

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

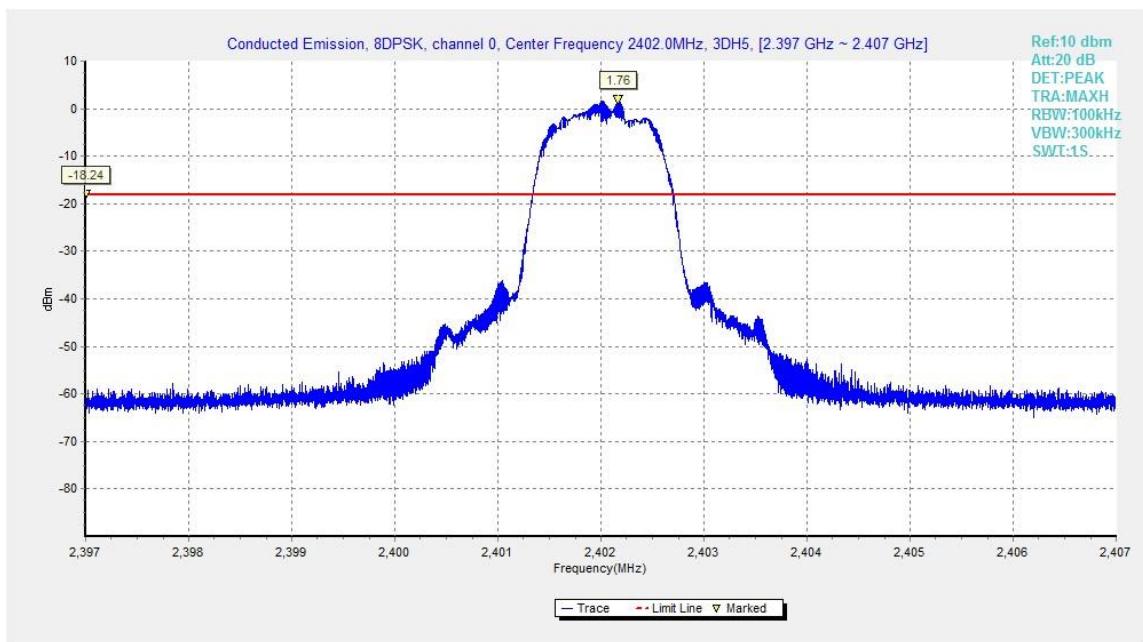


Fig.43. Conducted spurious emission: 8DPSK, Channel 0, 2402MHz

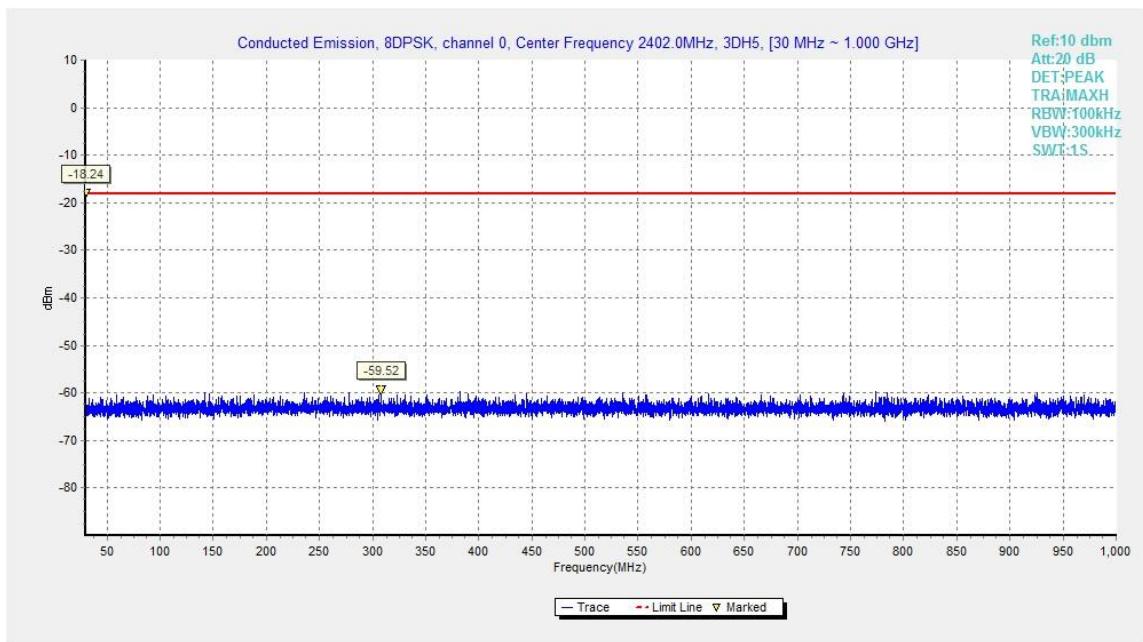


Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

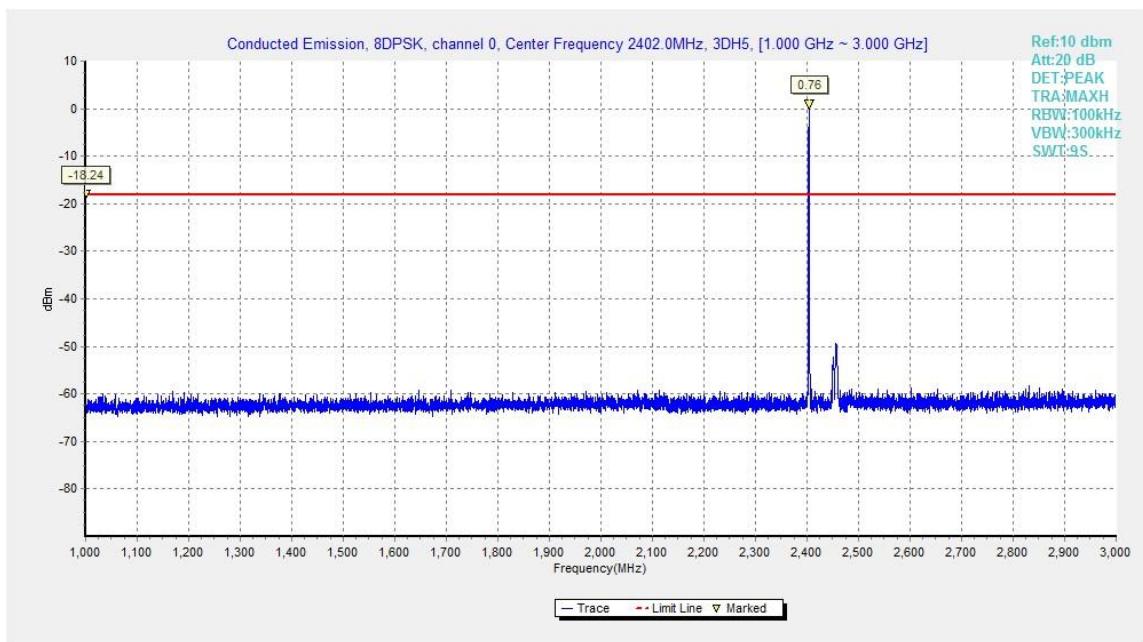


Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

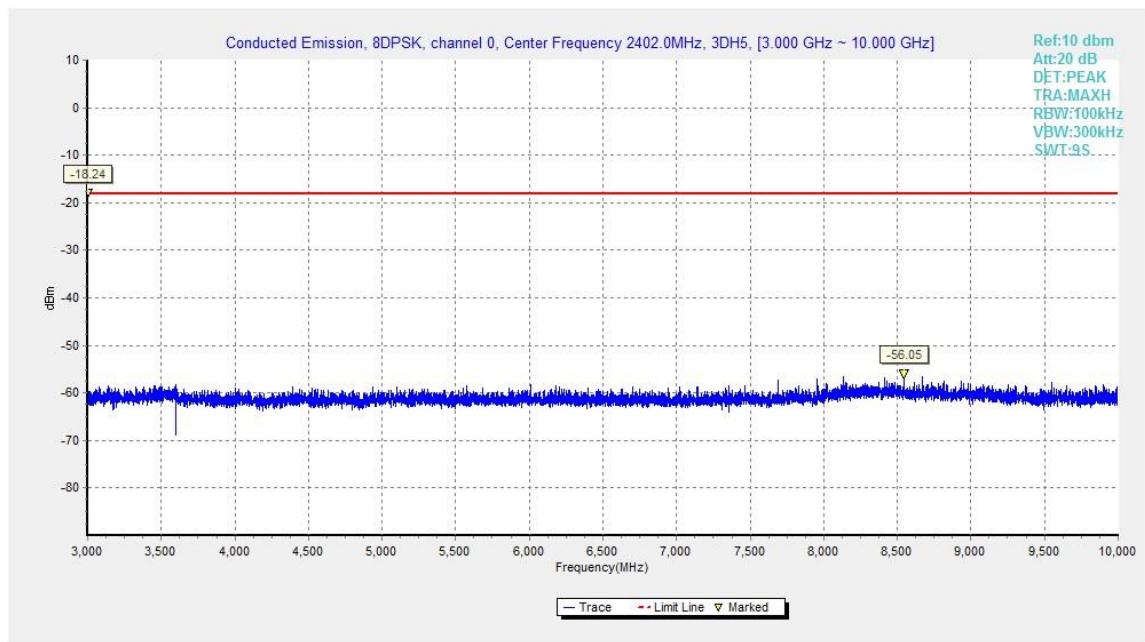


Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

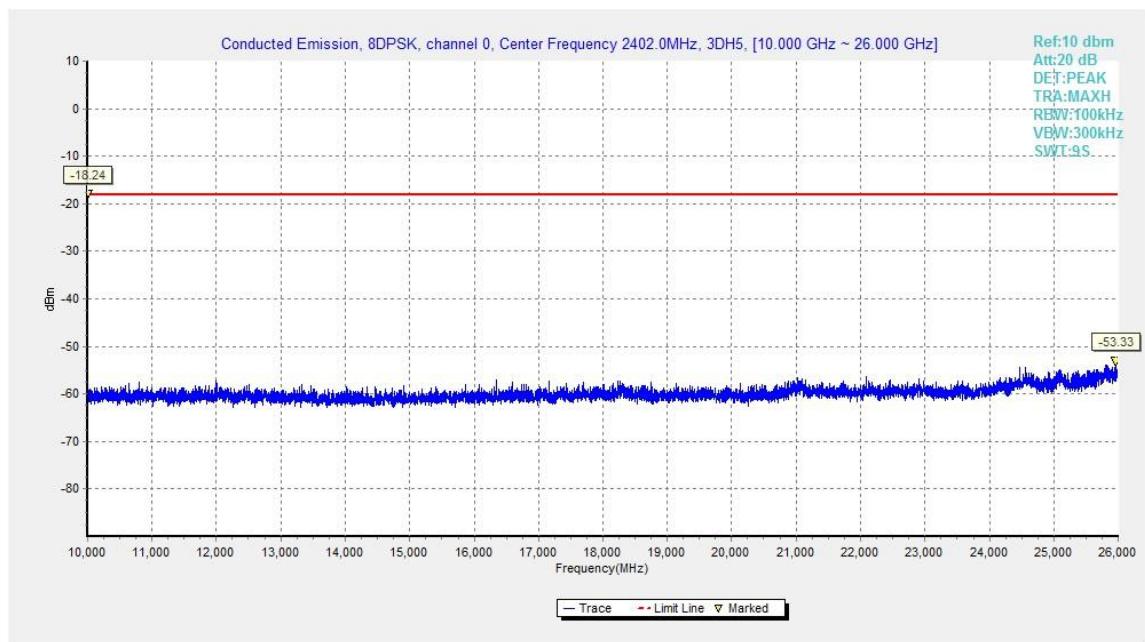


Fig.47. Conducted spurious emission: 8DPSK, Channel 0, 10GHz - 26GHz

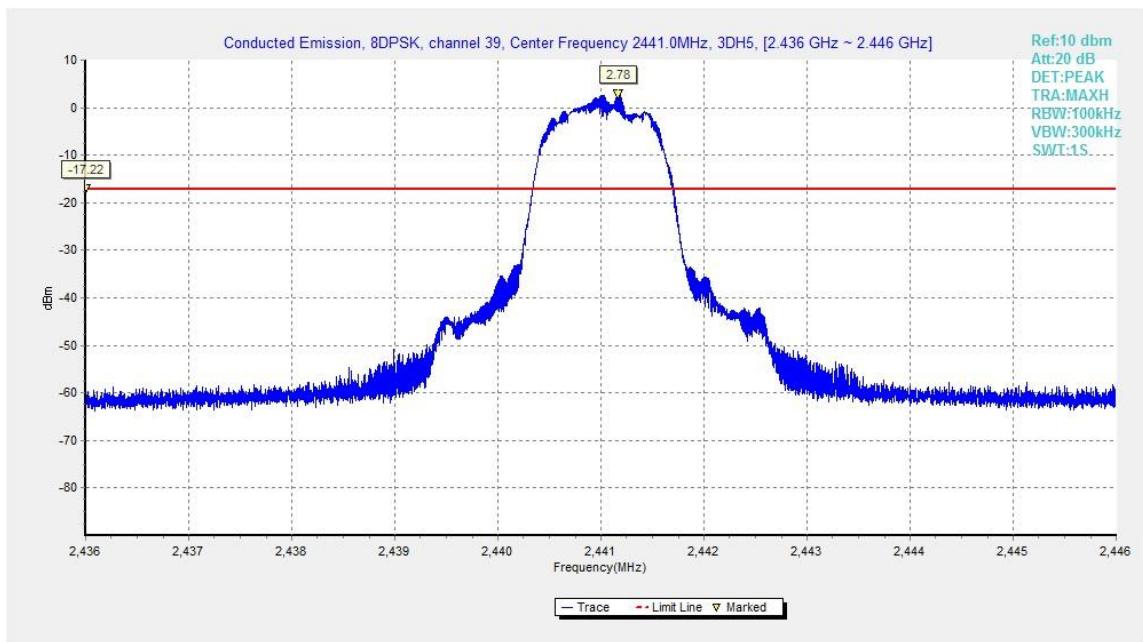


Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

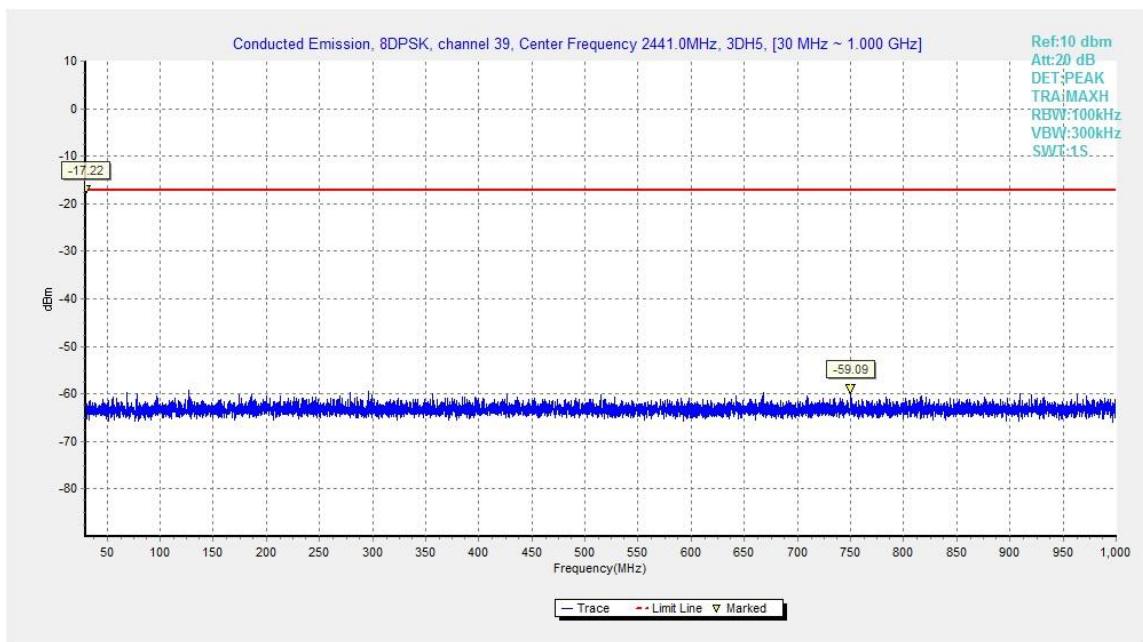


Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

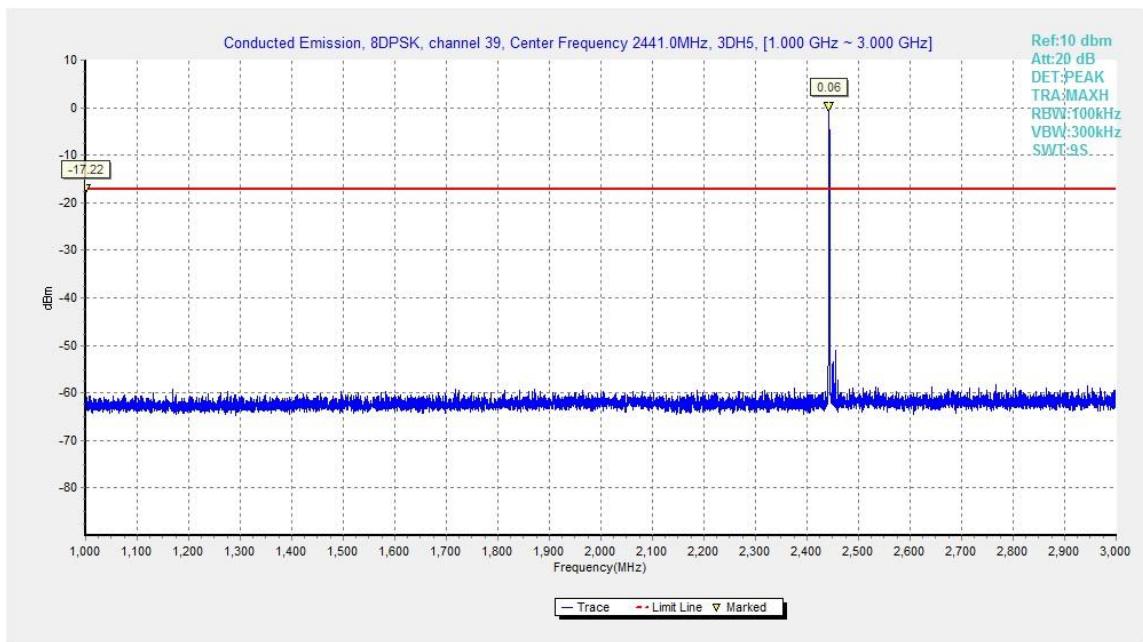


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

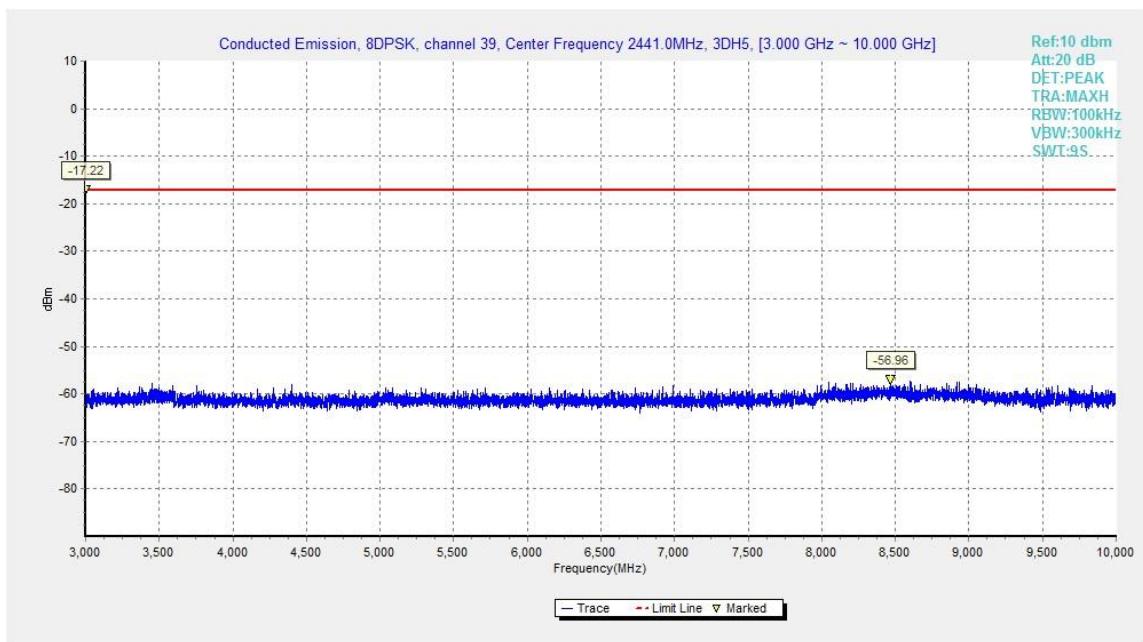


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

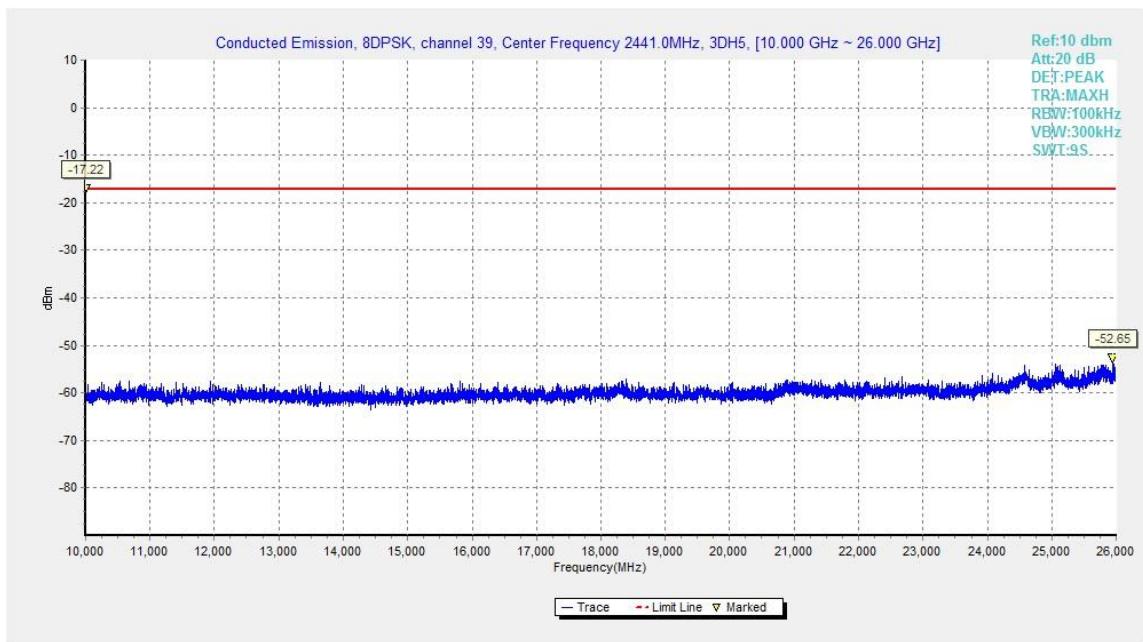


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

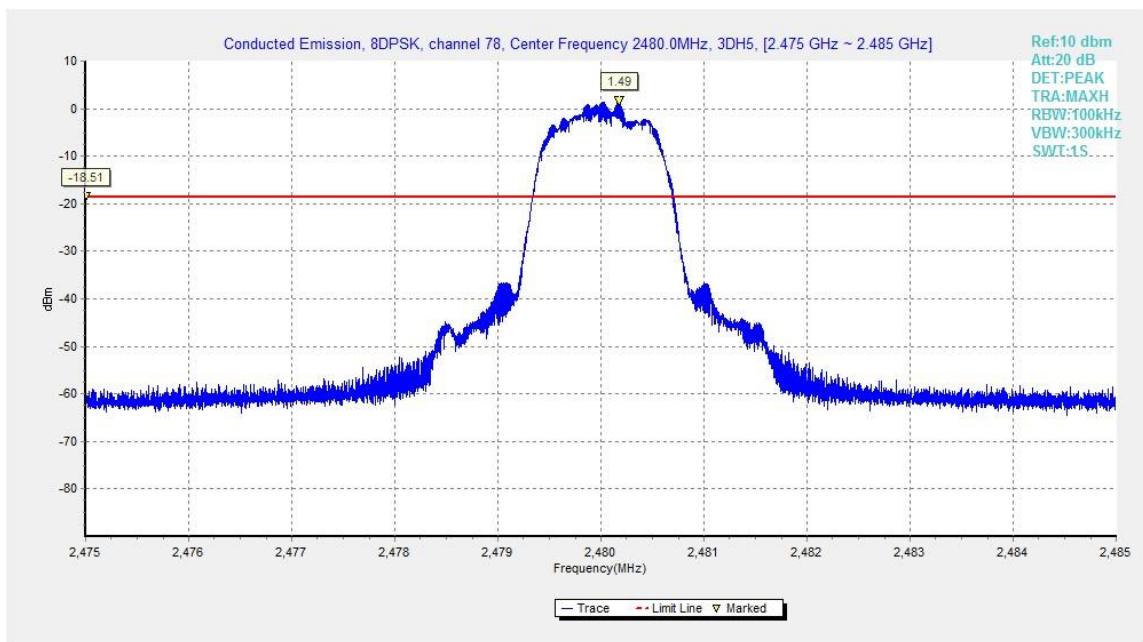


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

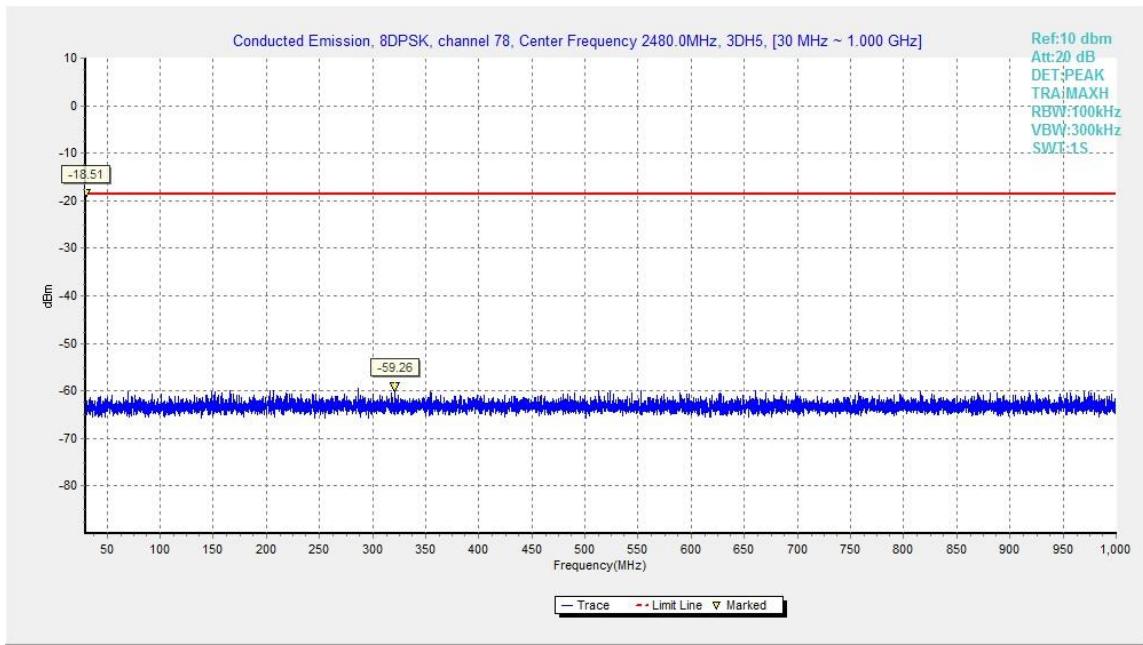


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

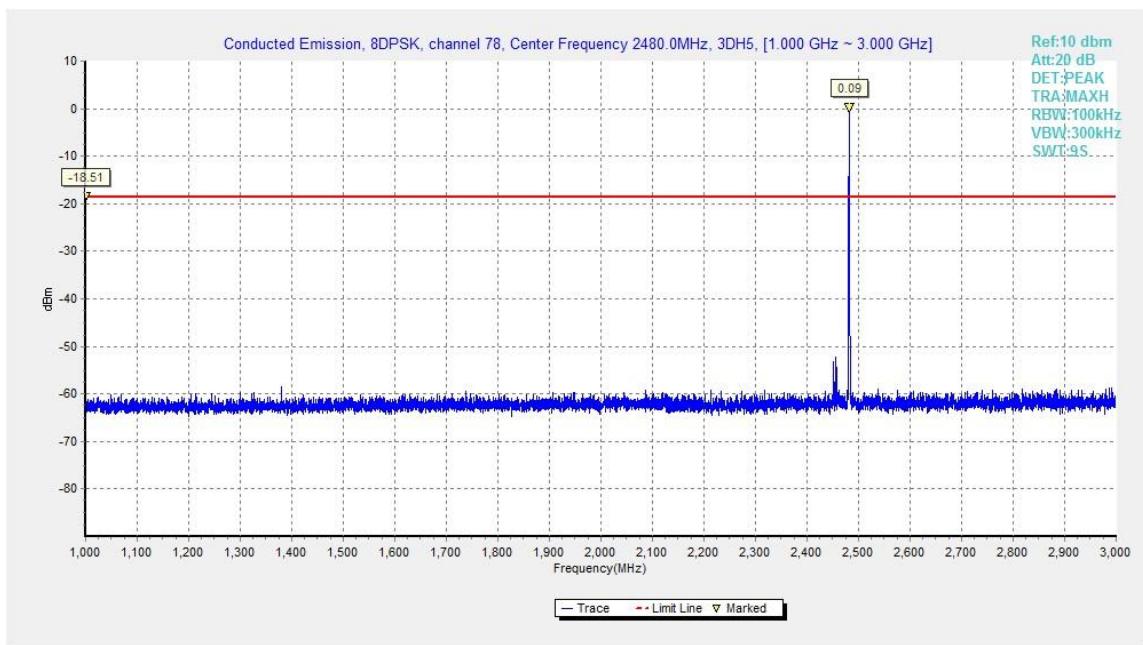


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

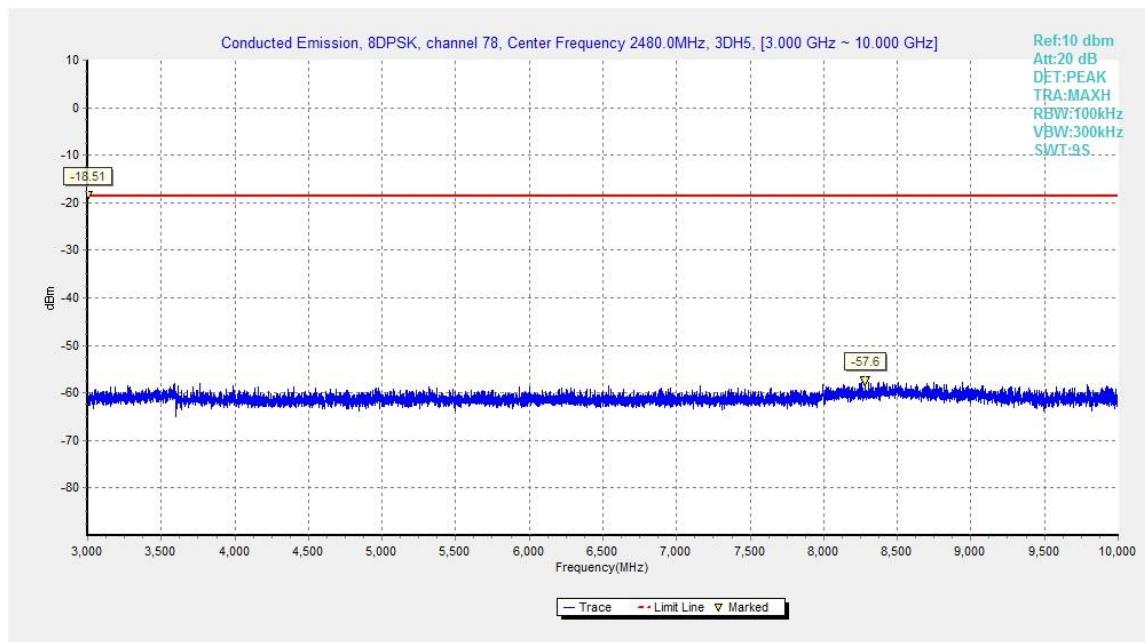


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

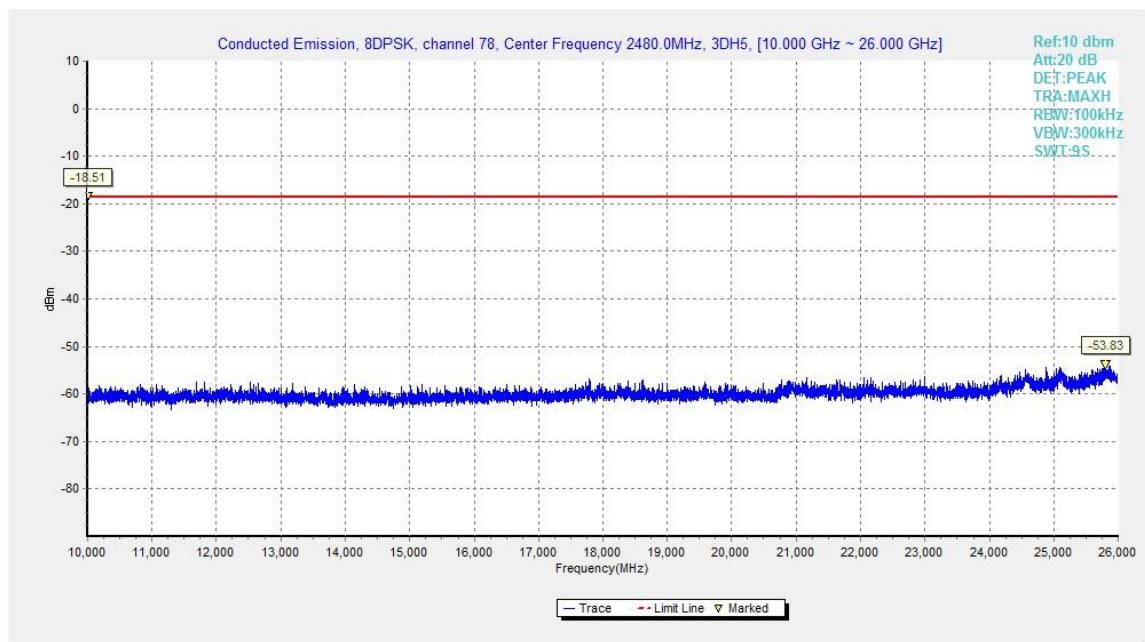


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

A.5. Transmitter Spurious Emission - Radiated

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

For π/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)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2388.900	46.35	2.9	32.0	11.49	54.0	7.7	H	155	135
2390.000	46.27	2.9	32.0	11.43	54.0	7.7	H	155	160
4804.500	37.76	-32.8	34.5	36.10	54.0	16.2	H	155	92
7206.000	37.23	-31.6	36.1	32.76	54.0	16.8	H	155	115
9607.500	41.11	-30.0	37.0	34.16	54.0	12.9	H	155	112
12010.500	42.17	-29.8	39.3	32.69	54.0	11.8	H	155	85

GFSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2436.000	46.46	2.9	32.0	11.57	54.0	7.5	H	155	20
2445.900	46.50	2.9	32.2	11.35	54.0	7.5	H	155	248
4882.500	33.97	-32.7	34.5	32.18	54.0	20.0	H	155	49
7323.000	38.41	-31.9	36.1	34.26	54.0	15.6	H	155	335
9763.500	39.15	-30.6	37.2	32.52	54.0	14.8	H	155	180
12205.500	44.03	-29.4	39.2	34.24	54.0	10.0	H	155	8

GFSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2483.500	49.06	2.9	32.8	13.37	54.0	4.9	H	155	20
2483.600	47.88	2.9	32.8	12.19	54.0	6.1	H	155	45
4960.500	33.93	-33.4	34.5	32.81	54.0	20.1	H	155	240
7440.000	37.47	-31.8	36.0	33.21	54.0	16.5	H	155	180
9919.500	41.12	-29.9	37.4	33.64	54.0	12.9	H	155	85
12400.500	43.44	-29.5	39.1	33.81	54.0	10.6	H	155	25

$\pi/4$ DQPSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2388.800	46.28	2.9	32.0	11.43	54.0	7.7	H	155	0
2390.000	46.26	2.9	32.0	11.42	54.0	7.7	H	155	22
4804.500	34.93	-32.8	34.5	33.28	54.0	19.1	H	155	352
7206.000	37.22	-31.6	36.1	32.75	54.0	16.8	V	155	352
9607.500	41.05	-30.0	37.0	34.10	54.0	12.9	V	155	176
12010.500	42.20	-29.8	39.3	32.72	54.0	11.8	V	155	176

 $\pi/4$ DQPSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2437.100	46.51	2.9	32.0	11.59	54.0	7.5	H	155	25
2445.500	46.54	2.9	32.2	11.40	54.0	7.5	H	155	49
4882.500	33.34	-32.7	34.5	31.55	54.0	20.7	H	155	4
7323.000	38.44	-31.9	36.1	34.28	54.0	15.6	H	155	6
9763.500	39.17	-30.6	37.2	32.55	54.0	14.8	H	155	25
12205.500	44.11	-29.4	39.2	34.32	54.0	9.9	H	155	186

 $\pi/4$ DQPSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2483.500	48.47	2.9	32.8	12.78	54.0	5.5	H	155	175
2483.600	48.18	2.9	32.8	12.49	54.0	5.8	H	155	5
4960.500	33.87	-33.4	34.5	32.75	54.0	20.1	H	155	26
7440.000	37.31	-31.8	36.0	33.05	54.0	16.7	H	155	355
9919.500	41.22	-29.9	37.4	33.75	54.0	12.8	H	155	6
12400.500	43.48	-29.5	39.1	33.85	54.0	10.5	H	155	12

8DPSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2387.700	46.24	2.9	32.0	11.38	54.0	7.8	H	155	5
2390.000	46.29	2.9	32.0	11.45	54.0	7.7	H	155	25
4375.500	34.57	-33.4	34.3	33.69	54.0	19.4	H	155	356
7206.000	37.26	-31.6	36.1	32.79	54.0	16.7	H	155	350
9607.500	40.98	-30.0	37.0	34.03	54.0	13.0	H	155	185
12010.500	42.21	-29.8	39.3	32.74	54.0	11.8	H	155	187

8DPSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2436.100	46.44	2.9	32.0	11.55	54.0	7.6	H	155	86
2446.600	46.47	2.9	32.3	11.30	54.0	7.5	H	155	107
4882.500	33.09	-32.7	34.5	31.31	54.0	20.9	H	155	130
7323.000	38.43	-31.9	36.1	34.28	54.0	15.6	H	155	152
9763.500	39.19	-30.6	37.2	32.56	54.0	14.8	H	155	174
12205.500	44.11	-29.4	39.2	34.32	54.0	9.9	H	155	195

8DPSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2483.500	47.47	2.9	32.8	11.77	54.0	6.5	H	155	20
2483.700	47.00	2.9	32.8	11.31	54.0	7.0	H	155	45
4960.500	33.80	-33.4	34.5	32.67	54.0	20.2	H	155	240
7440.000	37.43	-31.8	36.0	33.17	54.0	16.6	H	155	180
9919.500	41.17	-29.9	37.4	33.69	54.0	12.8	H	155	85
12400.500	43.45	-29.5	39.1	33.82	54.0	10.6	H	155	25

GFSK Ch 0 – Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2385.306	60.05	2.9	32.0	25.17	74.0	14.0	H	155	132
2387.616	60.12	2.9	32.0	25.25	74.0	13.9	H	155	154
4804.000	44.76	-32.9	34.5	43.11	74.0	29.2	V	155	88
7206.000	43.05	-31.6	36.1	38.58	74.0	30.9	H	155	110
9608.000	47.51	-30.0	37.0	40.56	74.0	26.5	V	155	110
12010.000	45.40	-29.8	39.3	35.92	74.0	28.6	V	155	88

GFSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2373.000	48.43	-26.8	32.1	43.16	74.0	25.6	H	155	22
2603.600	48.79	-26.9	33.0	42.70	74.0	25.2	H	155	242
4882.000	41.12	-32.7	34.5	39.33	74.0	32.9	V	155	44
7323.000	45.02	-31.9	36.1	40.86	74.0	29.0	H	155	330
9764.000	44.87	-30.6	37.2	38.24	74.0	29.1	H	155	176
12205.000	49.05	-29.4	39.2	39.26	74.0	25.0	H	155	0

GFSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2487.930	60.31	2.9	32.6	24.74	74.0	13.7	H	155	22
2490.860	60.43	2.9	32.6	24.94	74.0	13.6	H	155	44
4960.000	40.57	-33.4	34.5	39.44	74.0	33.4	H	155	242
7440.000	42.52	-31.8	36.0	38.26	74.0	31.5	H	155	176
9920.000	47.47	-29.9	37.4	40.00	74.0	26.5	H	155	88
12400.000	47.16	-29.5	39.1	37.54	74.0	26.8	V	155	22

$\pi/4$ DQPSK Ch 0 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2384.018	60.01	2.9	32.0	25.12	74.0	14.0	H	155	88
2388.036	59.80	2.9	32.0	24.94	74.0	14.2	H	155	22
4804.000	41.13	-32.9	34.5	39.49	74.0	32.9	V	155	220
7206.000	42.98	-31.6	36.1	38.51	74.0	31.0	V	155	242
9608.000	47.36	-30.0	37.0	40.41	74.0	26.6	V	155	44
12010.000	46.69	-29.8	39.3	37.22	74.0	27.3	V	155	66

 $\pi/4$ DQPSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2379.000	48.38	-26.4	32.1	42.7	74.0	25.6	H	155	22
2498.600	48.73	-26.0	32.3	42.4	74.0	25.3	V	155	44
4882.000	41.36	-32.7	34.5	39.58	74.0	32.6	H	155	0
7323.000	45.14	-31.9	36.1	40.99	74.0	28.9	H	155	0
9764.000	45.65	-30.6	37.2	39.02	74.0	28.4	H	155	22
12205.000	49.63	-29.4	39.2	39.84	74.0	24.4	H	155	176

 $\pi/4$ DQPSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2486.610	60.37	2.9	32.7	24.76	74.0	13.6	H	155	176
2494.350	60.46	2.9	32.5	25.07	74.0	13.5	H	155	0
4960.000	41.31	-33.4	34.5	40.19	74.0	32.7	V	155	22
7440.000	43.77	-31.8	36.0	39.51	74.0	30.2	V	155	352
9920.000	46.86	-29.9	37.4	39.39	74.0	27.1	V	155	0
12400.000	46.92	-29.5	39.1	37.29	74.0	27.1	V	155	0

8DPSK Ch 0 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2386.244	60.68	2.9	32.0	25.81	74.0	13.3	H	155	0
2388.876	60.42	2.9	32.0	25.57	74.0	13.6	H	155	22
4804.000	40.65	-32.9	34.5	39.00	74.0	33.4	H	155	352
7206.000	43.11	-31.6	36.1	38.64	74.0	30.9	V	155	352
9608.000	48.26	-30.0	37.0	41.30	74.0	25.7	V	155	176
12010.000	46.60	-29.8	39.3	37.13	74.0	27.4	V	155	176

8DPSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2377.800	48.14	-26.5	32.1	42.52	74.0	25.9	V	155	88
2523.200	48.08	-26.8	32.7	42.20	74.0	25.9	H	155	110
4882.000	39.91	-32.7	34.5	38.13	74.0	34.1	V	155	132
7323.000	44.89	-31.9	36.1	40.74	74.0	29.1	H	155	154
9764.000	45.01	-30.6	37.2	38.38	74.0	29.0	V	155	176
12205.000	46.58	-29.4	39.2	36.79	74.0	27.4	V	155	198

8DPSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dB μ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB μ V)	Limit (dB μ V/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2489.610	60.98	2.9	32.6	25.45	74.0	13.0	H	155	22
2495.040	60.35	2.9	32.4	24.97	74.0	13.6	H	155	44
4960.000	40.47	-33.4	34.5	39.34	74.0	33.5	H	155	242
7440.000	42.51	-31.8	36.0	38.25	74.0	31.5	H	155	176
9920.000	45.51	-29.9	37.4	38.03	74.0	28.5	H	155	88
12400.000	47.19	-29.5	39.1	37.56	74.0	26.8	V	155	22

Conclusion: PASS

Test graphs as below:

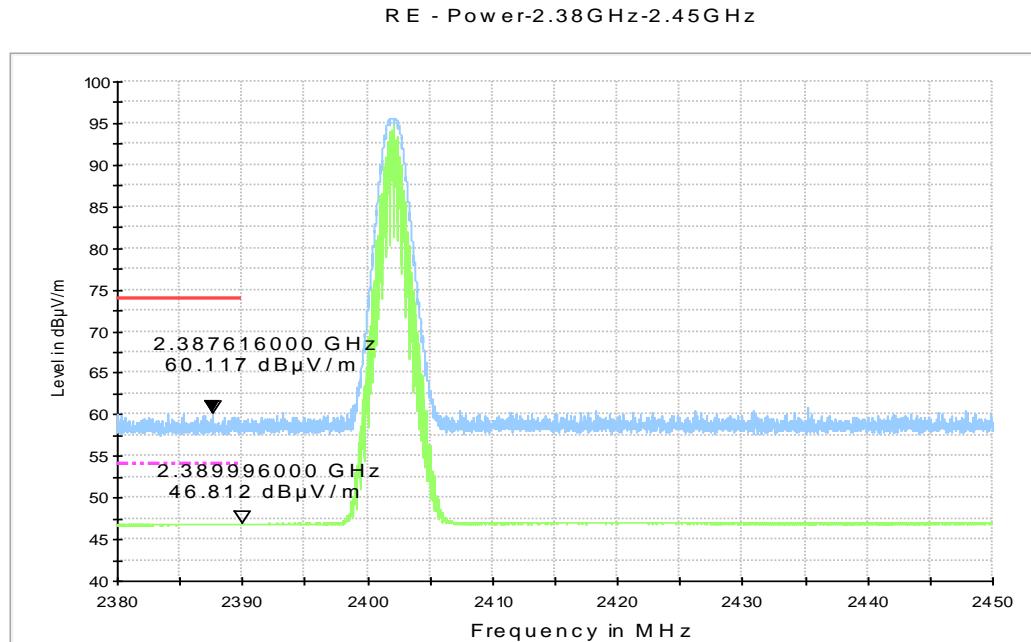


Fig.58. Radiated emission (Power): GFSK, low channel

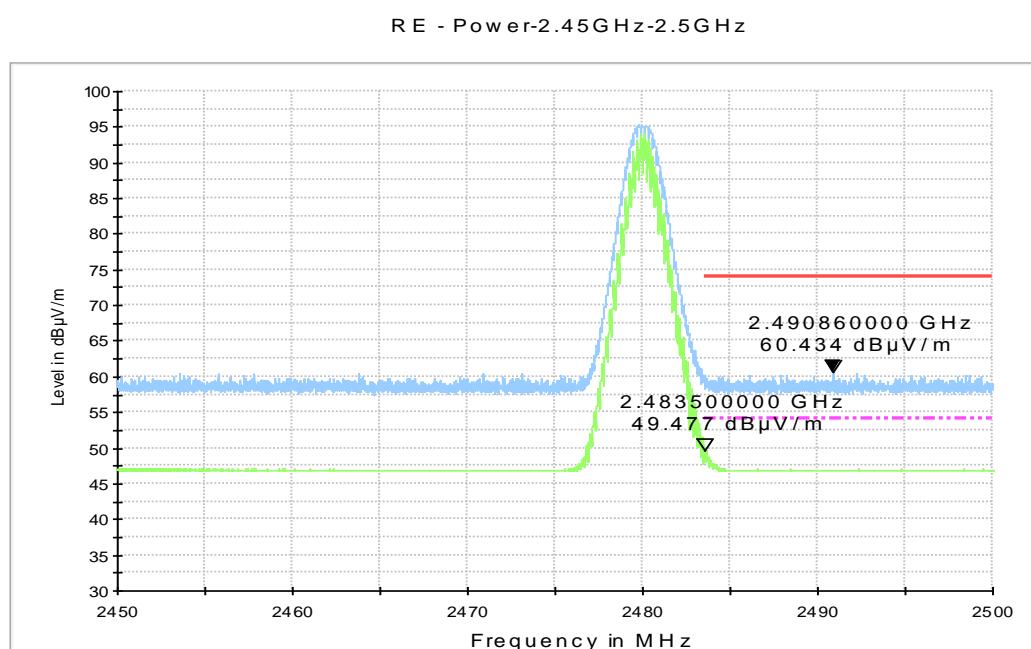


Fig.59. Radiated emission (Power) GFSK, high channel

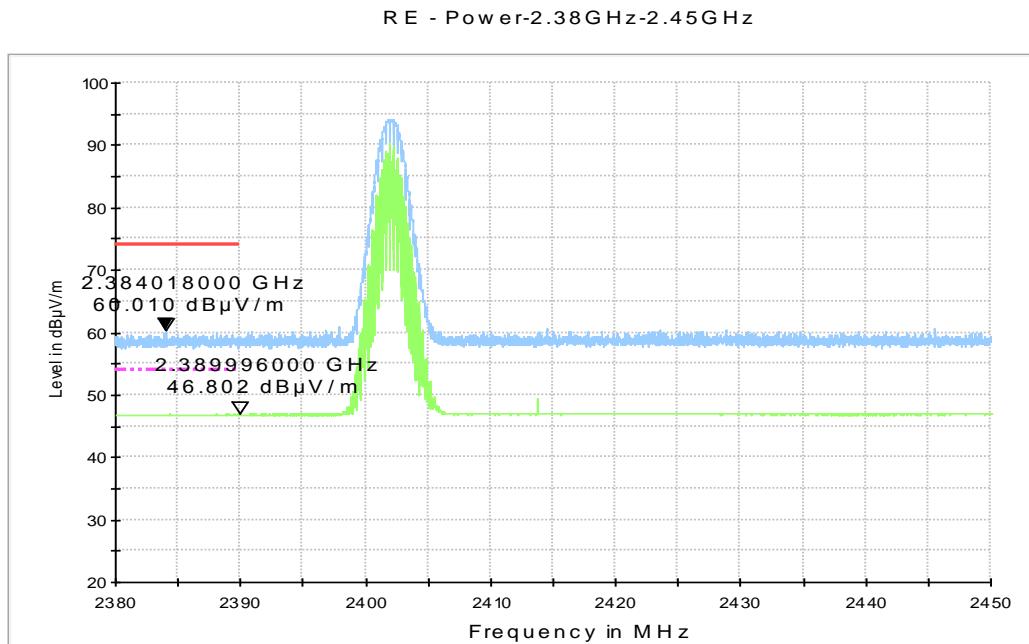


Fig.60. Radiated emission (Power): $\pi/4$ DQPSK, low channel

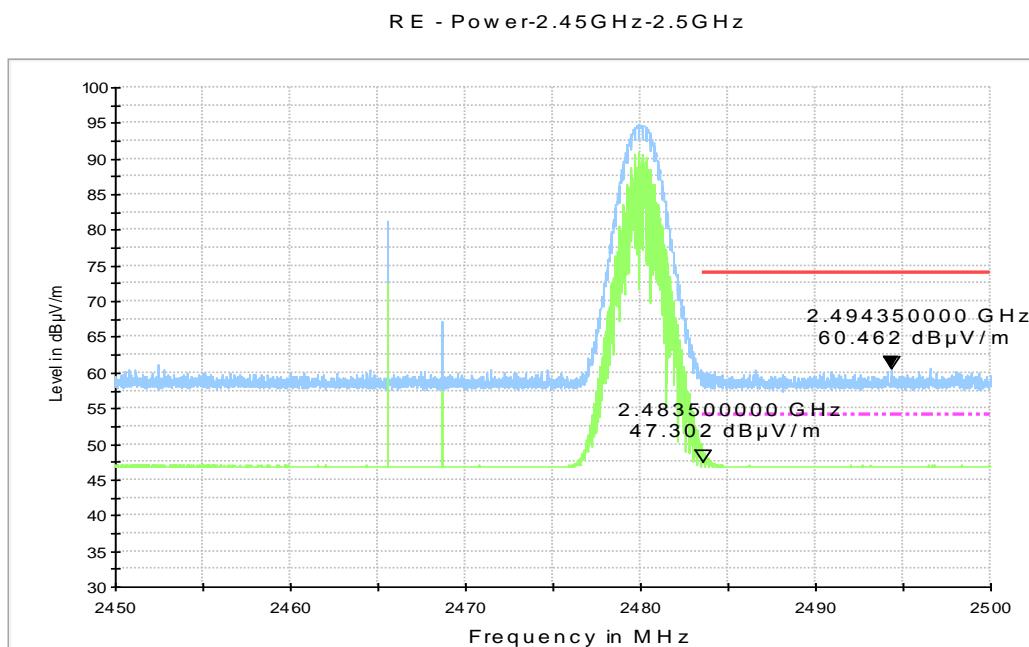


Fig.61. Radiated emission (Power): $\pi/4$ DQPSK, high channel

R E - Power-2.38 GHz-2.45 GHz

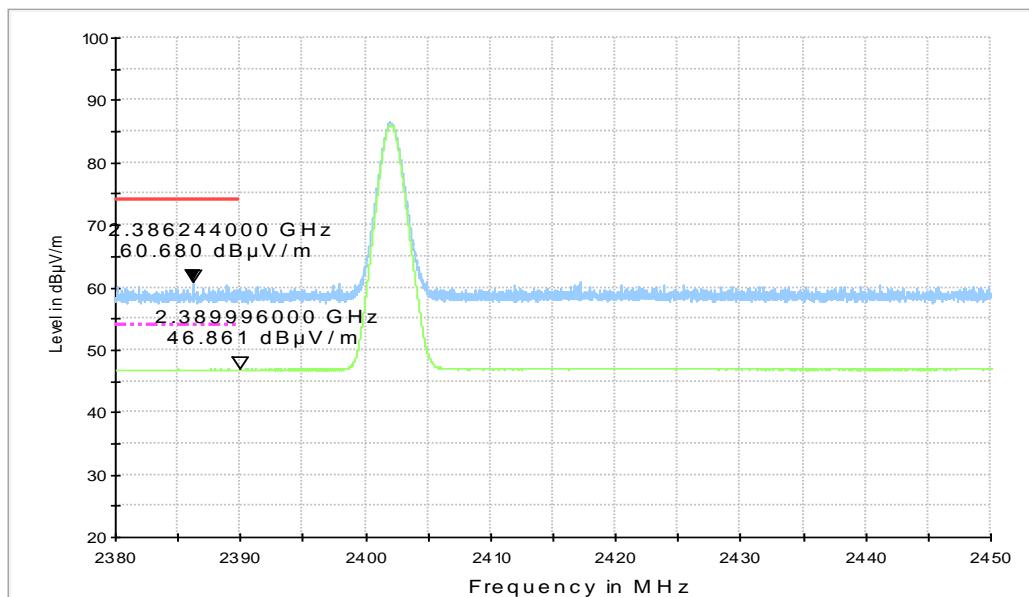


Fig.62. Radiated emission (Power): 8DPSK, low channel

R E - Power-2.45 GHz-2.5 GHz

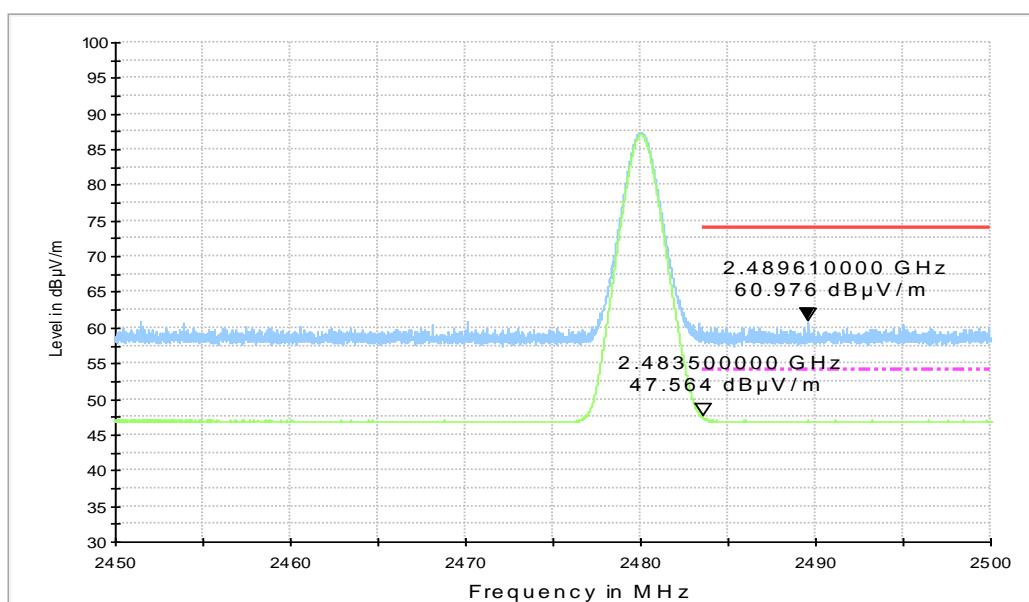


Fig.63. Radiated emission (Power): 8DPSK, high channel

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 \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.64	121.15	P
		Fig.65		
	DH3	Fig.66	157.16	P
		Fig.67		
	DH5	Fig.68	213.52	P
		Fig.69		

For π/4 DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.70	123.43	P
		Fig.71		
	DH3	Fig.72	160.62	P
		Fig.73		
	DH5	Fig.74	181.88	P
		Fig.75		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.76	122.99	P
		Fig.77		
	DH3	Fig.78	186.71	P

		Fig.79		
DH5		Fig.80	210.88	P
		Fig.81		

Conclusion: PASS

Test graphs as below:

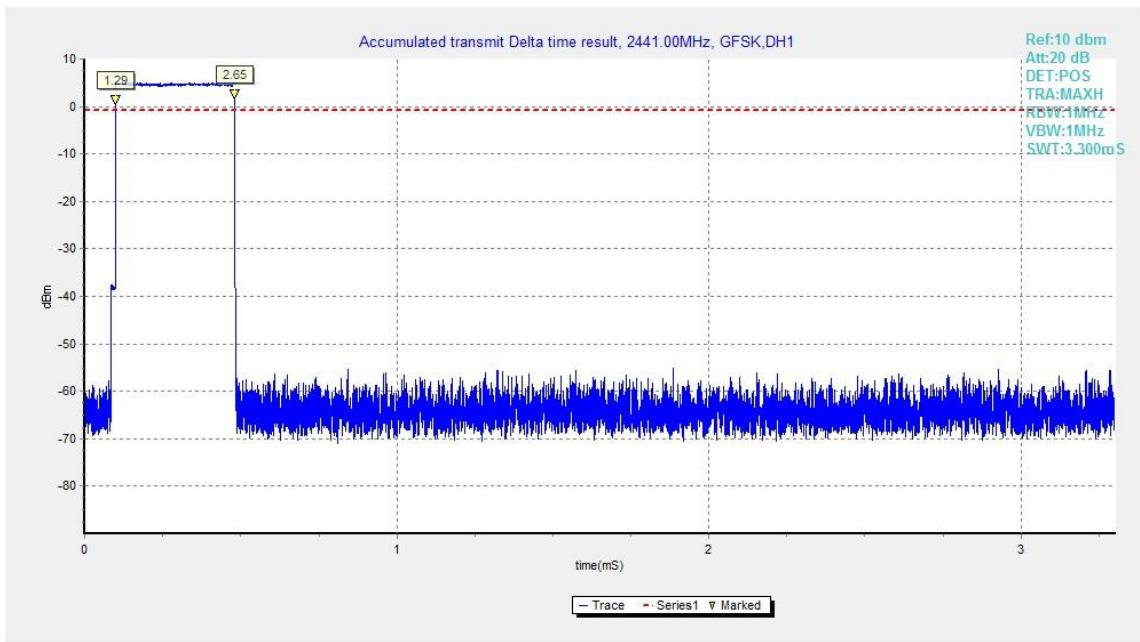


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

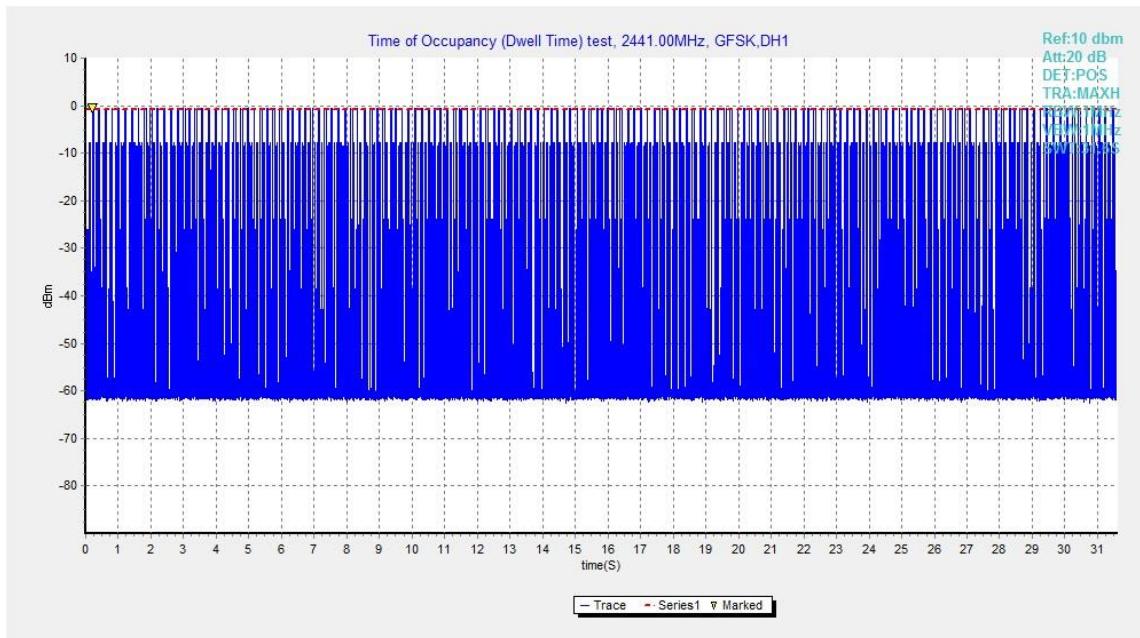


Fig.65. Number of Transmissions Measurement: Channel 39,Packet DH1

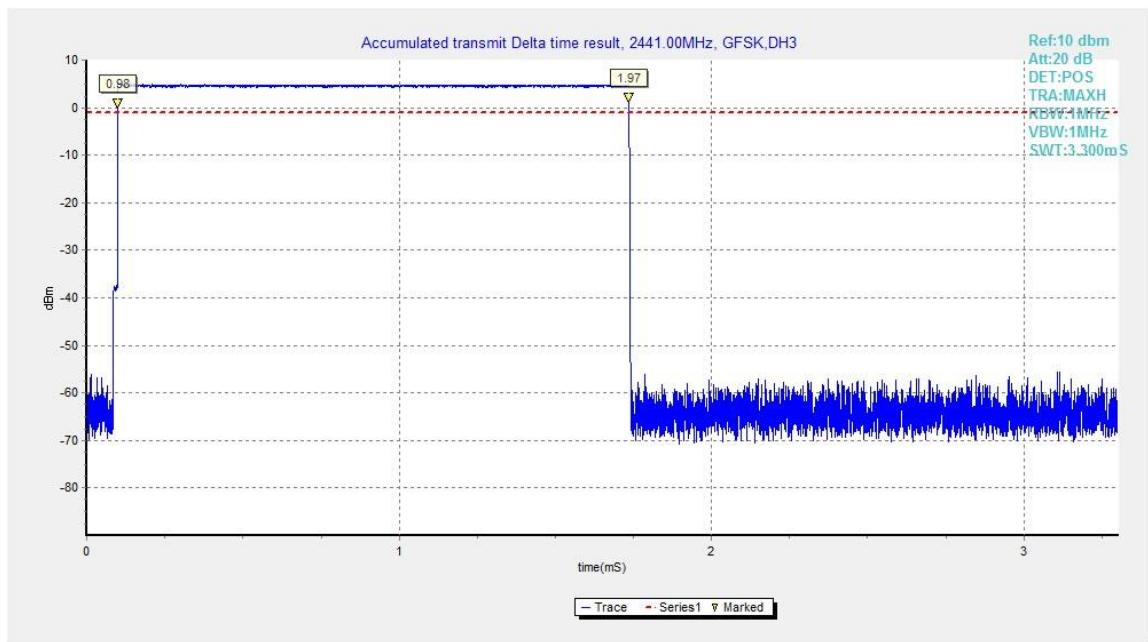


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

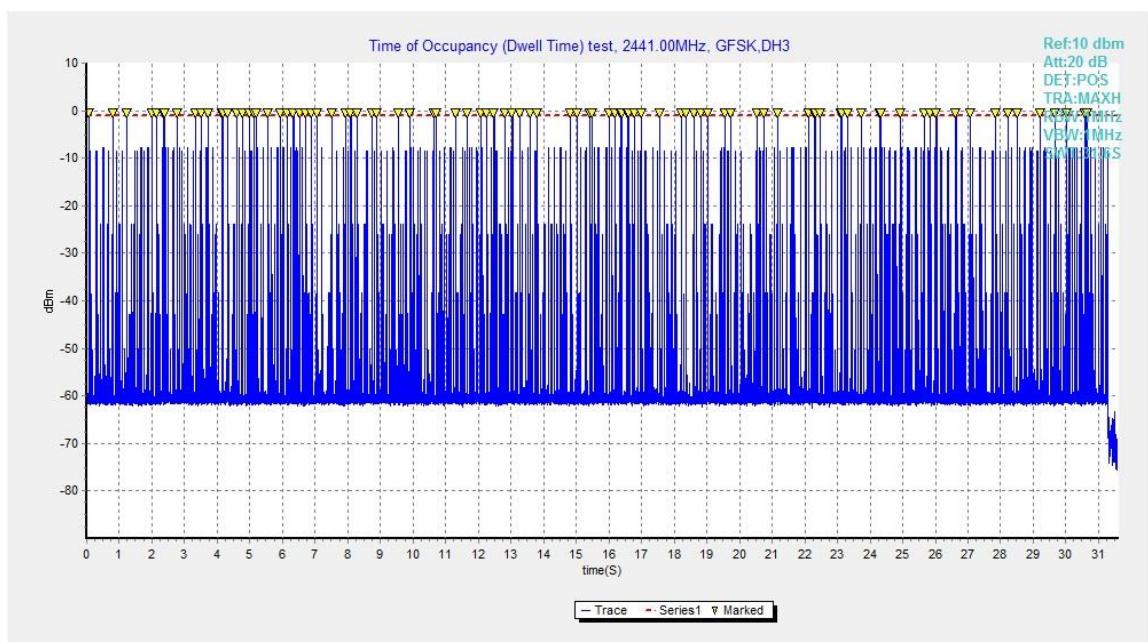


Fig.67. Number of Transmissions Measurement: Channel 39,Packet DH3

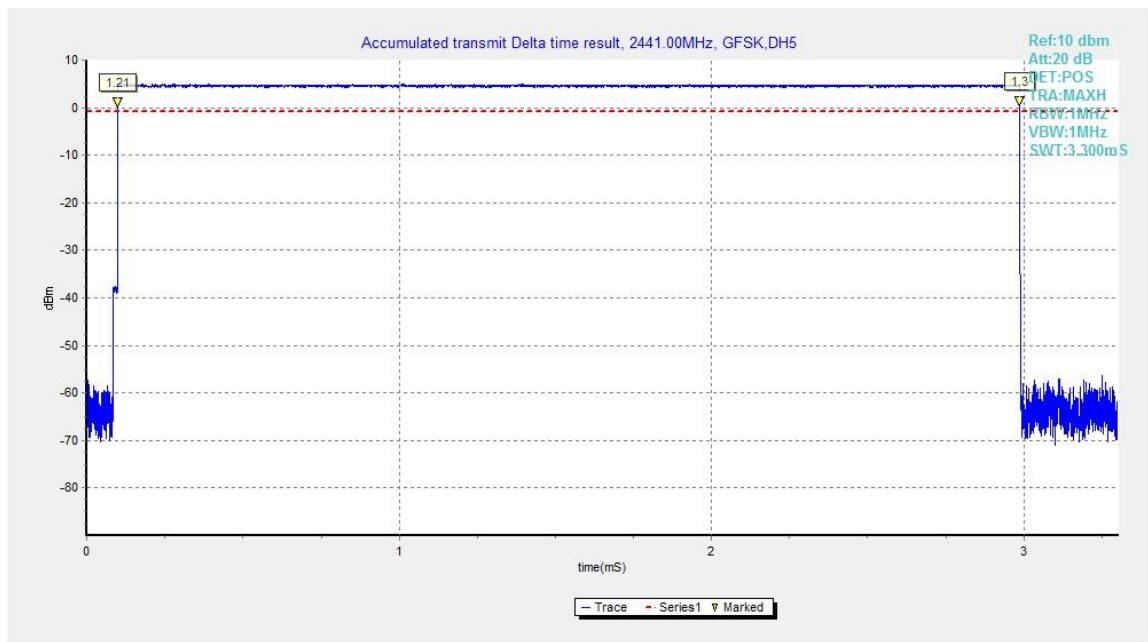


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

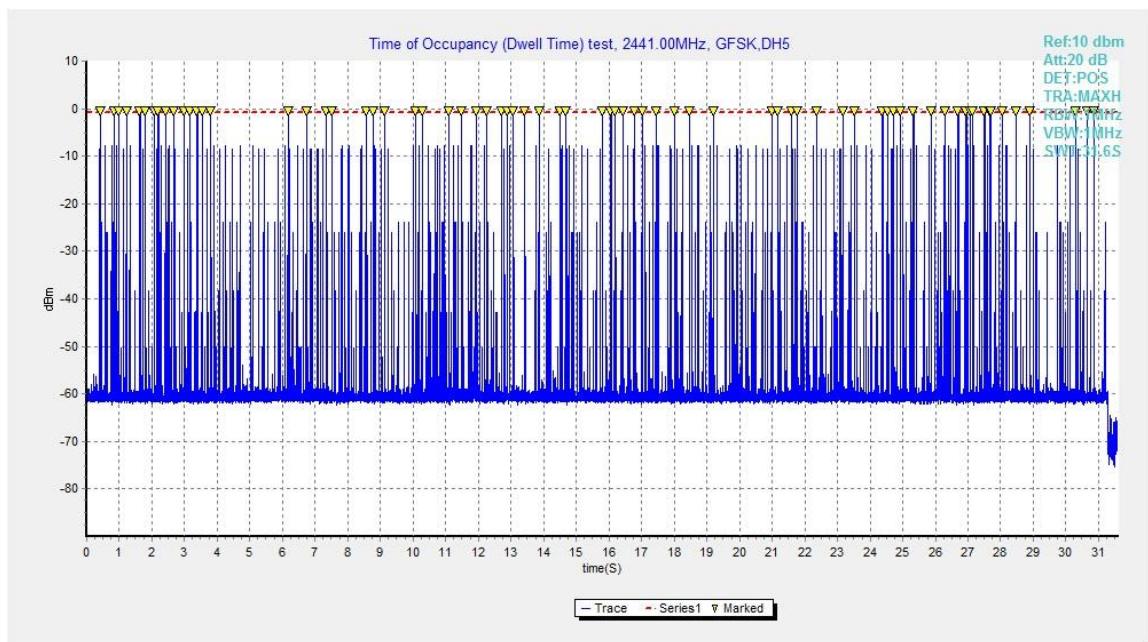


Fig.69. Number of Transmissions Measurement: Channel 39,Packet DH5

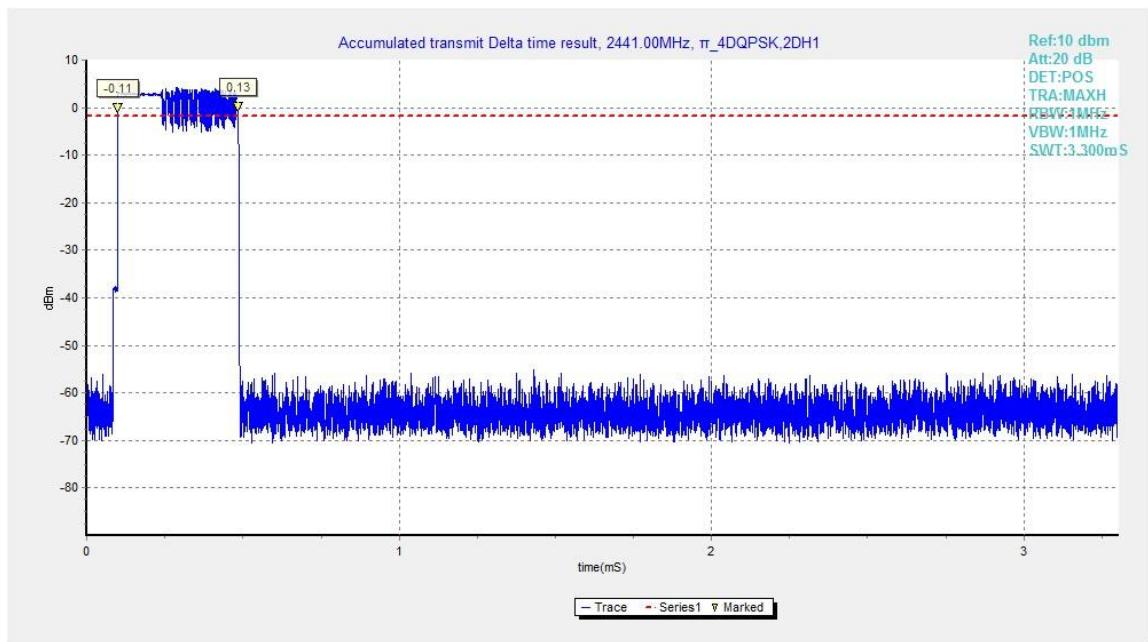


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

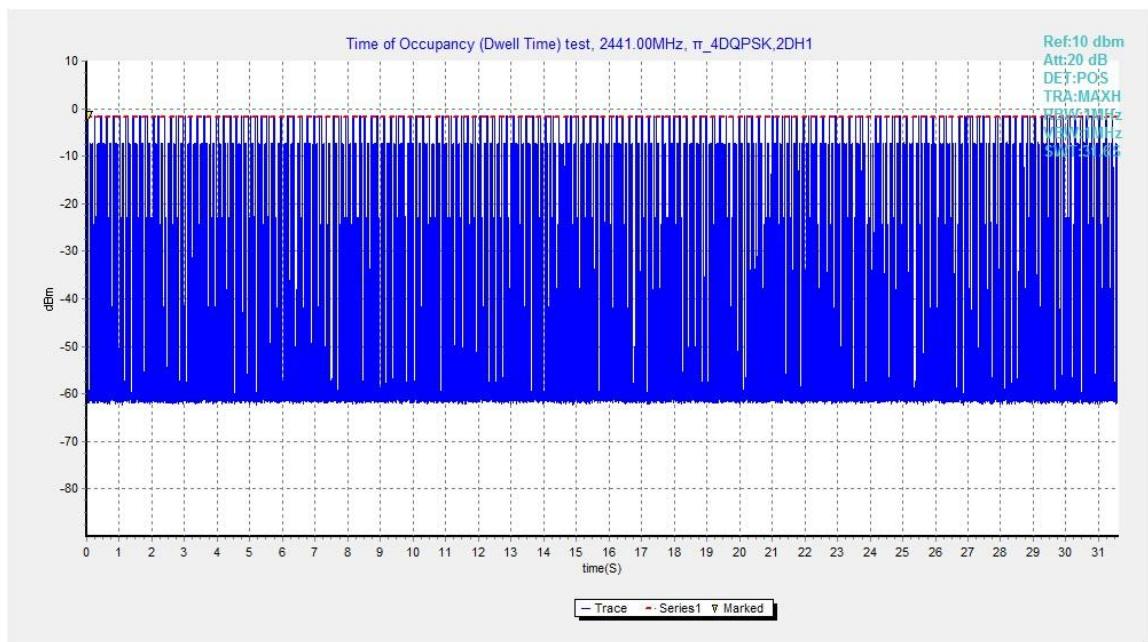


Fig.71. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

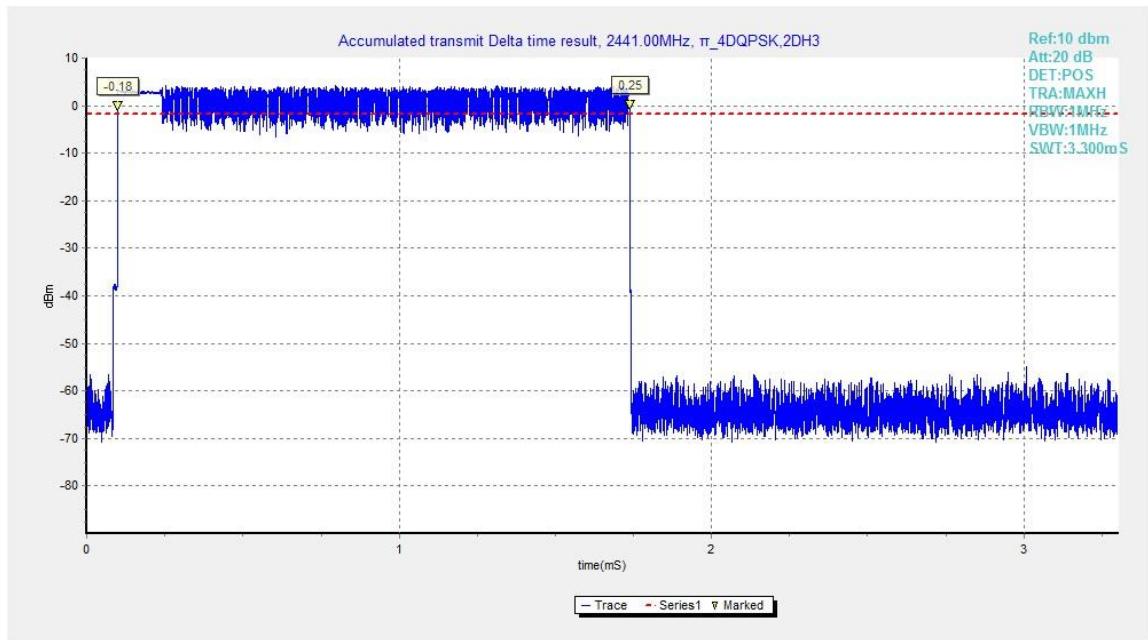


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

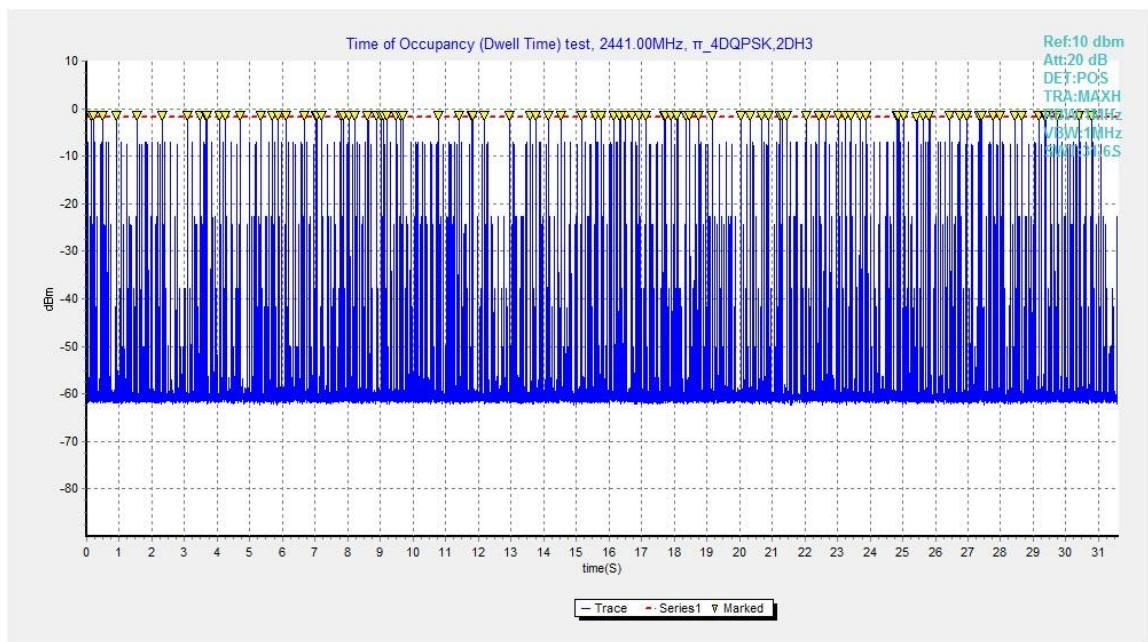


Fig.73. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

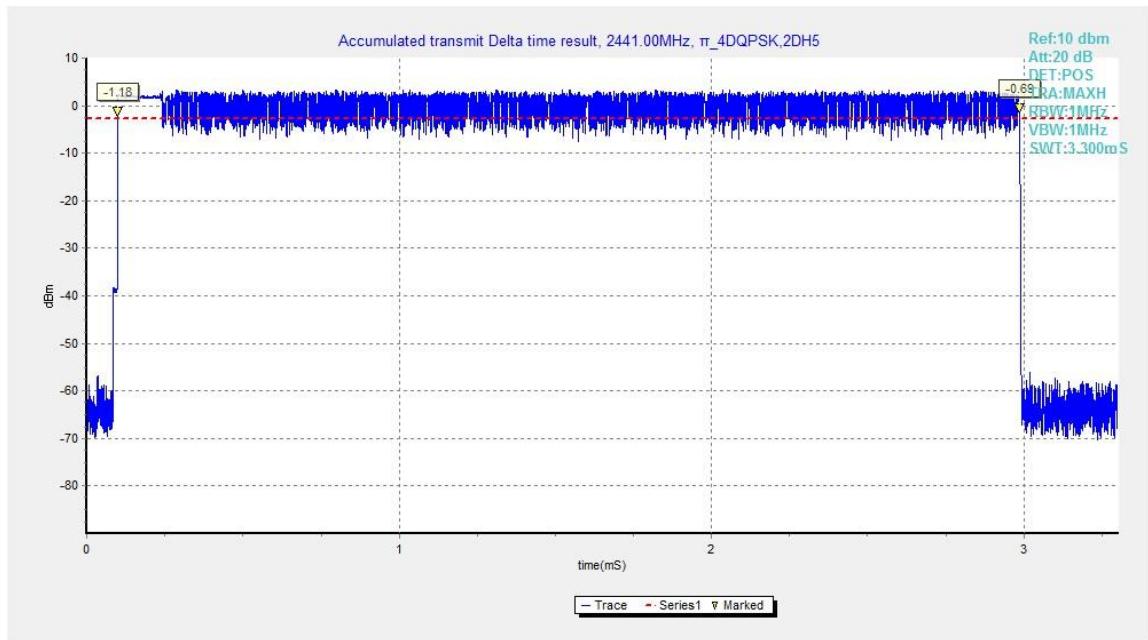


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

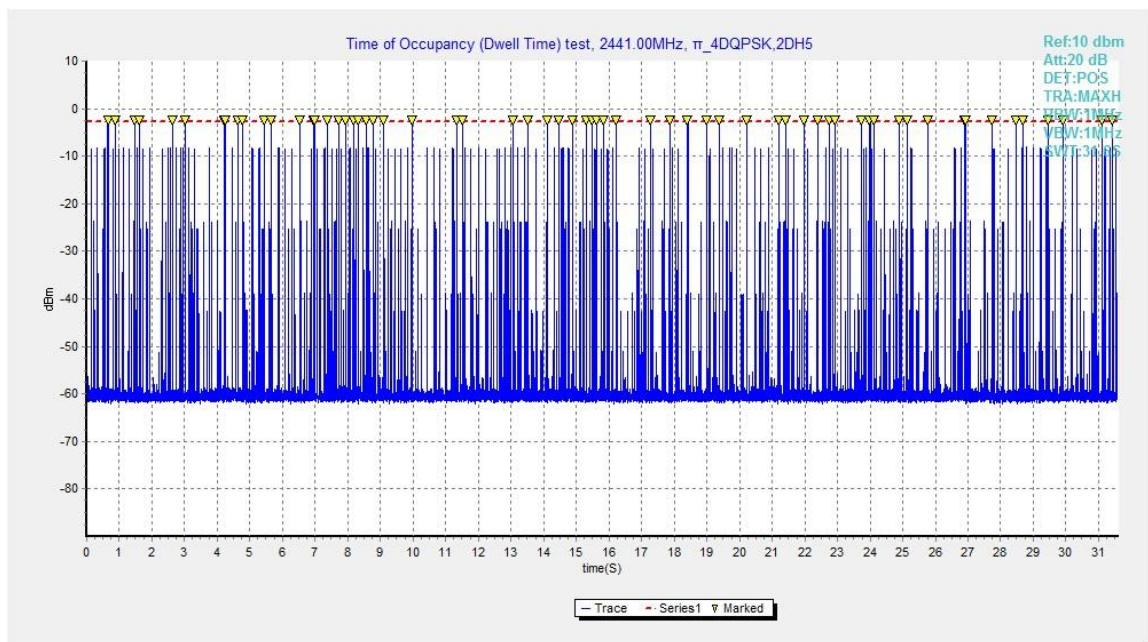


Fig.75. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

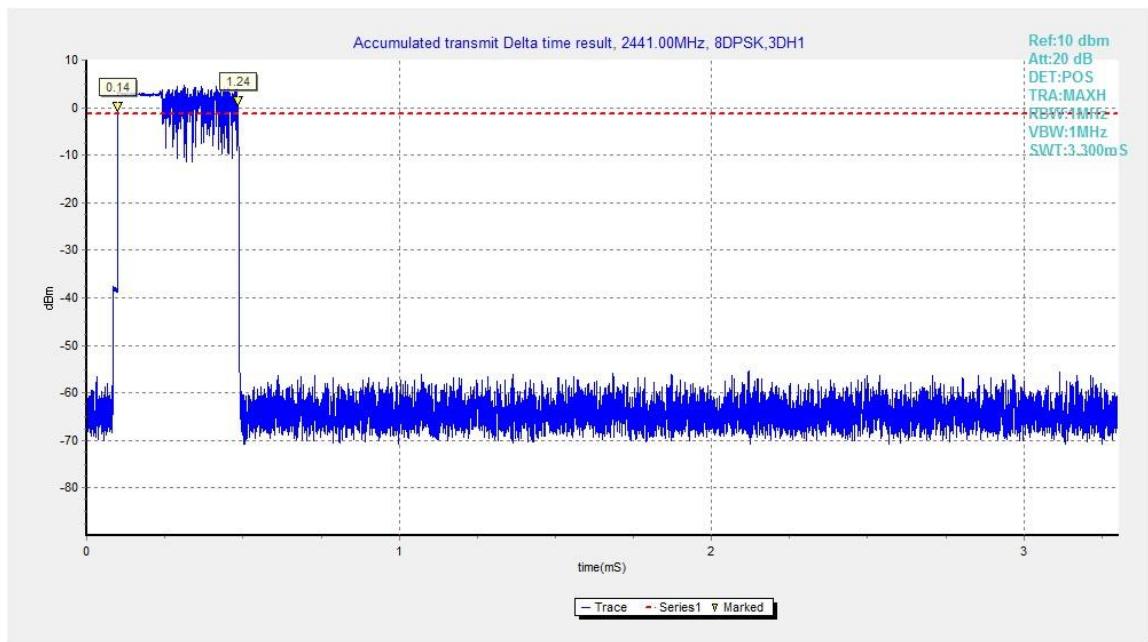


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

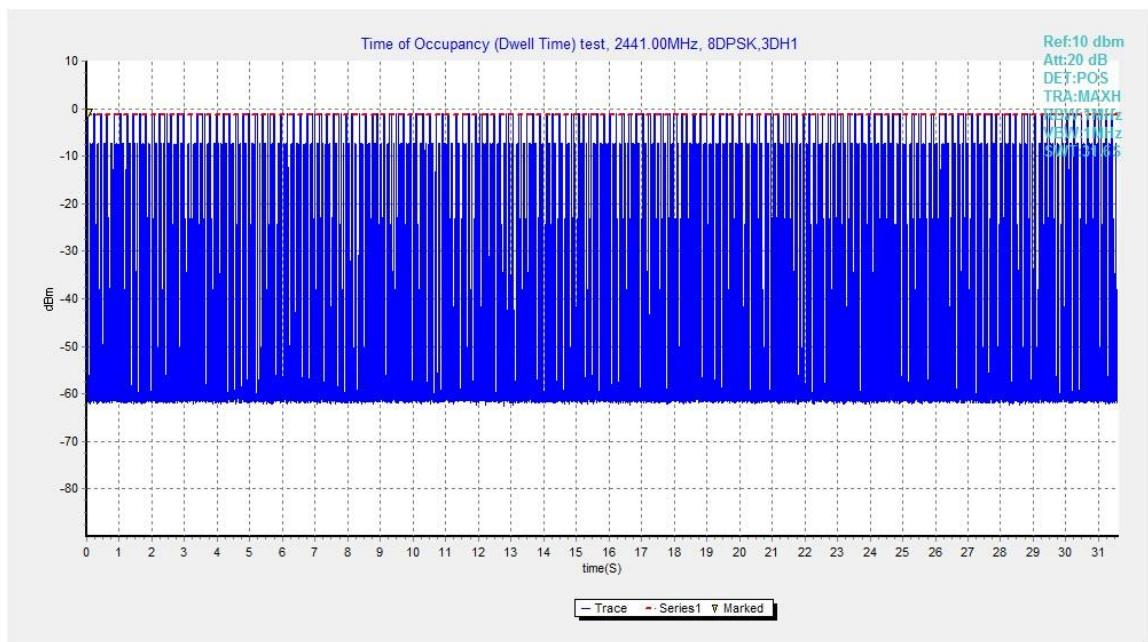


Fig.77. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

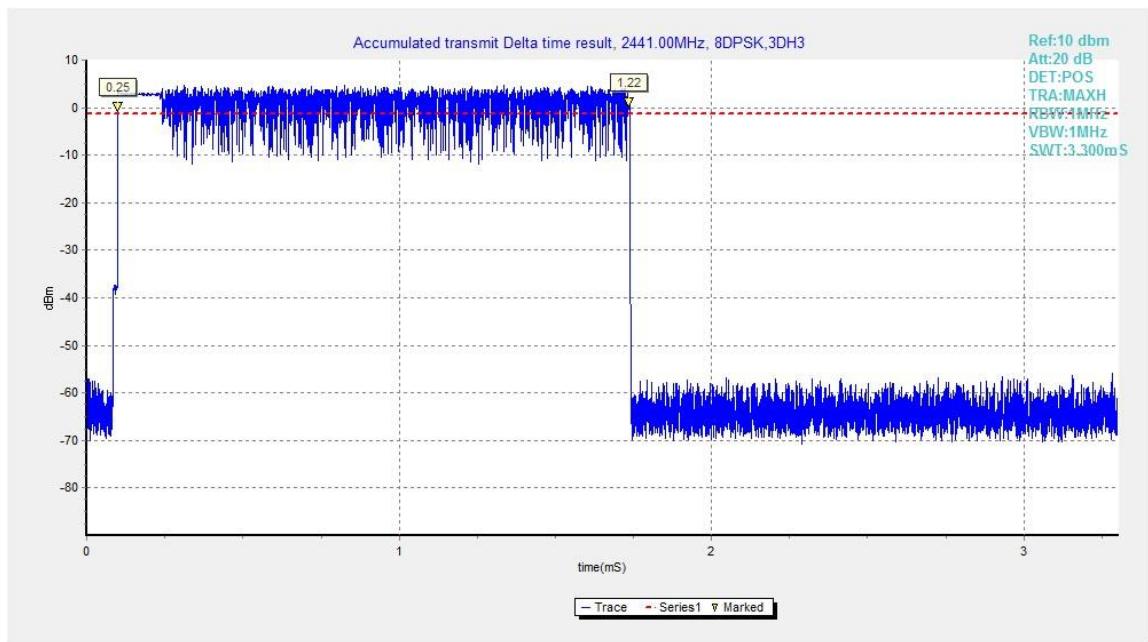


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

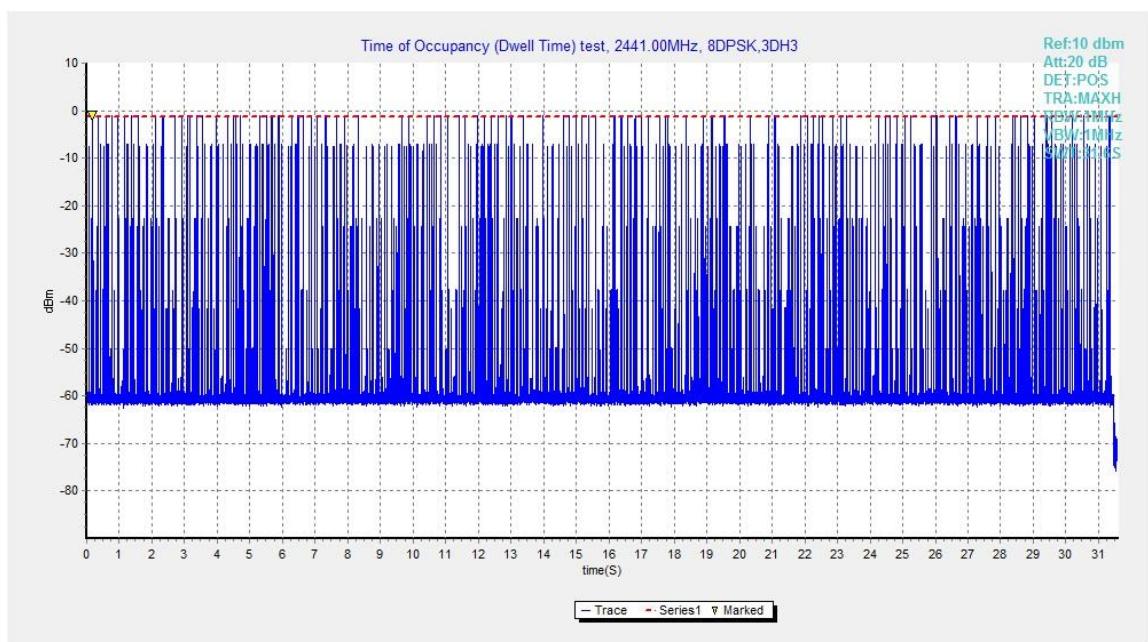


Fig.79. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

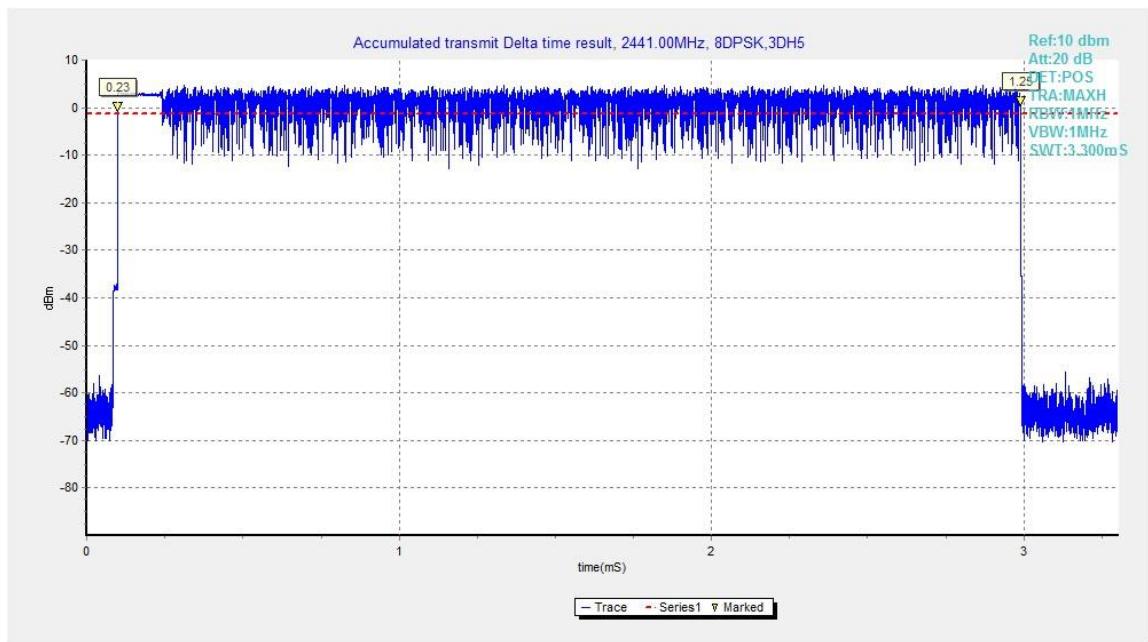


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

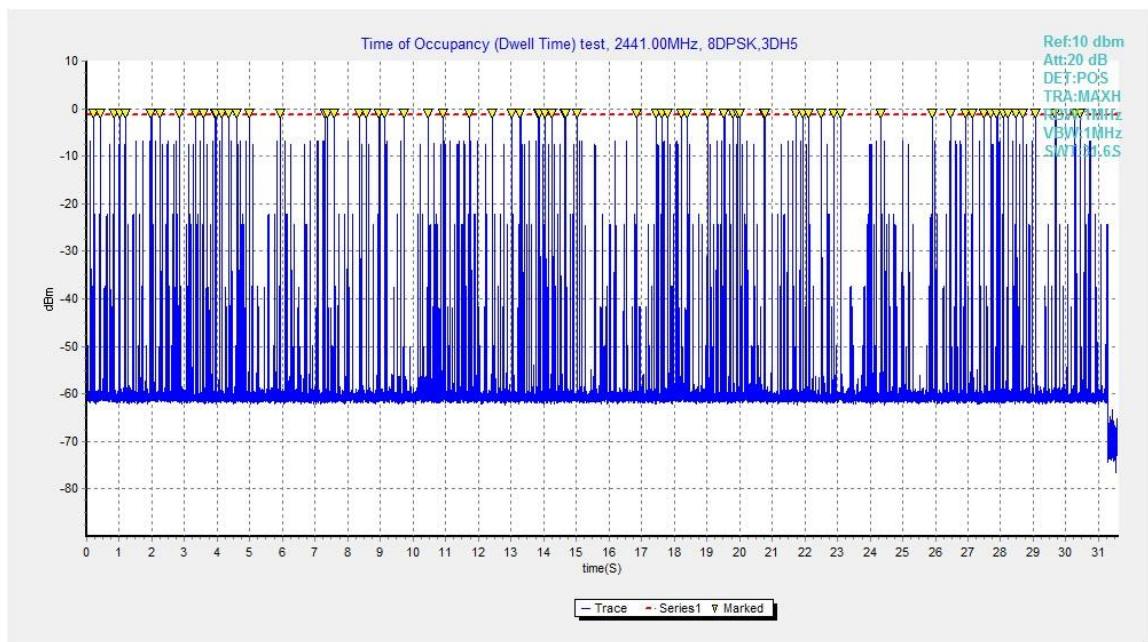


Fig.81. Number of Transmissions Measurement: Channel 39,Packet 3-DH5