FCC RADIO TEST REPORT

No. 180401196SHA-001

Applicant	:	Pass & Seymour, Inc., d/b/a Legrand 301 Fulling Mill Rd, Suite G, Middletown, PA 17057, USA
Manufacturer	:	Pass & Seymour, Inc., d/b/a Legrand 301 Fulling Mill Rd, Suite G, Middletown, PA 17057, USA
Factory	:	Hangzhou Samko Electronics Co. Ltd. No.8,Jiaqi Road,Xianlin Street,Yuhang District,Hangzhou, China.
Product Name	:	Wireless Zone Player
Type/Model	:	NV-P200
TEST RESULT	**:**	**PASS**

SUMMARY

The equipment complies with the requirements according to the following standard(s) or specification:

47CFR Part 15 (2017): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 2 (February 2017): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 5 (April 2018): General Requirements for Compliance of Radio Apparatus

Date of issue: June 29, 2018

Prepared by:

Nemo Li (Project engineer)

Reviewed by:

Daniel Zhao (Reviewer)

Contents

Revision History

180401196SHA-001	Rev. 01	Initial issue of report	June 29, 2018

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name	:	Wireless Zone Player
Type/Model	:	NV-P200
Description of EUT	:	EUT is a Wireless Zone Player with Bluetooth function, and has only one model.
Rating	:	100-240V~, 50/60Hz, 150W
Sample received date	:	April 13, 2018
Date of test	:	April 13, 2018 ~ June 28, 2018

1.2 RF Technical Information

Assigned Frequency Band	:	2400MHz to 2483.5MHz
Protocol	:	Bluetooth Base Rate + EDR
Operating Frequency	:	2402MHz to 2480MHz
Type of Modulation	:	GFSK, π/4-DQPSK, 8DPSK
Number of Channels	:	79
Channel Separation	:	1MHz
Antenna Type	:	PCB antenna
Antenna Gain	:	2.0dBi
FCC ID	:	YV8-NVP200ACN
IC	:	9922A-NVP200ACN

1.3 Description of Test Facility

Name	:	Intertek Testing Services Shanghai
Address	:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone	:	86 21 61278200
Telefax	:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations	:	CNAS Accreditation Lab Registration No. CNAS L0139 FCC Accredited Lab Designation Number: CN1175 IC Registration Lab Registration code No.: 2042B-1 VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252 NVLAP Accreditation Lab NVLAP LAB CODE: 200849-0 A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2017)
ANSI C63.10 (2013)
DA 00-705
RSS-247 Issue 2 (February 2017)
RSS-Gen Issue 5 (April 2018)

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the continuously transmission was applied by following software.

Blue Test3	CSR	-	Client

The lowest, middle and highest channel were tested as representatives.

2400-2483.5	GFSK	2402	2441	2480
	π/4-DQPSK	2402	2441	2480
	8DPSK	2402	2441	2480

The pre-test was conducted and the worst-case configuration was chosen to do the final test as listed below:

2400-2483.5	GFSK	BR-1Mbps	DH1, DH3, DH5	BR-1Mbps DH5
	π/4-DQPSK	EDR-2Mbps	2DH1, 2DH3, 2DH5	EDR-2Mbps 2DH5
	8DPSK	EDR-3Mbps	3DH1, 3DH3, 3DH5	EDR-3Mbps 3DH5

2.3 Test environment condition:

Temperature:	24-26°C
Humidity:	54-60% RH
Atmospheric Pressure:	101-102kPa

2.4 Test peripherals used

1	Laptop computer	HP	5480	-

2.5 Test software list:

Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.6 Instrument list

2.7 Measurement Uncertainty

Maximum conducted output power	0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	5.02dB
Emission outside the frequency band	2.89dB
Power line conducted emission	3.19dB

2.8 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Services Shanghai.

20 dB Bandwidth	15.247(a)(1)	RSS-247 Issue 2 Clause 5	Pass
Peak output power	15.247(b)(1)	RSS-247 Issue 2 Clause 5	Pass
Conducted Spurious Emissions & Band Edge	15.247(d)	RSS-247 Issue 2 Clause 5	Pass
Number of Hopping Frequencies	15.247(a)(1)(iii)	RSS-247 Issue 2 Clause 5	Pass
Carrier Frequency Separation	15.247(a)(1)	RSS-247 Issue 2 Clause 5	Pass
Dwell time	15.247(a)(1)(iii)	RSS-247 Issue 2 Clause 5	Pass
Radiated Spurious Emissions	15.205 & 15.209	RSS-247 Issue 2 Clause 5	Pass
Power line conducted emission	15.207	RSS-Gen Issue 4 Clause 8.8	Pass
Antenna requirement	15.203	-	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 6.6	Tested

Notes: 1: NA =Not Applicable

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3 20dB Bandwidth

Test result: Pass

3.1 Limit

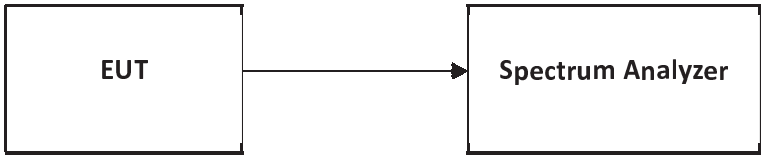
☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

☒ Frequency hopping systems operating in the 2400–2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

3.2 Measurement Procedure

The 20 bandwidth is measured using the Spectrum Analyzer with Span = 2 to 3 times the 20dB bandwidth, RBW ≥ 1% of the 20dB bandwidth, VBW ≥ RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

3.3 Test Configuration



3.4 Test Results of 20dB Bandwidth

Please refer to Appendix A

4 Peak Output Power

Test result: **Pass**

4.1 Limit

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

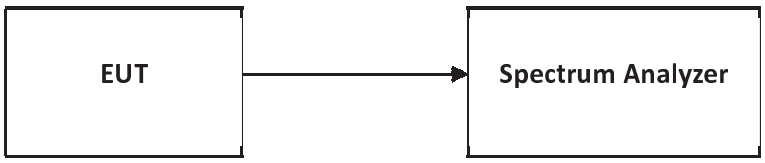
For all other frequency hopping systems in the 2400-2483.5MHz band: 0.125 watts

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Measurement Procedure

The Peak Power output is measured using the Spectrum Analyzer with Span = 5 times the 20dB bandwidth, RBW ⩾ the 20dB bandwidth, VBW ⩾ RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

4.3 Test Configuration



4.4 Test Results of Peak Output Power

Please refer to Appendix A

5 Conducted Spurious Emissions & Band Edge

Test result: **Pass**

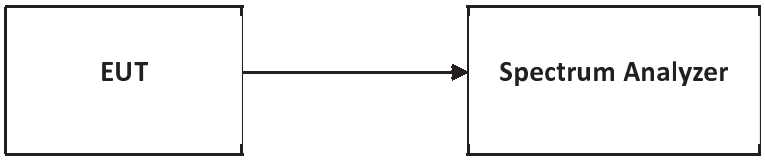
5.1 Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum 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 100kHz bandwidth within the band that contains the highest level of the desired power.

5.2 Measurement Procedure

The Conducted Spurious Emissions per FCC §15.247(d) is measured using the Spectrum Analyzer with Span wide enough capturing all spurious from the lowest emission frequency of the EUT up to 10th harmonics, RBW = 100kHz, VBW ≥ RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

5.3 Test Configuration



5.4 The results of Conducted Spurious Emissions & Band Edge

Please refer to Appendix A

6 Number of Hopping Frequencies

Test result: **Pass**

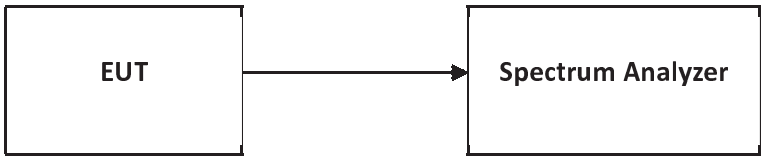
6.1 Limit

Number of Hopping Frequencies in the 2400-2483.5MHz band shall use at least 15 channels.

6.2 Measurement Procedure

The Number of Hopping Frequencies is measured using the Spectrum Analyzer with RBW = 100kHz, VBW ≥ RBW, Sweep = auto, Detector = peak, Trace = max hold.
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems).

6.3 Test Configuration



6.4 Test Results of Number of Hopping Frequencies

Please refer to Appendix A

7 Carrier Frequency Separation

Test result: Pass

7.1 Limit

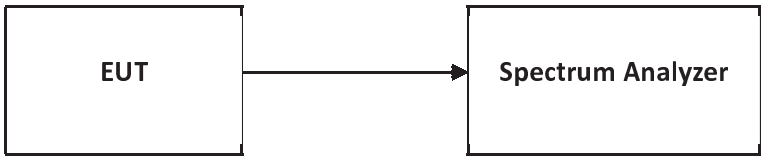
☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

☒ Frequency hopping systems operating in the 2400–2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

7.2 Measurement Procedure

The Carrier Frequency Separation is measured using the Spectrum Analyzer with Span can capture two adjacent channels, RBW ≥ 1% of the span, VBW≥RBW, Sweep = auto, Detector = peak, Trace = max hold.
The test was performed at 3 channels (lowest, middle and highest channel).
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems)

7.3 Test Configuration



7.4 Test Results of Carrier Frequency Separation

Please refer to Appendix A

8 Dwell Time

Test result: **Pass**

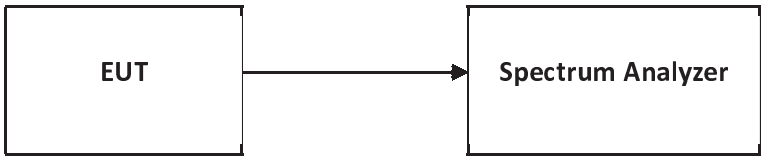
8.1 Limit

The dwell time on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.2 Measurement Procedure

Dwell time is measured using the Spectrum Analyzer with Span = 0, RBW = 1MHz, VBW ≥ RBW, Sweep can capture the entire dwell time, Detector = peak, Trace = max hold.
The EUT was tested according to DA 00-705 (Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems).

8.3 Test Configuration



8.4 Test Results of Dwell Time

Please refer to Appendix A

9 Radiated Spurious Emissions

Test result: **Pass**

9.1 Limit

The 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) showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

9.2 Measurement Procedure

For Radiated emission below 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) Both X and Y axes of the antenna are set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

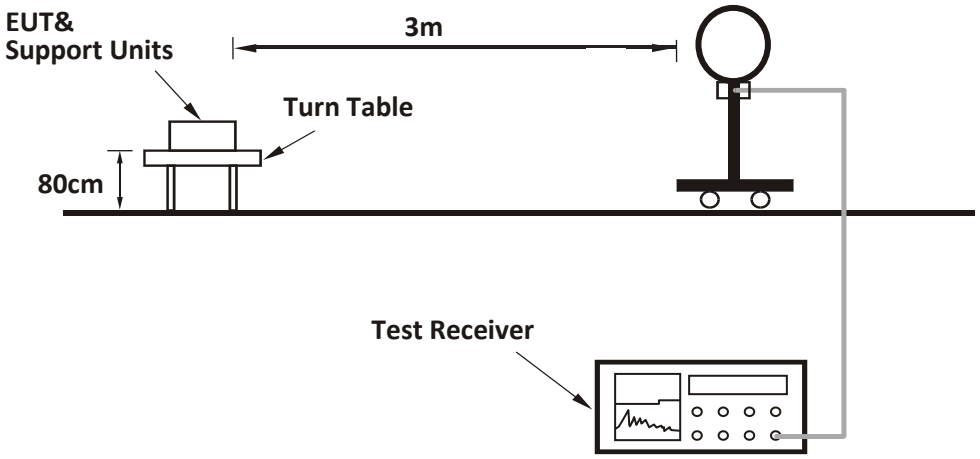
f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

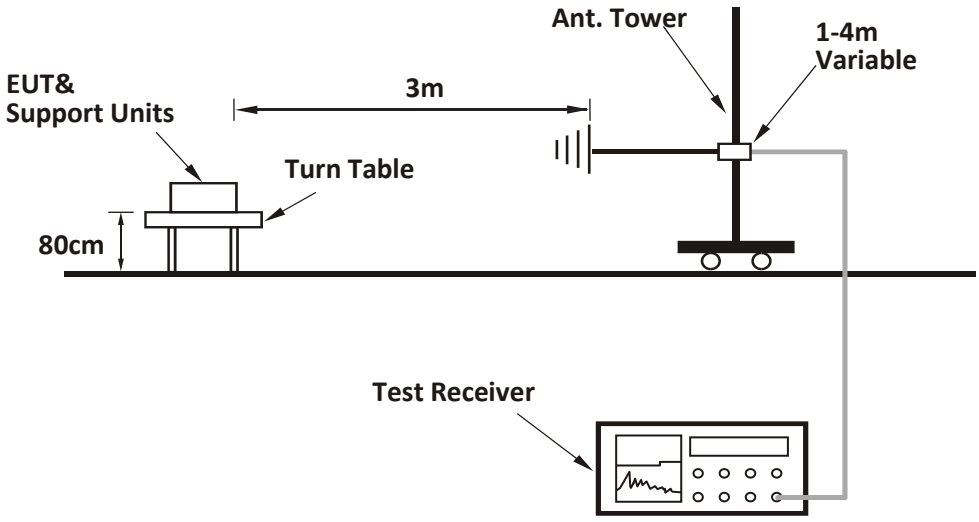
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 3 x RBW (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported

9.3 Test Configuration

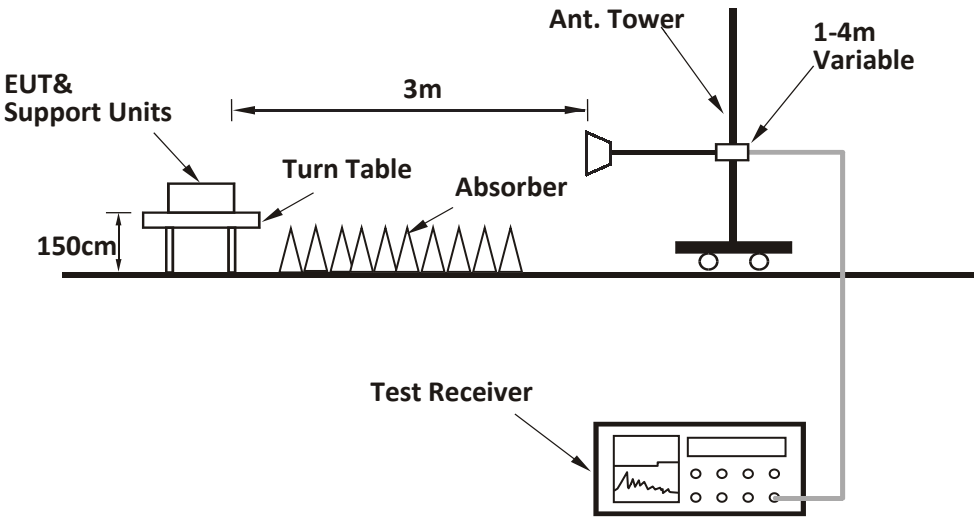
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:



9.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

EUT was tested with WiFi transmit on and off, and the worst data was listed in the report.

Test data below 1GHz

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	30.00	21.60	19.20	40.00	18.40	PK
H	43.61	16.10	11.60	40.00	23.90	PK
H	78.60	19.50	7.70	40.00	20.50	PK
H	105.81	20.90	12.40	40.00	19.10	PK
H	168.02	30.30	10.80	40.00	9.70	PK
H	216.61	25.80	10.70	40.00	14.20	PK
H	286.59	34.20	14.40	47.00	12.80	PK
H	393.51	30.00	17.10	47.00	17.00	PK
H	566.51	34.00	20.10	47.00	13.00	PK
H	840.60	33.60	22.60	47.00	13.40	PK
V	33.89	24.30	16.80	40.00	15.70	PK
V	49.44	22.40	9.00	40.00	17.60	PK
V	74.71	27.20	7.50	40.00	12.80	PK
V	101.92	29.00	12.10	40.00	11.00	PK
V	168.02	29.60	10.80	40.00	10.40	PK
V	175.79	26.90	10.50	40.00	13.10	PK
V	286.59	29.20	14.40	47.00	17.80	PK
V	455.71	27.80	18.40	47.00	19.20	PK
V	562.63	31.80	20.10	47.00	15.20	PK
V	984.45	33.20	23.80	47.00	13.80	PK

Test result above 1GHz:
The emission was conducted from 1GHz to 25GHz

GFSK

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2402	97.70	34.10	Fundamental	/	PK
	H	2390.00	50.70	34.20	74.00	23.39	PK
	V	4808.00	53.50	-3.60	74.00	20.50	PK
M	H	2441	97.30	34.20	Fundamental	/	PK
	V	4882.00	53.40	-3.60	74.00	20.60	PK
H	H	2480	97.40	34.40	Fundamental	/	PK
	H	2483.50	51.50	34.80	74.00	22.50	PK
	V	4960.00	50.30	-3.60	74.00	23.70	PK

π/4-DQPSK

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2402	96.80	34.10	Fundamental	/	PK
	H	2390.00	50.50	34.20	74.00	23.50	PK
	V	4808.00	49.30	-3.60	74.00	24.70	PK
M	H	2441	96.30	34.20	Fundamental	/	PK
	V	4882.00	52.00	-3.60	74.00	22.00	PK
H	H	2480	96.10	34.40	Fundamental	/	PK
	H	2483.50	51.00	34.80	74.00	23.00	PK
	V	4961.00	50.70	-3.60	74.00	23.30	PK

8DPSK

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2402	97.20	34.10	Fundamental	/	PK

	H	2390.00	50.20	34.20	74.00	23.80	PK
	V	4808.00	48.60	-3.60	74.00	25.40	PK
M	H	2441	97.40	34.20	Fundamental	/	PK
	V	4882.00	51.50	-3.60	74.00	22.50	PK
H	H	2480	96.10	34.40	Fundamental	/	PK
	H	2483.50	51.40	34.80	74.00	22.60	PK
	V	4961.00	50.80	-3.60	74.00	23.20	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

10 Power line conducted emission

Test result: **Pass**

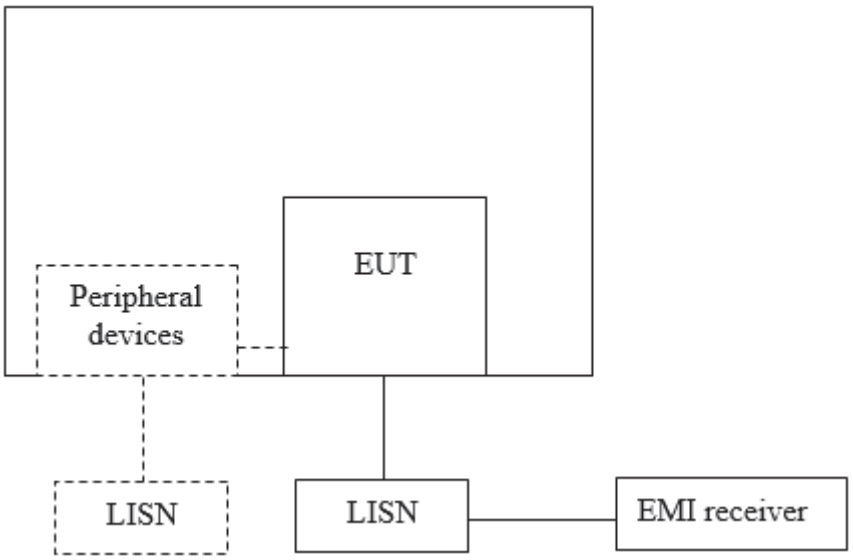
10.1 Measurement Procedure

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

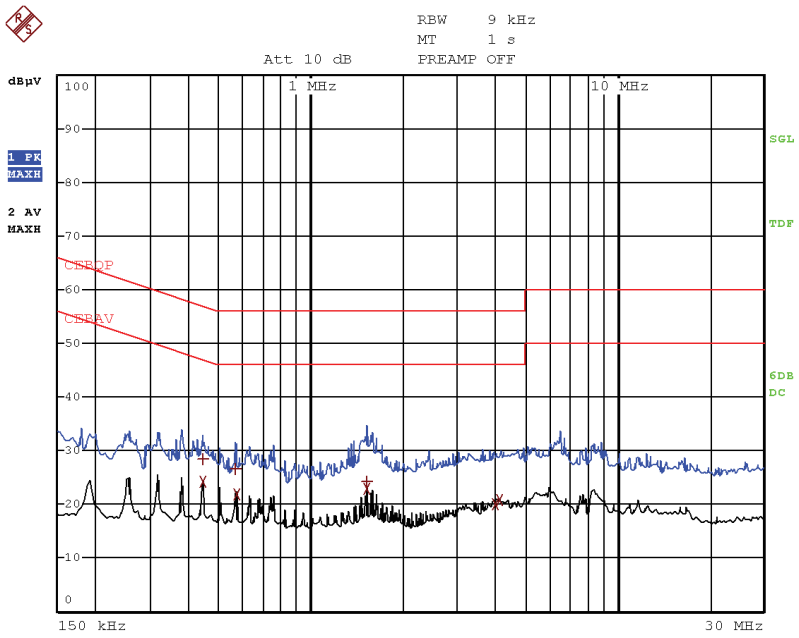
10.2 Test Configuration



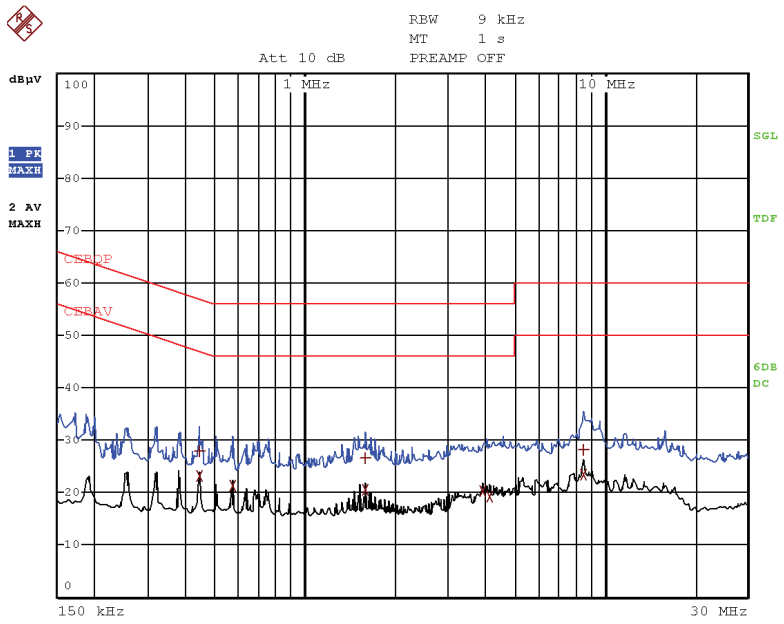
10.3 Test Results of Power line conducted emission

Test Curve:

L line:



N line:



Test Data:

Frequency (MHz)	Quasi-peak			Average			Line
	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	Corrected Reading (dBuV)	Limit (dBuV)	Margin (dB)	
0.44	28.57	57.01	28.44	24.19	47.02	22.83	L
0.57	26.63	55.99	29.36	21.95	45.99	24.04	L
1.53	24.39	55.99	31.60	22.97	45.99	23.02	L
3.99	-	-	-	19.99	45.99	26.00	L
4.11	-	-	-	20.83	45.99	25.16	L
0.44	27.85	57.01	29.16	23.21	47.01	23.80	N
0.57	-	-	-	21.50	45.99	24.49	N
1.59	26.52	55.99	29.47	20.67	45.99	25.32	N
4.12	-	-	-	19.22	45.99	26.77	N
8.49	28.22	59.99	31.77	23.60	49.99	26.39	N
Note: * means the emission level 20dB below the relevant limit.							

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
Then Correct Factor = 10.00 + 2.00 = 12.00dB;
Corrected Reading = 10dBuV + 12.00dB = 22.00dBuV;
Margin = 66.00dBuV – 22.00dBuV = 44.00dB.

11 Antenna requirement

Requirement:
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Result:
EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

12 Occupied Bandwidth

Test result: **Pass**

12.1 Limit

None

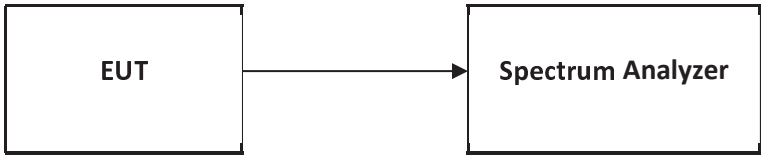
12.2 Measurement Procedure

The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

12.3 Test Configuration



12.4 The results of Occupied Bandwidth

Please refer to Appendix A

Appendix A: Test results

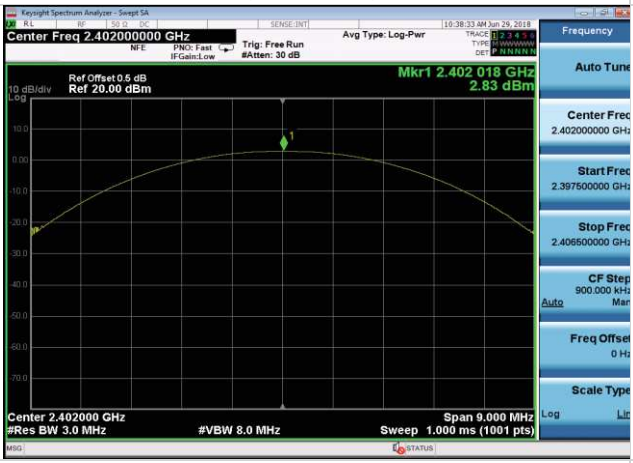
1. Peak Output Power

1.1 Test Data

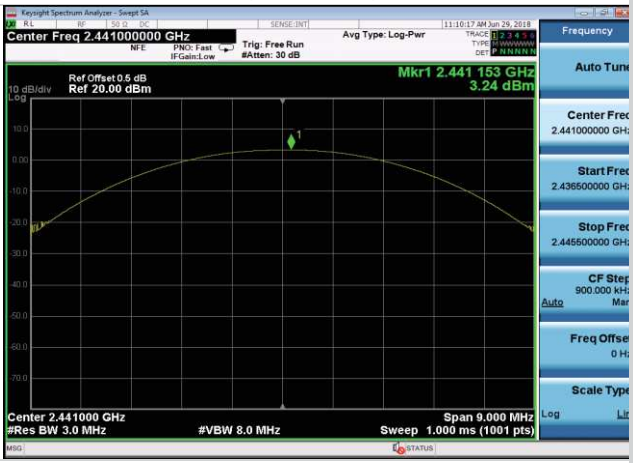
BT Maximum Output Power				
GFSK	2402	DH5	2.83	Pass
GFSK	2441	DH5	3.24	Pass
GFSK	2480	DH5	3.67	Pass
DQPSK	2402	2DH5	1.95	Pass
DQPSK	2441	2DH5	2.96	Pass
DQPSK	2480	2DH5	2.50	Pass
8DPSK	2402	3DH5	2.16	Pass
8DPSK	2441	3DH5	3.14	Pass
8DPSK	2480	3DH5	2.84	Pass

1.2 Test Plots

GFSK,2402MHz,DH5

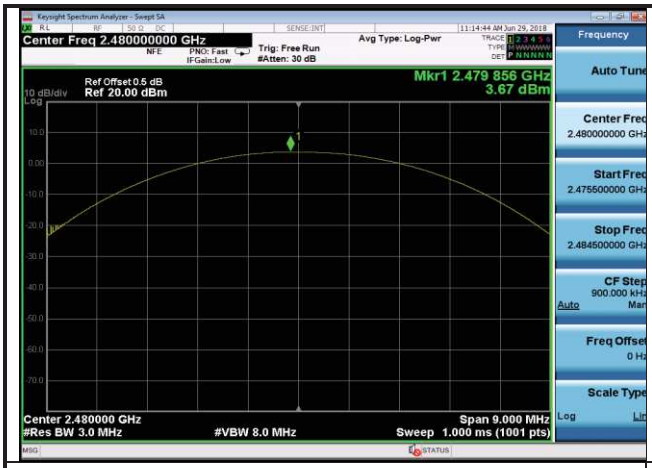


GFSK,2441MHz,DH5

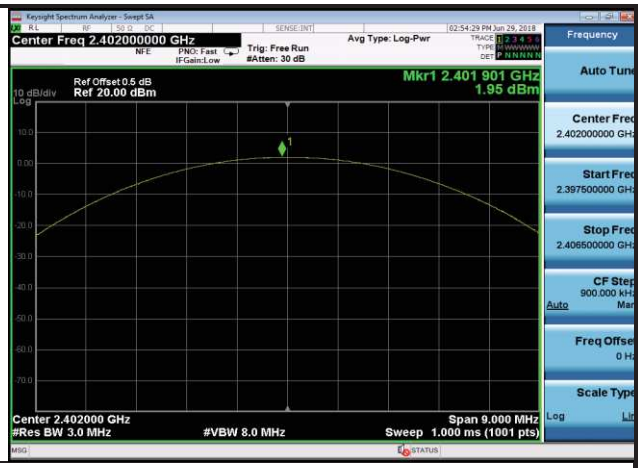


GFSK,2480MHz,DH5

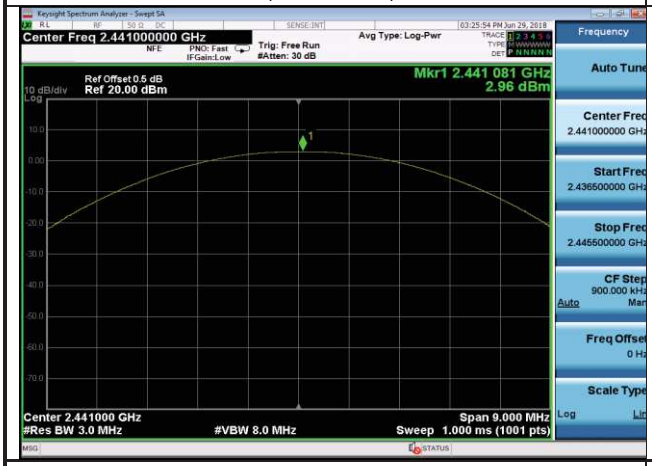
DQPSK,2402MHz,2DH5



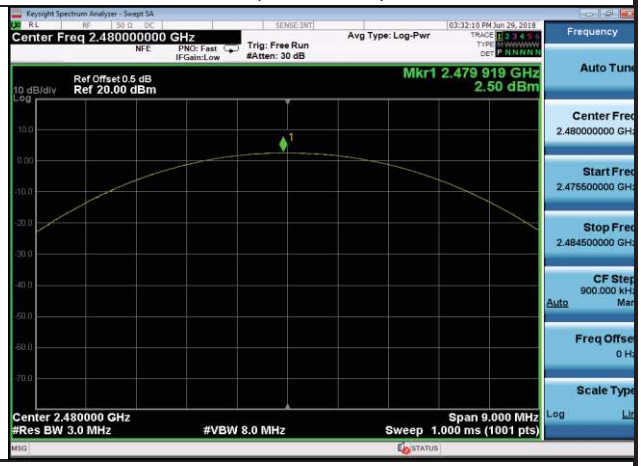
DQPSK,2441MHz,2DH5



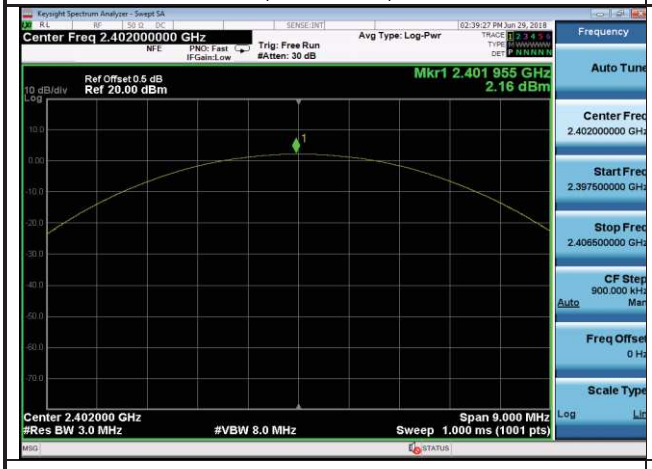
DQPSK,2480MHz,2DH5



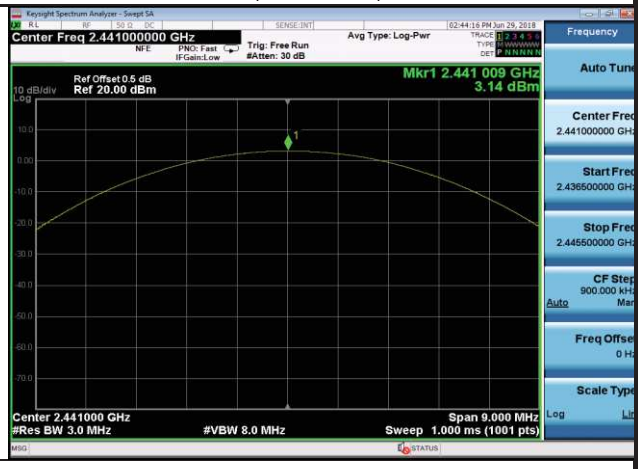
8DPSK,2402MHz,3DH5

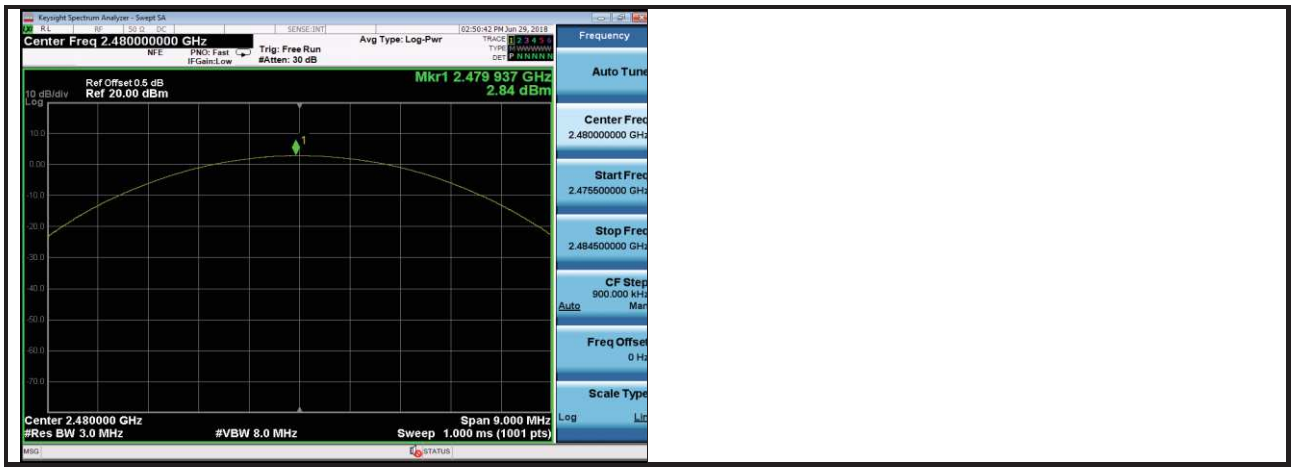


8DPSK,2441MHz,3DH5



8DPSK,2480MHz,3DH5




Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
NFE
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
02:50:42 PM Jun 29, 2018
Frequency
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.479 937 GHz
2.84 dBm
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.475500000 GHz
Stop Freq
2.484500000 GHz
CF Step
900.000 kHz
Auto
Freq Offset
0 Hz
Scale Type
Log
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 8.0 MHz
Span 9.000 MHz
Sweep 1.000 ms (1001 pts)

2. 20dB Bandwidth

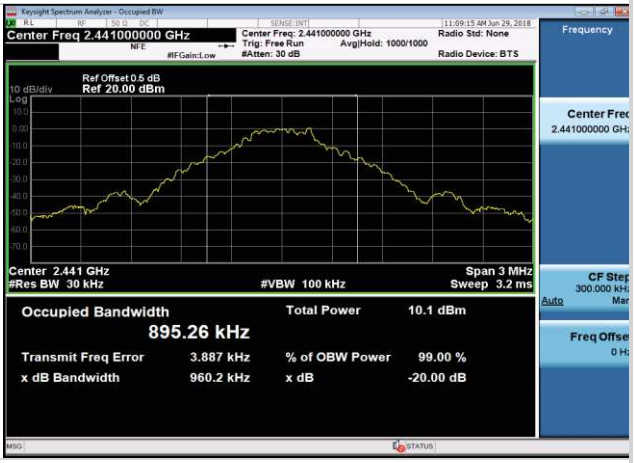
2.1 Test Data

BT Occupied 20dB Bandwidth				
GFSK	2402	DH5	823.6	Pass
GFSK	2441	DH5	960.2	Pass
GFSK	2480	DH5	959.6	Pass
DQPSK	2402	2DH5	1285.6	Pass
DQPSK	2441	2DH5	1298.5	Pass
DQPSK	2480	2DH5	1293.3	Pass
8DPSK	2402	3DH5	1281.6	Pass
8DPSK	2441	3DH5	1292.8	Pass
8DPSK	2480	3DH5	1284.3	Pass

2.2 Test Plots

GFSK,2402MHz,DH5

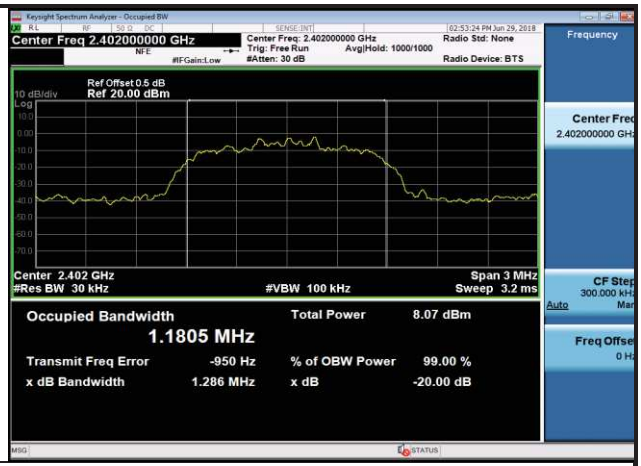
GFSK,2441MHz,DH5



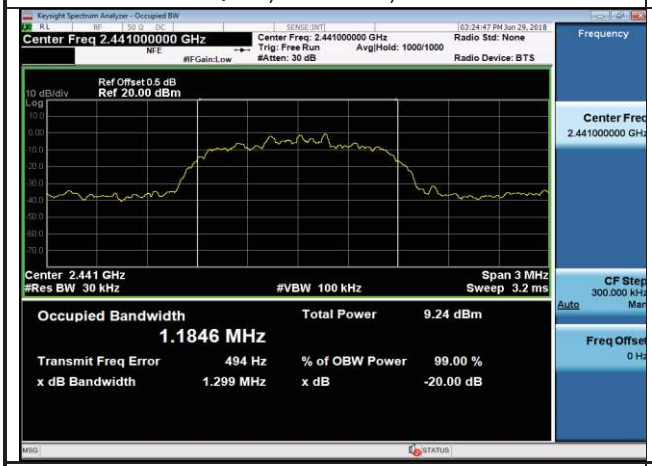
GFSK,2480MHz,DH5

DQPSK,2402MHz,2DH5

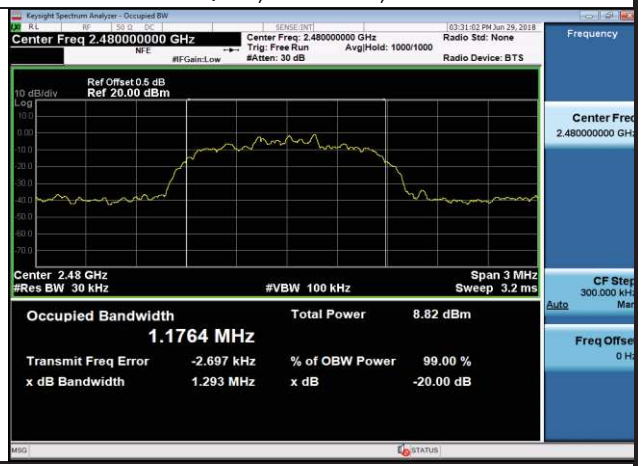
DQPSK,2441MHz,2DH5



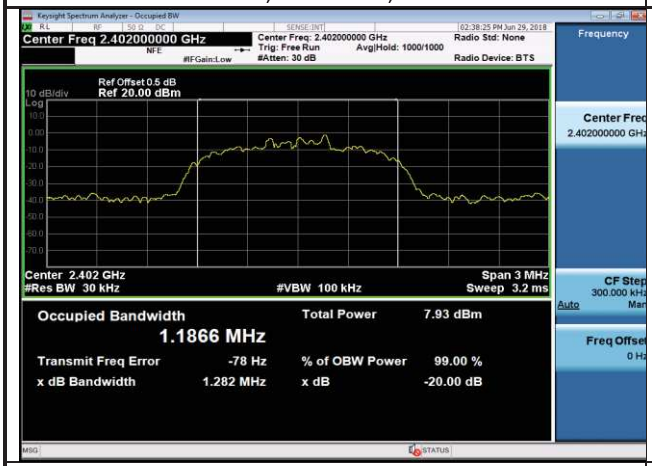
DQPSK,2480MHz,2DH5



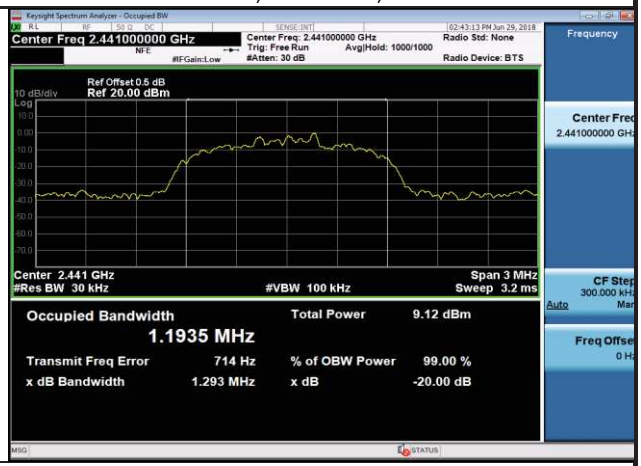
8DPSK,2402MHz,3DH5

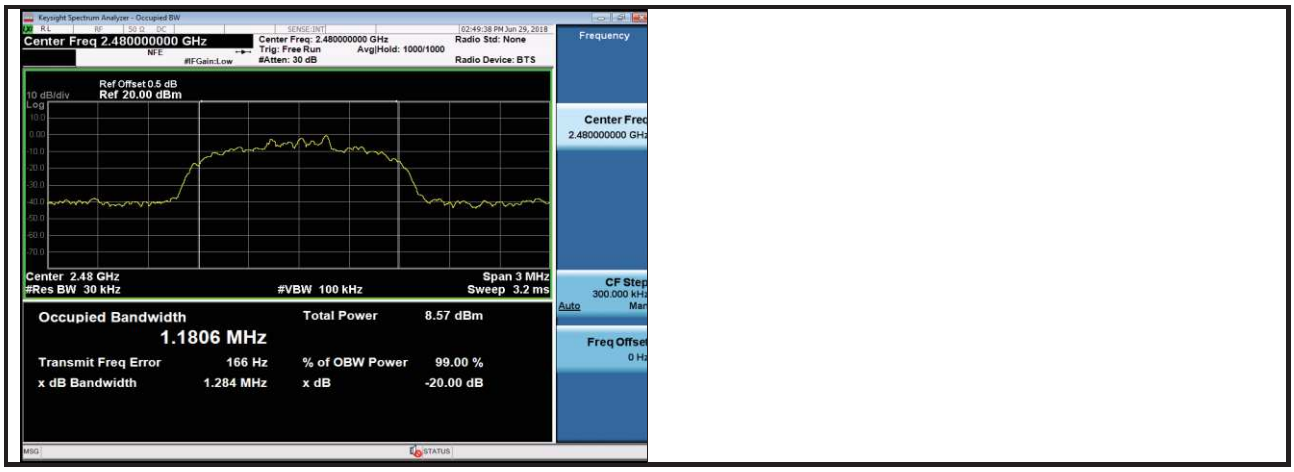


8DPSK,2441MHz,3DH5



8DPSK,2480MHz,3DH5




Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 1000/1000
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Freq Offset
0 Hz
Occupied Bandwidth
1.1806 MHz
Total Power 8.57 dBm
Transmit Freq Error 166 Hz
% of OBW Power 99.00 %
x dB Bandwidth 1.284 MHz
x dB -20.00 dB
MSG
STATUS

3. Occupied Bandwidth

3.1 Test Data

BT 99% Occupied Bandwidth				
GFSK	2402	DH5	838.54	Pass
GFSK	2441	DH5	893.17	Pass
GFSK	2480	DH5	891.67	Pass
DQPSK	2402	2DH5	1181.03	Pass
DQPSK	2441	2DH5	1184.57	Pass
DQPSK	2480	2DH5	1171.98	Pass
8DPSK	2402	3DH5	1185.49	Pass
8DPSK	2441	3DH5	1194.44	Pass
8DPSK	2480	3DH5	1180.96	Pass

3.2 Test Plots

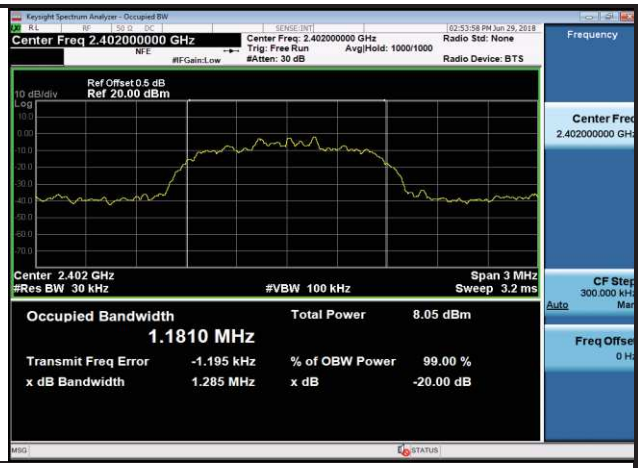
GFSK,2402MHz,DH5

GFSK,2441MHz,DH5

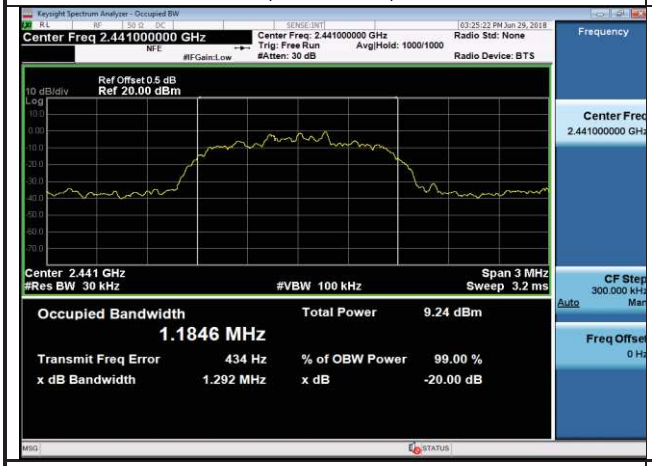
GFSK,2480MHz,DH5

DQPSK,2402MHz,2DH5

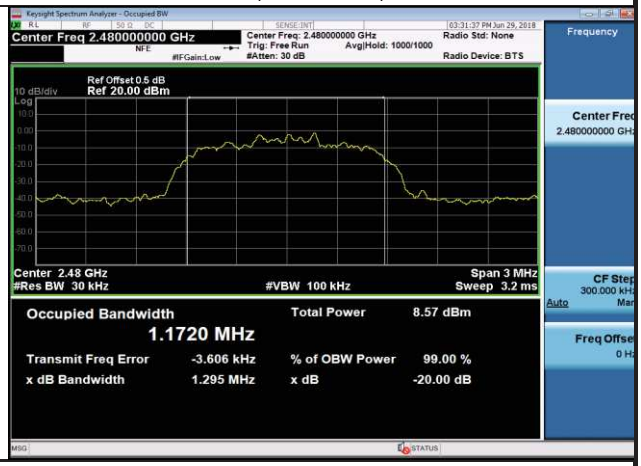
DQPSK,2441MHz,2DH5



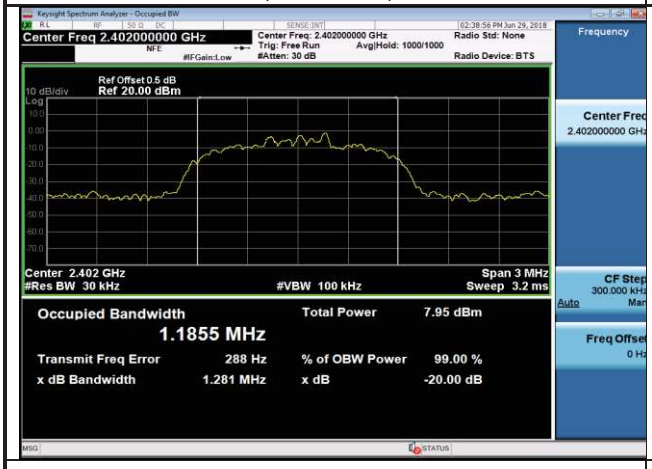
DQPSK,2480MHz,2DH5



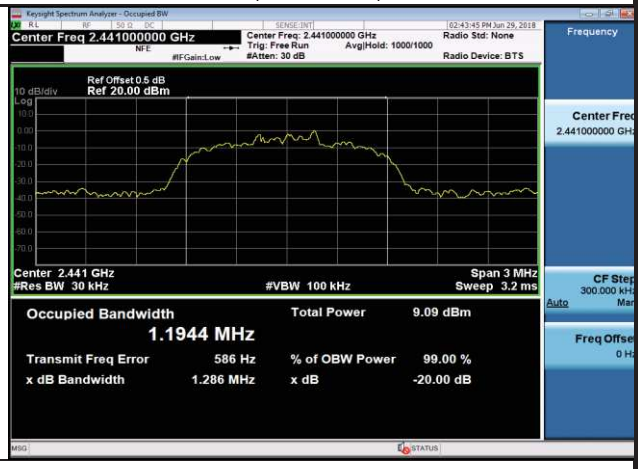
8DPSK,2402MHz,3DH5

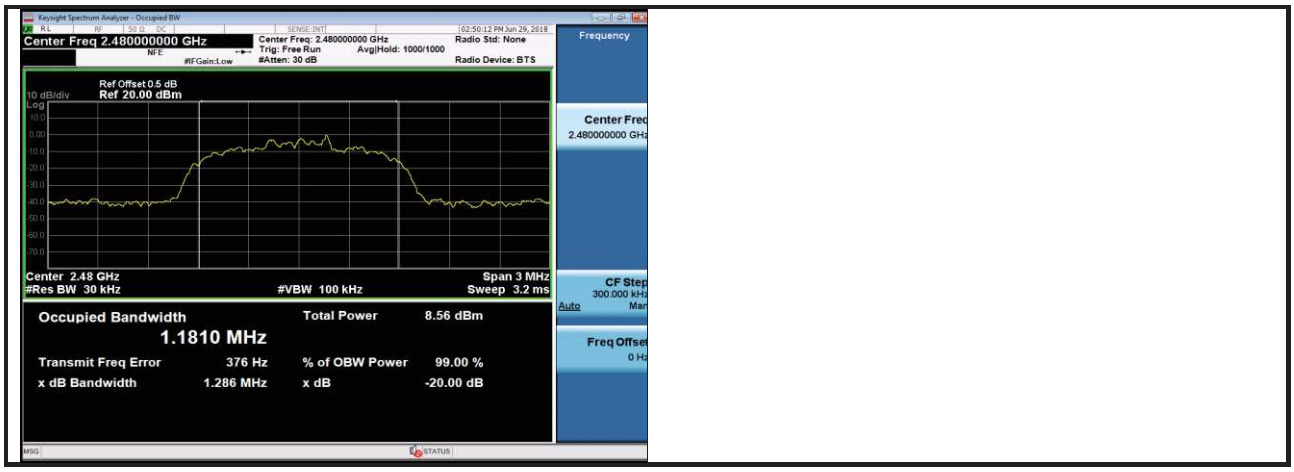


8DPSK,2441MHz,3DH5



8DPSK,2480MHz,3DH5




Keysight Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 1000/1000
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Log
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
CF Step
300.000 kHz
Auto
Freq Offset
0 Hz
Occupied Bandwidth
1.1810 MHz
Total Power 8.56 dBm
Transmit Freq Error 376 Hz
% of OBW Power 99.00 %
x dB Bandwidth 1.286 MHz
x dB -20.00 dB
MSG
STATUS

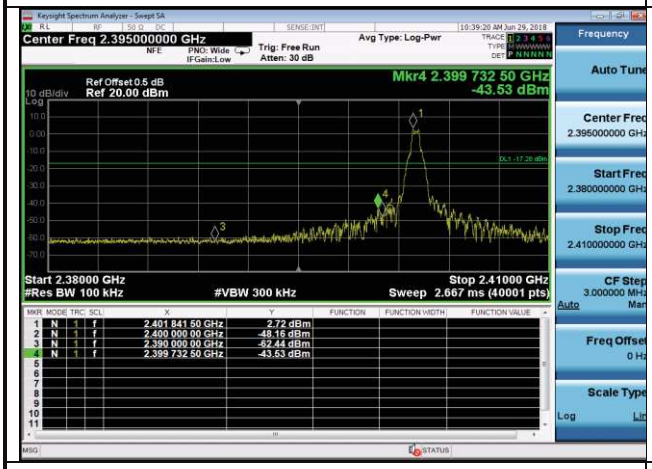
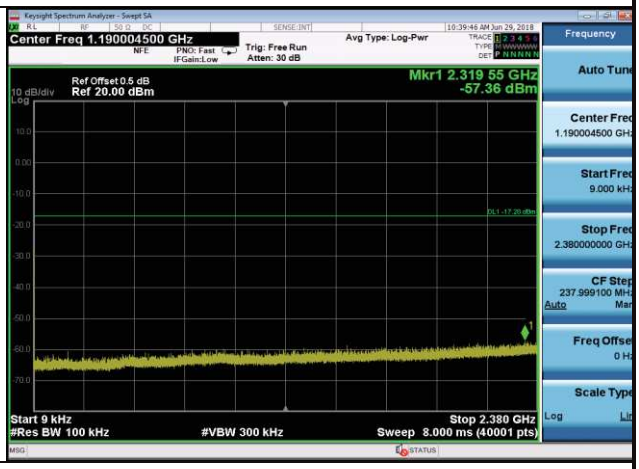
4. Conducted Spurious Emissions & Band Edge

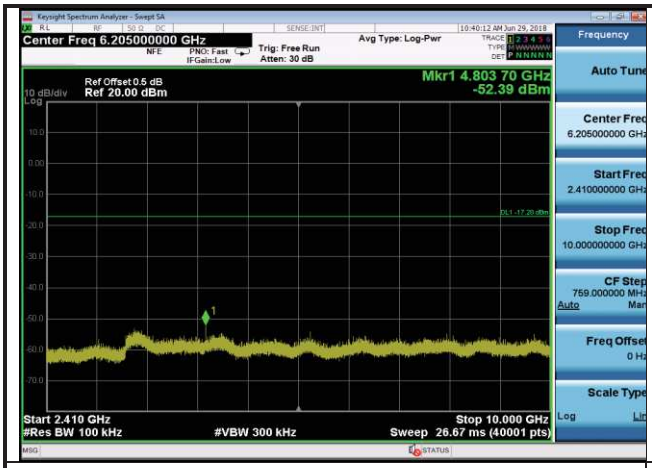
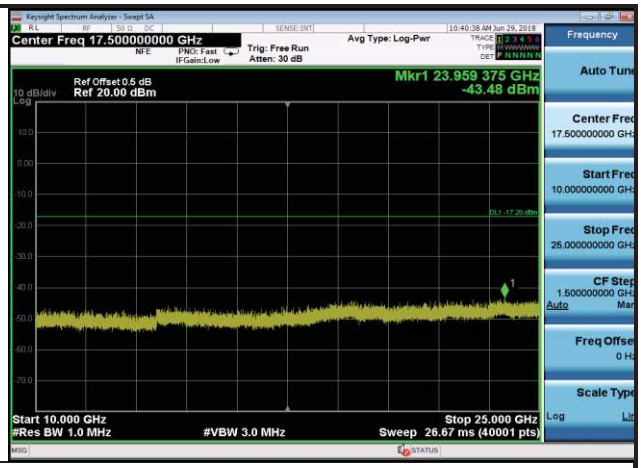
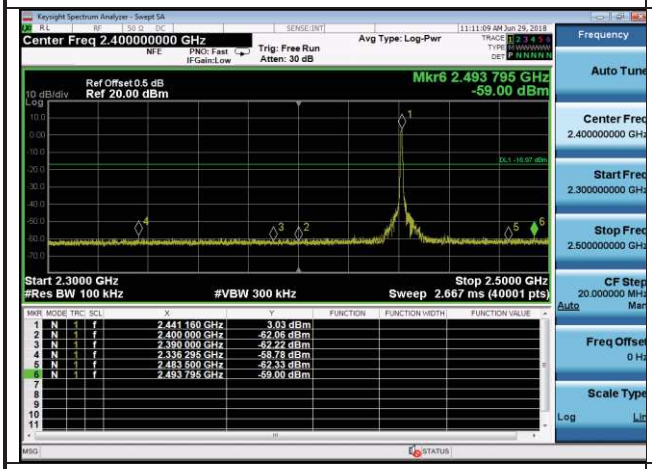
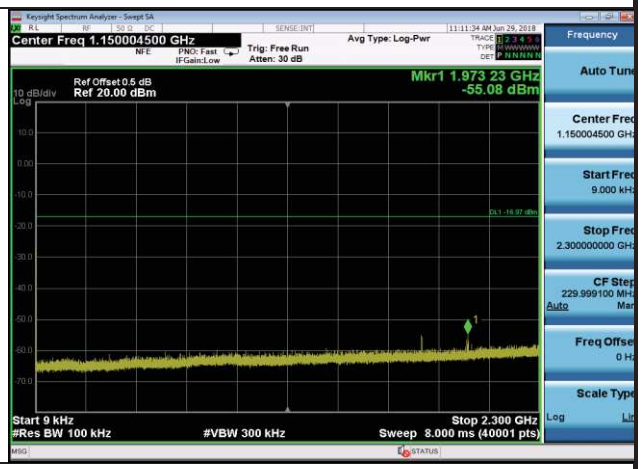
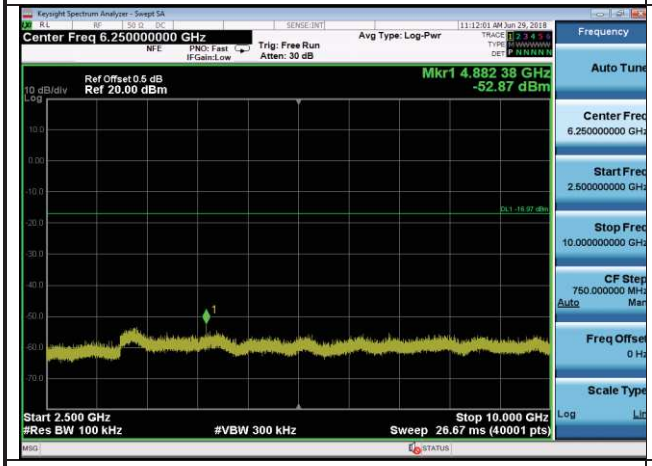
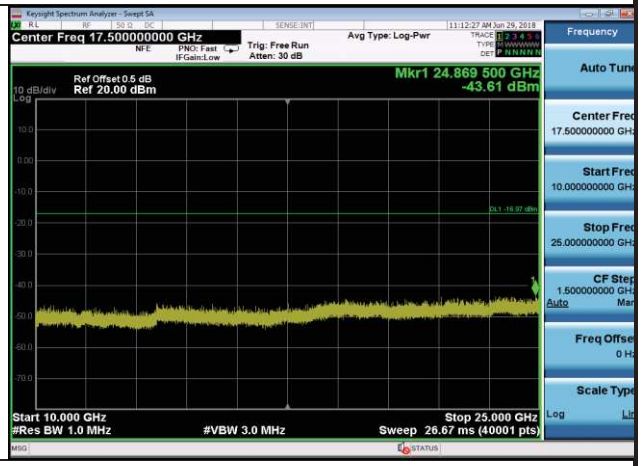
4.1 Test Data

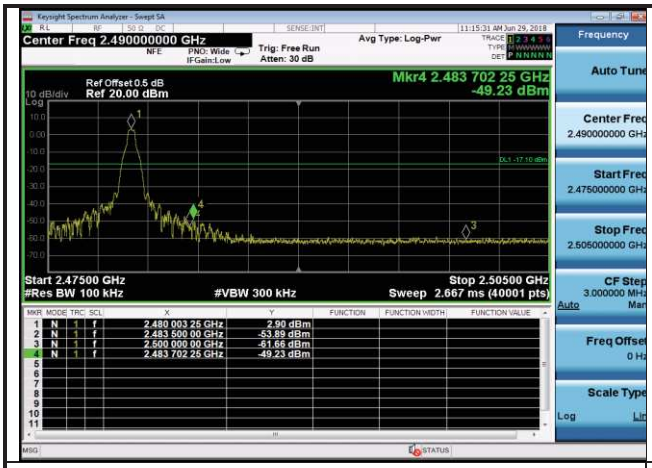
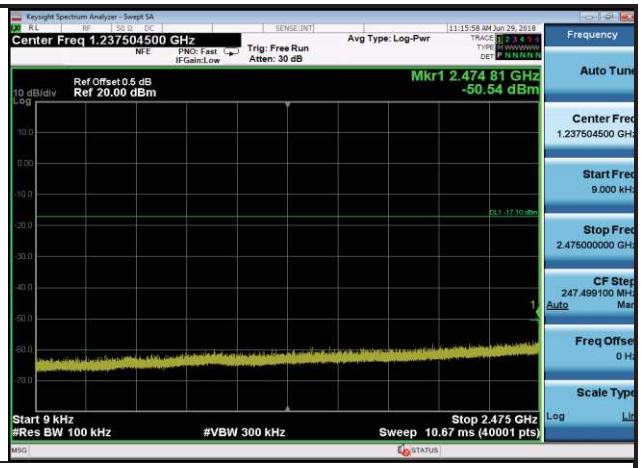
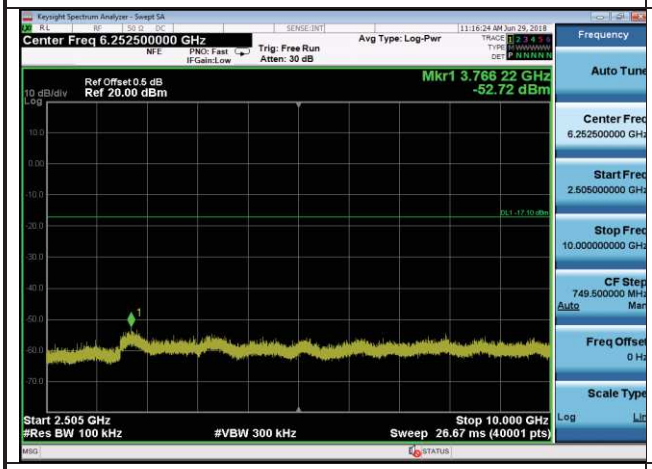
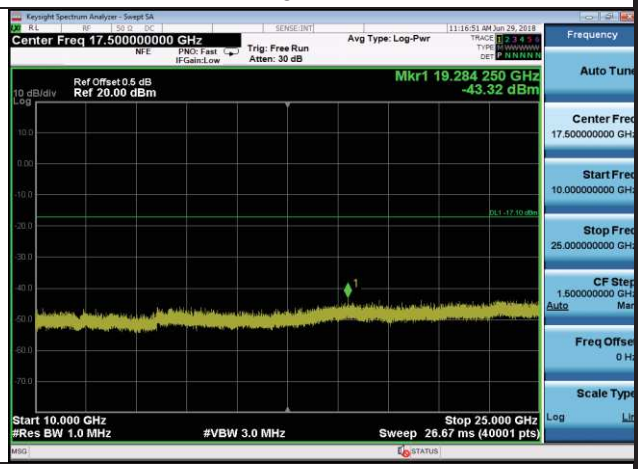
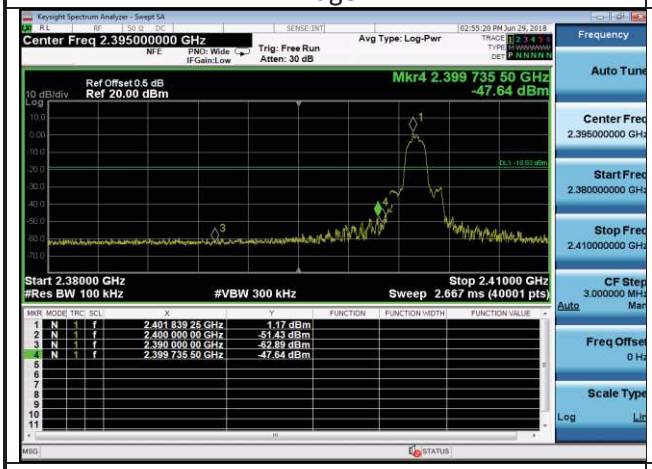
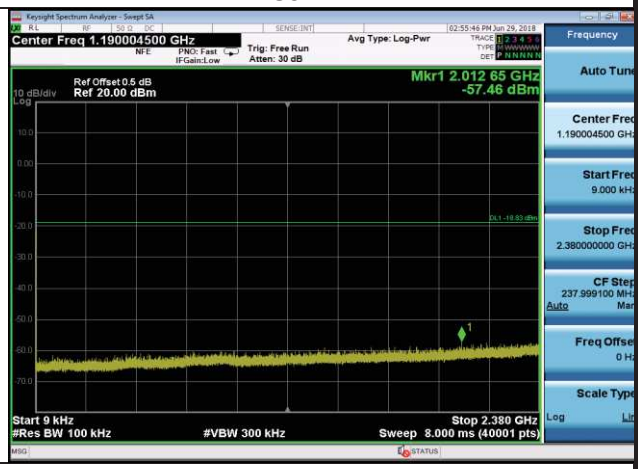
BT Transmitter Spurious Emission					
GFSK	2402	DH5	0.009MHz~2380MHz	-57.36	Pass
GFSK	2402	DH5	10000MHz~25000MHz	-43.48	Pass
GFSK	2402	DH5	2410MHz~10000MHz	-52.39	Pass
GFSK	2402	DH5	Band Edge	-43.53	Pass
GFSK	2441	DH5	0.009MHz~2300MHz	-55.08	Pass
GFSK	2441	DH5	10000MHz~25000MHz	-43.61	Pass
GFSK	2441	DH5	2500MHz~10000MHz	-52.87	Pass
GFSK	2441	DH5	Band Edge	-58.78	Pass
GFSK	2480	DH5	0.009MHz~2475MHz	-50.54	Pass
GFSK	2480	DH5	10000MHz~25000MHz	-43.32	Pass
GFSK	2480	DH5	2505MHz~10000MHz	-52.72	Pass
GFSK	2480	DH5	Band Edge	-49.23	Pass
DQPSK	2402	2DH5	0.009MHz~2380MHz	-57.46	Pass
DQPSK	2402	2DH5	10000MHz~25000MHz	-43.37	Pass
DQPSK	2402	2DH5	2410MHz~10000MHz	-53.29	Pass
DQPSK	2402	2DH5	Band Edge	-47.64	Pass
DQPSK	2441	2DH5	0.009MHz~2300MHz	-57.46	Pass
DQPSK	2441	2DH5	10000MHz~25000MHz	-43.06	Pass
DQPSK	2441	2DH5	2500MHz~10000MHz	-53.10	Pass
DQPSK	2441	2DH5	Band Edge	-58.86	Pass
DQPSK	2480	2DH5	0.009MHz~2475MHz	-46.92	Pass
DQPSK	2480	2DH5	10000MHz~25000MHz	-43.07	Pass
DQPSK	2480	2DH5	2505MHz~10000MHz	-53.07	Pass
DQPSK	2480	2DH5	Band Edge	-53.85	Pass
8DPSK	2402	3DH5	0.009MHz~2380MHz	-51.34	Pass

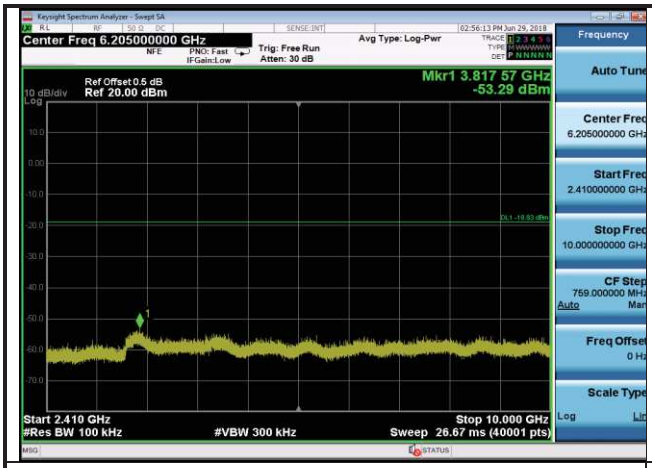
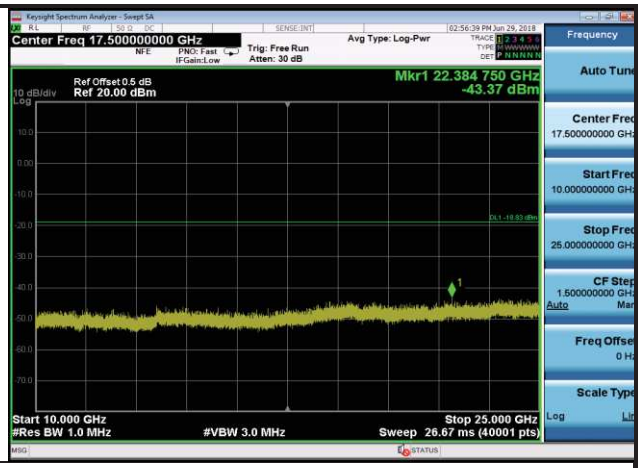
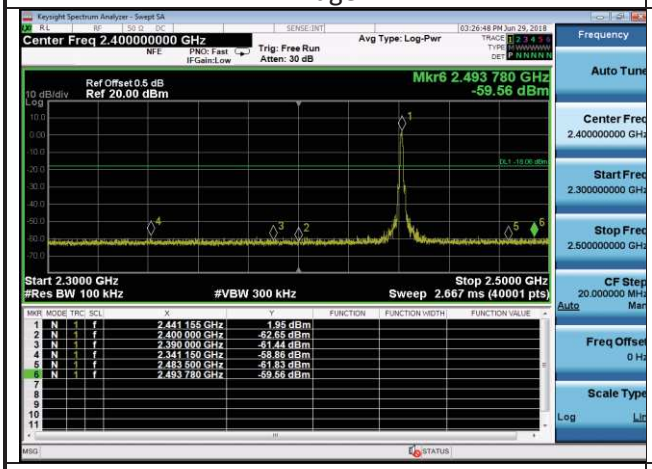
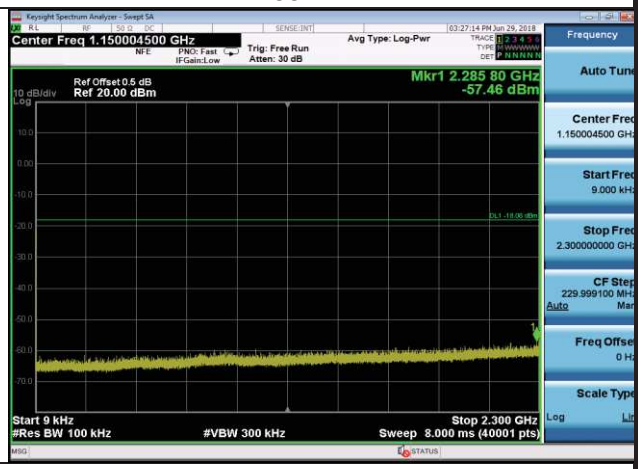
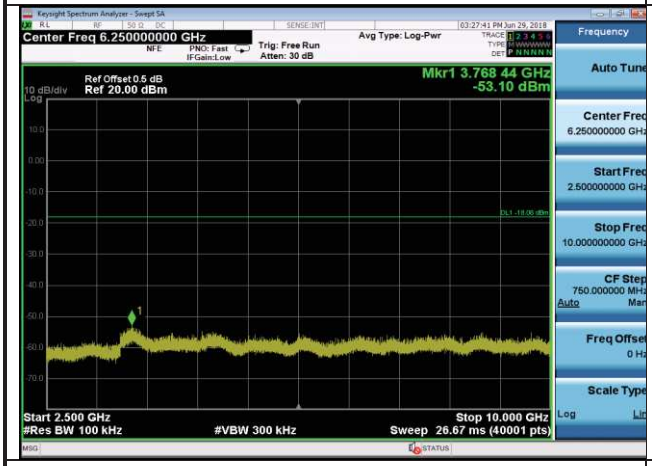
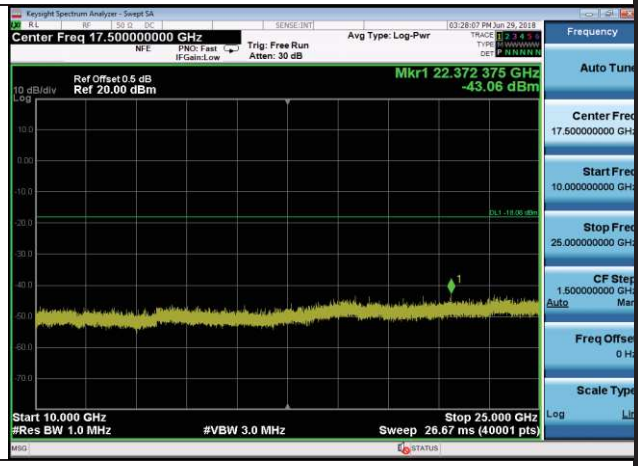
8DPSK	2402	3DH5	10000MHz~25000MHz	-43.56	Pass
8DPSK	2402	3DH5	2410MHz~10000MHz	-53.27	Pass
8DPSK	2402	3DH5	Band Edge	-47.38	Pass
8DPSK	2441	3DH5	0.009MHz~2300MHz	-57.94	Pass
8DPSK	2441	3DH5	10000MHz~25000MHz	-43.22	Pass
8DPSK	2441	3DH5	2500MHz~10000MHz	-53.60	Pass
8DPSK	2441	3DH5	Band Edge	-58.79	Pass
8DPSK	2480	3DH5	0.009MHz~2475MHz	-55.39	Pass
8DPSK	2480	3DH5	10000MHz~25000MHz	-43.57	Pass
8DPSK	2480	3DH5	2505MHz~10000MHz	-53.49	Pass
8DPSK	2480	3DH5	Band Edge	-51.13	Pass

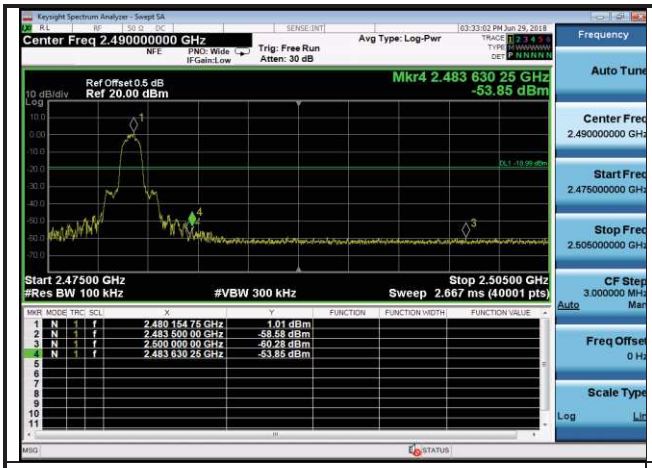
4.2 Test Plots

GFSK,2402MHz,DH5,Plot 1,Band Edge	GFSK,2402MHz,DH5,Plot 2,0.009MHz~2380 MHz
	
GFSK,2402MHz,DH5,Plot 3,2410MHz~10000 MHz	GFSK,2402MHz,DH5,Plot 4,10000MHz~2500 0MHz

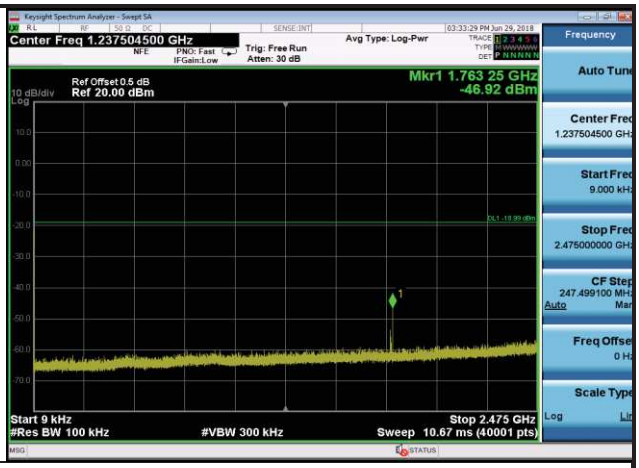
	
GFSK,2441MHz,DH5,Plot 1,Band Edge	GFSK,2441MHz,DH5,Plot 2,0.009MHz~2300 MHz
	
GFSK,2441MHz,DH5,Plot 3,2500MHz~10000 MHz	GFSK,2441MHz,DH5,Plot 4,10000MHz~25000MHz
	
GFSK,2480MHz,DH5,Plot 1,Band Edge	GFSK,2480MHz,DH5,Plot 2,0.009MHz~2475 MHz

	
GFSK,2480MHz,DH5,Plot 3,2505MHz~10000 MHz	GFSK,2480MHz,DH5,Plot 4,10000MHz~25000MHz
	
DQPSK,2402MHz,2DH5,Plot 1,Band Edge	DQPSK,2402MHz,2DH5,Plot 2,0.009MHz~2380MHz
	
DQPSK,2402MHz,2DH5,Plot 3,2410MHz~10000MHz	DQPSK,2402MHz,2DH5,Plot 4,10000MHz~25000MHz

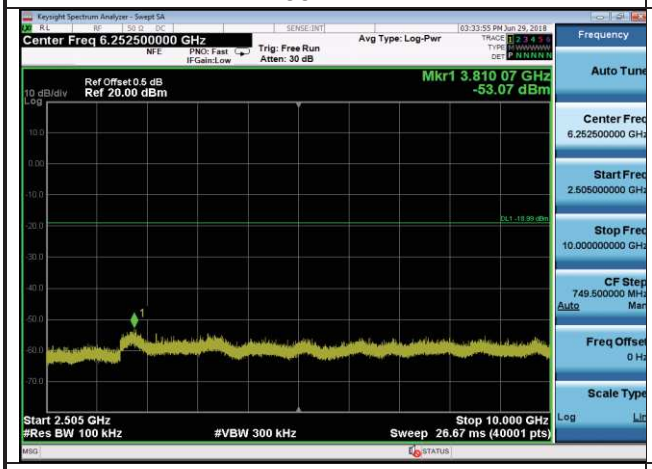
	
DQPSK,2441MHz,2DH5,Plot 1,Band Edge	DQPSK,2441MHz,2DH5,Plot 2,0.009MHz~2300MHz
	
DQPSK,2441MHz,2DH5,Plot 3,2500MHz~10000MHz	DQPSK,2441MHz,2DH5,Plot 4,10000MHz~25000MHz
	
DQPSK,2480MHz,2DH5,Plot 1,Band Edge	DQPSK,2480MHz,2DH5,Plot 2,0.009MHz~2475MHz



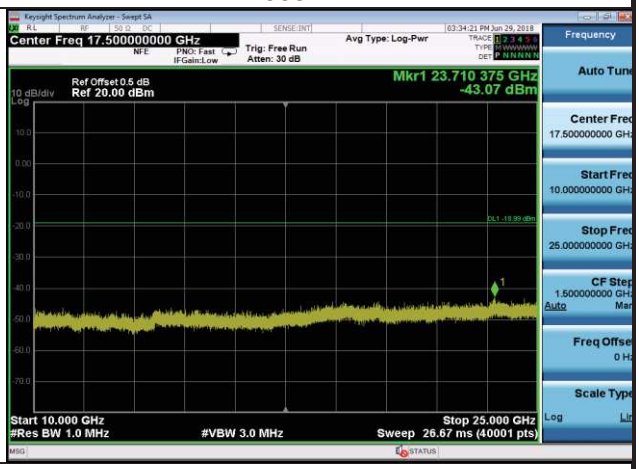
DQPSK,2480MHz,2DH5,Plot 3,2505MHz~10000MHz



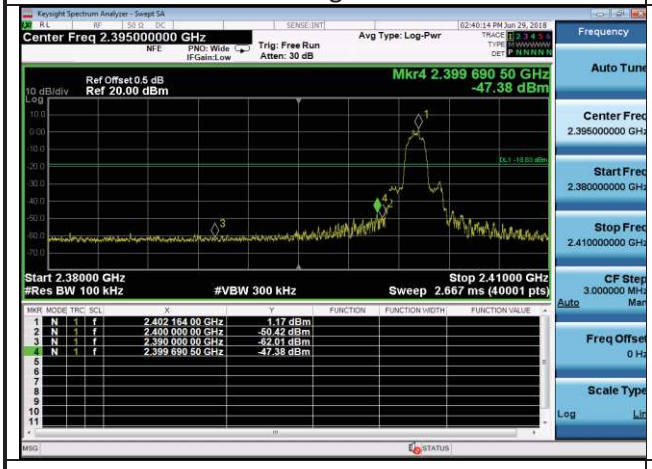
DQPSK,2480MHz,2DH5,Plot 4,10000MHz~25000MHz



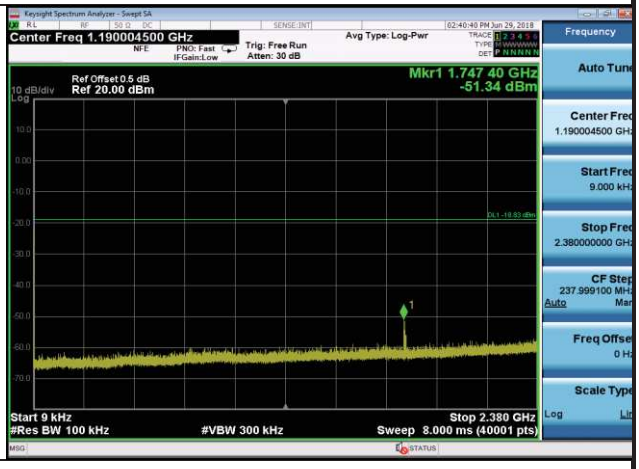
8DPSK,2402MHz,3DH5,Plot 1,Band Edge



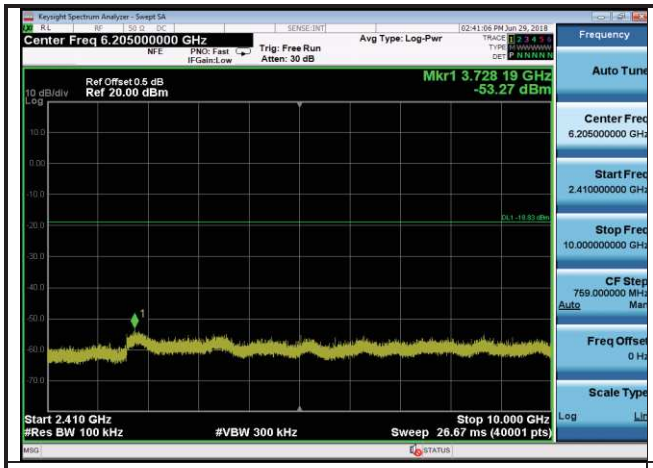
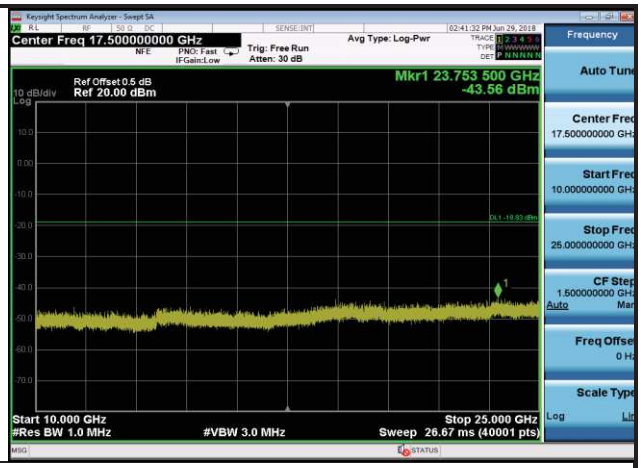
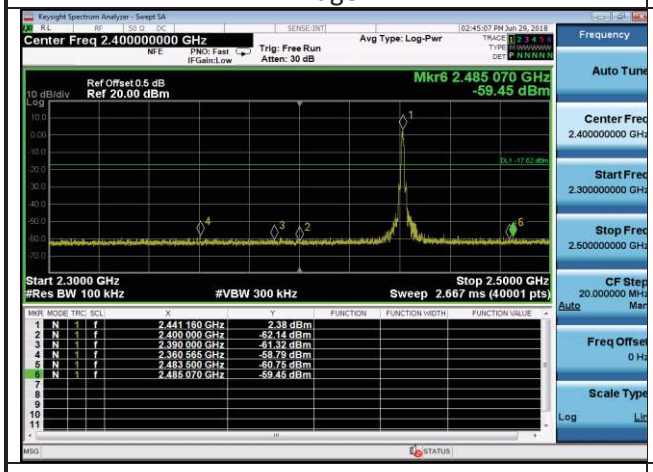
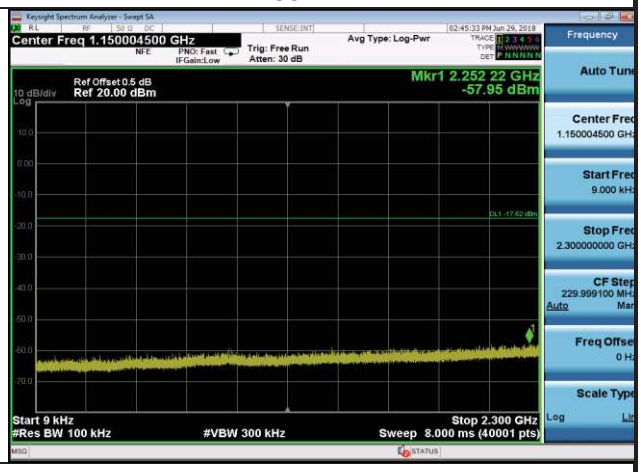
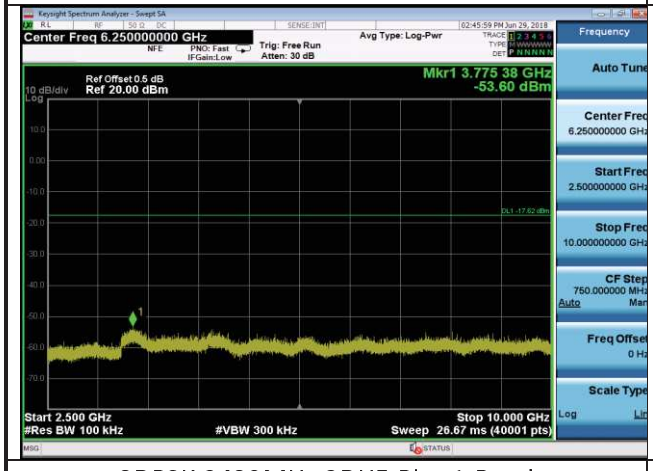
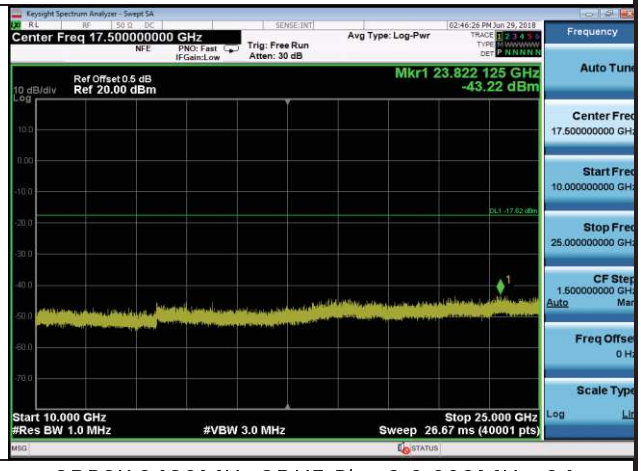
8DPSK,2402MHz,3DH5,Plot 2,0.009MHz~2380MHz

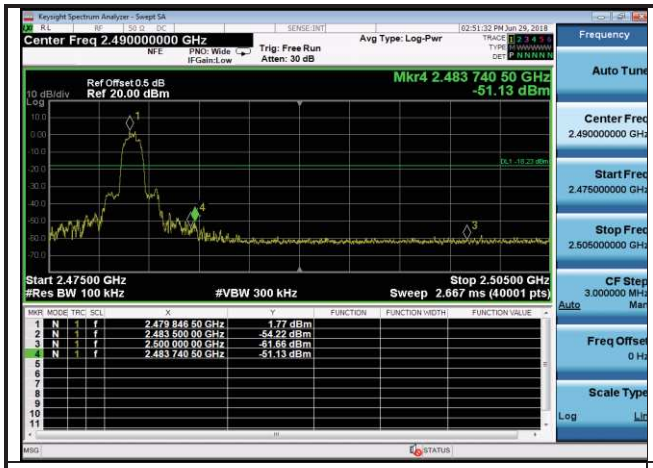


8DPSK,2402MHz,3DH5,Plot 3,2410MHz~10000MHz

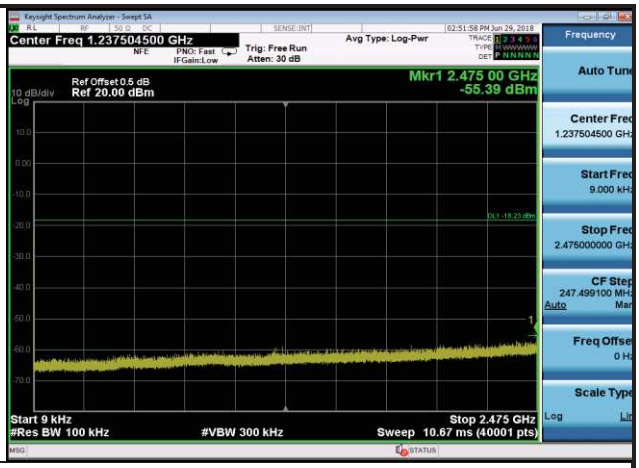


8DPSK,2402MHz,3DH5,Plot 4,10000MHz~25000MHz

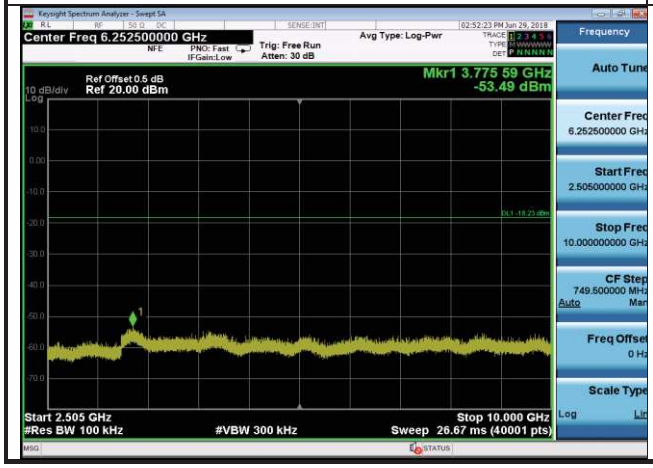
	
8DPSK,2441MHz,3DH5,Plot 1,Band Edge	8DPSK,2441MHz,3DH5,Plot 2,0.009MHz~2300MHz
	
8DPSK,2441MHz,3DH5,Plot 3,2500MHz~10000MHz	8DPSK,2441MHz,3DH5,Plot 4,10000MHz~25000MHz
	
8DPSK,2480MHz,3DH5,Plot 1,Band Edge	8DPSK,2480MHz,3DH5,Plot 2,0.009MHz~2475MHz

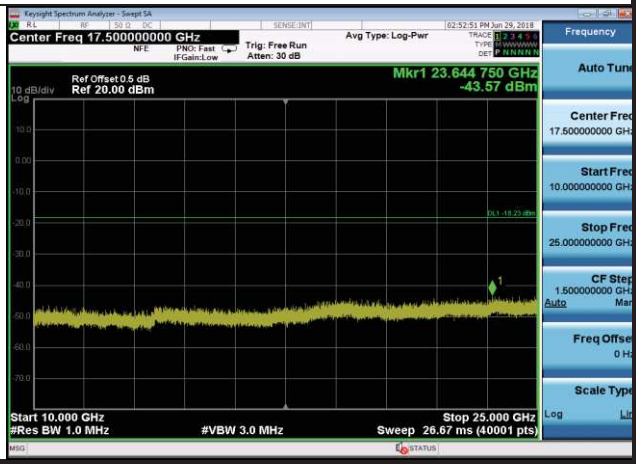


8DPSK,2480MHz,3DH5,Plot 3,2505MHz~10000MHz



8DPSK,2480MHz,3DH5,Plot 4,10000MHz~25000MHz





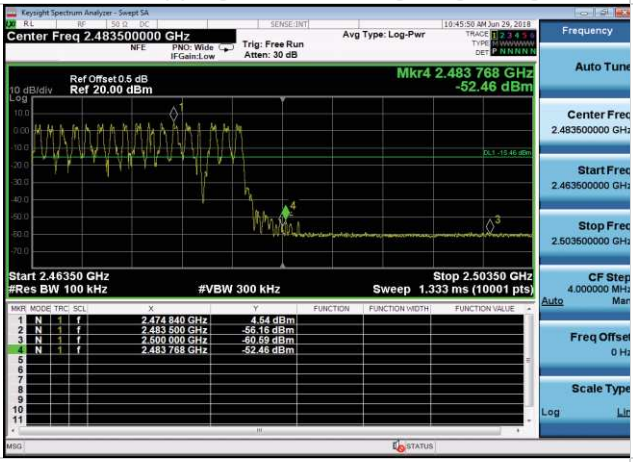
5. Band Edge - Hopping on mode

5.1 Test Data

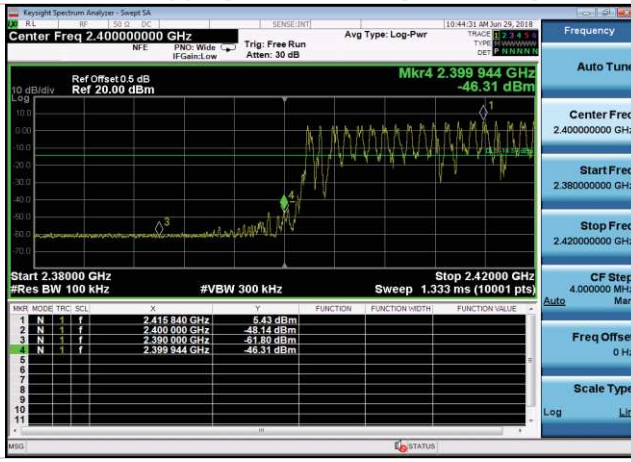
BT Frequency Band Edges-Conducted						
GFSK	2380~2420	DH5	Hopping On	-46.31	-14.573	Pass
GFSK	2463.5~2503.5	DH5	Hopping On	-52.46	-15.458	Pass
DQPSK	2380~2420	2DH5	Hopping On	-50.00	-16.574	Pass
DQPSK	2463.5~2503.5	2DH5	Hopping On	-55.53	-17.453	Pass
8DPSK	2380~2420	3DH5	Hopping On	-51.39	-16.449	Pass
8DPSK	2463.5~2503.5	3DH5	Hopping On	-52.11	-17.893	Pass

5.2 Test Plots

GFSK,Hopping,DH5,Band Edge HighRange

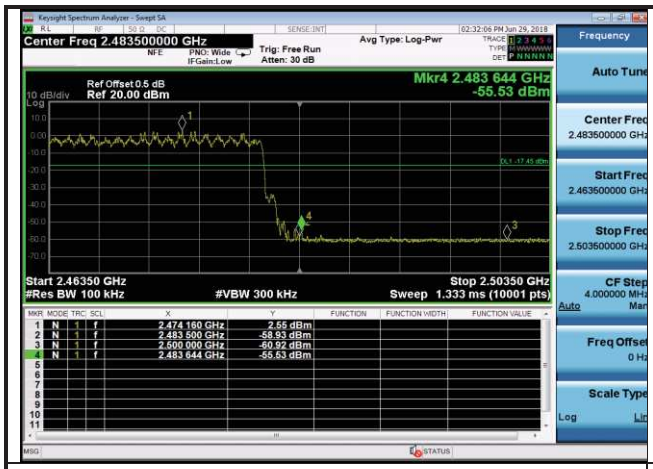


GFSK,Hopping,DH5,Band Edge LowRange

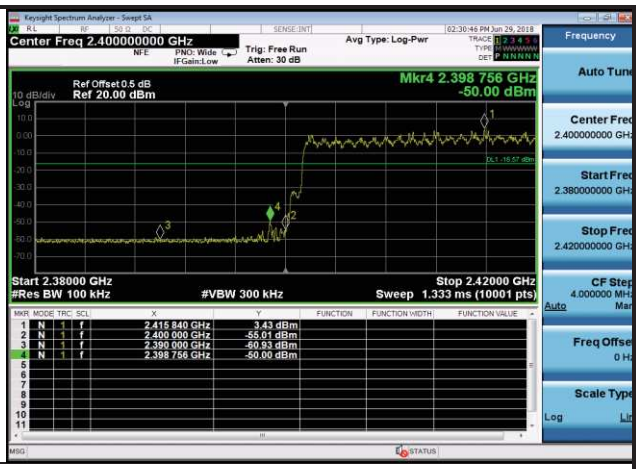


DQPSK,Hopping,2DH5,Band Edge HighRange

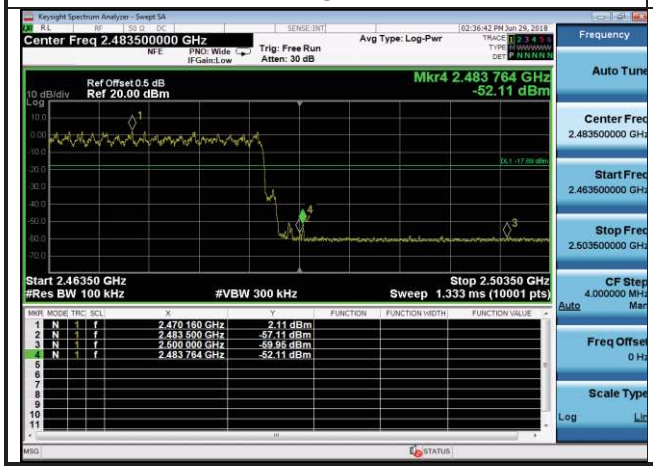
DQPSK,Hopping,2DH5,Band Edge LowRange

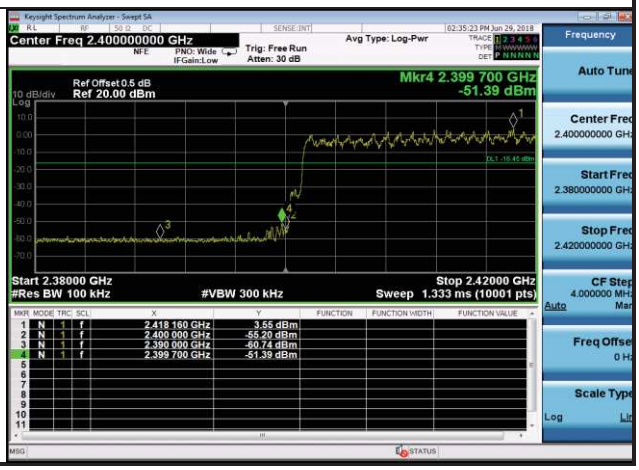


8DPSK,Hopping,3DH5,Band Edge HighRang
e



8DPSK,Hopping,3DH5,Band Edge LowRange





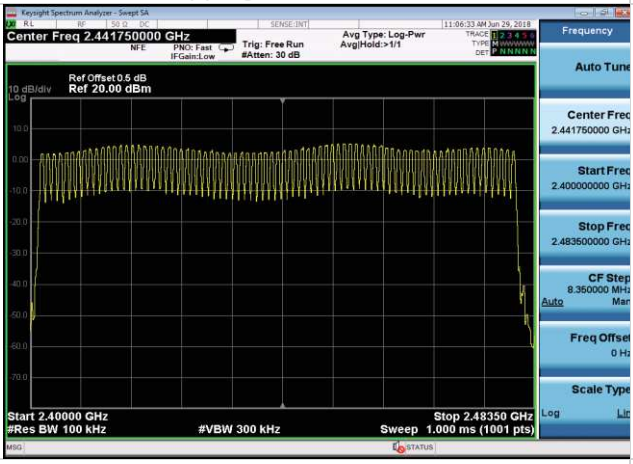
6. Number of Hopping Frequencies

6.1 Test Data

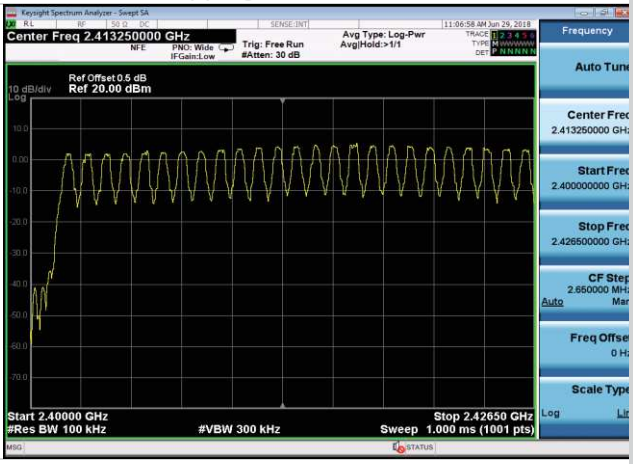
BT Number Of Hopping Channels				
GFSK	Hopping	DH5	2400MHz~2483.5MHz	Pass
GFSK	Hopping	DH5	2400MHz~2426.5MHz	Pass
GFSK	Hopping	DH5	2426.5MHz~2454.5MHz	Pass
GFSK	Hopping	DH5	2454.5MHz~2483.5MHz	Pass

6.2 Test Plots

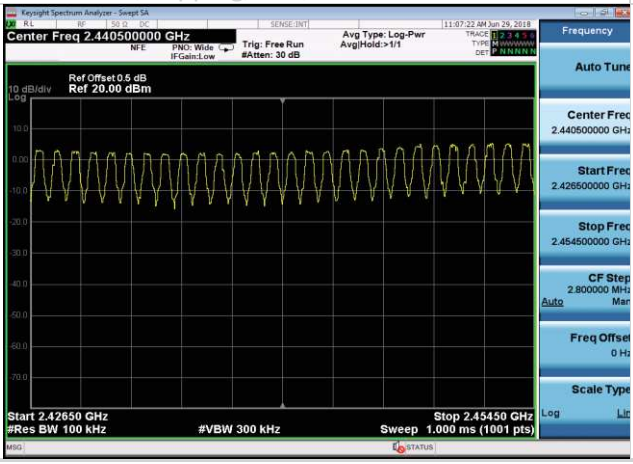
GFSK,Hopping,DH5,2400~2483.5MHz



GFSK,Hopping,DH5,2400~2426.5MHz



GFSK,Hopping,DH5,2426.5~2454.5MHz



GFSK,Hopping,DH5,2454.5~2483.5MHz

7. Carrier Frequency Separation

7.1 Test Data

BT Carrier Frequency Separation					
GFSK	Hopping	DH5	2401.5MHz~2403.5MHz	999	Pass
GFSK	Hopping	DH5	2440.5MHz~2442.5MHz	1001	Pass
GFSK	Hopping	DH5	2478.5MHz~2480.5MHz	897	Pass

7.2 Test Plots

GFSK,Hopping,DH5,2401.5~2403.5MHz

GFSK,Hopping,DH5,2440.5~2442.5MHz

GFSK,Hopping,DH5,2478.5~2480.5MHz

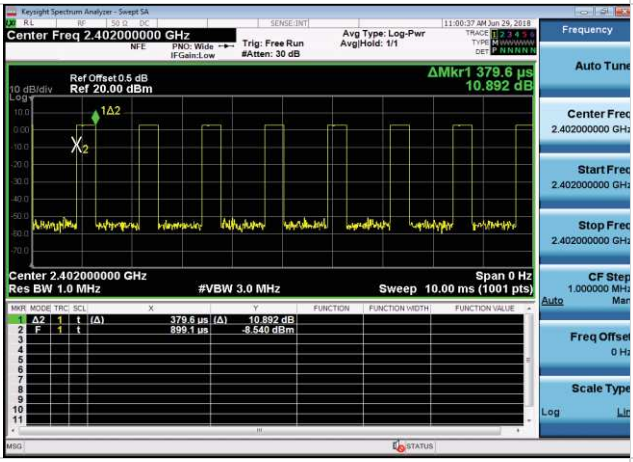
8. Dwell time

8.1 Test Data

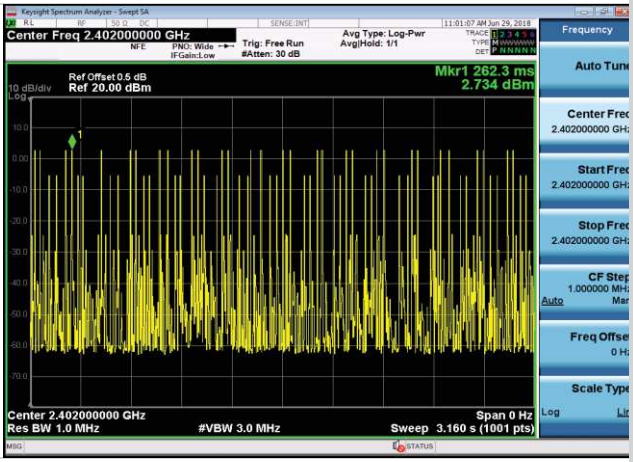
BT Dwell Time						
GFSK	2402	DH1	0.380	310	117.68	Pass
GFSK	2402	DH3	1.628	120	195.40	Pass
GFSK	2402	DH5	2.877	90	258.94	Pass

8.2 Test Plots

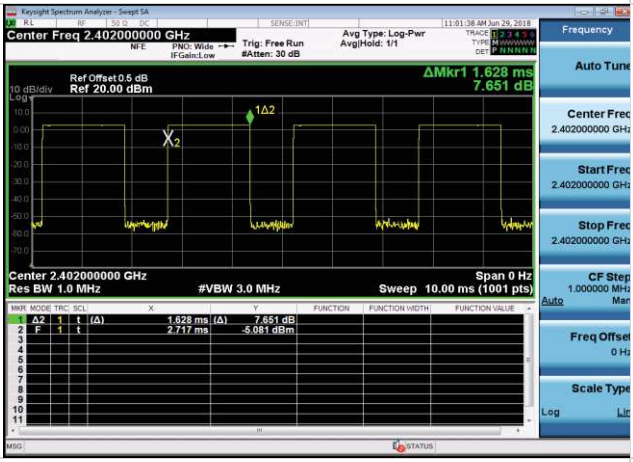
GFSK,2402,DH1,Transmission Time



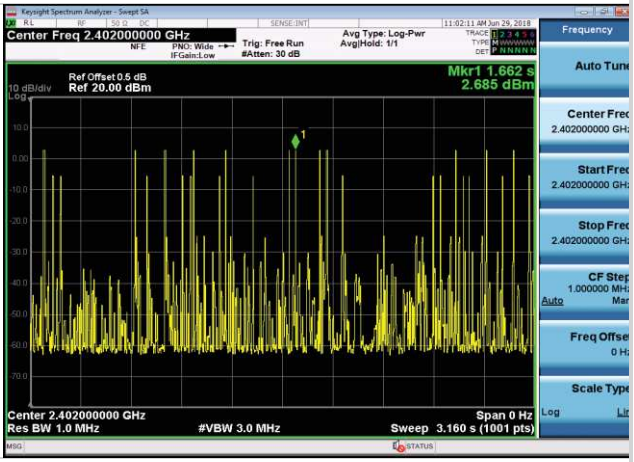
GFSK,2402,DH1,Transmission Number



GFSK,2402,DH3,Transmission Time

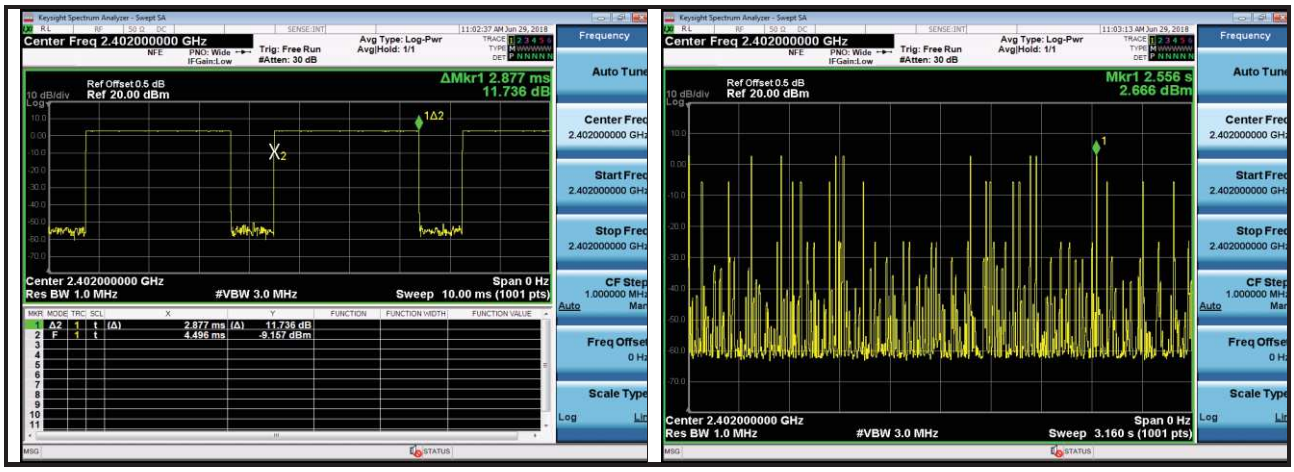


GFSK,2402,DH3,Transmission Number



GFSK,2402,DH5,Transmission Time

GFSK,2402,DH5,Transmission Number


Center Freq 2.402000000 GHz
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 2.877 ms
11.736 dB
Center 2.402000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.00 ms (1001 pts)
Center Freq 2.402000000 GHz
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 1/1
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.556 s
2.666 dBm
Center 2.402000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 3.160 s (1001 pts)

********** END **********