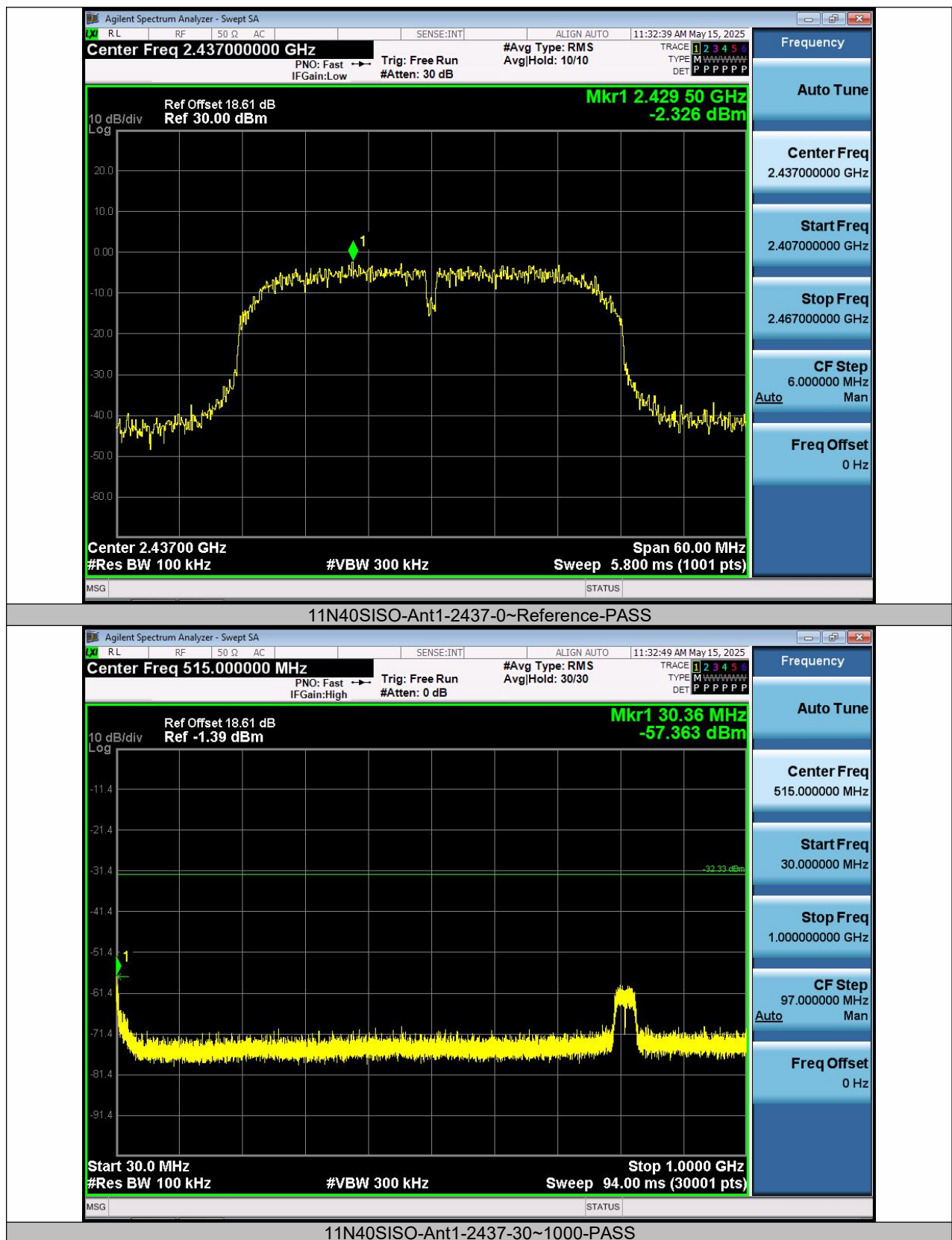


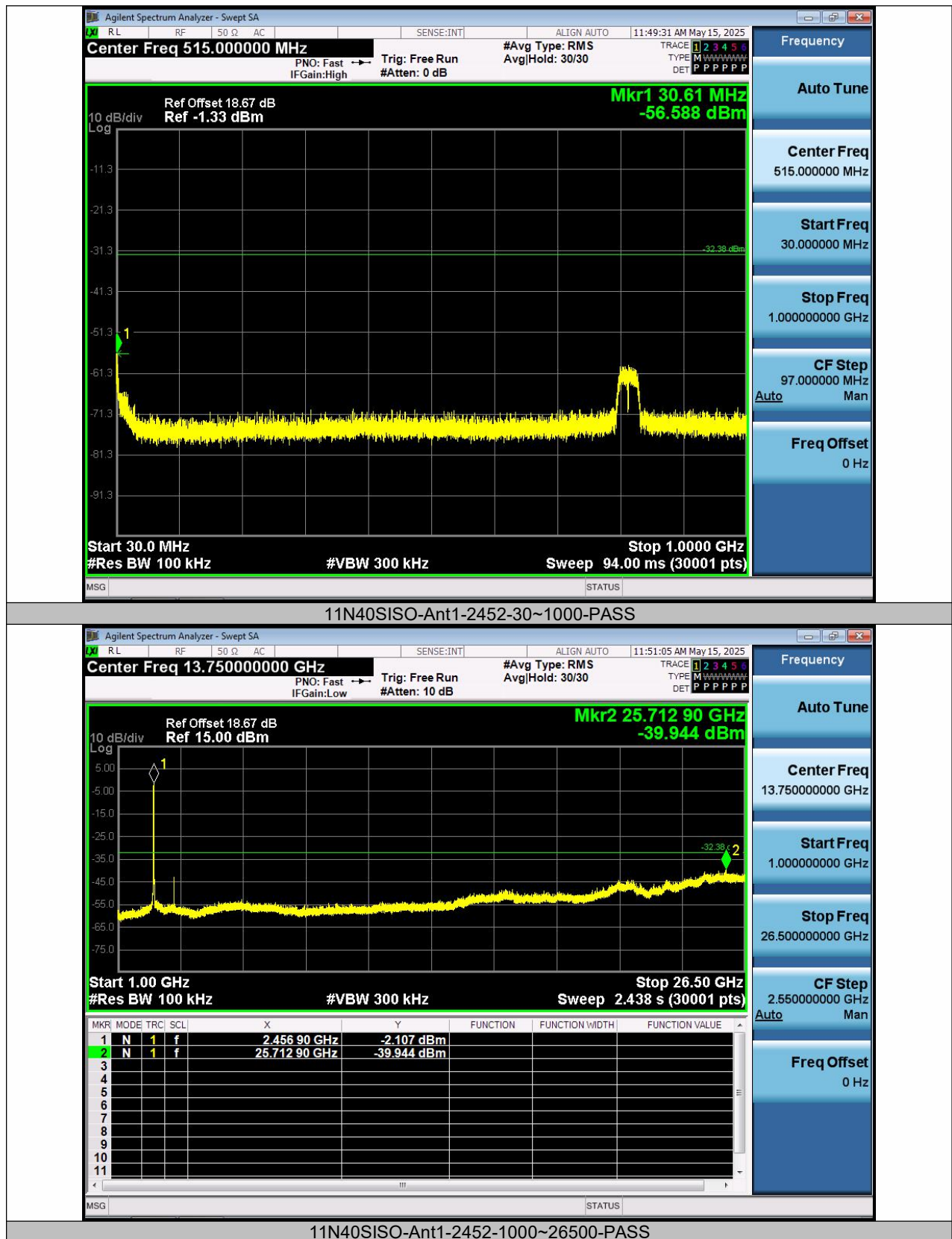




11N40SISO-Ant1-2437-1000~26500-PASS



11N40SISO-Ant1-2452-0~Reference-PASS



7.5 RADIATED EMISSION

7.5.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02.

7.5.2 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

7.5.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2.

7.5.4 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.
 $VBW \geq RBW$.
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.

7.5.5 Test Results

All of the configurations or modes are tested, the data of the worst case is recorded as below.

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

Temperature: 25°C Test By: CZF
Humidity: 60%
Test mode: 802.11b

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

Note: 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 Above 1GHz(1GHz to 25GHz)

All antennas and modulation modes are tested, the data of the worst mode is described in the table.

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

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
4822.5	V	55.85	74.00	18.15	peak
9995.625	V	62.05	74.00	11.95	peak
13708.125	V	65.34	74.00	8.66	peak
4822.5	V	49.70	54.00	4.30	AVG
9995.625	V	42.36	54.00	11.64	AVG
13708.125	V	44.13	54.00	9.87	AVG
4824.375	H	54.82	74.00	19.18	peak
9909.375	H	61.69	74.00	12.31	peak
13648.125	H	64.18	74.00	9.82	peak
4824.375	H	48.16	54.00	5.84	AVG
9909.375	H	43.29	54.00	10.71	AVG
13648.125	H	42.53	54.00	11.47	AVG

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

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
4873.125	V	56.25	74.00	17.75	peak
10014.375	V	62.04	74.00	11.96	peak
13725	V	65.43	74.00	8.57	peak
4873.125	V	50.15	54.00	3.85	AVG
10014.375	V	42.36	54.00	11.64	AVG
13725	V	43.52	54.00	10.48	AVG
4873.125	H	54.74	74.00	19.26	peak
9937.5	H	62.31	74.00	11.69	peak
13681.875	H	65.37	74.00	8.63	peak
4873.125	H	48.24	54.00	5.76	AVG
9937.5	H	43.12	54.00	10.88	AVG
13681.875	H	43.23	54.00	10.77	AVG

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

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
4923.75	V	55.66	74.00	18.34	peak
9881.25	V	62.57	74.00	11.43	peak
14542.5	V	64.96	74.00	9.04	peak
4923.75	V	49.84	54.00	4.16	AVG
9881.25	V	41.90	54.00	12.10	AVG
14542.5	V	46.40	54.00	7.60	AVG
4923.75	H	54.35	74.00	19.65	peak
9879.375	H	61.84	74.00	12.16	peak
14182.5	H	65.21	74.00	8.79	peak
4923.75	H	47.53	54.00	6.47	AVG
9879.375	H	42.44	54.00	11.56	AVG
14182.5	H	45.01	54.00	8.99	AVG

- 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

Test mode: 802.11N20 Frequency: Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2387.759	V	51.30	74.00	22.70	peak
2387.759	V	37.95	54.00	16.05	AVG
2387.065	H	59.55	74.00	14.45	peak
2387.065	H	44.29	54.00	9.71	AVG

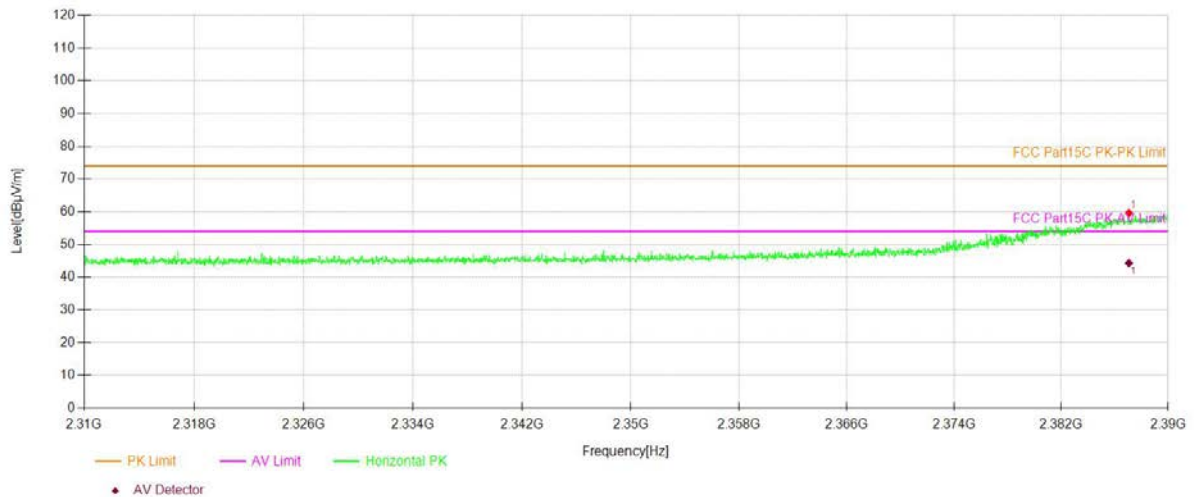
Test mode: 802.11N20 Frequency: Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2483.716	V	54.99	74.00	19.01	peak
2483.716	V	38.22	54.00	15.78	AVG
2483.90	H	31.70	74.00	12.78	peak
2483.90	H	44.53	54.00	9.47	AVG

- 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.

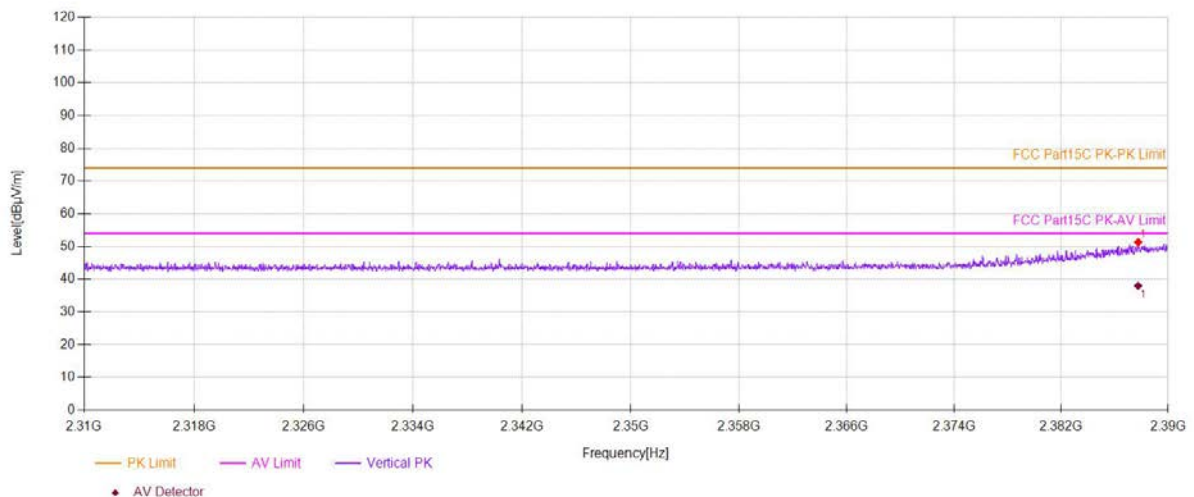
Spurious Emission in Restricted Band 2310-2390MHz

Test Model ☐ 802.11AX20 ☐ 802.11g ☒ 802.11n(HT20) ☐ 802.11n(HT40)
☒ Channel 1:2412MHz ☐ Channel 3: 2422MHz Polarity: H
 VBW=3MHz



Spurious Emission in Restricted Band 2310-2390MHz

Test Model ☐ 802.11 AX20 ☐ 802.11g ☒ 802.11n(HT20) ☐ 802.11n(HT40)
☒ Channel 1:2412MHz ☐ Channel 3: 2422MHz Polarity: V
 VBW=3MHz

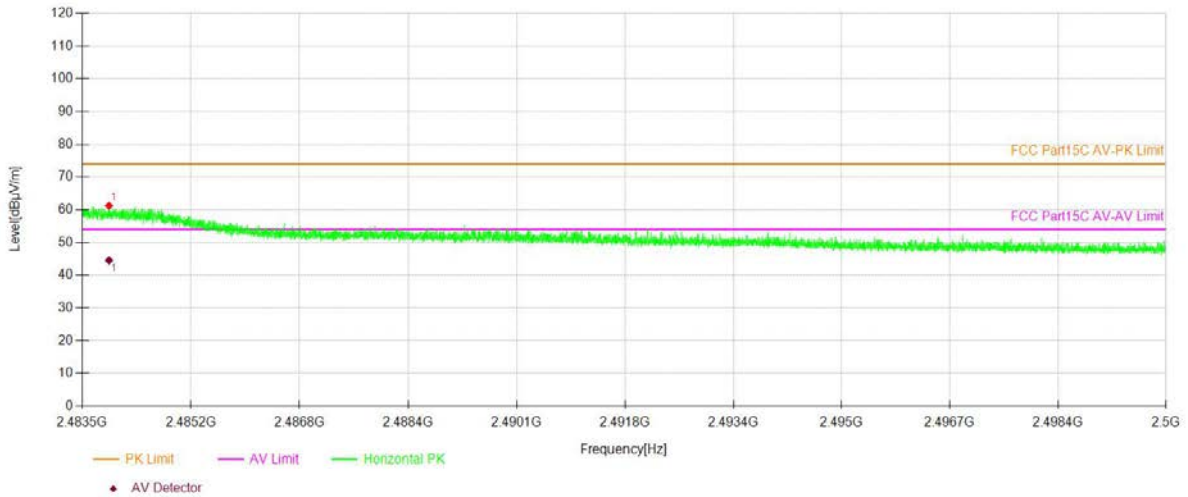


Spurious Emission in Restricted Band 2483.5-2500MHz

Test Model ☐ 802.11 AX20 ☐ 802.11g ☒ 802.11n(HT20) ☐ 802.11n(HT40)

☒ Channel 11: 2462MHz ☐ Channel 9: 2452MHz Polarity: H

VBW=3MHz

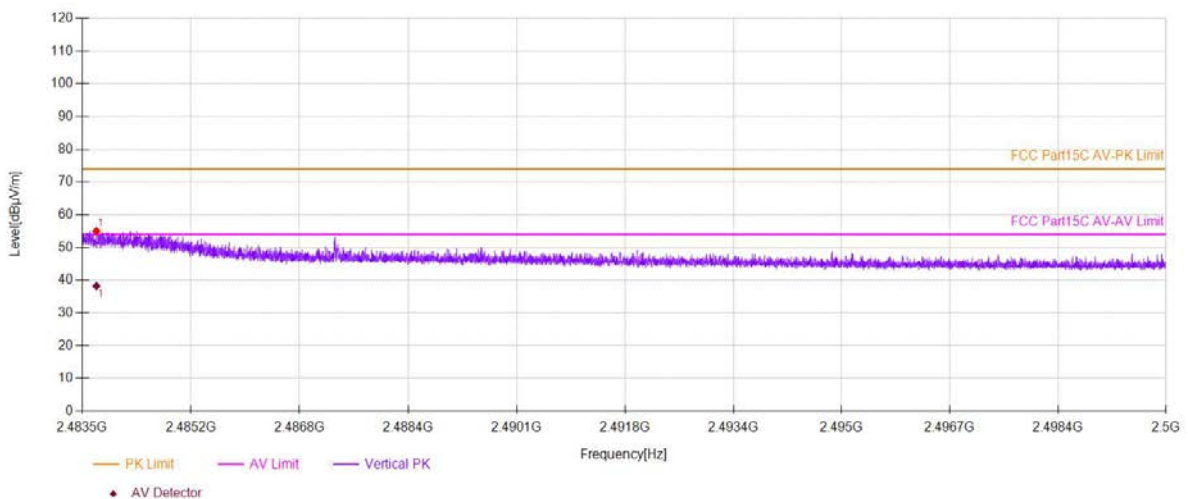


Spurious Emission in Restricted Band 2483.5-2500MHz

Test Model ☐ 802.11 AX20 ☐ 802.11g ☒ 802.11n(HT20) ☐ 802.11n(HT40)

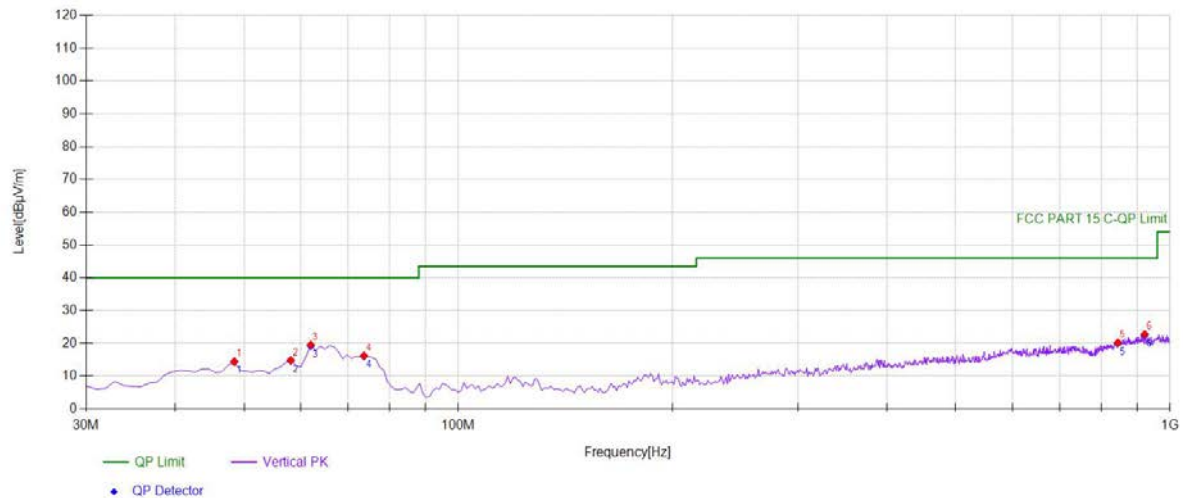
☒ Channel 11: 2462MHz ☐ Channel 9: 2452MHz Polarity: V

VBW=3MHz



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

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

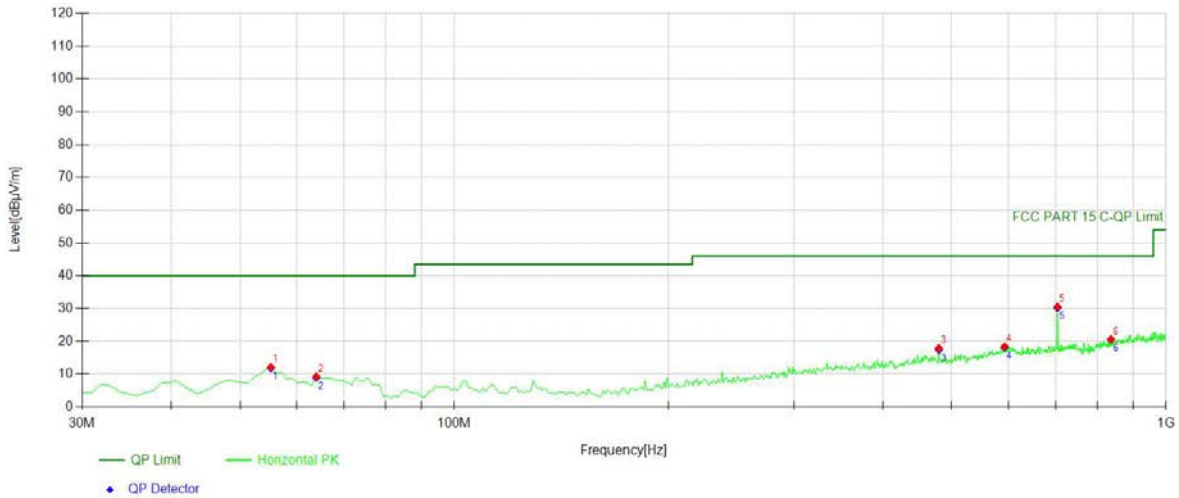


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	48.4484	36.63	-22.24	14.39	PK	40.00	25.61	Vertical
2	58.1582	37.91	-23.14	14.77	PK	40.00	25.23	Vertical
3	62.042	43.27	-23.68	19.59	PK	40.00	20.41	Vertical
4	73.6937	41.55	-25.33	16.22	PK	40.00	23.78	Vertical
5	844.644	30.35	-10.12	20.23	PK	46.00	25.77	Vertical
6	921.351	31.42	-8.61	22.81	PK	46.00	23.19	Vertical

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	48.4484	-22.24	14.35	40.00	25.65
2	58.1582	-23.14	14.73	40.00	25.27
3	62.042	-23.68	19.23	40.00	20.77
4	73.6937	-25.33	16.04	40.00	23.96
5	844.6446	-10.12	20.05	46.00	25.95
6	921.3514	-8.61	22.55	46.00	23.45



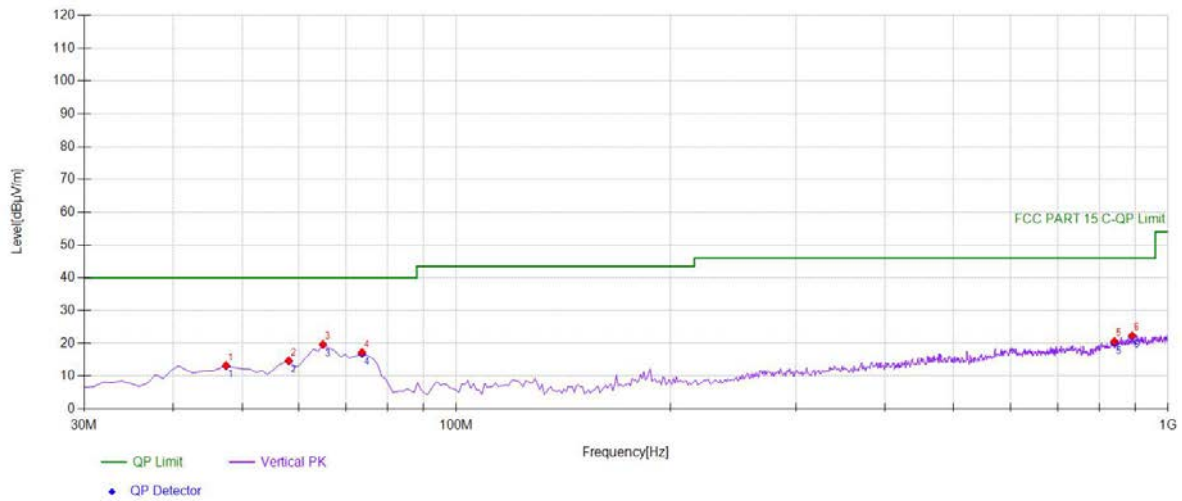
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	55.2452	34.84	-22.74	12.10	PK	40.00	27.90	Horizontal
2	63.984	33.15	-23.94	9.21	PK	40.00	30.79	Horizontal
3	479.559	33.78	-15.93	17.85	PK	46.00	28.15	Horizontal
4	593.163	30.86	-12.50	18.36	PK	46.00	27.64	Horizontal
5	703.853	42.42	-11.84	30.58	PK	46.00	15.42	Horizontal
6	836.876	31.00	-10.43	20.57	PK	46.00	25.43	Horizontal

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	55.2452	-22.74	11.80	40.00	28.20
2	63.984	-23.94	8.91	40.00	31.09
3	479.5596	-15.93	17.45	46.00	28.55
4	593.1632	-12.50	18.14	46.00	27.86
5	703.8539	-11.84	30.18	46.00	15.82
6	836.8769	-10.43	20.50	46.00	25.50

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

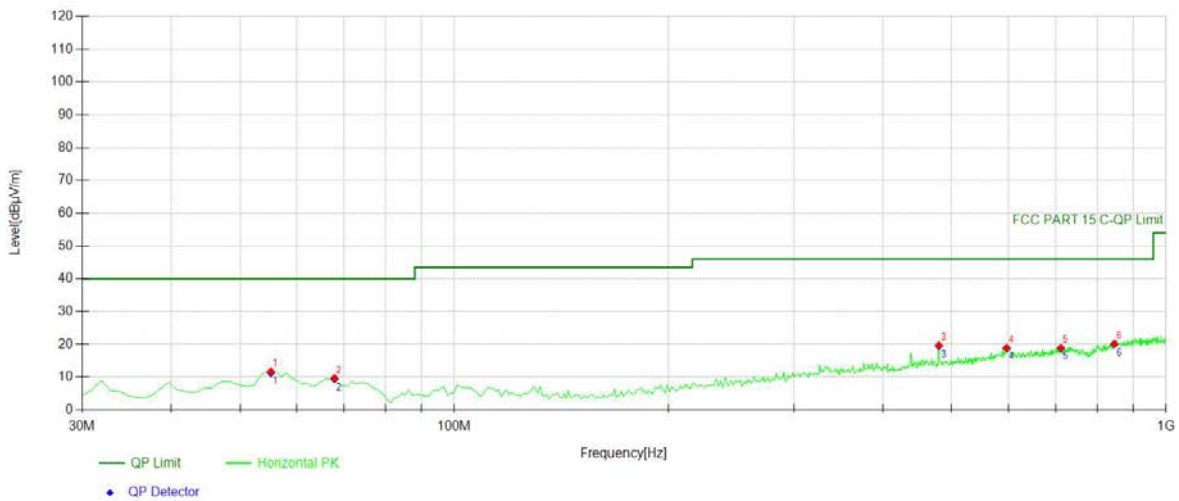


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	47.4775	35.61	-22.39	13.22	PK	40.00	26.78	Vertical
2	58.1582	37.81	-23.14	14.67	PK	40.00	25.33	Vertical
3	64.955	43.76	-24.07	19.69	PK	40.00	20.31	Vertical
4	73.6937	42.62	-25.33	17.29	PK	40.00	22.71	Vertical
5	840.760	30.95	-10.33	20.62	PK	46.00	25.38	Vertical
6	890.280	31.51	-9.12	22.39	PK	46.00	23.61	Vertical

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	47.4775	-22.39	13.14	40.00	26.86
2	58.1582	-23.14	14.59	40.00	25.41
3	64.955	-24.07	19.53	40.00	20.47
4	73.6937	-25.33	16.81	40.00	23.19
5	840.7608	-10.33	20.14	46.00	25.86
6	890.2803	-9.12	22.08	46.00	23.92



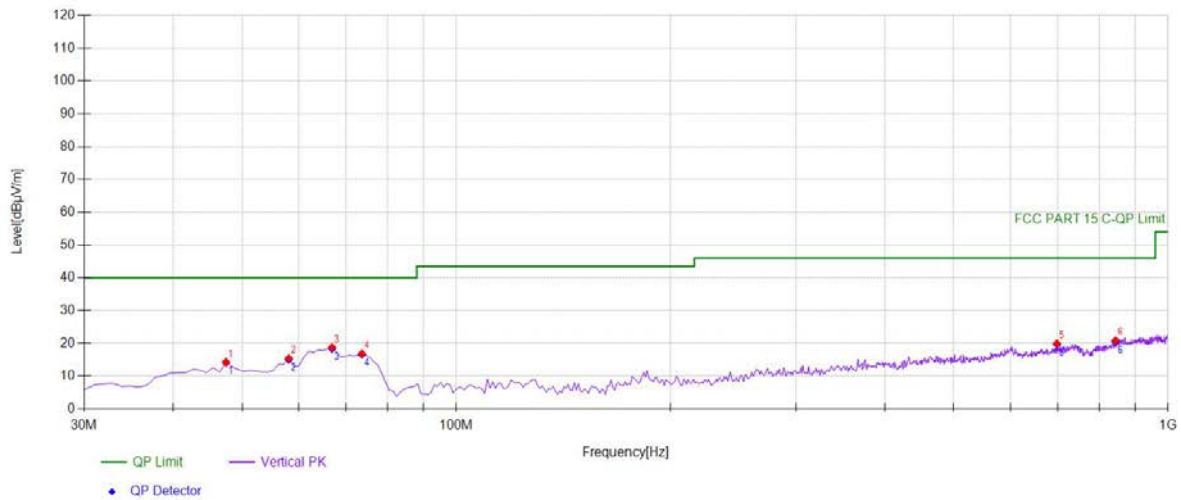
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	55.2452	34.43	-22.74	11.69	PK	40.00	28.31	Horizontal
2	67.8679	34.14	-24.48	9.66	PK	40.00	30.34	Horizontal
3	479.559	35.59	-15.93	19.66	PK	46.00	26.34	Horizontal
4	597.047	31.14	-12.28	18.86	PK	46.00	27.14	Horizontal
5	711.621	30.63	-11.78	18.85	PK	46.00	27.15	Horizontal
6	845.615	30.22	-10.08	20.14	PK	46.00	25.86	Horizontal

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	55.2452	-22.74	11.29	40.00	28.71
2	67.8679	-24.48	9.44	40.00	30.56
3	479.5596	-15.93	19.44	46.00	26.56
4	597.047	-12.28	18.82	46.00	27.18
5	711.6216	-11.78	18.81	46.00	27.19
6	845.6156	-10.08	20.02	46.00	25.98

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

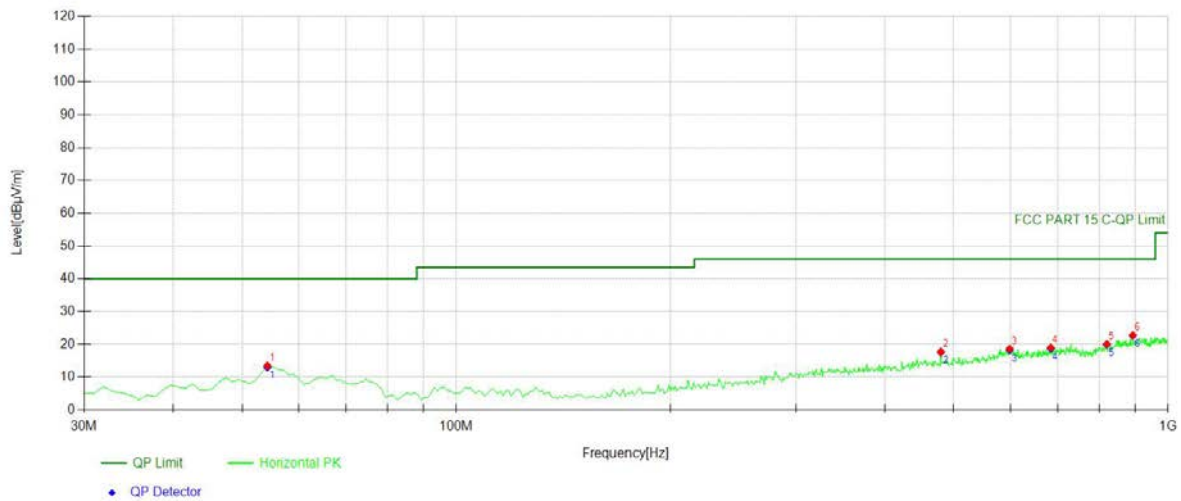


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	47.4775	36.62	-22.39	14.23	PK	40.00	25.77	Vertical
2	58.1582	38.57	-23.14	15.43	PK	40.00	24.57	Vertical
3	66.8969	43.12	-24.34	18.78	PK	40.00	21.22	Vertical
4	73.6937	42.16	-25.33	16.83	PK	40.00	23.17	Vertical
5	698.028	31.88	-11.96	19.92	PK	46.00	26.08	Vertical
6	843.673	31.03	-10.17	20.86	PK	46.00	25.14	Vertical

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	47.4775	-22.39	14.14	40.00	25.86
2	58.1582	-23.14	15.02	40.00	24.98
3	66.8969	-24.34	18.37	40.00	21.63
4	73.6937	-25.33	16.59	40.00	23.41
5	698.028	-11.96	19.68	46.00	26.32
6	843.6737	-10.17	20.54	46.00	25.46



Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	54.2743	36.06	-22.60	13.46	PK	40.00	26.54	Horizontal
2	479.559	33.57	-15.93	17.64	PK	46.00	28.36	Horizontal
3	598.989	30.74	-12.16	18.58	PK	46.00	27.42	Horizontal
4	684.434	31.46	-12.48	18.98	PK	46.00	27.02	Horizontal
5	820.370	30.78	-10.70	20.08	PK	46.00	25.92	Horizontal
6	892.222	31.89	-9.09	22.80	PK	46.00	23.20	Horizontal

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	54.2743	-22.60	13.02	40.00	26.98
2	479.5596	-15.93	17.62	46.00	28.38
3	598.989	-12.16	18.23	46.00	27.77
4	684.4344	-12.48	18.63	46.00	27.37
5	820.3704	-10.70	19.91	46.00	26.09
6	892.2222	-9.09	22.63	46.00	23.37

7.6 CONDUCTED EMISSION TEST

7.6.1 Applicable Standard

According to IC RSS-Gen 8.8

7.6.2 Conformance Limit

FCC Part 15, Subpart B, Class B

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.

7.6.3 Test Configuration

Test according to clause 6.3 conducted emission test setup 3.

7.6.4 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.

7.6.5 Test Results

N/A

Not applicable, since the EUT is DC power supply.

7.7 ANTENNA APPLICATION

7.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	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, 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), 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..

7.7.2 Result

PASS

Temperature : 25°C ATM Pressure: 1011 mbar
Humidity : 45 % Test Engineer: GJ

The EUT is Integrated Antenna, the antenna gain is 2.35dBi.

- ☐ Antenna uses 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.

Detail of factor for radiated emission:

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

--- End of Report ---

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