

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

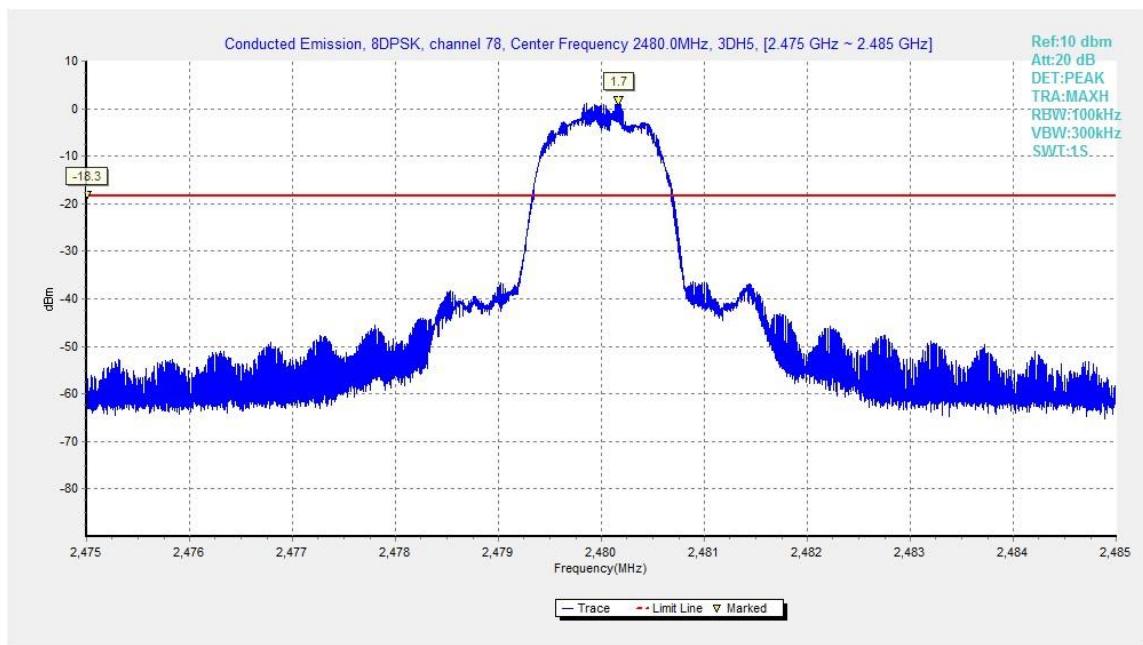


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

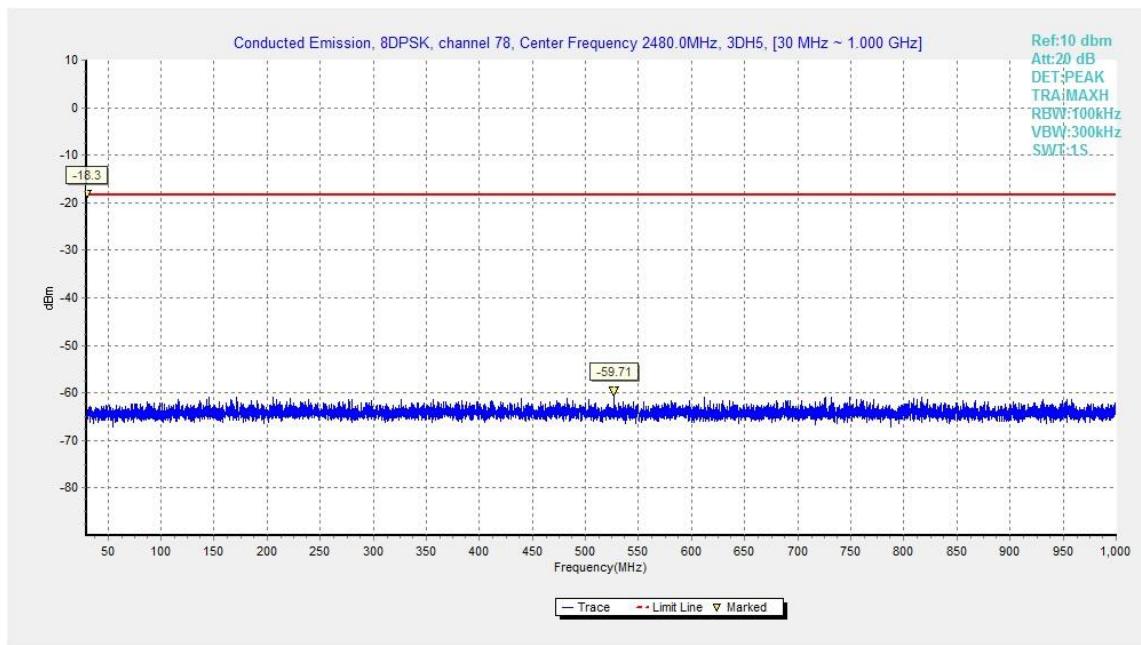


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

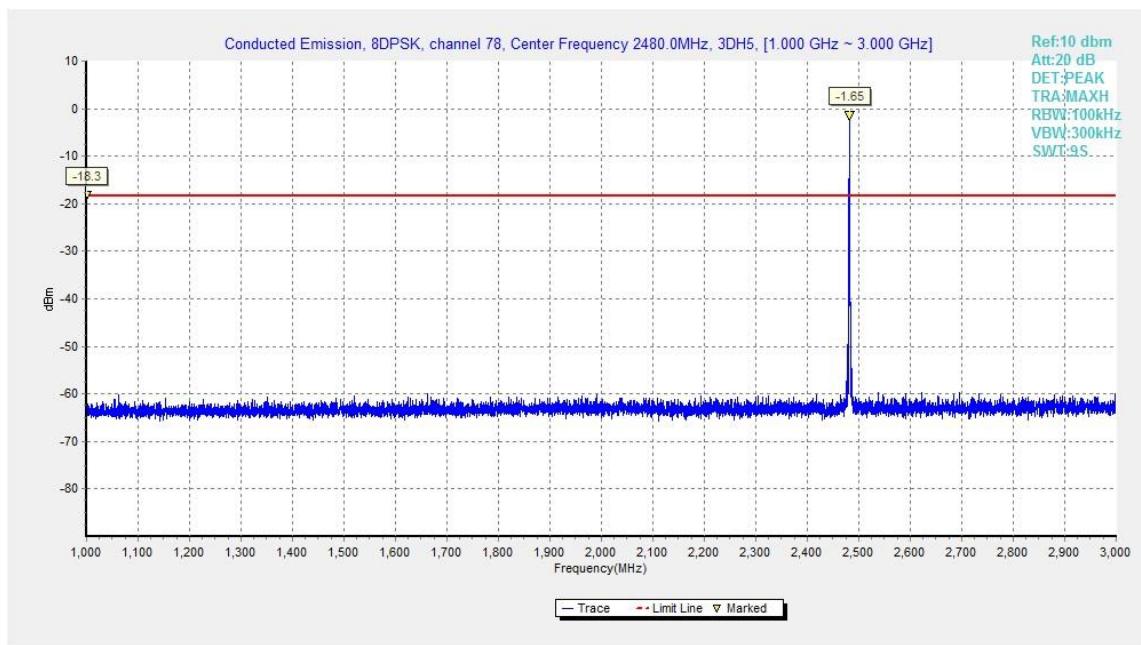


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

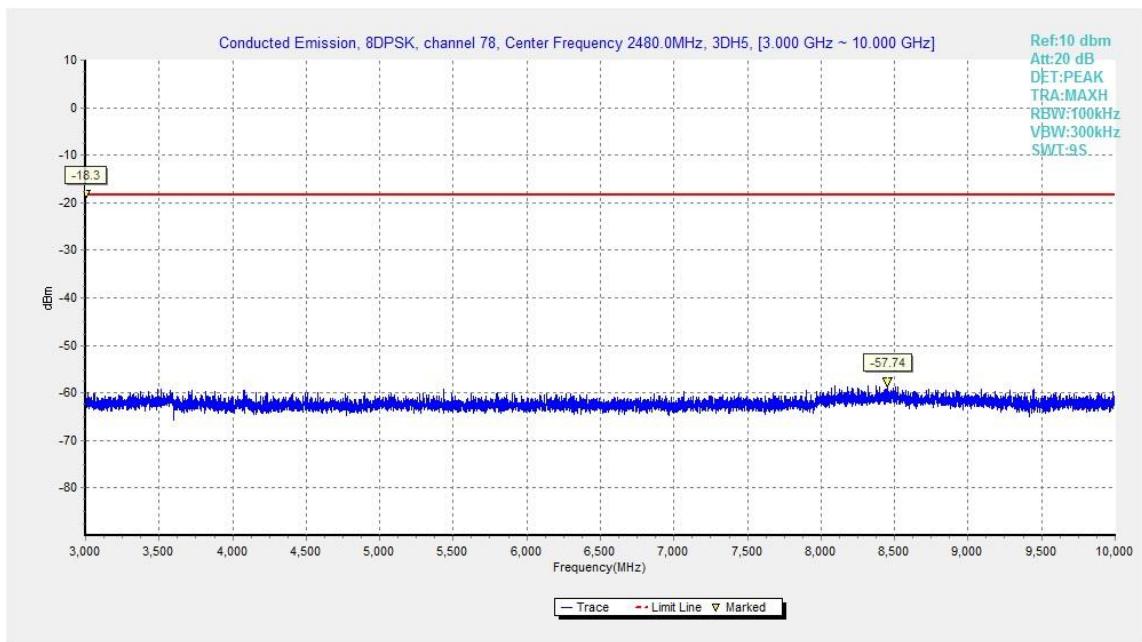


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

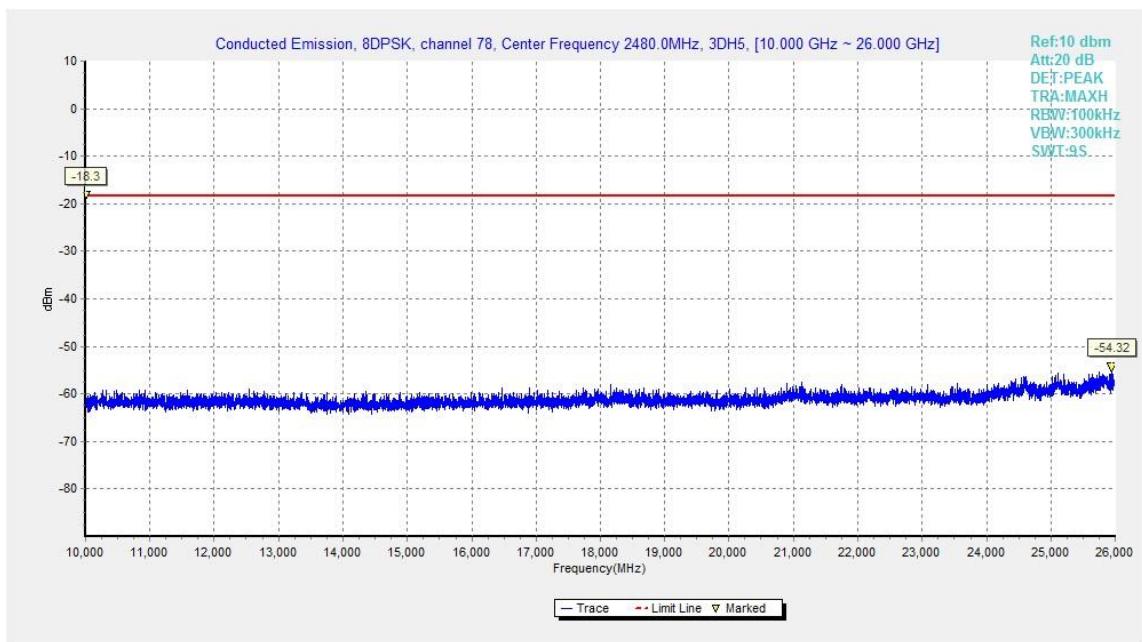


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

## 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 $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2386.300	46.2	2.9	32.0	11.38	54.0	7.8	H
2387.100	46.3	2.9	32.0	11.42	54.0	7.7	H
4804.000	35.2	-32.9	34.5	33.55	54.0	18.8	H
7206.000	37.9	-31.6	36.1	33.43	54.0	16.1	H
9608.000	40.5	-30.0	37.0	33.55	54.0	13.5	H
12010.000	43.2	-29.8	39.3	33.73	54.0	10.8	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2437.300	46.3	2.9	32.0	11.43	54.0	7.7	H
2445.100	46.6	2.9	32.2	11.49	54.0	7.4	H
4882.000	35.6	-32.7	34.5	33.81	54.0	18.4	H
7323.000	37.7	-31.9	36.1	33.55	54.0	16.3	H
9764.000	40.1	-30.6	37.2	33.47	54.0	13.9	H
12205.000	43.7	-29.4	39.2	33.91	54.0	10.3	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2483.500	47.2	2.9	32.8	11.52	54.0	6.8	H
2484.100	47.0	2.9	32.7	11.37	54.0	7.0	H
4960.000	35.0	-33.4	34.5	33.87	54.0	19.0	H
7440.000	37.8	-31.8	36.0	33.54	54.0	16.2	H
9920.000	41.0	-29.9	37.4	33.53	54.0	13.0	H
12400.000	43.9	-29.5	39.1	34.27	54.0	10.1	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2385.200	46.3	2.9	32.0	11.40	54.0	7.7	H
2386.300	46.3	2.9	32.0	11.42	54.0	7.7	H
4804.000	35.3	-32.9	34.5	33.65	54.0	18.7	H
7206.000	38.0	-31.6	36.1	33.53	54.0	16.0	H
9608.000	40.6	-30.0	37.0	33.65	54.0	13.4	H
12010.000	43.2	-29.8	39.3	33.73	54.0	10.8	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2437.300	46.4	2.9	32.0	11.44	54.0	7.6	H
2445.100	46.6	2.9	32.2	11.50	54.0	7.4	H
4882.000	35.5	-32.7	34.5	33.71	54.0	18.5	H
7323.000	37.7	-31.9	36.1	33.55	54.0	16.3	H
9764.000	40.1	-30.6	37.2	33.47	54.0	13.9	H
12205.000	43.7	-29.4	39.2	33.91	54.0	10.3	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2483.500	47.2	2.9	32.8	11.54	54.0	6.8	H
2486.600	47.0	2.9	32.7	11.39	54.0	7.0	H
4960.000	35.0	-33.4	34.5	33.87	54.0	19.0	H
7440.000	37.9	-31.8	36.0	33.64	54.0	16.1	H
9920.000	41.1	-29.9	37.4	33.63	54.0	12.9	H
12400.000	43.9	-29.5	39.1	34.27	54.0	10.1	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2383.000	46.2	2.9	32.0	11.34	54.0	7.8	H
2385.500	46.3	2.9	32.0	11.41	54.0	7.7	H
4804.000	35.1	-32.9	34.5	33.45	54.0	18.9	H
7206.000	37.8	-31.6	36.1	33.33	54.0	16.2	H
9608.000	40.6	-30.0	37.0	33.65	54.0	13.4	H
12010.000	43.2	-29.8	39.3	33.73	54.0	10.8	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2437.100	46.4	2.9	32.0	11.48	54.0	7.6	H
2447.400	46.7	2.9	32.3	11.51	54.0	7.3	H
4882.000	35.5	-32.7	34.5	33.71	54.0	18.5	H
7323.000	37.6	-31.9	36.1	33.45	54.0	16.4	H
9764.000	40.1	-30.6	37.2	33.47	54.0	13.9	H
12205.000	43.6	-29.4	39.2	33.81	54.0	10.4	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2483.500	47.2	2.9	32.8	11.54	54.0	6.8	H
2484.900	47.1	2.9	32.7	11.46	54.0	6.9	H
4960.000	35.0	-33.4	34.5	33.87	54.0	19.0	H
7440.000	37.8	-31.8	36.0	33.54	54.0	16.2	H
9920.000	41.0	-29.9	37.4	33.53	54.0	13.0	H
12400.000	43.9	-29.5	39.1	34.27	54.0	10.1	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2381.736	59.3	2.9	32.0	24.44	74.0	14.7	H
2382.912	59.2	2.9	32.0	24.28	74.0	14.8	V
4803.750	38.9	-32.9	34.5	37.25	74.0	35.1	H
7206.000	41.5	-31.6	36.1	37.03	74.0	32.5	V
9608.250	43.1	-30.0	37.0	36.14	74.0	30.9	H
12009.750	45.9	-29.8	39.3	36.43	74.0	28.1	V

**GFSK Ch 39 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2323.000	48.6	-27.7	31.2	45.15	74.0	25.4	H
2545.400	51.1	-26.8	33.0	44.90	74.0	22.9	H
4881.750	40.1	-32.7	34.5	38.31	74.0	33.9	V
7323.000	41.0	-31.9	36.1	36.85	74.0	33.0	V
9764.250	42.3	-30.6	37.2	35.67	74.0	31.7	H
12204.750	47.5	-29.4	39.2	37.71	74.0	26.5	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2484.100	60.0	2.9	32.7	24.28	74.0	14.0	H
2486.740	59.9	2.9	32.7	24.25	74.0	14.1	V
4959.750	40.0	-33.4	34.5	38.87	74.0	34.0	H
7440.000	41.9	-31.8	36.0	37.64	74.0	32.1	H
9920.250	44.9	-29.9	37.4	37.43	74.0	29.1	H
12399.750	45.1	-29.5	39.1	35.47	74.0	28.9	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)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2380.490	59.8	2.9	32.1	24.93	74.0	14.2	H
2388.932	59.5	2.9	32.0	24.65	74.0	14.5	H
4803.750	39.0	-32.9	34.5	37.35	74.0	35.0	H
7206.000	41.1	-31.6	36.1	36.63	74.0	32.9	H
9608.250	44.3	-30.0	37.0	37.34	74.0	29.7	H
12009.750	47.0	-29.8	39.3	37.53	74.0	27.0	V

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

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2355.400	49.2	-27.7	31.7	45.19	74.0	24.8	H
2548.600	51.5	-26.8	33.1	45.23	74.0	22.5	H
4881.750	39.7	-32.7	34.5	37.91	74.0	34.3	V
7323.000	41.8	-31.9	36.1	37.65	74.0	32.2	H
9764.250	43.8	-30.6	37.2	37.17	74.0	30.2	H
12204.750	46.6	-29.4	39.2	36.81	74.0	27.4	H

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

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2493.770	60.0	2.9	32.5	24.58	74.0	14.0	H
2494.800	60.1	2.9	32.4	24.72	74.0	13.9	H
4959.750	40.4	-33.4	34.5	39.27	74.0	33.6	V
7440.000	41.5	-31.8	36.0	37.24	74.0	32.5	H
9920.250	45.5	-29.9	37.4	38.03	74.0	28.5	V
12399.750	45.2	-29.5	39.1	35.57	74.0	28.8	V

**8DPSK Ch 0 -Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2385.922	59.5	2.9	32.0	24.67	74.0	14.5	H
2386.916	59.2	2.9	32.0	24.32	74.0	14.8	H
4803.750	39.3	-32.9	34.5	37.65	74.0	34.7	V
7206.000	40.5	-31.6	36.1	36.03	74.0	33.5	V
9608.250	44.0	-30.0	37.0	37.04	74.0	30.0	H
12009.750	46.0	-29.8	39.3	36.53	74.0	28.0	V

**8DPSK Ch 39 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2376.200	50.3	-26.6	32.1	44.81	74.0	23.7	H
2543.800	50.9	-26.8	33.0	44.71	74.0	23.1	H
4881.750	40.0	-32.7	34.5	38.21	74.0	34.0	V
7323.000	42.2	-31.9	36.1	38.05	74.0	31.8	H
9764.250	43.5	-30.6	37.2	36.87	74.0	30.5	H
12204.750	45.5	-29.4	39.2	35.71	74.0	28.5	V

**8DPSK Ch 78 - Peak**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
2484.540	60.0	2.9	32.7	24.32	74.0	14.0	H
2488.600	60.1	2.9	32.6	24.51	74.0	13.9	V
4959.750	39.4	-33.4	34.5	38.27	74.0	34.6	V
7440.000	41.4	-31.8	36.0	37.14	74.0	32.6	H
9920.250	46.5	-29.9	37.4	39.03	74.0	27.5	H
12399.750	45.6	-29.5	39.1	35.97	74.0	28.4	V

Sample calculation: 8DPSK Ch 78 - Peak, 2484.540MHz

$$\text{Peak ERP(dBm)} = P_{\text{Mea}}(24.32 \text{ dBuV/m}) + A_{\text{Rpl}} (35.6 \text{ dB}) = 60.0 \text{ dBuV/m}$$

**Conclusion: PASS**

**Test graphs as below:**

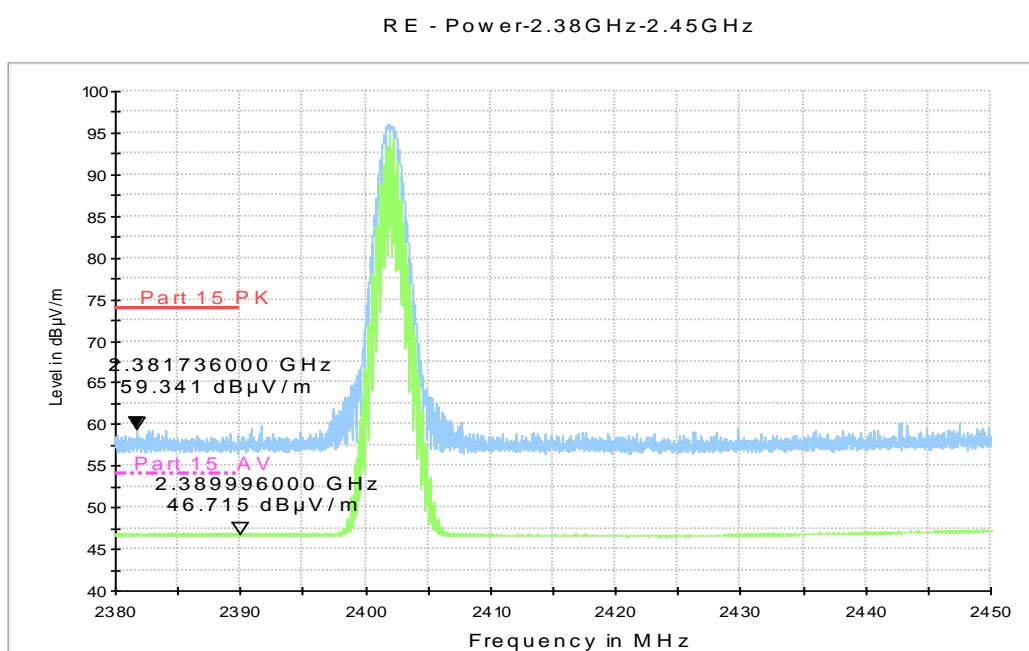


Fig.58. Radiated emission (Power): GFSK, low channel

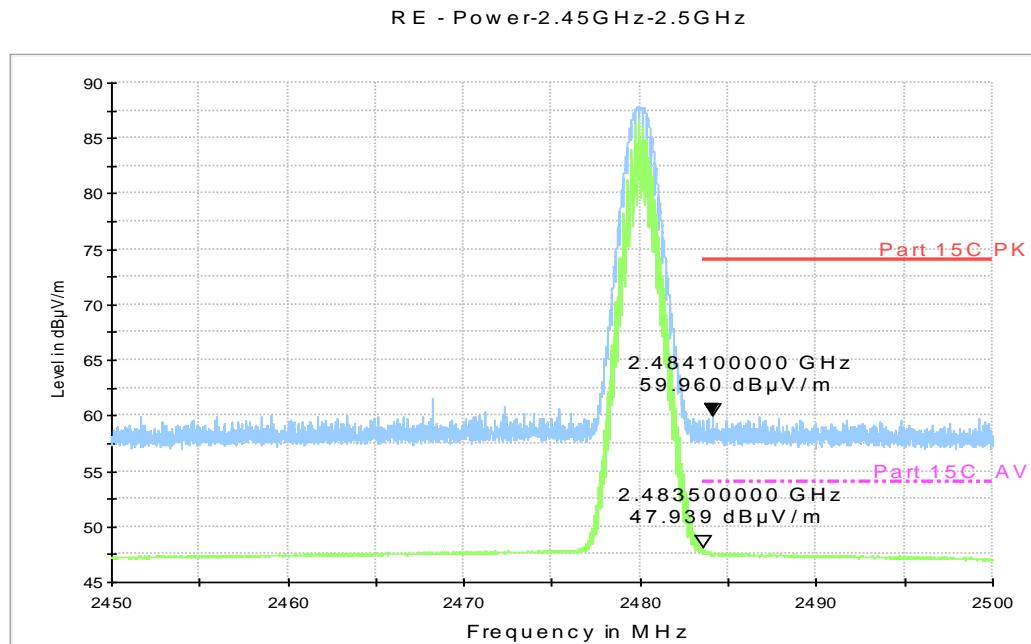


Fig.59. Radiated emission (Power) GFSK, high channel

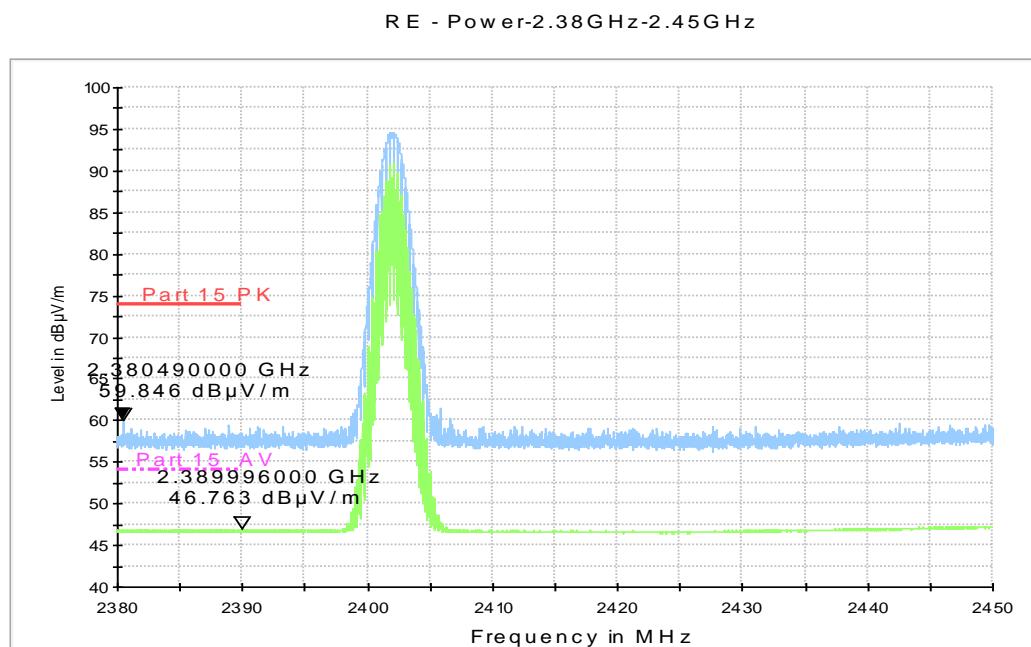


Fig.60. Radiated emission (Power):  $\pi/4$  DQPSK, low channel

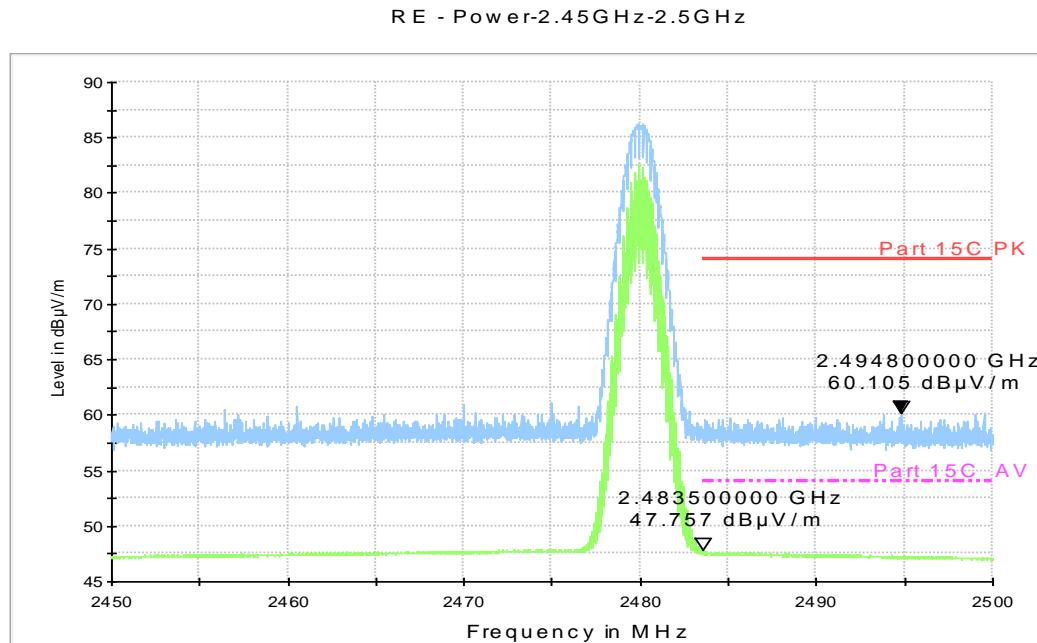


Fig.61. Radiated emission (Power):  $\pi/4$  DQPSK, high channel

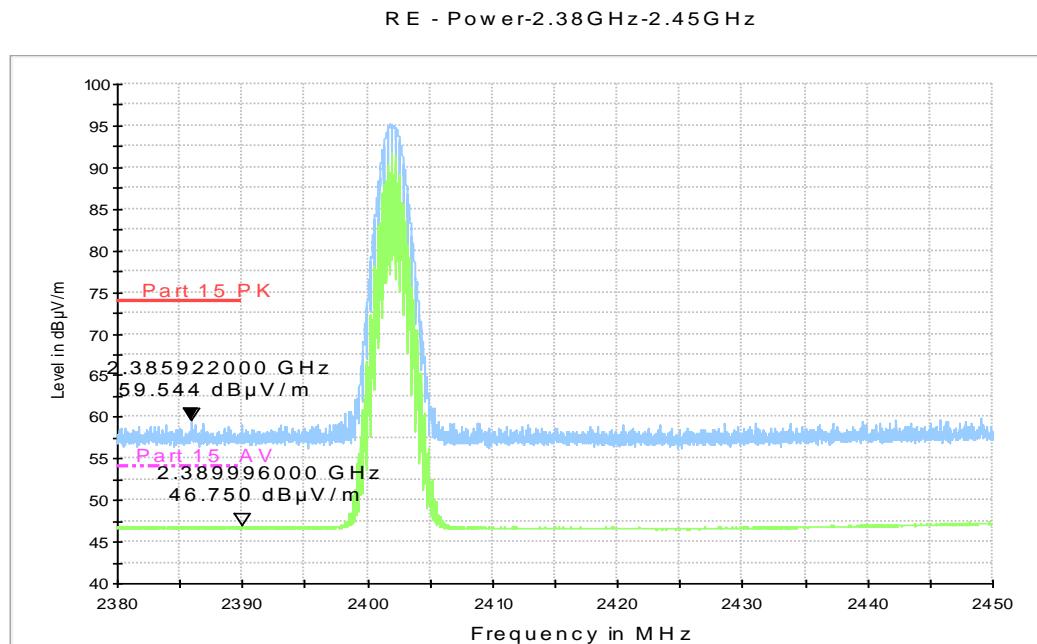


Fig.62. Radiated emission (Power): 8DPSK, low channel

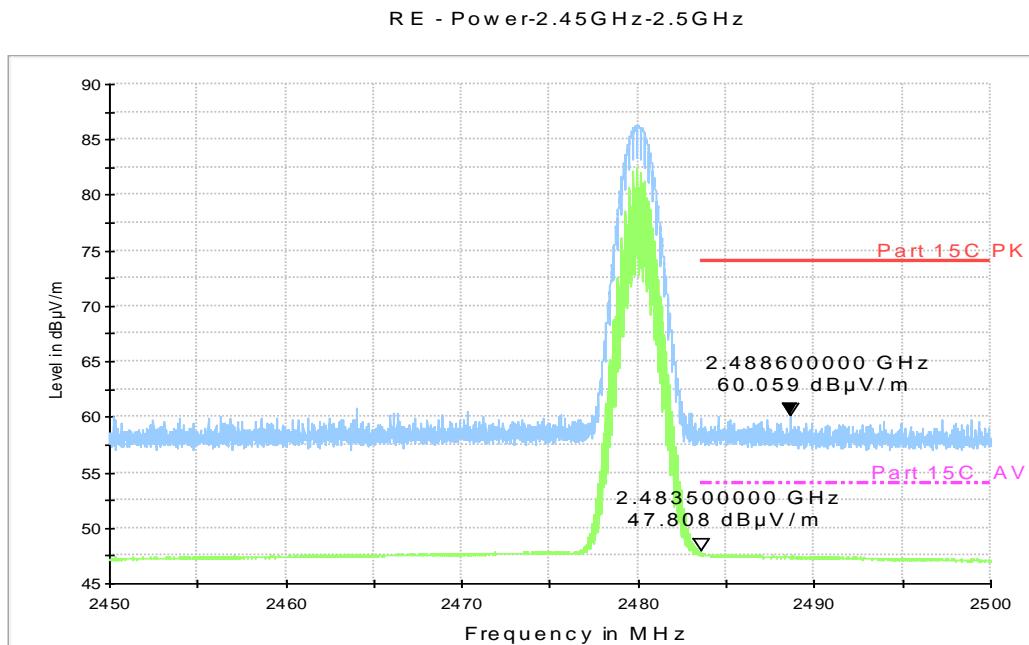


Fig.63. Radiated emission (Power): 8DPSK, high channel

## 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  $\geq$  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	117.64	P
		Fig.65		
	DH3	Fig.66	177.24	P
		Fig.67		
	DH5	Fig.68	204.06	P
		Fig.69		

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

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.70	119.89	P
		Fig.71		
	DH3	Fig.72	166.18	P
		Fig.73		
	DH5	Fig.74	201.42	P
		Fig.75		

##### For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.76	120.37	P
		Fig.77		
	DH3	Fig.78	177.51	P

		Fig.79		
	DH5	Fig.80	213.10	P
		Fig.81		

**Conclusion: PASS**

**Test graphs as below:**

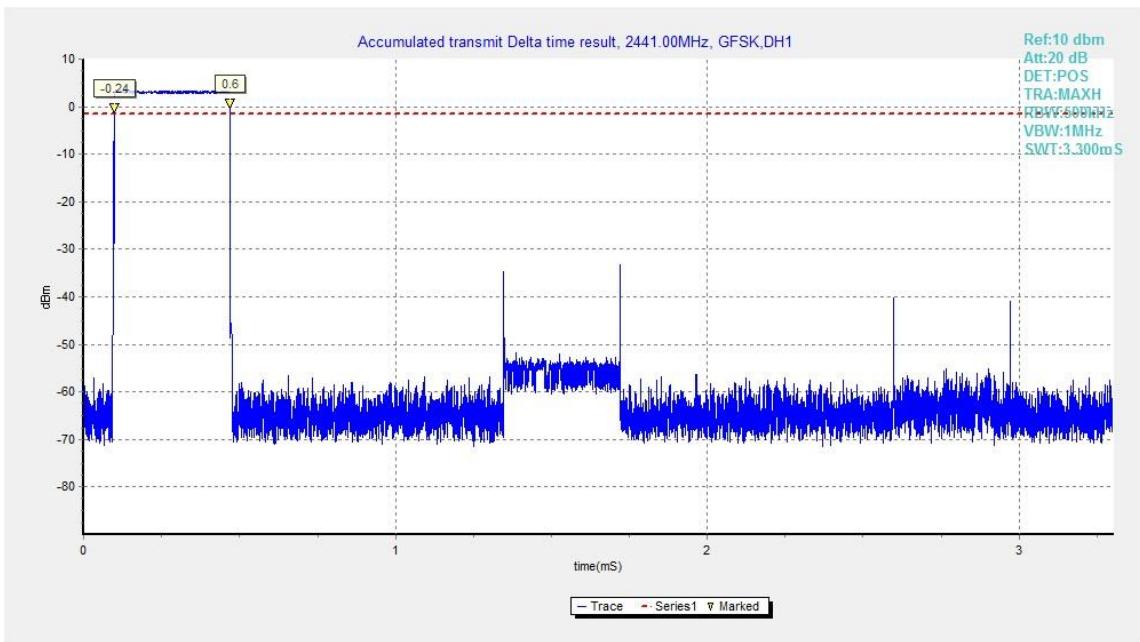


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

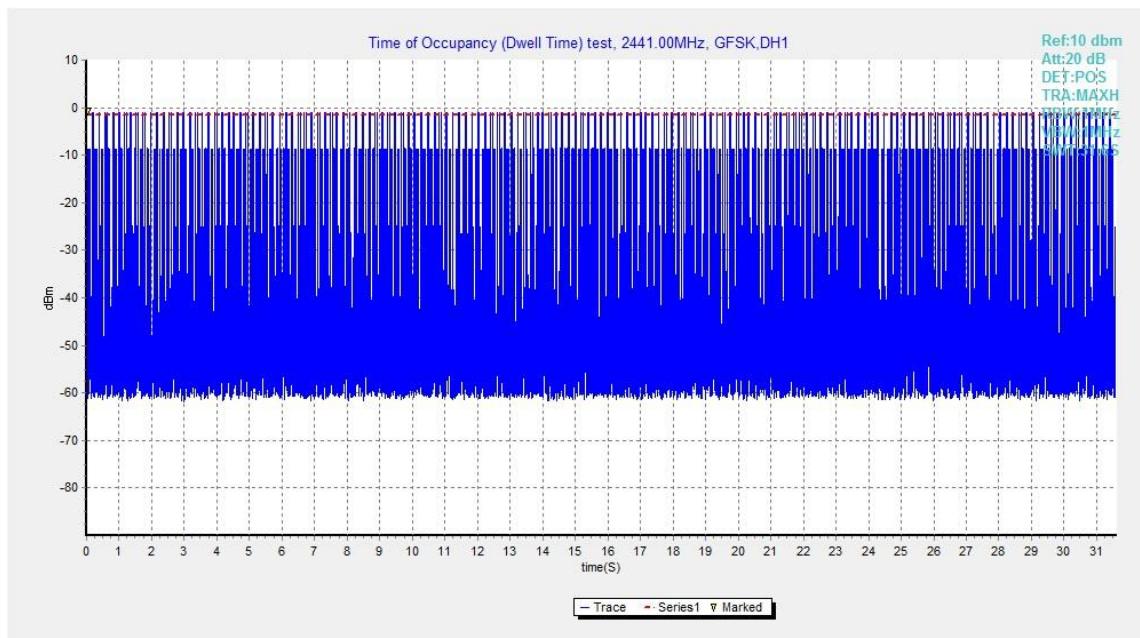


Fig.65. Number of Transmissions Measurement:Channel 39,Packet DH1

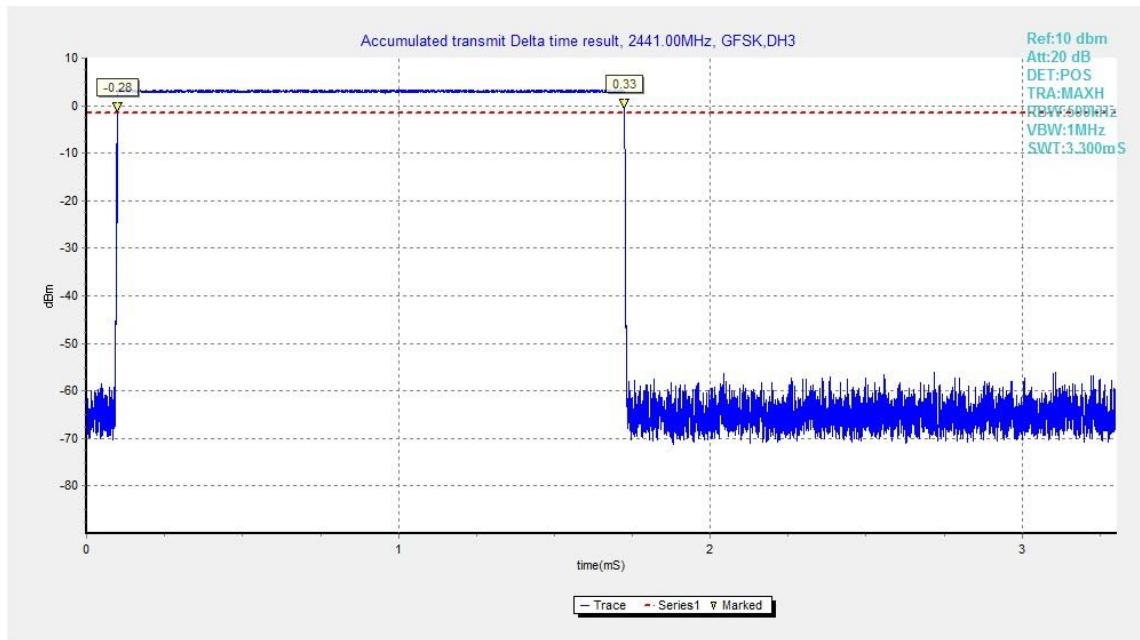


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

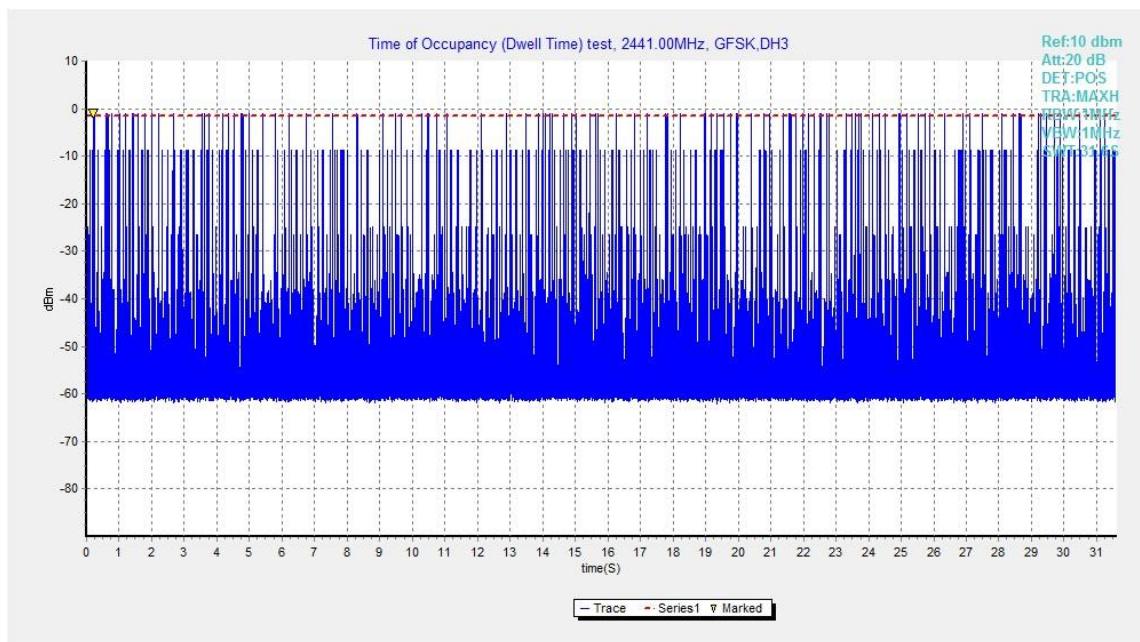


Fig.67. Number of Transmissions Measurement:Channel 39,Packet DH3

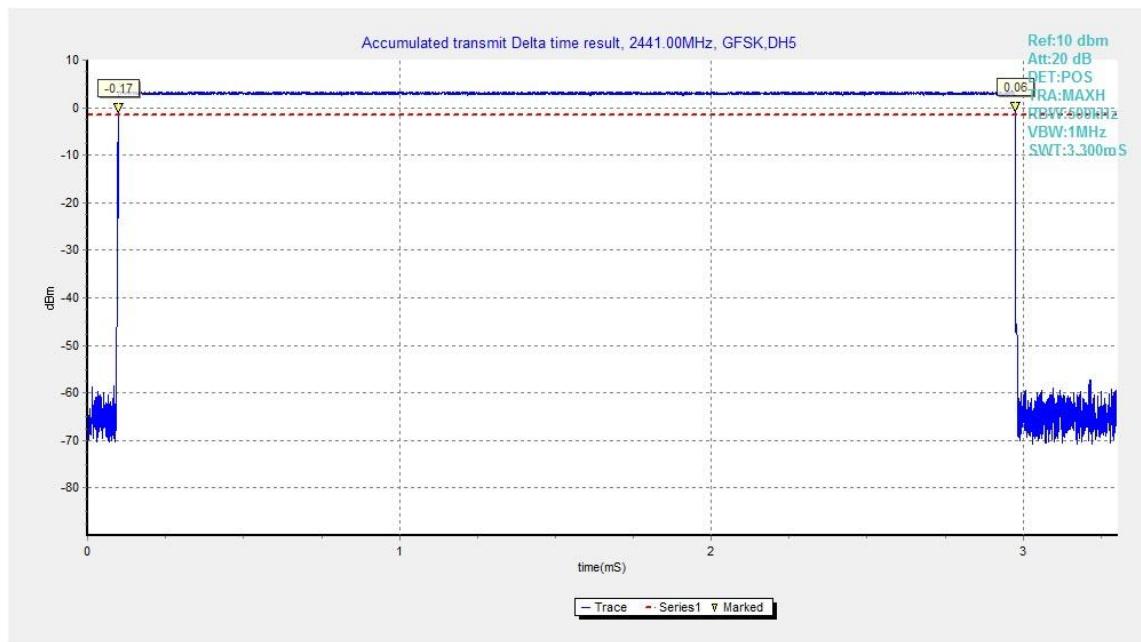


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

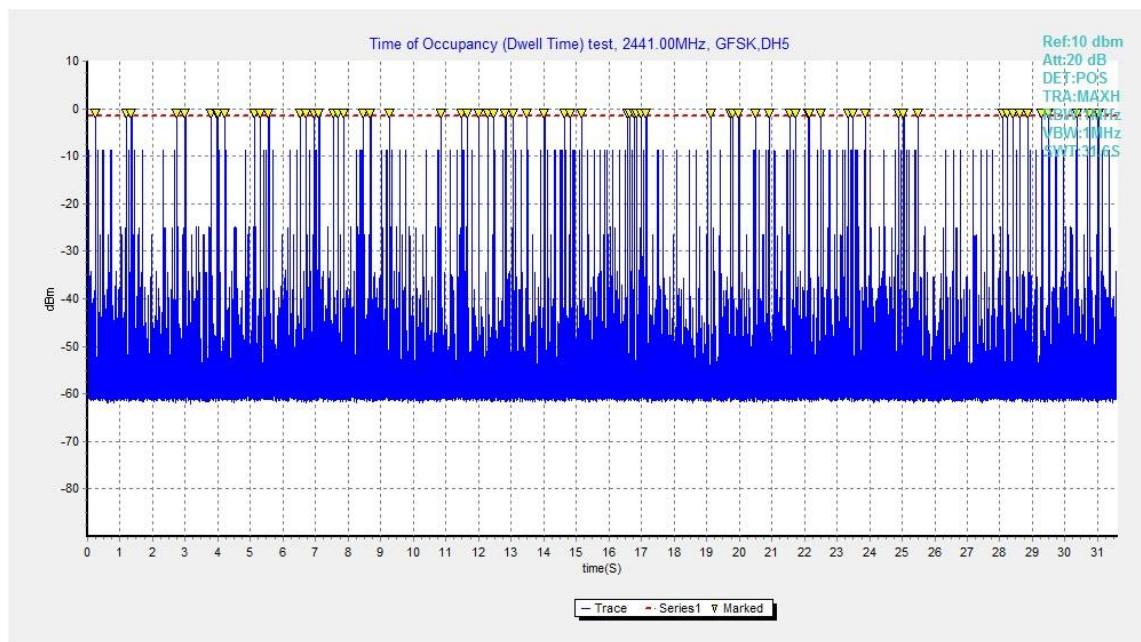


Fig.69. Number of Transmissions Measurement:Channel 39,Packet DH5

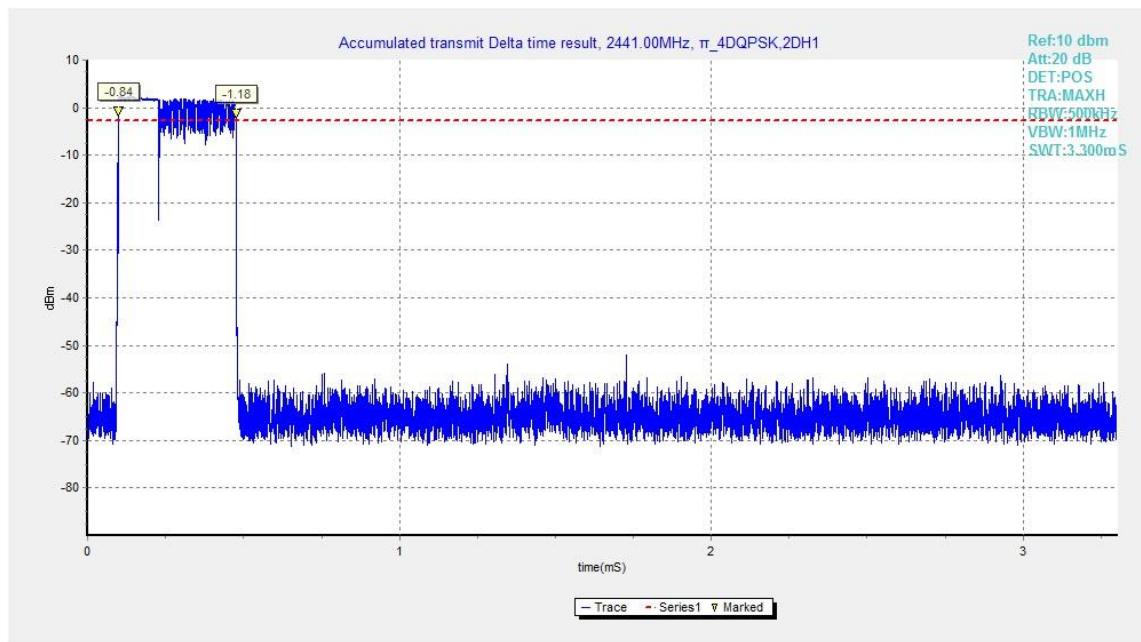


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

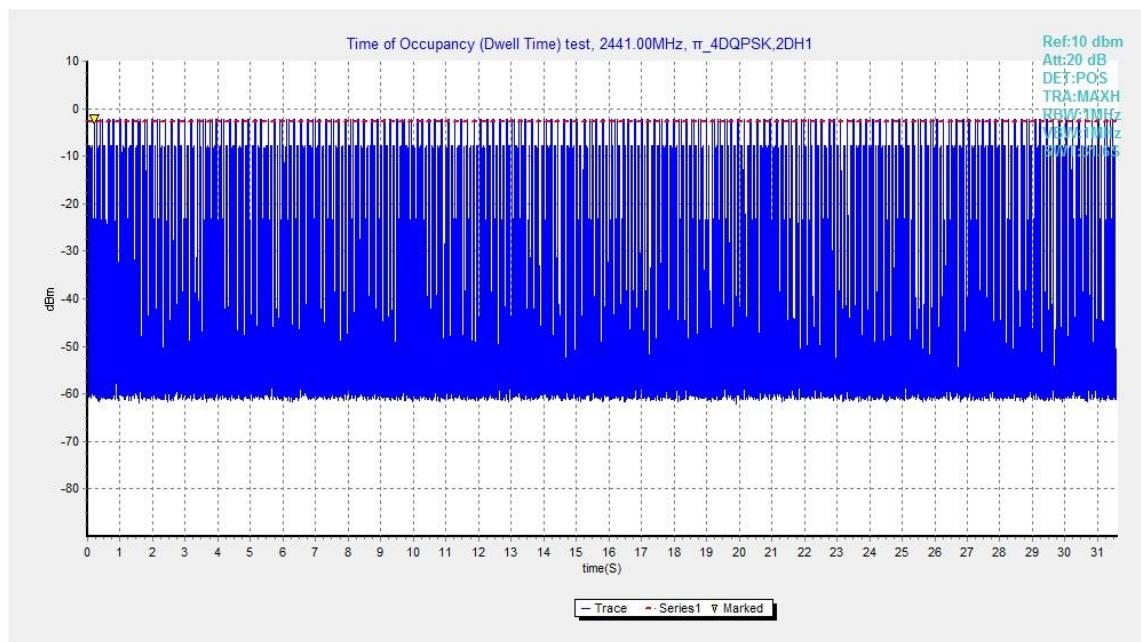


Fig.71. Number of Transmissions Measurement:Channel 39,Packet 2-DH1

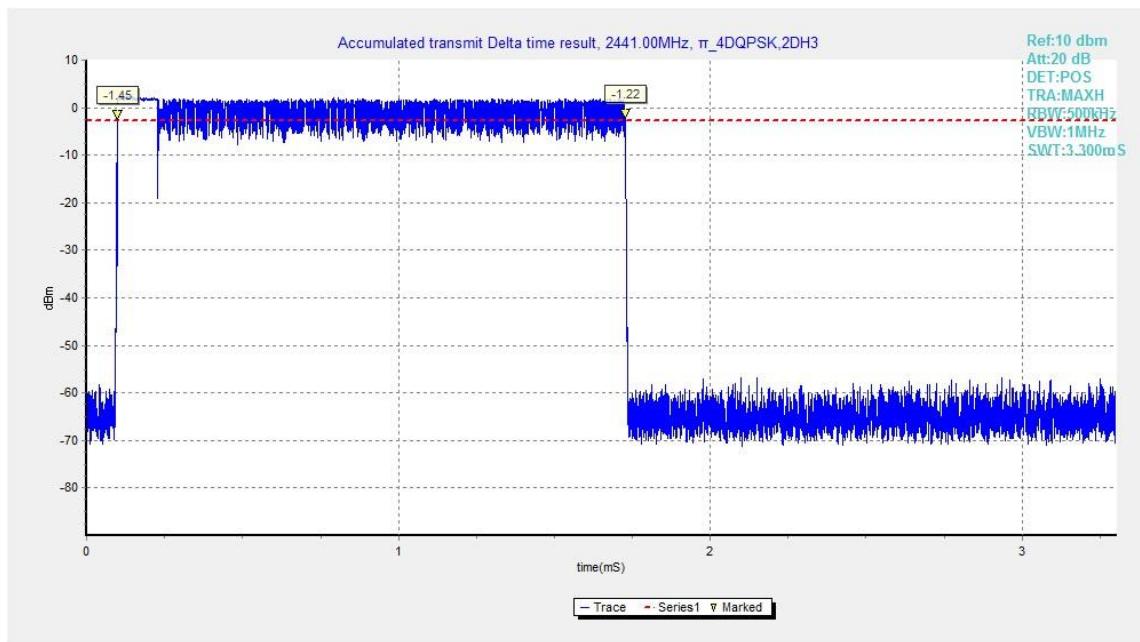


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

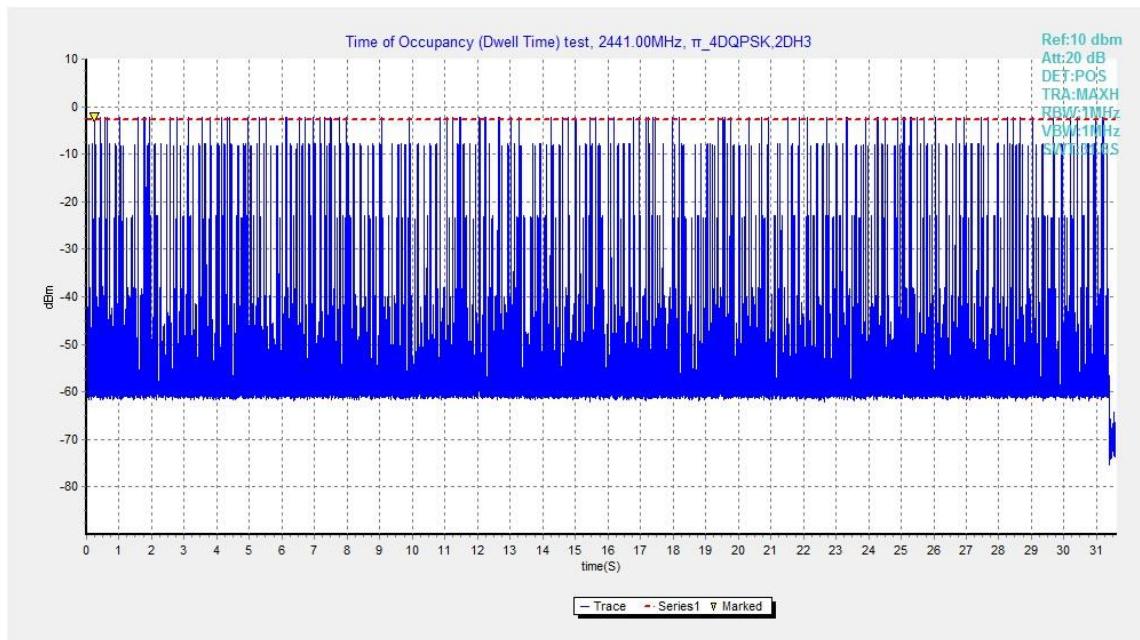


Fig.73. Number of Transmissions Measurement:Channel 39,Packet 2-DH3

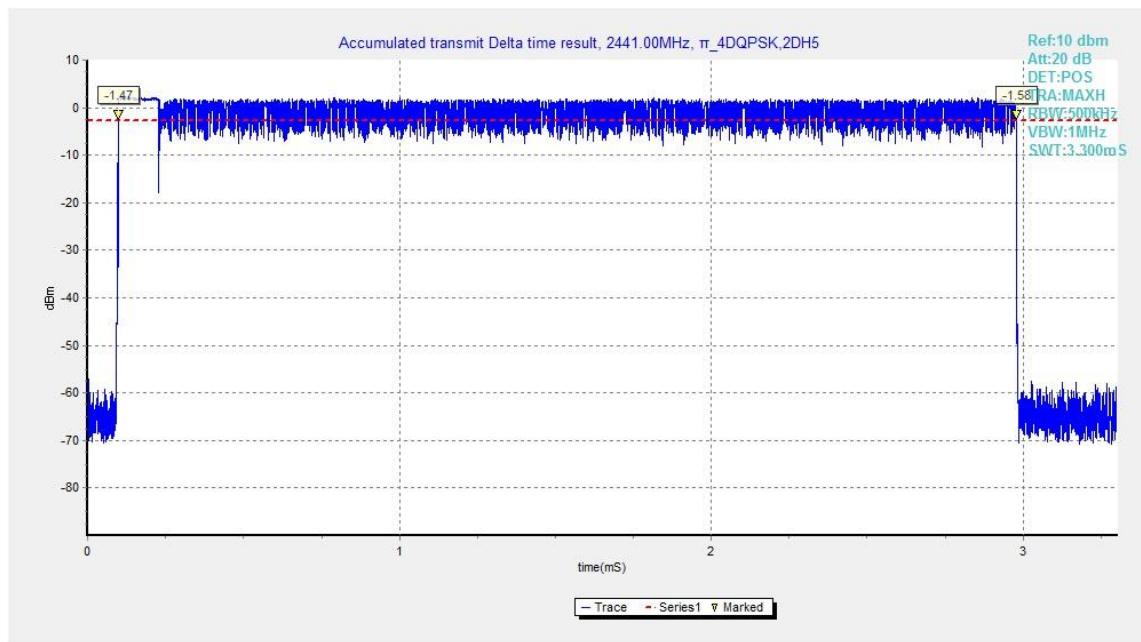


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

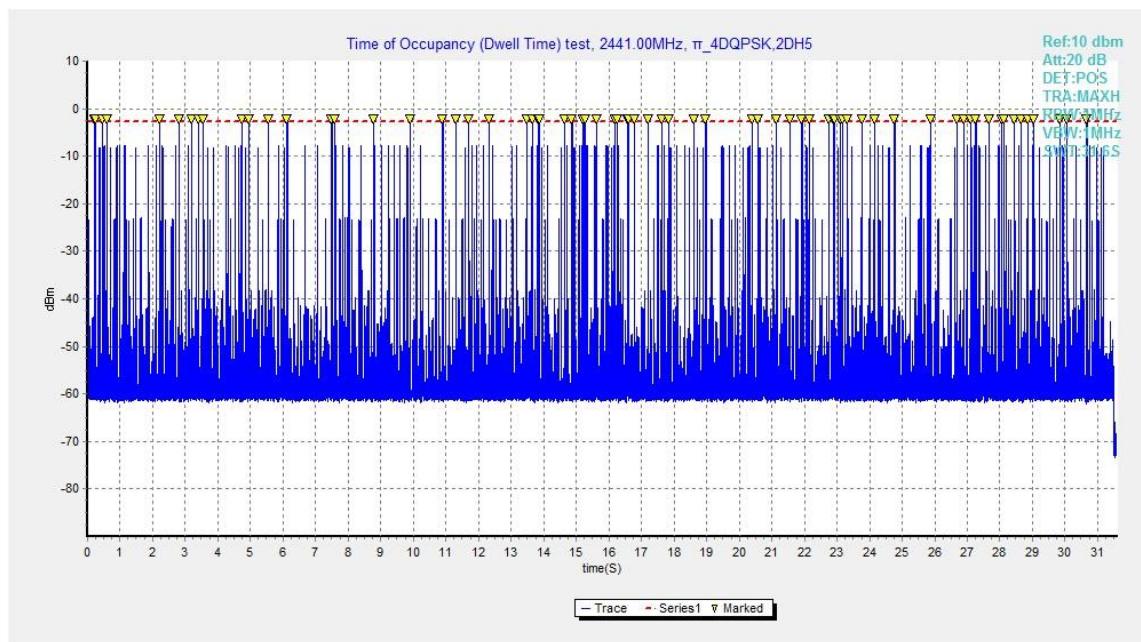


Fig.75. Number of Transmissions Measurement:Channel 39,Packet 2-DH5

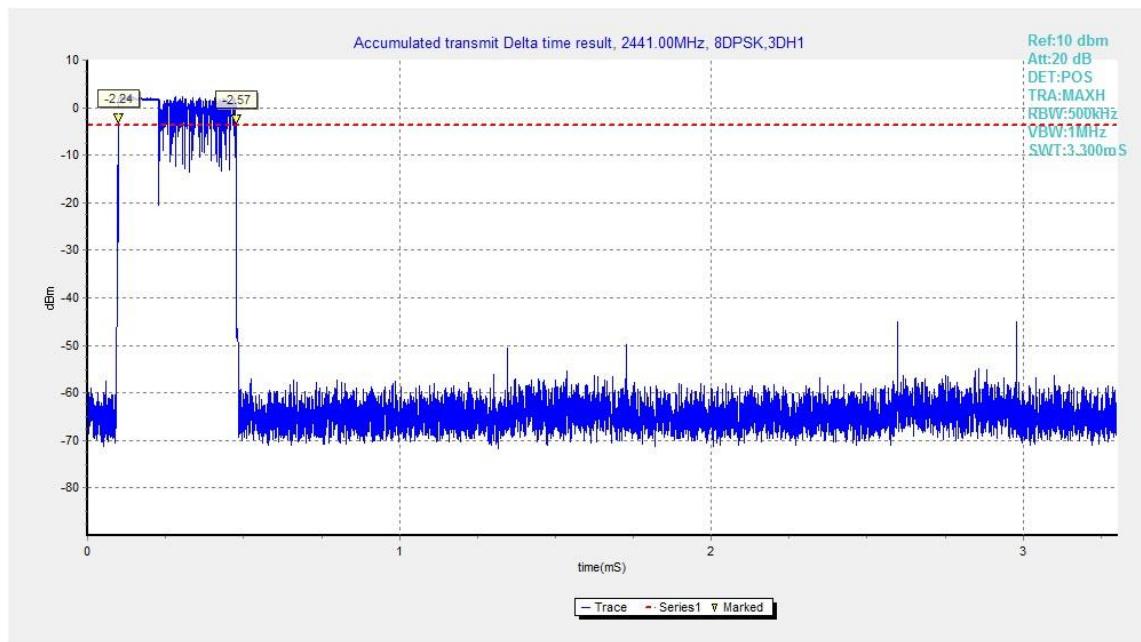


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

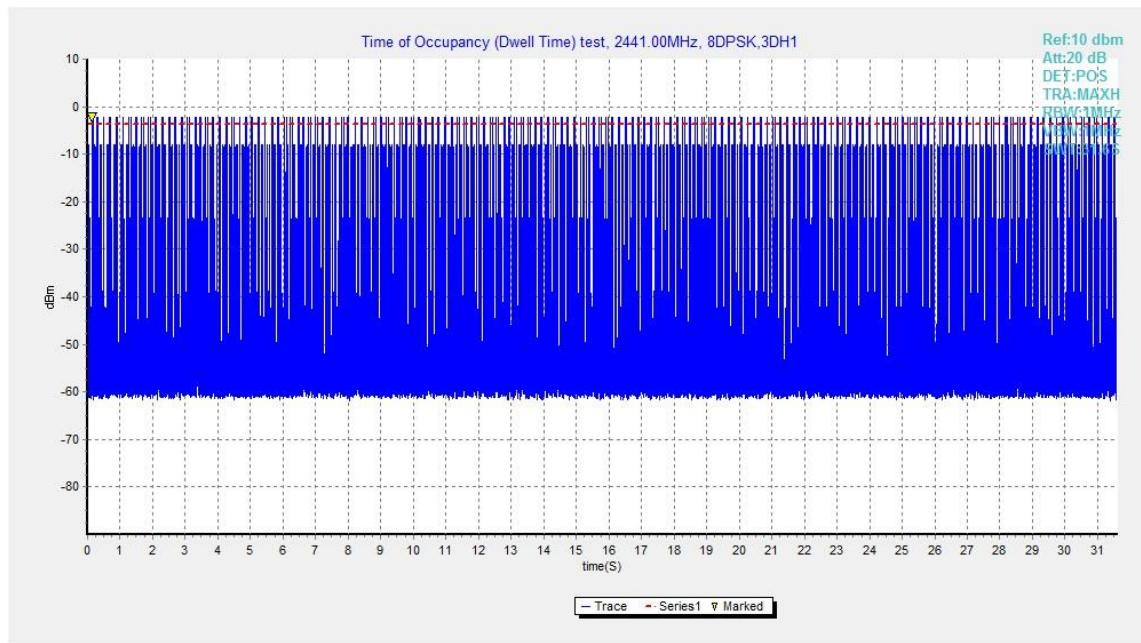


Fig.77. Number of Transmissions Measurement:Channel 39,Packet 3-DH1

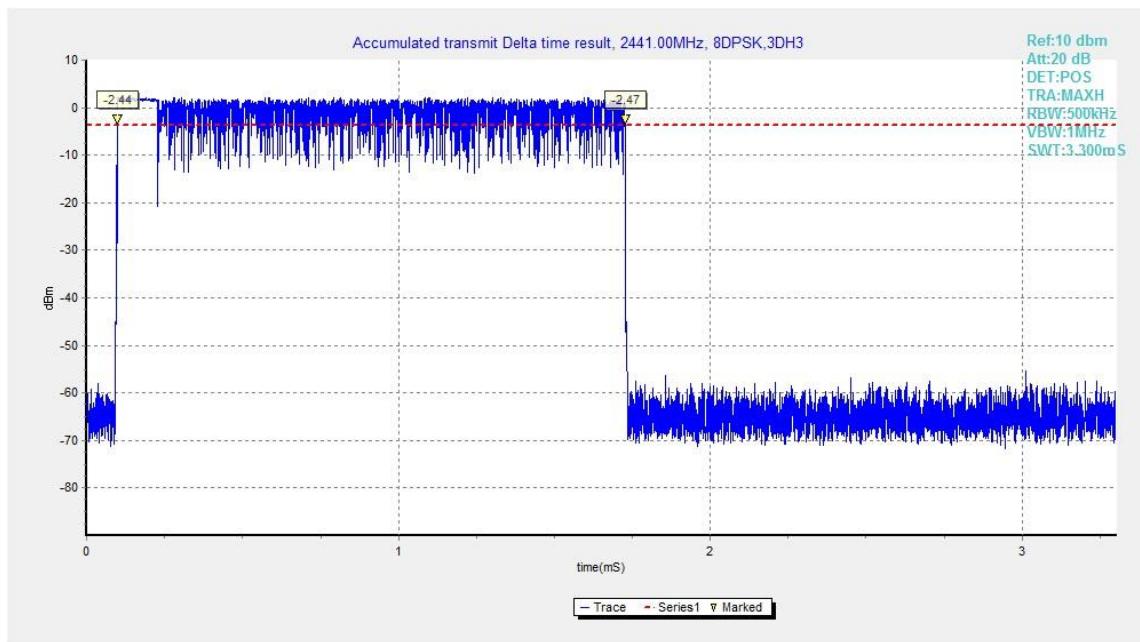


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

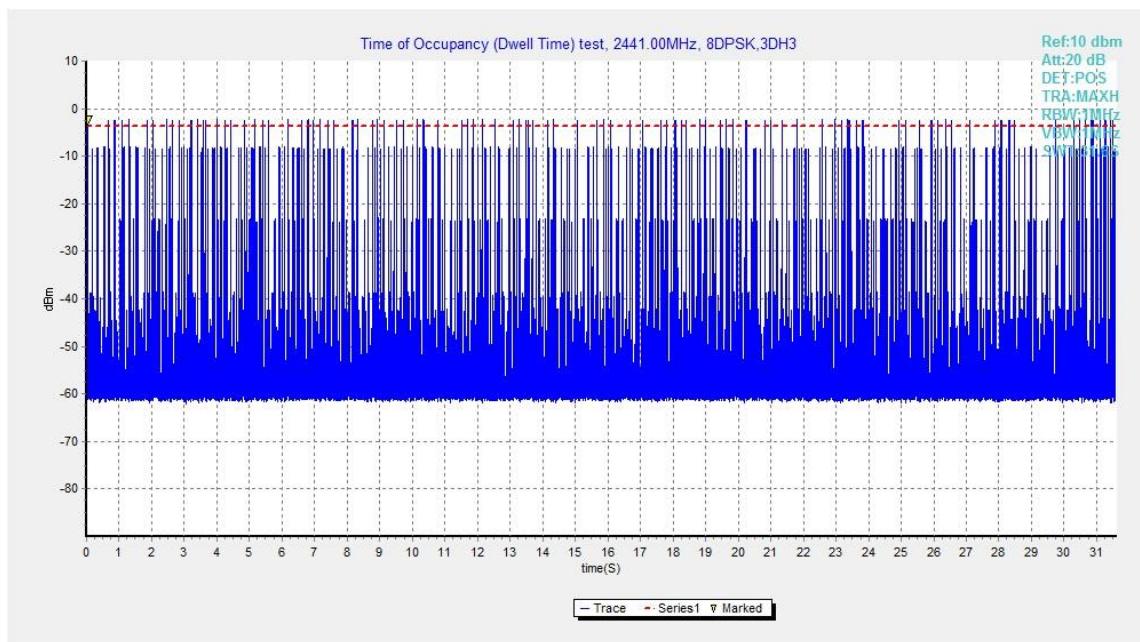


Fig.79. Number of Transmissions Measurement:Channel 39,Packet 3-DH3

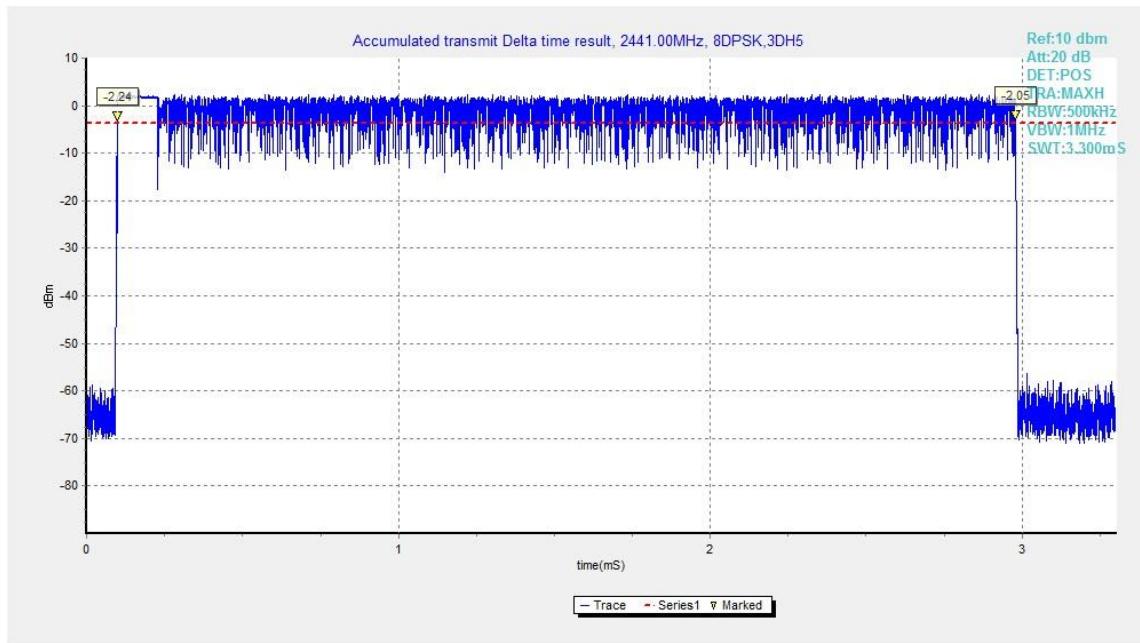


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

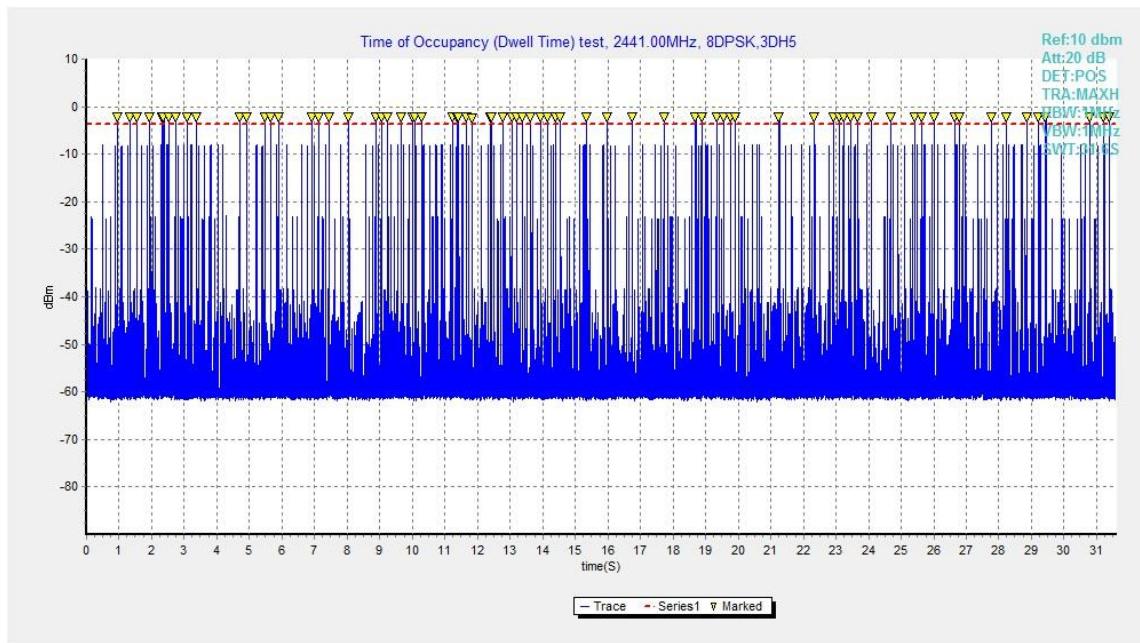


Fig.81. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

## A.7. 20dB Bandwidth

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

Measurement Procedure - Unwanted Emissions

1. Set RBW = 30kHz.
2. Set VBW = 100 kHz.
3. Set span to 3MHz
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

### Measurement Limit:

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

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

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

### Measurement Results:

#### For GFSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.82	945.00	NA
39	Fig.83	947.25	NA
78	Fig.84	945.75	NA

#### For π/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1290.75	NA
39	Fig.86	1267.50	NA
78	Fig.87	1264.50	NA

#### For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1290.00	NA
39	Fig.89	1272.75	NA
78	Fig.90	1289.25	NA

**Conclusion: NA**

**Test graphs as below:**

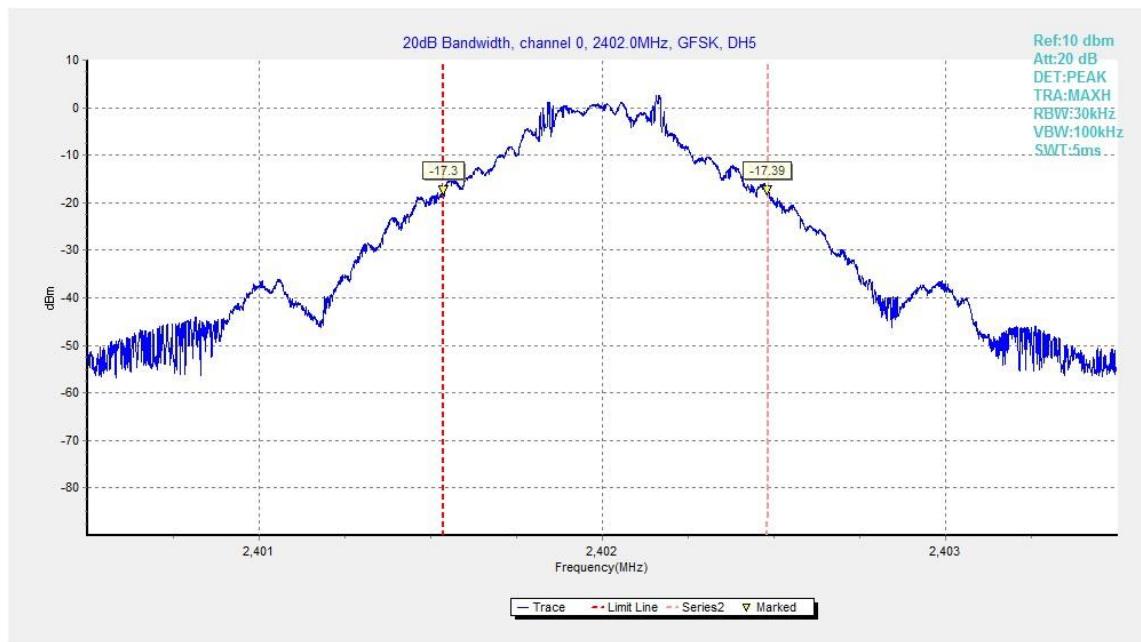


Fig.82. 20dB Bandwidth: GFSK, Channel 0

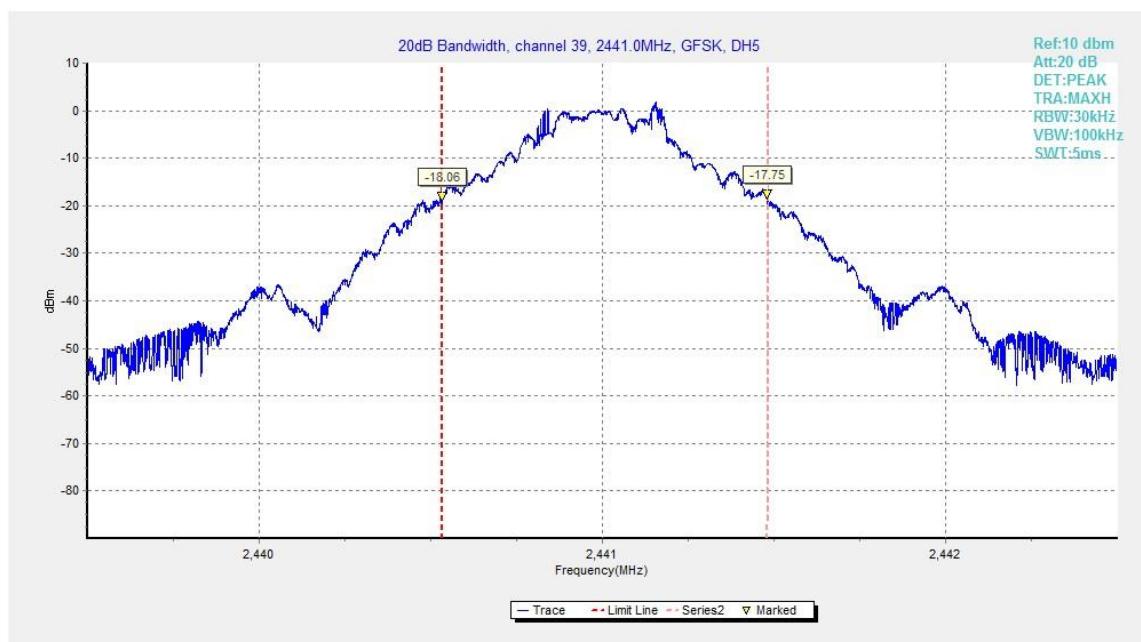


Fig.83. 20dB Bandwidth: GFSK, Channel 39

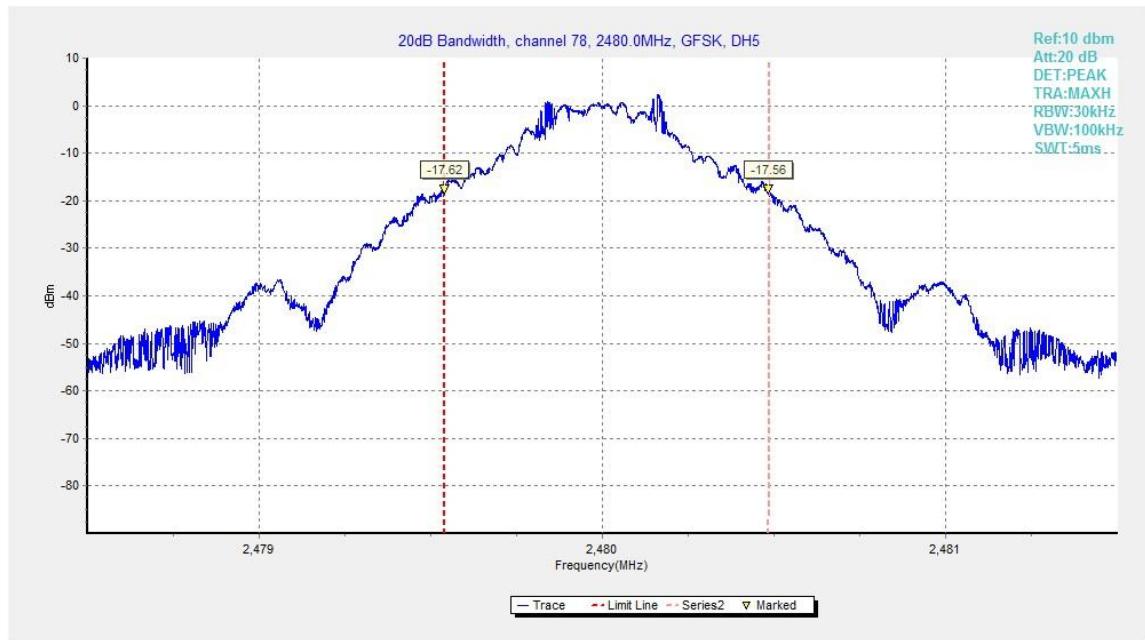


Fig.84. 20dB Bandwidth: GFSK, Channel 78

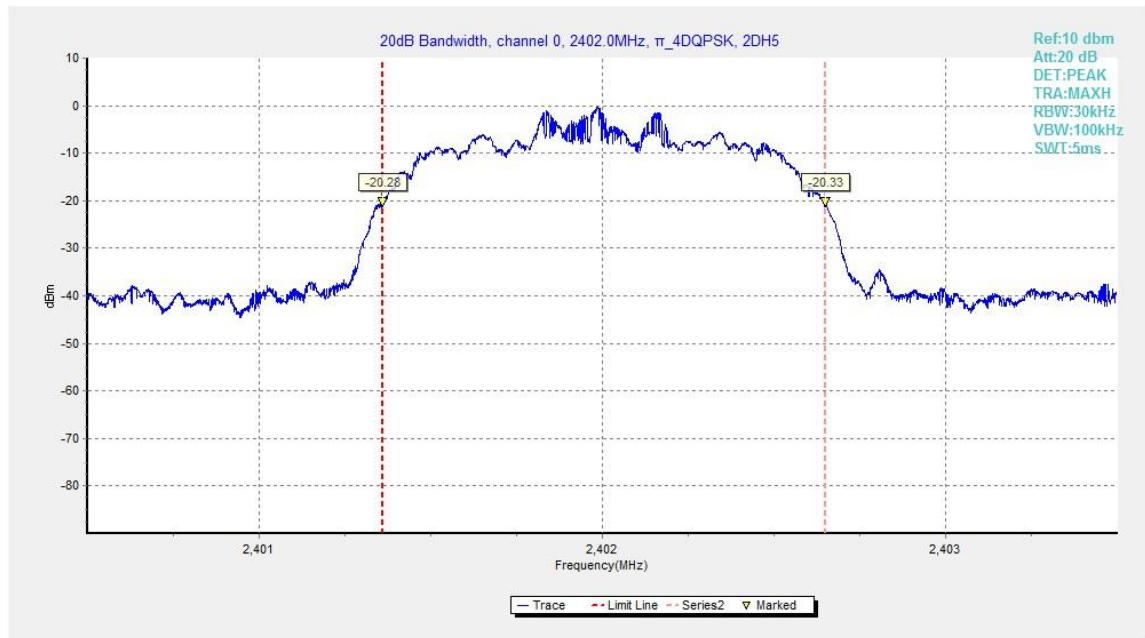


Fig.85. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 0

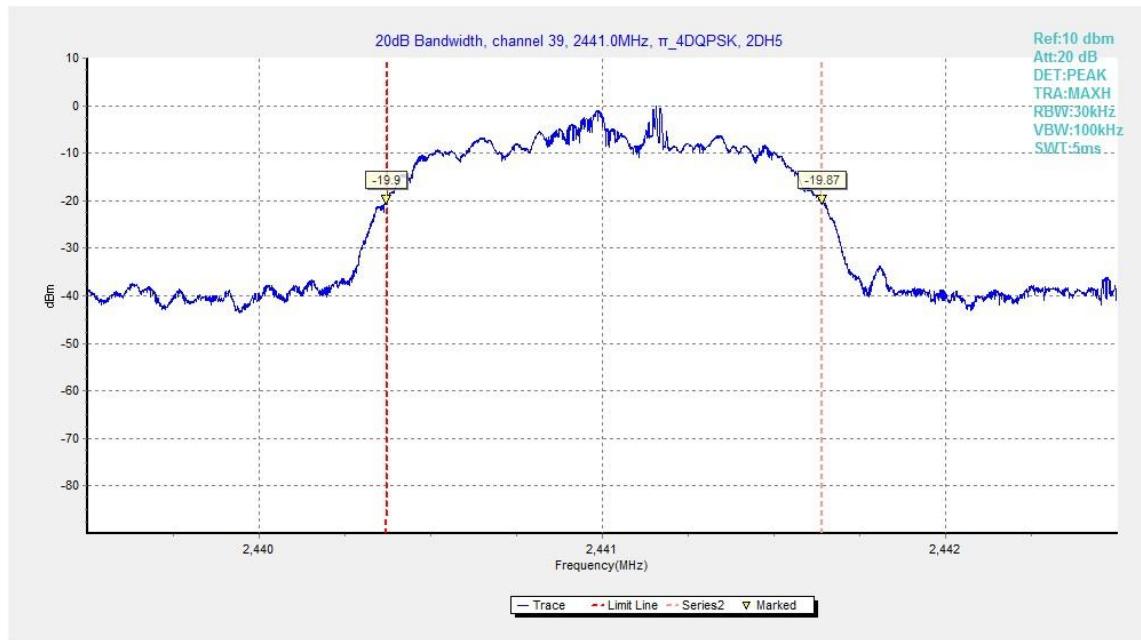


Fig.86. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 39

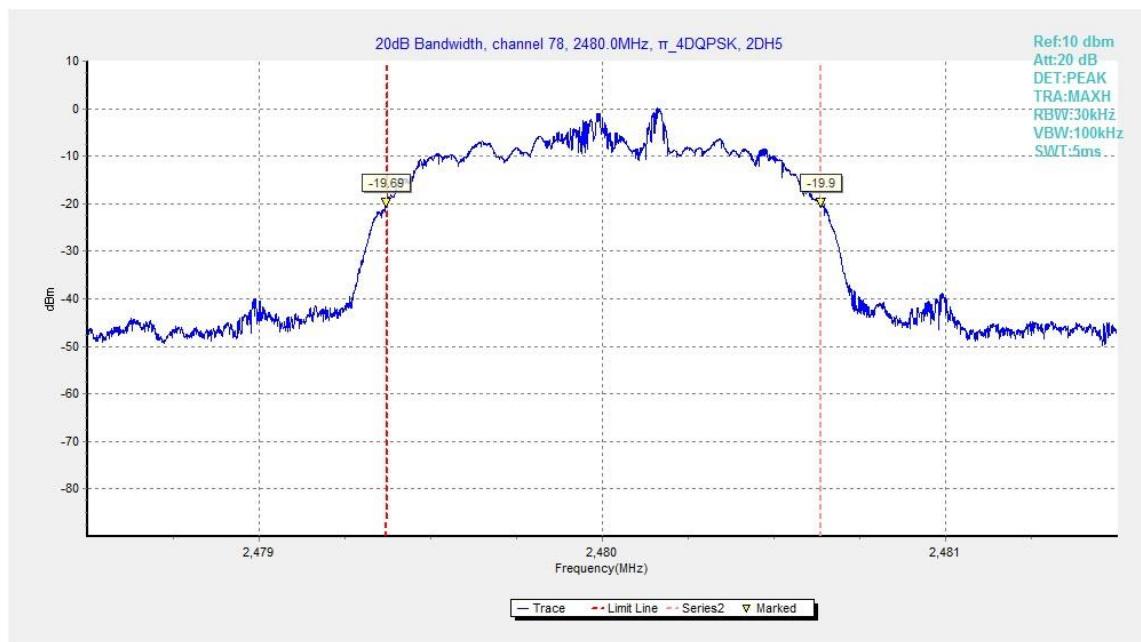


Fig.87. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 78

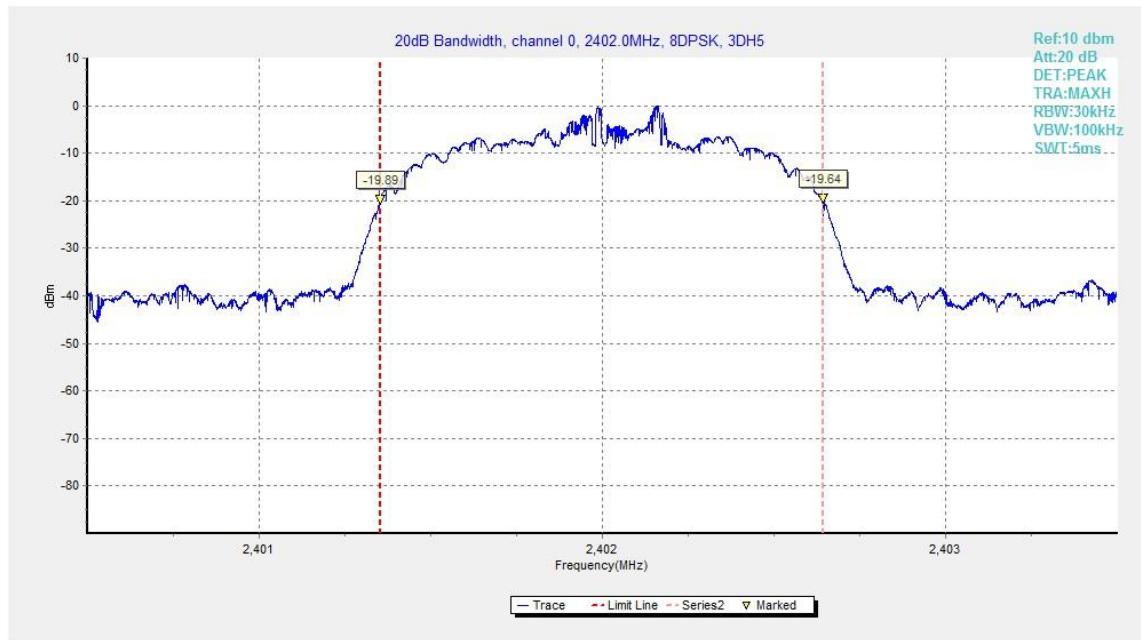


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

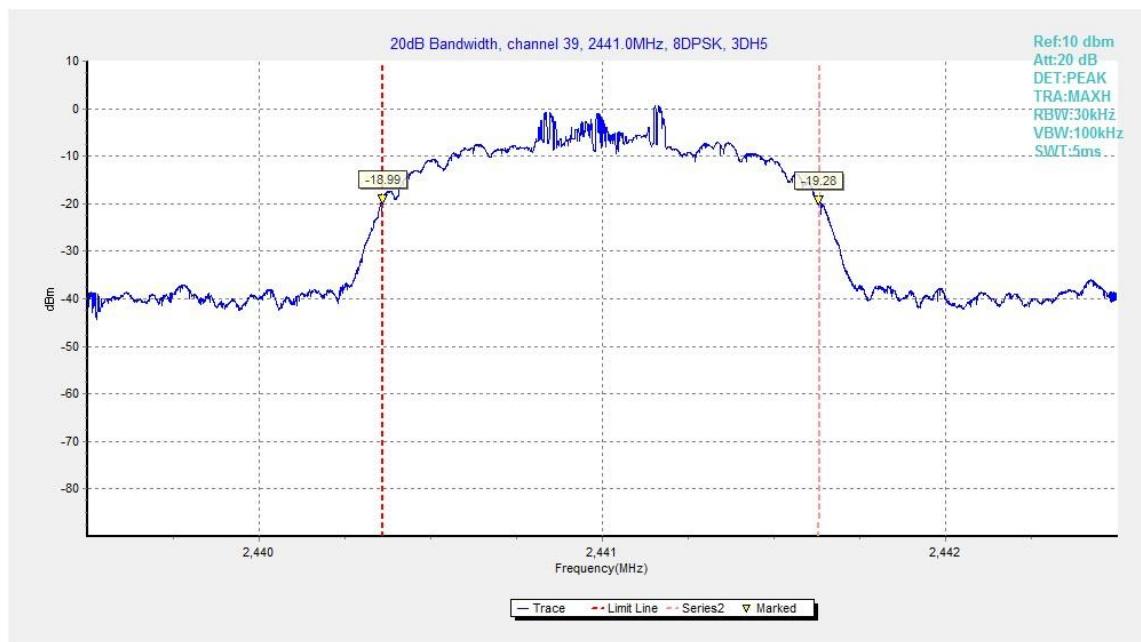


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

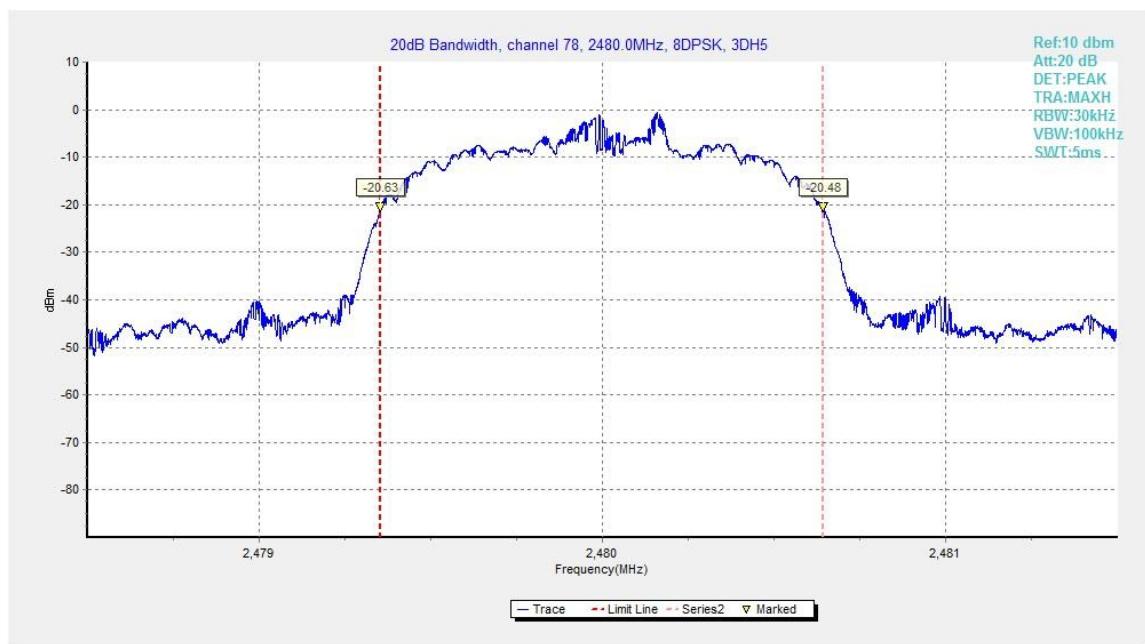


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

## A.8. Carrier Frequency Separation

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

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

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

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

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

#### Measurement Limit:

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

#### Measurement Result:

##### For GFSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.91	1020.00	P

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

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	1010.25	P

##### For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	973.50	P

**Conclusion: PASS**

**Test graphs as below:**

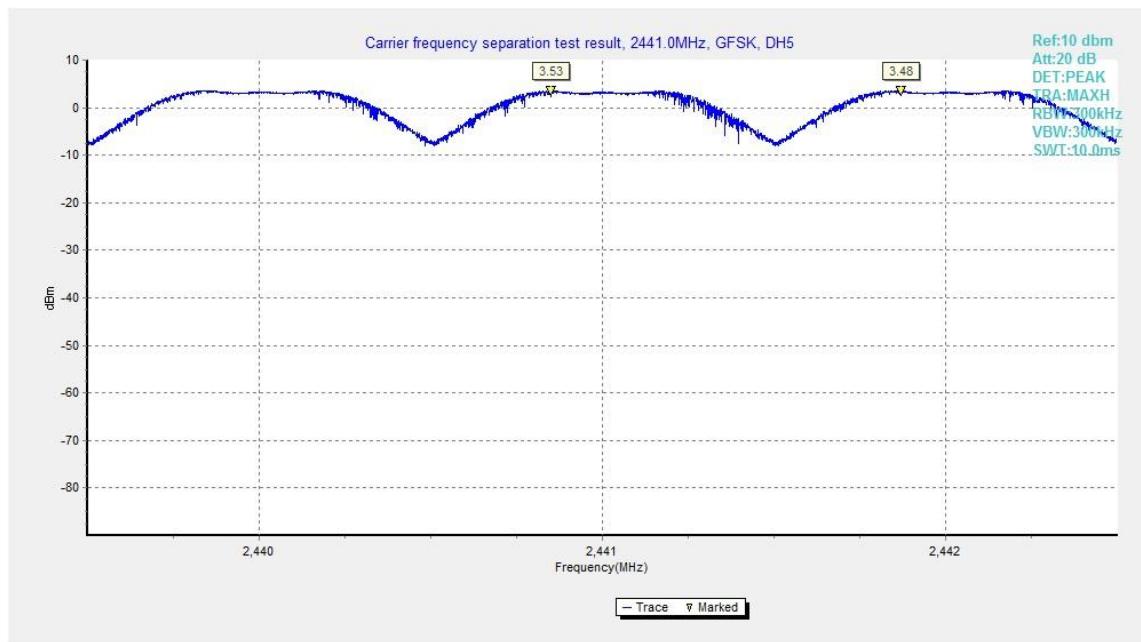


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

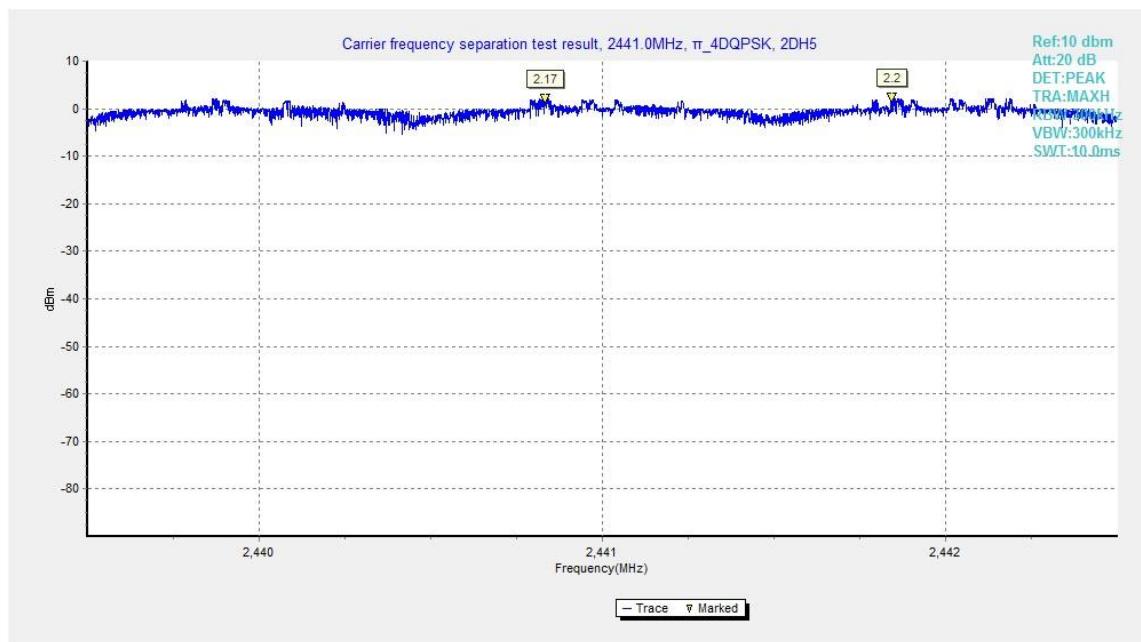


Fig.92. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

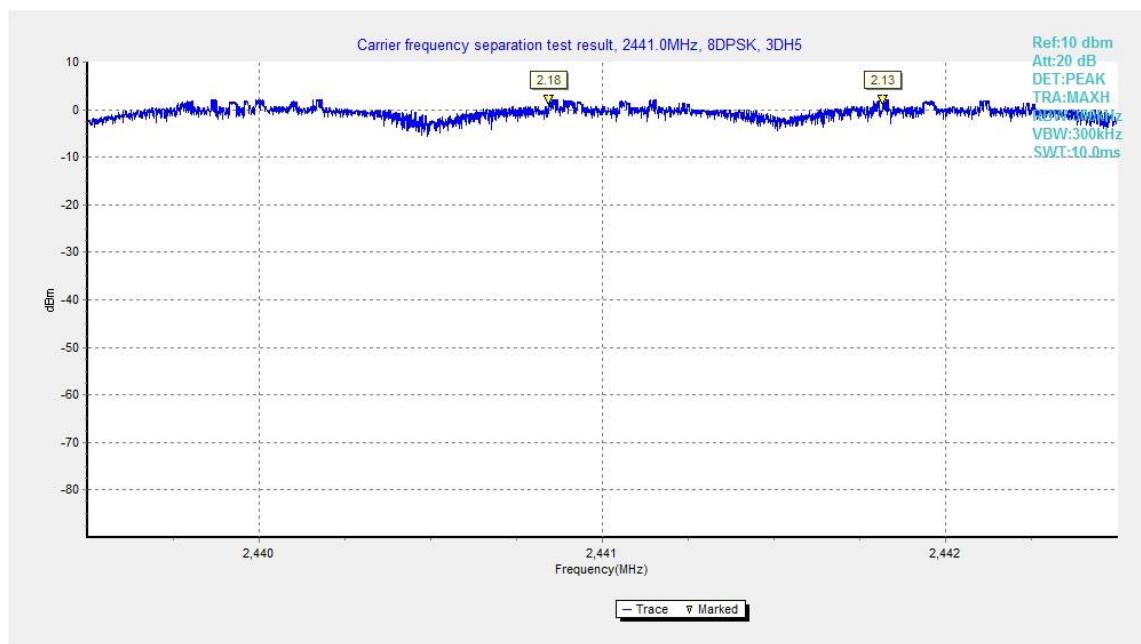


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

## A.9. Number of Hopping Channels

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

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

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

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

#### Measurement Limit:

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

#### Measurement Result:

##### For GFSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.94	
40~78	Fig.95	P

##### For 4 DQPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.96	
40~78	Fig.97	P

##### For 8DPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.98	
40~78	Fig.99	P

#### Conclusion: PASS

#### Test graphs as below:

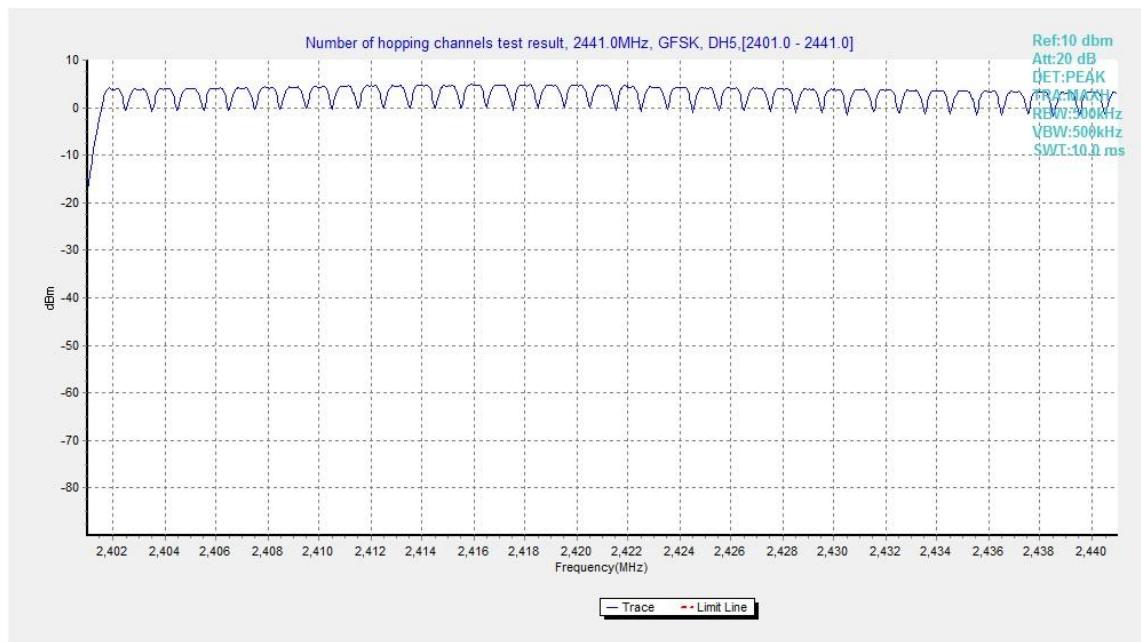


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

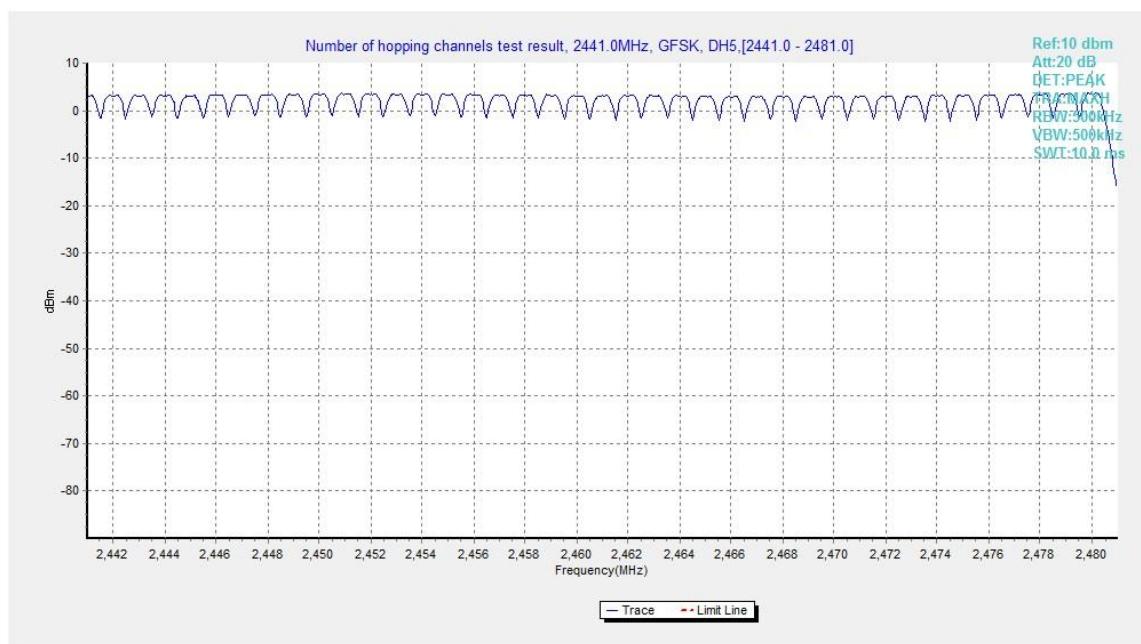


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

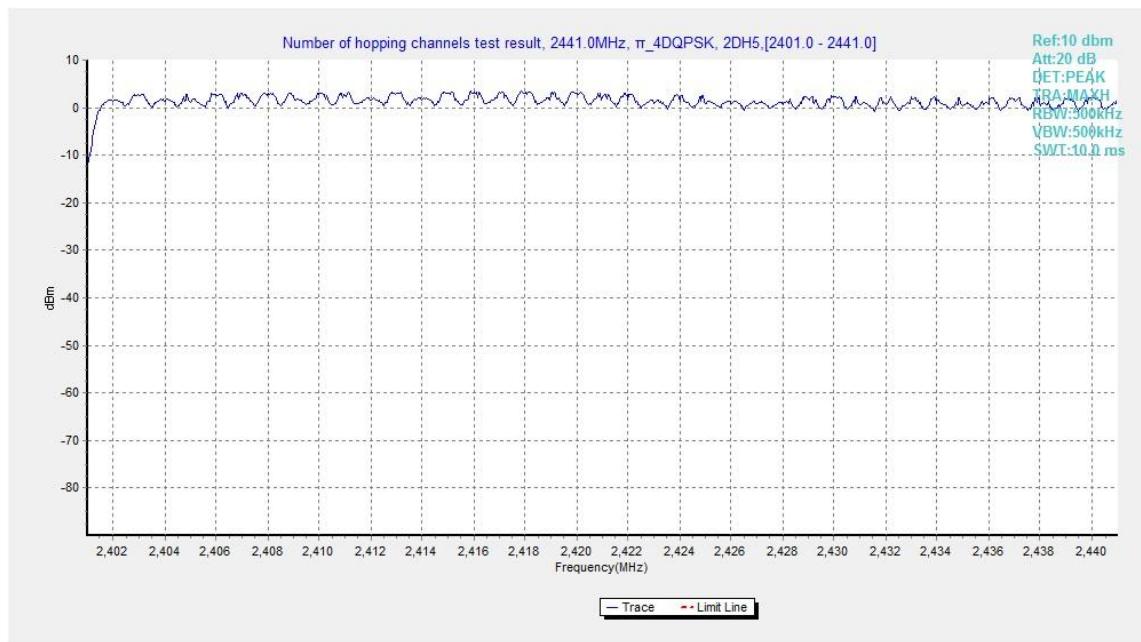


Fig.96. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 0 - 39

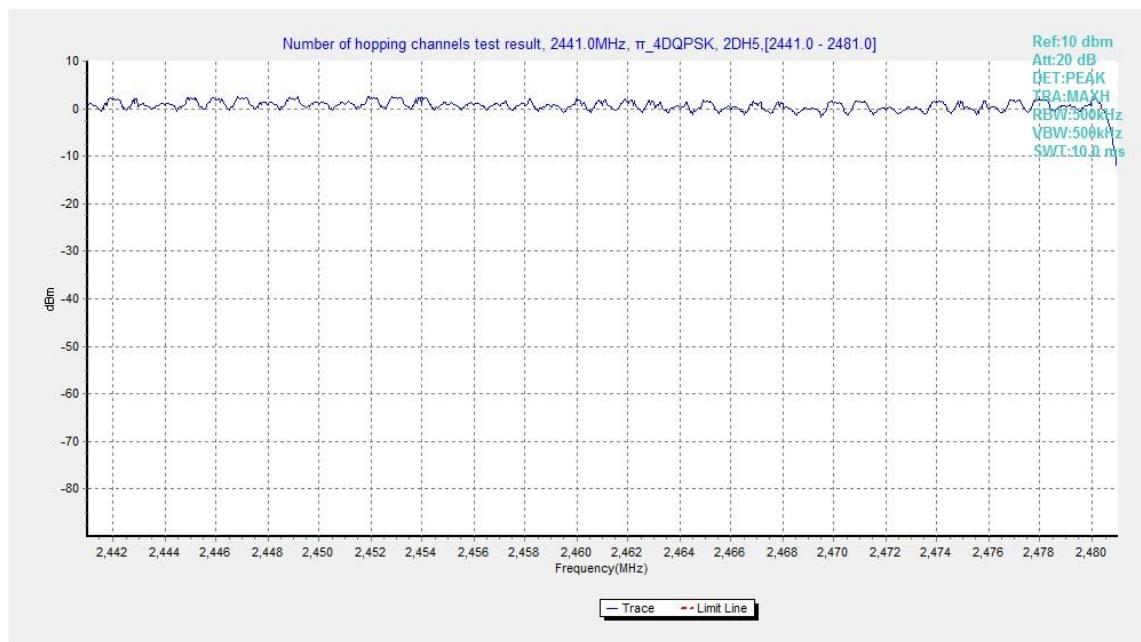


Fig.97. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 40 - 78

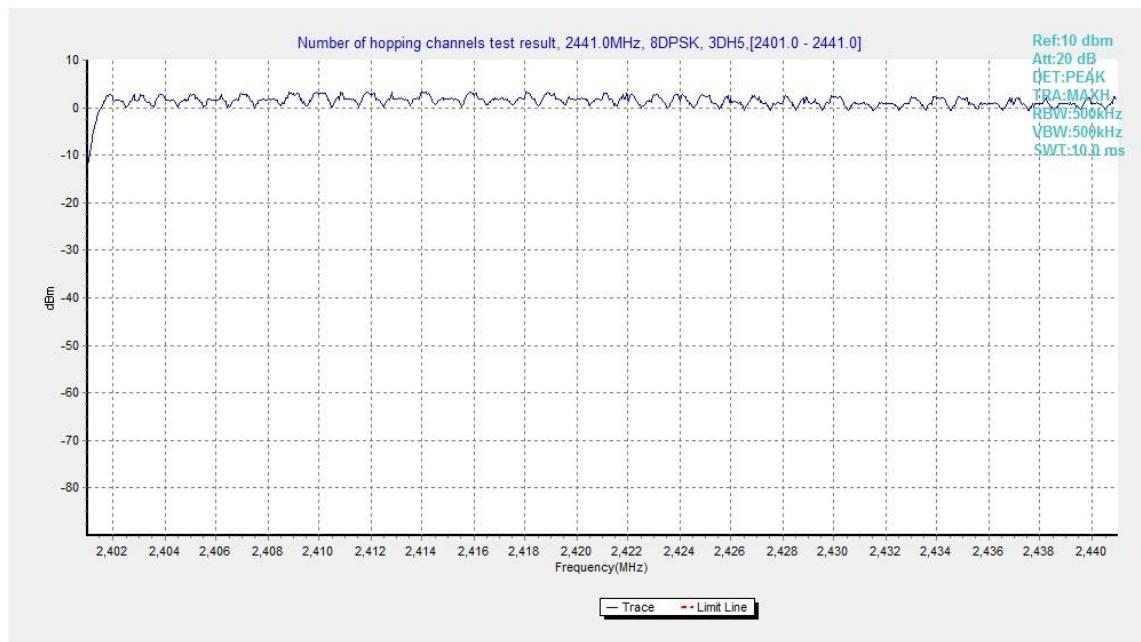


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

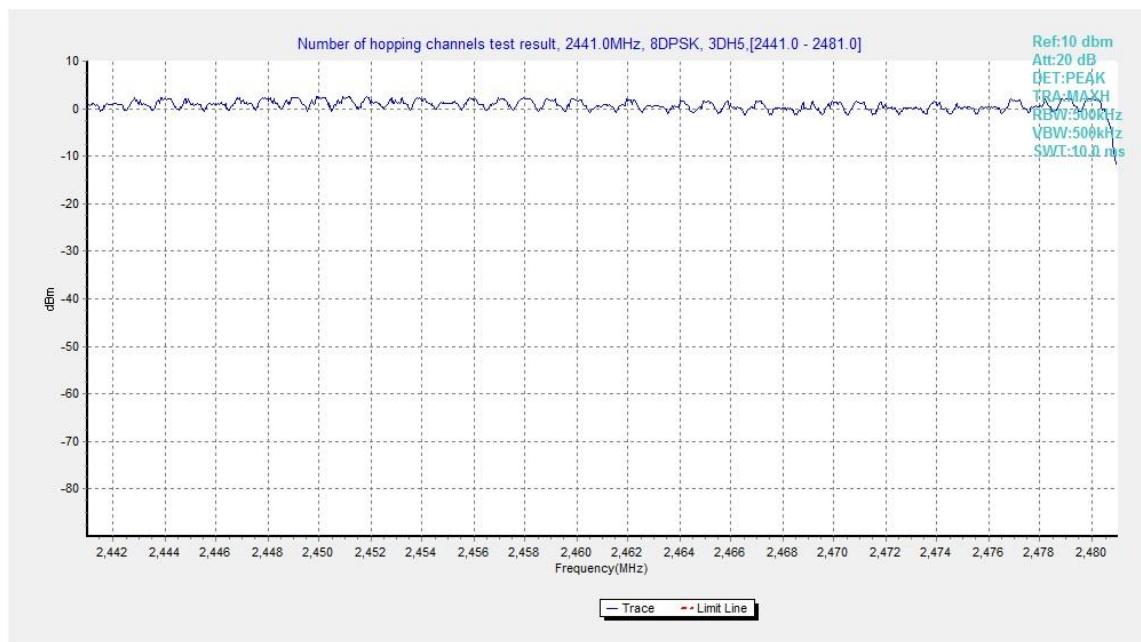


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

## A.10. AC Powerline Conducted Emission

**Method of Measurement:** See ANSI C63.10-clause 6.2

1. the one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.
2. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.
3. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.
4. If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.
5. If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.  
36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

### Test Condition

Voltage (V)	Frequency (Hz)
120	60

### Measurement Result and limit:

#### Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Conclusion
0.15 to 0.5	66 to 56	P
0.5 to 5	56	
5 to 30	60	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

**Bluetooth (Average Limit)**

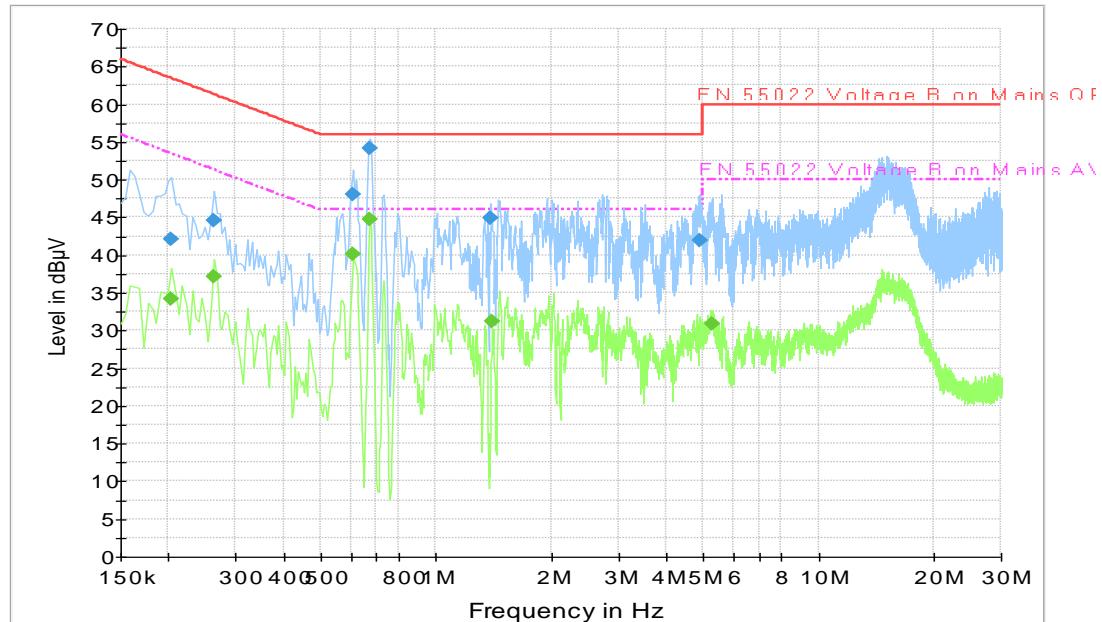
Frequency range (MHz)	Average Limit (dB $\mu$ V)	Conclusion
0.15 to 0.5	56 to 46	P
0.5 to 5	46	
5 to 30	50	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

**Conclusion: PASS**

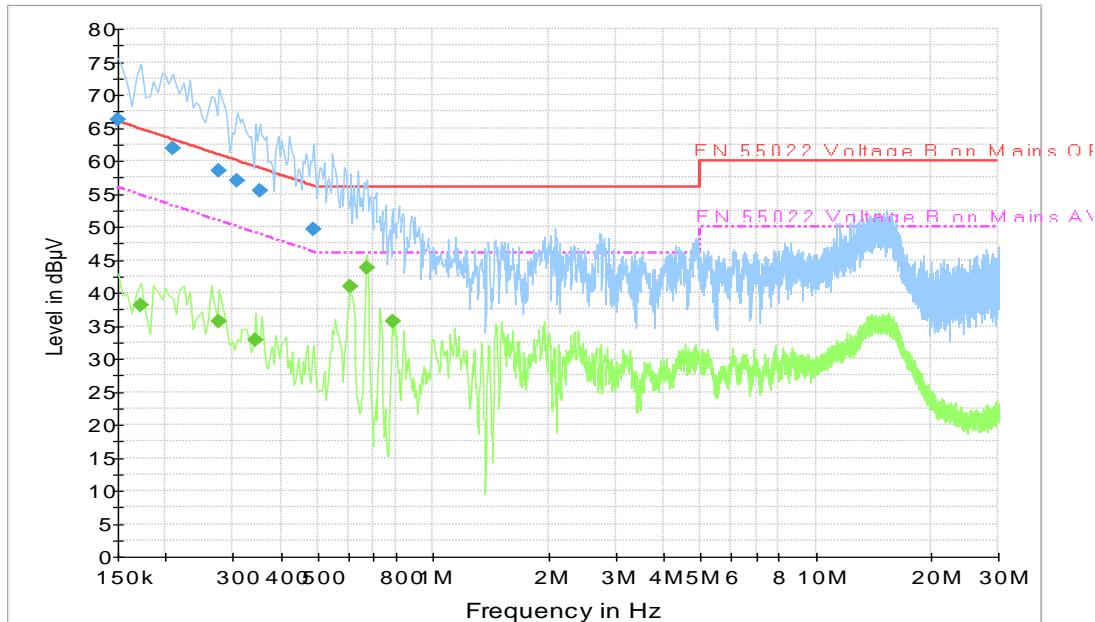
**Test graphs as below:**

**Traffic: Travel charger (CBA0061AGAC1)**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.204000	42.0	GND	L1	19.8	21.4	63.4
0.262500	44.6	GND	L1	19.8	16.8	61.4
0.609000	48.0	GND	L1	19.8	8.0	56.0
0.672000	54.2	GND	L1	19.8	1.8	56.0
1.392000	44.8	GND	L1	19.7	11.2	56.0
4.884000	42.0	GND	L1	19.6	14.0	56.0

**Final Result 2**

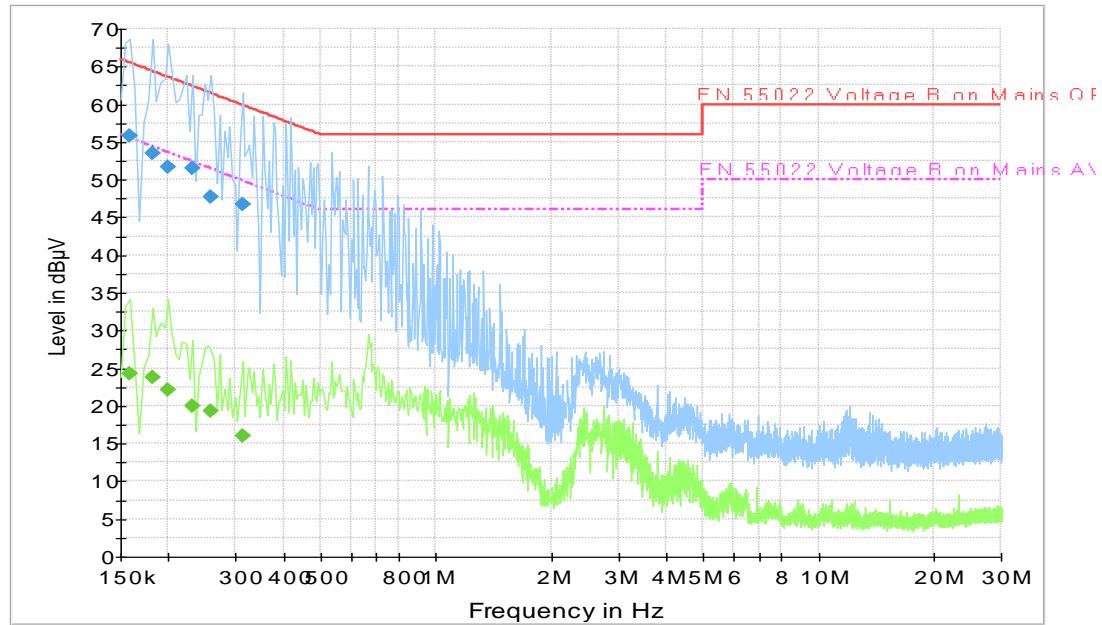
Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.204000	34.2	GND	L1	19.8	19.2	53.4
0.262500	37.2	GND	L1	19.8	14.2	51.4
0.609000	40.1	GND	L1	19.8	5.9	46.0
0.672000	44.7	GND	L1	19.8	1.3	46.0
1.401000	31.2	GND	L1	19.7	14.8	46.0
5.284500	30.9	GND	L1	19.6	19.1	50.0

**Idle:Travelcharger (CBA0061AGAC1)**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	66.1	GND	L1	20.2	-0.1	66.0
0.208500	61.9	GND	L1	19.8	1.4	63.3
0.276000	58.6	GND	L1	19.8	2.4	60.9
0.307500	57.0	GND	L1	19.8	3.0	60.0
0.352500	55.4	GND	L1	19.8	3.5	58.9
0.487500	49.7	GND	L1	19.9	6.5	56.2

**Final Result 2**

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.172500	38.2	GND	L1	19.9	16.6	54.8
0.276000	35.6	GND	L1	19.8	15.3	50.9
0.343500	32.8	GND	L1	19.9	16.3	49.1
0.604500	41.0	GND	L1	19.8	5.0	46.0
0.672000	43.7	GND	L1	19.8	2.3	46.0
0.784500	35.6	GND	L1	19.8	10.4	46.0

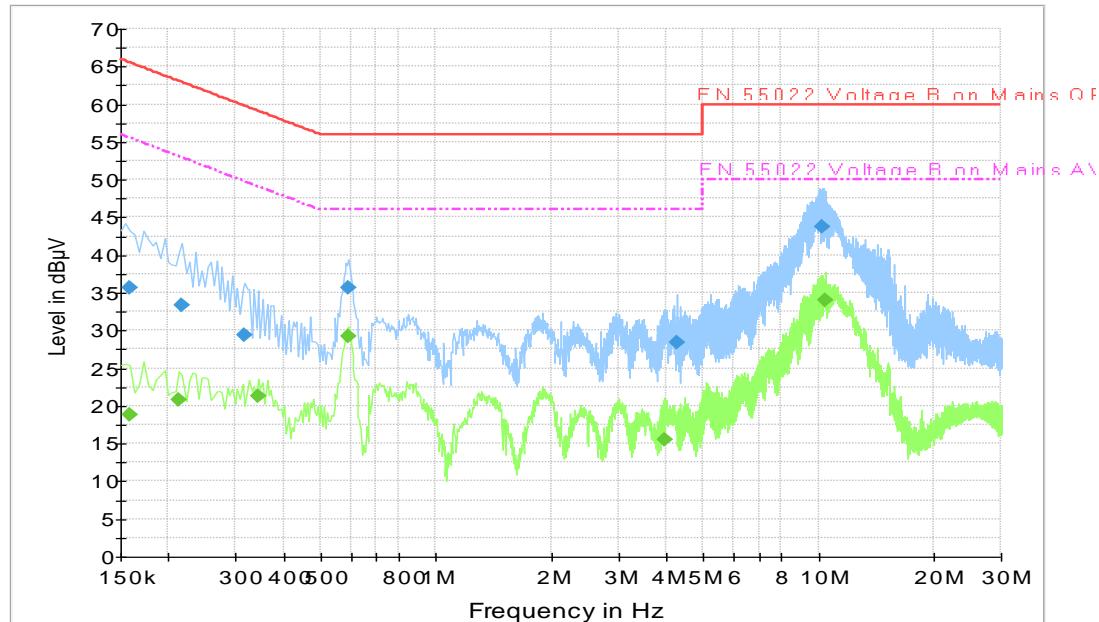
**Traffic: Travel charger (CBA0061AGAC1)**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.159000	55.8	GND	L1	19.9	9.7	65.5
0.181500	53.5	GND	L1	19.8	10.9	64.4
0.199500	51.7	GND	L1	19.8	11.9	63.6
0.231000	51.5	GND	N	19.8	10.9	62.4
0.258000	47.8	GND	L1	19.8	13.7	61.5
0.312000	46.7	GND	N	19.8	13.2	59.9

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.159000	24.3	GND	L1	19.9	31.2	55.5
0.181500	23.7	GND	L1	19.8	30.7	54.4
0.199500	22.0	GND	L1	19.8	31.6	53.6
0.231000	20.0	GND	N	19.8	32.4	52.4
0.258000	19.4	GND	L1	19.8	32.1	51.5
0.312000	16.0	GND	N	19.8	34.0	49.9

**Traffic: Travel charger (CBA0059AGAC2)**



**Final Result 1**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.159000	35.7	GND	L1	19.9	29.8	65.5
0.217500	33.3	GND	L1	19.8	29.6	62.9
0.316500	29.3	GND	L1	19.8	30.5	59.8
0.591000	35.6	GND	L1	19.8	20.4	56.0
4.258500	28.5	GND	L1	19.6	27.5	56.0
10.216500	43.7	GND	L1	19.7	16.3	60.0

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.159000	18.7	GND	L1	19.9	36.8	55.5
0.213000	20.8	GND	N	19.8	32.3	53.1
0.343500	21.2	GND	N	19.9	27.9	49.1
0.591000	29.3	GND	N	19.8	16.7	46.0
3.961500	15.5	GND	L1	19.5	30.5	46.0
10.414500	33.9	GND	L1	19.7	16.1	50.0

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