

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

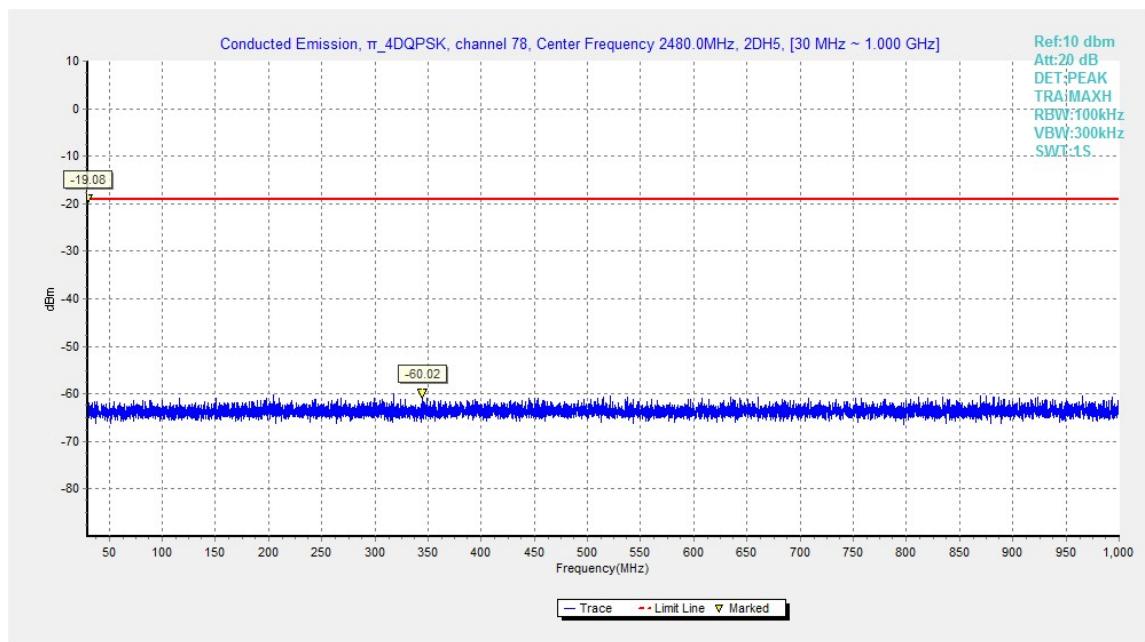


Fig.39. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 30MHz - 1GHz

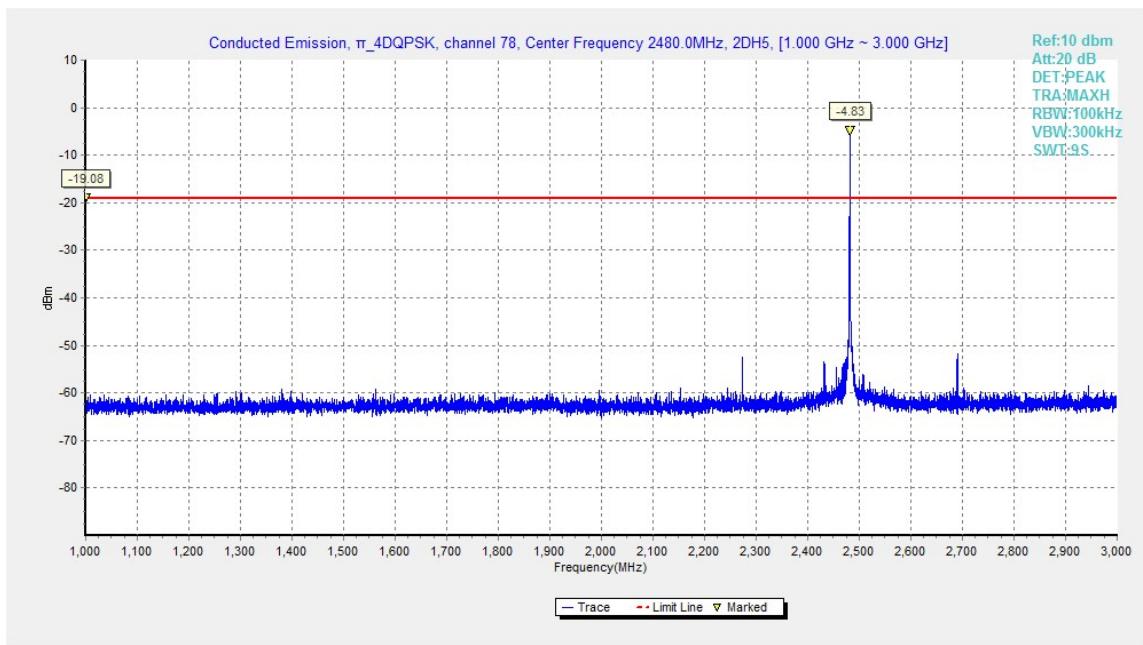


Fig.40. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 1GHz - 3GHz

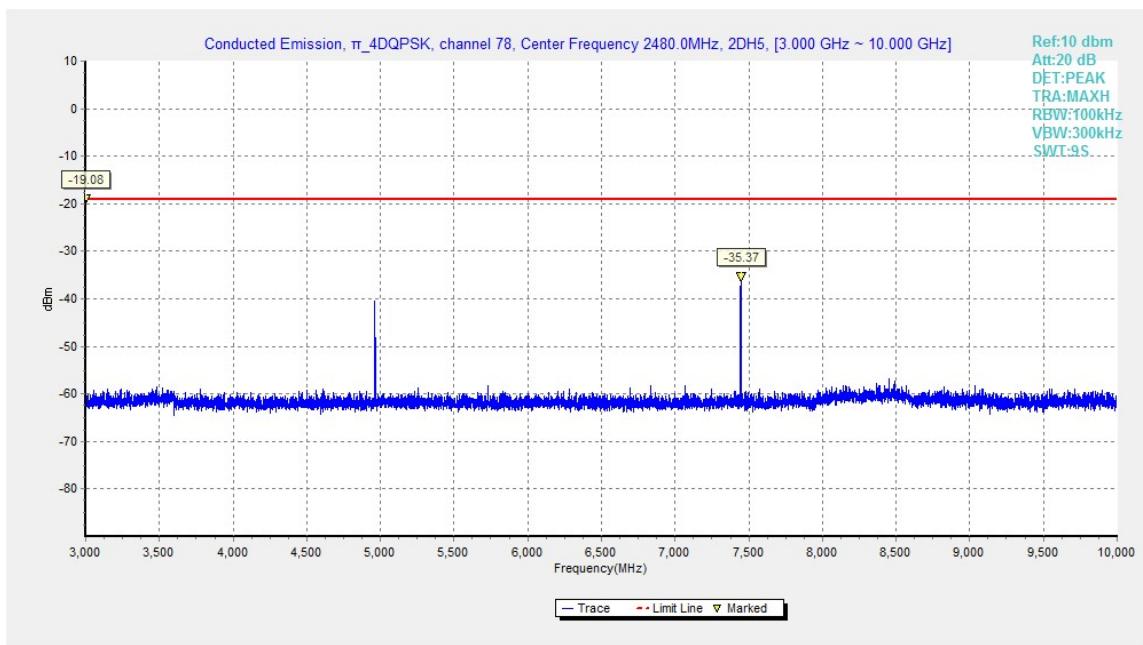


Fig.41. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 3GHz - 10GHz

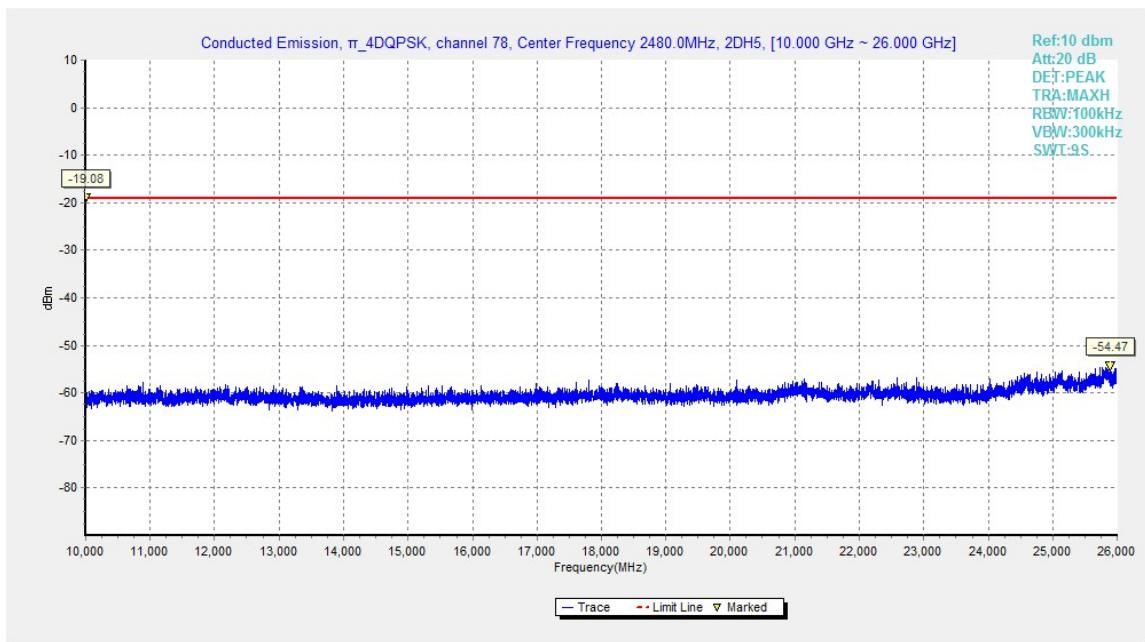


Fig.42. Fig.30 Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 10GHz - 26GHz

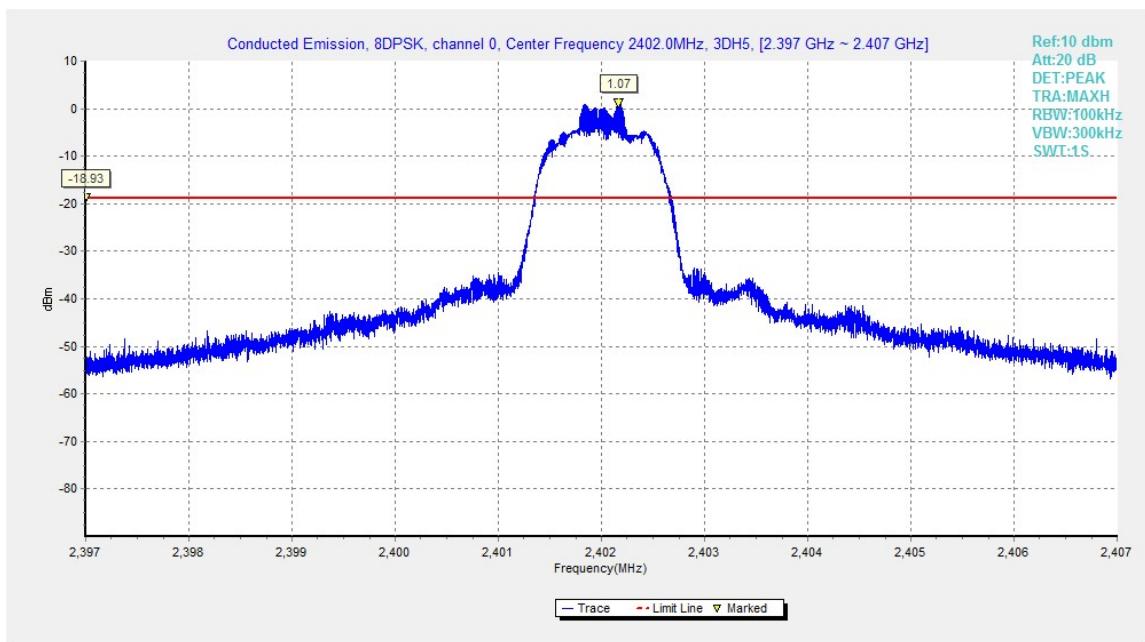


Fig.43. Conducted spurious emission: 8DPSK, Channel 0, 2402MHz

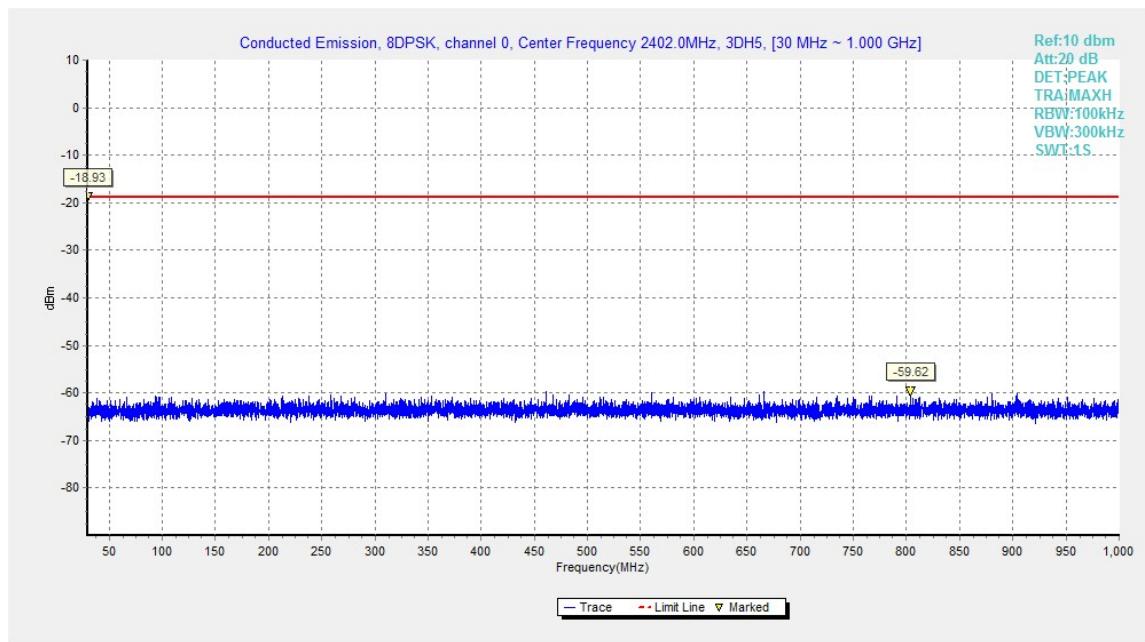


Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

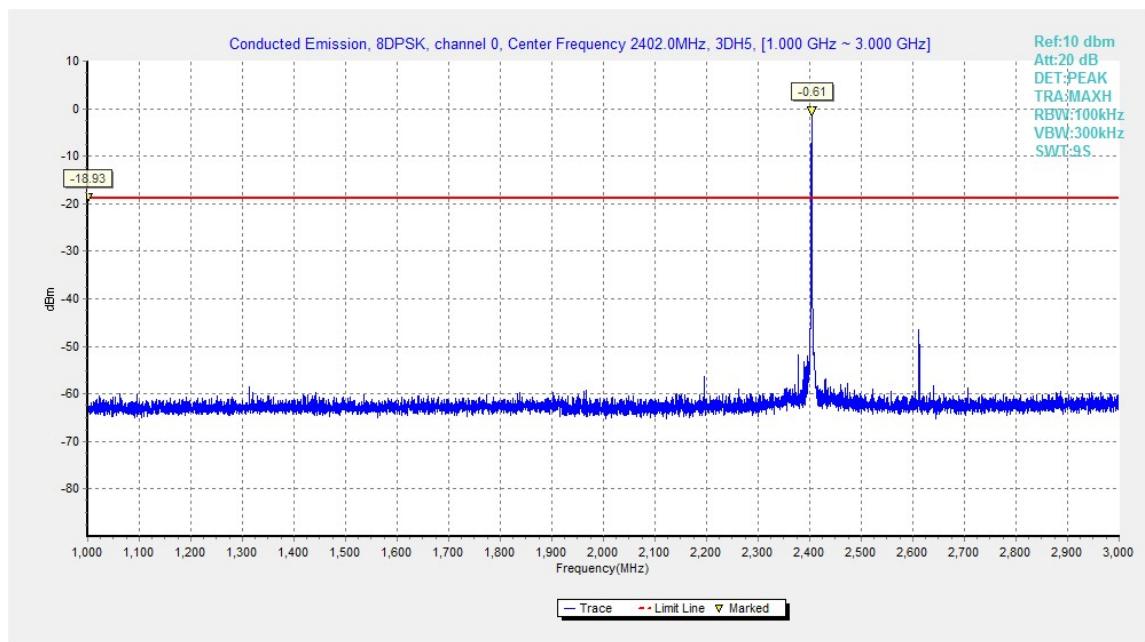


Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

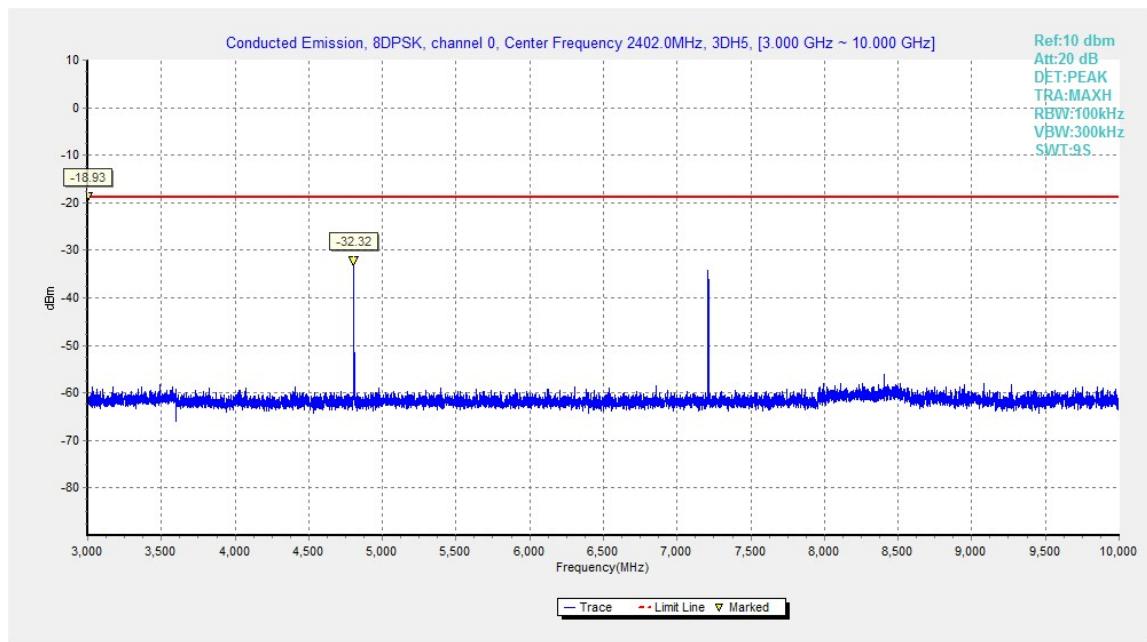


Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

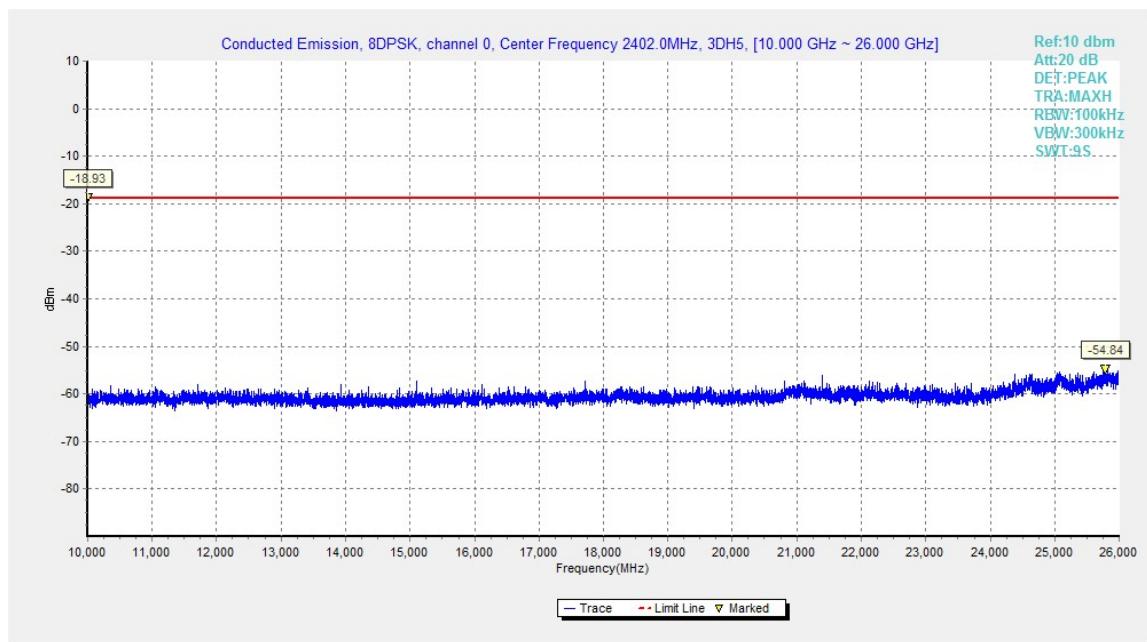


Fig.47. Conducted spurious emission: 8DPSK, Channel 0, 10GHz - 26GHz

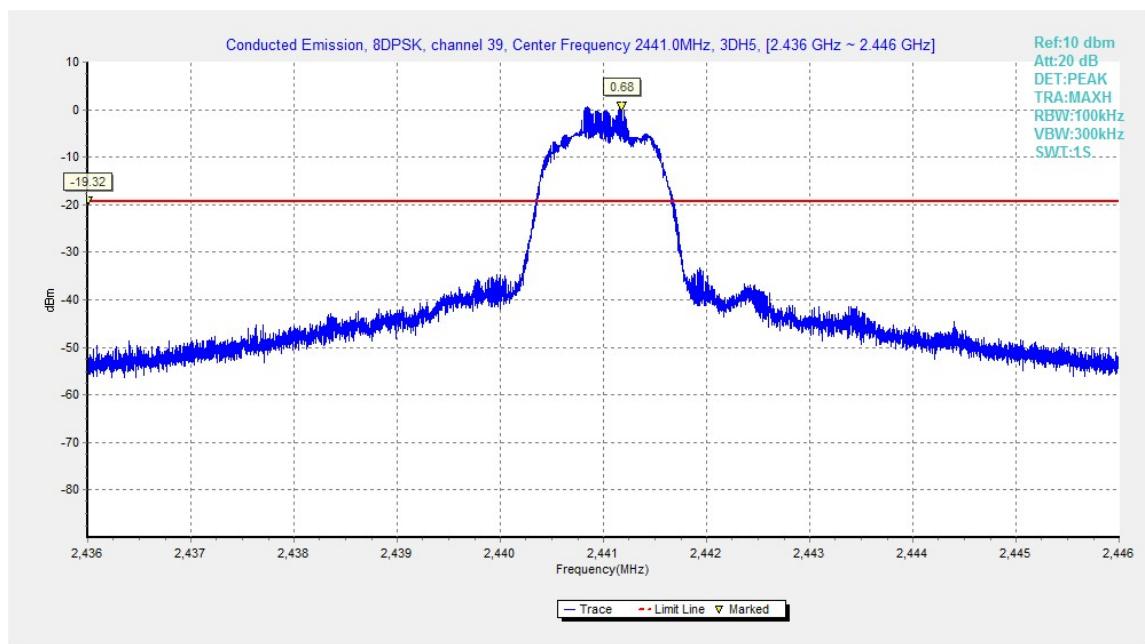


Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

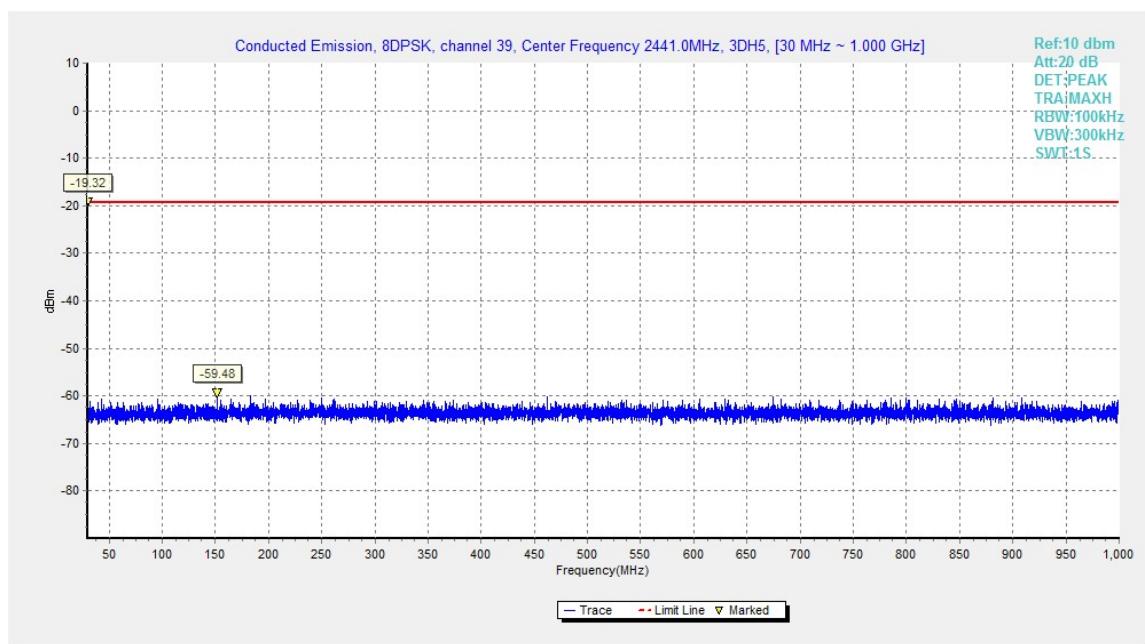


Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

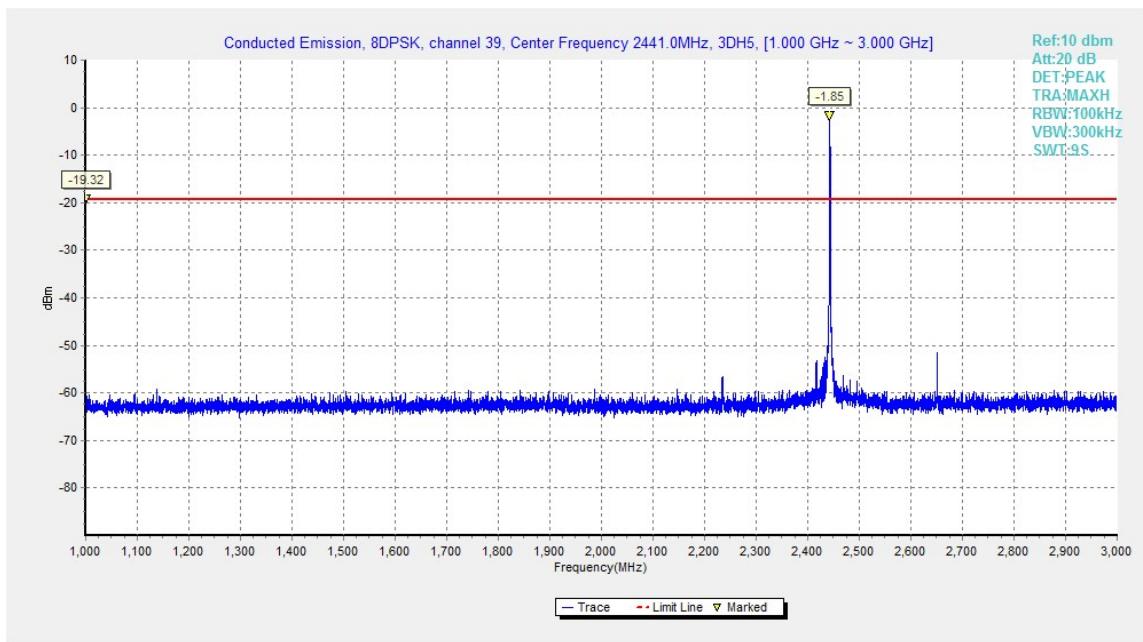


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

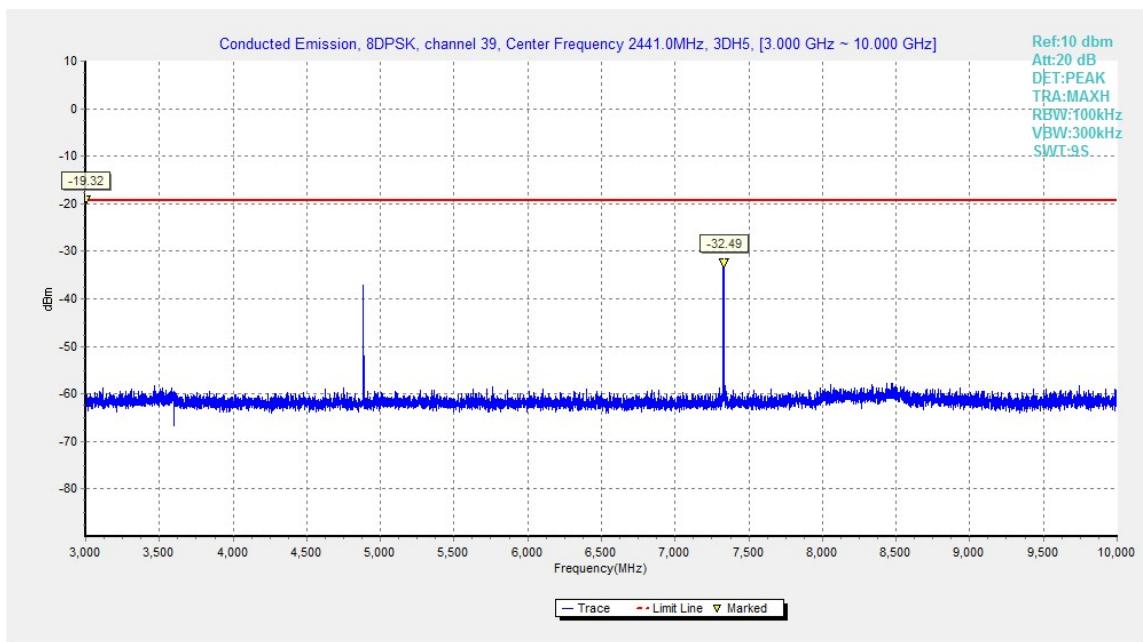


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

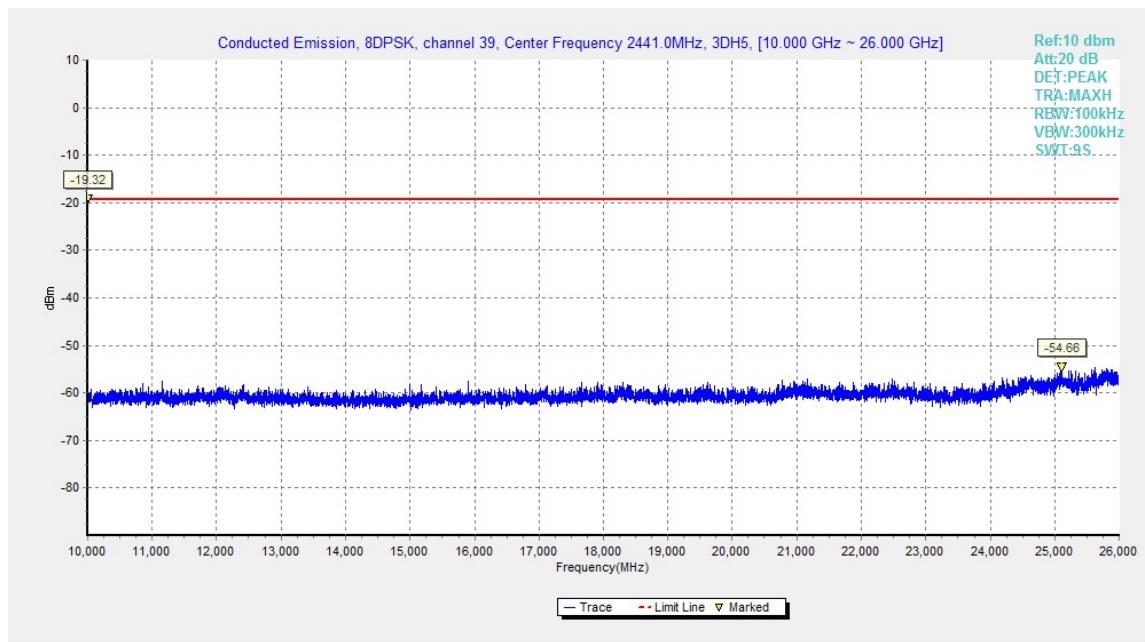


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

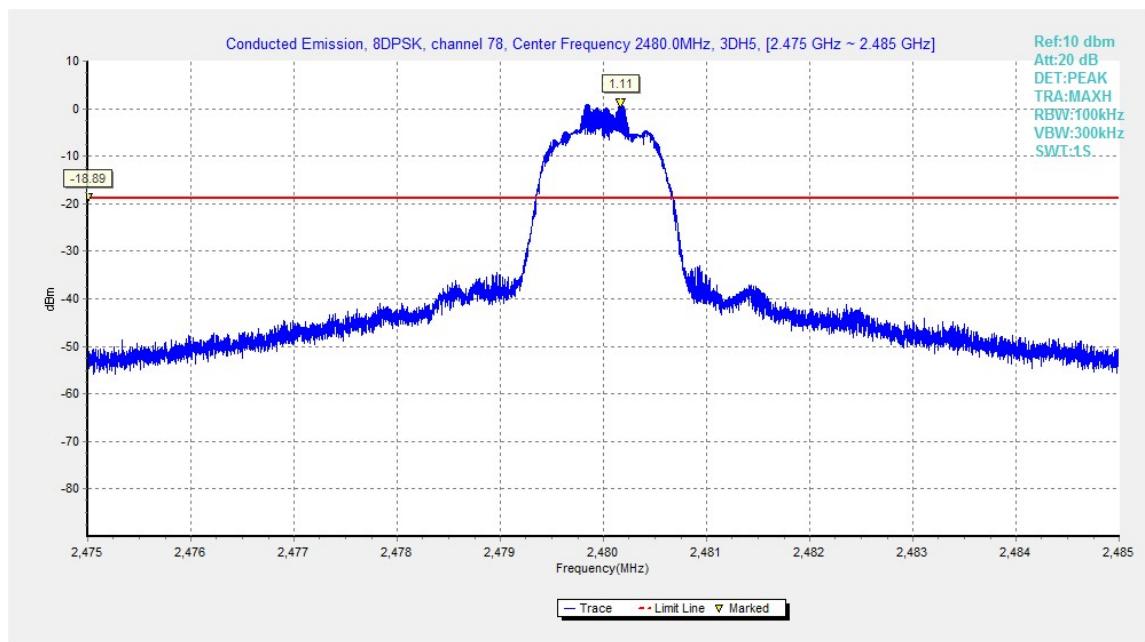


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

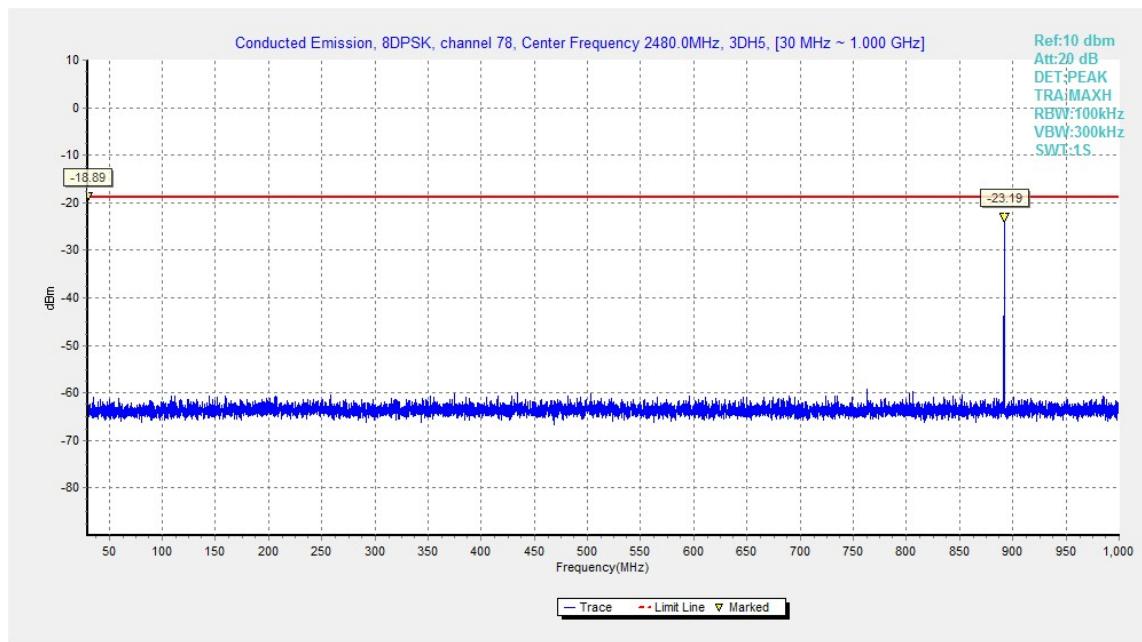


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

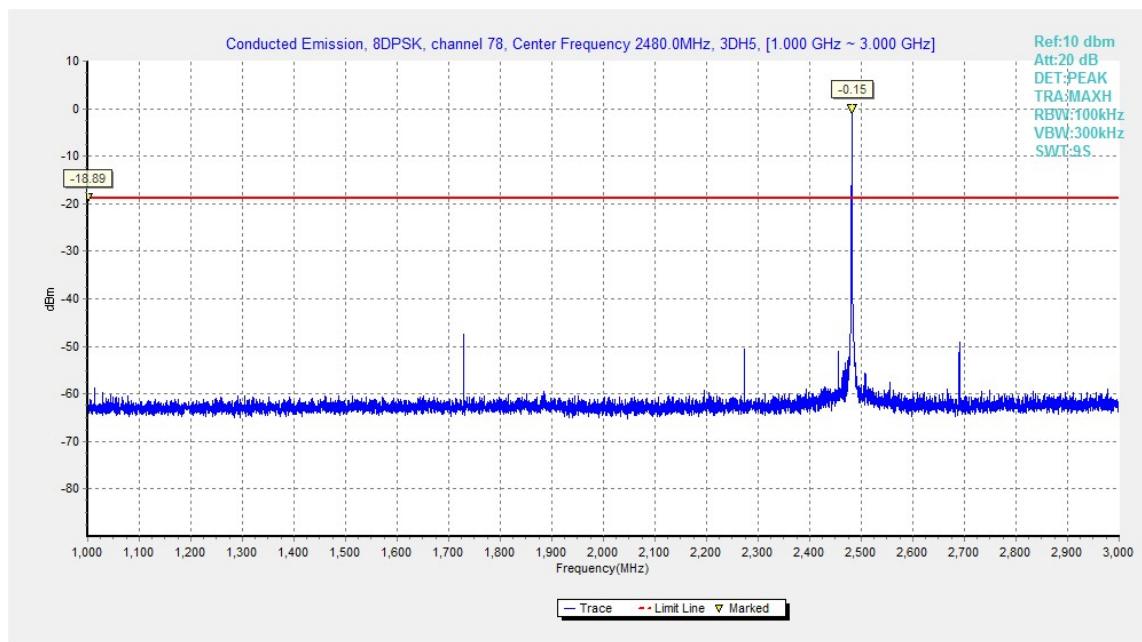


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

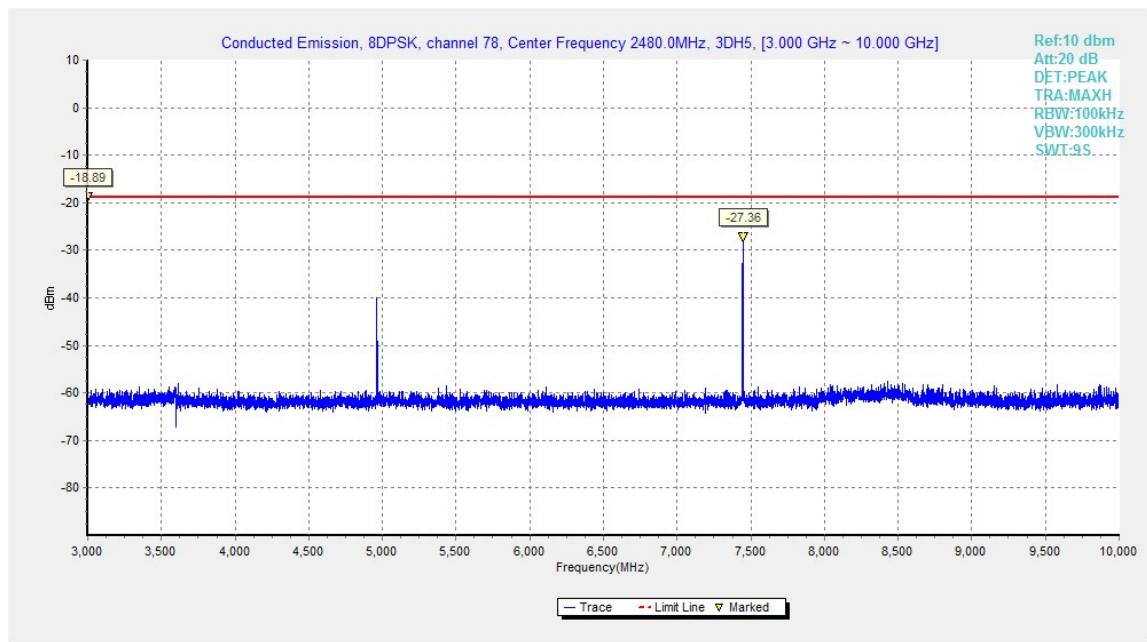


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

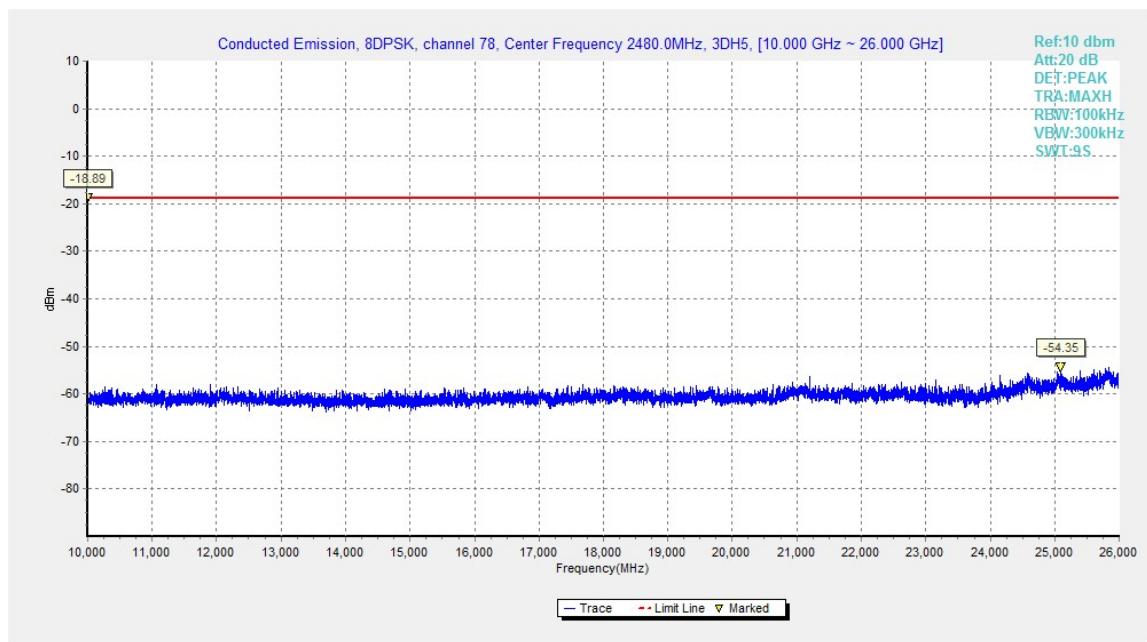


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

## 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:

$$\text{Result} = P_{\text{Mea}} + \text{ARPL}$$

### 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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**Form/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)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2389.835	41.9	-38.8	27.7	53.0	H
17997.188	50.2	-17.7	45.6	22.3	H
18000.000	50.0	-45.6	44.5	51.1	V
17986.406	50.0	-17.7	45.6	22.1	H
17993.438	50.0	-17.7	45.6	22.1	H
17997.656	49.9	-17.7	45.6	22.0	H

**GFSK Ch 39 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17994.375	50.0	-17.7	45.6	22.100	H
17997.656	49.9	-17.7	45.6	22.000	H

17996.719	49.9	-17.7	45.6	22.000	V
17998.594	49.9	-17.7	45.6	22.000	H
17993.438	49.9	-17.7	45.6	22.000	H
17996.250	49.9	-17.7	45.6	22.000	H

**GFSK Ch 78 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2483.620	38.3	-38.9	27.7	49.5	H
17997.188	50.1	-17.7	45.6	22.2	H
17984.063	50.0	-17.7	45.6	22.1	V
17990.156	50.0	-17.7	45.6	22.1	H
17988.281	49.9	-17.7	45.6	22.0	H
17993.906	49.9	-17.7	45.6	22.0	H

 **$\pi/4$  DQPSK Ch 0 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2386.415	32.8	-38.8	27.7	43.9	H
17997.1875	50.2	-17.7	45.6	22.3	H
18000	50	-45.6	44.5	51.1	V
17986.40625	50	-17.7	45.6	22.1	H
17993.4375	50	-17.7	45.6	22.1	H
17997.65625	49.9	-17.7	45.6	22	H

 **$\pi/4$  DQPSK Ch 39 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17994.375	50.0	-17.7	45.6	22.1	H
17997.656	49.9	-17.7	45.6	22.0	H
17996.719	49.9	-17.7	45.6	22.0	V
17998.594	49.9	-17.7	45.6	22.0	H
17993.438	49.9	-17.7	45.6	22.0	H
17996.250	49.9	-17.7	45.6	22.0	H

 **$\pi/4$  DQPSK Ch 78 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2483.250	35.5	-38.9	27.7	46.7	H
17997.188	50.1	-17.7	45.6	22.2	H
17984.063	50.0	-17.7	45.6	22.1	V

17990.156	50.0	-17.7	45.6	22.1	H
17988.281	49.9	-17.7	45.6	22.0	H
17993.906	49.9	-17.7	45.6	22.0	H

**8DPSK Ch 0 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2389.780	32.7	-38.8	27.7	43.8	H
17990.625	50.0	-17.7	45.6	22.1	H
17982.188	50.0	-17.7	45.6	22.1	V
17988.750	49.9	-17.7	45.6	22.0	H
17988.281	49.9	-17.7	45.6	22.0	H
17998.594	49.9	-17.7	45.6	22.0	H

**8DPSK Ch 39 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17994.375	50.0	-17.7	45.6	22.1	H
17997.656	49.9	-17.7	45.6	22.0	H
17996.719	49.9	-17.7	45.6	22.0	V
17998.594	49.9	-17.7	45.6	22.0	H
17993.438	49.9	-17.7	45.6	22.0	H
17996.250	49.9	-17.7	45.6	22.0	H

**8DPSK Ch 78 - Average**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2484.030	36.3	-38.9	27.7	47.5	H
17997.188	50.1	-17.7	45.6	22.2	H
17984.063	50.0	-17.7	45.6	22.1	V
17990.156	50.0	-17.7	45.6	22.1	H
17988.281	49.9	-17.7	45.6	22.0	H
17993.906	49.9	-17.7	45.6	22.0	H

**GFSK Ch 0 – Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2389.815	61.9	-38.8	27.7	73.0	H
17984.063	61.9	-17.7	45.6	34.0	H
17997.188	60.9	-17.7	45.6	33.0	V
17990.625	60.8	-17.7	45.6	32.9	H

17981.250	60.8	-17.7	45.6	32.9	H
17999.063	60.7	-17.7	45.6	32.8	H

**GFSK Ch 39 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17998.594	60.5	-17.7	45.6	32.6	H
17992.031	60.5	-17.7	45.6	32.6	H
17991.563	60.4	-17.7	45.6	32.5	V
17997.656	60.3	-17.7	45.6	32.4	H
17967.656	60.3	-17.7	45.6	32.4	H
17984.531	60.1	-17.7	45.6	32.2	H

**GFSK Ch 78 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2483.620	73.6	-38.9	27.7	84.800	H
17988.750	60.9	-17.7	45.6	33.000	H
17988.281	60.8	-17.7	45.6	32.900	V
17990.625	60.6	-17.7	45.6	32.700	H
17983.125	60.6	-17.7	45.6	32.700	H
17994.375	60.5	-17.7	45.6	32.600	H

 **$\pi/4$  DQPSK Ch 0 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
2388.945	60.2	-38.8	27.7	71.3	H
17984.063	61.9	-17.7	45.6	34.0	H
17997.188	60.9	-17.7	45.6	33.0	V
17990.625	60.8	-17.7	45.6	32.9	H
17981.250	60.8	-17.7	45.6	32.9	H
17999.063	60.7	-17.7	45.6	32.8	H

 **$\pi/4$  DQPSK Ch 39 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Antenna Pol. (H/V)
17998.594	60.5	-17.7	45.6	32.6	H
17992.031	60.5	-17.7	45.6	32.6	H
17991.563	60.4	-17.7	45.6	32.5	V
17997.656	60.3	-17.7	45.6	32.4	H
17967.656	60.3	-17.7	45.6	32.4	H

17984.531	60.1	-17.7	45.6	32.2	H
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**π/4 DQPSK Ch 78 - Peak**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
2483.680	70.3	-38.9	27.7	81.5	H
17988.750	60.9	-17.7	45.6	33.0	H
17988.281	60.8	-17.7	45.6	32.9	V
17990.625	60.6	-17.7	45.6	32.7	H
17983.125	60.6	-17.7	45.6	32.7	H
17994.375	60.5	-17.7	45.6	32.6	H

**8DPSK Ch 0 - Peak**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
2389.835	51.2	-38.8	27.7	62.3	H
17992.969	61.4	-17.7	45.6	33.5	H
17993.438	61.2	-17.7	45.6	33.3	V
17998.125	61.1	-17.7	45.6	33.2	H
17996.250	60.8	-17.7	45.6	32.9	H
17988.750	60.8	-17.7	45.6	32.9	H

**8DPSK Ch 39 - Peak**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
17998.594	60.5	-17.7	45.6	32.6	H
17992.031	60.5	-17.7	45.6	32.6	H
17991.563	60.4	-17.7	45.6	32.5	V
17997.656	60.3	-17.7	45.6	32.4	H
17967.656	60.3	-17.7	45.6	32.4	H
17984.531	60.1	-17.7	45.6	32.2	H

**8DPSK Ch 78 - Peak**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Antenna Pol. (H/V)
2483.875	64.4	-38.9	27.7	75.6	H
17988.750	60.9	-17.7	45.6	33.0	H
17988.281	60.8	-17.7	45.6	32.9	V
17990.625	60.6	-17.7	45.6	32.7	H
17983.125	60.6	-17.7	45.6	32.7	H
17994.375	60.5	-17.7	45.6	32.6	H

**Conclusion: PASS**  
**Test graphs as below:**

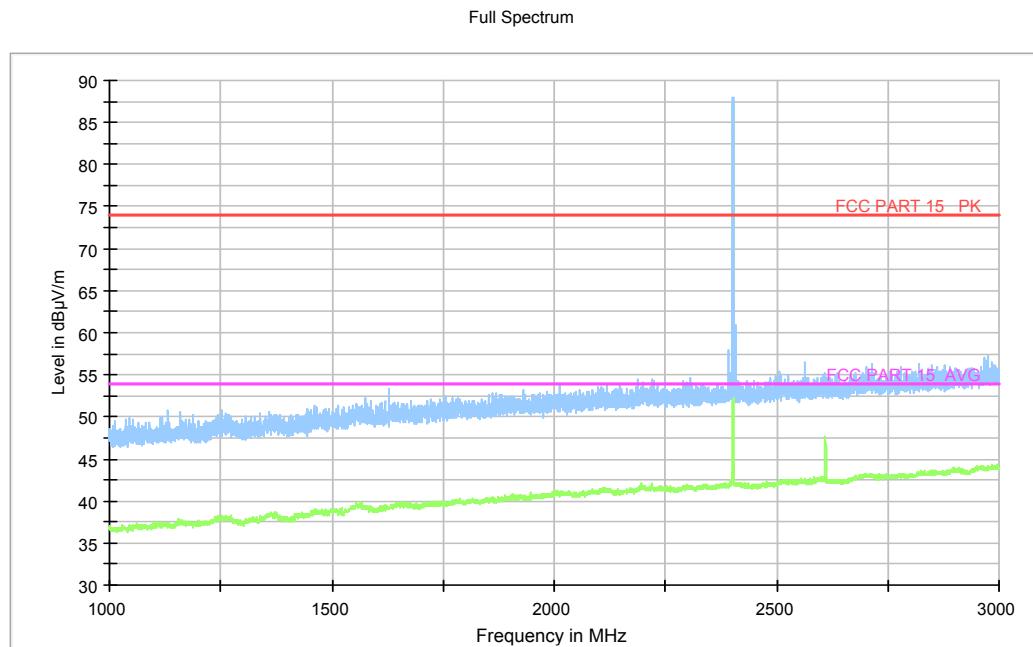


Fig.58. Radiated emission: GFSK, Channel 0, 1 GHz - 3 GHz

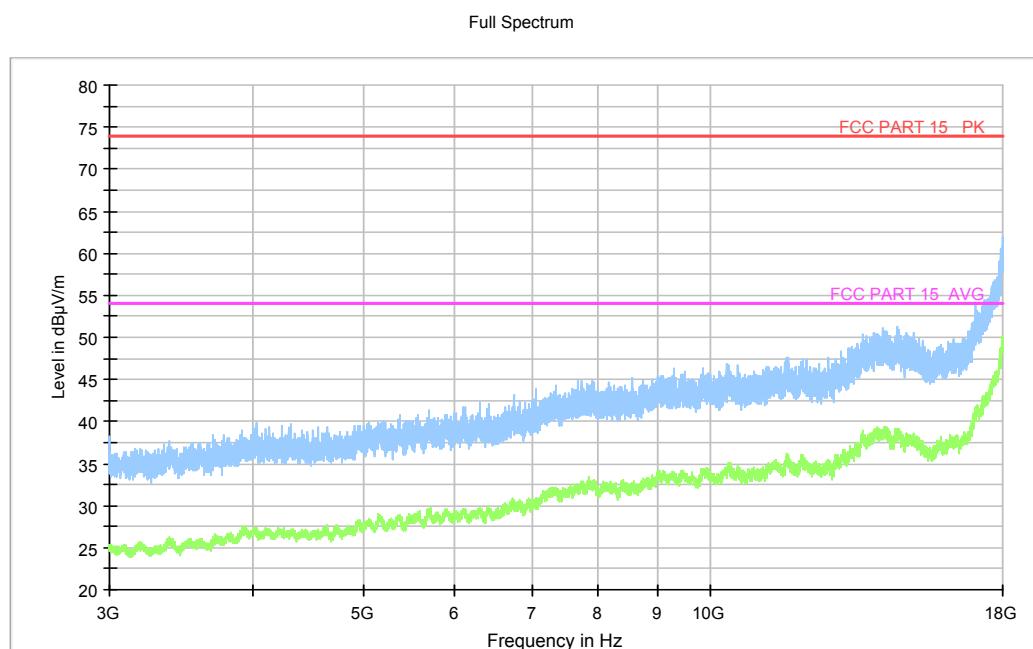


Fig.59. Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

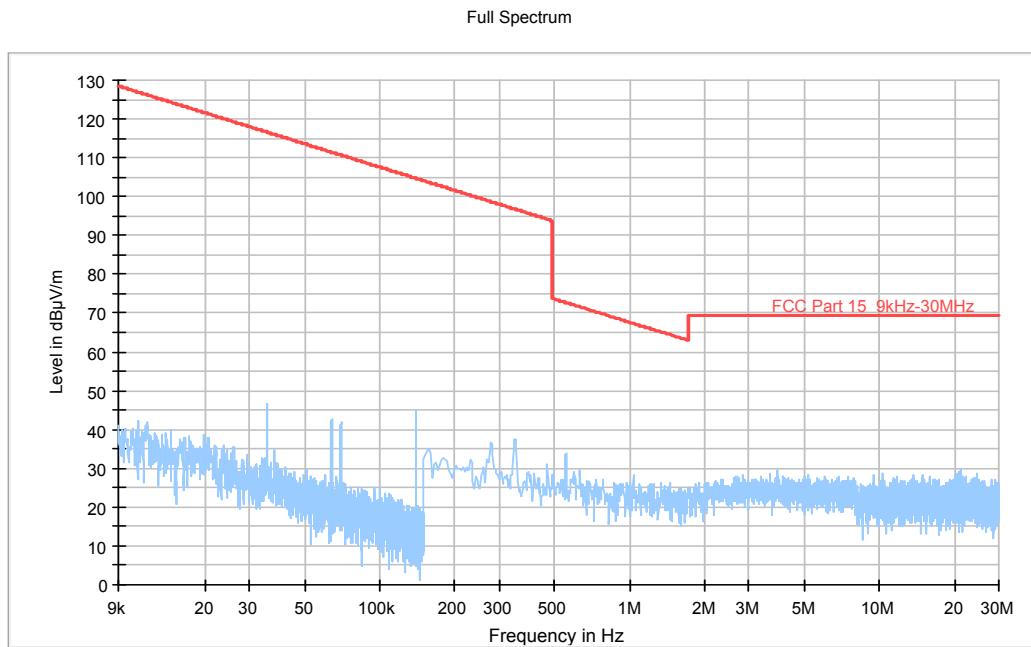


Fig.60. Radiated emission: GFSK, Channel 39, 9 kHz - 30 MHz

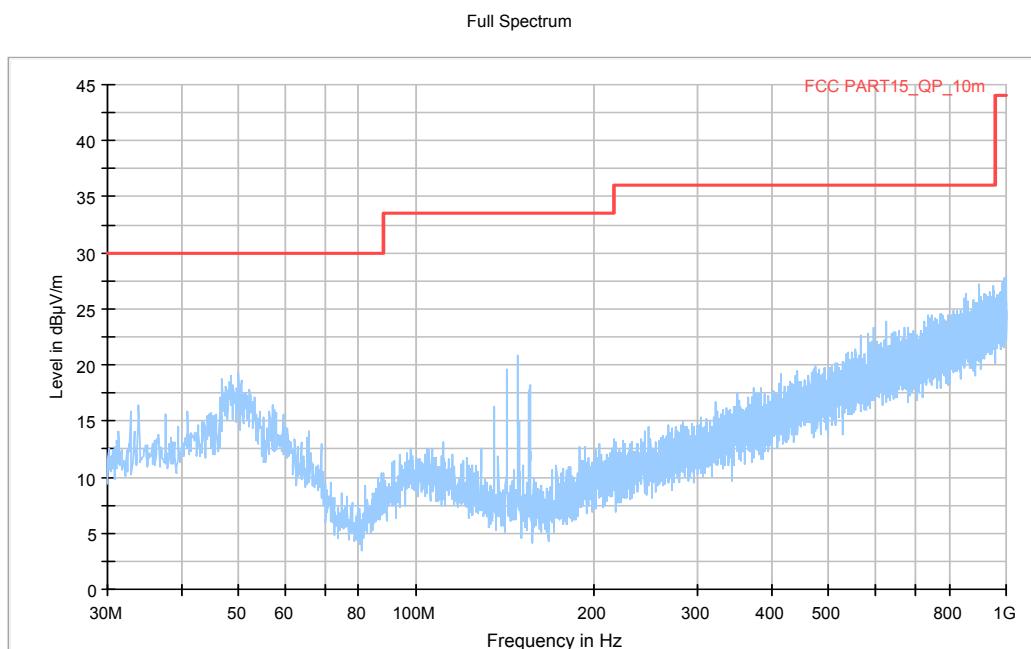


Fig.61. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

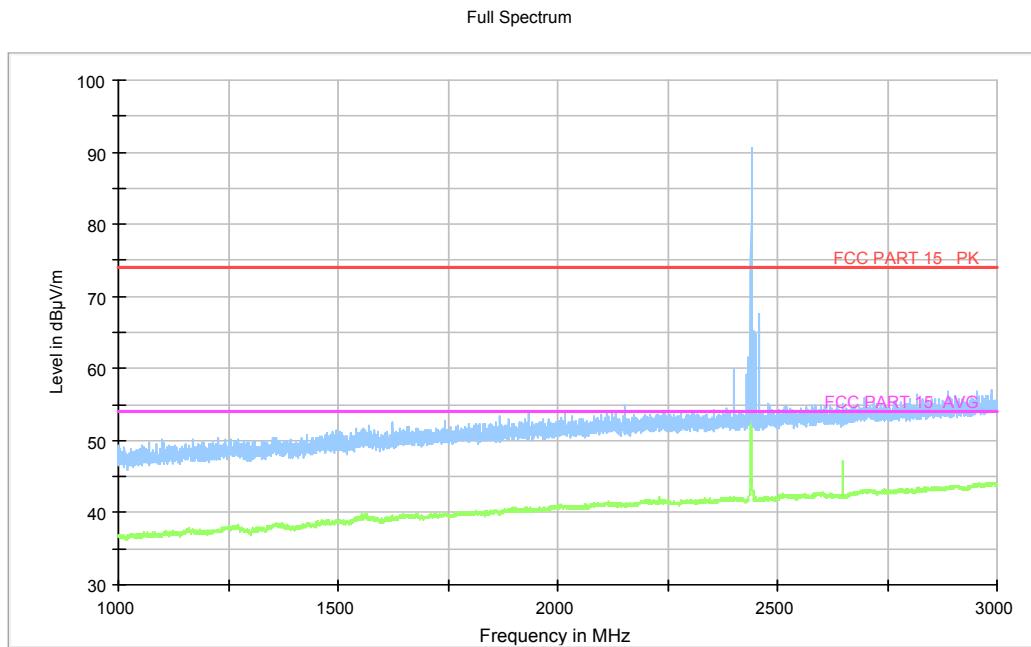


Fig.62. Radiated emission: GFSK, Channel 39, 1 GHz - 3 GHz

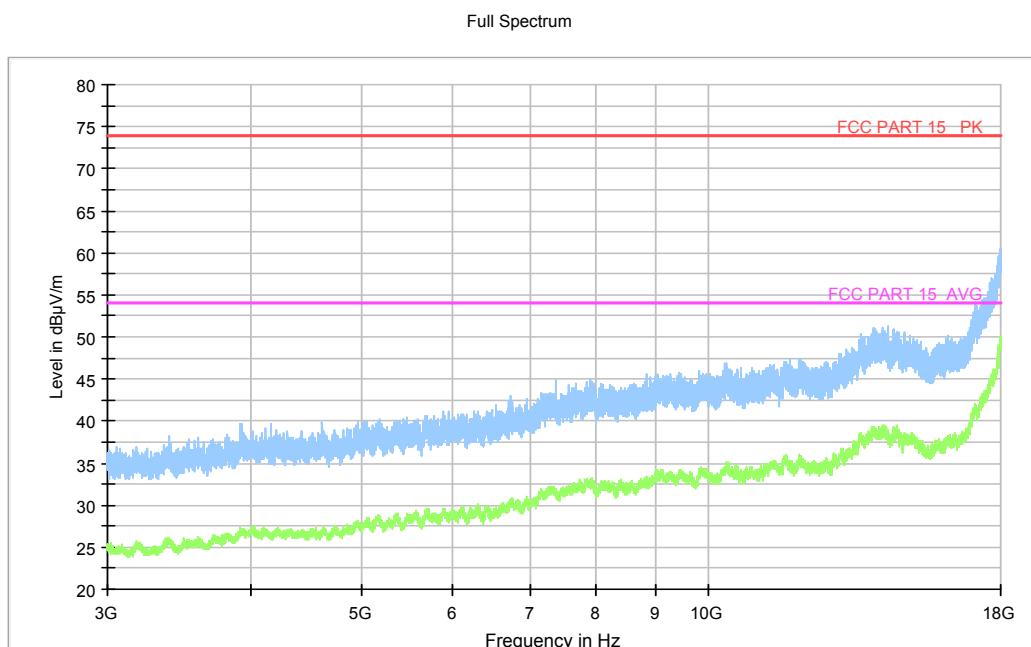


Fig.63. Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz

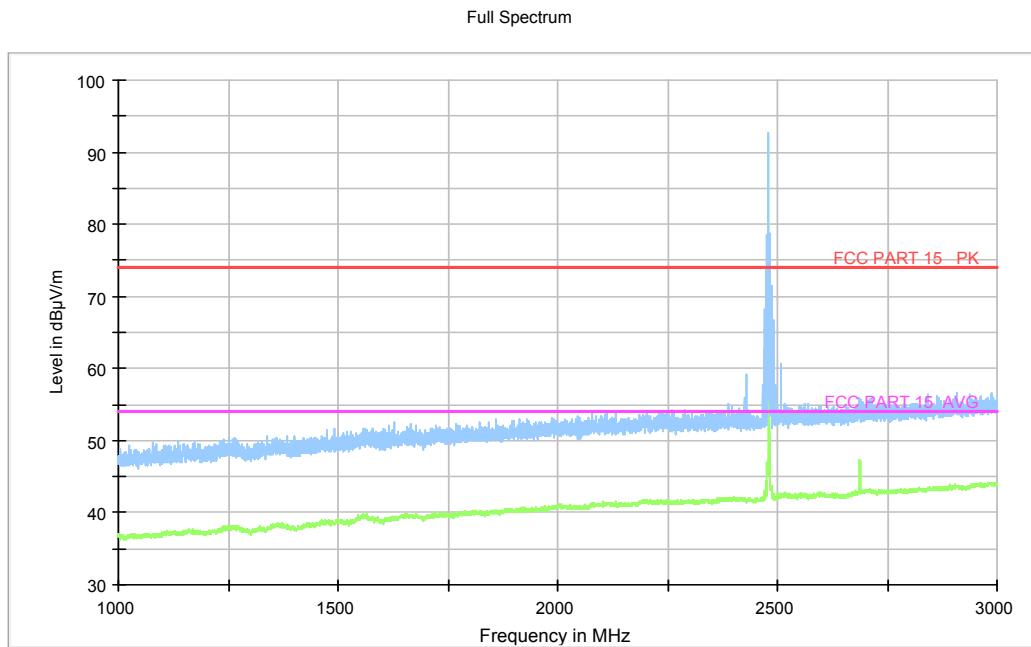


Fig.64. Radiated emission: GFSK, Channel 78, 1 GHz - 3 GHz

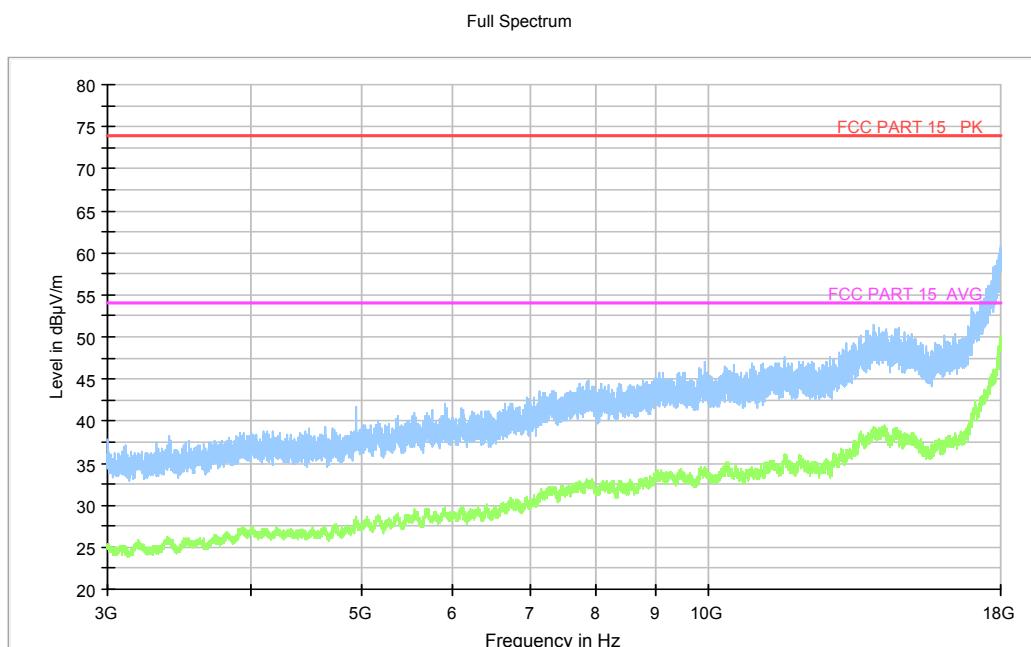


Fig.65. Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz

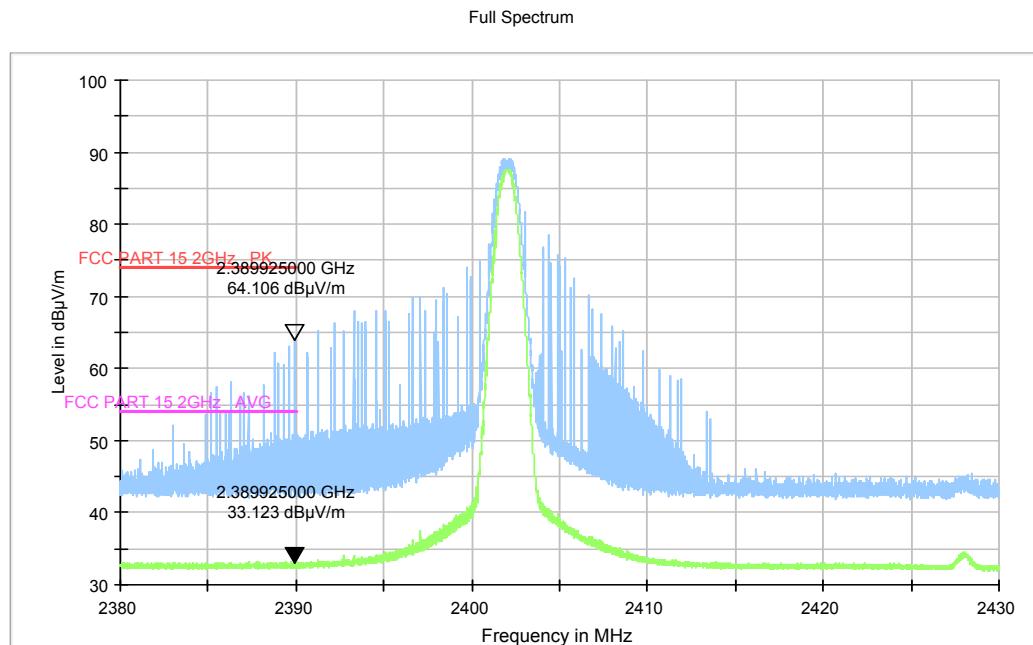


Fig.66. Radiated emission (Power): GFSK, low channel

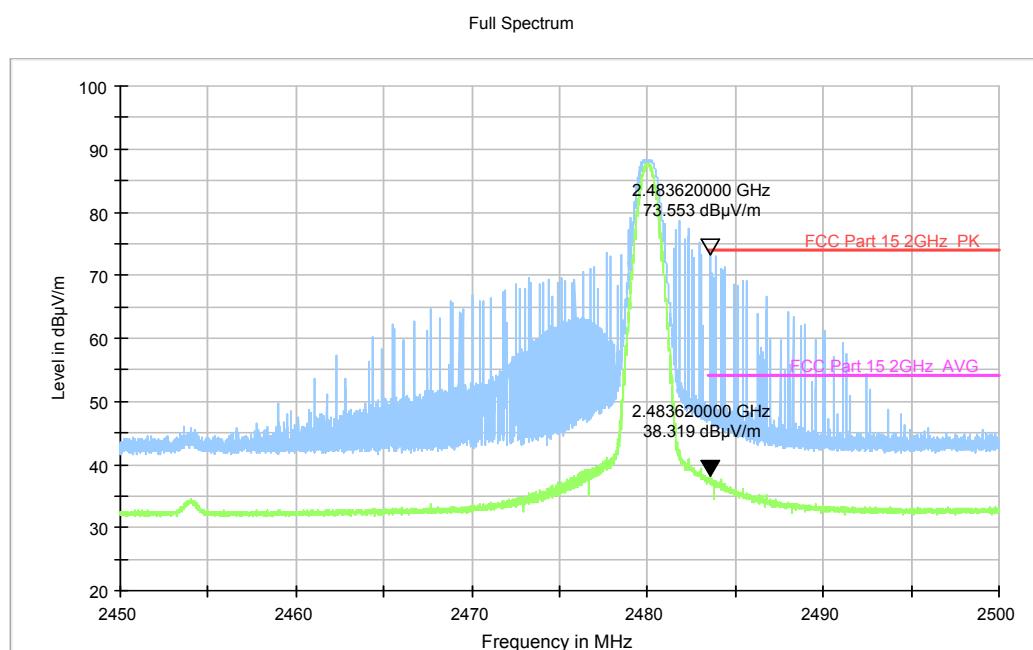


Fig.67. Radiated emission (Power) GFSK, high channel

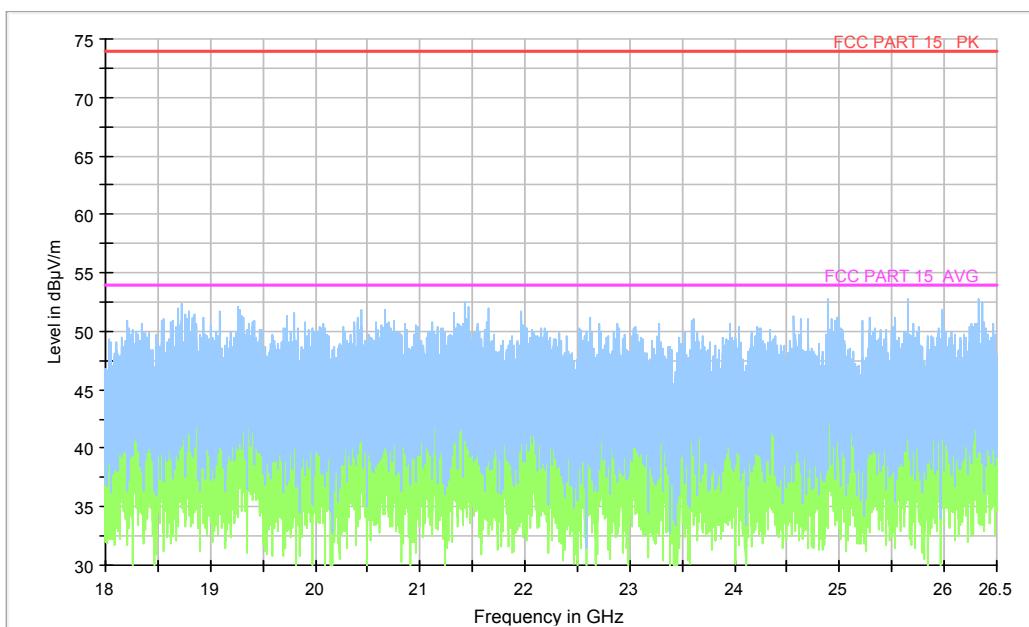


Fig.68. Radiated emission: GFSK, 18 GHz - 26 GHz

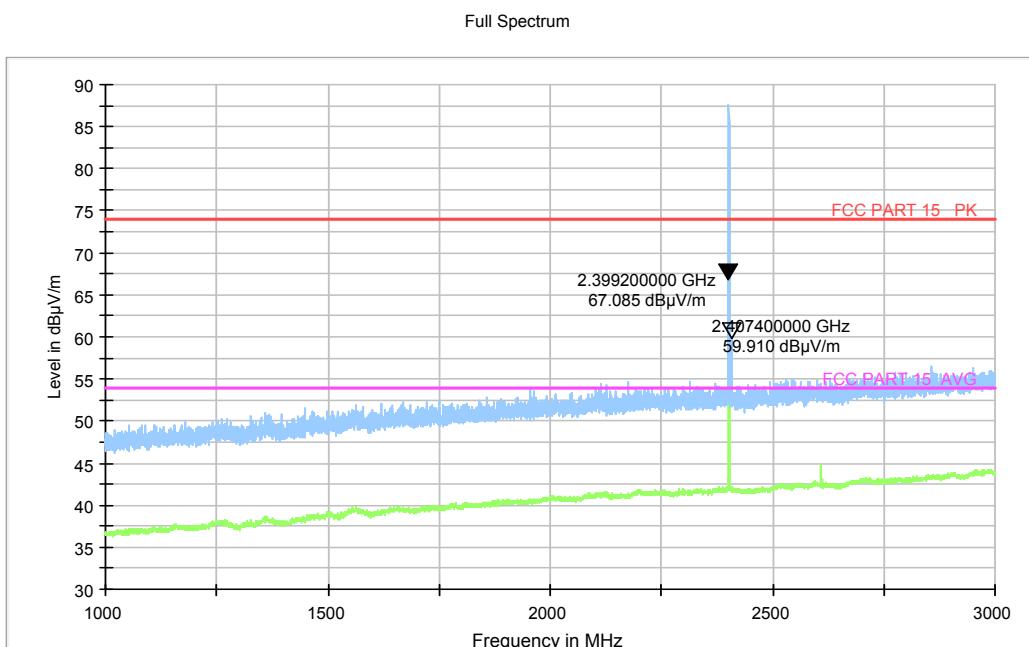


Fig.69. Radiated emission:  $\pi/4$  DQPSK, Channel 0, 1 GHz - 3 GHz

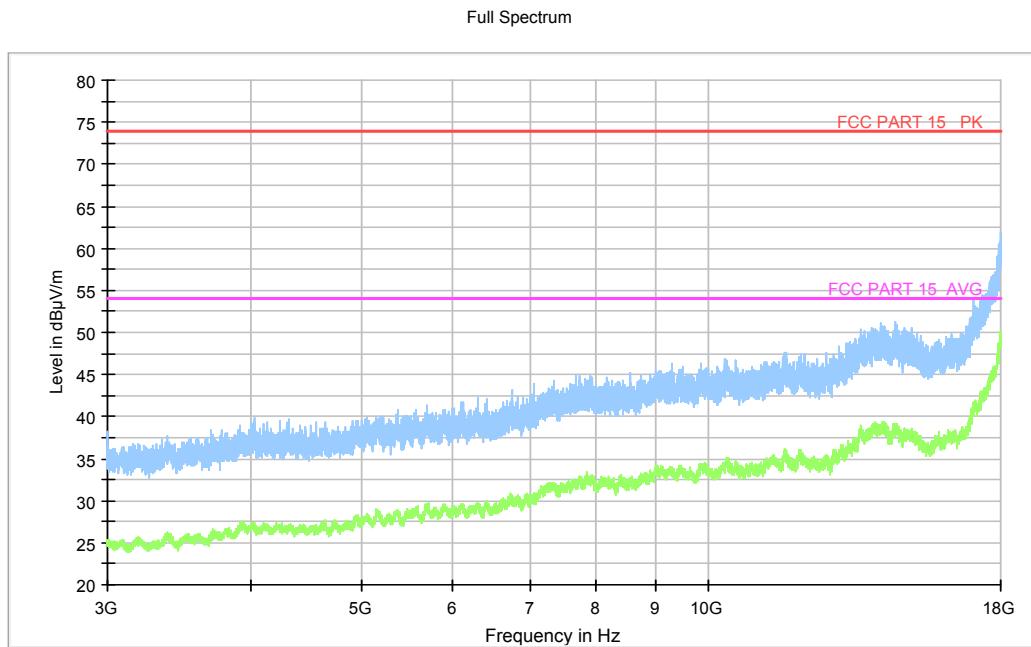


Fig.70. Radiated emission:  $\pi/4$  DQPSK, Channel 0, 3 GHz - 18 GHz

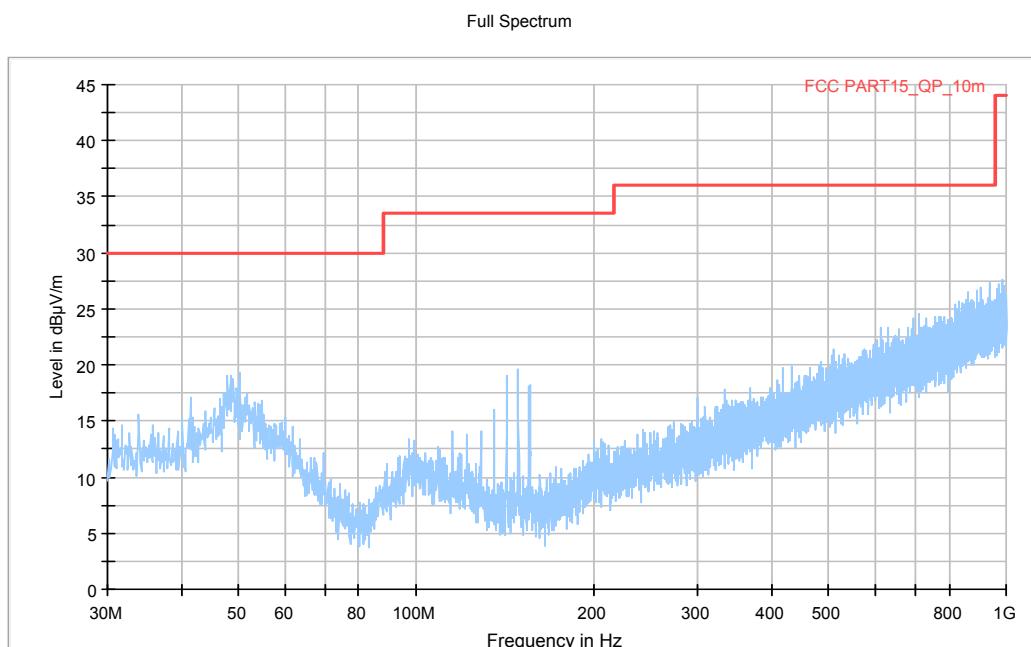


Fig.71. Radiated emission:  $\pi/4$  DQPSK, Channel 39, 30 MHz - 1 GHz

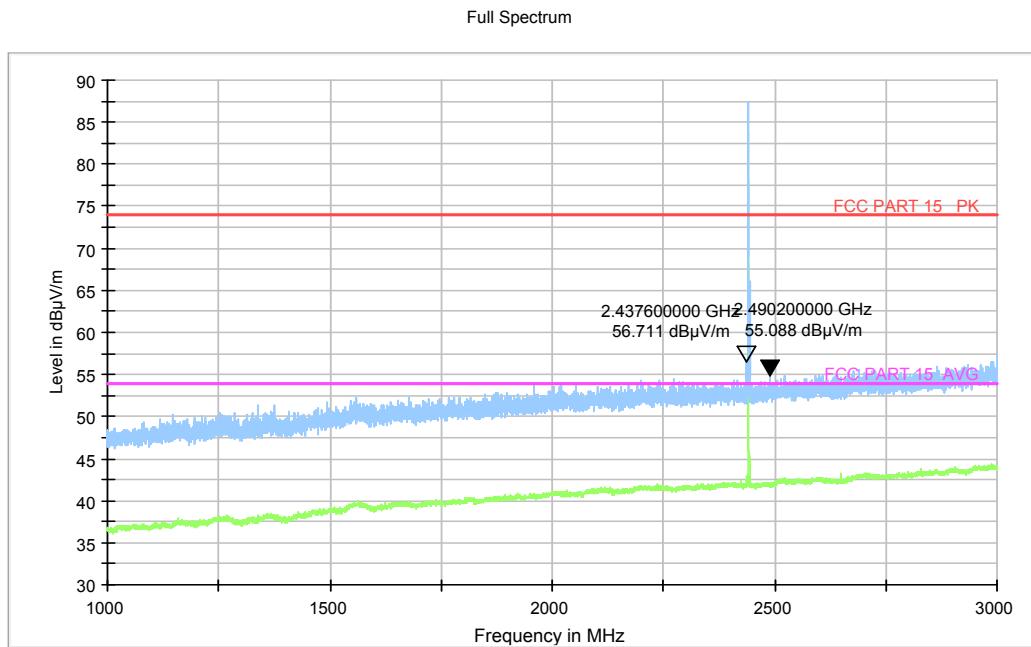


Fig.72. Radiated emission:  $\pi/4$  DQPSK, Channel 39, 1 GHz - 3 GHz

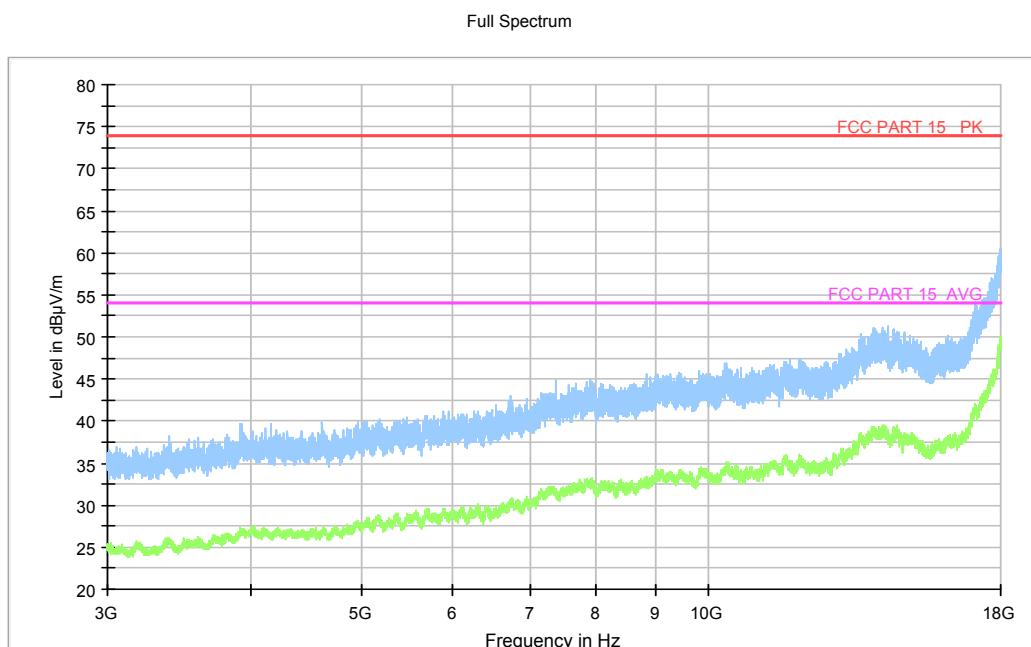


Fig.73. Radiated emission:  $\pi/4$  DQPSK, Channel 39, 3 GHz - 18 GHz

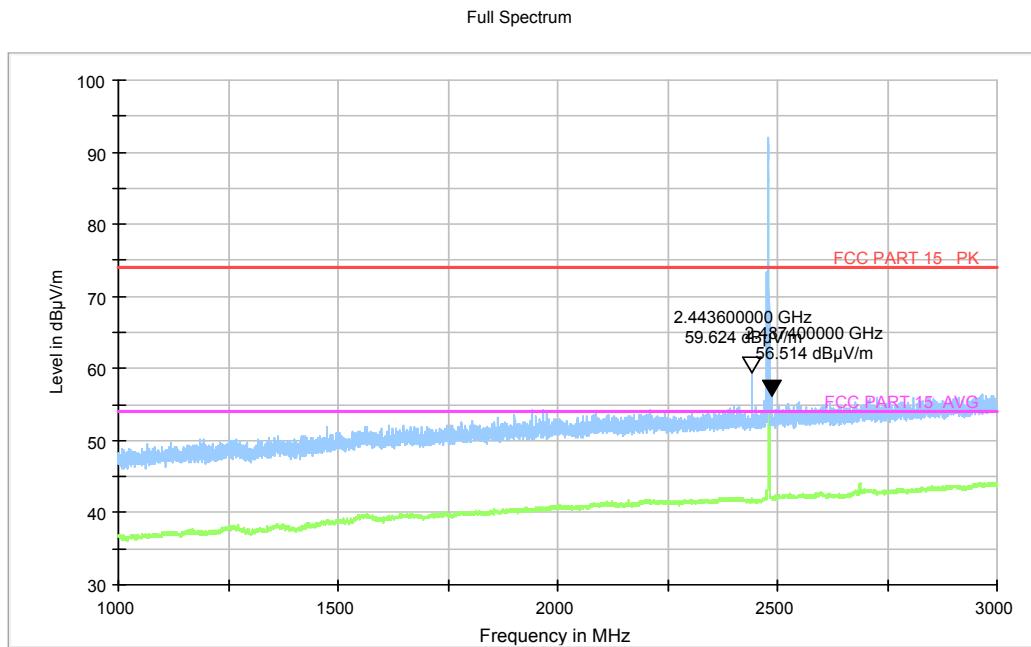


Fig.74. Radiated emission:  $\pi/4$  DQPSK, Channel 78, 1 GHz - 3 GHz

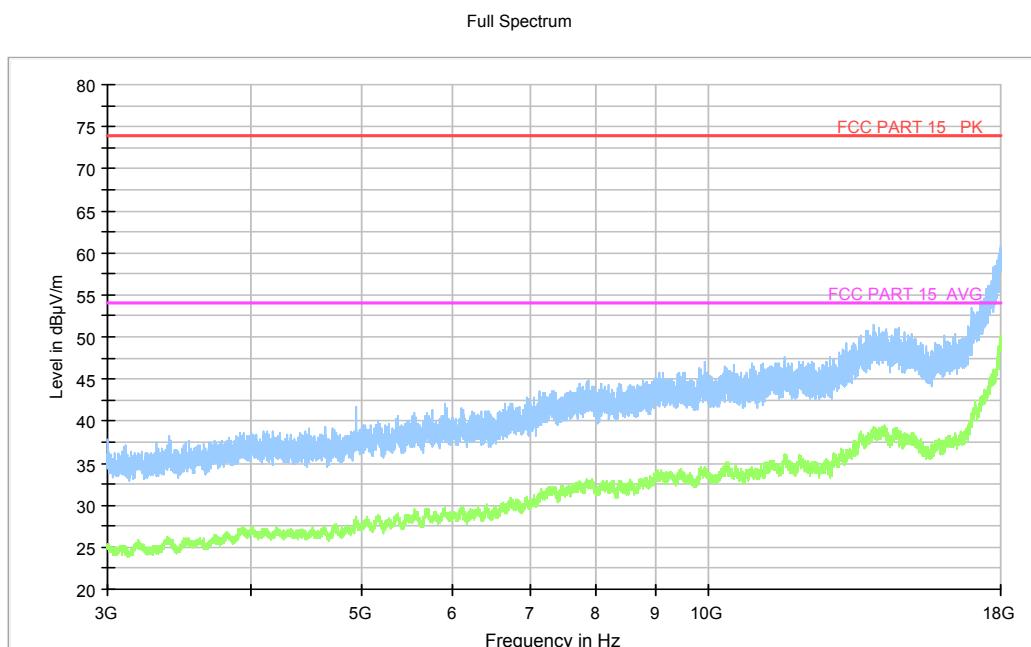


Fig.75. Radiated emission:  $\pi/4$  DQPSK, Channel 78, 3 GHz - 18 GHz

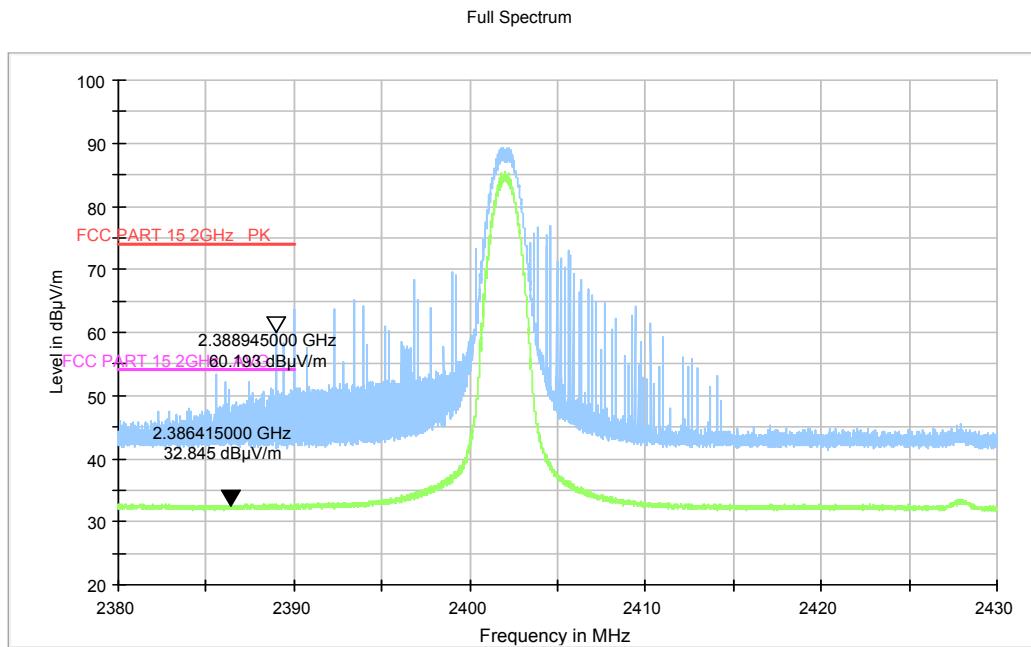


Fig.76. Radiated emission (Power):  $\pi/4$  DQPSK, low channel

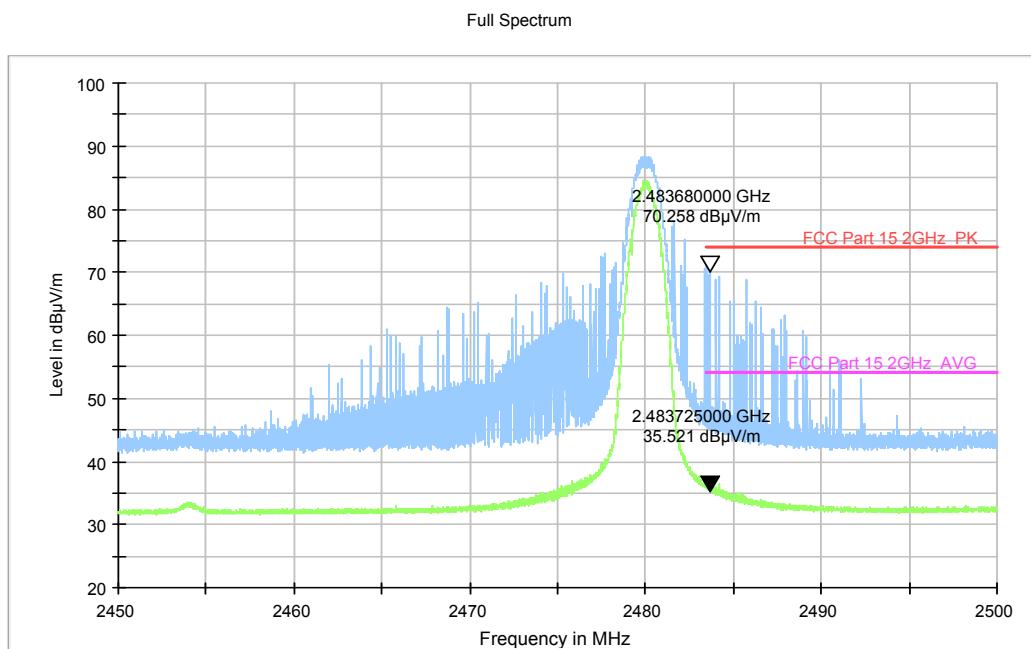


Fig.77. Radiated emission (Power):  $\pi/4$  DQPSK, high channel

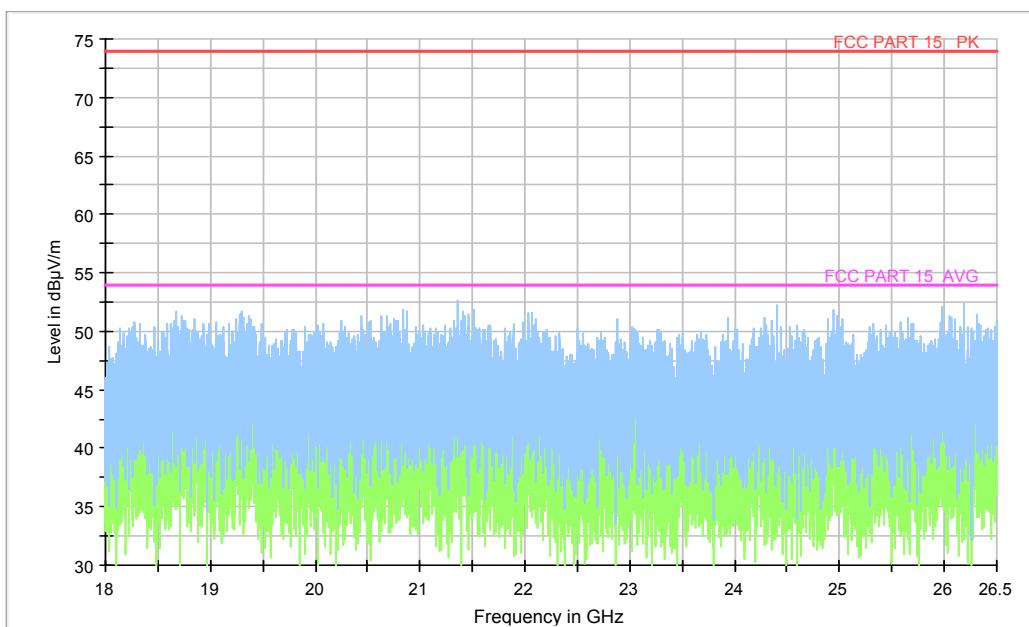
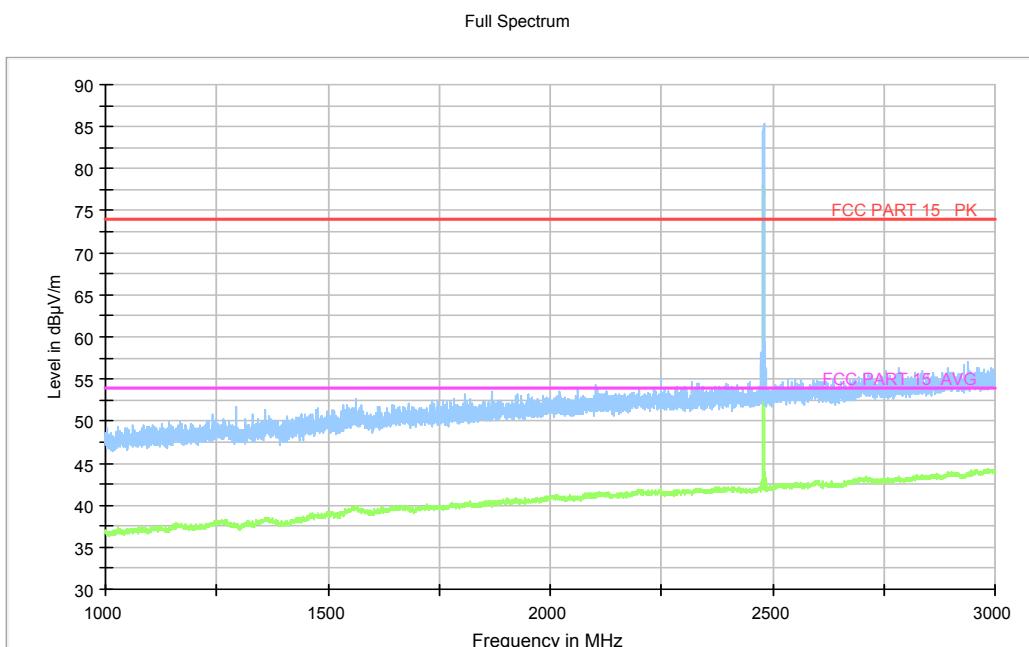
Fig.78. Radiated emission:  $\pi/4$  DQPSK, 18 GHz - 26 GHz

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

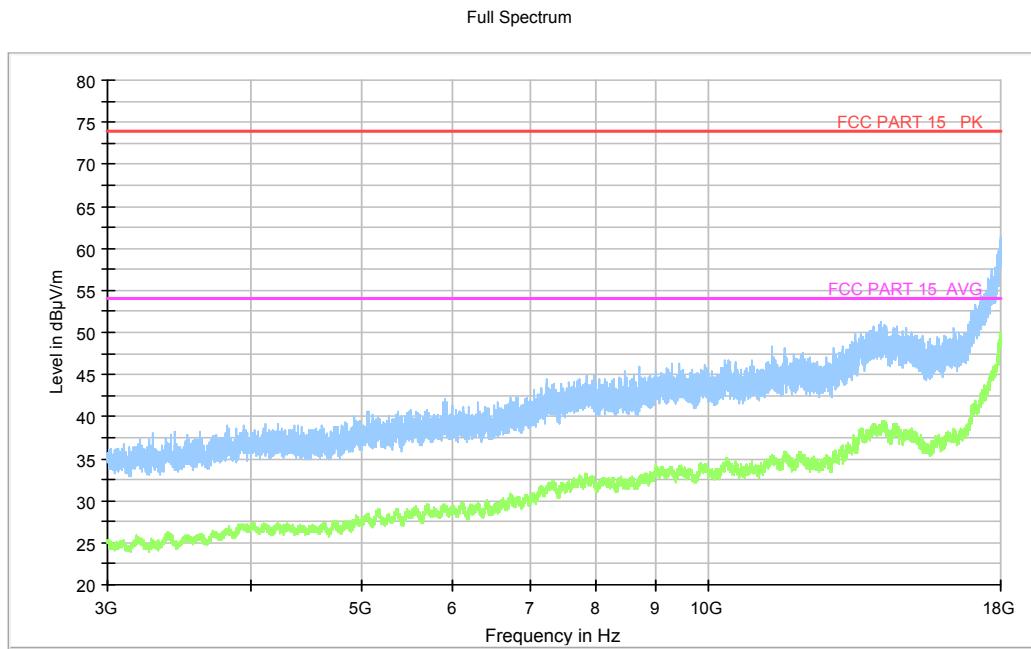


Fig.80. Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

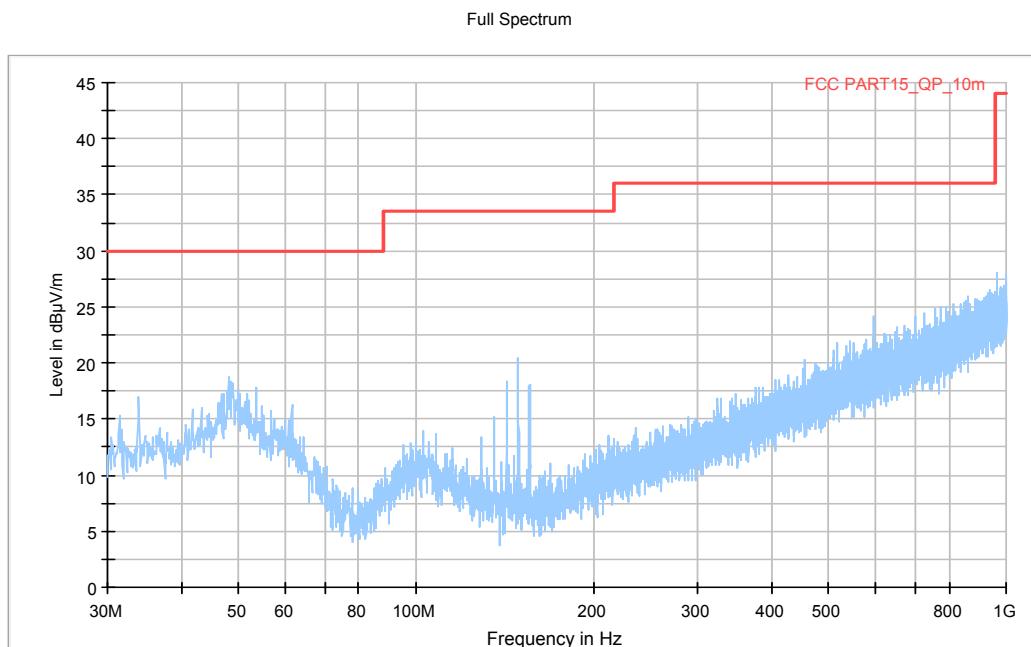


Fig.81. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

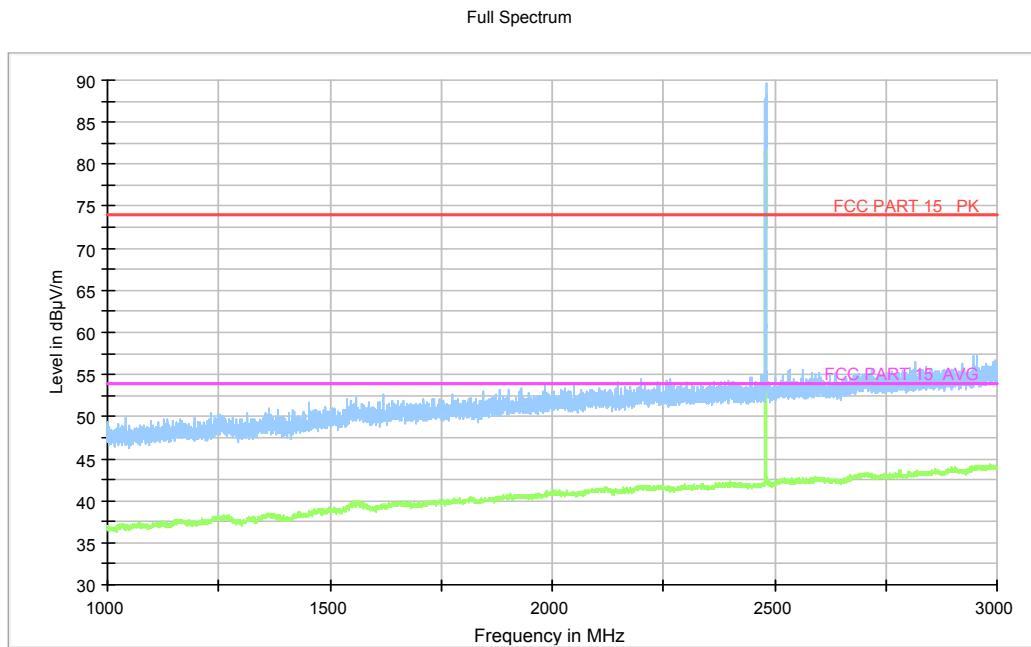


Fig.82. Radiated emission: 8DPSK, Channel 39, 1 GHz - 3 GHz

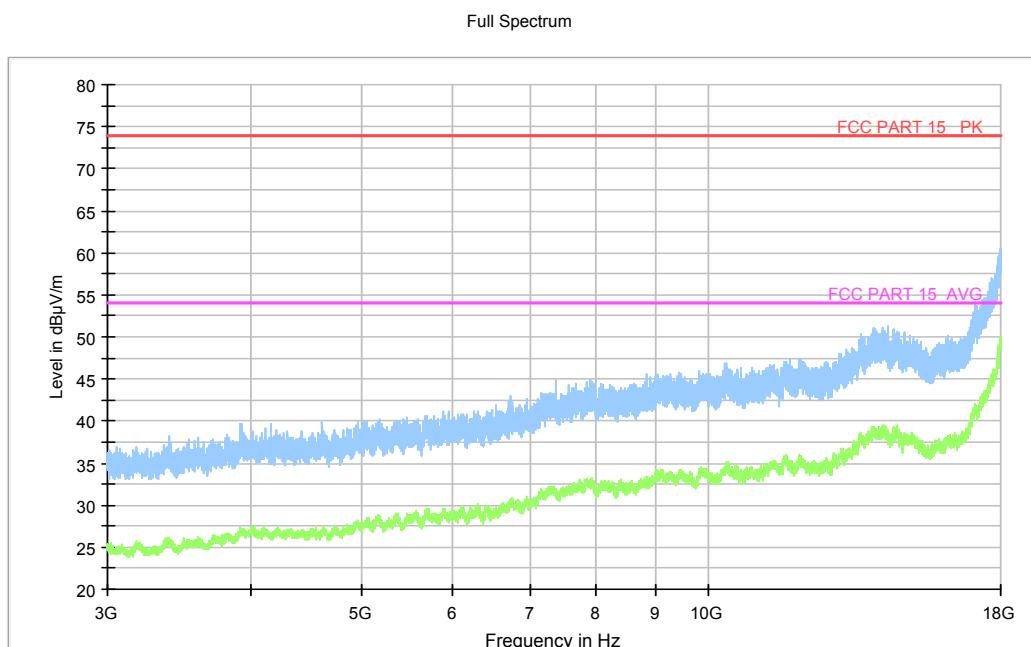


Fig.83. Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz

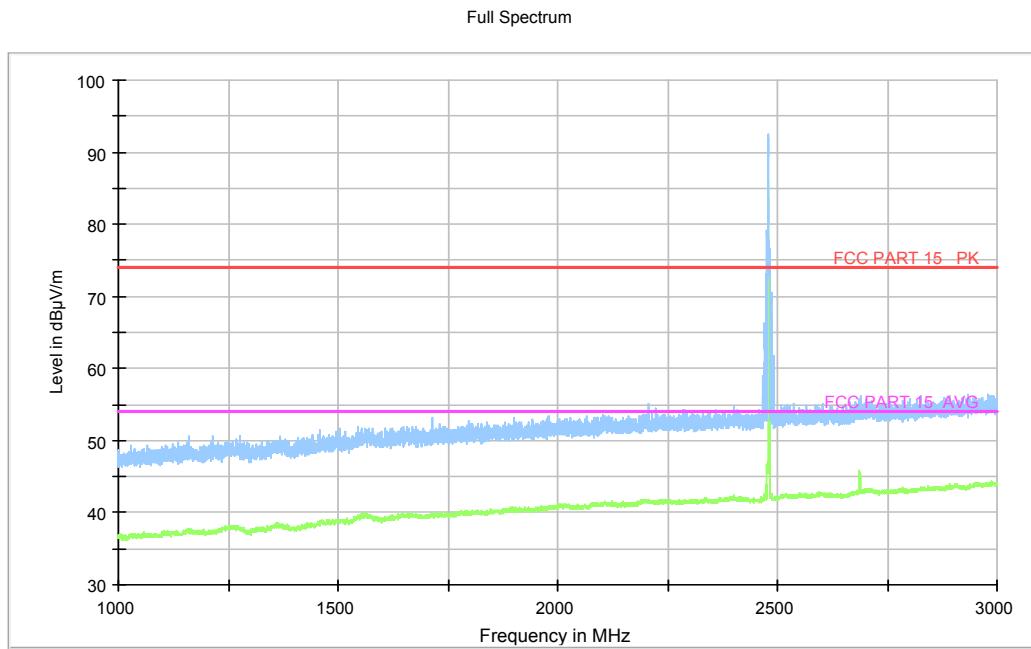


Fig.84. Radiated emission: 8DPSK, Channel 78, 1 GHz - 3 GHz

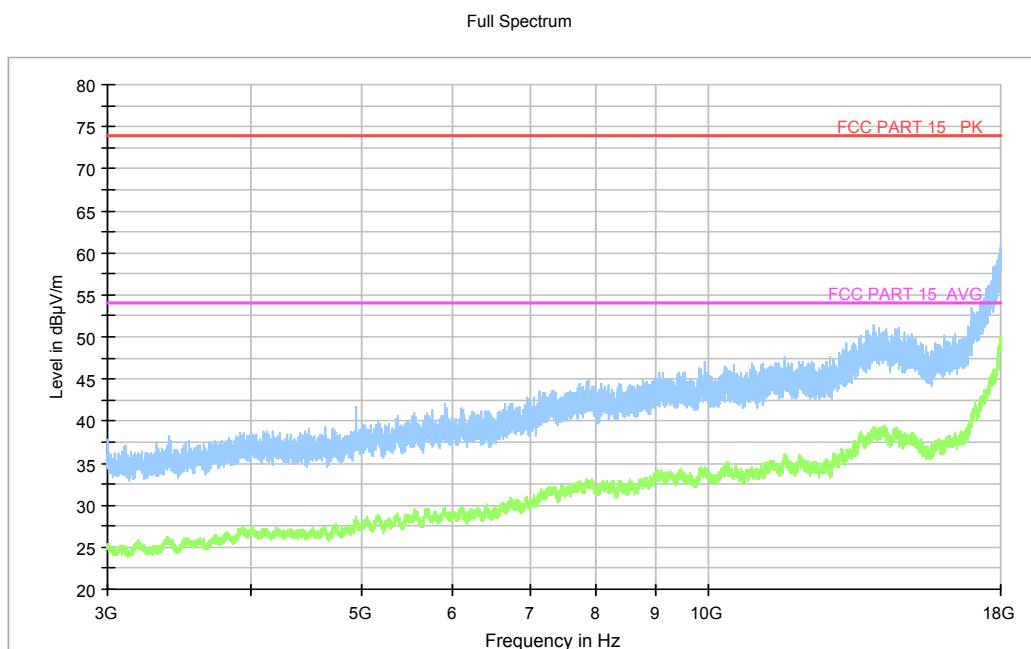


Fig.85. Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

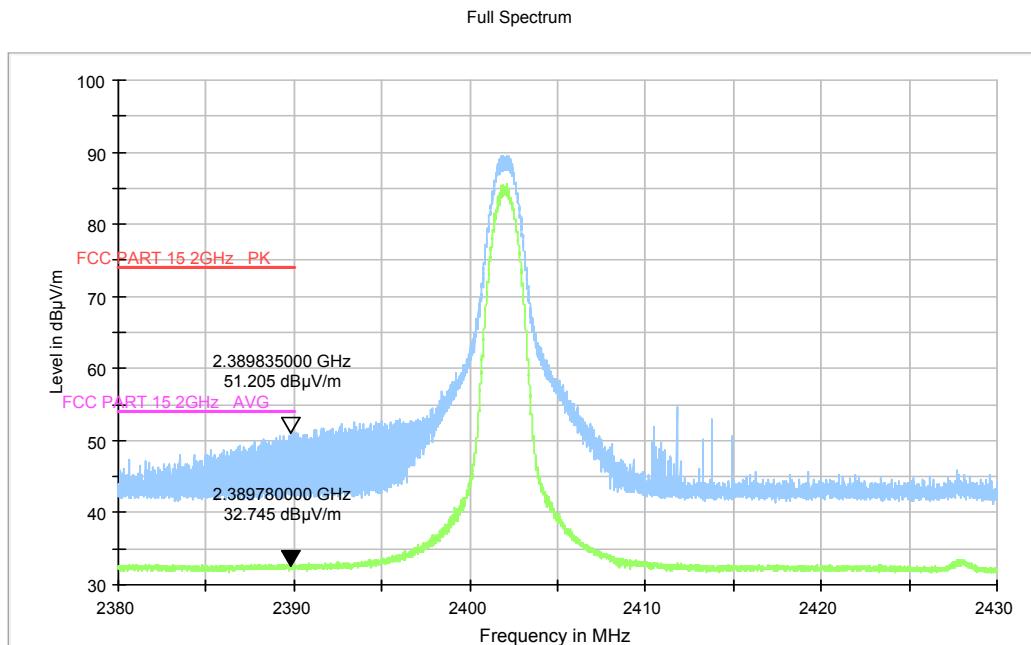


Fig.86. Radiated emission (Power): 8DPSK, low channel

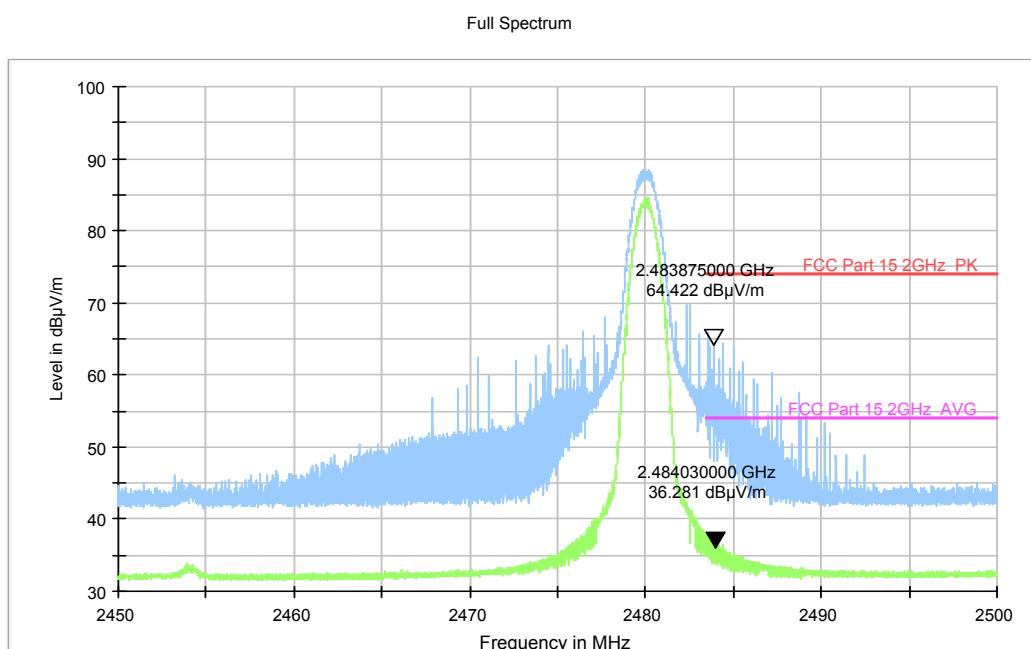


Fig.87. Radiated emission (Power): 8DPSK, high channel

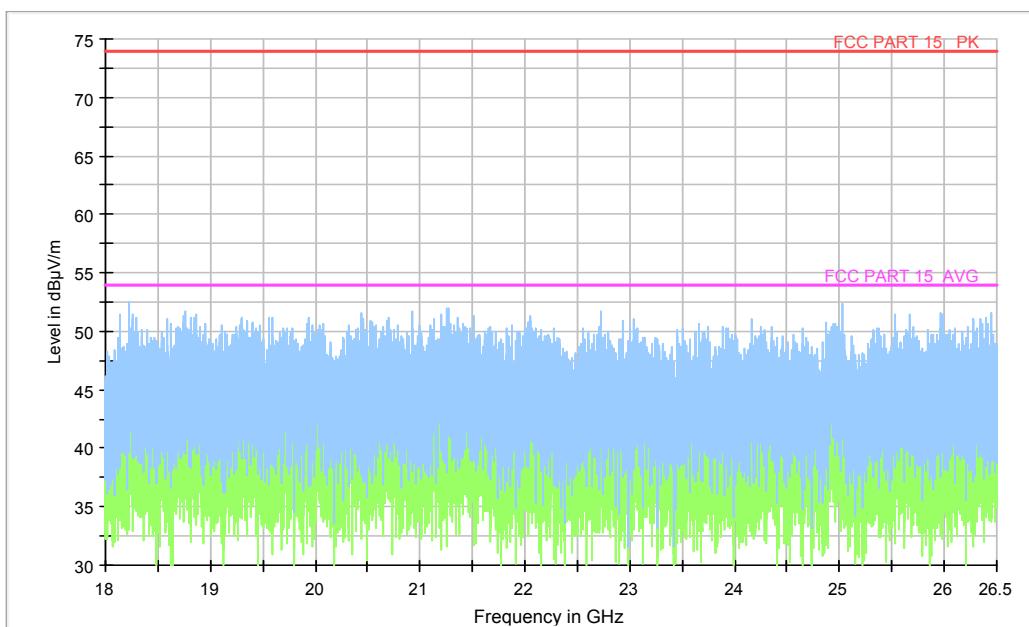


Fig.88. Radiated emission: 8DPSK, 18 GHz - 26 GHz

## 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	129.34
	DH3	Fig.90	162.46
	DH5	Fig.91	215.10

##### For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)	Conclusion
39	DH1	Fig.92	120.26
	DH3	Fig.93	198.97
	DH5	Fig.94	176.49

##### For 8DPSK

Channel	Packet	Dwell Time (ms)	Conclusion
39	DH1	Fig.95	118.96

	DH3	Fig.96	155.34	P
	DH5	Fig.97	195.42	P

**Conclusion: PASS**

**Test graphs as below:**

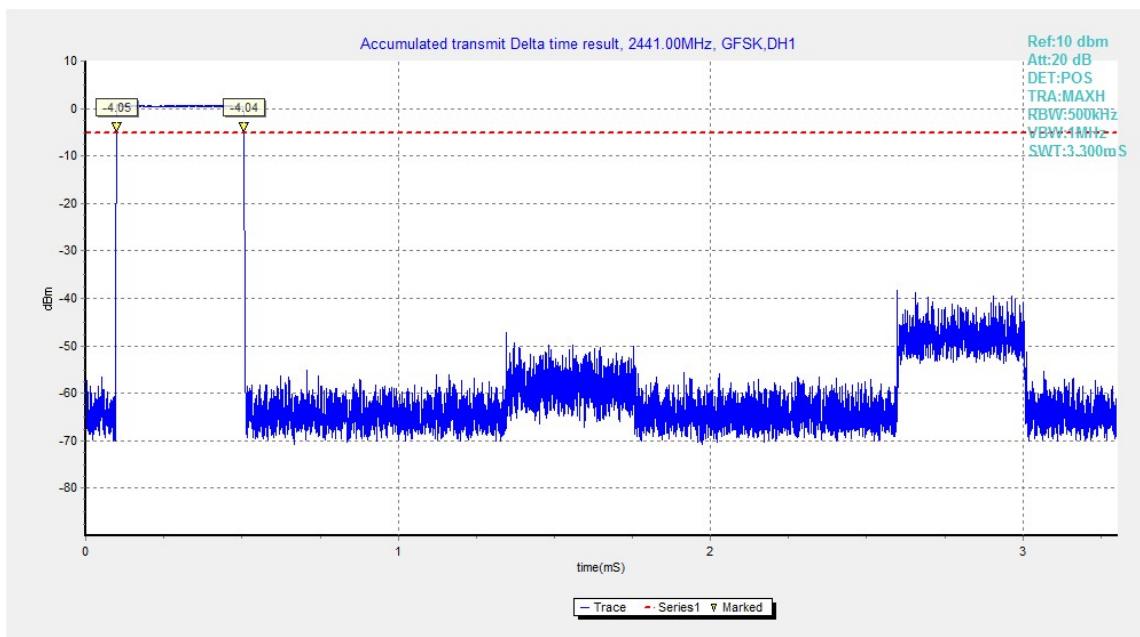
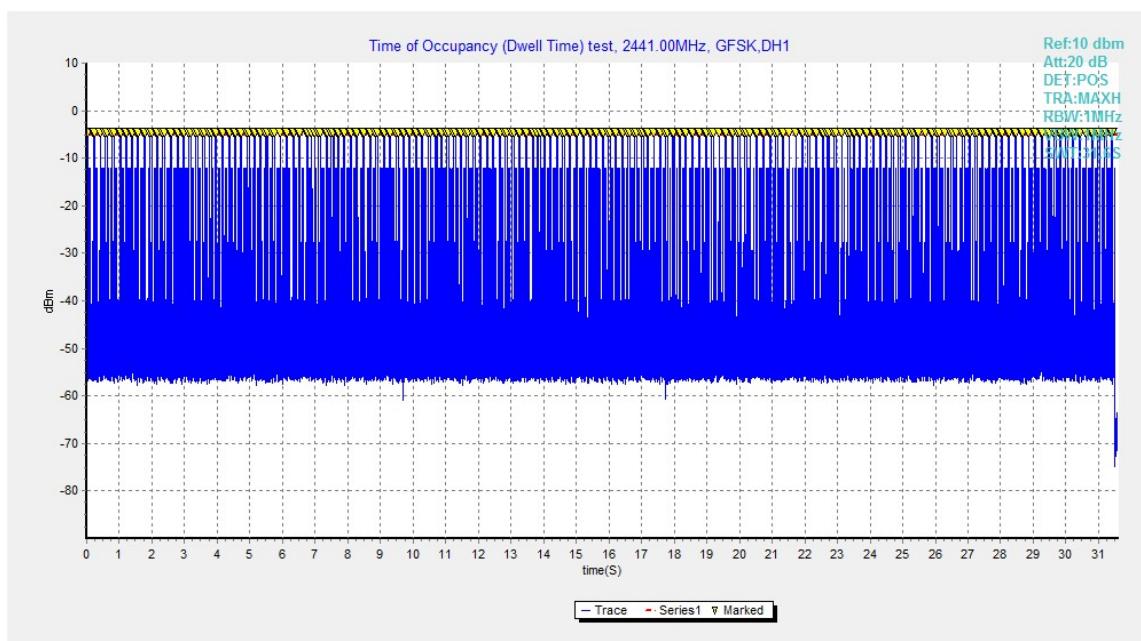


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet DH1



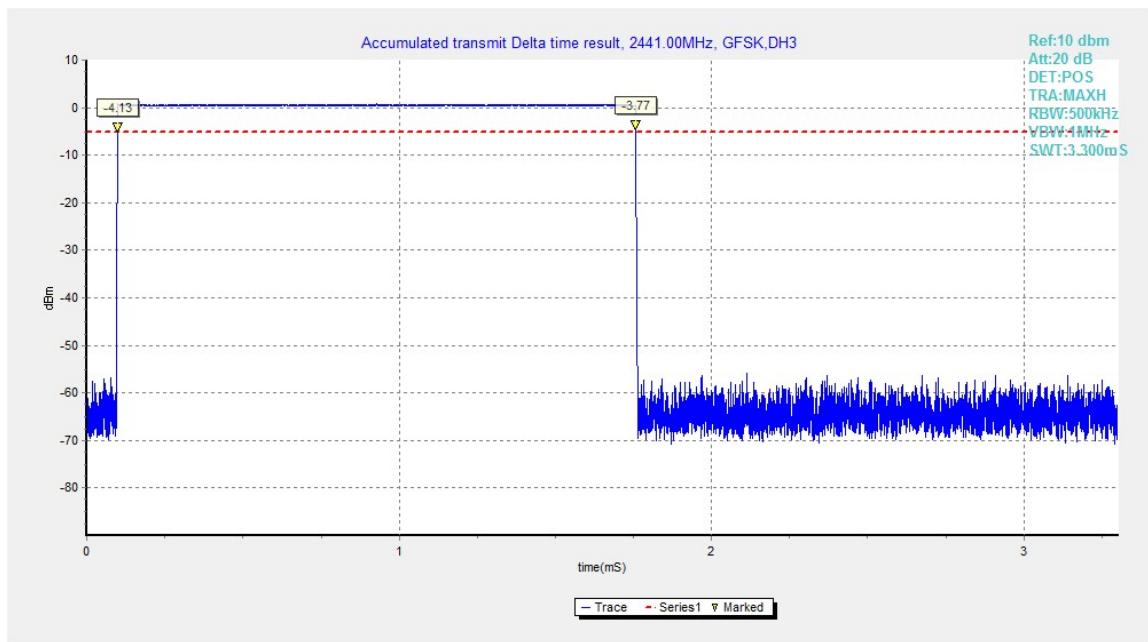
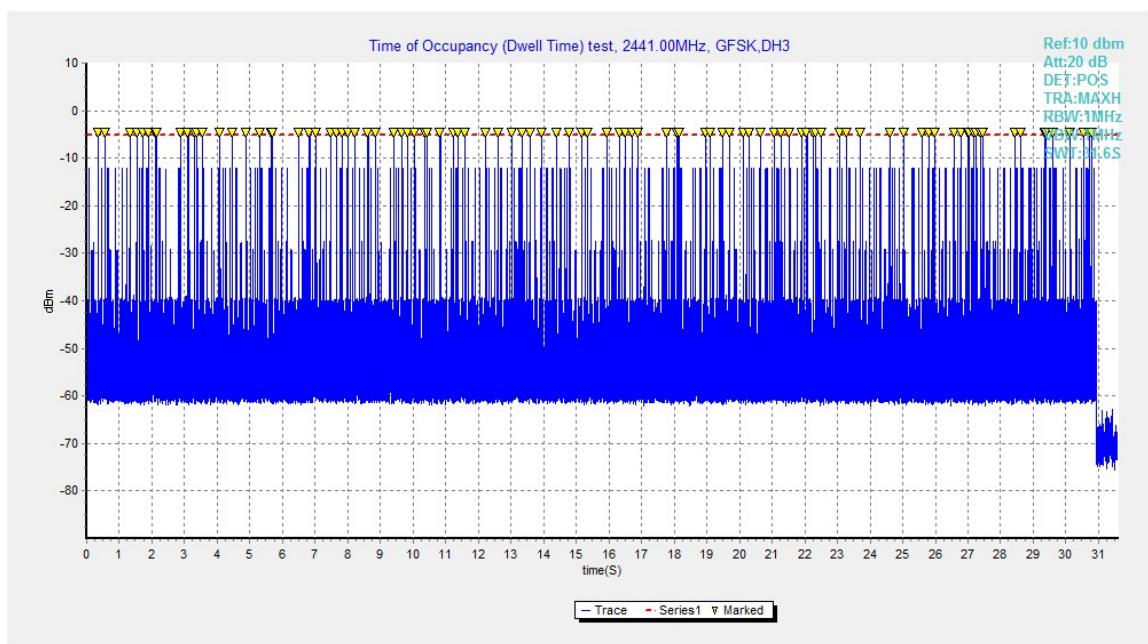


Fig.90. Time of occupancy (Dwell Time): Channel 39, Packet DH3



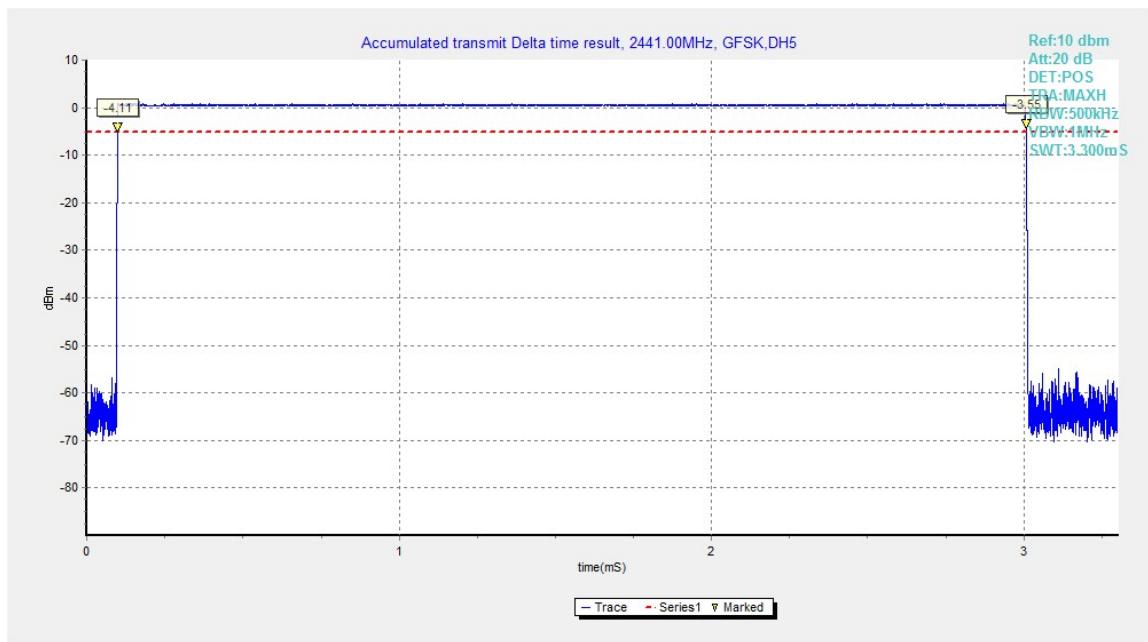


Fig.91. Time of occupancy (Dwell Time): Channel 39, Packet DH5

