

Application for Certification
On behalf of

Bellman & Symfon Europe AB

Product Name: Visit Smart Hub

Model No.: BE1310

IC ID: 6693A-BE1310US

Prepared For : Bellman & Symfon Europe AB
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Report No. : ACI-I15095
Date of Test : Oct. 26 – Nov. 01, 2015
Date of Report : Nov. 02, 2015

TABLE OF CONTENTS

	Page
1 SUMMARY OF STANDARDS AND RESULTS	5
1.1 Description of Standards and Results.....	5
2 GENERAL INFORMATION	6
2.1 Description of Equipment Under Test.....	6
2.2 Peripherals.....	6
2.3 Description of Test Facility.....	7
2.4 Measurement Uncertainty.....	7
3 CONDUCTED EMISSION TEST	8
3.1 Test Equipment.....	8
3.2 Block Diagram of Test Setup.....	8
3.3 Conducted Emission Limit [IC RSS-Gen Issue 4 § 8.8 Table 3].....	8
3.4 Test Configuration.....	8
3.5 Operating Condition of EUT.....	9
3.6 Test Procedures.....	9
3.7 Test Results.....	9
4 RADIATED EMISSION TEST	11
4.1 Test Equipment.....	11
4.2 Block Diagram of Test Setup.....	11
4.3 Radiated Emission Limit [IC RSS-Gen Issue 4 § 8.9 Table 4].....	12
4.4 Test Configuration.....	12
4.5 Operating Condition of EUT.....	12
4.6 Test Procedures.....	12
4.7 Test Results.....	14
5 99% OCCUPIED BANDWIDTH MEASUREMENT	23
5.1 Test Equipment.....	23
5.2 Block Diagram of Test Setup.....	23
5.3 Specification Limits (IC RSS-Gen Issue 4 § 6.6).....	23
5.4 Operating Condition of EUT.....	23
5.5 Test Procedure.....	23
5.6 Test Results.....	24
6 20 dB BANDWIDTH MEASUREMENT	28
6.1 Test Equipment.....	28
6.2 Block Diagram of Test Setup.....	28
6.3 Specification Limits (IC RSS-247 Issue 1 § 5.1 (1)).....	28
6.4 Operating Condition of EUT.....	28
6.5 Test Procedure.....	28
6.6 Test Results.....	29
7 CARRIER FREQUENCY SEPARATION MEASUREMENT	33
7.1 Test Equipment.....	33
7.2 Block Diagram of Test Setup.....	33
7.3 Specification Limits (IC RSS-247 Issue 1 § 5.1 (2)).....	33
7.4 Operating Condition of EUT.....	33
7.5 Test Procedure.....	33
7.6 Test Results.....	33

8	NUMBER OF HOPPING FREQUENCIES MEASUREMENT	35
8.1	Test Equipment.....	35
8.2	Block Diagram of Test Setup	35
8.3	Specification Limits (IC RSS-247 Issue 1 § 5.1 (4))	35
8.4	Operating Condition of EUT	35
8.5	Test Procedure	35
8.6	Test Results	35
9	DEWLL TIME MEASUREMENT.....	37
9.1	Test Equipment.....	37
9.2	Block Diagram of Test Setup	37
9.3	Specification Limits (IC RSS-247 Issue 1 § 5.1 (4))	37
9.4	Operating Condition of EUT	37
9.5	Test Procedure	37
9.6	Test Results	37
10	TRANSMITTER OUTPUT POWER AND EQUIVALENT ISOTROPICALLY RADIATED POWER (E.I.R.P.)	59
10.1	Test Equipment.....	59
10.2	Block Diagram of Test Setup	59
10.3	Specification Limits (IC RSS-247 Issue1 §5.4(2))	59
10.4	Operating Condition of EUT	59
10.5	Test Procedure	59
10.6	Test Results	59
11	UNWANTED EMISSIONS MEASUREMENT	63
11.1	Test Equipment.....	63
11.2	Block Diagram of Test Setup	63
11.3	Specification Limits (IC RSS-247 Issue1 §5.5)	63
11.4	Operating Condition of EUT	63
11.5	Test Procedure	63
11.6	Test Results	63
12	BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS MEASUREMENT.....	76
12.1	Test Equipment.....	76
12.2	Block Diagram of Test Setup	76
12.3	Specification Limits (IC RSS-247 Issue1 §5.5)	76
12.4	Operating Condition of EUT	76
12.5	Test Procedure	76
12.6	Test Results	77
13	DEVIATION TO TEST SPECIFICATIONS	82

TEST REPORT FOR IC CERTIFICATE

Applicant : Bellman & Symfon Europe AB
Manufacturer : Bellman & Symfon Europe AB

EUT Description : Visit Smart Hub
(A) Model No. : BE1310
(B) Power Supply : AC 120V/60Hz
(C) Test Voltage : AC 120V/60Hz

Test Procedure Used:

RSS-Gen Issue 4, November 2014
RSS-247 Issue 1, May 2015
ANSI C63.10:2013

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the Canada RSS-Gen (Issue 4) and RSS-247 (Issue 1) limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT (M/N: BE1310), which was tested on Oct. 26 – Nov. 01, 2015 is technically compliance with the IC limits.

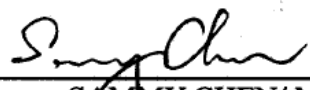
This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.


This report contains data that are not covered by the NVLAP accreditation.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Oct. 25 – Nov. 01, 2015 Date of Report : Nov. 02, 2015

Producer : 
ALAN HE / Assistant

Review : 
SAMMY CHEN/ Manager

 For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : 
Authorized Signature EMC BYRON KWO/Assistant General Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Conducted Emission Measurement	RSS-Gen Issue 4 General Requirements for Compliance of Radio Apparatus	Pass	§ 8.8 Table 3.
Spurious Radiated Emissions Measurement	RSS-Gen Issue 4 General Requirements for Compliance of Radio Apparatus	Pass	§ 8.9 Table 4.
99% Occupied Bandwidth	RSS-Gen Issue 4 General Requirements for Compliance of Radio Apparatus	Tested	§ 6.6
20 dB Bandwidth Measurement	RSS-247 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Pass	§ 5.1 (1)
Carrier Frequency Separation	RSS-247 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Pass	§ 5.1 (2)
Number of Hopping Frequencies	RSS-247 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Pass	§ 5.1 (4)
Dwell Time	RSS-247 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Pass	§ 5.1 (4)
Transmitter Output Power and Equivalent Isotropically Radiated Power (E.I.R.P.)	RSS-247 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Pass	§ 5.4 (2)
Unwanted Emissions	RSS-247 Issue 1 Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	Pass	§ 5.5
N/A is an abbreviation for Not Applicable.			

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : Visit Smart Hub

Model Number : BE1310

Type of EUT Production Pre-product Pro-type

Radio Tech : Bluetooth (GFSK, $\pi/4$ -DQPSK, 8-DPSK)

Freq. Band : 2402 MHz ~ 2480 MHz
Total 79 Channels:

Tested Freq. : 2402 MHz (Channel 00)
2441 MHz (Channel 39)
2480 MHz (Channel 78)

Antenna Type : PCB antenna

Antenna Gain : 2.0 dBi

RF Test Offset : 1dB (cable loss)

Power Supply : Manufacturer : LEADER ELECTRONIC INC.
M/N : MU03B6050055-A1
Input : 100~240V~50/60Hz
Output : 5.0V 0.55A

Applicant : Bellman & Symfon Europe AB
Sodra Langebergsgatan 30 421 32
Vastra Frolunda, Sweden

Manufacturer : Same as Applicant

Factory : Xingtel Xiamen Group Co., Ltd.
Xingtel Building, Torch Industrial District,
Xiamen 361006, P.R. China

2.2 Peripherals

2.2.1 Notebook PC

Manufacturer : DELL

Model Number : P51F

Certificate : FCC DoC; CE/EMC; VCCI; IC

2.3 Description of Test Facility

Site Description	: The site filed on November 29, 2004 is acceptable to Industry Canada, please reference the file number 5484A-1. Aug. 06, 2014 Renewed
Name of Firm	: Audix Technology (Shanghai) Co., Ltd.
Site Location	: 3 F 34 Bldg 680 Guiping Rd., Caohejing Hi-Tech Park, Shanghai 200233, China
IC Registration Number	: IC 5484
Accredited by NVLAP Lab Code	: 200371-0

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty	: U = 3.4dB
Radiated Emission Expanded Uncertainty (30-200MHz):	U = 4.6 dB (H) U = 4.3 dB (V)
Radiated Emission Expanded Uncertainty (200M-1GHz):	U = 5.4 dB (H) U = 4.5 dB (V)
Radiated Emission Expanded Uncertainty (Above 1GHz):	U = 5.1 dB
20 dB Bandwidth Expanded Uncertainty	: U = 1×10^{-8} MHz
Peak Output Power Expanded Uncertainty	: U = 1.56 dB
Spurious RF Conducted Emissions Expanded Uncertainty	: U = 1.20 dB

3 CONDUCTED EMISSION TEST

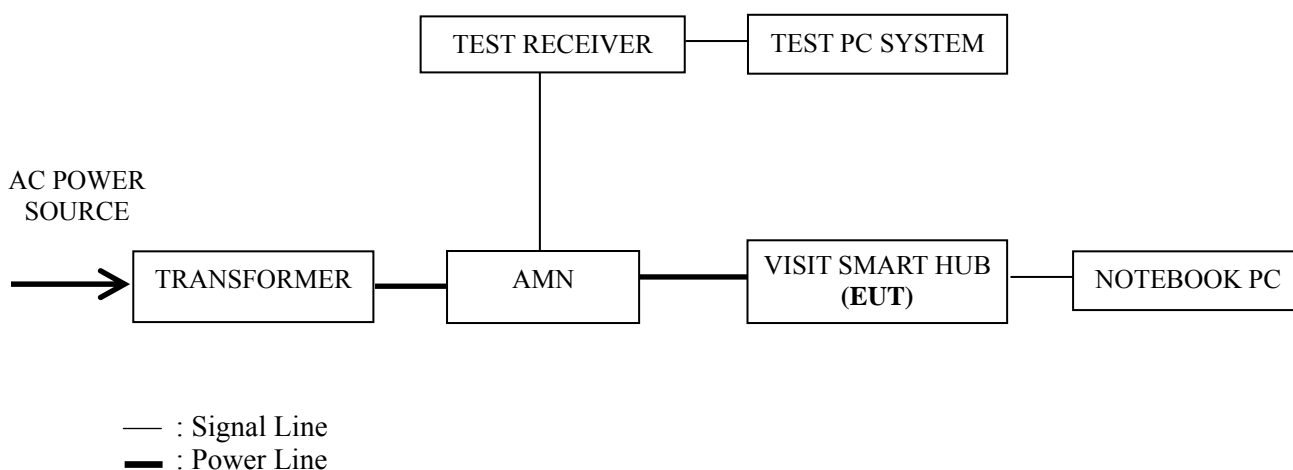
3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101302	Apr 27, 2015	Apr 26, 2016
2.	Artificial Mains Network (AMN)	R&S	ESH2-Z5	843890/011	Feb 25, 2015	Feb 24, 2016
3.	50Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2015	Mar 17, 2016
4.	Software	Audix	E3	SET00200 9804M592	--	--

3.2 Block Diagram of Test Setup

3.2.1 Conducted Disturbance Test Setup



3.3 Conducted Emission Limit [IC RSS-Gen Issue 4 § 8.8 Table 3]

Frequency Range (MHz)	Limits dB (μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE 1 – The lower limit shall apply at the transition frequencies.
 NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz

3.4 Test Configuration

The EUT (listed in Sec.2.1) and the peripherals (listed in Sec 2.2) were installed as shown on Sec.3.2 to meet IC requirement and operating in a manner that tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

- 3.5.1 Setup the EUT as shown in Sec. 3.2.
- 3.5.2 Turn on the power of all equipments and the EUT.
- 3.5.3 Turn the EUT on the test mode, and then test.

3.6 Test Procedures

The EUT were connected to the power mains through an Artificial Mains Network (AMN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line (Line & Neutral) were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to ANSI C63.10, RSS-Gen and RSS-247 during conducted emission test.

The bandwidth of R&S Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7.

3.7 Test Results

< **PASS** >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

NOTE 1 – Factor = Cable Loss + AMN Factor.

NOTE 2 – Emission Level = Meter Reading + Factor.

NOTE 3 – “QP” means “Quasi-Peak” values, “AV” means “Average” values.

NOTE 4 –The worst emission is detected at 1.403 MHz (Average Value) with corrected signal level of 13.86dB (μ V) (limit is 46.00 dB (μ V)), when the Neutral of the EUT is connected to AMN.

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 48%RH

Test Mode : Transmitting Date of Test : Oct. 30, 2015

Test Line	Frequency (MHz)	Meter Reading dB(μ V)	Factor (dB)	Emission Level dB(μ V)	Limits dB(μ V)	Margin (dB)	Remark
Line	0.150	29.98	0.16	30.14	66.00	35.86	QP
	0.174	27.82	0.16	27.98	64.77	36.79	
	0.247	22.80	0.17	22.97	61.86	38.89	
	1.282	16.67	0.27	16.94	56.00	39.06	
	1.449	15.58	0.28	15.86	56.00	40.14	
	3.472	16.29	0.33	16.62	56.00	39.38	
	0.150	14.56	0.16	14.72	56.00	41.28	AV
	0.174	14.26	0.16	14.42	54.77	40.35	
	0.247	10.51	0.17	10.68	51.86	41.18	
	1.282	10.28	0.27	10.55	46.00	35.45	
	1.449	10.45	0.28	10.73	46.00	35.27	
	3.472	4.59	0.33	4.92	46.00	41.08	
Neutral	0.150	30.05	0.16	30.21	66.00	35.79	QP
	0.180	27.81	0.17	27.98	64.50	36.52	
	0.247	22.73	0.17	22.90	61.86	38.96	
	0.796	14.46	0.23	14.69	56.00	41.31	
	1.403	15.18	0.28	15.46	56.00	40.54	
	3.364	16.07	0.36	16.43	56.00	39.57	
	0.150	15.69	0.16	15.85	56.00	40.15	AV
	0.180	14.69	0.17	14.86	54.50	39.64	
	0.247	12.37	0.17	12.54	51.86	39.32	
	0.796	12.64	0.23	12.87	46.00	33.13	
	1.403	13.58	0.28	13.86	46.00	32.14	
	3.364	12.37	0.36	12.73	46.00	33.27	

TEST ENGINEER: WENCY YANG

4 RADIATED EMISSION TEST

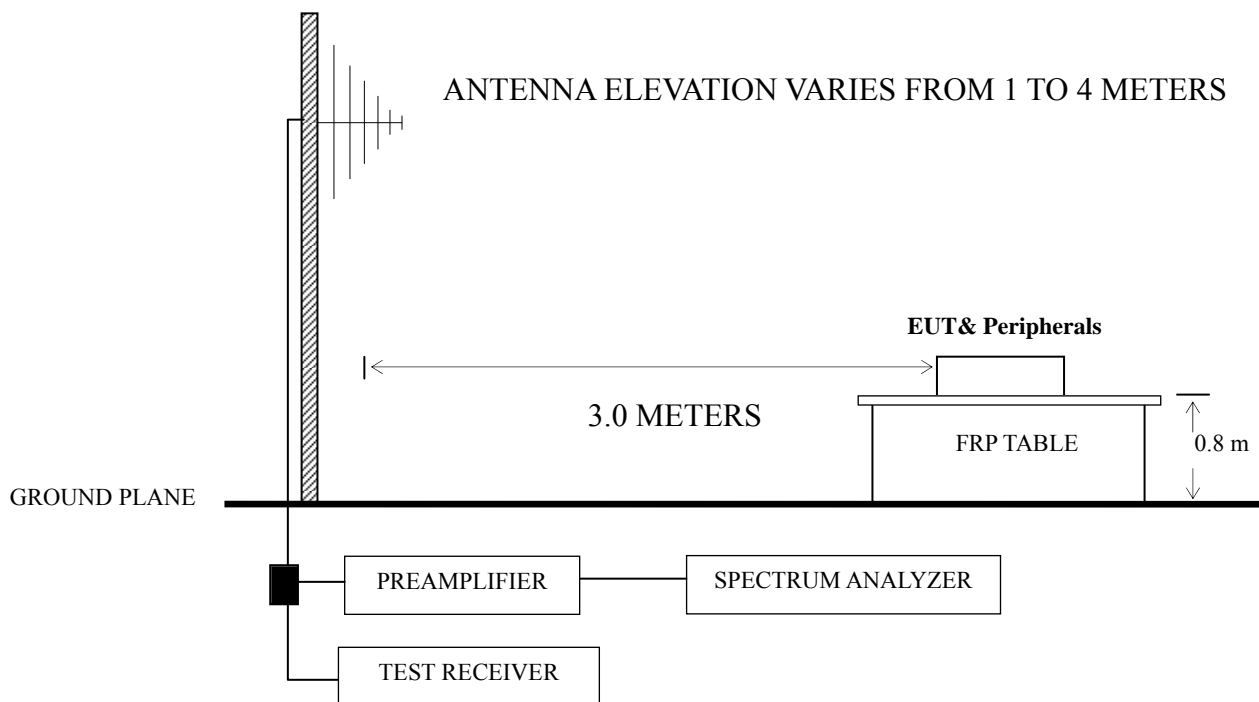
4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2015	Apr 26, 2016
2.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2015	Mar 19, 2016
3.	EXA Signal Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016
4.	Test Receiver	R&S	ESCI	101303	May 07, 2015	May 06, 2016
5.	Bi-log Antenna	TESEQ	CBL6112D	23193	May 15, 2015	May 15, 2016
6.	Horn Antenna	EMCO	3115	96074878	Jun 03, 2015	Jun 02, 2016
7.	Horn Antenna	EMCO	3116	00062643	Jul 03, 2015	Jul 02, 2016
8.	50 Ω Coaxial Switch	Anritsu	MP59B	6200426389	Sep 18, 2015	Mar 17, 2016
9.	Software	Audix	E3	6.2007-9-10	-	-

4.2 Block Diagram of Test Setup

4.2.1 Test Setup



■ : 50 ohm Coaxial Switch

4.3 Radiated Emission Limit [IC RSS-Gen Issue 4 § 8.9 Table 4]

Frequency (MHz)	Distance (m)	Field strength limits ($\mu\text{V/m}$)	
		($\mu\text{V/m}$)	dB($\mu\text{V/m}$)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level dB ($\mu\text{V/m}$) = 20 log Emission Level ($\mu\text{V/m}$)
NOTE 2 - The tighter limit applies at the band edges.
NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.
NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

4.4 Test Configuration

The EUT (listed in Sec.2.1) and the peripherals (listed in Sec.2.2) were installed as shown on Sec.4.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 4.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Turn the EUT on the test mode, and then test.

4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable that is 0.8 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10, RSS-Gen and RSS-247 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz for Spectrum Agilent N9010A.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

The EUT was tested under the following test modes:

Mode	Operation	Channel	Frequency
1.	Transmitting	00	2402 MHz
2.		39	2441 MHz
3.		78	2480 MHz
4.	Receiving	--	--
5.	Transmitting	00	2402 MHz
6.	Band-Edge	78	2480 MHz

All the test results are listed in Sec.4.7.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

No.	Operation	Channel	Frequency	Data Page
1.	Transmitting (1M GFSK)	00	2402 MHz	P15
2.		39	2441 MHz	P16
3.		78	2480 MHz	P17
4.	Transmitting (3M 8-DPSK)	00	2402 MHz	P18
5.		39	2441 MHz	P19
6.		78	2480 MHz	P20
7.	Receiving	--	--	P21
8.	Transmitting	Band Edge		P22

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss (<1GHz)

NOTE 2 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor (>1GHz)

NOTE 3 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Transmitting Ch00
(1M GFSK) Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	50.94	23.89	0.82	7.38	--	32.09	40.00	7.91	QP
	191.75	23.25	1.92	10.23	--	35.40	43.50	8.10	
	213.02	23.49	2.02	10.13	--	35.64	43.50	7.86	
	224.52	23.17	2.07	10.75	--	35.99	46.00	10.01	
	255.62	18.18	2.22	12.70	--	33.10	46.00	12.90	
	303.54	17.64	2.60	13.91	--	34.15	46.00	11.85	
	1603.25	56.88	4.01	26.04	35.55	51.38	74.00	22.62	PK
	3147.75	48.74	5.93	30.82	35.05	50.44	74.00	23.56	
	4804.00	46.19	6.33	33.91	33.97	52.46	74.00	21.54	
Vertical	52.95	15.14	0.83	6.92	--	22.89	40.00	17.11	QP
	107.89	10.92	1.38	12.56	--	24.86	43.50	18.64	
	172.00	8.93	1.78	10.81	--	21.52	43.50	21.98	
	226.89	11.40	2.08	10.96	--	24.44	46.00	21.56	
	265.68	11.10	2.29	13.20	--	26.59	46.00	19.41	
	310.00	10.91	2.60	14.10	--	27.61	46.00	18.39	
	1803.01	49.82	4.15	26.82	35.31	45.48	74.00	28.52	PK
	4197.59	48.12	6.31	33.12	34.21	53.34	74.00	20.66	
	4804.00	46.70	6.33	33.91	33.97	52.97	74.00	21.03	

TEST ENGINEER: BILL WU

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Transmitting Ch39
(1M GFSK) Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	52.03	22.54	0.83	7.10	--	30.47	40.00	9.53	QP
	104.90	17.97	1.35	12.50	--	31.82	43.50	11.68	
	191.75	18.41	1.92	10.23	--	30.56	43.50	12.94	
	223.73	20.50	2.07	10.70	--	33.27	46.00	12.73	
	255.62	20.50	2.22	12.70	--	35.42	46.00	10.58	
	302.48	21.13	2.59	13.88	--	37.60	46.00	8.40	
	1629.30	56.92	4.03	26.15	35.52	51.58	74.00	22.42	PK
	3140.51	48.78	5.93	30.80	35.06	50.45	74.00	23.55	
Vertical	47.99	20.02	0.79	8.90	--	29.71	40.00	10.29	QP
	52.03	23.10	0.83	7.10	--	31.03	40.00	8.97	
	114.92	10.69	1.43	12.70	--	24.82	43.50	18.68	
	191.75	13.35	1.92	10.23	--	25.50	43.50	18.00	
	223.73	16.74	2.07	10.70	--	29.51	46.00	16.49	
	245.09	13.72	2.14	12.30	--	28.16	46.00	17.84	
	3296.10	48.03	6.03	31.12	34.90	50.28	74.00	23.72	PK
	4197.59	48.47	6.31	33.12	34.21	53.69	74.00	20.31	
4882.00	45.80	6.24	33.99	33.94	52.09	74.00	21.91		

TEST ENGINEER: BILL WU

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Transmitting Ch78
(1M GFSK) Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	50.06	21.12	0.81	7.60	--	29.53	40.00	10.47	QP
	128.11	8.65	1.51	12.90	--	23.06	43.50	20.44	
	191.75	19.70	1.92	10.23	--	31.85	43.50	11.65	
	223.73	20.73	2.07	10.70	--	33.50	46.00	12.50	
	272.28	22.15	2.35	13.26	--	37.76	46.00	8.24	
	303.54	20.99	2.60	13.91	--	37.50	46.00	8.50	
	1655.77	54.36	4.06	26.25	35.48	49.19	74.00	24.81	PK
	3147.75	45.50	5.93	30.82	35.05	47.20	74.00	22.80	
	4960.00	44.58	6.14	34.06	33.91	50.87	74.00	23.13	
Vertical	50.94	21.66	0.82	7.38	--	29.86	40.00	10.14	QP
	107.89	11.45	1.38	12.56	--	25.39	43.50	18.11	
	191.75	17.13	1.92	10.23	--	29.28	43.50	14.22	
	223.73	16.97	2.07	10.70	--	29.74	46.00	16.26	
	255.62	10.95	2.22	12.70	--	25.87	46.00	20.13	
	287.99	12.01	2.49	13.58	--	28.08	46.00	17.92	
	3296.10	47.67	6.03	31.12	34.90	49.92	74.00	24.08	PK
	4197.59	47.30	6.31	33.12	34.21	52.52	74.00	21.48	
	4960.00	46.06	6.14	34.06	33.91	52.35	74.00	21.65	

TEST ENGINEER: BILL WU

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Transmitting Ch00
(3M 8-DPSK) Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	50.94	13.60	0.82	7.38	--	21.80	40.00	18.20	QP
	104.90	16.06	1.35	12.50	--	29.91	43.50	13.59	
	128.11	14.73	1.51	12.90	--	29.14	43.50	14.36	
	191.75	21.89	1.92	10.23	--	34.04	43.50	9.46	
	224.00	25.50	2.07	10.75	--	38.32	46.00	7.68	
	294.11	21.03	2.52	13.60	--	37.15	46.00	8.85	
	1603.25	56.88	4.01	26.04	35.55	51.38	74.00	22.62	PK
	3147.75	49.85	5.93	30.82	35.05	51.55	74.00	22.45	
	4804.00	47.19	6.33	33.91	33.97	59.46	74.00	20.54	
Vertical	50.94	21.33	0.82	7.38	--	29.53	40.00	10.47	QP
	55.03	20.85	0.85	6.52	--	28.22	40.00	11.78	
	191.75	17.32	1.92	10.23	--	29.47	43.50	14.03	
	223.73	19.47	2.07	10.70	--	32.24	46.00	13.76	
	255.62	18.32	2.22	12.70	--	33.24	46.00	12.76	
	294.11	11.25	2.52	13.60	--	27.37	46.00	18.63	
	1803.02	54.65	4.15	26.82	35.31	50.31	74.00	23.69	PK
	4197.59	48.12	6.31	33.12	34.21	53.34	74.00	20.66	
	4804.00	46.70	6.33	33.91	33.97	52.97	74.00	21.03	

TEST ENGINEER: BILL WU

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Transmitting Ch39
(3M 8-DPSK) Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	52.95	16.61	0.83	6.92	--	24.36	40.00	15.64	QP
	104.90	10.17	1.35	12.50	--	24.02	43.50	19.48	
	128.11	10.83	1.51	12.90	--	25.24	43.50	18.26	
	191.75	22.00	1.92	10.23	--	34.15	43.50	9.35	
	223.73	24.78	2.07	10.70	--	37.55	46.00	8.45	
	264.75	21.74	2.29	13.20	--	37.23	46.00	8.77	
	1629.30	56.92	4.03	26.15	35.52	51.58	74.00	22.42	PK
	3140.51	49.89	5.93	30.80	35.06	51.56	74.00	22.44	
Vertical	4882.00	46.81	6.24	33.99	33.94	59.10	74.00	20.90	QP
	56.99	21.47	0.86	6.25	--	28.58	40.00	11.42	
	104.90	15.60	1.35	12.50	--	29.45	43.50	14.05	
	128.11	15.17	1.51	12.90	--	29.58	43.50	13.92	
	191.75	21.94	1.92	10.23	--	34.09	43.50	9.41	
	223.73	20.23	2.07	10.70	--	33.00	46.00	13.00	
	271.33	15.01	2.35	13.28	--	30.64	46.00	15.36	
	3296.10	49.14	6.03	31.12	34.90	51.39	74.00	22.61	
4197.59	48.47	6.31	33.12	34.21	53.69	74.00	20.31		
4882.00	46.80	6.24	33.99	33.94	59.09	74.00	20.91		

TEST ENGINEER: BILL WU

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Transmitting Ch78
(3M 8-DPSK) Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	56.00	13.03	0.85	6.30	--	20.18	40.00	19.82	QP
	104.90	13.35	1.35	12.50	--	27.20	43.50	16.30	
	191.75	19.98	1.92	10.23	--	32.13	43.50	11.37	
	223.73	23.59	2.07	10.70	--	36.36	46.00	9.64	
	255.62	20.65	2.22	12.70	--	35.57	46.00	10.43	
	302.48	21.42	2.59	13.88	--	37.89	46.00	8.11	
	1655.77	54.36	4.06	26.25	35.48	49.19	74.00	24.81	PK
	3147.75	49.40	5.93	30.82	35.05	51.10	74.00	22.90	
Vertical	4960.00	44.58	6.14	34.06	33.91	50.87	74.00	23.13	QP
	47.99	17.63	0.79	8.90	--	27.32	40.00	12.68	
	51.12	18.09	0.82	7.32	--	26.23	40.00	13.77	
	112.13	8.35	1.41	12.65	--	22.41	43.50	21.09	
	200.69	19.36	1.97	9.72	--	31.05	43.50	12.45	
	223.73	23.67	2.07	10.70	--	36.44	46.00	9.56	
	302.48	9.17	2.59	13.88	--	25.64	46.00	20.36	
	3296.10	49.78	6.03	31.12	34.90	52.03	74.00	21.97	
4197.59	47.30	6.31	33.12	34.21	52.52	74.00	21.48		
4960.00	47.06	6.14	34.06	33.91	59.35	74.00	20.65		

TEST ENGINEER: BILL WU

EUT : Visit Smart Hub Temperature : 22°C

Model No. : BE1310 Humidity : 40%RH

Test Mode : Receiving Date of Test : Nov. 01, 2015

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	49.71	17.45	0.81	7.86	--	26.12	40.00	13.88	QP
	77.05	13.29	1.04	8.89	--	23.22	40.00	16.78	
	116.95	15.45	1.44	12.74	--	29.63	43.50	13.87	
	222.17	23.64	2.05	10.65	--	36.34	46.00	9.66	
	275.16	22.04	2.39	13.20	--	37.63	46.00	8.37	
	294.11	19.86	2.52	13.60	--	35.98	46.00	10.02	PK
	1196.74	54.45	3.52	24.43	36.14	46.26	74.00	27.74	
	2404.36	49.44	4.81	28.25	35.15	47.35	74.00	26.65	
	3147.75	48.61	5.93	30.82	35.05	50.31	74.00	23.69	
Vertical	47.99	17.11	0.79	8.90	--	26.80	40.00	13.20	QP
	58.00	18.29	0.87	6.20	--	25.36	40.00	14.64	
	116.95	13.03	1.44	12.74	--	27.21	43.50	16.29	
	178.76	15.74	1.83	10.56	--	28.13	43.50	15.37	
	210.79	16.75	2.01	10.03	--	28.79	43.50	14.71	
	294.11	13.95	2.52	13.60	--	30.07	46.00	15.93	PK
	1803.02	49.82	4.15	26.82	35.31	45.48	74.00	28.52	
	2393.32	52.06	4.81	28.22	35.14	49.95	74.00	24.05	
	4187.94	48.43	6.19	33.12	34.22	53.52	74.00	20.48	

TEST ENGINEER: BILL WU

Radiated Band Edge measurement:**For 1M GFSK mode:**

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	2389.55	57.18	4.81	28.22	35.14	55.07	74.00	18.93	PK
	2483.81	53.73	4.89	28.38	35.15	51.85	74.00	22.15	
	2389.55	40.46	4.81	28.22	35.14	38.35	54.00	15.65	AV
	2483.81	35.46	4.89	28.38	35.15	33.58	54.00	20.42	
Vertical	2389.98	51.35	4.81	28.22	35.14	49.24	74.00	24.76	PK
	2483.62	55.72	4.86	28.38	35.15	53.81	74.00	20.19	
	2389.98	32.56	4.81	28.22	35.14	30.45	54.00	23.55	AV
	2483.62	35.46	4.86	28.38	35.15	33.55	54.00	20.45	

For 3M 8-DPSK mode:

Polarization	Frequency (MHz)	Meter Reading dB (μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Margin (dB)	Remark
Horizontal	2389.78	57.13	4.81	28.22	35.14	55.02	74.00	18.98	PK
	2483.74	53.55	4.89	28.38	35.15	51.67	74.00	22.33	
	2389.78	40.60	4.81	28.22	35.14	38.49	54.00	15.51	AV
	2483.74	35.59	4.89	28.38	35.15	33.71	54.00	20.29	
Vertical	2389.69	51.32	4.81	28.22	35.14	49.21	74.00	24.79	PK
	2483.88	55.66	4.86	28.38	35.15	53.75	74.00	20.25	
	2389.69	33.43	4.81	28.22	35.14	31.32	54.00	22.68	AV
	2483.88	35.44	4.86	28.38	35.15	33.53	54.00	20.47	

TEST ENGINEER: BILL WU

5 99% OCCUPIED BANDWIDTH MEASUREMENT

5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

5.2 Block Diagram of Test Setup



5.3 Specification Limits (IC RSS-Gen Issue 4 § 6.6)

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

5.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

5.5 Test Procedure

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

5.6 Test Results

PASSED.

All the test results are attached in next pages.

(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

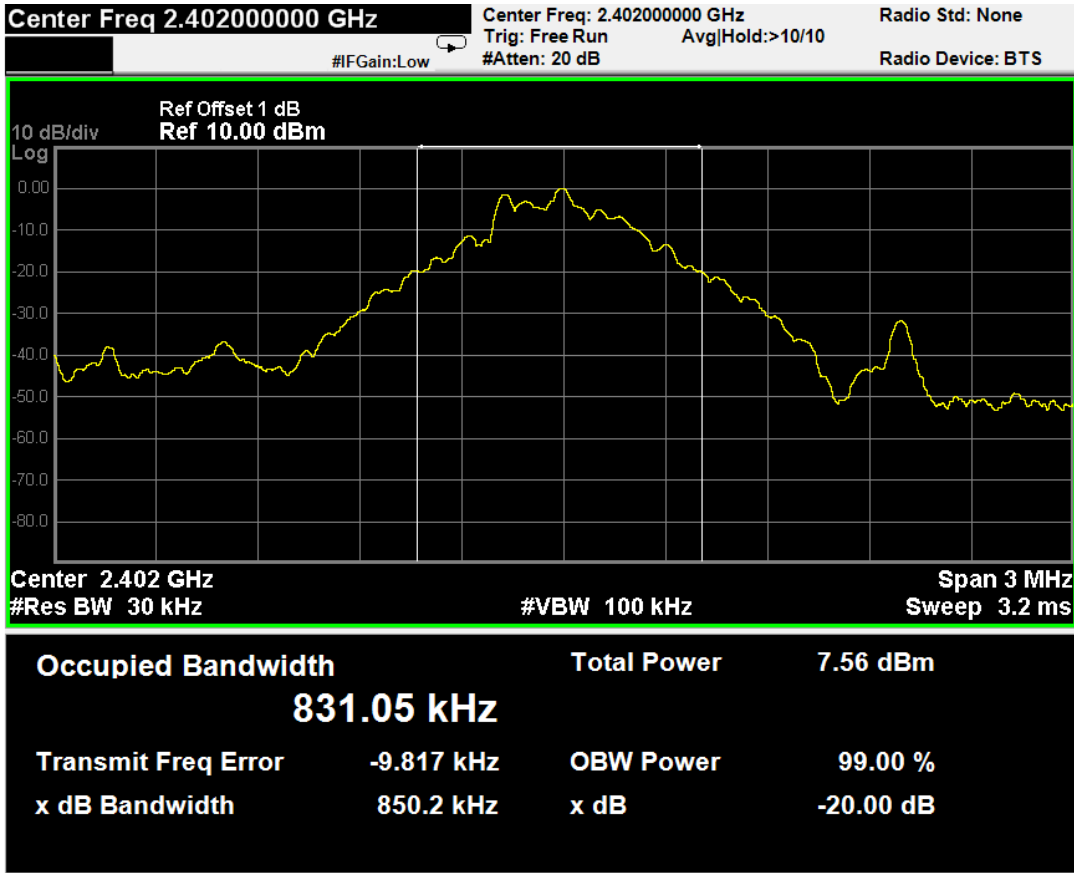
For 1M GFSK

Channel	Frequency	99% Occupied Bandwidth
00	2402 MHz	0.8310 MHz
39	2441 MHz	0.8316 MHz
78	2480 MHz	0.8305 MHz

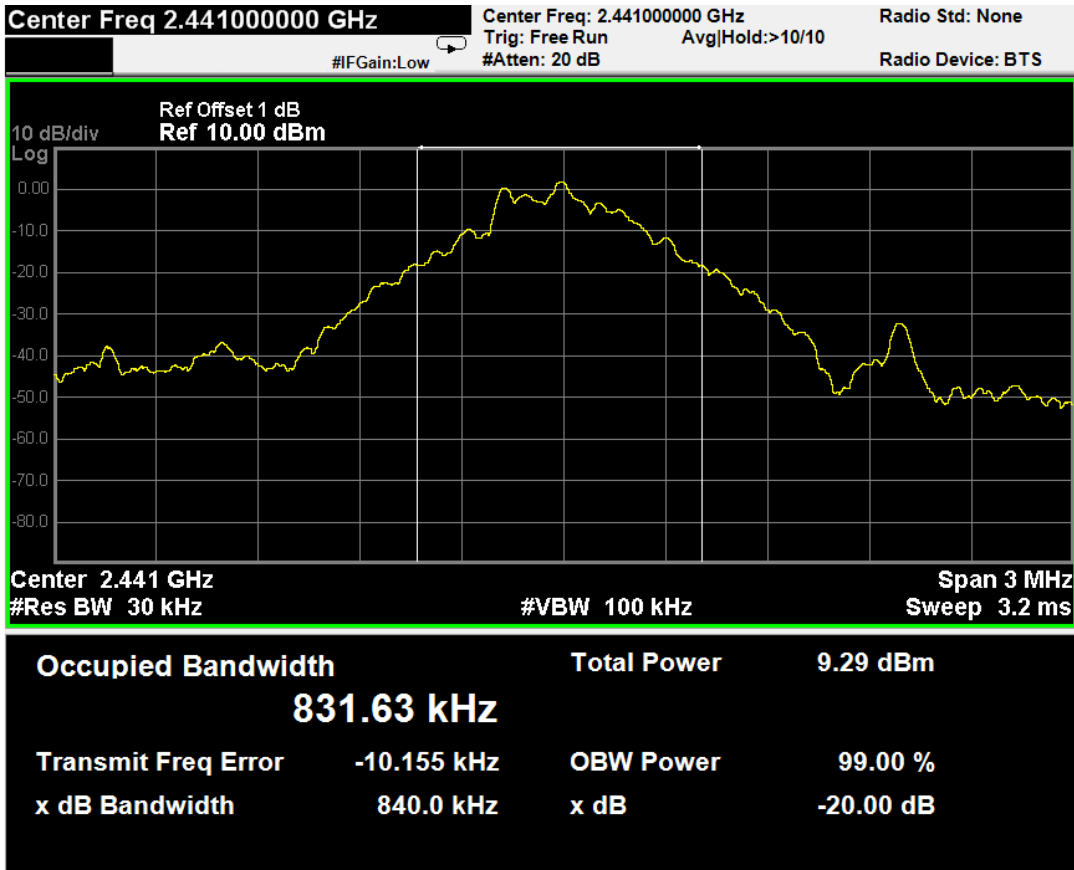
For 3M 8-DPSK

Channel	Frequency	99% Occupied Bandwidth
00	2402 MHz	1.161 MHz
39	2441 MHz	1.161 MHz
78	2480 MHz	1.154 MHz

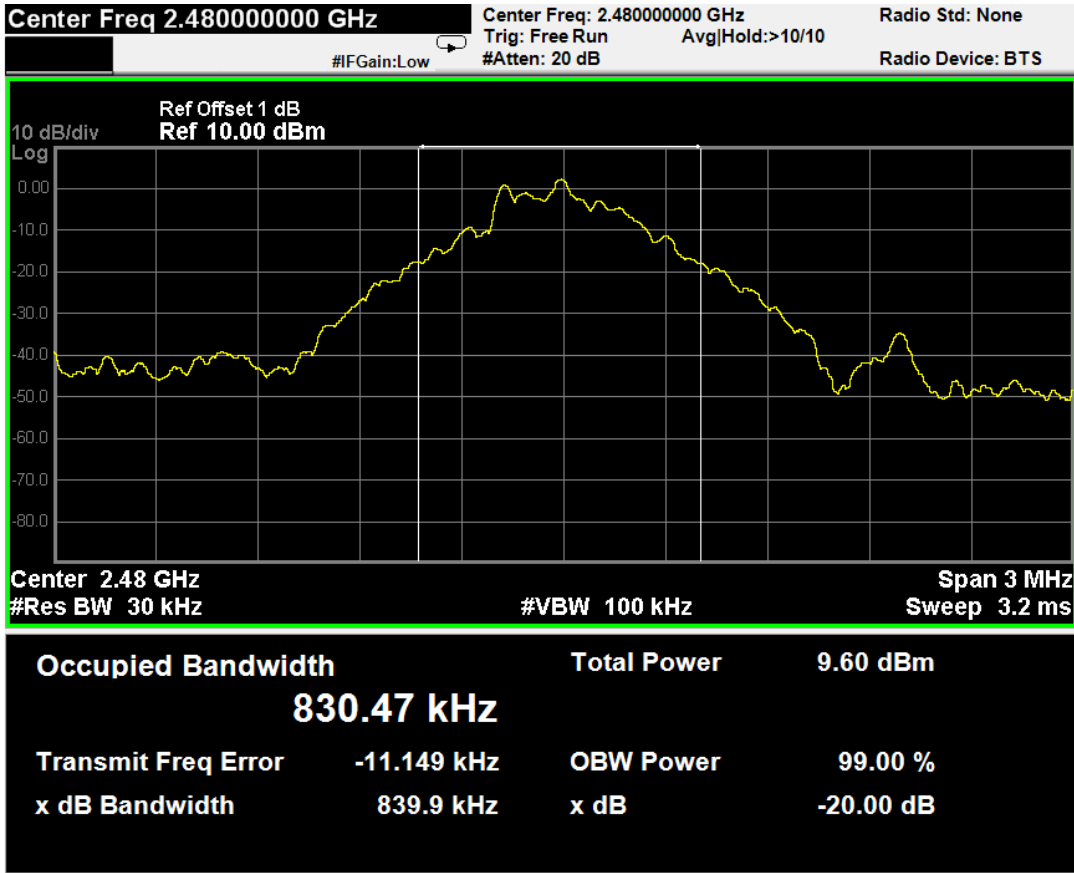
Ch 00 (2402 MHz) 1M GFSK



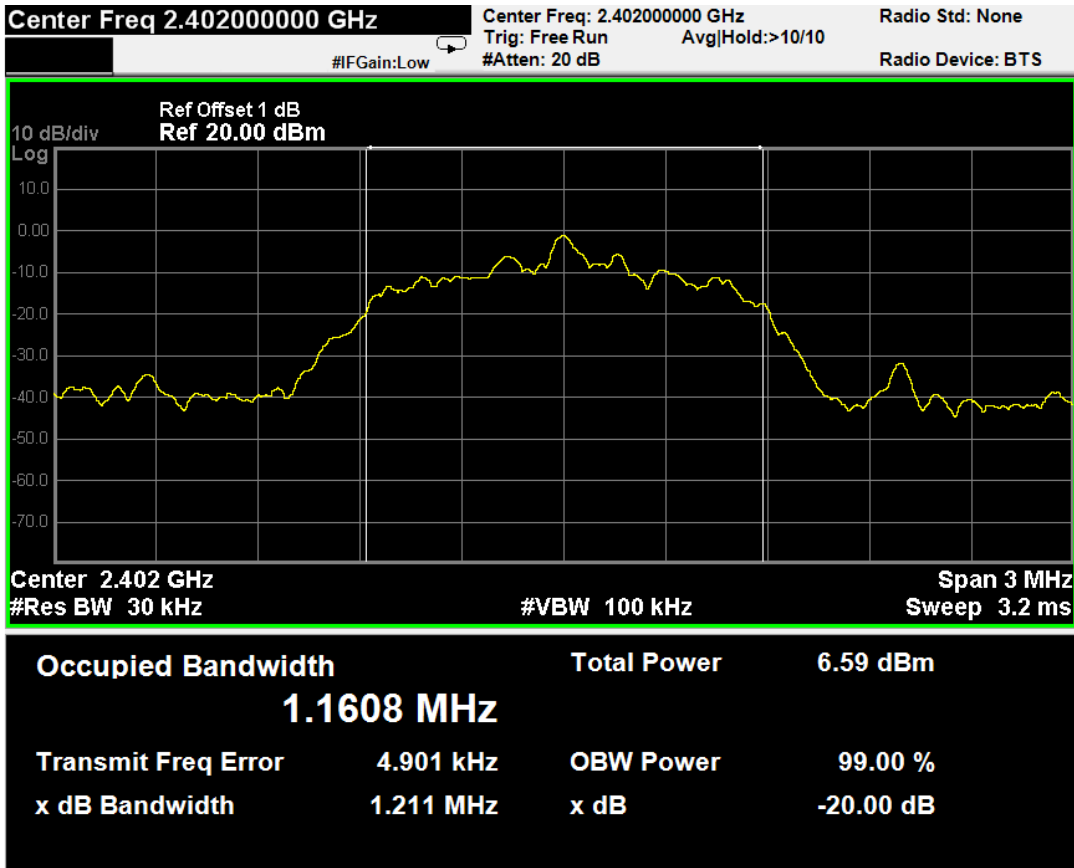
Ch 39 (2441 MHz) 1M GFSK



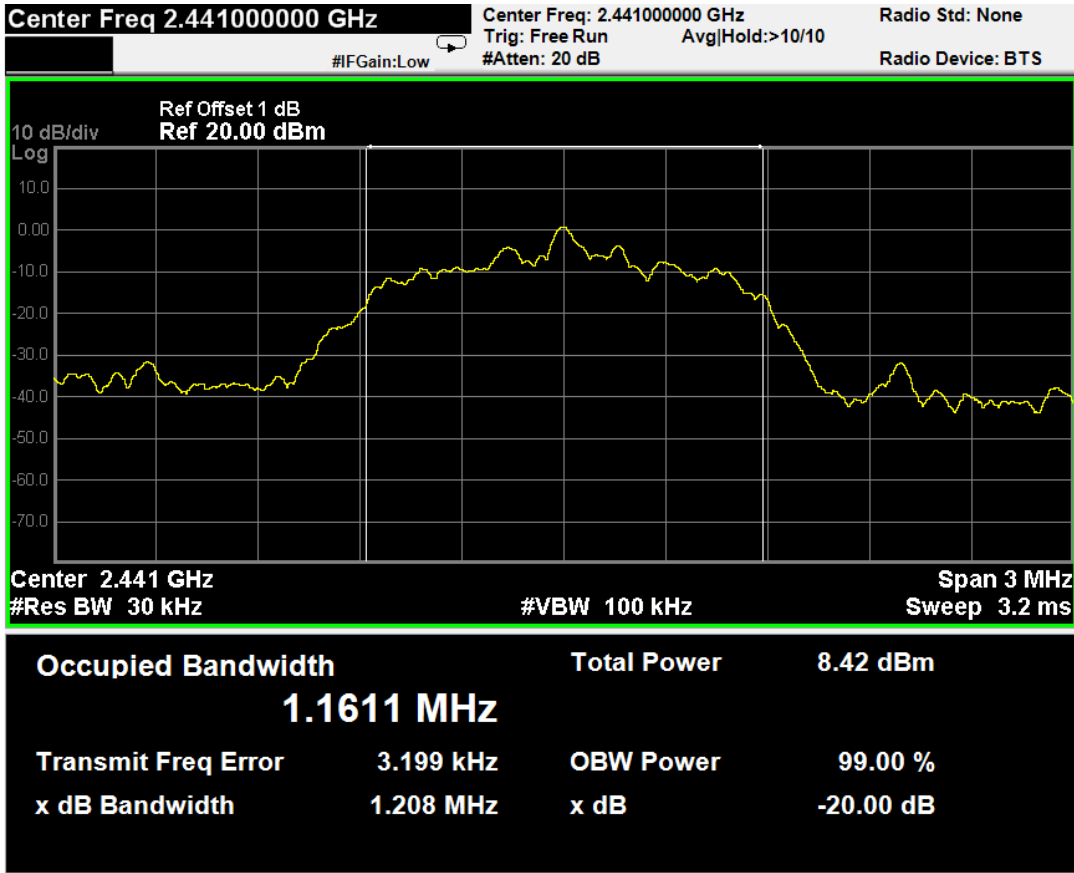
Ch 78 (2480 MHz) 1M GFSK



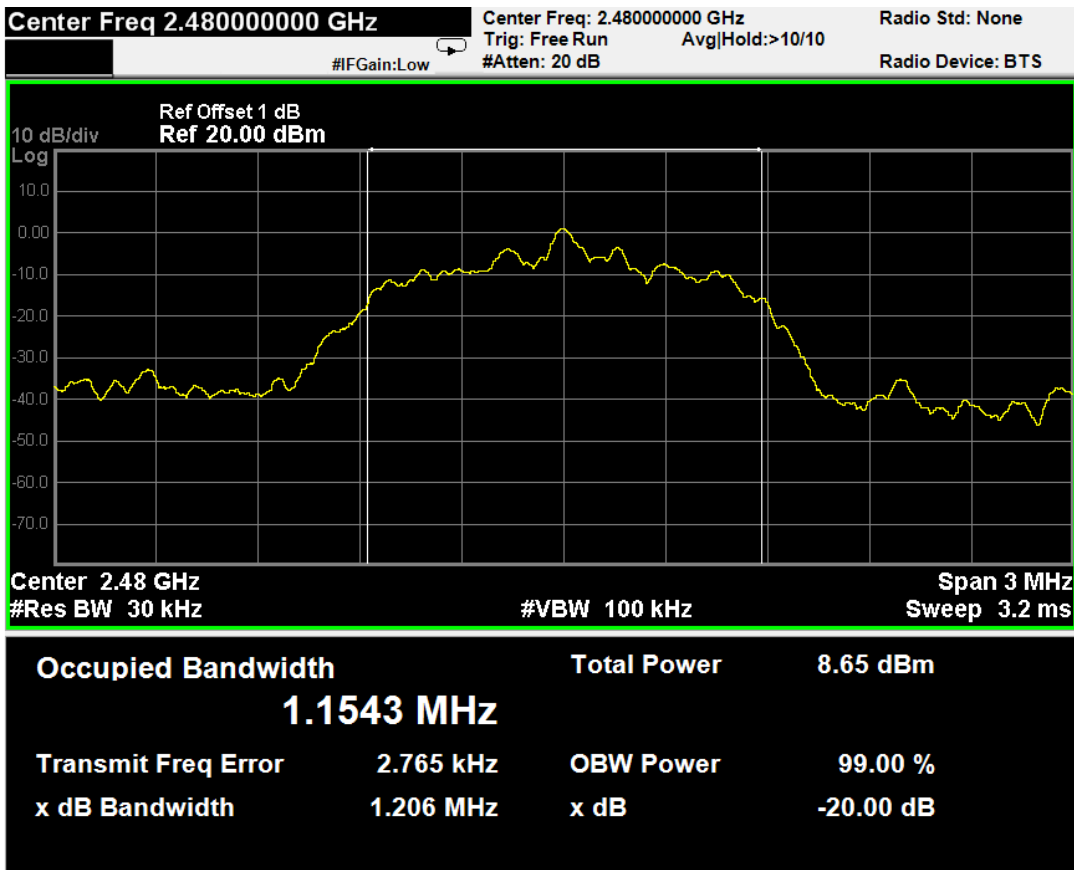
Ch 00 (2402 MHz) 3M 8-DPSK



Ch 39 (2441 MHz) 3M 8-DPSK



Ch 78 (2480 MHz) 3M 8-DPSK



6 20 dB BANDWIDTH MEASUREMENT

6.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

6.2 Block Diagram of Test Setup

Same as section.5.2.

6.3 Specification Limits (IC RSS-247 Issue 1 § 5.1 (1))

The bandwidth of a frequency hopping channel is the -20 dB emission bandwidth, measured with the hopping stopped. The system's radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset.

6.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

6.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

The test procedure is defined in DA 00-705.

6.6 Test Results

PASSED.

All the test results are attached in next pages.

(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

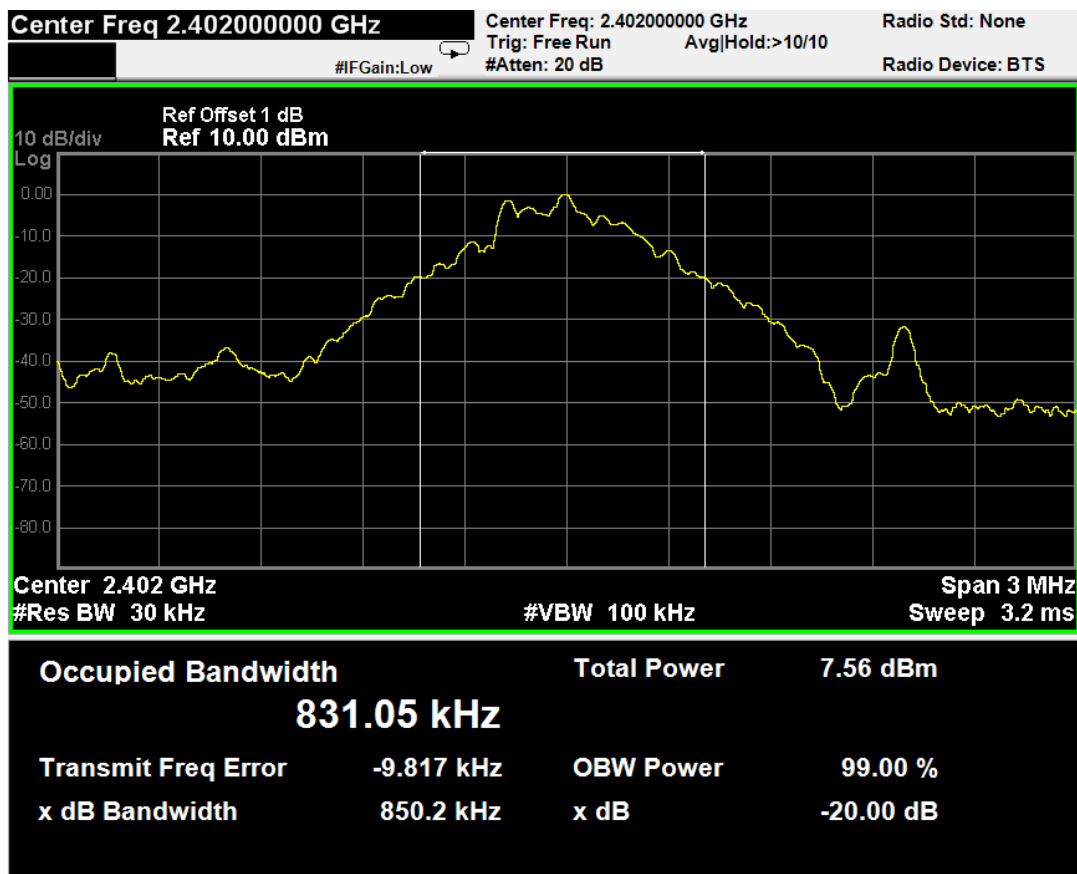
For 1M GFSK

Channel	Frequency	20dB Bandwidth
00	2402 MHz	0.8502 MHz
39	2441 MHz	0.8400 MHz
78	2480 MHz	0.8399 MHz

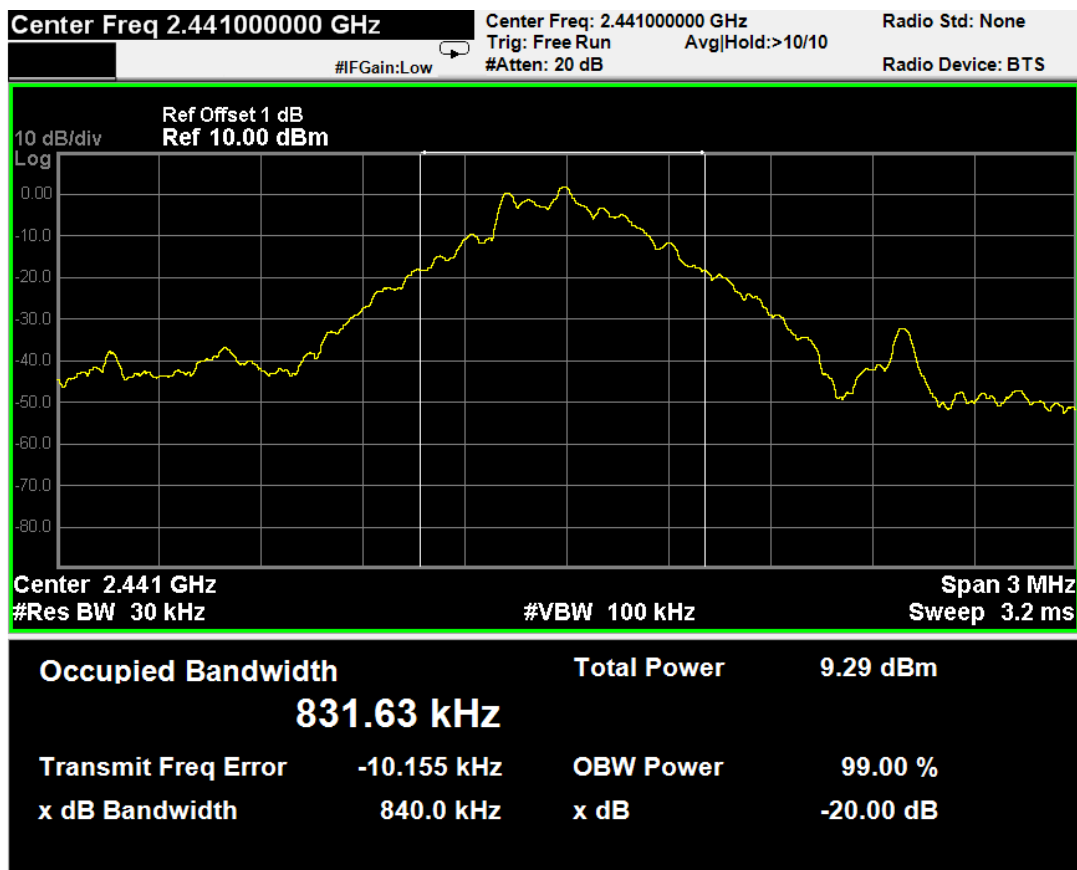
For 3M 8-DPSK

Channel	Frequency	20dB Bandwidth
00	2402 MHz	1.211 MHz
39	2441 MHz	1.208 MHz
78	2480 MHz	1.206 MHz

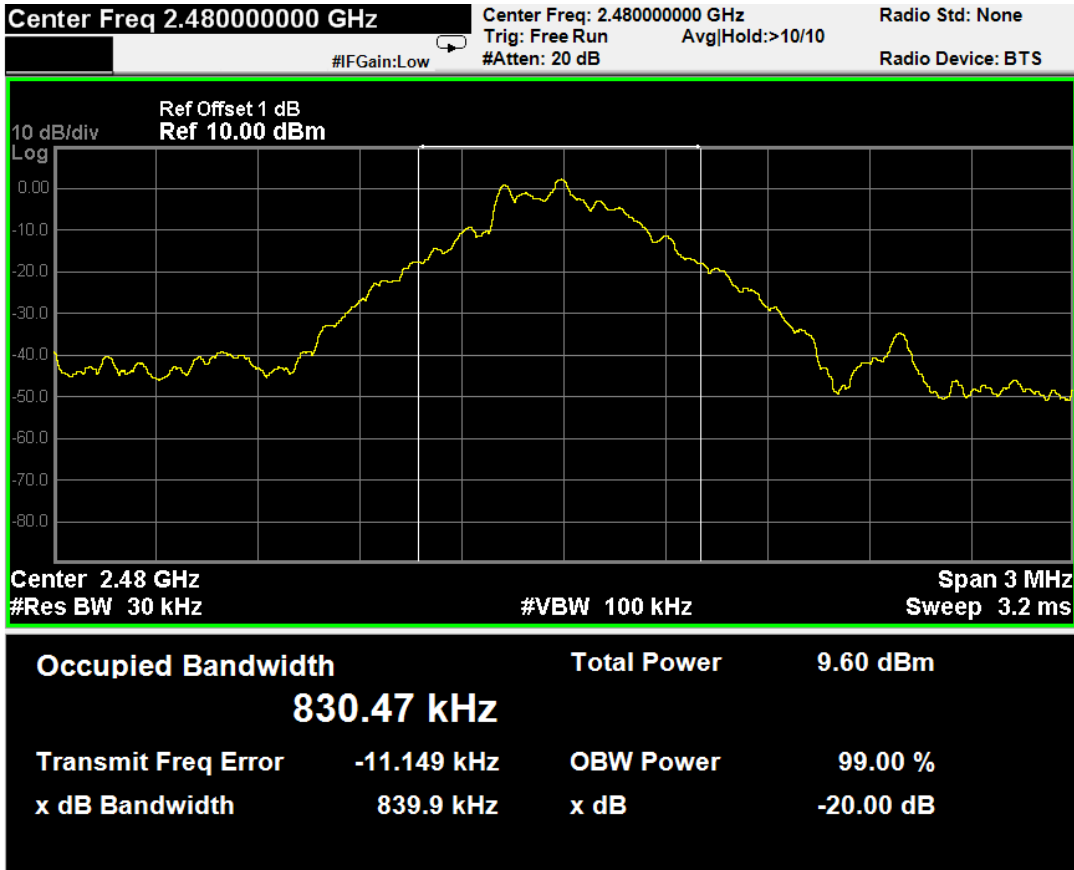
Ch 00 (2402 MHz) 1M GFSK



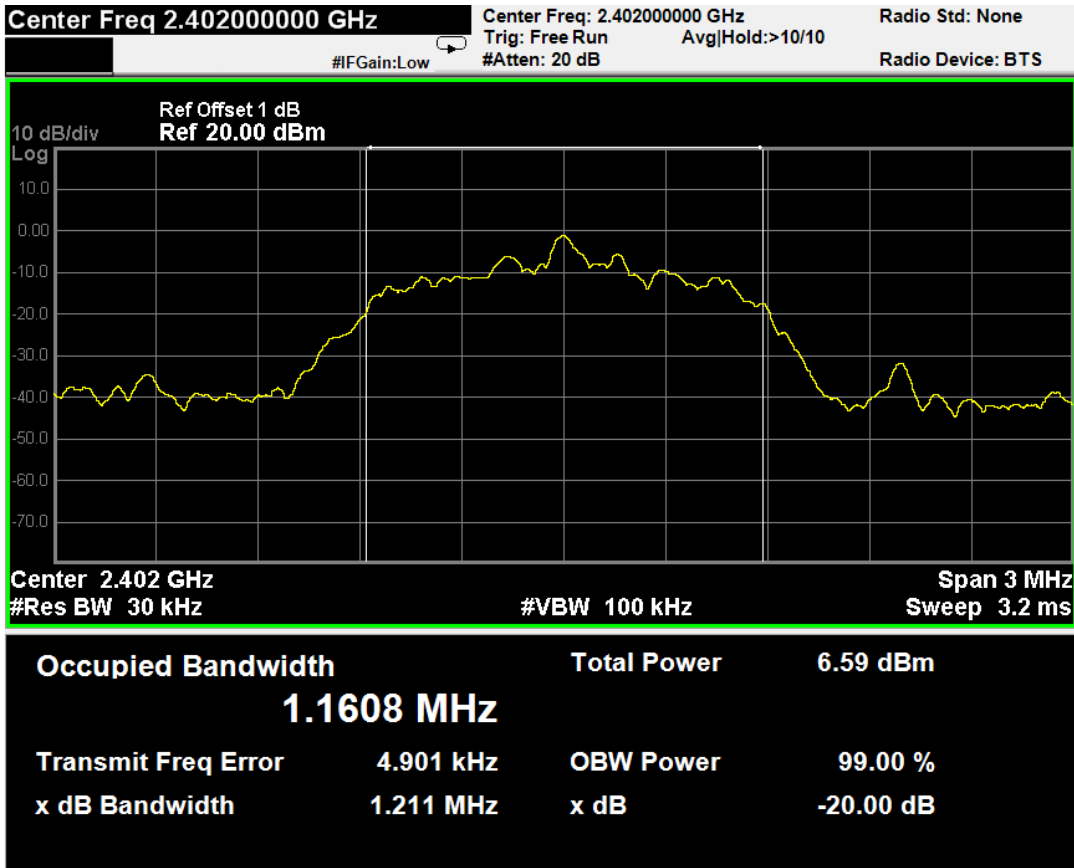
Ch 39 (2441 MHz) 1M GFSK



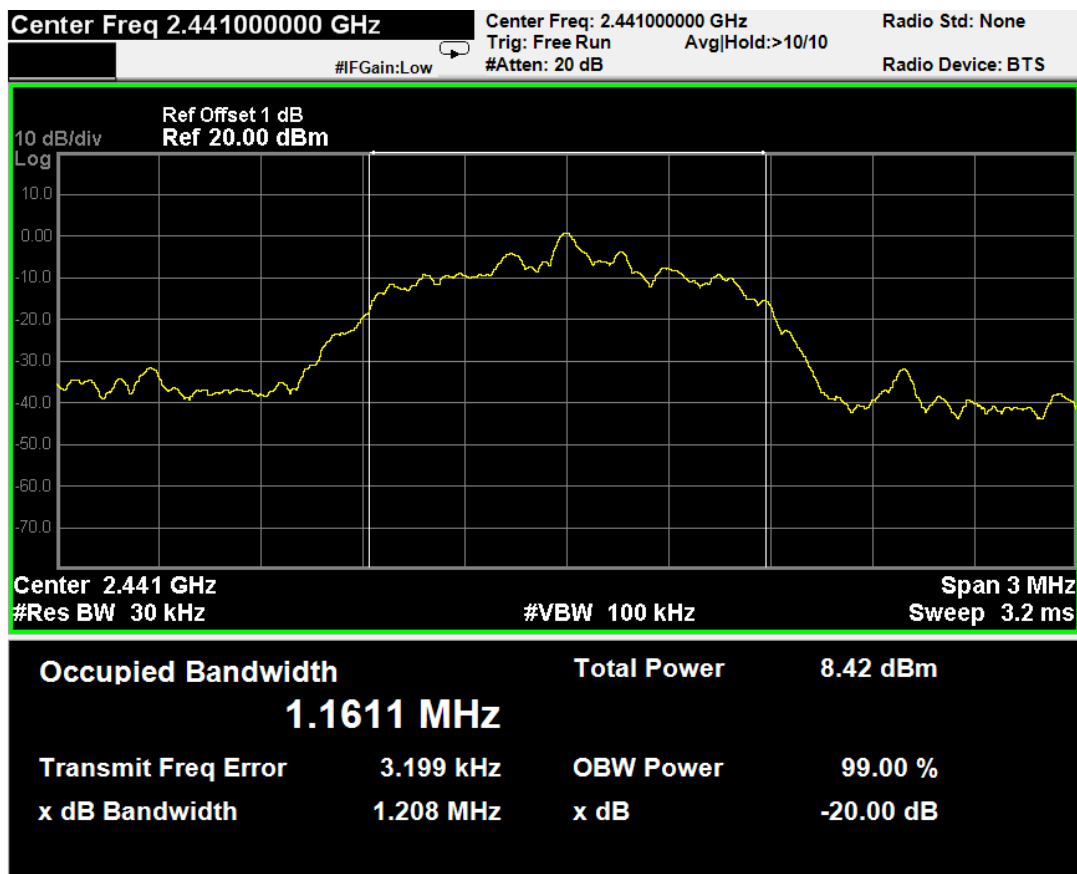
Ch 78 (2480 MHz) 1M GFSK



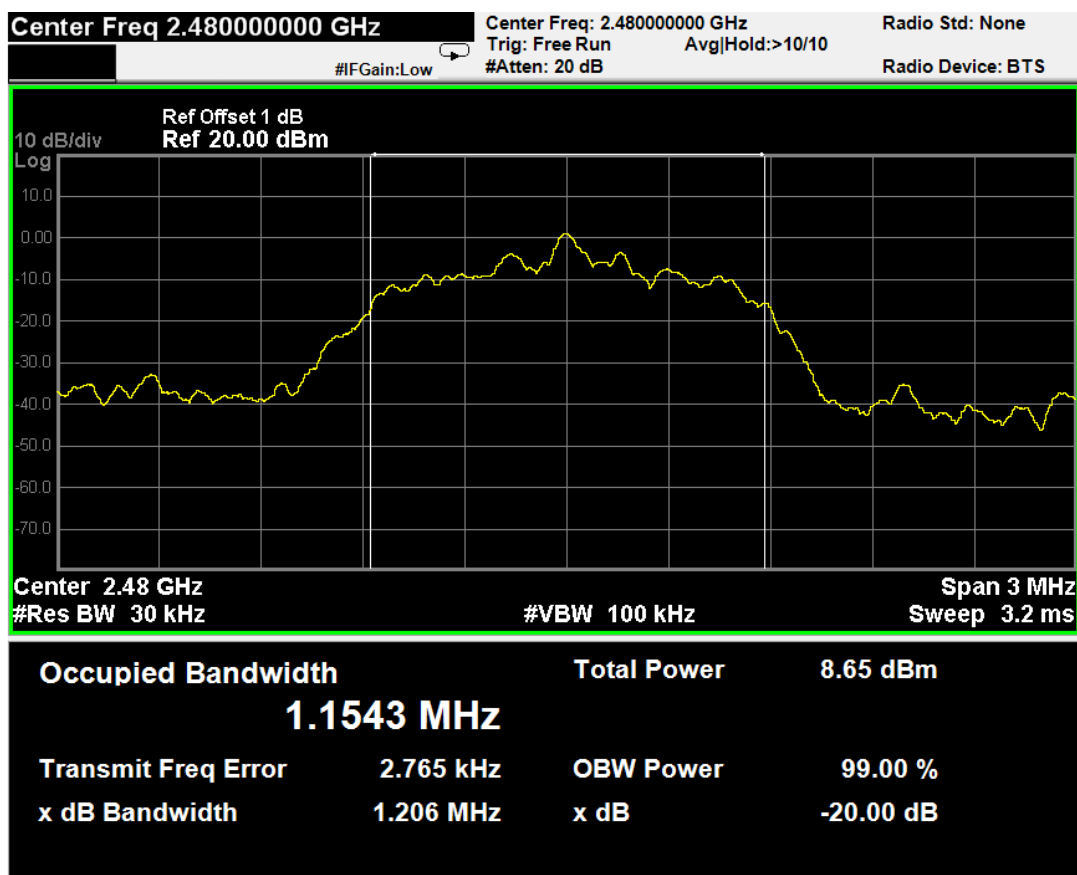
Ch 00 (2402 MHz) 3M 8-DPSK



Ch 39 (2441 MHz) 3M 8-DPSK



Ch 78 (2480 MHz) 3M 8-DPSK



7 CARRIER FREQUENCY SEPARATION MEASUREMENT

7.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

7.2 Block Diagram of Test Setup

Same as section.5.2.

7.3 Specification Limits (IC RSS-247 Issue 1 § 5.1 (2))

FHSs shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, FHSs operating in the band 2400-2483.5 MHz 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 that the systems operate with an output power no greater than 0.125 W. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals..

7.4 Operating Condition of EUT

Enable the EUT hopping function.

7.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The spectrum analyzer was set as RBW = 100 kHz, VBW = 300 kHz, span = wide enough to capture the peaks of two adjacent channels. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

The test procedure is defined in DA 00-705.

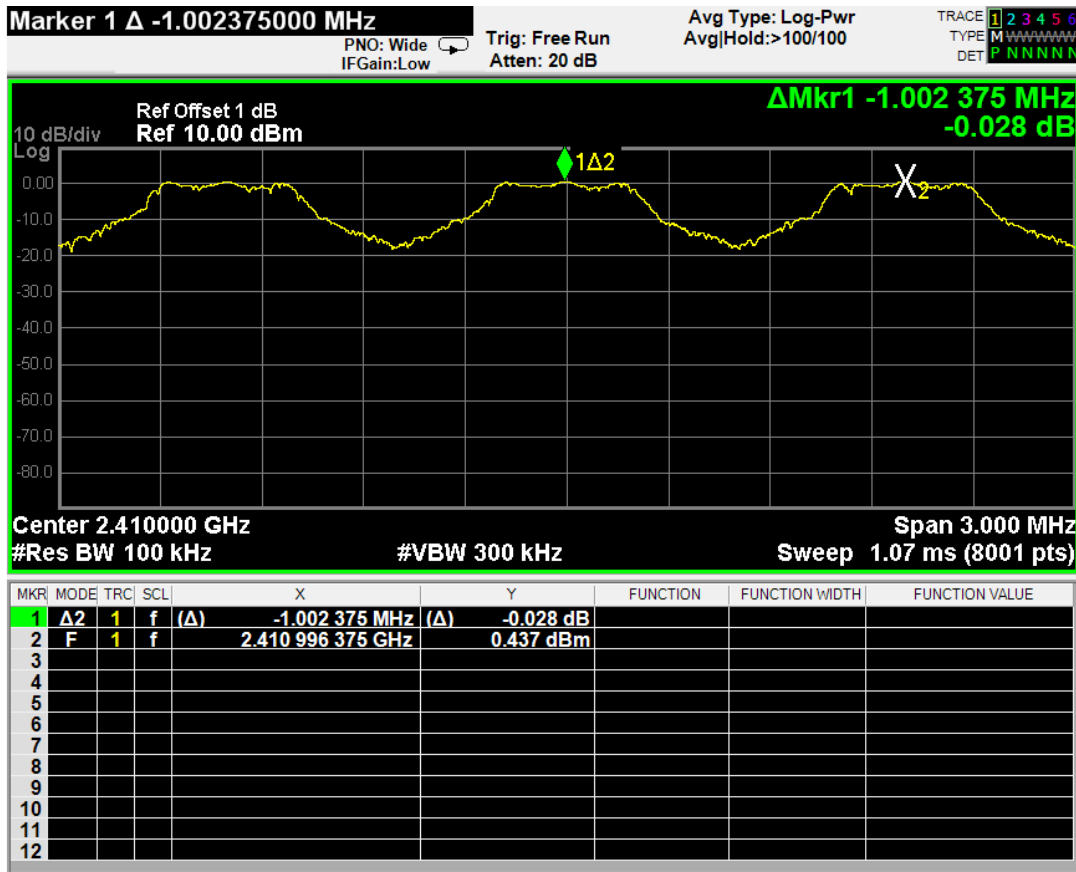
7.6 Test Results

PASSED. All the test results are attached in next pages.

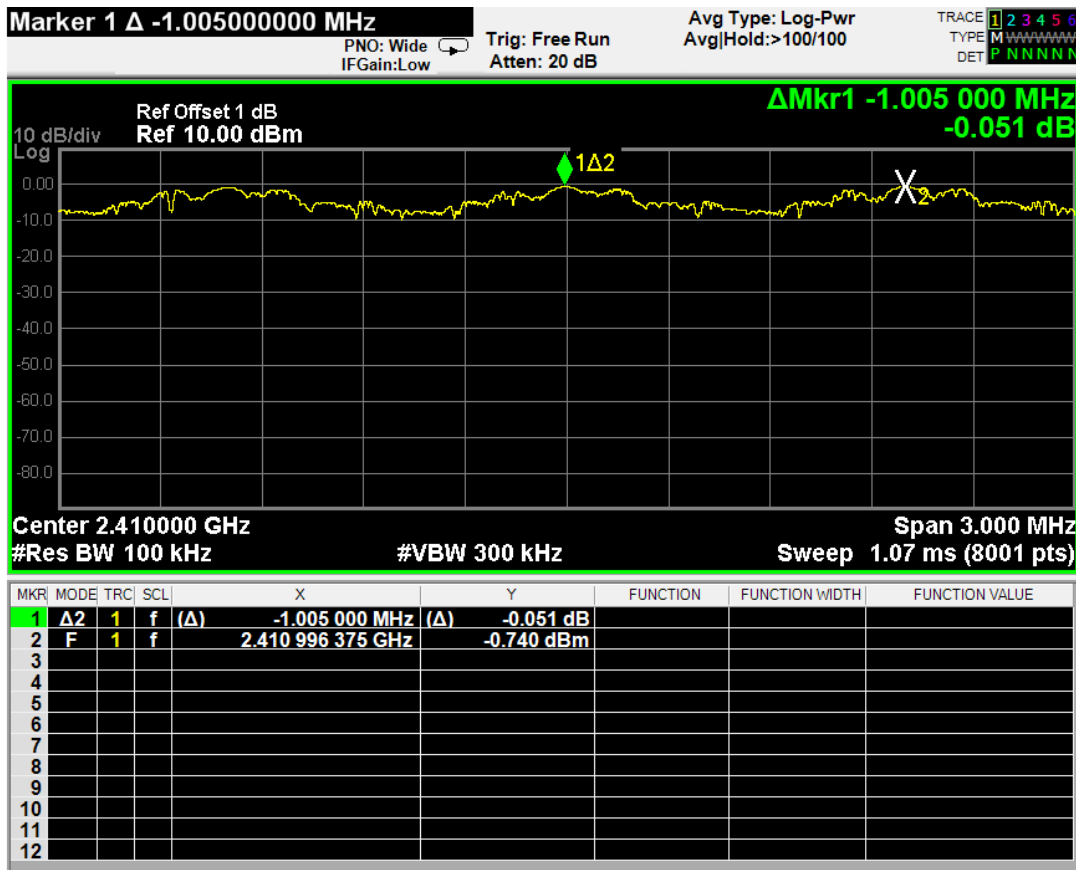
(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

Mode	Result	Limit (2/3 of the 20dB bandwidth)	Conclusion
1M GFSK	1.002 MHz	> 0.560 MHz	Pass
3M 8-DPSK	1.005 MHz	> 0.804 MHz	Pass

1M GFSK



3M 8-DPSK



8 NUMBER OF HOPPING FREQUENCIES MEASUREMENT

8.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

8.2 Block Diagram of Test Setup

Same as section 5.2.

8.3 Specification Limits (IC RSS-247 Issue 1 § 5.1 (4))

FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.

8.4 Operating Condition of EUT

Enable the EUT hopping function.

8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The spectrum analyzer was set as RBW = 300 kHz, VBW = 300 kHz, count the number of hopping frequencies used and recorded.

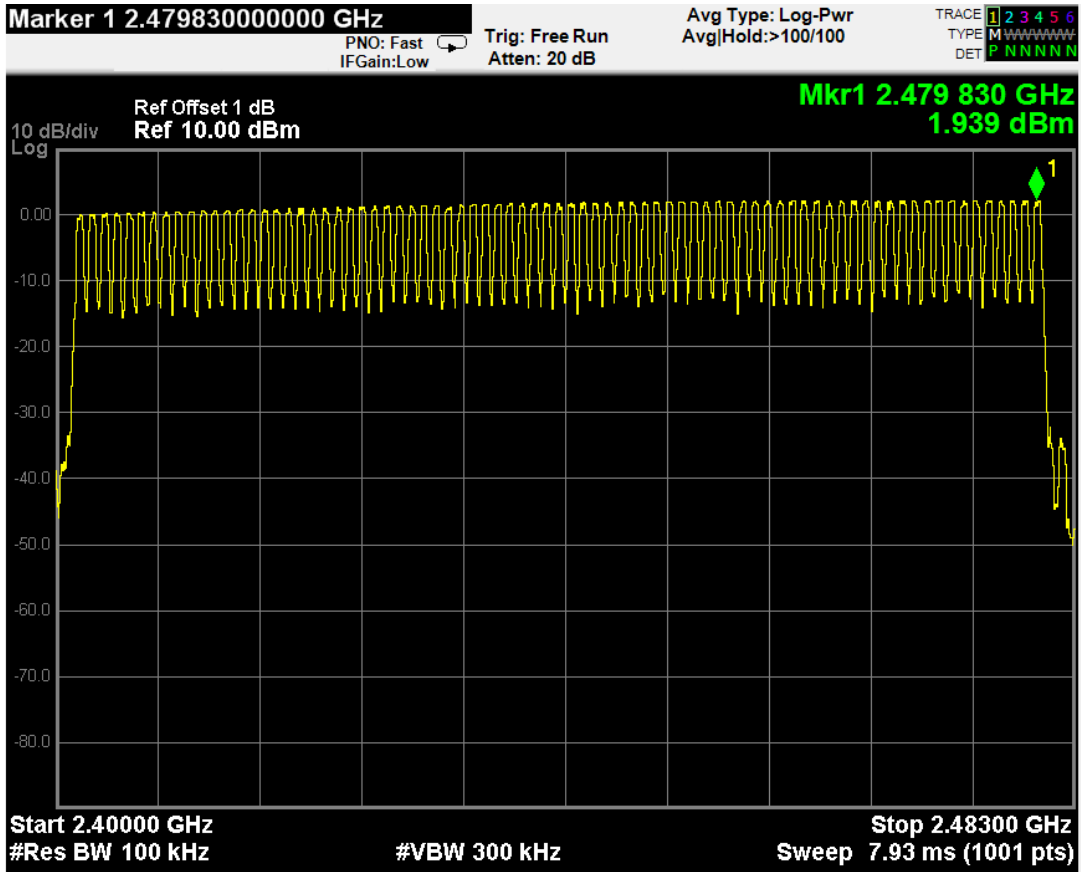
The test procedure is defined in DA 00-705.

8.6 Test Results

PASSED. All the test results are attached in next pages.

(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

Result	Limit	Conclusion
79	> 15	Pass



9 DEWLL TIME MEASUREMENT

9.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	Sep 11, 2014	Sep 11, 2014

9.2 Block Diagram of Test Setup

Same as section.5.2.

9.3 Specification Limits (IC RSS-247 Issue 1 § 5.1 (4))

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.

9.4 Operating Condition of EUT

Enable the EUT hopping function.

9.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The spectrum analyzer was set as RBW = 1MHz, VBW = 1MHz, span = zero span, centered on a hopping channel. Use the marker-delta function to calculate the dwell time.

The test procedure is defined in DA 00-705.

9.6 Test Results

PASSED. All the test results are attached in next pages.

(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

No.	Channel	Frequency	Data Page
1.	00	2402 MHz	P60-66
2.	39	2441 MHz	P67-73
3.	78	2480 MHz	P74-80

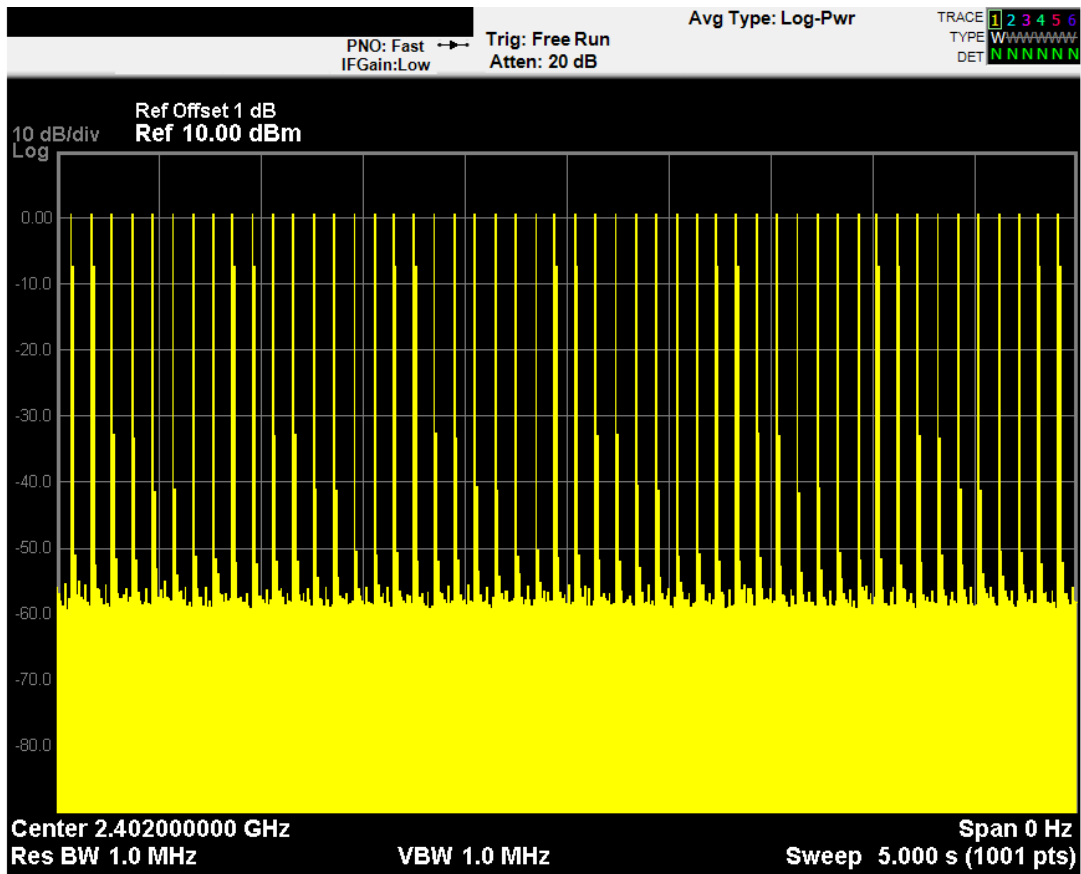
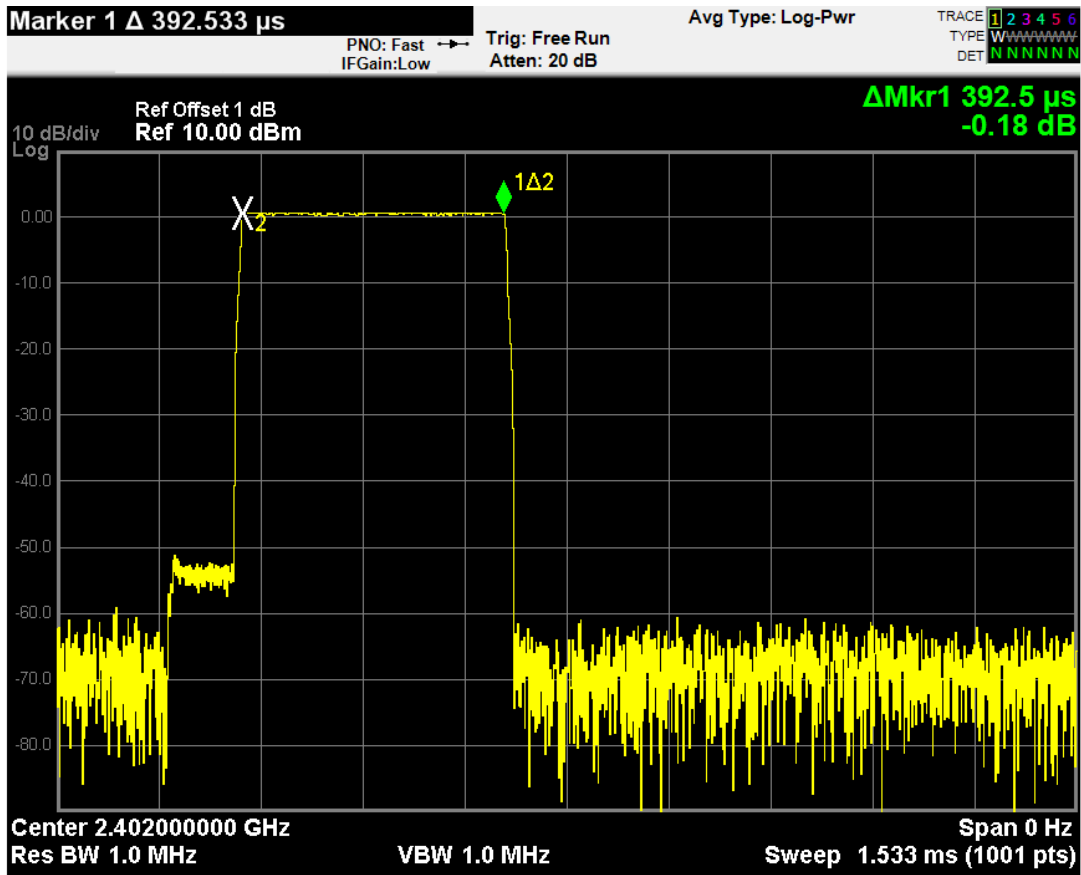
Ch 00 2402MHz 1M GFSK

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
DH1	50 times/5 sec * 31.6=316 times	0.3925	$316*0.3925 = 124.03$	< 400	Pass
DH3	17 times/5 sec * 31.6=108 times	1.645	$108*1.645 = 177.66$	< 400	Pass
DH5	20 times/10 sec * 31.6=63 times	2.900	$63*2.900 = 182.70$	< 400	Pass

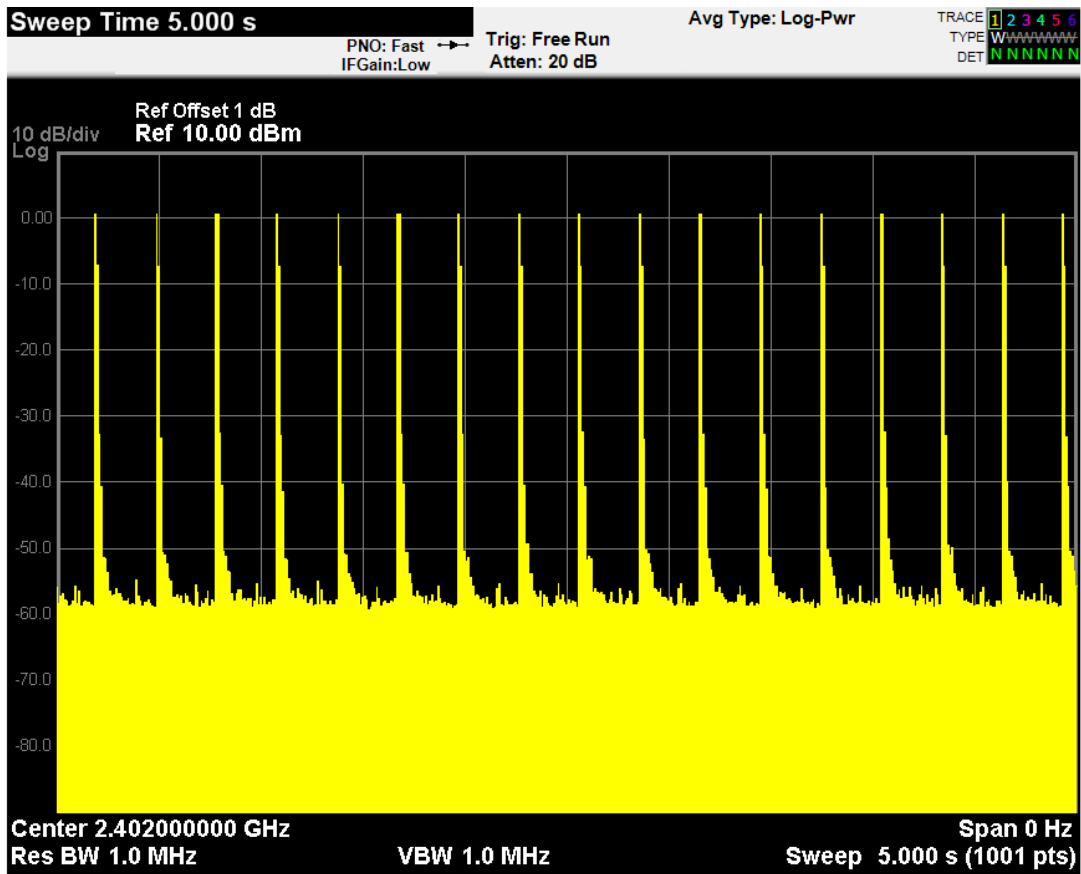
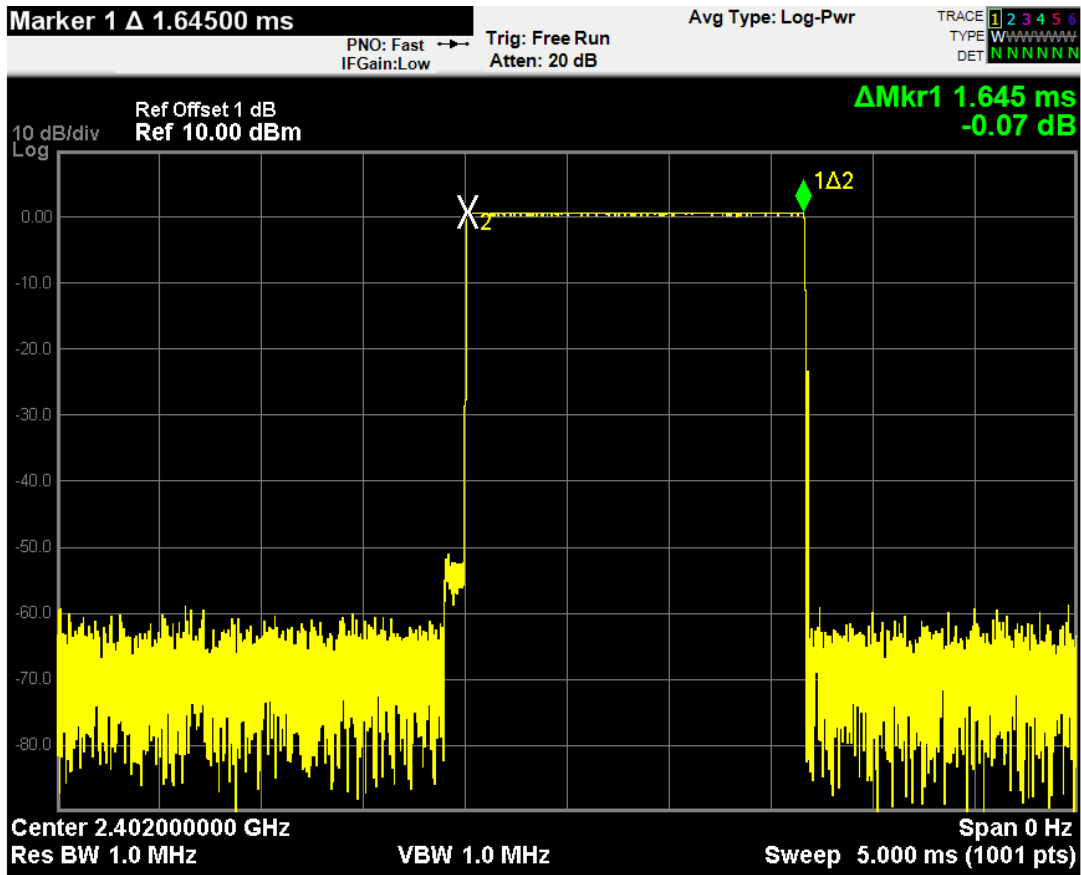
Ch 00 2402MHz 3M 8-DPSK

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
3DH1	30 times/3 sec * 31.6=316 times	0.407	$316*0.407 = 128.61$	< 400	Pass
3DH3	17 times/5 sec * 31.6=108 times	1.656	$108*1.656 = 178.85$	< 400	Pass
3DH5	20 times/10 sec * 31.6=63 times	2.910	$63*2.910 = 183.33$	< 400	Pass

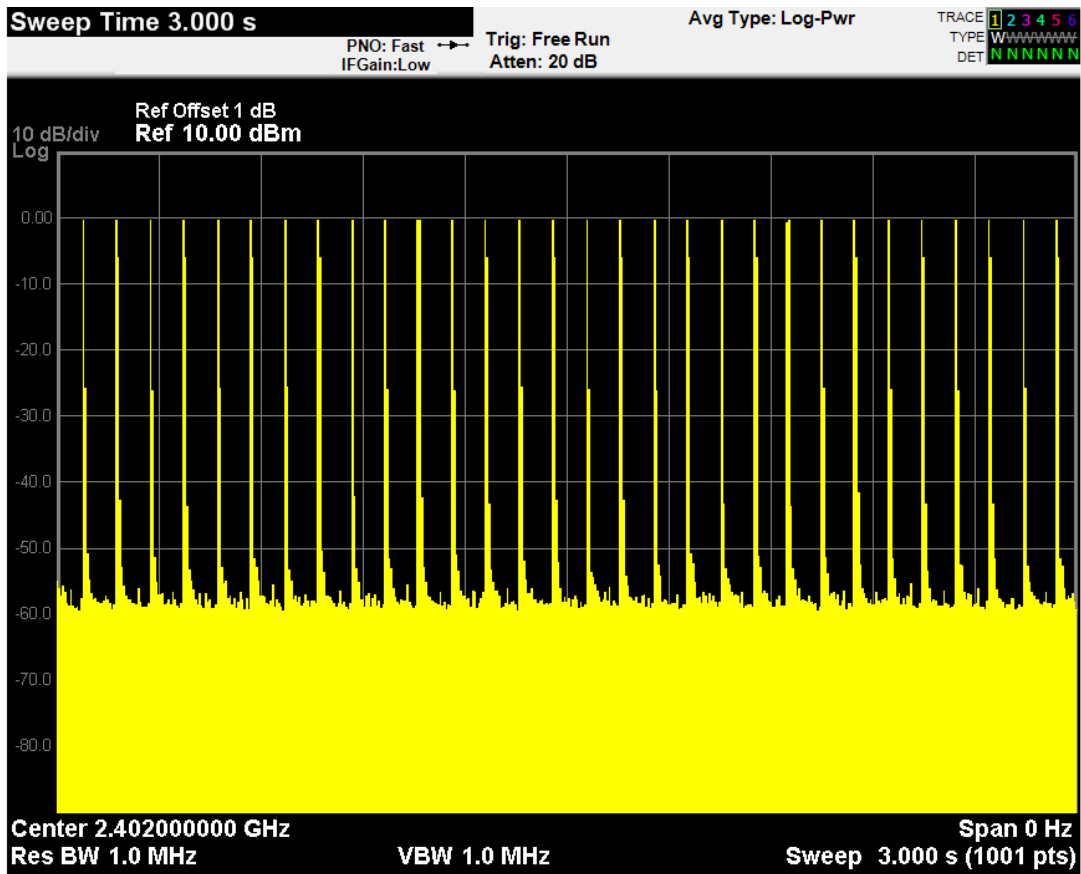
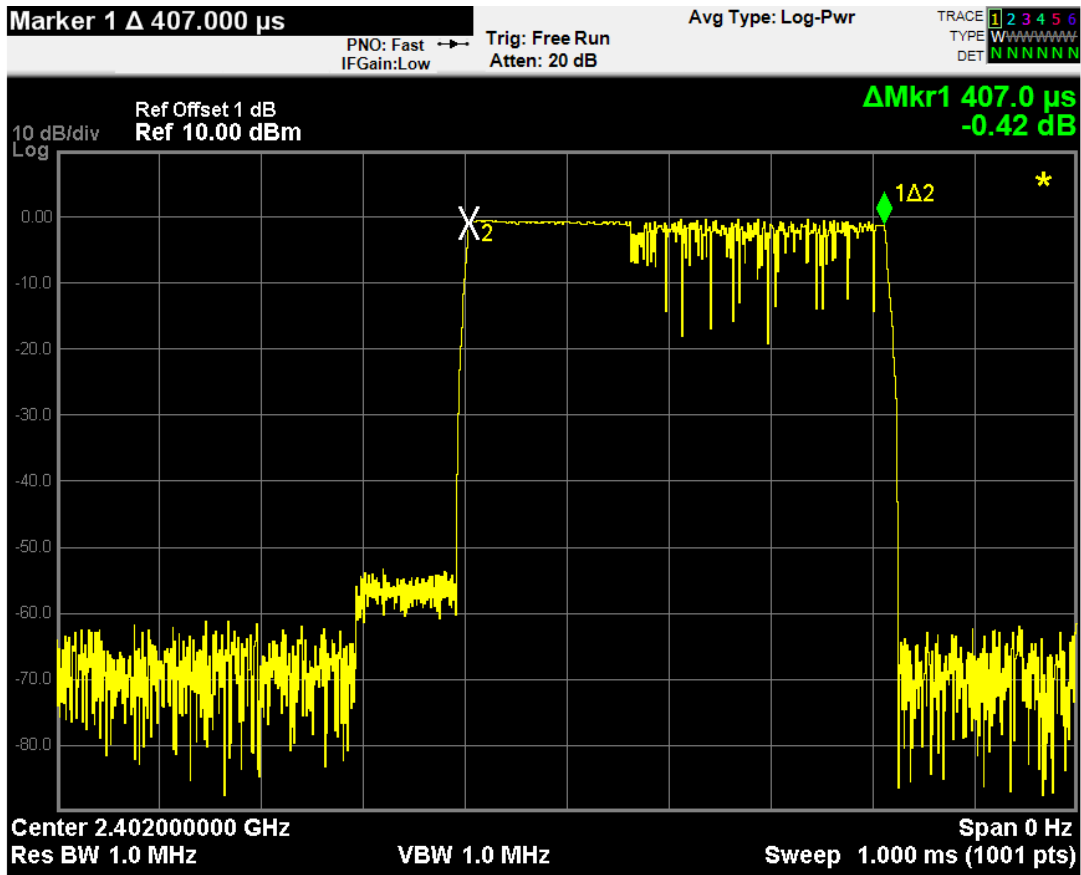
For Ch 00 2402MHz 1M GFSK DH1



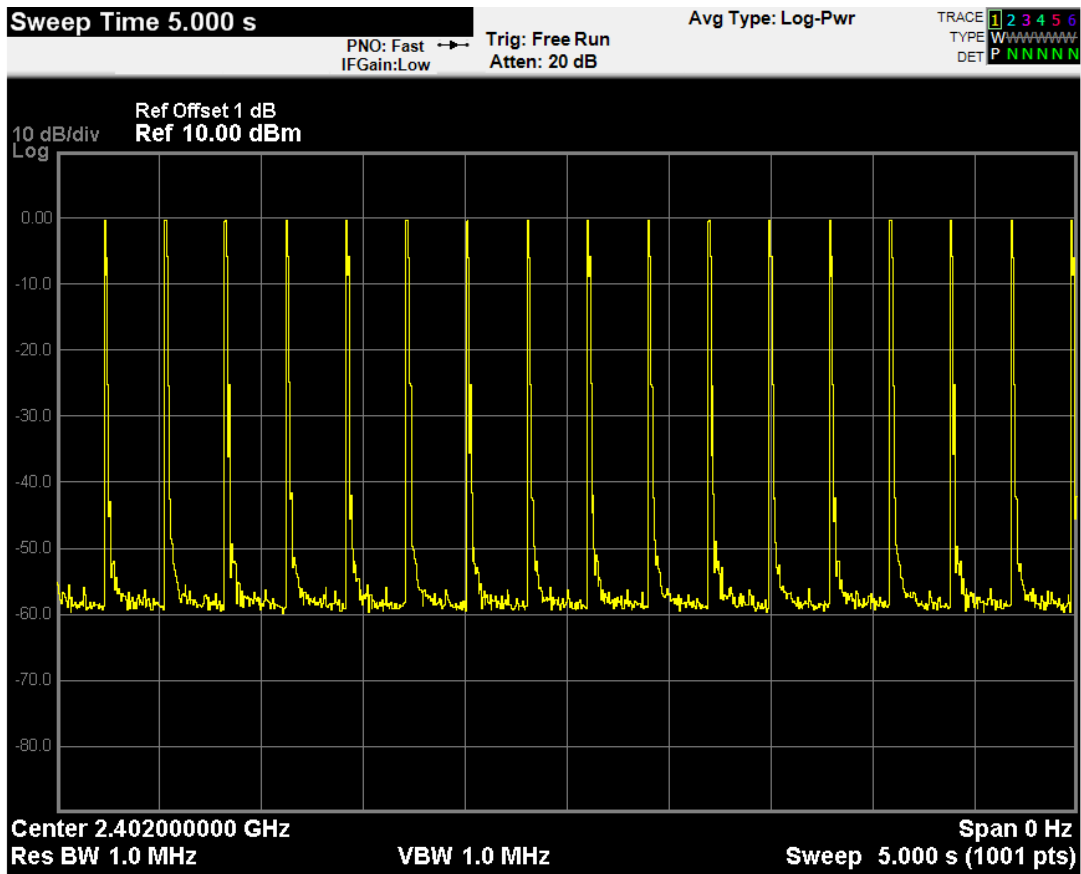
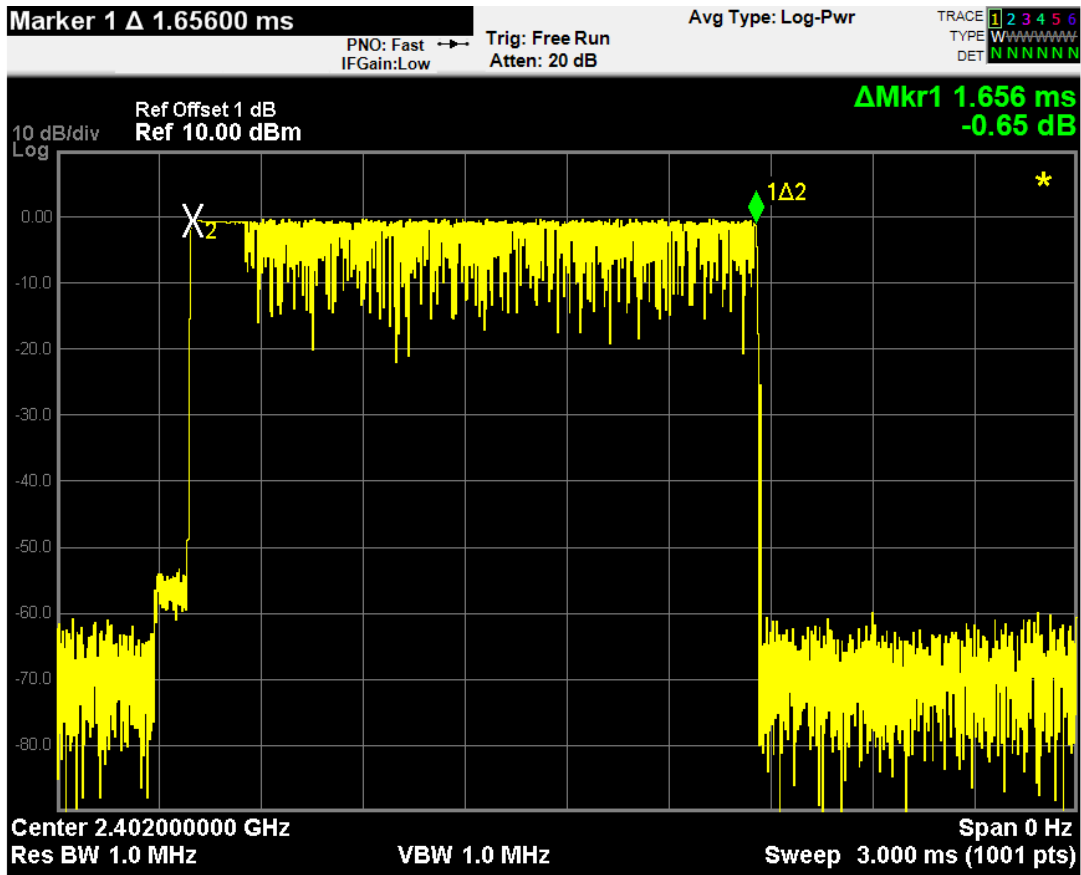
For Ch 00 2402MHz 1M GFSK DH3



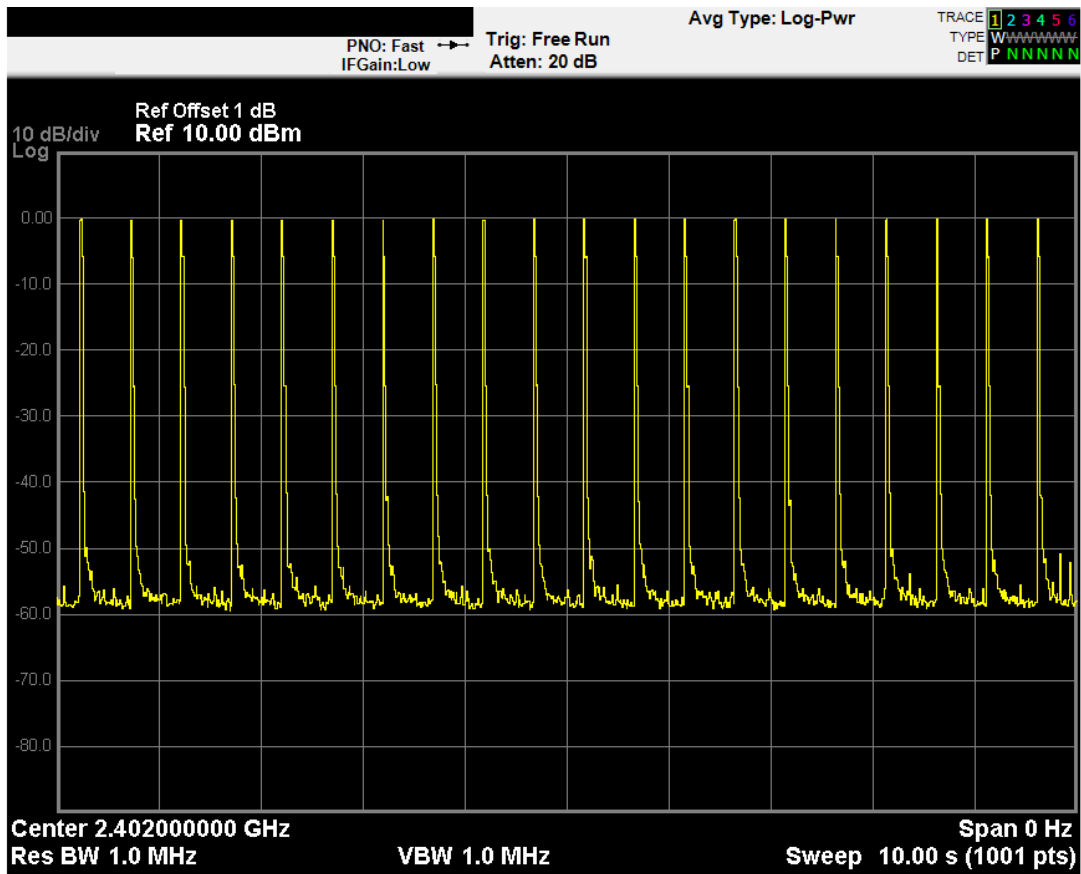
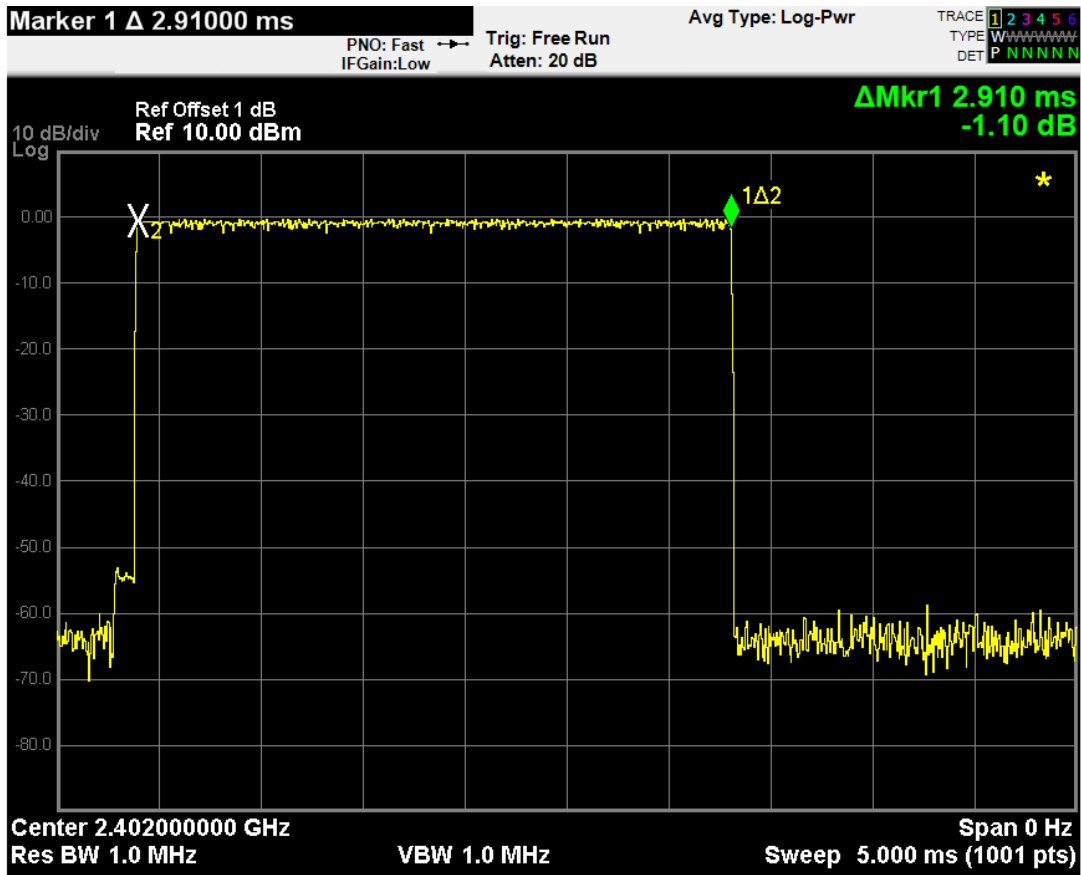
For Ch 00 2402MHz 3M 8-DPSK DH1



For Ch 00 2402MHz 3M 8-DPSK DH3



For Ch 00 2402MHz 3M 8-DPSK DH5



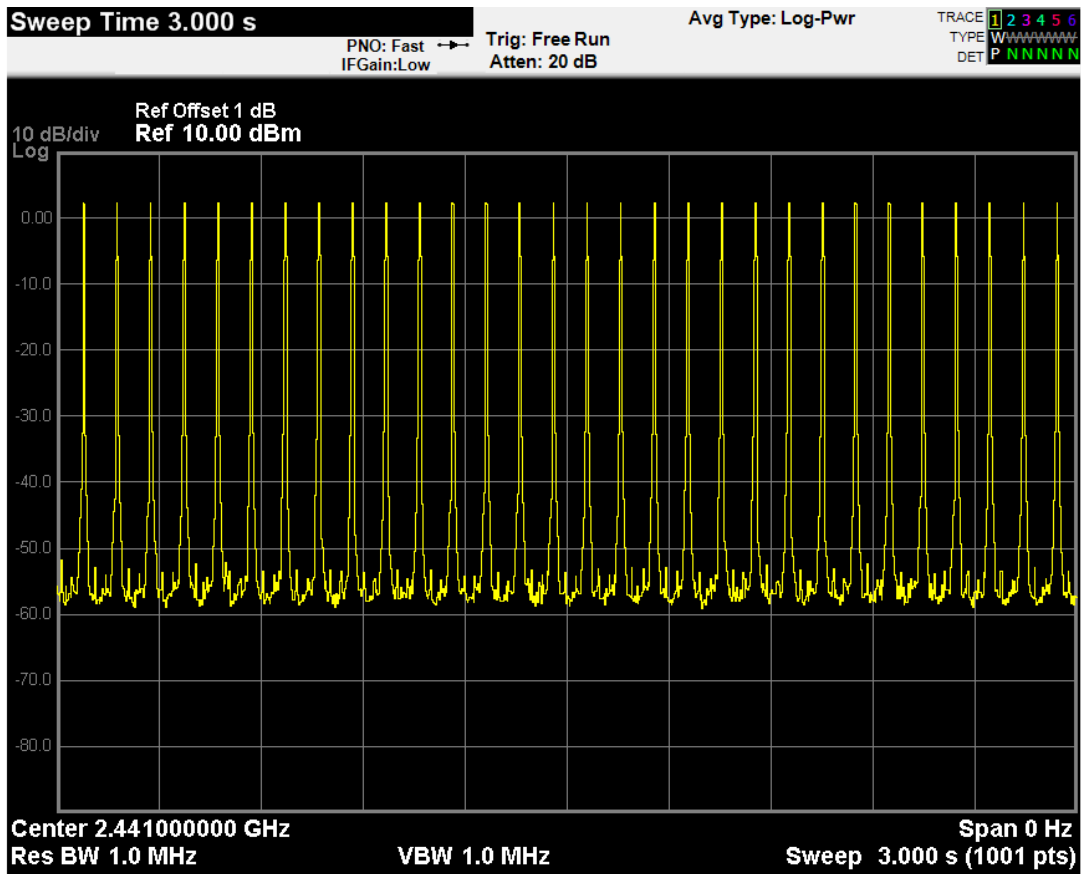
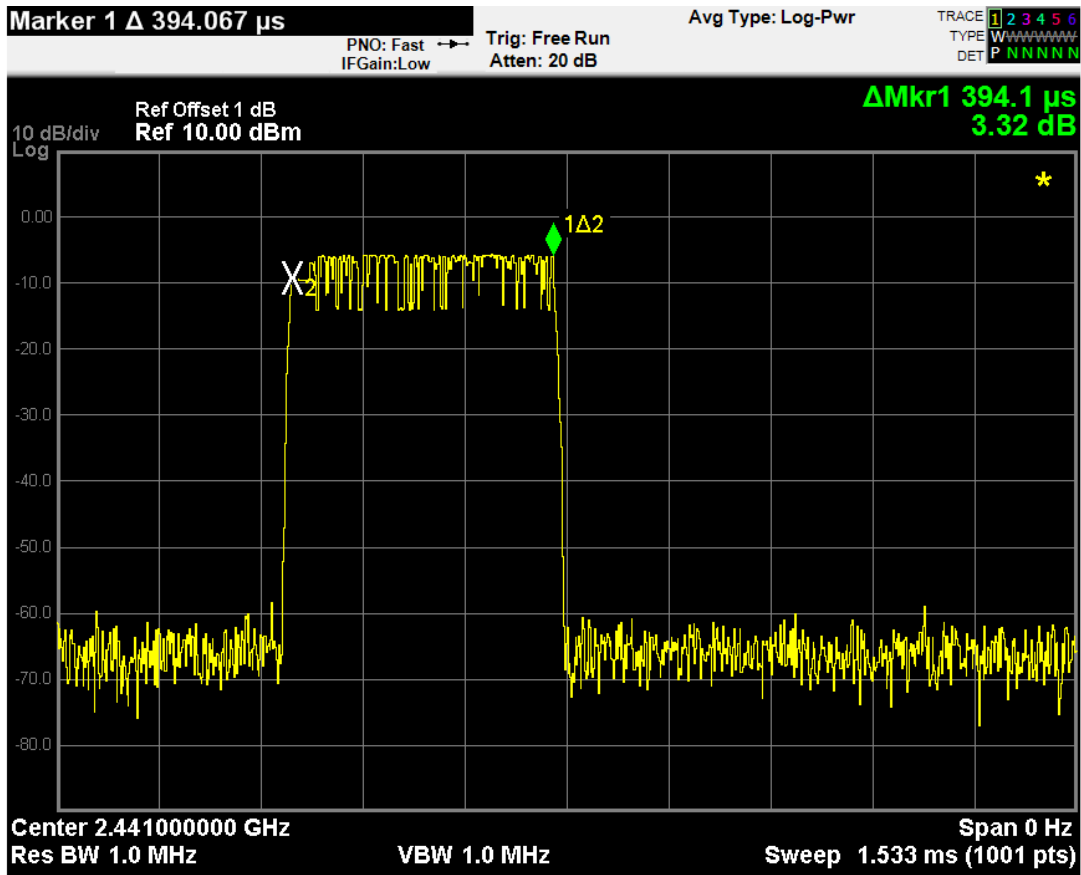
Ch 39 2441MHz 1M GFSK

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
DH1	30 times/3 sec * 31.6=316 times	0.394	$316*0.394 = 124.5$	< 400	Pass
DH3	17 times/5 sec * 31.6=108 times	1.645	$108*1.645 = 177.66$	< 400	Pass
DH5	20 times/10 sec * 31.6=63 times	2.895	$63*2.895 = 182.38$	< 400	Pass

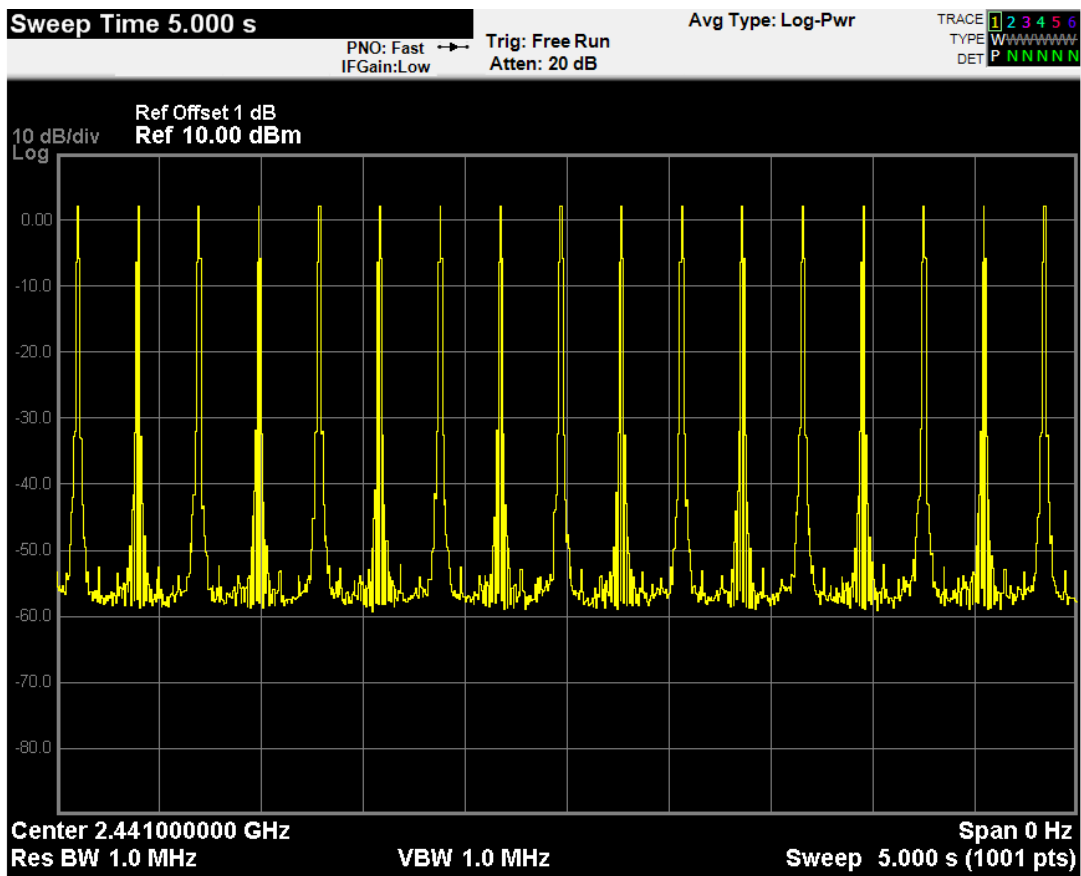
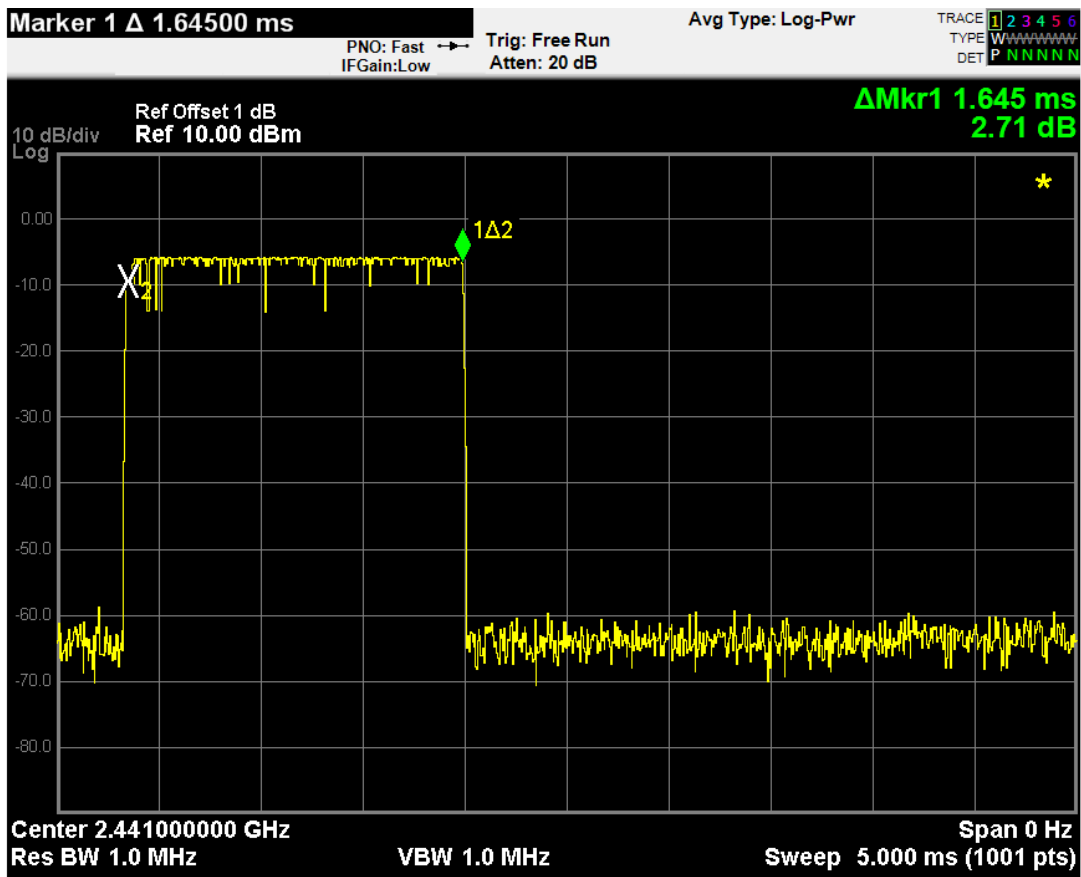
Ch 39 2441MHz 3M 8-DPSK

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
3DH1	30 times/3 sec * 31.6=316 times	0.406	$316*0.406 = 128.30$	< 400	Pass
3DH3	34 times/10 sec * 31.6=108 times	1.600	$108*1.600 = 172.80$	< 400	Pass
3DH5	20 times/10 sec * 31.6=63 times	2.870	$63*2.870 = 180.81$	< 400	Pass

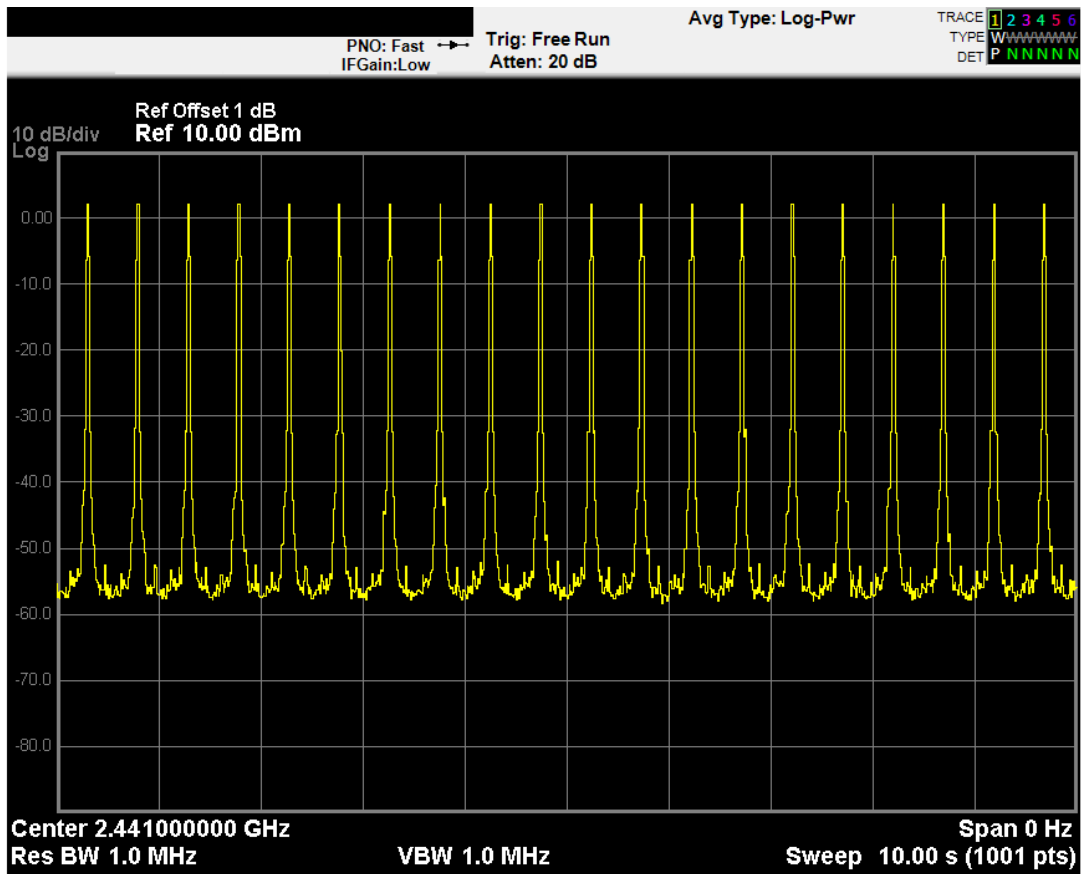
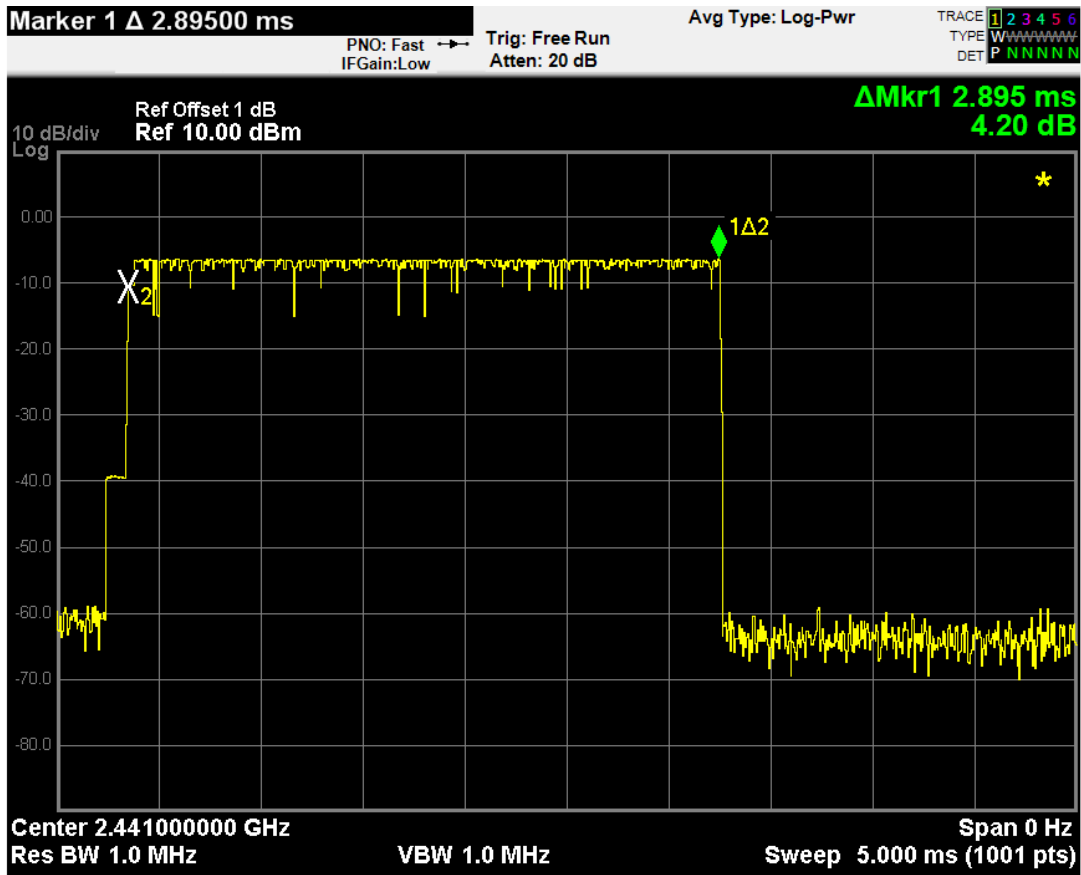
For Ch 39 2441MHz 1M GFSK DH1



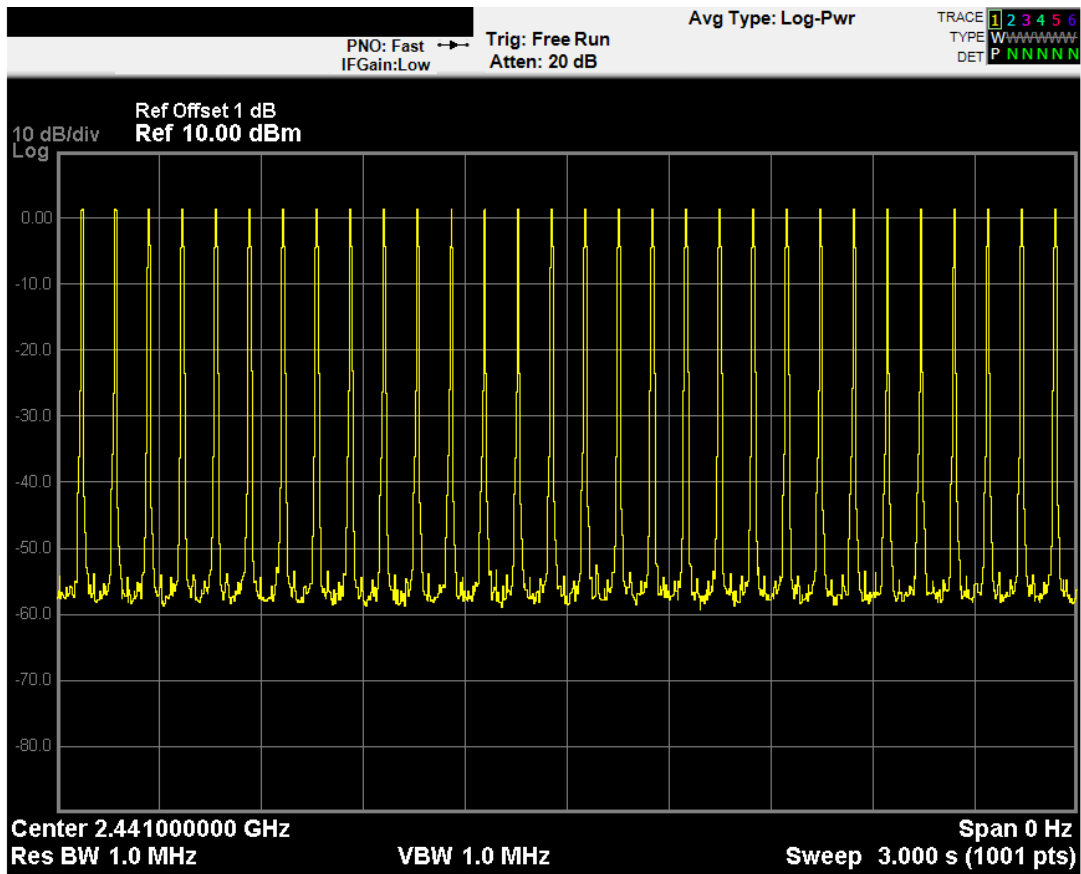
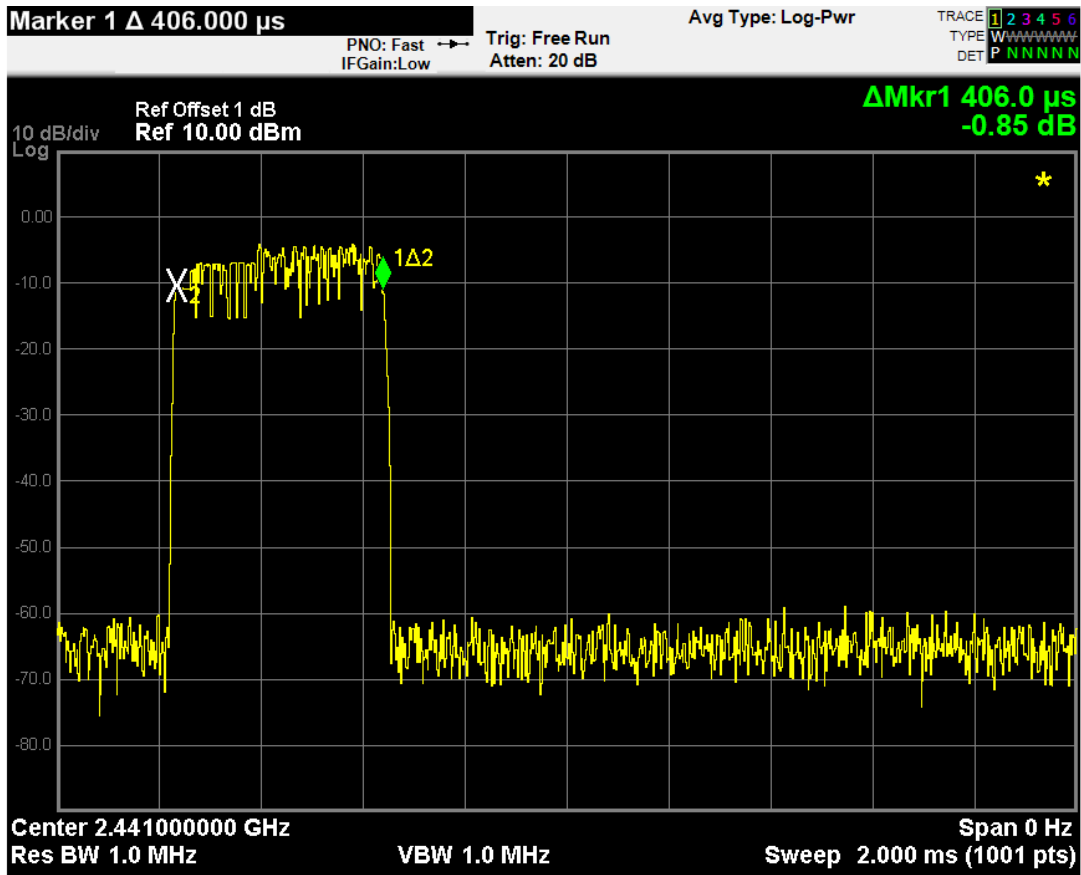
For Ch 39 2441MHz 1M GFSK DH3



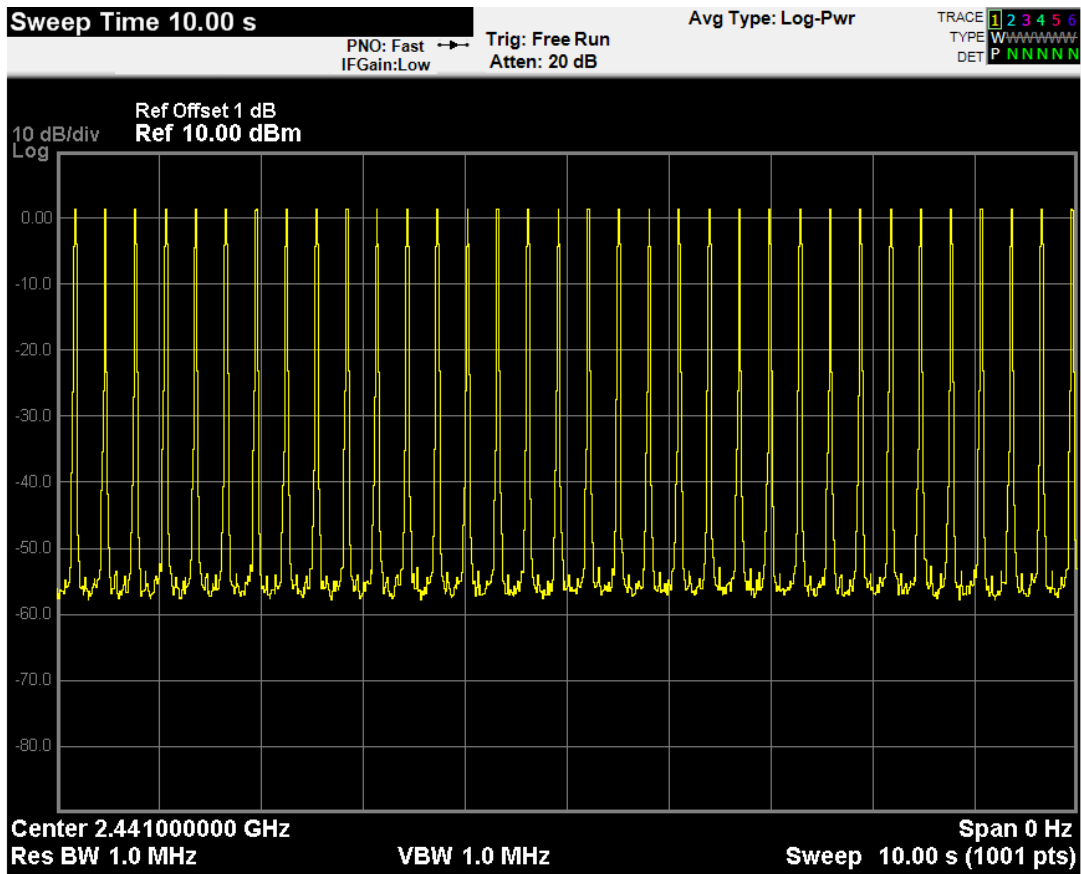
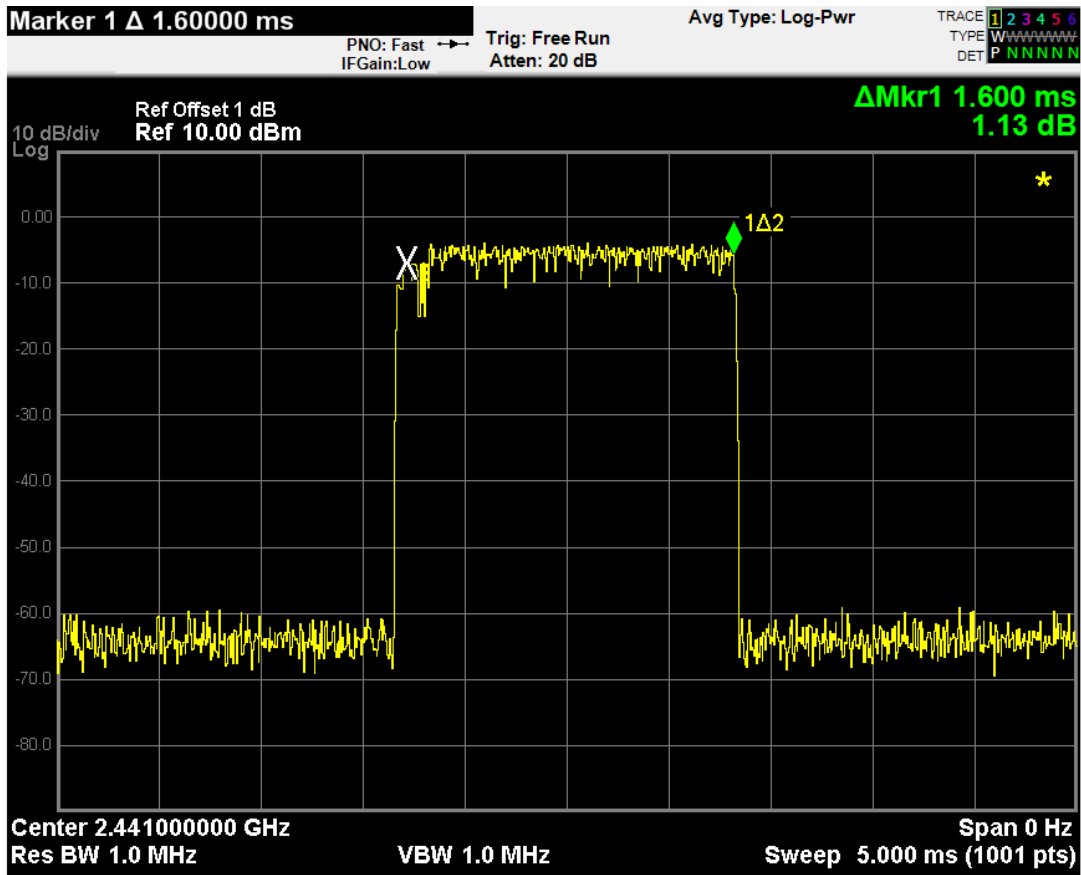
For Ch 39 2441MHz 1M GFSK DH5



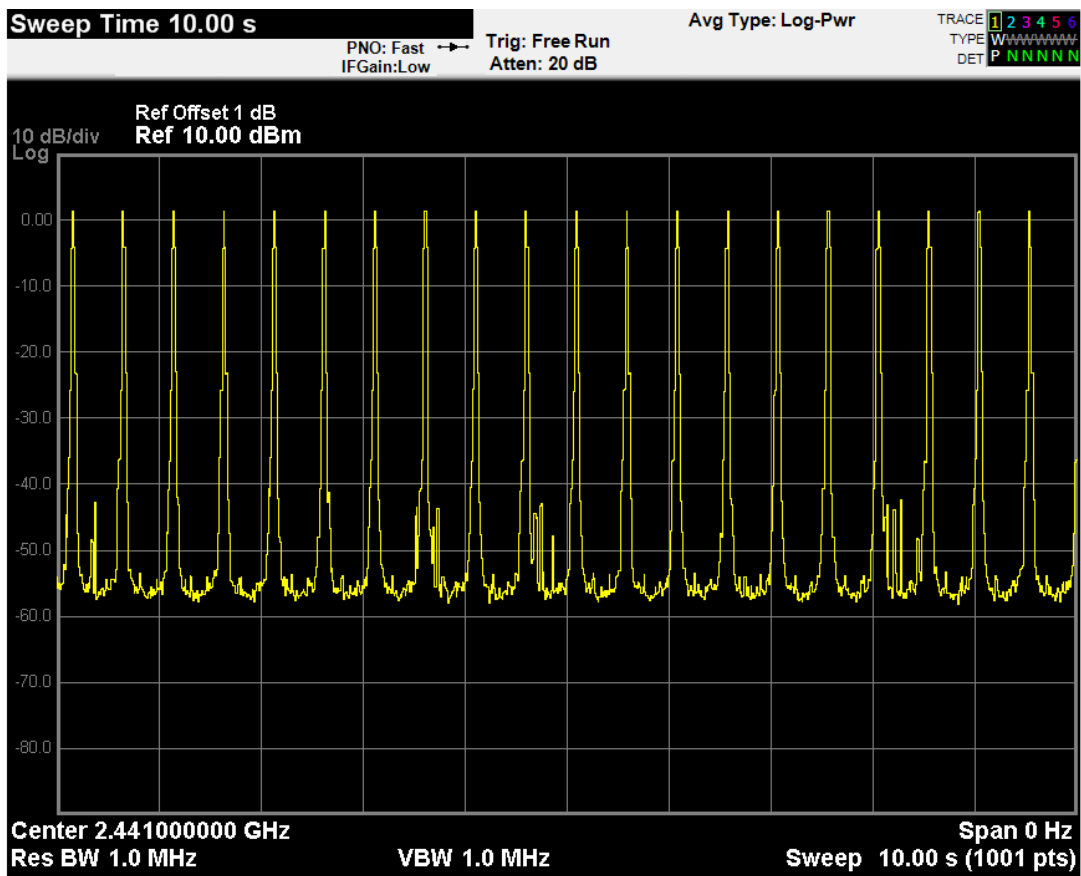
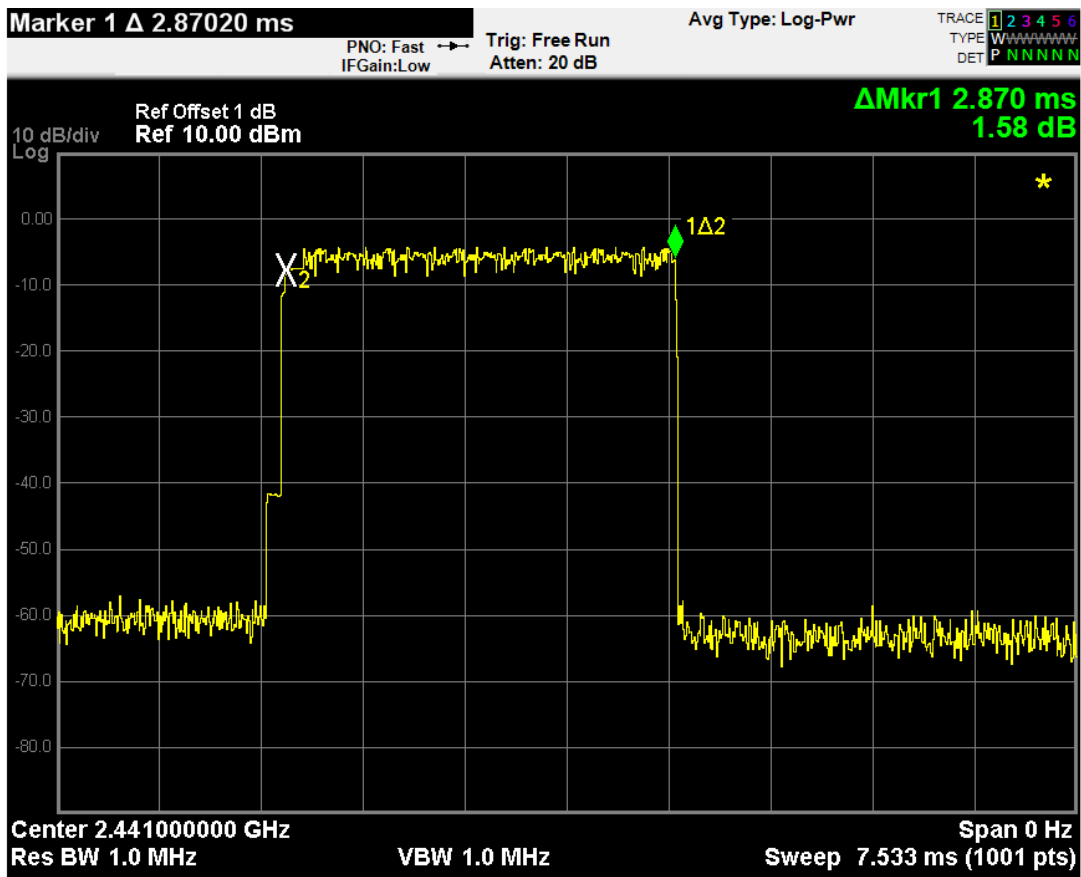
For Ch 39 2441MHz 3M 8-DPSK DH1



For Ch 39 2441MHz 3M 8-DPSK DH3



For Ch 39 2441MHz 3M 8-DPSK DH5



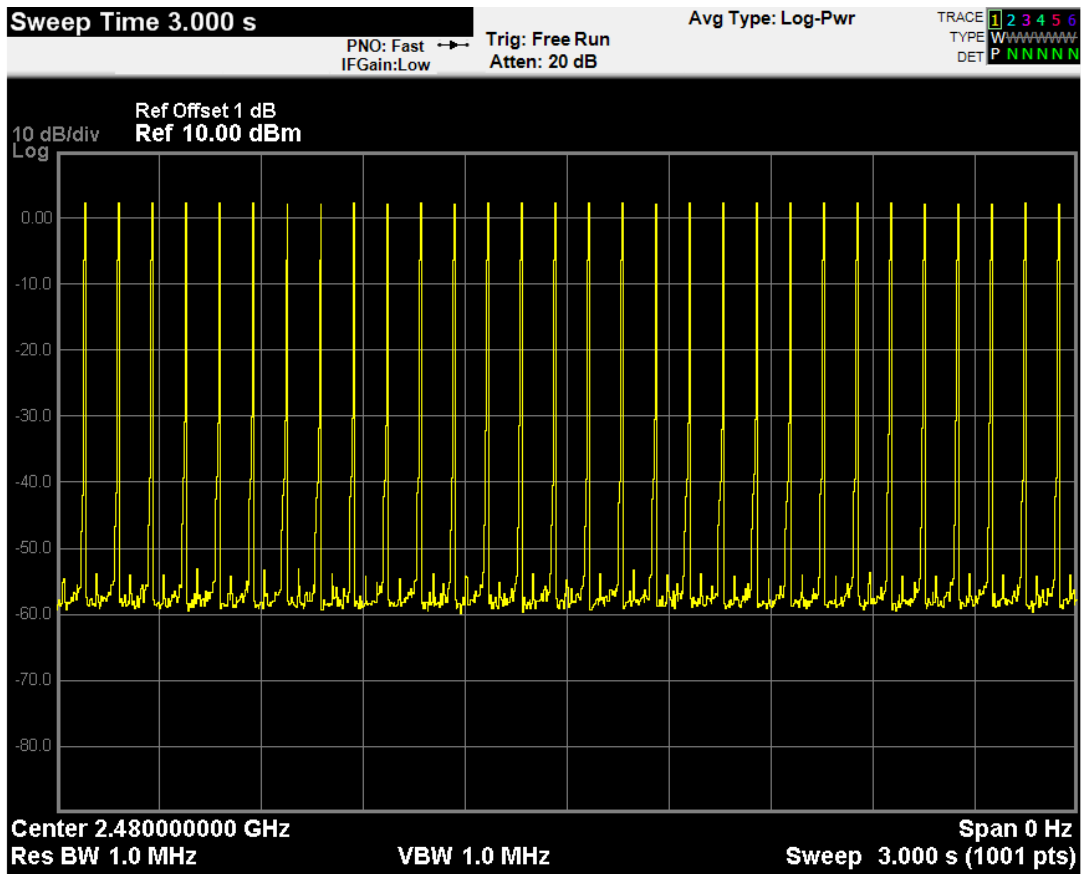
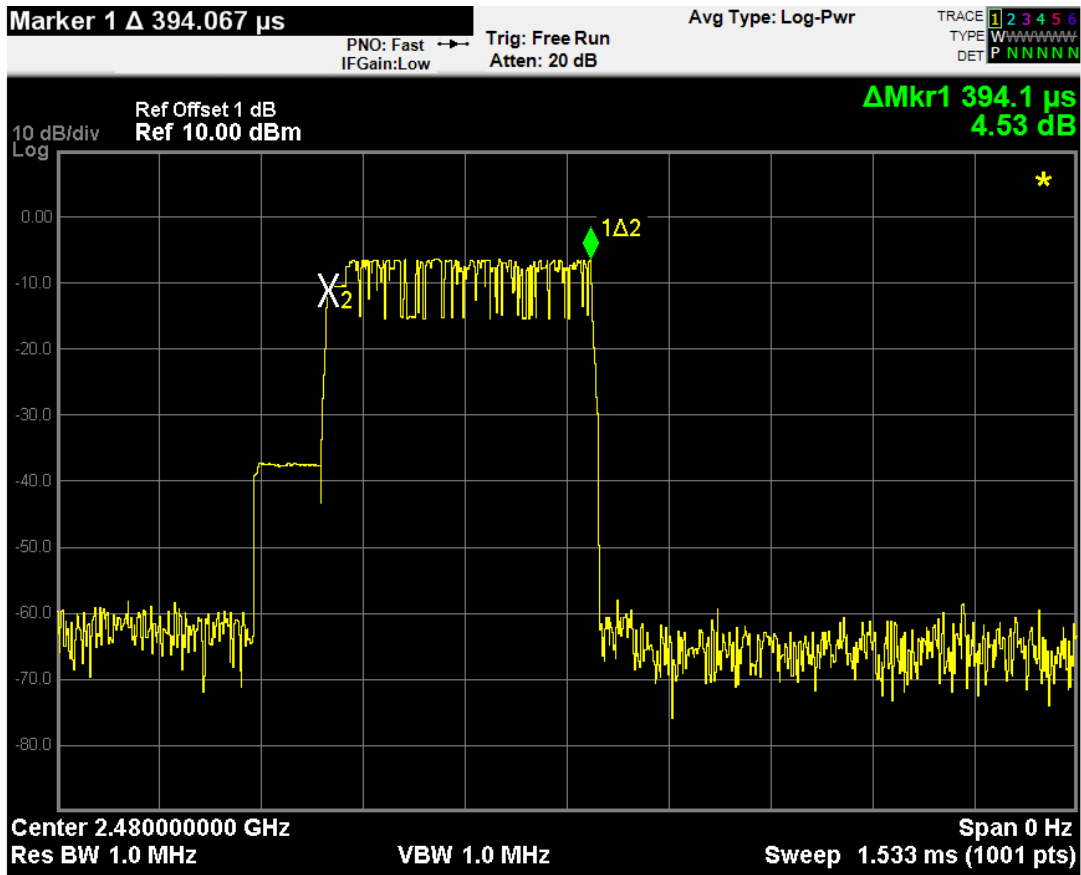
Ch 78 2480MHz 1M GFSK

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
DH1	30 times/3 sec * 31.6=316 times	0.394	$316*0.394 = 124.50$	< 400	Pass
DH3	25 times/7.5 sec * 31.6=106 times	1.650	$106*1.650 = 174.90$	< 400	Pass
DH5	20 times/10 sec * 31.6=63 times	2.885	$63*2.885 = 181.76$	< 400	Pass

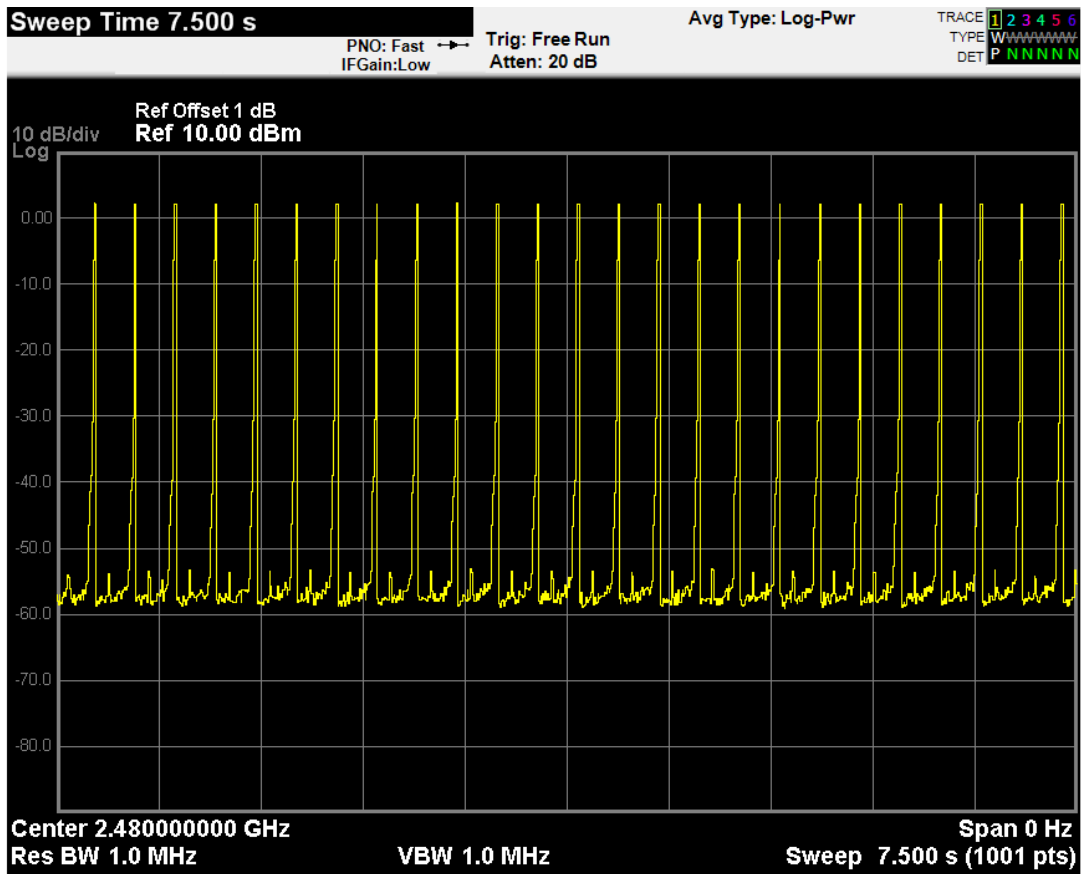
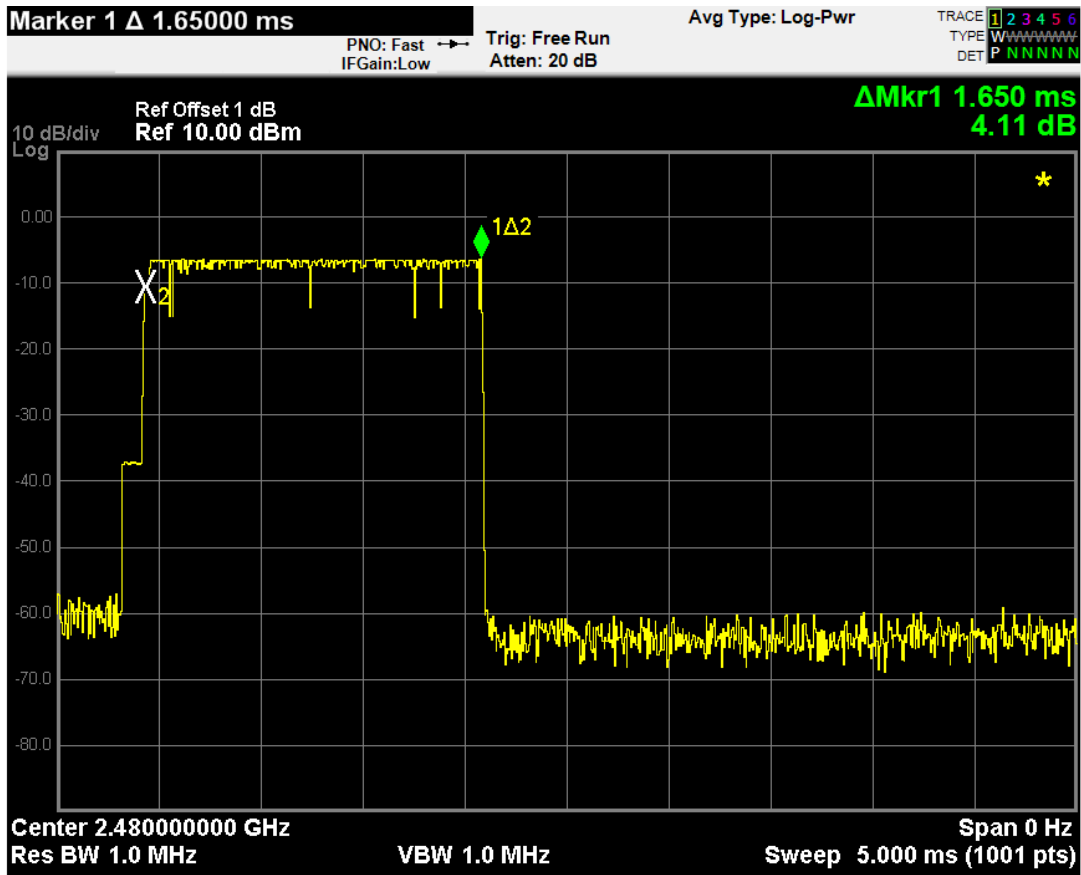
Ch 78 2480MHz 3M 8-DPSK

Mode	Number of transmission in a 31.6 (79 hopping*0.4) second period	Length of transmission time (msec)	Result (msec)	Limit (msec)	Conclusion
3DH1	30 times/3 sec * 31.6=316 times	0.404	$316*0.404 = 127.66$	< 400	Pass
3DH3	25 times/7.5 sec * 31.6=106 times	1.605	$106*1.605 = 170.13$	< 400	Pass
3DH5	20 times/10 sec * 31.6=63 times	2.855	$107*0.167 = 179.87$	< 400	Pass

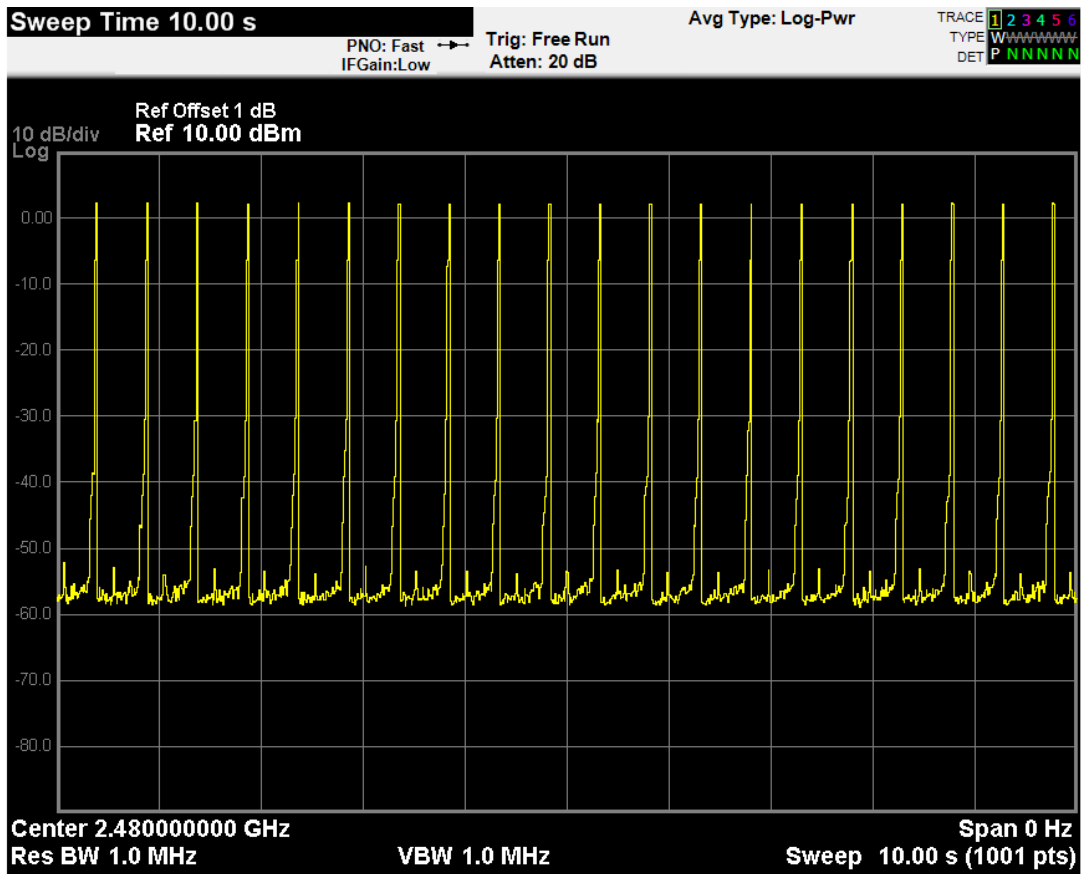
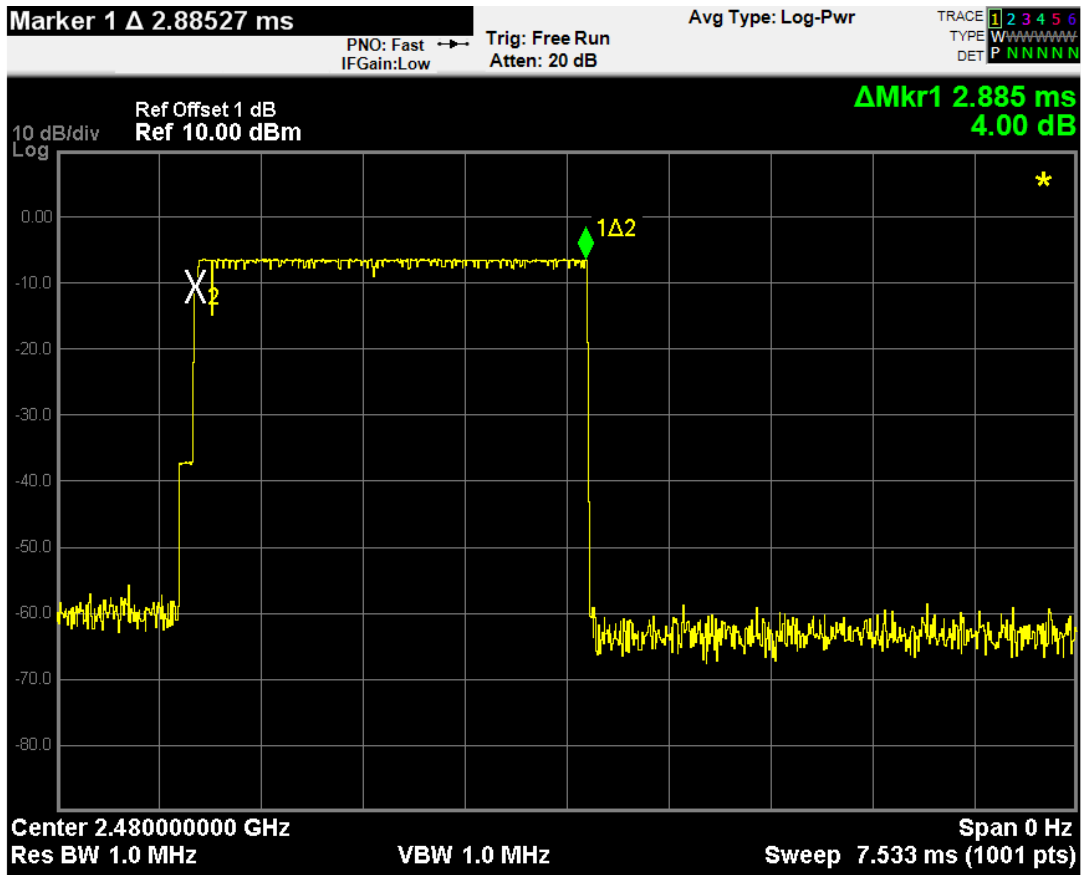
For Ch 78 2480MHz 1M GFSK DH1



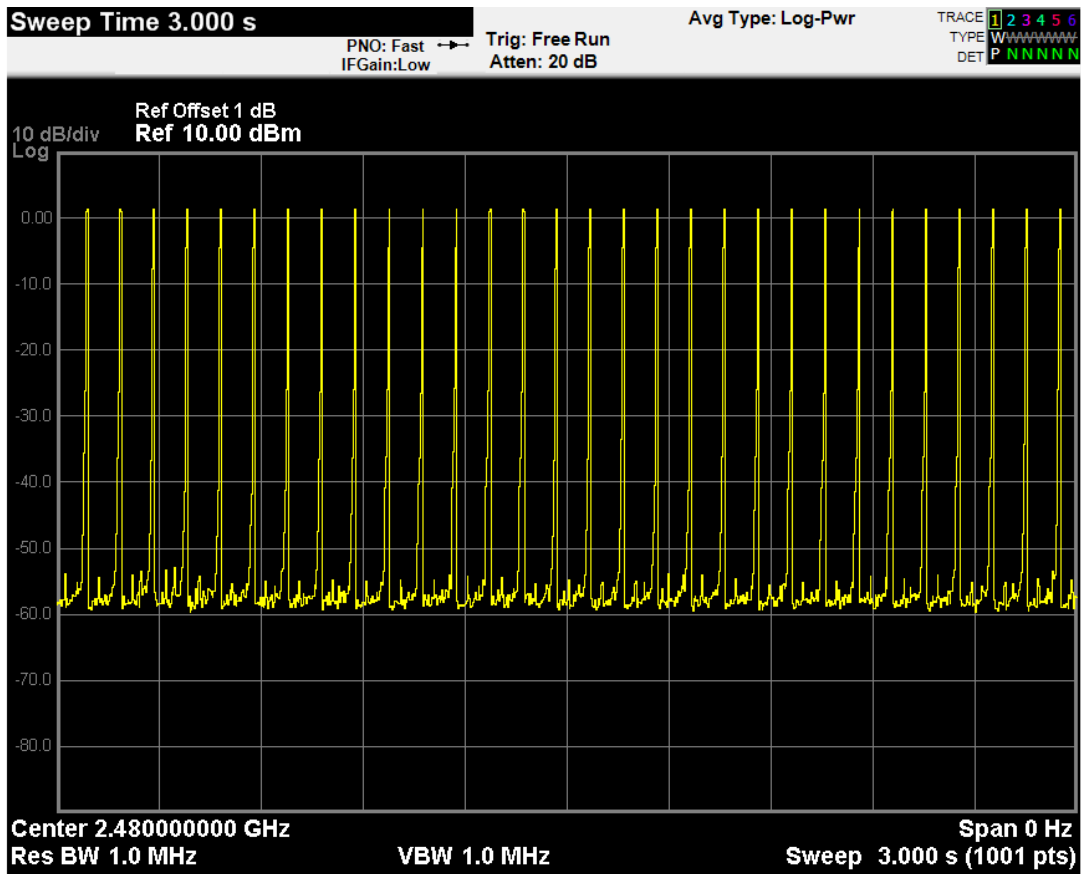
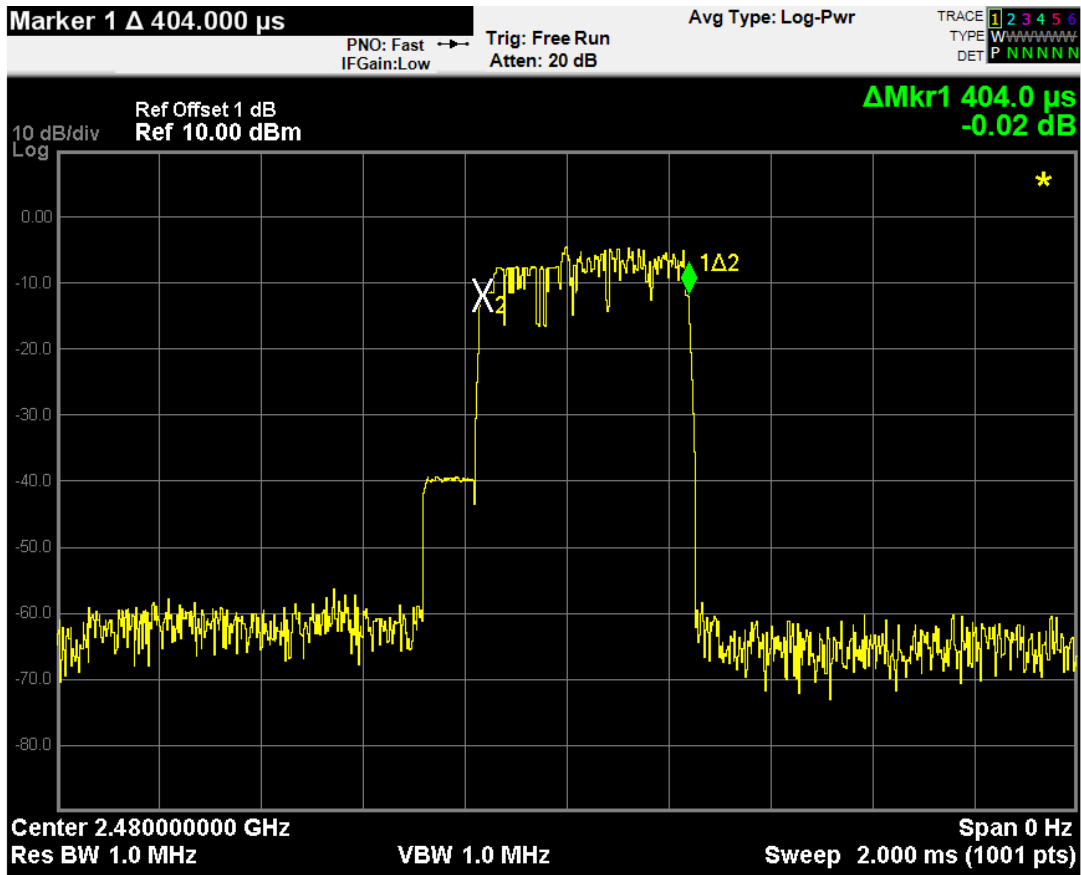
For Ch 78 2480MHz 1M GFSK DH3



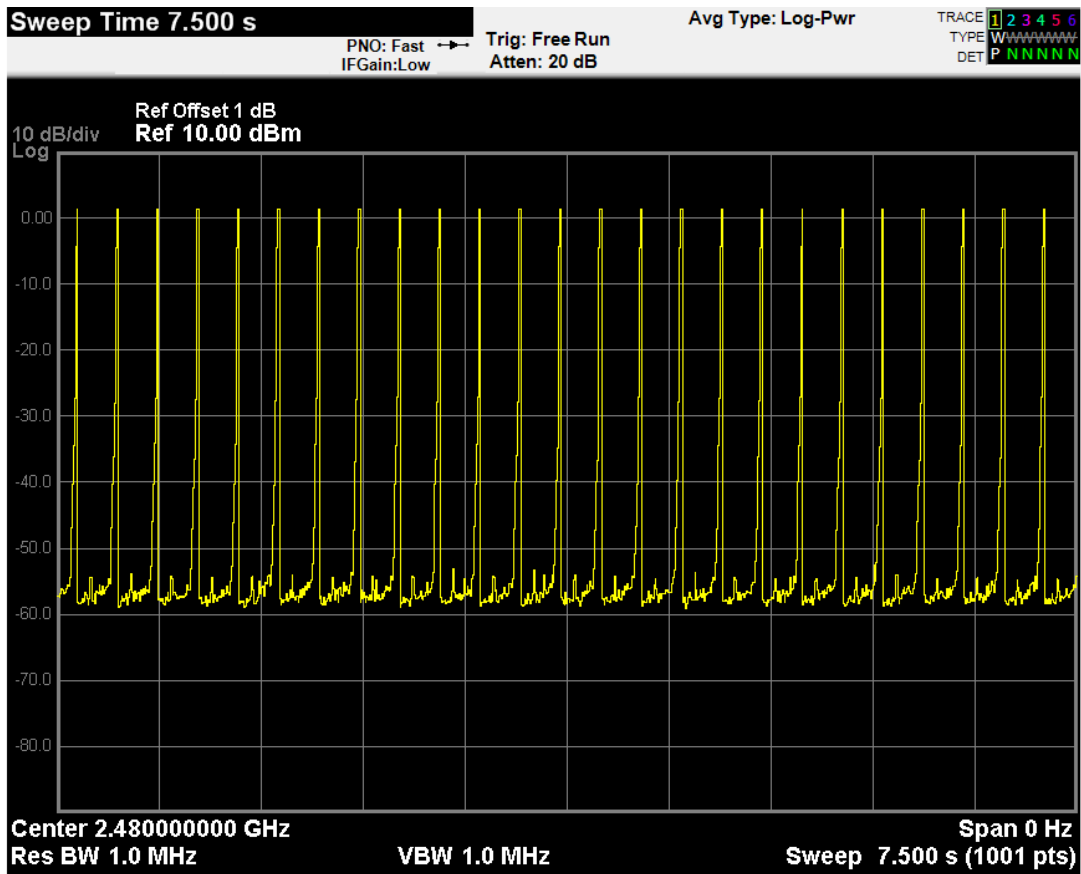
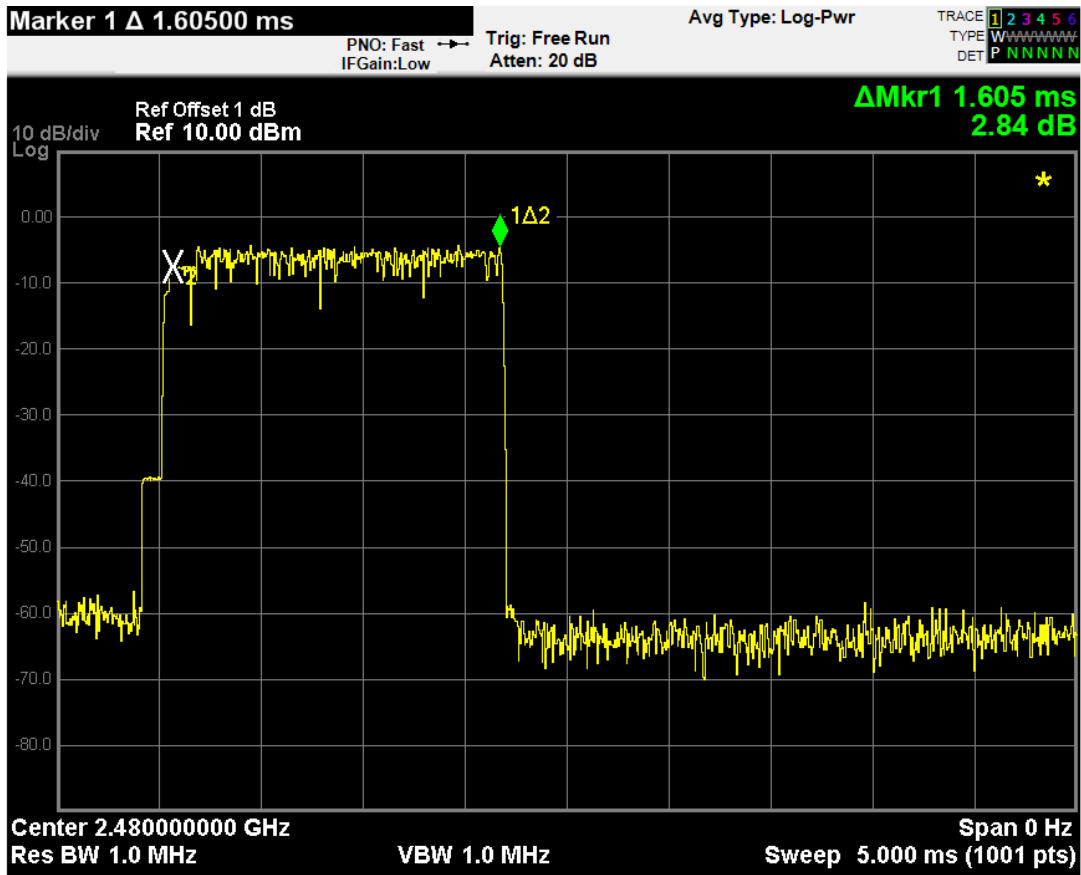
For Ch 78 2480MHz 1M GFSK DH5



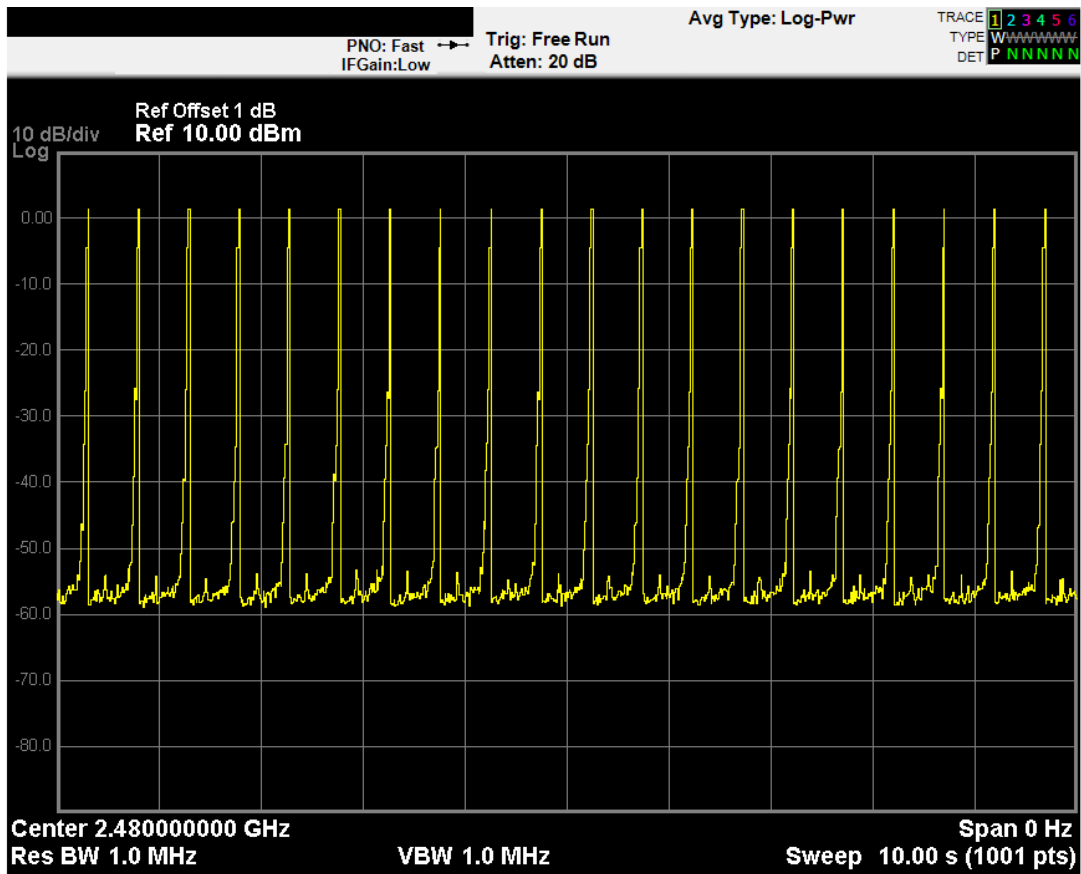
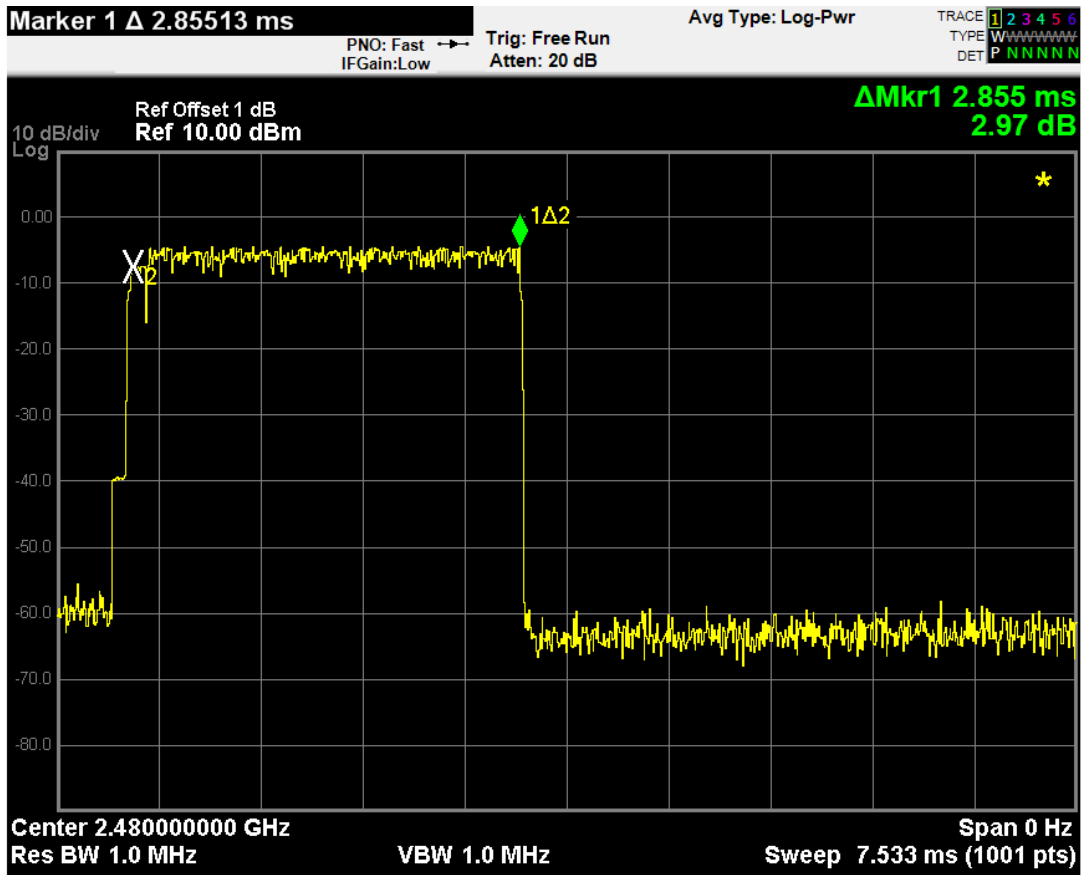
For Ch 78 2480MHz 3M 8-DPSK DH1



For Ch 78 2480MHz 3M 8-DPSK DH3



For Ch 78 2480MHz 3M 8-DPSK DH5



10 TRANSMITTER OUTPUT POWER AND EQUIVALENT ISOTROPICALLY RADIATED POWER (E.I.R.P.)

10.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

10.2 Block Diagram of Test Setup

Same as section 5.2.

10.3 Specification Limits (IC RSS-247 Issue1 §5.4(2))

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels.

10.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

10.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.
The test procedure is defined in DA 00-705.

10.6 Test Results

PASSED.

(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

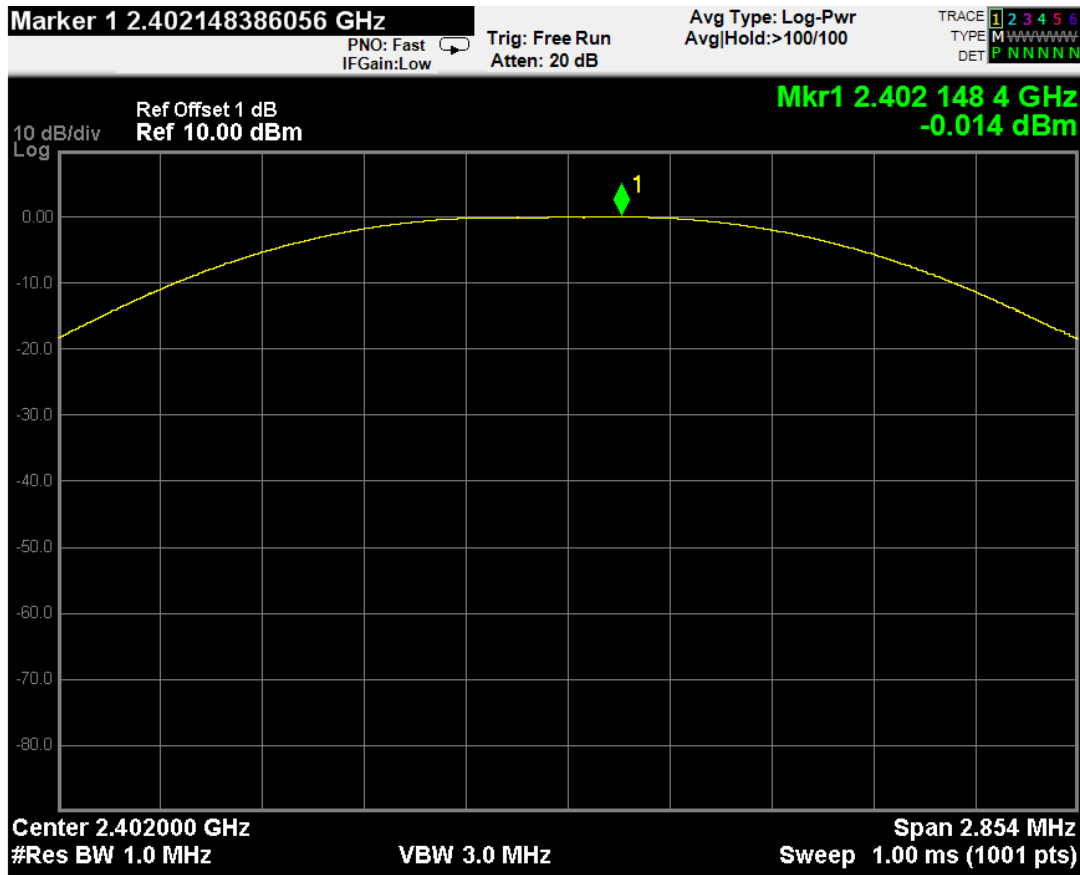
For 1M GFSK (Antenna Gain: 2 dBi)

Channel	Frequency	Peak Output Power		E. I. R. P.	
		Result	Limit	Result	Limit
00	2402 MHz	-0.014 dBm	30 dBm	1.986 dBm	36 dBm
39	2441 MHz	1.743 dBm	30 dBm	3.743 dBm	36 dBm
78	2480 MHz	2.069 dBm	30 dBm	4.069 dBm	36 dBm

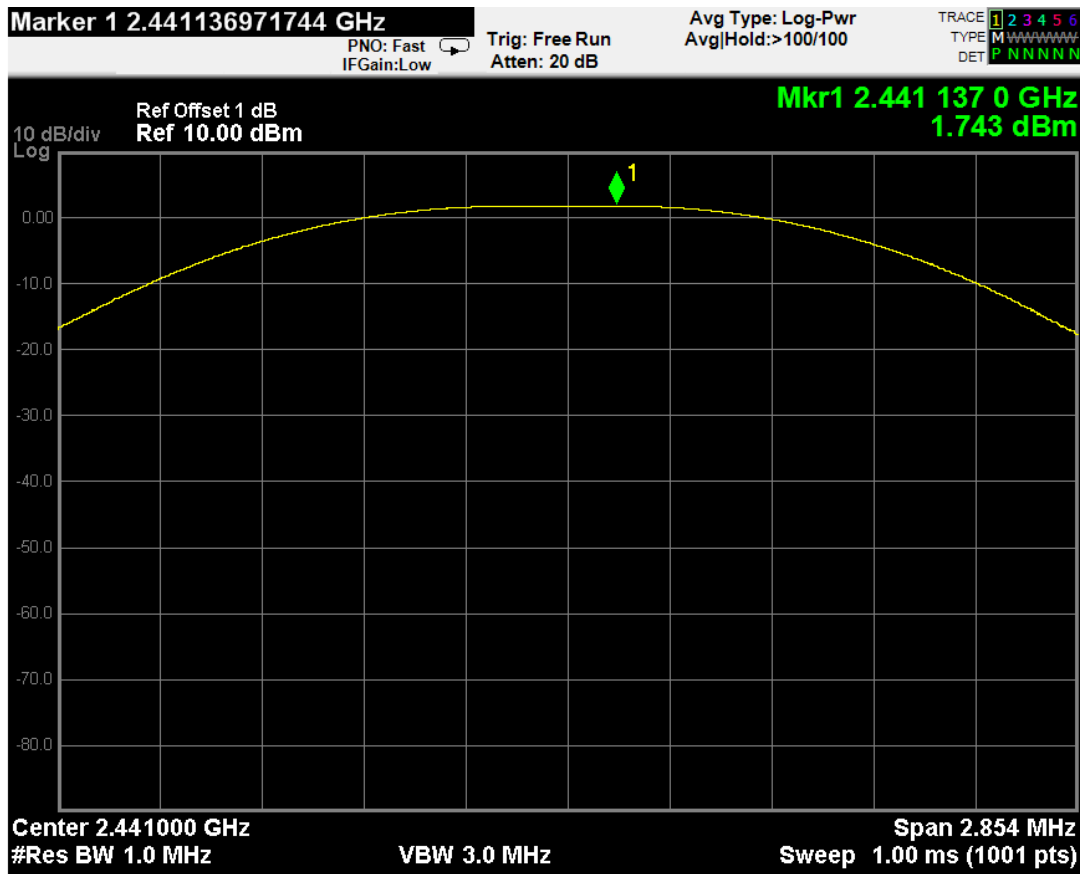
For 3M 8-DPSK (Antenna Gain: 2 dBi)

Channel	Frequency	Peak Output Power		E. I. R. P.	
		Result	Limit	Result	Limit
00	2402 MHz	-0.756 dBm	30 dBm	1.244 dBm	36 dBm
39	2441 MHz	1.112 dBm	30 dBm	3.112 dBm	36 dBm
78	2480 MHz	1.385 dBm	30 dBm	3.385 dBm	36 dBm

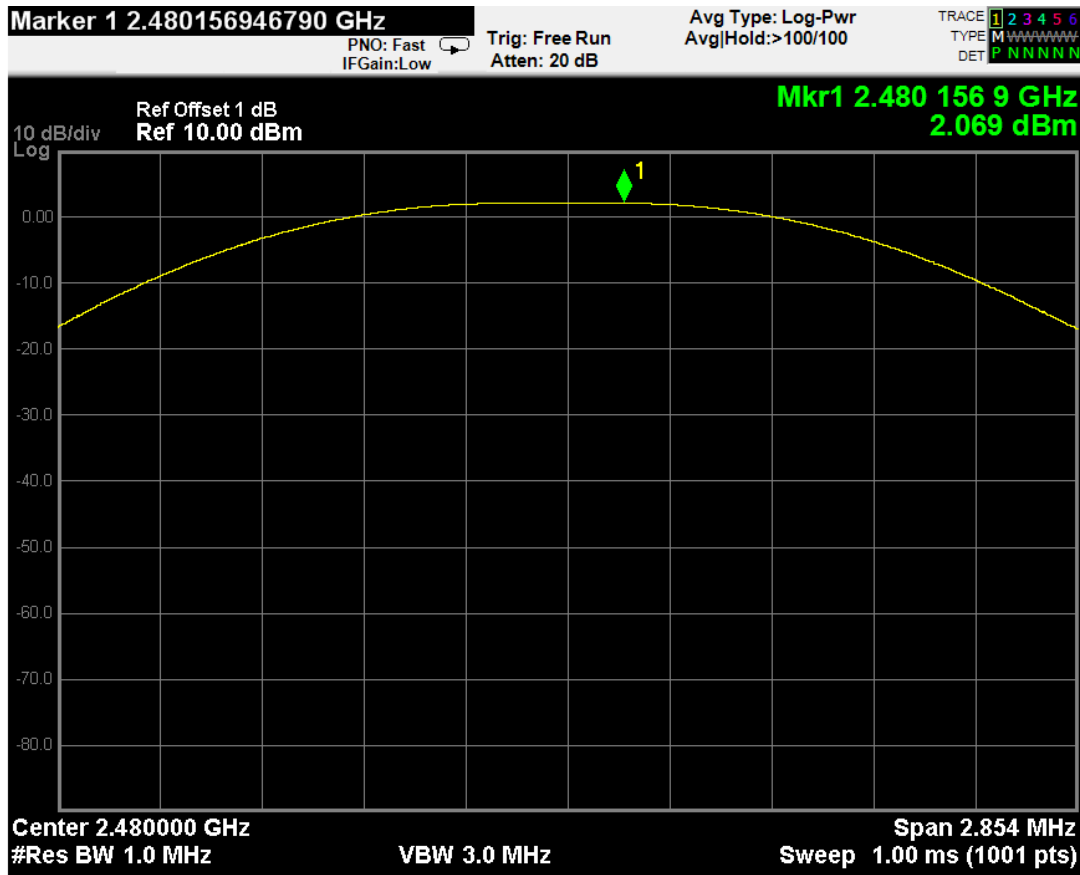
Ch 00 (2402 MHz) 1M GSKF



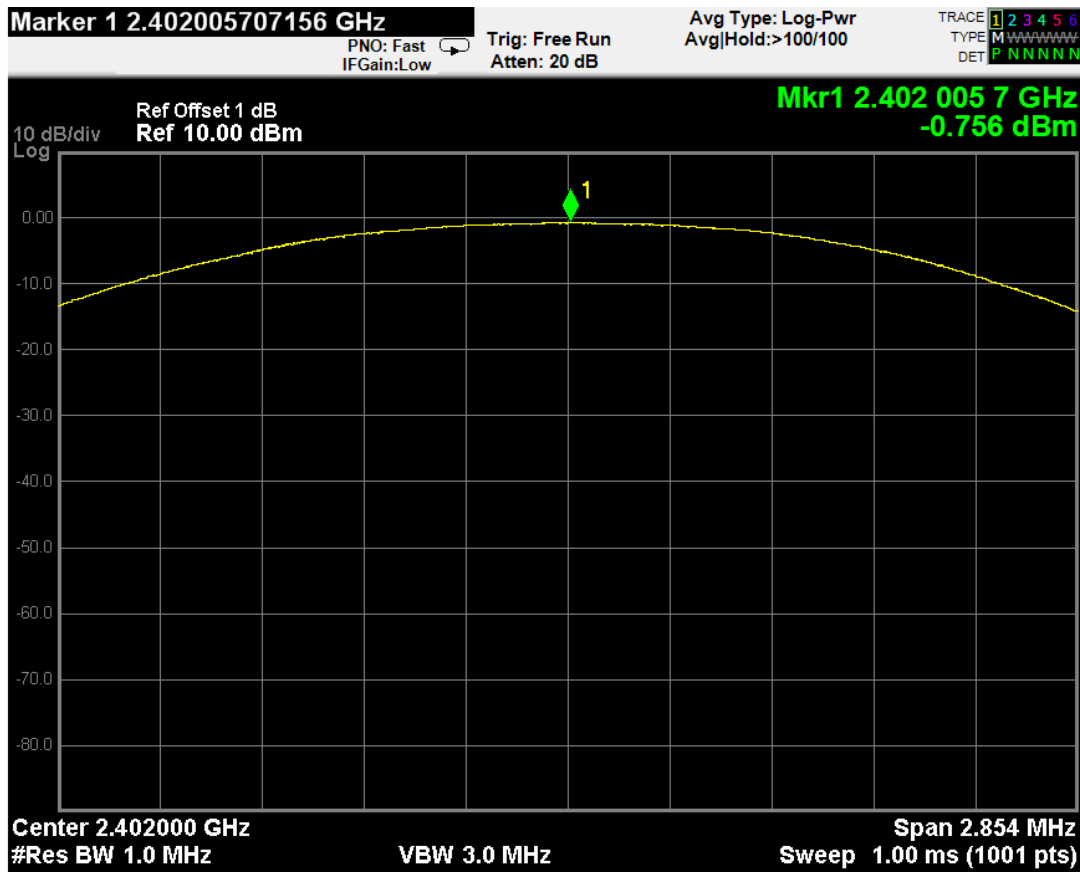
Ch 39 (2441 MHz) 1M GSKF



Ch 78 (2480 MHz) 1M GSKF



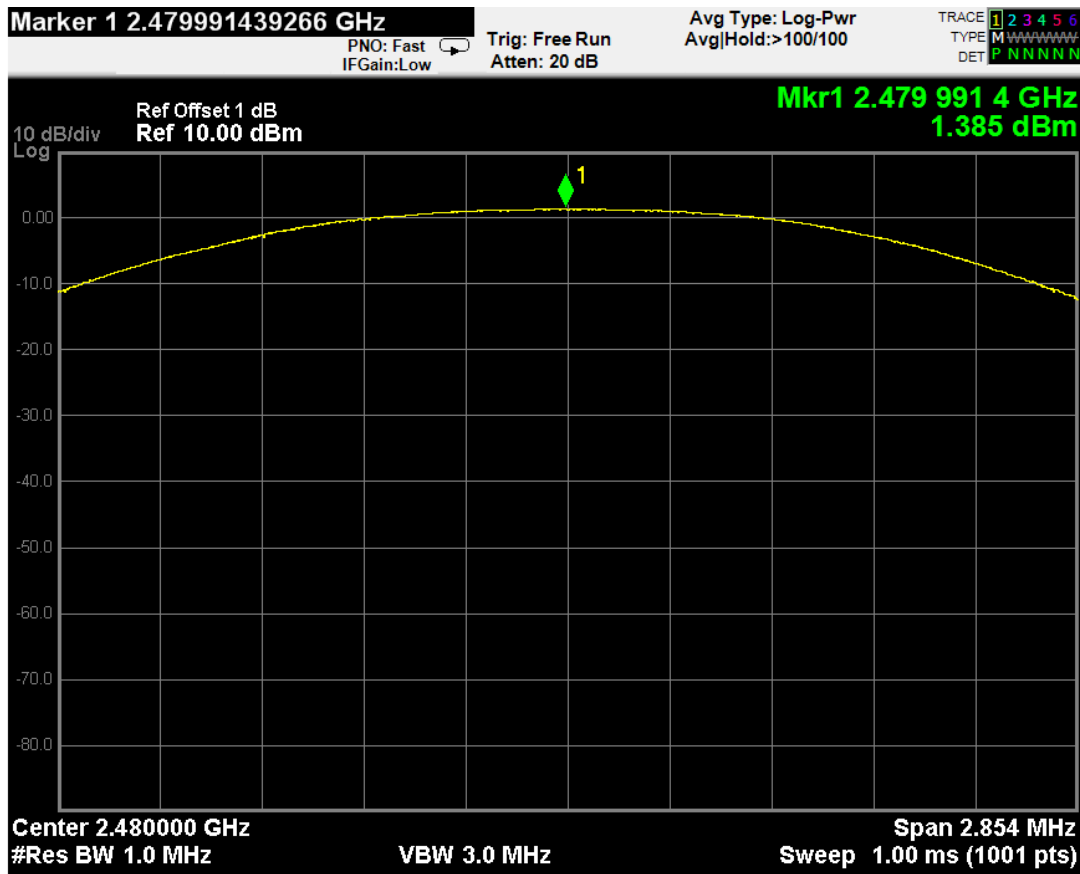
Ch 00 (2402 MHz) 3M 8-DPSK



Ch 39 (2441 MHz) 3M 8-DPSK



Ch 78 (2480 MHz) 3M 8-DPSK



11 UNWANTED EMISSIONS MEASUREMENT

11.1 Test Equipment

The following test equipment was used during the emission limitations test :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

11.2 Block Diagram of Test Setup

Same as Section. 5.2.

11.3 Specification Limits (IC RSS-247 Issue1 §5.5)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

11.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

11.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. Set RBW = 100 kHz, VBW = 300 kHz, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

The test procedure is defined in DA 00-705.

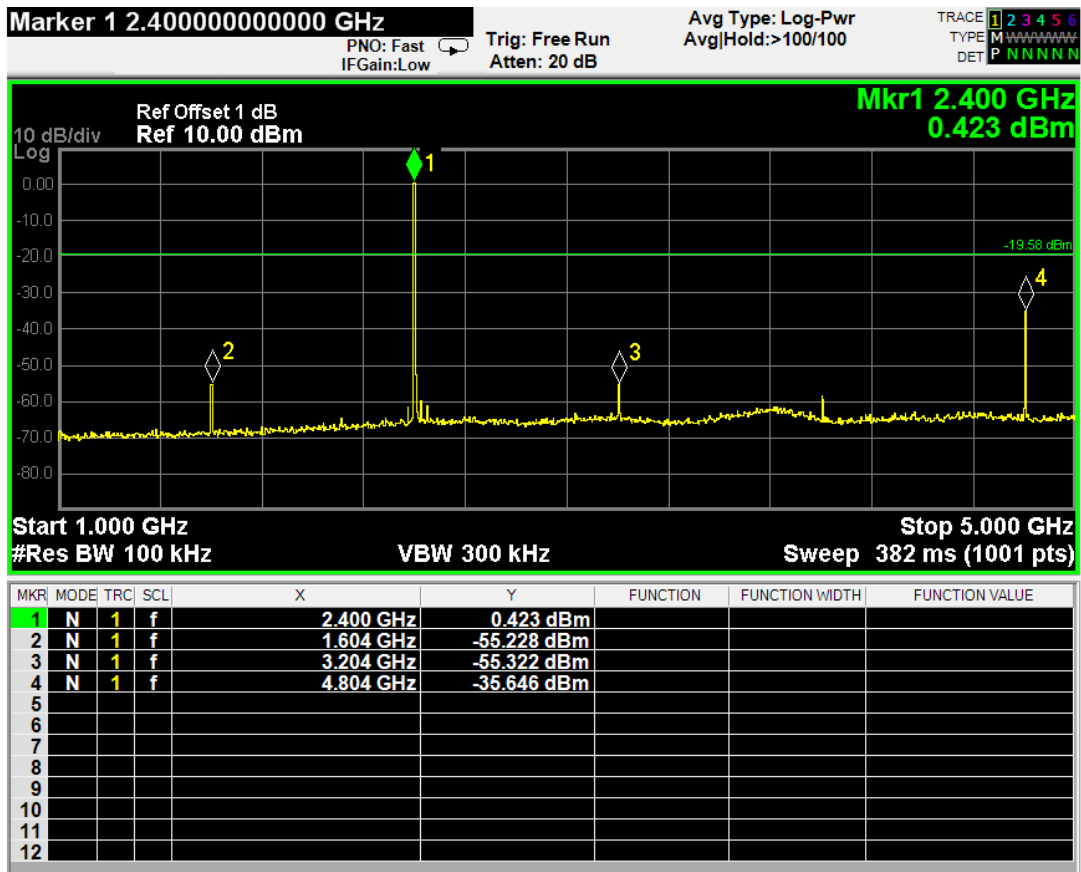
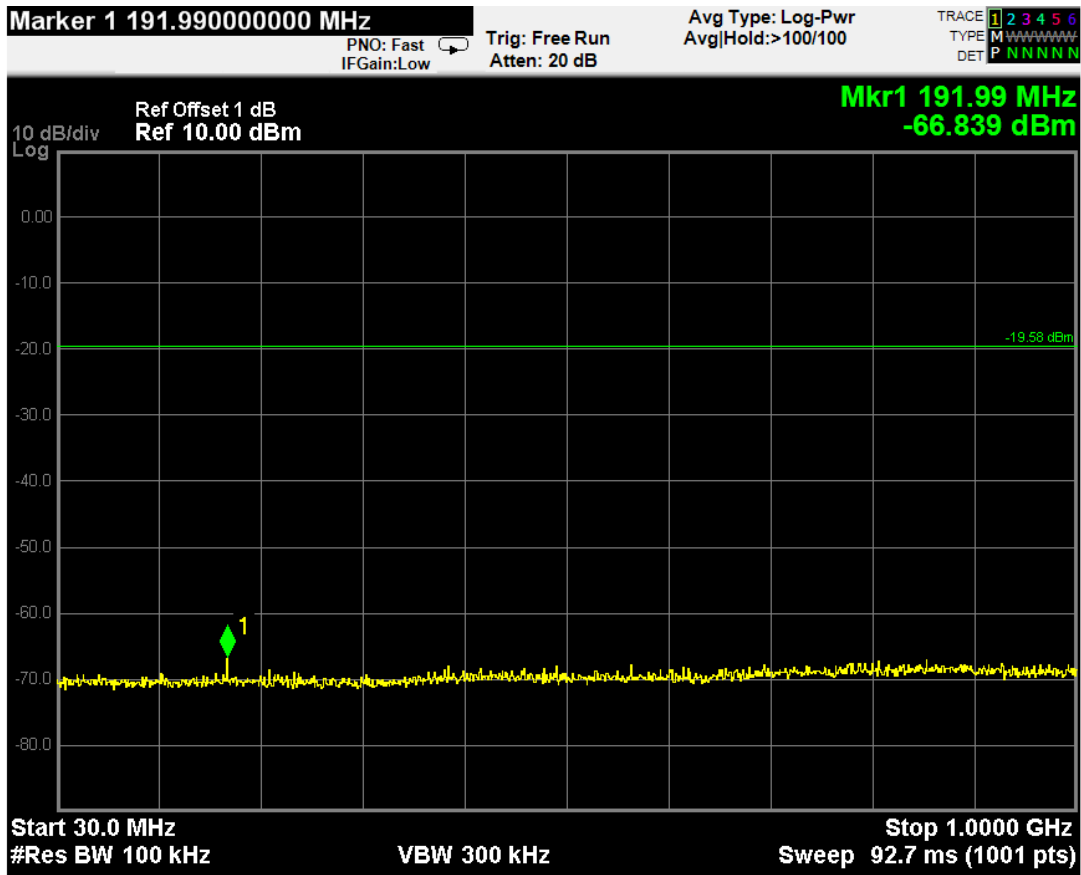
11.6 Test Results

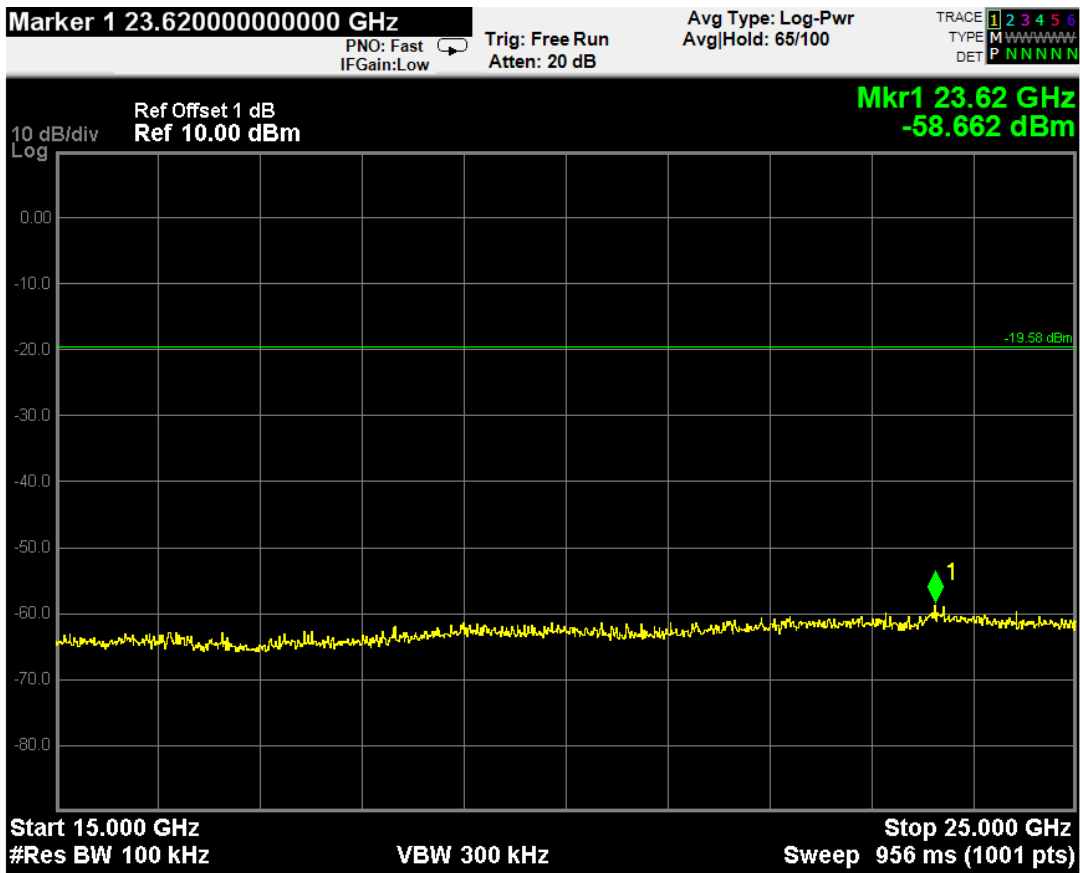
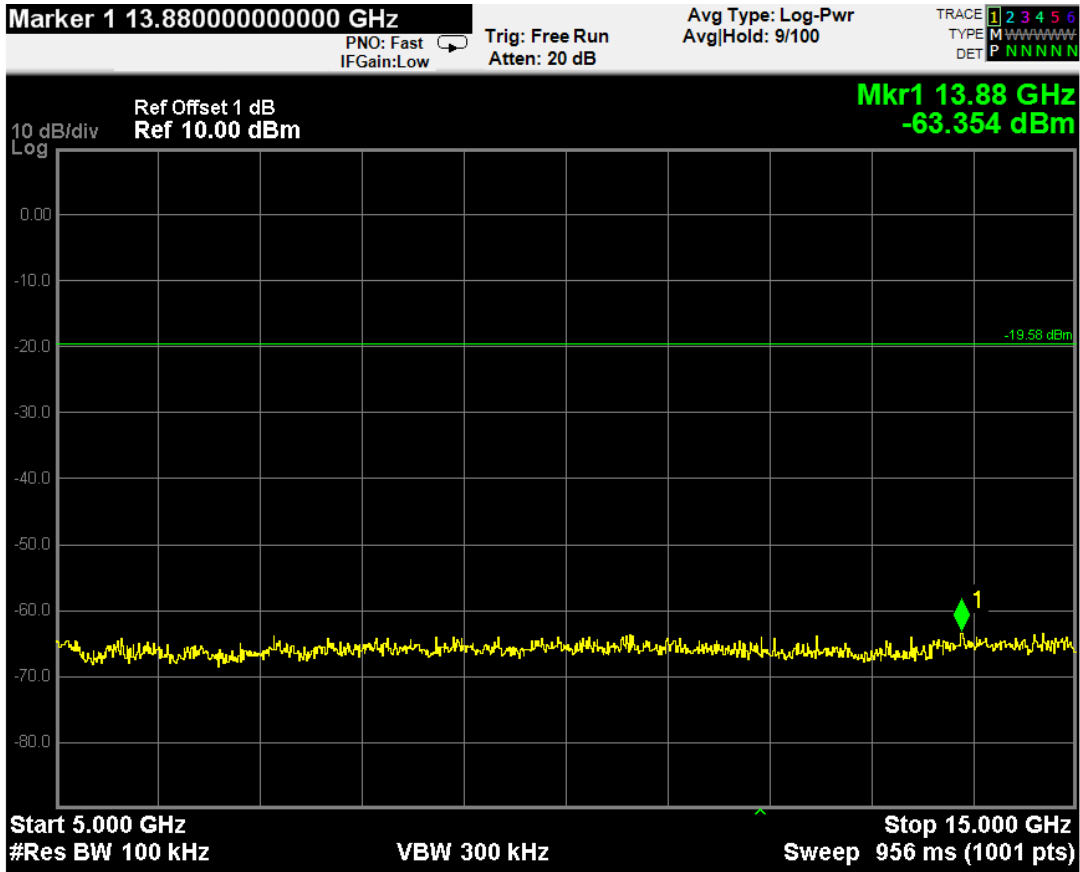
PASSED.

The test data was attached in the next pages.

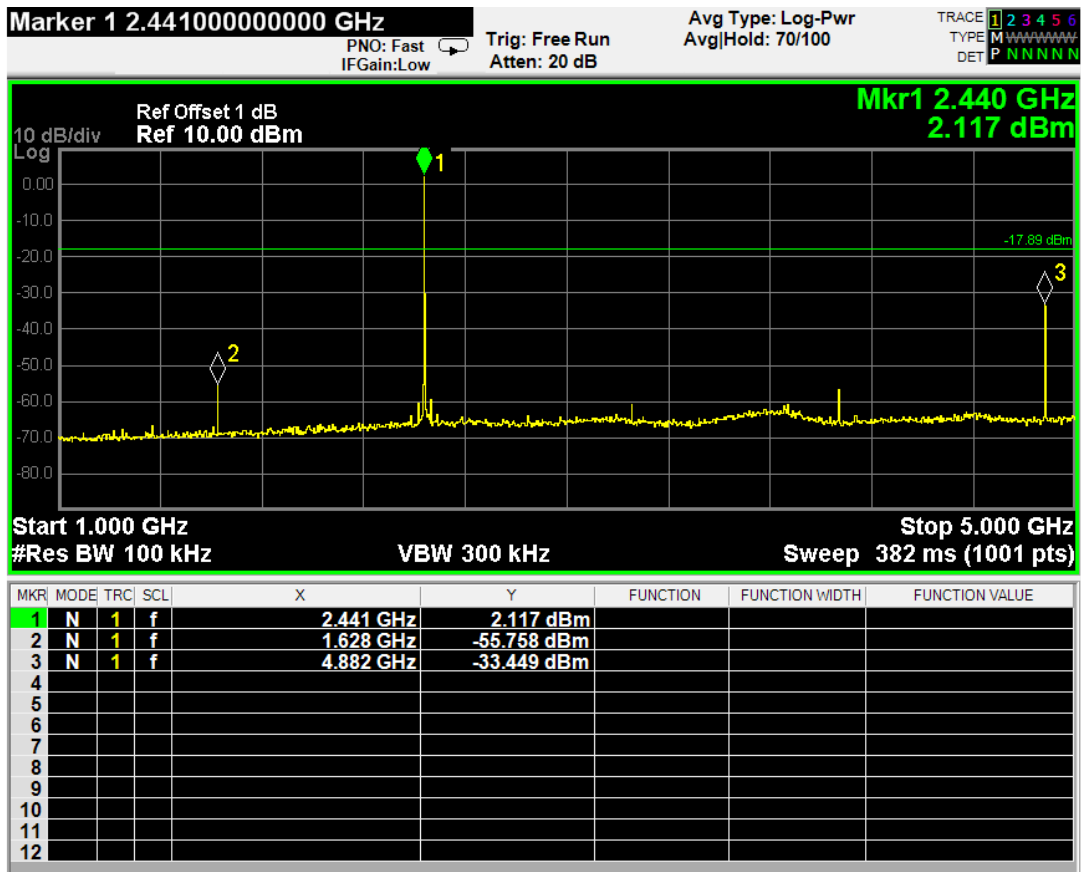
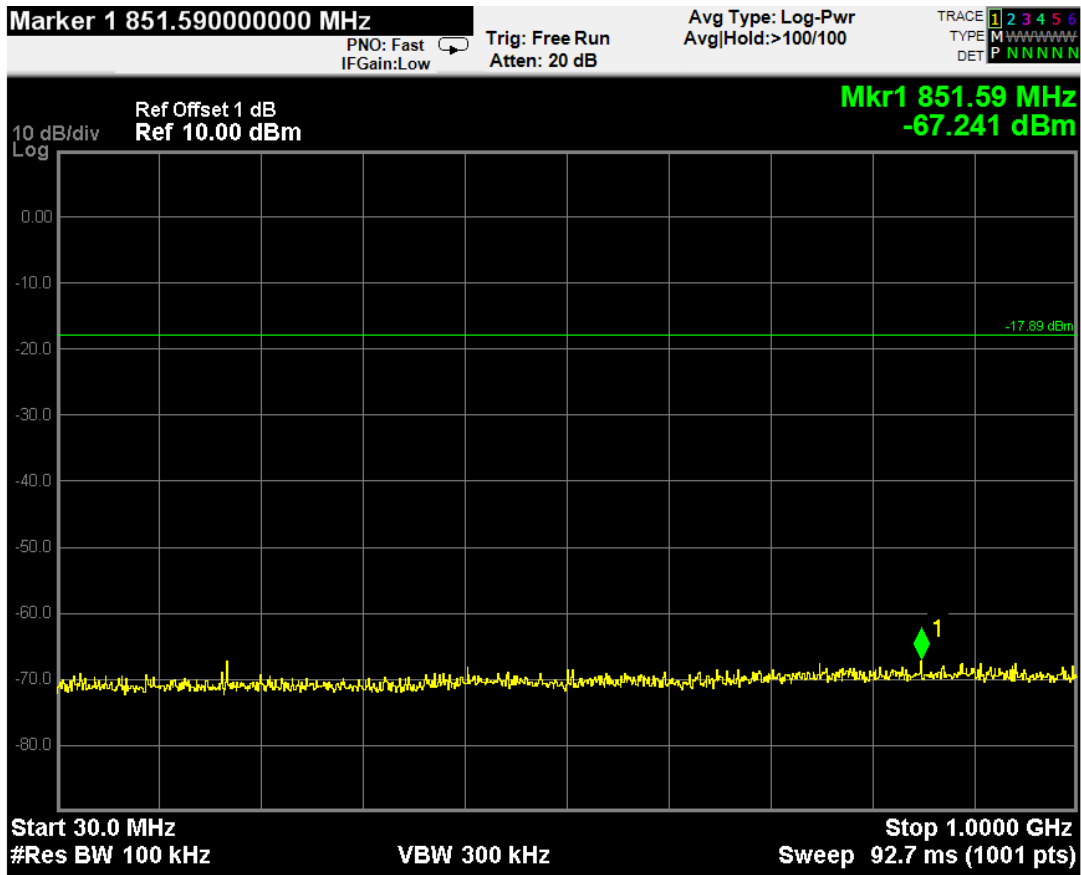
(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

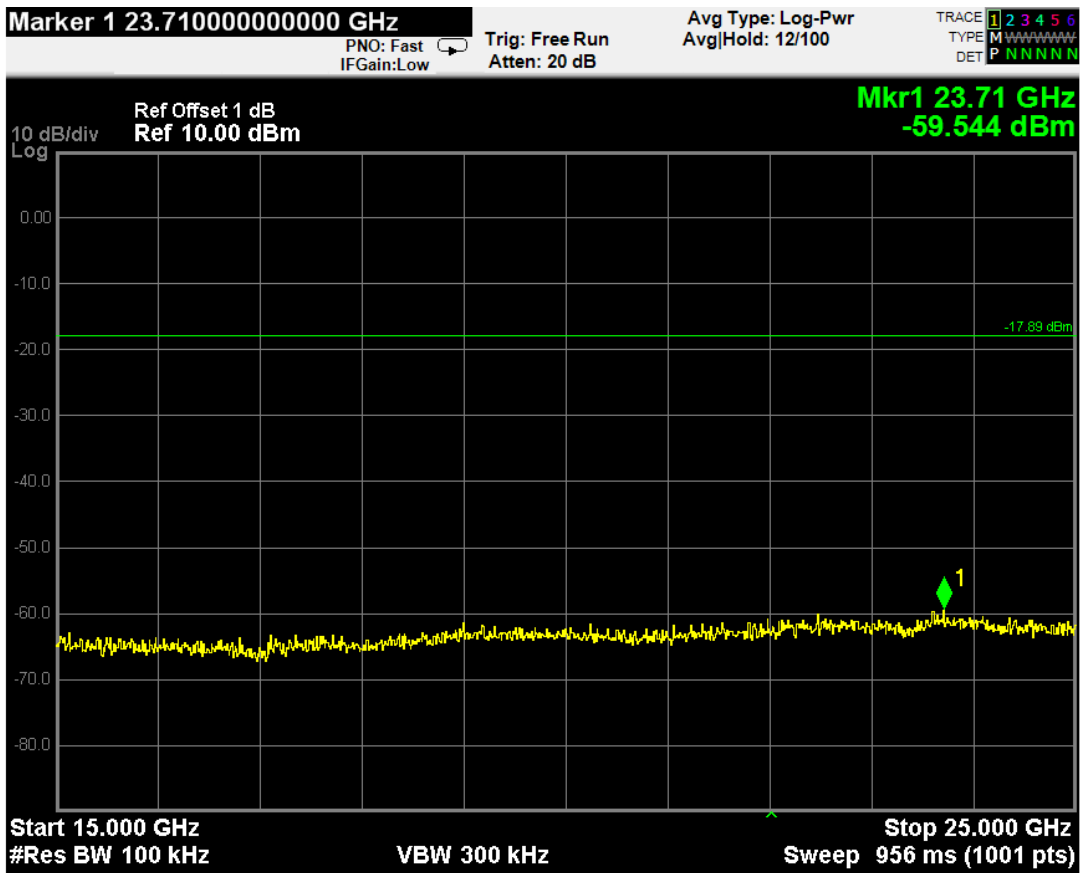
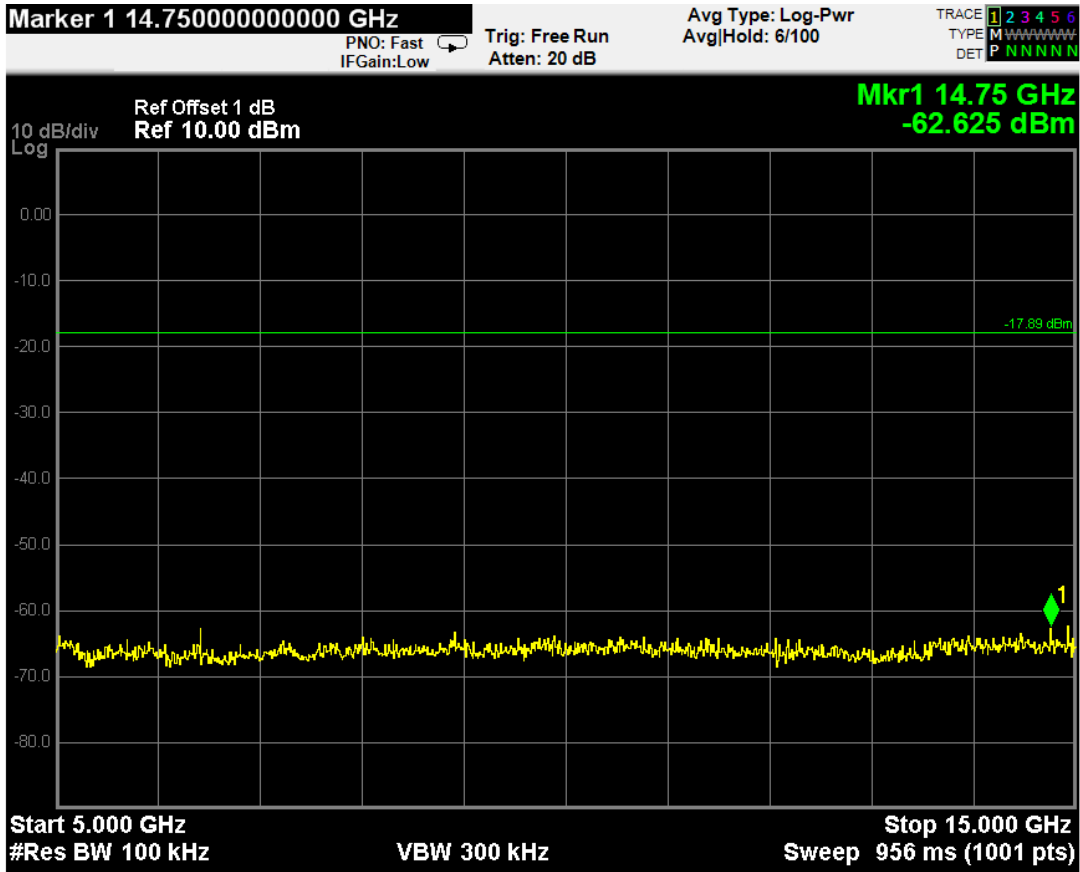
1M GFSK Ch 00 (2402 MHz)



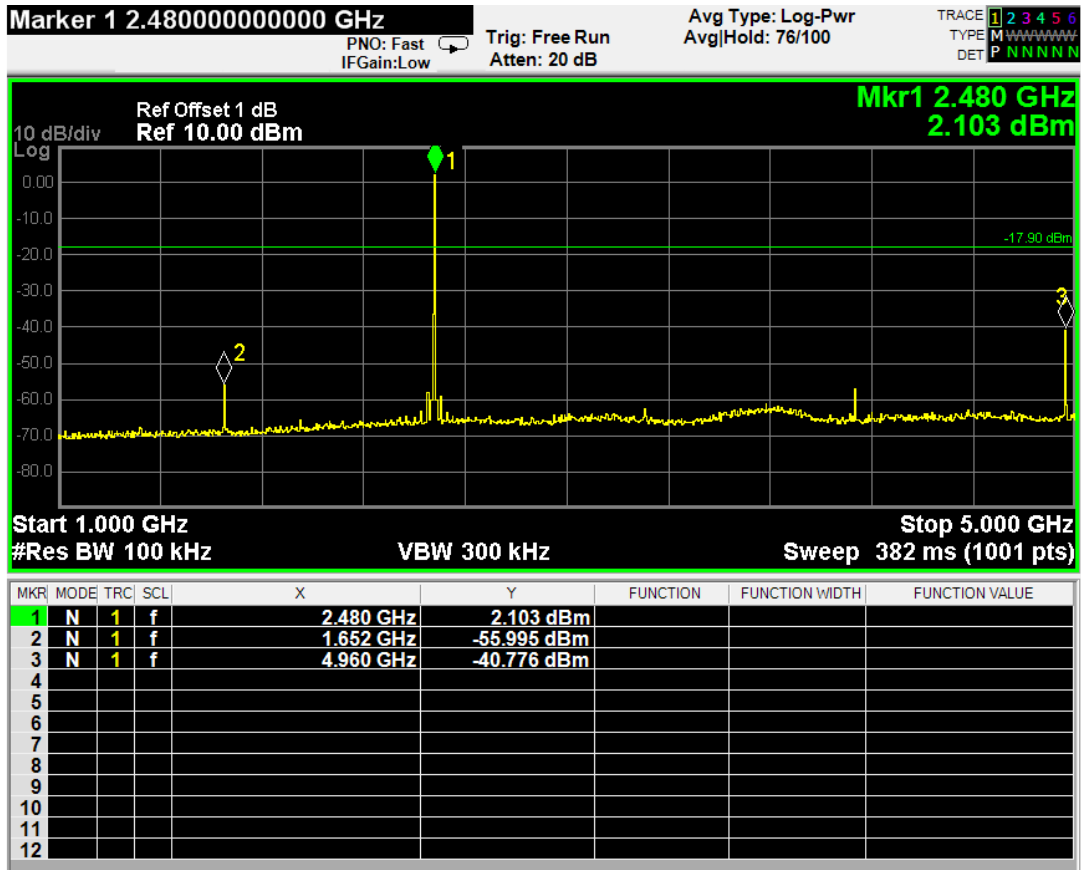
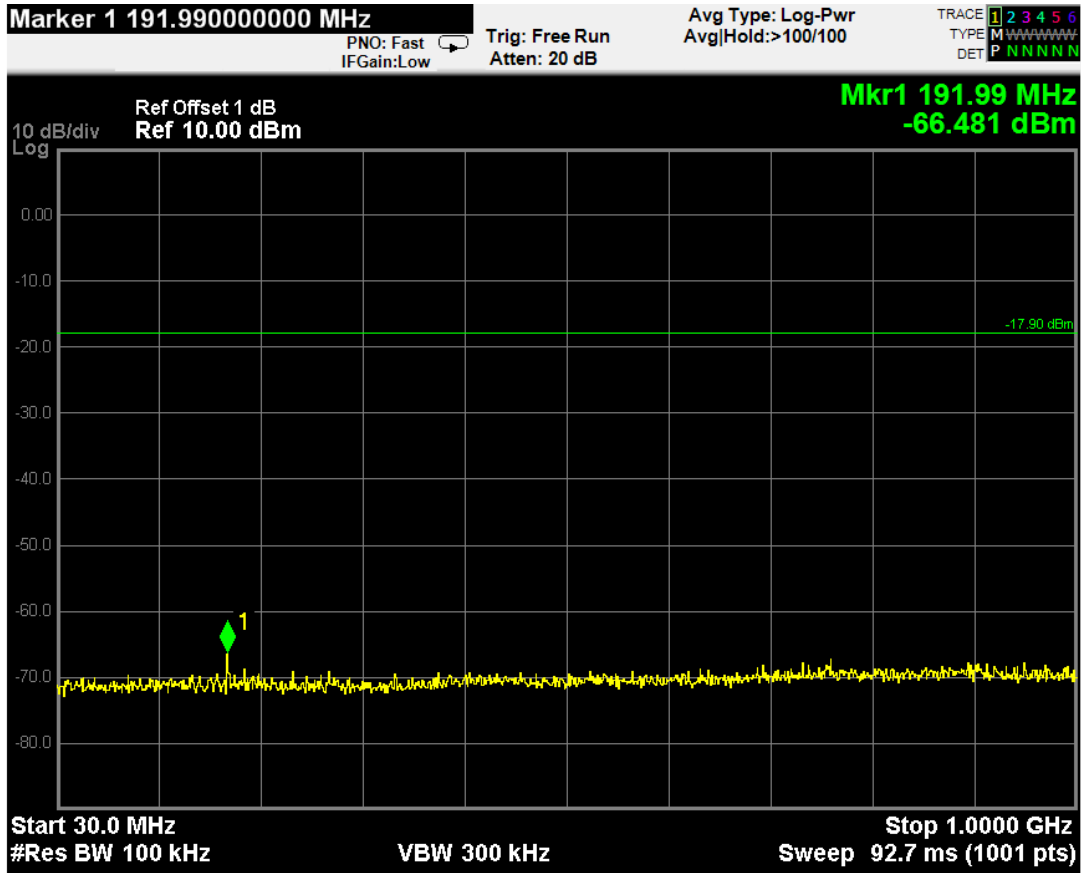


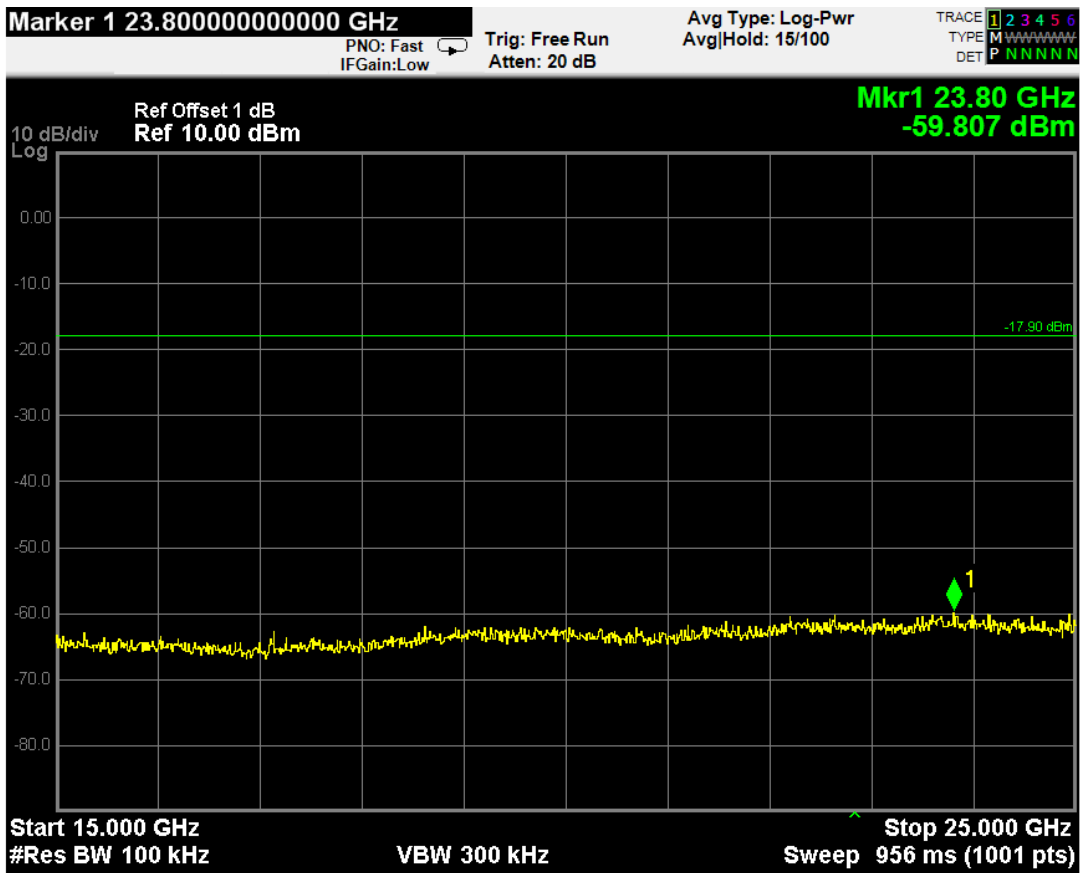
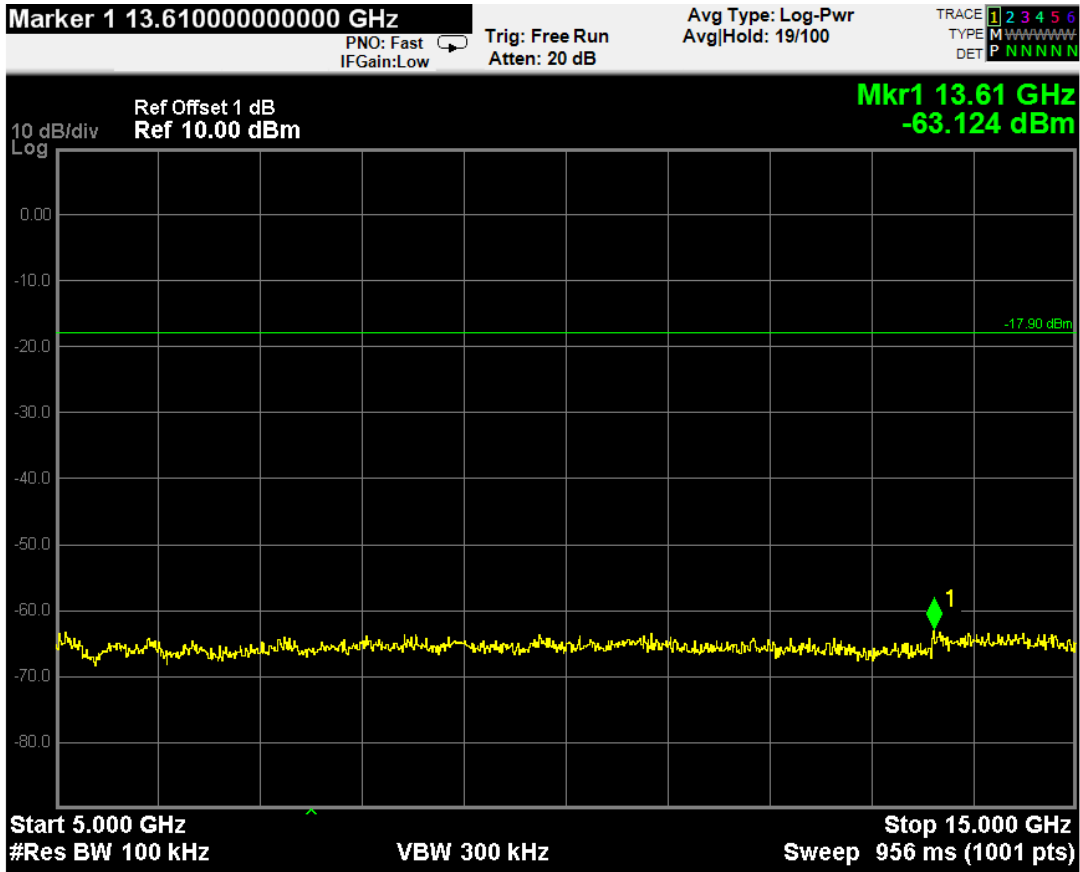
1M GFSK Ch 39 (2441 MHz)



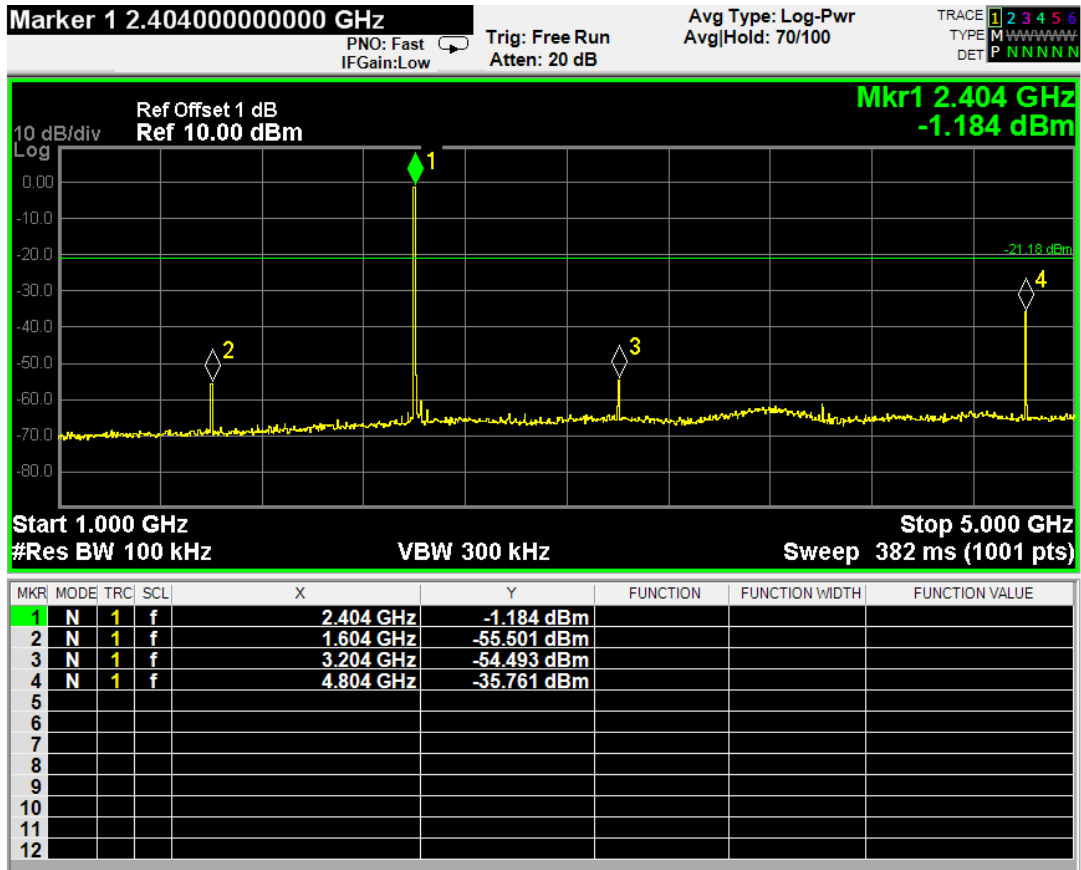
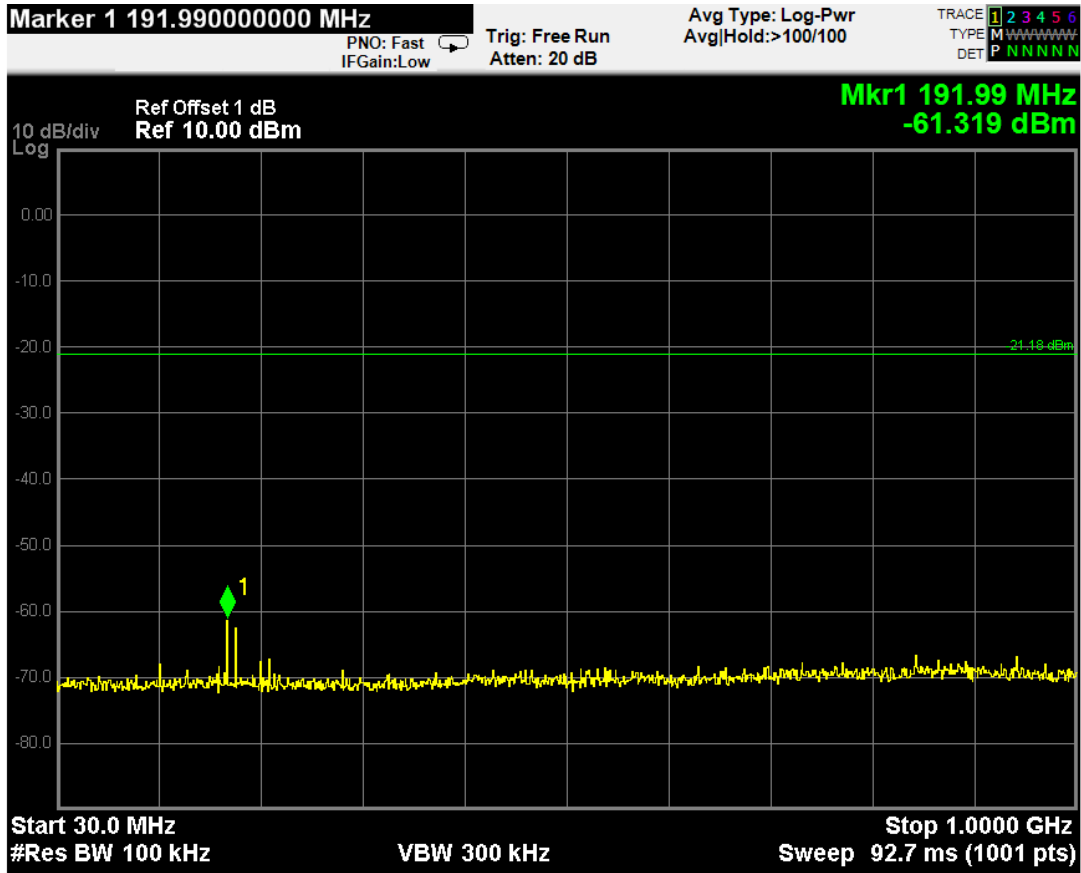


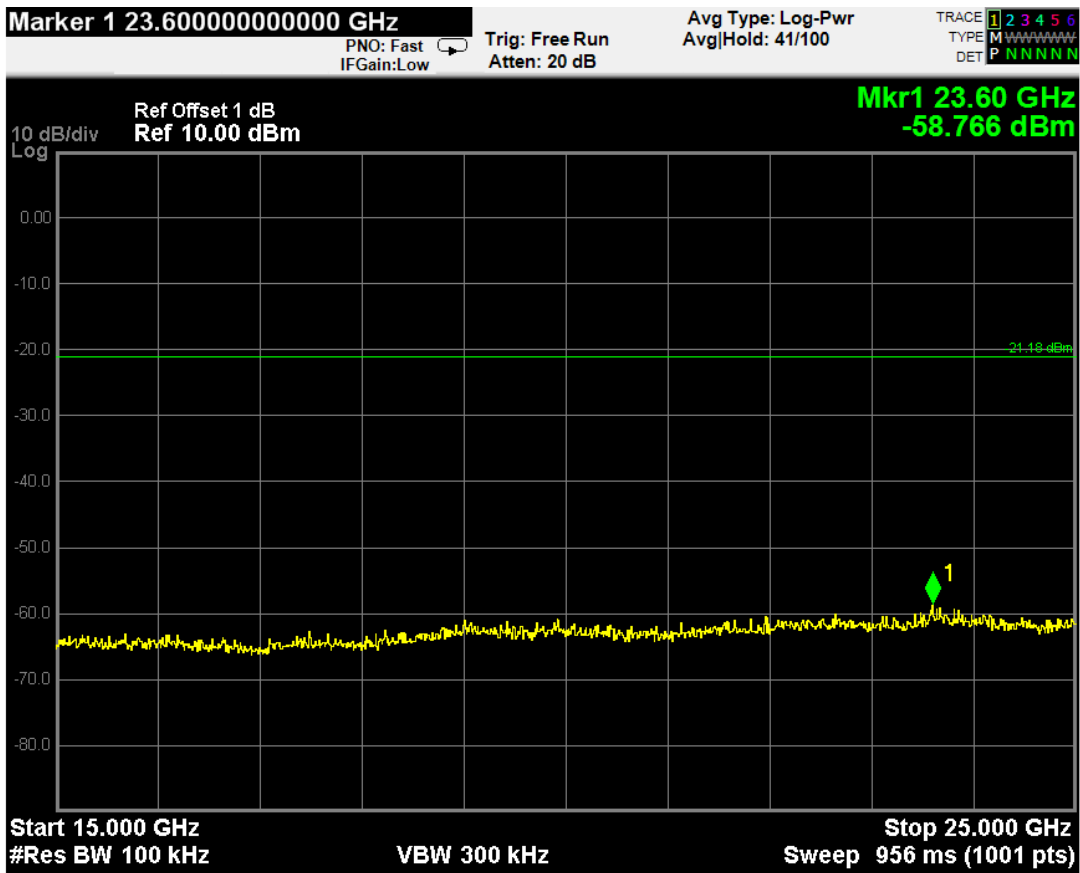
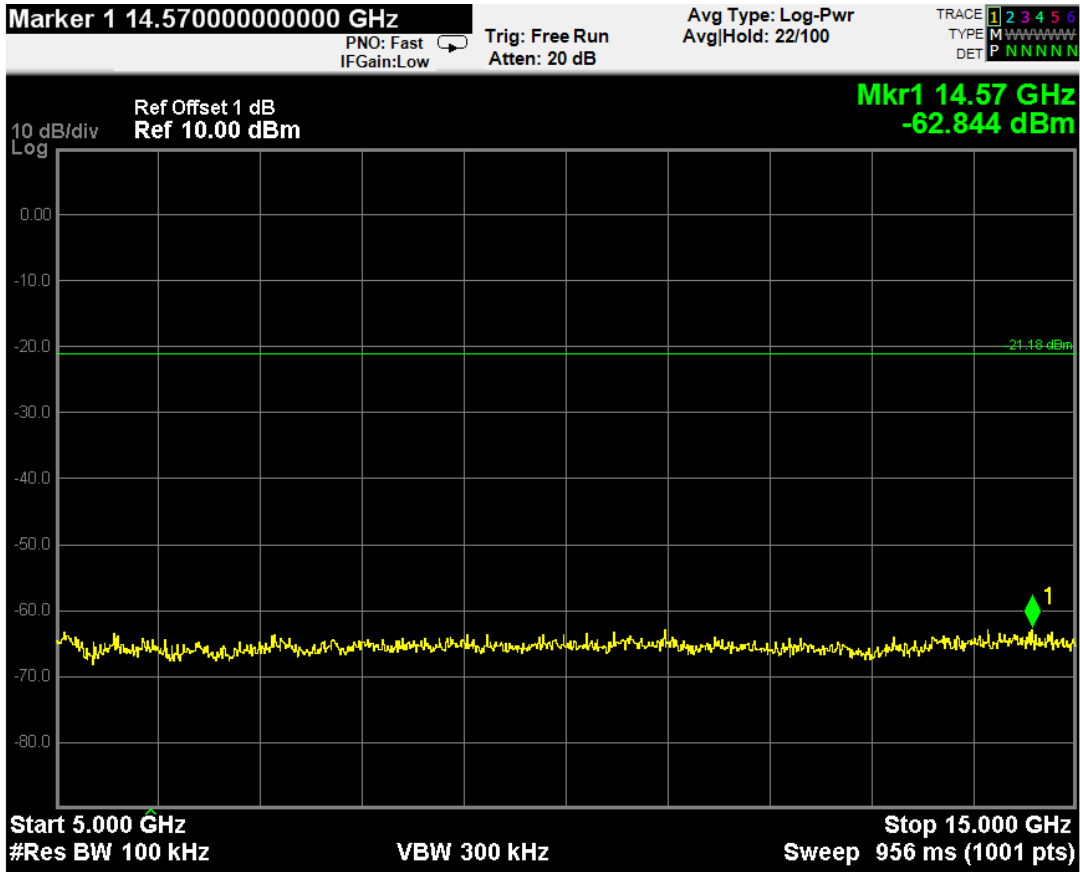
1M GFSK Ch 78 (2480 MHz)



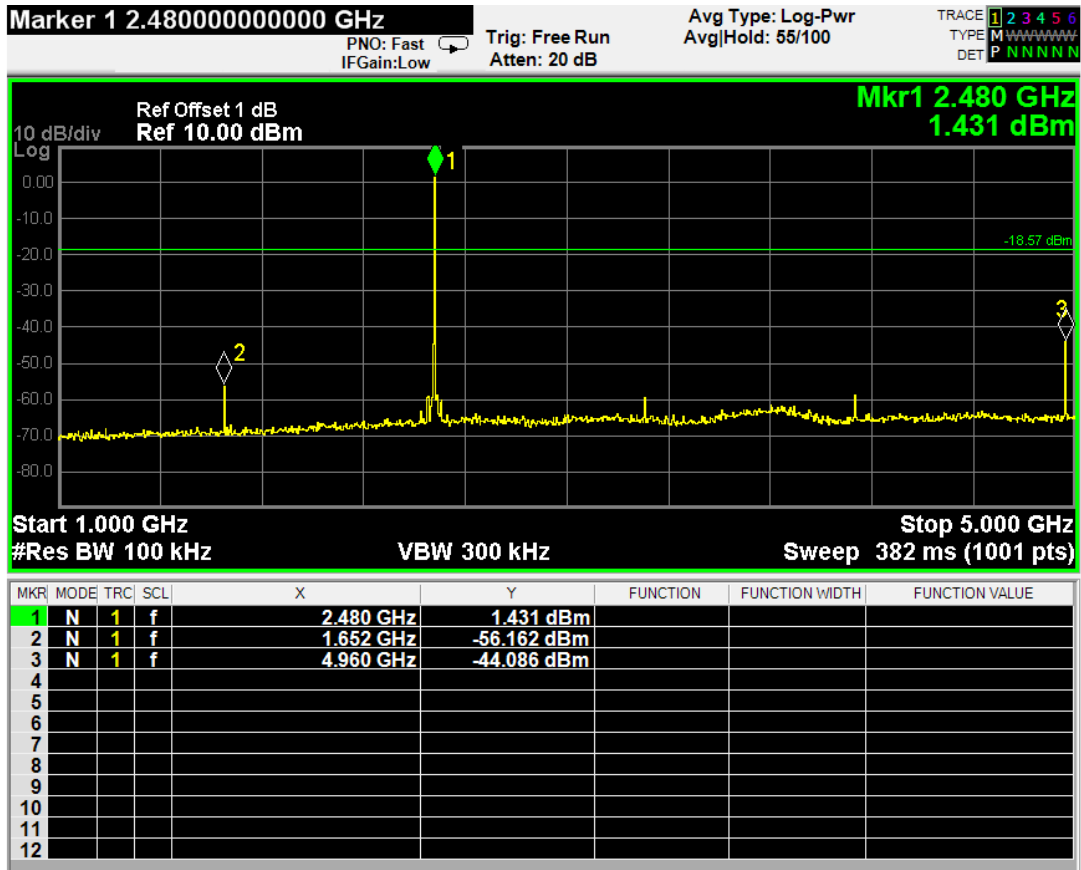
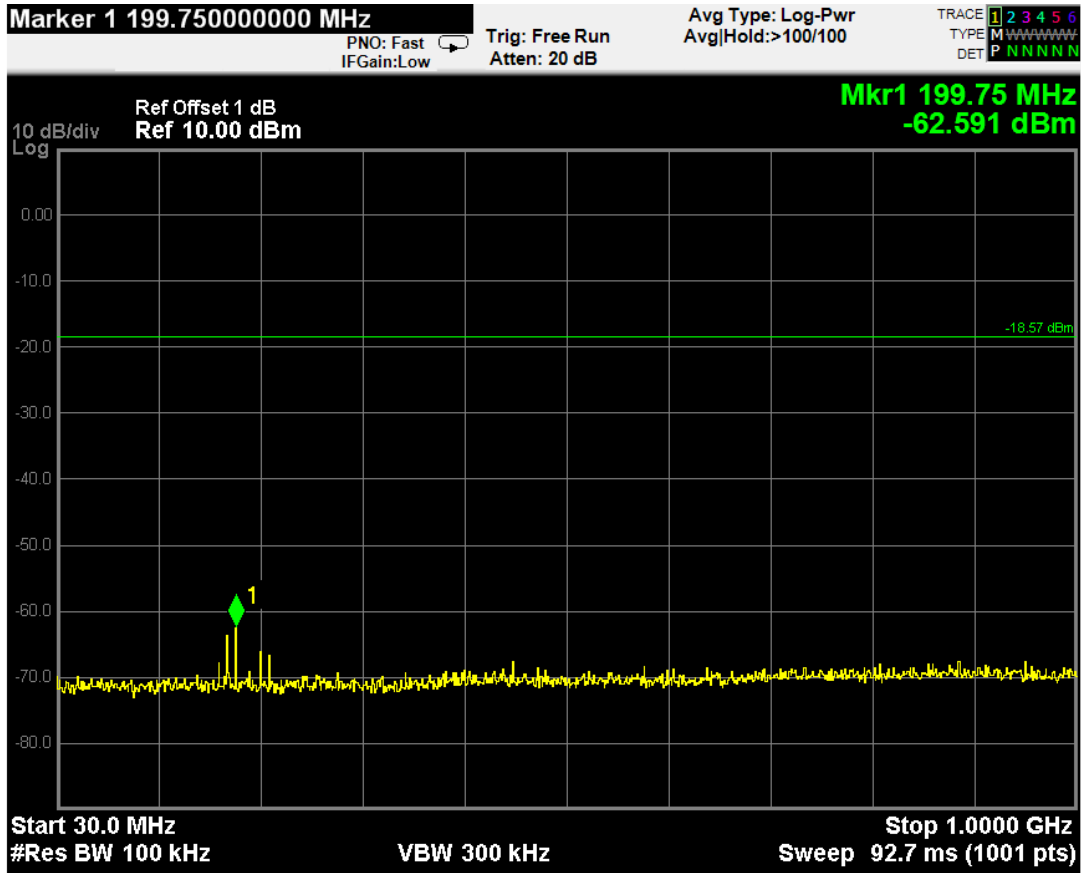


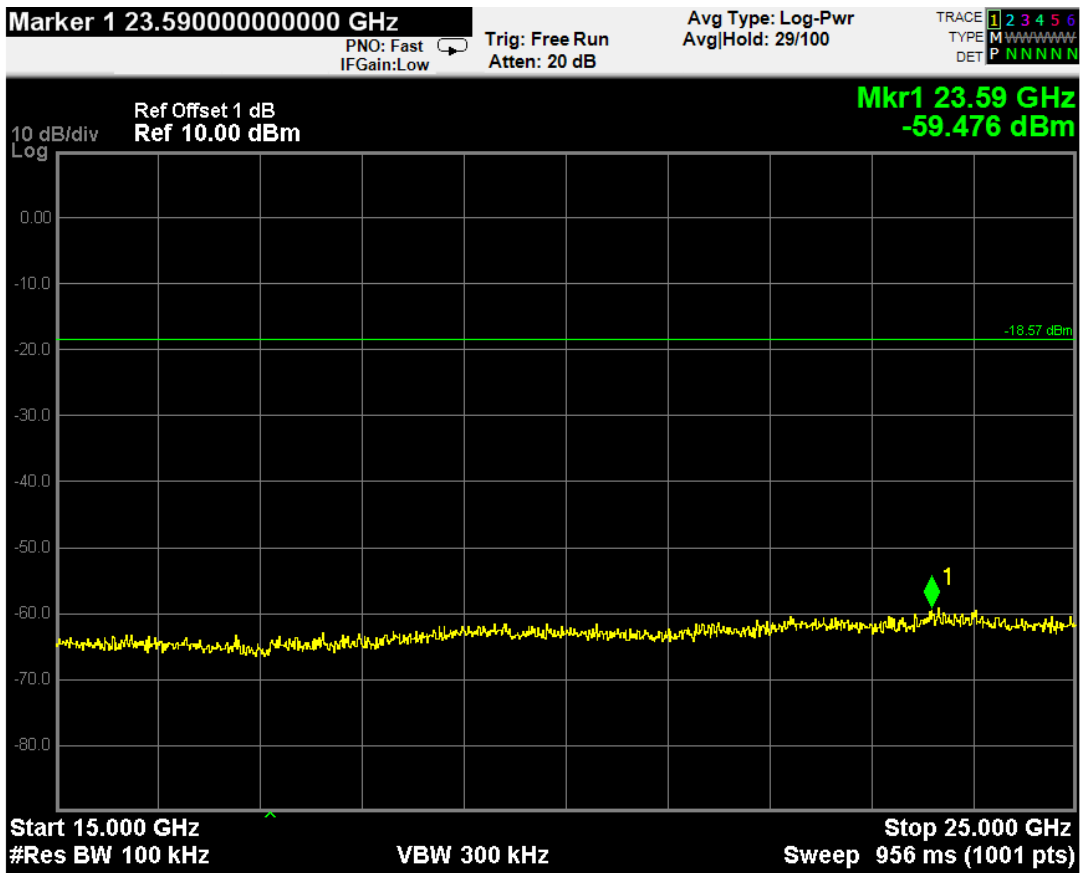
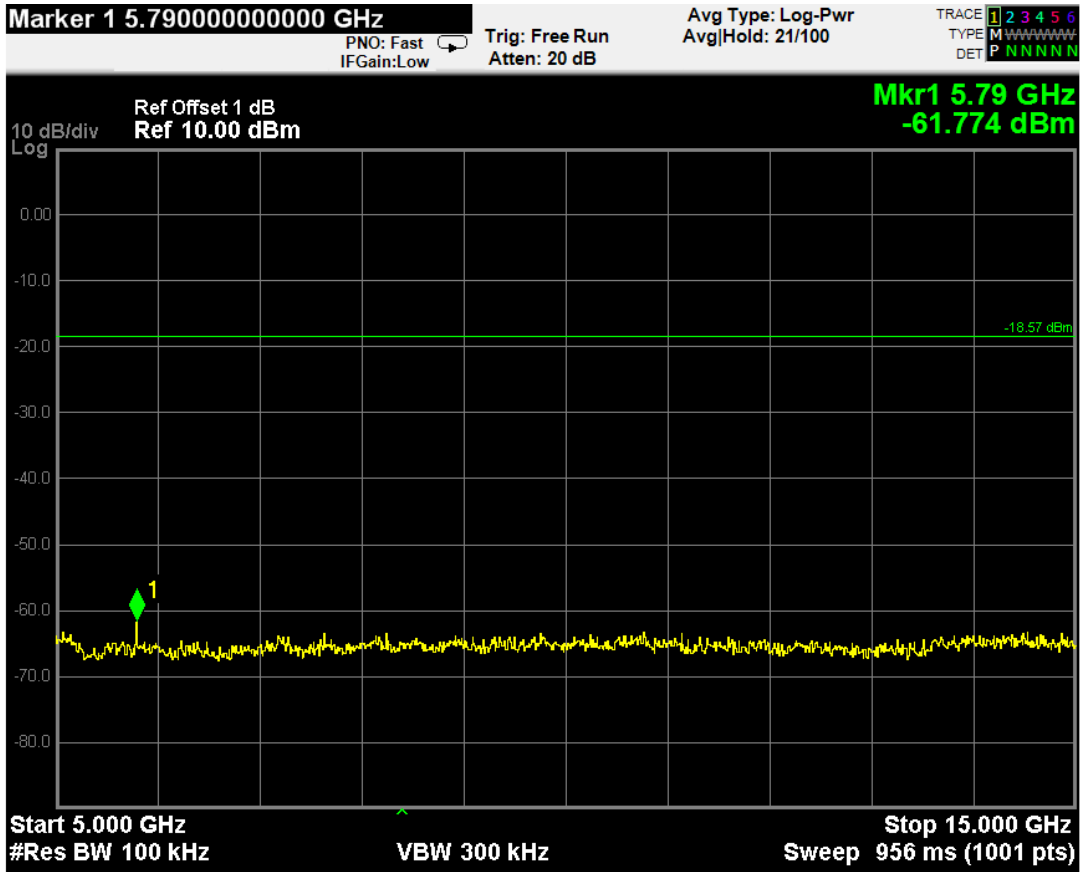
3M 8-DPSK Ch 00 (2402 MHz)





3M 8-DPSK Ch 78 (2480 MHz)





12 BAND-EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS MEASUREMENT

12.1 Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	Jun 12, 2015	Jun 11, 2016

12.2 Block Diagram of Test Setup

Same as section.5.2.

12.3 Specification Limits (IC RSS-247 Issue1 §5.5)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

12.4 Operating Condition of EUT

Enable the EUT to transmit data at different channel frequency individually.

12.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with span wide enough to fully capture the emission being measured.
The test procedure is defined in DA 00-705.

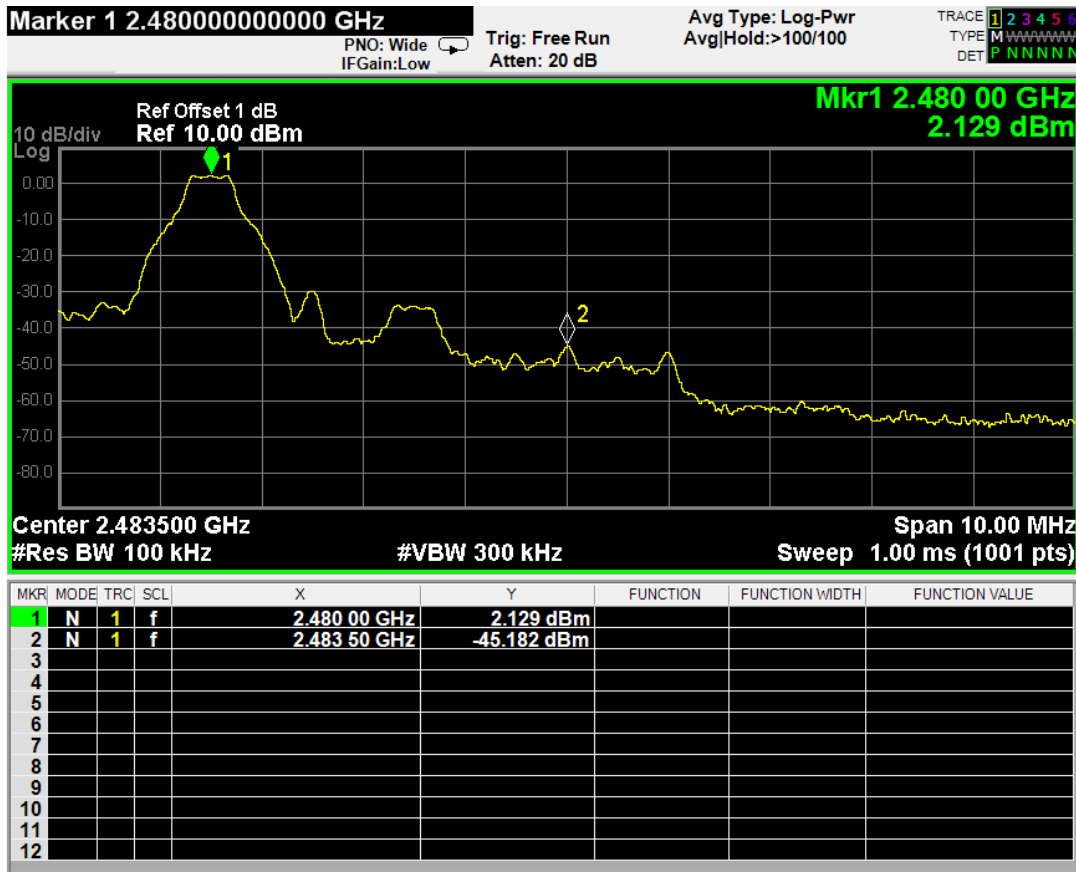
12.6 Test Results

PASSED. All the test results are attached in next pages.

(Test Date: Oct. 28, 2015 Temperature: 21°C Humidity: 42 %)

Modulation	Location	Channel	Frequency	Delta Marker (worst)	Data Page	Result
1M GFSK	Below Band Edge	00	2402 MHz	38.088 dB (non-hopping)	P47	More than 20 dB below the highest level of the desired power
				38.465 dB (hopping)		
	Upper Band Edge	78	2480 MHz	47.311 dB (non-hopping)	P48	
				50.584 dB (hopping)		
3M 8-DPSK	Below Band Edge	00	2402 MHz	40.820 dB (non-hopping)	P49	
				41.388 dB (hopping)		
	Upper Band Edge	78	2480 MHz	48.870 dB (non-hopping)	P50	
				49.010 dB (hopping)		

Ch78 2480MHz (Upper Edge 2483.5 MHz) 1M GFSK



Ch78 2480MHz (Upper Edge 2483.5 MHz) 1M GFSK HOPPING



Ch78 2480MHz (Upper Edge 2483.5 MHz) 3M 8-DPSK



Ch78 2480MHz (Upper Edge 2483.5 MHz) 3M 8-DPSK HOPPING



13 DEVIATION TO TEST SPECIFICATIONS

None.