

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 lie-down position (X axis) and the loop antenna is vertical, the others are vertical and horizontal. and the worst case was recorded.

1. Unwanted Emission

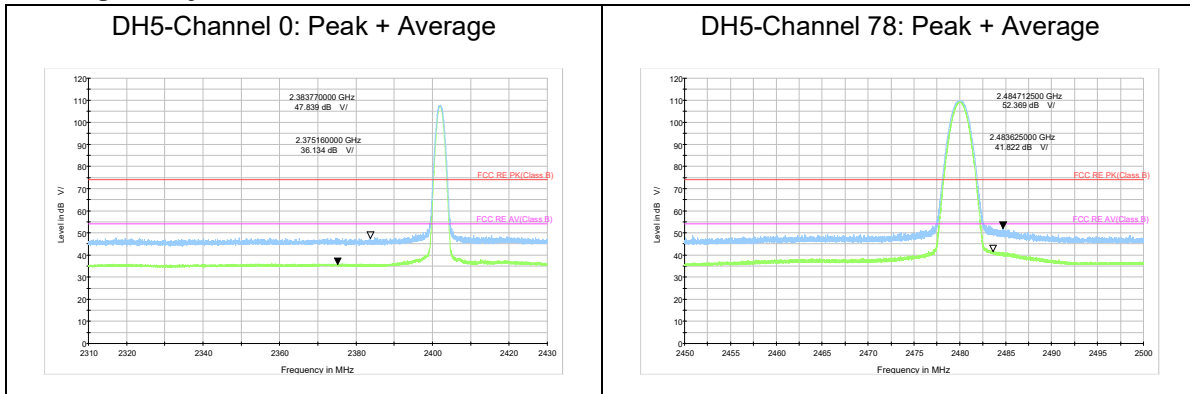
1.1. Bluetooth

The following graphs display the maximum values of horizontal and vertical by software.

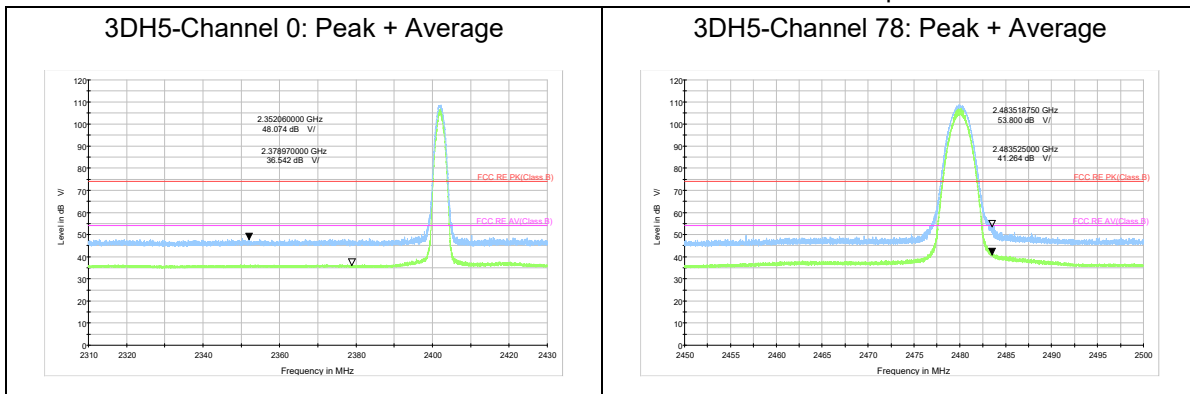
Blue trace uses the peak detection, Green trace uses the average detection.

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

The signal beyond the limit is carrier.



The bandage was performed in all EDR mode (2DH5 and 3DH5), 3DH5 was selected as the worse condition. The test data of the worst-case condition was recorded in this report.



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. A symbol ($\text{dB } \mu\text{V/m}$) in the test plot below means (dB $\mu\text{V/m}$)
A symbol ($\text{dB } \mu\text{V/m}$) in the test plot below means (dB $\mu\text{V/m}$)
4. The following graphs display the maximum values of horizontal and vertical by software.
5. For below 1GHz

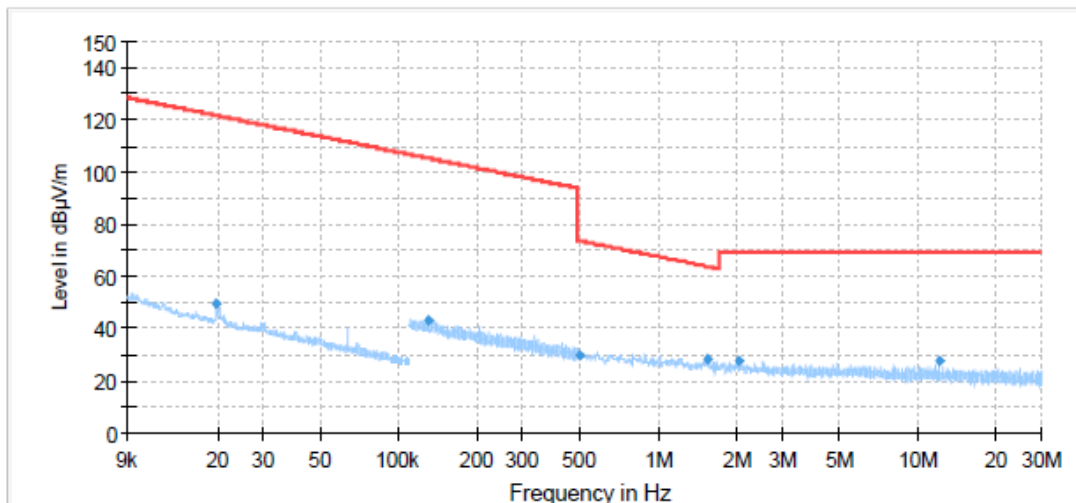
~ QP Level @Spectrum Overview H
 ~ QP Level @Spectrum Overview V
 ◆ QP Level @Final Results
 — QP Limit

For above 1GHz

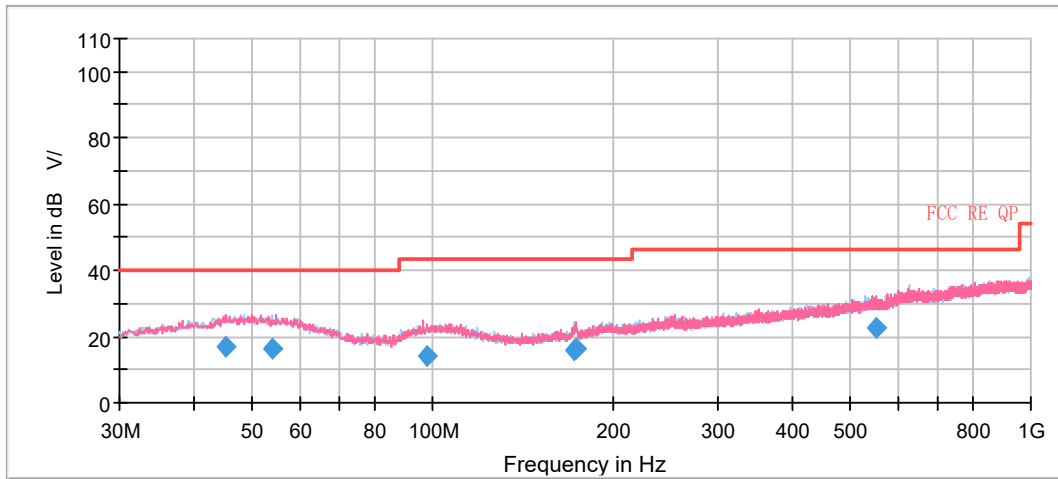
~ PK Level @Spectrum Overview H
 ~ PK Level @Spectrum Overview V
 ◆ PK Level @Final Results
 — PK Limit
~ AVG Level @Spectrum Overview H
 ~ AVG Level @Spectrum Overview V
 ◆ AVG Level @Final Results
 — AVG Limit

Continuous TX mode:

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



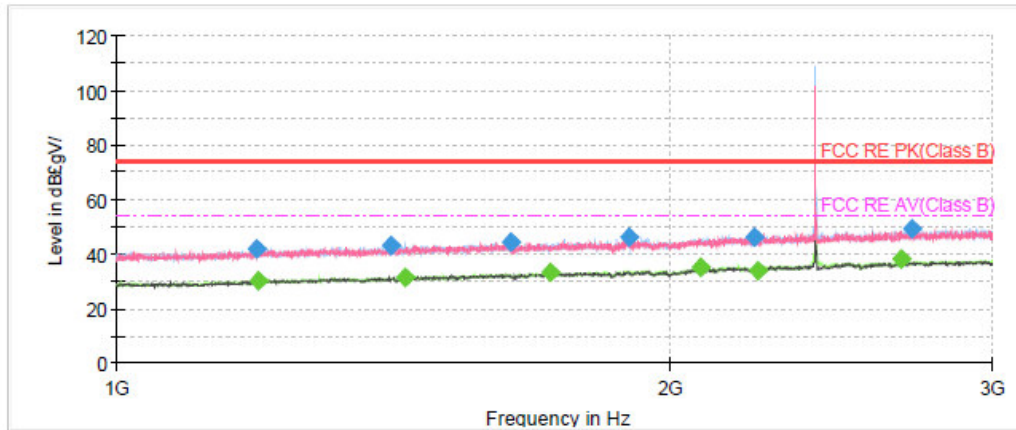
Radiates Emission from 9kHz to 30MHz



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)
45.156250	16.75	40.00	23.25	110.0	V	0.0	21.0
53.886250	16.61	40.00	23.39	125.0	H	261.0	20.9
97.778750	14.11	43.50	29.39	210.0	V	80.0	18.9
173.075000	15.84	43.50	27.66	100.0	H	14.0	19.3
174.045000	16.48	43.50	27.02	100.0	V	249.0	20.0
549.920000	22.46	46.00	23.54	125.0	V	331.0	26.2

DH5-Channel 0

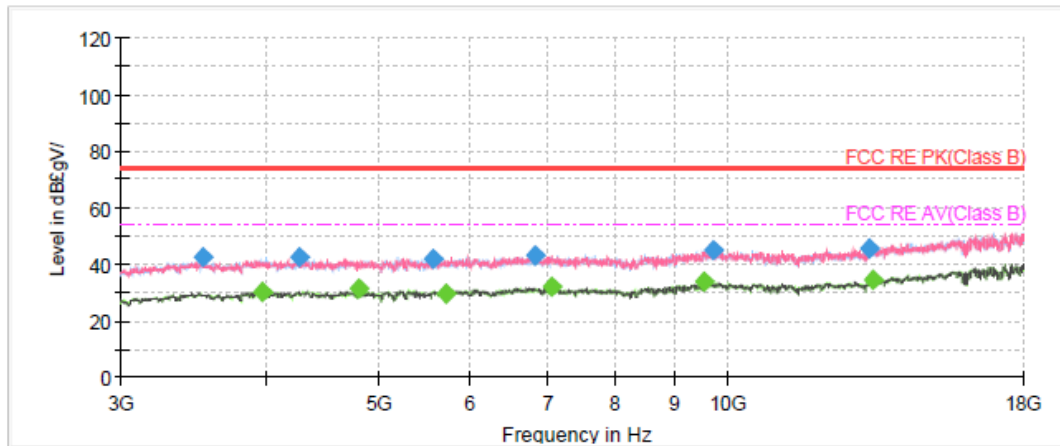


Final Result

Frequency (MHz)	MaxPeak (dBµgV/m)	Average (dBµgV/m)	Limit (dBµgV/m)	Margin (dB)	Meas. Time (ms)	Pol	Azimuth (deg)	Corr. (dB/m)
1192.250000	41.96	---	74.00	32.04	500.0	H	53.0	-9.0
1194.500000	---	30.34	54.00	23.66	500.0	H	62.0	-8.9
1410.500000	43.04	---	74.00	30.96	500.0	H	174.0	-7.5
1437.000000	---	31.58	54.00	22.42	500.0	H	53.0	-7.3
1637.750000	44.45	---	74.00	29.55	500.0	H	45.0	-6.2
1724.000000	---	33.08	54.00	20.92	500.0	H	0.0	-5.9
1899.750000	45.90	---	74.00	28.10	500.0	H	62.0	-5.0
2078.750000	---	35.35	54.00	18.65	500.0	V	250.0	-3.9
2227.000000	46.43	---	74.00	27.57	500.0	H	53.0	-3.2
2237.250000	---	34.05	54.00	19.95	500.0	H	97.0	-3.2
2673.250000	---	38.21	54.00	15.79	500.0	V	258.0	-1.8
2713.250000	49.06	---	74.00	24.94	500.0	H	131.0	-1.5

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

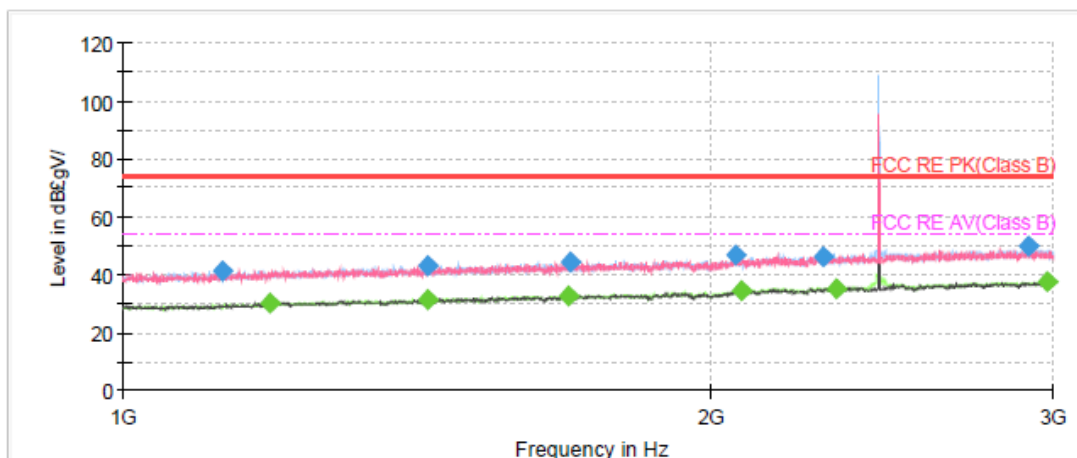


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3523.125000	42.23	---	74.00	31.77	500.0	200.0	H	124.0	-8.3
3965.625000	---	30.16	54.00	23.84	500.0	100.0	V	358.0	-7.0
4267.500000	42.36	---	74.00	31.64	500.0	100.0	V	29.0	-6.5
4803.750000	---	31.19	54.00	22.81	500.0	200.0	H	10.0	-6.1
5566.875000	42.15	---	74.00	31.85	500.0	100.0	H	319.0	-4.5
5709.375000	---	29.80	54.00	24.20	500.0	200.0	H	40.0	-4.4
6815.625000	43.18	---	74.00	30.82	500.0	200.0	V	260.0	-3.2
7065.000000	---	31.91	54.00	22.09	500.0	200.0	V	274.0	-3.1
9532.500000	---	33.76	54.00	20.24	500.0	200.0	V	245.0	-0.2
9735.000000	45.19	---	74.00	28.81	500.0	100.0	H	172.0	-0.6
13276.875000	45.74	---	74.00	28.26	500.0	100.0	H	172.0	2.2
13351.875000	---	34.50	54.00	19.50	500.0	200.0	V	112.0	2.4

Radiates Emission from 3GHz to 18GHz

DH5-Channel 39

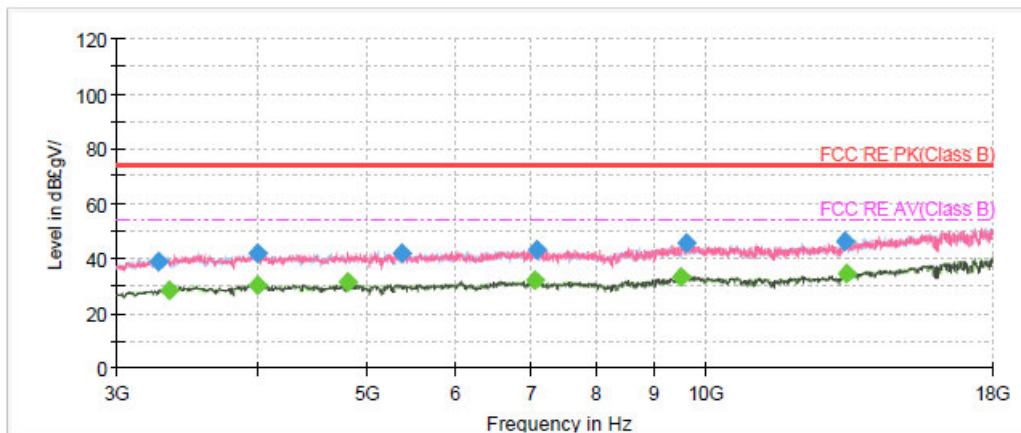


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Azimuth (deg)	Corr. (dB/m)
1122.750000	41.40	---	74.00	32.60	500.0	V	83.0	-9.9
1188.000000	---	30.40	54.00	23.60	500.0	H	88.0	-9.0
1431.000000	42.84	---	74.00	31.16	500.0	V	0.0	-7.4
1431.500000	---	31.52	54.00	22.48	500.0	H	0.0	-7.4
1692.250000	---	32.83	54.00	21.17	500.0	H	139.0	-6.0
1697.250000	44.51	---	74.00	29.49	500.0	H	0.0	-6.0
2063.000000	46.48	---	74.00	27.52	500.0	H	5.0	-4.1
2074.250000	---	34.69	54.00	19.31	500.0	H	55.0	-4.0
2285.000000	45.94	---	74.00	28.06	500.0	H	0.0	-2.9
2321.750000	---	35.20	54.00	18.80	500.0	H	202.0	-2.9
2913.500000	49.79	---	74.00	24.21	500.0	V	122.0	-1.0
2978.500000	---	37.58	54.00	16.42	500.0	H	72.0	-0.7

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

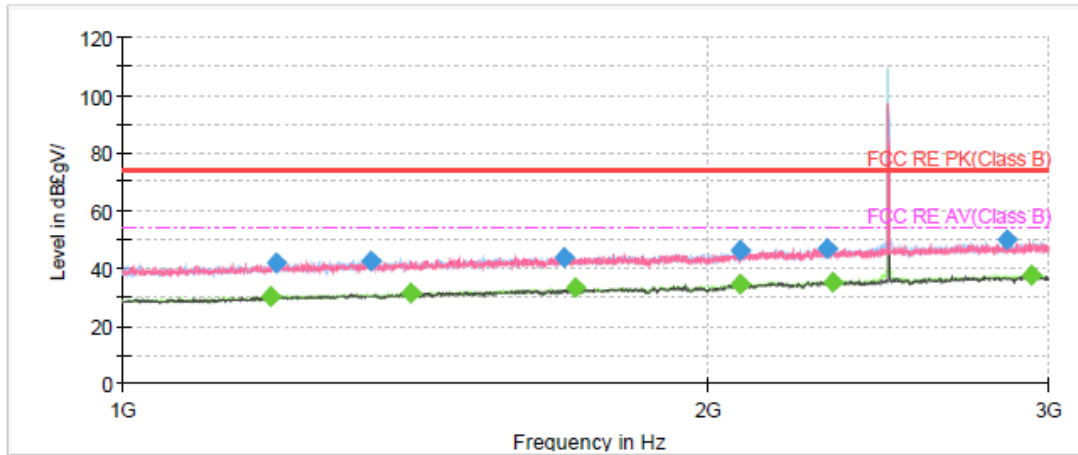


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3266.250000	38.93	---	74.00	35.07	500.0	100.0	H	315.0	-9.5
3339.375000	---	28.50	54.00	25.50	500.0	100.0	H	295.0	-9.1
3997.500000	---	30.35	54.00	23.65	500.0	100.0	V	53.0	-6.8
4005.000000	41.62	---	74.00	32.38	500.0	100.0	H	107.0	-6.8
4803.750000	---	31.32	54.00	22.68	500.0	200.0	H	107.0	-6.1
5364.375000	41.99	---	74.00	32.01	500.0	200.0	H	146.0	-4.9
7061.250000	---	31.86	54.00	22.14	500.0	100.0	V	217.0	-3.1
7085.625000	43.33	---	74.00	30.67	500.0	200.0	V	220.0	-3.0
9528.750000	---	33.44	54.00	20.56	500.0	100.0	H	340.0	-0.2
9626.250000	45.46	---	74.00	28.54	500.0	200.0	V	147.0	-0.6
13327.500000	45.87	---	74.00	28.13	500.0	100.0	H	330.0	2.3
13329.375000	---	34.39	54.00	19.61	500.0	200.0	V	303.0	2.3

Radiates Emission from 3GHz to 18GHz

DH5-Channel 78

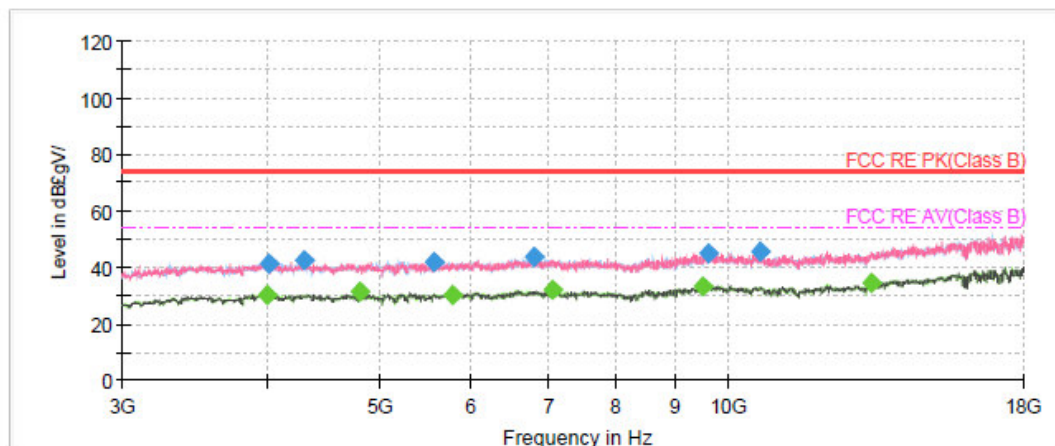


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Azimuth (deg)	Corr. (dB/m)
1192.250000	---	30.22	54.00	23.78	500.0	H	37.0	-9.0
1199.750000	41.88	---	74.00	32.12	500.0	H	63.0	-8.8
1343.500000	42.71	---	74.00	31.29	500.0	V	304.0	-8.0
1408.250000	---	31.46	54.00	22.54	500.0	H	20.0	-7.5
1686.750000	43.93	---	74.00	30.07	500.0	H	45.0	-6.0
1710.250000	---	33.08	54.00	20.92	500.0	V	227.0	-5.9
2078.000000	46.05	---	74.00	27.95	500.0	H	20.0	-3.9
2079.000000	---	34.69	54.00	19.31	500.0	V	253.0	-3.9
2306.750000	46.94	---	74.00	27.07	500.0	V	287.0	-2.8
2319.750000	---	35.22	54.00	18.78	500.0	H	63.0	-2.9
2855.500000	49.69	---	74.00	24.31	500.0	H	20.0	-1.1
2943.000000	---	37.59	54.00	16.41	500.0	H	63.0	-0.9

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



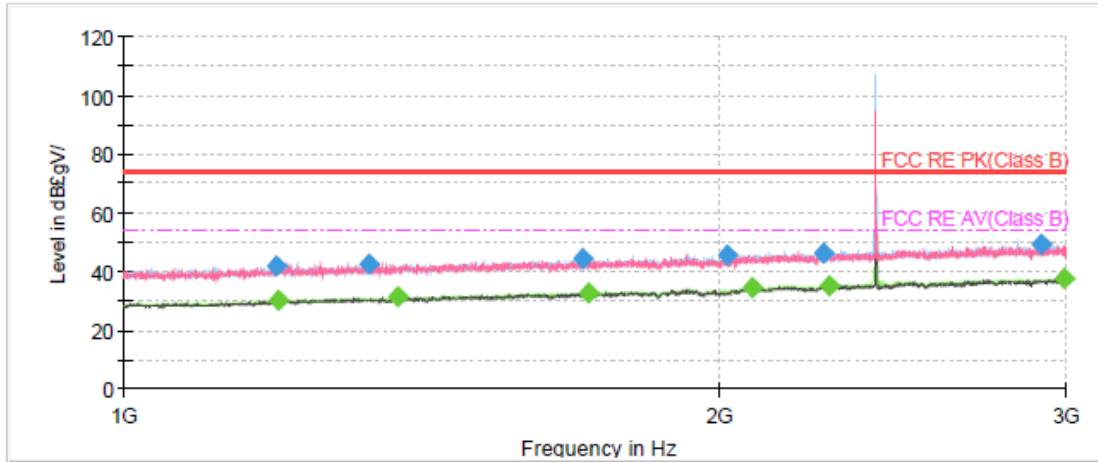
Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4003.125000	---	30.29	54.00	23.71	500.0	100.0	H	115.0	-6.8
4008.750000	41.36	---	74.00	32.64	500.0	100.0	V	102.0	-6.8
4312.500000	42.48	---	74.00	31.52	500.0	100.0	H	255.0	-6.4
4803.750000	---	31.39	54.00	22.61	500.0	200.0	H	354.0	-6.1
5565.000000	41.69	---	74.00	32.31	500.0	200.0	H	41.0	-4.5
5773.125000	---	30.20	54.00	23.80	500.0	100.0	H	110.0	-4.6
6808.125000	43.41	---	74.00	30.59	500.0	100.0	H	342.0	-3.2
7061.250000	---	31.85	54.00	22.15	500.0	200.0	V	296.0	-3.1
9525.000000	---	33.49	54.00	20.51	500.0	200.0	H	31.0	-0.1
9633.750000	45.01	---	74.00	28.99	500.0	100.0	V	17.0	-0.6
10657.500000	45.47	---	74.00	28.53	500.0	200.0	V	325.0	-0.8
13312.500000	---	34.30	54.00	19.70	500.0	200.0	V	228.0	2.3

Radiates Emission from 3GHz to 18GHz

The Radiates Emission was performed in all EDR mode (2DH5 and 3DH5), 3DH5 was selected as the worse condition. The test data of the worst-case condition was recorded in this report.

3DH5-Channel 0

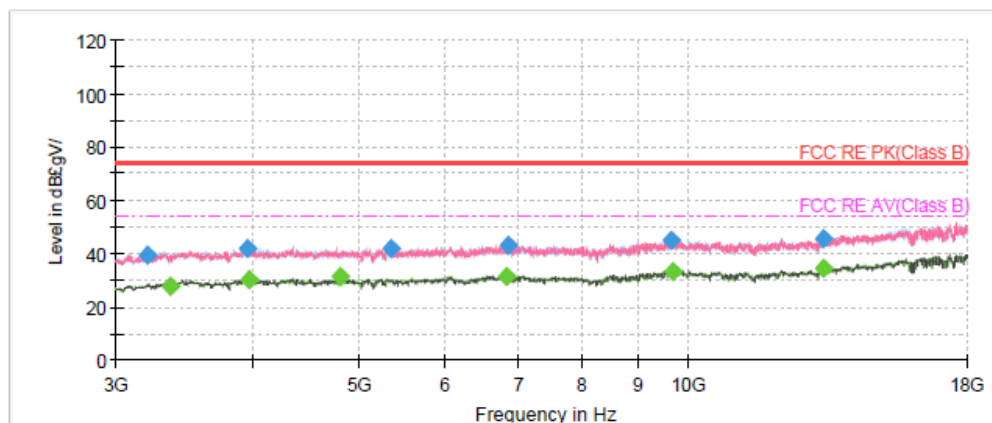


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Azim uth (deg)	Corr. (dB/m)
1195.000000	41.64	---	74.00	32.36	500.0	H	287.0	-8.9
1196.250000	---	30.36	54.00	23.64	500.0	H	202.0	-8.9
1331.500000	42.58	---	74.00	31.42	500.0	H	330.0	-8.0
1377.000000	---	31.64	54.00	22.36	500.0	H	279.0	-7.7
1707.750000	44.58	---	74.00	29.42	500.0	H	261.0	-5.9
1717.000000	---	32.74	54.00	21.26	500.0	H	279.0	-5.9
2019.500000	45.64	---	74.00	28.36	500.0	H	270.0	-4.4
2077.750000	---	34.65	54.00	19.35	500.0	H	287.0	-3.9
2262.750000	45.99	---	74.00	28.01	500.0	H	355.0	-3.0
2277.250000	---	34.79	54.00	19.21	500.0	H	134.0	-3.0
2916.750000	49.37	---	74.00	24.63	500.0	H	244.0	-1.0
2991.750000	---	37.77	54.00	16.23	500.0	H	143.0	-0.6

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

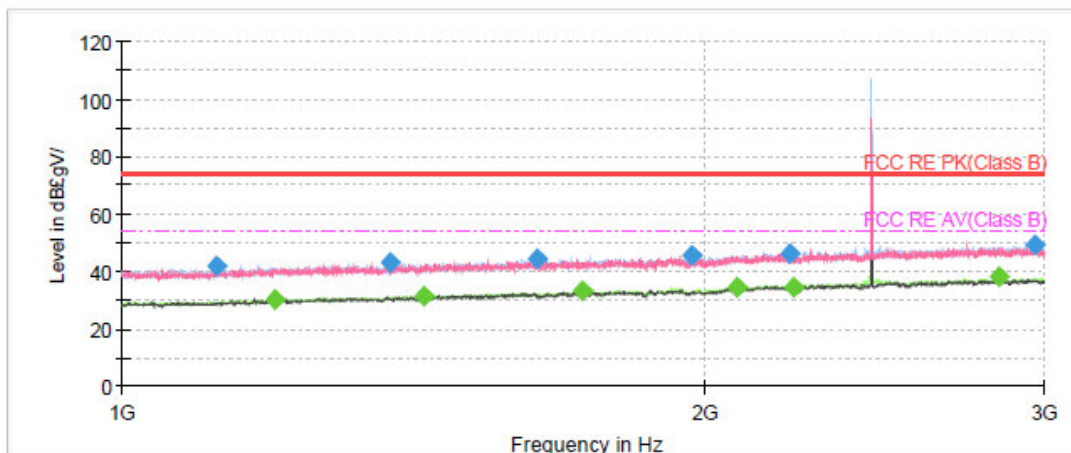


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3202.500000	39.24	---	74.00	34.76	500.0	100.0	H	0.0	-9.9
3358.125000	---	27.99	54.00	26.01	500.0	200.0	H	211.0	-9.0
3954.375000	41.74	---	74.00	32.26	500.0	200.0	H	82.0	-7.2
3973.125000	---	30.11	54.00	23.89	500.0	100.0	V	3.0	-6.9
4803.750000	---	31.29	54.00	22.71	500.0	100.0	H	331.0	-6.1
5345.625000	41.98	---	74.00	32.02	500.0	200.0	H	34.0	-4.8
6819.375000	---	31.63	54.00	22.37	500.0	200.0	H	0.0	-3.2
6849.375000	43.32	---	74.00	30.68	500.0	200.0	H	262.0	-3.2
9658.125000	44.73	---	74.00	29.27	500.0	200.0	V	298.0	-0.6
9678.750000	---	33.54	54.00	20.46	500.0	200.0	H	29.0	-0.7
13290.000000	45.30	---	74.00	28.70	500.0	200.0	H	34.0	2.3
13314.375000	---	34.20	54.00	19.80	500.0	200.0	H	53.0	2.3

Radiates Emission from 3GHz to 18GHz

3DH5-Channel 39

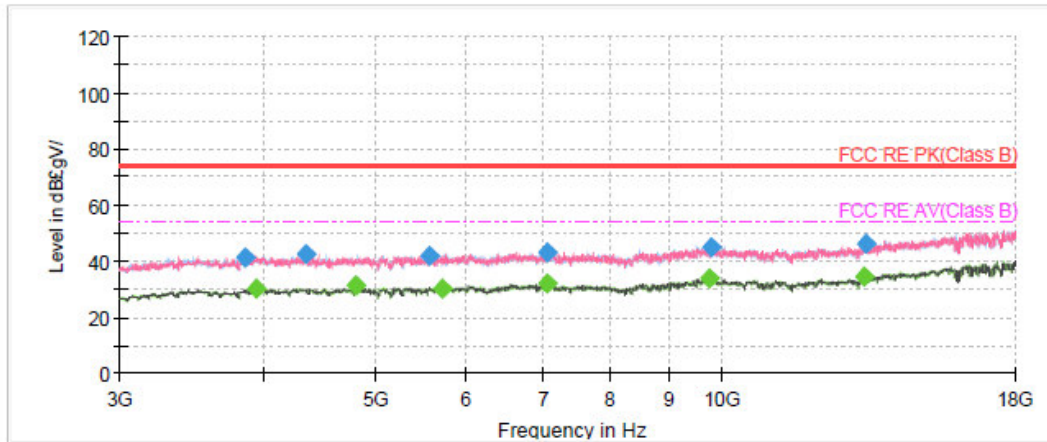


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Azim uth (deg)	Corr. (dB/m)
1117.750000	41.66	---	74.00	32.34	500.0	V	289.0	-10.0
1199.500000	---	30.23	54.00	23.77	500.0	H	0.0	-8.8
1377.000000	42.81	---	74.00	31.19	500.0	H	169.0	-7.7
1431.250000	---	31.47	54.00	22.53	500.0	H	246.0	-7.4
1638.500000	44.59	---	74.00	29.41	500.0	V	86.0	-6.2
1731.750000	---	33.00	54.00	21.00	500.0	H	134.0	-5.8
1971.000000	45.36	---	74.00	28.64	500.0	H	272.0	-4.7
2079.250000	---	34.73	54.00	19.27	500.0	V	35.0	-3.9
2216.000000	46.01	---	74.00	27.99	500.0	H	357.0	-3.2
2225.000000	---	34.42	54.00	19.58	500.0	H	340.0	-3.2
2841.250000	---	37.88	54.00	16.12	500.0	H	263.0	-1.1
2964.000000	49.40	---	74.00	24.60	500.0	V	103.0	-0.8

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

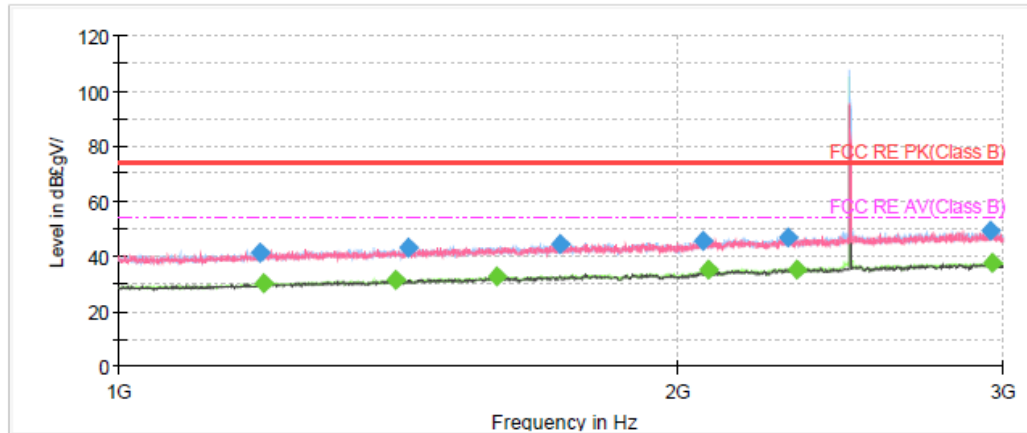


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3855.000000	41.17	---	74.00	32.83	500.0	100.0	H	130.0	-7.4
3935.625000	---	30.16	54.00	23.84	500.0	100.0	H	71.0	-7.3
4355.625000	42.24	---	74.00	31.76	500.0	200.0	V	322.0	-6.5
4803.750000	---	31.30	54.00	22.71	500.0	200.0	H	346.0	-6.1
5572.500000	42.12	---	74.00	31.88	500.0	100.0	H	358.0	-4.5
5709.375000	---	29.87	54.00	24.13	500.0	200.0	H	37.0	-4.4
7059.375000	---	31.77	54.00	22.23	500.0	200.0	H	62.0	-3.1
7068.750000	43.26	---	74.00	30.74	500.0	200.0	V	235.0	-3.0
9776.250000	---	33.61	54.00	20.39	500.0	100.0	H	81.0	-0.5
9789.375000	44.98	---	74.00	29.02	500.0	200.0	H	115.0	-0.5
13312.500000	---	34.31	54.00	19.69	500.0	100.0	H	144.0	2.3
13348.125000	46.08	---	74.00	27.92	500.0	200.0	H	135.0	2.4

Radiates Emission from 3GHz to 18GHz

3DH5-Channel 78

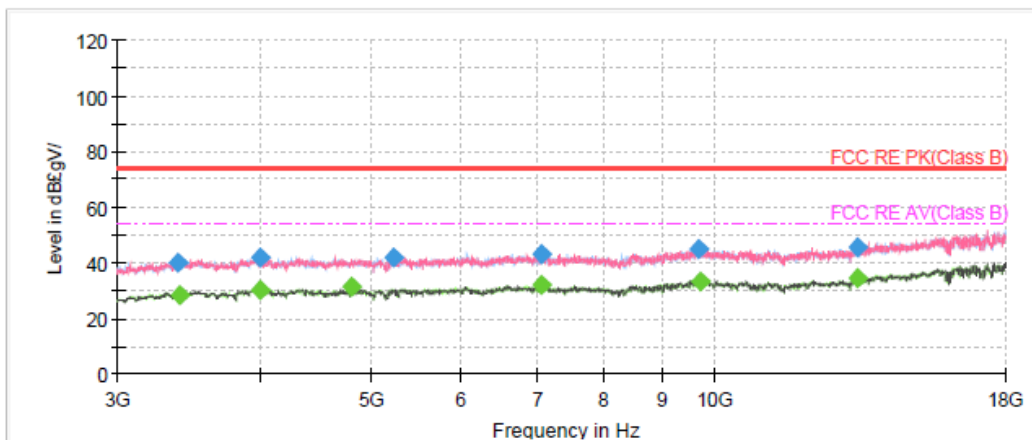


Final Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Pol	Azimuth (deg)	Corr. (dB/m)
1191.000000	41.11	---	74.00	32.89	500.0	V	245.0	-9.0
1197.750000	---	30.25	54.00	23.75	500.0	H	327.0	-8.8
1409.250000	---	31.55	54.00	22.45	500.0	H	320.0	-7.5
1432.000000	43.05	---	74.00	30.95	500.0	H	336.0	-7.4
1599.000000	---	32.65	54.00	21.35	500.0	H	137.0	-6.3
1730.750000	44.59	---	74.00	29.41	500.0	H	353.0	-5.8
2066.250000	45.63	---	74.00	28.37	500.0	H	344.0	-4.1
2079.000000	---	34.85	54.00	19.15	500.0	V	289.0	-3.9
2297.750000	46.81	---	74.00	27.19	500.0	H	327.0	-2.8
2321.250000	---	35.31	54.00	18.69	500.0	H	320.0	-2.9
2951.000000	49.25	---	74.00	24.75	500.0	H	258.0	-0.9
2959.750000	---	37.72	54.00	16.28	500.0	H	359.0	-0.8

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz



Final Result

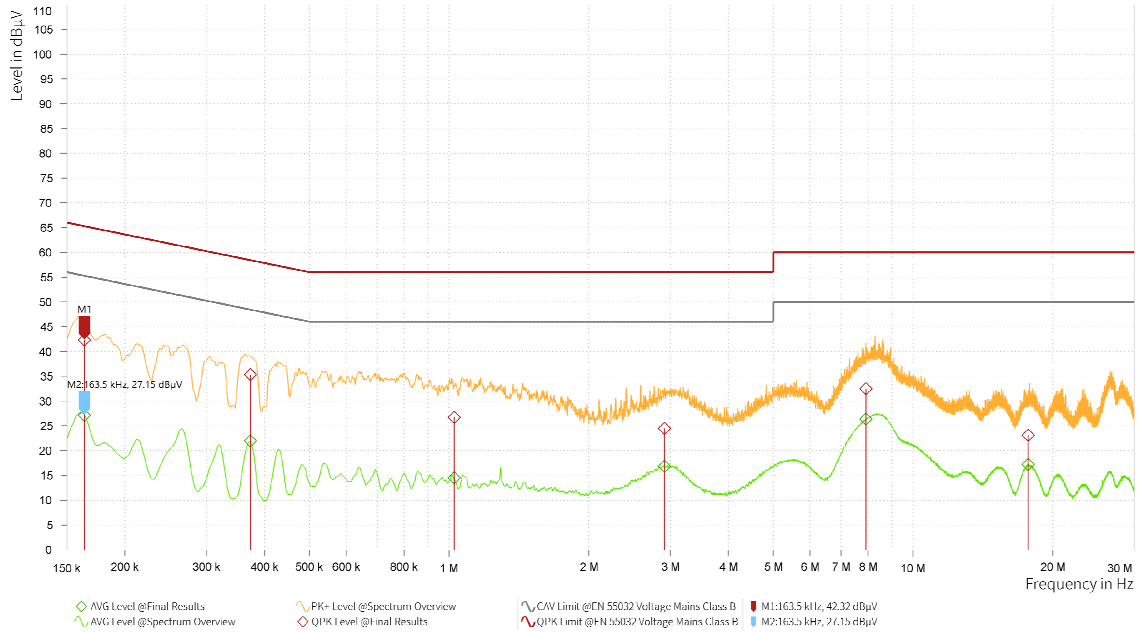
Frequency (MHz)	MaxPeak (dBµgV/m)	Average (dBµgV/m)	Limit (dBµgV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3384.375000	39.75	---	74.00	34.25	500.0	200.0	H	222.0	-8.8
3406.875000	---	28.34	54.00	25.66	500.0	200.0	H	275.0	-8.6
3999.375000	41.76	---	74.00	32.24	500.0	100.0	V	40.0	-6.8
4006.875000	---	30.22	54.00	23.78	500.0	100.0	V	0.0	-6.8
4803.750000	---	31.56	54.00	22.44	500.0	100.0	H	353.0	-6.1
5227.500000	41.62	---	74.00	32.38	500.0	100.0	H	200.0	-4.7
7055.625000	42.96	---	74.00	31.04	500.0	100.0	H	293.0	-3.1
7065.000000	---	32.21	54.00	21.79	500.0	100.0	H	171.0	-3.1
9684.375000	44.72	---	74.00	29.28	500.0	100.0	H	235.0	-0.7
9731.250000	---	33.39	54.00	20.61	500.0	100.0	H	235.0	-0.6
13333.125000	---	34.32	54.00	19.68	500.0	100.0	H	3.0	2.3
13340.625000	45.72	---	74.00	28.28	500.0	200.0	H	73.0	2.3

Radiates Emission from 3GHz to 18GHz

2. Conducted Emission

2.1. Bluetooth

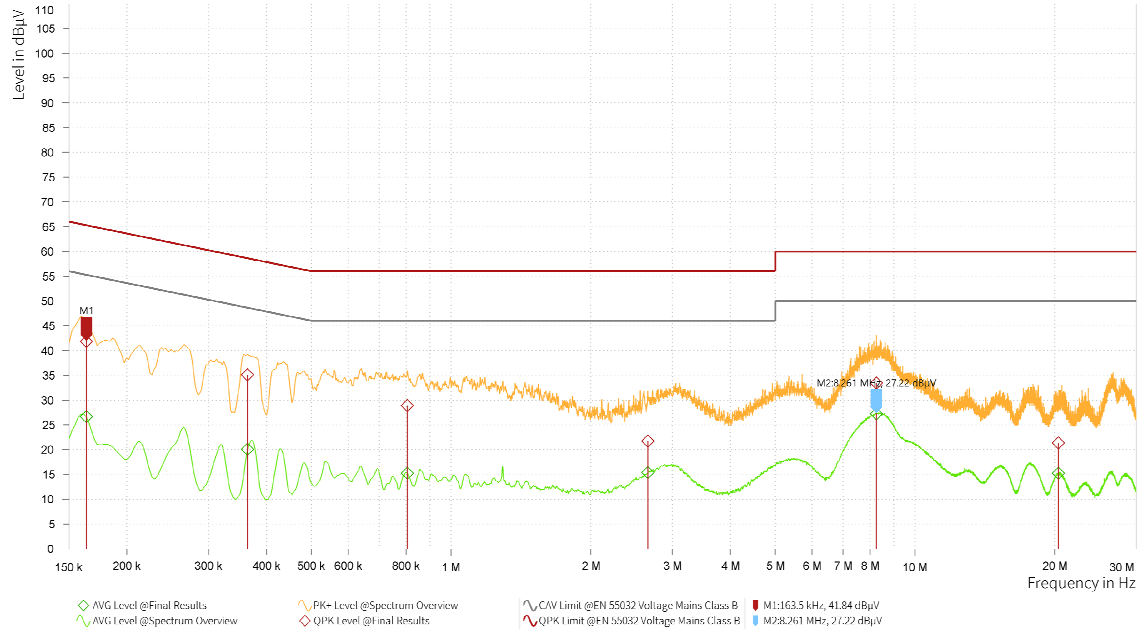
During the test, the Conducted Emission was performed in all modes with all channels. The test data of the worst-case condition was recorded in this report.



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]
0.164	42.32	65.28	22.97	27.15	55.28	28.13	20.89	L1	9.000	1.000
0.373	35.35	58.44	23.08	21.98	48.44	26.46	20.90	L1	9.000	1.000
1.025	26.72	56.00	29.28	14.53	46.00	31.47	20.14	L1	9.000	1.000
2.911	24.47	56.00	31.53	16.86	46.00	29.14	19.49	L1	9.000	1.000
7.917	32.50	60.00	27.50	26.36	50.00	23.64	19.41	L1	9.000	1.000
17.727	23.08	60.00	36.92	17.22	50.00	32.78	19.59	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]
0.164	41.84	65.28	23.45	26.66	55.28	28.63	20.90	N	9.000	1.000
0.364	35.09	58.64	23.55	20.05	48.64	28.59	20.92	N	9.000	1.000
0.805	28.88	56.00	27.12	15.20	46.00	30.80	20.33	N	9.000	1.000
2.654	21.74	56.00	34.26	15.39	46.00	30.61	19.53	N	9.000	1.000
8.261	33.43	60.00	26.57	27.22	50.00	22.78	19.42	N	9.000	1.000
20.382	21.34	60.00	38.66	15.23	50.00	34.77	19.72	N	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz