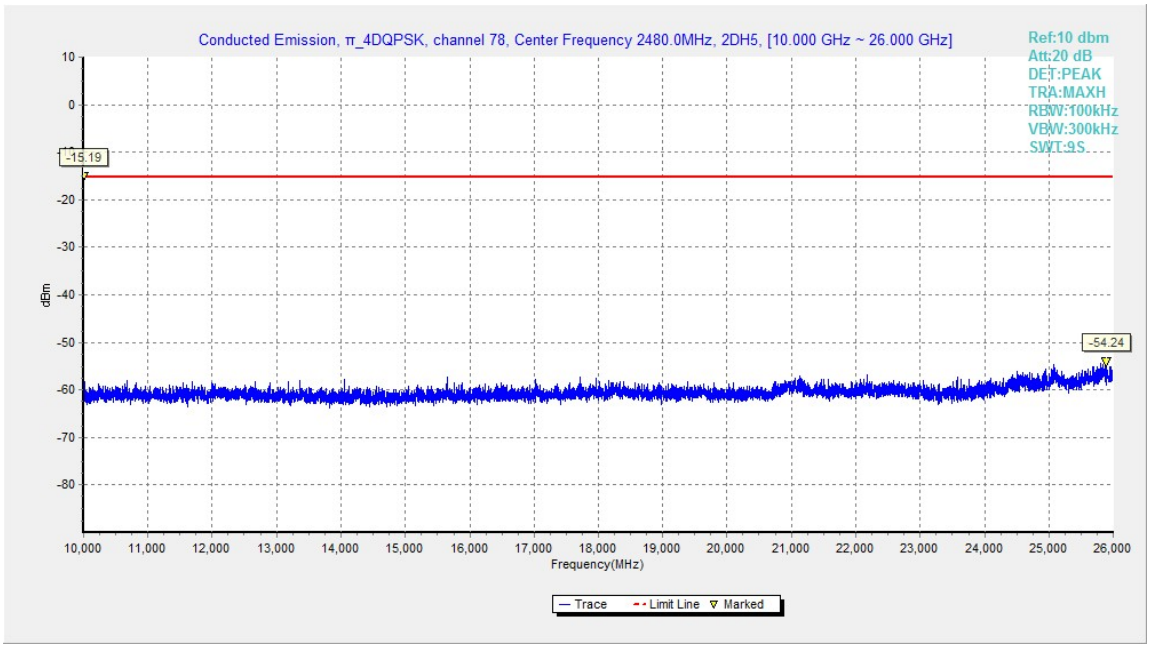


Fig.42. Fig.30 Conducted spurious emission: π/4 DQPSK, Channel 78, 10GHz - 26GHz

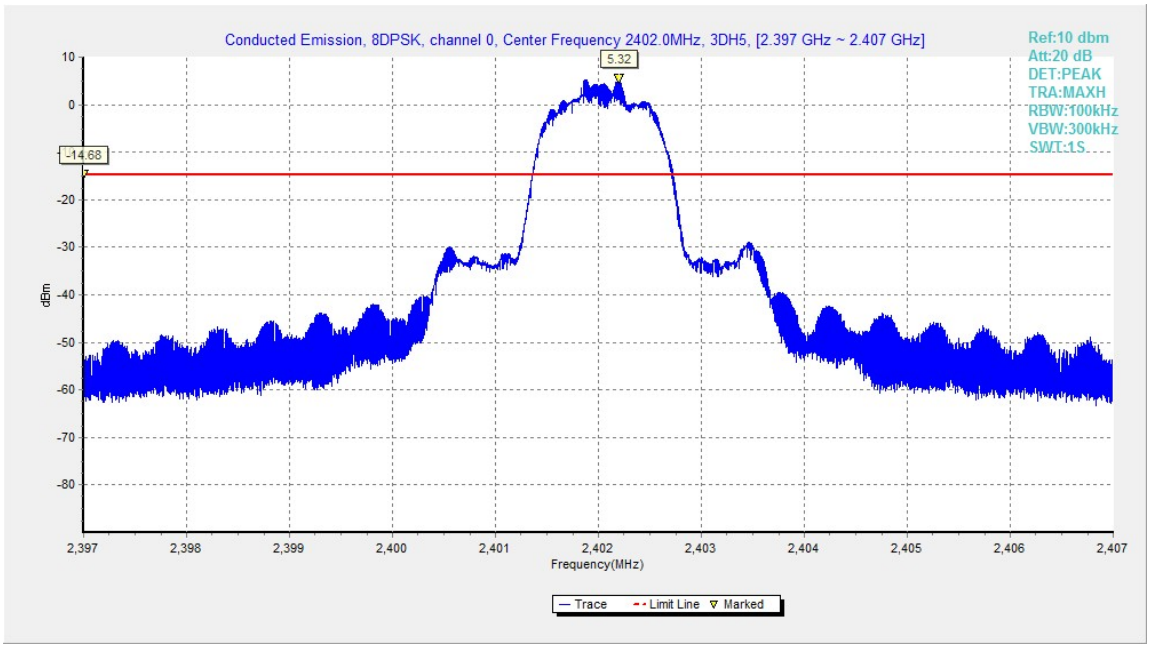


Fig.43. Conducted spurious emission: 8DPSK, Channel 0,2402MHz

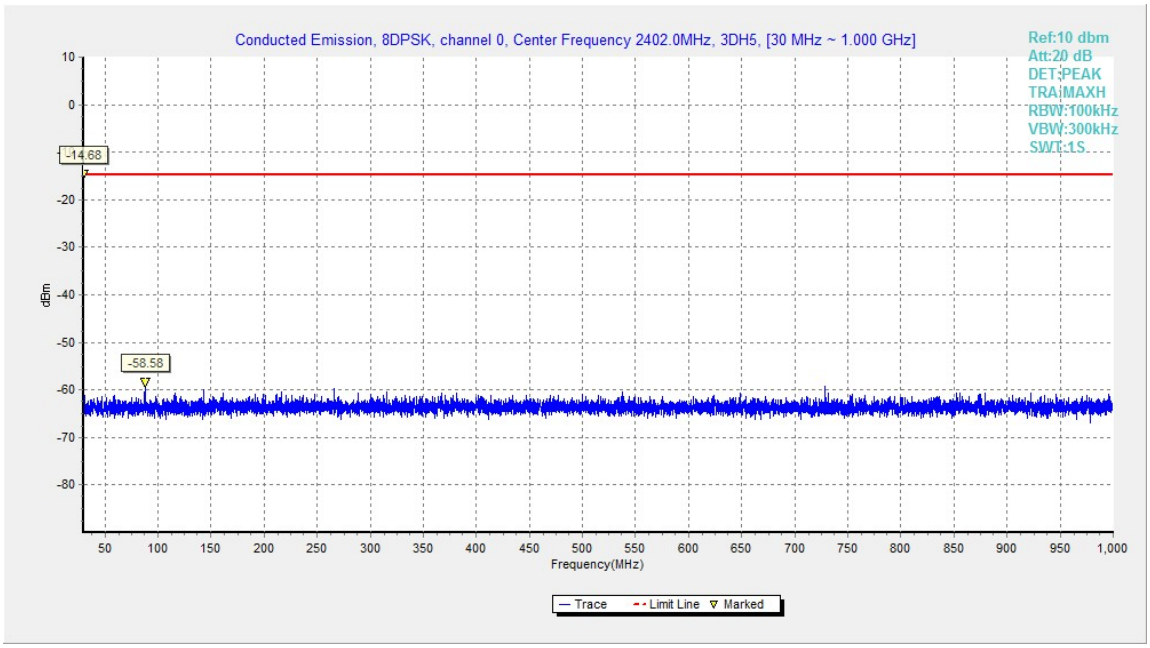


Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

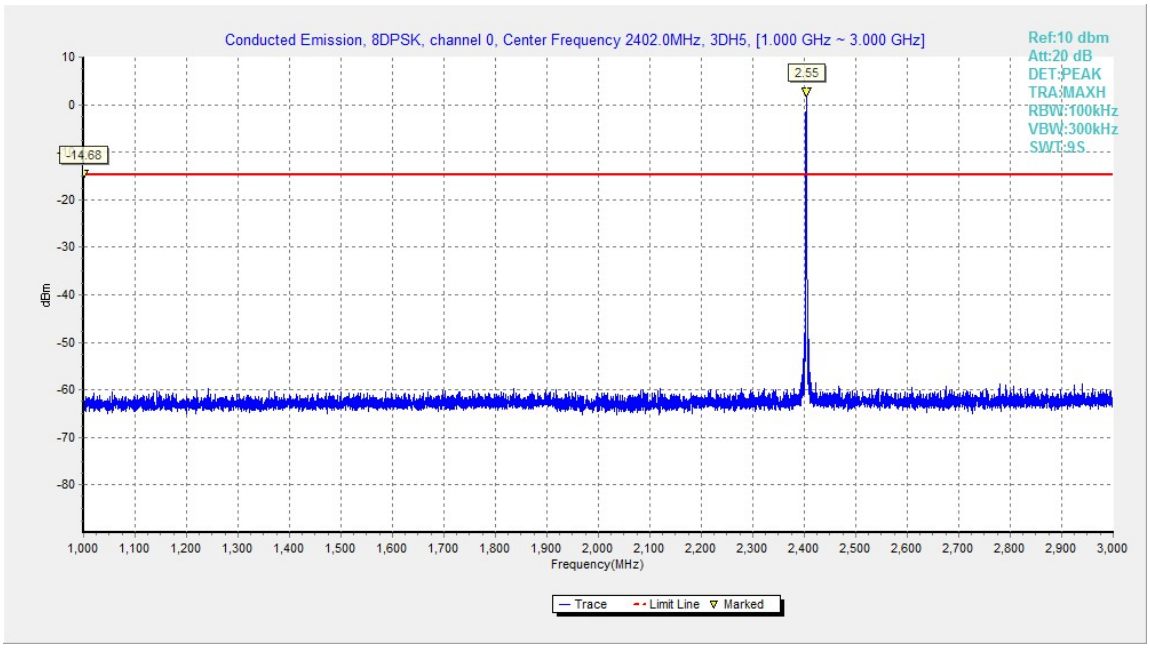


Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

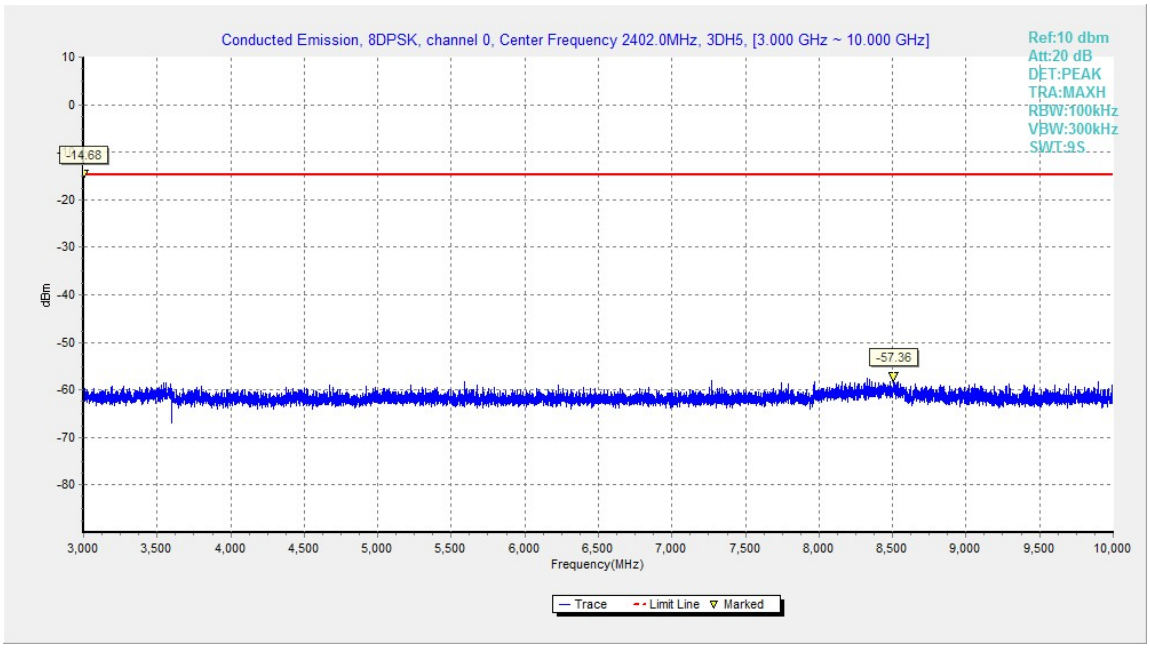


Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

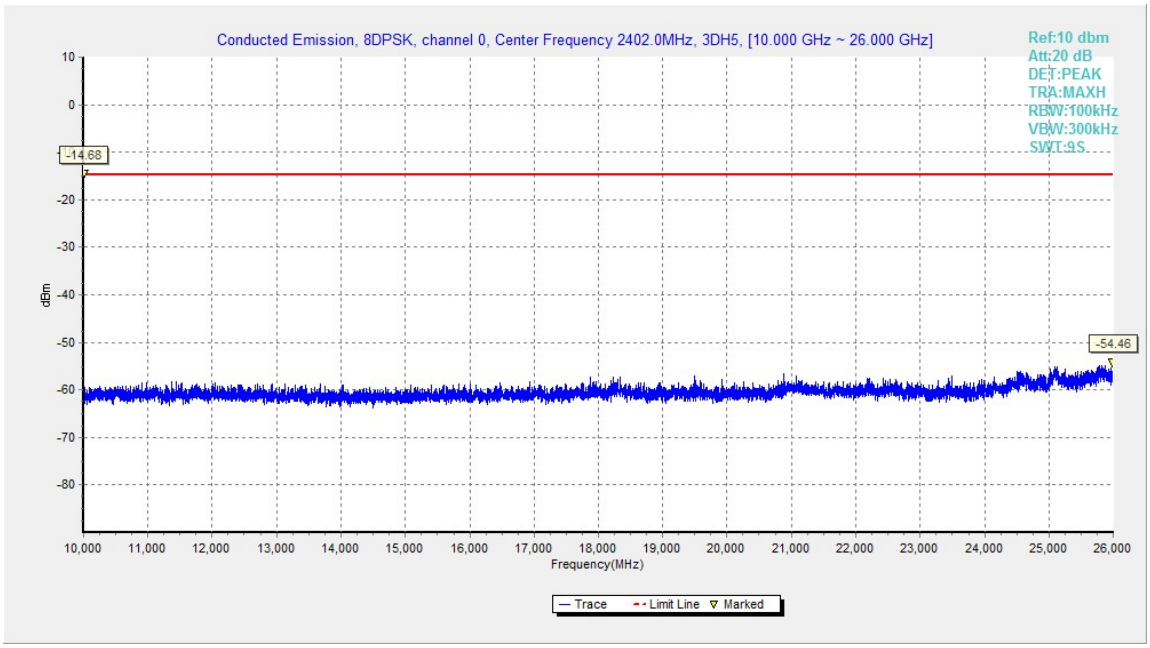


Fig.47. Conducted spurious emission: 8DPSK, Channel 0,10GHz - 26GHz

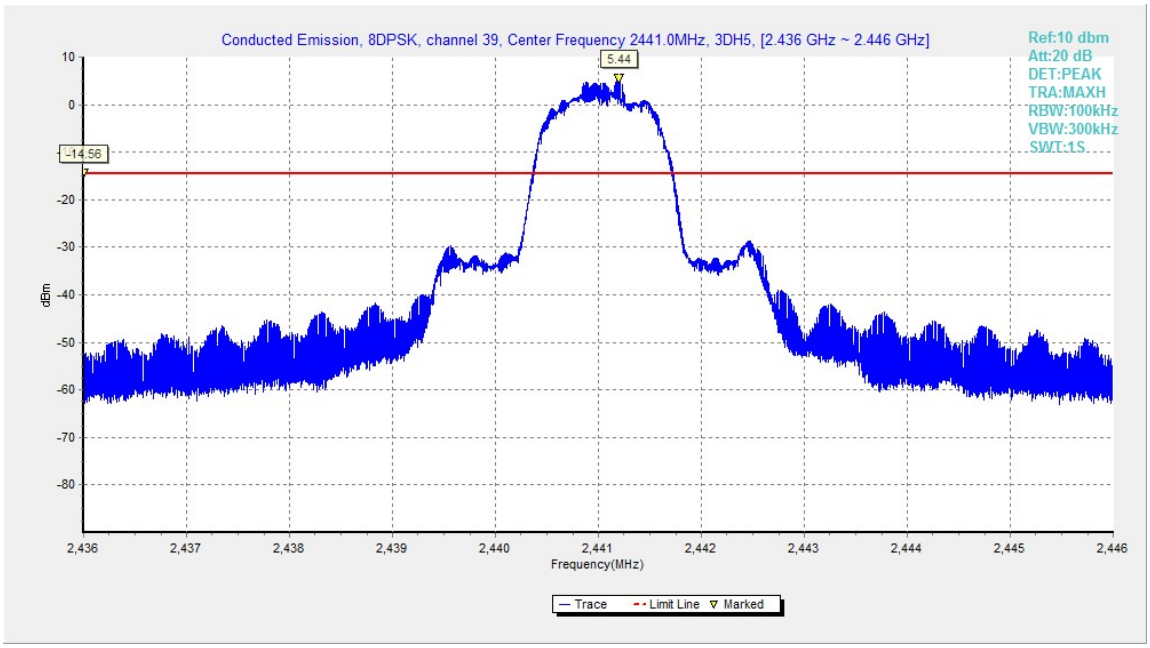


Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

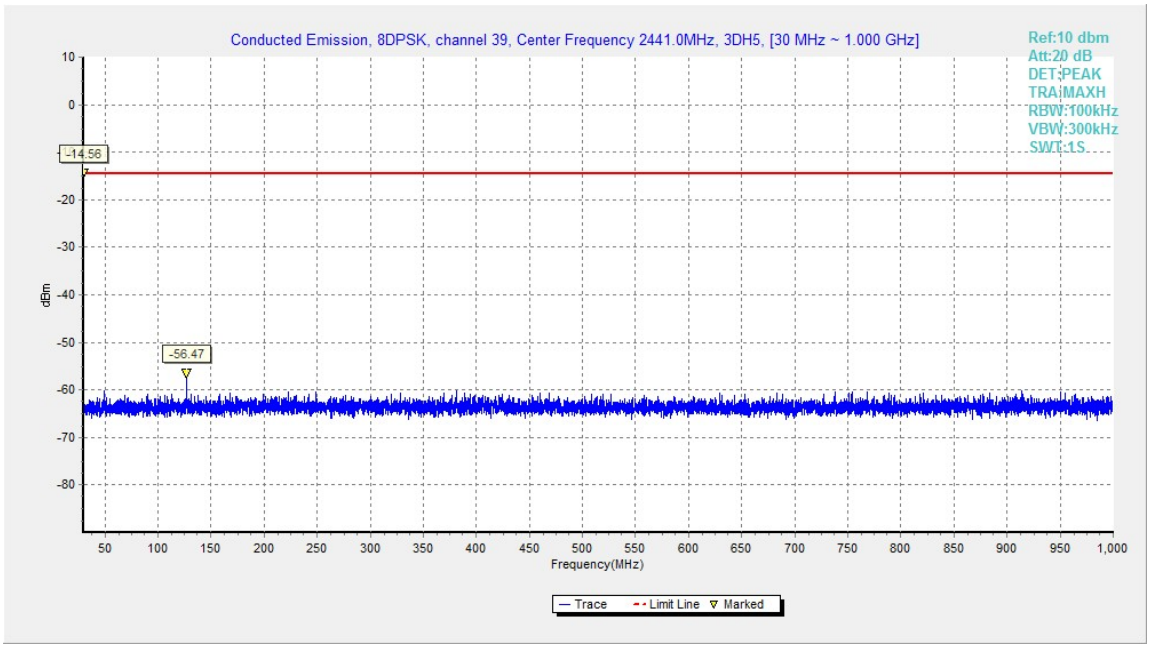


Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

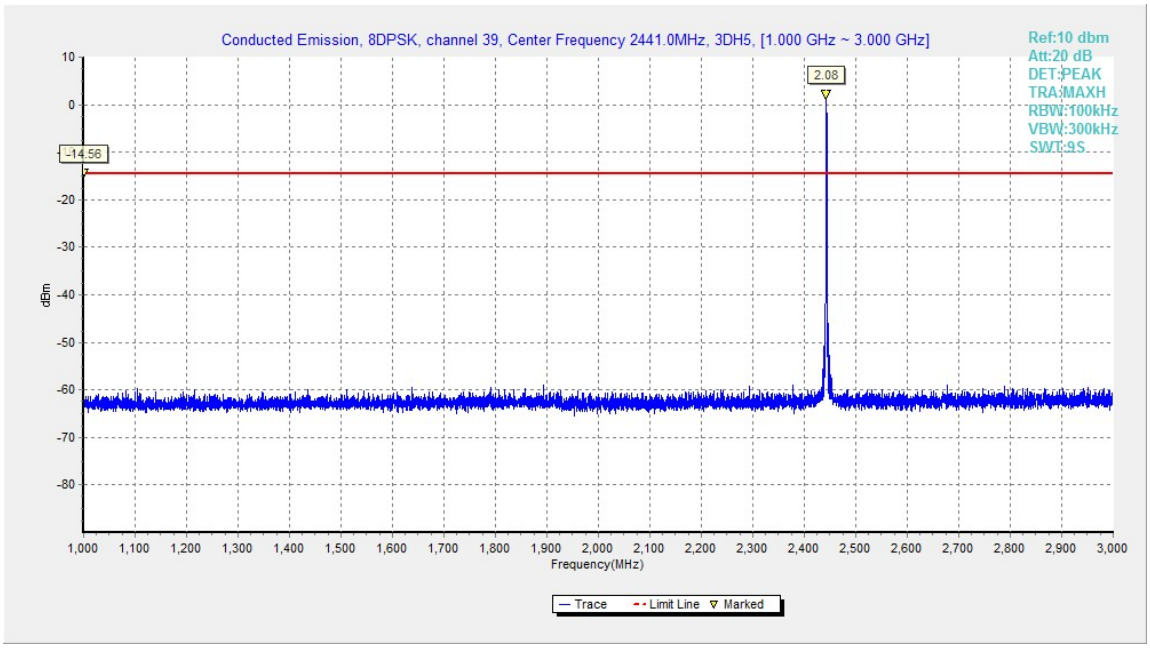


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

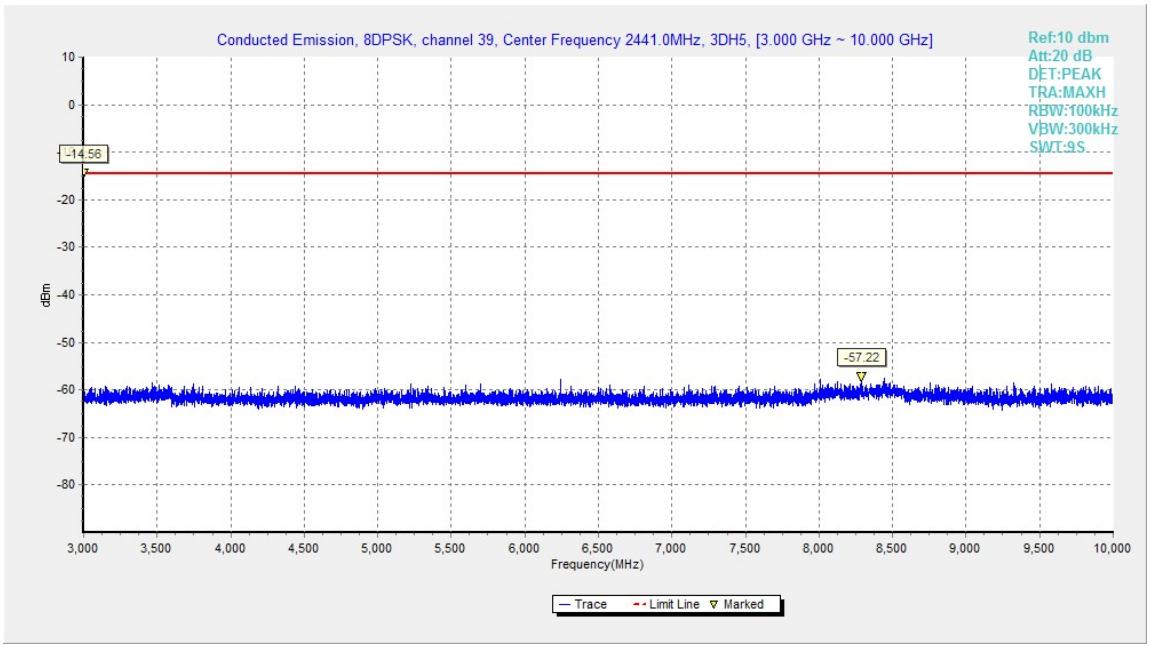


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

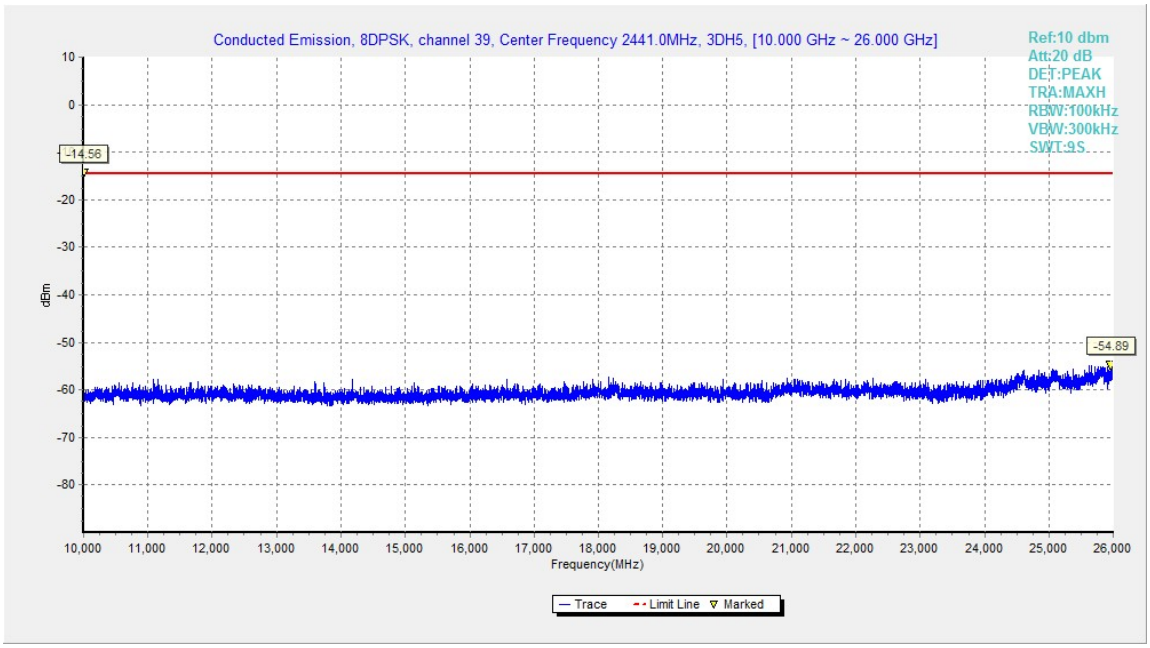


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

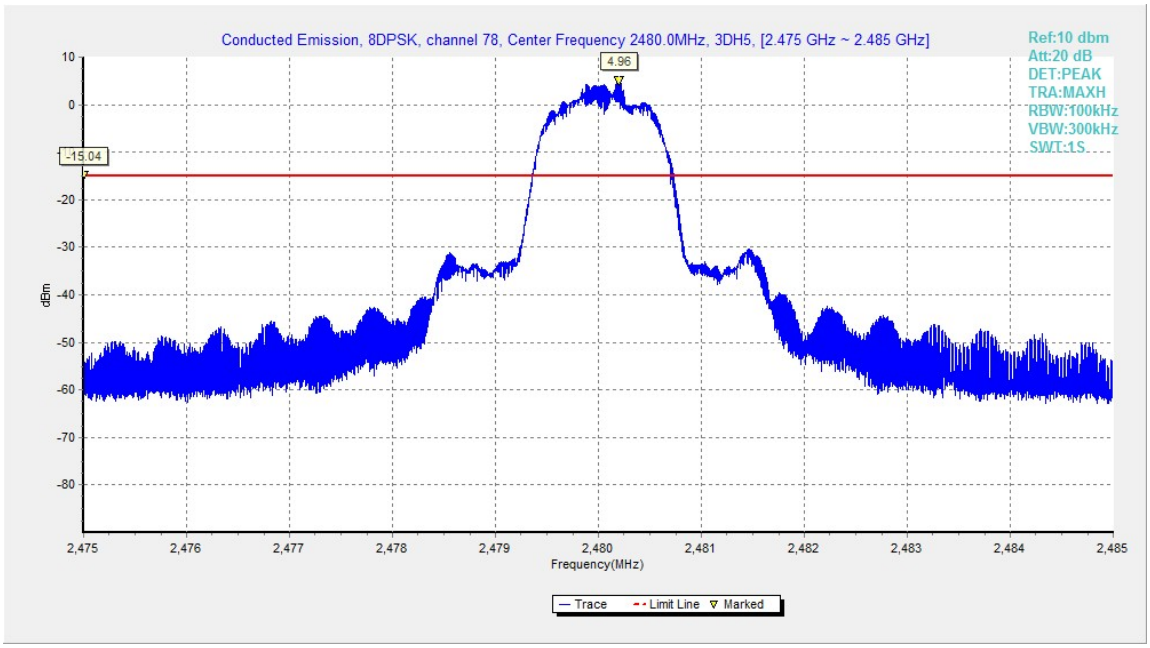


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

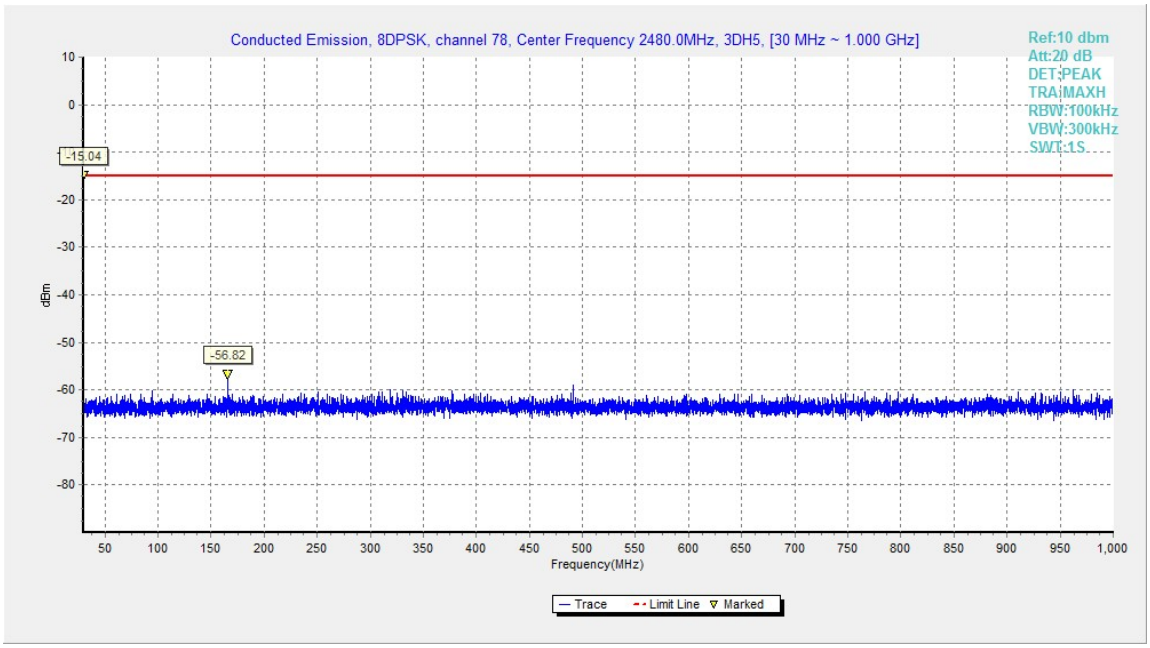


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

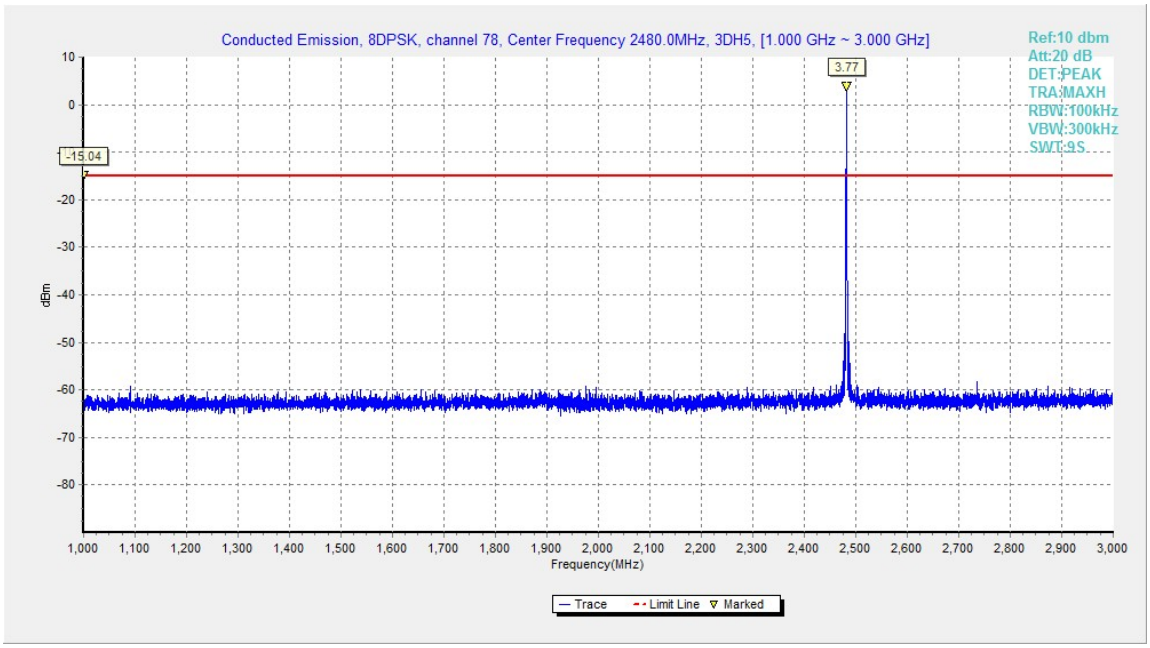


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

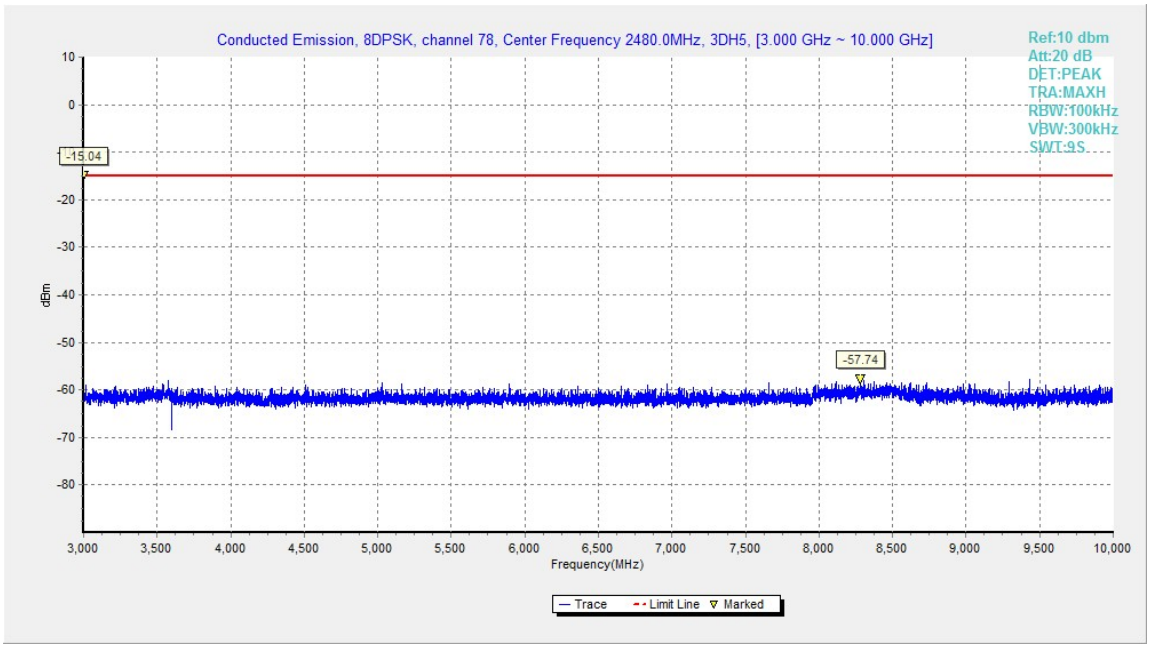


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

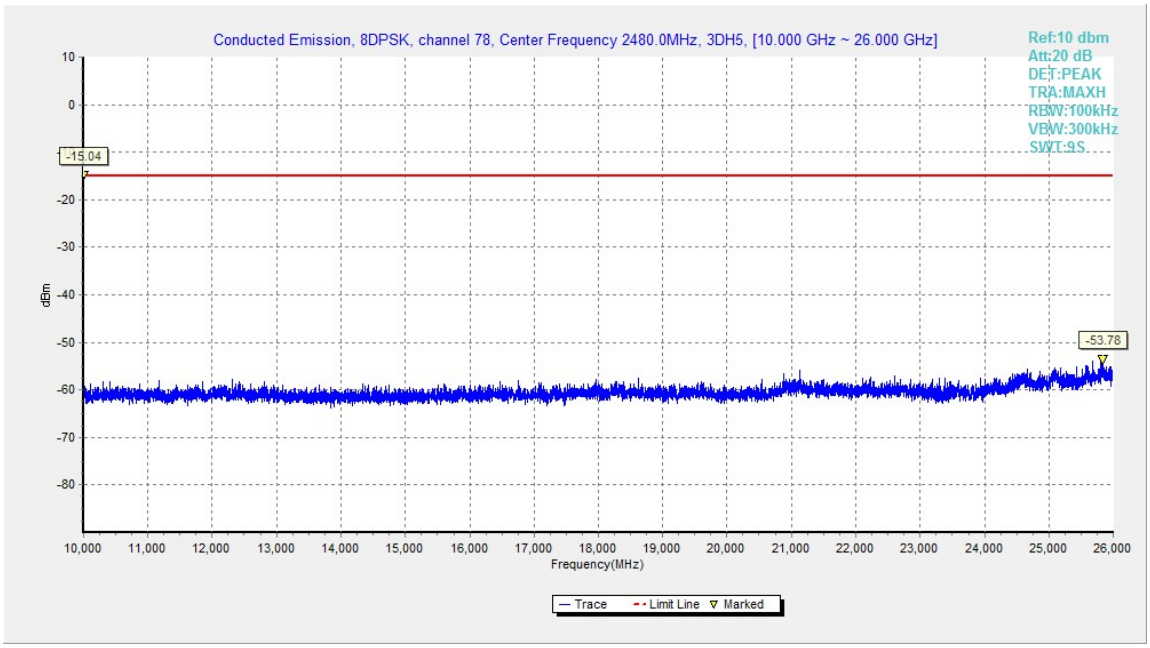


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

A.5. Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

The measurement is made according to ANSI C63.10

Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Condition

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

Measurement Results for Set.10:

Result=P_{Mea}+ARPL

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.58	P
	3 GHz ~ 18 GHz	Fig.59	P
Ch 39 2440 MHz	9 kHz ~ 30 MHz	Fig.60	P
	30 MHz ~ 1 GHz	Fig.61	P
	1 GHz ~ 3 GHz	Fig.62	P
	3 GHz ~ 18 GHz	Fig.63	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.64	P
	3 GHz ~ 18 GHz	Fig.65	P
Power	2.38GHz~2.4GHz---L	Fig.66	P
Power	2.45GHz~2.5GHz---H	Fig.67	P
For all channels	18 GHz ~ 26 GHz	Fig.68	P

Forπ/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.69	P
	3 GHz ~ 18 GHz	Fig.70	P
Ch 39 2440 MHz	30 MHz ~ 1 GHz	Fig.71	P
	1 GHz ~ 3 GHz	Fig.72	P
	3 GHz ~ 18 GHz	Fig.73	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.74	P
	3 GHz ~ 18 GHz	Fig.75	P
Power	2.38GHz~2.4GHz---L	Fig.76	P
Power	2.45GHz~2.5GHz---H	Fig.77	P
For all channels	18 GHz ~ 26 GHz	Fig.78	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.79	P
	3 GHz ~ 18 GHz	Fig.80	P
Ch 39 2440 MHz	30 MHz ~ 1 GHz	Fig.81	P
	1 GHz ~ 3 GHz	Fig.82	P
	3 GHz ~ 18 GHz	Fig.83	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.84	P
	3 GHz ~ 18 GHz	Fig.85	P
Power	2.38GHz~2.4GHz---L	Fig.86	P
Power	2.45GHz~2.5GHz---H	Fig.87	P
For all channels	18 GHz ~ 26 GHz	Fig.88	P

GFSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2386.888	46.6	2.9	32.0	11.752	54.0	7.4	H
2388.720	46.6	2.9	32.0	11.766	54.0	7.4	V
4804.500	37.4	-17.3	34.5	20.207	54.0	16.6	H
7206.000	39.4	-16.4	36.1	19.727	54.0	14.6	H
9607.500	38.3	-18.2	37.0	19.582	54.0	15.7	H
12010.500	41.3	-17.4	39.3	19.397	54.0	12.7	H

GFSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2384.470	46.8	2.9	32.0	11.896	54.0	7.2	H
2488.500	47.8	2.9	32.6	12.230	54.0	6.2	H
4882.500	36.2	-18.5	34.5	20.219	54.0	17.8	H
7323.000	37.2	-18.5	36.1	19.656	54.0	16.8	H
9763.500	39.0	-17.8	37.2	19.587	54.0	15.0	H
12205.500	40.4	-17.8	39.2	18.959	54.0	13.6	H

GFSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.630	49.1	2.9	32.8	13.436	54.0	4.9	H
2485.000	47.9	2.9	32.7	12.254	54.0	6.1	H
4960.500	36.8	-18.2	34.5	20.520	54.0	17.2	H
7440.000	38.8	-16.9	36.0	19.714	54.0	15.2	H
9919.500	39.9	-17.1	37.4	19.563	54.0	14.1	H
12240.000	40.5	-17.8	39.2	19.103	54.0	13.5	H

GFSK Ch 0 – Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2385.222	59.7	2.9	32.0	24.798	74.0	14.3	H
2389.114	59.4	2.9	32.0	24.575	74.0	14.6	H
17684.250	59.5	-13.1	41.1	31.580	74.0	14.5	V
17790.000	59.4	-13.4	41.0	31.843	74.0	14.6	V
17295.000	59.3	-14.0	41.2	32.080	74.0	14.7	H
17421.750	59.3	-14.7	41.2	32.799	74.0	14.7	H

GFSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2366.600	49.5	-27.2	32.0	44.749	74.0	24.5	H
2506.400	51.0	-26.4	32.4	45.052	74.0	23.0	V
17937.000	59.9	-13.6	40.9	32.621	74.0	14.1	V
17632.500	59.6	-13.0	41.1	31.542	74.0	14.4	V
17655.750	59.6	-13.1	41.1	31.578	74.0	14.4	V
17635.500	59.4	-13.0	41.1	31.346	74.0	14.6	V

GFSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.880	64.4	2.9	32.8	28.766	74.0	9.6	V
2484.220	64.5	2.9	32.7	28.822	74.0	9.5	H
17610.750	60.2	-13.2	41.1	32.330	74.0	13.8	H
17334.750	59.7	-14.2	41.2	32.713	74.0	14.3	H
17653.500	59.5	-13.1	41.1	31.509	74.0	14.5	V
2483.880	64.4	2.9	32.8	28.766	74.0	9.6	V

π/4 DQPSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2383.262	46.7	2.9	32.0	11.777	54.0	7.3	V
2386.400	46.8	2.9	32.0	11.880	54.0	7.2	H
4804.500	37.4	-17.3	34.5	20.142	54.0	16.6	H
7206.000	39.4	-16.4	36.1	19.673	54.0	14.6	H
9607.500	38.3	-18.2	37.0	19.573	54.0	15.7	H
12010.500	41.3	-17.4	39.3	19.368	54.0	12.7	H

π/4 DQPSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2380.300	46.8	2.9	32.1	11.860	54.0	7.2	H
2486.900	47.9	2.9	32.7	12.260	54.0	6.1	V
4882.500	36.1	-18.5	34.5	20.135	54.0	17.9	H
7323.000	37.1	-18.5	36.1	19.511	54.0	16.9	H
9763.500	39.1	-17.8	37.2	19.601	54.0	14.9	H
12205.500	40.4	-17.8	39.2	18.935	54.0	13.6	H

π/4 DQPSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.660	48.6	2.9	32.8	12.886	54.0	5.4	V
2484.400	48.0	2.9	32.7	12.355	54.0	6.0	H
4960.500	36.6	-18.2	34.5	20.315	54.0	17.4	H
7440.000	38.9	-16.9	36.0	19.771	54.0	15.1	H
9919.500	39.9	-17.1	37.4	19.538	54.0	14.1	H
12240.000	40.5	-17.8	39.2	19.090	54.0	13.5	H

π/4 DQPSK Ch 0 – Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2381.344	59.6	2.9	32.0	24.653	74.0	14.4	H
2387.084	59.3	2.9	32.0	24.436	74.0	14.7	H
17250.750	59.5	-14.2	41.2	32.433	74.0	14.5	V
17579.250	59.4	-13.6	41.1	31.840	74.0	14.6	H
17823.000	59.3	-13.5	40.9	31.856	74.0	14.7	H
17622.750	59.3	-13.1	41.1	31.278	74.0	14.7	V

π/4 DQPSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2371.400	50.1	-26.9	32.0	45.013	74.0	23.9	V
2551.800	52.0	-26.8	33.1	45.700	74.0	22.0	H
17286.750	59.2	-13.9	41.2	31.977	74.0	14.8	H
17580.750	59.1	-13.6	41.1	31.504	74.0	14.9	V
17621.250	59.0	-13.1	41.1	31.068	74.0	15.0	V
2371.400	50.1	-26.9	32.0	45.013	74.0	23.9	V

π/4 DQPSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.980	63.4	2.9	32.7	27.670	74.0	10.7	H
2484.300	61.8	2.9	32.7	26.119	74.0	12.2	H
17661.750	59.8	-13.1	41.1	31.831	74.0	14.2	V
17284.500	59.5	-13.9	41.2	32.276	74.0	14.5	V
17586.750	59.4	-13.5	41.1	31.797	74.0	14.6	V
17715.000	59.2	-13.2	41.0	31.440	74.0	14.8	H

8DPSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2380.500	46.8	2.9	32.1	11.836	54.0	7.2	H
2388.899	46.8	2.9	32.0	11.914	54.0	7.2	V
4804.500	37.4	-17.3	34.5	20.188	54.0	16.6	H
7206.000	39.5	-16.4	36.1	19.810	54.0	14.5	H
9607.500	38.2	-18.2	37.0	19.506	54.0	15.8	H
12010.500	41.3	-17.4	39.3	19.348	54.0	12.7	H

8DPSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2389.200	46.8	2.9	32.0	11.936	54.0	7.2	H
2484.000	47.9	2.9	32.7	12.201	54.0	6.1	V
4882.500	36.1	-18.5	34.5	20.096	54.0	17.9	H
7323.000	37.2	-18.5	36.1	19.567	54.0	16.8	H
9763.500	39.1	-17.8	37.2	19.605	54.0	14.9	H
12205.500	40.4	-17.8	39.2	18.965	54.0	13.6	H

8DPSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.540	49.0	2.9	32.8	13.278	54.0	5.0	H
2484.600	47.9	2.9	32.7	12.250	54.0	6.1	H
4960.500	36.7	-18.2	34.5	20.387	54.0	17.3	H
7440.000	38.9	-16.9	36.0	19.762	54.0	15.1	H
9919.500	39.8	-17.1	37.4	19.513	54.0	14.2	H
12240.000	40.5	-17.8	39.2	19.117	54.0	13.5	H

8DPSK Ch 0 – Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2388.834	60.0	2.9	32.0	25.127	74.0	14.0	H
2388.918	60.2	2.9	32.0	25.328	74.0	13.8	V
17630.250	60.3	-13.0	41.1	32.225	74.0	13.7	H
17303.250	59.6	-14.0	41.2	32.412	74.0	14.4	V
17648.250	59.6	-13.0	41.1	31.521	74.0	14.4	H
17649.750	59.5	-13.0	41.1	31.471	74.0	14.5	H

8DPSK Ch 39 - Peak

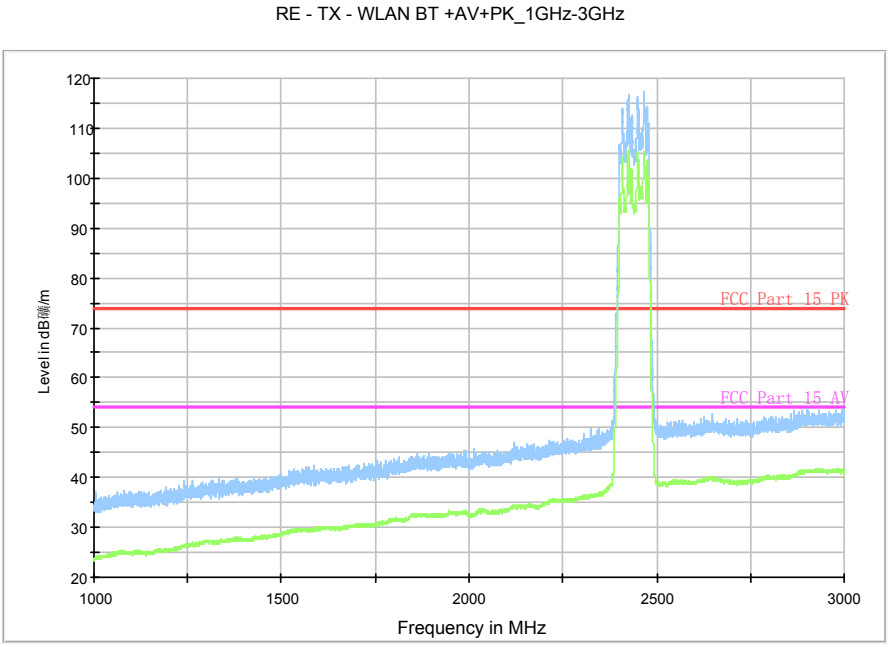
Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2321.000	49.1	-27.8	31.2	45.680	74.0	24.9	V
2521.200	51.5	-26.7	32.6	45.616	74.0	22.5	H
17228.250	60.1	-14.3	41.2	33.186	74.0	13.9	V
17570.250	59.3	-13.7	41.1	31.838	74.0	14.7	V
17507.250	59.2	-14.4	41.2	32.341	74.0	14.8	V
17944.500	59.1	-13.6	40.8	31.879	74.0	14.9	V

8DPSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.580	64.5	2.9	32.8	28.831	74.0	9.5	H
2483.670	65.1	2.9	32.8	29.420	74.0	8.9	H
17868.750	60.1	-13.5	40.9	32.721	74.0	13.9	V
17572.500	59.9	-13.7	41.1	32.382	74.0	14.1	H
17709.000	59.5	-13.2	41.0	31.707	74.0	14.5	H
17522.250	59.4	-14.2	41.2	32.403	74.0	14.6	V

Conclusion: PASS

Test graphs as below for Set.10:



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.58. Radiated emission: GFSK, Channel 0, 1 GHz - 3 GHz

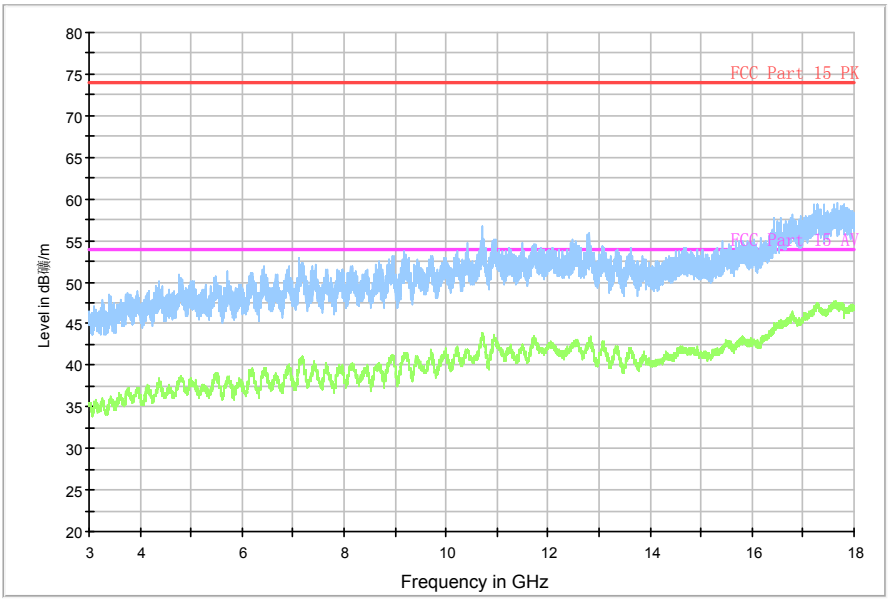


Fig.59. Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

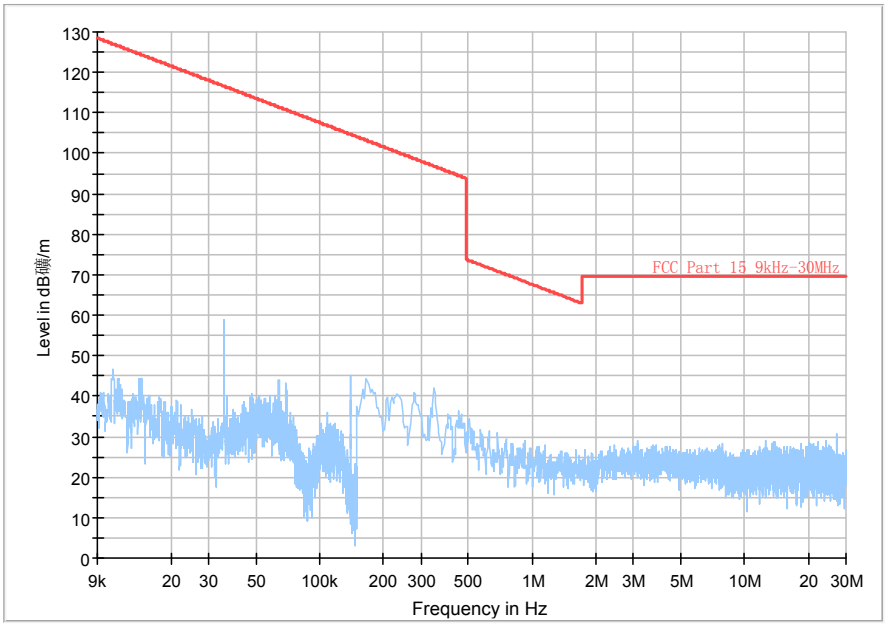


Fig.60. Radiated emission: GFSK, Channel 39, 9 kHz - 30 MHz

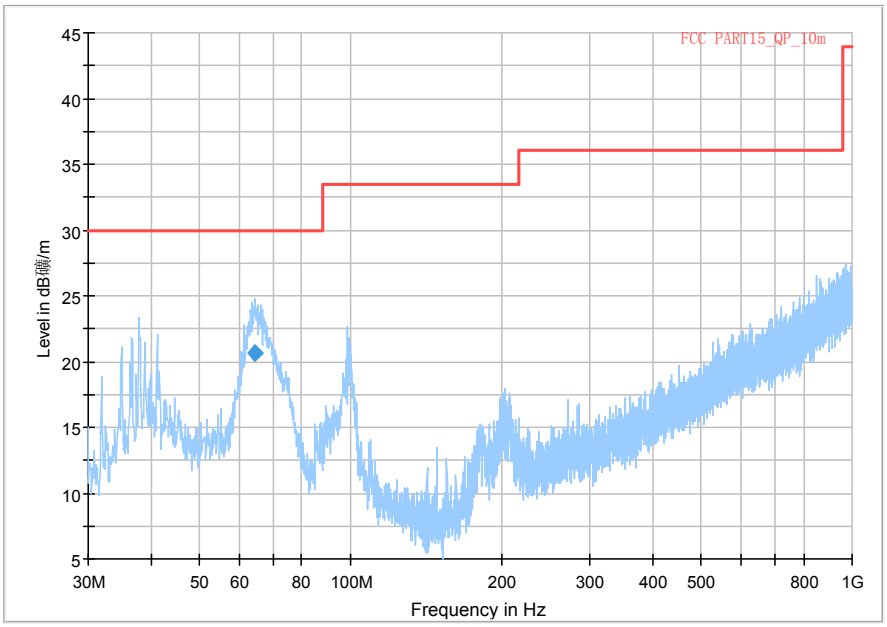
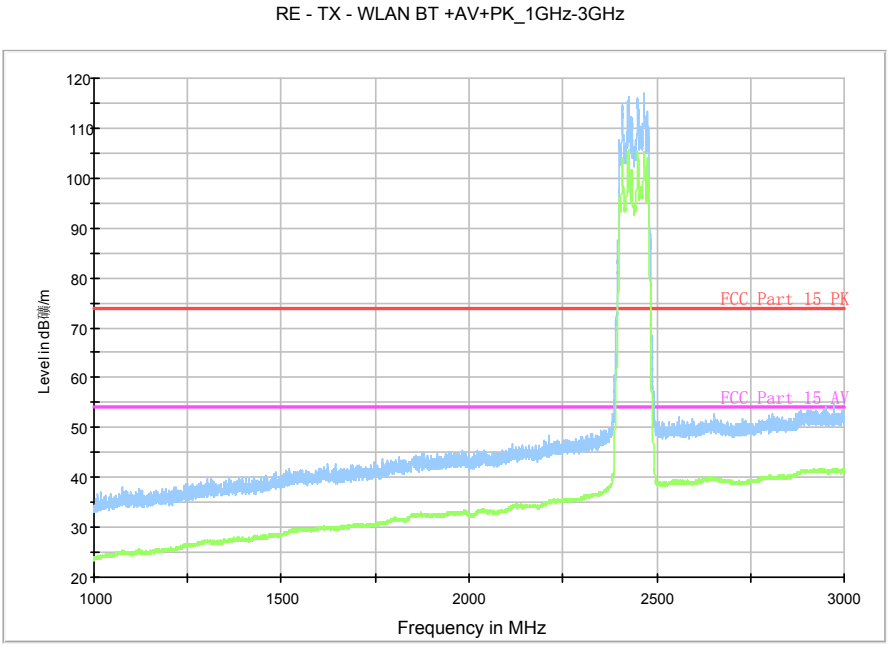


Fig.61. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
64.652000	20.61	30.00	9.39	1000.0	120.000	101.0	V	-30.0	-13.6



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.62. Radiated emission: GFSK, Channel 39, 1 GHz - 3 GHz

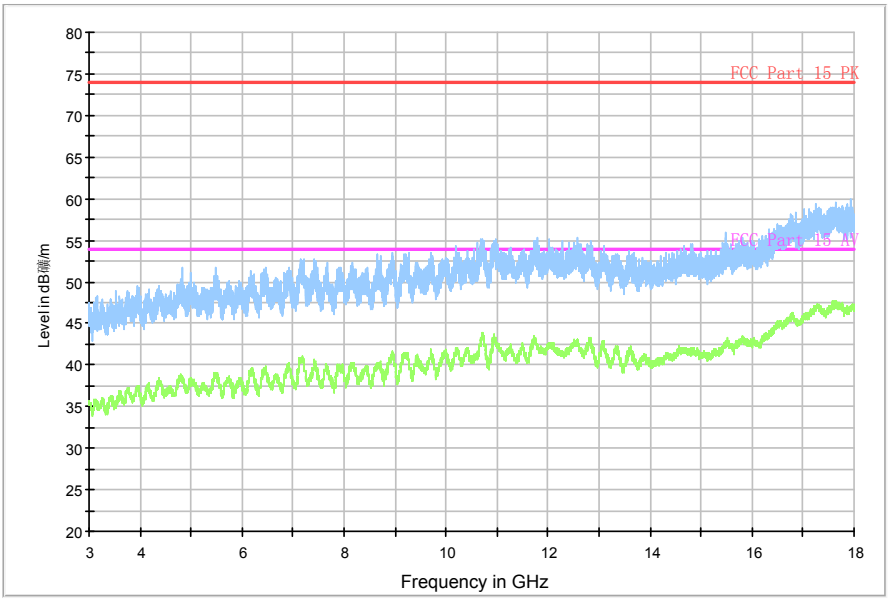
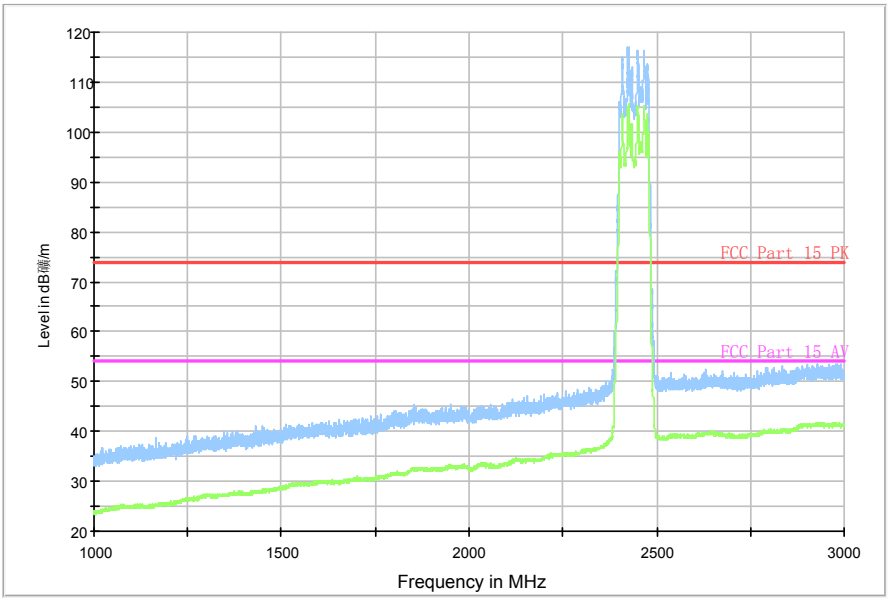


Fig.63. Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz

RE - TX - WLAN BT +AV+PK_1GHz-3GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.64. Radiated emission: GFSK, Channel 78, 1 GHz - 3 GHz

RE - 3GHz-18GHz

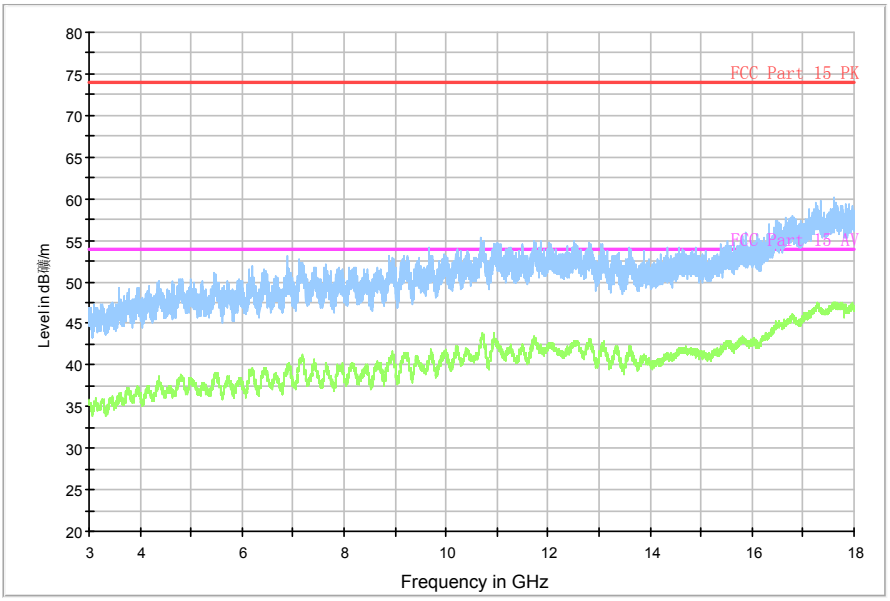


Fig.65. Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz

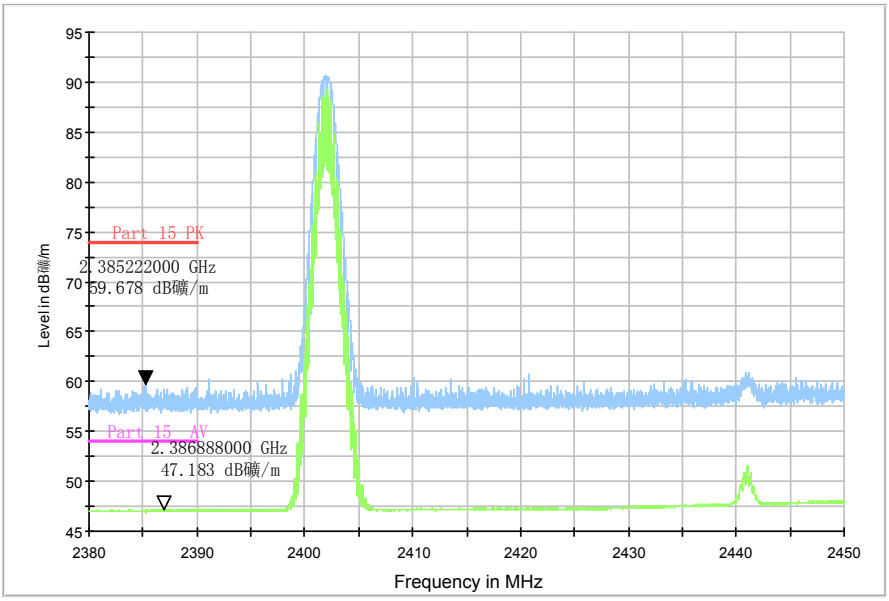


Fig.66. Radiated emission (Power): GFSK, low channel

RE - Power-2.45GHz-2.5GHz

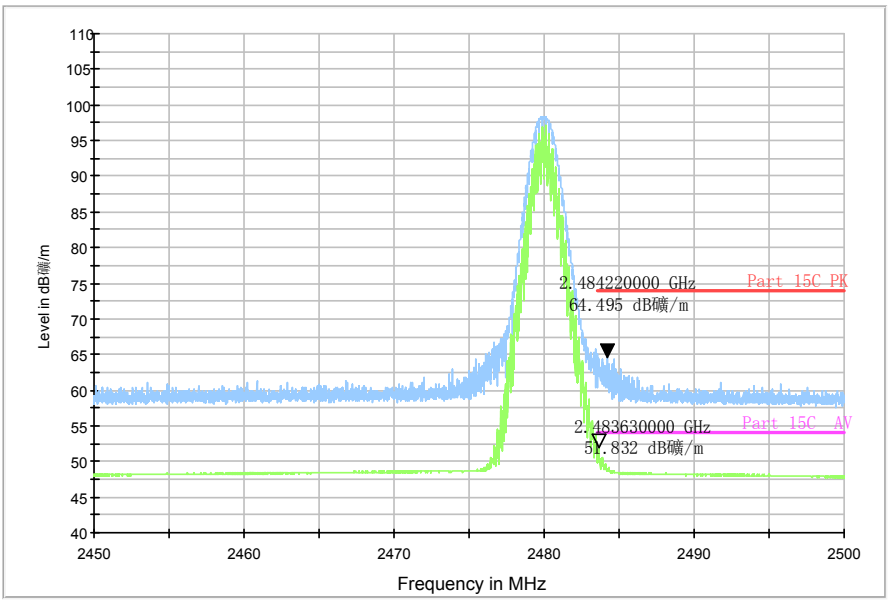


Fig.67. Radiated emission (Power) GFSK, high channel

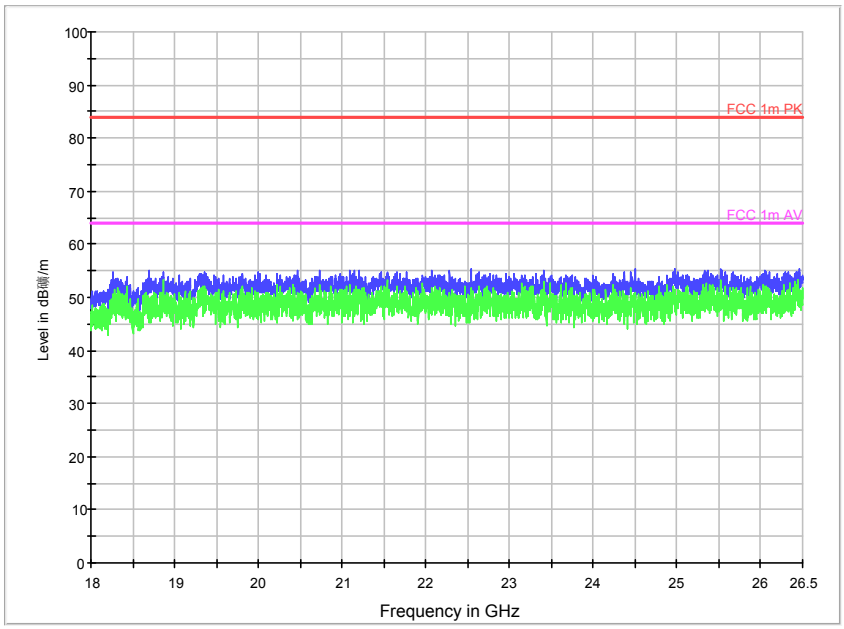
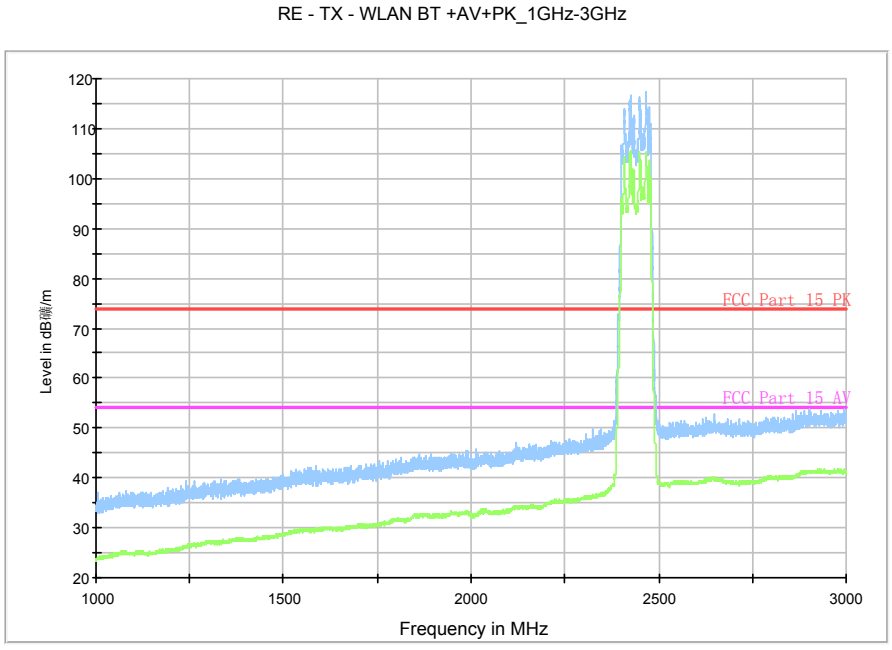


Fig.68. Radiated emission: GFSK, 18 GHz - 26 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.69. Radiated emission: π/4 DQPSK, Channel 0, 1 GHz - 3 GHz

RE - 3GHz-18GHz

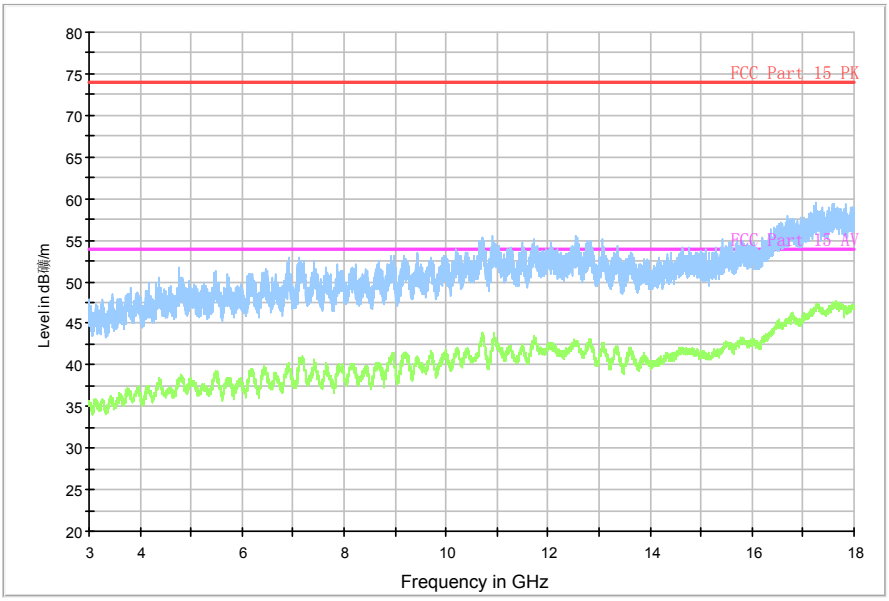


Fig.70. Radiated emission: π/4 DQPSK, Channel 0, 3 GHz - 18 GHz

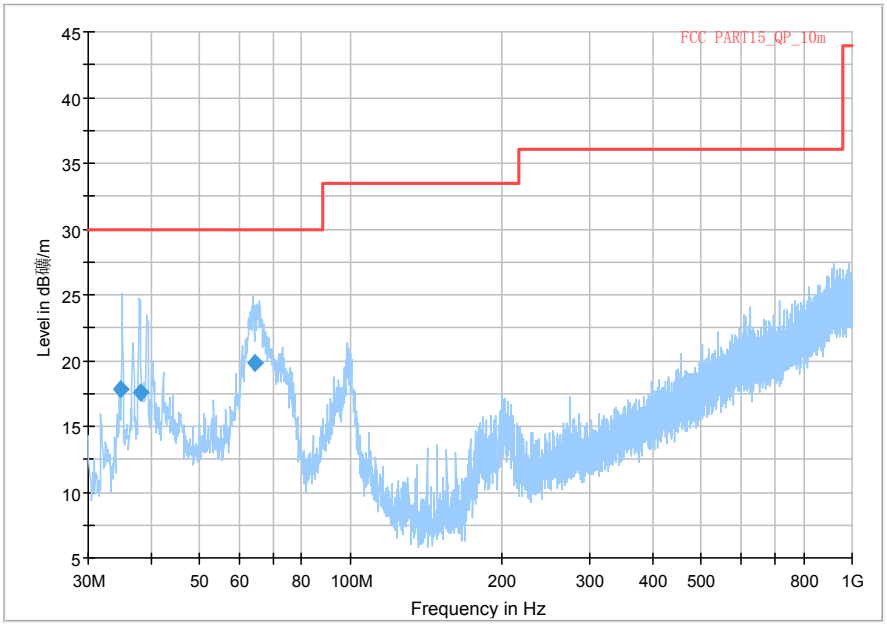
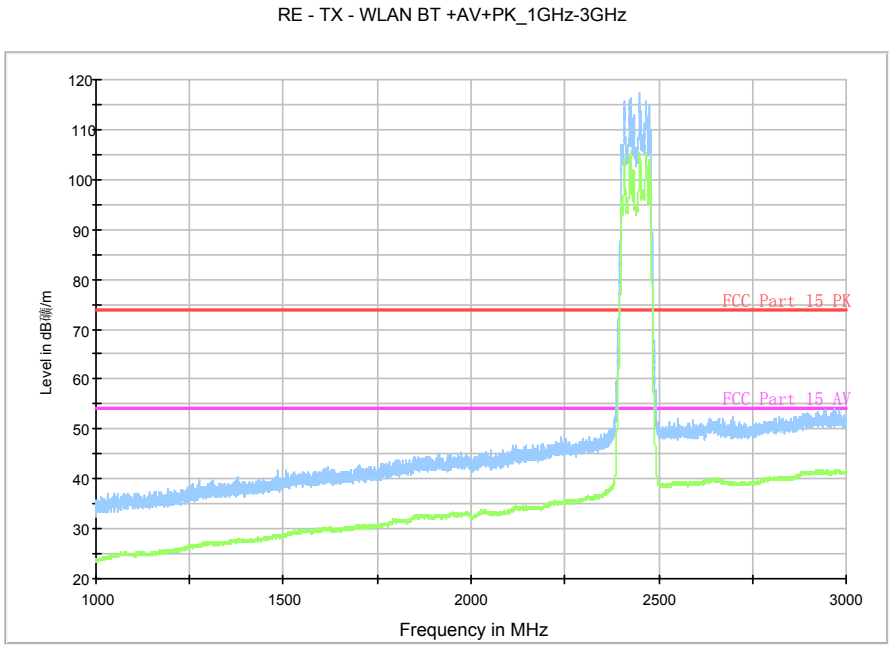


Fig.71. Radiated emission: π/4 DQPSK, Channel 39, 30 MHz - 1 GHz

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
34.924000	17.87	30.00	12.13	1000.0	120.000	276.0	V	300.0	-13.1
38.074000	17.55	30.00	12.45	1000.0	120.000	219.0	V	16.0	-12.4
64.587000	19.88	30.00	10.12	1000.0	120.000	100.0	V	300.0	-13.6



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.72. Radiated emission: π/4 DQPSK, Channel 39, 1 GHz - 3 GHz

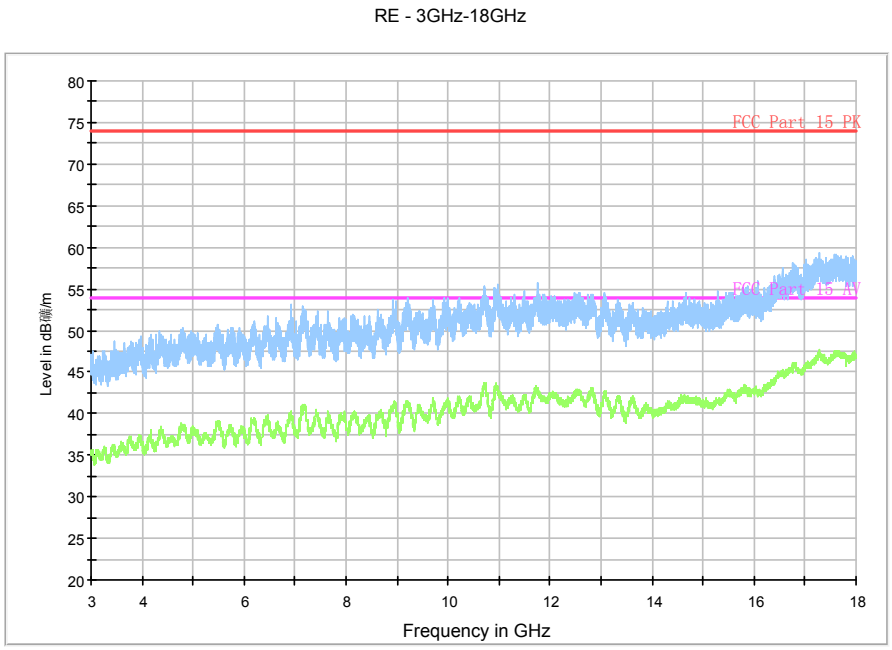
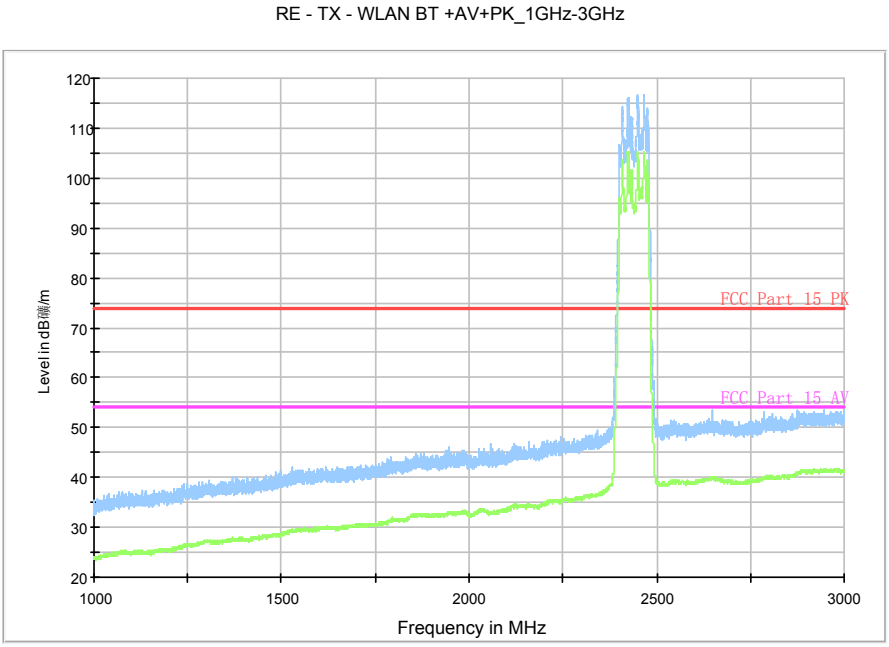


Fig.73. Radiated emission: π/4 DQPSK, Channel 39, 3 GHz - 18 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.74. Radiated emission: π/4 DQPSK, Channel 78, 1 GHz - 3 GHz

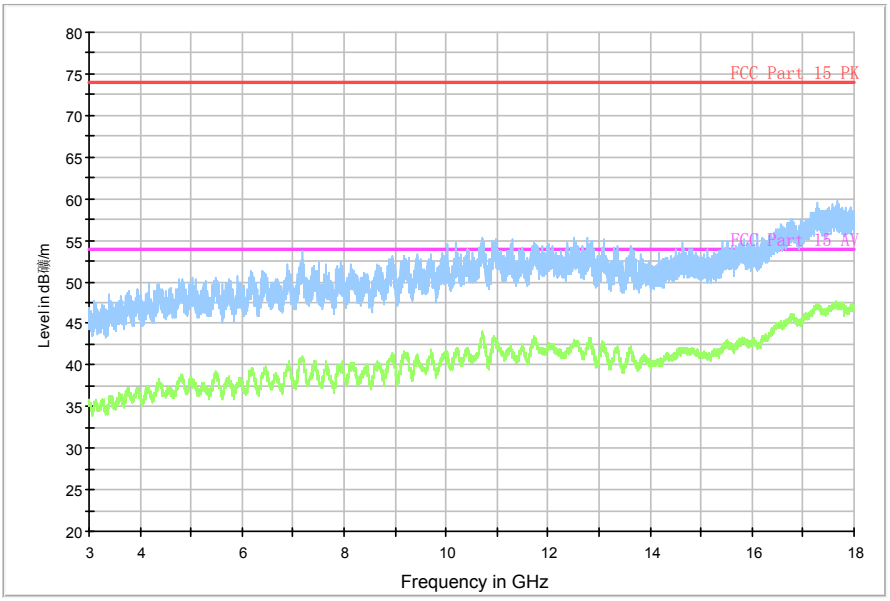


Fig.75. Radiated emission: π/4 DQPSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz

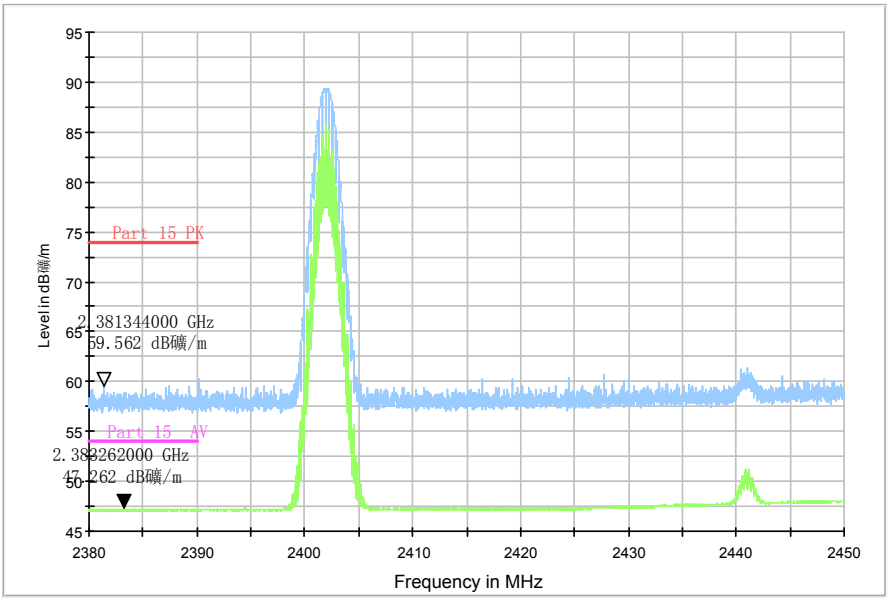


Fig.76. Radiated emission (Power): π/4 DQPSK, low channel

RE - Power-2.45GHz-2.5GHz

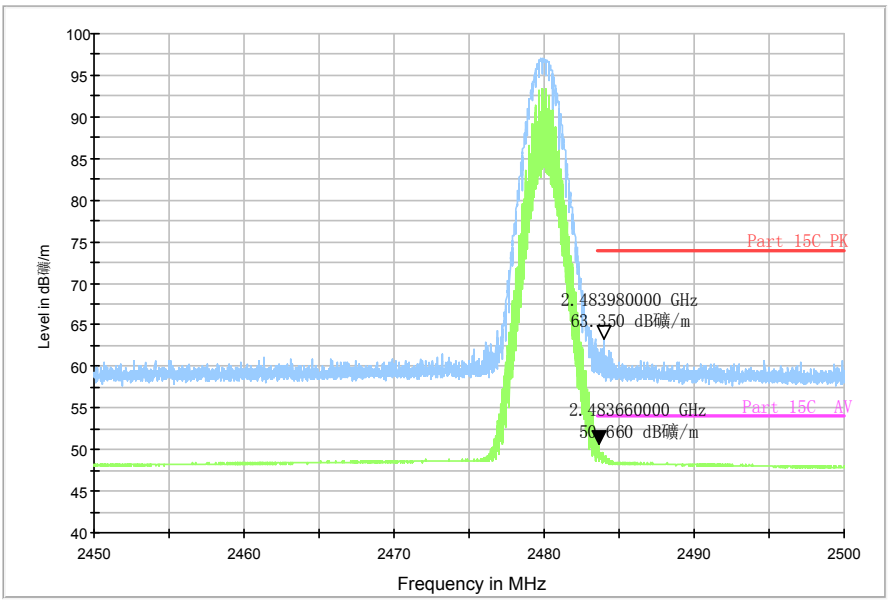


Fig.77. Radiated emission (Power): π/4 DQPSK, high channel

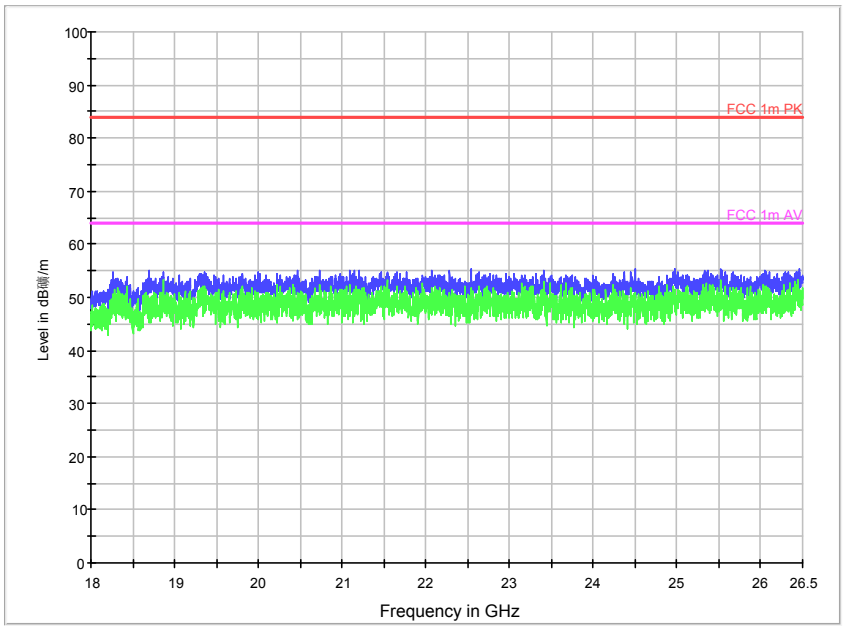
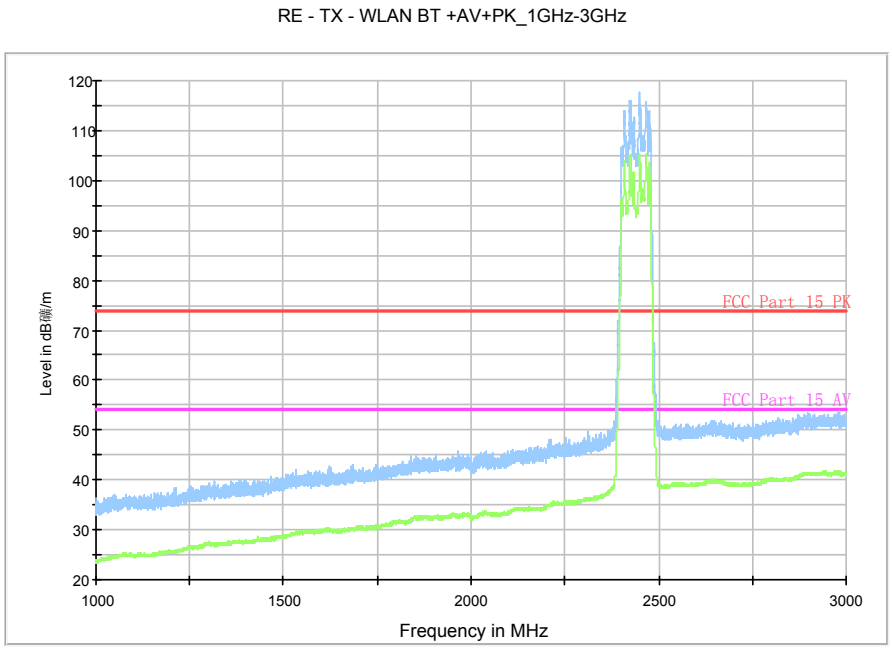


Fig.78. Radiated emission: π/4 DQPSK, 18 GHz - 26 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.79. Radiated emission: 8DPSK, Channel 0, 1 GHz - 3 GHz

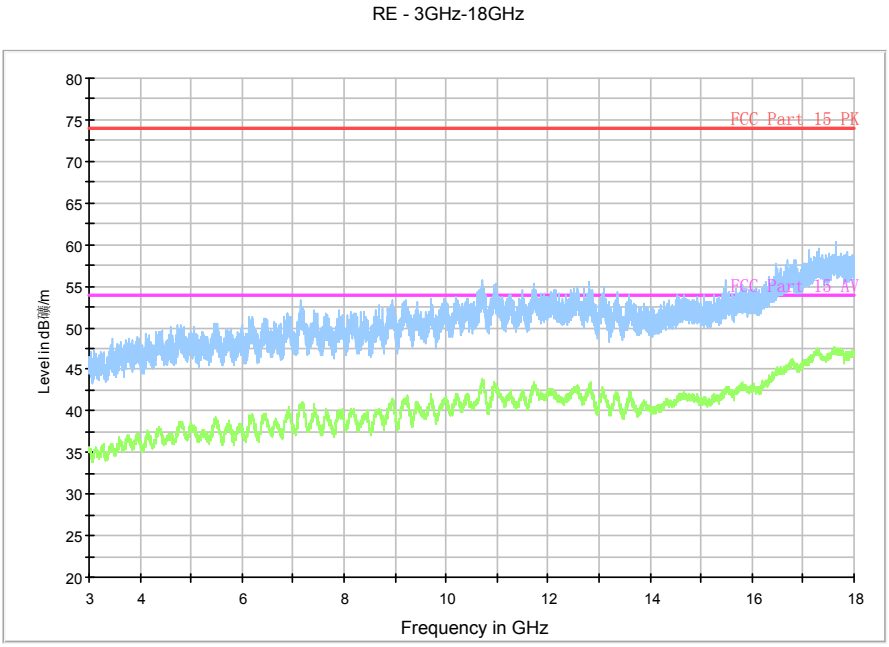


Fig.80. Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

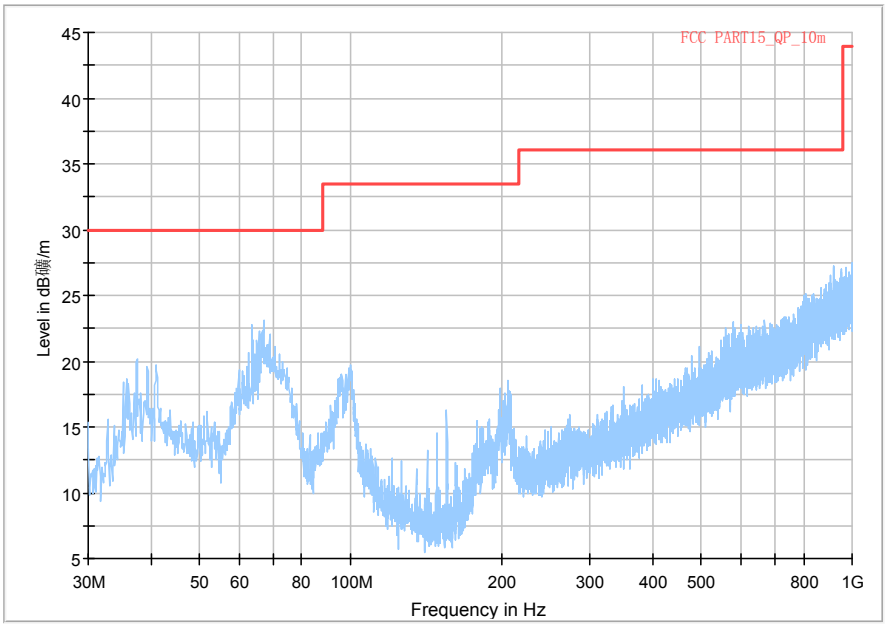
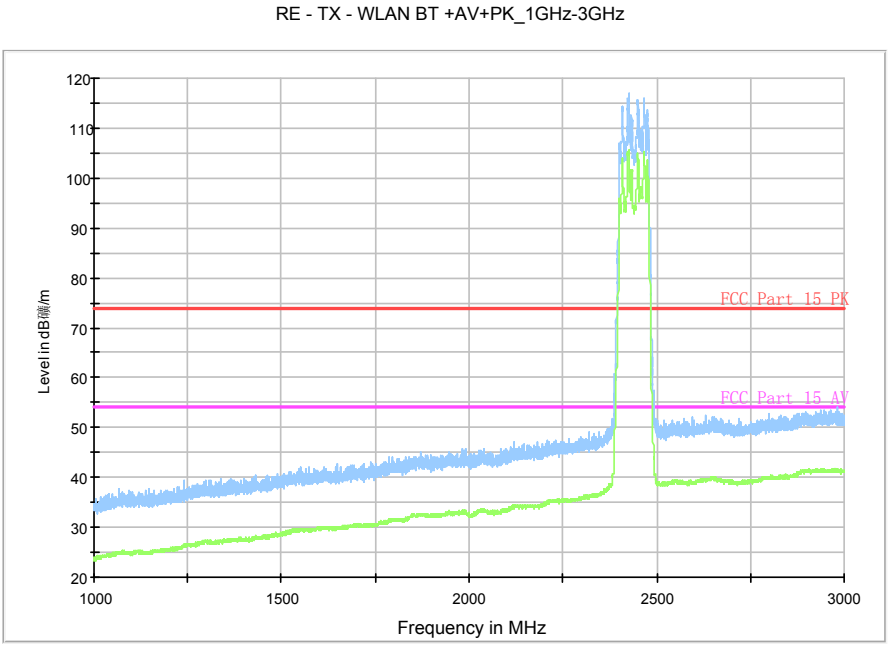


Fig.81. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.82. Radiated emission: 8DPSK, Channel 39, 1 GHz - 3 GHz

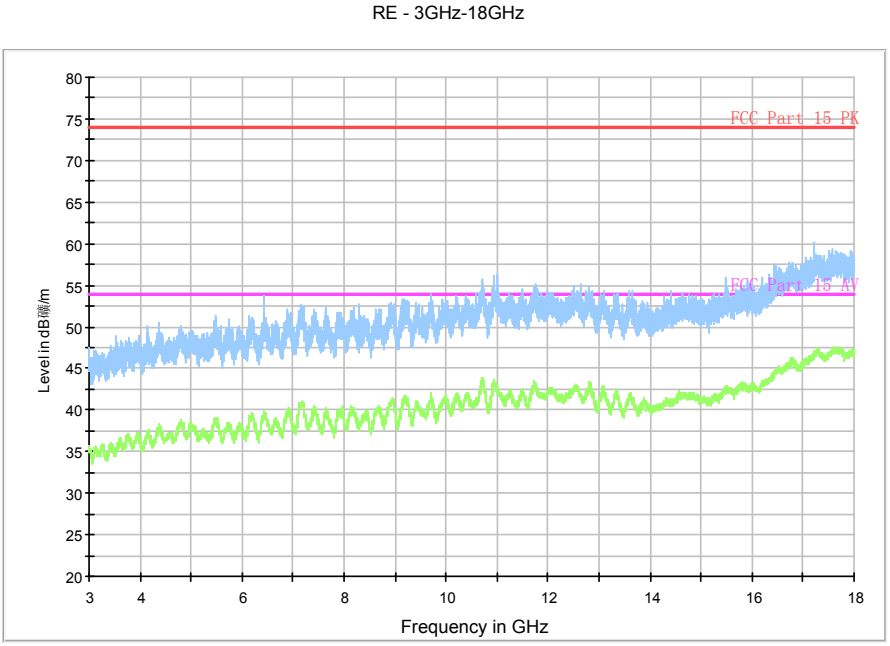
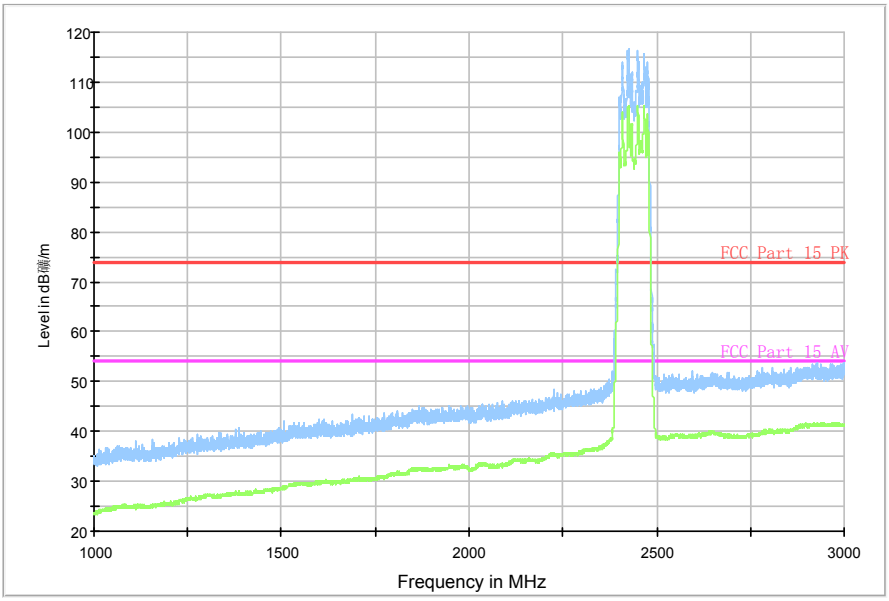


Fig.83. Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz

RE - TX - WLAN BT +AV+PK_1GHz-3GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.84. Radiated emission: 8DPSK, Channel 78, 1 GHz - 3 GHz

RE - 3GHz-18GHz

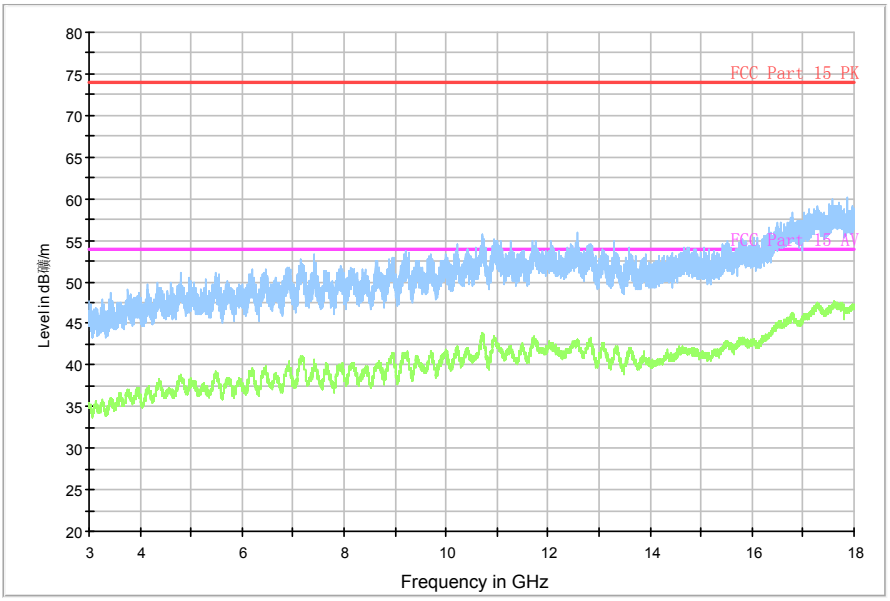


Fig.85. Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

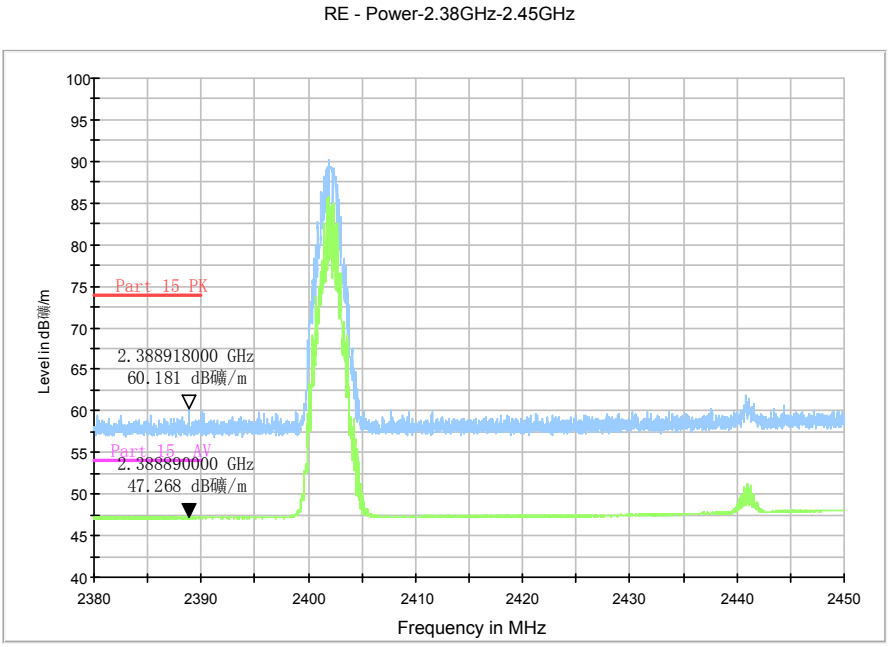


Fig.86. Radiated emission (Power): 8DPSK, low channel

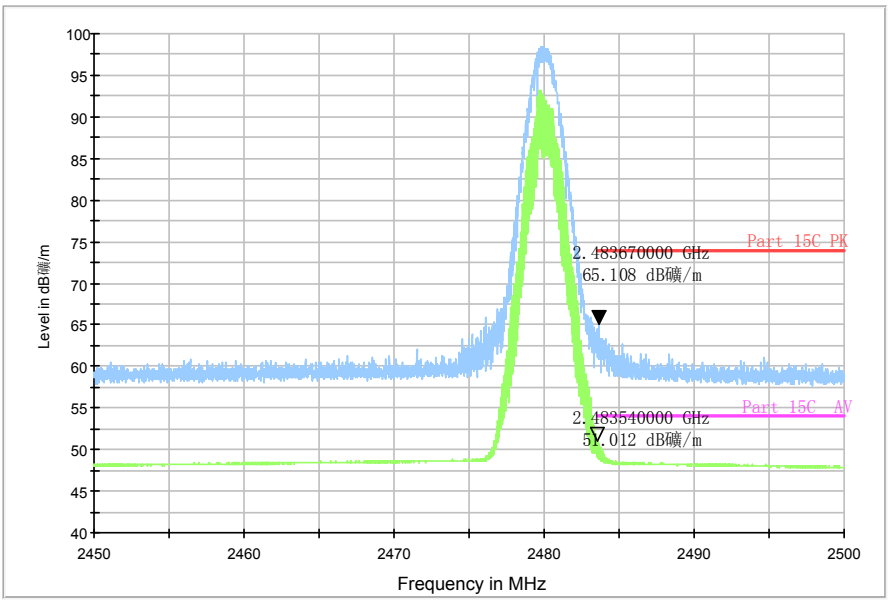


Fig.87. Radiated emission (Power): 8DPSK, high channel

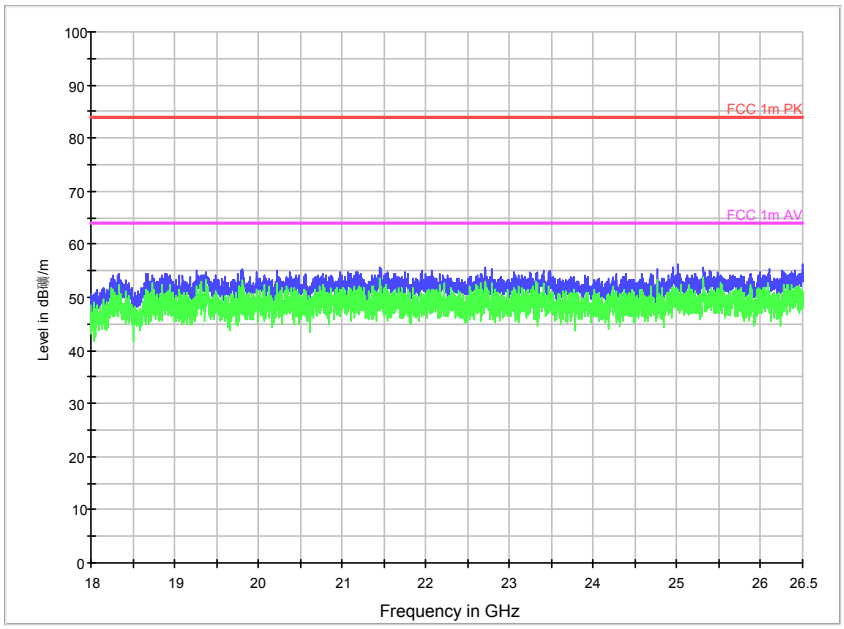


Fig.88. Radiated emission: 8DPSK, 18 GHz – 26.5 GHz

A.6. Time of Occupancy (Dwell Time)

Method of Measurement: See ANSI C63.10-clause 7.8.4

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW ≥ RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

Measurement Limit:

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii)	< 400

Measurement Result:

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.89	118.32	P
	DH3	Fig.90	260.12	P
	DH5	Fig.91	306.56	P

For π/4 DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.92	120.60	P
	DH3	Fig.93	260.65	P
	DH5	Fig.94	307.01	P

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.95	120.91	P

	DH3	Fig.96	260.46	P
	DH5	Fig.97	306.72	P

Conclusion: PASS

Test graphs as below:

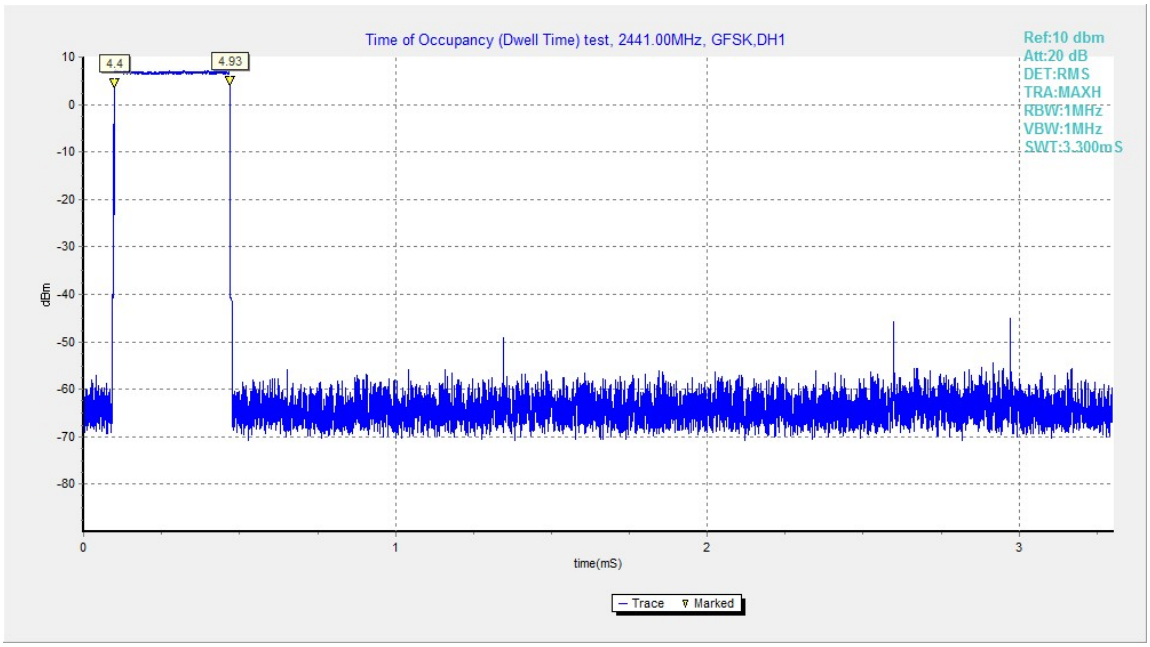


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet DH1

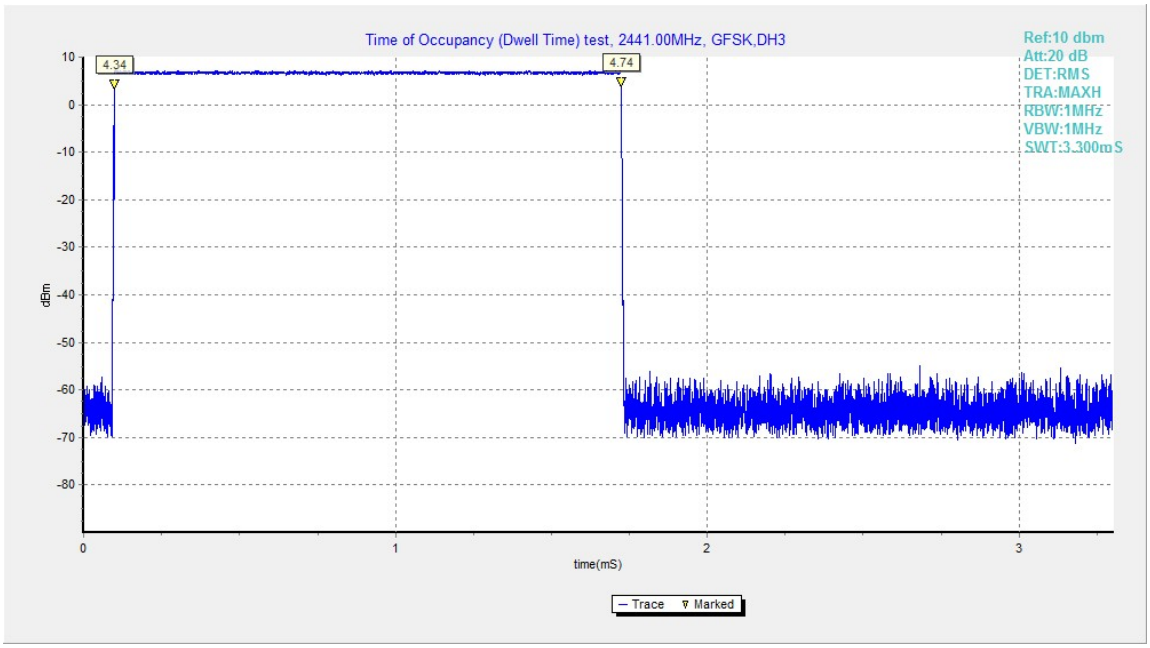


Fig.90. Time of occupancy (Dwell Time): Channel 39, Packet DH3

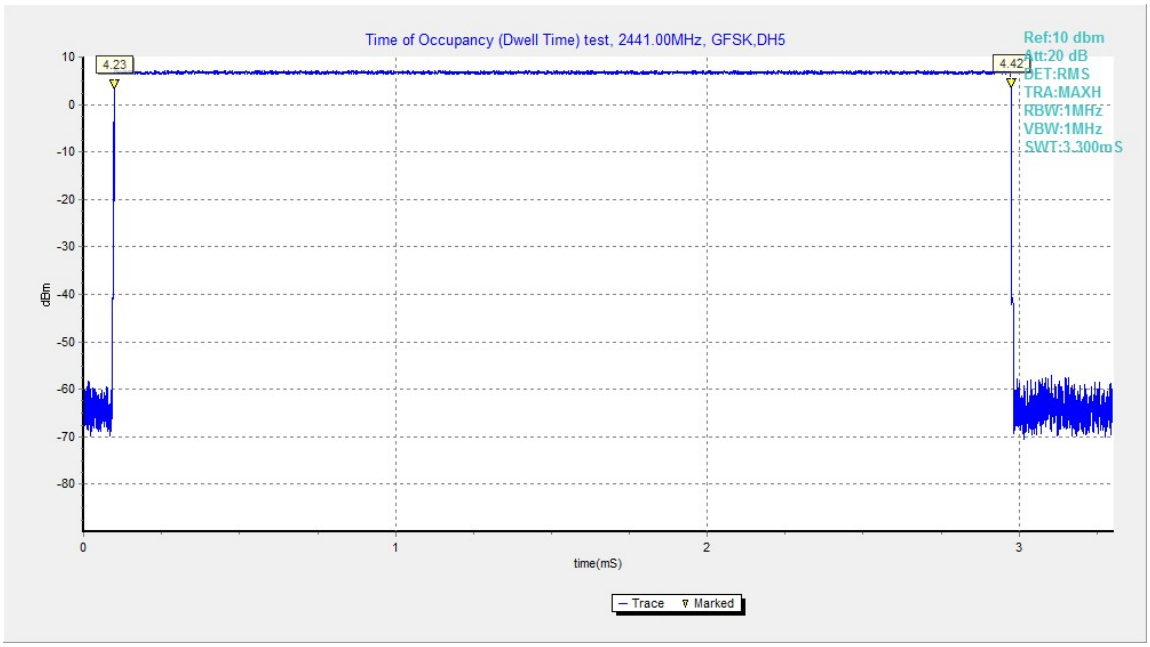


Fig.91. Time of occupancy (Dwell Time): Channel 39, Packet DH5

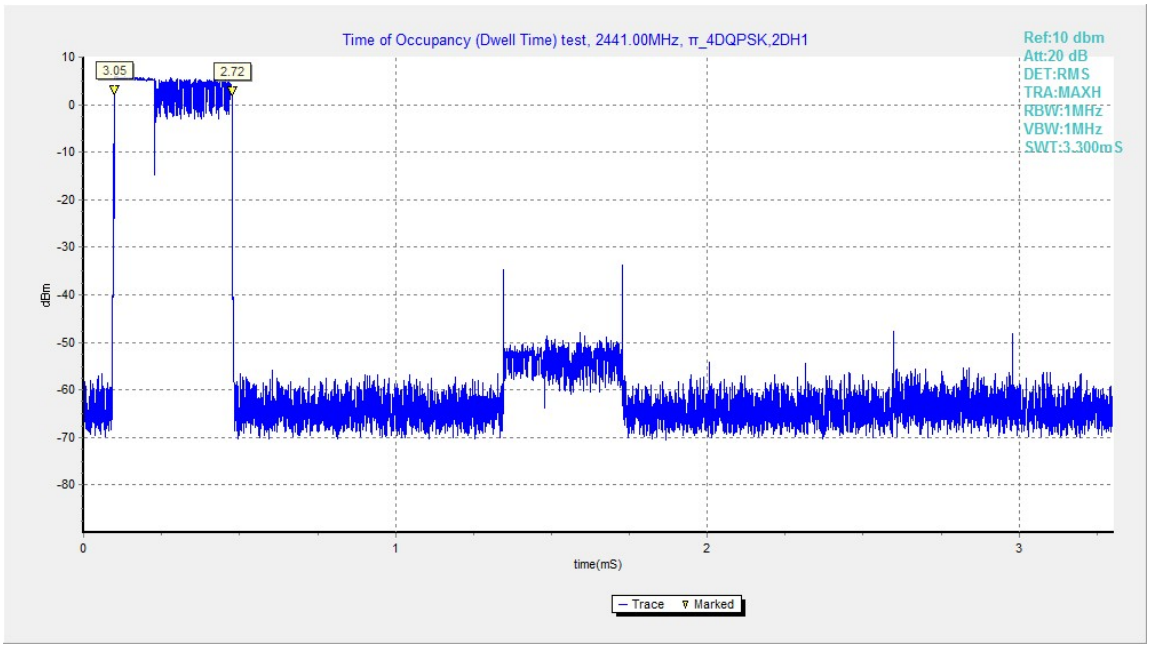


Fig.92. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

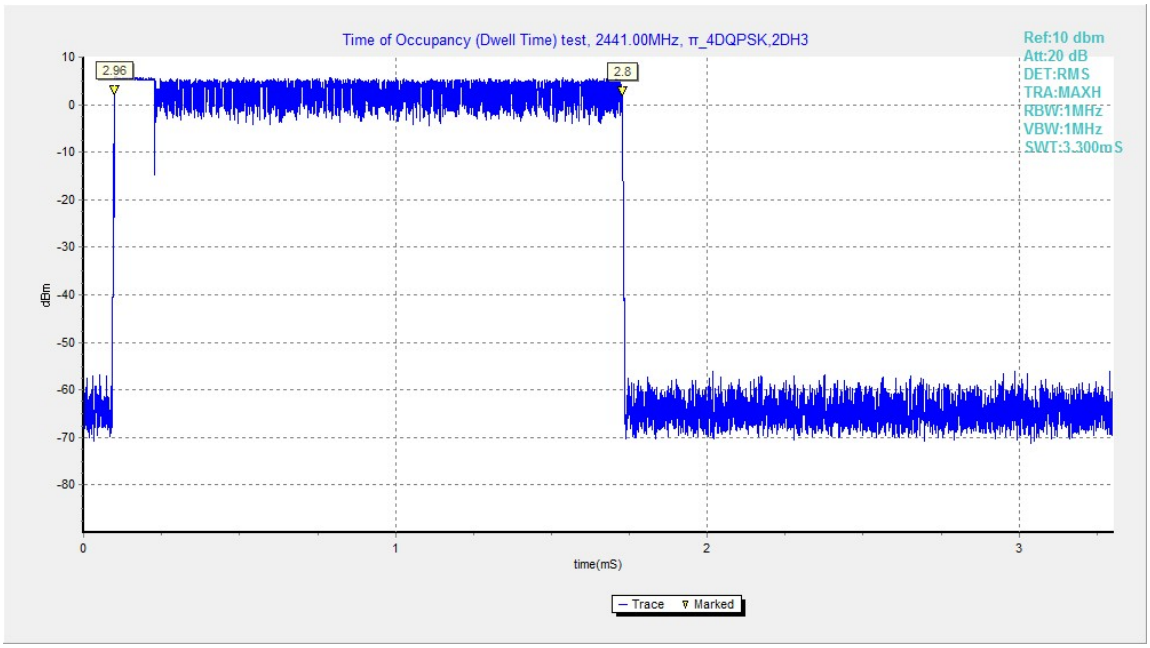


Fig.93. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

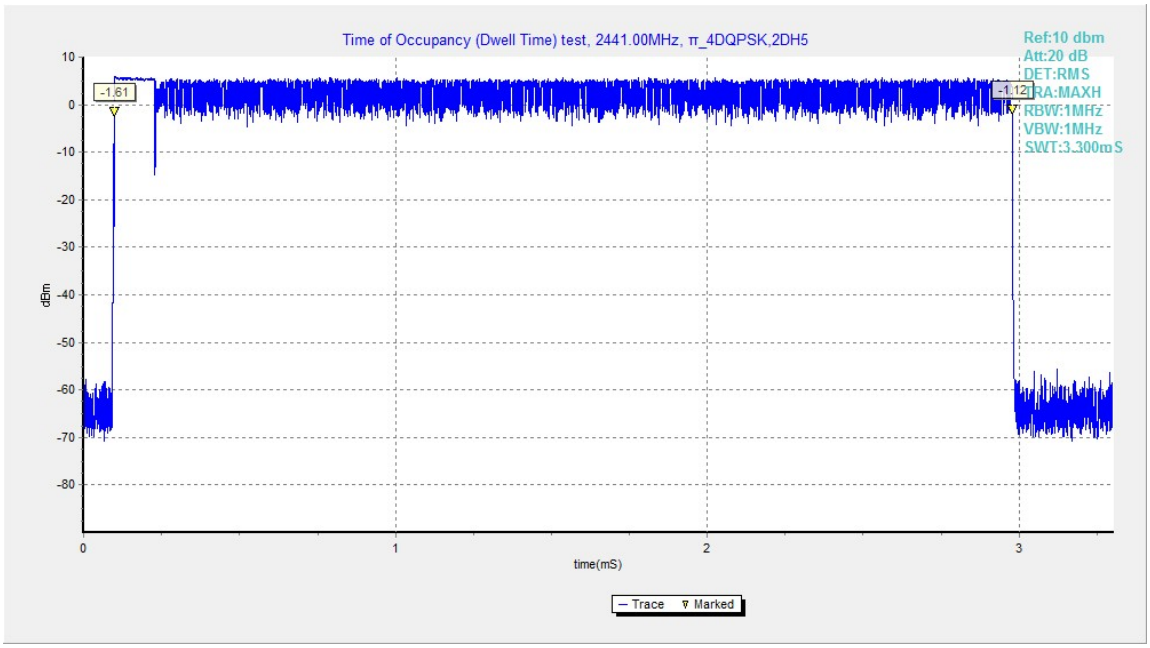


Fig.94. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

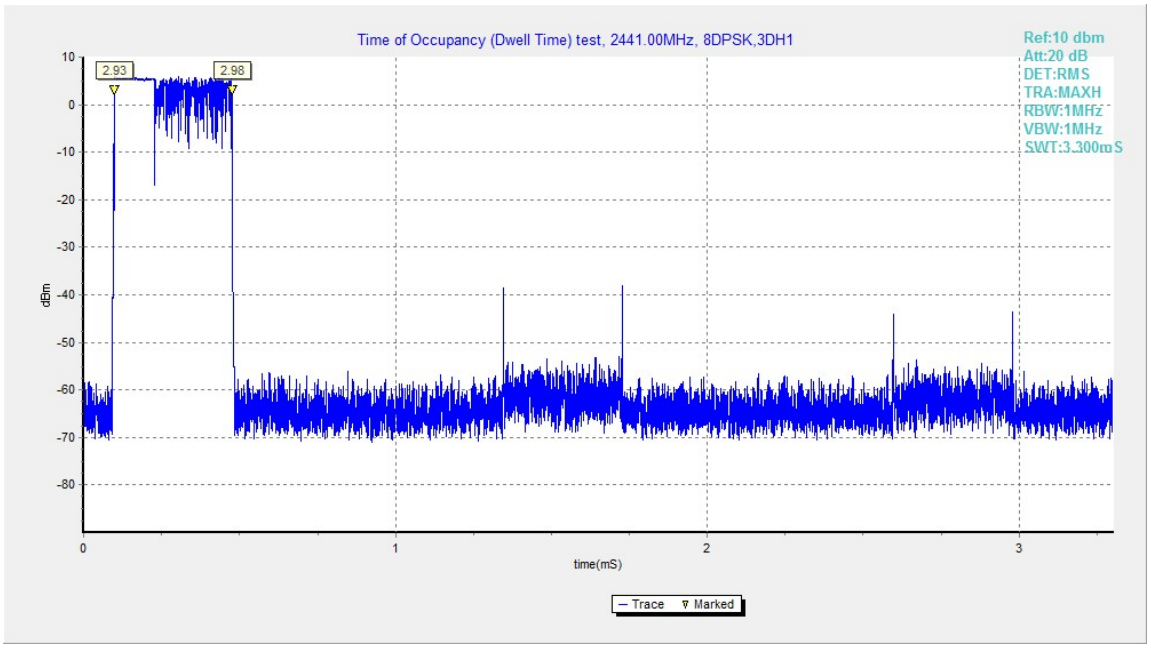


Fig.95. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

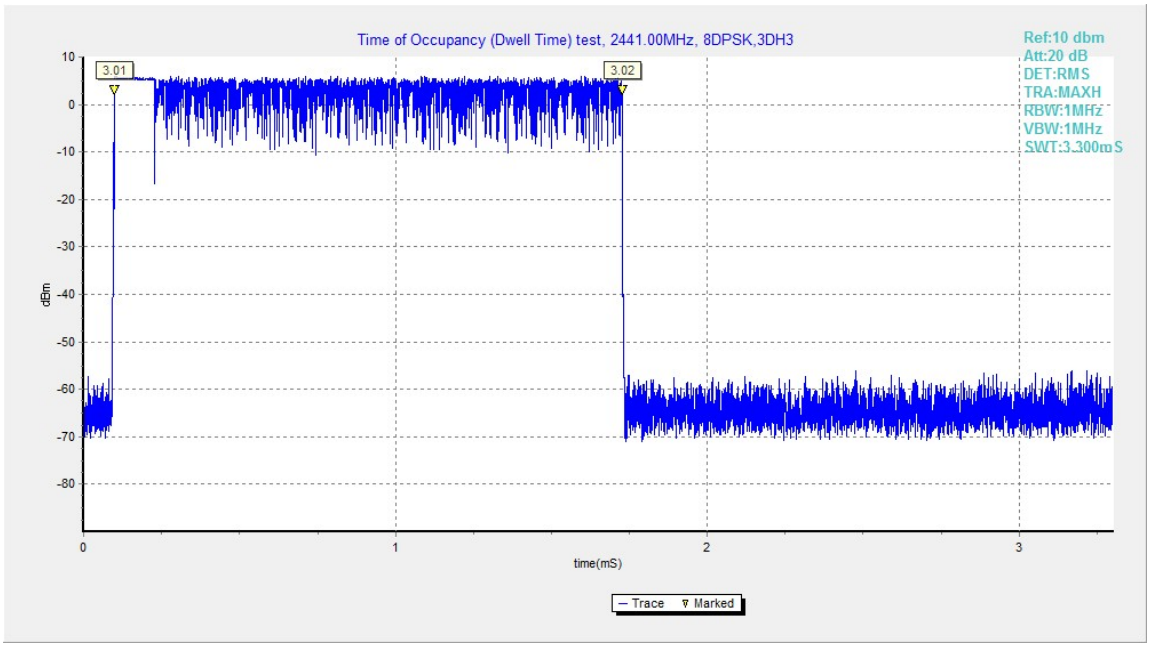


Fig.96. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

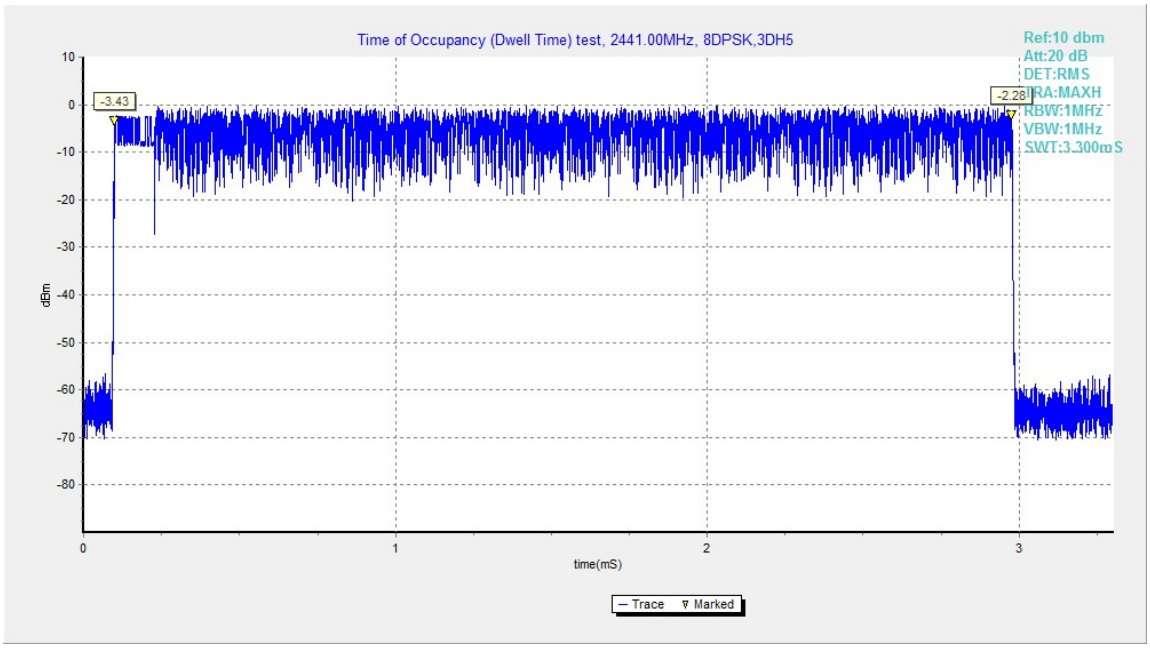


Fig.97. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

A.7. 20dB Bandwidth

Method of Measurement: See ANSI C63.10-clause 6.9.2

Measurement Procedure - Unwanted Emissions

1. Set RBW = 30kHz.

2. Set VBW = 100 kHz.

3. Set span to 3MHz

4. Detector = peak.

5. Trace Mode = max hold.

6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	NA *

Use NdB Down function of the SA to measure the 20dB Bandwidth

* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for “carrier frequency separation” test case, in Annex A.8.

Measurement Results:

For GFSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.98	950.00	NA
39	Fig.99	949.00	NA
78	Fig.100	946.00	NA

Forπ/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.101	1291.00	NA
39	Fig.102	1285.00	NA
78	Fig.103	1279.00	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.104	1264.00	NA
39	Fig.105	1292.00	NA
78	Fig.106	1269.00	NA

Conclusion: NA

Test graphs as below:

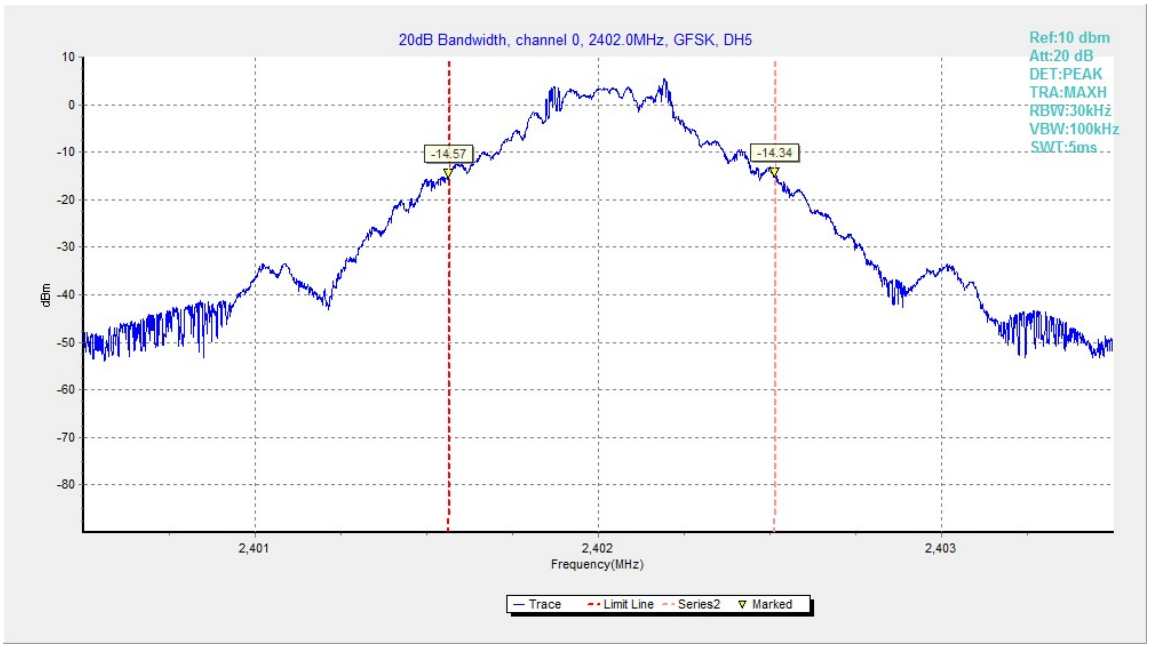


Fig.98. 20dB Bandwidth: GFSK, Channel 0

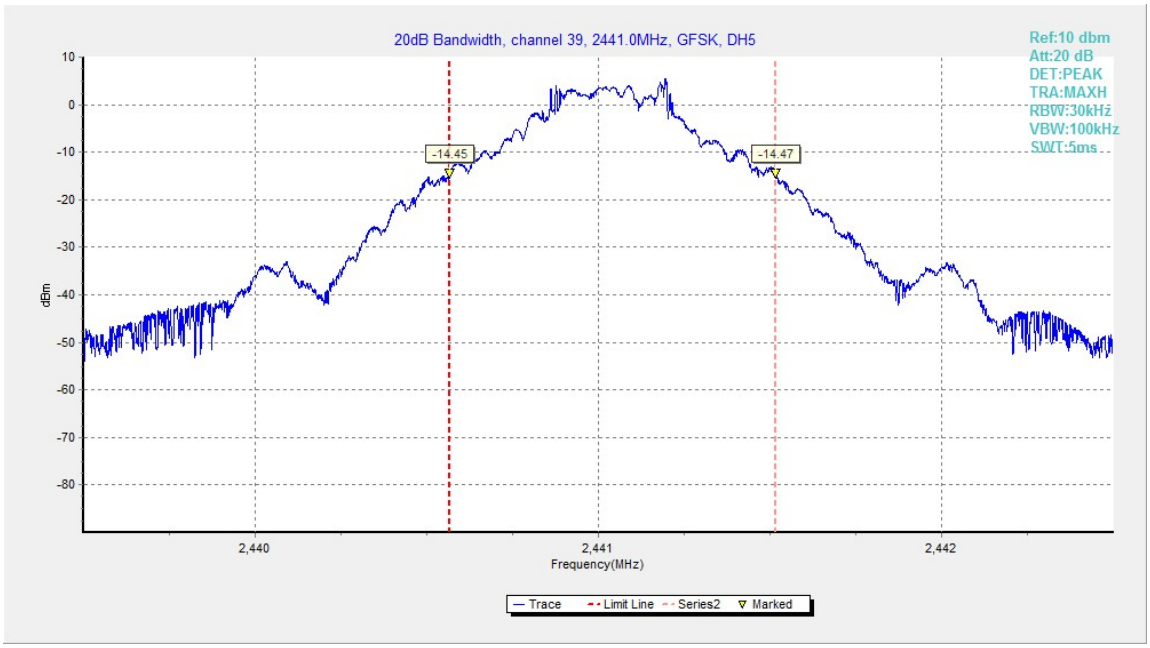


Fig.99. 20dB Bandwidth: GFSK, Channel 39

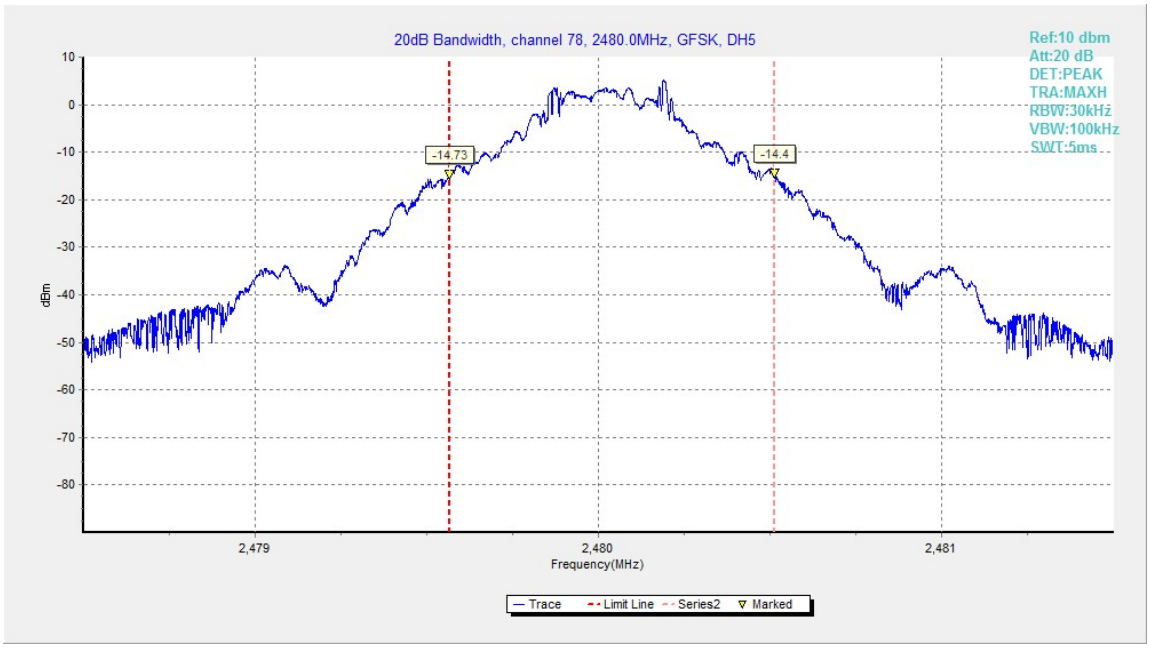


Fig.100. 20dB Bandwidth: GFSK, Channel 78

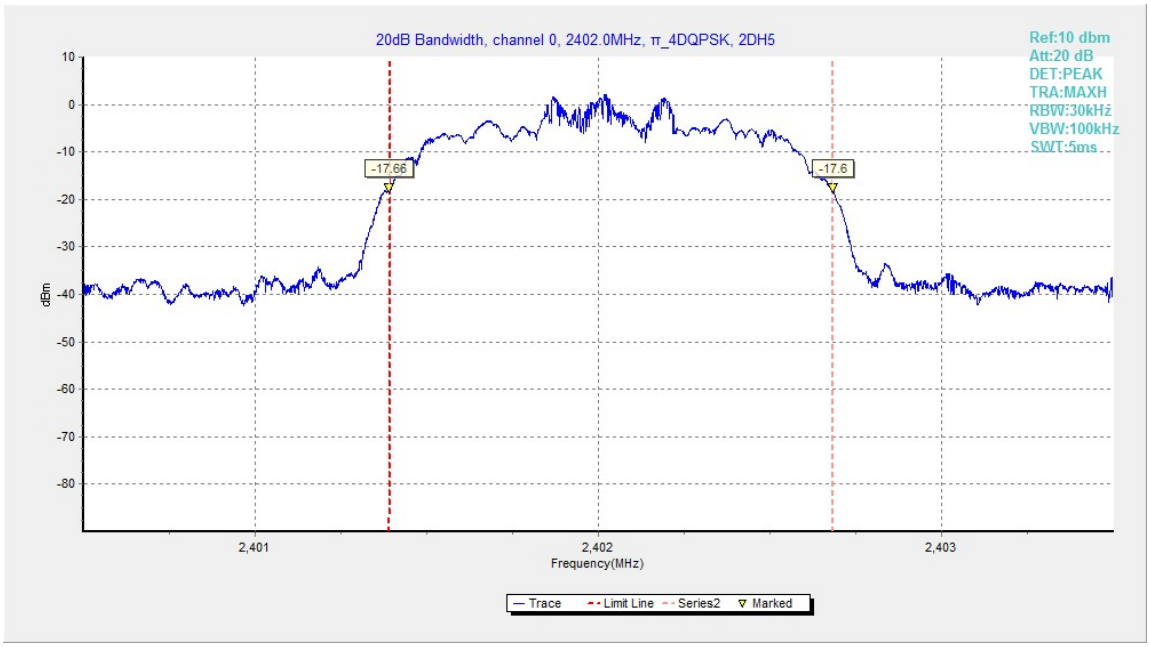


Fig.101. 20dB Bandwidth: π/4 DQPSK, Channel 0

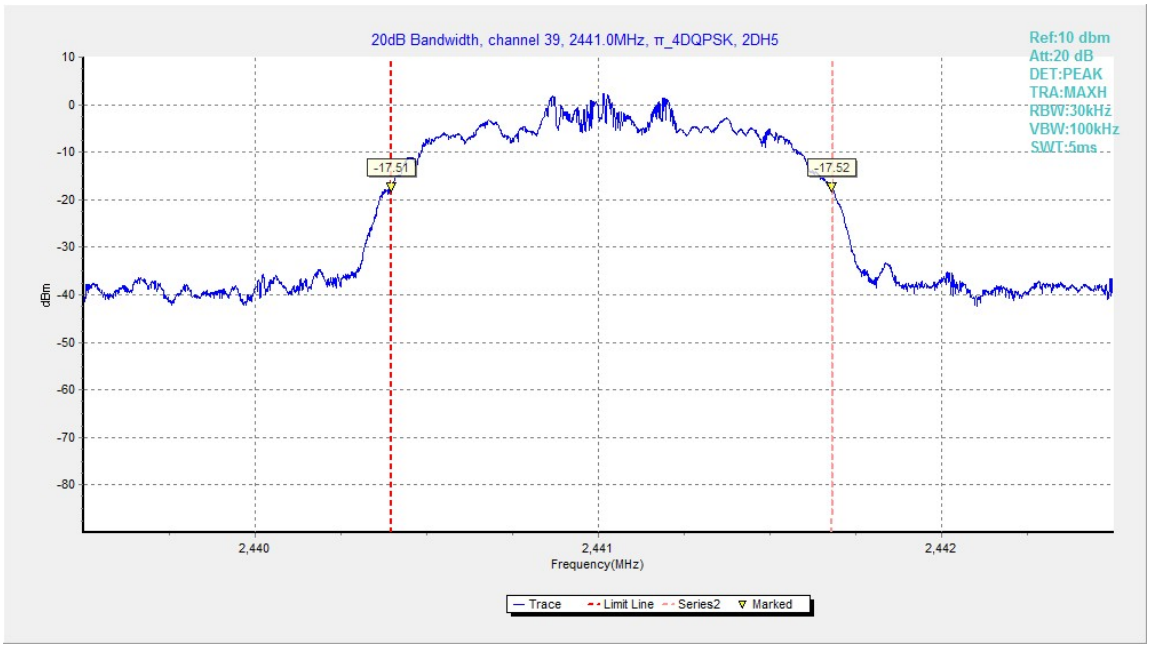


Fig.102. 20dB Bandwidth: π/4 DQPSK, Channel 39

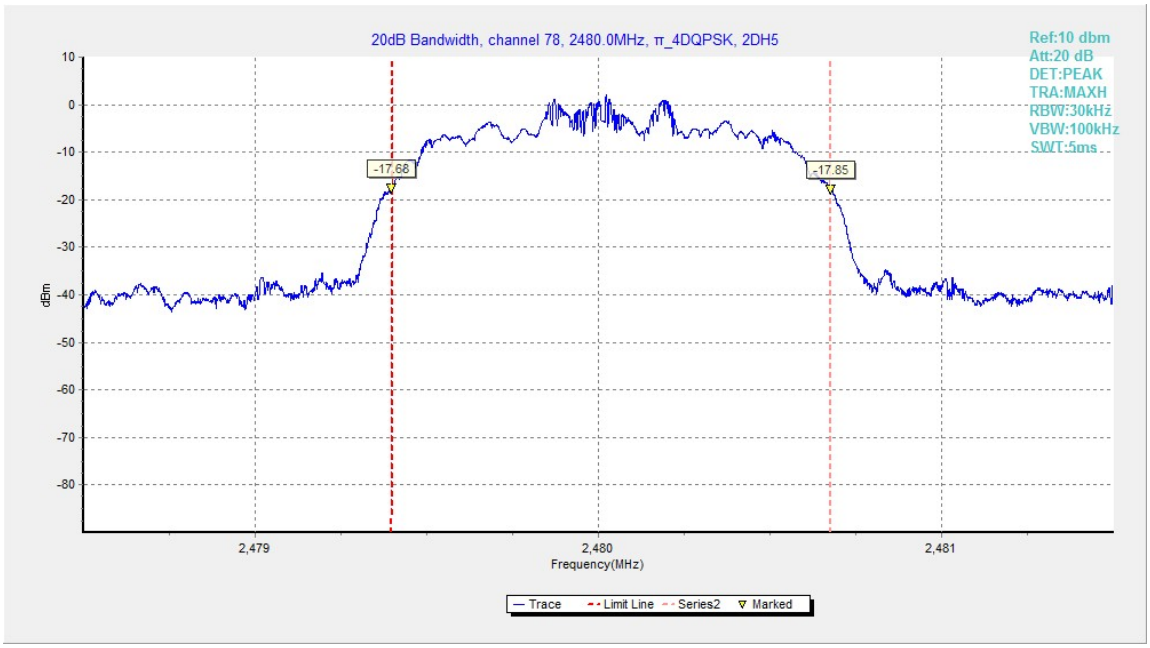


Fig.103. 20dB Bandwidth: π/4 DQPSK, Channel 78

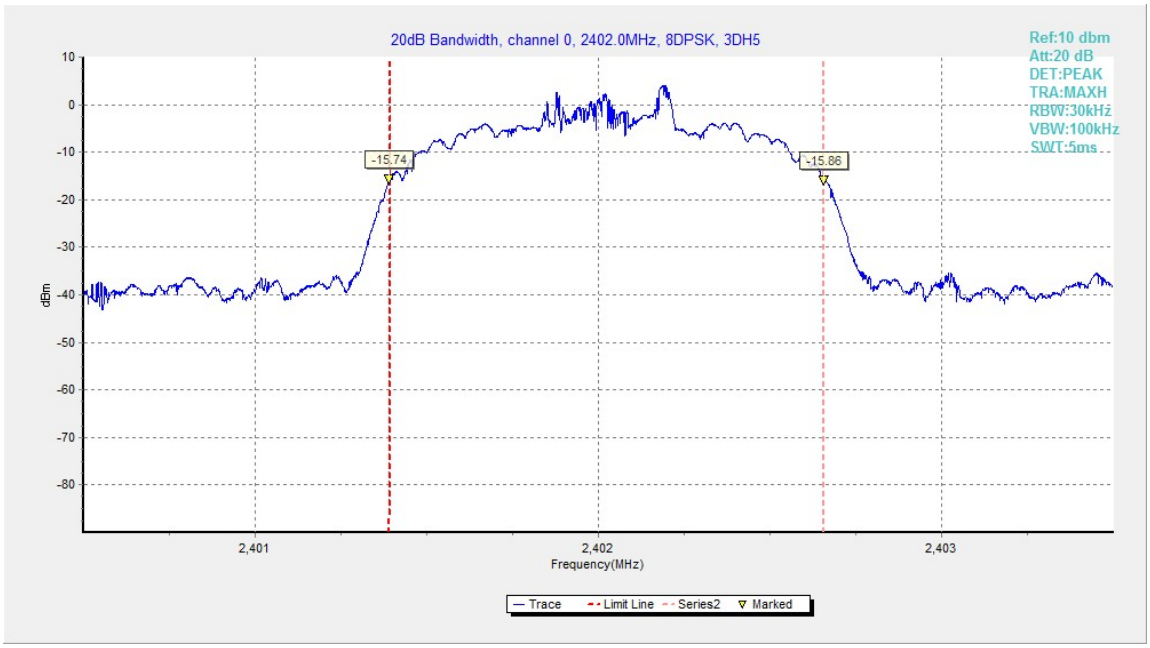


Fig.104. 20dB Bandwidth: 8DPSK, Channel 0

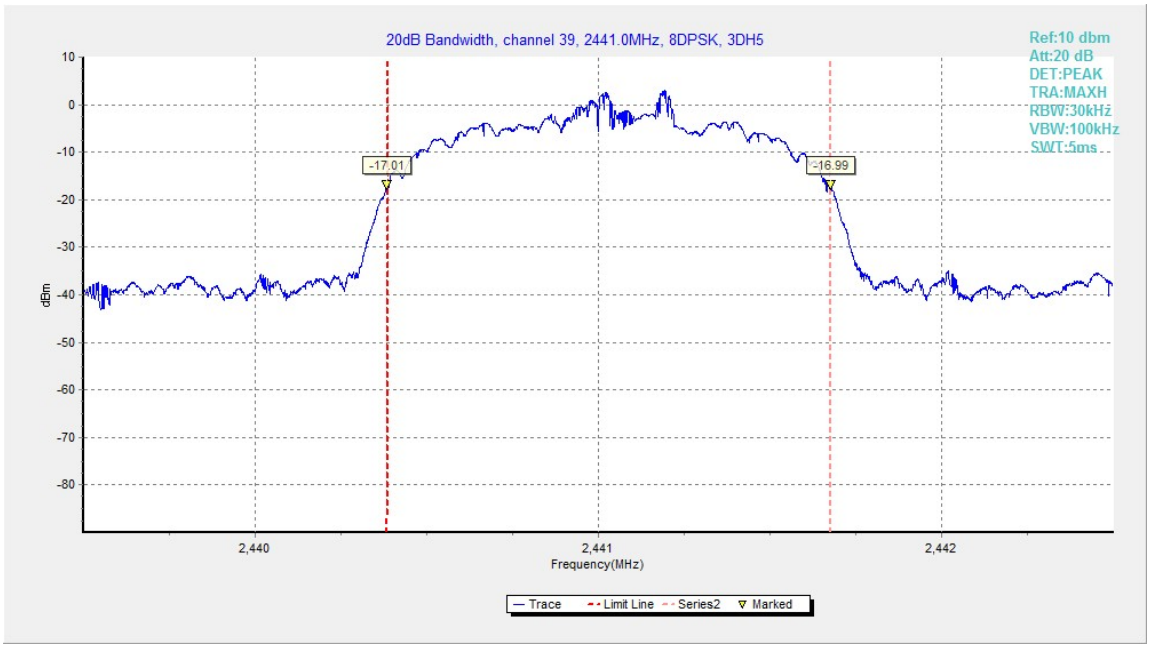


Fig.105. 20dB Bandwidth: 8DPSK, Channel 39

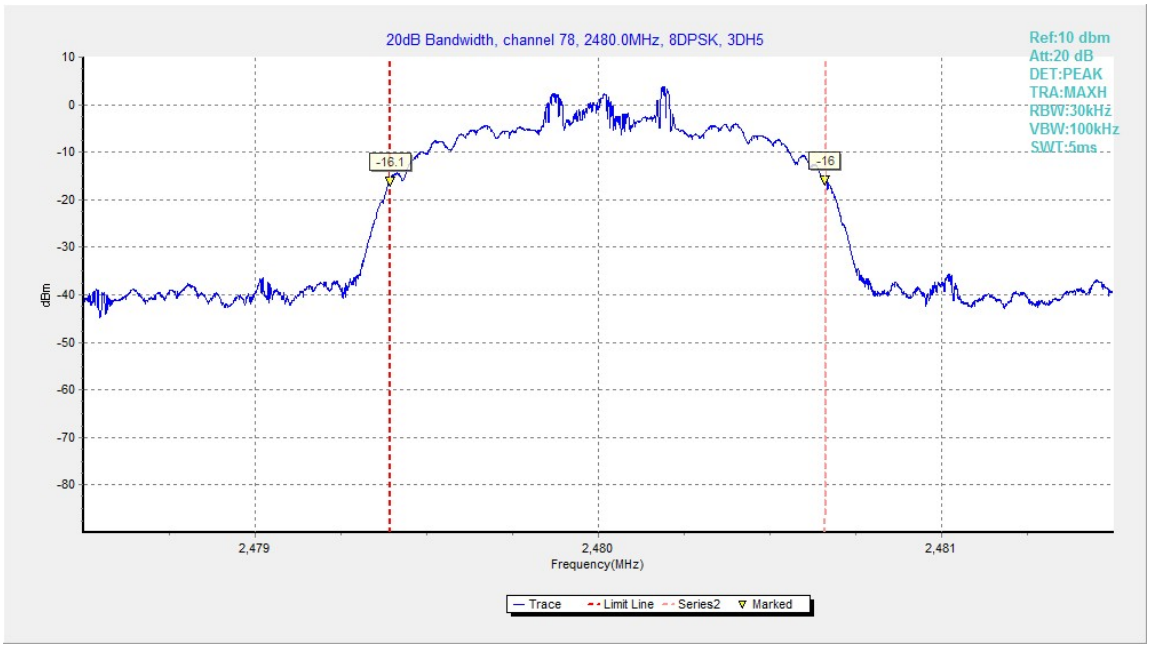


Fig.106. 20dB Bandwidth: 8DPSK, Channel 78

A.8. Carrier Frequency Separation

Method of Measurement: See ANSI C63.10-clause 7.8.2

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = 3MHz
- RBW=300kHz
- VBW=300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.

* Comment: This limit should be over 25 kHz or (2/3) * 20dB bandwidth, whichever is greater.

Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or (2/3) * 20dB bandwidth

Measurement Result:

For GFSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.107	1311.00	P

For π/4 DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.108	1144.00	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.109	998.00	P

Conclusion: PASS

Test graphs as below:

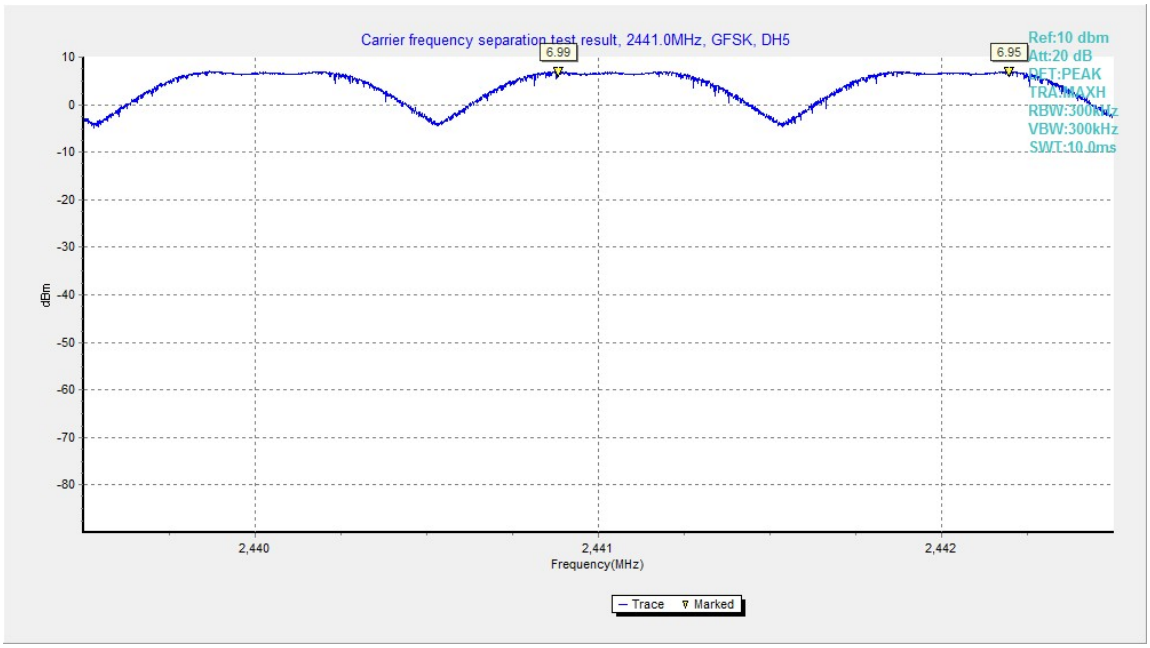


Fig.107. Carrier frequency separation measurement: GFSK, Channel 39

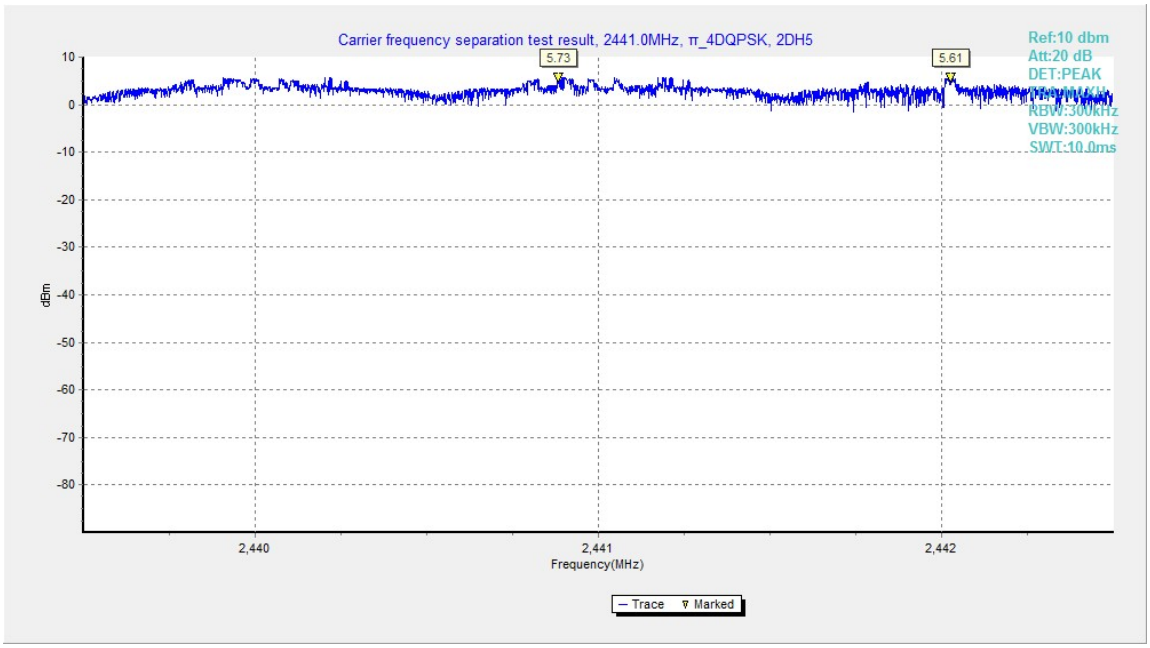


Fig.108. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

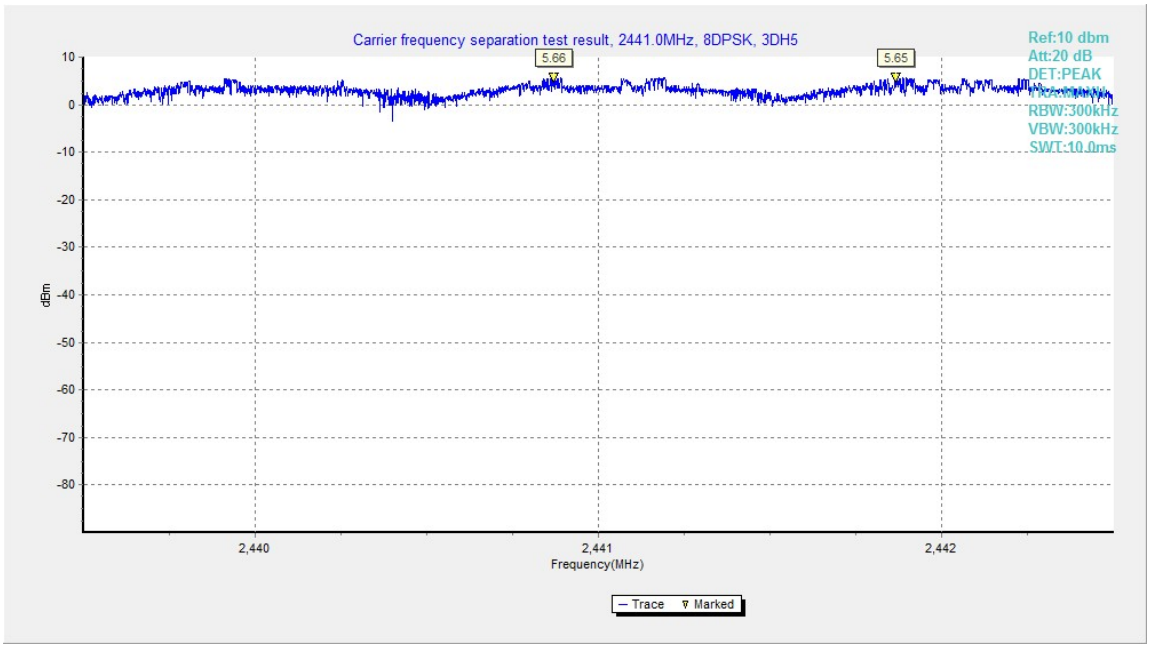


Fig.109. Carrier frequency separation measurement: 8DPSK, Channel 39

A.9. Number of Hopping Channels

Method of Measurement: See ANSI C63.10-clause 7.8.3

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	At least 15 non-overlapping channels

Measurement Result:

For GFSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.110	79	P
40~78	Fig.111		

Forπ/4 DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.112	79	P
40~78	Fig.113		

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.114	79	P
40~78	Fig.115		

Conclusion: PASS

Test graphs as below:

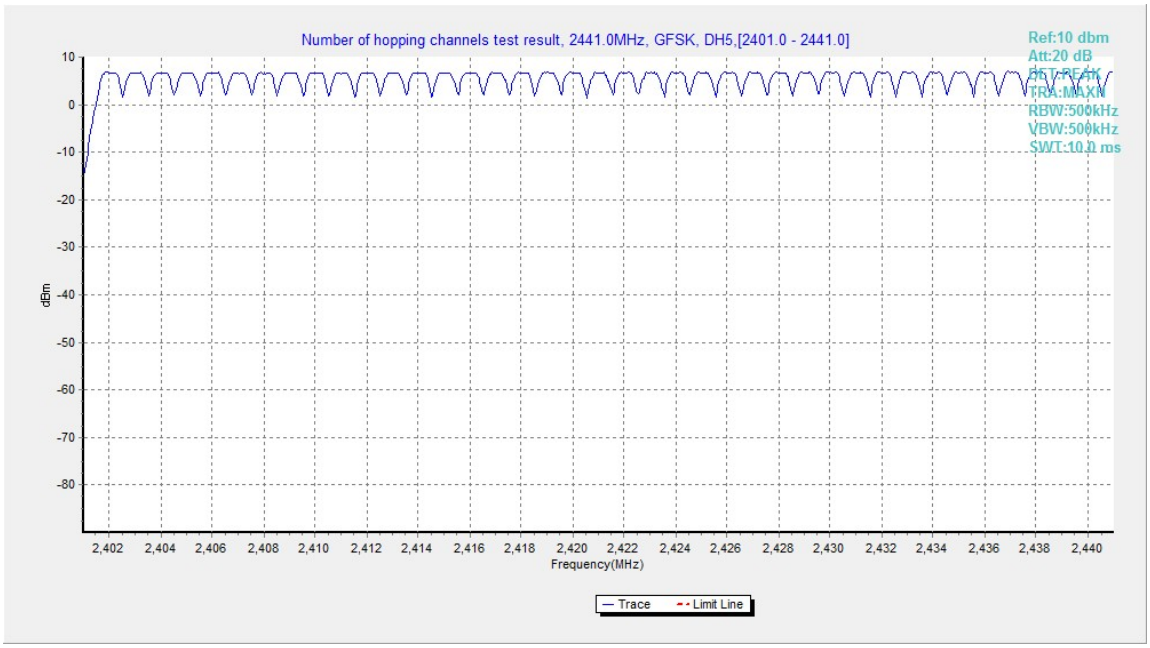


Fig.110. Number of hopping frequencies: GFSK, Channel 0 - 39

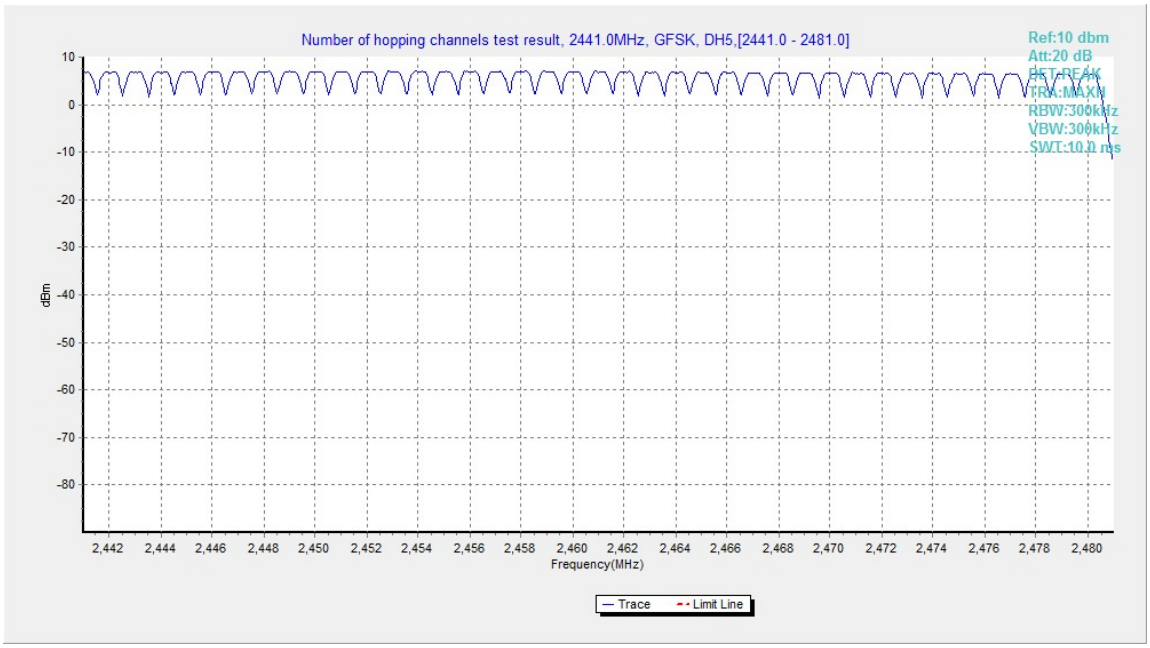


Fig.111. Number of hopping frequencies: GFSK, Channel 40 - 78

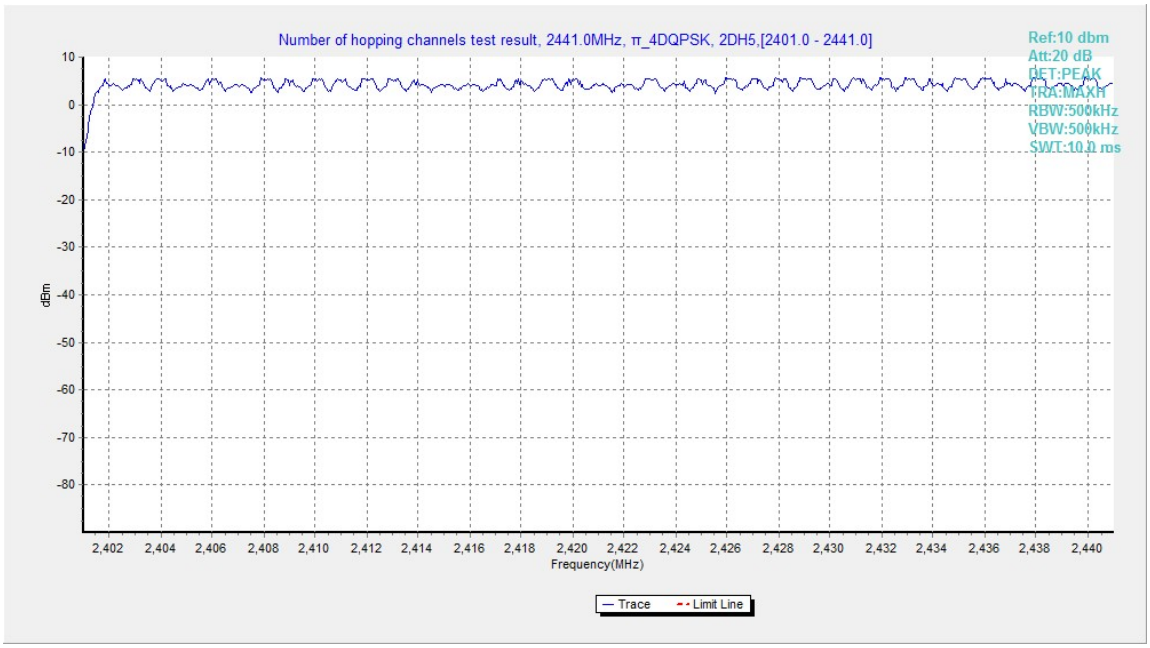


Fig.112. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

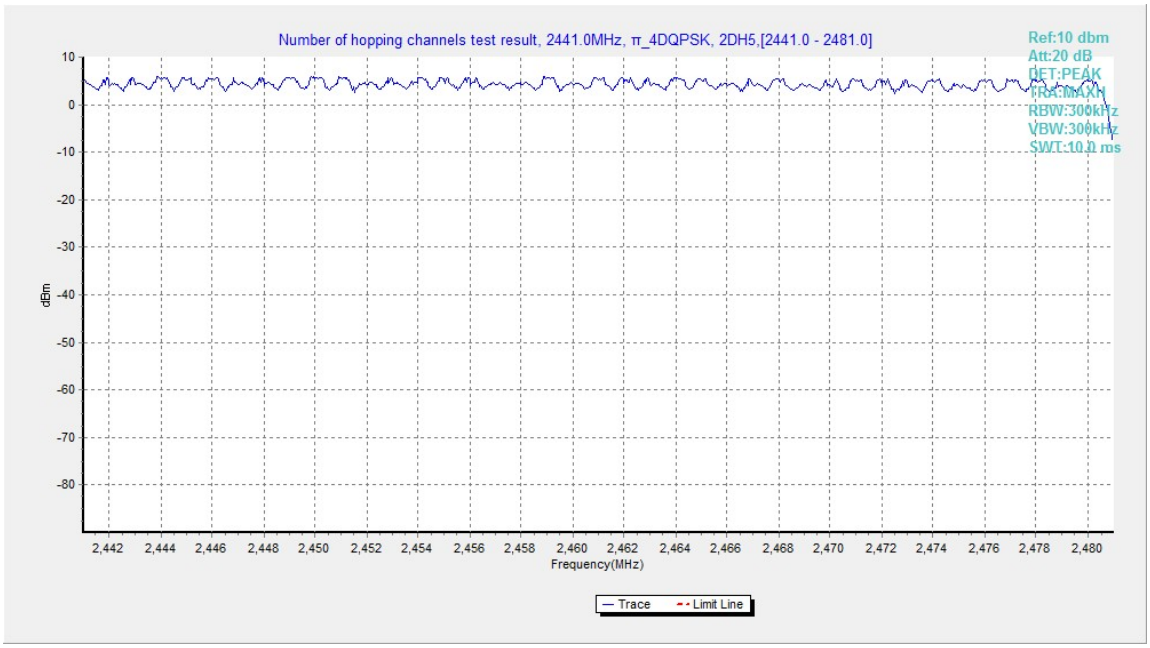


Fig.113. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

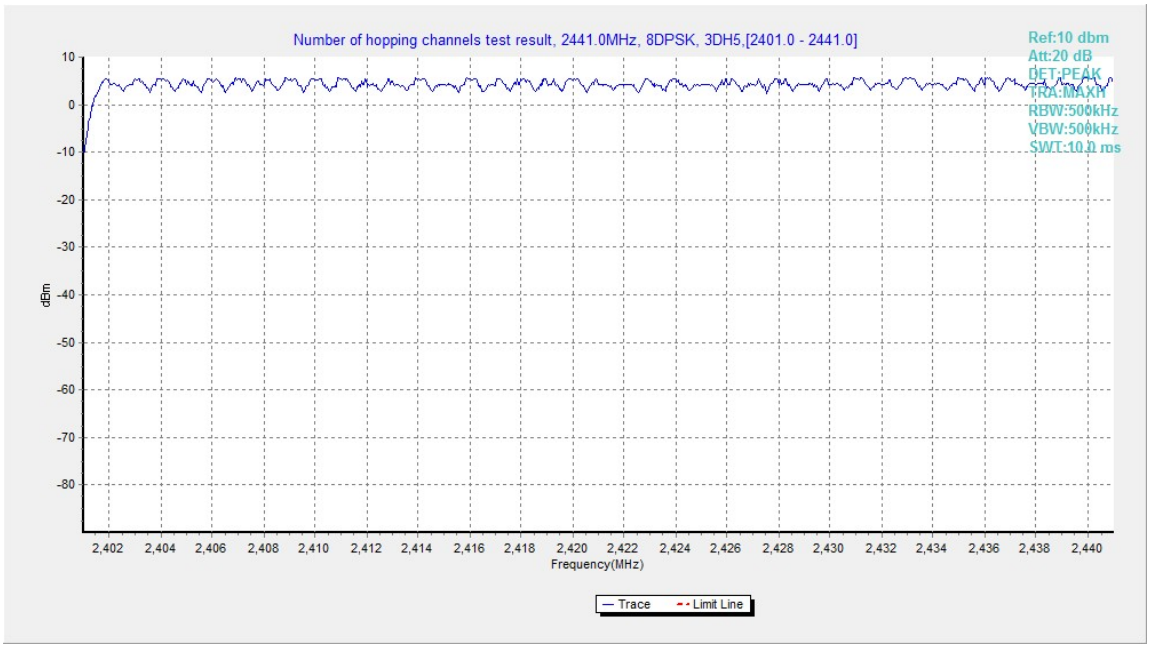


Fig.114. Number of hopping frequencies: 8DPSK, Channel 0 - 39

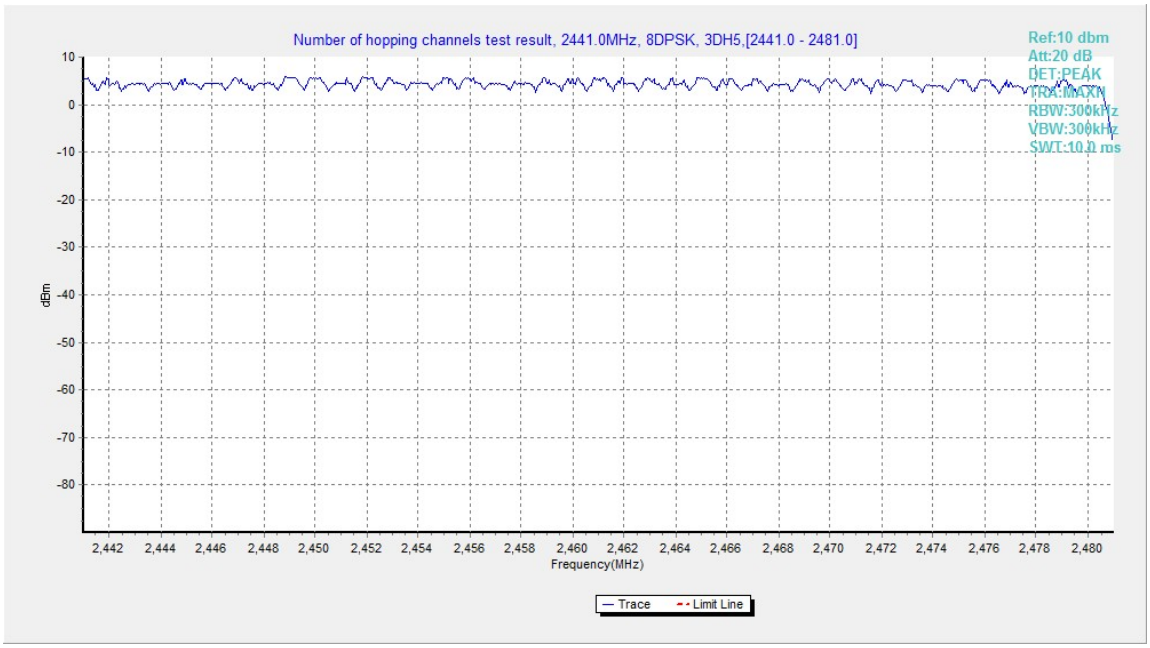


Fig.115. Number of hopping frequencies: 8DPSK, Channel 40 - 78

A.10. AC Powerline Conducted Emission

Test Condition

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Conclusion
0.15 to 0.5	66 to 56	P
0.5 to 5	56	
5 to 30	60	
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

Bluetooth (Average Limit)

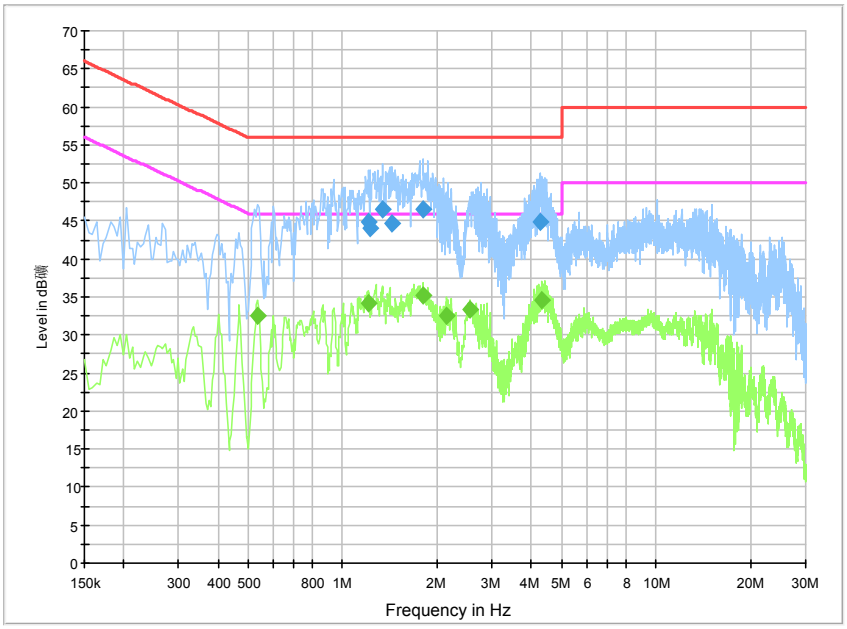
Frequency range (MHz)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	56 to 46	P
0.5 to 5	46	
5 to 30	50	
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

Traffic: Set.10



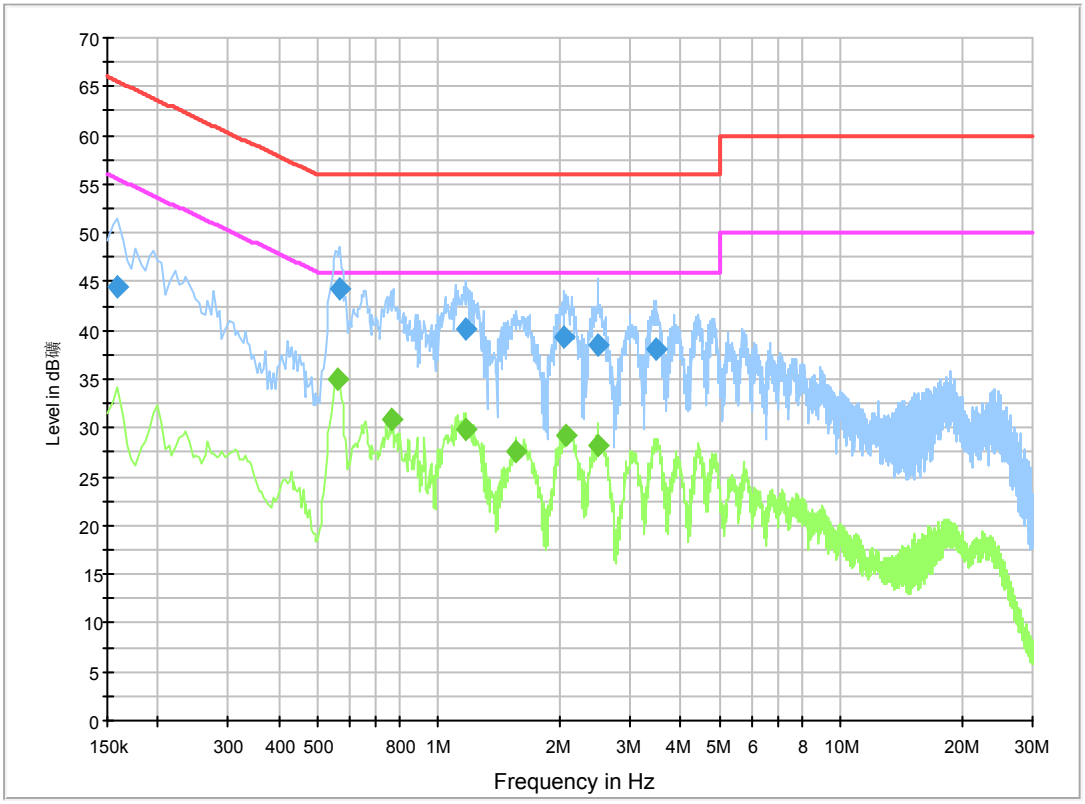
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.212000	44.8	GND	N	10.4	11.2	56.0
1.225500	44.0	GND	N	10.4	12.0	56.0
1.342500	46.5	GND	L1	10.3	9.5	56.0
1.437000	44.6	GND	L1	10.3	11.4	56.0
1.806000	46.6	GND	L1	10.4	9.4	56.0
4.281000	44.8	GND	N	10.5	11.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.537000	32.5	GND	N	10.4	13.5	46.0
1.203000	34.1	GND	N	10.4	11.9	46.0
1.806000	35.2	GND	L1	10.4	10.8	46.0
2.157000	32.5	GND	L1	10.4	13.5	46.0
2.548500	33.3	GND	N	10.5	12.7	46.0
4.344000	34.5	GND	L1	10.5	11.5	46.0

Traffic: Set.11



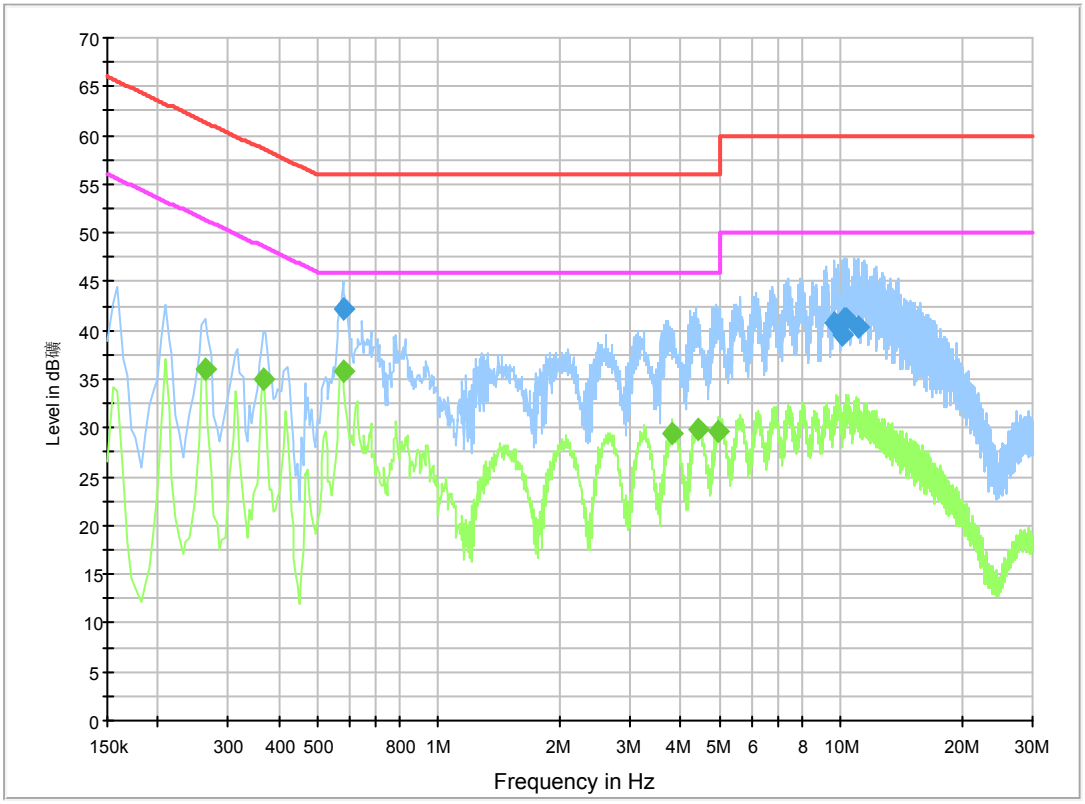
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	44.5	GND	L1	10.3	21.0	65.5
0.568500	44.4	GND	N	10.4	11.6	56.0
1.167000	40.2	GND	N	10.4	15.8	56.0
2.058000	39.4	GND	N	10.5	16.6	56.0
2.490000	38.5	GND	L1	10.4	17.5	56.0
3.466500	38.0	GND	N	10.5	18.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.559500	35.1	GND	N	10.4	10.9	46.0
0.762000	30.9	GND	N	10.4	15.1	46.0
1.167000	29.9	GND	N	10.4	16.1	46.0
1.563000	27.7	GND	L1	10.3	18.3	46.0
2.071500	29.1	GND	N	10.5	16.9	46.0
2.490000	28.2	GND	L1	10.4	17.8	46.0

Traffic: Set.12



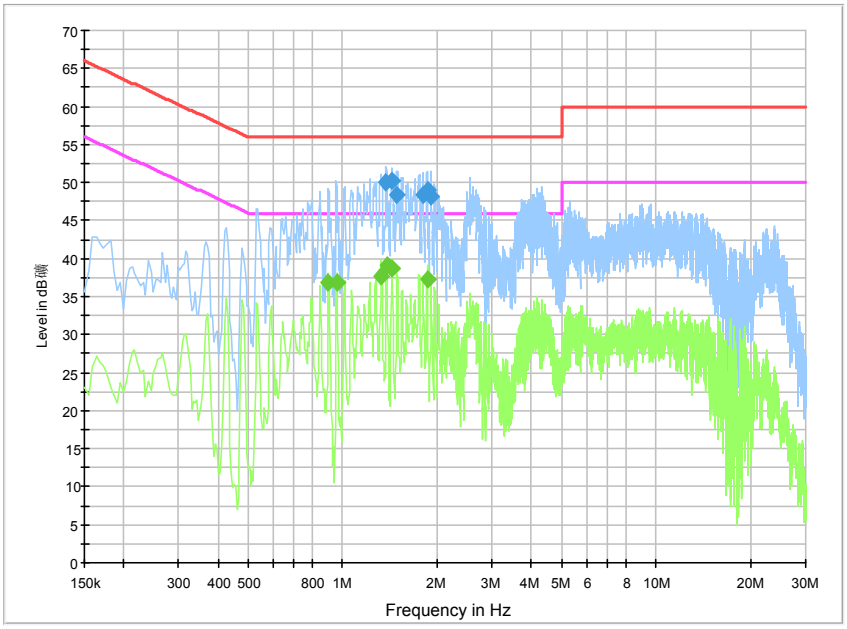
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.577500	42.3	GND	N	10.4	13.7	56.0
9.649500	40.7	GND	L1	10.7	19.3	60.0
10.140000	39.5	GND	N	10.7	20.5	60.0
10.243500	41.1	GND	L1	10.7	18.9	60.0
10.288500	41.3	GND	N	10.7	18.7	60.0
11.017500	40.4	GND	L1	10.7	19.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.262500	36.1	GND	L1	10.3	15.2	51.4
0.366000	34.9	GND	L1	10.3	13.7	48.6
0.577500	35.8	GND	N	10.4	10.2	46.0
3.813000	29.4	GND	N	10.5	16.6	46.0
4.402500	29.8	GND	N	10.5	16.2	46.0
4.956000	29.7	GND	N	10.6	16.3	46.0

Idle: Set.10



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.378500	50.1	GND	L1	10.3	5.9	56.0
1.437000	50.3	GND	L1	10.3	5.7	56.0
1.486500	48.3	GND	N	10.4	7.7	56.0
1.801500	48.5	GND	N	10.4	7.5	56.0
1.860000	49.1	GND	L1	10.4	6.9	56.0
1.909500	48.1	GND	L1	10.4	7.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.901500	36.9	GND	N	10.4	9.1	46.0
0.960000	36.9	GND	N	10.4	9.1	46.0
1.324500	37.6	GND	N	10.4	8.4	46.0
1.383000	39.2	GND	N	10.4	6.8	46.0
1.437000	38.7	GND	L1	10.3	7.3	46.0
1.860000	37.3	GND	L1	10.4	8.7	46.0

*****END OF REPORT*****