

Fig.94. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

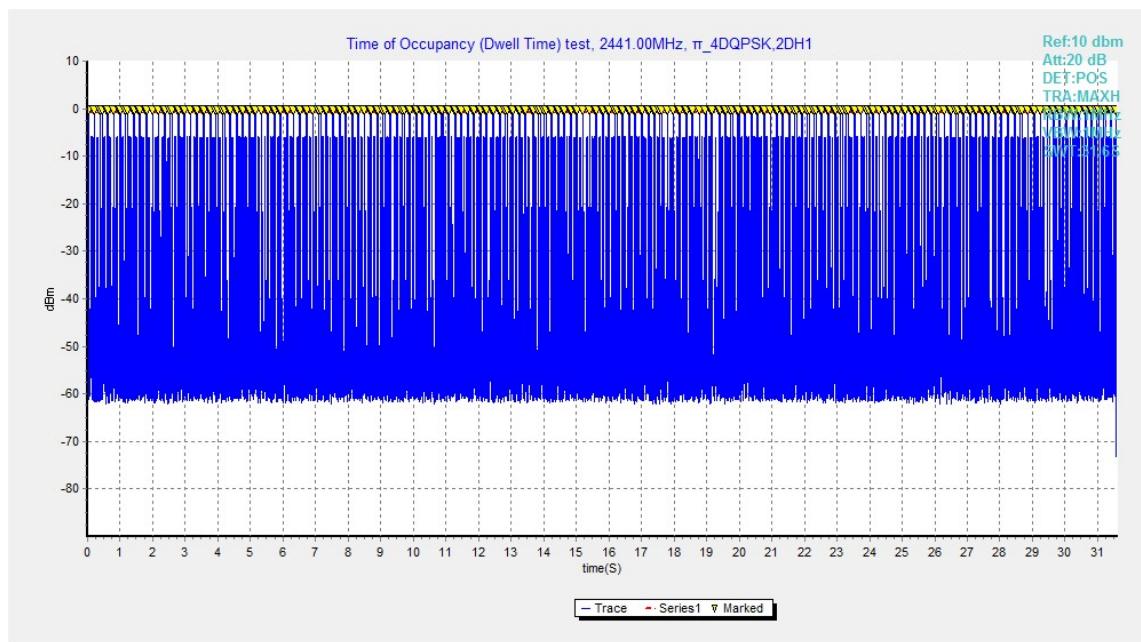


Fig.95. Number of Transmissions Measurement: Channel 39, Packet 2-DH1

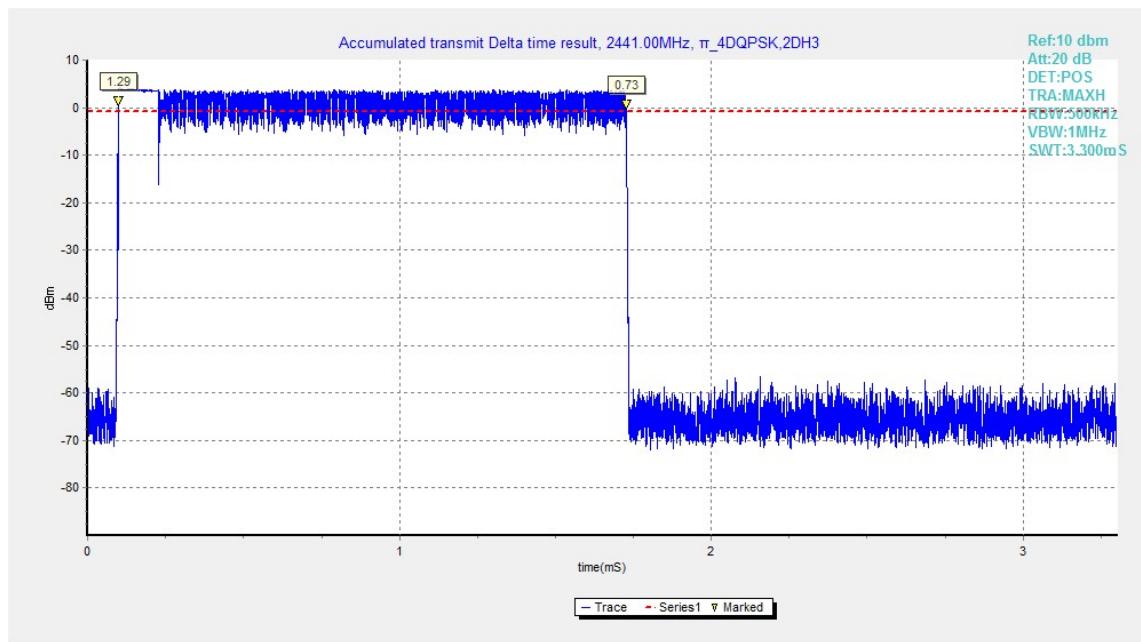


Fig.96. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

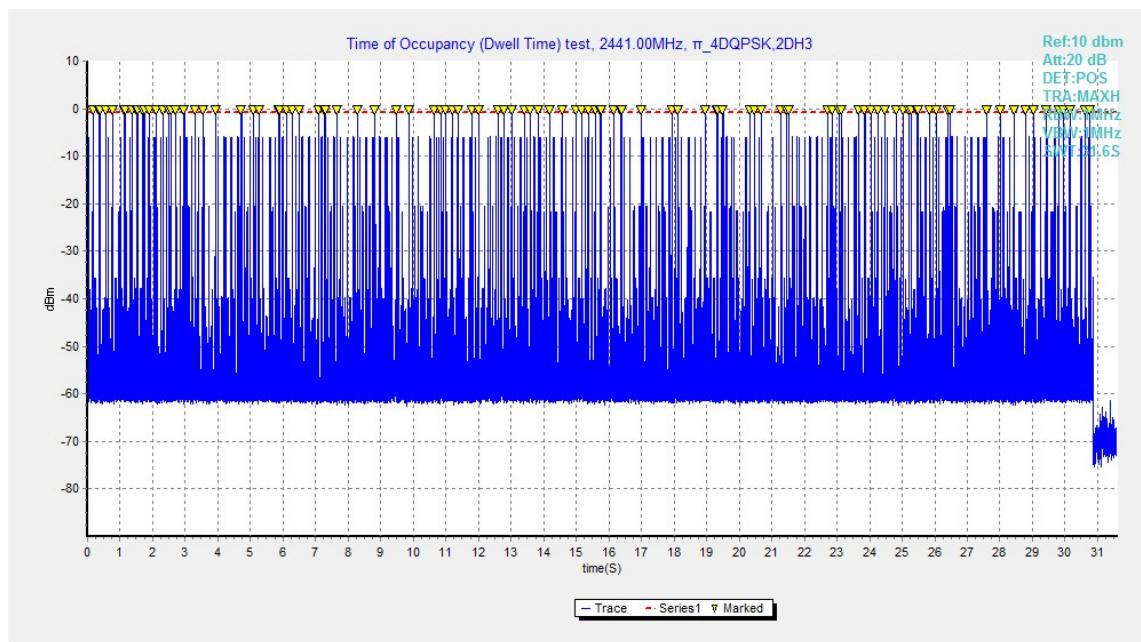


Fig.97. Number of Transmissions Measurement: Channel 39, Packet 2-DH3

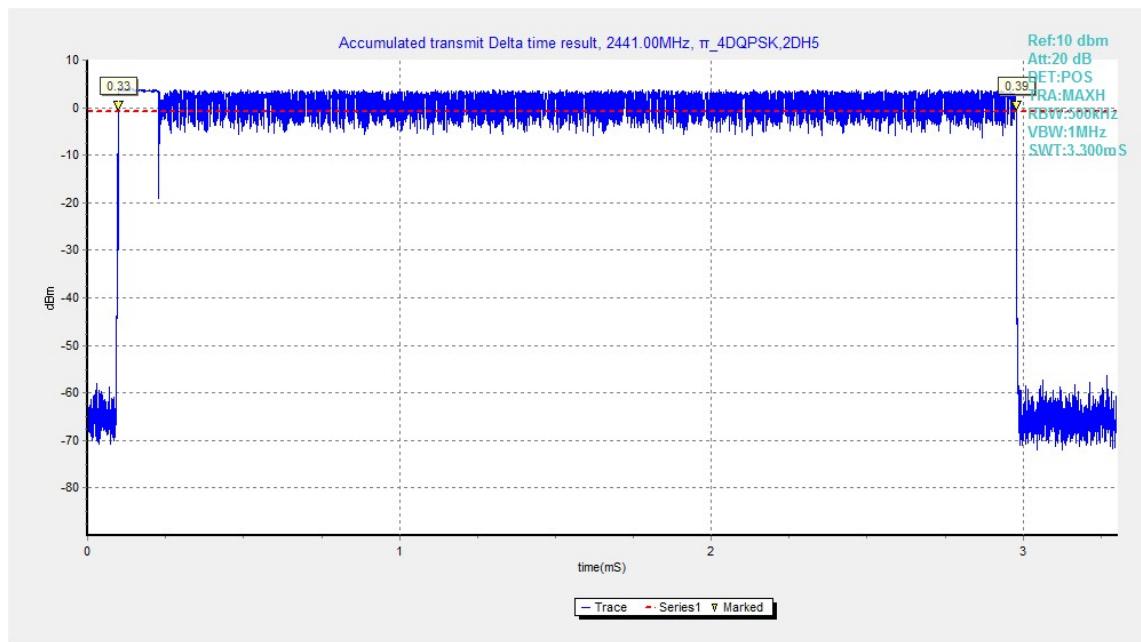


Fig.98. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

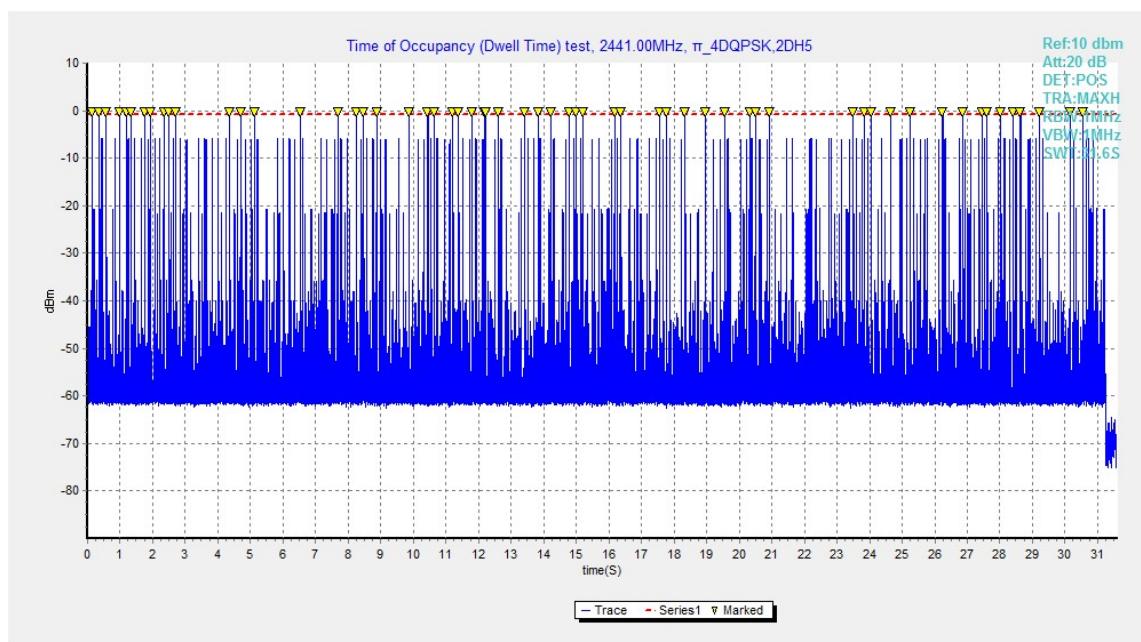


Fig.99. Number of Transmissions Measurement: Channel 39, Packet 2-DH5

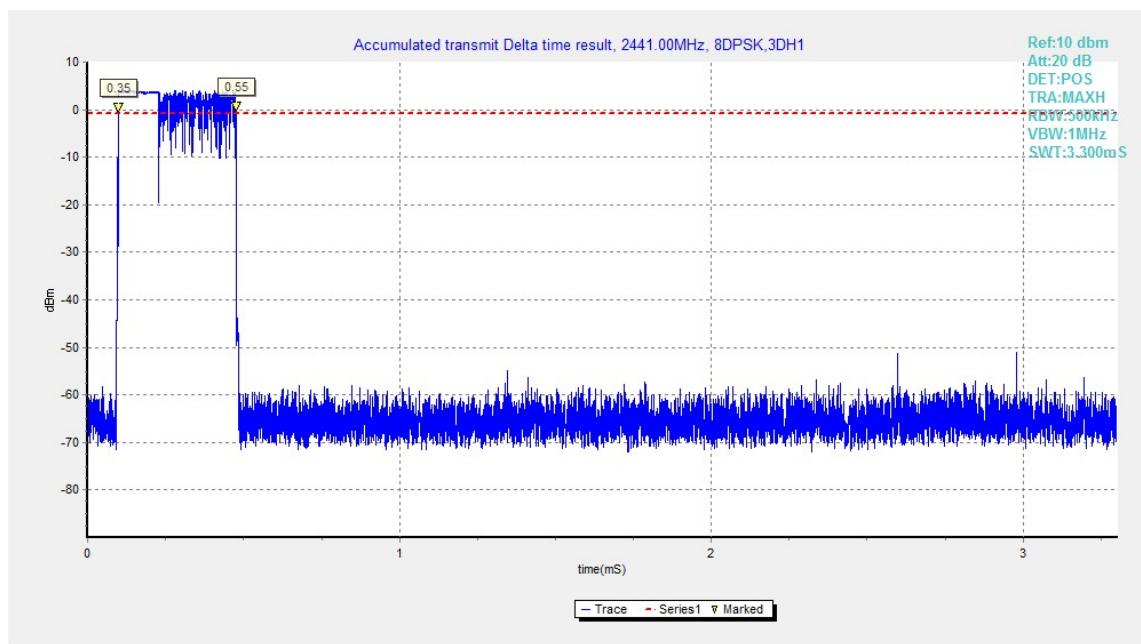


Fig.100. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

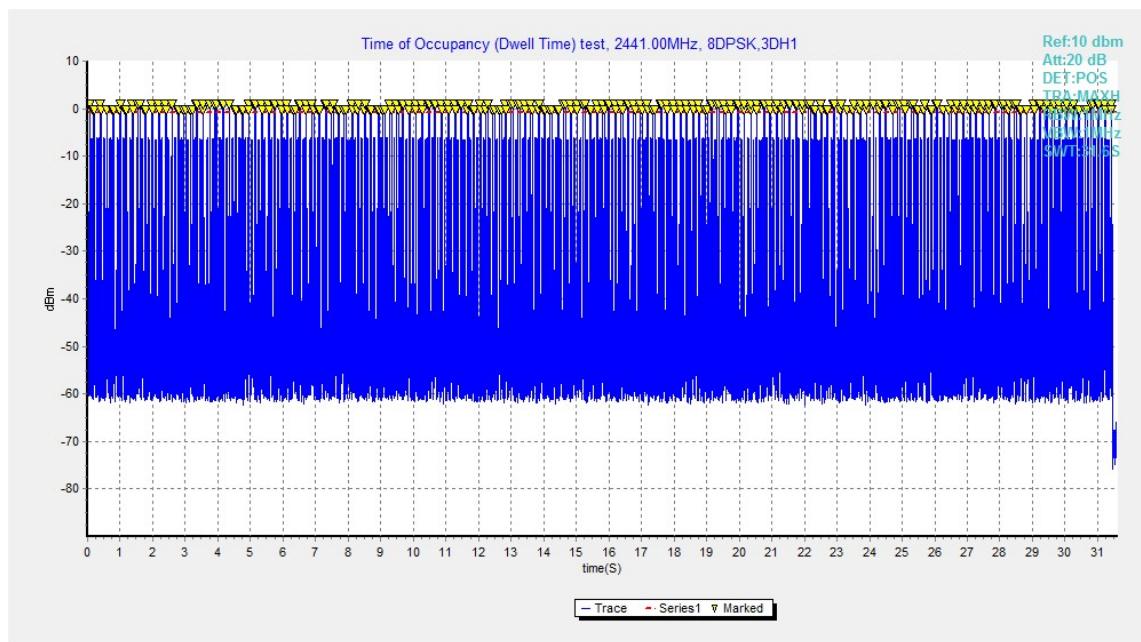


Fig.101. Number of Transmissions Measurement: Channel 39, Packet 3-DH1

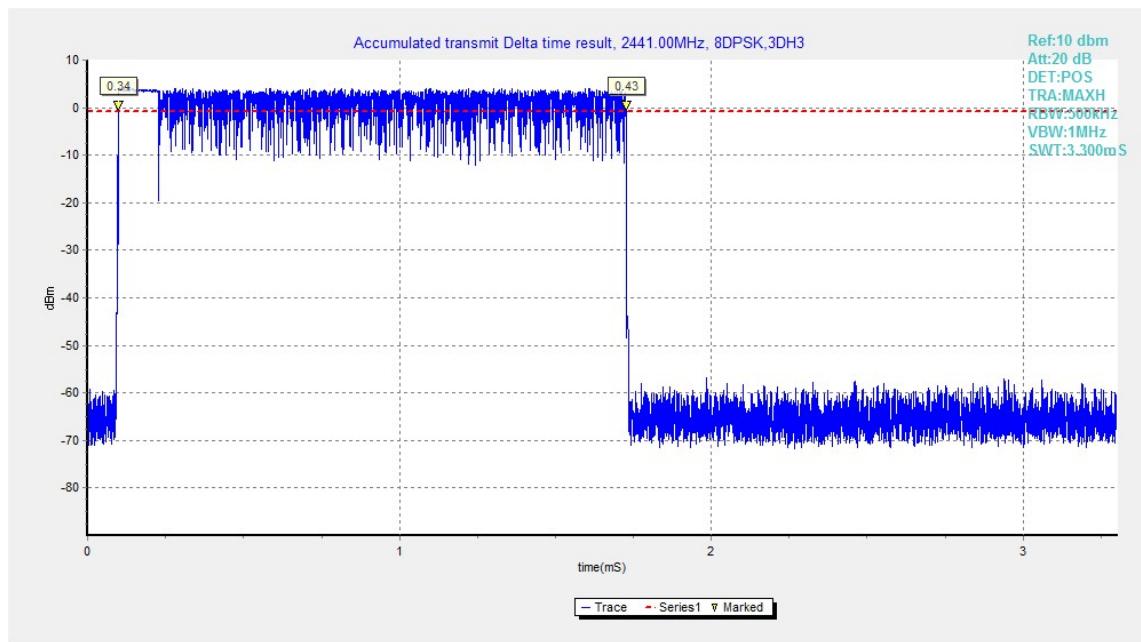


Fig.102. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

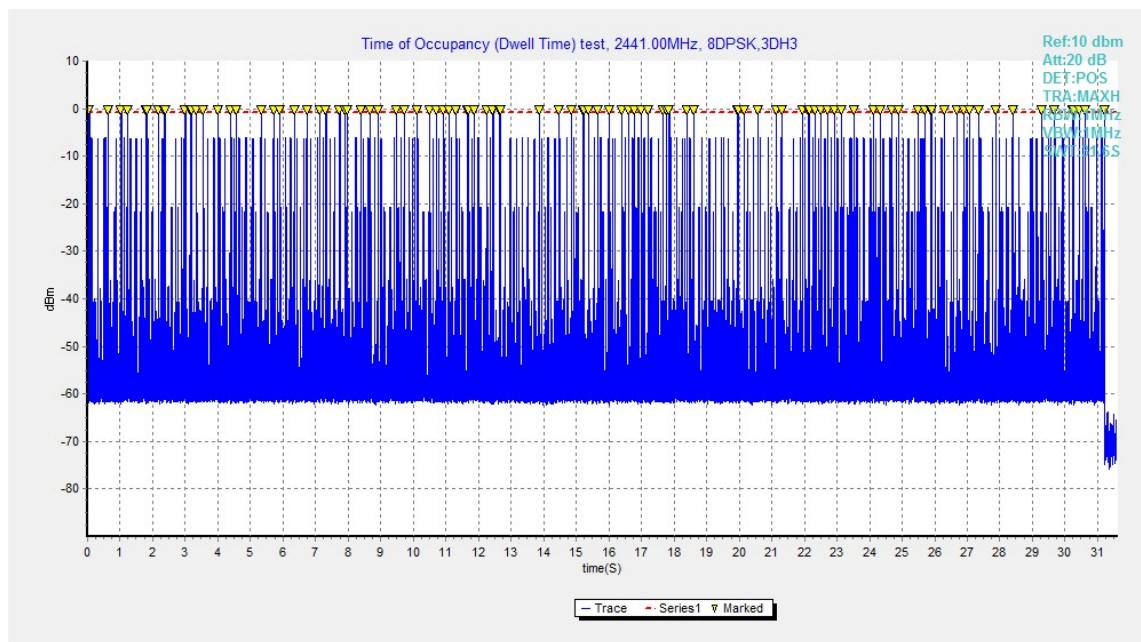


Fig.103. Number of Transmissions Measurement: Channel 39, Packet 3-DH3

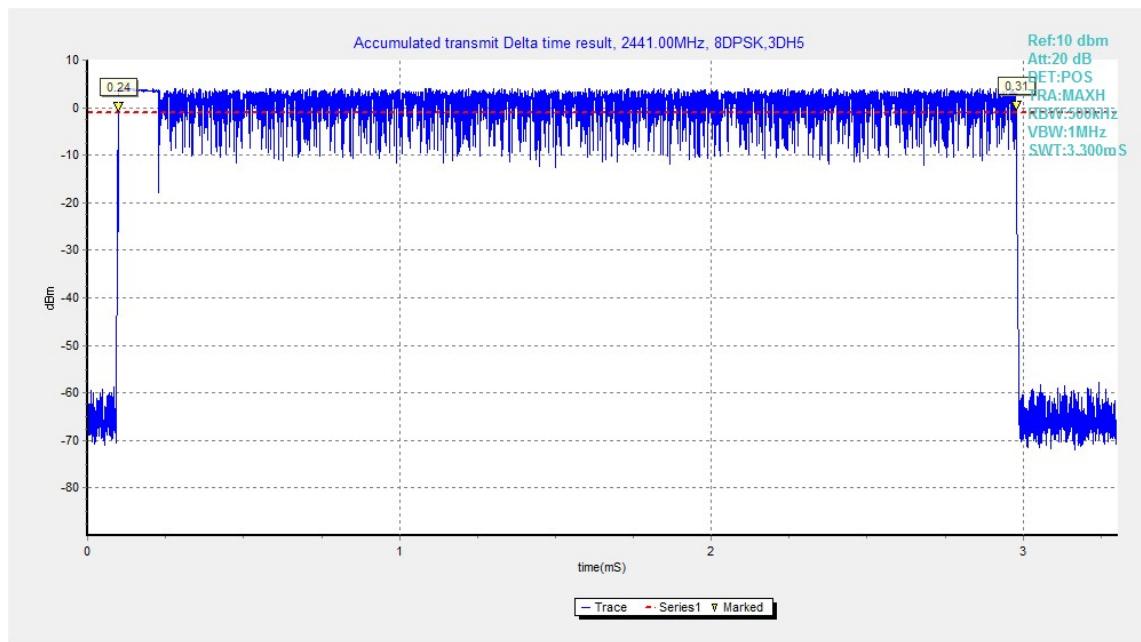


Fig.104. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

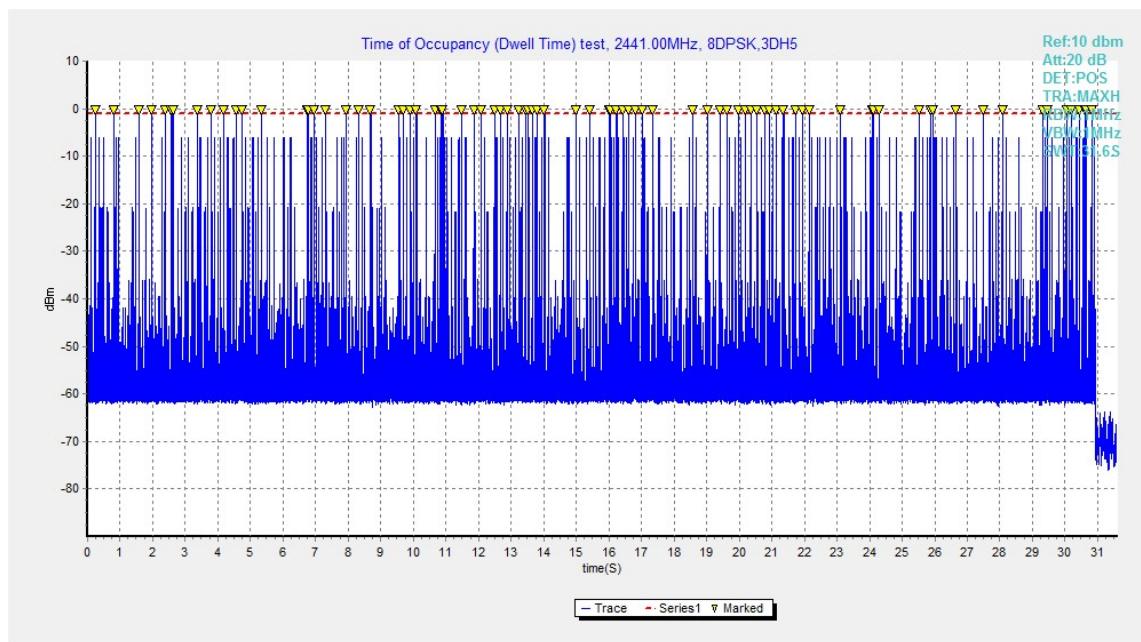


Fig.105. Number of Transmissions Measurement: Channel 39, Packet 3-DH5

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.106	942.75	NA
39	Fig.107	945.75	NA
78	Fig.108	942.75	NA

For π/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.109	1285.50	NA
39	Fig.110	1266.75	NA
78	Fig.111	1264.50	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.112	1266.75	NA
39	Fig.113	1269.00	NA
78	Fig.114	1290.00	NA

Conclusion: NA

Test graphs as below:

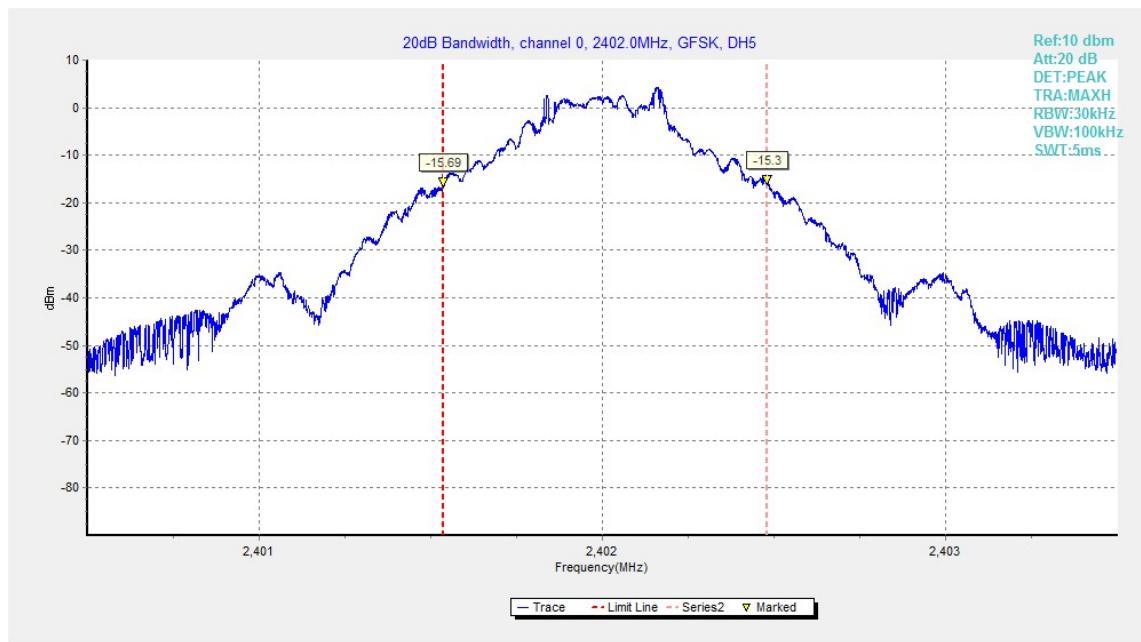


Fig.106. 20dB Bandwidth: GFSK, Channel 0

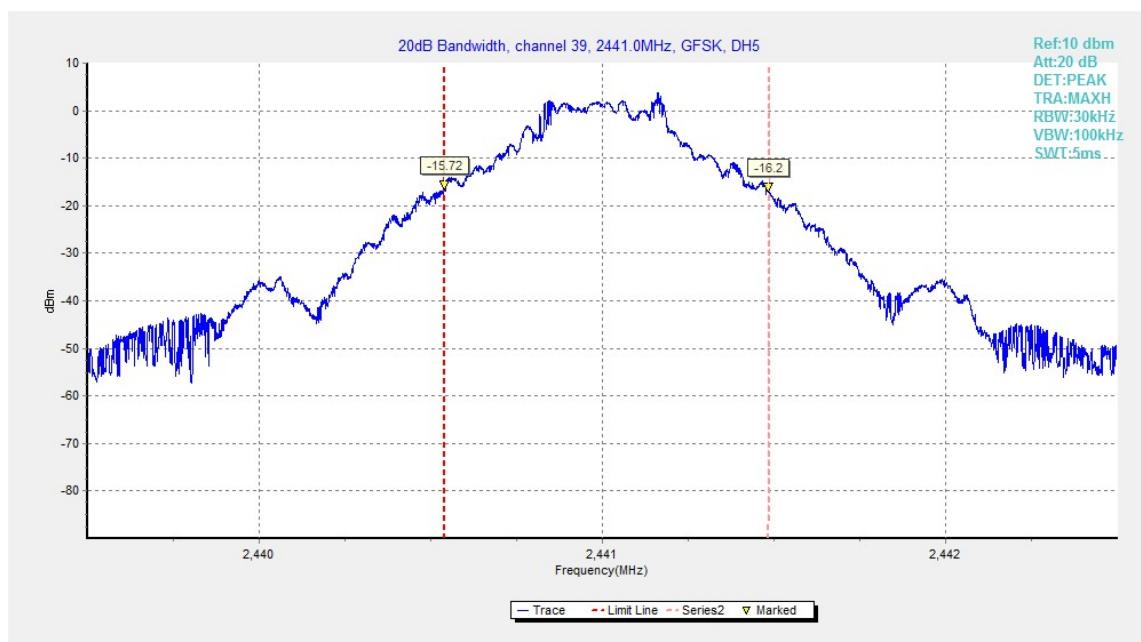


Fig.107. 20dB Bandwidth: GFSK, Channel 39

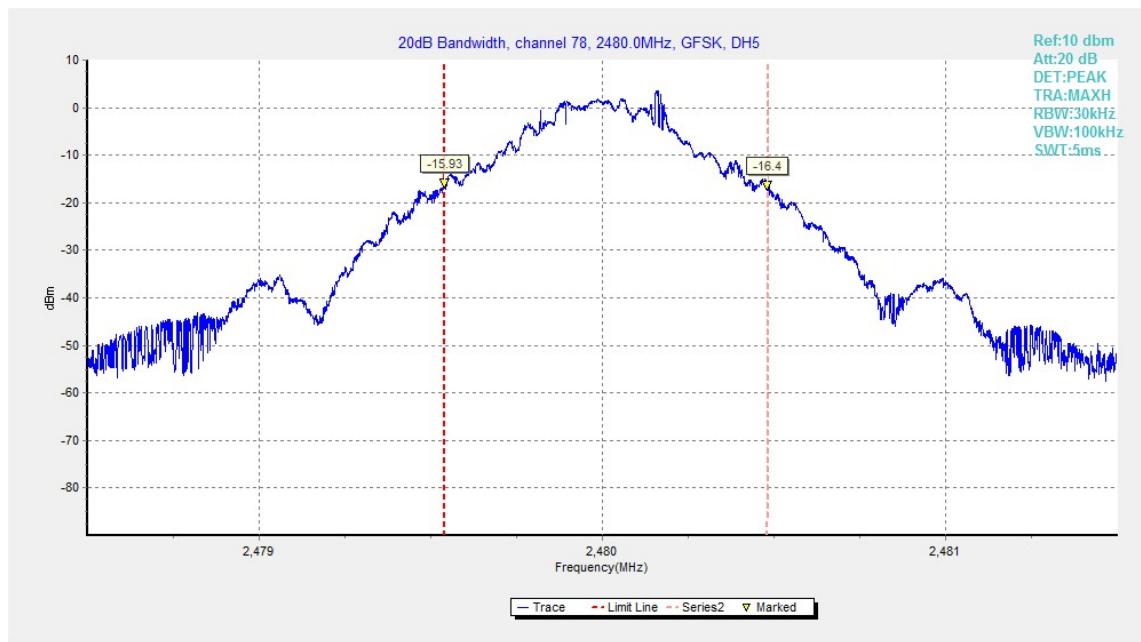


Fig.108. 20dB Bandwidth: GFSK, Channel 78

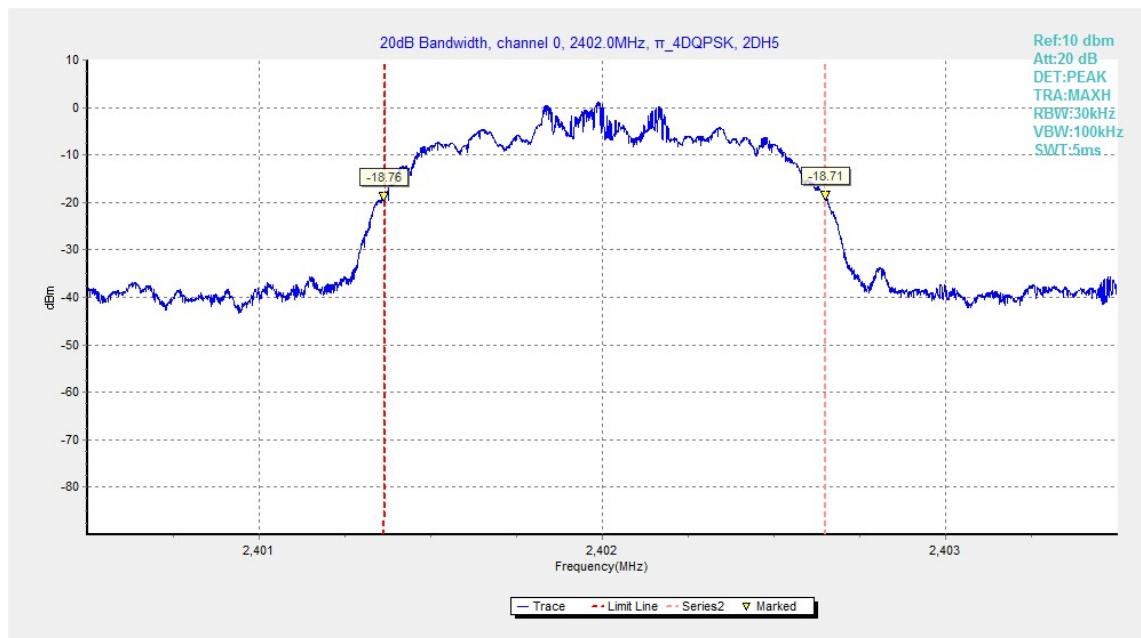
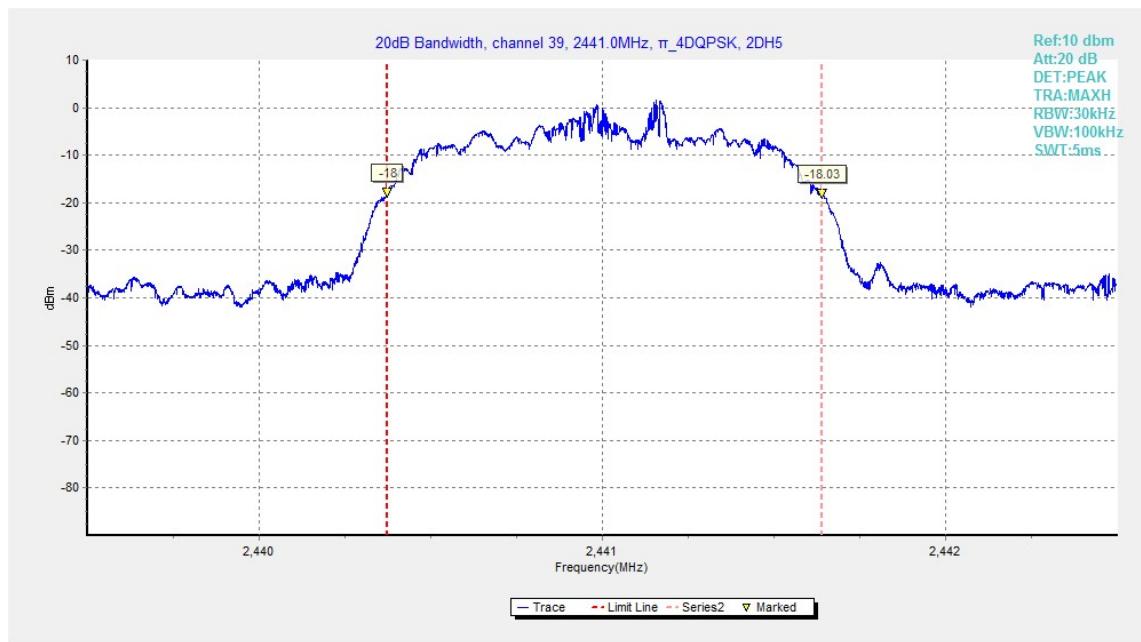
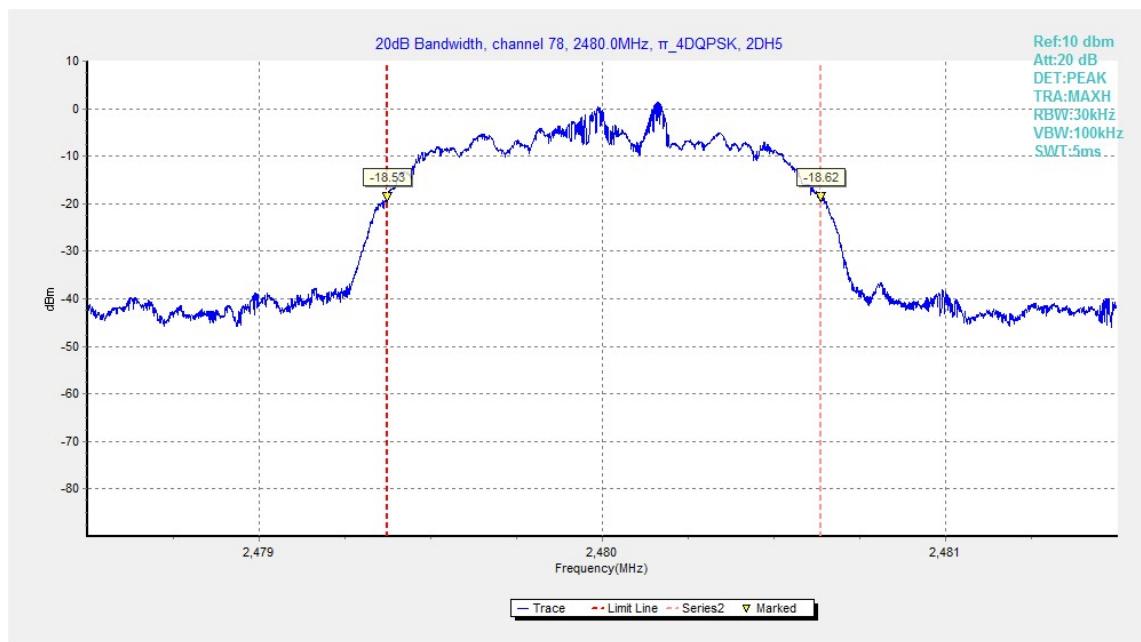


Fig.109. 20dB Bandwidth: π/4 DQPSK, Channel 0


 Fig.110. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39

 Fig.111. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78

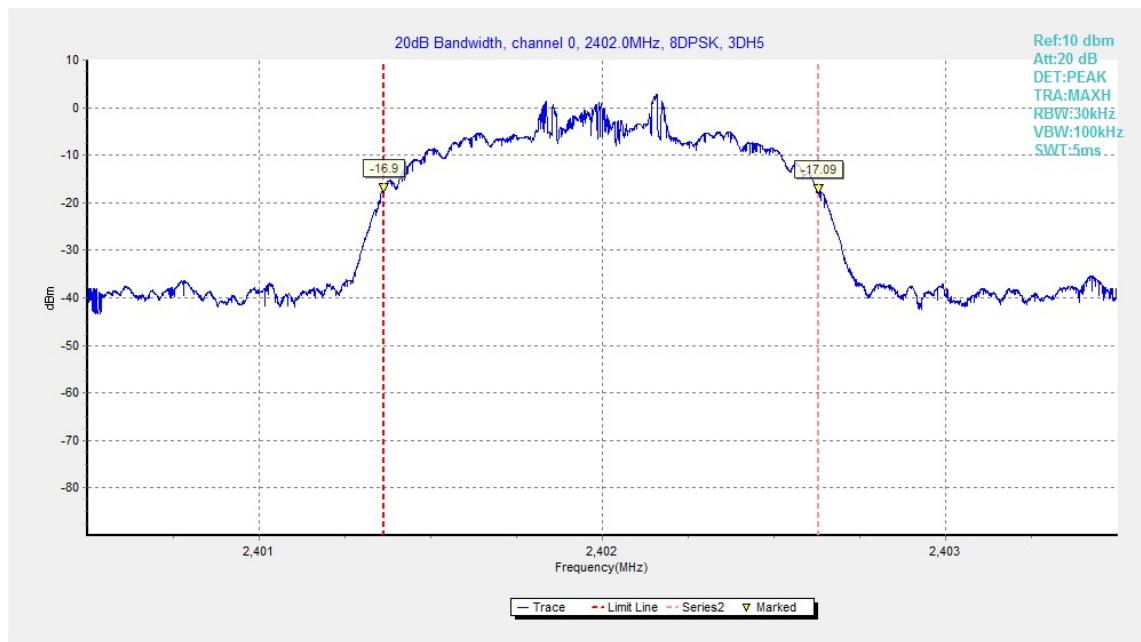


Fig.112. 20dB Bandwidth: 8DPSK, Channel 0

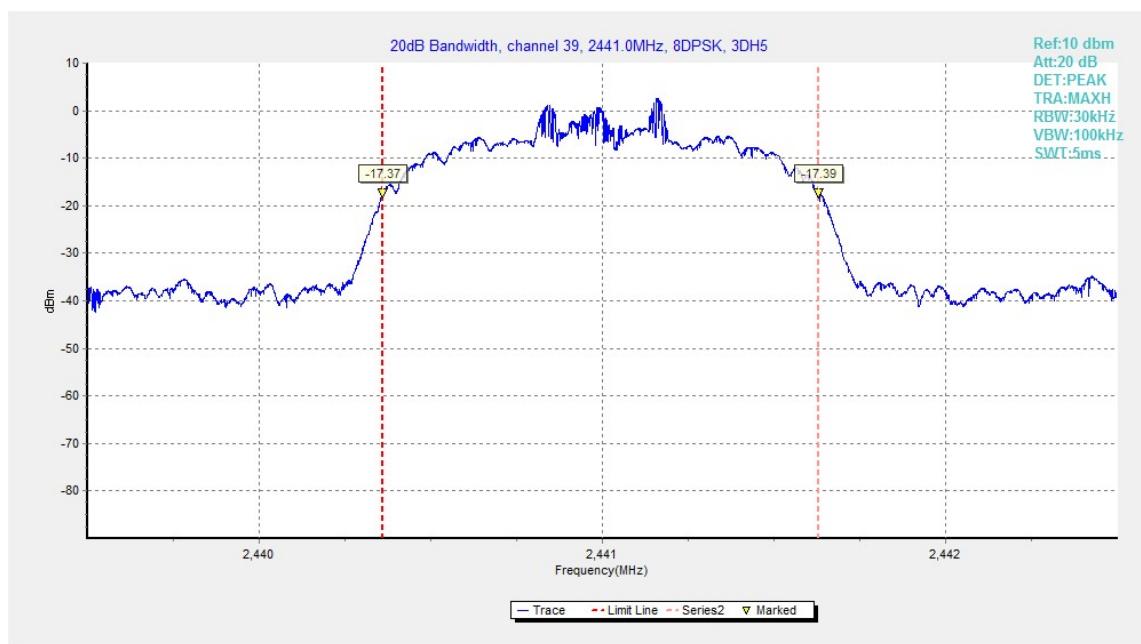


Fig.113. 20dB Bandwidth: 8DPSK, Channel 39

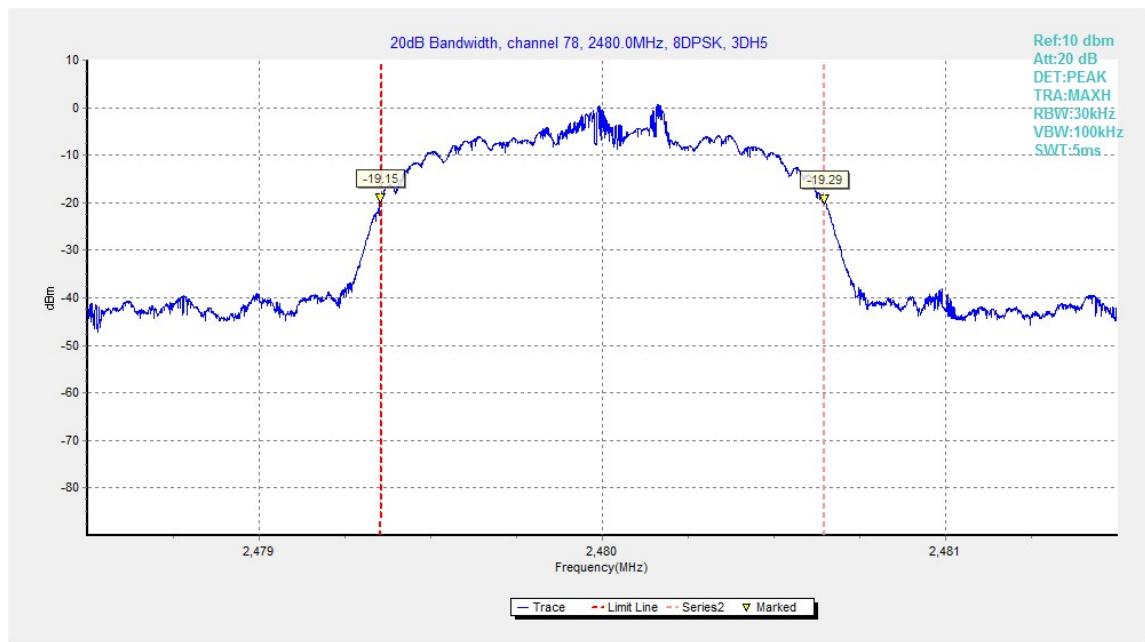


Fig.114. 20dB Bandwidth: 8DPSK, Channel 78

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.115	973.50	P

For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.116	1012.50	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.117	998.25	P

Conclusion: PASS

Test graphs as below:

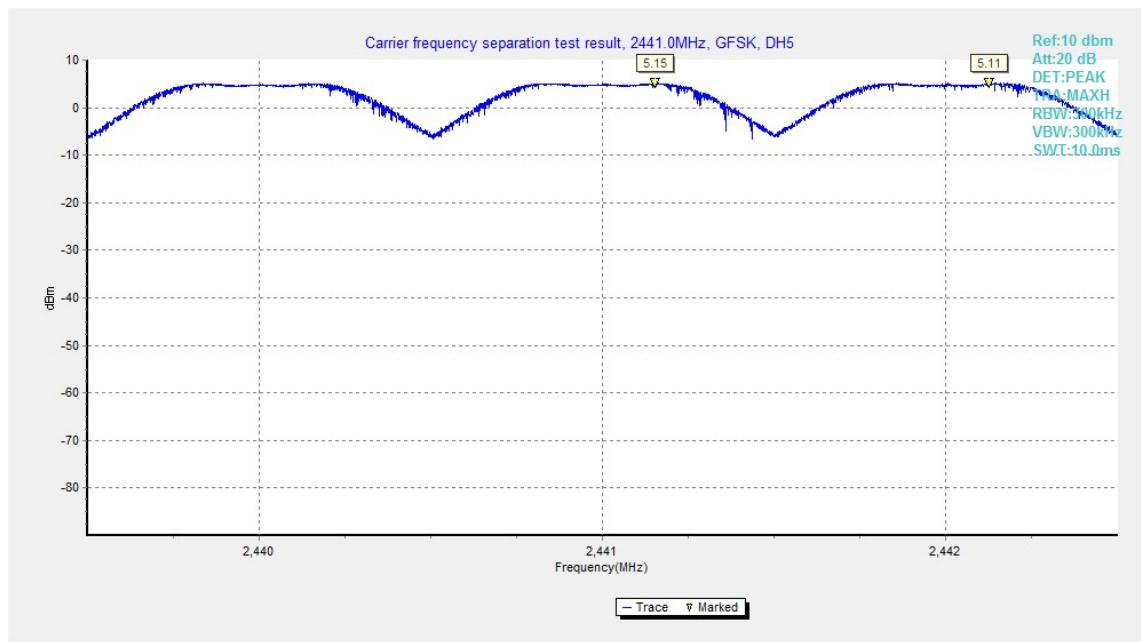


Fig.115. Carrier frequency separation measurement: GFSK, Channel 39

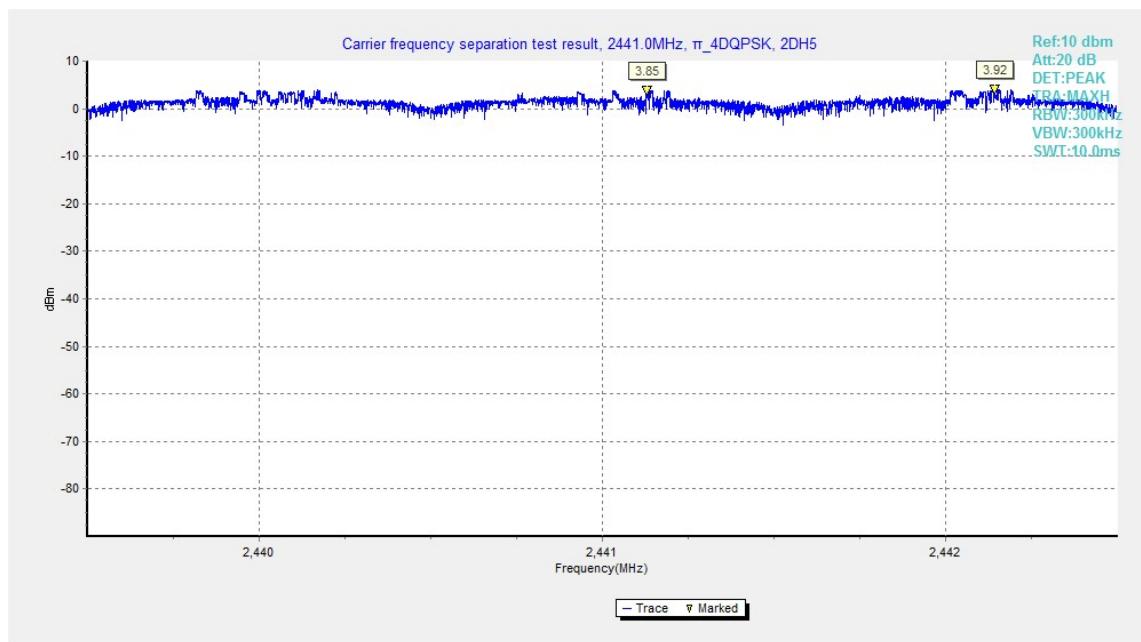


Fig.116. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39

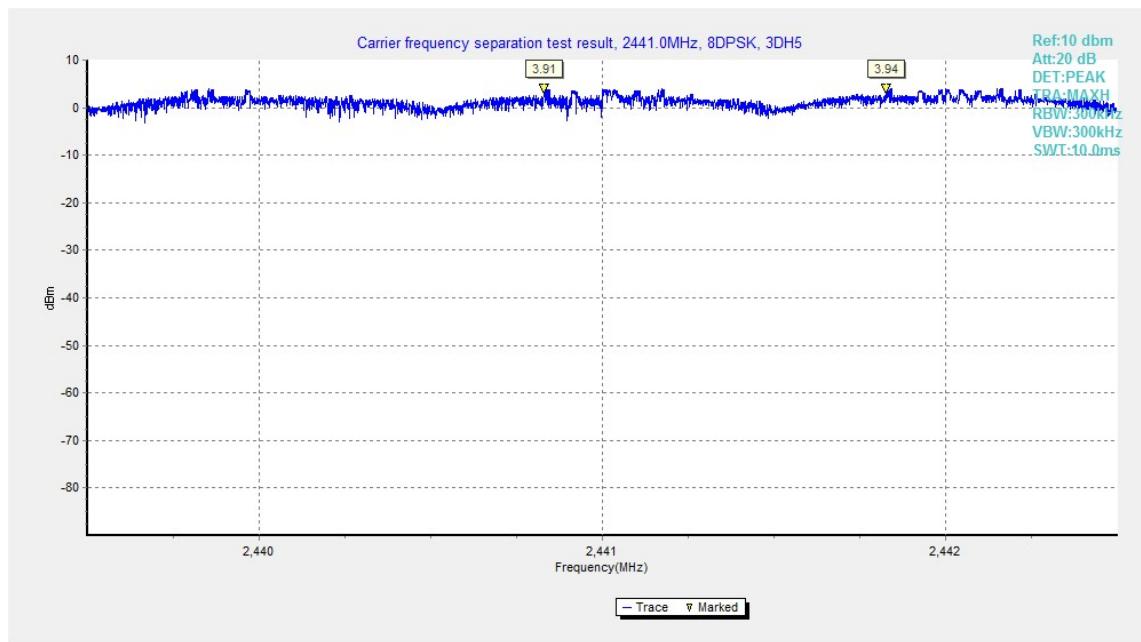


Fig.117. Carrier frequency separation measurement: 8DPSK, Channel 39

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.118	
40~78	Fig.119	P

For 4 DQPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.120	
40~78	Fig.121	P

For 8DPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.122	
40~78	Fig.123	P

Conclusion: PASS

Test graphs as below:

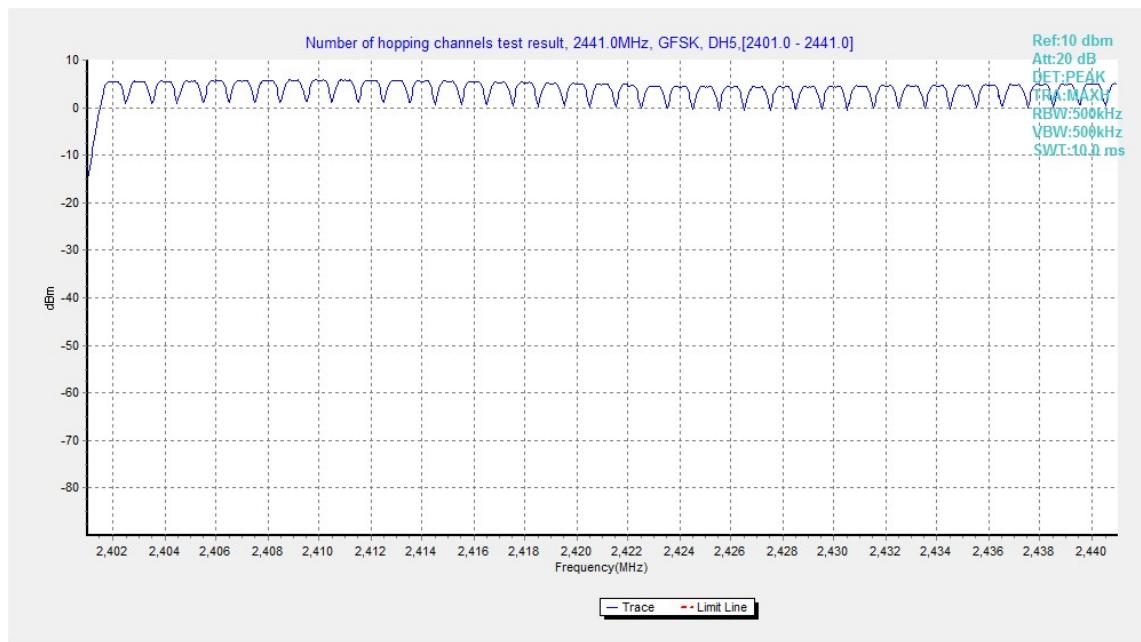


Fig.118. Number of hopping frequencies: GFSK, Channel 0 - 39

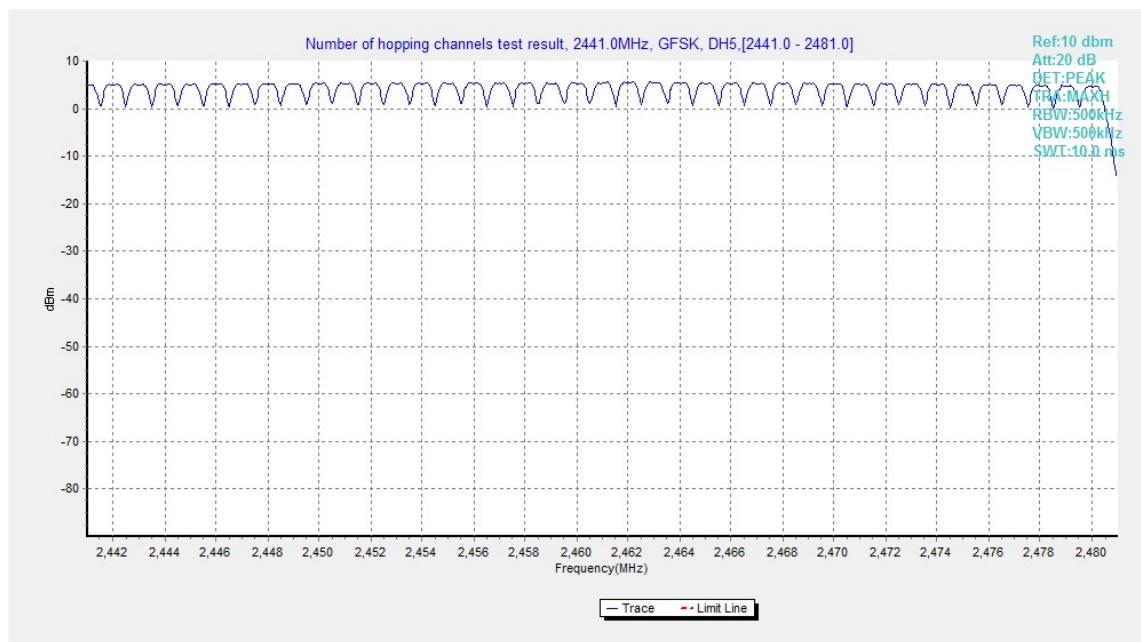
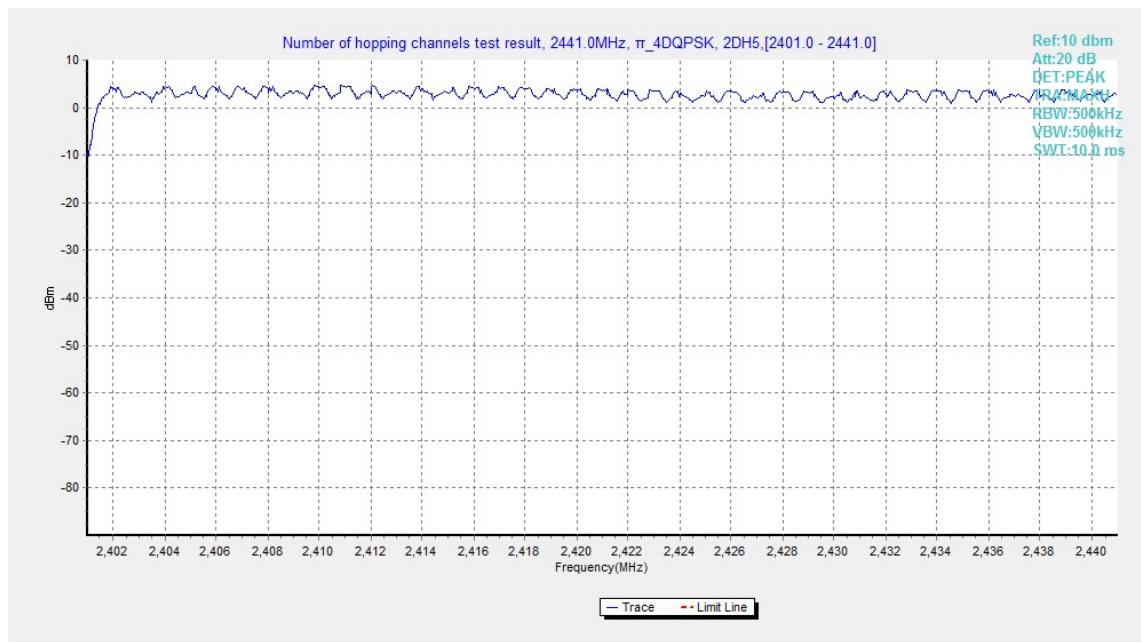
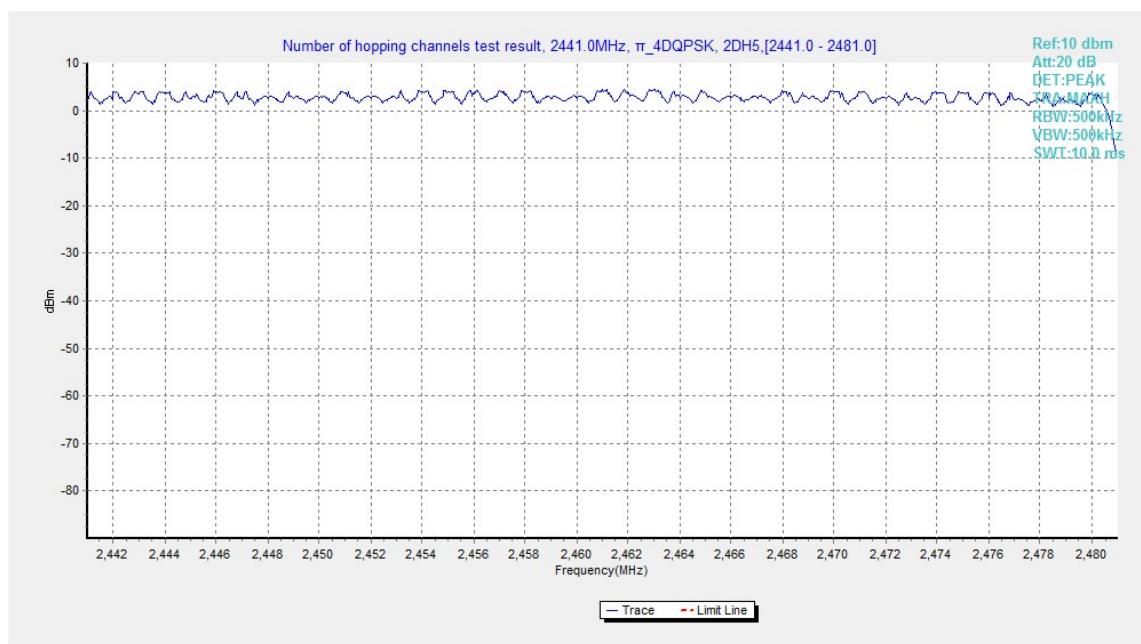


Fig.119. Number of hopping frequencies: GFSK, Channel 40 - 78


 Fig.120. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39

 Fig.121. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78

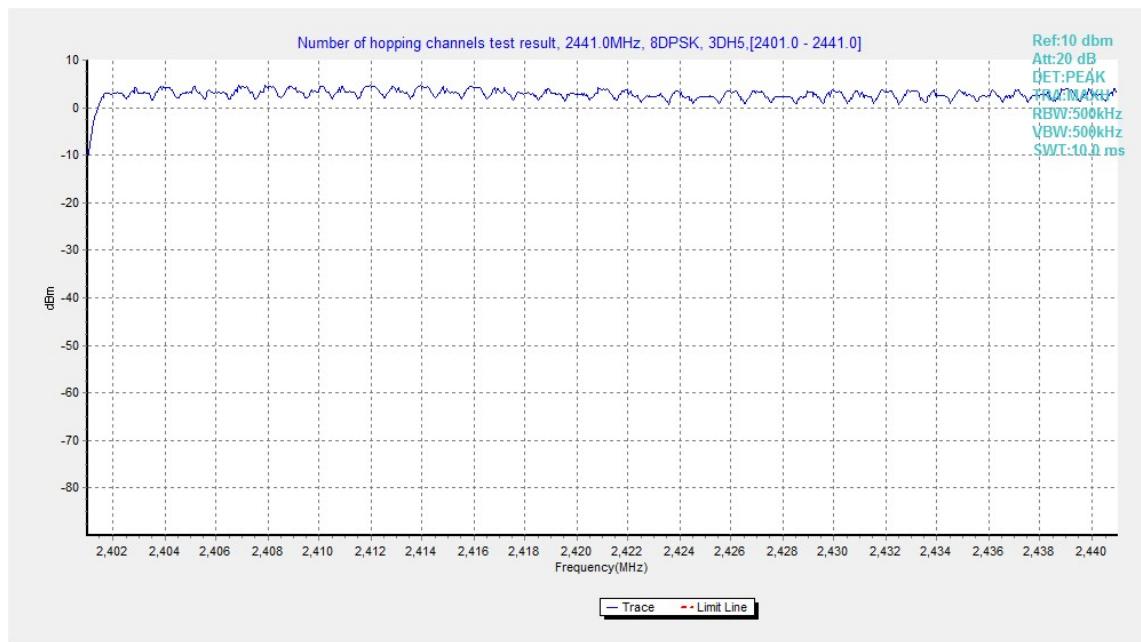


Fig.122. Number of hopping frequencies: 8DPSK, Channel 0 - 39

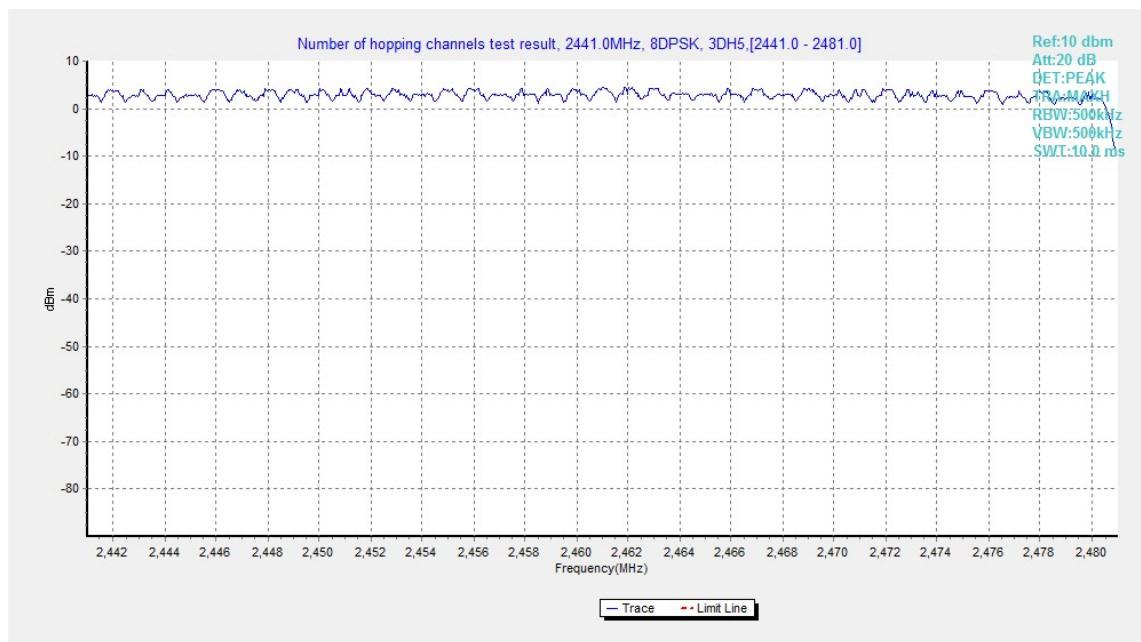


Fig.123. Number of hopping frequencies: 8DPSK, Channel 40 - 78

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	

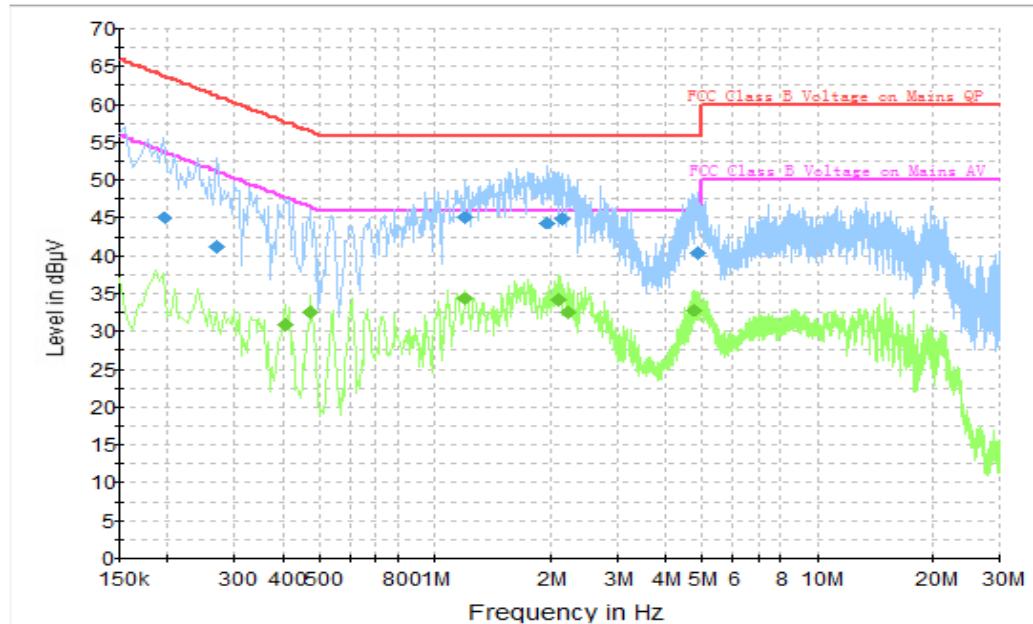
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

Traffic:(Charger:CBA0058AGAC2)



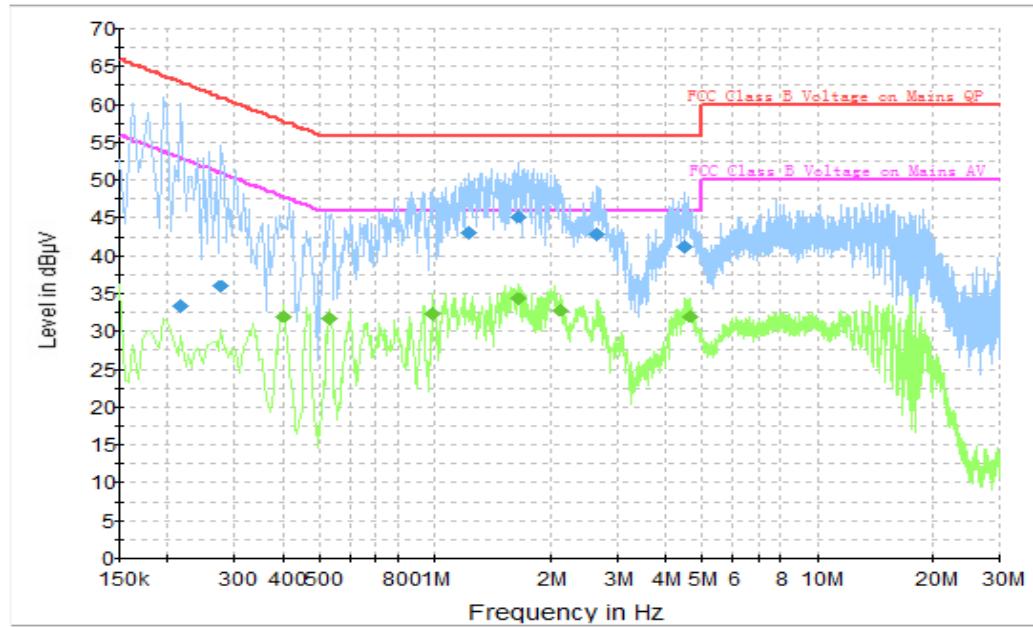
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.195000	45.1	2000.0	9.000	On	L1	19.8	18.7	63.8
0.267000	41.2	2000.0	9.000	On	L1	19.8	20.0	61.2
1.203000	45.1	2000.0	9.000	On	N	19.7	10.9	56.0
1.968000	44.4	2000.0	9.000	On	L1	19.7	11.6	56.0
2.157000	44.9	2000.0	9.000	On	L1	19.4	11.1	56.0
4.848000	40.5	2000.0	9.000	On	L1	19.6	15.5	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.406500	30.8	2000.0	9.000	On	L1	19.9	16.9	47.7
0.474000	32.5	2000.0	9.000	On	N	19.9	14.0	46.4
1.203000	34.4	2000.0	9.000	On	N	19.7	11.6	46.0
2.107500	34.2	2000.0	9.000	On	L1	19.6	11.8	46.0
2.229000	32.5	2000.0	9.000	On	L1	19.3	13.5	46.0
4.753500	32.8	2000.0	9.000	On	L1	19.6	13.2	46.0

Idle:(Charger:CBA0058AGAC2)



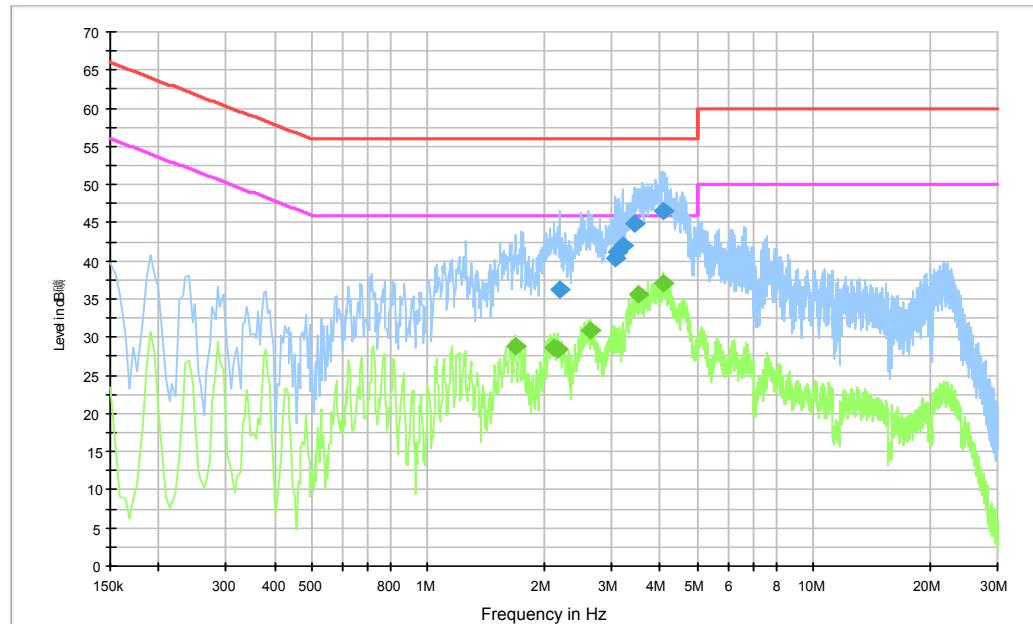
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.217500	33.3	2000.0	9.000	On	N	19.8	29.6	62.9
0.276000	36.0	2000.0	9.000	On	N	19.8	25.0	60.9
1.221000	43.1	2000.0	9.000	On	N	19.7	12.9	56.0
1.653000	45.3	2000.0	9.000	On	N	19.7	10.7	56.0
2.656500	43.0	2000.0	9.000	On	N	19.4	13.0	56.0
4.528500	41.3	2000.0	9.000	On	L1	19.6	14.7	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.402000	32.0	2000.0	9.000	On	L1	19.9	15.8	47.8
0.528000	31.7	2000.0	9.000	On	L1	19.9	14.3	46.0
0.991500	32.3	2000.0	9.000	On	N	19.7	13.7	46.0
1.653000	34.4	2000.0	9.000	On	N	19.7	11.6	46.0
2.125500	32.8	2000.0	9.000	On	N	19.5	13.2	46.0
4.623000	32.0	2000.0	9.000	On	L1	19.6	14.0	46.0

Traffic:(Charger:CBA0058AGAC4)



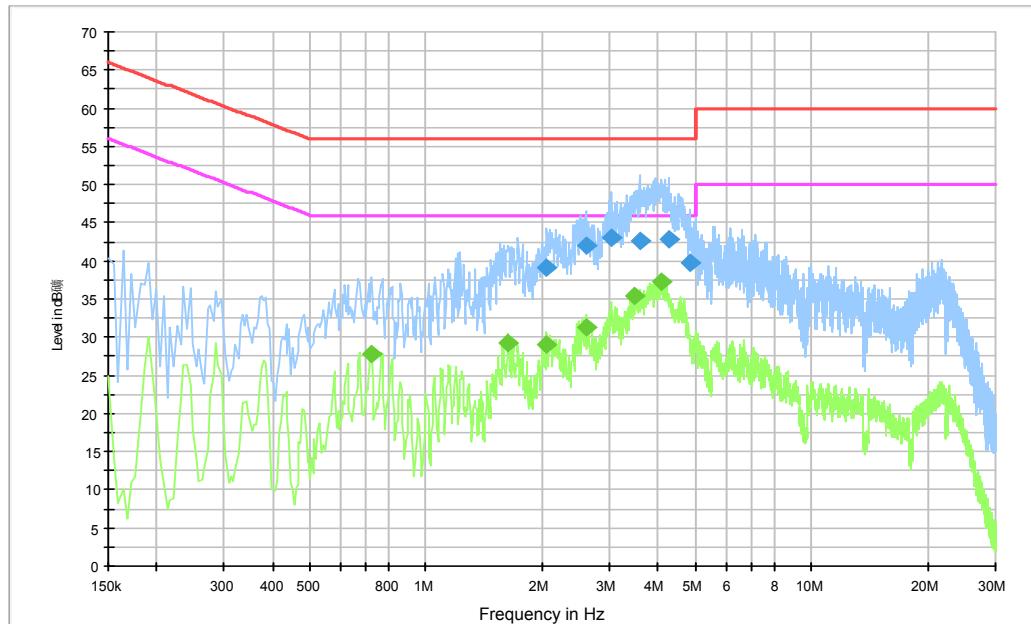
Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.193000	36.2	GND	N	10.5	19.8	56.0
3.061500	40.3	GND	N	10.5	15.7	56.0
3.088500	41.3	GND	N	10.5	14.8	56.0
3.187500	42.0	GND	N	10.5	14.0	56.0
3.421500	44.8	GND	L1	10.4	11.2	56.0
4.096500	46.6	GND	L1	10.5	9.4	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
1.680000	28.9	GND	L1	10.3	17.1	46.0
2.121000	28.7	GND	L1	10.4	17.3	46.0
2.161500	28.4	GND	L1	10.4	17.6	46.0
2.647500	30.9	GND	L1	10.4	15.1	46.0
3.516000	35.6	GND	L1	10.4	10.4	46.0
4.096500	37.1	GND	L1	10.5	8.9	46.0

Idle:(Charger:CBA0058AGAC4)



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
2.058000	39.2	GND	L1	10.4	16.8	56.0
2.593500	42.1	GND	L1	10.4	13.9	56.0
3.034500	42.9	GND	L1	10.4	13.1	56.0
3.579000	42.7	GND	N	10.5	13.3	56.0
4.276500	42.9	GND	N	10.5	13.1	56.0
4.825500	39.7	GND	N	10.6	16.3	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.721500	27.7	GND	L1	10.3	18.3	46.0
1.635000	29.2	GND	L1	10.3	16.8	46.0
2.058000	29.1	GND	L1	10.4	16.9	46.0
2.593500	31.4	GND	L1	10.4	14.6	46.0
3.462000	35.4	GND	L1	10.4	10.6	46.0
4.087500	37.3	GND	L1	10.5	8.7	46.0

END OF REPORT