

5.6. Unwanted Emission

Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10.

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna.

The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. Sweep the Restricted Band and the emissions less than 20 dB below the permissible value are reported.

The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

This method refer to ANSI C63.10.

The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:

Set the spectrum analyzer in the following:

9kHz~150 kHz

RBW=200Hz, VBW=1kHz/ Sweep=AUTO

150 kHz~30MHz

RBW=9kHz, VBW=30kHz,/ Sweep=AUTO

Below 1GHz

RBW=100kHz / VBW=300kHz / Sweep=AUTO

a) Peak emission levels are measured by setting the instrument as follows:

Above 1GHz

PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

b) Average emission levels are measured by setting the instrument as follows:

Above 1GHz

AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

c) Detector: The measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage

averaging. Log or dB averaging shall not be used.)

e) Sweep time = auto.

f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of $1 / D$, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is $[10 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

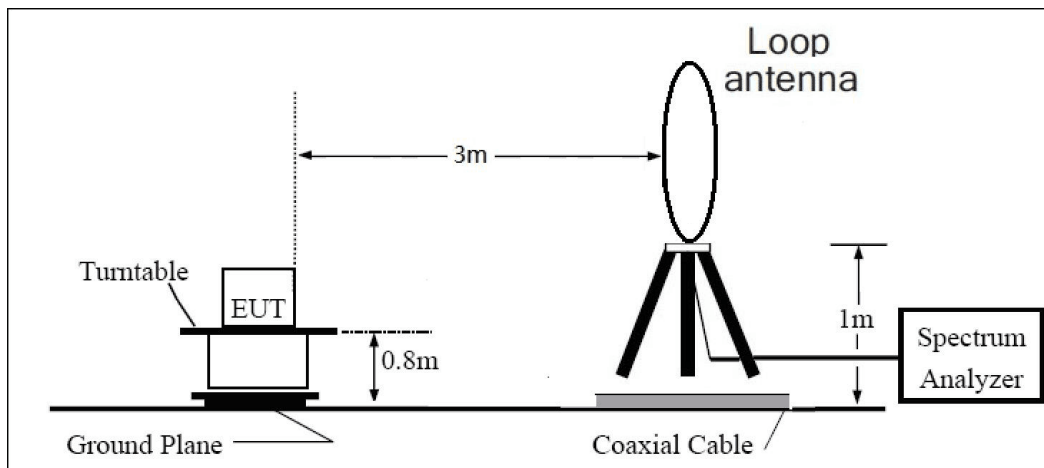
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is $[20 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

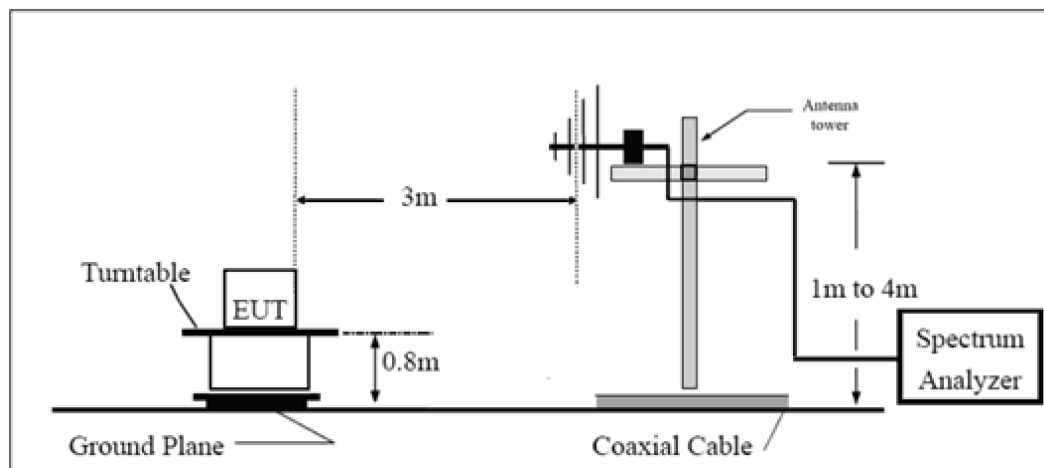
The test is in transmitting mode.

Test Setup

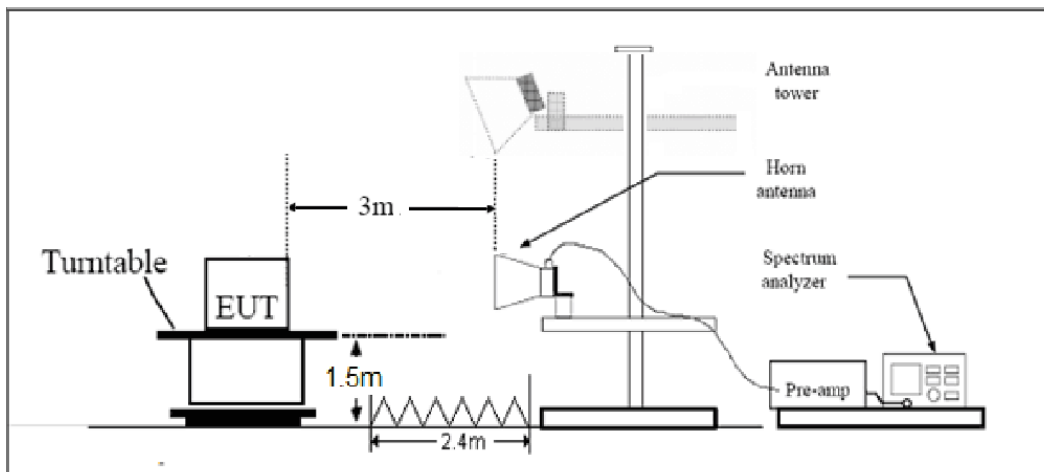
9kHz~ 30MHz



30MHz~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits

Rule Part 15.247(d) specifies that “In addition, 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)).”

Limit in restricted band

Frequency of emission (MHz)	Field strength(μ V/m)	Field strength(dB μ V/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30–88	100	40
88–216	150	43.5
216–960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Peak Limit=74 dB μ V/m

Average Limit=54 dB μ V/m

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	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	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	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			

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
9kHz-30MHz	3.55 dB
30MHz-200MHz	4.17 dB
200MHz-1GHz	4.84 dB
1-18GHz	4.35 dB
18-26.5GHz	5.90 dB
26.5GHz~40GHz	5.92 dB

Test Results:

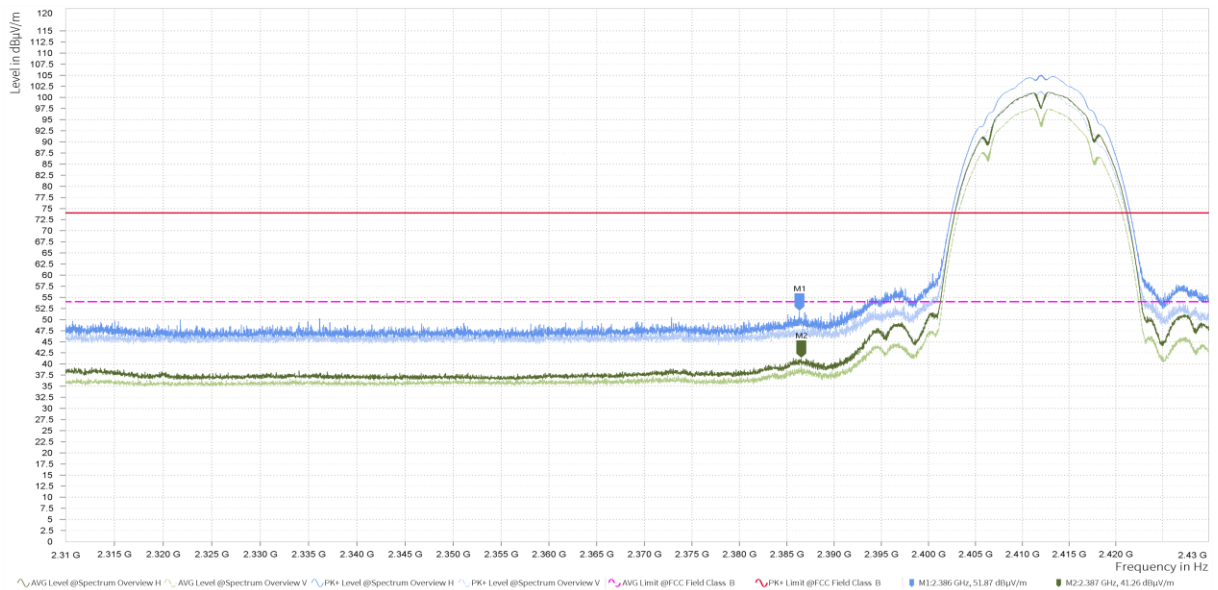
The following graphs display the maximum values of horizontal and vertical by software. Blue trace uses the peak detection, Green trace uses the average detection.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the loop antenna is vertical, the others are vertical and horizontal. and the worst case was recorded.

The signal beyond the limit is carrier.

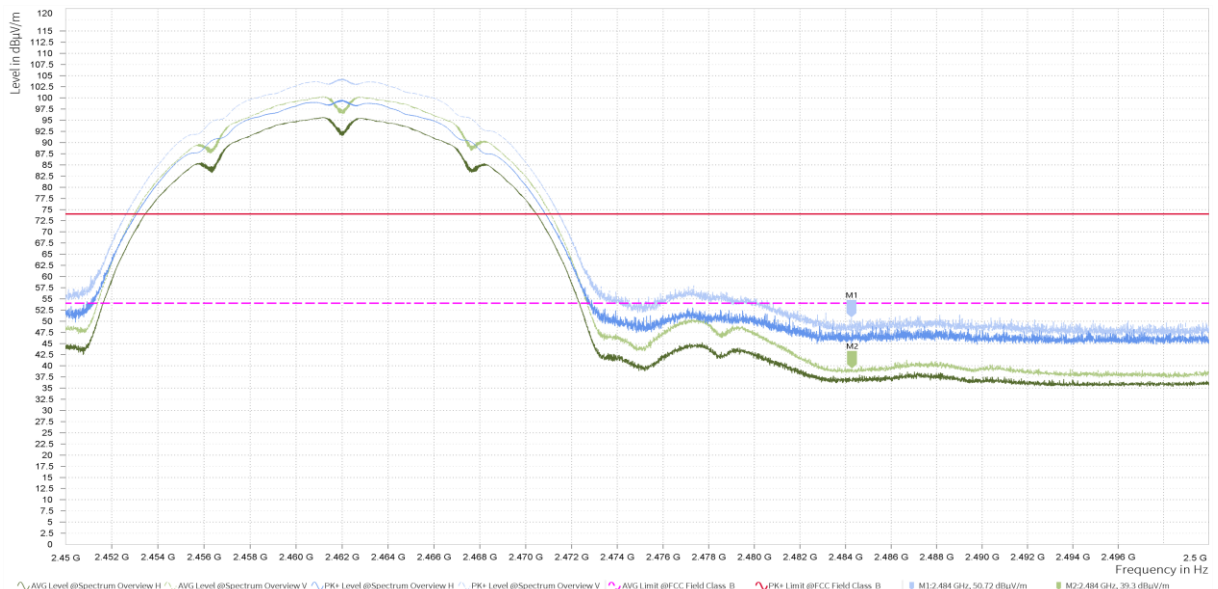
SFW80110

Spectrum Overview H/V



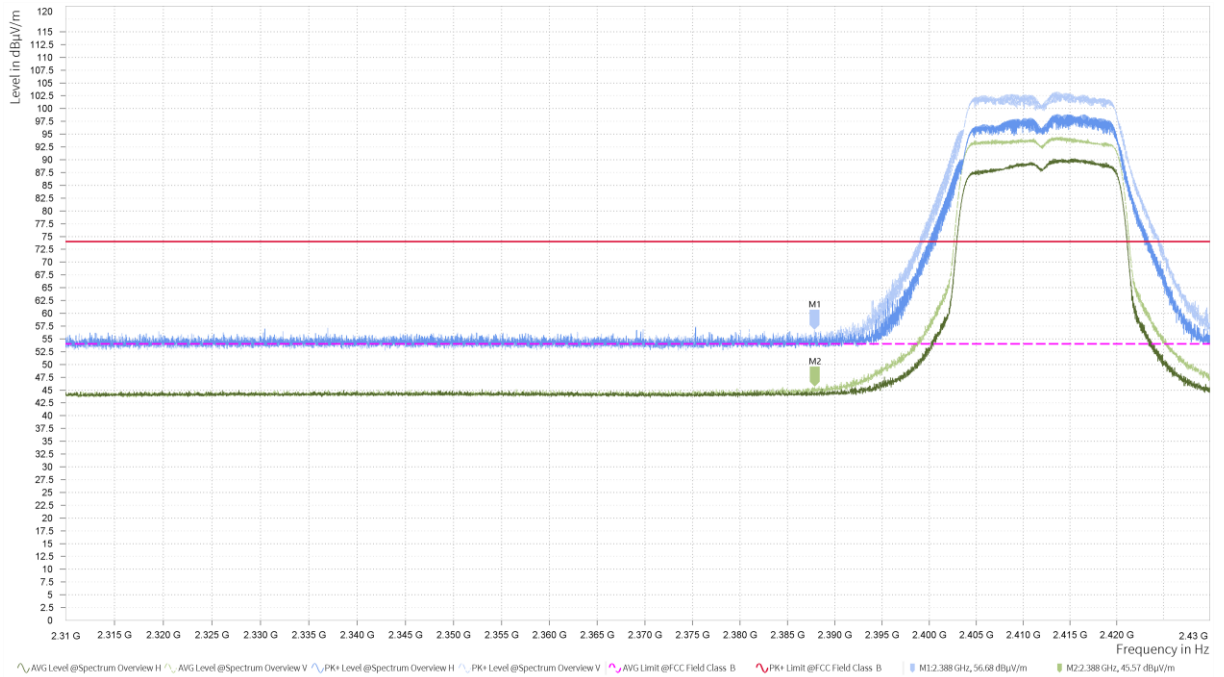
802.11b-Channel 1 Peak+ Average

Spectrum Overview H/V



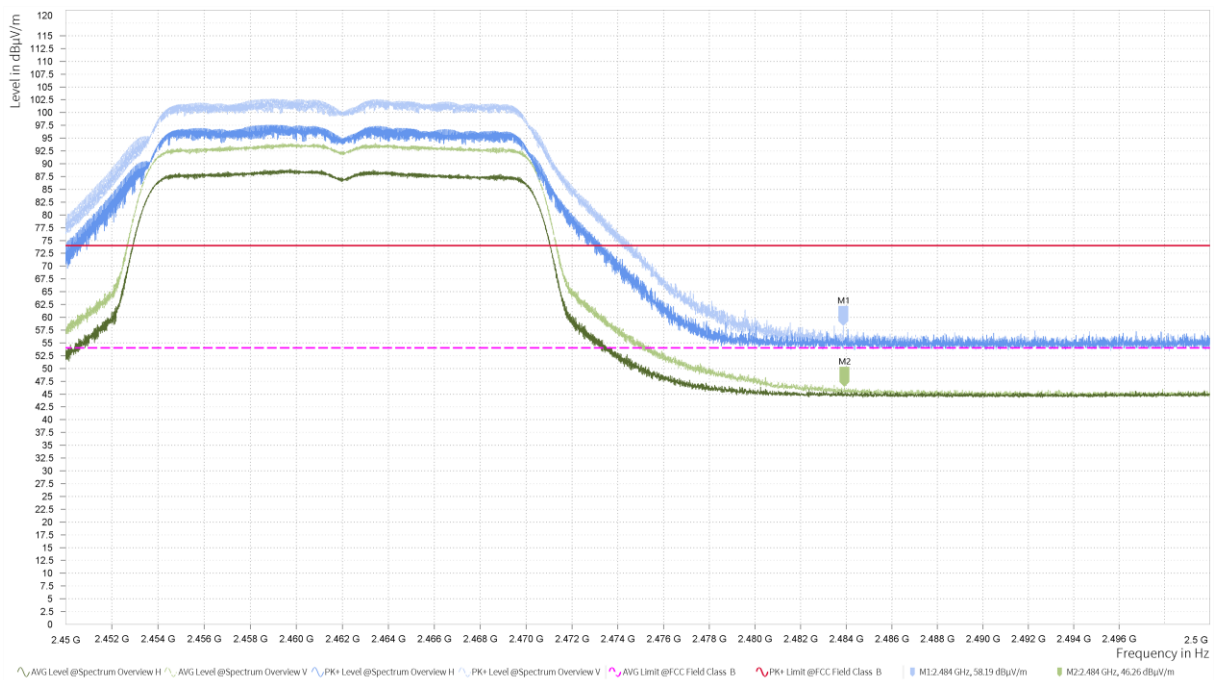
802.11b-Channel 11 Peak+ Average

Spectrum Overview H/V



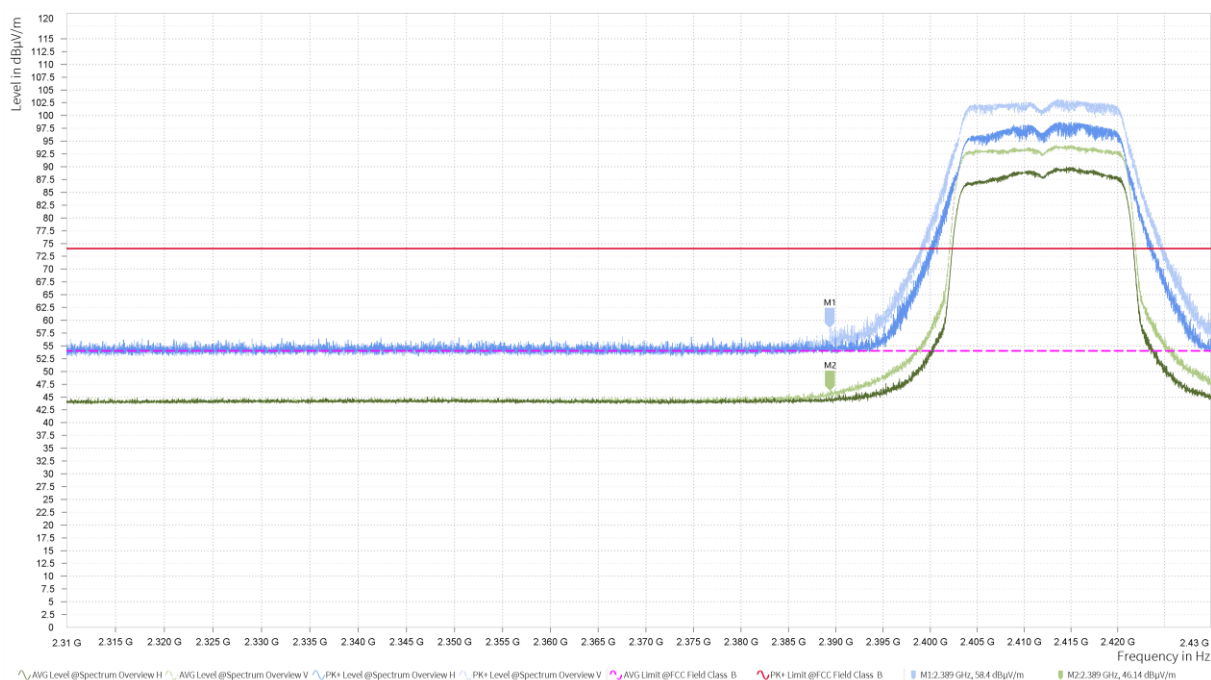
802.11g-Channel 1 Peak+ Average

Spectrum Overview H/V



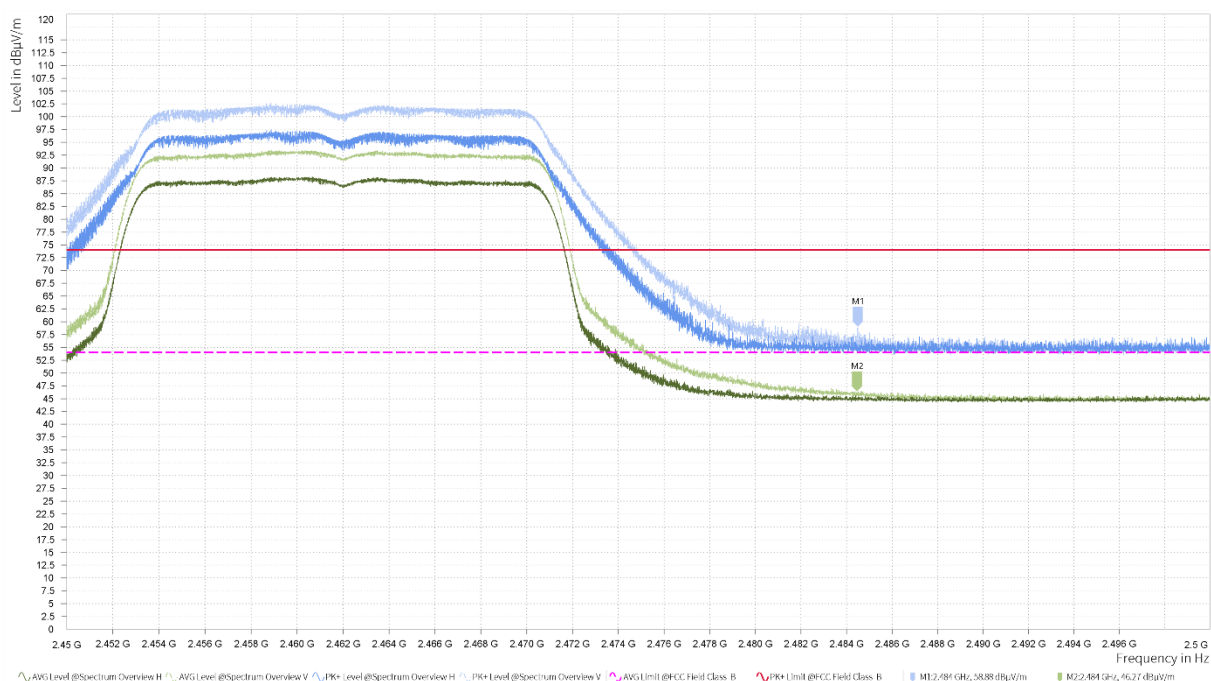
802.11g-Channel 11 Peak+ Average

Spectrum Overview H/V



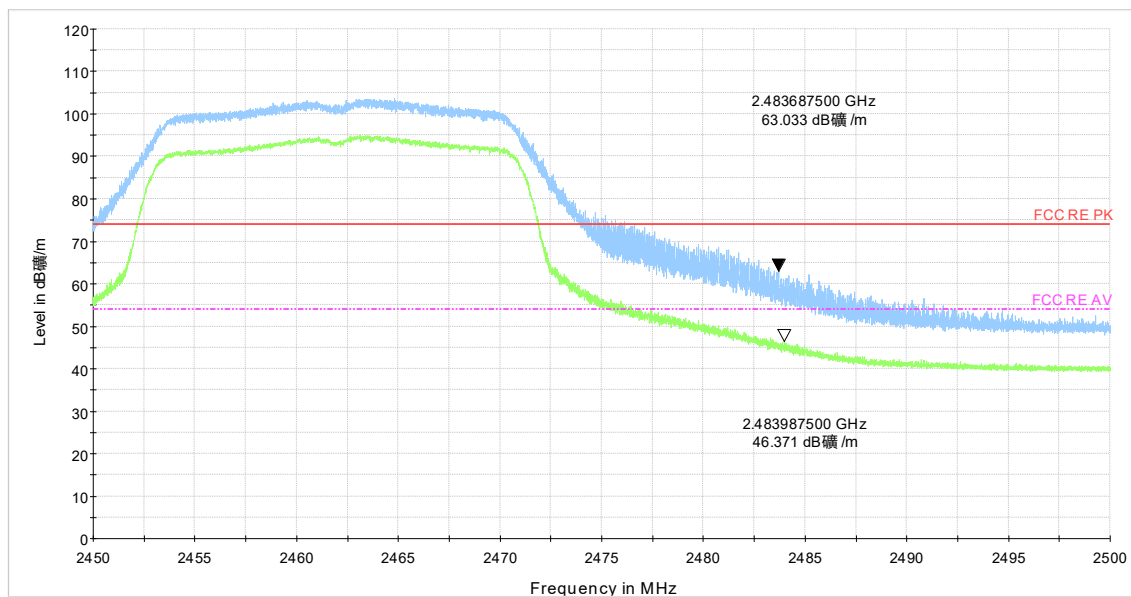
802.11n HT20-Channel 1 Peak+ Average

Spectrum Overview H/V



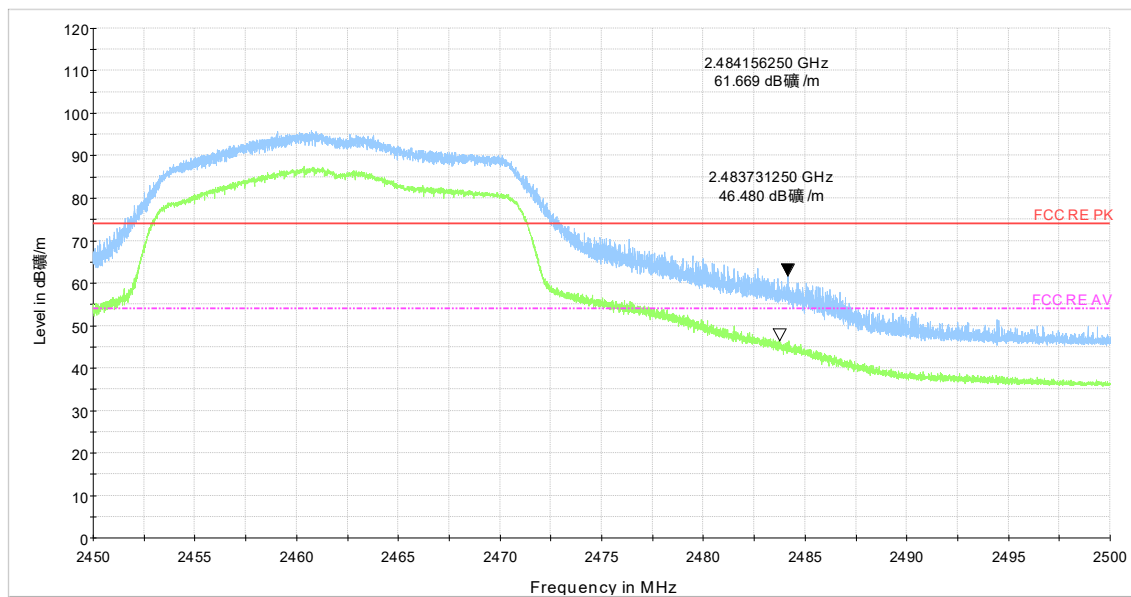
802.11n HT20-Channel 11 Peak+ Average

SFW70110



802.11n HT20-Channel 11 Peak+ Average

SFW60110



802.11n HT20-Channel 11 Peak+ Average

Result of RE

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier.
The Radiates Emission from 18GHz to 26.5GHz are more than 20dB below the limit are not reported.

Remark:

1. **Correction Factor = Antenna factor + Insertion loss (cable loss + amplifier gain)**
2. **Margin = Limit – Quasi-Peak/ MAX Peak/ Average**
3. **The following graphs display the maximum values of horizontal and vertical by software.**
4. **For below 1GHz**

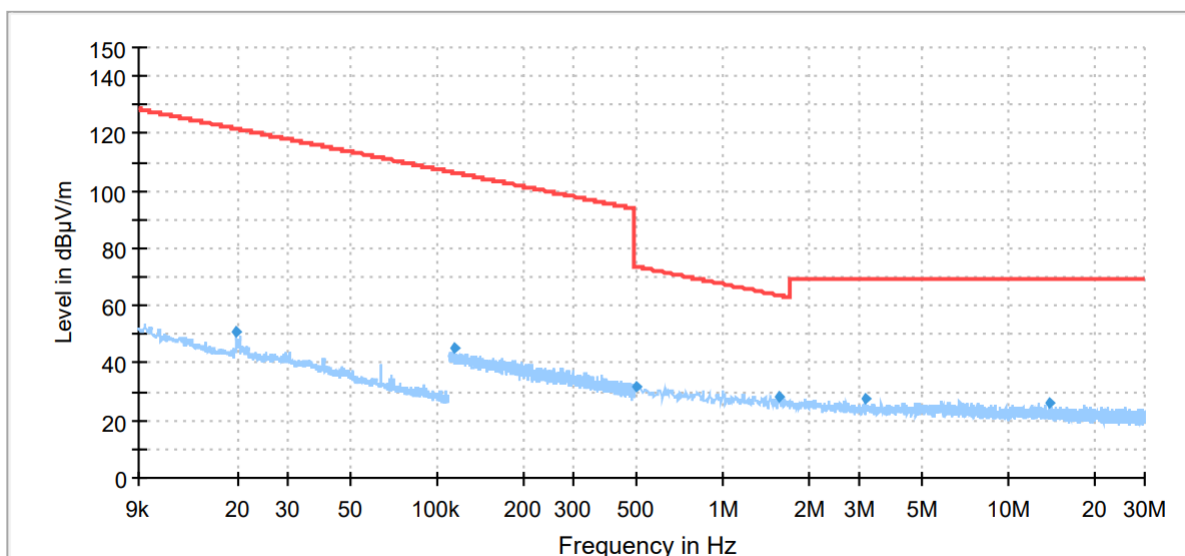
 QP Level @Spectrum Overview H
  QP Level @Spectrum Overview V
  QP Level @Final Results
  QP Limit

Continuous TX mode:

Wi-Fi 2.4GHz

During the test, the Radiates Emission from 9kHz to 1GHz was performed in all modes with all channels, the test data of the worst-case condition was recorded in this report.

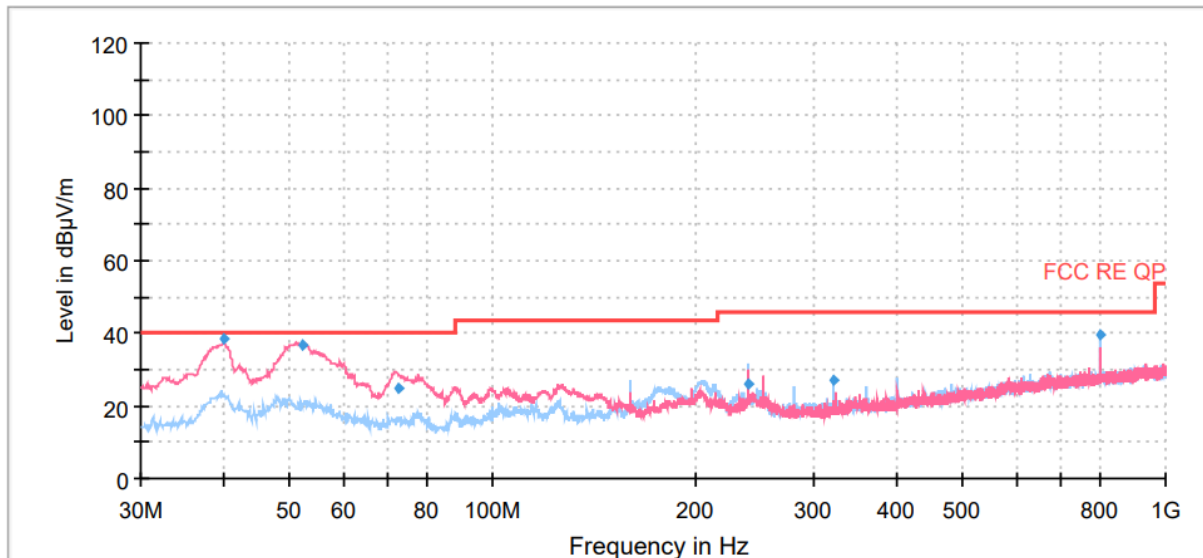
SFW80110



Radiates Emission from 9kHz to 30MHz

Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Azimuth (deg)	Corr. (dB/m)
0.02	50.79	121.69	70.91	500.00	122.00	17
0.11	44.97	106.43	61.46	150.00	174.00	17
0.50	32.03	73.67	41.64	150.00	188.00	17
1.56	28.10	63.71	35.62	150.00	91.00	17
3.18	27.67	69.50	41.83	150.00	7.00	17
13.99	26.10	69.50	43.40	150.00	282.00	17



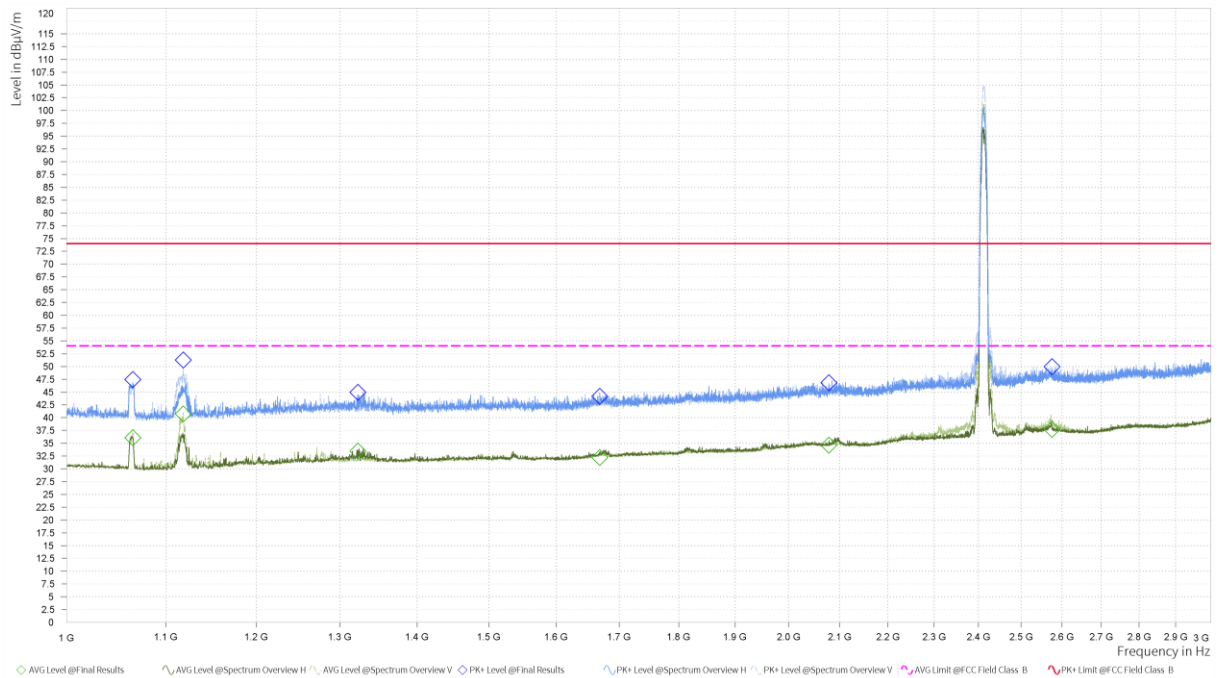
Radiates Emission from 30MHz to 1GHz

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.94	38.41	40.00	1.59	1000.00	101.0	V	176.00	19
52.23	36.54	40.00	3.46	1000.00	100.0	V	1.00	20
72.39	25.09	40.00	14.91	1000.00	197.0	V	83.00	15
240.01	26.31	46.00	19.69	1000.00	175.0	H	82.00	20
319.99	27.18	46.00	18.82	1000.00	100.0	H	73.00	21
799.98	39.45	46.00	6.55	1000.00	108.0	H	321.00	30

802.11b CH1

Spectrum Overview H/V

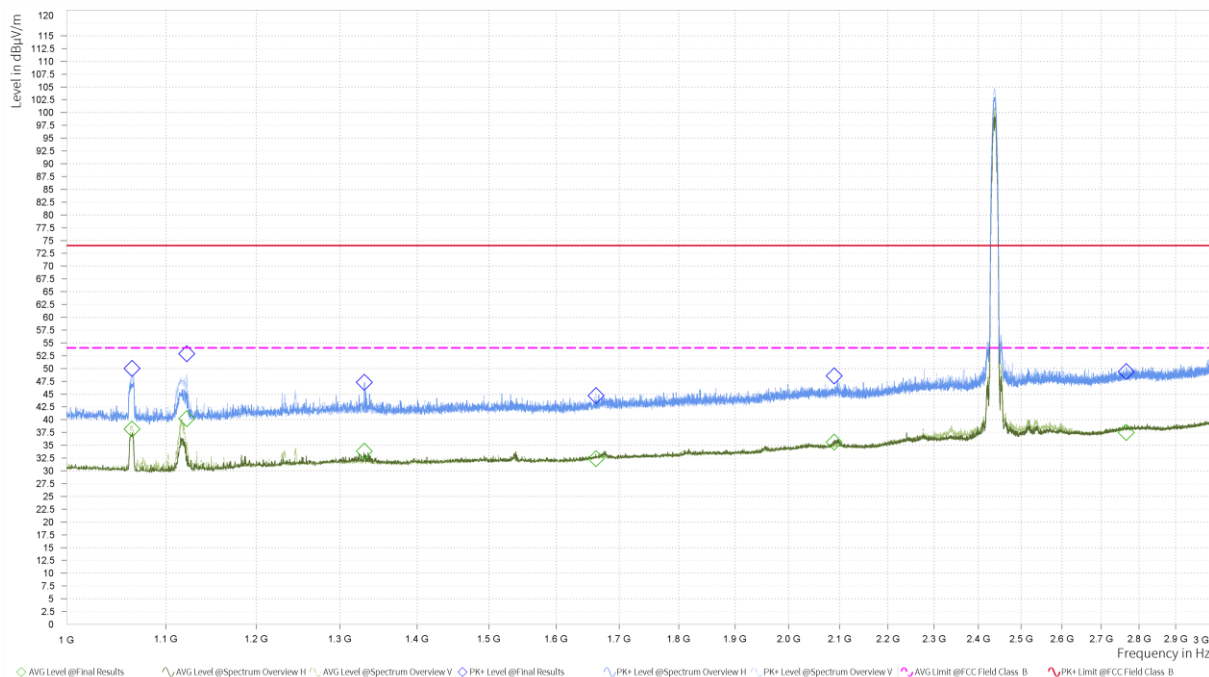


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,065.500	47.41	74.00	26.59	36.03	54.00	17.97	-5.67	V	297.6	1.00	1.000
1,118.500	51.25	74.00	22.75	40.68	54.00	13.32	-5.56	V	57.1	1.00	1.000
1,322.500	44.92	74.00	29.08	33.44	54.00	20.56	-4.30	H	326.6	2.00	1.000
1,668.500	44.12	74.00	29.88	32.19	54.00	21.81	-3.92	H	298.2	1.00	1.000
2,078.750	46.78	74.00	27.22	34.60	54.00	19.40	-1.52	V	100.8	2.00	1.000
2,575.750	49.94	74.00	24.06	37.68	54.00	16.32	0.76	H	278.1	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

802.11b CH6

Spectrum Overview H/V



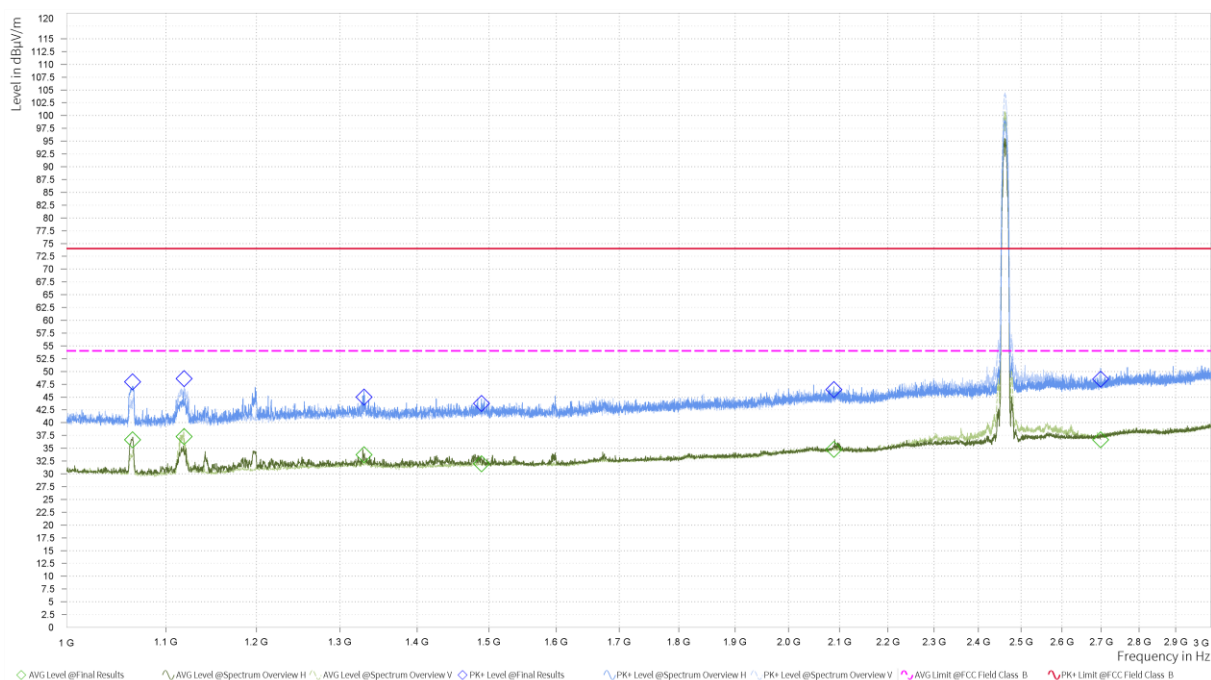
Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,064.750	49.96	74.00	24.04	38.15	54.00	15.85	-5.67	V	327.6	1.00	1.000
1,122.250	52.83	74.00	21.17	40.15	54.00	13.85	-5.48	V	61.8	1.00	1.000
1,331.000	47.26	74.00	26.74	33.78	54.00	20.22	-4.26	H	5.4	1.00	1.000
1,662.500	44.65	74.00	29.35	32.35	54.00	21.65	-3.91	V	355.1	1.00	1.000
2,089.750	48.53	74.00	25.47	35.58	54.00	18.42	-1.52	H	358.5	2.00	1.000
2,765.750	49.35	74.00	24.65	37.46	54.00	16.54	1.26	H	311.5	1.00	1.000

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

802.11b CH11

Spectrum Overview H/V



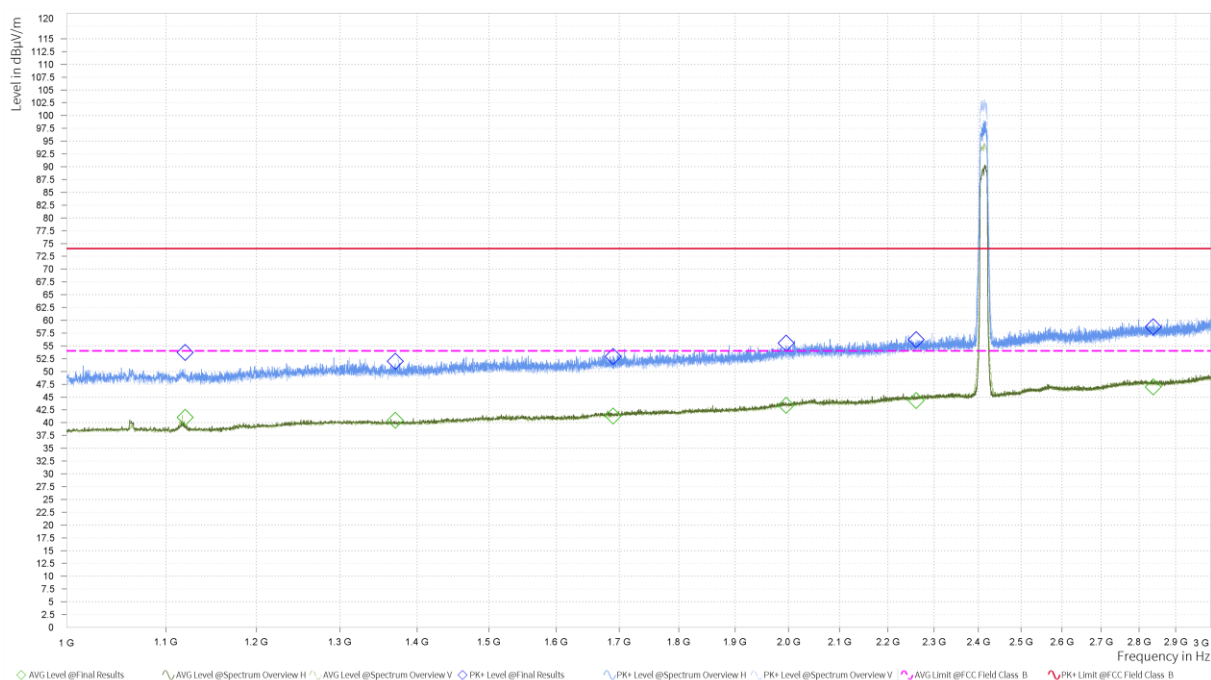
Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,065.250	47.96	74.00	26.04	36.63	54.00	17.37	-5.67	H	220.1	2.00	1.000
1,119.500	48.57	74.00	25.43	37.23	54.00	16.77	-5.54	V	288.1	2.00	1.000
1,330.500	44.98	74.00	29.02	33.73	54.00	20.27	-4.26	H	177.5	2.00	1.000
1,489.250	43.74	74.00	30.26	31.92	54.00	22.08	-3.90	H	51.8	2.00	1.000
2,088.750	46.44	74.00	27.56	34.73	54.00	19.27	-1.51	H	325.5	2.00	1.000
2,698.500	48.47	74.00	25.53	36.61	54.00	17.39	0.55	H	248.1	2.00	1.000

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

802.11g CH1

Spectrum Overview H/V

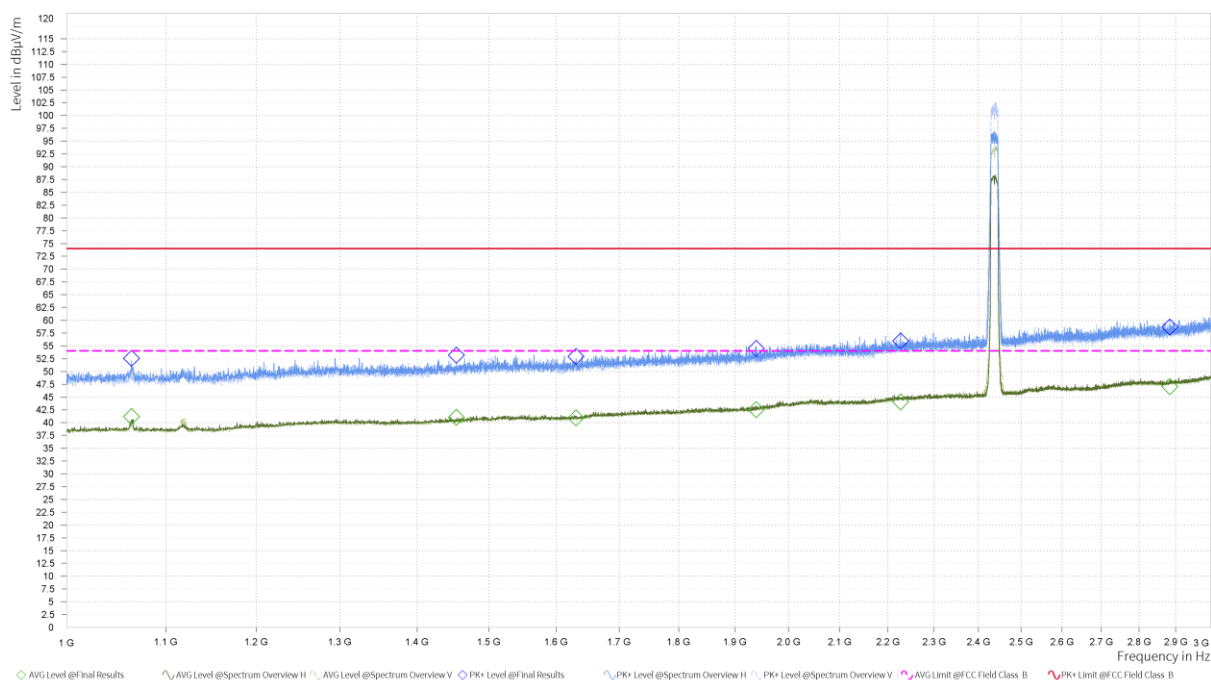


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,120.500	53.67	74.00	20.33	41.00	54.00	13.00	-5.52	V	292	2.00	1.000
1,371.000	51.95	74.00	22.05	40.41	54.00	13.59	-4.46	H	325.2	2.00	1.000
1,690.000	52.92	74.00	21.08	41.25	54.00	12.75	-3.91	H	121.2	2.00	1.000
1,995.500	55.52	74.00	18.48	43.37	54.00	10.63	-1.76	H	43.4	2.00	1.000
2,260.500	56.21	74.00	17.79	44.27	54.00	9.73	-0.93	V	360	2.00	1.000
2,838.250	58.70	74.00	15.30	46.95	54.00	7.05	1.47	H	36.2	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

802.11g CH6

Spectrum Overview H/V

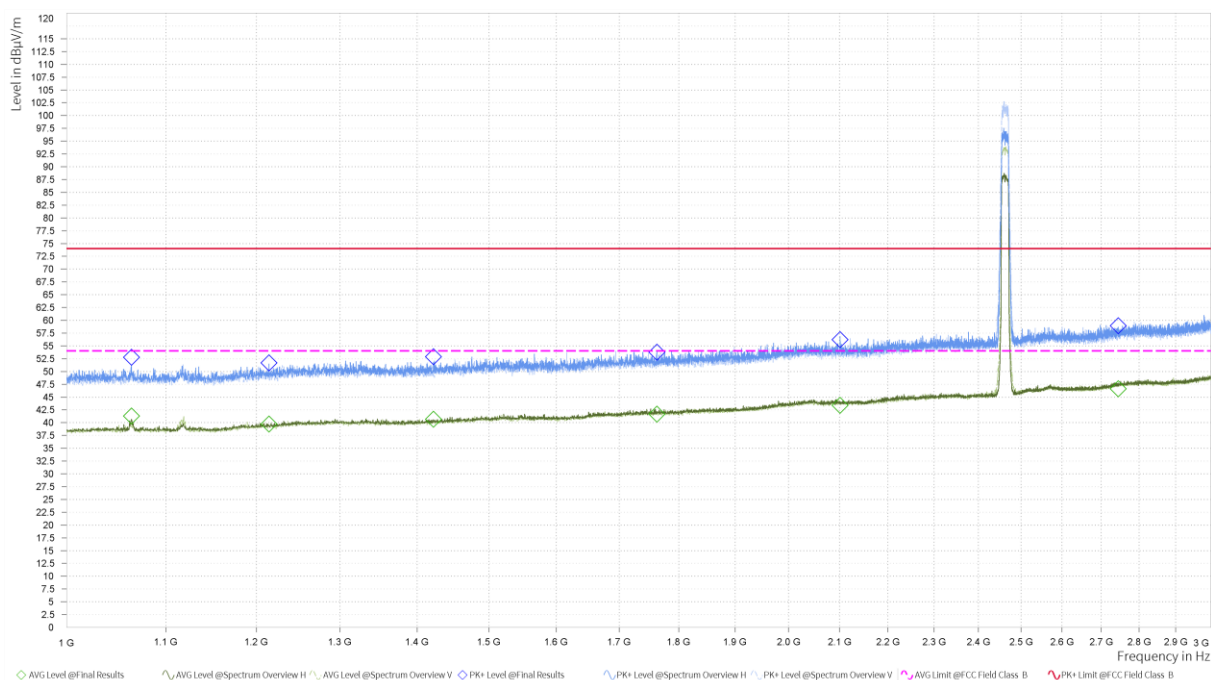


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,064.250	52.56	74.00	21.44	41.17	54.00	12.83	-5.67	H	346.6	2.00	1.000
1,454.000	53.14	74.00	20.86	40.99	54.00	13.01	-4.18	H	92.9	2.00	1.000
1,631.000	52.91	74.00	21.09	40.92	54.00	13.08	-4.22	H	141.7	2.00	1.000
1,938.750	54.48	74.00	19.52	42.54	54.00	11.46	-2.64	H	205.3	2.00	1.000
2,227.000	55.91	74.00	18.09	44.05	54.00	9.95	-1.02	H	113.8	2.00	1.000
2,884.000	58.64	74.00	15.36	47.01	54.00	6.99	1.47	H	155.7	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

802.11g CH11

Spectrum Overview H/V

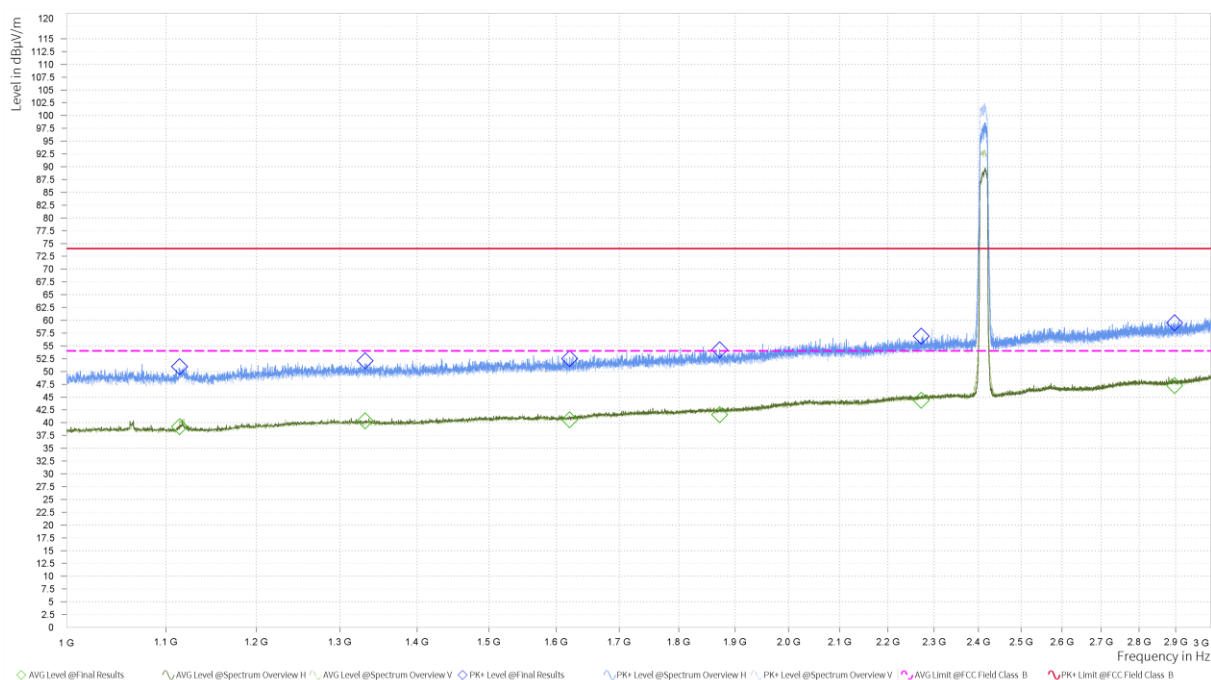


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,064.250	52.76	74.00	21.24	41.28	54.00	12.72	-5.67	H	346.6	2.00	1.000
1,214.500	51.67	74.00	22.33	39.71	54.00	14.29	-4.63	H	101.6	2.00	1.000
1,422.250	52.87	74.00	21.13	40.62	54.00	13.38	-4.34	H	144.1	2.00	1.000
1,762.500	53.76	74.00	20.24	41.63	54.00	12.37	-3.57	H	220.7	2.00	1.000
2,101.500	56.21	74.00	17.79	43.36	54.00	10.64	-1.59	H	339.8	2.00	1.000
2,744.500	58.90	74.00	15.10	46.58	54.00	7.42	1.07	H	59.3	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

802.11n (HT20) CH1

Spectrum Overview H/V

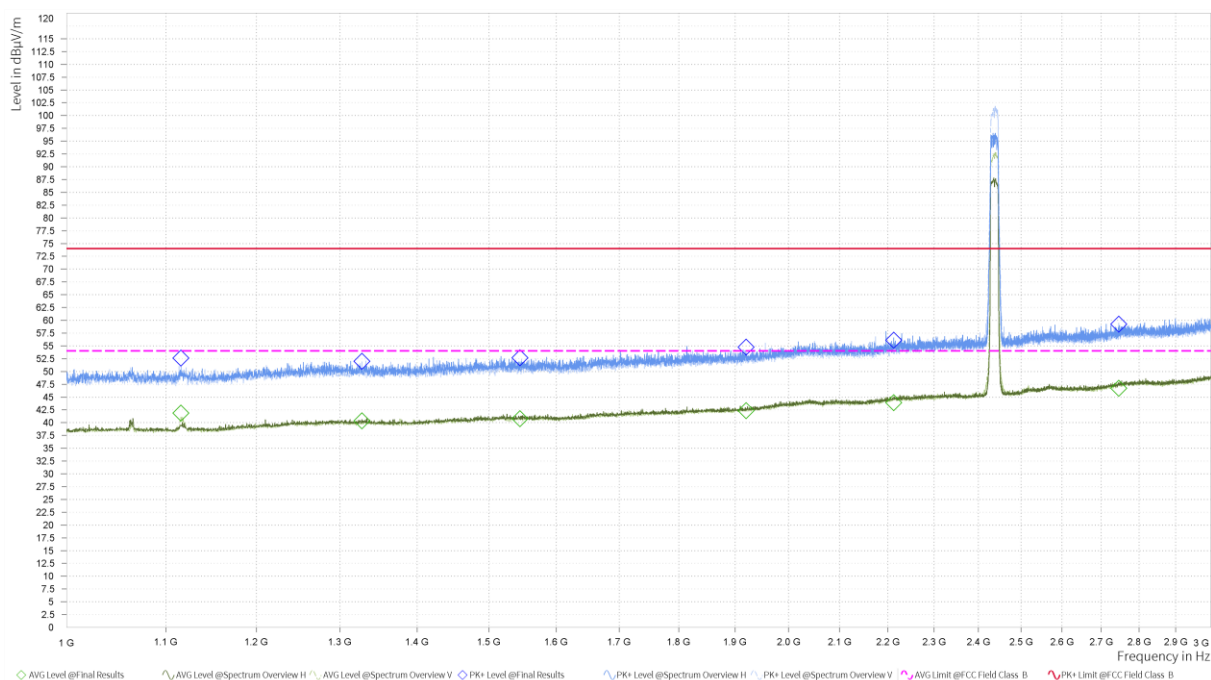


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,114.500	50.92	74.00	23.08	39.20	54.00	14.80	-5.63	H	117.1	2.00	1.000
1,332.000	52.05	74.00	21.95	40.35	54.00	13.65	-4.25	H	152.8	2.00	1.000
1,620.750	52.49	74.00	21.51	40.55	54.00	13.45	-4.23	H	282.5	2.00	1.000
1,872.000	54.19	74.00	19.81	41.54	54.00	12.46	-3.14	H	46.1	2.00	1.000
2,271.500	56.88	74.00	17.12	44.33	54.00	9.67	-0.82	V	360	2.00	1.000
2,897.250	59.46	74.00	14.54	47.22	54.00	6.78	1.53	H	1.1	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

802.11n (HT20) CH6

Spectrum Overview H/V

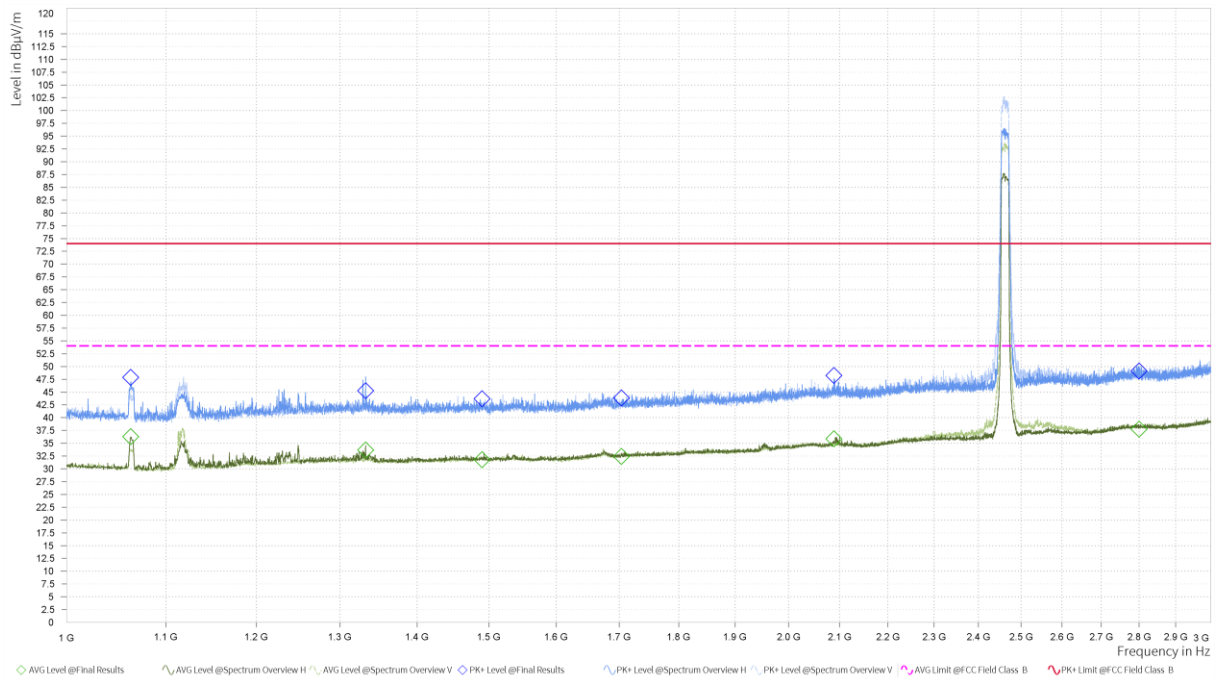


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,116.000	52.57	74.00	21.43	41.84	54.00	12.16	-5.62	V	296.8	2.00	1.000
1,327.750	51.97	74.00	22.03	40.32	54.00	13.68	-4.27	V	232.8	2.00	1.000
1,545.500	52.65	74.00	21.35	40.75	54.00	13.25	-3.85	H	202.5	2.00	1.000
1,920.000	54.72	74.00	19.28	42.31	54.00	11.69	-2.80	H	159.4	2.00	1.000
2,212.500	56.10	74.00	17.90	43.89	54.00	10.11	-1.09	H	52.9	2.00	1.000
2,745.750	59.20	74.00	14.80	46.68	54.00	7.32	1.08	V	359.6	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

802.11n (HT20) CH11

Spectrum Overview H/V

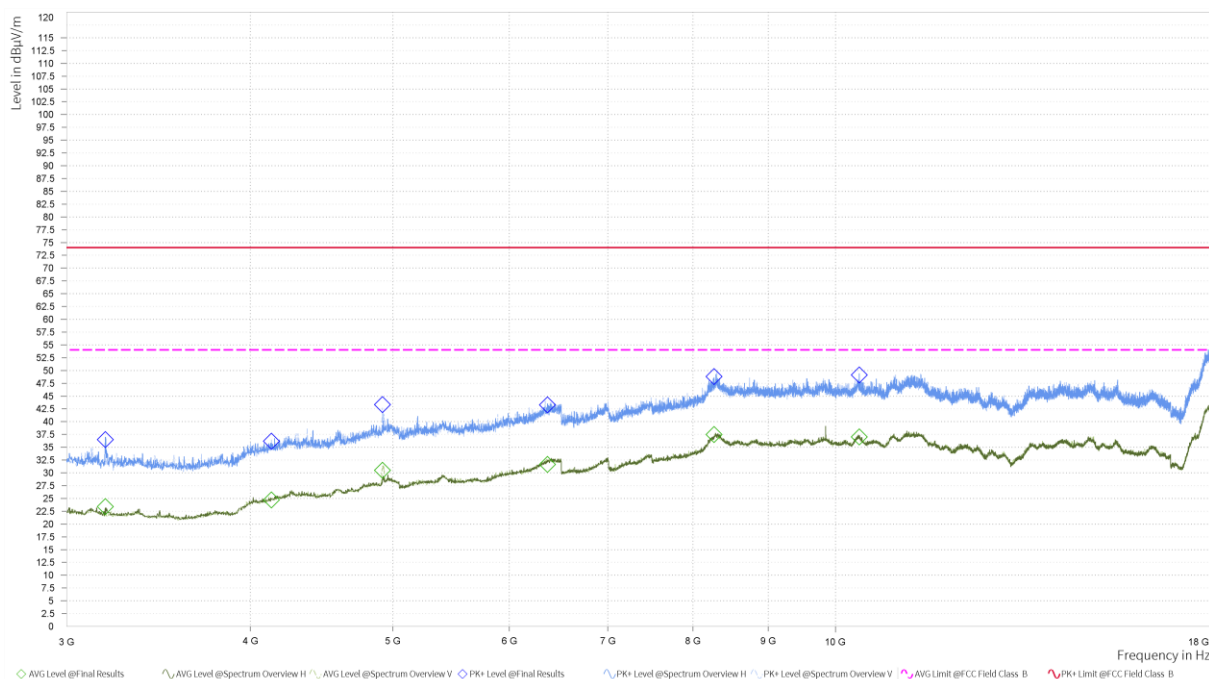


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
1,063.500	47.85	74.00	26.15	36.26	54.00	17.74	-5.67	H	230.5	2.00	1.000
1,332.500	45.21	74.00	28.79	33.63	54.00	20.37	-4.25	H	79	2.00	1.000
1,490.250	43.65	74.00	30.35	31.75	54.00	22.25	-3.91	H	158.9	2.00	1.000
1,703.250	43.84	74.00	30.16	32.38	54.00	21.62	-3.82	V	114.6	2.00	1.000
2,089.000	48.22	74.00	25.78	35.83	54.00	18.17	-1.51	H	303.1	2.00	1.000
2,800.250	49.09	74.00	24.91	37.72	54.00	16.28	1.45	H	64.5	2.00	1.000

Note: The signal beyond the limit is carrier.
Radiates Emission from 1GHz to 3GHz

During the test, the Radiates Emission from 3GHz to 18GHz was performed in all modes with all channels. The test data of the worst-case condition was recorded in this report.

Spectrum Overview H/V

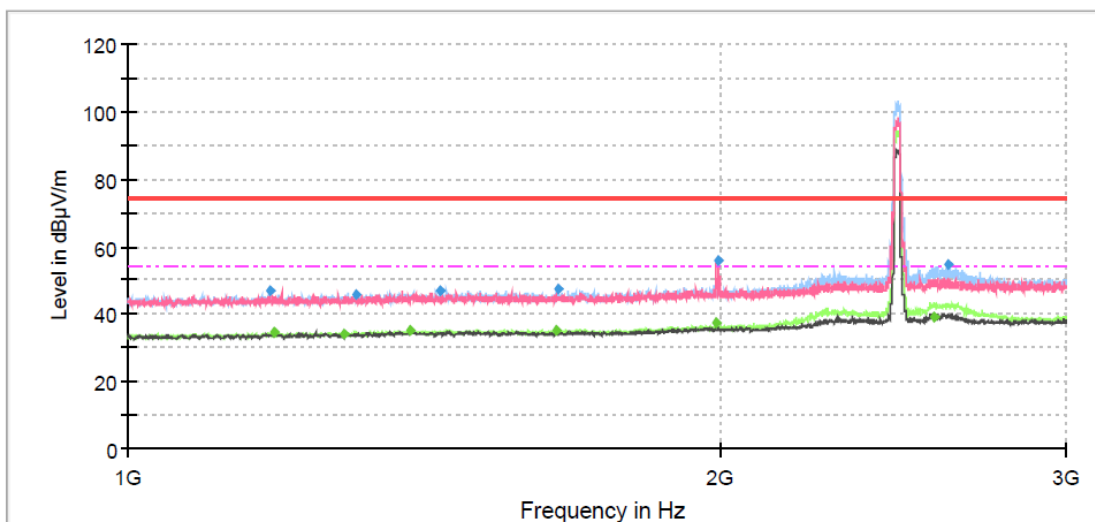


Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. Time [s]
3,187.500	36.47	74.00	37.53	23.40	54.00	30.60	-7.90	H	0.3	2.00	1.000
4,134.375	36.15	74.00	37.85	24.66	54.00	29.34	-4.95	V	223	2.00	1.000
4,920.000	43.33	74.00	30.67	30.49	54.00	23.51	-1.73	V	306.9	2.00	1.000
6,369.375	43.23	74.00	30.77	31.60	54.00	22.40	1.51	H	0	2.00	1.000
8,268.750	48.81	74.00	25.19	37.46	54.00	16.54	6.39	H	230.5	2.00	1.000
10,378.125	49.09	74.00	24.91	37.02	54.00	16.98	6.20	H	160.8	2.00	1.000

Radiates Emission from 3GHz to 18GHz

SFW70110

802.11n (HT20) CH11

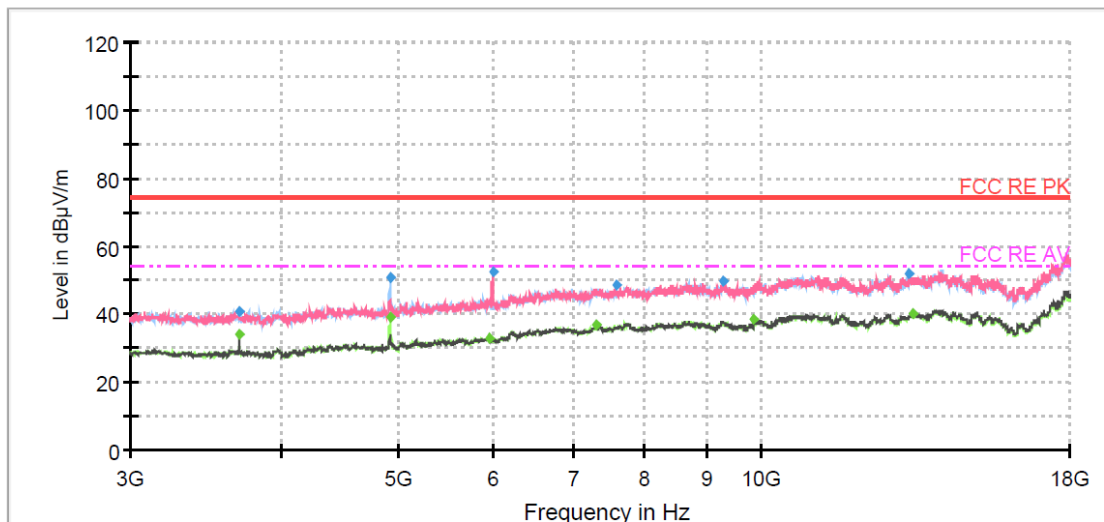


Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1181.00	46.85	---	74.00	27.15	500.00	100.0	V	37.00	-5
1186.50	---	34.53	54.00	19.47	500.00	100.0	H	327.00	-5
1287.50	---	33.95	54.00	20.05	500.00	200.0	H	0.00	-5
1306.25	45.78	---	74.00	28.22	500.00	100.0	H	151.00	-5
1391.75	---	35.23	54.00	18.77	500.00	100.0	H	275.00	-4
1440.00	46.87	---	74.00	27.13	500.00	200.0	H	212.00	-4
1652.75	---	35.34	54.00	18.66	500.00	100.0	H	319.00	-4
1654.25	47.27	---	74.00	26.73	500.00	100.0	H	191.00	-3
1991.25	---	37.40	54.00	16.60	500.00	200.0	V	189.00	-2
1996.25	55.85	---	74.00	18.15	500.00	200.0	V	189.00	-2
2568.75	---	38.85	54.00	15.15	500.00	100.0	H	334.00	1
2611.25	54.71	---	74.00	19.29	500.00	100.0	H	319.00	1

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



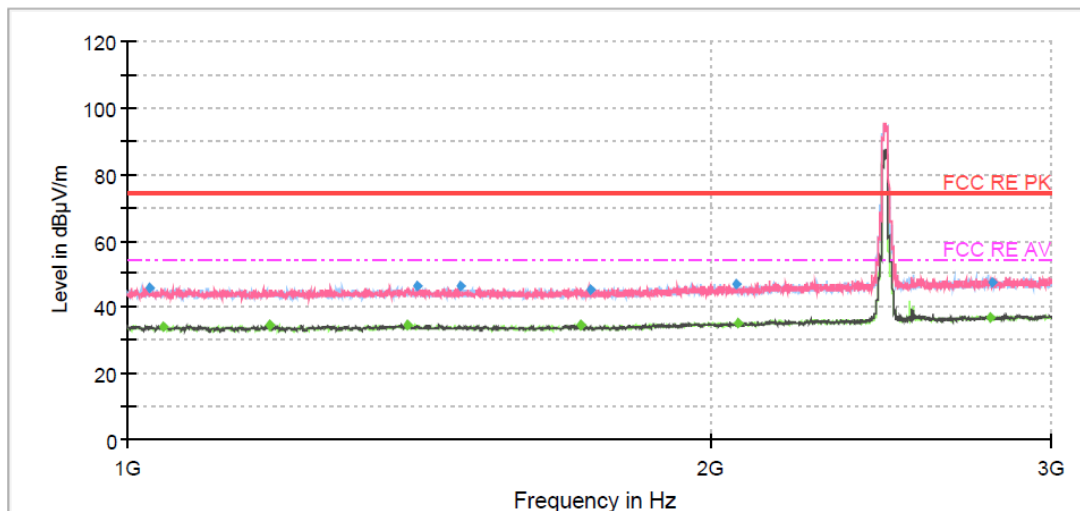
Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3691.88	---	33.97	54.00	20.03	500.00	100.0	V	262.00	-6
3691.88	40.84	---	74.00	33.16	500.00	100.0	V	262.00	-6
4921.88	50.52	---	74.00	23.48	500.00	100.0	H	303.00	-3
4925.63	---	38.86	54.00	15.14	500.00	100.0	H	314.00	-3
5943.75	---	33.00	54.00	21.00	500.00	200.0	H	52.00	-1
5983.13	52.46	---	74.00	21.54	500.00	100.0	V	278.00	-1
7288.13	---	36.57	54.00	17.43	500.00	200.0	H	0.00	2
7578.75	48.76	---	74.00	25.24	500.00	100.0	H	358.00	2
9300.00	49.56	---	74.00	24.44	500.00	100.0	V	11.00	6
9847.50	---	38.55	54.00	15.45	500.00	100.0	H	355.00	5
13245.00	52.06	---	74.00	21.94	500.00	100.0	V	246.00	8
13335.00	---	40.20	54.00	13.80	500.00	200.0	V	0.00	8

Radiates Emission from 3GHz to 18GHz

SFW60110

802.11n (HT20) CH11

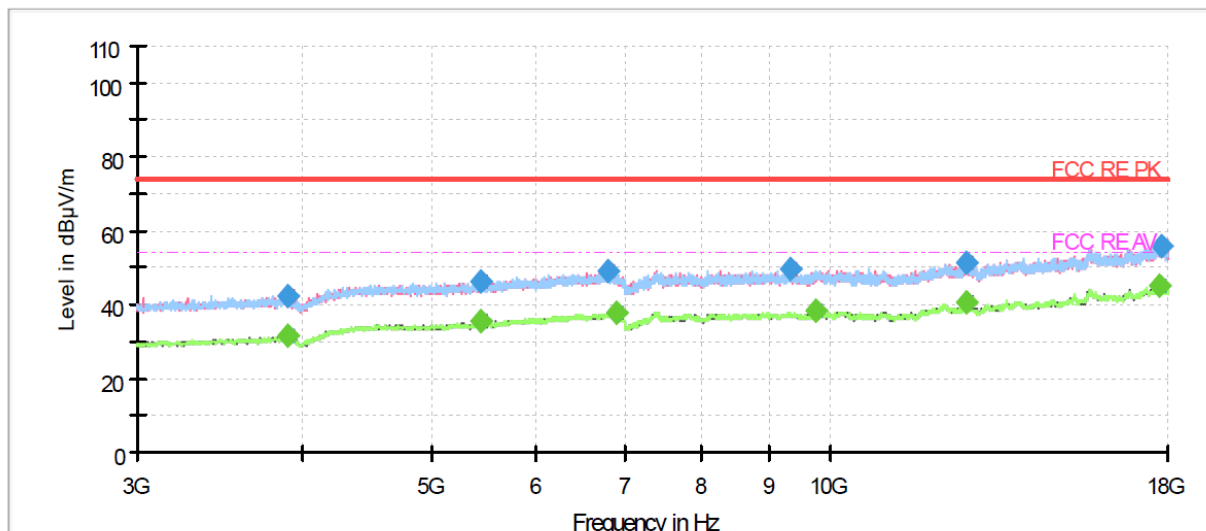


Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1025.50	45.78	---	74.00	28.22	500.00	200.0	V	45.00	3
1043.00	---	34.28	54.00	19.72	500.00	200.0	H	223.00	3
1183.00	---	34.48	54.00	19.52	500.00	100.0	H	34.00	4
1396.00	---	34.70	54.00	19.30	500.00	200.0	H	344.00	5
1409.75	46.08	---	74.00	27.92	500.00	200.0	V	1.00	4
1487.00	46.21	---	74.00	27.79	500.00	200.0	V	316.00	5
1713.50	---	34.79	54.00	19.21	500.00	200.0	V	246.00	5
1732.75	45.29	---	74.00	28.71	500.00	100.0	V	5.00	5
2061.50	47.04	---	74.00	26.96	500.00	200.0	H	293.00	6
2066.50	---	35.41	54.00	18.59	500.00	200.0	V	148.00	6
2792.25	---	36.73	54.00	17.27	500.00	200.0	H	0.00	8
2793.25	47.72	---	74.00	26.28	500.00	200.0	H	126.00	8

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3896.250000	42.32	---	74.00	31.68	500.0	200.0	H	329.0	-5
3898.125000	---	31.55	54.00	22.45	500.0	100.0	H	358.0	-5
5443.125000	46.12	---	74.00	27.88	500.0	200.0	V	295.0	0
5448.750000	---	35.28	54.00	18.72	500.0	200.0	V	210.0	0
6795.000000	48.90	---	74.00	25.10	500.0	200.0	H	188.0	1
6900.000000	---	37.72	54.00	16.28	500.0	200.0	V	48.0	1
9352.500000	49.36	---	74.00	24.64	500.0	100.0	V	180.0	3
9755.625000	---	38.18	54.00	15.82	500.0	200.0	H	350.0	3
12678.750000	---	40.42	54.00	13.58	500.0	200.0	H	289.0	5
12703.125000	51.25	---	74.00	22.75	500.0	200.0	H	289.0	5
17709.375000	---	45.13	54.00	8.87	500.0	100.0	V	271.0	10
17788.125000	55.94	---	74.00	18.06	500.0	200.0	V	7.0	10

Radiates Emission from 3GHz to 18GHz

5.7. Conducted Emission

Ambient Condition

Temperature	Relative humidity
15°C ~ 35°C	20% ~ 80%

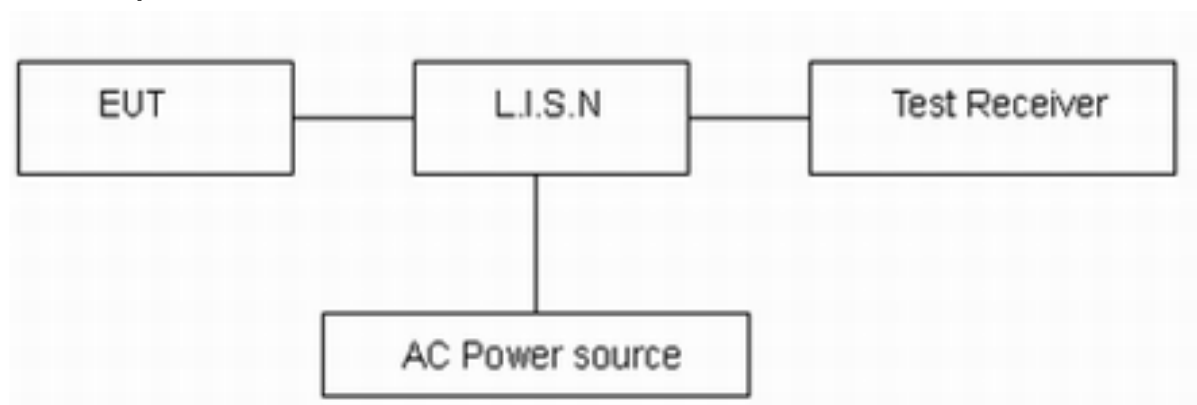
Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz.

The measurement result should include both L line and N line.

The test is in transmitting mode.

Test Setup



Note: AC Power source is used to change the voltage 110V/60Hz.

Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 2.69$ dB.

Test Results:

Following plots, Blue trace uses the peak detection and Green trace uses the average detection.

Wi-Fi 2.4GHz

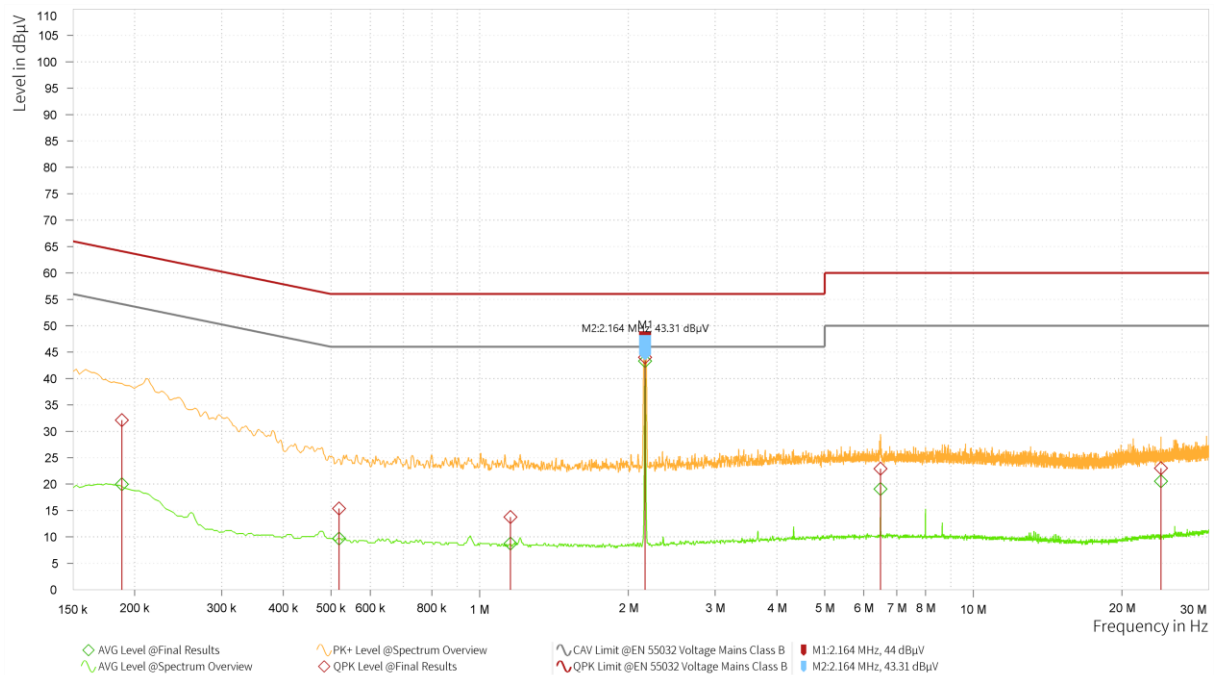
During the test, the Conducted Emission was performed in all modes with all channel. The test data of the worst-case condition was recorded in this report.



Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	AVG Level [dBμV]	AVG: CAV Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.170	32.96	64.95	31.98	20.60	54.95	34.35	20.89	L1	9.000	1.000
0.389	18.34	58.10	39.75	11.02	48.10	37.08	20.89	L1	9.000	1.000
1.127	13.97	56.00	42.03	8.81	46.00	37.19	20.07	L1	9.000	1.000
2.162	44.90	56.00	11.10	42.81	46.00	3.19	19.61	L1	9.000	1.000
6.488	22.71	60.00	37.29	17.53	50.00	32.47	19.40	L1	9.000	1.000
24.000	23.83	60.00	36.17	21.68	50.00	28.32	19.78	L1	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

L line Conducted Emission from 150 kHz to 30 MHz



Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	AVG Level [dBμV]	AVG: CAV Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.188	32.12	64.11	31.99	19.99	54.11	34.12	21.03	N	9.000	1.000
0.519	15.36	56.00	40.64	9.70	46.00	36.30	20.77	N	9.000	1.000
1.154	13.77	56.00	42.23	8.72	46.00	37.28	20.06	N	9.000	1.000
2.164	44.00	56.00	12.00	43.31	46.00	2.69	19.62	N	9.000	1.000
6.488	22.92	60.00	37.08	19.06	50.00	30.94	19.41	N	9.000	1.000
24.000	23.02	60.00	36.98	20.54	50.00	29.46	19.84	N	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz

6. Main Test Instruments

Date of Testing: June 28, 2025 ~ July 24, 2025

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Power sensor	R&S	NRP18S	101954	2025-05-06	2026-05-05
Spectrum Analyzer	KEYSIGHT	N9020A	MY51330870	2025-05-06	2026-05-05
Artificial main network	R&S	ENV216	102191	2024-12-02	2026-12-01
EMI Test Receiver	R&S	ESCI3	100948	2025-05-07	2026-05-06
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2023-04-16	2026-04-15
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	1023	2023-07-14	2026-07-13
Signal Analyzer	R&S	FSV40	101298	2025-05-07	2026-05-06
Horn Antenna	R&S	HF 907	102723	2023-11-24	2026-11-23
Software	R&S	EMC32	9.26.01	/	/
Artificial main network	R&S	ENV216	101171	2024-12-02	2026-12-01
EMI Test Receiver	R&S	ESR	101667	2025-05-06	2026-05-05
Software	R&S	EMC32	10.35.10	/	/

Date of Testing: January 4, 2026 ~ January 15, 2026 and January 20, 2026

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Spectrum Analyzer	KEYSIGHT	N9020A	MY51330870	2025-05-06	2026-05-05
EMI Test Receiver	R&S	ESCI3	100948	2025-05-07	2026-05-06
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2023-04-16	2026-04-15
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	1023	2023-07-14	2026-07-13
Signal Analyzer	R&S	FSV40	101298	2025-05-07	2026-05-06
Horn Antenna	R&S	HF 907	102723	2023-11-24	2026-11-23
Software	R&S	EMC32	9.26.01	/	/
Artificial main network	R&S	ENV216	101171	2024-12-02	2026-12-01
EMI Test Receiver	R&S	ESR	101667	2025-05-06	2026-05-05
Software	R&S	EMC32	10.35.10	/	/

ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.

ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.

***** END OF REPORT *****