

9.6 MAXIMUM PEAK CONDUCTED OUTPUT POWER

9.6.1 Applicable Standard

According to FCC Part 15.247(b)(1) and DA 00-705
According to IC RSS-247

9.6.2 Conformance Limit

The max For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

9.6.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.6.4 Test Procedure

■ According to FCC Part15.247(b)(1) and IC RSS-247

As an alternative to a peak power measurement, compliance with the limit can be based on a measurement of the maximum conducted output power.

Use the following spectrum analyzer settings:

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel (about 10MHz)

Set RBW > the 20 dB bandwidth of the emission being measured (about 3MHz)

Set VBW \geq RBW

Set Sweep = auto

Set Detector function = peak

Set Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission to determine the peak amplitude level.

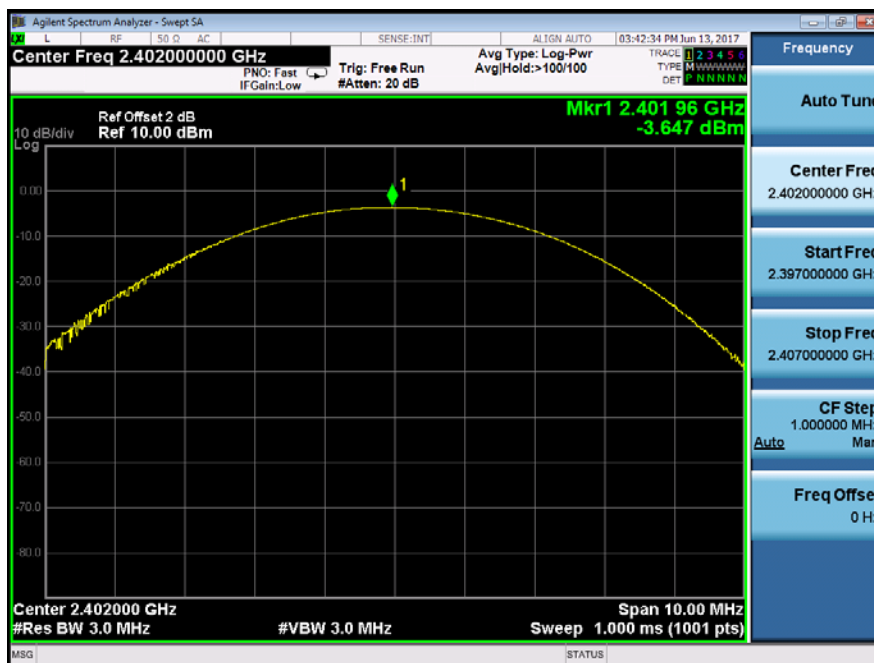
Test Results

Temperature:	24 °C	Test Date:	June 13, 2017
Humidity:	53 %	Test By:	King Kong

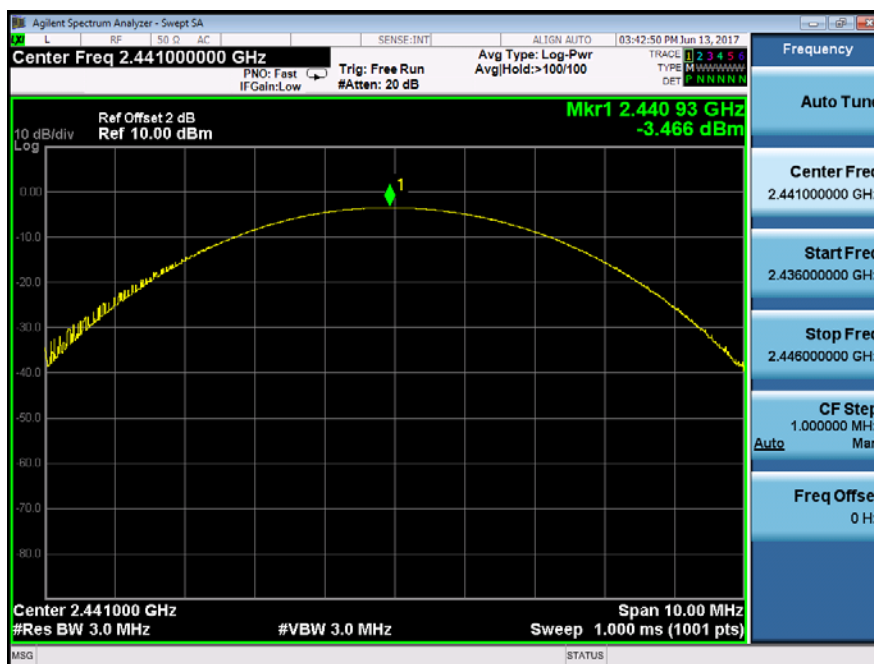
Operation Mode	Channel Number	Channel Frequency (MHz)	Measurement Level (dBm)	Limit (dBm)	Verdict
GFSK	0	2402	-3.647	21	PASS
	39	2441	-3.466	21	PASS
	78	2480	-4.030	21	PASS
8DPSK	0	2402	-2.091	21	PASS
	39	2441	-1.995	21	PASS
	78	2480	-2.556	21	PASS

Note: N/A

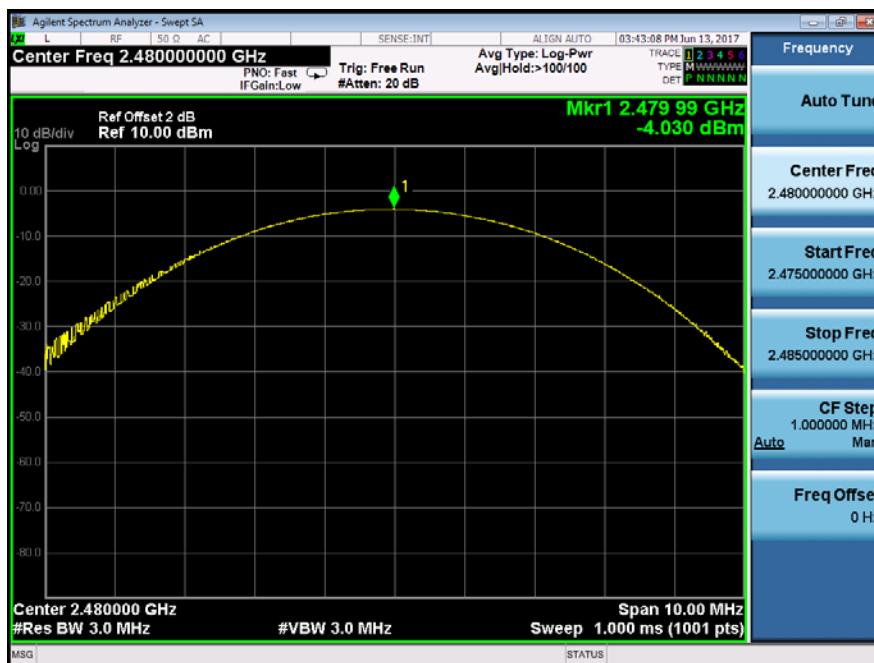
Test Model	Maximum Peak Conducted Output Power	
	Bluetooth v4.2	GFSK
	Channel 0: 2402MHz	



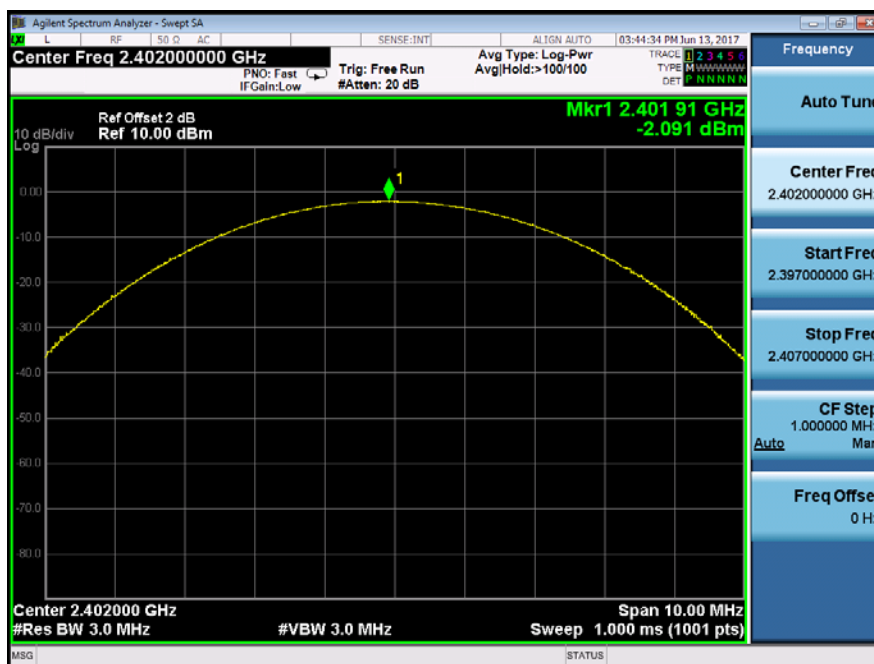
Test Model	Maximum Peak Conducted Output Power	
	Bluetooth v4.2	GFSK
	Channel 39: 2441MHz	



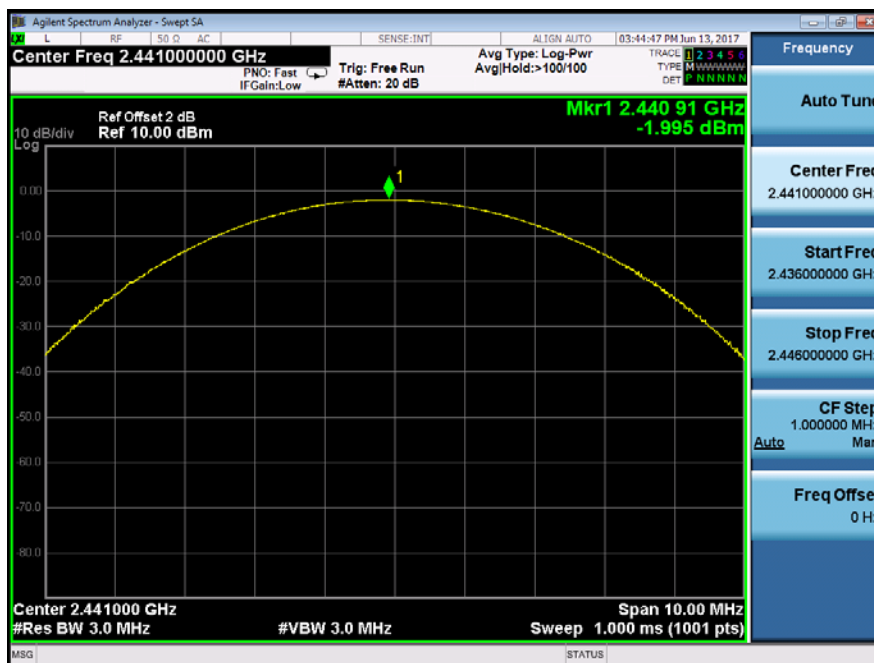
Test Model	Maximum Peak Conducted Output Power	
	Bluetooth v4.2	GFSK
	Channel 78: 2480MHz	



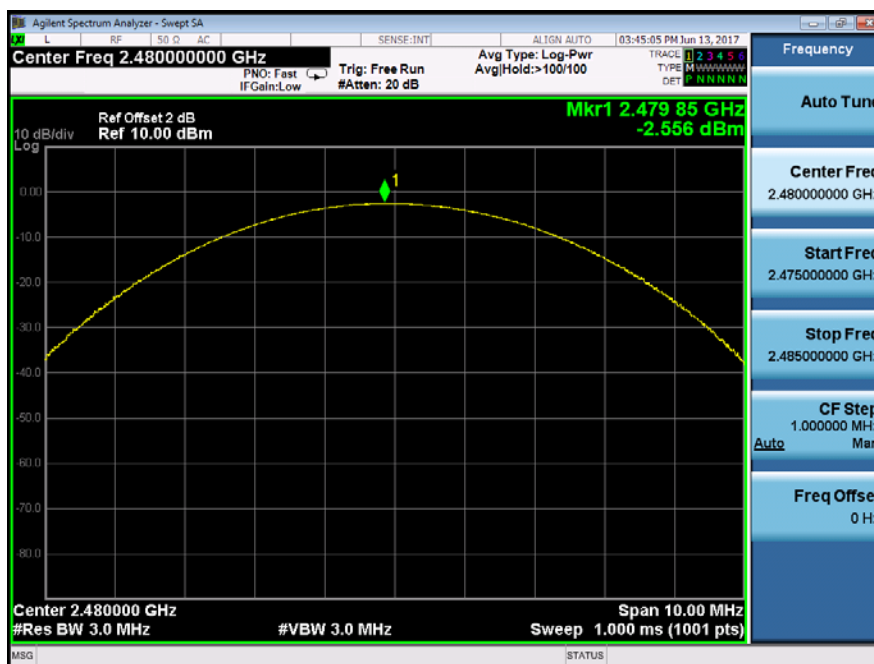
Test Model	Maximum Peak Conducted Output Power	
	Bluetooth v4.2	8DPSK
	Channel 0: 2402MHz	



Test Model	Maximum Peak Conducted Output Power	
	Bluetooth v4.2	
	Channel 39: 2441MHz	8DPSK



Test Model	Maximum Peak Conducted Output Power	
	Bluetooth v4.2	
	Channel 78: 2480MHz	8DPSK



9.7 CONDUCTED SUPRIIOUS EMISSION

9.7.1 Applicable Standard

According to FCC Part 15.247(d) and DA 00-705
According to IC RSS-247

9.7.2 Conformance Limit

According to FCC Part 15.247(d) and IC RSS-247

In any 100 kHz 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 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted, provided the transmitter demonstrates compliance with the peak conducted power limits.

9.7.3 Test Configuration

Test according to clause 7.1 radio frequency test setup 1

9.7.4 Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

■ Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DSS channel center frequency.

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel.

Set the RBW = 100 kHz. Set the VBW $\geq 3 \times$ RBW.

Set Detector = peak. Set Sweep time = auto couple.

Set Trace mode = max hold. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum Maximum conduceted level.

Note that the channel found to contain the maximum conduceted level can be used to establish the reference level.

■ Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation

Set RBW $\geq 1\%$ of the span=100kHz Set VBW \geq RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

■ Conduceted Spurious RF Conducted Emission

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.(30MHz to 25GHz). Set RBW = 100 kHz Set VBW \geq RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

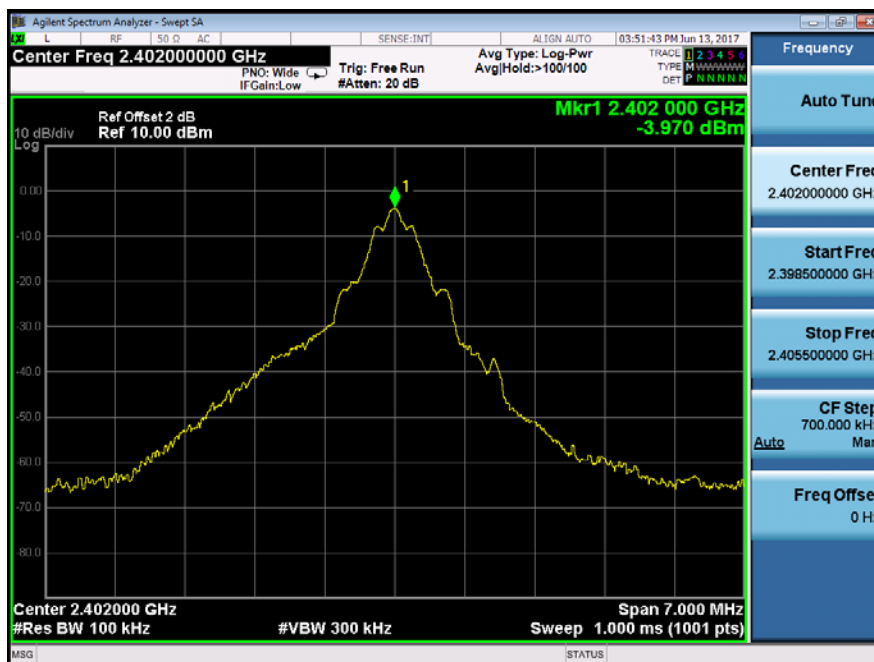
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.

9.7.5 Test Results

Test Model

Maximum Conduced Level RBW=100kHz
Bluetooth v4.2
Channel 0: 2402MHz

GFSK



Test Model

Conduced Spurious RF Conducted Emission
Bluetooth v4.2
Channel 0: 2402MHz

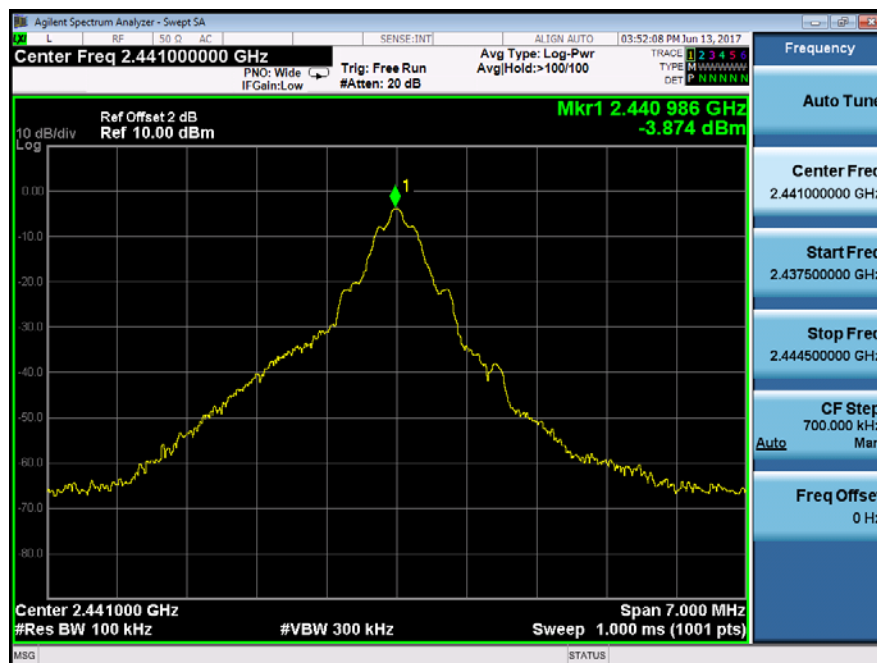
GFSK



Test Model	Band-edge Conducted Emissions	
	Bluetooth v4.2	
	Channel 0: 2402MHz	GFSK



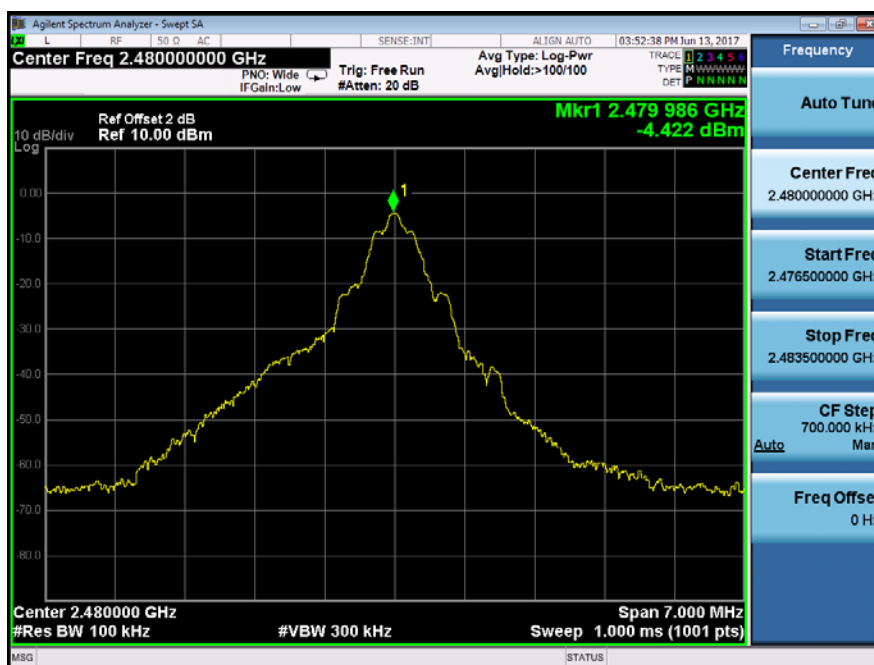
Test Model	Maximum Conducted Level RBW=100kHz	
	Bluetooth v4.2	
	Channel 39: 2441MHz	GFSK



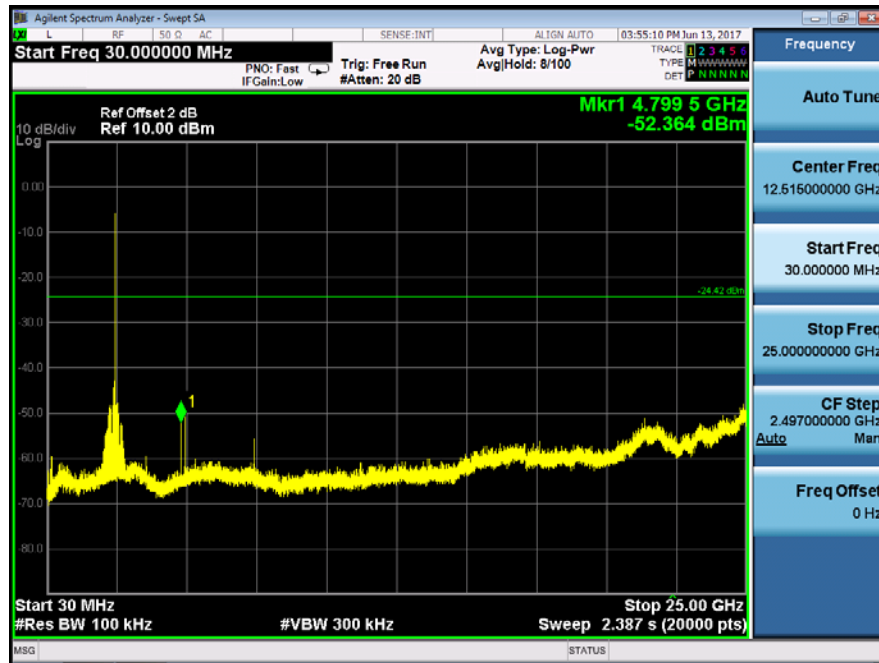
Test Model	Conduceted Spurious RF Conducted Emission	
	Bluetooth v4.2	GFSK
	Channel 39: 2441MHz	



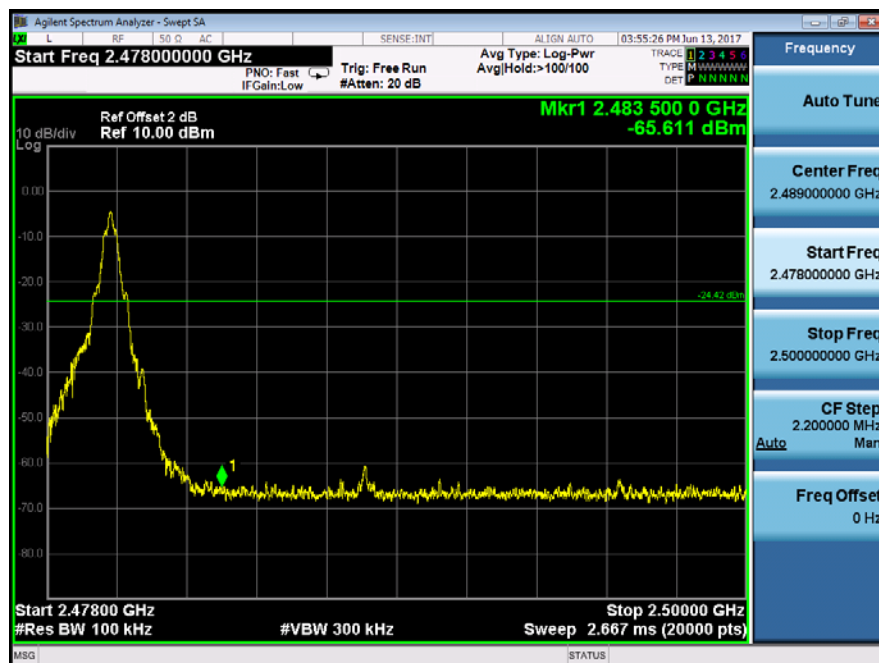
Test Model	Maximum Conduceted Level RBW=100kHz	
	Bluetooth v4.2	GFSK
	Channel 78: 2480MHz	



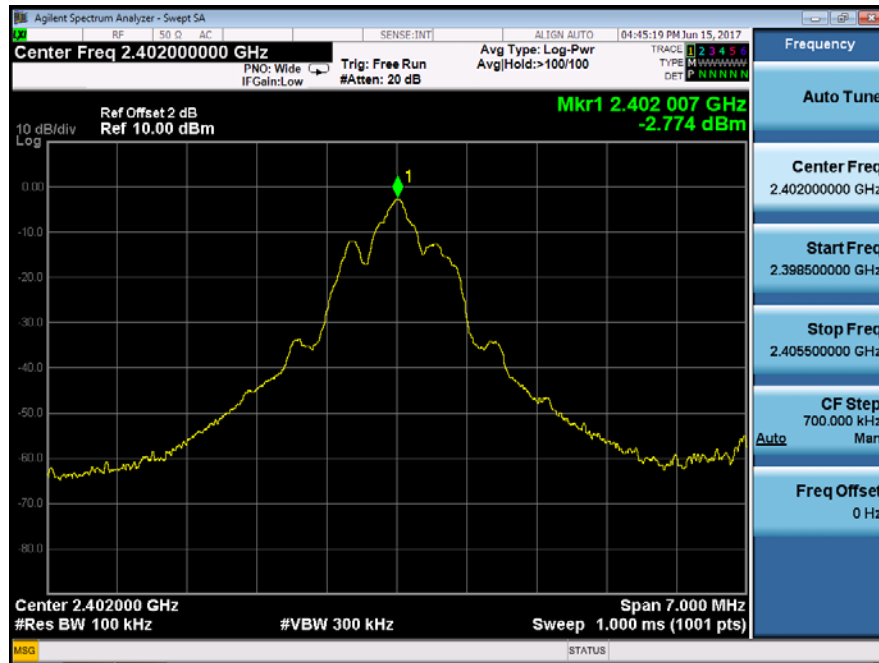
Test Model	Conduceted Spurious RF Conducted Emission	
	Bluetooth v4.2	GFSK
	Channel 78: 2480MHz	



Test Model	Band-edge Conducted Emissions	
	Bluetooth v4.2	GFSK
	Channel 78: 2480MHz	



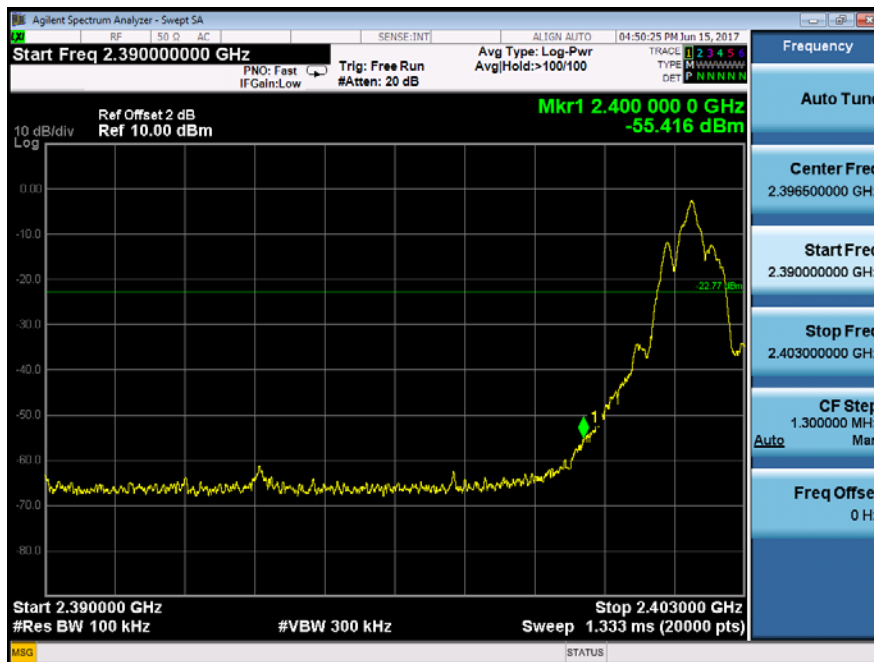
Test Model	Maximum Conducted Level RBW=100kHz	
	Bluetooth v4.2	8DPSK
	Channel 0: 2402MHz	



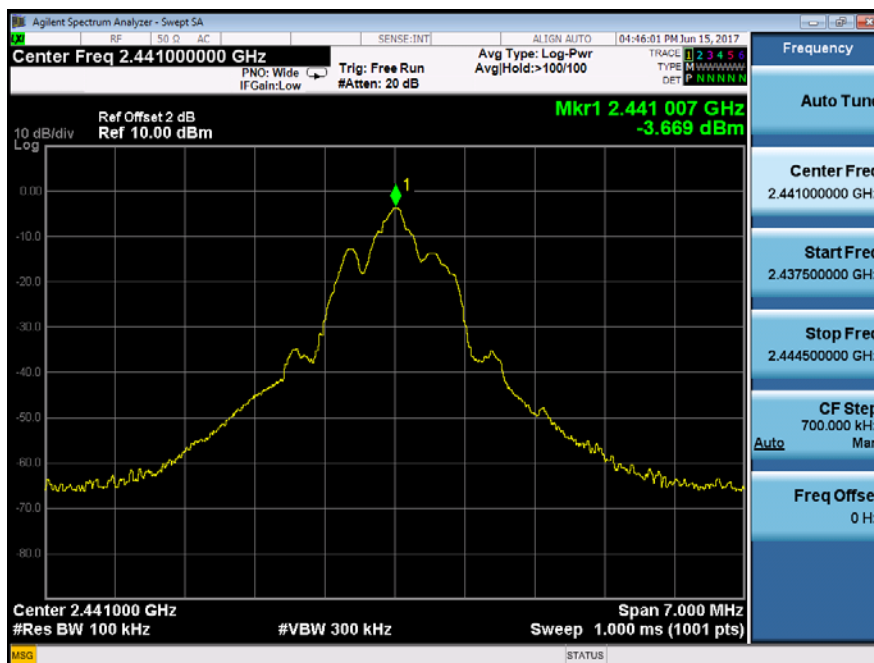
Test Model	Conducted Spurious RF Conducted Emission	
	Bluetooth v4.2	8DPSK
	Channel 0: 2402MHz	



Test Model	Band-edge Conducted Emissions	
	Bluetooth v4.2	
	Channel 0: 2402MHz	8DPSK



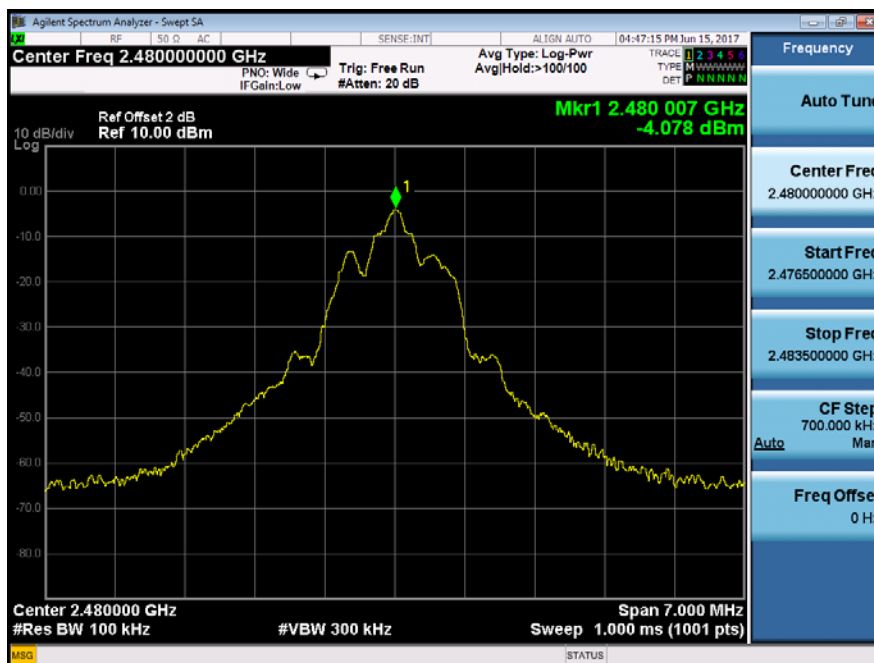
Test Model	Maximum Conducted Level RBW=100kHz	
	Bluetooth v4.2	
	Channel 39: 2441MHz	8DPSK



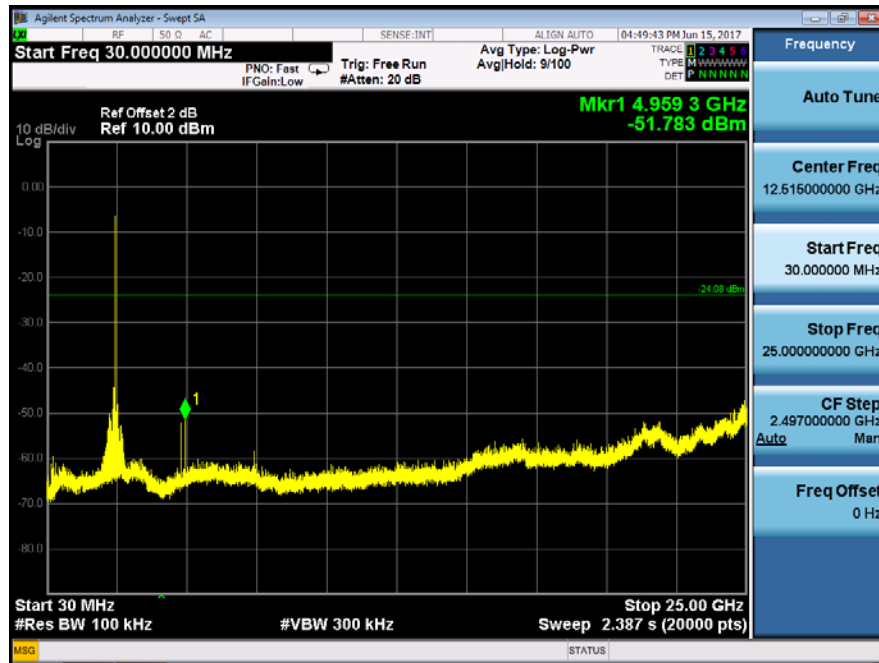
Test Model	Conduceted Spurious RF Conducted Emission	
	Bluetooth v4.2	8DPSK
	Channel 39: 2441MHz	



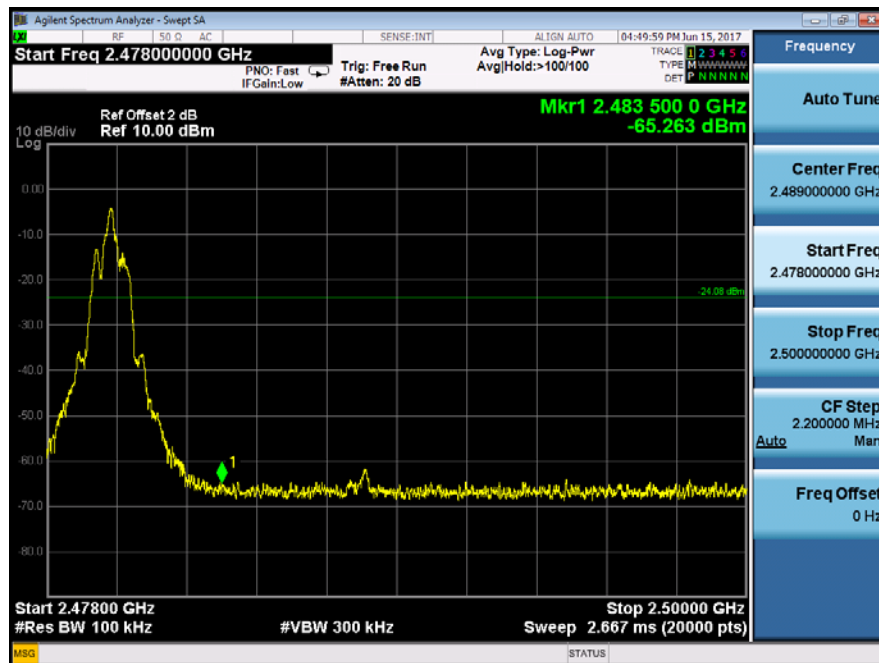
Test Model	Maximum Conduceted Level RBW=100kHz	
	Bluetooth v4.2	8DPSK
	Channel 78: 2480MHz	



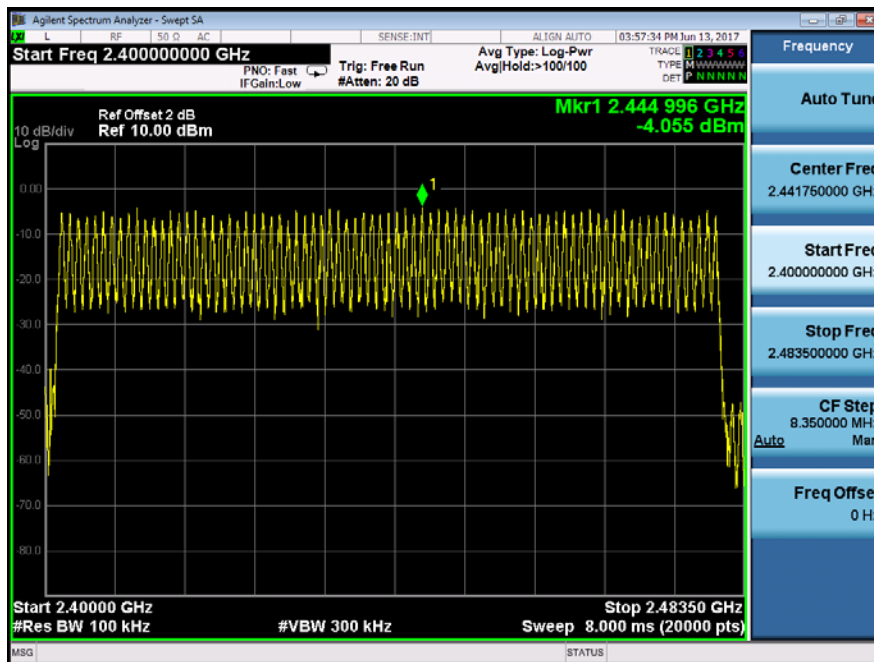
Test Model	Conduceted Spurious RF Conducted Emission	
	Bluetooth v4.2	8DPSK
	Channel 78: 2480MHz	



Test Model	Band-edge Conducted Emissions	
	Bluetooth v4.2	8DPSK
	Channel 78: 2480MHz	



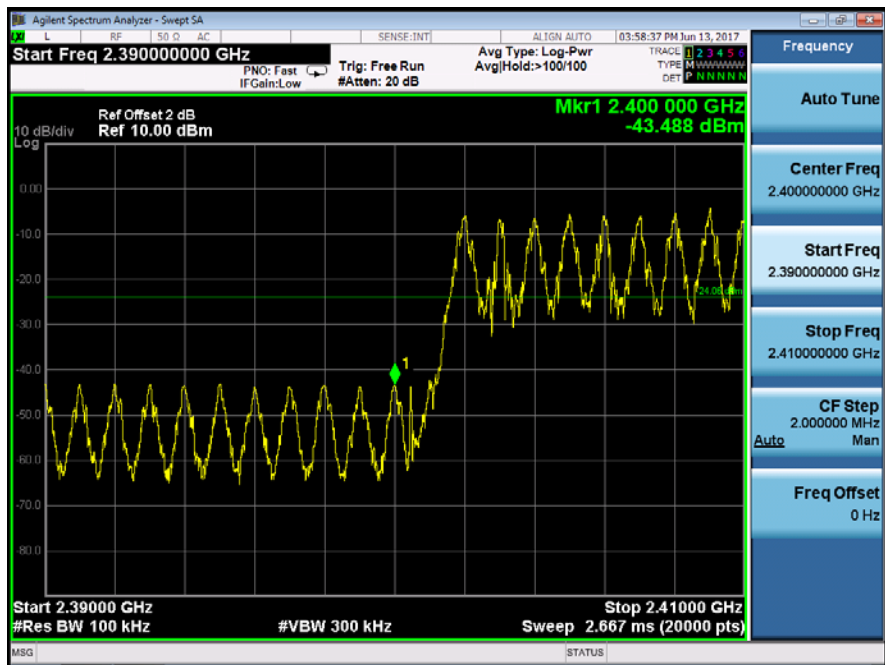
Test Model	Maximum Conduceted Level RBW=100kHz
	Bluetooth v4.2
	Hopping GFSK



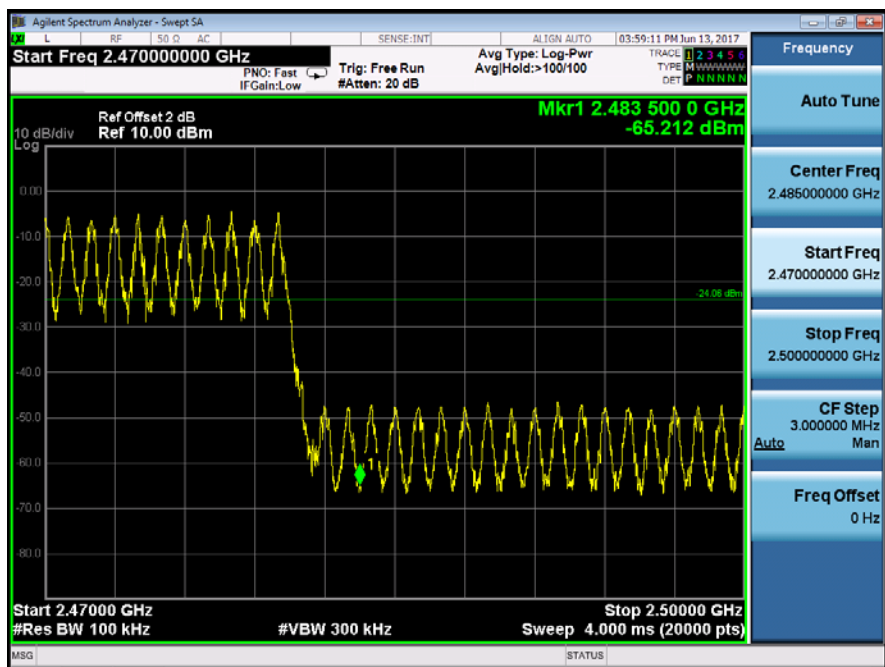
Test Model	Conduceted Spurious RF Conducted Emission
	Bluetooth v4.2
	Hopping GFSK



Test Model	Band-edge Conducted Emissions
	Bluetooth v4.2
	Hopping
	GFSK



Test Model	Band-edge Conducted Emissions
	Bluetooth v4.2
	Hopping
	GFSK



9.8 RADIATED SPURIOUS EMISSION

9.8.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and DA 00-705

According to IC RSS-Gen 6.13, IC RSS-Gen 8.9, IC RSS-Gen 8.10

9.8.2 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

9.8.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

9.8.4 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 0.1m 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 0.1m 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 ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 30MHz:

The EUT was placed on a turn table which is 0.1m 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 ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

For Below 150KHz:

The EUT was placed on a turn table which is 0.1m 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 ≥ 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.

9.8.5 Test Results

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

Temperature:	24 °C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	KK
Test mode:	TX Mode		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
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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 Above 1GHz (1GHz to 25GHz)

Temperature:	24℃	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	GFSK	Frequency:	Channel 0: 2402MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
16249	V	54.45	40.80	74.00	54.00	-19.55	-13.20
25947	V	53.52	37.60	74.00	54.00	-20.48	-16.40
17065	H	53.90	40.10	74.00	54.00	-20.10	-13.90
25123	H	53.42	38.50	74.00	54.00	-20.58	-15.50

Temperature:	24℃	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	GFSK	Frequency:	Channel 39: 2441MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
17252	V	54.29	38.80	74.00	54.00	-19.71	-15.20
25777	V	25.90	37.40	74.00	54.00	-21.10	-16.60
14974	H	53.46	37.30	74.00	54.00	-20.54	-16.70
26024	H	53.75	39.80	74.00	54.00	-20.25	-14.20

Temperature:	24℃	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	GFSK	Frequency:	Channel 78: 2480MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
17167	V	53.47	37.80	74.00	54.00	-20.53	-16.20
24664	V	53.11	38.20	74.00	54.00	-20.89	-15.80
17745	H	53.98	39.20	74.00	54.00	-20.02	-14.80
25335	H	53.78	40.20	74.00	54.00	-20.22	-13.80

Temperature:	24℃	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	8DPSK	Frequency:	Channel 0: 2402MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
17915	V	54.38	40.30	74.00	54.00	-19.62	-13.70
25905	V	53.95	39.60	74.00	54.00	-20.05	-14.40
16283	H	54.05	38.60	74.00	54.00	-19.95	-15.40
23202	H	53.60	37.50	74.00	54.00	-20.40	-16.50

Temperature:	24℃	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	8DPSK	Frequency:	Channel 39: 2441MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
16980	V	53.22	39.40	74.00	54.00	-20.78	-14.60
25437	V	52.80	39.10	74.00	54.00	-21.20	-14.90
17864	H	54.32	40.60	74.00	54.00	-19.68	-13.40
25454	H	53.09	38.40	74.00	54.00	-20.91	-15.60

Temperature:	24℃	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	8DPSK	Frequency:	Channel 78: 2480MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
17422	V	54.01	40.70	74.00	54.00	-19.99	-13.30
25896	V	53.12	38.80	74.00	54.00	-20.88	-15.20
11608	H	53.18	37.80	74.00	54.00	-20.80	-16.20
25318	H	53.29	37.20	74.00	54.00	-20.71	-16.80

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 - (3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

Temperature:	24°C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	GFSK	Frequency:	Channel 0: 2402MHz

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)
2388.32	H	43.52	74	-30.48	29.40	54	-24.60
2389.44	V	44.83	74	-29.17	29.10	54	-24.90

Temperature:	24°C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	GFSK	Frequency:	Channel 78: 2480MHz

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)
2483.912	H	43.71	74	-30.29	28.80	54	-25.20
2483.682	V	43.45	74	-30.55	28.80	54	-25.20

Temperature:	24°C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	KK
Test mode:	GFSK	Frequency:	Hopping

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)
2390.00	H	37.19	74	-36.81	24.60	54	-29.40
2483.50	H	38.13	74	-35.87	24.40	54	-29.60
2358.07	V	39.55	74	-34.45	23.90	54	-30.10
2483.50	V	37.32	74	-36.68	23.40	54	-30.60

Temperature:	24°C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	8DPSK	Frequency:	Channel 0: 2402MHz

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)
2387.04	H	44.29	74	-29.71	28.50	54	-25.50
2389.68	V	44.94	74	-29.06	29.80	54	-24.20

Temperature:	24°C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	King Kong
Test mode:	8DPSK	Frequency:	Channel 78: 2480MHz

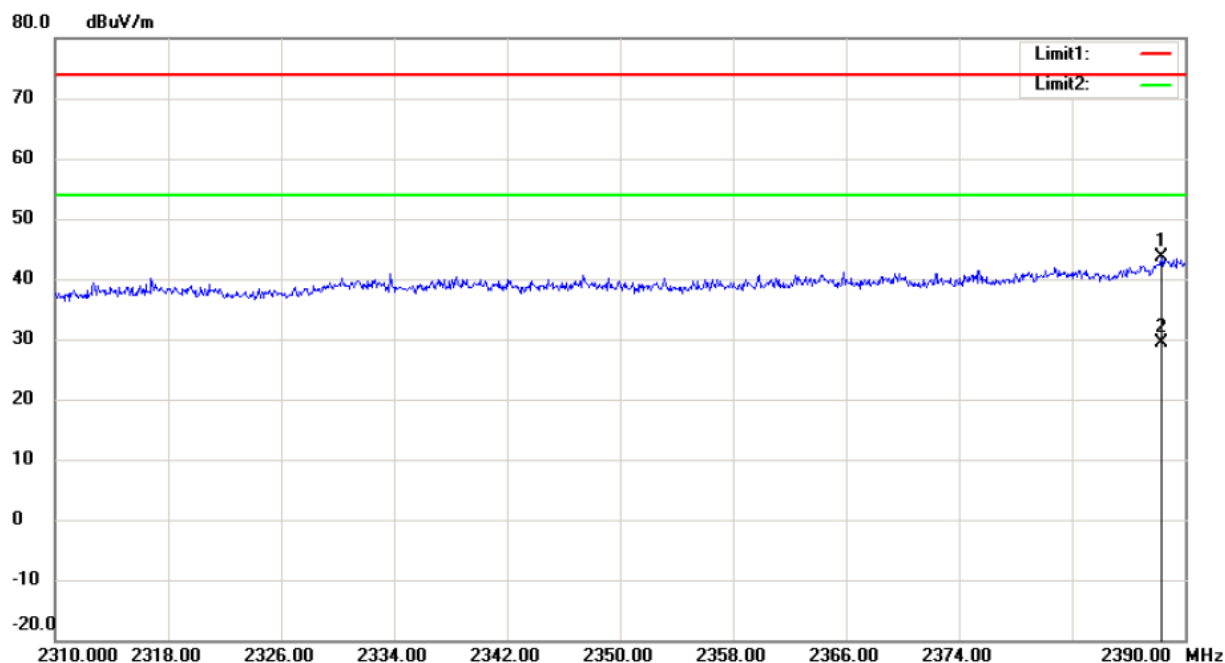
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)
2484.424	H	46.88	74	-27.12	31.90	54	-22.10
2483.682	V	47.52	74	-26.48	33.70	54	-20.30

Temperature:	24°C	Test Date:	June 07, 2017
Humidity:	53 %	Test By:	KK
Test mode:	GFSK	Frequency:	Hopping

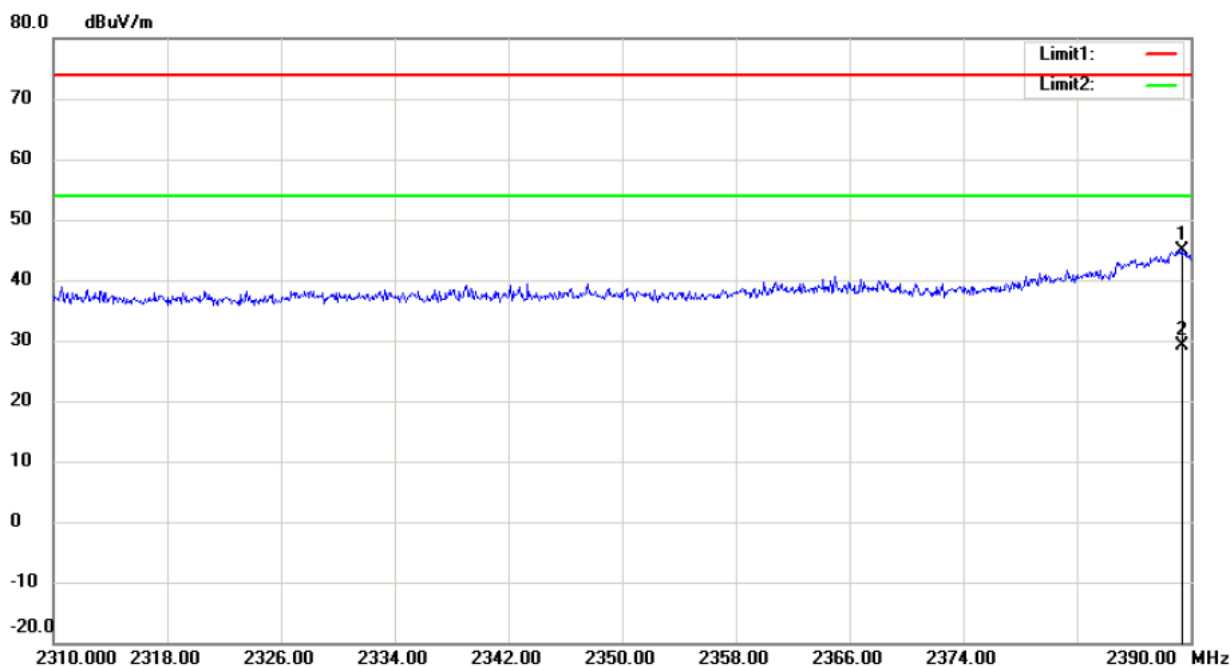
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)
2361.11	H	41.16	74	-32.84	26.20	54	-27.80
2483.50	H	44.34	74	-29.66	30.20	54	-23.80
2390.00	V	39.02	74	-34.98	26.30	54	-27.70
2483.50	V	46.95	74	-27.05	32.80	54	-21.20

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 (3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

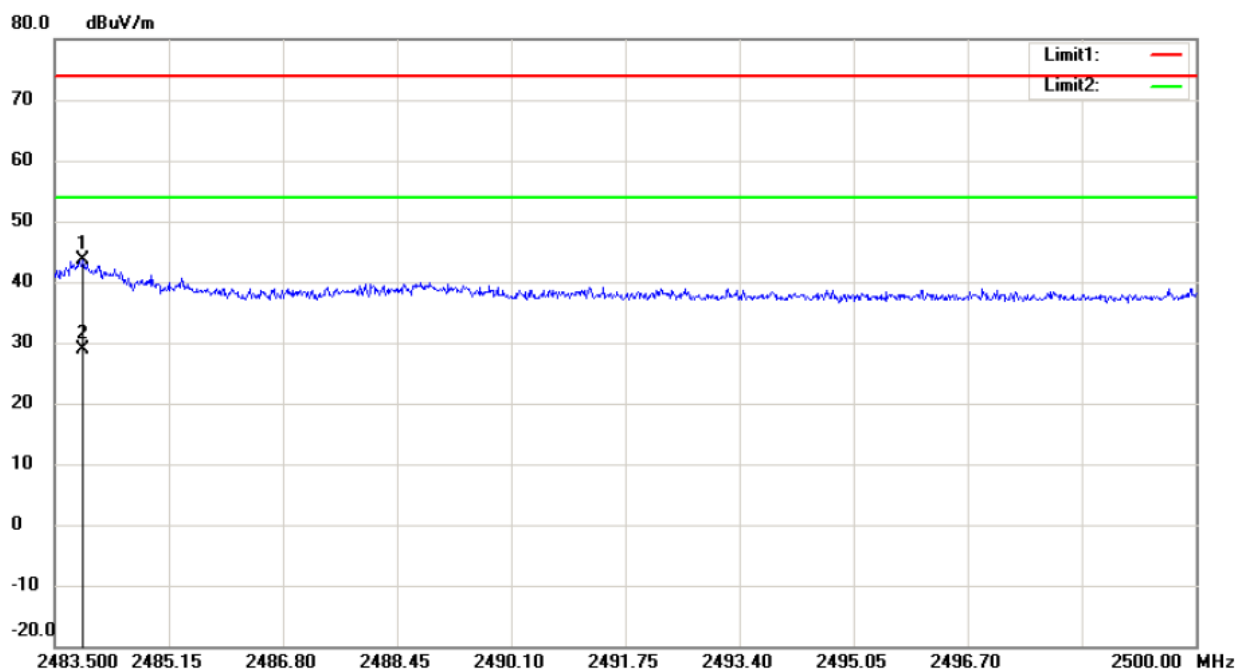
Test Model	Spurious Emission in Restricted Band 2310-2390MHz		
	Bluetooth v4.2		
	Channel 0: 2402MHz	GFSK	H
Test By: King Kong			



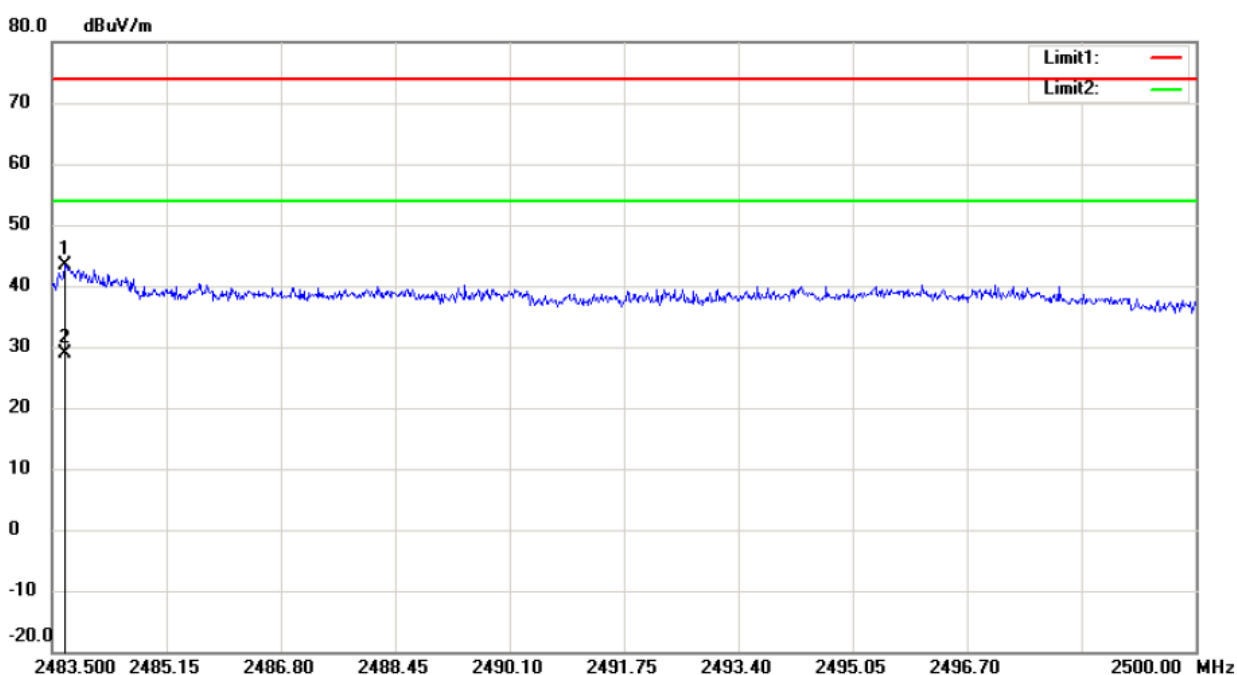
Test Model	Spurious Emission in Restricted Band 2310-2390MHz		
	Bluetooth v4.2/v3.0		
	Channel 0: 2402MHz	GFSK	V
Test By: King Kong			



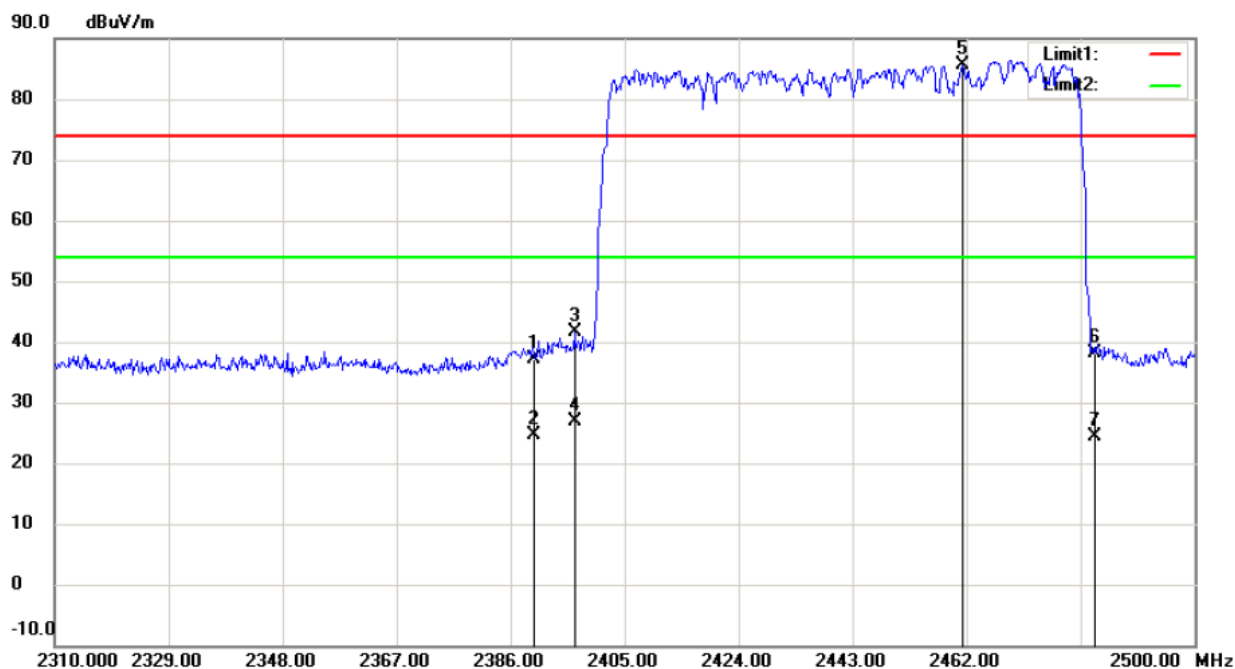
Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz		
	Bluetooth v4.2		
	Channel 78: 2480MHz	GFSK	H
Test By: King Kong			



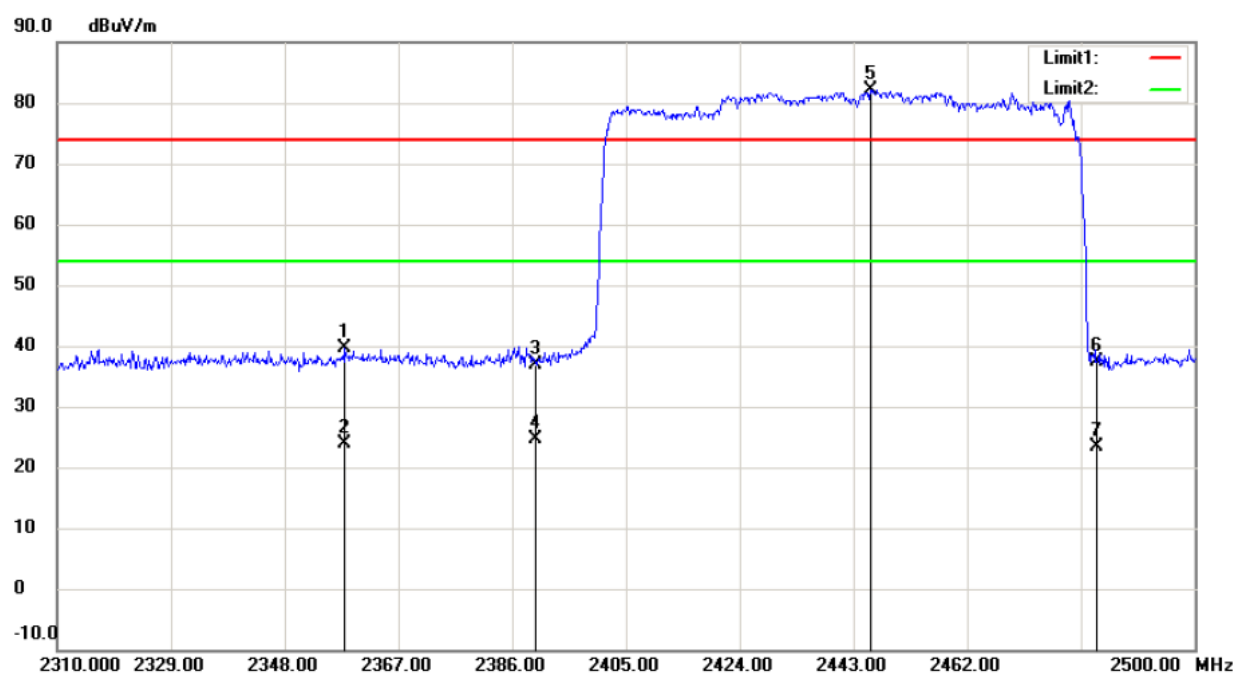
Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz		
	Bluetooth v4.2		
	Channel 78: 2480MHz	GFSK	V
Test By: King Kong			



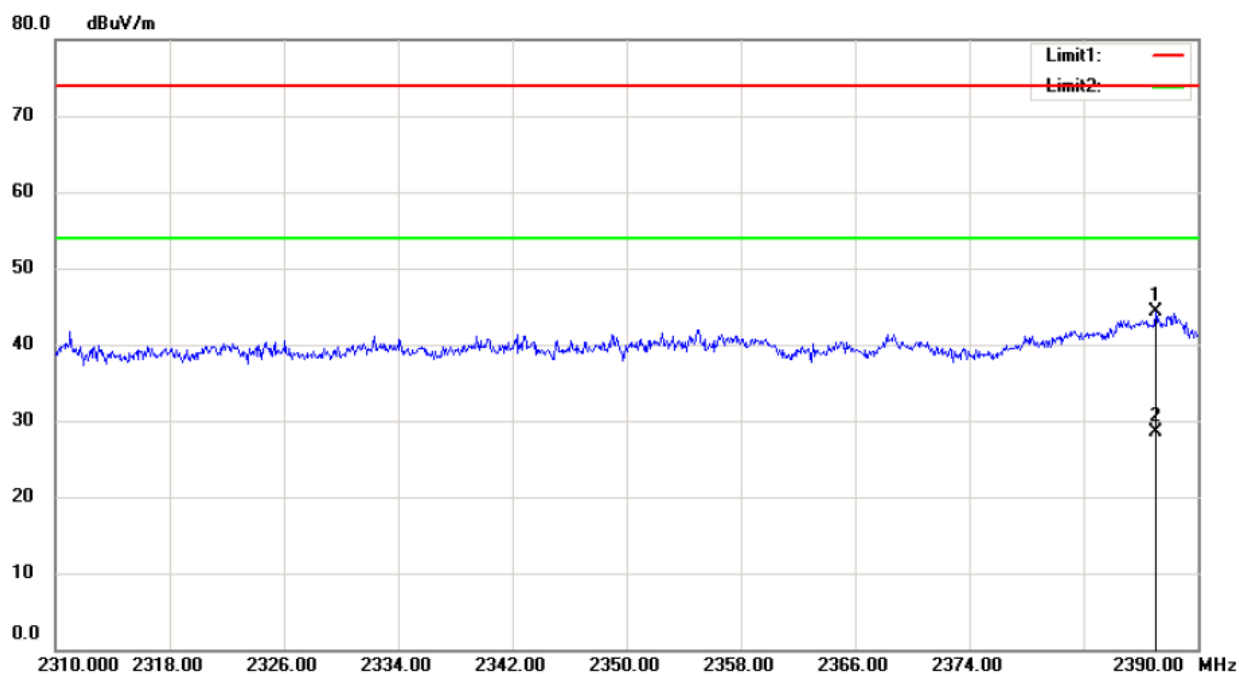
Test Model	Spurious Emission in Restricted Band 2310-2390&2483.5-2500MHz		
	Bluetooth v4.2		
	Hopping	GFSK	H
Test By: King Kong			



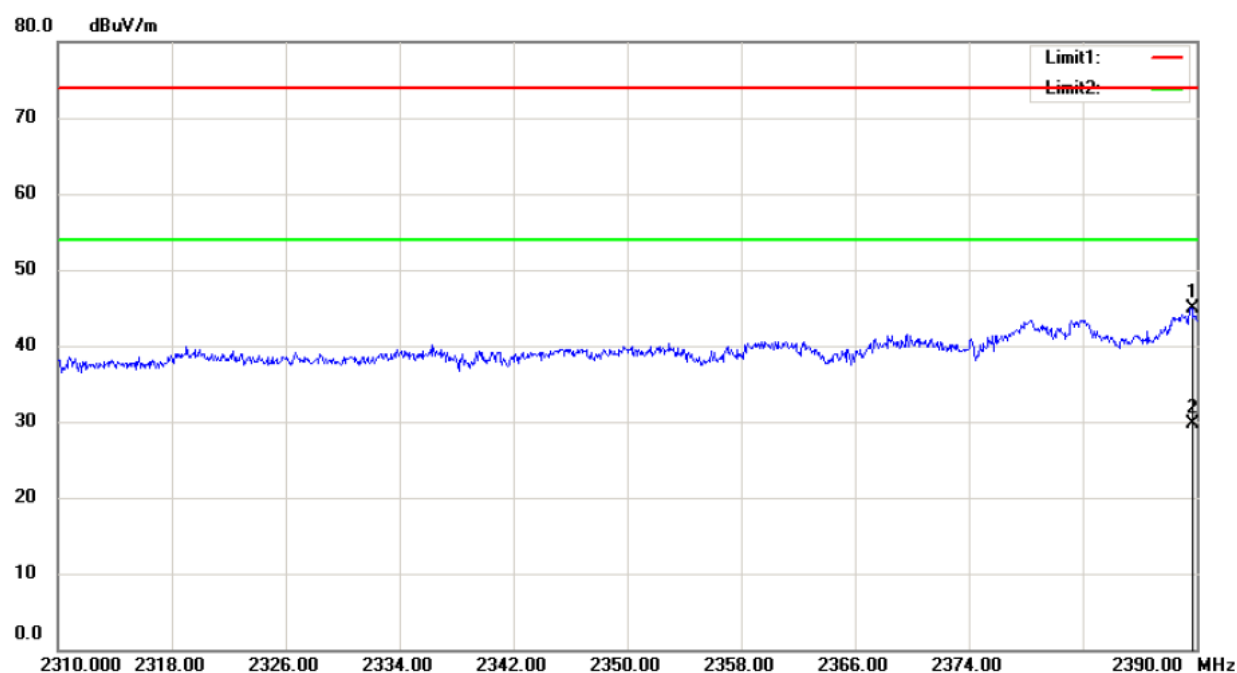
Test Model	Spurious Emission in Restricted Band 2310-2390&2483.5-2500MHz		
	Bluetooth v4.2		
	Hopping	GFSK	V
Test By: King Kong			



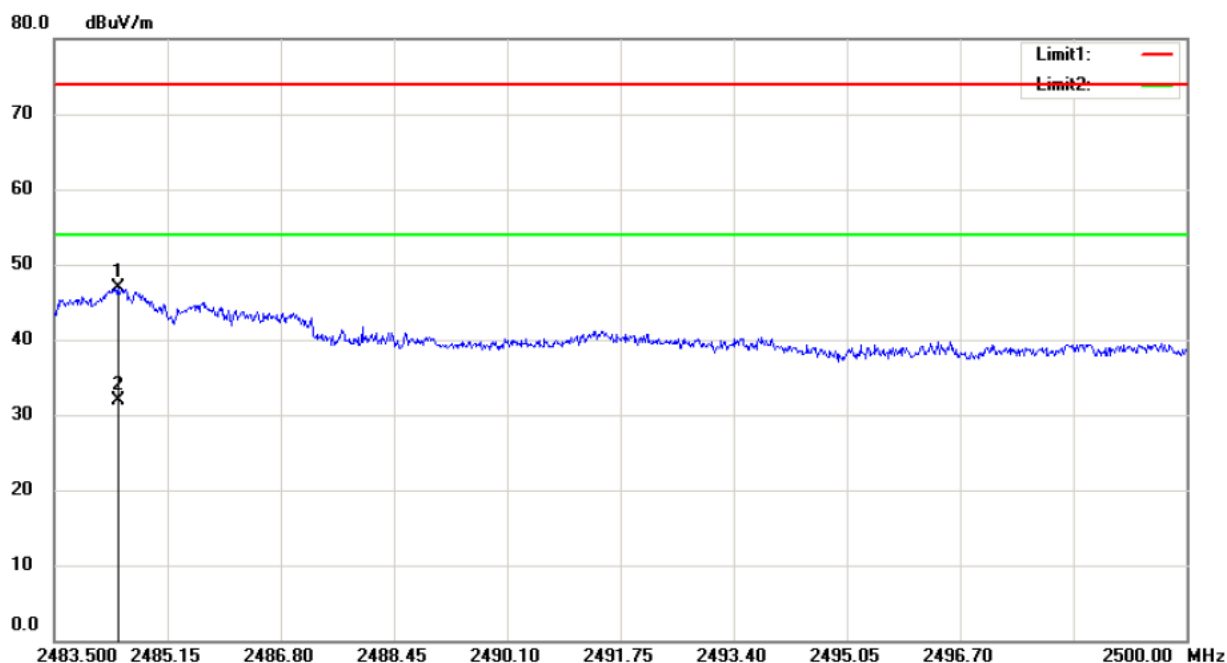
Test Model	Spurious Emission in Restricted Band 2310-2390MHz		
	Bluetooth v4.2		
	Channel 0: 2402MHz	8DPSK	H
Test By: King Kong			



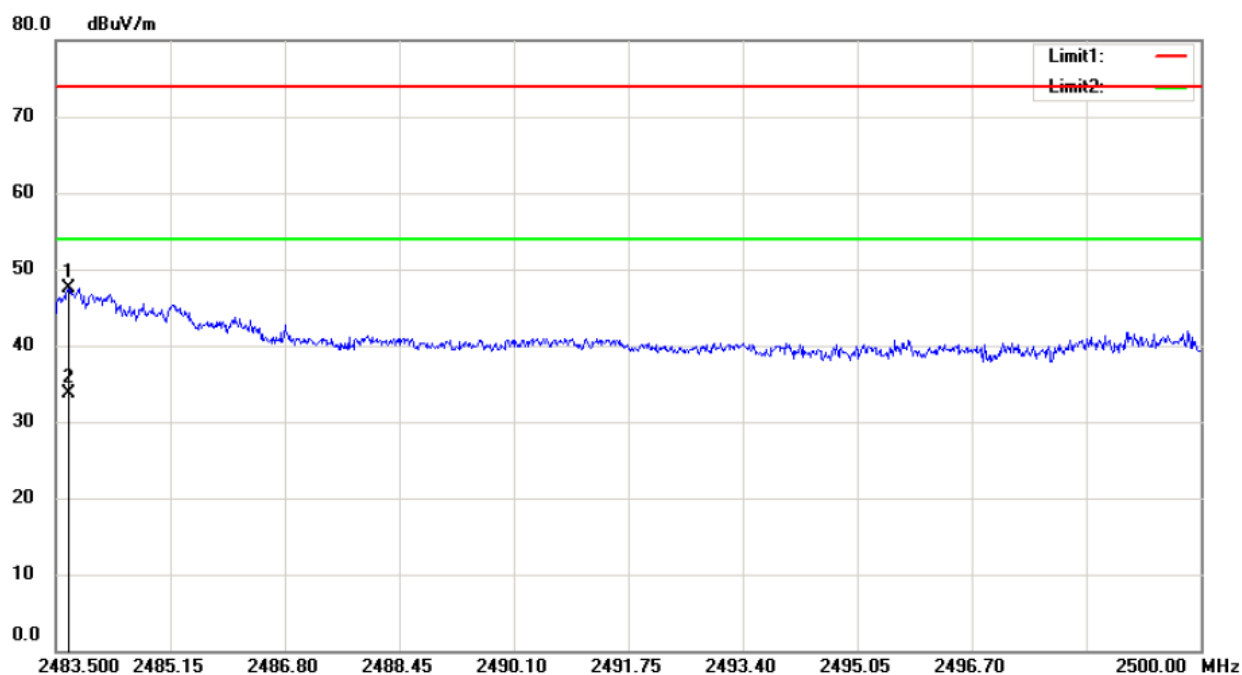
Test Model	Spurious Emission in Restricted Band 2310-2390MHz		
	Bluetooth v4.2/v3.0		
	Channel 0: 2402MHz	8DPSK	V
Test By: King Kong			



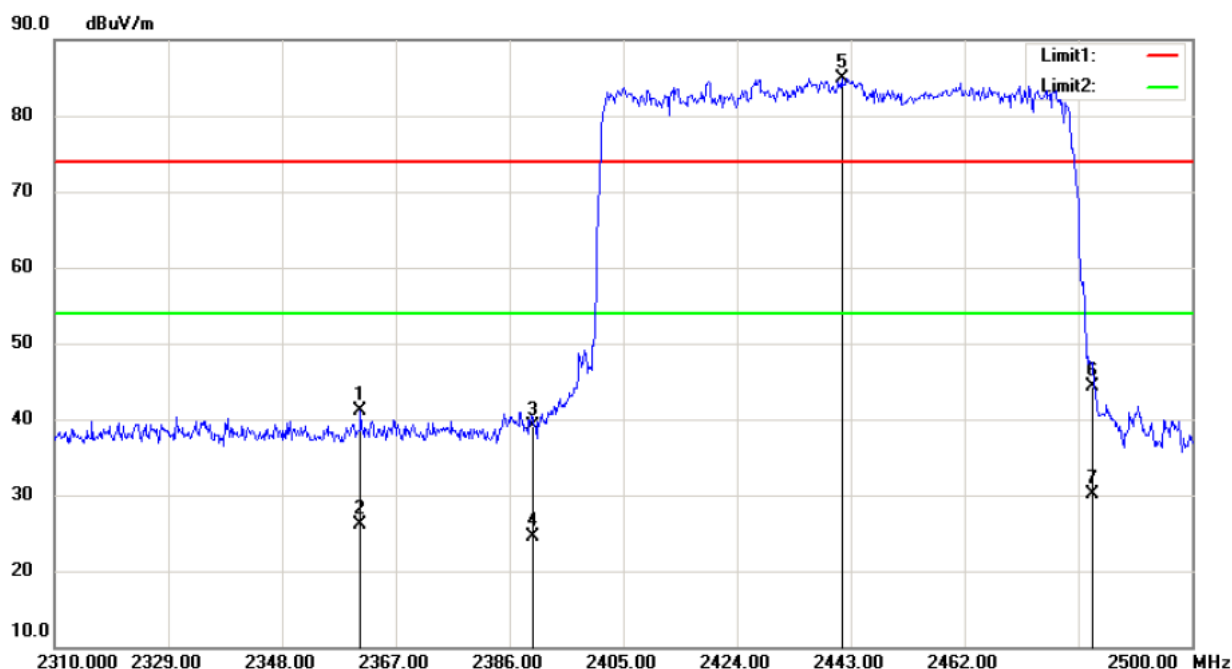
Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz		
	Bluetooth v4.2		
	Channel 78: 2480MHz	8DPSK	H
Test By: King Kong			



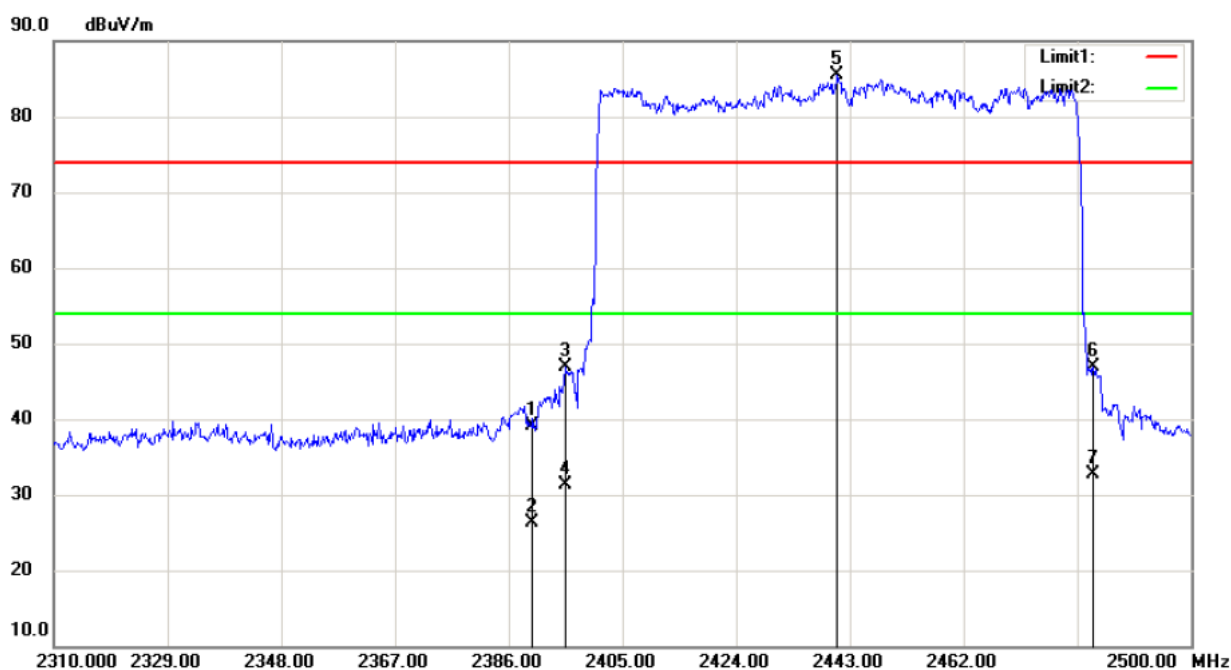
Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz		
	Bluetooth v4.2		
	Channel 78: 2480MHz	8DPSK	V
Test By: King Kong			



Test Model	Spurious Emission in Restricted Band 2310-2390&2483.5-2500MHz		
	Bluetooth v4.2		
	Hopping	8DPSK	H
Test By: King Kong			

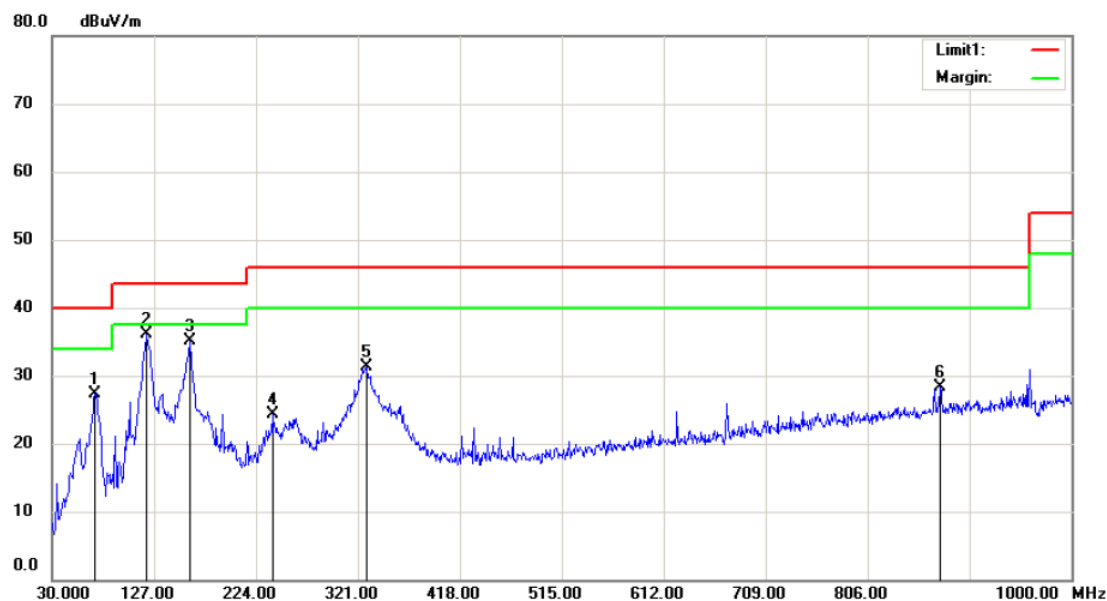


Test Model	Spurious Emission in Restricted Band 2310-2390&2483.5-2500MHz		
	Bluetooth v4.2		
	Hopping	8DPSK	V
Test By: King Kong			



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

Bluetooth (GFSK, 8DPSK) mode have been tested, and the worst result(GFSK) was report as below:



Site 3m Chamber #2

Polarization: **Horizontal**

Temperature: 22 C

Limit: (RE)FCC PART 15 CLASS C

Power: AC 120V/60Hz

Humidity: 55 %

EUT: Wine better

M/N: WB-168

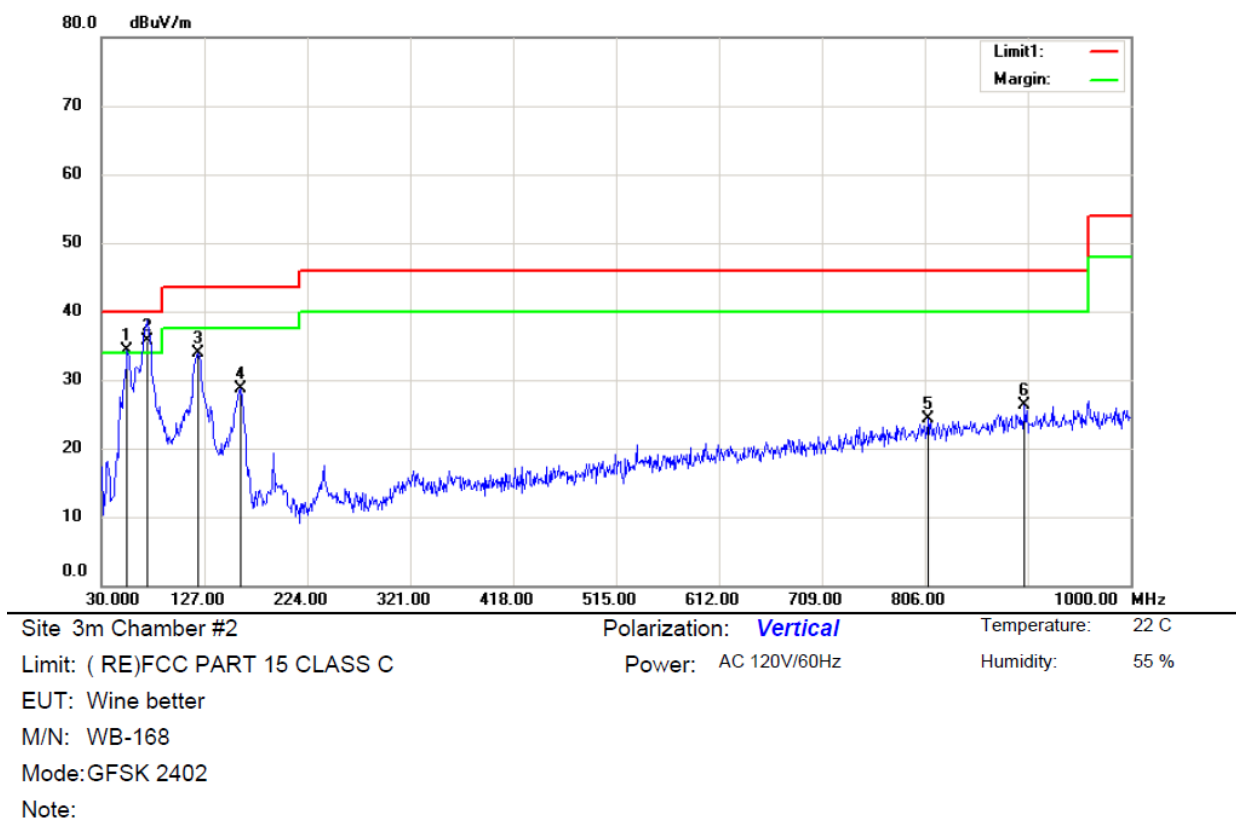
Mode:GFSK 2402

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		70.7400	44.66	-17.32	27.34	40.00	-12.66	QP		
2	*	120.2100	52.53	-16.34	36.19	43.50	-7.31	QP		
3		160.9500	52.74	-17.62	35.12	43.50	-8.38	QP		
4		239.5200	37.61	-13.32	24.29	46.00	-21.71	QP		
5		329.7300	41.48	-10.13	31.35	46.00	-14.65	QP		
6		874.8700	28.44	-0.17	28.27	46.00	-17.73	QP		

*:Maximum data x:Over limit !:over margin

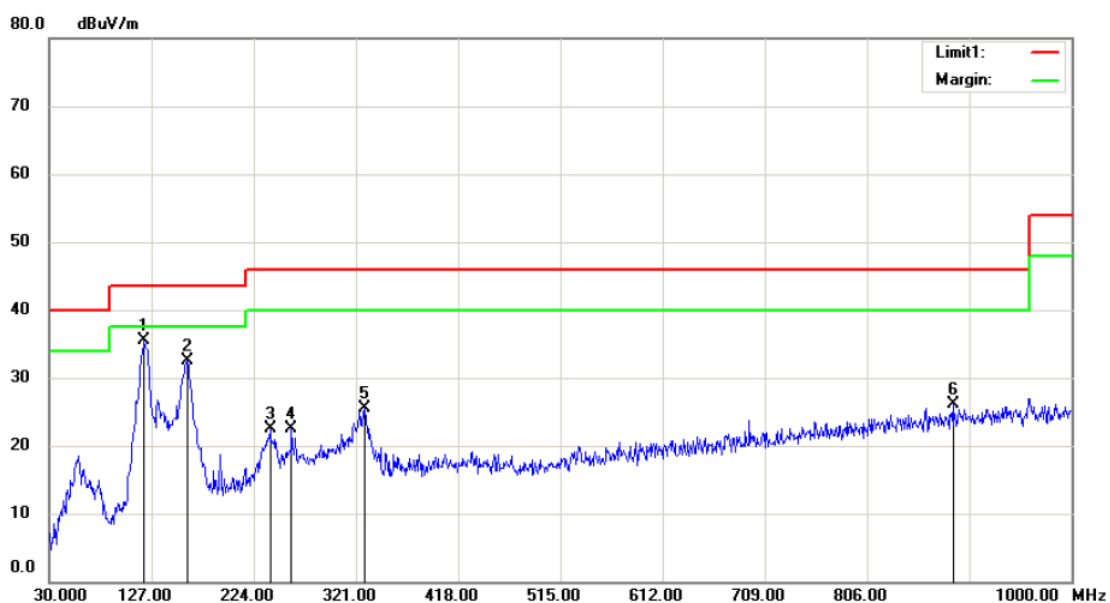
Operator: KK



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	!	54.2500	48.09	-13.78	34.31	40.00	-5.69	QP		
2	*	73.6500	53.78	-17.98	35.80	40.00	-4.20	QP		
3		121.1800	50.48	-16.50	33.98	43.50	-9.52	QP		
4		160.9500	46.35	-17.62	28.73	43.50	-14.77	QP		
5		808.9100	25.37	-0.97	24.40	46.00	-21.60	QP		
6		900.0900	26.08	0.14	26.22	46.00	-19.78	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK

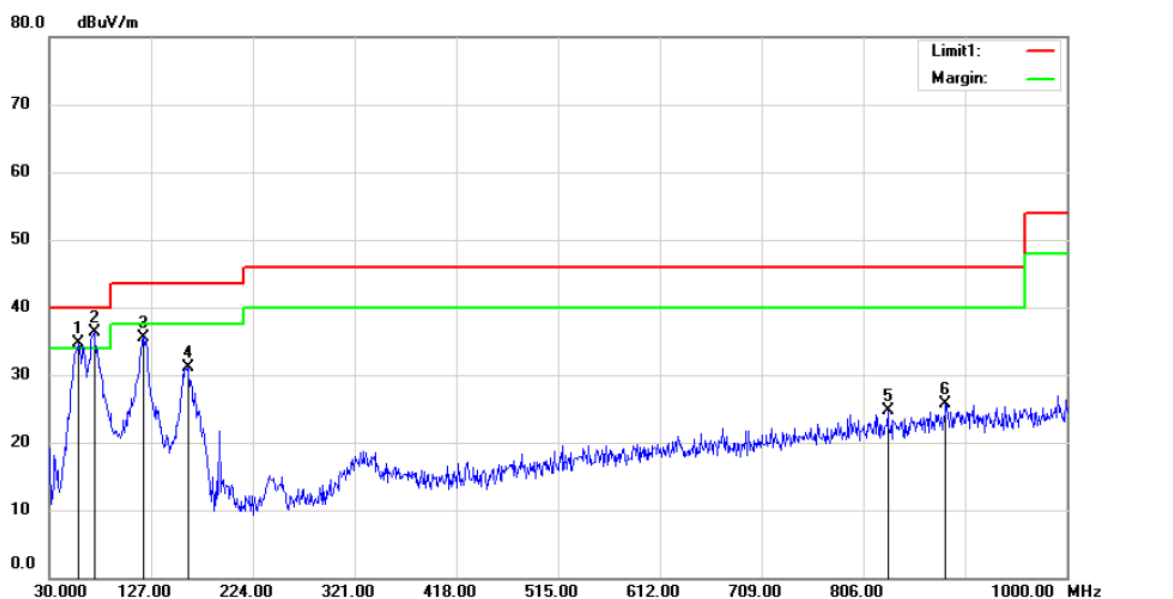


Site 3m Chamber #2 Polarization: **Horizontal** Temperature: 22 C
Limit: (RE)FCC PART 15 CLASS C Power: AC 120V/60Hz Humidity: 55 %
EUT: Wine better
M/N: WB-168
Mode:GFSK 2441
Note:

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	*	120.2100	51.80	-16.34	35.46	43.50	-8.04	QP		
2		160.9500	50.03	-17.62	32.41	43.50	-11.09	QP		
3		239.5200	35.81	-13.32	22.49	46.00	-23.51	QP		
4		259.8900	34.76	-12.31	22.45	46.00	-23.55	QP		
5		329.7300	35.67	-10.13	25.54	46.00	-20.46	QP		
6		887.4800	26.10	-0.02	26.08	46.00	-19.92	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK



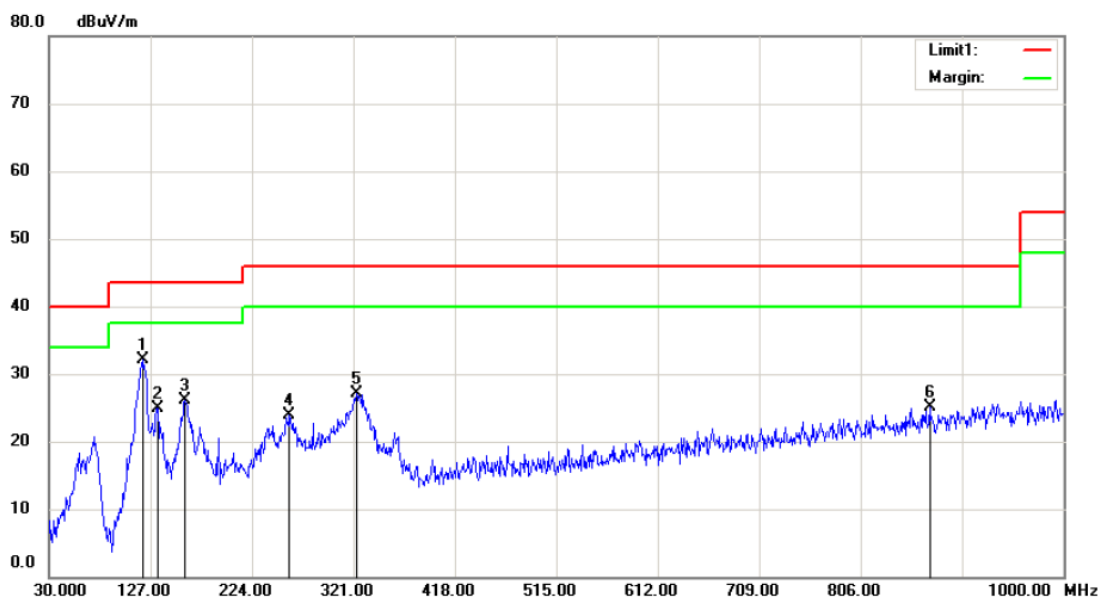
Site 3m Chamber #2
 Limit: (RE)FCC PART 15 CLASS C
 EUT: Wine better
 M/N: WB-168
 Mode:GFSK 2441
 Note:

Polarization: **Vertical**
 Power: AC 120V/60Hz
 Temperature: 22 C
 Humidity: 55 %

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	!	57.1600	50.41	-15.62	34.79	40.00	-5.21	QP		
2	*	72.6800	54.03	-17.75	36.28	40.00	-3.72	QP		
3		119.2400	51.67	-16.21	35.46	43.50	-8.04	QP		
4		161.9200	48.63	-17.49	31.14	43.50	-12.36	QP		
5		829.2800	25.38	-0.73	24.65	46.00	-21.35	QP		
6		884.5700	25.72	-0.05	25.67	46.00	-20.33	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK



Site 3m Chamber #2

Polarization: **Horizontal**

Temperature: 22 C

Limit: (RE)FCC PART 15 CLASS C

Power: AC 120V/60Hz

Humidity: 55 %

EUT: Wine better

M/N: WB-168

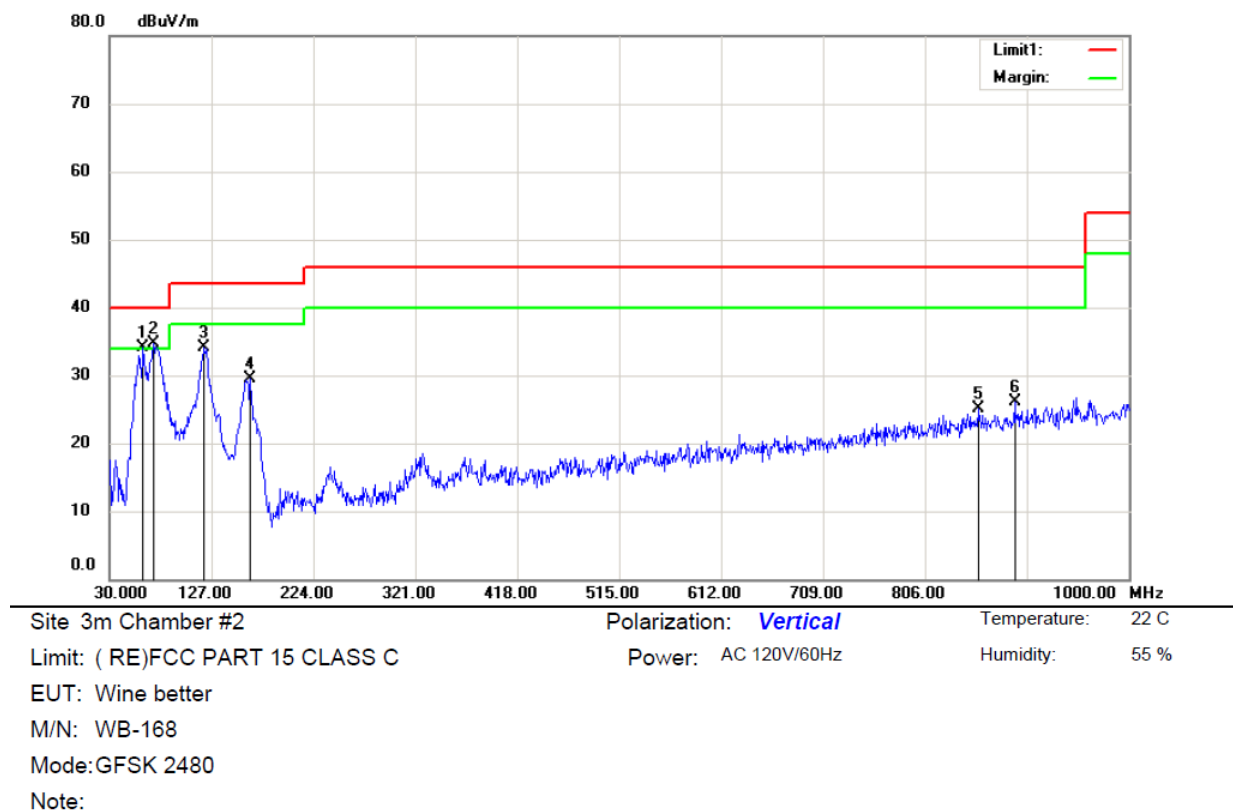
Mode:GFSK 2480

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	120.2100	48.50	-16.34	32.16	43.50	-11.34	QP		
2		133.7900	43.05	-18.06	24.99	43.50	-18.51	QP		
3		159.9800	43.85	-17.73	26.12	43.50	-17.38	QP		
4		259.8900	36.28	-12.31	23.97	46.00	-22.03	QP		
5		323.9100	37.44	-10.35	27.09	46.00	-18.91	QP		
6		871.9600	25.37	-0.21	25.16	46.00	-20.84	QP		

*:Maximum data x:Over limit !:over margin

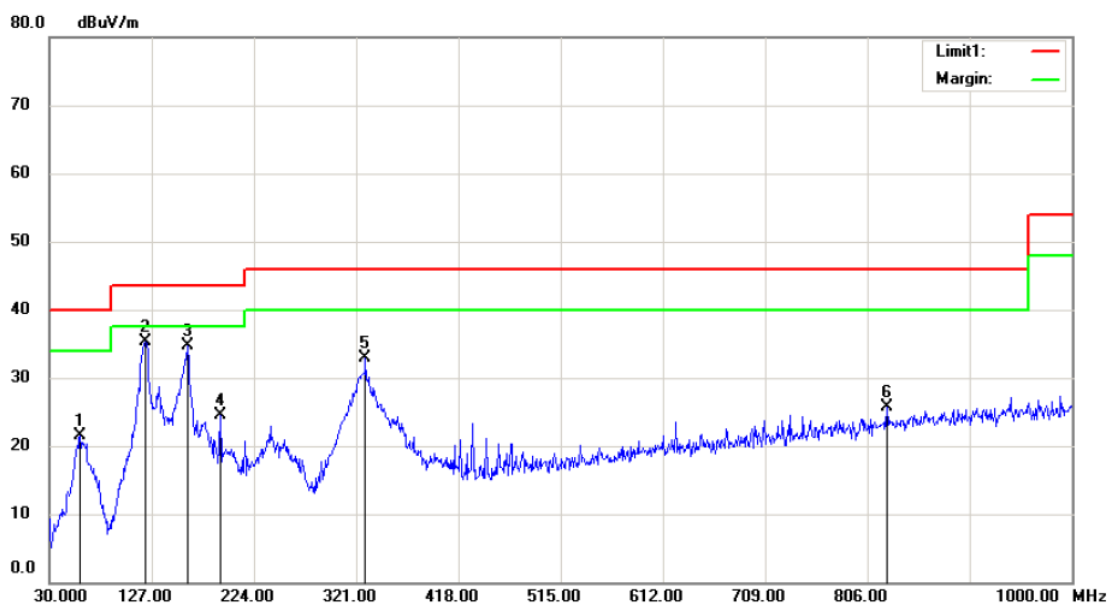
Operator: KK



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	!	62.0100	49.51	-15.47	34.04	40.00	-5.96	QP		
2	*	71.7100	52.24	-17.54	34.70	40.00	-5.30	QP		
3		120.2100	50.51	-16.34	34.17	43.50	-9.33	QP		
4		163.8600	46.65	-17.24	29.41	43.50	-14.09	QP		
5		856.4400	25.48	-0.40	25.08	46.00	-20.92	QP		
6		891.3600	26.02	0.03	26.05	46.00	-19.95	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK

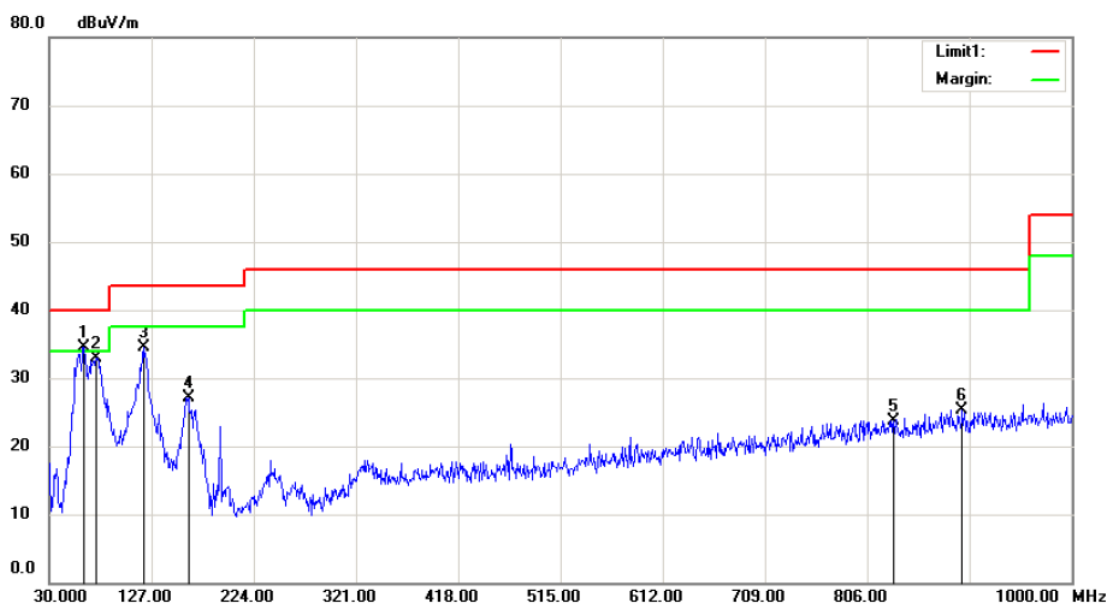


Site 3m Chamber #2 Polarization: **Horizontal** Temperature: 22 C
 Limit: (RE)FCC PART 15 CLASS C Power: AC 120V/60Hz Humidity: 55 %
 EUT: Wine better
 M/N: WB-168
 Mode:8DPSK 2402
 Note:

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		59.1000	37.36	-15.85	21.51	40.00	-18.49	QP		
2	*	121.1800	51.85	-16.50	35.35	43.50	-8.15	QP		
3		160.9500	52.33	-17.62	34.71	43.50	-8.79	QP		
4		191.9900	40.20	-15.79	24.41	43.50	-19.09	QP		
5		329.7300	43.04	-10.13	32.91	46.00	-13.09	QP		
6		824.4300	26.56	-0.78	25.78	46.00	-20.22	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK



Site 3m Chamber #2

Polarization: **Vertical**

Temperature: 22 C

Limit: (RE)FCC PART 15 CLASS C

Power: AC 120V/60Hz

Humidity: 55 %

EUT: Wine better

M/N: WB-168

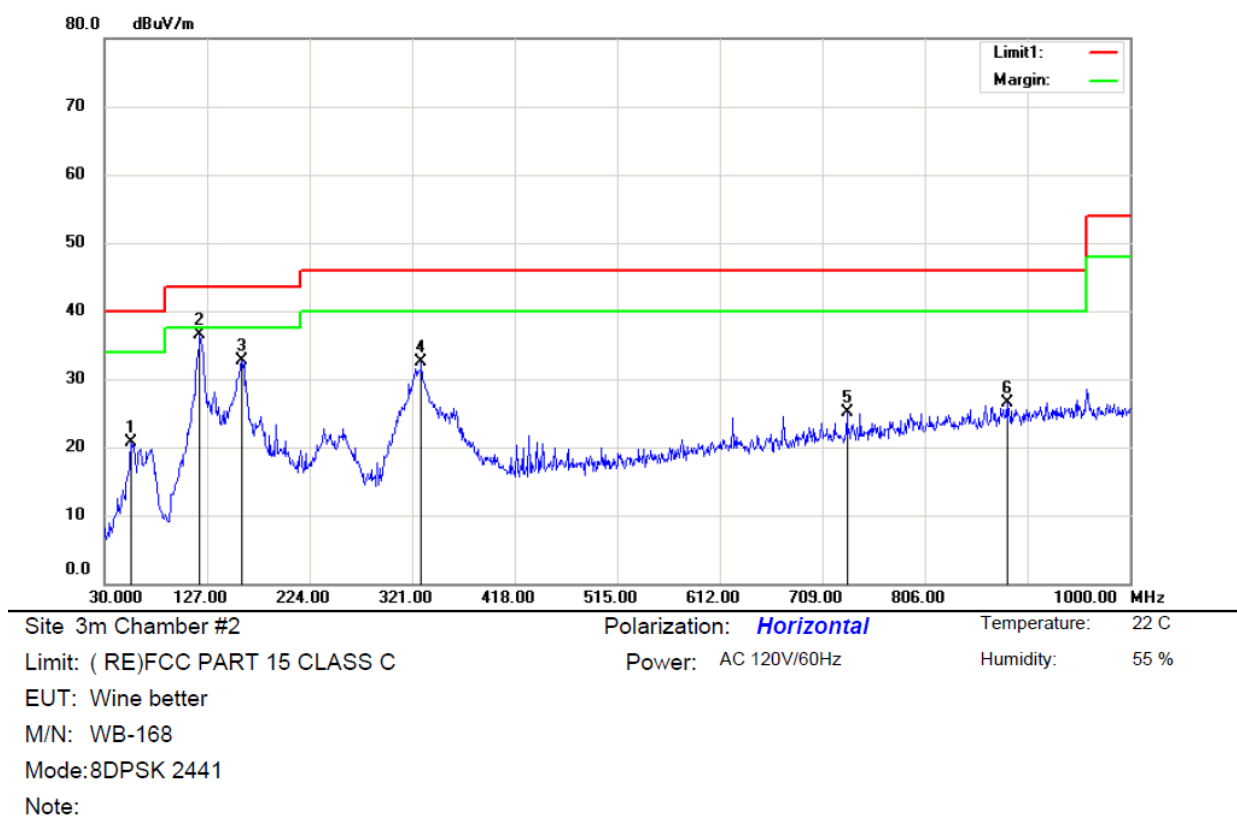
Mode:8DPSK 2402

Note:

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	*	62.9800	50.02	-15.52	34.50	40.00	-5.50	QP		
2		74.6200	51.14	-18.20	32.94	40.00	-7.06	QP		
3		119.2400	50.63	-16.21	34.42	43.50	-9.08	QP		
4		161.9200	44.63	-17.49	27.14	43.50	-16.36	QP		
5		831.2200	24.45	-0.70	23.75	46.00	-22.25	QP		
6		896.2100	25.21	0.09	25.30	46.00	-20.70	QP		

*:Maximum data x:Over limit !:over margin

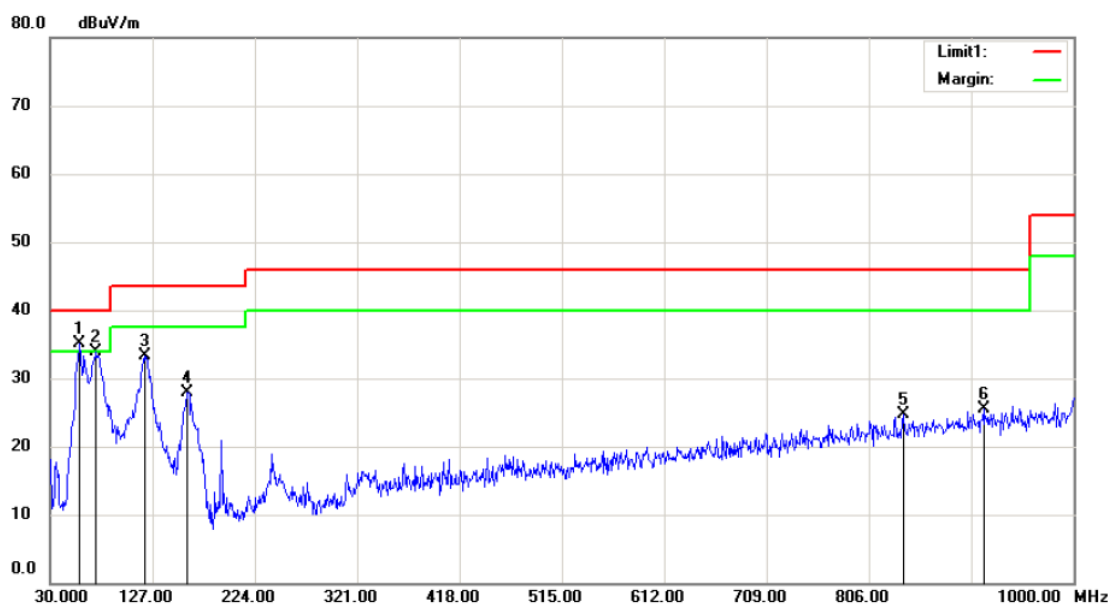
Operator: KK



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		55.2200	34.92	-14.20	20.72	40.00	-19.28	QP		
2	*	120.2100	52.90	-16.34	36.56	43.50	-6.94	QP		
3		159.9800	50.34	-17.73	32.61	43.50	-10.89	QP		
4		329.7300	42.68	-10.13	32.55	46.00	-13.45	QP		
5		732.2800	27.38	-2.32	25.06	46.00	-20.94	QP		
6		883.6000	26.50	-0.06	26.44	46.00	-19.56	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK

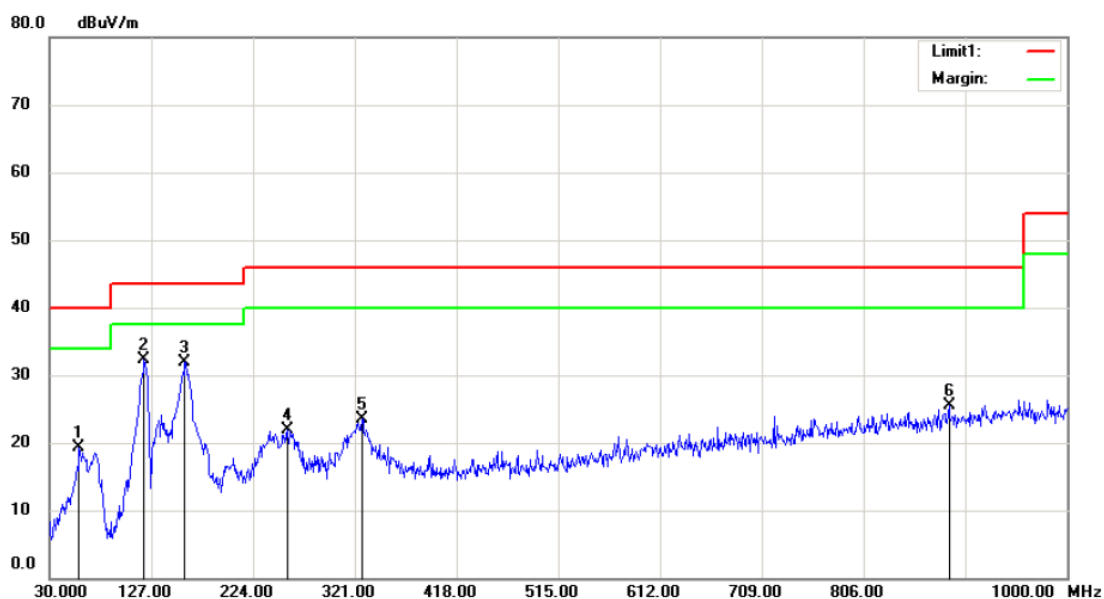


Site 3m Chamber #2 Polarization: **Vertical** Temperature: 22 C
 Limit: (RE)FCC PART 15 CLASS C Power: AC 120V/60Hz Humidity: 55 %
 EUT: Wine better
 M/N: WB-168
 Mode:8DPSK 2441
 Note:

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	*	58.1300	51.51	-16.34	35.17	40.00	-4.83	QP		
2		73.6500	51.82	-17.98	33.84	40.00	-6.16	QP		
3		119.2400	49.56	-16.21	33.35	43.50	-10.15	QP		
4		159.9800	45.68	-17.73	27.95	43.50	-15.55	QP		
5		838.9800	25.31	-0.61	24.70	46.00	-21.30	QP		
6		914.6400	25.21	0.30	25.51	46.00	-20.49	QP		

*:Maximum data x:Over limit l:over margin

Operator: KK



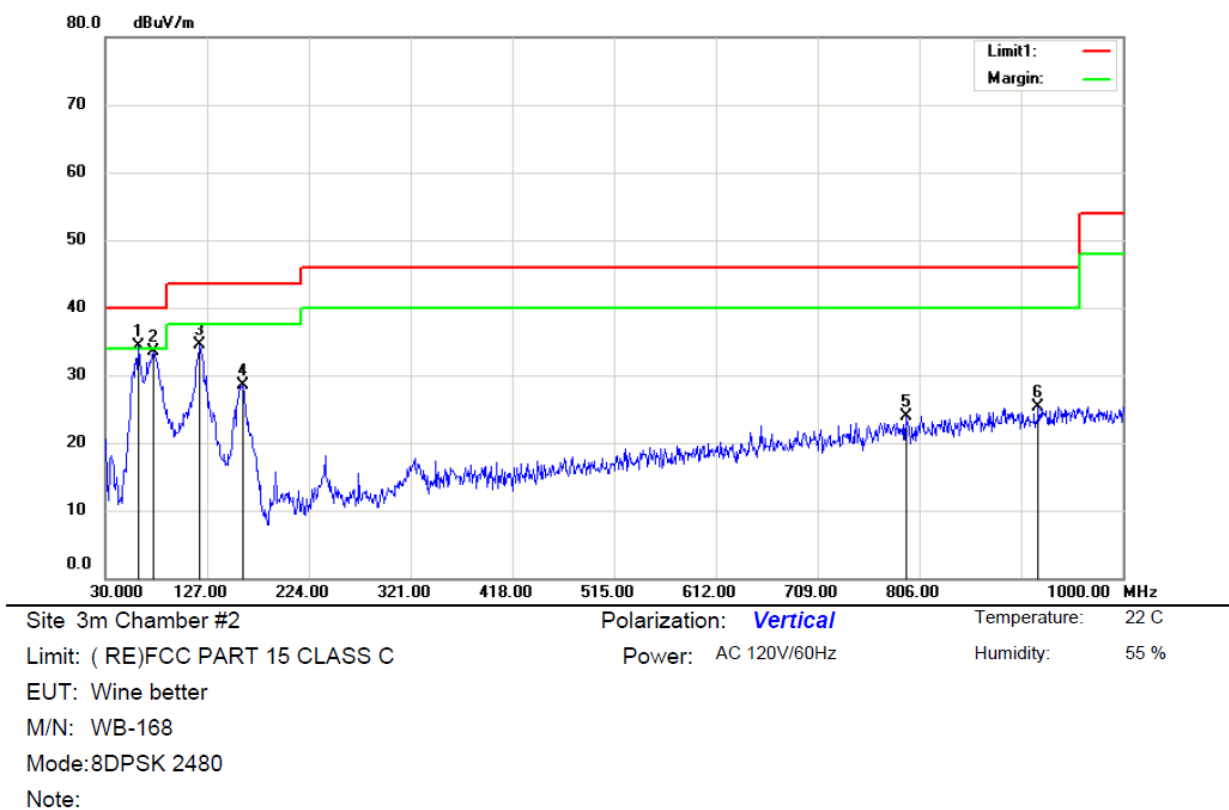
Site 3m Chamber #2
Limit: (RE)FCC PART 15 CLASS C
EUT: Wine better
M/N: WB-168
Mode:8DPSK 2480
Note:

Polarization: **Horizontal**
Power: AC 120V/60Hz
Temperature: 22 C
Humidity: 55 %

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	58.1300	35.65	-16.34	19.31	40.00	-20.69	QP		
2 *	120.2100	48.61	-16.34	32.27	43.50	-11.23	QP		
3	159.0100	49.76	-17.78	31.98	43.50	-11.52	QP		
4	256.9800	34.46	-12.59	21.87	46.00	-24.13	QP		
5	327.7900	33.76	-10.20	23.56	46.00	-22.44	QP		
6	887.4800	25.43	-0.02	25.41	46.00	-20.59	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK



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	*	61.0400	49.81	-15.44	34.37	40.00	-5.63	QP		
2		75.5900	51.99	-18.42	33.57	40.00	-6.43	QP		
3		120.2100	50.79	-16.34	34.45	43.50	-9.05	QP		
4		160.9500	46.19	-17.62	28.57	43.50	-14.93	QP		
5		793.3900	25.01	-1.20	23.81	46.00	-22.19	QP		
6		919.4900	24.96	0.36	25.32	46.00	-20.68	QP		

*:Maximum data x:Over limit !:over margin

Operator: KK

9.9 CONDUCTED EMISSION TEST

9.9.1 Applicable Standard

According to FCC Part 15.207(a)
According to IC RSS-Gen 6.13

9.9.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

9.9.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

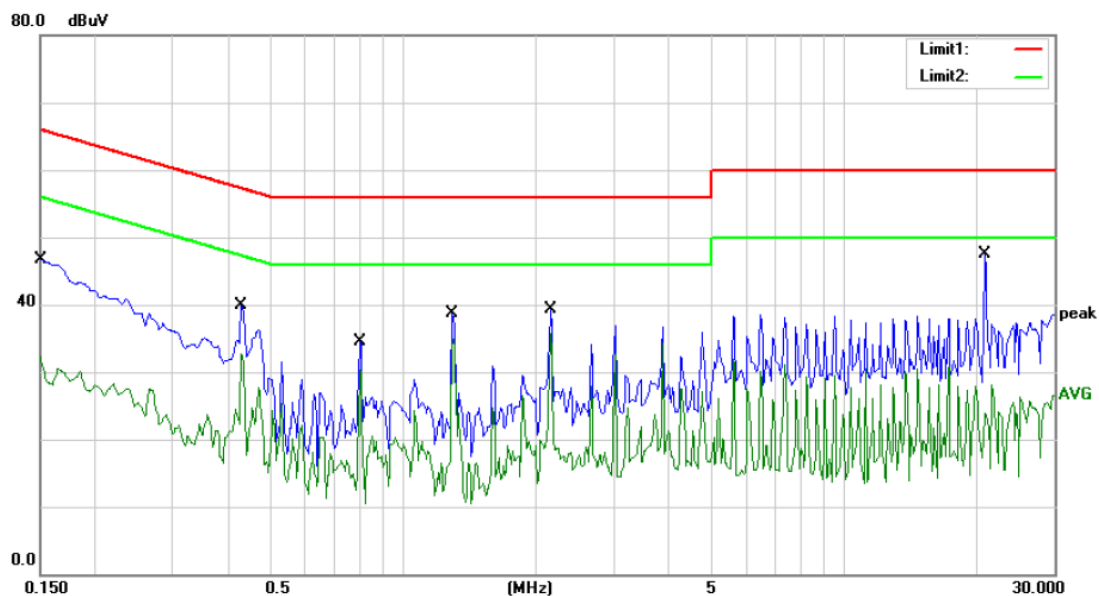
9.9.4 Test Procedure

The EUT was placed on a table which is 0.1m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

9.9.5 Test Results

Pass

We test the EUT at 120V, and show the worst result as bellow.



Site Conduction #1

Limit: (CE)FCC PART 15 207

EUT: Wine better

M/N: WB-168

Mode: BT mode

Note:

Phase: **L1**

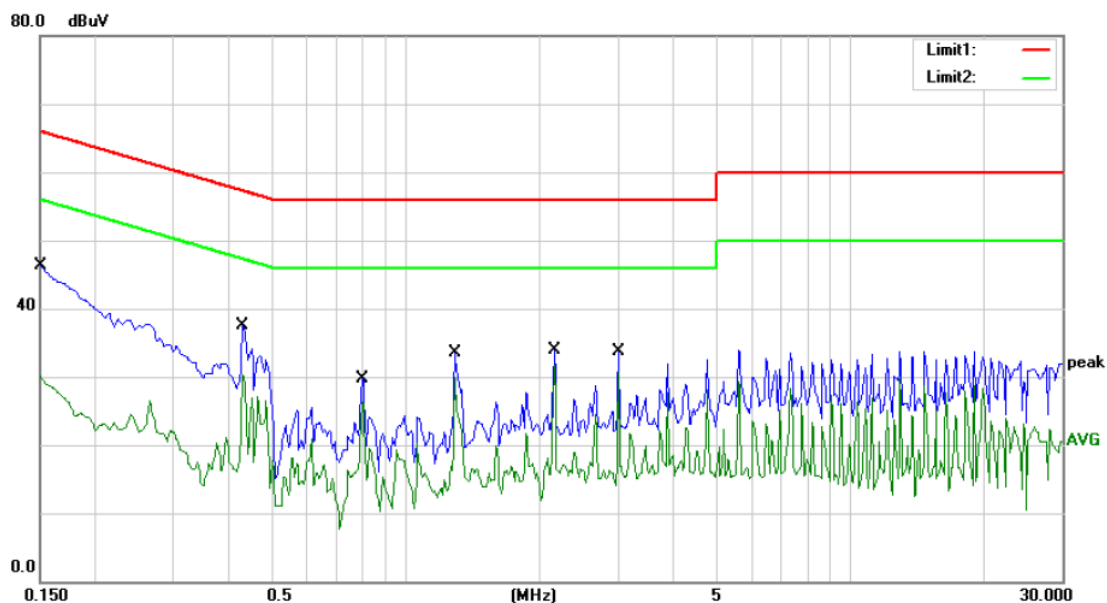
Power: AC 120V/60Hz

Temperature: 22

Humidity: 55 %

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1500	46.72	0.00	46.72	66.00	-19.28	QP	
2	0.1500	32.30	0.00	32.30	56.00	-23.70	AVG	
3	0.4300	39.84	0.00	39.84	57.25	-17.41	QP	
4	0.4300	32.60	0.00	32.60	47.25	-14.65	AVG	
5	0.8000	34.57	0.00	34.57	56.00	-21.43	QP	
6	0.8000	30.31	0.00	30.31	46.00	-15.69	AVG	
7	1.2950	38.64	0.00	38.64	56.00	-17.36	QP	
8	1.2950	34.82	0.00	34.82	46.00	-11.18	AVG	
9	2.1600	39.28	0.00	39.28	56.00	-16.72	QP	
10 *	2.1600	35.80	0.00	35.80	46.00	-10.20	AVG	
11	20.8700	47.47	0.00	47.47	60.00	-12.53	QP	
12	20.8700	28.13	0.00	28.13	50.00	-21.87	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #1
 Limit: (CE)FCC PART 15 207
 EUT: Wine better
 M/N: WB-168
 Mode: BT mode
 Note:

Phase: **N**
 Power: AC 120V/60Hz

Temperature: 22
 Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	46.38	0.00	46.38	66.00	-19.62	QP	
2		0.1500	30.01	0.00	30.01	56.00	-25.99	AVG	
3		0.4300	37.52	0.00	37.52	57.25	-19.73	QP	
4		0.4300	30.21	0.00	30.21	47.25	-17.04	AVG	
5		0.8000	29.76	0.00	29.76	56.00	-26.24	QP	
6		0.8000	26.33	0.00	26.33	46.00	-19.67	AVG	
7		1.2950	33.55	0.00	33.55	56.00	-22.45	QP	
8		1.2950	29.80	0.00	29.80	46.00	-16.20	AVG	
9		2.1600	33.83	0.00	33.83	56.00	-22.17	QP	
10	*	2.1600	31.78	0.00	31.78	46.00	-14.22	AVG	
11		3.0250	33.62	0.00	33.62	56.00	-22.38	QP	
12		3.0250	30.64	0.00	30.64	46.00	-15.36	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan

9.10 ANTENNA APPLICATION

9.10.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203 IC RSS-Gen 6.7	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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203 and IC RSS-Gen 6.7, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b) and IC RSS-Gen 6.7, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.10.2 Result

PASS.

The EUT has 1 antenna: a PCB Antenna for BT v4.2 with classic model, the gain is 0 dBi

- Note:
- ☒ Antenna use a permanently attached antenna which is not replaceable.
 - ☐ Not using a standard antenna jack or electrical connector for antenna replacement
 - ☐ The antenna has to be professionally installed (please provide method of installation)

which in accordance to section 15.203, please refer to the internal photos.

-----END OF REPORT-----