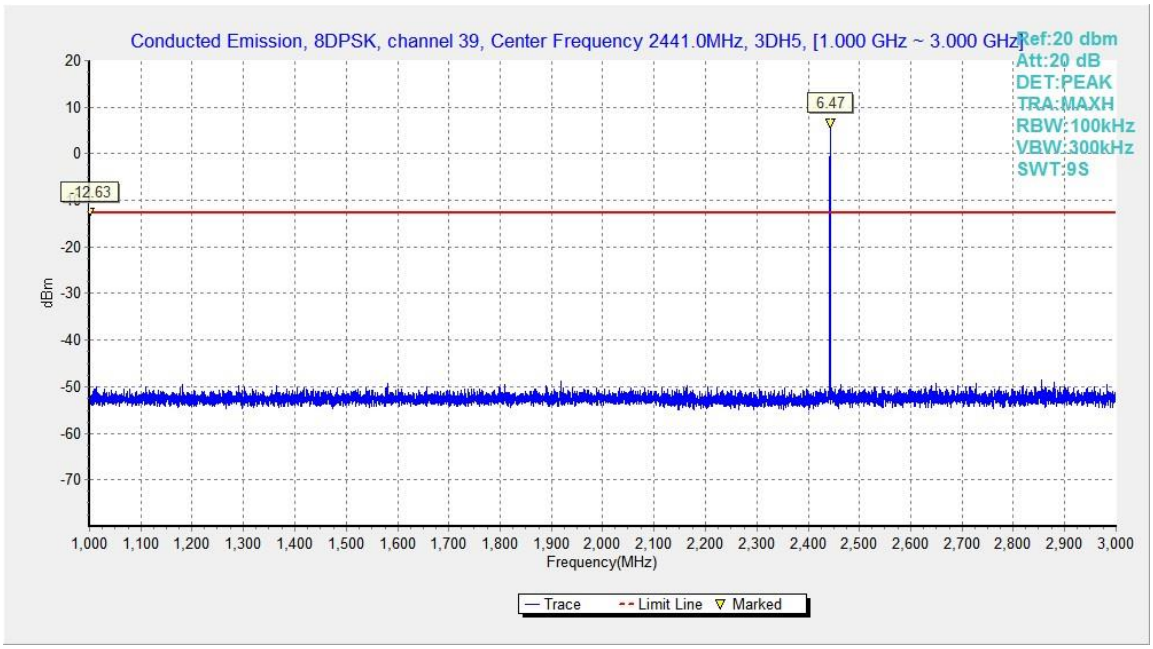


Fig.56. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

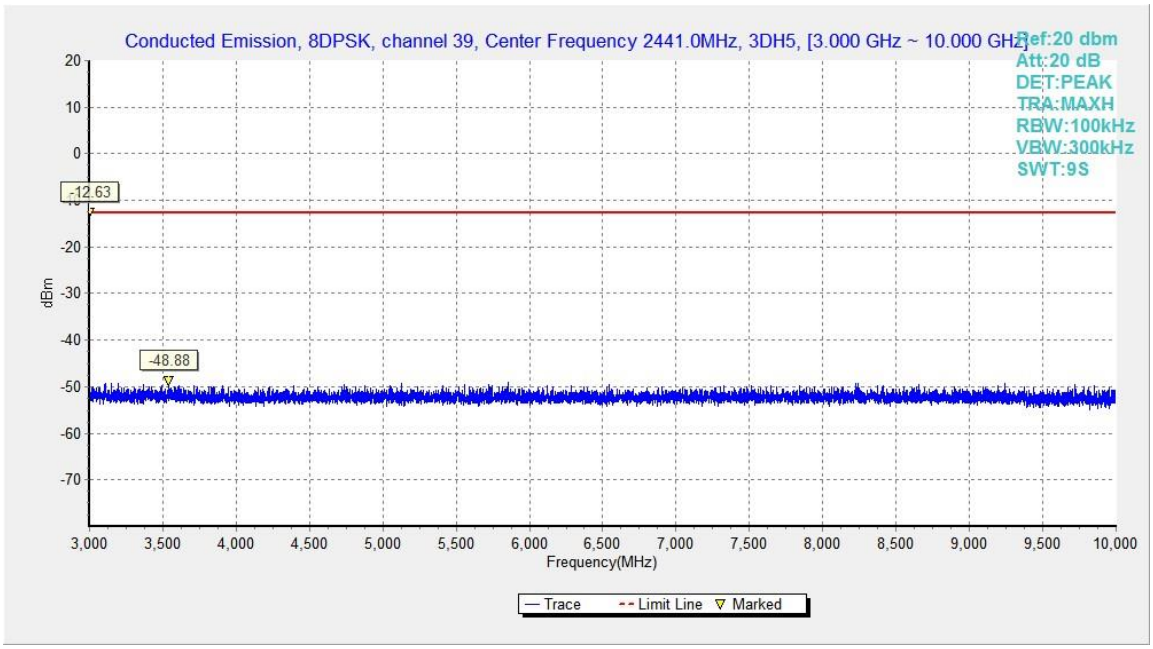


Fig.57. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

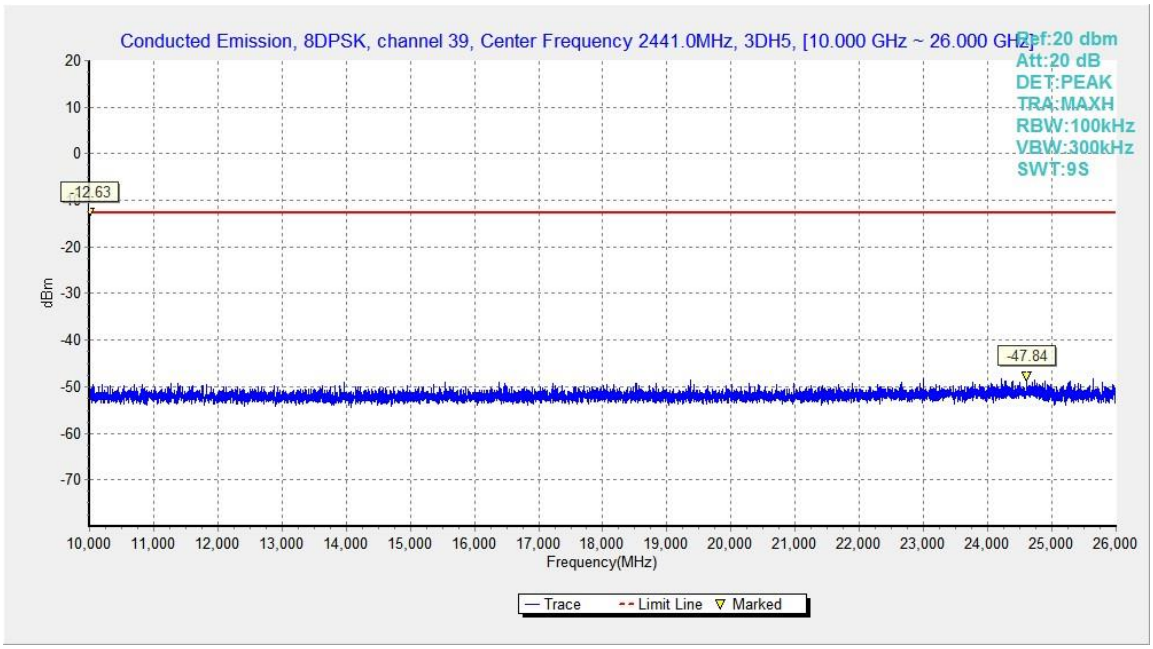


Fig.58. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

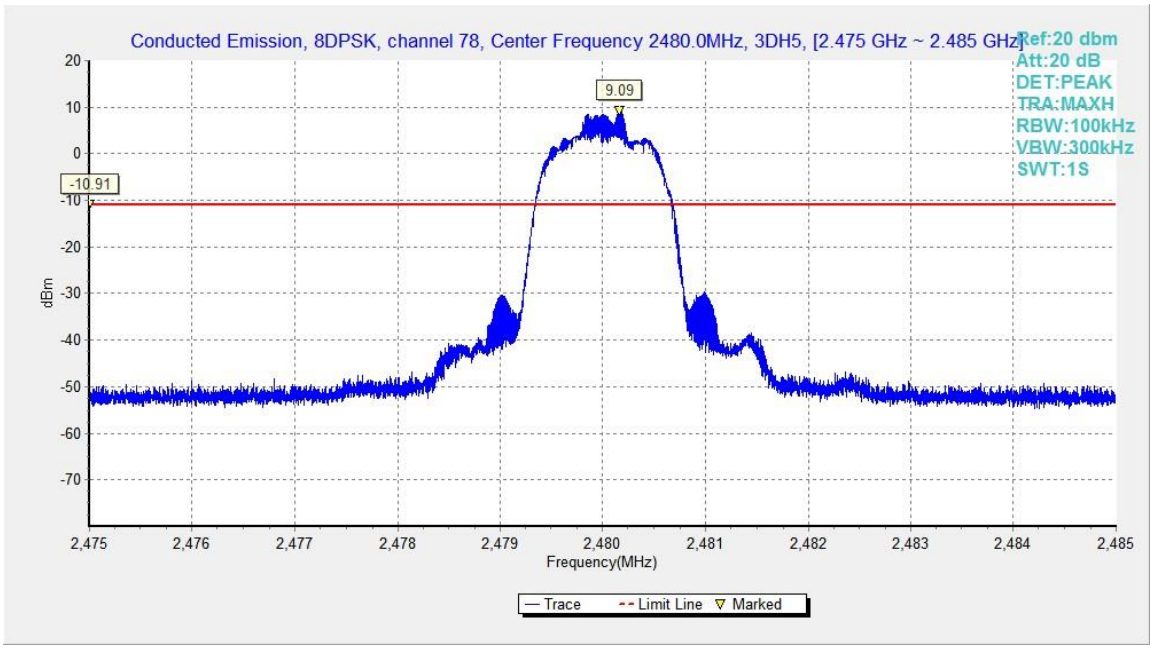


Fig.59. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

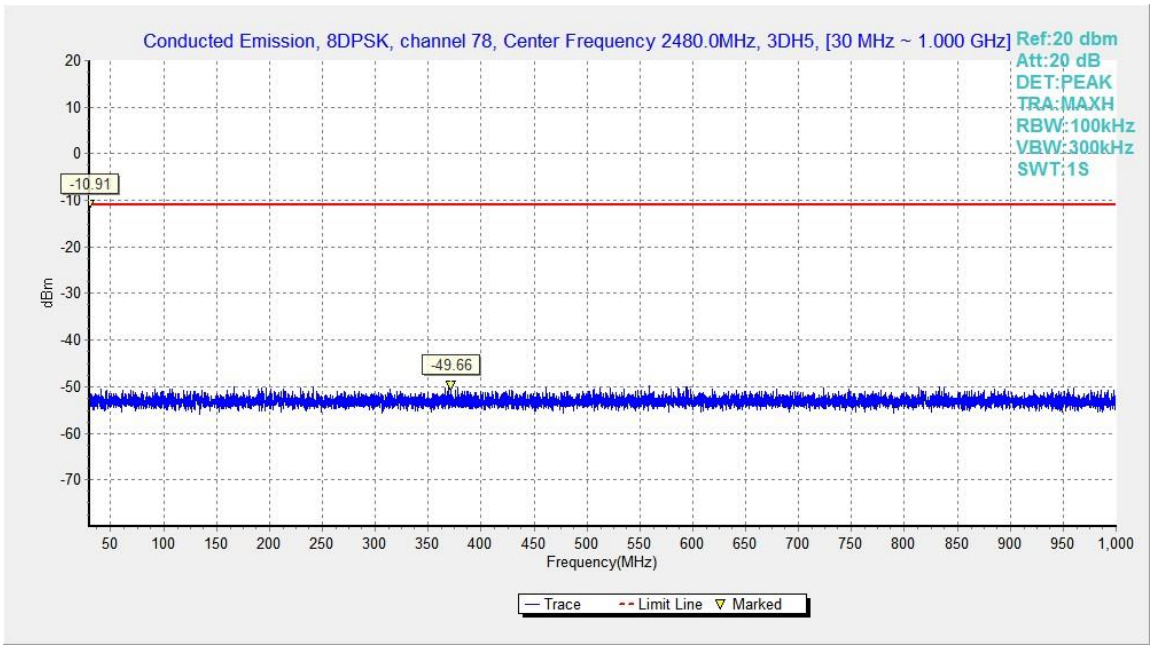


Fig.60. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

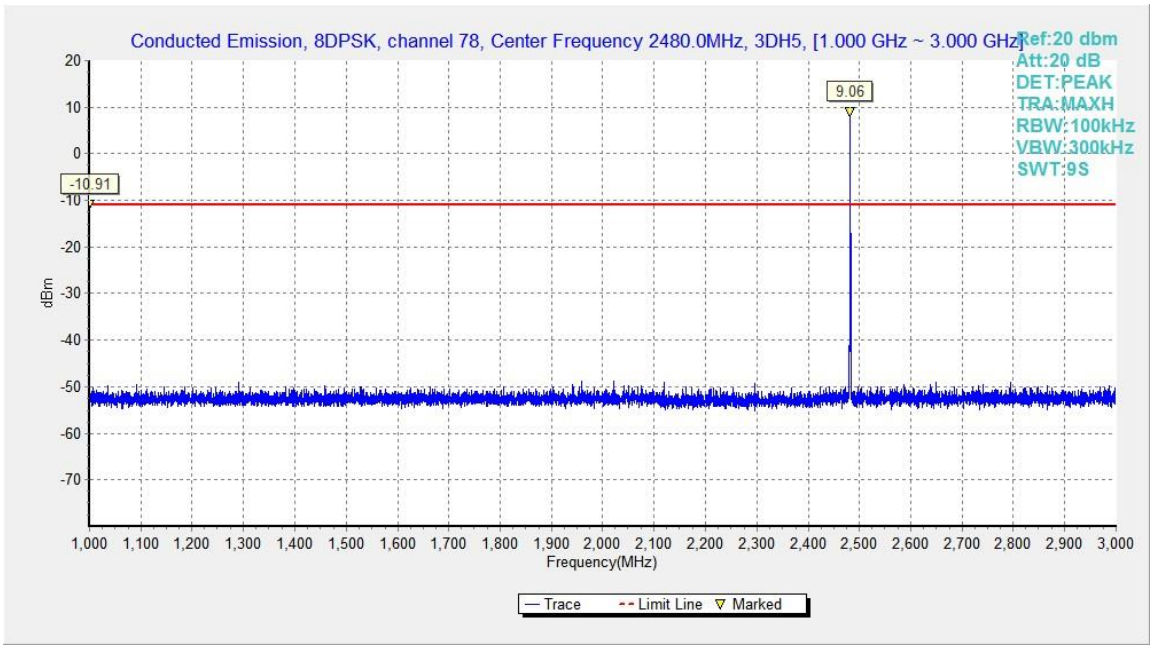


Fig.61. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

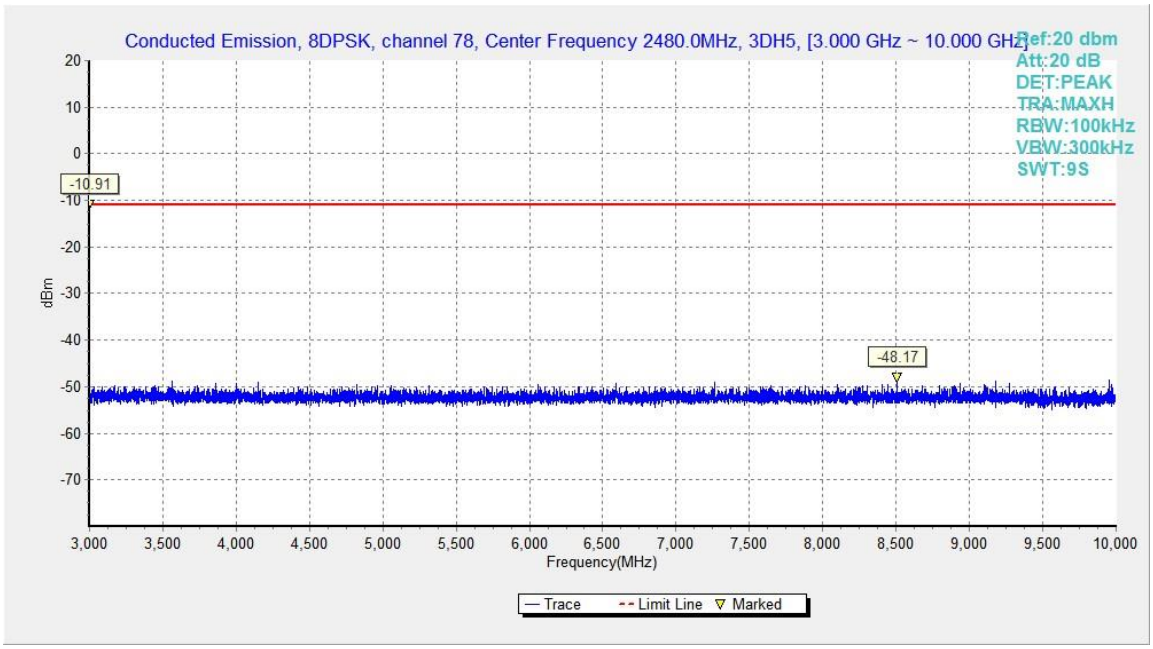


Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

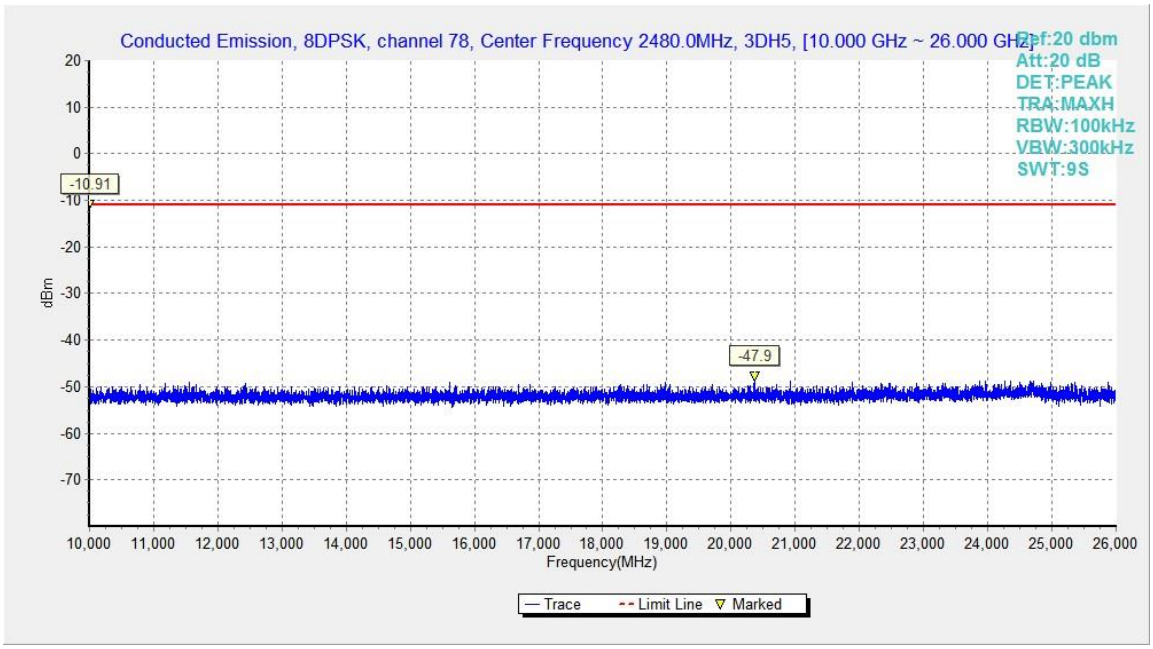


Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

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)
2388.162	60.13	5.35	32.24	22.55	74.00	13.87	V
2389.184	60.31	5.35	32.25	22.71	74.00	13.69	V
4803.500	44.12	-33.92	34.10	43.94	74.00	29.88	V
7206.000	42.31	-32.60	35.81	39.10	74.00	31.69	H
9608.000	45.91	-30.52	36.90	39.54	74.00	28.09	V
12010.000	46.74	-29.89	38.72	37.91	74.00	27.26	V

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)
2321.400	42.80	-29.82	31.59	41.04	74.00	31.20	H
2623.000	42.80	-29.26	32.65	39.41	74.00	31.20	H
4882.000	43.14	-34.20	34.16	43.18	74.00	30.86	V
7323.000	42.95	-32.46	35.91	39.51	74.00	31.05	H
9764.000	43.66	-31.43	36.93	38.17	74.00	30.34	H
12205.000	45.68	-30.74	39.09	37.33	74.00	28.32	H

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)
2483.590	61.25	5.46	32.60	23.19	74.00	12.75	H
2484.015	61.00	5.46	32.60	22.94	74.00	13.00	H
4960.000	43.34	-33.73	34.26	42.81	74.00	30.66	V
7440.000	43.52	-32.27	35.80	40.00	74.00	30.48	H
9920.000	44.33	-32.13	37.10	39.36	74.00	29.67	V
12400.000	45.99	-30.11	39.00	37.10	74.00	28.01	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)
2386.426	60.08	5.34	32.21	22.52	74.00	13.92	V
2389.786	59.91	5.35	32.26	22.30	74.00	14.09	V
4804.000	42.72	-33.93	34.10	42.55	74.00	31.28	H
7206.000	43.08	-32.60	35.81	39.87	74.00	30.92	V
9608.000	46.14	-30.52	36.90	39.76	74.00	27.86	H
12010.000	47.78	-29.89	38.72	38.95	74.00	26.22	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)
2351.000	41.81	-29.65	31.71	39.75	74.00	32.19	H
2516.800	43.60	-29.11	32.63	40.07	74.00	30.40	V
4882.000	42.30	-34.20	34.16	42.33	74.00	31.70	V
7323.000	43.58	-32.46	35.91	40.14	74.00	30.42	H
9764.000	44.15	-31.43	36.93	38.66	74.00	29.85	V
12205.000	46.28	-30.74	39.09	37.92	74.00	27.72	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)
2483.665	61.41	5.46	32.60	23.35	74.00	12.59	V
2484.975	60.97	5.46	32.60	22.90	74.00	13.03	H
4960.000	42.35	-33.73	34.26	41.82	74.00	31.65	V
7440.000	42.48	-32.27	35.80	38.96	74.00	31.52	V
9920.000	42.82	-32.13	37.10	37.85	74.00	31.18	V
12400.000	46.90	-30.11	39.00	38.01	74.00	27.10	V

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)
2383.556	60.70	5.34	32.17	23.19	74.00	13.30	V
2389.744	60.78	5.35	32.26	23.17	74.00	13.22	V
4804.000	42.11	-33.93	34.10	41.94	74.00	31.89	V
7206.000	43.47	-32.60	35.81	40.25	74.00	30.53	H
9608.000	45.19	-30.52	36.90	38.81	74.00	28.81	V
12010.000	47.44	-29.89	38.72	38.61	74.00	26.56	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)
2348.200	42.04	-29.65	31.69	40.00	74.00	31.96	V
2518.400	43.59	-29.19	32.64	40.15	74.00	30.41	H
4882.000	41.89	-34.20	34.16	41.93	74.00	32.11	V
7323.000	42.51	-32.46	35.91	39.06	74.00	31.49	H
9764.000	45.46	-31.43	36.93	39.96	74.00	28.54	V
12205.000	45.91	-30.74	39.09	37.56	74.00	28.09	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)
2483.650	61.52	5.46	32.60	23.46	74.00	12.48	V
2484.450	62.05	5.46	32.60	23.98	74.00	11.95	H
4960.000	42.30	-33.73	34.26	41.78	74.00	31.70	V
7440.000	42.26	-32.27	35.80	38.74	74.00	31.74	V
9920.000	43.46	-32.13	37.10	38.49	74.00	30.54	V
12400.000	45.84	-30.11	39.00	36.95	74.00	28.16	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)
2386.463	45.67	5.34	32.21	8.11	54.00	8.33	V
2389.275	45.74	5.35	32.25	8.14	54.00	8.26	V
4803.800	33.02	-33.92	34.10	32.85	54.00	20.98	H
7205.850	31.04	-32.60	35.81	27.83	54.00	22.96	V
9607.900	33.95	-30.52	36.90	27.57	54.00	20.05	V
12009.950	35.43	-29.89	38.72	26.60	54.00	18.57	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)
2437.387	47.70	5.41	32.55	9.75	54.00	6.30	V
2444.400	47.89	5.41	32.58	9.90	54.00	6.11	V
4881.500	32.99	-34.20	34.16	33.03	54.00	21.01	H
7323.100	31.18	-32.46	35.91	27.74	54.00	22.82	V
9764.000	32.57	-31.43	36.93	27.07	54.00	21.43	V
12204.900	34.29	-30.74	39.09	25.94	54.00	19.71	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)
2484.000	47.96	5.46	32.60	9.90	54.00	6.04	V
2486.850	48.03	5.46	32.60	9.97	54.00	5.97	V
4959.900	34.08	-33.73	34.26	33.55	54.00	19.92	V
7440.000	30.96	-32.27	35.80	27.44	54.00	23.04	H
9920.100	31.50	-32.13	37.10	26.52	54.00	22.50	V
12399.850	34.75	-30.11	39.00	25.86	54.00	19.25	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)
2387.775	45.72	5.35	32.23	8.14	54.00	8.28	V
2389.500	45.70	5.35	32.25	8.10	54.00	8.30	V
4803.800	30.68	-33.92	34.10	30.50	54.00	23.32	H
7205.850	31.19	-32.60	35.81	27.98	54.00	22.81	V
9607.900	33.95	-30.52	36.90	27.58	54.00	20.05	V
12009.950	35.81	-29.89	38.72	26.98	54.00	18.19	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)
2435.775	47.68	5.41	32.54	9.73	54.00	6.32	V
2445.300	47.76	5.41	32.58	9.76	54.00	6.24	V
4881.850	29.60	-34.20	34.16	29.64	54.00	24.40	V
7323.100	31.38	-32.46	35.91	27.94	54.00	22.62	V
9764.000	32.72	-31.43	36.93	27.22	54.00	21.28	H
12204.900	34.21	-30.74	39.09	25.86	54.00	19.79	V

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)
2483.850	48.10	5.46	32.60	10.04	54.00	5.90	V
2484.525	48.05	5.46	32.60	9.98	54.00	5.95	V
4959.900	30.28	-33.73	34.26	29.75	54.00	23.72	V
7440.000	30.95	-32.27	35.80	27.42	54.00	23.05	H
9920.100	31.68	-32.13	37.10	26.71	54.00	22.32	H
12399.850	34.82	-30.11	39.00	25.93	54.00	19.18	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)
2386.575	45.70	5.35	32.21	8.14	54.00	8.30	V
2389.050	45.73	5.35	32.25	8.14	54.00	8.27	V
4804.150	30.04	-33.93	34.10	29.86	54.00	23.96	V
7205.850	31.15	-32.60	35.81	27.94	54.00	22.85	V
9607.900	33.99	-30.52	36.90	27.61	54.00	20.01	H
12009.950	35.82	-29.89	38.72	26.99	54.00	18.18	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)
2434.838	47.57	5.40	32.54	9.63	54.00	6.43	V
2446.988	47.77	5.42	32.59	9.77	54.00	6.23	V
4881.850	29.57	-34.20	34.16	29.61	54.00	24.43	V
7323.100	31.33	-32.46	35.91	27.89	54.00	22.67	H
9764.000	32.75	-31.43	36.93	27.25	54.00	21.25	V
12204.900	34.25	-30.74	39.09	25.90	54.00	19.75	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)
2484.075	48.09	5.46	32.60	10.02	54.00	5.91	V
2487.300	48.03	5.47	32.60	9.97	54.00	5.97	V
4959.900	30.30	-33.73	34.26	29.77	54.00	23.70	V
7440.000	30.79	-32.27	35.80	27.27	54.00	23.21	H
9920.100	31.46	-32.13	37.10	26.48	54.00	22.54	H
12399.850	34.61	-30.11	39.00	25.72	54.00	19.39	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	319	121.22	P
	DH3	Fig.66	1.63	Fig.67	109	177.67	P
	DH5	Fig.68	2.88	Fig.69	65	187.2	P

For π/4 DQPSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	2DH1	Fig.70	0.38	Fig.71	321	121.98	P
	2DH3	Fig.72	1.64	Fig.73	114	186.96	P
	2DH5	Fig.74	2.88	Fig.75	59	169.92	P

For 8DPSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	3DH1	Fig.76	0.38	Fig.77	320	121.6	P
	3DH3	Fig.78	1.63	Fig.79	101	164.63	P
	3DH5	Fig.80	2.89	Fig.81	55	158.95	P

Conclusion: PASS

Test graphs as below:

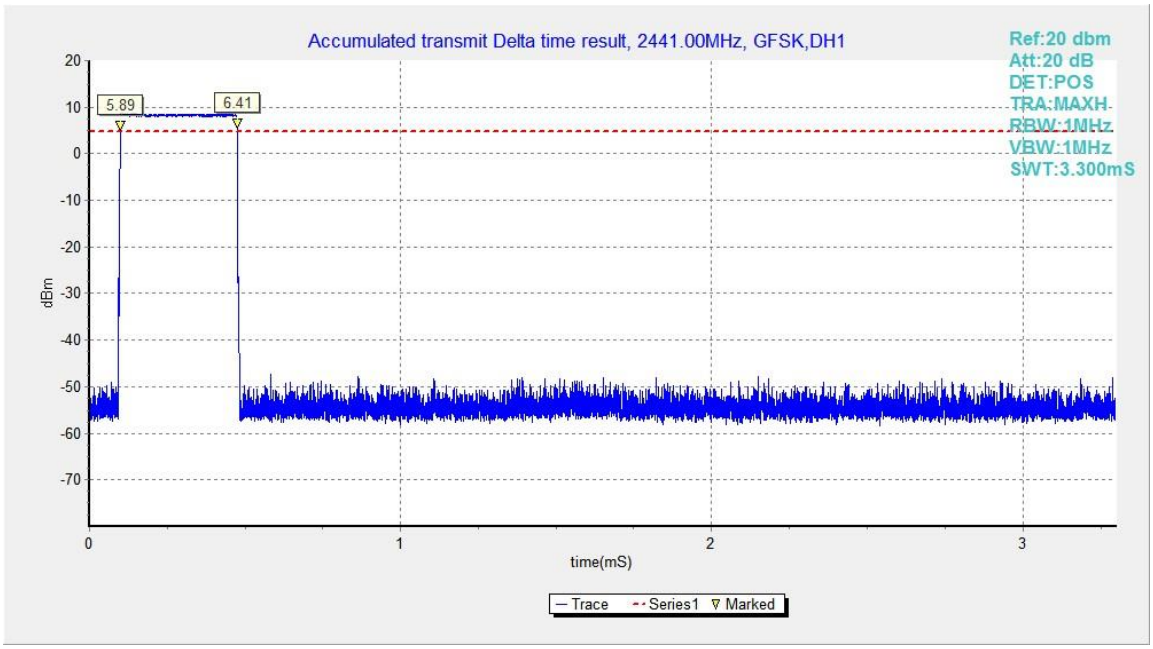


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

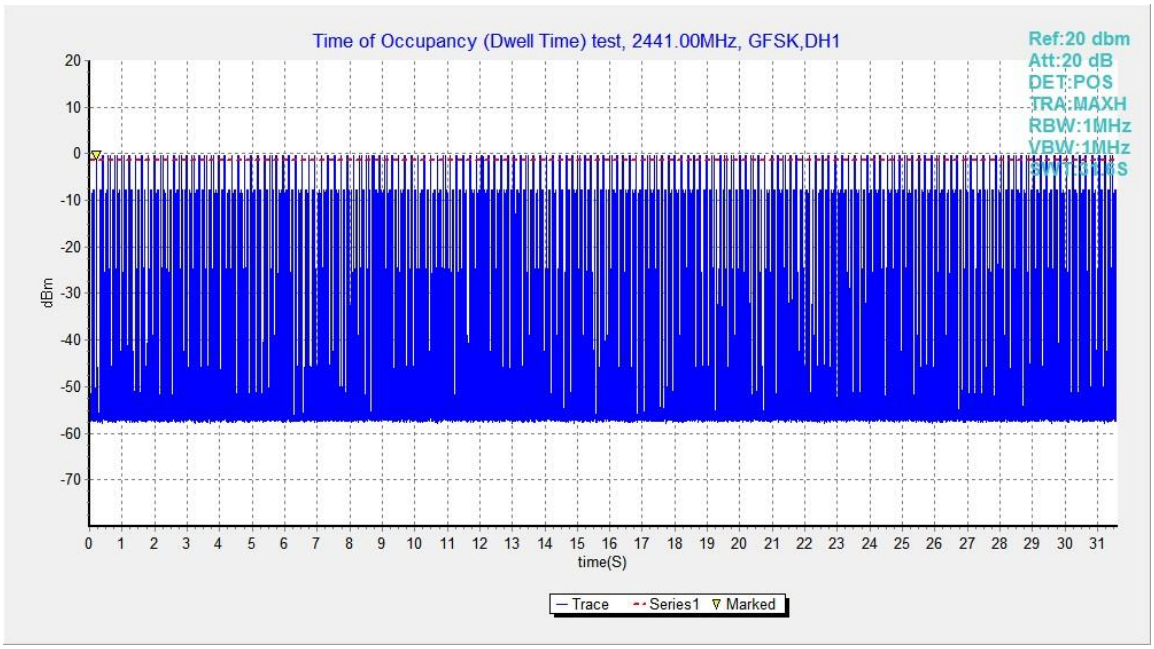


Fig.65. Number of Transmissions Measurement: Channel 39,Packet DH1

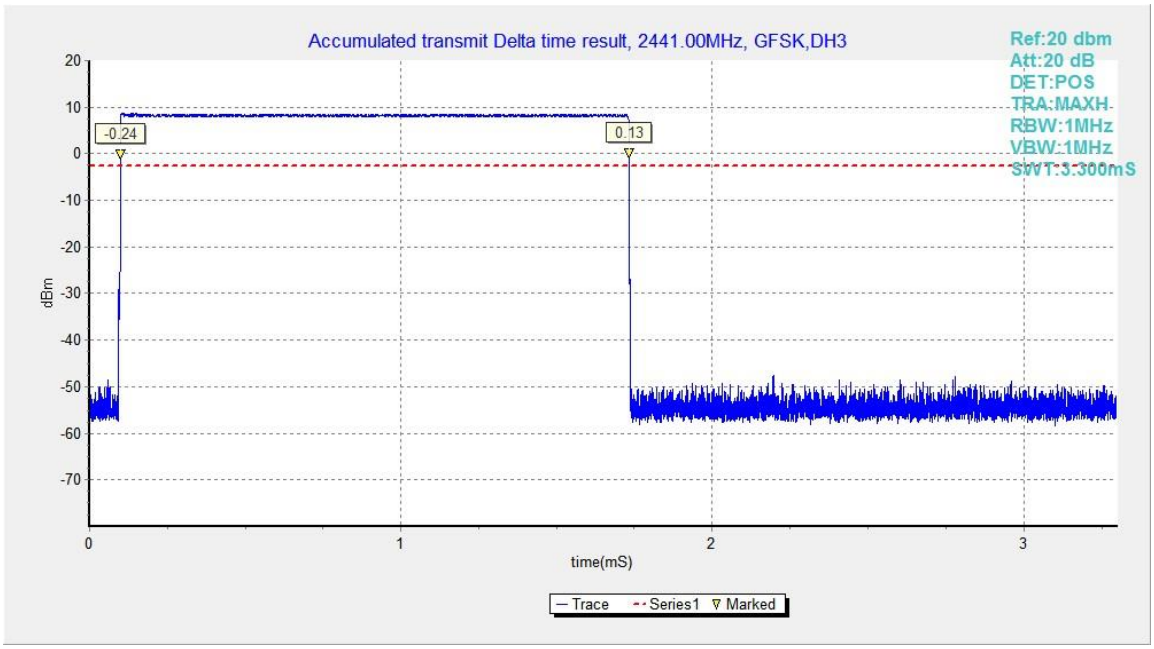


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

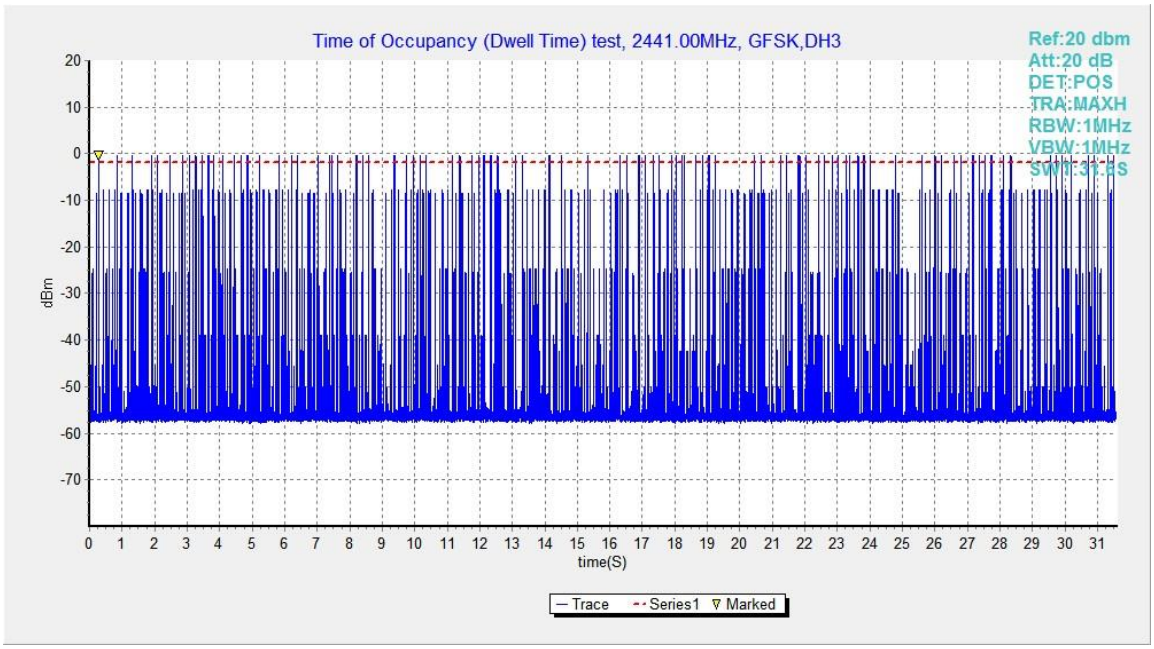


Fig.67. Number of Transmissions Measurement: Channel 39,Packet DH3

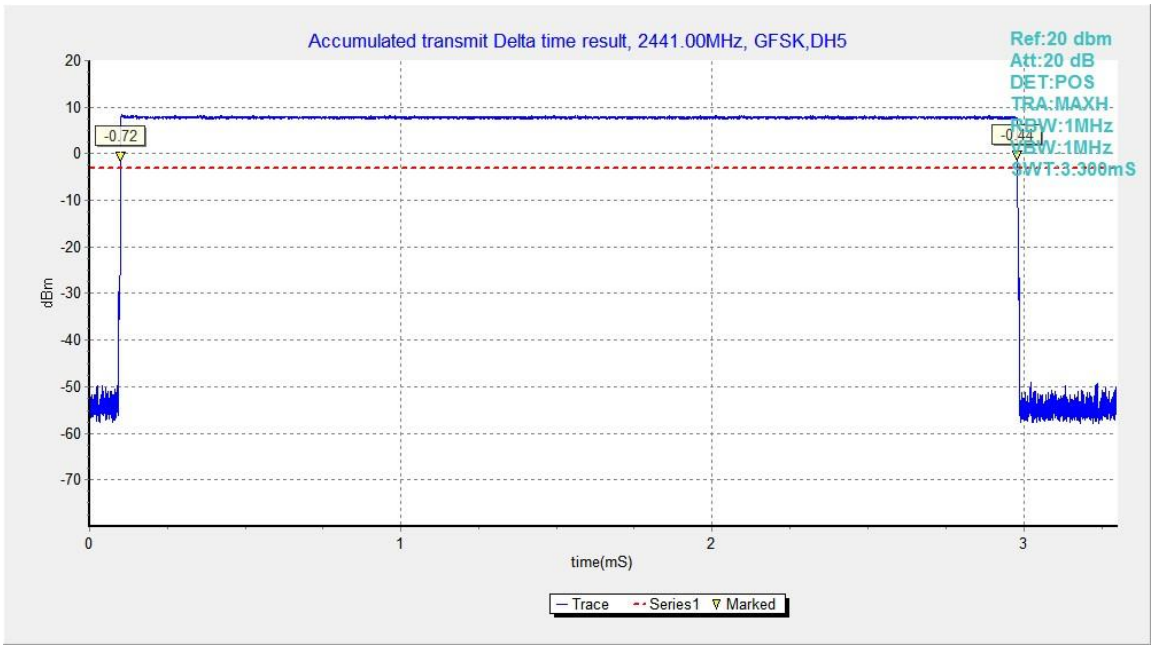


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

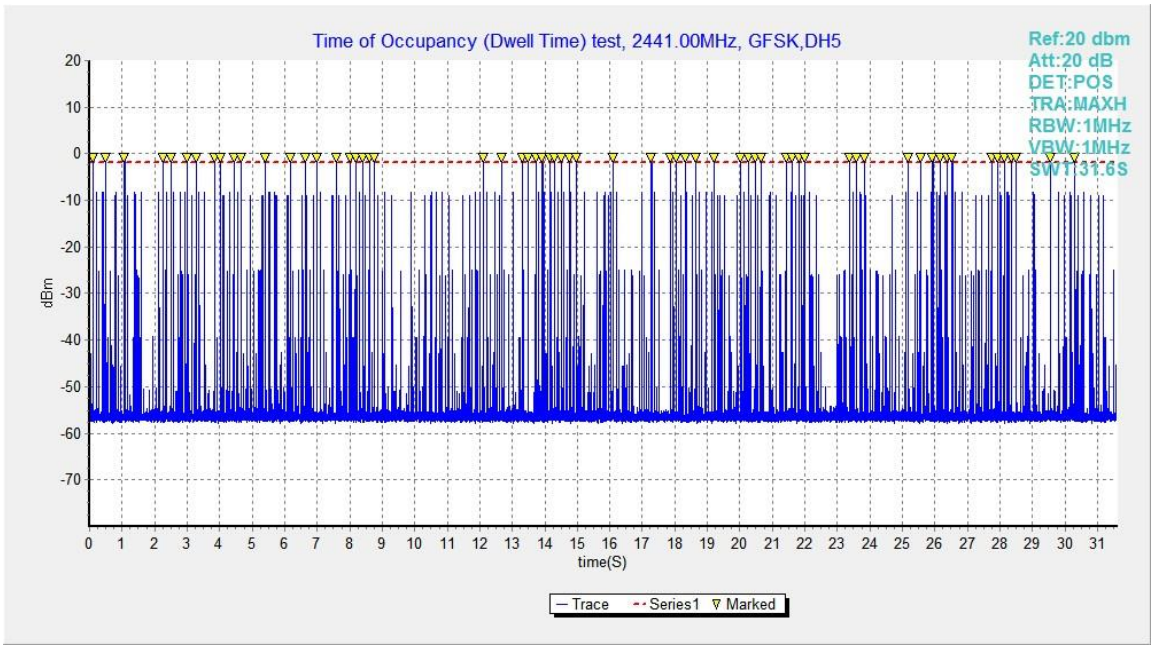


Fig.69. Number of Transmissions Measurement: Channel 39,Packet DH5

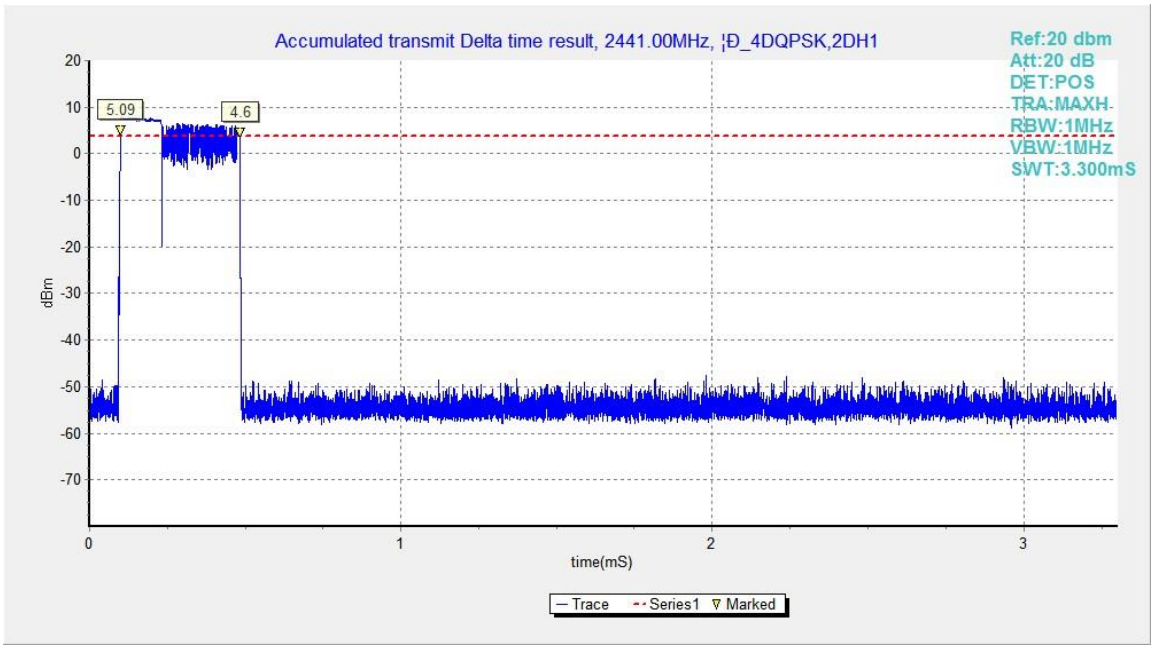


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

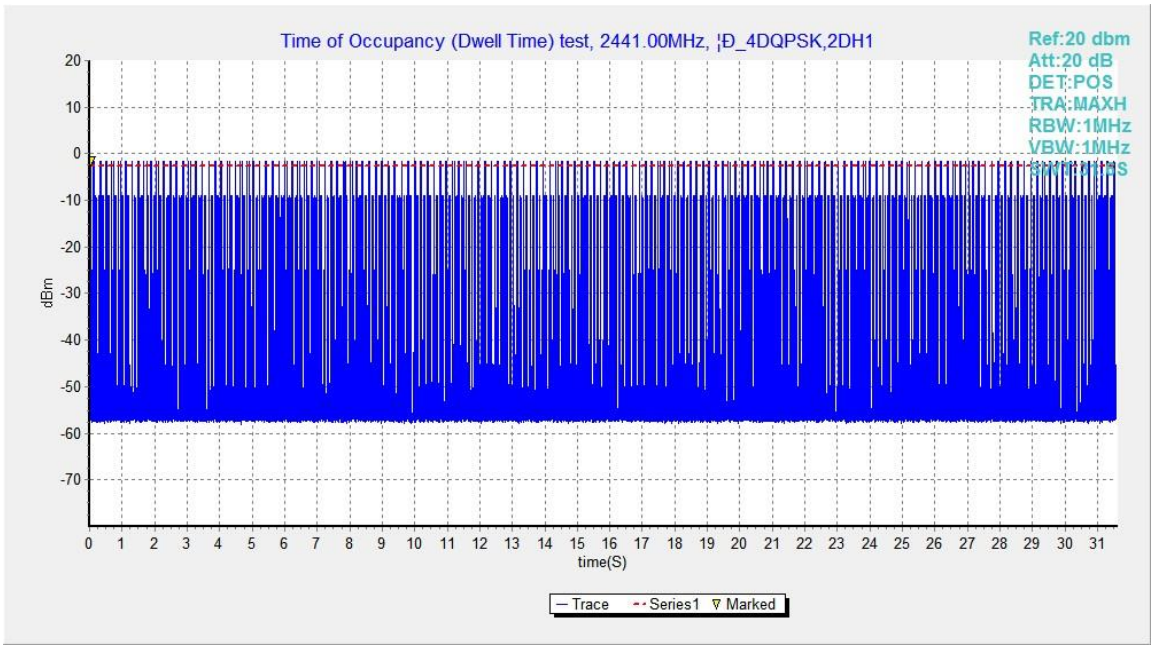


Fig.71. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

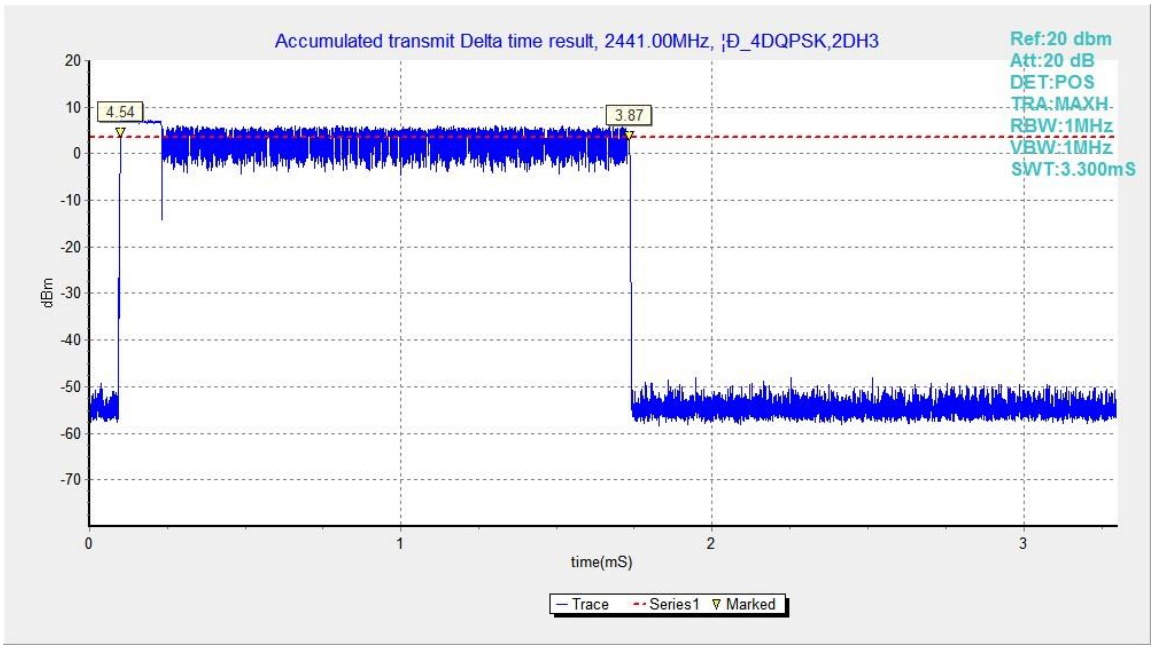


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

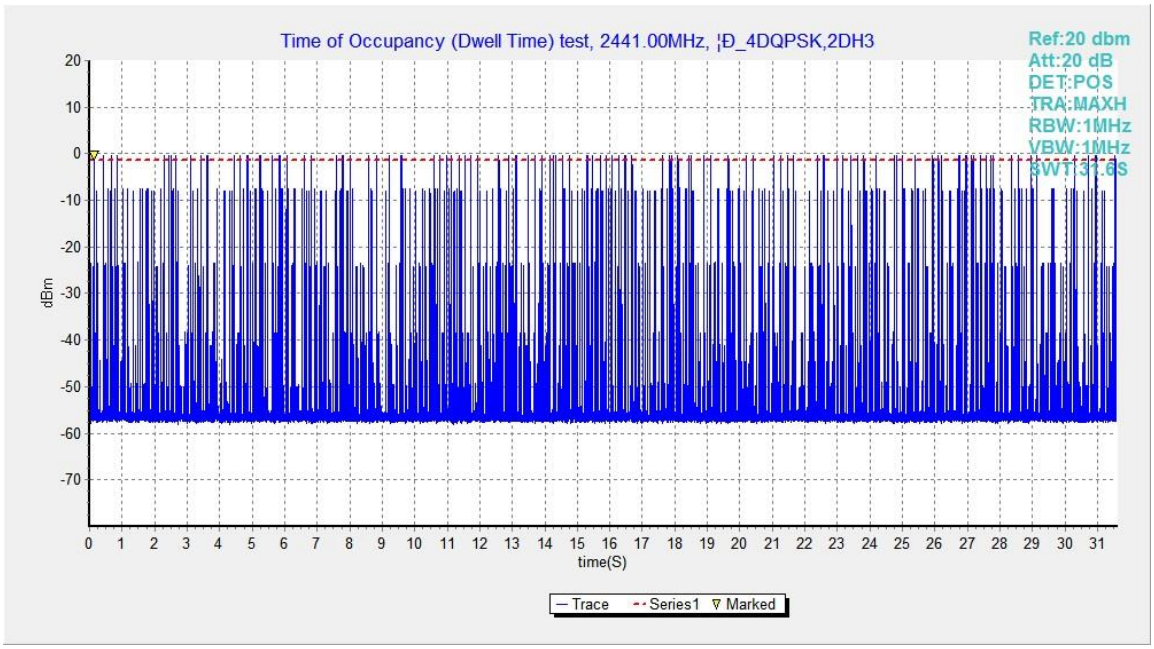


Fig.73. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

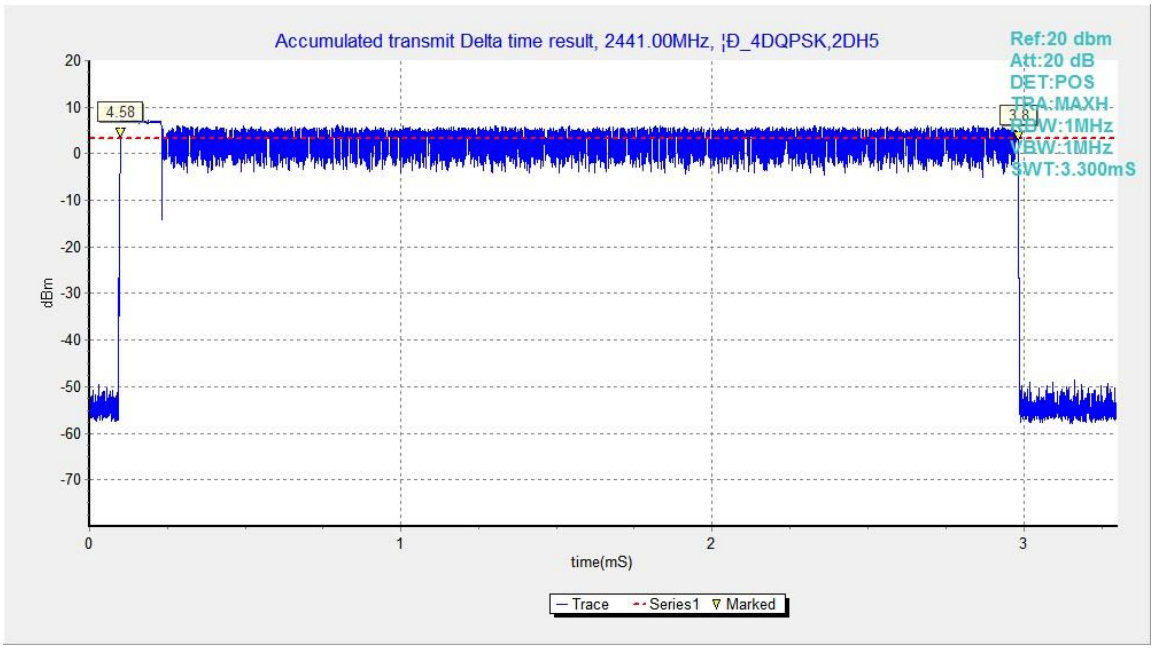


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

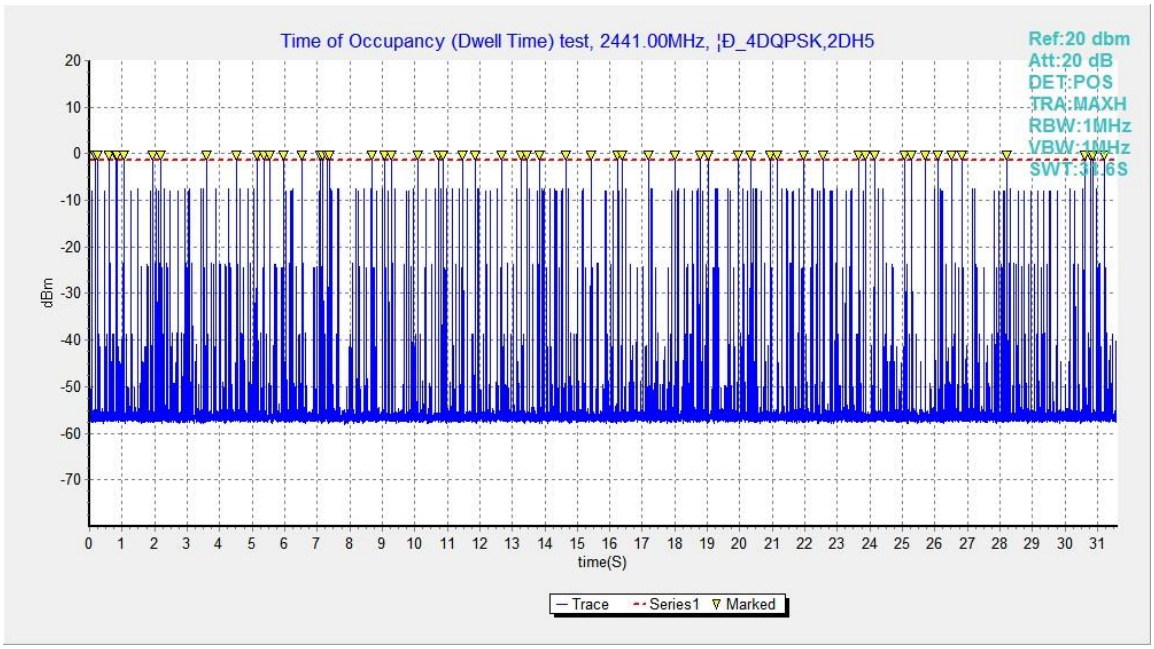


Fig.75. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

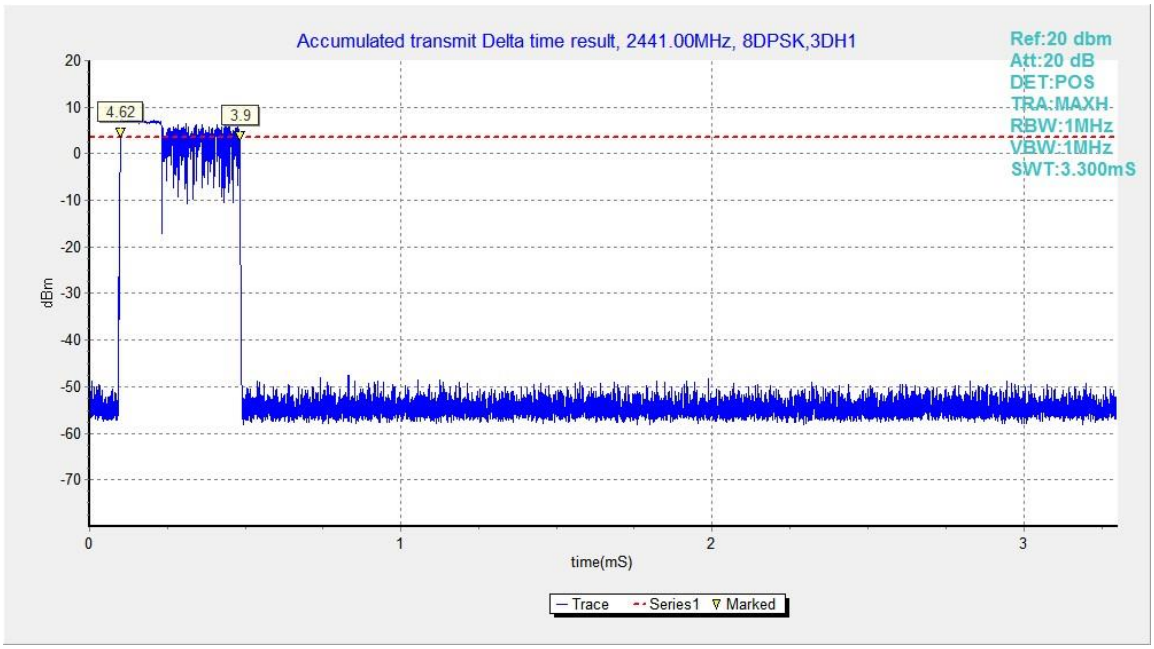


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

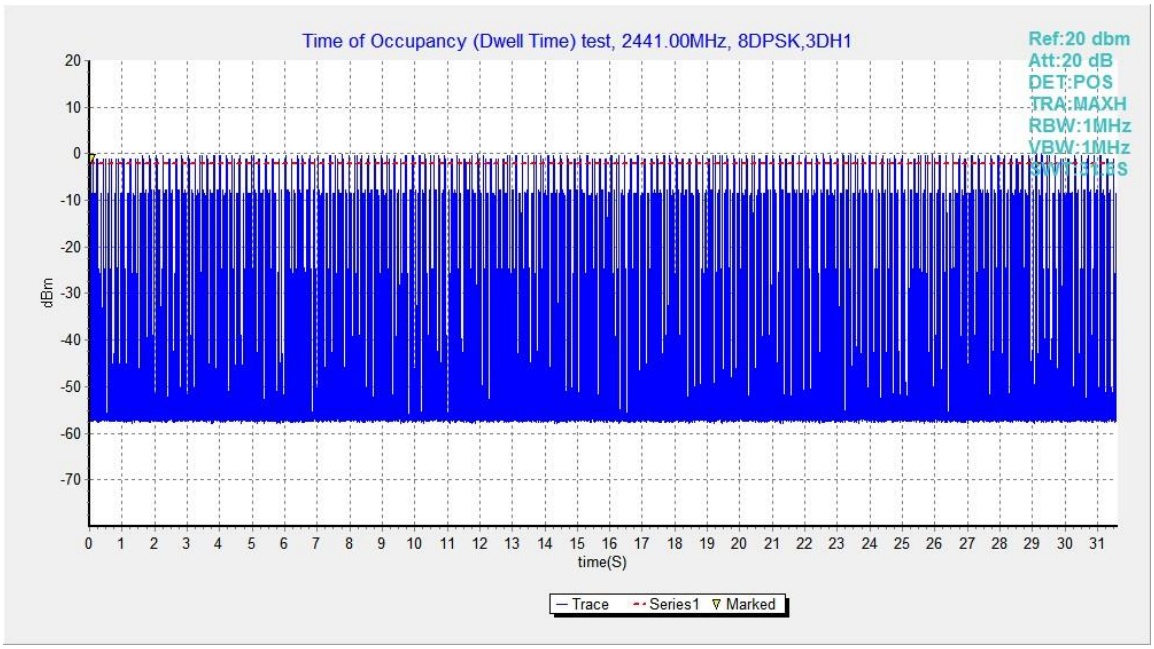


Fig.77. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

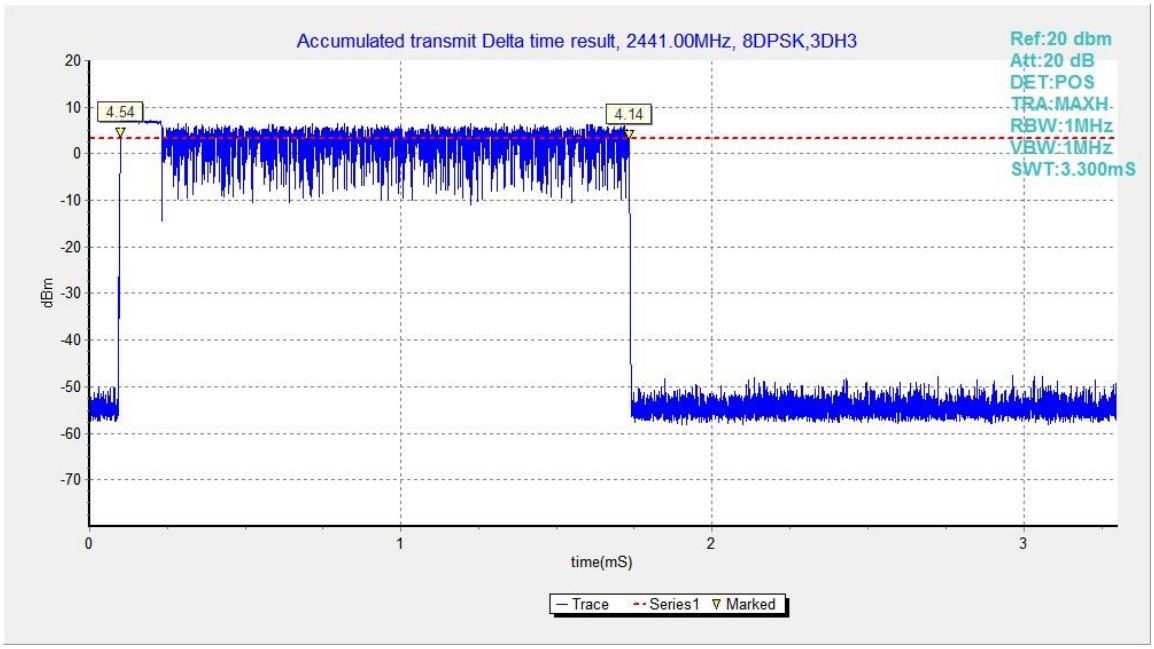


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

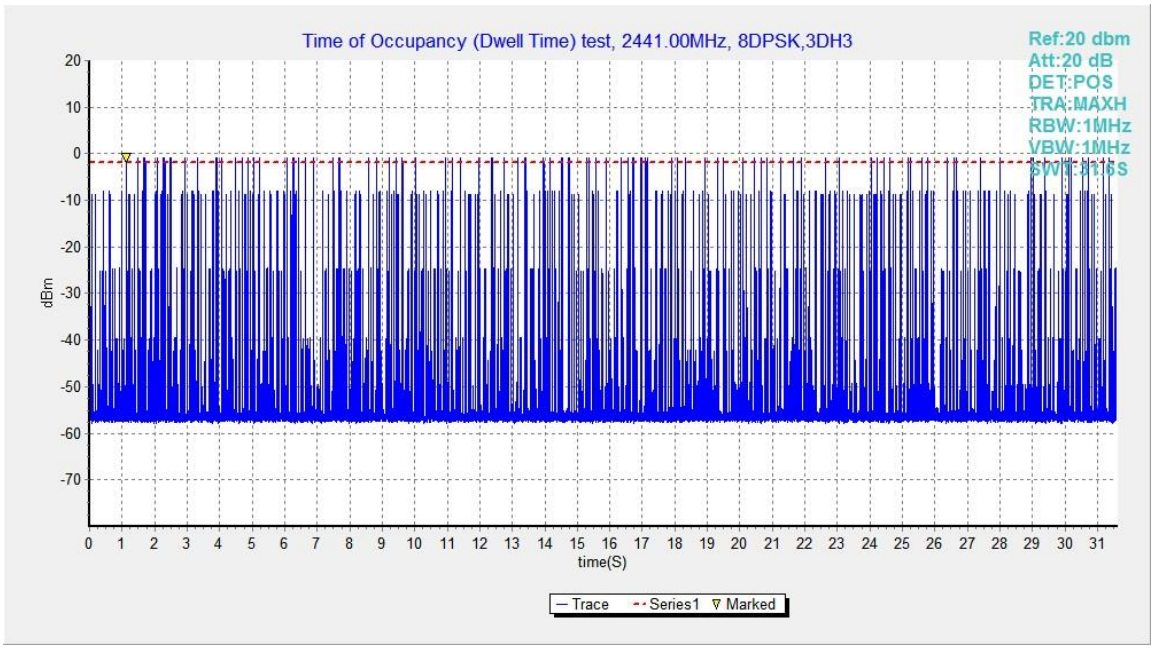


Fig.79. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

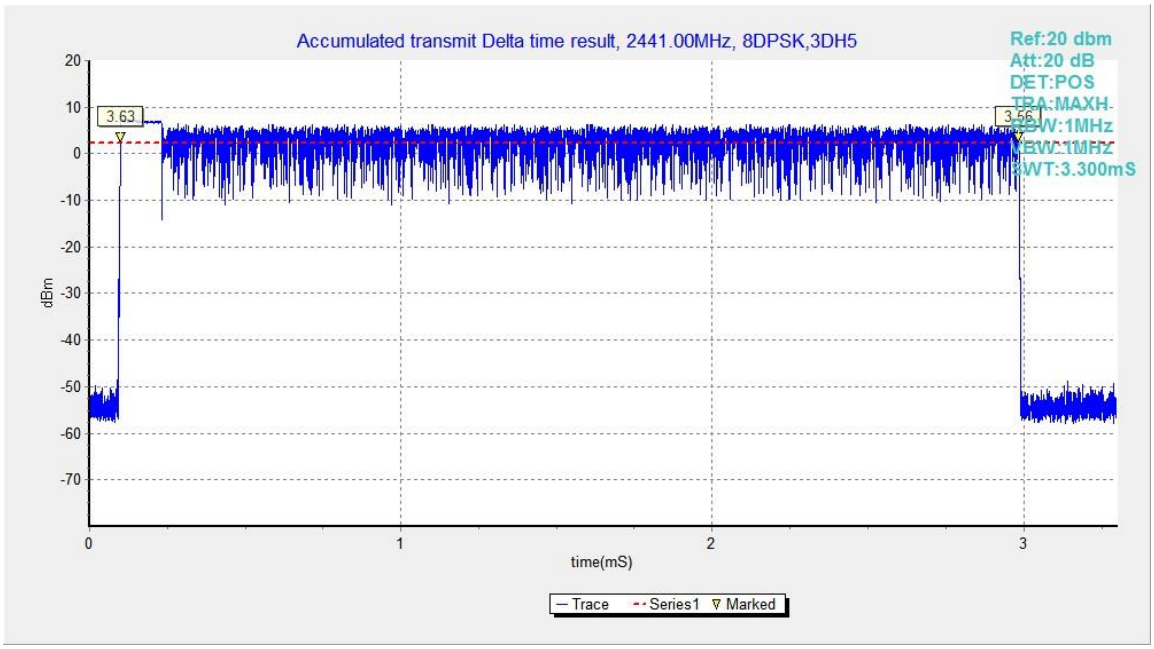


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

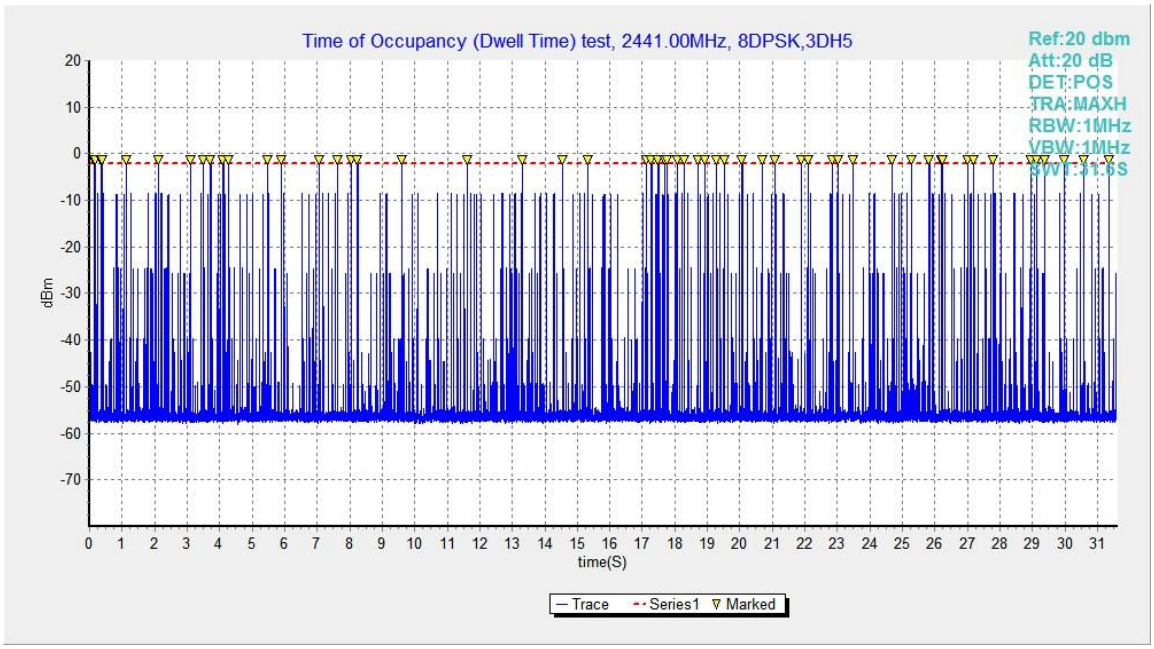


Fig.81. Number of Transmissions Measurement: Channel 39,Packet 3-DH5

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	942.00	NA
39	Fig.83	942.00	NA
78	Fig.84	944.25	NA

For π/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1253.25	NA
39	Fig.86	1207.50	NA
78	Fig.87	1253.25	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1256.25	NA
39	Fig.89	1254.00	NA
78	Fig.90	1256.25	NA

Conclusion: NA

Test graphs as below:

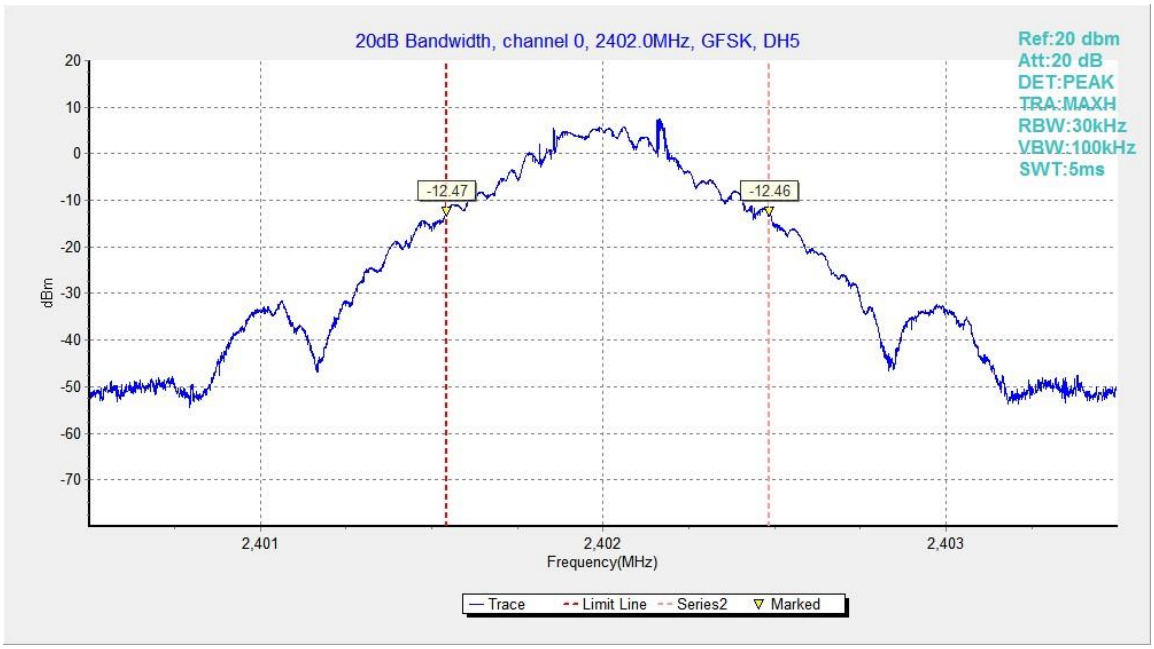


Fig.82. 20dB Bandwidth: GFSK, Channel 0

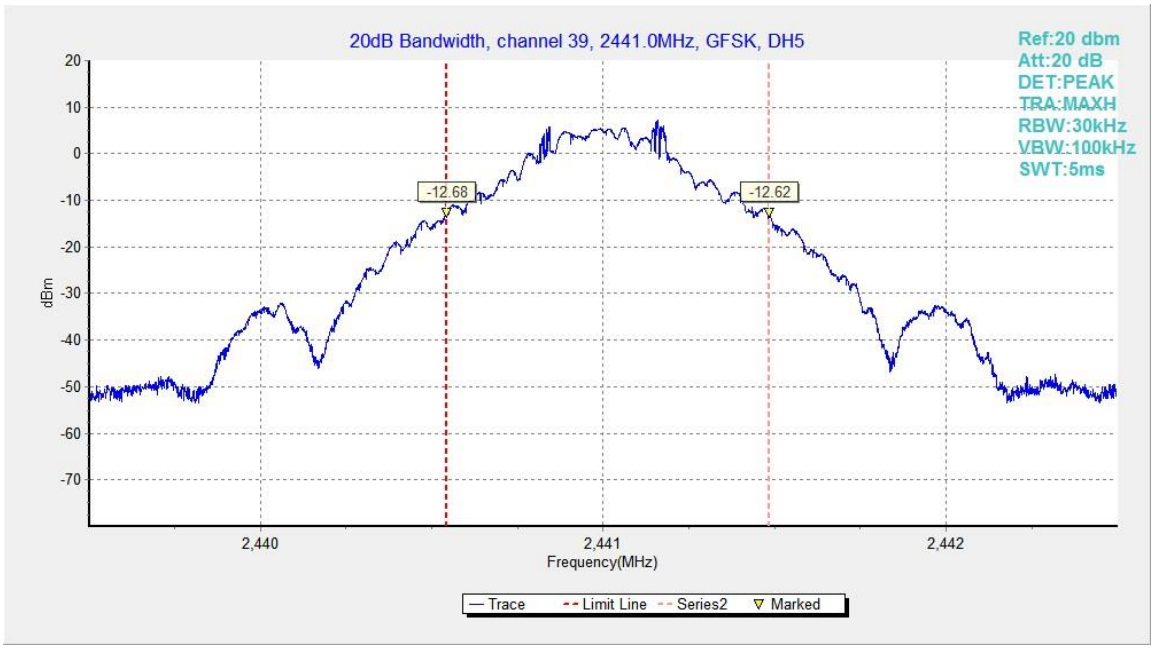


Fig.83. 20dB Bandwidth: GFSK, Channel 39

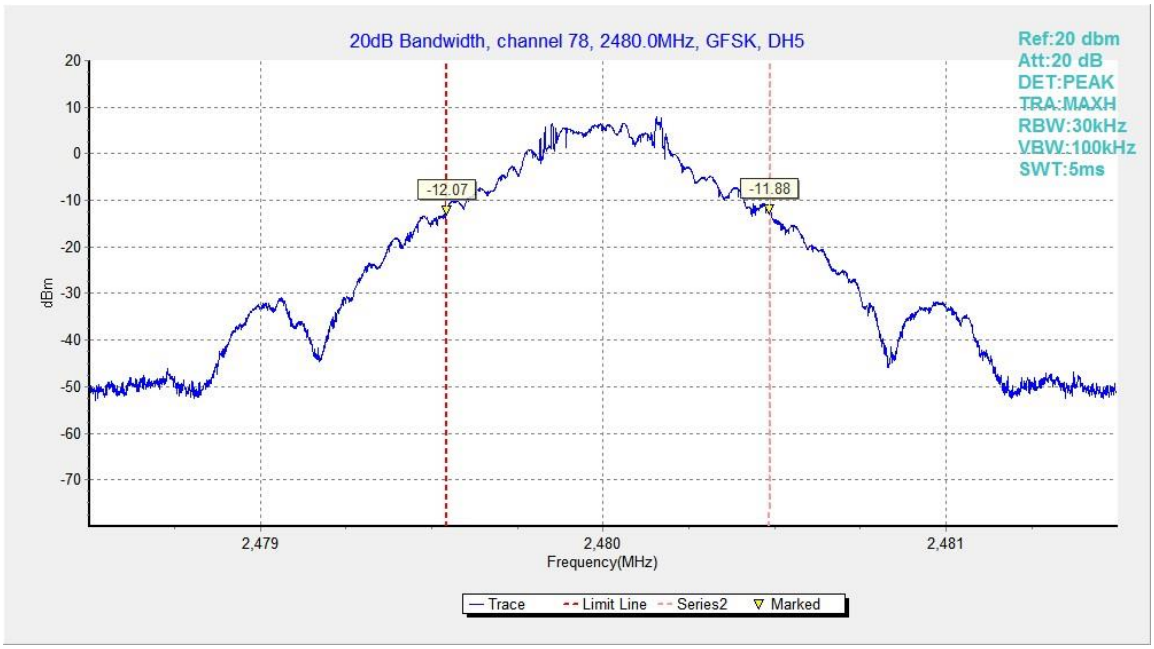


Fig.84. 20dB Bandwidth: GFSK, Channel 78

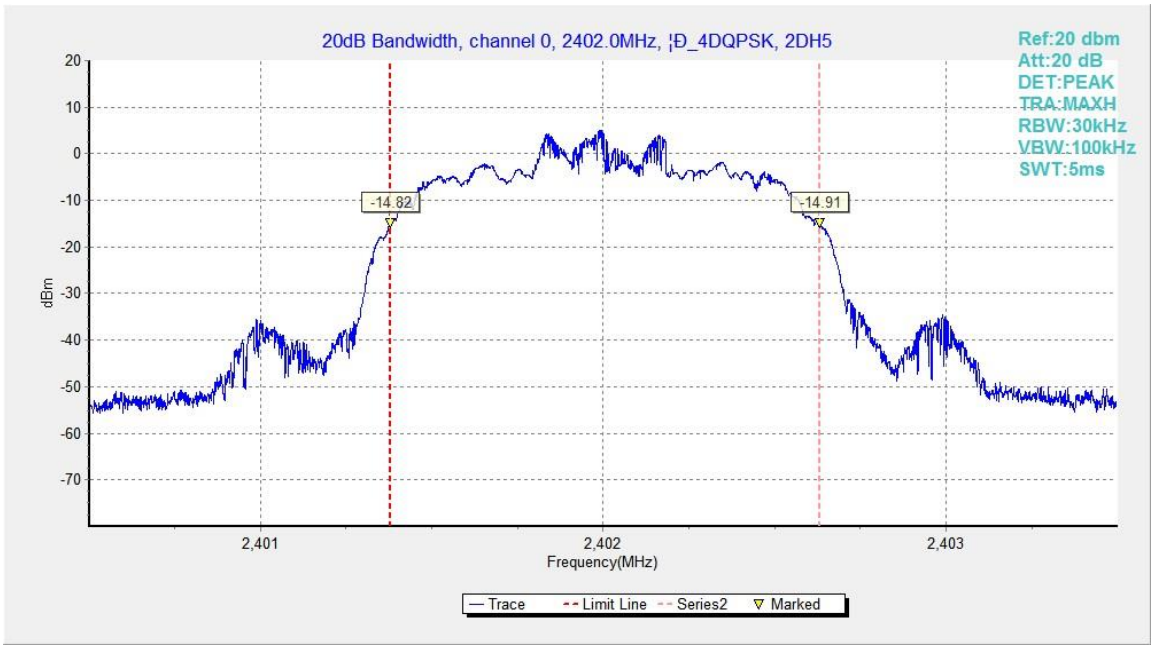


Fig.85. 20dB Bandwidth: π/4 DQPSK, Channel 0

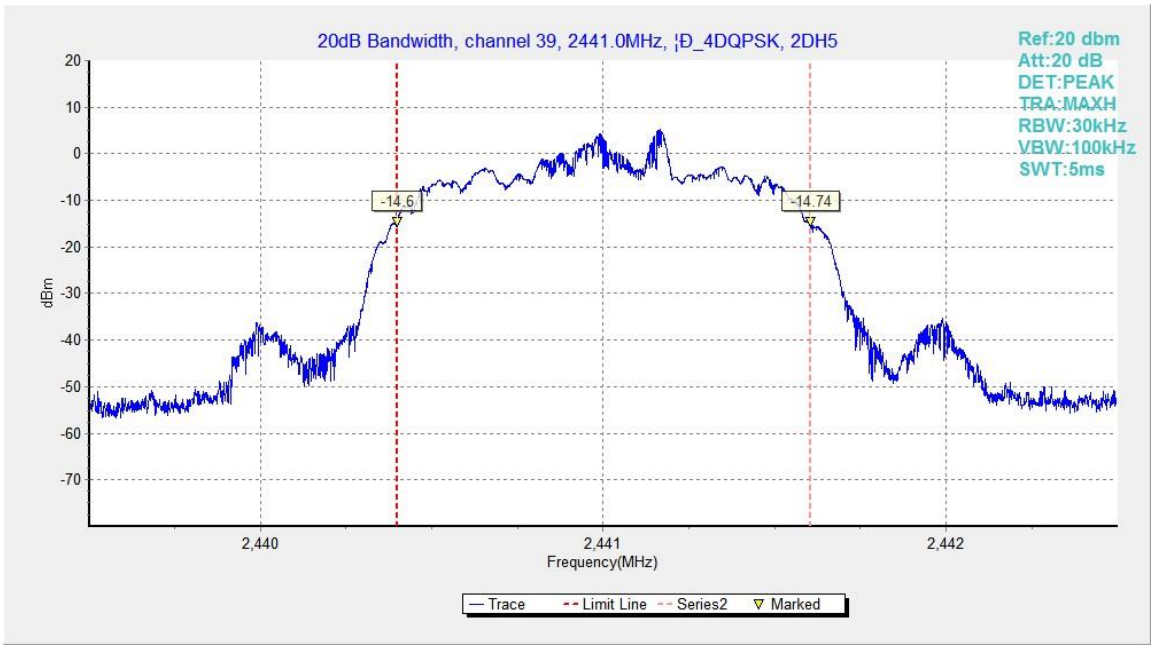


Fig.86. 20dB Bandwidth: π/4 DQPSK, Channel 39

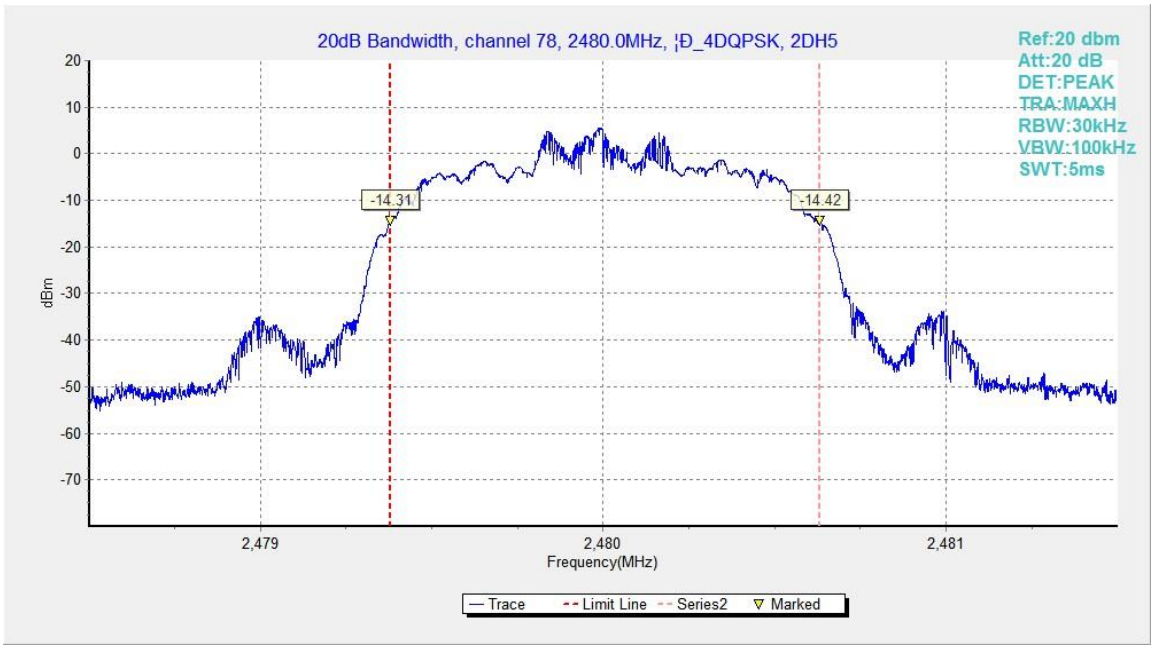


Fig.87. 20dB Bandwidth: π/4 DQPSK, Channel 78

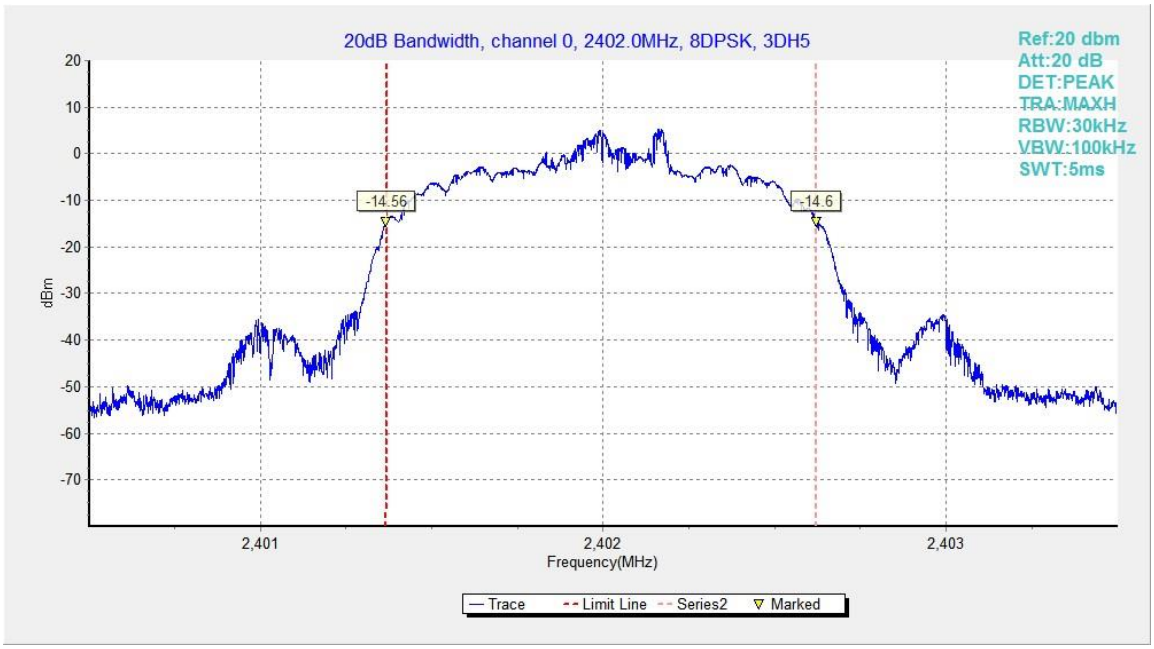


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

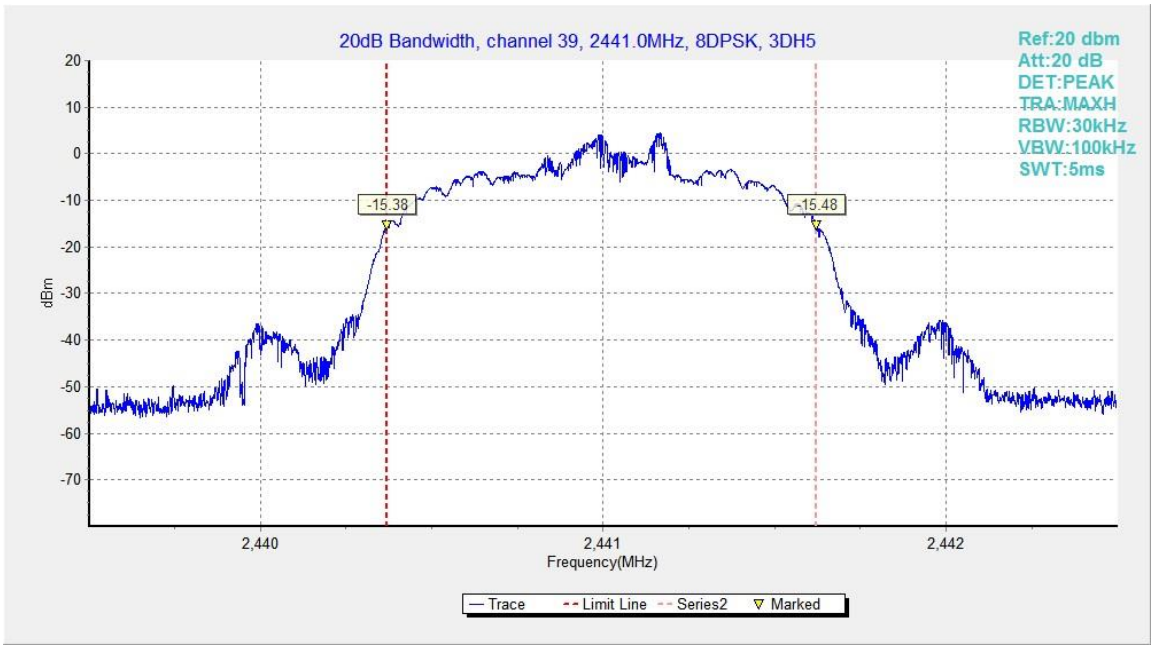


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

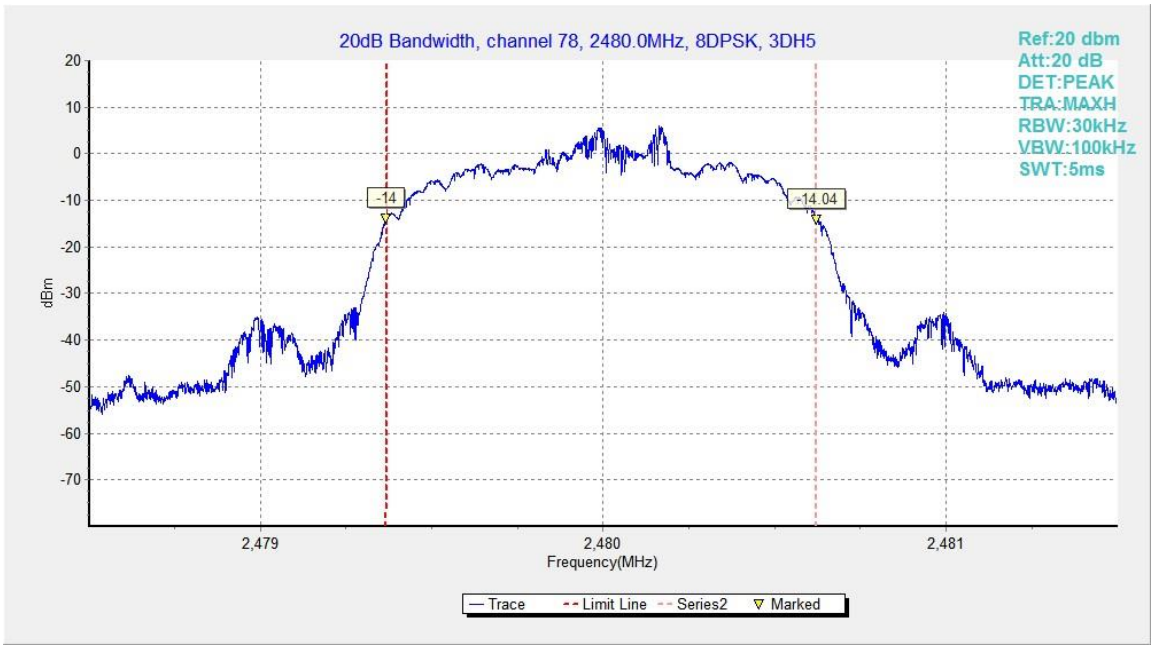


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

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	1304.25	P

For π/4 DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	1113.75	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	977.25	P

Conclusion: PASS

Test graphs as below:

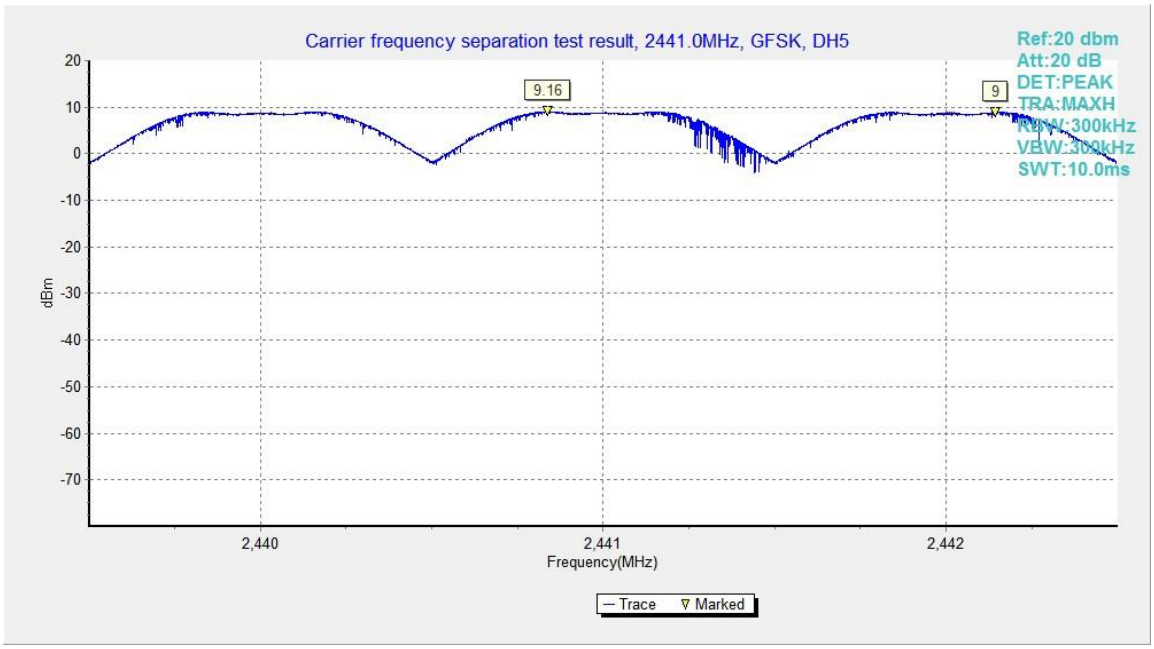


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

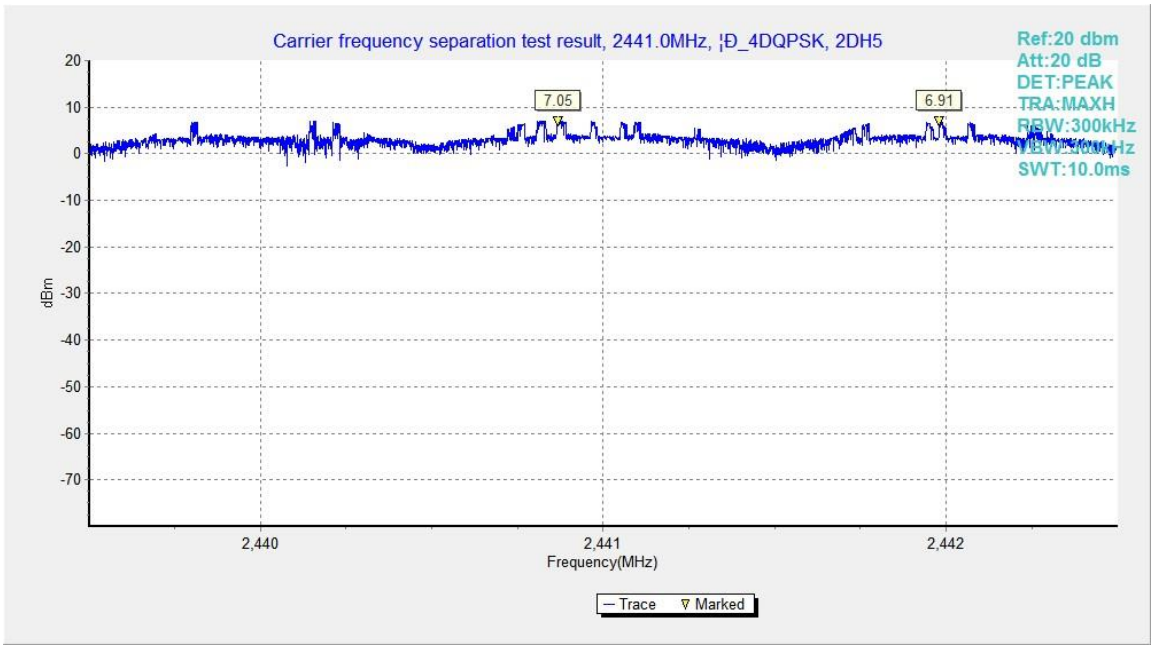


Fig.92. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

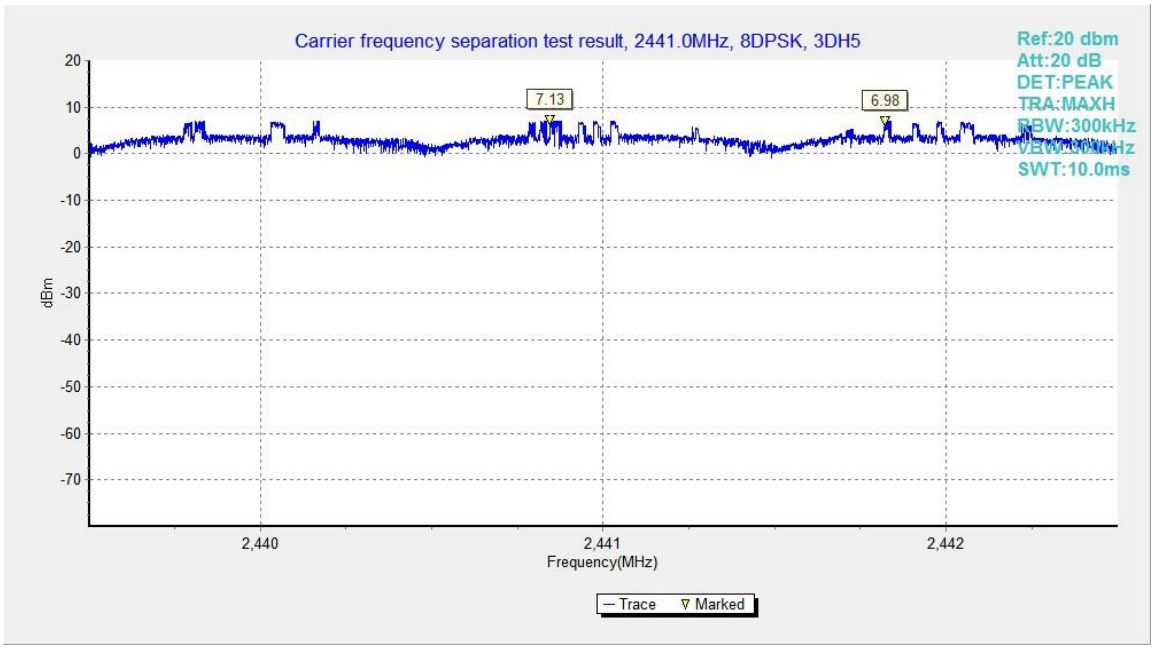


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

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:

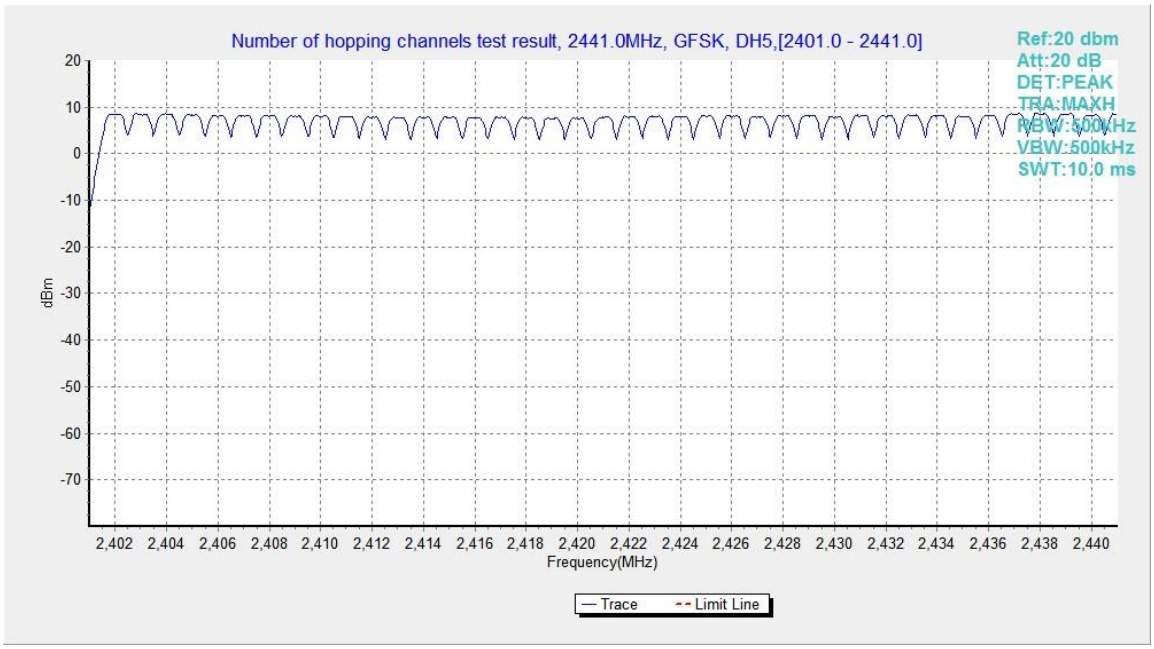


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

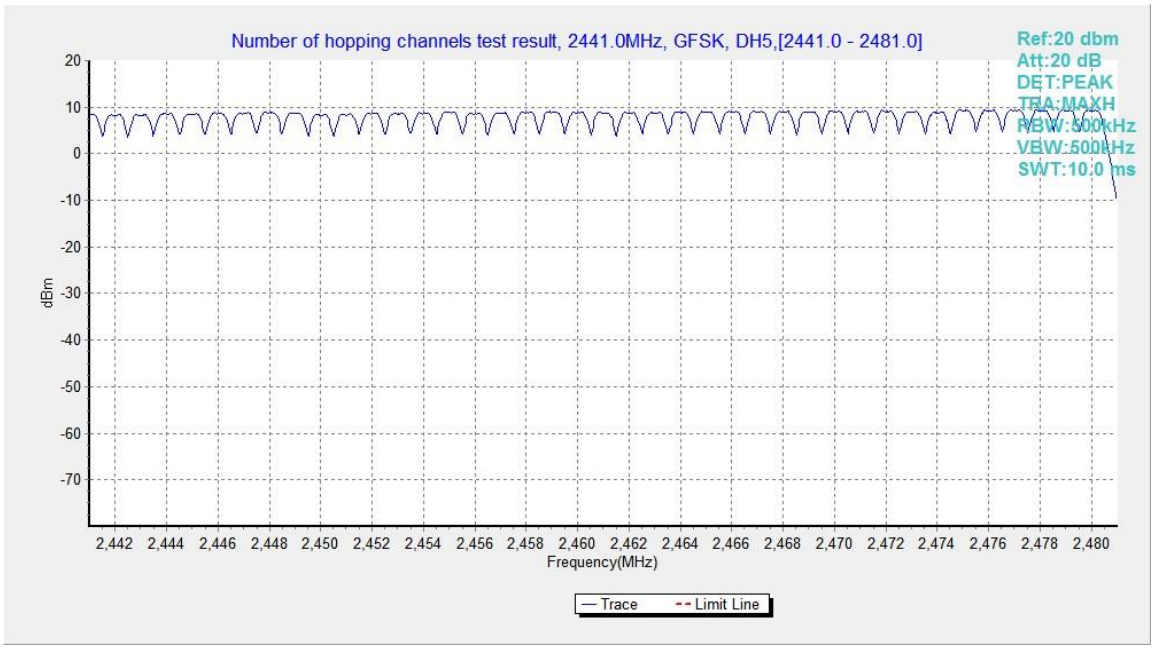


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

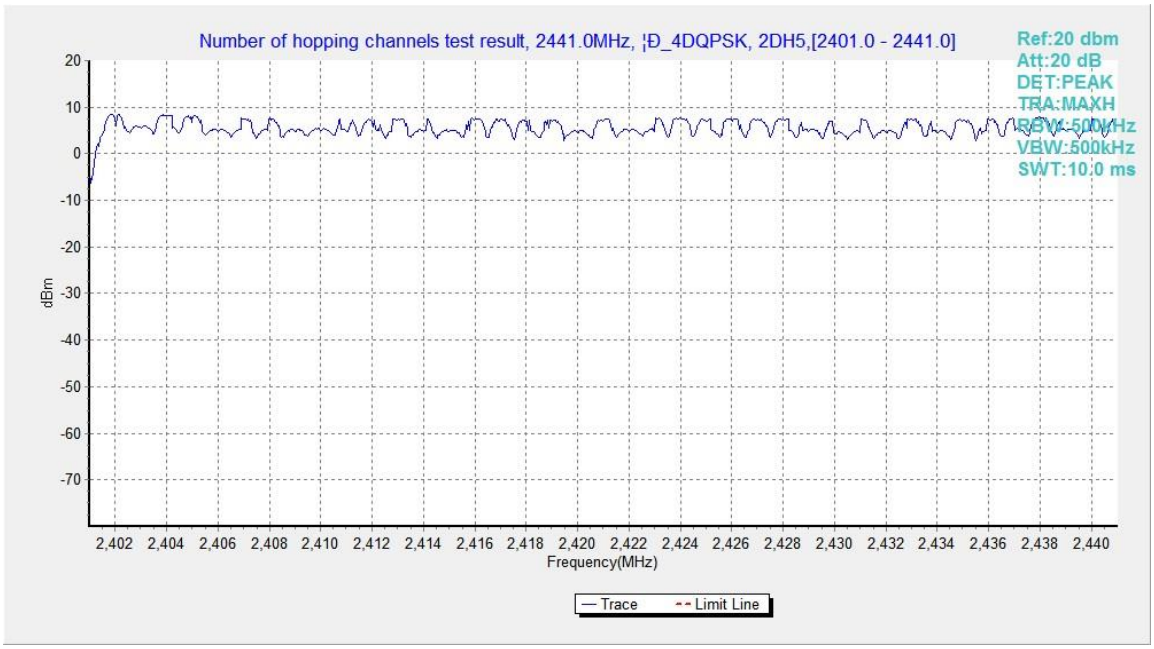


Fig.96. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

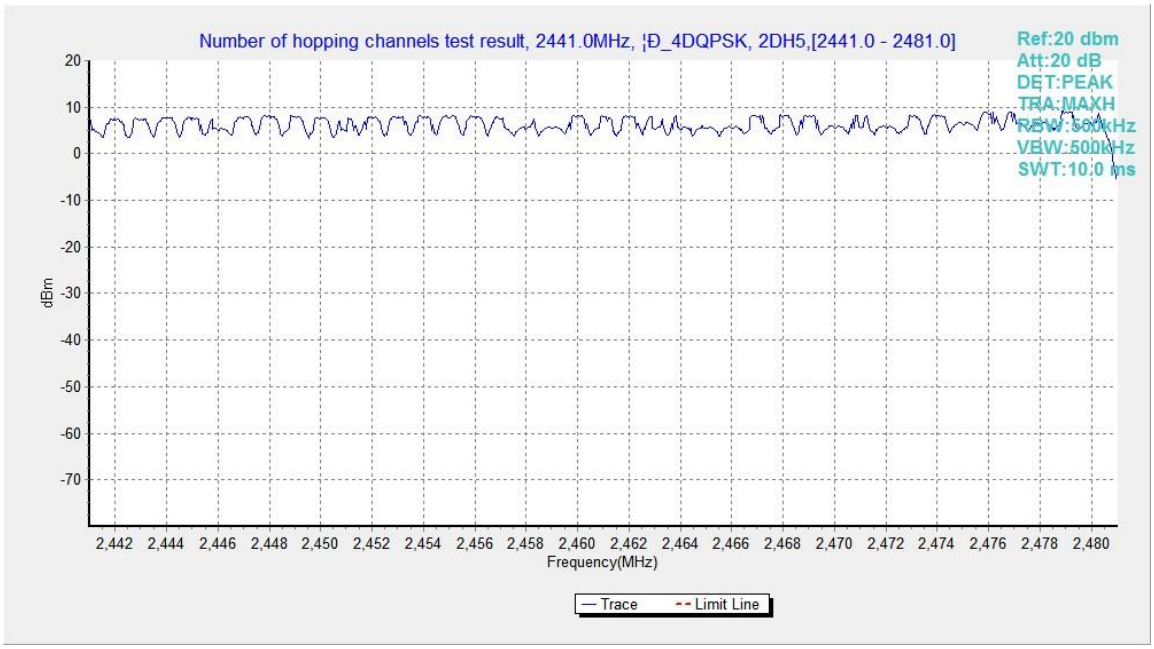


Fig.97. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

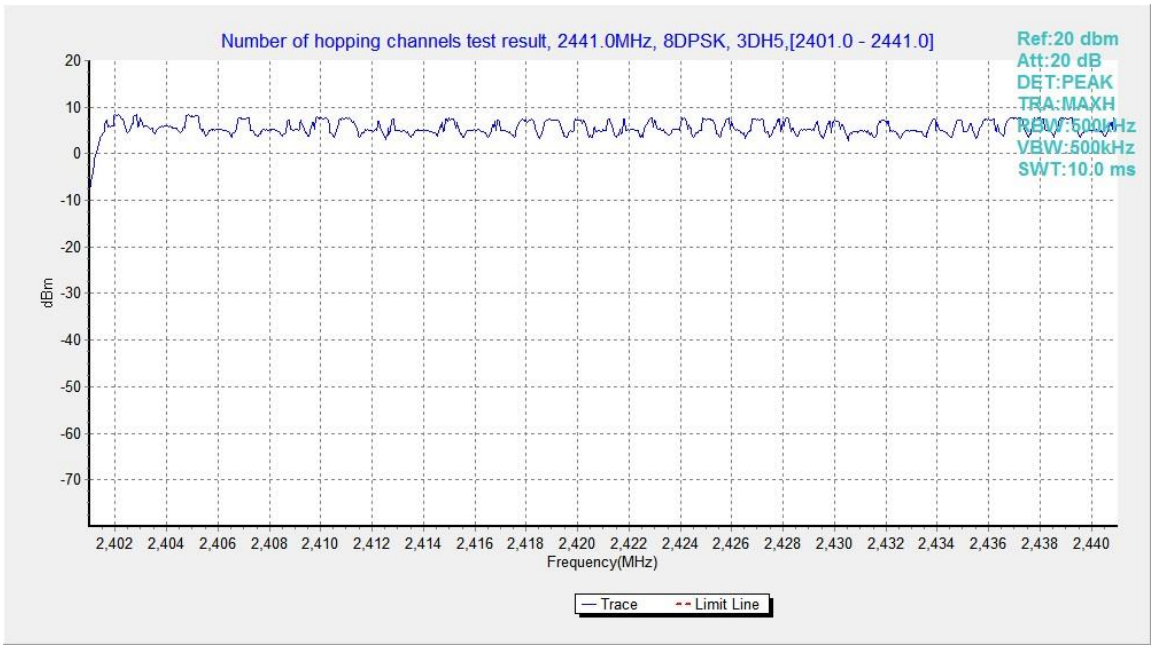


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

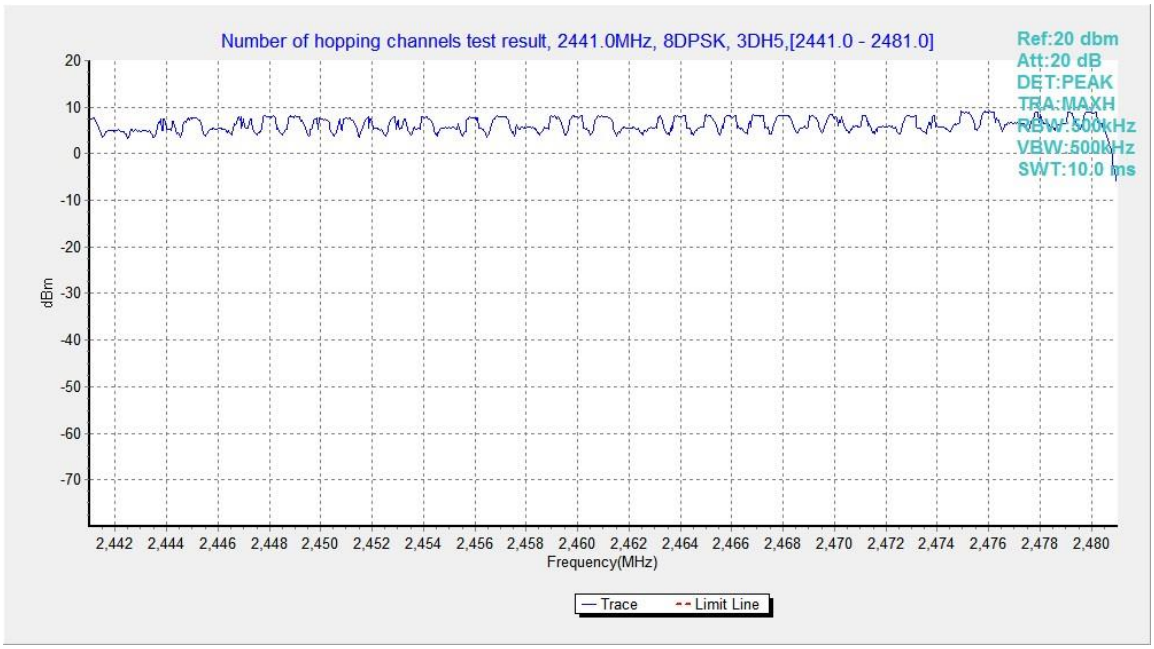


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

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.

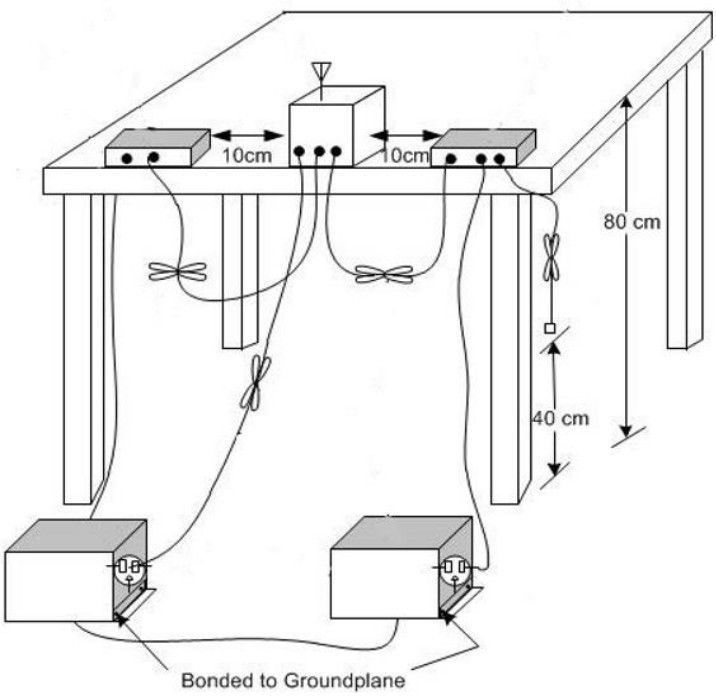
The measurement bandwidth is:

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: UT12a

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:

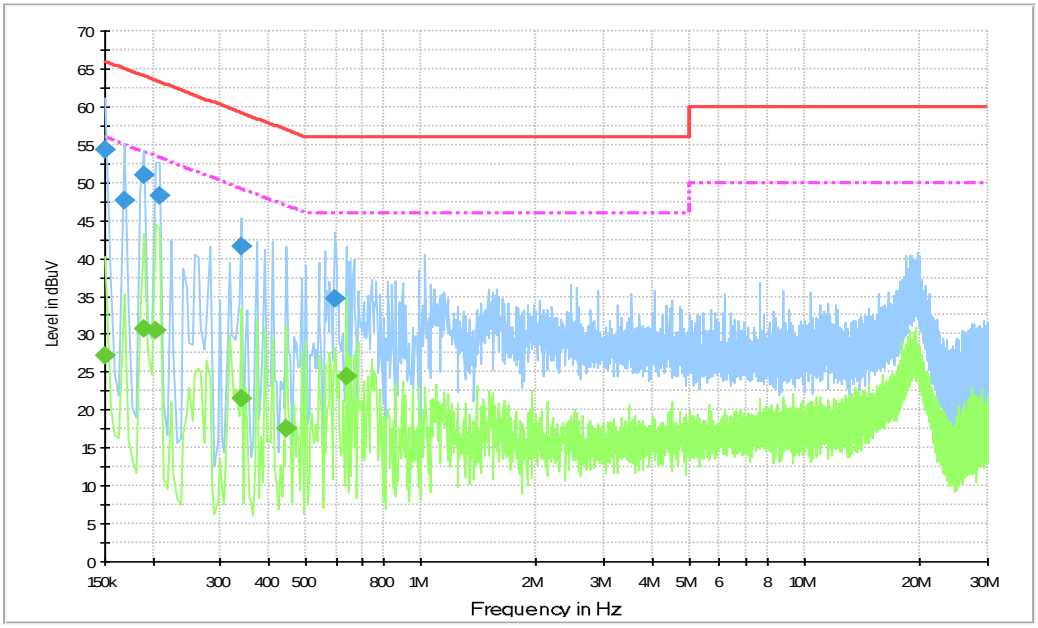


Fig.B.11.1 AC Powerline Conducted Emission- bluetooth

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)
0.150000	54.4	2000.0	9.000	On	L1	28.6	11.6	66.0
0.168000	47.7	2000.0	9.000	On	N	25.1	17.4	65.1
0.190500	50.9	2000.0	9.000	On	N	21.2	13.1	64.0
0.208500	48.3	2000.0	9.000	On	N	19.7	15.0	63.3
0.339000	41.6	2000.0	9.000	On	L1	19.8	17.6	59.2
0.595500	34.6	2000.0	9.000	On	N	19.7	21.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	27.1	2000.0	9.000	On	L1	28.6	28.9	56.0
0.190500	30.7	2000.0	9.000	On	L1	21.2	23.3	54.0
0.204000	30.5	2000.0	9.000	On	N	19.7	23.0	53.4
0.339000	21.6	2000.0	9.000	On	N	19.7	27.6	49.2
0.447000	17.5	2000.0	9.000	On	N	19.8	29.5	46.9
0.636000	24.4	2000.0	9.000	On	N	19.7	21.6	46.0

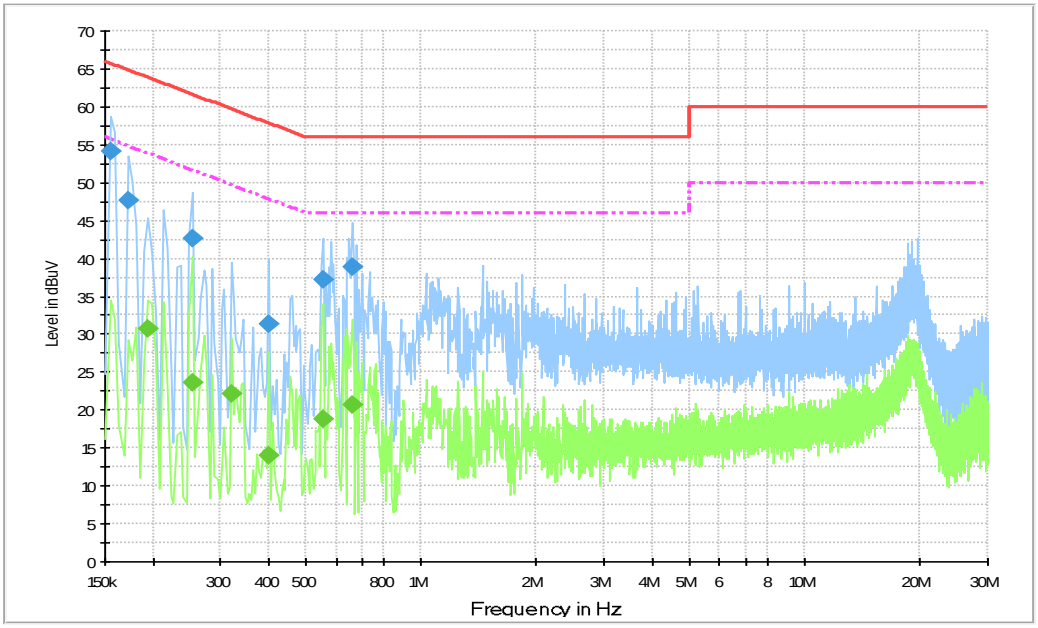


Fig.B.11.2 AC Powerline Conducted Emission-Idle

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)
0.154500	54.2	2000.0	9.000	On	L1	27.7	11.6	65.8
0.172500	47.6	2000.0	9.000	On	N	24.3	17.3	64.8
0.253500	42.6	2000.0	9.000	On	N	19.7	19.0	61.6
0.402000	31.4	2000.0	9.000	On	N	19.8	26.4	57.8
0.555000	37.1	2000.0	9.000	On	L1	19.8	18.9	56.0
0.663000	38.9	2000.0	9.000	On	N	19.7	17.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.195000	30.6	2000.0	9.000	On	N	20.5	23.2	53.8
0.253500	23.6	2000.0	9.000	On	N	19.7	28.0	51.6
0.321000	22.1	2000.0	9.000	On	L1	19.7	27.5	49.7
0.402000	14.0	2000.0	9.000	On	L1	19.8	33.8	47.8
0.555000	18.8	2000.0	9.000	On	N	19.8	27.2	46.0
0.663000	20.7	2000.0	9.000	On	L1	19.7	25.3	46.0

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

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ilac-MRA

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 600118-0

Telecommunication Technology Labs, CAICT
Beijing
China

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2022-10-01 through 2023-09-30
Effective Dates

DEPARTMENT OF COMMERCE · UNITED STATES OF AMERICA

For the National Voluntary Laboratory Accreditation Program

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