FCC RF Test Report

Product Type	:	WCDMA Mobile Phone
Applicant	:	Sky Phone LLC
Address	:	1348 Washington Av., Miami Beach
Trade Name	:	SKY DEVICE
Model Number	:	SKY 5.0S
Test Specification	:	FCC 47 CFR PART 15 SUBPART C: Oct., 2013 ANSI C63.10:200
Receive Date	:	23 July, 2014
Test Period	:	23 July, 2014 to 23 Aug, 2014
Issue Date	:	23, Aug 2014

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

Revision History

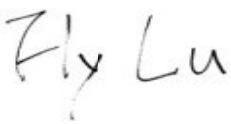
Rev.	Issue Date	Revisions	Revised By
00	23 Aug, 2014	Initial Issue	

Verification of Compliance

Issued Date: 08/23/2014

Product Type	:	WCDMA Mobile Phone
Applicant	:	Sky Phone LLC
Address	:	1348 Washington Av., Miami Beach
Trade Name	:	SKY DEVICE
Model Number	:	SKY 5.0S
FCC ID	:	2ABOSGCSKY50S
EUT Rated Voltage	:	AC 120V; DC 3.7V battery, DC 5.0V USB charge;
Test Voltage	:	AC 120V; DC 3.7V;
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C: Oct., 2013 RSS-210 Issue 8 December 2010 ANSI C63.10:2009
Test Result	:	Complied
Performing Lab.	:	Shenzhen Academy of Metrology and Quality Inspection No.4 Tongfa Road, Xili Town, Nanshan District, Shenzhen, Guangdong, China Tel：0086-755-86928965 / Fax：0086-755-86009898-31396 Web: www.smq.com.cn

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory assumed full responsibility for the accuracy of the test results. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with FCC Rules Part 15.207, 15.209 and 15.247.
The test results of this report relate only to the tested sample identified in this report.

Approved By	:		Reviewed By	:	
(Manager)		(Murphy Wang)	(Testing Engineer)		(Fly Lu)

CONTENT

1. General Information

1.1 Applied Standard

Applied Rules: FCC 47 CFR PART 15 SUBPART C: Oct., 2013

Test Method: FCC PUBLIC NOTICE DA 00-705
FilingandMeasurementGuidelinesforFrequencyHoppingSpreadSpectrumSystems(ReleasedMarch 30, 2000)
ANSI C63.10-2009,AmericanNationalStandard for Testing Unlicensed Wireless Devices.

1.2 Test Location

TestLocation1: Shenzhen Academy of Metrology and quality Inspection
Address: No.4 Tongfa Road, Xili Town, Nanshan District, Shenzhen, Guangdong, China

1.3 Test Environment Condition

Ambient Temperature: 19.5to 25°C
Ambient Relative Humidity: 40 to 55 %
Atmospheric Pressure: Not applicable

2. Test Summary

Test Item	FCC Part No.	Requirements	Verdict
20dB Emission Bandwidth (EBW)	15.247(a)(1)	No limit.	PASS
Carrier Frequency Separation	15.247(a)(1)	≥MAX{25kHz,IIF{output power ≤125mW,2/3*20dB EBW, 20dB EBW}}.	PASS
Number of Hopping Channel	15.247(a)(1)(iii)	≥15channels.	PASS
Time of Occupancy (Dwell Time)	15.247(a)(1)(iii)	<0.4swithinaperiod of (0.4s*hopping number).	PASS
Maximum Peak Conducted Output Power	15.247(b)(1)	< 1W if using ≥75 Non-overlapping channels.	PASS
Band edge spurious emission	15.247(d)	< -20 dBc/100kHzif total peak power ≤ power limit.	PASS
Conducted RF Spurious Emission	15.247(d)	< -20 dBc/100kHzif total peak power ≤ power limit.	PASS
Radiated Emissions in the Restricted Bands	15.247(d) 15.209	FCC Part 15.209fieldstrength limit;	PASS
AC Power Line Conducted Emissions	15.207	FCC Part 15.207 conducted limit;	

3. Description of the Equipment under Test (EUT)

3.1 General Description

Product	WCDMA Mobile Phone
Trade Name	SKY DEVICE
Model Number	SKY 5.0S
Applicant	Sky Phone LLC 1348 Washington Av., Miami Beach
Manufacturer	Shenzhen Malata Mobile Communication CO.,LTD 25/F, Malata Technology Building, NO9998 ShennanRd,Hi-techPark,Nanshan,Shenzhen,P.R. China 518057.
FCC ID	2ABOSGCSKY50S
Frequency Range	2402 ~ 2480 MHz
Modulation Type	GFSK for 1Mbps
	π/4-DQPSK for 2Mbps
	8DPSK for 3Mbps
Antenna Type	Internal
Antenna Gain	0dBi

NOTE: Only Bluetooth test data included in this report.

3.2 EUT Identity

IMEI No.	
SIM 1	883772029997780
SIM 2	863772029998101

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

3.3 EUT Configurations

3.3.1 General Configurations

Configuration	Description
Test Antenna Ports	Until otherwise specified, All TX tests are performed at all TX antenna ports of the EUT, and All RX tests are performed at all RX antenna ports of the EUT.
Multiple RF Sources	Other than the tested RF source of the EUT, other RF source(s) are disabled or shutdown during measurements.

Note: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

3.4 Customized Configurations

#EUT Conf.	Signal Description	Operating Frequency
TM1_DH5_Hop	GFSK modulation, package type DH5, hopping on.	---
TM1_DH5_Ch0	GFSK modulation, package type DH5, hopping off.	Ch No. 00 /2402MHz
TM1_DH5_Ch39	GFSK modulation, package type DH5, hopping off.	Ch No. 39/ 2441MHz
TM1_DH5_Ch78	GFSK modulation, package type DH5, hopping off.	Ch No. 78/ 2480MHz
TM2_2DH5_Hop	π/4-DQPSK modulation, package type 2DH5, hopping on.	---
TM2_2DH5_Ch0	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No.00 /2402MHz
TM2_2DH5_Ch39	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 39/ 2441MHz
TM2_2DH5_Ch78	π/4-DQPSK modulation, package type 2DH5, hopping off.	Ch No. 78/2480MHz
TM3_3DH5_Hop	8DPSK modulation, package type 3DH5, hopping on.	---
TM3_3DH5_Ch0	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 00 /2402MHz
TM3_3DH5_Ch39	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 39/ 2441MHz
TM3_3DH5_Ch78	8DPSK modulation, package type 3DH5, hopping off.	Ch No. 78/ 2480MHz

3.5 Test Environments

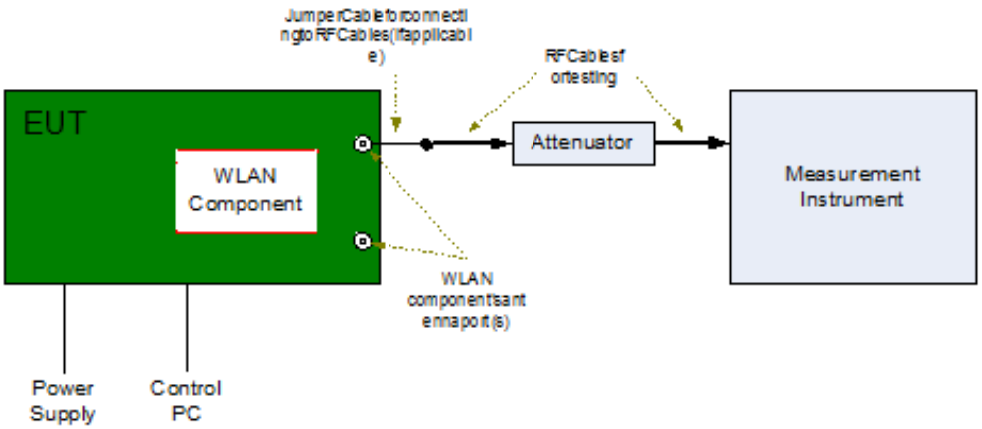
NOTE: The values used in the test report maybe stringent than the declared.

Environment Parameter	Selected Values During Tests		
NTNV	Temperature	Voltage	Relative Humidity
	Ambient	3.7VDC	Ambient

3.6 Test Setups

3.6.1 Test Setup 1

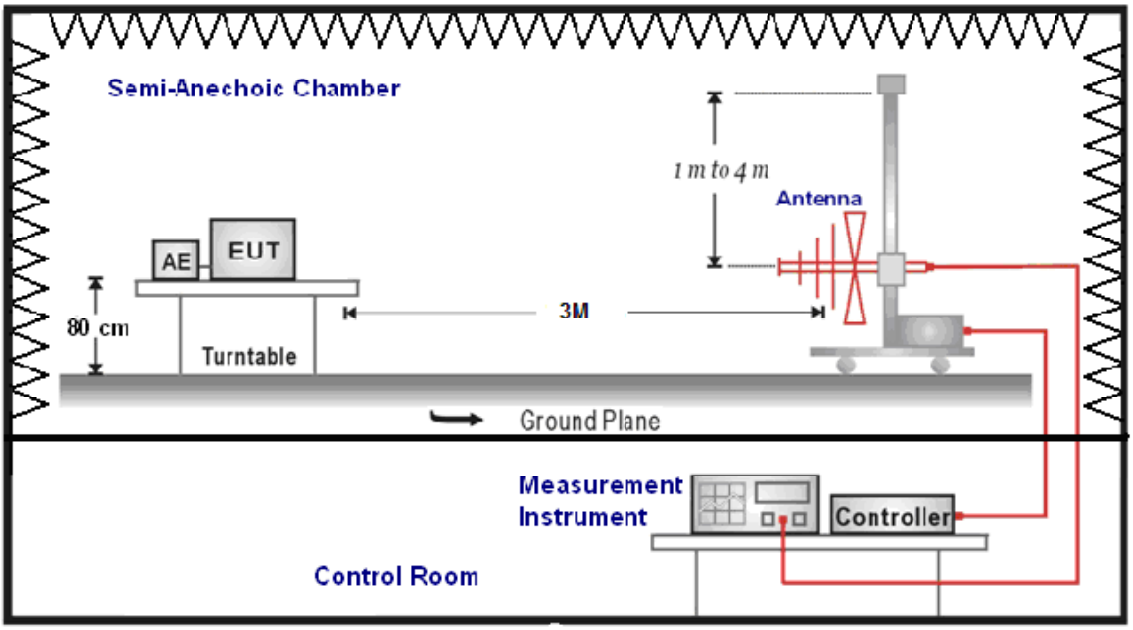
The BLE component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



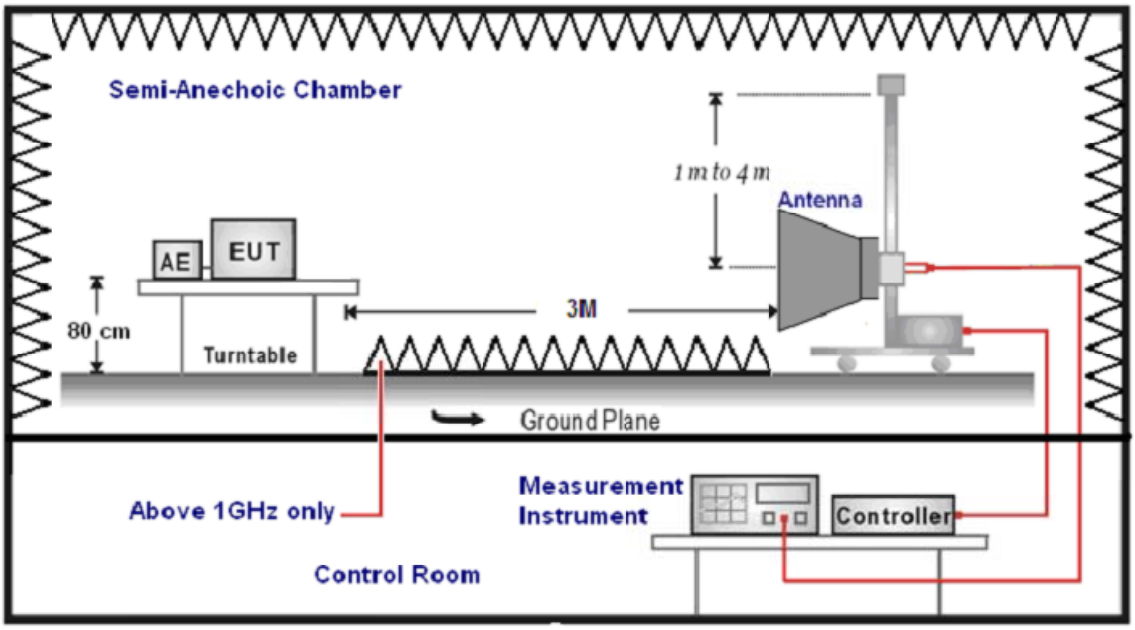
3.6.1 Test Setup 2

The test sites anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSIC63.4. The test distance is 3m.The setup is according to ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarization and turntable azimuth. Normally, the height range of antenna is 1m to 4m, the azimuth range of turntable is 0° to 360°,and the receive antenna has two polarizations Vertical (V) and Horizontal (H).



(Below1 GHz)

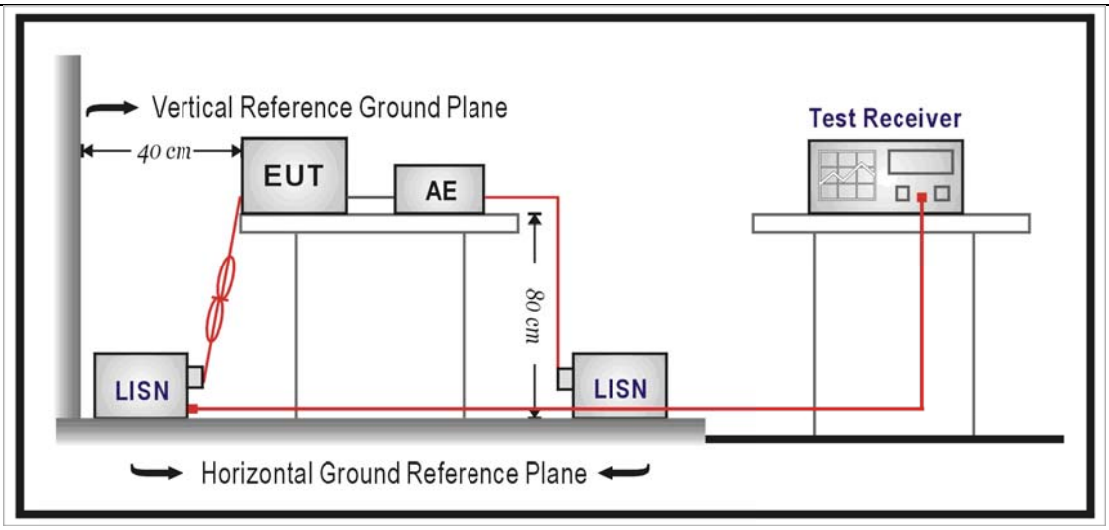


(Above 1GHz)

3.6.2 Test Setup 3

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than0.1 m.



3.7 Test Conditions

Test Case	Test Conditions	
	Configuration	Description
20dB Emission Bandwidth (EBW)	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH5_Ch00,TM1_DH5_Ch39,TM1_DH5_Ch78,TM2_2DH5_Ch00,TM2_2DH5_Ch39,TM2_2DH5_Ch78,TM3_3DH5_Ch00,TM3_3DH5_Ch39,TM3_3DH5_Ch78, TM4_DH5_Ch00,TM4_DH5_Ch19,TM4_DH5_Ch39.
Carrier Frequency Separation	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH5_Hop,TM2_2DH5_Hop,TM3_3DH5_Hop,
Number of Hopping Channel	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH5_Hop,TM2_2DH5_Hop,TM3_3DH5_Hop,
Time of Occupancy (Dwell Time)	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH5_Ch39,TM2_2DH5_Ch39,TM3_3DH5_Ch39.
Maximum Peak Conducted Output Power	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH3_Ch00,TM1_DH3_Ch39,TM1_DH3_Ch78,TM2_2DH3_Ch00,TM2_2DH3_Ch39,TM2_2DH3_Ch78,TM3_3DH3_Ch00,TM3_3DH3_Ch39,TM3_3DH3_Ch78, TM4_DH3_Ch00,TM4_DH3_Ch19,TM4_DH3_Ch39.
Bandedge spurious emission (Conducted)	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH3_Ch00,TM1_DH3_Ch78,TM2_2DH3_Ch00,TM2_2DH3_Ch78,

		TM3_3DH3_Ch00,TM3_3DH3_Ch78. TM4_DH3_Ch00,TM4_DH3_Ch39.
Conducted RF Spurious Emission	Meas. Method	ANSI C63.10:2009
	Test Environment	NTNV
	Test Setup	Test Setup1
	EUT Conf.	TM1_DH5_Ch00, TM1_DH5_Ch39, TM1_DH5_Ch78, TM2_2DH5_Ch00, TM2_2DH5_Ch39, TM2_2DH5_Ch78, TM3_3DH5_Ch00, TM3_3DH5_Ch39, TM3_3DH5_Ch78. TM4_DH5_Ch00,TM4_DH5_Ch19,TM4_DH5_Ch39.
Radiated Emissions in the Restricted Bands	Meas. Method	ANSI C63.10:2009 30 MHz to 1 GHz: Pre: RBW=100kHz; VBW=300kHz; Det. = Peak. Final: RBW=120kHz; Det. = CISPR Quasi-Peak. 1 GHz to 26.5GHz: Average: RBW=1 MHz; VBW= 10Hz; Det. = Peak; Sweep-time= Auto; Trace = Single. Peak: RBW=1 MHz; VBW= 3 MHz; Det. = Peak; Sweep-time= Auto; Trace≥ MaxHold * 100.
	Test Environment	NTNV
	Test Setup	Test Setup2
	EUT Conf.	30 MHz-1GHz TM1_DH5_Ch00 (Worst Conf.).
		1-18 GHz: TM1_DH5_Ch00, TM1_DH5_Ch39, TM1_DH5_Ch78, (Worst Conf.).

Test Case	Test Conditions	
	Configuration	Description
AC Power Line Conducted Emissions	Measurement Method	AC mains conducted.
	Test Environment	NTNV
	Test Setup	TestSetup3
	EUT Configuration	TM1_DH5_Ch39. (Worst Conf.).

Note: For Radiated Emissions, By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “Z axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	9kHz ~ 30MHz	3.50
Radiated Emission	9kHz ~ 30MHz	4.12
	30MHz ~ 1000MHz	4.50
	1000MHz ~ 18000MHz	4.60
	18000MHz ~ 40000MHz	5.12

5. Main Test Instruments

AC Power Conducted Emission					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal Period
Test Receiver	R&S	ESCS	SB3319	01/20/2014	1 year
LISN	R&S	ESH2-Z5	SB3321	01/20/2014	1 year
LISN	R&S	ESH3-Z5	SB2604	01/20/2014	1 year
Test Software	R&S	ESK1	N/A	N/A	N/A

Radiated Emission					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal Period
Loop Antenna	Schwarzbeck	FMZB1516	SB3345	01/22/2014	1 year
Horn Antenna	AR	AT4560	SB3450/01	05/16/2014	1 year
Amplifier(18-40GHz)	R&S	---	SB3435/02	05/16/2014	1 year
Amplifier(1-18GHz)	R&S	---	SB3435/01	01/22/2014	1 year
Horn Antenna	R&S	HF907	SB8501/01	05/13/2014	1 year
Bilog Antenna	Schwarzbeck	VULB9163	SB8501/04	01/20/2014	1 year
EMI Test Receiver	R&S	ESU40	SB85001/09	05/16/2014	1 year
EMI Test Receiver	R&S	ESIB26	SB3253	01/22/2014	1 year
Test Software	R&S	ESK1	N/A	N/A	N/A
Test Software	R&S	EMC32	N/A	N/A	N/A

Maximum Peak Output Power / 20dB Bandwidth / Frequency Separation / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission/ Number of hopping frequency/ Time of Occupancy					
Equipment Name	Manufacturer	Model	Serial Number	Cal Date	Cal Period
MXA Signal Analyzer	Agilent	N9020A	MY53420615	05/12/2014	1 year
Power Sensor	Agilent	U2021XA	MY53180015	09/27/2013	1 year
Power Sensor	Agilent	U2021XA	MY53260040	09/27/2013	1 year
Power Sensor	Agilent	U2021XA	MY53360002	09/27/2013	1 year
Power Sensor	Agilent	U2021XA	MY53360006	09/27/2013	1 year
USB Modular Simultaneous Data Acquisition	Agilent	U2531A	TW53353509	N/A	N/A
USB Modular Simultaneous Data Acquisition	Agilent	U2531A	TW53353511	N/A	N/A

6. Test Conditions and Results

6.1 AC Power Conducted Emission

TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2009.
2. Support equipment, if needed, was placed as per ANSI C63.10-2009
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2009
4. The EUT received DC5V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

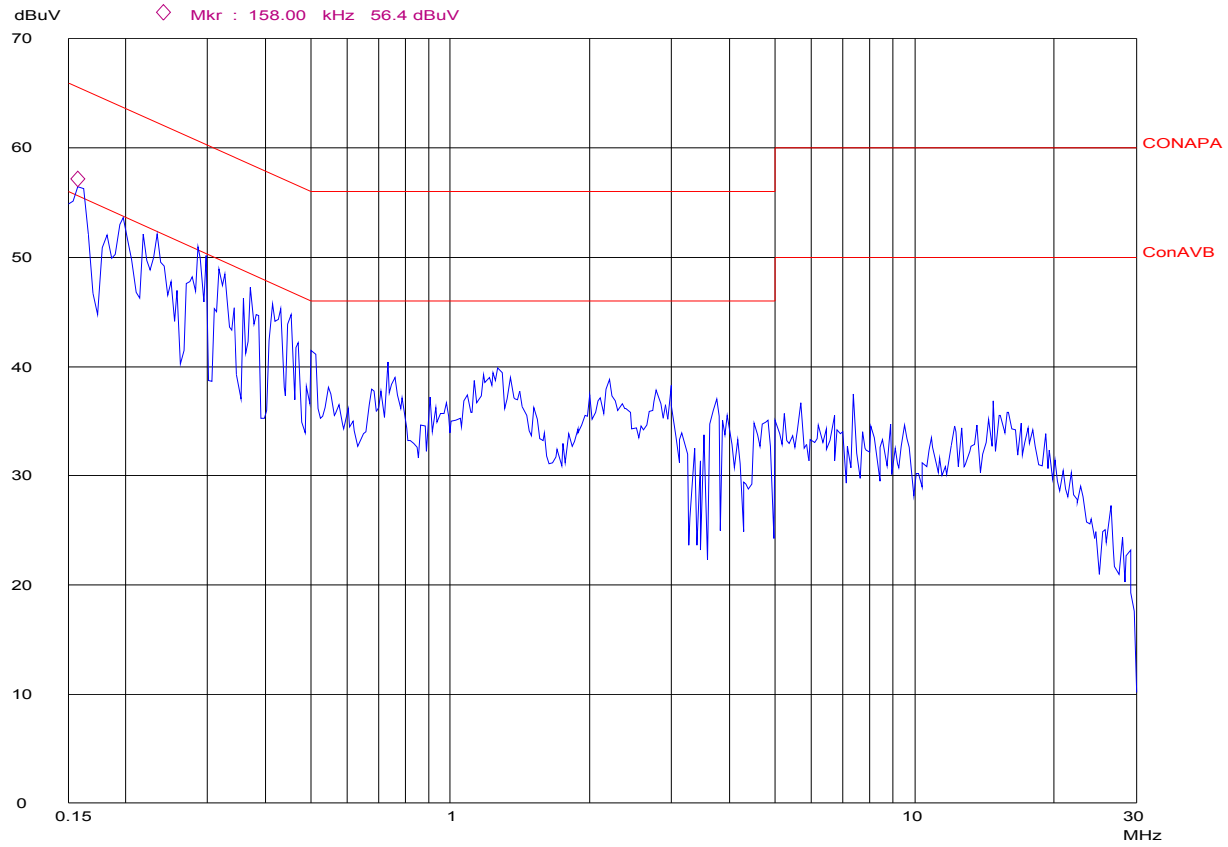
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

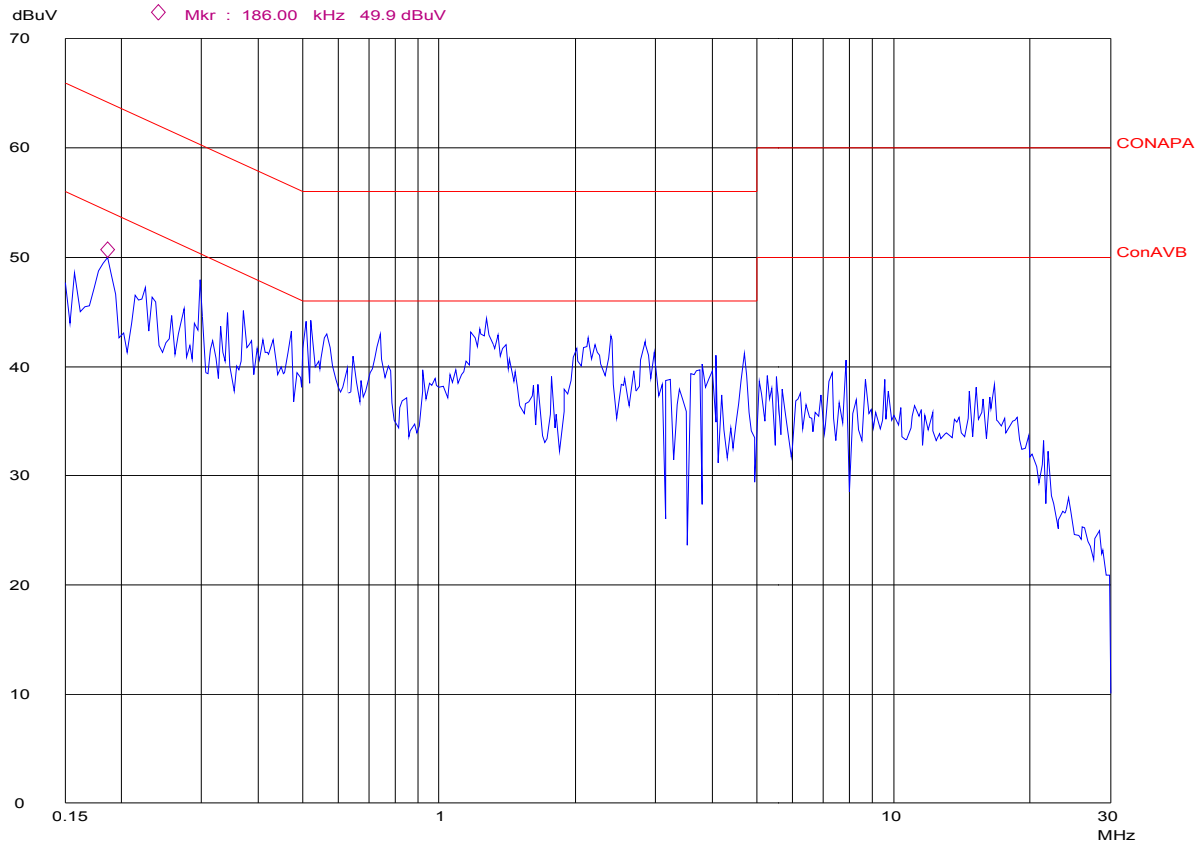
* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

Note: We tested Conducted Emission of GFSK, π/4 DQPSK and 8DPSK mode from 0.15 KHz to 30MHz (DH1, DH3 and DH5) and all channels (low, middle and high), recorded the worst case data at GFSK DH5 middle channel.



	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)
Line	0.162	9.7	29.6	39.3	65.4	18.5	28.2	55.4
	0.198	9.7	31.3	41.0	63.7	18.9	28.6	53.7
	0.234	9.7	27.5	37.2	62.3	17.7	27.4	52.3
	0.288	9.7	32.2	41.9	60.6	16.3	26.0	50.6
	0.37	9.7	27.5	37.2	58.5	16.6	26.3	48.5
	0.422	9.7	30.5	40.2	57.4	11.4	21.1	47.4



	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)
Neutral	0.158	9.7	26.9	36.6	65.6	21.8	31.5	55.6
	0.186	9.7	26.6	36.3	64.2	14.2	23.9	54.2
	0.298	9.7	20.9	30.6	60.3	10.1	19.8	50.3
	0.37	9.7	21.8	31.5	58.5	15.2	24.9	48.5
	0.522	9.8	20.5	30.3	56	13.3	23.1	46.0
	1.27	9.8	33.3	43.1	56	15.6	25.4	46.0

6.2 Radiated Emissions

TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768 KHz and maximum operation frequency was 2462MHz.so radiated emission test frequency band from 9 KHz to 25GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz, VBW=3MHz for Peak Detector while the RBW=1MHz, VBW=10Hz for Average Detector, Readings are both peak and average values.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	300	20log(2400/F(KHz))+80	2400/F(KHz)
0.49-1.705	30	20log(24000/F(KHz))+40	24000/F(KHz)
1.705-30	30	20log(30)+40	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

Remark:

1. The radiated measurement are performed the each channel (low/mid/high) at all Packet type (DH1, DH3 and DH5) also for difference modulation type (GFSK, 8DPSK and π/4 DQPSK), recorded worst case at GFSK_DH5_Low channel (Channel 00) for below 1GHz and GFSK_DH5_Low channel (Channel

00), GFSK_DH5_Middle channel (Channel 39), GFSK_DH5_High channel (Channel 78).

2. ULTRA-BROADBAND ANTENNA for the radiation emission test below 1G.

3. HORN ANTENNA for the radiation emission test above 1G.

4. We tested both battery powered and powered by adapter charging mode at three orientate ones, recorded worst case at powered by adapter charging mode.

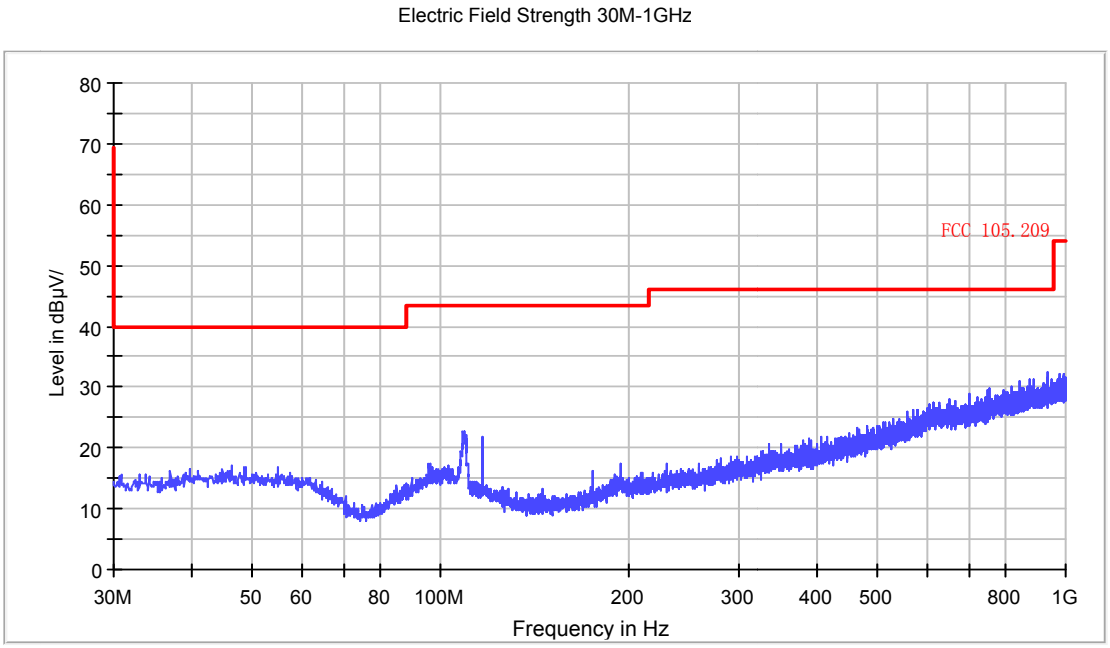
5. "---" means not recorded as emission levels lower than limit.

For 9 KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBμV/m)@3m	FCC Limit (dBμV/m) @3m	Margin (dB)	Detector	Result
12.00	44.46	69.54	25.08	QP	PASS
24.00	41.27	69.54	28.27	QP	PASS

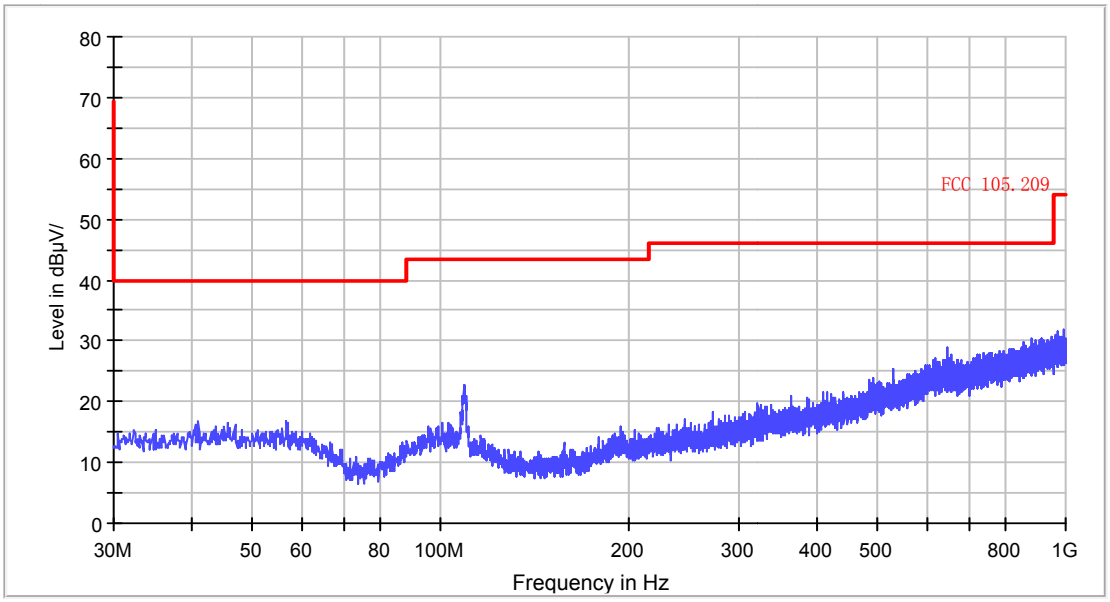
For 30MHz to 1000MHz

Channel 00 @ 2402 MHz @ GFSK_DH5



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					Peak	H

Electric Field Strength 30M-1GHz

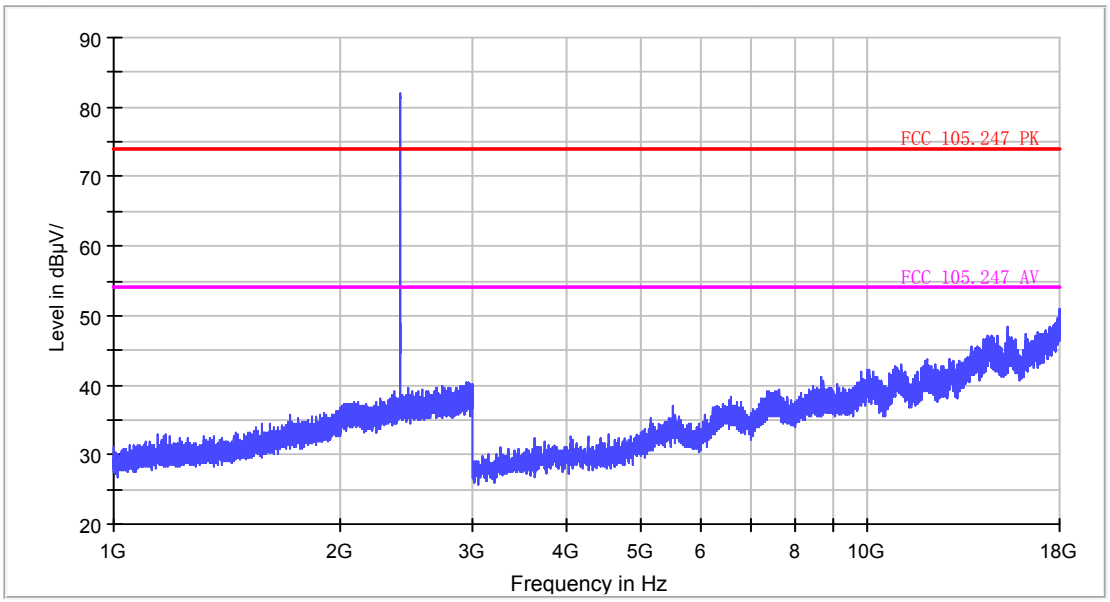


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					Peak	V

For 1GHz to 25GHz

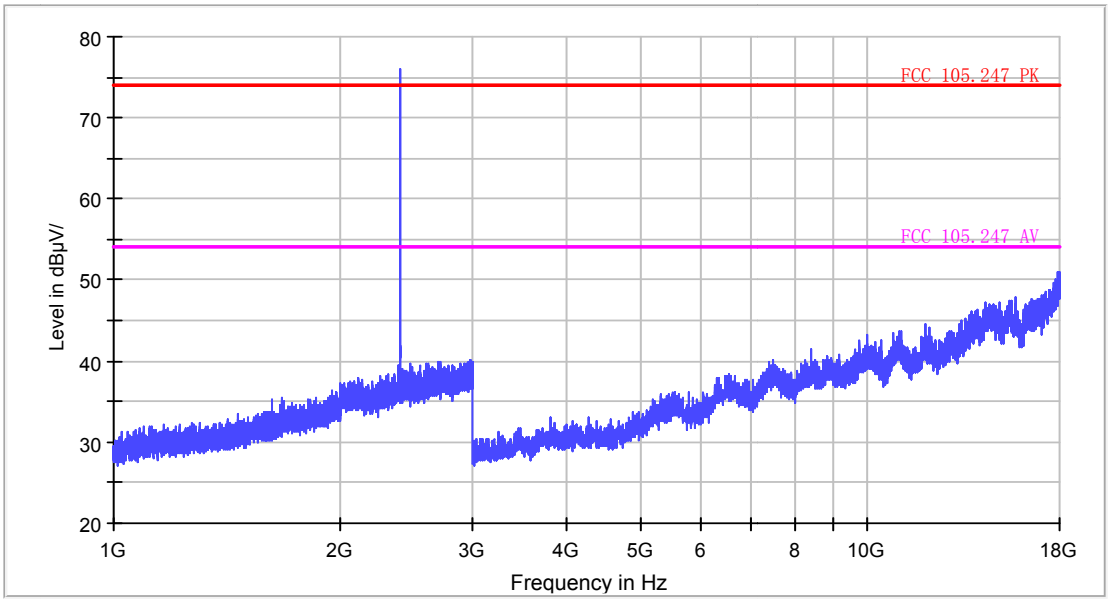
Channel 00 @ 2402 MHz @ GFSK_DH5

FCC Electric Field Strength 1-18GHz operate on 2.4GHz

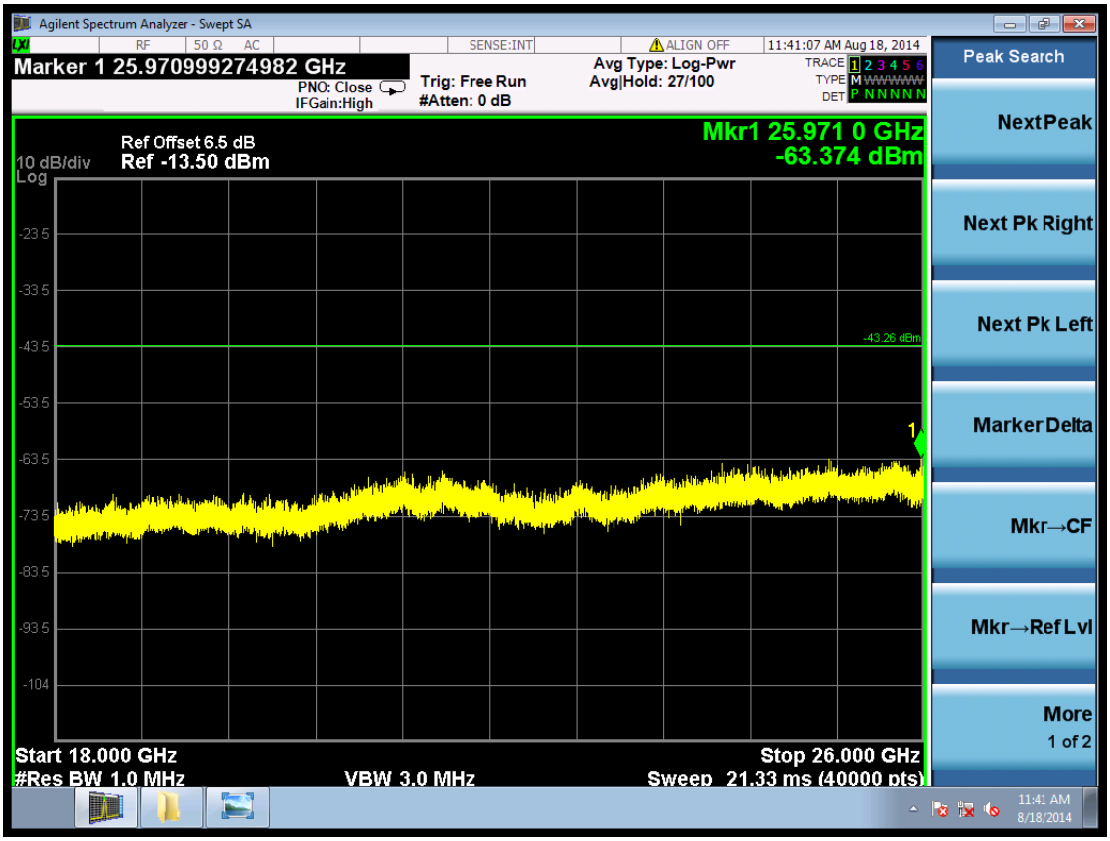


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					AV	V

FCC Electric Field Strength 1-18GHz operate on 2.4GHz

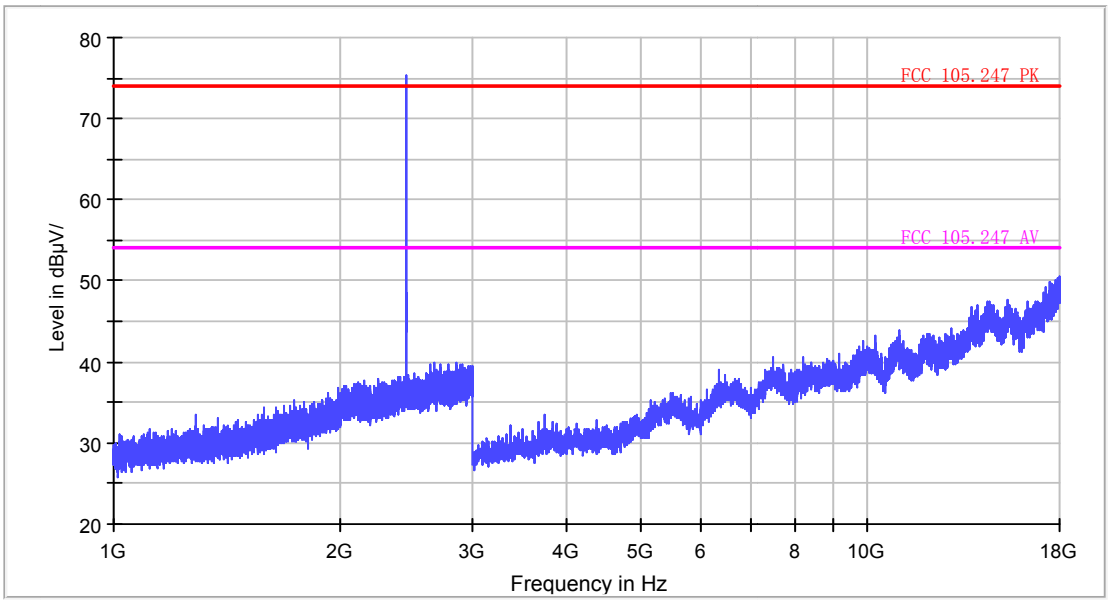


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					AV	V



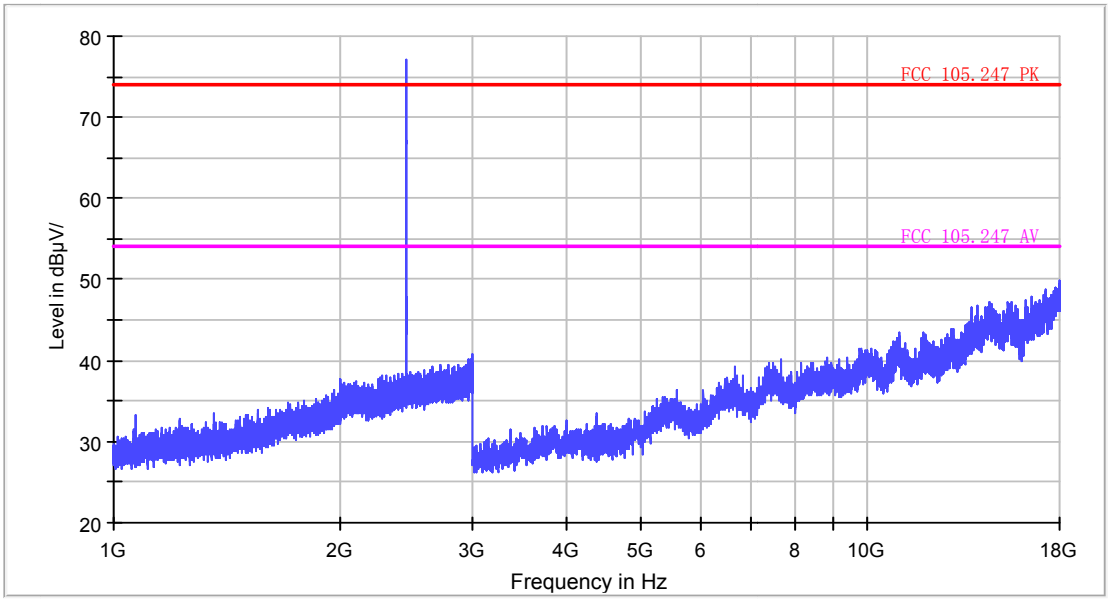
Channel 39 @ 2441 MHz @ GFSK_DH5

FCC Electric Field Strength 1-18GHz operate on 2.4GHz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					AV	V

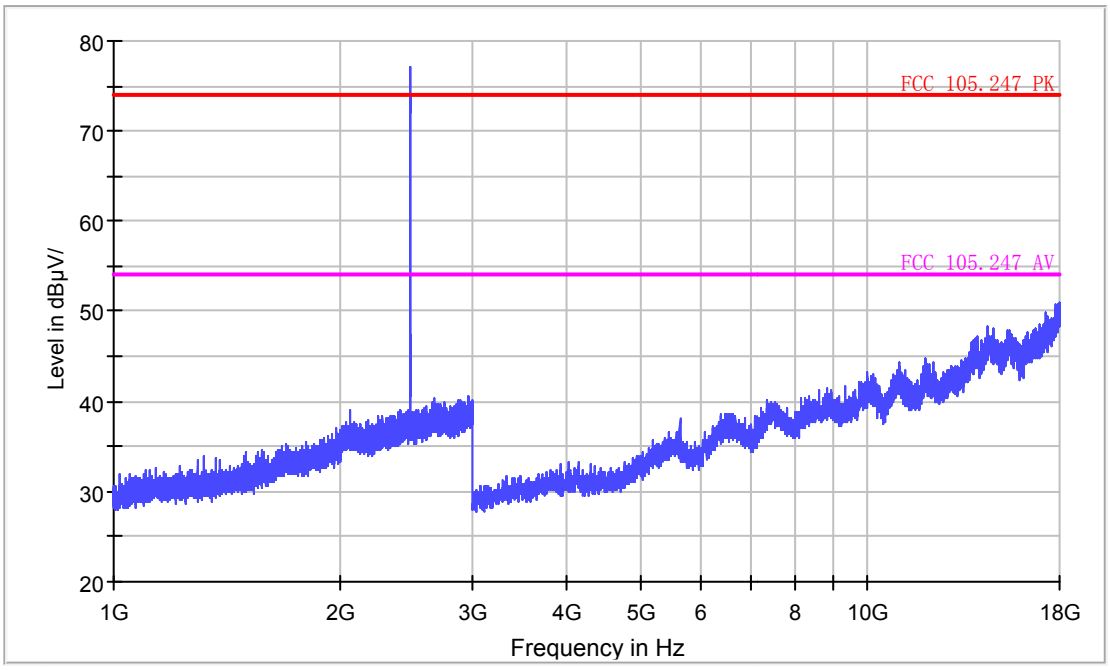
FCC Electric Field Strength 1-18GHz operate on 2.4GHz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					AV	V

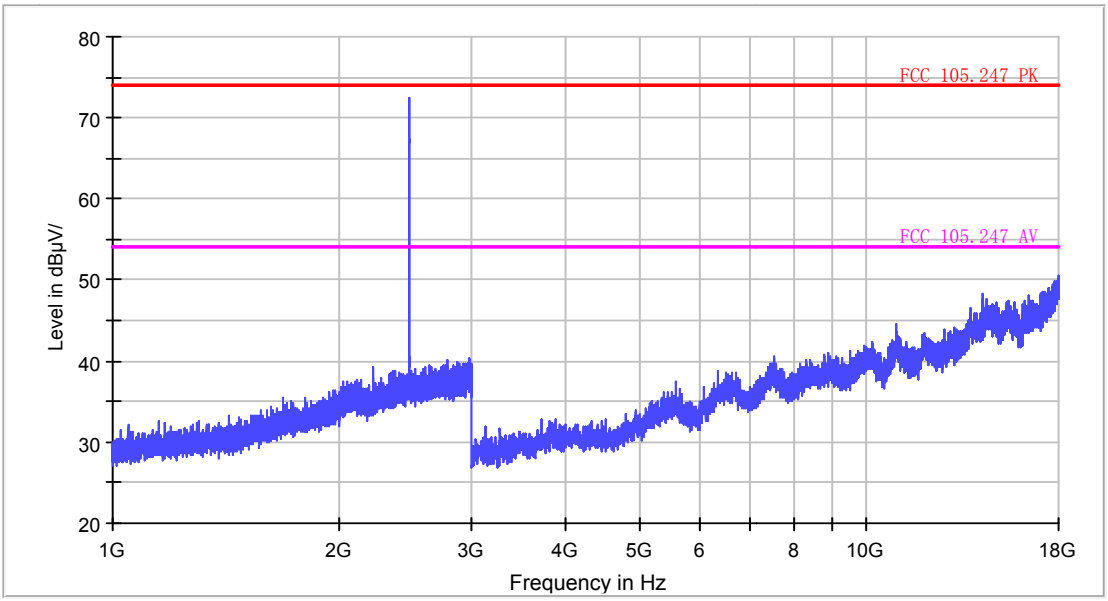
Channel 78 @ 2480 MHz @ GFSK_DH5

FCC Electric Field Strength 1-18GHz operate on 2.4GHz

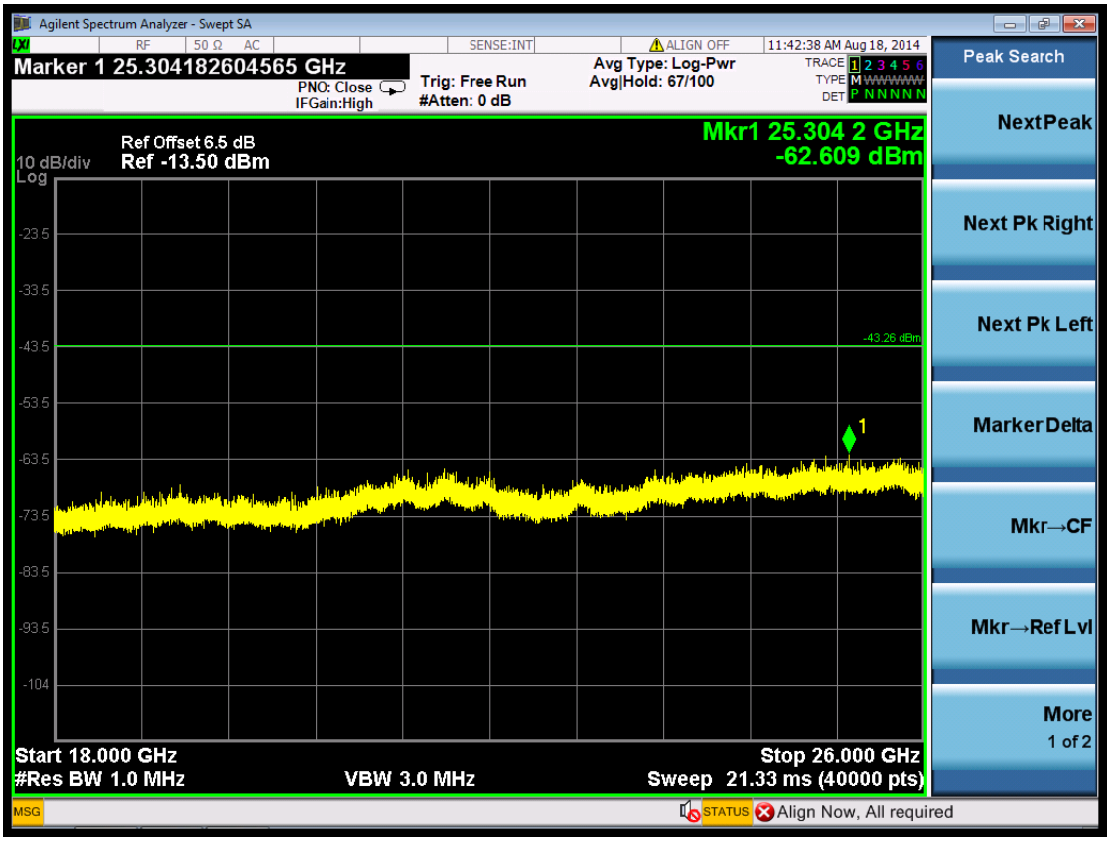


Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					AV	V

FCC Electric Field Strength 1-18GHz operate on 2.4GHz



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
	---					AV	V



6.3 Maximum Peak Output Power

TEST PROCEDURE

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

LIMIT

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

TEST RESULTS

Remark: We test maximum peak output power at difference Packet Type (DH1, DH3 and DH5), recorded worst case at DH3

6.3.1 GFSK Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
00	2402	0.72	30	PASS
39	2441	2.11	30	PASS
78	2480	3.28	30	PASS

Note: 1.The test results including the cable lose.

6.3.2 π/4 DQPSK Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
00	2402	-0.91	21	PASS
39	2441	1.95	21	PASS
78	2480	2.34	21	PASS

Note: 1.The test results including the cable lose.

6.3.3 8DPSK Test Mode

B. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
00	2402	-1.48	21	PASS
39	2441	1.63	21	PASS
78	2480	1.97	21	PASS

Note: 1.The test results including the cable lose.

6.4 20dB Bandwidth

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100 KHz.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

LIMIT

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

TEST RESULTS

Remark: We test 20dB Bandwidth at difference Packet Type (DH1, DH3 and DH5), recorded worst case at DH5.

6.4.1 GFSK Test Mode

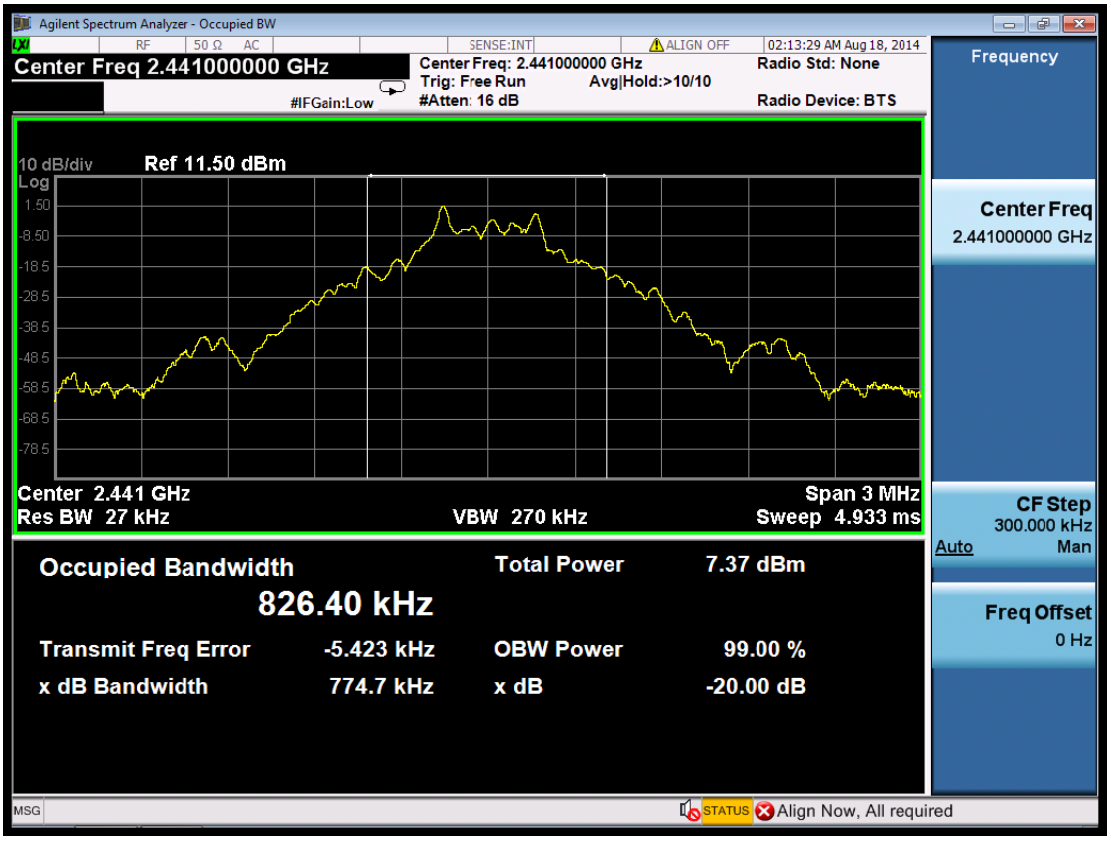
A. Test Verdict

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot	Limits (MHz)	Verdict
00	2402	0.8168	Plot 6.4.1 A	/	PASS
39	2441	0.7747	Plot 6.4.1 B	/	PASS
78	2480	0.8168	Plot 6.4.1 C	/	PASS

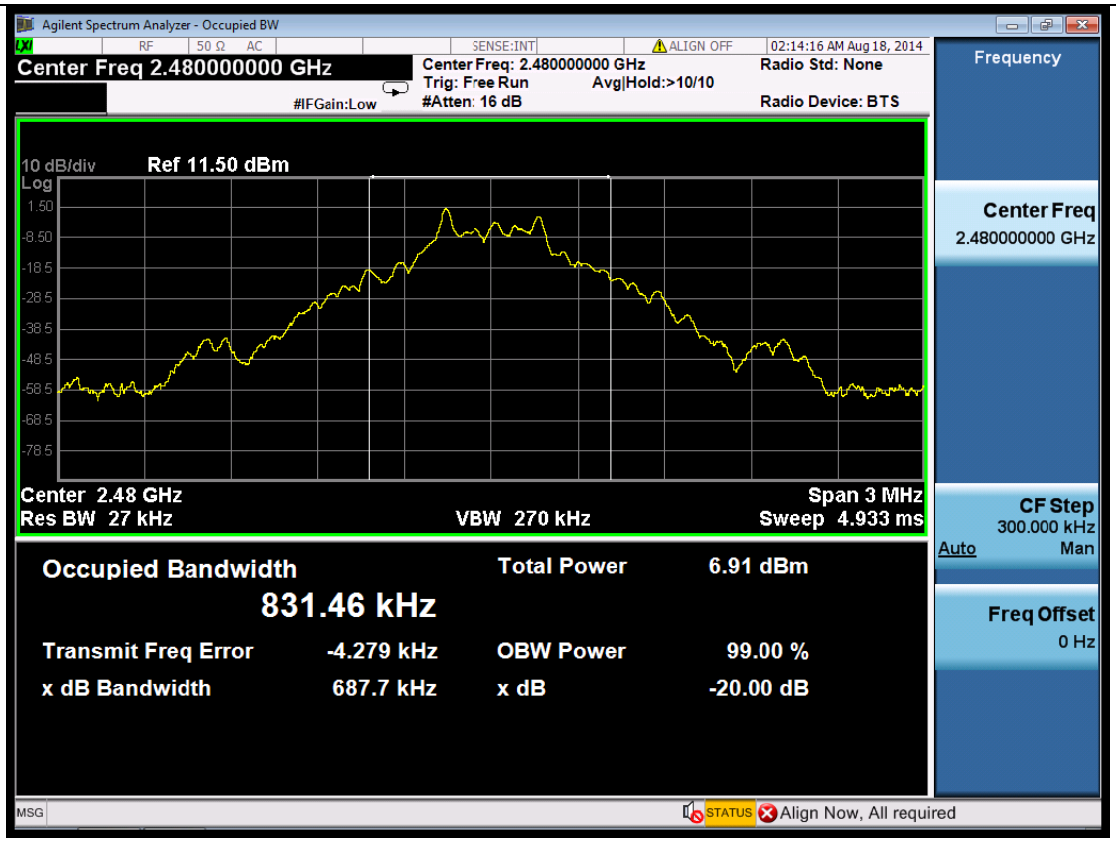
Note: 1.The test results including the cable lose.

B. Test Plots

(Plot 6.4.1 A: Channel 00: 2402MHz @ GFSK)



(Plot 6.4.1 B: Channel 39: 2441MHz @ GFSK)



(Plot 6.4.1 C: Channel 78: 2480MHz @ GFSK)

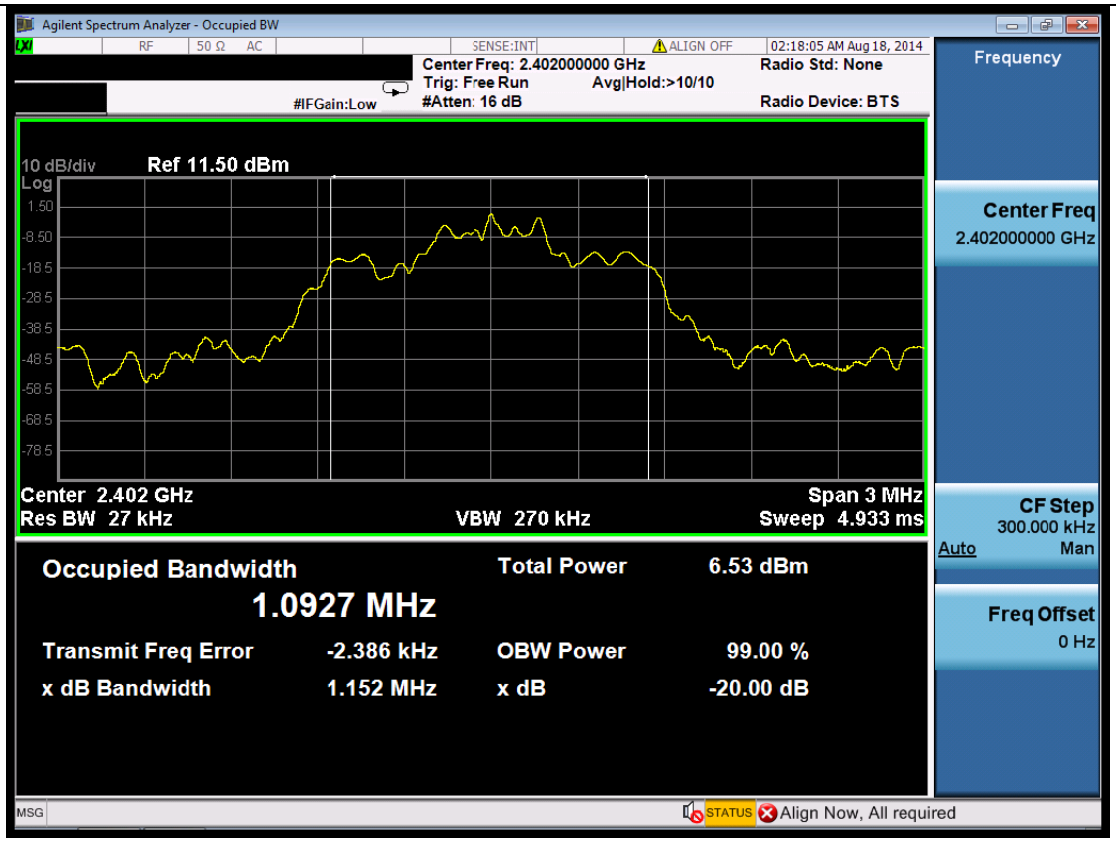
6.4.2 8DPSK Test Mode

A. Test Verdict

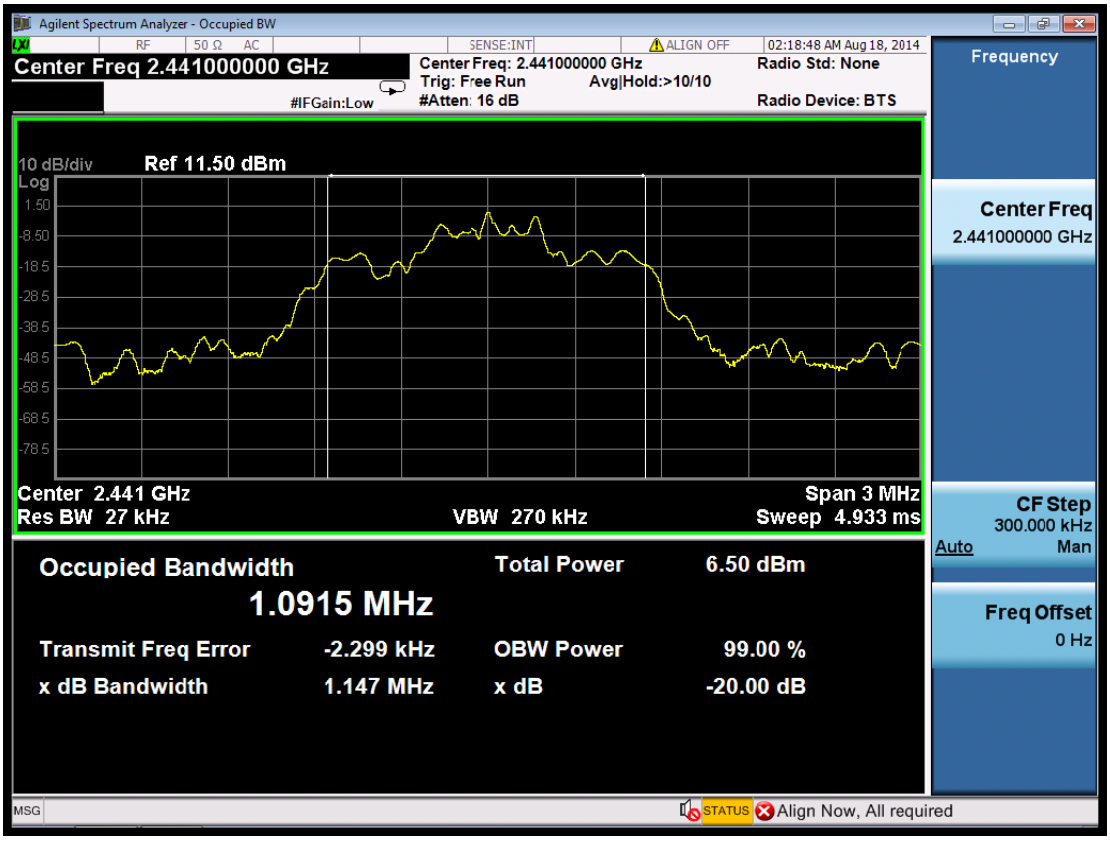
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot	Limits (MHz)	Verdict
00	2402	1.152	Plot 6.4.2 A	/	PASS
39	2441	1.147	Plot 6.4.2 B	/	PASS
78	2480	1.148	Plot 6.4.2 C	/	PASS

Note: 1.The test results including the cable lose.

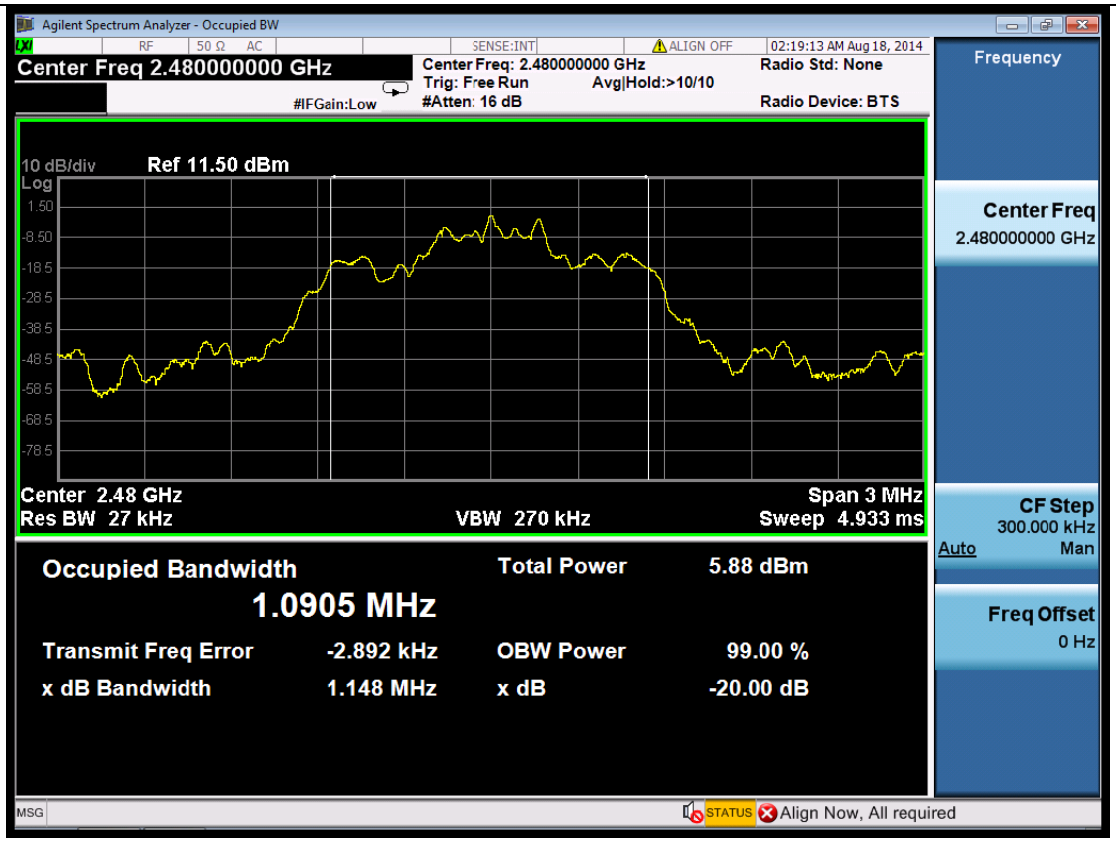
B. Test Plots



(Plot 6.4.2 A: Channel 00: 2402MHz @ 8DPSK)



(Plot 6.4.2 B: Channel 39: 2441MHz @ 8DPSK)



(Plot 6.4.2 C: Channel 78: 2480MHz @ 8DPSK)

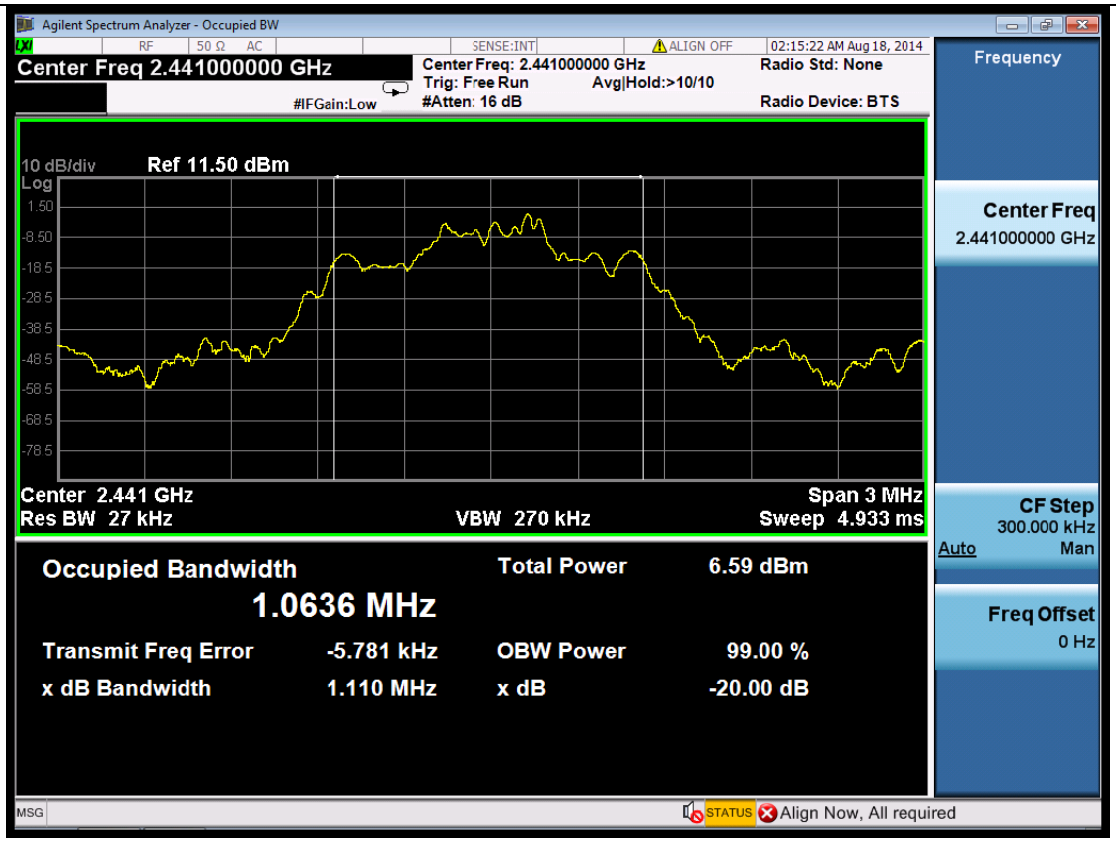
4.4.3 π/4DQPSKTest Mode

A. Test Verdict

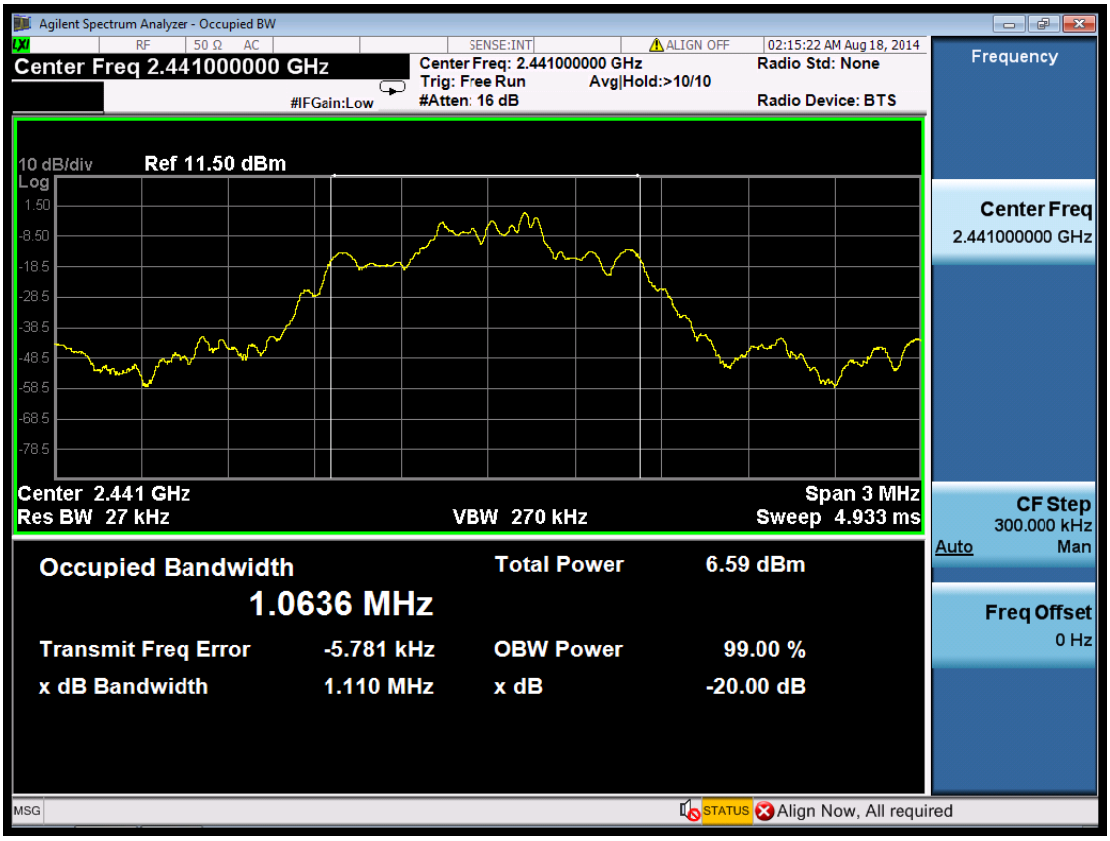
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot	Limits (MHz)	Verdict
00	2402	1.109	Plot 6.4.3 A	/	PASS
39	2441	1.110	Plot 6.4.3 B	/	PASS
78	2480	1.108	Plot 6.4.3 C	/	PASS

Note: 1.The test results including the cable lose.

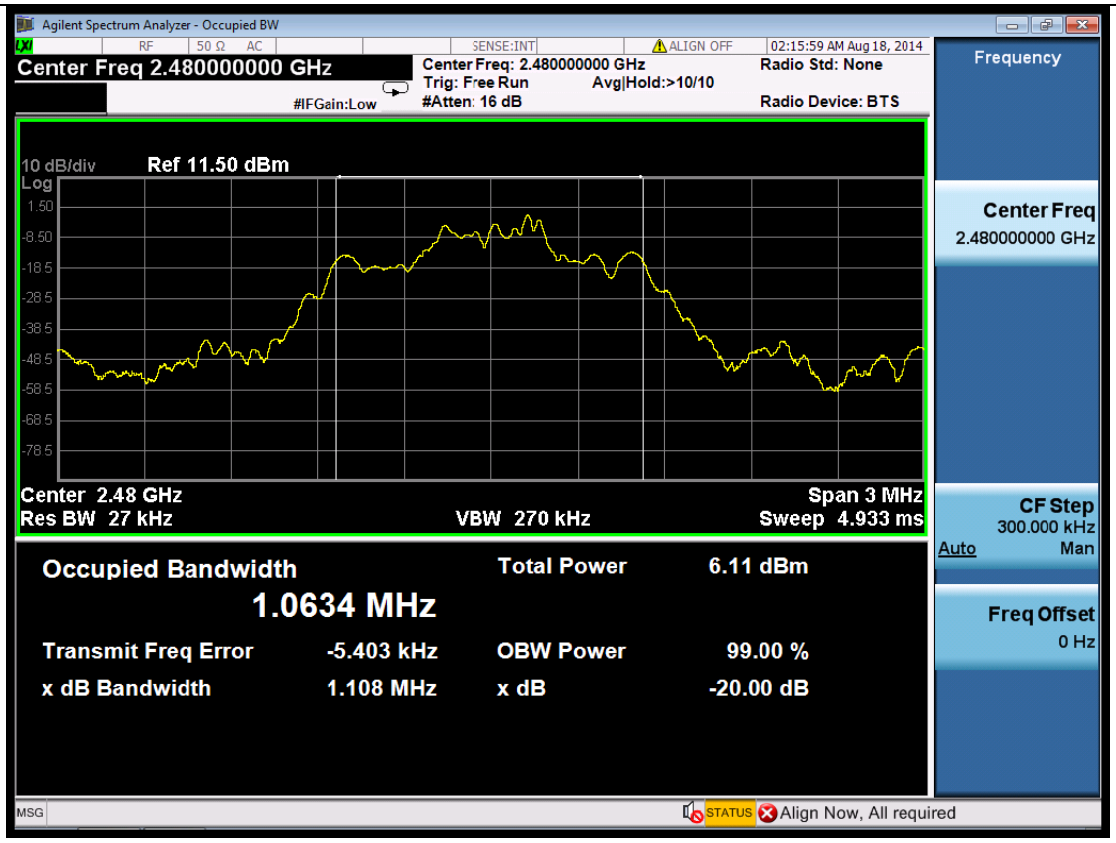
B. Test Plots



(Plot 6.4.3 A: Channel 00: 2402MHz @ π/4DQPSK)



(Plot 6.4.3 B: Channel 39: 2441MHz @π/4DQPSK)



(Plot 6.4.3 C: Channel 78: 2480MHz @π/4DQPSK)

6.5 Band Edge

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

TEST RESULTS

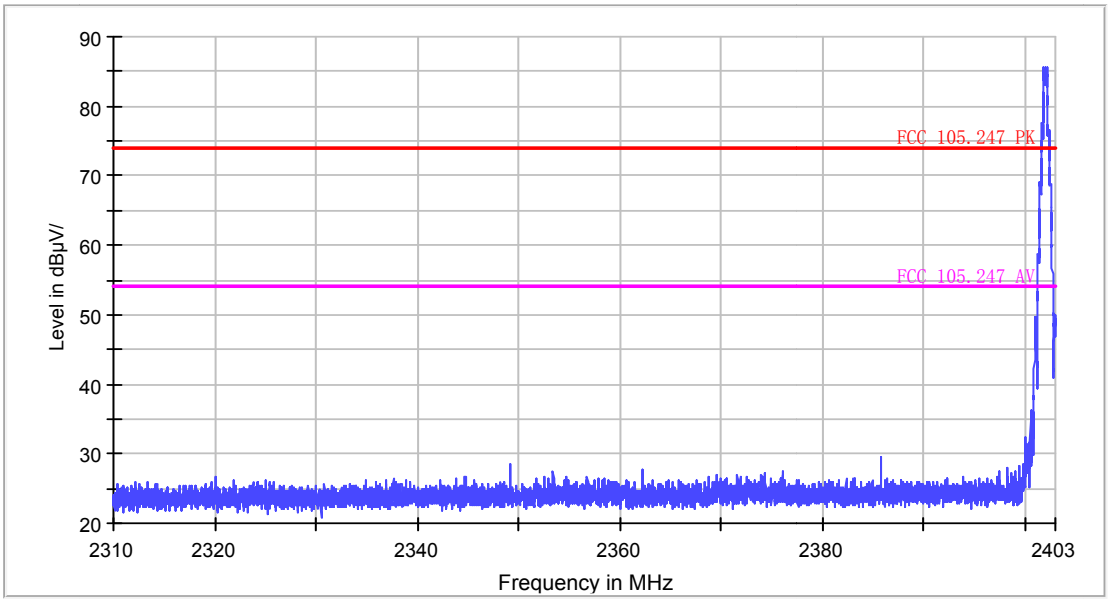
Remark: 1. We test Band Edge at difference Packet Type (DH1, DH3 and DH5), recorded worst case at DH5.
2. "---" means not recorded as emission levels lower than limit.

6.5.1 For Radiated Bandedge Measurement

Remark: we tested radiated bandedge at both hopping and no-hopping modes, recorded worst case at no-hopping mode

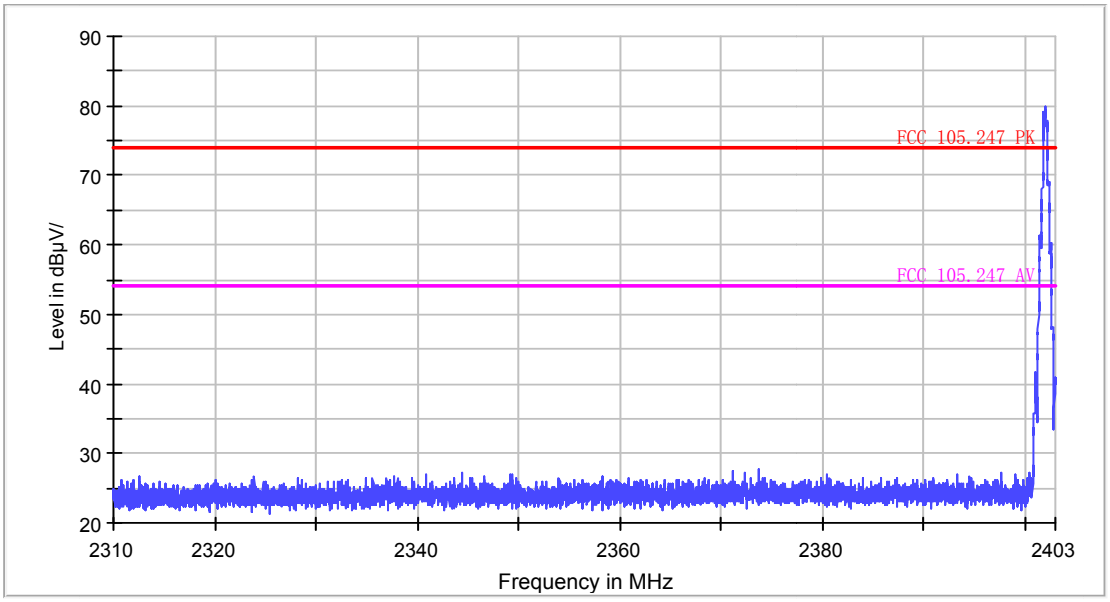
6.5.1.1 GFSK Test Mode

FCC Electric Field Strength 2.4GHz Bandedge-PK



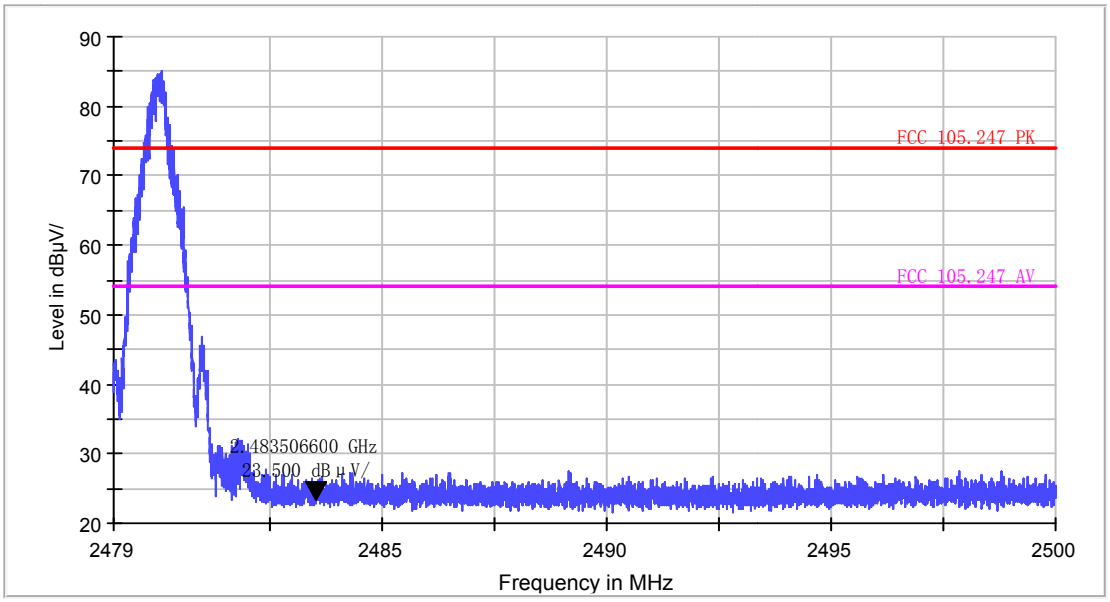
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2390.00	---					Peak	H

FCC Electric Field Strength 2.4GHz Bandedge-PK



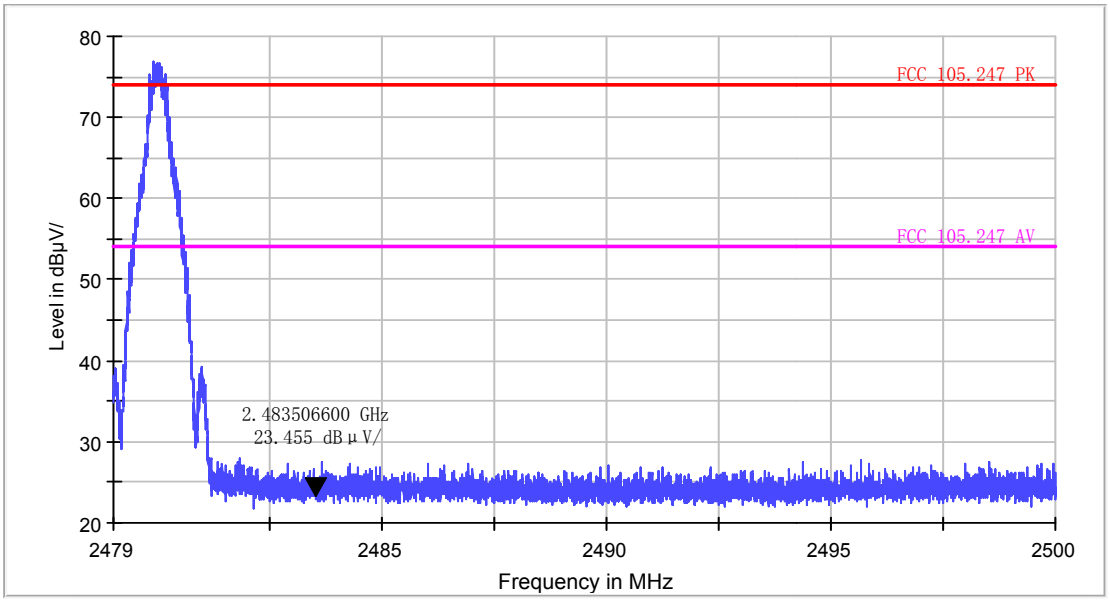
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2390.00	---					Peak	V

FCC Electric Field Strength 2.4GHz Bandedge-PK



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2483.50	---					Peak	H

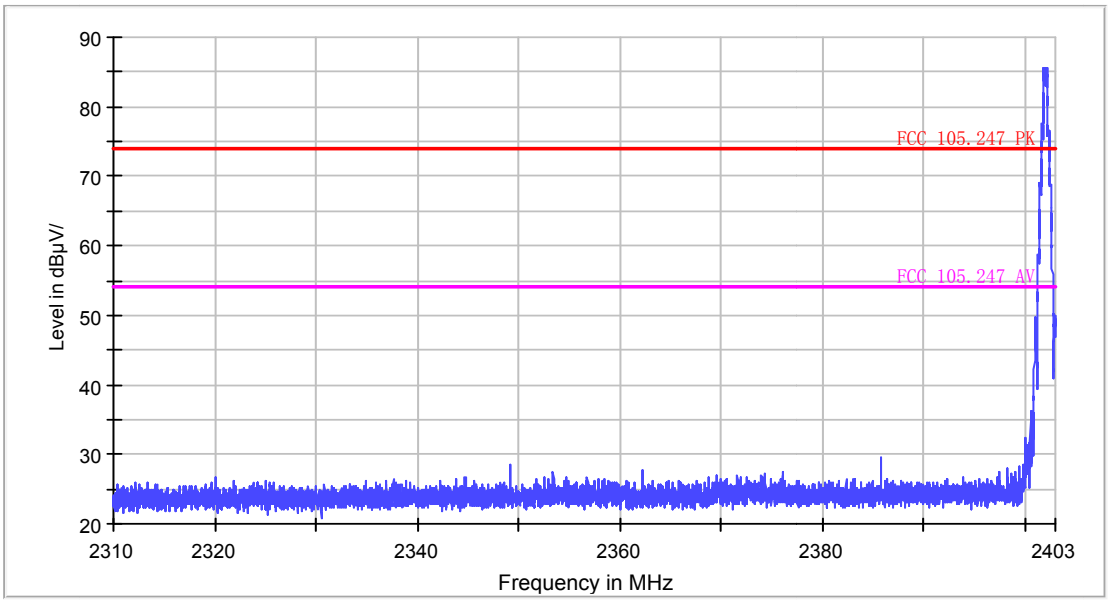
FCC Electric Field Strength 2.4GHz Bandedge-PK



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2483.50	---					Peak	V

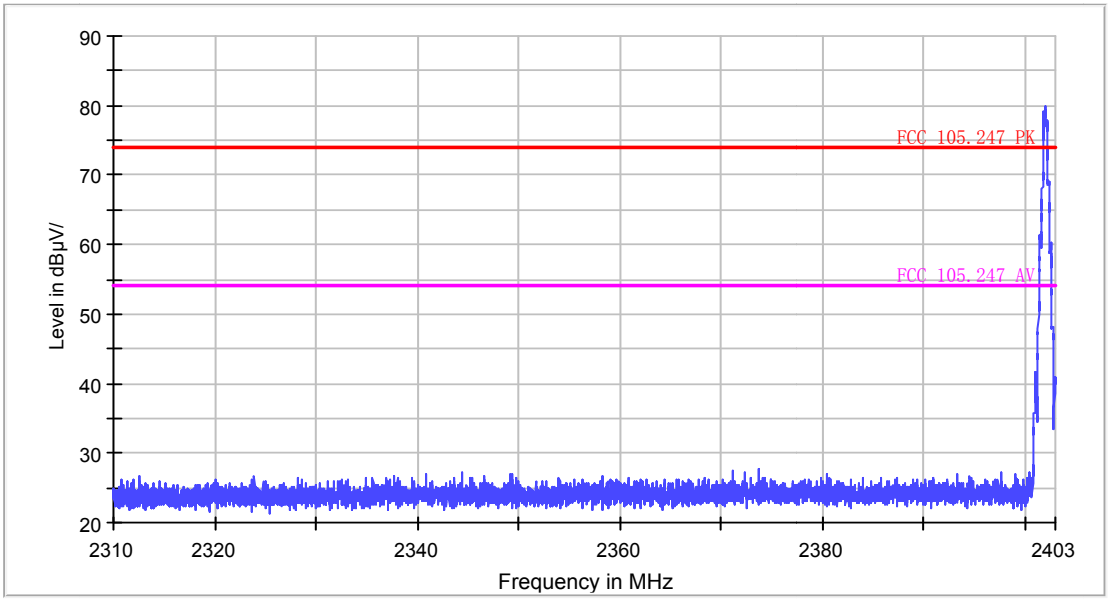
6.5.1.2 π/4DQPSK Test Mode

FCC Electric Field Strength 2.4GHz Bandedge-PK



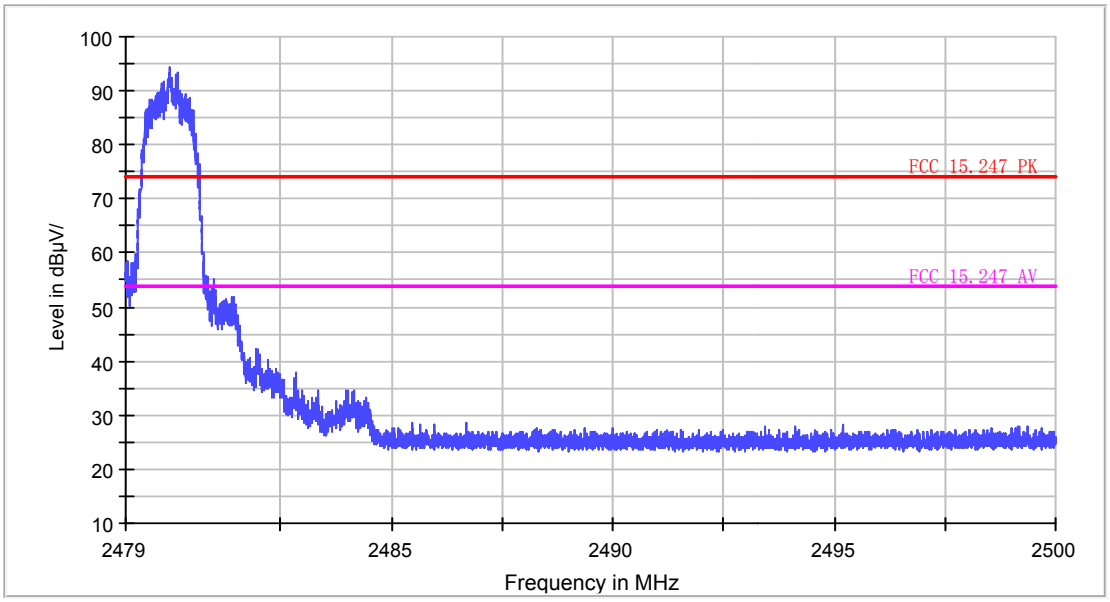
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2390.00	---					Peak	H

FCC Electric Field Strength 2.4GHz Bandedge-PK



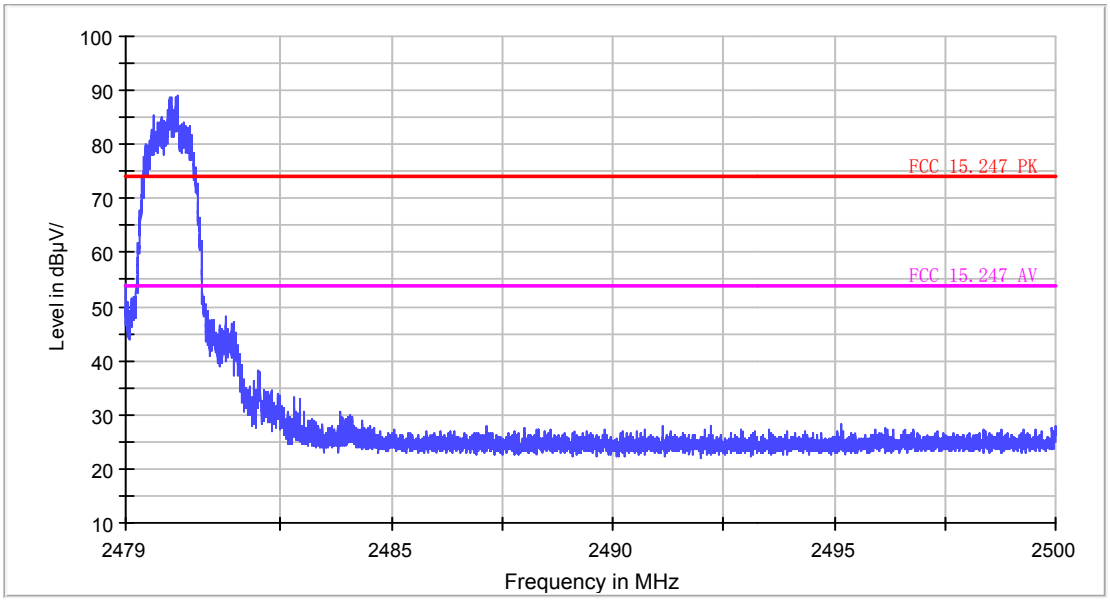
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2390.00	---					Peak	V

FCC Electric Field Strength 2.4GHz Bandedge-PK



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2483.50	---					Peak	H

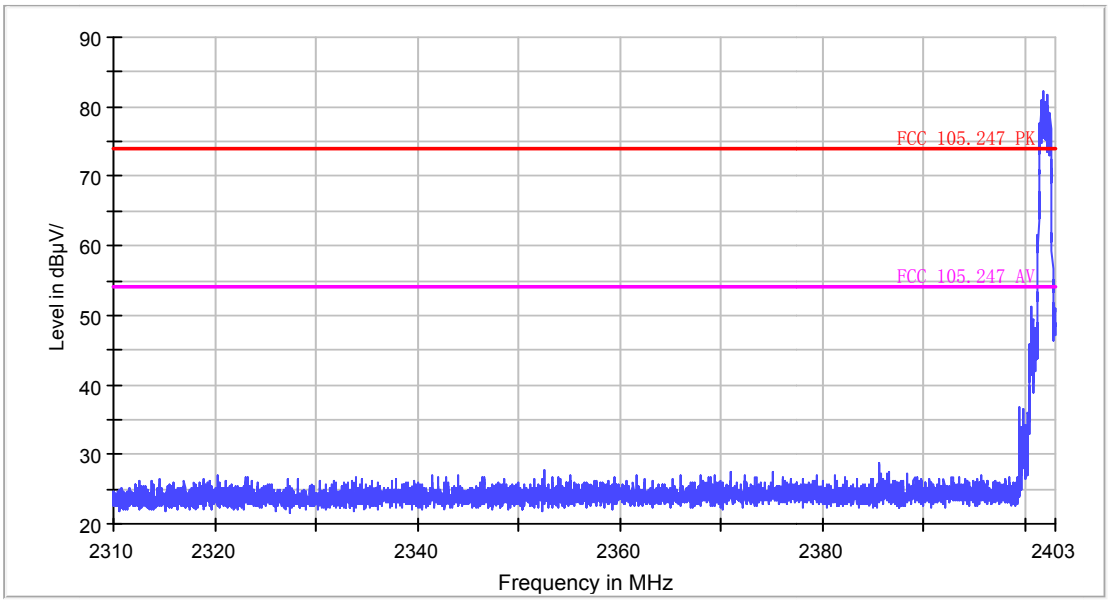
FCC Electric Field Strength 2.4GHz Bandedge-PK



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2483.50	---					Peak	V

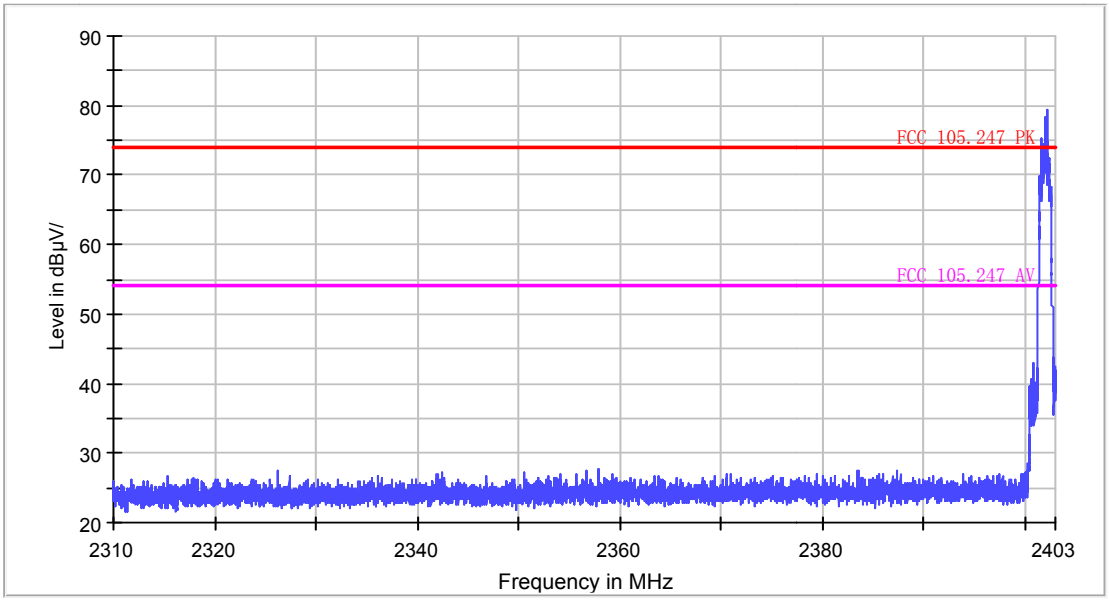
6.5.1.3 8DPSK Test Mode

FCC Electric Field Strength 2.4GHz Bandedge-PK



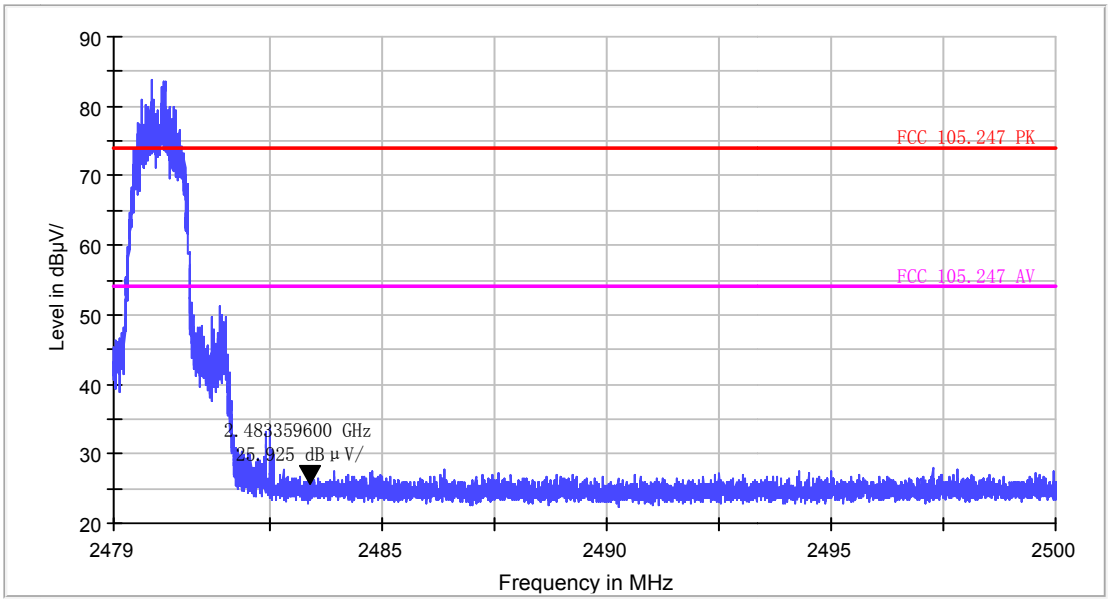
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2390	---					Peak	H

FCC Electric Field Strength 2.4GHz Bandedge-PK



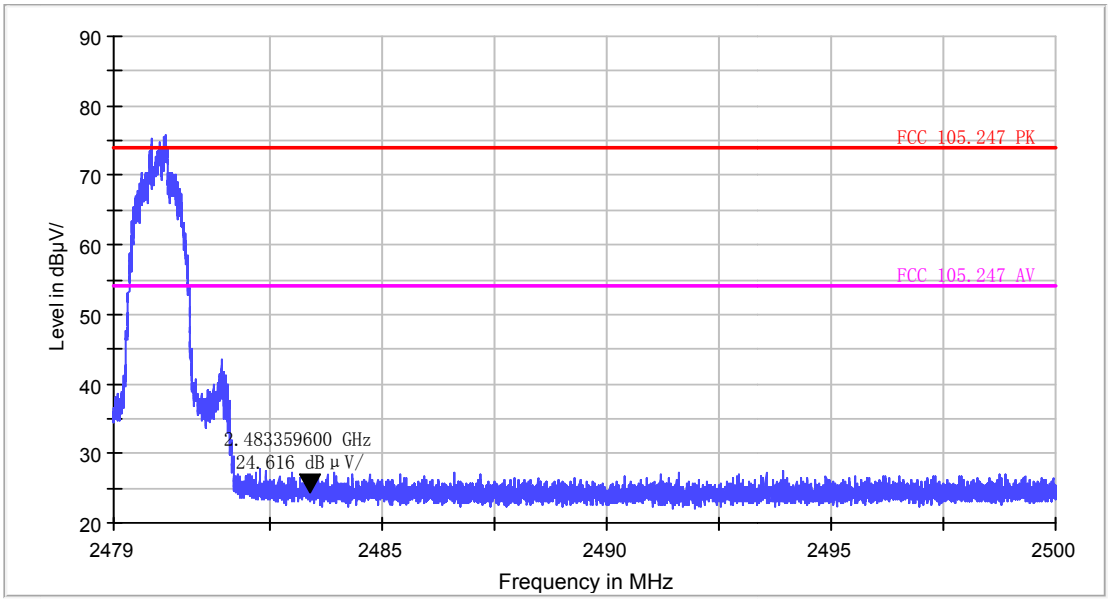
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2390	---					Peak	V

FCC Electric Field Strength 2.4GHz Bandedge-PK



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2483.50	---					Peak	H

FCC Electric Field Strength 2.4GHz Bandedge-PK



Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Ant. Polar. H / V
2483.50	---					Peak	V

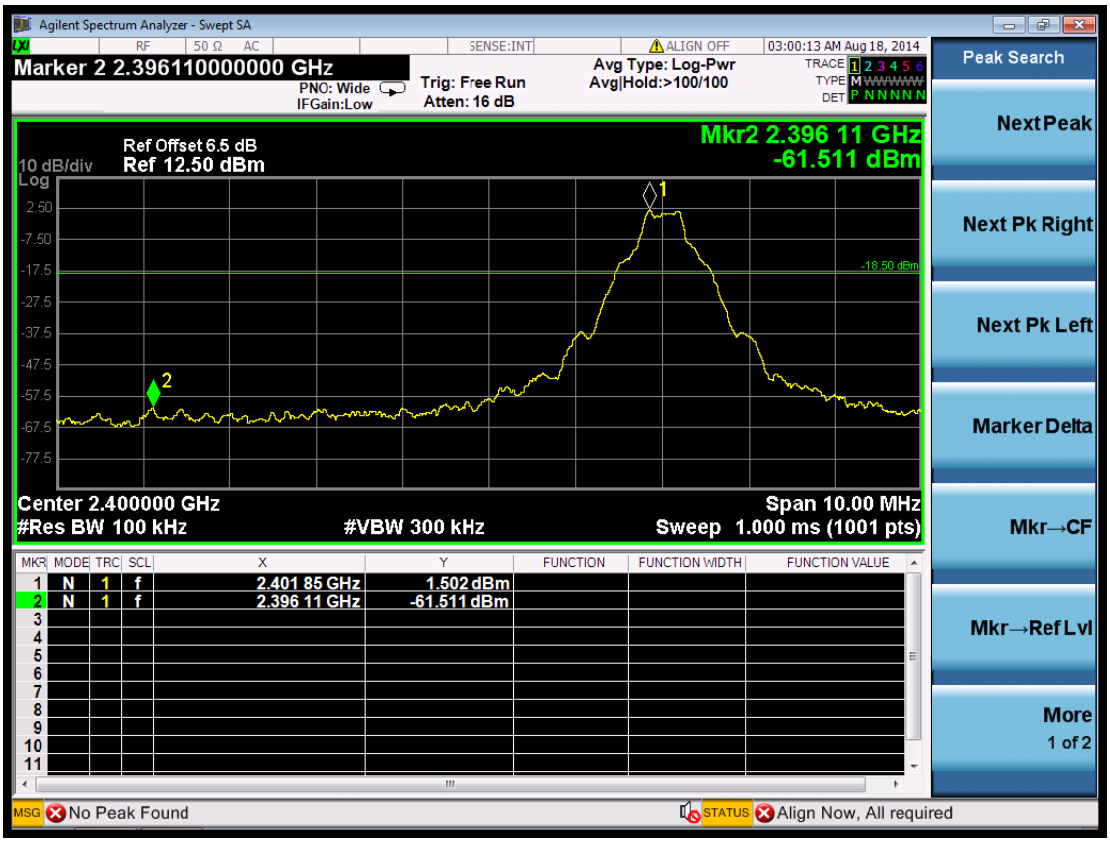
6.5.2 For Conducted Bandedge Measurement

6.5.2.1 GFSK Test Mode

A. Test Verdict

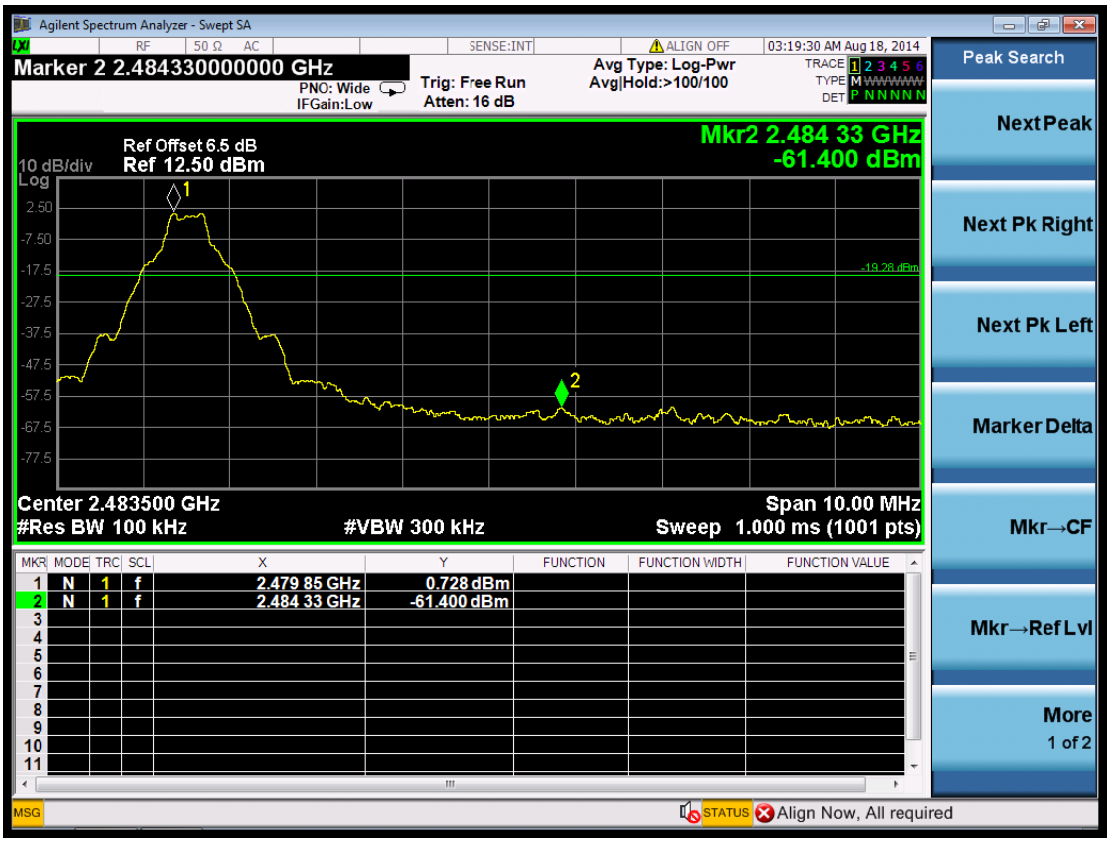
Frequency (MHz)	Delta Peak to Band emission (dBc)	Hoping Mode	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-67.013	OFF	Peak	-20	Plot 6.5.2.1 A	PASS
2400.00	-63.427	ON	Peak	-20	Plot 6.5.2.1 B	PASS
2483.50	-62.128	OFF	Peak	-20	Plot 6.5.2.1 C	PASS
2483.50	-63.221	ON	Peak	-20	Plot 6.5.2.1 D	PASS

B. Test Plots

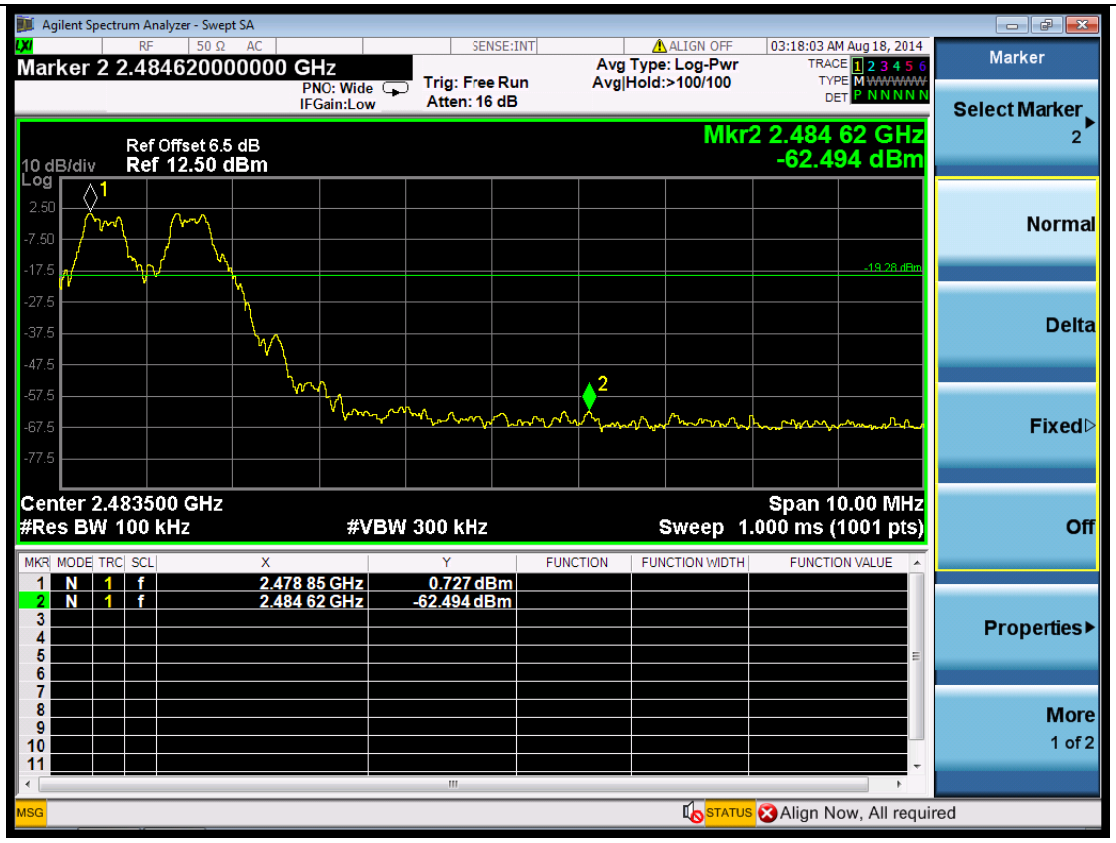


(Plot 6.5.2.1 A: Hopping Off @ GFSK)

(Plot 6.5.2.1 B: Hopping On @ GFSK)



(Plot 6.5.2.1 C: Hopping Off @ GFSK)



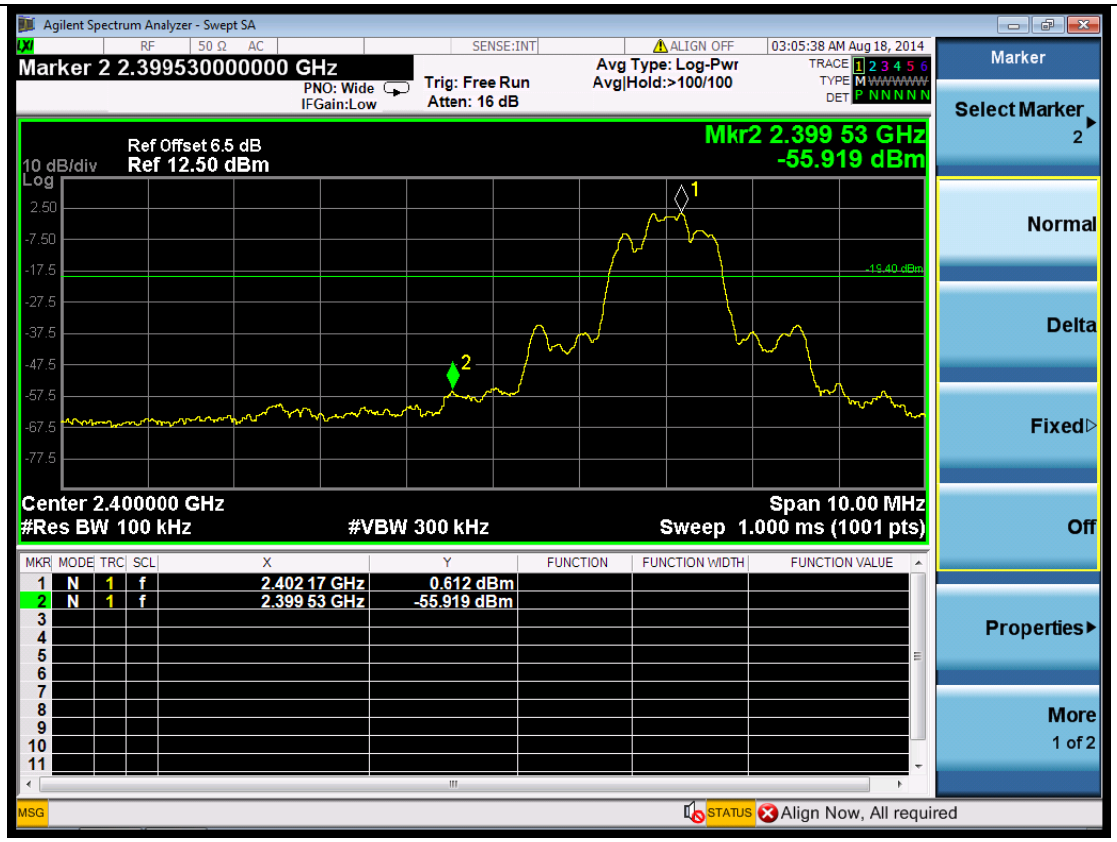
(Plot 6.5.2.1 D: Hopping On @ GFSK)

4.5.2.2 8DPSK Test Mode

A. Test Verdict

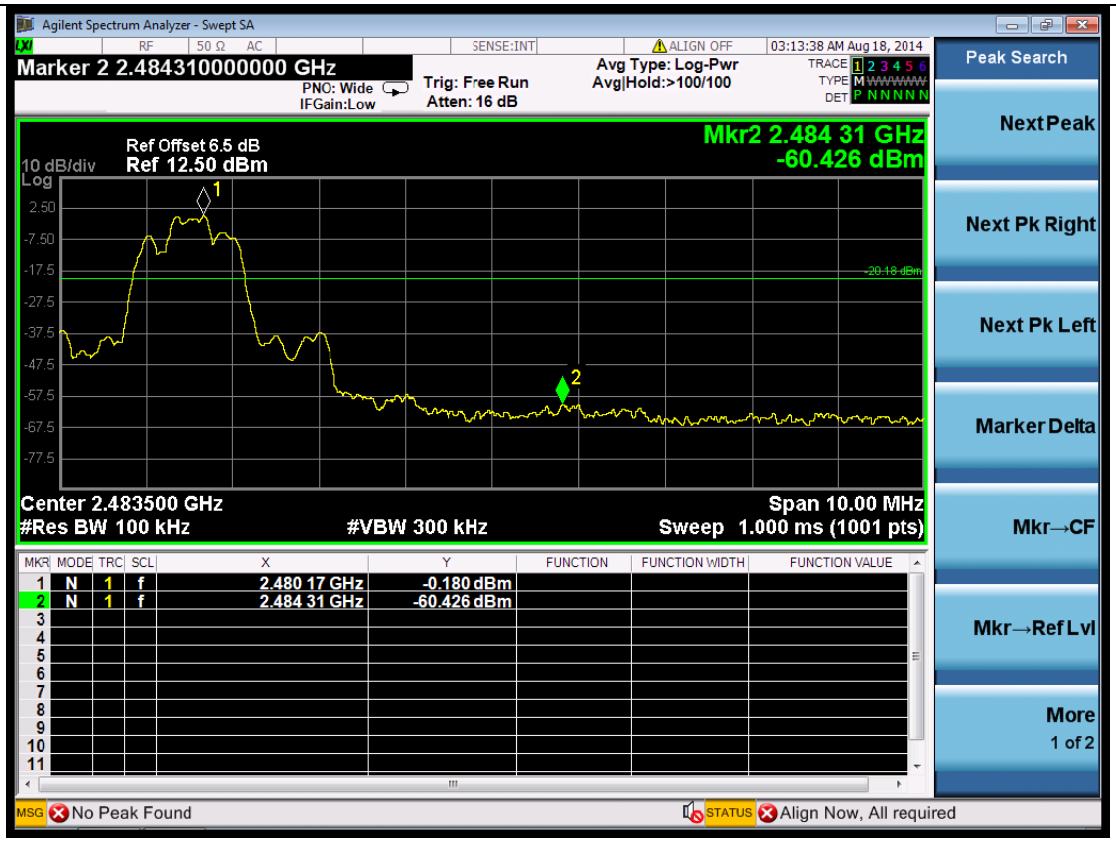
Frequency (MHz)	Delta Peak to Band emission (dBc)	Hoping Mode	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-56.531	OFF	Peak	-20	Plot 6.5.2.2 A	PASS
2400.00	-57.458	ON	Peak	-20	Plot 6.5.2.2 B	PASS
2483.50	-60.246	OFF	Peak	-20	Plot 6.5.2.2 C	PASS
2483.50	-61.200	ON	Peak	-20	Plot 6.5.2.2 D	PASS

B. Test Plots

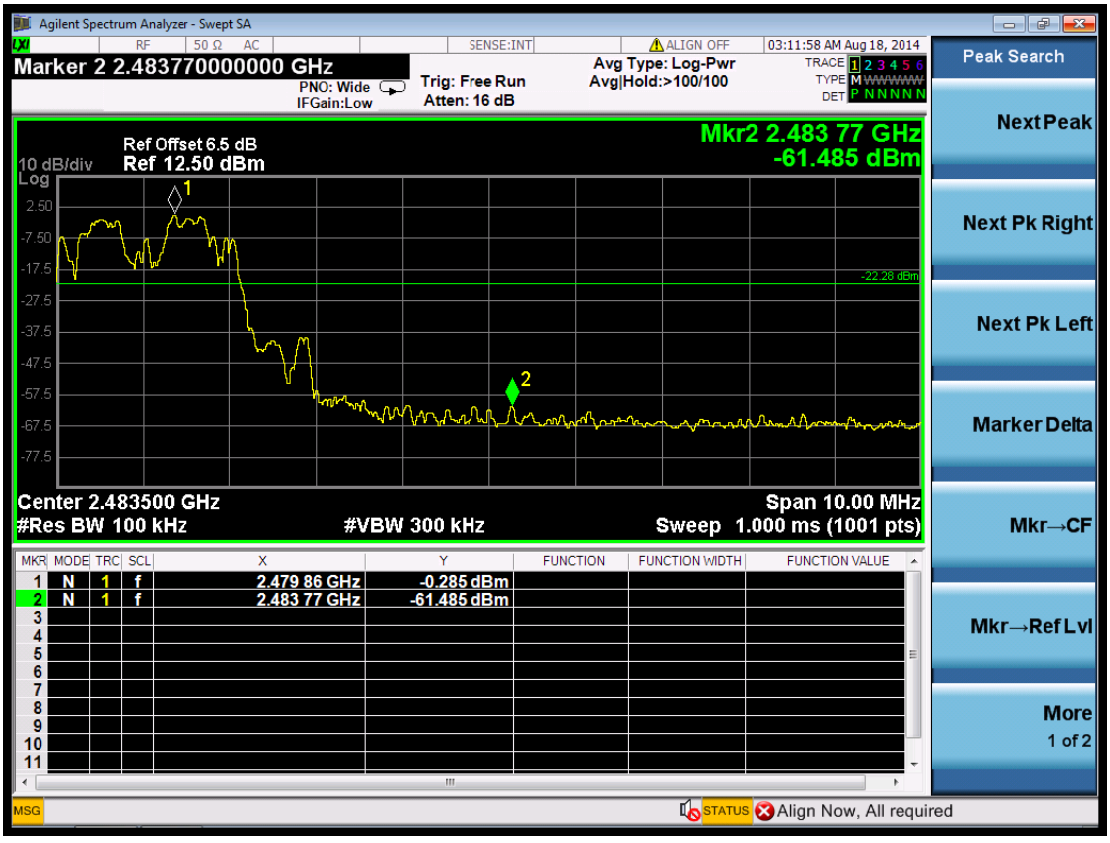


(Plot 6.5.2.2 A: Hopping Off @ 8DPSK)

(Plot 6.5.2.2 B: Hopping On @ 8DPSK)



(Plot 6.5.2.2 C: Hopping Off @ 8DPSK)



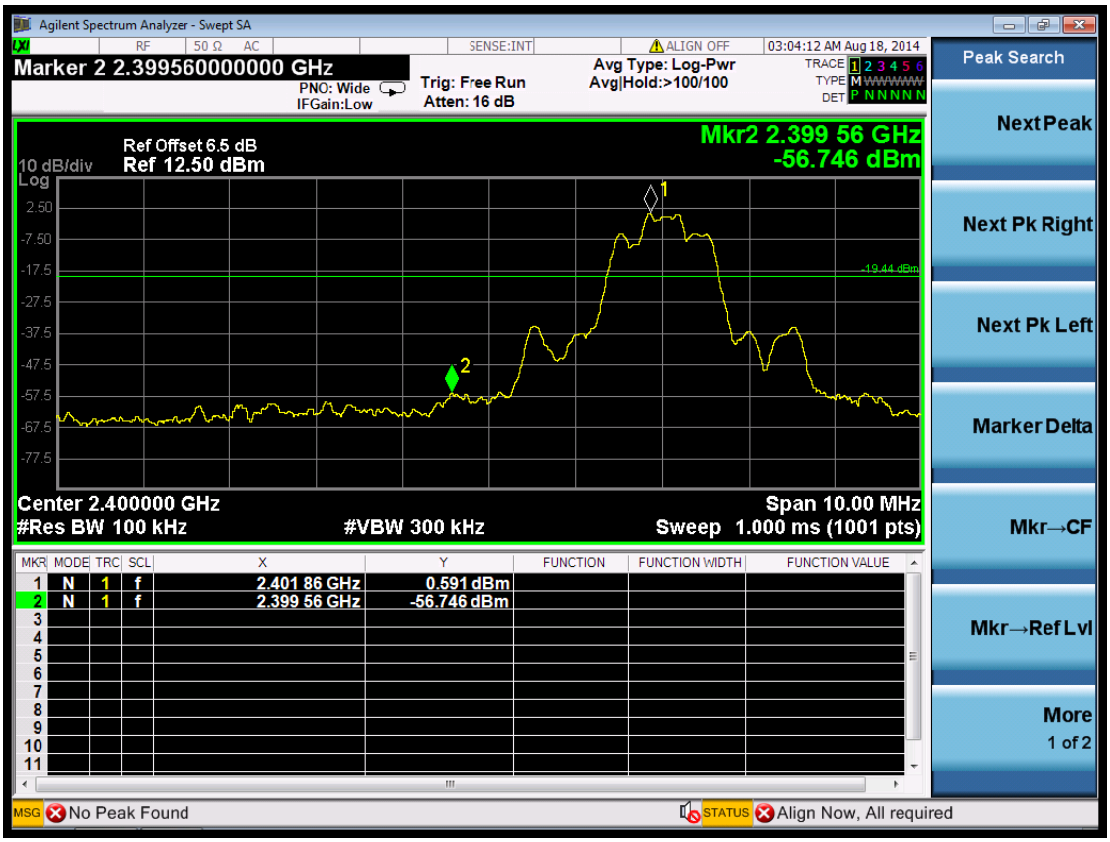
(Plot 6.5.2.2 D: Hopping On @ 8DPSK)

6.5.2.3 π/4DQPSK Test Mode

A. Test Verdict

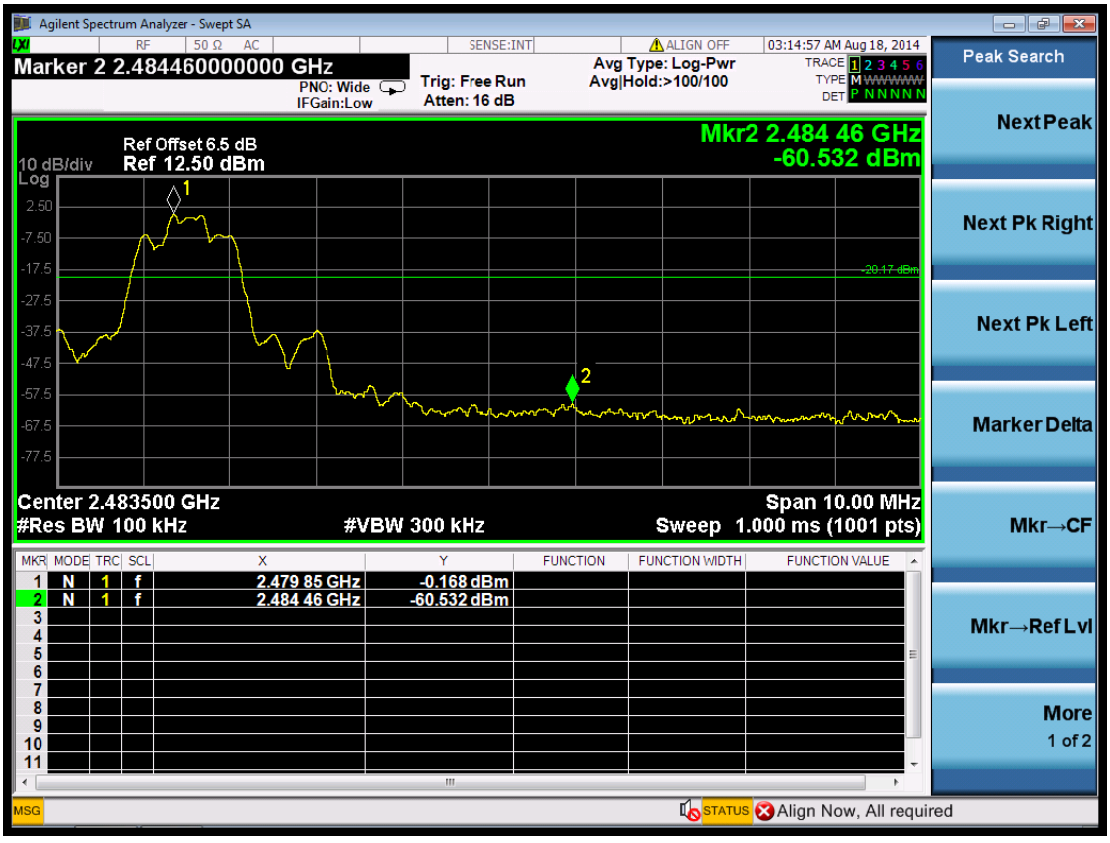
Frequency (MHz)	Delta Peak to Band emission (dBc)	Hoping Mode	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-57.337	OFF	Peak	-20	Plot 6.5.2.3 A	PASS
2400.00	-61.199	ON	Peak	-20	Plot 6.5.2.3 B	PASS
2483.50	-60.700	OFF	Peak	-20	Plot 6.5.2.3 C	PASS
2483.50	-61.918	ON	Peak	-20	Plot 6.5.2.3 D	PASS

B. Test Plots



(Plot 6.5.2.3 A: Hopping Off @ π/4DQPSK)

(Plot 6.5.2.3 B: Hopping On @π/4DQPSK)



(Plot 6.5.2.3 C: Hopping Off @ π/4DQPSK)

(Plot 6.5.2.3 D: Hopping On @π/4DQPSK)

6.6 Frequency Separation

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30 KHz and VBW=100KHz.

LIMIT

According to 15.247(a)(1),frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 2/3*20dB bandwidth of the hopping channel, whichever is greater.

TEST RESULTS

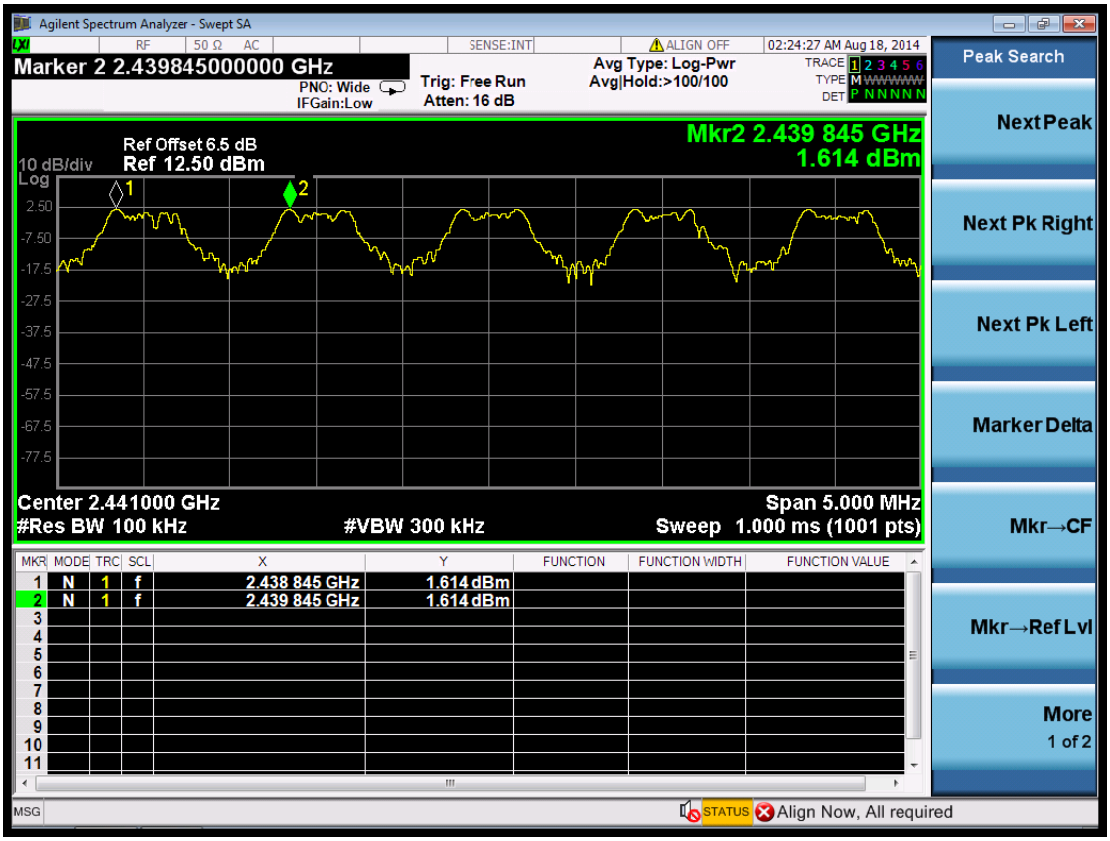
Remark: 1. We test Frequency Separation at difference Packet Type (DH1, DH3 and DH5) and all test channels, recorded worst case at DH5 and middle channel.

6.6.1 GFSK Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Channel Separation (MHz)	Refer to Plot	Limits (MHz)	Verdict
38	2440	1.000	Plot 6.6.1 A	0.7747	PASS
39	2441				

B. Test Plots



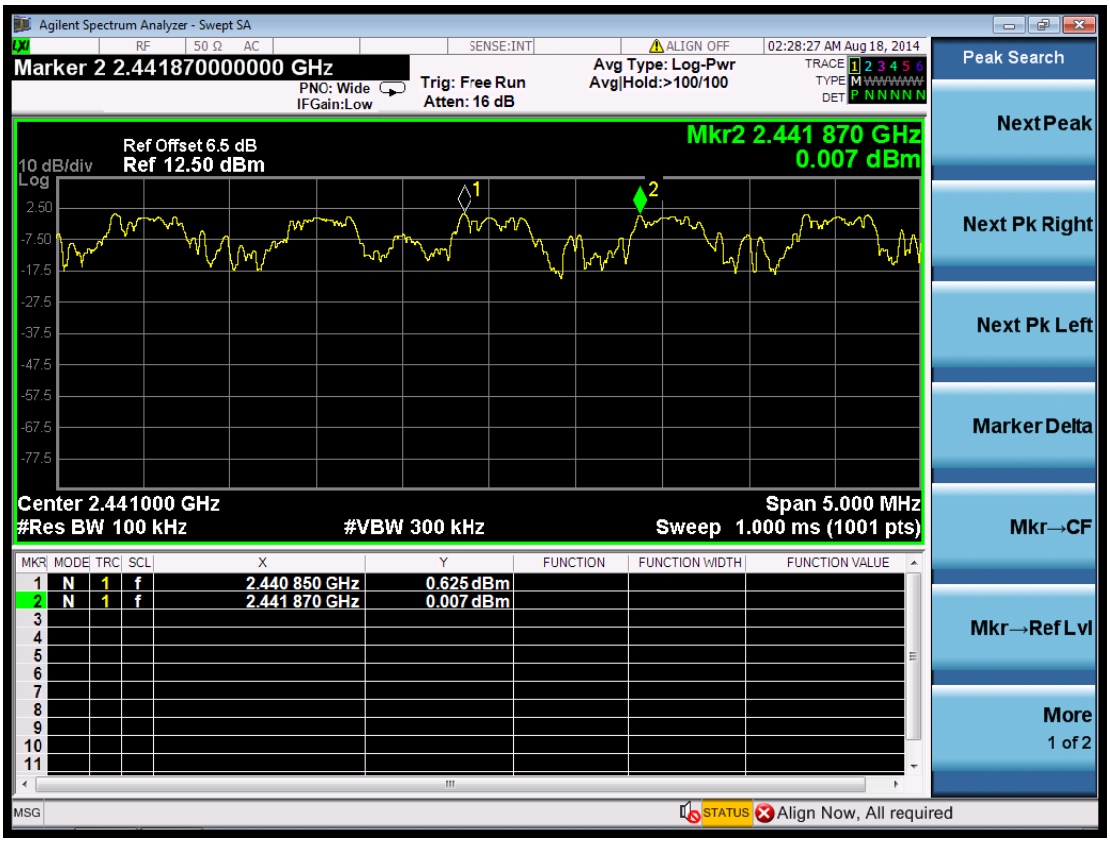
(Plot 6.6.1 A: Channel 39: 2441MHz @ GFSK)

4.6.2 8DPSK Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Channel Separation (MHz)	Refer to Plot	Limits (MHz)	Verdict
38	2440	1.020	Plot 6.6.2 A	0.7647	PASS
39	2441				

B. Test Plots



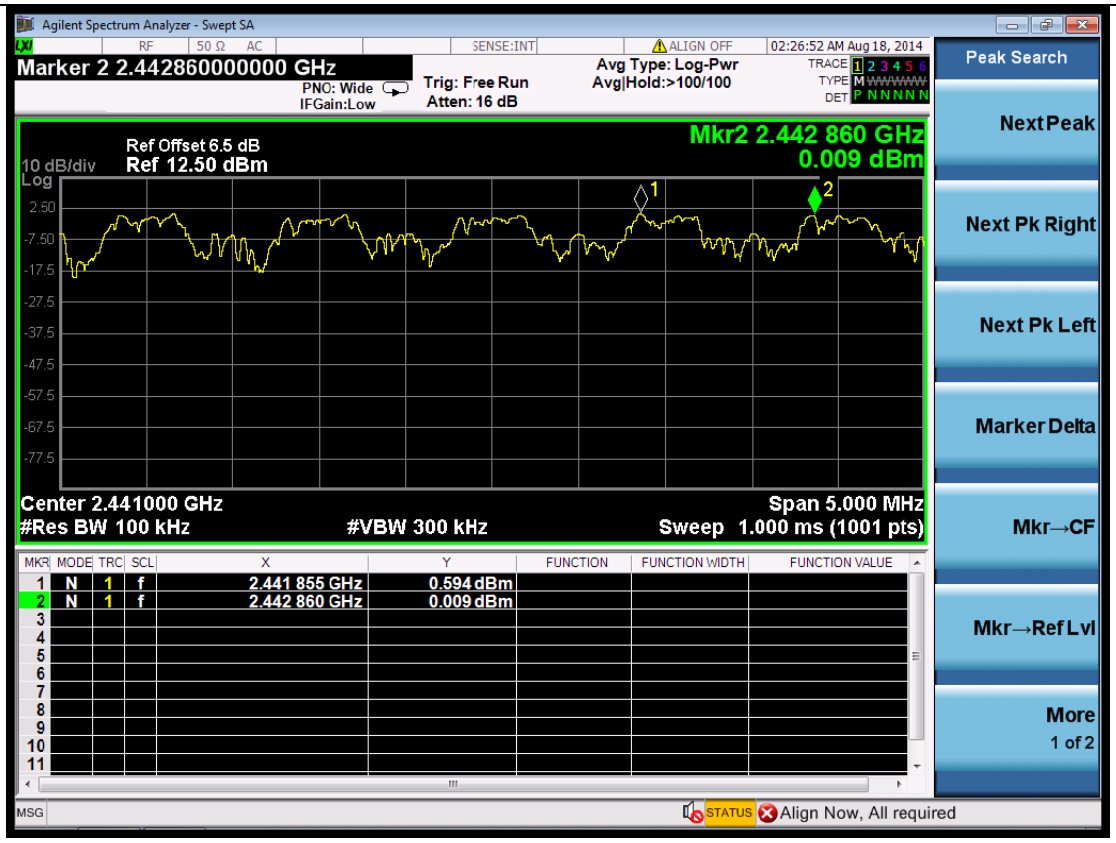
(Plot 6.6.2 A: Channel 39: 2441MHz @ 8DPSK)

6.6.3 π/4DQPSK Test Mode

A. Test Verdict

Channel	Frequency (MHz)	Channel Separation (MHz)	Refer to Plot	Limits (KHz)	Verdict
38	2440	1.005	Plot 4.6.3 A	0.7334	PASS
39	2441				

B. Test Plots



(Plot 6.6.3 A: Channel 39: 2441MHz @ π/4DQPSK)

6.7 Number of Hopping Channels

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz with RBW= 30 KHz and VBW=100 KHz.

LIMIT

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

TEST RESULTS

Remark: 1. We test Frequency Separation at difference Packet Type (DH1, DH3 and DH5), recorded worst case at DH5.

6.7.1 GFSK Test Mode

A. Test Verdict

Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Refer to Plot	Limit	Verdict
2400-2483.5	79	Plot 6.7.1 A	≥15	PASS

B. Test Plots

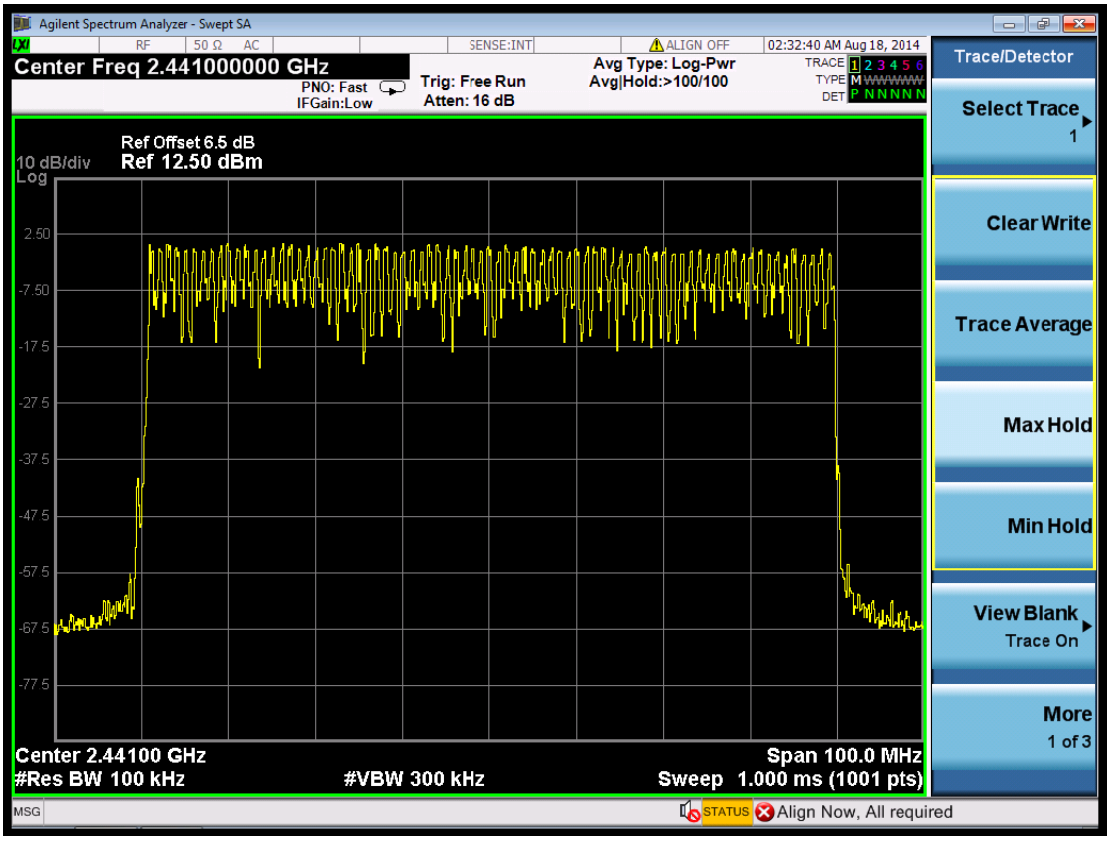
(Plot 6.7.1 A: @ GFSK)

6.7.2 8DPSK Test Mode

A. Test Verdict

Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Refer to Plot	Limit	Verdict
2400-2483.5	79	Plot 6.7.2 A	≥15	PASS

B. Test Plots



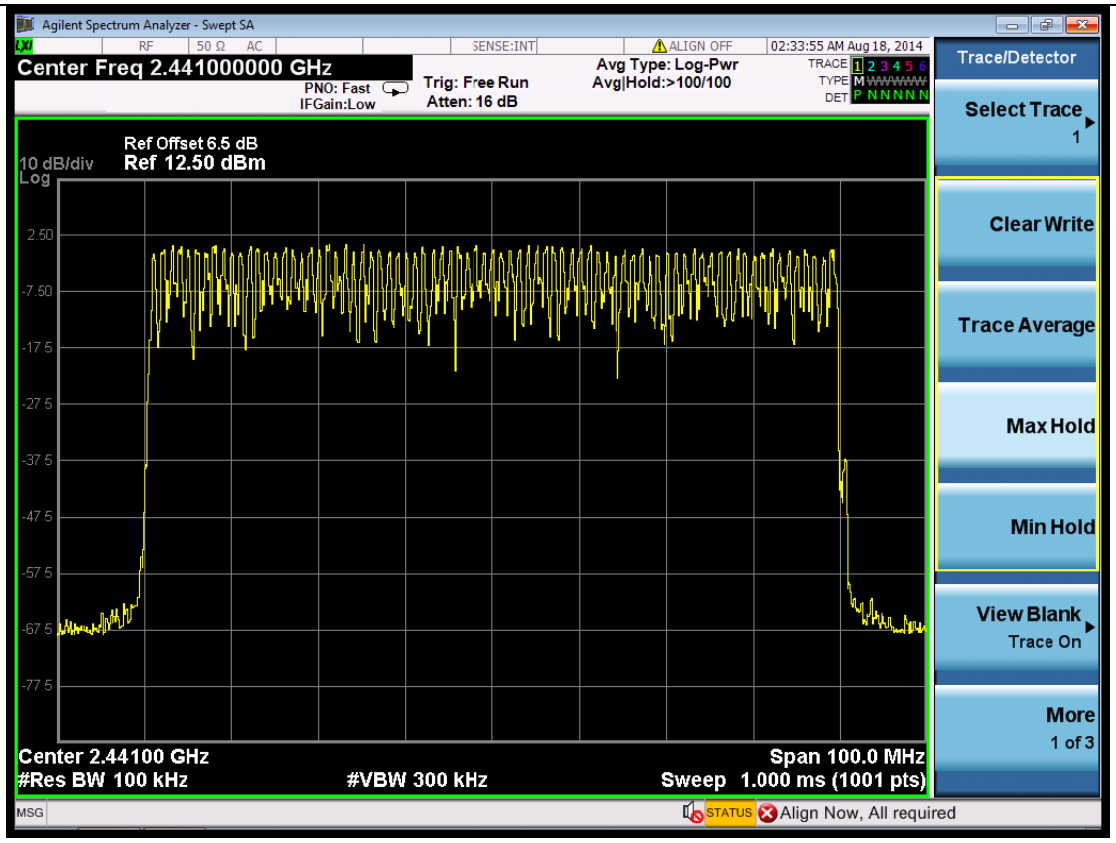
(Plot 6.7.2 A: @ 8DPSK)

4.7.3 π/4DQPSK Test Mode

A. Test Verdict

Hopping Channel Frequency Range (MHz)	Number of Hopping Channel	Refer to Plot	Limit	Verdict
2400-2483.5	79	Plot 6.7.3 A	≥15	PASS

B. Test Plots



(Plot 6.7.3 A: @ π/4DQPSK)

6.8 Time of Occupancy (Dwell Time)

TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with RBW=1MHz and VBW=3MHz, Span=0Hz.

LIMIT

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.

TEST RESULTS

The Dwell Time=Burst Width*Total Hops. The detailed calculations are showed as follows:
The duration for dwell time calculation:0.4[s]*hopping number=0.4[s]*79[ch]=31.6[s*ch];
The burst width [ms/hop/ch], which is directly measured, refers to the duration on one channel hop.
The hops per second for all channels: The selected EUT Conf uses a slot type of 5-Tx&1-Rx and a hopping rate of 1600 [ch*hop/s] for all channels. So the final hopping rate for all channels is 1600/6=266.67 [ch*hop/s]
The hops per second on one channel: 266.67 [ch*hops/s]/79 [ch]=3.38 [hop/s];
The total hops for all channels within the dwell time calculation duration: 3.38 [hop/s]*31.6[s*ch]=106.67 [hop*ch];
The dwell time for all channels hopping: 106.67 [hop*ch]*Burst Width [ms/hop/ch].

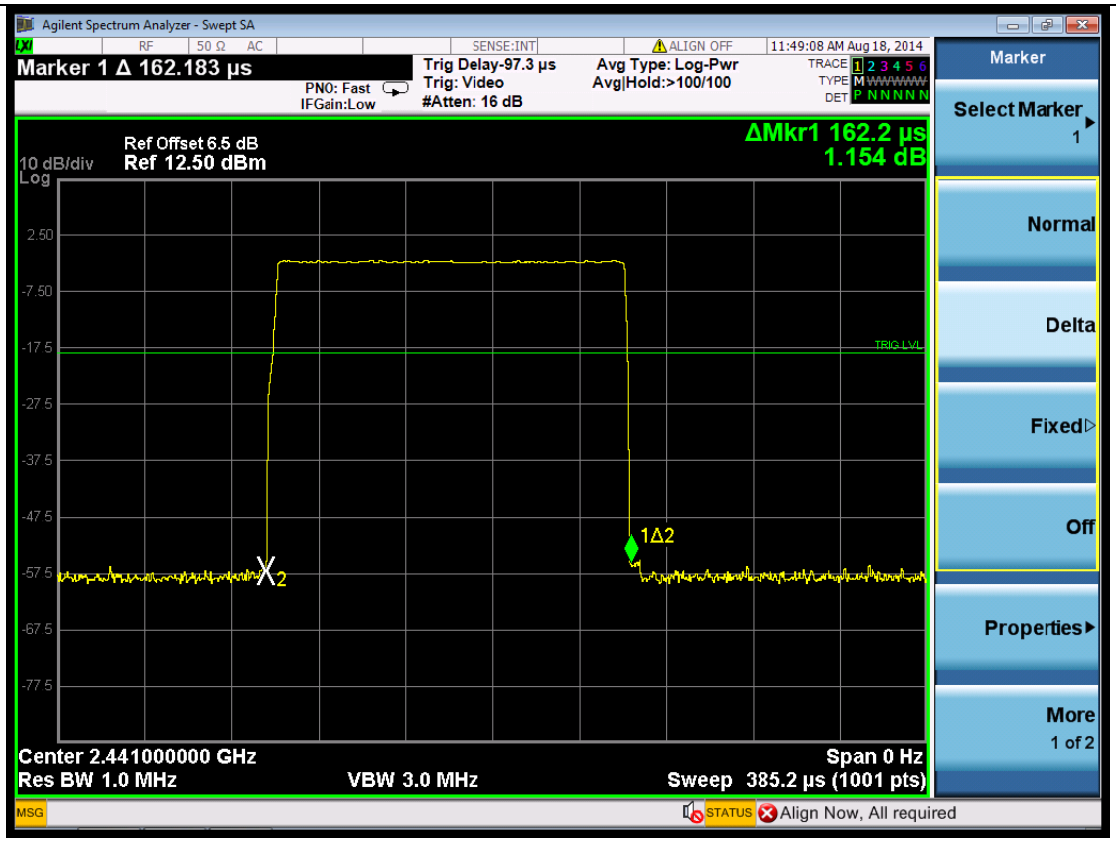
Remark: 1. We test Frequency Separation at all test channels, recorded worst case at middle channel.

6.8.1 GFSK Test Mode

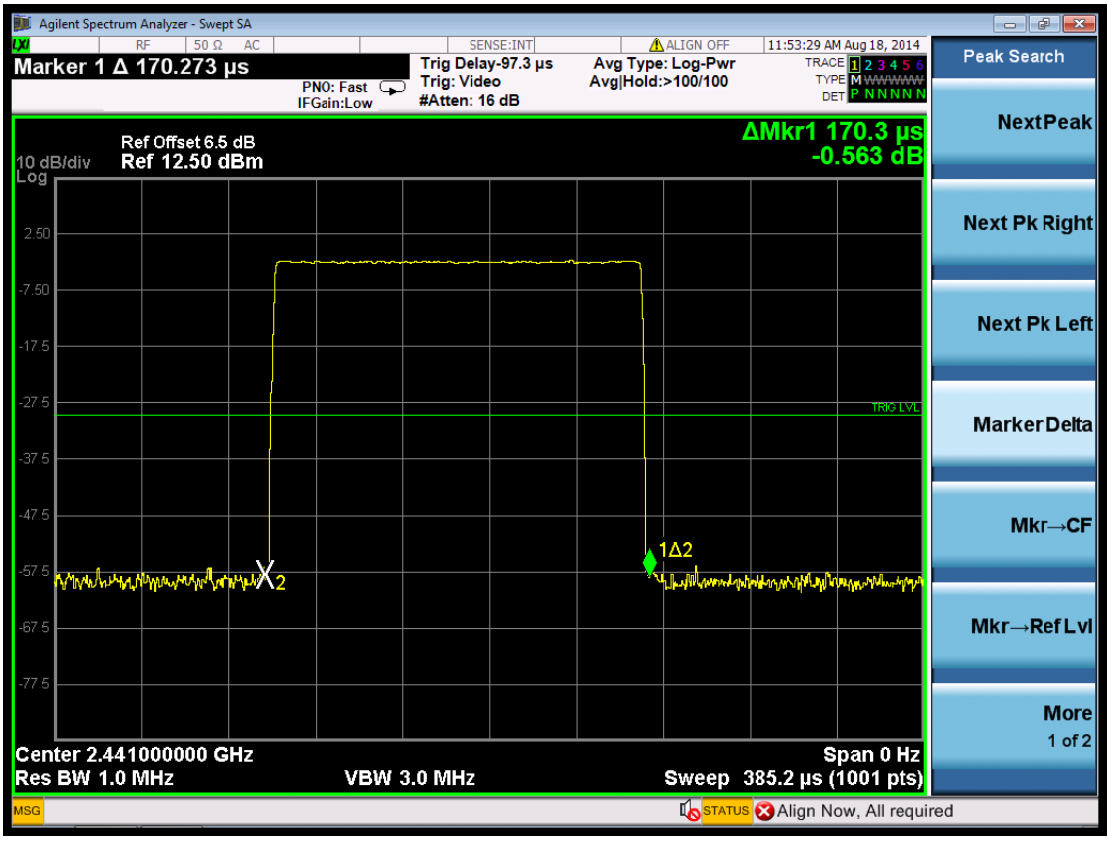
A. Test Verdict

Mode	Frequency (MHz)	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Refer to Plot	Verdict
DH1	2441	0.1622	0.051904	0.4	Plot 6.8.1 A	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second					
DH3	2441	0.1730	0.02768	0.4	Plot 6.8.1 B	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second					
DH5	2441	0.1687	0.01799	0.4	Plot 6.8.1 C	PASS
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second					

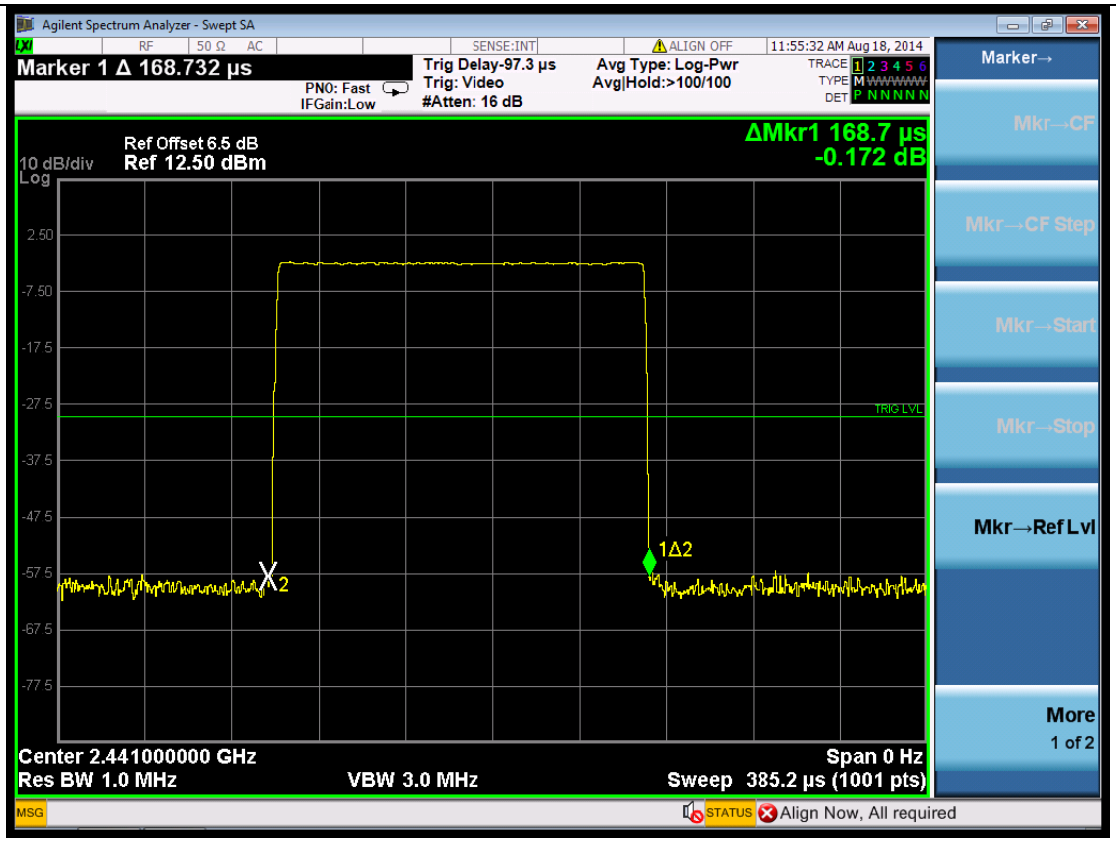
B. Test Plots



(Plot 6.8.1.A: Channel 39: 2441MHz @ GFSK @ DH1)



(Plot 6.8.1.B: Channel 39: 2441MHz @ GFSK @ DH3)



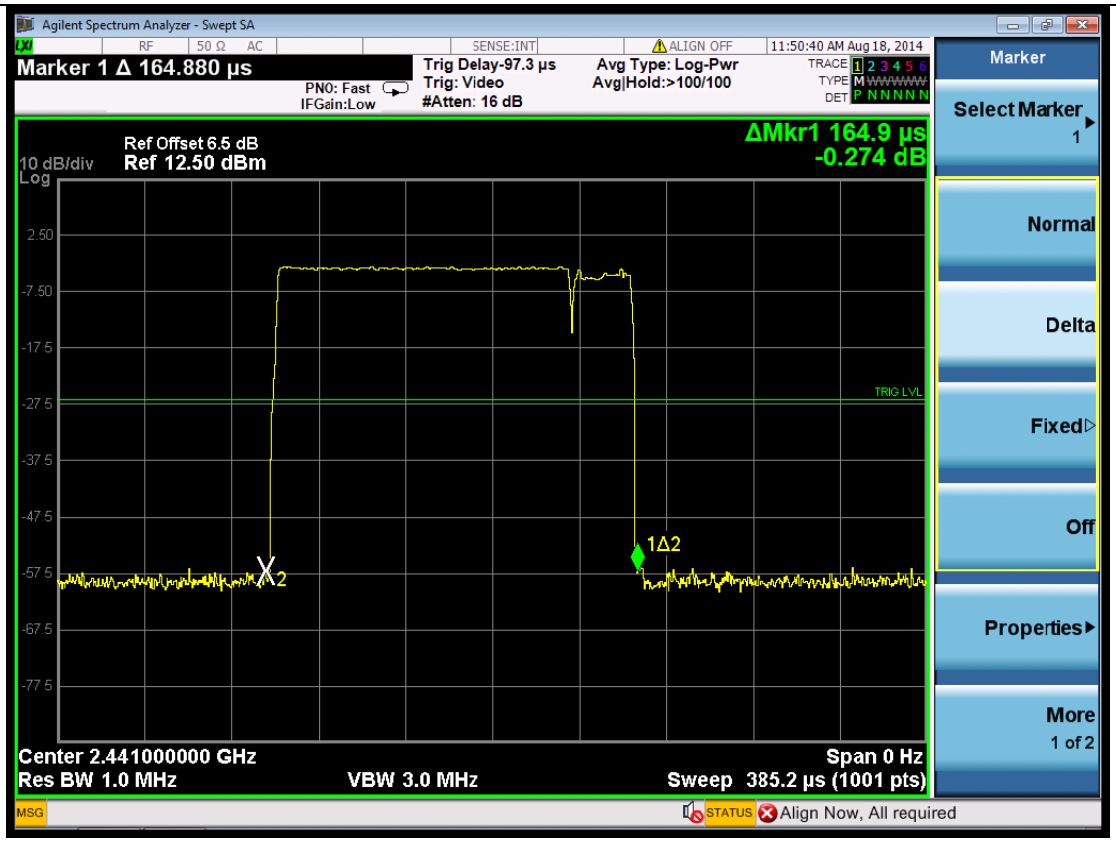
(Plot 6.8.1.C: Channel 39: 2441MHz @ GFSK @ DH5)

6.8.2 8DPSK Test Mode

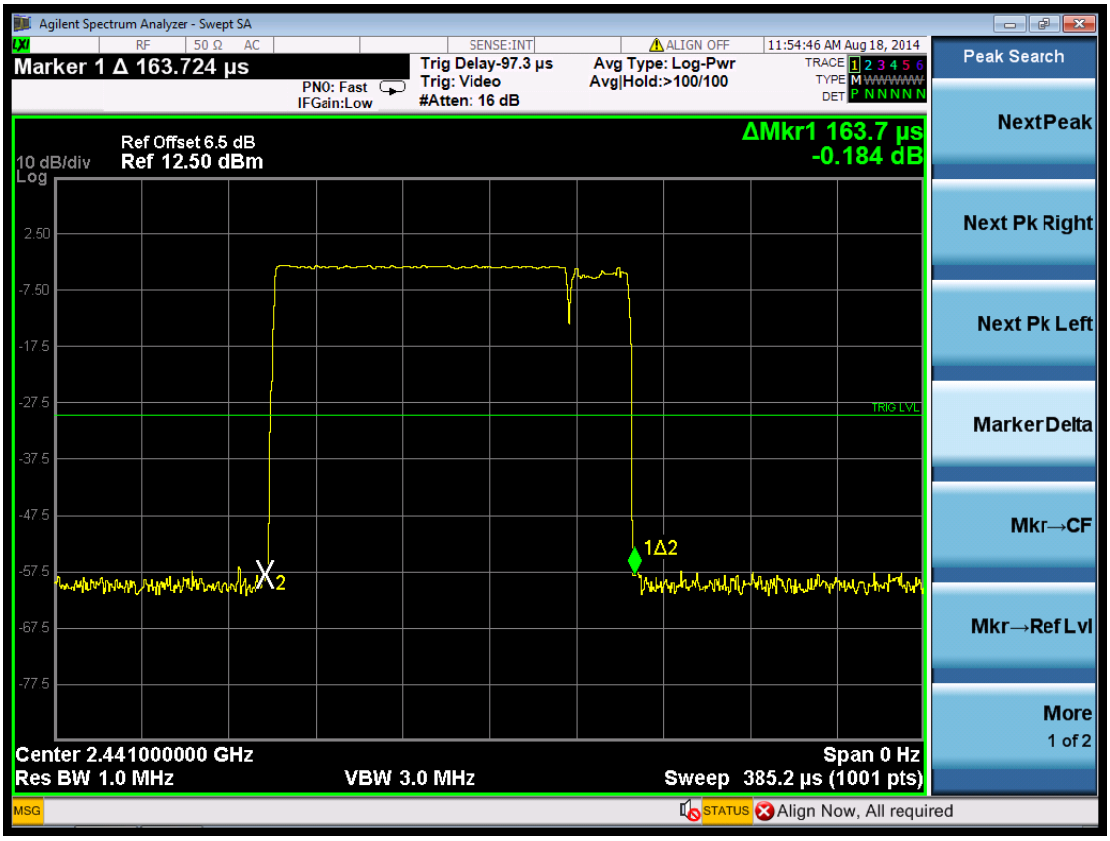
A. Test Verdict

Mode	Frequency (MHz)	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Refer to Plot	Verdict
DH1	2441	0.1649	0.052768	0.4	Plot 6.8.2 A	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second					
DH3	2441	0.1637	0.026192	0.4	Plot 6.8.2 B	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second					
DH5	2441	0.1637	0.01746	0.4	Plot 6.8.2 C	PASS
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second					

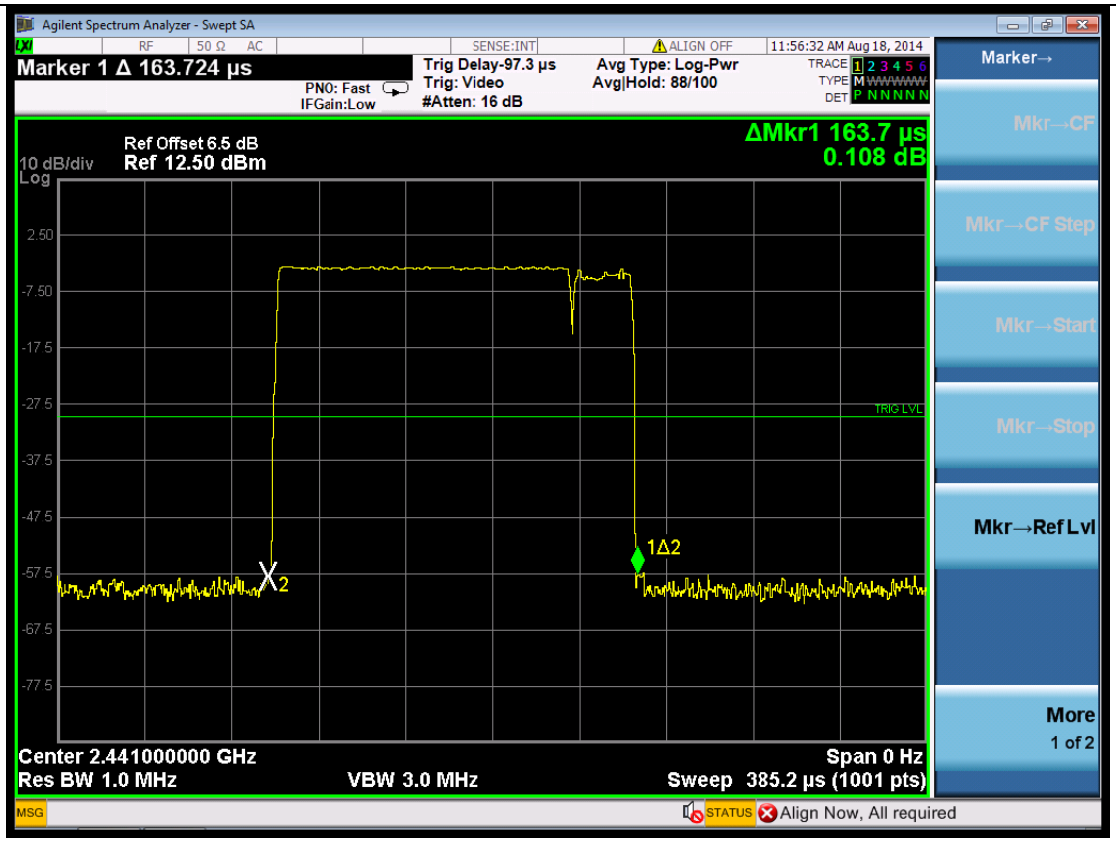
B. Test Plots



(Plot 6.8.2.A: Channel 39: 2441MHz @ 8DPSK @ DH1)



(Plot 6.8.2.B: Channel 39: 2441MHz @ 8DPSK @ DH3)



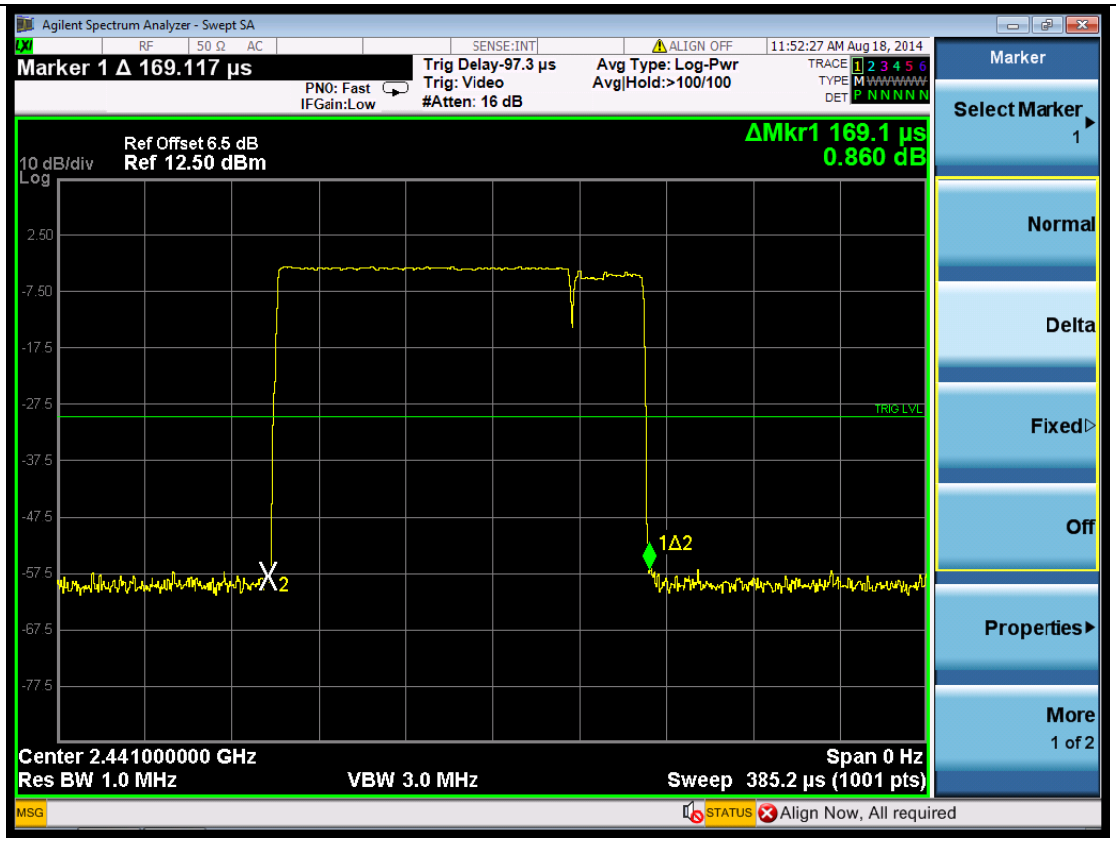
(Plot 6.8.2.C: Channel 39: 2441MHz @ 8DPSK @ DH5)

4.8.3 π/4DQPSK Test Mode

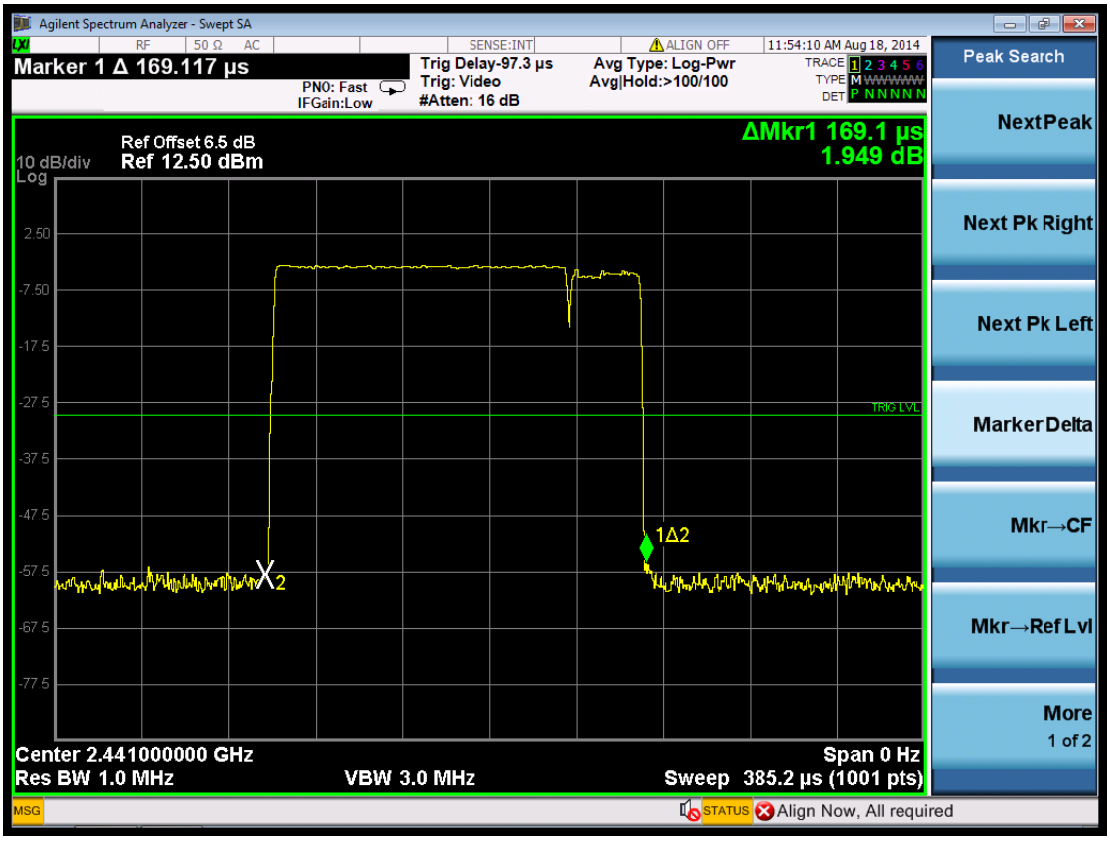
A. Test Verdict

Mode	Frequency (MHz)	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Refer to Plot	Verdict
DH1	2441	0.1691	0.054112	0.4	Plot 6.8.3 A	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second					
DH3	2441	0.1691	0.027056	0.4	Plot 6.8.3 B	PASS
	Note: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second					
DH5	2441	0.1699	0.018123	0.4	Plot 6.8.3 C	PASS
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second					

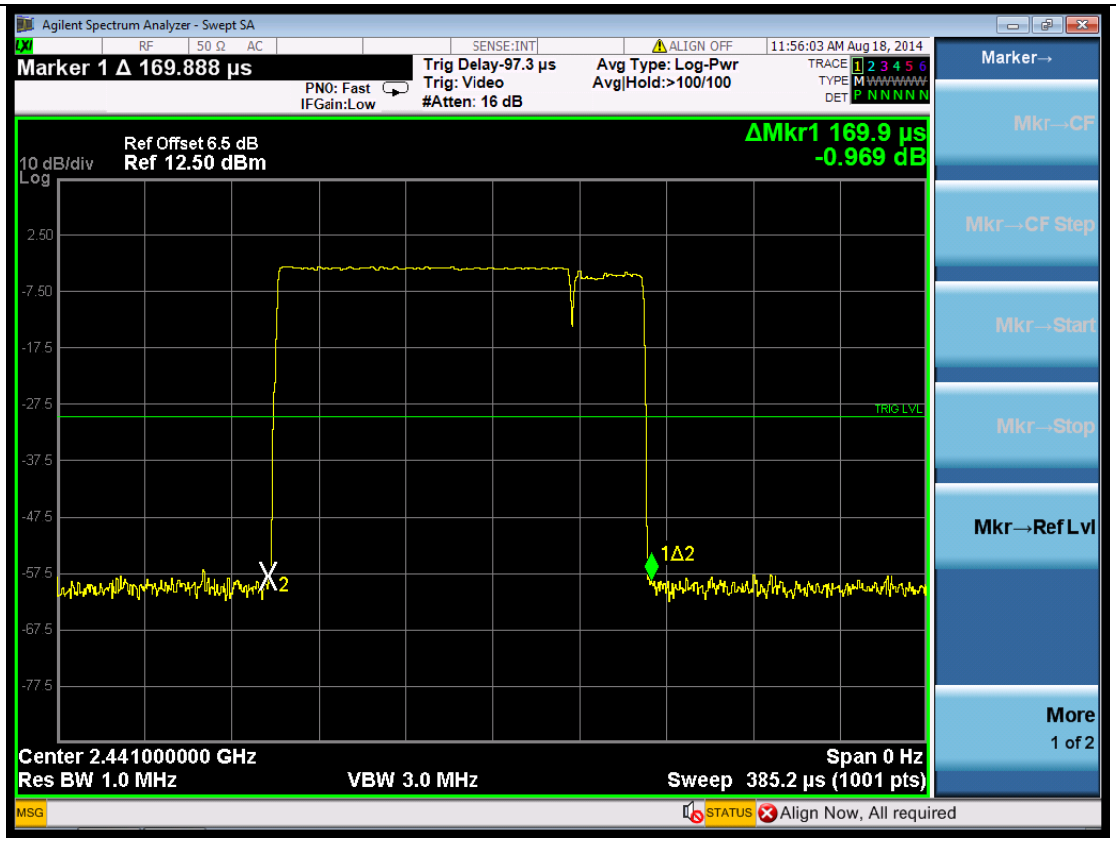
B. Test Plots



(Plot 6.8.3.A: Channel 39: 2441MHz @ π/4DQPSK @ DH1)



(Plot 6.8.3.B: Channel 39: 2441MHz @ π/4DQPSK @ DH3)



(Plot 6.8.3.C: Channel 39: 2441MHz @ π/4DQPSK @ DH5)

6.9 Spurious RF Conducted Emission

TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength , and measurement frequency range from 9KHz to 26.5GHz.

LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

TEST RESULTS

Remark: 1. We test Frequency Separation at difference Packet Type (DH1, DH3 and DH5), recorded worst case at DH3.

6.9.1 GFSK Test Mode

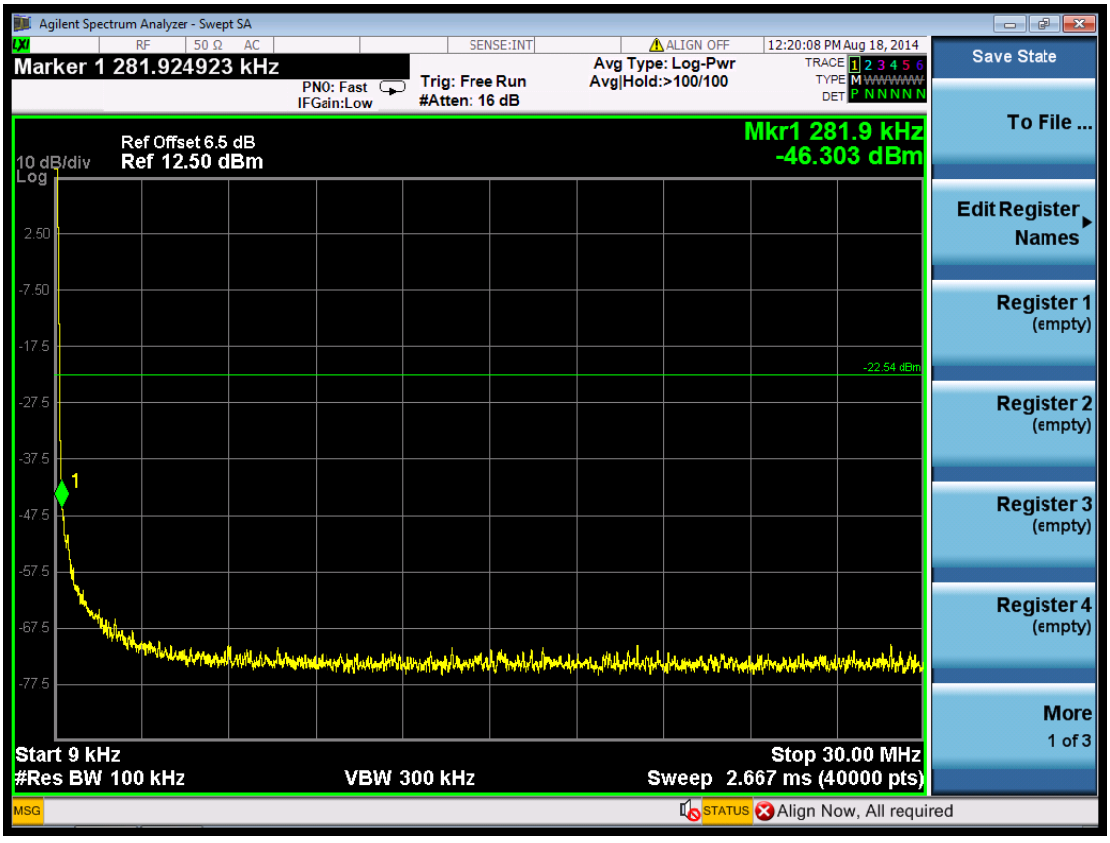
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
00	2402	2.402 GHz	Plot 6.9.1 A1	---	PASS
		9KHz-30MHz	Plot 6.9.1 A2	-20	PASS
		30MHz-3GHz	Plot 6.9.1 A3	-20	PASS
		3GHz-10GHz	Plot 6.9.1 A4	-20	PASS
		10GHz-18GHz	Plot 6.9.1 A5	-20	PASS
		18GHz-26GHz	Plot 6.9.1 A6	-20	PASS
39	2441	2.441 GHz	Plot 6.9.1 B1	---	PASS
		9KHz-30MHz	Plot 6.9.1 B2	-20	PASS
		30MHz-3GHz	Plot 6.9.1 B3	-20	PASS
		3GHz-10GHz	Plot 6.9.1 B4	-20	PASS
		10GHz-18GHz	Plot 6.9.1 B5	-20	PASS
		18GHz-26GHz	Plot 6.9.1 B6	-20	PASS
78	2480	2.480 GHz	Plot 6.9.1 C1	---	PASS
		9KHz-30MHz	Plot 6.9.1 C2	-20	PASS
		30MHz-3GHz	Plot 6.9.1 C3	-20	PASS
		3GHz-10GHz	Plot 6.9.1 C4	-20	PASS
		10GHz-18GHz	Plot 6.9.1 C5	-20	PASS
		18GHz-26GHz	Plot 6.9.1 C6	-20	PASS

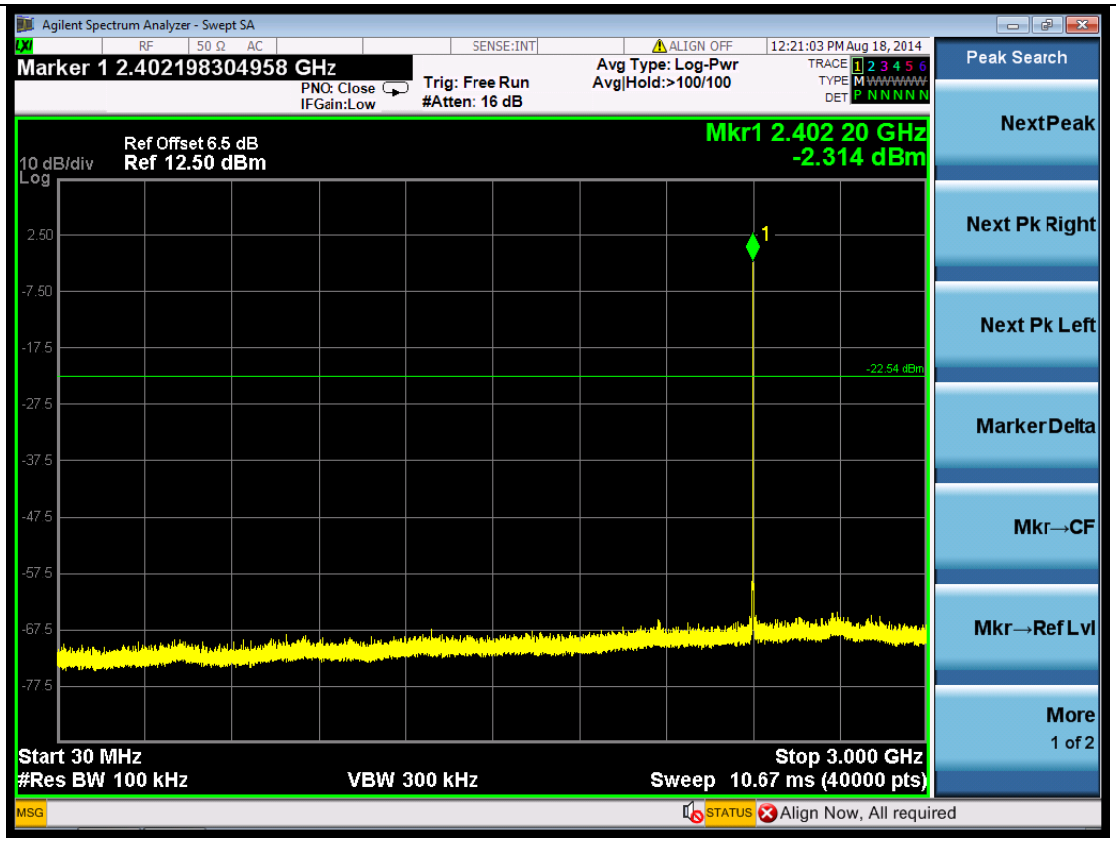
Note: 1. The test results including the cable lose.

B. Test Plots

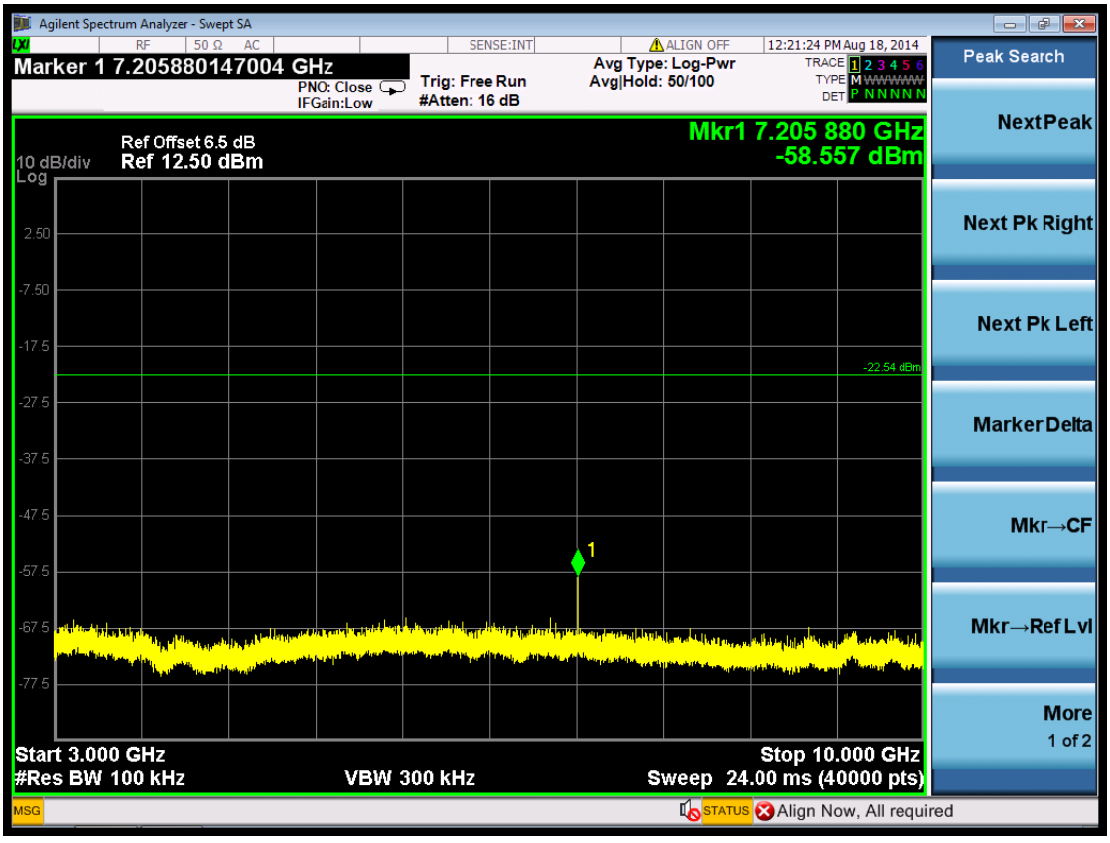
(Plot 6.9.1 A1: Channel 00: 2402MHz @ GFSK)



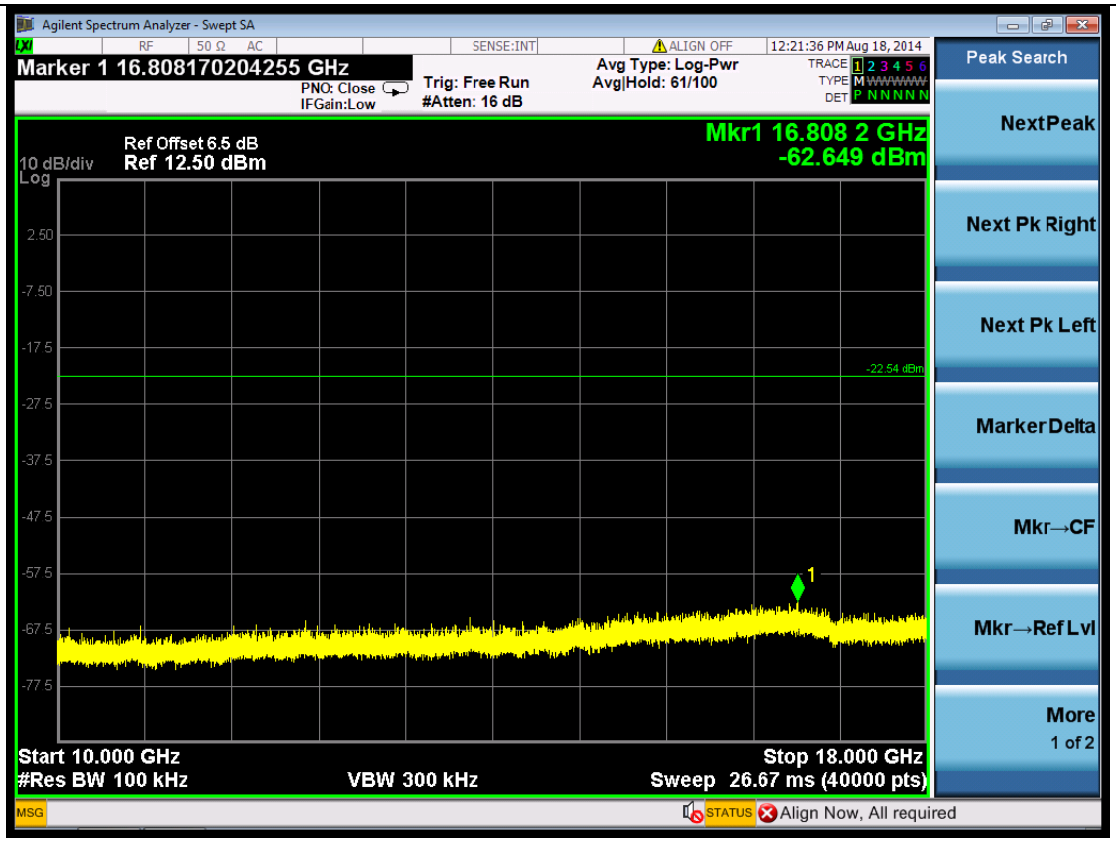
(Plot 6.9.1 A2: Channel 00: 2402MHz @ GFSK)



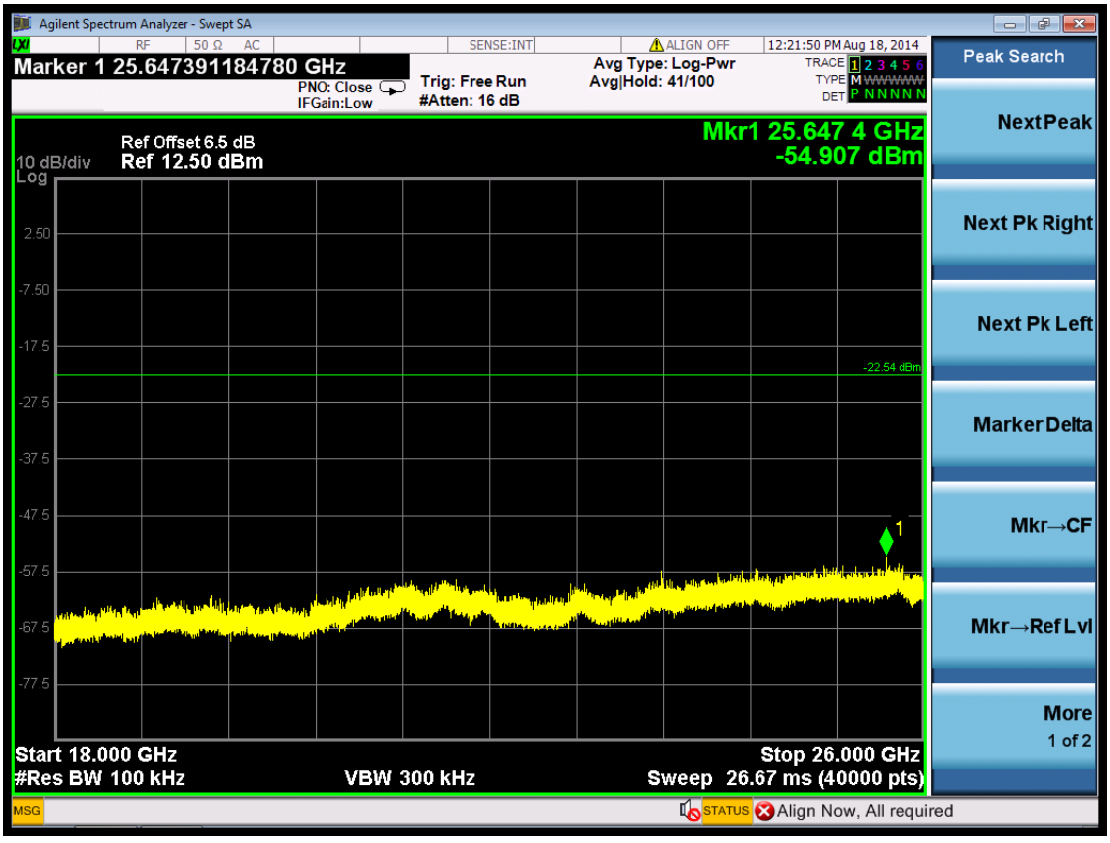
(Plot 6.9.1 A3: Channel 00: 2402MHz @ GFSK)



(Plot 6.9.1 A4: Channel 00: 2402MHz @ GFSK)

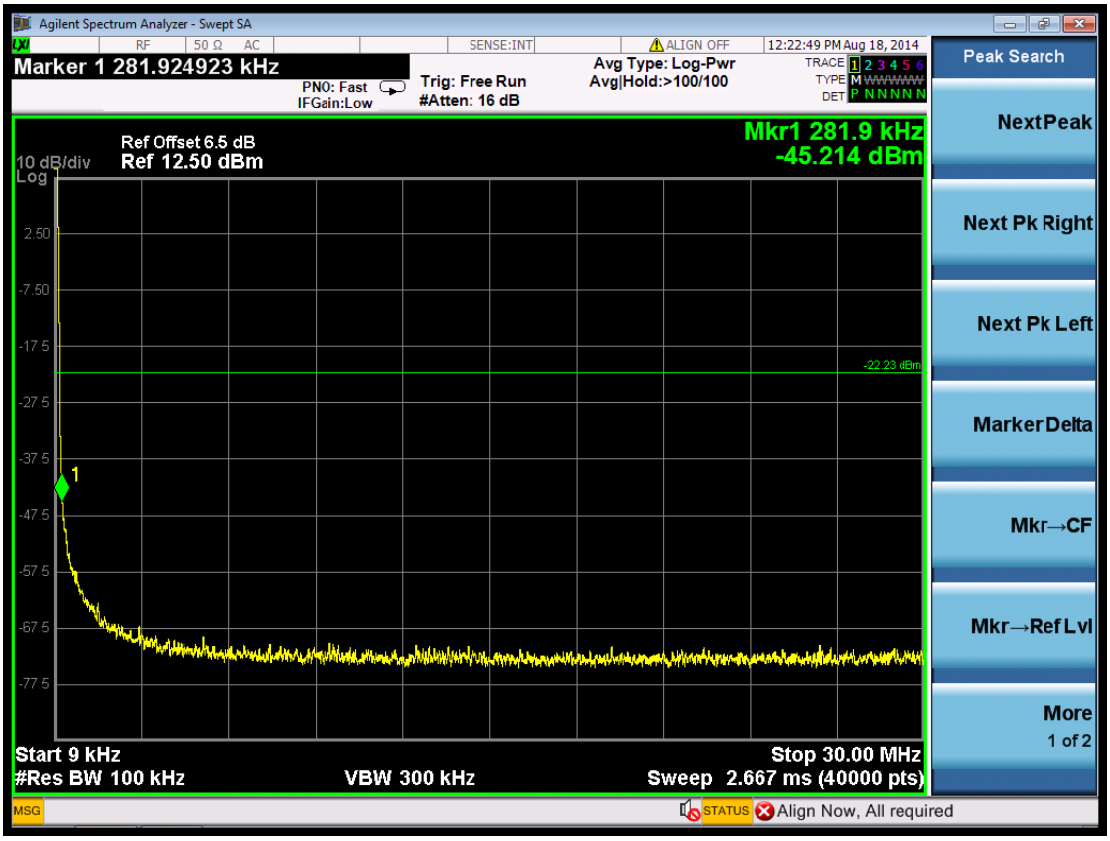


(Plot 6.9.1 A5: Channel 00: 2402MHz @ GFSK)

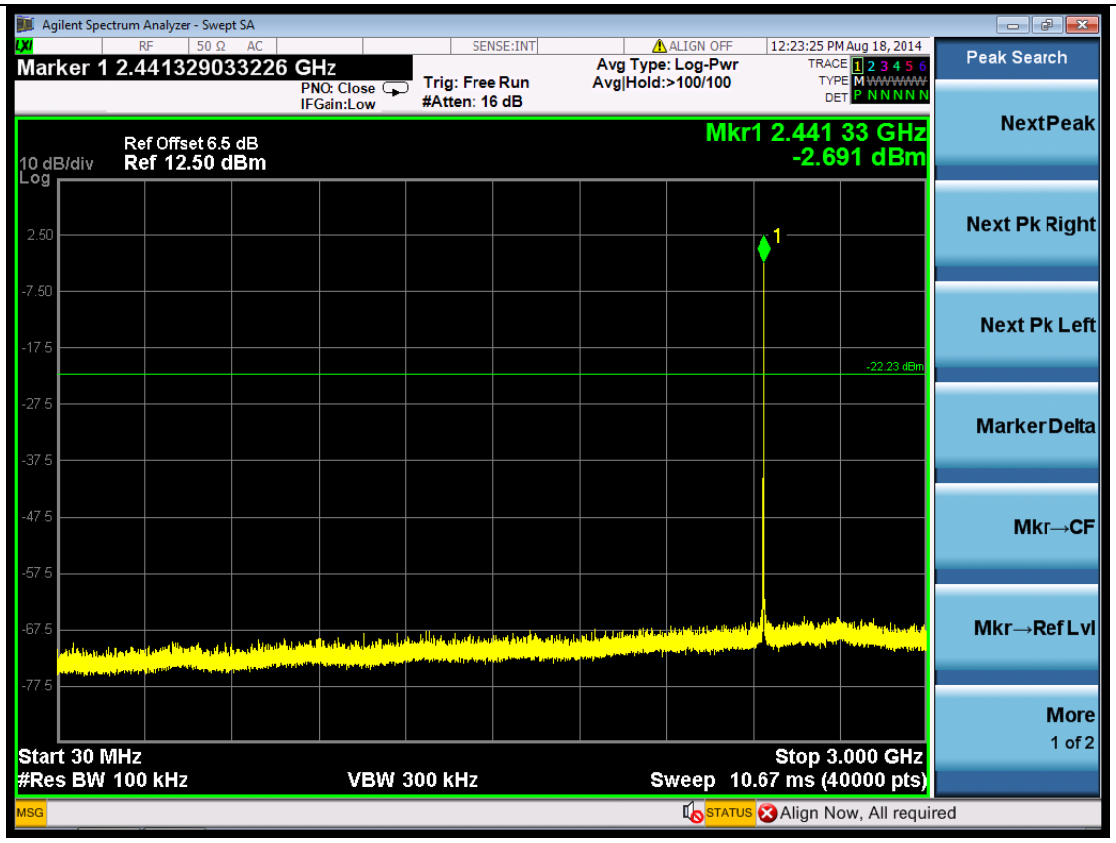


(Plot 6.9.1 A6: Channel 00: 2402MHz @ GFSK)

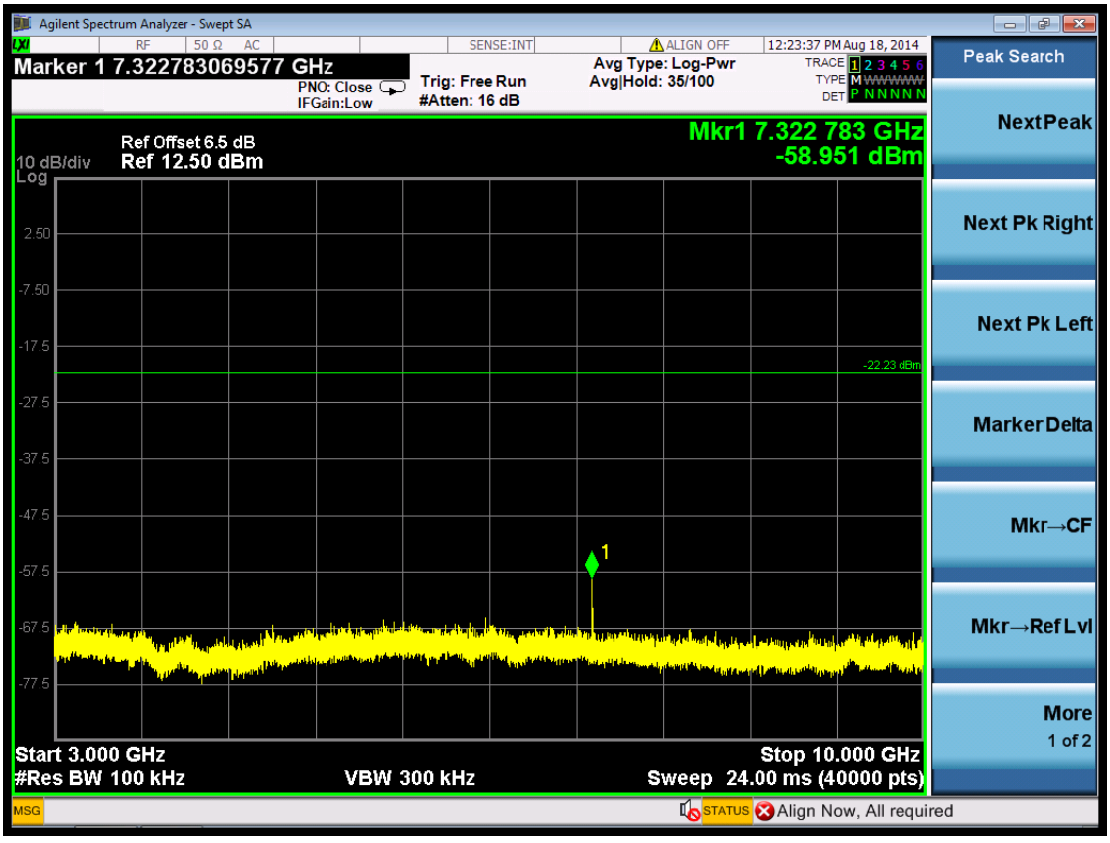
(Plot 6.9.1 B1: Channel 39: 2441MHz @ GFSK)



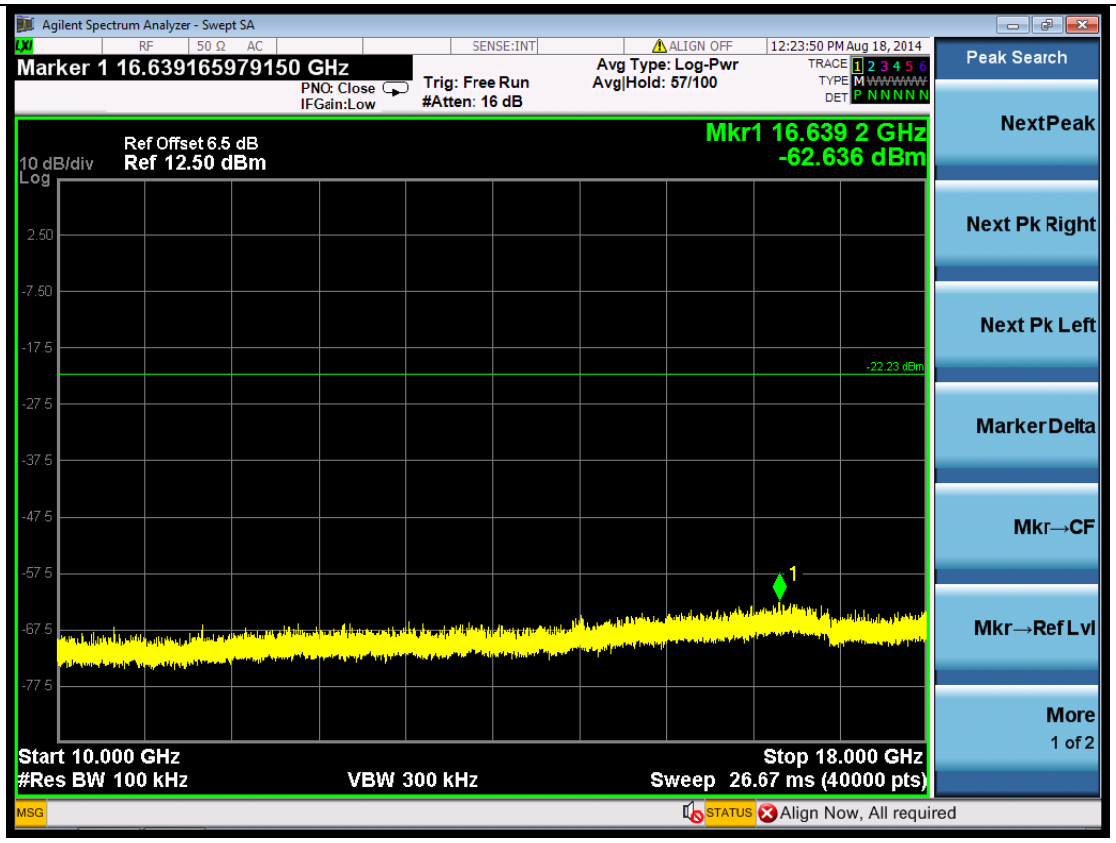
(Plot 6.9.1 B2: Channel 39: 2441MHz @ GFSK)



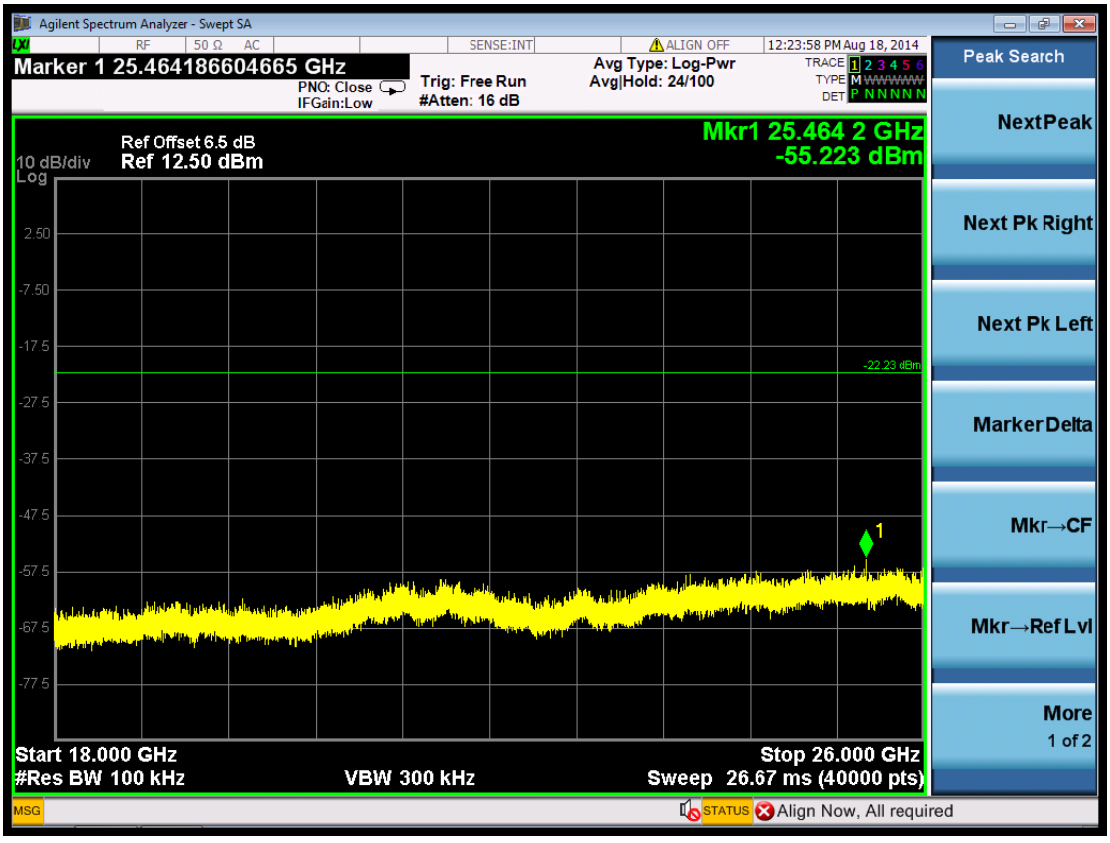
(Plot 6.9.1 B3: Channel 39: 2441MHz @ GFSK)



(Plot 6.9.1 B4: Channel 39: 2441MHz @ GFSK)

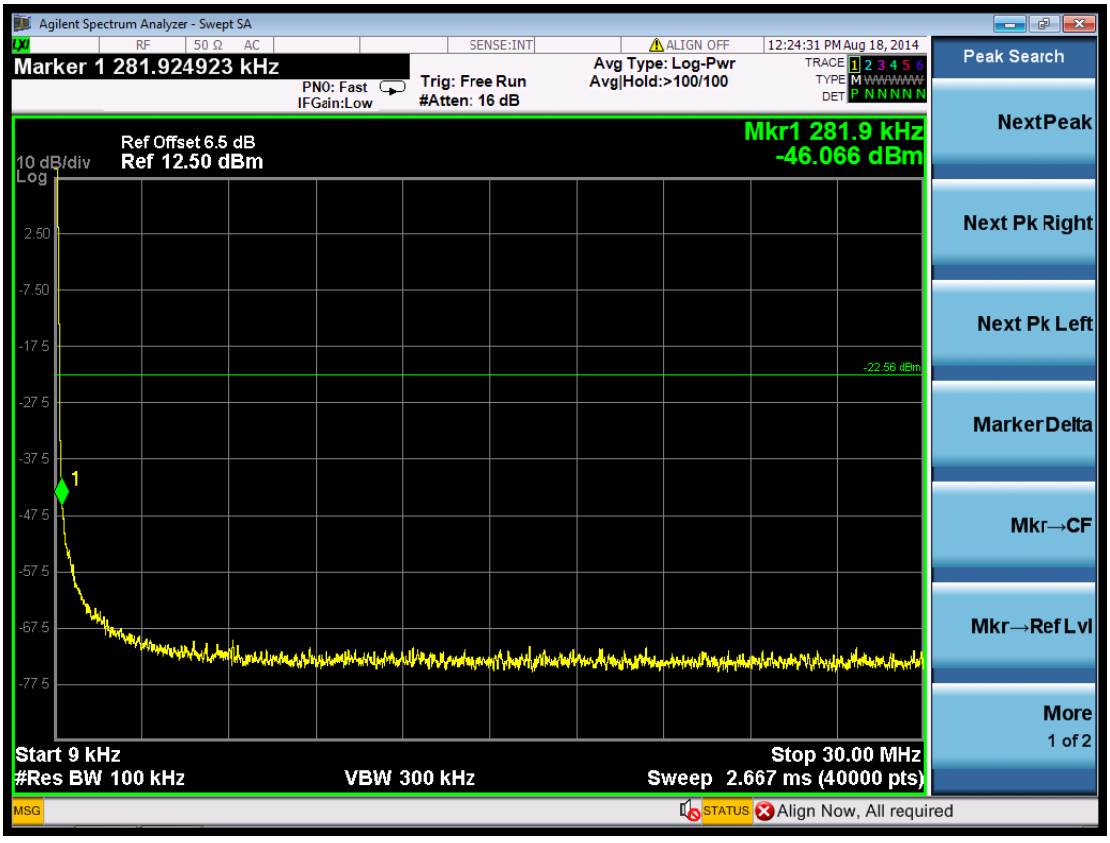


(Plot 6.9.1 B5: Channel 39: 2441MHz @ GFSK)

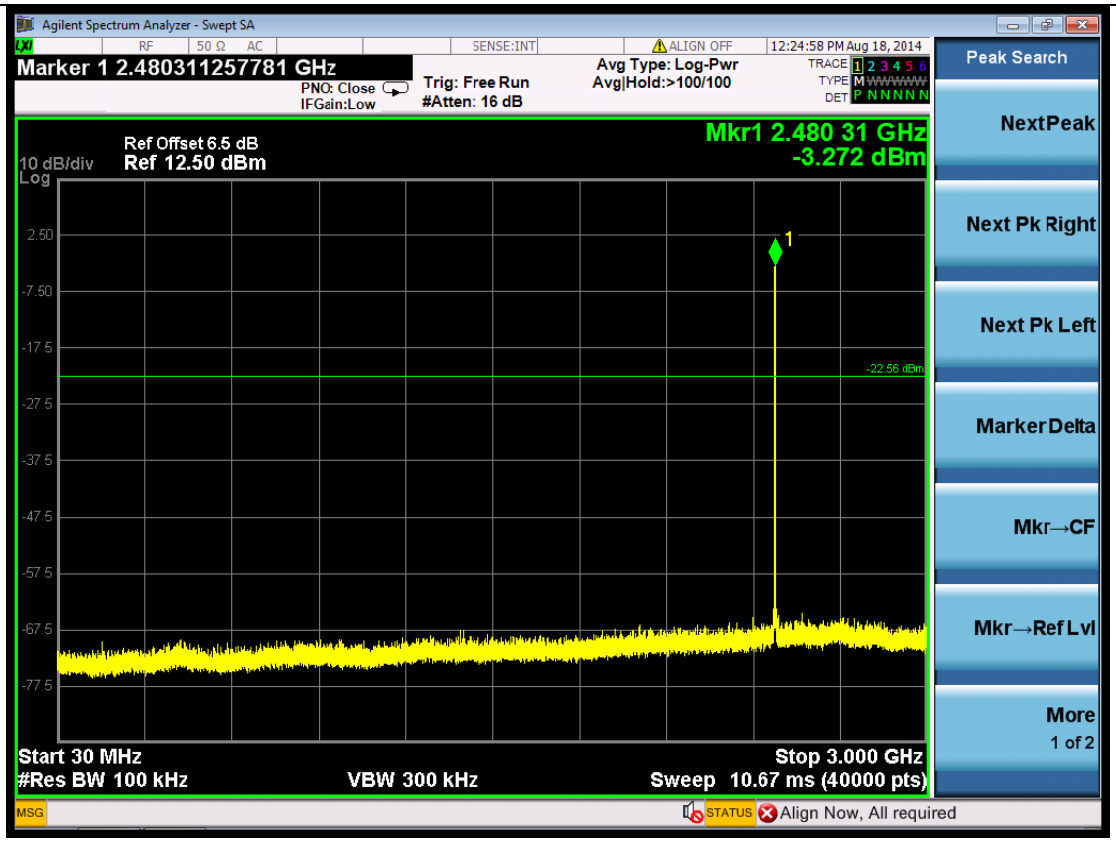


(Plot 6.9.1 B6: Channel 39: 2441MHz @ GFSK)

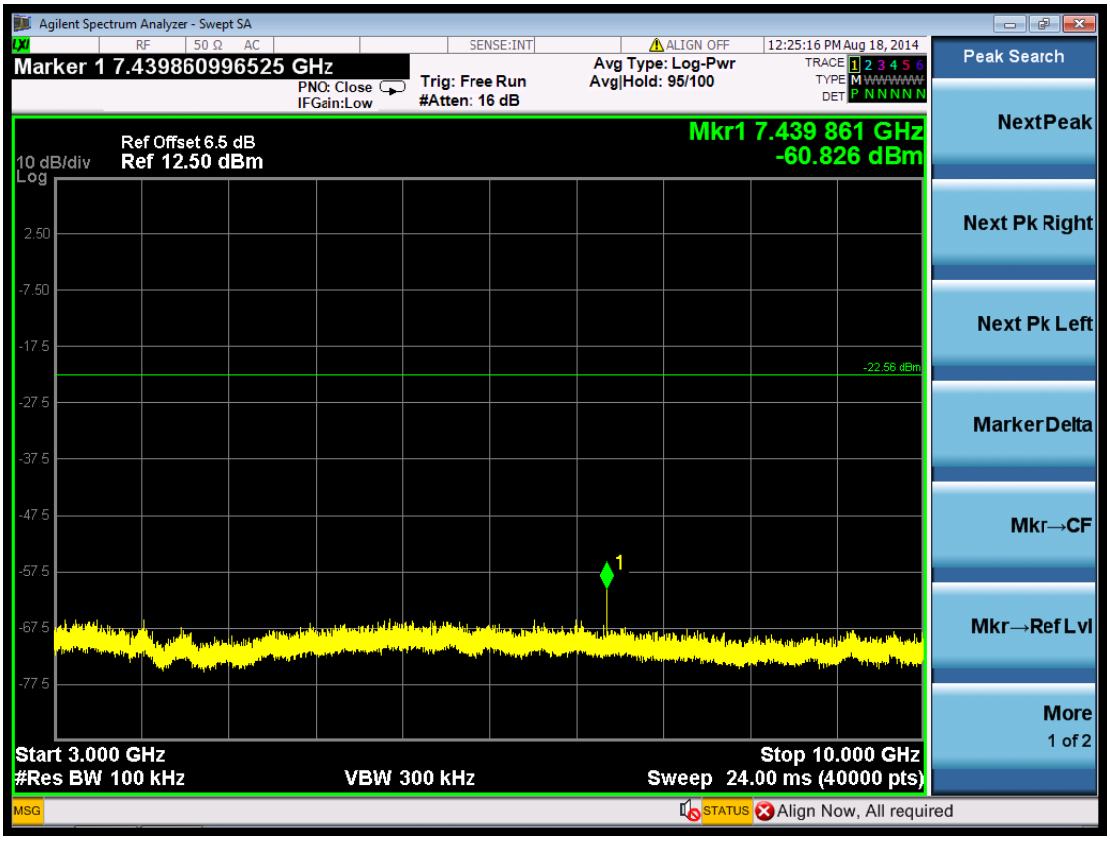
(Plot 6.9.1 C1: Channel 78: 2480MHz @ GFSK)



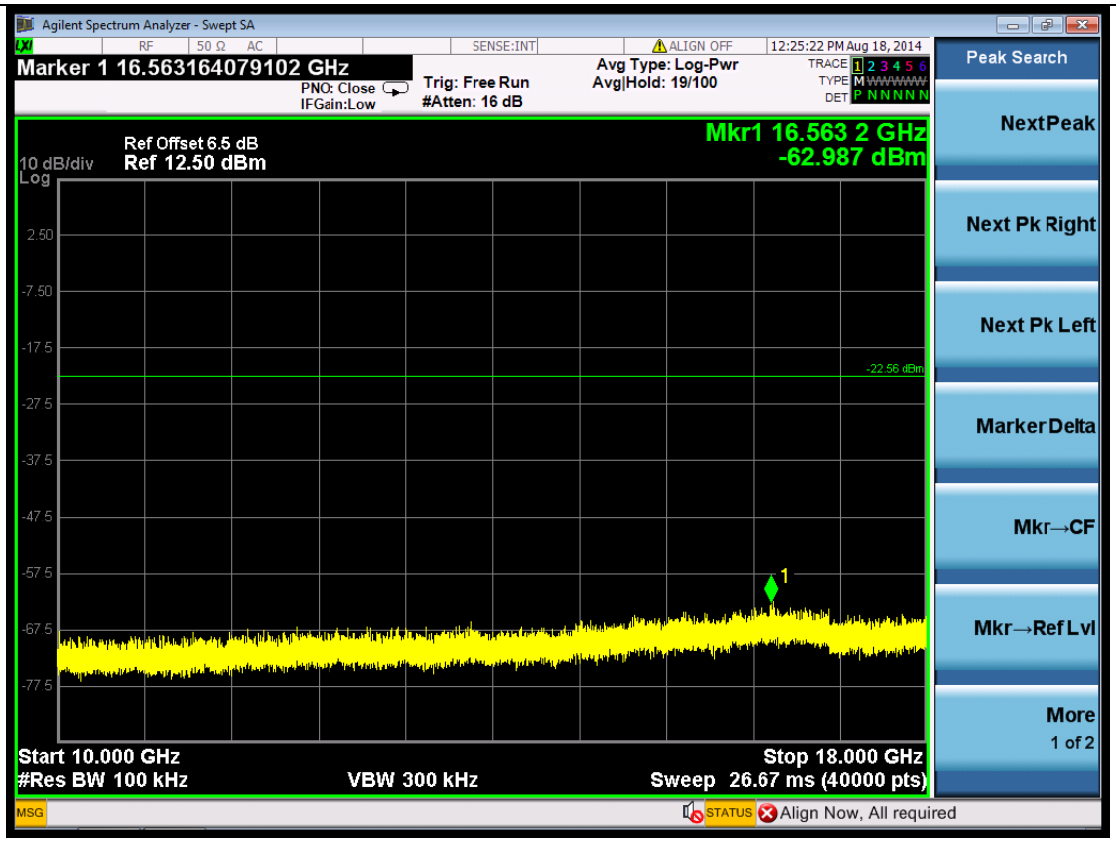
(Plot 6.9.1 C2: Channel 78: 2480MHz @ GFSK)



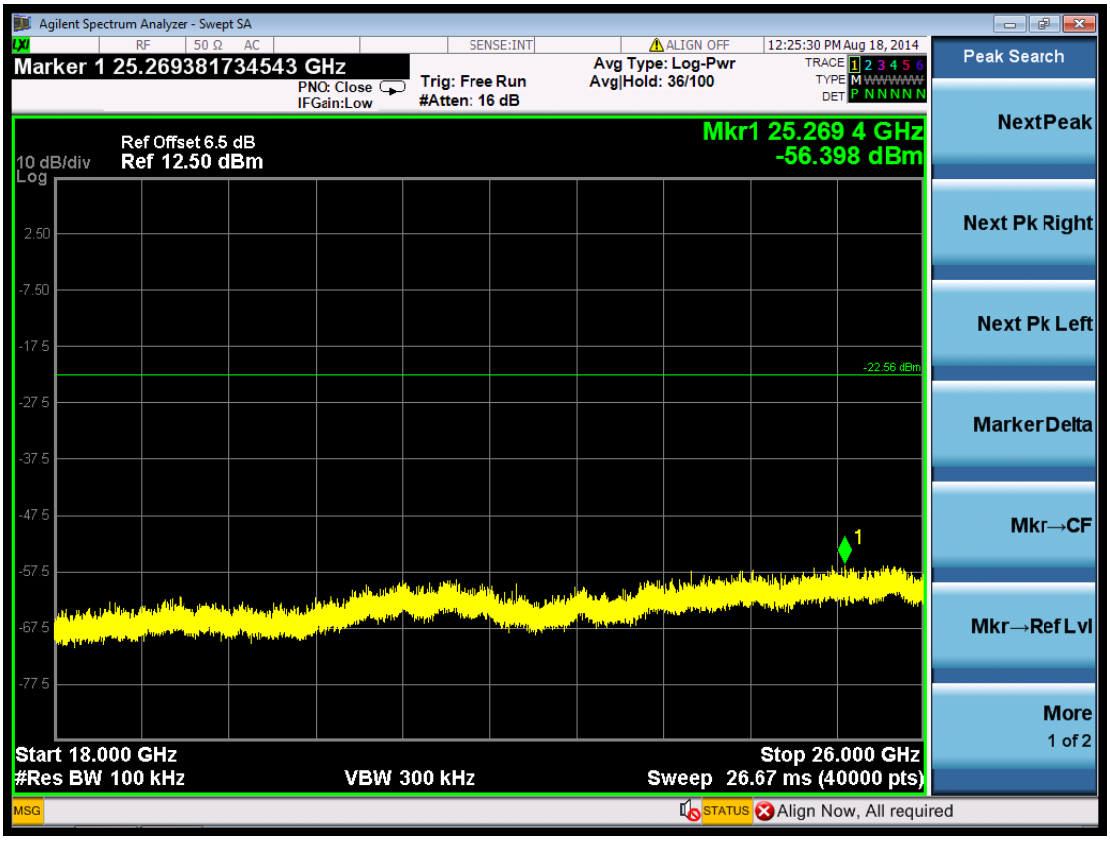
(Plot 6.9.1 C3: Channel 78: 2480MHz @ GFSK)



(Plot 6.9.1 C4: Channel 78: 2480MHz @ GFSK)



(Plot 6.9.1 C5: Channel 78: 2480MHz @ GFSK)



(Plot 6.9.1 C6: Channel 78: 2480MHz @ GFSK)

6.9.2 π/4DQPSK Test Mode

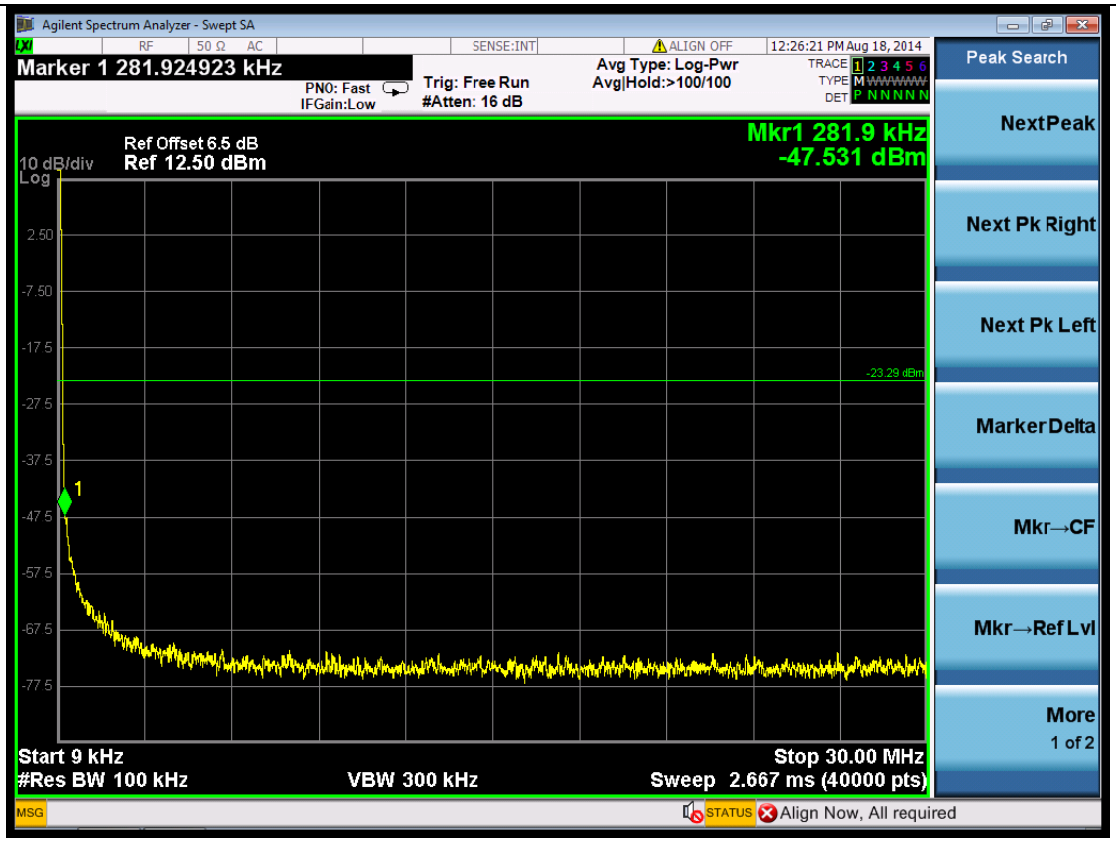
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
00	2402	2.402 GHz	Plot 6.9.2 A1	---	PASS
		9KHz-30MHz	Plot 6.9.2 A2	-20	PASS
		30MHz-3GHz	Plot 6.9.2 A3	-20	PASS
		3GHz-10GHz	Plot 6.9.2 A4	-20	PASS
		10GHz-18GHz	Plot 6.9.2 A5	-20	PASS
		18GHz-26GHz	Plot 6.9.2 A6	-20	PASS
39	2441	2.441 GHz	Plot 6.9.2 B1	---	PASS
		9KHz-30MHz	Plot 6.9.2 B2	-20	PASS
		30MHz-3GHz	Plot 6.9.2 B3	-20	PASS
		3GHz-10GHz	Plot 6.9.2 B4	-20	PASS
		10GHz-18GHz	Plot 6.9.2 B5	-20	PASS
		18GHz-26GHz	Plot 6.9.2 B6	-20	PASS
78	2480	2.480 GHz	Plot 6.9.2 C1	---	PASS
		9KHz-30MHz	Plot 6.9.2 C2	-20	PASS
		30MHz-3GHz	Plot 6.9.2 C3	-20	PASS
		3GHz-10GHz	Plot 6.9.2 C4	-20	PASS
		10GHz-18GHz	Plot 6.9.2 C5	-20	PASS
		18GHz-26GHz	Plot 6.9.2 C6	-20	PASS

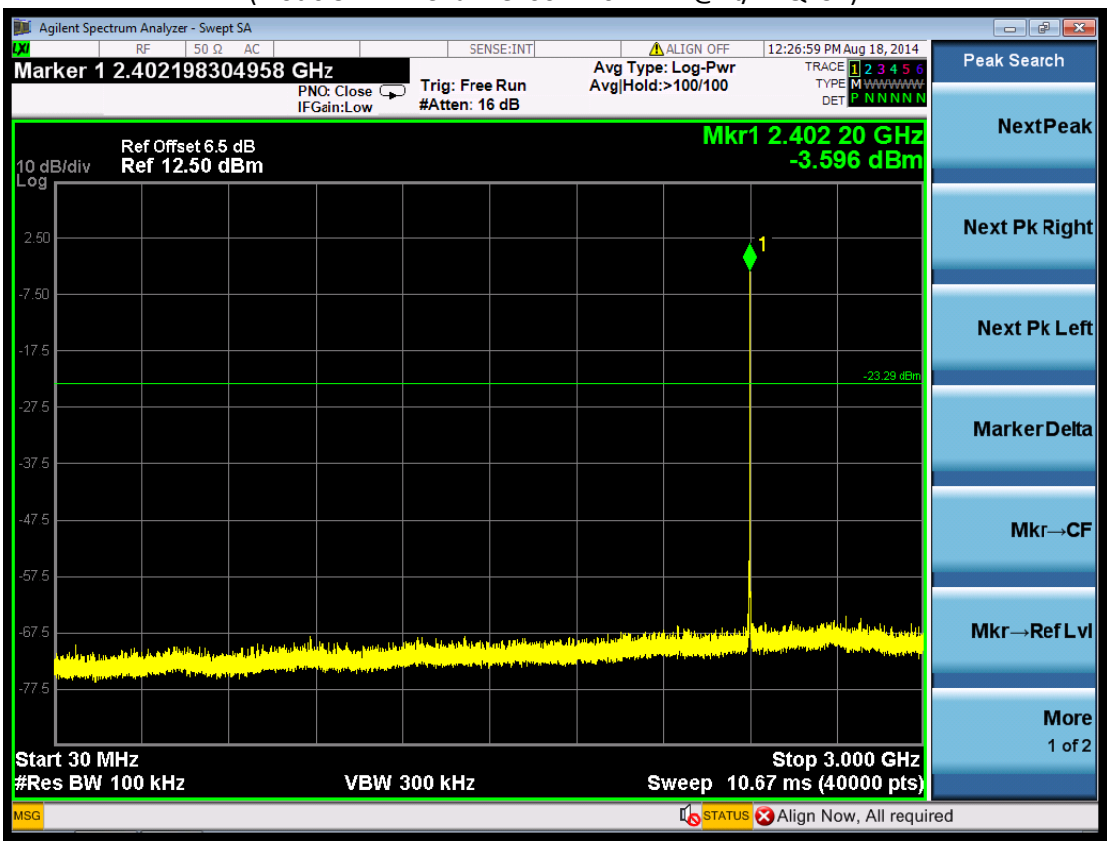
Note: 1. The test results including the cable lose.

B. Test Plots

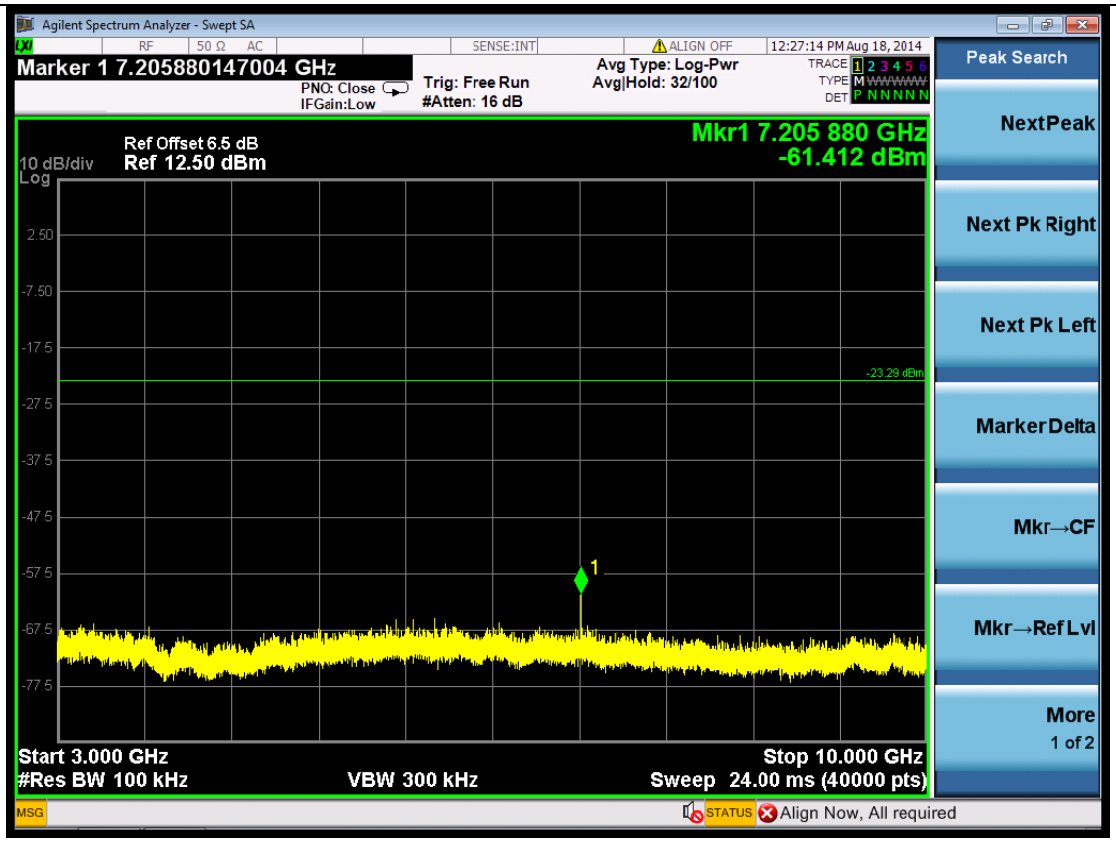
(Plot 6.9.2 A1: Channel 00: 2402MHz @ π/4DQPSK)



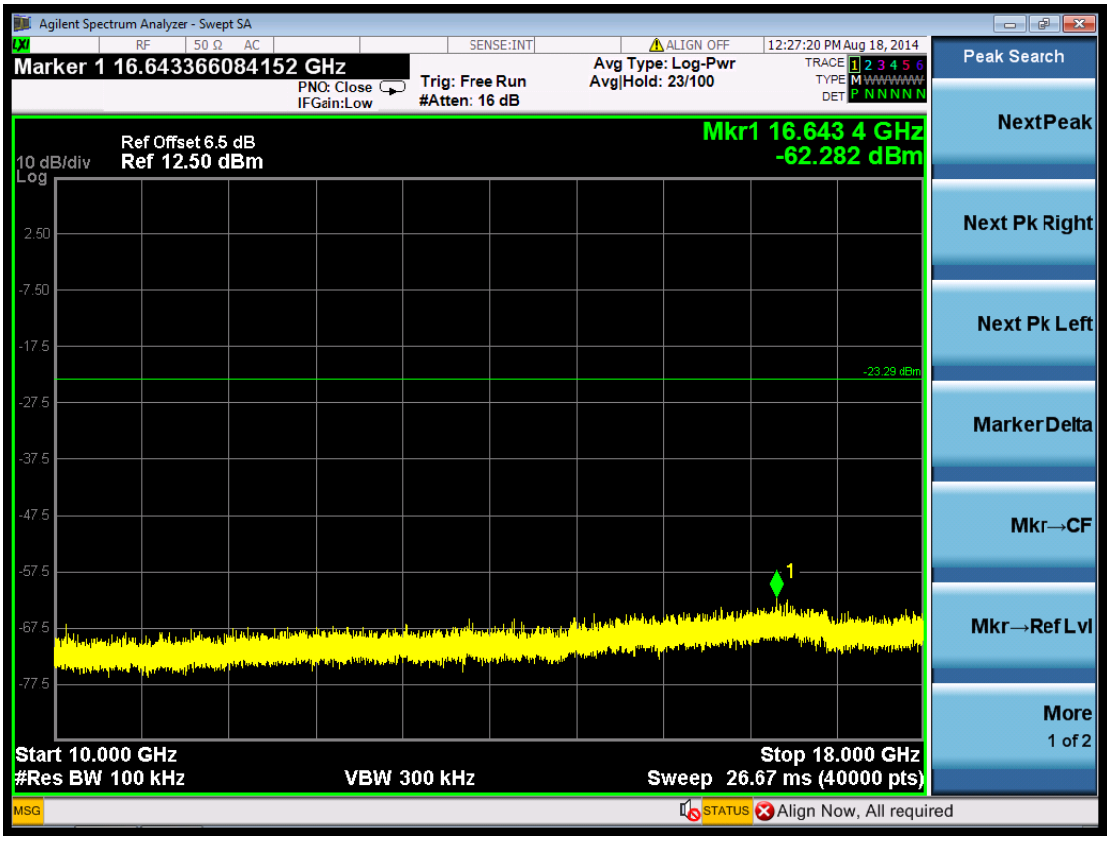
(Plot 6.9.2 A2: Channel 00: 2402MHz @ π/4DQPSK)



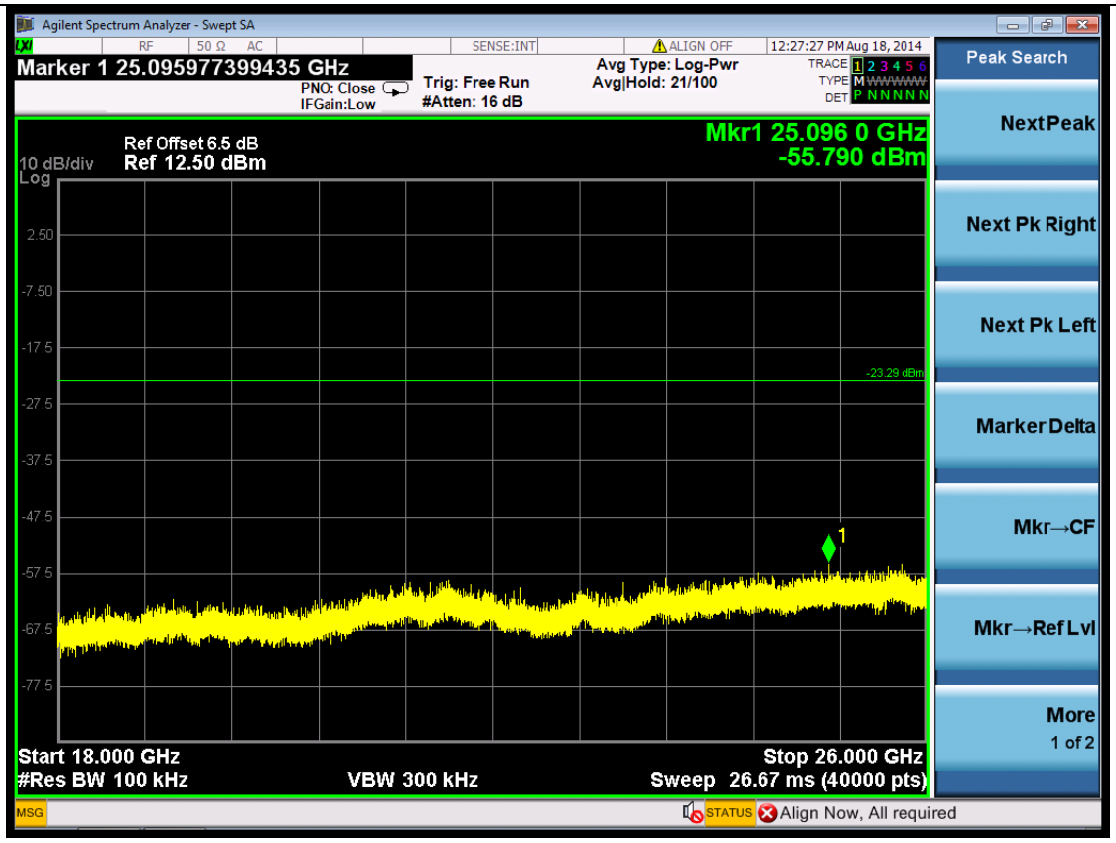
(Plot 6.9.2 A3: Channel 00: 2402MHz @ π/4DQPSK)



(Plot 6.9.2 A4: Channel 00: 2402MHz @ π/4DQPSK)

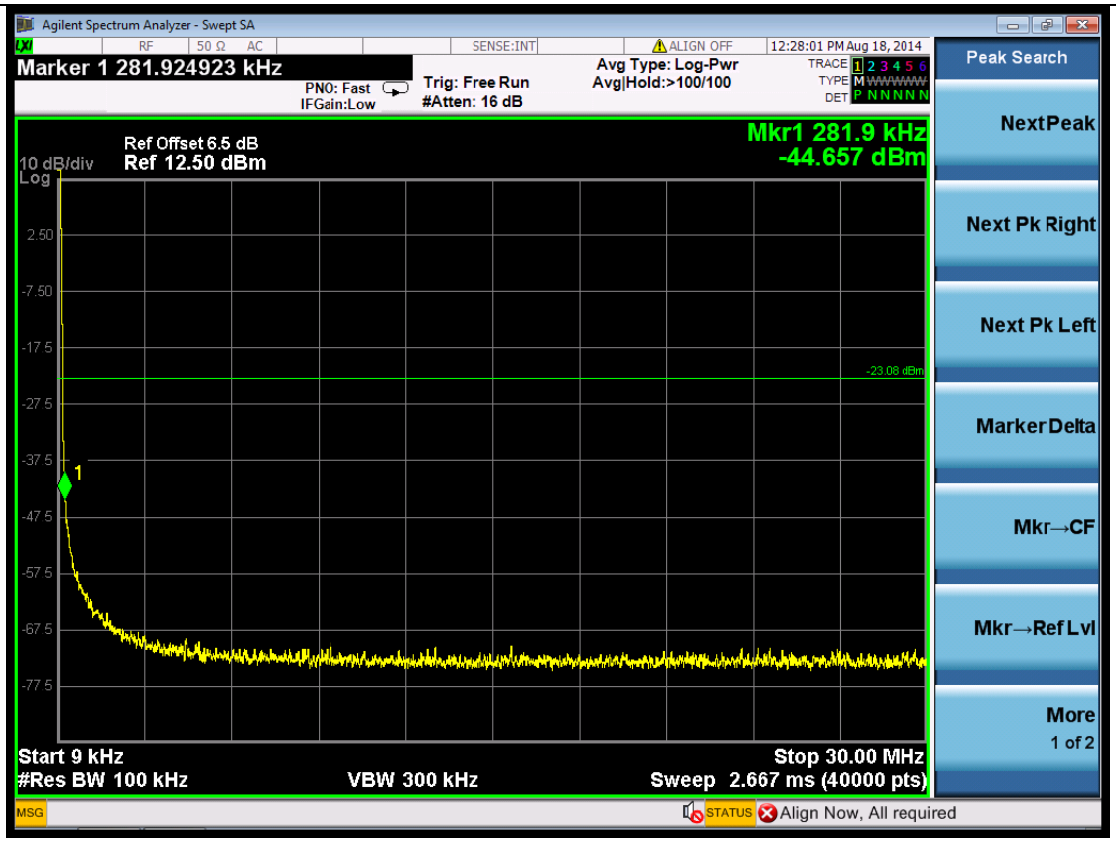


(Plot 6.9.2 A5: Channel 00: 2402MHz @ π/4DQPSK)

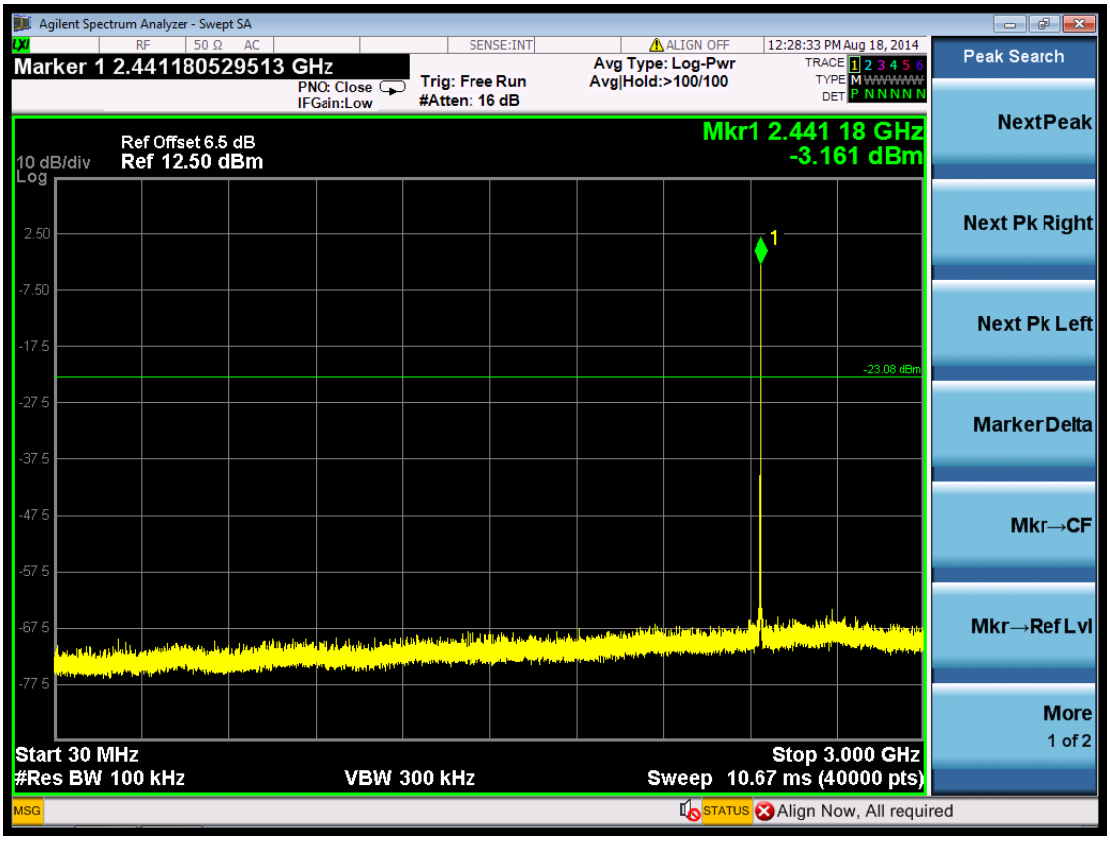


(Plot 6.9.2 A6: Channel 00: 2402MHz @ π/4DQPSK)

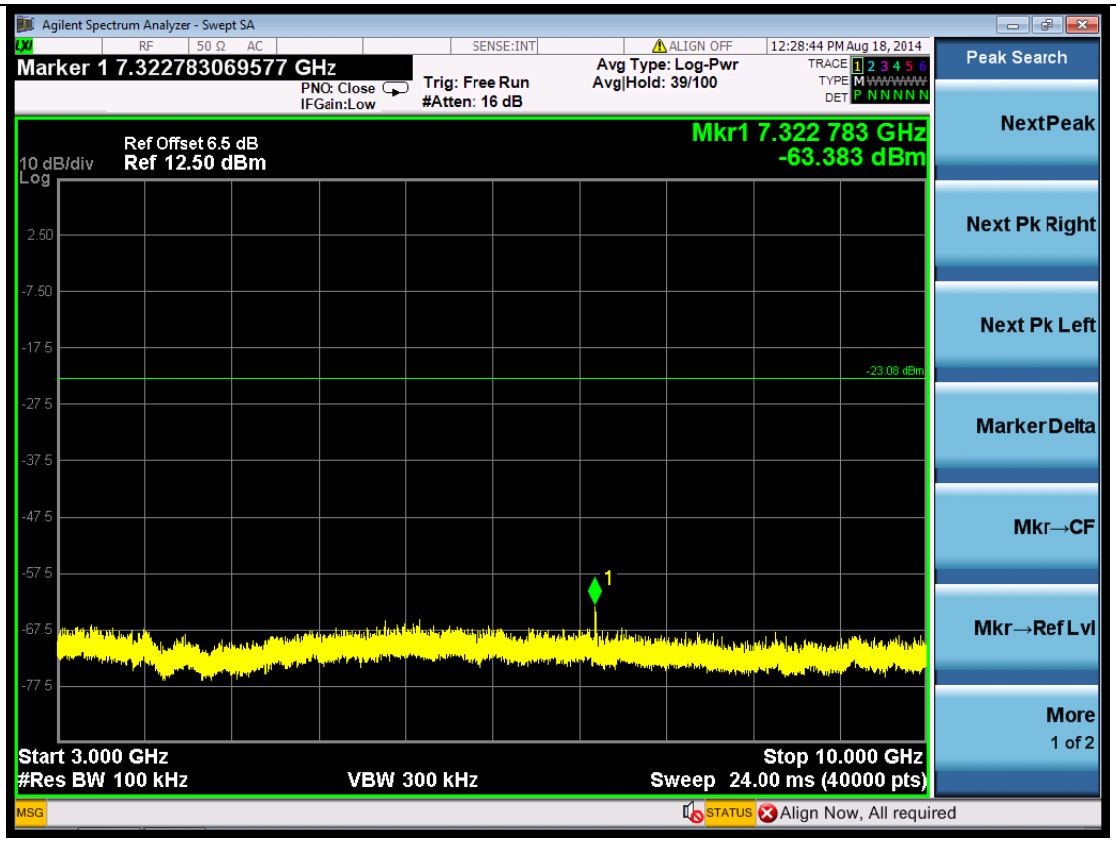
(Plot 6.9.2 B1: Channel 39: 2441MHz @ π/4DQPSK)



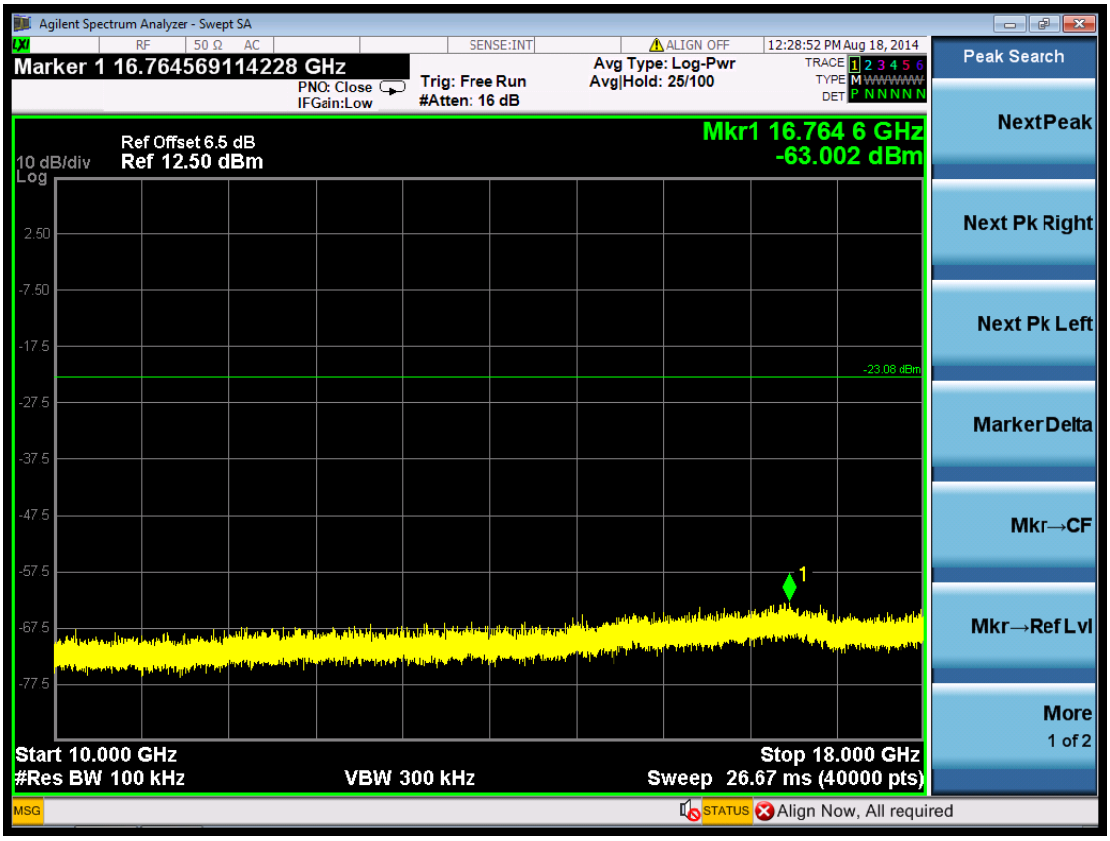
(Plot 6.9.2 B2: Channel 39: 2441MHz @ π/4DQPSK)



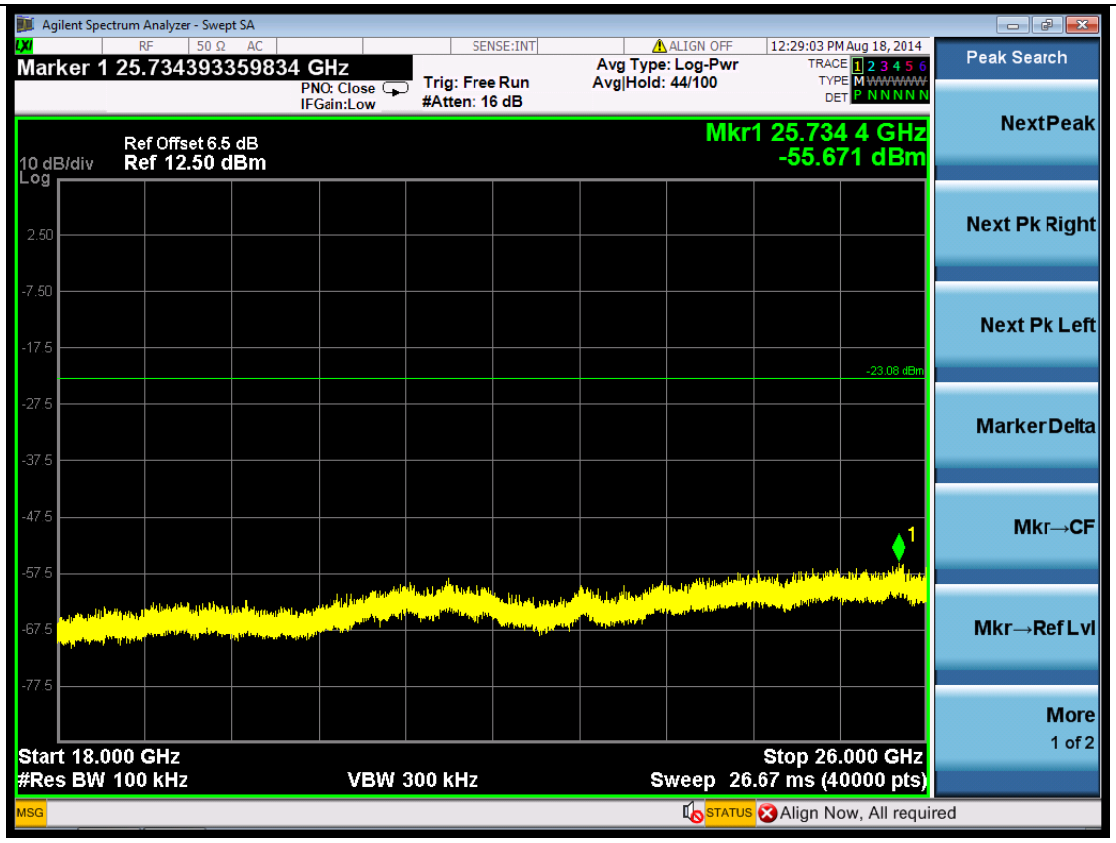
(Plot 6.9.2 B3: Channel 39: 2441MHz @ π/4DQPSK)



(Plot 6.9.2 B4: Channel 39: 2441MHz @ π/4DQPSK)

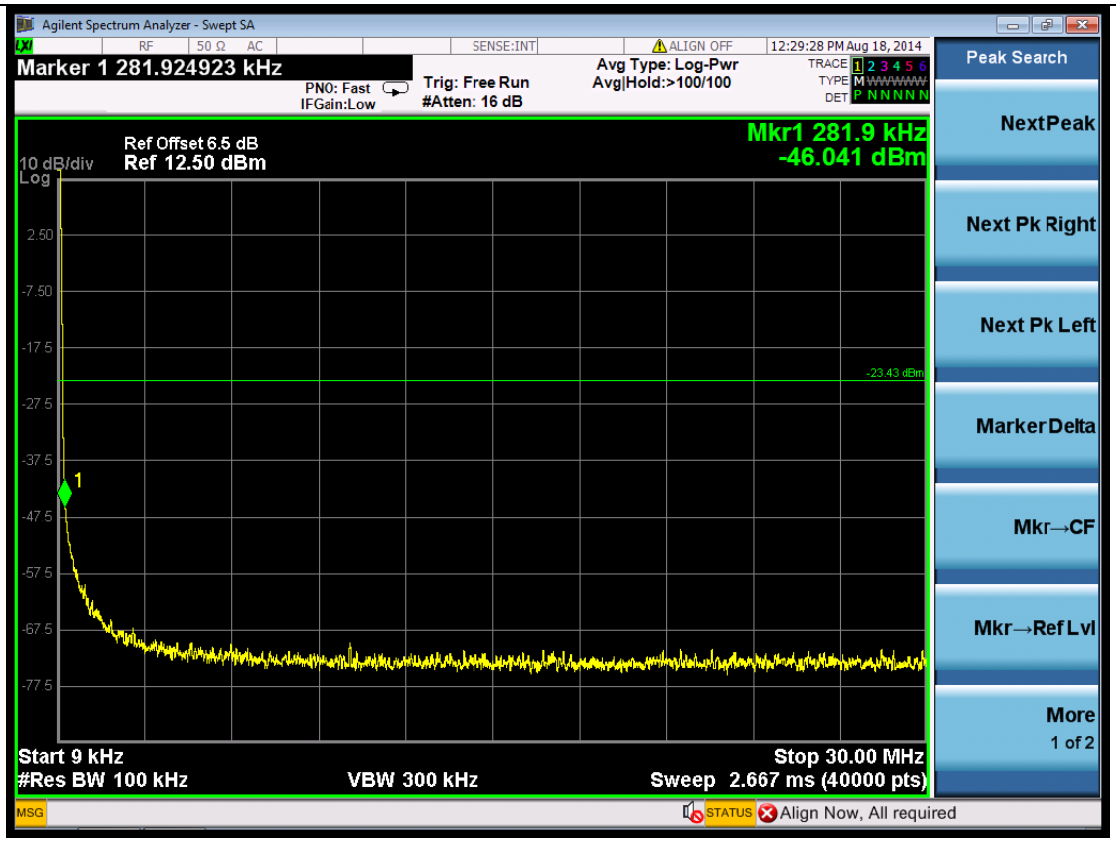


(Plot 6.9.2 B5: Channel 39: 2441MHz @ π/4DQPSK)

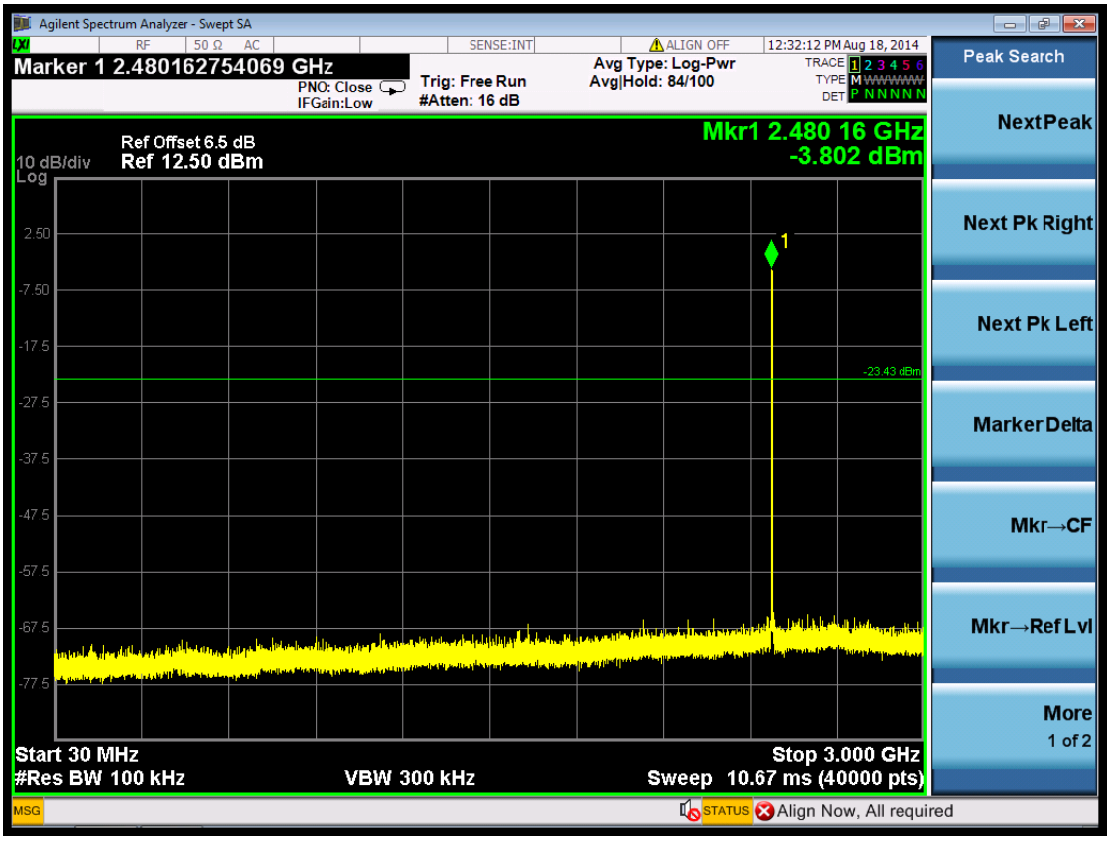


(Plot 6.9.2 B6: Channel 39: 2441MHz @ π/4DQPSK)

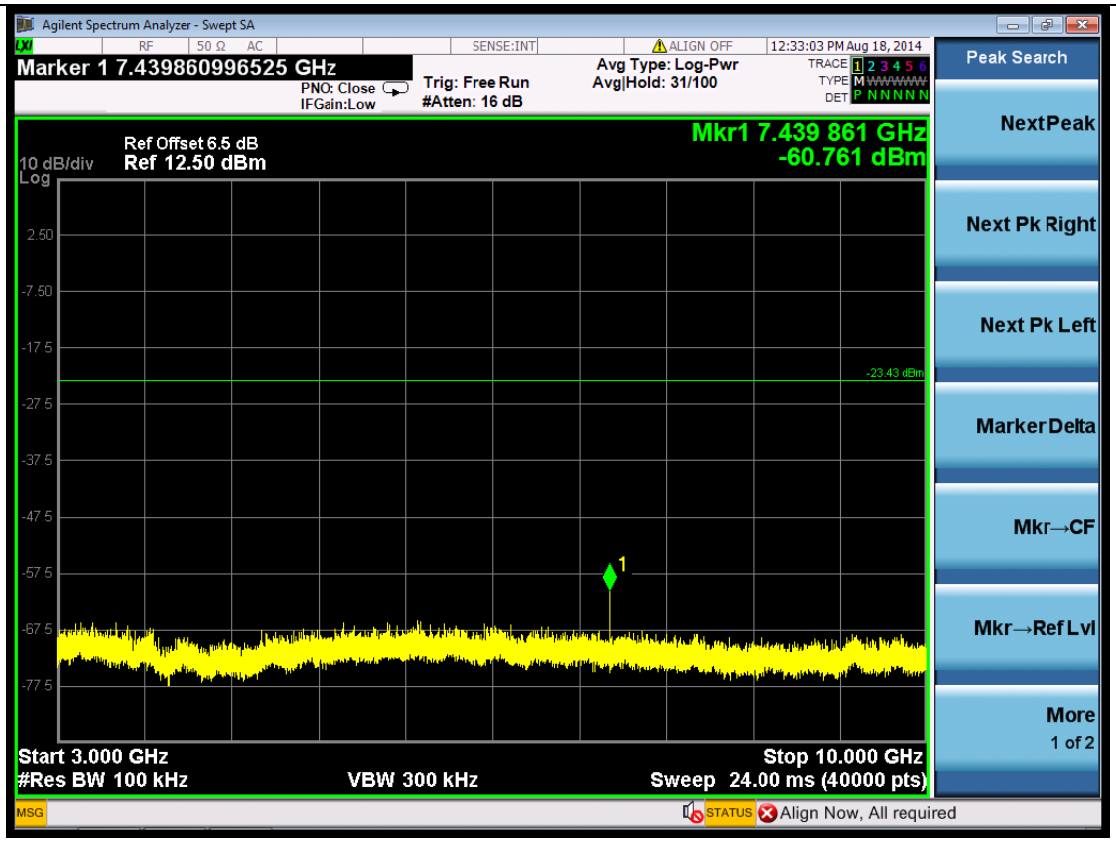
(Plot 6.9.2 C1: Channel 78: 2480MHz @ π/4DQPSK)



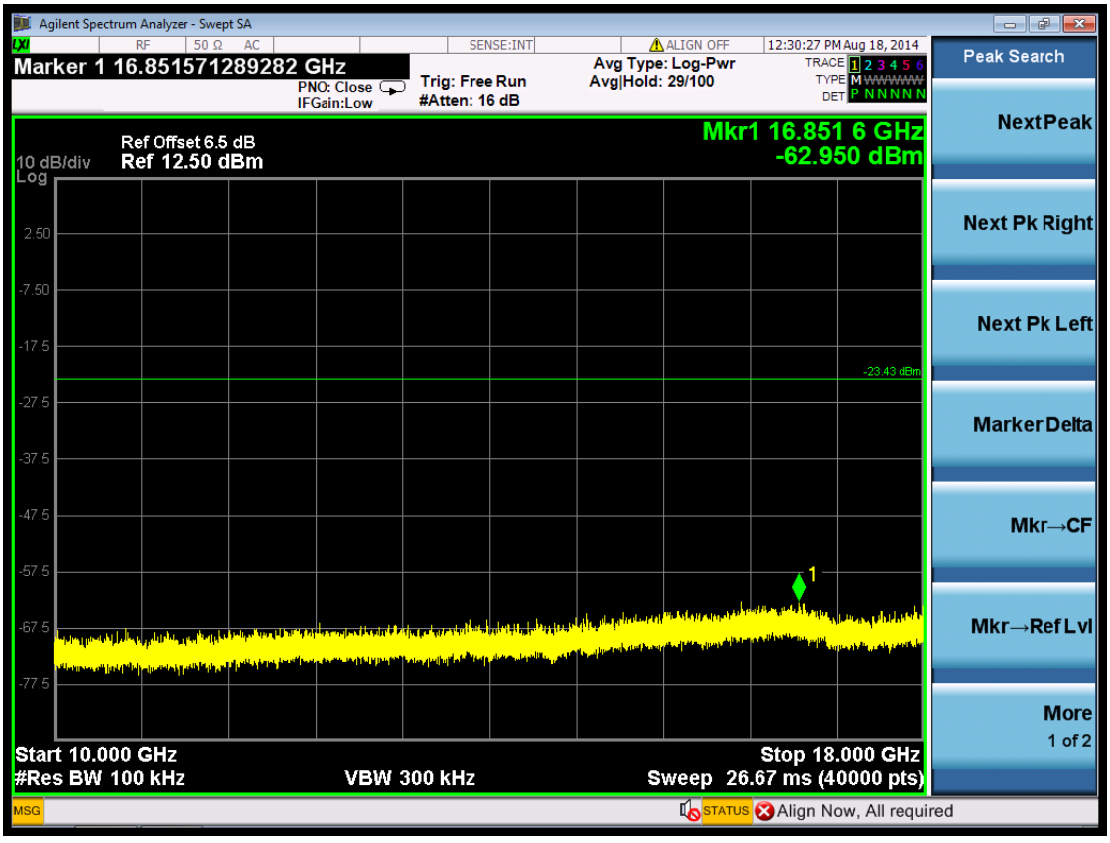
(Plot 6.9.2 C2: Channel 78: 2480MHz @ π/4DQPSK)



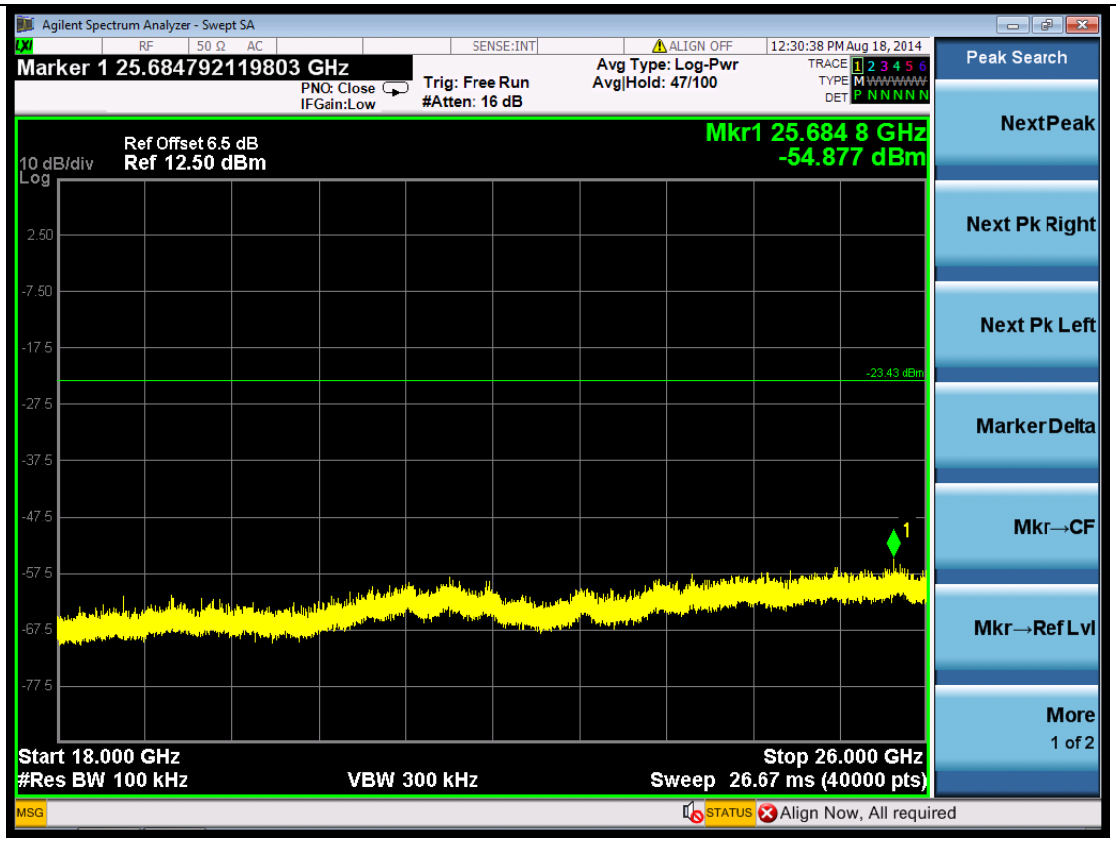
(Plot 6.9.2 C3: Channel 78: 2480MHz @ π/4DQPSK)



(Plot 6.9.2 C4: Channel 78: 2480MHz @ π/4DQPSK)



(Plot 6.9.2 C5: Channel 78: 2480MHz @ π/4DQPSK)



(Plot 6.9.2 C6: Channel 78: 2480MHz @ π/4DQPSK)

6.9.3 8DPSK Test Mode

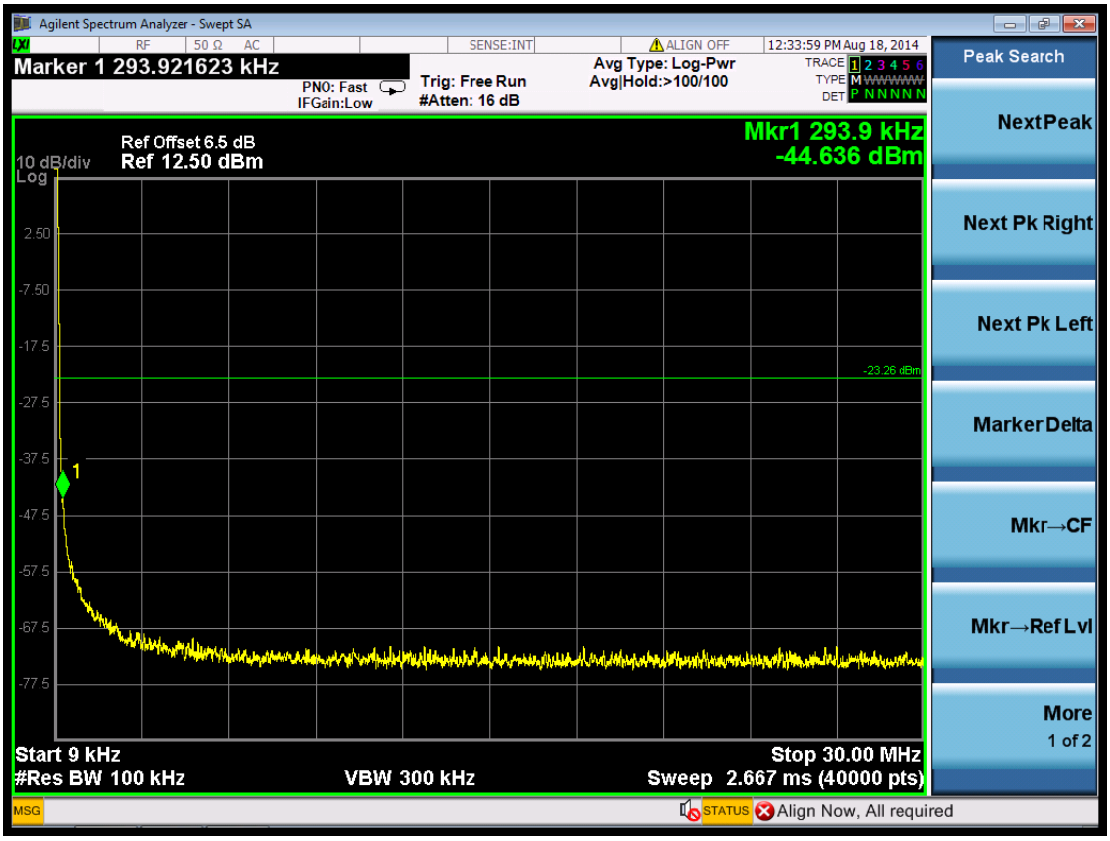
A. Test Verdict

Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
00	2402	2.402 GHz	Plot 6.9.3 A1	---	PASS
		9KHz-30MHz	Plot 6.9.3 A2	-20	PASS
		30MHz-3GHz	Plot 6.9.3 A3	-20	PASS
		3GHz-10GHz	Plot 6.9.3 A4	-20	PASS
		10GHz-18GHz	Plot 6.9.3 A5	-20	PASS
		18GHz-26GHz	Plot 6.9.3 A6	-20	PASS
39	2441	2.441 GHz	Plot 6.9.3 B1	---	PASS
		9KHz-30MHz	Plot 6.9.3 B2	-20	PASS
		30MHz-3GHz	Plot 6.9.3 B3	-20	PASS
		3GHz-10GHz	Plot 6.9.3 B4	-20	PASS
		10GHz-18GHz	Plot 6.9.3 B5	-20	PASS
		18GHz-26GHz	Plot 6.9.3 B6	-20	PASS
78	2480	2.480 GHz	Plot 6.9.3 C1	---	PASS
		9KHz-30MHz	Plot 6.9.3 C2	-20	PASS
		30MHz-3GHz	Plot 6.9.3 C3	-20	PASS
		3GHz-10GHz	Plot 6.9.3 C4	-20	PASS
		10GHz-18GHz	Plot 6.9.3 C5	-20	PASS
		18GHz-26GHz	Plot 6.9.3 C6	-20	PASS

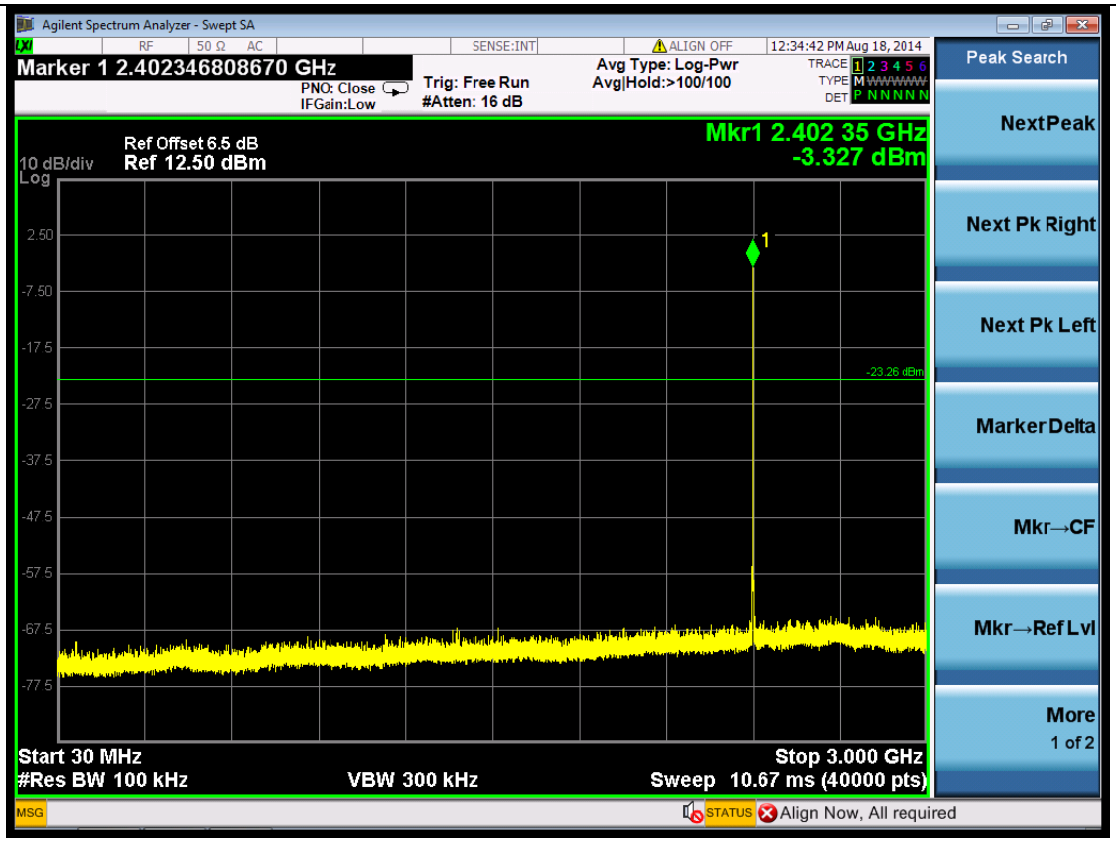
Note: 1. The test results including the cable lose.

B. Test Plots

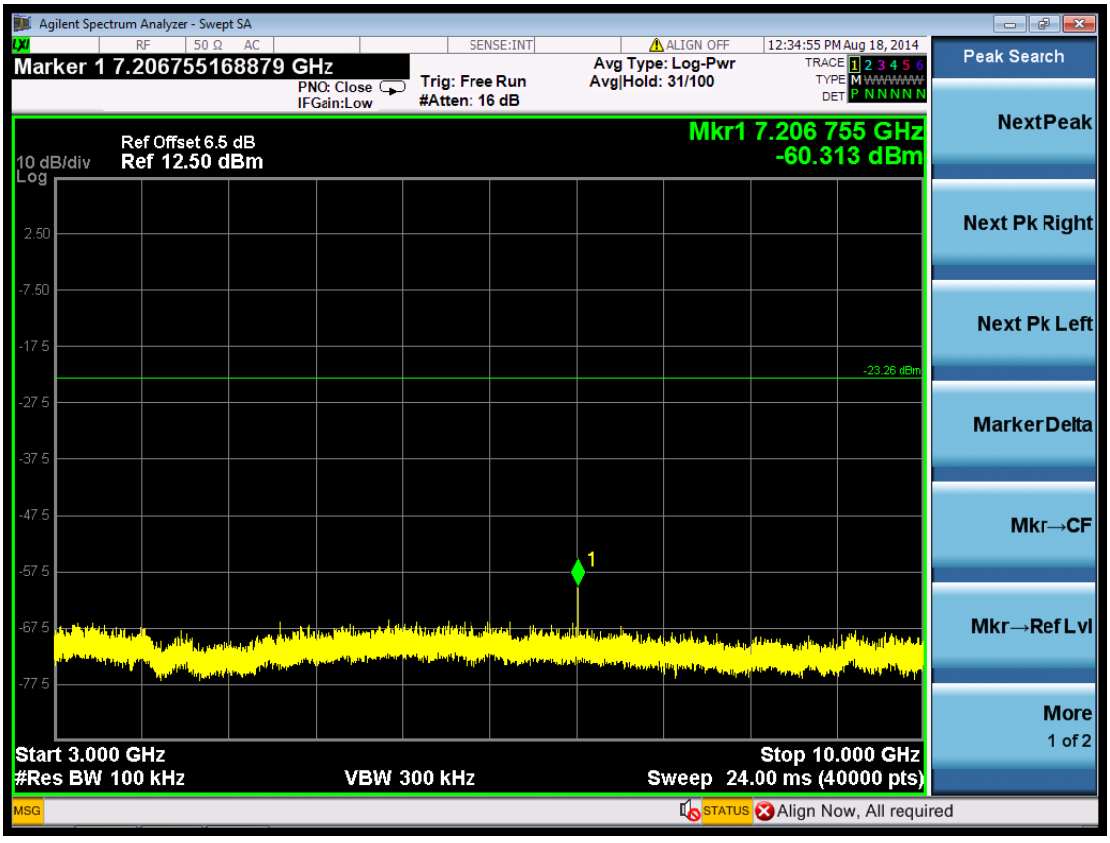
(Plot 6.9.3 A1: Channel 00: 2402MHz @ 8DPSK)



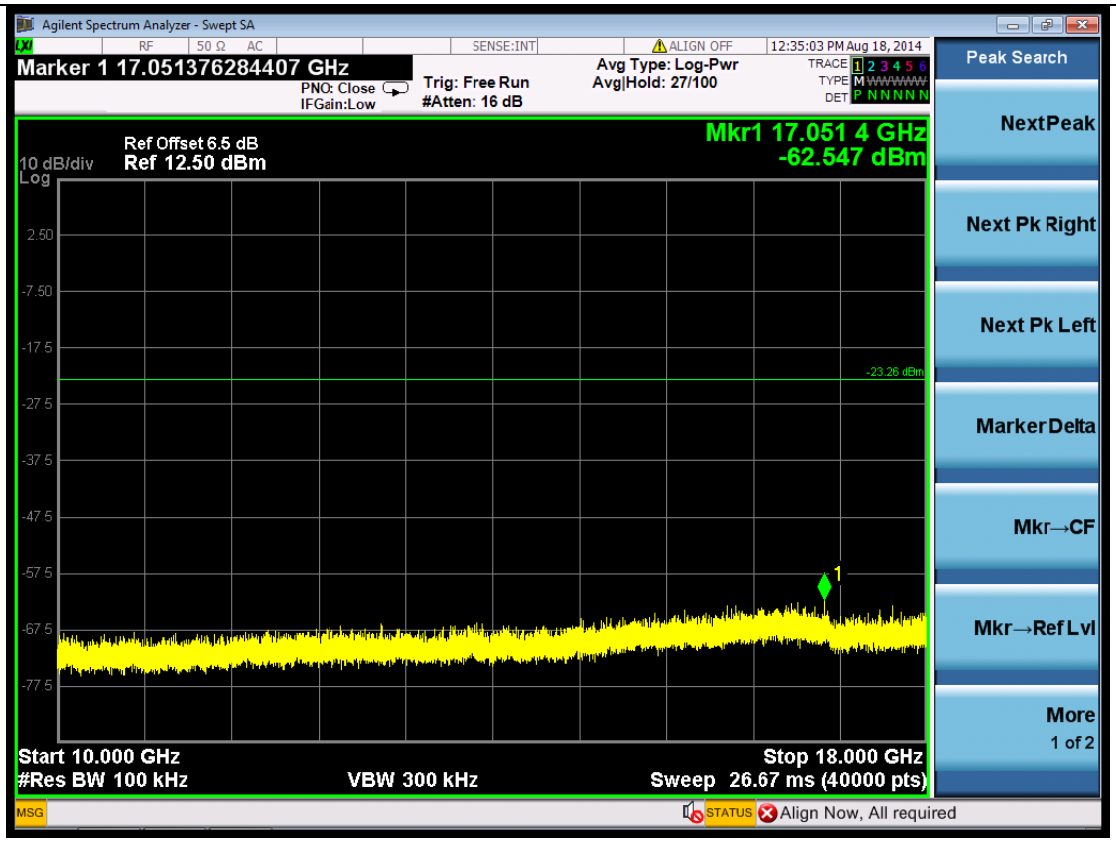
(Plot 6.9.3 A2: Channel 00: 2402MHz @ 8DPSK)



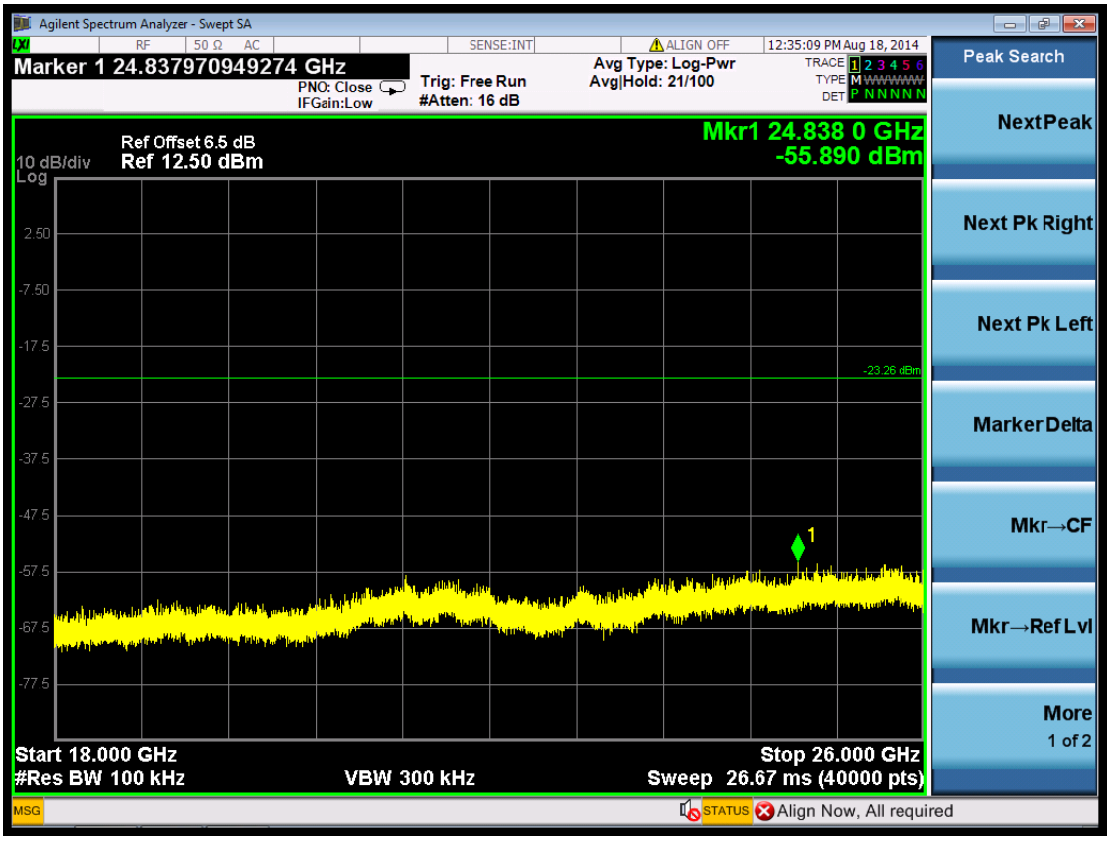
(Plot 6.9.3 A3: Channel 00: 2402MHz @ 8DPSK)



(Plot 6.9.3 A4: Channel 00: 2402MHz @ 8DPSK)

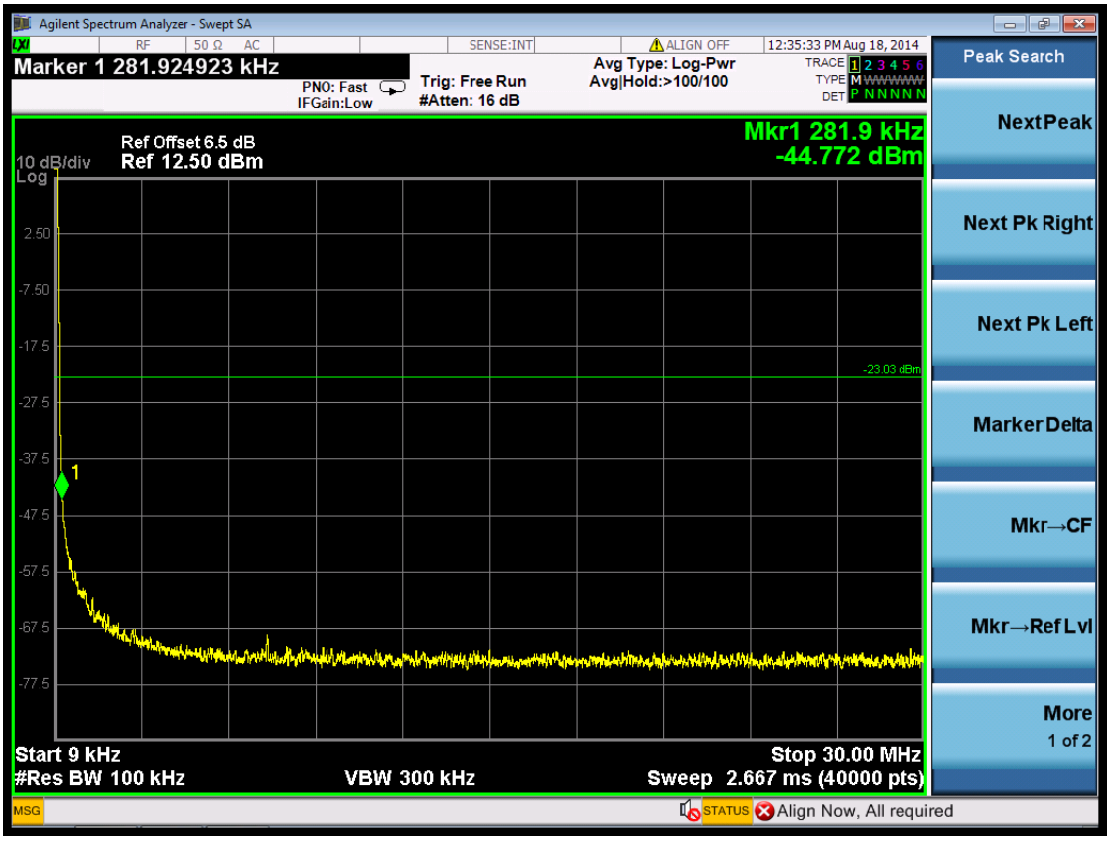


(Plot 6.9.3 A5: Channel 00: 2402MHz @ 8DPSK)

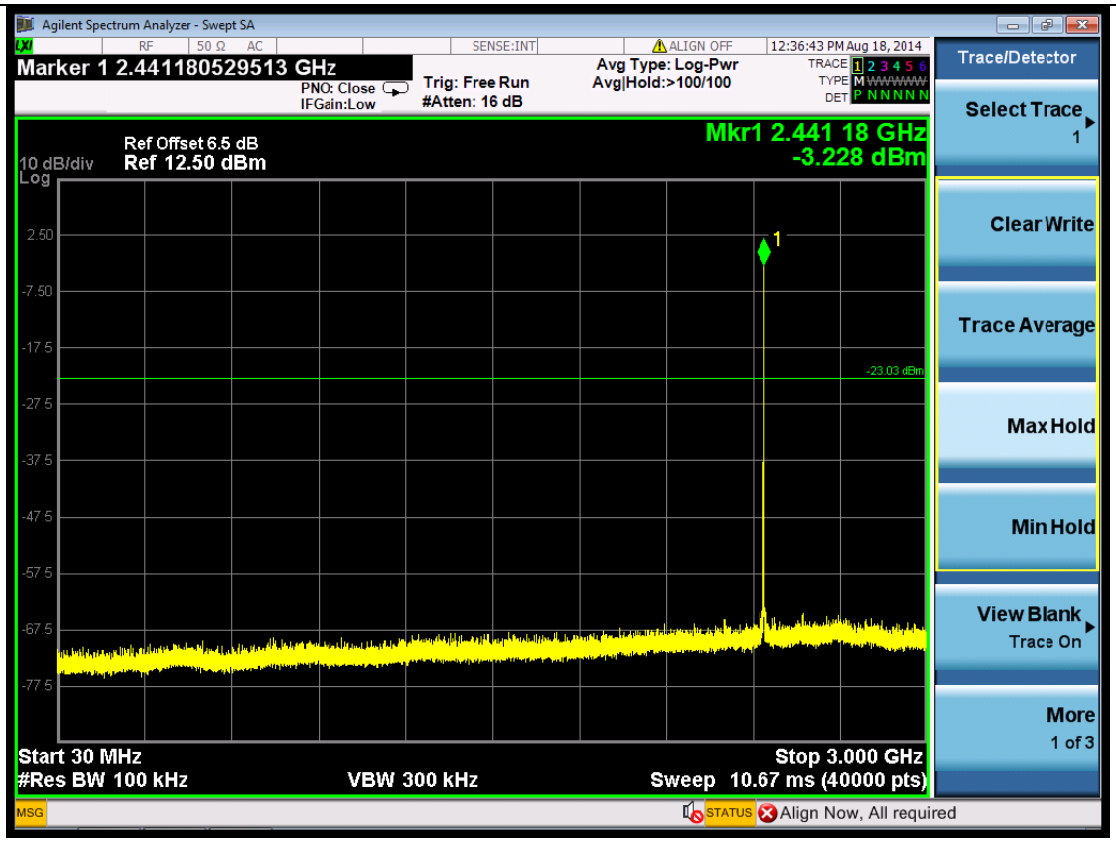


(Plot 6.9.3 A6: Channel 00: 2402MHz @ 8DPSK)

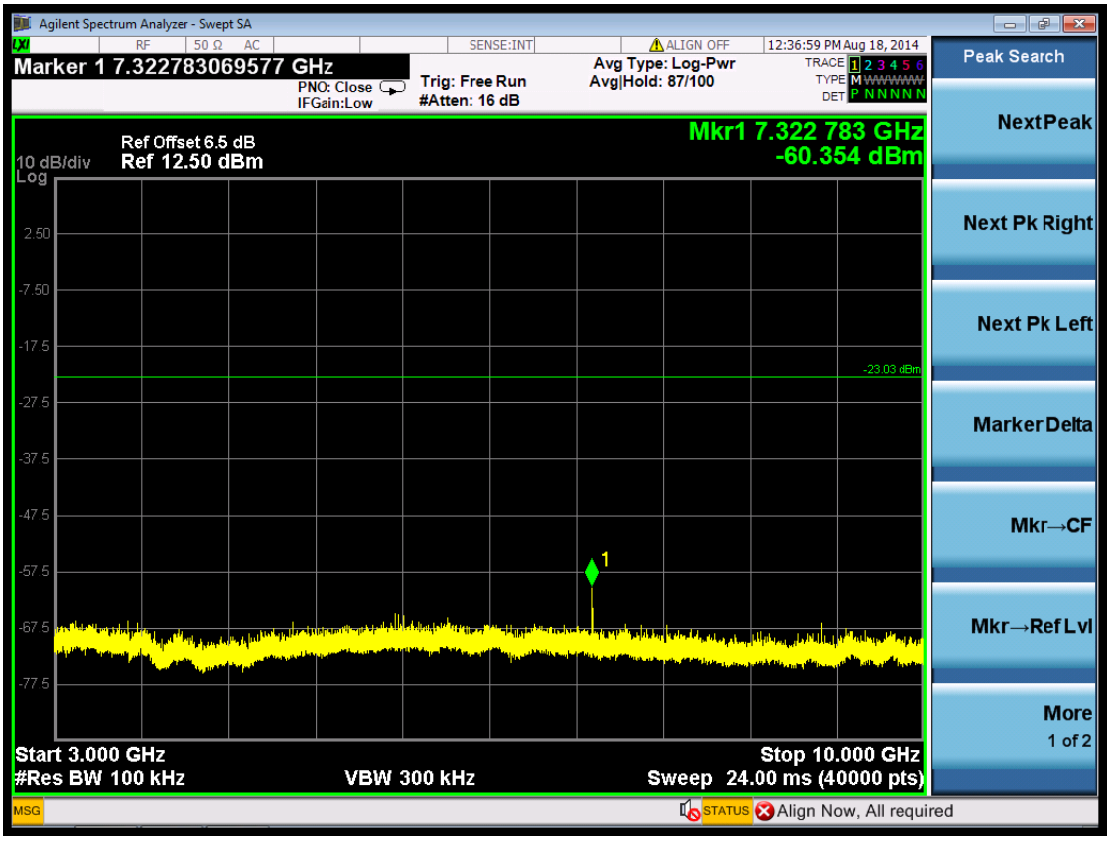
(Plot 6.9.3 B1: Channel 39: 2441MHz @ 8DPSK)



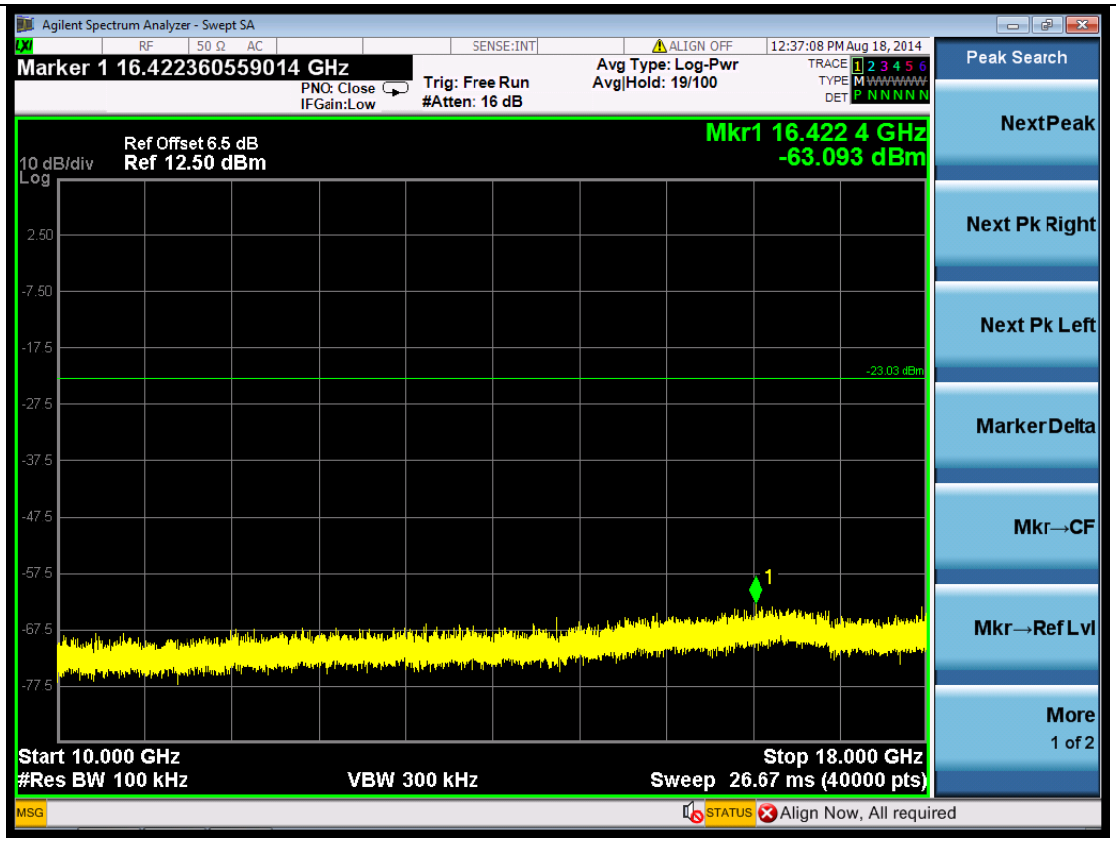
(Plot 6.9.3 B2: Channel 39: 2441MHz @ 8DPSK)



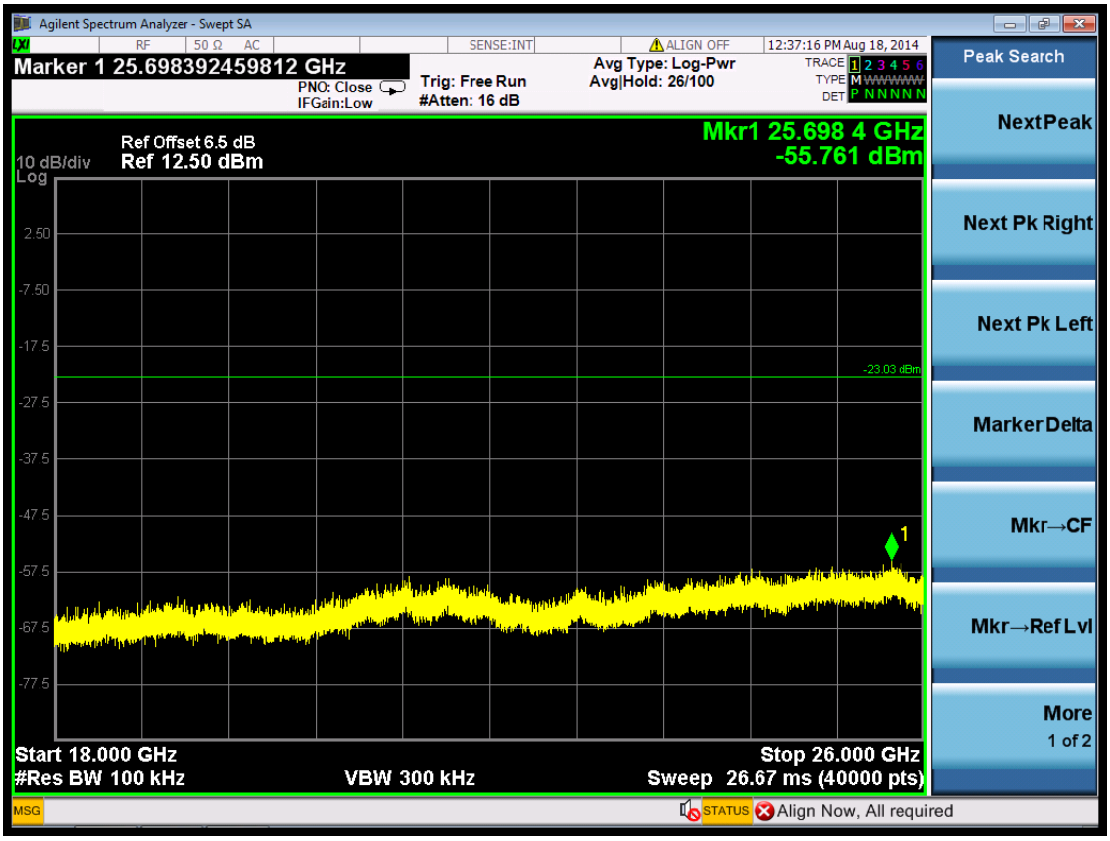
(Plot 6.9.3 B3: Channel 39: 2441MHz @ 8DPSK)



(Plot 6.9.3 B4: Channel 39: 2441MHz @ 8DPSK)

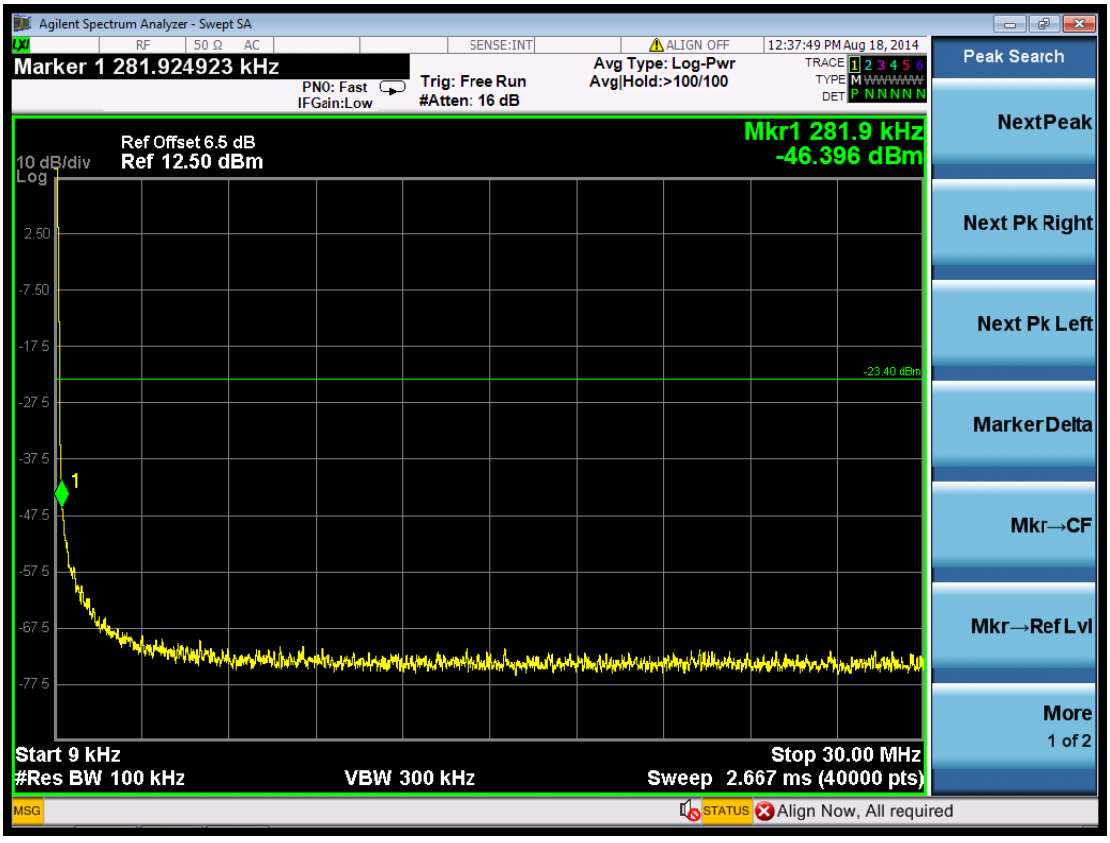


(Plot 6.9.3 B5: Channel 39: 2441MHz @ 8DPSK)

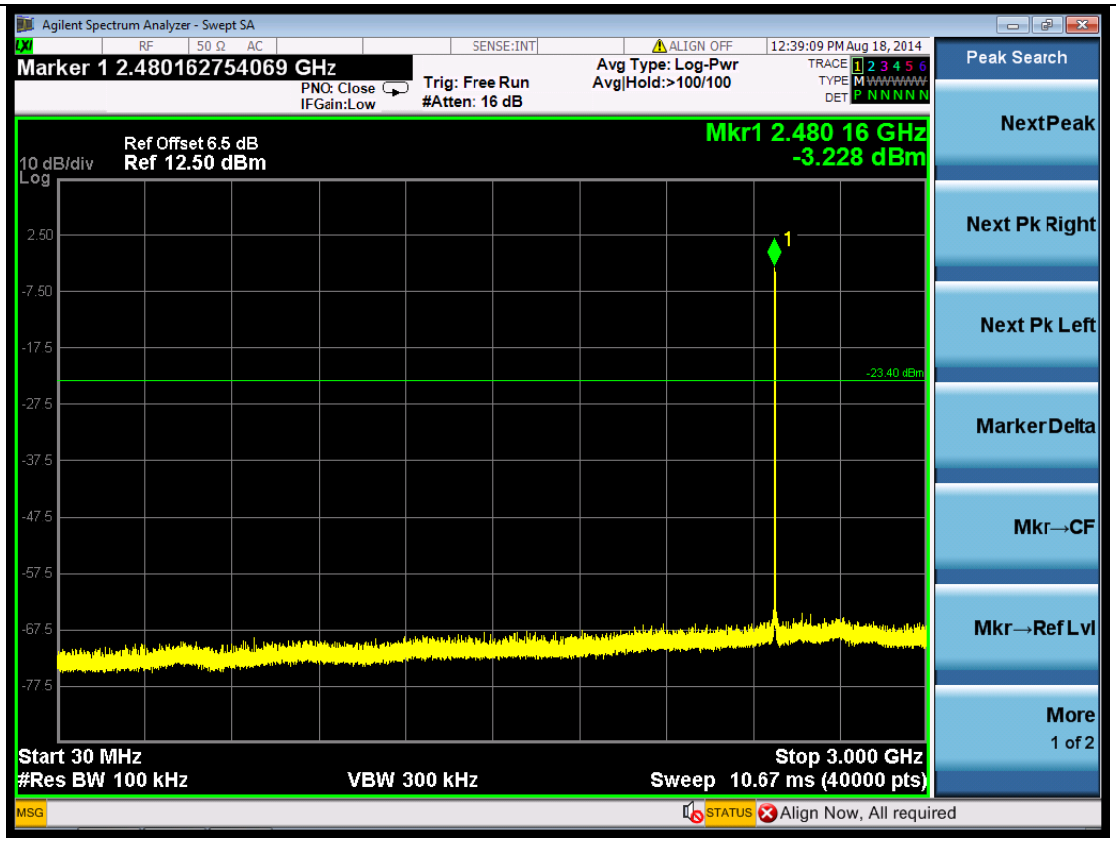


(Plot 6.9.3 B6: Channel 39: 2441MHz @ 8DPSK)

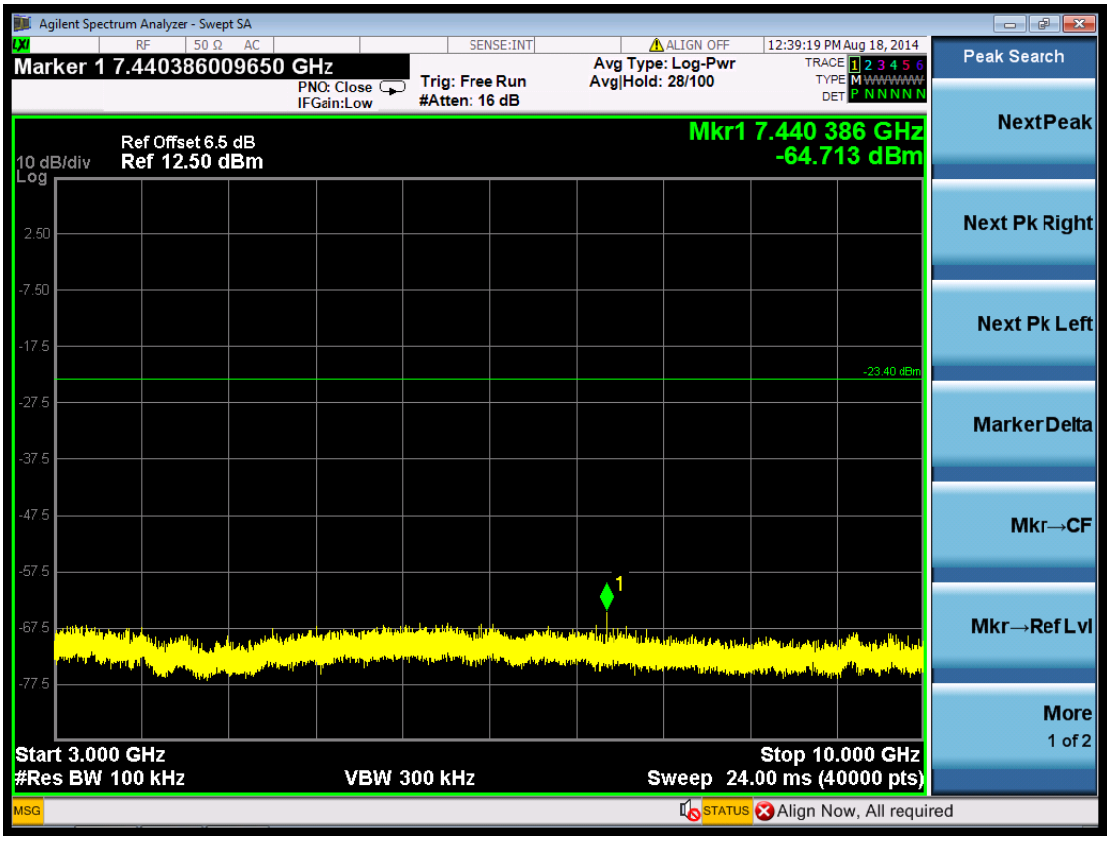
(Plot 6.9.3 C1: Channel 78: 2480MHz @ 8DPSK)



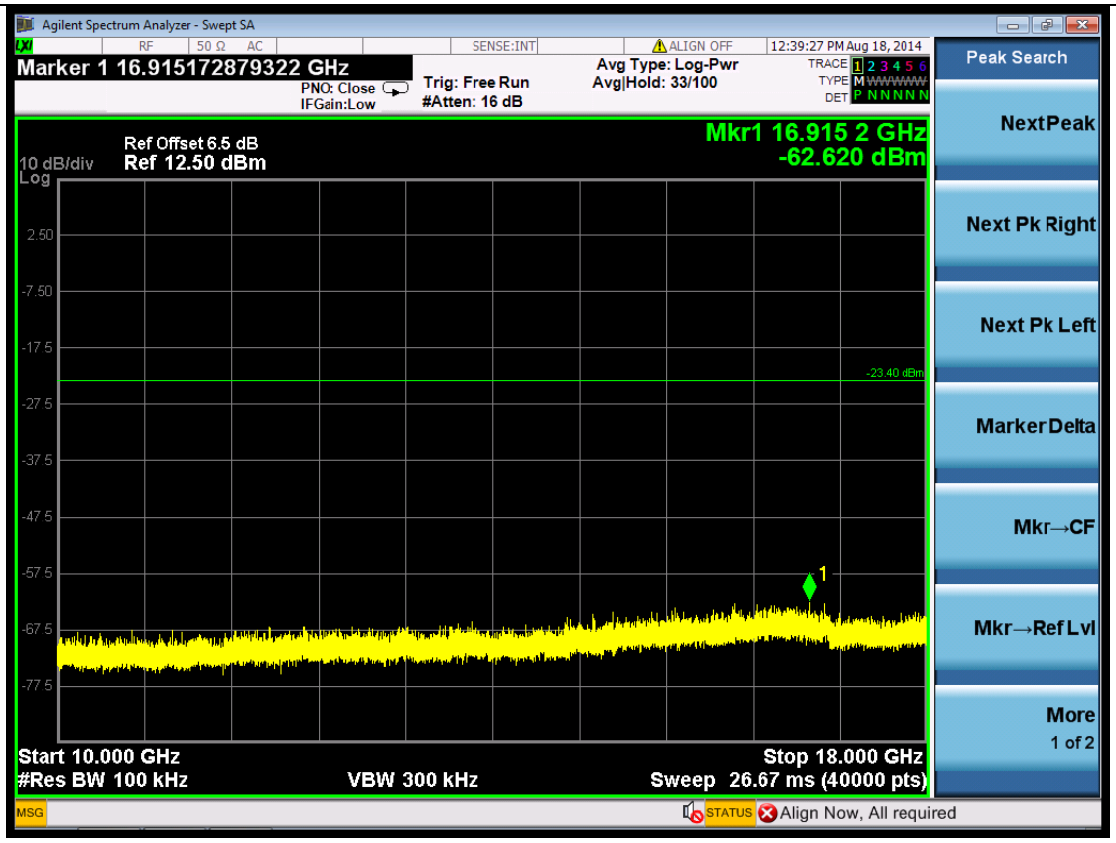
(Plot 6.9.3 C2: Channel 78: 2480MHz @ 8DPSK)



(Plot 6.9.3 C3: Channel 78: 2480MHz @ 8DPSK)



(Plot 6.9.3 C4: Channel 78: 2480MHz @ 8DPSK)



(Plot 6.9.3 C5: Channel 78: 2480MHz @ 8DPSK)

(Plot 6.9.3 C6: Channel 78: 2480MHz @ 8DPSK)

6.10 Pseudorandom Frequency Hopping Sequence

TEST APPLICABLE

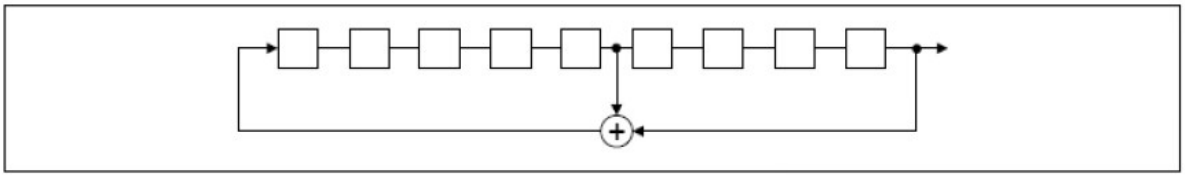
For 47 CFR Part 15C section 15.247 (a)(1) requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hop-ping channel, whichever is greater. Al-tentatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hop-ping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence Requirement

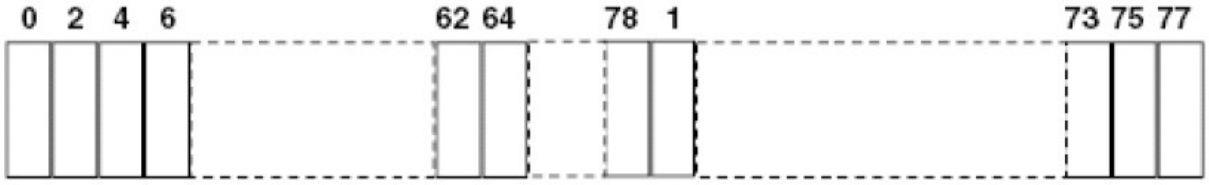
The pseudorandom frequency hopping sequence may be generated in a nice-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages:9
- Length of pseudo-random sequence:29-1=511 bits
- Longest sequence of zeros:8(non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.
The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

6.11 Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The WLAN and Bluetooth sharing same antenna and the maximum antenna gain of BT used was 0.00 dBi.

END