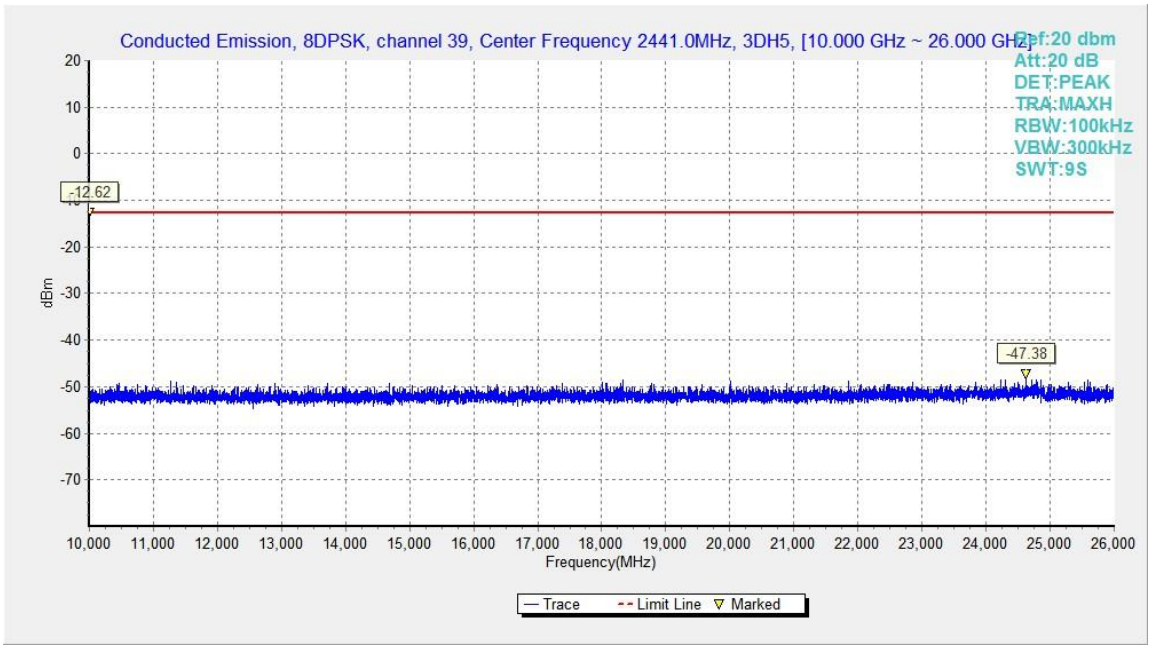


Fig.58. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

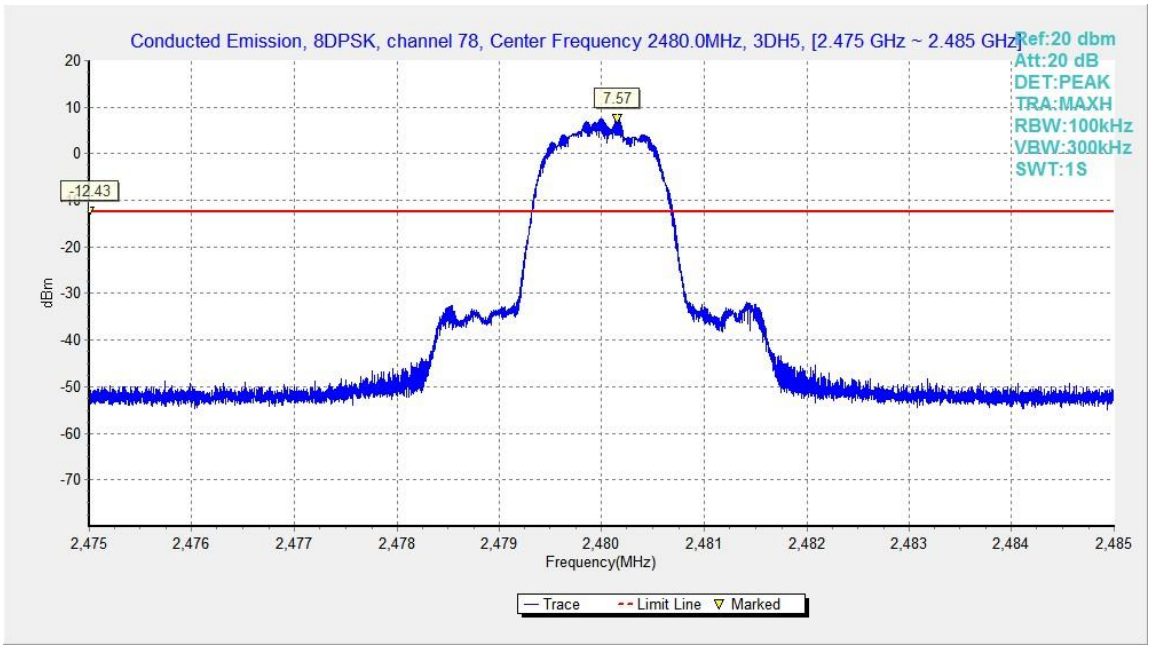


Fig.59. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

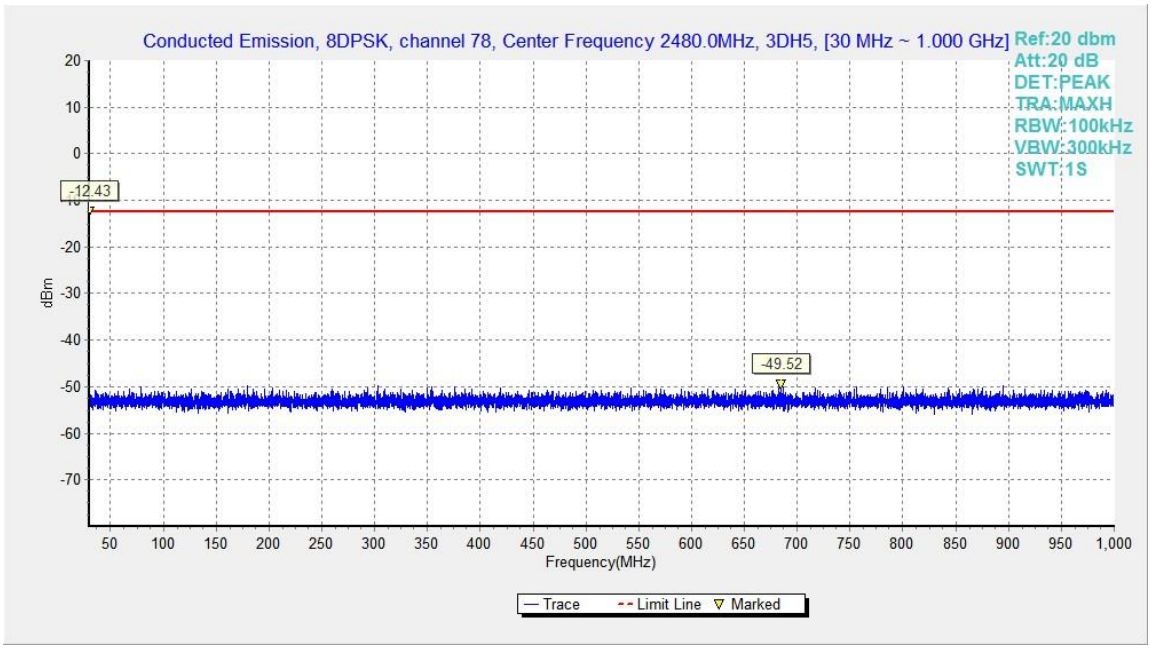


Fig.60. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

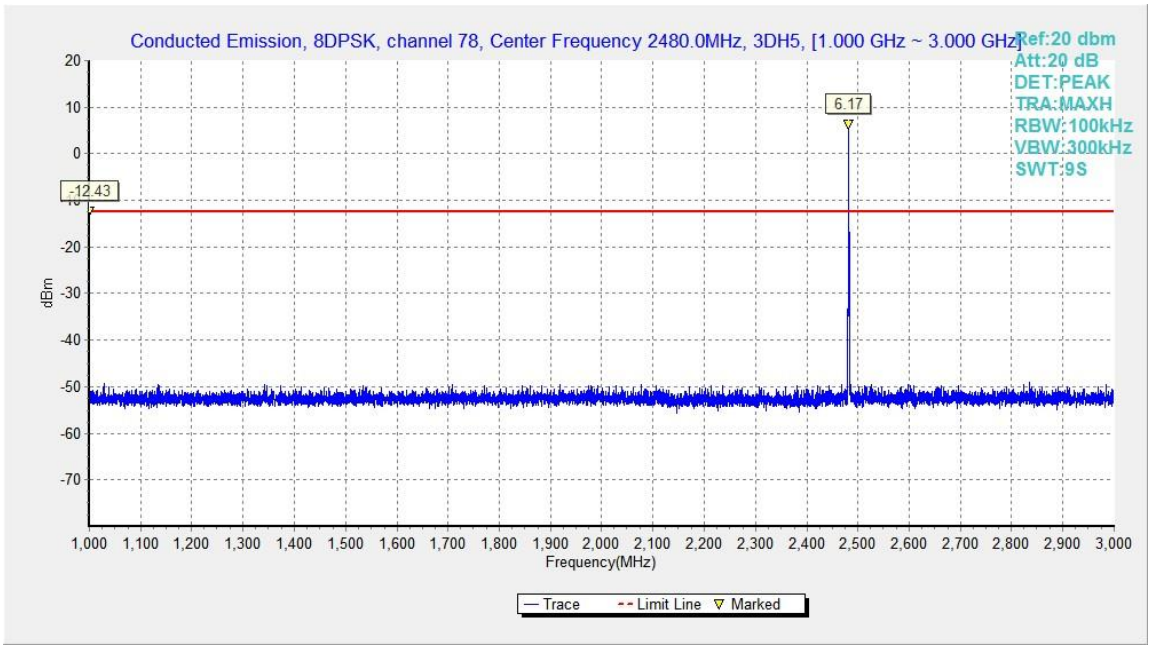


Fig.61. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

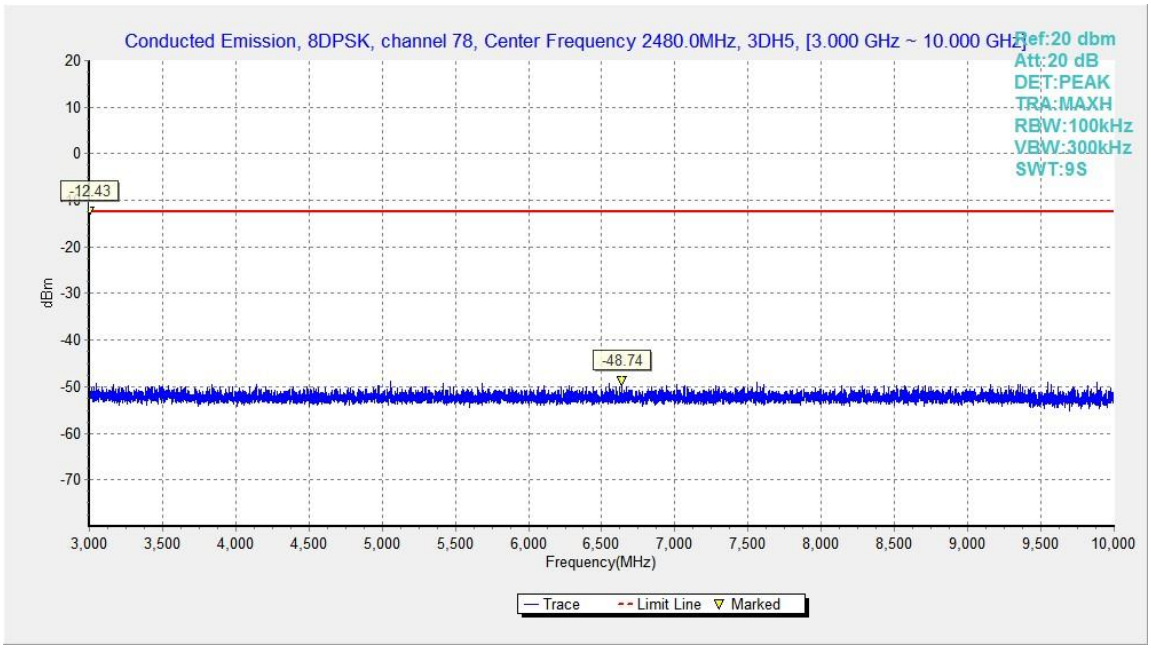


Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

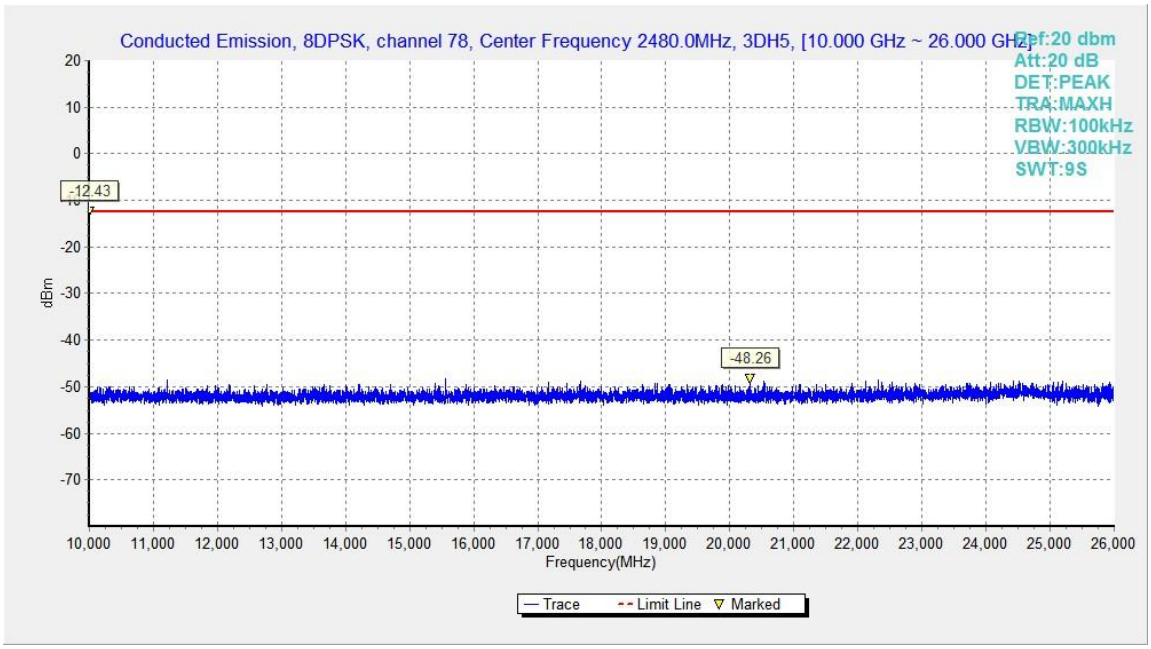


Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

B.6. Transmitter Spurious Emission - Radiated

Method of Measurement: See ANSI C63.10-clause 6.4 &6.5 & 6.6

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency (MHz)	Field strength(μV/m)	Measurement distance(m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The EUT and transmitting antenna shall be centered on the turntable.

Note:

1. A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.
P_{Mea} is the field strength recorded from the instrument.
The measurement results are obtained as described below:
Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

2. The range of evaluated frequency is from 9 kHz to 26GHz. Measurement value showed here only up to 6 maximum emissions noted.

Peak Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2384.158	60.10	5.7	32.2	22.26	74.0	13.9	V
2387.910	60.50	5.7	32.2	22.60	74.0	13.5	H
4804.500	44.75	-33.9	34.1	44.58	74.0	29.2	H
7206.000	44.42	-32.6	35.8	41.21	74.0	29.6	H
9608.000	45.44	-30.5	36.9	39.07	74.0	28.6	H
12010.000	46.99	-29.9	38.7	38.15	74.0	27.0	H

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2380.600	46.48	-35.6	32.1	49.92	74.0	27.5	V
2493.600	50.47	-30.4	32.6	48.28	74.0	23.5	V
4882.500	45.08	-34.2	34.2	45.12	74.0	28.9	H
7323.000	44.72	-32.5	35.9	41.27	74.0	29.3	V
9764.000	45.79	-31.4	36.9	40.30	74.0	28.2	H
12205.000	45.36	-30.7	39.1	37.00	74.0	28.6	V

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2484.015	61.80	5.7	32.6	23.50	74.0	12.2	H
2487.165	61.87	5.7	32.6	23.54	74.0	12.1	V
4960.000	44.78	-33.7	34.3	44.25	74.0	29.2	H
7440.500	45.29	-32.3	35.8	41.76	74.0	28.7	V
9920.000	43.47	-32.1	37.1	38.50	74.0	30.5	H
12400.000	46.47	-30.1	39.0	37.58	74.0	27.5	H

π/4 DQPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2386.440	60.13	5.7	32.2	22.25	74.0	13.9	H
2388.554	60.32	5.7	32.2	22.41	74.0	13.7	H
4803.500	44.56	-33.9	34.1	44.38	74.0	29.4	H
7206.000	43.23	-32.6	35.8	40.02	74.0	30.8	H
9608.000	45.19	-30.5	36.9	38.82	74.0	28.8	V
12010.000	46.50	-29.9	38.7	37.67	74.0	27.5	H

π/4 DQPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2379.600	46.17	-35.7	32.1	49.74	74.0	27.8	H
2497.000	49.30	-32.4	32.6	49.12	74.0	24.7	H
4882.000	44.51	-34.2	34.2	44.55	74.0	29.5	H
7323.000	43.66	-32.5	35.9	40.22	74.0	30.3	H
9764.000	44.31	-31.4	36.9	38.81	74.0	29.7	V
12205.000	46.67	-30.7	39.1	38.32	74.0	27.3	H

π/4 DQPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2486.830	61.56	5.7	32.6	23.24	74.0	12.4	H
2494.300	61.93	5.7	32.6	23.59	74.0	12.1	H
4959.500	45.77	-33.7	34.3	45.24	74.0	28.2	V
7440.000	44.63	-32.3	35.8	41.10	74.0	29.4	V
9920.000	43.50	-32.1	37.1	38.53	74.0	30.5	H
12400.000	46.02	-30.1	39.0	37.13	74.0	28.0	H

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2370.396	60.73	5.6	32.0	23.13	74.0	13.3	V
2384.662	60.61	5.7	32.2	22.77	74.0	13.4	H
4803.500	45.07	-33.9	34.1	44.89	74.0	28.9	H
7206.000	43.07	-32.6	35.8	39.86	74.0	30.9	H
9608.000	45.02	-30.5	36.9	38.64	74.0	29.0	H
12010.000	47.09	-29.9	38.7	38.26	74.0	26.9	H

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2377.200	46.48	-36.0	32.1	50.38	74.0	27.5	V
2496.200	50.23	-31.9	32.6	49.57	74.0	23.8	H
4881.500	44.97	-34.2	34.2	45.01	74.0	29.0	H
7323.000	43.81	-32.5	35.9	40.36	74.0	30.2	V
9764.000	43.83	-31.4	36.9	38.33	74.0	30.2	H
12205.000	45.32	-30.7	39.1	36.97	74.0	28.7	H

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2486.050	61.27	5.7	32.6	22.95	74.0	12.7	H
2464.975	61.90	5.7	32.6	23.63	74.0	12.1	V
4959.500	45.07	-33.7	34.3	44.53	74.0	28.9	V
7440.000	43.32	-32.3	35.8	39.79	74.0	30.7	V
9920.000	42.99	-32.1	37.1	38.01	74.0	31.0	V
12400.000	46.07	-30.1	39.0	37.18	74.0	27.9	V

Average Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2385.750	46.03	5.7	32.2	8.17	54.0	8.0	V
2389.013	46.05	5.7	32.2	8.13	54.0	8.0	V
4837.500	38.42	-34.1	34.1	38.43	54.0	15.6	V
7205.850	34.53	-32.6	35.8	31.32	54.0	19.5	H
9607.950	33.83	-30.5	36.9	27.46	54.0	20.2	V
12010.500	35.49	-29.9	38.7	26.65	54.0	18.5	H

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2435.963	47.73	5.4	32.5	9.78	54.0	6.3	V
2446.838	47.81	5.4	32.6	9.80	54.0	6.2	V
4881.600	37.65	-34.2	34.2	37.68	54.0	16.4	V
7322.850	35.31	-32.5	35.9	31.86	54.0	18.7	H
9764.100	32.61	-31.4	36.9	27.11	54.0	21.4	H
12204.900	34.08	-30.7	39.1	25.72	54.0	19.9	V

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2486.213	48.40	5.7	32.6	10.08	54.0	5.6	V
2492.850	48.34	5.7	32.6	10.00	54.0	5.7	V
4959.900	38.27	-33.7	34.3	37.74	54.0	15.7	H
7439.850	35.84	-32.3	35.8	32.31	54.0	18.2	H
9919.800	31.73	-32.1	37.1	26.76	54.0	22.3	V
12400.200	34.72	-30.1	39.0	25.83	54.0	19.3	V

π/4 DQPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2385.375	45.92	5.7	32.2	8.06	54.0	5.8	V
2388.938	45.99	5.7	32.2	8.07	54.0	5.8	V
4803.750	34.56	-33.9	34.1	34.38	54.0	19.4	H
7205.400	31.99	-32.6	35.8	28.78	54.0	22.0	V
9607.950	33.77	-30.5	36.9	27.40	54.0	20.2	H
12010.000	35.40	-29.9	38.7	26.57	54.0	18.6	V

π/4 DQPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2436.263	47.74	5.4	32.5	9.79	54.0	6.3	V
2445.263	47.93	5.4	32.6	9.94	54.0	6.1	V
4881.600	35.19	-34.2	34.2	35.23	54.0	18.8	H
7322.850	32.49	-32.5	35.9	29.04	54.0	21.5	V
9764.100	32.61	-31.4	36.9	27.11	54.0	21.4	V
12204.900	34.03	-30.7	39.1	25.67	54.0	20.0	H

π/4 DQPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2497.125	48.29	5.7	32.6	9.96	54.0	8.3	V
2524.800	48.59	5.8	32.6	10.12	54.0	8.3	V
4959.450	35.43	-33.7	34.3	34.90	54.0	18.6	H
7439.850	31.93	-32.3	35.8	28.40	54.0	22.1	V
9919.800	31.67	-32.1	37.1	26.70	54.0	22.3	H
12400.200	34.73	-30.1	39.0	25.84	54.0	19.3	H

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2373.363	45.73	5.6	32.0	8.08	54.0	8.3	V
2386.313	45.94	5.7	32.2	8.07	54.0	8.3	V
4803.750	35.09	-33.9	34.1	34.91	54.0	18.9	H
7205.400	31.88	-32.6	35.8	28.67	54.0	22.1	H
9607.950	33.80	-30.5	36.9	27.42	54.0	20.2	H
12010.050	35.40	-29.9	38.7	26.57	54.0	18.6	V

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2436.263	47.75	5.4	32.5	9.80	54.0	6.2	V
2446.575	47.97	5.4	32.6	9.96	54.0	6.0	V
4881.600	35.65	-34.2	34.2	35.69	54.0	18.3	V
7322.400	32.52	-32.5	35.9	29.08	54.0	21.5	H
9764.100	32.67	-31.4	36.9	27.17	54.0	21.3	H
12204.900	34.11	-30.7	39.1	25.76	54.0	19.9	V

8DPSK Ch 78

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2505.300	48.41	5.7	32.6	10.08	54.0	5.7	V
2507.400	48.45	5.7	32.6	10.11	54.0	5.9	V
4959.900	36.07	-33.7	34.3	35.54	54.0	17.9	V
7439.850	32.23	-32.3	35.8	28.71	54.0	21.8	H
9919.800	31.67	-32.1	37.1	26.70	54.0	22.3	H
12400.000	34.48	-30.1	39.0	25.59	54.0	19.5	V

Conclusion: Pass

B.7. Time of Occupancy (Dwell Time)

Method of Measurement: See ANSI C63.10-clause 7.8.4

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW ≥ RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

Measurement Limit:

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii)	< 400

Measurement Result:

For GFSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	DH1	Fig.64	0.38	Fig.65	318	120.84	P
	DH3	Fig.66	1.64	Fig.67	108	177.12	P
	DH5	Fig.68	2.89	Fig.69	59	170.51	P

For π/4 DQPSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	2DH1	Fig.70	0.39	Fig.71	319	124.41	P
	2DH3	Fig.72	1.64	Fig.73	124	203.36	P
	2DH5	Fig.74	2.89	Fig.75	69	199.41	P

For 8DPSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	3DH1	Fig.76	0.39	Fig.77	320	124.8	P
	3DH3	Fig.78	1.64	Fig.79	115	188.6	P
	3DH5	Fig.80	2.89	Fig.81	51	147.39	P

Conclusion: PASS

Test graphs as below:

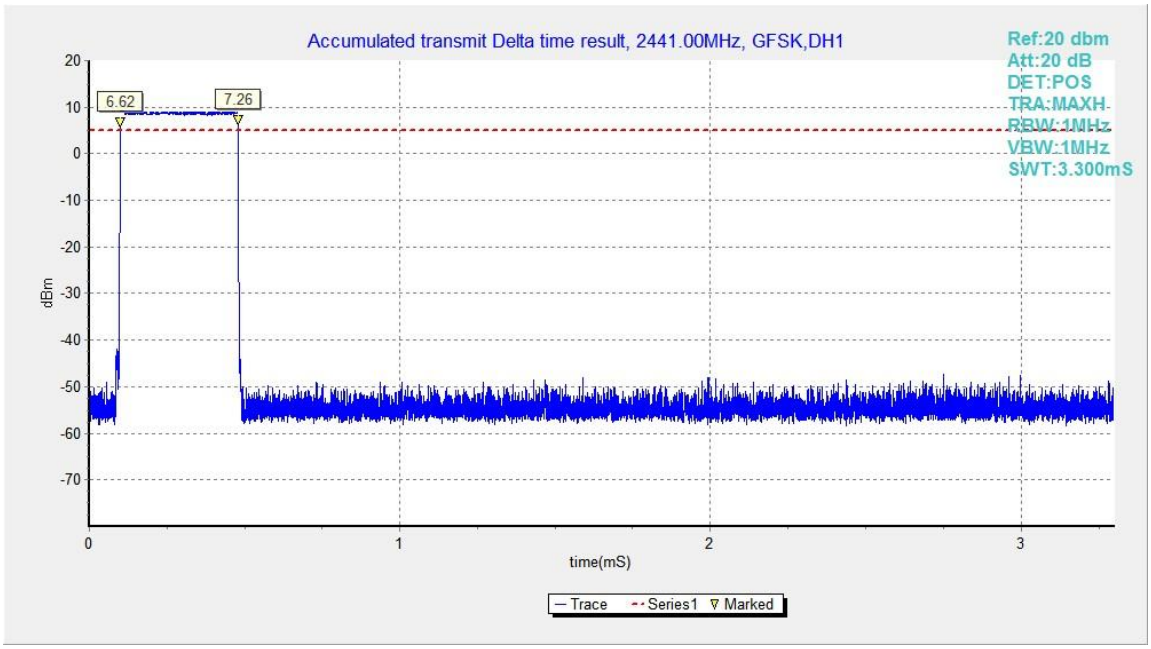


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

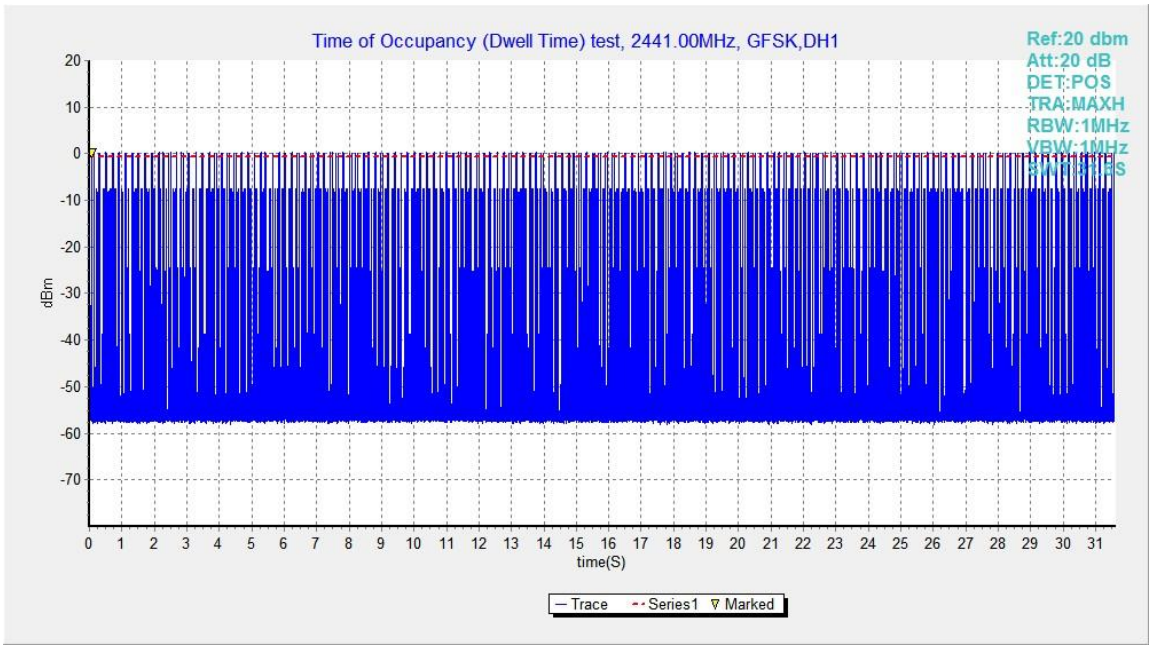


Fig.65. Number of Transmissions Measurement: Channel 39,Packet DH1

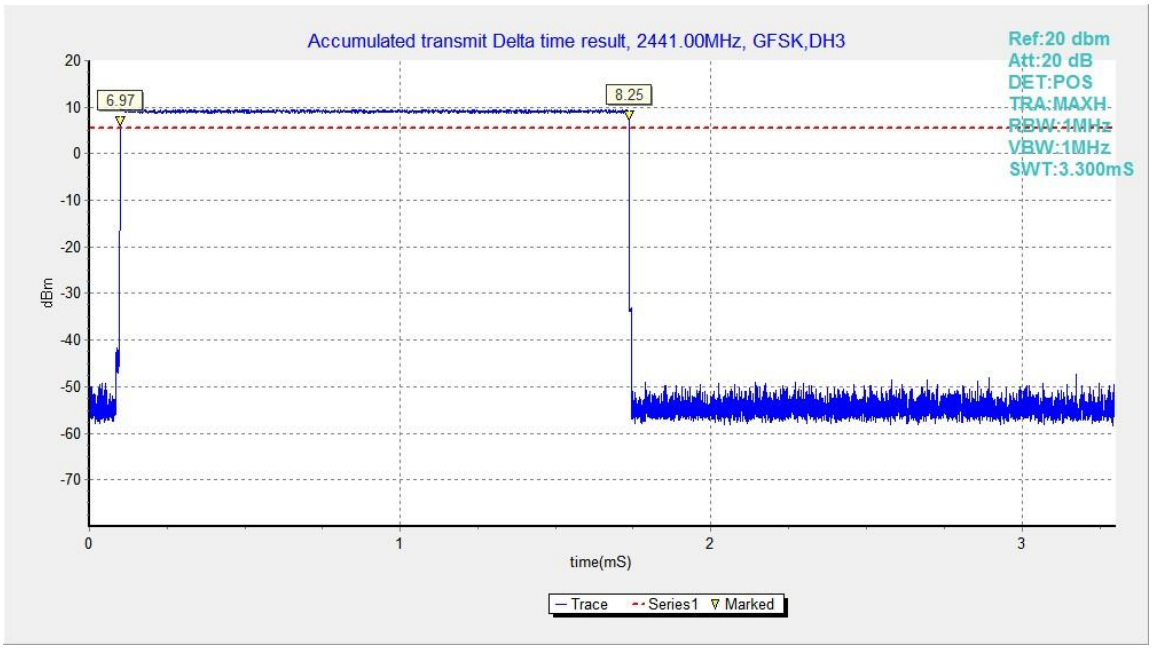


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

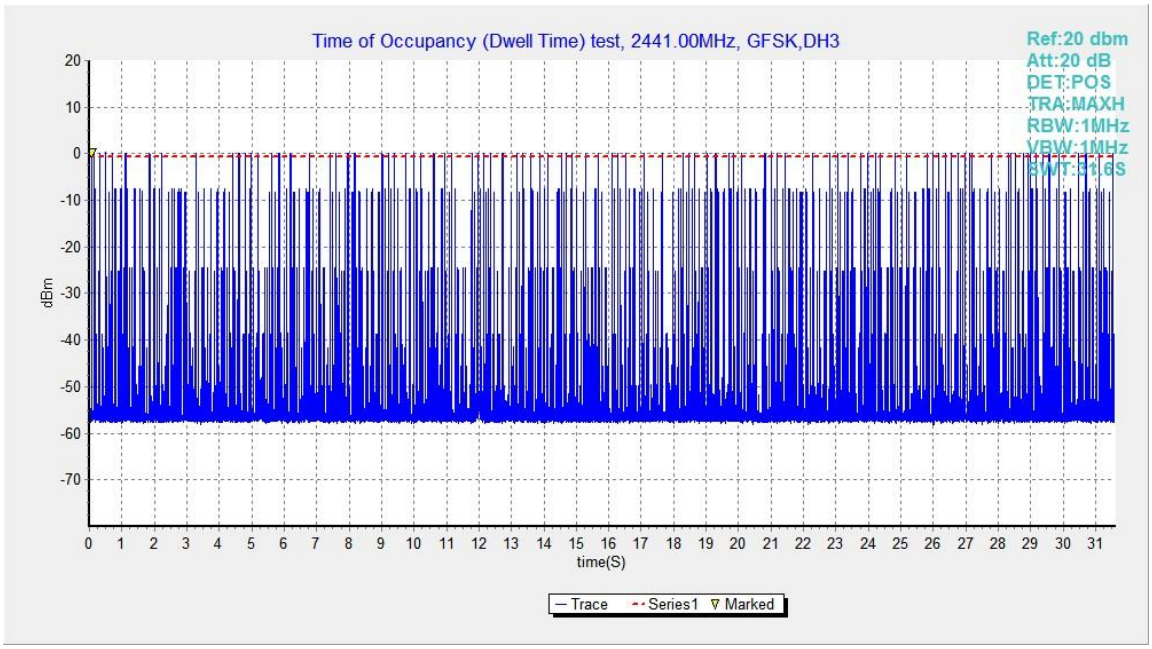


Fig.67. Number of Transmissions Measurement: Channel 39,Packet DH3

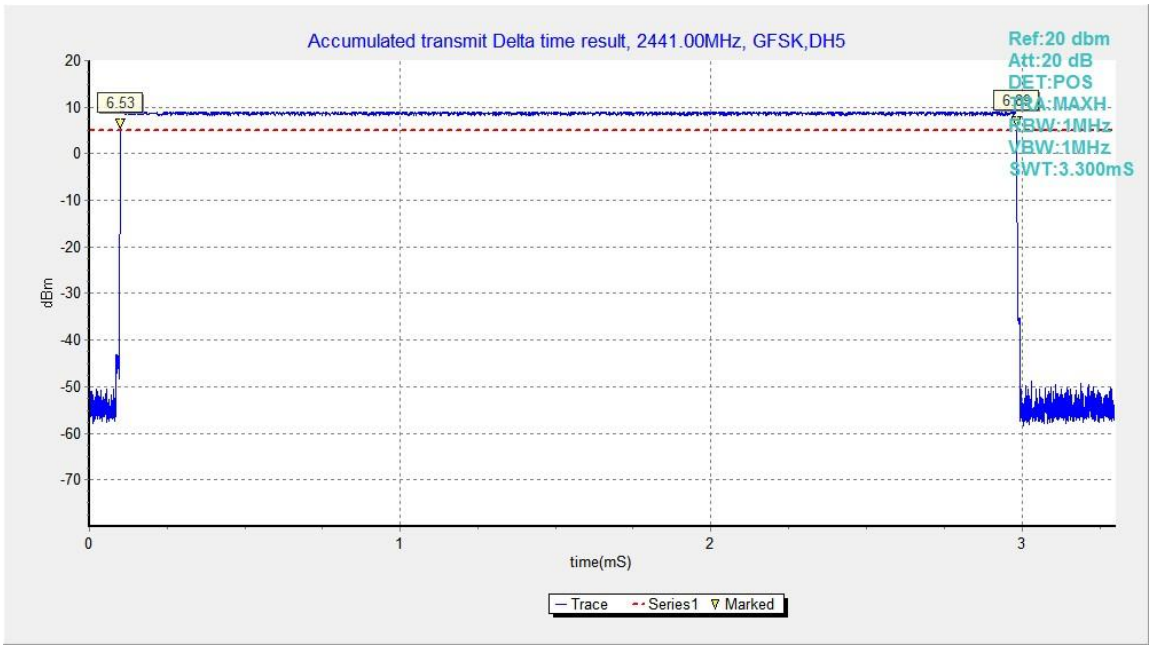


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

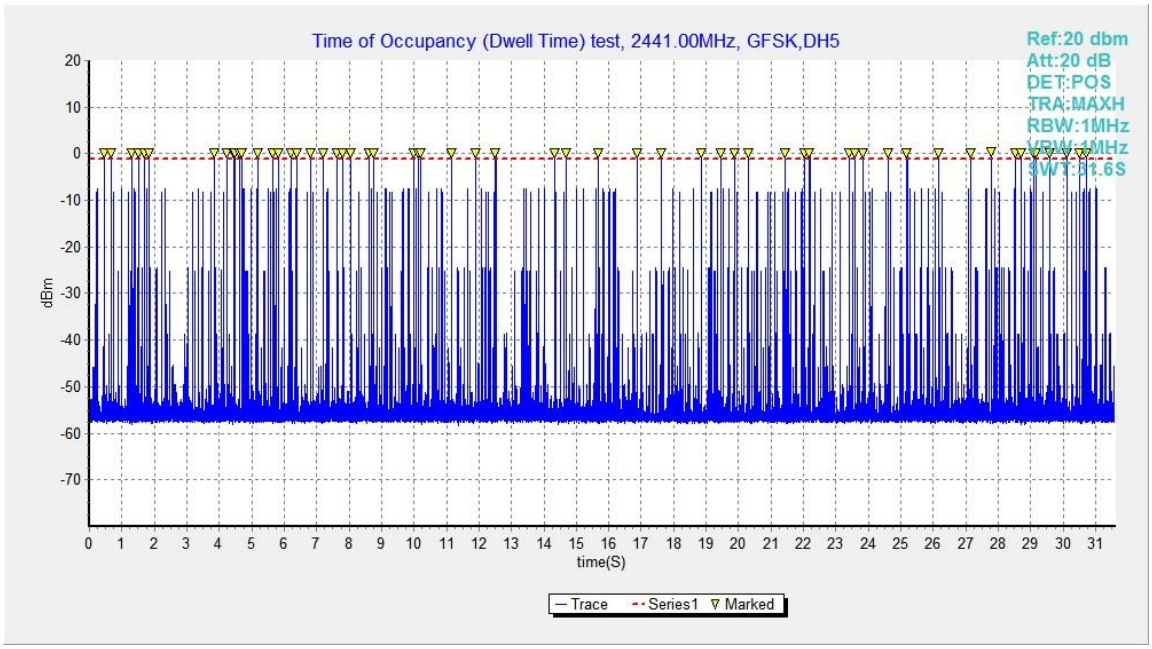


Fig.69. Number of Transmissions Measurement: Channel 39,Packet DH5

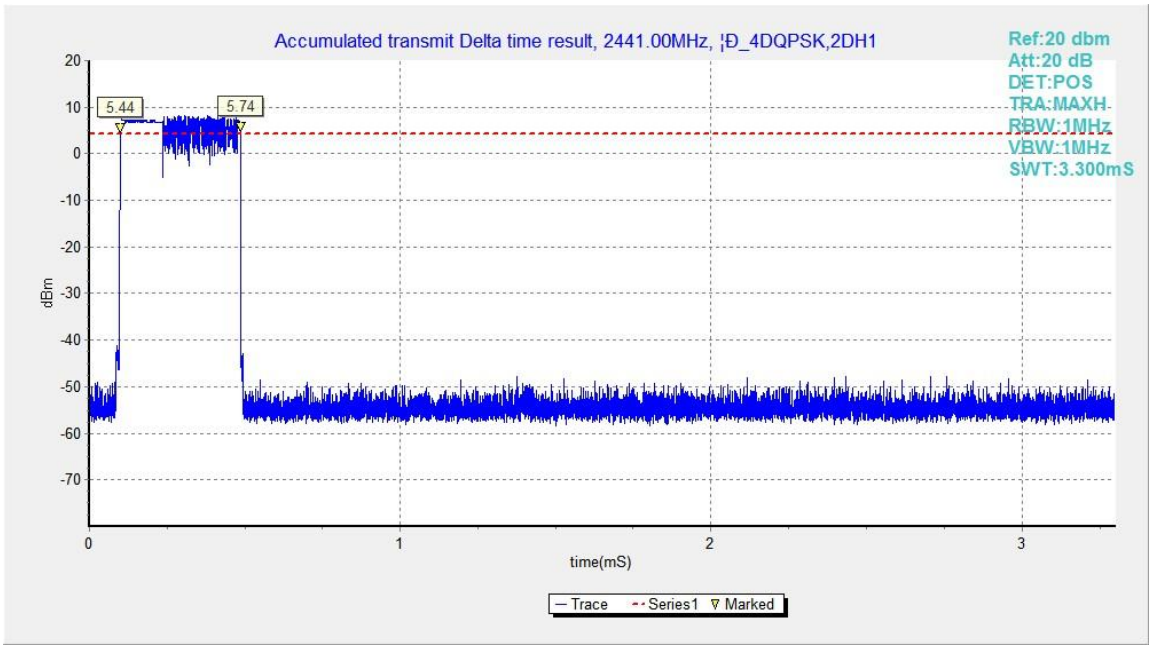


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

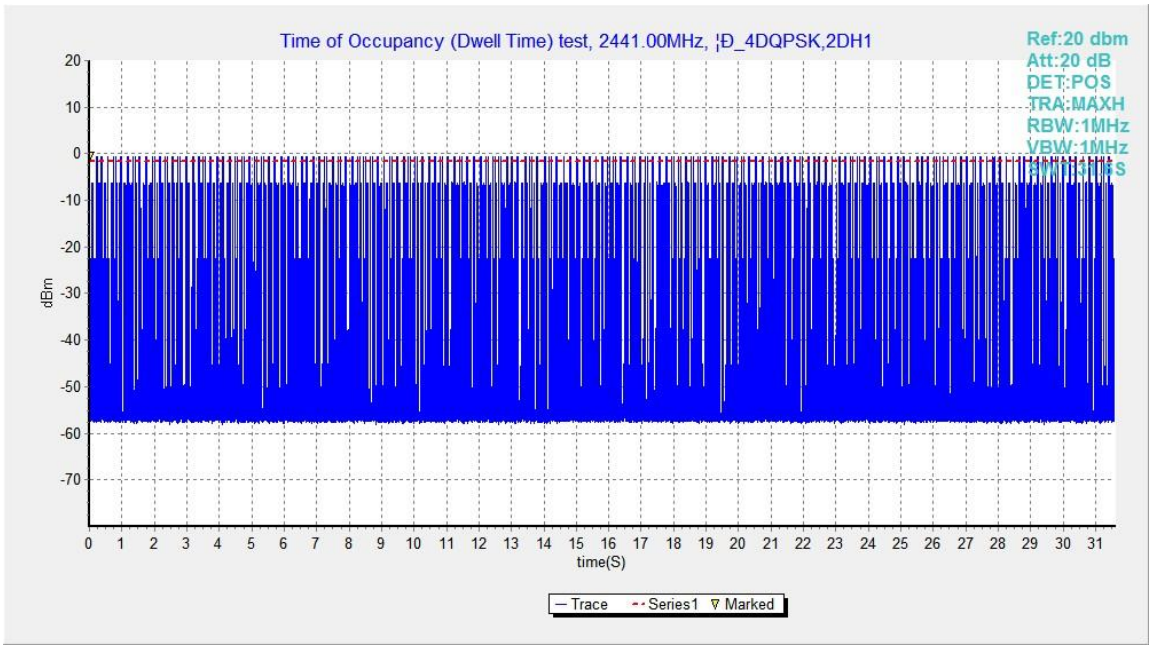


Fig.71. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

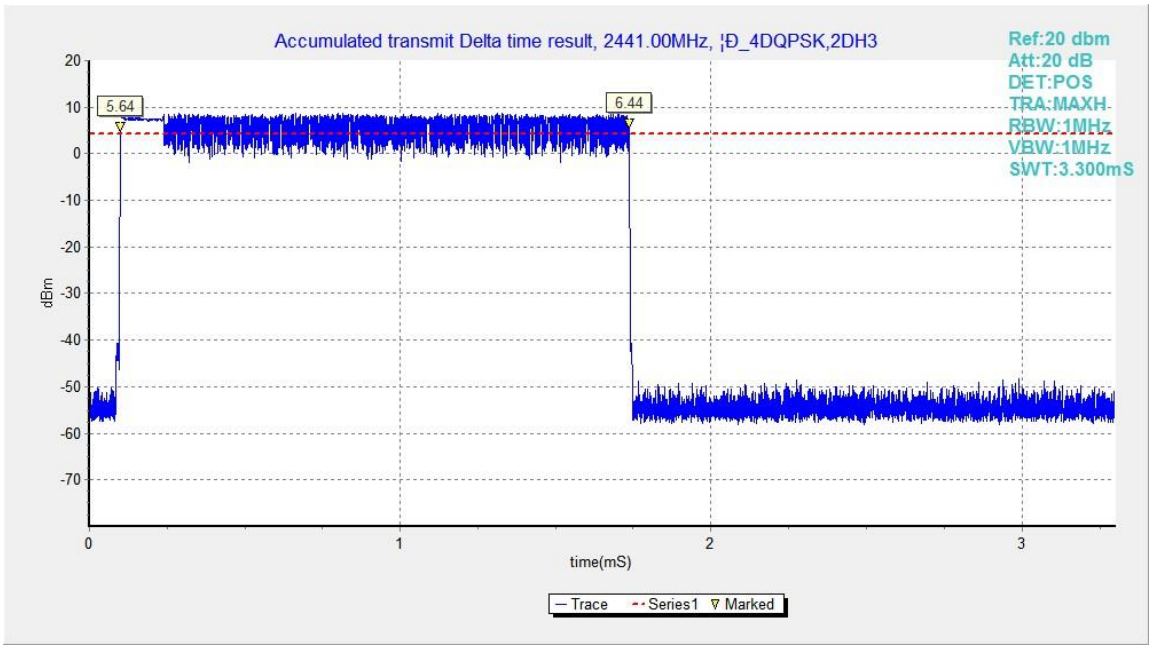


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

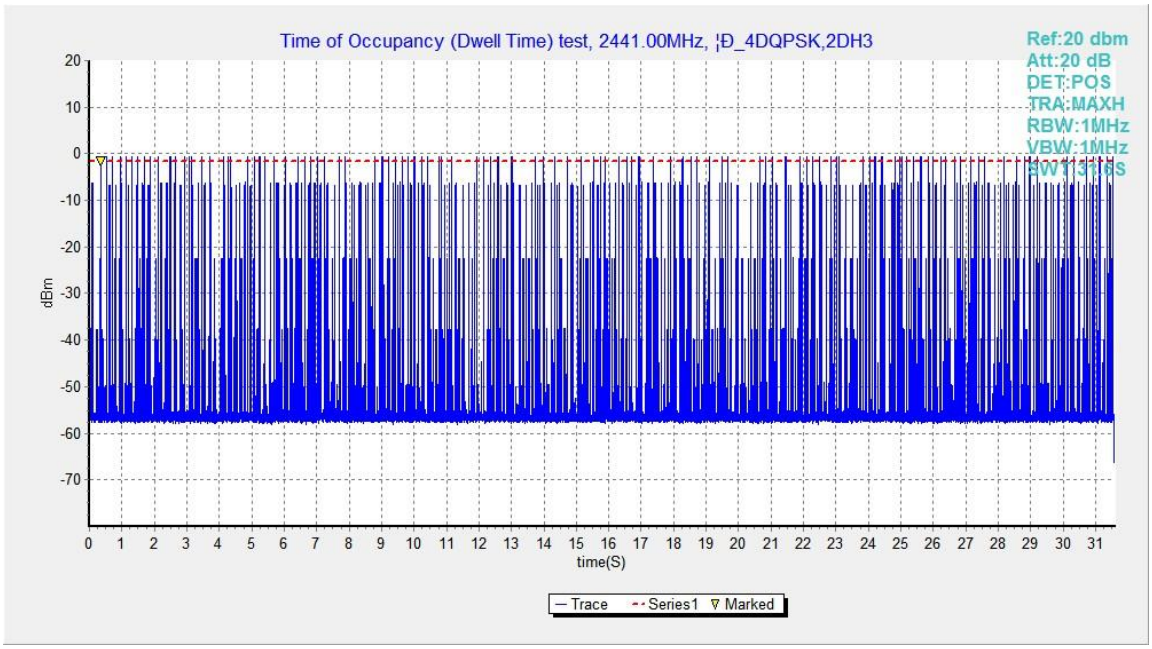


Fig.73. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

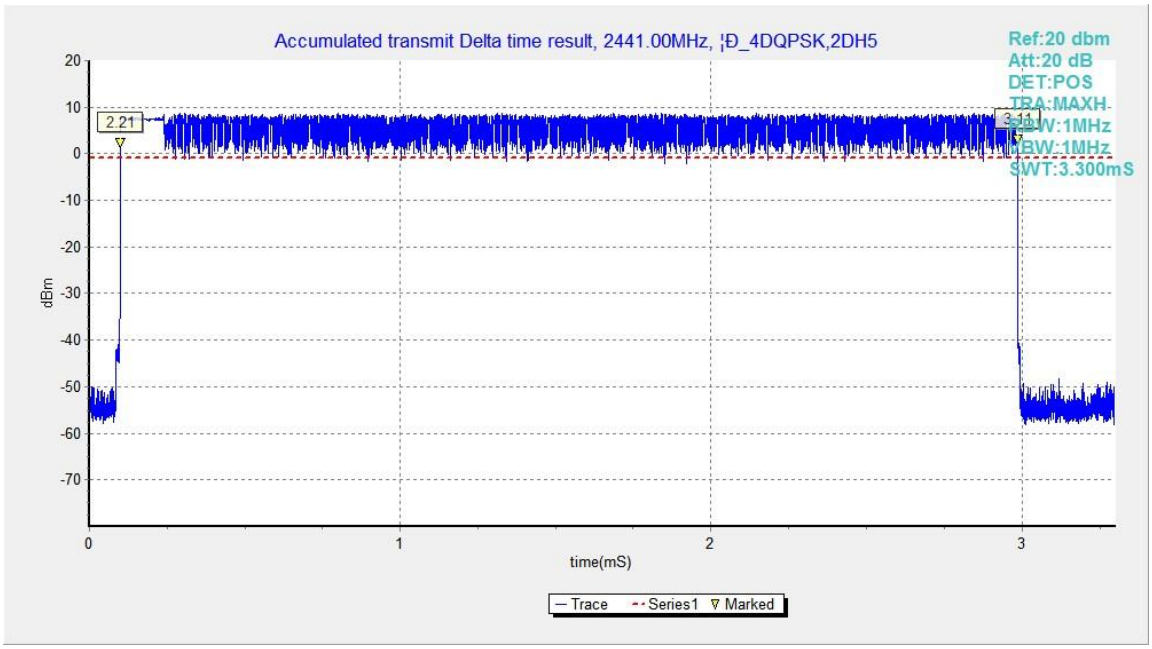


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

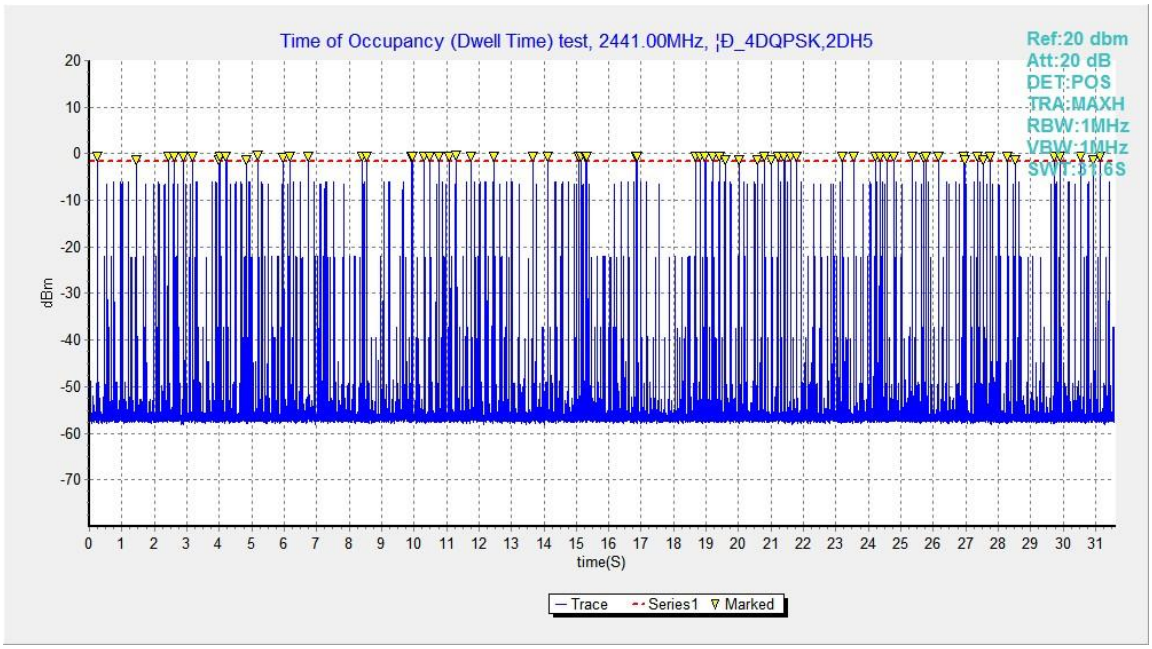


Fig.75. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

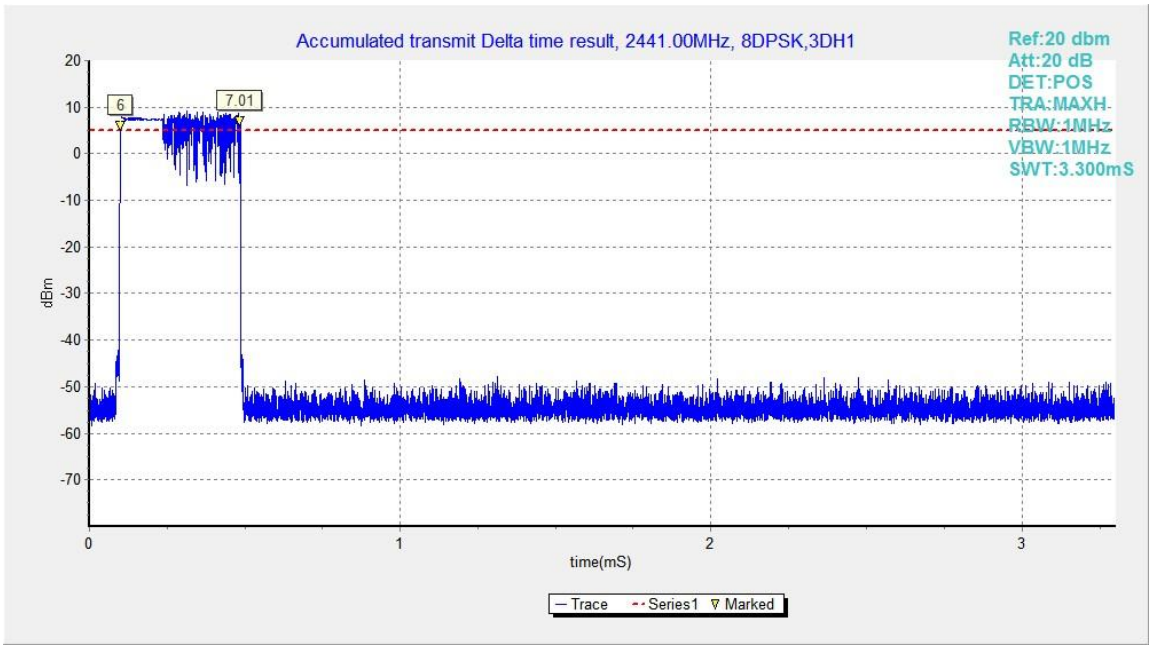


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

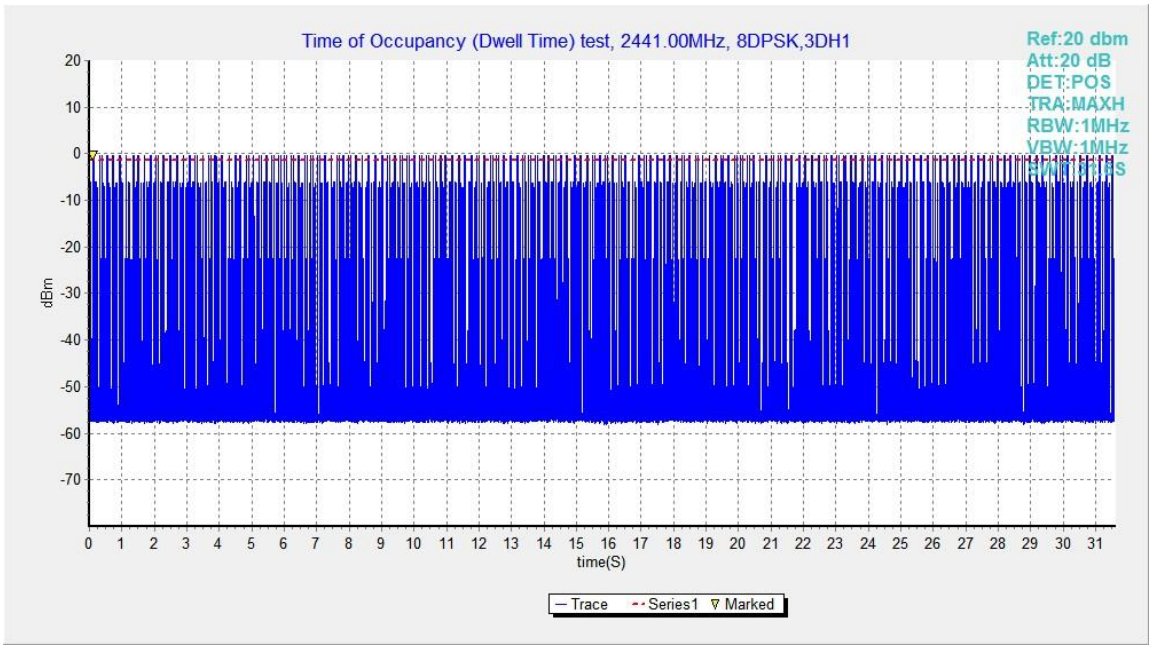


Fig.77. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

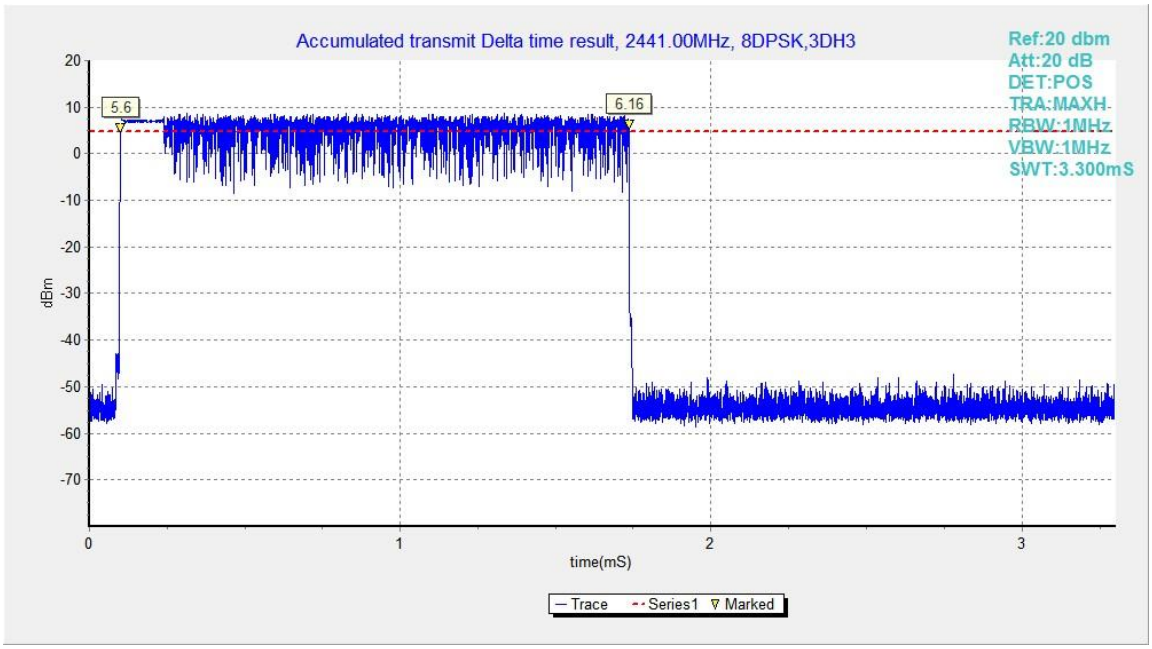


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

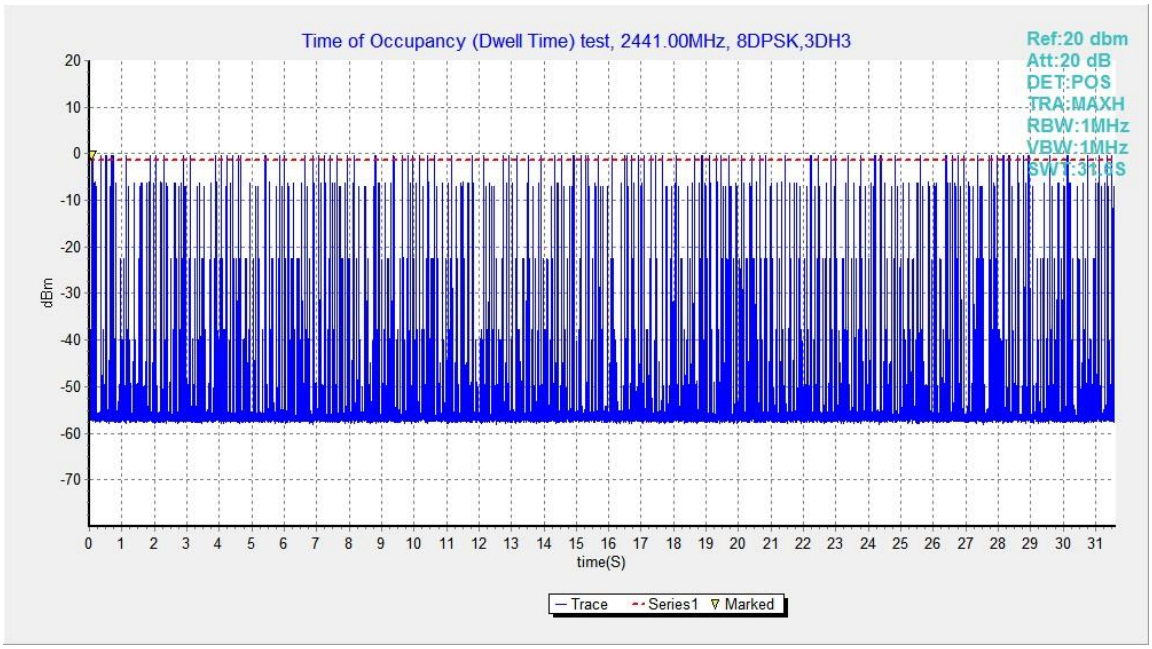


Fig.79. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

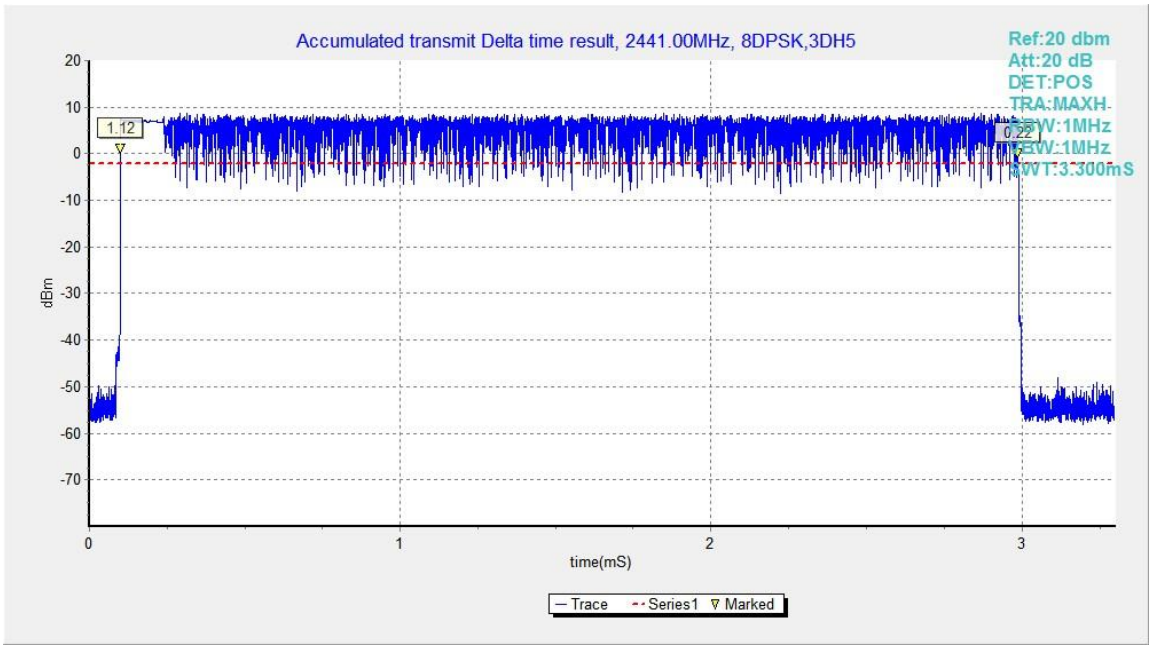


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

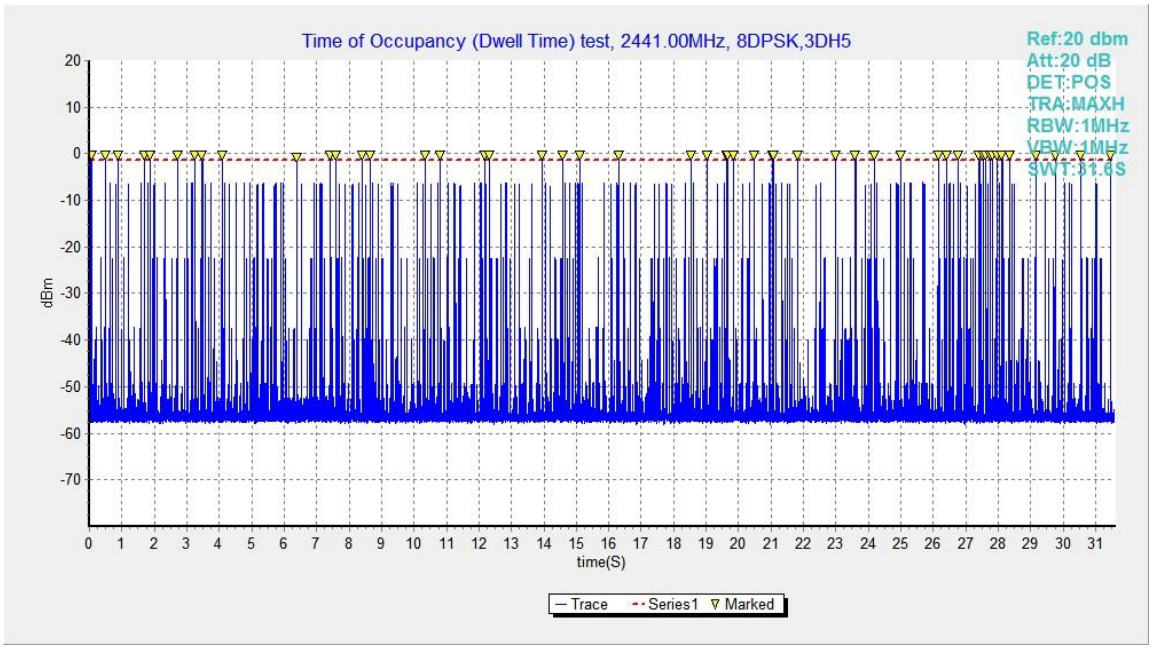


Fig.81. Number of Transmissions Measurement: Channel 39,Packet 3-DH5

B.8. 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	923.25	NA
39	Fig.83	920.25	NA
78	Fig.84	919.50	NA

For π/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1280.25	NA
39	Fig.86	1287.00	NA
78	Fig.87	1277.25	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1280.25	NA
39	Fig.89	1278.75	NA
78	Fig.90	1278.75	NA

Conclusion: NA

Test graphs as below:

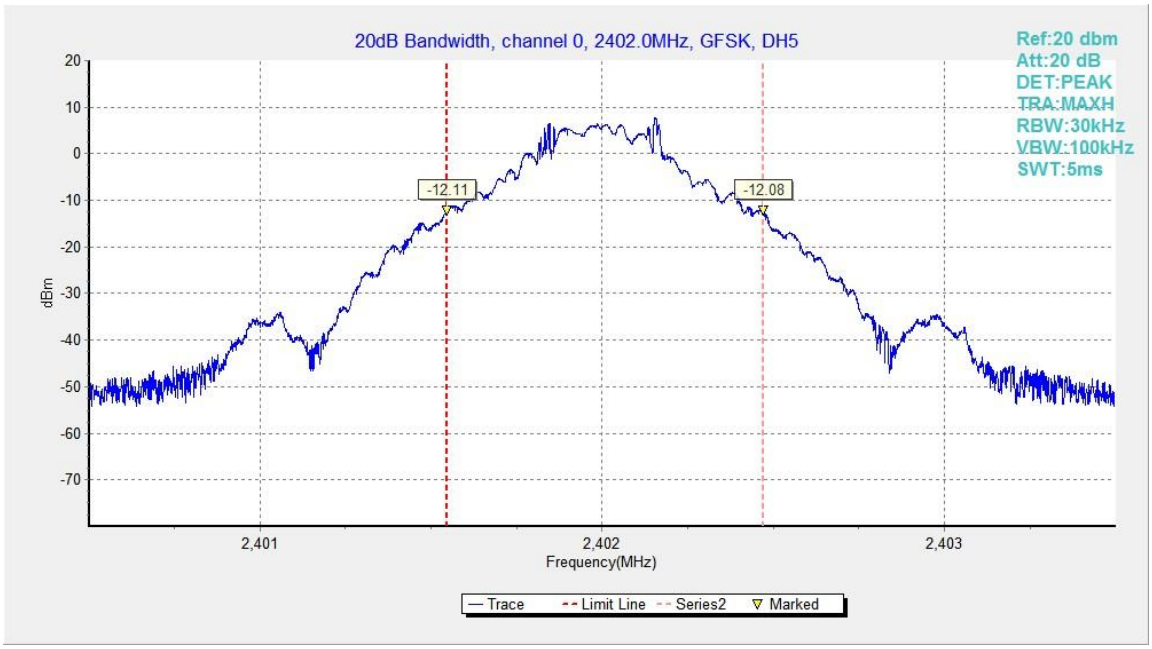


Fig.82. 20dB Bandwidth: GFSK, Channel 0

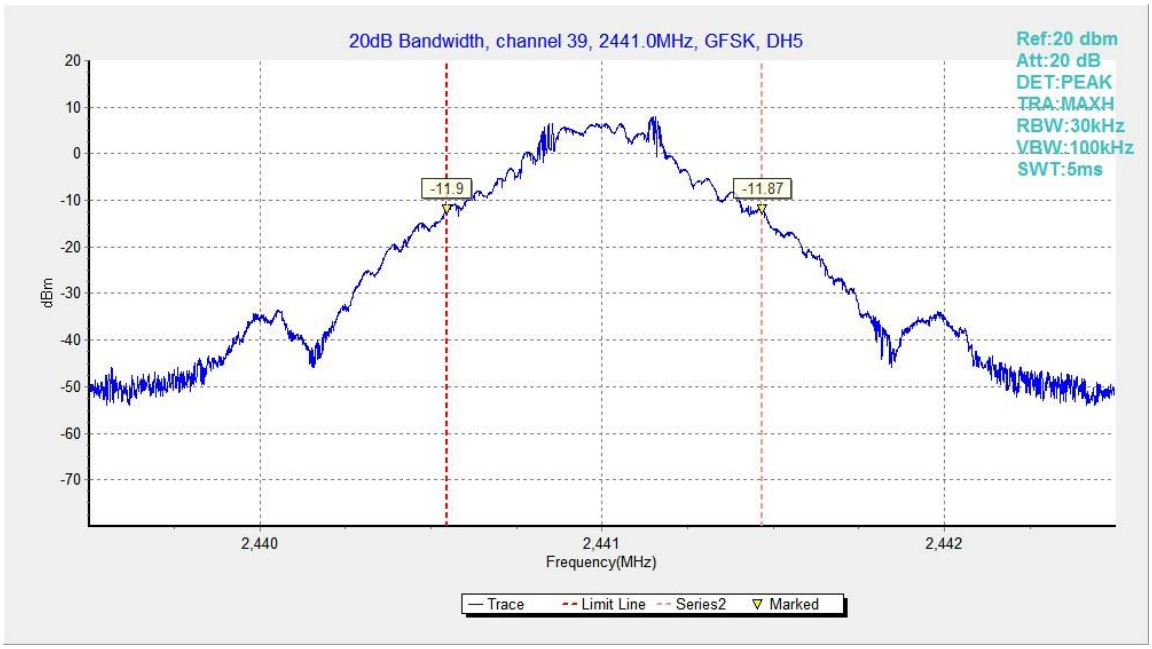


Fig.83. 20dB Bandwidth: GFSK, Channel 39

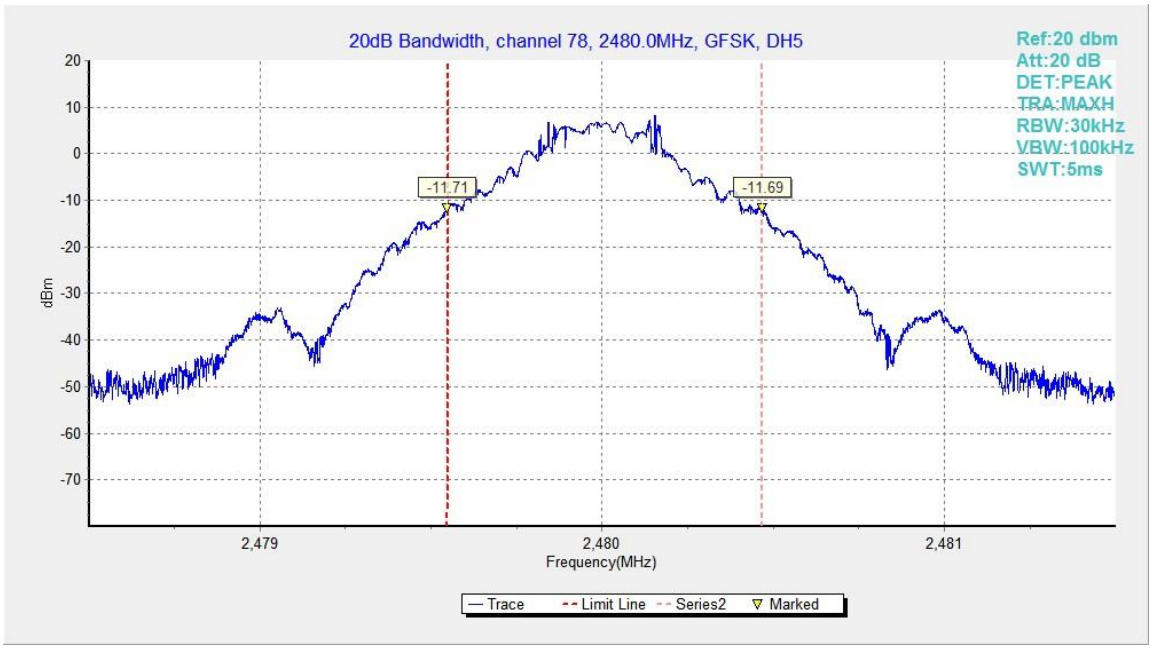


Fig.84. 20dB Bandwidth: GFSK, Channel 78

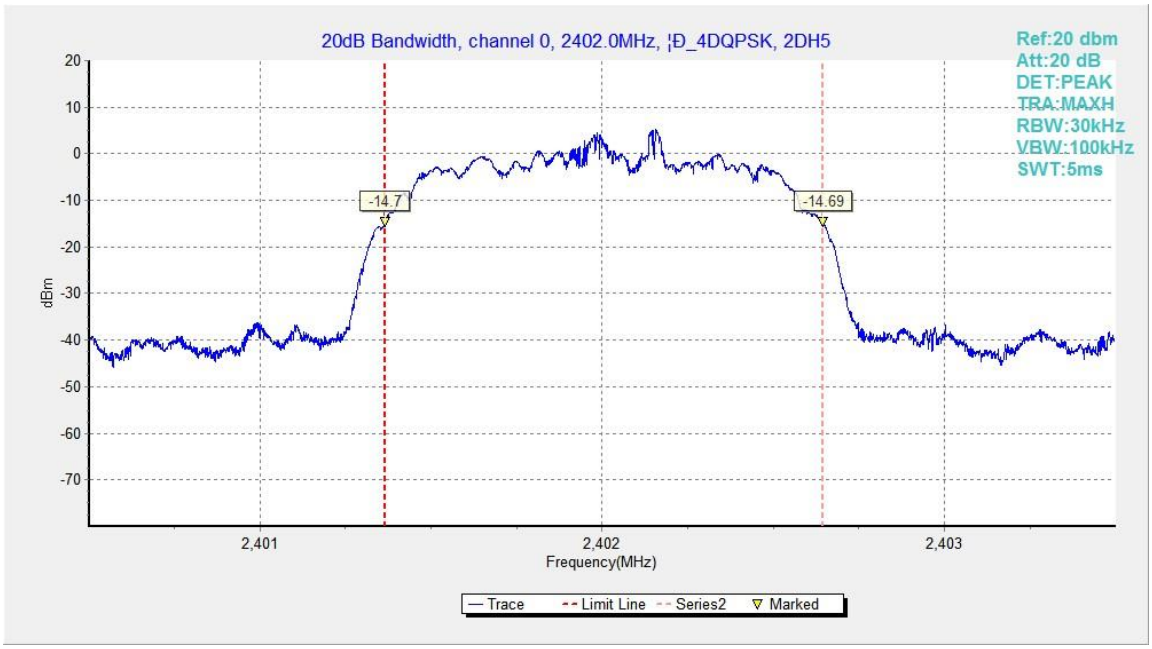


Fig.85. 20dB Bandwidth: π/4 DQPSK, Channel 0

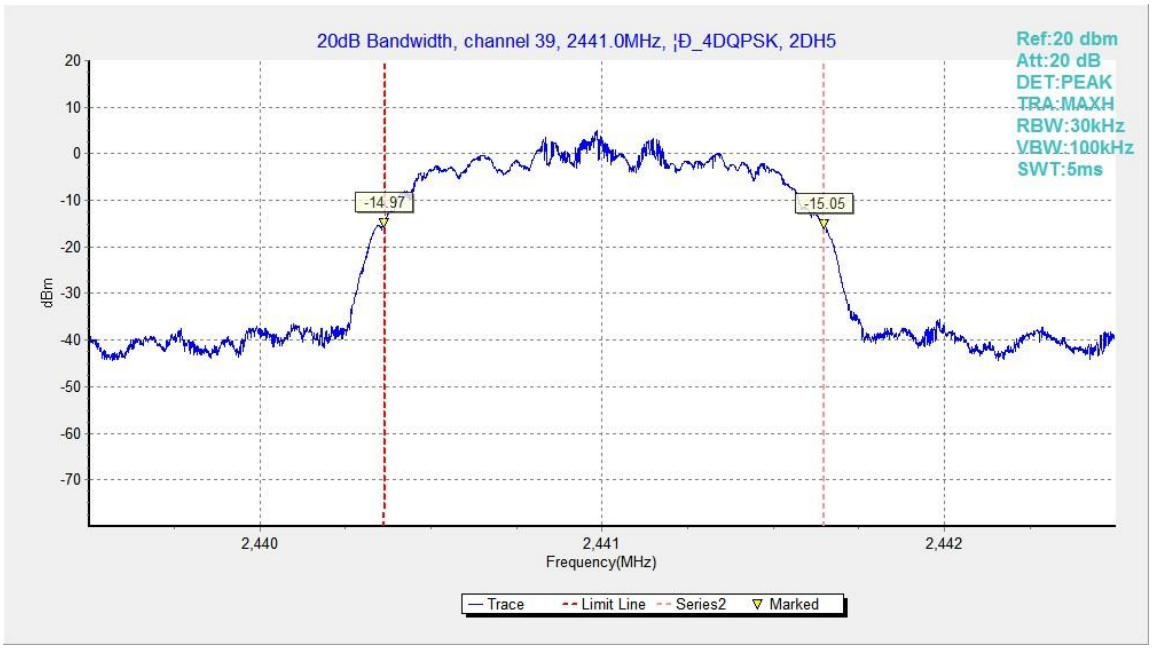


Fig.86. 20dB Bandwidth: π/4 DQPSK, Channel 39

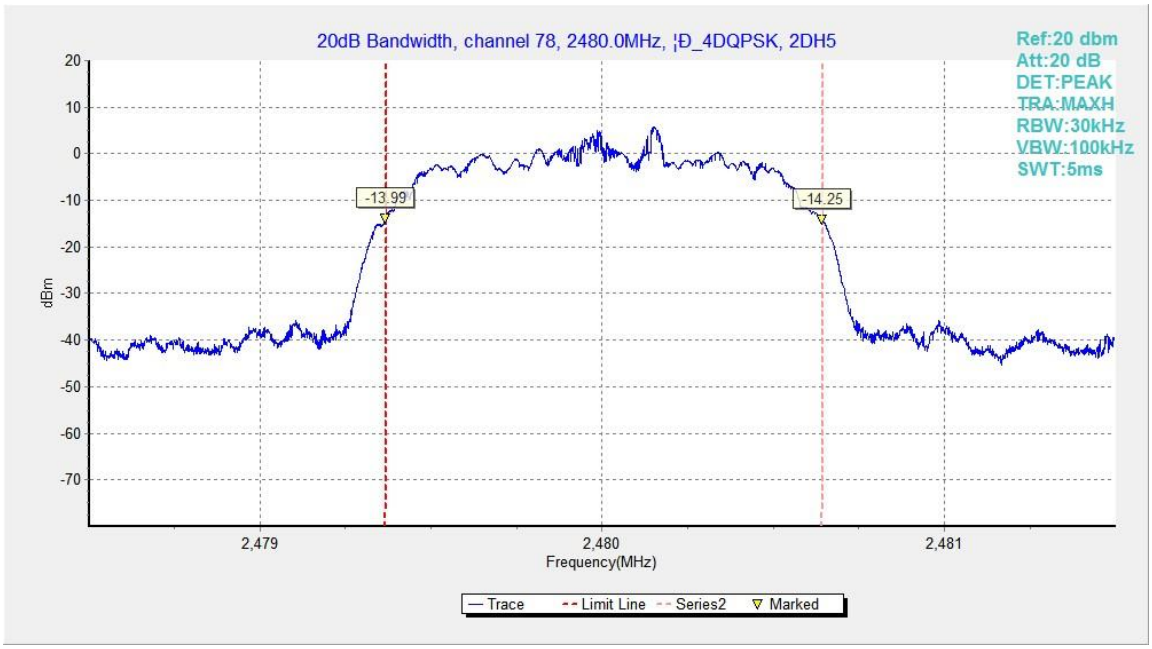


Fig.87. 20dB Bandwidth: π/4 DQPSK, Channel 78

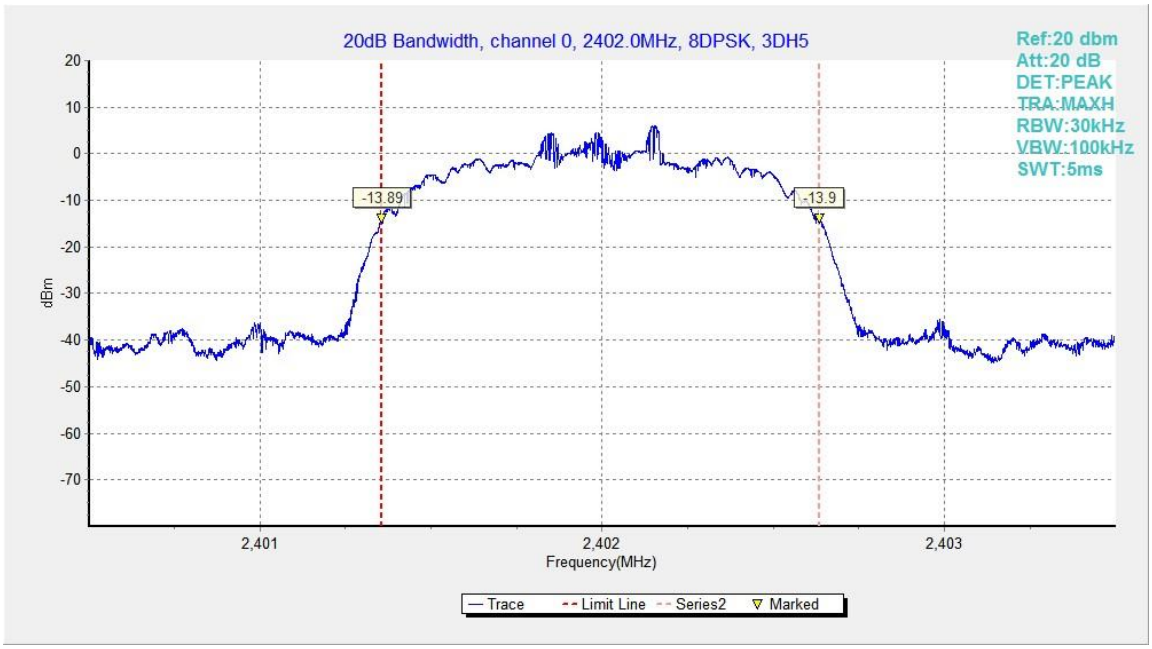


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

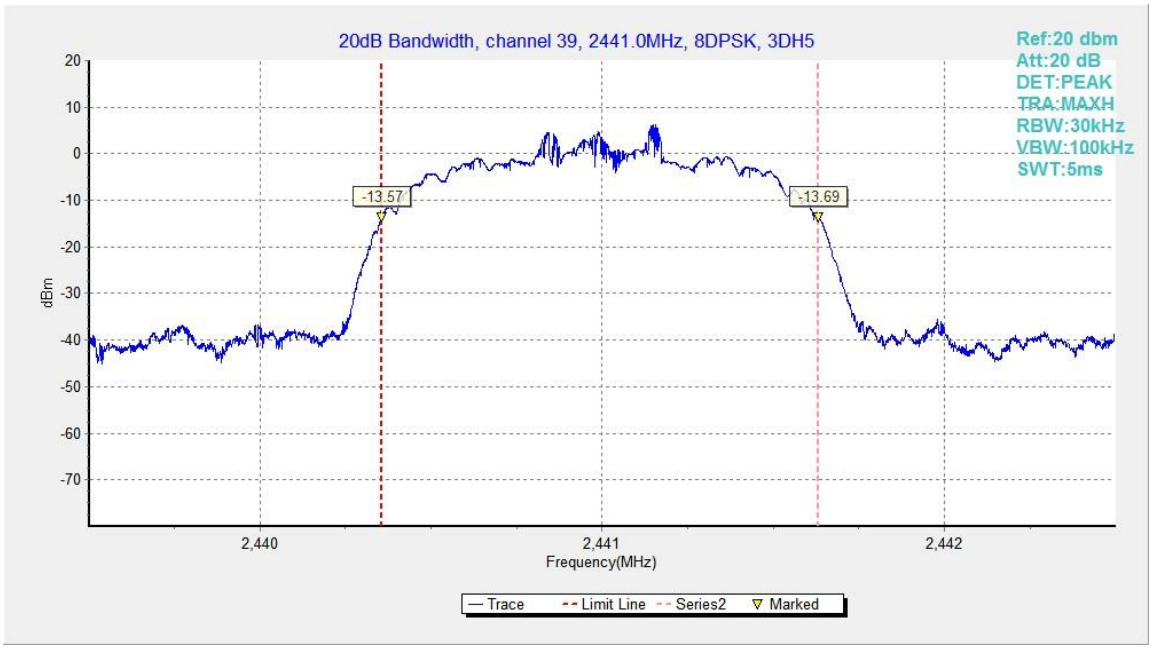


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

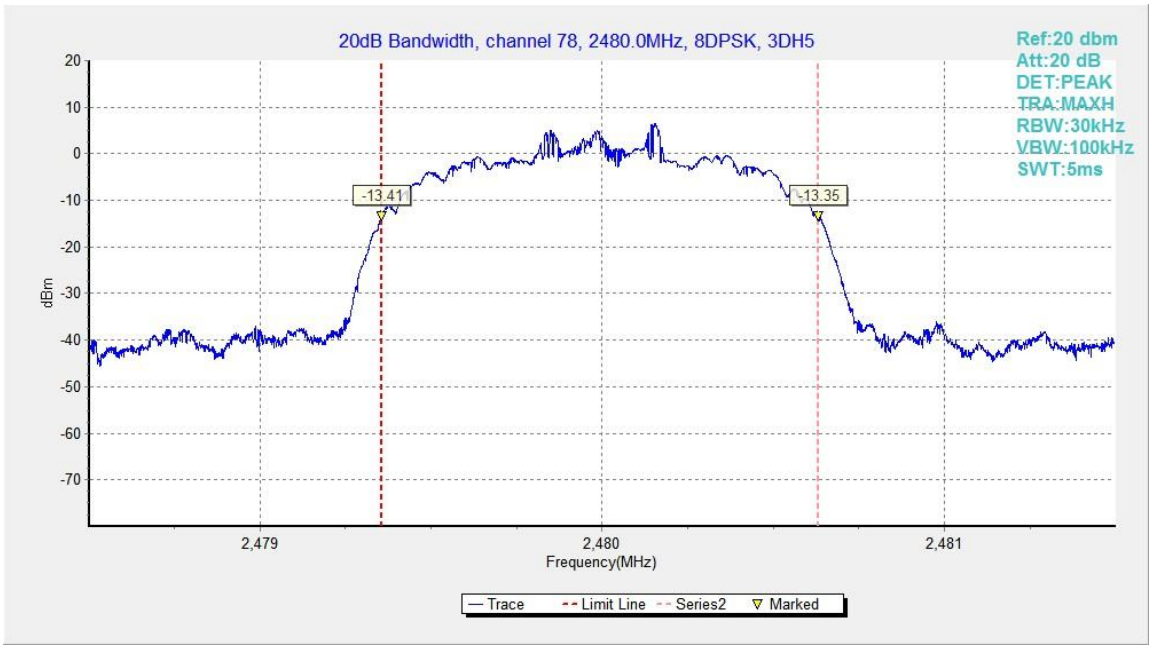


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

B.9. 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) * 20dB bandwidth, whichever is greater.

Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or (2/3) * 20dB bandwidth

Measurement Result:

For GFSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.91	1189.50	P

For π/4 DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	964.50	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	1050.00	P

Conclusion: PASS

Test graphs as below:

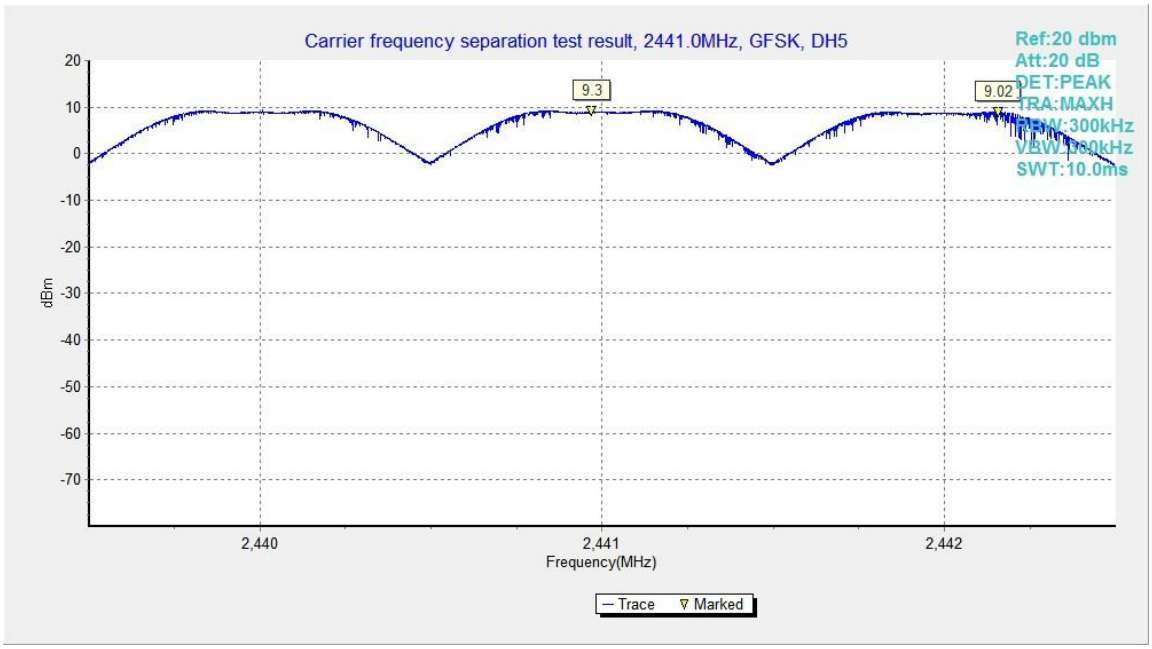


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

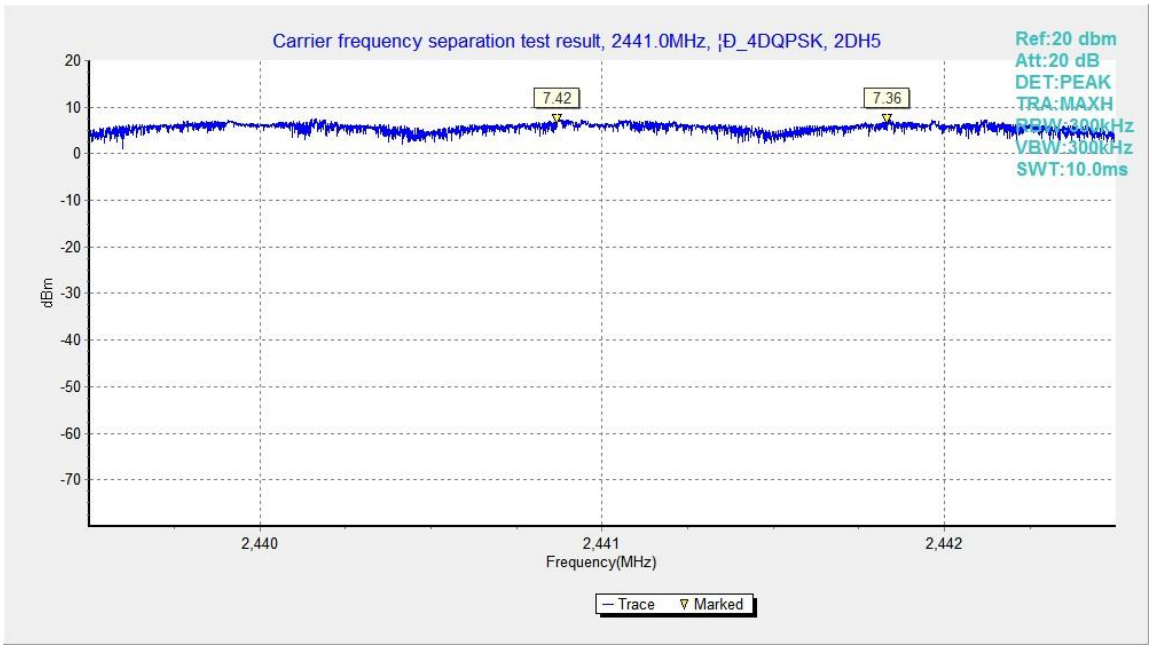


Fig.92. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

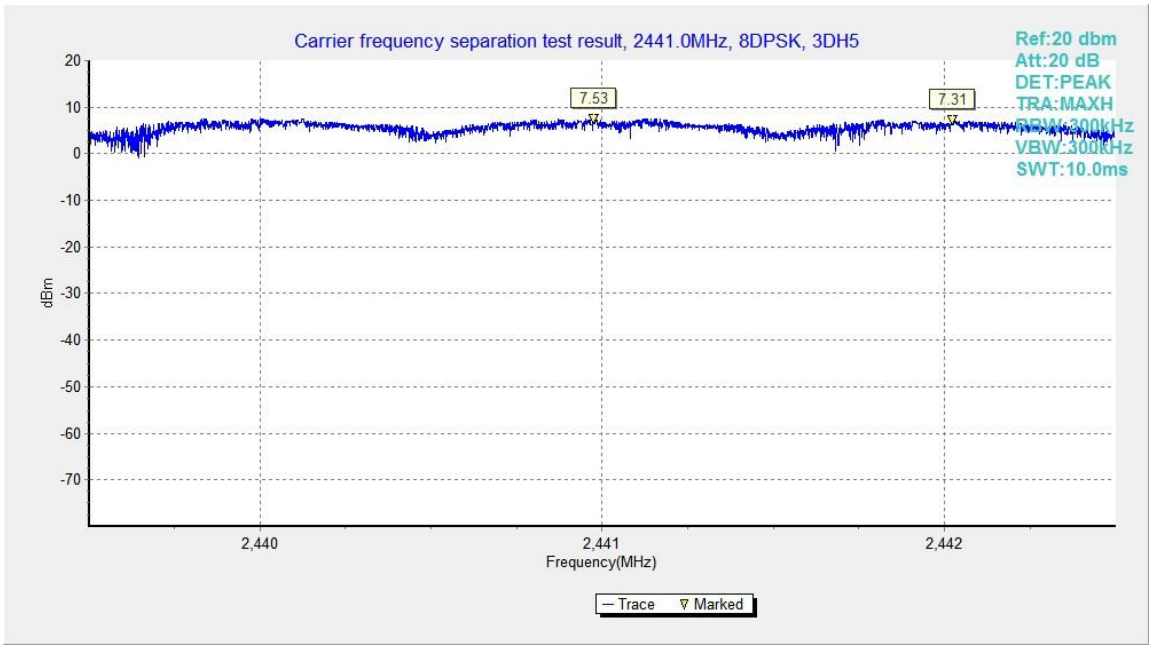


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

B.10. 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	79	P
40~78	Fig.95		

Forπ/4 DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.96	79	P
40~78	Fig.97		

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.98	79	P
40~78	Fig.99		

Conclusion: PASS

Test graphs as below:

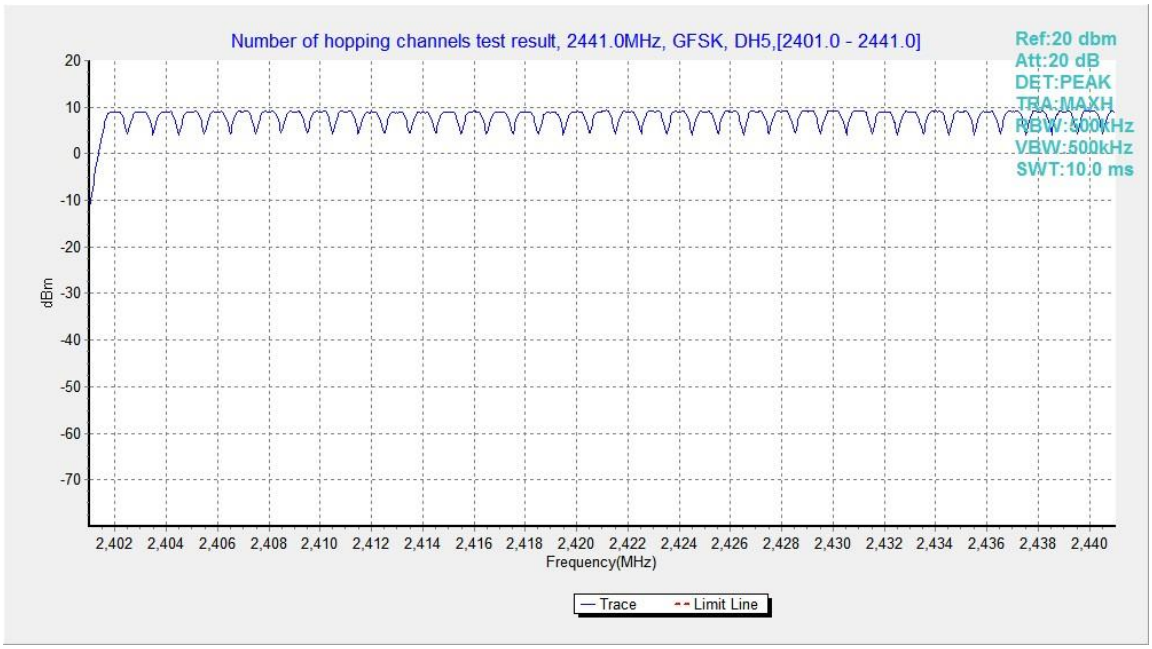


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

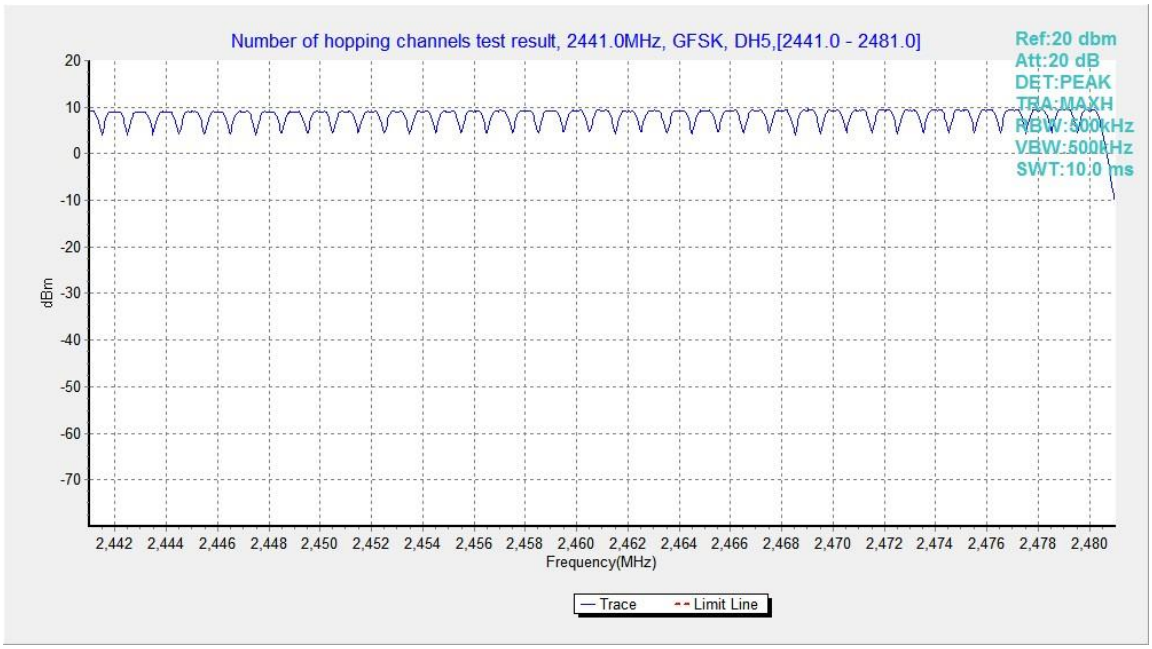


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

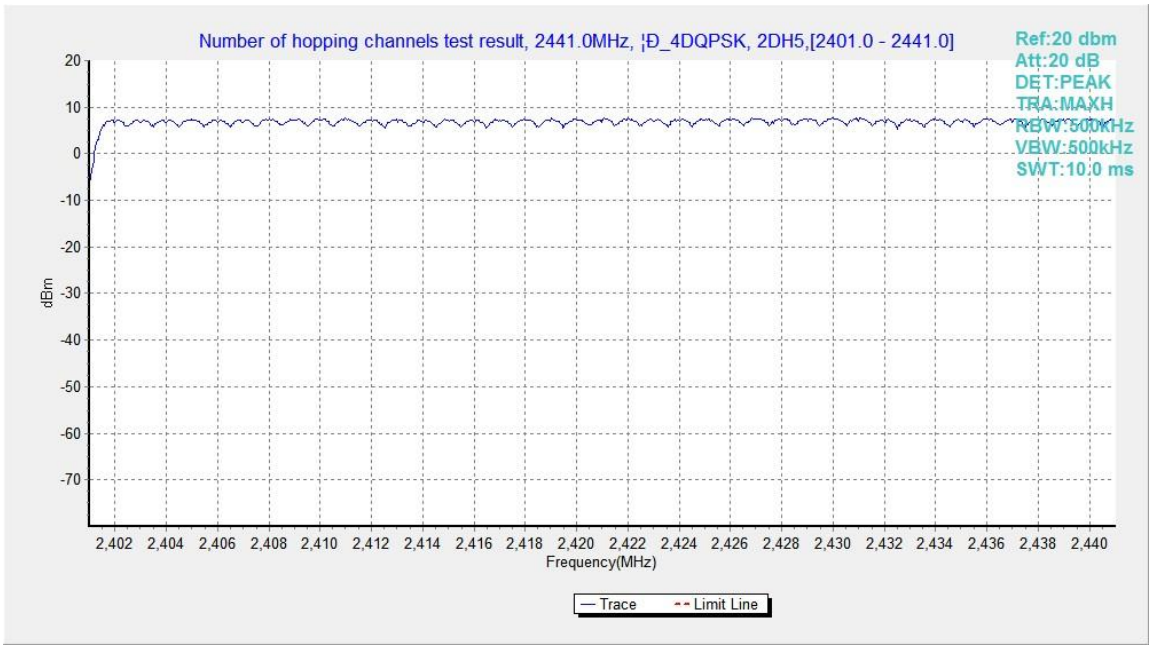


Fig.96. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

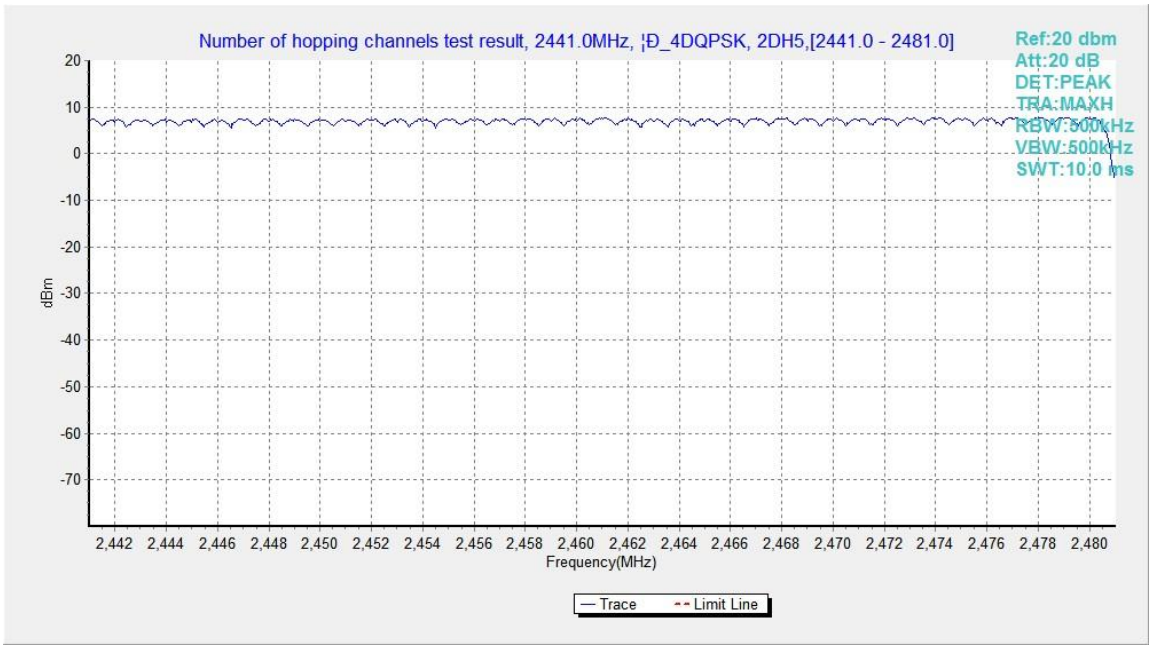


Fig.97. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

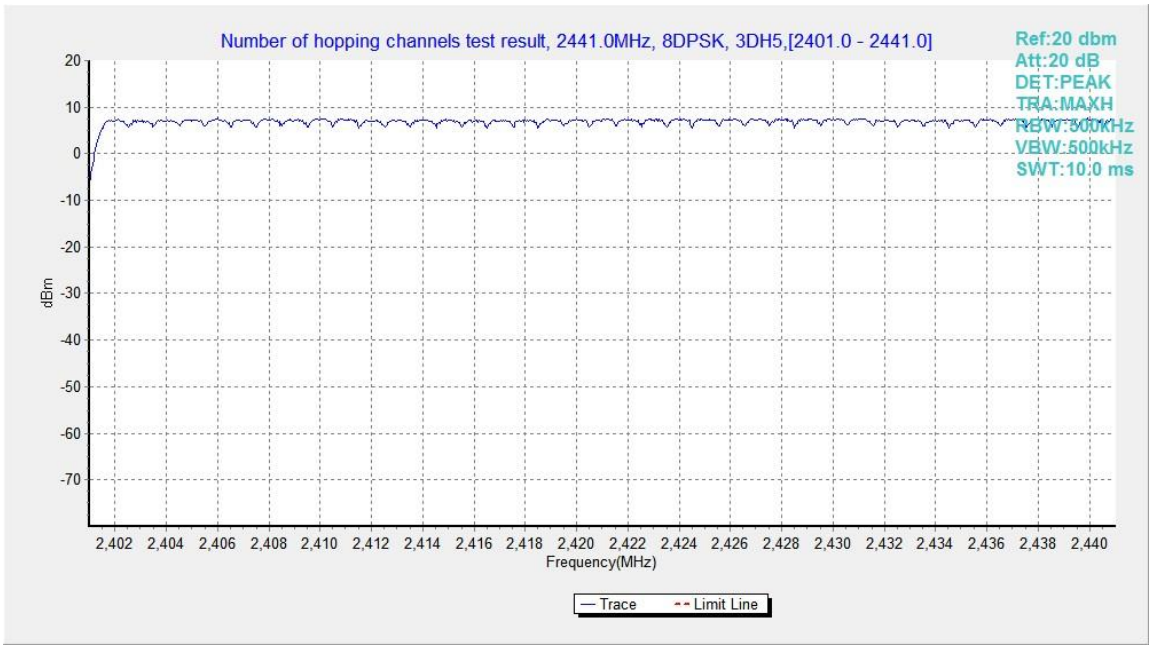


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

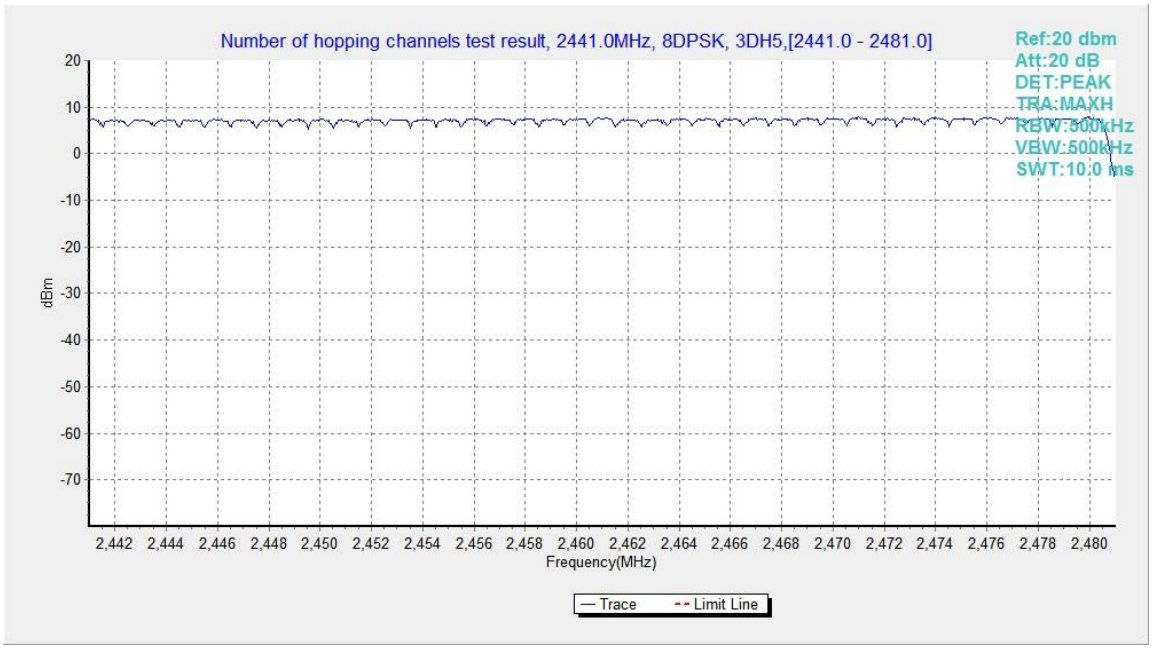


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

B.11. AC Powerline Conducted Emission

Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

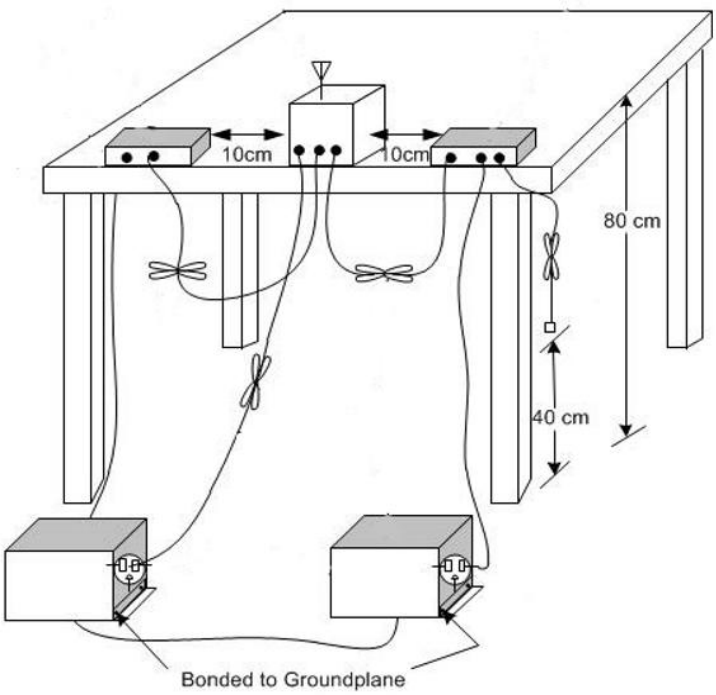
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Setup



Measurement Result and limit:

EUT ID: UT08a

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	66 to 56	Fig.B.11.1	Fig.B.11.2	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 (dBμV)	Result (dBμV)		Conclusion
		With charger		
		bluetooth	Idle	
0.15 to 0.5	56 to 46	Fig.B.11.1	Fig.B.11.2	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.				

Conclusion: Pass

Test graphs as below:

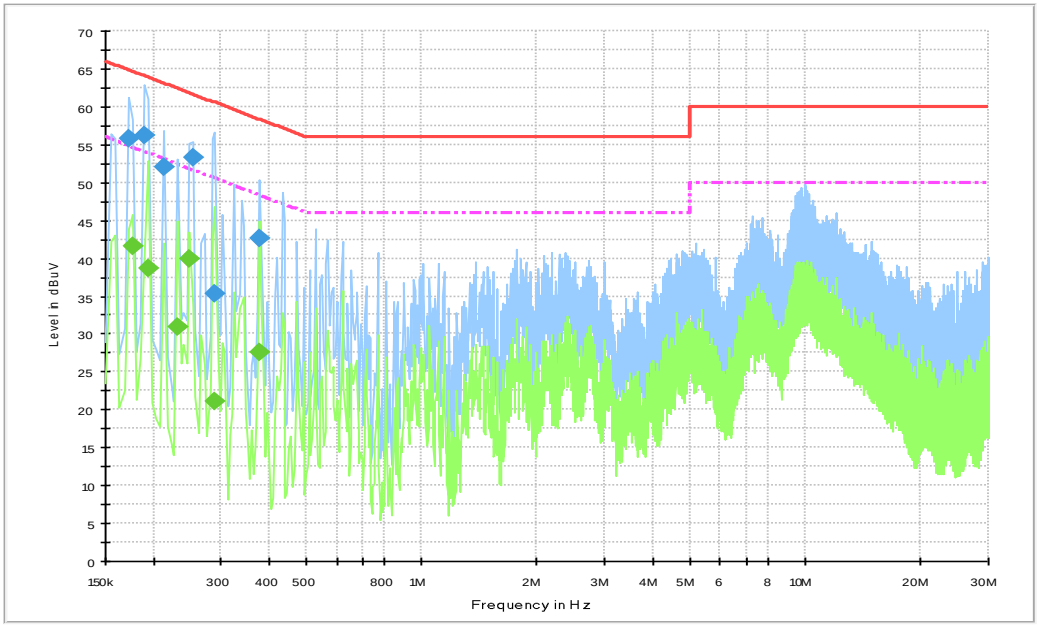


Fig.B.11.1 AC Powerline Conducted Emission- bluetooth

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.172500	55.9	2000.0	9.000	Off	L1	19.4	9.0	64.8
0.190500	56.3	2000.0	9.000	Off	N	19.5	7.7	64.0
0.213000	52.0	2000.0	9.000	Off	N	19.4	11.1	63.1
0.253500	53.2	2000.0	9.000	Off	N	19.4	8.5	61.6
0.289500	35.3	2000.0	9.000	Off	N	19.5	25.3	60.5
0.379500	42.7	2000.0	9.000	Off	L1	19.4	15.6	58.3

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.177000	41.5	2000.0	9.000	Off	L1	19.4	13.1	54.6
0.195000	38.7	2000.0	9.000	Off	N	19.4	15.1	53.8
0.231000	31.0	2000.0	9.000	Off	N	19.5	21.5	52.4
0.249000	39.9	2000.0	9.000	Off	N	19.4	11.9	51.8
0.289500	21.0	2000.0	9.000	Off	L1	19.5	29.5	50.5
0.379500	27.6	2000.0	9.000	Off	L1	19.4	20.6	48.3

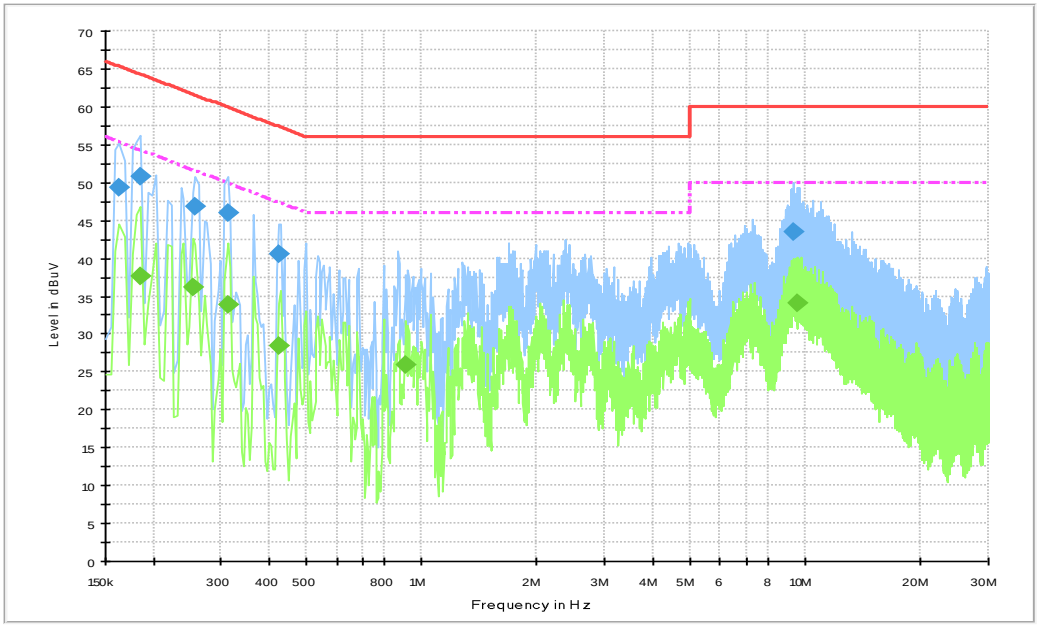


Fig.B.11.2 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.163500	49.3	2000.0	9.000	Off	L1	19.5	16.0	65.3
0.186000	50.8	2000.0	9.000	Off	L1	19.5	13.4	64.2
0.258000	46.8	2000.0	9.000	Off	N	19.4	14.7	61.5
0.312000	46.0	2000.0	9.000	Off	N	19.5	13.9	59.9
0.424500	40.5	2000.0	9.000	Off	N	19.5	16.8	57.4
9.303000	43.4	2000.0	9.000	Off	N	19.7	16.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186000	37.7	2000.0	9.000	Off	L1	19.5	16.5	54.2
0.253500	36.1	2000.0	9.000	Off	L1	19.4	15.5	51.6
0.312000	33.8	2000.0	9.000	Off	L1	19.5	16.1	49.9
0.424500	28.5	2000.0	9.000	Off	L1	19.5	18.9	47.4
0.910500	26.0	2000.0	9.000	Off	L1	19.5	20.0	46.0
9.541500	34.0	2000.0	9.000	Off	L1	19.7	16.0	50.0

B.12. Antenna Requirement

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.
The unit complies with the requirement of FCC Part 15.203.

ANNEX C: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 26th day of June 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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