FCC RF TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Bluetooth Speaker

ISSUED TO
Voxx Accessories Corp.

3502 Woodview Trace, Suite 220, Indianapolis, IN. 46268

Prepared by: Tu Lang
(Reporting Specialist)
Date 2014.01.15

Approved by: Li Lei
(Project Manager)
Date 2014.01.15

Report No.:	BL-13C008-601
EUT Type:	Bluetooth Speaker
Model Name:	AS3BK
Brand Name:	AR/808
FCC ID:	VIX-AS3BK
Test Standard:	47 CFR Part 15, Subpart C
Test conclusion:	PASS
Test Date:	Dec 13, 2013 – Dec 24, 2013
Date of Issue:	Jan 15, 2014

Block B, 1st FL,Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100
FAX: +86-755-61824271
www.baluntek.com

Revision History

Version	Issue Date	Revisions
Rev. 01	Jan 15, 2014	Initial Issue

TABLE OF CONTENTS

1 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 CTL Testing Technology Co., Ltd
Address	Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen, China
Accreditation Certificate	The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are **970318** The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are **9618B**
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	19 to 25 ℃
Ambient Relative Humidity	45 to 55 %
Ambient Pressure	N/A (Not applicable)

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	Voxx Accessories Corp.
Address	3502 Woodview Trace, Suite 220, Indianapolis, IN. 46268

2.2 Manufacturer

Manufacturer	Smart Power Industrial Ltd
Address	Building Four, Huaguan Industrial Zone, Zhangqi Road, Qiping Village, Guanlan Town, Shenzhen City, Guangdong Province, China

2.3 General Description for Equipment under Test (EUT)

EUT Type	Bluetooth Speaker
Model Name	AS3BK
Hardware Version	N/A
Software Version	N/A
Network/ Wireless connectivity	Bluetooth BR+EDR
Description	The AS3BK is an Acoustic Research Branded speaker that is powered by eight replaceable AA cell batteries (not supplied) or by the supplied power adaptor. It will operate on batteries for up to 12 hours. It is designed to stream music from any Bluetooth enabled A2DP device. It also supports wired audio playback via a line in connector. The product is built for portability and features an integrated carry handle. It is perfect for typical leisure activities like boating, picnics, tailgating, camping etc. but also for traditional use cases in the home due to its superior design. The speaker delivers outstanding sound and features a 3-way acoustical system with a tweeter, mid-range and bass radiator.

2.4 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

TX/ RX Operating Range	2400~2483.5MHz band f_c = 2402 MHz + N*1 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, π/4-DQPSK, 8DPSK
Antenna Type	Patch Antenna	
Antenna Gain	0dBi	

2.5 Ancillary Equipment

Ancillary Equipment 1	AC Adapter (Charger for Battery)	
	Brand Name	JFEC
	Model No	JF012WR-1200100UH
	Serial No	(n.a. marked #1 by test site)
	Rated Input	~ 100-240V, 350mA, 50/60Hz
	Rated Output	⎓12V

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 C63.4-2003/2009	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

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage	Relative Humidity
Normal Temperature, Normal Voltage (NTNV)	Ambient	DC 12V	Ambient

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	AGILENT	E4440A	MY45304434	2013.05.10	2014.05.09
Attenuator (20dB)	KMW	ZA-S1-201	110617091	--	--
Attenuator (6dB)	KMW	ZA-S1-61	1305003189	--	--
DC Power Supply	R&S	HMP2020	018141664	2013.07.06	2014.07.07
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2013.07.03	2014.07.02
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2013.07.03	2014.07.02
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2013.07.02	2014.07.01
Test Antenna-Horn	R&S	HL050S7	72681	2013.07.02	2014.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2013.10.07	2014.10.06
EMI Test Receiver	R&S	ESRP	101036	2013.06.04	2014.06.03
Artificial Mains Network	SCHWARZBECK	NSLK8127	8127-687	2013.06.04	2014.06.03

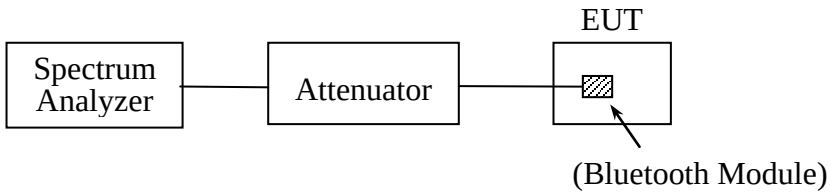
4.3 Test Configurations

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	π/4-DQPSK modulation, package type DH5, hopping on	--
TC06	π/4-DQPSK modulation, package type DH5, hopping off	Ch No. 0/ 2402MHz

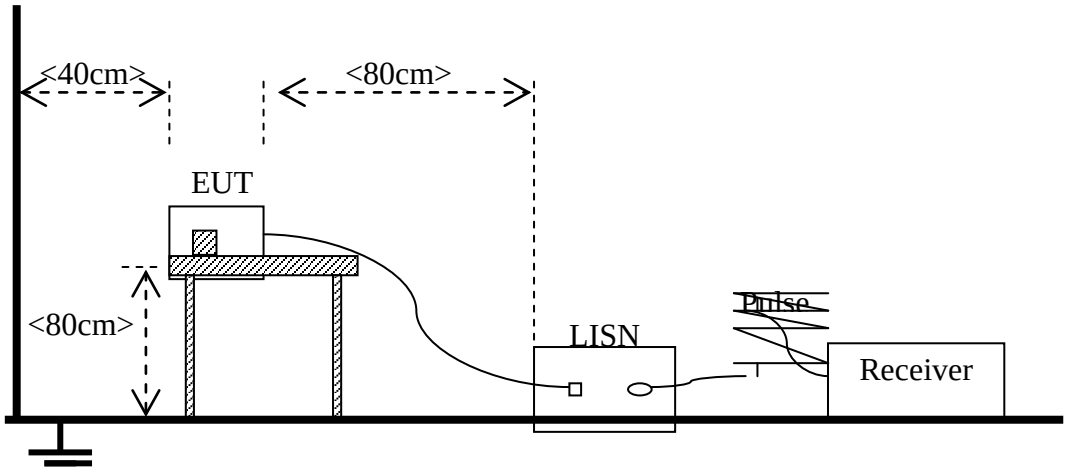
TC07	π/4-DQPSK modulation, package type DH5, hopping off	Ch No. 39/ 2441MHz
TC08	π/4-DQPSK modulation, package type DH5, hopping off	Ch No. 78/ 2480MHz
TC09	8DPSK modulation, package type DH5, hopping on	--
TC10	8DPSK modulation, package type DH5, hopping off	Ch No. 0/ 2402MHz
TC11	8DPSK modulation, package type DH5, hopping off	Ch No. 39/ 2441MHz
TC12	8DPSK modulation, package type DH5, hopping off	Ch No. 78/ 2480MHz

4.4 Test Setups

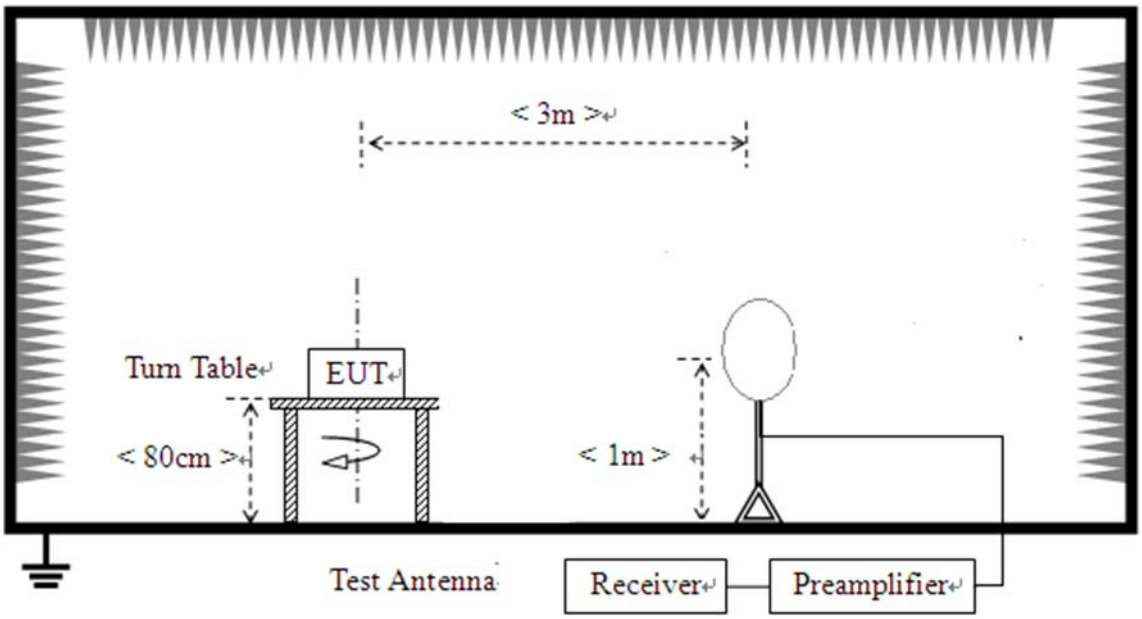
Test Setup 1- RF Conducted Test Setup



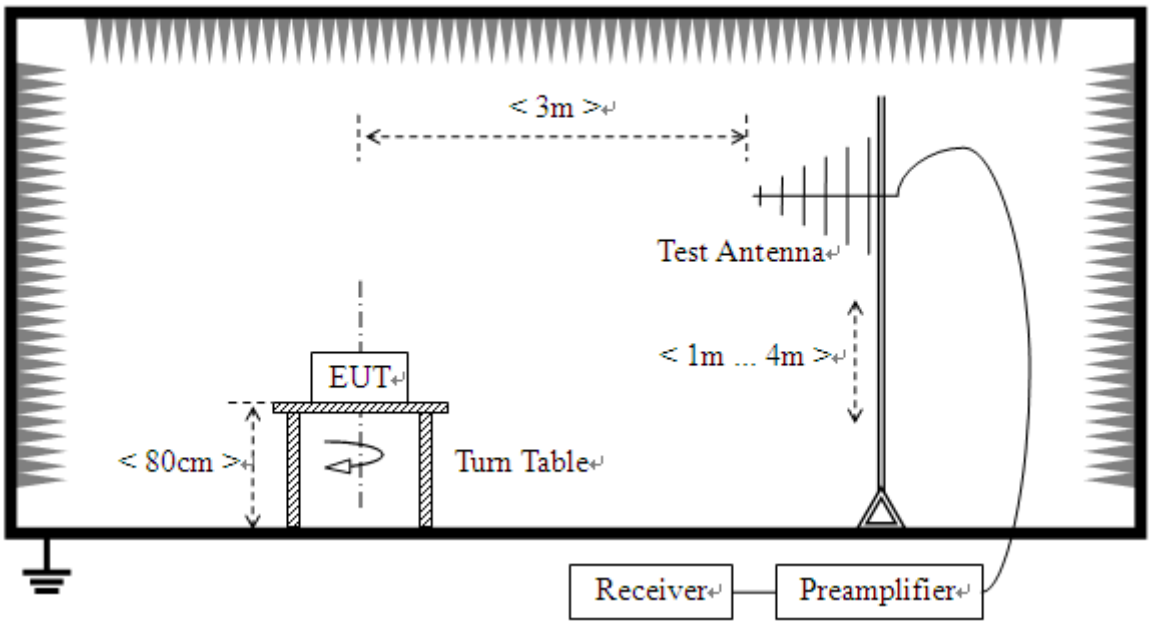
Test Setup 2 - Conducted Emission Test Setup



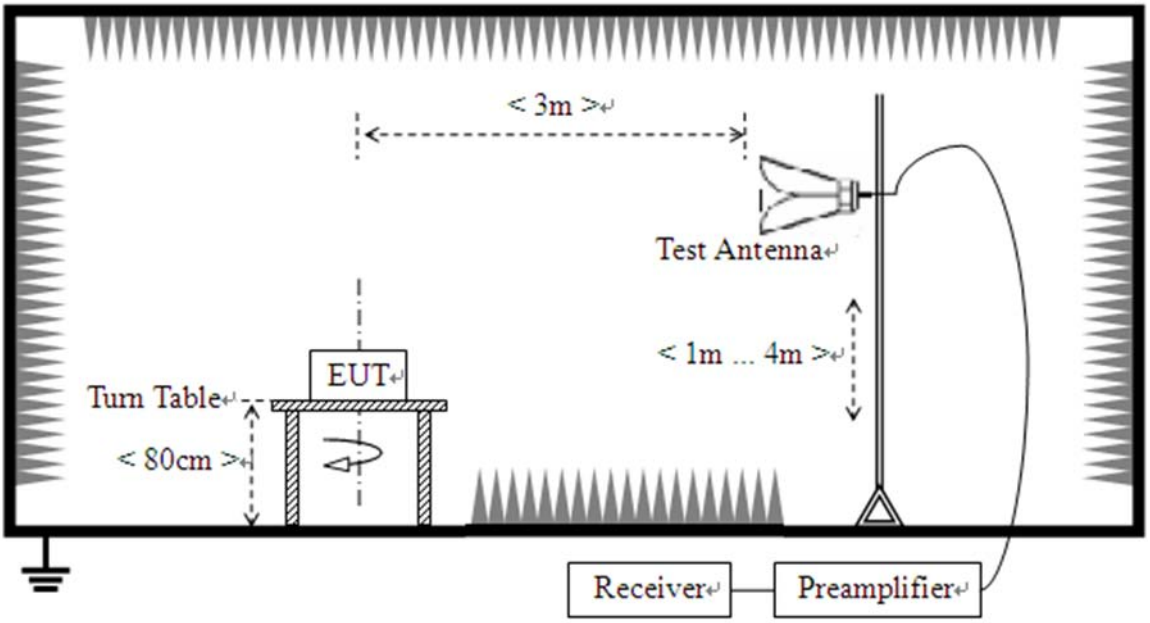
Test Setup 3–Radiated Spurious Emission Test Setup_1



Test Setup 4– Radiated Spurious Emission Test Setup_2



Test Setup 5– Radiated Spurious Emission Test Setup_3



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 Number of Hopping Frequency

5.1.1 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.

5.1.2 Test Procedure

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

Span = the frequency band of operation
RBW ≥ 1% of the span
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

5.2 Peak Output Power

5.2.1 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.

5.2.2 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.

5.3 Occupied Bandwidth

5.3.1 Limit

FCC §15.247(a)

The 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth (10*log1%=20dB) taking the total RF output power.

5.3.2 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW ≥ 1% of the 20 dB bandwidth
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

5.4 Carrier Frequency Separation

5.4.1 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.

5.4.2 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) ≥ 1% of the span
Video (or Average) Bandwidth (VBW) ≥ 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.

5.5 Time of Occupancy (Dwell time)

5.5.1 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.

5.5.2 Test Procedure

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

Span = zero span, centered on a hopping channel
RBW = 1 MHz
VBW ≥ RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak
Trace = max hold

The average time of occupancy on any channel within the Period can be calculated with formulas (for DH5 package type):

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

{Period} = 0.4s * {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.

5.6 Conducted Spurious Emission

5.6.1 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.

5.6.2 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 ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

5.7 Conducted Emission

5.7.1 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 50μH/50Ω line impedance stabilization network (LISN).

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

5.7.2 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.

5.8 Radiated Spurious Emission

5.8.1 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 (μV/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).

5.8.2 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 ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold

5.9 Band Edge

5.9.1 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.

5.9.2 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 ≥ 1% of the span

VBW ≥ RBW

Sweep = auto

Detector function = peak /AV

Trace = max hold

Allow the trace to stabilize.

E [dBμV/m] =UR + AT + AFactor [dB]; AT =LCable loss [dB]-Gpreamp [dB]

AT: Total correction Factor except Antenna

UR: Receiver Reading

Gpreamp: Preamplifier Gain

AFactor: Antenna Factor at 3m

ANNEX A TEST RESULTS

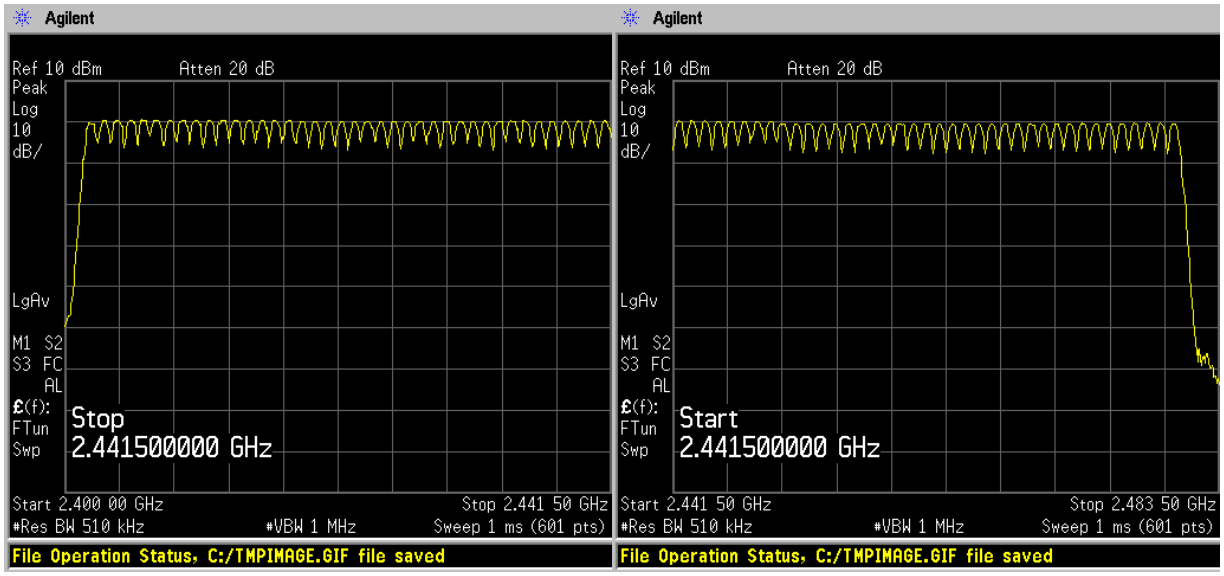
A.1 Number of Hopping Frequency

Test Data

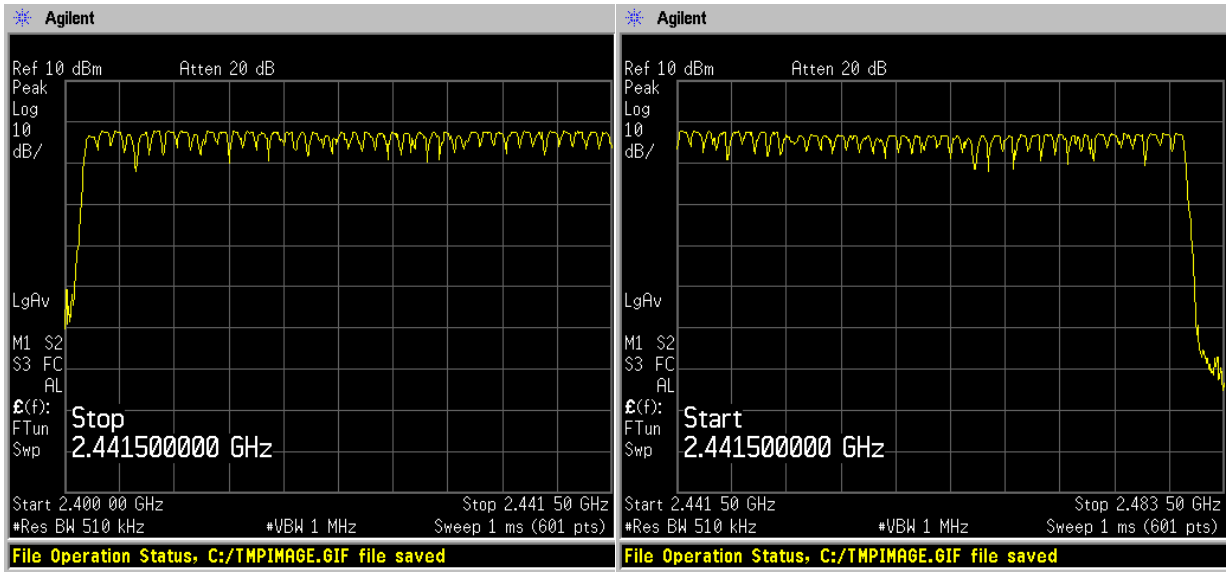
Test Mode	Frequency Band (MHz)	Channel Numbers	Limits	Verdict
GFSK	2402-2480	79	≥15	Pass
π/4DQPSK	2402-2480	79	≥15	Pass
8-DPSK	2402-2480	79	≥15	Pass

Test Plots

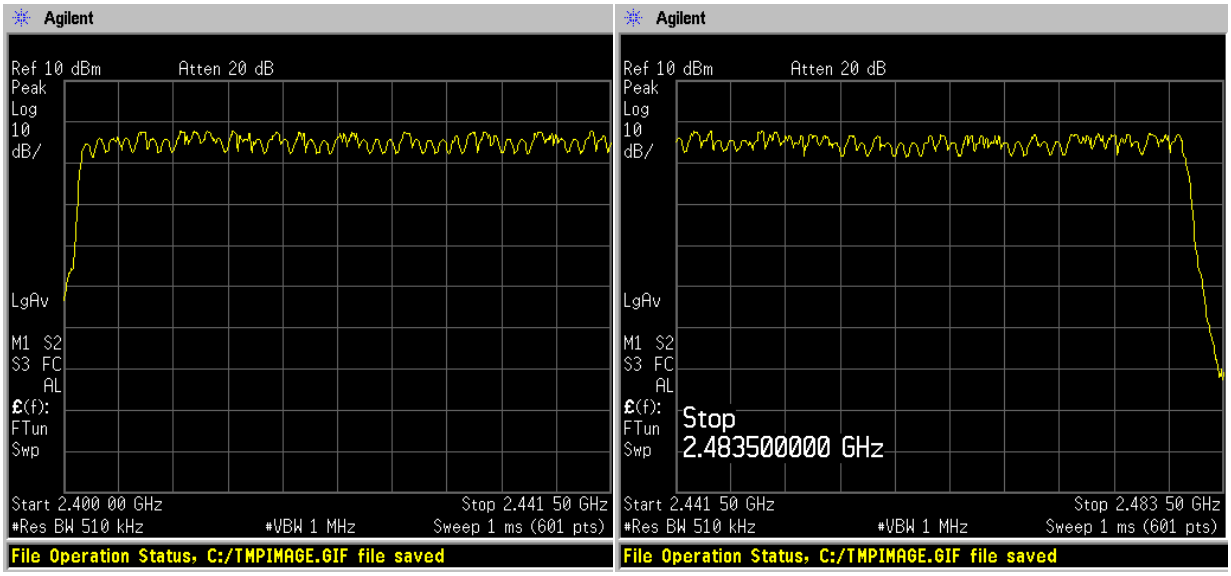
GFSK Mode



π/4 DQPSK Mode



8-DPSK Mode


Agilent
Ref 10 dBm
Atten 20 dB
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Start 2.400 00 GHz
#Res BW 510 kHz
#VBW 1 MHz
Stop 2.441 50 GHz
Sweep 1 ms (601 pts)
File Operation Status, C:/TMPIMAGE.GIF file saved
Agilent
Ref 10 dBm
Atten 20 dB
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AL
£(f):
FTun
Swp
Stop
2.483500000 GHz
Start 2.441 50 GHz
#Res BW 510 kHz
#VBW 1 MHz
Stop 2.483 50 GHz
Sweep 1 ms (601 pts)
File Operation Status, C:/TMPIMAGE.GIF file saved

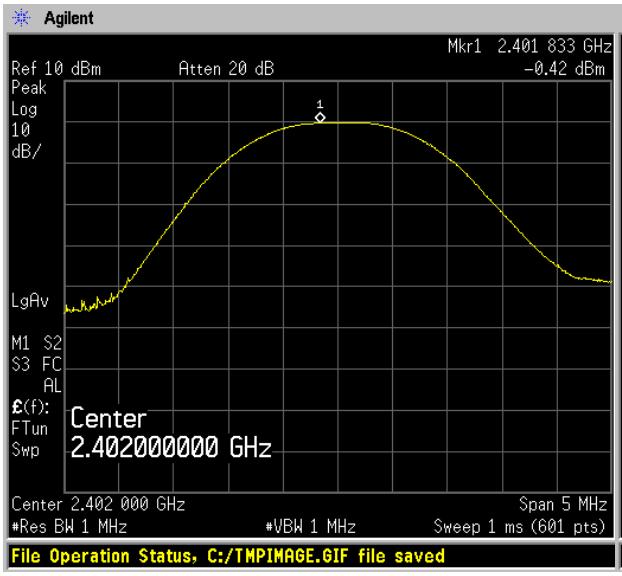
A.2 Peak Output Power

Test Data

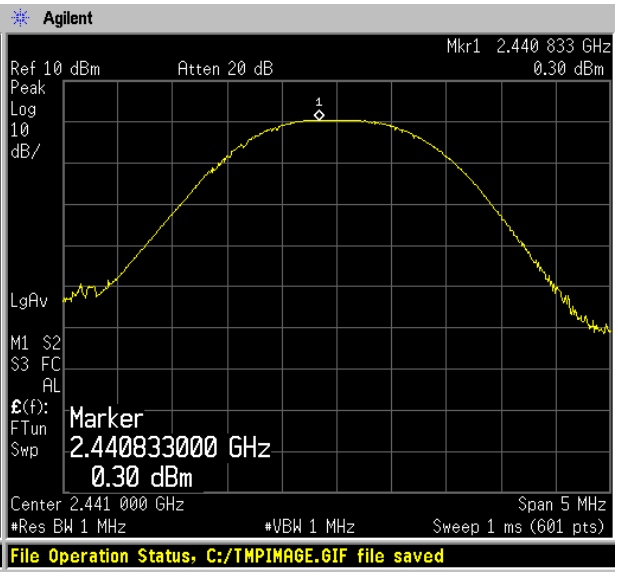
Test Mode	Chan.	Fre. (MHz)	Reading (dBm)	Factor (dB)	Output Peak Power		Limit (dBm)	Verdict
					dBm	W		
GFSK	0	2402	-0.42	6.48	6.06	0.004036	30 (1W)	Pass
	39	2441	0.30	6.49	6.79	0.004775		Pass
	78	2480	-0.27	6.50	6.23	0.004198		Pass
π/4DQPSK	0	2402	-3.17	6.48	3.31	0.002143		Pass
	39	2441	-2.03	6.49	4.46	0.002793		Pass
	78	2480	-2.68	6.50	3.82	0.002410		Pass
8-DPSK	0	2402	-3.08	6.48	3.40	0.002188		Pass
	39	2441	-1.94	6.49	4.55	0.002851		Pass
	78	2480	-2.58	6.50	3.92	0.002466		Pass

Test Plots

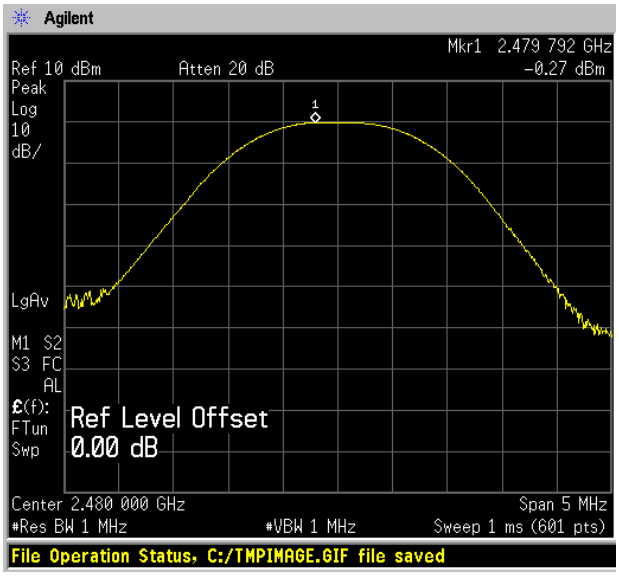
GFSK Mode



Low Channel

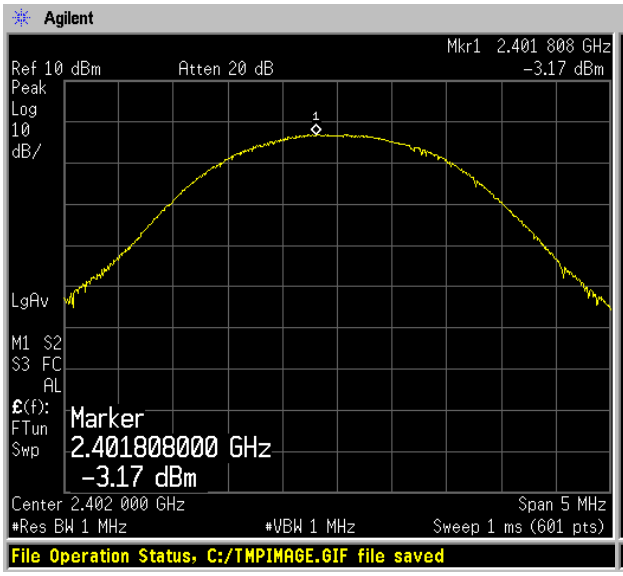


Middle Channel



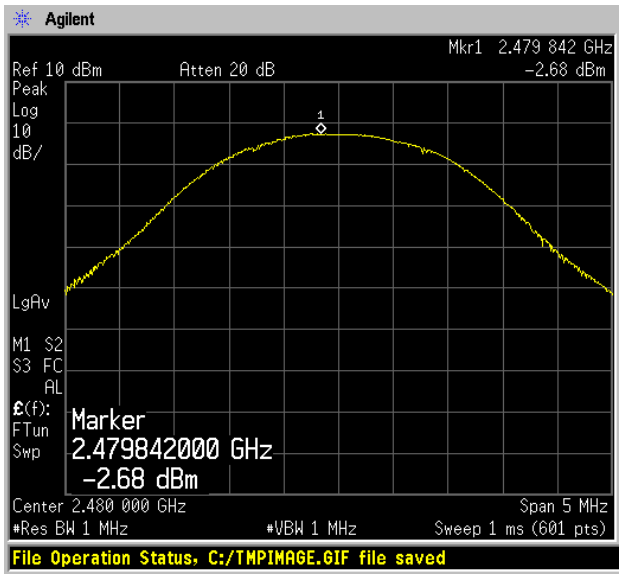
High Channel

π/4 DQPSK Mode



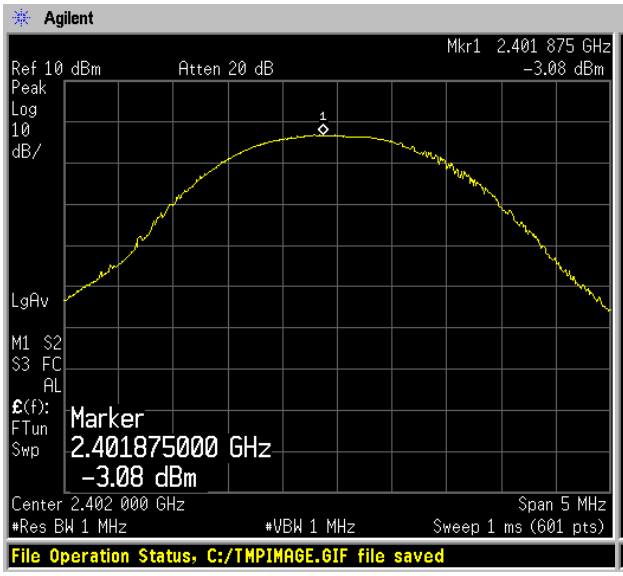
Low Channel

Middle Channel

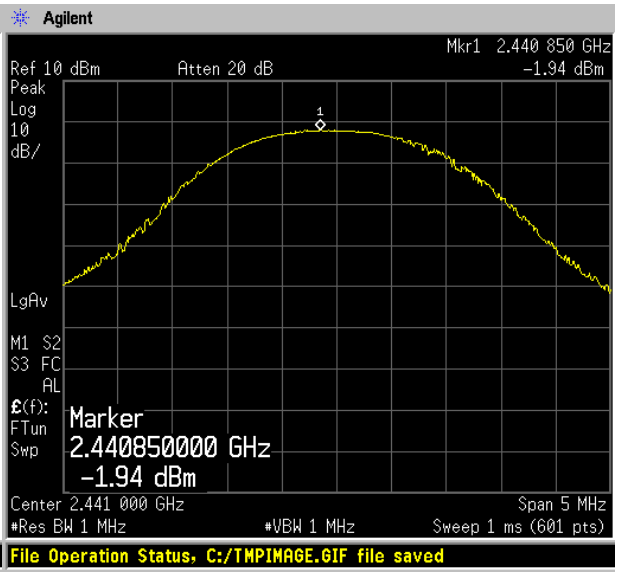


High Channel

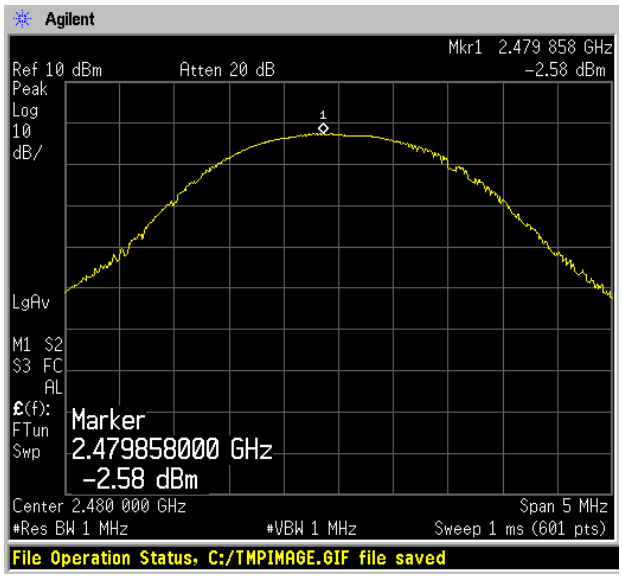
8-DPSK Mode



Low Channel



Middle Channel



High Channel

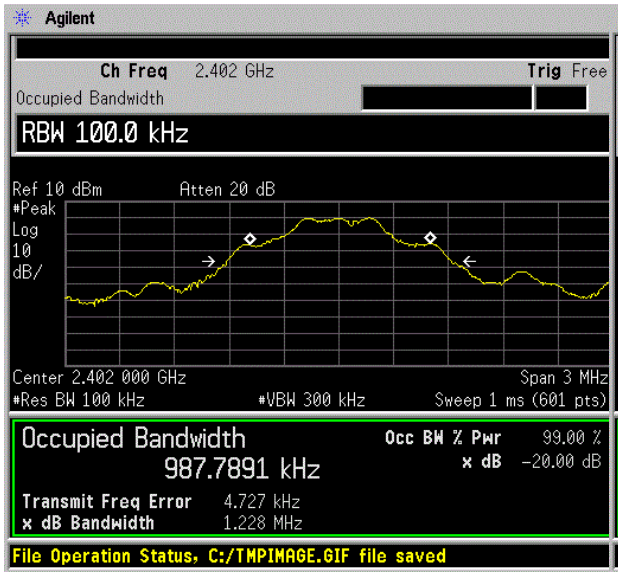
A.3 Occupied Bandwidth

Test Data

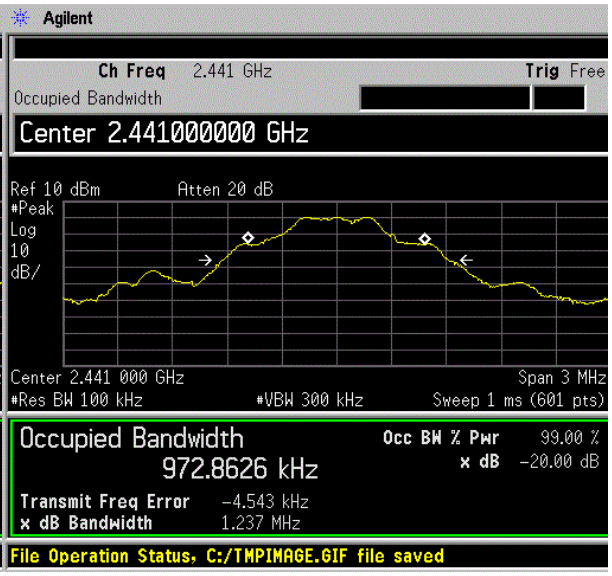
Test Mode	Channel	Frequency (MHz)	99% Bandwidth (MHz)	20 dB Bandwidth (MHz)	Verdict
GFSK	0	2402	0.988	1.228	Pass
	39	2441	0.973	1.237	Pass
	78	2480	0.976	1.227	Pass
π/4DQPSK	0	2402	1.142	1.394	Pass
	39	2441	1.170	1.418	Pass
	78	2480	1.157	1.391	Pass
8-DPSK	0	2402	1.188	1.410	Pass
	39	2441	1.192	1.400	Pass
	78	2480	1.191	1.405	Pass

Test Plots

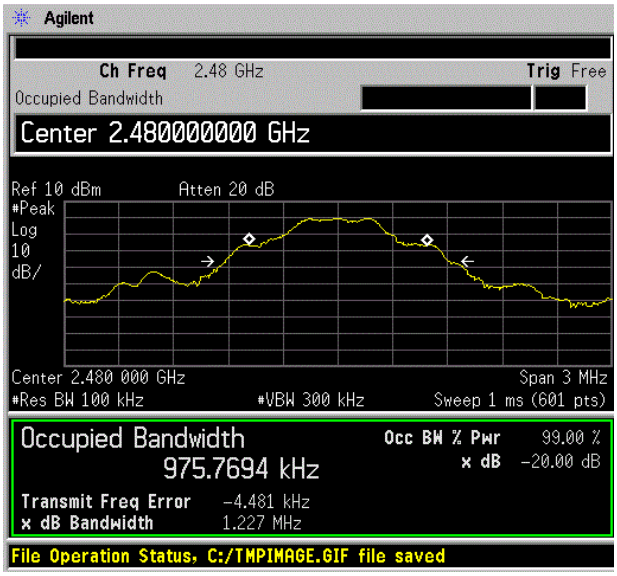
GFSK Mode



Low Channel

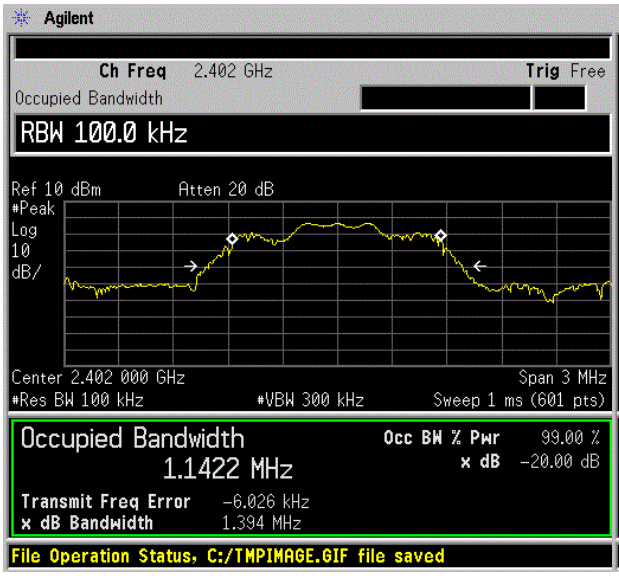


Middle Channel

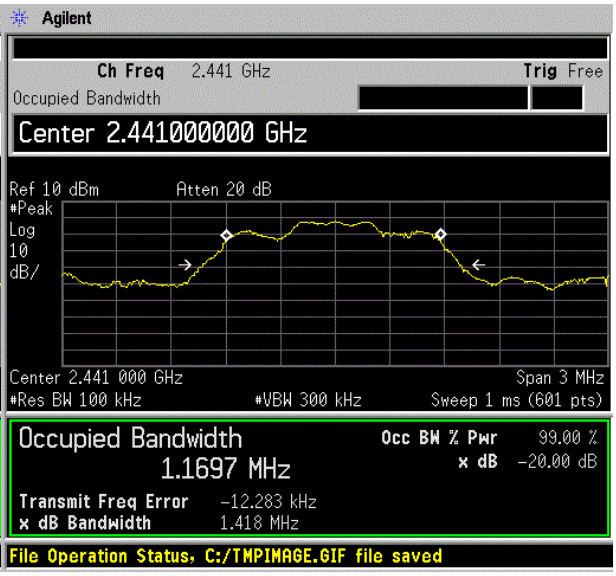


High Channel

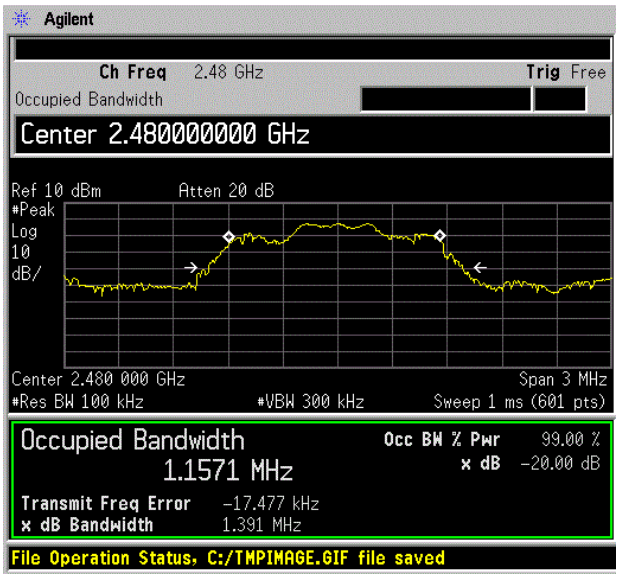
π/4 DQPSK Mode



Low Channel

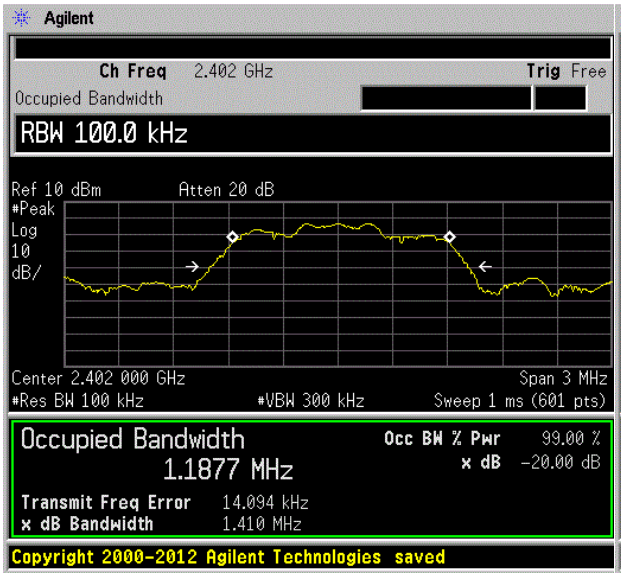


Middle Channel

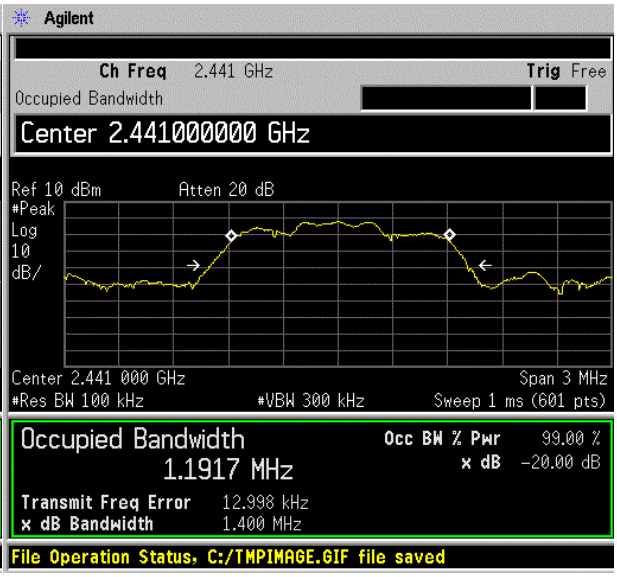


High Channel

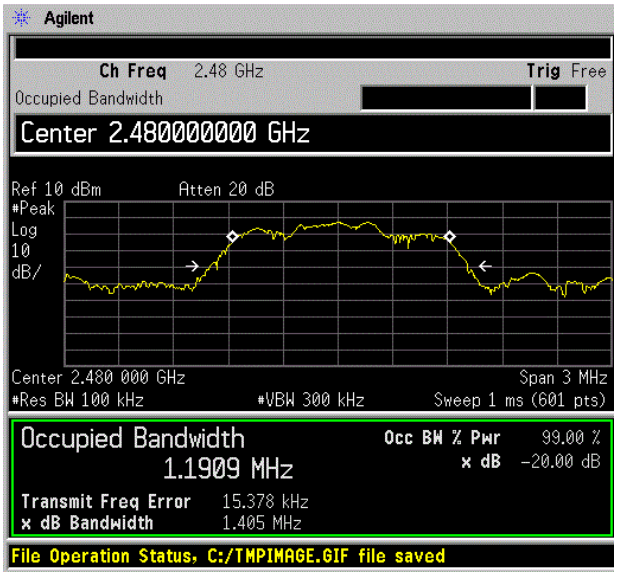
8-DPSK Mode



Low Channel



Middle Channel



High Channel

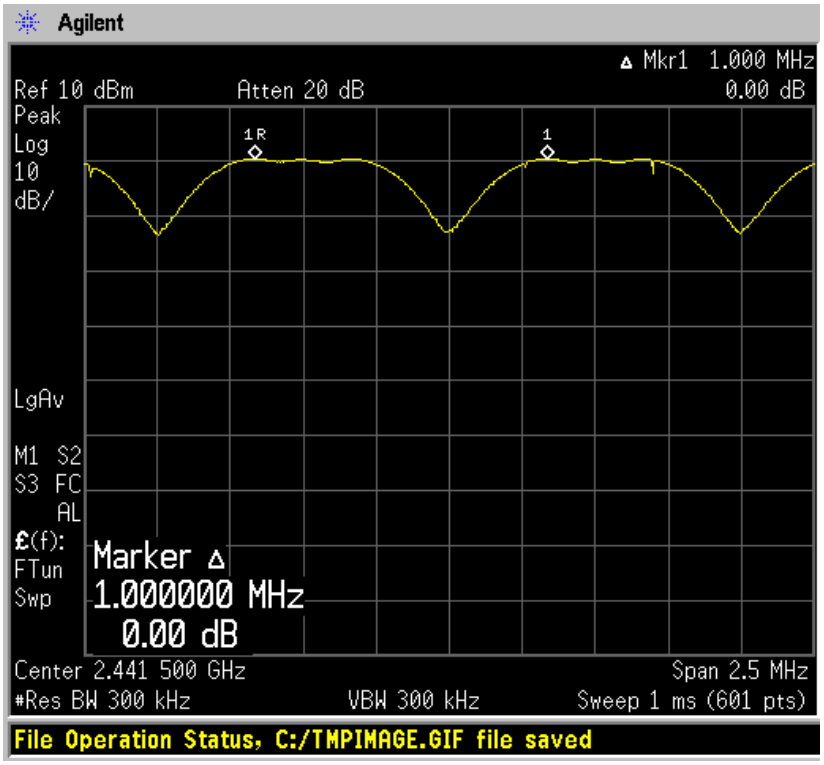
A.4 Carrier Frequency Separation

Test Data

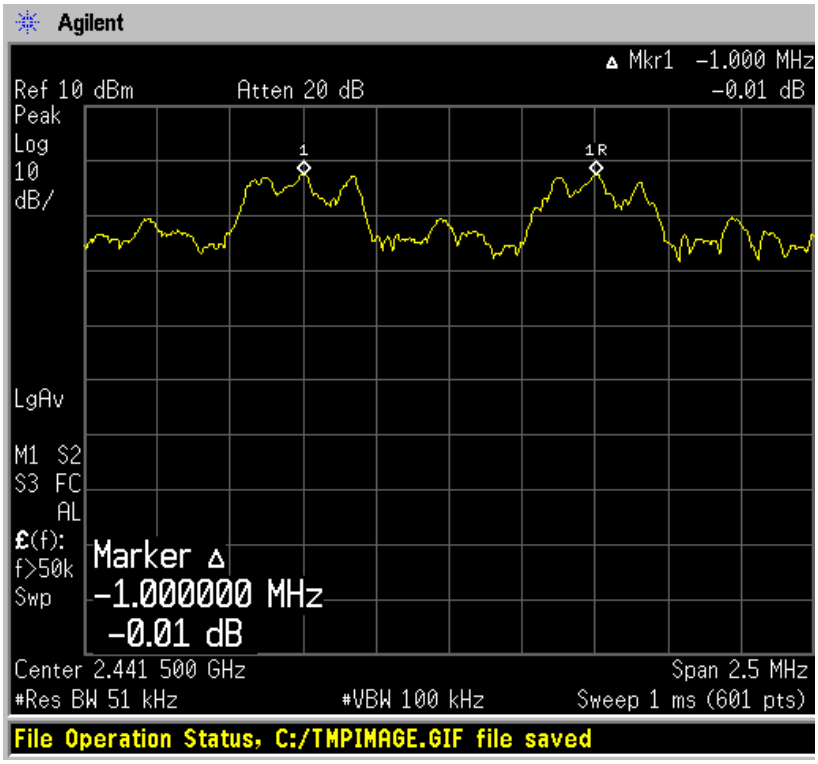
Test Mode	Fre. Separation (MHz)	Limits	Limits (≥two-thirds 20 dB bandwidth)	Verdict
GFSK	0.996	≥25KHz	0.829MHz	Pass
π/4DQPOSK	1.004	≥25KHz	0.950MHz	Pass
8-DPSK	0.983	≥25KHz	0.938MHz	Pass

Test Plots

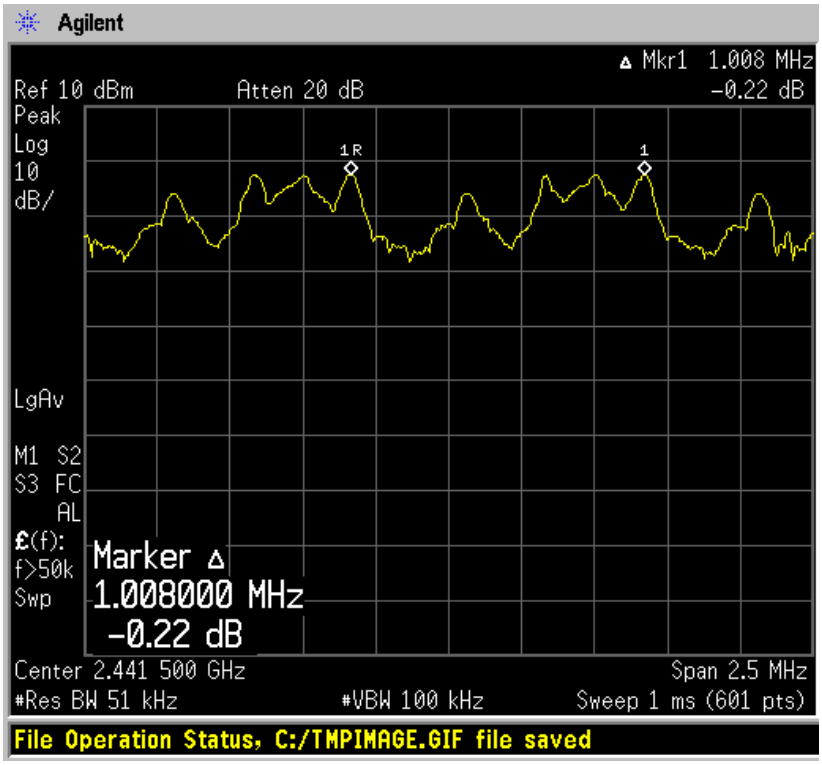
GFSK Mode



π/4 DQPSK Mode



8-DPSK Mode



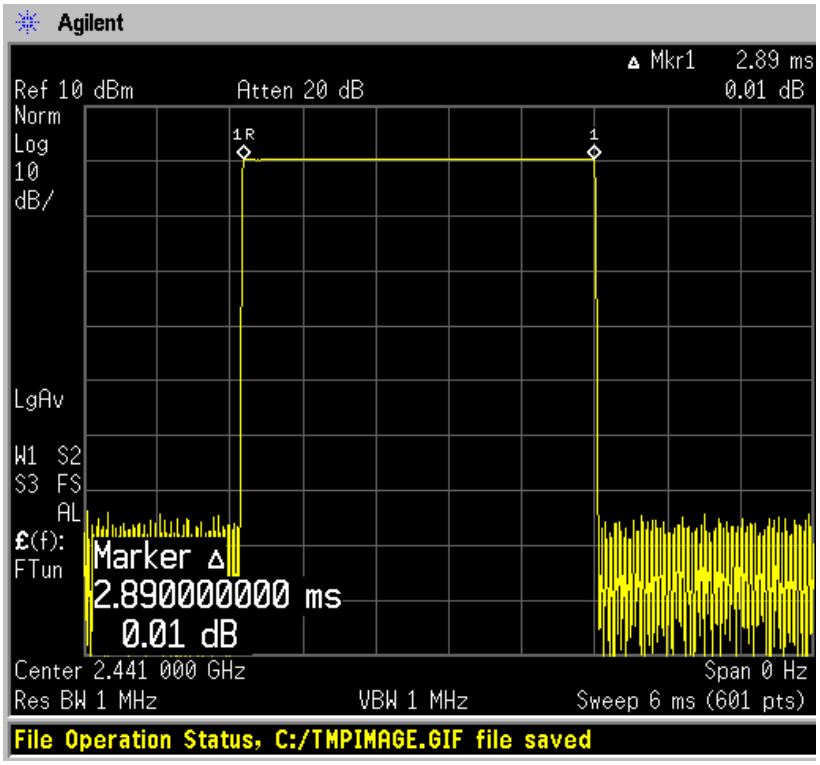
A.5 Time of Occupancy (Dwell time)

Test Data

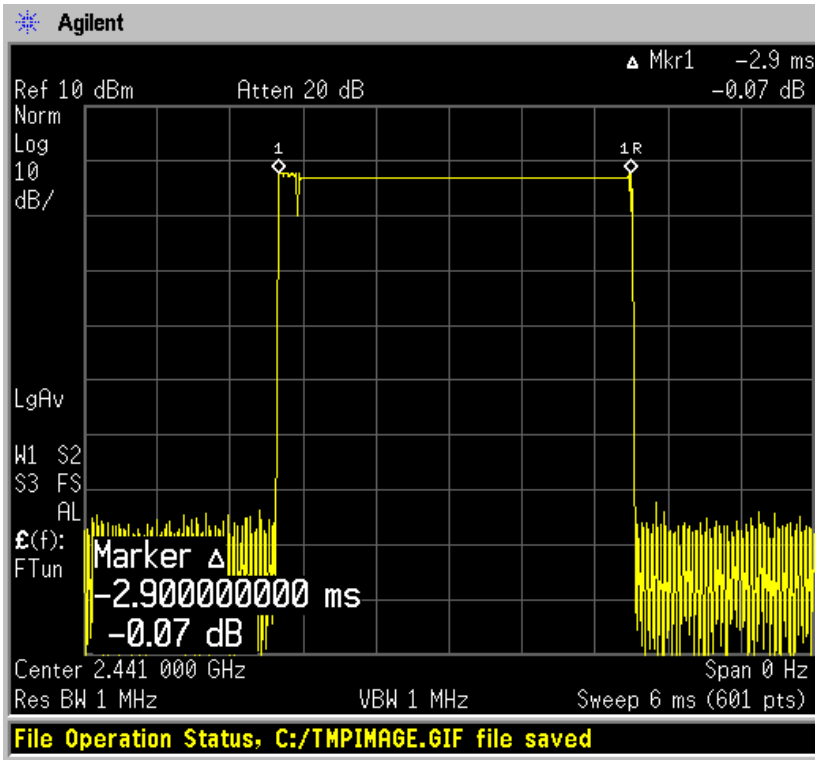
Test Mode	Pulse Time (ms)	Total of Dwell Time (ms)	Limits (ms)	Verdict
GFSK	2.890	308.276	400	Pass
π/4DQPOSK	2.900	309.343	400	Pass
8-DPSK	2.870	306.143	400	Pass

Test Plots

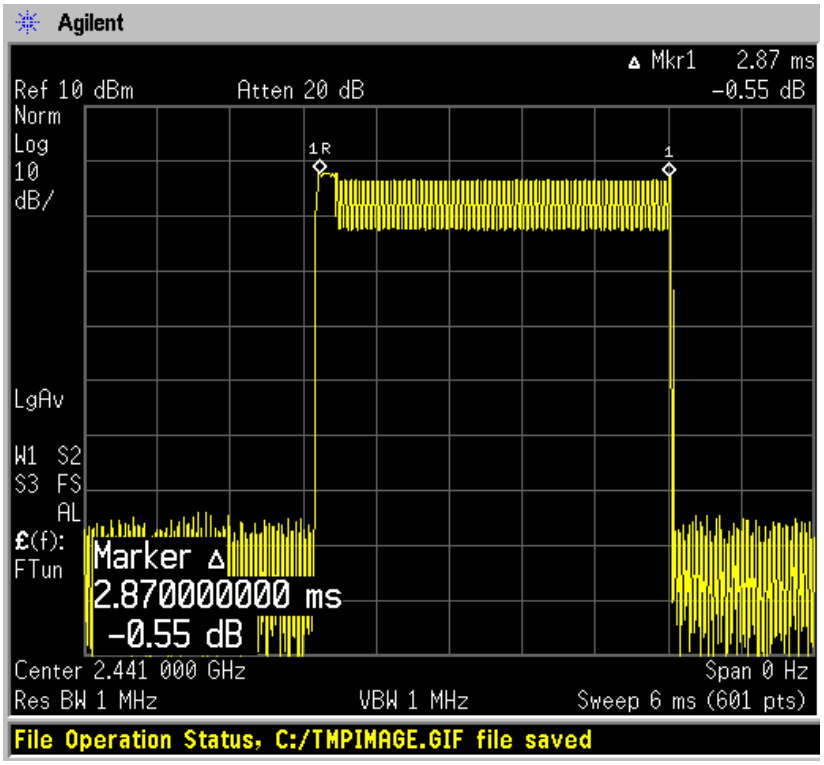
GFSK Mode



π/4 DQPSK Mode



8-DPSK Mode



A.6 Conducted Spurious Emission

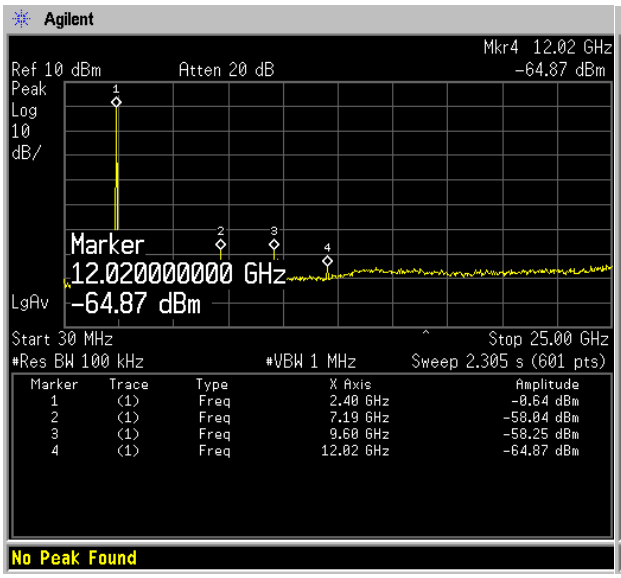
Test Data

GFSK Mode						
No.	Frequency (GHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Verdict
Tx: 2402MHz						
1	2.40	-0.64	6.5	5.86	N/A	PASS
2	7.19	-58.04	7.2	-50.84	-14.14	PASS
3	9.60	-58.25	7.6	-50.65	-14.14	PASS
4	12.22	-64.87	8.2	-56.67	-14.14	PASS
Tx: 2441MHz						
1	2.44	-0.04	6.5	6.46	N/A	PASS
2	7.31	-49.46	7.2	-42.26	-13.54	PASS
3	9.60	-60.95	7.6	-53.35	-13.54	PASS
4	12.22	-57.36	8.2	-49.16	-13.54	PASS
Tx: 2480MHz						
1	2.49	-0.51	6.5	5.99	N/A	PASS
2	7.44	-52.79	7.2	-45.59	-14.01	PASS
3	9.60	-59.54	7.6	-51.94	14.01	PASS
4	12.39	-53.47	8.2	-45.27	14.01	PASS
∏/4-DQPSK Mode						
No.	Frequency (GHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Verdict
Tx: 2402MHz						
1	2.40	-3.74	6.5	2.76	N/A	PASS
2	9.60	-64.49	7.6	-56.89	-17.24	PASS
3	14.43	-58.42	8.2	-50.22	-17.24	PASS
Tx: 2441MHz						
1	2.44	-3.24	6.5	3.26	N/A	PASS
2	7.31	-56.15	7.2	-48.95	-16.74	PASS
3	9.60	-60.17	7.6	-52.57	-16.74	PASS
Tx: 2480MHz						
1	2.49	-4.00	6.5	2.5	N/A	PASS
2	7.44	-58.62	7.2	-51.42	-17.50	PASS
3	9.60	-60.68	7.6	-53.08	-17.50	PASS
4	12.39	-63.08	8.2	-54.88	-17.50	PASS
8-DPSK Mode						
No.	Frequency (GHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Verdict
Tx: 2402MHz						
1	2.40	-7.36	6.5	-0.86	N/A	PASS
2	9.60	-64.74	7.6	-57.14	-20.86	PASS
3	14.43	-58.25	8.2	-50.05	-20.86	PASS

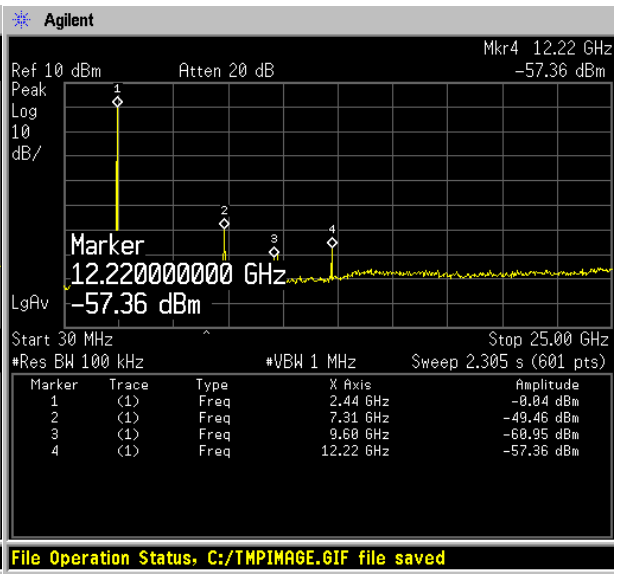
Tx: 2441MHz						
1	2.44	-6.14	6.5	0.36	N/A	PASS
2	7.31	-55.03	7.2	-47.83	-19.64	PASS
3	9.60	-60.28	7.6	-52.68	-19.64	PASS
Tx: 2480MHz						
1	2.49	-5.16	6.5	1.34	N/A	PASS
2	7.44	-61.12	7.2	-53.92	-18.66	PASS
3	9.60	-60.39	7.6	-52.79	-18.66	PASS
4	12.39	-64.51	8.2	-56.31	-18.66	PASS

Test Plots

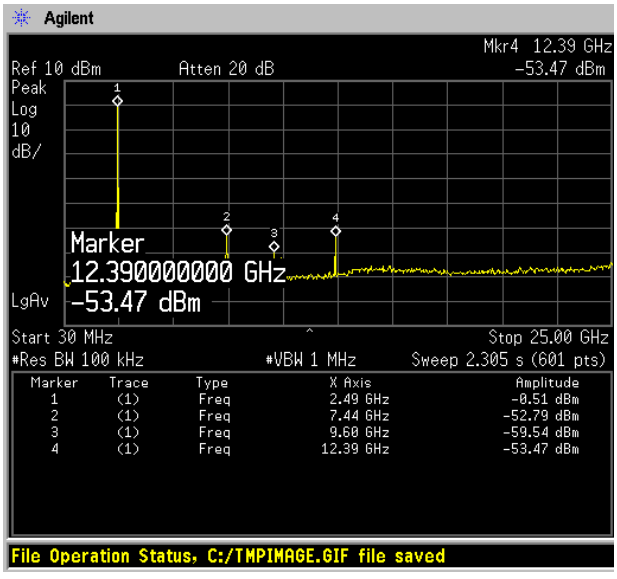
GFSK Mode



Low Channel

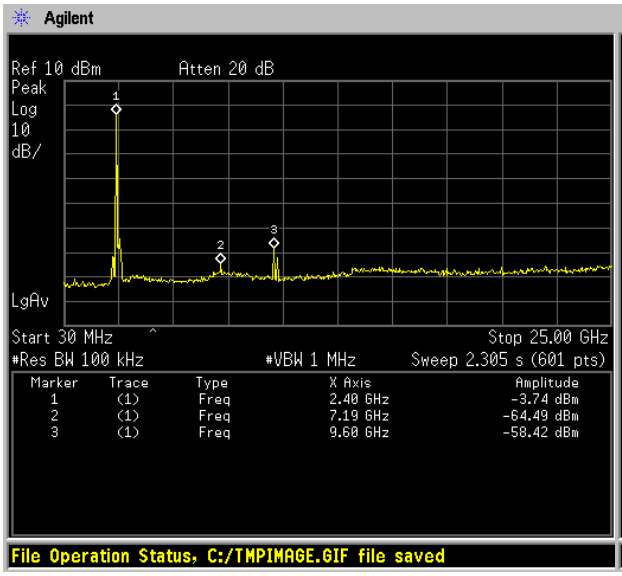


Middle Channel

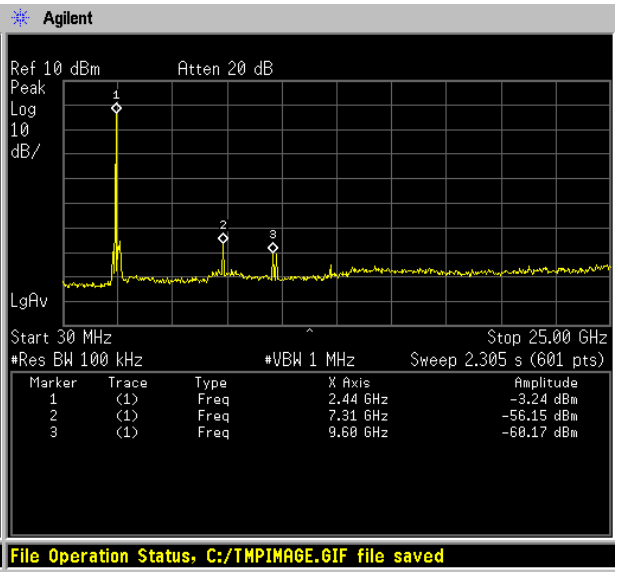


High Channel

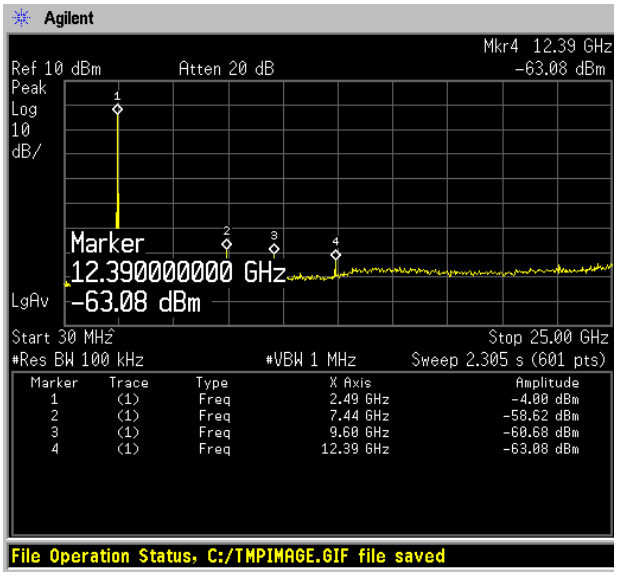
∏/4-DQPSK Mode



Low Channel

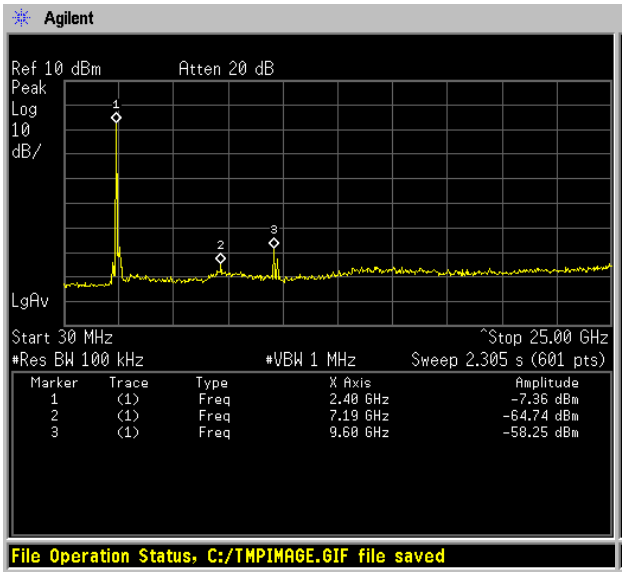


Middle Channel

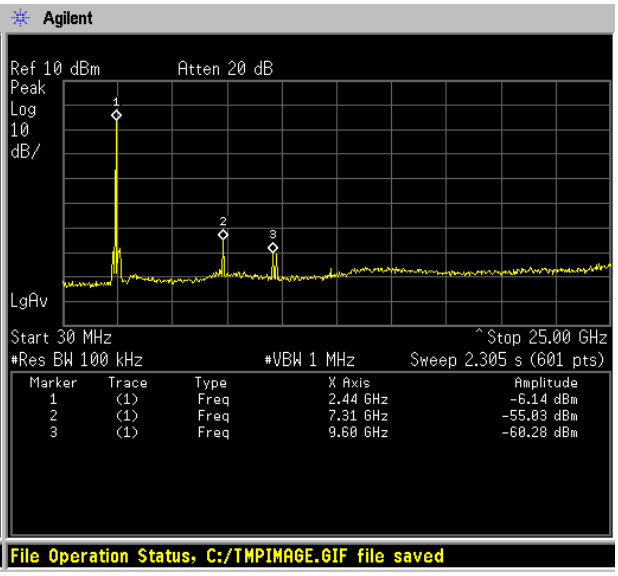


High Channel

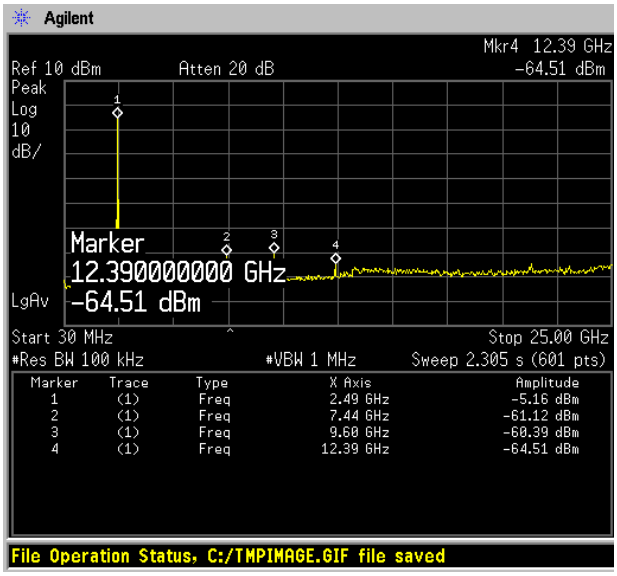
8-DPSK Mode



Low Channel



Middle Channel



High Channel

A.7 Conducted Emission

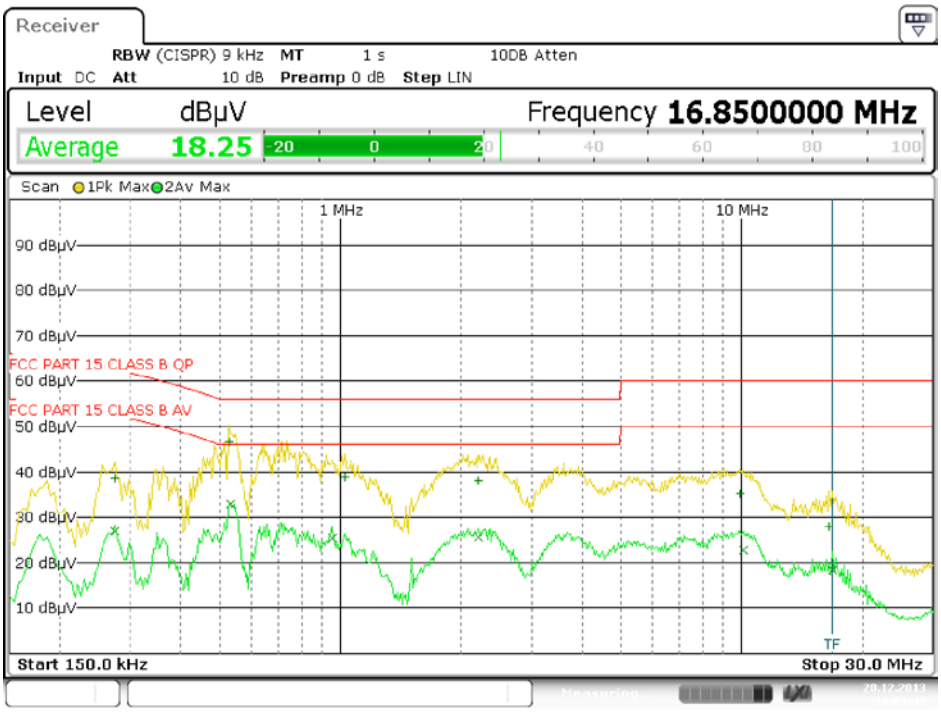
Note: Only the worst test results were recorded in this report.

Test Data

No.	Fre. (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Verdict
1	0.274	38.5	62.46	-23.96	L	QP	PASS
2	0.274	26.82	52.46	-25.64	L	AV	PASS
3	0.530	46.67	56.00	-9.33	L	QP	PASS
4	0.534	32.9	46.00	-13.1	L	AV	PASS
5	0.954	25.33	46.00	-20.67	L	AV	PASS
6	1.030	38.79	56.00	-17.21	L	QP	PASS
7	2.202	38.09	56.00	-17.91	L	QP	PASS
8	2.210	25.61	46.00	-20.39	L	AV	PASS
9	9.930	35.34	60.00	-24.66	L	QP	PASS
10	10.154	22.89	50.00	-27.11	L	AV	PASS
11	16.550	27.89	60.00	-32.11	L	QP	PASS
12	16.850	18.37	50.00	-31.63	L	AV	PASS

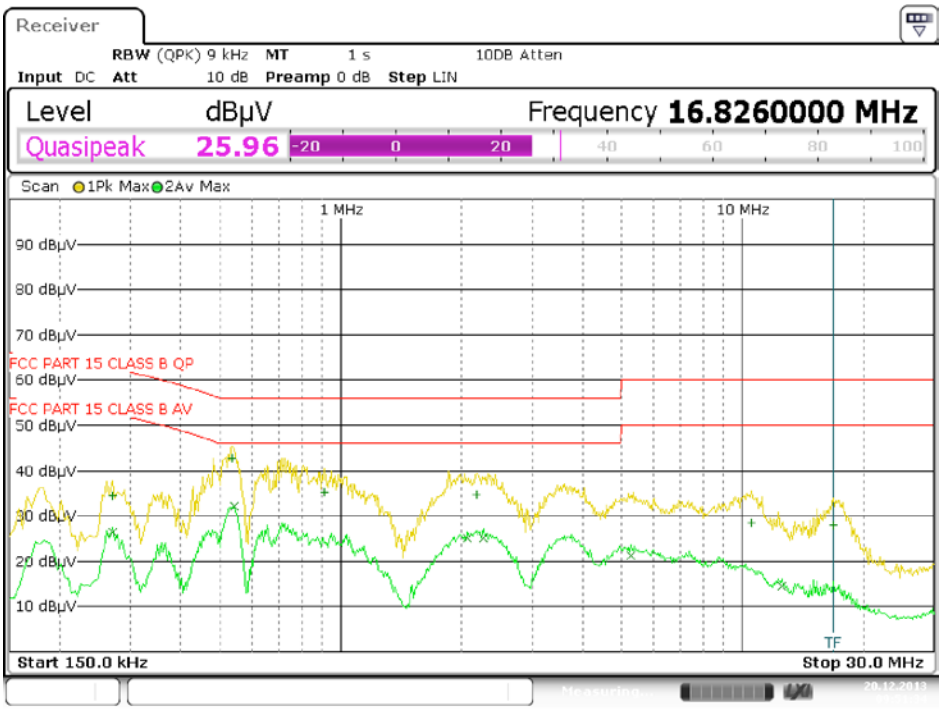
No.	Fre. (MHz)	Measurement Level (dBuV)	Limit (dBuV)	Margin (dB)	Phase	Detector	Verdict
1	0.270	34.42	62.57	-28.15	N	QP	PASS
2	0.270	26.32	52.57	-26.25	N	AV	PASS
3	0.538	42.81	56.00	-13.19	N	QP	PASS
4	0.542	32.03	46.00	-13.97	N	AV	PASS
5	0.910	35.31	56.00	-20.69	N	QP	PASS
6	2.070	25.15	46.00	-20.85	N	AV	PASS
7	2.182	34.75	56.00	-21.25	N	QP	PASS
8	2.270	25.23	46.00	-20.77	N	AV	PASS
9	5.290	21.3	50.00	-28.7	N	AV	PASS
10	10.546	28.61	60.00	-31.39	N	QP	PASS
11	12.566	14.54	50.00	-35.46	N	AV	PASS
12	16.826	27.9	60.00	-32.1	N	QP	PASS

Test Plots



Date: 20.DEC.2013 10:01:49

(Phase: L)



Date: 20.DEC.2013 09:51:35

(Phase:N)

A.8 Radiated Spurious Emissions

Note: No spurious emissions were detected below 30MHz, so only spurious emissions above 30MHz were recorded in the following test data and plots.

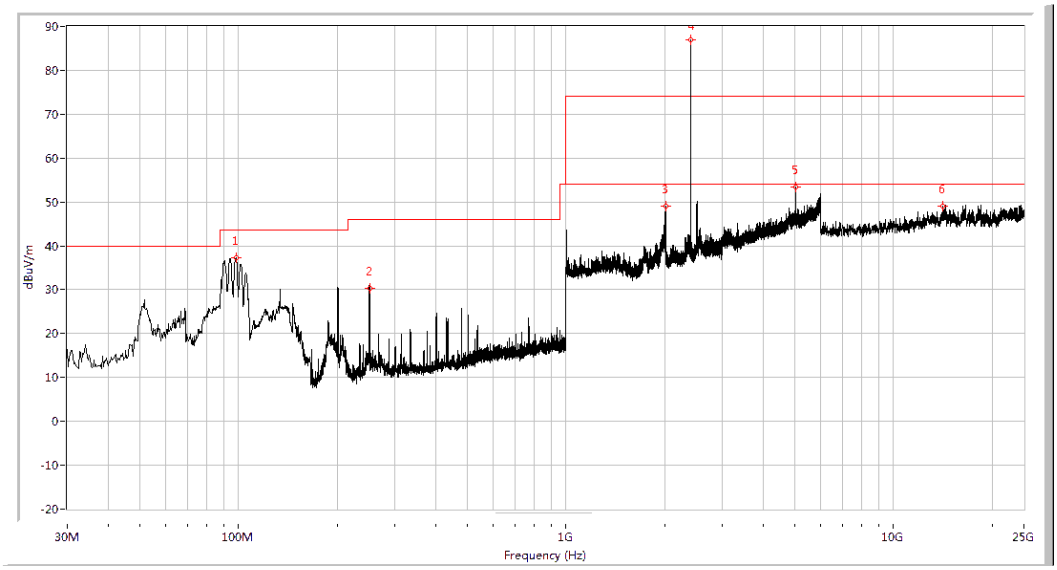
Test Data

Fre. (MHz)	Pk (dBuV)	QP (dBuV)	AV (dBuV)	Limit-PK (dBuV)	Limit-QP (dBuV)	Limit-AV (dBuV)	Antenna	Verdict
GFSK Mode-Low Channel								
98.125	37.21	--	--	--	43.5	--	Vertical	Pass
251.590	30.42	--	--	--	46.0	--	Vertical	Pass
2011.747	48.96	--	--	74.0	--	54.0	Vertical	Pass
2401.650	86.98	--	--	N/A	--	N/A	Vertical	N/A
5019.245	53.41	--	--	74.0	--	54.0	Vertical	Pass
14140.000	49.05	--	--	74.0	--	54.0	Vertical	Pass
146.371	29.81	--	--	--	43.5	--	Horizontal	PASS
251.590	35.67	--	--	--	46.0	--	Horizontal	PASS
2009.248	47.23	--	--	74.0	--	54.0	Horizontal	PASS
2401.650	83.55	--	--	N/A	--	N/A	Horizontal	N/A
5930.267	50.51	--	--	74.0	--	54.0	Horizontal	PASS
14140.000	49.05	--	--	74.0	--	54.0	Horizontal	PASS
GFSK Mode-Mid Channel								
251.347	36.62	--	--	--	46.0	--	Vertical	PASS
1005.999	50.30	--	--	74.0	--	54.0	Vertical	PASS
2011.247	49.78	--	--	74.0	--	54.0	Vertical	PASS
2479.630	80.03	--	--	N/A	--	N/A	Vertical	N/A
5027.493	50.51	--	--	74.0	--	54.0	Vertical	PASS
14440.000	49.20	--	--	74.0	--	54.0	Vertical	PASS
251.347	35.81	--	--	--	46.0	--	Horizontal	PASS
1005.499	47.79	--	--	74.0	--	54.0	Horizontal	PASS
2013.247	47.55	--	--	74.0	--	54.0	Horizontal	PASS
2440.640	86.14	--	--	N/A	--	N/A	Horizontal	N/A
5893.527	51.32	--	--	74.0	--	54.0	Horizontal	PASS
16590.000	49.20	--	--	74.0	--	54.0	Horizontal	PASS
GFSK Mode-High Channel								
251.105	29.12	--	--	--	46.0	--	Vertical	PASS
1002.999	43.56	--	--	74.0	--	54.0	Vertical	PASS
2009.248	45.33	--	--	74.0	--	54.0	Vertical	PASS
2479.630	90.18	--	--	N/A	--	N/A	Vertical	N/A
5999.250	51.26	--	--	74.0	--	54.0	Vertical	PASS
14440.000	49.20	--	--	74.0	--	54.0	Vertical	PASS
251.105	37.11	--	--	--	46.0	--	Horizontal	PASS
1003.499	47.63	--	--	74.0	--	54.0	Horizontal	PASS
2011.247	48.92	--	--	74.0	--	54.0	Horizontal	PASS
2479.630	82.90	--	--	N/A	--	N/A	Horizontal	N/A
5025.994	51.08	--	--	74.0	--	54.0	Horizontal	PASS
16590.000	49.20	--	--	74.0	--	54.0	Horizontal	PASS

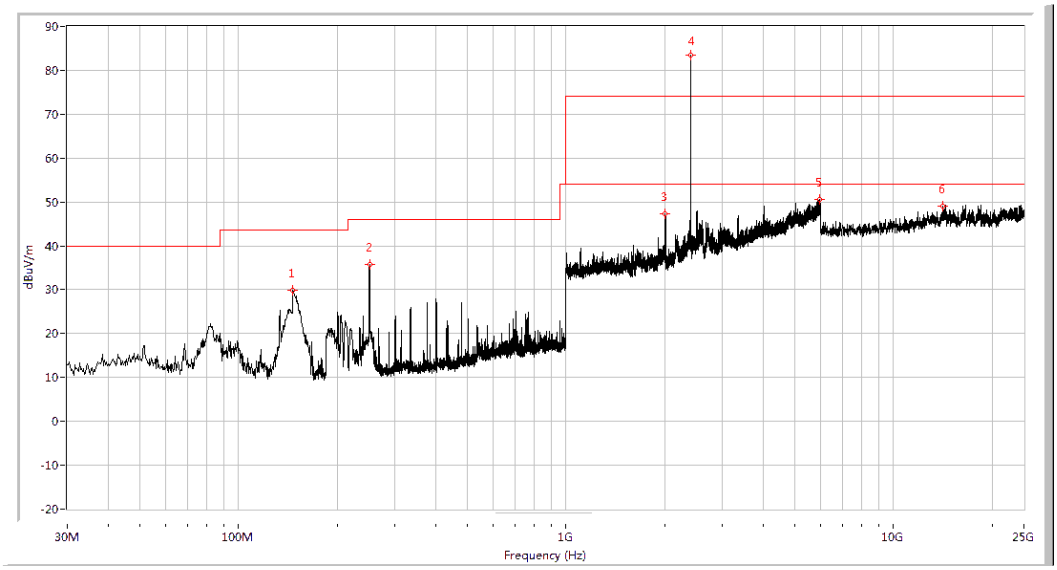
Fre. (MHz)	Pk (dBuV)	QP (dBuV)	AV (dBuV)	Limit-PK (dBuV)	Limit-QP (dBuV)	Limit-AV (dBuV)	Antenna	Verdict
π/4 DQPSK Mode-Low Channel								
141.037	33.84	--	--	--	43.5	--	Vertical	PASS
251.590	32.03	--	--	--	46.0	--	Vertical	PASS
1006.498	51.02	--	--	74.0	--	54.0	Vertical	PASS
2402.149	87.18	--	--	N/A	--	N/A	Vertical	N/A
2511.122	48.94	--	--	74.0	--	54.0	Vertical	PASS
5028.243	51.61	--	--	74.0	--	54.0	Vertical	PASS
146.371	27.68	--	--	--	43.5	--	Horizontal	PASS
251.590	36.59	--	--	--	46.0	--	Horizontal	PASS
2012.747	48.14	--	--	74.0	--	54.0	Horizontal	PASS
2401.650	80.46	--	--	N/A	--	N/A	Horizontal	N/A
2508.123	53.04	--	--	74.0	--	54.0	Horizontal	PASS
5943.764	51.00	--	--	74.0	--	54.0	Horizontal	PASS
π/4 DQPSK Mode-Mid Channel								
88.428	35.48	--	--	--	43.5	--	Vertical	PASS
251.590	31.76	--	--	--	46.0	--	Vertical	PASS
1001.000	44.49	--	--	74.0	--	54.0	Vertical	PASS
2441.140	89.71	--	--	N/A	--	N/A	Vertical	N/A
2512.122	49.67	--	--	74.0	--	54.0	Vertical	PASS
4355.661	52.42	--	--	74.0	--	54.0	Vertical	PASS
133.764	24.10	--	--	--	43.5	--	Horizontal	PASS
251.590	35.59	--	--	--	46.0	--	Horizontal	PASS
2010.747	47.47	--	--	74.0	--	54.0	Horizontal	PASS
2441.140	82.95	--	--	N/A	--	N/A	Horizontal	N/A
2508.623	53.35	--	--	74.0	--	54.0	Horizontal	PASS
5016.246	50.67	--	--	74.0	--	54.0	Horizontal	PASS
π/4 DQPSK Mode-High Channel								
139.583	28.29	--	--	--	43.5	--	Vertical	PASS
251.590	29.92	--	--	--	46.0	--	Vertical	PASS
1004.499	44.00	--	--	74.0	--	54.0	Vertical	PASS
2480.630	84.60	--	--	N/A	--	N/A	Vertical	N/A
5945.264	50.96	--	--	74.0	--	54.0	Vertical	PASS
14440.000	49.20	--	--	74.0	--	54.0	Vertical	PASS
251.590	37.02	--	--	--	46.0	--	Horizontal	PASS
1672.832	46.88	--	--	74.0	--	54.0	Horizontal	PASS
2008.748	47.14	--	--	74.0	--	54.0	Horizontal	PASS
2480.130	80.16	--	--	N/A	--	N/A	Horizontal	N/A
5924.269	51.02	--	--	74.0	--	54.0	Horizontal	PASS
14140.000	48.57	--	--	74.0	--	54.0	Horizontal	PASS

Fre. (MHz)	Pk (dBuV)	QP (dBuV)	AV (dBuV)	Limit-PK (dBuV)	Limit-QP (dBuV)	Limit-AV (dBuV)	Antenna	Verdict
8-DPSK Mode-Low Channel								
141.037	33.96	--	--	--	43.5	--	Vertical	PASS
251.590	31.21	--	--	--	46.0	--	Vertical	PASS
1006.498	50.45	--	--	74.0	--	54.0	Vertical	PASS
2402.149	86.87	--	--	N/A	--	N/A	Vertical	N/A
2514.121	49.57	--	--	74.0	--	54.0	Vertical	PASS
5028.243	51.24	--	--	74.0	--	54.0	Vertical	PASS
142.734	24.19	--	--	--	43.5	--	Horizontal	PASS
251.590	34.56	--	--	--	46.0	--	Horizontal	PASS
1003.499	47.03	--	--	74.0	--	54.0	Horizontal	PASS
2402.149	80.82	--	--	N/A	--	N/A	Horizontal	N/A
2514.121	53.07	--	--	74.0	--	54.0	Horizontal	PASS
5928.018	50.98	--	--	74.0	--	54.0	Horizontal	PASS
8-DPSK Mode-Mid Channel								
88.428	36.35	--	--	--	43.5	--	Vertical	PASS
251.105	31.71	--	--	--	46.0	--	Vertical	PASS
2007.748	45.95	--	--	74.0	--	54.0	Vertical	PASS
2440.640	89.69	--	--	N/A	--	N/A	Vertical	N/A
5022.994	50.44	--	--	74.0	--	54.0	Vertical	PASS
5999.250	52.48	--	--	74.0	--	54.0	Vertical	PASS
141.037	29.95	--	--	--	43.5	--	Horizontal	PASS
251.105	36.31	--	--	--	46.0	--	Horizontal	PASS
2006.748	46.70	--	--	74.0	--	54.0	Horizontal	PASS
2440.640	82.92	--	--	N/A	--	N/A	Horizontal	N/A
2514.121	53.73	--	--	74.0	--	54.0	Horizontal	PASS
4363.159	51.74	--	--	74.0	--	54.0	Horizontal	PASS
8-DPSK Mode-High Channel								
88.428	34.26	--	--	--	43.5	--	Vertical	PASS
251.590	32.33	--	--	--	46.0	--	Vertical	PASS
1004.999	44.12	--	--	74.0	--	54.0	Vertical	PASS
2480.130	87.64	--	--	N/A	--	N/A	Vertical	N/A
5025.994	51.49	--	--	74.0	--	54.0	Vertical	PASS
14440.000	49.20	--	--	74.0	--	54.0	Vertical	PASS
145.886	23.82	--	--	--	43.5	--	Horizontal	PASS
251.590	36.78	--	--	--	46.0	--	Horizontal	PASS
1004.999	45.06	--	--	74.0	--	54.0	Horizontal	PASS
2480.130	79.02	--	--	N/A	--	N/A	Horizontal	N/A
5924.269	50.91	--	--	74.0	--	54.0	Horizontal	PASS
14140.000	49.05	--	--	74.0	--	54.0	Horizontal	PASS

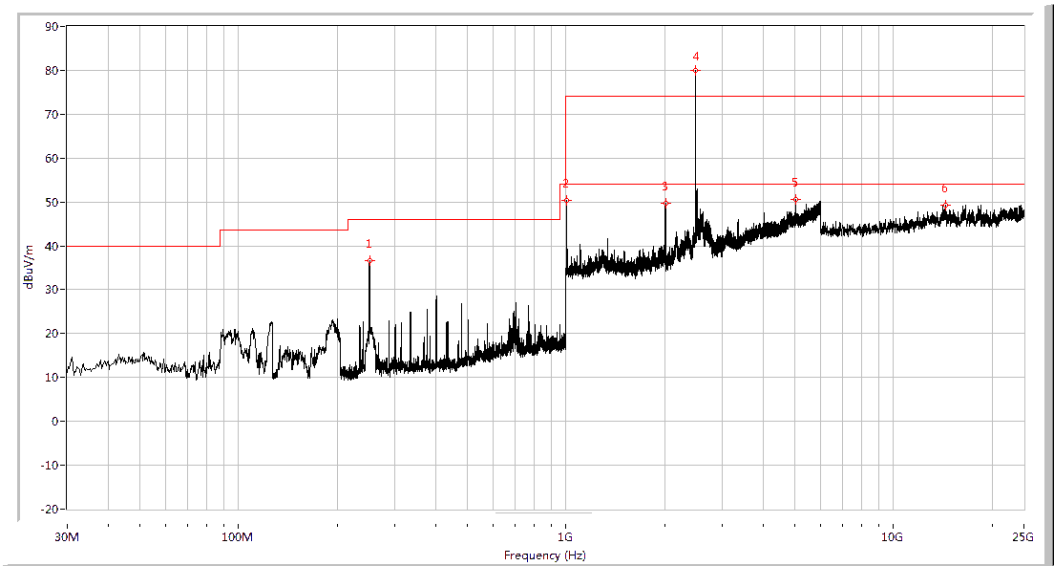
Test Plot



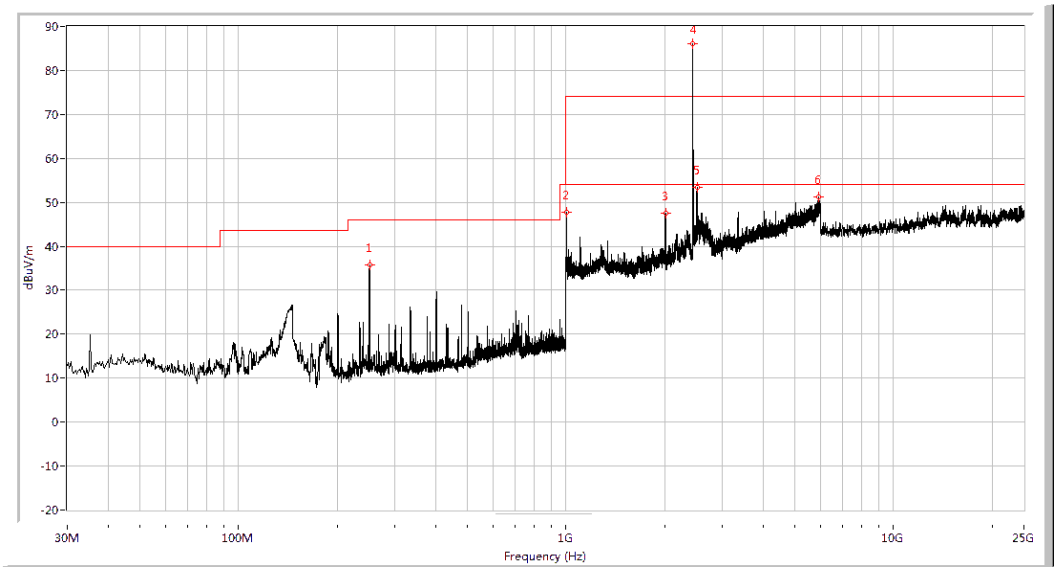
Plot A_GFSK Mode, Low Channel, ANT V



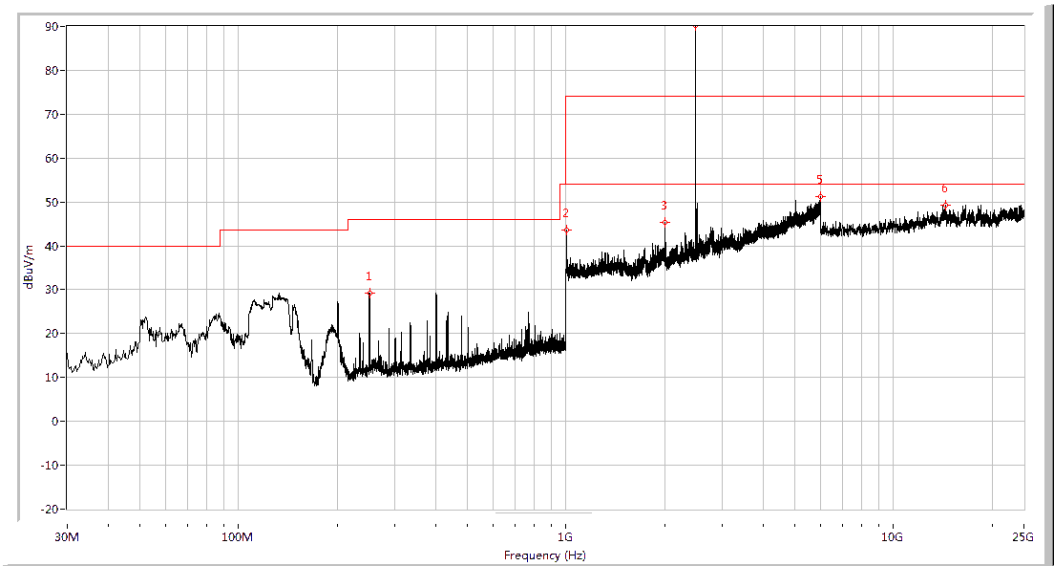
Plot B_GFSK Mode, Low Channel, ANT H



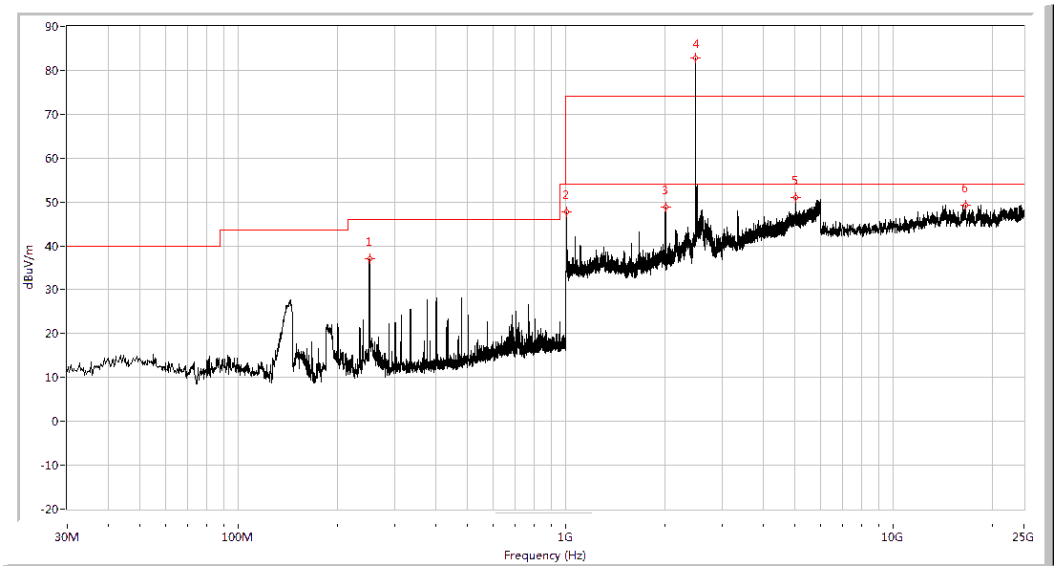
Plot C_GFSK Mode, Mid Channel, ANT V



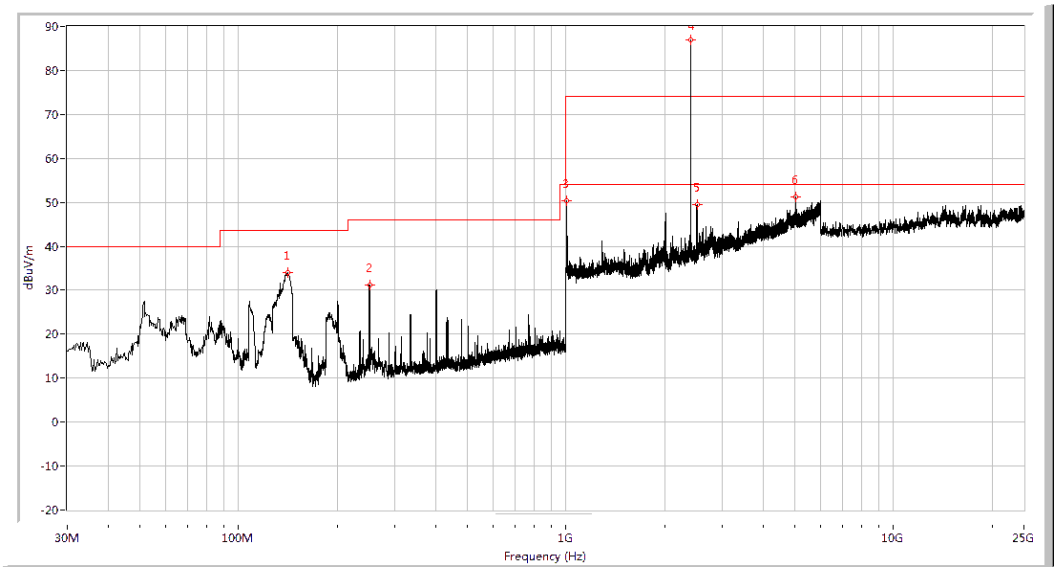
Plot D_GFSK Mode, Mid Channel, ANT H



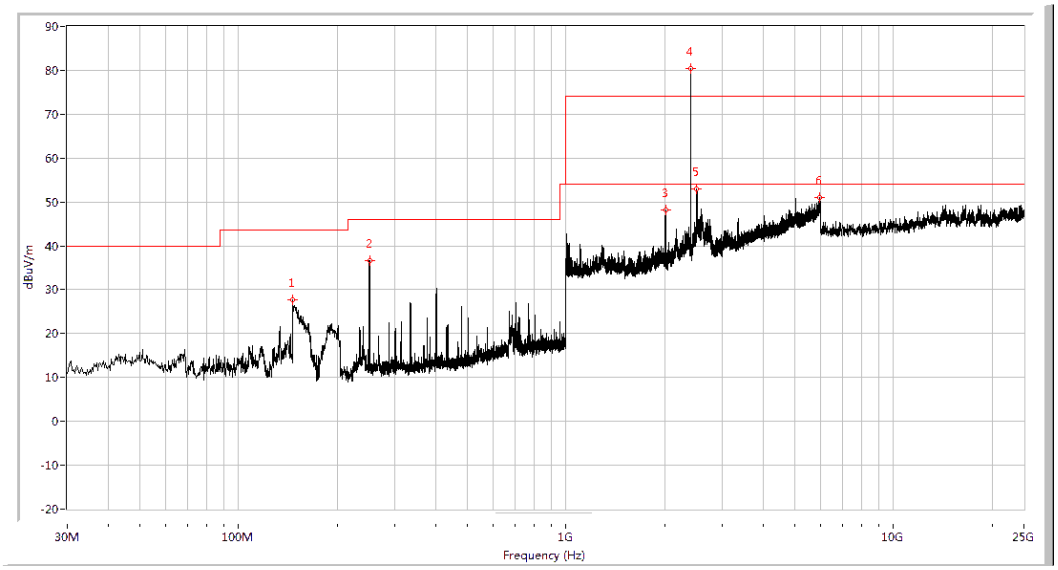
Plot E_GFSK Mode, High Channel, ANT V



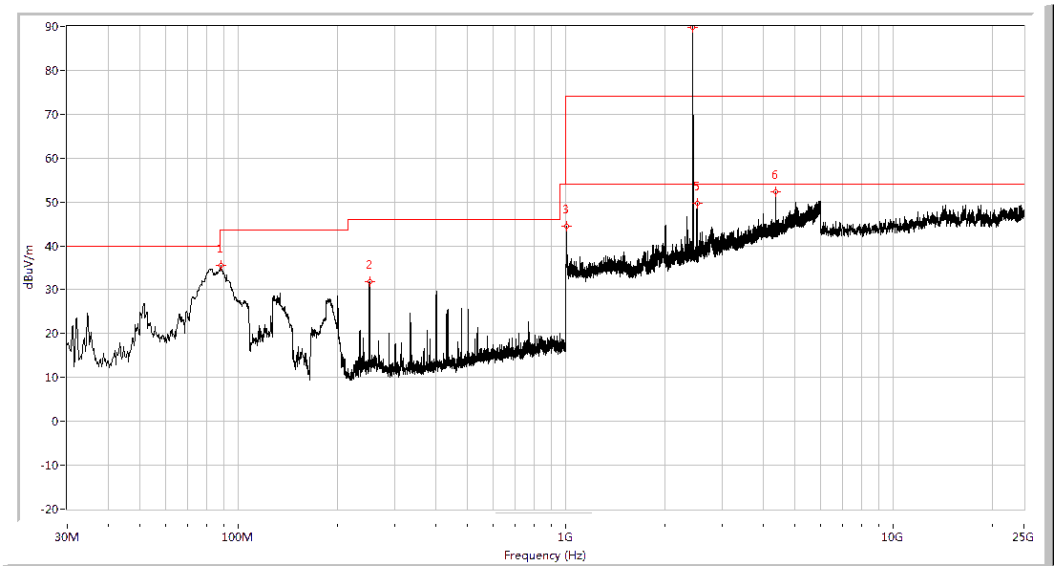
Plot F_GFSK Mode, High Channel, ANT H



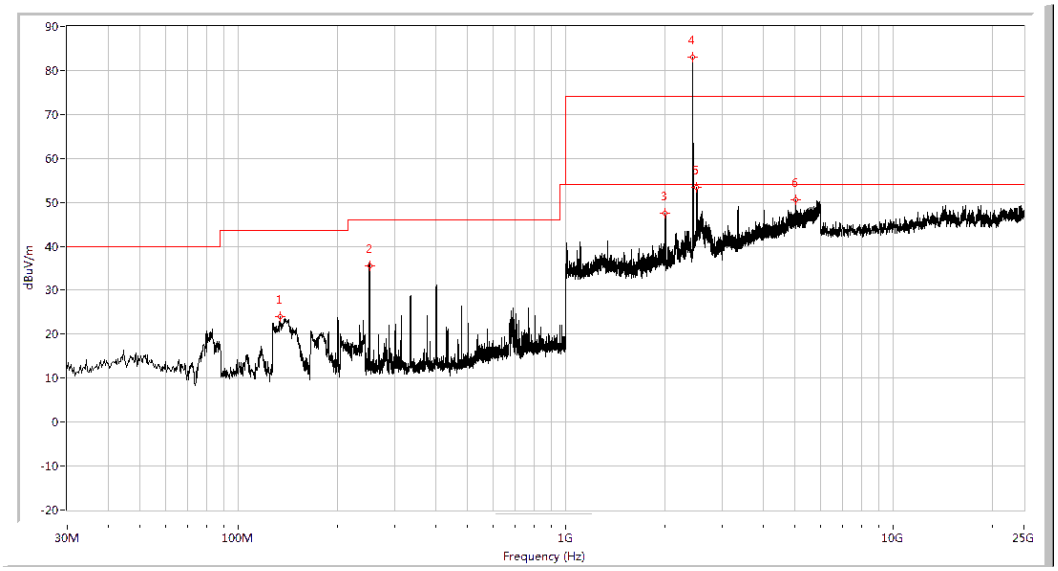
Plot G_π/4 DQPSK Mode, Low Channel, ANT V



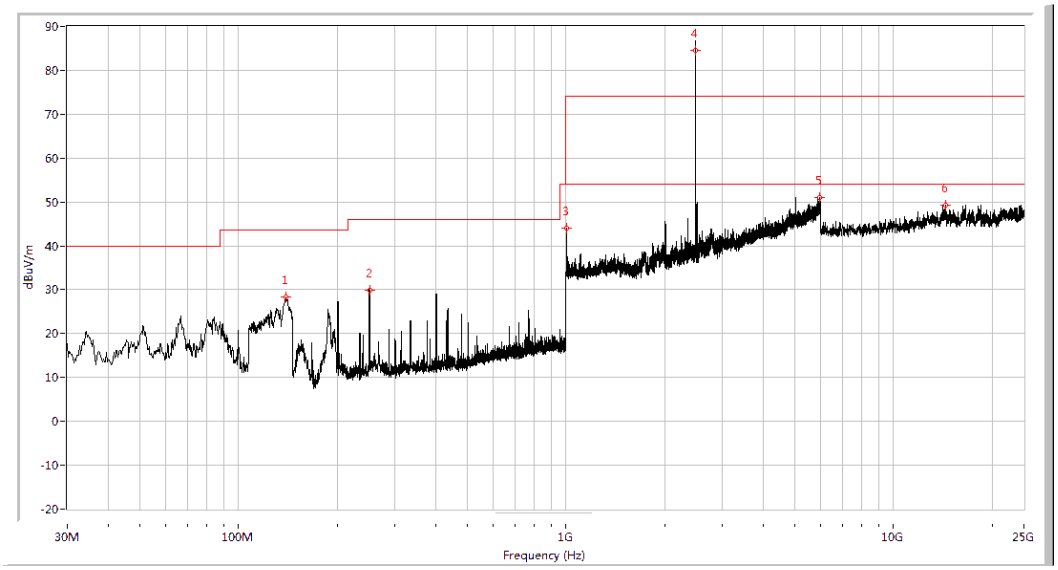
Plot H_π/4 DQPSK Mode, Low Channel, ANT H



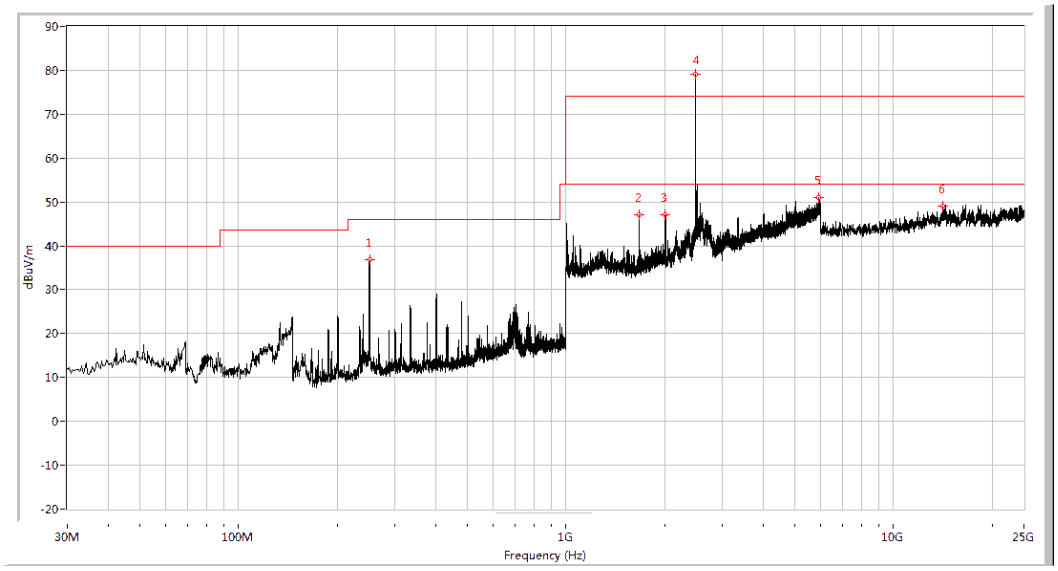
Plot I_π/4 DQPSK Mode, Mid Channel, ANT V



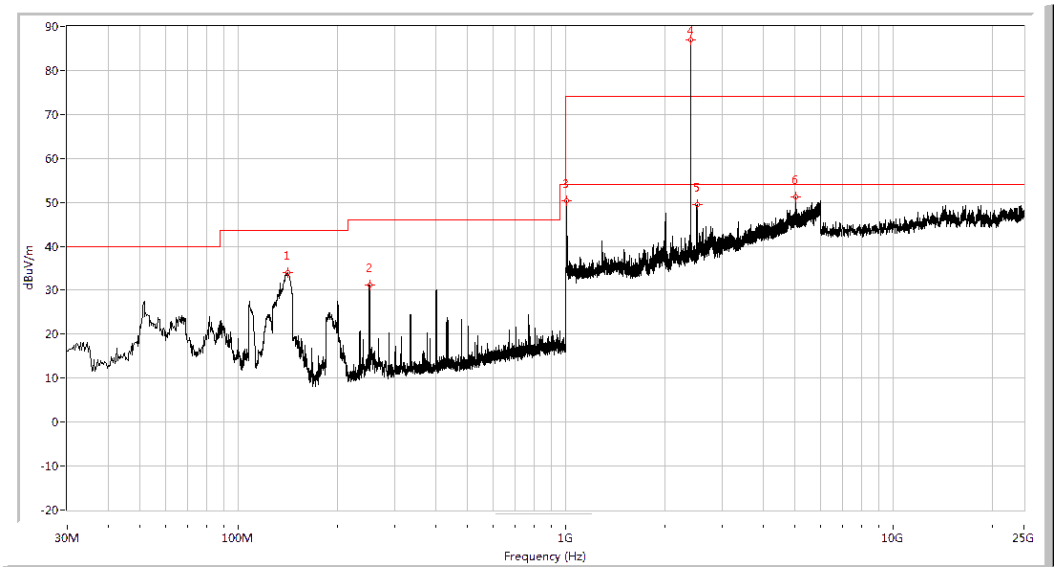
Plot J_π/4 DQPSK Mode, Mid Channel, ANT H



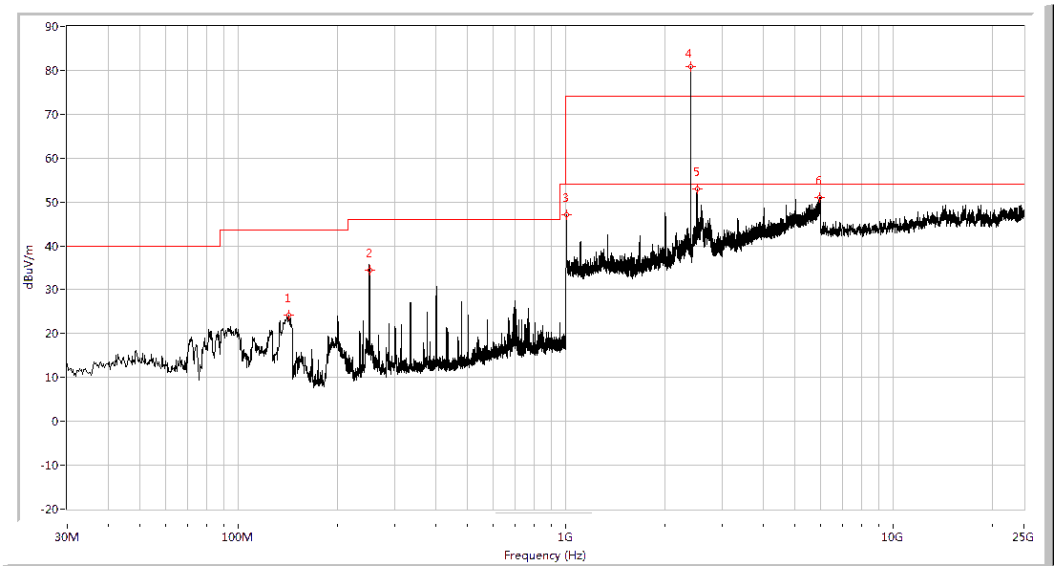
Plot K_π/4 DQPSK Mode, High Channel, ANT V



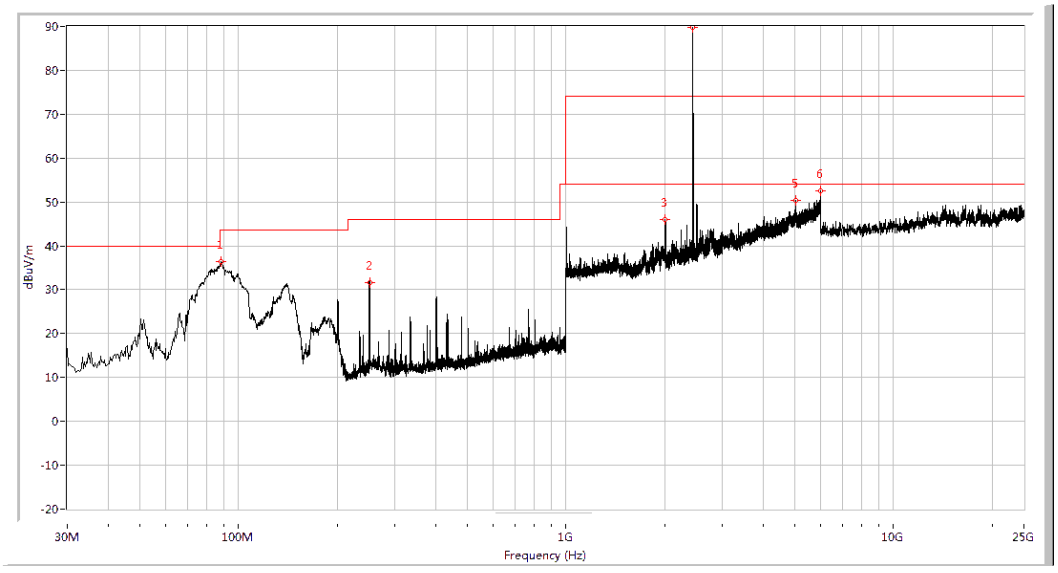
Plot L_π/4 DQPSK Mode, High Channel, ANT H



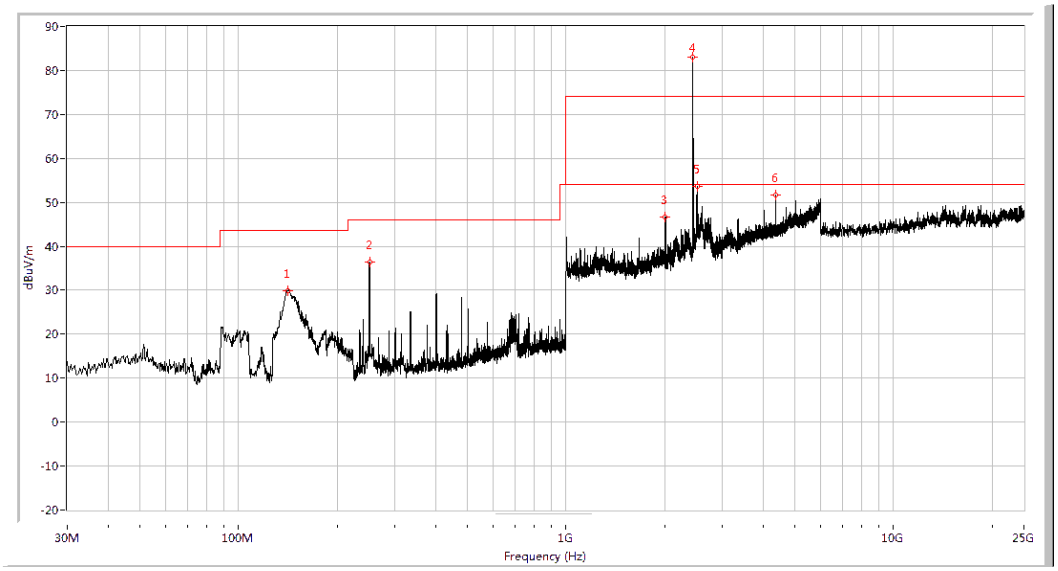
Plot M_8-DPSK Mode, Low Channel, ANT V



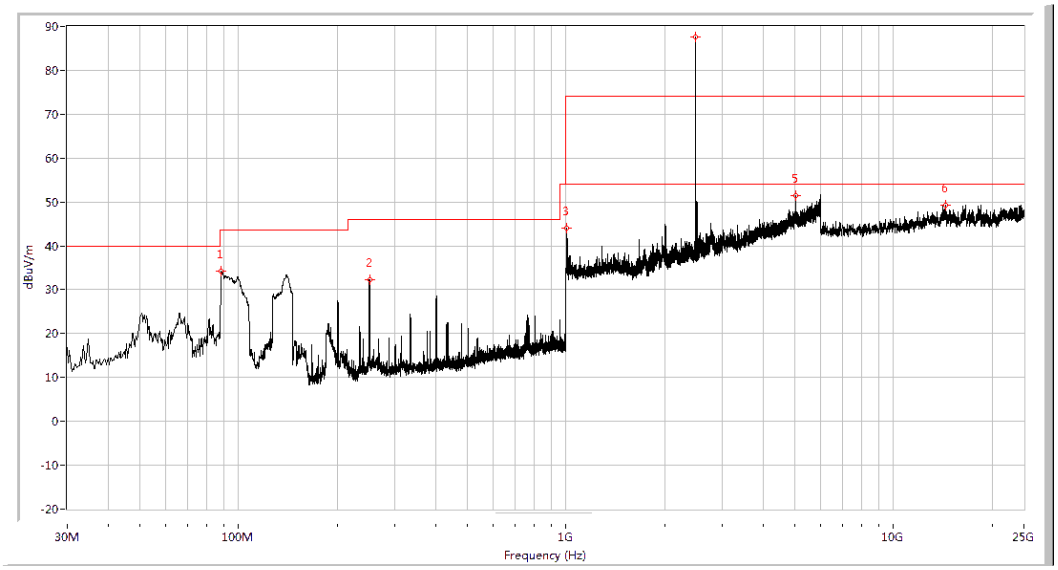
Plot N_8-DPSK Mode, Low Channel, ANT H



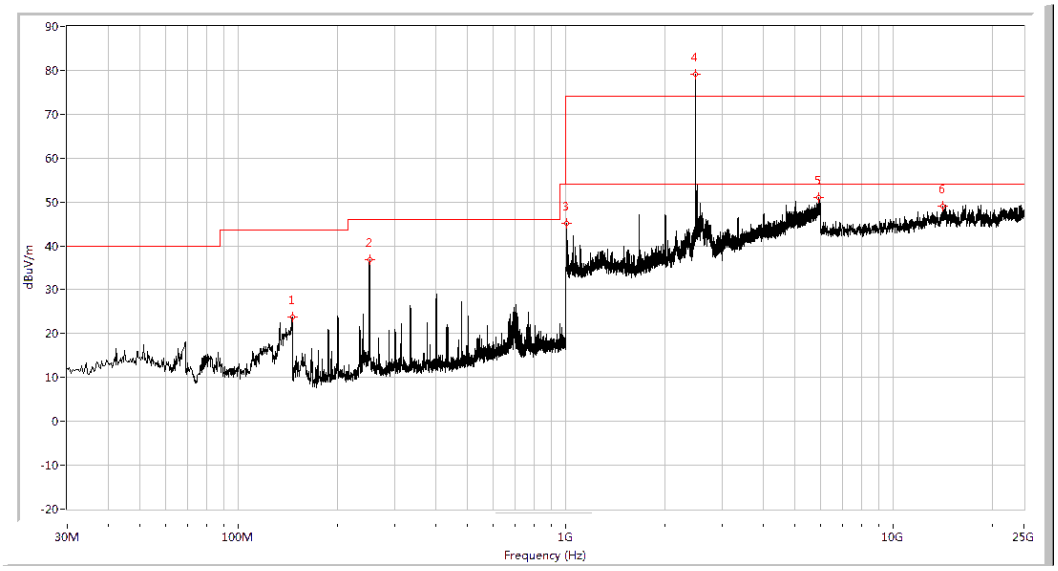
Plot O_8-DPSK Mode, Mid Channel, ANT V



Plot P_8-DPSK Mode, Mid Channel, ANT H



Plot Q_8-DPSK Mode, High Channel, ANT V



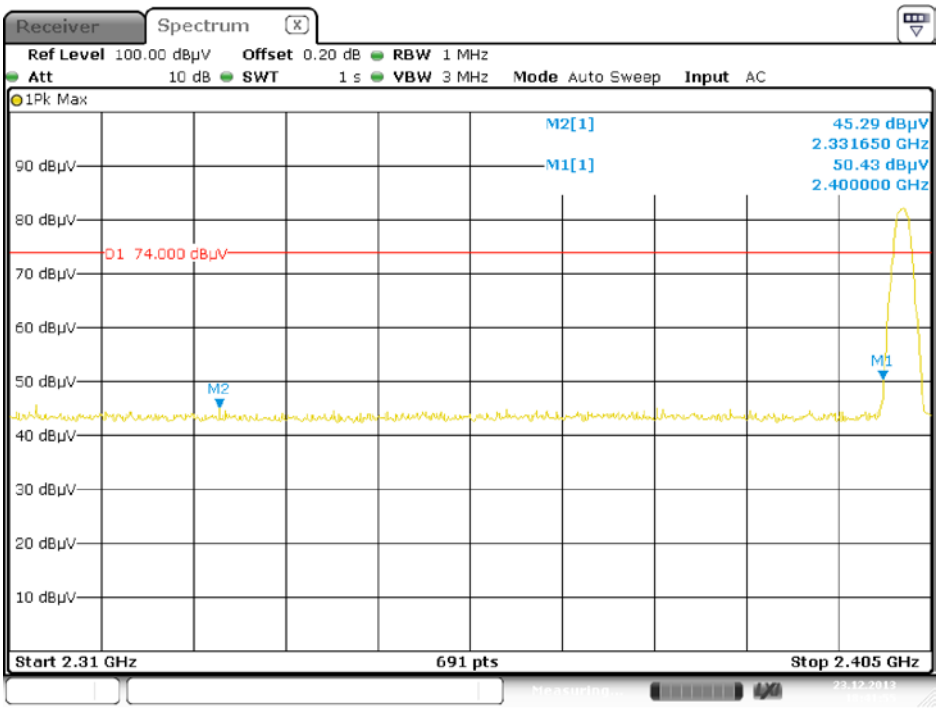
Plot R_8-DPSK Mode, High Channel, ANT H

A.9 Band Edge

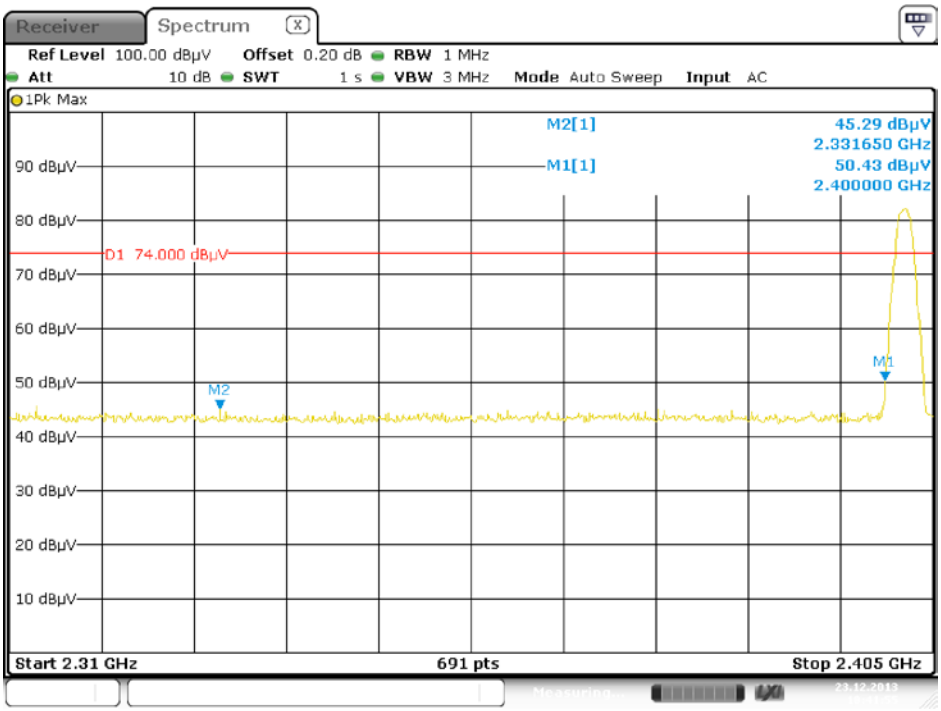
Test Data

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

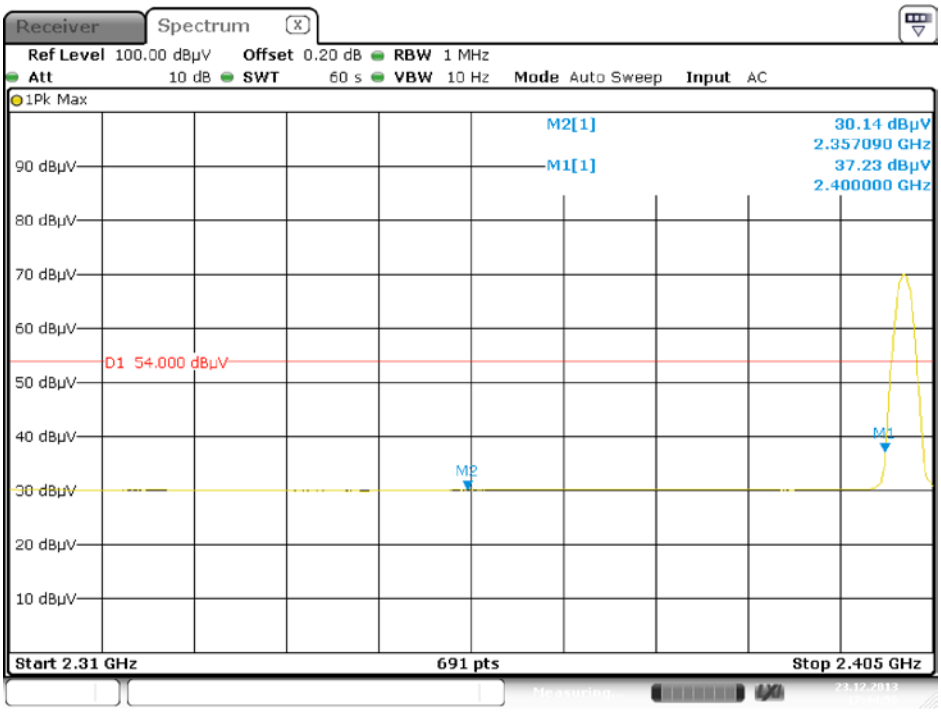
Test Plots



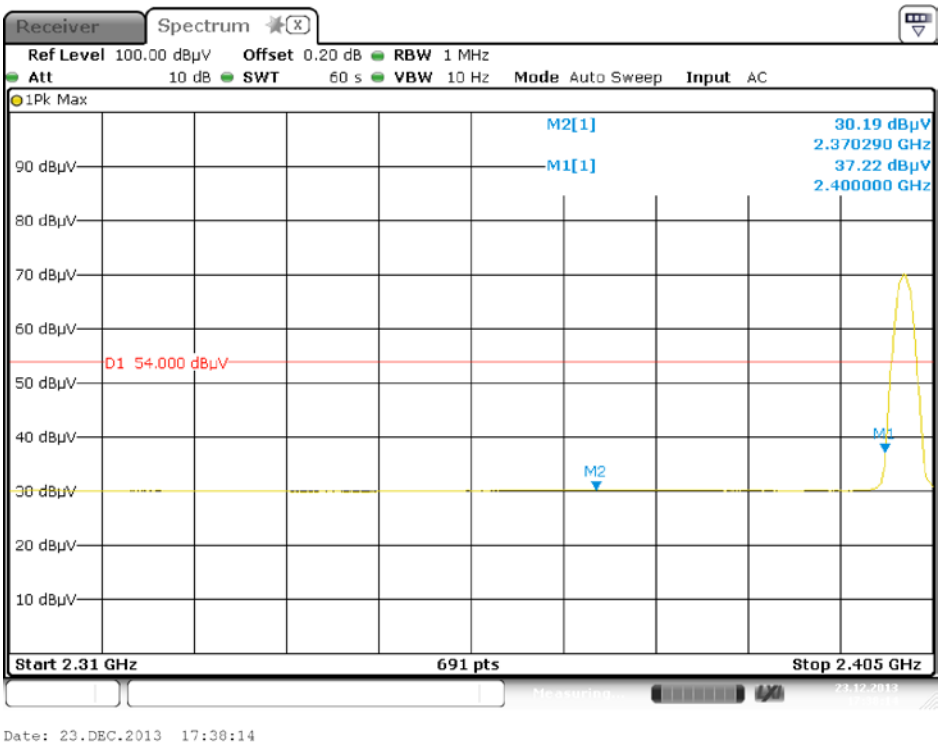
(GFSK CH Low, Vertical, Peak)



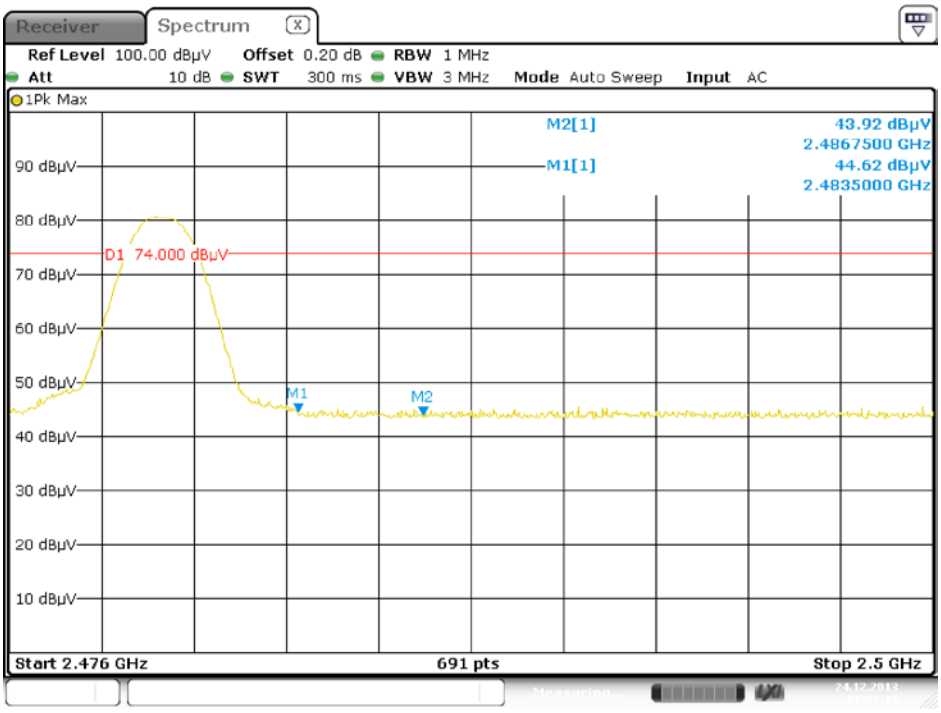
(GFSK CH Low, Horizontal, Peak)



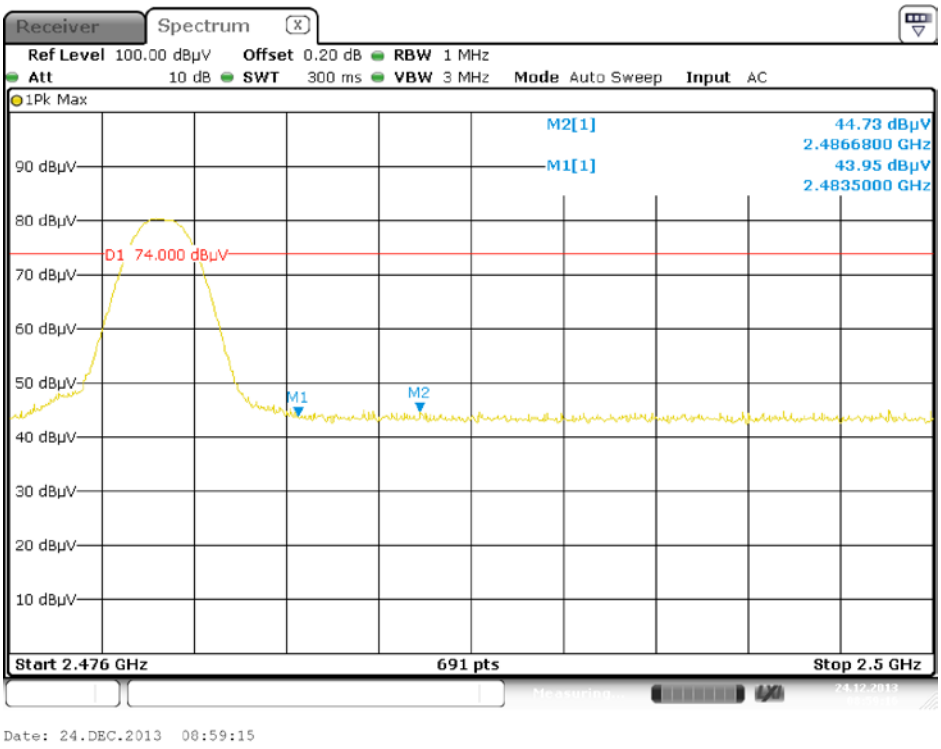
(GFSK CH Low, Vertical, Average)



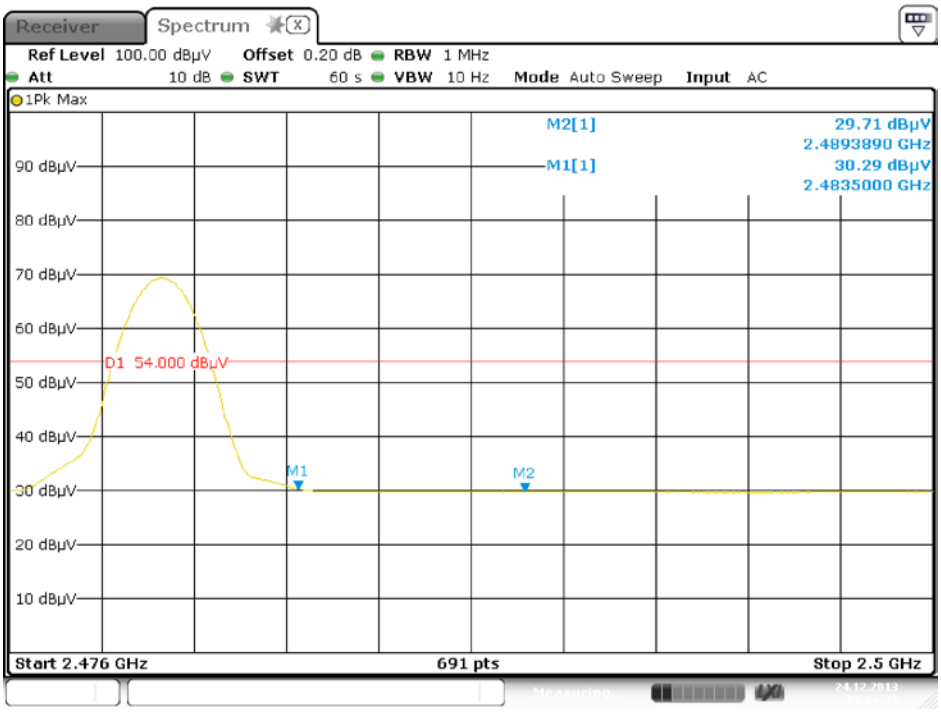
(GFSK CH Low, Horizontal, Average)



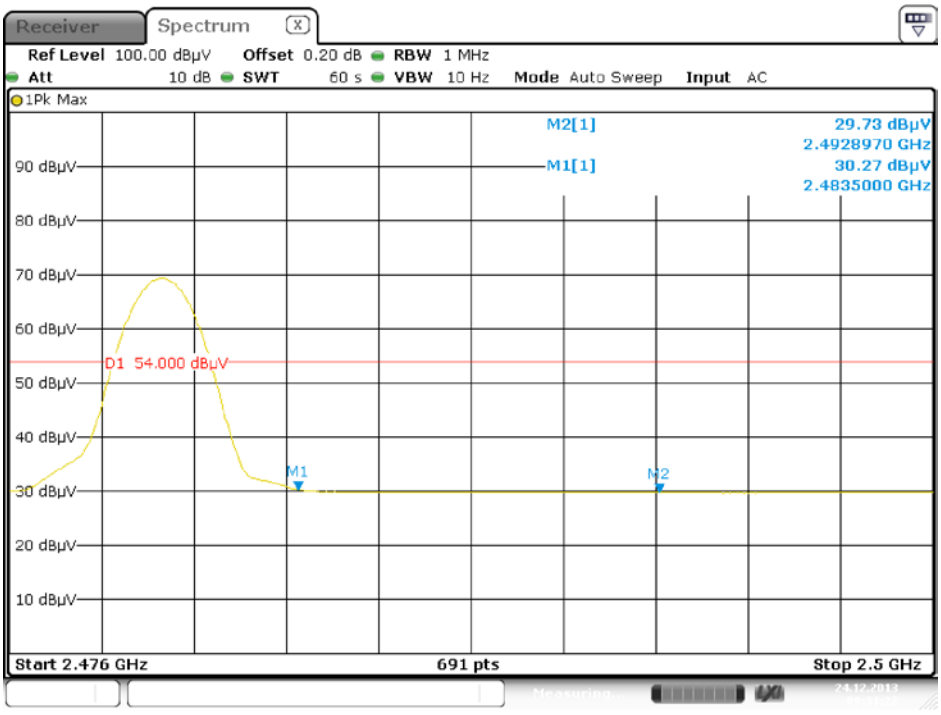
(GFSK CH High, Vertical, Peak)



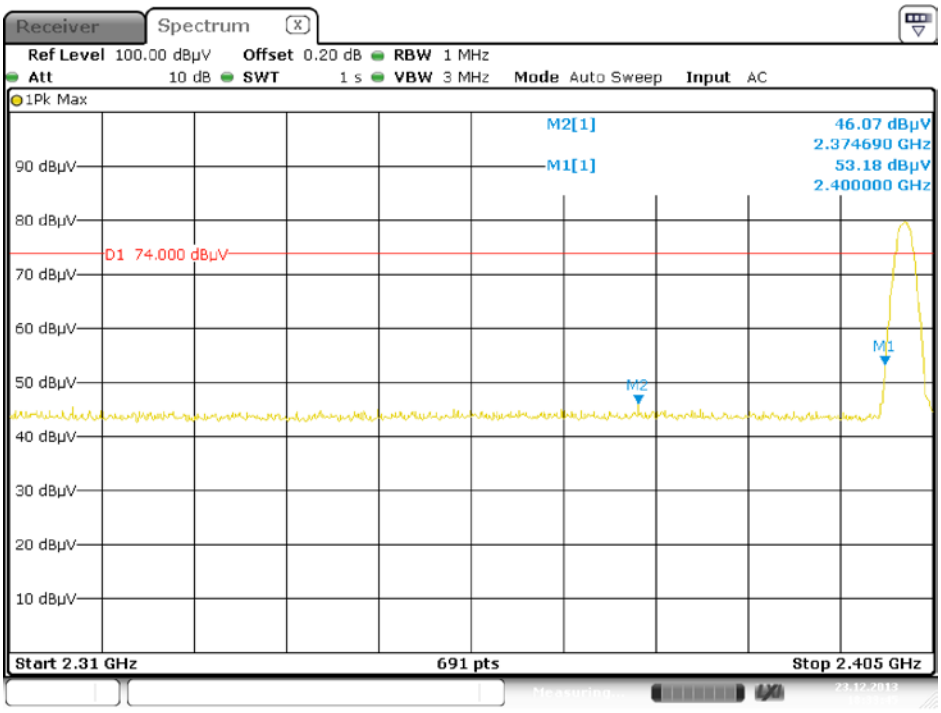
(GFSK CH High, Horizontal, Peak)



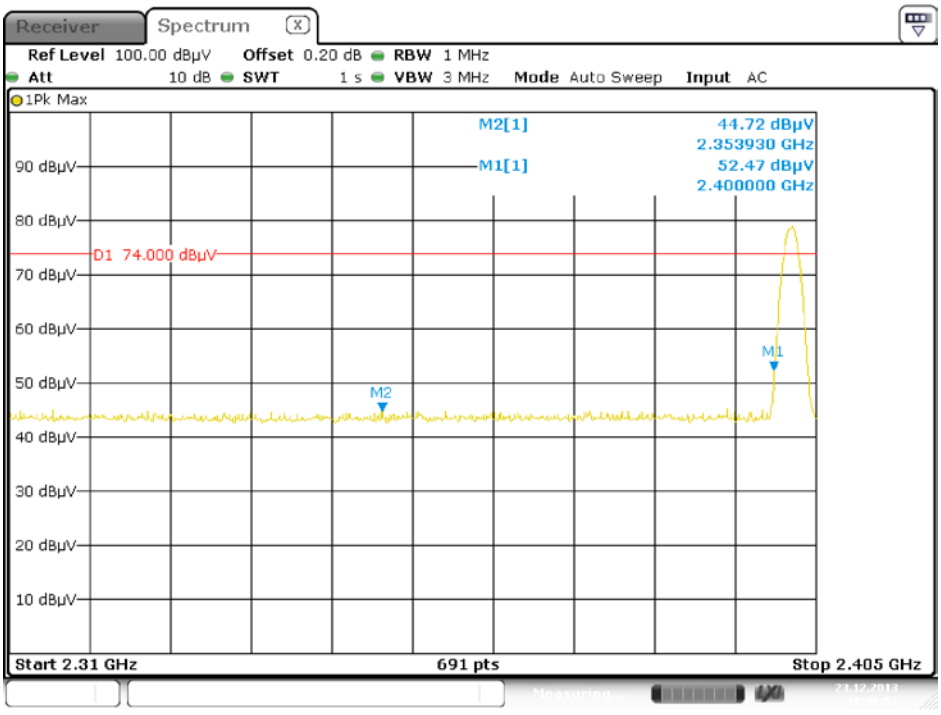
(GFSK CH High, Vertical, Average)



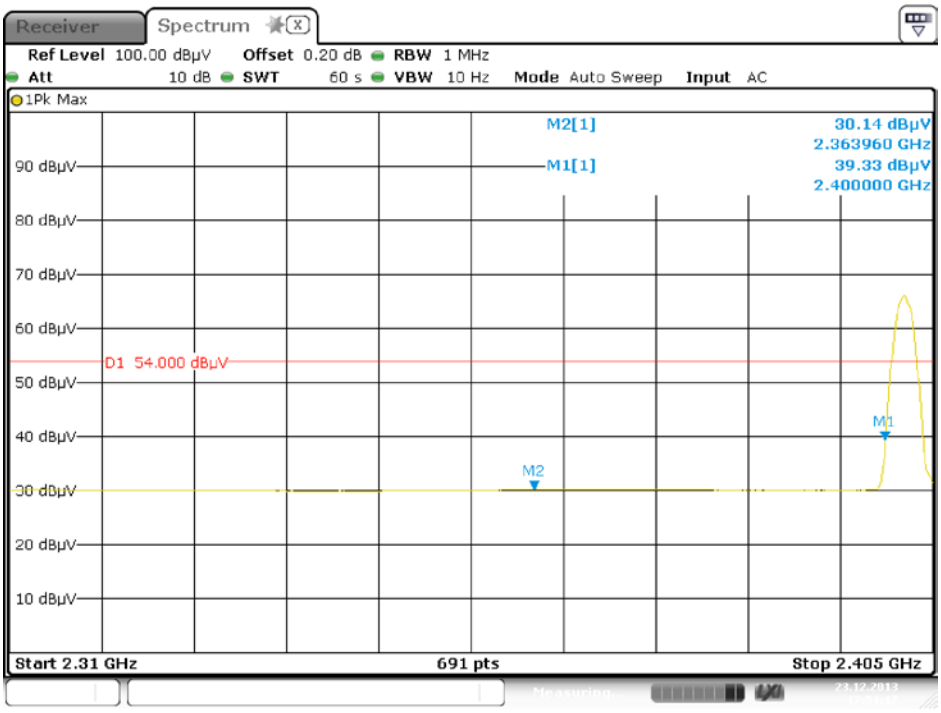
(GFSK CH High, Horizontal, Average)



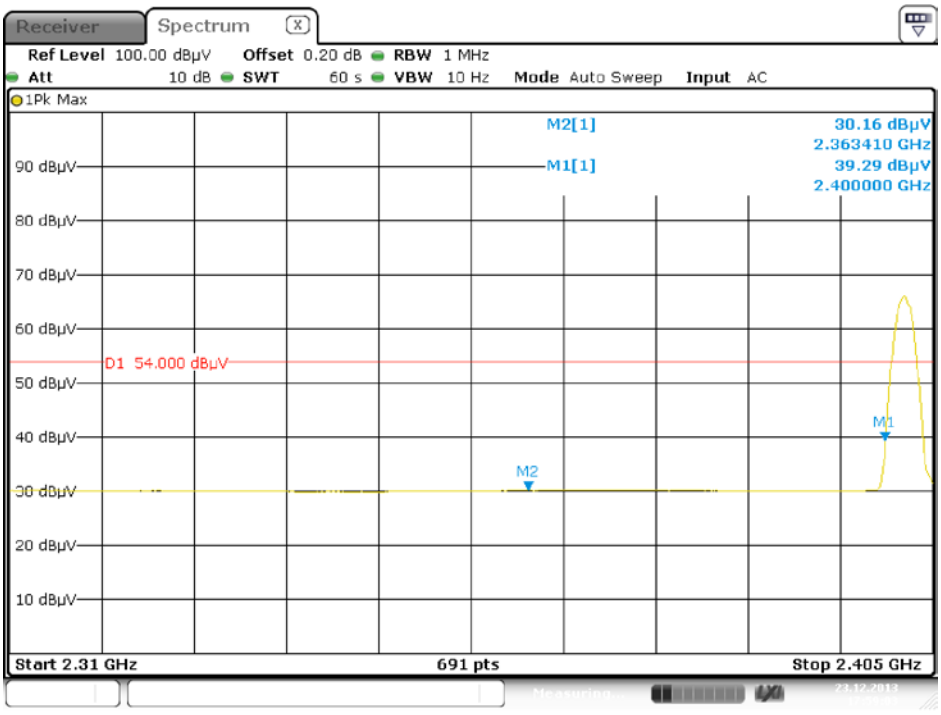
(π/4DQPOSK CH Low, Vertical, Peak)



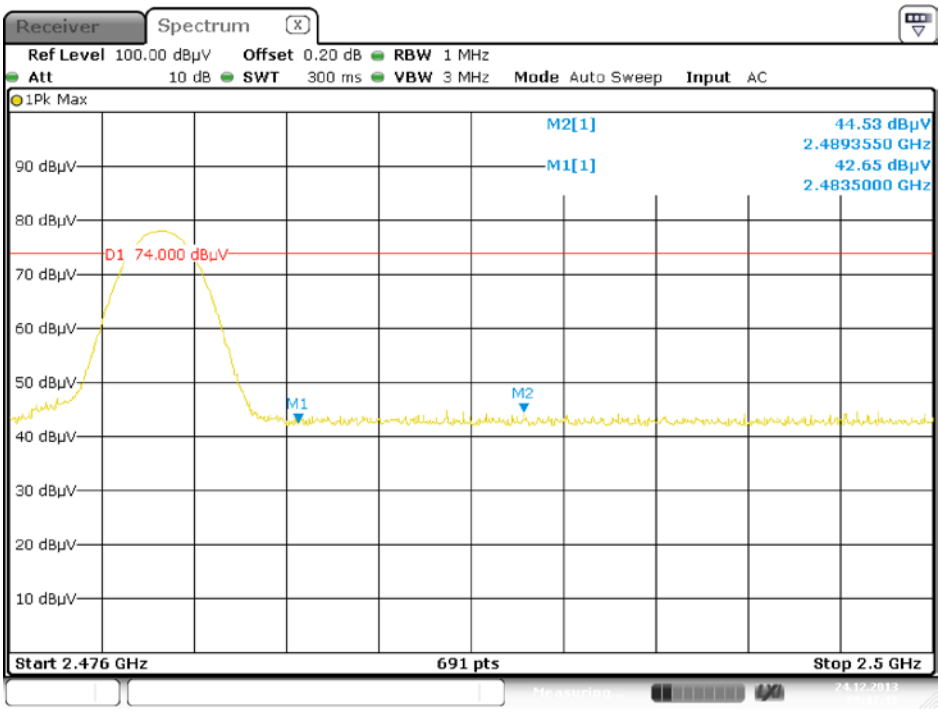
(π/4DQPOSK CH Low, Horizontal, Peak)



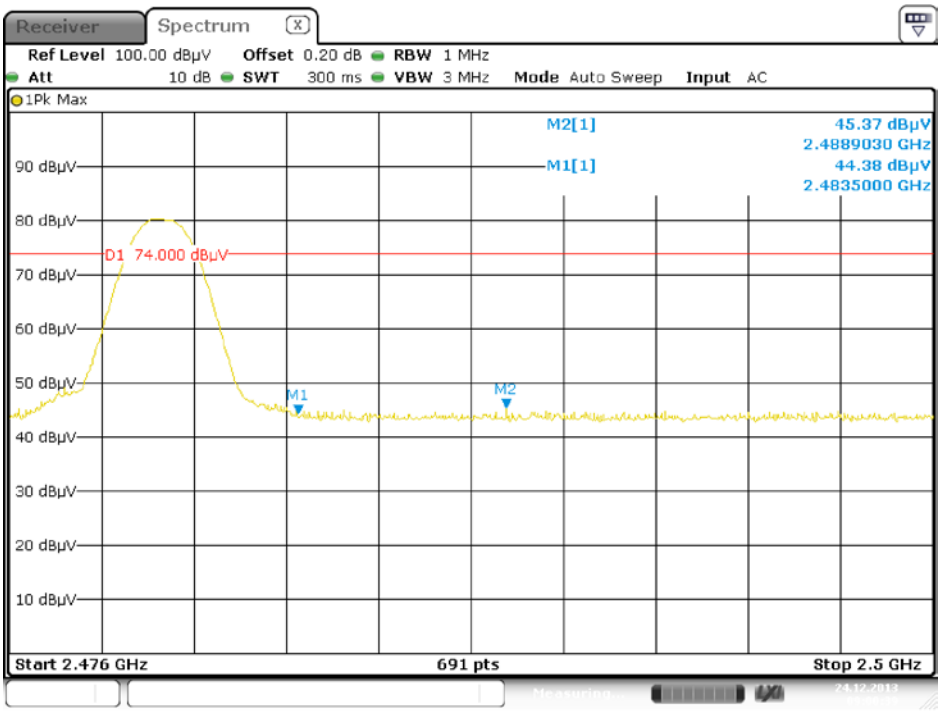
(π/4DQPOSK CH Low, Vertical, Average)



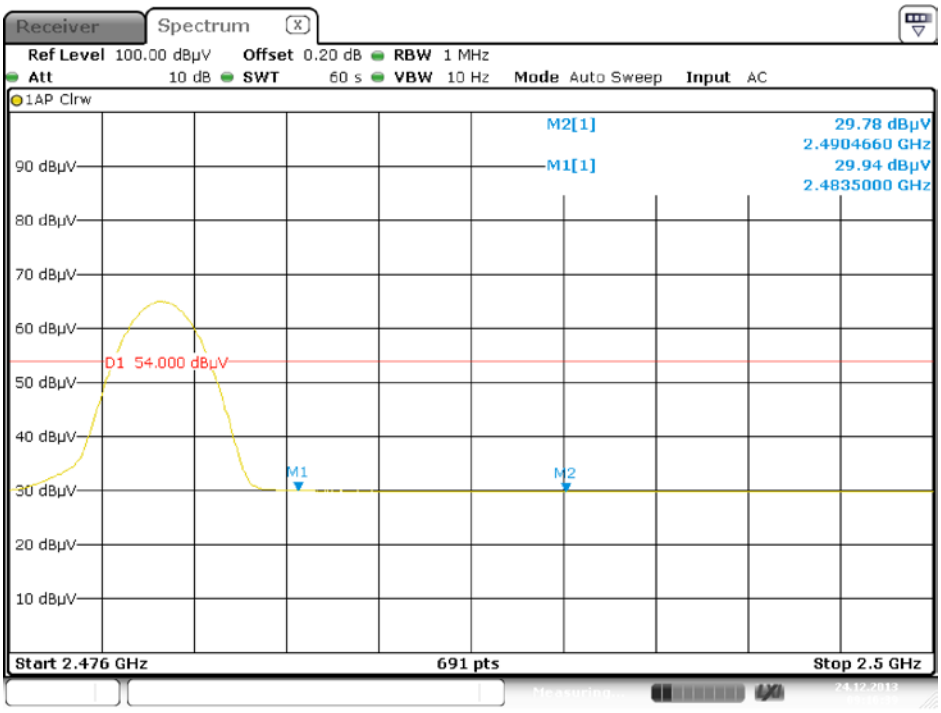
(π/4DQPOSK CH Low, Horizontal, Average)



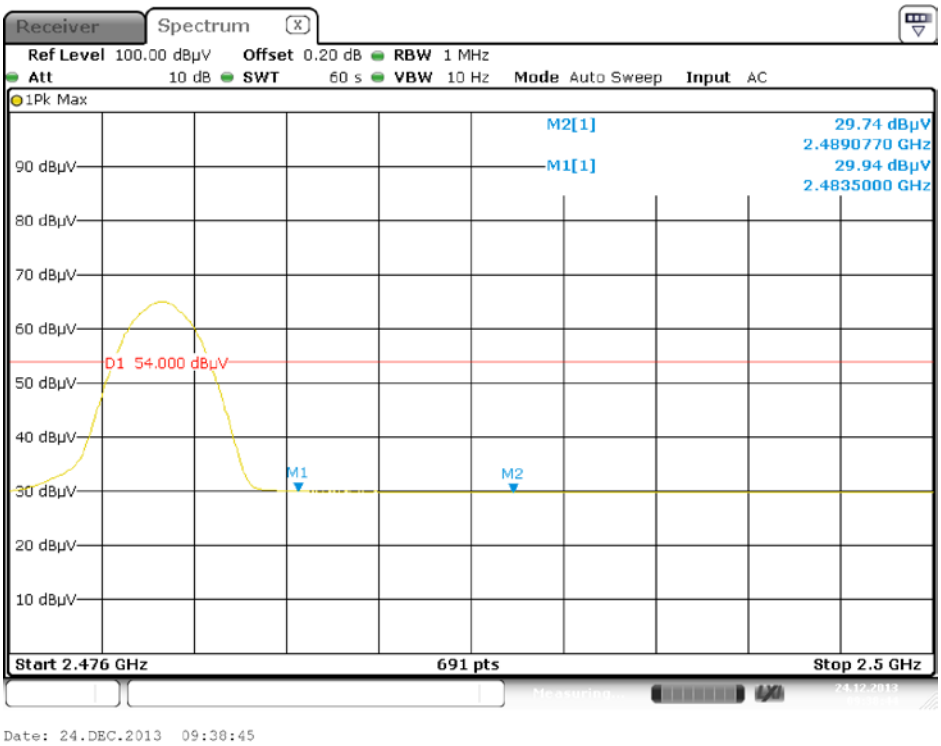
(π/4DQPOSK CH High, Vertical, Peak)



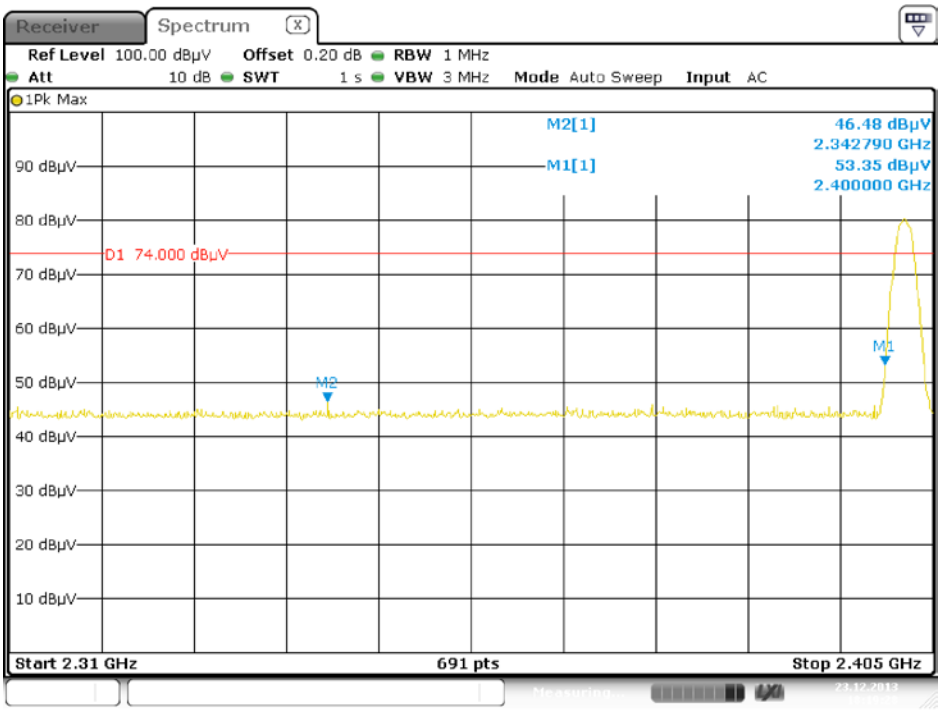
(π/4DQPOSK CH High, Horizontal, Peak)



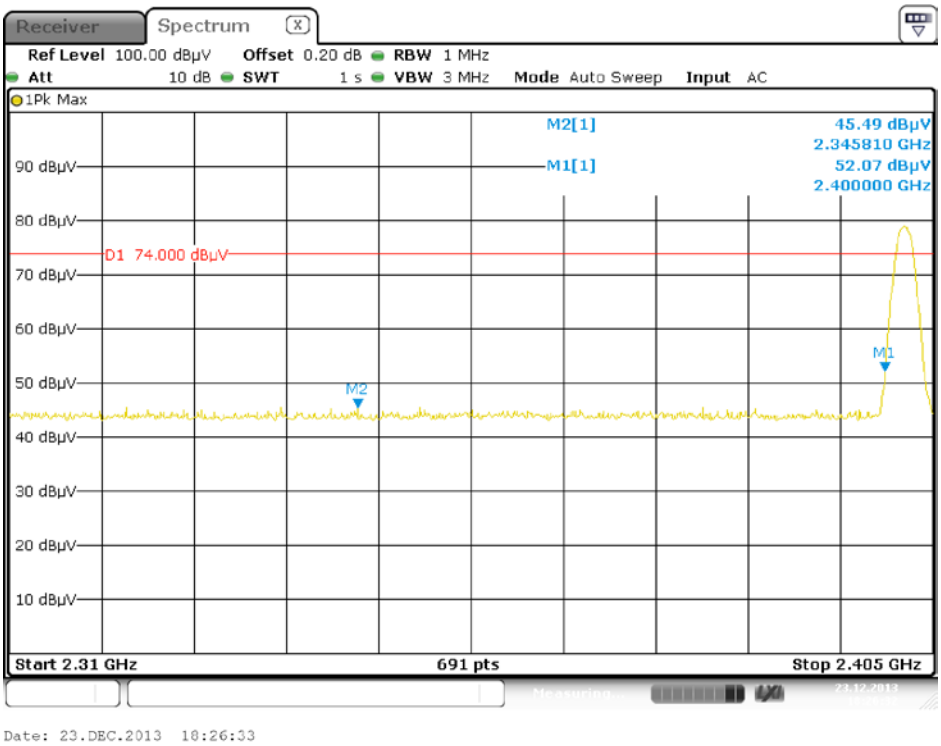
(π/4DQPOSK CH High, Vertical, Average)



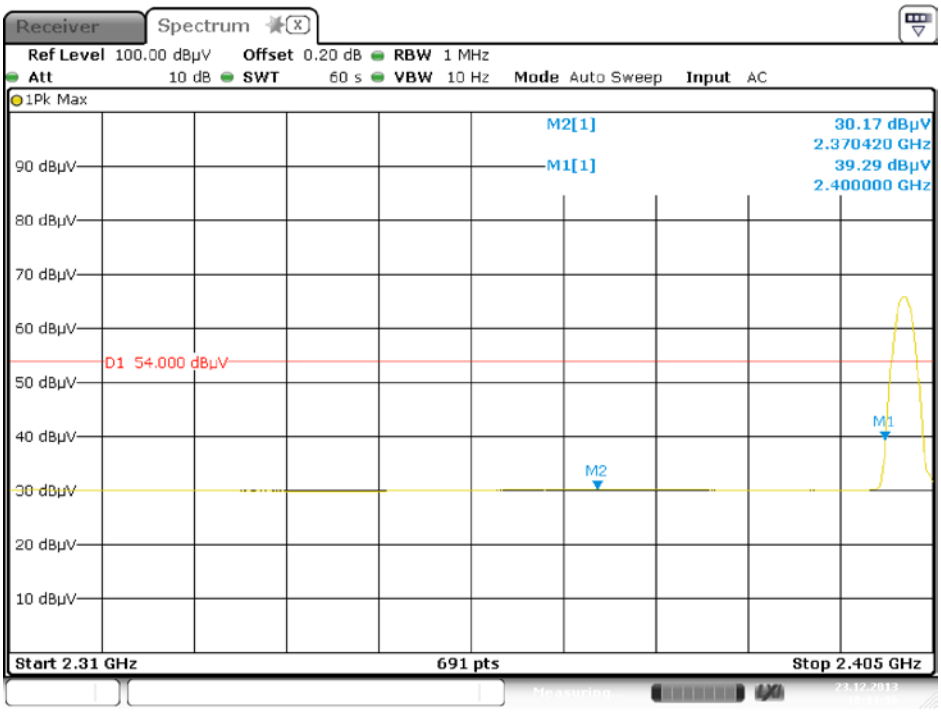
(π/4DQPOSK CH High, Horizontal, Average)



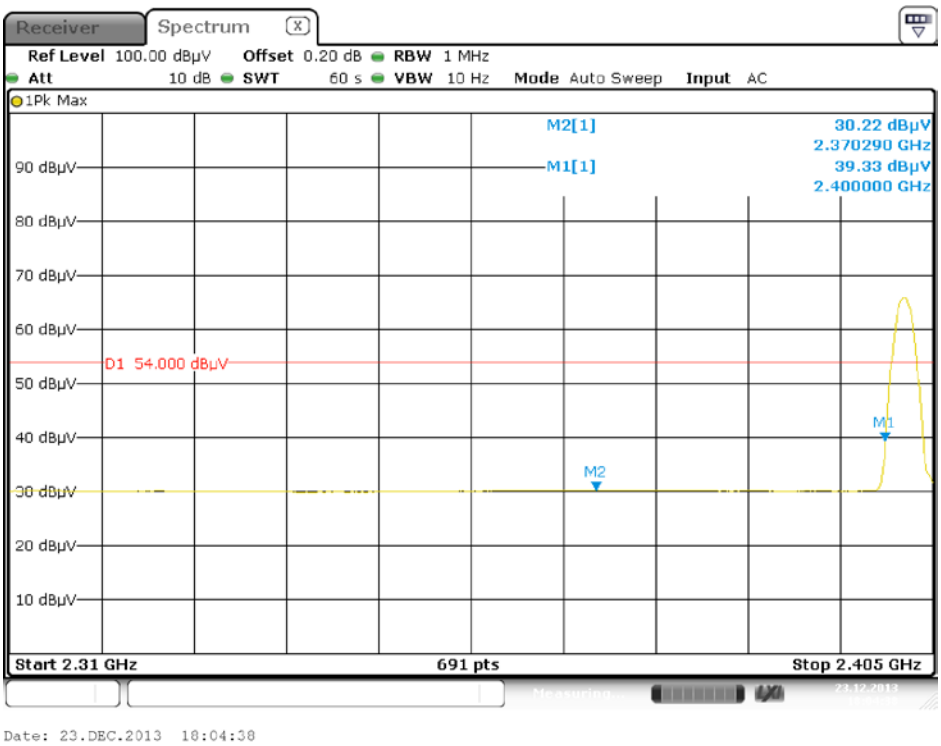
(8-DPSK CH Low, Vertical, Peak)



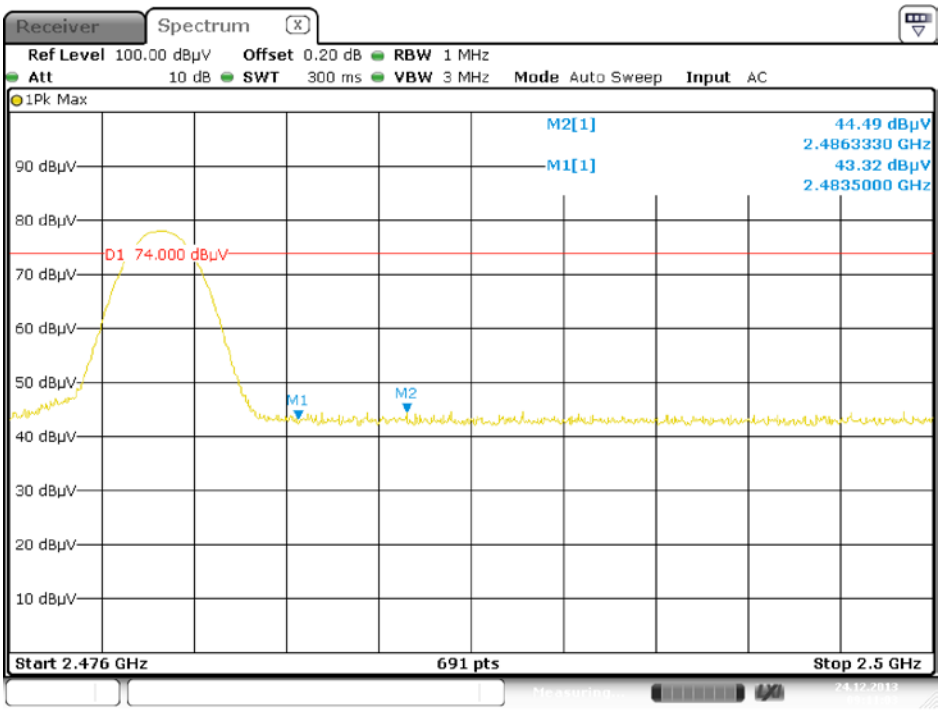
(8-DPSK CH Low, Horizontal, Peak)



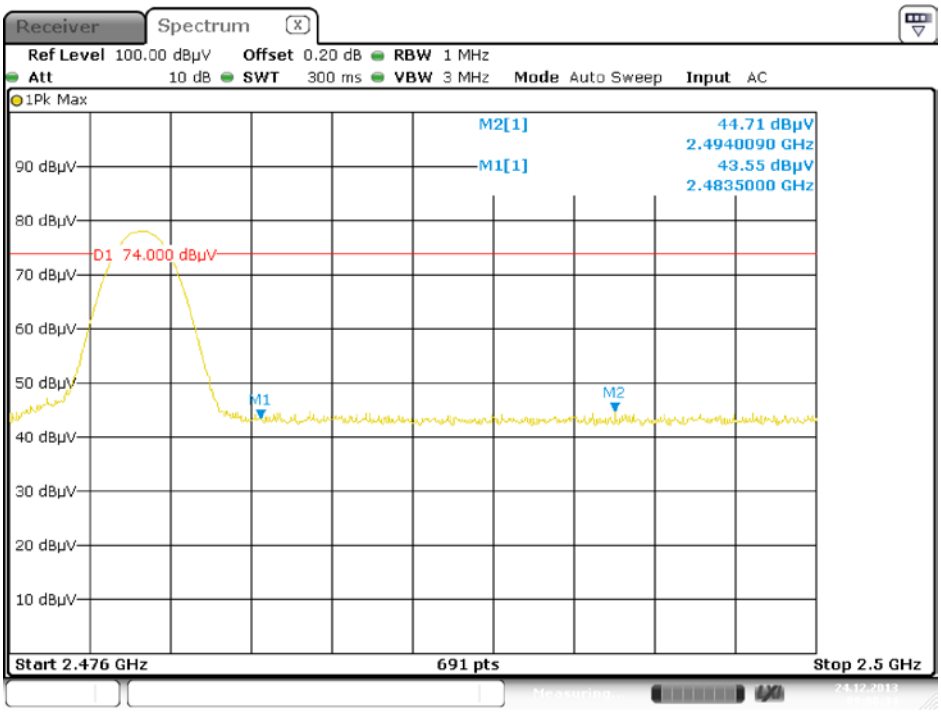
(8-DPSK CH Low, Vertical, Average)



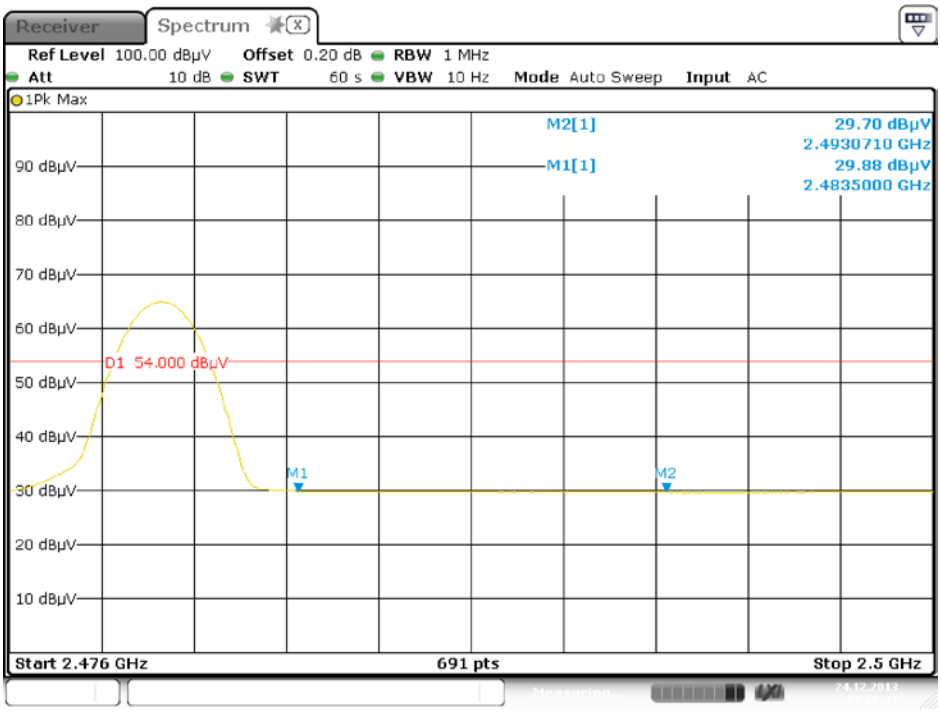
(8-DPSK CH Low, Horizontal, Average)



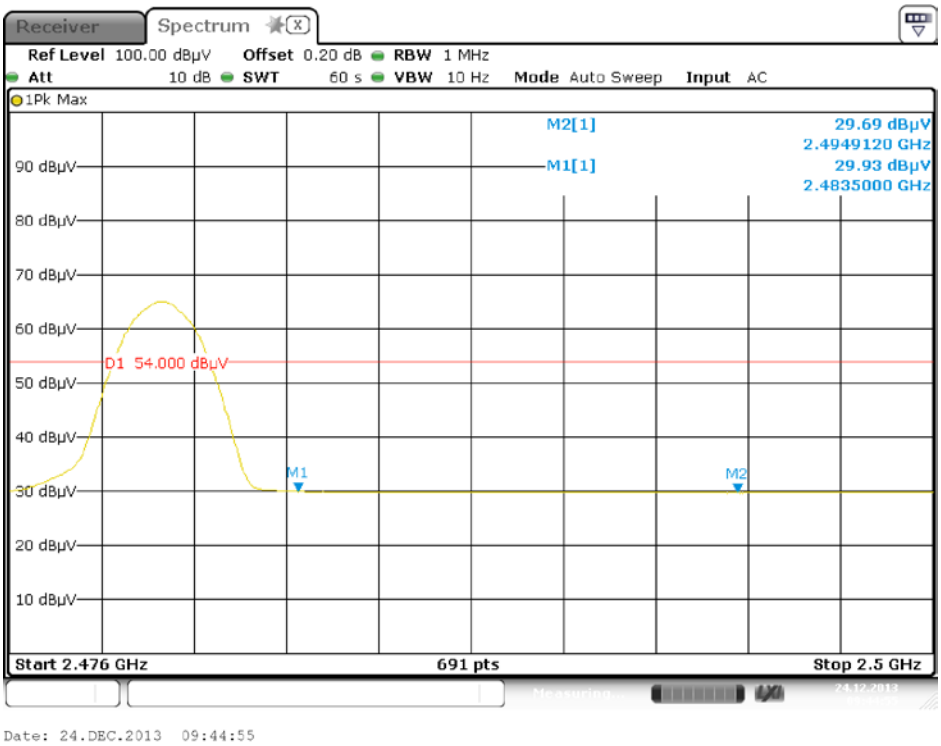
(8-DPSK CH High, Vertical, Peak)



(8-DPSK CH High, Horizontal, Peak)



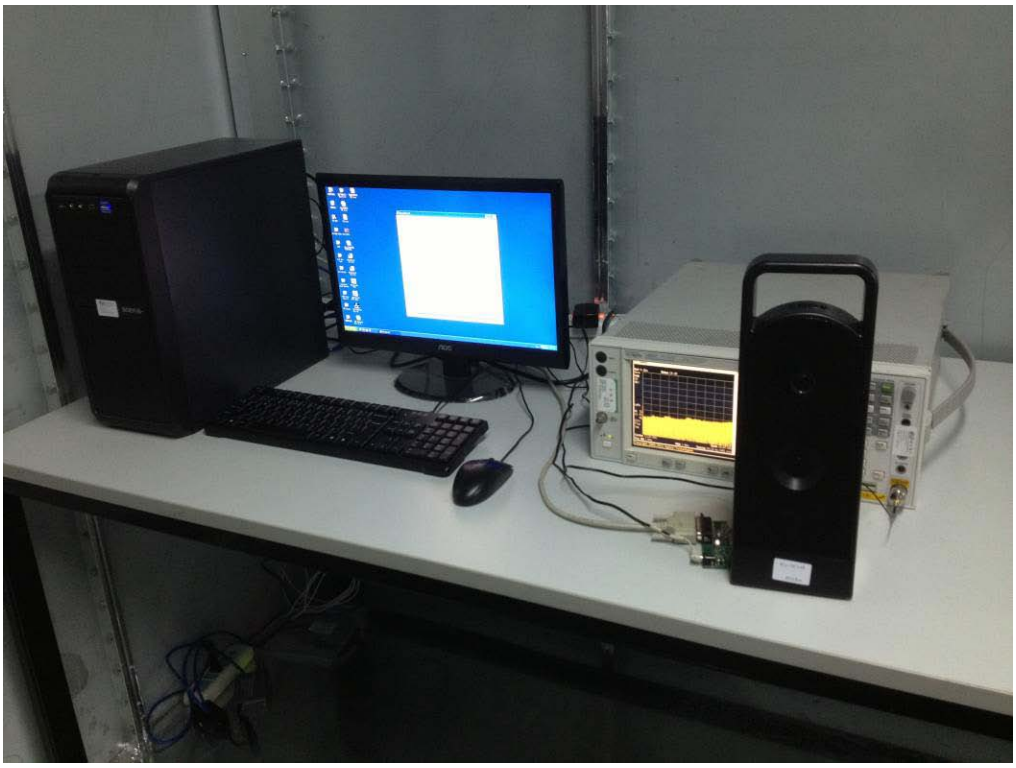
(8-DPSK CH High, Vertical, Average)



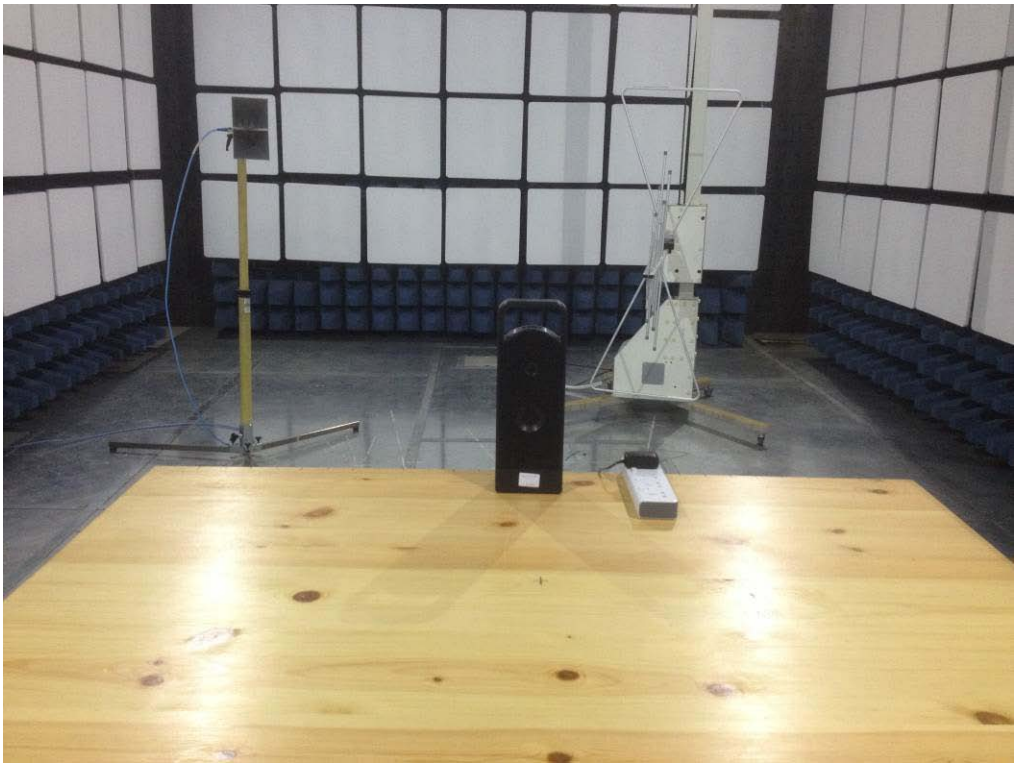
(8-DPSK CH High, Horizontal, Average)

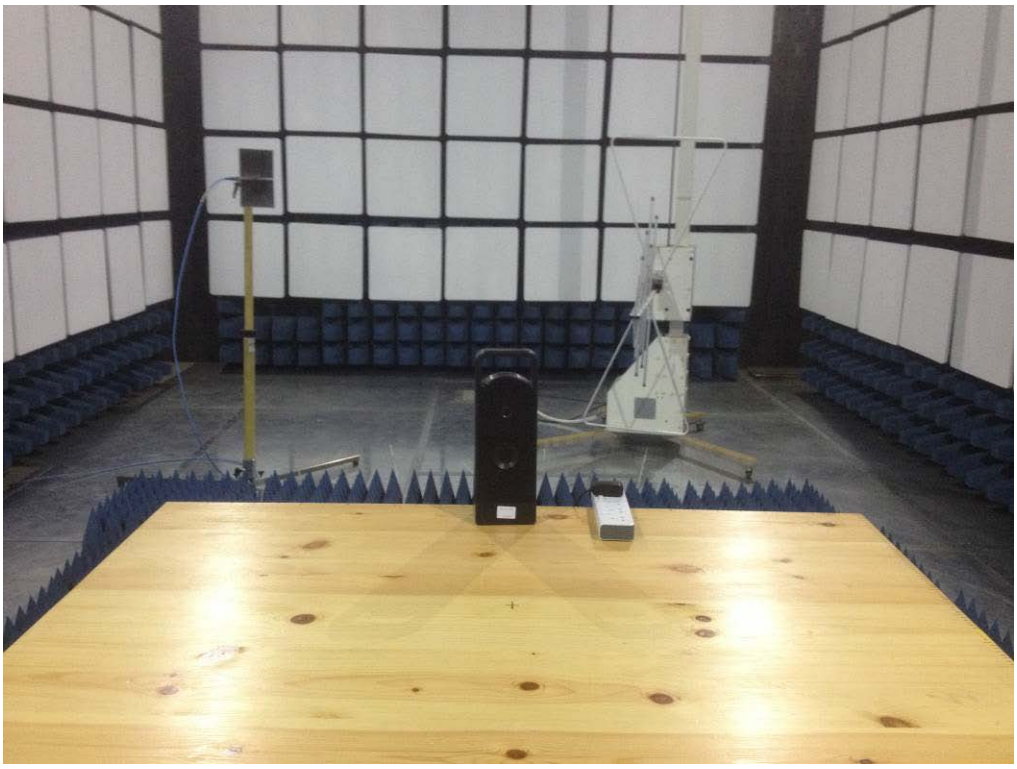
ANNEX B TEST SETUP PHOTOS

B.1 Conducted Test Photo

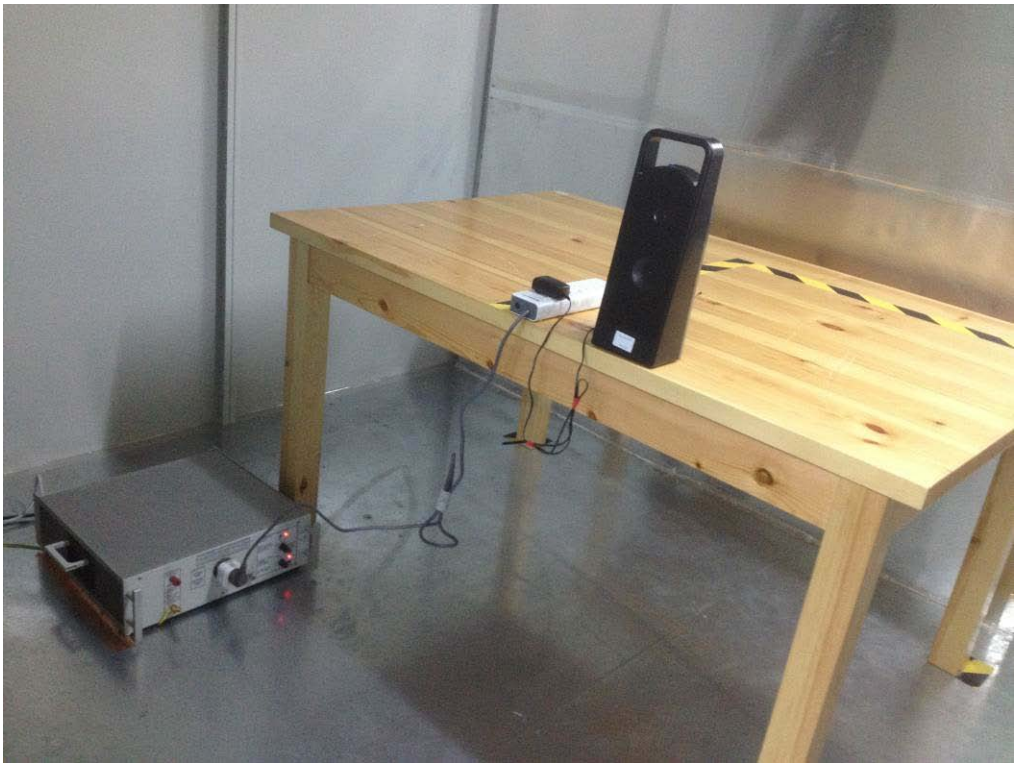


B.2 Radiated Test Photo





B.3 Conducted Emission Test Setup



ANNEX C EUT PHOTOS

C.1 Appearance of the EUT

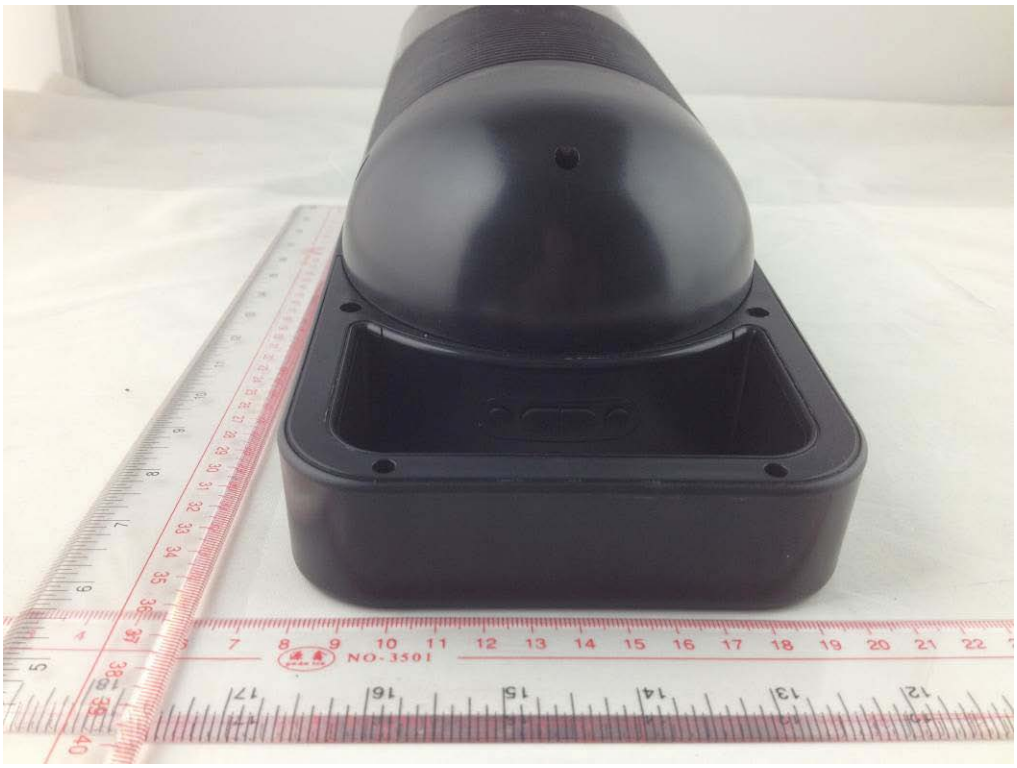
Front View of Sample

Back View of Sample

Left View of Sample

Right View of Sample

Up View of Sample

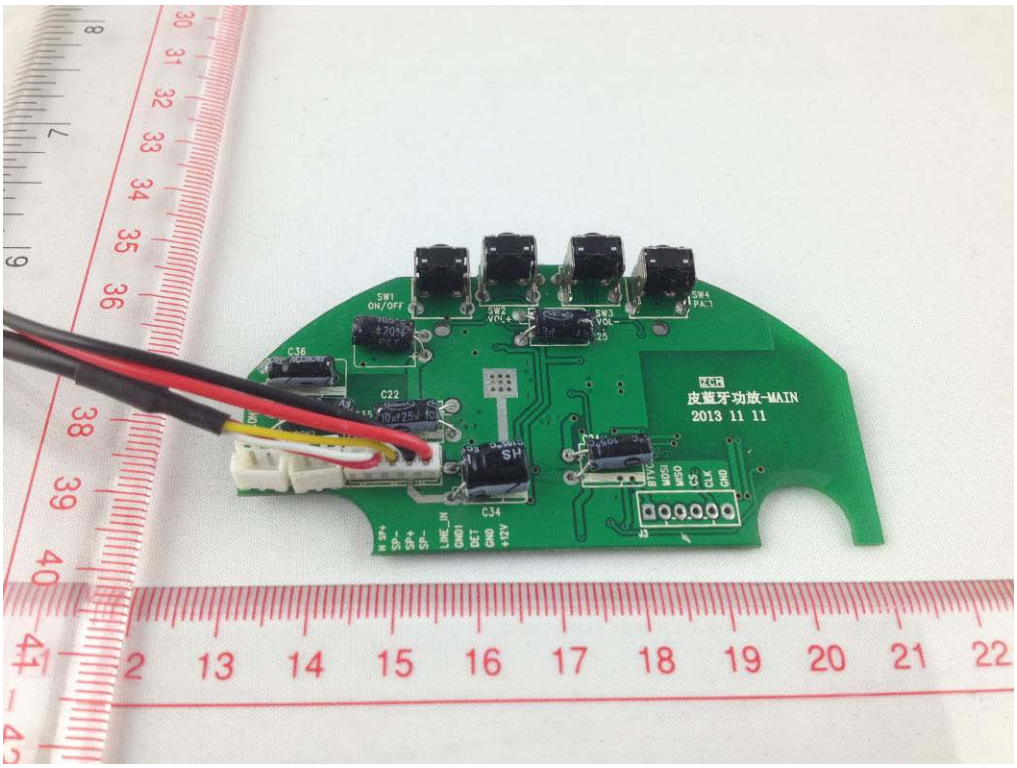


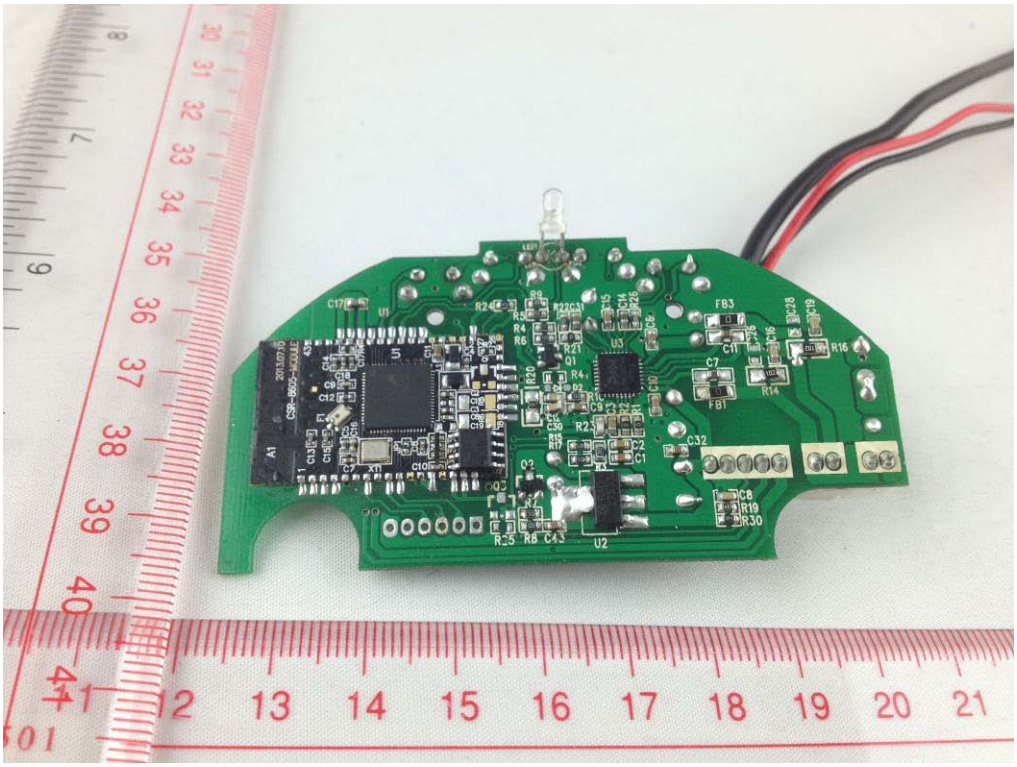
Down View of Sample

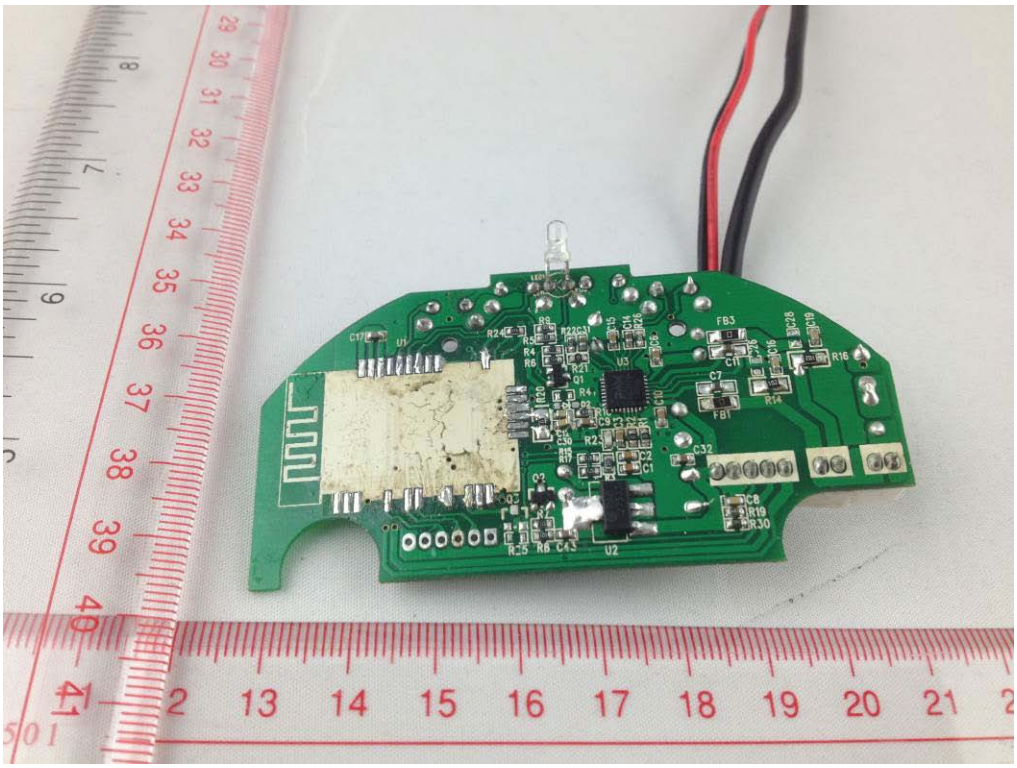
Photo of Charger

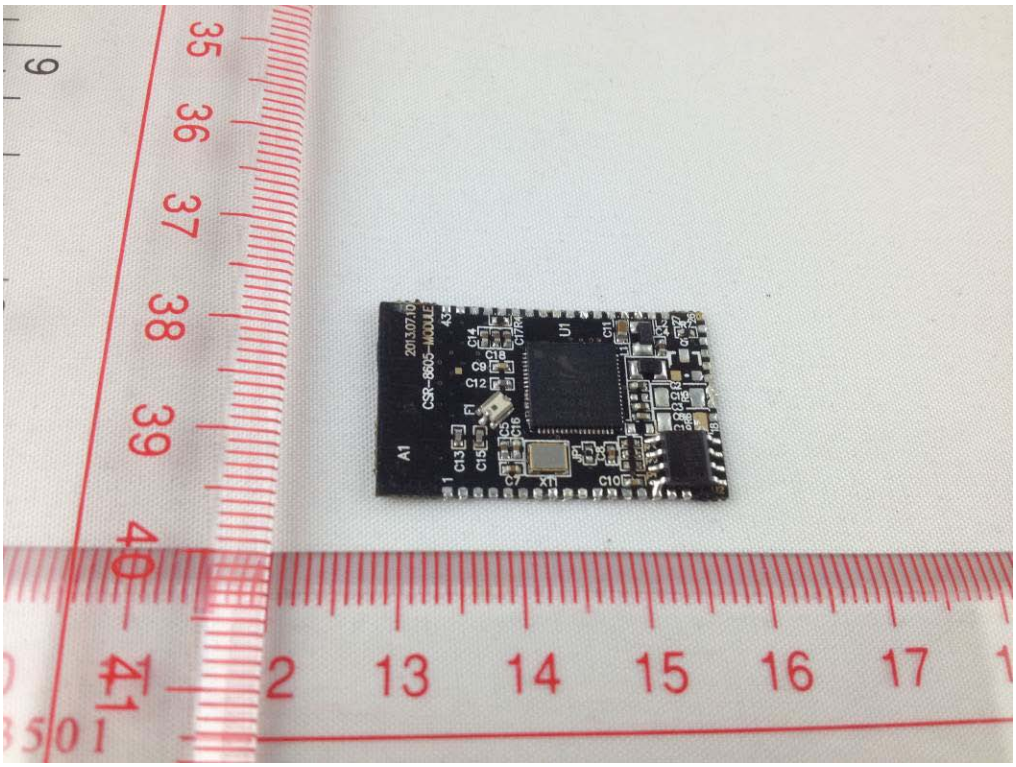
C.2 Inside of the EUT

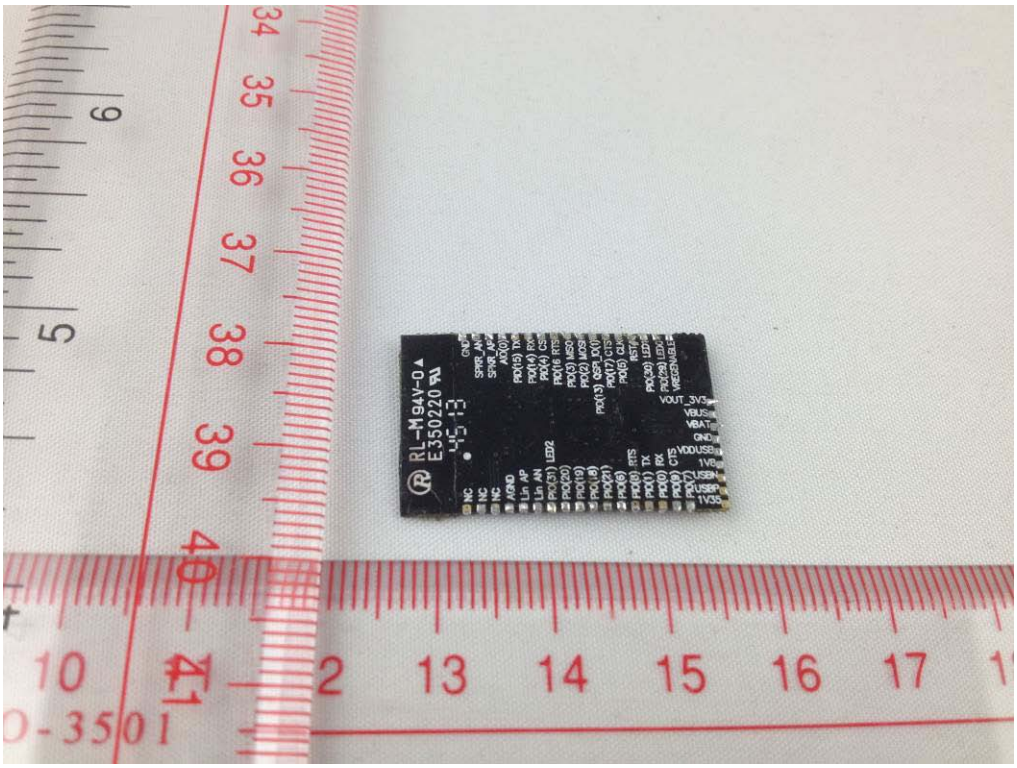

NO-3501

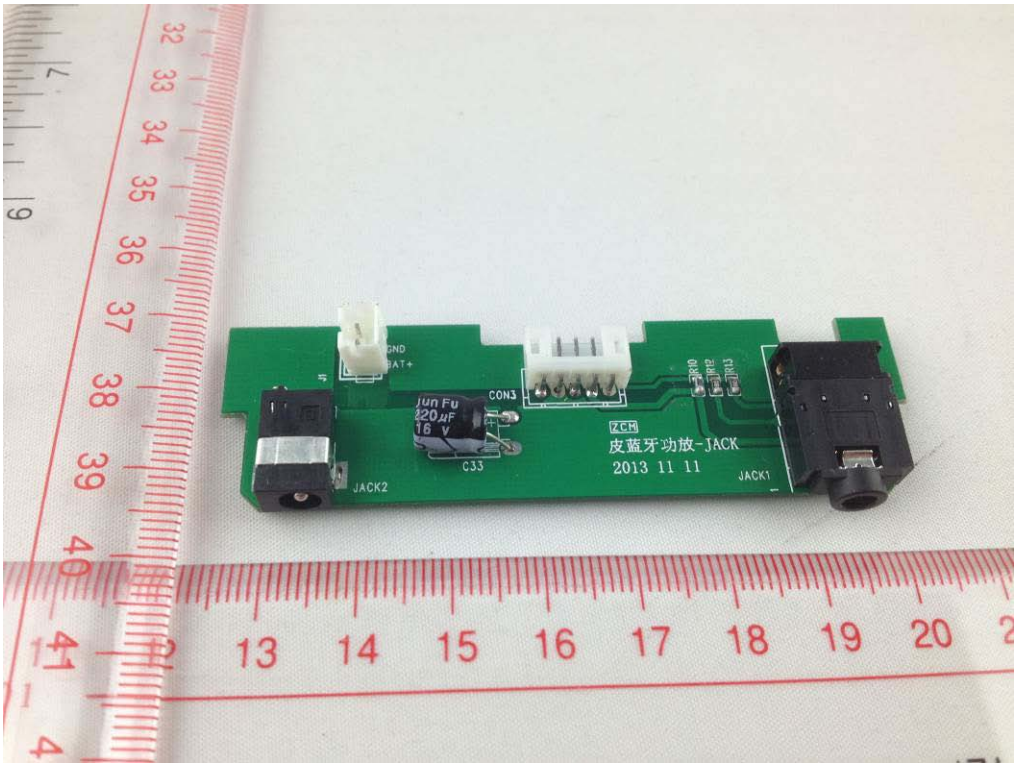

SW1
ON/OFF
SW2
VOL+
SW3
VOL-
SW4
PA?
C36
C22
C34
皮蓝牙功放-MAIN
2013 11 11
LINE_IN
DET
GND
+12V

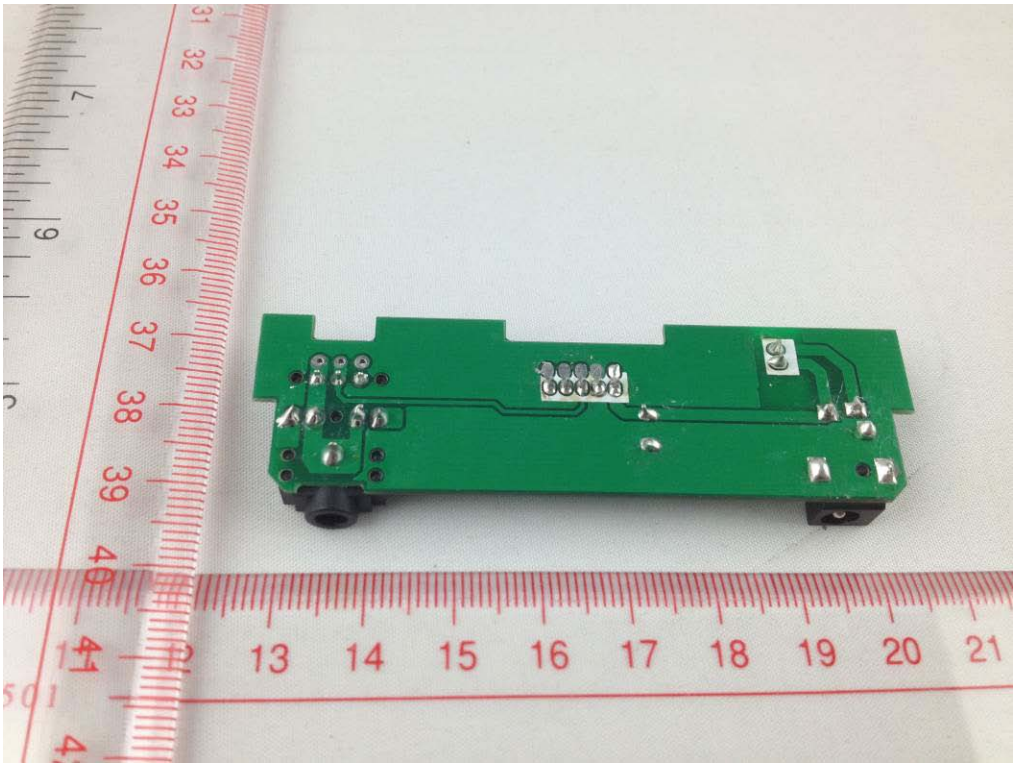












--END OF REPORT--