

## ANNEX A: Test Result

### 1. Unwanted Emission

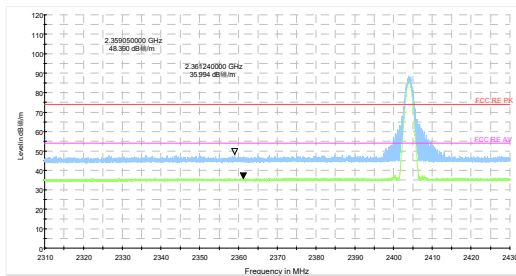
#### 1.1. Bluetooth LE

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.

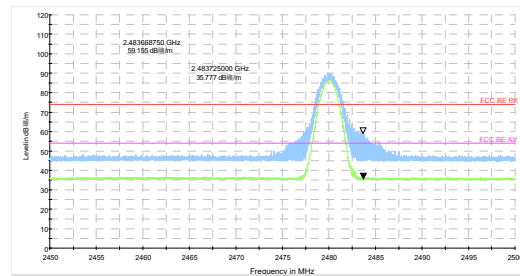
A symbol ( $\text{dB}\mu\text{V/m}$ ) in the test plot below means ( $\text{dB}\mu\text{V/m}$ )

The signal beyond the limit is carrier.

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



Bluetooth LE Channel 0 Peak+ Average







Bluetooth LE 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 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**

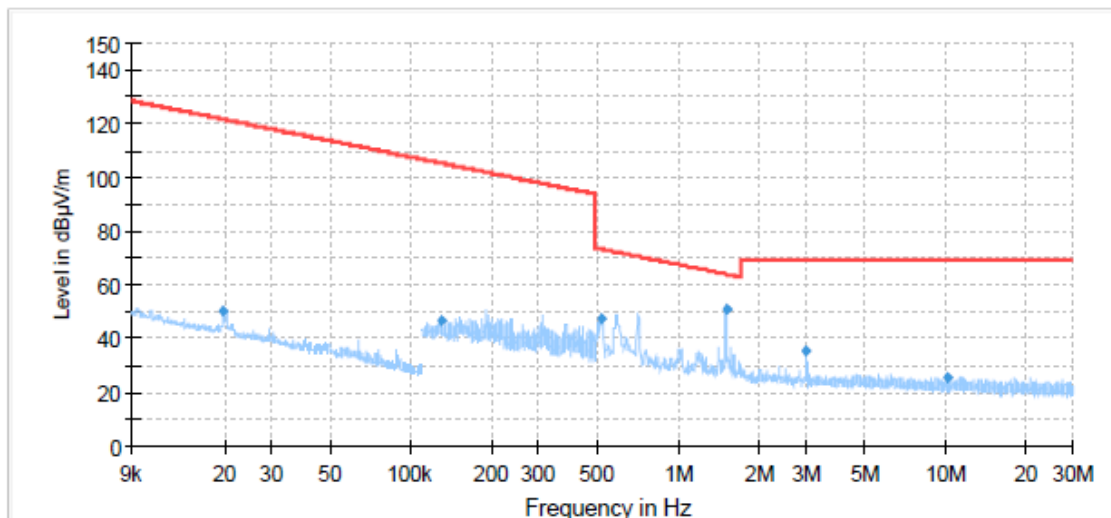
 QP Level @Spectrum Overview H
  QP Level @Spectrum Overview V
  QP Level @Final Results
  QP Limit

### For above 1GHz

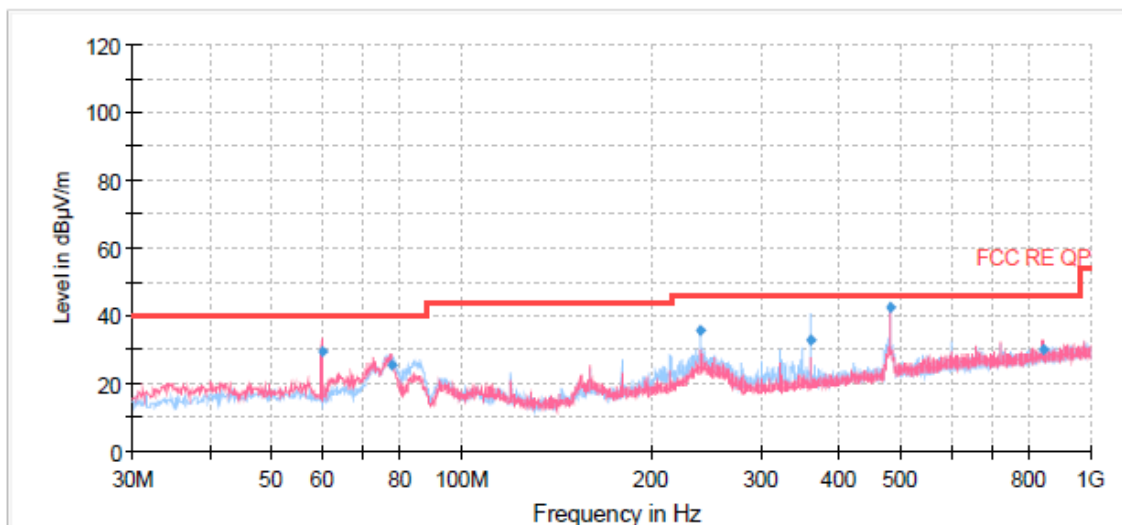
 PK Level @Spectrum Overview H
  PK Level @Spectrum Overview V
  PK Level @Final Results
  PK Limit  
 AVG Level @Spectrum Overview H
  AVG Level @Spectrum Overview V
  AVG Level @Final Results
  AVG Limit

### Continuous TX mode:

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



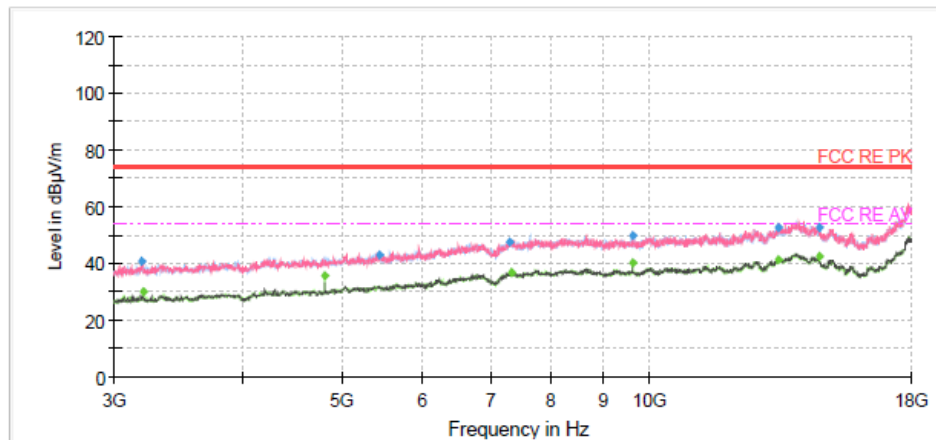
Radiates Emission from 9kHz to 30MHz



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)
59.95	29.28	40.00	10.72	101.0	V	230.00	19
77.53	25.45	40.00	14.55	224.0	V	127.00	15
240.01	35.66	46.00	10.34	109.0	H	276.00	20
359.92	32.81	46.00	13.19	100.0	H	134.00	22
479.96	42.17	46.00	3.83	183.0	H	156.00	25
840.56	30.07	46.00	15.93	109.0	V	191.00	30

## Bluetooth LE-Channel 0

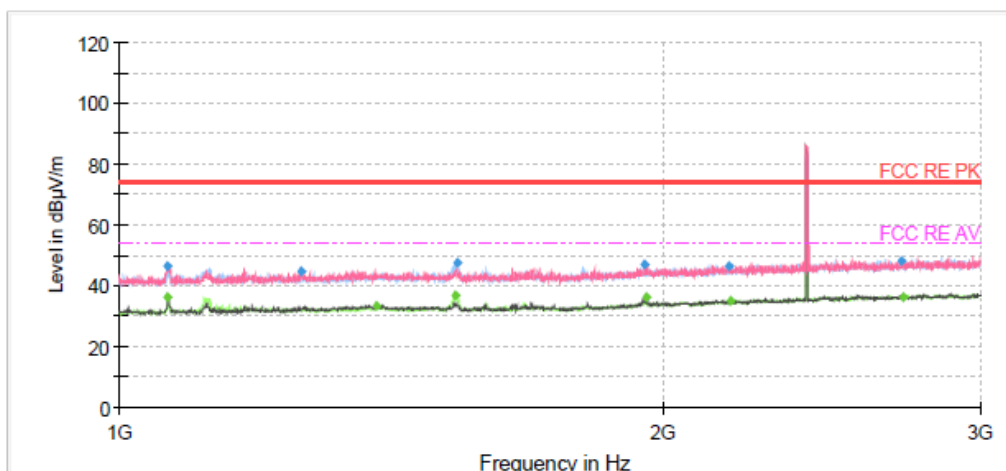


## Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3193.13	40.78	---	74.00	33.22	500.00	100.0	V	162.00	-6
3204.38	---	30.08	54.00	23.92	500.00	100.0	V	145.00	-6
4807.50	---	35.78	54.00	18.22	500.00	100.0	H	12.00	-2
5437.50	43.07	---	74.00	30.93	500.00	100.0	V	113.00	0
7299.38	47.72	---	74.00	26.28	500.00	100.0	H	17.00	6
7308.75	---	36.96	54.00	17.04	500.00	100.0	V	359.00	5
9615.00	---	39.98	54.00	14.02	500.00	200.0	V	47.00	7
9616.88	49.93	---	74.00	24.07	500.00	200.0	H	300.00	7
13336.88	52.56	---	74.00	21.44	500.00	200.0	V	217.00	11
13351.88	---	41.59	54.00	12.41	500.00	100.0	V	314.00	11
14600.63	---	42.23	54.00	11.77	500.00	200.0	V	0.00	11
14600.63	52.89	---	74.00	21.11	500.00	200.0	H	355.00	11

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

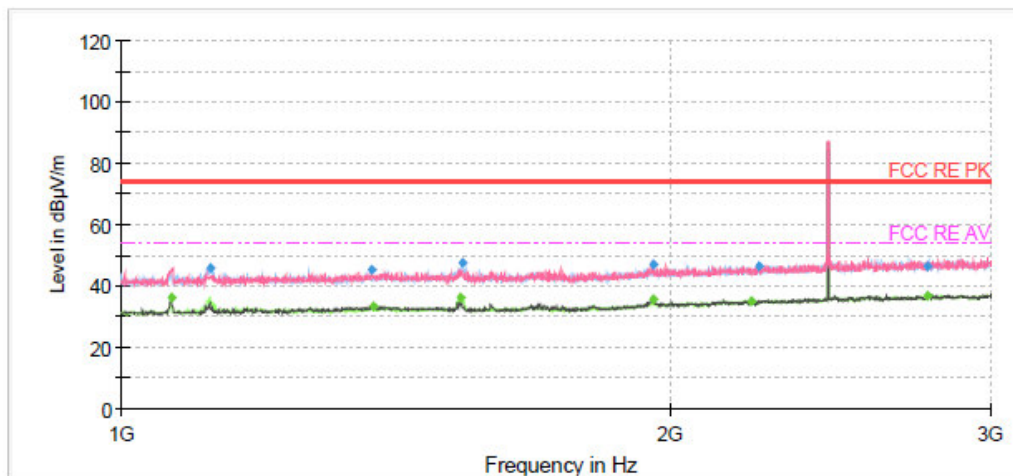


## Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1062.50	46.34	---	74.00	27.66	500.00	200.0	V	216.00	-5
1063.25	---	36.47	54.00	17.53	500.00	200.0	V	216.00	-5
1262.25	44.80	---	74.00	29.20	500.00	200.0	V	159.00	-4
1389.25	---	33.60	54.00	20.40	500.00	200.0	V	88.00	-3
1536.00	---	37.07	54.00	16.93	500.00	200.0	H	54.00	-2
1538.50	47.55	---	74.00	26.45	500.00	200.0	H	54.00	-2
1954.50	47.00	---	74.00	27.00	500.00	200.0	V	188.00	0
1960.25	---	36.03	54.00	17.97	500.00	200.0	V	1.00	0
2177.50	46.61	---	74.00	27.39	500.00	100.0	V	97.00	1
2180.75	---	34.84	54.00	19.16	500.00	100.0	V	5.00	1
2711.25	48.29	---	74.00	25.71	500.00	200.0	V	304.00	3
2720.50	---	36.41	54.00	17.59	500.00	100.0	H	0.00	3

Radiates Emission from 3GHz to 18GHz

# Bluetooth LE-Channel 19

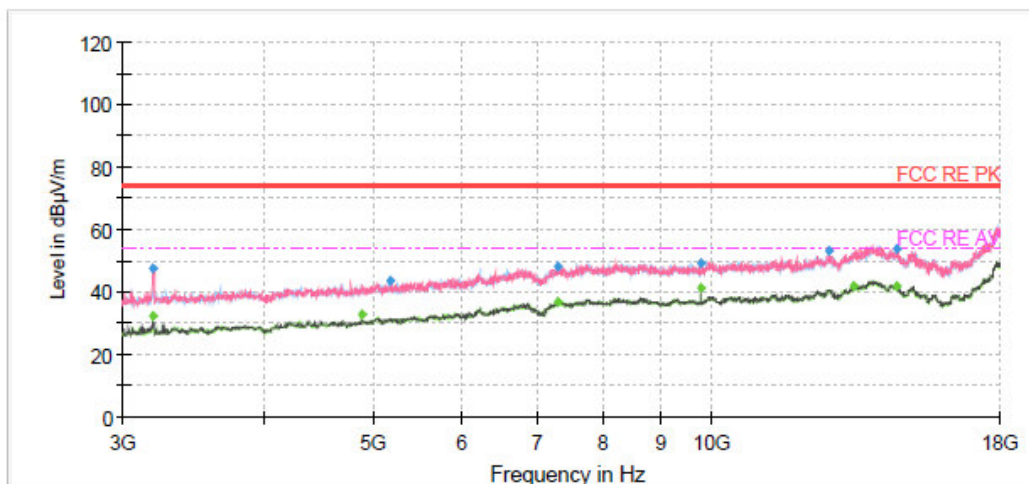


## Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1065.00	---	36.35	54.00	17.65	500.00	200.0	V	218.00	-5
1118.25	46.07	---	74.00	27.93	500.00	100.0	H	138.00	-4
1371.50	45.02	---	74.00	28.98	500.00	200.0	V	134.00	-3
1373.75	---	33.53	54.00	20.47	500.00	200.0	V	54.00	-3
1535.75	---	36.41	54.00	17.59	500.00	200.0	H	58.00	-2
1538.75	47.63	---	74.00	26.37	500.00	100.0	H	138.00	-2
1956.50	---	35.87	54.00	18.13	500.00	100.0	V	174.00	0
1960.75	46.81	---	74.00	27.19	500.00	100.0	V	174.00	0
2219.75	---	34.96	54.00	19.04	500.00	100.0	H	13.00	1
2240.50	46.60	---	74.00	27.40	500.00	100.0	V	359.00	1
2768.75	---	36.78	54.00	17.22	500.00	200.0	V	54.00	3
2772.25	46.27	---	74.00	27.73	500.00	200.0	H	142.00	3

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



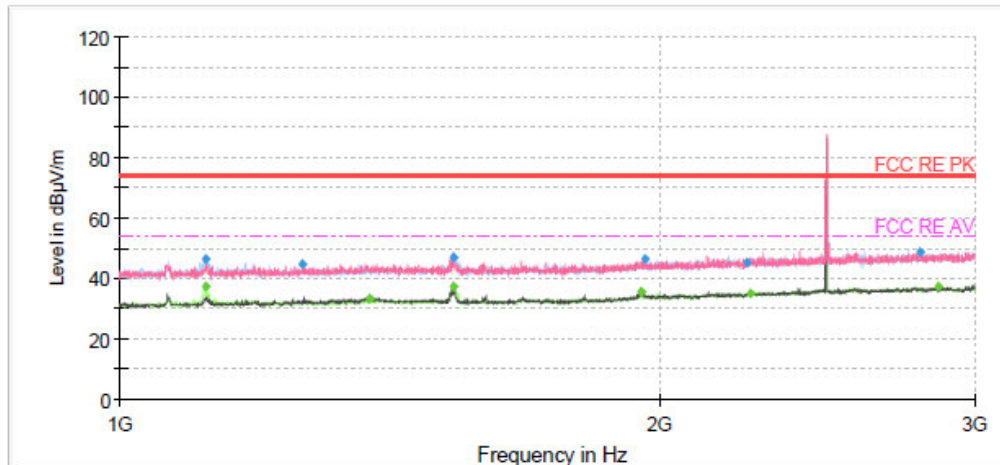
## Final Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3191.25	---	32.21	54.00	21.79	500.00	100.0	V	145.00	-6
3191.25	47.80	---	74.00	26.20	500.00	100.0	V	145.00	-6
4888.13	---	32.72	54.00	21.28	500.00	100.0	H	29.00	-1
5176.88	43.64	---	74.00	30.36	500.00	100.0	H	73.00	0
7295.63	48.16	---	74.00	25.84	500.00	200.0	V	216.00	6
7303.13	---	36.82	54.00	17.18	500.00	100.0	V	245.00	6
9776.25	49.14	---	74.00	24.86	500.00	200.0	V	133.00	7
9776.25	---	41.43	54.00	12.57	500.00	200.0	V	133.00	7
12691.88	52.96	---	74.00	21.04	500.00	100.0	H	179.00	10
13335.00	---	41.82	54.00	12.18	500.00	100.0	V	0.00	11
14559.38	---	41.79	54.00	12.21	500.00	100.0	H	273.00	11
14578.13	53.89	---	74.00	20.11	500.00	100.0	H	2.00	11

Radiates Emission from 3GHz to 18GHz



## Bluetooth LE-Channel 39



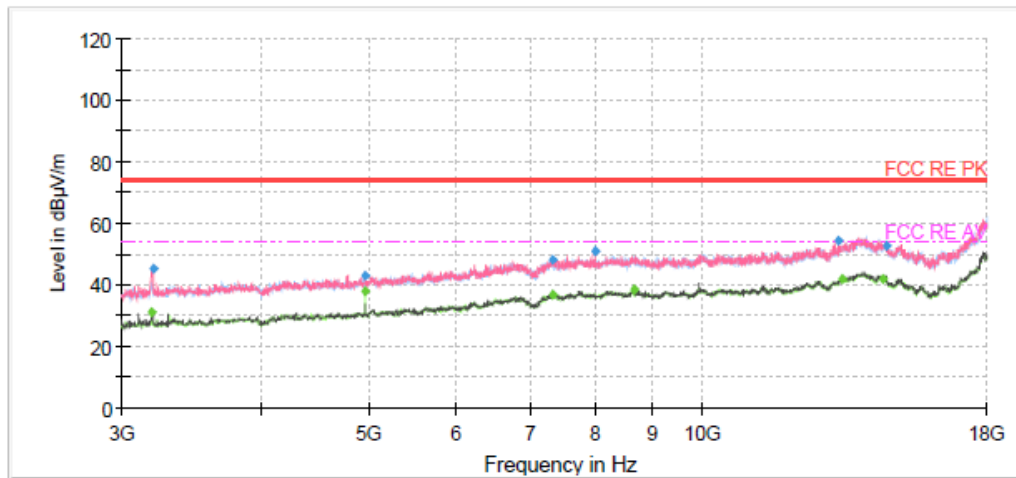
## Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1115.25	---	37.51	54.00	16.49	500.00	200.0	H	127.00	-5
1115.25	46.37	---	74.00	27.63	500.00	200.0	H	127.00	-5
1263.25	44.68	---	74.00	29.32	500.00	200.0	V	145.00	-4
1379.25	---	33.54	54.00	20.46	500.00	200.0	V	84.00	-3
1533.50	47.06	---	74.00	26.94	500.00	100.0	V	12.00	-2
1536.75	---	37.20	54.00	16.80	500.00	200.0	H	56.00	-2
1953.75	---	35.70	54.00	18.30	500.00	100.0	V	170.00	0
1963.75	46.39	---	74.00	27.61	500.00	200.0	V	188.00	0
2238.50	45.46	---	74.00	28.54	500.00	200.0	H	342.00	1
2248.50	---	35.33	54.00	18.67	500.00	200.0	V	230.00	1
2796.00	48.88	---	74.00	25.12	500.00	200.0	H	264.00	3
2865.75	---	37.31	54.00	16.69	500.00	100.0	H	16.00	3

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz





## Final Result

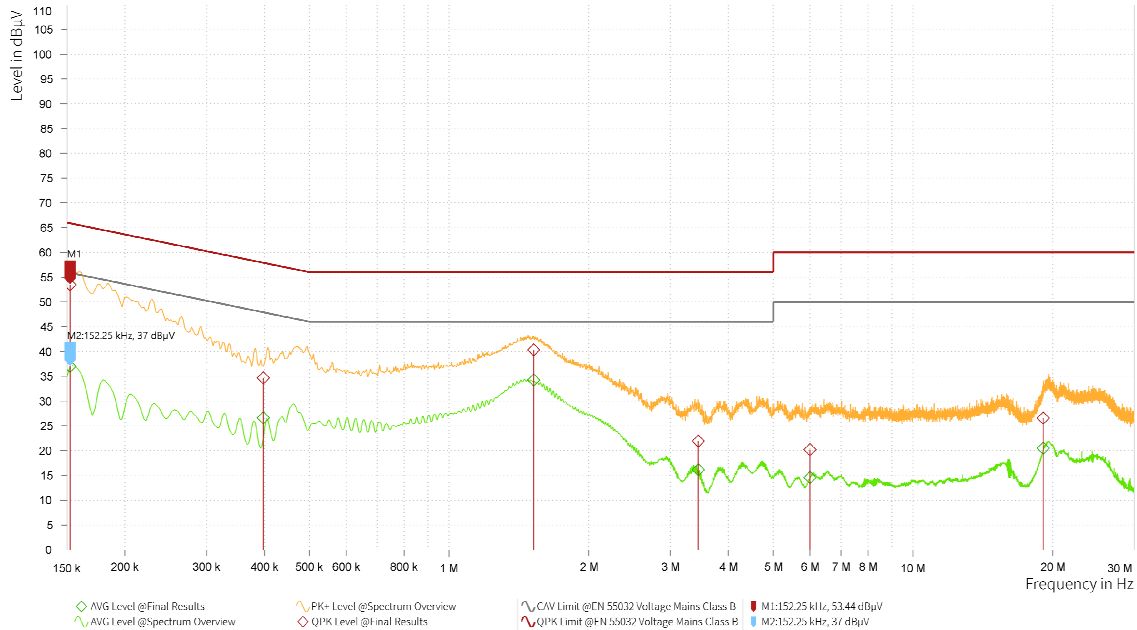
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3193.13	---	30.86	54.00	23.14	500.00	200.0	V	175.00	-6
3196.88	45.22	---	74.00	28.78	500.00	200.0	V	175.00	-6
4959.38	---	37.77	54.00	16.23	500.00	100.0	H	166.00	-1
4959.38	43.29	---	74.00	30.71	500.00	100.0	H	166.00	-1
7306.88	48.25	---	74.00	25.75	500.00	100.0	H	1.00	5
7312.50	---	36.83	54.00	17.17	500.00	200.0	H	355.00	5
7989.38	50.86	---	74.00	23.14	500.00	200.0	V	223.00	6
8655.00	---	38.32	54.00	15.68	500.00	100.0	V	241.00	7
13248.75	54.58	---	74.00	19.42	500.00	100.0	V	257.00	11
13351.88	---	42.14	54.00	11.86	500.00	200.0	H	285.00	11
14531.25	---	42.10	54.00	11.90	500.00	200.0	H	338.00	11
14615.63	52.69	---	74.00	21.31	500.00	100.0	H	87.00	10

Radiates Emission from 3GHz to 18GHz

## 2. Conducted Emission

### 2.1. Bluetooth LE

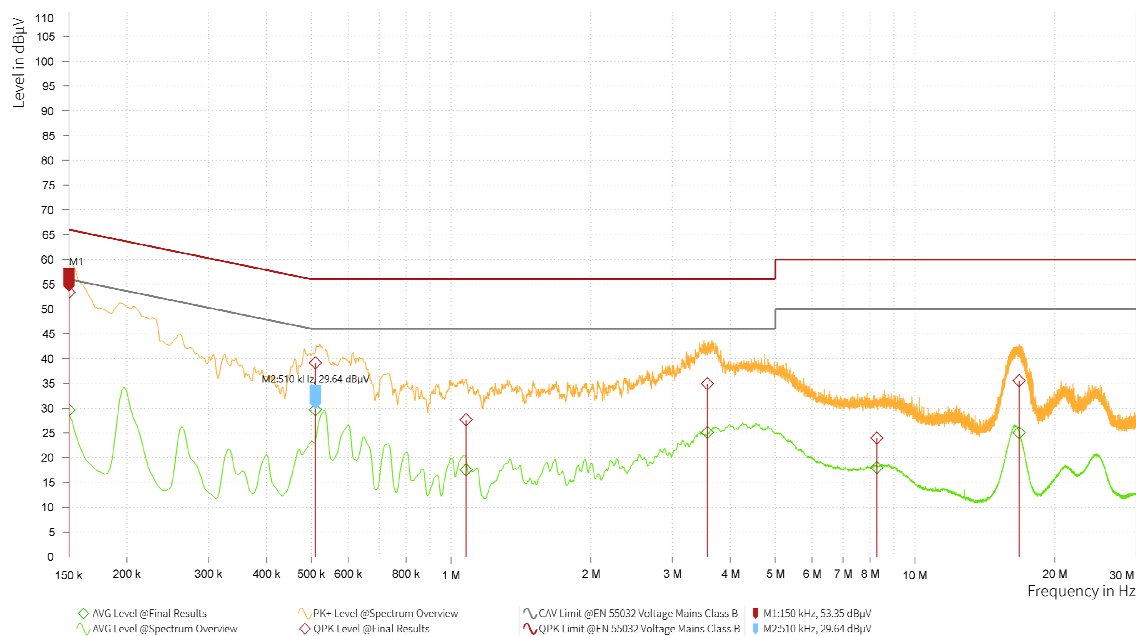
During the test, the Conducted Emission was performed in all modes with all channels. The test data of the worst-case condition was recorded in this report.



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]
0.152	53.44	65.88	12.43	37.00	55.88	18.88	20.90	L1	9.000	1.000
0.398	34.66	57.91	23.24	26.63	47.91	21.28	20.88	L1	9.000	1.000
1.523	40.30	56.00	15.70	34.25	46.00	11.75	19.83	L1	9.000	1.000
3.444	21.92	56.00	34.08	16.14	46.00	29.86	19.45	L1	9.000	1.000
5.996	20.19	60.00	39.81	14.57	50.00	35.43	19.40	L1	9.000	1.000
19.104	26.54	60.00	33.46	20.51	50.00	29.49	19.63	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]
0.150	53.35	66.00	12.65	29.59	56.00	26.41	20.91	N	9.000	1.000
0.510	39.14	56.00	16.86	29.64	46.00	16.36	20.78	N	9.000	1.000
1.077	27.65	56.00	28.35	17.54	46.00	28.46	20.11	N	9.000	1.000
3.570	34.92	56.00	21.08	25.08	46.00	20.92	19.46	N	9.000	1.000
8.275	23.95	60.00	36.05	17.96	50.00	32.04	19.42	N	9.000	1.000
16.771	35.53	60.00	24.47	25.05	50.00	24.95	19.60	N	9.000	1.000

**Remark: Correct factor=cable loss + LISN factor**

N line Conducted Emission from 150 kHz to 30 MHz