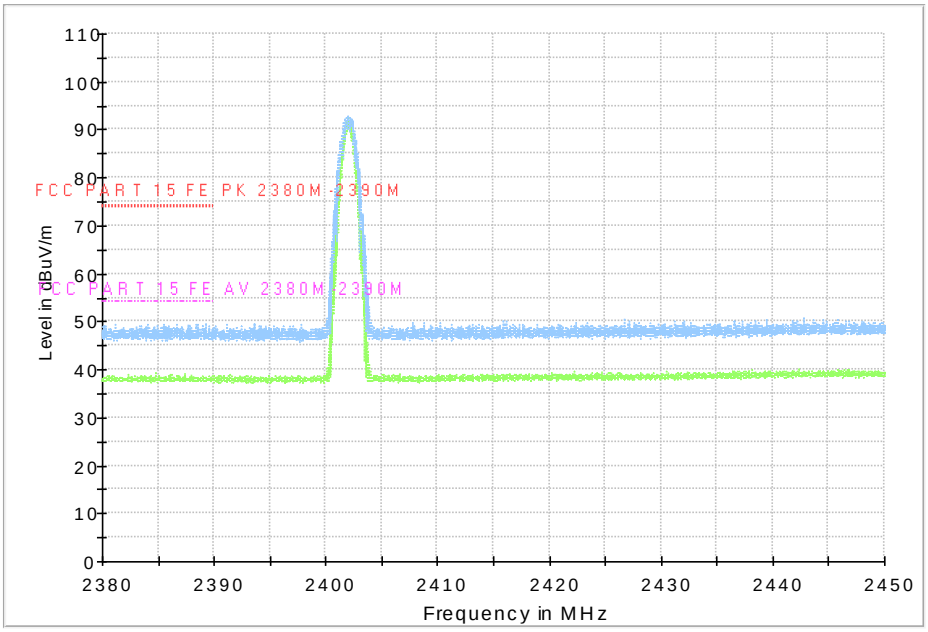

Fig. 64 Radiated Band Edges (8DPSK, Ch0, 2380GHz~2450GHz)

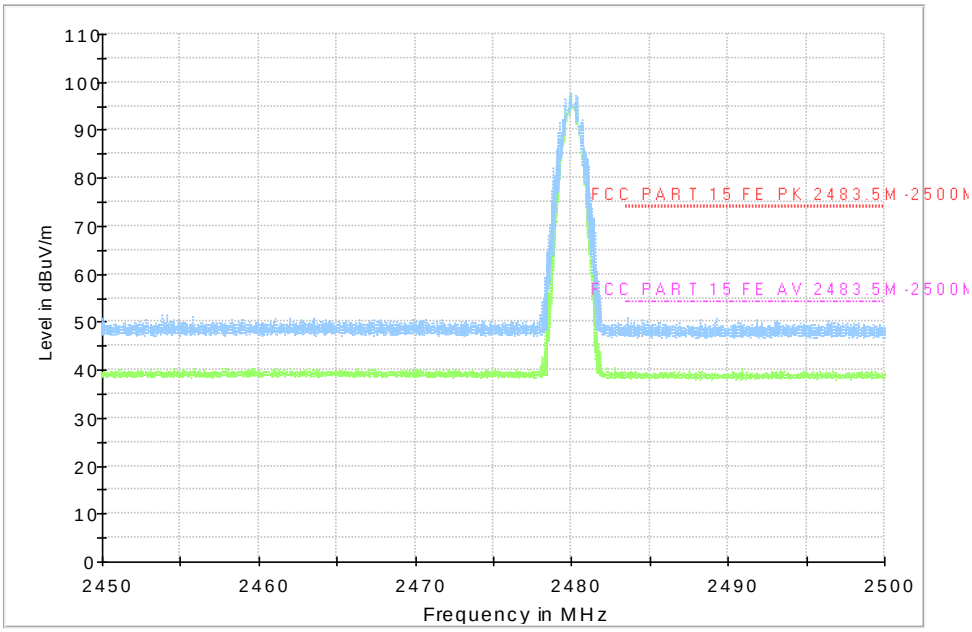

Fig. 65 Radiated Band Edges (8DPSK, Ch78, 2450GHz~2500GHz)

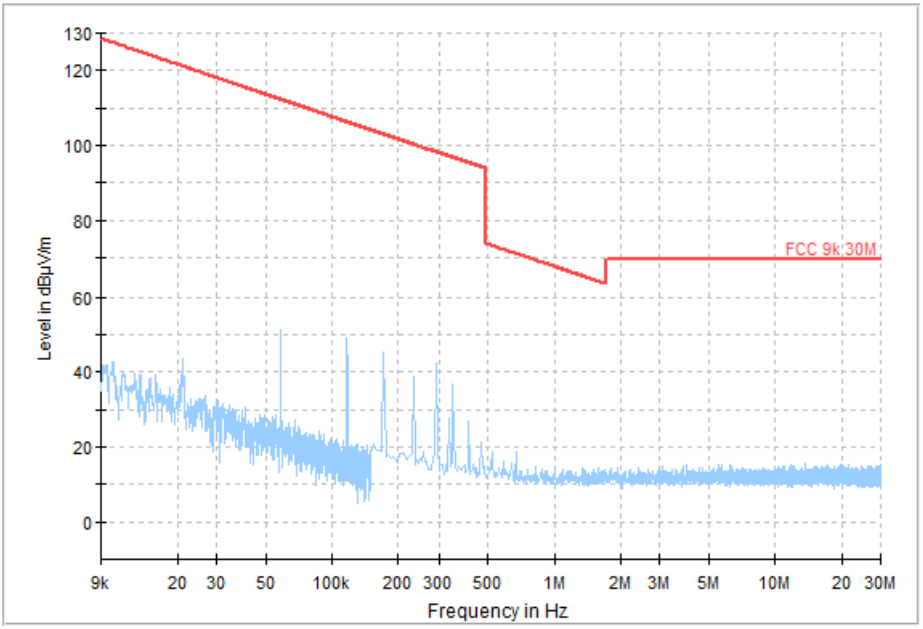

Fig. 66 Radiated Spurious Emission (All Channels, 9 kHz ~ 30 MHz)

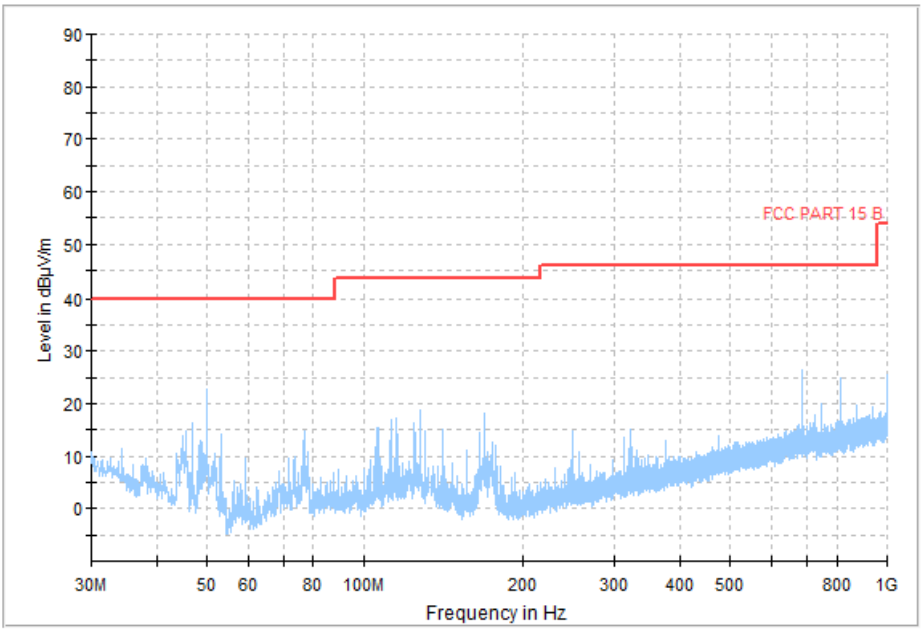

Fig. 67 Radiated Spurious Emission (All Channels, 30 MHz ~ 1 GHz)

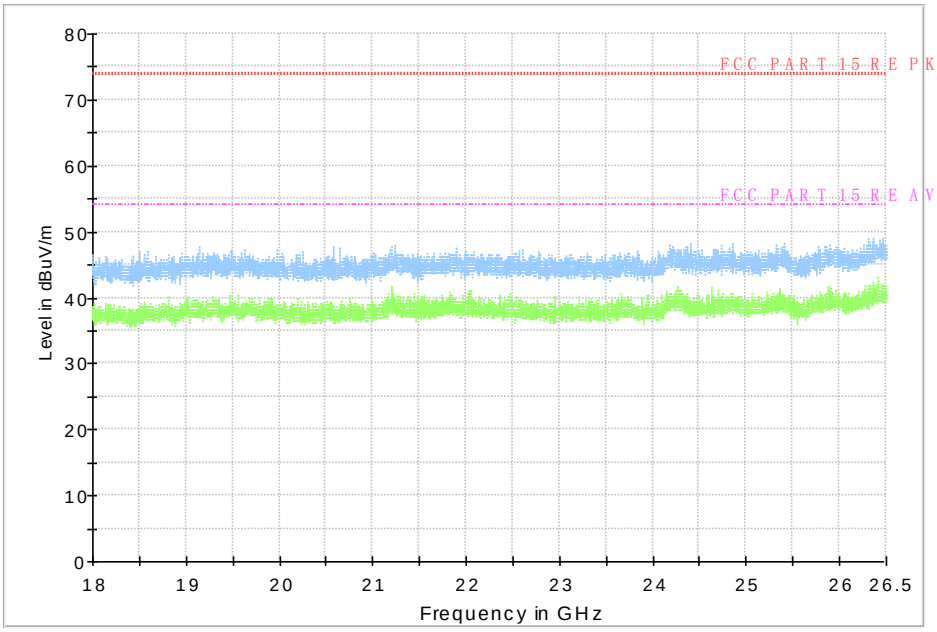

Fig. 68 Radiated Spurious Emission (All Channels, 18 GHz ~ 26.5 GHz)

A.6 20dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	/

Measurement Result:

Mode	Channel	20dB Bandwidth (KHz)		conclusion
GFSK	0	Fig.69	942.75	/
	39	Fig.70	942.00	
	78	Fig.71	943.50	
π /4 DQPSK	0	Fig.72	1230.00	/
	39	Fig.73	1228.50	
	78	Fig.74	1251.75	
8DPSK	0	Fig.75	1237.50	/
	39	Fig.76	1253.25	
	78	Fig.77	1254.00	

See below for test graphs.
Conclusion: PASS

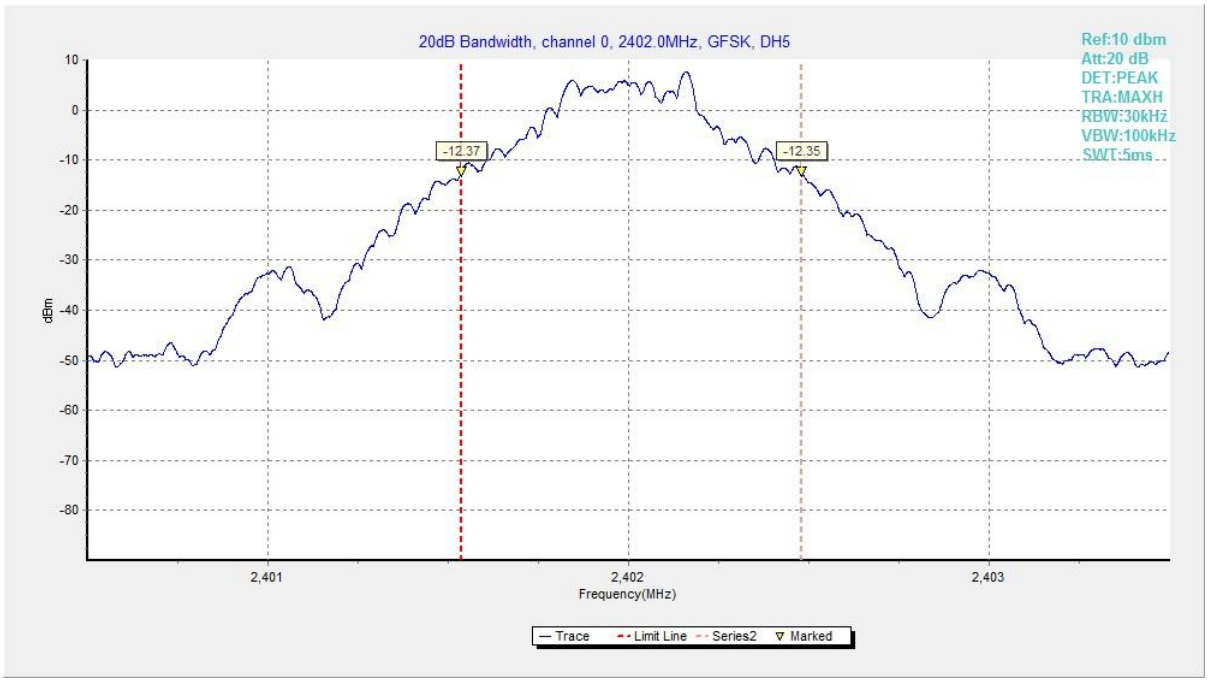

Fig. 69 20dB Bandwidth (GFSK, Ch 0)

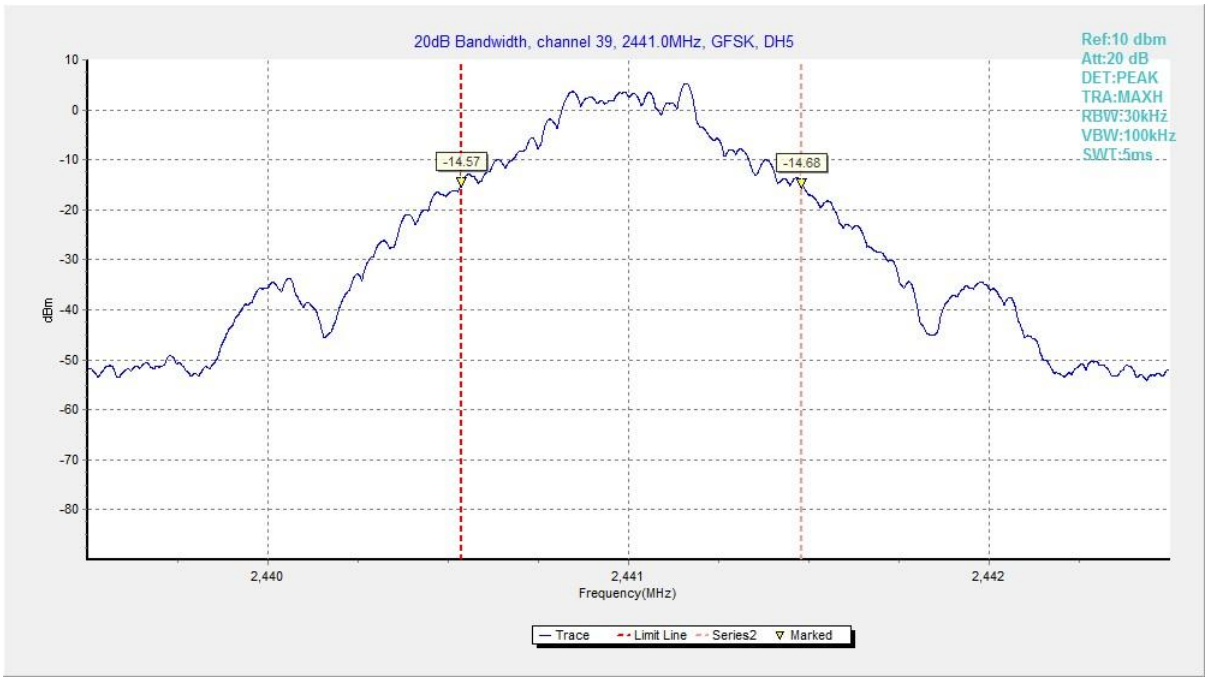

Fig. 70 20dB Bandwidth (GFSK, Ch 39)

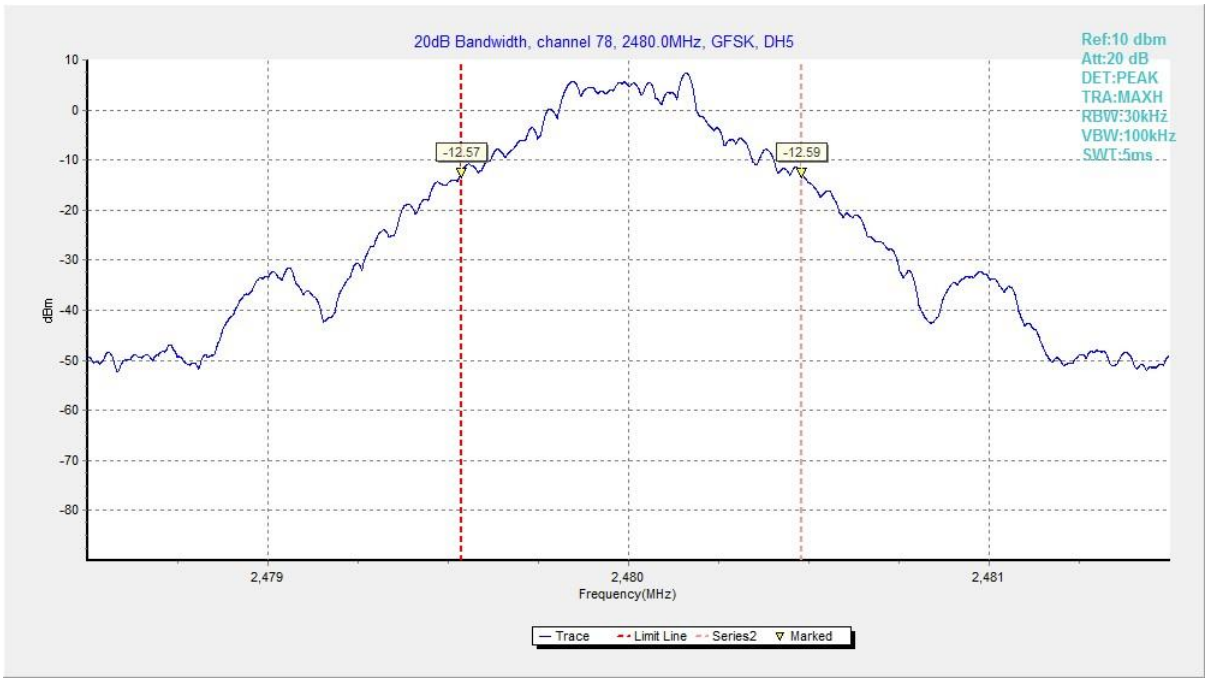

Fig. 71 20dB Bandwidth (GFSK, Ch 78)

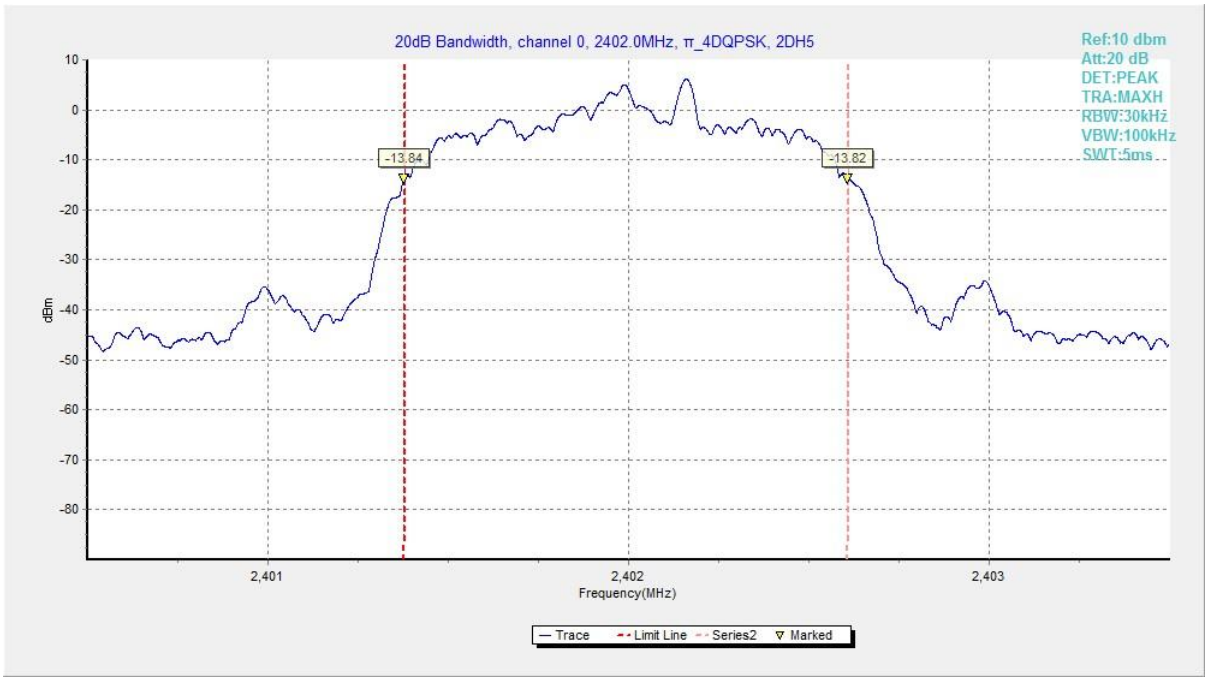

Fig. 72 20dB Bandwidth (π /4 DQPSK, Ch 0)

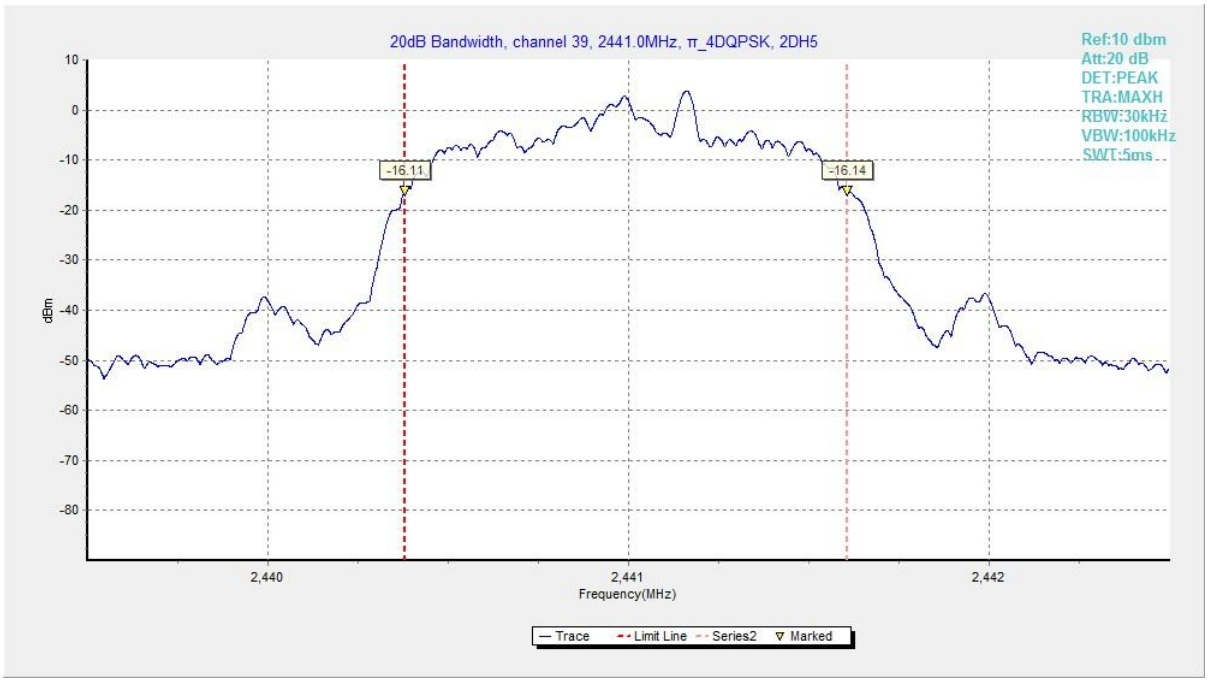

Fig. 73 20dB Bandwidth (π /4 DQPSK, Ch 39)

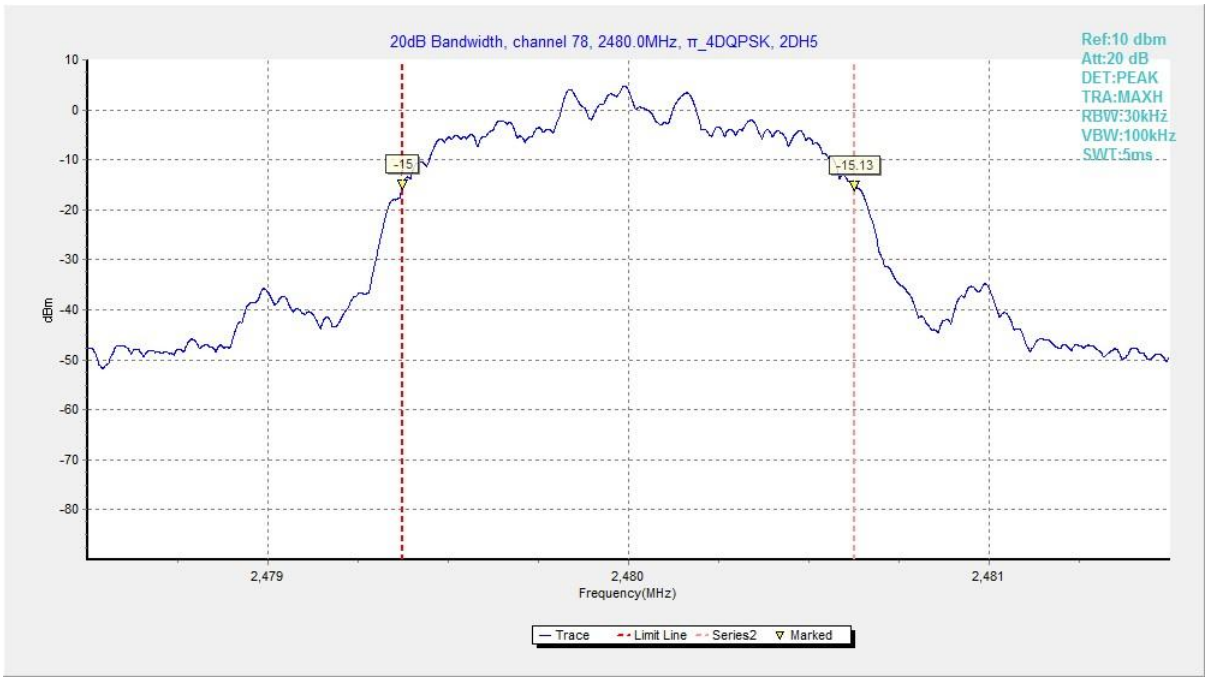

Fig. 74 20dB Bandwidth (π /4 DQPSK, Ch 78)

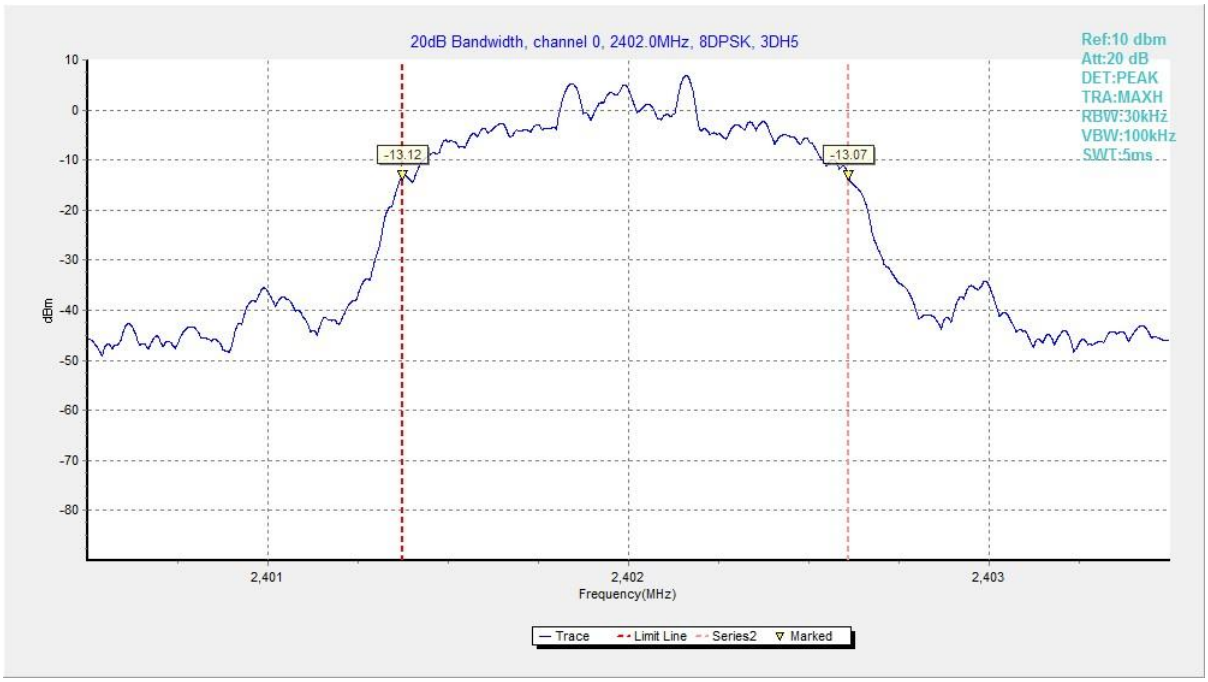

Fig. 75 20dB Bandwidth (8DPSK, Ch 0)

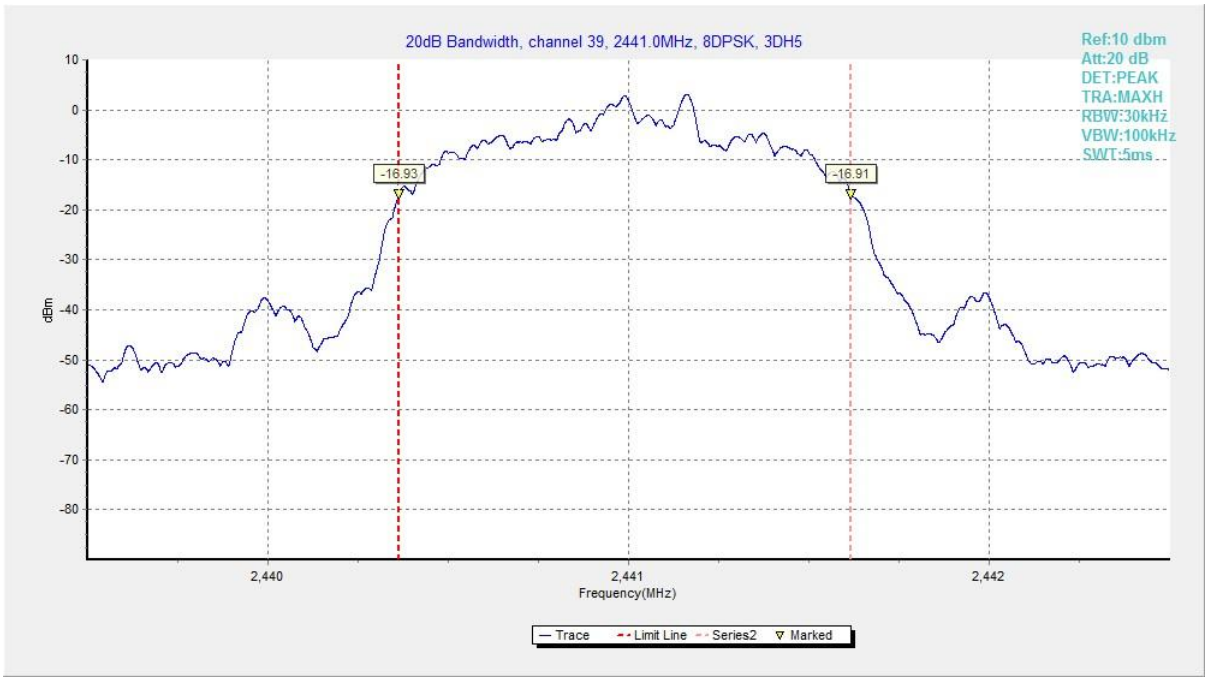

Fig. 76 20dB Bandwidth (8DPSK, Ch 39)

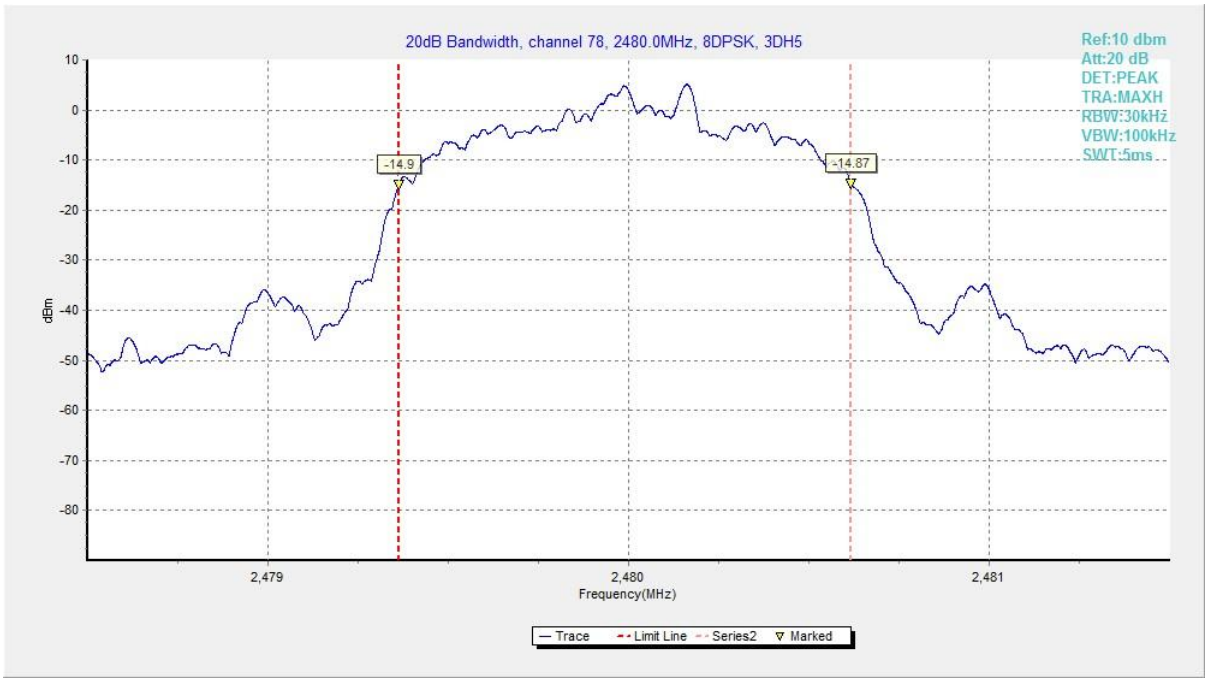

Fig. 77 20dB Bandwidth (8DPSK, Ch 78)

A.7 Time of Occupancy (Dwell Time)

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)	< 400 ms

Measurement Results:

Mode	Channel	Packet	Dwell Time(ms)		Conclusion
GFSK	39	DH5	Fig.78	307.19	**P**
			Fig.79		
π /4 DQPSK	39	2-DH5	Fig.80	306.33	**P**
			Fig.81		
8DPSK	39	3-DH5	Fig.82	306.80	**P**
			Fig.83		

See below for test graphs.
Conclusion: Pass

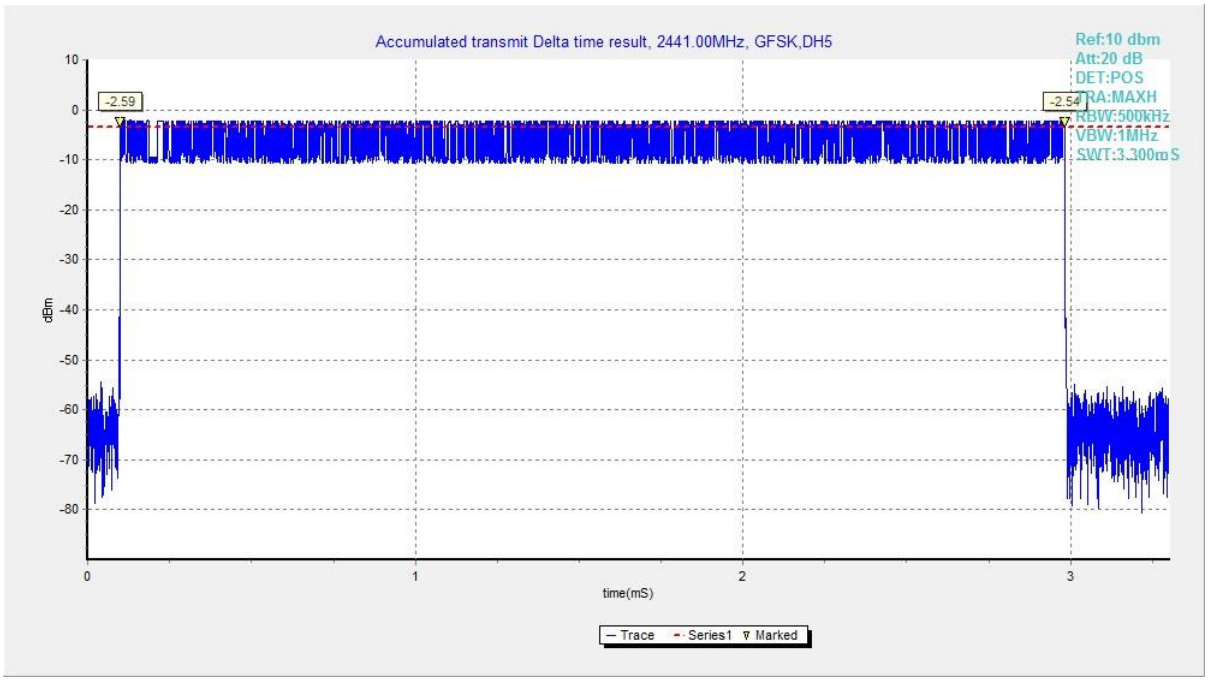

Fig. 78 Time of Occupancy(Dwell Time) (GFSK, Ch39)

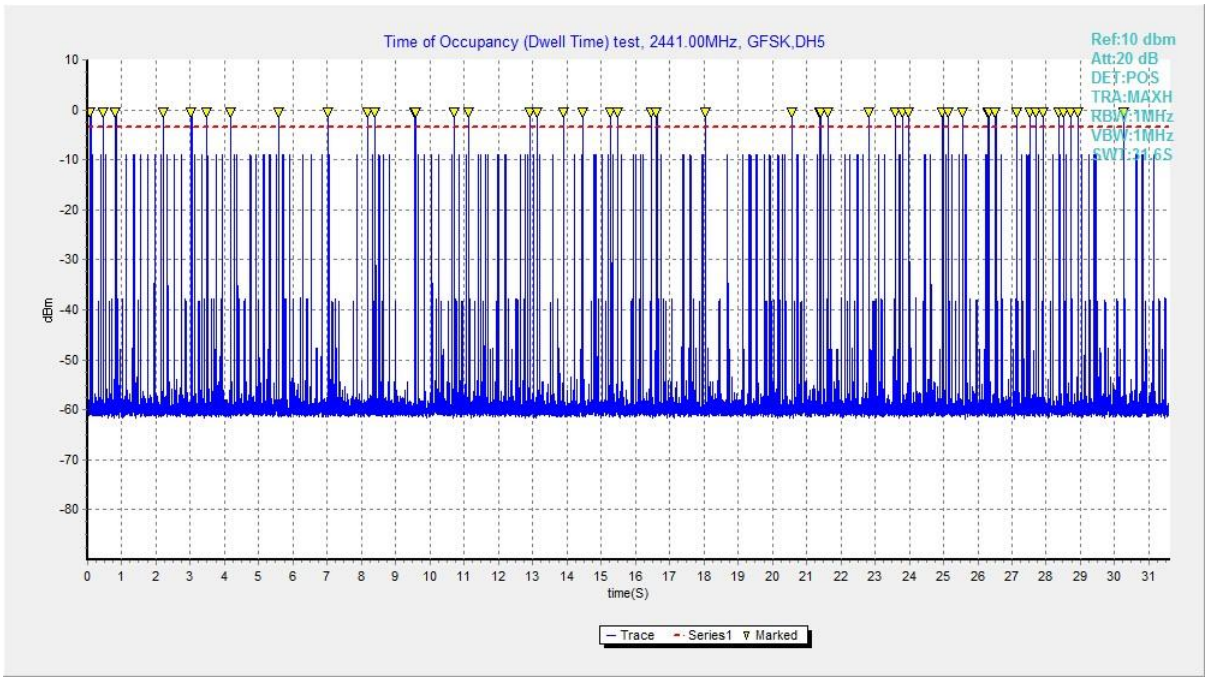

Fig. 79 Time of Occupancy(Dwell Time) (GFSK, Ch39)

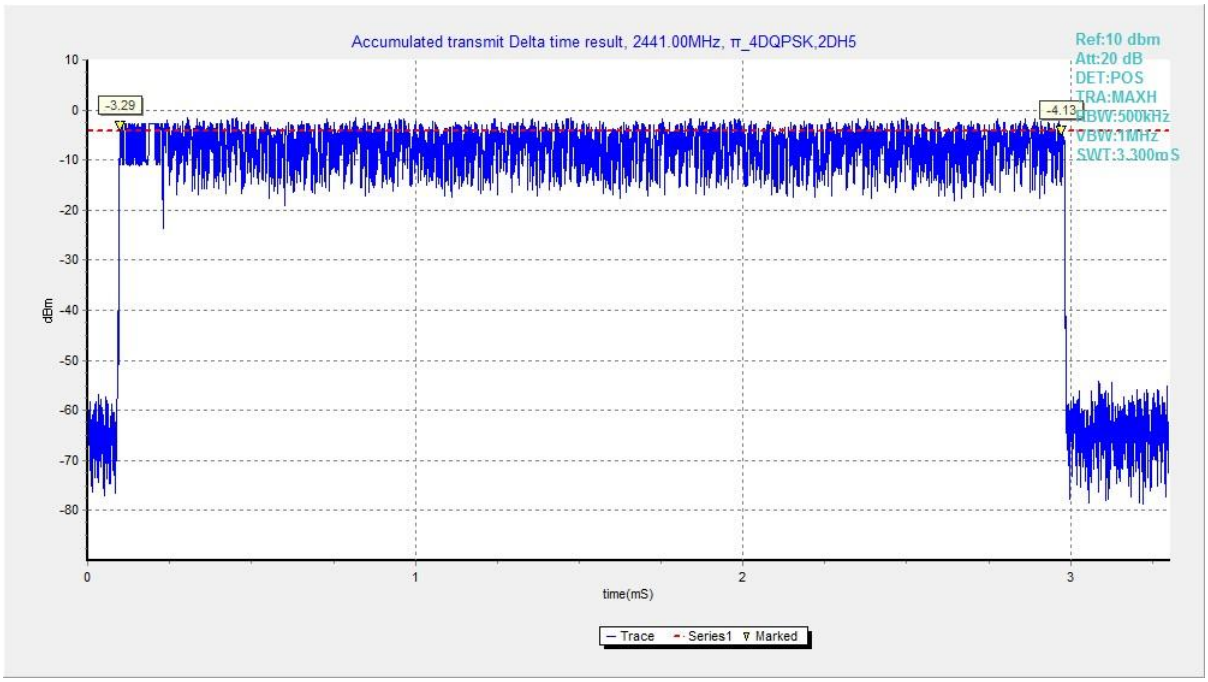

Fig. 80 Time of Occupancy(Dwell Time) (π /4 DQPSK, Ch39)

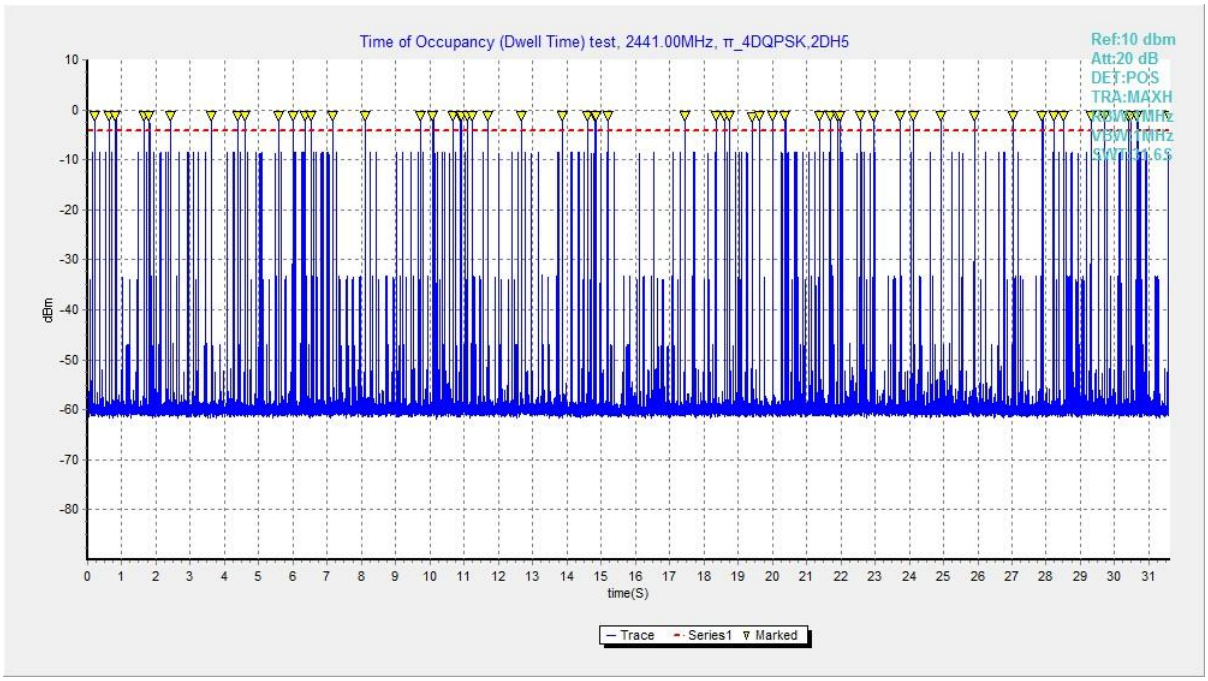

Fig. 81 Time of Occupancy(Dwell Time) (π /4 DQPSK, Ch39)

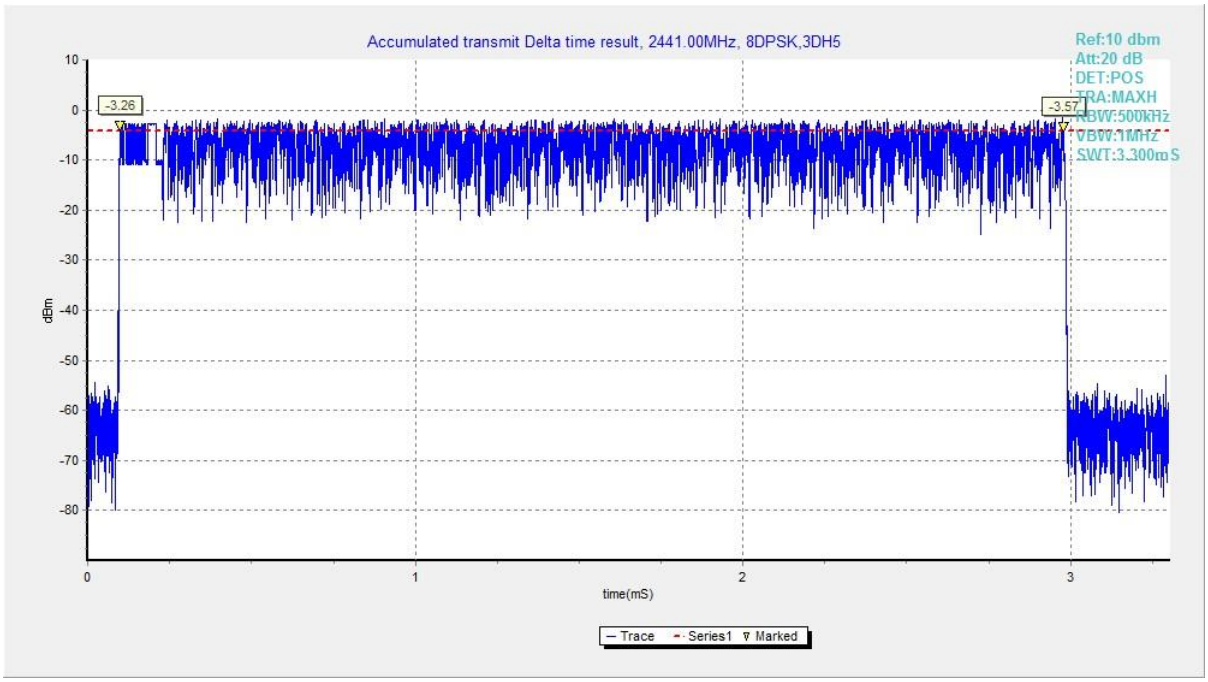

Fig. 82 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

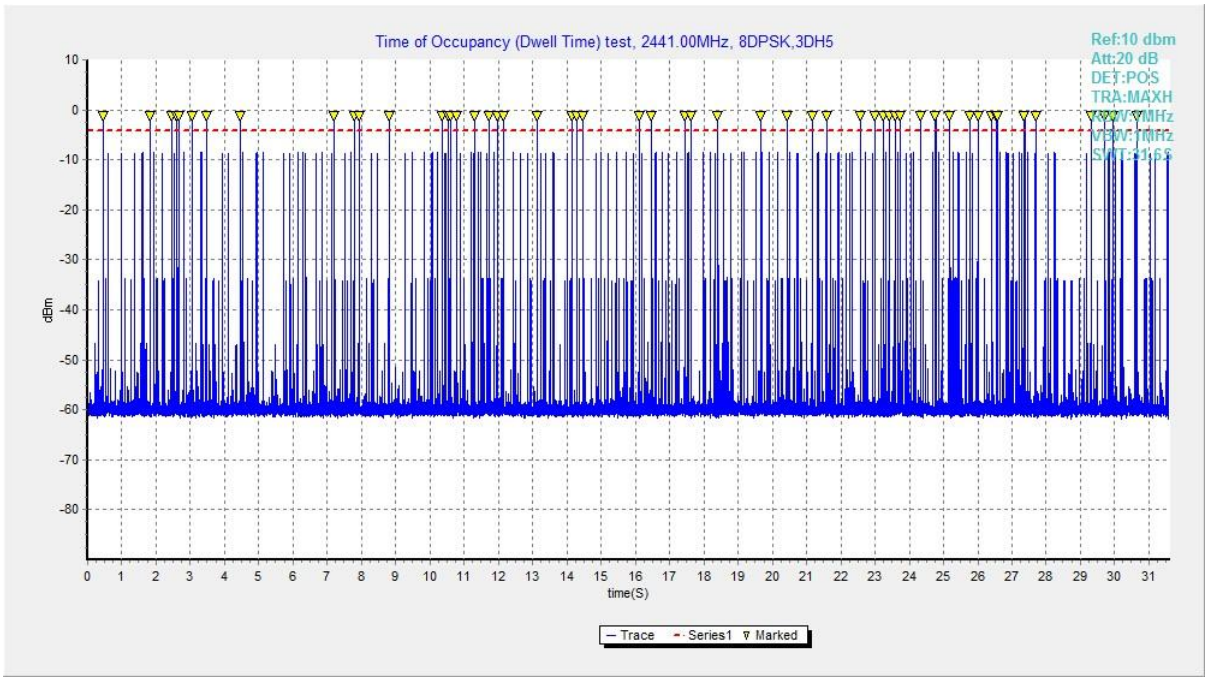

Fig. 83 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

A.8 Number of Hopping Channels

Measurement Limit:

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

Measurement Results:

Mode	Packet	Number of hopping channels		Test result	Conclusion
GFSK	DH5	Fig.84	Fig.85	79	**P**
π /4 DQPSK	2-DH5	Fig.86	Fig.87	79	**P**
8DPSK	3-DH5	Fig.88	Fig.89	79	**P**

See below for test graphs.
Conclusion: Pass

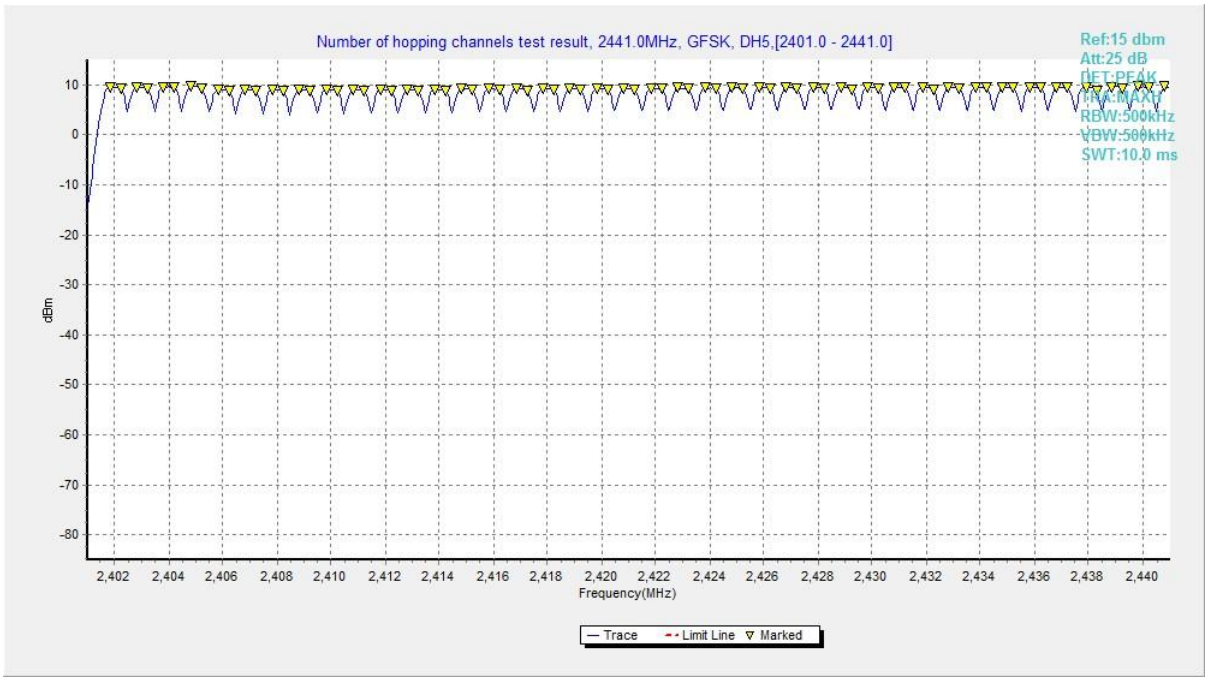

Fig. 84 Hopping channel ch0~39 (GFSK, Ch39)

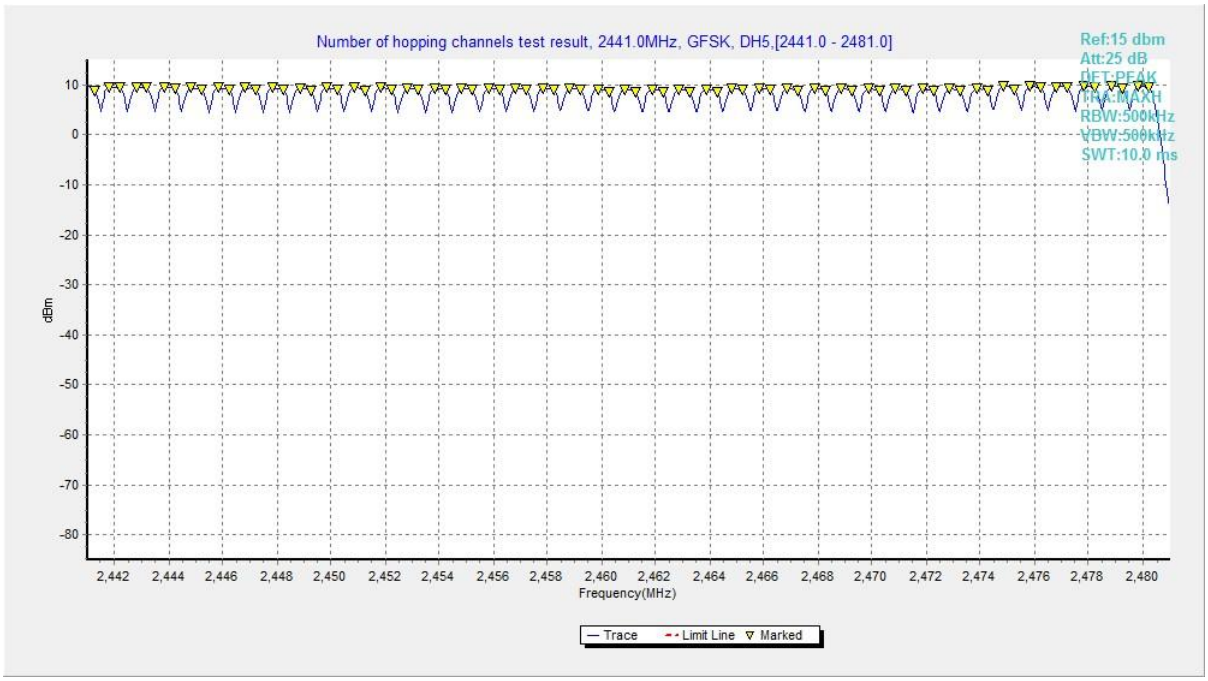

Fig. 85 Hopping channel ch40~78 (GFSK, Ch39)

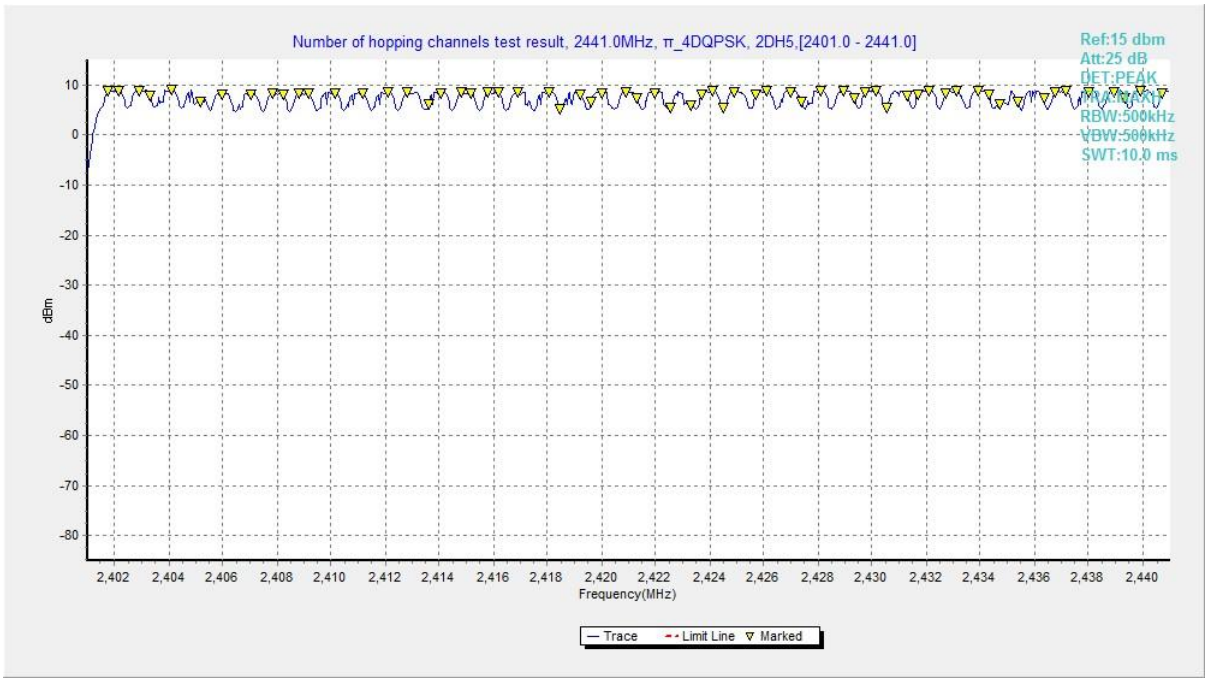

Fig. 86 Hopping channel ch0~39 (π /4 DQPSK, Ch39)

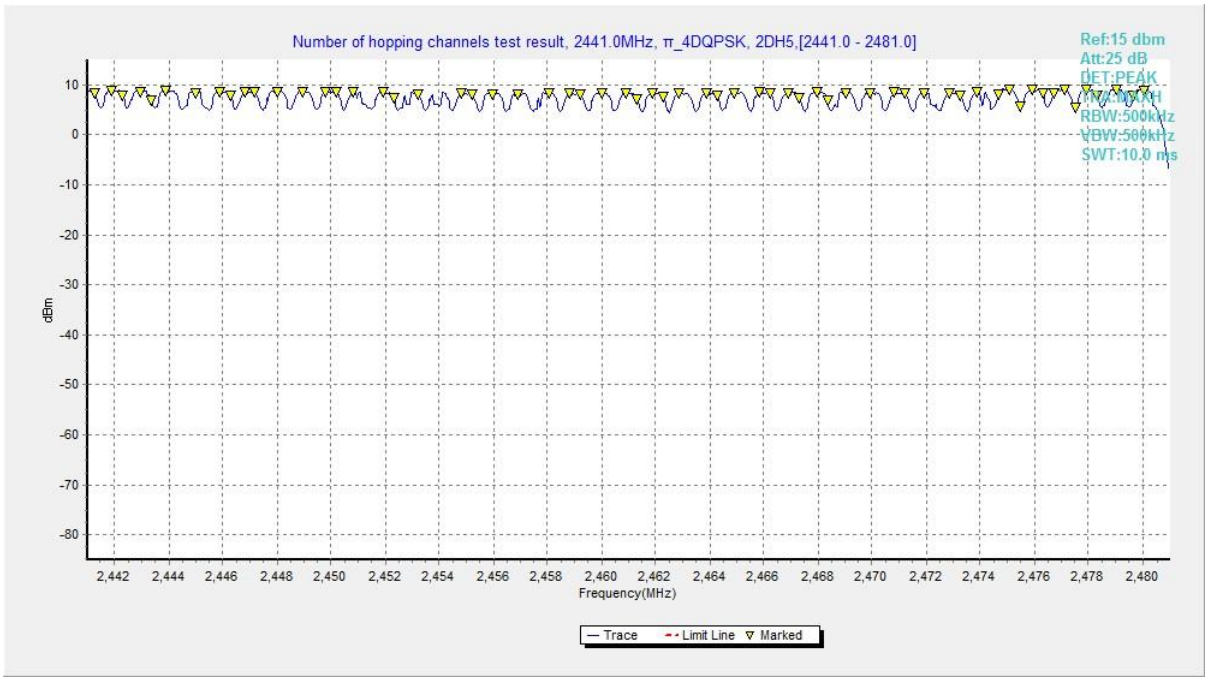

Fig. 87 Hopping channel ch40~78 (π /4 DQPSK, Ch39)

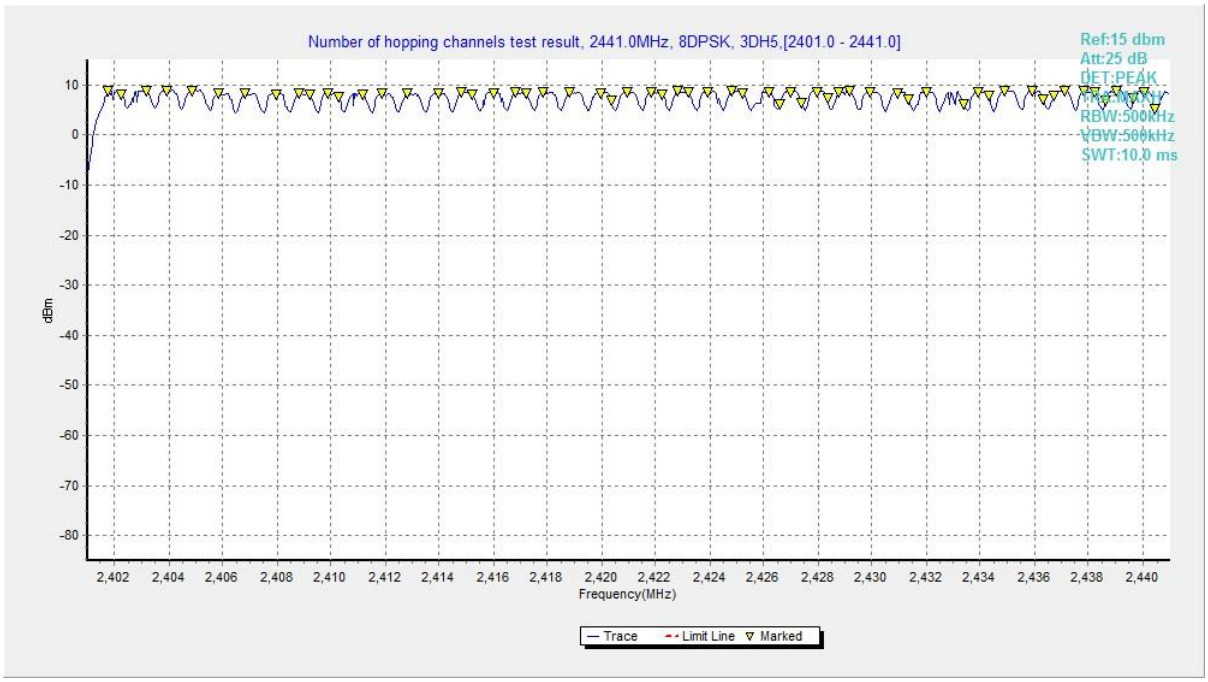

Fig. 88 Hopping channel ch0~39 (8DPSK, Ch39)

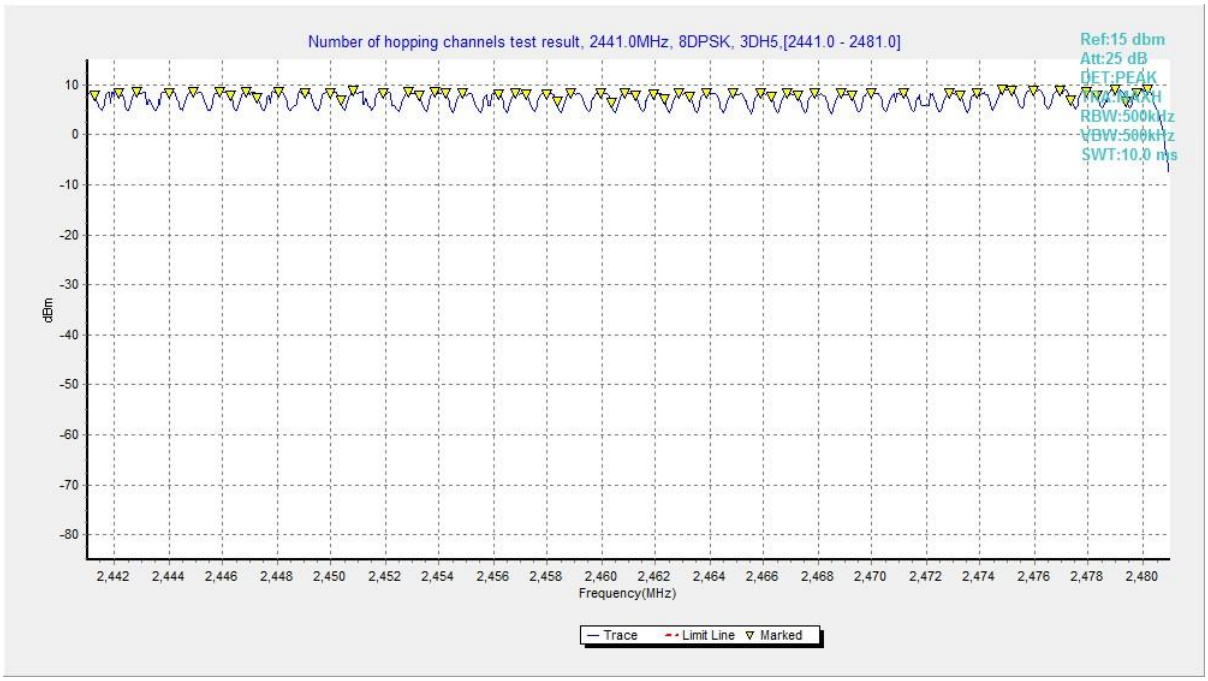

Fig. 89 Hopping channel ch40~78 (8DPSK, Ch39)

A.9 Carrier Frequency Separation

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)	By a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater

Measurement Results:

Mode	Channel	Packet	Separation of hopping channels	Test result (MHz)	Conclusion
GFSK	39	DH5	Fig.90	1.01	**P**
π /4 DQPSK	39	2-DH5	Fig.91	1.00	**P**
8DPSK	39	3-DH5	Fig.92	1.00	**P**

See below for test graphs.
Conclusion: Pass

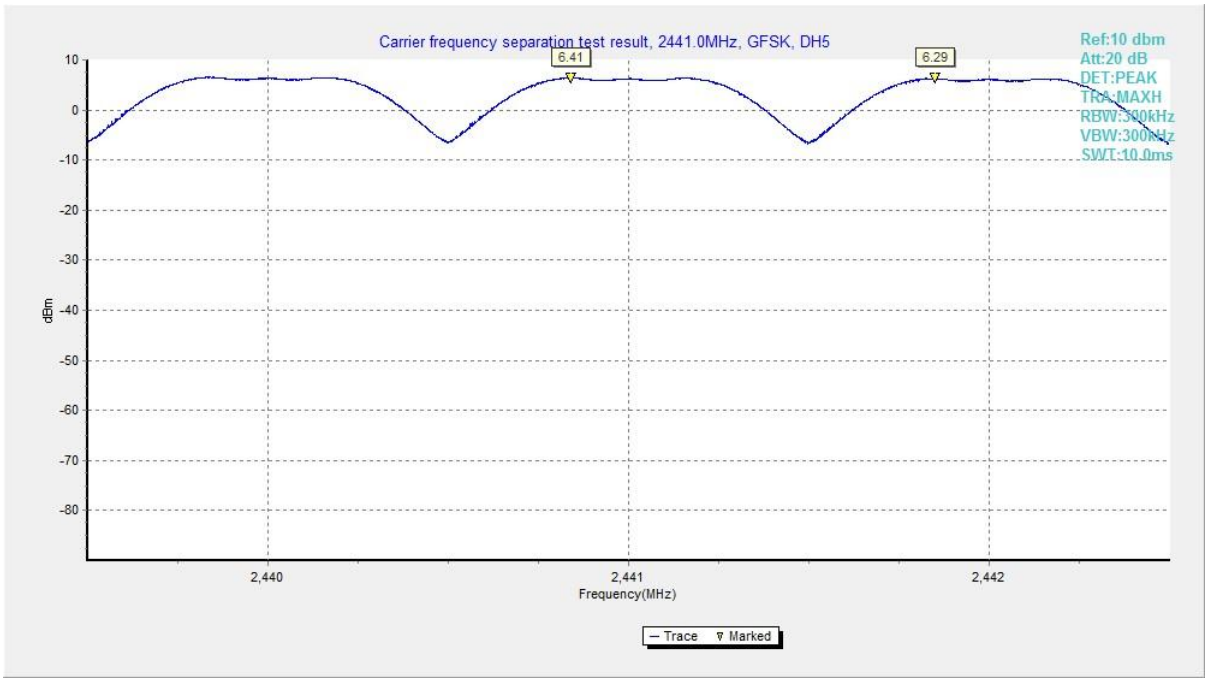

Fig. 90 Carrier Frequency Separation (GFSK, Ch39)

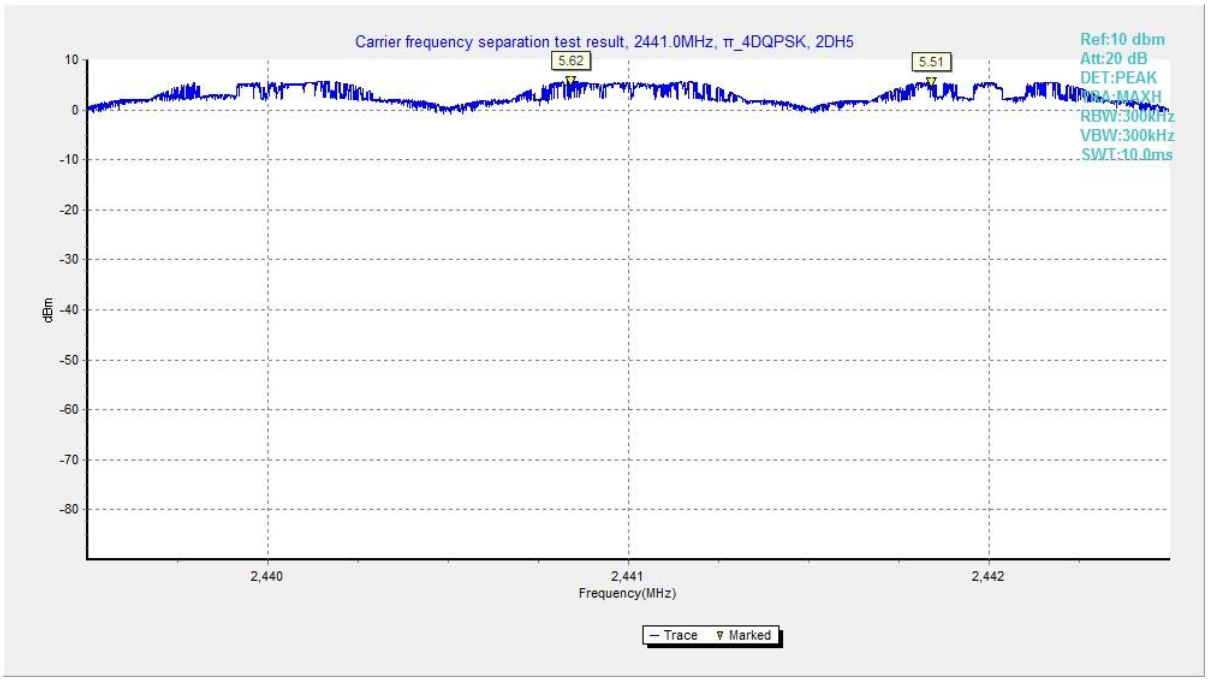

Fig. 91 Carrier Frequency Separation (π /4 DQPSK, Ch39)

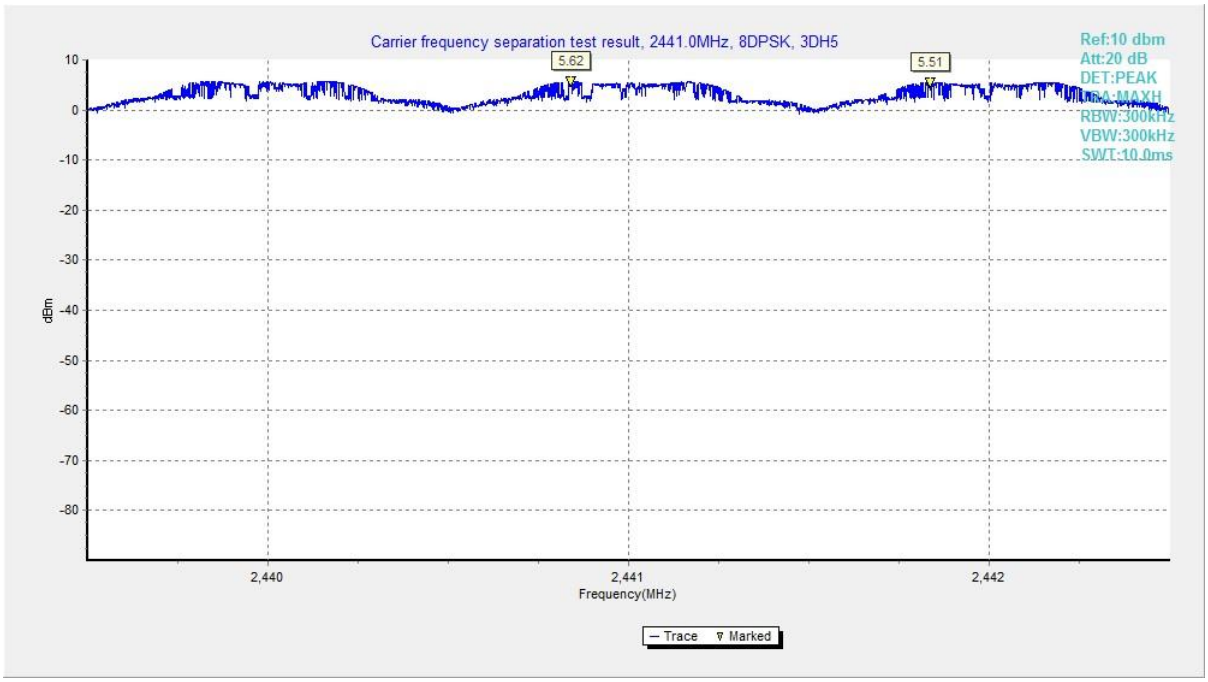

Fig. 92 Carrier Frequency Separation (8DPSK, Ch39)

A.10 AC Power line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

BT (Quasi-peak Limit) - AE3

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.93	Fig.94	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.				

BT (Average Limit) - AE3

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.93	Fig.94	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.				

BT (Quasi-peak Limit) - AE4

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.95	Fig.96	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.				

BT (Average Limit) - AE4

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.95	Fig.96	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.				

Test Condition:

Voltage (V)	Frequency (Hz)
240	60

Measurement Result and limit:

BT (Quasi-peak Limit) - AE3

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.97	Fig.98	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.				

BT (Average Limit) - AE3

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.97	Fig.98	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.				

BT (Quasi-peak Limit) - AE4

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.99	Fig.100	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.				

BT (Average Limit) - AE4

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.99	Fig.100	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.				

Note: The measurement results include the L1 and N measurements.

See below for test graphs.

Conclusion: Pass

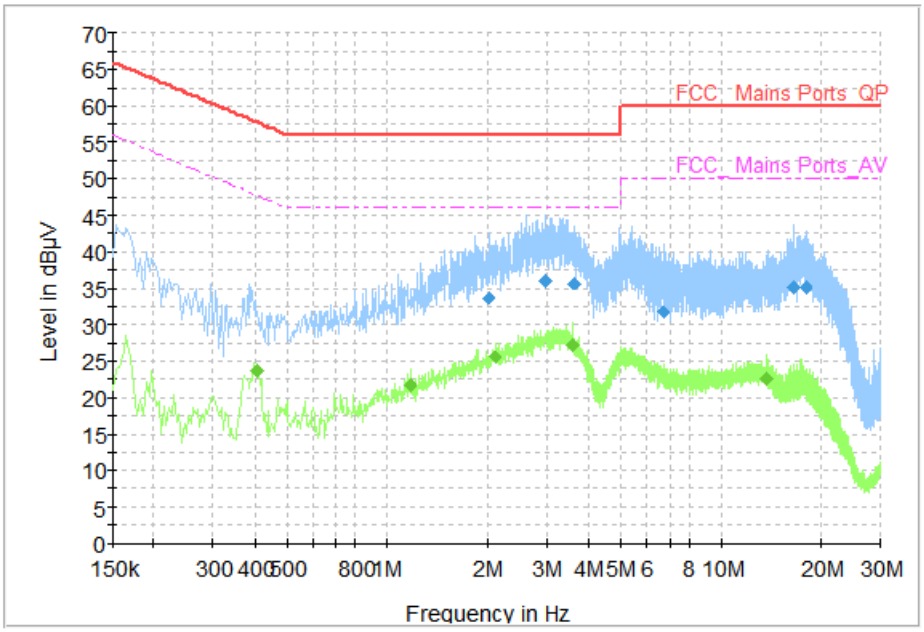

Fig. 93 AC Powerline Conducted Emission (Traffic, AE3, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
2.010000	33.71	56.00	22.30	N	ON	9.7
2.978000	35.92	56.00	20.08	N	ON	9.7
3.626000	35.59	56.00	20.41	N	ON	9.7
6.714000	31.76	60.00	28.24	N	ON	9.8
16.454000	35.17	60.00	24.83	L1	ON	10.1
17.914000	35.07	60.00	24.93	L1	ON	10.1

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.410000	23.58	47.65	24.07	N	ON	9.7
1.170000	21.75	46.00	24.25	L1	ON	9.7
2.106000	25.50	46.00	20.50	L1	ON	9.7
3.586000	27.07	46.00	18.93	L1	ON	9.7
3.606000	27.22	46.00	18.78	L1	ON	9.7
13.626000	22.49	50.00	27.51	L1	ON	10.0

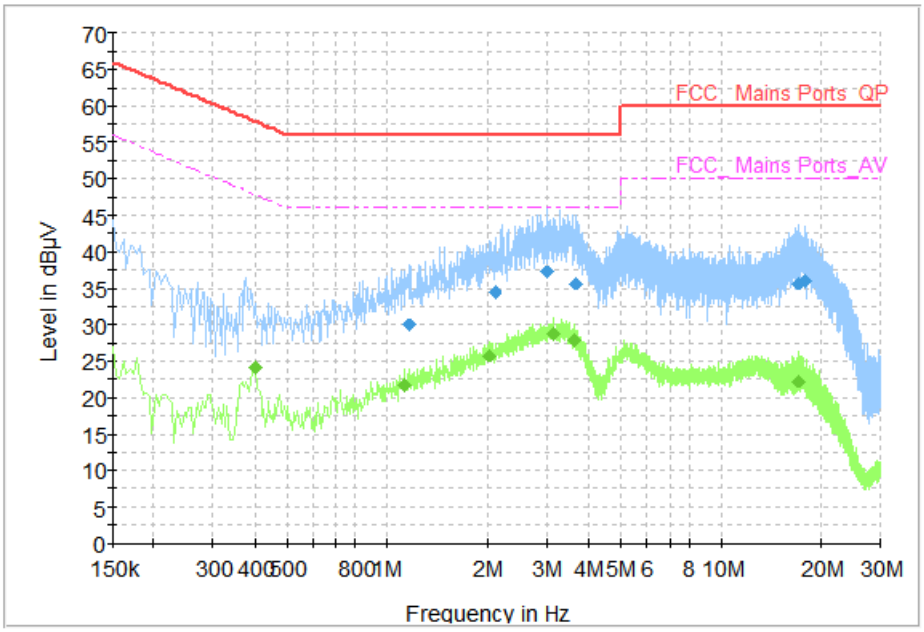

Fig. 94 AC Power line Conducted Emission (Idle, AE3, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
1.166000	29.98	56.00	26.02	N	ON	9.7
2.098000	34.45	56.00	21.55	N	ON	9.7
3.030000	37.19	56.00	18.81	N	ON	9.7
3.662000	35.67	56.00	20.33	N	ON	9.7
17.050000	35.67	60.00	24.33	L1	ON	10.2
17.722000	35.94	60.00	24.06	L1	ON	10.1

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406000	24.11	47.73	23.62	N	ON	9.7
1.126000	21.71	46.00	24.29	L1	ON	9.7
2.034000	25.77	46.00	20.23	L1	ON	9.7
3.154000	28.66	46.00	17.34	L1	ON	9.7
3.642000	27.89	46.00	18.11	L1	ON	9.7
17.082000	22.29	50.00	27.71	L1	ON	10.2

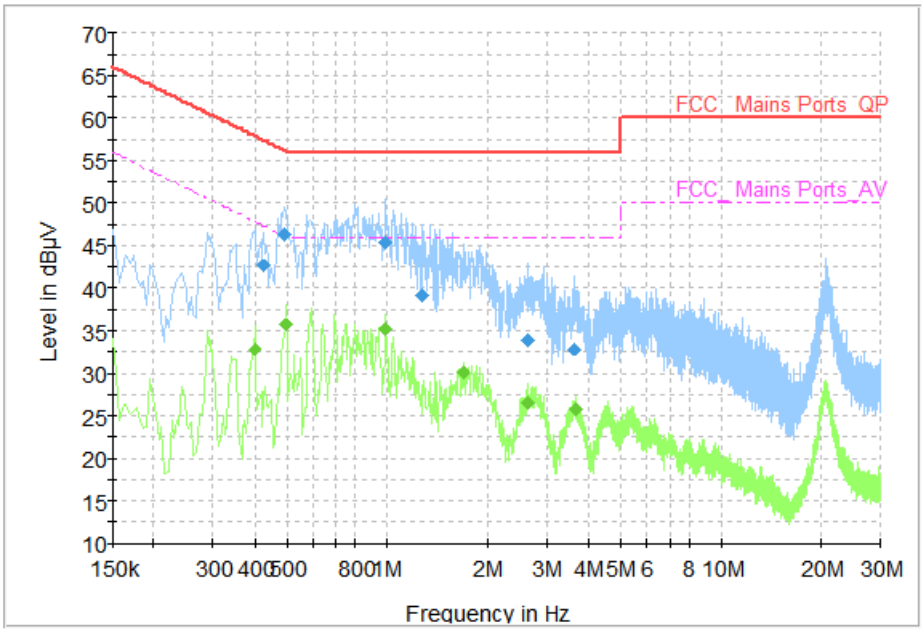

Fig. 95 AC Powerline Conducted Emission (Traffic, AE4, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.426000	42.59	57.33	14.74	L1	ON	9.7
0.490000	46.23	56.17	9.94	L1	ON	9.7
0.990000	45.41	56.00	10.59	L1	ON	9.7
1.274000	39.24	56.00	16.76	L1	ON	9.7
2.658000	33.81	56.00	22.19	L1	ON	9.7
3.626000	32.83	56.00	23.17	N	ON	9.7

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	32.86	47.81	14.95	L1	ON	9.7
0.498000	35.64	46.03	10.39	L1	ON	9.7
0.994000	35.25	46.00	10.75	L1	ON	9.7
1.690000	30.17	46.00	15.83	N	ON	9.7
2.646000	26.52	46.00	19.48	N	ON	9.7
3.678000	25.69	46.00	20.31	L1	ON	9.7

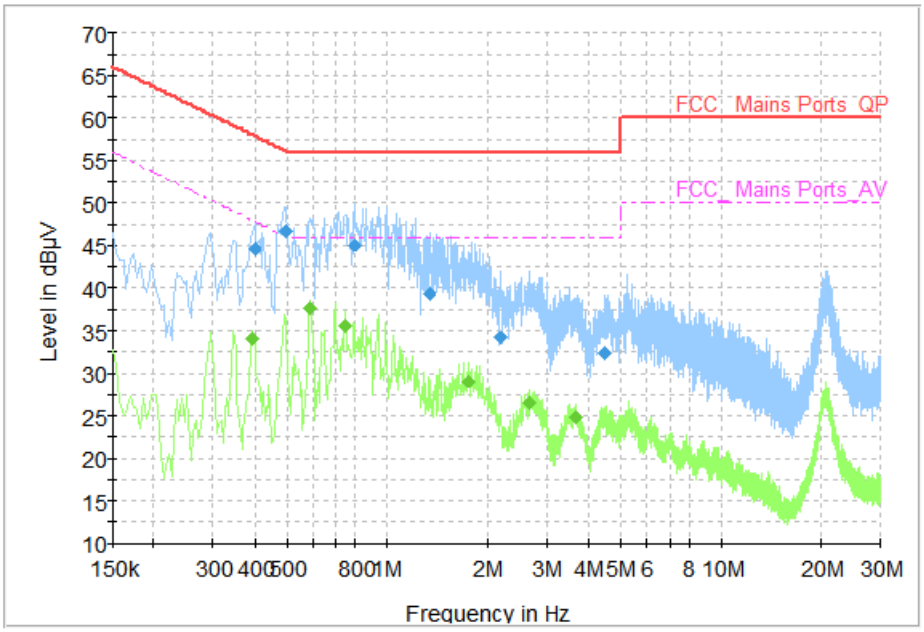

Fig. 96 AC Power line Conducted Emission (Idle, AE4, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	44.67	57.81	13.14	L1	ON	9.7
0.498000	46.75	56.03	9.29	L1	ON	9.7
0.798000	45.04	56.00	10.96	L1	ON	9.7
1.342000	39.39	56.00	16.61	N	ON	9.7
2.170000	34.21	56.00	21.79	L1	ON	9.7
4.474000	32.34	56.00	23.66	L1	ON	9.8

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.394000	34.02	47.98	13.96	L1	ON	9.7
0.586000	37.70	46.00	8.30	L1	ON	9.7
0.746000	35.52	46.00	10.48	L1	ON	9.7
1.746000	29.04	46.00	16.96	L1	ON	9.7
2.682000	26.47	46.00	19.53	N	ON	9.7
3.666000	24.88	46.00	21.12	L1	ON	9.7

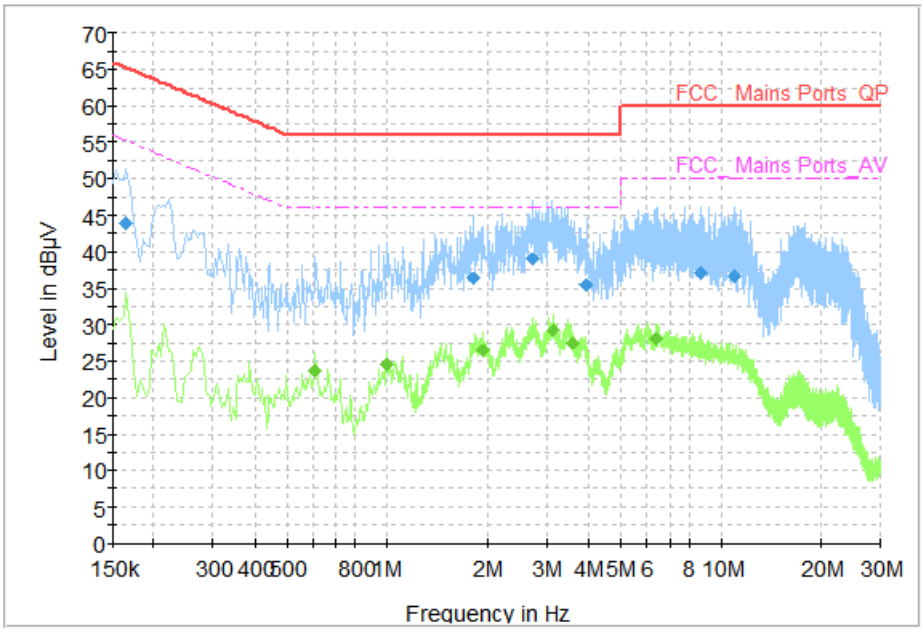

Fig. 97 AC Powerline Conducted Emission (Traffic, AE3, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	43.89	65.16	21.27	N	ON	9.6
1.814000	36.30	56.00	19.70	N	ON	9.7
2.722000	38.98	56.00	17.02	N	ON	9.7
3.934000	35.46	56.00	20.54	N	ON	9.7
8.678000	37.10	60.00	22.90	N	ON	9.8
10.926000	36.69	60.00	23.31	N	ON	9.8

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.610000	23.54	46.00	22.46	N	ON	9.7
0.998000	24.59	46.00	21.41	L1	ON	9.7
1.950000	26.50	46.00	19.50	L1	ON	9.7
3.126000	29.33	46.00	16.67	L1	ON	9.7
3.614000	27.48	46.00	18.52	L1	ON	9.7
6.386000	28.00	50.00	22.00	N	ON	9.8

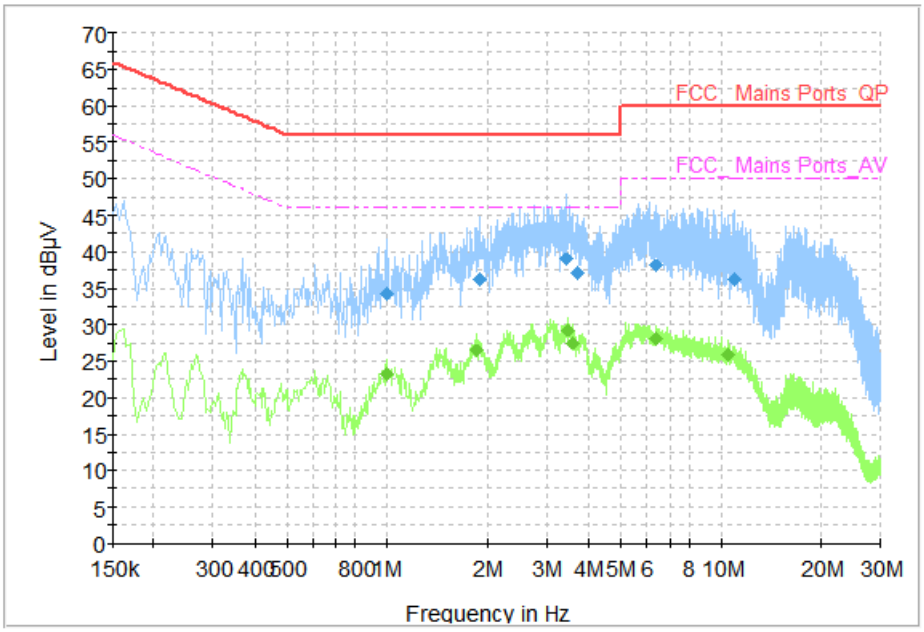

Fig. 98 AC Power line Conducted Emission (Idle, AE3, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.998000	34.27	56.00	21.73	N	ON	9.7
1.886000	36.17	56.00	19.83	N	ON	9.7
3.466000	39.04	56.00	16.96	N	ON	9.7
3.706000	36.96	56.00	19.04	N	ON	9.7
6.338000	38.06	60.00	21.94	N	ON	9.8
10.958000	36.23	60.00	23.77	N	ON	9.8

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.998000	23.28	46.00	22.72	N	ON	9.7
1.850000	26.42	46.00	19.58	L1	ON	9.7
3.490000	29.27	46.00	16.73	L1	ON	9.7
3.606000	27.58	46.00	18.42	L1	ON	9.7
6.366000	28.11	50.00	21.89	N	ON	9.8
10.418000	25.87	50.00	24.13	L1	ON	9.9

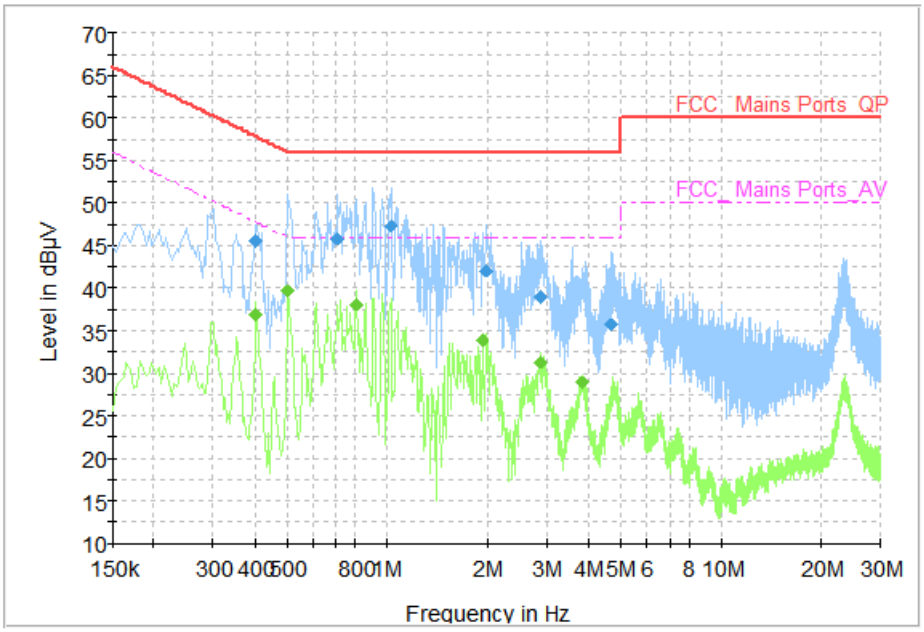

Fig. 99 AC Powerline Conducted Emission (Traffic, AE4, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406000	45.51	57.73	12.22	L1	ON	9.7
0.710000	45.88	56.00	10.12	L1	ON	9.7
1.026000	47.36	56.00	8.64	L1	ON	9.7
1.974000	42.10	56.00	13.90	L1	ON	9.7
2.886000	39.06	56.00	16.94	L1	ON	9.7
4.678000	35.74	56.00	20.26	L1	ON	9.8

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406000	36.96	47.73	10.77	L1	ON	9.7
0.506000	39.62	46.00	6.38	L1	ON	9.7
0.806000	38.16	46.00	7.84	L1	ON	9.7
1.930000	33.84	46.00	12.16	L1	ON	9.7
2.886000	31.24	46.00	14.76	L1	ON	9.7
3.834000	28.91	46.00	17.09	L1	ON	9.7

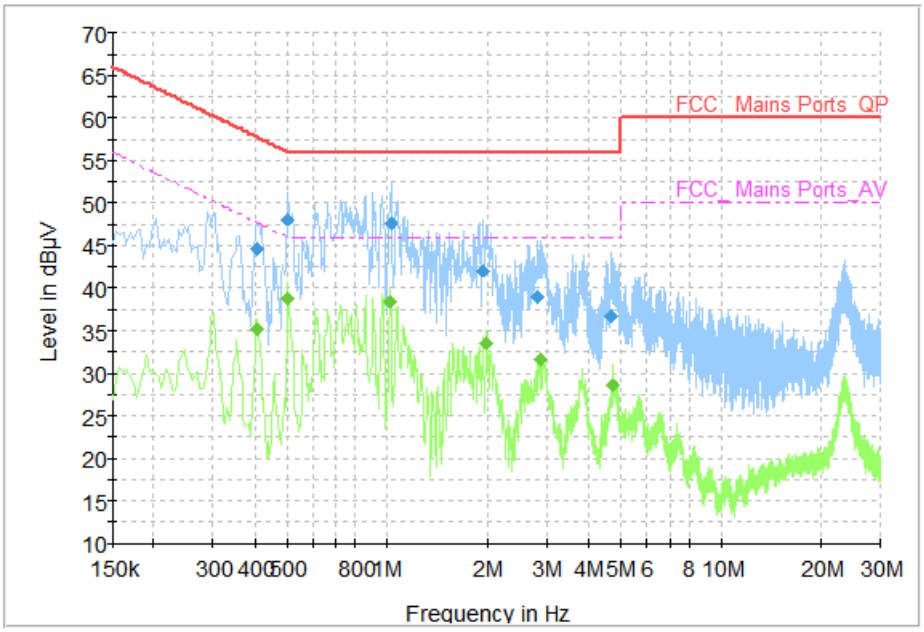

Fig. 100 AC Power line Conducted Emission (Idle, AE4, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.410000	44.62	57.65	13.02	L1	ON	9.7
0.506000	48.16	56.00	7.84	L1	ON	9.7
1.026000	47.60	56.00	8.40	L1	ON	9.7
1.934000	41.98	56.00	14.02	L1	ON	9.7
2.826000	38.98	56.00	17.02	L1	ON	9.7
4.686000	36.81	56.00	19.19	L1	ON	9.8

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.410000	35.30	47.65	12.35	L1	ON	9.7
0.506000	38.74	46.00	7.26	L1	ON	9.7
1.018000	38.35	46.00	7.65	L1	ON	9.7
1.982000	33.57	46.00	12.43	L1	ON	9.7
2.894000	31.58	46.00	14.42	L1	ON	9.7
4.766000	28.61	46.00	17.39	L1	ON	9.8

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