

### A.5 20dB Bandwidth

#### Measurement Limit:

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

#### Measurement Result:

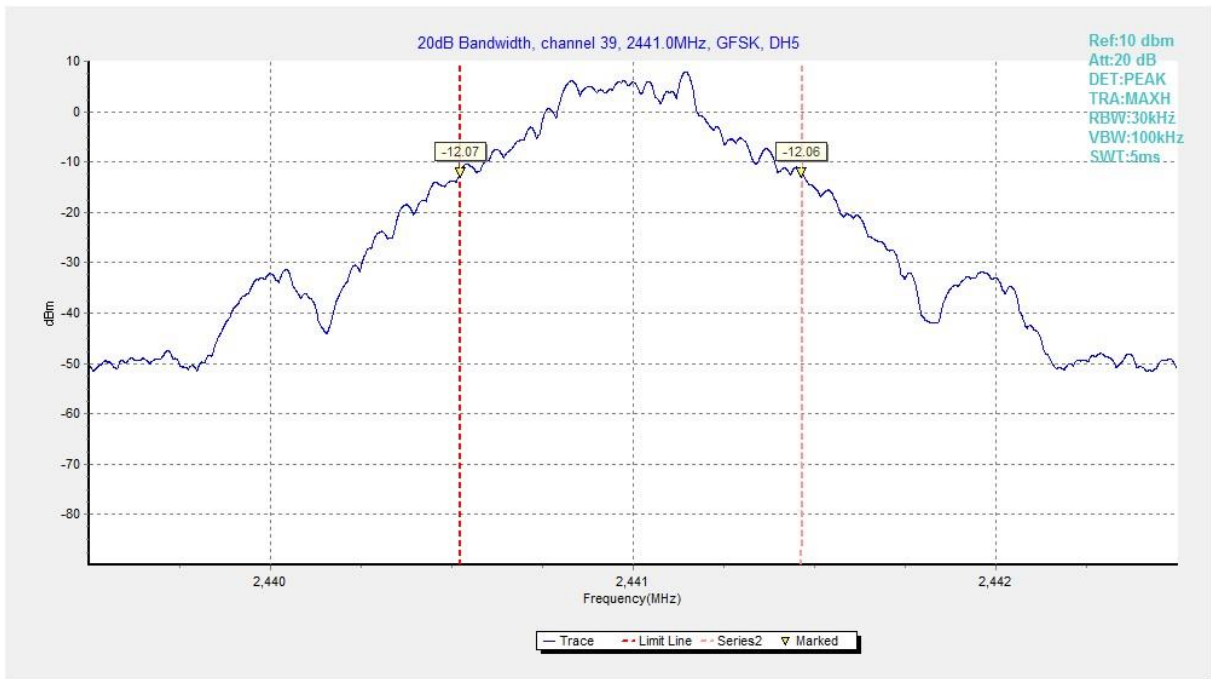
Mode	Channel	20dB Bandwidth ( kHz)		conclusion
		Fig.	Value	
GFSK	0	Fig.60	951.75	/
	39	Fig.61	941.25	
	78	Fig.62	949.50	
$\pi/4$ DQPSK	0	Fig.63	1257.00	/
	39	Fig.64	1229.25	
	78	Fig.65	1233.75	
8DPSK	0	Fig.66	1259.25	/
	39	Fig.67	1254.00	
	78	Fig.68	1286.25	

See below for test graphs.

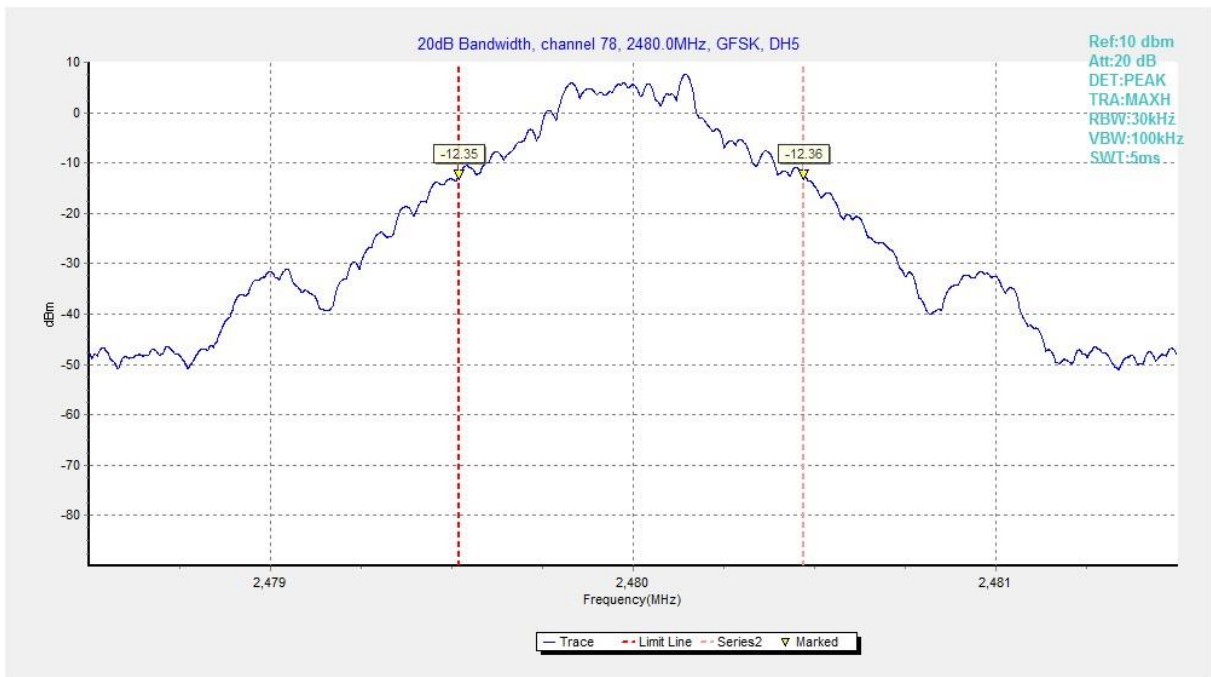
Conclusion: PASS



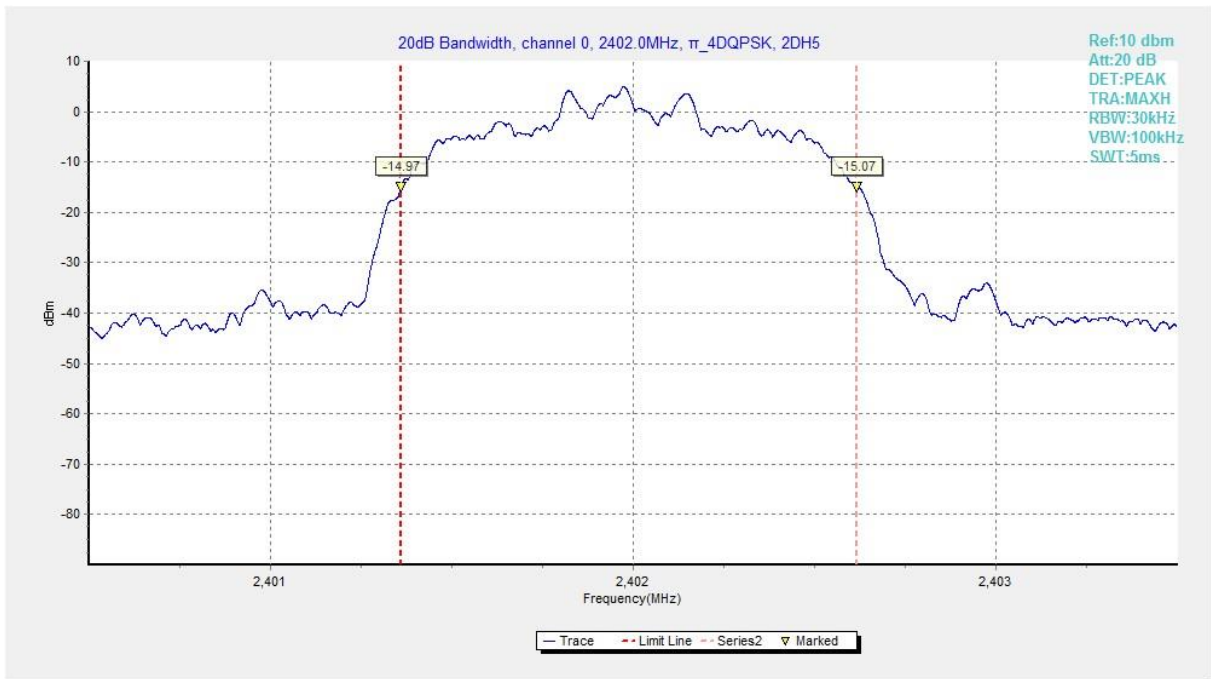
Fig. 60 20dB Bandwidth (GFSK, Ch 0)



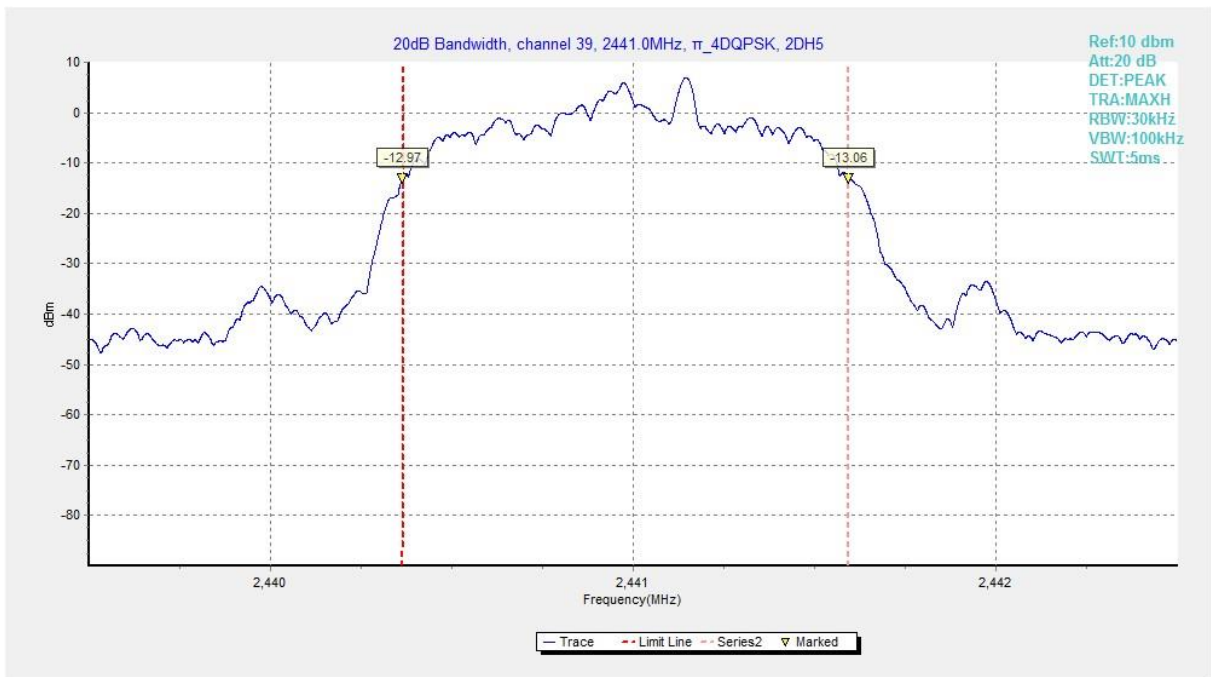
**Fig. 61 20dB Bandwidth (GFSK, Ch 39)**



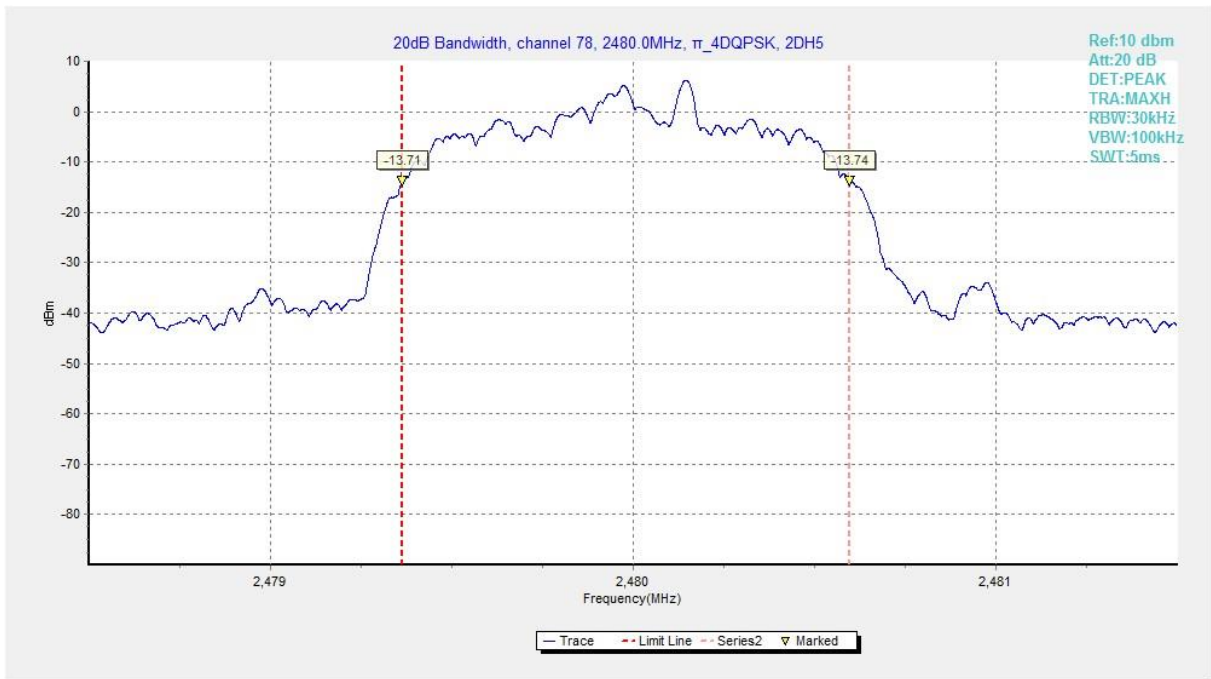
**Fig. 62 20dB Bandwidth (GFSK, Ch 78)**



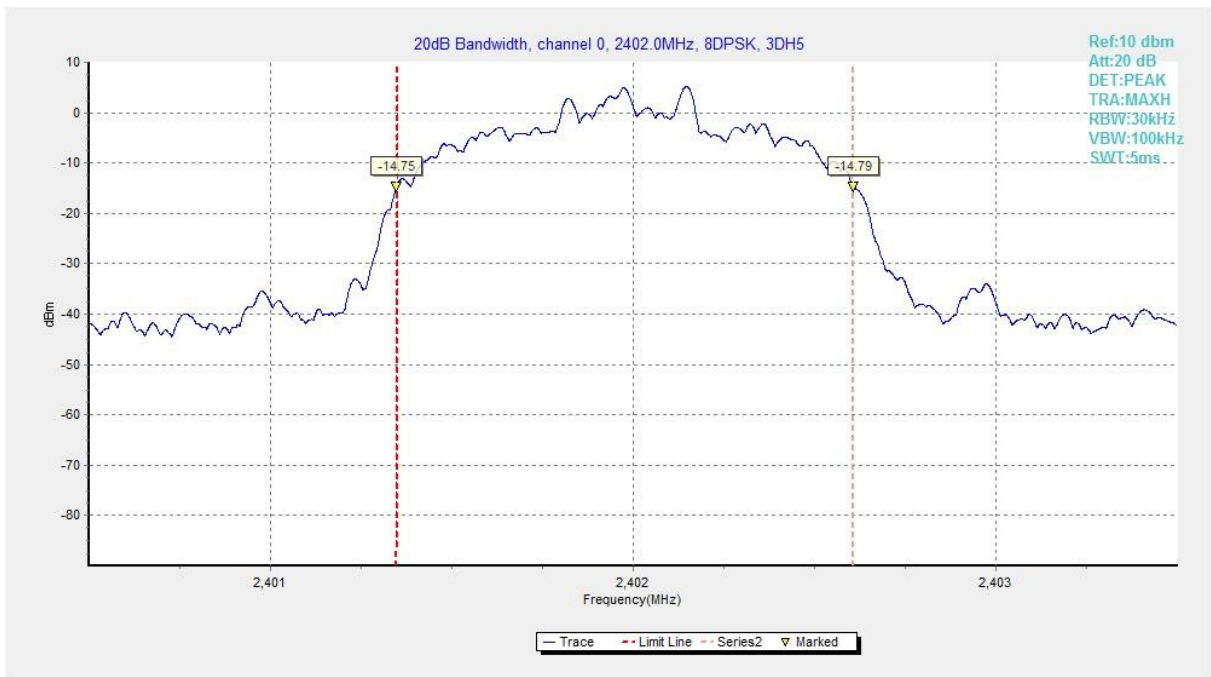
**Fig. 63 20dB Bandwidth ( $\pi$ /4 DQPSK, Ch 0)**



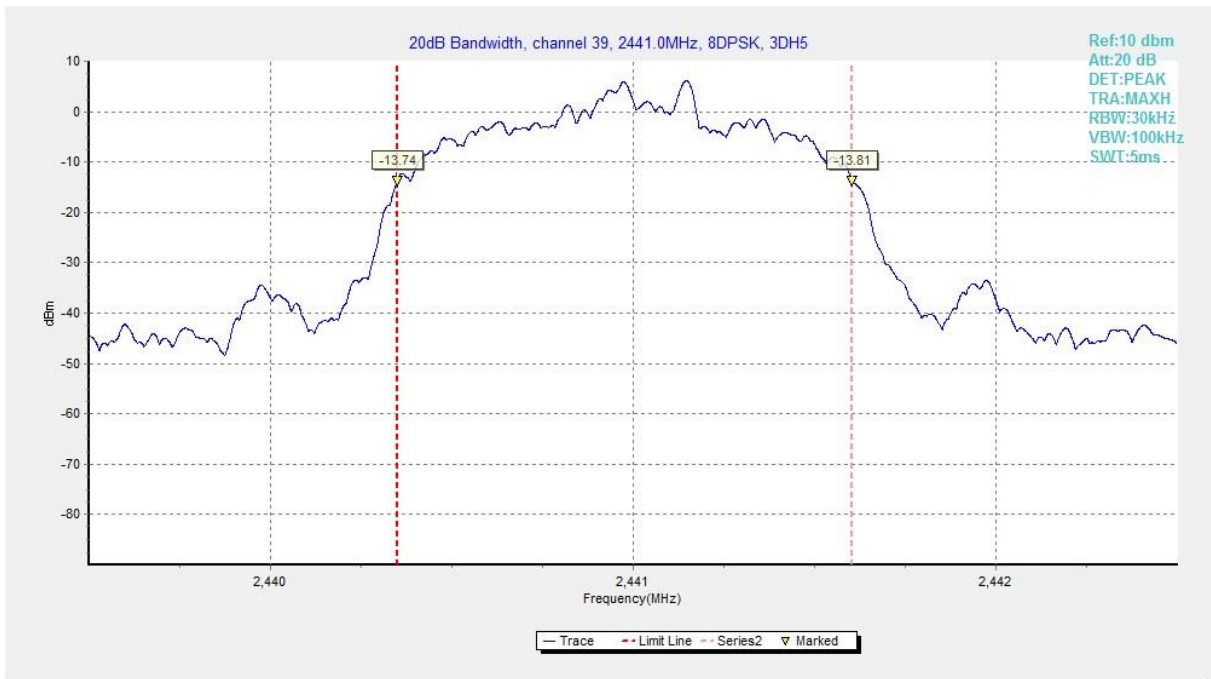
**Fig. 64 20dB Bandwidth ( $\pi$ /4 DQPSK, Ch 39)**



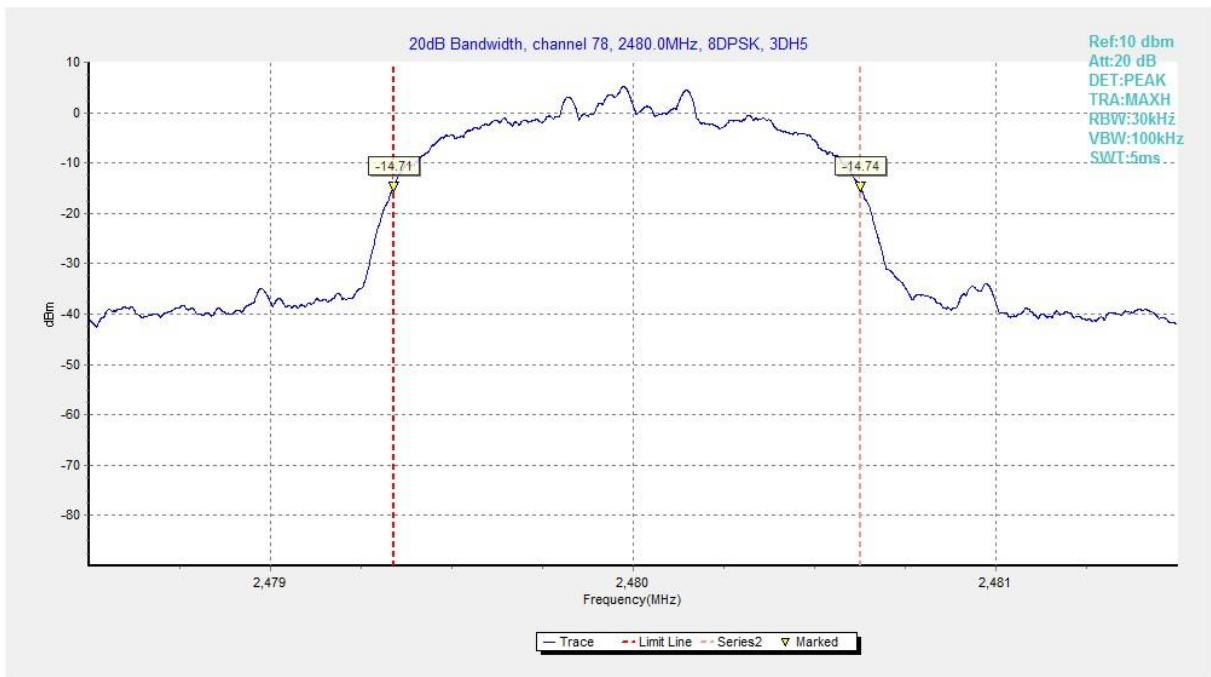
**Fig. 65 20dB Bandwidth ( $\pi/4$  DQPSK, Ch 78)**



**Fig. 66 20dB Bandwidth (8DPSK, Ch 0)**



**Fig. 67 20dB Bandwidth (8DPSK, Ch 39)**



**Fig. 68 20dB Bandwidth (8DPSK, Ch 78)**



### A.6 Time of Occupancy (Dwell Time)

**Measurement Limit:**

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

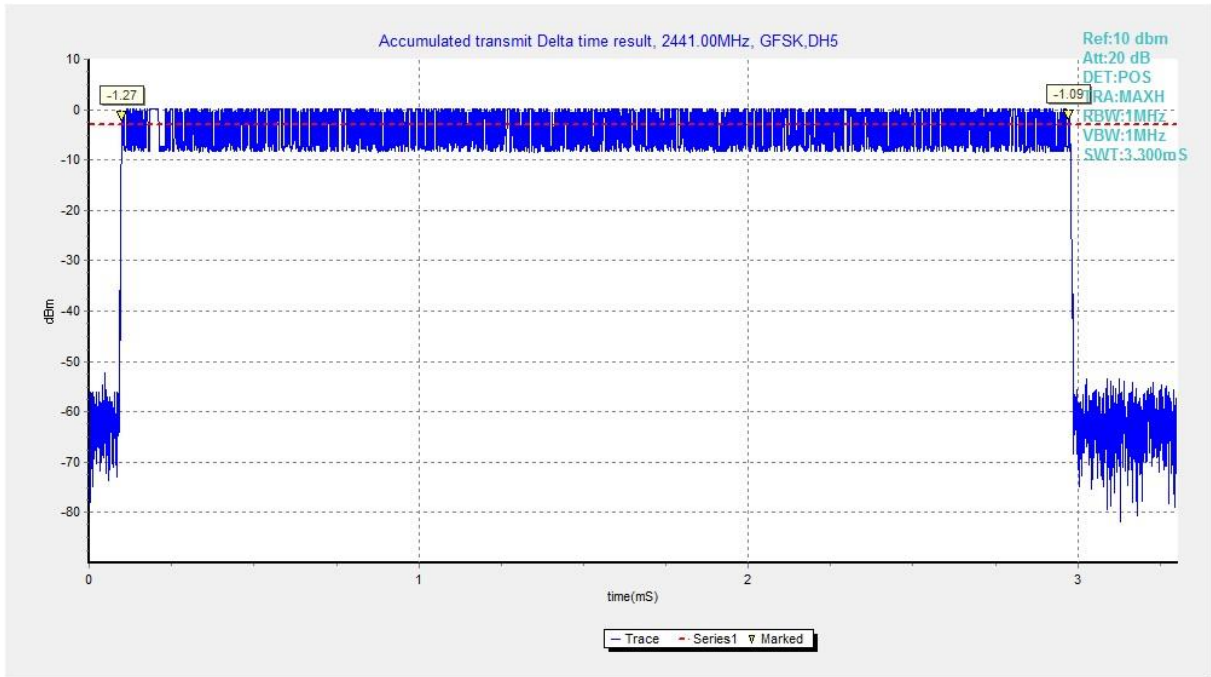
**Measurement Results:**

Mode	Channel	Packet	Dwell Time(ms)		Conclusion
GFSK	39	DH5	Fig.69	306.36	<b>P</b>
			Fig.70		
$\pi/4$ DQPSK	39	2-DH5	Fig.71	307.79	<b>P</b>
			Fig.72		
8DPSK	39	3-DH5	Fig.73	307.15	<b>P</b>
			Fig.74		

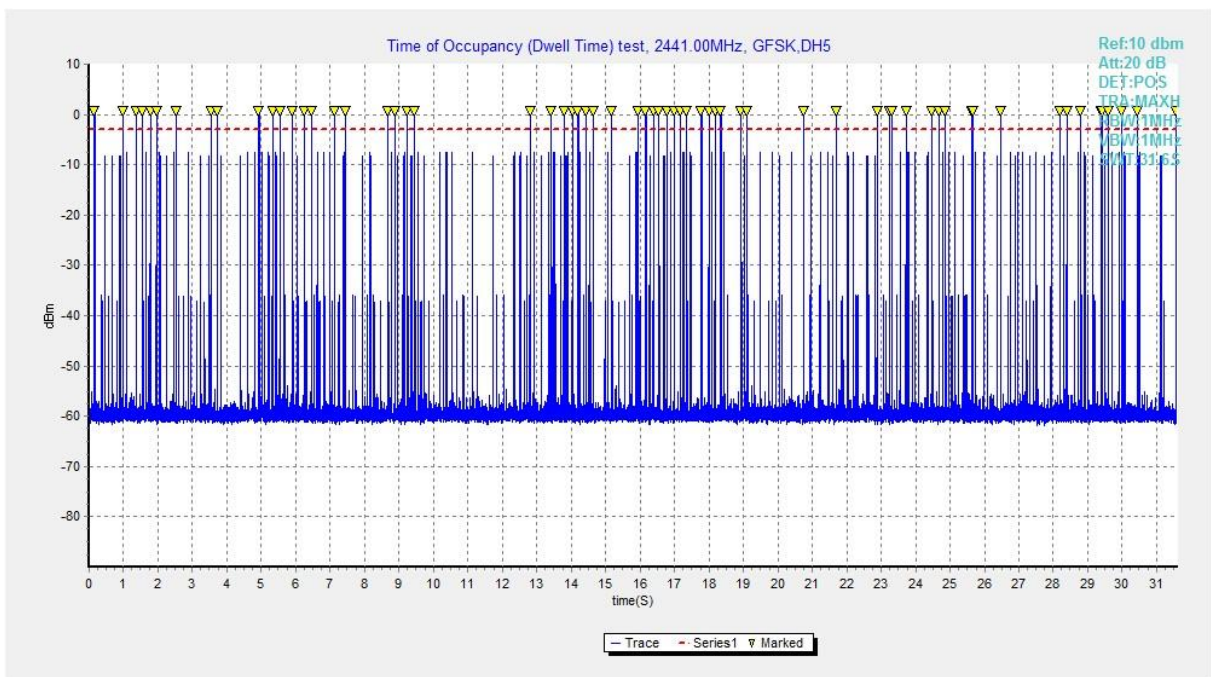
See below for test graphs.

**Conclusion: Pass**

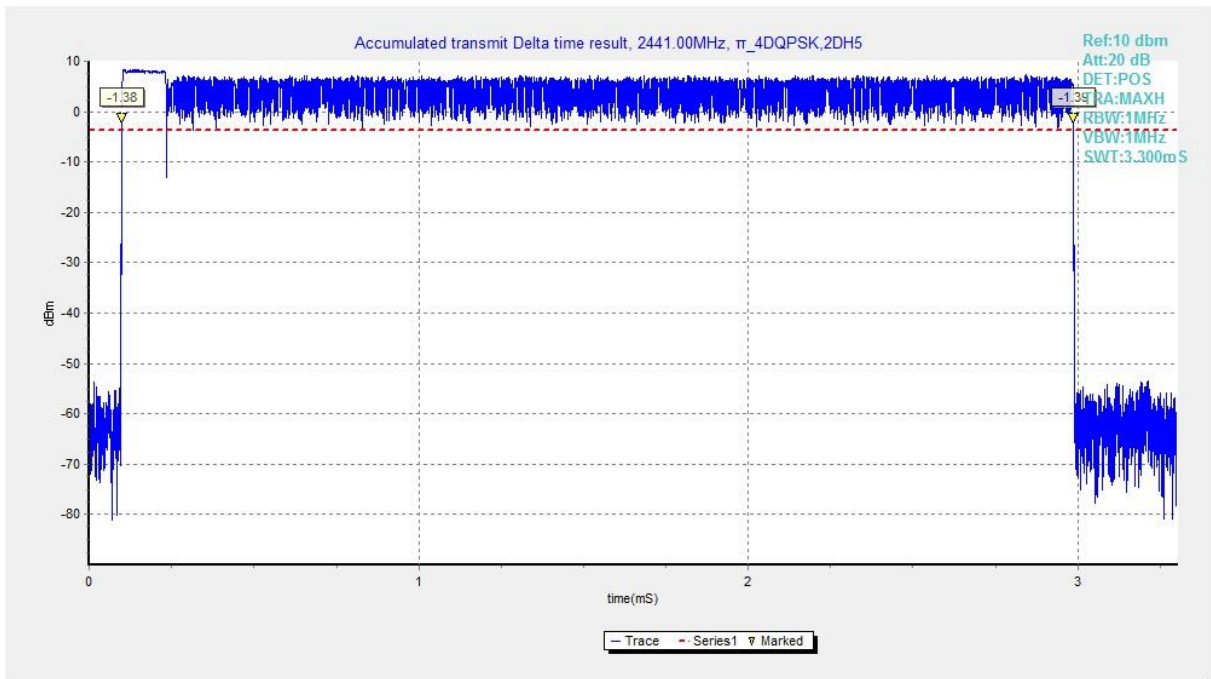




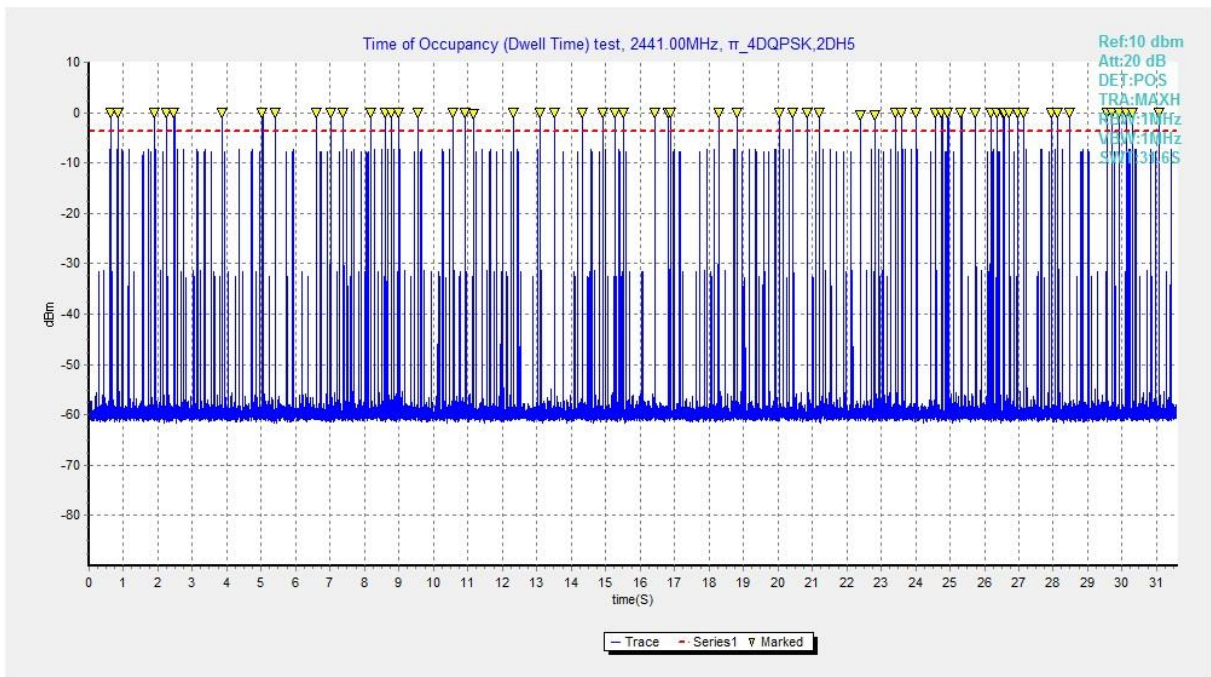
**Fig. 69 Time of Occupancy(Dwell Time) (GFSK, Ch39)**



**Fig. 70 Time of Occupancy(Dwell Time) (GFSK, Ch39)**

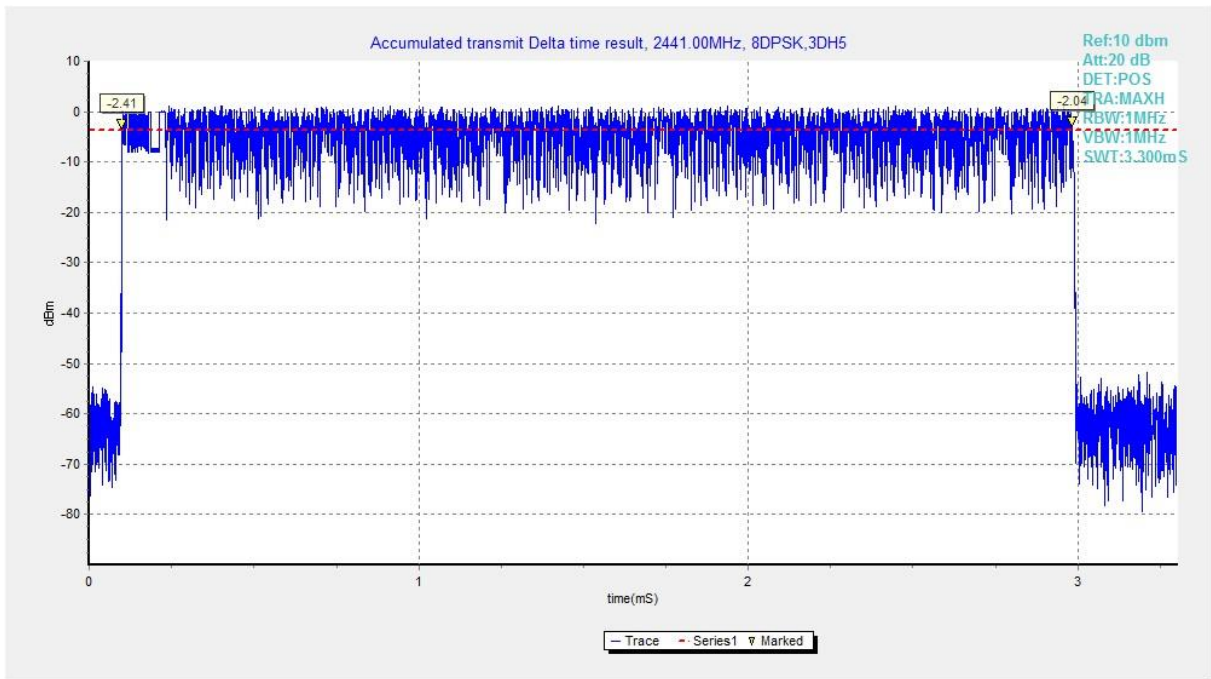


**Fig. 71 Time of Occupancy(Dwell Time) ( $\pi/4$  DQPSK, Ch39)**

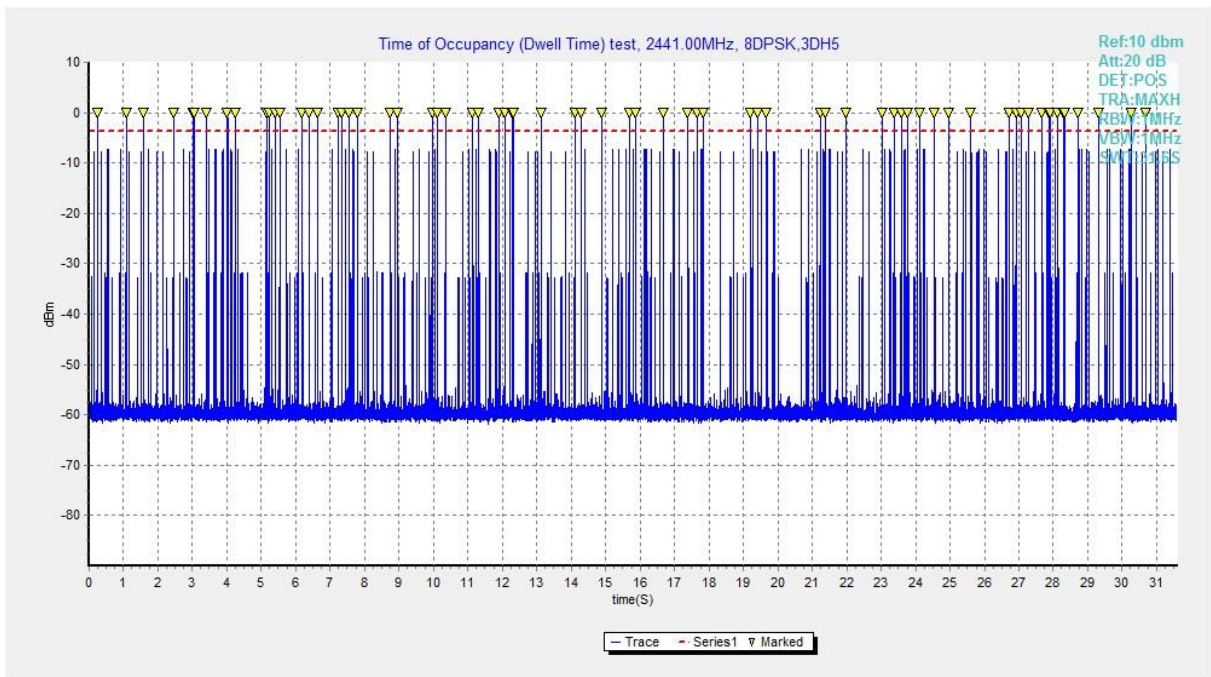


**Fig. 72 Time of Occupancy(Dwell Time) ( $\pi/4$  DQPSK, Ch39)**





**Fig. 73 Time of Occupancy(Dwell Time) (8DPSK, Ch39)**



**Fig. 74 Time of Occupancy(Dwell Time) (8DPSK, Ch39)**



## A.7 Number of Hopping Channels

### Measurement Limit:

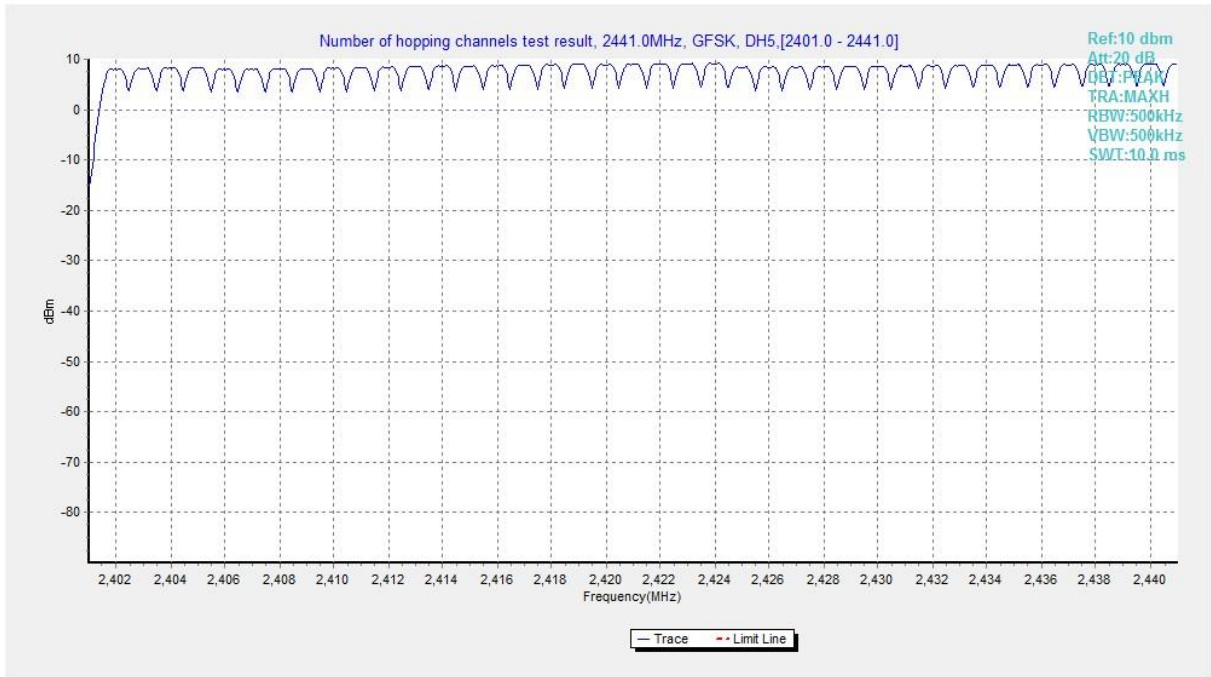
Standard	Limit
FCC 47 CFR Part 15.247(a)	At least 15 non-overlapping channels

### Measurement Results:

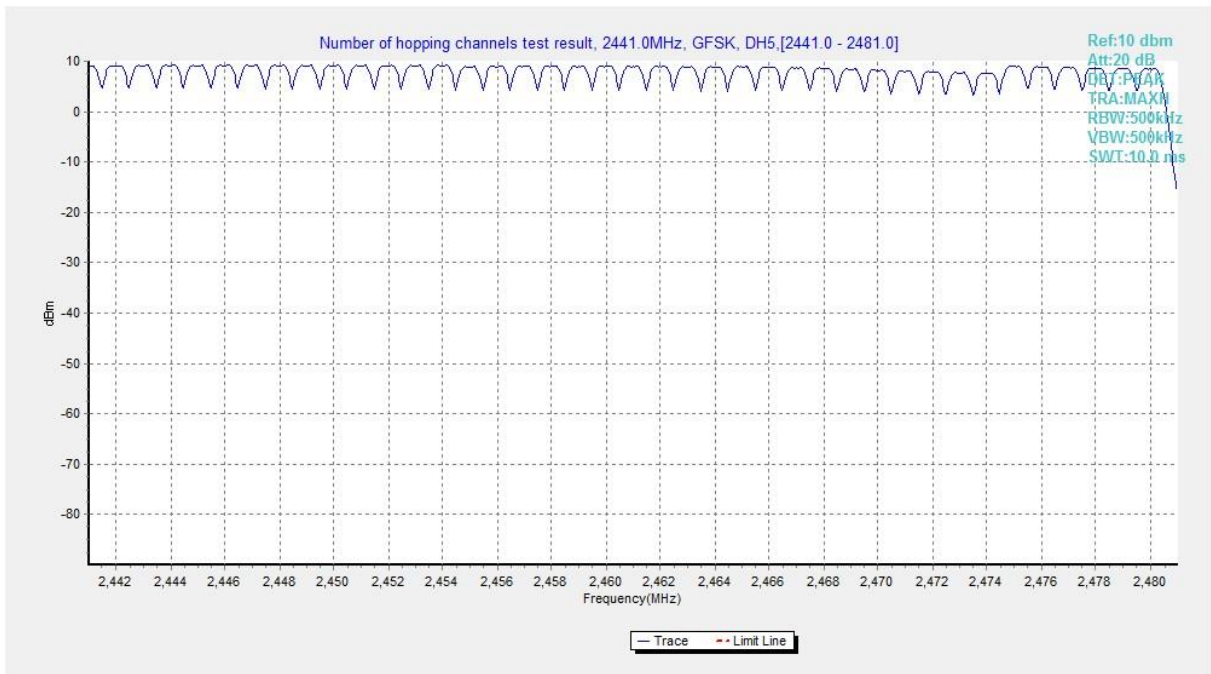
Mode	Packet	Number of hopping		Test result	Conclusion
GFSK	DH5	Fig.75	Fig.76	79	<b>P</b>
$\pi/4$ DQPSK	2-DH5	Fig.77	Fig.78	79	<b>P</b>
8DPSK	3-DH5	Fig.79	Fig.80	79	<b>P</b>

See below for test graphs.

**Conclusion: Pass**



**Fig. 75 Hopping channel ch0~39 (GFSK, Ch39)**



**Fig. 76 Hopping channel ch39~78 (GFSK, Ch39)**

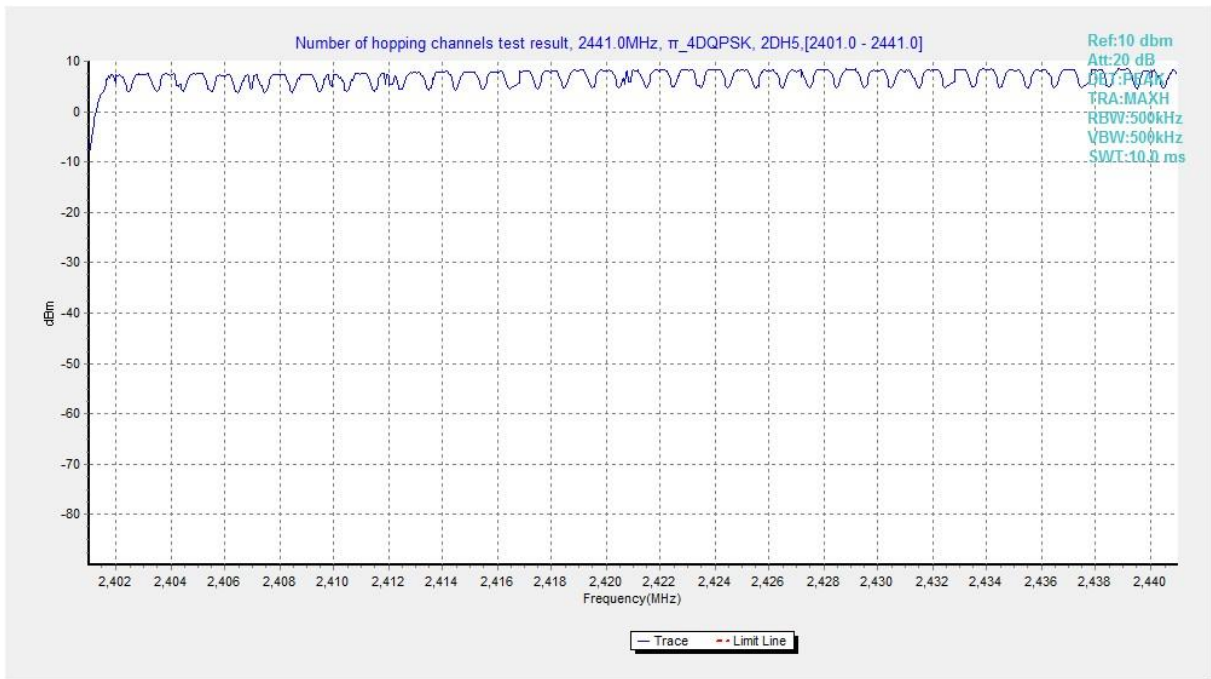


Fig. 77 Hopping channel ch0~39 ( $\pi/4$  DQPSK, Ch39)

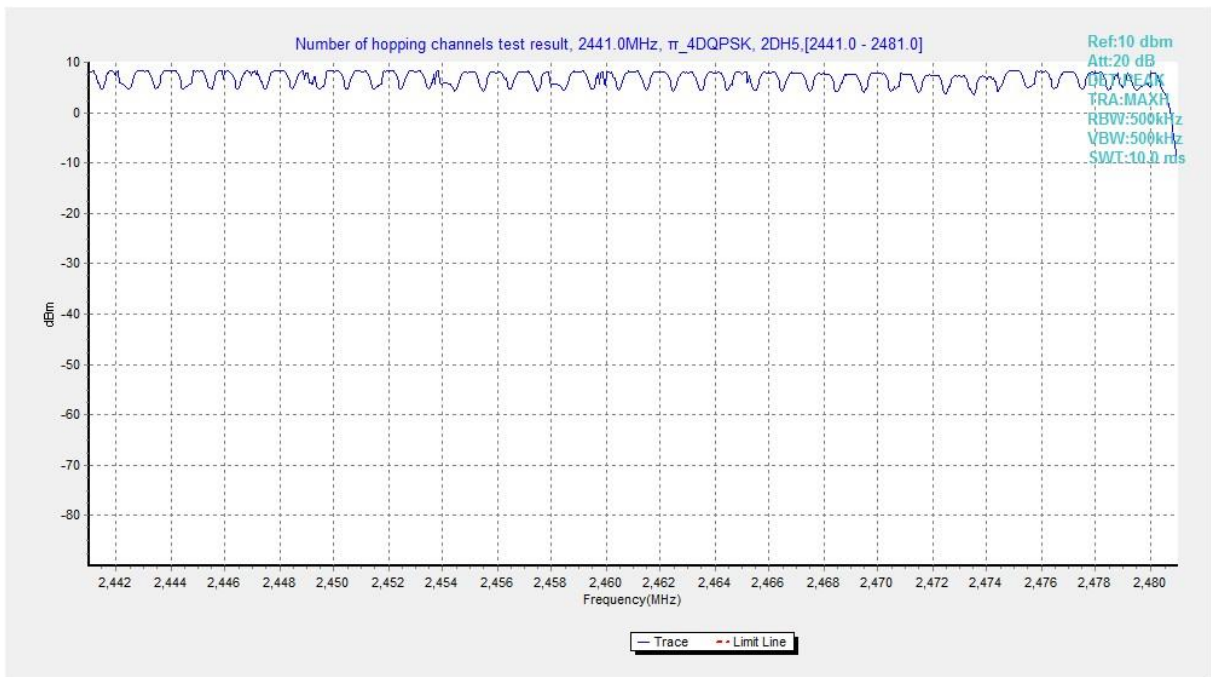
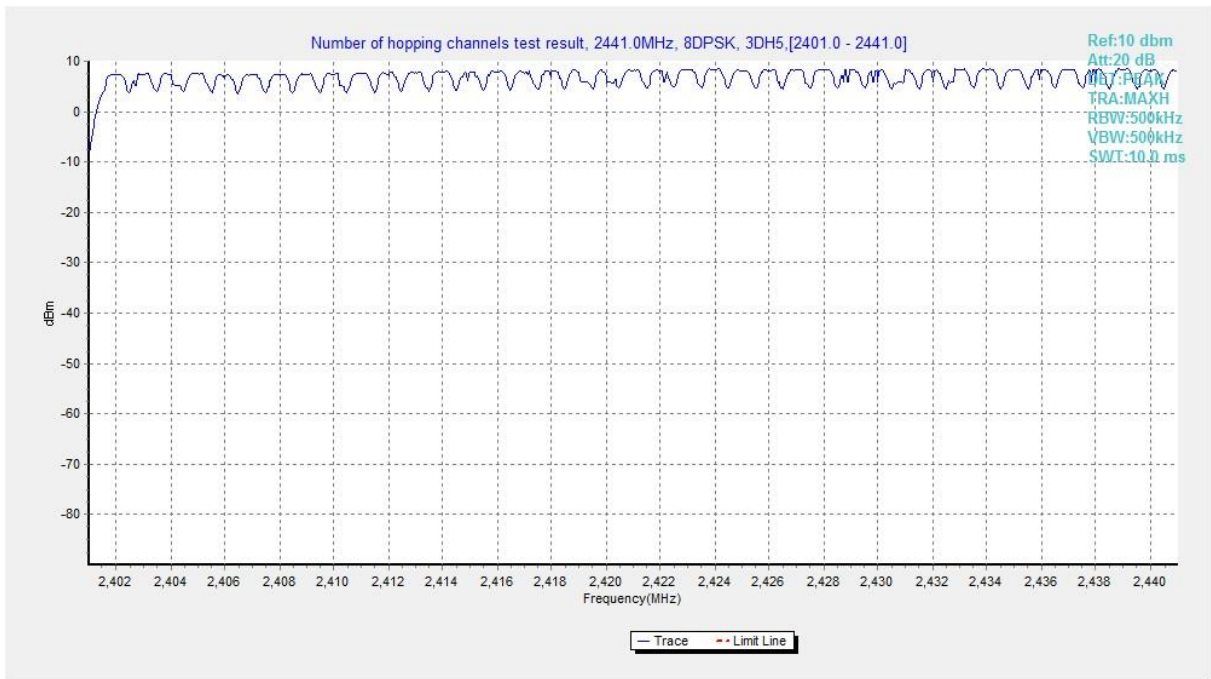
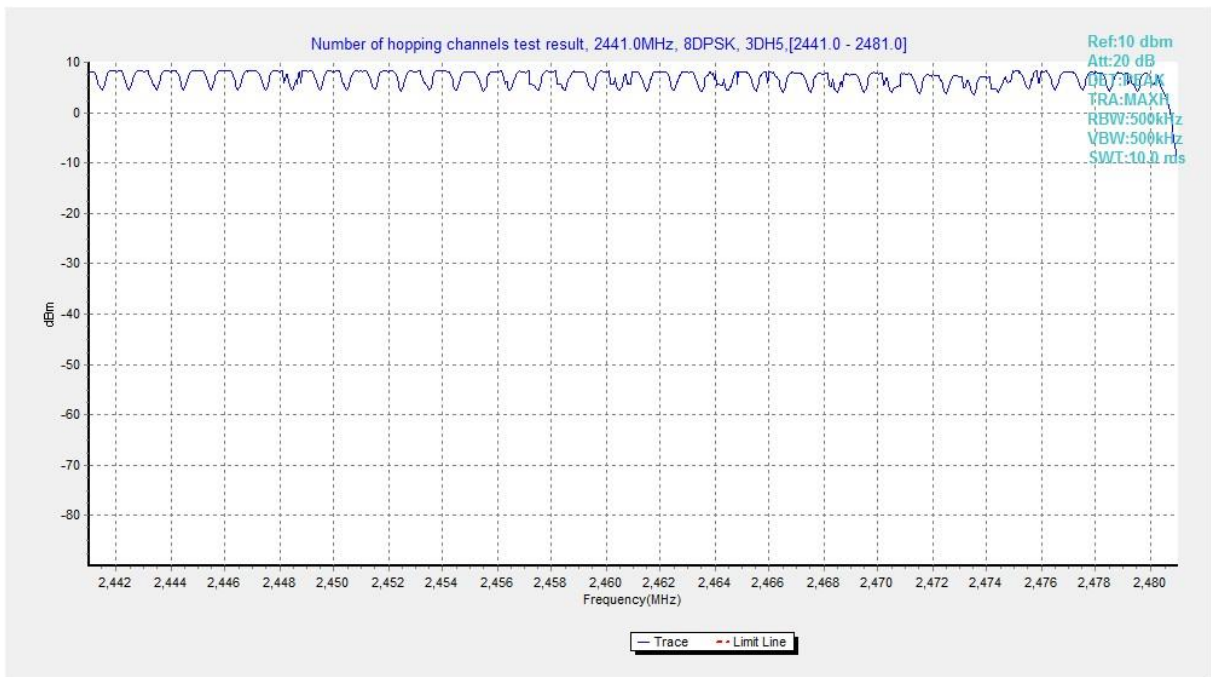


Fig. 78 Hopping channel ch39~78 ( $\pi/4$  DQPSK, Ch39)





**Fig. 79 Hopping channel ch0~39 (8DPSK, Ch39)**



**Fig. 80 Hopping channel ch39~78 (8DPSK, Ch39)**



## A.8 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 (kHz)	Conclusion
GFSK	39	DH5	Fig.81	989.25	P
$\pi/4$ DQPSK	39	2-DH5	Fig.82	998.25	P
8DPSK	39	3-DH5	Fig.83	989.25	P

See below for test graphs.

Conclusion: Pass

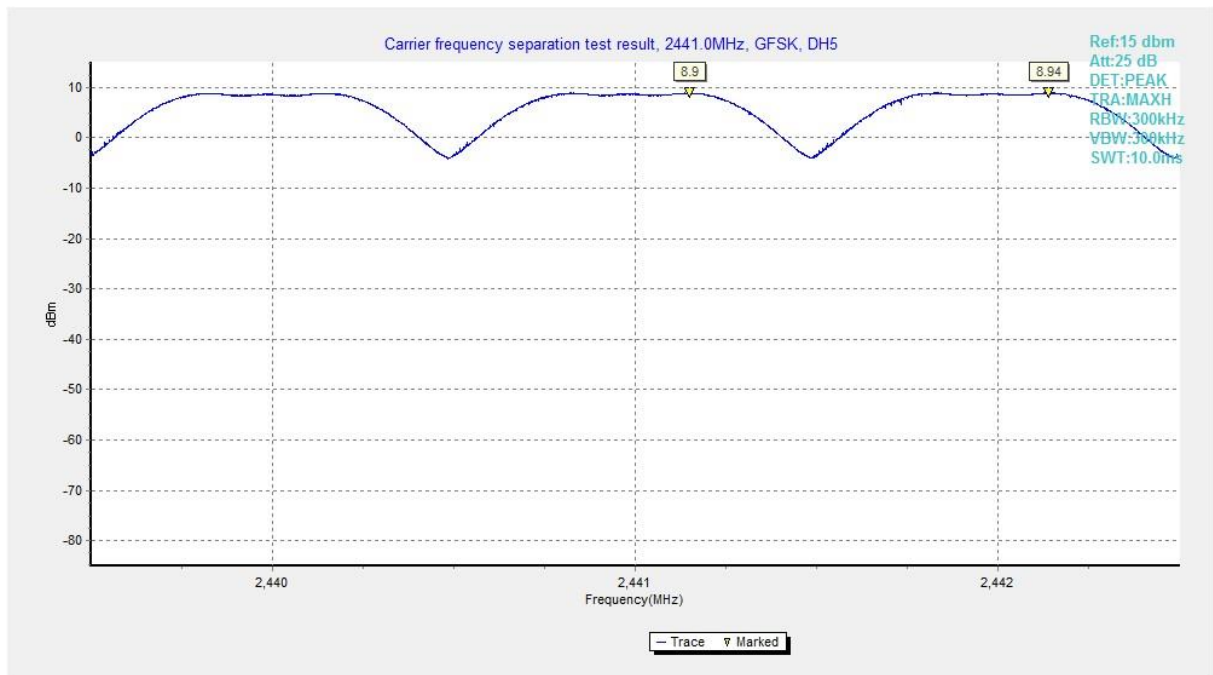
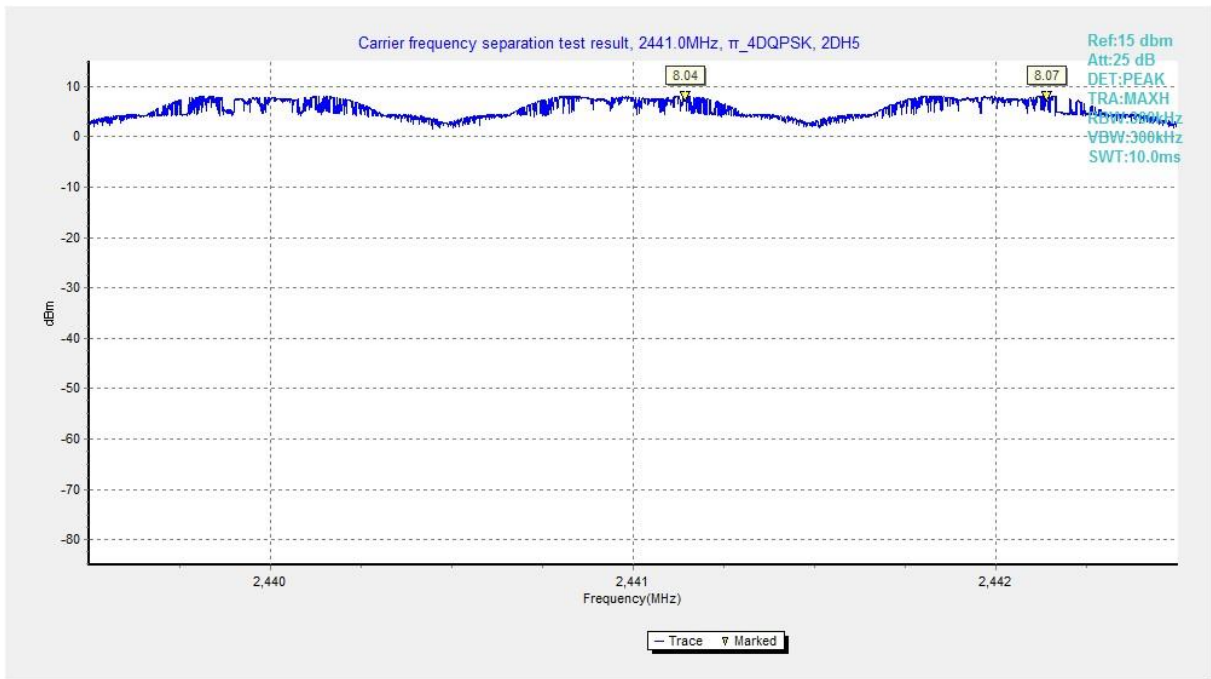
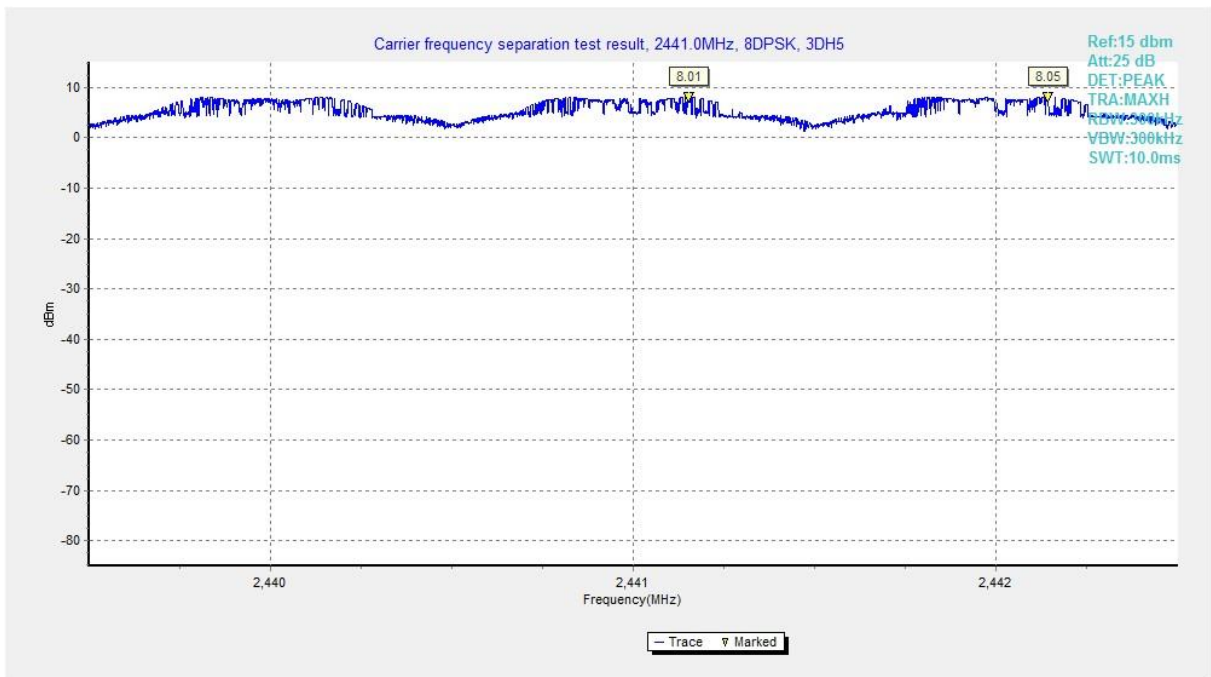


Fig. 81 Carrier Frequency Separation (GFSK, Ch39)



**Fig. 82 Carrier Frequency Separation ( $\pi/4$  DQPSK, Ch39)**



**Fig. 83 Carrier Frequency Separation (8DPSK, Ch39)**

## A.9 AC Power line Conducted Emission

### Test Condition:

Voltage (V)	Frequency (Hz)
120	60

### Measurement Result and limit:

BT (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.84	Fig.85	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)

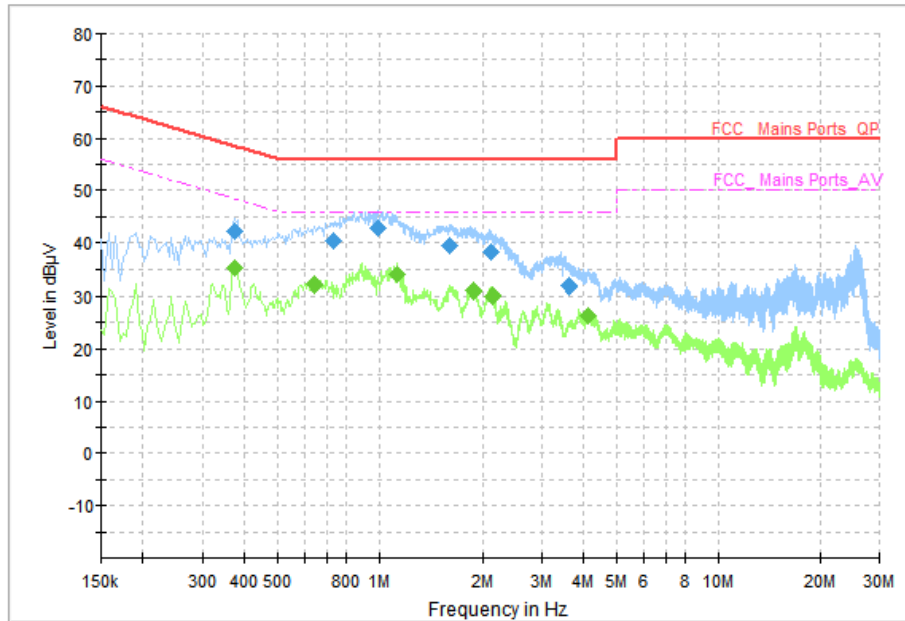
Frequency range (MHz)	Average-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.84	Fig.85	P
0.5 to 5	46			
5 to 30	50			

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. 84 AC Powerline Conducted Emission (Traffic)**

**Measurement Results: Quasi Peak**

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	42.07	58.41	16.34	N	ON	9.6
0.734000	40.33	56.00	15.67	N	ON	9.7
0.990000	42.77	56.00	13.23	N	ON	9.7
1.594000	39.34	56.00	16.66	L1	ON	9.7
2.122000	38.37	56.00	17.63	L1	ON	9.7
3.618000	31.83	56.00	24.17	L1	ON	9.7

**Measurement Results: Average**

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	35.30	48.41	13.11	N	ON	9.6
0.642000	32.06	46.00	13.94	N	ON	9.7
1.126000	34.04	46.00	11.96	N	ON	9.7
1.882000	30.79	46.00	15.21	N	ON	9.7
2.134000	29.87	46.00	16.13	N	ON	9.7
4.122000	26.30	46.00	19.70	N	ON	9.7

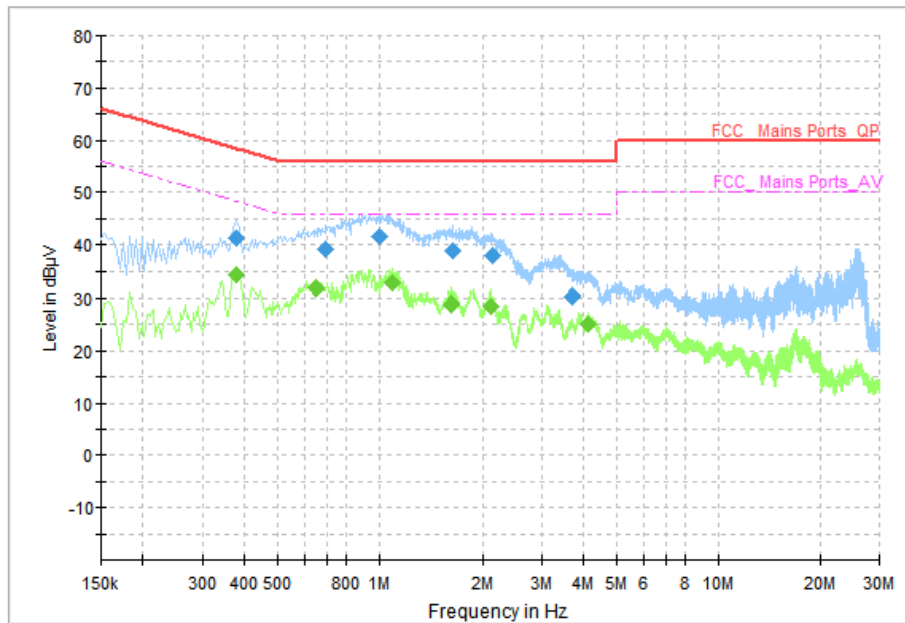


Fig. 85 AC Power line Conducted Emission (Idle)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.378000	41.37	58.32	16.95	N	ON	9.6
0.694000	39.08	56.00	16.92	N	ON	9.7
1.002000	41.56	56.00	14.44	N	ON	9.7
1.634000	38.70	56.00	17.30	L1	ON	9.7
2.146000	37.94	56.00	18.06	L1	ON	9.7
3.686000	30.44	56.00	25.56	N	ON	9.7

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.378000	34.42	48.32	13.90	N	ON	9.6
0.650000	31.70	46.00	14.30	N	ON	9.7
1.094000	32.70	46.00	13.30	N	ON	9.7
1.622000	28.88	46.00	17.12	N	ON	9.7
2.122000	28.44	46.00	17.56	N	ON	9.7
4.114000	25.22	46.00	20.78	N	ON	9.7

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