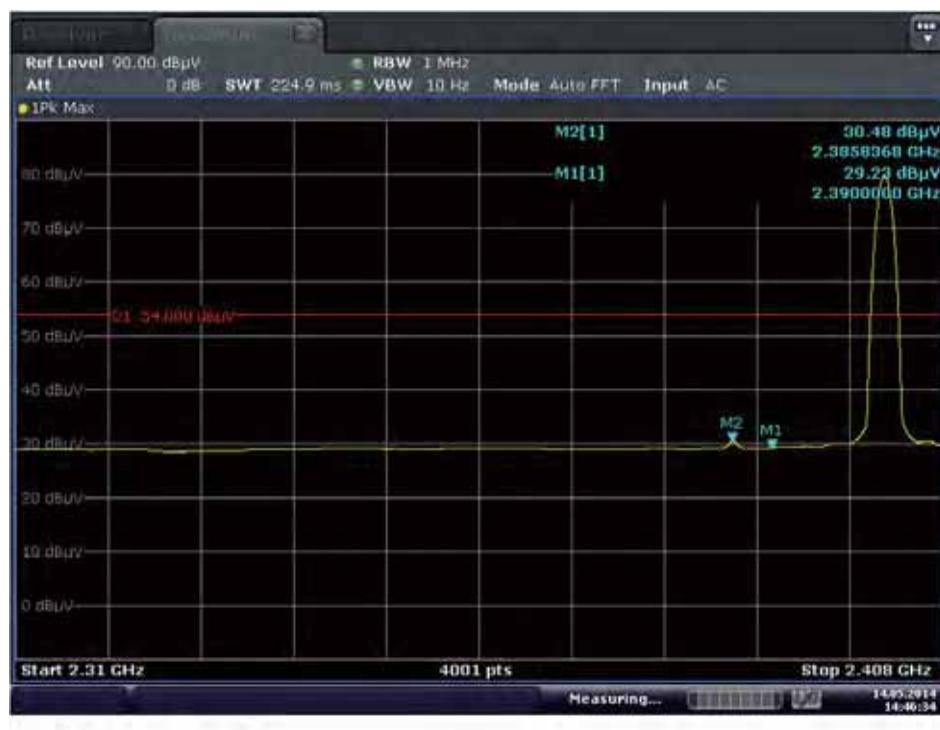
The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Test Plots

GFSK LOW CHANNEL , ANT V, PEAK



GFSK LOW CHANNEL , ANT V, AVERAGE



GFSK LOW CHANNEL , ANT H, PEAK



GFSK LOW CHANNEL , ANT H, AVERAGE



GFSK HIGH CHANNEL , ANT V, PEAK



Date: 14.05.2014 15:00:37

GFSK HIGH CHANNEL , ANT V, AVERAGE



Date: 14.05.2014 15:09:19

GFSK HIGH CHANNEL , ANT H, PEAK



GFSK HIGH CHANNEL , ANT H, AVERAGE



π /4DQPSK LOW CHANNEL , ANT V, PEAK



π /4DQPSK LOW CHANNEL , ANT V, AVERAGE



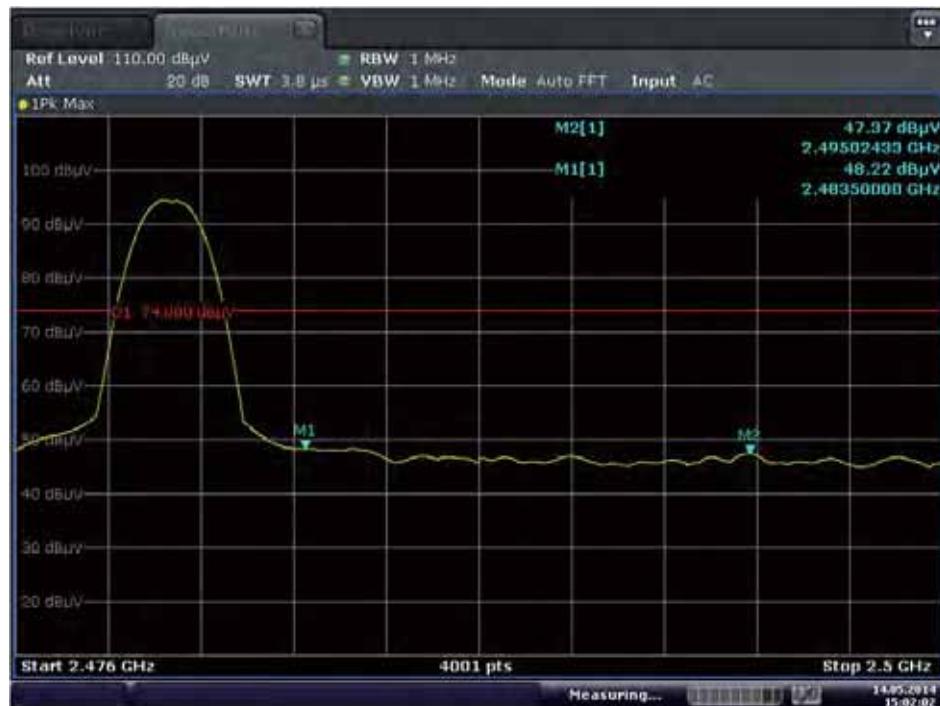
π /4DQPSK LOW CHANNEL , ANT H, PEAK



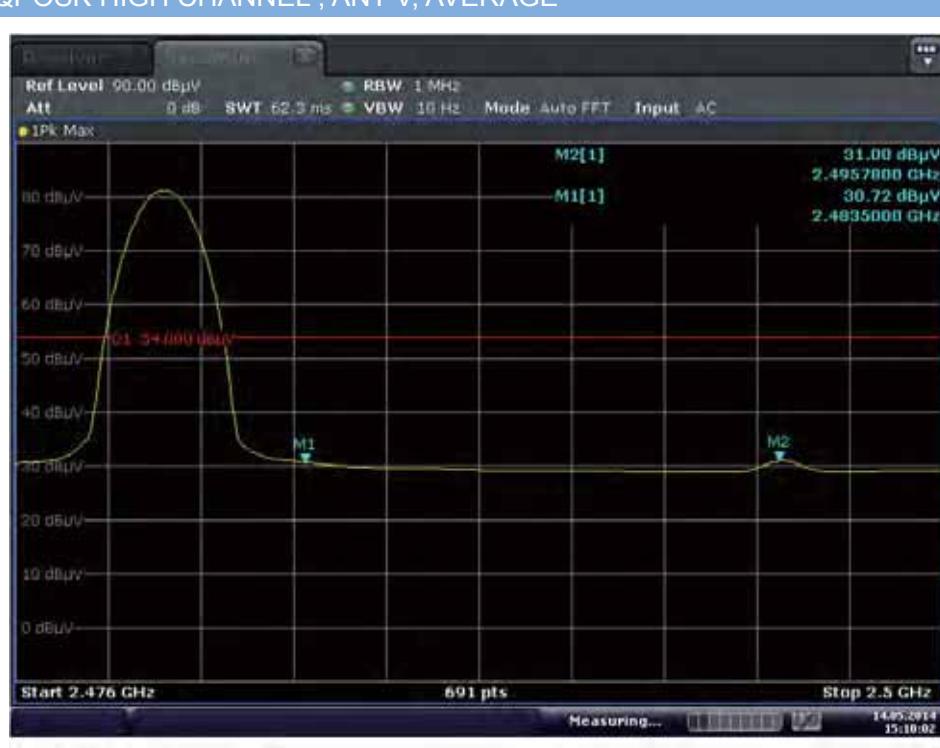
π /4DQPSK LOW CHANNEL , ANT H, AVERAGE



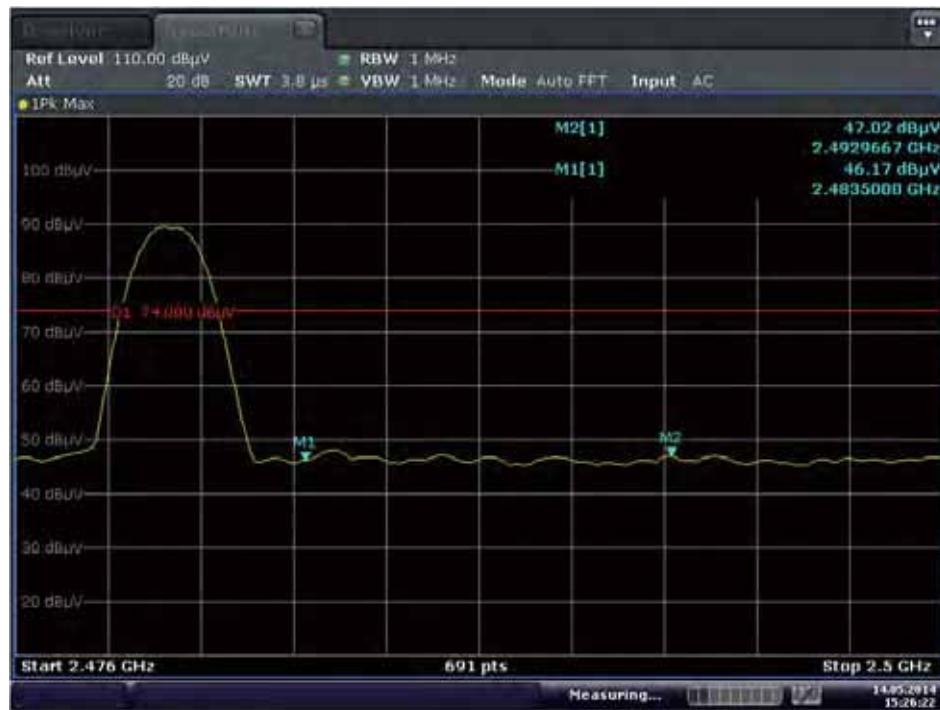
π /4DQPSK HIGH CHANNEL , ANT V, PEAK



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



8-DPSK LOW CHANNEL , ANT V, AVERAGE



8-DPSK LOW CHANNEL , ANT H, PEAK



8-DPSK LOW CHANNEL , ANT H, AVERAGE

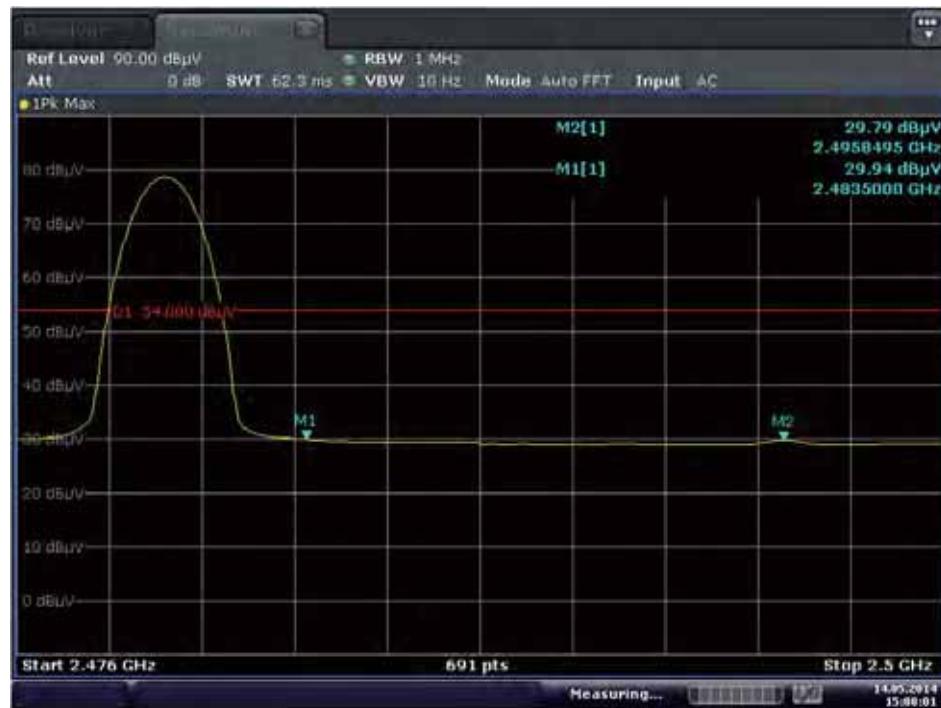


8-DPSK HIGH CHANNEL , ANT V, PEAK



Date: 14.MAY.2014 15:02:54

8-DPSK HIGH CHANNEL , ANT V, AVERAGE

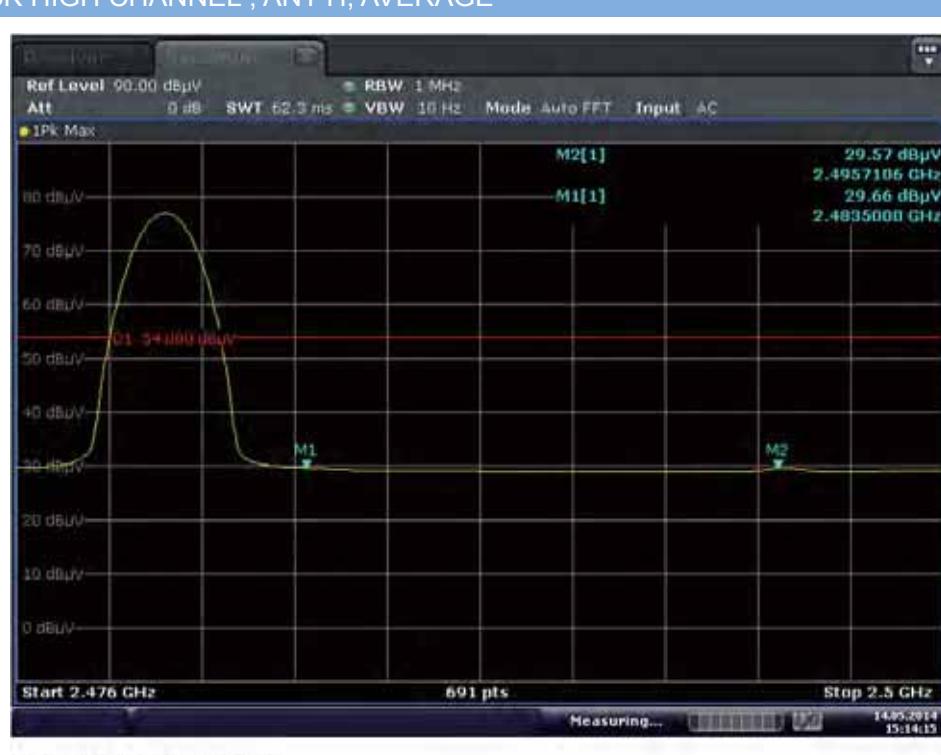


Date: 14.MAY.2014 15:08:01

8-DPSK HIGH CHANNEL , ANT H, PEAK



8-DPSK HIGH CHANNEL , ANT H, AVERAGE



ANNEX B TEST SETUP PHOTOS

B.1. Conducted Test Photo



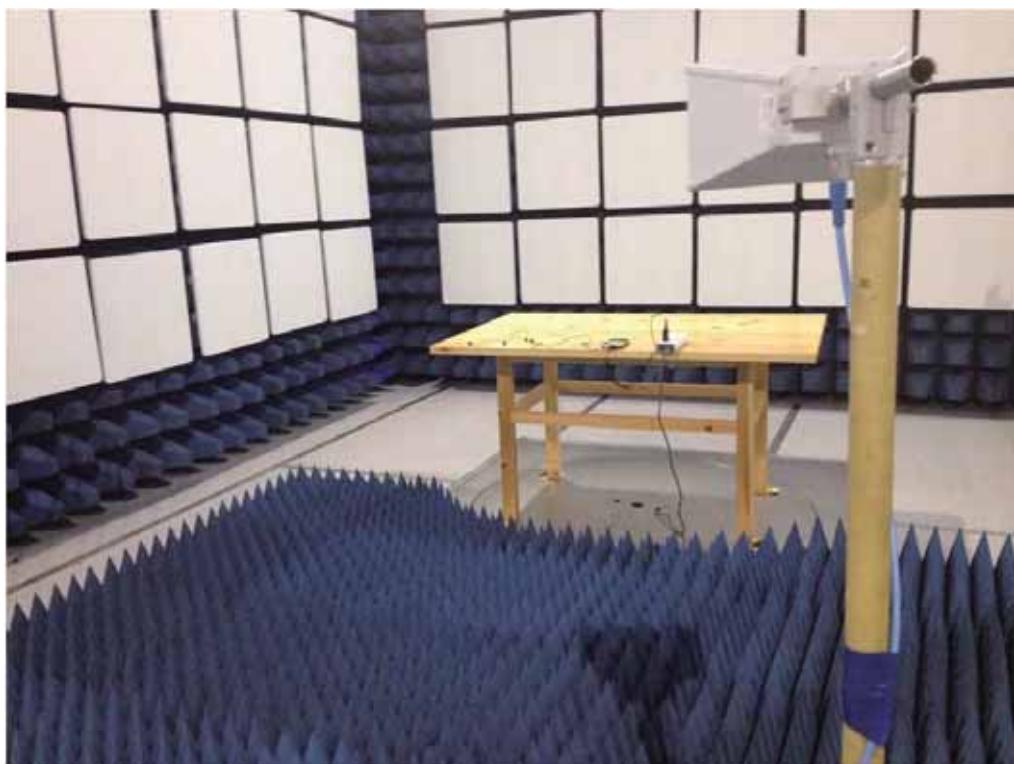
B.2. Radiated Test Photo



Below 30MHz



30MHz to 1GHz



Above 1GHz

ANNEX C EUT PHOTOS

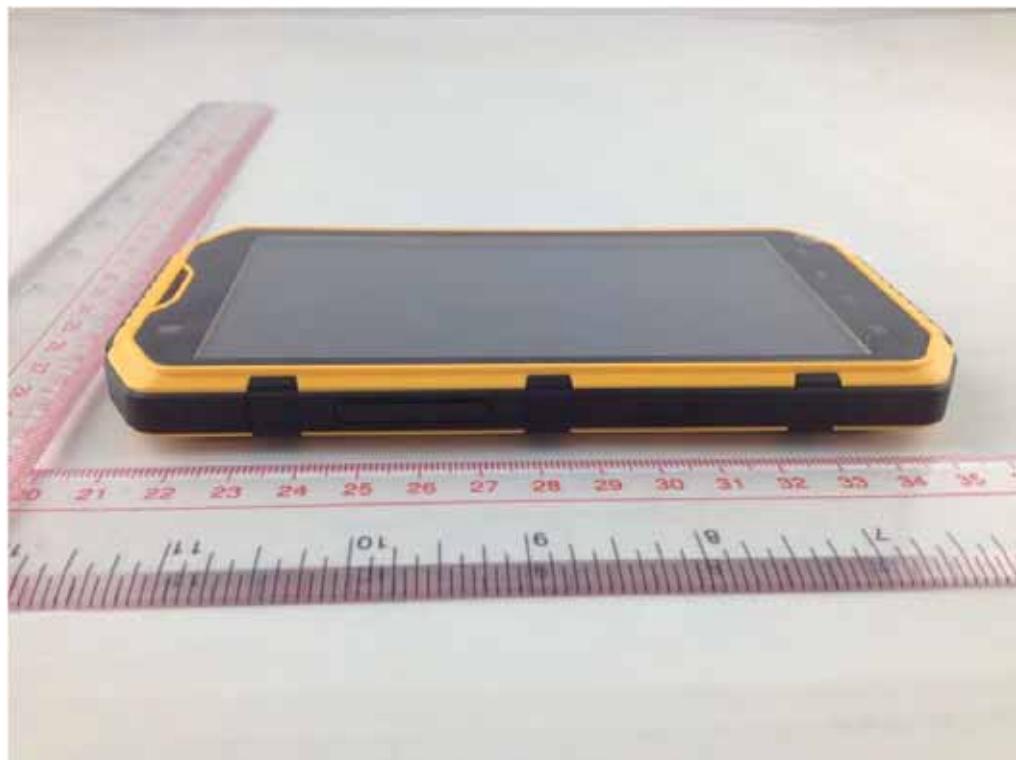
C.1 Appearance of the EUT



THE FRONT OF EUT



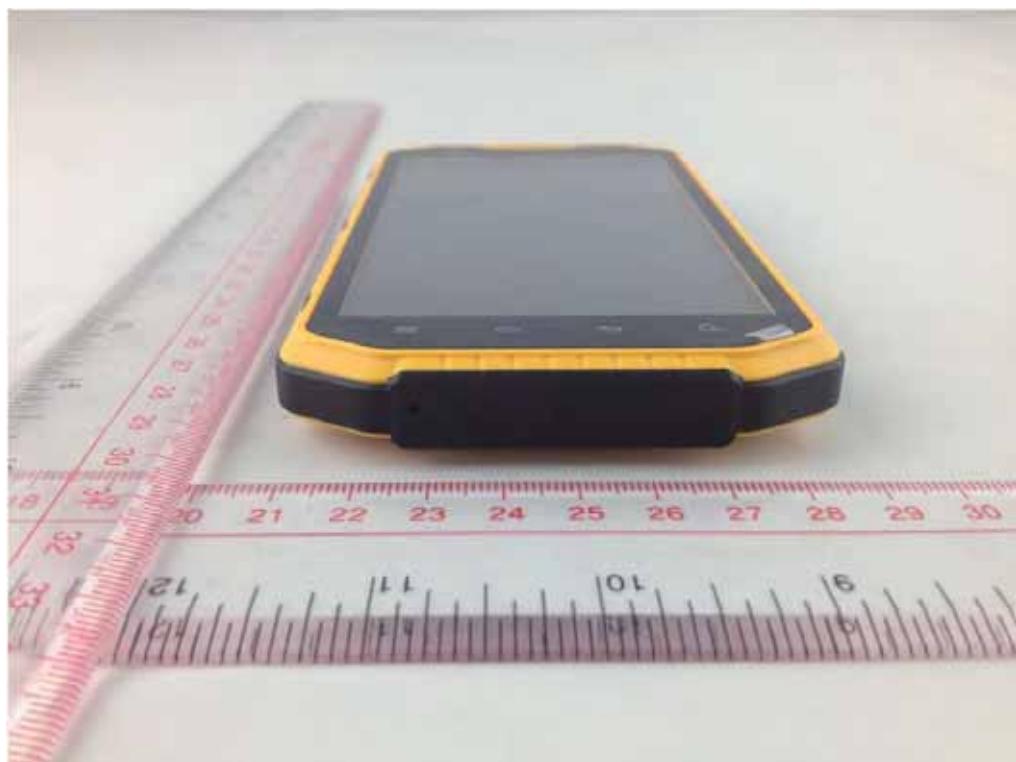
THE BACK OF EUT



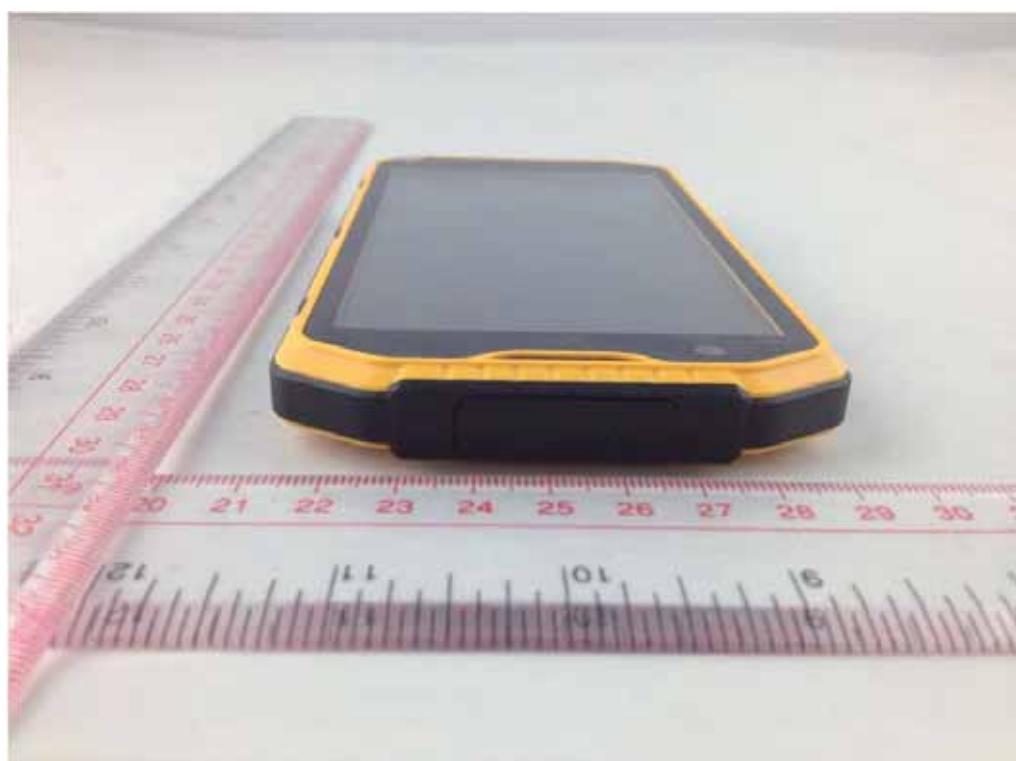
THE LEFT OF EUT



THE RIGHT OF EUT



THE UP OF EUT



THE DOWN OF EUT



CHARGER



DATA CABLE



HEADPHONE CABLE

C.2 Inside of the EUT



EUT UNCOVER VIEW 1



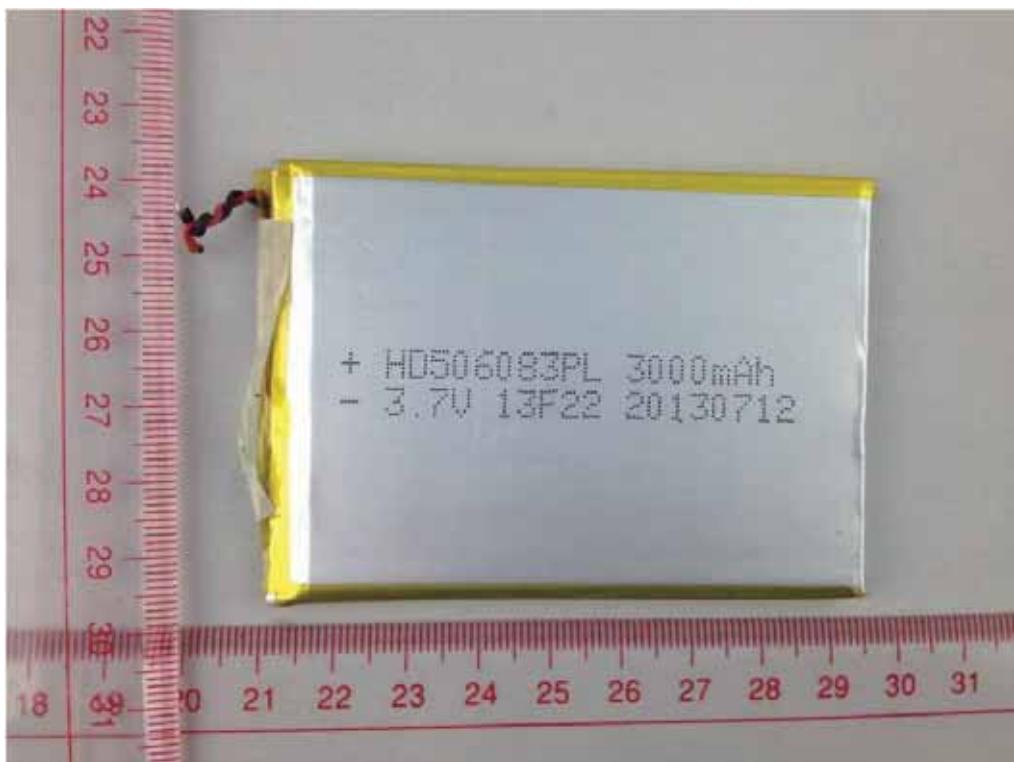
EUT UNCOVER VIEW 2



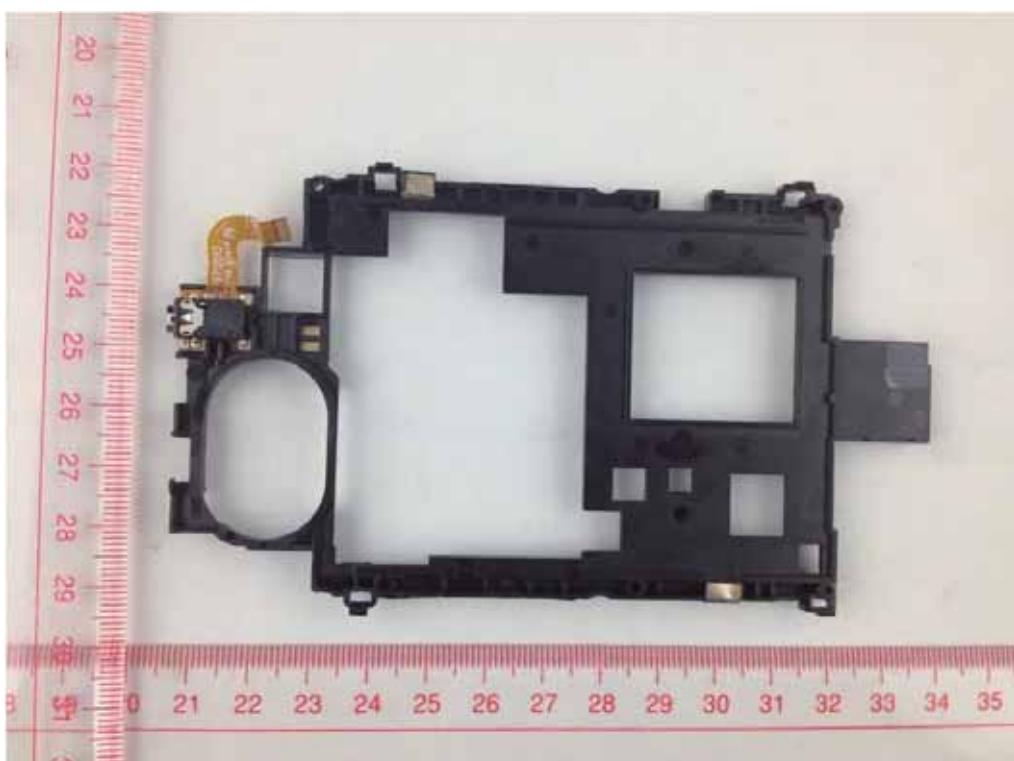
EUT UNCOVER VIEW 3



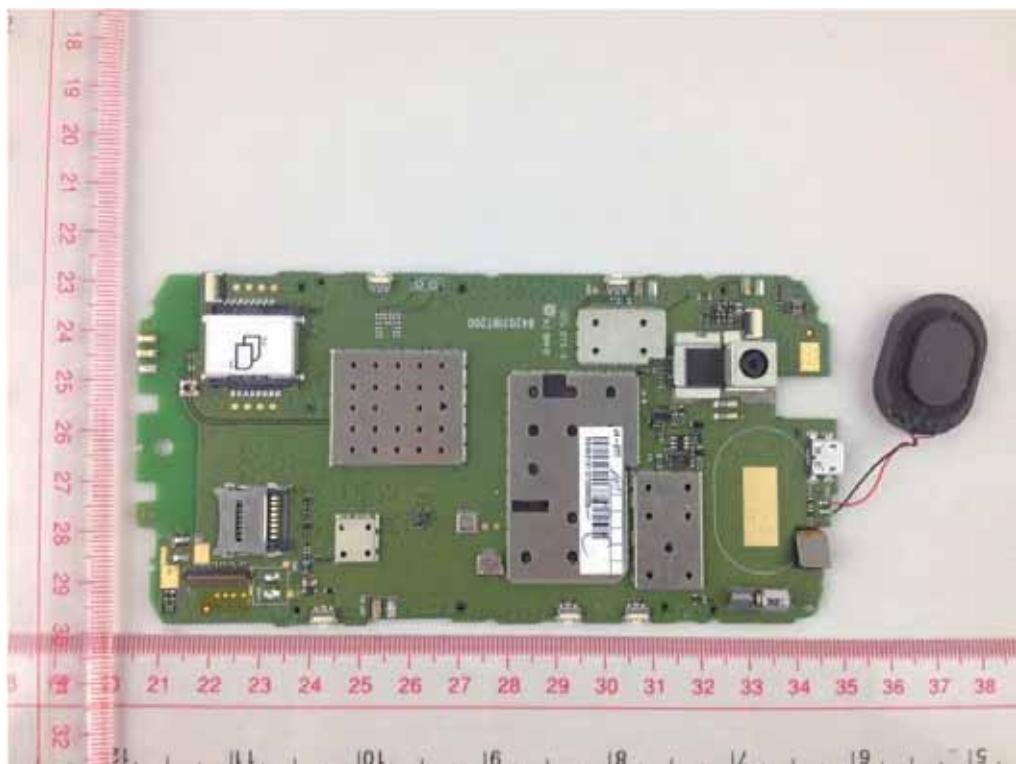
EUT UNCOVER VIEW 3



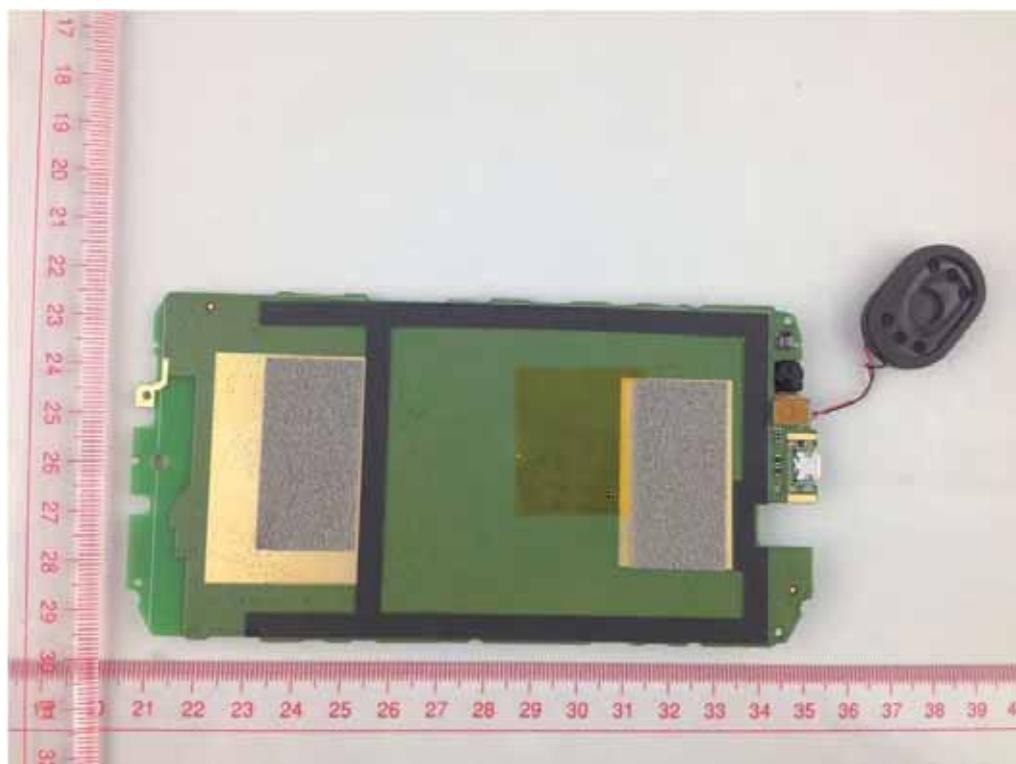
BATTERY



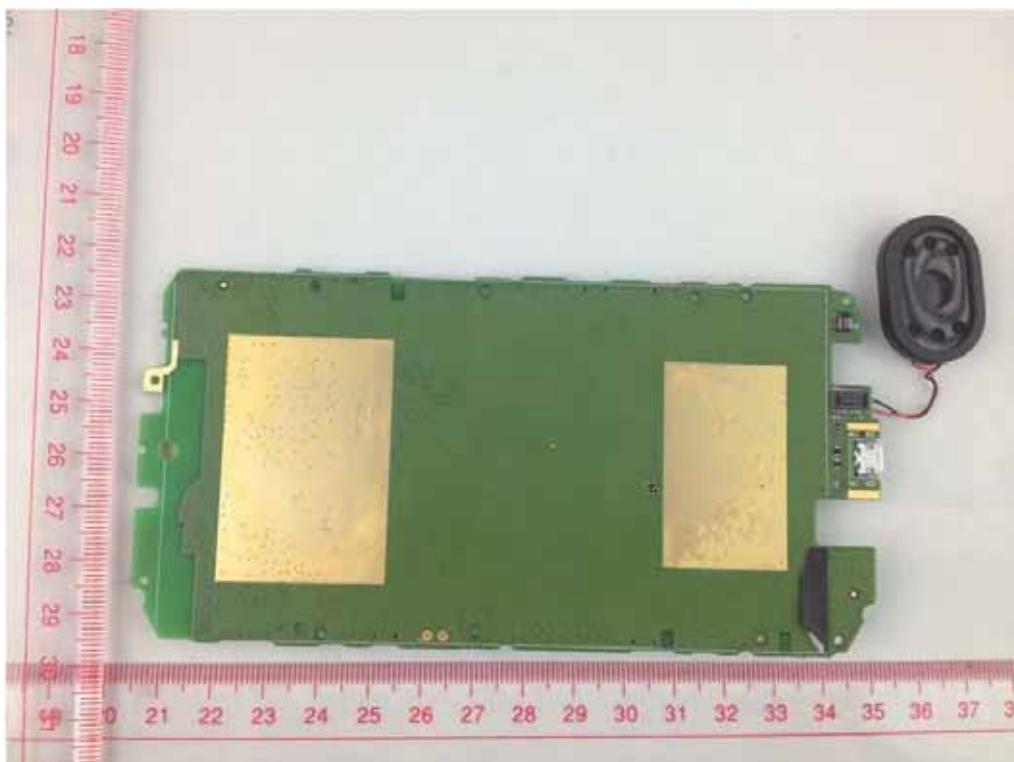
ANTENNA



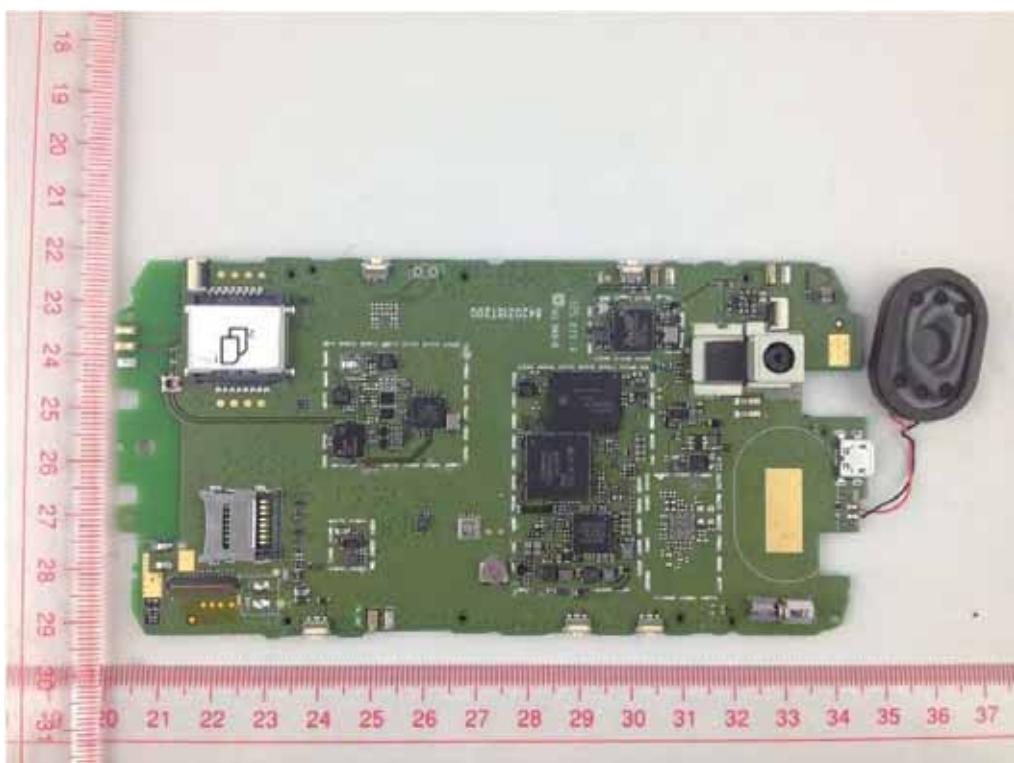
MAIN BOARD TOP VIEW 1



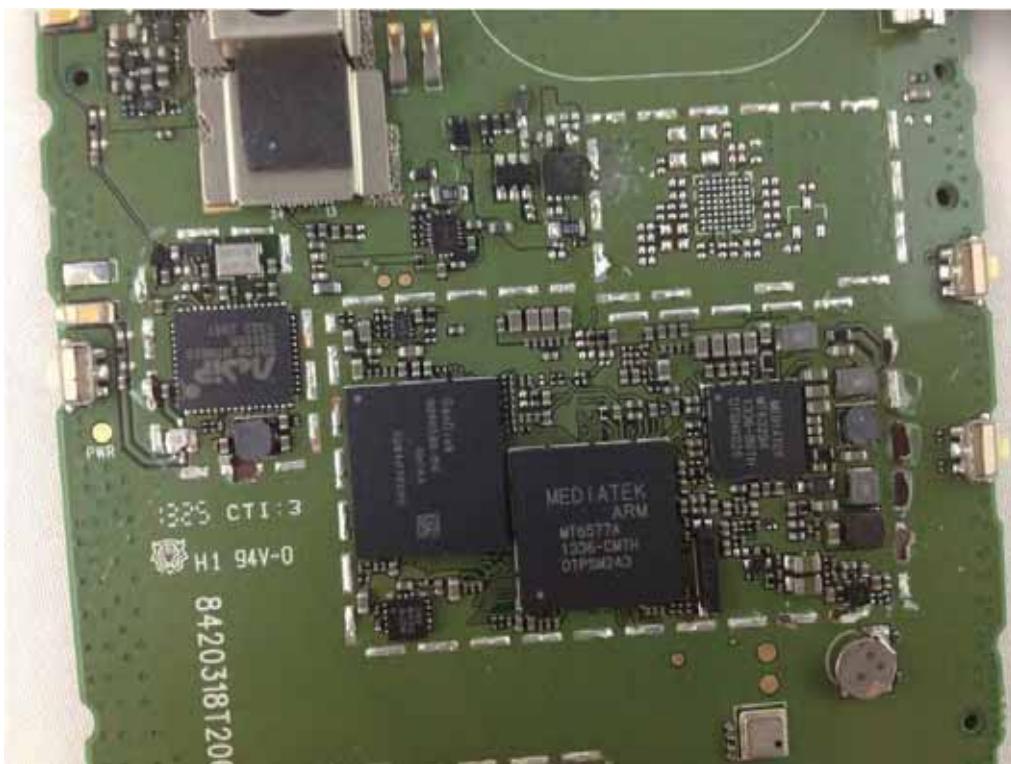
MAIN BOARD BACK VIEW 1



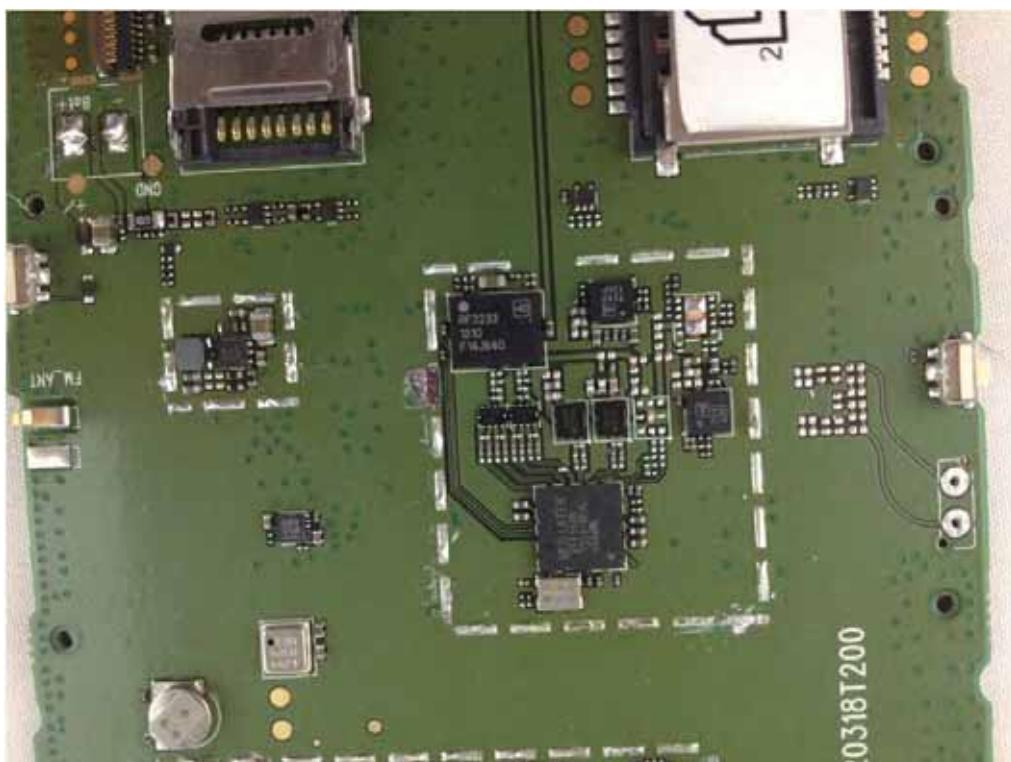
MAIN BOARD TOP VIEW 2



MAIN BOARD TOP VIEW 3



MAIN BOARD TOP VIEW 4



MAIN BOARD TOP VIEW 5

--END OF REPORT--