

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

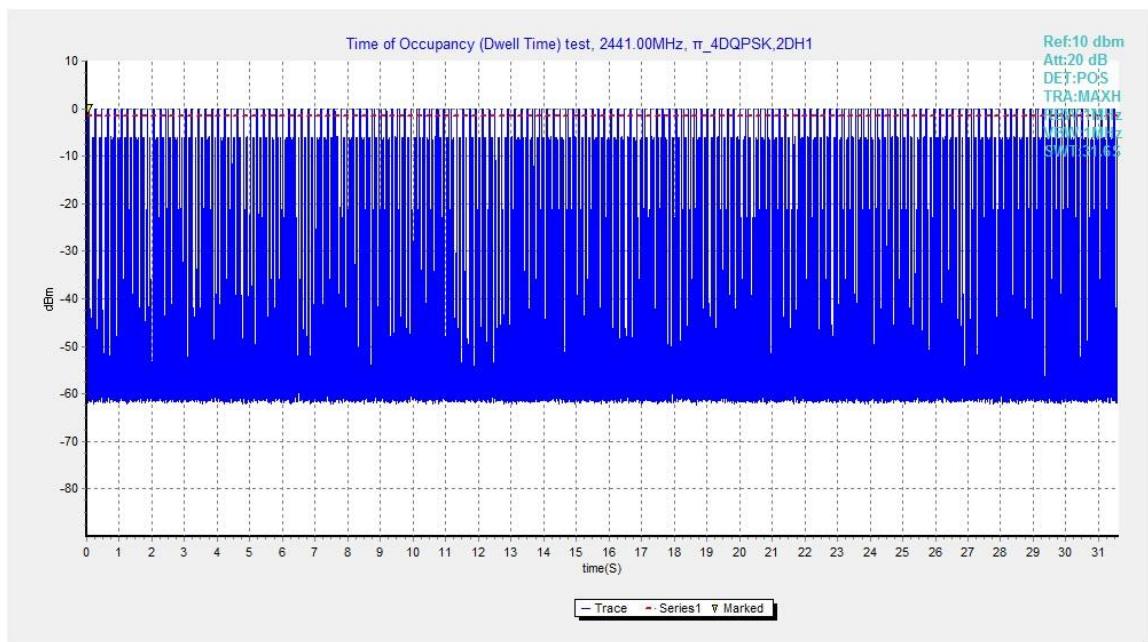


Fig.71. Number of Transmissions Measurement:Channel 39,Packet 2-DH1

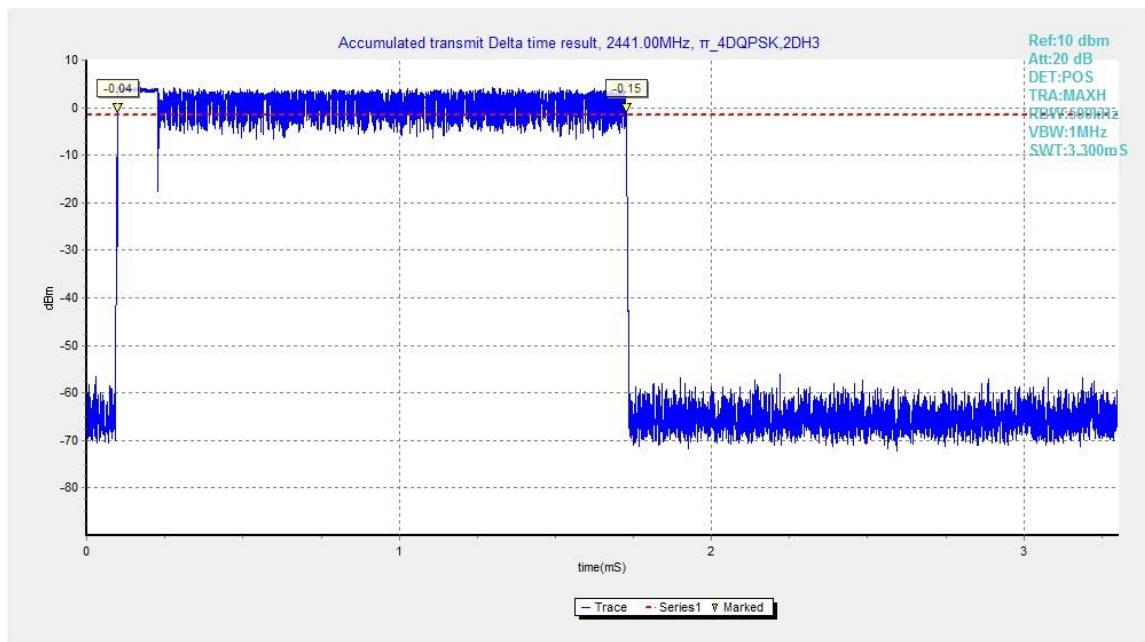


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

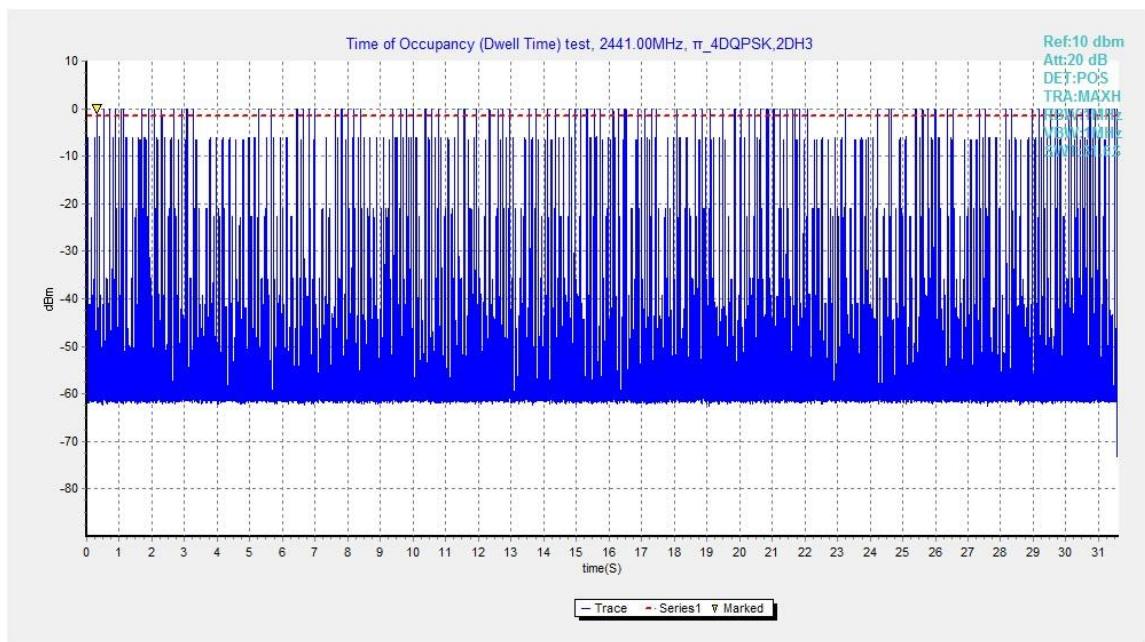


Fig.73. Number of Transmissions Measurement:Channel 39,Packet 2-DH3

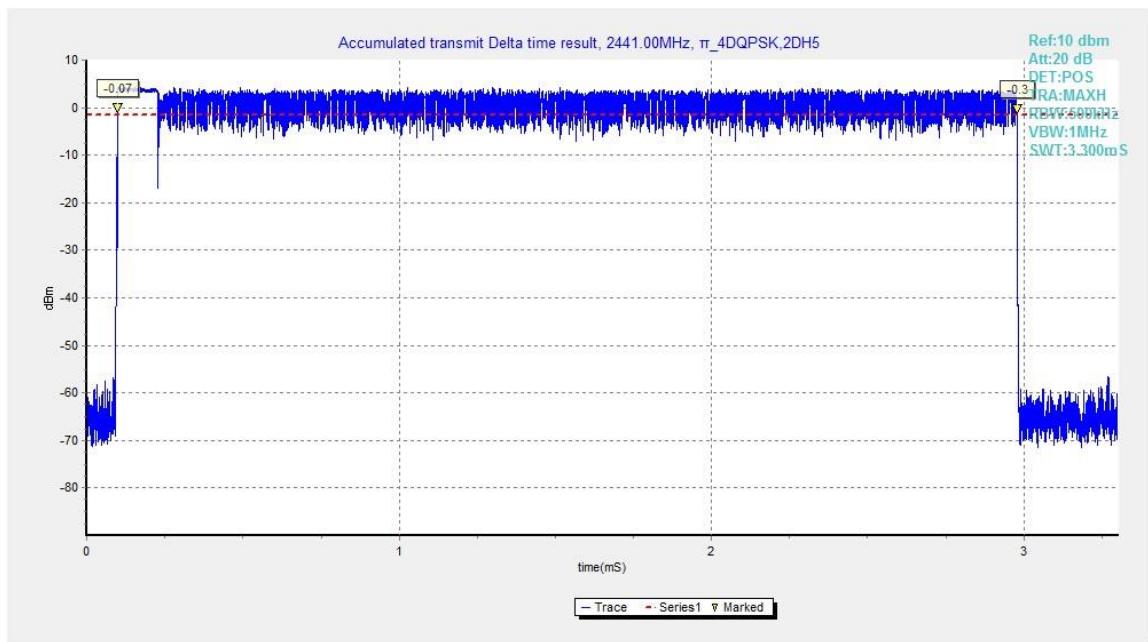


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

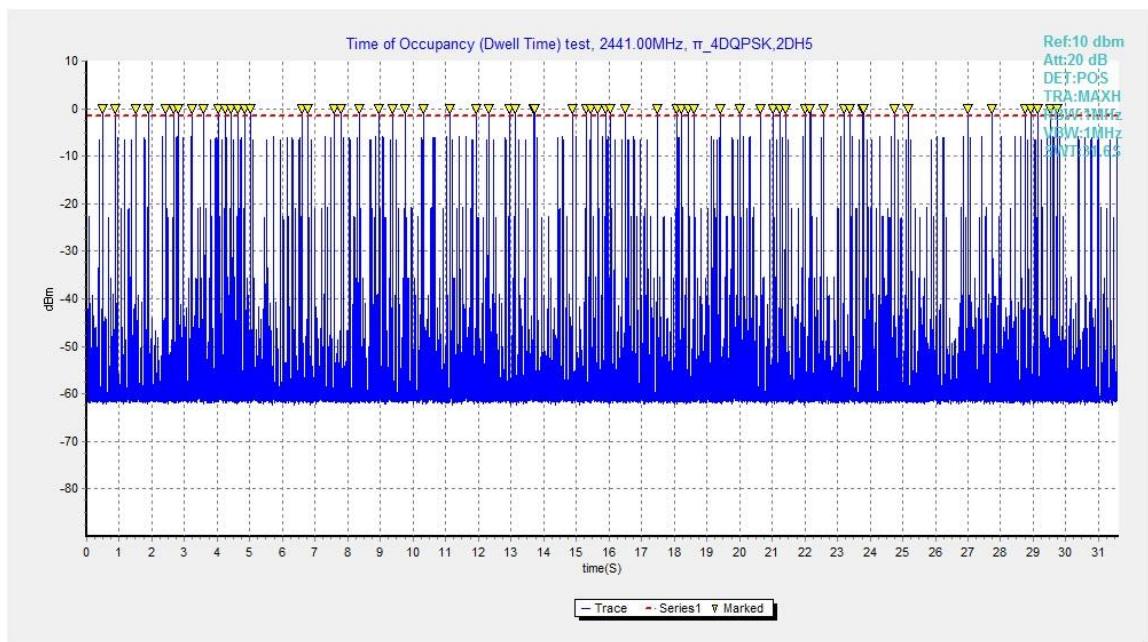


Fig.75. Number of Transmissions Measurement:Channel 39,Packet 2-DH5

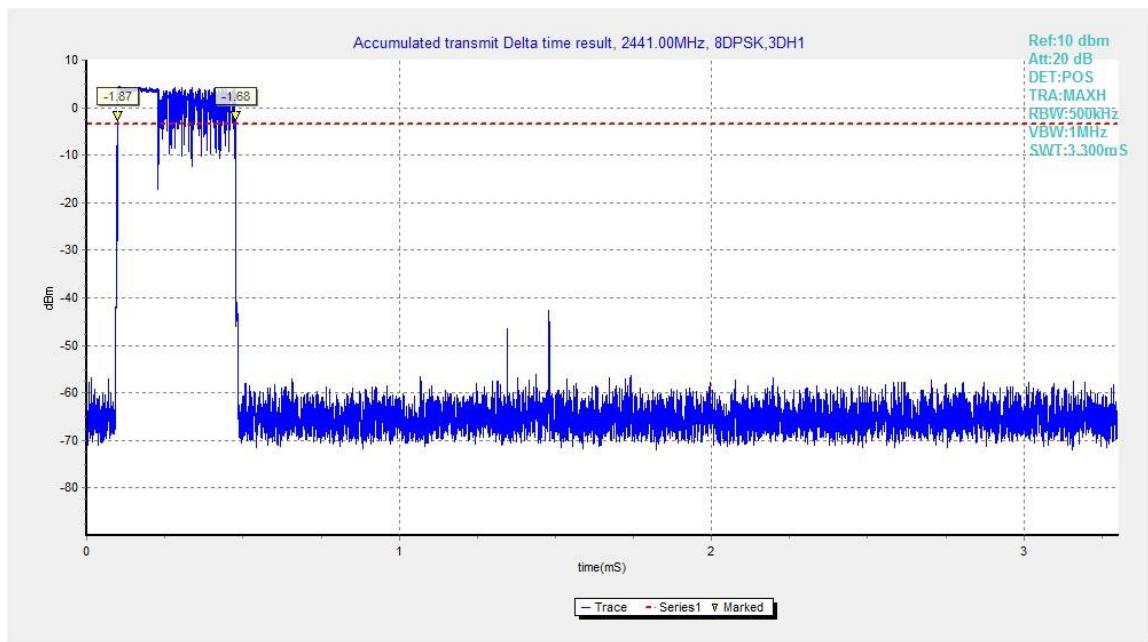


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

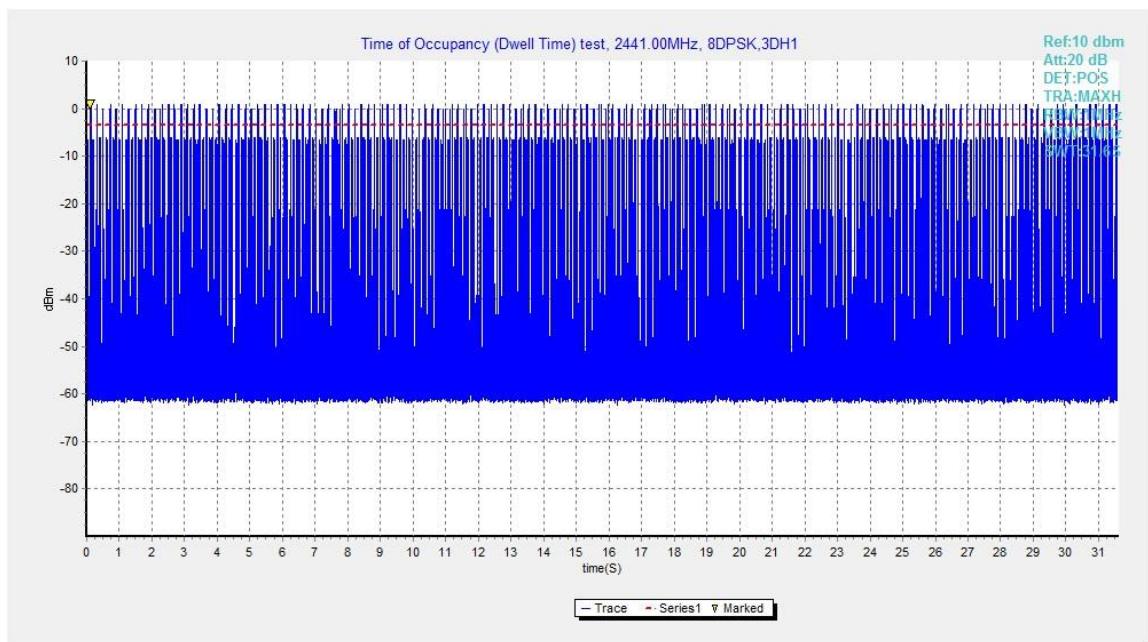


Fig.77. Number of Transmissions Measurement:Channel 39,Packet 3-DH1

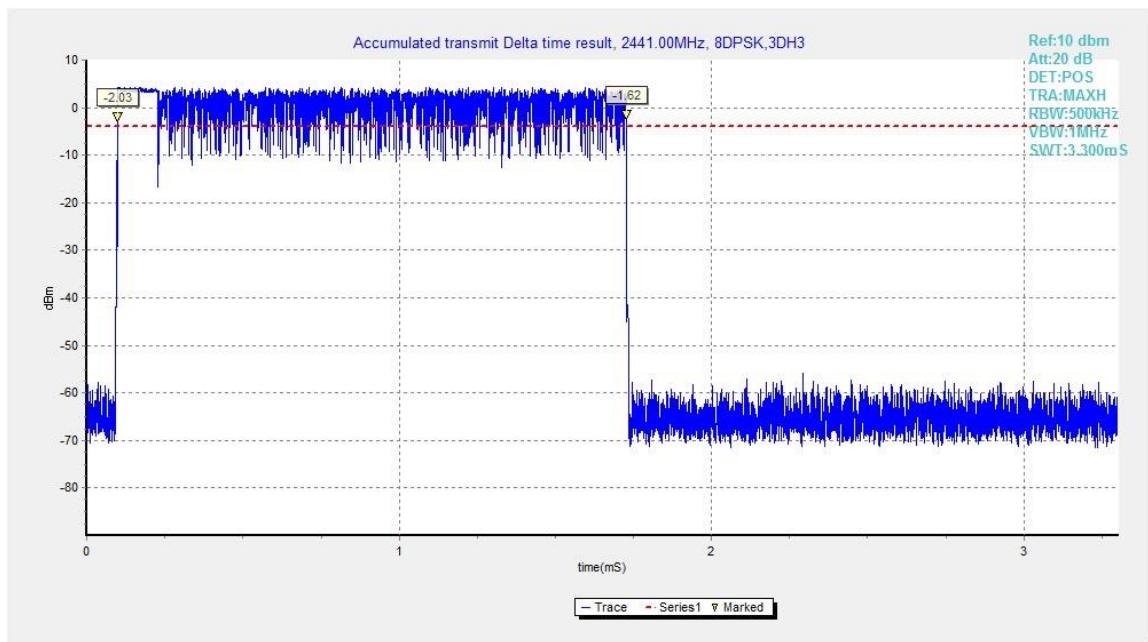


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

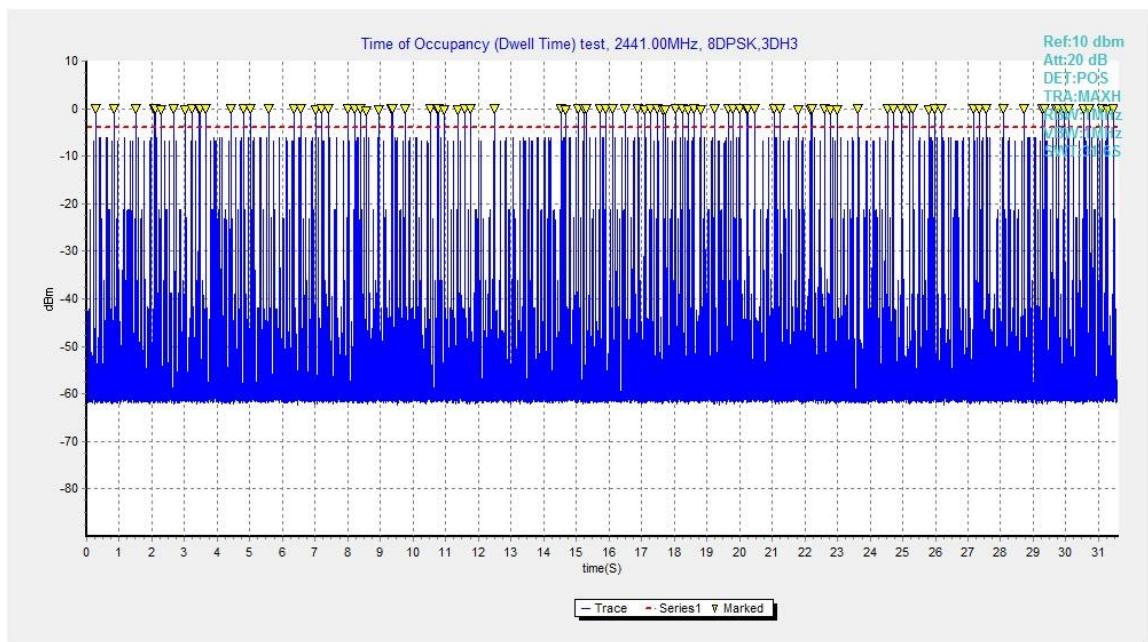


Fig.79. Number of Transmissions Measurement:Channel 39,Packet 3-DH3

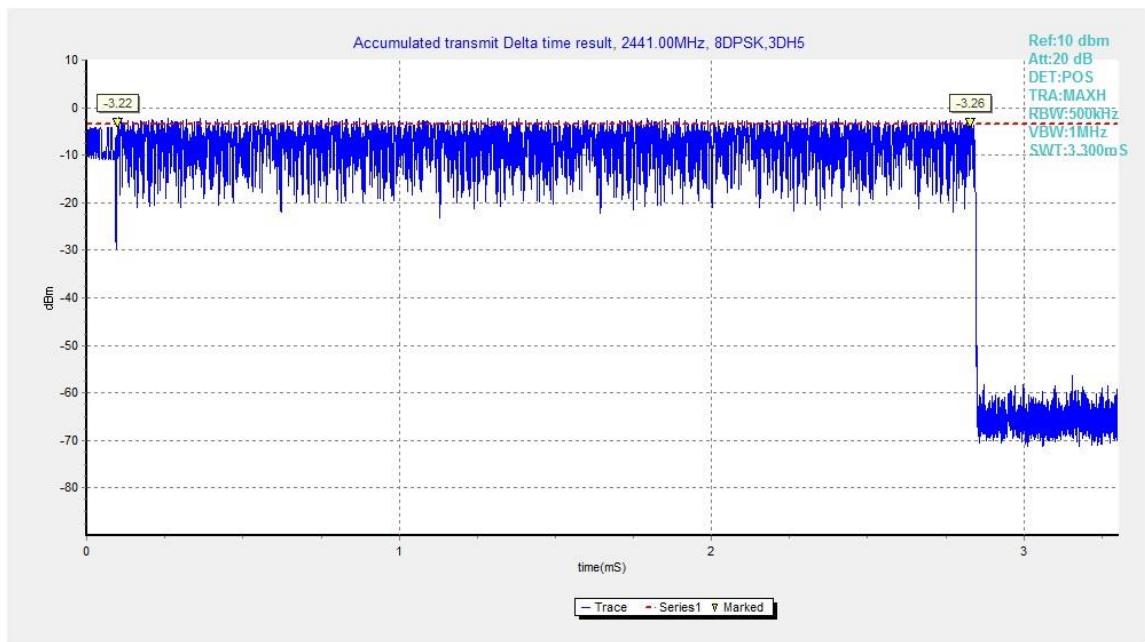


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

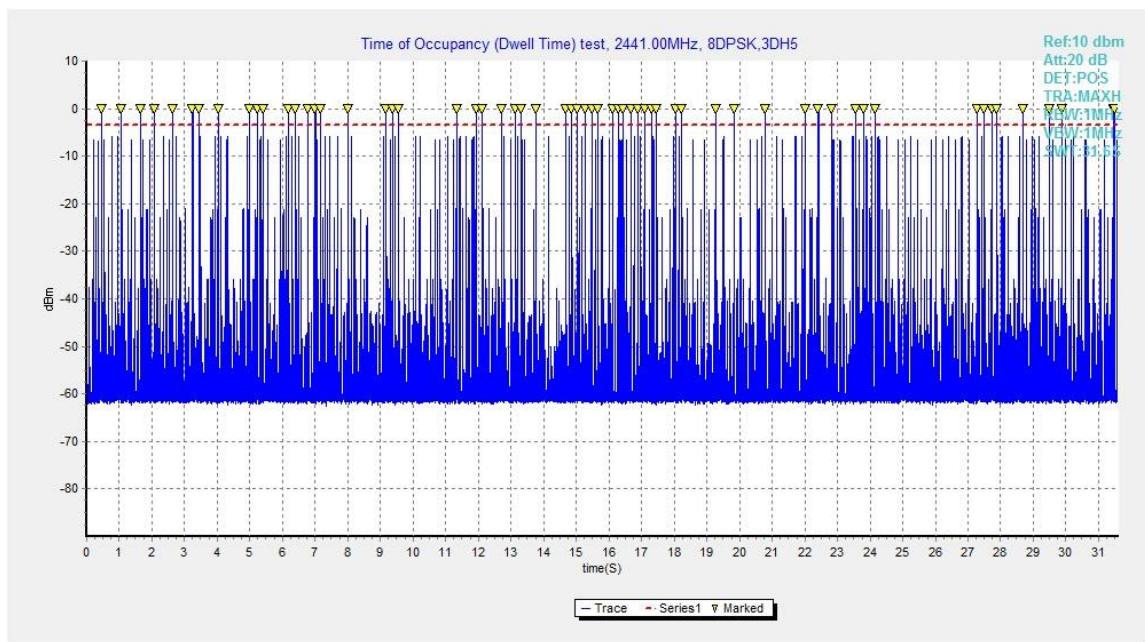


Fig.81. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

A.7. 20dB Bandwidth

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.82	948.75	NA
39	Fig.83	947.25	NA
78	Fig.84	948.00	NA

For π/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1283.25	NA
39	Fig.86	1281.75	NA
78	Fig.87	1262.25	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1256.25	NA
39	Fig.89	1281.00	NA
78	Fig.90	1257.75	NA

Conclusion: NA

Test graphs as below:

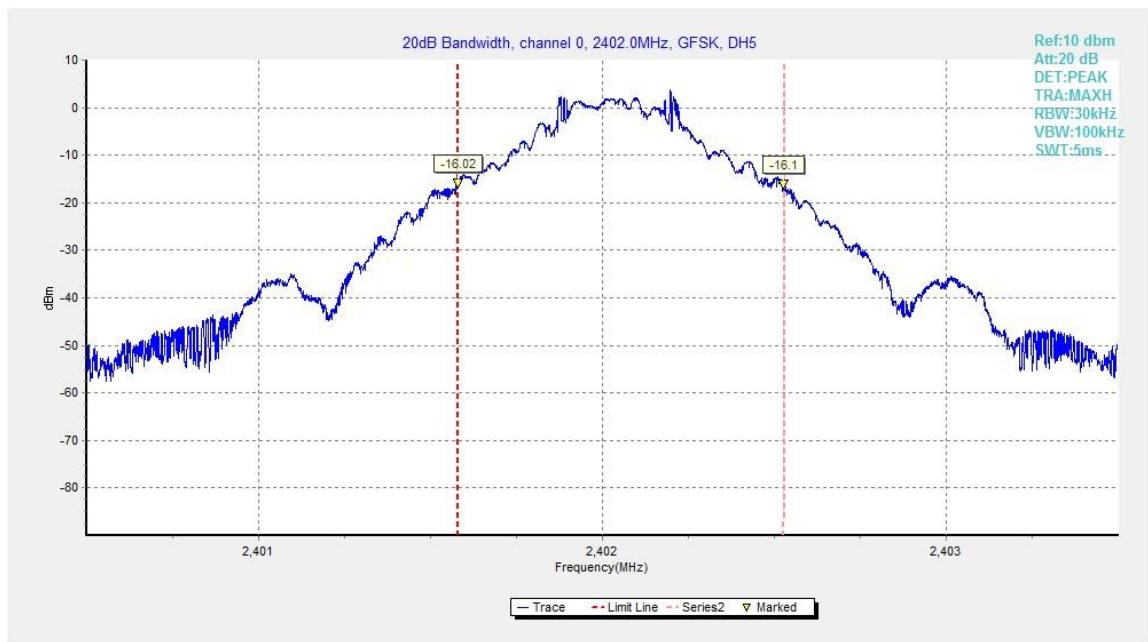


Fig.82. 20dB Bandwidth: GFSK, Channel 0

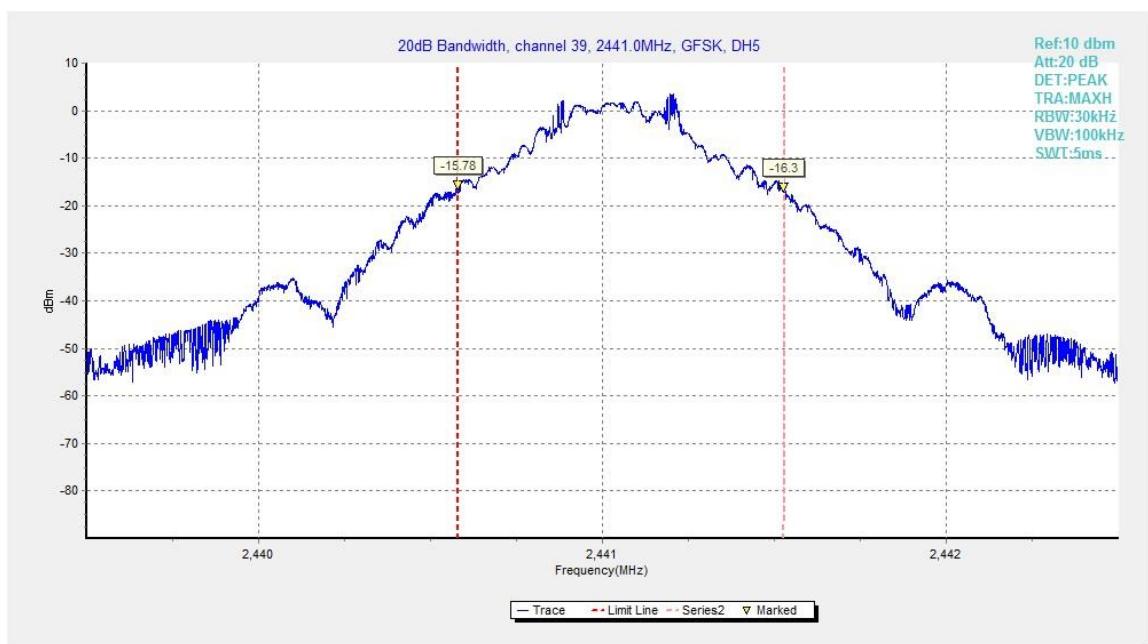


Fig.83. 20dB Bandwidth: GFSK, Channel 39

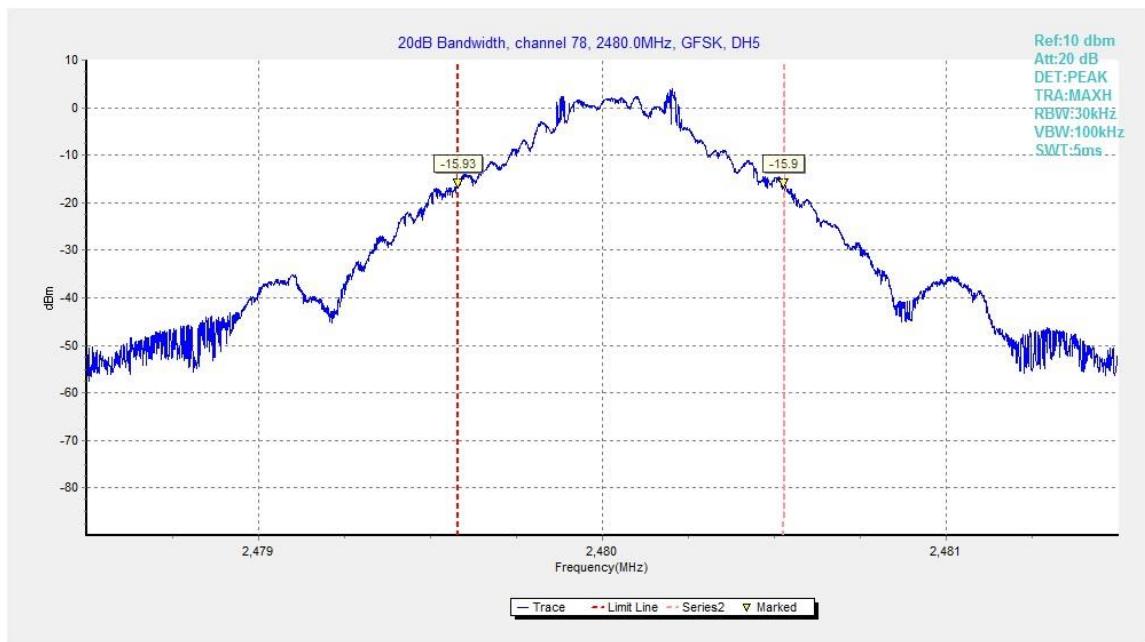


Fig.84. 20dB Bandwidth: GFSK, Channel 78

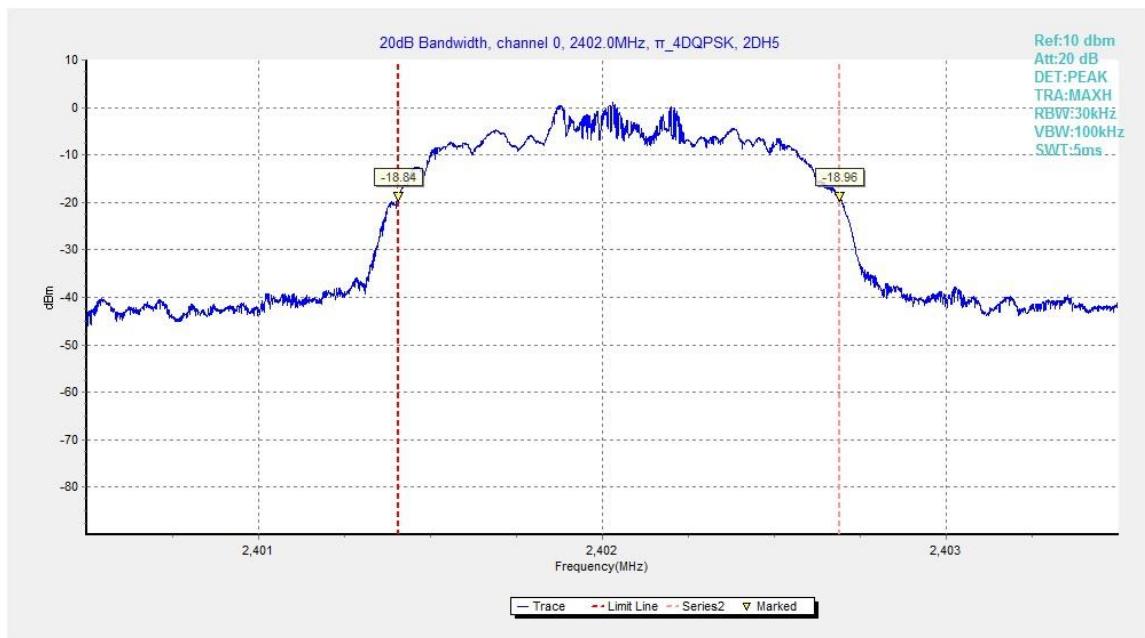
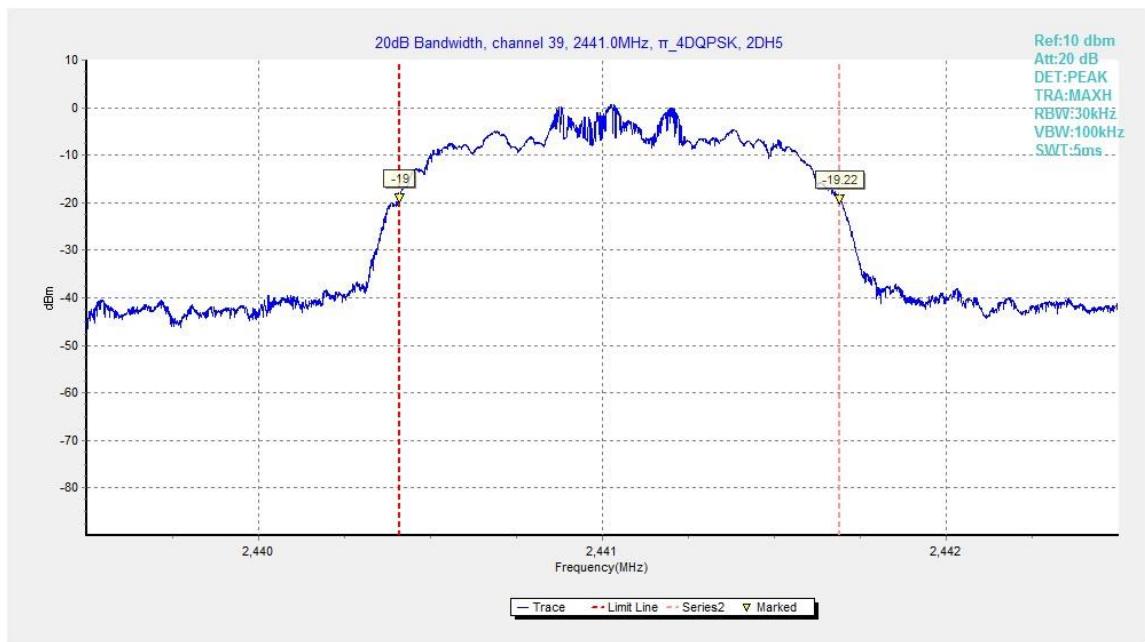
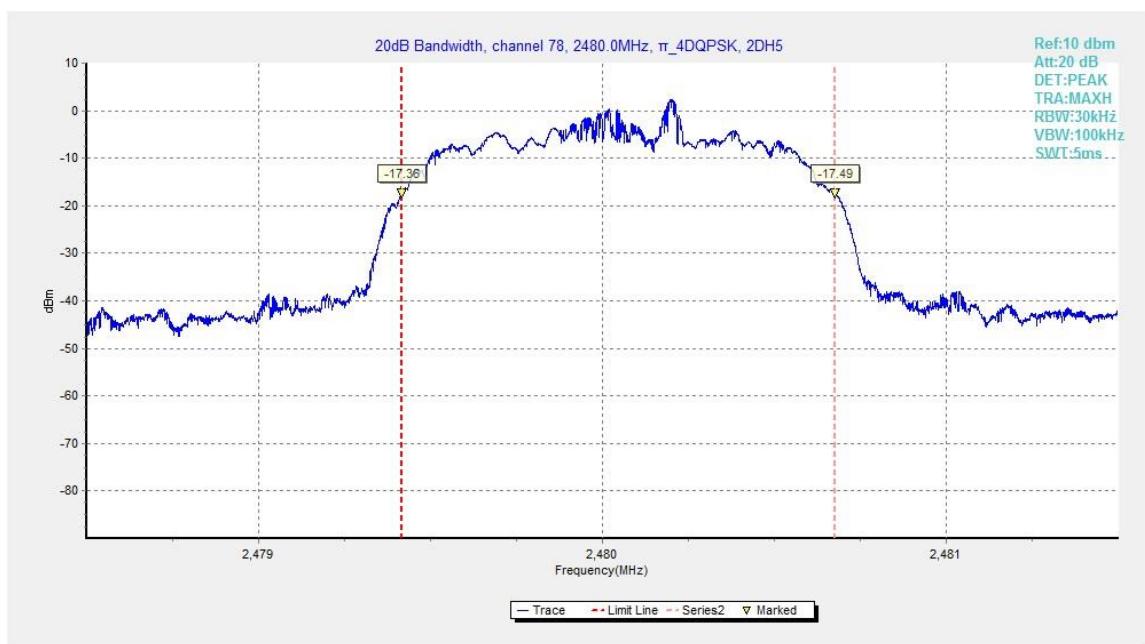


Fig.85. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0


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

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

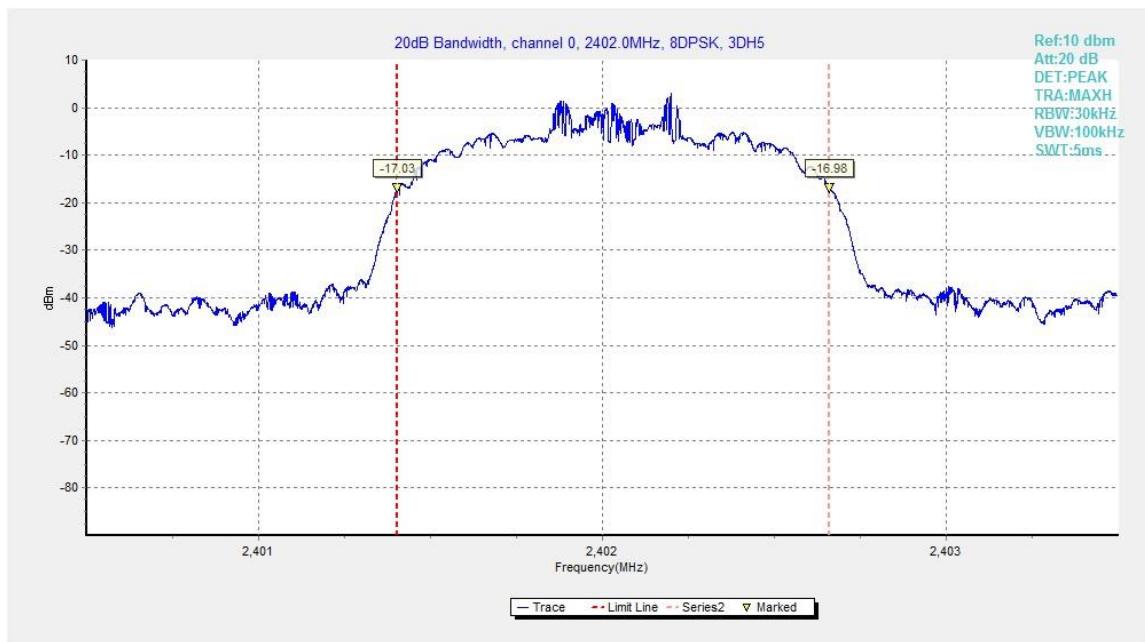


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

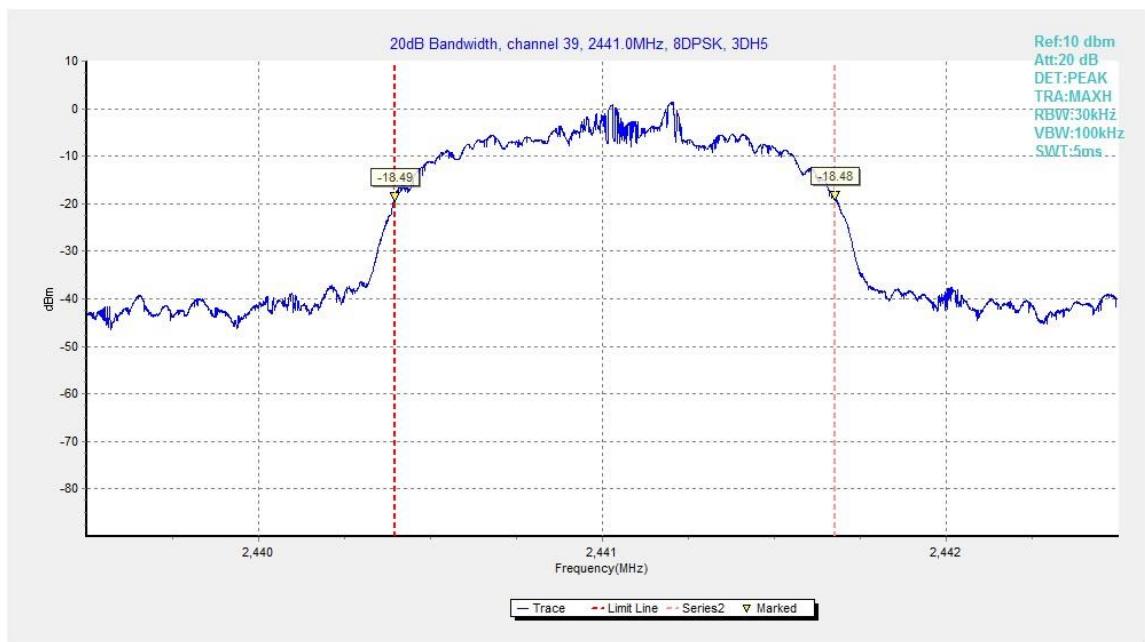


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

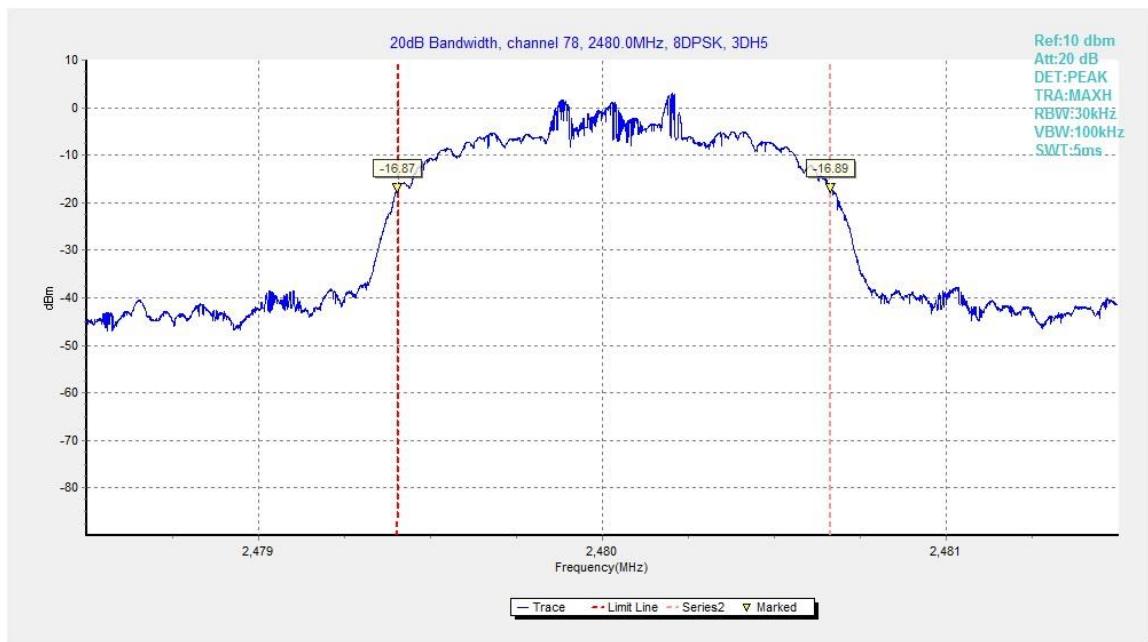


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

A.8. Carrier Frequency Separation

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.91	1309.50	P

For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	1158.75	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	985.50	P

Conclusion: PASS

Test graphs as below:

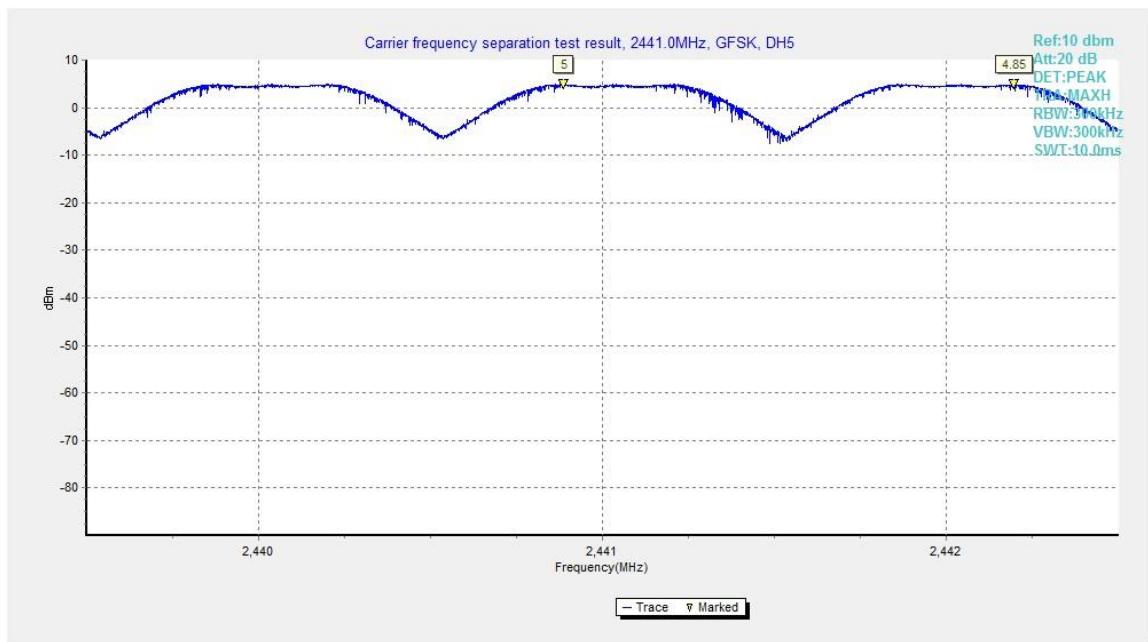


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

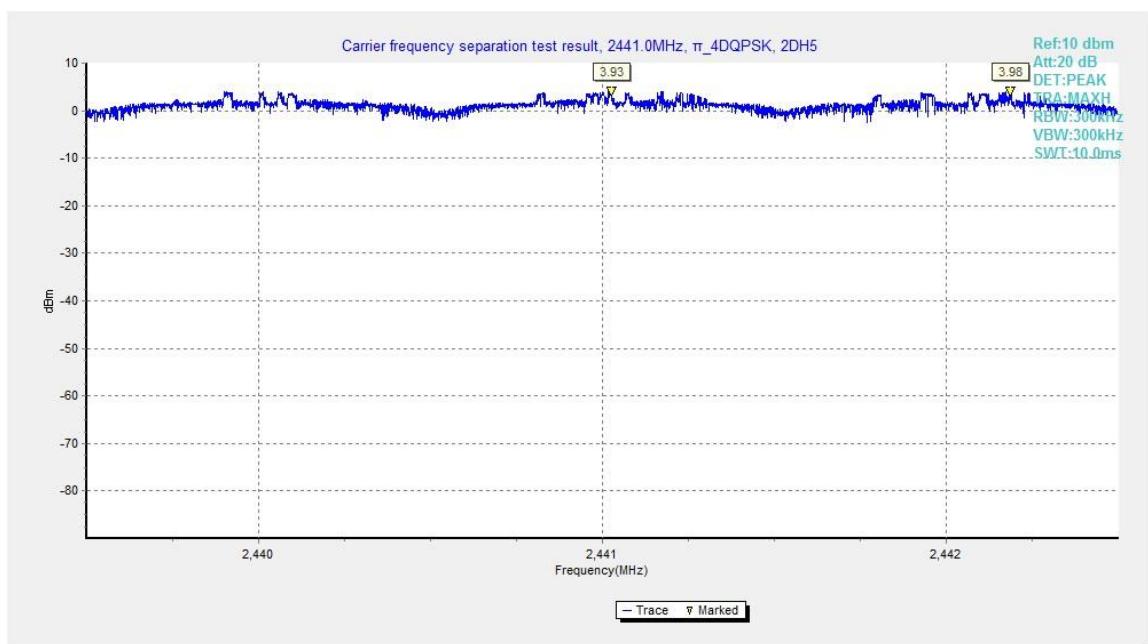


Fig.92. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39

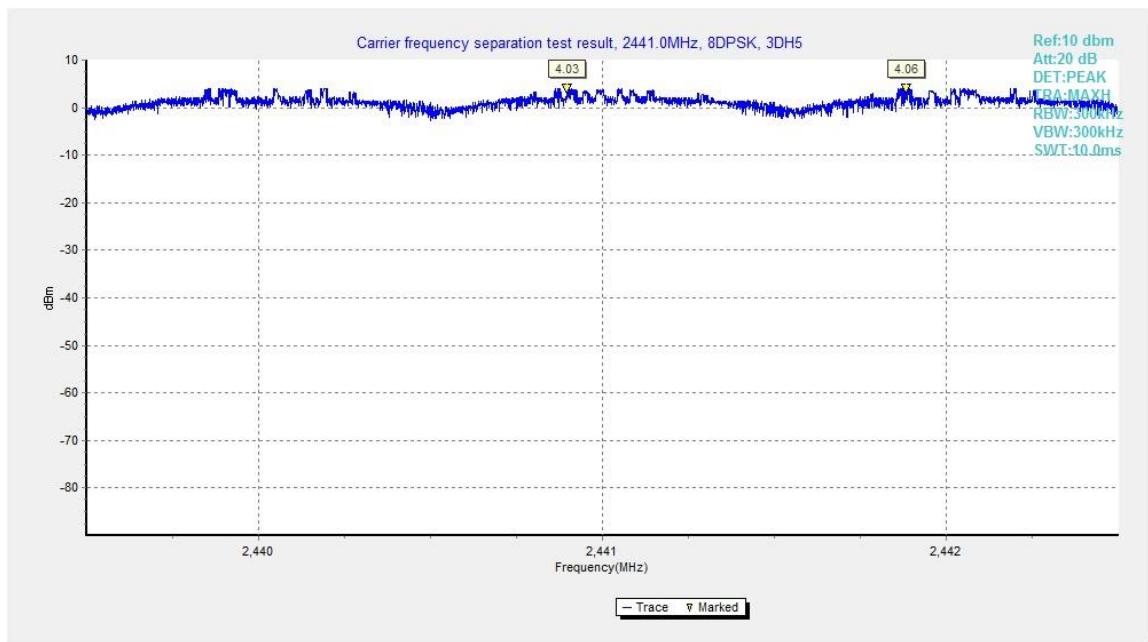


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

A.9. Number of Hopping Channels

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.94	
40~78	Fig.95	P

For π/4 DQPSK

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

For 8DPSK

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

Conclusion: PASS

Test graphs as below:

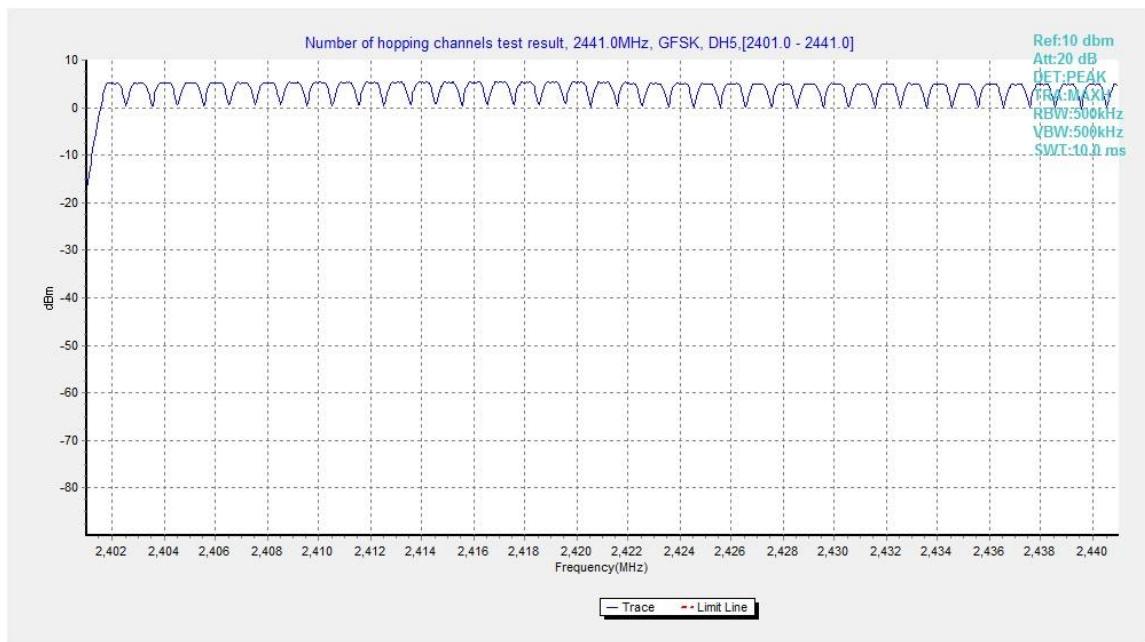


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39



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

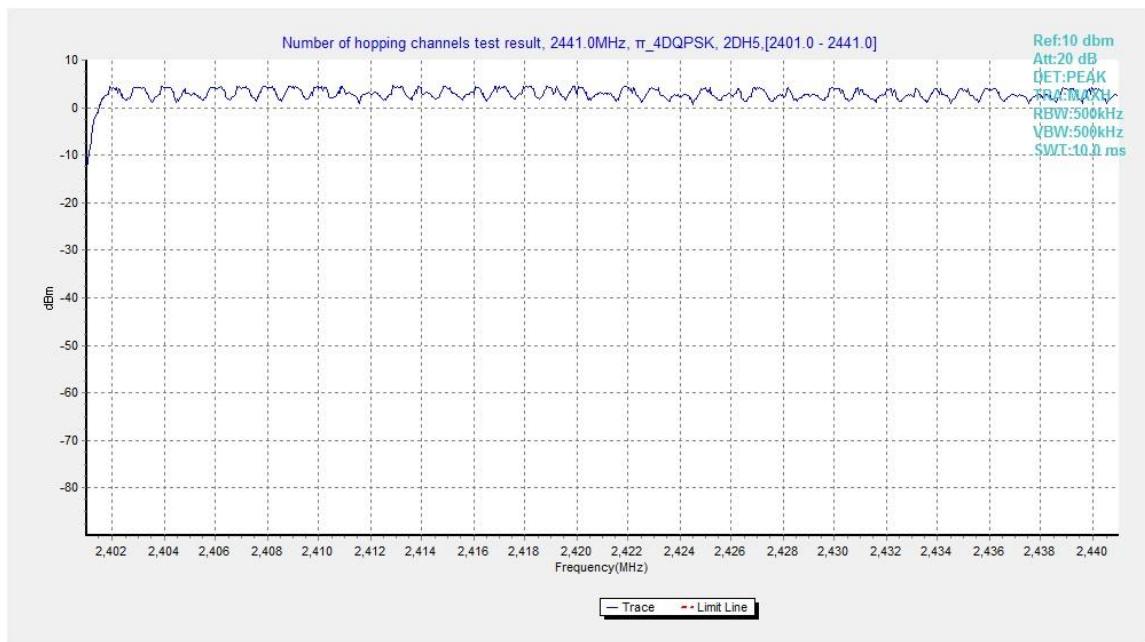


Fig.96. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39

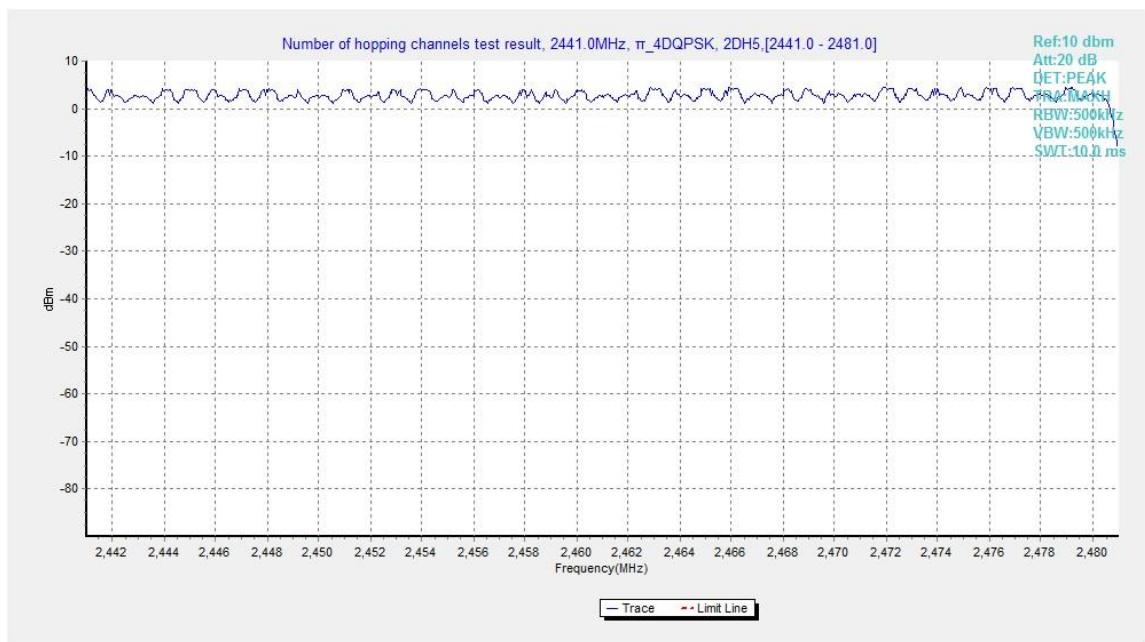


Fig.97. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78

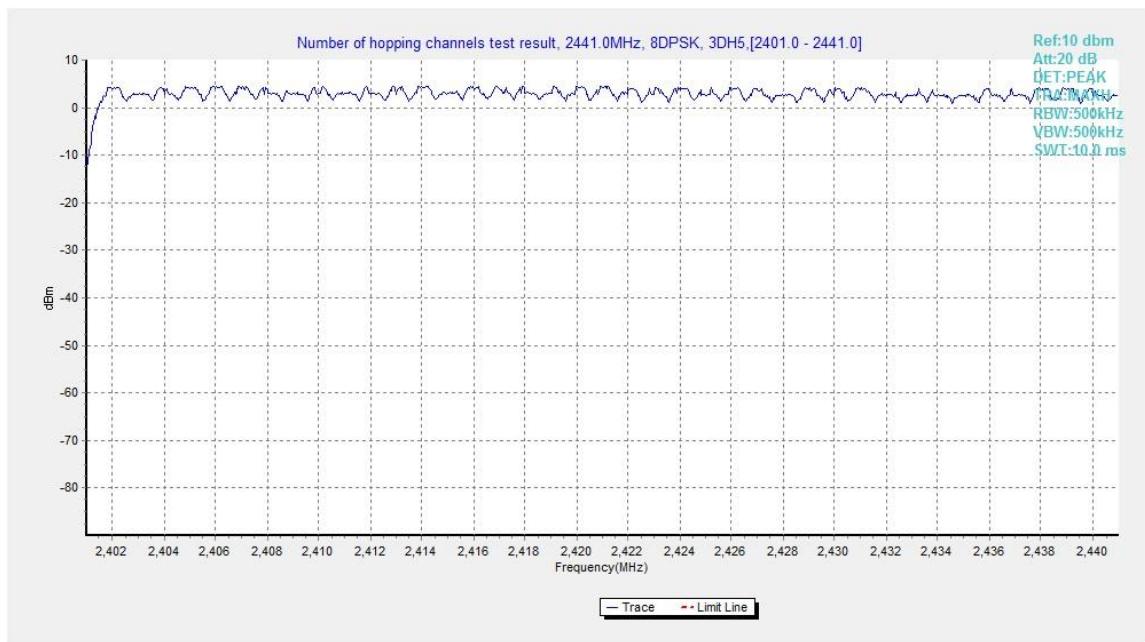


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

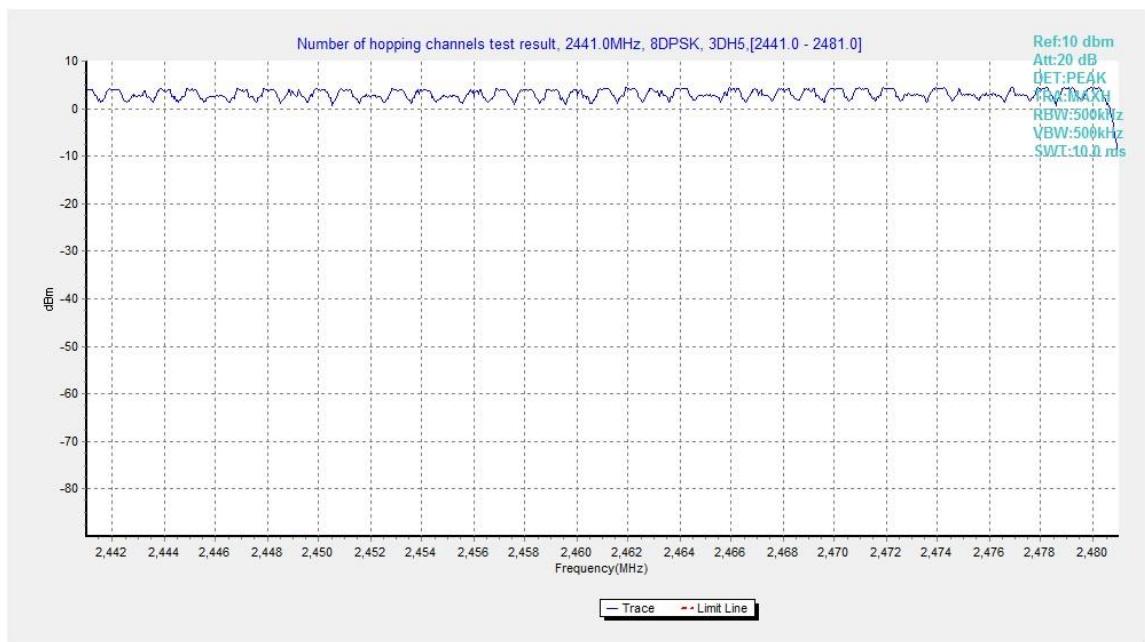


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

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	

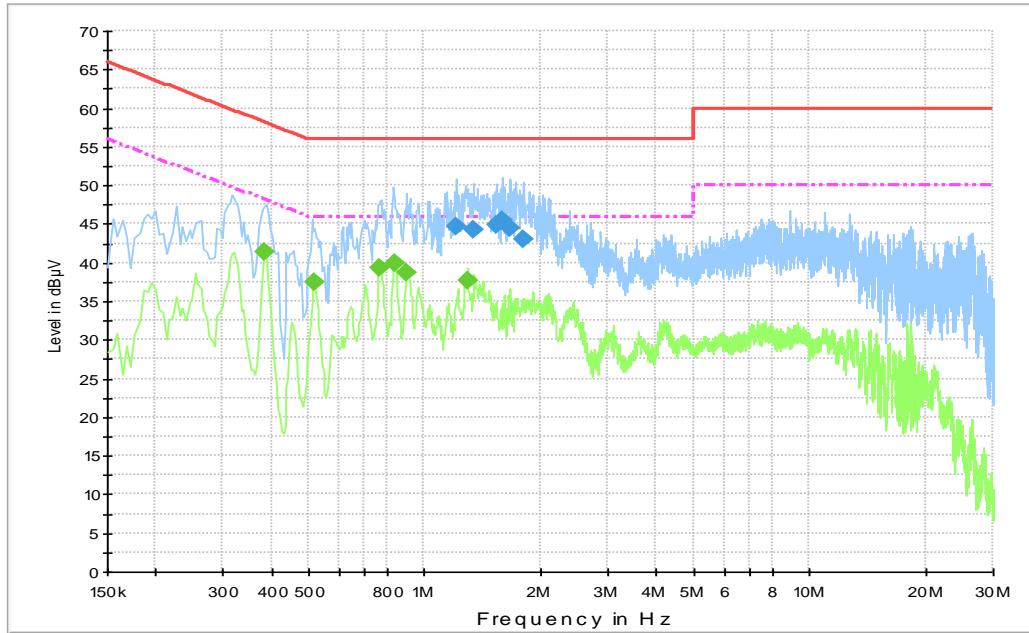
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

Traffic with CBA0058AGAC4:



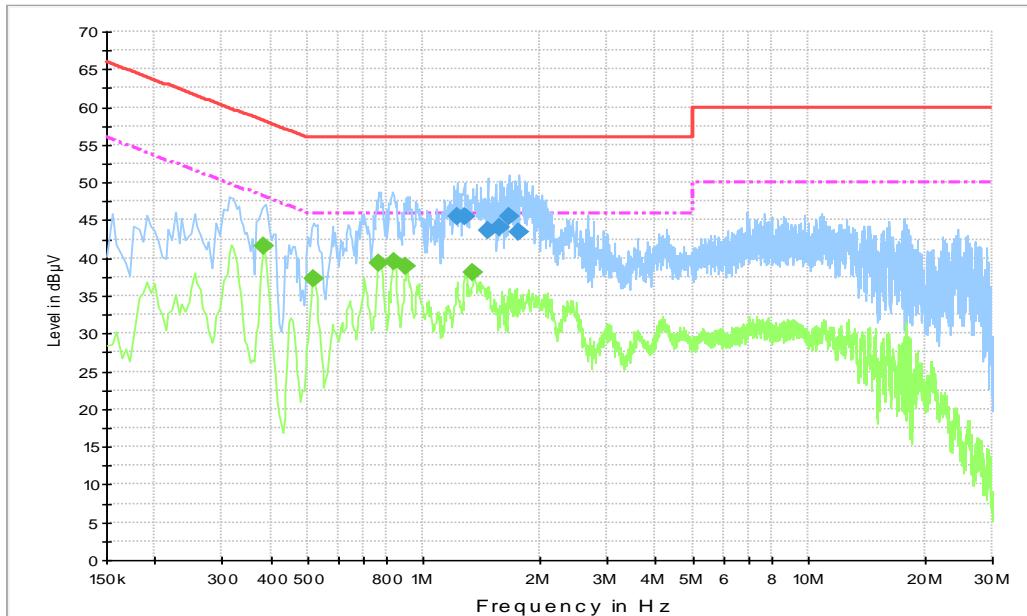
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.207500	44.6	GND	L1	10.2	11.4	56.0
1.338000	44.3	GND	N	10.3	11.7	56.0
1.531500	45.0	GND	L1	10.2	11.0	56.0
1.599000	45.6	GND	L1	10.2	10.4	56.0
1.675500	44.6	GND	L1	10.2	11.4	56.0
1.815000	43.0	GND	L1	10.3	13.0	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.384000	41.4	GND	N	10.3	6.8	48.2
0.519000	37.4	GND	N	10.3	8.6	46.0
0.762000	39.4	GND	N	10.3	6.6	46.0
0.834000	40.0	GND	N	10.3	6.0	46.0
0.897000	38.8	GND	N	10.3	7.2	46.0
1.288500	37.7	GND	N	10.3	8.3	46.0

Idle with CBA0058AGAC4:

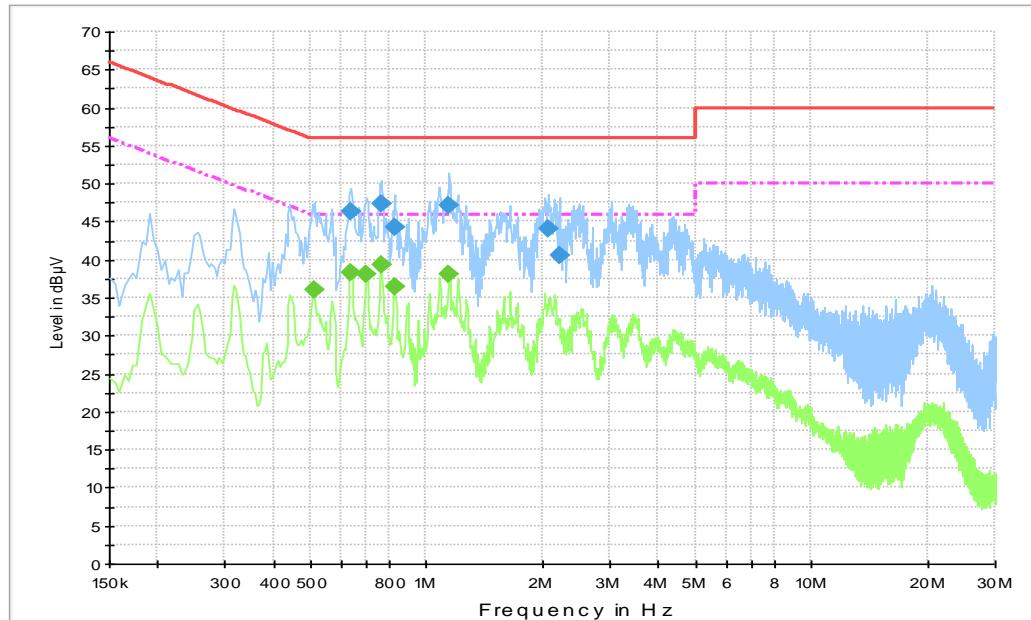


Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.216500	45.5	GND	L1	10.2	10.5	56.0
1.275000	45.6	GND	L1	10.2	10.4	56.0
1.464000	43.7	GND	L1	10.2	12.3	56.0
1.576500	44.0	GND	L1	10.2	12.0	56.0
1.662000	45.4	GND	L1	10.2	10.6	56.0
1.774500	43.4	GND	L1	10.2	12.6	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.384000	41.5	GND	N	10.3	6.7	48.2
0.519000	37.2	GND	N	10.3	8.8	46.0
0.762000	39.4	GND	N	10.3	6.6	46.0
0.838500	39.4	GND	N	10.3	6.6	46.0
0.901500	39.0	GND	N	10.3	7.0	46.0
1.347000	38.0	GND	N	10.3	8.0	46.0

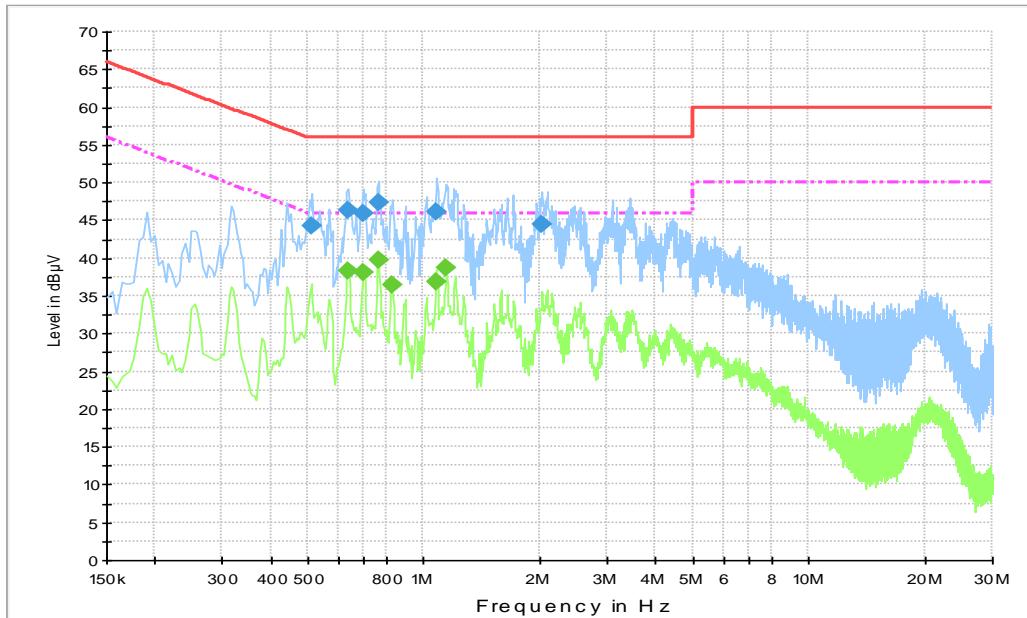
Traffic with CBA0058AGAC2:

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.636000	46.3	GND	L1	10.2	9.7	56.0
0.762000	47.4	GND	L1	10.2	8.6	56.0
0.825000	44.4	GND	L1	10.2	11.6	56.0
1.144500	47.1	GND	L1	10.2	8.9	56.0
2.071500	44.2	GND	L1	10.3	11.8	56.0
2.220000	40.6	GND	L1	10.3	15.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.510000	36.1	GND	N	10.3	9.9	46.0
0.636000	38.3	GND	N	10.3	7.7	46.0
0.699000	38.2	GND	N	10.3	7.8	46.0
0.762000	39.3	GND	L1	10.2	6.7	46.0
0.825000	36.5	GND	N	10.3	9.5	46.0
1.144500	38.2	GND	L1	10.2	7.8	46.0

Idle with CBA0058AGAC2:



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.514500	44.3	GND	L1	10.2	11.7	56.0
0.636000	46.2	GND	L1	10.2	9.8	56.0
0.694500	45.9	GND	L1	10.2	10.1	56.0
0.762000	47.3	GND	L1	10.2	8.7	56.0
1.081500	46.1	GND	L1	10.2	9.9	56.0
2.026500	44.5	GND	L1	10.3	11.5	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.636000	38.2	GND	N	10.3	7.8	46.0
0.699000	38.1	GND	N	10.3	7.9	46.0
0.762000	39.6	GND	N	10.3	6.4	46.0
0.825000	36.5	GND	L1	10.2	9.5	46.0
1.081500	36.9	GND	L1	10.2	9.1	46.0
1.140000	38.7	GND	N	10.3	7.3	46.0

END OF REPORT