

ANNEX A: Test Result

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 stand-up position (Z axis) and the loop antenna is coplanar, the others are vertical and horizontal. and the worst case was recorded.

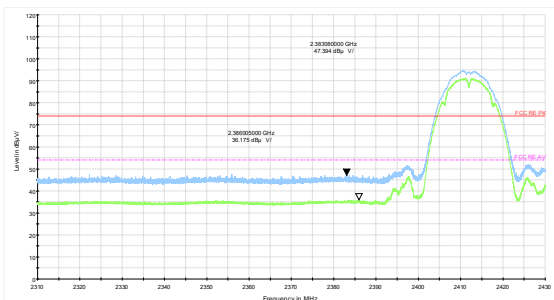
1. Unwanted Emission

1.1. Wi-Fi 2.4GHz

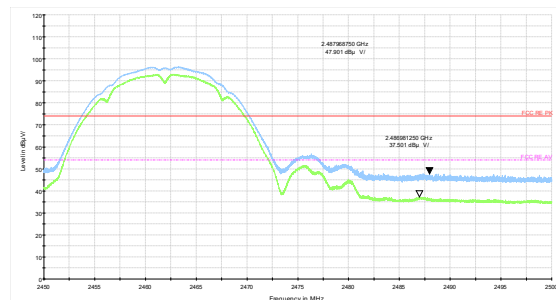
The following graphs display the maximum values of horizontal and vertical by software. Blue trace uses the peak detection, Green trace uses the average detection.

A symbol ($\text{dB}\mu\text{V}$) in the test plot below means ($\text{dB}\mu\text{V/m}$)

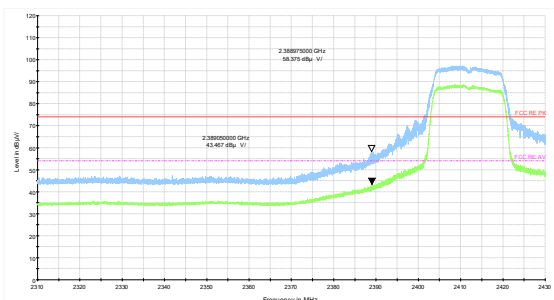
The signal beyond the limit is carrier.



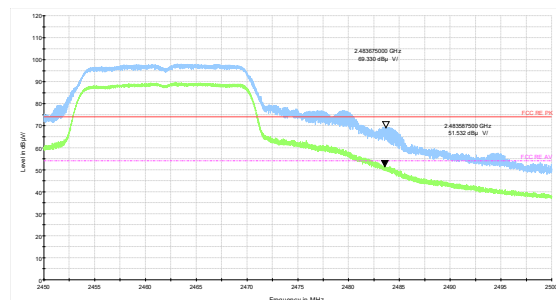
802.11b-Channel 1 Peak+ Average



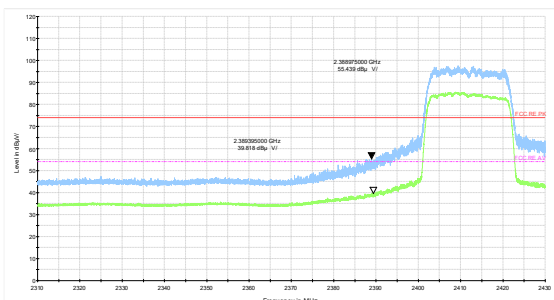
802.11b-Channel 11 Peak+ Average



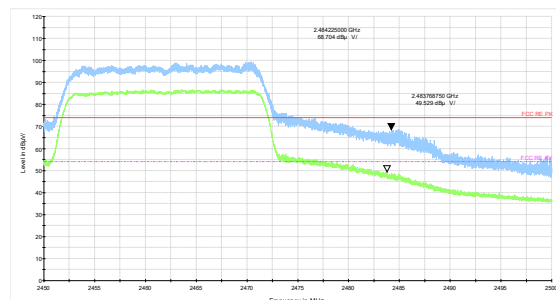
802.11g-Channel 1 Peak+ Average



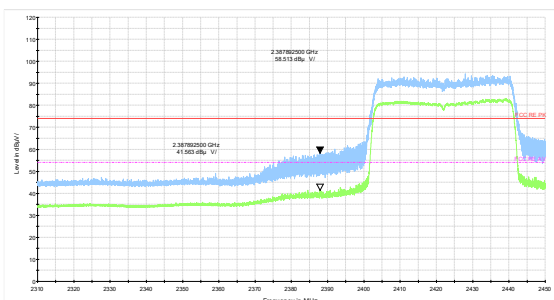
802.11g-Channel 11 Peak+ Average



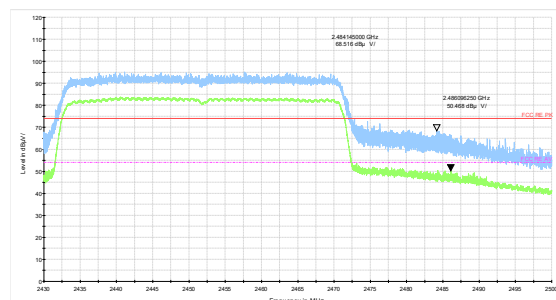
802.11ax HE20-Channel 1 Peak+ Average



802.11ax HE20-Channel 11 Peak+ Average



802.11ax HE40-Channel 3 Peak+ Average



802.11ax HE40-Channel 9 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 30MHz to 1GHz and 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. **A symbol ($\text{dB}\mu\text{V/}$) in the test plot below means ($\text{dB}\mu\text{V/m}$)**
4. **The following graphs display the maximum values of coaxial and coplanar for 9k-30MHz; horizontal and vertical for above 30MHz by software.**
5. **For below 1GHz**

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

For above 1GHz

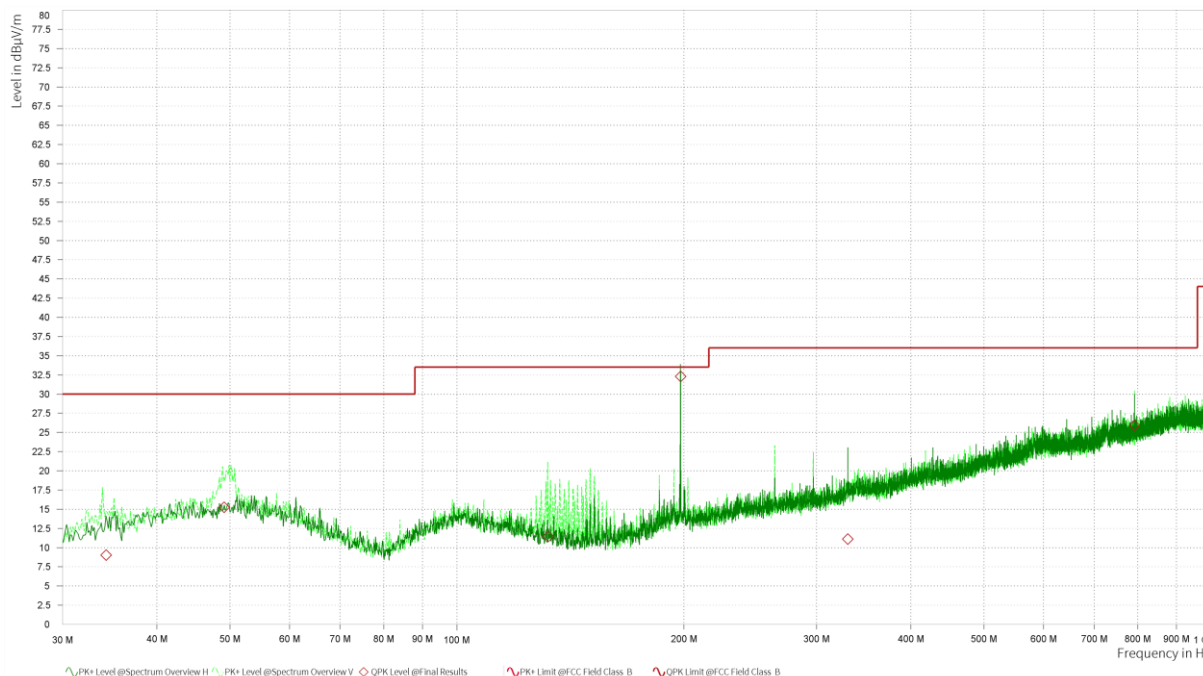
 PK Level @Spectrum Overview H
  PK Level @Spectrum Overview V
  PK Level @Final Results
  PK Limit

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

Continuous TX mode:

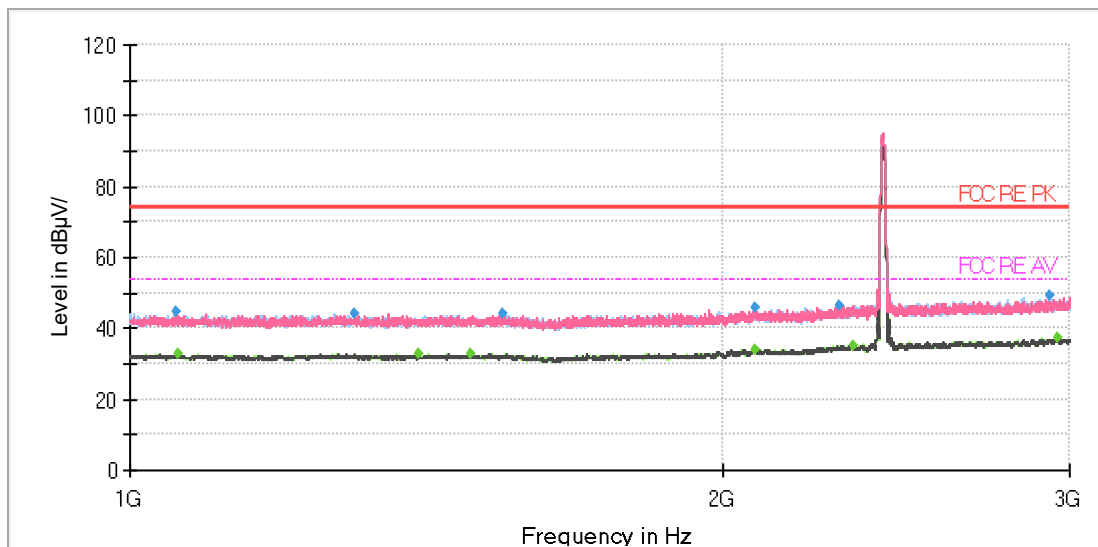
During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, the test data of the worst-case condition (**802.11g CH11**) was recorded in this report.

Spectrum Overview H/V



Radiates Emission from 30MHz to 1GHz

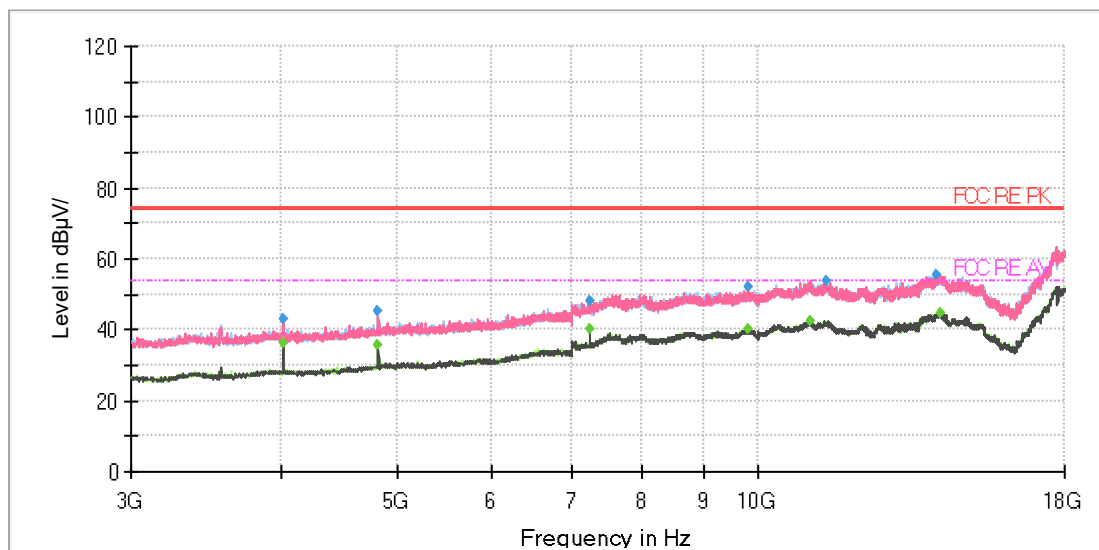
Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
34.254	8.99	30.00	21.01	-10.95	V	106.4	1.17	120.000	1.000
49.135	15.24	30.00	14.76	-8.06	V	2.7	1.25	120.000	1.000
132.203	11.45	33.50	22.05	-12.69	V	64.6	1.75	120.000	1.000
197.989	32.28	33.50	1.22	-9.91	H	270.7	2.25	120.000	1.000
329.879	11.10	36.00	24.90	-6.41	H	70	2.15	120.000	1.000
791.949	25.92	36.00	10.08	0.57	V	99.6	2.02	120.000	1.000



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

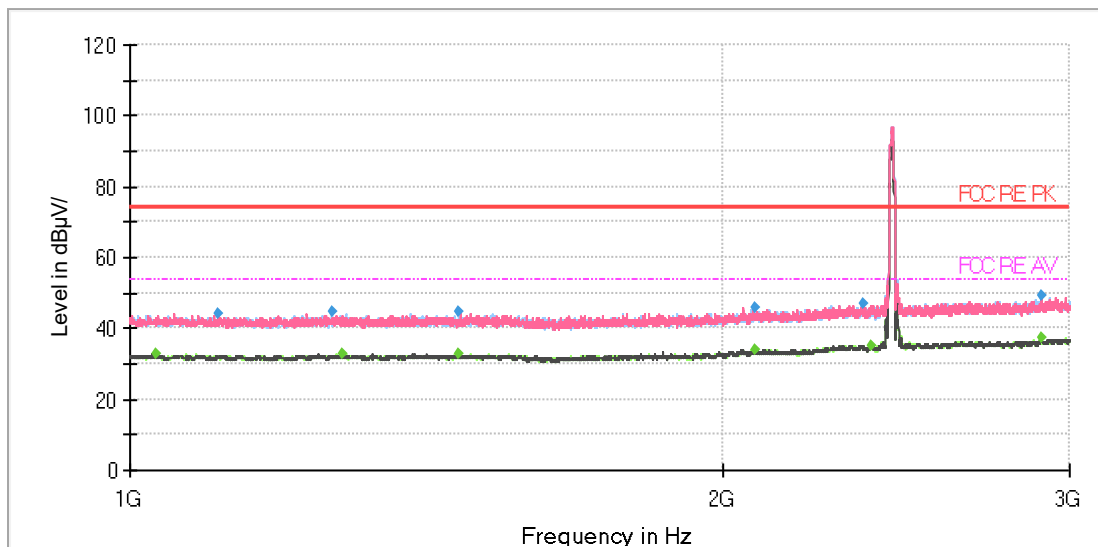
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1055.25	44.71	---	74.00	29.29	500.00	100.0	V	345.00
1058.50	---	32.89	54.00	21.11	500.00	200.0	V	106.00
1298.75	44.35	---	74.00	29.65	500.00	100.0	V	0.00
1400.00	---	32.90	54.00	21.10	500.00	100.0	H	173.00
1490.25	---	32.78	54.00	21.22	500.00	100.0	H	0.00
1544.75	44.29	---	74.00	29.71	500.00	200.0	H	9.00
2076.50	---	34.12	54.00	19.88	500.00	100.0	H	142.00
2078.00	45.84	---	74.00	28.16	500.00	200.0	H	255.00
2291.75	46.63	---	74.00	27.37	500.00	100.0	V	206.00
2327.25	---	35.14	54.00	18.86	500.00	200.0	H	222.00
2931.25	48.98	---	74.00	25.02	500.00	100.0	H	78.00
2960.75	---	37.26	54.00	16.74	500.00	100.0	H	0.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
4016.25	43.15	---	74.00	30.85	500.00	200.0	H	16.00
4020.00	---	35.97	54.00	18.03	500.00	100.0	V	16.00
4822.50	---	35.77	54.00	18.23	500.00	100.0	H	9.00
4822.50	45.15	---	74.00	28.85	500.00	100.0	H	9.00
7237.50	48.12	---	74.00	25.88	500.00	100.0	H	264.00
7237.50	---	40.06	54.00	13.94	500.00	100.0	H	264.00
9789.38	---	40.25	54.00	13.75	500.00	100.0	V	125.00
9811.88	51.96	---	74.00	22.04	500.00	200.0	H	0.00
11026.88	---	42.52	54.00	11.48	500.00	100.0	H	74.00
11403.75	54.03	---	74.00	19.97	500.00	100.0	V	352.00
14090.63	55.48	---	74.00	18.52	500.00	100.0	V	231.00
14161.88	---	44.95	54.00	9.05	500.00	200.0	V	10.00

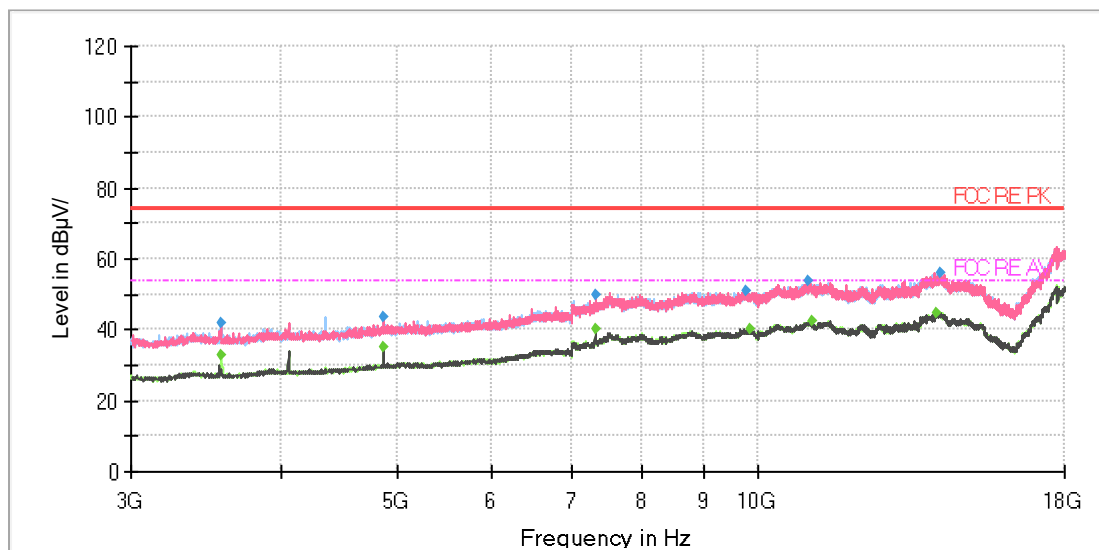
802.11b CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

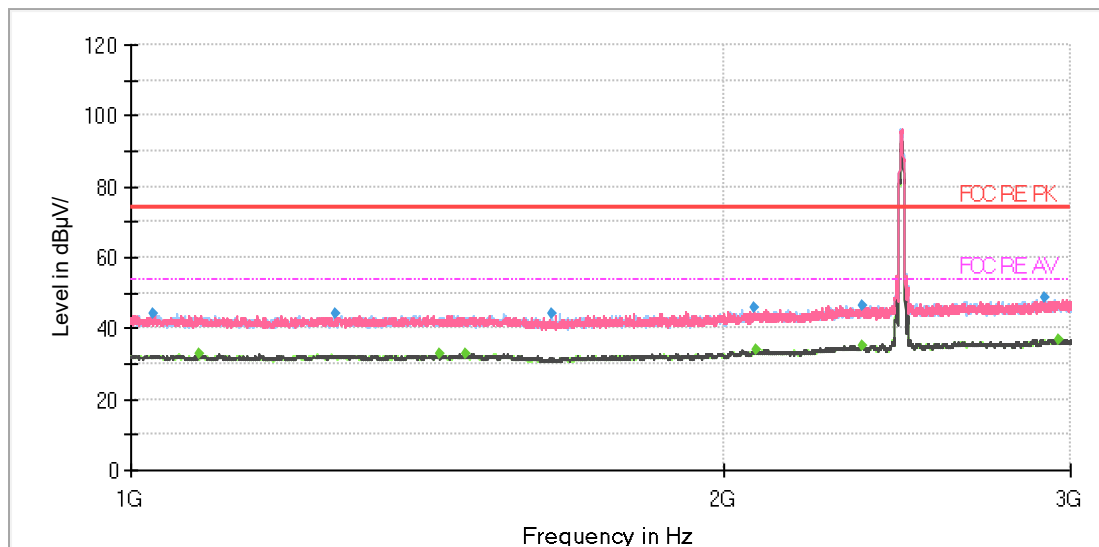
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1031.50	---	32.71	54.00	21.29	500.00	100.0	H	25.00
1108.75	44.32	---	74.00	29.68	500.00	200.0	H	39.00
1265.50	44.57	---	74.00	29.43	500.00	100.0	H	136.00
1280.50	---	32.87	54.00	21.13	500.00	200.0	V	344.00
1469.50	---	32.68	54.00	21.32	500.00	100.0	V	71.00
1470.00	44.48	---	74.00	29.52	500.00	100.0	H	170.00
2076.50	46.08	---	74.00	27.92	500.00	200.0	H	4.00
2077.00	---	34.05	54.00	19.95	500.00	100.0	V	344.00
2356.25	46.89	---	74.00	27.11	500.00	200.0	V	135.00
2379.75	---	35.24	54.00	18.76	500.00	100.0	H	25.00
2901.00	---	37.21	54.00	16.79	500.00	100.0	H	4.00
2904.50	49.34	---	74.00	24.66	500.00	100.0	V	288.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	32.72	54.00	21.28	500.00	200.0	H	333.00
3568.13	42.09	---	74.00	31.91	500.00	200.0	H	333.00
4873.13	---	35.19	54.00	18.81	500.00	200.0	H	0.00
4873.13	43.49	---	74.00	30.51	500.00	100.0	H	2.00
7310.63	49.59	---	74.00	24.41	500.00	200.0	H	0.00
7312.50	---	40.26	54.00	13.74	500.00	200.0	H	0.00
9753.75	50.79	---	74.00	23.21	500.00	100.0	V	286.00
9826.88	---	40.10	54.00	13.90	500.00	200.0	H	228.00
10983.75	53.70	---	74.00	20.30	500.00	200.0	V	208.00
11071.88	---	42.40	54.00	11.60	500.00	100.0	V	358.00
14094.38	---	44.87	54.00	9.13	500.00	200.0	V	8.00
14208.75	56.14	---	74.00	17.86	500.00	200.0	V	22.00

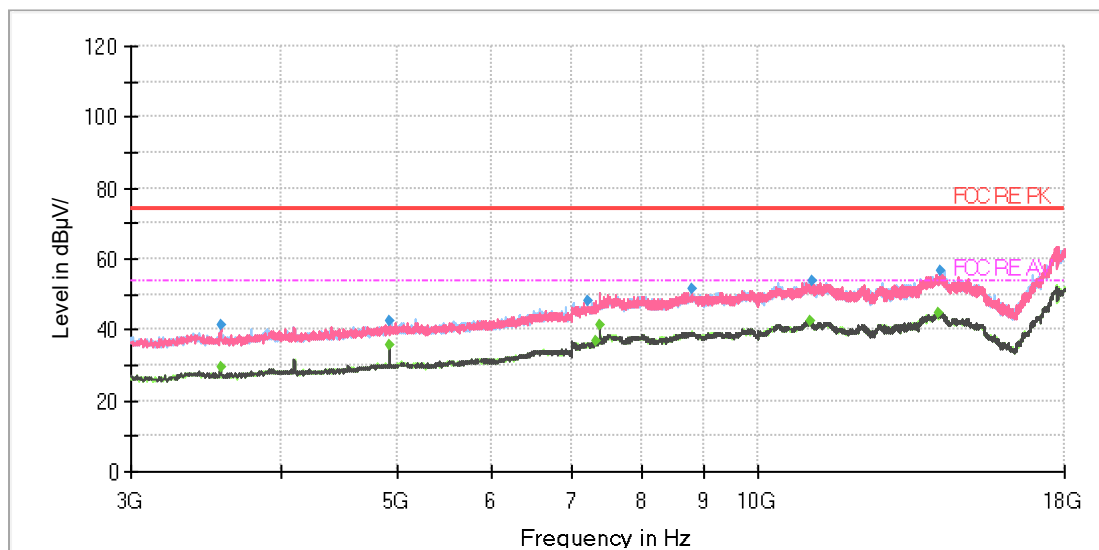
802.11b CH11



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

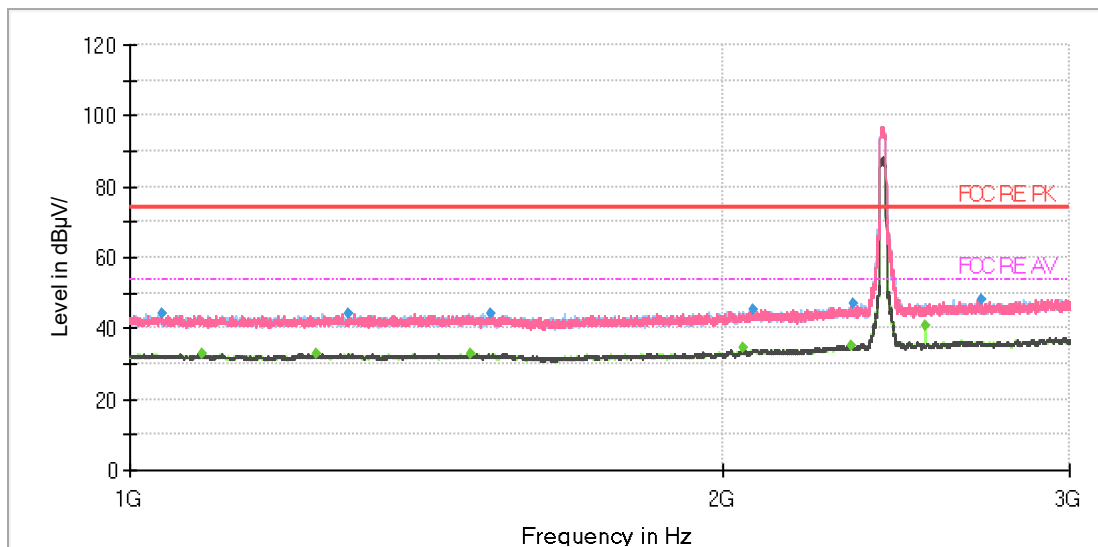
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1025.50	44.04	---	74.00	29.96	500.00	100.0	H	0.00
1083.50	---	32.75	54.00	21.25	500.00	100.0	H	4.00
1269.25	44.04	---	74.00	29.96	500.00	200.0	H	108.00
1433.50	---	32.77	54.00	21.23	500.00	100.0	H	0.00
1479.50	---	32.82	54.00	21.18	500.00	200.0	H	77.00
1636.00	44.23	---	74.00	29.77	500.00	100.0	H	0.00
2073.75	45.77	---	74.00	28.23	500.00	100.0	H	0.00
2075.25	---	33.86	54.00	20.14	500.00	200.0	H	4.00
2348.75	---	35.27	54.00	18.73	500.00	200.0	H	2.00
2353.00	46.53	---	74.00	27.47	500.00	100.0	V	21.00
2907.00	48.40	---	74.00	25.60	500.00	100.0	V	268.00
2956.50	---	37.02	54.00	16.98	500.00	100.0	V	0.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	29.70	54.00	24.30	500.00	200.0	H	339.00
3562.50	41.56	---	74.00	32.45	500.00	100.0	H	344.00
4923.75	---	35.52	54.00	18.48	500.00	100.0	V	246.00
4923.75	42.64	---	74.00	31.36	500.00	100.0	H	262.00
7198.13	48.08	---	74.00	25.92	500.00	200.0	H	99.00
7333.13	---	36.84	54.00	17.16	500.00	100.0	V	328.00
7383.75	---	41.39	54.00	12.61	500.00	100.0	H	358.00
8799.38	51.24	---	74.00	22.76	500.00	100.0	V	356.00
11032.50	---	42.63	54.00	11.37	500.00	200.0	H	292.00
11090.63	53.51	---	74.00	20.49	500.00	100.0	V	347.00
14154.38	---	44.91	54.00	9.09	500.00	100.0	H	43.00
14165.63	56.71	---	74.00	17.29	500.00	200.0	H	0.00

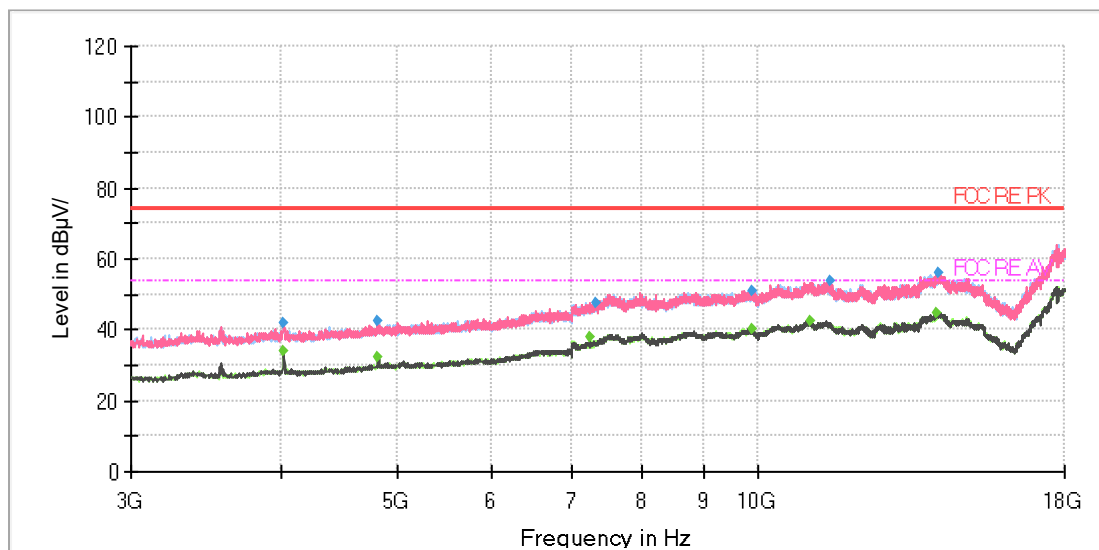
802.11g CH1



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

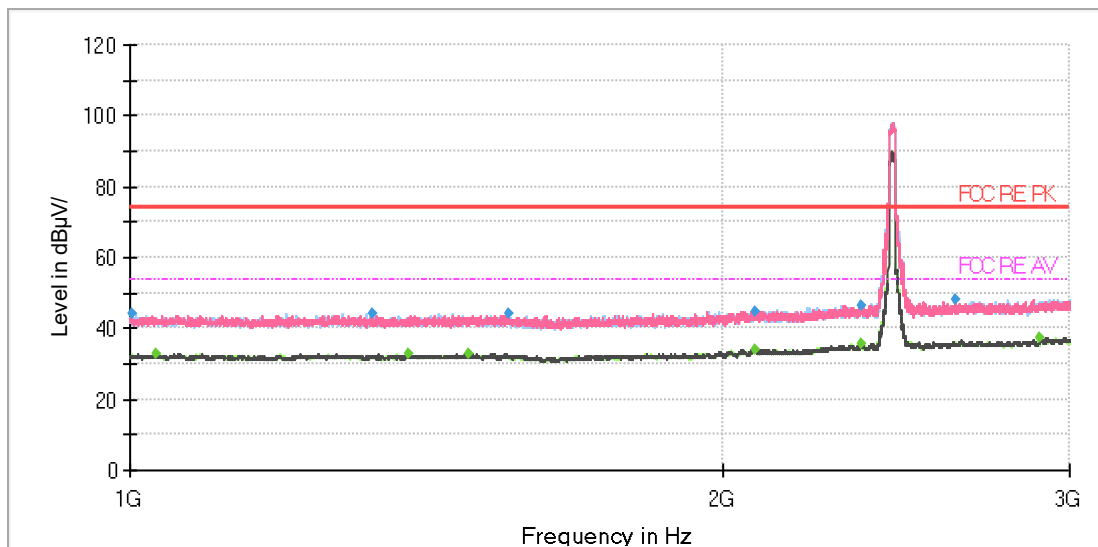
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1037.00	44.34	---	74.00	29.66	500.00	100.0	H	58.00
1089.25	---	32.95	54.00	21.05	500.00	100.0	H	0.00
1242.25	---	32.84	54.00	21.16	500.00	200.0	H	2.00
1290.00	44.17	---	74.00	29.83	500.00	100.0	V	236.00
1488.50	---	32.93	54.00	21.07	500.00	100.0	H	2.00
1525.50	44.20	---	74.00	29.80	500.00	200.0	V	356.00
2045.75	---	34.27	54.00	19.73	500.00	200.0	V	220.00
2071.75	45.03	---	74.00	28.97	500.00	100.0	V	122.00
2323.25	---	35.19	54.00	18.81	500.00	100.0	V	303.00
2329.25	46.99	---	74.00	27.01	500.00	200.0	H	73.00
2533.00	---	40.86	54.00	13.14	500.00	100.0	H	4.00
2704.25	48.37	---	74.00	25.63	500.00	100.0	H	271.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
4016.25	---	33.91	54.00	20.09	500.00	200.0	H	0.00
4021.88	42.15	---	74.00	31.85	500.00	200.0	V	22.00
4822.50	---	32.07	54.00	21.93	500.00	200.0	V	5.00
4822.50	42.40	---	74.00	31.60	500.00	200.0	H	0.00
7235.63	---	38.10	54.00	15.90	500.00	100.0	V	148.00
7333.13	47.65	---	74.00	26.35	500.00	100.0	V	122.00
9862.50	50.91	---	74.00	23.09	500.00	200.0	V	1.00
9871.88	---	40.24	54.00	13.76	500.00	200.0	V	123.00
11040.00	---	42.43	54.00	11.57	500.00	200.0	H	202.00
11467.50	53.84	---	74.00	20.16	500.00	100.0	V	357.00
14085.00	---	44.67	54.00	9.33	500.00	200.0	V	150.00
14118.75	55.93	---	74.00	18.07	500.00	100.0	H	47.00

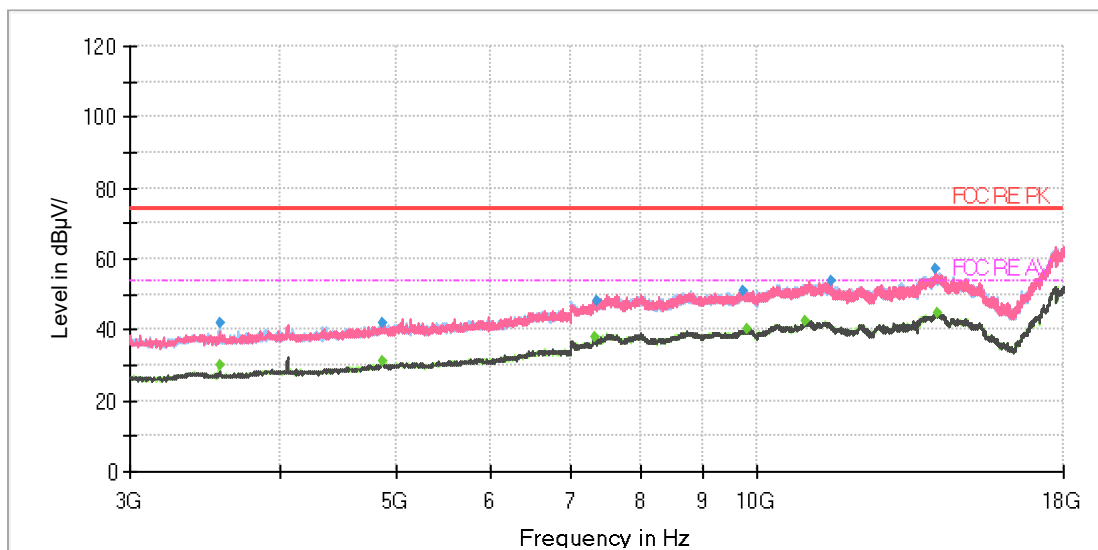
802.11g CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

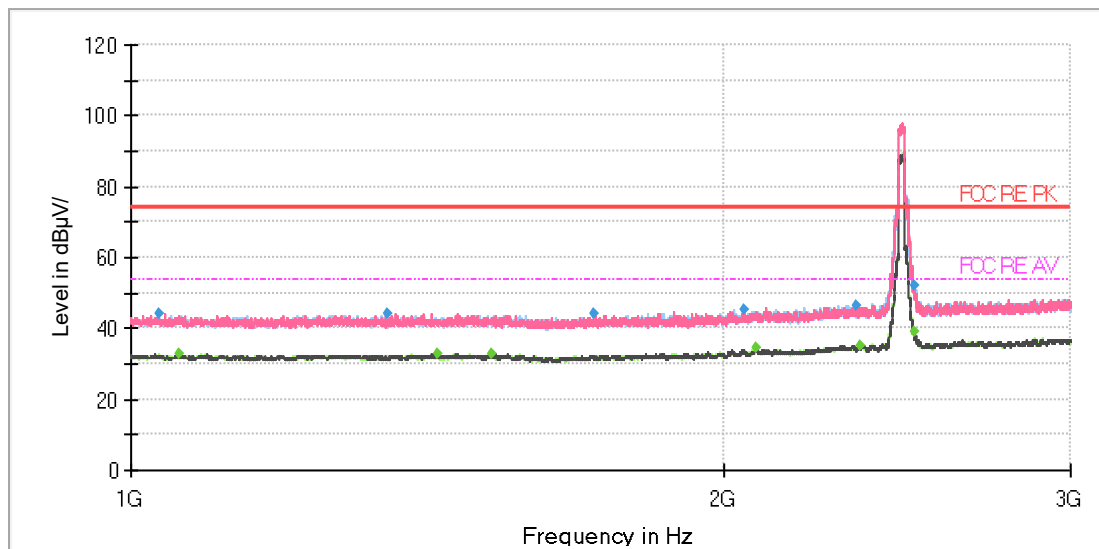
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1002.50	44.24	---	74.00	29.76	500.00	100.0	V	209.00
1031.25	---	32.76	54.00	21.24	500.00	100.0	V	0.00
1326.75	44.42	---	74.00	29.58	500.00	200.0	H	18.00
1383.25	---	32.95	54.00	21.05	500.00	100.0	V	358.00
1485.50	---	33.01	54.00	20.99	500.00	200.0	V	192.00
1555.25	44.25	---	74.00	29.75	500.00	100.0	V	288.00
2075.25	44.83	---	74.00	29.17	500.00	100.0	V	240.00
2077.25	---	34.00	54.00	20.00	500.00	100.0	V	160.00
2350.25	46.56	---	74.00	27.44	500.00	200.0	V	0.00
2352.00	---	35.39	54.00	18.61	500.00	100.0	V	319.00
2625.25	48.29	---	74.00	25.71	500.00	200.0	V	356.00
2898.25	---	37.17	54.00	16.83	500.00	100.0	V	60.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	29.95	54.00	24.05	500.00	200.0	H	345.00
3562.50	41.87	---	74.00	32.13	500.00	100.0	H	344.00
4873.13	---	31.41	54.00	22.59	500.00	100.0	H	0.00
4875.00	41.67	---	74.00	32.33	500.00	200.0	V	0.00
7310.63	---	38.03	54.00	15.97	500.00	100.0	H	0.00
7340.63	48.09	---	74.00	25.91	500.00	100.0	H	20.00
9742.50	51.01	---	74.00	22.99	500.00	200.0	V	14.00
9817.50	---	40.01	54.00	13.99	500.00	100.0	H	0.00
10966.88	---	42.67	54.00	11.33	500.00	200.0	H	69.00
11536.88	53.77	---	74.00	20.23	500.00	200.0	V	345.00
14081.25	56.93	---	74.00	17.07	500.00	100.0	V	359.00
14143.13	---	45.00	54.00	9.00	500.00	100.0	V	355.00

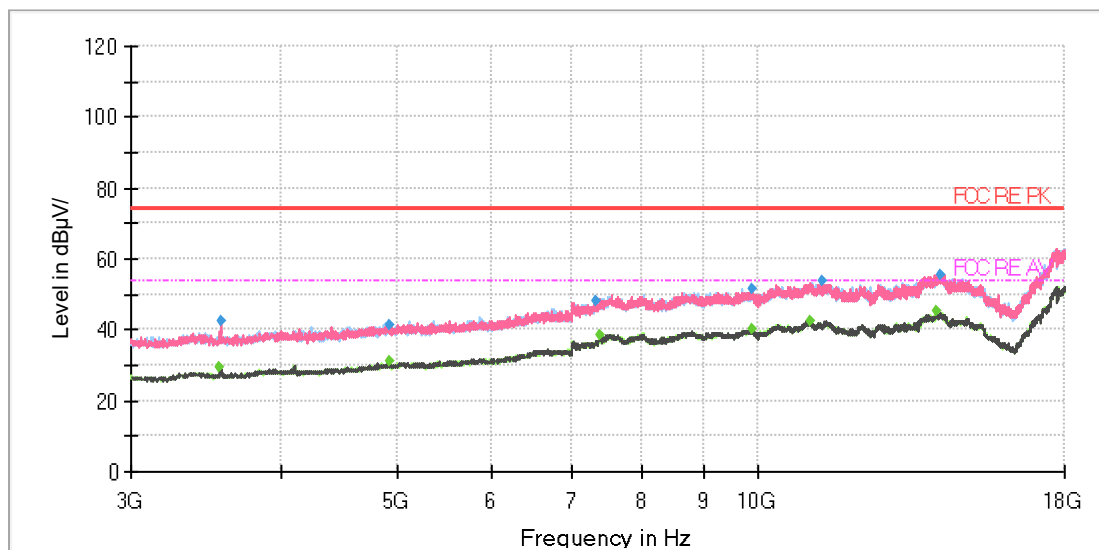
802.11g CH11



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

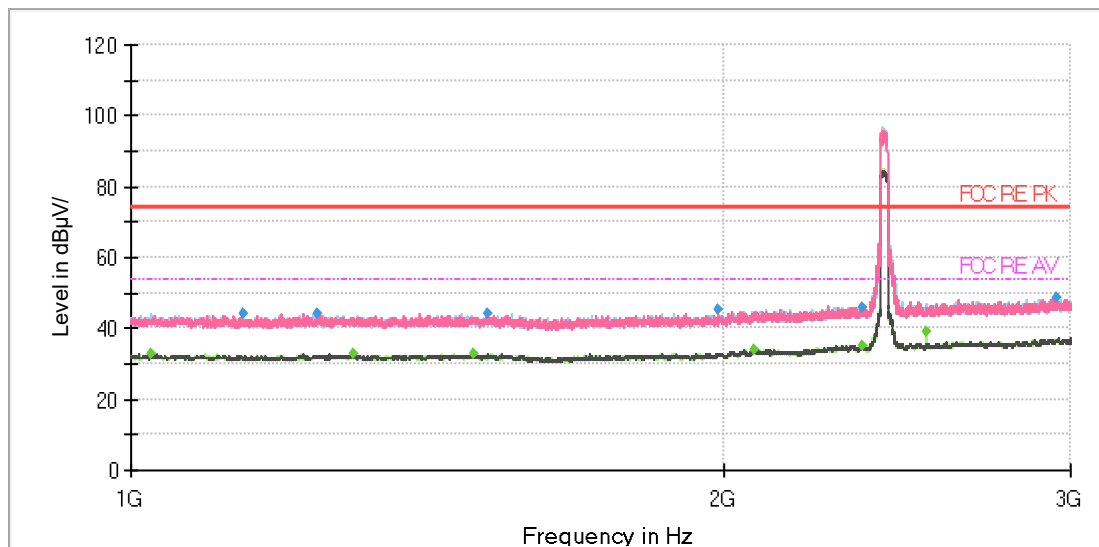
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1033.00	44.01	---	74.00	29.99	500.00	100.0	H	171.00
1058.75	---	32.87	54.00	21.13	500.00	200.0	H	26.00
1350.50	44.30	---	74.00	29.70	500.00	100.0	H	351.00
1431.25	---	32.90	54.00	21.10	500.00	200.0	H	4.00
1523.00	---	32.95	54.00	21.05	500.00	100.0	H	104.00
1718.00	44.28	---	74.00	29.72	500.00	100.0	V	187.00
2047.00	45.31	---	74.00	28.69	500.00	200.0	V	355.00
2077.50	---	34.25	54.00	19.75	500.00	200.0	H	0.00
2333.00	46.69	---	74.00	27.31	500.00	100.0	V	203.00
2347.25	---	35.03	54.00	18.97	500.00	100.0	H	120.00
2498.25	---	39.08	54.00	14.92	500.00	200.0	H	4.00
2499.25	52.34	---	74.00	21.66	500.00	100.0	H	2.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3558.75	---	29.55	54.00	24.45	500.00	200.0	H	340.00
3562.50	42.61	---	74.00	31.39	500.00	100.0	V	335.00
4921.88	41.15	---	74.00	32.85	500.00	100.0	V	310.00
4923.75	---	31.14	54.00	22.86	500.00	100.0	H	262.00
7325.63	47.95	---	74.00	26.05	500.00	100.0	H	124.00
7389.38	---	38.32	54.00	15.68	500.00	100.0	H	0.00
9862.50	51.71	---	74.00	22.29	500.00	100.0	H	0.00
9875.63	---	40.06	54.00	13.94	500.00	100.0	H	0.00
11040.00	---	42.46	54.00	11.54	500.00	200.0	V	138.00
11321.25	53.53	---	74.00	20.47	500.00	200.0	H	210.00
14088.75	---	45.40	54.00	8.60	500.00	200.0	V	0.00
14176.88	55.69	---	74.00	18.31	500.00	200.0	V	138.00

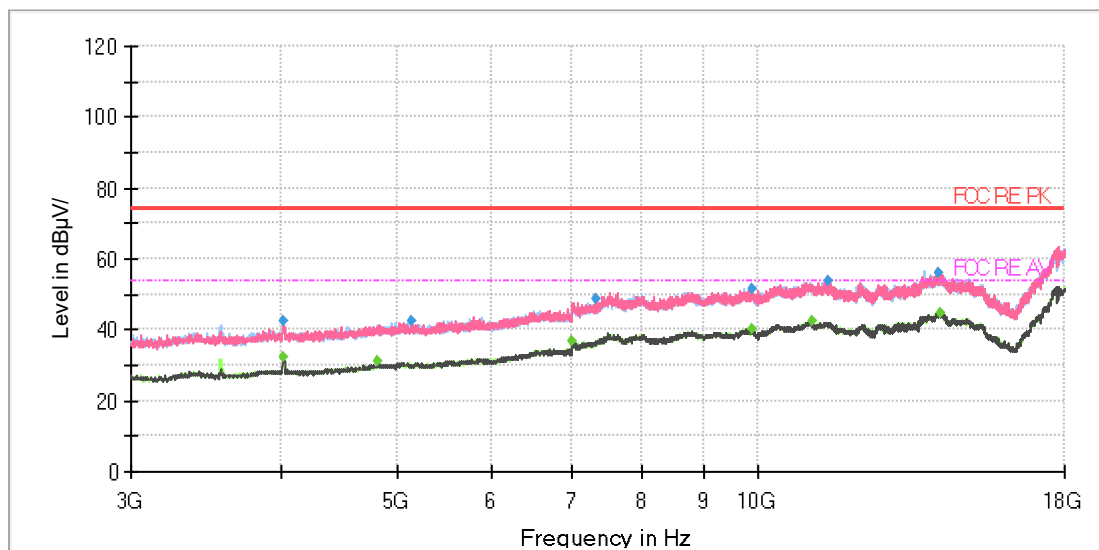
802.11ax HE20 CH 1



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

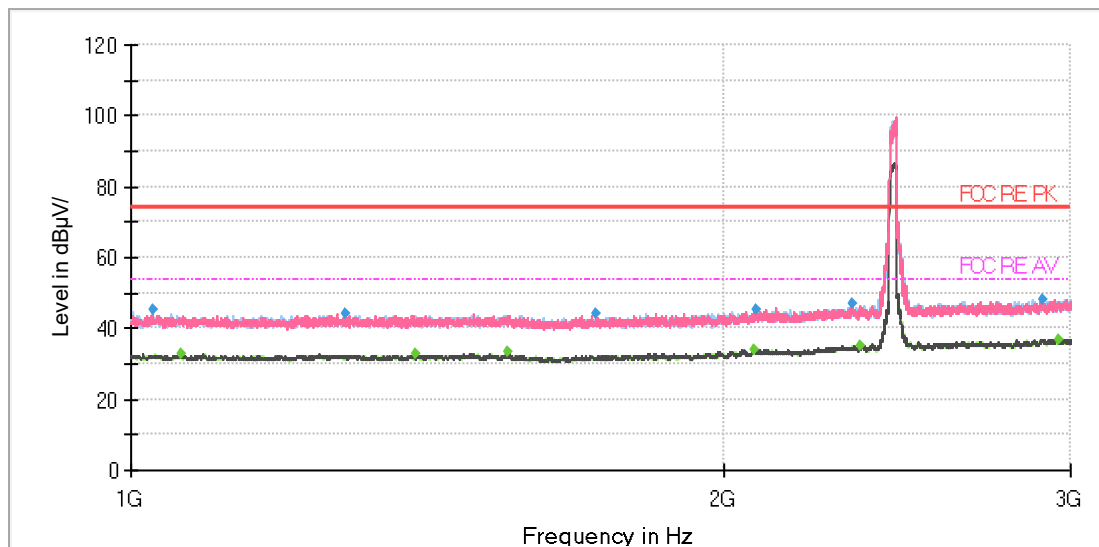
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1024.75	---	32.74	54.00	21.26	500.00	100.0	V	244.00
1140.00	44.07	---	74.00	29.93	500.00	200.0	H	107.00
1244.75	44.41	---	74.00	29.59	500.00	100.0	V	359.00
1296.00	---	32.79	54.00	21.21	500.00	100.0	V	276.00
1494.00	---	32.83	54.00	21.17	500.00	200.0	H	2.00
1517.25	44.16	---	74.00	29.84	500.00	200.0	V	229.00
1988.25	45.03	---	74.00	28.97	500.00	100.0	V	348.00
2070.00	---	34.10	54.00	19.90	500.00	100.0	H	58.00
2353.50	46.11	---	74.00	27.89	500.00	100.0	V	0.00
2353.50	---	35.26	54.00	18.74	500.00	200.0	V	0.00
2533.75	---	38.87	54.00	15.13	500.00	200.0	H	173.00
2950.50	48.70	---	74.00	25.30	500.00	100.0	H	0.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
4012.50	---	32.32	54.00	21.68	500.00	200.0	V	24.00
4014.38	42.45	---	74.00	31.55	500.00	200.0	V	24.00
4818.75	---	30.93	54.00	23.07	500.00	200.0	V	3.00
5148.75	42.34	---	74.00	31.66	500.00	100.0	V	254.00
7003.13	---	36.76	54.00	17.24	500.00	200.0	V	75.00
7323.75	48.41	---	74.00	25.59	500.00	100.0	V	279.00
9883.13	51.56	---	74.00	22.44	500.00	100.0	V	0.00
9898.13	---	40.30	54.00	13.70	500.00	200.0	H	338.00
11071.88	---	42.46	54.00	11.54	500.00	200.0	V	24.00
11431.88	53.92	---	74.00	20.08	500.00	200.0	V	3.00
14116.88	56.12	---	74.00	17.88	500.00	200.0	V	0.00
14167.50	---	44.89	54.00	9.11	500.00	200.0	V	237.00

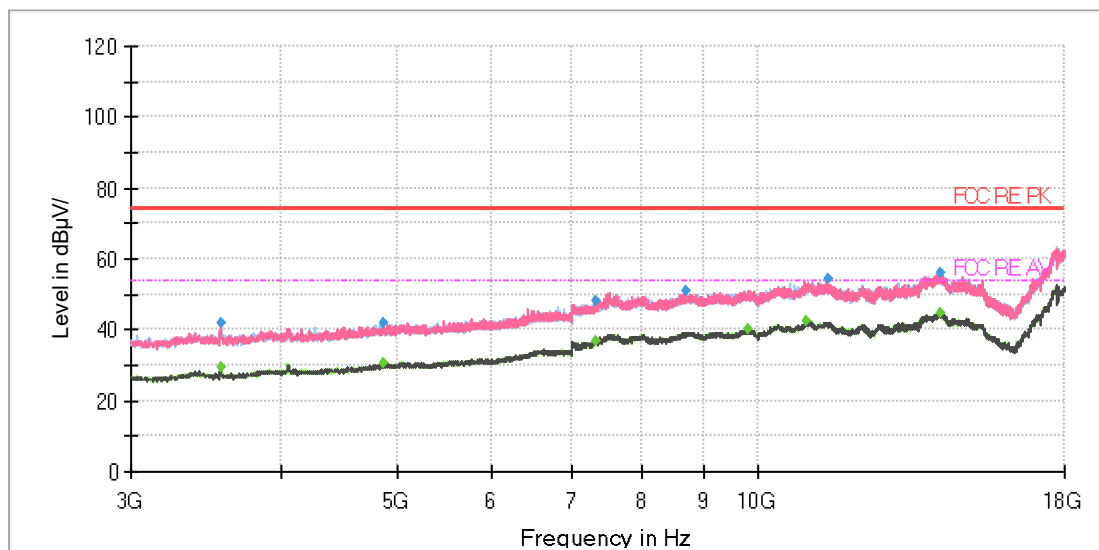
802.11ax HE20 CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

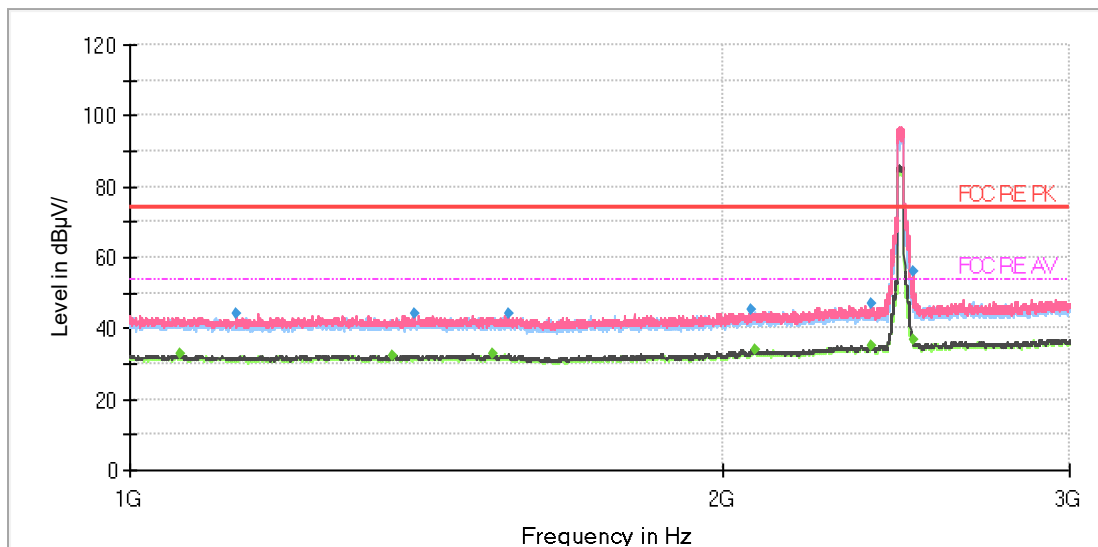
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1025.00	45.03	---	74.00	28.97	500.00	100.0	V	285.00
1060.50	---	32.77	54.00	21.23	500.00	200.0	H	254.00
1286.00	44.16	---	74.00	29.84	500.00	100.0	V	237.00
1394.25	---	32.84	54.00	21.16	500.00	200.0	V	254.00
1551.50	---	33.22	54.00	20.78	500.00	200.0	V	351.00
1721.00	43.98	---	74.00	30.02	500.00	100.0	V	0.00
2071.00	---	34.05	54.00	19.95	500.00	100.0	H	204.00
2076.50	45.36	---	74.00	28.64	500.00	100.0	H	84.00
2325.00	46.71	---	74.00	27.29	500.00	200.0	V	121.00
2347.25	---	35.11	54.00	18.89	500.00	200.0	H	84.00
2901.00	48.28	---	74.00	25.72	500.00	100.0	H	1.00
2957.00	---	37.06	54.00	16.94	500.00	100.0	V	358.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	29.71	54.00	24.29	500.00	100.0	V	334.00
3564.38	41.69	---	74.00	32.31	500.00	100.0	V	334.00
4875.00	41.89	---	74.00	32.11	500.00	100.0	V	334.00
4878.75	---	30.62	54.00	23.38	500.00	100.0	V	334.00
7310.63	---	36.83	54.00	17.17	500.00	100.0	V	95.00
7310.63	48.31	---	74.00	25.69	500.00	100.0	V	95.00
8688.75	51.06	---	74.00	22.94	500.00	100.0	V	350.00
9810.00	---	40.34	54.00	13.66	500.00	100.0	H	0.00
10976.25	---	42.37	54.00	11.63	500.00	200.0	V	3.00
11424.38	54.10	---	74.00	19.90	500.00	200.0	H	208.00
14165.63	---	44.90	54.00	9.10	500.00	200.0	H	0.00
14186.25	55.92	---	74.00	18.08	500.00	100.0	V	1.00

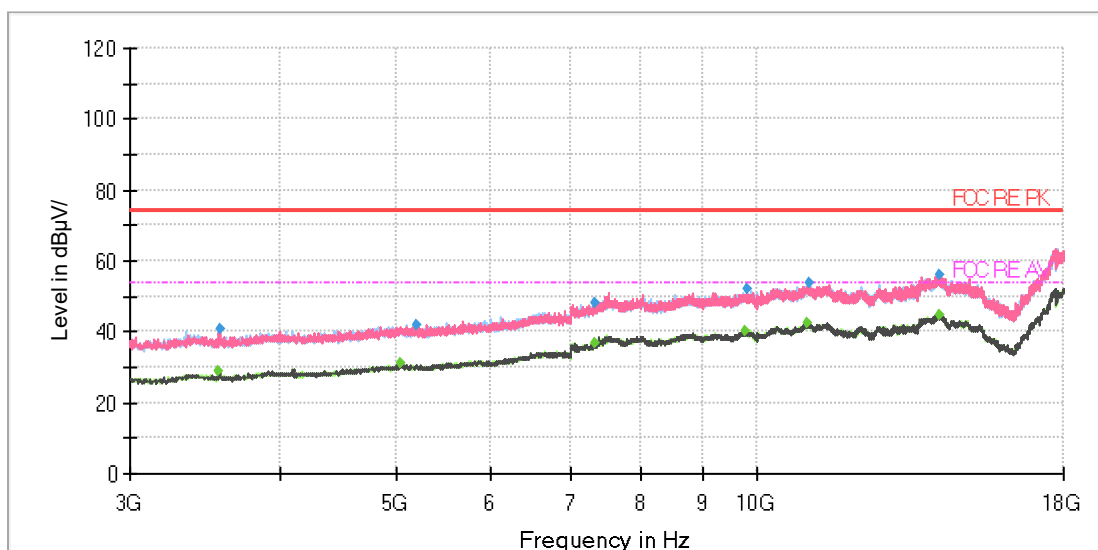
802.11ax HE20 CH11



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

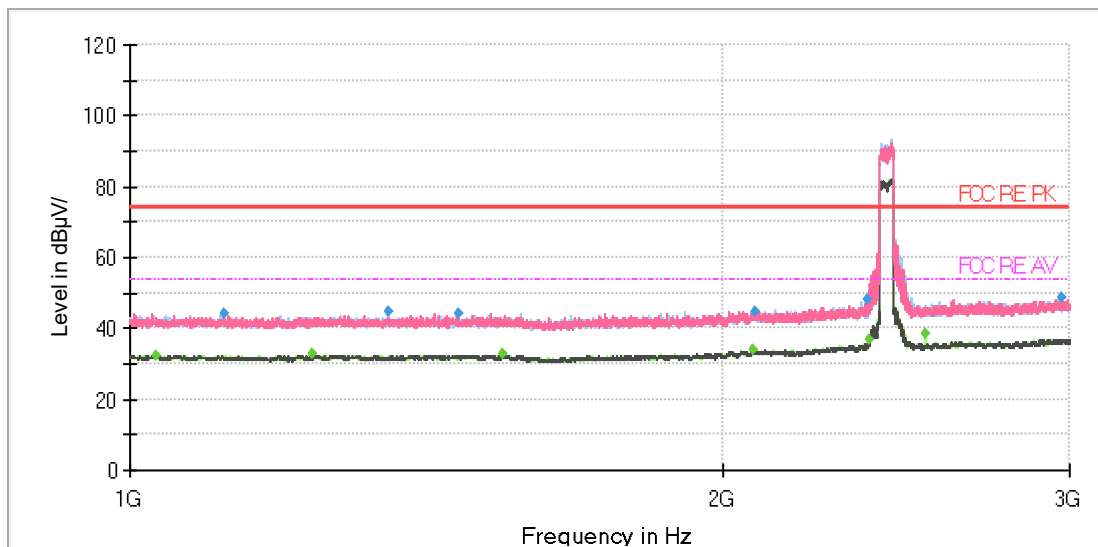
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1059.75	---	32.56	54.00	21.44	500.00	100.0	V	299.00
1132.00	44.40	---	74.00	29.60	500.00	100.0	V	350.00
1358.75	---	32.49	54.00	21.51	500.00	200.0	V	330.00
1394.00	44.20	---	74.00	29.80	500.00	100.0	V	172.00
1529.50	---	32.82	54.00	21.18	500.00	200.0	V	355.00
1555.25	43.90	---	74.00	30.10	500.00	100.0	H	338.00
2065.75	45.31	---	74.00	28.69	500.00	100.0	H	320.00
2078.50	---	34.06	54.00	19.94	500.00	200.0	V	359.00
2376.50	46.77	---	74.00	27.23	500.00	200.0	V	266.00
2381.50	---	35.21	54.00	18.79	500.00	100.0	V	282.00
2499.75	---	37.04	54.00	16.96	500.00	100.0	V	36.00
2499.75	55.97	---	74.00	18.03	500.00	200.0	V	36.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3558.75	---	28.85	54.00	25.15	500.00	200.0	H	334.00
3562.50	40.83	---	74.00	33.17	500.00	200.0	H	334.00
5038.13	---	30.95	54.00	23.05	500.00	100.0	H	264.00
5197.50	41.93	---	74.00	32.07	500.00	100.0	V	220.00
7321.88	48.32	---	74.00	25.68	500.00	100.0	V	274.00
7321.88	---	36.85	54.00	17.16	500.00	200.0	H	284.00
9768.75	---	40.07	54.00	13.93	500.00	200.0	H	0.00
9821.25	51.84	---	74.00	22.16	500.00	200.0	H	357.00
11006.25	---	42.36	54.00	11.64	500.00	200.0	H	357.00
11025.00	53.65	---	74.00	20.35	500.00	100.0	V	328.00
14156.25	56.04	---	74.00	17.96	500.00	200.0	V	0.00
14160.00	---	44.68	54.00	9.32	500.00	200.0	V	0.00

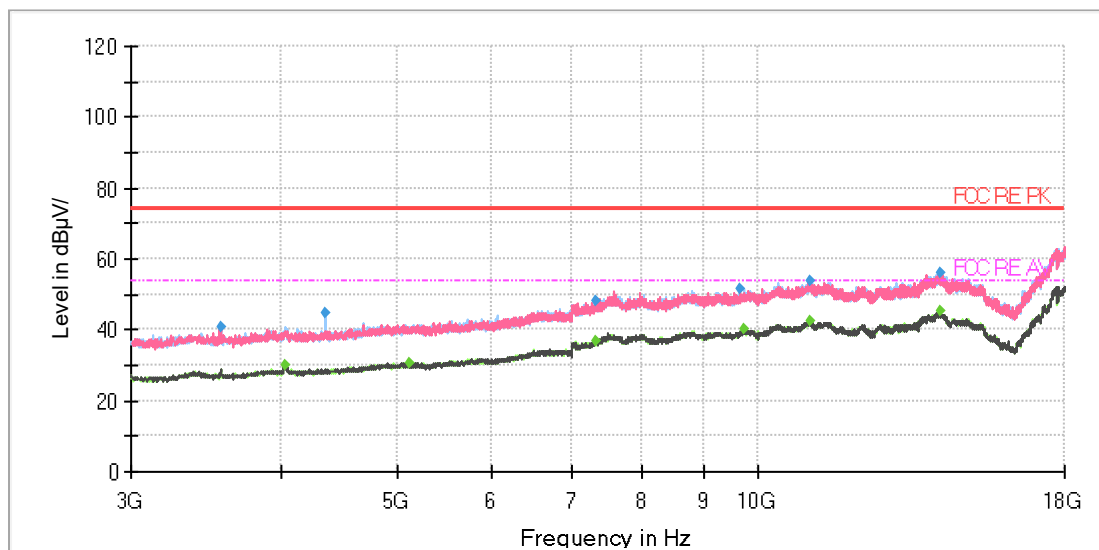
802.11ax HE40 CH3



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

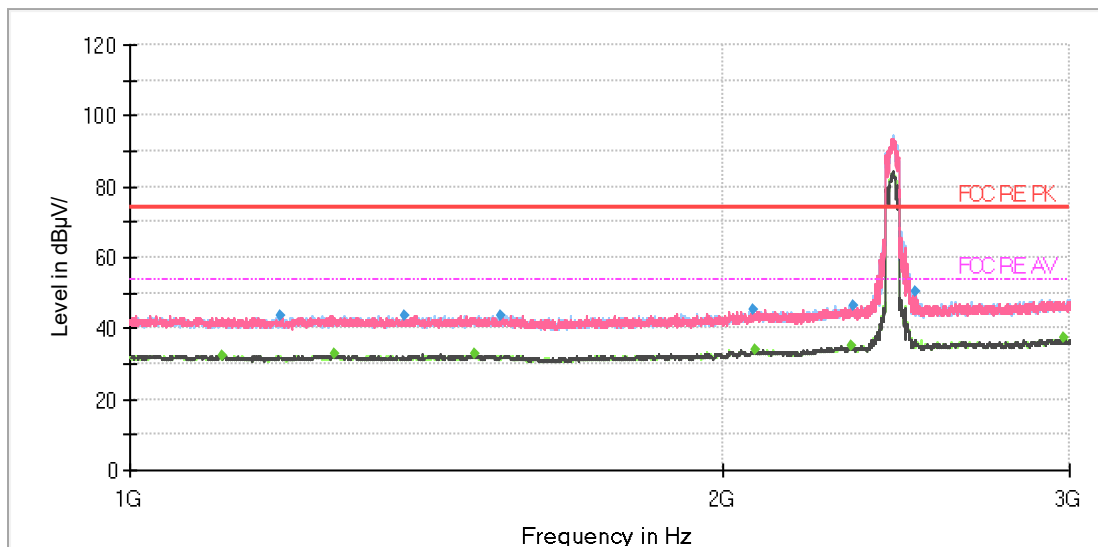
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1031.50	---	32.53	54.00	21.47	500.00	100.0	H	75.00
1116.50	44.30	---	74.00	29.70	500.00	100.0	H	291.00
1238.00	---	32.56	54.00	21.44	500.00	200.0	V	358.00
1354.00	44.68	---	74.00	29.32	500.00	100.0	H	26.00
1468.50	44.18	---	74.00	29.82	500.00	100.0	V	306.00
1546.75	---	32.62	54.00	21.38	500.00	200.0	H	291.00
2074.00	---	33.80	54.00	20.20	500.00	200.0	H	57.00
2075.00	44.93	---	74.00	29.07	500.00	100.0	V	274.00
2368.25	48.32	---	74.00	25.68	500.00	100.0	V	0.00
2371.50	---	36.93	54.00	17.07	500.00	200.0	V	9.00
2533.25	---	38.62	54.00	15.38	500.00	100.0	H	173.00
2969.00	48.61	---	74.00	25.39	500.00	100.0	V	190.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	40.76	---	74.00	33.24	500.00	200.0	V	345.00
4036.88	---	30.15	54.00	23.85	500.00	200.0	V	0.00
4353.75	44.62	---	74.00	29.38	500.00	200.0	H	323.00
5118.75	---	30.75	54.00	23.25	500.00	100.0	H	293.00
7327.50	---	36.95	54.00	17.05	500.00	200.0	H	0.00
7327.50	47.92	---	74.00	26.08	500.00	100.0	V	316.00
9665.63	51.67	---	74.00	22.33	500.00	100.0	V	262.00
9740.63	---	40.00	54.00	14.00	500.00	100.0	V	358.00
11025.00	---	42.28	54.00	11.72	500.00	200.0	V	49.00
11045.63	53.53	---	74.00	20.47	500.00	200.0	V	3.00
14167.50	---	45.31	54.00	8.69	500.00	200.0	H	0.00
14197.50	56.07	---	74.00	17.93	500.00	200.0	H	0.00

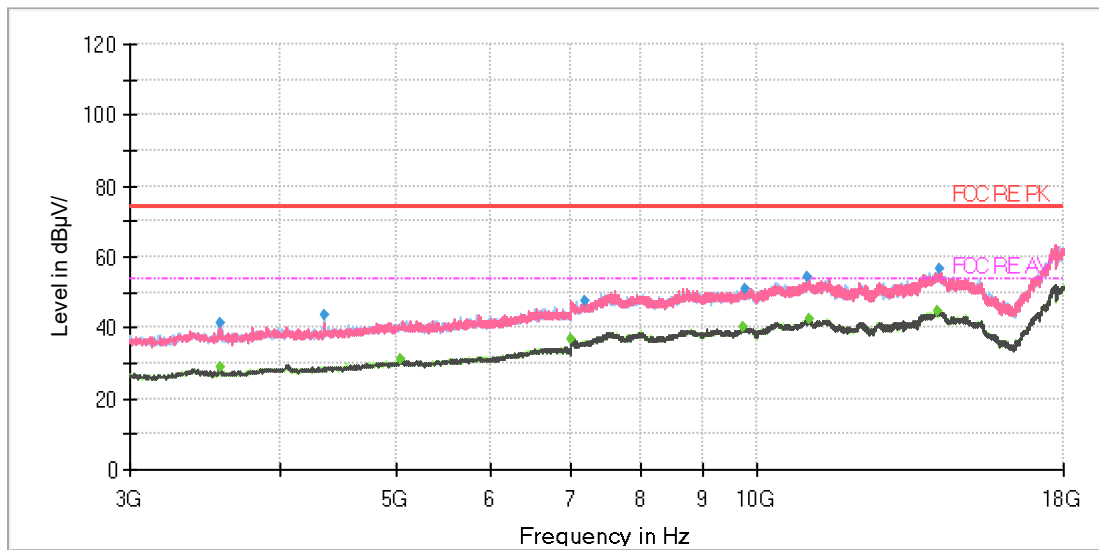
802.11ax HE40 CH6



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

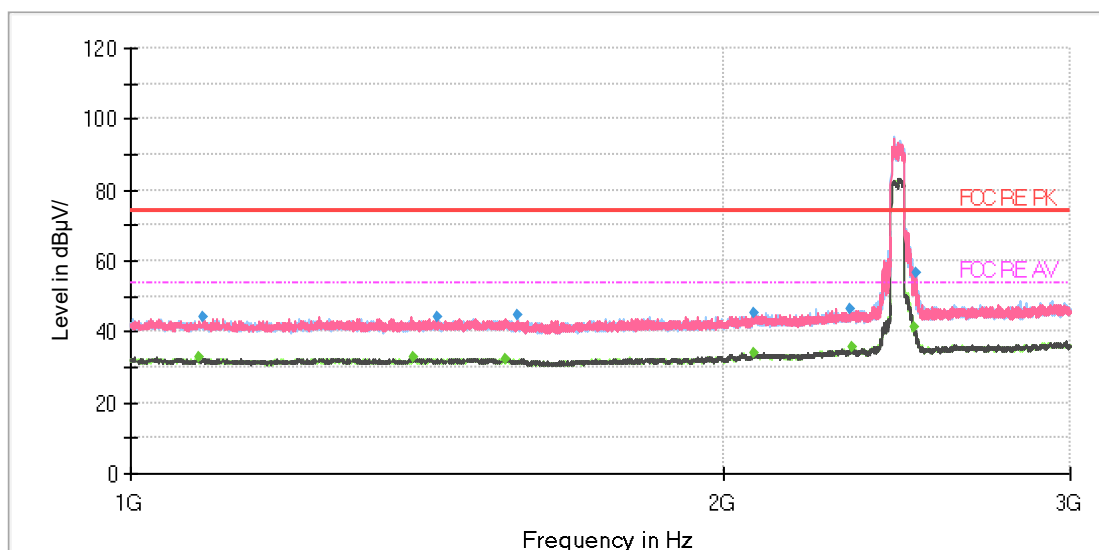
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1114.75	---	32.52	54.00	21.48	500.00	200.0	V	357.00
1191.00	43.83	---	74.00	30.17	500.00	100.0	H	58.00
1270.00	---	32.78	54.00	21.22	500.00	200.0	H	93.00
1379.25	43.85	---	74.00	30.15	500.00	100.0	V	357.00
1495.50	---	32.64	54.00	21.36	500.00	100.0	V	105.00
1541.50	43.70	---	74.00	30.30	500.00	100.0	H	270.00
2072.25	45.11	---	74.00	28.89	500.00	100.0	H	124.00
2075.75	---	33.88	54.00	20.12	500.00	200.0	V	347.00
2322.75	---	34.82	54.00	19.18	500.00	200.0	H	206.00
2329.25	46.48	---	74.00	27.52	500.00	100.0	V	139.00
2506.50	50.13	---	74.00	23.87	500.00	100.0	H	0.00
2979.50	---	37.32	54.00	16.69	500.00	200.0	H	108.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	41.39	---	74.00	32.61	500.00	100.0	H	344.00
3566.25	---	29.05	54.00	24.95	500.00	100.0	V	350.00
4355.63	43.46	---	74.00	30.54	500.00	200.0	H	333.00
5041.88	---	30.94	54.00	23.06	500.00	200.0	H	175.00
7001.25	---	36.91	54.00	17.09	500.00	200.0	V	9.00
7192.50	47.72	---	74.00	26.28	500.00	100.0	H	6.00
9748.13	---	40.14	54.00	13.86	500.00	100.0	V	231.00
9759.38	51.06	---	74.00	22.94	500.00	200.0	H	349.00
10998.75	54.49	---	74.00	19.51	500.00	100.0	H	0.00
11040.00	---	42.46	54.00	11.54	500.00	100.0	H	118.00
14139.38	---	44.68	54.00	9.32	500.00	100.0	V	286.00
14180.63	56.43	---	74.00	17.57	500.00	100.0	H	226.00

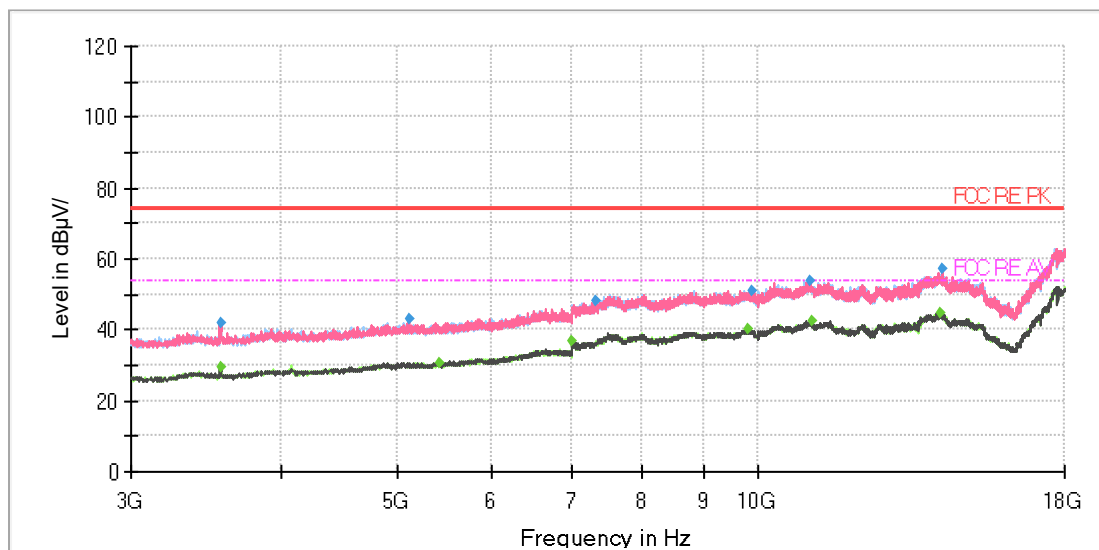
802.11ax HE40 CH9



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1083.00	---	32.93	54.00	21.07	500.00	100.0	H	33.00
1087.25	43.88	---	74.00	30.12	500.00	200.0	V	130.00
1392.25	---	32.64	54.00	21.36	500.00	200.0	H	33.00
1432.00	44.42	---	74.00	29.58	500.00	100.0	V	313.00
1551.25	---	32.54	54.00	21.46	500.00	100.0	H	160.00
1573.25	44.74	---	74.00	29.26	500.00	100.0	H	3.00
2071.25	---	34.03	54.00	19.97	500.00	200.0	H	6.00
2072.50	45.41	---	74.00	28.59	500.00	100.0	H	0.00
2316.75	46.30	---	74.00	27.70	500.00	200.0	H	20.00
2323.75	---	35.57	54.00	18.43	500.00	100.0	V	264.00
2498.50	---	41.22	54.00	12.78	500.00	200.0	H	20.00
2502.00	56.68	---	74.00	17.32	500.00	100.0	V	0.00



Radiates Emission from 3GHz to 18GHz

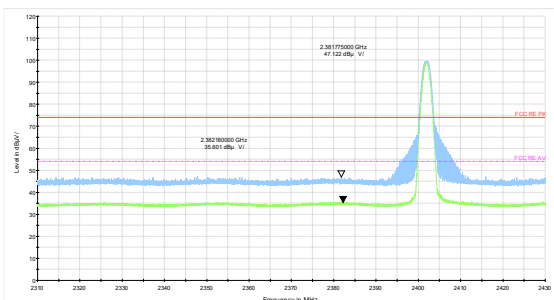
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	29.20	54.00	24.80	500.00	200.0	H	336.00
3566.25	41.64	---	74.00	32.36	500.00	100.0	V	336.00
5111.25	42.80	---	74.00	31.20	500.00	100.0	V	260.00
5431.88	---	30.78	54.00	23.22	500.00	200.0	H	0.00
7003.13	---	36.84	54.00	17.16	500.00	200.0	H	0.00
7325.63	48.01	---	74.00	25.99	500.00	100.0	V	351.00
9808.13	---	40.28	54.00	13.72	500.00	100.0	H	50.00
9894.38	50.97	---	74.00	23.03	500.00	100.0	H	3.00
11045.63	53.83	---	74.00	20.17	500.00	200.0	V	102.00
11070.00	---	42.38	54.00	11.62	500.00	200.0	H	0.00
14169.38	---	44.87	54.00	9.13	500.00	100.0	H	50.00
14231.25	57.00	---	74.00	17.00	500.00	100.0	V	287.00

1.2. Bluetooth LE

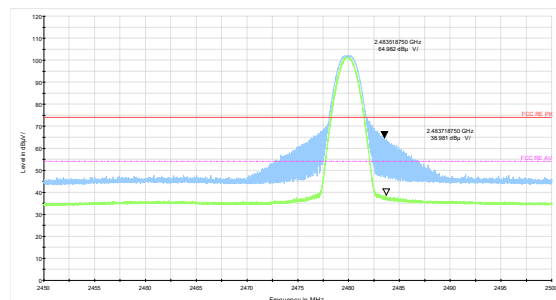
The following graphs display the maximum values of horizontal and vertical by software.
Blue trace uses the peak detection, Green trace uses the average detection.

A symbol ($\text{dB}\mu\text{V}/\text{m}$) in the test plot below means (dB $\mu\text{V}/\text{m}$)

After the pretest, Bluetooth LE (1M) was selected as the worst Mode for Bluetooth LE.



Bluetooth LE (1M) Channel 0 Peak+ Average



Bluetooth LE (1M) Channel 39 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 30MHz to 1GHz and 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. **A symbol ($\text{dB}\mu\text{V/}$) in the test plot below means ($\text{dB}\mu\text{V/m}$)**
4. **The following graphs display the maximum values of coaxial and coplanar for 9k-30MHz; horizontal and vertical for above 30MHz by software.**
5. **For below 1GHz**

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

For above 1GHz

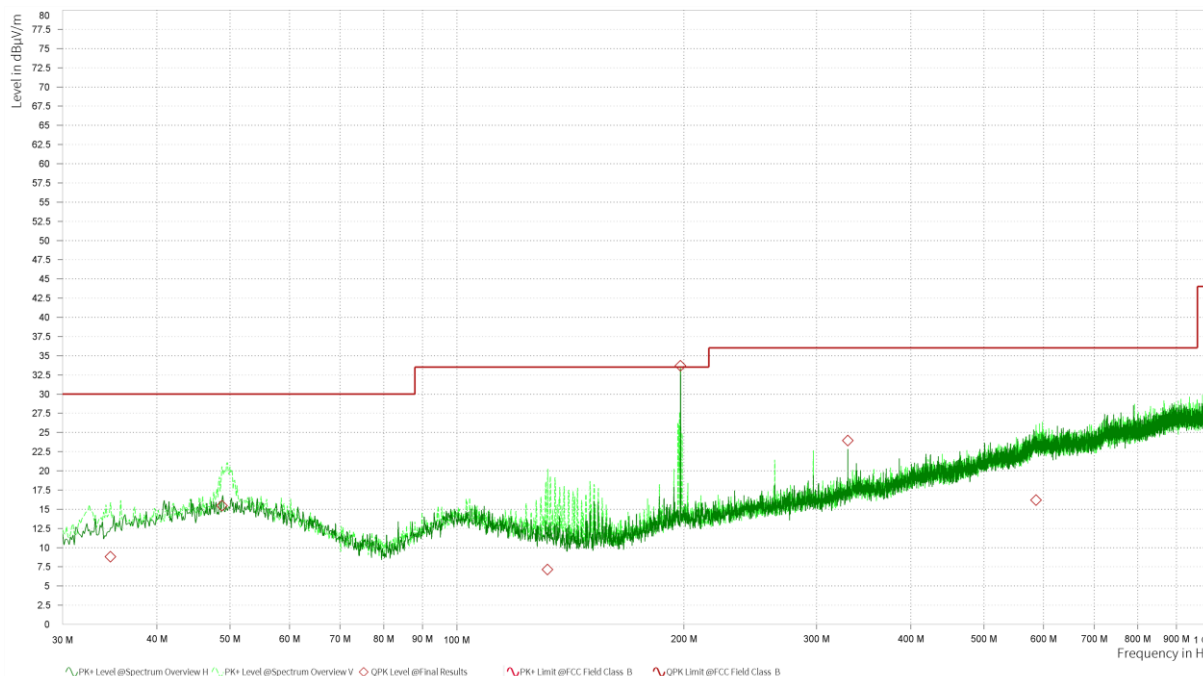
 PK Level @Spectrum Overview H
  PK Level @Spectrum Overview V
  PK Level @Final Results
  PK Limit

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

Continuous TX mode:

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels. The test data of the worst-case condition (**Bluetooth LE-Channel 39**) was recorded in this report.

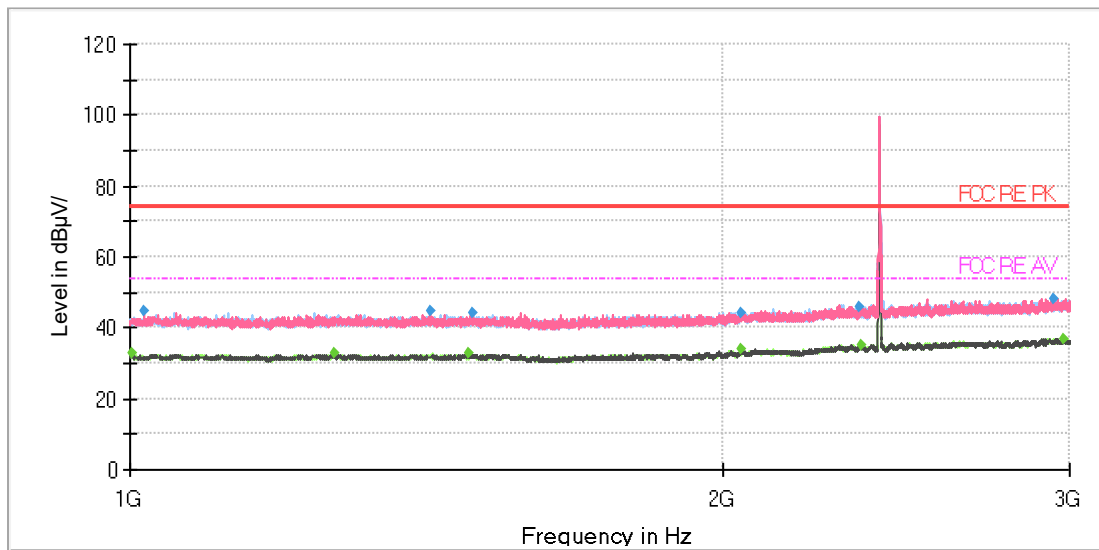
Spectrum Overview H/V



Radiates Emission from 30MHz to 1GHz

Frequency [MHz]	QPK Level [dBμV/m]	QPK Limit [dBμV/m]	QPK Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]	Meas. BW [kHz]	Meas. Time [s]
34.704	8.79	30.00	21.21	-10.81	V	22.8	1.02	120.000	1.000
48.829	15.44	30.00	14.56	-8.10	V	28.3	1.07	120.000	1.000
131.886	7.13	33.50	26.37	-12.66	V	101.9	1.00	120.000	1.000
197.983	31.68	33.50	1.82	-9.91	V	303.7	1.00	120.000	1.000
330.009	23.91	36.00	12.09	-6.41	H	84.5	2.25	120.000	1.000
586.327	16.17	36.00	19.83	-1.25	V	53.7	2.01	120.000	1.000

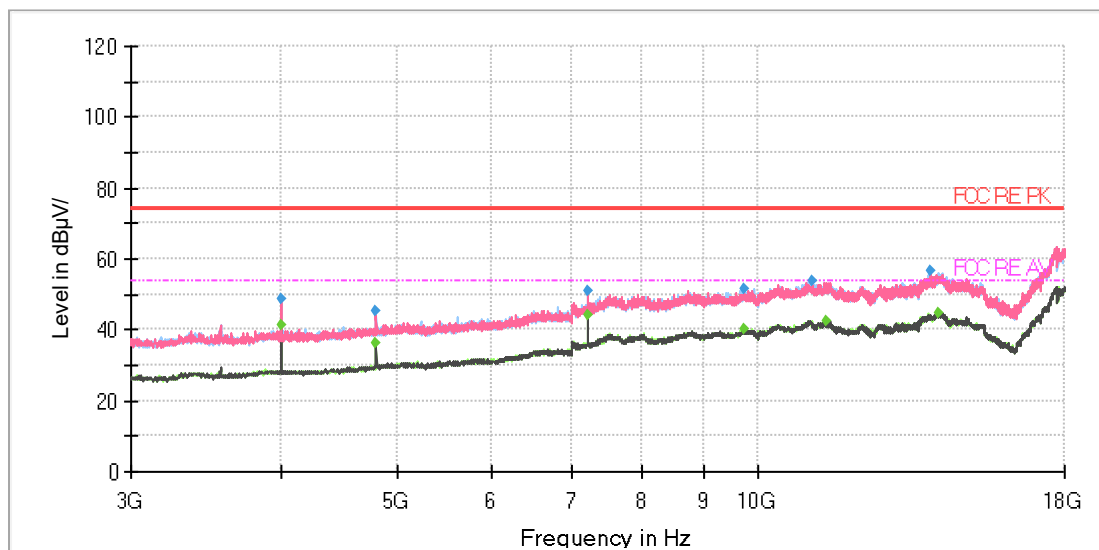
Bluetooth LE-Channel 0



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

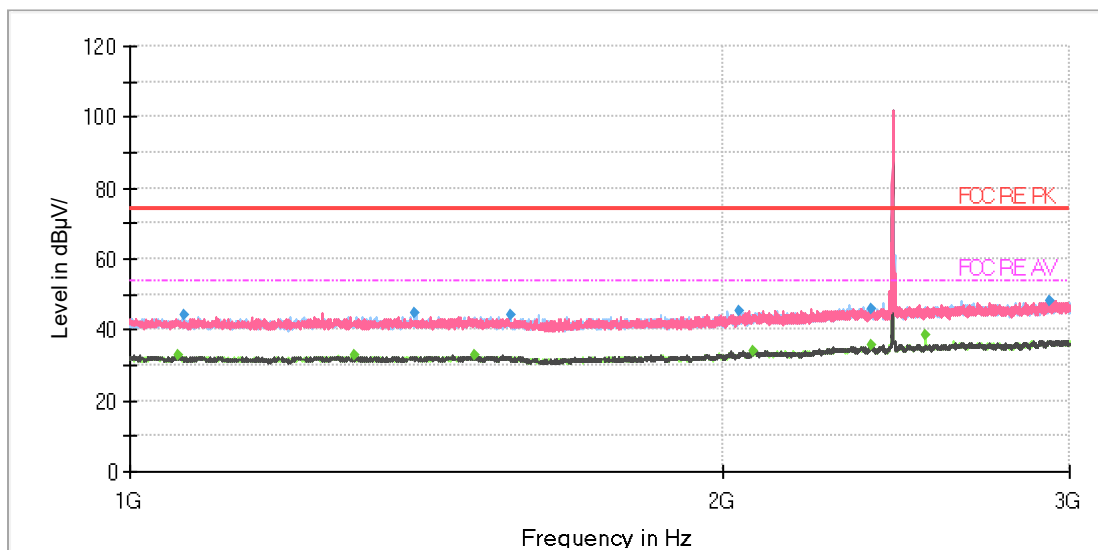
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1002.75	---	32.56	54.00	21.44	500.00	100.0	H	0.00
1016.25	44.56	---	74.00	29.44	500.00	100.0	V	220.00
1269.50	---	32.61	54.00	21.39	500.00	100.0	H	7.00
1419.50	44.56	---	74.00	29.44	500.00	100.0	V	189.00
1485.25	---	32.66	54.00	21.34	500.00	100.0	H	204.00
1494.25	44.35	---	74.00	29.65	500.00	100.0	H	186.00
2043.00	44.42	---	74.00	29.58	500.00	100.0	V	220.00
2044.00	---	33.73	54.00	20.27	500.00	100.0	H	3.00
2347.25	45.95	---	74.00	28.05	500.00	100.0	V	318.00
2349.75	---	35.15	54.00	18.85	500.00	100.0	V	302.00
2946.75	48.36	---	74.00	25.64	500.00	100.0	H	1.00
2978.00	---	37.07	54.00	16.93	500.00	100.0	V	285.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
4001.25	48.91	---	74.00	25.09	500.00	200.0	V	26.00
4003.13	---	41.22	54.00	12.78	500.00	200.0	V	26.00
4803.75	---	36.21	54.00	17.79	500.00	100.0	V	0.00
4803.75	45.12	---	74.00	28.88	500.00	100.0	H	3.00
7205.63	---	44.01	54.00	9.99	500.00	200.0	H	41.00
7205.63	50.77	---	74.00	23.23	500.00	100.0	V	41.00
9742.50	51.68	---	74.00	22.32	500.00	200.0	H	230.00
9748.13	---	40.36	54.00	13.64	500.00	200.0	V	184.00
11073.75	53.50	---	74.00	20.50	500.00	100.0	H	154.00
11371.88	---	42.62	54.00	11.38	500.00	200.0	V	130.00
13935.00	56.33	---	74.00	17.67	500.00	200.0	V	0.00
14135.63	---	44.73	54.00	9.27	500.00	200.0	V	0.00

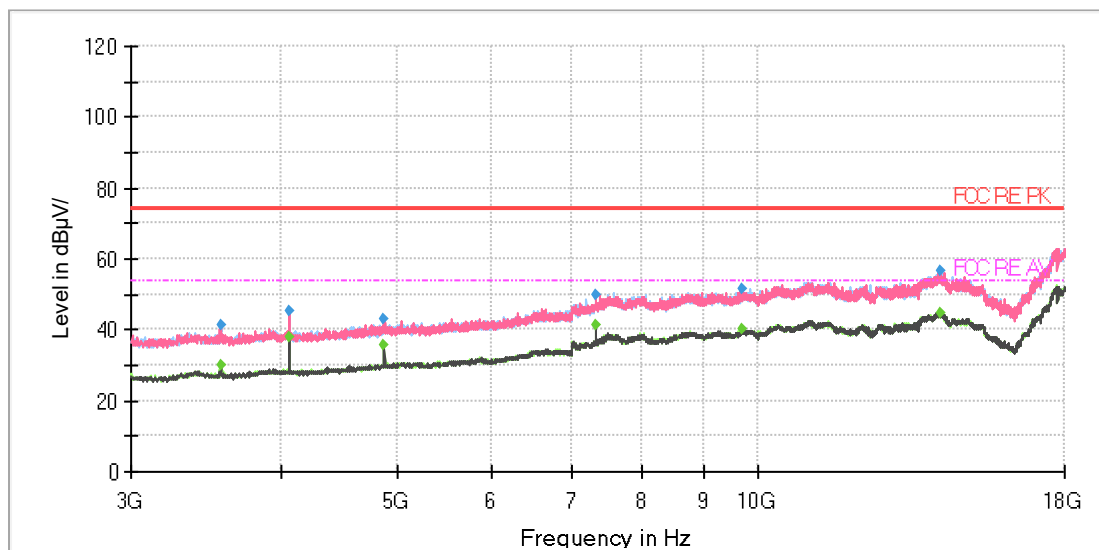
Bluetooth LE-Channel 19



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

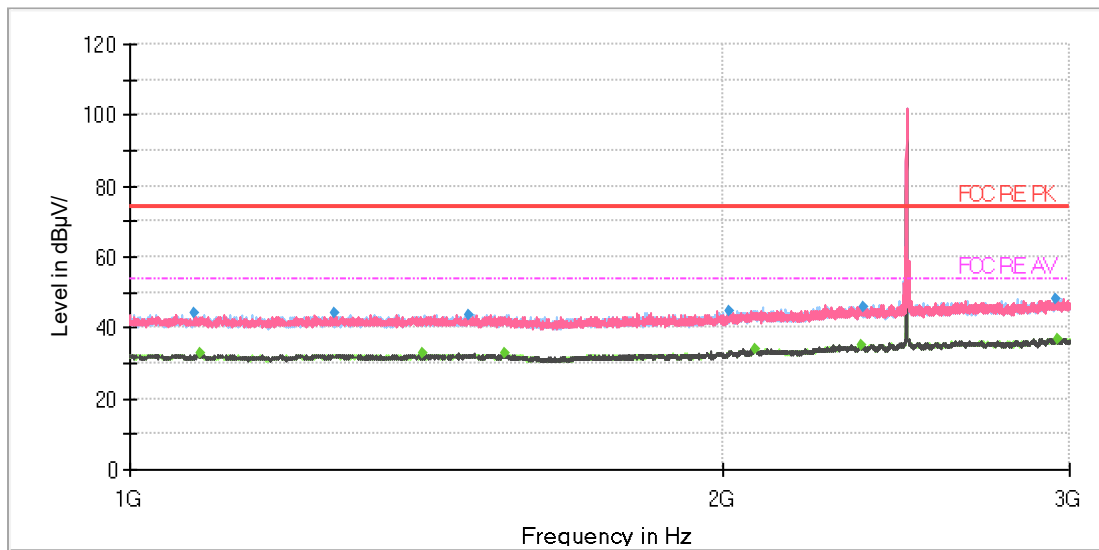
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1056.75	---	32.88	54.00	21.12	500.00	100.0	V	174.00
1064.25	44.02	---	74.00	29.98	500.00	200.0	H	239.00
1301.00	---	32.68	54.00	21.32	500.00	100.0	H	106.00
1396.00	44.67	---	74.00	29.33	500.00	200.0	H	106.00
1495.75	---	32.70	54.00	21.30	500.00	100.0	H	25.00
1560.25	44.04	---	74.00	29.96	500.00	200.0	H	0.00
2039.50	45.15	---	74.00	28.85	500.00	200.0	V	243.00
2071.25	---	34.13	54.00	19.87	500.00	100.0	H	89.00
2377.00	---	35.46	54.00	18.54	500.00	100.0	H	155.00
2378.00	45.91	---	74.00	28.09	500.00	200.0	V	359.00
2532.25	---	38.59	54.00	15.41	500.00	100.0	H	25.00
2933.25	48.37	---	74.00	25.63	500.00	200.0	V	21.00



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	29.79	54.00	24.21	500.00	200.0	H	335.00
3566.25	41.52	---	74.00	32.48	500.00	100.0	H	345.00
4065.00	---	37.71	54.00	16.29	500.00	100.0	V	16.00
4066.88	45.15	---	74.00	28.85	500.00	200.0	H	14.00
4878.75	43.11	---	74.00	30.89	500.00	100.0	V	340.00
4878.75	---	35.67	54.00	18.33	500.00	100.0	V	340.00
7320.00	49.95	---	74.00	24.05	500.00	100.0	V	0.00
7320.00	---	41.44	54.00	12.56	500.00	100.0	V	0.00
9675.00	---	40.13	54.00	13.87	500.00	100.0	H	345.00
9708.75	51.29	---	74.00	22.71	500.00	100.0	H	153.00
14161.88	---	44.89	54.00	9.11	500.00	100.0	V	0.00
14169.38	56.57	---	74.00	17.43	500.00	200.0	H	350.00

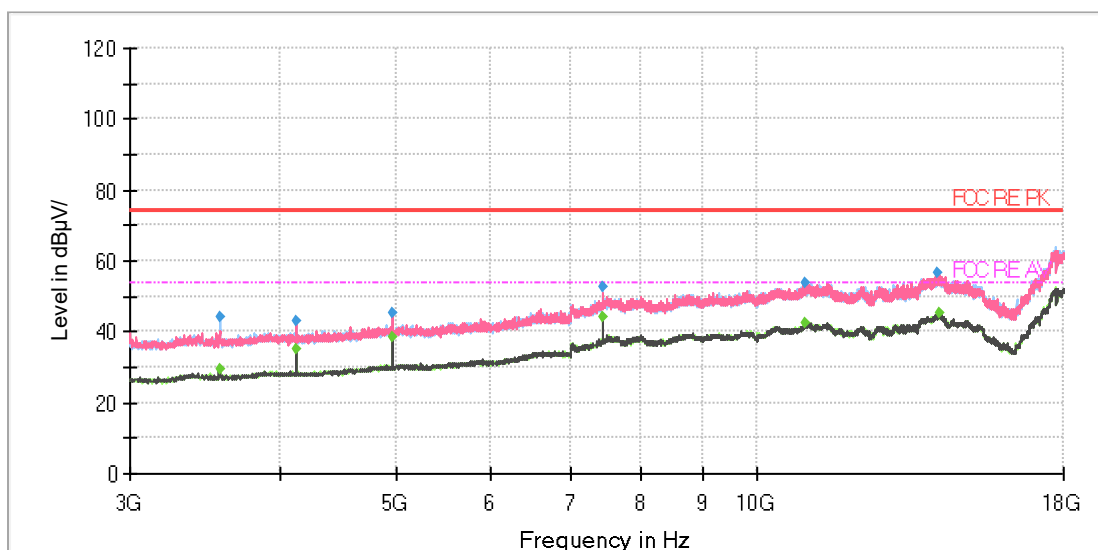
Bluetooth LE-Channel 39



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
1077.25	44.36	---	74.00	29.64	500.00	100.0	V	172.00
1085.00	---	32.79	54.00	21.21	500.00	200.0	H	54.00
1270.00	44.19	---	74.00	29.81	500.00	200.0	V	204.00
1408.50	---	32.67	54.00	21.33	500.00	100.0	V	319.00
1485.25	43.80	---	74.00	30.20	500.00	100.0	H	14.00
1551.25	---	32.65	54.00	21.35	500.00	200.0	H	0.00
2014.75	44.95	---	74.00	29.05	500.00	100.0	V	358.00
2078.75	---	34.12	54.00	19.88	500.00	100.0	H	0.00
2350.75	---	35.25	54.00	18.75	500.00	200.0	V	351.00
2354.50	45.80	---	74.00	28.20	500.00	100.0	H	4.00
2952.75	48.12	---	74.00	25.88	500.00	200.0	V	254.00
2955.00	---	36.93	54.00	17.07	500.00	100.0	H	0.00



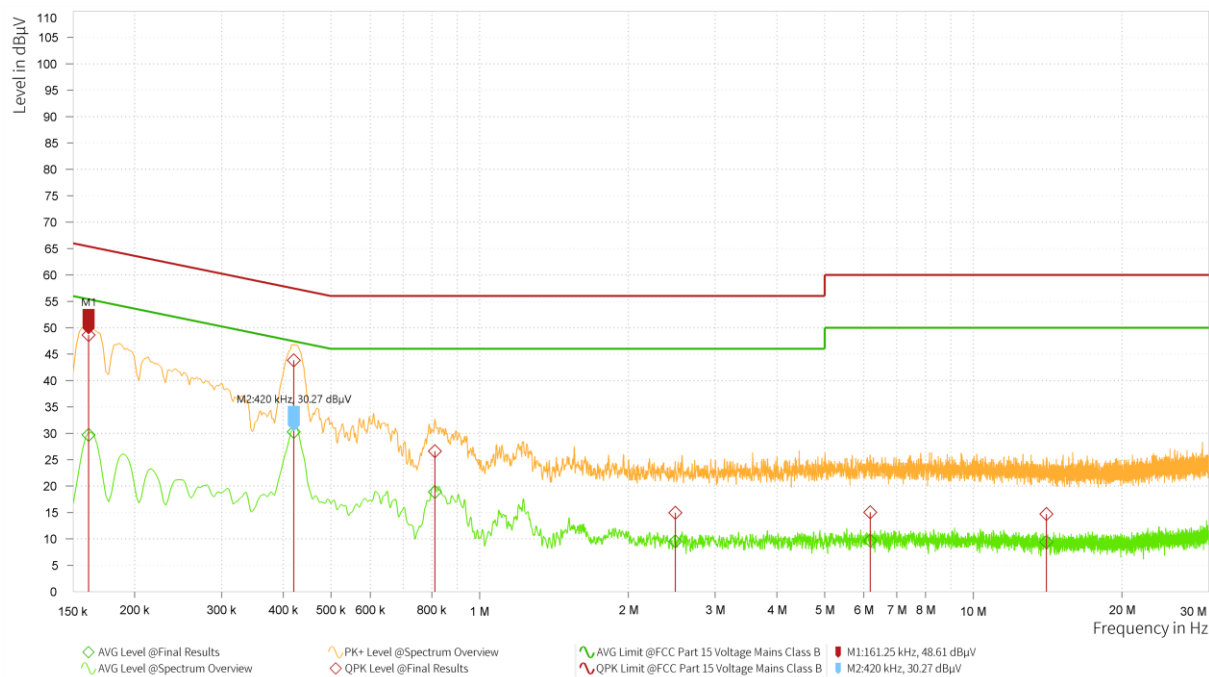
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)
3562.50	---	29.40	54.00	24.60	500.00	200.0	V	345.00
3562.50	44.31	---	74.00	29.69	500.00	200.0	H	206.00
4132.50	---	34.99	54.00	19.01	500.00	100.0	V	336.00
4132.50	42.75	---	74.00	31.25	500.00	200.0	H	336.00
4959.38	---	38.21	54.00	15.79	500.00	100.0	H	0.00
4959.38	45.56	---	74.00	28.44	500.00	100.0	H	0.00
7438.13	52.72	---	74.00	21.28	500.00	100.0	H	282.00
7440.00	---	44.09	54.00	9.91	500.00	200.0	H	285.00
10965.00	53.88	---	74.00	20.12	500.00	200.0	H	336.00
10974.38	---	42.70	54.00	11.30	500.00	200.0	V	11.00
14146.88	56.86	---	74.00	17.14	500.00	100.0	H	2.00
14163.75	---	45.44	54.00	8.56	500.00	100.0	H	17.00

2. Conducted Emission

2.1. Wi-Fi 2.4GHz

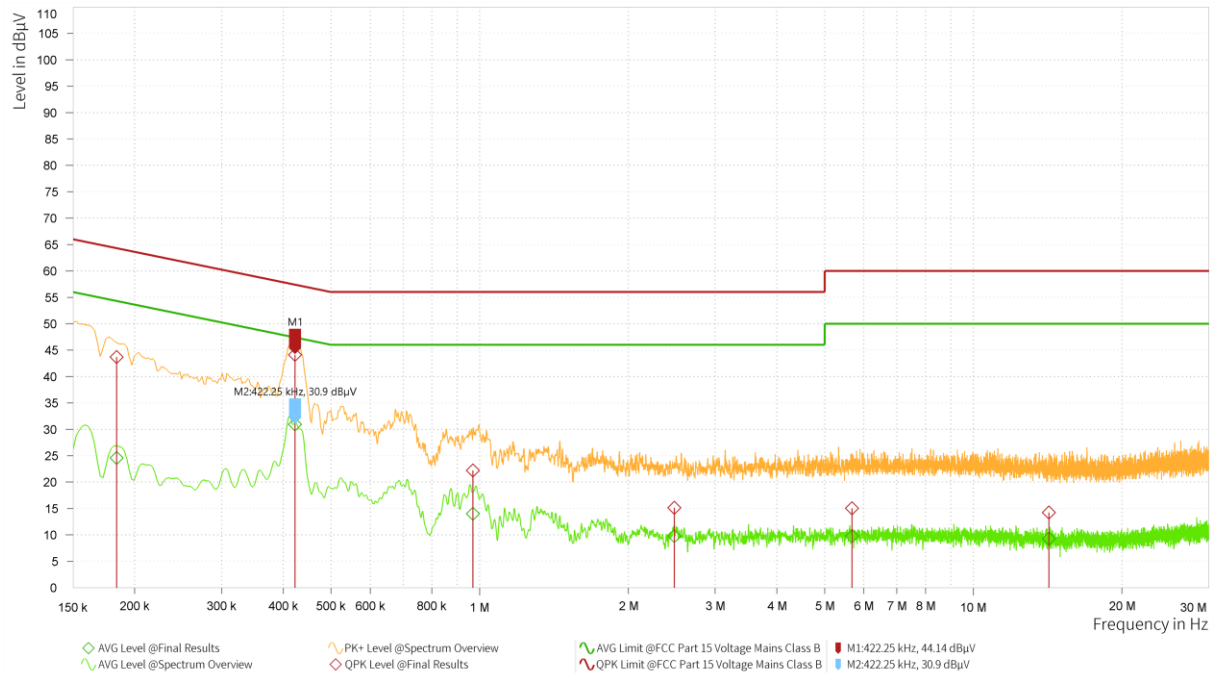
During the test, the Conducted Emission was performed in all modes with all channel. The test data of the worst-case condition (**802.11g CH11**) was recorded in this report.



Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	AVG Level [dBμV]	AVG Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.161	48.61	65.40	16.79	29.68	55.40	25.72	20.89	L1	9.000	1.000
0.420	43.83	57.45	13.62	30.27	47.45	17.18	20.86	L1	9.000	1.000
0.812	26.59	56.00	29.41	18.87	46.00	27.13	20.32	L1	9.000	1.000
2.490	14.93	56.00	41.07	9.55	46.00	36.45	19.55	L1	9.000	1.000
6.180	15.06	60.00	44.94	9.66	50.00	40.34	19.40	L1	9.000	1.000
14.057	14.68	60.00	45.32	9.39	50.00	40.61	19.48	L1	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

L line Conducted Emission from 150 kHz to 30 MHz



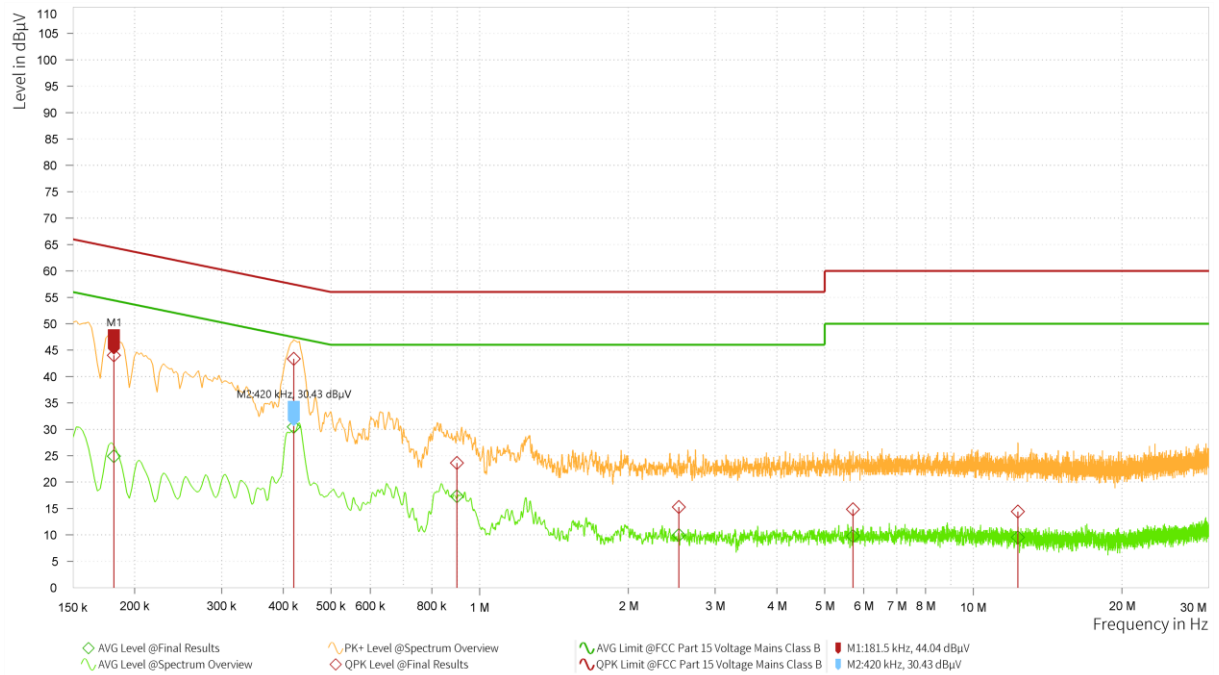
Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	AVG Level [dBμV]	AVG Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.184	43.69	64.31	20.62	24.55	54.31	29.76	21.04	N	9.000	1.000
0.422	44.14	57.40	13.27	30.90	47.40	16.50	20.86	N	9.000	1.000
0.969	22.22	56.00	33.78	14.01	46.00	31.99	20.19	N	9.000	1.000
2.479	15.13	56.00	40.87	9.76	46.00	36.24	19.56	N	9.000	1.000
5.681	15.02	60.00	44.98	9.79	50.00	40.21	19.41	N	9.000	1.000
14.228	14.23	60.00	45.77	9.29	50.00	40.71	19.51	N	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz

2.2. Bluetooth LE

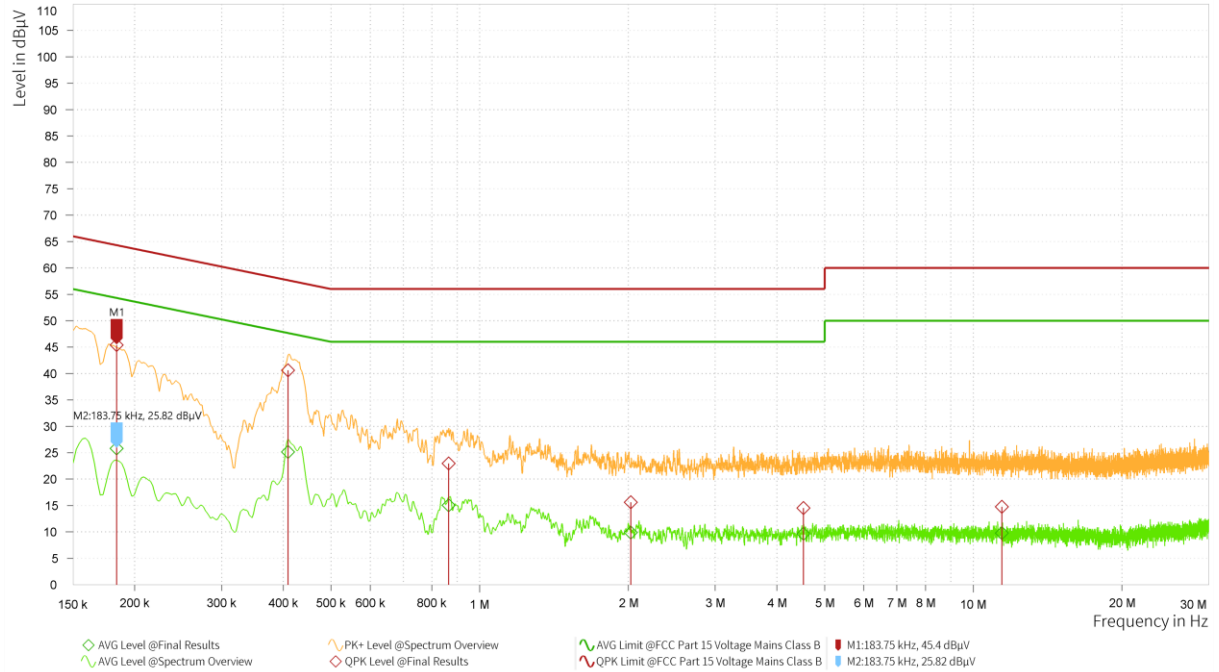
During the test, the Conducted Emission was performed in all modes with all channels. The test data of the worst-case condition (**Bluetooth LE-Channel 39**) was recorded in this report.



Frequency [MHz]	QPK Level [dBμV]	QPK Limit [dBμV]	QPK Margin [dB]	AVG Level [dBμV]	AVG Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.182	44.04	64.42	20.38	24.89	54.42	29.53	21.03	L1	9.000	1.000
0.420	43.36	57.45	14.09	30.43	47.45	17.02	20.86	L1	9.000	1.000
0.899	23.62	56.00	32.38	17.32	46.00	28.68	20.24	L1	9.000	1.000
2.531	15.28	56.00	40.72	9.97	46.00	36.03	19.54	L1	9.000	1.000
5.703	14.85	60.00	45.15	9.76	50.00	40.24	19.40	L1	9.000	1.000
12.318	14.44	60.00	45.56	9.53	50.00	40.47	19.43	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 Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.184	45.40	64.31	18.92	25.82	54.31	28.49	21.04	N	9.000	1.000
0.409	40.63	57.67	17.05	25.14	47.67	22.53	20.88	N	9.000	1.000
0.866	22.98	56.00	33.02	15.06	46.00	30.94	20.28	N	9.000	1.000
2.024	15.58	56.00	40.42	9.88	46.00	36.12	19.65	N	9.000	1.000
4.529	14.51	56.00	41.49	9.61	46.00	36.39	19.42	N	9.000	1.000
11.420	14.73	60.00	45.27	9.78	50.00	40.22	19.44	N	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz