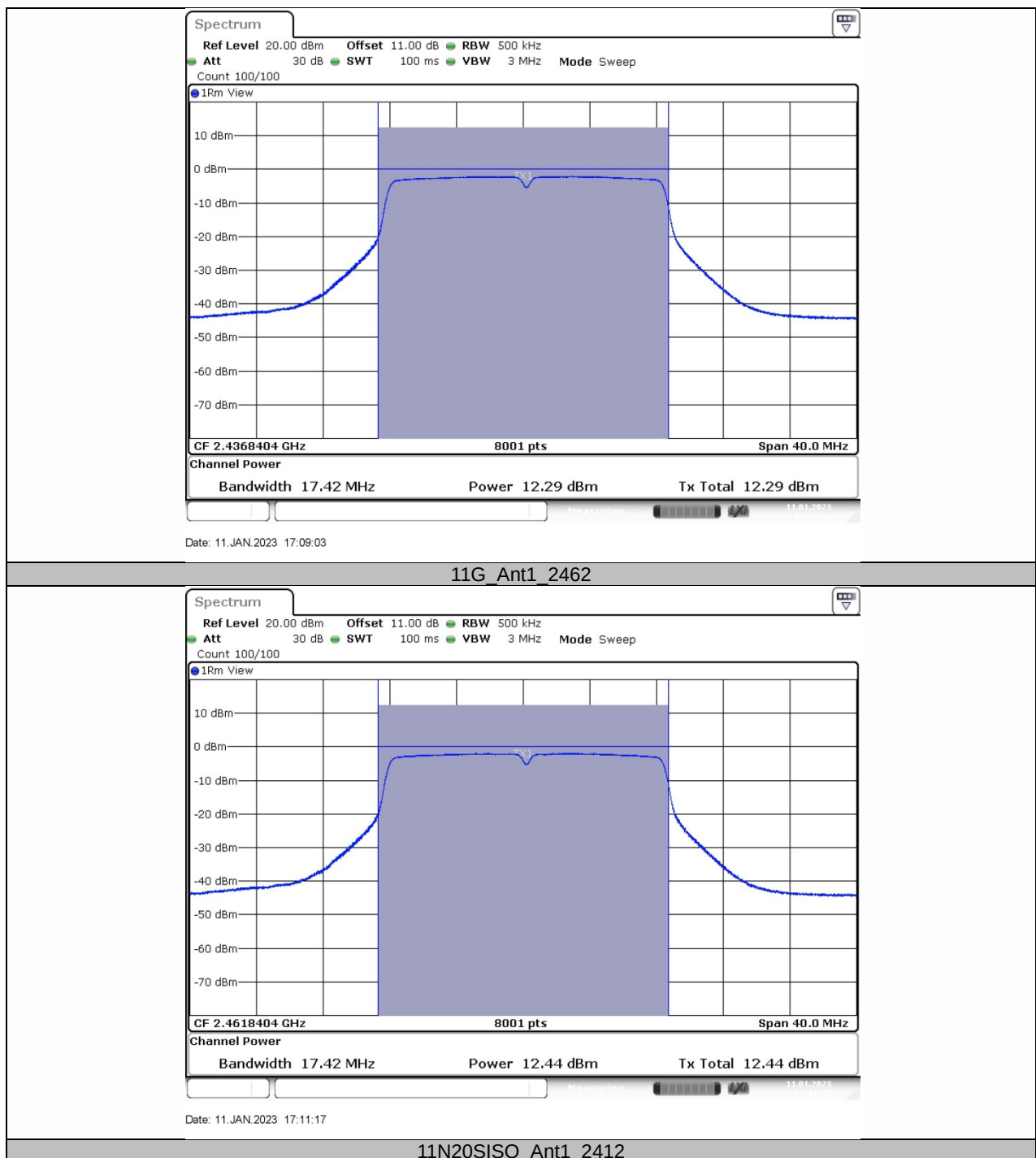
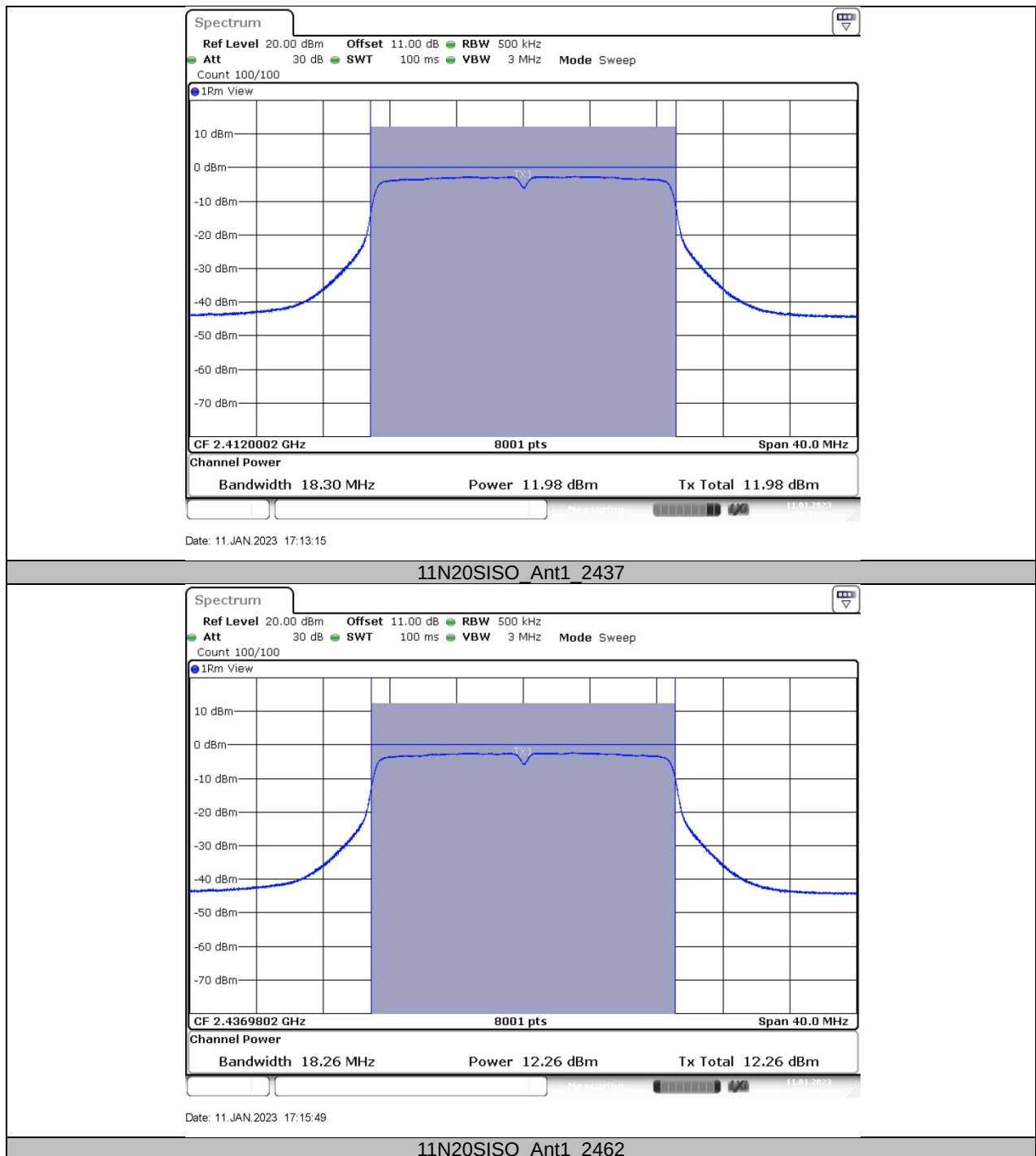
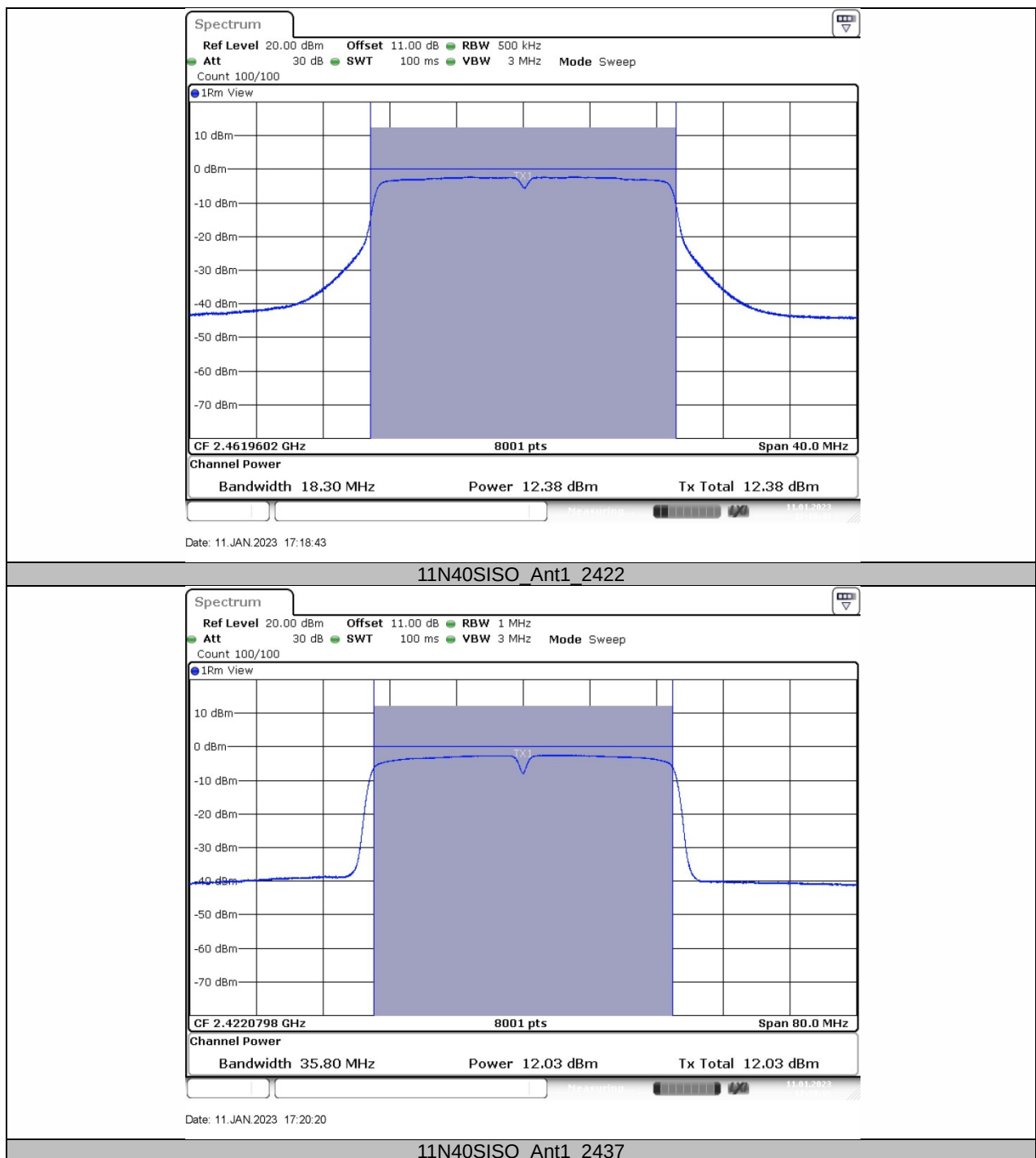
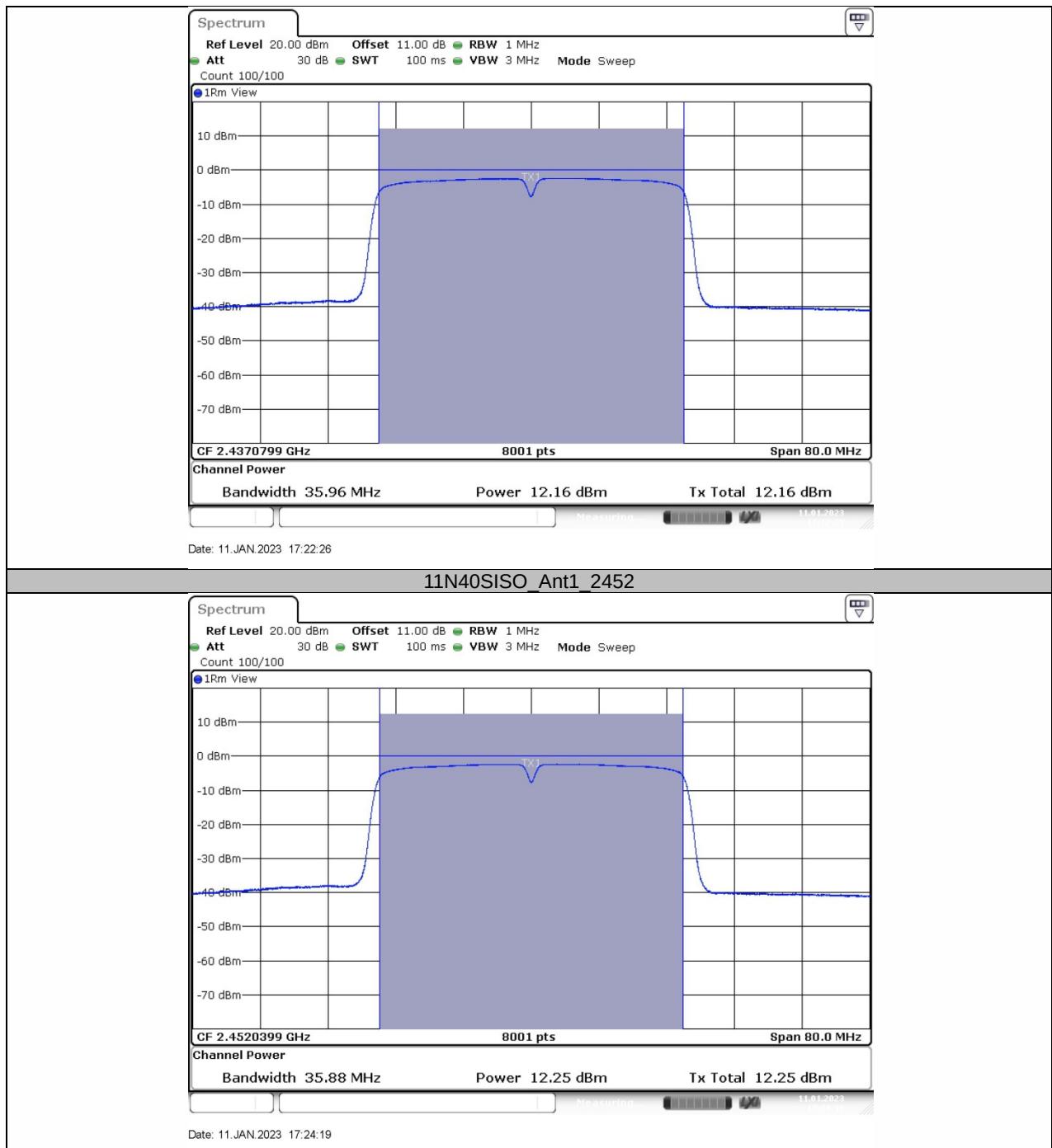










8.4 MAXIMUM POWER SPECTRAL DENSITY

8.4.1 Applicable Standard

According to FCC Part15.247(e) and KDB 558074 D01 15.247 Meas Guidance v05r02
According to RSS-247, 5.2(b) and RSS-Gen6.12

8.4.2 Conformance Limit

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

8.4.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.4.4 Test Procedure

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance

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

Set analyzer center frequency to DTS channel center frequency.

Set the span to 1.5 times the DTS bandwidth.

Set the RBW to: 3 kHz

Set the VBW to: 10 kHz.

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 amplitude level within the RBW.

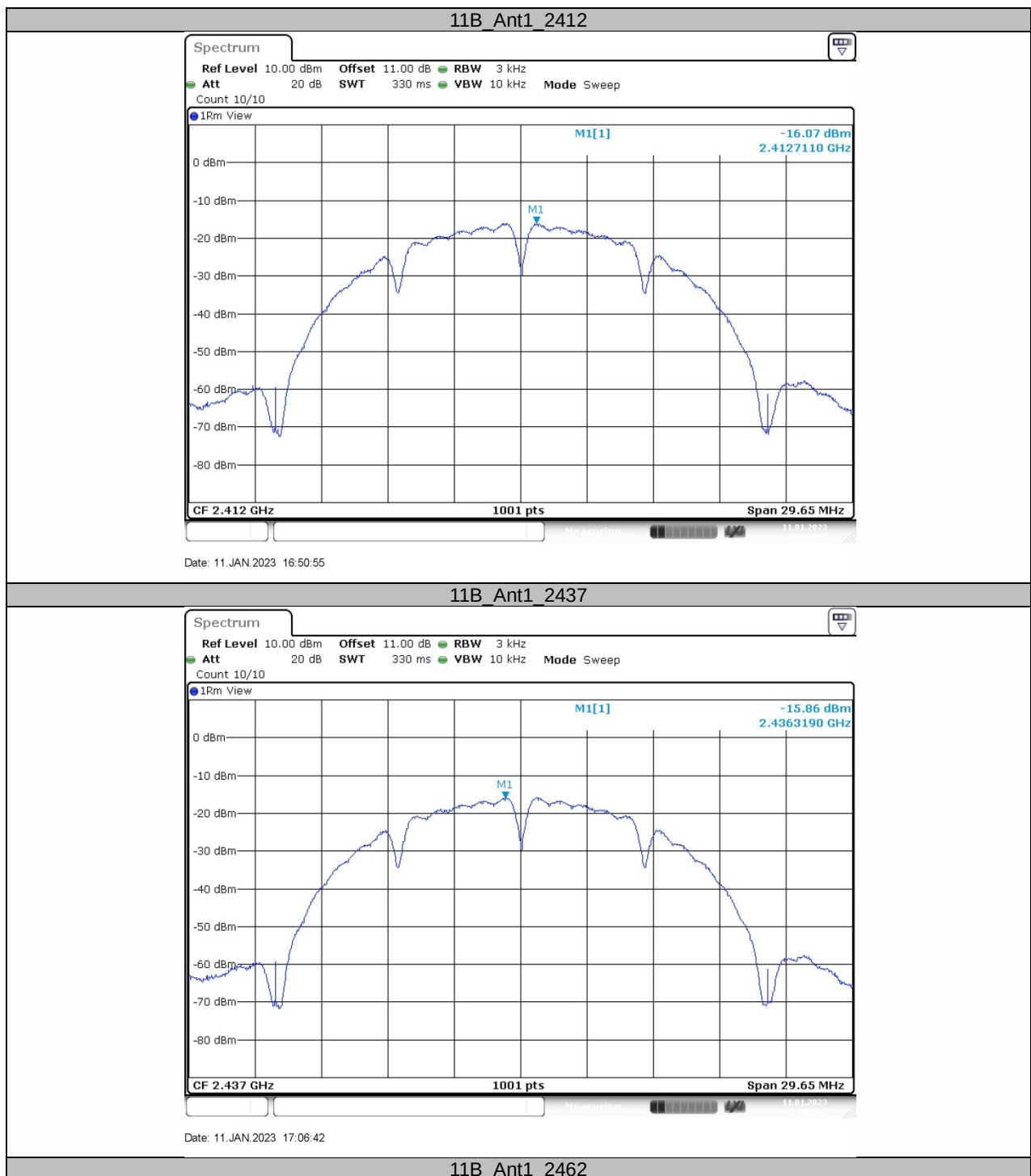
8.4.5 Test Results

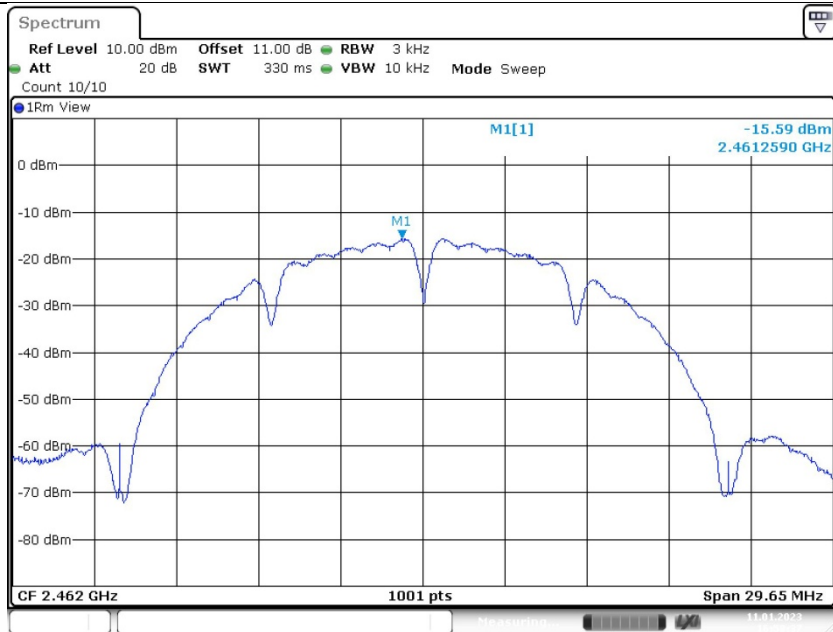
Temperature:	25 °C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

Note: N/A

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-16.07	≤8.00	PASS
		2437	-15.86	≤8.00	PASS
		2462	-15.59	≤8.00	PASS
11G	Ant1	2412	-22.24	≤8.00	PASS
		2437	-22.46	≤8.00	PASS
		2462	-22.31	≤8.00	PASS
11N20SISO	Ant1	2412	-22.85	≤8.00	PASS
		2437	-22.64	≤8.00	PASS
		2462	-22.58	≤8.00	PASS
11N40SISO	Ant1	2422	-26.12	≤8.00	PASS
		2437	-25.81	≤8.00	PASS
		2452	-25.79	≤8.00	PASS

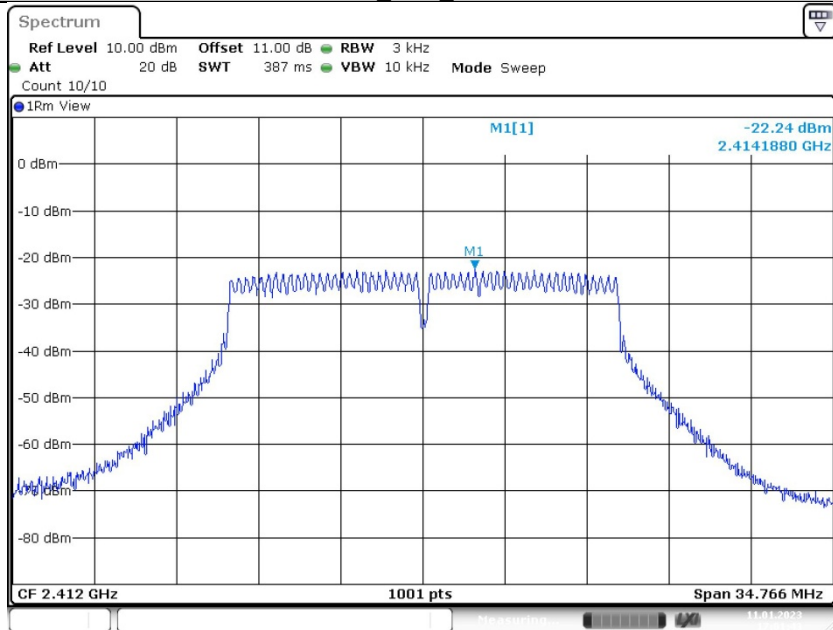






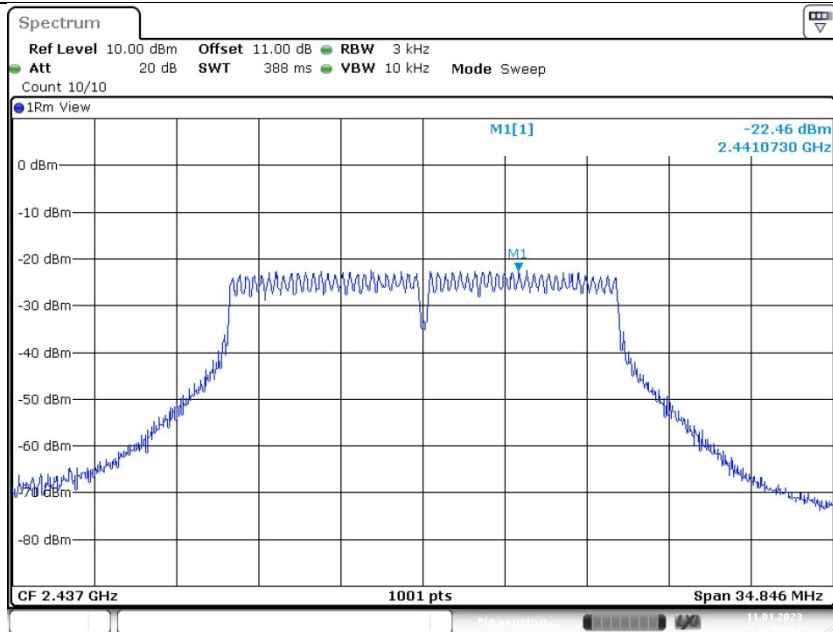
Date: 11.JAN.2023 16:58:38

11G_Ant1_2412



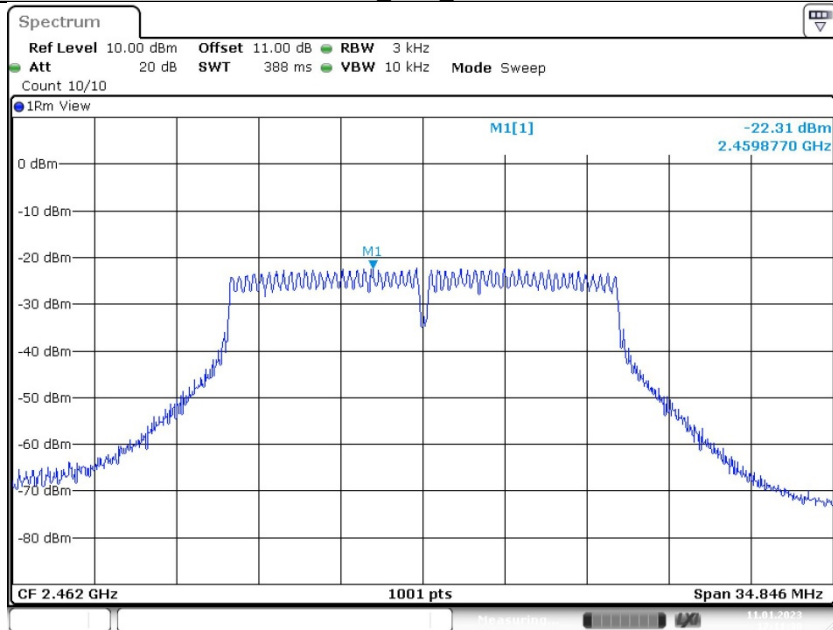
Date: 11.JAN.2023 17:01:43

11G_Ant1_2437



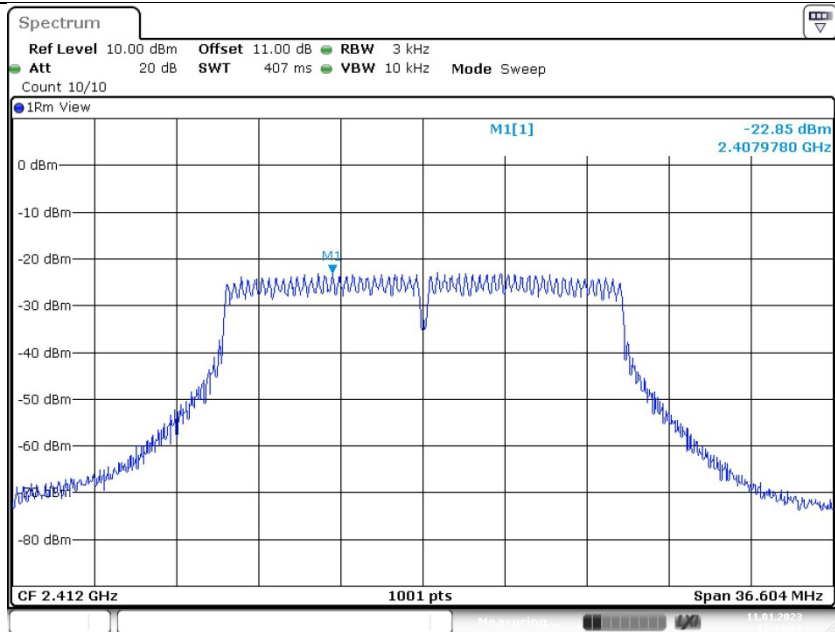
Date: 11.JAN.2023 17:09:16

11G_Ant1_2462



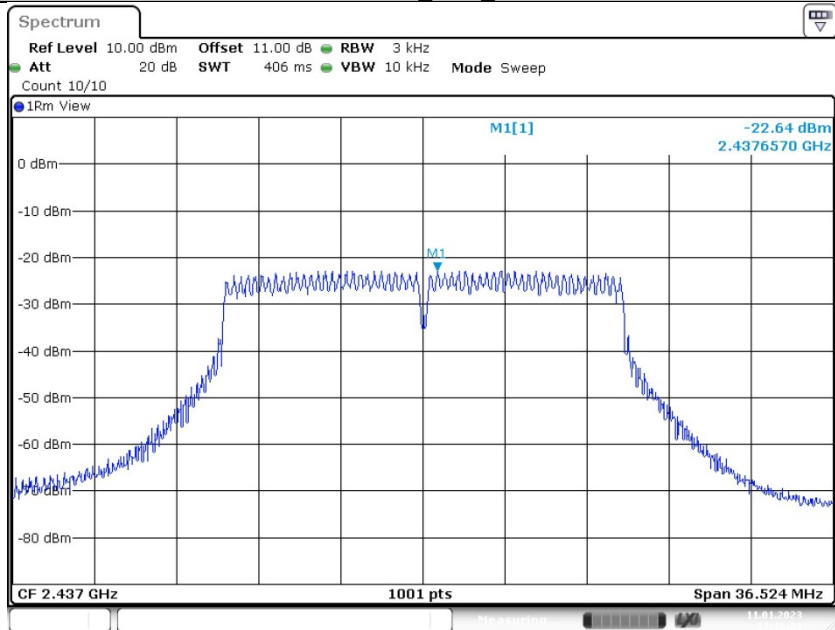
Date: 11.JAN.2023 17:11:30

11N20SISO_Ant1_2412



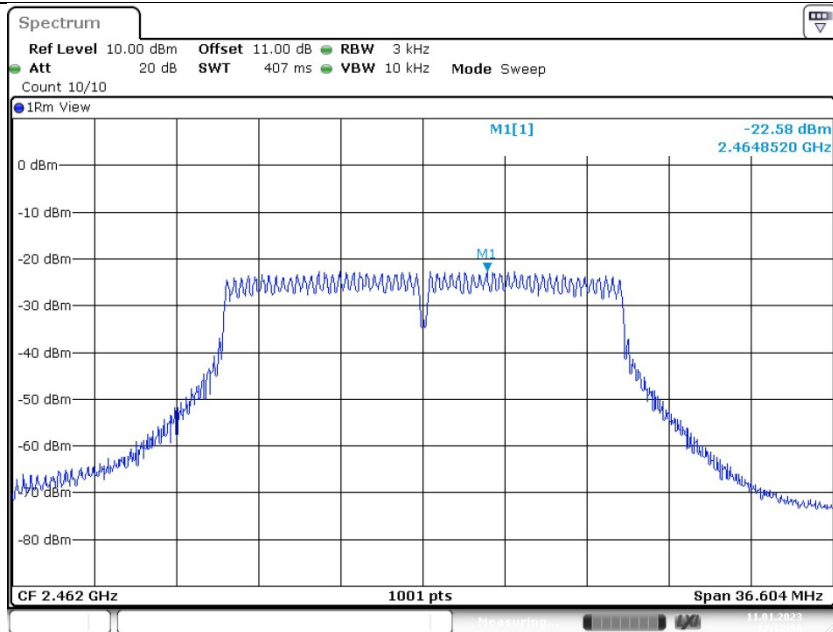
Date: 11.JAN.2023 17:13:29

11N20SISO_Ant1_2437



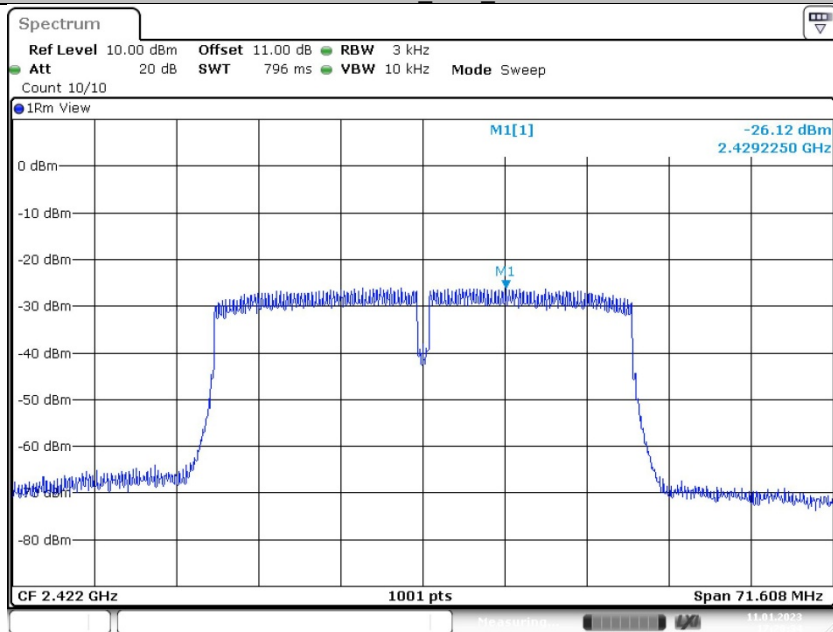
Date: 11.JAN.2023 17:16:03

11N20SISO_Ant1_2462



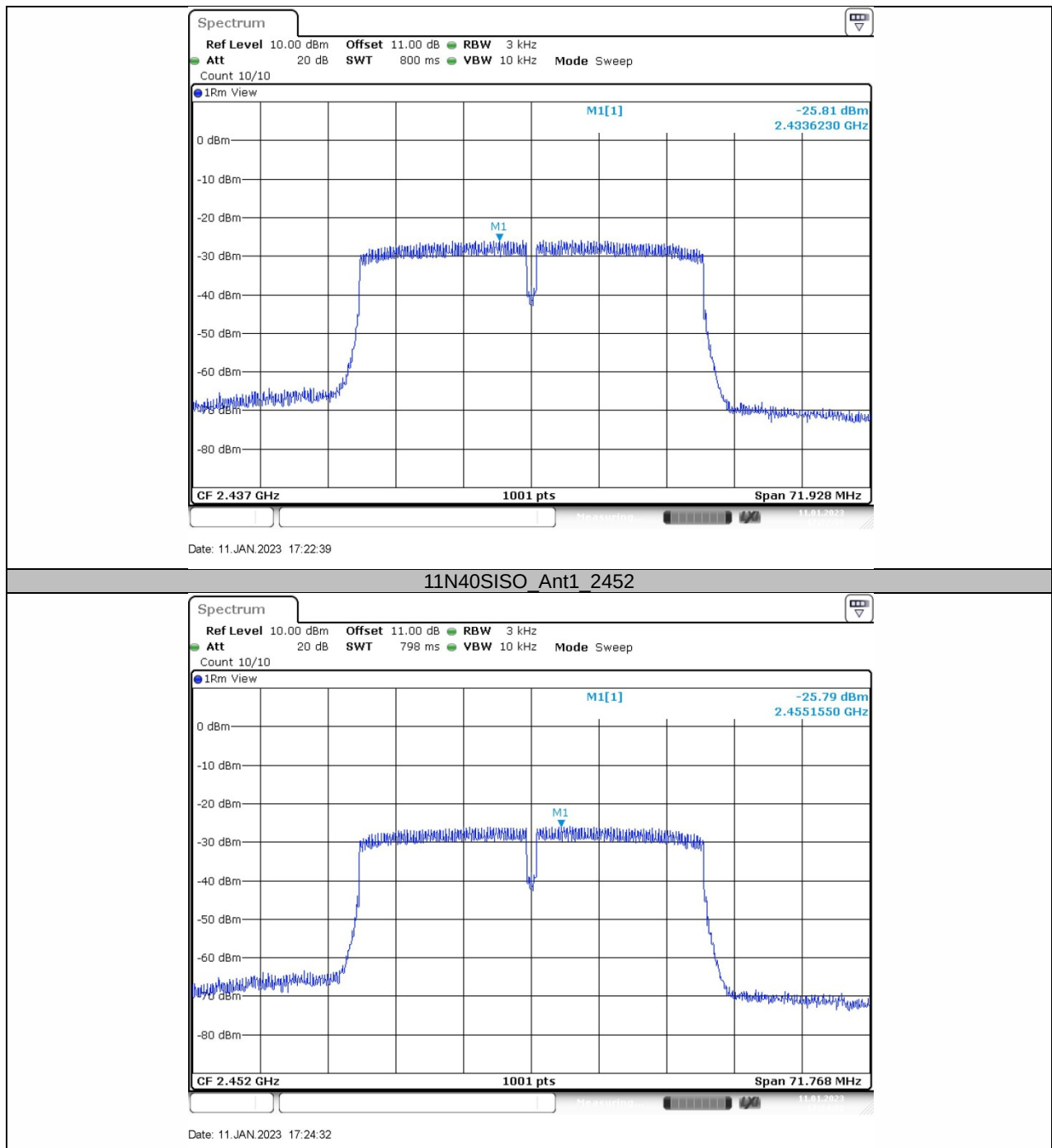
Date: 11.JAN.2023 17:18:57

11N40SISO_Ant1_2422



Date: 11.JAN.2023 17:20:33

11N40SISO_Ant1_2437



8.5 UNWANTED EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

8.5.1 Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

According to RSS-247, 5.5

8.5.2 Conformance Limit

According to FCC Part 15.247(d):

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

8.5.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.5.4 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 DTS channel center frequency.

Set the span to ≥ 1.5 times the DTS bandwidth.

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 PSD level.

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

■ Band-edge measurement

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 $\geq 3 \times$ 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 band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. 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.

■ Emission level measurement

Set the center frequency and span to encompass frequency range to be measured.

Set the RBW = 100 kHz.

Set the VBW = 300 kHz.

Set Detector = peak

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements. Report the three highest emissions relative to the limit.

8.5.5 Test Results

Temperature:	25 °C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

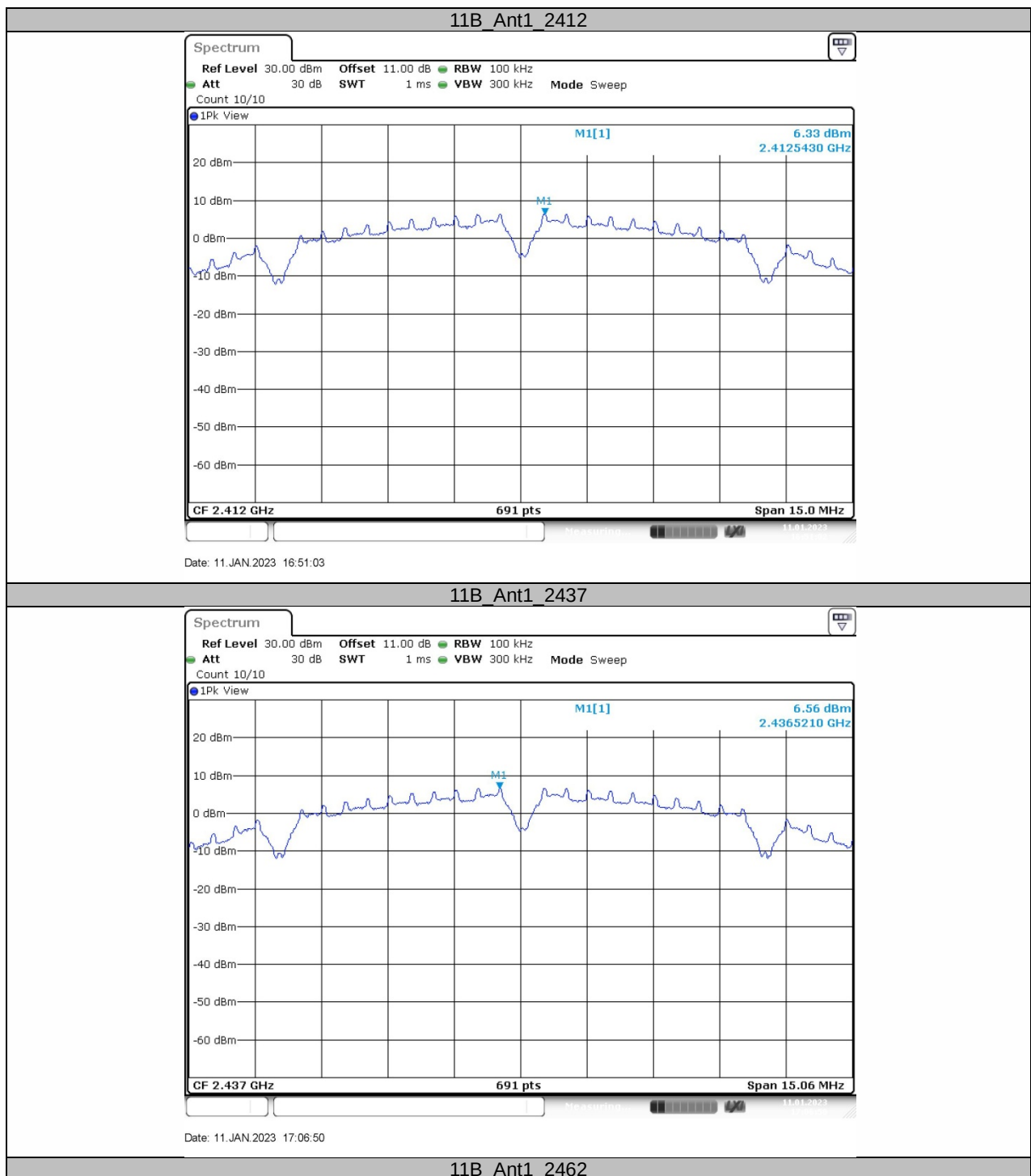
Note: N/A

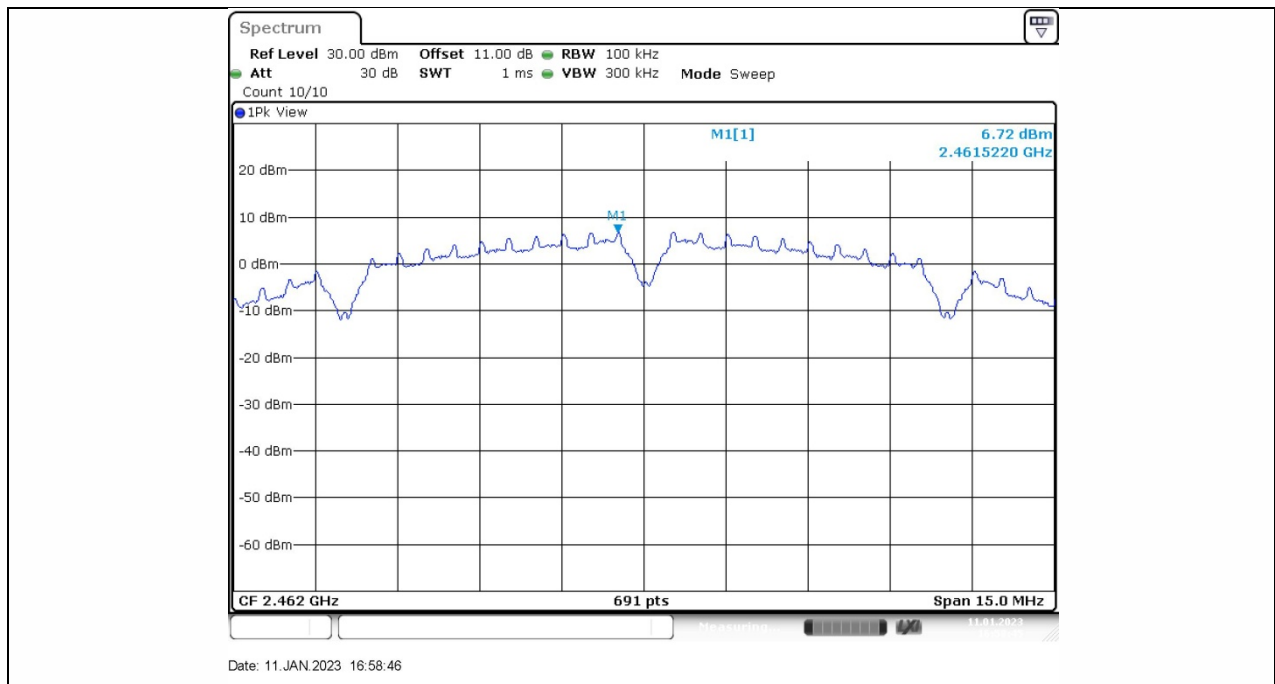
All the antenna (Antenna 1) and modes (802.11b/g/n) have been tested and the worst (Antenna 1, 802.11b) result recorded was reported as below:



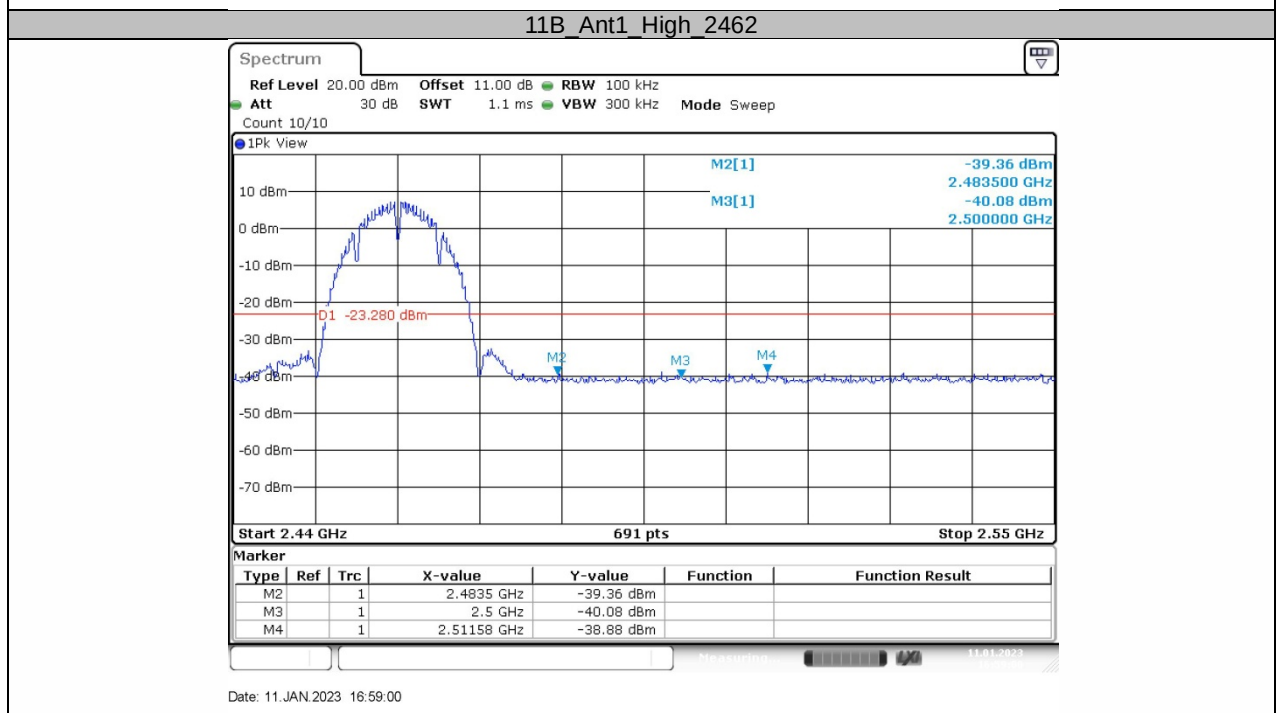
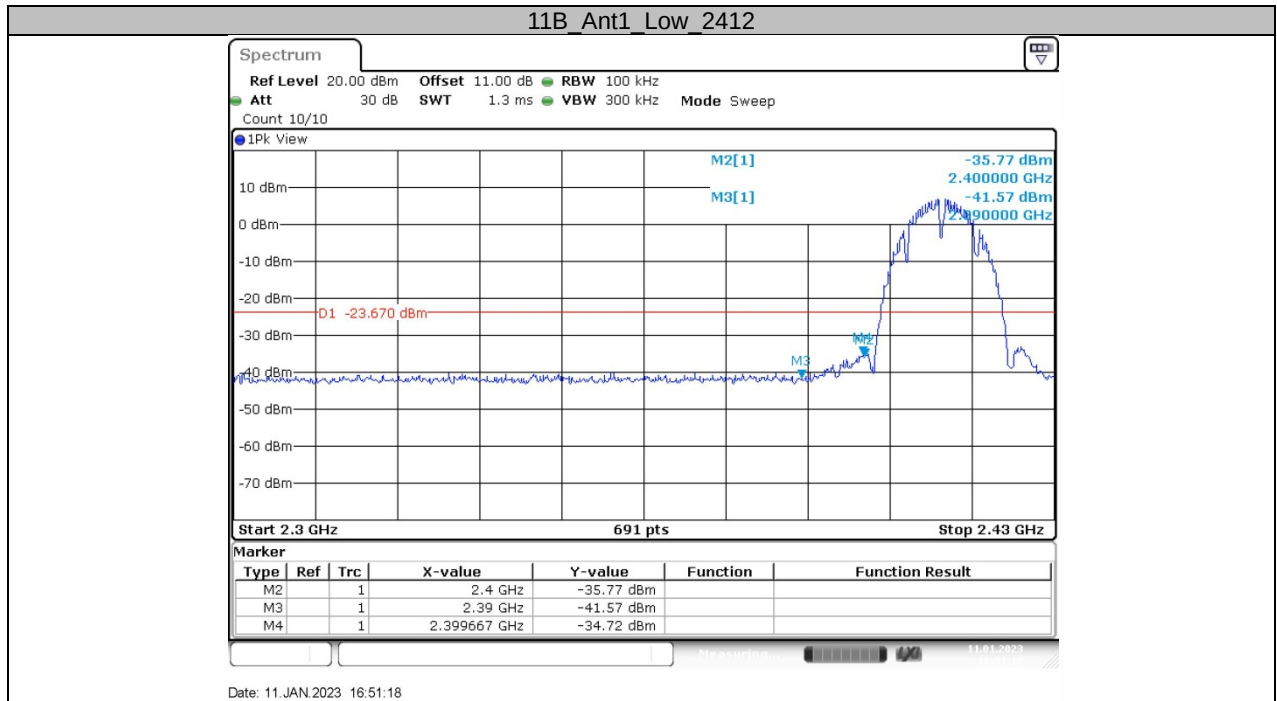
TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
11B	Ant1	2412	2412.54	6.33
		2437	2436.52	6.56
		2462	2461.52	6.72





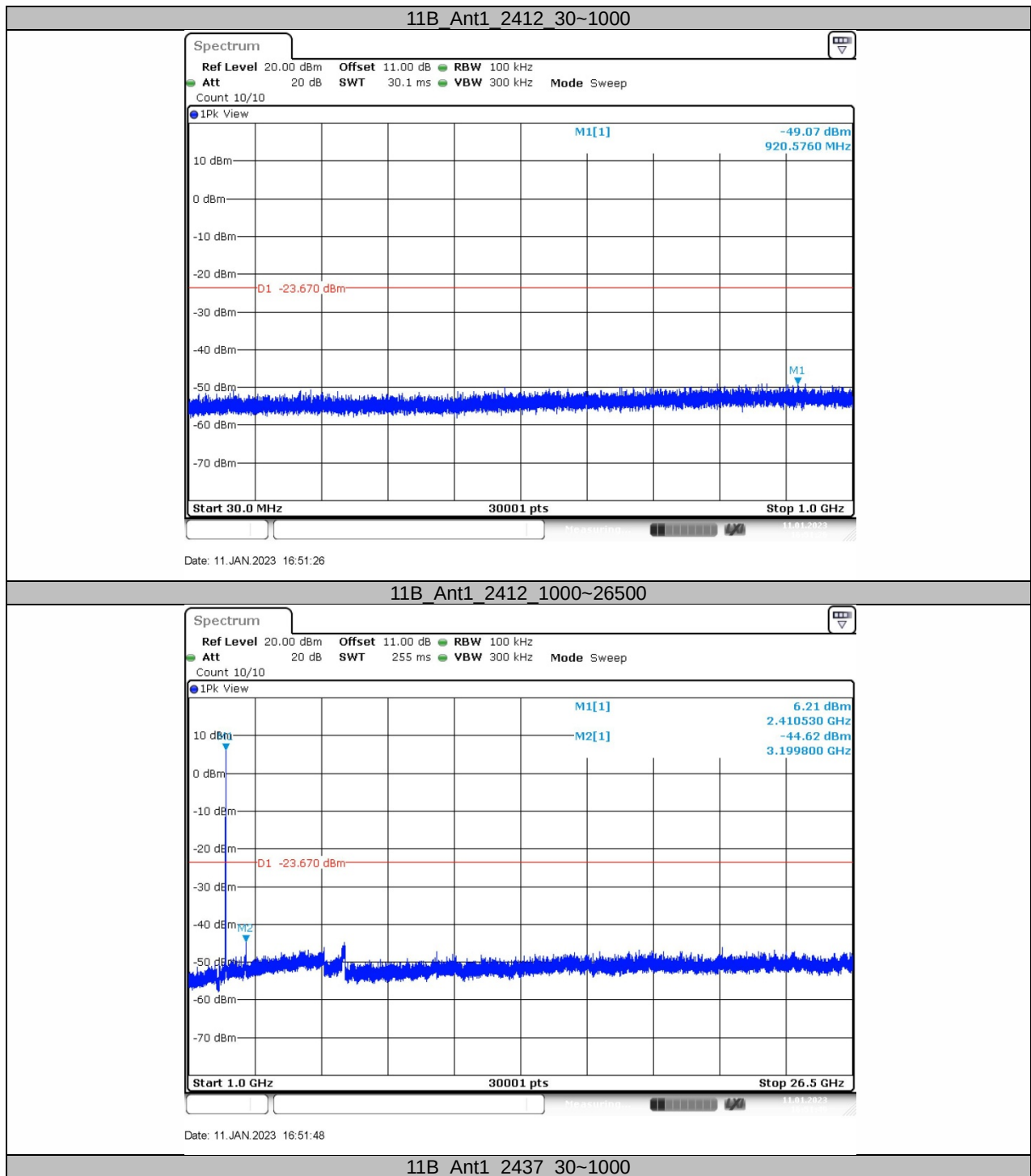


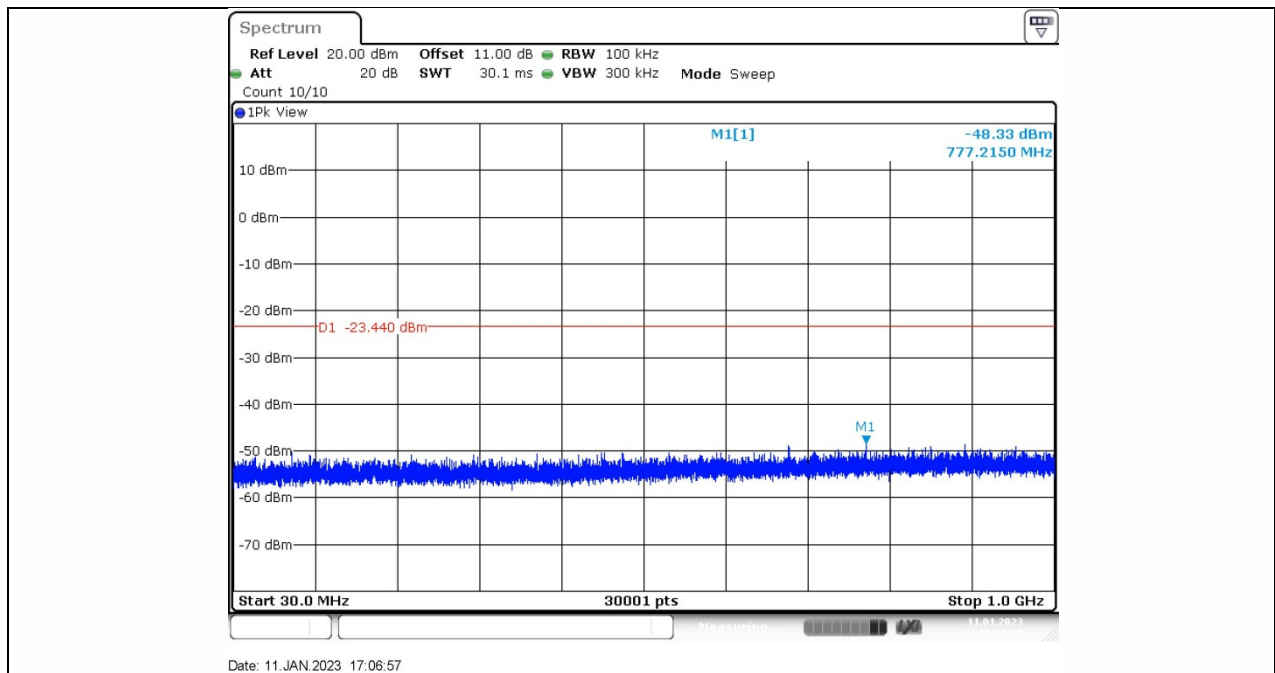
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	6.33	-34.72	≤-23.67	PASS
		High	2462	6.72	-38.88	≤-23.28	PASS



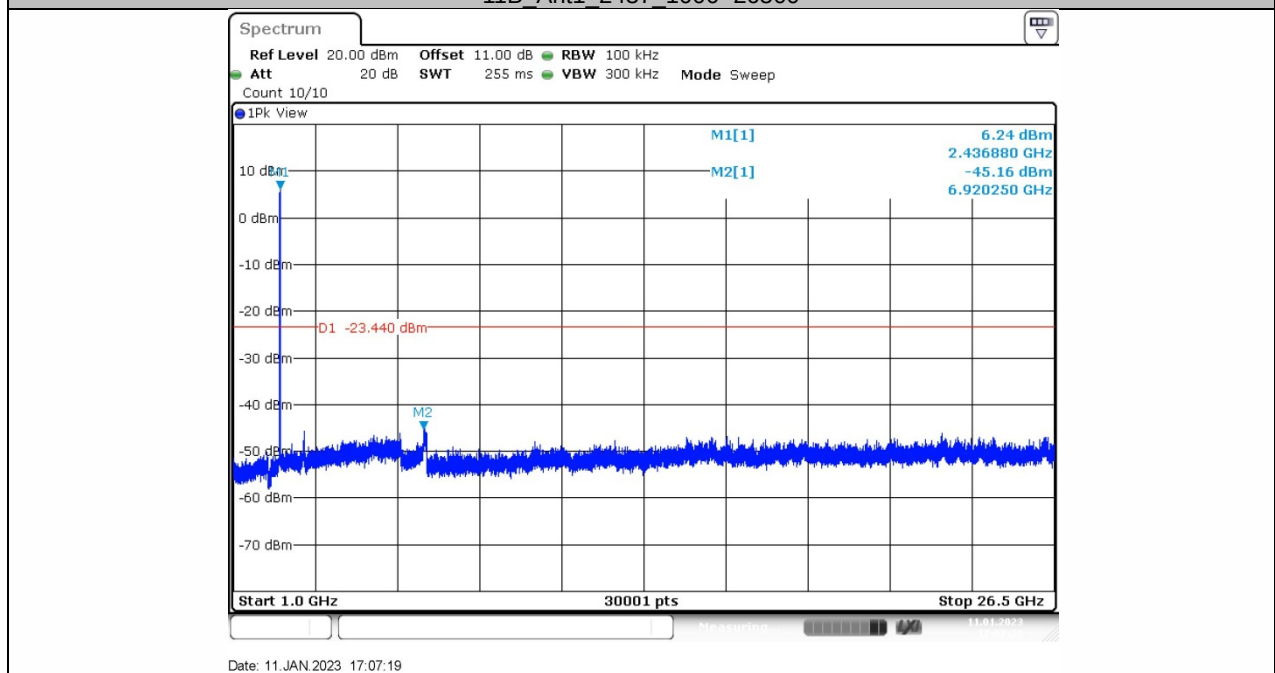
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	6.33	-49.07	≤-23.67	PASS
			1000~26500	6.33	-44.62	≤-23.67	PASS
		2437	30~1000	6.56	-48.33	≤-23.44	PASS
			1000~26500	6.56	-45.16	≤-23.44	PASS
		2462	30~1000	6.72	-48.87	≤-23.28	PASS
			1000~26500	6.72	-44.24	≤-23.28	PASS



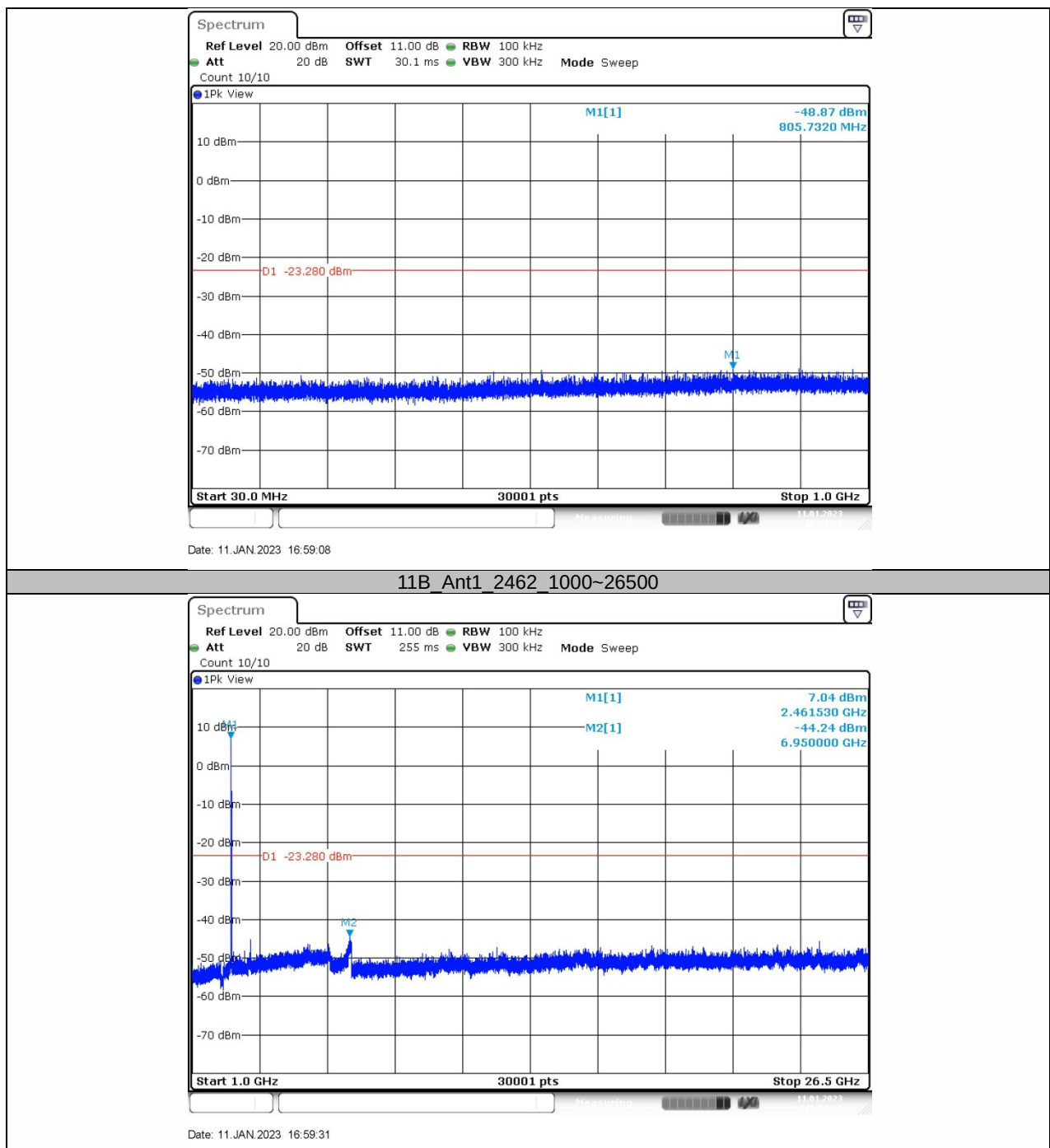




11B_Ant1_2437_1000~26500



11B_Ant1_2462_30~1000



8.6 RADIATED SPURIOUS EMISSION

8.6.1 Applicable Standard

According to FCC Part 15.247(d), 15.205, 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02
According to IC RSS-Gen and RSS-247

8.6.2 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 (μV/m)	300
0.490-1.705	24000/F(KHz)	20 log (μV/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

8.6.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

8.6.4 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 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. 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. 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 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

8.6.5 Test Results

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

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

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 Above 1GHz(1GHz to 25GHz)

All the antenna(Antenna 1)and modes(802.11b/g/n)have been tested and the worst(Antenna 1,802.11b) result recorded was report as below:

Test mode: 802.11b Frequency: Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11486.25	V	60.76	49.69	74.00	54.00	-13.24	-4.31
14626.87	V	63.97	50.06	74.00	54.00	-10.03	-3.94
17600.62	V	70.30	50.75	74.00	54.00	-3.70	-3.25
11508.75	H	60.74	49.61	74.00	54.00	-13.26	-4.39
14647.5	H	64.80	50.21	74.00	54.00	-9.20	-3.79
17602.5	H	70.09	50.18	74.00	54.00	-3.91	-3.82

Test mode: 802.11b Frequency: Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11503.12	V	61.71	49.62	74.00	54.00	-12.29	-4.38
14613.75	V	64.67	50.97	74.00	54.00	-9.33	-3.03
17640	V	70.16	49.49	74.00	54.00	-3.84	-4.51
11263.12	H	59.68	48.57	74.00	54.00	-14.32	-5.43
14694.37	H	64.80	49.68	74.00	54.00	-9.20	-4.32
17596.87	H	70.15	50.62	74.00	54.00	-3.85	-3.38

Test mode: 802.11b Frequency: Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11531.25	V	60.14	49.08	74.00	54.00	-13.86	-4.92
14671.87	V	64.31	50.46	74.00	54.00	-9.69	-3.54
17679.37	V	69.92	47.63	74.00	54.00	-4.08	-6.37
11512.5	H	60.81	49.42	74.00	54.00	-13.19	-4.58
14658.75	H	64.22	50.00	74.00	54.00	-9.78	-4.00
17619.37	H	70.23	49.62	74.00	54.00	-3.77	-4.38

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Correct Factor.
 - (3) Correct Factor= Ant_F + Cab_L - Preamp
 - (4) 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
All the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1,802.11b) result recorded was report as below:

Test mode: 802.11b Frequency: Channel 1: 2412MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2325.35	H	44.91	74.00	41.77	54.00
2326.63	V	44.97	74.00	41.45	54.00

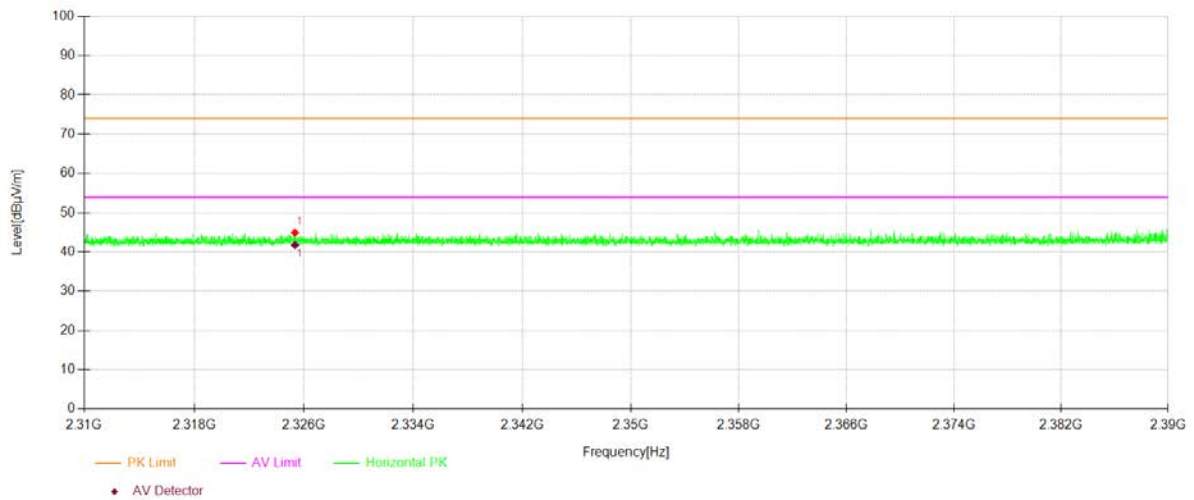
Test mode: 802.11b Frequency: Channel 11: 2462MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2484.24	H	46.18	74.00	43.19	54.00
2484.21	V	46.75	74.00	43.62	54.00

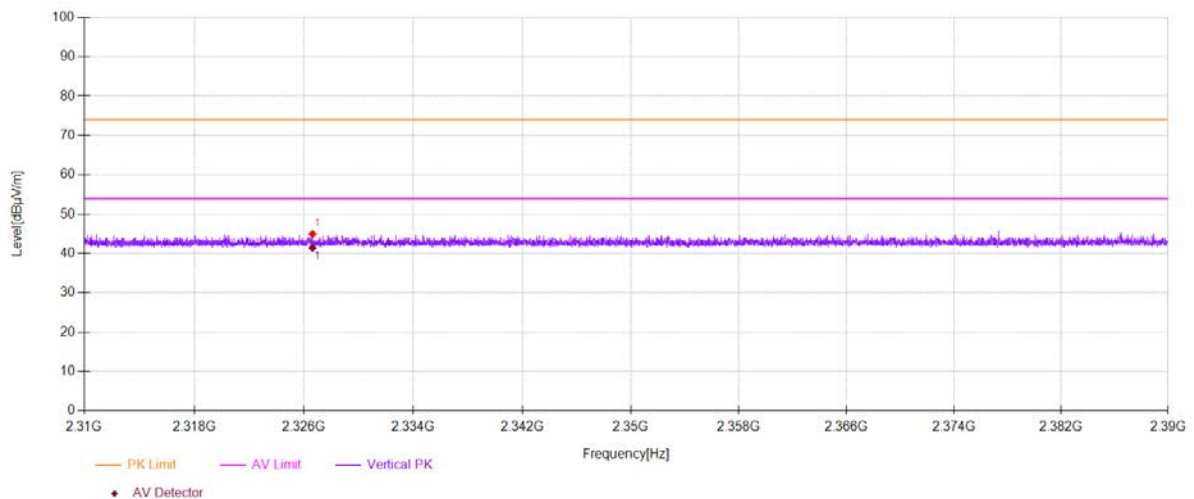
Note:

- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
- (2) Emission Level= Reading Level+Correct Factor.
- (3) Correct Factor= Ant_F + Cab_L - Preamp
- (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

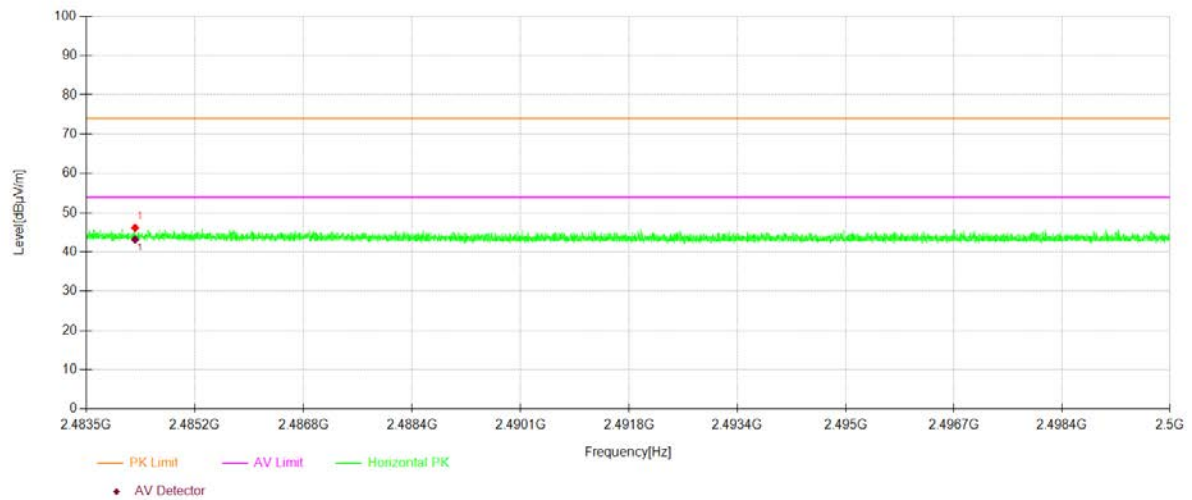
Test Model	802.11b	Spurious Emission in Restricted Band 2310-2390MHz	
		Channel 1: 2412MHz	Polarity: H
		VBW=3MHz	



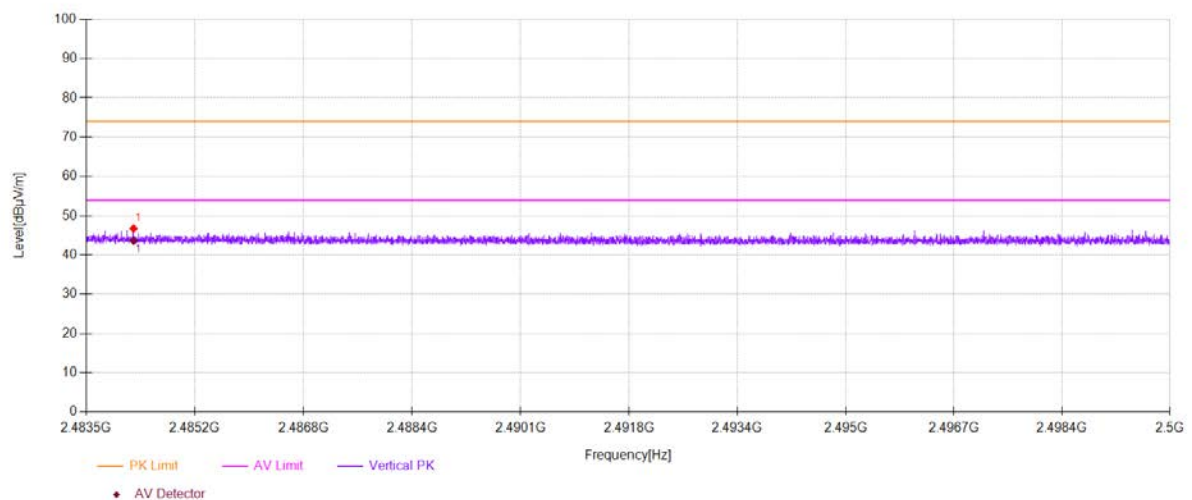
Test Model	802.11b	Spurious Emission in Restricted Band 2310-2390MHz	
		Channel 1: 2412MHz	Polarity: V
		VBW=3MHz	



Test Model	802.11b	Spurious Emission in Restricted Band 2483.5-2500MHz		
		Channel 11: 2462MHz	VBW=3MHz	Polarity: H



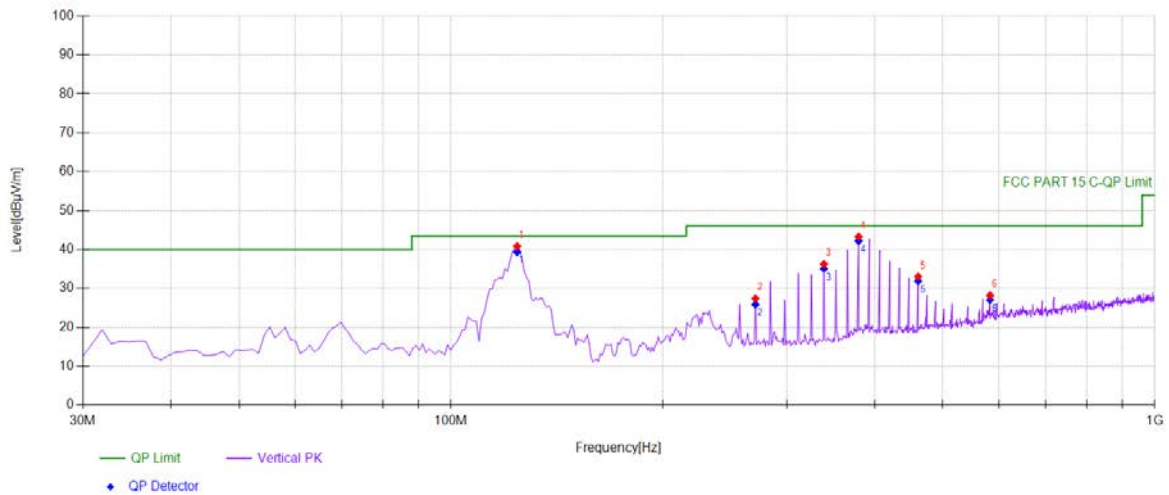
Test Model	802.11b	Spurious Emission in Restricted Band 2483.5-2500MHz		
		Channel 11: 2462MHz	VBW=3MHz	Polarity: V



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

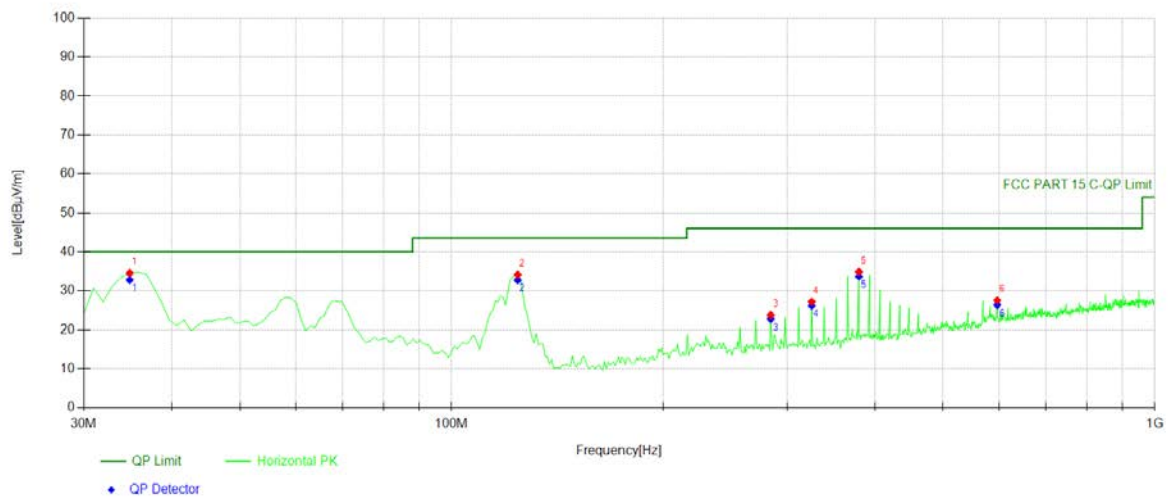
All the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1,802.11b) result recorded was report as below:

Mode:	11B 2412
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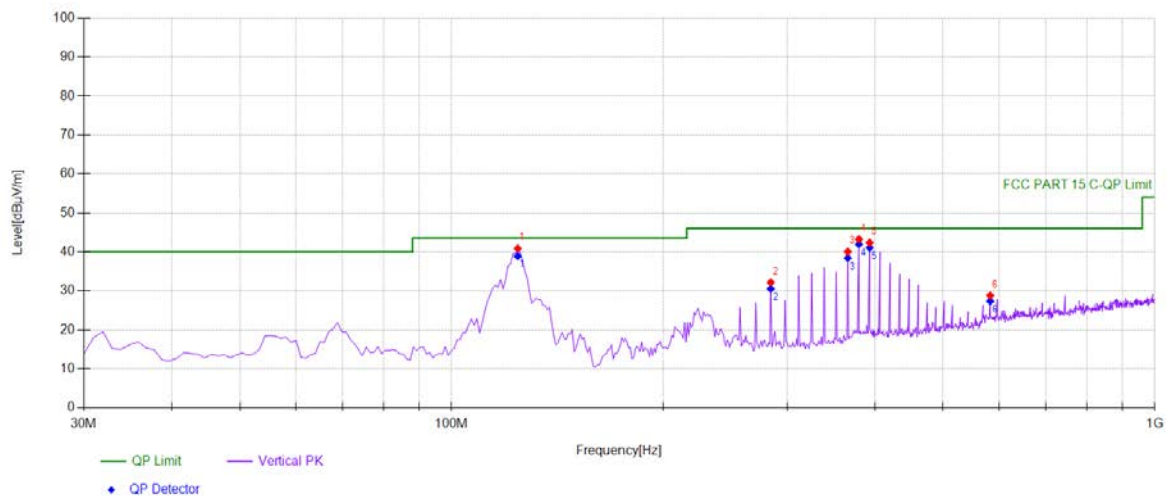
Suspected Data List										
NO	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarization	Angle[°]	Height[m]
1	124.1842	59.19	-18.37	40.82	PK	43.50	2.68	Vertical	170	100
2	270.8008	42.09	-14.70	27.39	PK	46.00	18.61	Vertical	197	100
3	338.7688	49.71	-13.49	36.22	PK	46.00	9.78	Vertical	329	100
4	379.5496	55.15	-11.86	43.29	PK	46.00	2.71	Vertical	329	100
5	461.1111	43.99	-10.97	33.02	PK	46.00	12.98	Vertical	174	100
6	583.4535	35.33	-7.14	28.19	PK	46.00	17.81	Vertical	41	100

Mode:	11B 2412
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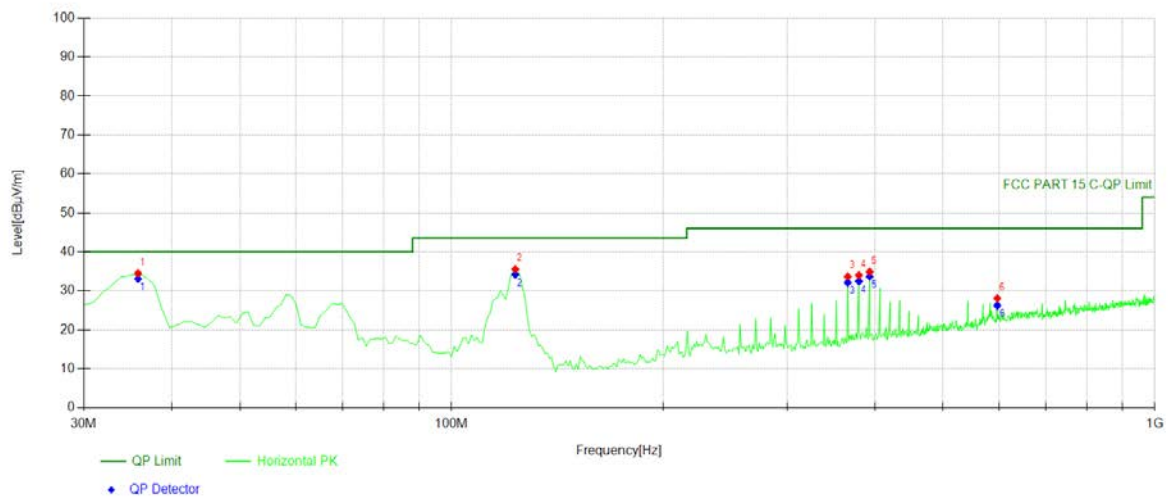
Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity	Angle[°]	Height [cm]
1	34.8549	52.78	-18.23	34.55	PK	40.00	5.45	Horizontal	301	100
2	124.1842	52.51	-18.37	34.14	PK	43.50	9.36	Horizontal	301	100
3	284.3944	37.98	-14.17	23.81	PK	46.00	22.19	Horizontal	95	100
4	325.1752	41.16	-13.93	27.23	PK	46.00	18.77	Horizontal	338	100
5	379.5496	46.76	-11.86	34.90	PK	46.00	11.10	Horizontal	319	100
6	597.047	34.71	-7.14	27.57	PK	46.00	18.43	Horizontal	187	100

Mode:	11B 2437
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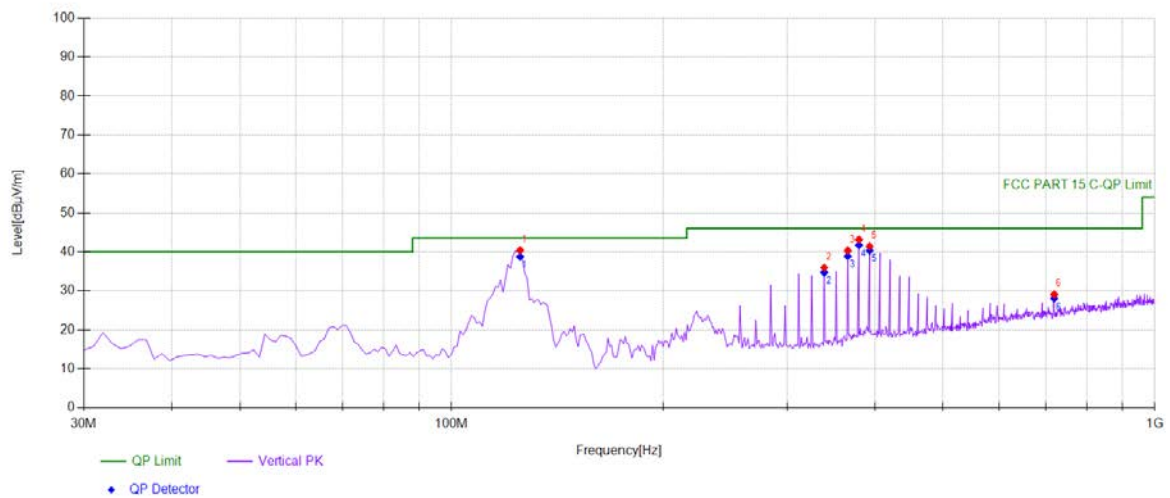
Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity	Angle[°]	Height[m]
1	124.1842	59.28	-18.37	40.91	PK	43.50	2.59	Vertical	329	100
2	284.3944	46.34	-14.17	32.17	PK	46.00	13.83	Vertical	329	100
3	365.956	53.00	-12.96	40.04	PK	46.00	5.96	Vertical	325	100
4	379.5496	55.13	-11.86	43.27	PK	46.00	2.73	Vertical	329	100
5	393.1431	54.17	-11.82	42.35	PK	46.00	3.65	Vertical	325	100
6	583.4535	35.92	-7.14	28.78	PK	46.00	17.22	Vertical	72	100

Mode:	11B 2437
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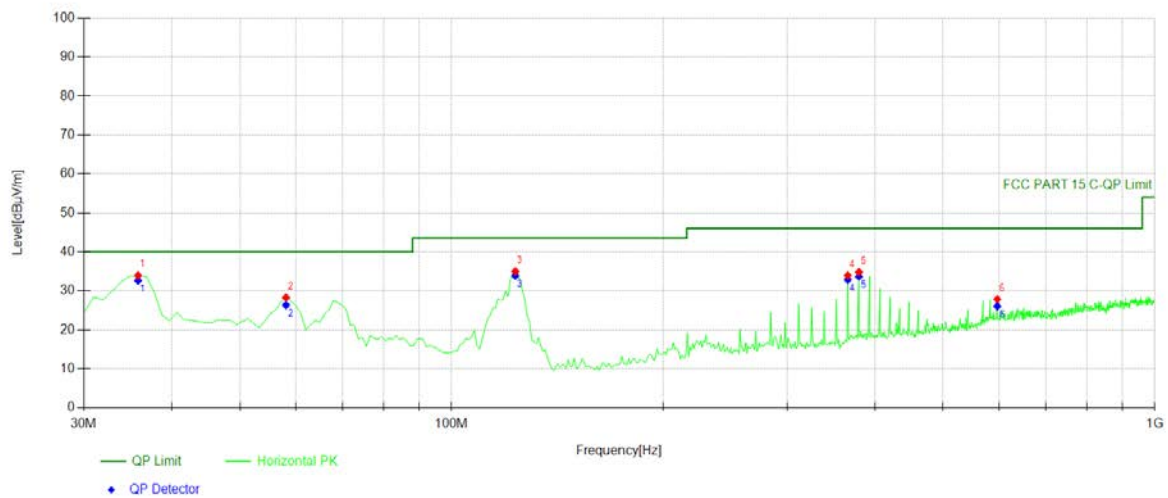
Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity	Angle[°]	Height [cm]
1	35.8258	52.67	-18.17	34.50	PK	40.00	5.50	Horizontal	49	100
2	123.2132	53.85	-18.27	35.58	PK	43.50	7.92	Horizontal	300	100
3	365.956	46.65	-12.96	33.69	PK	46.00	12.31	Horizontal	331	100
4	379.5496	45.87	-11.86	34.01	PK	46.00	11.99	Horizontal	322	100
5	393.1431	46.73	-11.82	34.91	PK	46.00	11.09	Horizontal	309	100
6	597.047	35.22	-7.14	28.08	PK	46.00	17.92	Horizontal	281	100

Mode:	11B 2462
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Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity	Angle[°]	Height[m]
1	125.1552	58.88	-18.47	40.41	PK	43.50	3.09	Vertical	329	100
2	338.7688	49.46	-13.49	35.97	PK	46.00	10.03	Vertical	329	100
3	365.956	53.32	-12.96	40.36	PK	46.00	5.64	Vertical	329	100
4	379.5496	55.02	-11.86	43.16	PK	46.00	2.84	Vertical	329	100
5	393.1431	53.26	-11.82	41.44	PK	46.00	4.56	Vertical	315	100
6	719.3894	34.93	-5.82	29.11	PK	46.00	16.89	Vertical	288	100

Mode:	11B 2462
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Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity	Angle[°]	Height[m]
1	35.8258	52.11	-18.17	33.94	PK	40.00	6.06	Horizontal	300	100
2	58.1582	46.61	-18.30	28.31	PK	40.00	11.69	Horizontal	81	100
3	123.2132	53.28	-18.27	35.01	PK	43.50	8.49	Horizontal	300	100
4	365.956	46.92	-12.96	33.96	PK	46.00	12.04	Horizontal	350	100
5	379.5496	46.68	-11.86	34.82	PK	46.00	11.18	Horizontal	318	100
6	597.047	35.00	-7.14	27.86	PK	46.00	18.14	Horizontal	176	100

8.7 CONDUCTED EMISSION TEST

8.7.1 Applicable Standard

According to FCC Part 15.207(a)

According to IC RSS-Gen 8.8

8.7.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	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.

8.7.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

8.7.4 Test Procedure

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

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

Repeat above procedures until all frequency measured were complete.

8.7.5 Test Results

Pass

The AC120V &240V voltage have been tested, and the worst result recorded was report as below: