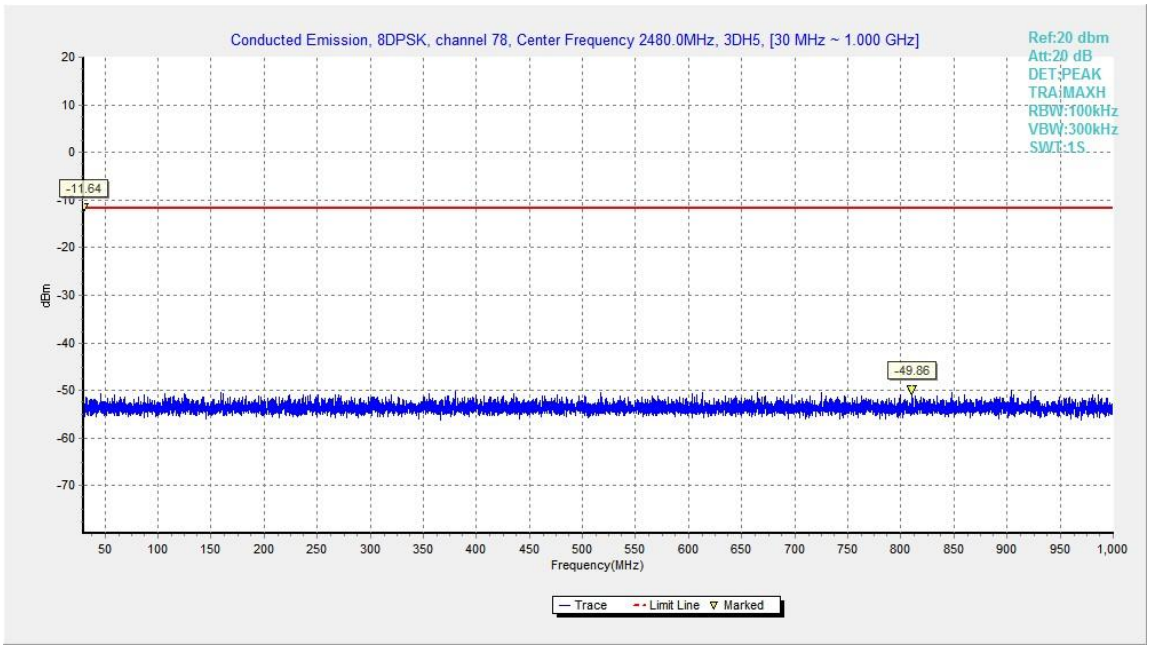


Fig.60. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

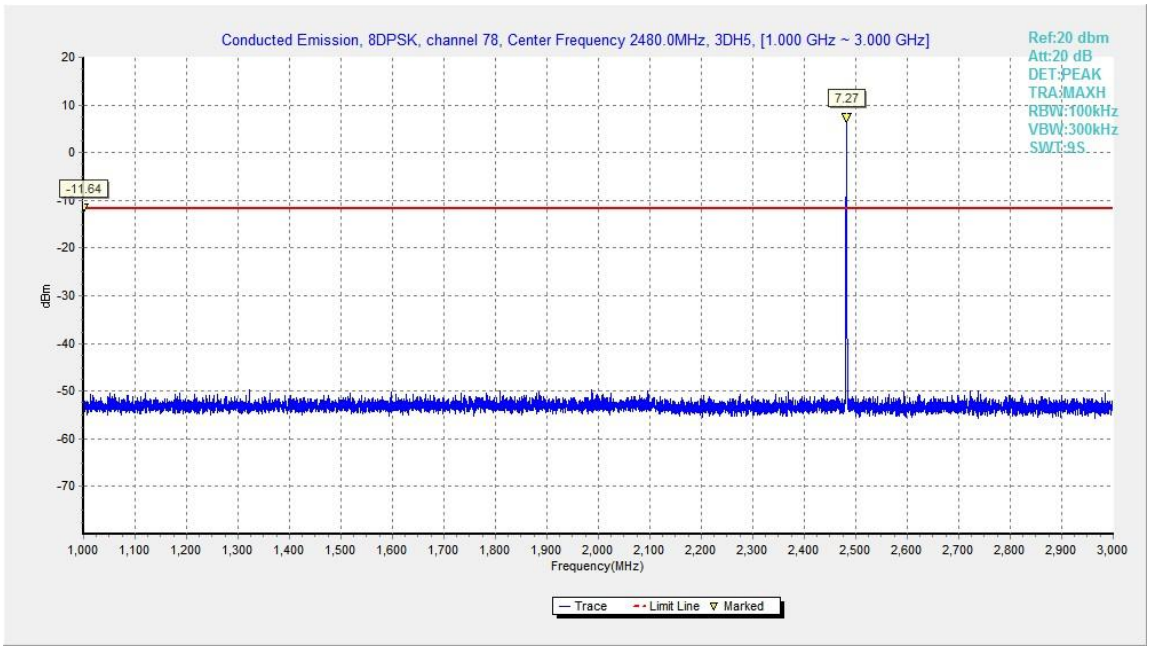


Fig.61. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

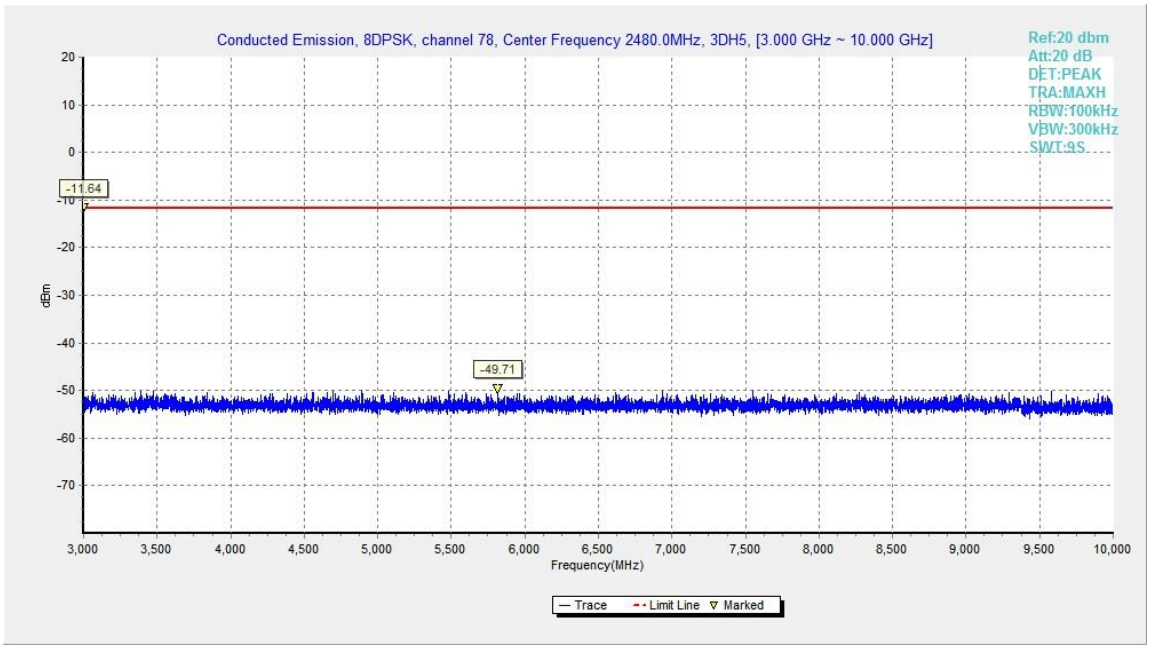


Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

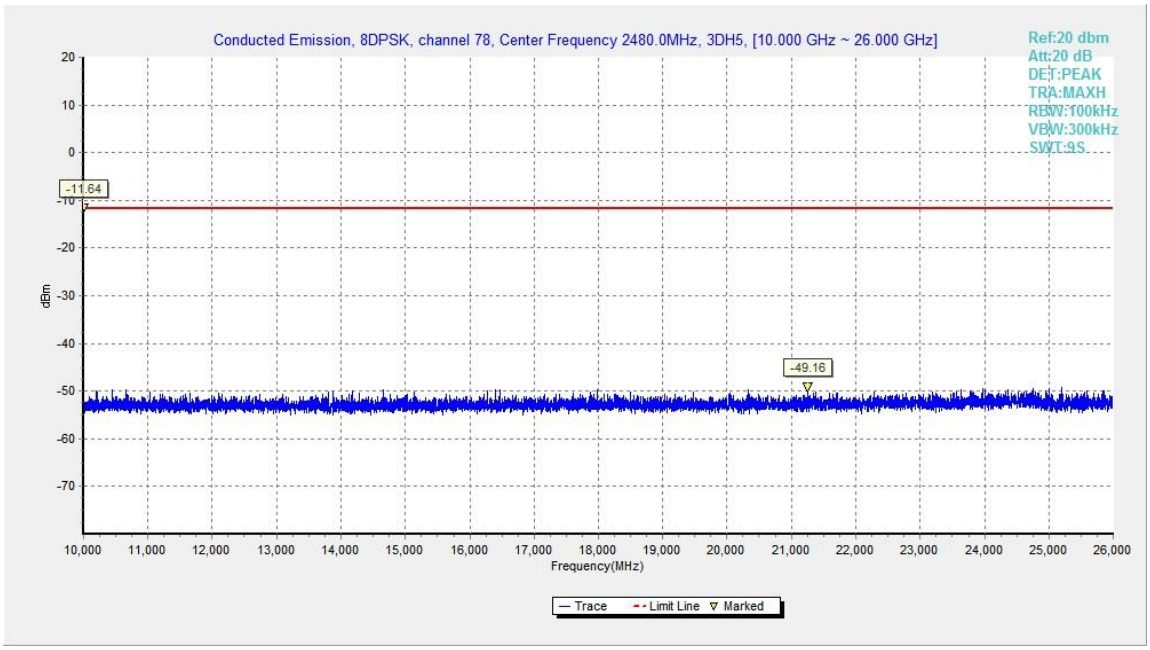


Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

B.6. Transmitter Spurious Emission - Radiated

Method of Measurement: See ANSI C63.10-2013-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)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

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.

Test Procedure

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The receiver references:

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

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 show 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)
17990.5	56.99	-25.5	46.7	35.79	74	17.01	V
14612.5	51.14	-27.3	41.9	36.54	74	22.86	H
12771	47.73	-30.5	39.1	39.13	74	26.27	H
9271	44.84	-33.7	38	40.54	74	29.16	H
7942	43.74	-34.8	37.1	41.44	74	30.26	H
2381.2	54.59	-20	28.1	46.59	74	19.41	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)
17970	57.08	-25.5	46.7	35.88	74	16.92	V
14604.5	51.68	-27.3	41.9	37.08	74	22.32	V
12674.5	47.12	-30.5	39.1	38.52	74	26.88	H
9368	45.36	-33.9	38	41.26	74	28.64	V
7475	43.66	-34.5	36.8	41.36	74	30.34	V
4947	39.36	-37.1	33.3	43.16	74	34.64	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)
17982	56.57	-25.5	46.7	35.37	74	17.43	V
13992	51.3	-29.4	41.7	39.1	74	22.7	V
12773.5	47.48	-30.7	39.1	38.98	74	26.52	V
9490	45.09	-33.2	37.9	40.39	74	28.91	V
7506	43.07	-34.5	36.8	40.77	74	30.93	V
2494.6	55.11	-20	28.3	46.81	74	18.89	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)
17912	57.06	-25.5	46.7	35.86	74	16.94	V
14363	51.75	-28.4	42.3	37.85	74	22.25	H
12658	47.55	-30.5	39.1	38.95	74	26.45	V
9396	44.86	-32.9	37.9	39.86	74	29.14	V
7851	43.14	-34.9	37.1	40.94	74	30.86	V
2385.6	54.22	-20	28.1	46.22	74	19.78	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)
17997.5	57.63	-25.5	46.7	36.43	74	16.37	H
14601.5	52.13	-27.3	41.9	37.53	74	21.87	V
12642.5	47.32	-31	39	39.42	74	26.68	H
9959.5	44.99	-33.6	38.1	40.49	74	29.01	V
7593.5	43.85	-35	36.9	42.05	74	30.15	V
4869	39.86	-37.2	33.2	43.86	74	34.14	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)
17982.5	57.12	-25.5	46.7	35.92	74	16.88	V
14381.5	51.57	-28.4	42.3	37.67	74	22.43	H
12933.5	47.39	-30.5	39.2	38.69	74	26.61	H
9112	45.14	-33.8	38.1	40.94	74	28.86	V
7484	43.81	-34.5	36.8	41.51	74	30.19	V
2499.5	54.69	-20	28.4	46.29	74	19.31	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)
17853.5	57.16	-25.5	46.7	35.96	74	16.84	V
14527.5	51.6	-28.6	42.5	37.7	74	22.4	H
12937.5	47.94	-30.5	39.2	39.24	74	26.06	H
9178.5	45.19	-33.8	38.1	40.99	74	28.81	V
7721.5	43.04	-34.8	37	40.94	74	30.96	V
2355.9	55.03	-20.1	28	47.03	74	18.97	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)
17975.5	57.22	-25.5	46.7	36.02	74	16.78	V
14588	51.61	-27.3	41.9	37.01	74	22.39	H
12655	47.75	-30.5	39.1	39.15	74	26.25	V
9086	44.81	-33.8	38.1	40.41	74	29.19	V
7993	43.43	-34.8	37.1	41.13	74	30.57	V
4822	39.52	-37.5	33.1	43.82	74	34.48	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)
17959	57.09	-25.5	46.7	35.89	74	16.91	V
14464	51.39	-28.6	42.5	37.49	74	22.61	V
12354.5	47.51	-31.1	38.9	39.71	74	26.49	H
9945	45.56	-33.5	38.1	40.96	74	28.44	V
7564.5	43.45	-35	36.9	41.65	74	30.55	V
2485.3	54.49	-20	28.3	46.19	74	19.51	H

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)
17968	45.75	-25.5	46.7	24.55	54	8.25	V
14390	39.96	-28.4	42.3	26.06	54	14.04	V
12640	35.68	-31	39	27.78	54	18.32	V
9088.5	33.5	-33.8	38.1	29.1	54	20.5	V
7450	31.89	-35.2	36.7	30.29	54	22.11	H
2383.3	41.59	-20	28.1	33.59	54	12.41	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)
17994	45.54	-25.5	46.7	24.34	54	8.46	V
14309	40.01	-28.4	42.3	26.11	54	13.99	H
12986.5	36	-30.5	39.2	27.3	54	18	V
9833.5	33.18	-33.5	38	28.68	54	20.82	V
7575	31.98	-35	36.9	30.18	54	22.02	V
4929.5	28.39	-37.1	33.3	32.19	54	25.61	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)
17983.5	45.43	-25.5	46.7	24.23	54	8.57	H
14387	39.93	-28.4	42.3	26.03	54	14.07	V
12759.5	36.14	-30.5	39.1	27.54	54	17.86	V
9092.5	33.37	-33.8	38.1	28.97	54	20.63	H
7997.5	32.08	-34.8	37.1	29.78	54	21.92	V
2486.1	41.85	-20	28.3	33.55	54	12.15	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)
17999	45.88	-25.5	46.7	24.68	54	8.12	V
14397.5	39.94	-28.6	42.5	26.04	54	14.06	H
12955.5	35.88	-30.5	39.2	27.18	54	18.12	V
8981.5	33.67	-33.3	38.2	28.77	54	20.33	V
7985.5	32.05	-34.8	37.1	29.75	54	21.95	V
2388.1	41.59	-20	28.1	33.59	54	12.41	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)
17982.5	45.48	-25.5	46.7	24.28	54	8.52	V
14390.5	39.99	-28.4	42.3	26.09	54	14.01	H
12959	35.88	-30.5	39.2	27.18	54	18.12	V
9072	33.33	-33.8	38.1	28.93	54	20.67	V
7465	31.96	-34.5	36.8	29.66	54	22.04	V
4399	27.97	-37.9	32.4	33.47	54	26.03	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)
17988	45.6	-25.5	46.7	24.4	54	8.4	V
14310.5	40.14	-28.4	42.3	26.24	54	13.86	V
12637.5	35.88	-31	39	27.98	54	18.12	V
9098	33.11	-33.8	38.1	28.71	54	20.89	H
7577	31.95	-35	36.9	30.15	54	22.05	V
2498.1	41.75	-20	28.4	33.35	54	12.25	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)
17985.5	45.8	-25.5	46.7	24.6	54	8.2	V
14402	40.43	-28.6	42.5	26.53	54	13.57	V
12959	36.1	-30.5	39.2	27.4	54	17.9	V
9084.5	33.64	-33.8	38.1	29.24	54	20.36	V
7473	32.06	-34.5	36.8	29.76	54	21.94	V
2379.8	41.69	-20	28.1	33.69	54	12.31	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)
17973	45.79	-25.5	46.7	24.59	54	8.21	V
14397.5	40.29	-28.6	42.5	26.39	54	13.71	H
12933.5	36.13	-30.5	39.2	27.43	54	17.87	V
9749.5	33.73	-33	38	28.73	54	20.27	V
7964.5	31.97	-34.8	37.1	29.67	54	22.03	V
4955	28.17	-37.1	33.3	31.97	54	25.83	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)
17992.5	45.51	-25.5	46.7	24.31	54	8.49	V
14365	40.03	-28.4	42.3	26.13	54	13.97	V
12652.5	35.99	-30.5	39.1	27.39	54	18.01	V
9071.5	33.26	-33.8	38.1	28.86	54	20.74	V
7531.5	32.04	-34.5	36.8	29.74	54	21.96	V
2488	41.79	-20	28.3	33.49	54	12.21	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	321	121.98	P
	DH3	Fig.66	1.63	Fig.67	118	192.34	P
	DH5	Fig.68	2.88	Fig.69	61	175.68	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	319	121.22	P
	2DH3	Fig.72	1.64	Fig.73	110	180.4	P
	2DH5	Fig.74	2.89	Fig.75	70	202.3	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	110	180.4	P
	3DH5	Fig.80	2.89	Fig.81	63	182.07	P

Conclusion: PASS

Test graphs as below:

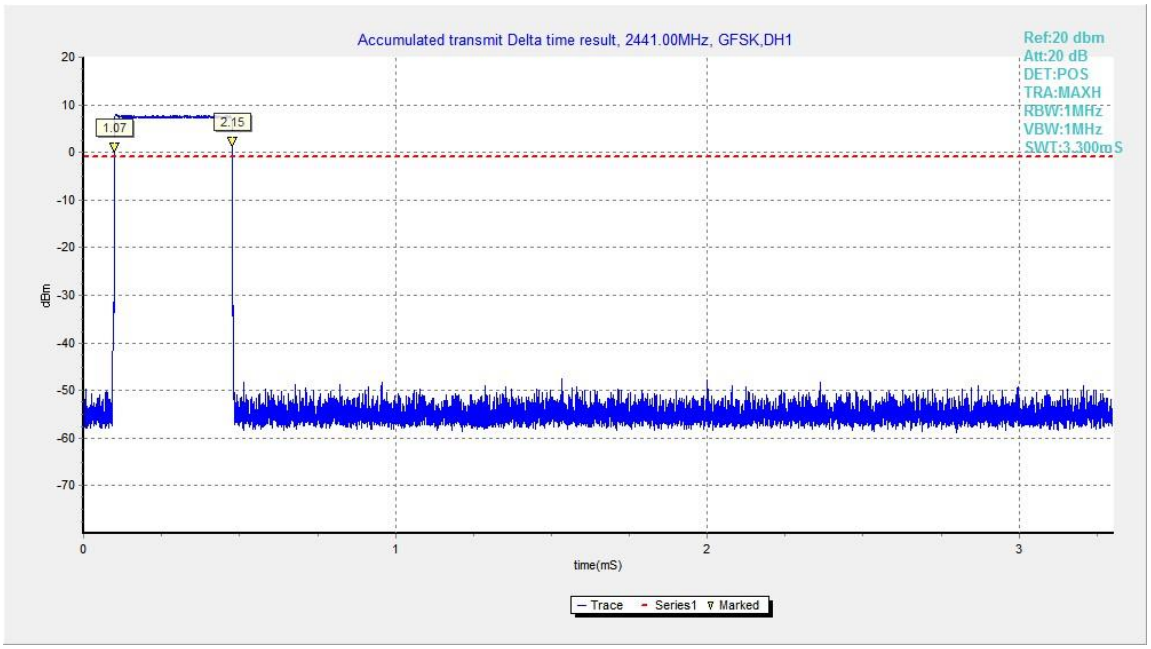


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

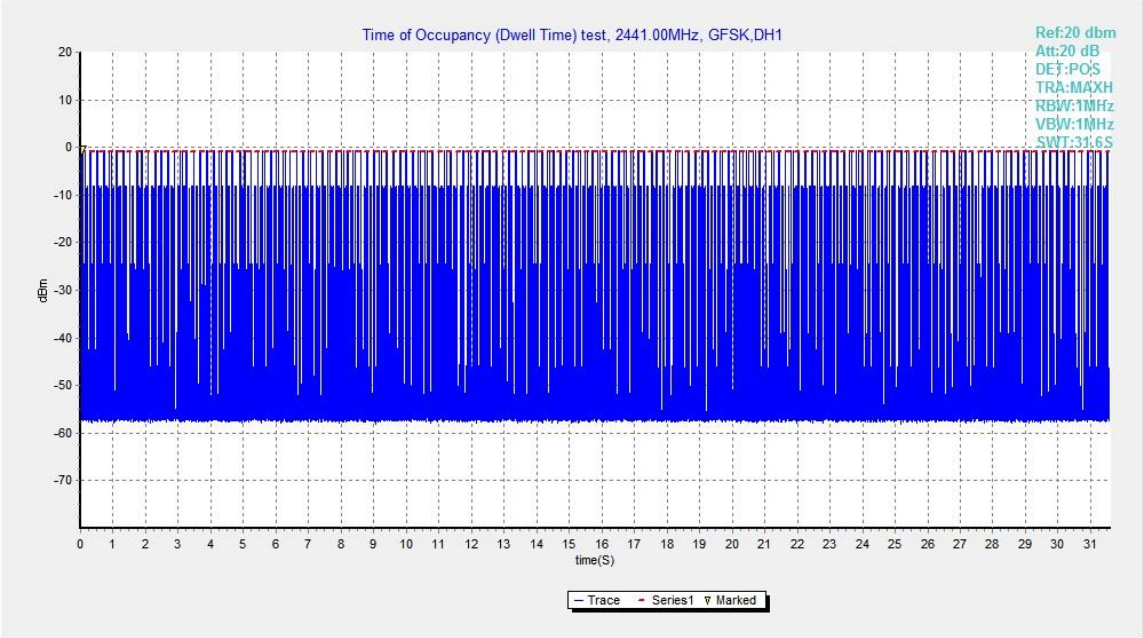


Fig.65. Number of Transmissions Measurement: Channel 39,Packet DH1

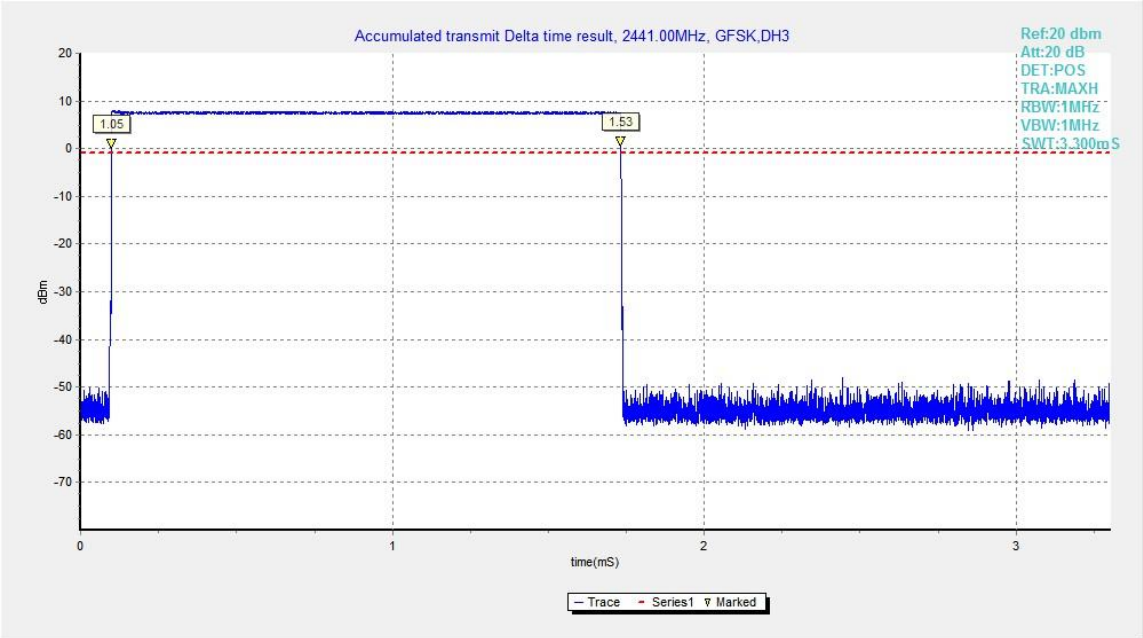


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

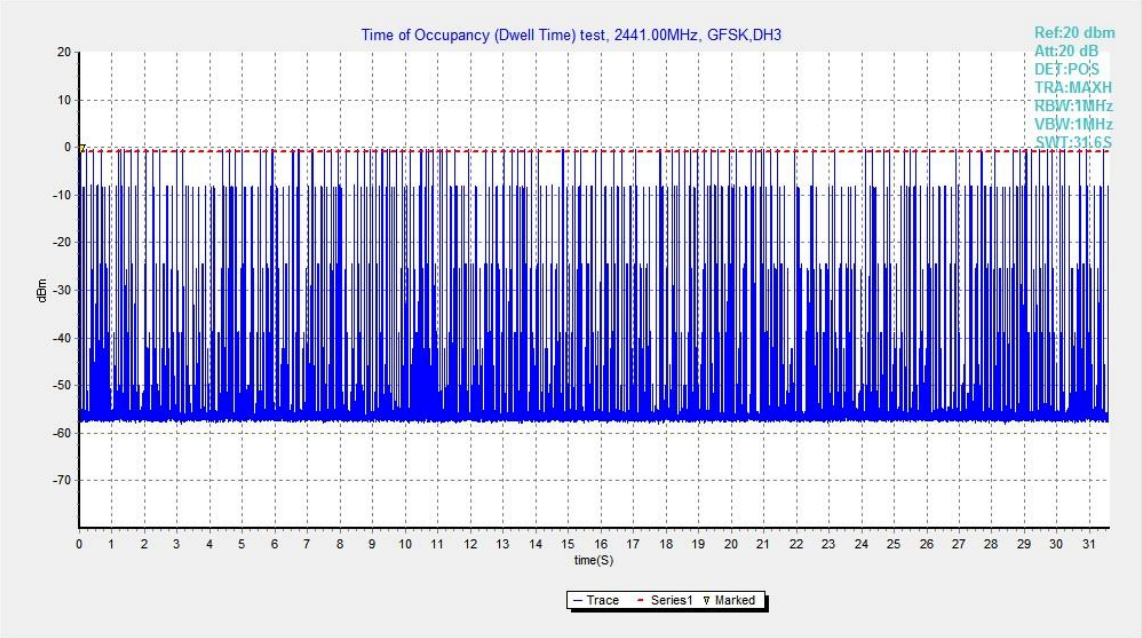


Fig.67. Number of Transmissions Measurement: Channel 39,Packet DH3

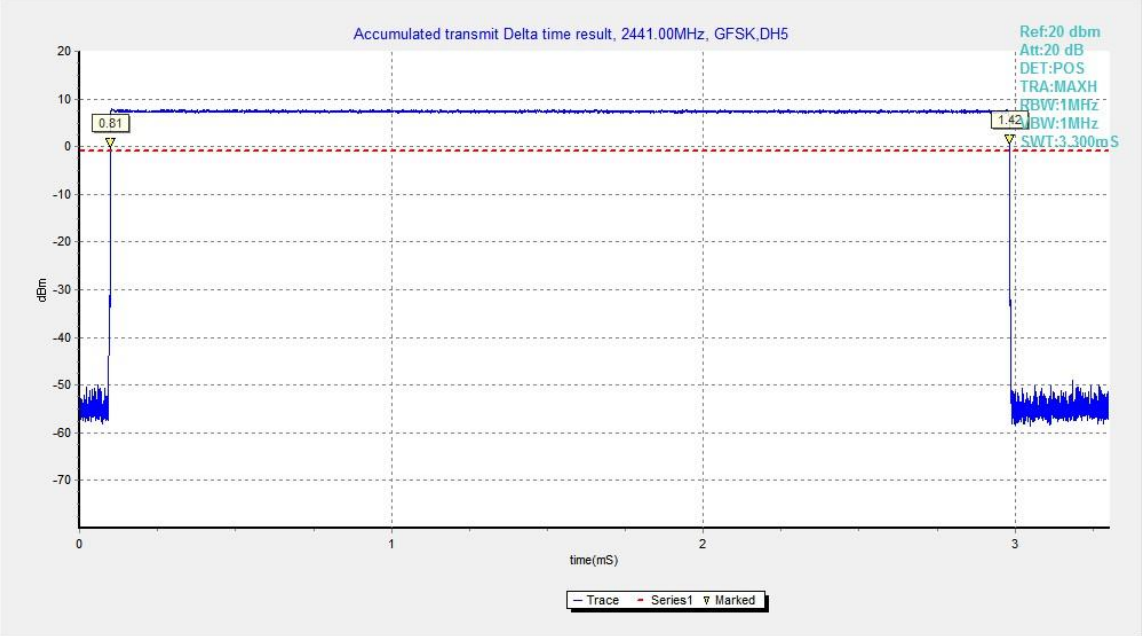


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

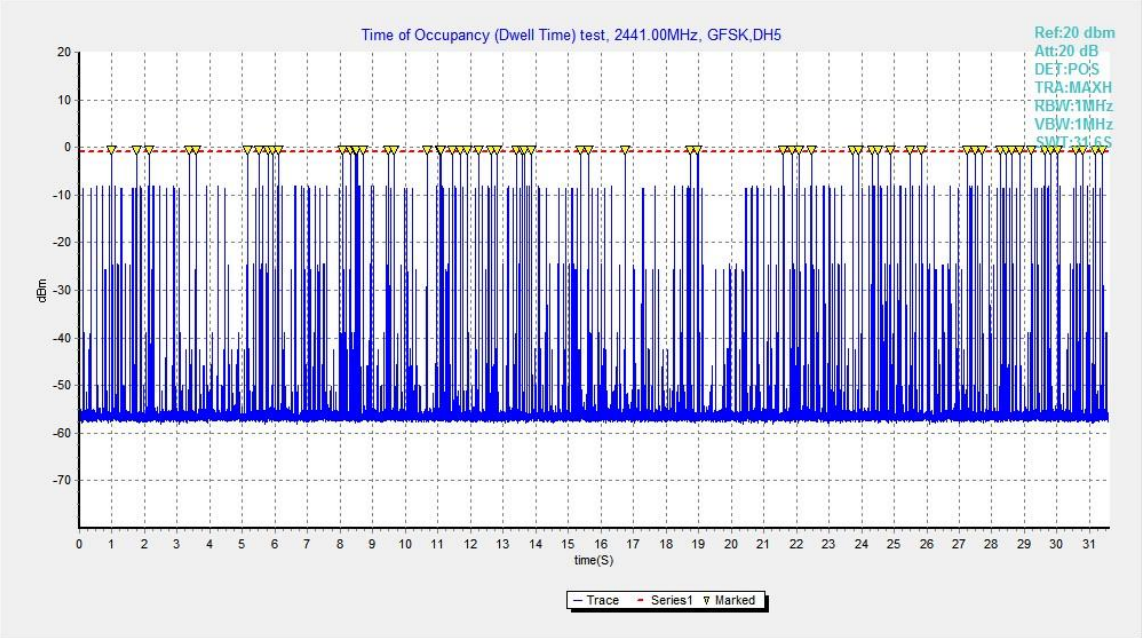


Fig.69. Number of Transmissions Measurement: Channel 39,Packet DH5

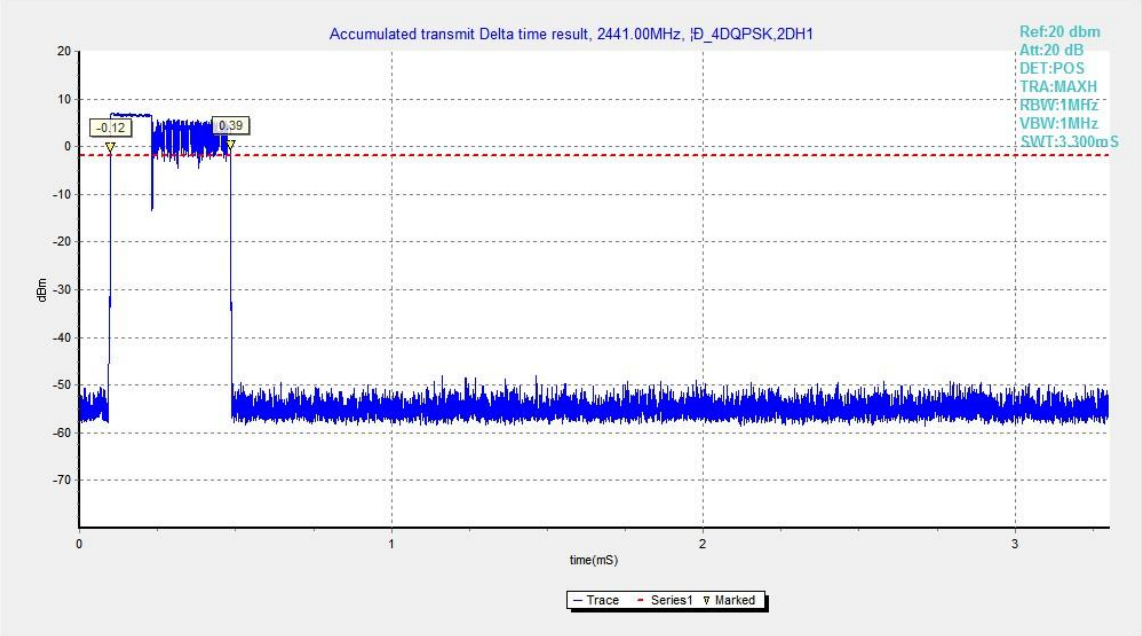


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

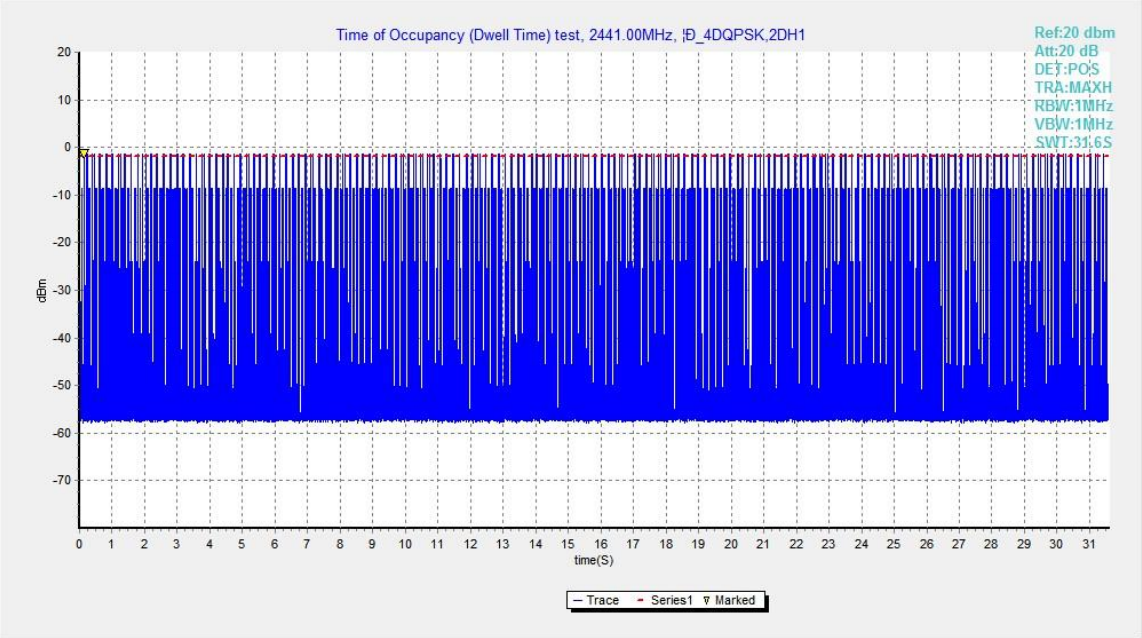


Fig.71. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

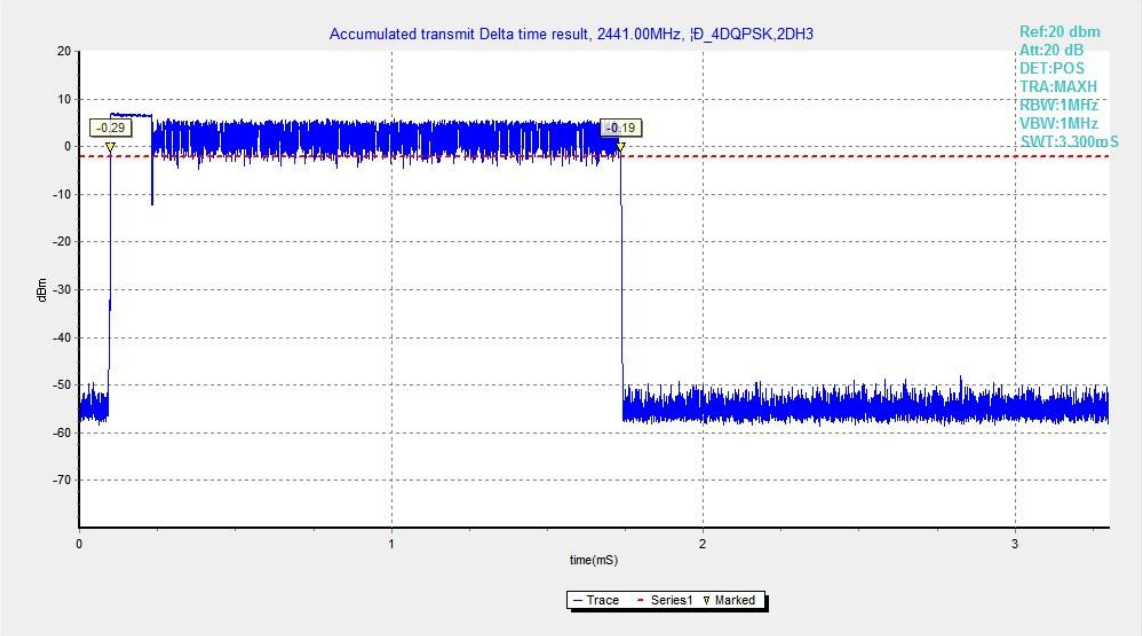


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

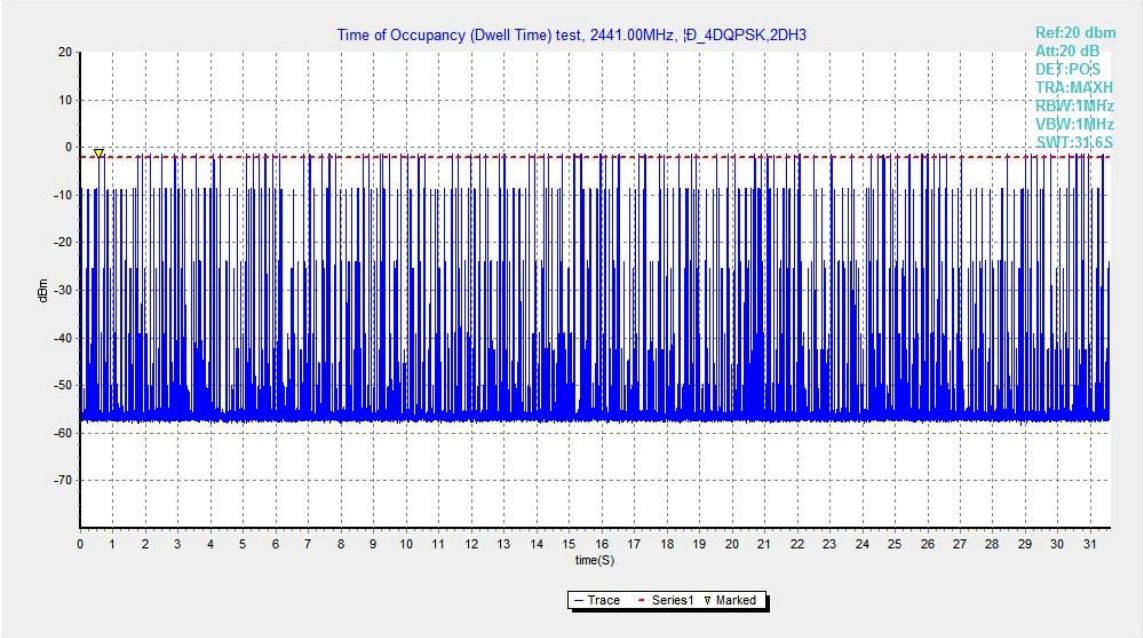


Fig.73. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

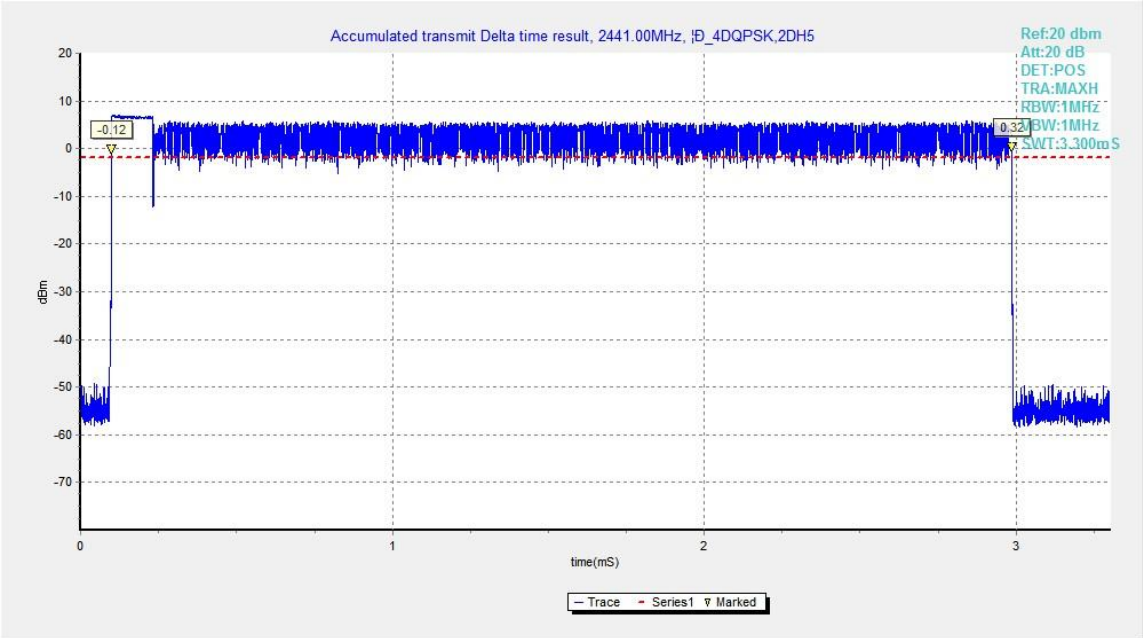


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

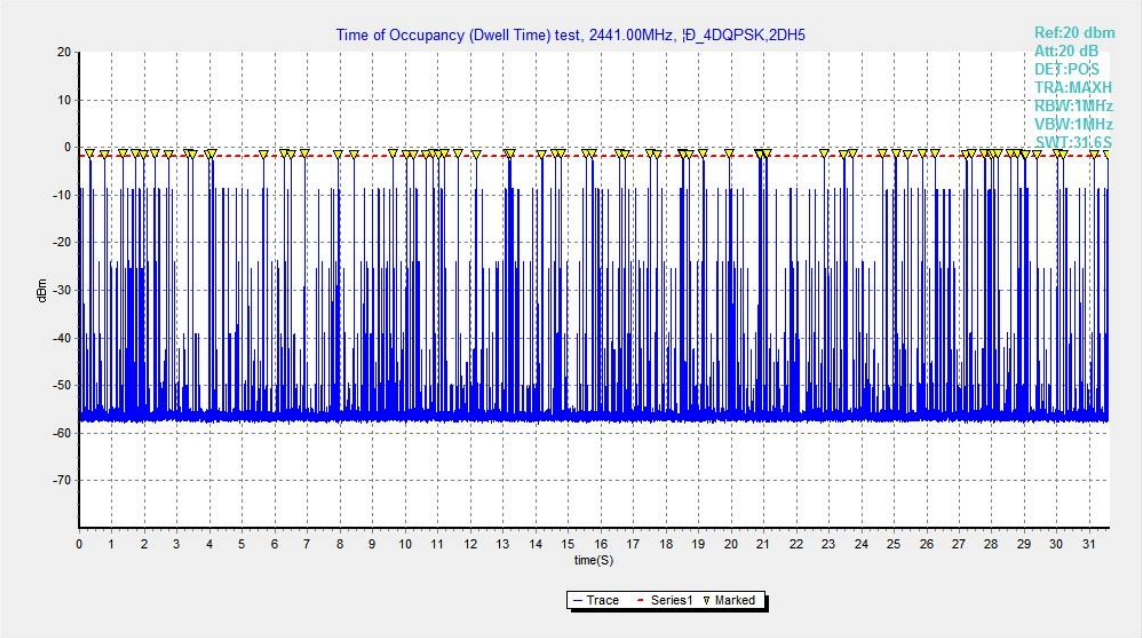


Fig.75. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

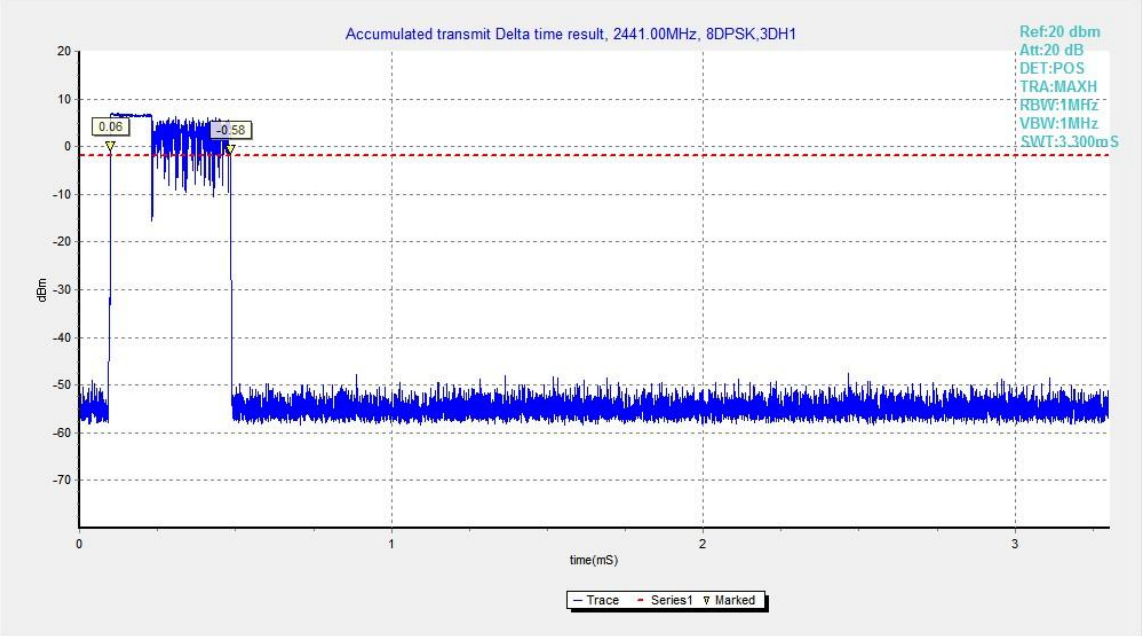


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

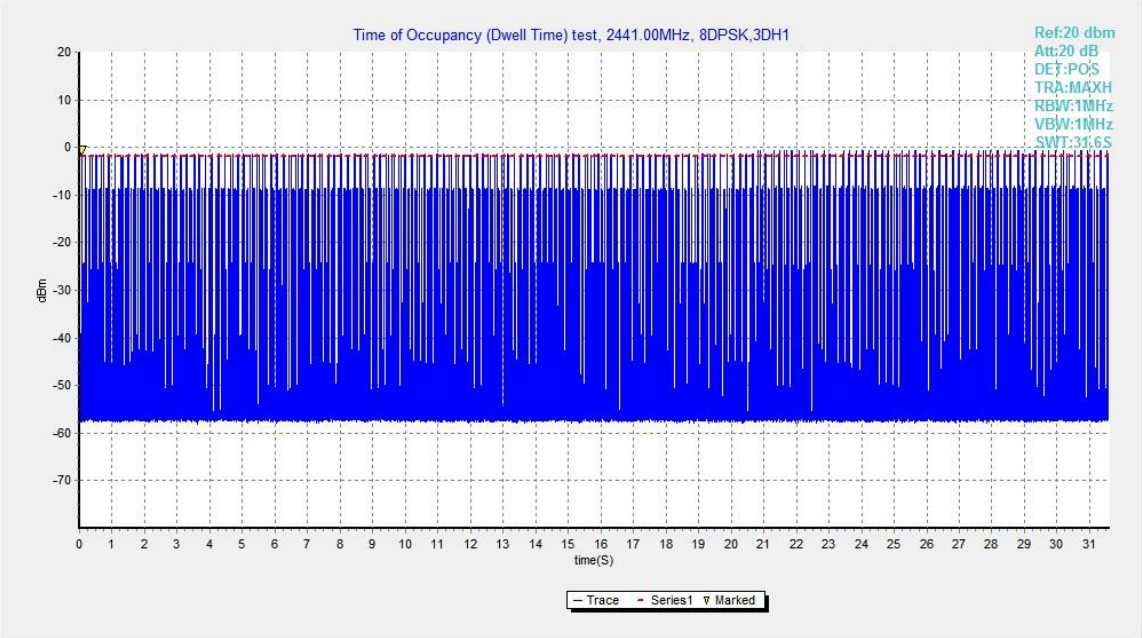


Fig.77. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

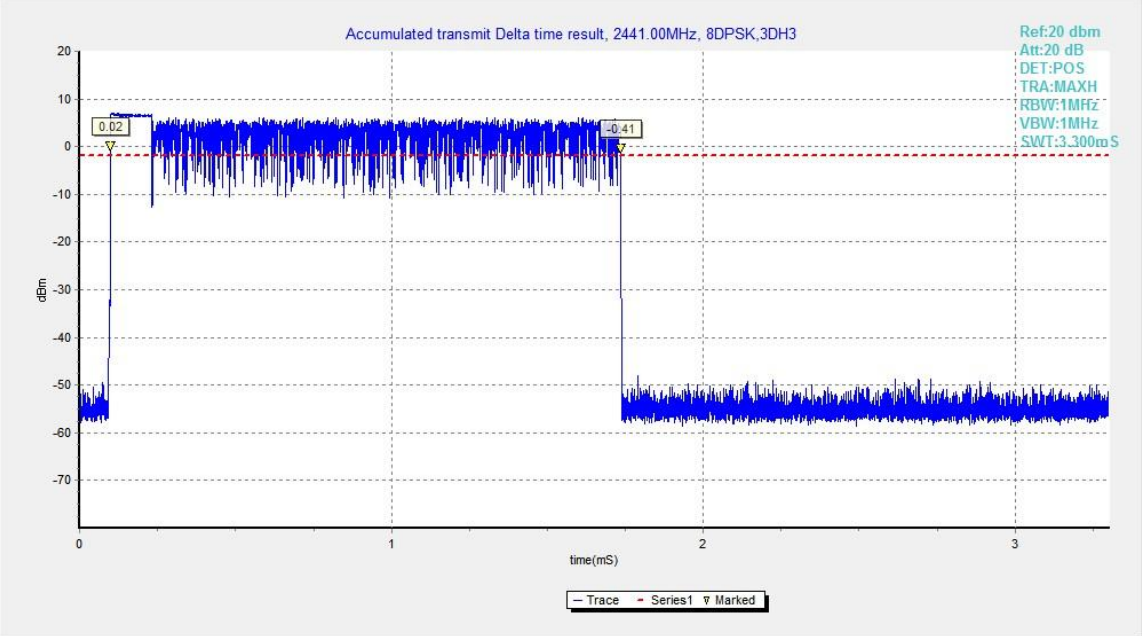


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

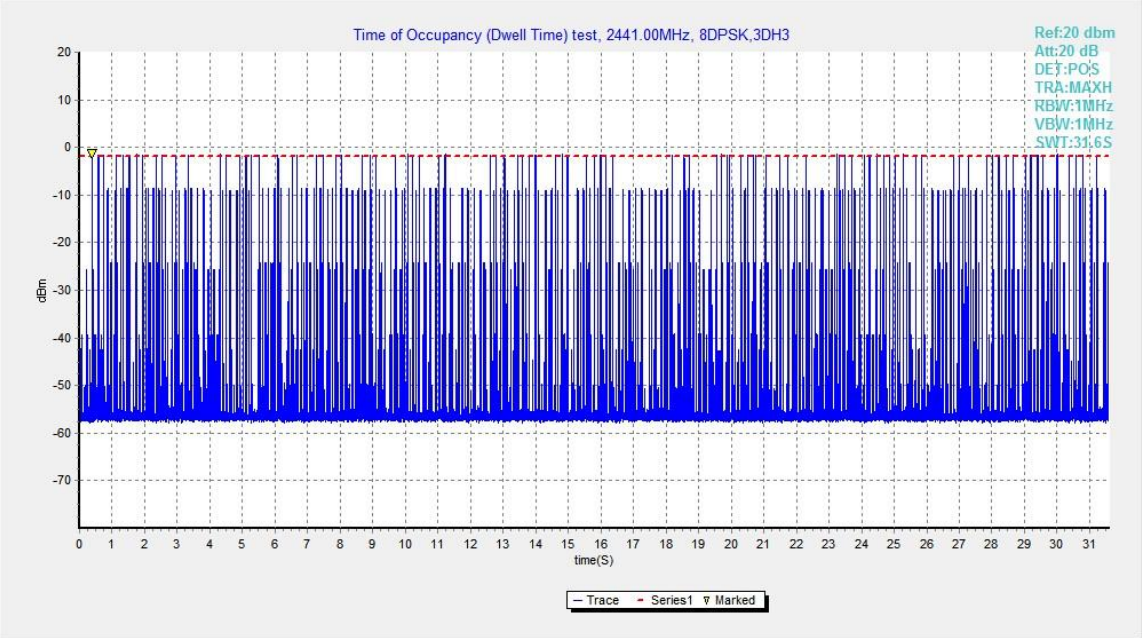


Fig.79. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

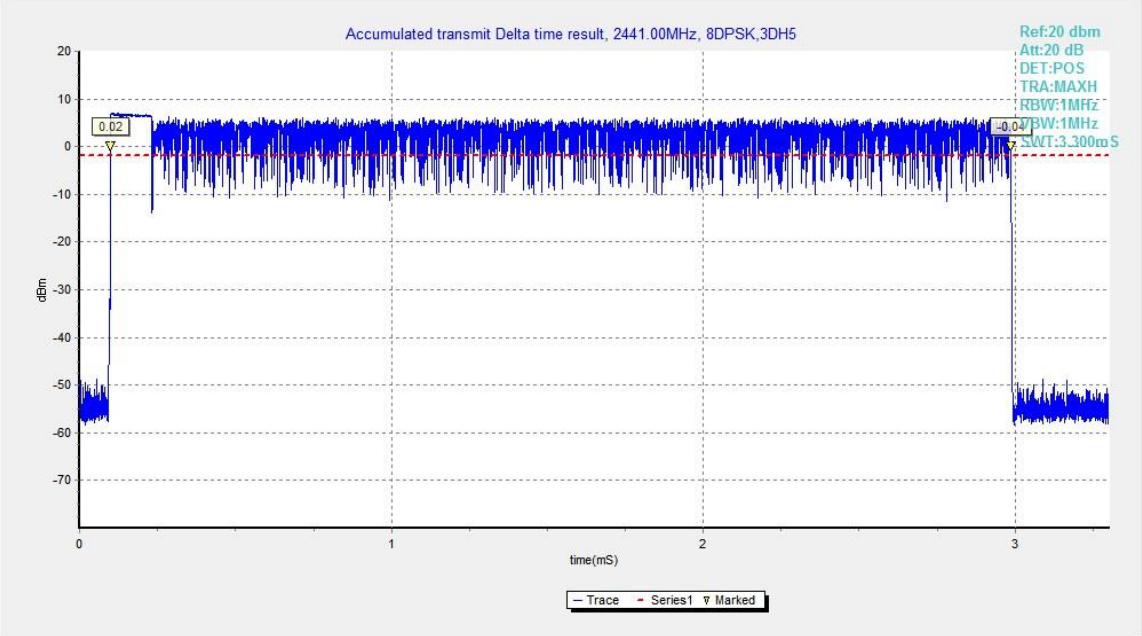


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

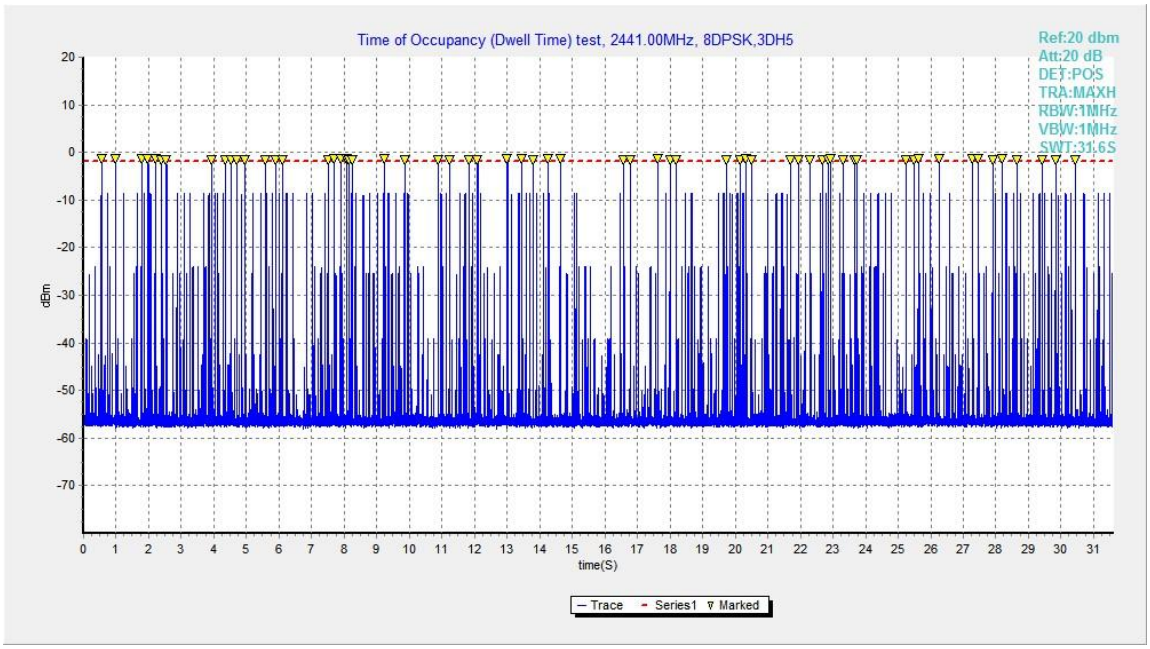


Fig.81. Number of Transmissions Measurement: Channel 39,Packet 3-DH5

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	942.75	NA
39	Fig.83	942.75	NA
78	Fig.84	939.00	NA

For π/4 DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1257.75	NA
39	Fig.86	1259.25	NA
78	Fig.87	1258.50	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1205.25	NA
39	Fig.89	1205.25	NA
78	Fig.90	1265.25	NA

Conclusion: NA

Test graphs as below:

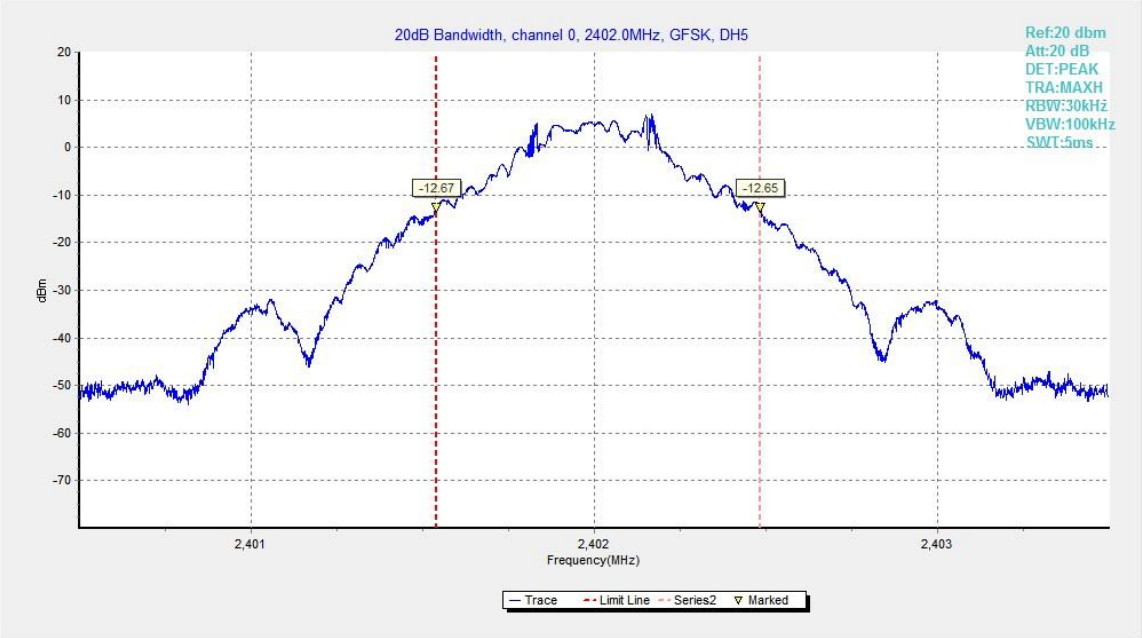


Fig.82. 20dB Bandwidth: GFSK, Channel 0

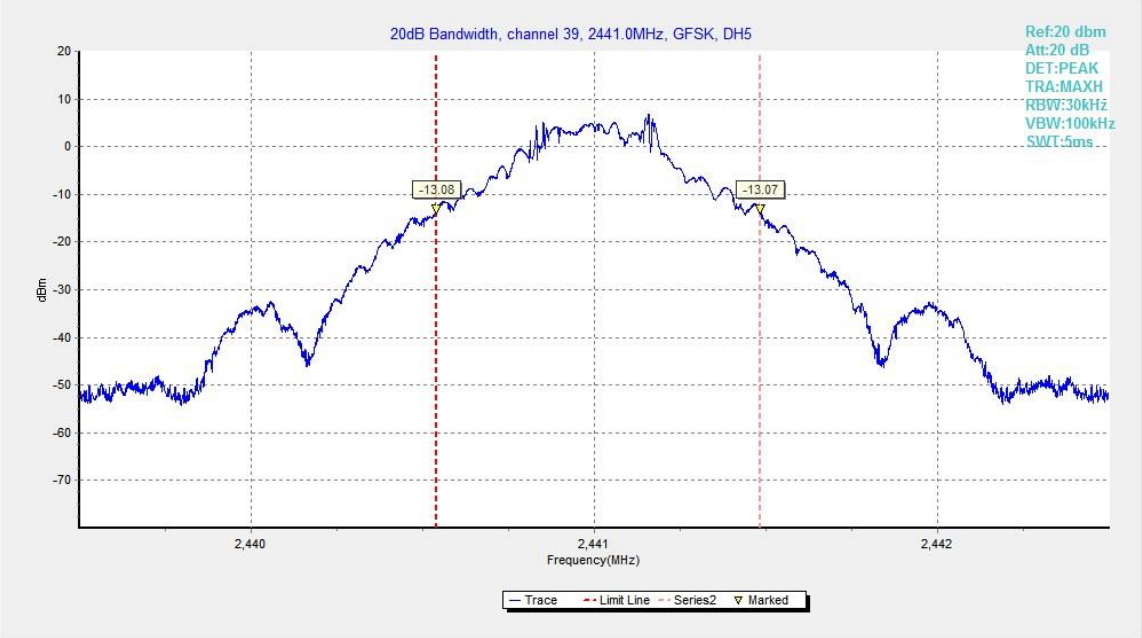


Fig.83. 20dB Bandwidth: GFSK, Channel 39

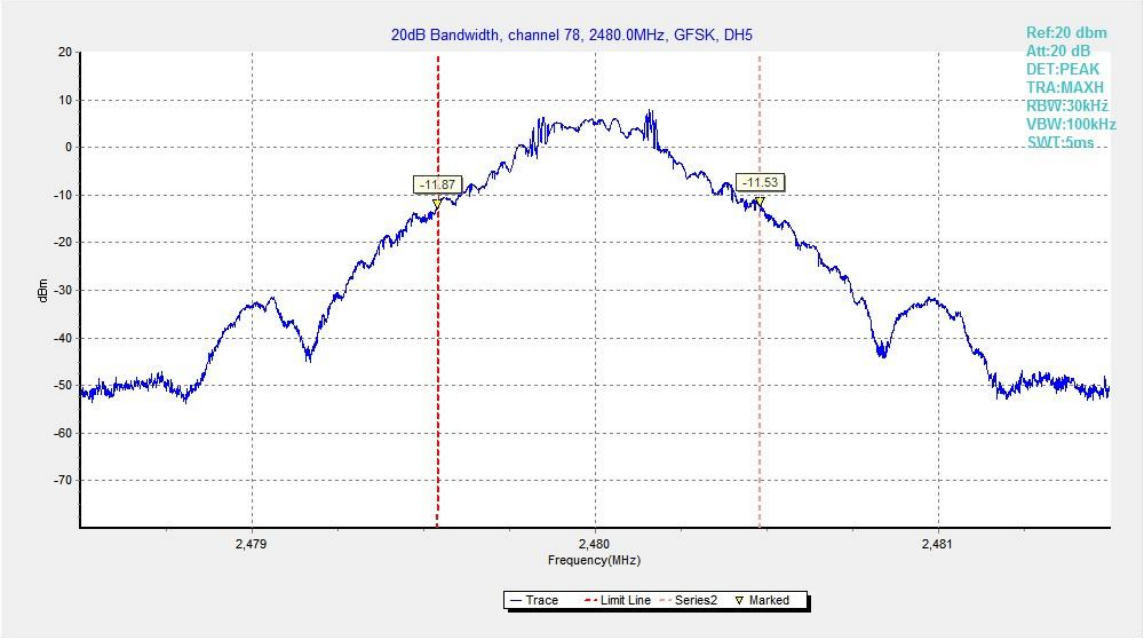


Fig.84. 20dB Bandwidth: GFSK, Channel 78

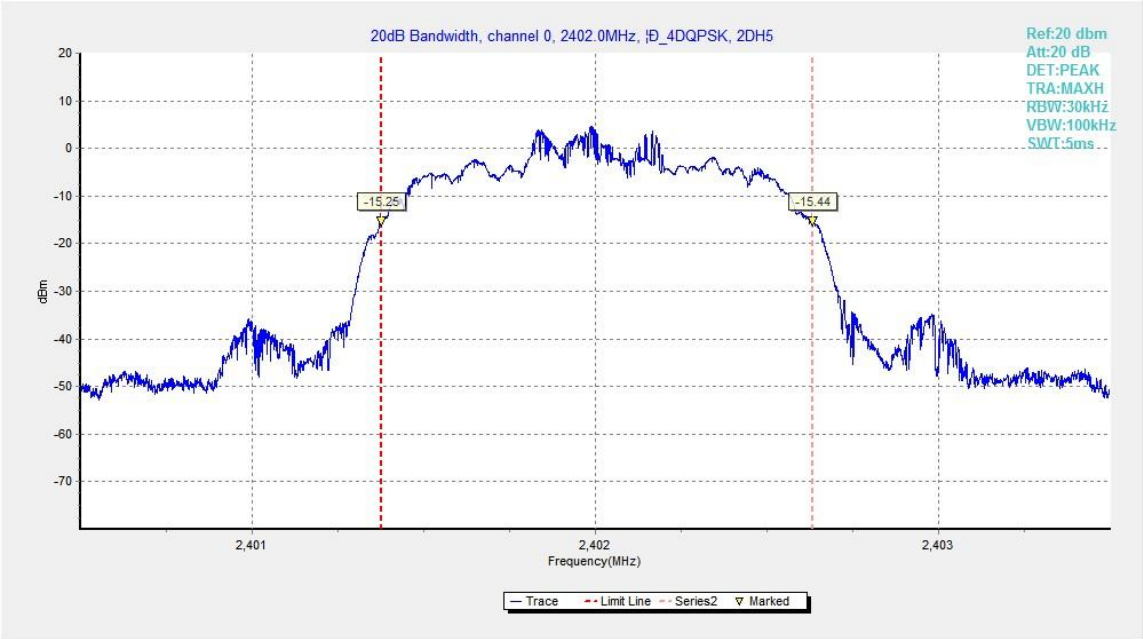


Fig.85. 20dB Bandwidth: π/4 DQPSK, Channel 0

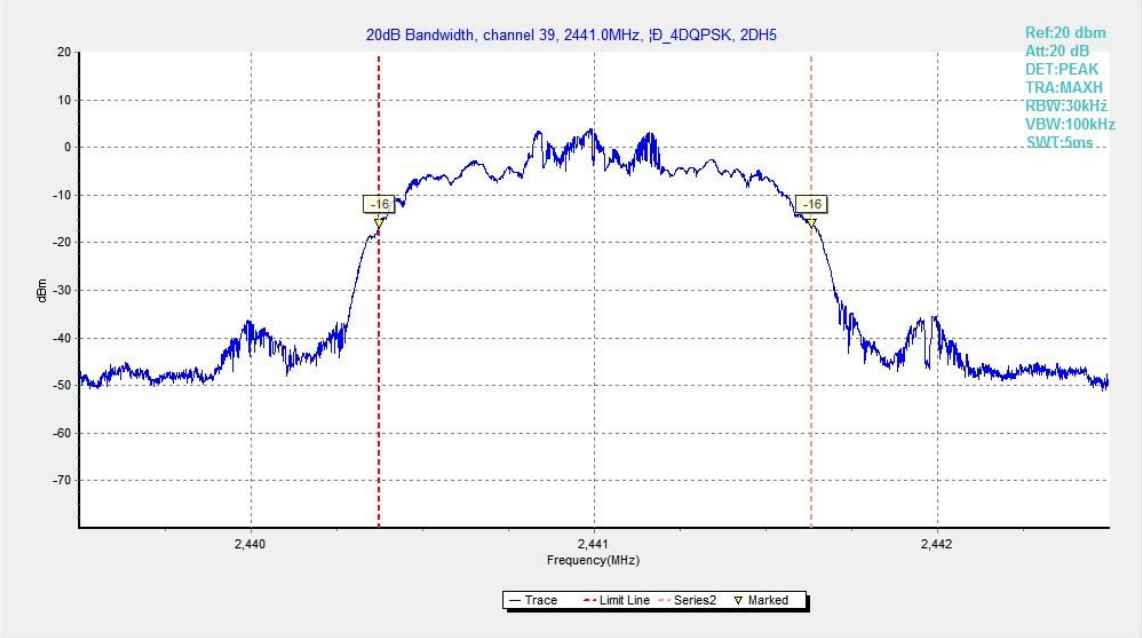


Fig.86. 20dB Bandwidth: π/4 DQPSK, Channel 39

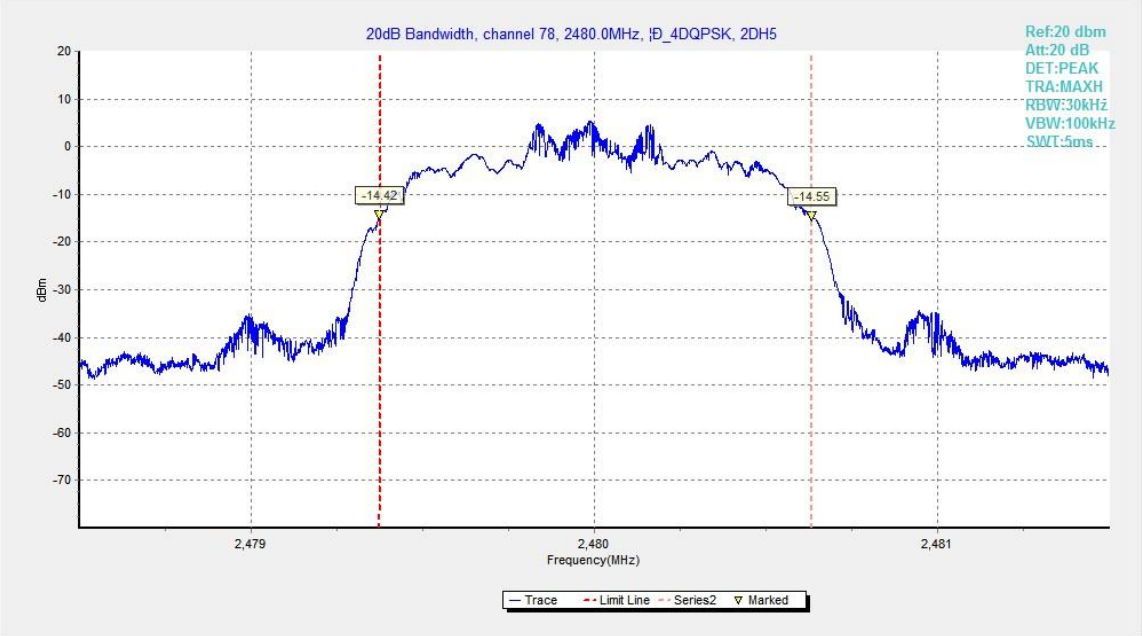


Fig.87. 20dB Bandwidth: π/4 DQPSK, Channel 78

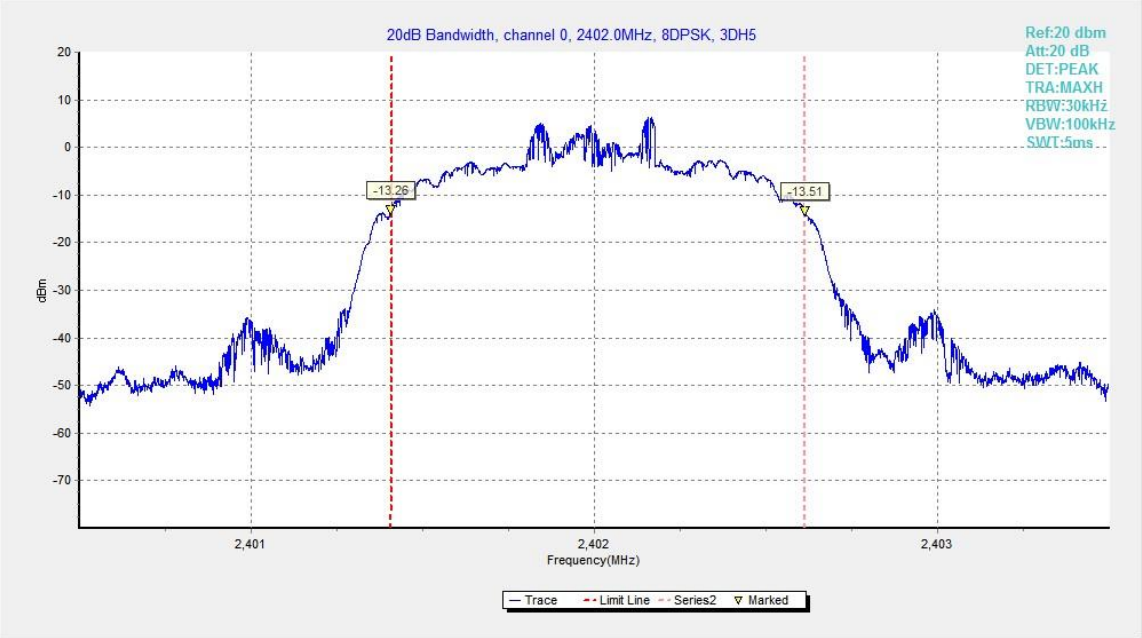


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

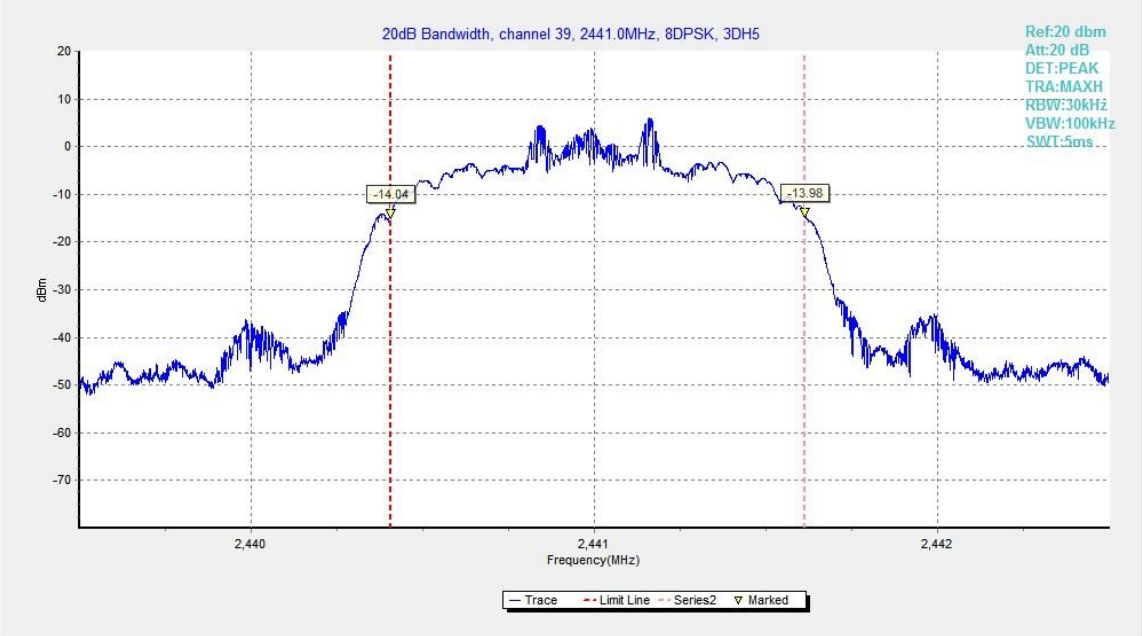


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

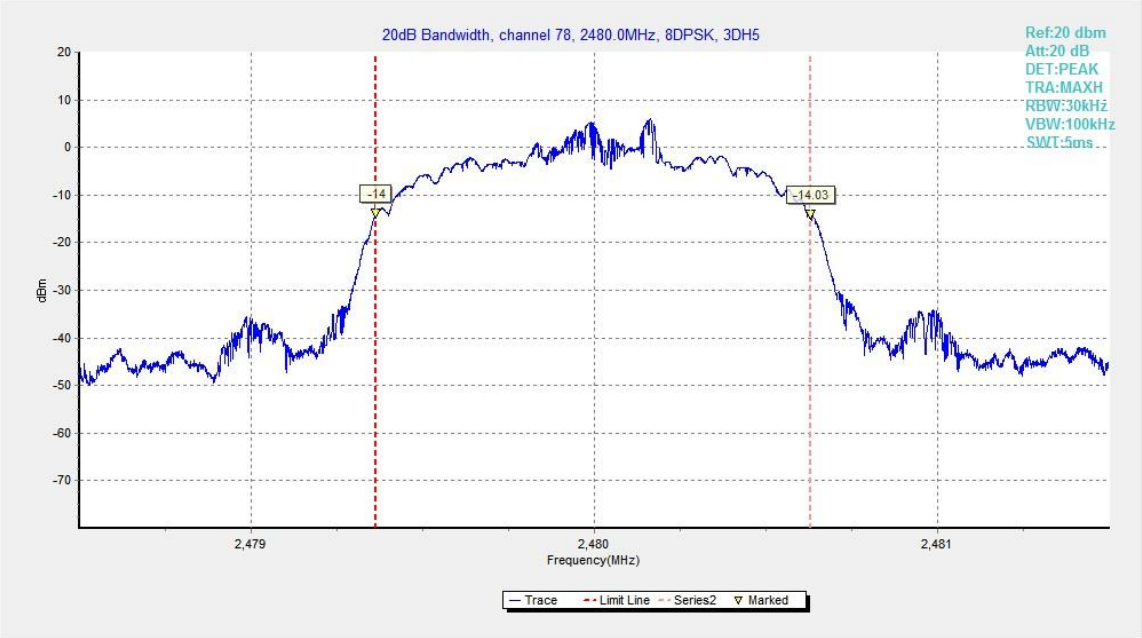


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

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	987.75	P

For π/4 DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.92	984.00	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.93	1002.75	P

Conclusion: PASS

Test graphs as below:

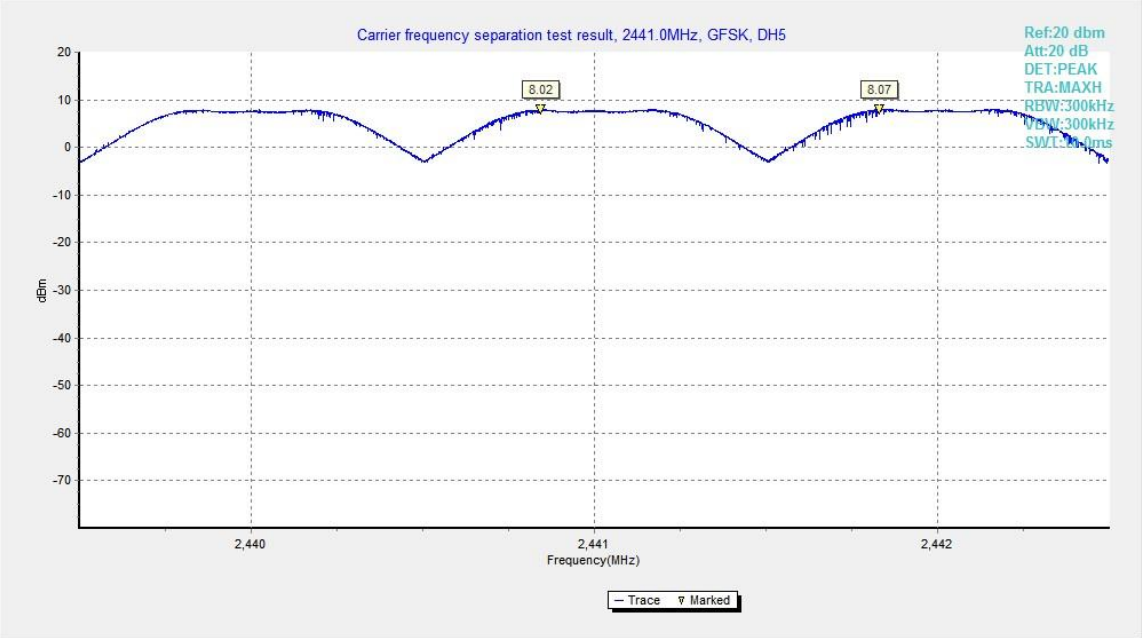


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

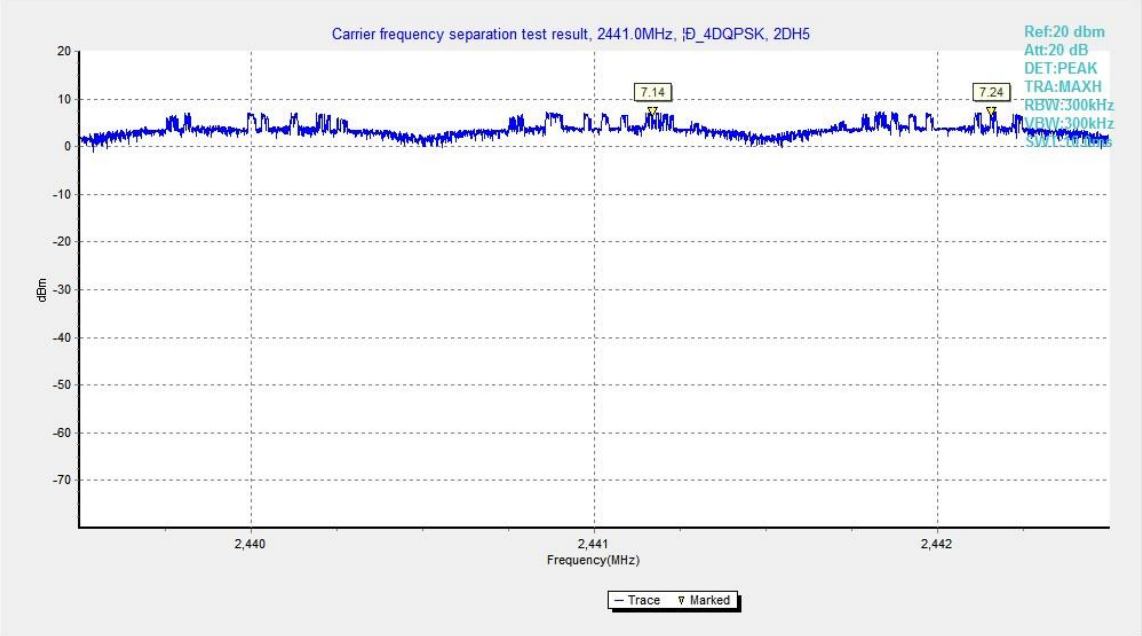


Fig.92. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

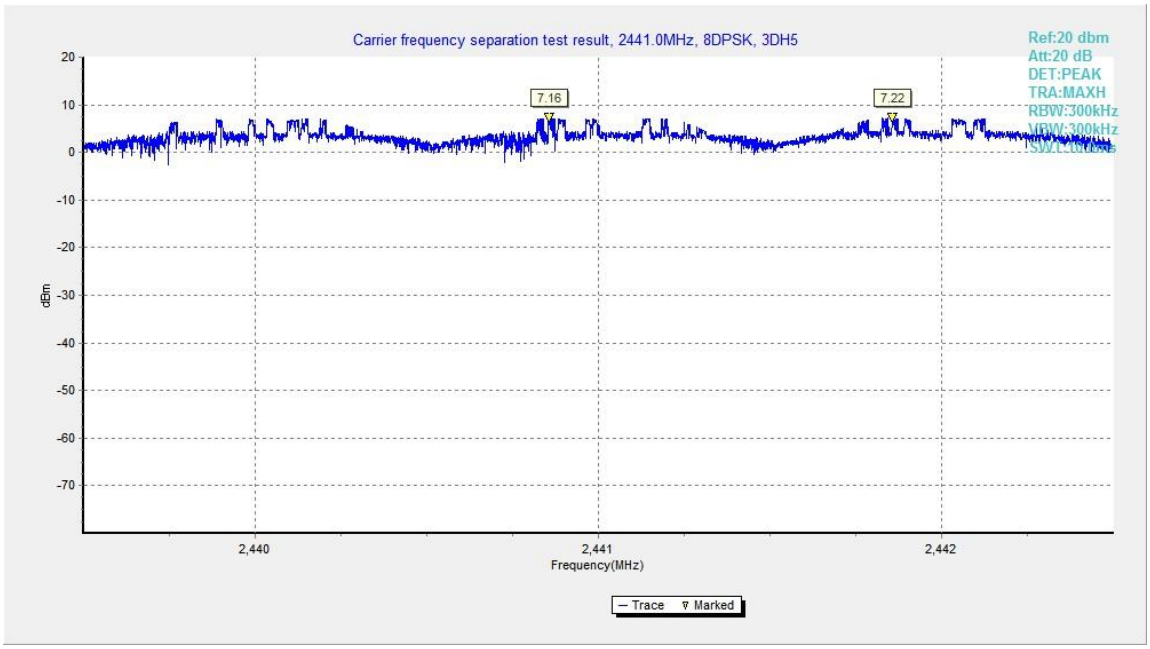


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

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:

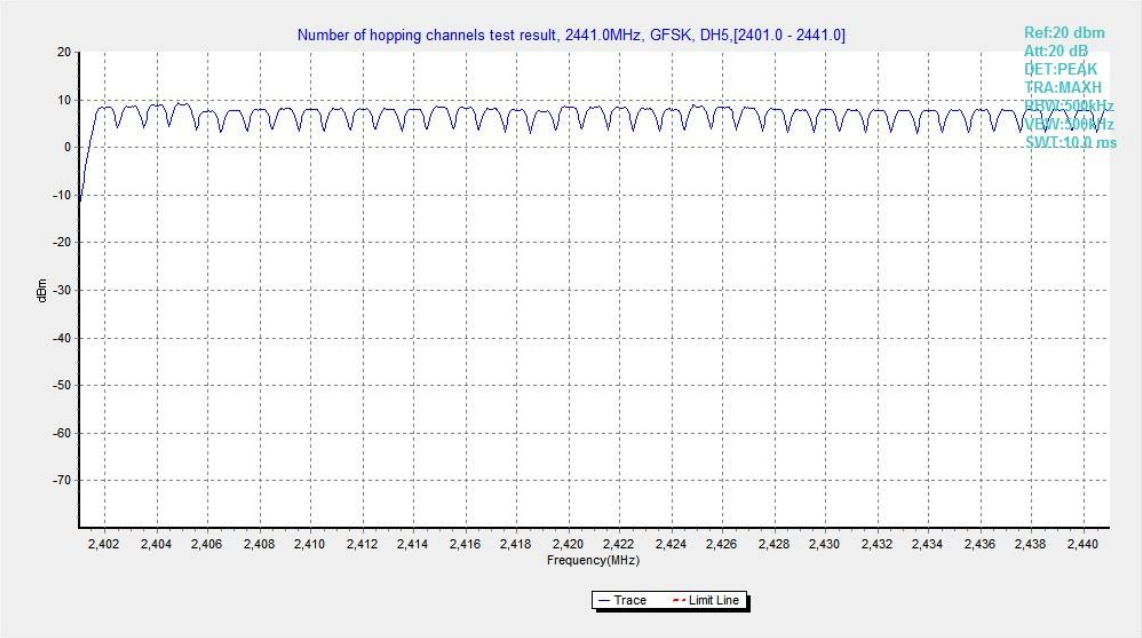


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

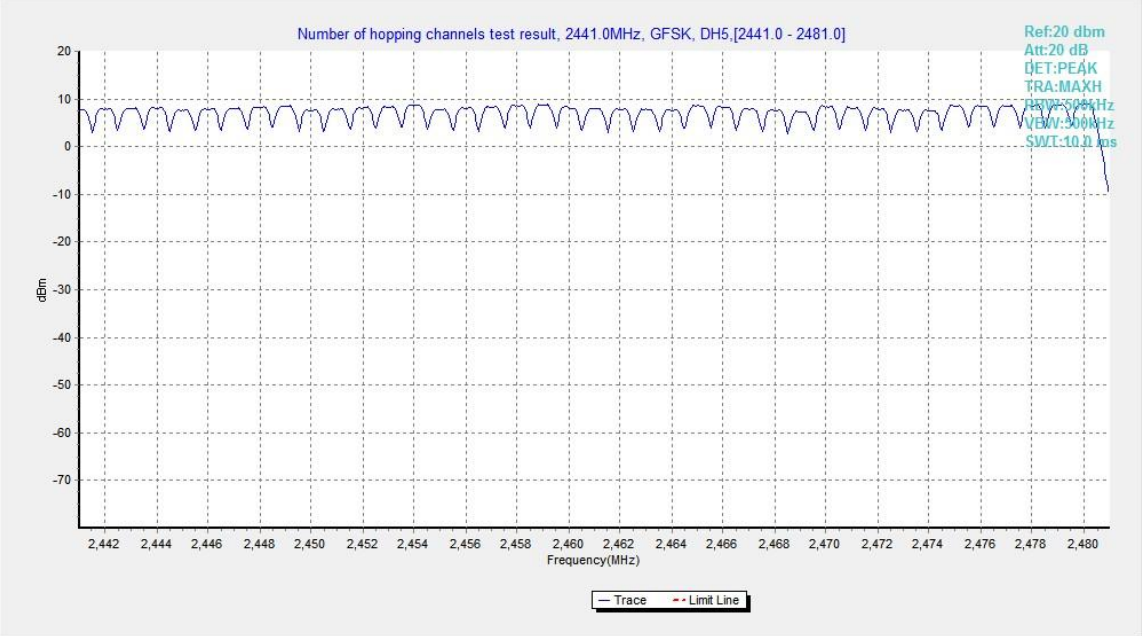


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

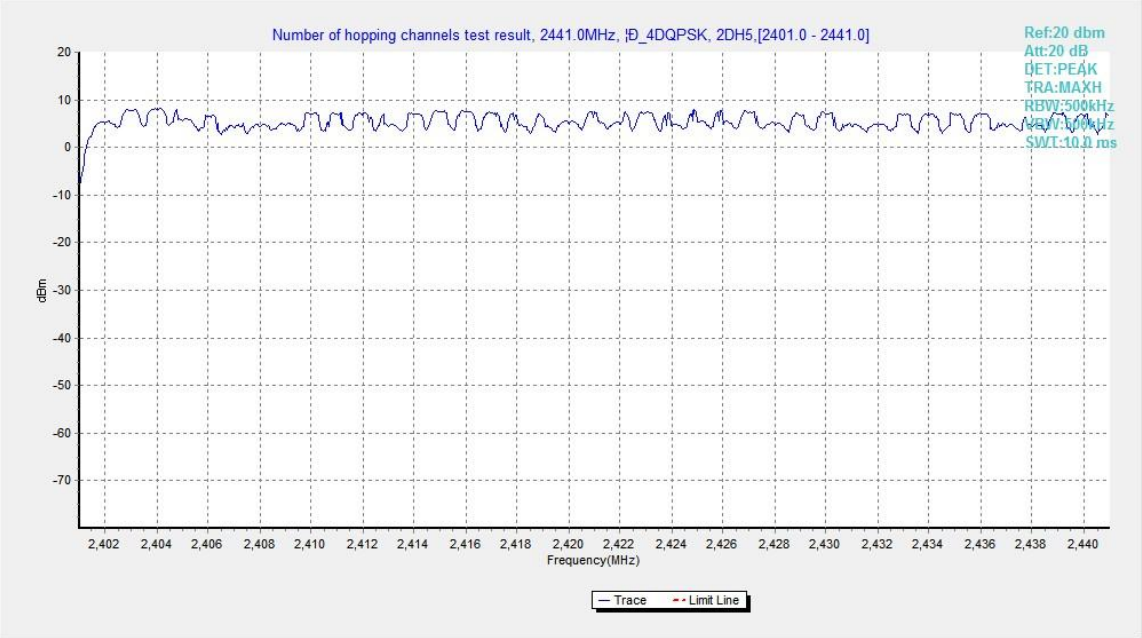


Fig.96. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

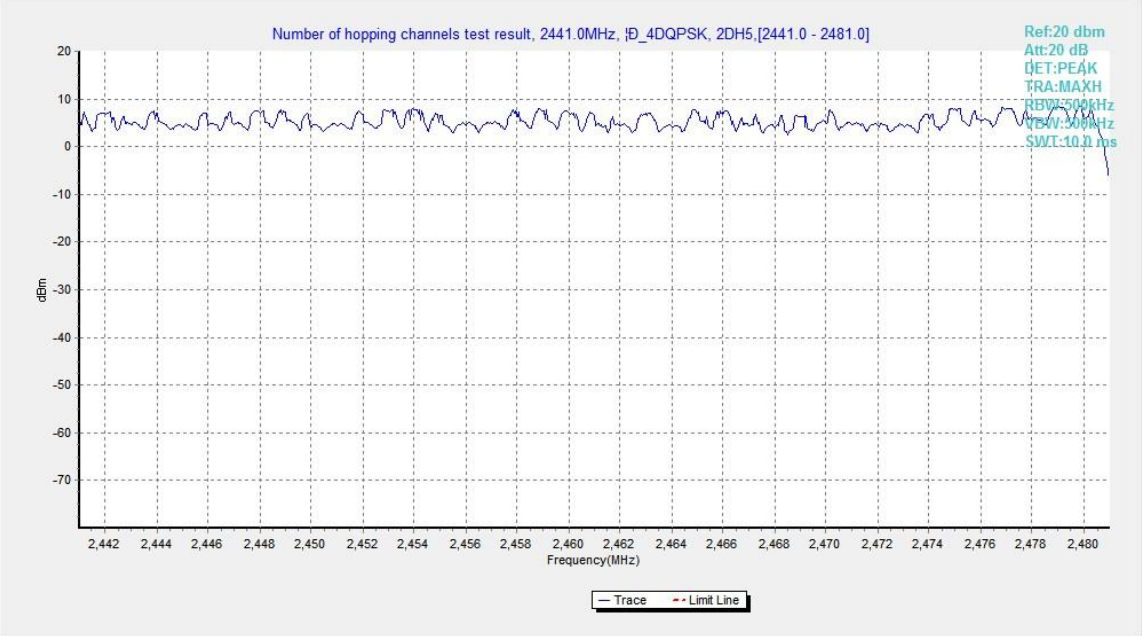


Fig.97. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

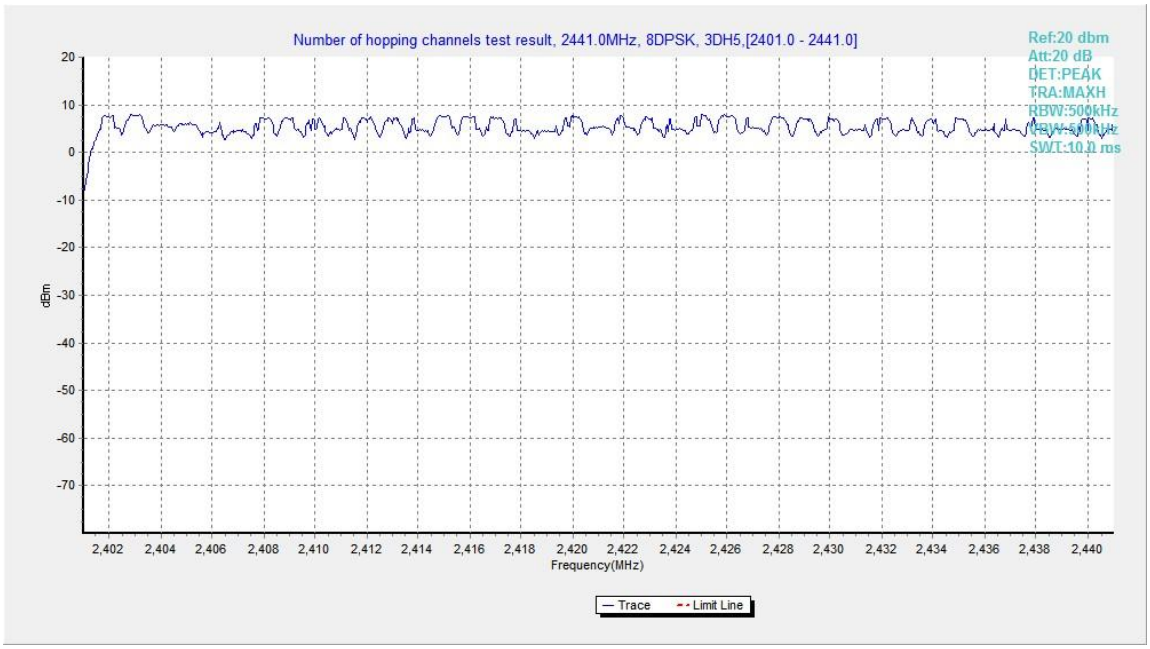


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

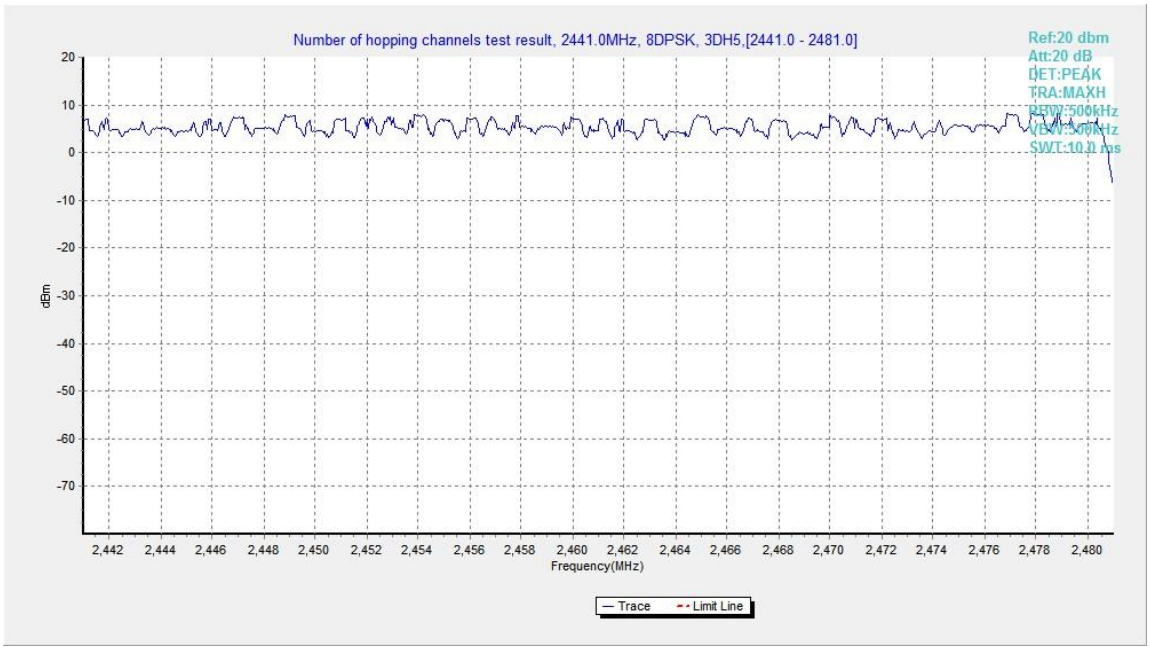


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

B.11. AC Powerline Conducted Emission

Method of Measurement: See ANSI C63.10-clause 6.2

1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.

2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.

3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.

4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

5 If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

EUT ID: UT30a

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:

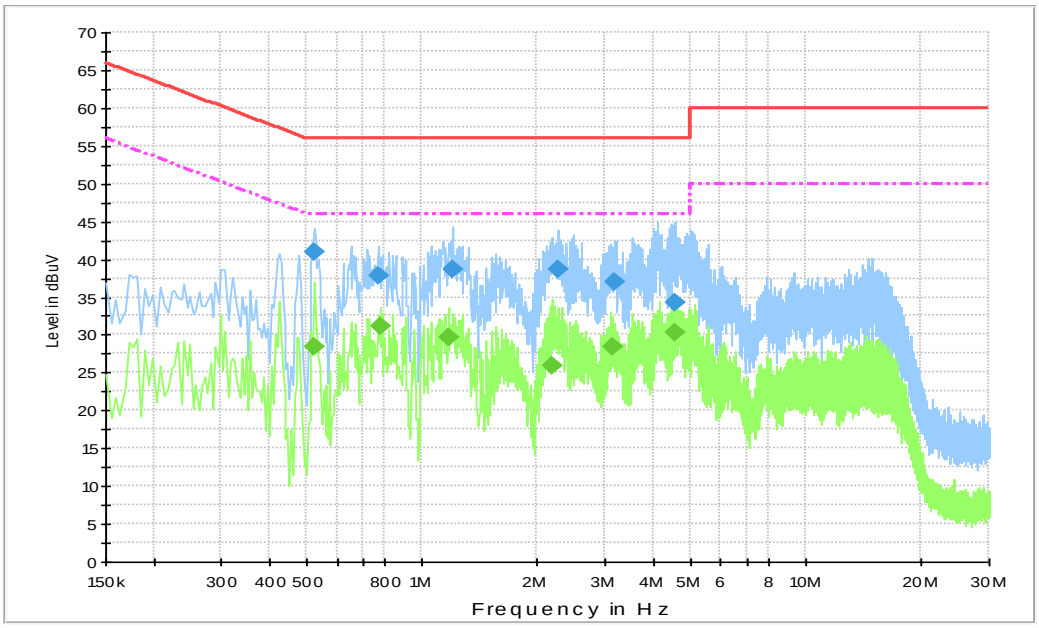


Fig.B.11.1 AC Powerline Conducted Emission- bluetooth

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)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.523500	40.9	1000.	9.000	L1	19.8	15.1	56.0
0.771000	37.8	1000.	9.000	L1	19.7	18.2	56.0
1.203000	38.6	1000.	9.000	L1	19.6	17.4	56.0
2.256000	38.6	1000.	9.000	L1	19.6	17.4	56.0
3.160500	36.9	1000.	9.000	L1	19.7	19.1	56.0
4.573500	34.4	1000.	9.000	N	19.6	21.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.523500	28.3	1000.0	9.000	N	19.8	17.7	46.0
0.780000	31.2	1000.0	9.000	L1	19.7	14.8	46.0
1.171500	29.7	1000.0	9.000	L1	19.6	16.3	46.0
2.179500	25.9	1000.0	9.000	N	19.6	20.1	46.0
3.129000	28.5	1000.0	9.000	L1	19.7	17.5	46.0
4.573500	30.4	1000.0	9.000	L1	19.6	15.6	46.0

Note2: The measurement results showed here are worst cases of the combinations of different chargers.

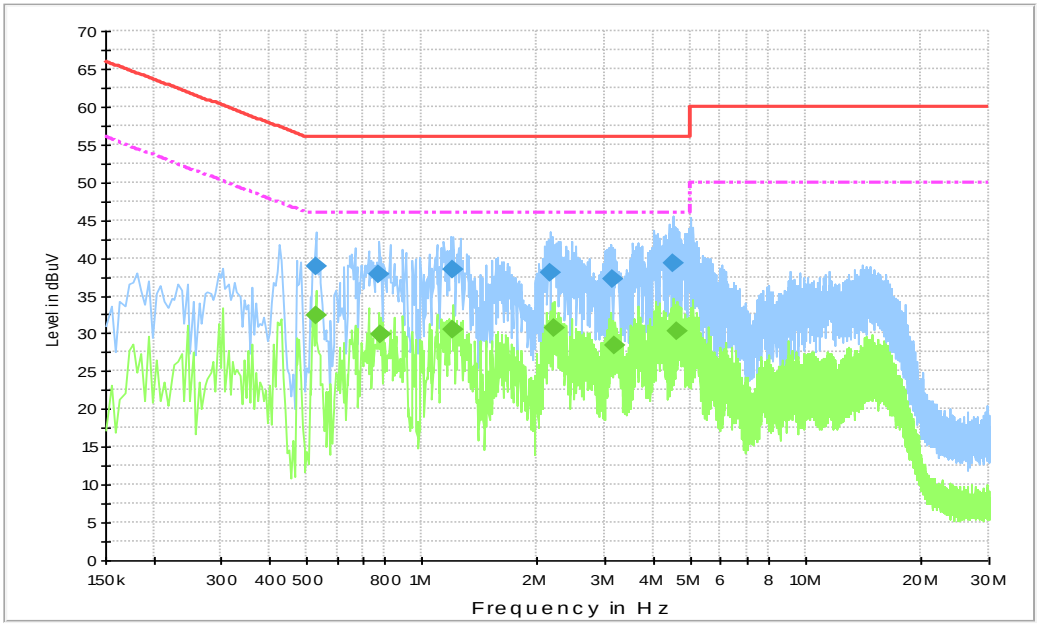


Fig.B.11.2 AC Powerline Conducted Emission-Idle

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

Final Result 1

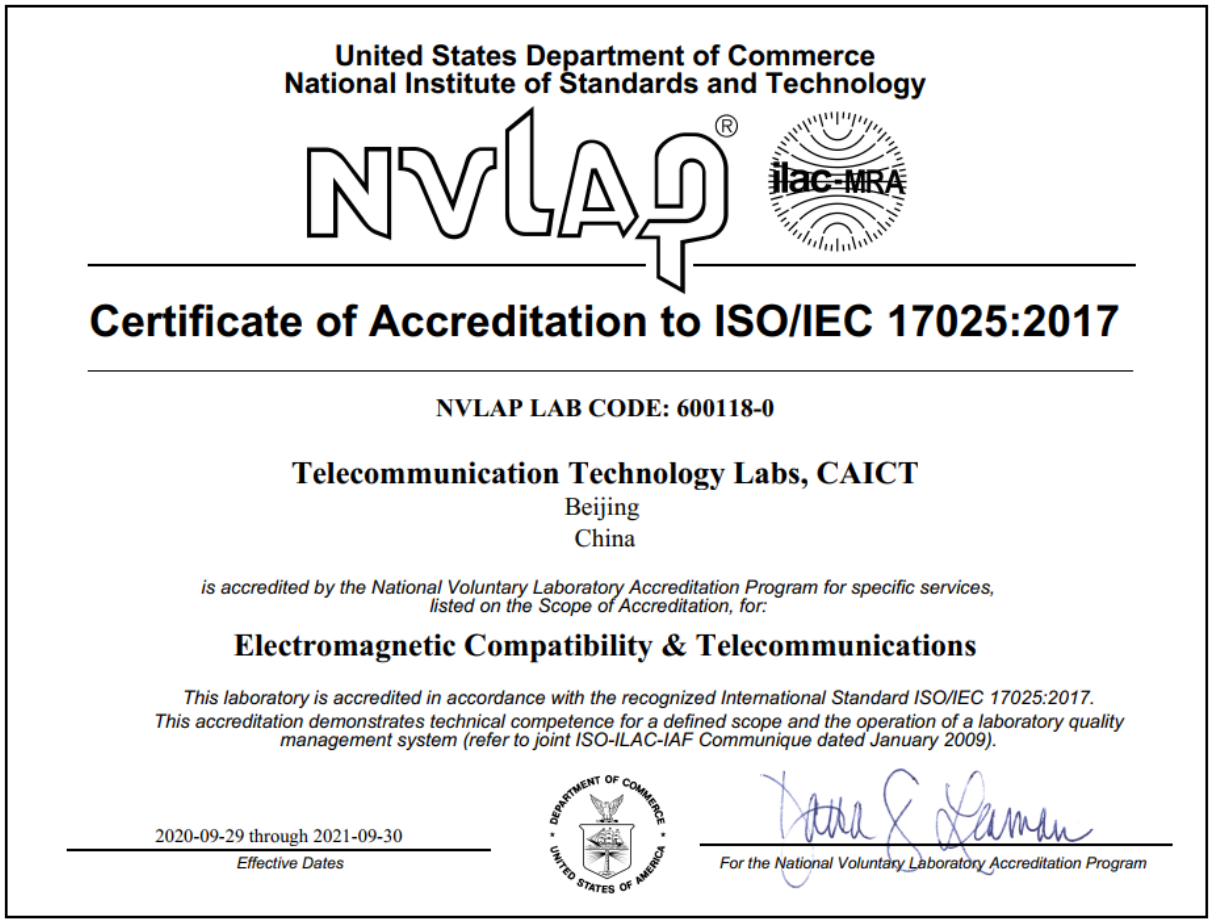
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.528000	39.0	1000.	9.000	L1	19.8	17.0	56.0
0.775500	37.9	1000.	9.000	L1	19.7	18.1	56.0
1.207500	38.5	1000.	9.000	L1	19.6	17.5	56.0
2.166000	38.0	1000.	9.000	L1	19.7	18.0	56.0
3.142500	37.3	1000.	9.000	L1	19.7	18.7	56.0
4.524000	39.2	1000.	9.000	L1	19.6	16.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.528000	32.5	1000.0	9.000	L1	19.8	13.5	46.0
0.784500	30.0	1000.0	9.000	L1	19.7	16.0	46.0
1.207500	30.5	1000.0	9.000	L1	19.6	15.5	46.0
2.211000	30.8	1000.0	9.000	L1	19.6	15.2	46.0
3.192000	28.3	1000.0	9.000	L1	19.7	17.7	46.0
4.618500	30.3	1000.0	9.000	L1	19.6	15.7	46.0

Note2: The measurement results showed here are worst cases of the combinations of different chargers.

ANNEX C: Accreditation Certificate



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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).

2020-09-29 through 2021-09-30
Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program

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