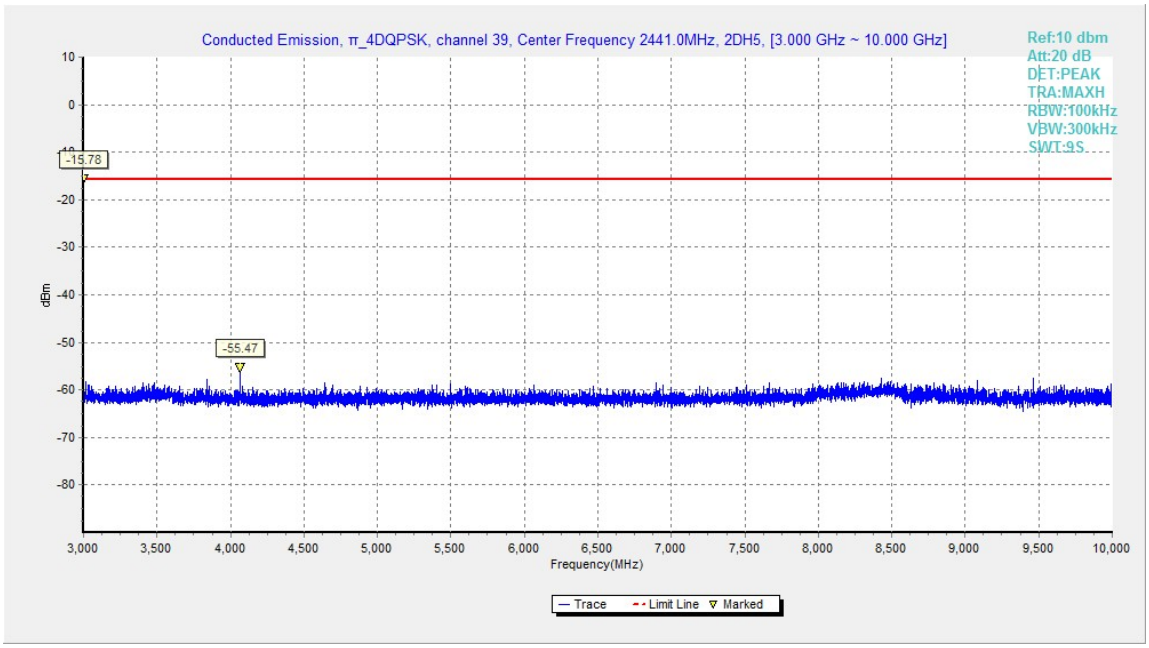

Fig.36. Conducted spurious emission: π/4 DQPSK, Channel 39, 3GHz - 10GHz

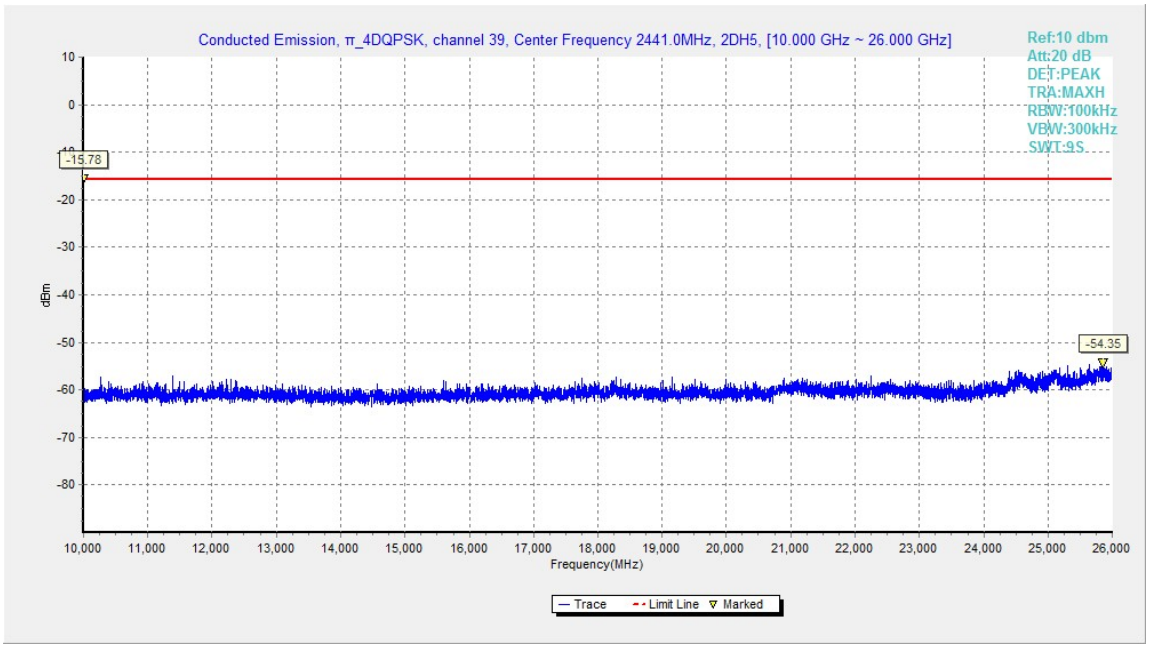

Fig.37. Conducted spurious emission: π/4 DQPSK, Channel 39, 10GHz – 26GHz

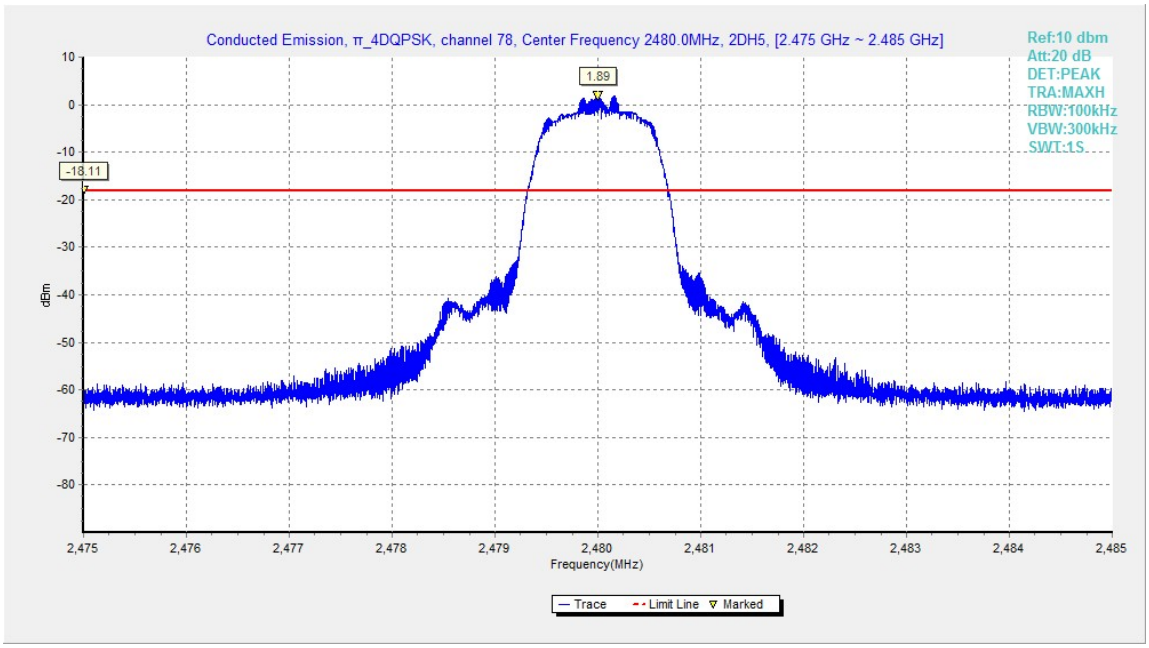

Fig.38. Conducted spurious emission: π/4 DQPSK, Channel 78, 2480MHz

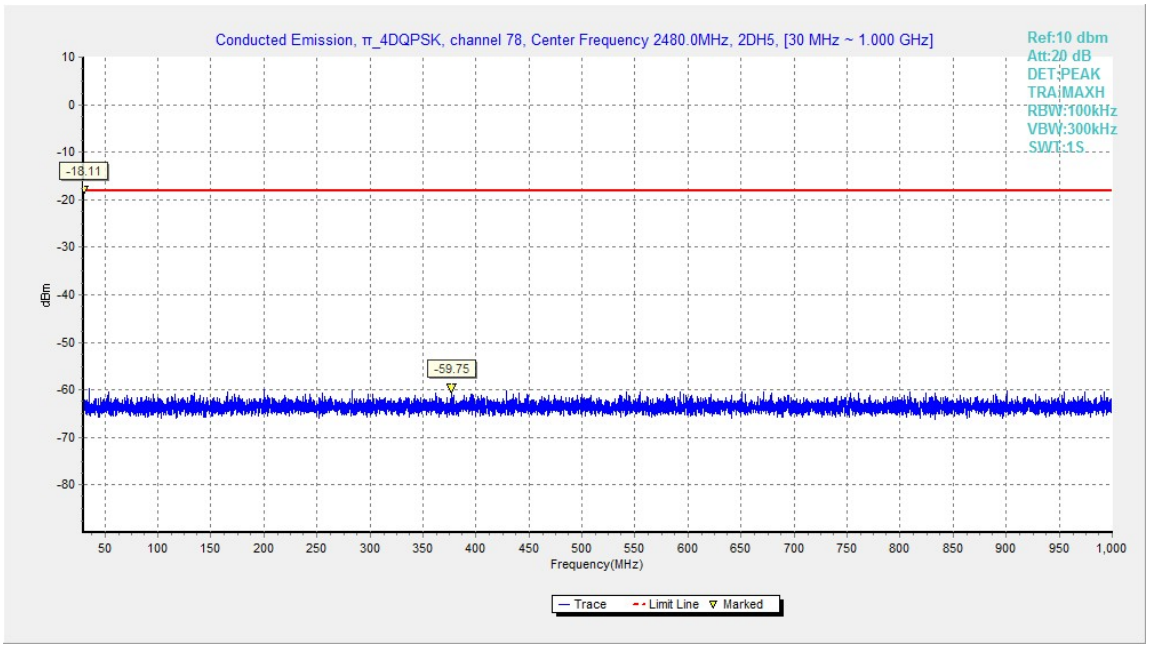

Fig.39. Conducted spurious emission: π/4 DQPSK, Channel 78, 30MHz - 1GHz

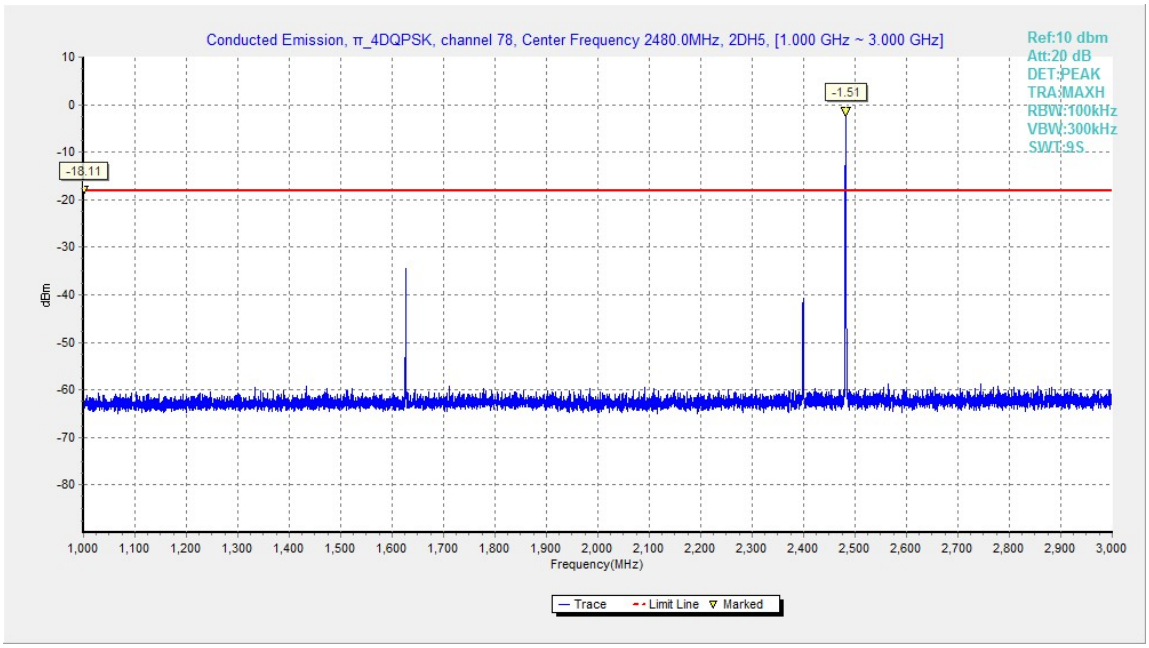

Fig.40. Conducted spurious emission: π/4 DQPSK, Channel 78, 1GHz - 3GHz

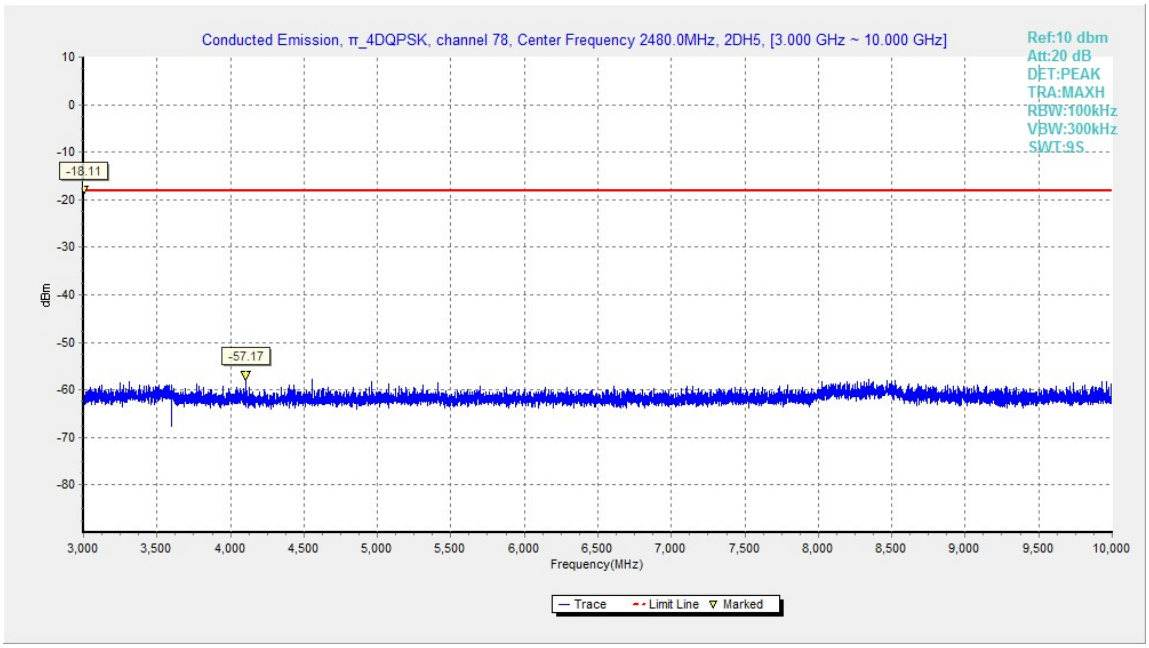

Fig.41. Conducted spurious emission: π/4 DQPSK, Channel 78, 3GHz - 10GHz

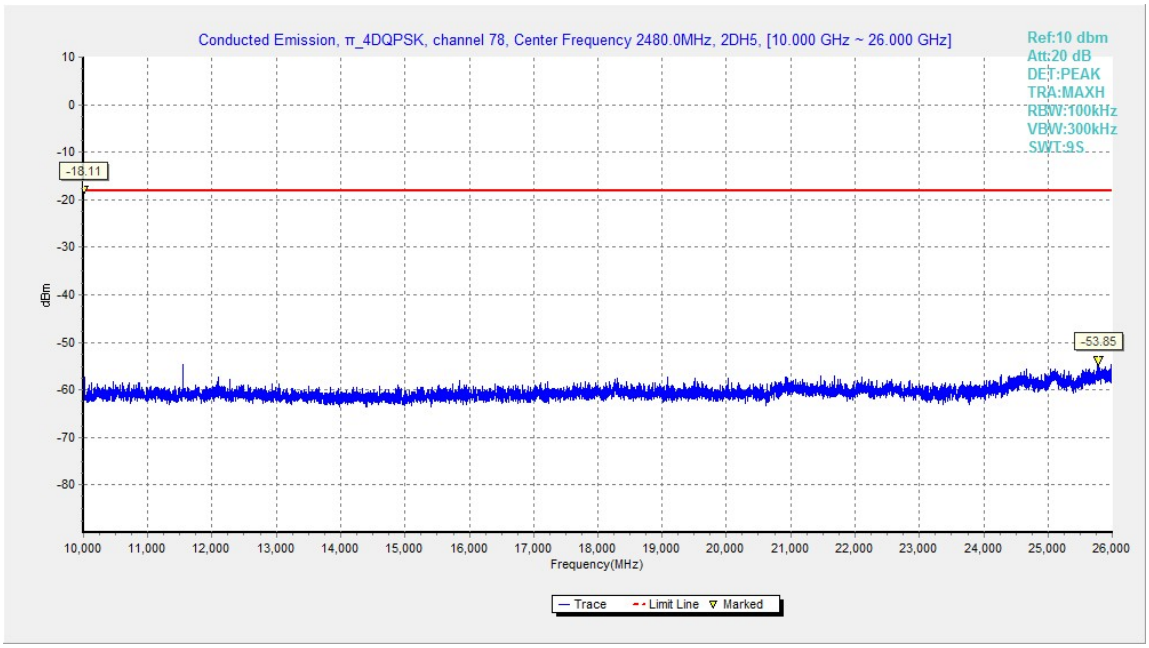

Fig.42. Fig.30 Conducted spurious emission: π/4 DQPSK, Channel 78, 10GHz - 26GHz

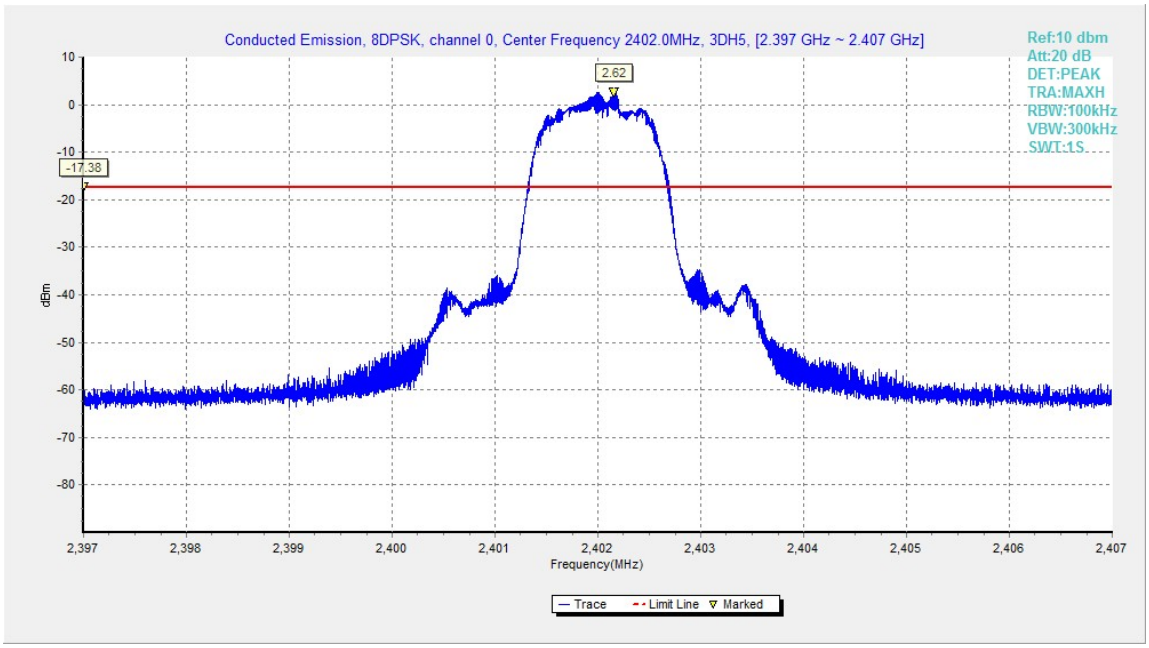

Fig.43. Conducted spurious emission: 8DPSK, Channel 0,2402MHz

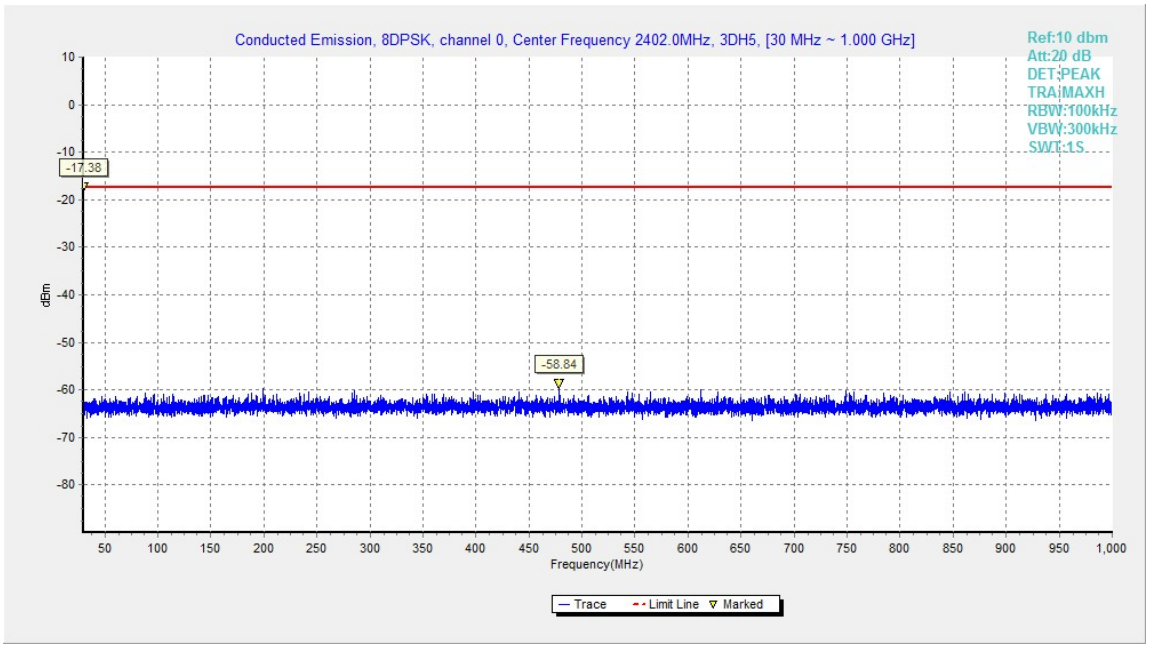

Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

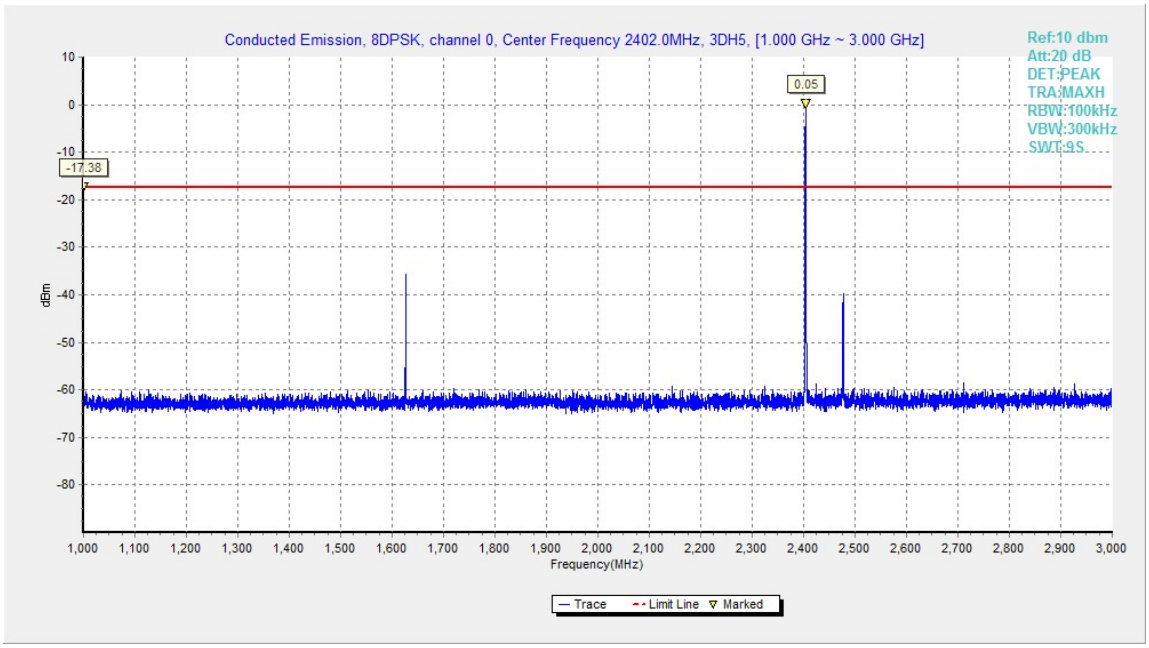

Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

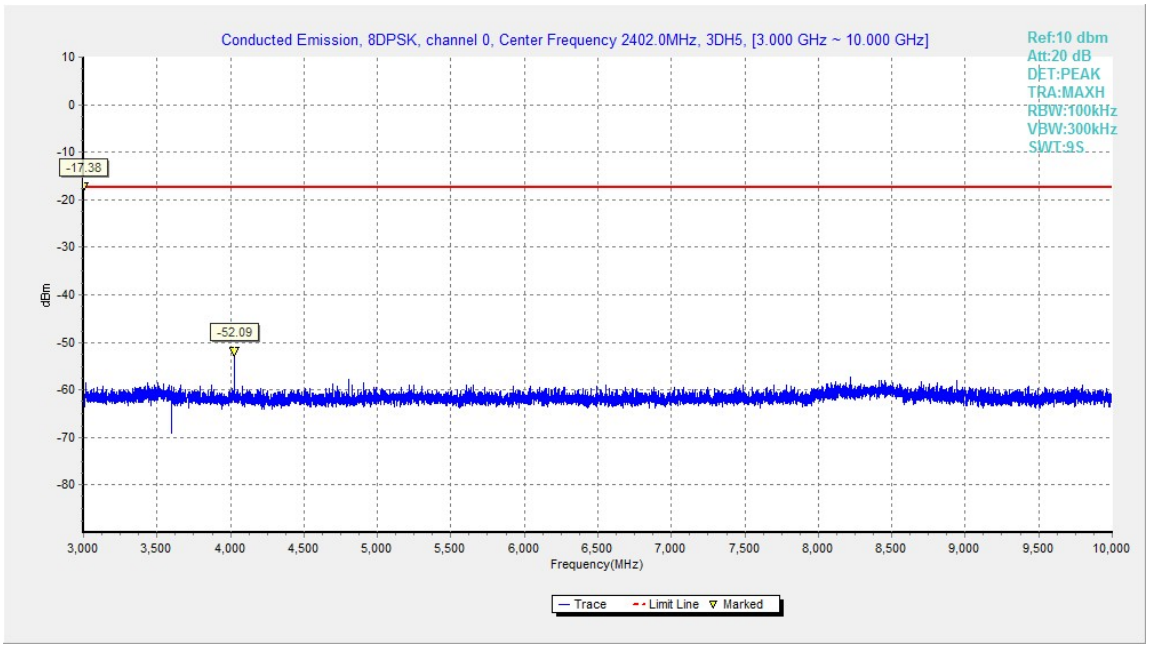

Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

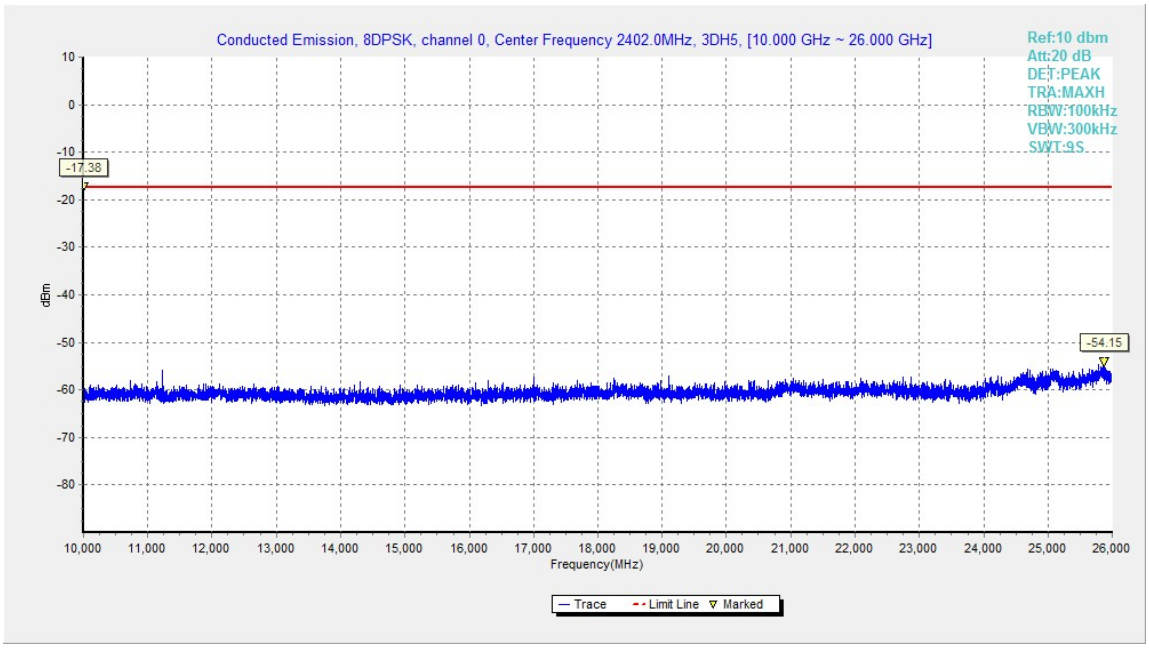

Fig.47. Conducted spurious emission: 8DPSK, Channel 0,10GHz - 26GHz

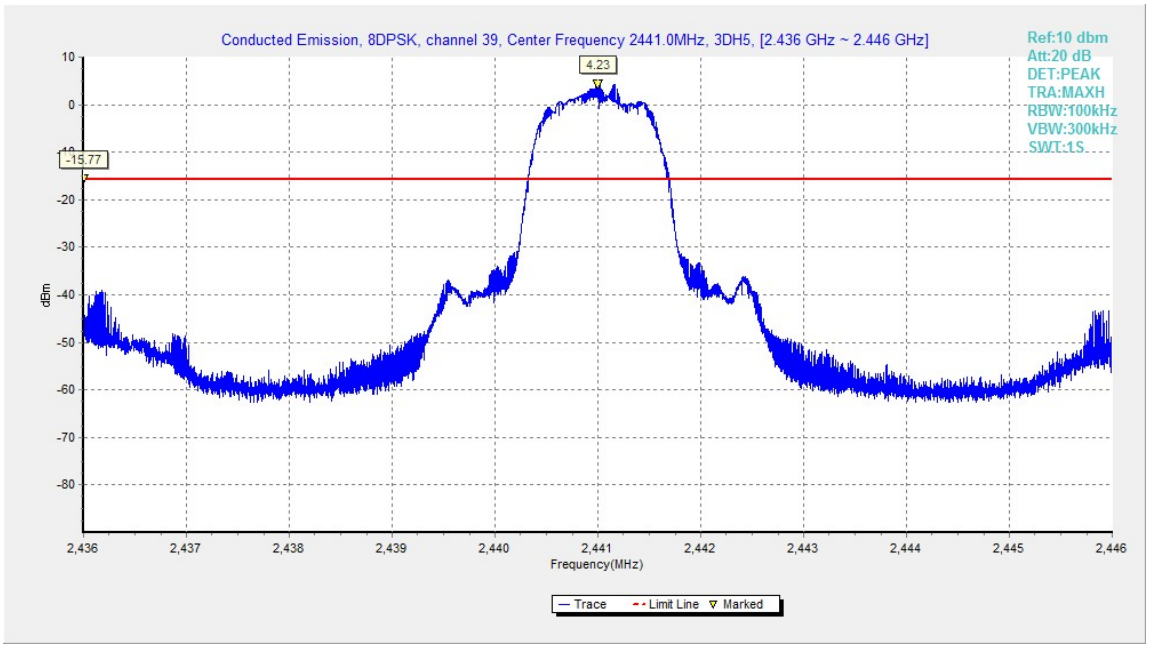

Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

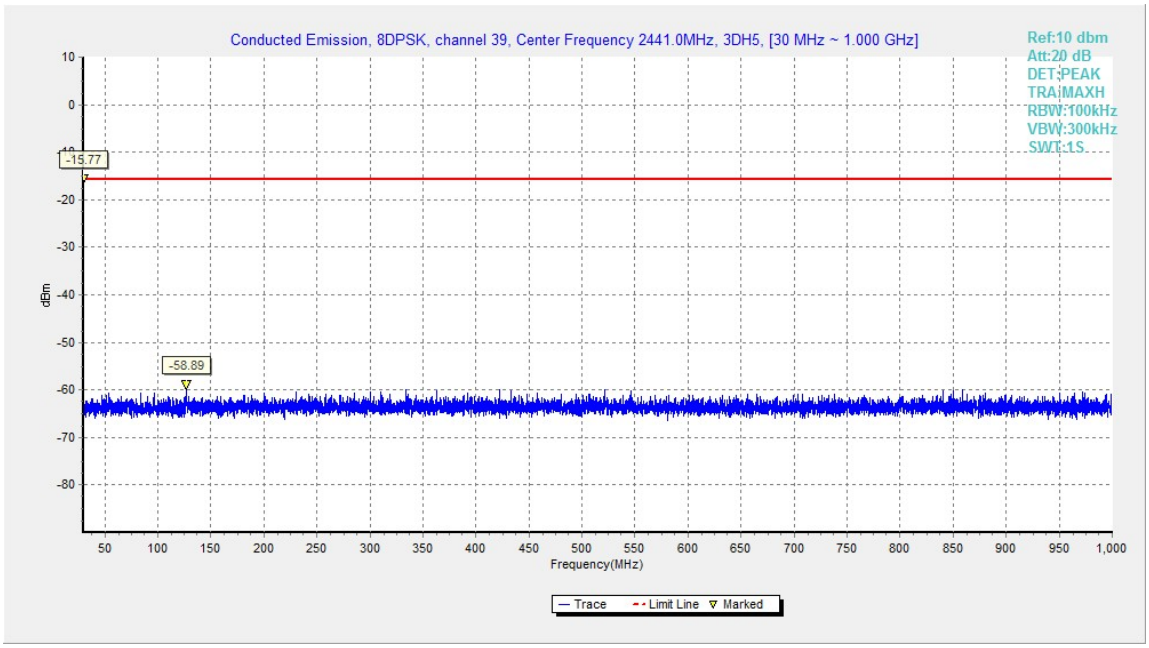

Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

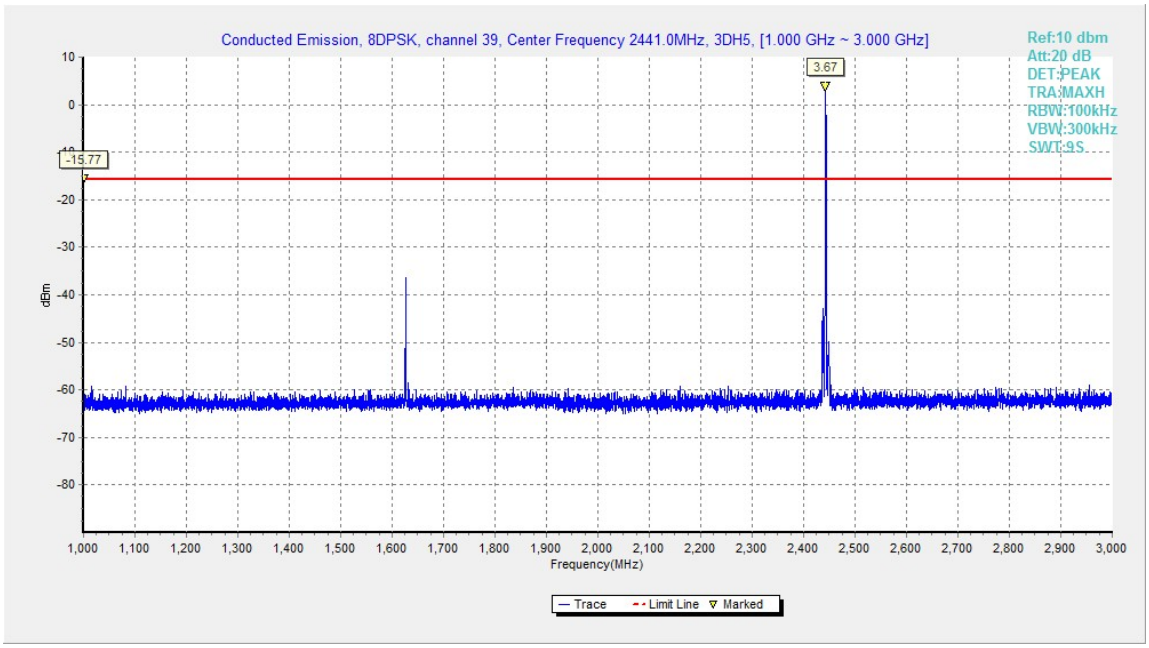

Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

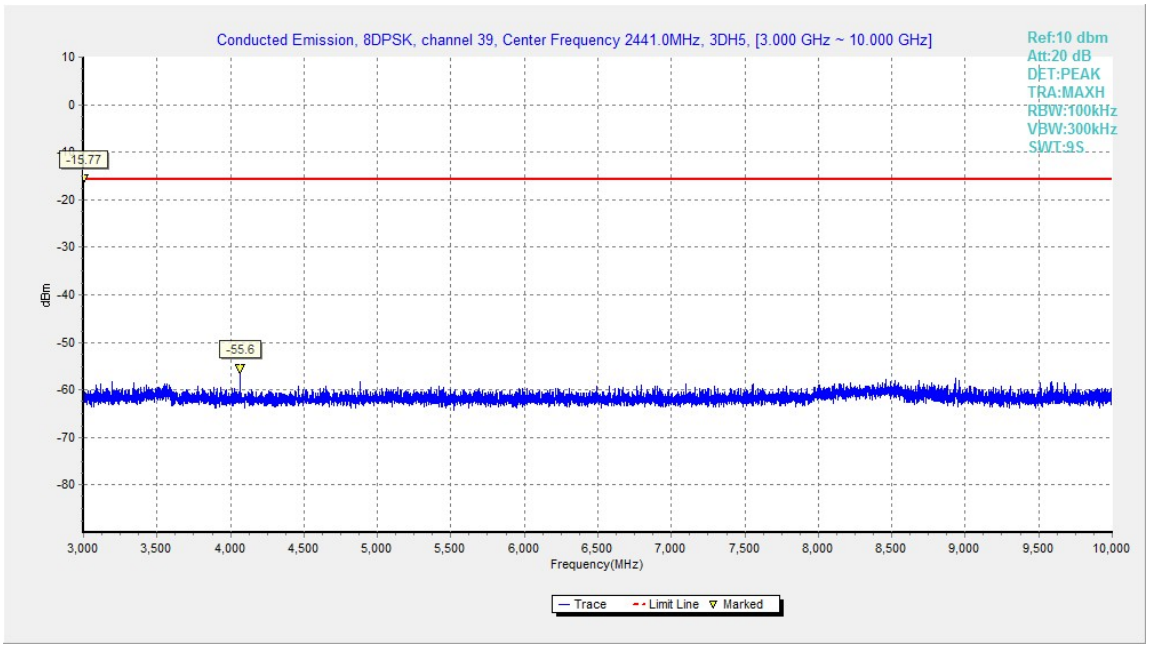

Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

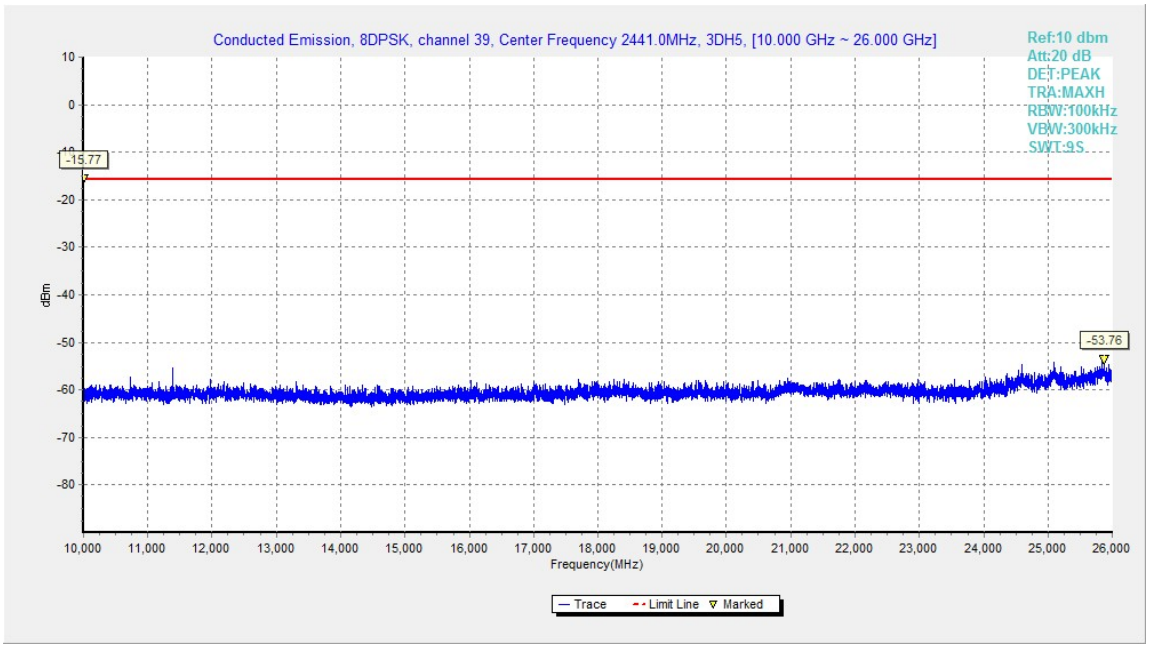

Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

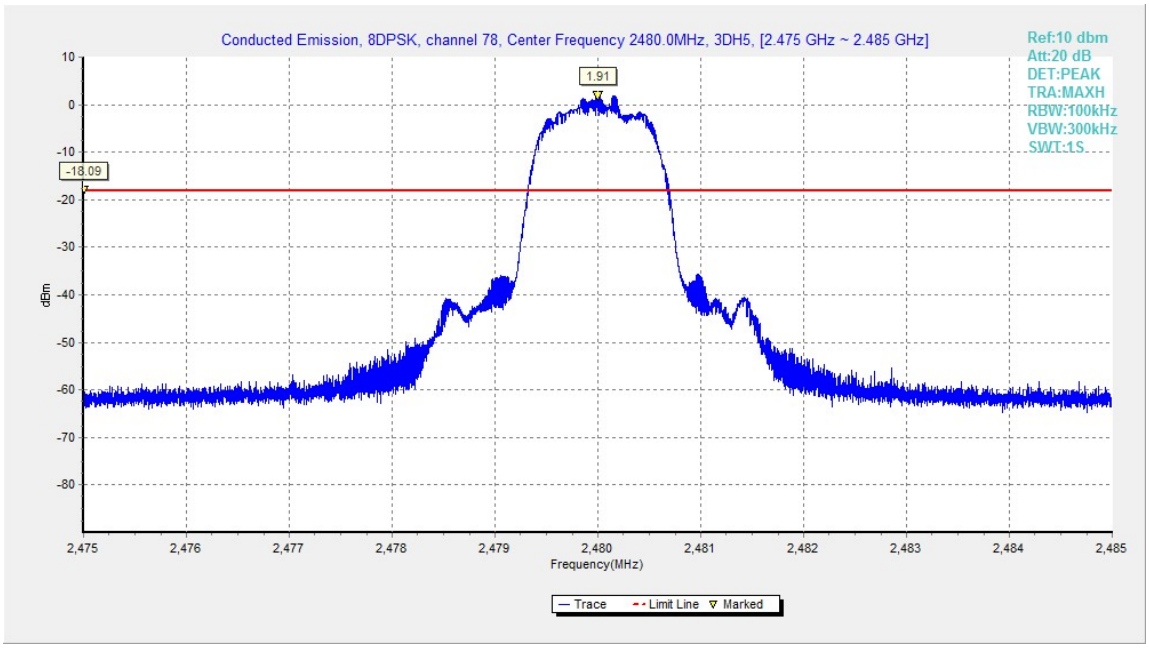

Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

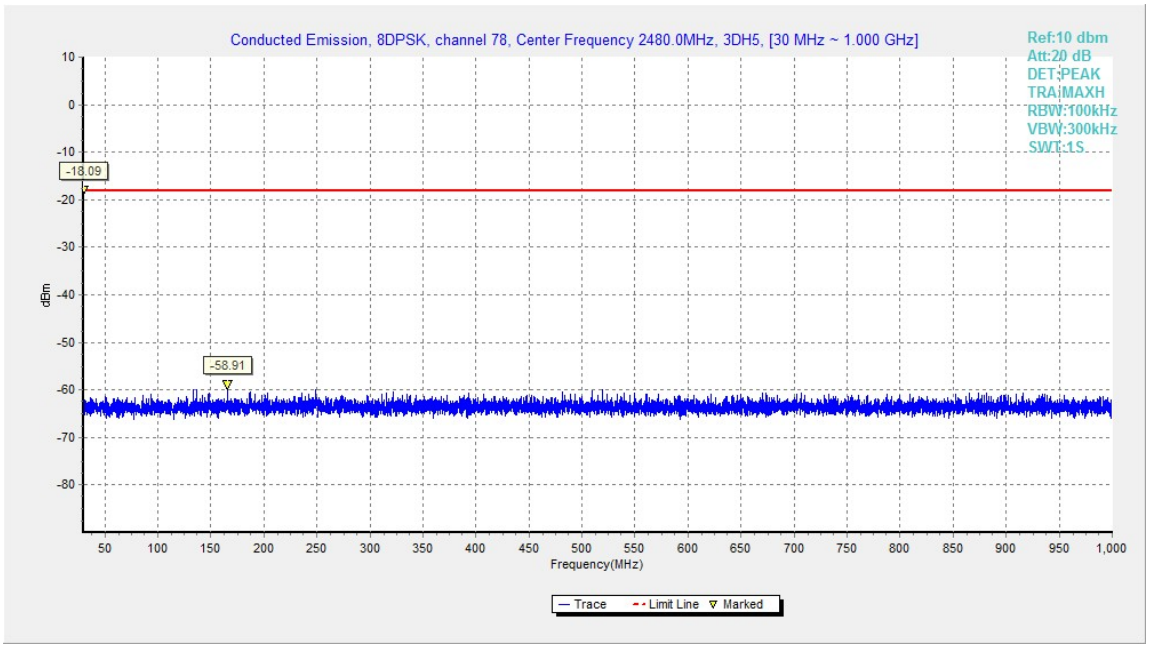

Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

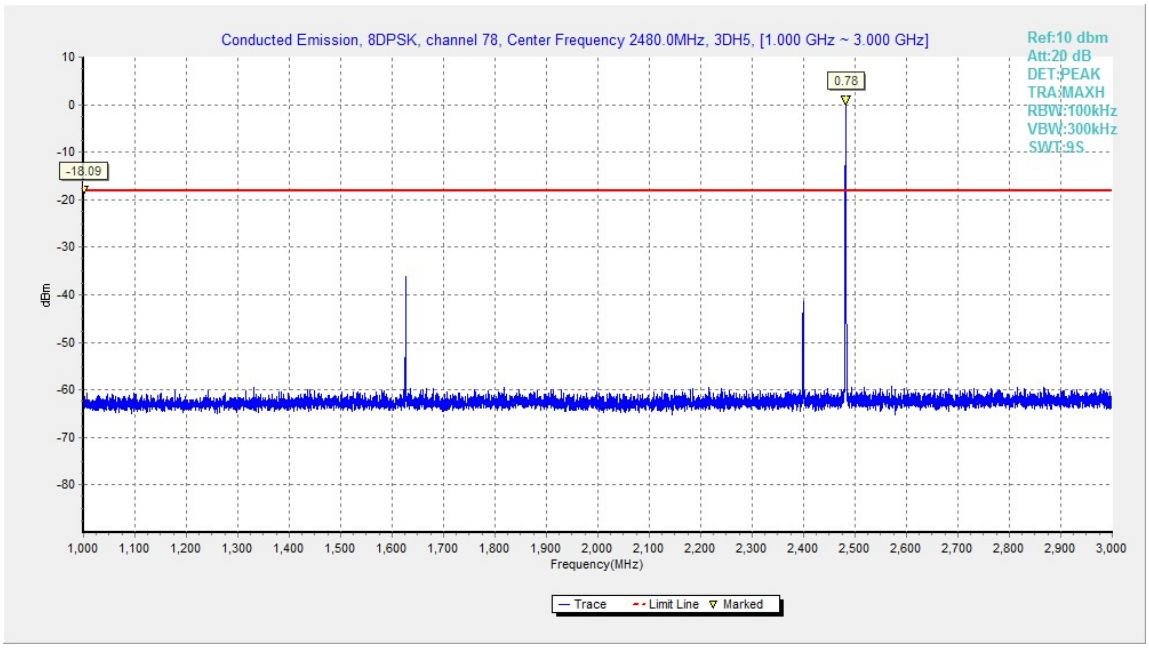

Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

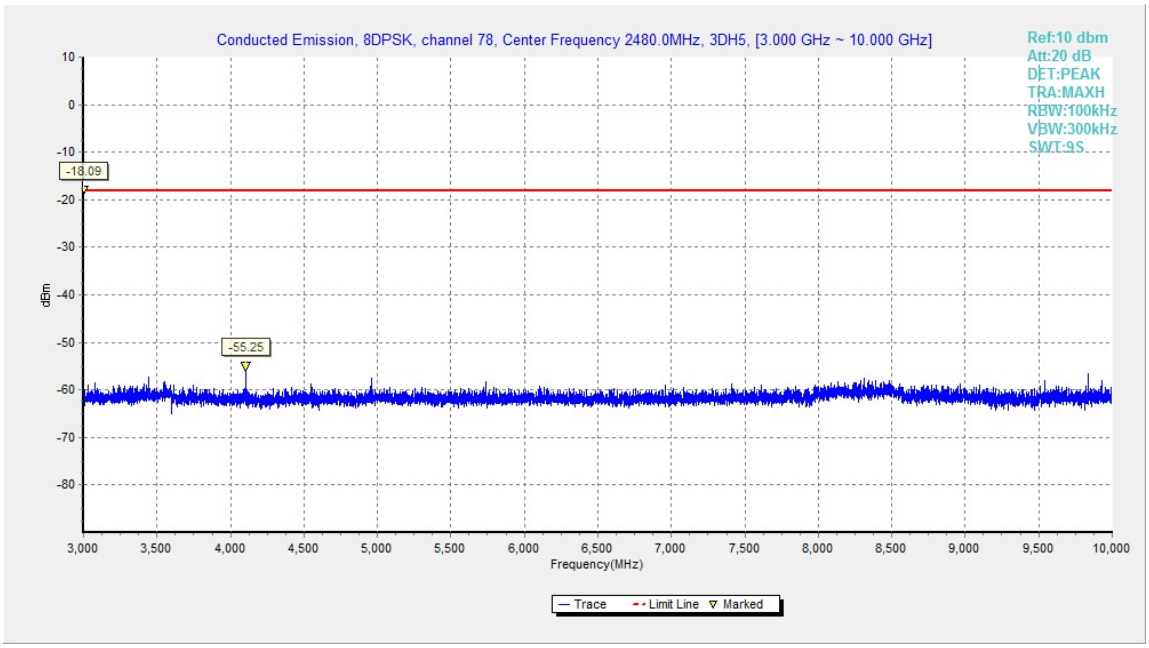

Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

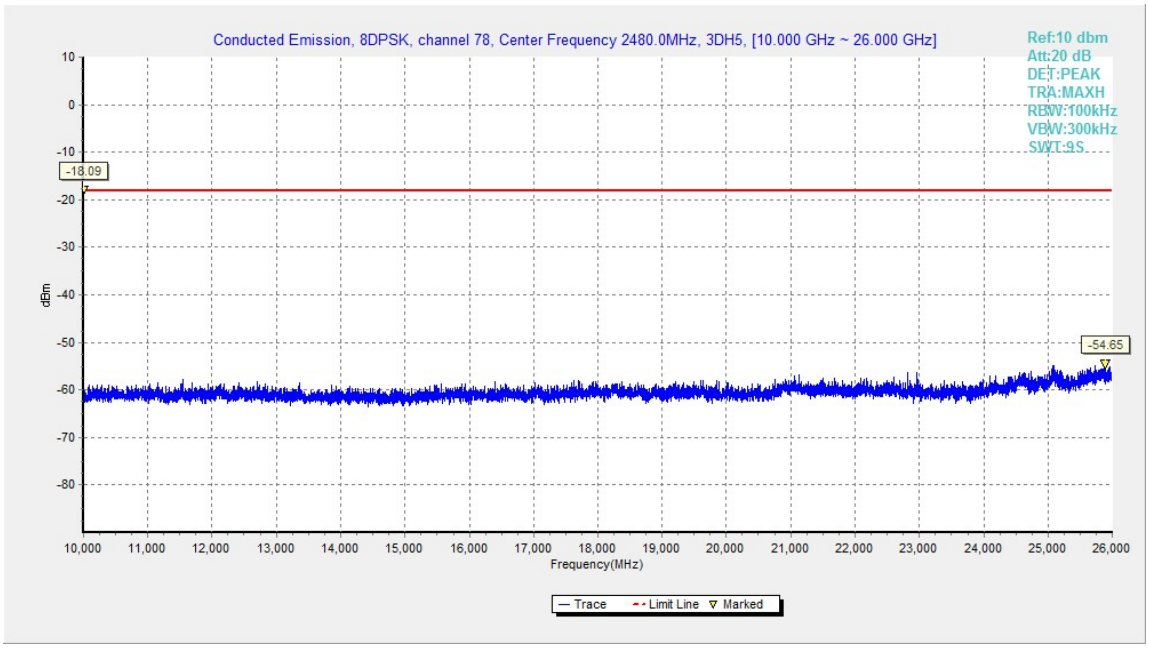

Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

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 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
Power	2.38GHz~2.4GHz---L	Fig.58	P
Power	2.45GHz~2.5GHz---H	Fig.59	P

Forπ/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Power	2.38GHz~2.4GHz---L	Fig.60	P
Power	2.45GHz~2.5GHz---H	Fig.61	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Power	2.38GHz~2.4GHz---L	Fig.62	P
Power	2.45GHz~2.5GHz---H	Fig.63	P

GFSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1627.8	51.2	-15.0	25.7	40.6	V
2389.19	38.4	-14.3	28.2	24.5	H
4804	39.8	-36.6	33.0	43.5	V
9608	35.0	-32.3	37.7	29.6	H
14412	40.7	-27.7	41.9	26.5	V
16814	39.0	-25.9	39.5	25.4	V

GFSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1628	51.2	-15.0	25.7	40.5	V
2987	40.4	-13.3	30.1	23.6	H
4082.5	36.8	-37.3	32.5	41.6	V
4882	29.5	-36.7	33.2	33.1	H
9764	34.3	-32.3	37.8	28.8	V
14646	40.0	-26.8	41.6	25.2	V

GFSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1630.2	49.9	-15.0	25.7	39.2	V
2438.2	38.2	-14.4	28.3	24.4	H
4110.5	41.6	-37.2	32.5	46.4	V
4960	30.1	-36.4	33.3	33.2	H
9920	37.1	-32.7	37.9	32.0	V
14800	37.2	-27.3	41.3	23.2	V

π/4 DQPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.8	48.5	-15.0	25.7	37.8	V
2389.38	38.5	-14.3	28.2	24.6	H
4031.5	37.1	-37.3	32.5	41.9	V
4804	33.0	-36.6	33.0	36.7	H
9608	35.6	-32.3	37.7	30.2	V
14412	39.3	-27.7	41.9	25.1	V

π/4 DQPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.4	49.9	-15.0	25.7	39.2	V
4070.5	31.8	-37.2	32.5	36.6	H
4881.5	31.2	-36.7	33.1	34.8	V
9764	35.0	-32.3	37.8	29.5	H
14646	39.8	-26.8	41.6	25.0	V
17087	39.9	-25.5	40.7	24.7	V

π/4 DQPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1630.4	53.8	-15.0	25.7	43.1	V
2484.7	38.4	-14.3	28.4	24.3	H
4955.5	31.4	-36.4	33.3	34.5	V
9920	35.4	-32.7	37.9	30.3	H
14800	37.3	-27.3	41.3	23.3	V
17360	43.5	-25.2	42.5	26.2	V

8DPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.6	53.1	-15.0	25.7	42.4	V
2389.705	38.3	-14.3	28.2	24.4	H
4031.5	37.8	-37.3	32.5	42.6	V
4804	32.6	-36.6	33.0	36.3	H
9608	35.4	-32.3	37.7	30.0	V
14412	39.5	-27.7	41.9	25.3	V

8DPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1628.6	52.3	-15.0	25.7	41.6	V
4069.5	30.9	-37.2	32.5	35.7	H
4882	31.7	-36.7	33.2	35.3	V
9764	36.0	-32.3	37.8	30.5	H
14646	39.9	-26.8	41.6	25.1	V
17087	39.6	-25.5	40.7	24.4	V

8DPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
2483.93	38.4	-14.3	28.4	24.3	V
4110	39.9	-37.2	32.5	44.7	H
4960	31.7	-36.4	33.3	34.8	V
9920	36.7	-32.7	37.9	31.6	H
14800	37.7	-27.3	41.3	23.7	V
17360	44.1	-25.2	42.5	26.8	V

GFSK Ch 0 – Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.8	63.2	-15.0	25.7	52.5	V
2389.275	50.7	-14.3	28.2	36.8	H
4804	45.2	-36.6	33.0	48.9	V
9608	46.5	-32.3	37.7	41.1	H
14412	50.2	-27.7	41.9	36.0	V
16814	49.5	-25.9	39.5	35.9	V

GFSK Ch 39 - Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.8	64.1	-15.0	25.7	53.4	V
2954	53.1	-13.4	30.0	36.5	H
4069	44.8	-37.2	32.5	49.6	V
4882	39.2	-36.7	33.2	42.8	H
9764	43.9	-32.3	37.8	38.4	V
14646	49.1	-26.8	41.6	34.3	V

GFSK Ch 78 - Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1630.2	62.7	-15.0	25.7	52.0	V
2483.15	50.7	-14.3	28.4	36.7	H
4110	46.2	-37.2	32.5	51.0	V
4960	40.4	-36.4	33.3	43.5	H
9920	47.0	-32.7	37.9	41.9	V
14800	48.3	-27.3	41.3	34.3	V

π/4 DQPSK Ch 0 - Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1630.2	62.1	-15.0	25.7	51.4	V
2389.415	50.5	-14.3	28.2	36.6	H
4031	42.9	-37.3	32.5	47.7	V
4804	41.8	-36.6	33.0	45.5	H
9608	46.5	-32.3	37.7	41.1	V
14412	50.6	-27.7	41.9	36.4	V

π/4 DQPSK Ch 39 -Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1630	62.1	-15.0	25.7	51.4	V
4070.5	43.7	-37.2	32.5	48.5	H
4882	40.4	-36.7	33.2	44.0	V
9764	45.4	-32.3	37.8	39.9	H
14646	51.0	-26.8	41.6	36.2	V
17087	50.5	-25.5	40.7	35.3	V

π/4 DQPSK Ch 78 - Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1630.2	63.2	-15.0	25.7	52.5	V
2484.725	51.4	-14.3	28.4	37.3	H
4955.5	42.3	-36.4	33.3	45.4	V
9920	45.4	-32.7	37.9	40.3	H
14800	48.9	-27.3	41.3	34.9	V
17360	55.5	-25.2	42.5	38.2	V

8DPSK Ch 0 -Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.8	64.7	-15.0	25.7	54.0	V
2389.695	49.8	-14.3	28.2	35.9	H
4032	44.0	-37.3	32.5	48.8	V
4804	42.7	-36.6	33.0	46.4	H
9608	44.8	-32.3	37.7	39.4	V
14412	51.3	-27.7	41.9	37.1	V

8DPSK Ch 39 - Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
1629.4	61.9	-15.0	25.7	51.2	V
4069.5	40.0	-37.2	32.5	44.8	H
4882	42.2	-36.7	33.2	45.8	V
9764	47.0	-32.3	37.8	41.5	H
14646	52.2	-26.8	41.6	37.4	V
17087	49.9	-25.5	40.7	34.7	V

8DPSK Ch 78 - Peak

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Antenna Factor(dB/m)	PMea(dBuv/m)	Polarization
2483.925	50.9	-14.3	28.4	36.8	V
4110.5	45.9	-37.2	32.5	50.7	H
4958.5	42.1	-36.4	33.3	45.2	V
9920	45.4	-32.7	37.9	40.3	H
14800	48.7	-27.3	41.3	34.7	V
17360	55.7	-25.2	42.5	38.4	V

Conclusion: PASS

Test graphs as below:

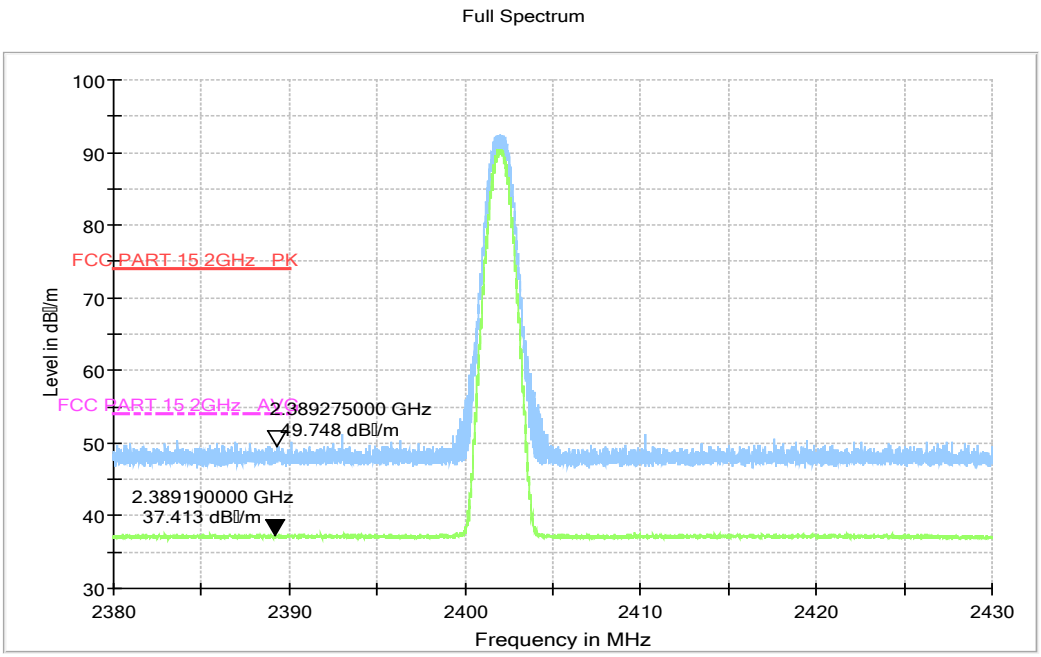

Fig.58. Radiated emission (Power): GFSK, low channel

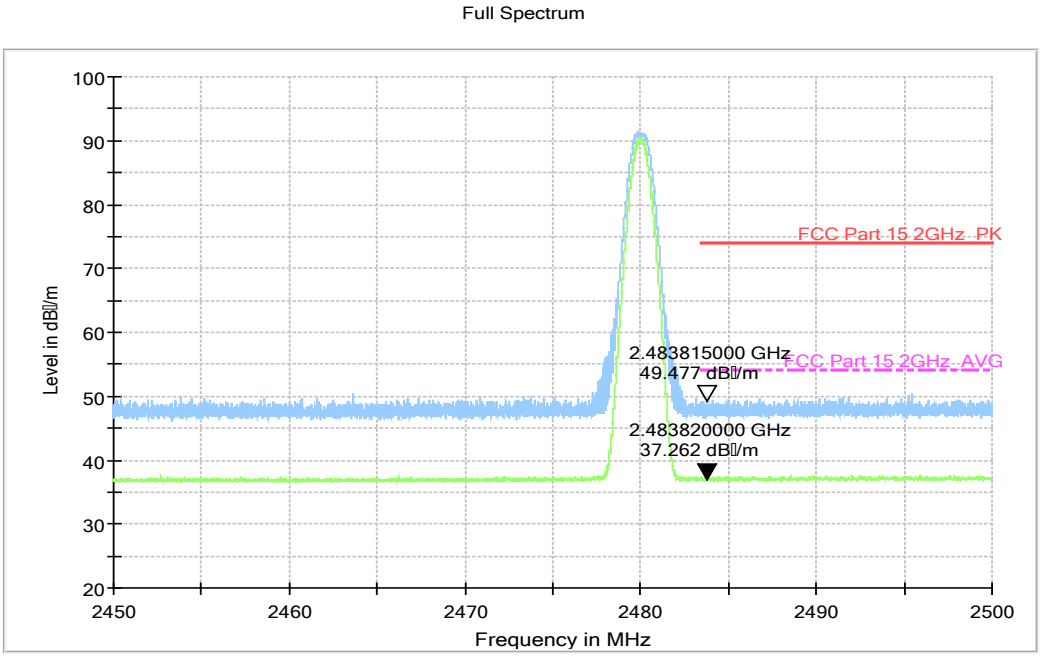

Fig.59. Radiated emission (Power) GFSK, high channel

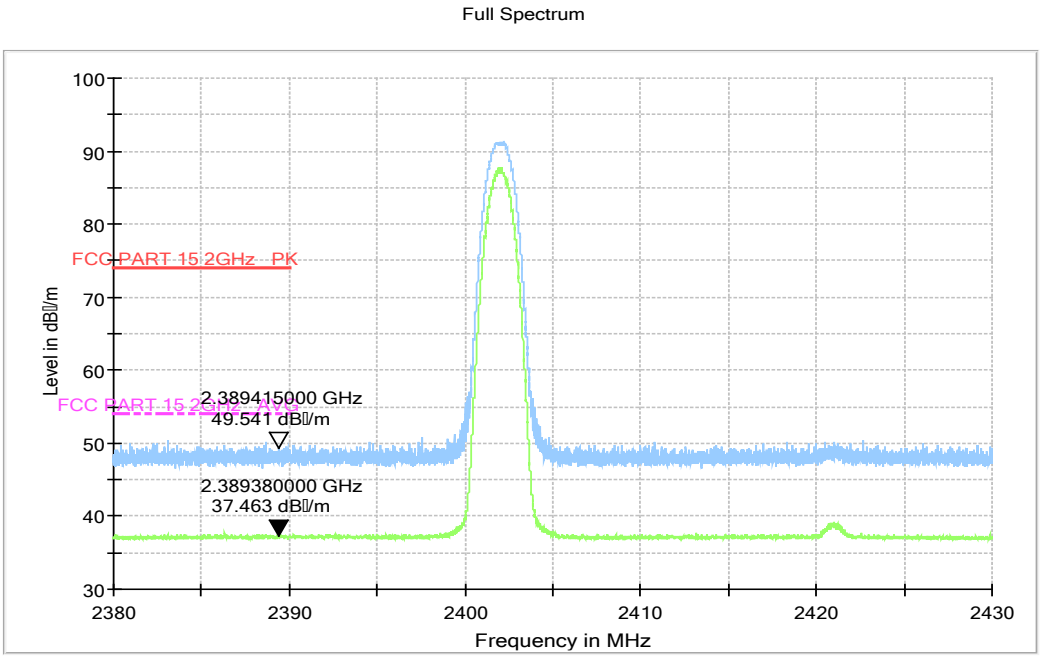

Fig.60. Radiated emission (Power): π/4 DQPSK, low channel

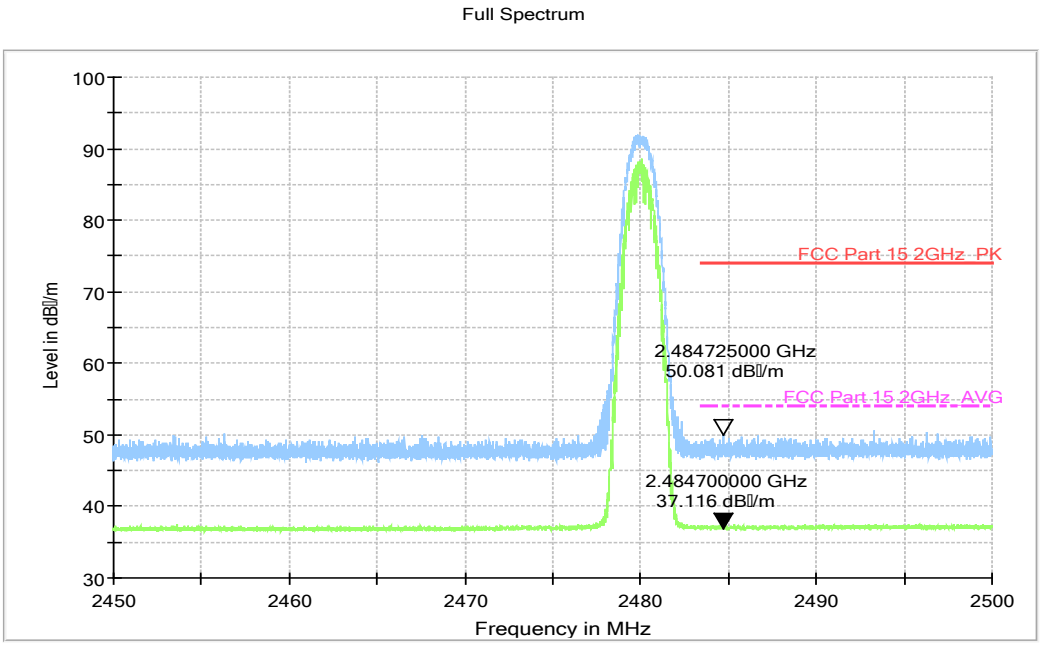

Fig.61. Radiated emission (Power): π/4 DQPSK, high channel

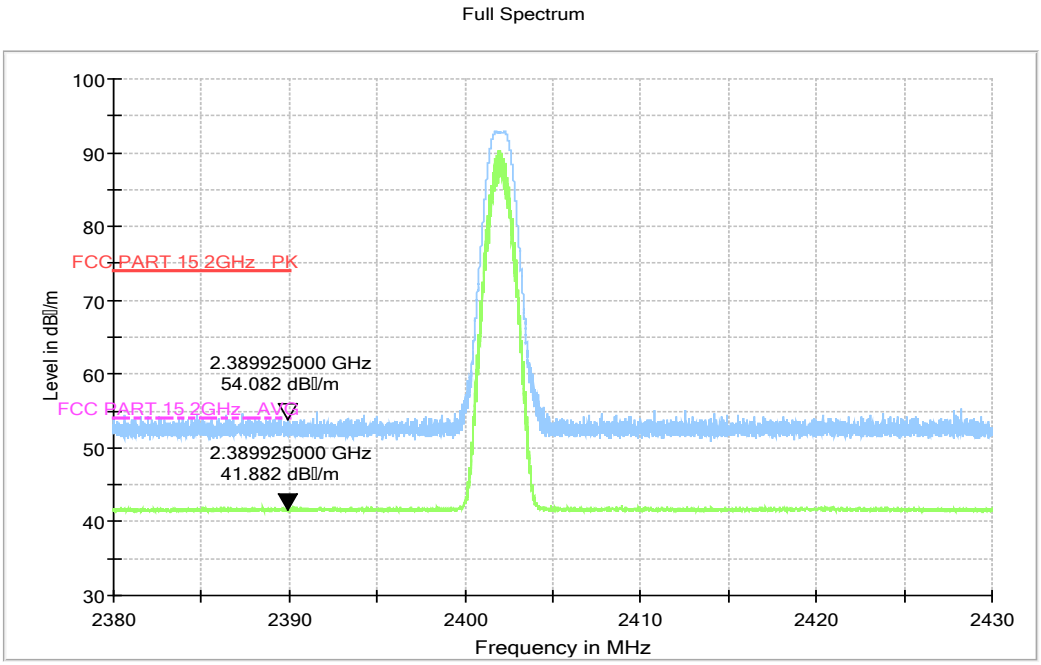

Fig.62. Radiated emission (Power): 8DPSK, low channel

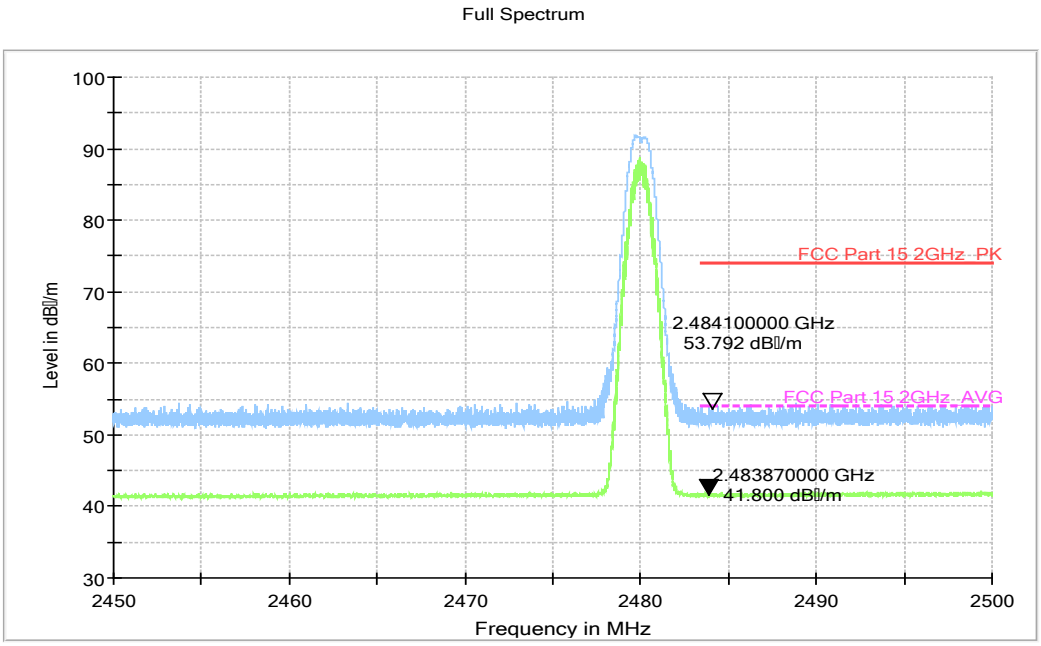

Fig.63. Radiated emission (Power): 8DPSK, high channel

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.64	121.53	P
		Fig.65		
	DH3	Fig.66	173.52	P
		Fig.67		
	DH5	Fig.68	164.46	P
		Fig.69		

For π/4 DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.70	123.82	P
		Fig.71		
	DH3	Fig.72	206.51	P
		Fig.73		
	DH5	Fig.74	225.17	P
		Fig.75		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.76	123.71	P
		Fig.77		
	DH3	Fig.78	198.17	P

		Fig.79		
	DH5	Fig.80	182.00	P
		Fig.81		

Conclusion: PASS

Test graphs as below:

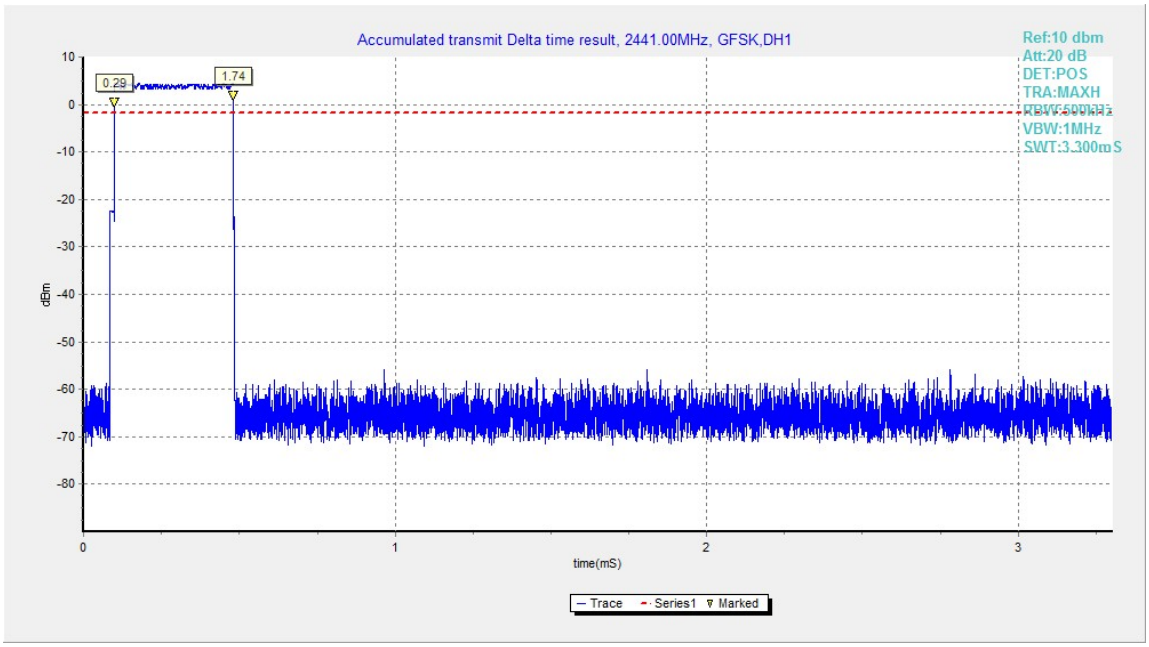

Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

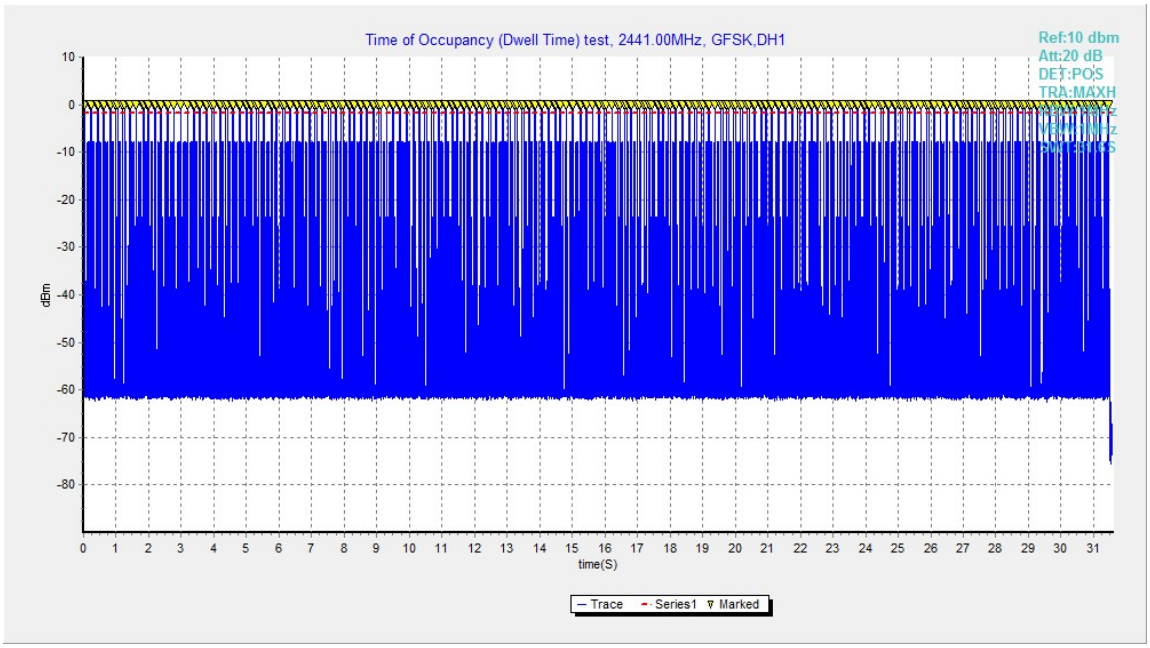

Fig.65. Number of Transmissions Measurement:Channel 39,Packet DH1

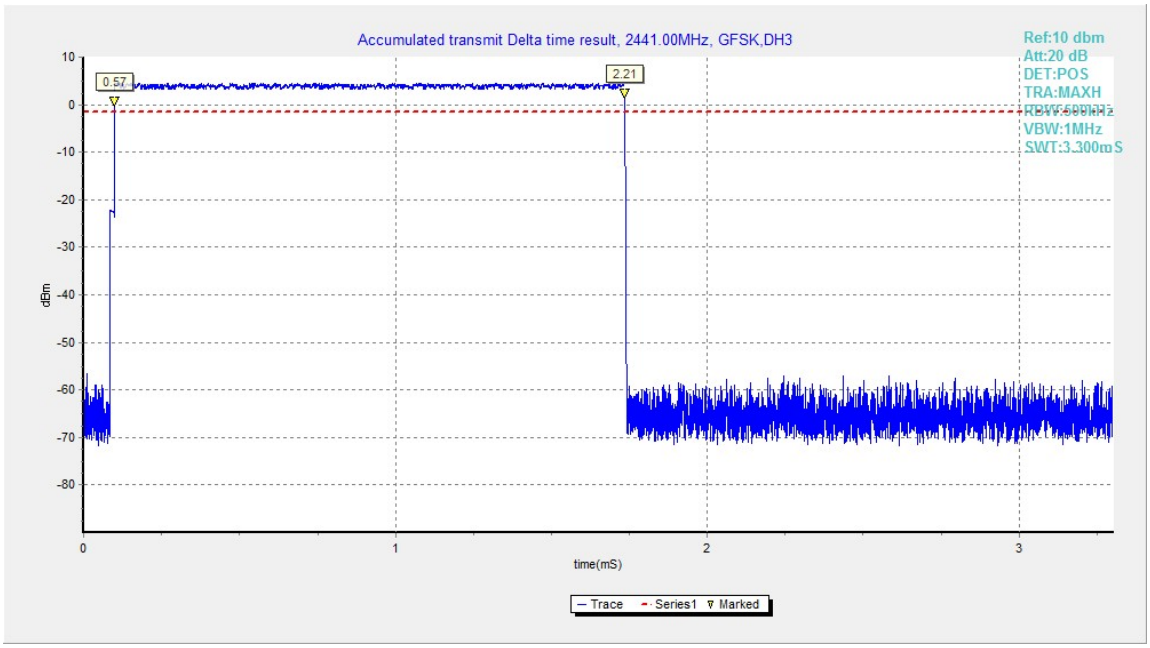

Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

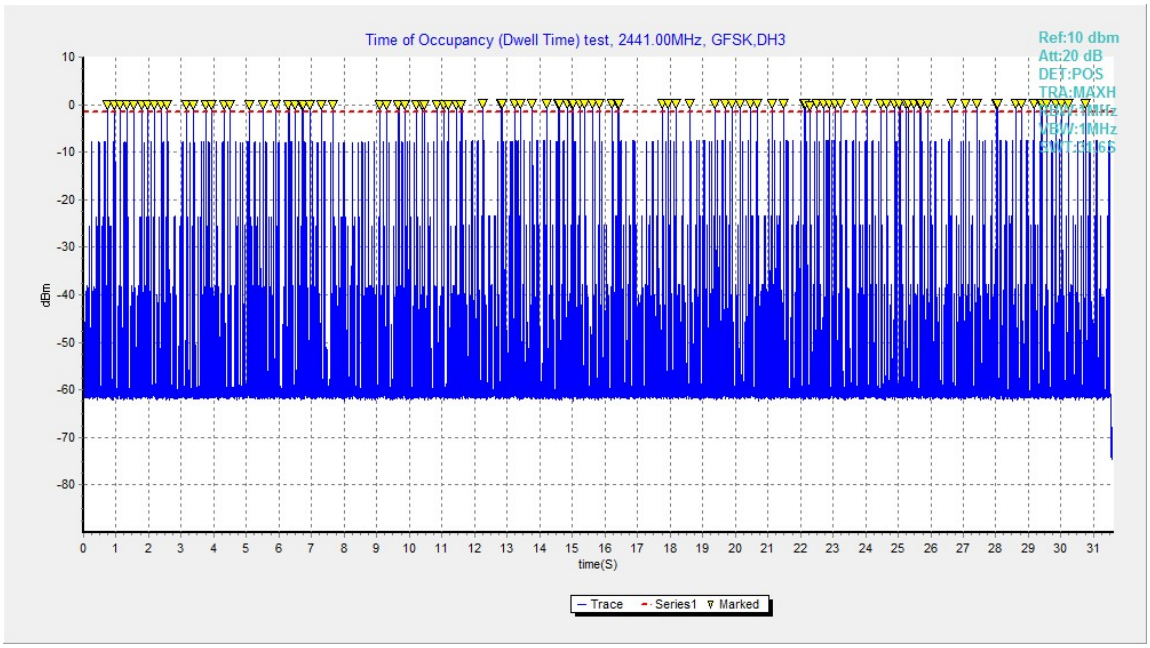

Fig.67. Number of Transmissions Measurement:Channel 39,Packet DH3

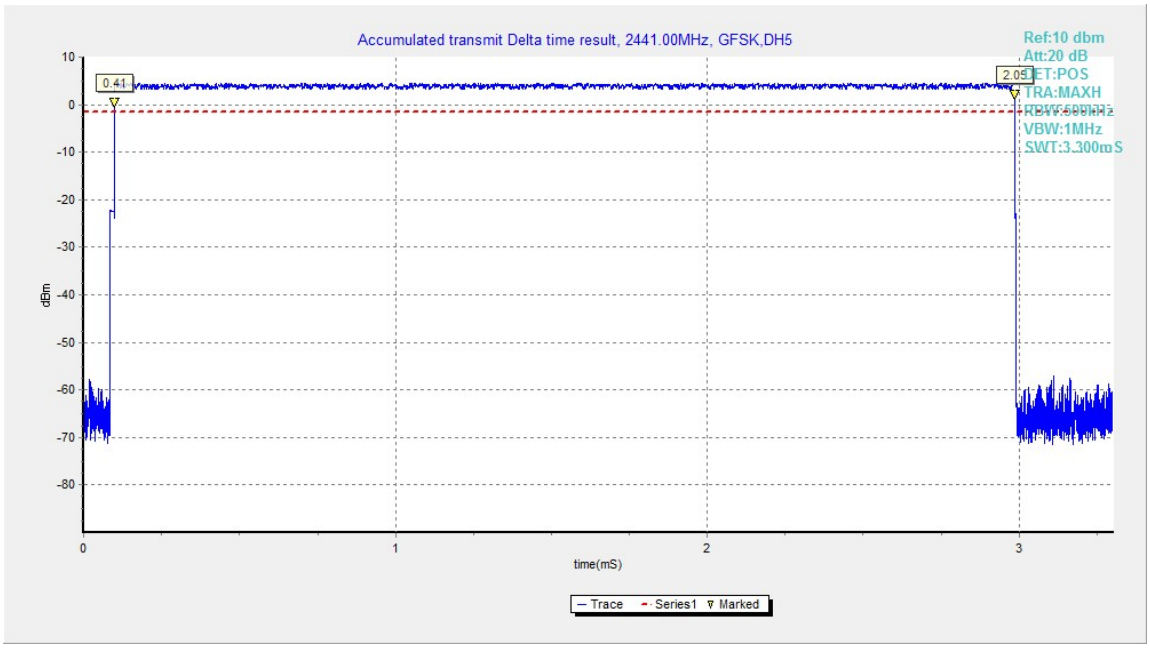

Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

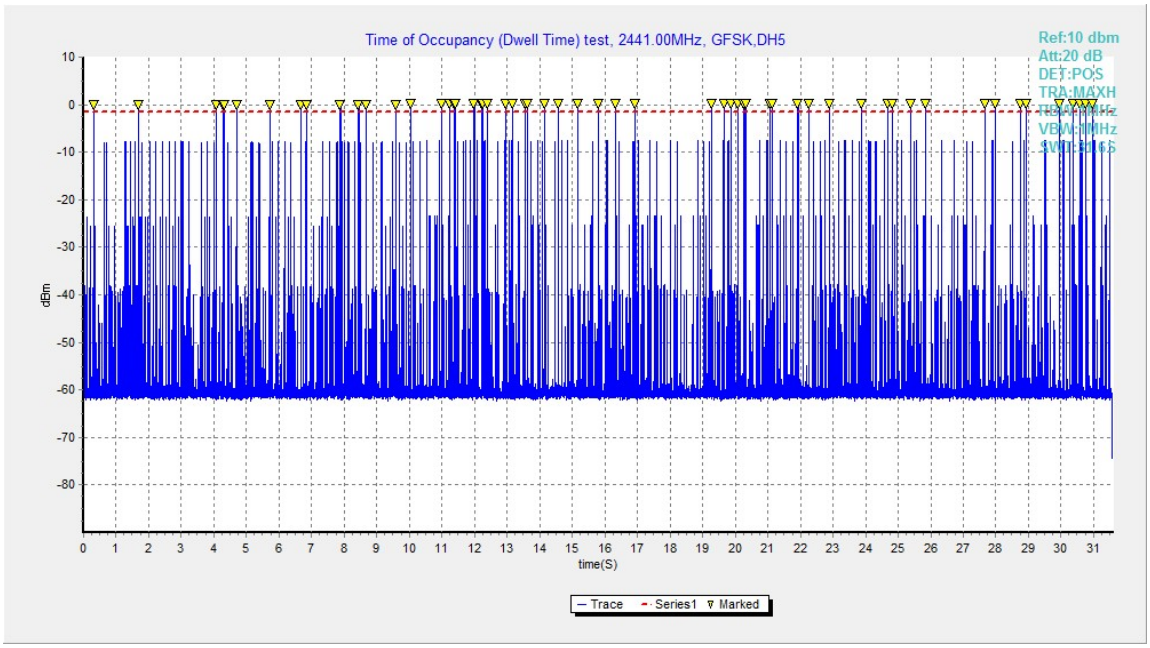

Fig.69. Number of Transmissions Measurement:Channel 39,Packet DH5

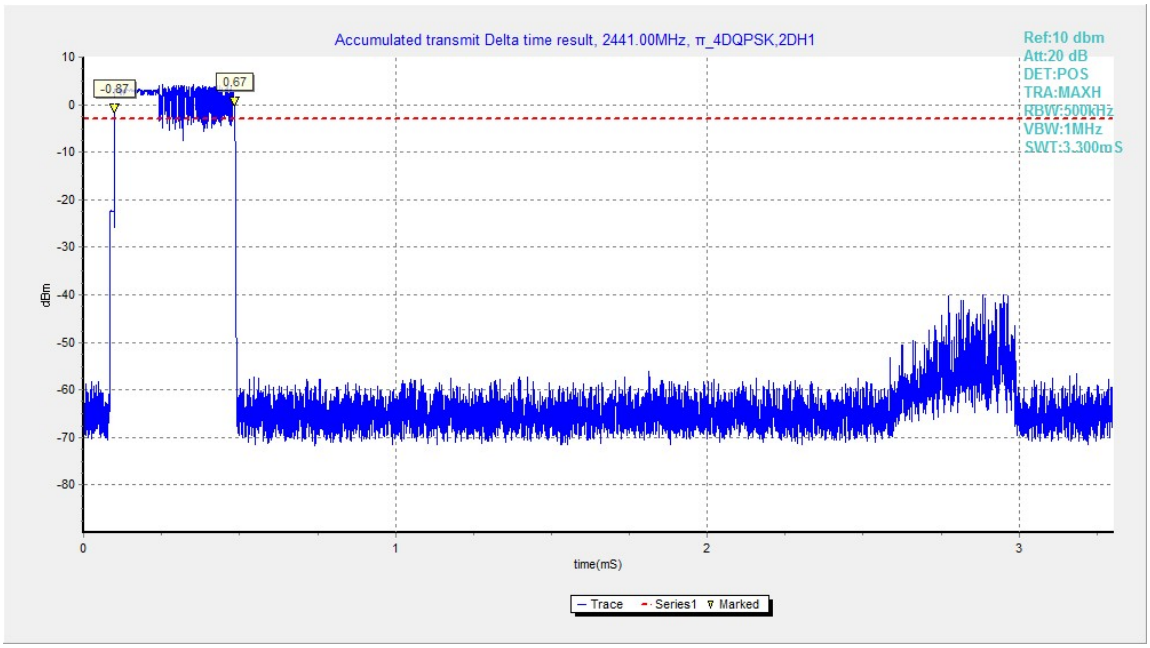

Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

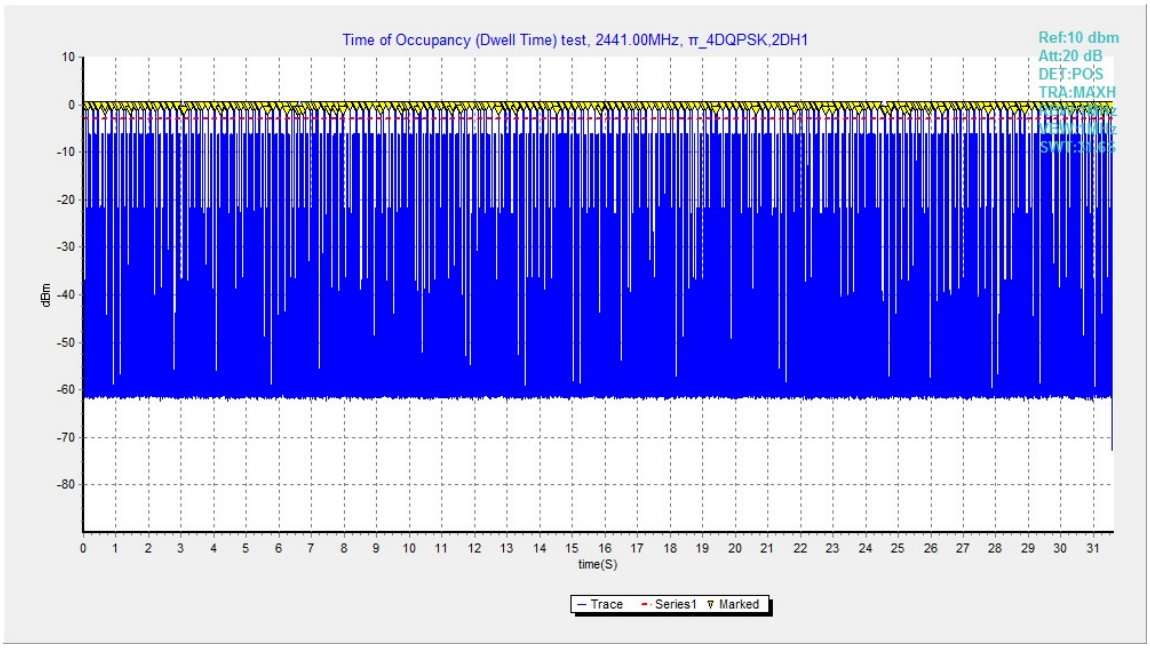

Fig.71. Number of Transmissions Measurement:Channel 39,Packet 2-DH1

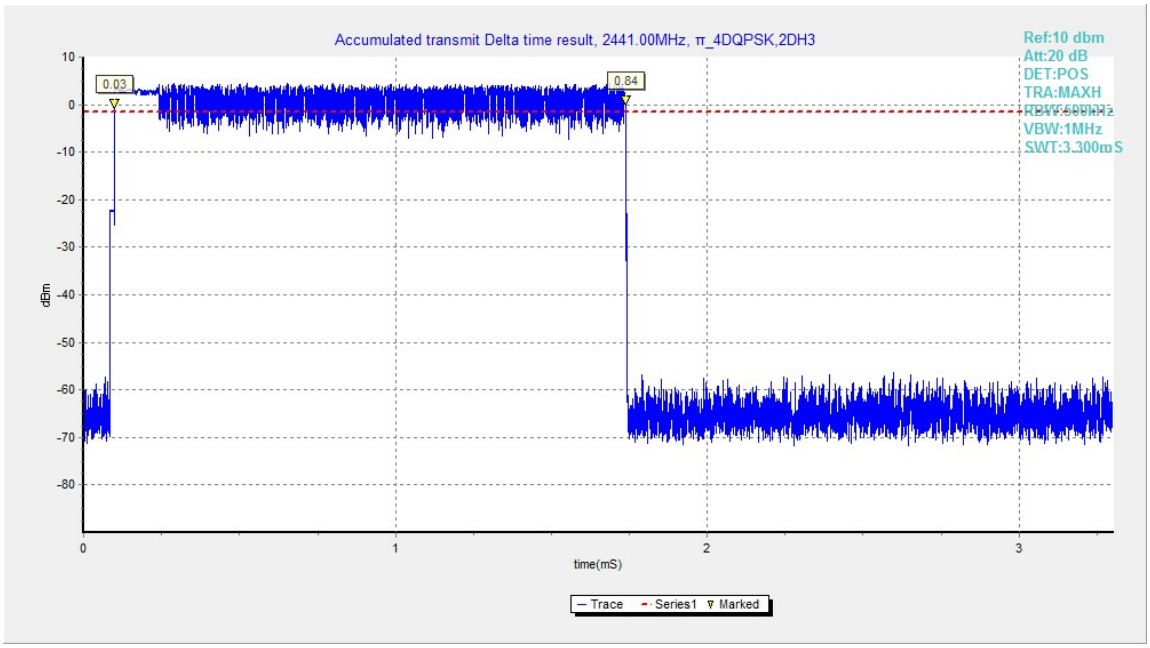

Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

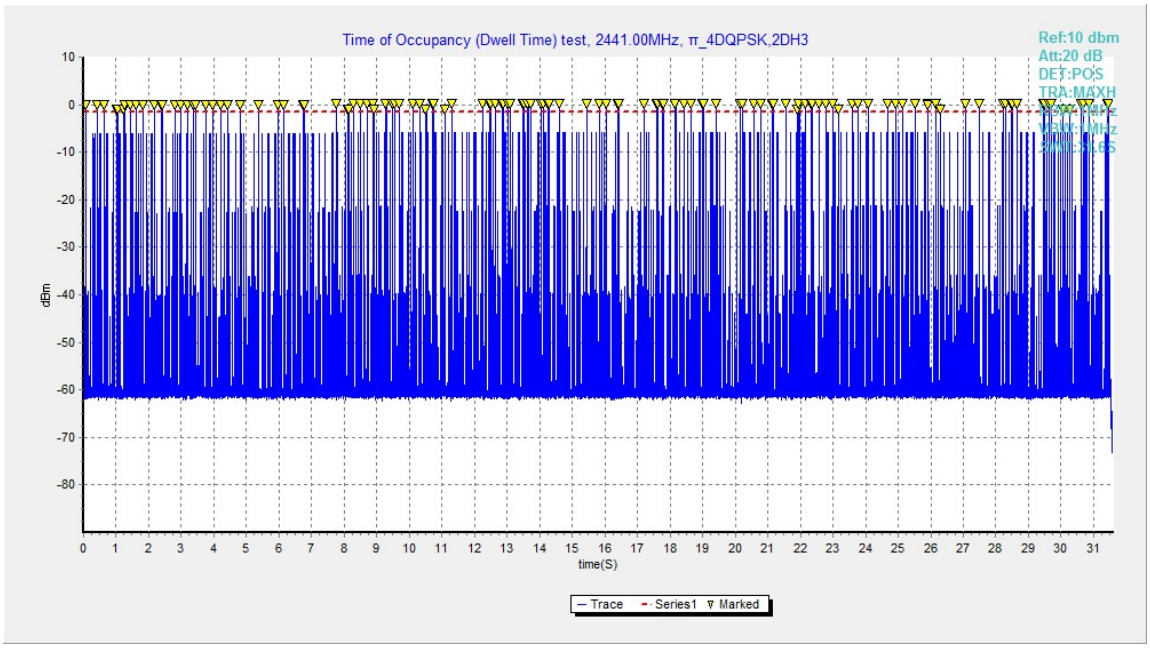

Fig.73. Number of Transmissions Measurement:Channel 39,Packet 2-DH3

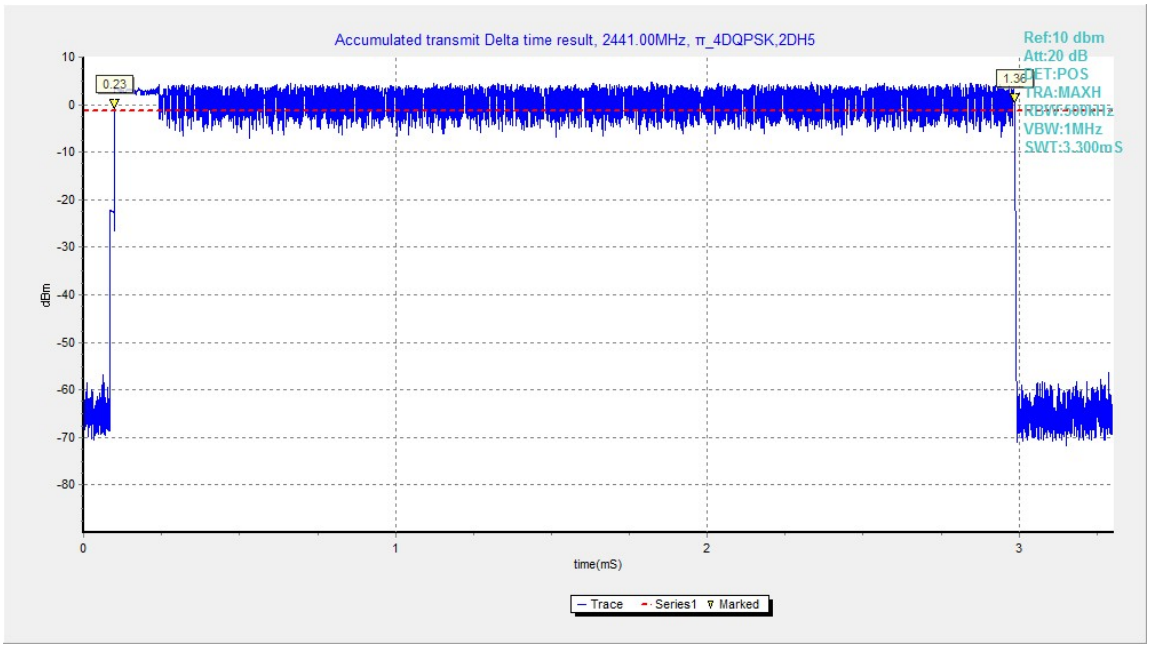

Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

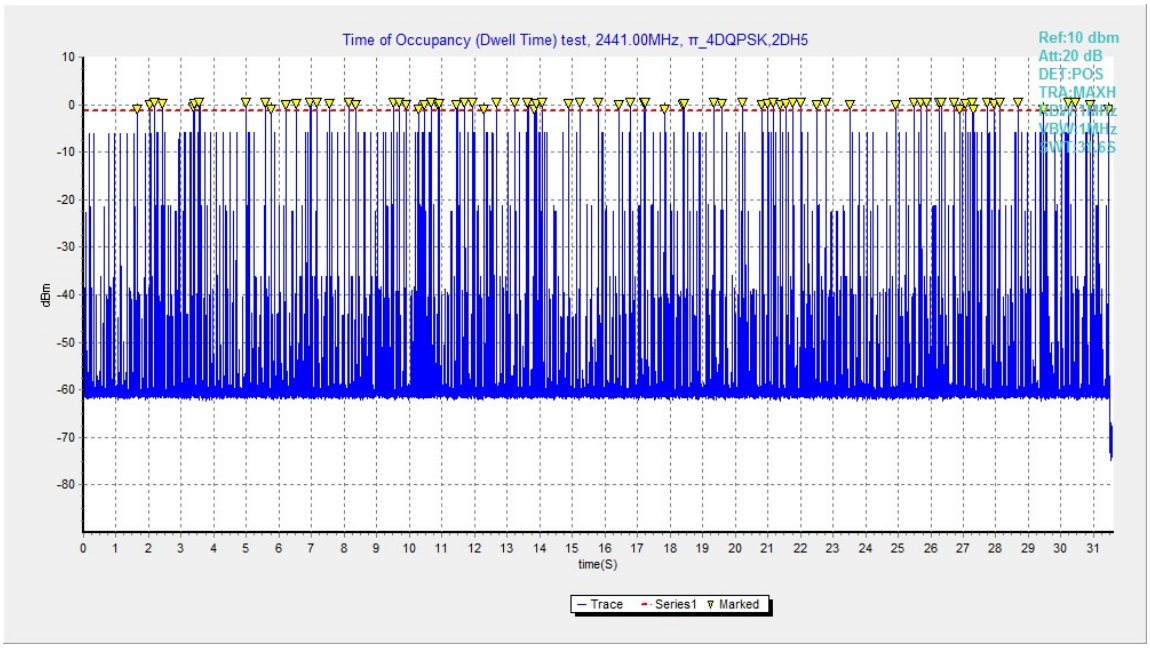

Fig.75. Number of Transmissions Measurement:Channel 39,Packet 2-DH5