

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 (Y axis) and the loop antenna is coplanar, the others are vertical and horizontal. and the worst case was recorded.

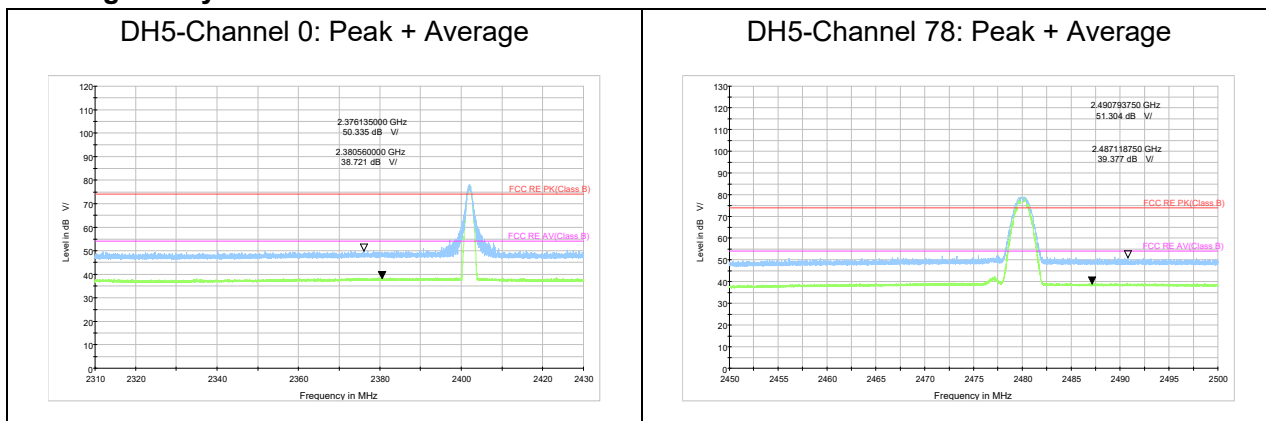
1. Unwanted Emission

1.1. Bluetooth

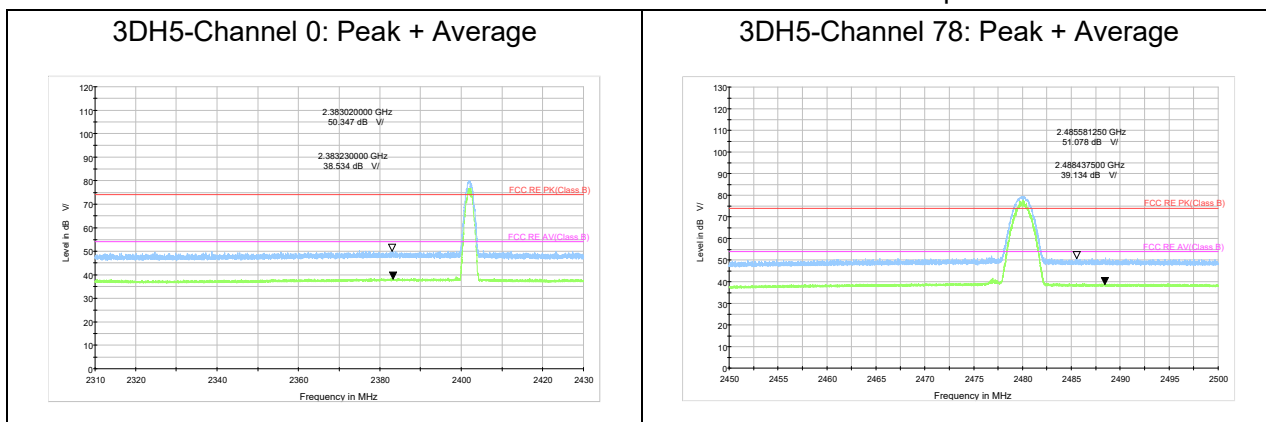
The following graphs display the maximum values of horizontal and vertical by software. Blue trace uses the peak detection, Green trace uses the average detection.

A symbol ($\text{dB } \mu\text{V/m}$) 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 9kHz to 30MHz 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 ($\text{dB}_{\text{dBm}}/\text{m}$) in the test plot below means (dB $\mu\text{V}/\text{m}$)**
A symbol ($\text{dB}_{\text{dBV}}/\text{m}$) in the test plot below means (dB $\mu\text{V}/\text{m}$)
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**

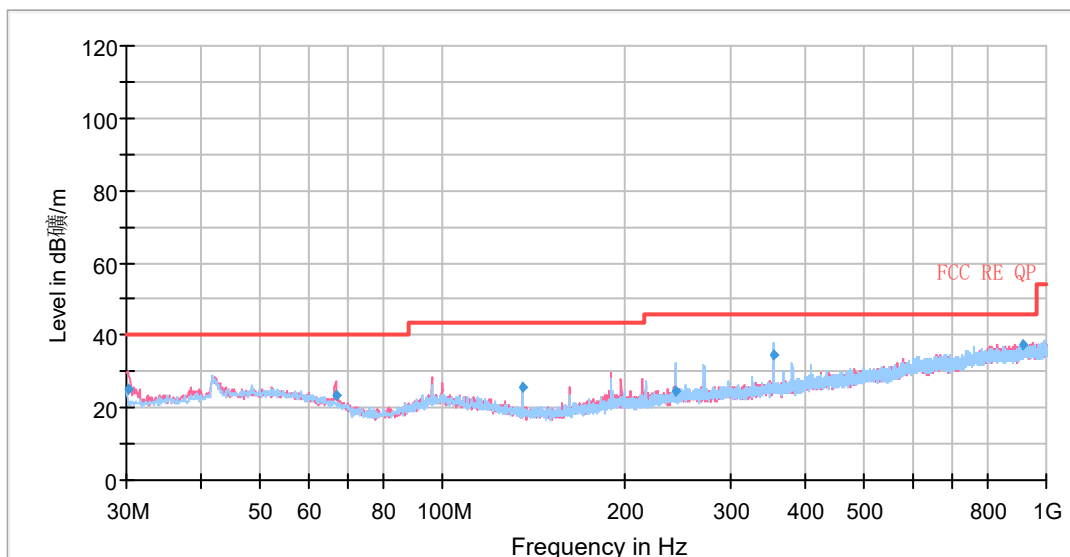
 QP Level @Spectrum Overview H
  QP Level @Spectrum Overview V
  QP Level @Final Results
  QP Limit

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:

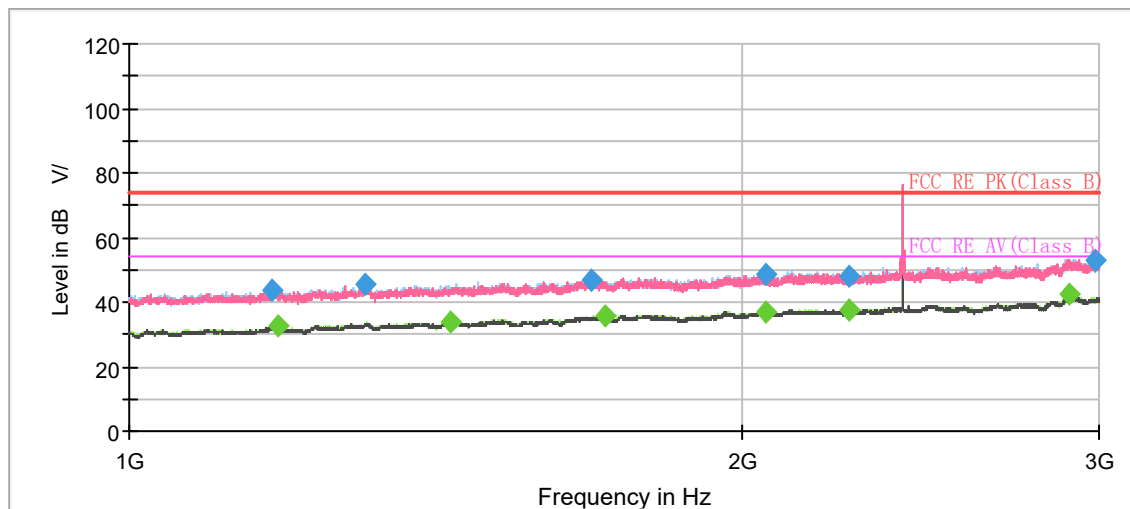
During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels. The test data of the worst-case condition (DH5-Channel 0) was recorded in this report.



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)
30.12	25.24	40.00	14.76	1000.00	200.0	V	106.00	17
66.62	23.47	40.00	16.53	1000.00	100.0	V	0.00	17
135.61	25.65	43.50	17.85	1000.00	200.0	H	210.00	15
244.01	24.32	46.00	21.68	1000.00	100.0	H	235.00	20
352.65	34.34	46.00	11.66	1000.00	100.0	H	256.00	22
915.49	37.38	46.00	8.62	1000.00	100.0	V	327.00	31

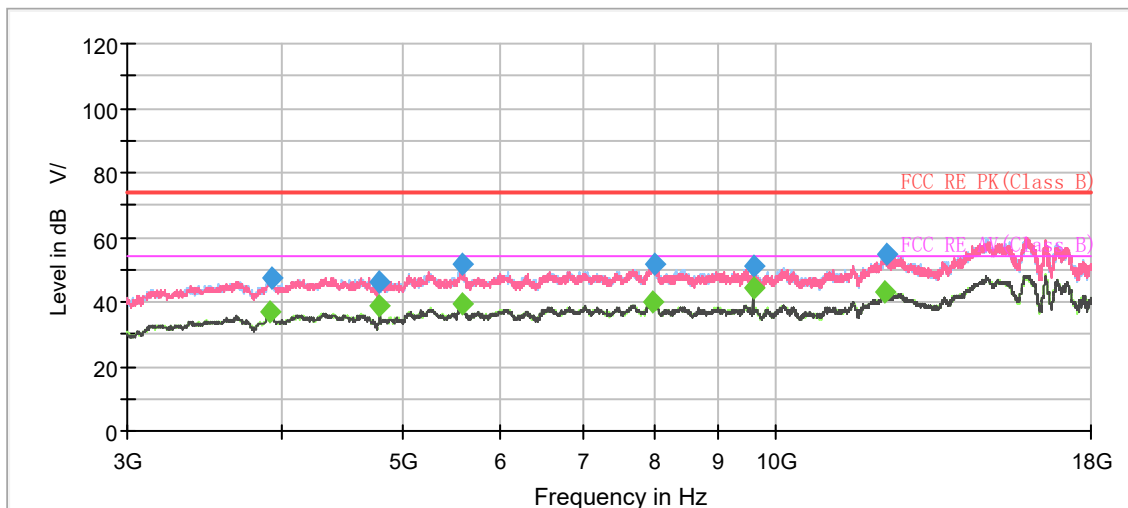
DH5-Channel 0



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

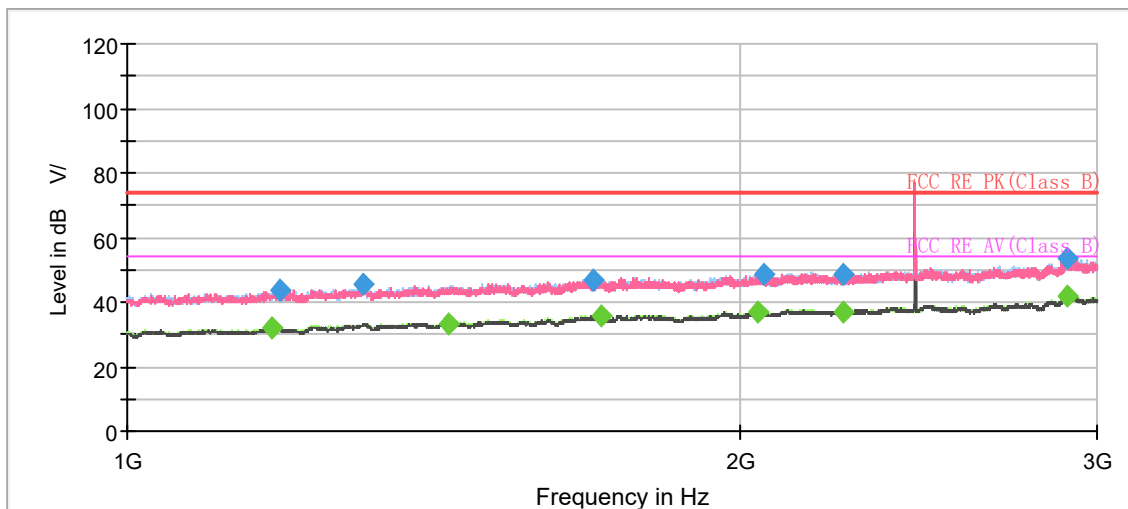
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1176.000000	43.75	---	74.00	30.25	500.0	100.0	H	148.0	-4.2
1184.500000	---	32.49	54.00	21.51	500.0	200.0	V	196.0	-3.9
1307.750000	45.37	---	74.00	28.63	500.0	100.0	H	233.0	-2.1
1438.750000	---	33.85	54.00	20.15	500.0	200.0	H	18.0	-1.7
1689.500000	46.50	---	74.00	27.50	500.0	100.0	H	354.0	0.4
1712.750000	---	35.54	54.00	18.46	500.0	100.0	H	233.0	0.4
2055.500000	---	36.96	54.00	17.04	500.0	200.0	V	148.0	2.4
2057.500000	48.49	---	74.00	25.51	500.0	200.0	V	209.0	2.3
2259.750000	47.92	---	74.00	26.08	500.0	100.0	H	233.0	2.8
2260.000000	---	37.61	54.00	16.39	500.0	200.0	V	196.0	2.8
2900.000000	---	42.27	54.00	11.73	500.0	100.0	H	134.0	8.6
2983.500000	53.14	---	74.00	20.86	500.0	100.0	V	46.0	8.1



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)	Corr. (dB/m)
3907.500000	---	36.67	54.00	17.33	500.0	100.0	V	249.0	3.6
3924.375000	47.47	---	74.00	26.53	500.0	100.0	V	26.0	2.7
4800.000000	---	39.07	54.00	14.93	500.0	200.0	V	245.0	2.1
4800.000000	46.38	---	74.00	27.62	500.0	100.0	V	306.0	2.1
5591.250000	---	39.16	54.00	14.84	500.0	200.0	H	286.0	8.1
5593.125000	51.64	---	74.00	22.36	500.0	200.0	V	51.0	8.1
7966.875000	---	40.06	54.00	13.94	500.0	100.0	H	171.0	9.9
7987.500000	51.96	---	74.00	22.05	500.0	200.0	H	123.0	9.9
9601.875000	51.02	---	74.00	22.98	500.0	200.0	V	24.0	7.7
9601.875000	---	44.07	54.00	9.93	500.0	100.0	V	346.0	7.7
12273.750000	---	43.30	54.00	10.70	500.0	100.0	V	0.0	14.6
12292.500000	54.54	---	74.00	19.46	500.0	200.0	H	260.0	14.3

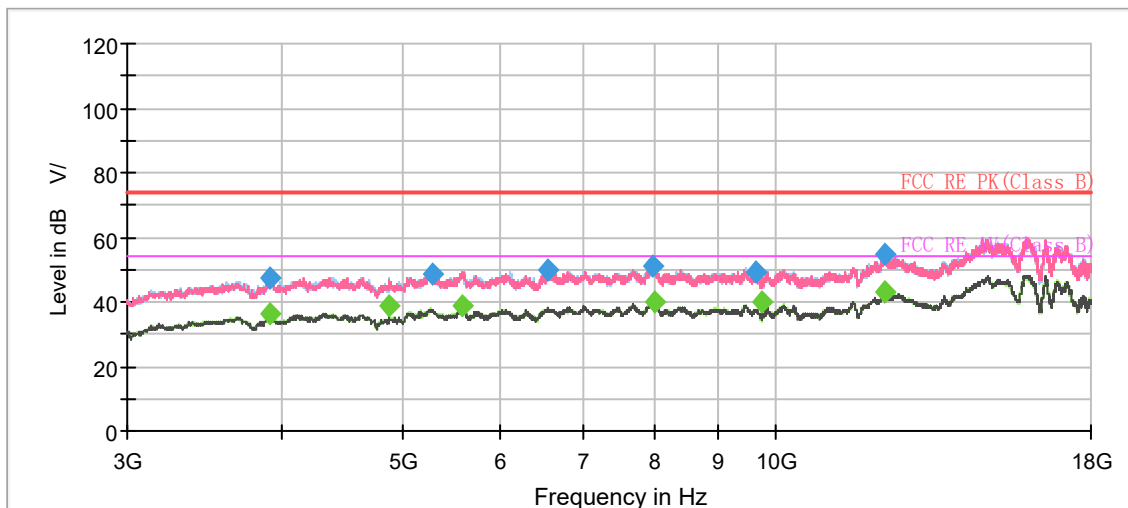
DH5-Channel 39



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

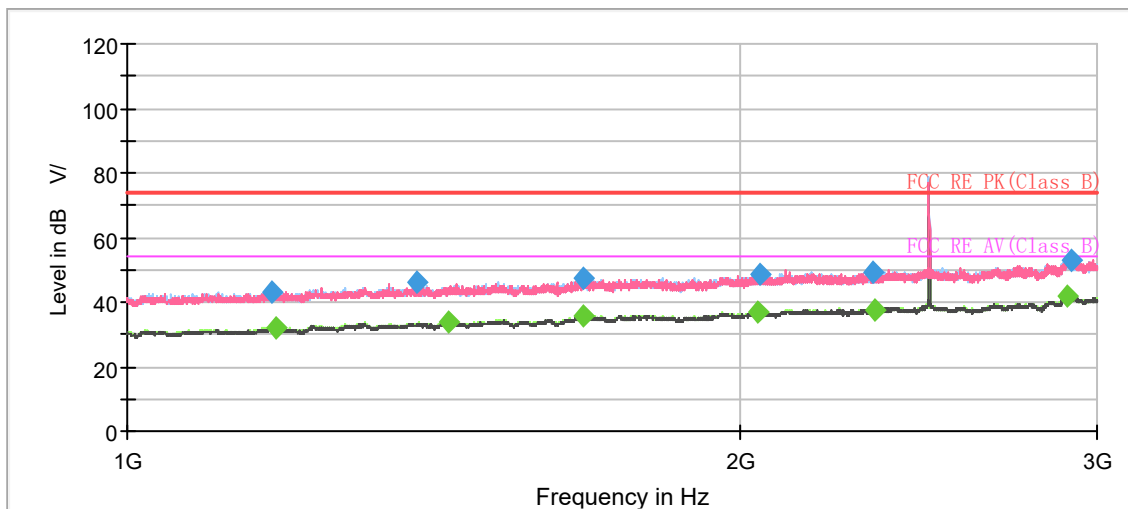
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1177.250000	---	32.17	54.00	21.83	500.0	100.0	H	209.0	-4.1
1189.000000	43.58	---	74.00	30.42	500.0	200.0	V	36.0	-4.1
1305.250000	45.39	---	74.00	28.61	500.0	100.0	H	329.0	-2.3
1439.250000	---	33.51	54.00	20.49	500.0	200.0	H	0.0	-1.7
1695.750000	46.92	---	74.00	27.08	500.0	100.0	H	122.0	0.3
1710.750000	---	35.54	54.00	18.46	500.0	200.0	V	0.0	0.5
2044.250000	---	37.06	54.00	16.94	500.0	100.0	V	187.0	2.5
2054.750000	48.46	---	74.00	25.54	500.0	100.0	V	93.0	2.4
2250.500000	48.66	---	74.00	25.34	500.0	100.0	V	213.0	3.0
2251.250000	---	36.96	54.00	17.04	500.0	200.0	H	88.0	3.0
2902.250000	---	42.10	54.00	11.90	500.0	200.0	H	0.0	8.6
2903.000000	53.25	---	74.00	20.75	500.0	200.0	H	5.0	8.5



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)	Corr. (dB/m)
3905.625000	---	36.54	54.00	17.46	500.0	200.0	H	0.0	3.5
3916.875000	47.36	---	74.00	26.64	500.0	200.0	V	113.0	3.2
4878.750000	---	38.93	54.00	15.07	500.0	100.0	V	247.0	3.1
5293.125000	48.66	---	74.00	25.34	500.0	200.0	H	221.0	6.2
5593.125000	---	39.01	54.00	14.99	500.0	200.0	H	326.0	8.1
6558.750000	49.73	---	74.00	24.27	500.0	200.0	H	133.0	6.8
7980.000000	51.17	---	74.00	22.83	500.0	200.0	H	287.0	9.9
8000.625000	---	40.12	54.00	13.88	500.0	100.0	H	138.0	9.9
9656.250000	49.22	---	74.00	24.78	500.0	100.0	V	100.0	8.4
9757.500000	---	40.04	54.00	13.96	500.0	200.0	V	0.0	6.2
12271.875000	---	43.33	54.00	10.67	500.0	100.0	V	26.0	14.6
12285.000000	54.79	---	74.00	19.21	500.0	100.0	V	352.0	14.4

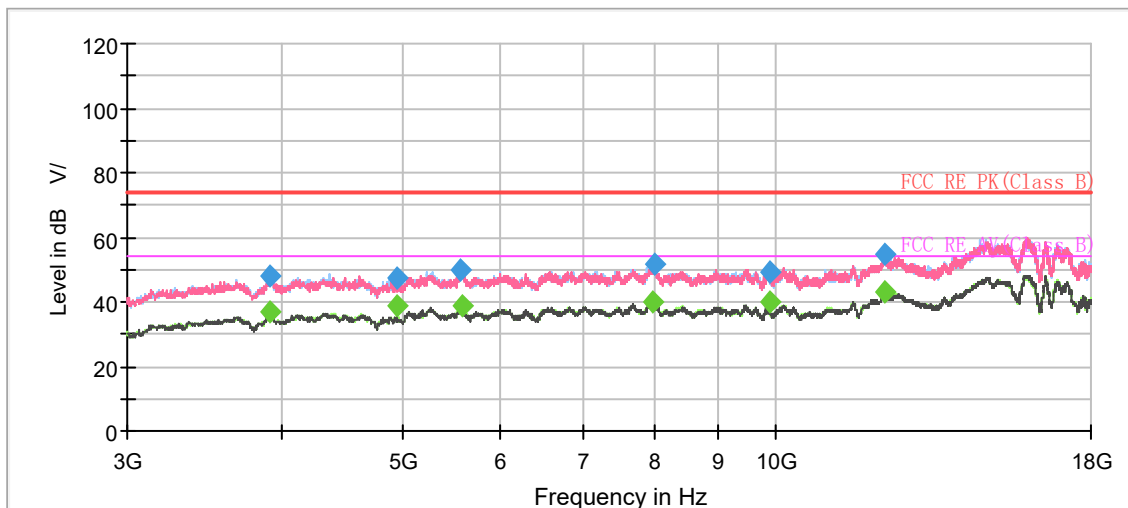
DH5-Channel 78



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)	Corr. (dB/m)
1179.500000	43.20	---	74.00	30.80	500.0	200.0	V	217.0	-4.0
1182.750000	---	32.12	54.00	21.88	500.0	200.0	H	321.0	-3.9
1387.500000	46.11	---	74.00	27.89	500.0	200.0	H	157.0	-2.4
1440.000000	---	33.74	54.00	20.26	500.0	100.0	H	317.0	-1.7
1677.000000	47.15	---	74.00	26.85	500.0	100.0	V	0.0	0.4
1677.750000	---	35.49	54.00	18.51	500.0	200.0	H	0.0	0.4
2045.000000	---	36.82	54.00	17.18	500.0	200.0	H	61.0	2.5
2047.250000	48.73	---	74.00	25.27	500.0	100.0	V	58.0	2.6
2329.000000	48.94	---	74.00	25.06	500.0	100.0	V	270.0	3.3
2334.000000	---	37.23	54.00	16.77	500.0	200.0	H	0.0	3.3
2898.750000	---	41.95	54.00	12.05	500.0	200.0	H	24.0	8.5
2914.750000	53.04	---	74.00	20.96	500.0	200.0	V	0.0	8.3

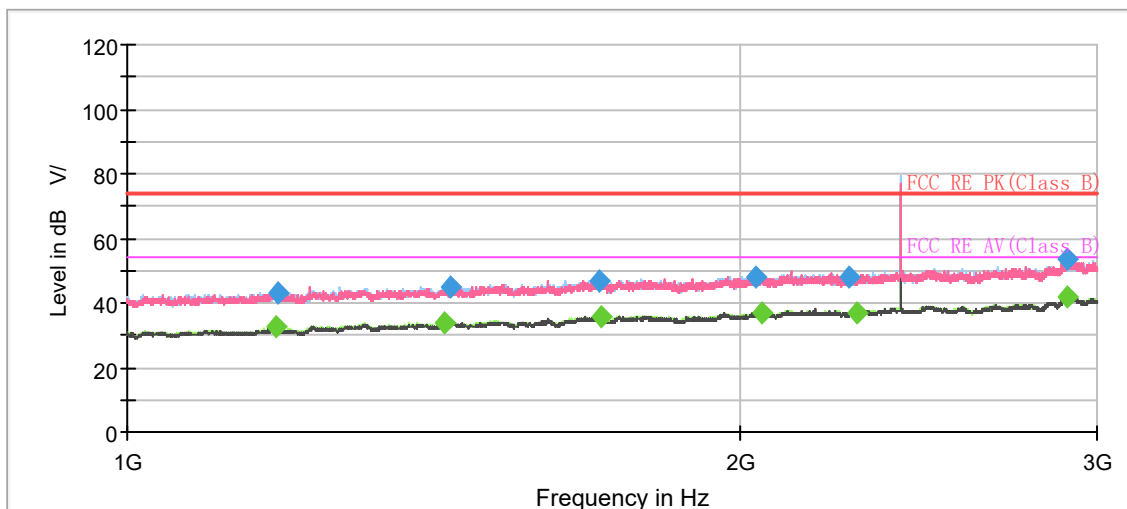


Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3907.500000	47.87	---	74.00	26.13	500.0	200.0	H	0.0	3.6
3909.375000	---	36.82	54.00	17.18	500.0	200.0	H	323.0	3.7
4955.625000	---	38.85	54.00	15.15	500.0	100.0	V	290.0	3.2
4955.625000	47.53	---	74.00	26.47	500.0	100.0	V	290.0	3.2
5572.500000	49.83	---	74.00	24.17	500.0	100.0	H	222.0	7.2
5591.250000	---	38.83	54.00	15.17	500.0	200.0	H	40.0	8.1
7978.125000	---	40.13	54.00	13.87	500.0	200.0	H	309.0	9.9
7987.500000	51.49	---	74.00	22.51	500.0	100.0	H	304.0	9.9
9913.125000	49.22	---	74.00	24.78	500.0	200.0	V	198.0	8.3
9913.125000	---	39.94	54.00	14.06	500.0	100.0	V	202.0	8.3
12271.875000	54.65	---	74.00	19.35	500.0	200.0	H	82.0	14.6
12273.750000	---	43.22	54.00	10.78	500.0	100.0	H	236.0	14.6

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.

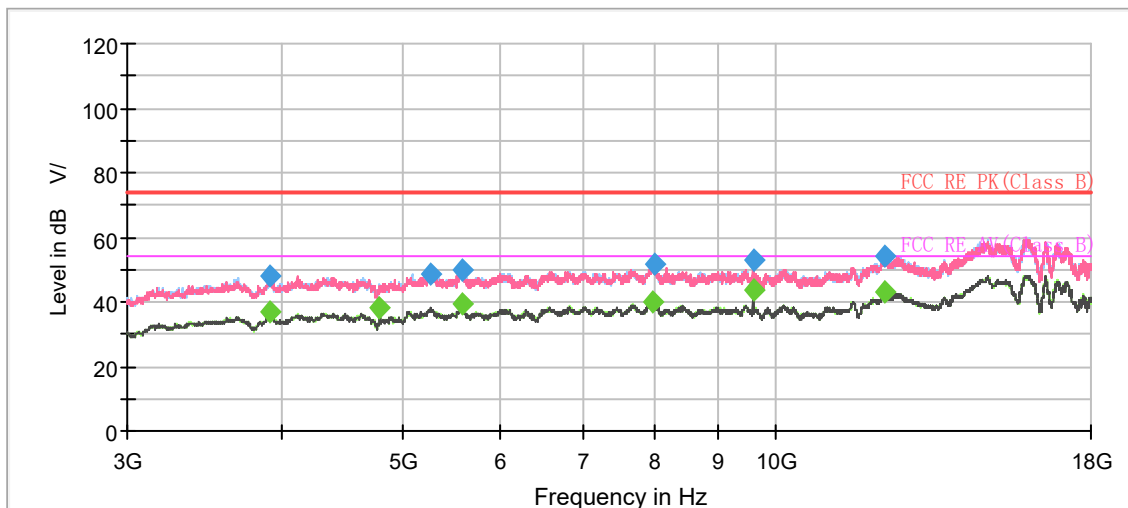
3DH5-Channel 0



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

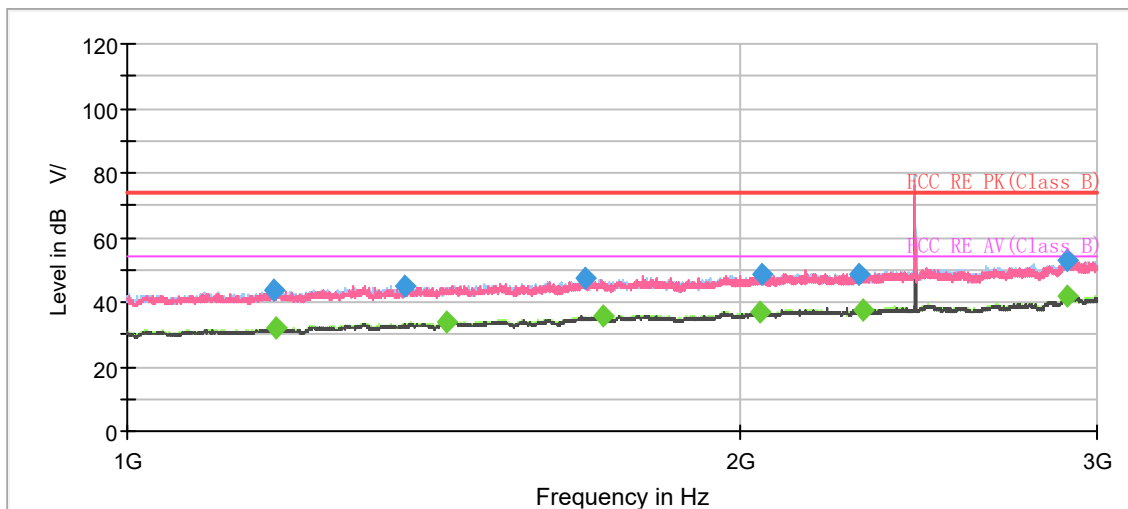
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1184.750000	---	32.37	54.00	21.63	500.0	200.0	H	34.0	-3.9
1186.000000	43.20	---	74.00	30.80	500.0	200.0	V	306.0	-4.0
1432.250000	---	33.63	54.00	20.37	500.0	100.0	V	235.0	-1.9
1440.750000	44.86	---	74.00	29.14	500.0	100.0	H	282.0	-1.7
1706.250000	46.94	---	74.00	27.06	500.0	200.0	H	359.0	0.4
1709.000000	---	35.50	54.00	18.50	500.0	100.0	H	354.0	0.5
2037.000000	48.29	---	74.00	25.71	500.0	100.0	H	62.0	2.4
2050.750000	---	37.07	54.00	16.93	500.0	100.0	V	198.0	2.5
2263.250000	47.82	---	74.00	26.18	500.0	200.0	H	69.0	2.8
2286.750000	---	37.06	54.00	16.94	500.0	200.0	V	245.0	3.1
2900.000000	---	41.99	54.00	12.01	500.0	100.0	H	23.0	8.6
2900.000000	53.36	---	74.00	20.64	500.0	200.0	V	175.0	8.6



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)	Corr. (dB/m)
3909.375000	---	36.81	54.00	17.19	500.0	200.0	V	0.0	3.7
3916.875000	47.99	---	74.00	26.01	500.0	200.0	V	208.0	3.2
4800.000000	---	38.45	54.00	15.55	500.0	200.0	V	303.0	2.1
5278.125000	48.76	---	74.00	25.24	500.0	100.0	V	20.0	6.4
5591.250000	49.70	---	74.00	24.30	500.0	100.0	H	0.0	8.1
5595.000000	---	39.23	54.00	14.77	500.0	200.0	V	180.0	8.0
7959.375000	---	40.23	54.00	13.77	500.0	200.0	H	89.0	9.9
7985.625000	51.77	---	74.00	22.23	500.0	200.0	H	116.0	9.9
9601.875000	52.87	---	74.00	21.13	500.0	100.0	V	358.0	7.7
9601.875000	---	43.95	54.00	10.05	500.0	200.0	V	11.0	7.7
12247.500000	---	43.25	54.00	10.75	500.0	100.0	H	337.0	14.0
12247.500000	54.42	---	74.00	19.58	500.0	100.0	H	337.0	14.0

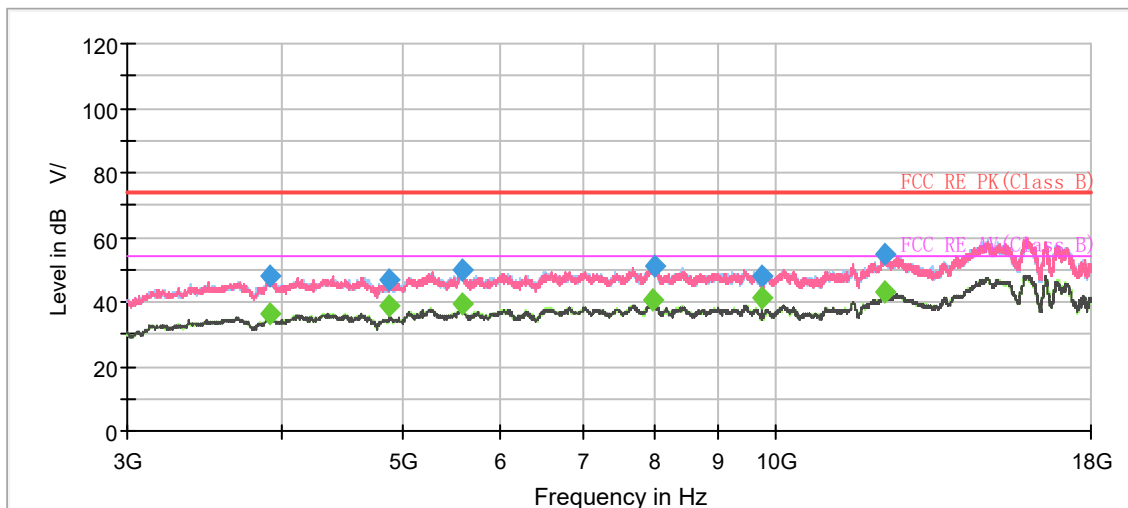
3DH5-Channel 39



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

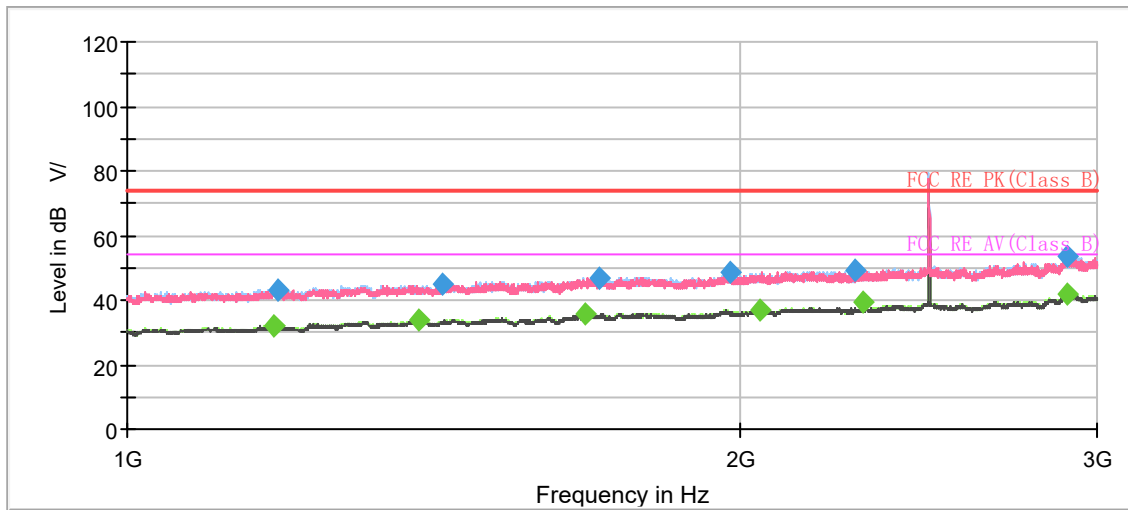
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1181.000000	43.53	---	74.00	30.47	500.0	200.0	H	102.0	-4.0
1183.500000	---	32.08	54.00	21.92	500.0	200.0	H	113.0	-3.9
1371.000000	44.88	---	74.00	29.12	500.0	200.0	H	175.0	-2.5
1434.750000	---	33.76	54.00	20.24	500.0	100.0	H	61.0	-1.8
1680.500000	47.25	---	74.00	26.75	500.0	100.0	V	0.0	0.4
1713.500000	---	35.71	54.00	18.29	500.0	200.0	H	17.0	0.4
2048.500000	---	37.06	54.00	16.94	500.0	100.0	H	0.0	2.5
2050.250000	48.60	---	74.00	25.40	500.0	100.0	H	74.0	2.5
2292.250000	48.48	---	74.00	25.52	500.0	100.0	V	173.0	3.2
2302.000000	---	37.68	54.00	16.32	500.0	100.0	V	101.0	3.4
2898.500000	53.07	---	74.00	20.93	500.0	100.0	V	297.0	8.5
2898.750000	---	42.08	54.00	11.92	500.0	100.0	H	359.0	8.5



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3907.500000	---	36.60	54.00	17.40	500.0	200.0	V	144.0	3.6
3916.875000	48.07	---	74.00	25.93	500.0	200.0	H	81.0	3.2
4878.750000	---	38.70	54.00	15.30	500.0	100.0	V	289.0	3.1
4878.750000	46.47	---	74.00	27.53	500.0	100.0	V	289.0	3.1
5593.125000	---	39.24	54.00	14.76	500.0	100.0	H	0.0	8.1
5593.125000	49.62	---	74.00	24.38	500.0	200.0	H	217.0	8.1
7980.000000	---	40.35	54.00	13.65	500.0	100.0	V	316.0	9.9
7987.500000	51.24	---	74.00	22.76	500.0	200.0	V	359.0	9.9
9757.500000	47.89	---	74.00	26.11	500.0	100.0	H	64.0	6.2
9757.500000	---	41.29	54.00	12.71	500.0	200.0	V	43.0	6.2
12260.625000	54.55	---	74.00	19.45	500.0	200.0	H	349.0	14.3
12271.875000	---	43.27	54.00	10.73	500.0	200.0	V	156.0	14.6

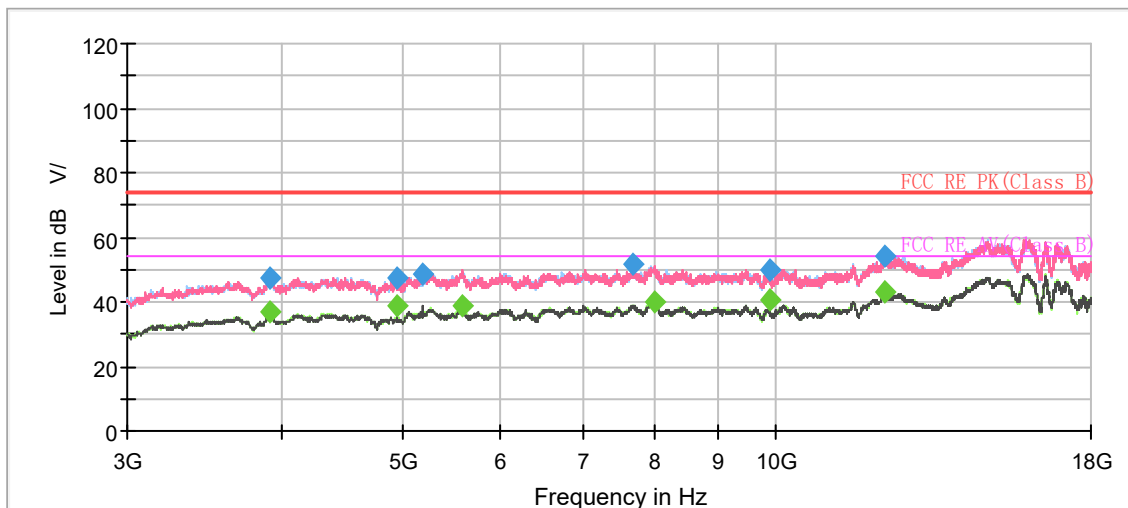
3DH5-Channel 78



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)	Corr. (dB/m)
1181.000000	---	32.11	54.00	21.89	500.0	200.0	H	285.0	-4.0
1186.750000	43.36	---	74.00	30.64	500.0	100.0	H	209.0	-4.0
1390.500000	---	33.84	54.00	20.16	500.0	100.0	H	149.0	-2.4
1430.250000	44.97	---	74.00	29.03	500.0	200.0	V	0.0	-2.0
1679.750000	---	35.55	54.00	18.45	500.0	200.0	V	289.0	0.4
1706.750000	46.86	---	74.00	27.14	500.0	100.0	H	220.0	0.5
1979.500000	48.65	---	74.00	25.35	500.0	100.0	H	0.0	1.8
2047.750000	---	37.08	54.00	16.92	500.0	200.0	V	278.0	2.6
2280.500000	49.33	---	74.00	24.67	500.0	100.0	H	100.0	3.0
2302.500000	---	39.52	54.00	14.48	500.0	200.0	V	184.0	3.4
2900.750000	---	42.08	54.00	11.92	500.0	200.0	V	289.0	8.6
2902.000000	53.42	---	74.00	20.58	500.0	100.0	V	0.0	8.6



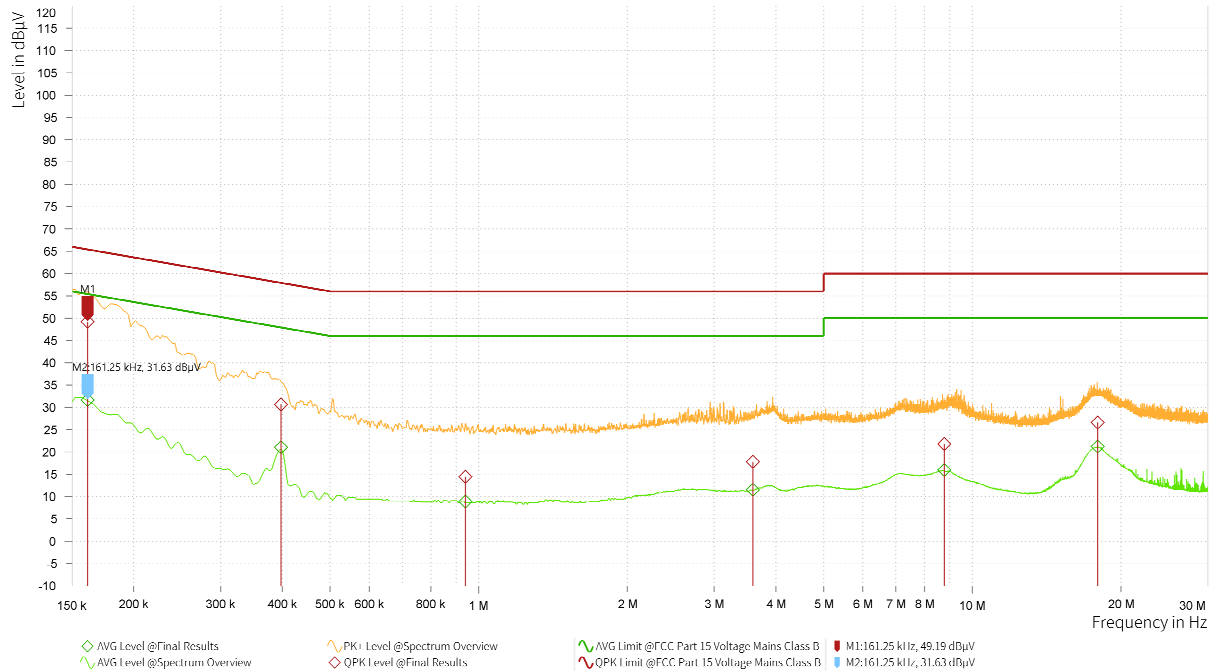
Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3909.375000	---	36.70	54.00	17.30	500.0	200.0	H	229.0	3.7
3916.875000	47.16	---	74.00	26.84	500.0	200.0	H	311.0	3.2
4955.625000	---	38.60	54.00	15.40	500.0	100.0	V	254.0	3.2
4955.625000	47.69	---	74.00	26.31	500.0	100.0	V	254.0	3.2
5199.375000	48.70	---	74.00	25.30	500.0	100.0	V	135.0	4.8
5591.250000	---	38.73	54.00	15.27	500.0	200.0	V	50.0	8.1
7685.625000	51.50	---	74.00	22.50	500.0	200.0	H	110.0	9.3
7993.125000	---	40.00	54.00	14.00	500.0	100.0	V	108.0	9.9
9913.125000	49.54	---	74.00	24.46	500.0	200.0	V	195.0	8.3
9913.125000	---	40.90	54.00	13.10	500.0	200.0	V	195.0	8.3
12264.375000	---	43.24	54.00	10.76	500.0	100.0	H	21.0	14.4
12270.000000	54.43	---	74.00	19.57	500.0	200.0	V	130.0	14.5

2. Conducted Emission

2.1. Bluetooth

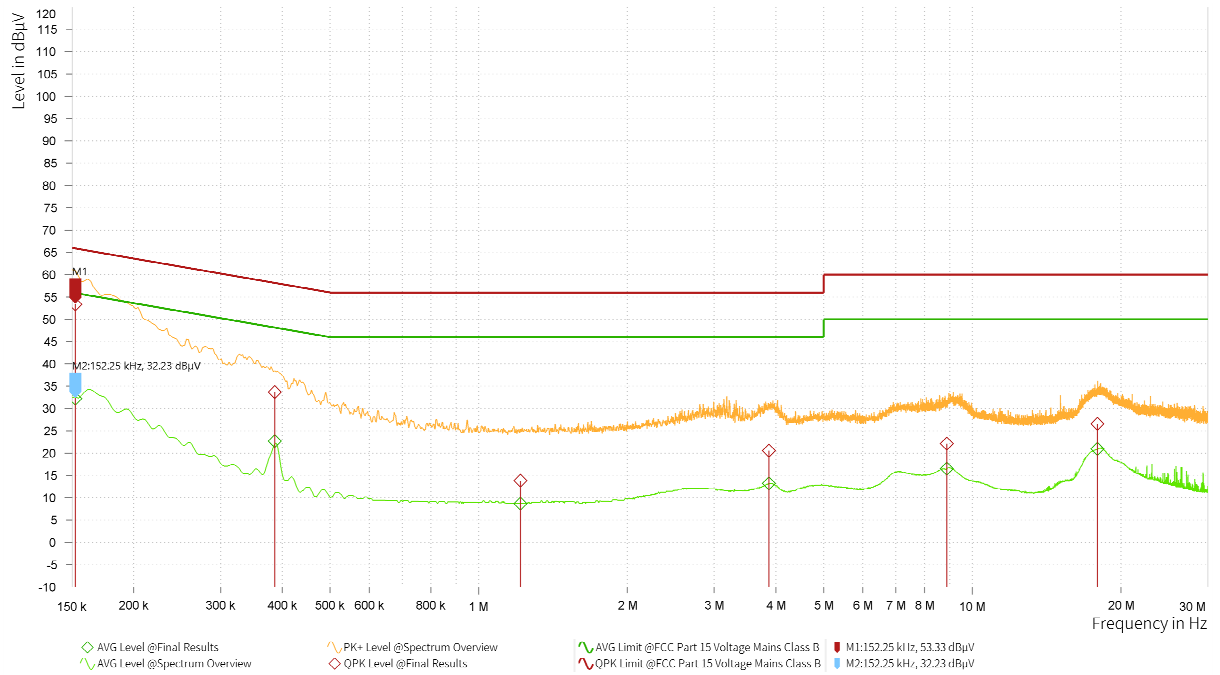
During the test, the Conducted Emission was performed in all modes with all channels. The test data of the worst-case condition (DH5-Channel 0) was recorded in this report.



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	49.19	65.40	16.21	31.63	55.40	23.77	20.89	L1	9.000	1.000
0.398	30.63	57.91	27.28	21.05	47.91	26.85	20.88	L1	9.000	1.000
0.940	14.41	56.00	41.59	8.88	46.00	37.12	20.21	L1	9.000	1.000
3.595	17.80	56.00	38.20	11.54	46.00	34.46	19.44	L1	9.000	1.000
8.772	21.80	60.00	38.20	15.94	50.00	34.06	19.41	L1	9.000	1.000
17.959	26.60	60.00	33.40	21.20	50.00	28.80	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 Limit [dBμV]	AVG Margin [dB]	Correction [dB]	Line	Meas. BW [kHz]	Meas. Time [s]
0.152	53.33	65.88	12.55	32.23	55.88	23.64	20.91	N	9.000	1.000
0.386	33.67	58.14	24.47	22.71	48.14	25.44	20.90	N	9.000	1.000
1.214	13.82	56.00	42.18	8.69	46.00	37.31	20.02	N	9.000	1.000
3.872	20.55	56.00	35.45	13.19	46.00	32.81	19.44	N	9.000	1.000
8.882	22.13	60.00	37.87	16.51	50.00	33.49	19.42	N	9.000	1.000
17.936	26.55	60.00	33.45	20.96	50.00	29.04	19.64	N	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz