

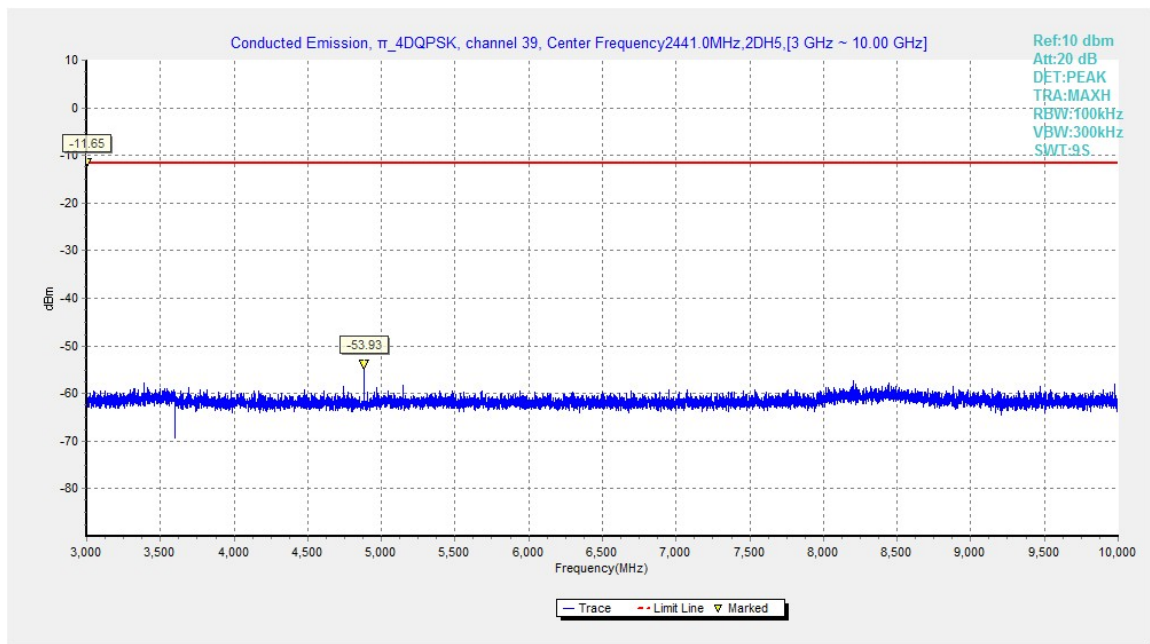


Fig.36. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 3GHz - 10GHz

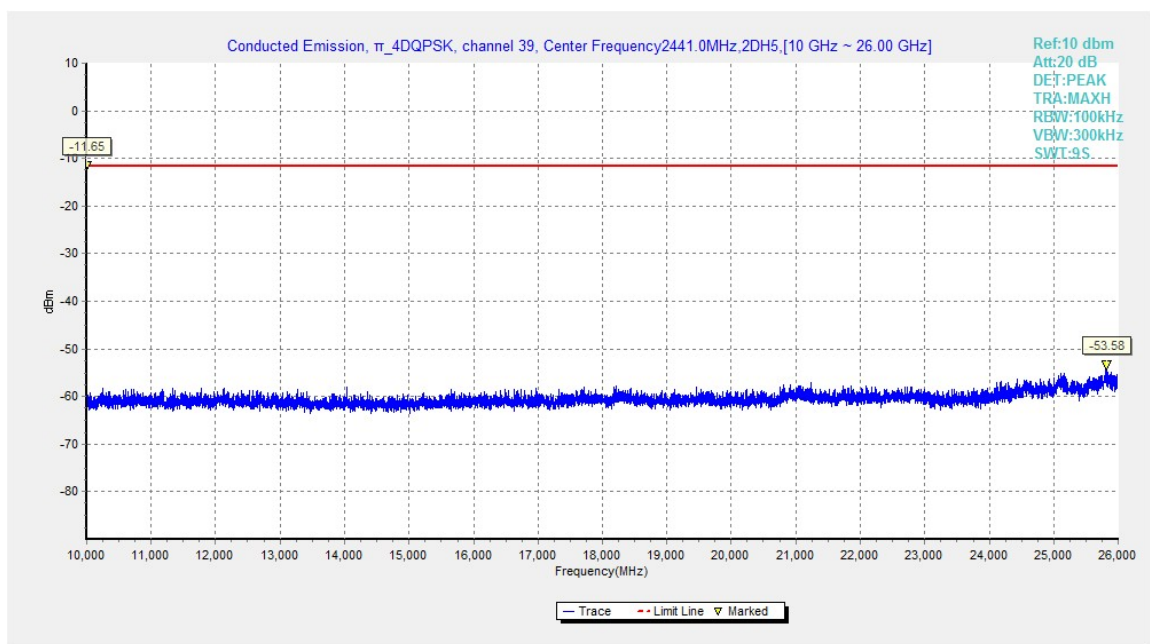


Fig.37. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 10GHz – 26GHz

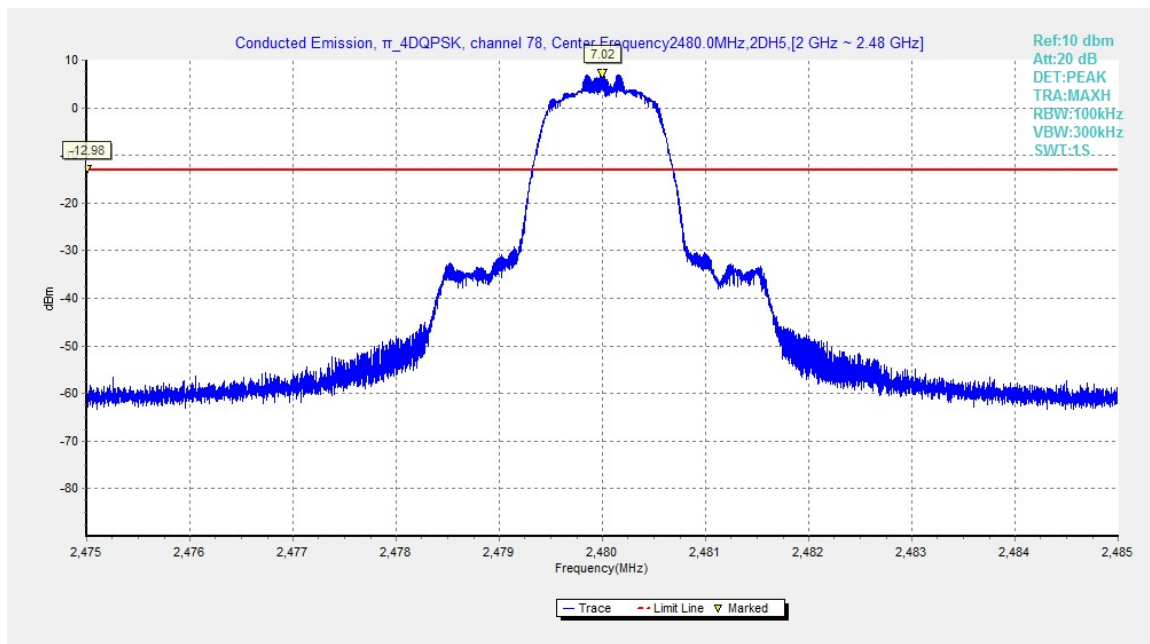


Fig.38. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 2480MHz

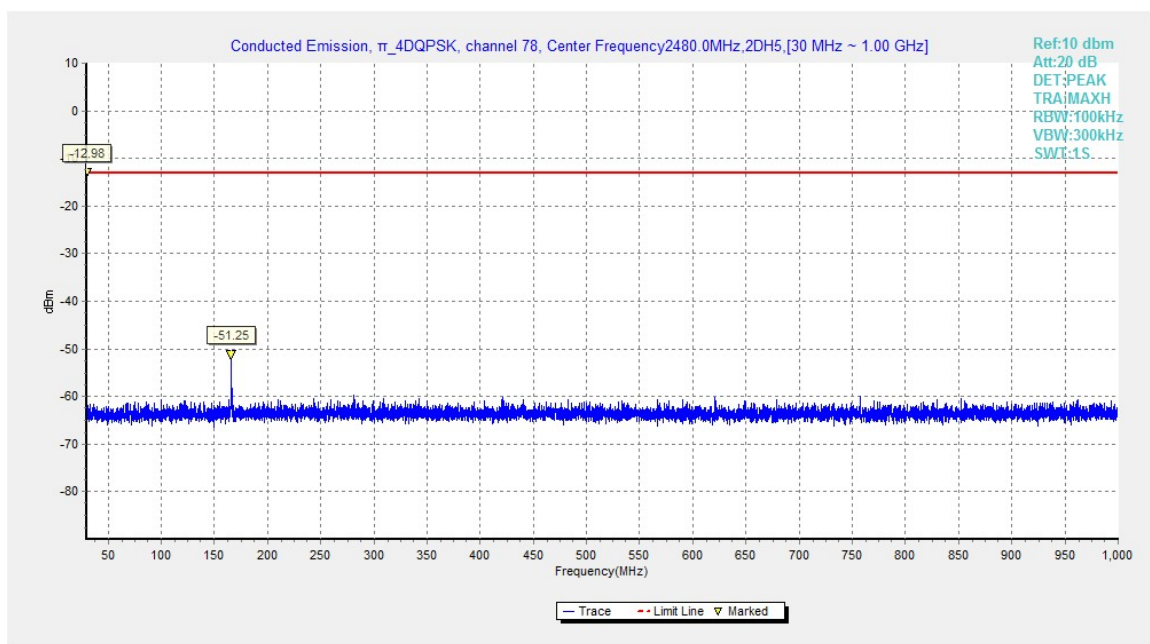


Fig.39. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 30MHz - 1GHz

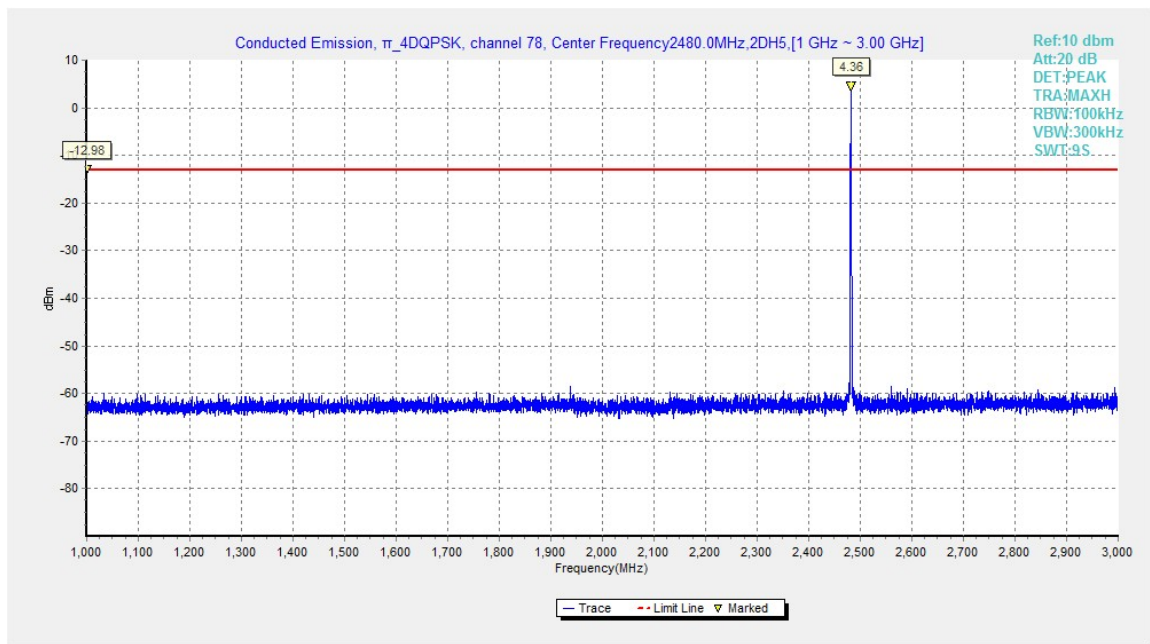


Fig.40. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 1GHz - 3GHz

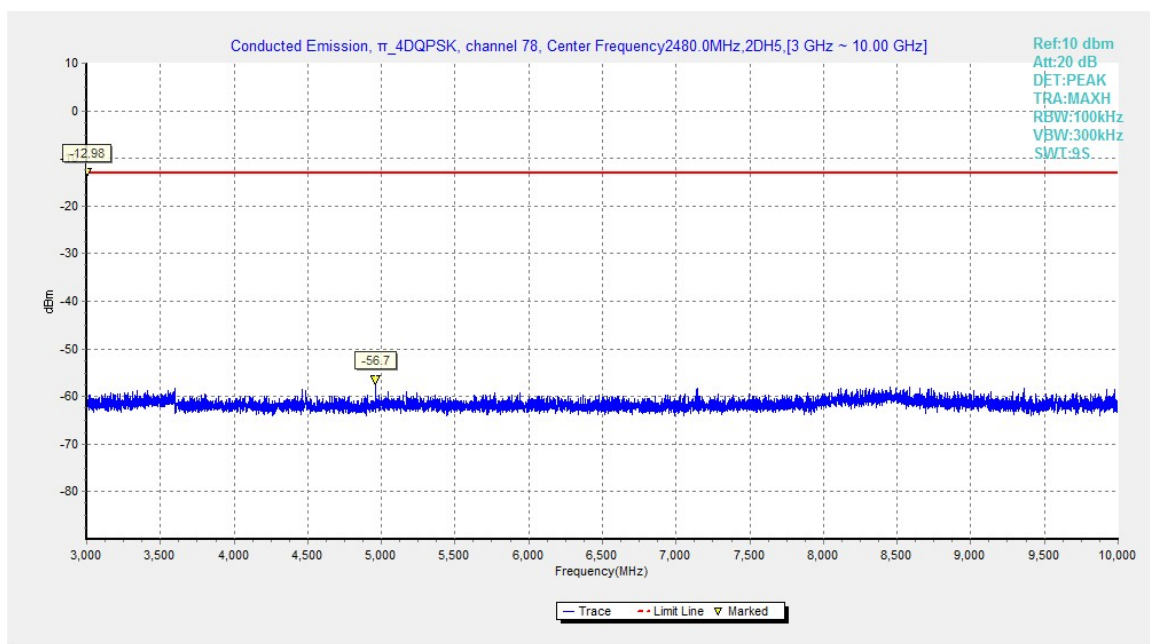


Fig.41. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 3GHz - 10GHz

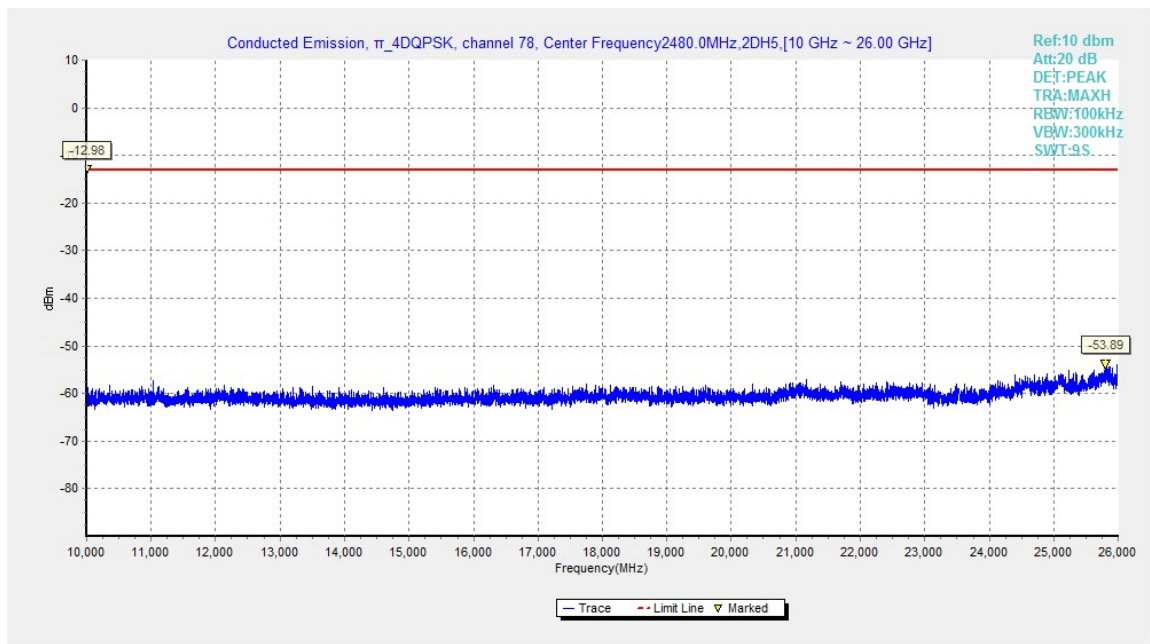


Fig.42. Fig.30 Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 10GHz - 26GHz

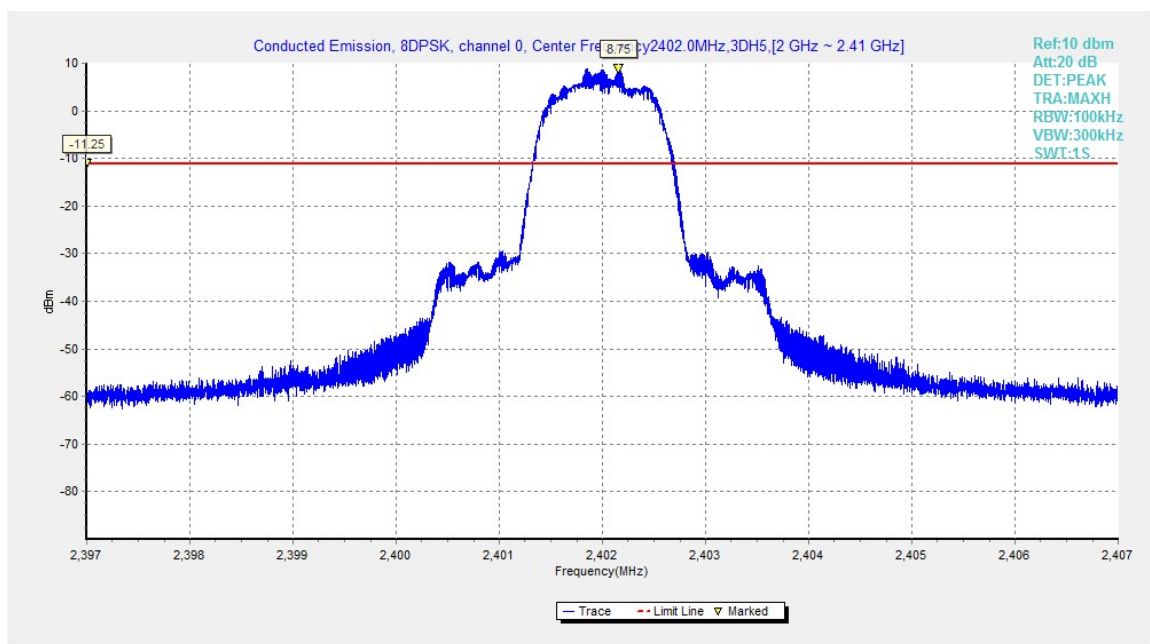


Fig.43. Conducted spurious emission: 8DPSK, Channel 0,2402MHz

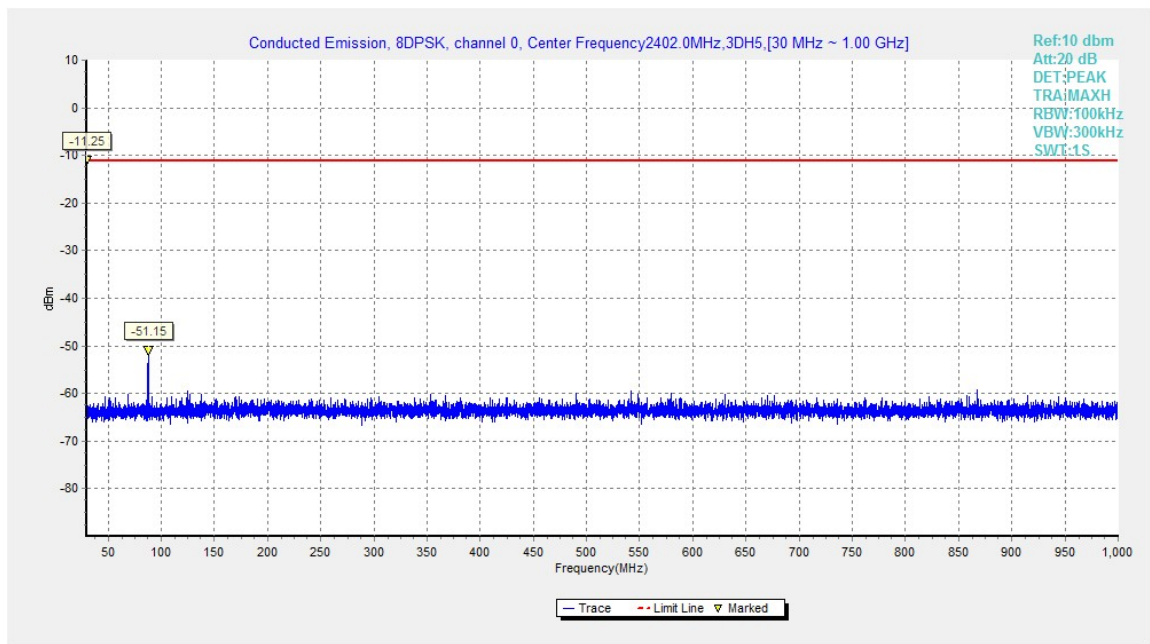


Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

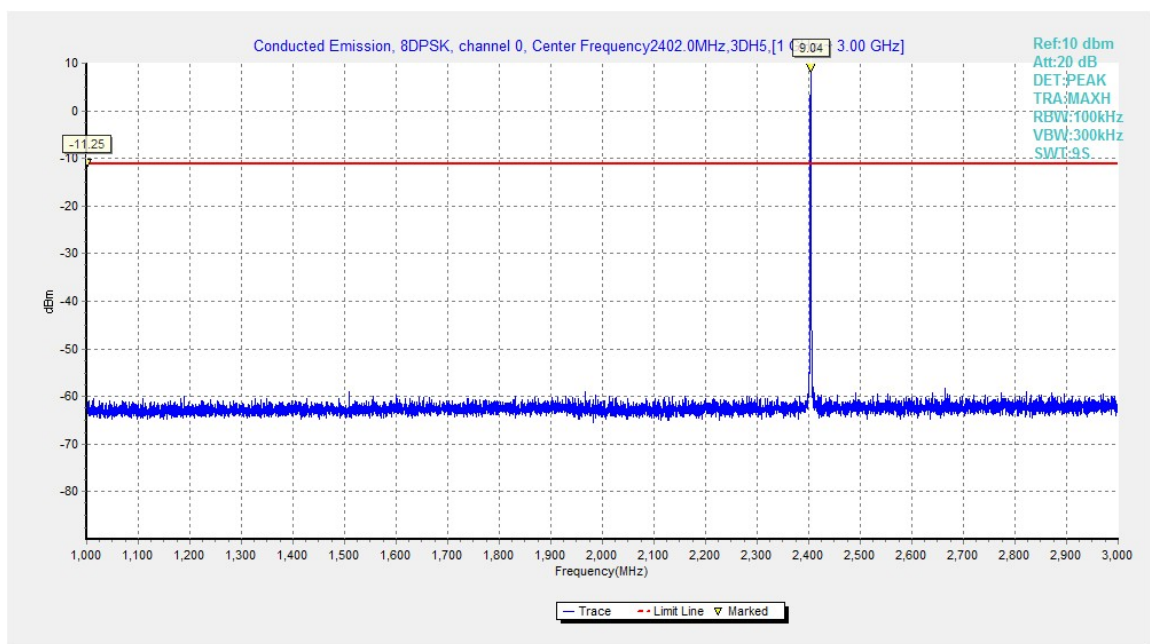


Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

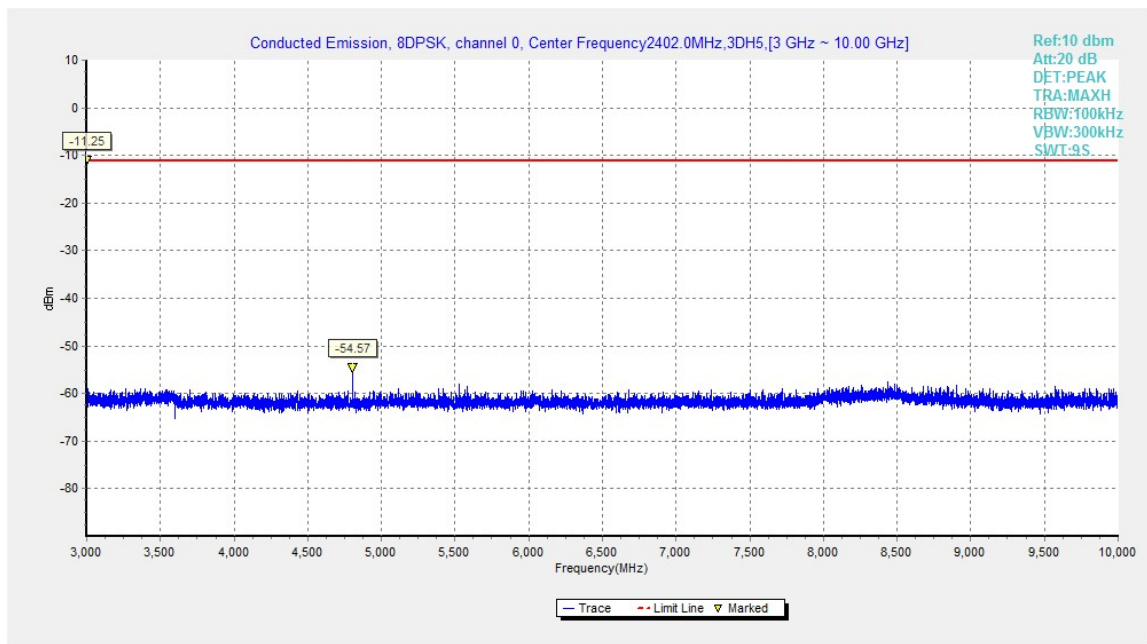


Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

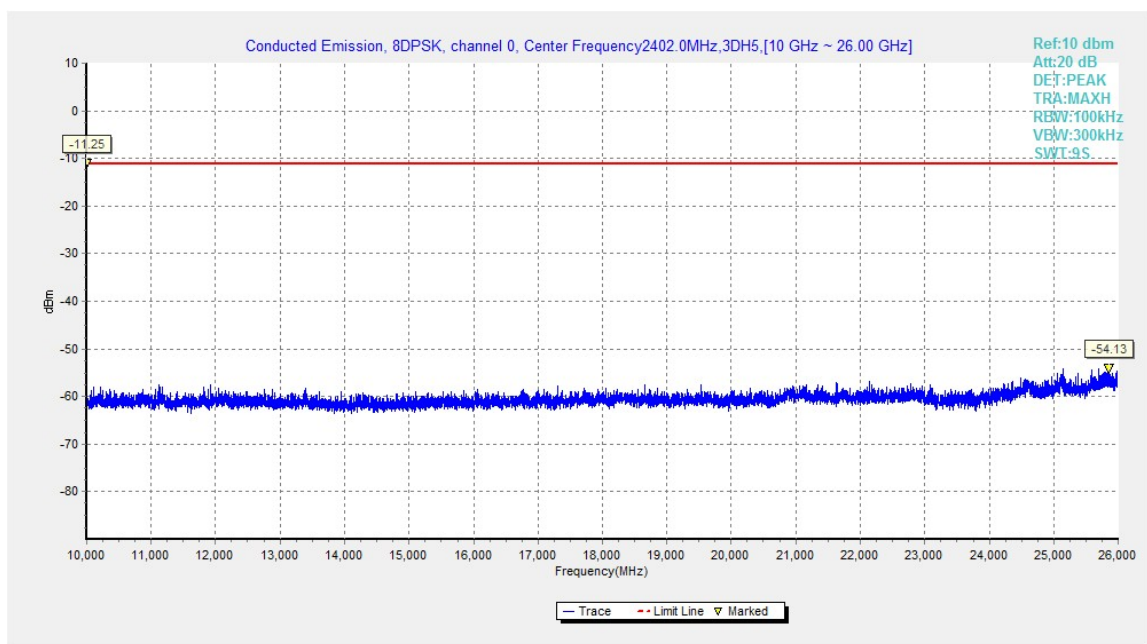


Fig.47. Conducted spurious emission: 8DPSK, Channel 0,10GHz - 26GHz

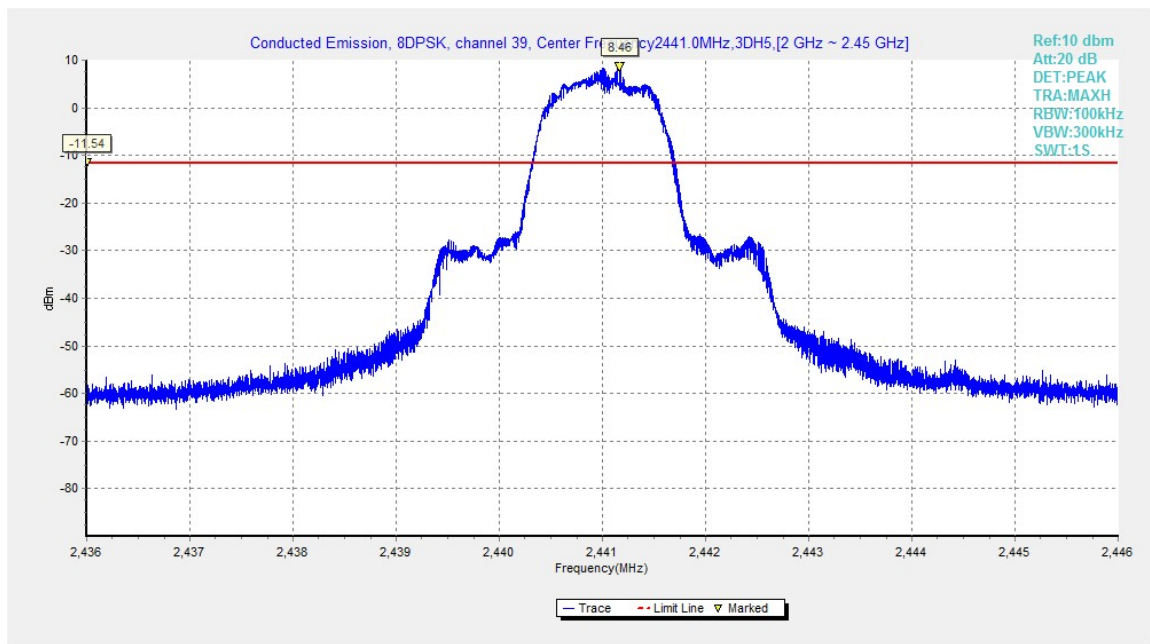


Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

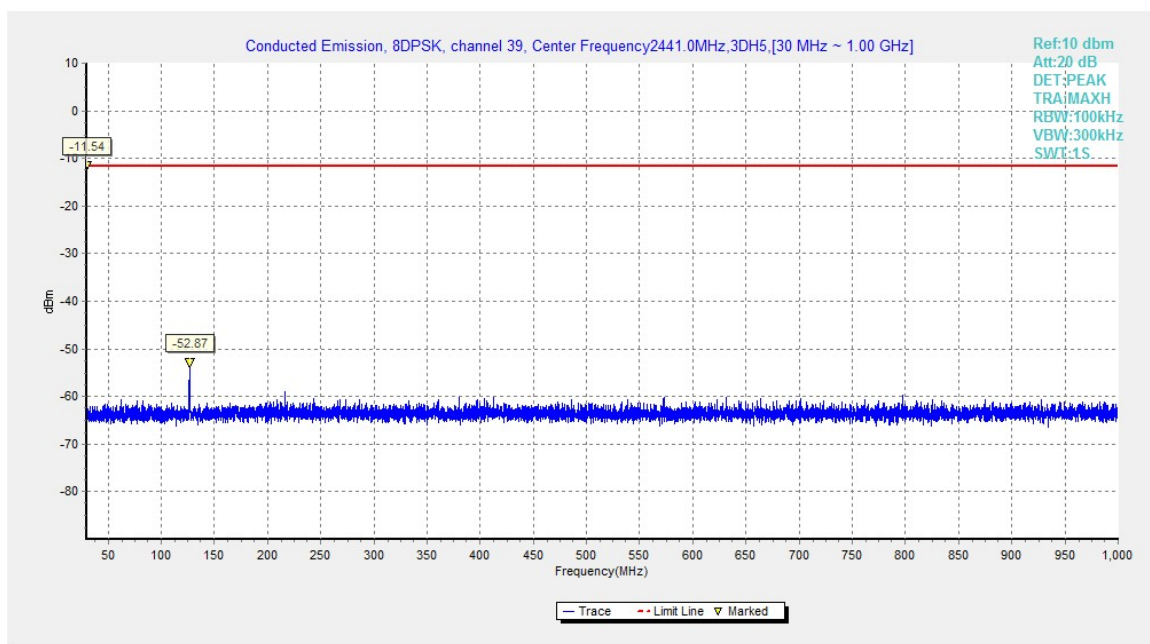


Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

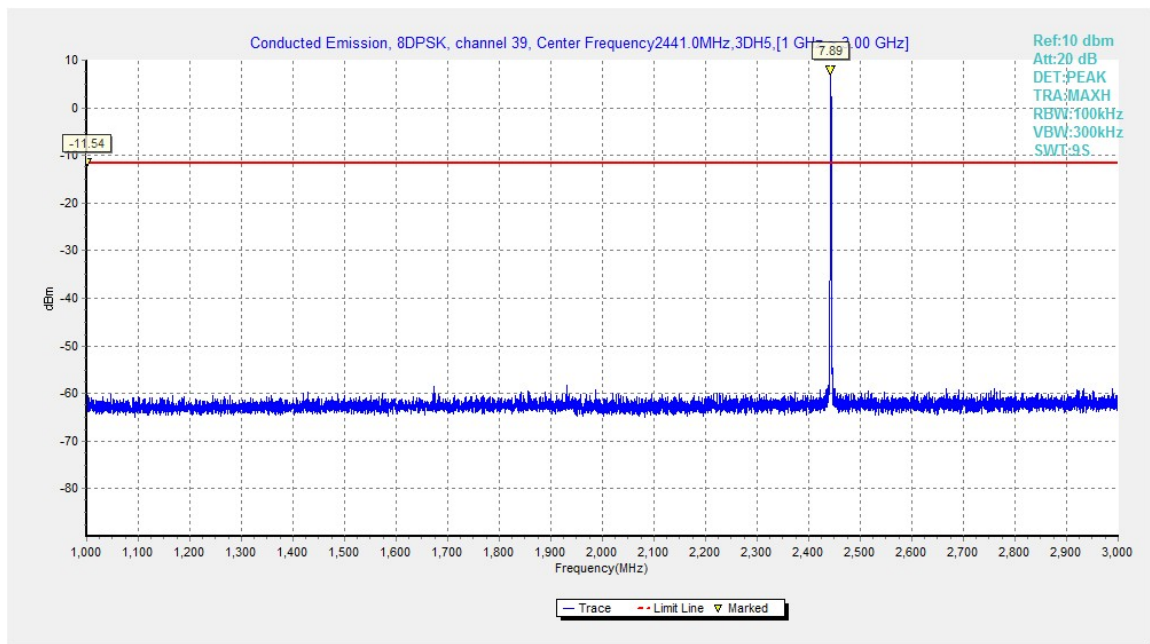


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

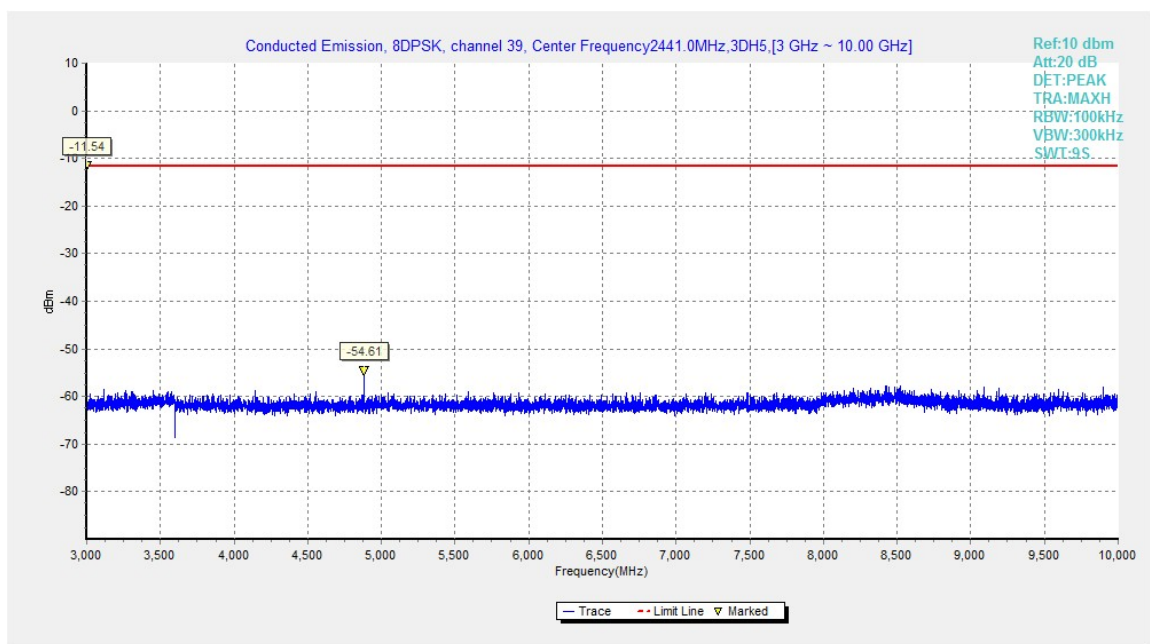


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

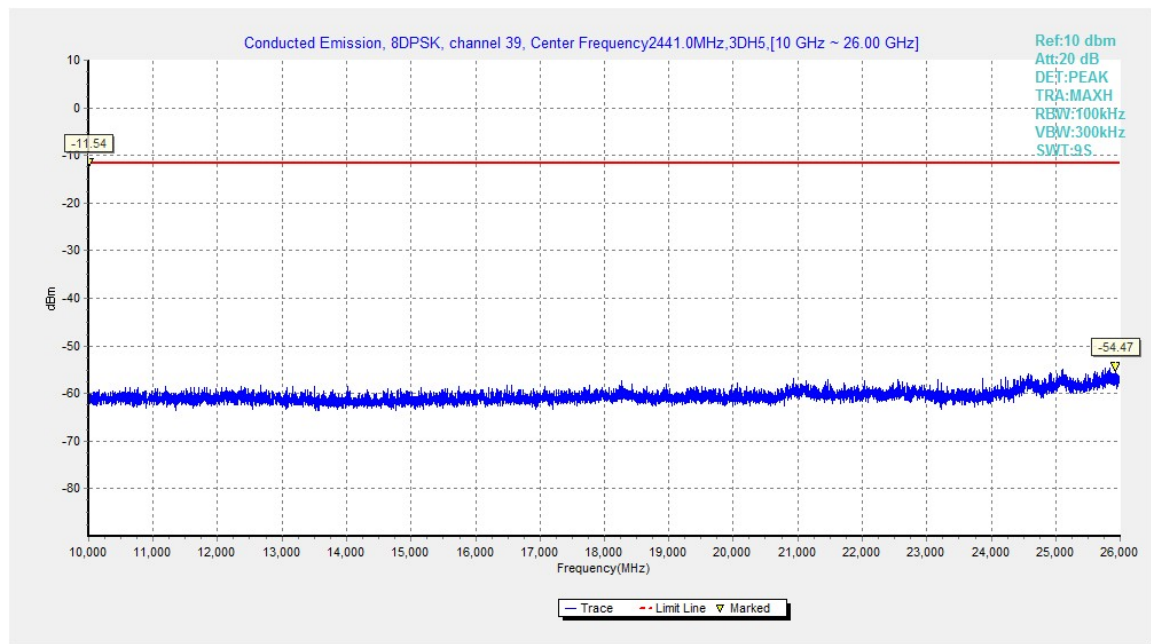


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

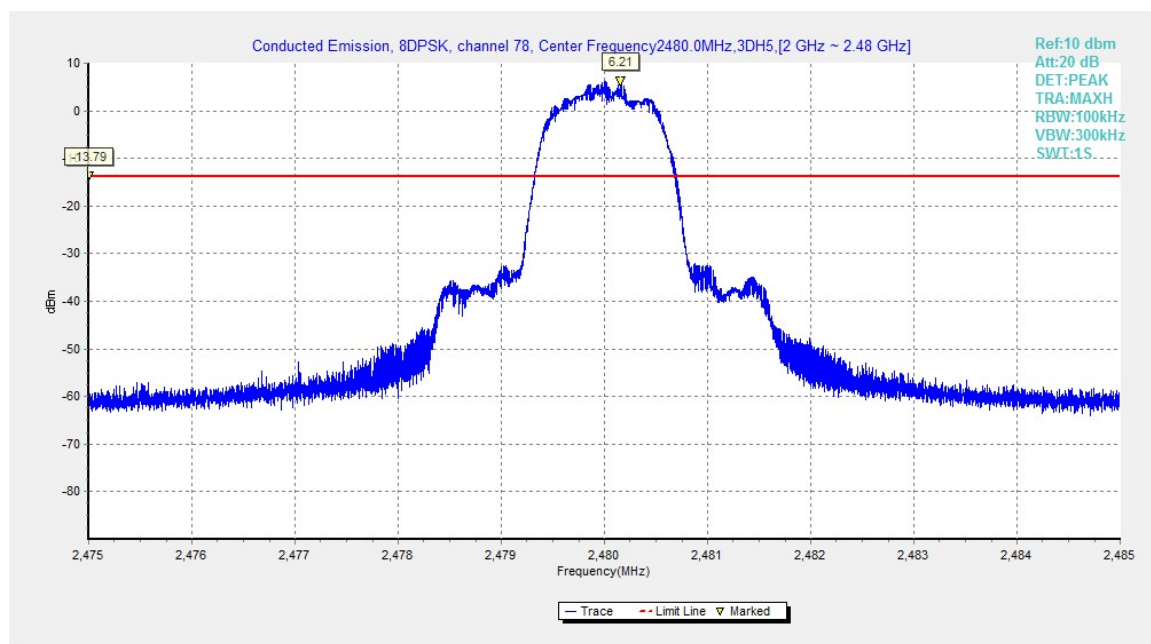


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

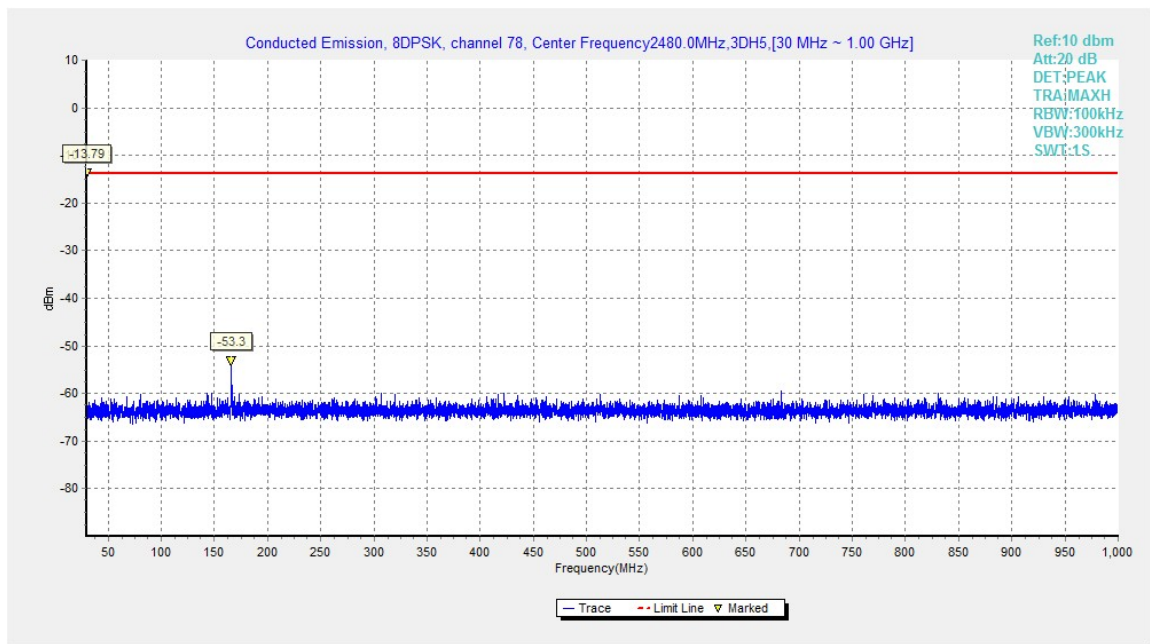


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

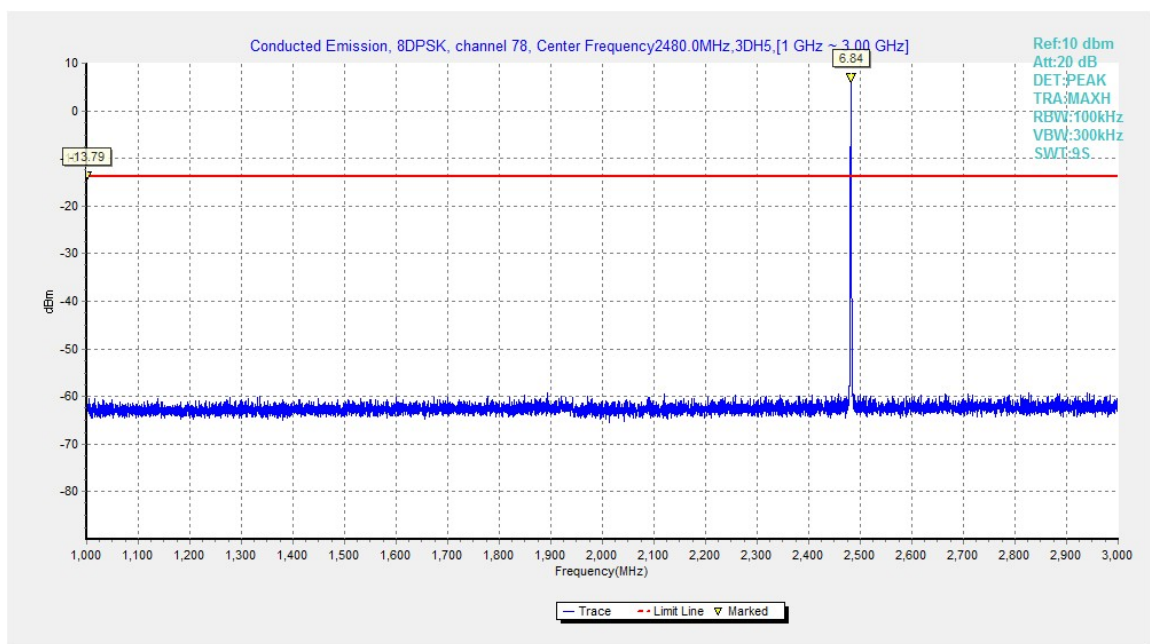


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

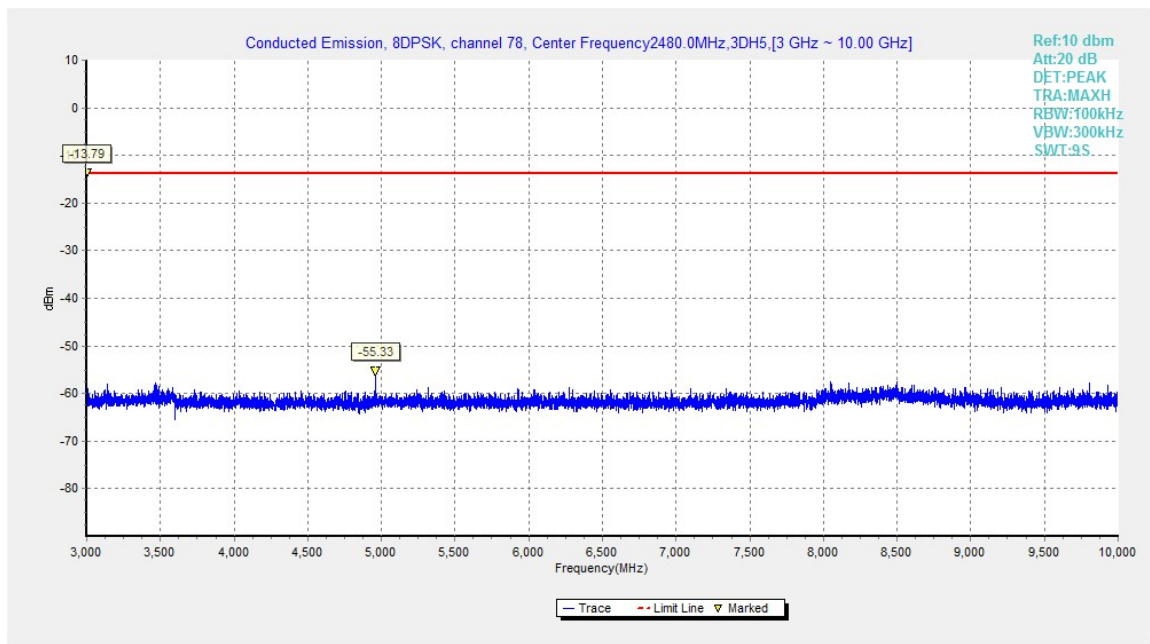


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

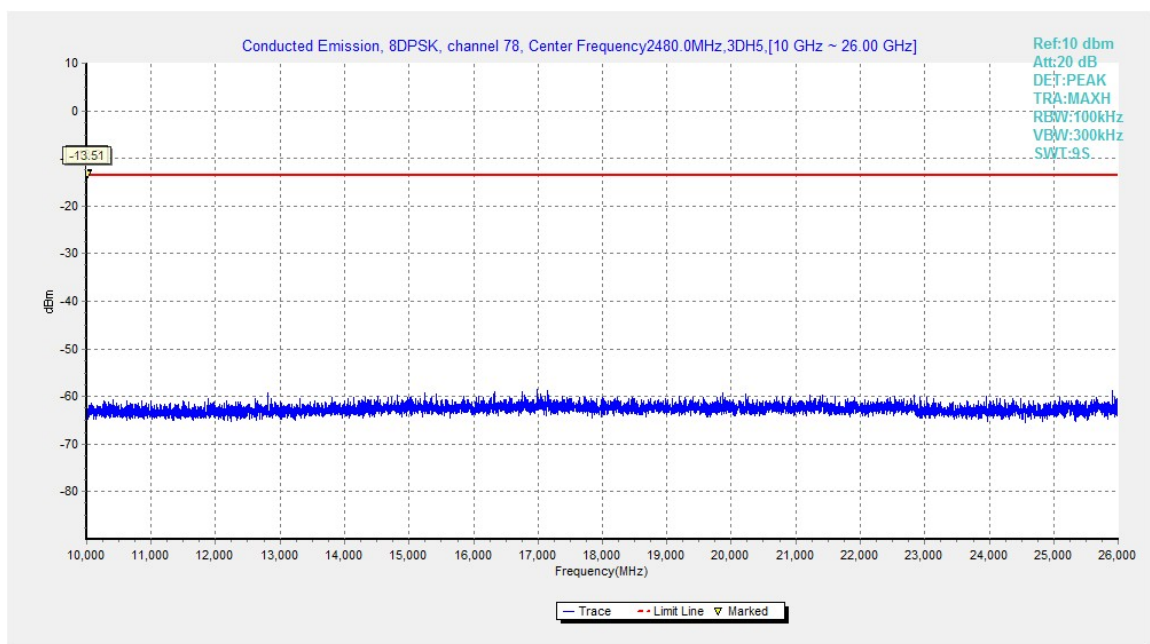


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

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 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:

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 2441 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
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For $\pi/4$ 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 2441 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 2441 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)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2382.975	50.1	2.9	32.0	15.240	H
2385.000	50.2	2.9	32.0	15.311	V
4804.500	38.3	-17.3	34.5	21.123	H
7206.000	40.0	-16.4	36.1	20.317	V
9607.500	39.5	-18.2	37.0	20.794	H
12010.500	42.8	-17.4	39.3	20.823	H

GFSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2434.750	50.1	2.9	32.0	15.210	H
2448.500	50.4	2.9	32.3	15.175	H
4882.500	36.9	-18.5	34.5	20.945	H
7323.000	38.0	-18.5	36.1	20.438	V

9765.000	40.0	-17.8	37.2	20.592	V
12205.500	41.9	-17.8	39.2	20.449	H

GFSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.575	51.6	2.9	32.8	15.915	H
2475.500	51.1	2.9	33.0	15.191	H
4960.500	37.5	-18.2	34.5	21.189	H
7440.000	39.9	-16.9	36.0	20.760	V
9921.000	40.8	-17.1	37.4	20.486	V
12400.500	41.8	-17.5	39.1	20.150	H

GFSK Ch 0 – Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2381.540	53.9	2.9	32.0	19.03	H
23822.050	53.7	2.9	32.0	18.76	V
4804.500	47.5	-17.3	34.5	30.232	H
7206.000	49.8	-16.4	36.1	30.133	V
9607.500	51.5	-18.2	37.0	32.790	H
12016.500	52.3	-17.3	39.3	30.378	H

GFSK Ch 39 - Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2411.800	51.8	2.9	32.0	16.91	H
2448.400	52.2	2.9	32.3	16.97	H
4882.500	48.3	-18.5	34.5	32.428	H
7323.000	48.3	-18.5	36.1	30.727	V
9763.500	48.3	-17.8	37.2	31.185	V
12205.500	48.3	-17.8	39.2	30.732	H

GFSK Ch 78 - Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
24835.000	57.5	2.9	32.8	21.78	H
2483.600	56.3	2.9	33.0	20.36	H
4960.500	47.5	-18.2	34.5	31.228	H
7440.000	49.9	-16.9	36.0	30.806	V
9921.000	51.5	-17.1	37.4	31.222	V
12400.500	52.2	-17.5	39.1	30.512	H

$\pi/4$ DQPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2388.750	50.1	2.9	32.0	15.234	H
2383.000	50.1	2.9	32.0	15.246	V
4804.500	38.1	-17.3	34.5	20.883	H
7206.000	39.8	-16.4	36.1	20.084	V
9607.500	39.2	-18.2	37.0	20.428	V
12016.500	42.1	-17.3	39.3	20.149	V

$\pi/4$ DQPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2436.000	50.1	2.9	32.0	15.167	H
2446.000	50.6	2.9	32.2	15.411	V
4882.500	36.9	-18.5	34.5	20.908	V
7323.000	38.0	-18.5	36.1	20.383	V
9763.500	40.0	-17.8	37.2	20.554	V
12205.500	41.8	-17.8	39.2	20.334	H

$\pi/4$ DQPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.500	53.2	2.9	32.8	17.524	H
2466.000	50.9	2.9	32.8	15.228	V
4960.500	37.4	-18.2	34.5	21.119	H
7440.000	39.7	-16.9	36.0	20.617	V
9921.000	40.7	-17.1	37.4	20.423	H
12400.500	41.6	-17.5	39.1	20.003	H

$\pi/4$ DQPSK Ch 0 – Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2389.100	54.0	2.9	32.0	19.17	H
2384.900	53.9	2.9	32.0	18.99	V
4804.500	47.6	-17.3	34.5	31.328	H
7206.000	50.0	-16.4	36.1	30.856	V
9607.500	51.4	-18.2	37.0	31.122	V
12016.500	52.3	-17.3	39.3	30.612	V

$\pi/4$ DQPSK Ch 39 - Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2402.000	53.3	2.9	32.0	18.46	H
2403.400	52.4	2.9	32.2	17.21	V
4882.500	48.6	-18.5	34.5	32.649	V
7323.000	48.3	-18.5	36.1	30.688	V
9763.500	50.5	-17.8	37.2	31.047	V
12205.500	51.7	-17.8	39.2	30.254	H

$\pi/4$ DQPSK Ch 78 - Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.500	57.5	2.9	32.8	21.78	H
2483.525	56.0	2.9	32.8	20.35	V
4960.500	47.6	-18.2	34.5	31.328	H
7440.000	50.0	-16.9	36.0	30.856	V
9921.000	51.4	-17.1	37.4	31.122	H
12400.500	52.3	-17.5	39.1	30.612	H

8DPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2387.210	50.1	2.9	32.0	15.281	H
2380.750	50.2	2.9	32.1	15.252	V
4804.500	38.2	-17.3	34.5	20.940	H
7206.000	40.0	-16.4	36.1	20.296	V
9609.000	39.3	-18.3	37.0	20.551	H
12100.500	42.3	-17.2	39.3	20.326	H

8DPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2434.500	50.0	2.9	31.9	15.176	H
2446.000	50.6	2.9	32.2	15.477	H
4882.500	36.9	-18.5	34.5	20.978	H
7323.000	38.2	-18.5	36.1	20.617	V
9765.000	40.0	-17.8	37.2	20.566	V
12205.500	41.7	-17.8	39.2	20.307	H

8DPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.500	52.6	2.9	32.8	16.945	H
2456.750	50.7	2.9	32.5	15.263	V
4960.500	37.7	-18.2	34.5	21.346	H
7440.000	39.9	-16.9	36.0	20.742	H
9921.000	40.8	-17.1	37.4	20.494	V
12400.500	41.8	-17.5	39.1	20.110	H

8DPSK Ch 0 – Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2385.390	54.0	2.9	32.0	19.10	H
2380.665	54.3	2.9	32.1	19.30	V
4804.500	47.6	-17.3	34.5	30.41	H
7206.000	49.8	-16.4	36.1	30.06	V
9607.500	51.7	-18.2	37.0	32.95	H
12016.500	52.5	-17.3	39.3	30.52	H

8DPSK Ch 39 - Peak

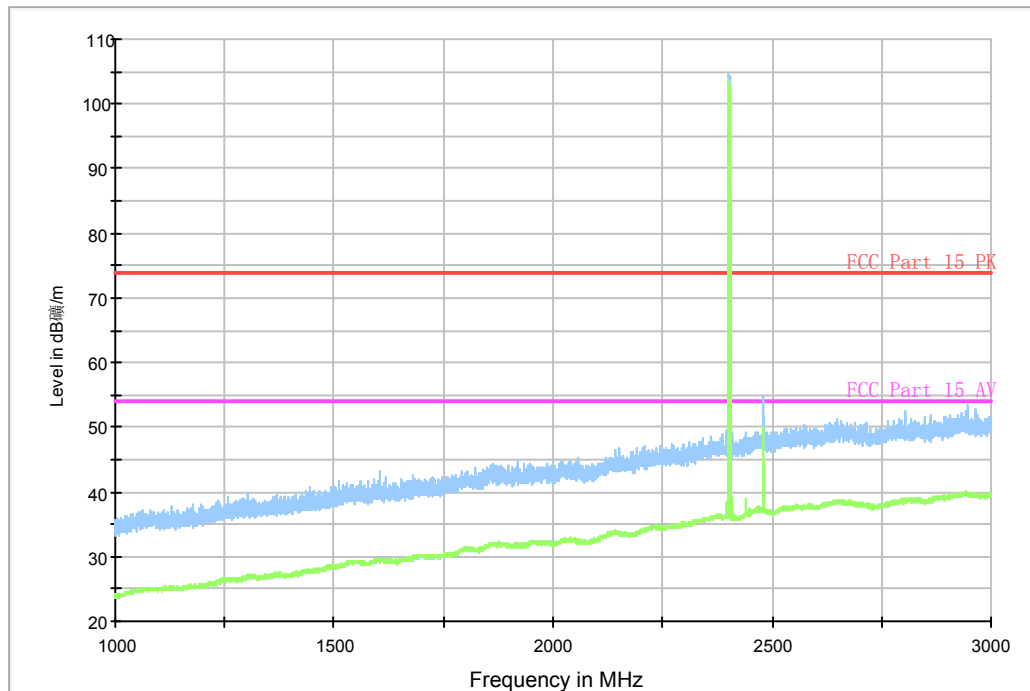
Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2469.400	52.6	2.9	31.9	17.80	H
2462.600	51.9	2.9	32.2	16.71	H
4882.500	48.6	-18.5	34.5	32.65	H
7323.000	48.5	-18.5	36.1	30.94	V
9763.500	50.5	-17.8	37.2	31.02	V
12205.500	52.3	-17.8	39.2	30.90	H

8DPSK Ch 78 - Peak

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
24835.000	58.5	2.9	32.8	22.80	H
2484.250	55.4	2.9	32.5	19.95	V
4960.500	47.7	-18.2	34.5	31.40	H
7440.000	49.9	-16.9	36.0	30.82	H
9921.000	51.6	-17.1	37.4	31.30	V
12400.500	52.4	-17.5	39.1	30.78	H

Test graphs as below:

RE - 1GHz-3GHz



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

RE - 3GHz-18GHz

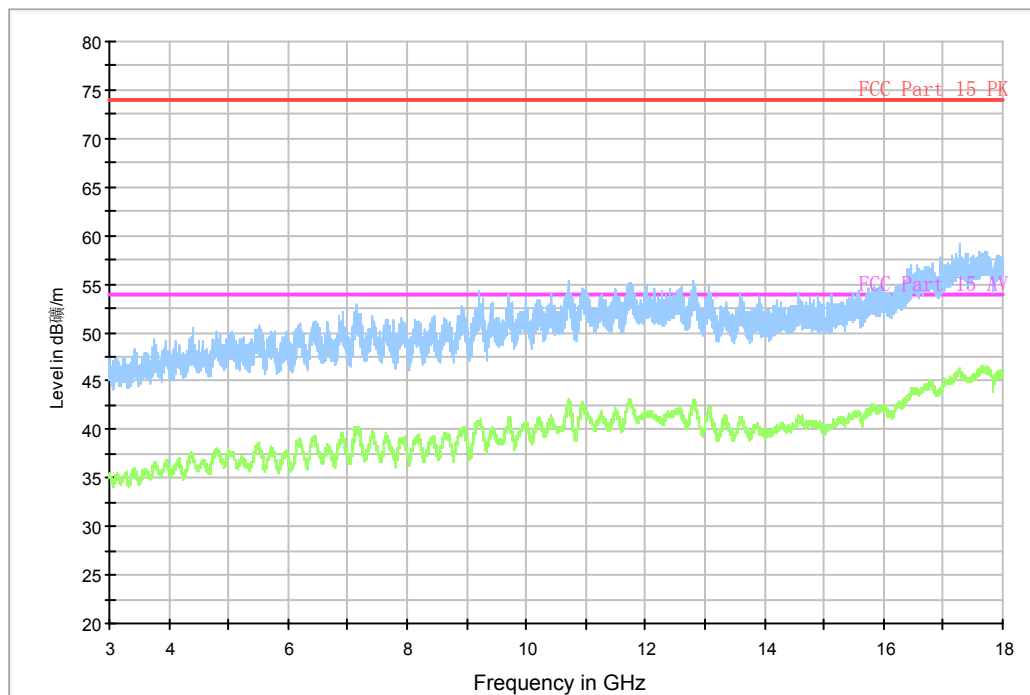


Fig.59. Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

RE 9kHz-30MHz_ESC13

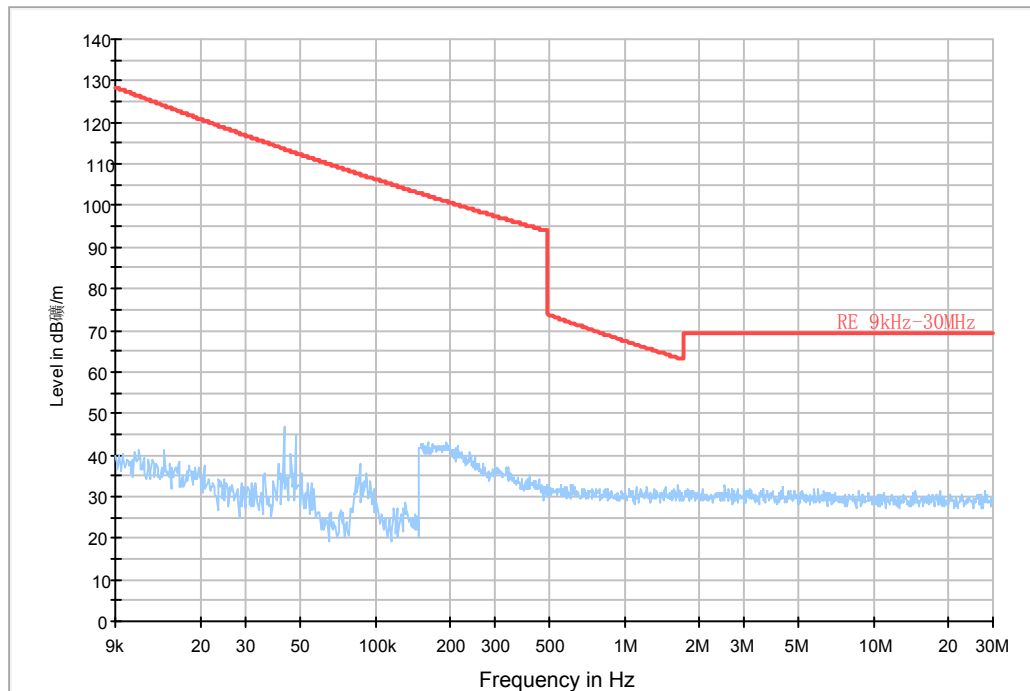


Fig.60. Radiated emission: GFSK, Channel 39, 9 kHz - 30 MHz

RE 30MHz-1GHz

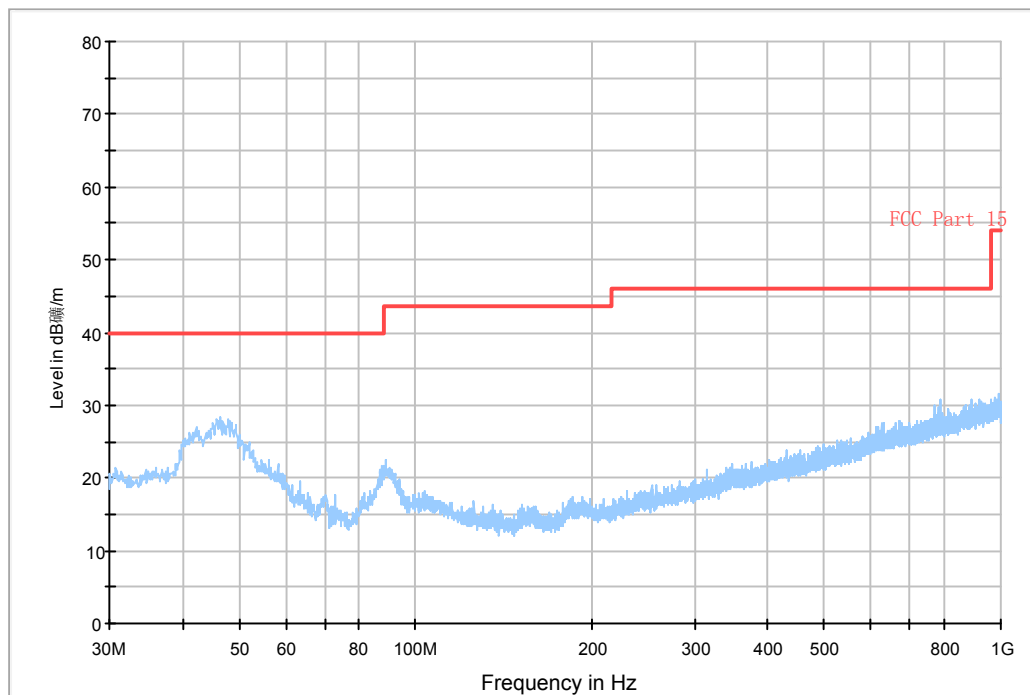
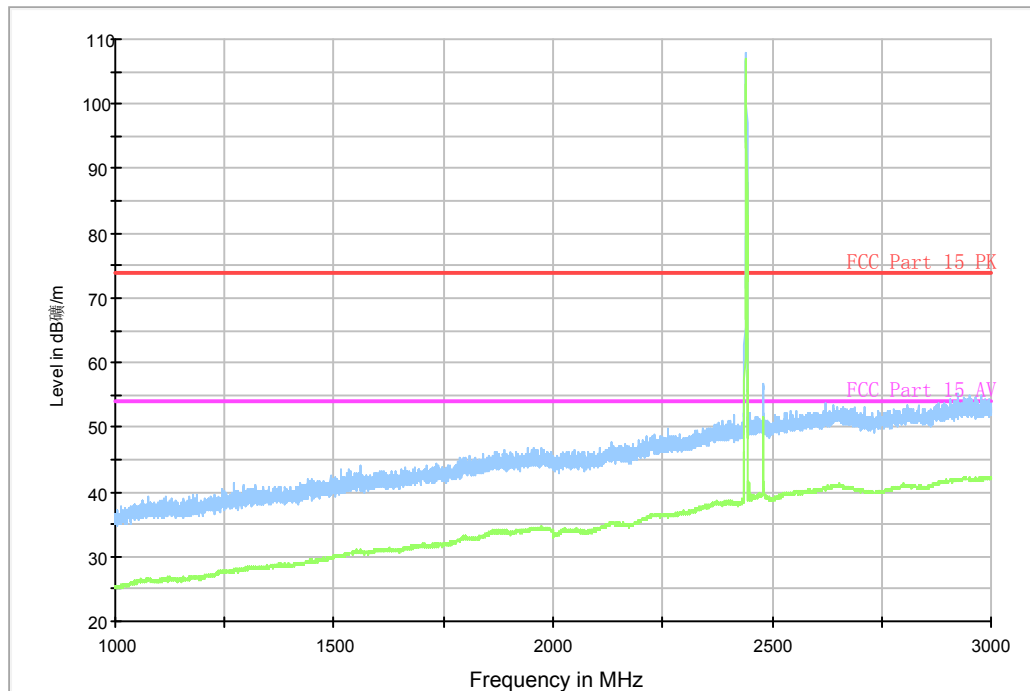


Fig.61. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

RE - 1GHz-3GHz



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

RE - 3GHz-18GHz

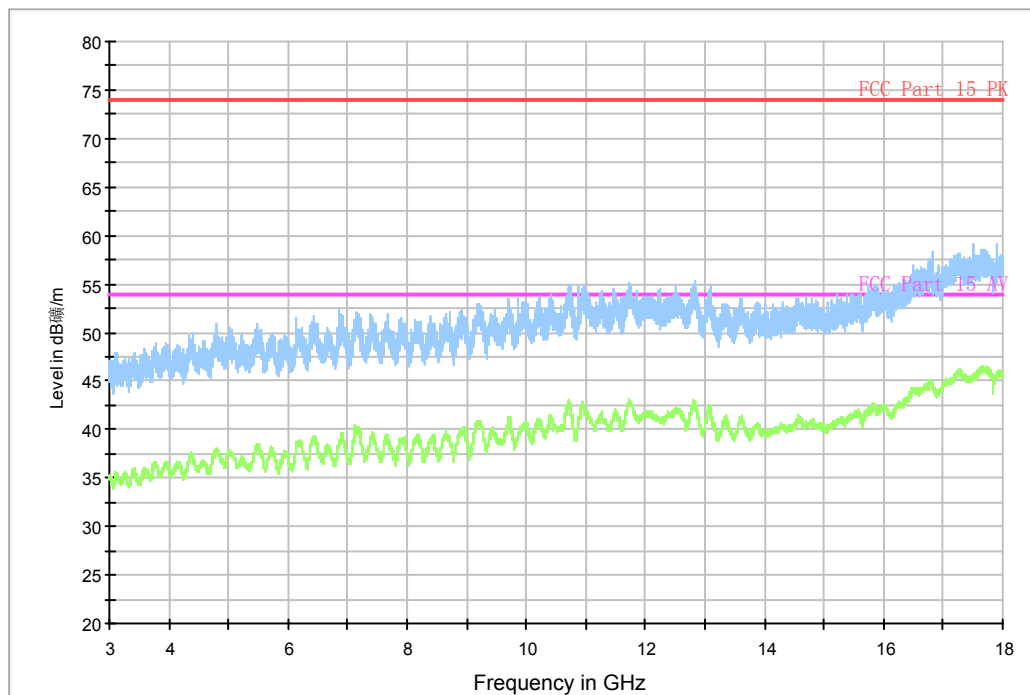
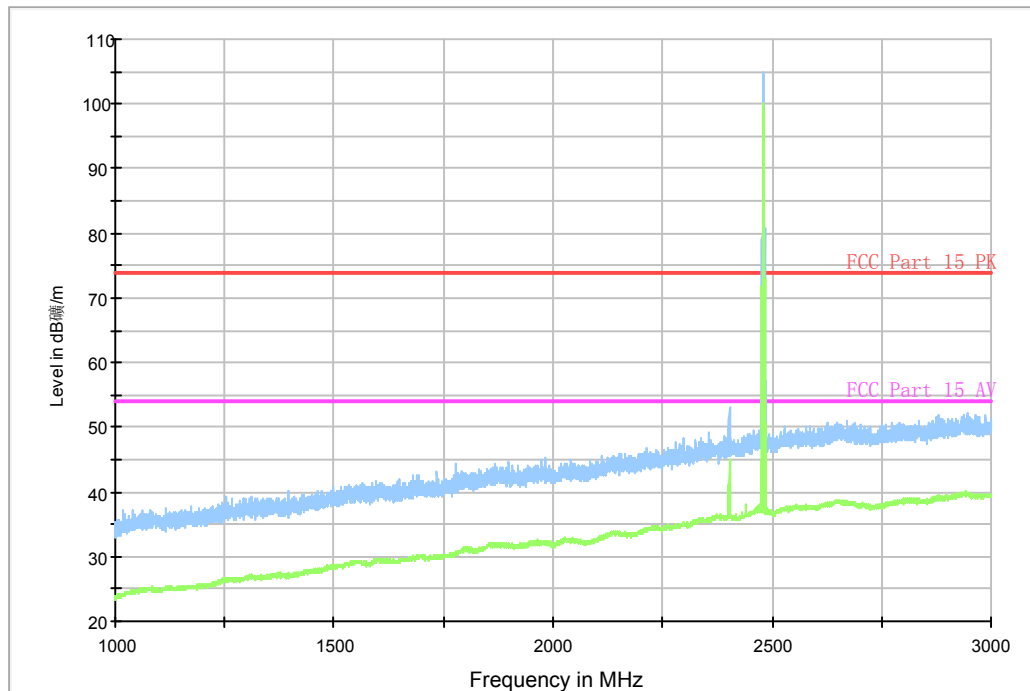


Fig.63. Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz

RE - 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

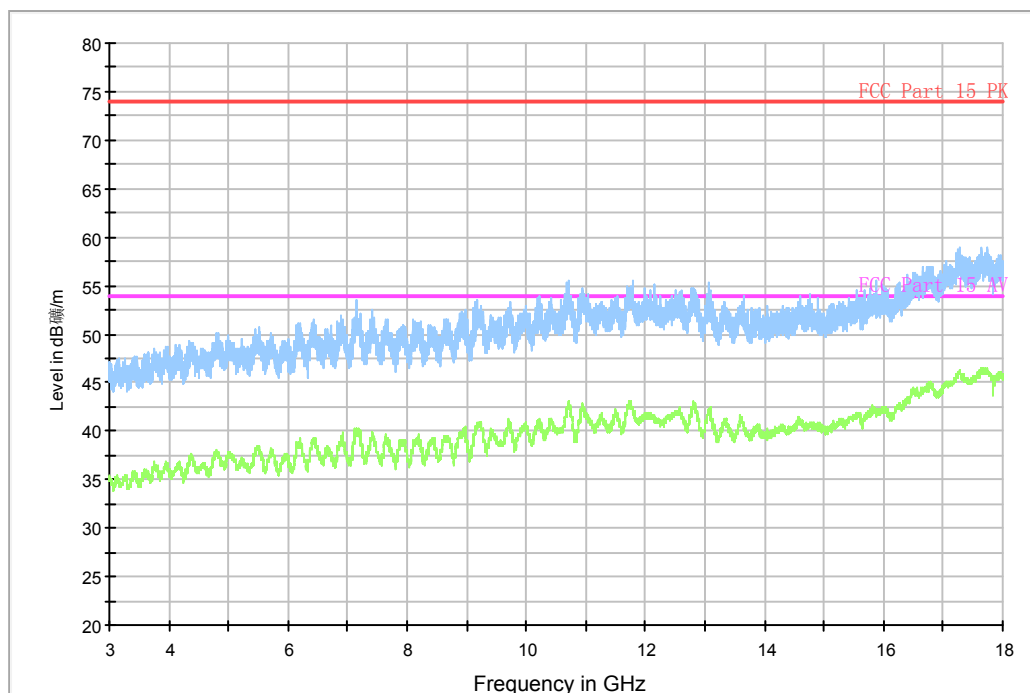


Fig.65. Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz_ESC13

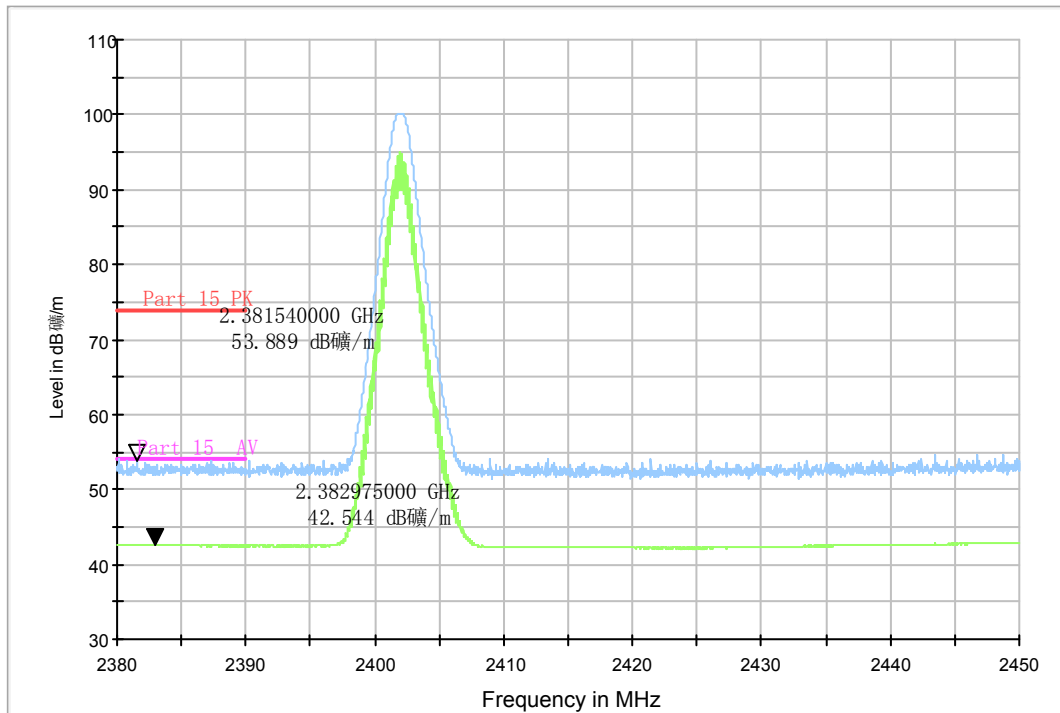


Fig.66. Radiated emission (Power): GFSK, low channel

RE - Power-2.45GHz-2.5GHz_ESC13

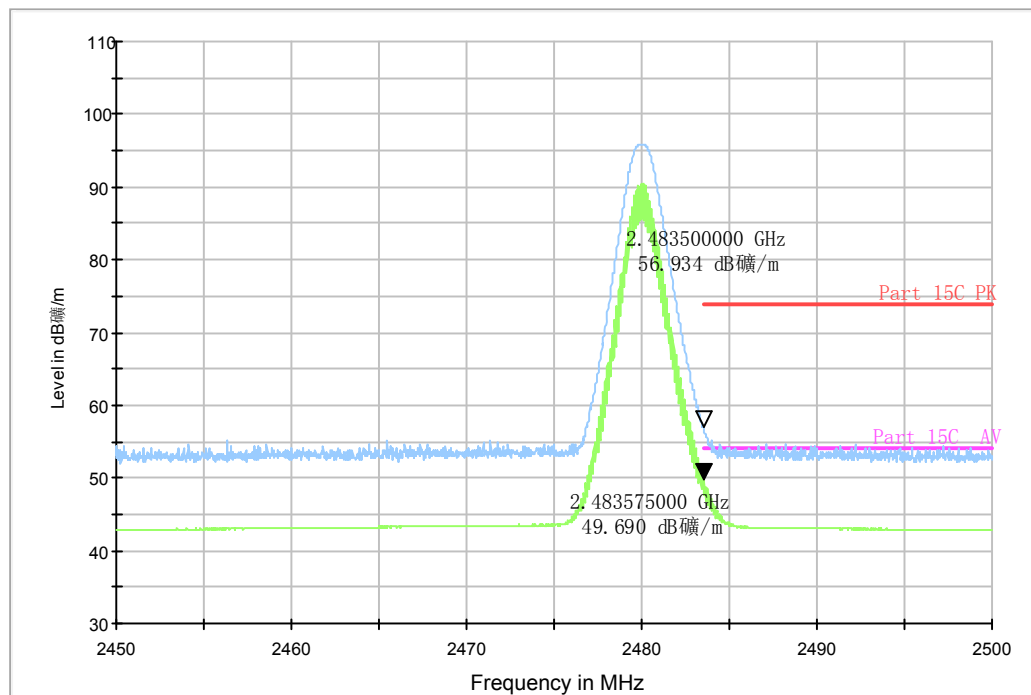


Fig.67. Radiated emission (Power) GFSK, high channel

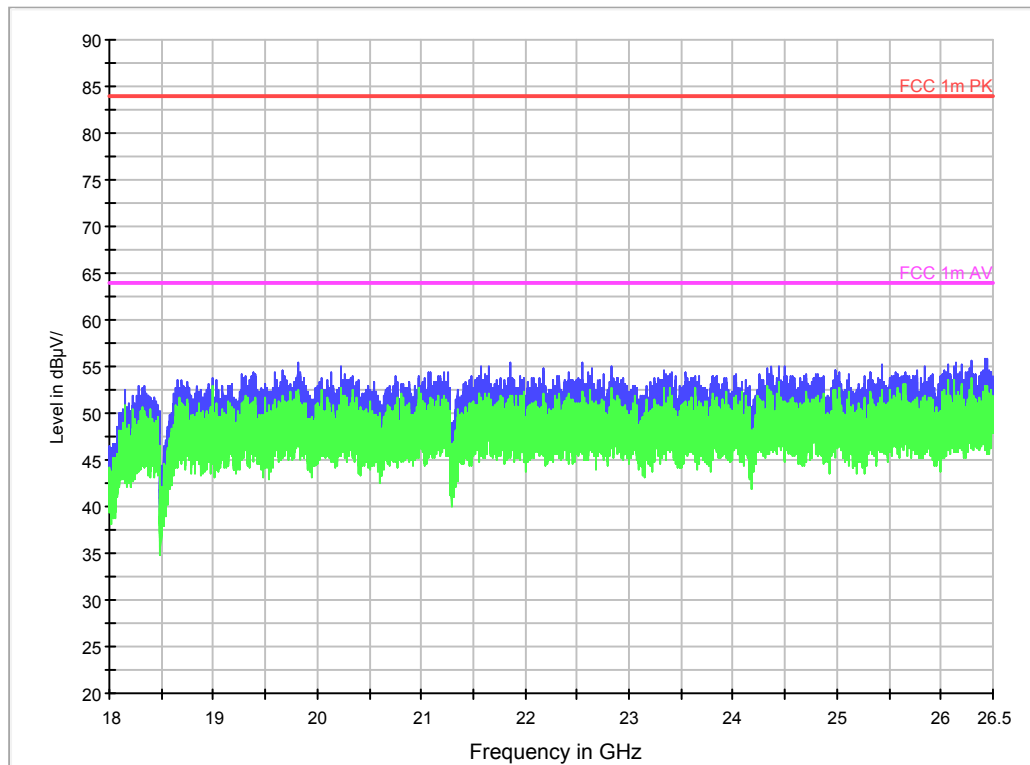
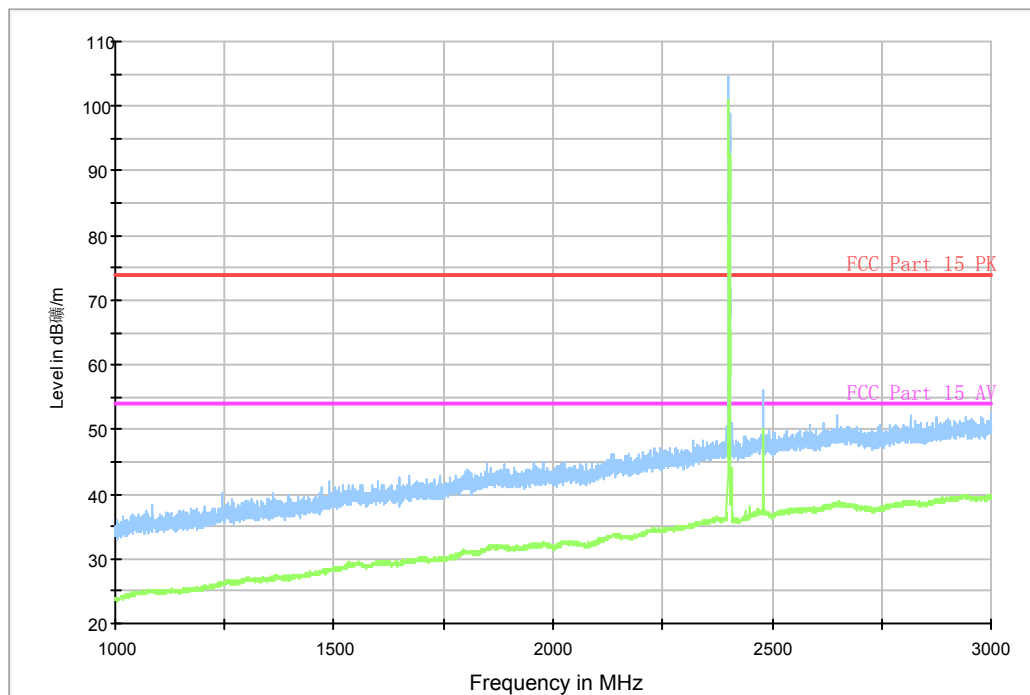


Fig.68. Radiated emission: GFSK, 18 GHz - 26 GHz

RE - 1GHz-3GHz



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

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

RE - 3GHz-18GHz

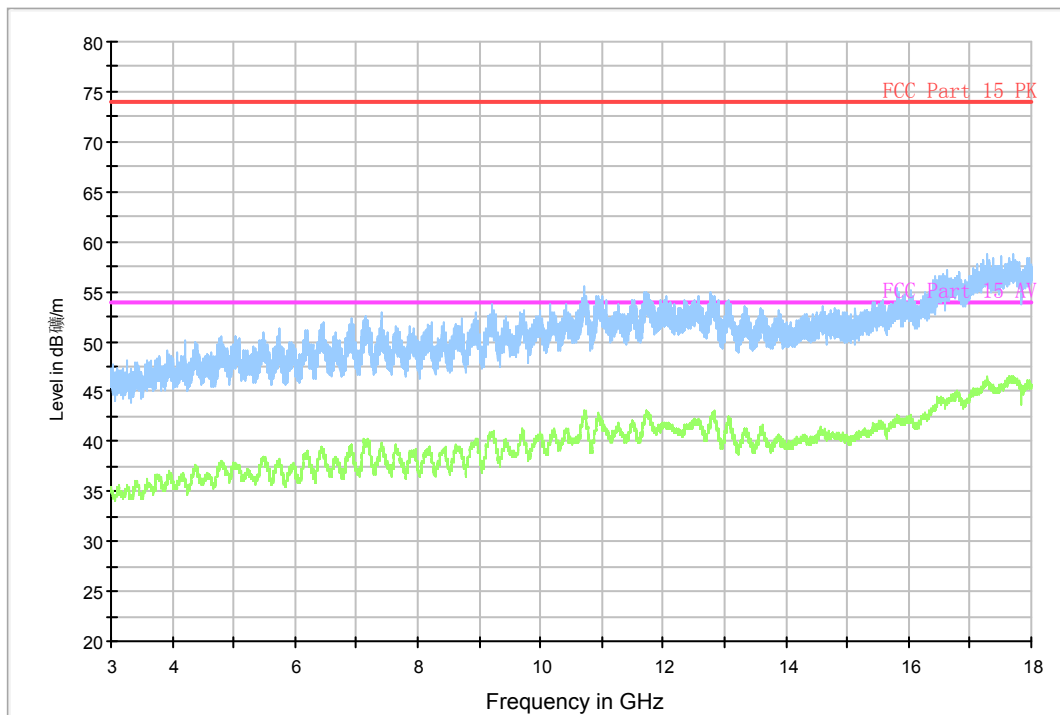


Fig.70. Radiated emission: $\pi/4$ DQPSK, Channel 0, 3 GHz - 18 GHz

RE 30MHz-1GHz

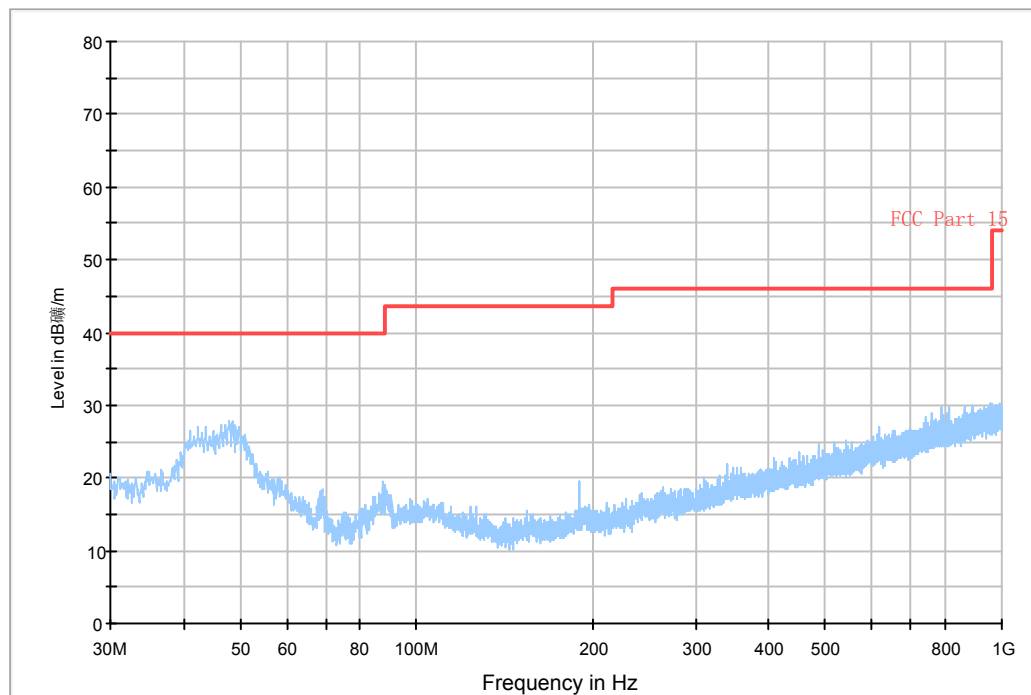
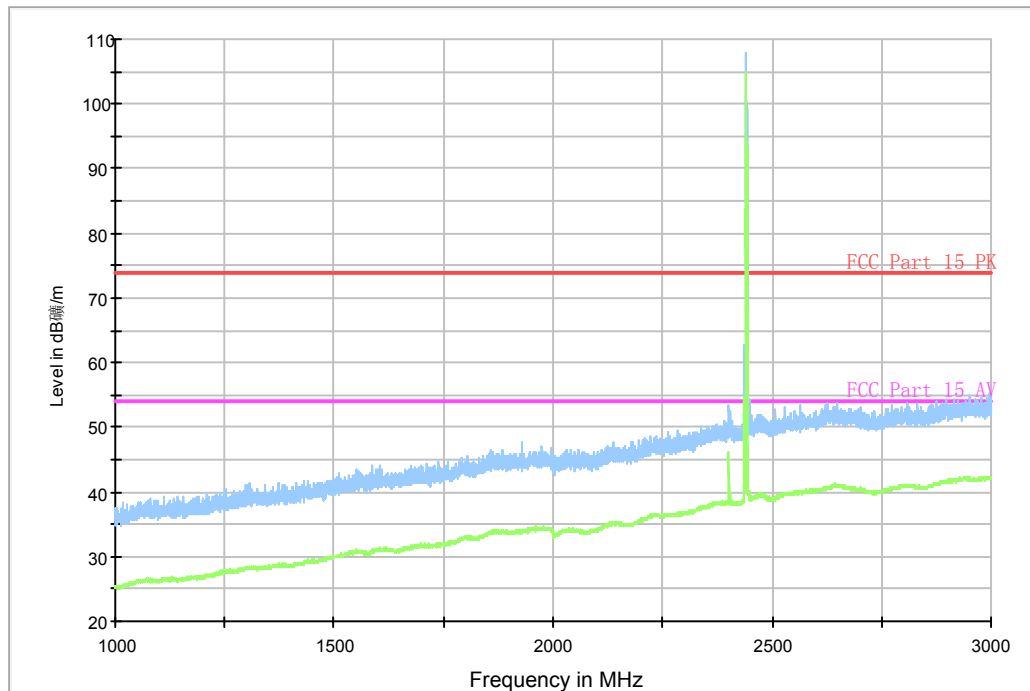


Fig.71. Radiated emission: $\pi/4$ DQPSK, Channel 39, 30 MHz - 1 GHz

RE - 1GHz-3GHz



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

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

RE - 3GHz-18GHz

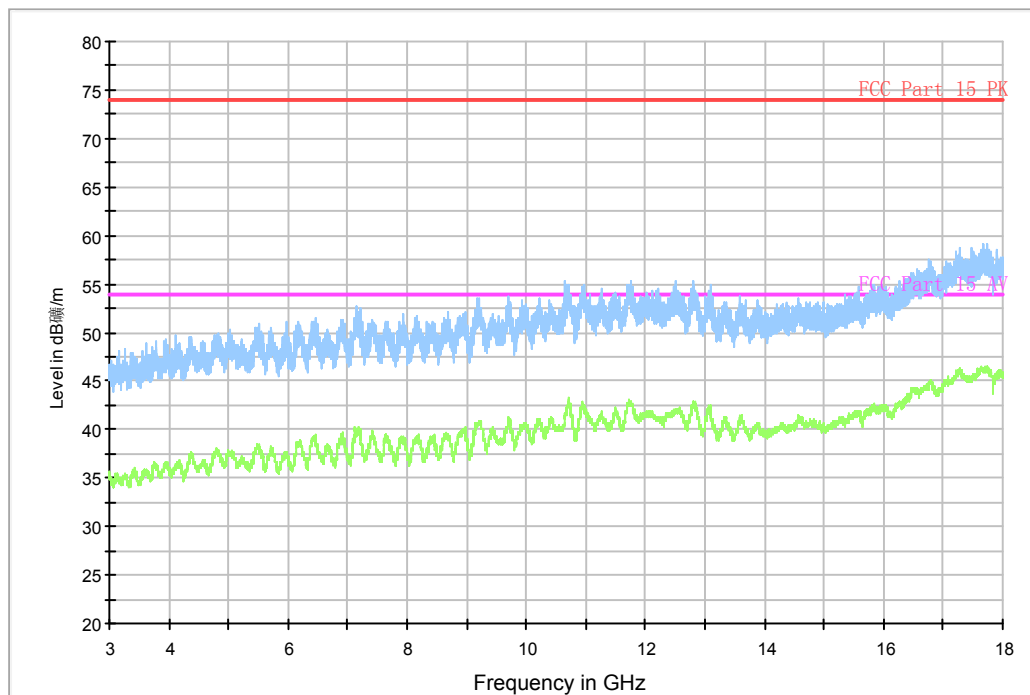
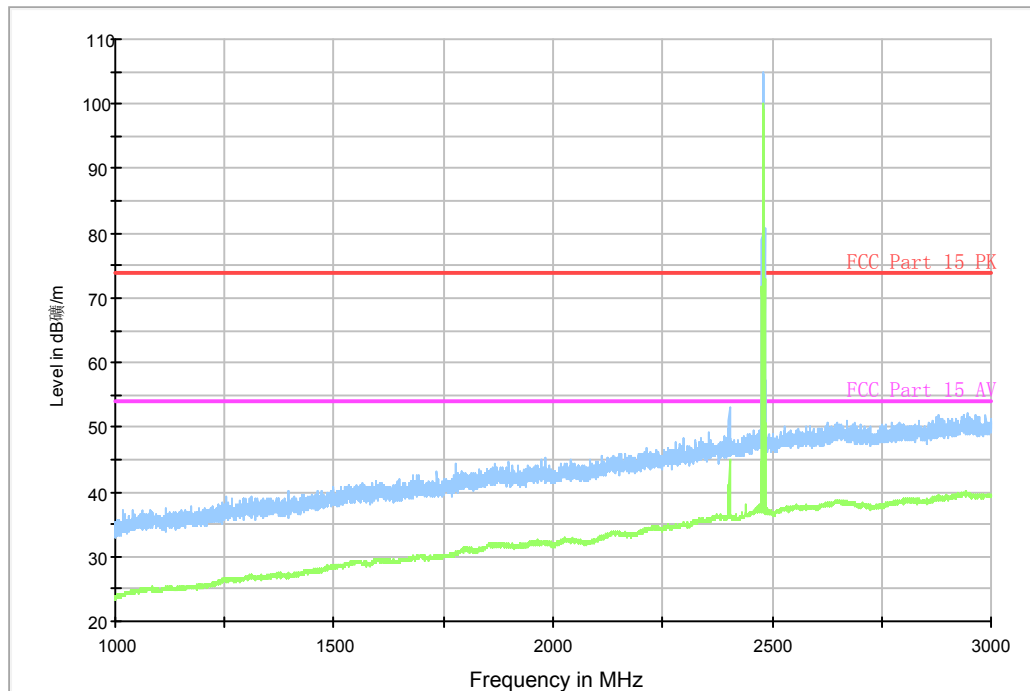


Fig.73. Radiated emission: $\pi/4$ DQPSK, Channel 39, 3 GHz - 18 GHz

RE - 1GHz-3GHz



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

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

RE - 3GHz-18GHz

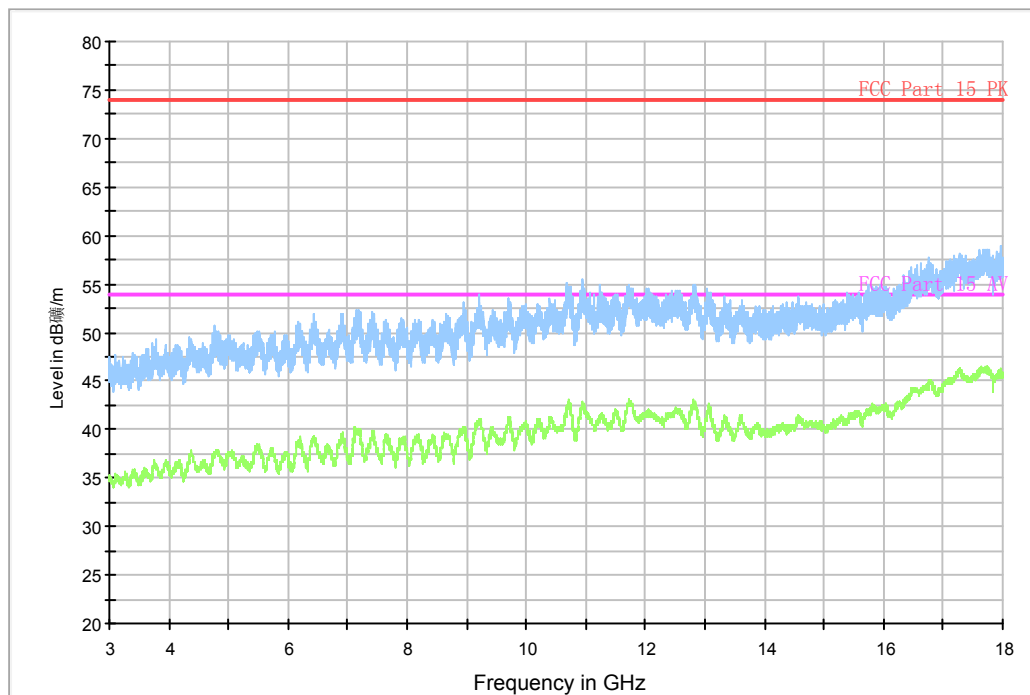


Fig.75. Radiated emission: $\pi/4$ DQPSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz_ESC13

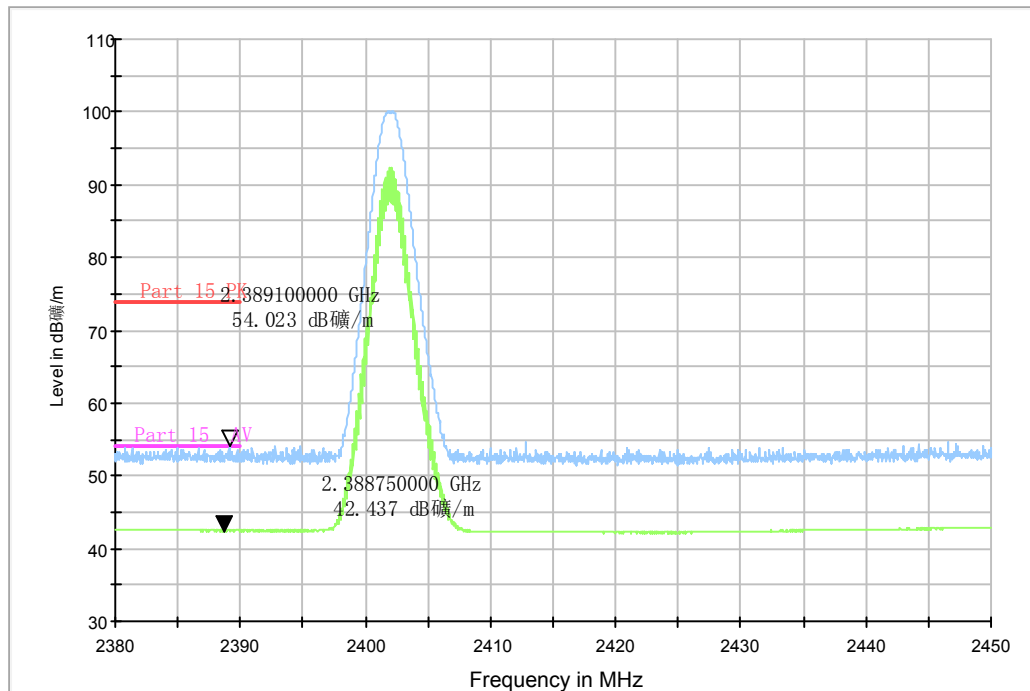


Fig.76. Radiated emission (Power): $\pi/4$ DQPSK, low channel

RE - Power-2.45GHz-2.5GHz_ESC13

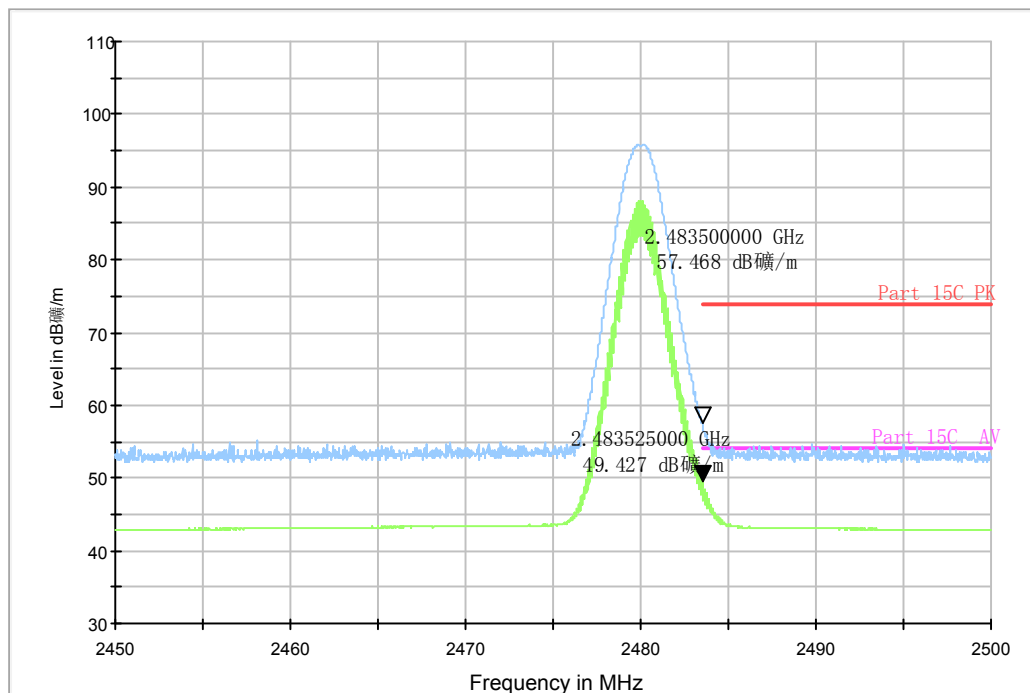


Fig.77. Radiated emission (Power): $\pi/4$ DQPSK, high channel

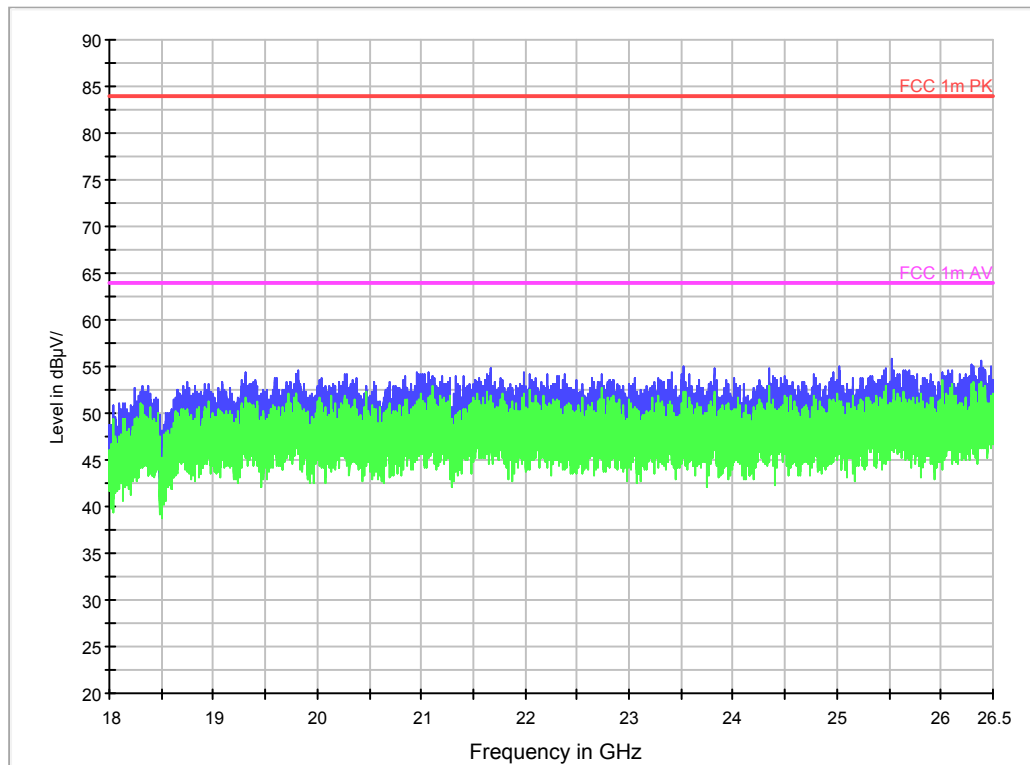
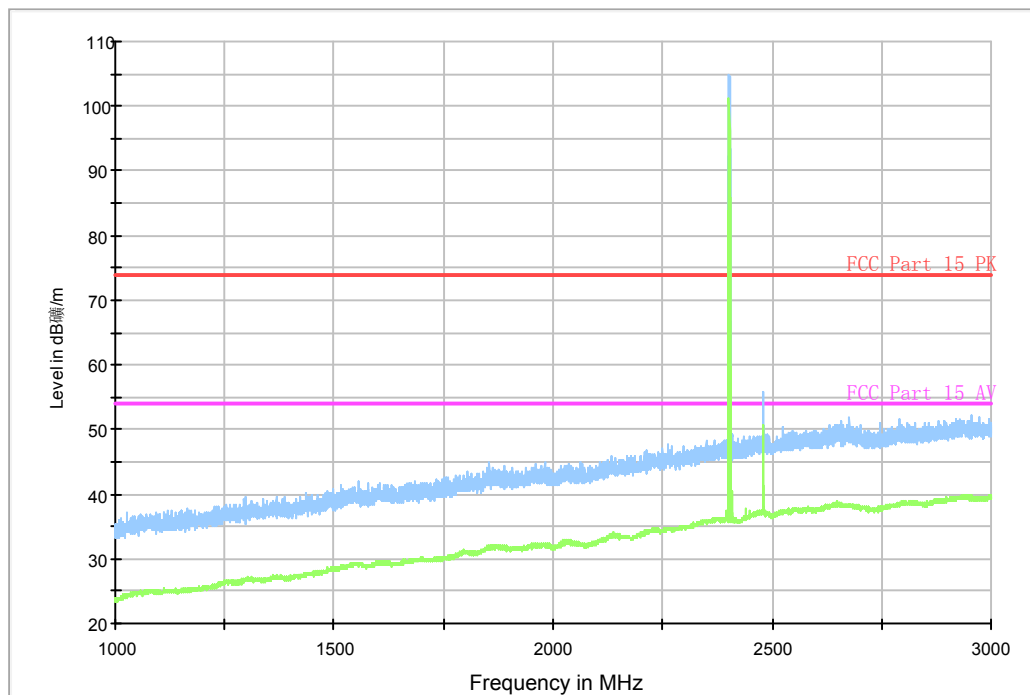


Fig.78. Radiated emission: $\pi/4$ DQPSK, 18 GHz - 26 GHz

RE - 1GHz-3GHz



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

RE - 3GHz-18GHz

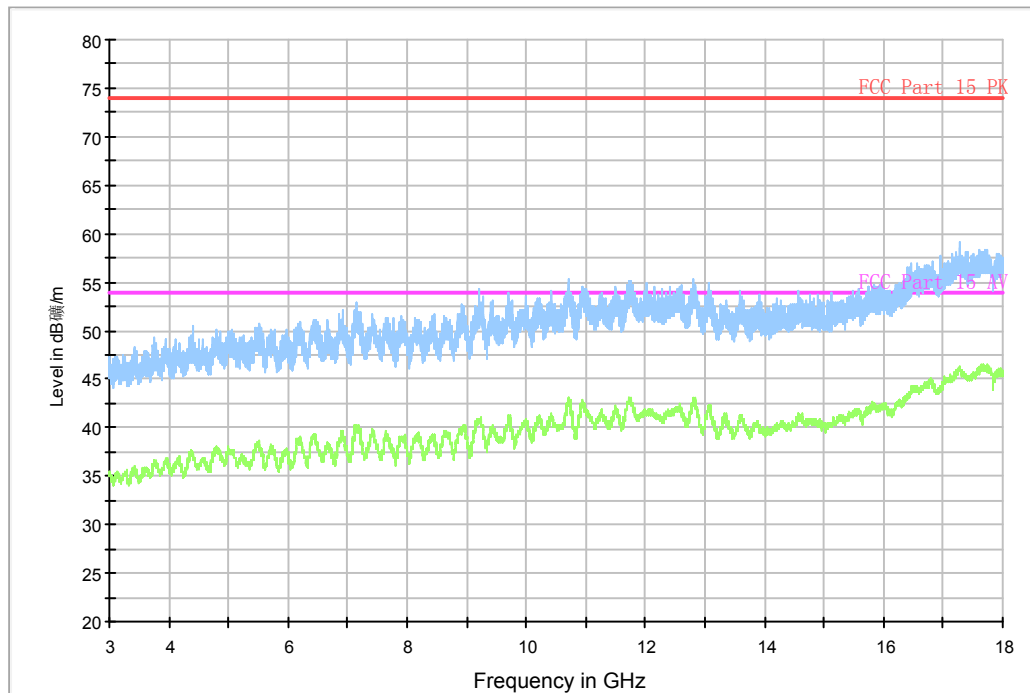


Fig.80. Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

RE 30MHz-1GHz

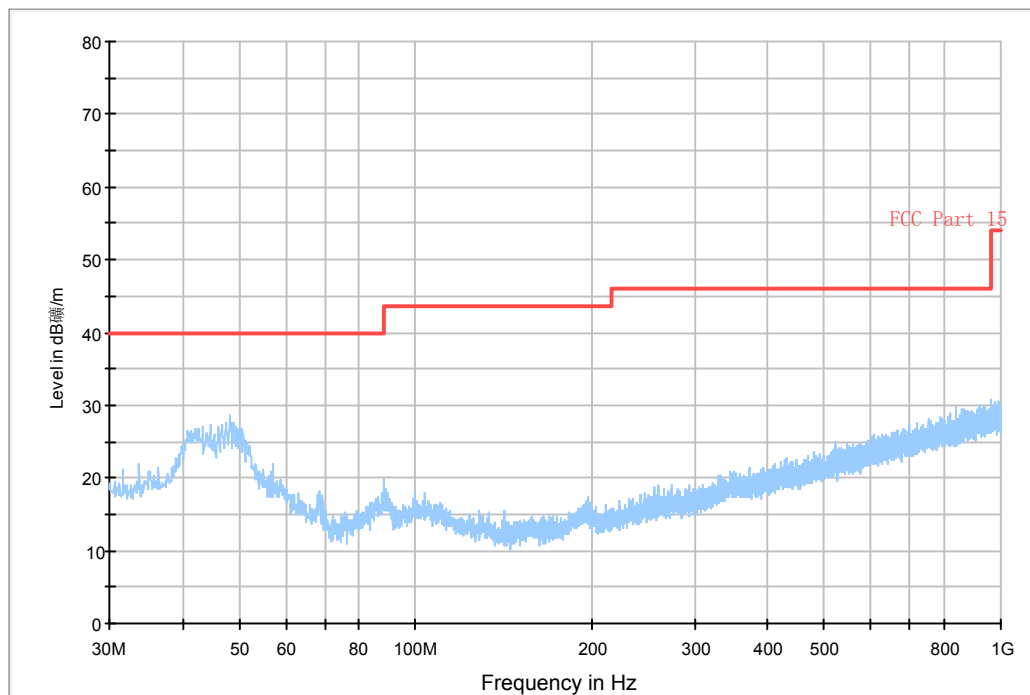
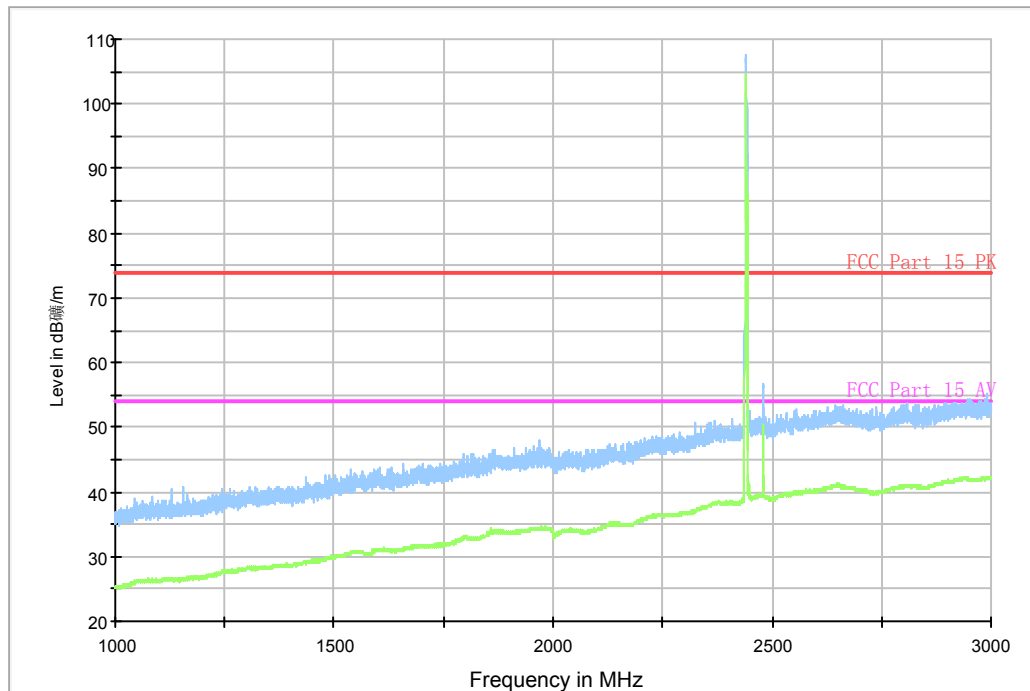


Fig.81. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

RE - 1GHz-3GHz



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

RE - 3GHz-18GHz

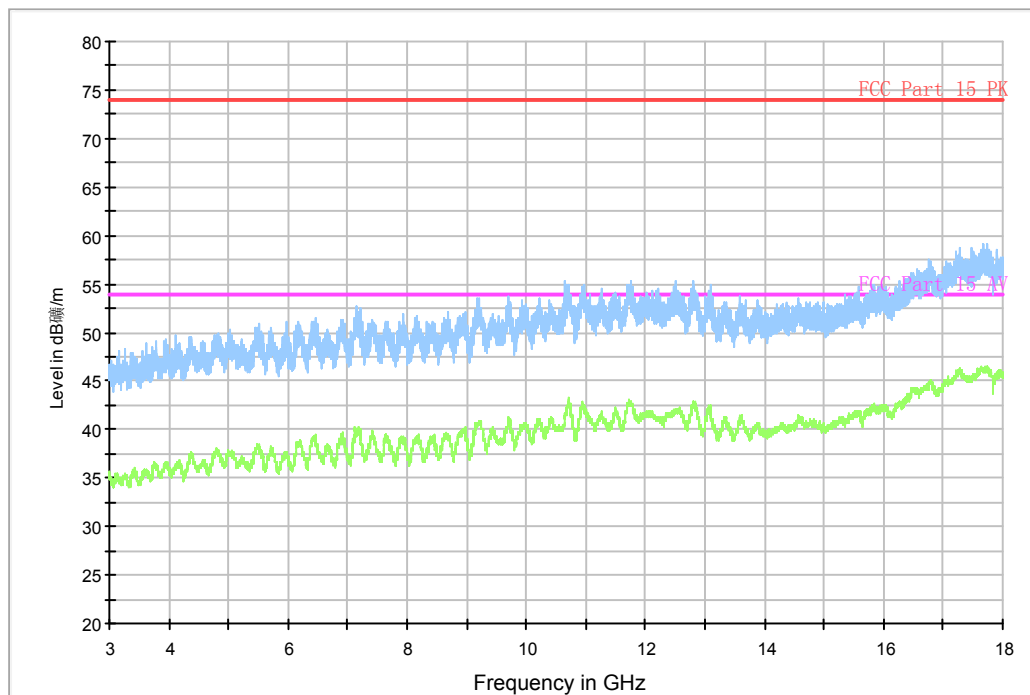
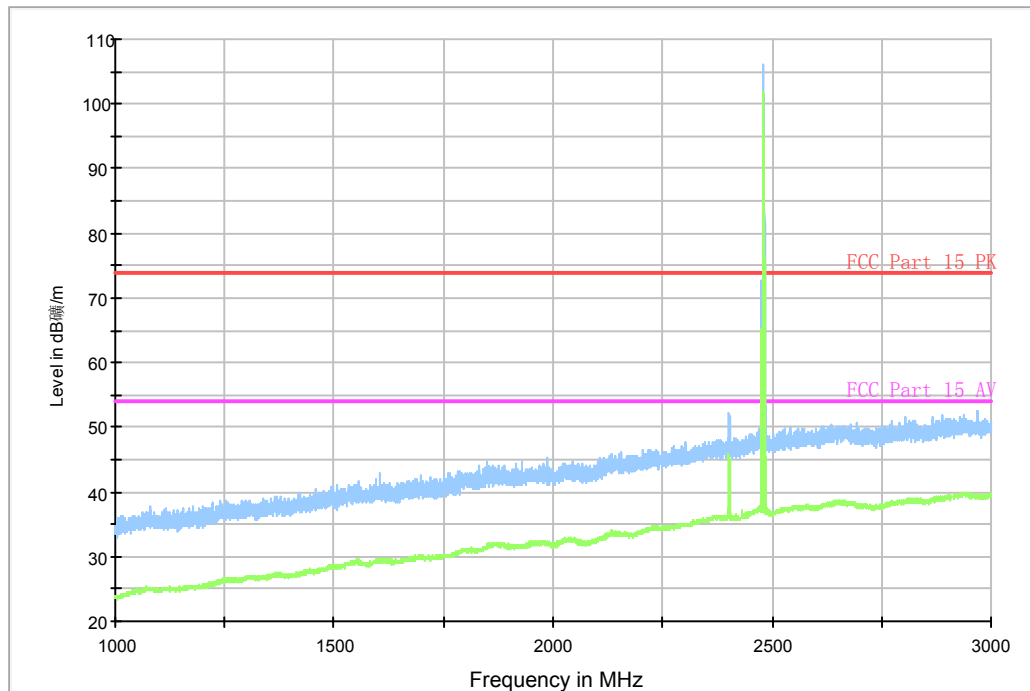


Fig.83. Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz

RE - 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

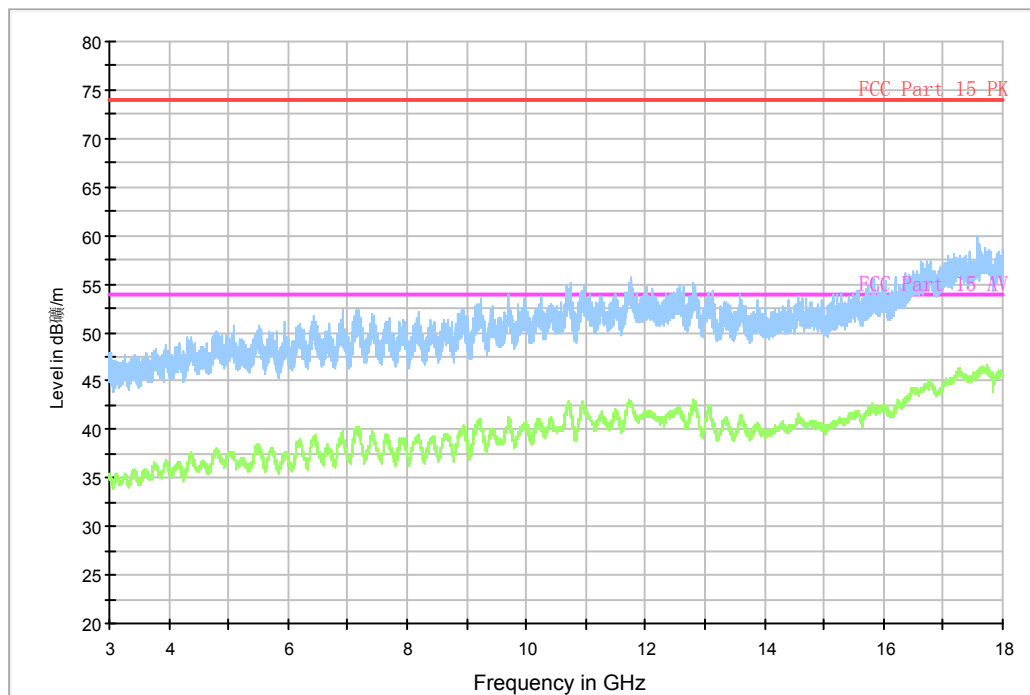


Fig.85. Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz_ESC13

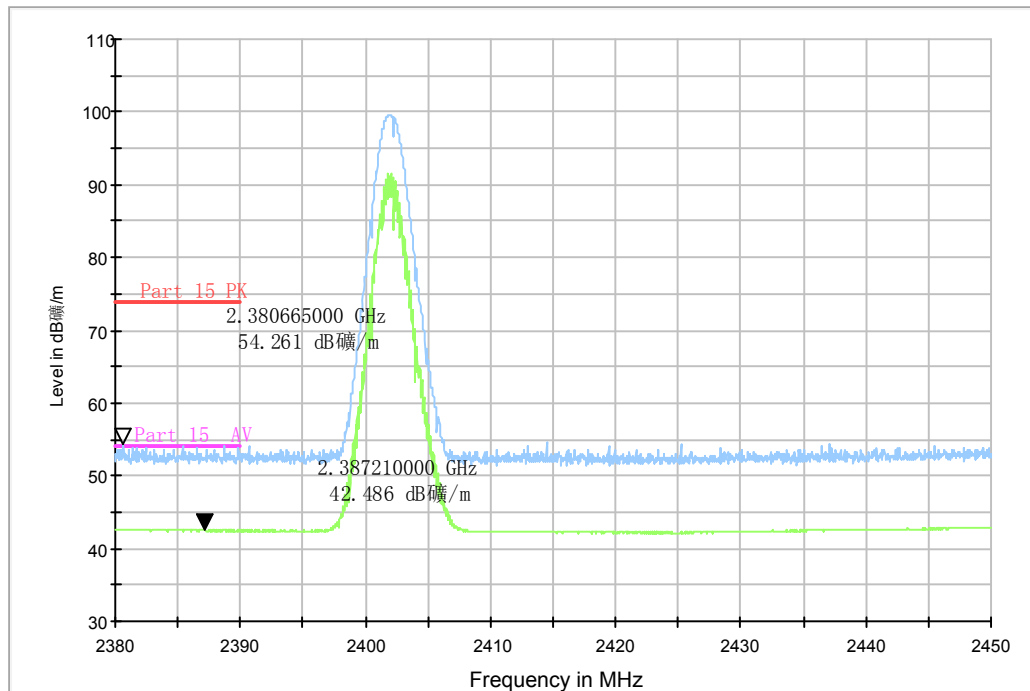


Fig.86. Radiated emission (Power): 8DPSK, low channel

RE - Power-2.45GHz-2.5GHz_ESC13

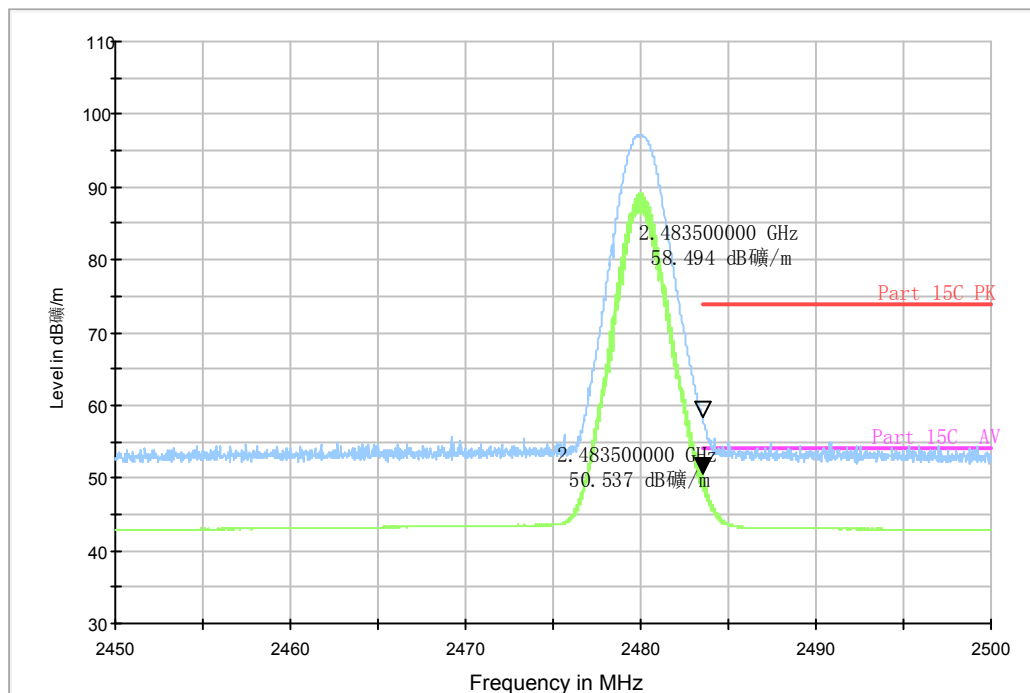


Fig.87. Radiated emission (Power): 8DPSK, high channel

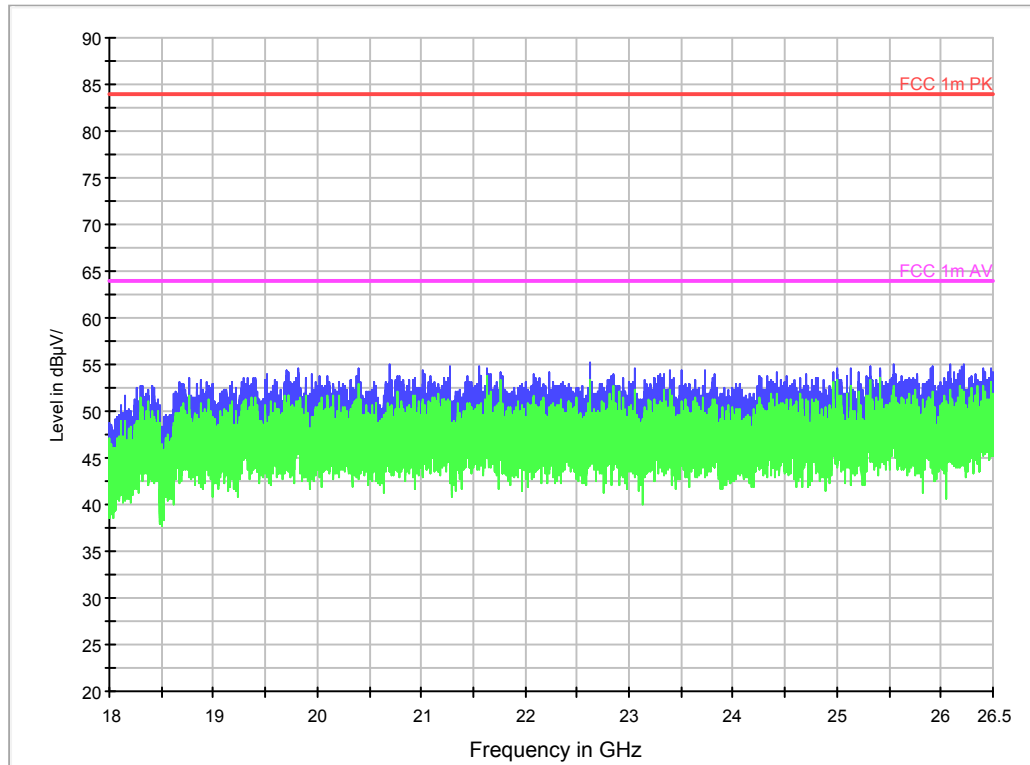


Fig.88. Radiated emission: 8DPSK, 18 GHz - 26 GHz

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 $\geq$ 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	121.81	P
		Fig.90		
	DH3	Fig.91	261.89	P
		Fig.92		
	DH5	Fig.93	307.74	P
		Fig.94		

For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.95	123.71	P
		Fig.96		
	DH3	Fig.97	262.18	P
		Fig.98		
	DH5	Fig.99	308.00	P
		Fig.100		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.101	123.60	P
		Fig.102		
	DH3	Fig.103	262.02	P

	DH5	Fig.104	306.50	P
		Fig.105		
		Fig.106		

Conclusion: PASS

Test graphs as below:

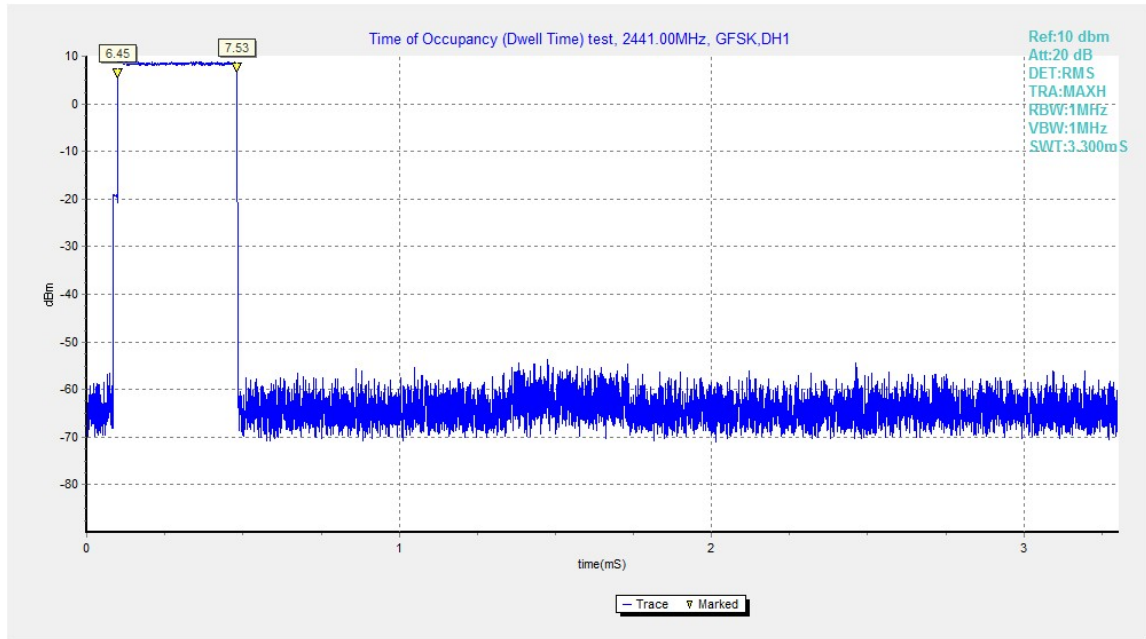


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet DH1

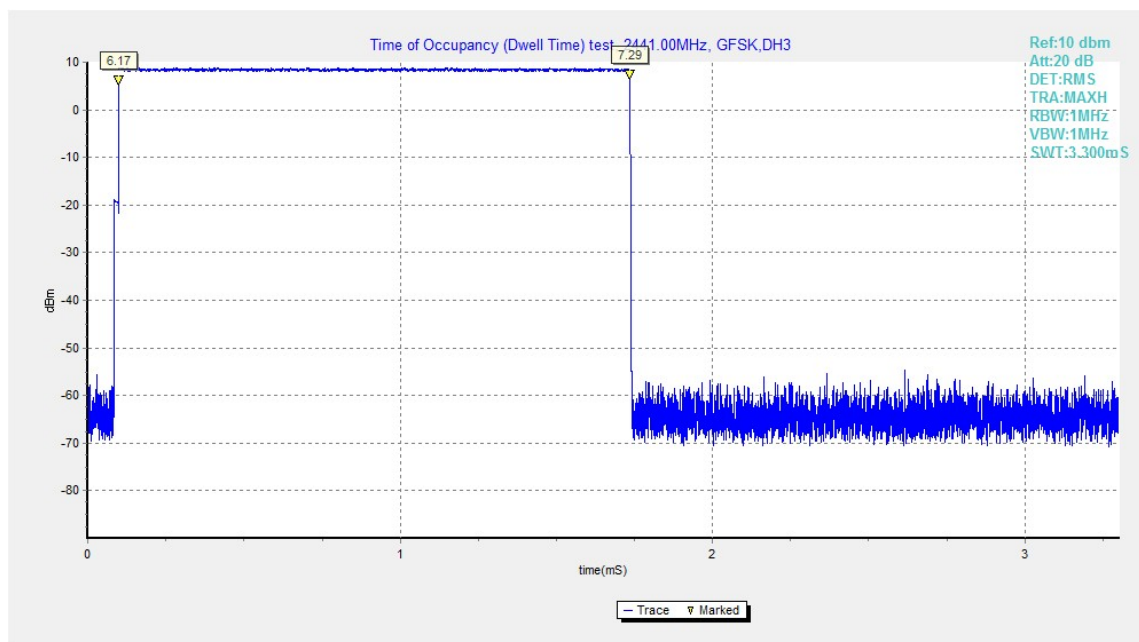


Fig.90. Time of occupancy (Dwell Time): Channel 39, Packet DH3

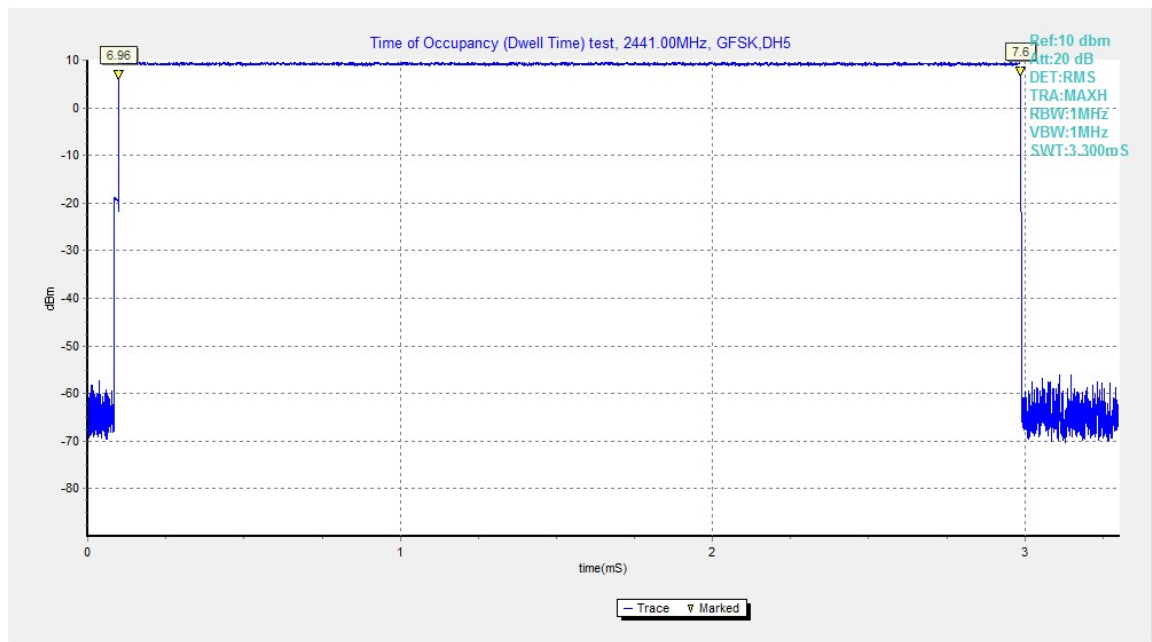


Fig.91. Time of occupancy (Dwell Time): Channel 39, Packet DH5

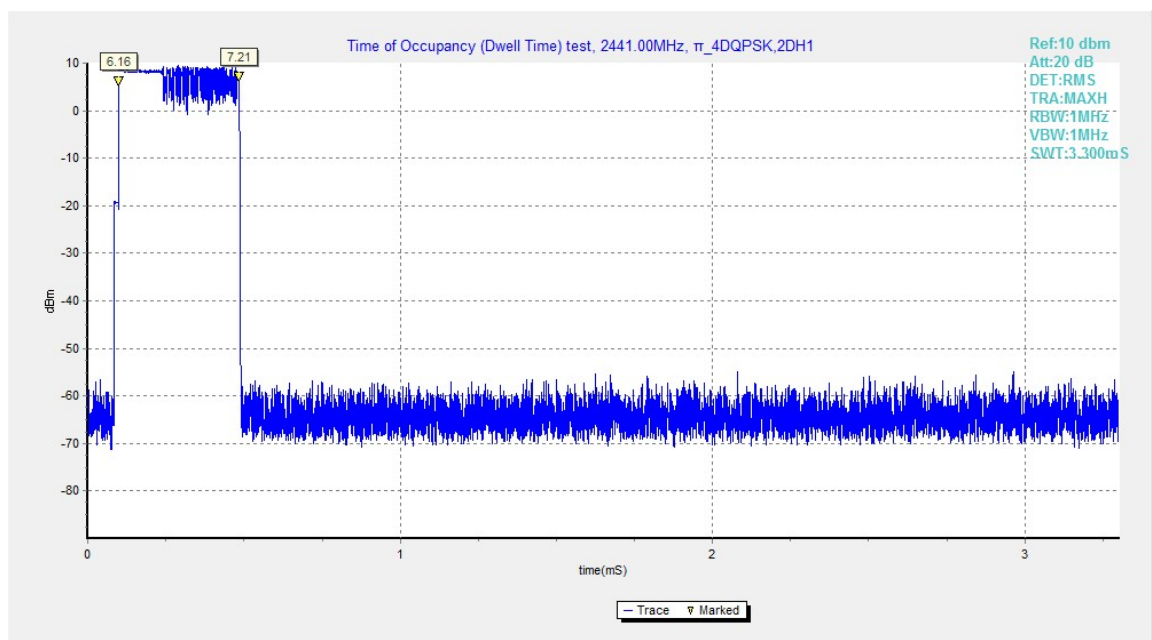


Fig.92. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

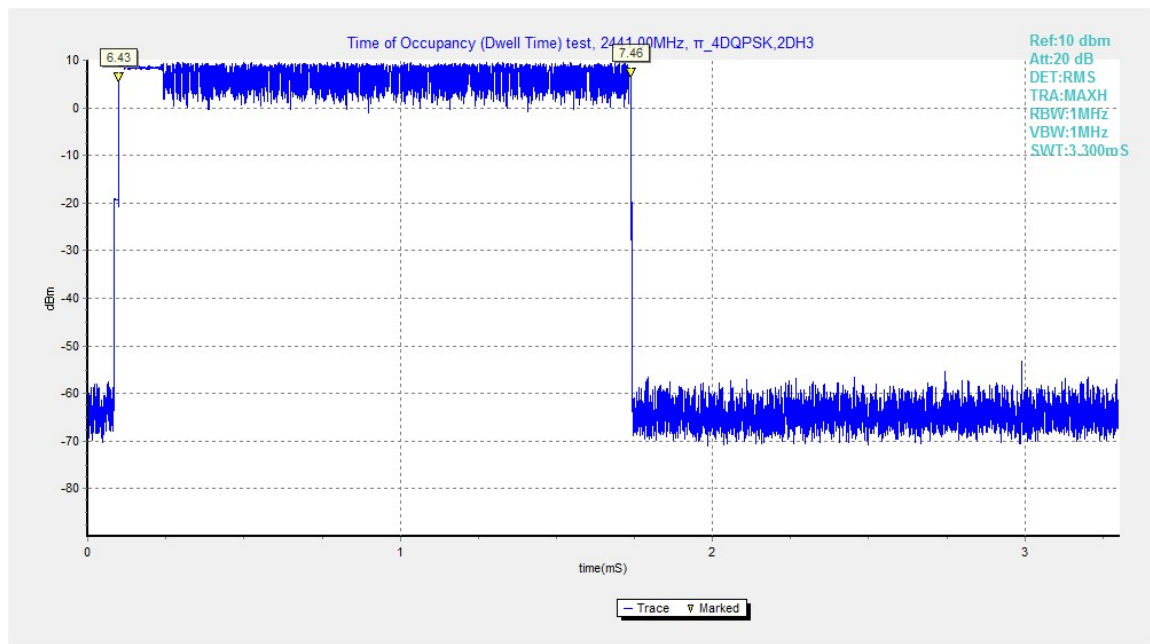


Fig.93. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

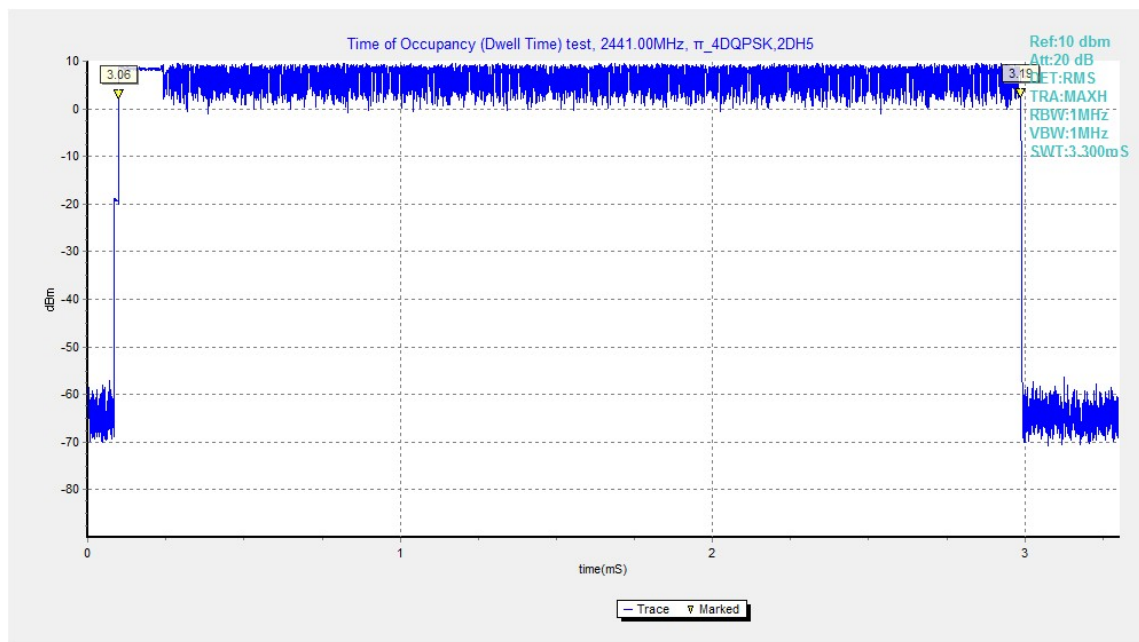


Fig.94. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

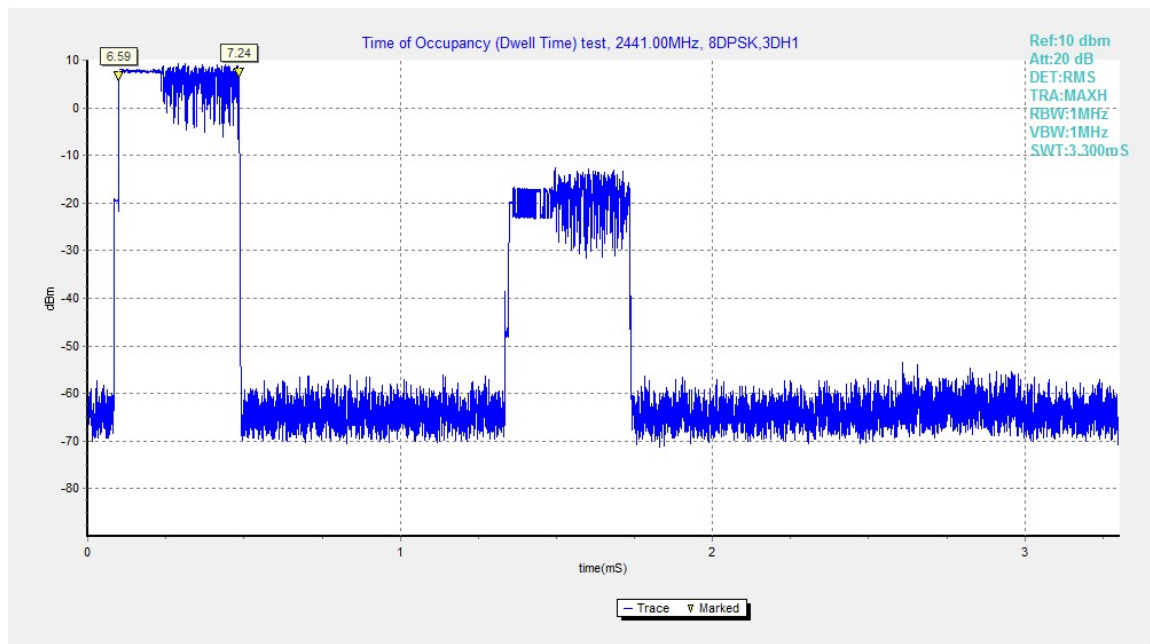


Fig.95. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

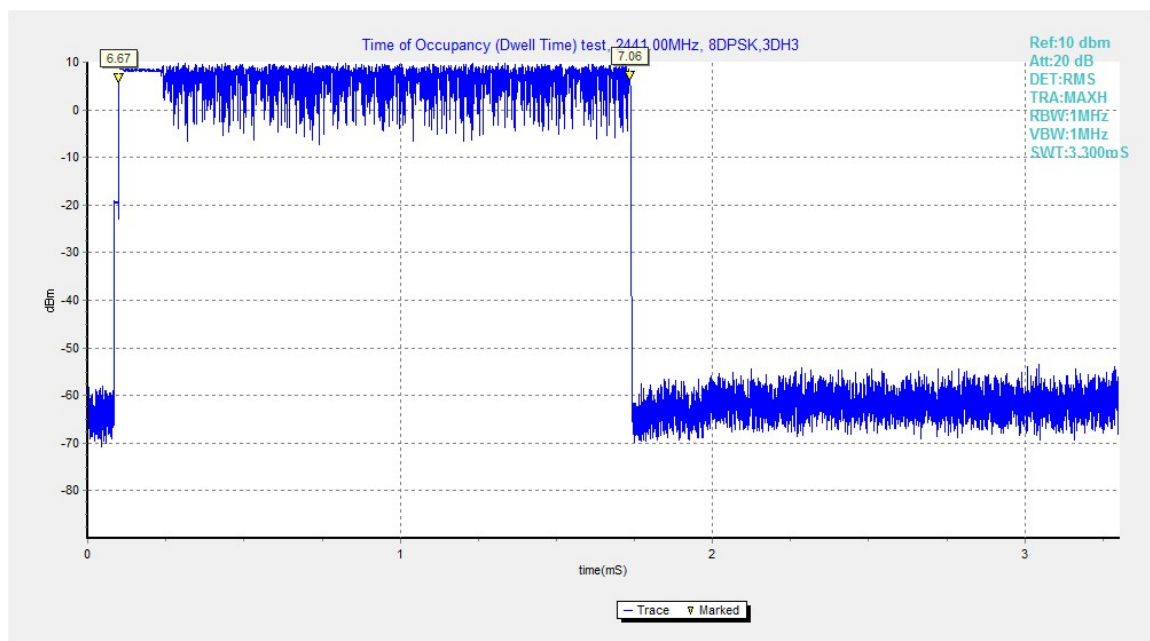


Fig.96. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3