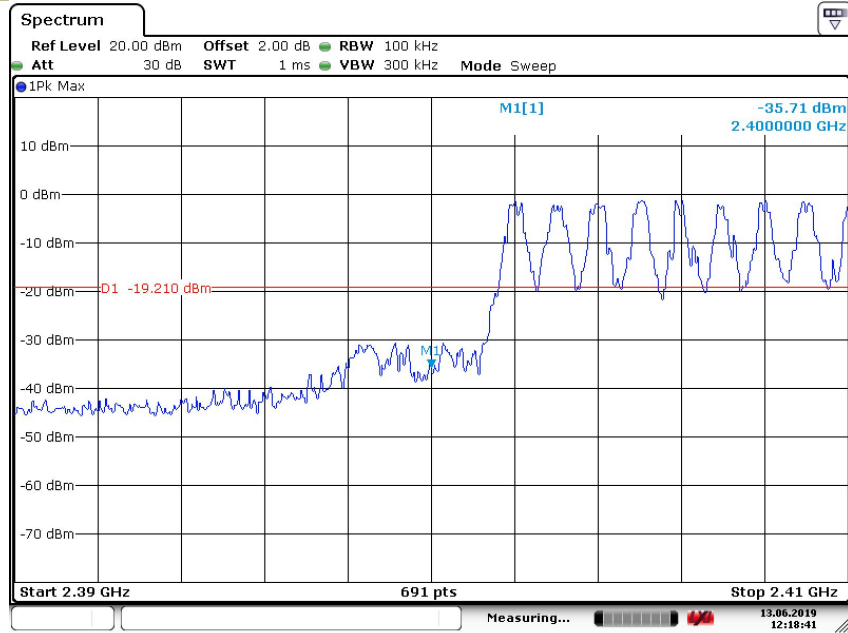


Test Model

Band-edge Conducted Emissions

Hopping

GFSK



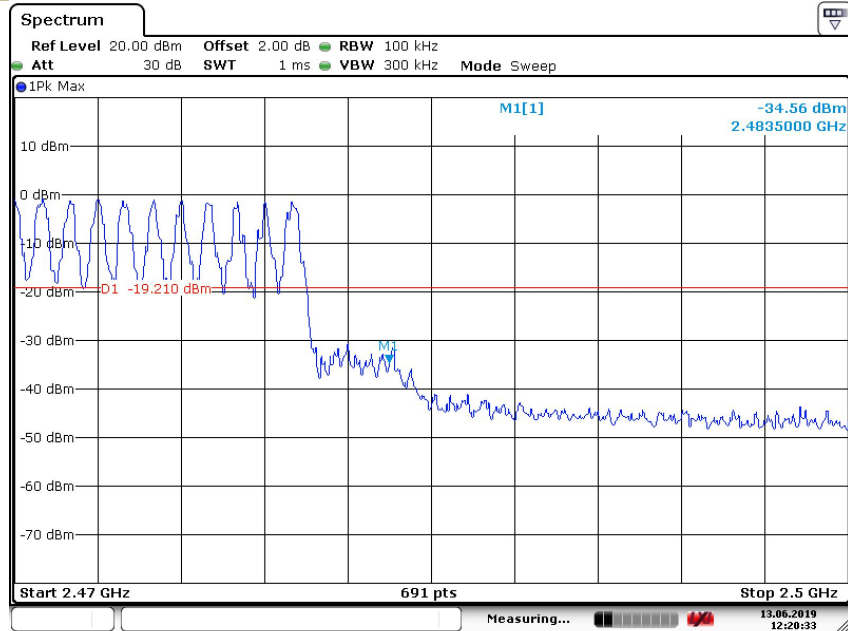
Date: 13.JUN.2019 12:18:42

Test Model

Band-edge Conducted Emissions

Hopping

GFSK



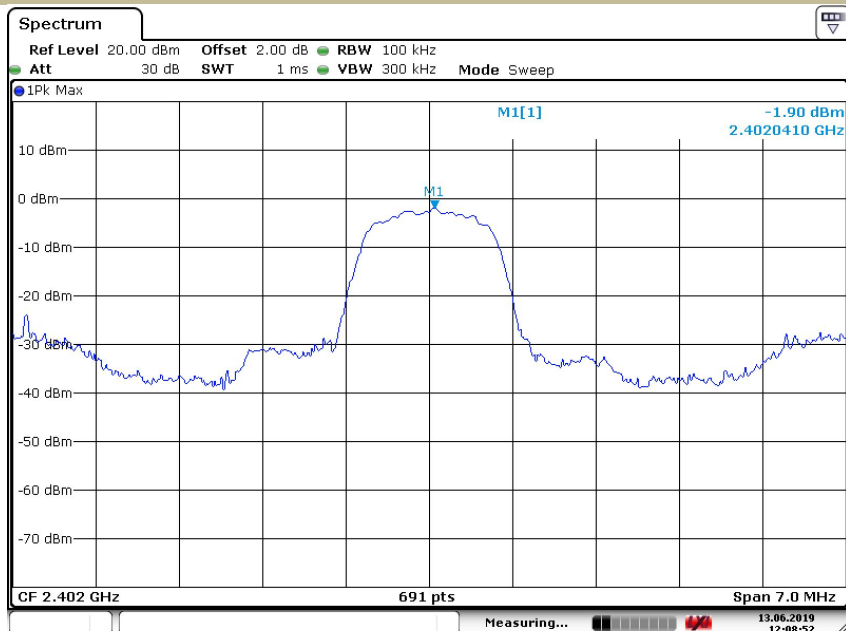
Date: 13.JUN.2019 12:20:34

Test Model

Maximum Conducted Level RBW=100kHz

Channel 0: 2402MHz

π /4DQPSK



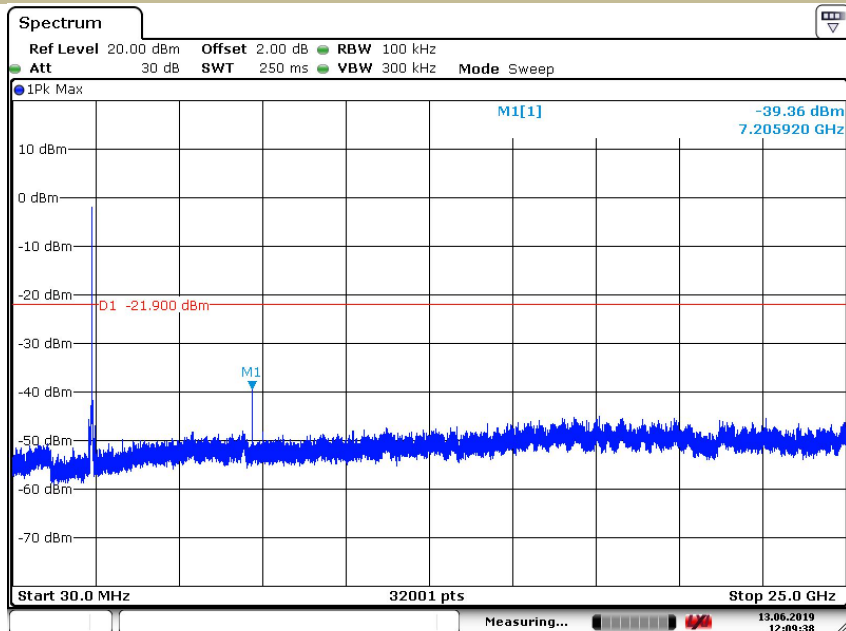
Date: 13.JUN.2019 12:08:52

Test Model

Conducted Spurious RF Conducted Emission

Channel 0: 2402MHz

π /4DQPSK



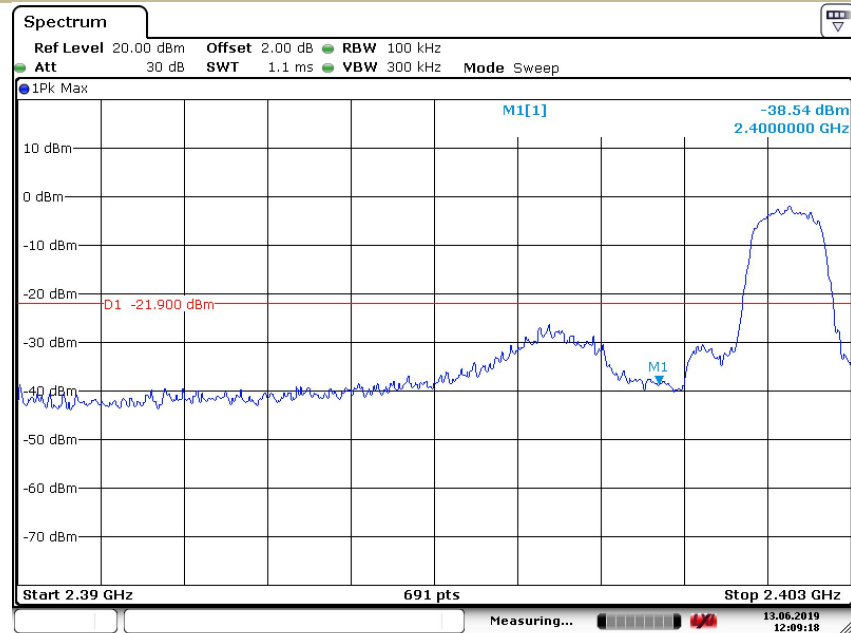
Date: 13.JUN.2019 12:09:38

Test Model

Band-edge Conducted Emissions

Channel 0: 2402MHz

π /4DQPSK



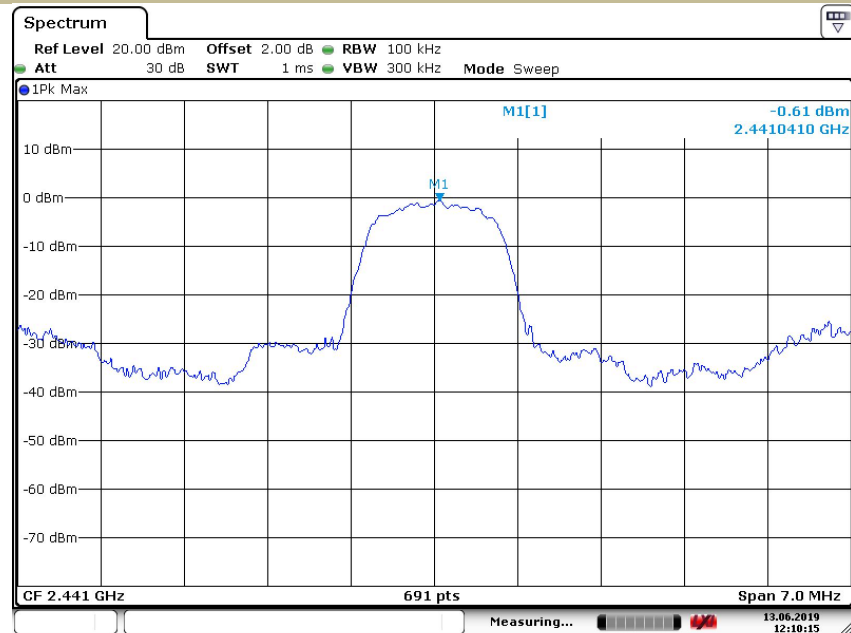
Date: 13.JUN.2019 12:09:18

Test Model

Maximum Conducted Level RBW=100kHz

Channel 39: 2441MHz

π /4DQPSK



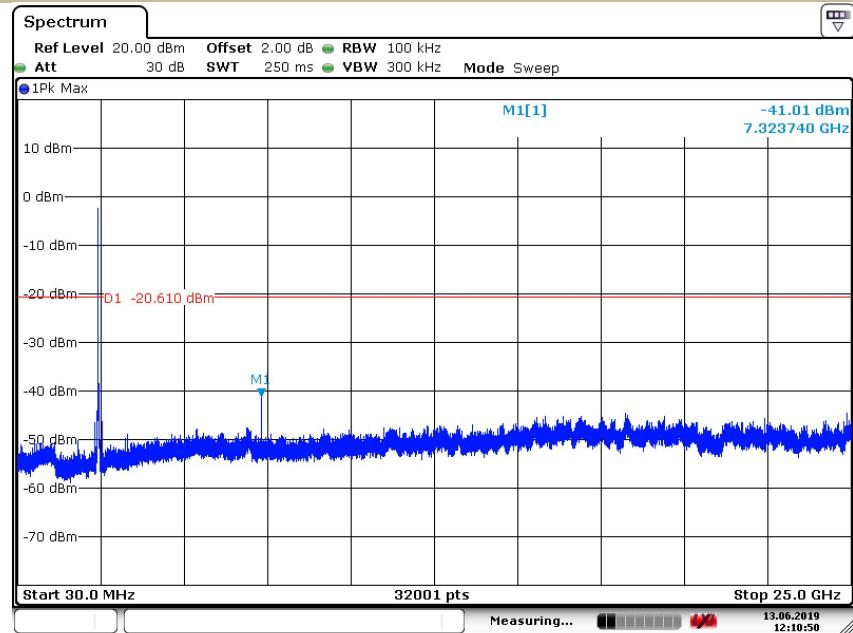
Date: 13.JUN.2019 12:10:15

Test Model

Conducted Spurious RF Conducted Emission

Channel 39: 2441MHz

π /4DQPSK



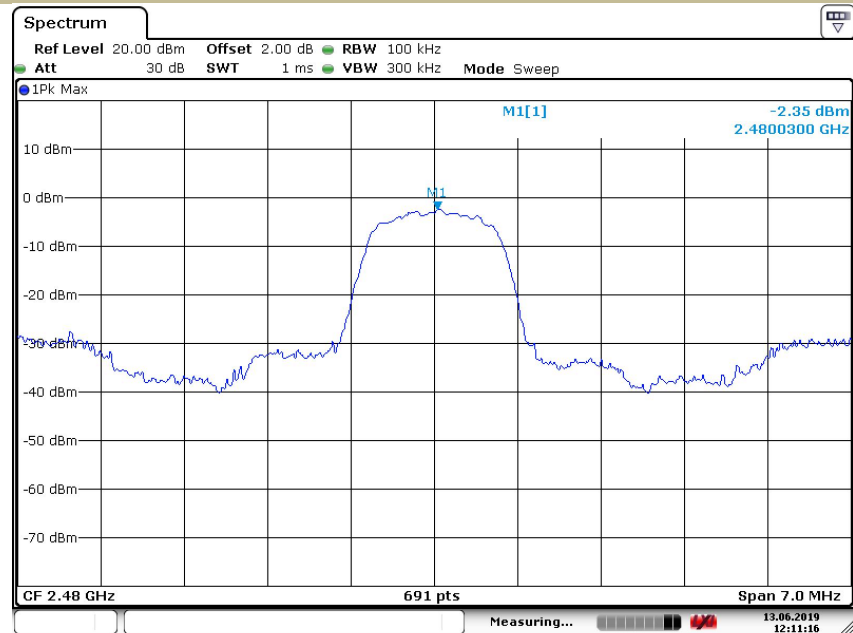
Date: 13.JUN.2019 12:10:51

Test Model

Maximum Conducted Level RBW=100kHz

Channel 78: 2480MHz

π /4DQPSK



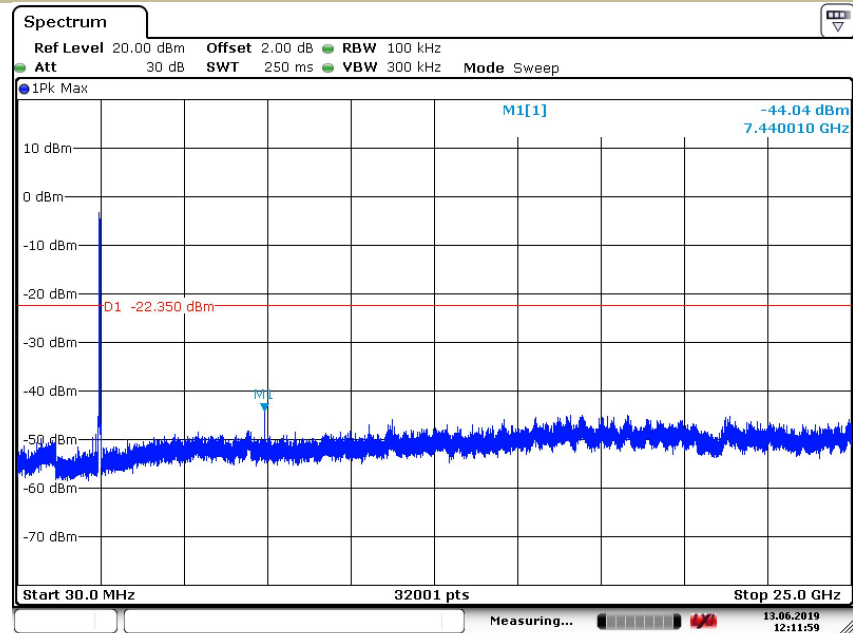
Date: 13.JUN.2019 12:11:17

Test Model

Conducted Spurious RF Conducted Emission

Channel 78: 2480MHz

π /4DQPSK



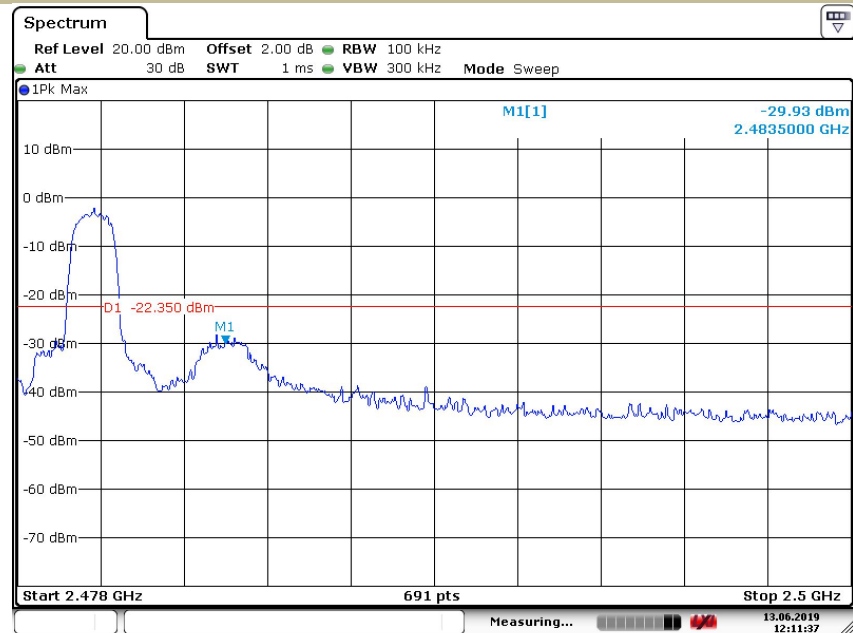
Date: 13.JUN.2019 12:12:00

Test Model

Band-edge Conducted Emissions

Channel 78: 2480MHz

π /4DQPSK



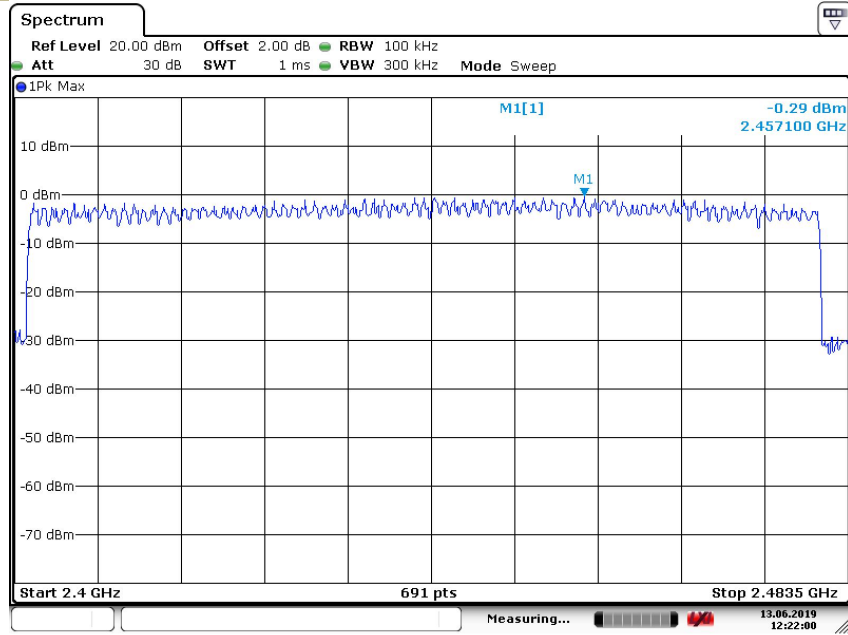
Date: 13.JUN.2019 12:11:38

Test Model

Maximum Conducted Level RBW=100kHz

Hopping

$\pi/4$ DQPSK



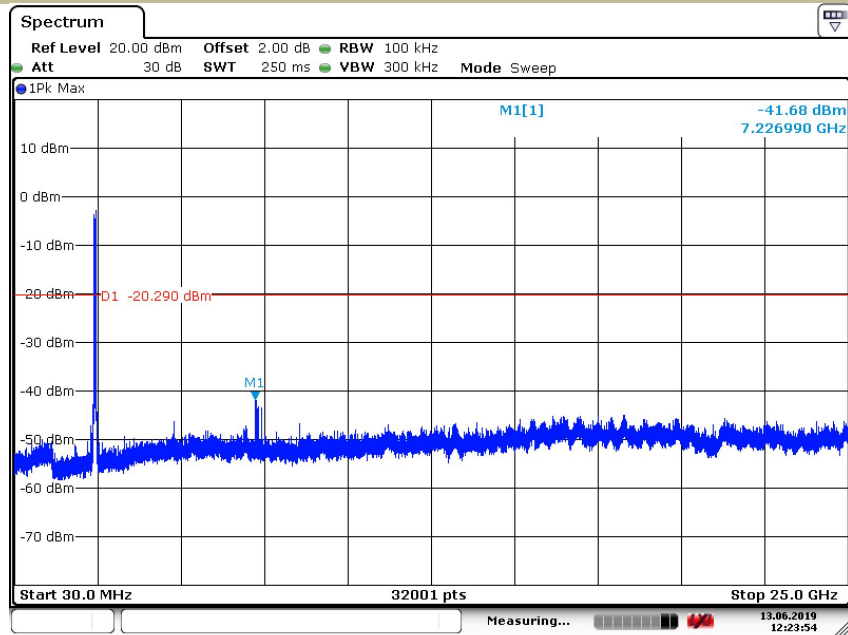
Date: 13.JUN.2019 12:22:01

Test Model

Conducted Spurious RF Conducted Emission

Hopping

$\pi/4$ DQPSK



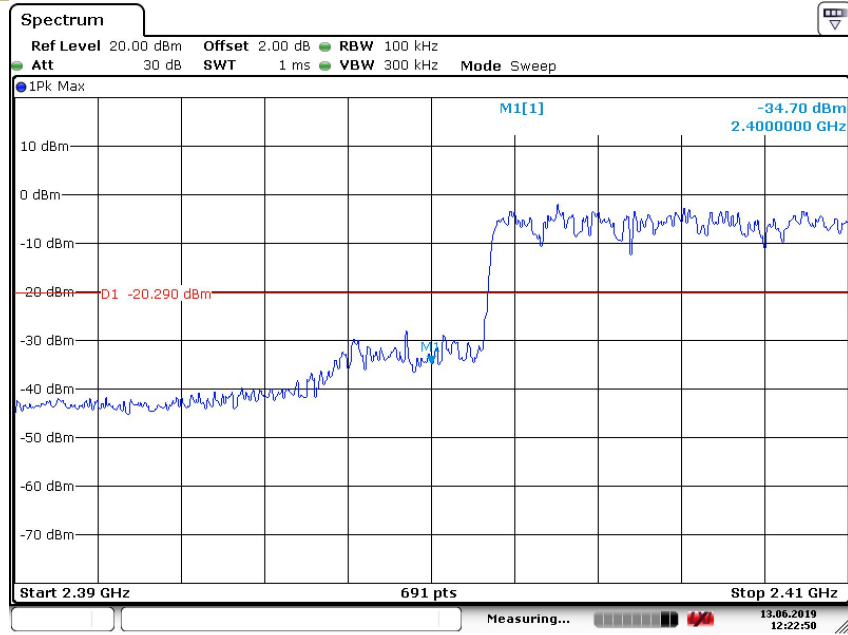
Date: 13.JUN.2019 12:23:55

Test Model

Band-edge Conducted Emissions

Hopping

π /4DQPSK



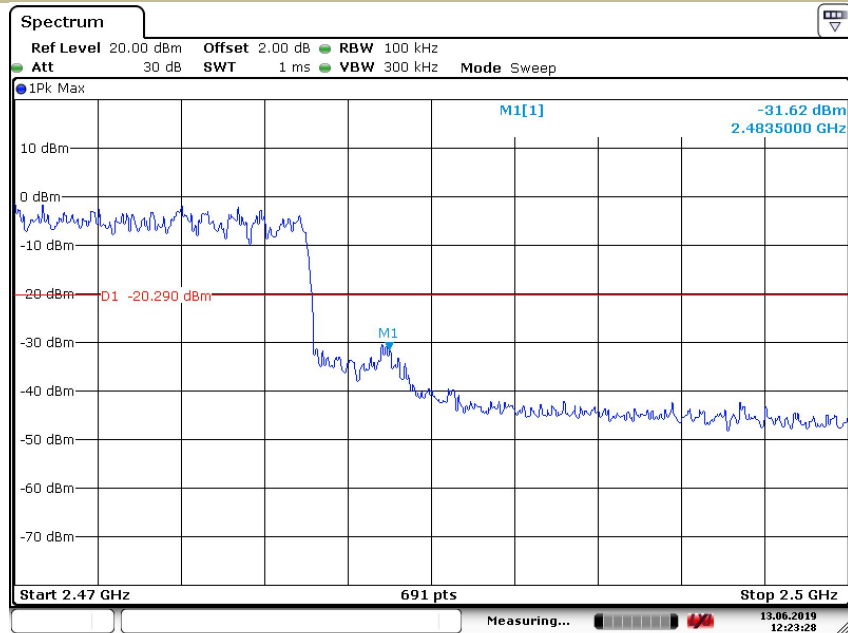
Date: 13.JUN.2019 12:22:51

Test Model

Band-edge Conducted Emissions

Hopping

π /4DQPSK



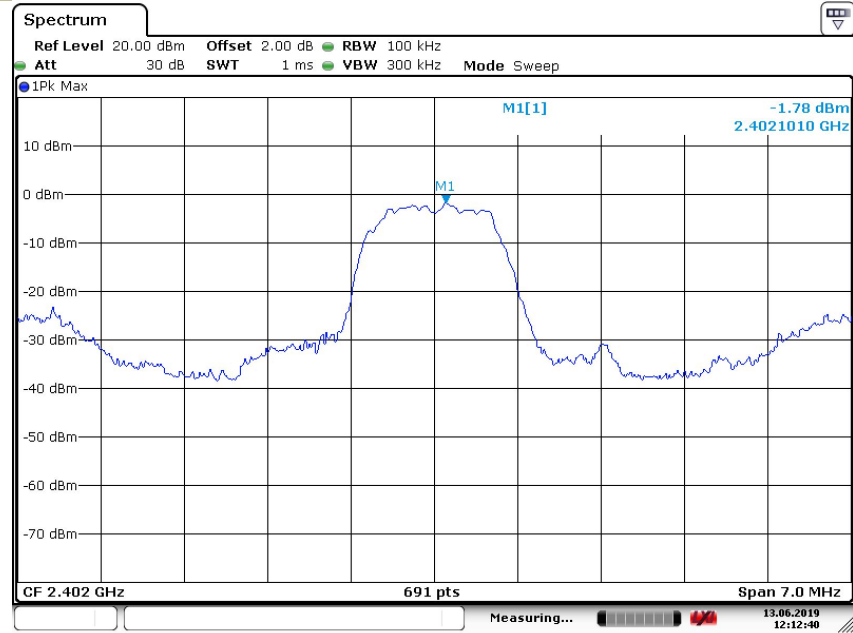
Date: 13.JUN.2019 12:23:28

Test Model

Maximum Conduced Level RBW=100kHz

Channel 0: 2402MHz

8DPSK



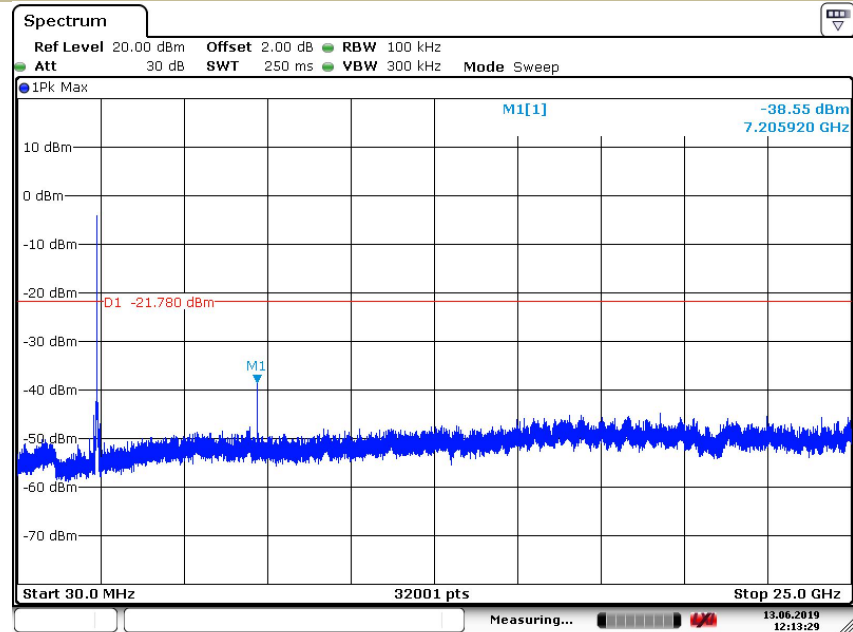
Date: 13.JUN.2019 12:12:40

Test Model

Conduced Spurious RF Conducted Emission

Channel 0: 2402MHz

8DPSK



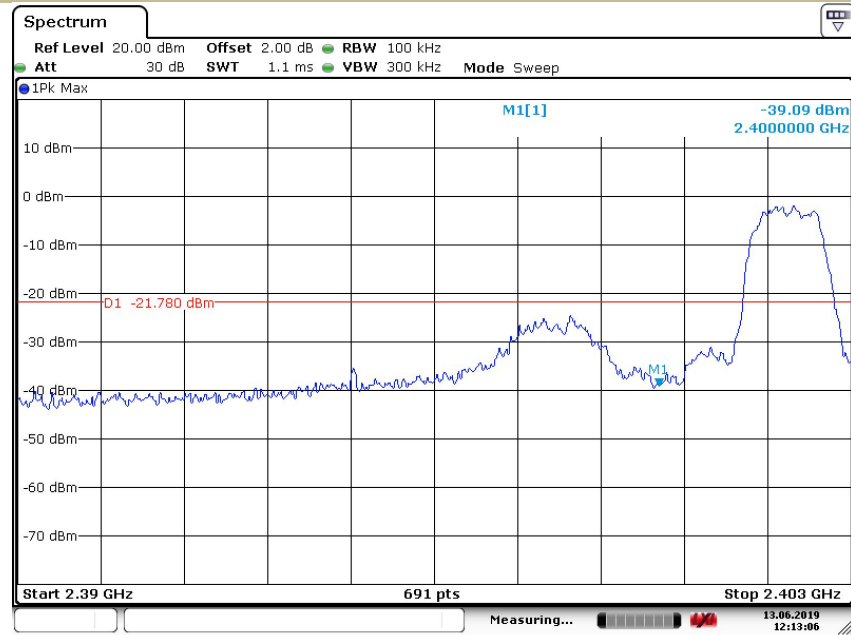
Date: 13.JUN.2019 12:13:29

Test Model

Band-edge Conducted Emissions

Channel 0: 2402MHz

8DPSK



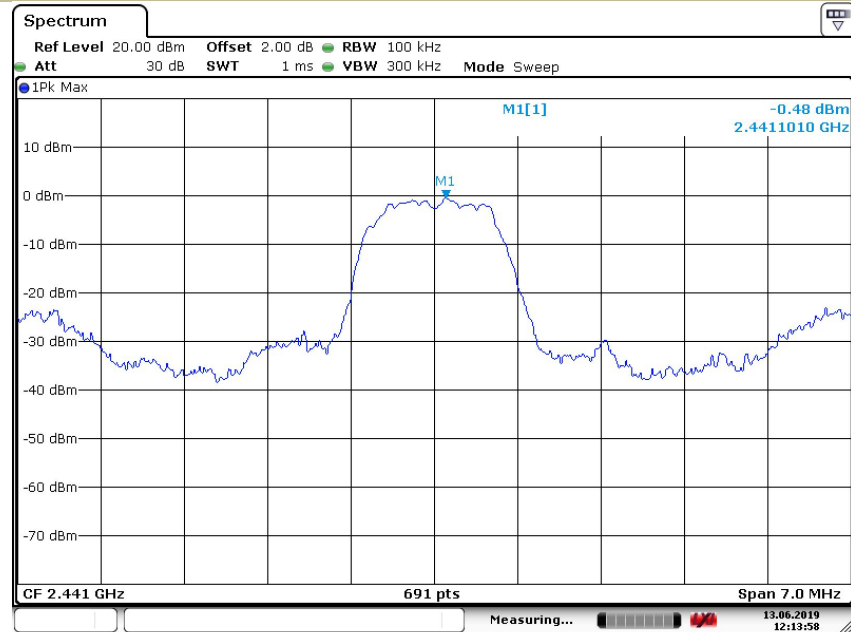
Date: 13.JUN.2019 12:13:07

Test Model

Maximum Conducted Level RBW=100kHz

Channel 39: 2441MHz

8DPSK



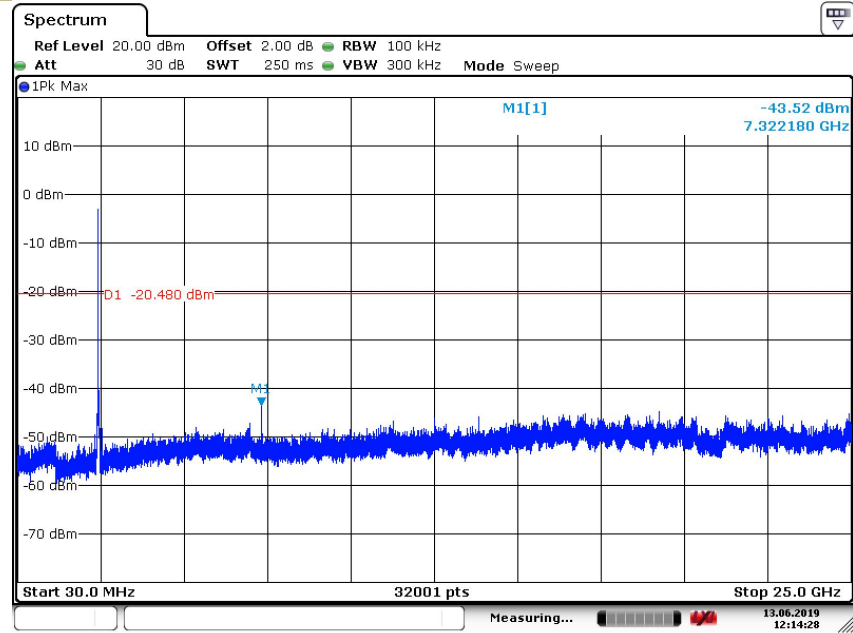
Date: 13.JUN.2019 12:13:58

Test Model

Conducted Spurious RF Conducted Emission

Channel 39: 2441MHz

8DPSK



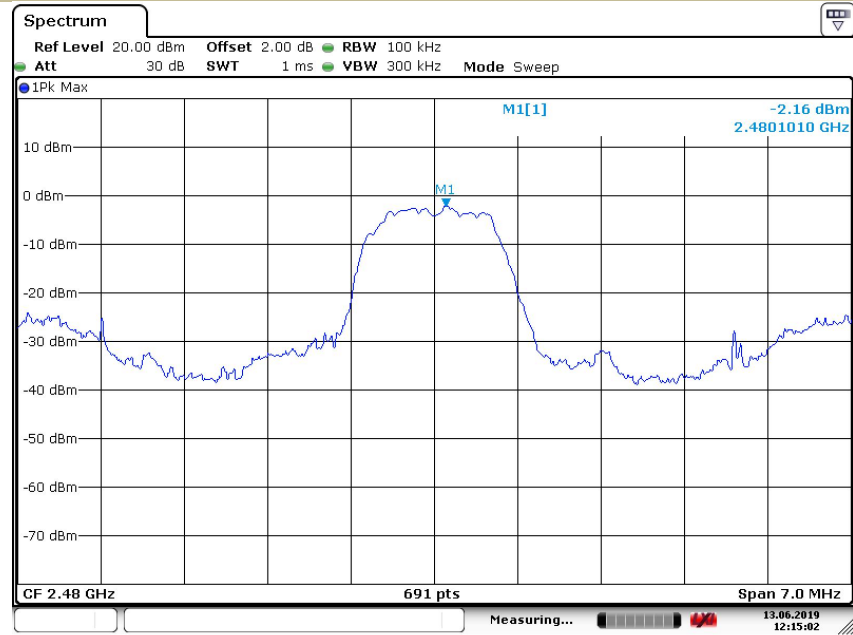
Date: 13.JUN.2019 12:14:28

Test Model

Maximum Conducted Level RBW=100kHz

Channel 78: 2480MHz

8DPSK



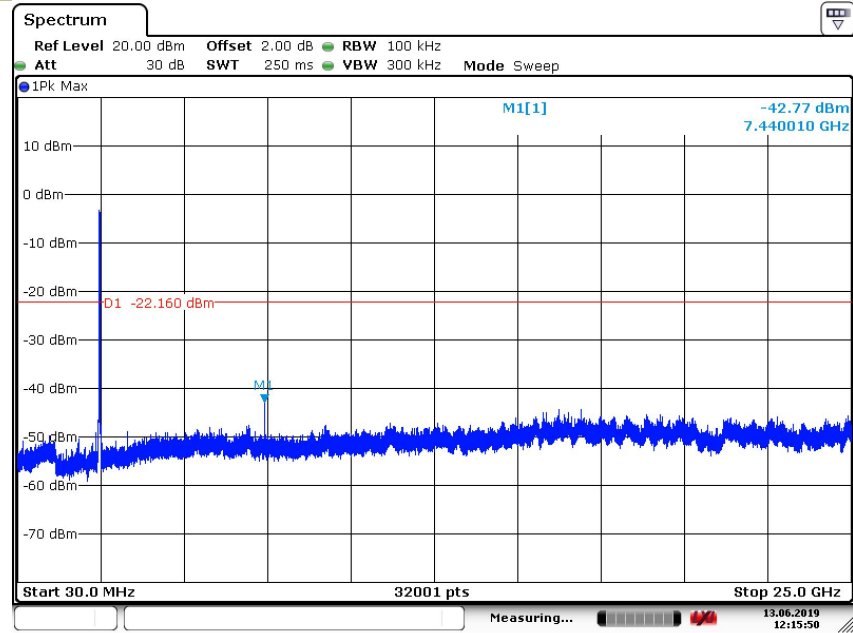
Date: 13.JUN.2019 12:15:03

Test Model

Conducted Spurious RF Conducted Emission

Channel 78: 2480MHz

8DPSK



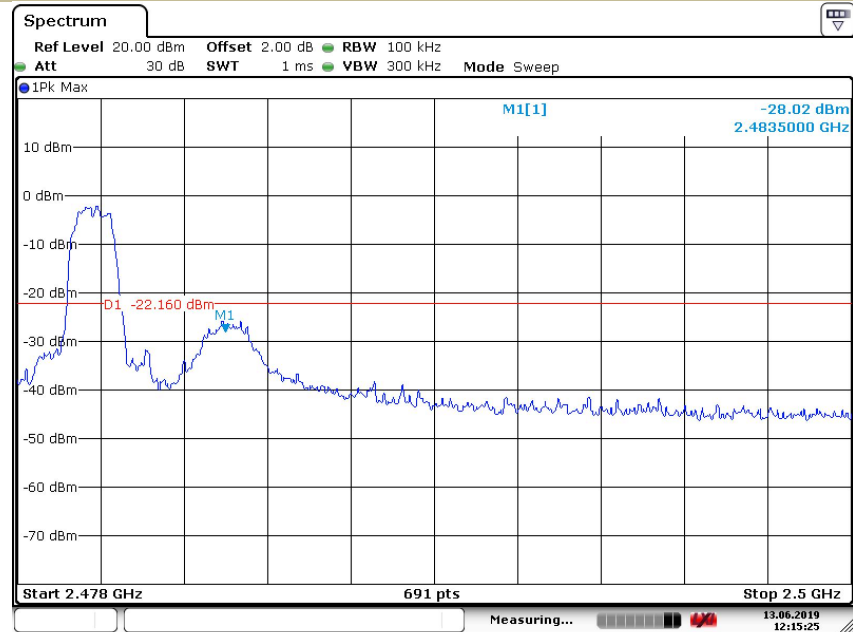
Date: 13.JUN.2019 12:15:51

Test Model

Band-edge Conducted Emissions

Channel 78: 2480MHz

8DPSK



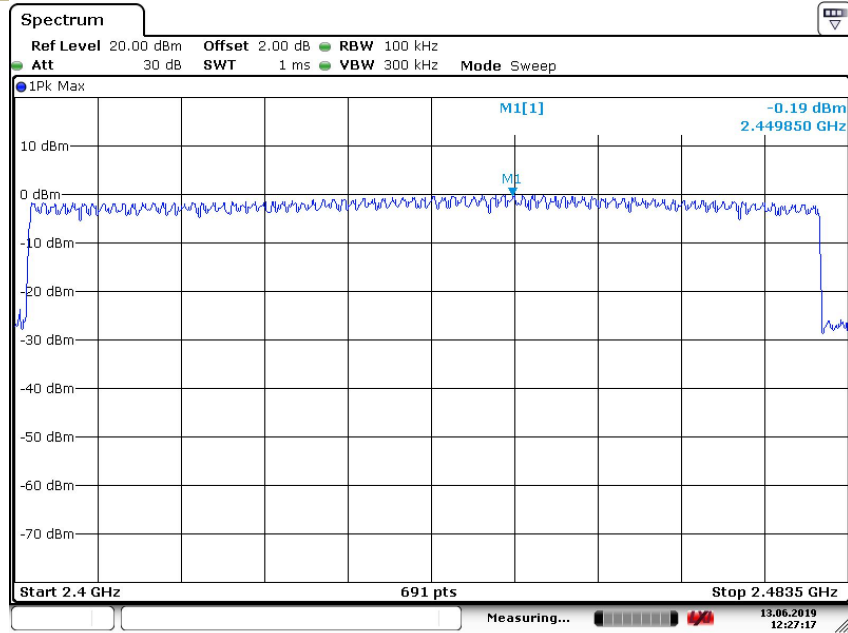
Date: 13.JUN.2019 12:15:26

Test Model

Maximum Conducted Level RBW=100kHz

Hopping

8DPSK



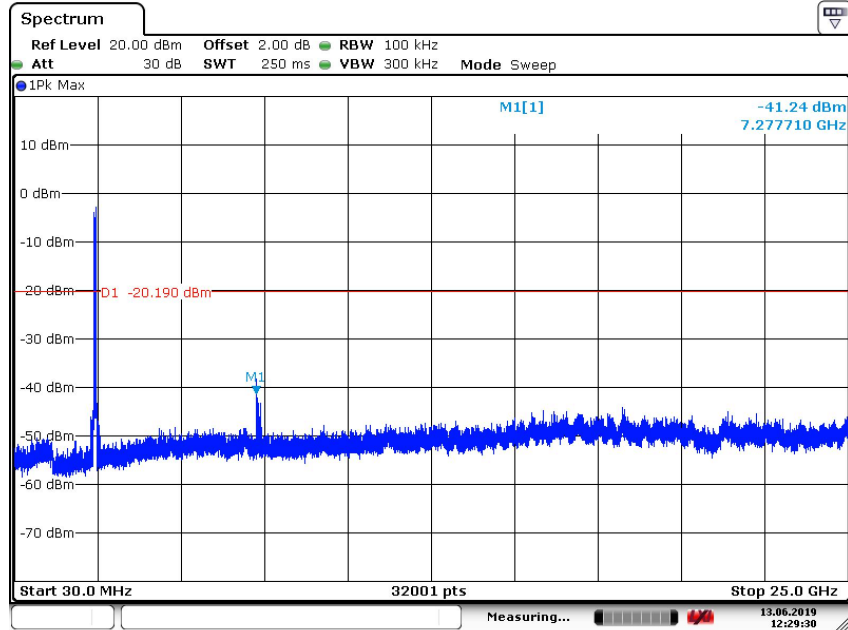
Date: 13.JUN.2019 12:27:17

Test Model

Conducted Spurious RF Conducted Emission

Hopping

8DPSK



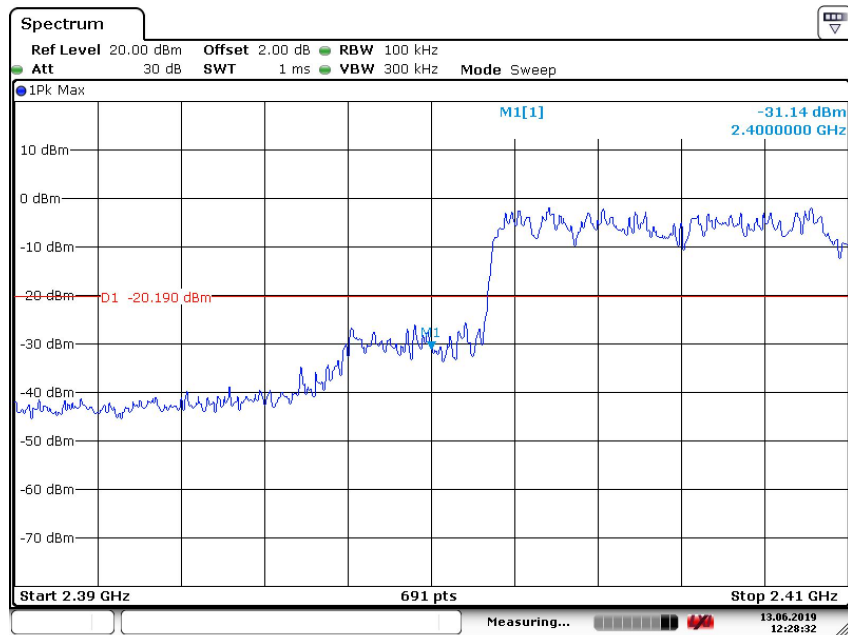
Date: 13.JUN.2019 12:29:30

Test Model

Band-edge Conducted Emissions

Hopping

8DPSK



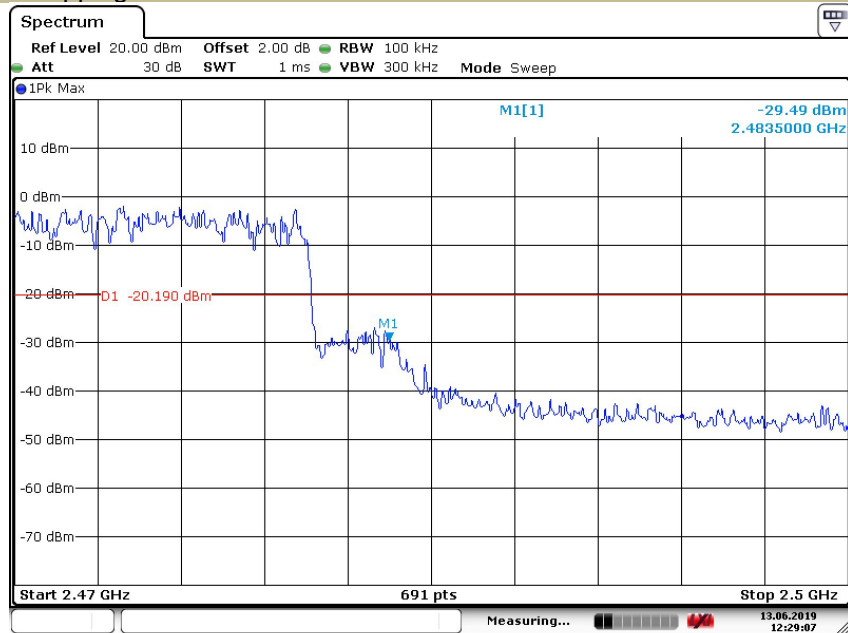
Date: 13.JUN.2019 12:28:32

Test Model

Band-edge Conducted Emissions

Hopping

8DPSK



Date: 13.JUN.2019 12:29:07

9.7 RADIATED SPURIOUS EMISSION

9.7.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 MEAS GUIDANCE v05r02

9.7.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part 15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

9.7.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

9.7.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

For Above 1GHz:

The EUT was placed on a turn table which is 1.5m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz

VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 1GHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz for

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 30MHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 9kHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 150KHz:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 200Hz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

9.7.5 Test Results

■ Spurious Emission below 30MHz (9KHz to 30MHz)

Temperature:	26°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

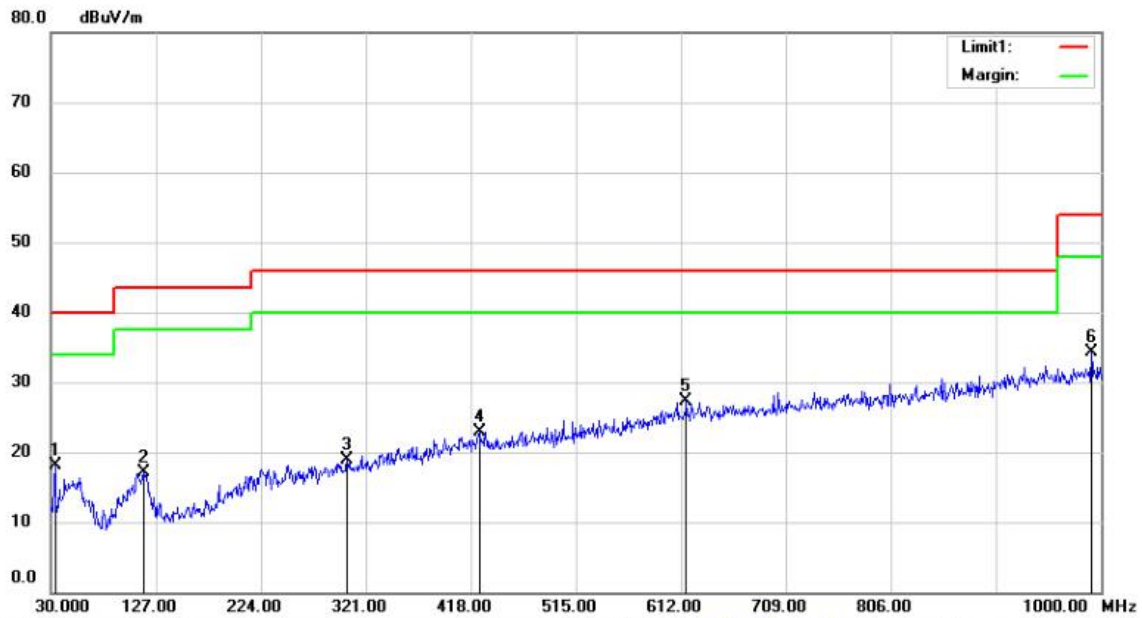
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $40\log(\text{Specific distance}/ \text{test distance})$ (dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor

■ Spurious Emission below 1GHz (30MHz to 1GHz)



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: FCC PART 15C

Power: AC 120V/60Hz

Humidity: 48 %

Mode:DH1 2402

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		33.8800	31.24	-13.12	18.12	40.00	-21.88	QP		
2		115.8450	30.48	-13.40	17.08	43.50	-26.42	QP		
3		303.5400	27.11	-8.24	18.87	46.00	-27.13	QP		
4		425.8811	28.41	-5.48	22.93	46.00	-23.07	QP		
5	*	617.4561	29.19	-1.94	27.25	46.00	-18.75	QP		
6		991.8762	30.49	3.80	34.29	54.00	-19.71	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: FCC PART 15C

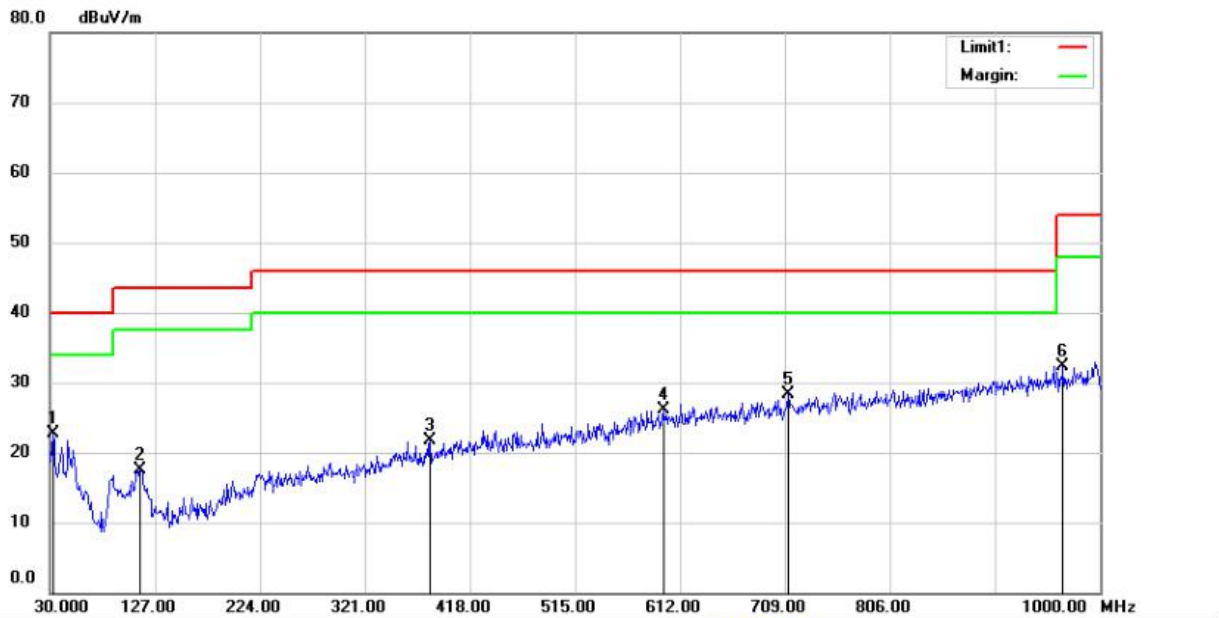
Power: AC 120V/60Hz

Humidity: 48 %

Mode: DH1 2402

Note:

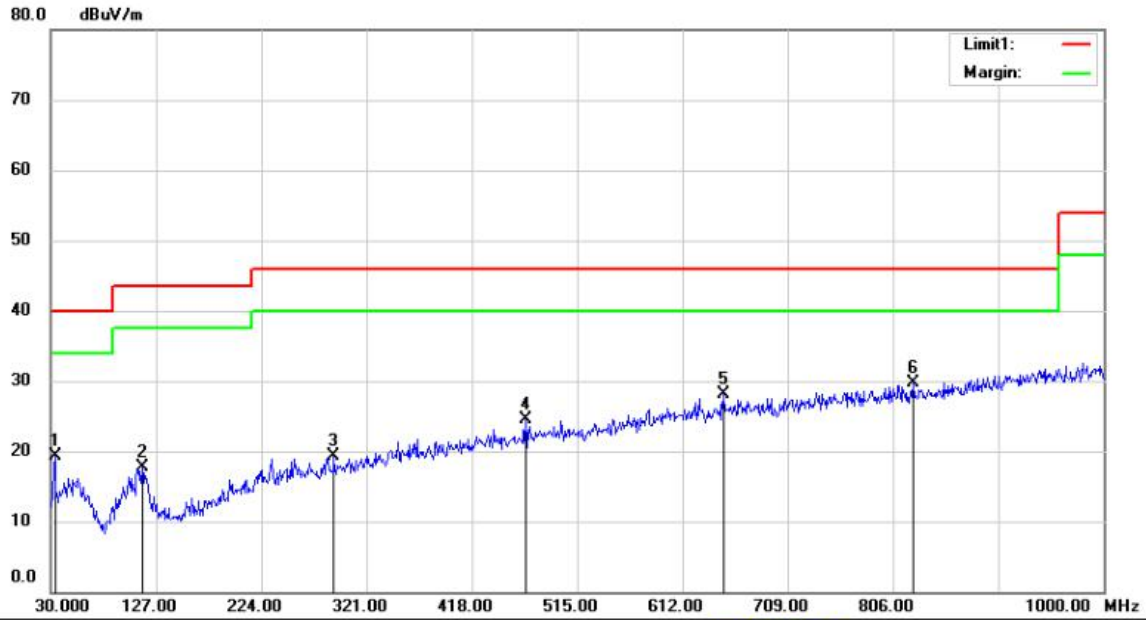
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		47.5812	32.52	-11.20	21.32	40.00	-18.68	QP		
2		112.8137	31.74	-12.96	18.78	43.50	-24.72	QP		
3		269.7112	28.37	-9.30	19.07	46.00	-26.93	QP		
4		617.5774	28.75	-1.93	26.82	46.00	-19.18	QP		
5	*	790.2374	28.30	0.15	28.45	46.00	-17.55	QP		
6		983.0250	29.12	3.60	32.72	54.00	-21.28	QP		



Site 3m Chamber #1
 Limit: FCC PART 15C
 Mode:DH1 2441
 Note:

Polarization: **Vertical**
 Power: AC 120V/60Hz
 Temperature: 29.5 C
 Humidity: 48 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	32.9100	36.36	-13.66	22.70	40.00	-17.30	QP		
2		114.1474	30.75	-13.15	17.60	43.50	-25.90	QP		
3		381.8675	28.08	-6.45	21.63	46.00	-24.37	QP		
4		597.0862	28.41	-2.27	26.14	46.00	-19.86	QP		
5		712.1525	29.10	-0.83	28.27	46.00	-17.73	QP		
6		966.8987	29.13	3.24	32.37	54.00	-21.63	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: FCC PART 15C

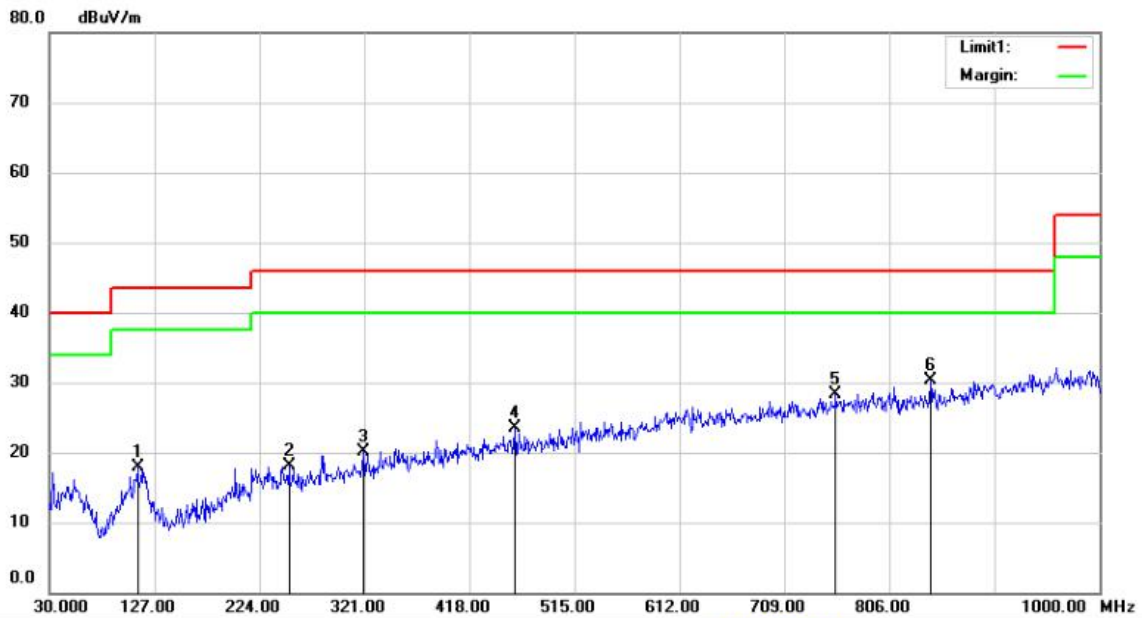
Power: AC 120V/60Hz

Humidity: 48 %

Mode:DH1 2441

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		34.1225	32.30	-13.08	19.22	40.00	-20.78	QP		
2		114.6324	30.83	-13.22	17.61	43.50	-25.89	QP		
3		291.5362	27.92	-8.53	19.39	46.00	-26.61	QP		
4		467.7124	29.69	-5.21	24.48	46.00	-21.52	QP		
5		650.6787	29.65	-1.62	28.03	46.00	-17.97	QP		
6	*	824.6725	29.24	0.50	29.74	46.00	-16.26	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: FCC PART 15C

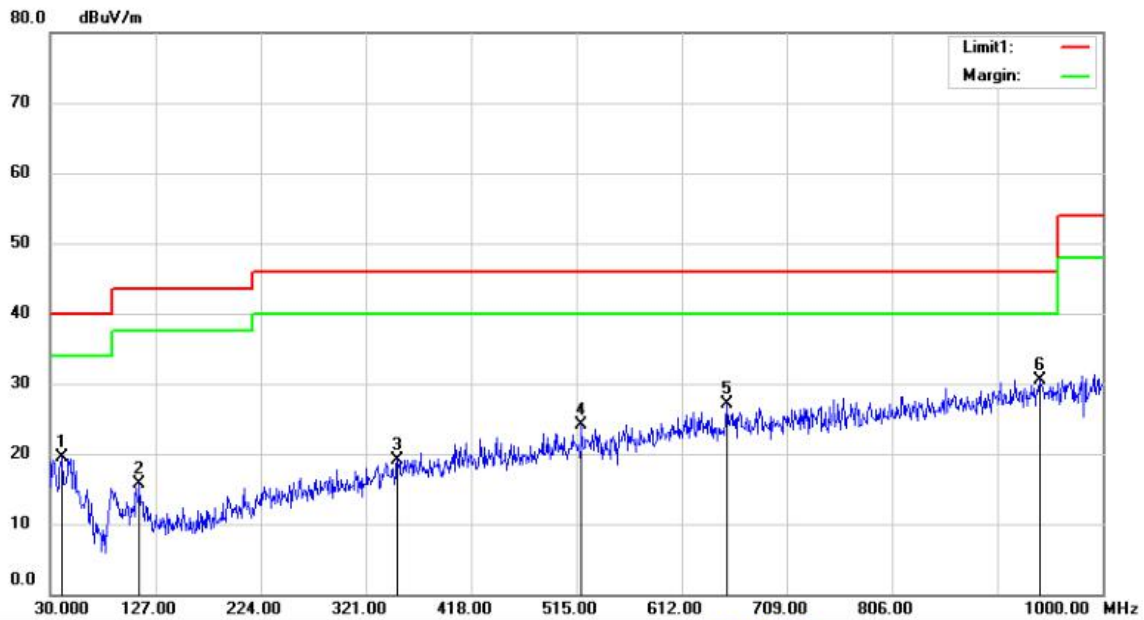
Power: AC 120V/60Hz

Humidity: 48 %

Mode:DH1 2480

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		111.4800	30.60	-12.78	17.82	43.50	-25.68	QP		
2		251.6450	27.87	-9.81	18.06	46.00	-27.94	QP		
3		320.7574	28.01	-7.90	20.11	46.00	-25.89	QP		
4		459.8312	28.73	-5.32	23.41	46.00	-22.59	QP		
5		756.6512	28.33	-0.11	28.22	46.00	-17.78	QP		
6	*	844.0724	29.43	0.86	30.29	46.00	-15.71	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: FCC PART 15C

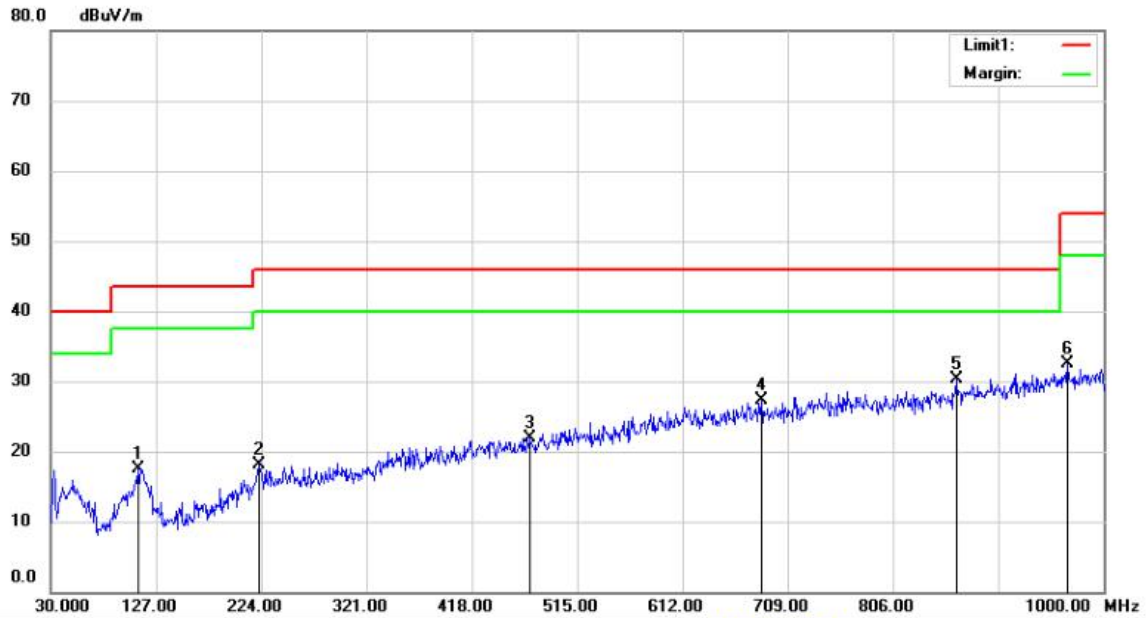
Power: AC 120V/60Hz

Humidity: 48 %

Mode:DH1 2480

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		40.9125	31.46	-12.00	19.46	40.00	-20.54	QP		
2		112.9350	28.74	-12.98	15.76	43.50	-27.74	QP		
3		350.9486	25.96	-6.78	19.18	46.00	-26.82	QP		
4		520.6987	28.42	-4.36	24.06	46.00	-21.94	QP		
5		654.4375	28.77	-1.58	27.19	46.00	-18.81	QP		
6	*	942.6487	27.64	2.84	30.48	46.00	-15.52	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: FCC PART 15C

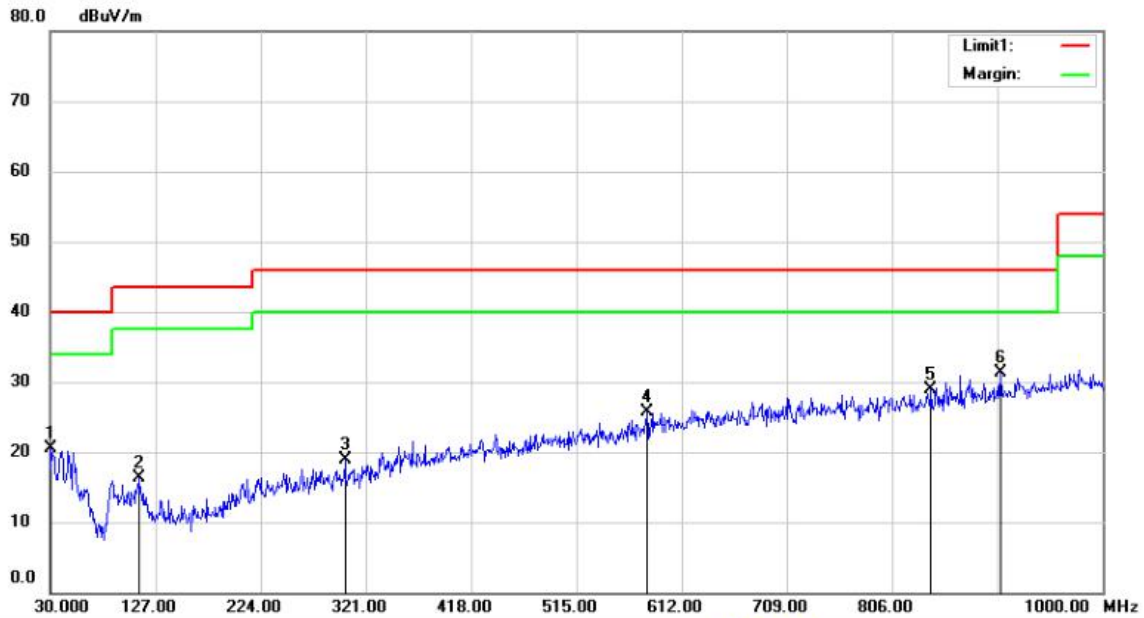
Power: AC 120V/60Hz

Humidity: 48 %

Mode:2DH1 2402

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		110.5100	30.11	-12.64	17.47	43.50	-26.03	QP		
2		222.7874	29.13	-10.97	18.16	46.00	-27.84	QP		
3		471.7137	27.14	-5.15	21.99	46.00	-24.01	QP		
4		685.2350	28.58	-1.22	27.36	46.00	-18.64	QP		
5	*	864.3212	29.00	1.29	30.29	46.00	-15.71	QP		
6		967.8687	29.33	3.25	32.58	54.00	-21.42	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: FCC PART 15C

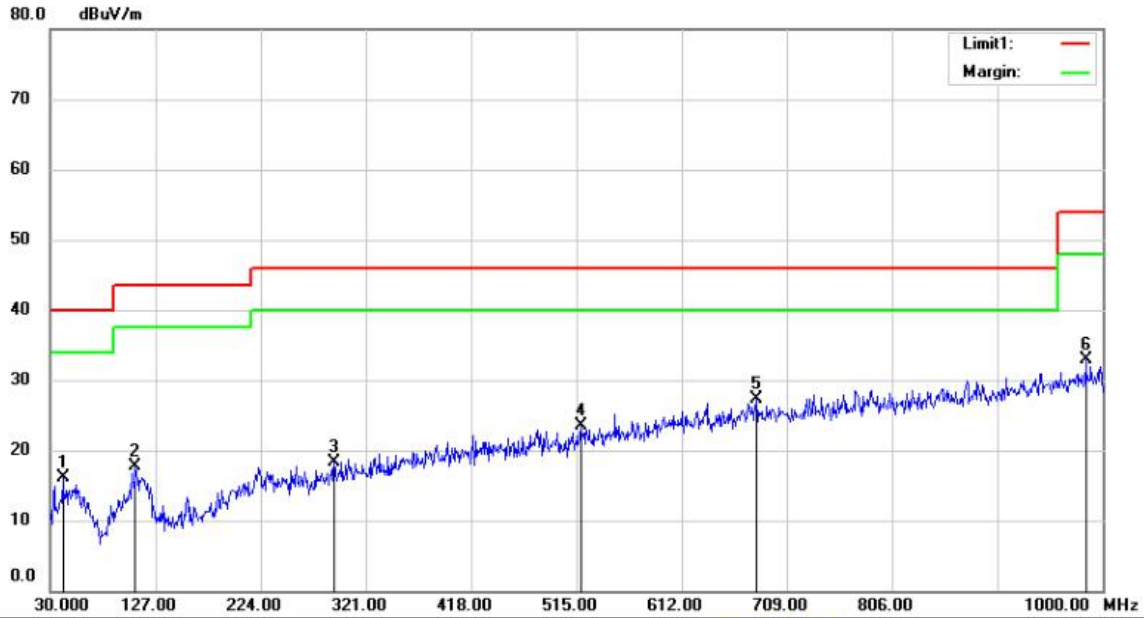
Power: AC 120V/60Hz

Humidity: 48 %

Mode: 2DH1 2402

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		30.0000	34.63	-14.12	20.51	40.00	-19.49	QP		
2		113.1774	29.23	-13.01	16.22	43.50	-27.28	QP		
3		301.8424	27.12	-8.26	18.86	46.00	-27.14	QP		
4		580.3537	28.68	-2.91	25.77	46.00	-20.23	QP		
5		842.0112	27.97	0.84	28.81	46.00	-17.19	QP		
6	*	906.5162	29.13	2.22	31.35	46.00	-14.65	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 29.5 C

Limit: FCC PART 15C

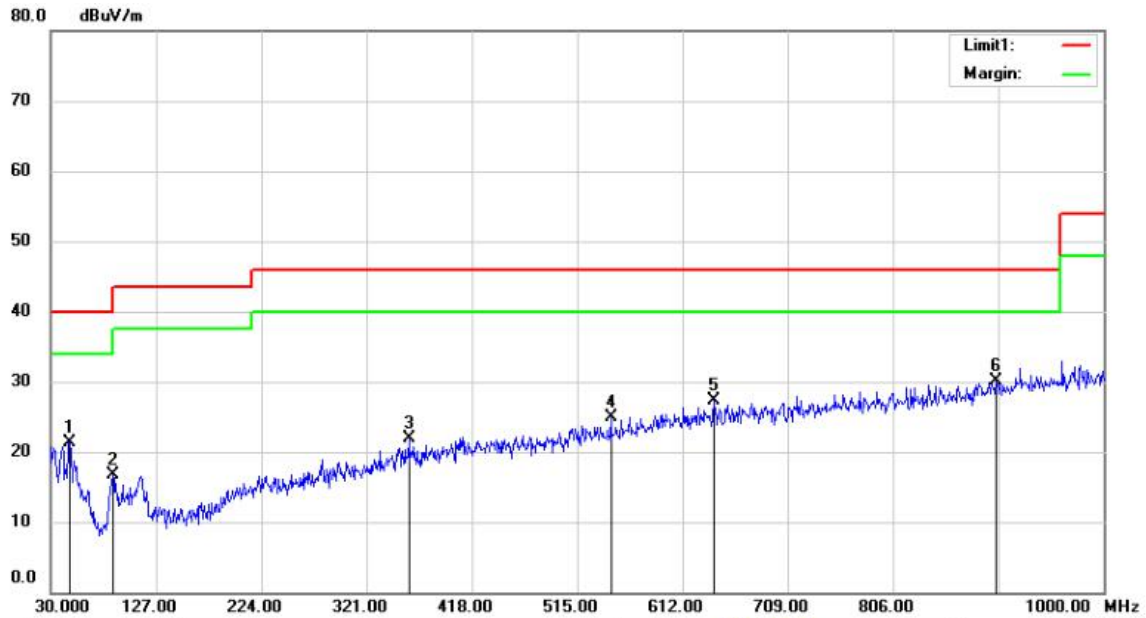
Power: AC 120V/60Hz

Humidity: 48 %

Mode:2DH1 2441

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		41.7612	27.76	-11.69	16.07	40.00	-23.93	QP		
2		109.1762	30.16	-12.51	17.65	43.50	-25.85	QP		
3		292.7487	26.78	-8.46	18.32	46.00	-27.68	QP		
4		519.2437	27.88	-4.40	23.48	46.00	-22.52	QP		
5	*	680.9912	28.57	-1.27	27.30	46.00	-18.70	QP		
6		984.6012	29.34	3.63	32.97	54.00	-21.03	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 29.5 C

Limit: FCC PART 15C

Power: AC 120V/60Hz

Humidity: 48 %

Mode: 2DH1 2441

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		47.5812	32.58	-11.20	21.38	40.00	-18.62	QP		
2		87.4724	32.14	-15.51	16.63	40.00	-23.37	QP		
3		360.0425	28.79	-6.84	21.95	46.00	-24.05	QP		
4		546.4037	28.88	-3.92	24.96	46.00	-21.04	QP		
5		641.8274	29.10	-1.73	27.37	46.00	-18.63	QP		
6	*	901.3025	28.12	2.08	30.20	46.00	-15.80	QP		