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APPENDIX A

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APPENDIX A

TEST PLOTS

(Model: 15Z970)

File Number: C1M1611059

Report Number: EM-F160754

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A.1 20dB BANDWIDTH MEASUREMENT

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

A.1.1 20dB Bandwidth Result

Modulation	Centre Frequency (MHz)	20 dB Bandwidth (MHz)	2/3 (20dB Bandwidth)
GFSK	2402	0.9203	0.614
	2441	0.9213	0.614
	2480	0.9216	0.614

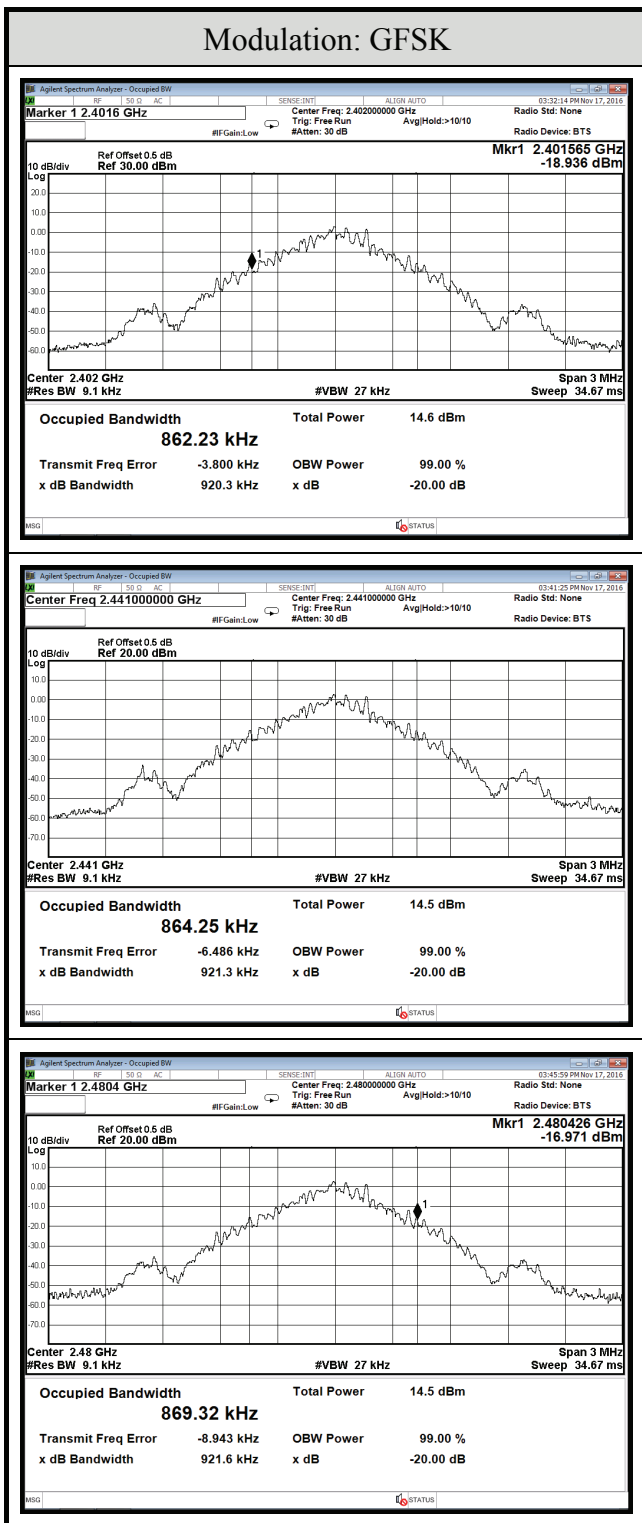
Remark: The maximum two-thirds of the 20dB bandwidth is the limit for carrier frequency separation presented.

Modulation	Centre Frequency (MHz)	20 dB Bandwidth (MHz)	2/3 (20dB Bandwidth)
8-DPSK	2402	1.385	0.923
	2441	1.385	0.923
	2480	1.385	0.923

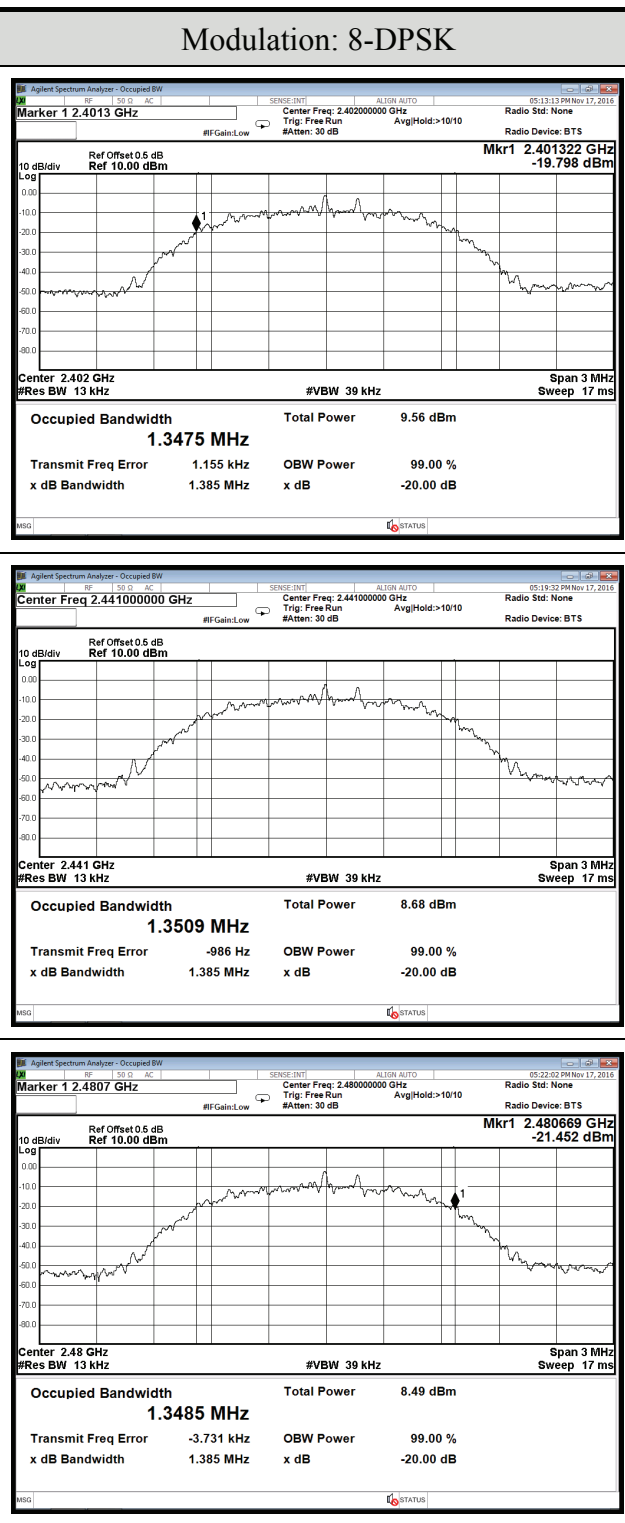
Remark: The maximum two-thirds of the 20dB bandwidth is the limit for carrier frequency separation presented.

A.1.2 Measurement Plots

Modulation: GFSK



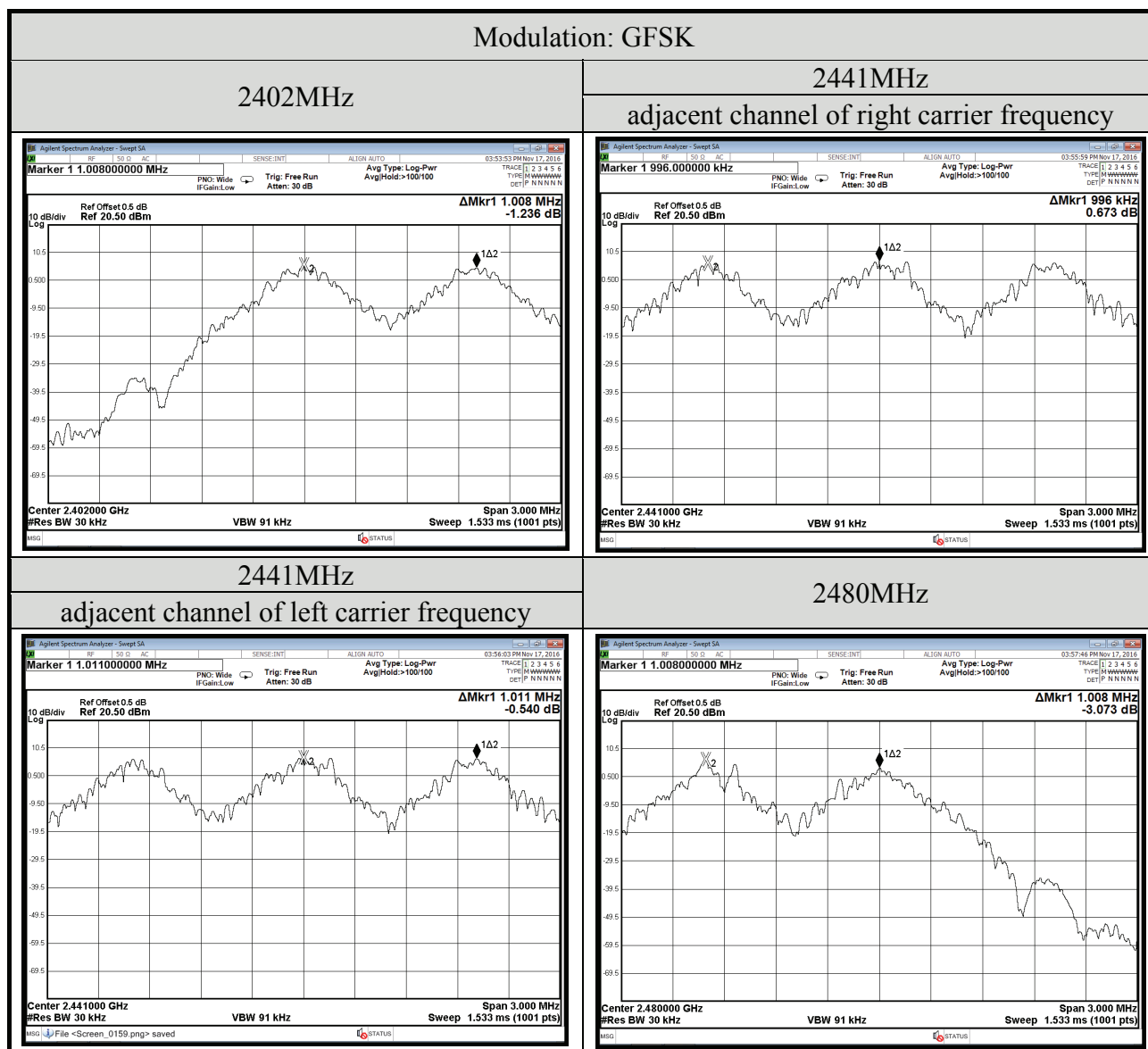
Modulation: 8-DPSK

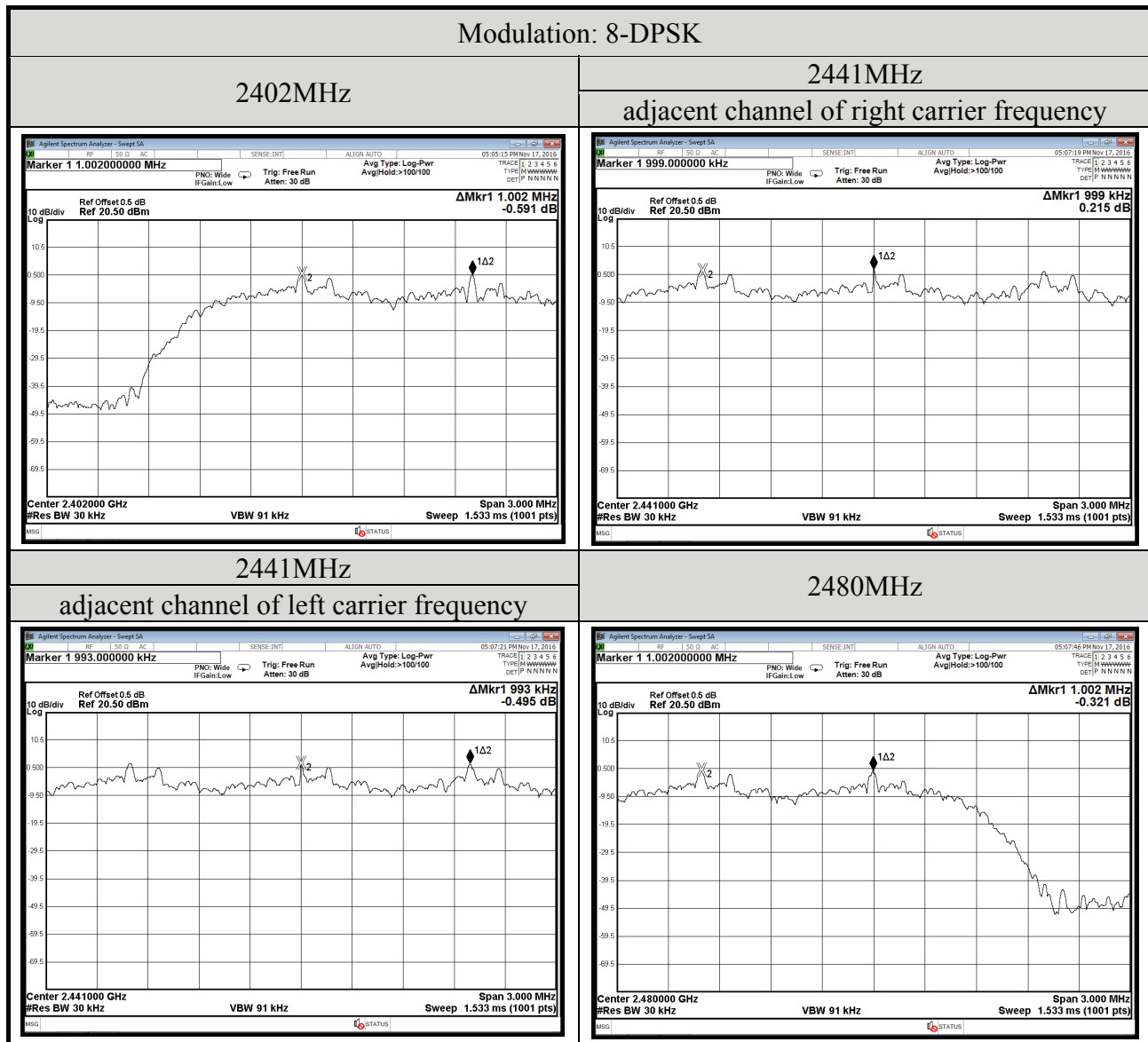


A.2 CARRIER FREQUENCY SEPARATION MEASUREMENT

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

A.2.1 Measurement Plots





A.3 TIME OF OCCUPANCY MEASUREMENT

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

A.3.1 Time of Occupancy

Modulation	Centre Frequency (MHz)	Mode	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
GFSK	2402	DH1	0.38	72.048	<400
		DH3	1.64	259.120	<400
		DH5	2.88	273.024	<400
	2441	DH1	0.38	72.048	<400
		DH3	1.62	255.960	<400
		DH5	2.90	274.920	<400
	2480	DH1	0.38	72.048	<400
		DH3	1.64	259.120	<400
		DH5	2.88	273.024	<400

Observation Period: 79 channels*0.4 seconds = 31.6 seconds

Centre Frequency: 2402MHz

DH1: For each second of 6 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

$$6 \text{ channels} * 31.6 \text{ seconds} * 0.38 \text{ ms} = 72.048 \text{ ms}$$

DH3: For each second of 5 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

$$5 \text{ channels} * 31.6 \text{ seconds} * 1.64 \text{ ms} = 259.120 \text{ ms}$$

DH5: For each second of 3 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

$$3 \text{ channels} * 31.6 \text{ seconds} * 2.88 \text{ ms} = 273.024 \text{ ms}$$

Centre Frequency: 2441MHz

DH1: For each second of 6 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

6 channels*31.6 seconds* **0.38** ms= **72.048** ms

DH3: For each second of 5 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

5 channels*31.6 seconds* **1.62** ms= **255.960** ms

DH5: For each second of 3 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

3 channels*31.6 seconds* **2.90** ms= **274.920** ms

Centre Frequency: 2480MHz

DH1: For each second of 6 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

6 channels*31.6 seconds* **0.38** ms= **72.048** m
s

DH3: For each second of 5 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

5 channels*31.6 seconds* **1.64** ms= **259.120** ms

DH5: For each second of 3 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

3 channels*31.6 seconds* **2.88** ms= **273.024** ms

Modulation	Centre Frequency (MHz)	Mode	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
8-DPSK	2402	3DH1	0.39	73.944	<400
		3DH3	1.64	207.296	<400
		3DH5	2.89	182.648	<400
	2441	3DH1	0.38	73.944	<400
		3DH3	1.64	207.296	<400
		3DH5	2.89	182.648	<400
	2480	3DH1	0.39	73.944	<400
		3DH3	1.64	207.296	<400
		3DH5	2.89	182.648	<400

Observation Period: 79 channels*0.4 seconds = 31.6 seconds

Centre Frequency: 2402MHz

3DH1: For each second of 10 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

6 channels*31.6 seconds* **0.39** ms= **73.944** ms

3DH3: For each second of 4 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

4 channels*31.6 seconds* **1.64** ms= **207.296** ms

3DH5: For each second of 2 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

2 channels*31.6 seconds* **2.89** ms= **182.648** ms

Centre Frequency: 2441MHz

3DH1: For each second of 6 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

6 channels*31.6 seconds* **0.39** ms= **73.944** ms

3DH3: For each second of 4 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

4 channels*31.6 seconds* **1.64** ms= **207.296** ms

3DH5: For each second of 2 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

2 channels*31.6 seconds* **2.89** ms= **182.648** ms

Centre Frequency: 2480MHz

3DH1: For each second of 6 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

6 channels*31.6 seconds* **0.39** ms= **73.944** ms

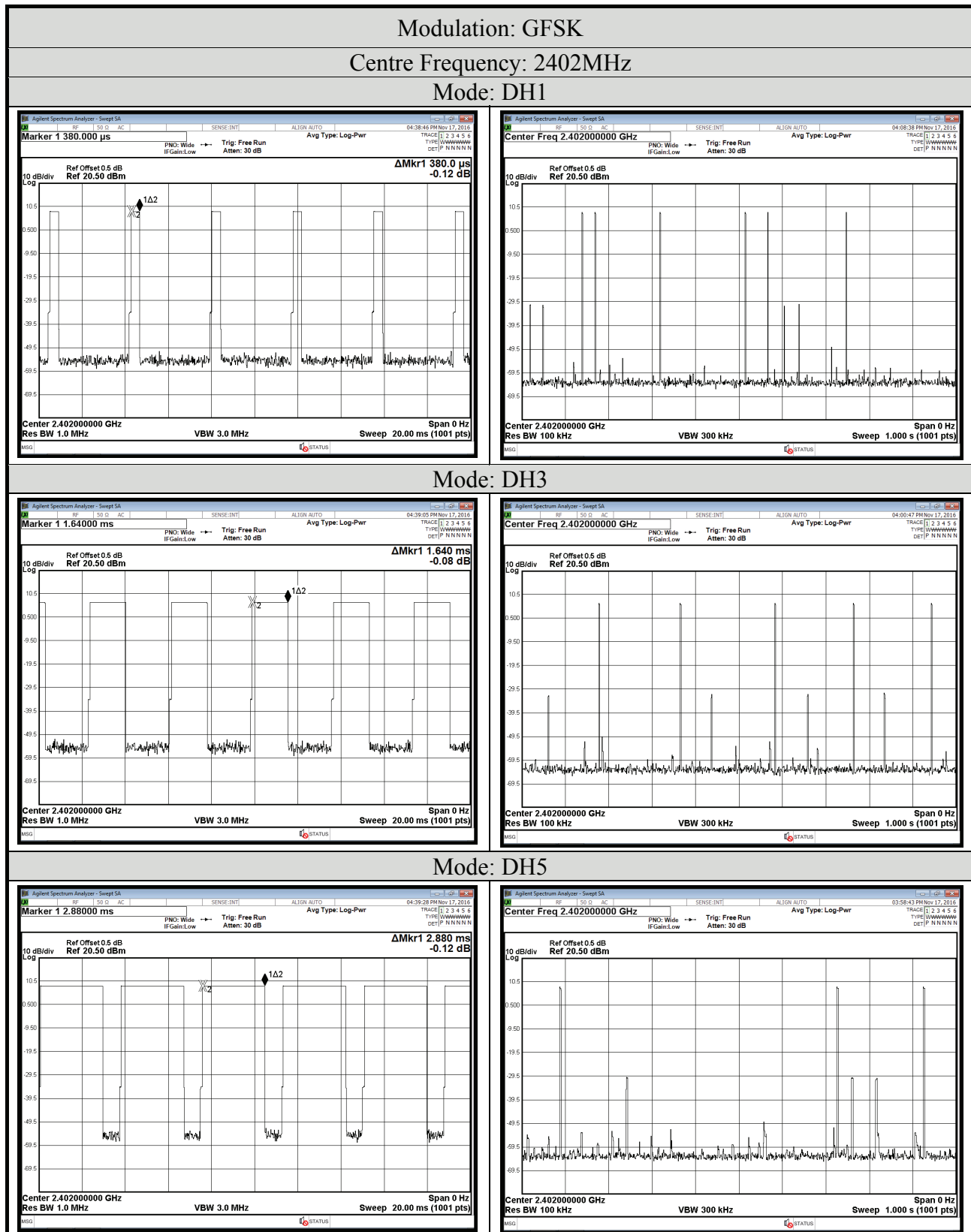
3DH3: For each second of 4 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

4 channels*31.6 seconds* **1.64** ms= **207.296** ms

3DH5: For each second of 2 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

2 channels*31.6 seconds* **2.89** ms= **182.648** ms

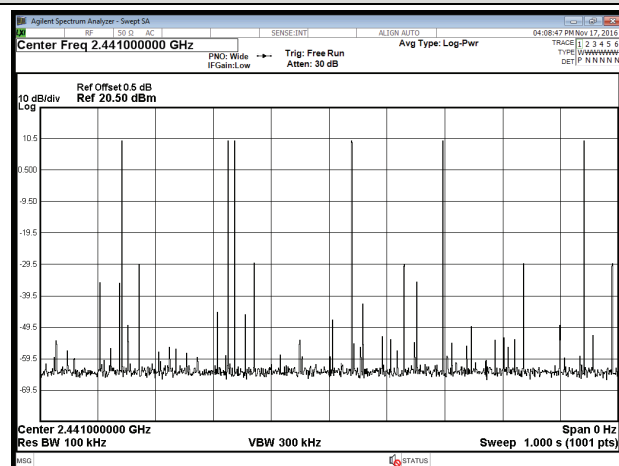
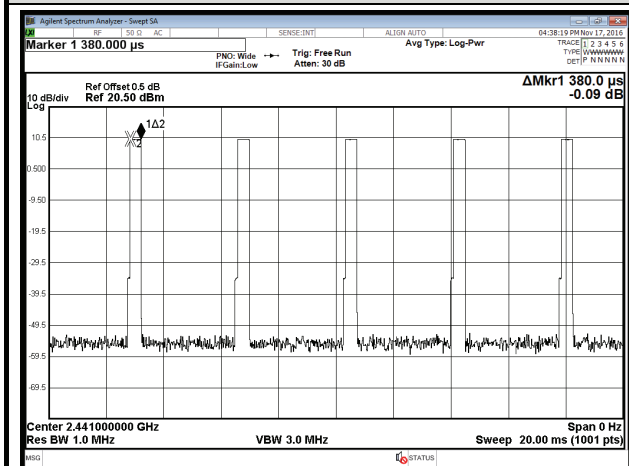
A.3.2 Measurement Plots



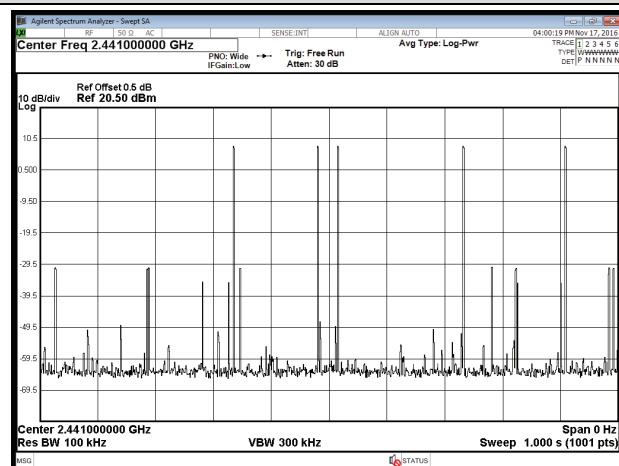
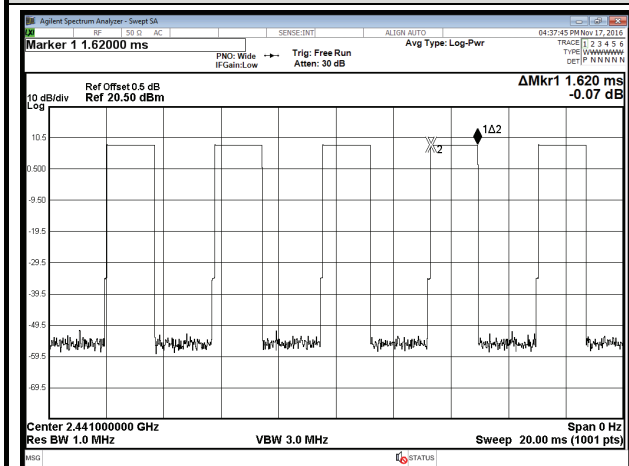
Modulation: GFSK

Centre Frequency: 2441MHz

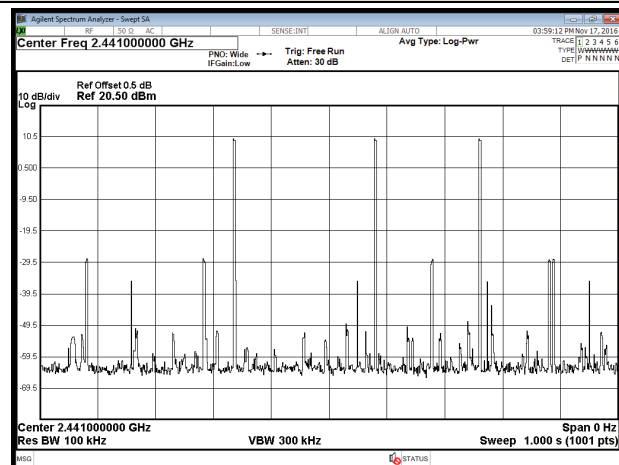
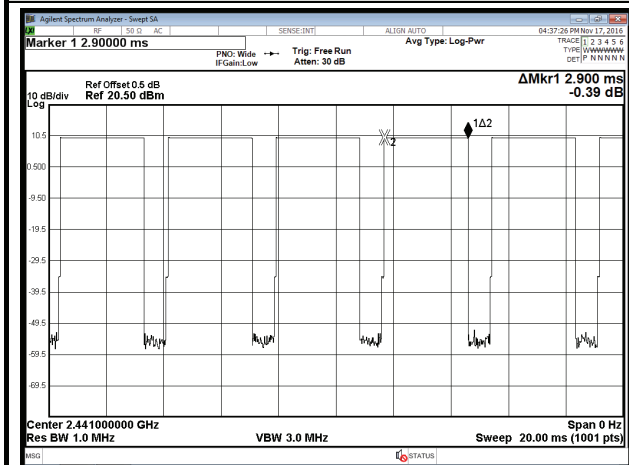
Mode: DH1



Mode: DH3



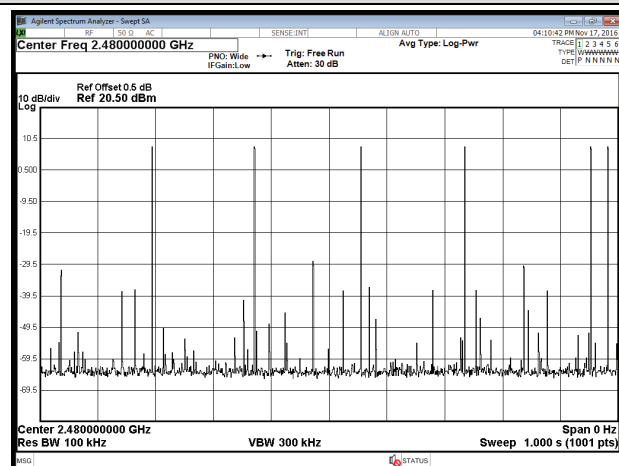
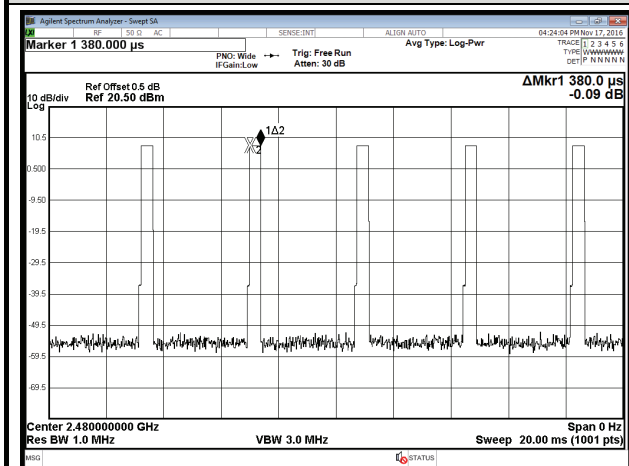
Mode: DH5



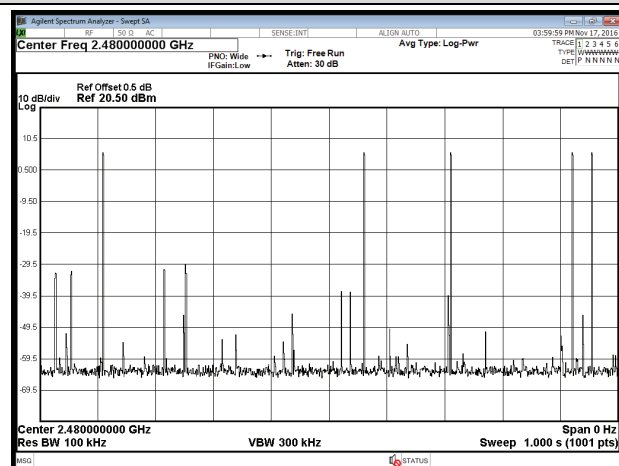
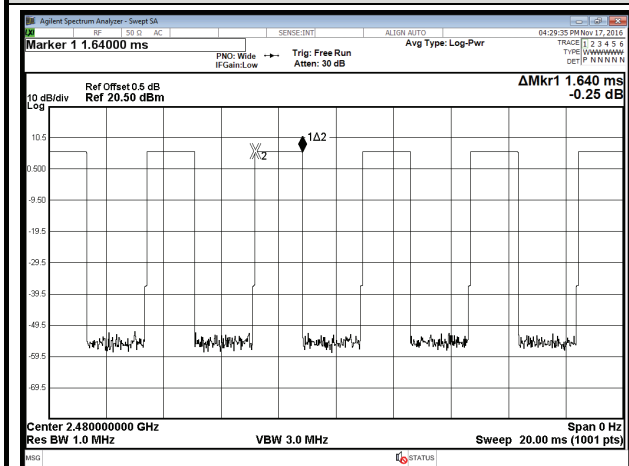
Modulation: GFSK

Centre Frequency: 2480MHz

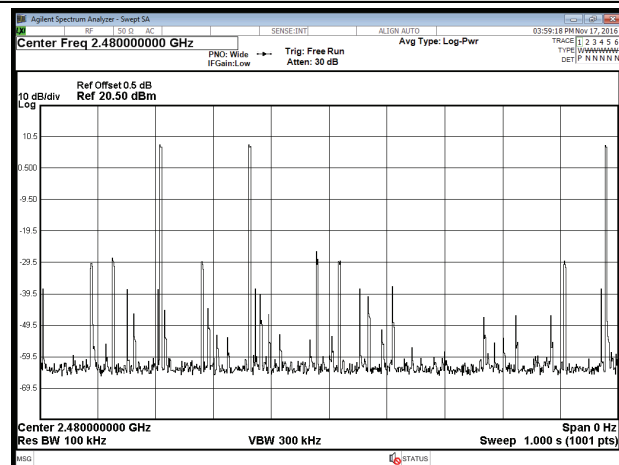
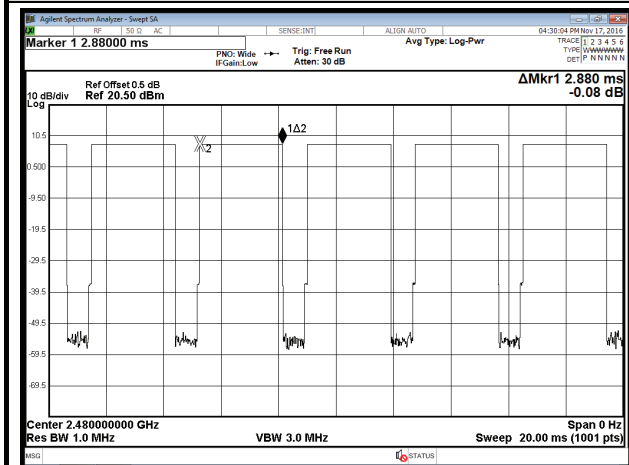
Mode: DH1



Mode: DH3



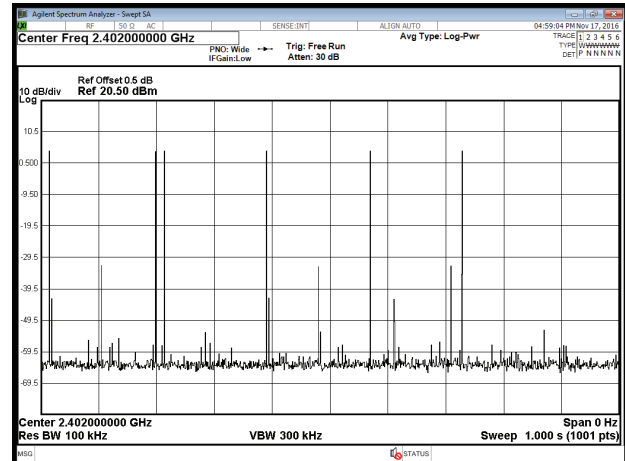
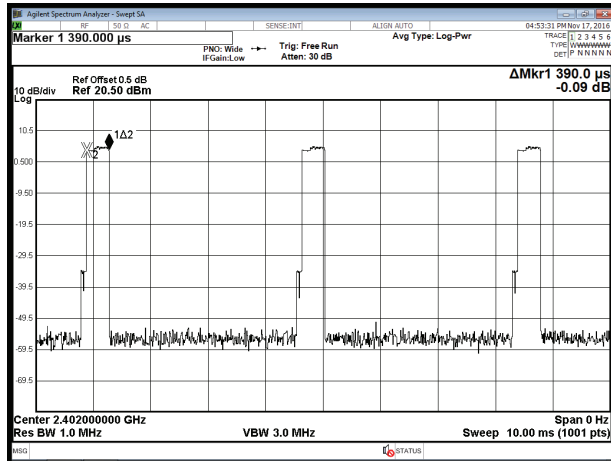
Mode: DH5



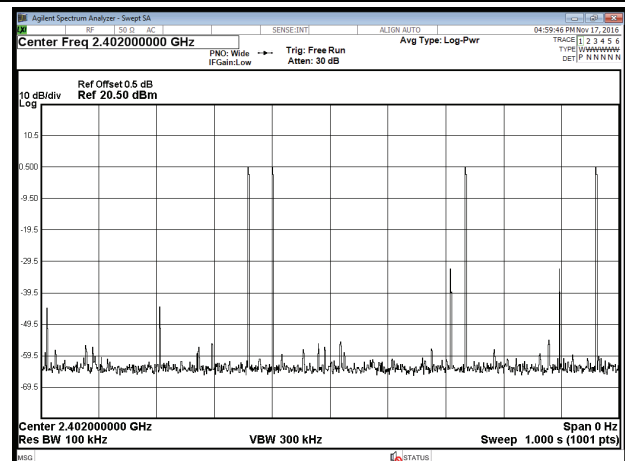
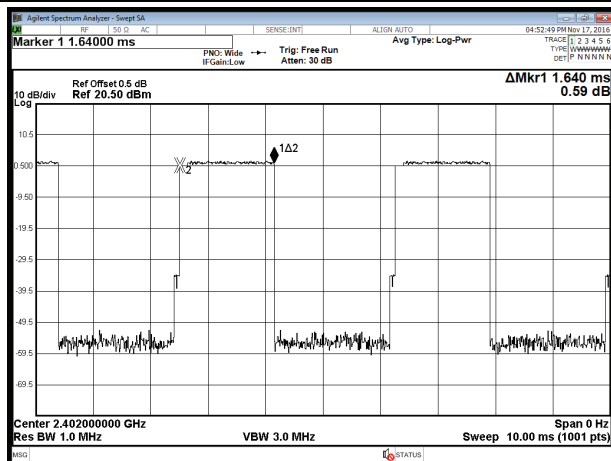
Modulation: 8-DPSK

Centre Frequency: 2402MHz

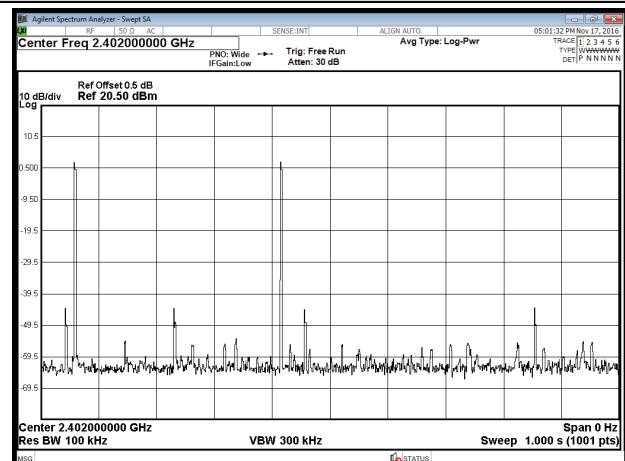
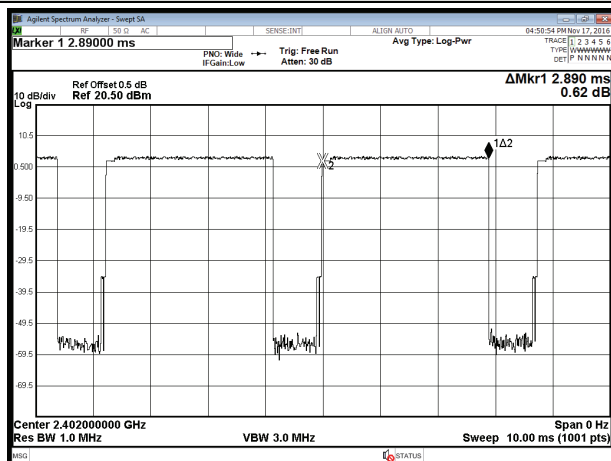
Mode: 3DH1



Mode: 3DH3



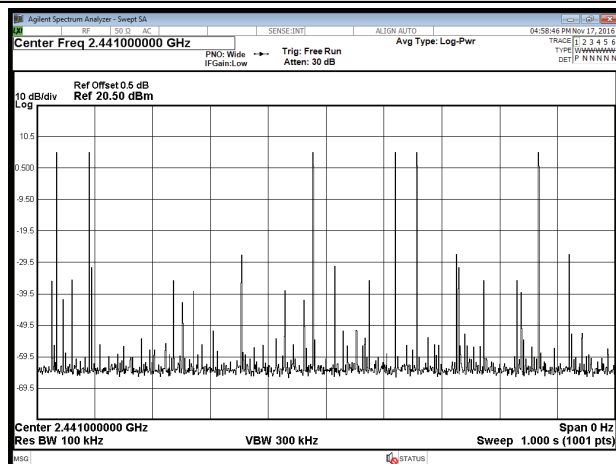
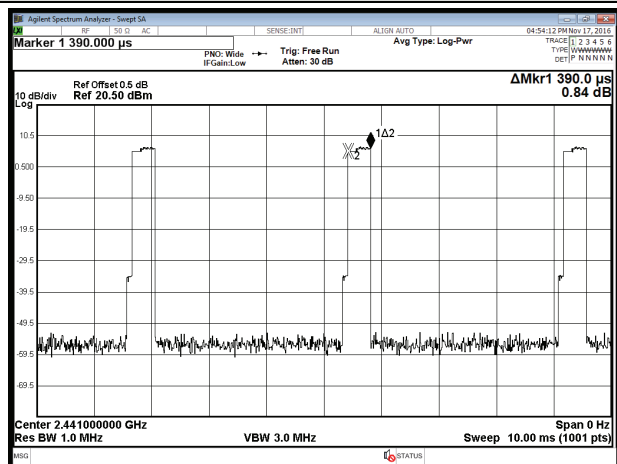
Mode: 3DH5



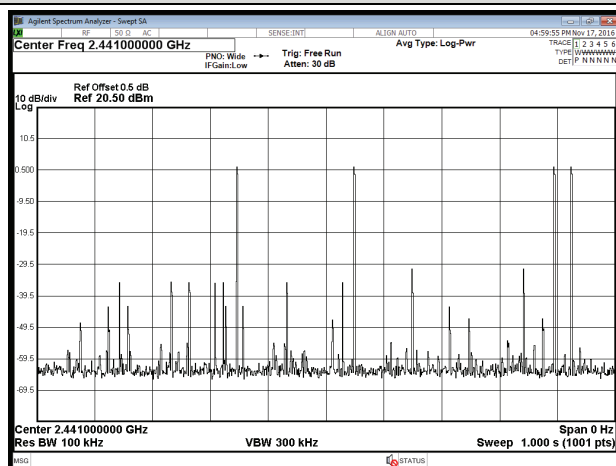
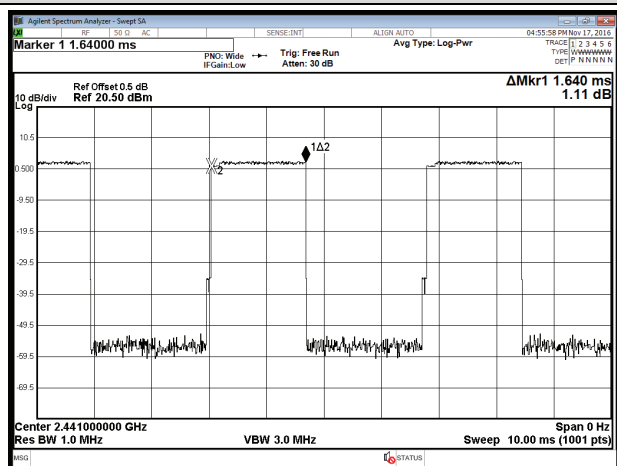
Modulation: 8-DPSK

Centre Frequency: 2441MHz

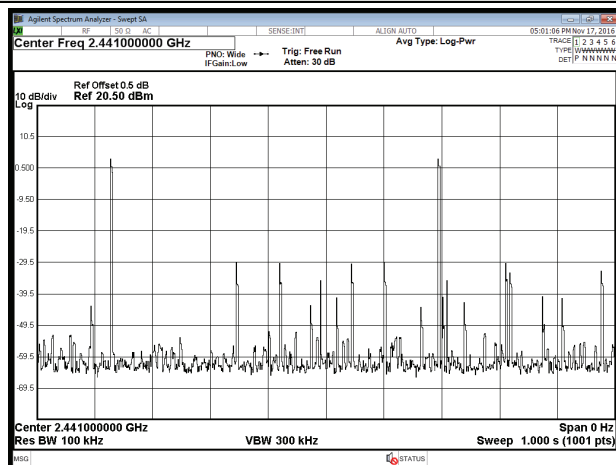
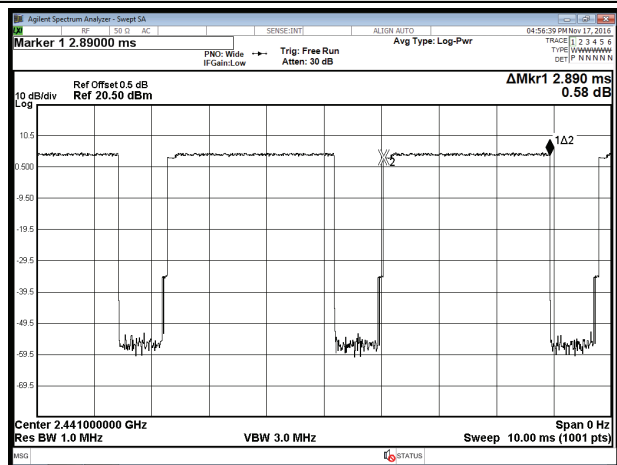
Mode: 3DH1



Mode: 3DH3



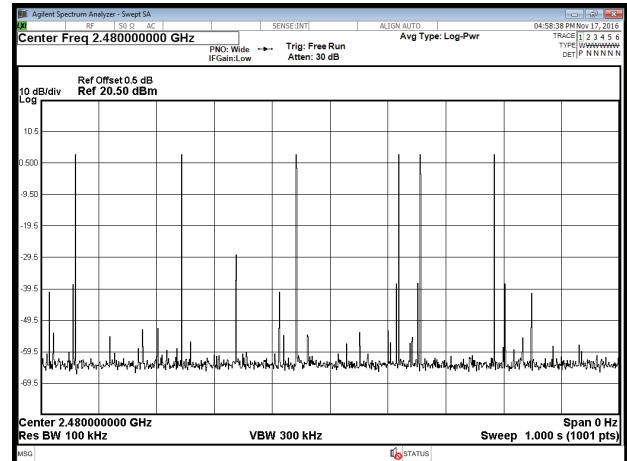
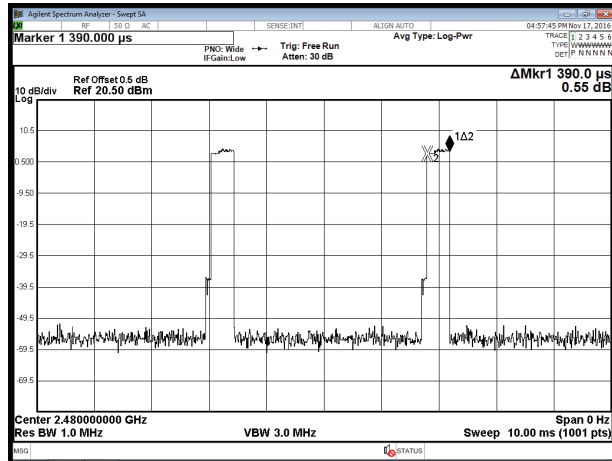
Mode: 3DH5



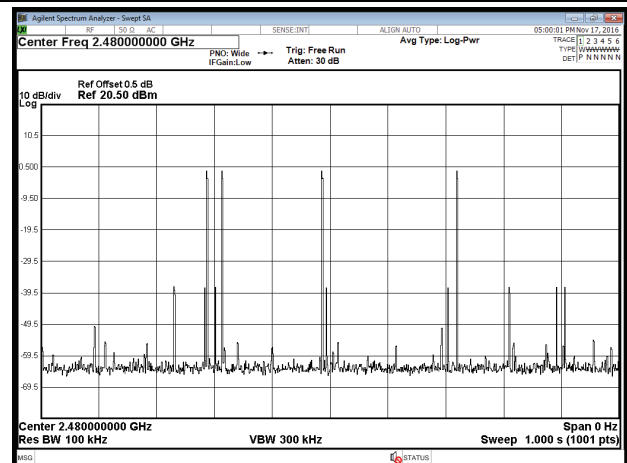
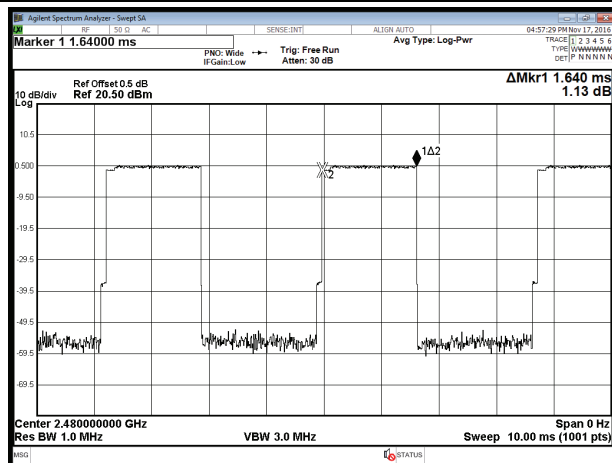
Modulation: 8-DPSK

Centre Frequency: 2480MHz

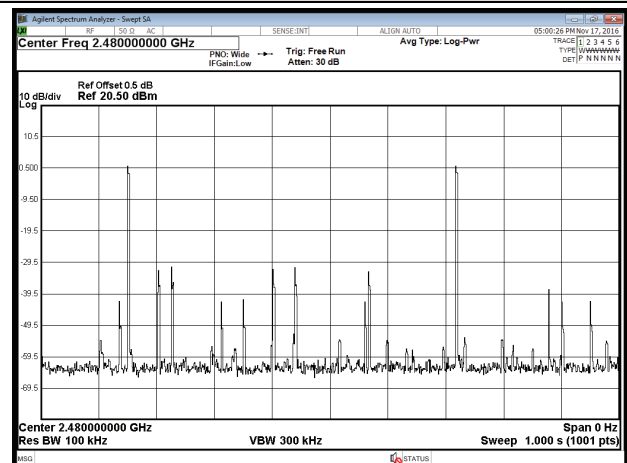
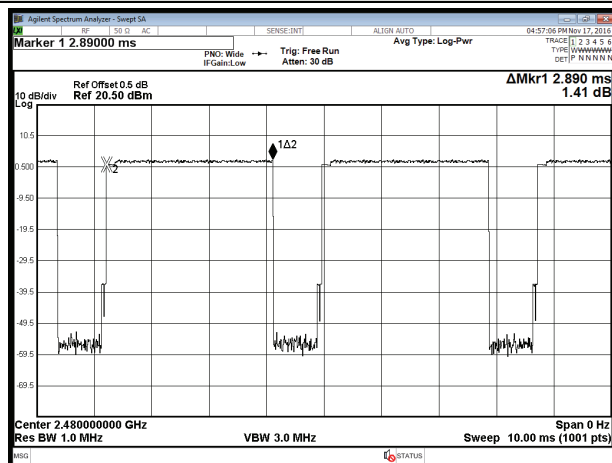
Mode: 3DH1



Mode: 3DH3



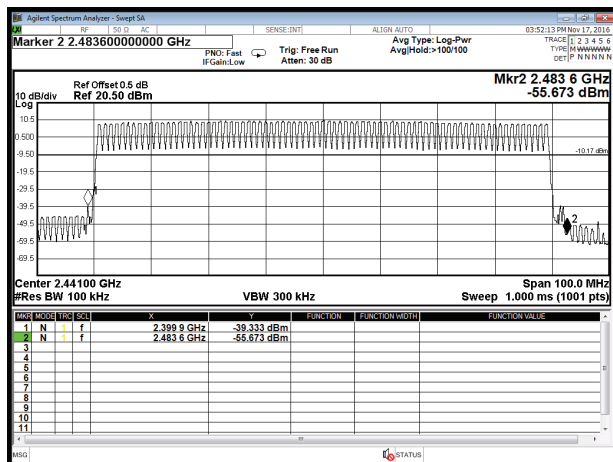
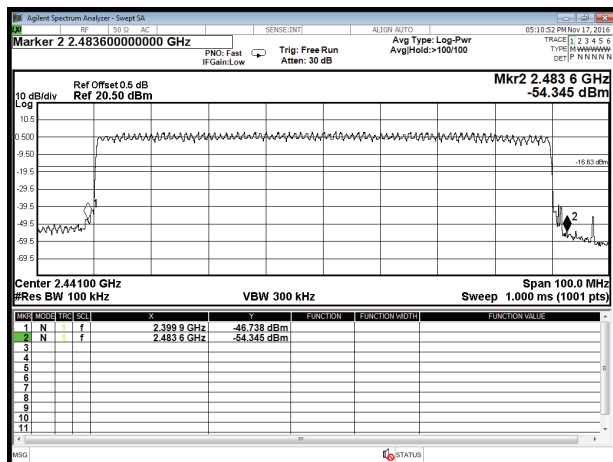
Mode: 3DH5



A.4 NUMBER OF HOPPING CHANNELS MEASUREMENT

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

A.4.1 Measurement Plots

Modulation: GFSK	Modulation: 8-DPSK
 The number hopping channel is 79.	 The number hopping channel is 79.

A.5 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

Test Date	201611/17	Temp./Hum.	25°C/58%
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

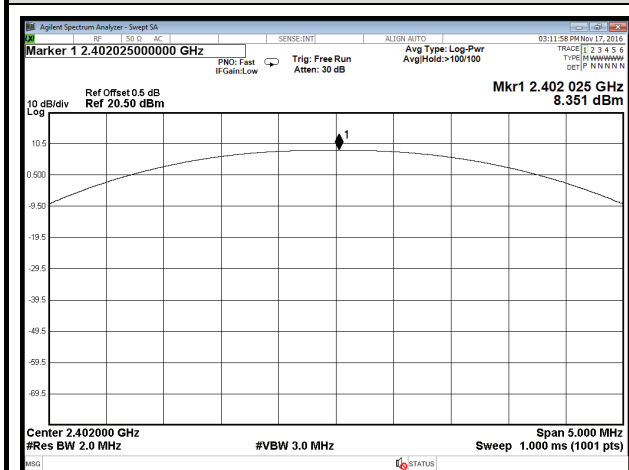
A.5.1 Output Power

Modulation	Centre Frequency (MHz)	Peak Output Power		Limit
		dBm	W	
GFSK	2402	8.351	0.006841	21dBm (0.125W)
	2441	8.241	0.006670	
	2480	7.902	0.006169	

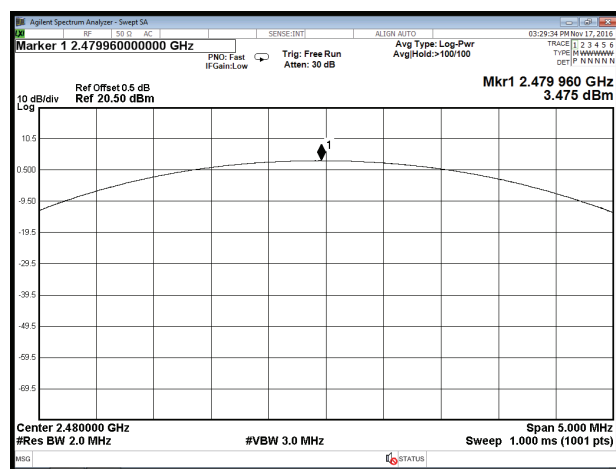
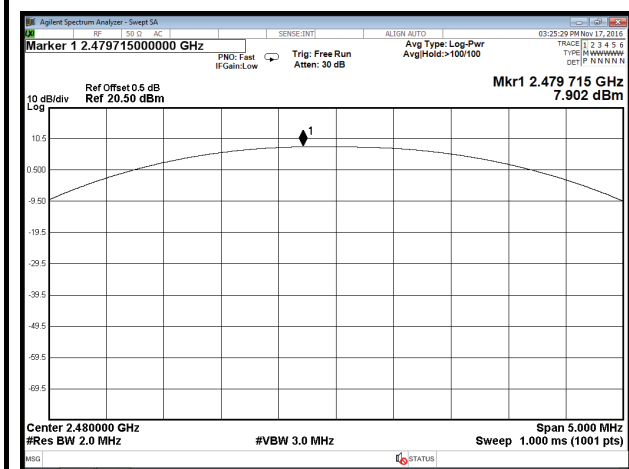
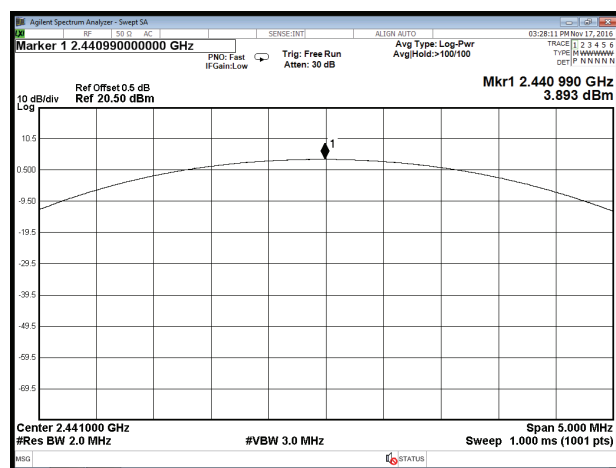
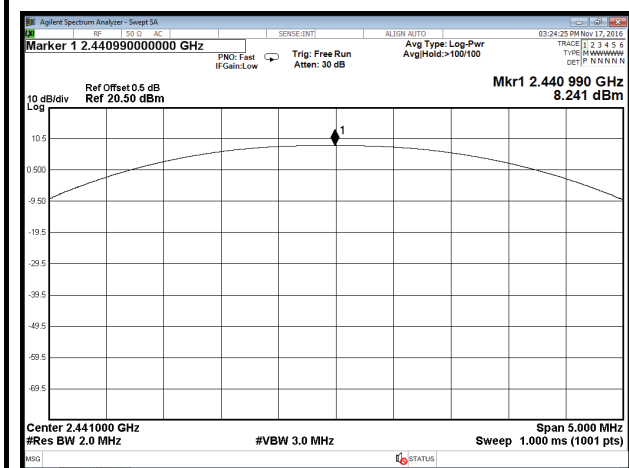
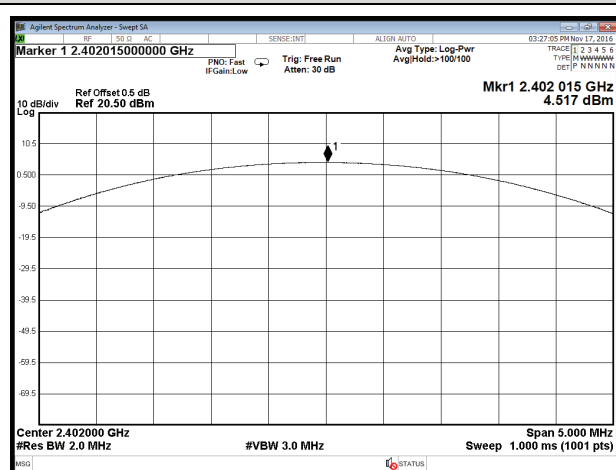
Modulation	Centre Frequency (MHz)	Peak Output Power		Limit
		dBm	W	
8-DPSK	2402	4.517	0.002829	21dBm (0.125W)
	2441	3.893	0.002451	
	2480	3.475	0.002226	

A.5.2 Measurement Plots

Modulation: GFSK



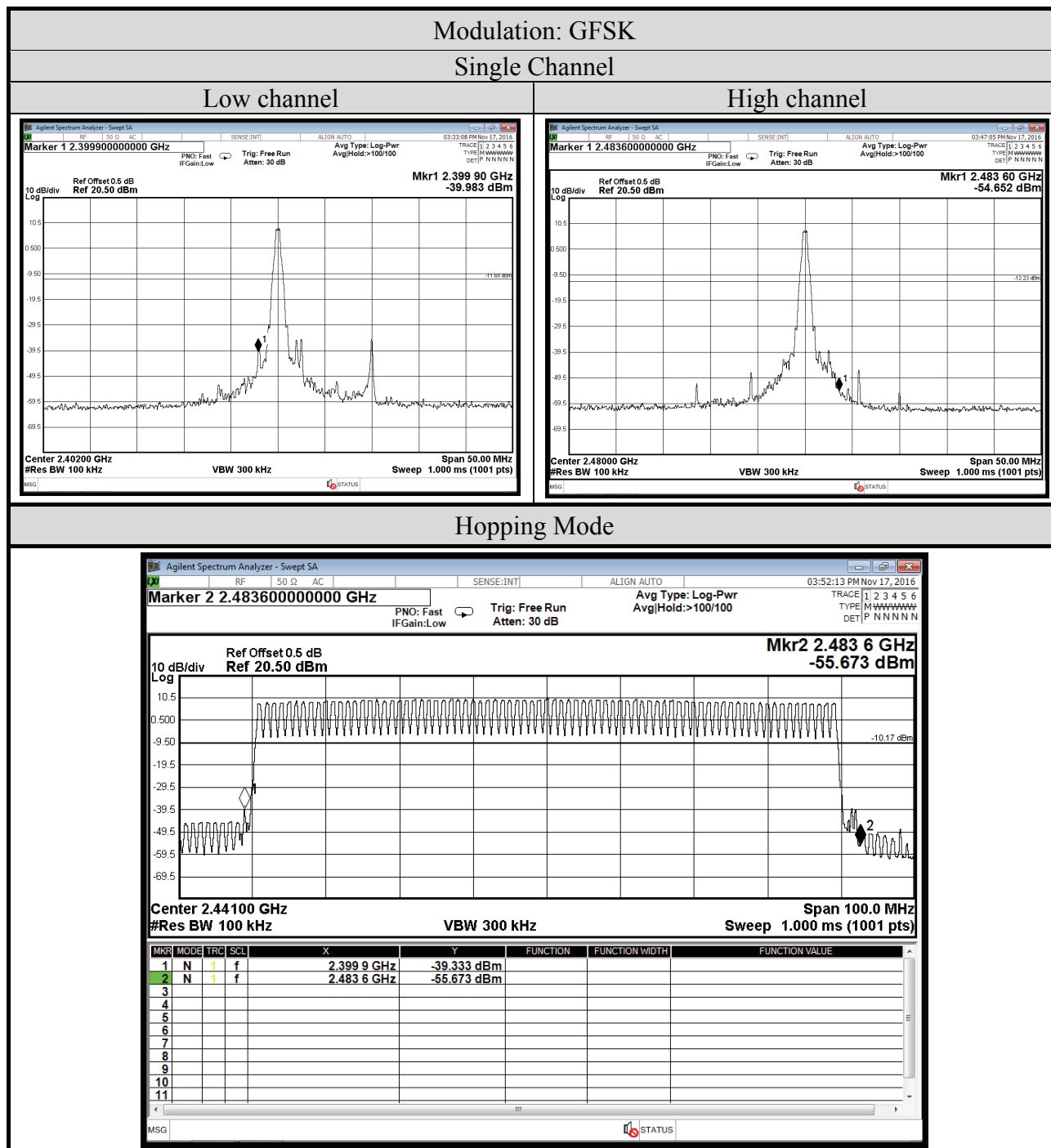
Modulation: 8-DPSK

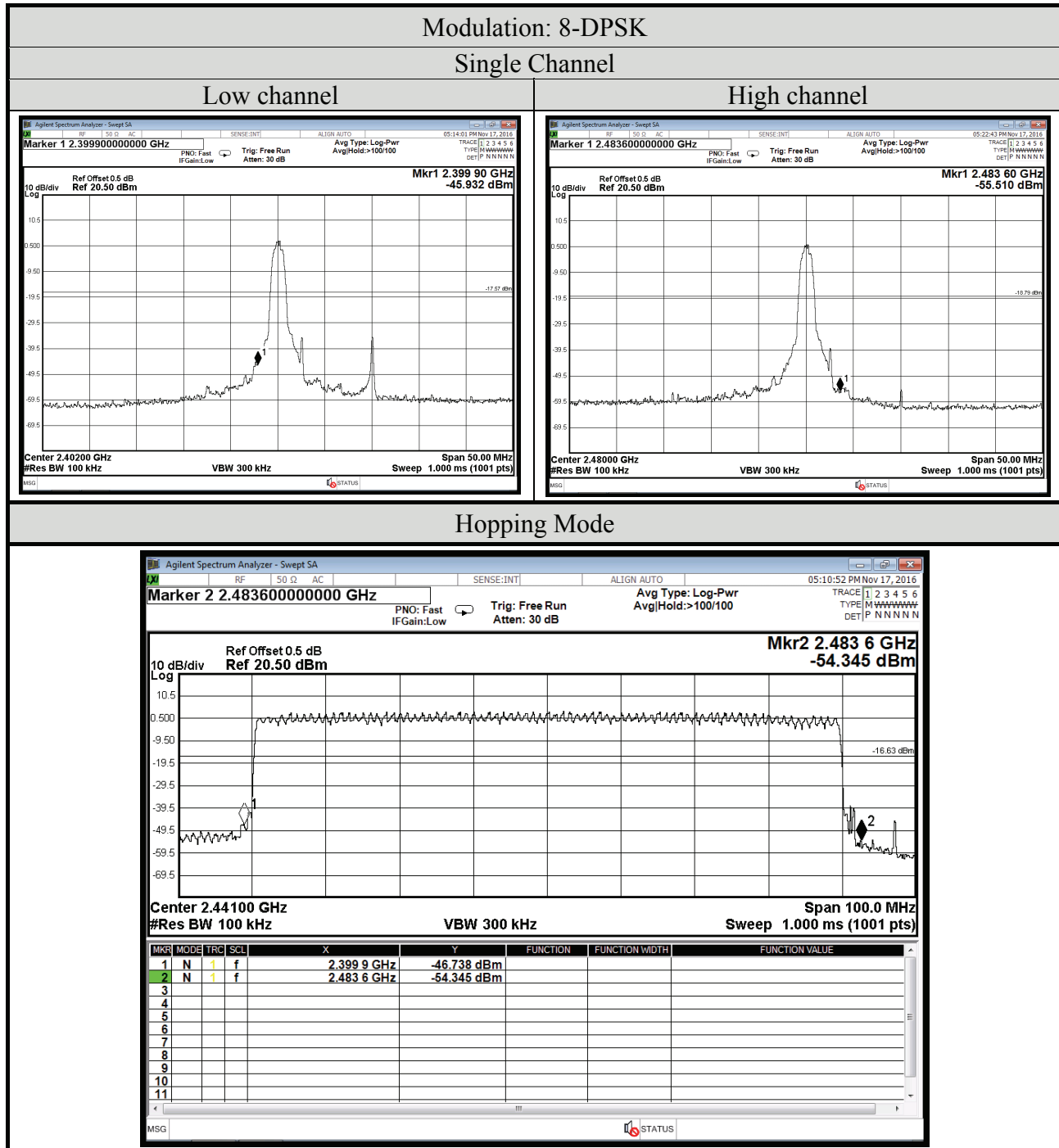


A.6 EMISSION LIMITATIONS MEASUREMENT

A.6.1 Band Edge

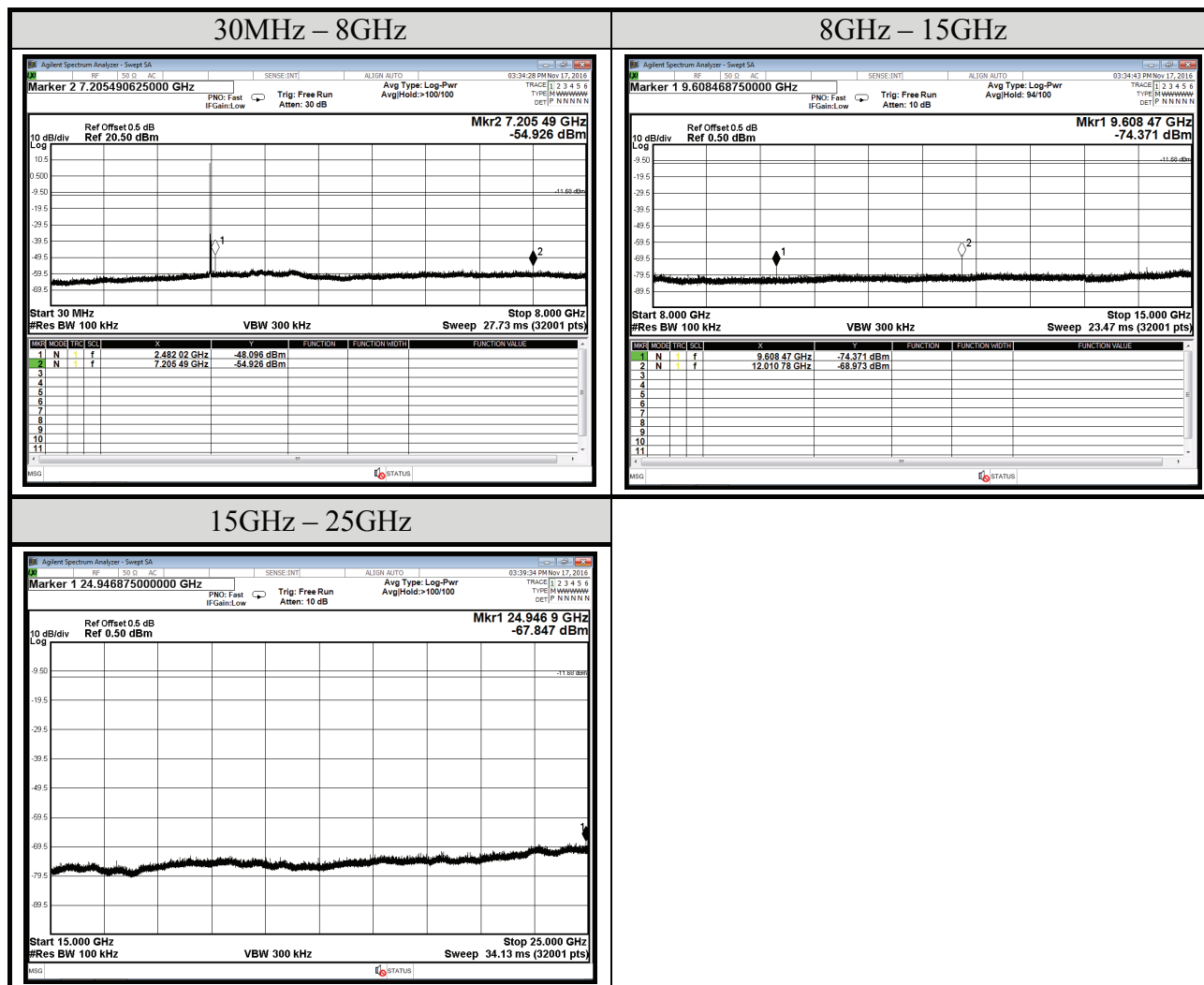
Test Date	2016/11/17	Temp./Hum.	25°C/58%
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)





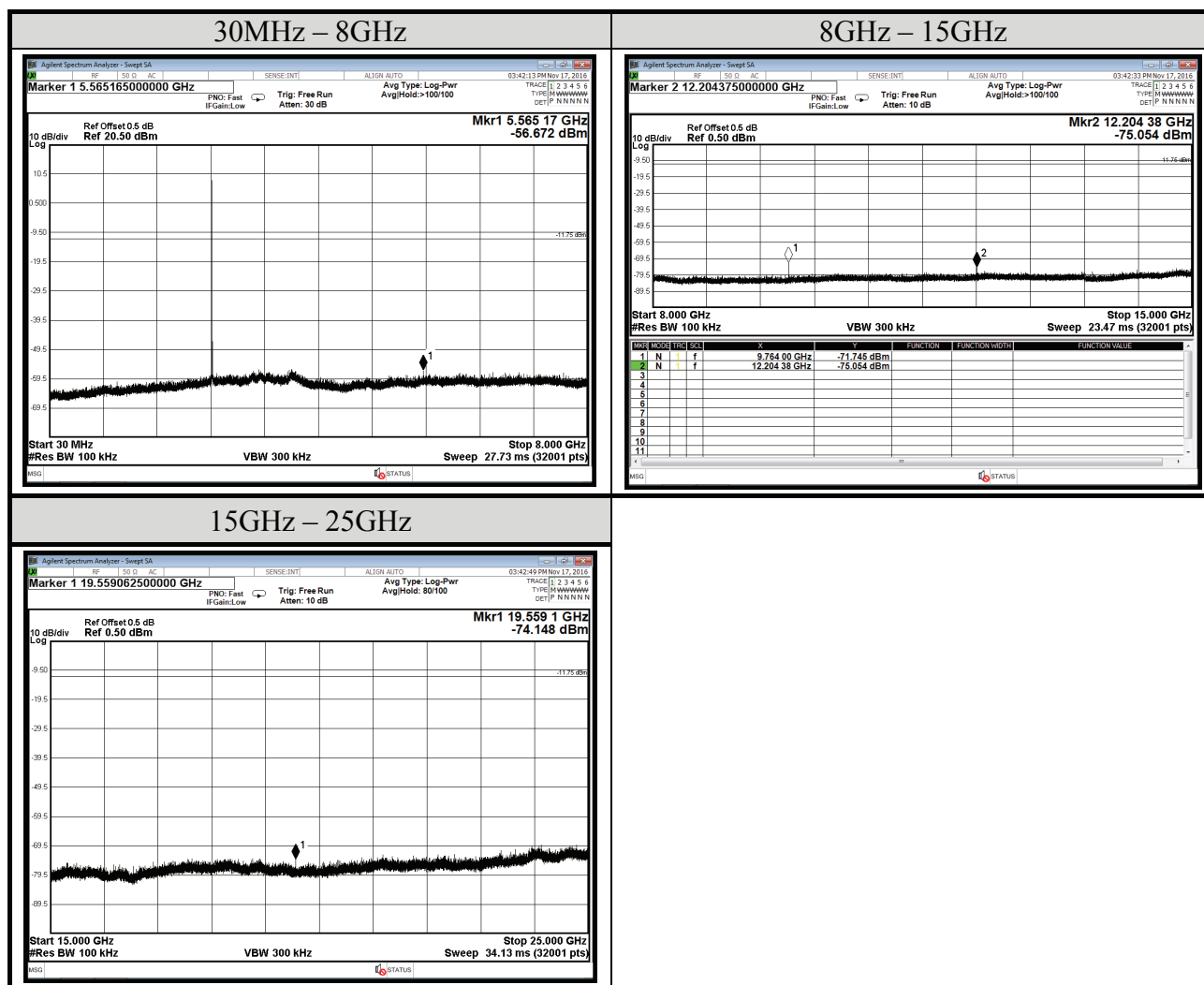
A.6.2 Spurious Emission

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Modulation	GFSK	Frequency	2402MHz
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)



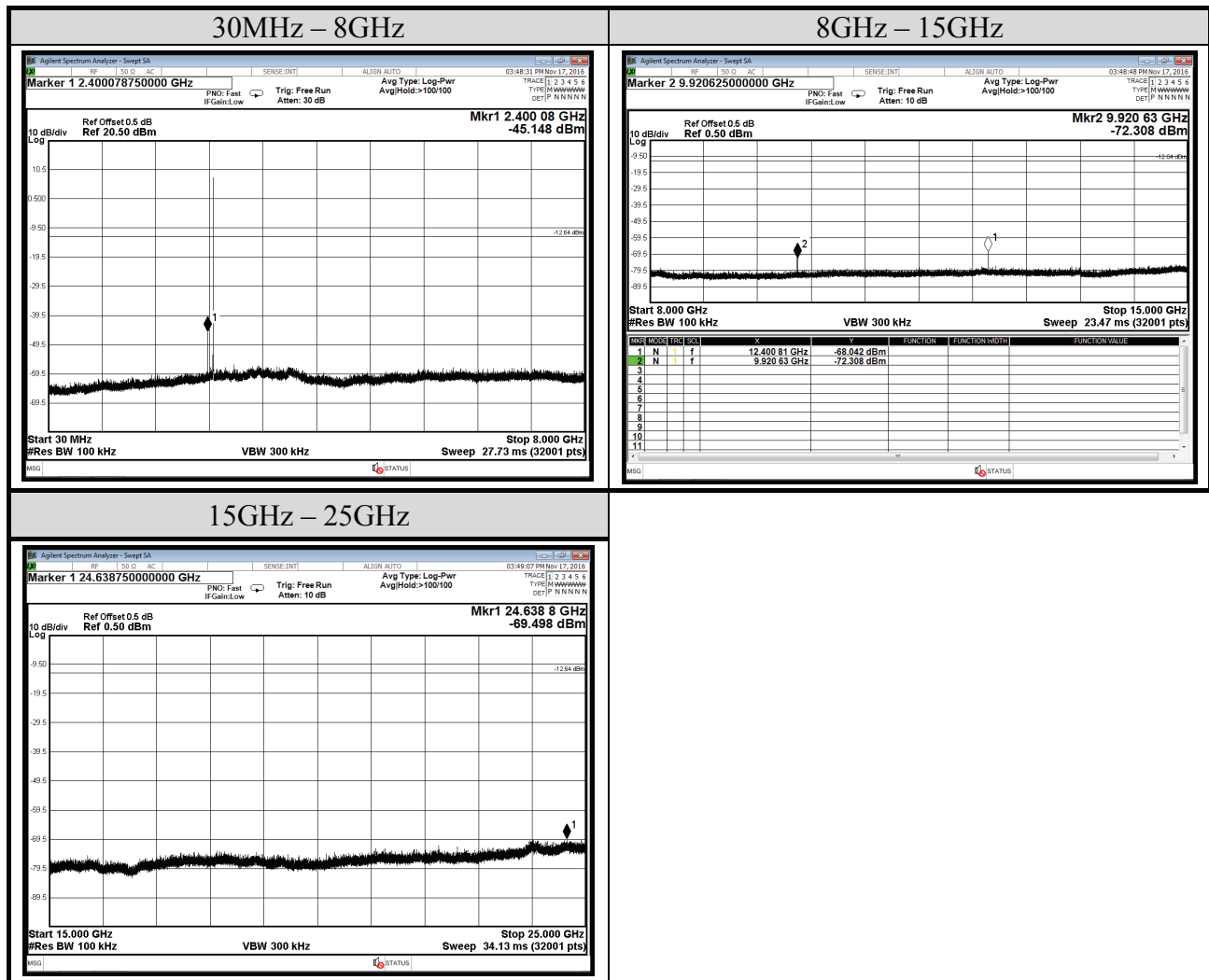
Note: All results have been included cable loss.

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Modulation	GFSK	Frequency	2441MHz
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)



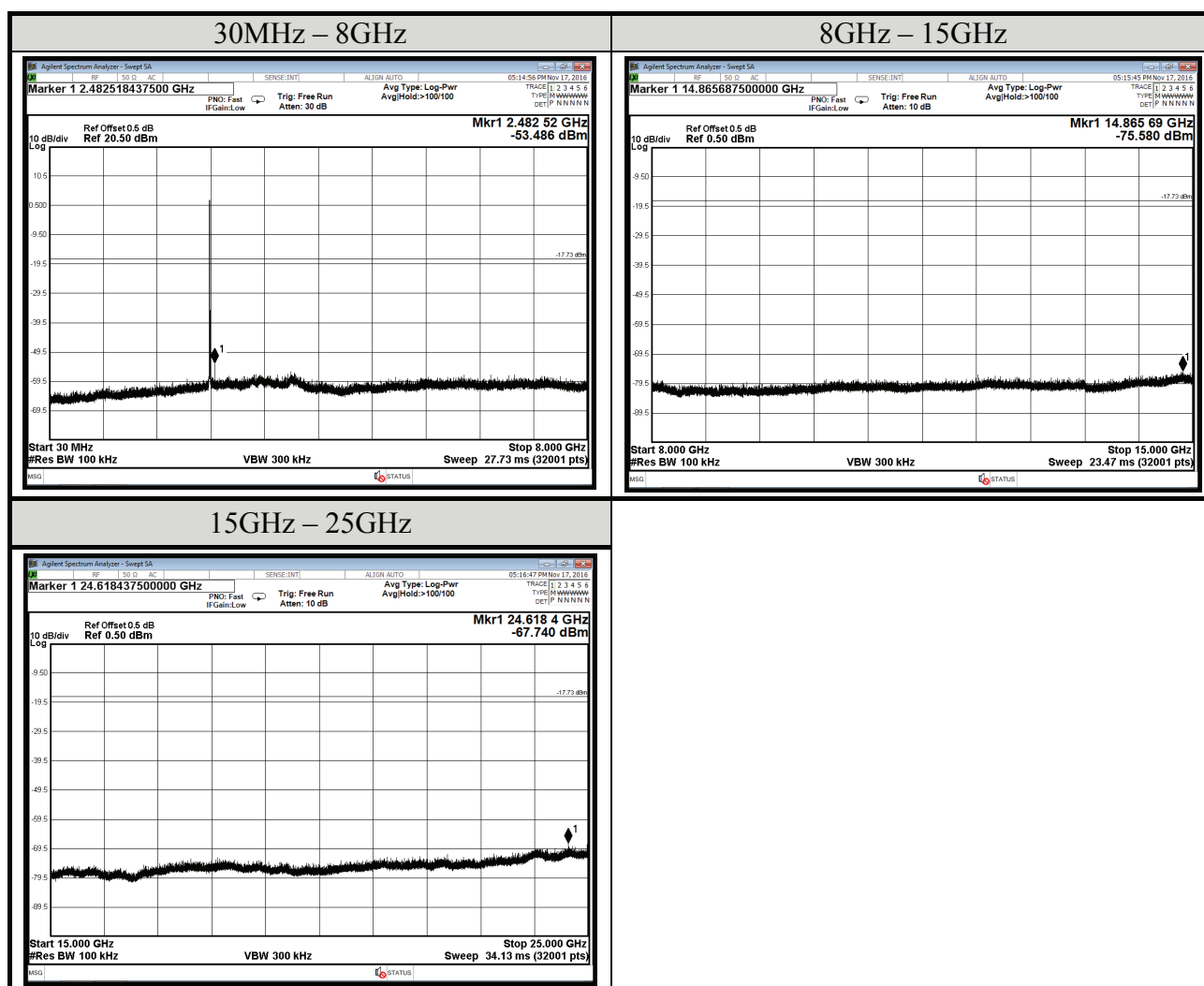
Note: All results have been included cable loss.

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Modulation	GFSK	Frequency	2480MHz
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)



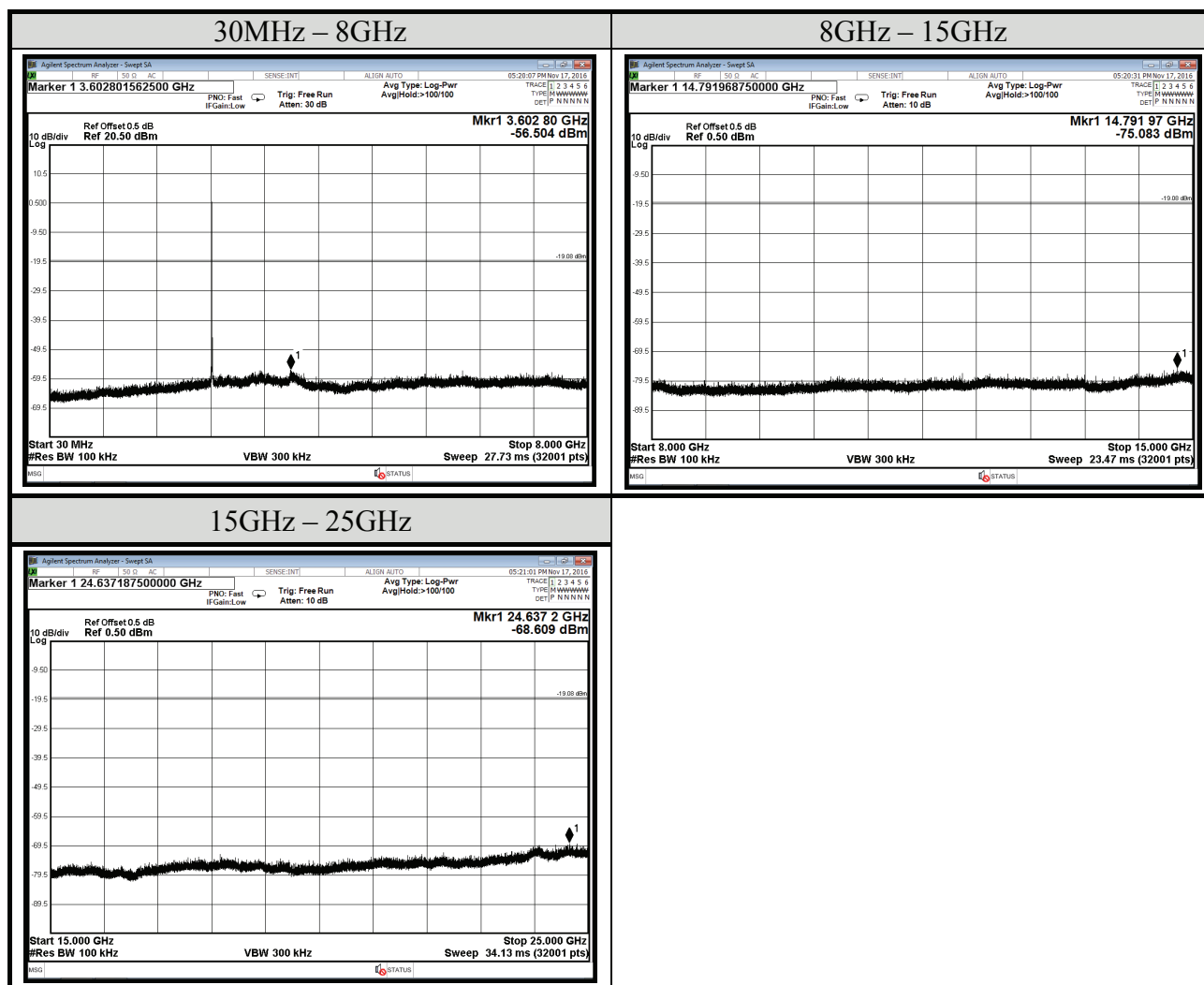
Note: All results have been included cable loss.

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Modulation	8-DPSK	Frequency	2402MHz
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)



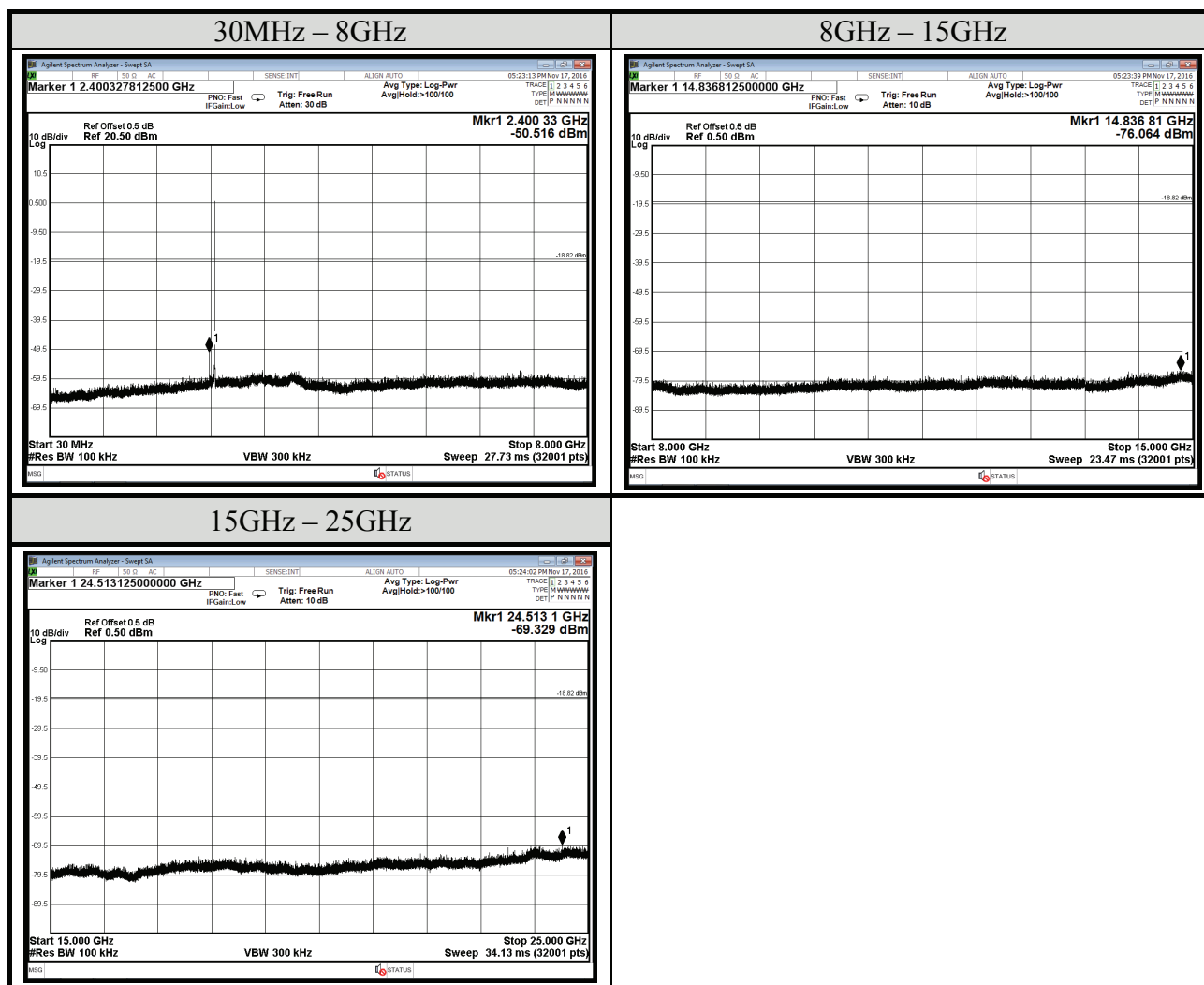
Note: All results have been included cable loss.

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Modulation	8-DPSK	Frequency	2441MHz
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)



Note: All results have been included cable loss.

Test Date	2016/11/17	Temp./Hum.	25°C/58%
Modulation	8-DPSK	Frequency	2480MHz
Cable Loss	0.5dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)



Note: All results have been included cable loss.