

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

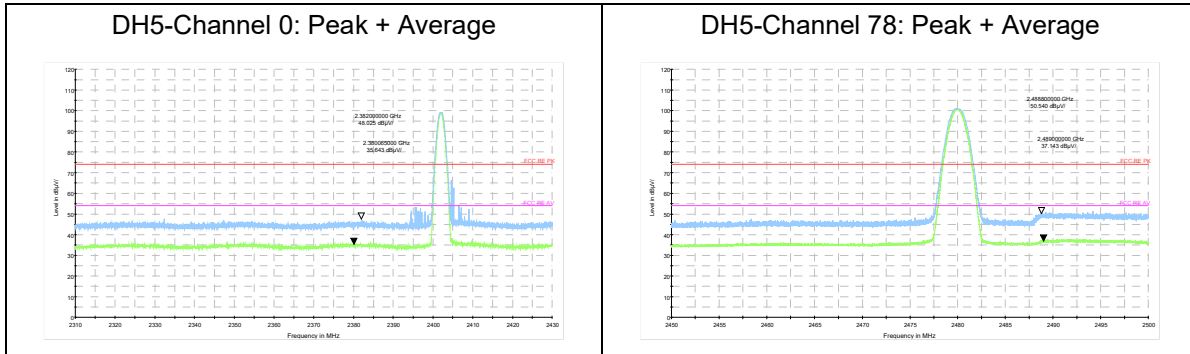
1. Unwanted Emission

1.1. Bluetooth

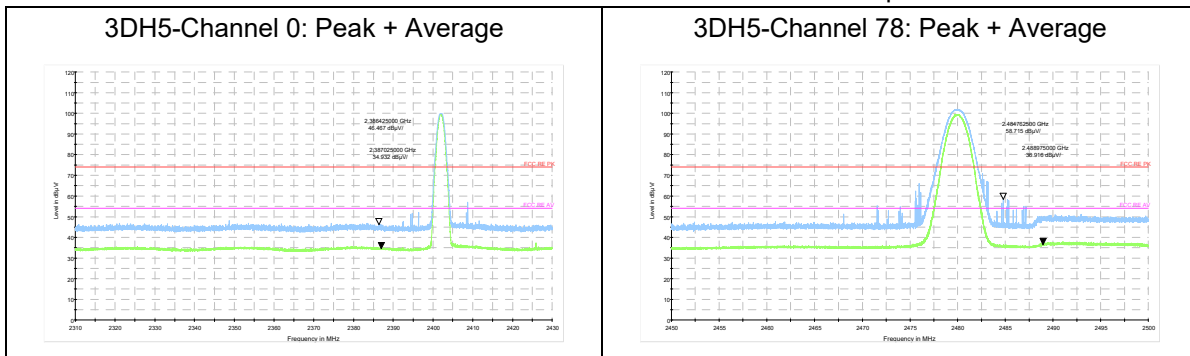
The following graphs display the maximum values of horizontal and vertical by software. Blue trace uses the peak detection, Green trace uses the average detection.

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

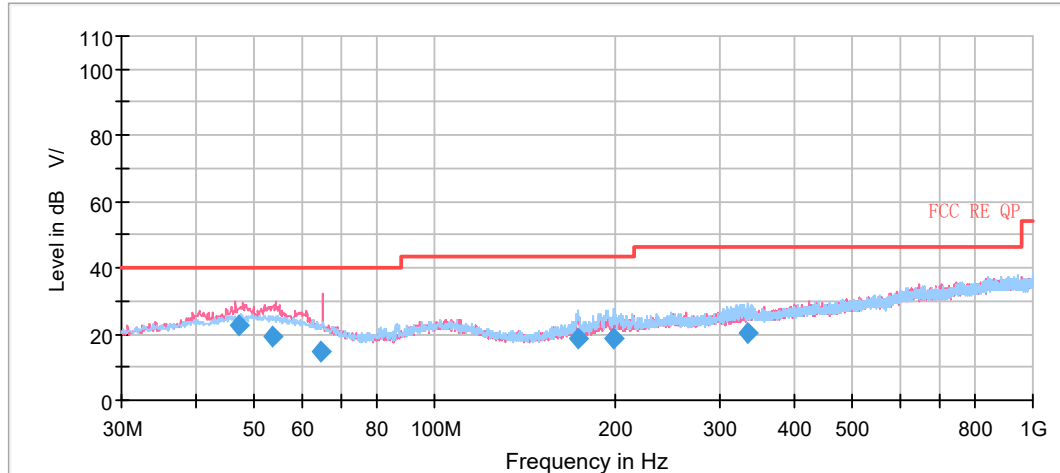
For above 1GHz

 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:

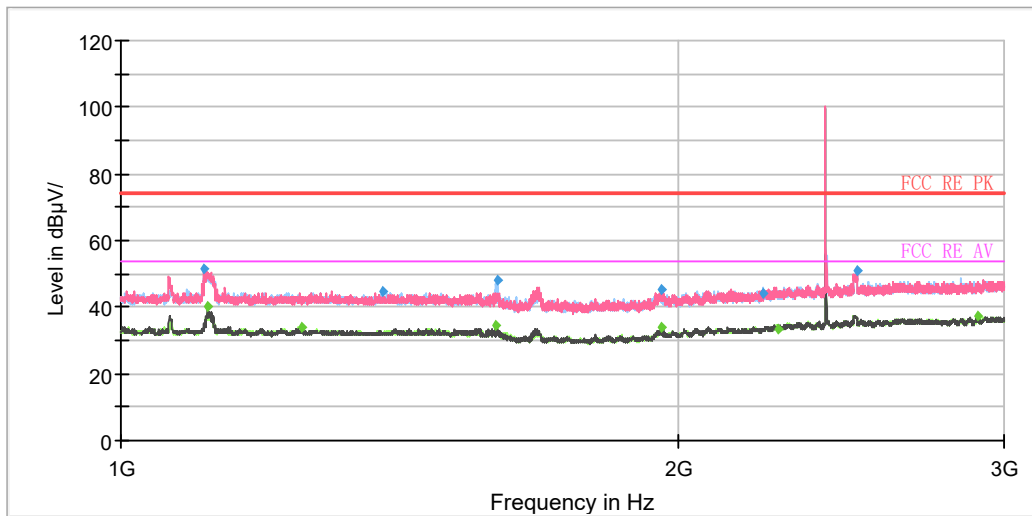
During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels. The test data of the worst-case condition (3DH5-Channel 78) was recorded in this report.



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)
47.211250	22.84	40.00	17.16	200.0	V	37.0	21.2
53.650000	19.23	40.00	20.77	107.0	V	0.0	20.9
64.602500	14.55	40.00	25.45	187.0	V	267.0	18.3
173.232500	18.87	43.50	24.63	175.0	H	253.0	19.5
199.178750	18.58	43.50	24.92	182.0	H	288.0	19.0
334.823750	20.14	46.00	25.86	100.0	H	82.0	22.2

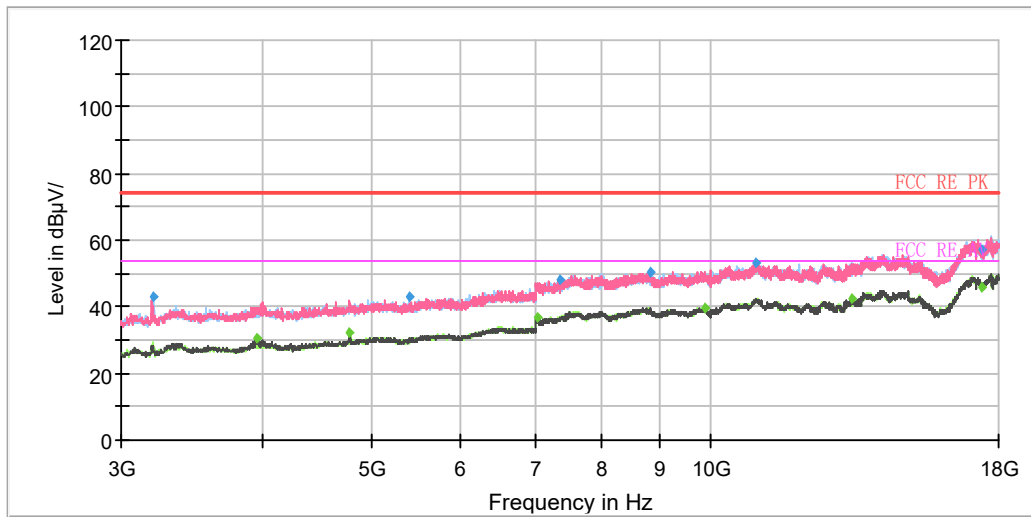
DH5-Channel 0



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

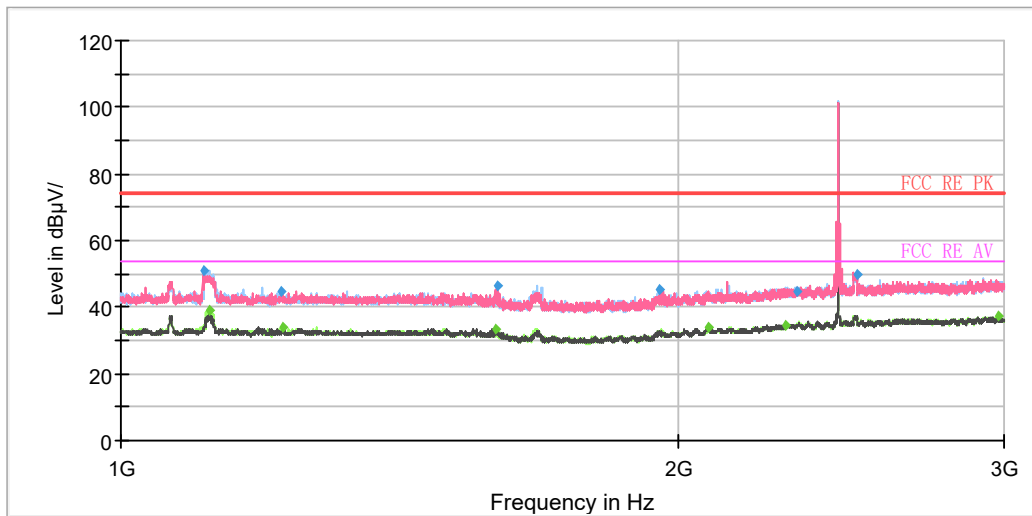
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1109.25	51.26	---	74.00	22.74	500.00	100.0	V	222.00	-6
1113.75	---	40.12	54.00	13.88	500.00	100.0	V	222.00	-6
1252.75	---	33.77	54.00	20.23	500.00	100.0	V	272.00	-5
1383.25	44.76	---	74.00	29.24	500.00	100.0	H	137.00	-5
1593.00	---	34.25	54.00	19.75	500.00	100.0	H	255.00	-5
1597.75	48.16	---	74.00	25.84	500.00	100.0	H	255.00	-6
1958.75	---	34.15	54.00	19.85	500.00	100.0	V	188.00	-5
1959.75	45.33	---	74.00	28.67	500.00	100.0	V	188.00	-5
2224.50	44.07	---	74.00	29.93	500.00	100.0	H	172.00	-3
2266.75	---	33.54	54.00	20.46	500.00	100.0	H	2.00	-3
2500.00	50.72	---	74.00	23.28	500.00	100.0	H	0.00	-1
2900.75	---	37.16	54.00	16.84	500.00	100.0	H	288.00	0



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)
3208.13	43.09	---	74.00	30.91	500.00	100.0	H	95.00	-9
3961.88	---	30.47	54.00	23.53	500.00	100.0	V	158.00	-7
4785.00	---	32.07	54.00	21.93	500.00	100.0	V	131.00	-6
5403.75	42.77	---	74.00	31.23	500.00	100.0	H	175.00	-5
7005.00	---	36.78	54.00	17.22	500.00	100.0	V	209.00	0
7346.25	48.27	---	74.00	25.73	500.00	100.0	H	309.00	1
8821.88	50.53	---	74.00	23.47	500.00	100.0	H	175.00	3
9868.13	---	39.52	54.00	14.48	500.00	100.0	V	3.00	3
10950.00	53.27	---	74.00	20.73	500.00	100.0	H	0.00	6
13344.38	---	42.51	54.00	11.49	500.00	100.0	H	254.00	8
17381.25	---	45.72	54.00	8.28	500.00	100.0	V	264.00	17
17392.50	57.07	---	74.00	16.93	500.00	100.0	H	0.00	17

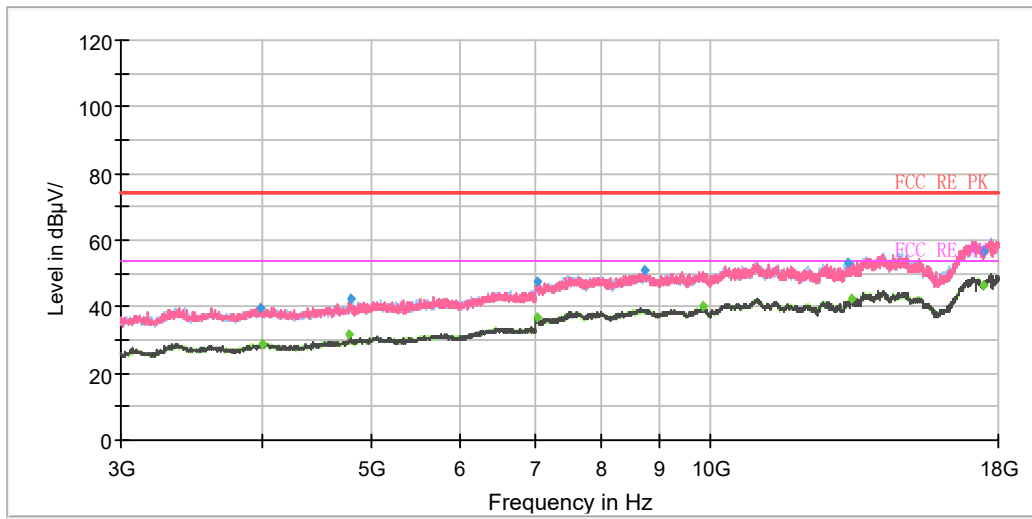
DH5-Channel 39



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

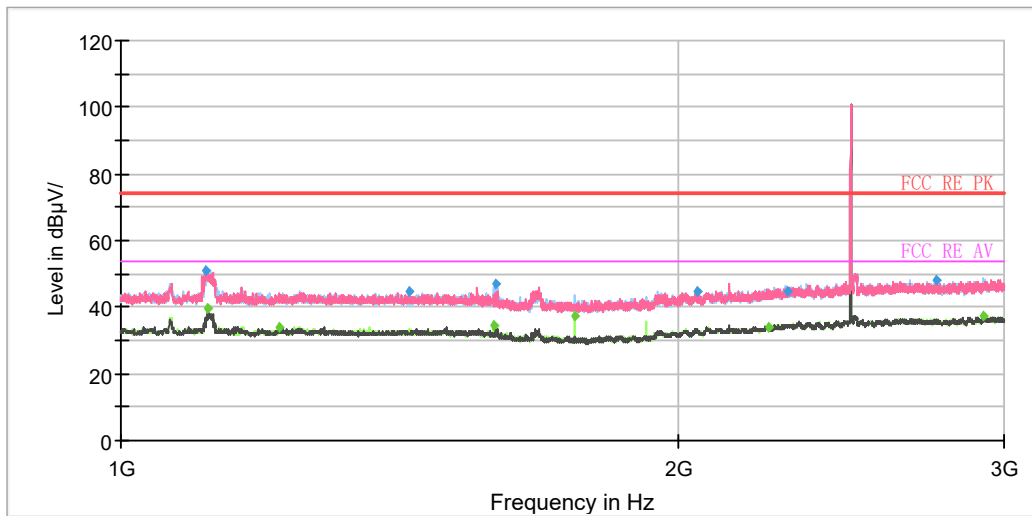
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1109.00	51.06	---	74.00	22.94	500.00	100.0	H	221.00	-6
1115.75	---	38.84	54.00	15.16	500.00	100.0	H	221.00	-6
1221.25	44.61	---	74.00	29.39	500.00	100.0	V	122.00	-5
1223.75	---	33.91	54.00	20.09	500.00	100.0	H	253.00	-5
1592.25	---	33.64	54.00	20.36	500.00	100.0	H	54.00	-5
1597.00	46.62	---	74.00	27.38	500.00	100.0	H	221.00	-6
1953.75	45.04	---	74.00	28.96	500.00	100.0	H	188.00	-5
2076.75	---	33.76	54.00	20.24	500.00	100.0	H	253.00	-4
2284.75	---	34.61	54.00	19.39	500.00	100.0	H	122.00	-2
2318.50	44.57	---	74.00	29.43	500.00	100.0	H	253.00	-2
2499.25	49.62	---	74.00	24.38	500.00	100.0	H	0.00	-1
2979.25	---	37.14	54.00	16.86	500.00	100.0	V	156.00	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)
3991.88	39.58	---	74.00	34.42	500.00	100.0	V	172.00	-7
3997.50	---	28.96	54.00	25.04	500.00	100.0	H	0.00	-7
4779.38	---	31.57	54.00	22.43	500.00	100.0	H	124.00	-6
4786.88	42.29	---	74.00	31.71	500.00	100.0	V	226.00	-6
7006.88	---	36.77	54.00	17.23	500.00	100.0	V	0.00	0
7008.75	47.66	---	74.00	26.34	500.00	100.0	V	2.00	0
8741.25	50.99	---	74.00	23.01	500.00	100.0	H	350.00	3
9834.38	---	40.01	54.00	13.99	500.00	100.0	V	6.00	3
13239.38	53.34	---	74.00	20.66	500.00	100.0	V	172.00	8
13344.38	---	42.61	54.00	11.39	500.00	100.0	H	0.00	8
17439.38	56.64	---	74.00	17.36	500.00	100.0	H	204.00	17
17441.25	---	46.14	54.00	7.86	500.00	100.0	H	95.00	17

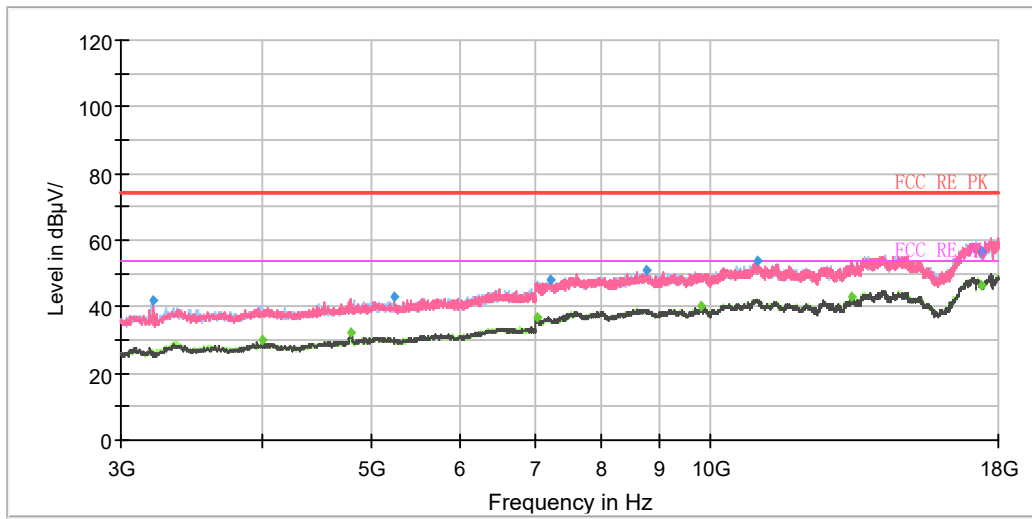
DH5-Channel 78



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)
1110.50	50.80	---	74.00	23.20	500.00	100.0	H	236.00	-6
1115.00	---	39.57	54.00	14.43	500.00	100.0	V	218.00	-6
1217.00	---	34.05	54.00	19.95	500.00	100.0	H	220.00	-5
1429.50	44.72	---	74.00	29.28	500.00	100.0	H	14.00	-5
1591.25	---	34.76	54.00	19.24	500.00	100.0	H	254.00	-5
1592.75	46.78	---	74.00	27.22	500.00	100.0	H	254.00	-5
1758.25	---	37.33	54.00	16.67	500.00	100.0	H	37.00	-5
2048.50	44.57	---	74.00	29.43	500.00	100.0	V	268.00	-4
2240.75	---	34.21	54.00	19.79	500.00	100.0	V	8.00	-3
2291.50	44.46	---	74.00	29.54	500.00	100.0	H	0.00	-2
2758.75	47.98	---	74.00	26.02	500.00	100.0	V	203.00	0
2925.50	---	37.12	54.00	16.88	500.00	100.0	H	53.00	1

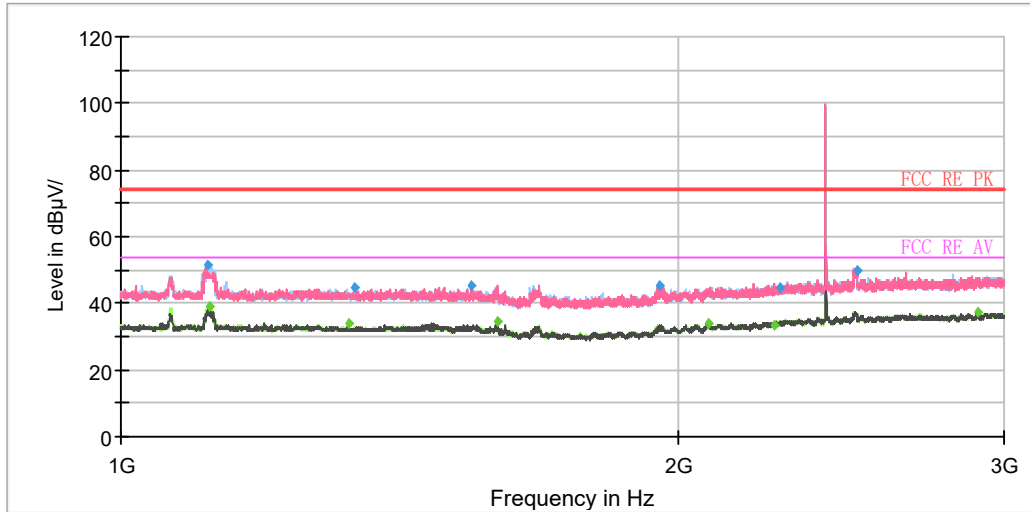


Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3208.13	42.07	---	74.00	31.93	500.00	100.0	V	21.00	-9
3995.63	---	29.92	54.00	24.08	500.00	100.0	H	16.00	-7
4790.63	---	32.20	54.00	21.80	500.00	100.0	V	21.00	-6
5236.88	42.76	---	74.00	31.24	500.00	100.0	V	43.00	-5
7005.00	---	36.79	54.00	17.21	500.00	100.0	V	21.00	0
7207.50	47.93	---	74.00	26.07	500.00	100.0	V	2.00	1
8761.88	50.67	---	74.00	23.33	500.00	100.0	V	2.00	3
9796.88	---	40.19	54.00	13.81	500.00	100.0	H	338.00	3
11008.13	53.86	---	74.00	20.14	500.00	100.0	V	320.00	7
13344.38	---	42.89	54.00	11.11	500.00	100.0	H	288.00	8
17381.25	---	46.23	54.00	7.77	500.00	100.0	H	262.00	17
17386.88	56.86	---	74.00	17.14	500.00	100.0	H	358.00	17

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.

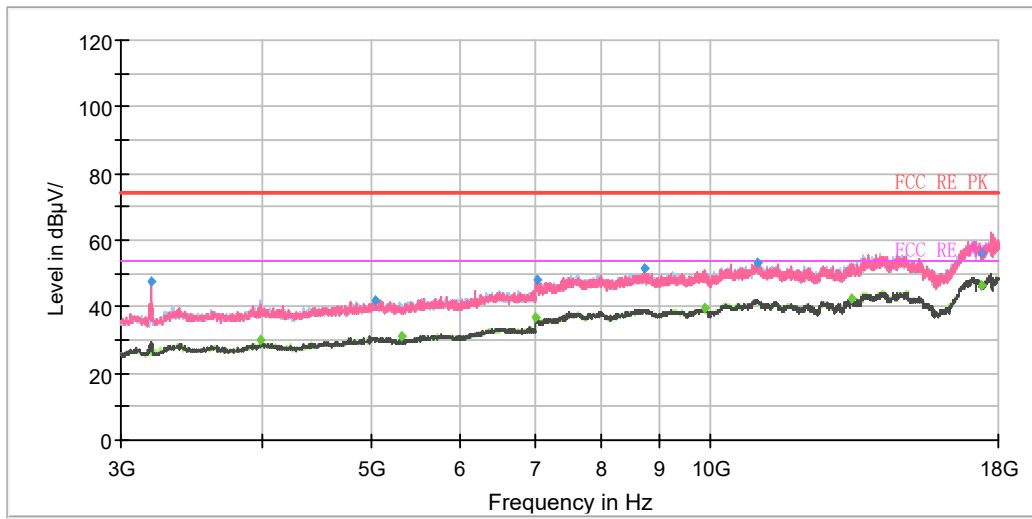
3DH5-Channel 0



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

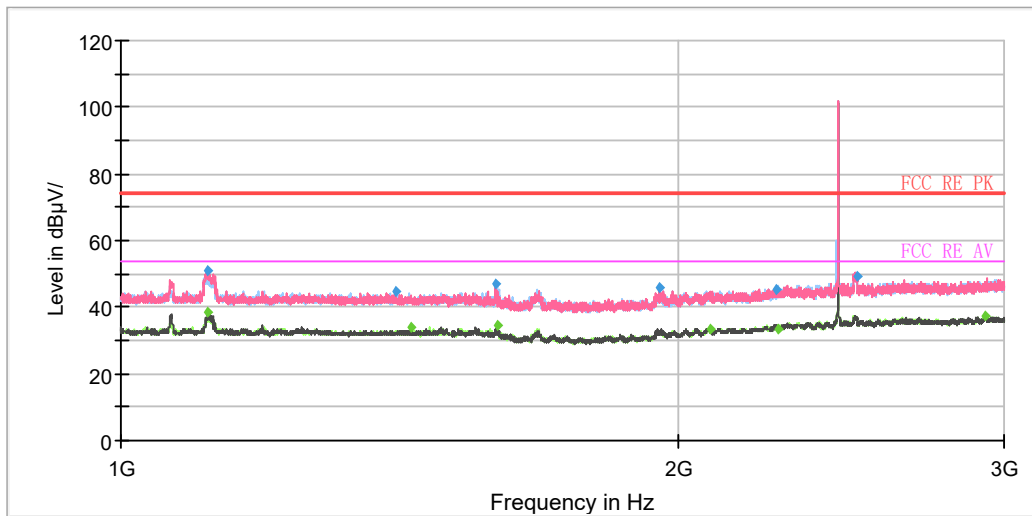
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1113.25	51.30	---	74.00	22.70	500.00	100.0	H	224.00	-6
1117.25	---	39.26	54.00	14.74	500.00	100.0	H	224.00	-6
1327.50	---	33.89	54.00	20.11	500.00	100.0	V	288.00	-5
1336.00	44.66	---	74.00	29.34	500.00	100.0	H	0.00	-5
1546.50	45.49	---	74.00	28.51	500.00	100.0	V	0.00	-5
1598.50	---	34.57	54.00	19.43	500.00	100.0	V	236.00	-6
1954.50	45.30	---	74.00	28.70	500.00	100.0	H	191.00	-5
2074.50	---	33.78	54.00	20.22	500.00	100.0	V	236.00	-4
2255.00	---	33.65	54.00	20.35	500.00	100.0	H	290.00	-3
2270.75	44.99	---	74.00	29.01	500.00	100.0	V	0.00	-3
2499.00	49.71	---	74.00	24.29	500.00	100.0	H	0.00	-1
2900.75	---	37.23	54.00	16.77	500.00	100.0	V	7.00	0



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)
3189.38	47.39	---	74.00	26.61	500.00	100.0	V	115.00	-9
3988.13	---	29.86	54.00	24.14	500.00	100.0	H	151.00	-7
5036.25	41.68	---	74.00	32.32	500.00	100.0	H	96.00	-6
5310.00	---	31.06	54.00	22.94	500.00	100.0	V	115.00	-6
7003.13	---	36.67	54.00	17.33	500.00	100.0	H	309.00	0
7005.00	48.15	---	74.00	25.85	500.00	100.0	V	14.00	0
8728.13	51.44	---	74.00	22.56	500.00	100.0	H	333.00	3
9871.88	---	39.69	54.00	14.31	500.00	100.0	H	309.00	3
11008.13	53.11	---	74.00	20.89	500.00	100.0	H	179.00	7
13346.25	---	42.67	54.00	11.33	500.00	100.0	H	0.00	8
17388.75	---	46.60	54.00	7.40	500.00	100.0	H	124.00	17
17409.38	55.77	---	74.00	18.23	500.00	100.0	V	4.00	17

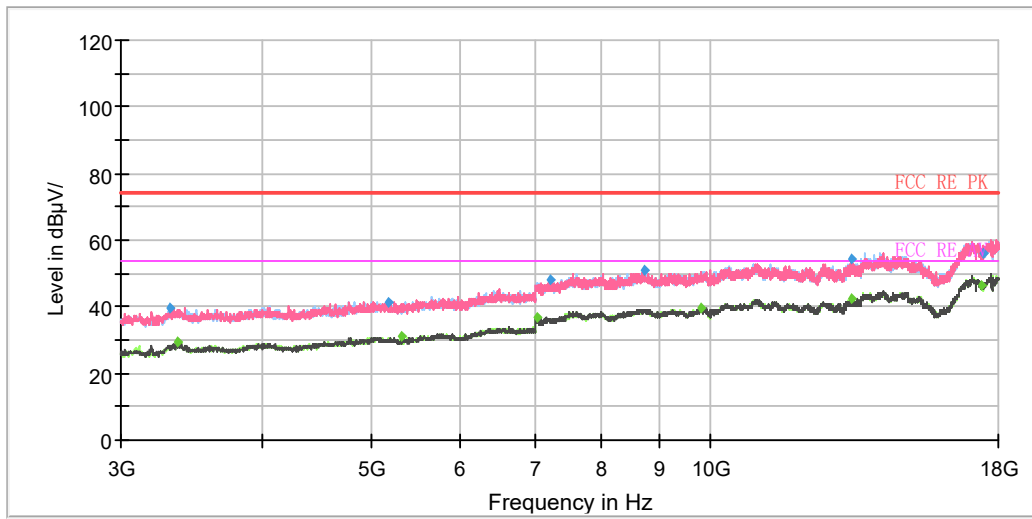
3DH5-Channel 39



Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

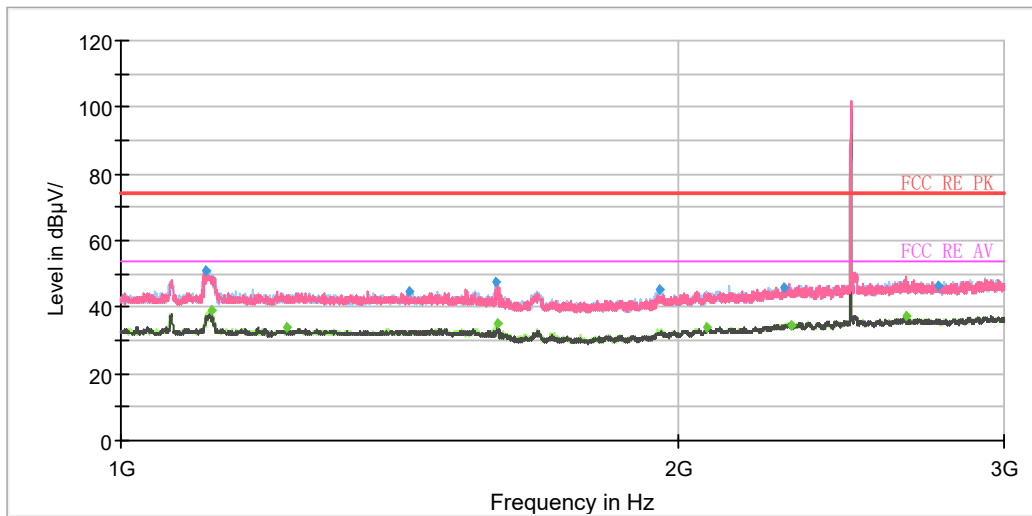
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1113.75	---	38.47	54.00	15.53	500.00	100.0	V	54.00	-6
1114.75	50.99	---	74.00	23.01	500.00	100.0	V	54.00	-6
1408.25	44.47	---	74.00	29.53	500.00	100.0	H	157.00	-5
1432.75	---	33.77	54.00	20.23	500.00	100.0	V	153.00	-5
1595.50	47.23	---	74.00	26.77	500.00	100.0	V	238.00	-5
1597.00	---	34.60	54.00	19.40	500.00	100.0	H	0.00	-6
1952.25	45.59	---	74.00	28.42	500.00	100.0	V	204.00	-5
2079.50	---	33.65	54.00	20.35	500.00	100.0	H	358.00	-4
2260.50	45.31	---	74.00	28.69	500.00	100.0	V	87.00	-3
2264.75	---	33.60	54.00	20.40	500.00	100.0	H	191.00	-3
2498.25	49.28	---	74.00	24.72	500.00	100.0	H	0.00	-1
2933.00	---	37.29	54.00	16.71	500.00	100.0	H	173.00	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)
3311.25	39.82	---	74.00	34.18	500.00	100.0	H	257.00	-8
3363.75	---	29.45	54.00	24.55	500.00	100.0	H	311.00	-8
5176.88	41.56	---	74.00	32.44	500.00	100.0	V	39.00	-6
5319.38	---	30.93	54.00	23.07	500.00	100.0	V	39.00	-6
7005.00	---	36.92	54.00	17.08	500.00	100.0	V	102.00	0
7205.63	47.90	---	74.00	26.10	500.00	100.0	V	0.00	1
8730.00	50.76	---	74.00	23.24	500.00	100.0	H	311.00	3
9819.38	---	39.63	54.00	14.37	500.00	100.0	V	0.00	3
13336.88	54.11	---	74.00	19.89	500.00	100.0	V	39.00	8
13346.25	---	42.64	54.00	11.36	500.00	100.0	H	178.00	8
17386.88	---	46.28	54.00	7.72	500.00	100.0	H	334.00	17
17437.50	56.29	---	74.00	17.71	500.00	100.0	H	284.00	17

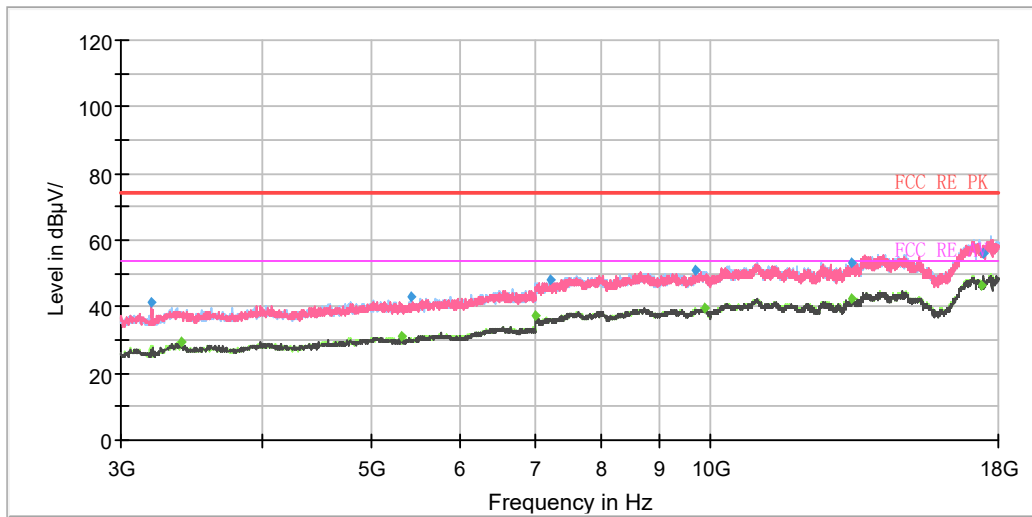
3DH5-Channel 78



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)
1112.25	51.13	---	74.00	22.87	500.00	100.0	H	226.00	-6
1119.00	---	39.32	54.00	14.68	500.00	100.0	H	226.00	-6
1228.75	---	33.68	54.00	20.32	500.00	100.0	H	210.00	-5
1431.75	44.83	---	74.00	29.17	500.00	100.0	H	226.00	-5
1594.00	47.65	---	74.00	26.35	500.00	100.0	H	293.00	-5
1596.50	---	35.19	54.00	18.81	500.00	100.0	V	254.00	-6
1954.50	45.19	---	74.00	28.81	500.00	100.0	H	192.00	-5
2074.00	---	33.93	54.00	20.07	500.00	100.0	H	359.00	-4
2279.00	45.67	---	74.00	28.33	500.00	100.0	V	254.00	-3
2301.75	---	34.62	54.00	19.38	500.00	100.0	H	210.00	-2
2653.00	---	37.55	54.00	16.45	500.00	100.0	V	156.00	0
2765.50	46.47	---	74.00	27.53	500.00	100.0	H	226.00	0



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)
3193.13	41.37	---	74.00	32.63	500.00	100.0	V	115.00	-9
3390.00	---	29.43	54.00	24.57	500.00	100.0	V	251.00	-7
5315.63	---	30.97	54.00	23.03	500.00	100.0	V	90.00	-6
5420.63	42.86	---	74.00	31.14	500.00	100.0	H	349.00	-5
7003.13	---	37.08	54.00	16.92	500.00	100.0	H	256.00	0
7205.63	47.98	---	74.00	26.02	500.00	100.0	V	0.00	1
9703.13	51.09	---	74.00	22.91	500.00	100.0	V	90.00	3
9868.13	---	39.70	54.00	14.30	500.00	100.0	V	251.00	3
13344.38	---	42.50	54.00	11.50	500.00	100.0	V	16.00	8
13346.25	53.27	---	74.00	20.73	500.00	100.0	V	0.00	8
17388.75	---	46.49	54.00	7.51	500.00	100.0	H	40.00	17
17430.00	55.83	---	74.00	18.17	500.00	100.0	H	311.00	17
17737.50	---	49.94	54.00	4.06	500.00	100.0	H	357.00	18
17739.38	61.19	---	74.00	12.81	500.00	100.0	H	283.00	18

2. Conducted Emission

2.1. Bluetooth

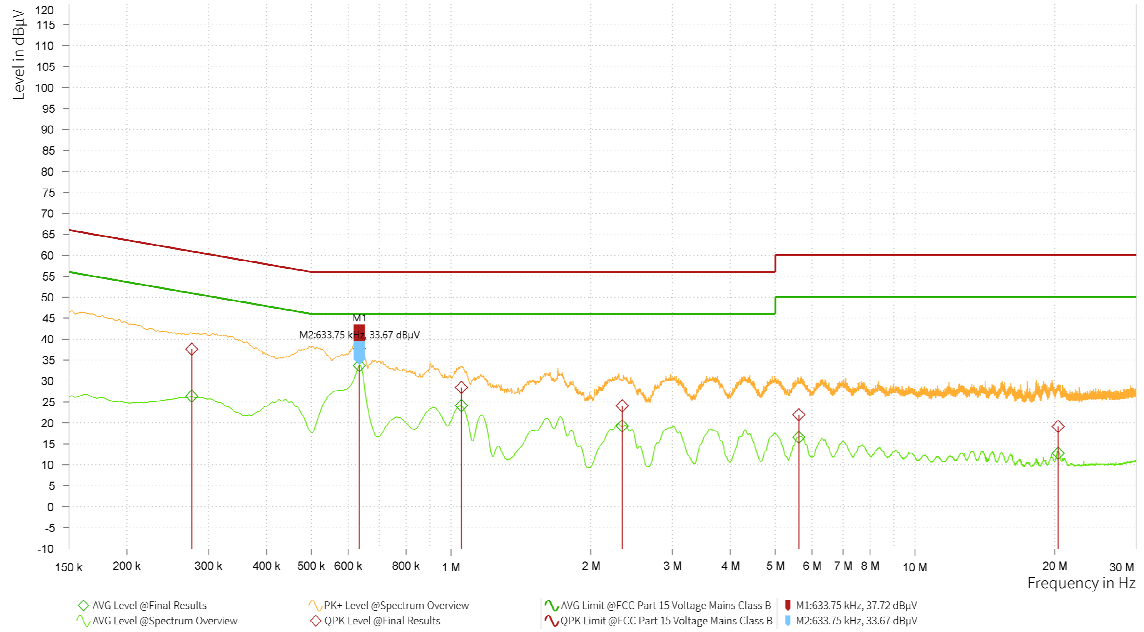
During the test, the Conducted Emission was performed in all modes with all channels. The test data of the worst-case condition (3DH5-Channel 78) was recorded in this report.



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]
0.267	36.12	61.21	25.09	25.49	51.21	25.72	20.96	L1	9.000	1.000
0.629	37.07	56.00	18.93	32.81	46.00	13.19	20.64	L1	9.000	1.000
1.048	28.06	56.00	27.94	23.92	46.00	22.08	20.12	L1	9.000	1.000
3.057	23.99	56.00	32.01	19.05	46.00	26.95	19.48	L1	9.000	1.000
5.669	20.81	60.00	39.19	15.70	50.00	34.30	19.40	L1	9.000	1.000
19.932	17.70	60.00	42.30	11.54	50.00	38.46	19.66	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]
0.276	37.60	60.94	23.33	26.38	50.94	24.55	20.97	N	9.000	1.000
0.634	37.72	56.00	18.28	33.67	46.00	12.33	20.65	N	9.000	1.000
1.052	28.46	56.00	27.54	24.13	46.00	21.87	20.13	N	9.000	1.000
2.339	24.07	56.00	31.93	19.26	46.00	26.74	19.58	N	9.000	1.000
5.620	21.97	60.00	38.03	16.58	50.00	33.42	19.41	N	9.000	1.000
20.355	19.17	60.00	40.83	12.75	50.00	37.25	19.72	N	9.000	1.000

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 kHz to 30 MHz