

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

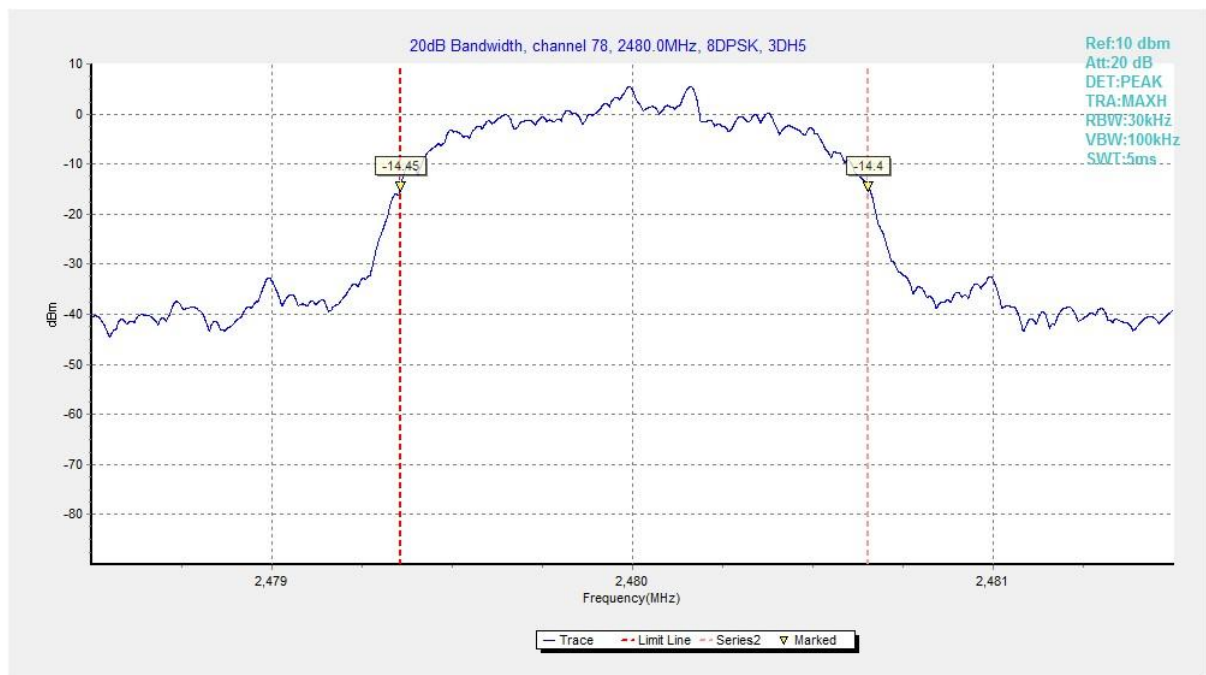


Fig. 68 20dB Bandwidth (8DPSK, Ch 78)

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.69	204.08	P
			Fig.70		
$\pi/4$ DQPSK	39	2-DH5	Fig.71	160.99	P
			Fig.72		
8DPSK	39	3-DH5	Fig.73	186.89	P
			Fig.74		

See below for test graphs

Conclusion: Pass

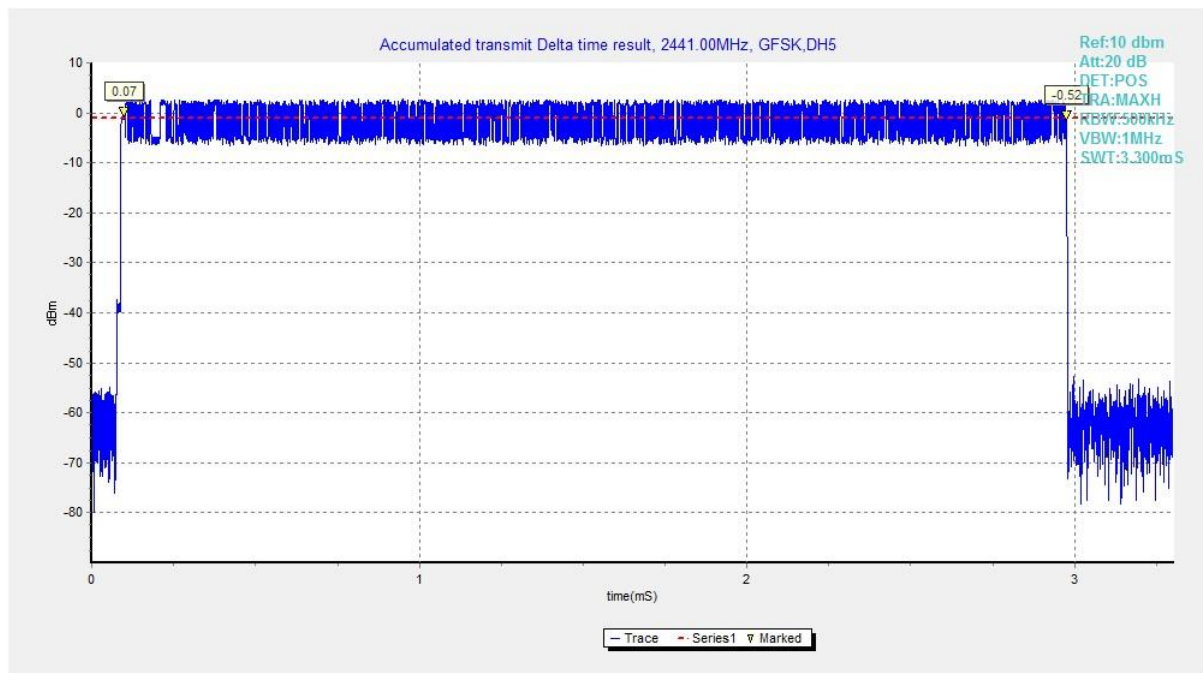


Fig. 69 Time of Occupancy(Dwell Time) (GFSK, Ch39)

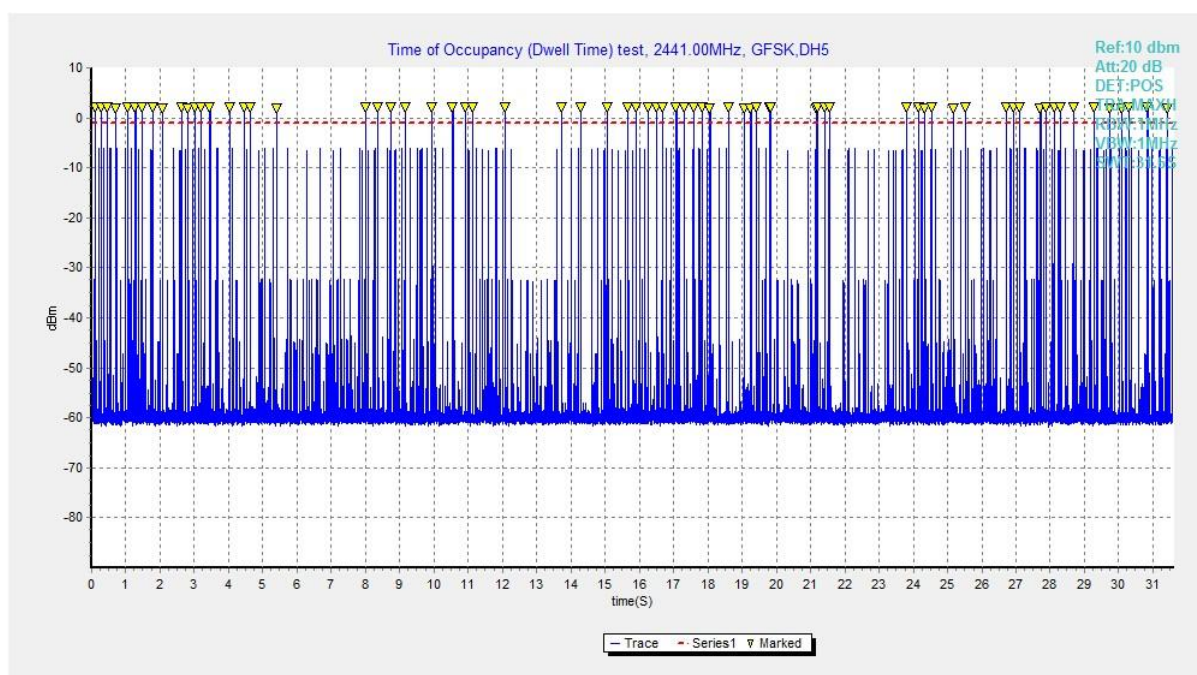


Fig. 70 Time of Occupancy(Dwell Time) (GFSK, Ch39)

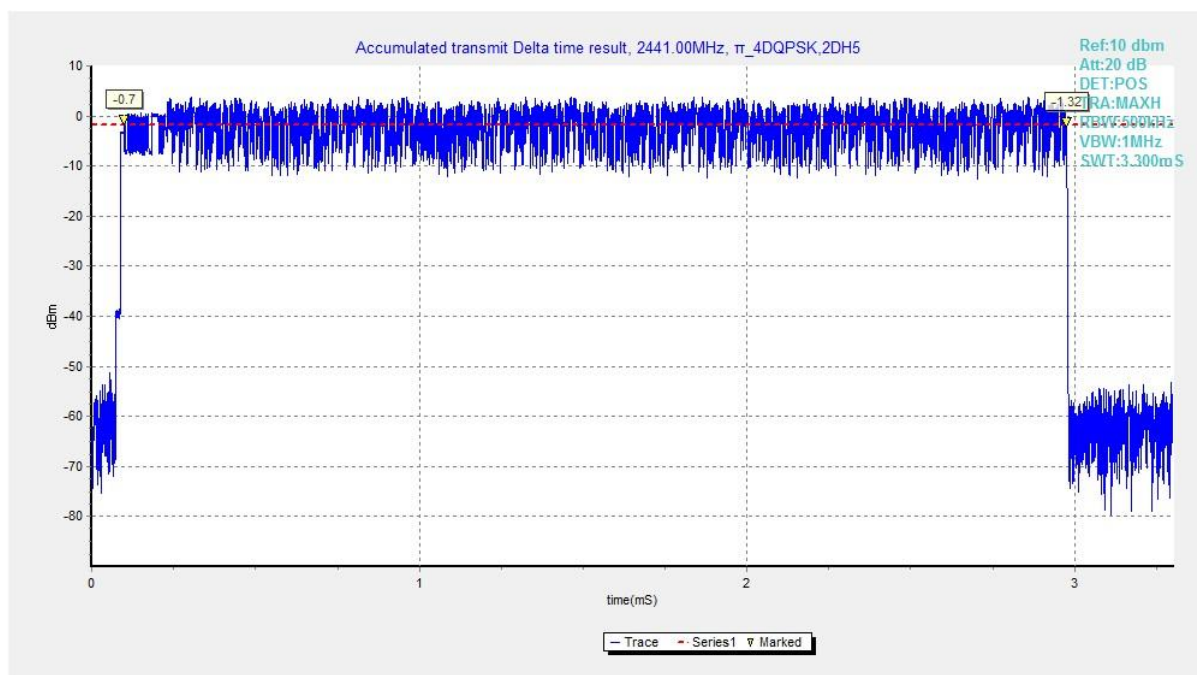


Fig. 71 Time of Occupancy(Dwell Time) ($\pi/4$ DQPSK, Ch39)

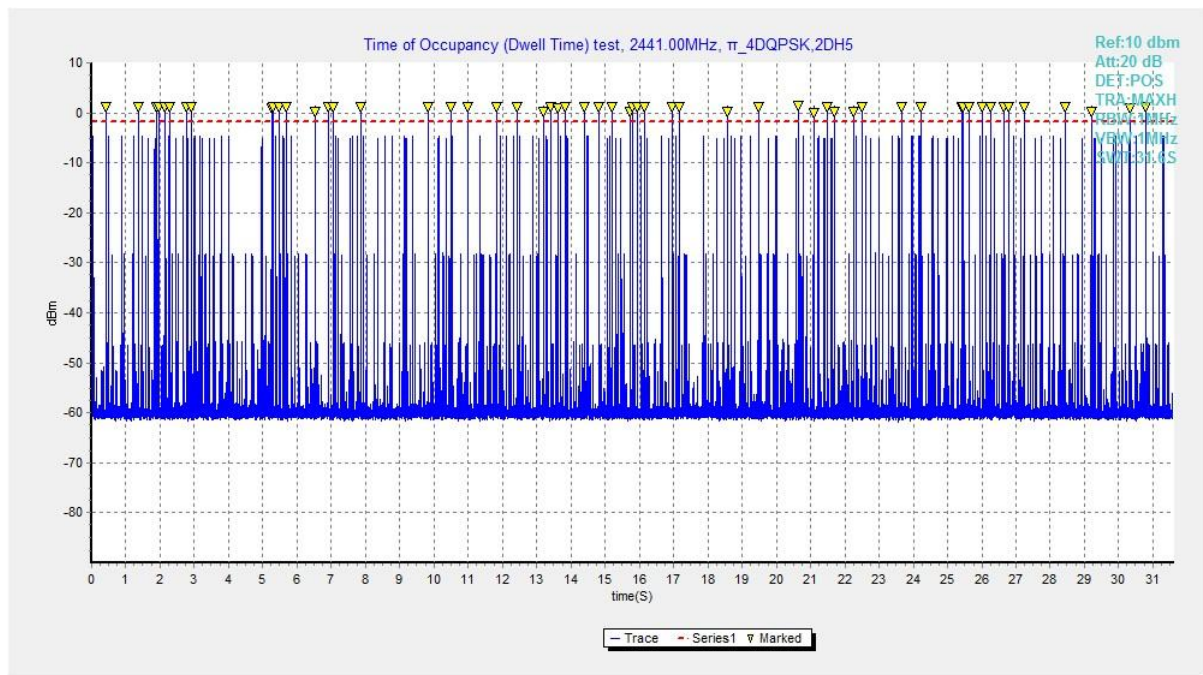


Fig. 72 Time of Occupancy(Dwell Time) ($\pi/4$ DQPSK, Ch39)

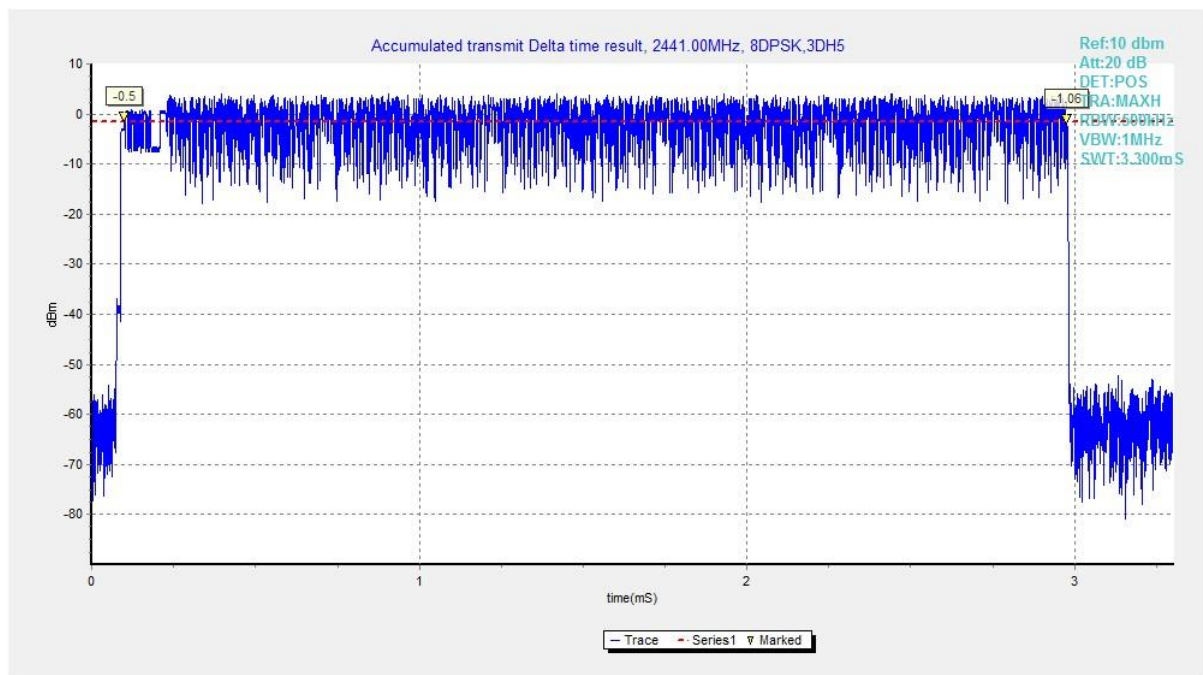


Fig. 73 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

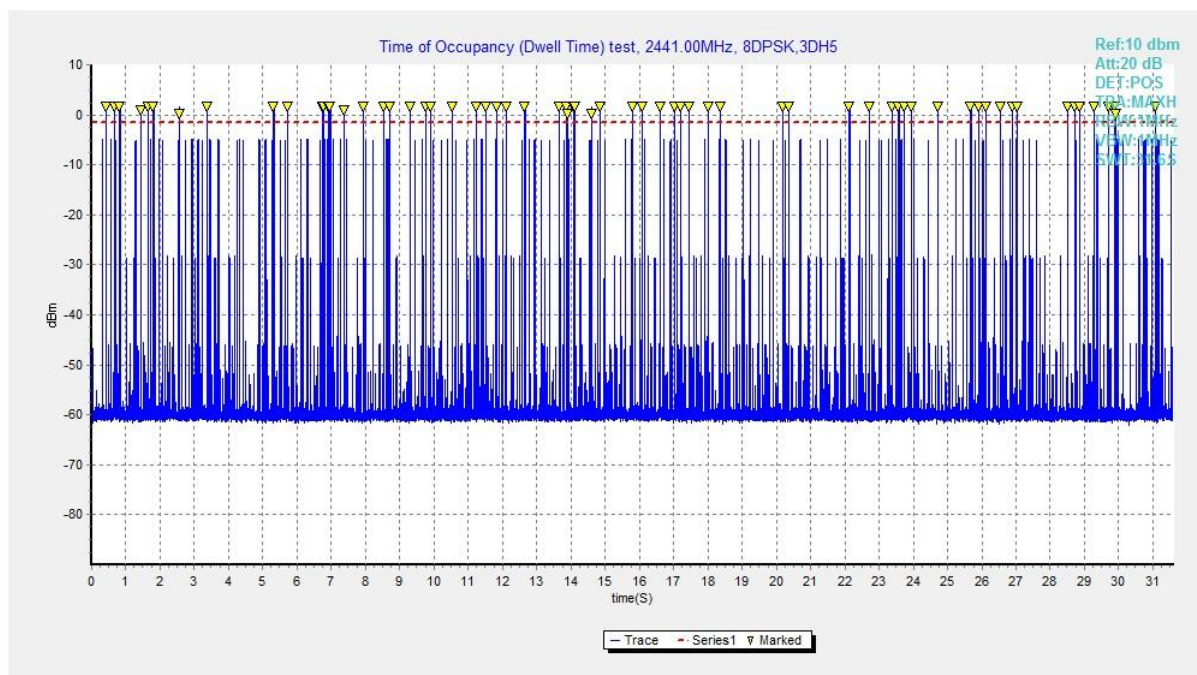


Fig. 74 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

A.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.75	Fig.76	79	P
$\pi/4$ DQPSK	2-DH5	Fig.77	Fig.78	79	P
8DPSK	3-DH5	Fig.79	Fig.80	79	P

See below for test graphs

Conclusion: Pass

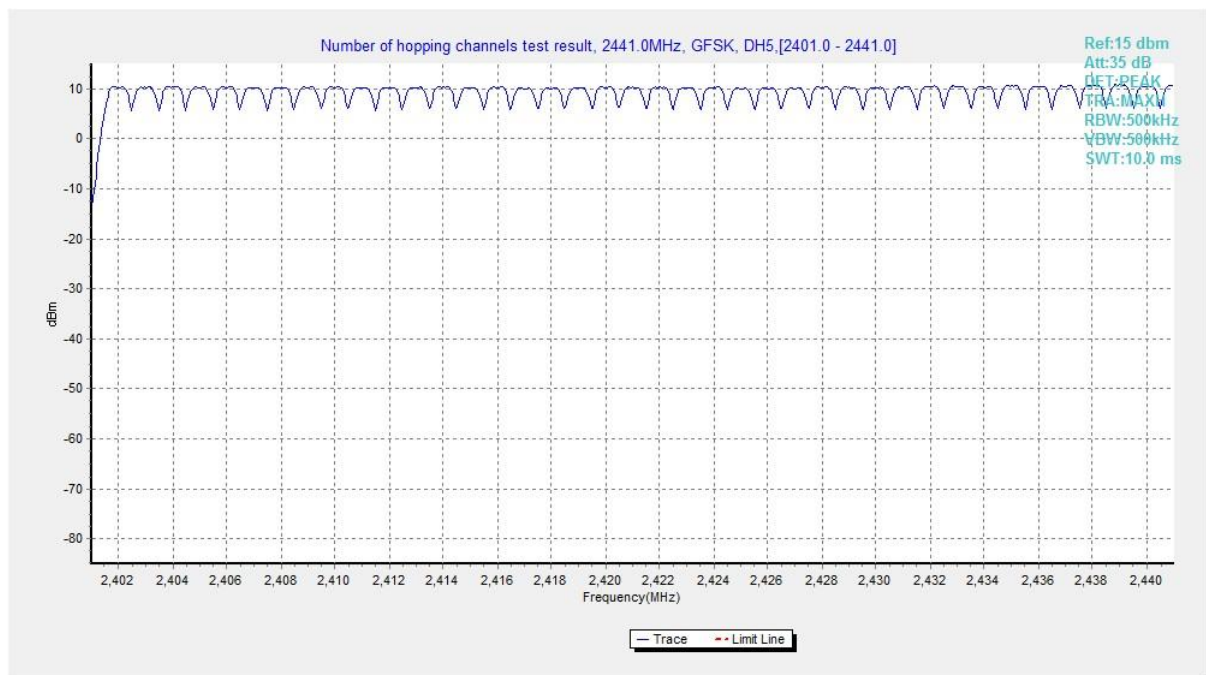


Fig. 75 Hopping channel ch0~39 (GFSK, Ch39)

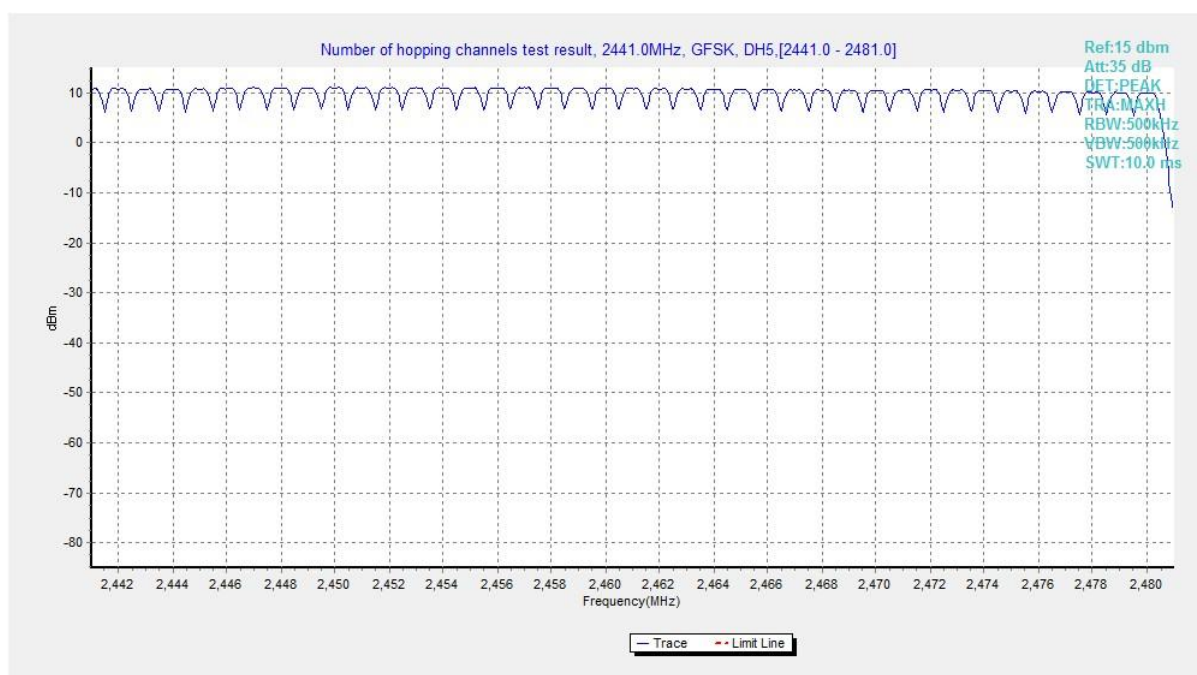


Fig. 76 Hopping channel ch40~78 (GFSK, Ch39)

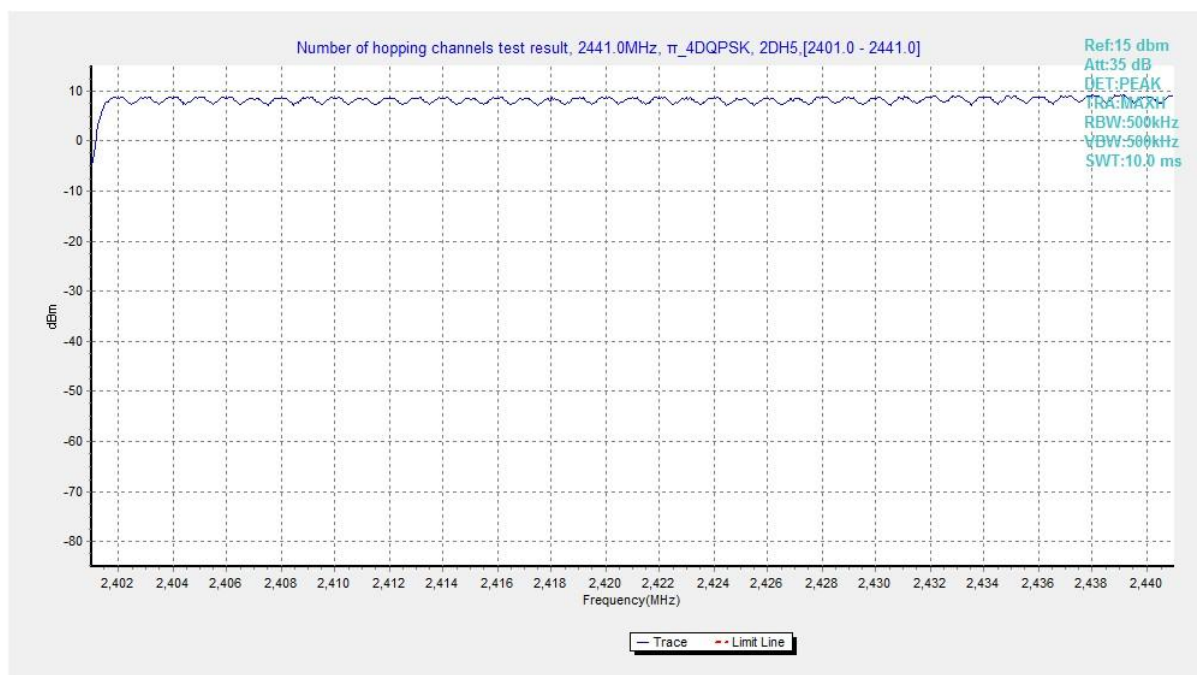


Fig. 77 Hopping channel ch0~39 ($\pi/4$ DQPSK, Ch39)

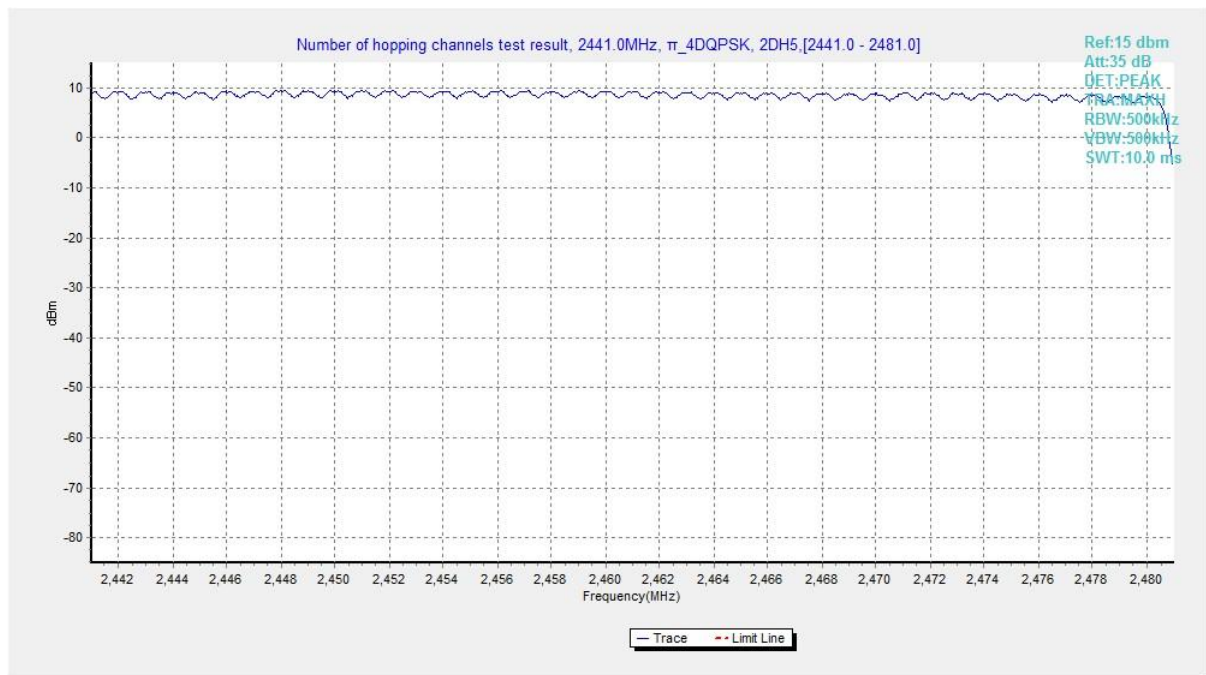


Fig. 78 Hopping channel ch40~78 ($\pi/4$ DQPSK, Ch39)

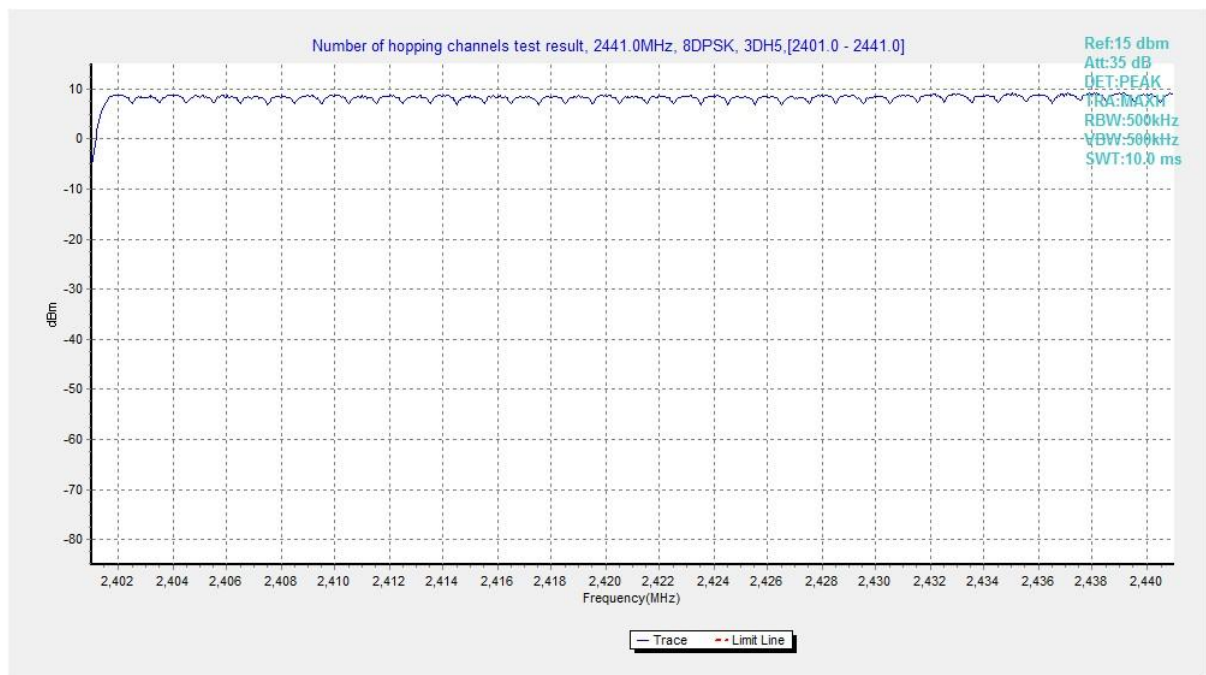


Fig. 79 Hopping channel ch0~39 (8DPSK, Ch39)

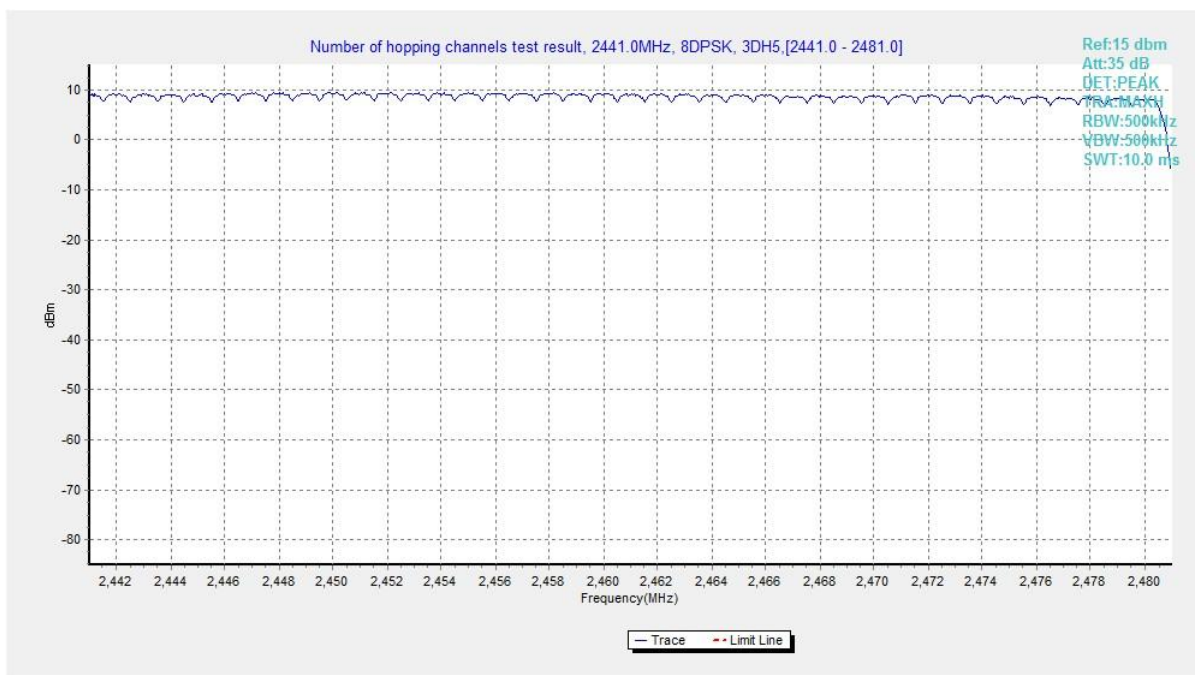


Fig. 80 Hopping channel ch40~78 (8DPSK, Ch39)

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.81	1.01	P
$\pi/4$ DQPSK	39	2-DH5	Fig.82	1.00	P
8DPSK	39	3-DH5	Fig.83	0.99	P

See below for test graphs

Conclusion: Pass

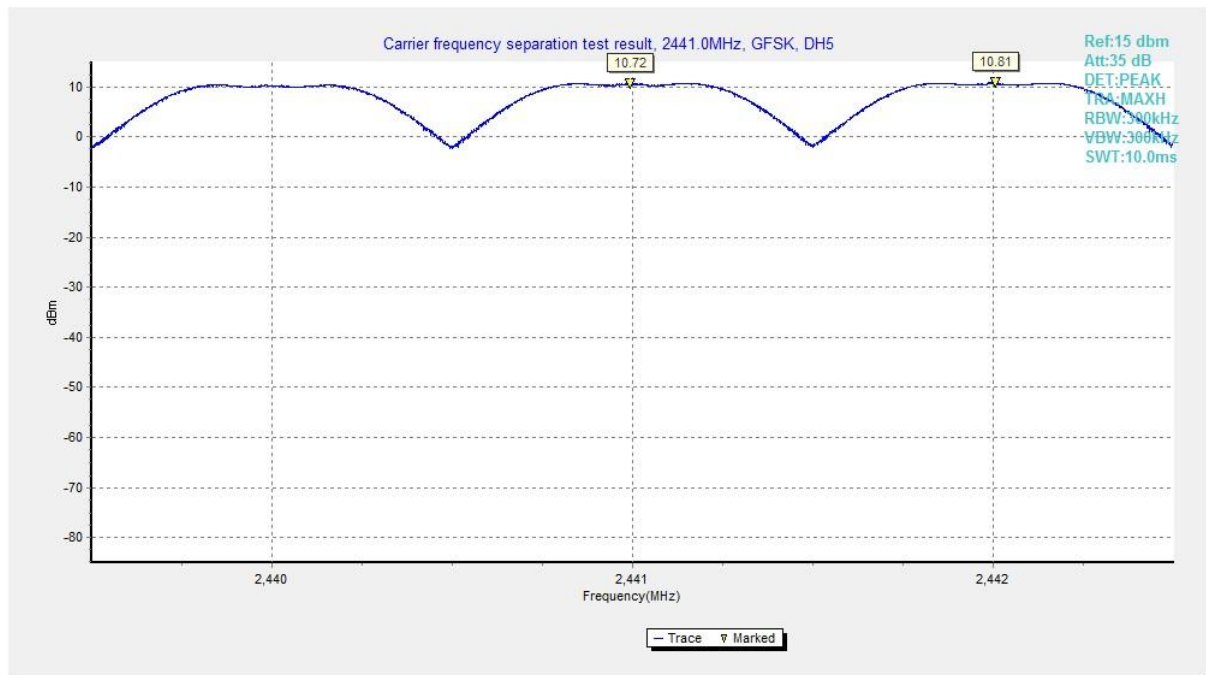


Fig. 81 Carrier Frequency Separation (GFSK, Ch39)

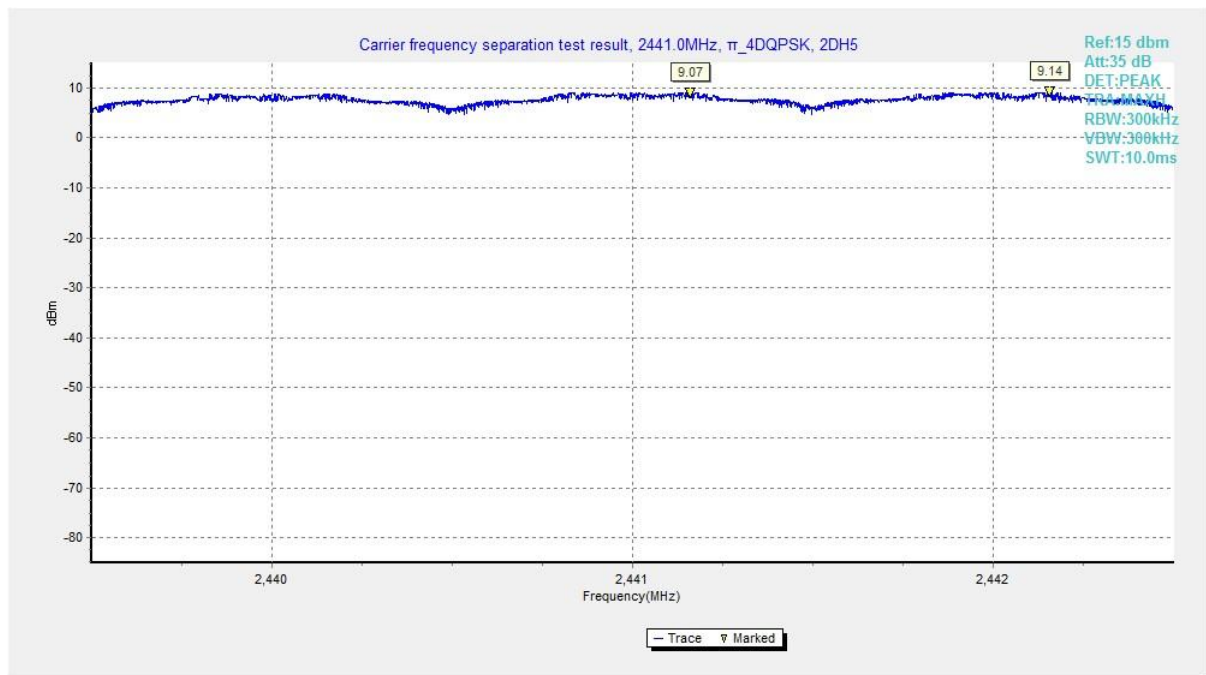


Fig. 82 Carrier Frequency Separation ($\pi/4$ DQPSK, Ch39)

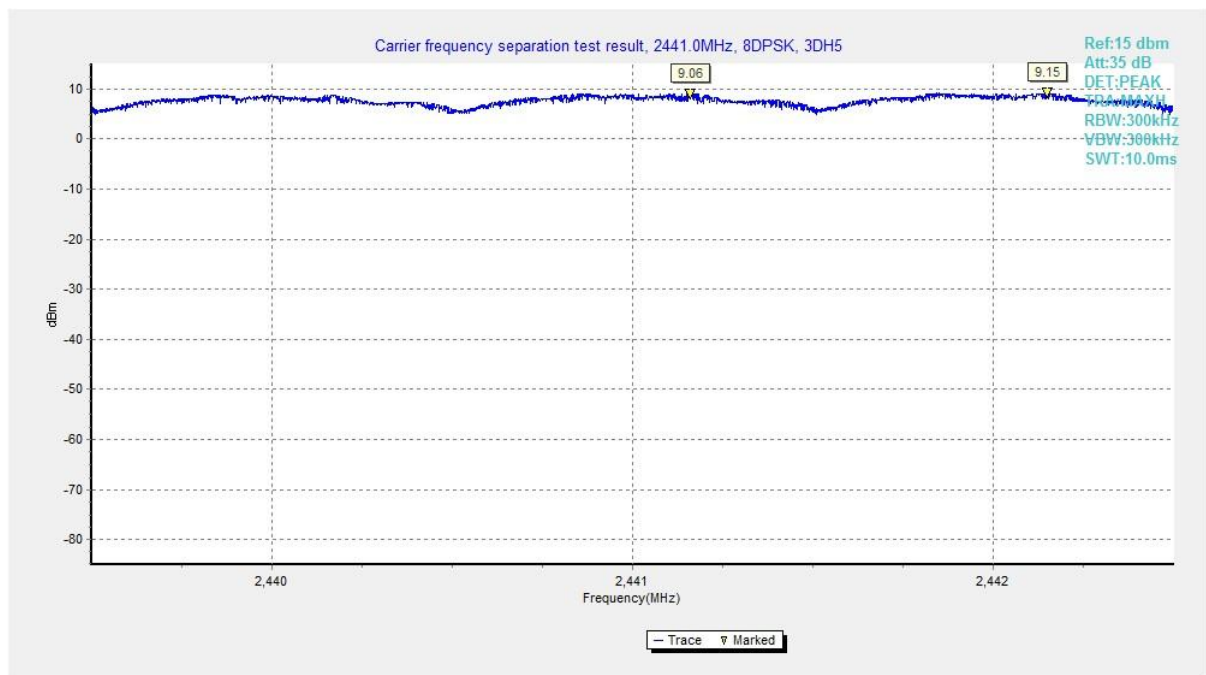


Fig. 83 Carrier Frequency Separation (8DPSK, Ch39)

A.10 AC Power line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

BT (Quasi-peak Limit) - AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ 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) - AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ 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.

BT (Quasi-peak Limit) - AE3

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.86	Fig.87	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 (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.86	Fig.87	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) - AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.88	Fig.89	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) - AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.88	Fig.89	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) - AE3

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.90	Fig.91	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 (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.90	Fig.91	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

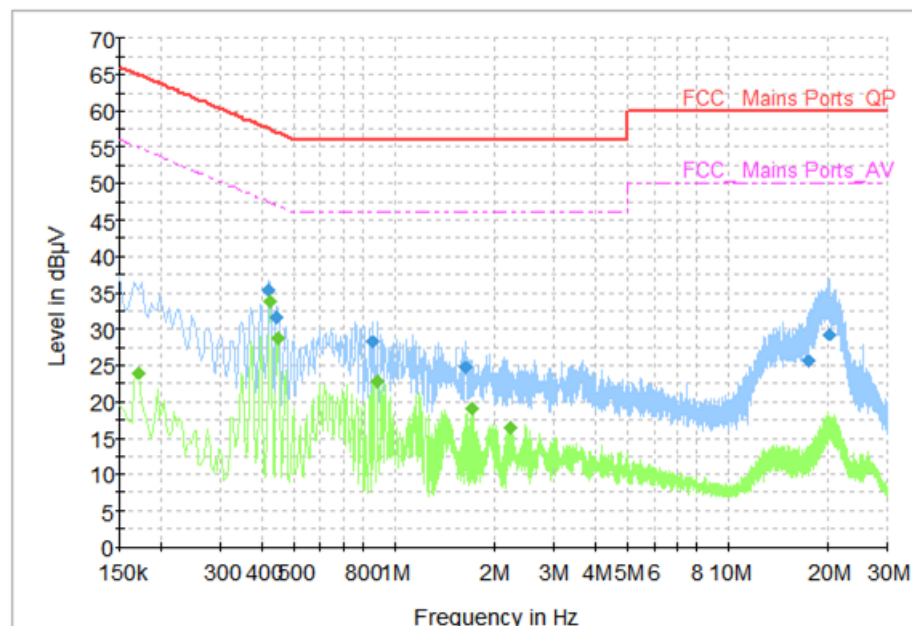


Fig. 84 AC Powerline Conducted Emission (Traffic, AE2, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	35.25	57.49	22.24	L1	ON	9.7
0.442000	31.58	57.02	25.44	L1	ON	9.7
0.862000	28.14	56.00	27.86	L1	ON	9.7
1.626000	24.65	56.00	31.35	L1	ON	9.7
17.534000	25.53	60.00	34.47	N	ON	10.2
20.126000	29.29	60.00	30.71	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170000	23.91	54.96	31.05	N	ON	9.6
0.422000	33.89	47.41	13.52	L1	ON	9.7
0.446000	28.81	46.95	18.14	L1	ON	9.7
0.890000	22.75	46.00	23.25	L1	ON	9.7
1.706000	19.06	46.00	26.94	L1	ON	9.7
2.222000	16.46	46.00	29.54	L1	ON	9.7

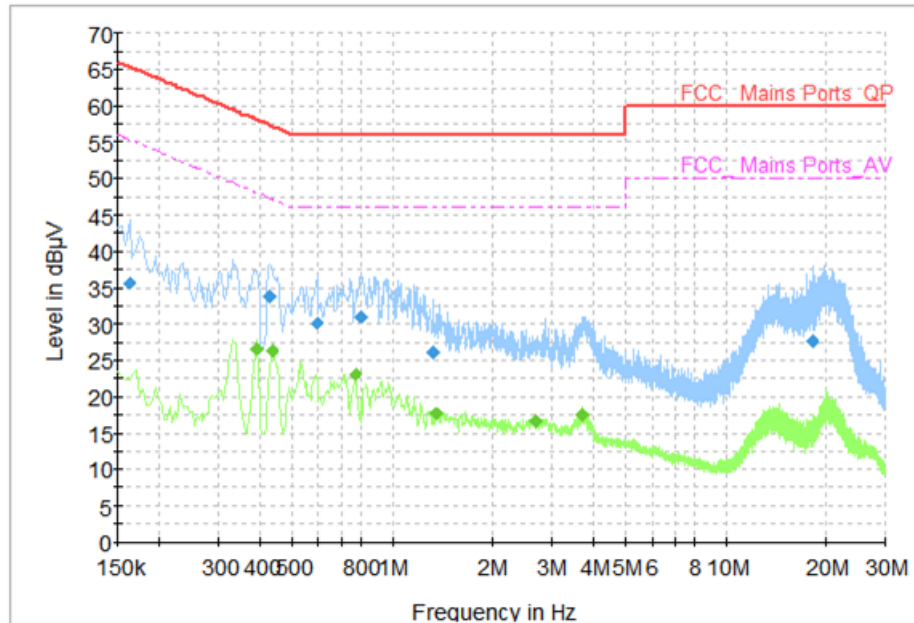


Fig. 85 AC Power line Conducted Emission (Idle, AE2, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	35.68	65.36	29.68	N	ON	9.6
0.426000	33.81	57.33	23.52	N	ON	9.7
0.590000	30.09	56.00	25.91	N	ON	9.7
0.798000	31.09	56.00	24.91	N	ON	9.7
1.322000	26.09	56.00	29.91	N	ON	9.7
18.166000	27.63	60.00	32.37	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.390000	26.64	48.06	21.42	L1	ON	9.7
0.434000	26.36	47.18	20.81	N	ON	9.7
0.770000	23.12	46.00	22.88	N	ON	9.7
1.354000	17.67	46.00	28.33	L1	ON	9.7
2.686000	16.49	46.00	29.51	N	ON	9.7
3.694000	17.52	46.00	28.48	N	ON	9.7

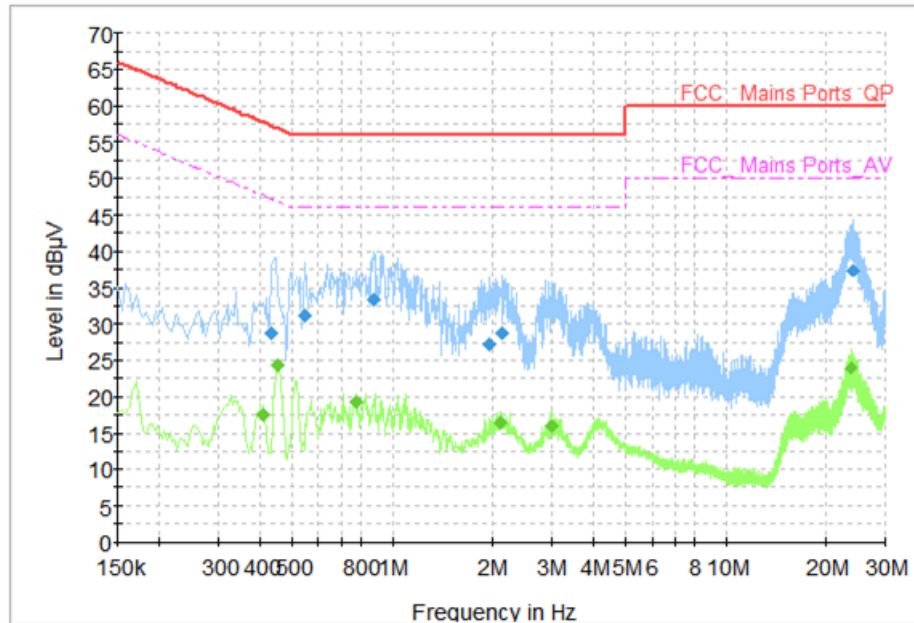


Fig. 86 AC Powerline Conducted Emission (Traffic, AE3, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.430000	28.82	57.25	28.43	N	ON	9.7
0.546000	31.25	56.00	24.75	N	ON	9.7
0.874000	33.36	56.00	22.64	N	ON	9.7
1.934000	27.13	56.00	28.87	N	ON	9.7
2.126000	28.79	56.00	27.21	N	ON	9.7
24.054000	37.38	60.00	22.62	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.410000	17.42	47.65	30.23	L1	ON	9.7
0.450000	24.28	46.88	22.59	L1	ON	9.7
0.778000	19.21	46.00	26.79	N	ON	9.7
2.110000	16.44	46.00	29.56	N	ON	9.7
2.994000	15.80	46.00	30.20	N	ON	9.7
23.698000	23.91	50.00	26.09	N	ON	10.3

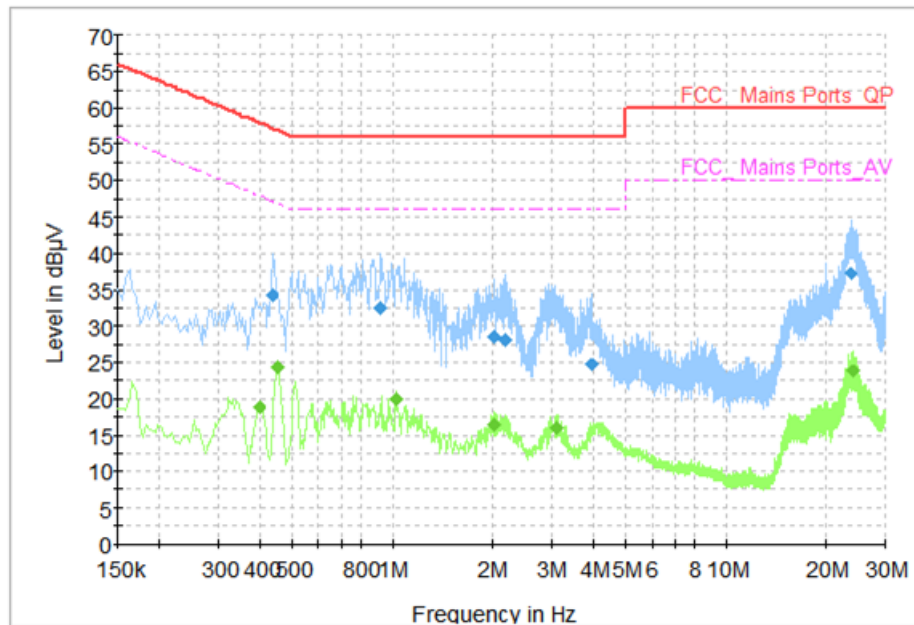


Fig. 87 AC Power line Conducted Emission (Idle, AE3, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.434000	34.22	57.18	22.96	N	ON	9.7
0.918000	32.52	56.00	23.48	N	ON	9.7
2.014000	28.53	56.00	27.47	N	ON	9.7
2.170000	28.06	56.00	27.94	N	ON	9.7
3.954000	24.75	56.00	31.25	N	ON	9.7
23.670000	37.18	60.00	22.82	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.398000	18.90	47.90	29.00	L1	ON	9.7
0.450000	24.42	46.88	22.46	L1	ON	9.7
1.026000	19.89	46.00	26.11	N	ON	9.7
2.010000	16.32	46.00	29.68	N	ON	9.7
3.106000	16.10	46.00	29.90	N	ON	9.7
24.026000	23.86	50.00	26.14	N	ON	10.3

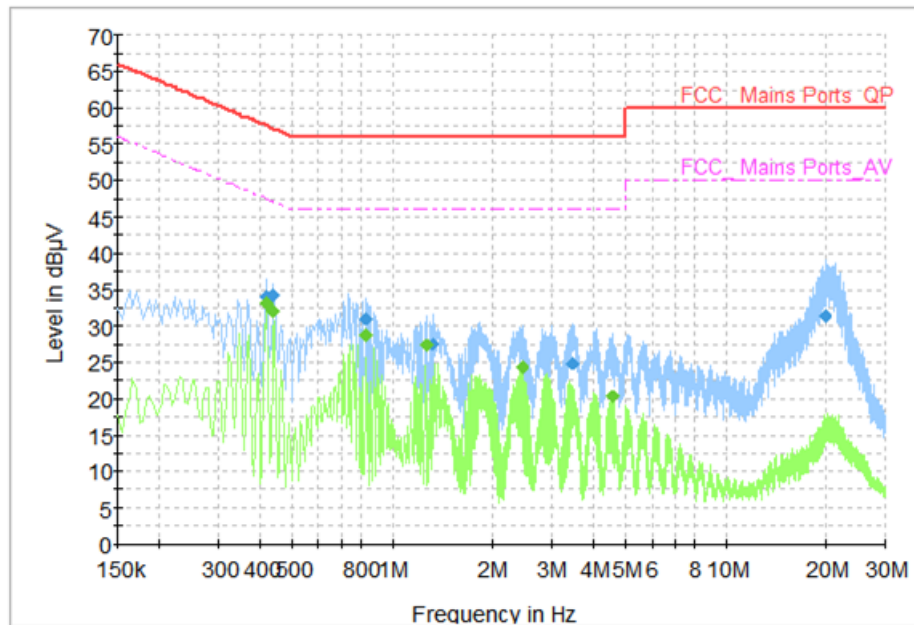


Fig. 88 AC Powerline Conducted Emission (Traffic, AE2, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	33.96	57.49	23.52	L1	ON	9.7
0.438000	34.21	57.10	22.89	L1	ON	9.7
0.830000	31.10	56.00	24.90	L1	ON	9.7
1.318000	27.53	56.00	28.47	L1	ON	9.7
3.446000	24.80	56.00	31.20	N	ON	9.7
19.766000	31.46	60.00	28.54	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	33.13	47.49	14.36	L1	ON	9.7
0.438000	32.09	47.10	15.01	L1	ON	9.7
0.830000	28.66	46.00	17.34	L1	ON	9.7
1.270000	27.39	46.00	18.61	L1	ON	9.7
2.446000	24.38	46.00	21.62	L1	ON	9.7
4.570000	20.19	46.00	25.81	L1	ON	9.8

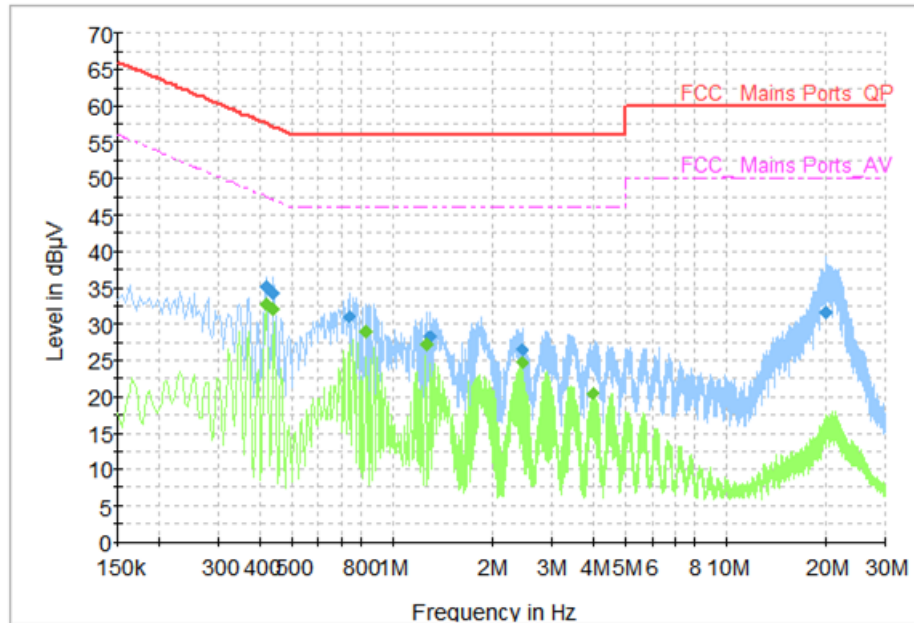


Fig. 89 AC Power line Conducted Emission (Idle, AE2, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.414000	35.12	57.57	22.45	L1	ON	9.7
0.438000	34.23	57.10	22.87	L1	ON	9.7
0.738000	30.98	56.00	25.02	L1	ON	9.7
1.294000	28.20	56.00	27.80	L1	ON	9.7
2.446000	26.52	56.00	29.48	L1	ON	9.7
19.974000	31.62	60.00	28.38	N	ON	10.4

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.418000	32.87	47.49	14.62	L1	ON	9.7
0.438000	32.13	47.10	14.97	L1	ON	9.7
0.830000	28.88	46.00	17.12	L1	ON	9.7
1.270000	27.17	46.00	18.83	L1	ON	9.7
2.446000	24.65	46.00	21.35	L1	ON	9.7
3.990000	20.42	46.00	25.58	L1	ON	9.7

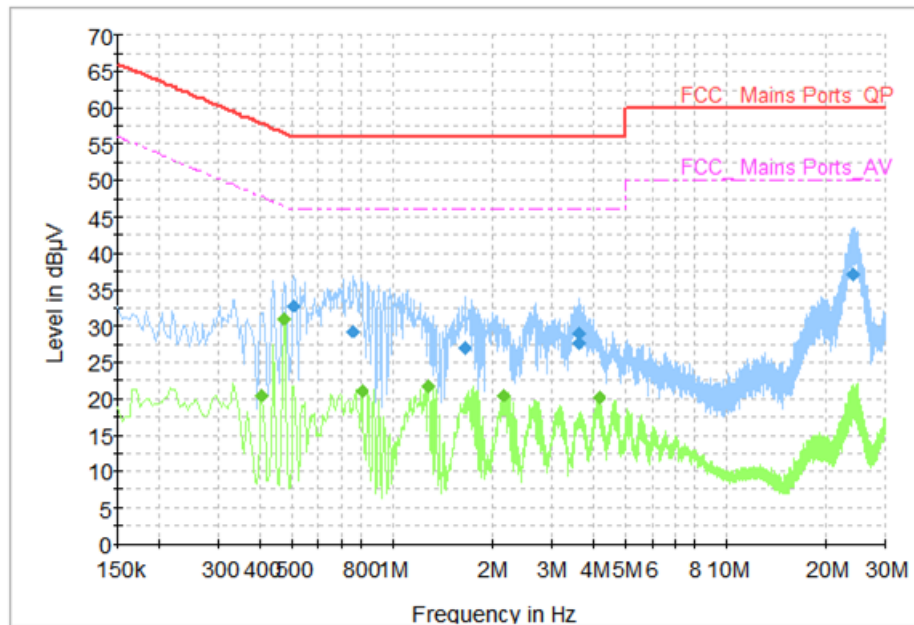


Fig. 90 AC Powerline Conducted Emission (Traffic, AE3, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.506000	32.81	56.00	23.19	N	ON	9.7
0.762000	29.25	56.00	26.75	N	ON	9.7
1.638000	26.95	56.00	29.05	N	ON	9.7
3.602000	27.67	56.00	28.33	N	ON	9.7
3.606000	28.98	56.00	27.02	N	ON	9.7
23.950000	37.07	60.00	22.93	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406000	20.49	47.73	27.24	L1	ON	9.7
0.470000	31.02	46.51	15.50	L1	ON	9.7
0.806000	20.90	46.00	25.10	L1	ON	9.7
1.278000	21.65	46.00	24.35	L1	ON	9.7
2.150000	20.47	46.00	25.53	L1	ON	9.7
4.154000	20.09	46.00	25.91	L1	ON	9.7

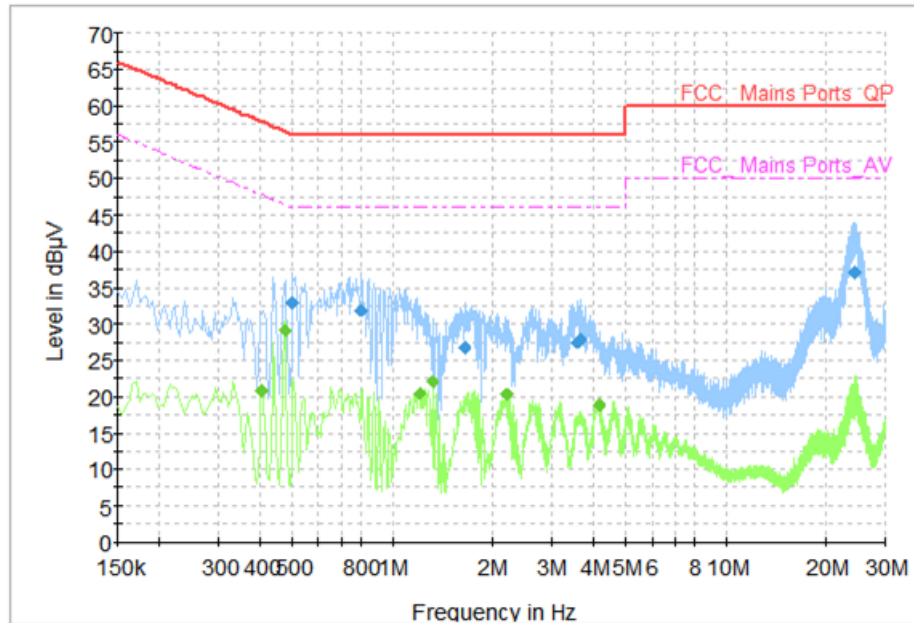


Fig. 91 AC Power line Conducted Emission (Idle, AE3, 240V)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.502000	33.05	56.00	22.95	N	ON	9.7
0.802000	31.89	56.00	24.11	N	ON	9.7
1.646000	26.77	56.00	29.23	N	ON	9.7
3.574000	27.48	56.00	28.52	N	ON	9.7
3.642000	27.85	56.00	28.15	N	ON	9.7
24.286000	37.04	60.00	22.96	N	ON	10.3

Measurement Results: Average

Frequency (MHz)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406000	20.89	47.73	26.84	L1	ON	9.7
0.474000	29.18	46.44	17.26	L1	ON	9.7
1.202000	20.44	46.00	25.56	L1	ON	9.7
1.314000	21.96	46.00	24.04	L1	ON	9.7
2.190000	20.31	46.00	25.69	L1	ON	9.7
4.162000	18.80	46.00	27.20	L1	ON	9.7

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