

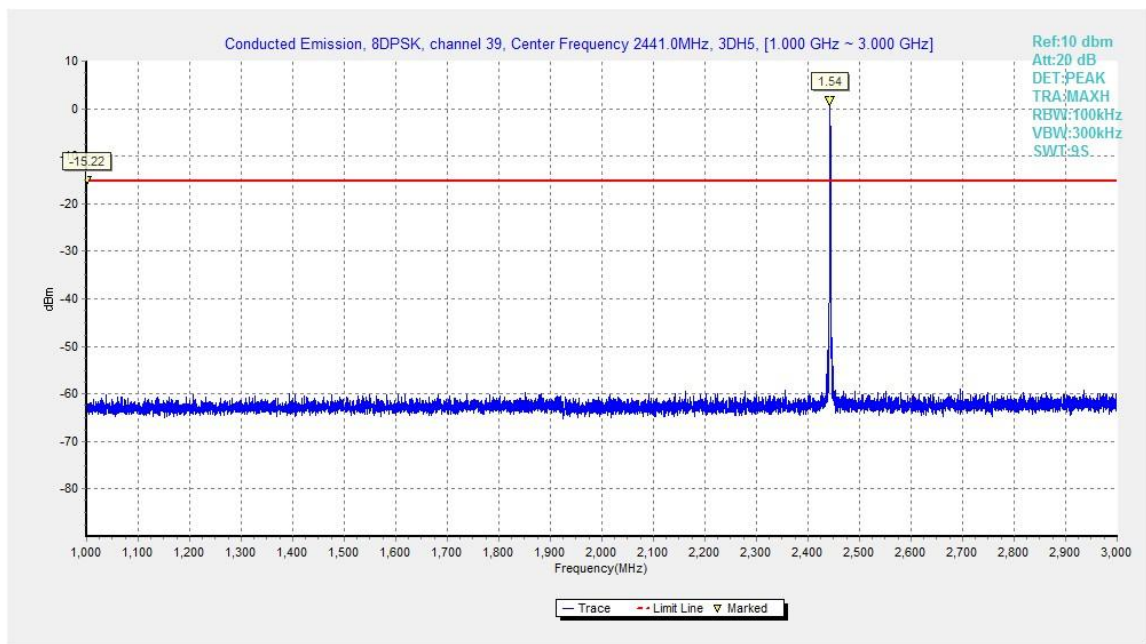


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

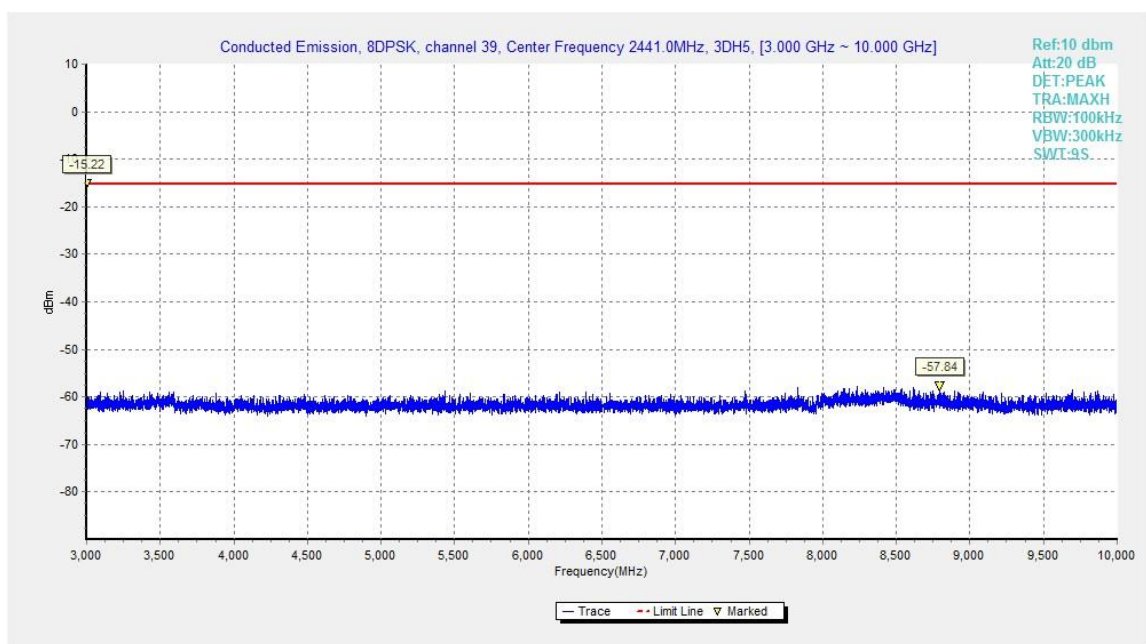


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

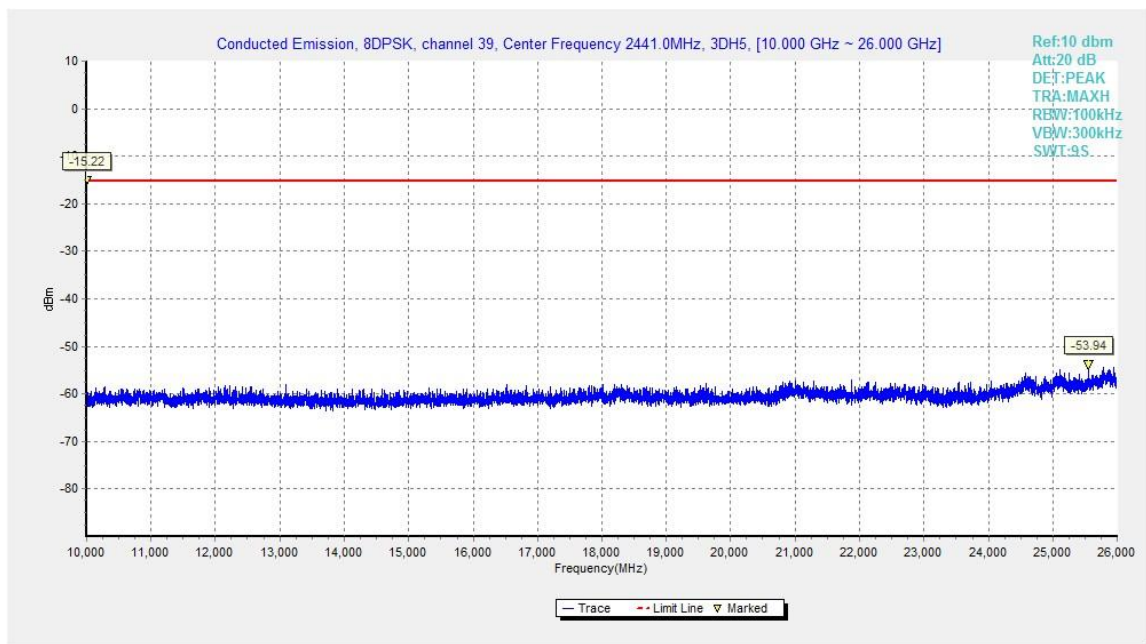


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

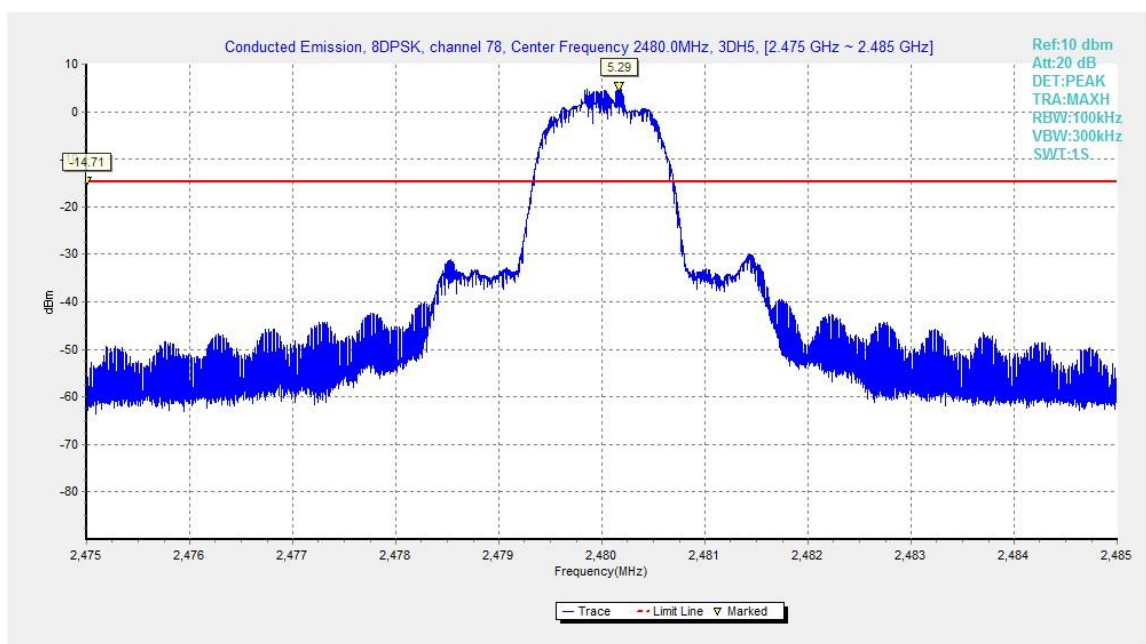


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

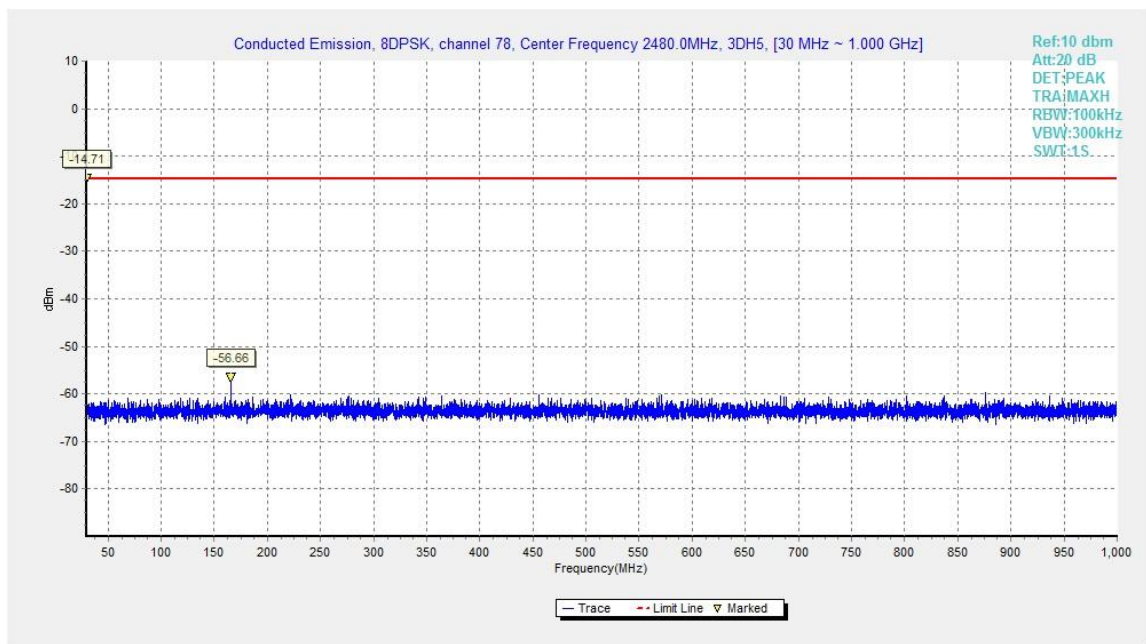


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

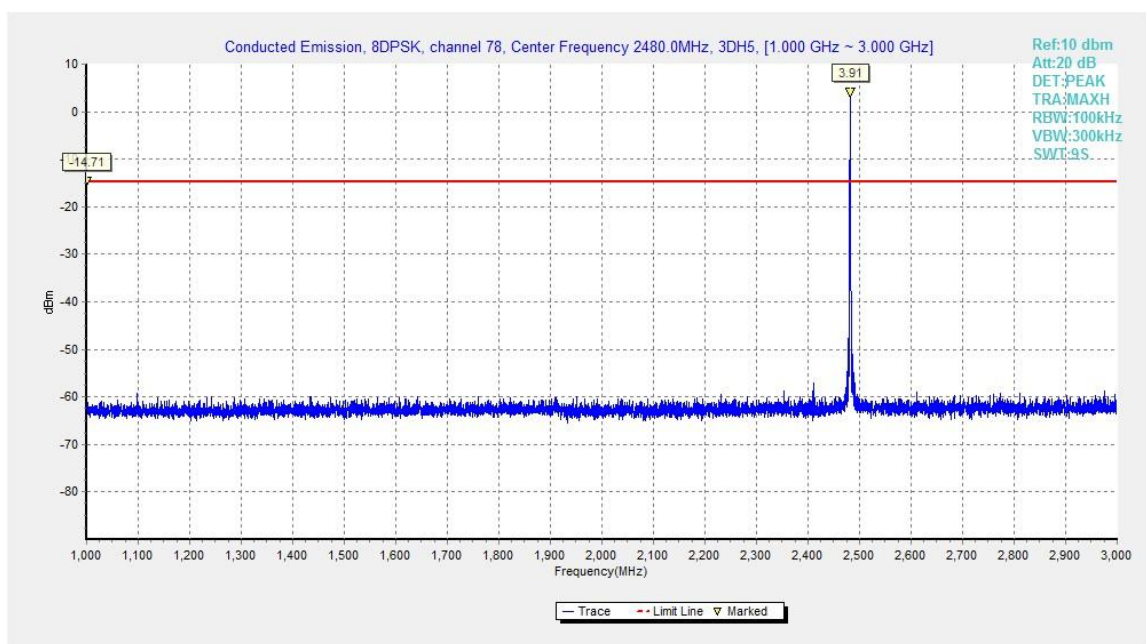


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

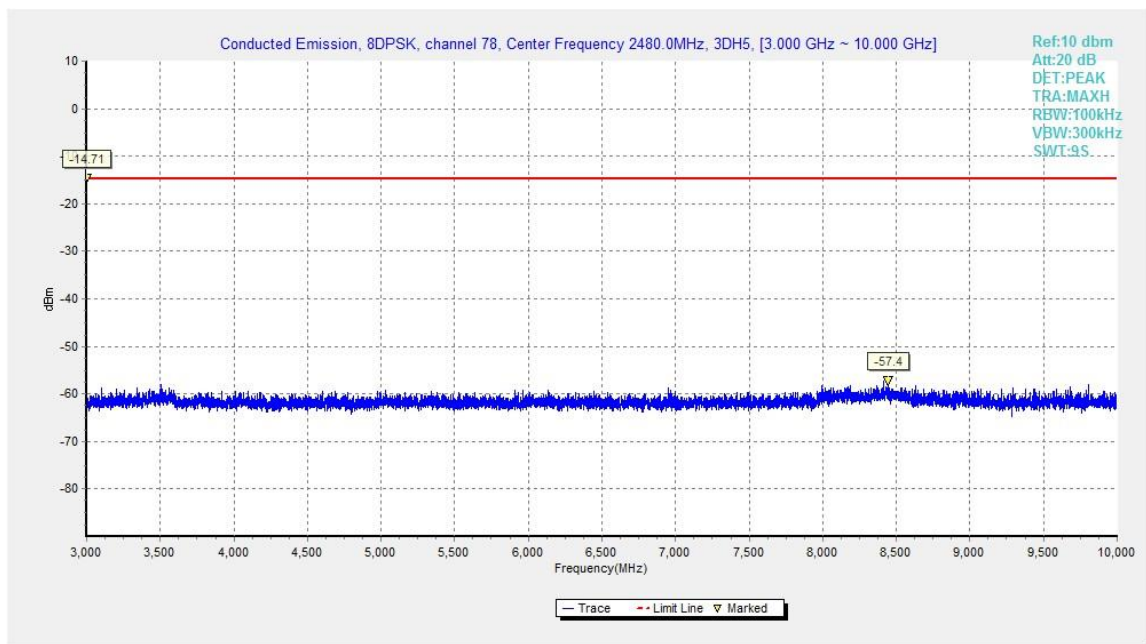


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

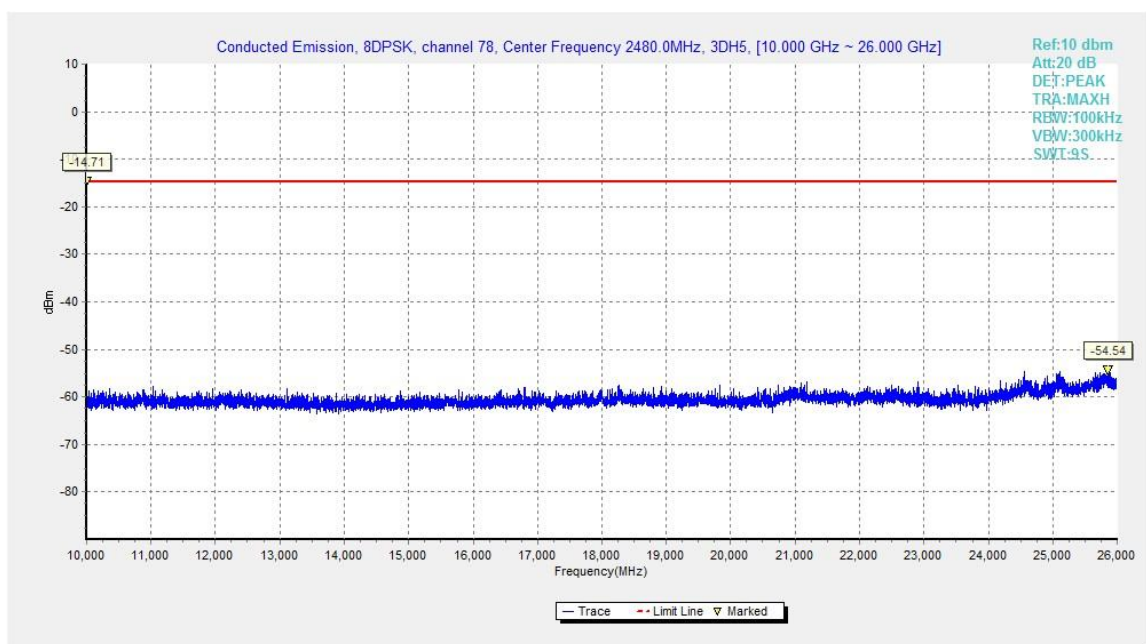


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

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)).

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 for Set.10:

Result= P_{Mea} +ARPL

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Ch 39 2440 MHz	9 kHz ~ 30 MHz	--	P
	30 MHz ~ 1 GHz	--	P
	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Power	2.38GHz~2.4GHz---L	Fig.58	P
Power	2.45GHz~2.5GHz---H	Fig.59	P
For all channels	18 GHz ~ 26 GHz	--	P

For $\pi/4$ DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Ch 39 2440 MHz	30 MHz ~ 1 GHz	--	P
	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Power	2.38GHz~2.4GHz---L	Fig.60	P
Power	2.45GHz~2.5GHz---H	Fig.61	P
For all channels	18 GHz ~ 26 GHz	--	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Ch 39 2440 MHz	30 MHz ~ 1 GHz	--	P
	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	--	P
	3 GHz ~ 18 GHz	--	P
Power	2.38GHz~2.4GHz---L	Fig.62	P
Power	2.45GHz~2.5GHz---H	Fig.63	P
For all channels	18 GHz ~ 26 GHz	--	P

GFSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2382.700	46.3	2.9	32.0	11.44	54.0	7.7	H	155	28
2385.110	46.3	2.9	32.0	11.46	54.0	7.7	H	155	49
4804.000	29.6	-32.9	34.5	27.80	54.0	24.4	H	155	246
7206.000	30.6	-31.6	36.1	26.22	54.0	23.4	H	155	182
9608.000	33.2	-30.0	37.0	26.51	54.0	20.8	H	155	94
12010.000	35.1	-29.8	39.3	25.45	54.0	18.9	H	155	42

GFSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2381.600	46.8	2.9	32.0	11.93	54.0		H	155	26
2492.300	46.7	2.9	32.5	11.22	54.0	7.3	H	155	48
4882.000	29.7	-32.7	34.5	27.95	54.0	24.3	H	155	68
7323.000	30.2	-31.9	36.1	26.07	54.0	23.8	H	155	44
9764.000	32.7	-30.6	37.2	26.20	54.0	21.3	H	155	8
12205.000	35.2	-29.4	39.2	25.39	54.0	18.8	H	155	102

GFSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2485.900	47.1	2.9	32.7	11.48	54.0	6.9	H	155	132
2487.500	47.1	2.9	32.6	11.49	54.0	6.9	H	155	28
4924.000	29.3	-33.1	34.5	27.93	54.0	24.7	H	155	38
7386.000	30.7	-31.8	36.0	26.54	54.0	23.3	H	155	65
9848.000	33.8	-30.1	37.3	26.59	54.0	20.2	H	155	4
12310.000	34.0	-29.7	39.2	24.52	54.0	20.0	H	155	24

GFSK Ch 0 – Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2388.148	59.3	2.9	32.0	24.47	74.0	14.7	H	155	22
2386.706	59.1	2.9	32.0	24.21	74.0	14.9	H	155	44
17756.250	53.1	-23.9	41.0	36.00	74.0	20.9	V	155	242
17800.500	52.6	-23.1	41.0	34.82	74.0	21.4	H	155	176
17784.000	52.6	-23.4	41.0	35.05	74.0	21.4	V	155	88
17046.000	52.5	-25.5	41.4	36.70	74.0	21.5	V	155	22

GFSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2376.800	50.4	-26.5	32.1	44.82	74.0	23.6	H	155	22
2551.800	52.3	-26.8	33.1	45.98	74.0	21.7	H	155	44
17781.000	53.3	-23.5	41.0	35.78	74.0	20.7	V	155	66
17787.750	52.7	-23.3	41.0	35.09	74.0	21.3	V	155	22
17805.000	52.6	-23.1	41.0	34.73	74.0	21.4	V	155	0
17782.500	52.4	-23.4	41.0	34.82	74.0	21.6	V	155	88

GFSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2486.230	60.1	2.9	32.7	24.49	74.0	13.9	H	155	110
2491.210	60.6	2.9	32.5	25.09	74.0	13.4	H	155	22
17802.000	53.3	-23.1	41.0	35.45	74.0	20.7	V	155	44
17804.250	52.8	-23.1	41.0	34.91	74.0	21.2	V	155	66
17754.000	52.5	-23.9	41.0	35.37	74.0	21.5	V	155	0
17790.000	52.4	-23.3	41.0	34.79	74.0	21.6	H	155	22

$\pi/4$ 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)
2381.300	46.3	2.9	32.0	11.41	54.0	7.7	H	155	8
2384.800	46.3	2.9	32.0	11.44	54.0	7.7	H	155	56
4804.000	29.6	-32.9	34.5	27.81	54.0	24.4	H	155	139
7206.000	30.6	-31.6	36.1	26.22	54.0	23.4	H	155	108
9608.000	33.2	-30.0	37.0	26.51	54.0	20.8	H	155	78
12010.000	35.1	-29.8	39.3	25.45	54.0	18.9	H	155	36

$\pi/4$ 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)
2384.230	46.5	2.9	32.0	11.60	54.0	7.5	H	155	268
2489.610	46.7	2.9	32.6	11.15	54.0	7.3	H	155	138
4882.000	29.8	-32.7	34.5	27.97	54.0	24.2	H	155	104
7323.000	30.2	-31.9	36.1	26.08	54.0	23.8	H	155	40
9764.000	32.7	-30.6	37.2	26.10	54.0	21.3	H	155	28
12205.000	35.2	-29.4	39.2	25.40	54.0	18.8	H	155	8

$\pi/4$ 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)
2484.610	47.2	2.9	32.7	11.49	54.0	6.8	H	155	16
2485.200	47.0	2.9	32.7	11.39	54.0	7.0	H	155	48
4924.000	29.4	-33.1	34.5	28.01	54.0	24.6	H	155	80
7386.000	30.7	-31.8	36.0	26.52	54.0	23.3	H	155	8
9848.000	33.9	-30.1	37.3	26.69	54.0	20.1	H	155	102
12310.000	34.0	-29.7	39.2	24.54	54.0	20.0	H	155	118

$\pi/4$ 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)
2387.434	59.4	2.9	32.0	24.52	74.0	14.6	H	155	0
2389.716	59.6	2.9	32.0	24.76	74.0	14.4	H	155	44
17788.500	53.1	-23.3	41.0	35.43	74.0	20.9	H	155	132
17800.500	52.6	-23.1	41.0	34.80	74.0	21.4	V	155	110
17758.500	52.6	-23.8	41.0	35.43	74.0	21.4	H	155	88
17783.250	52.4	-23.4	41.0	34.85	74.0	21.6	H	155	44

$\pi/4$ 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)
2348.400	49.5	-27.7	31.6	45.61	74.0	24.5	H	155	264
2694.200	52.0	-26.7	33.2	45.53	74.0	22.0	H	155	132
17798.250	52.6	-23.2	41.0	34.84	74.0	21.4	H	155	110
17806.500	52.5	-23.0	41.0	34.60	74.0	21.5	H	155	44
17766.000	52.5	-23.7	41.0	35.20	74.0	21.5	H	155	22
17763.750	52.1	-23.7	41.0	34.87	74.0	21.9	V	155	0

$\pi/4$ 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)
2484.360	59.7	2.9	32.7	23.99	74.0	14.3	H	155	22
2487.150	60.0	2.9	32.7	24.44	74.0	14.0	H	155	44
17793.000	52.8	-23.3	41.0	35.13	74.0	21.2	V	155	88
17791.500	52.3	-23.3	41.0	34.60	74.0	21.7	V	155	0
16956.000	52.1	-25.7	41.4	36.30	74.0	21.9	H	155	110
17811.750	52.0	-23.0	41.0	34.08	74.0	22.0	H	155	132

8DPSK Ch 0 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2384.600	46.3	2.9	32.0	11.46	54.0	7.7	H	155	28
2389.800	46.3	2.9	32.0	11.48	54.0	7.7	H	155	46
4804.000	30.1	-32.9	34.5	28.38	54.0	23.9	H	155	8
7206.000	30.7	-31.6	36.1	26.36	54.0	23.3	H	155	6
9608.000	33.3	-30.0	37.0	26.67	54.0	20.7	H	155	24
12010.000	35.3	-29.8	39.3	25.65	54.0	18.7	H	155	185

8DPSK Ch 39 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2383.400	46.6	2.9	32.0	11.71	54.0	7.4	H	155	28
2395.400	46.7	2.9	31.9	11.90	54.0	7.3	H	155	248
4882.000	30.1	-32.7	34.5	28.33	54.0	23.9	H	155	38
7323.000	30.4	-31.9	36.1	26.20	54.0	23.6	H	155	98
9764.000	32.8	-30.6	37.2	26.19	54.0	21.2	H	155	183
12205.000	35.2	-29.4	39.2	25.41	54.0	18.8	H	155	356

8DPSK Ch 78 - Average

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2485.410	47.1	2.9	32.7	11.48	54.0	6.9	H	155	354
2485.920	47.1	2.9	32.7	11.44	54.0	6.9	H	155	28
4924.000	30.1	-33.1	34.5	28.68	54.0	23.9	H	155	348
7386.000	30.8	-31.8	36.0	26.62	54.0	23.2	H	155	345
9848.000	33.9	-30.1	37.3	26.69	54.0	20.1	H	155	184
12310.000	34.1	-29.7	39.2	24.65	54.0	19.9	H	155	182

8DPSK Ch 0 – Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2383.500	60.2	2.9	32.0	25.30	74.0	13.8	H	155	22
2388.946	59.5	2.9	32.0	24.63	74.0	14.5	H	155	44
17882.250	53.1	-24.0	40.9	36.19	74.0	20.9	V	155	0
17797.500	52.8	-23.2	41.0	35.01	74.0	21.2	H	155	0
17848.500	52.7	-23.5	40.9	35.25	74.0	21.3	V	155	22
17749.500	52.6	-24.0	41.0	35.62	74.0	21.4	H	155	176

8DPSK Ch 39 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2354.600	49.1	-27.8	31.7	45.15	74.0	24.9	H	155	22
2622.300	52.1	-26.8	33.3	45.64	74.0	21.9	H	155	242
17839.500	53.2	-23.4	40.9	35.65	74.0	20.8	V	155	44
17800.500	53.1	-23.1	41.0	35.31	74.0	20.9	H	155	88
17306.250	52.9	-25.9	41.2	37.52	74.0	21.1	V	155	176
17909.250	52.7	-24.3	40.9	36.18	74.0	21.3	H	155	0

8DPSK Ch 78 - Peak

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2484.540	60.3	2.9	32.7	24.67	74.0	13.7	H	155	0
2486.710	59.8	2.9	32.7	24.22	74.0	14.2	H	155	22
17795.250	52.5	-23.2	41.0	34.80	74.0	21.5	V	155	352
17783.250	52.4	-23.4	41.0	34.85	74.0	21.6	V	155	352
17802.750	52.2	-23.1	41.0	34.31	74.0	21.8	V	155	176
17886.000	52.0	-24.0	40.9	35.12	74.0	22.0	V	155	176

Conclusion: PASS

Test graphs as below for Set.10:

RE - Power-2.38GHz-2.45GHz

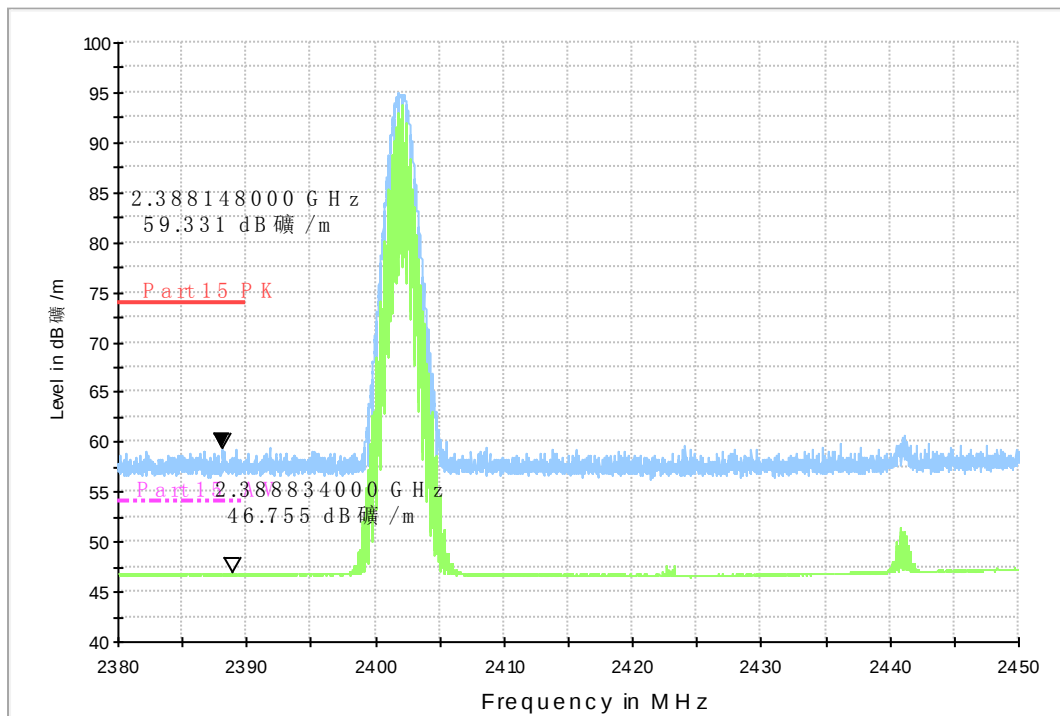


Fig.58. Radiated emission (Power): GFSK, low channel

RE - Power-2.45GHz-2.5GHz

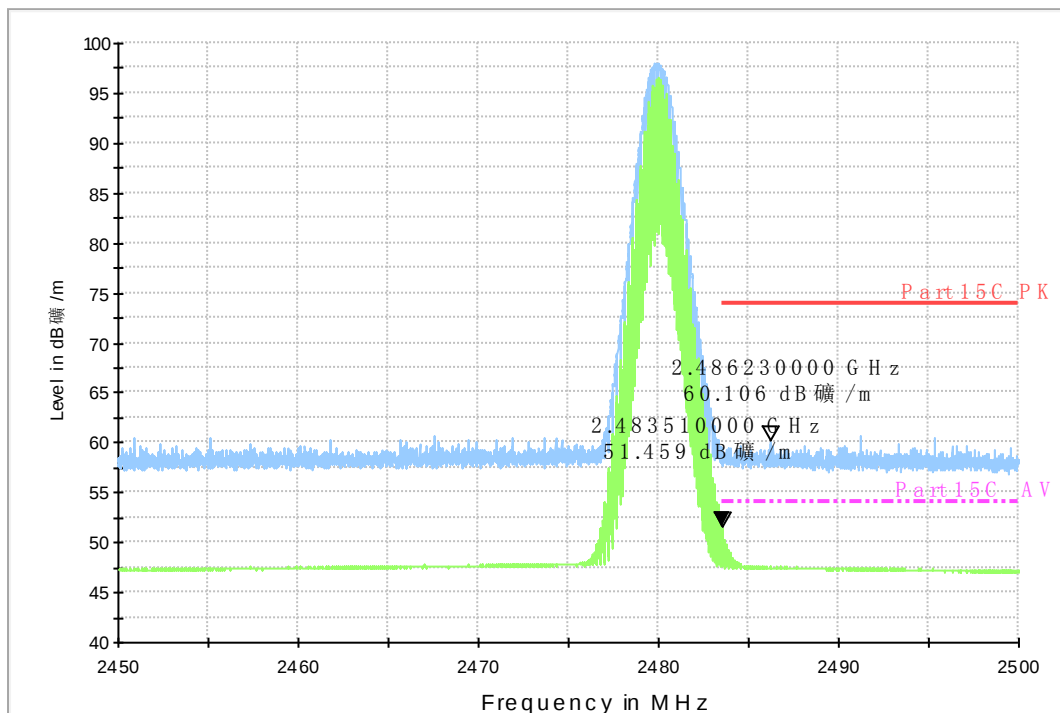


Fig.59. Radiated emission (Power) GFSK, high channel

RE - Power-2.38GHz-2.45GHz

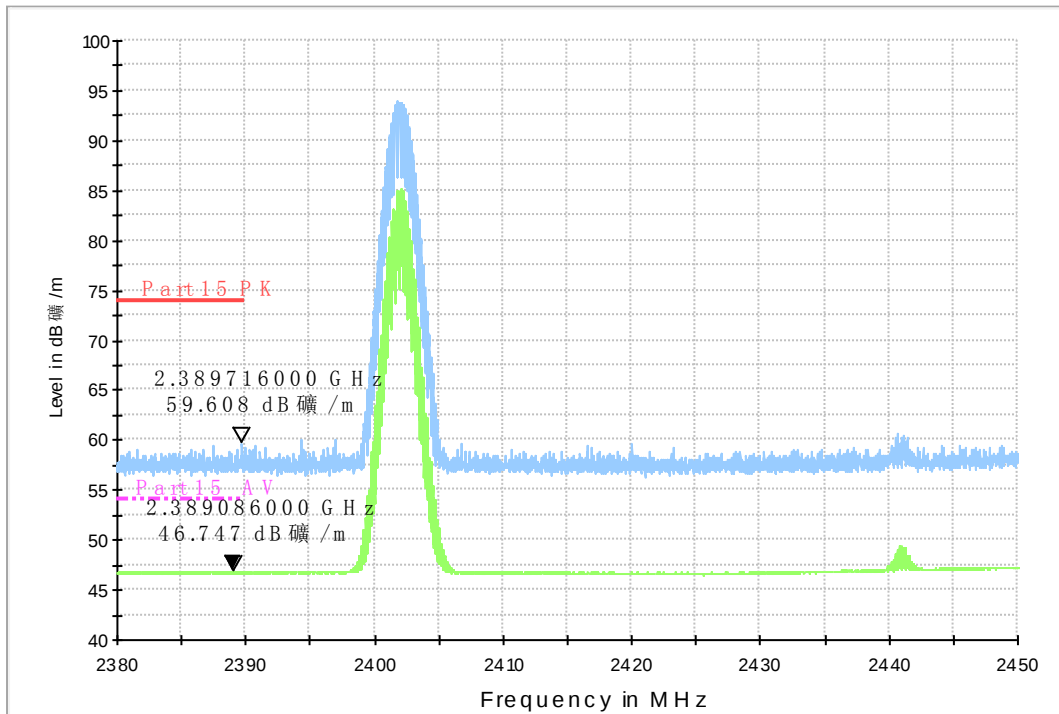


Fig.60. Radiated emission (Power): $\pi/4$ DQPSK, low channel

RE - Power-2.45GHz-2.5GHz

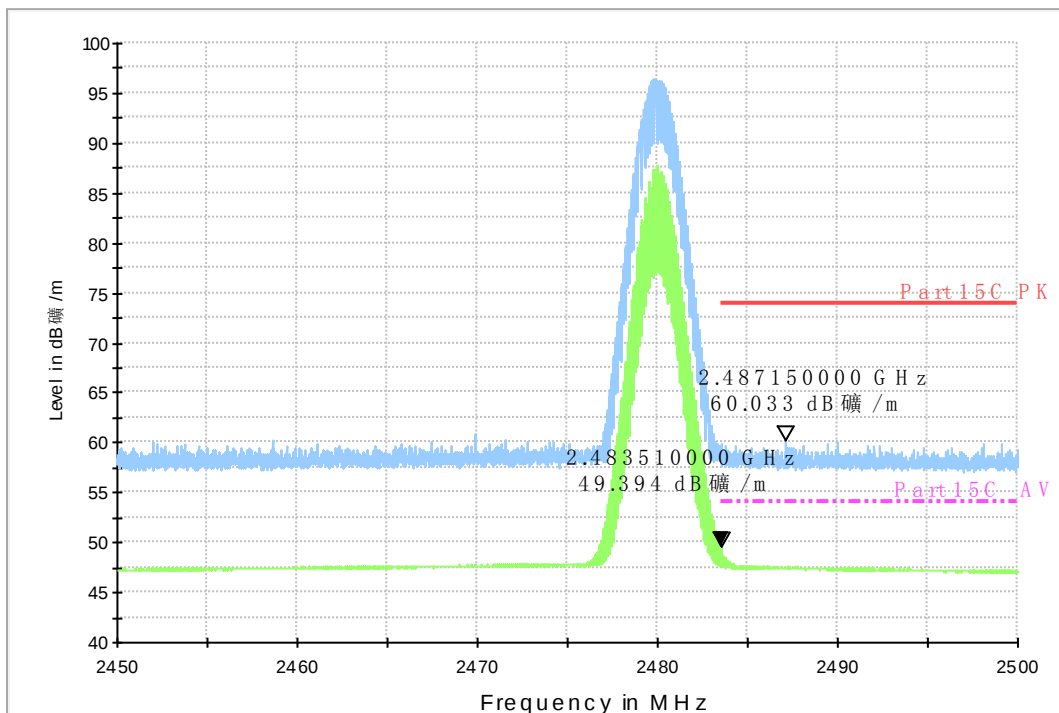


Fig.61. Radiated emission (Power): $\pi/4$ DQPSK, high channel

RE - Power-2.38GHz-2.45GHz

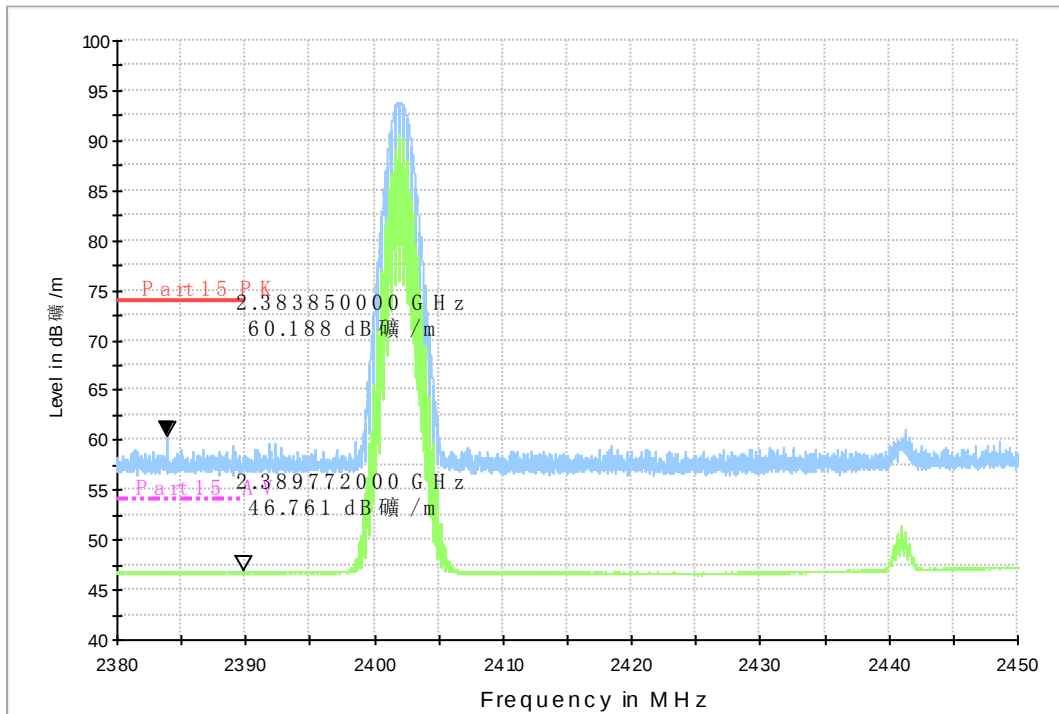


Fig.62. Radiated emission (Power): 8DPSK, low channel

RE - Power-2.45GHz-2.5GHz

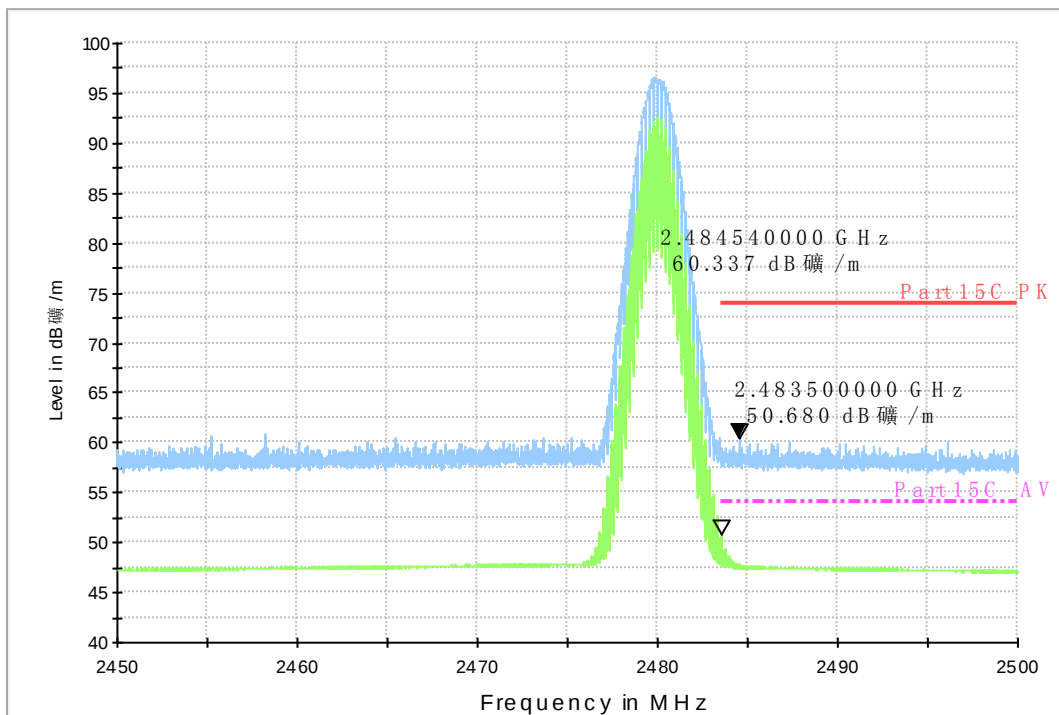


Fig.63. Radiated emission (Power): 8DPSK, high channel

A.6. Time of Occupancy (Dwell Time)

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	117.74	P
		Fig.65		
	DH3	Fig.66	178.89	P
		Fig.67		
	DH5	Fig.68	206.96	P
		Fig.69		

For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.70	117.37	P
		Fig.71		
	DH3	Fig.72	170.27	P
		Fig.73		
	DH5	Fig.74	149.66	P
		Fig.75		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.76	115.85	P
		Fig.77		
	DH3	Fig.78	164.52	P
		Fig.79		

	DH5	Fig.80	198.73	P
		Fig.81		

Conclusion: PASS

Test graphs as below:

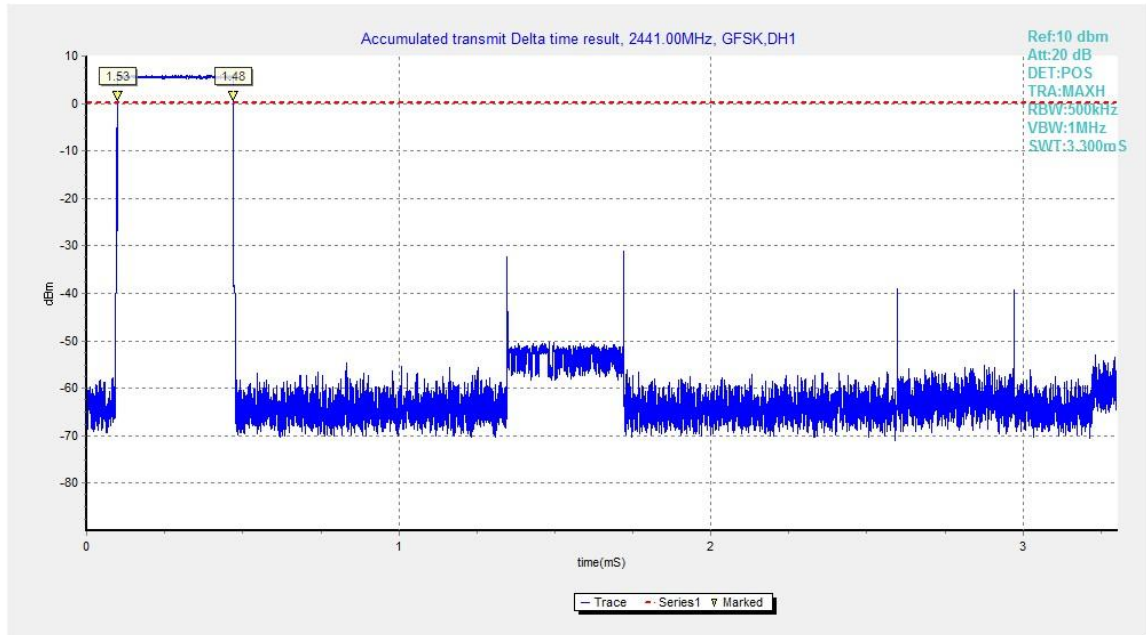


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

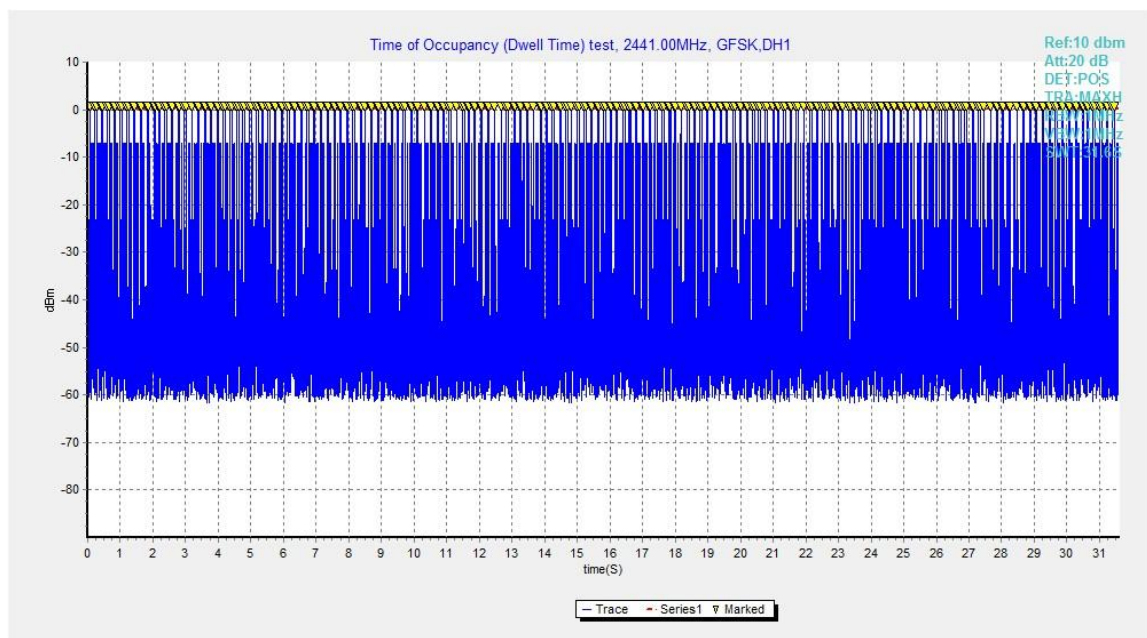


Fig.65. Number of Transmissions Measurement:Channel 39,Packet DH1

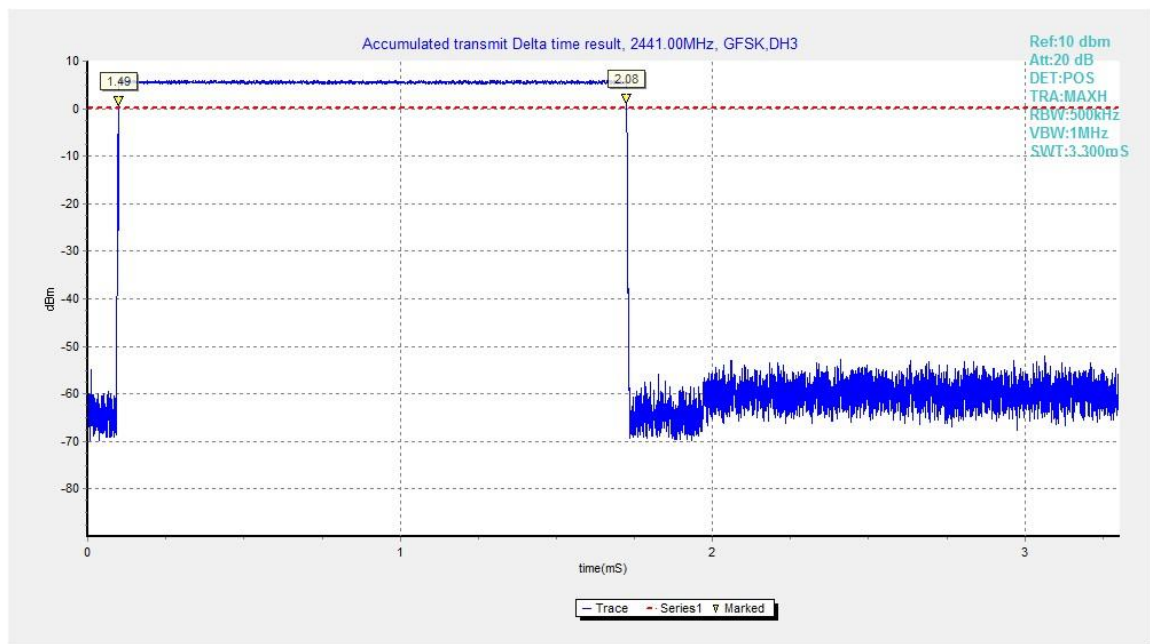


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

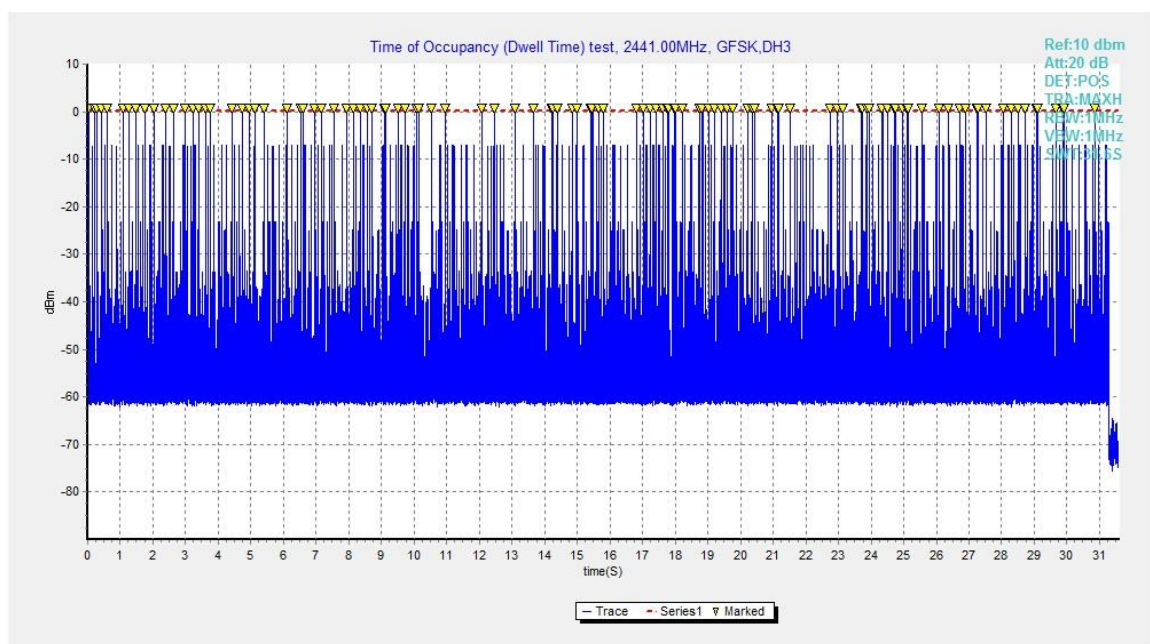


Fig.67. Number of Transmissions Measurement:Channel 39,Packet DH3



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

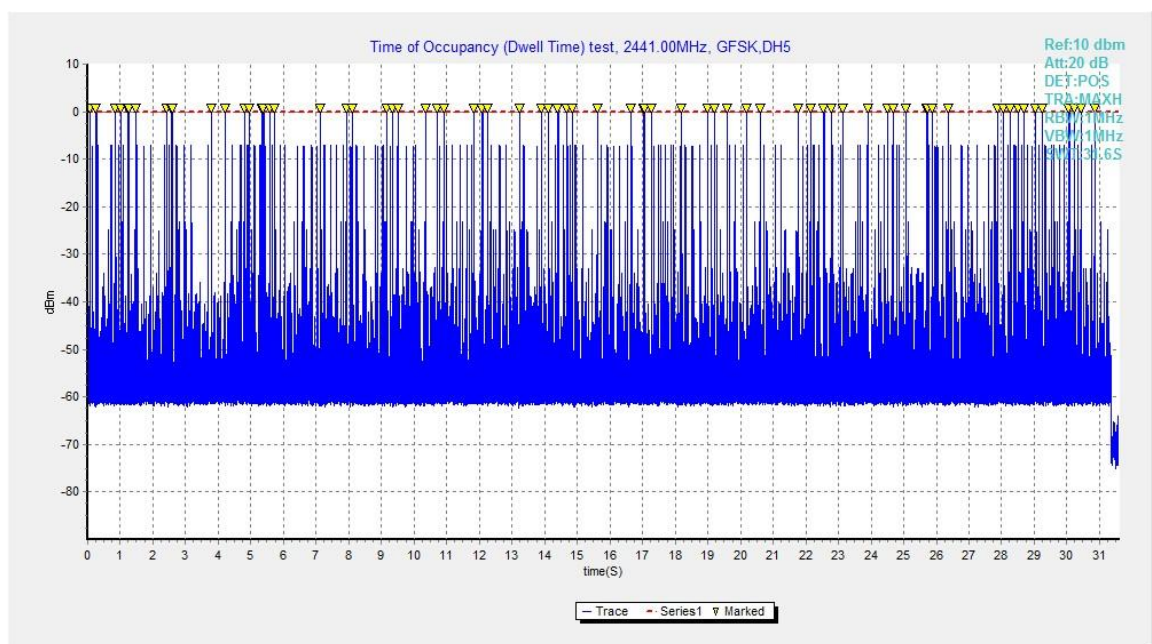


Fig.69. Number of Transmissions Measurement:Channel 39,Packet DH5

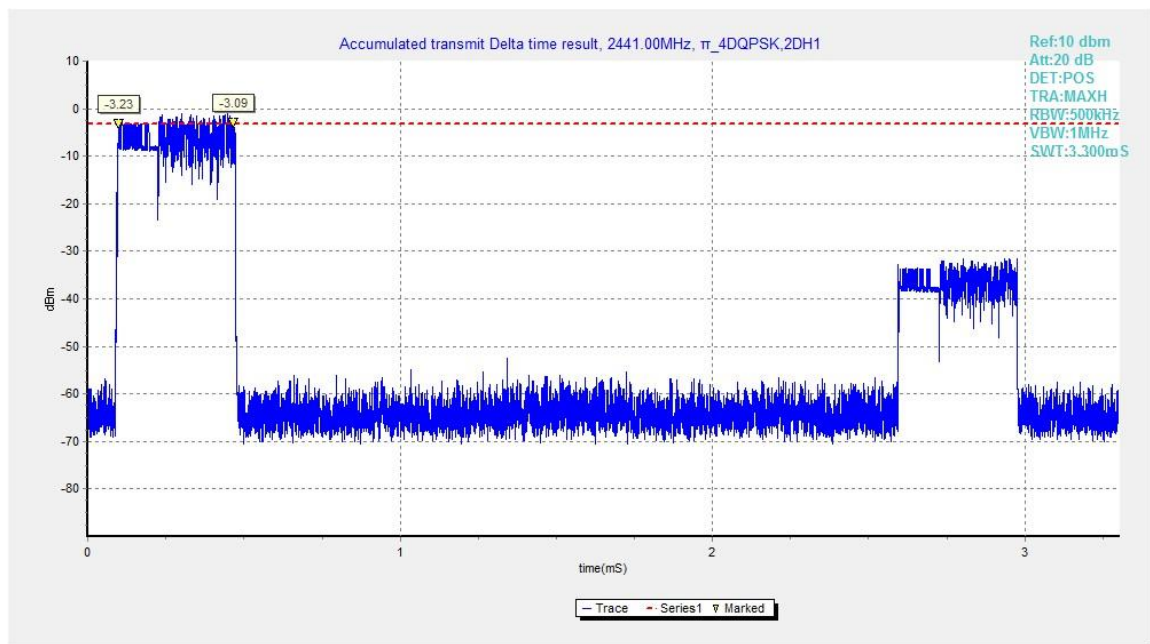


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

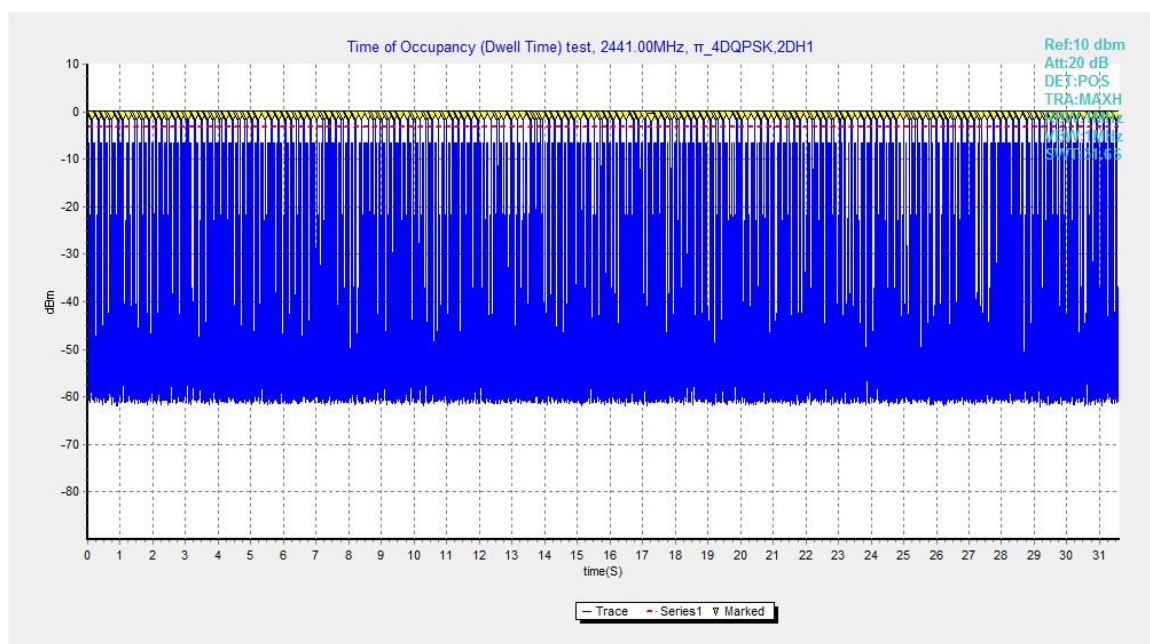


Fig.71. Number of Transmissions Measurement:Channel 39,Packet 2-DH1

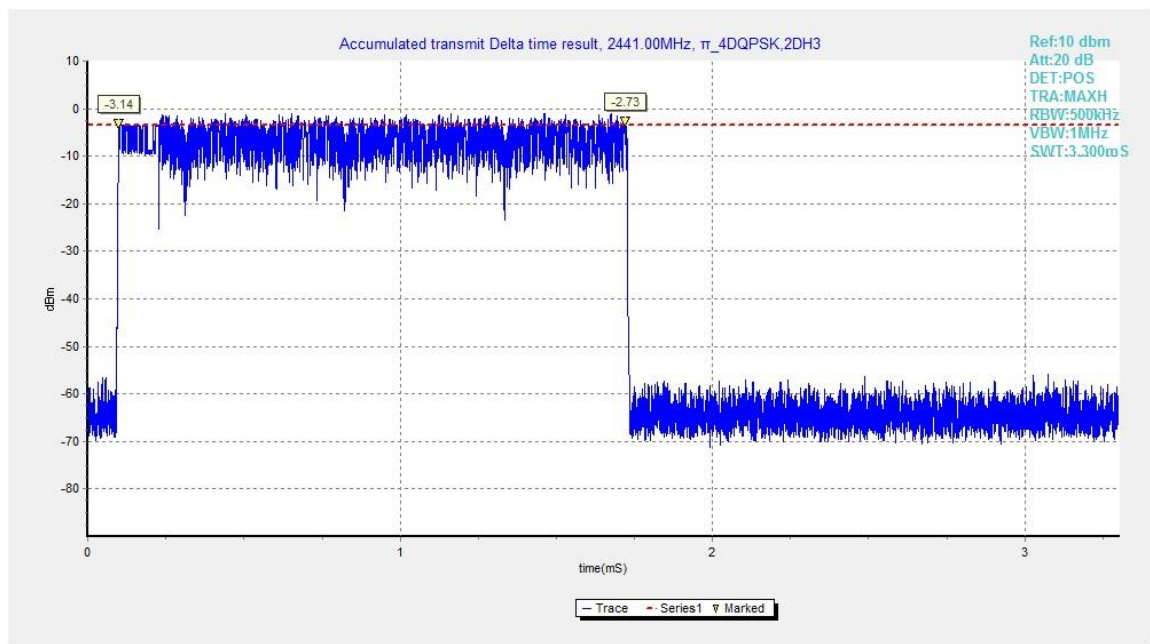


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

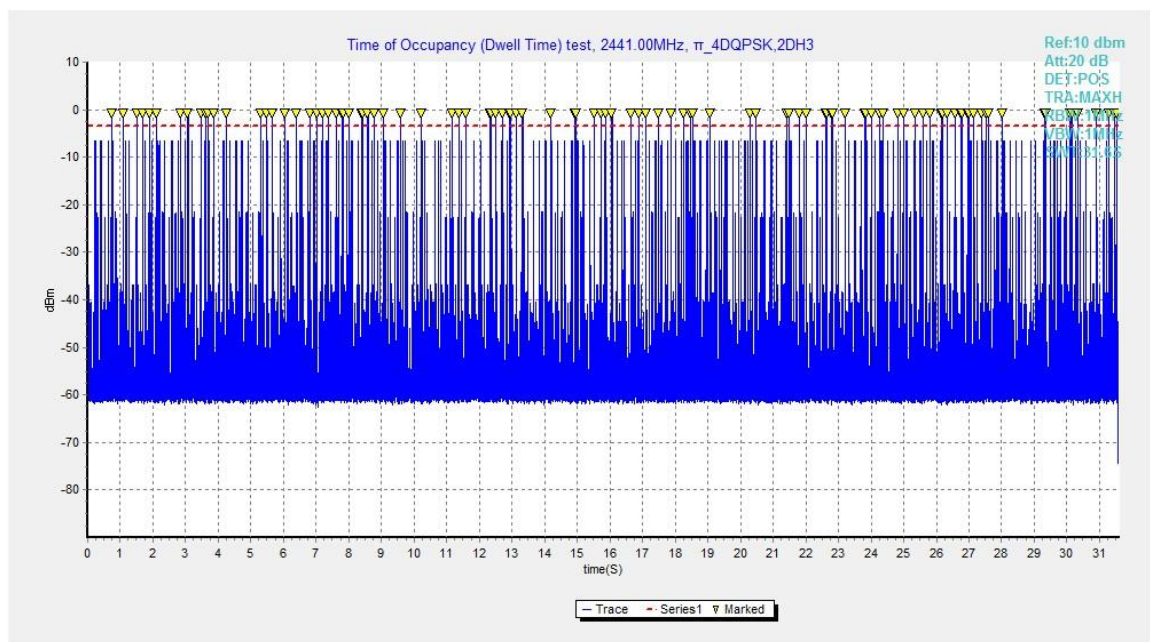


Fig.73. Number of Transmissions Measurement:Channel 39,Packet 2-DH3

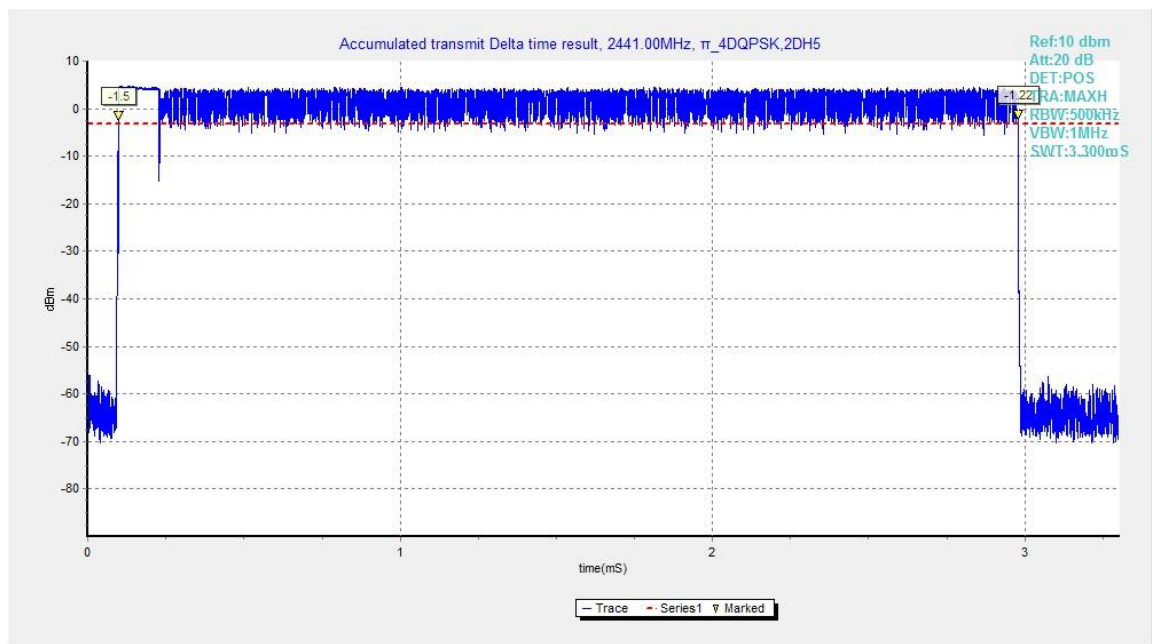


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

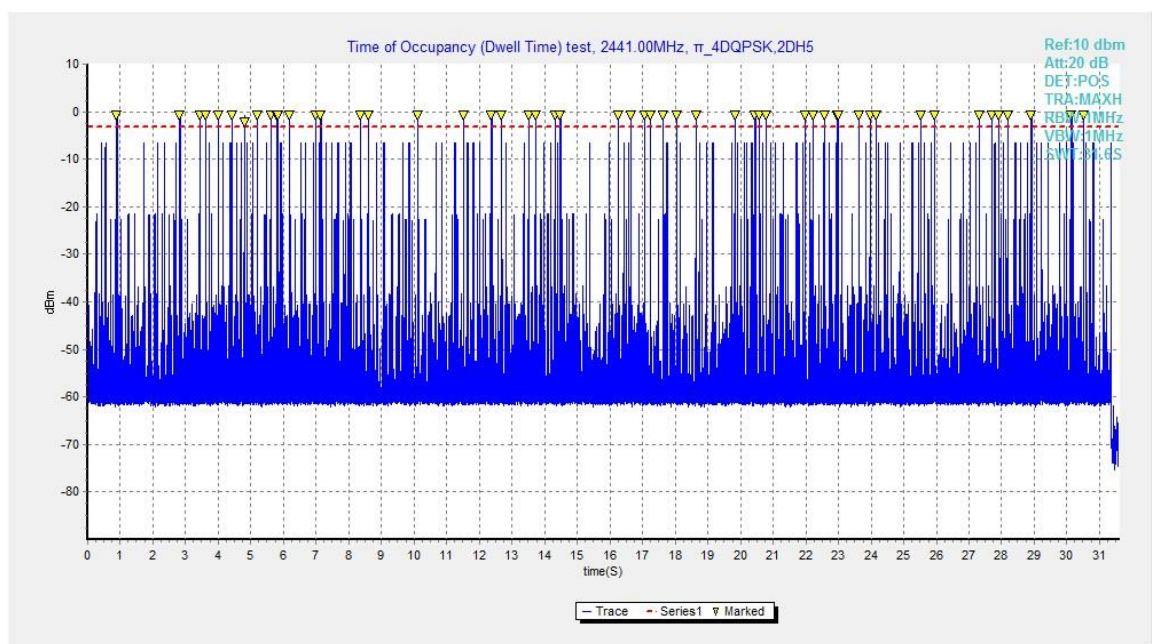


Fig.75. Number of Transmissions Measurement:Channel 39,Packet 2-DH5

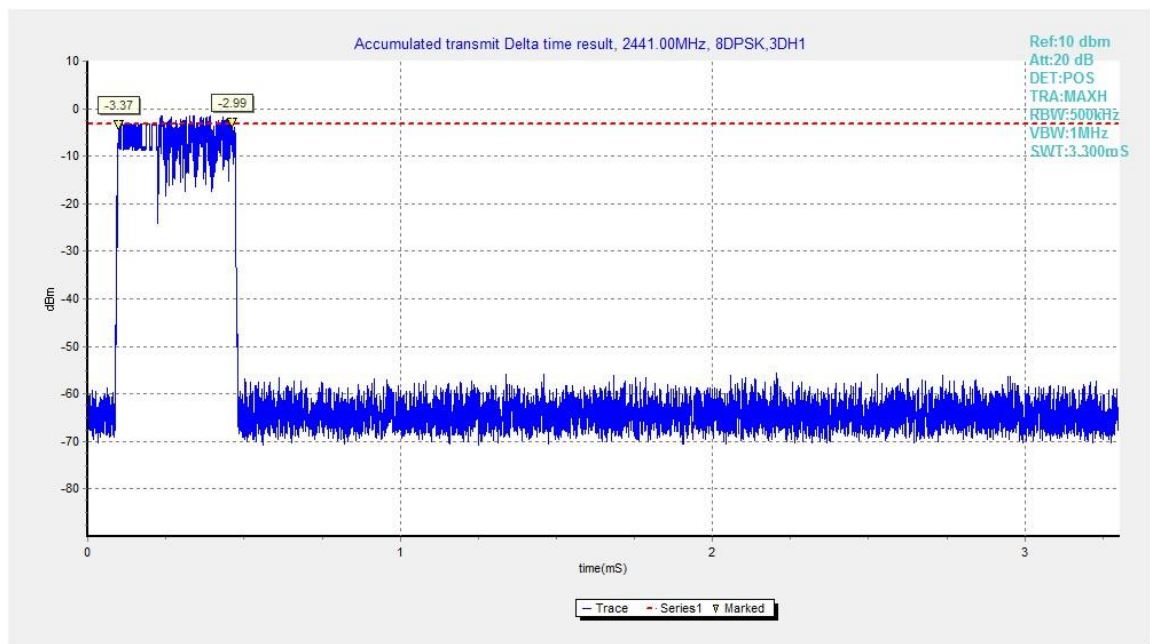


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

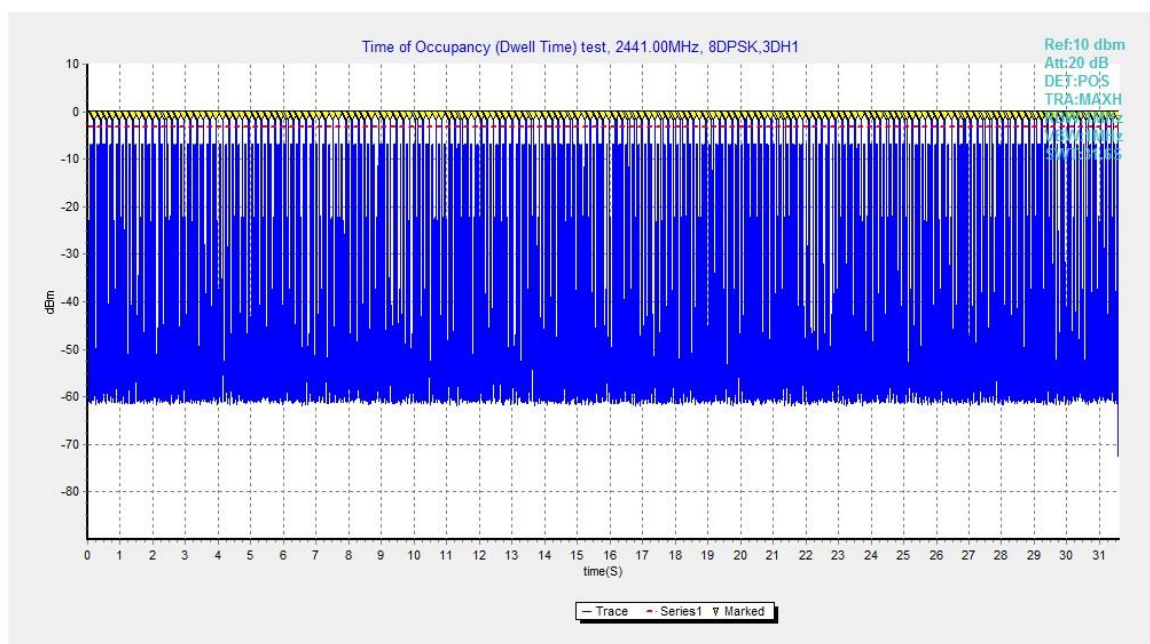


Fig.77. Number of Transmissions Measurement:Channel 39,Packet 3-DH1

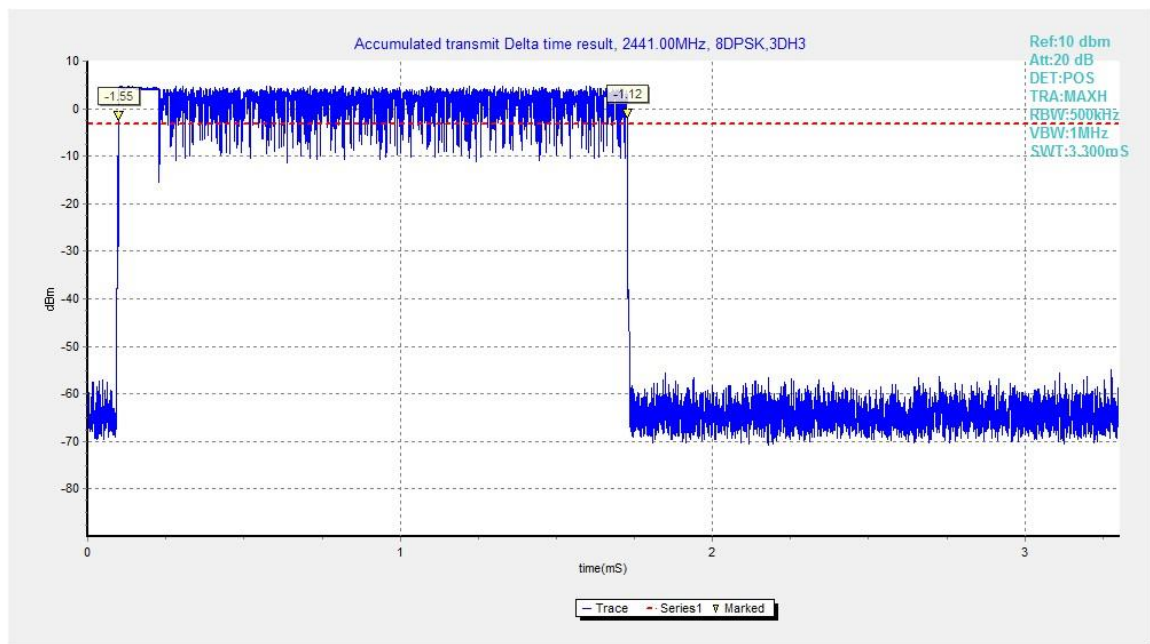


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

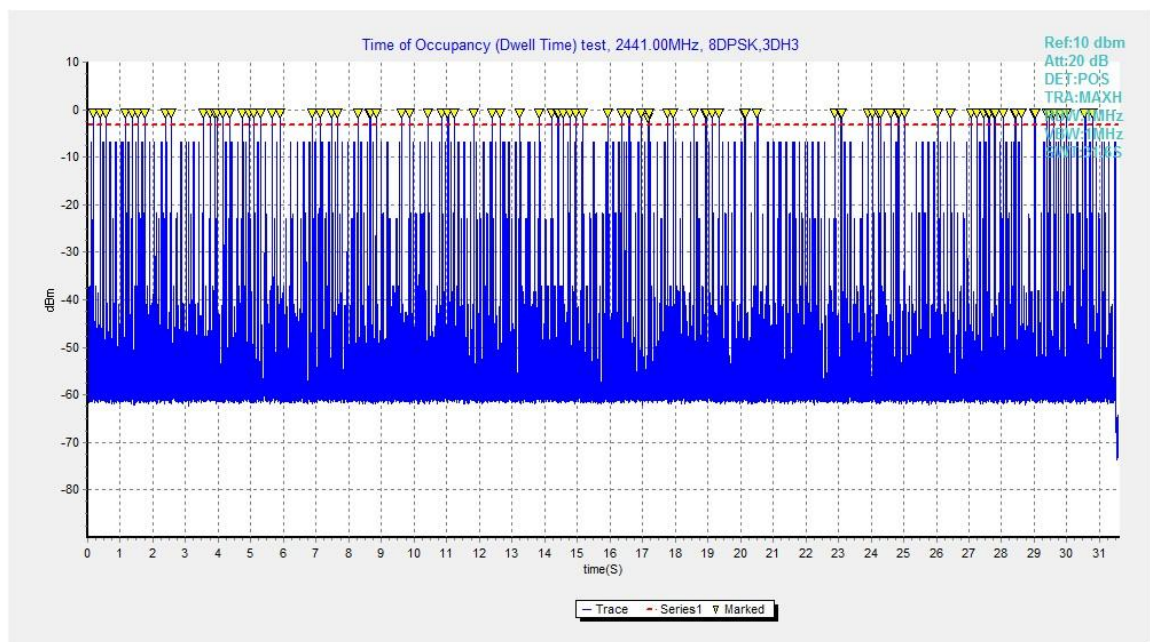


Fig.79. Number of Transmissions Measurement:Channel 39,Packet 3-DH3

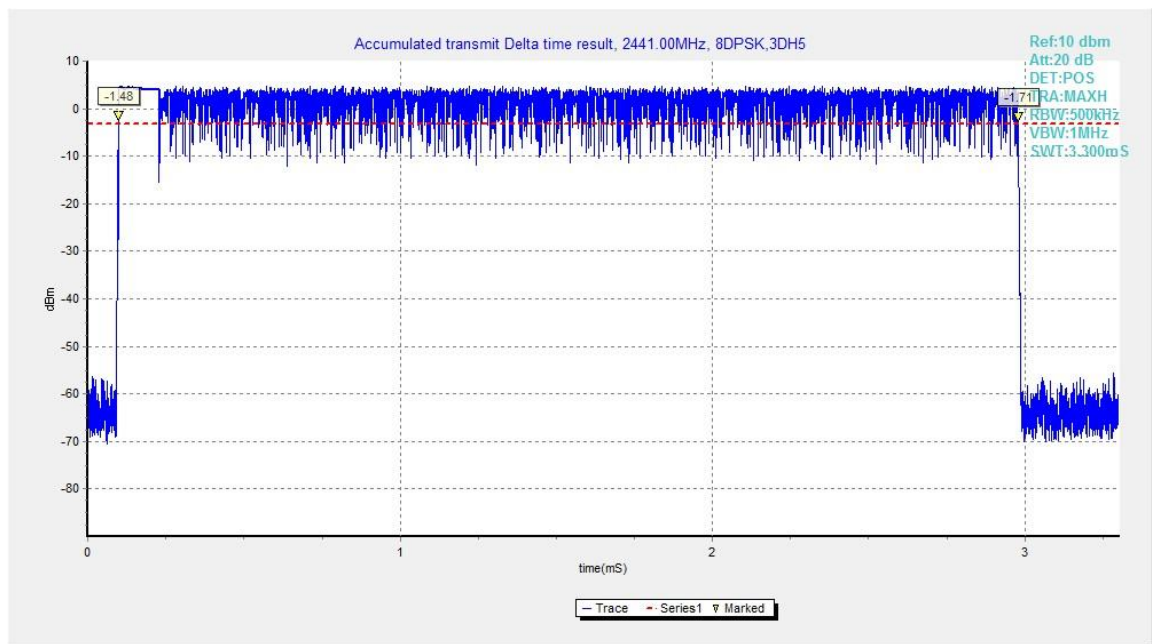


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

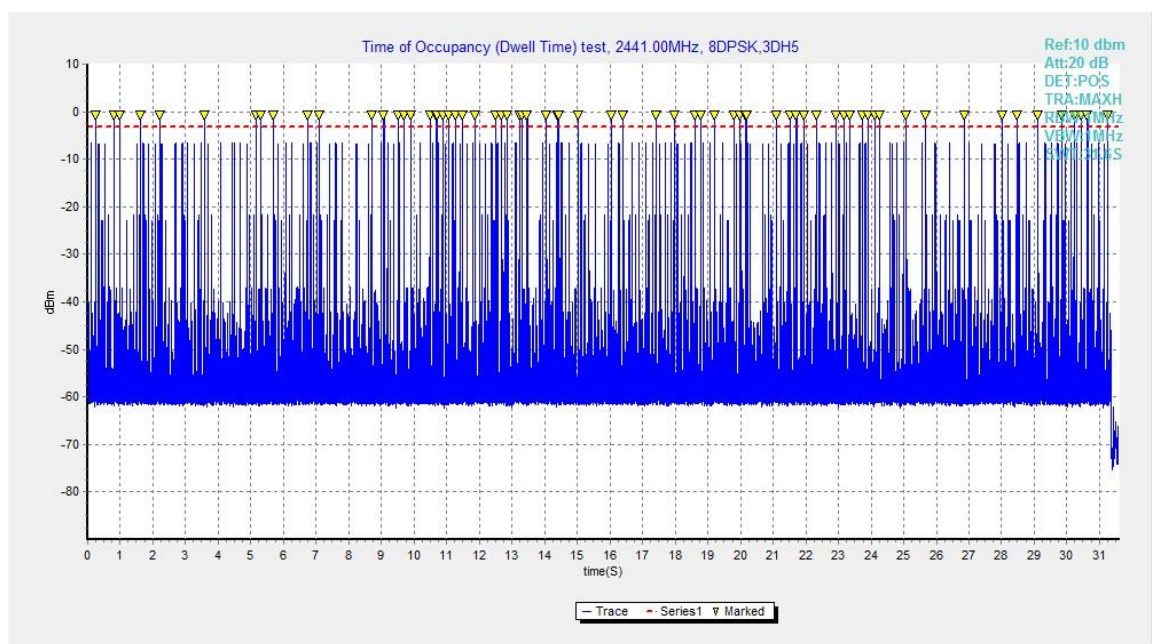


Fig.81. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

A.7. 20dB Bandwidth

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	942.00	NA
39	Fig.83	945.00	NA
78	Fig.84	942.75	NA

For $\pi/4$ DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1295.25	NA
39	Fig.86	1290.00	NA
78	Fig.87	1282.50	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1293.75	NA
39	Fig.89	1290.00	NA
78	Fig.90	1271.25	NA

Conclusion: NA

Test graphs as below:

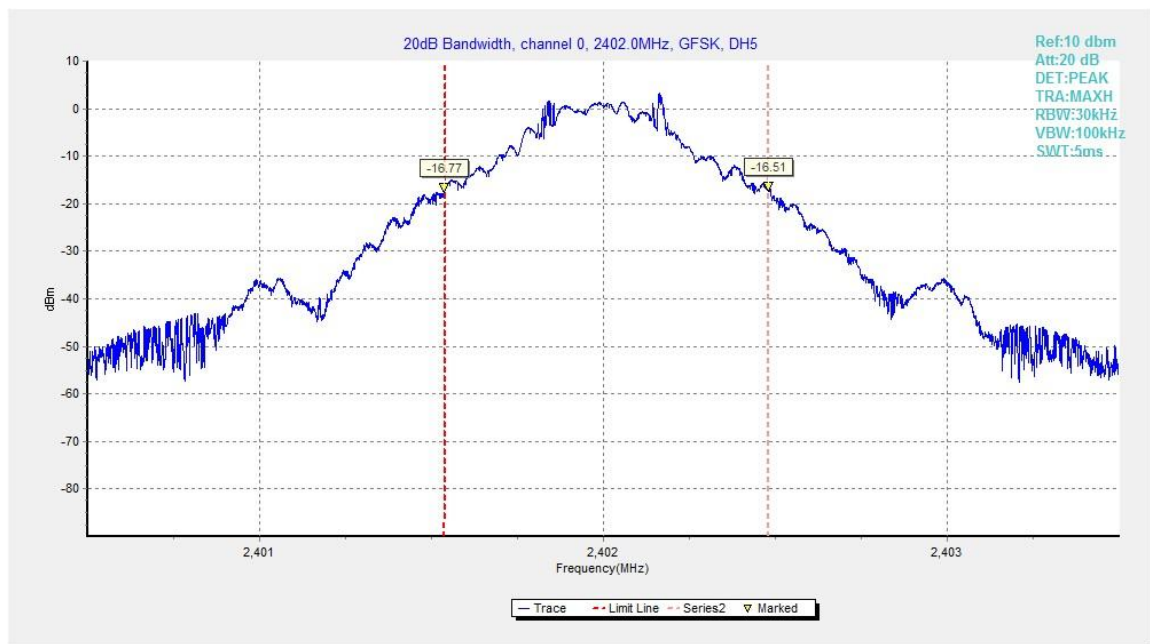


Fig.82. 20dB Bandwidth: GFSK, Channel 0

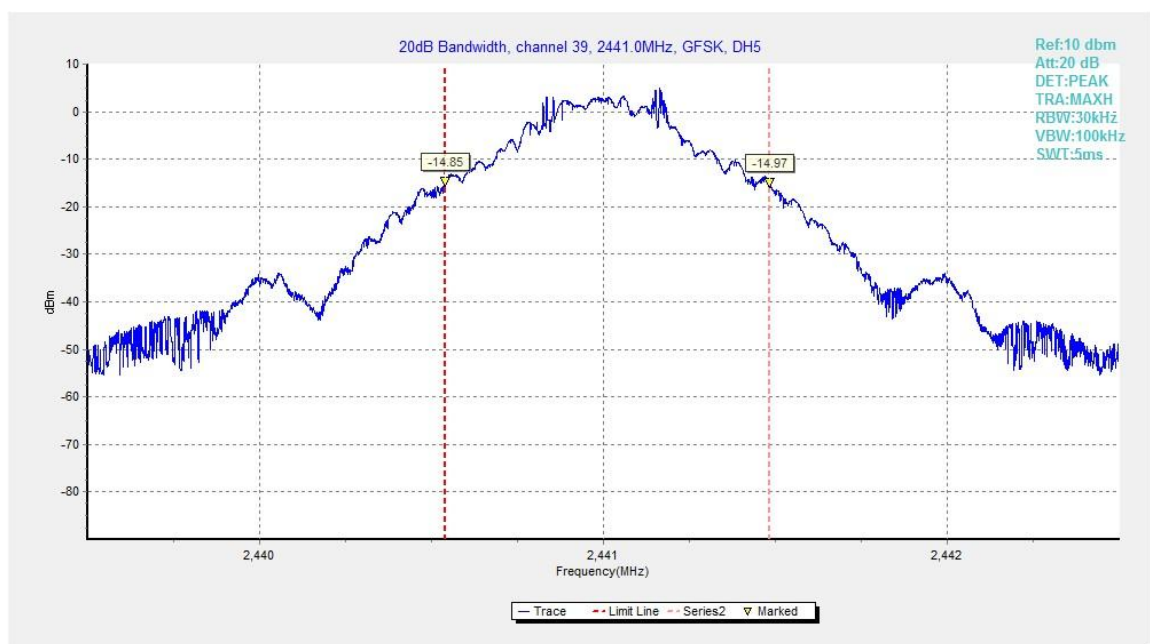


Fig.83. 20dB Bandwidth: GFSK, Channel 39

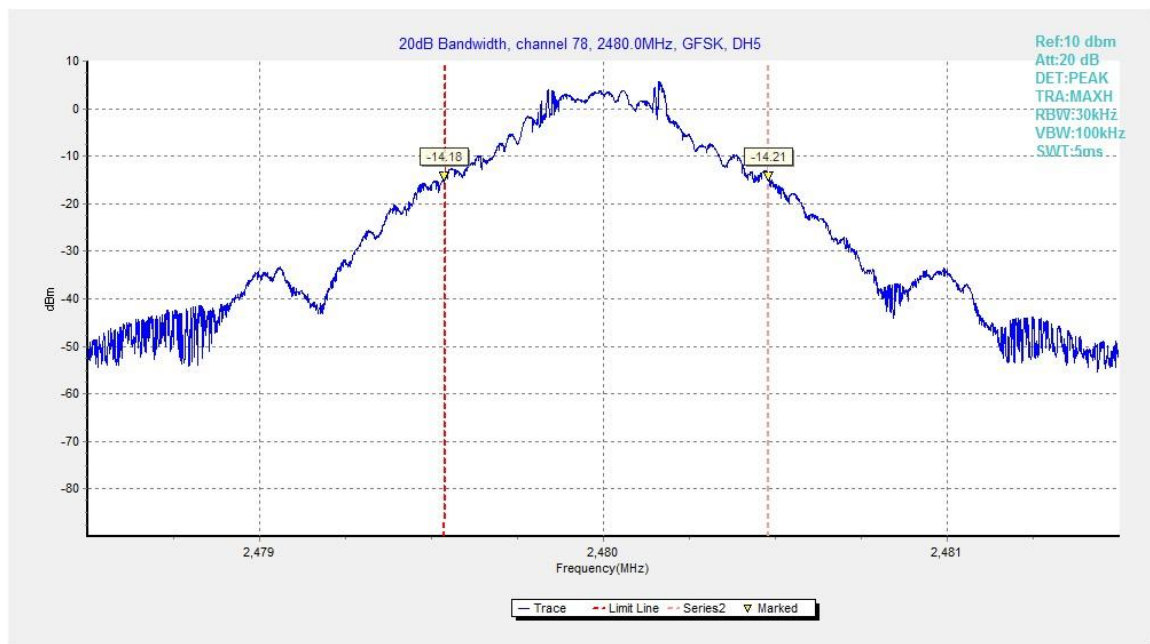


Fig.84. 20dB Bandwidth: GFSK, Channel 78

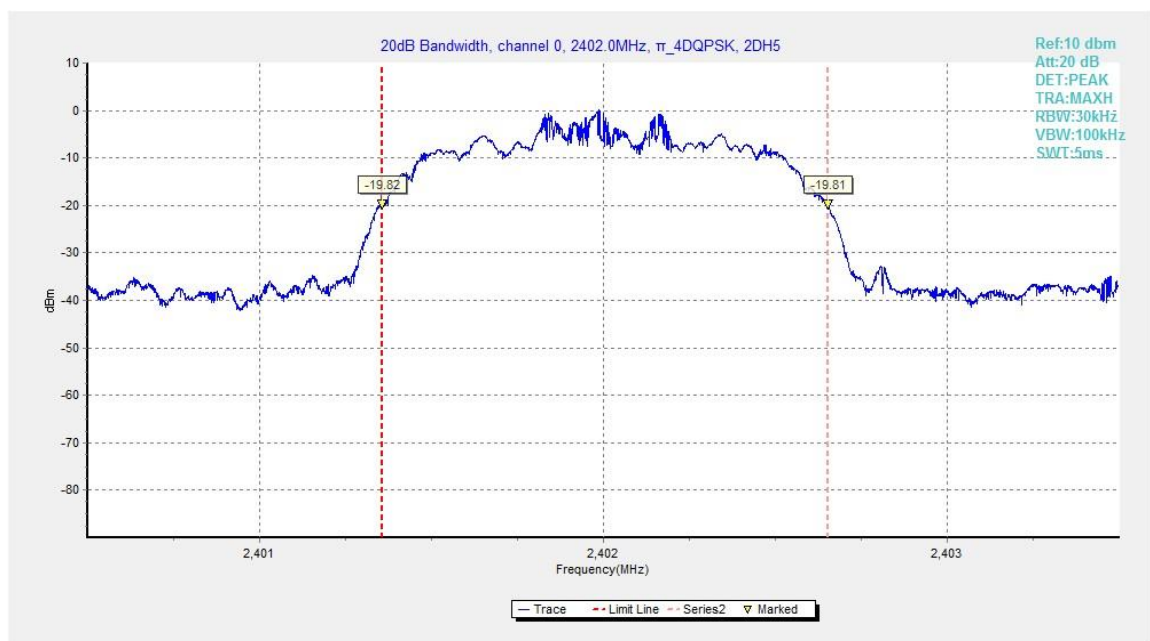


Fig.85. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0

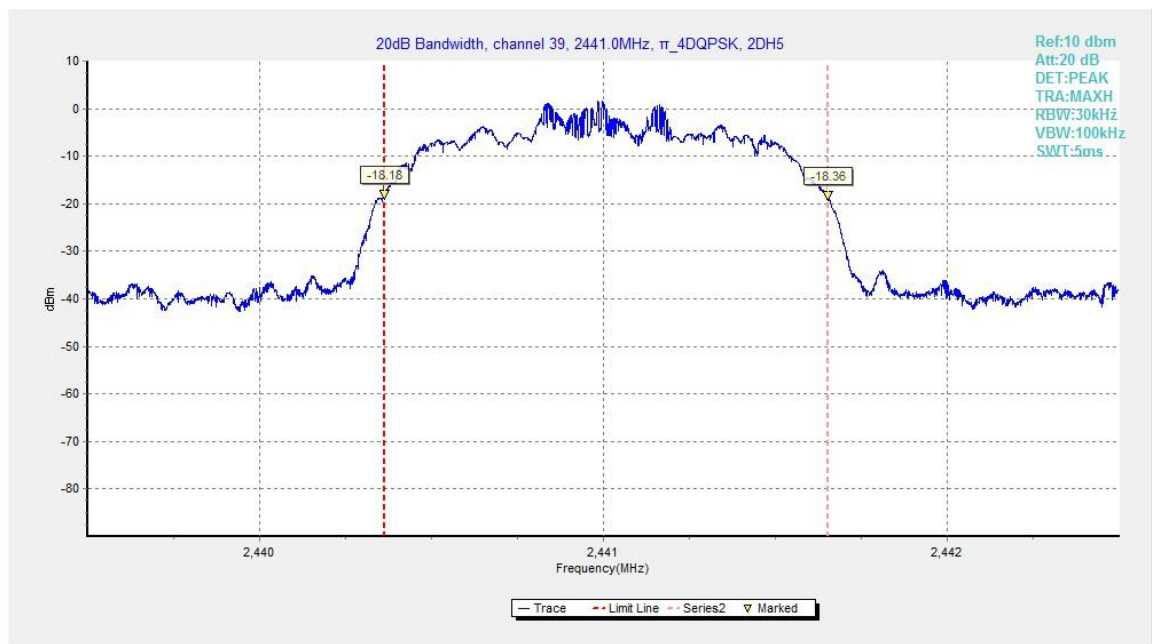


Fig.86. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39

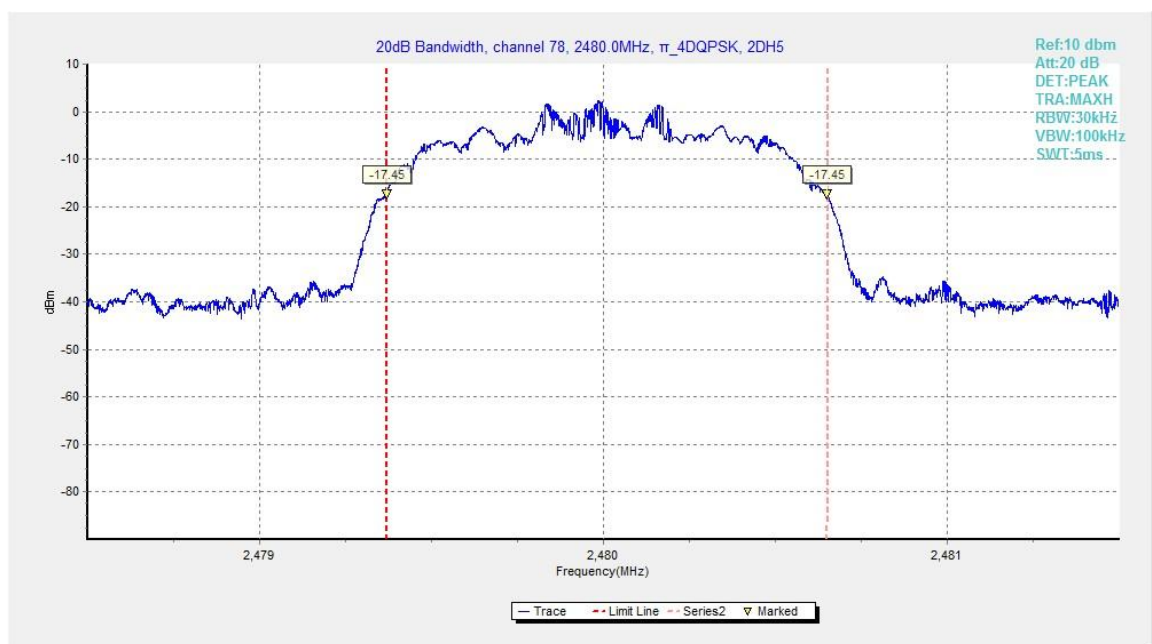


Fig.87. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78

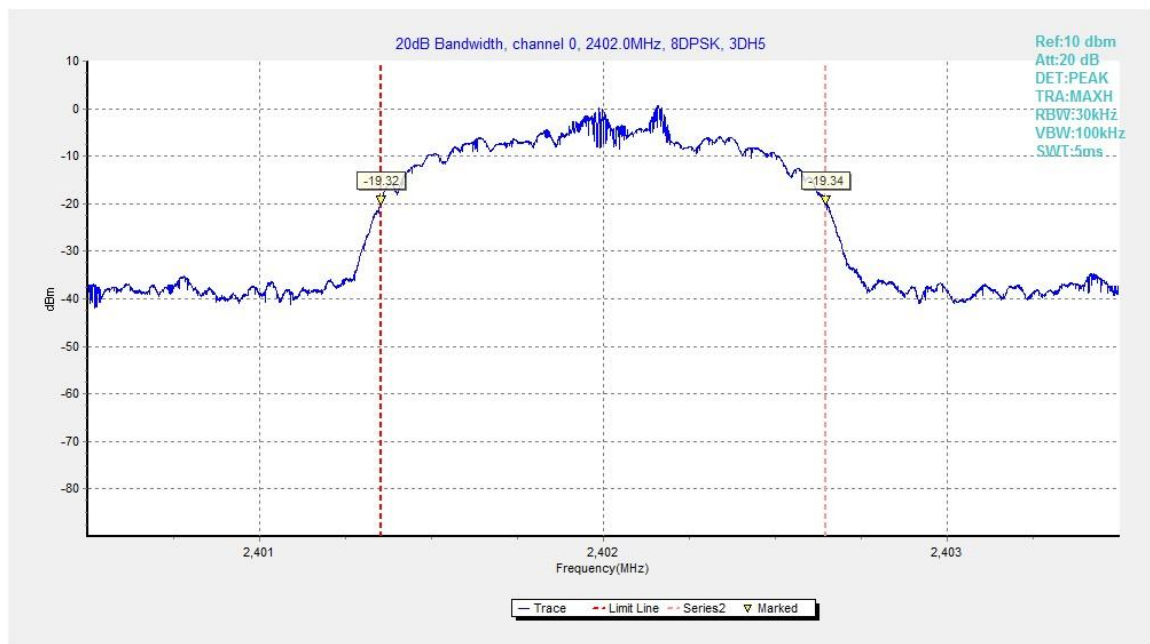


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

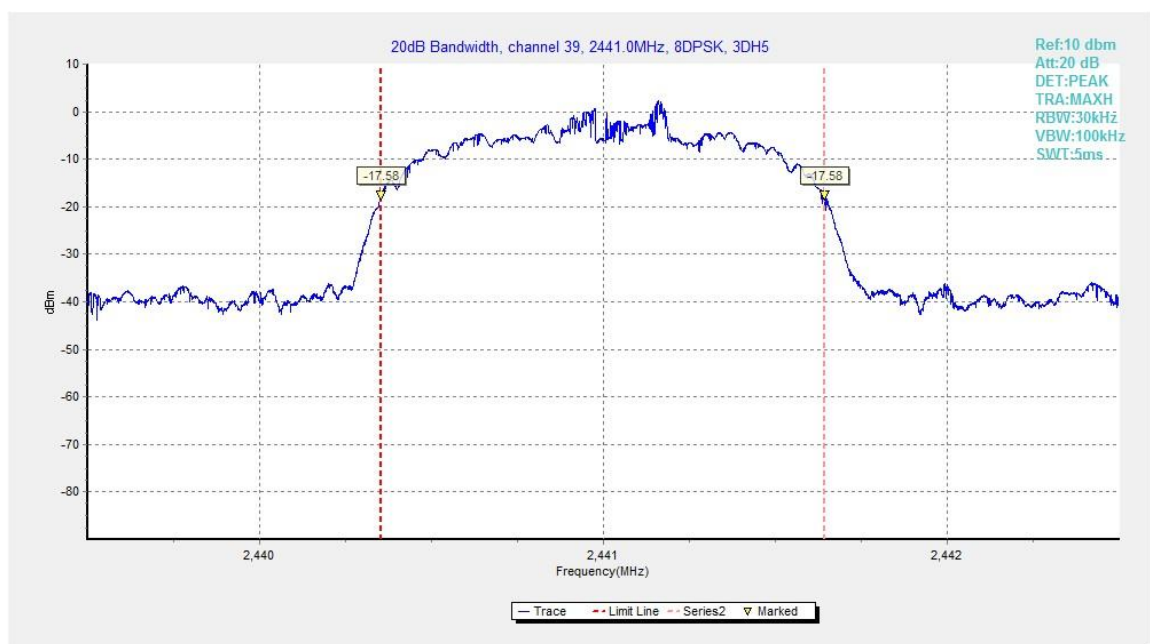


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

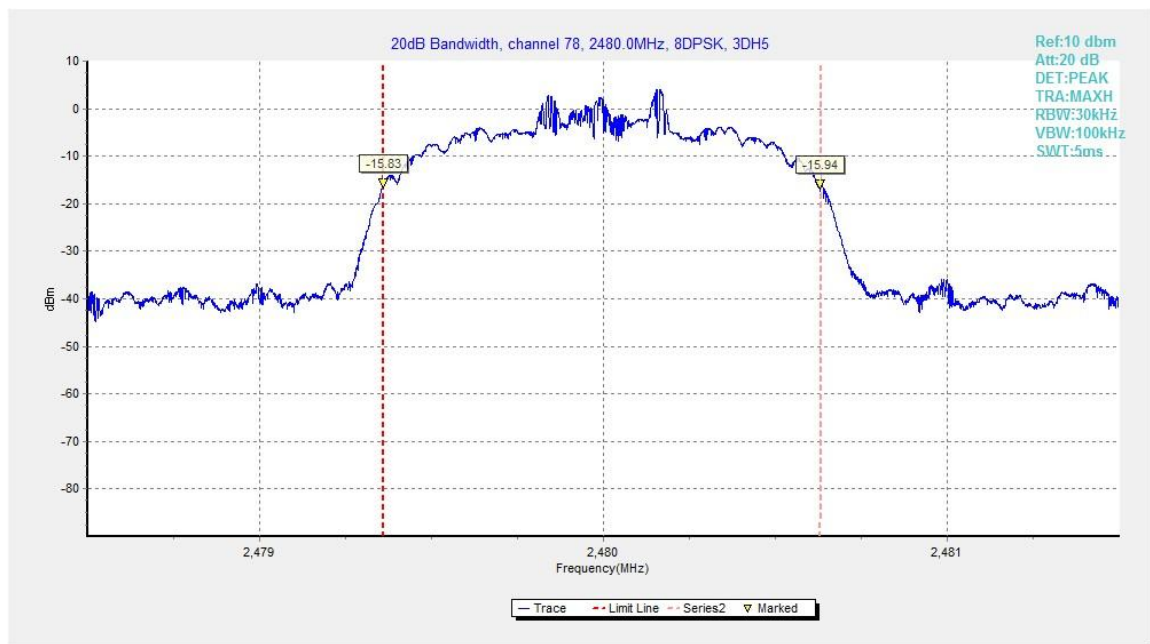


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

A.8. Carrier Frequency Separation

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	985.50	P

For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	1026.75	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	993.00	P

Conclusion: PASS

Test graphs as below:

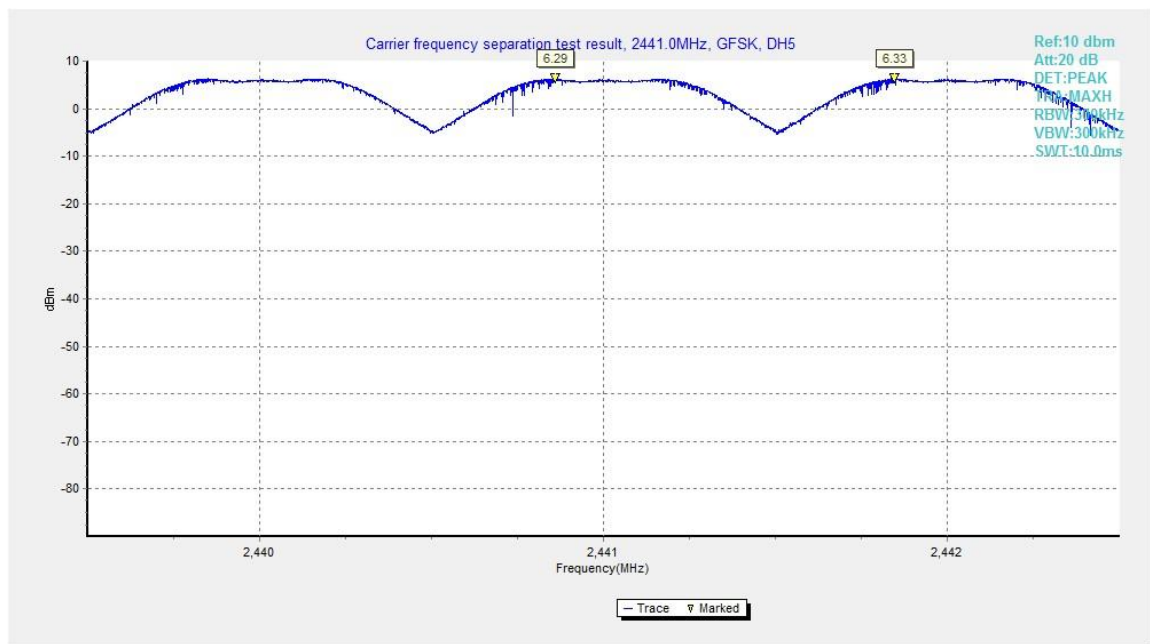


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

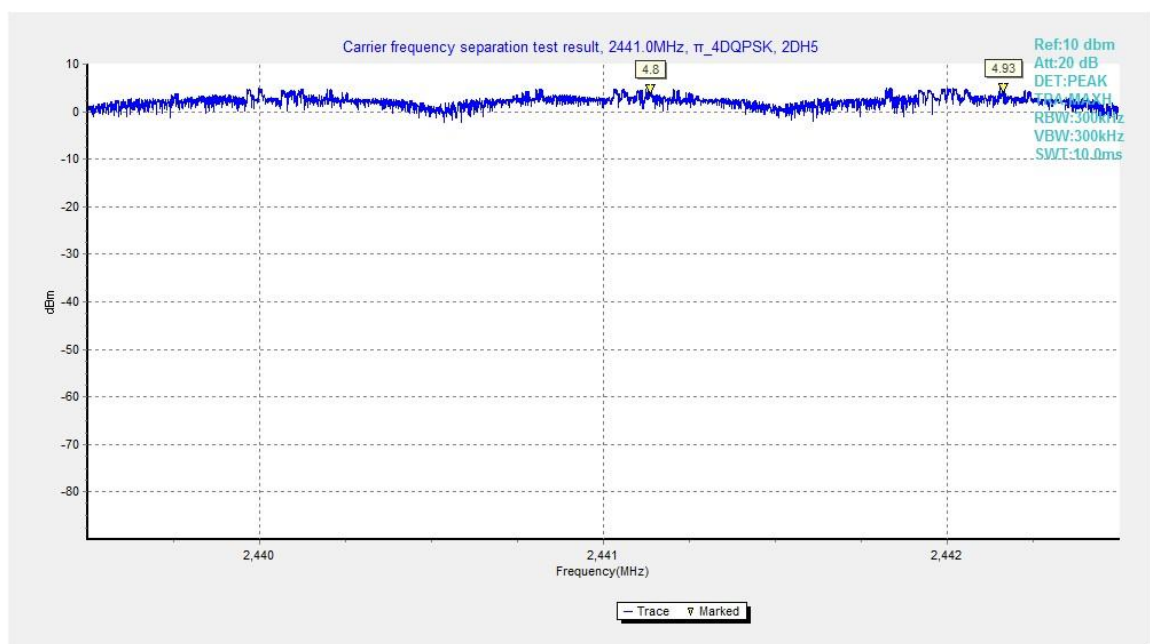


Fig.92. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39

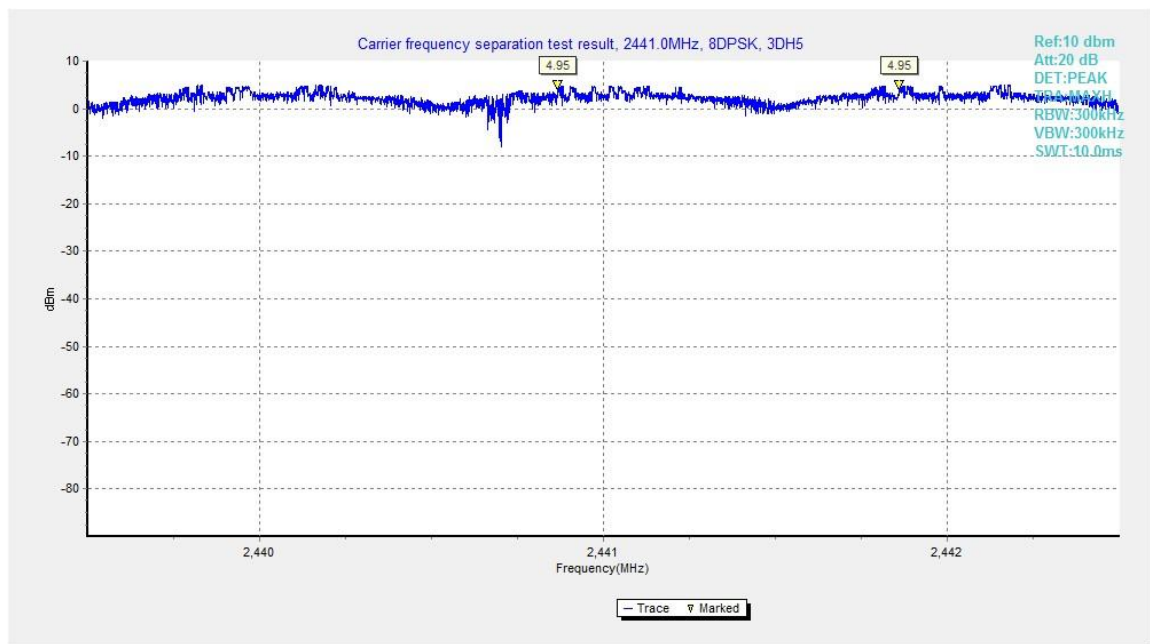


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

A.9. Number of Hopping Channels

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	79	P
40~78	Fig.95		

For $\pi/4$ DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.96	79	P
40~78	Fig.97		

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.98	79	P
40~78	Fig.99		

Conclusion: PASS

Test graphs as below:

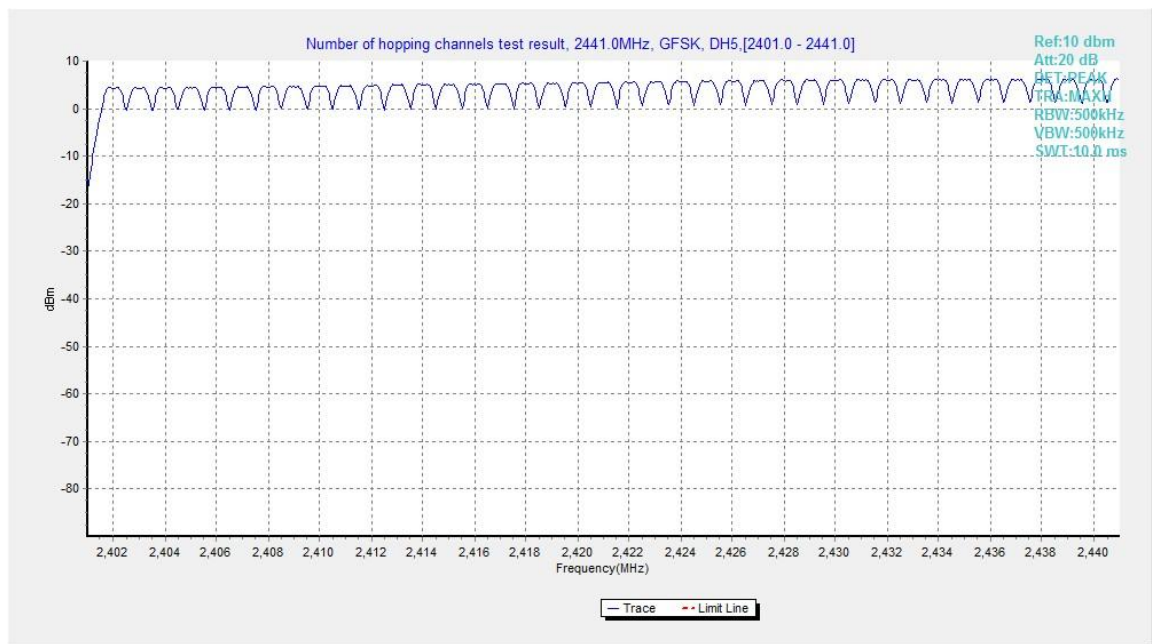


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

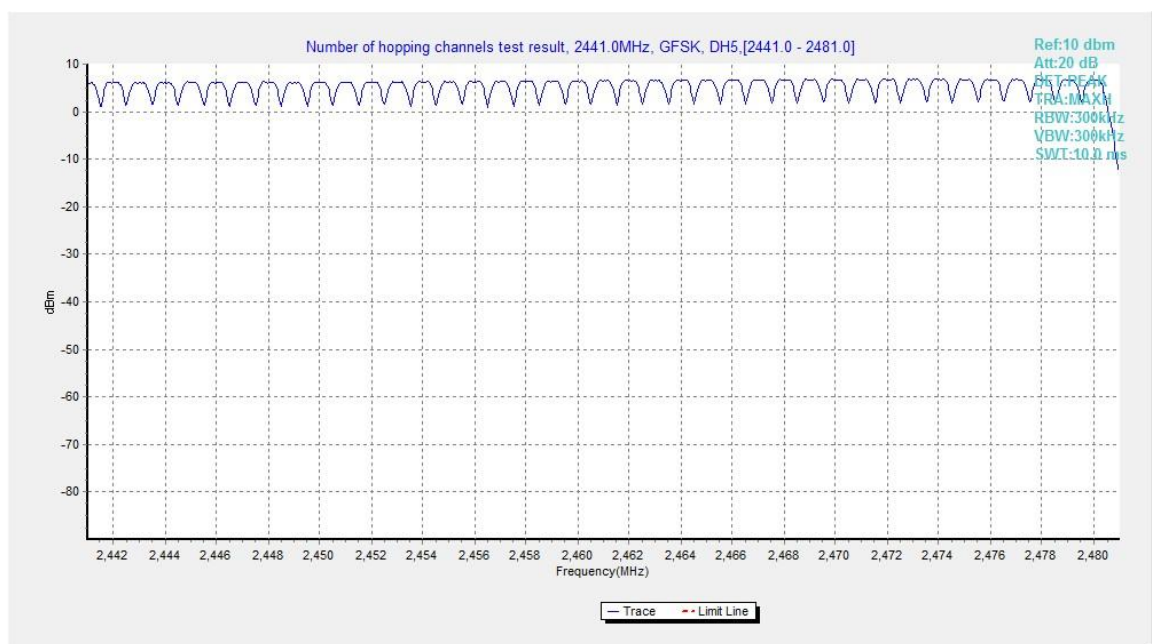


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

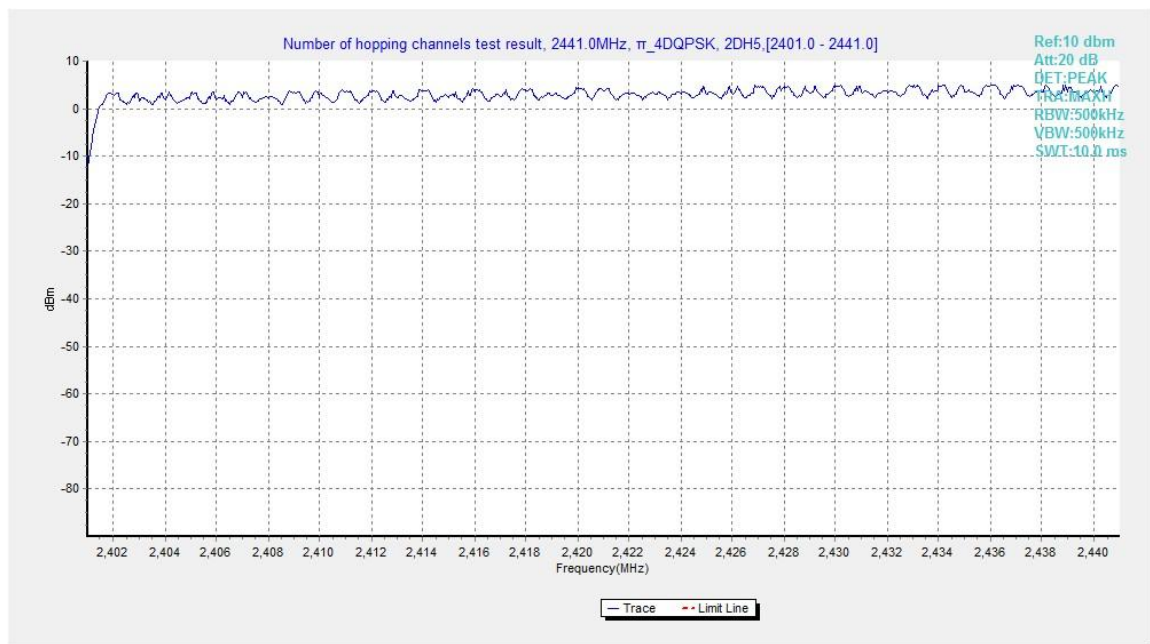


Fig.96. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39

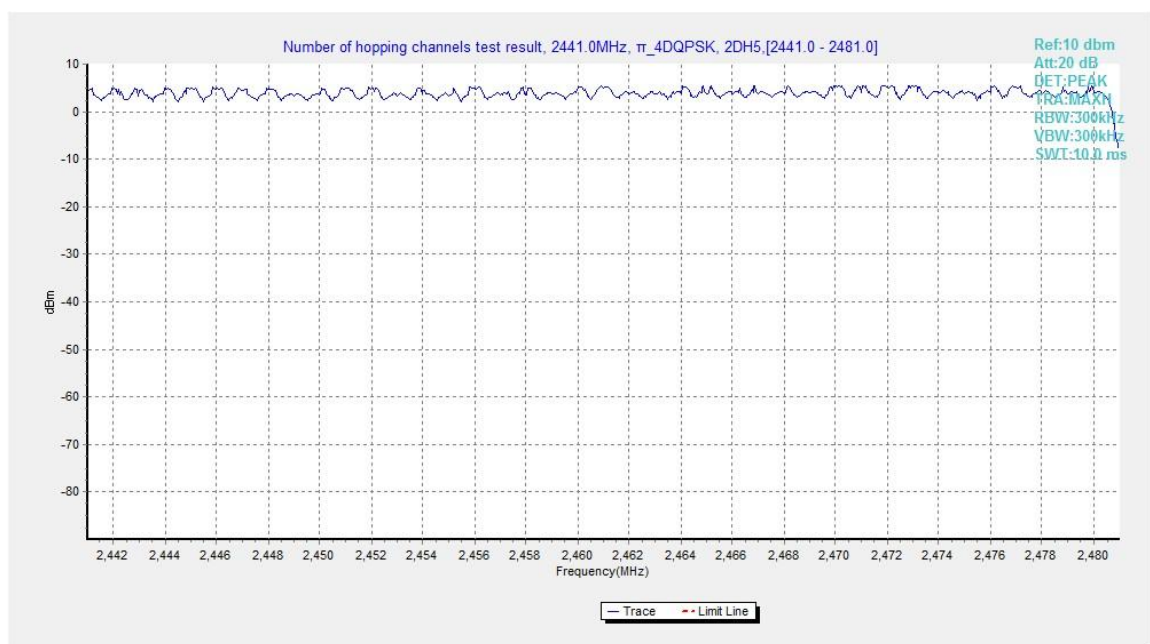


Fig.97. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78

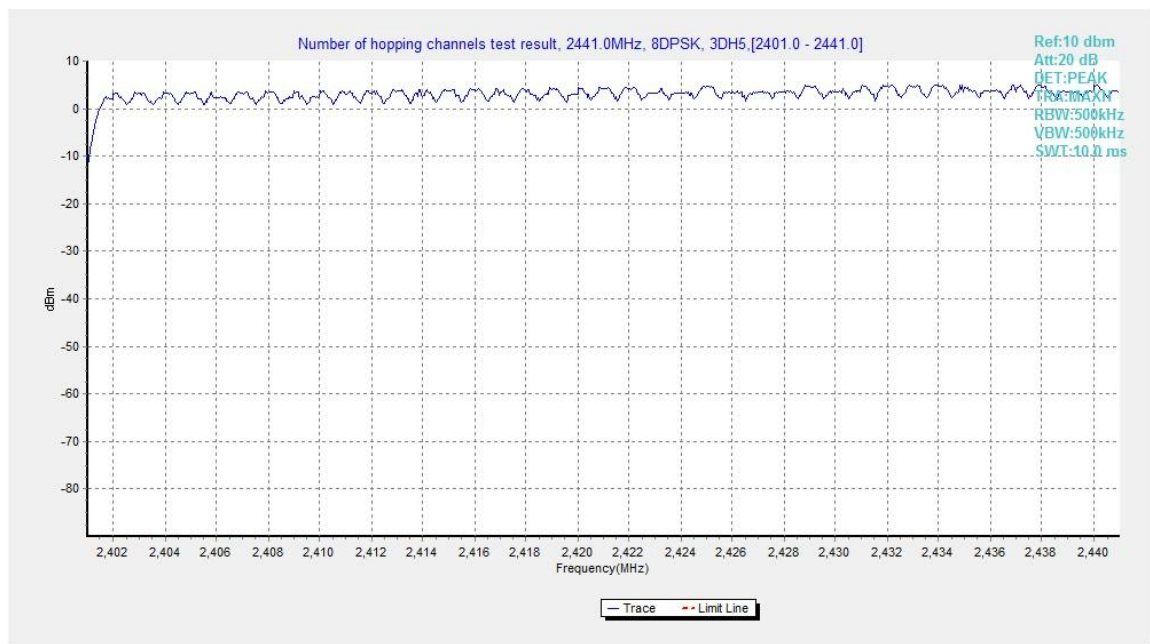


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

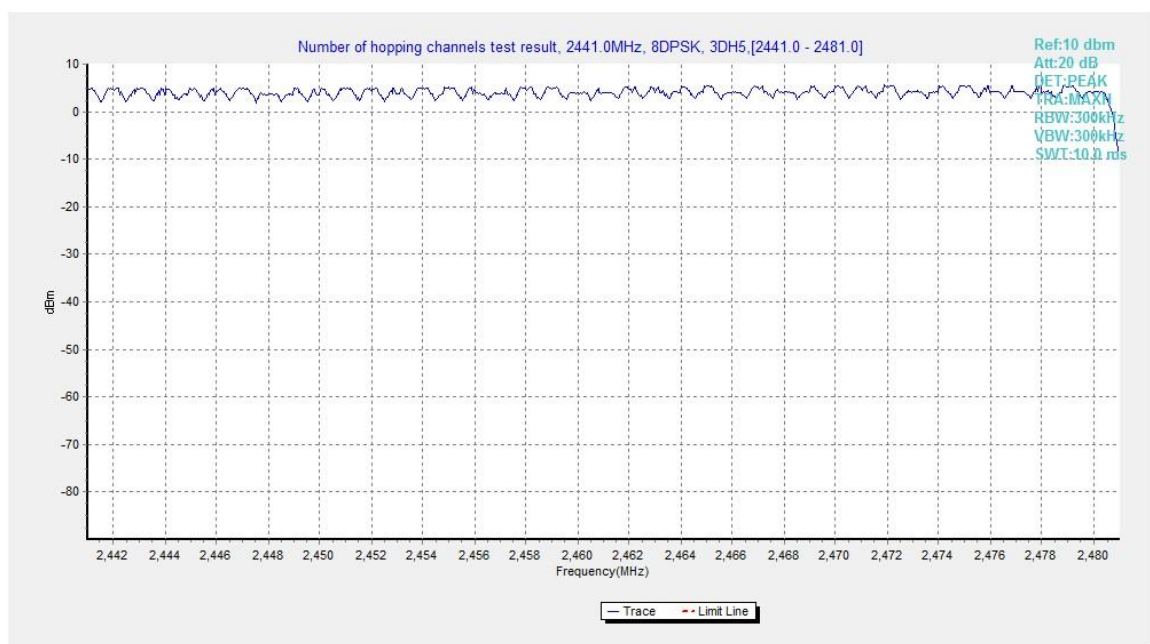


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

A.10. AC Powerline Conducted Emission**Test Condition**

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:**Bluetooth (Quasi-peak Limit)**

Frequency range (MHz)	Quasi-peak Limit (dB μ 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.

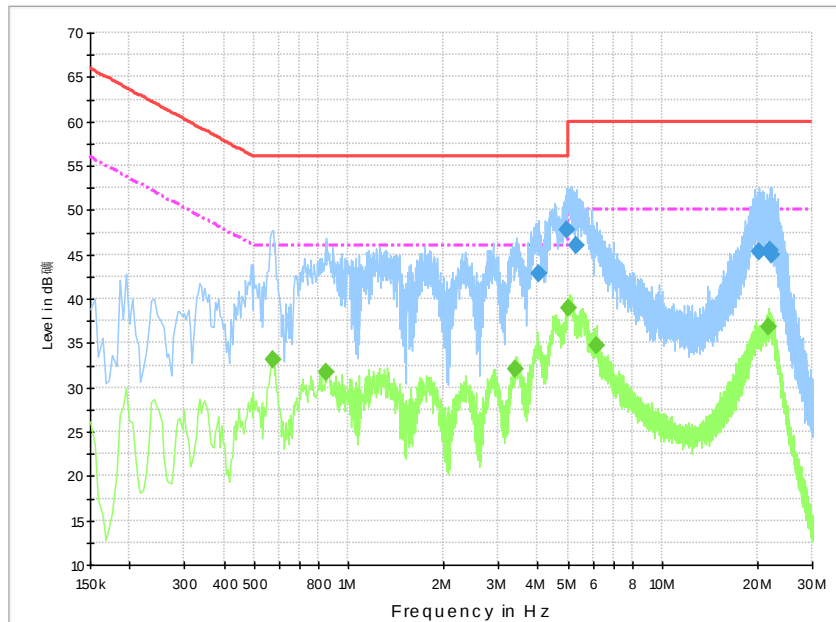
Bluetooth (Average Limit)

Frequency range (MHz)	Average Limit (dB μ 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.

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

Traffic: Set.10



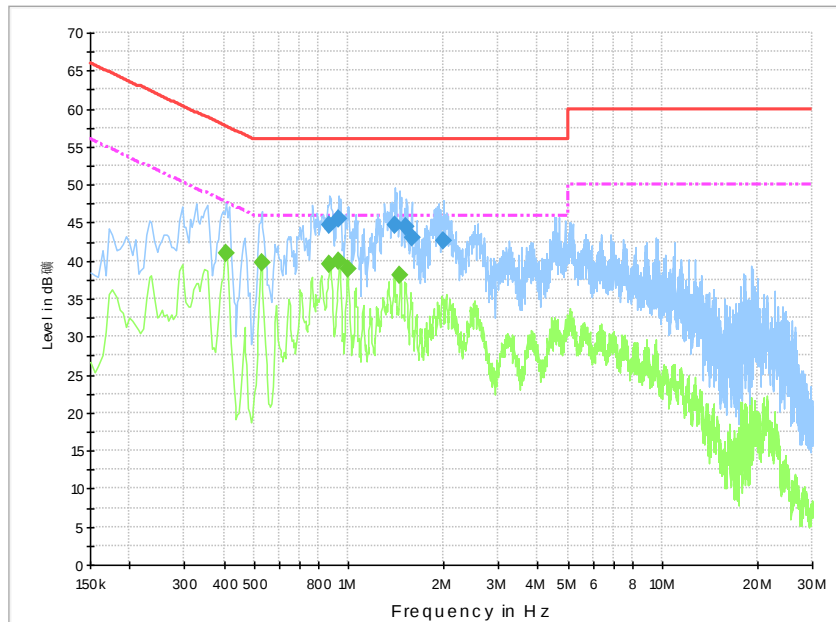
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
4.047000	42.8	GND	N	10.4	13.2	56.0
4.974000	47.8	GND	N	10.4	8.2	56.0
5.289000	46.0	GND	N	10.5	14.0	60.0
20.422500	45.3	GND	N	11.0	14.7	60.0
22.123500	45.4	GND	N	11.0	14.6	60.0
22.272000	45.0	GND	N	11.0	15.0	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.573000	33.2	GND	N	10.3	12.8	46.0
0.852000	31.7	GND	N	10.3	14.3	46.0
3.394500	32.0	GND	N	10.4	14.0	46.0
4.996500	39.0	GND	N	10.4	7.0	46.0
6.166500	34.7	GND	N	10.5	15.3	50.0
21.772500	36.9	GND	N	11.0	13.1	50.0

Traffic: Set.11



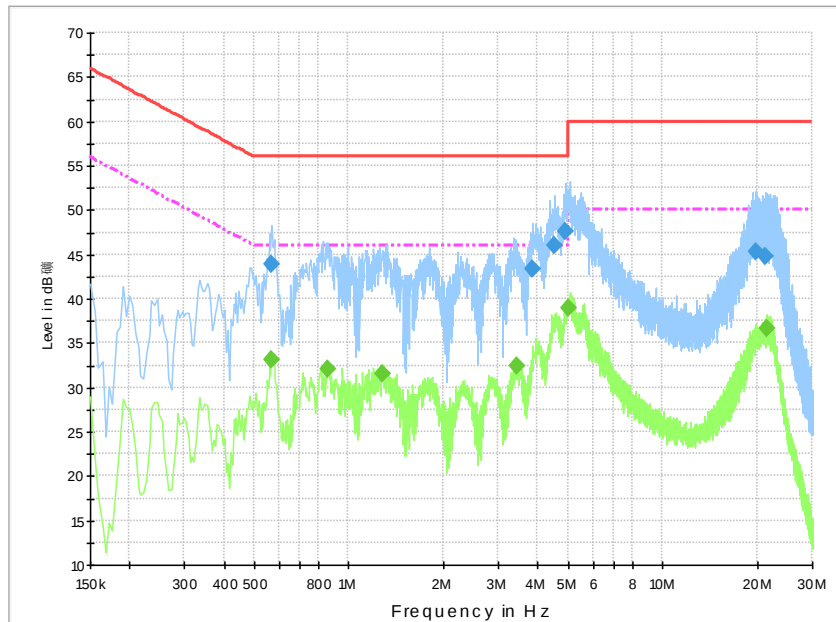
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.870000	44.6	GND	N	10.3	11.4	56.0
0.933000	45.4	GND	N	10.3	10.6	56.0
1.405500	44.6	GND	N	10.3	11.4	56.0
1.527000	44.4	GND	N	10.3	11.6	56.0
1.585500	43.1	GND	N	10.3	12.9	56.0
1.999500	42.6	GND	N	10.4	13.4	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.406500	40.9	GND	N	10.3	6.8	47.7
0.528000	39.8	GND	N	10.3	6.2	46.0
0.870000	39.5	GND	N	10.3	6.5	46.0
0.933000	39.9	GND	N	10.3	6.1	46.0
0.991500	39.0	GND	N	10.3	7.0	46.0
1.455000	38.0	GND	N	10.3	8.0	46.0

Idle: Set.10



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.568500	43.9	GND	N	10.3	12.1	56.0
3.849000	43.3	GND	N	10.4	12.7	56.0
4.519500	46.0	GND	N	10.4	10.0	56.0
4.920000	47.5	GND	N	10.4	8.5	56.0
19.873500	45.3	GND	N	11.0	14.7	60.0
21.331500	44.8	GND	N	11.0	15.2	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.568500	33.2	GND	N	10.3	12.8	46.0
0.861000	32.1	GND	N	10.3	13.9	46.0
1.275000	31.5	GND	N	10.3	14.5	46.0
3.421500	32.4	GND	N	10.4	13.6	46.0
4.992000	39.0	GND	N	10.4	7.0	46.0
21.606000	36.6	GND	N	11.0	13.4	50.0

END OF REPORT