

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

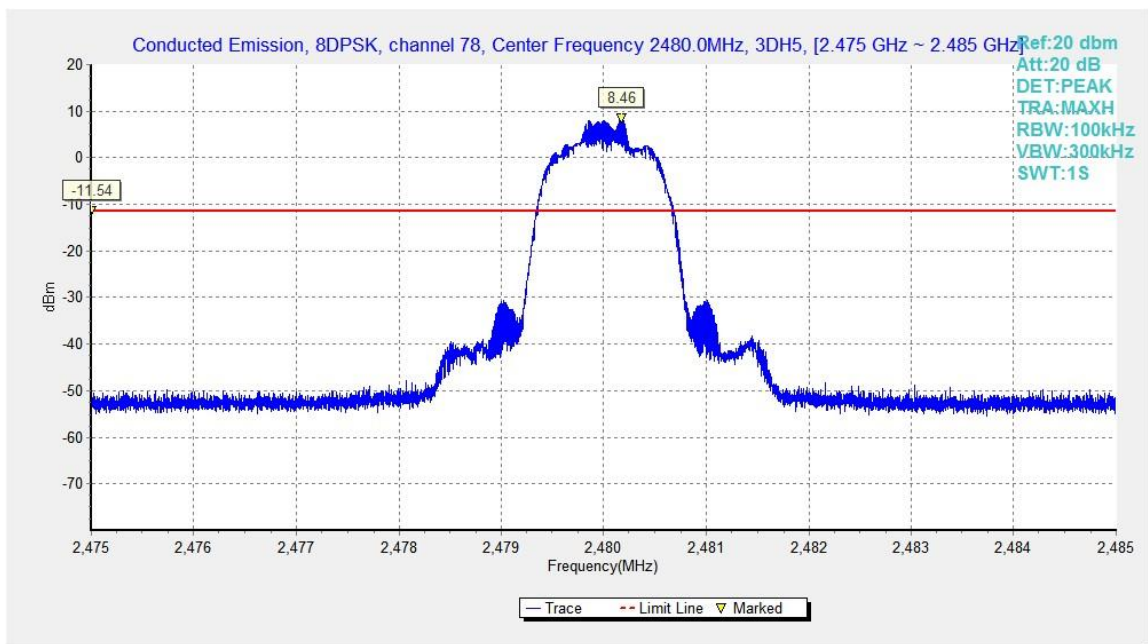


Fig.59. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

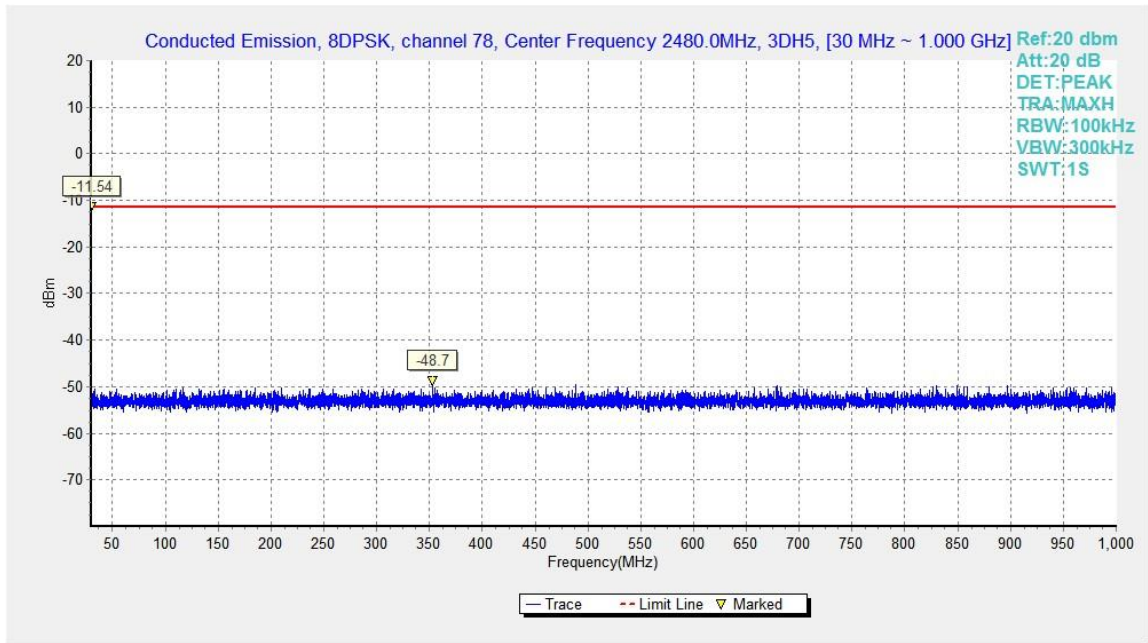


Fig.60. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

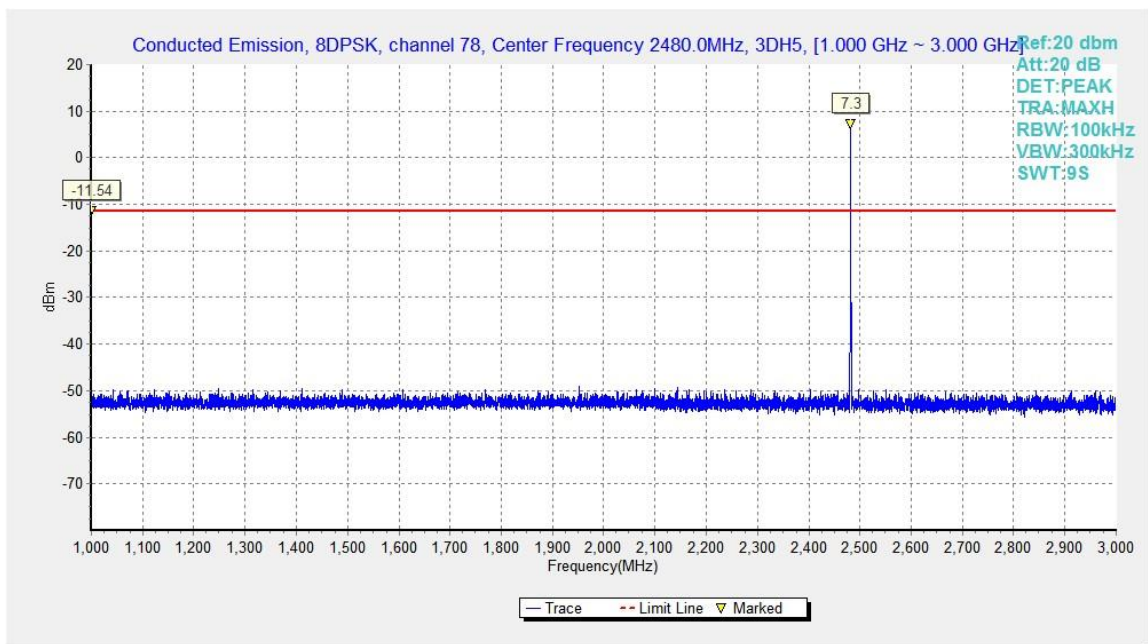


Fig.61. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

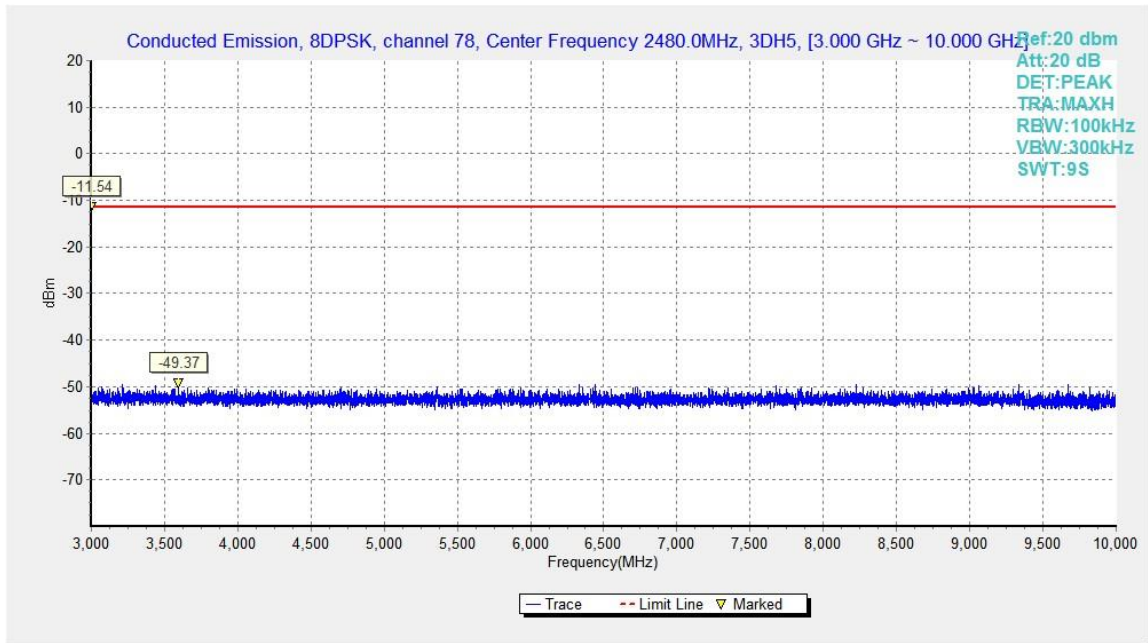


Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

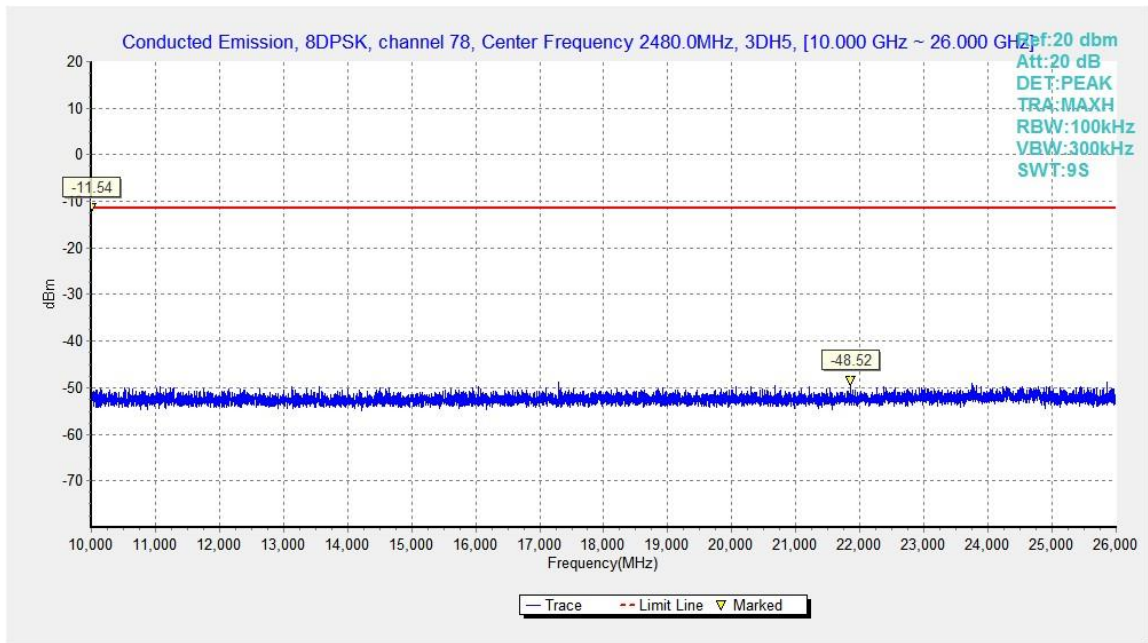


Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

B.6. Transmitter Spurious Emission - Radiated

Method of Measurement: See ANSI C63.10-2013-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)	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:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

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)
2387.042	60.50	5.35	32.22	22.93	74.00	13.50	V
2388.260	60.38	5.35	32.24	22.79	74.00	13.62	V
4803.500	46.23	-35.01	34.10	47.14	74.00	27.77	V
7206.000	43.70	-32.65	35.81	40.54	74.00	30.30	V
9608.000	43.66	-32.16	36.90	38.91	74.00	30.34	H
12010.000	45.87	-31.65	38.72	38.79	74.00	28.13	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)
2320.200	41.47	-29.84	31.93	39.37	74.00	32.53	V
2560.800	43.44	-29.36	32.22	40.57	74.00	30.56	H
4882.000	46.38	-34.32	34.16	46.54	74.00	27.62	V
7323.000	44.21	-32.61	35.91	40.91	74.00	29.79	H
9764.000	43.95	-32.26	36.93	39.28	74.00	30.05	V
12205.000	45.77	-31.13	39.09	37.82	74.00	28.23	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)
2483.740	60.73	5.46	32.60	22.67	74.00	13.27	V
2485.045	61.28	5.46	32.60	23.22	74.00	12.72	V
4960.000	46.68	-34.82	34.26	47.24	74.00	27.32	V
7440.000	42.94	-32.54	35.80	39.69	74.00	31.06	V
9920.000	46.46	-32.17	37.10	41.54	74.00	27.54	H
12400.000	46.47	-31.31	39.00	38.78	74.00	27.53	V

$\pi/4$ 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)
2483.580	60.22	5.46	32.60	22.16	74.00	13.78	V
2483.850	60.52	5.46	32.60	22.46	74.00	13.48	V
4804.000	43.95	-35.01	34.10	44.87	74.00	30.05	H
7206.000	44.21	-32.65	35.81	41.05	74.00	29.79	H
9608.000	44.43	-32.16	36.90	39.68	74.00	29.57	H
12010.000	45.64	-31.65	38.72	38.57	74.00	28.36	H

 $\pi/4$ 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)
2328.600	41.85	-29.69	31.94	39.60	74.00	32.15	H
2590.600	43.19	-29.38	32.28	40.29	74.00	30.81	H
4882.000	43.15	-34.32	34.16	43.31	74.00	30.85	H
7323.000	43.88	-32.61	35.91	40.59	74.00	30.12	V
9764.000	43.73	-32.26	36.93	39.07	74.00	30.27	V
12205.000	44.75	-31.13	39.09	36.80	74.00	29.25	V

 $\pi/4$ 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)
2386.860	60.22	5.35	32.22	22.66	74.00	13.78	V
2387.658	60.02	5.35	32.23	22.44	74.00	13.98	V
4960.000	44.93	-34.82	34.26	45.49	74.00	29.07	V
7440.000	42.78	-32.54	35.80	39.52	74.00	31.22	V
9920.000	45.35	-32.17	37.10	40.42	74.00	28.65	H
12400.000	45.32	-31.31	39.00	37.63	74.00	28.68	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)
2388.190	60.00	5.35	32.24	22.42	74.00	14.00	V
2389.856	60.07	5.35	32.26	22.46	74.00	13.93	H
4803.500	44.28	-35.01	34.10	45.19	74.00	29.72	V
7206.000	42.94	-32.65	35.81	39.78	74.00	31.06	H
9608.000	43.92	-32.16	36.90	39.18	74.00	30.08	V
12010.000	46.43	-31.65	38.72	39.36	74.00	27.57	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)
2246.000	42.38	-29.95	31.86	40.47	74.00	31.62	V
2607.200	43.22	-29.29	32.31	40.20	74.00	30.78	V
4881.000	44.33	-34.32	34.16	44.48	74.00	29.67	V
7323.000	44.00	-32.61	35.91	40.70	74.00	30.00	V
9764.000	43.56	-32.26	36.93	38.89	74.00	30.44	H
12205.000	44.92	-31.13	39.09	36.96	74.00	29.08	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)
2483.715	60.39	5.46	32.60	22.33	74.00	13.61	V
2484.220	60.81	5.46	32.60	22.74	74.00	13.19	V
4960.000	46.25	-34.82	34.26	46.81	74.00	27.75	H
7440.000	42.54	-32.54	35.80	39.29	74.00	31.46	H
9920.000	43.11	-32.17	37.10	38.18	74.00	30.89	H
12400.000	45.02	-31.31	39.00	37.33	74.00	28.98	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)
2383.988	45.70	5.34	32.18	8.19	54.00	8.30	V
2389.537	45.74	5.35	32.25	8.14	54.00	8.26	V
4803.733	40.20	-35.01	34.10	41.11	54.00	13.80	H
7206.133	33.55	-32.65	35.81	30.39	54.00	20.45	H
9608.000	32.49	-32.16	36.90	27.75	54.00	21.51	V
12010.133	33.93	-31.65	38.72	26.85	54.00	20.07	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)
2437.463	47.76	5.41	32.55	9.80	54.00	6.24	V
2444.775	47.86	5.41	32.58	9.86	54.00	6.14	V
4882.133	38.40	-34.32	34.16	38.56	54.00	15.60	V
7322.933	32.05	-32.61	35.91	28.76	54.00	21.95	H
9764.000	32.05	-32.26	36.93	27.39	54.00	21.95	V
122050.660	33.61	0.00	0.00	33.61	54.00	20.39	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)
2483.738	48.04	5.46	32.60	9.98	54.00	5.96	V
2483.925	48.08	5.46	32.60	10.02	54.00	5.92	V
4959.750	41.36	-34.82	34.26	41.91	54.00	12.64	V
7440.150	31.93	-32.54	35.80	28.68	54.00	22.07	H
9919.900	31.98	-32.17	37.10	27.05	54.00	22.02	H
12399.975	33.63	-31.31	39.00	25.94	54.00	20.37	V

$\pi/4$ 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)
2483.700	48.09	5.46	32.60	10.02	54.00	5.91	V
2484.150	48.03	5.46	32.60	9.97	54.00	5.97	V
4803.750	34.85	-35.01	34.10	35.76	54.00	19.15	H
7206.150	31.71	-32.65	35.81	28.55	54.00	22.29	V
9607.900	32.16	-32.16	36.90	27.41	54.00	21.84	H
12009.975	33.66	-31.65	38.72	26.59	54.00	20.34	H

 $\pi/4$ 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)
2437.500	47.77	5.41	32.55	9.81	54.00	6.23	V
2444.750	47.67	5.41	32.58	9.68	54.00	6.33	V
4881.750	34.41	-34.32	34.16	34.57	54.00	19.59	H
7323.150	31.48	-32.61	35.91	28.18	54.00	22.52	V
9763.900	31.89	-32.26	36.93	27.23	54.00	22.11	V
12204.975	33.63	-31.13	39.09	25.68	54.00	20.37	H

 $\pi/4$ 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)
2387.550	45.66	5.35	32.23	8.09	54.00	8.34	V
2389.537	45.76	5.35	32.25	8.15	54.00	8.24	V
4960.075	36.52	-34.82	34.26	37.08	54.00	17.48	H
7440.150	30.92	-32.54	35.80	27.66	54.00	23.08	H
9919.900	31.69	-32.17	37.10	26.76	54.00	22.31	V
12399.975	33.74	-31.31	39.00	26.04	54.00	20.26	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)
2388.188	45.72	5.35	32.24	8.14	54.00	8.28	V
2389.238	45.76	5.35	32.25	8.16	54.00	8.24	V
4804.075	34.98	-35.01	34.10	35.90	54.00	19.02	V
7206.150	31.61	-32.65	35.81	28.45	54.00	22.39	H
9607.900	32.24	-32.16	36.90	27.50	54.00	21.76	V
12009.975	33.66	-31.65	38.72	26.59	54.00	20.34	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)
2437.275	47.69	5.41	32.55	9.73	54.00	6.31	V
2445.262	47.78	5.41	32.58	9.78	54.00	6.22	V
4881.750	34.34	-34.32	34.16	34.49	54.00	19.66	V
7323.150	31.41	-32.61	35.91	28.11	54.00	22.59	H
9763.900	31.87	-32.26	36.93	27.20	54.00	22.13	H
12204.975	33.55	-31.13	39.09	25.59	54.00	20.45	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)
2483.662	48.07	5.46	32.60	10.01	54.00	5.93	V
2483.850	48.03	5.46	32.60	9.97	54.00	5.97	V
4960.075	36.54	-34.82	34.26	37.10	54.00	17.46	H
7440.150	30.80	-32.54	35.80	27.54	54.00	23.20	V
9919.900	31.73	-32.17	37.10	26.81	54.00	22.27	H
12399.975	33.70	-31.31	39.00	26.01	54.00	20.30	H

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 \geq 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
		Fig.	Value	Fig.	Value		
39	DH1	Fig.64	0.38	Fig.65	320	121.6	P
	DH3	Fig.66	1.63	Fig.67	112	182.56	P
	DH5	Fig.68	2.87	Fig.69	51	146.37	P

For $\pi/4$ DQPSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
		Fig.	Value	Fig.	Value		
39	2DH1	Fig.70	0.38	Fig.71	319	121.22	P
	2DH3	Fig.72	1.64	Fig.73	98	160.72	P
	2DH5	Fig.74	2.88	Fig.75	65	187.2	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	108	176.04	P
	3DH5	Fig.80	2.89	Fig.81	75	216.75	P

Conclusion: PASS

Test graphs as below:

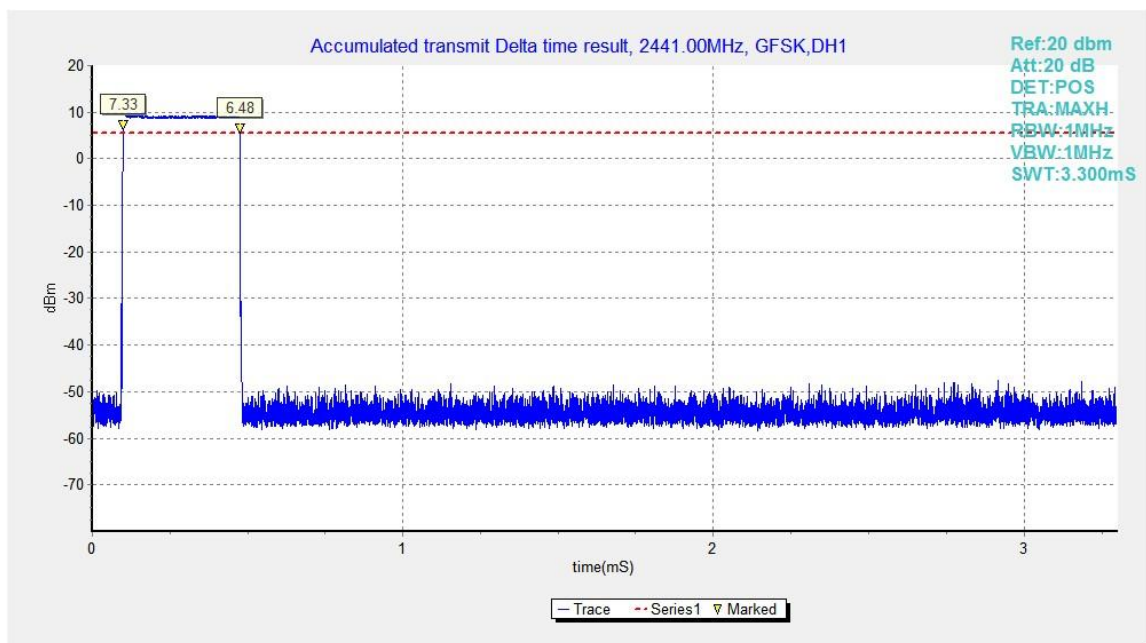


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

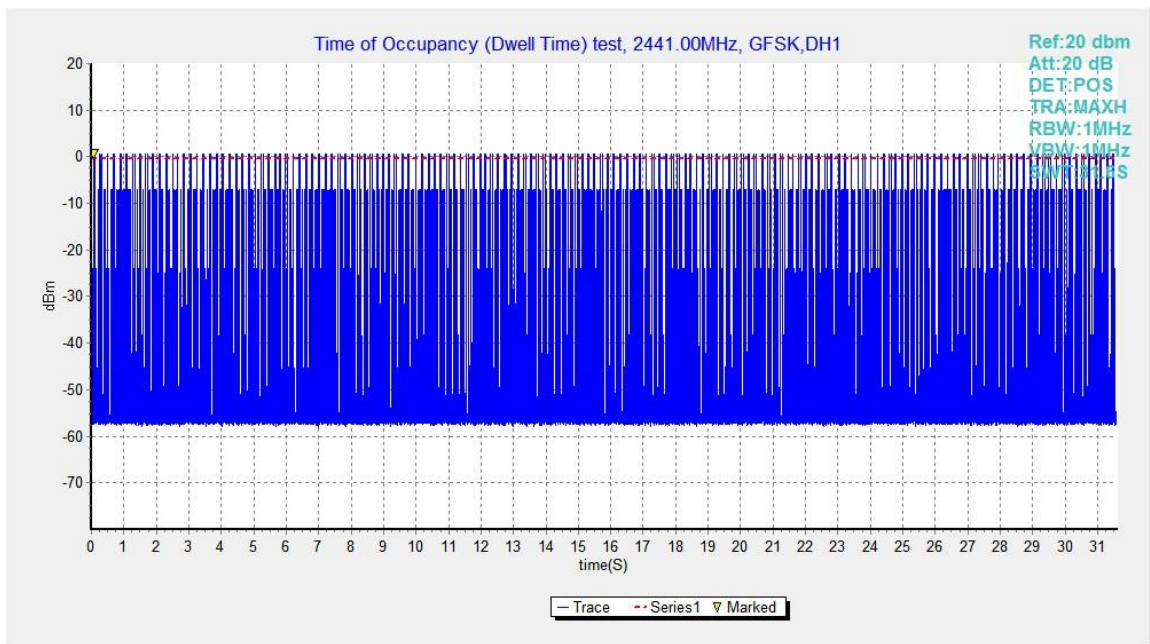


Fig.65. Number of Transmissions Measurement: Channel 39,Packet DH1

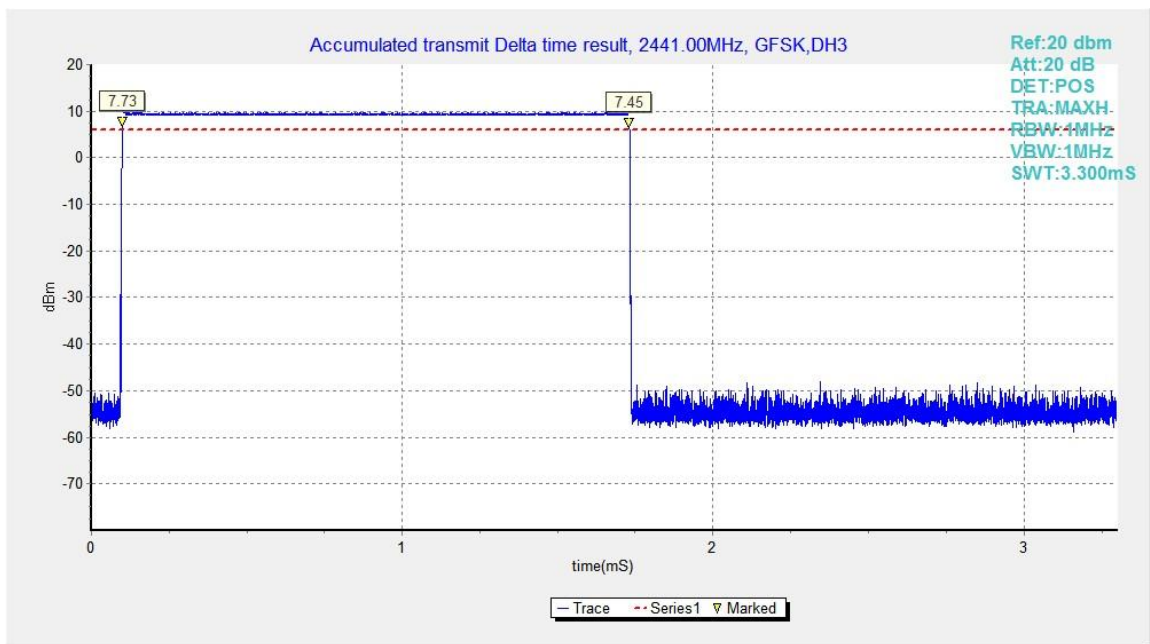


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

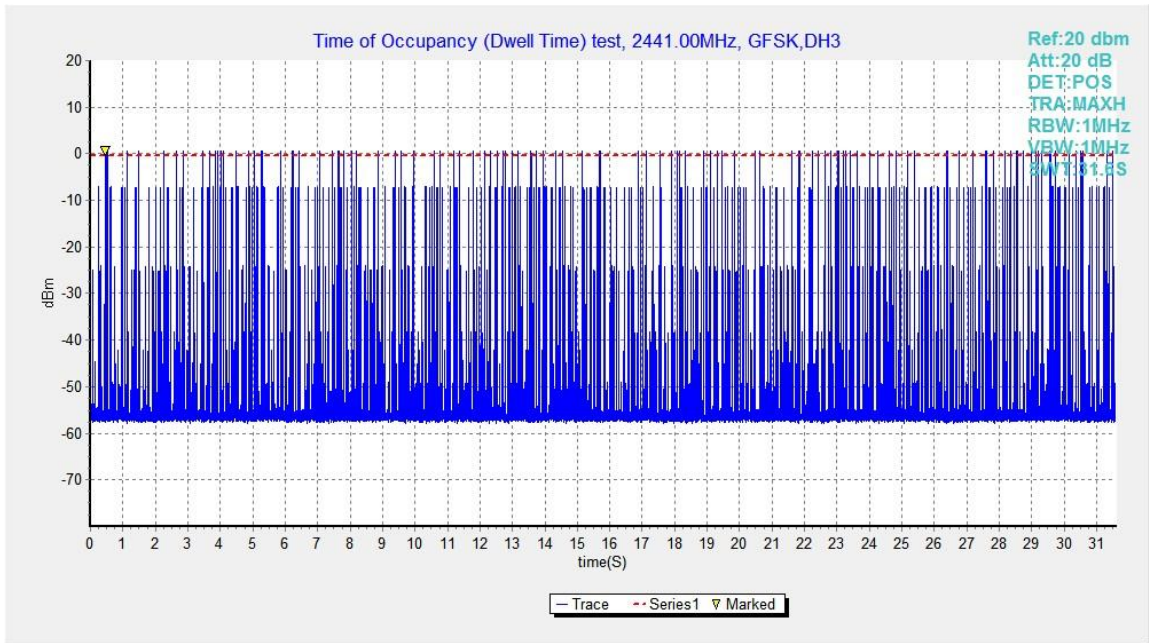


Fig.67. Number of Transmissions Measurement: Channel 39,Packet DH3

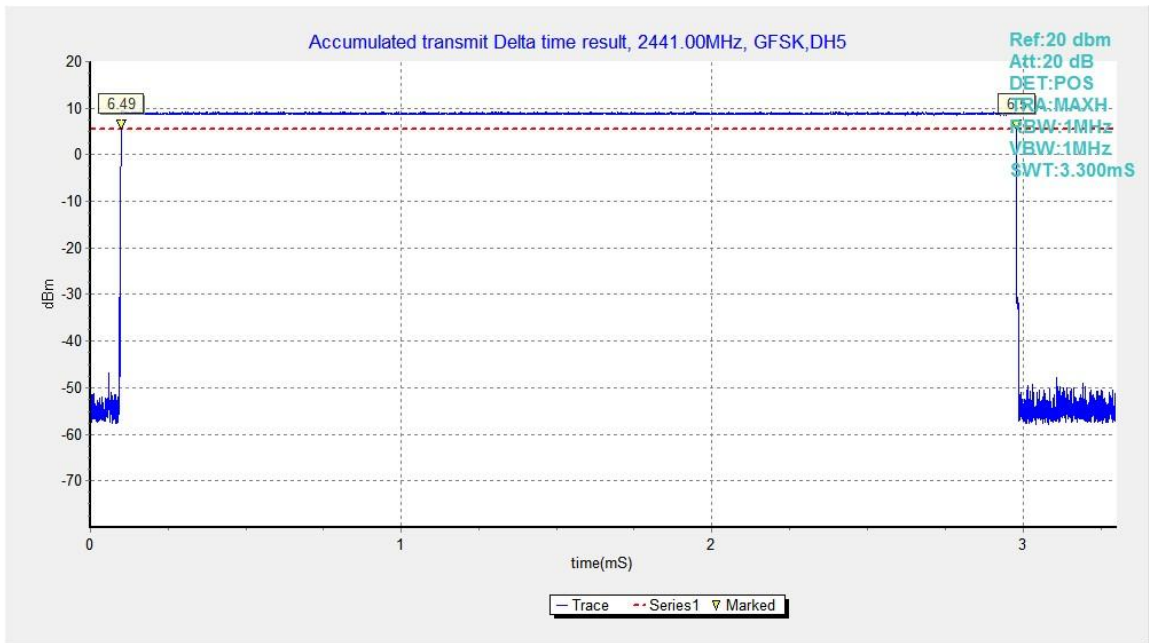


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

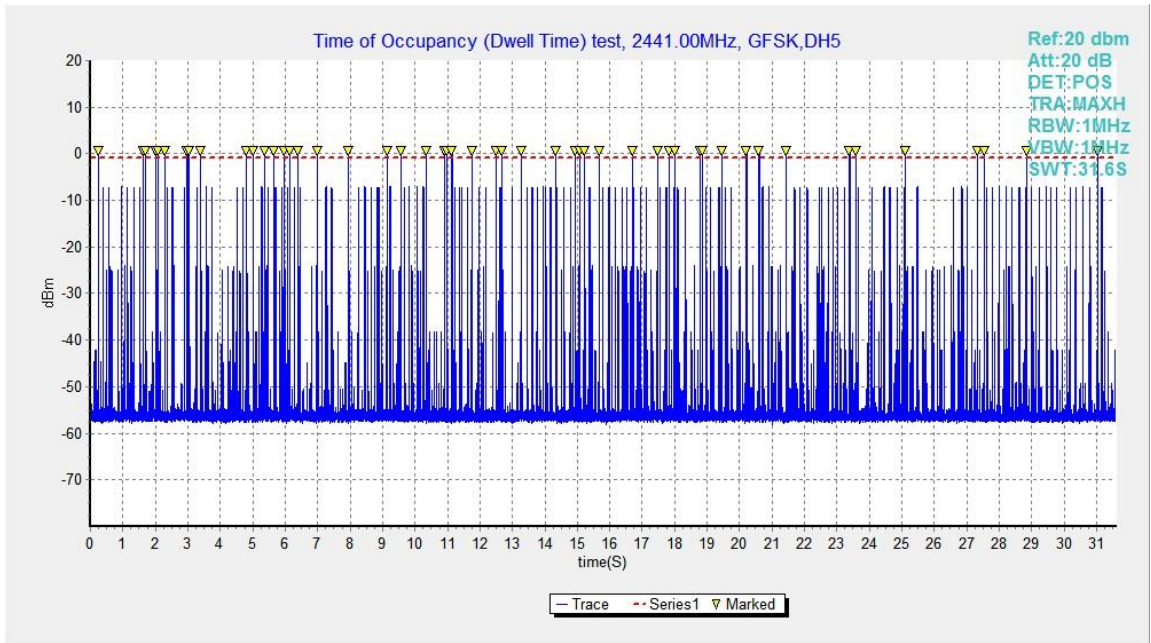


Fig.69. Number of Transmissions Measurement: Channel 39,Packet DH5

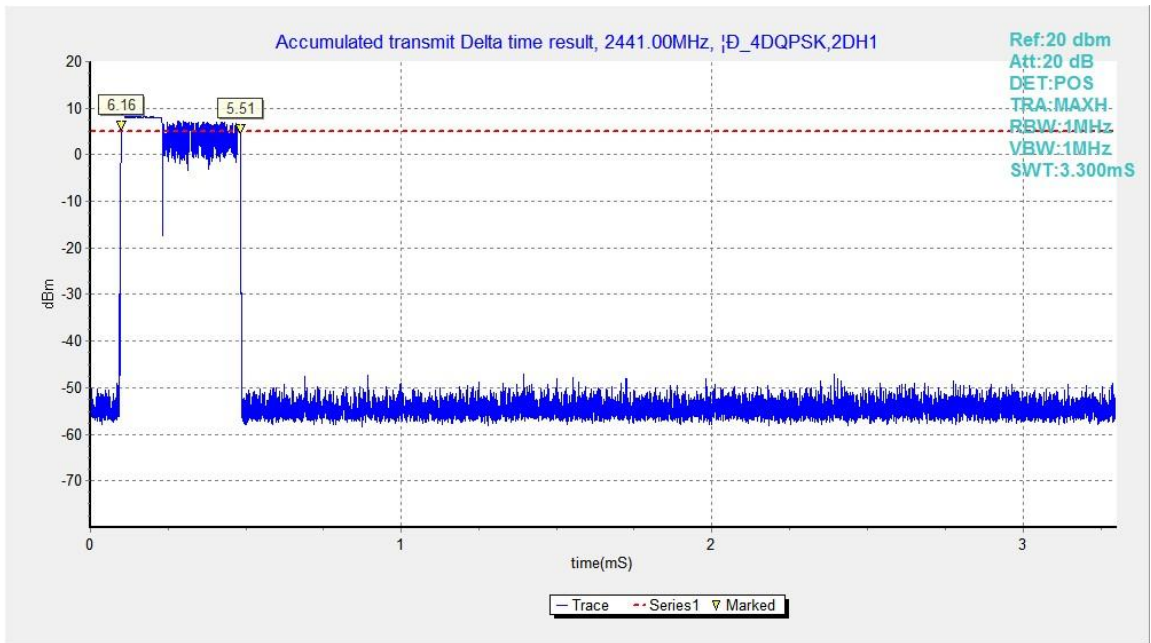


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

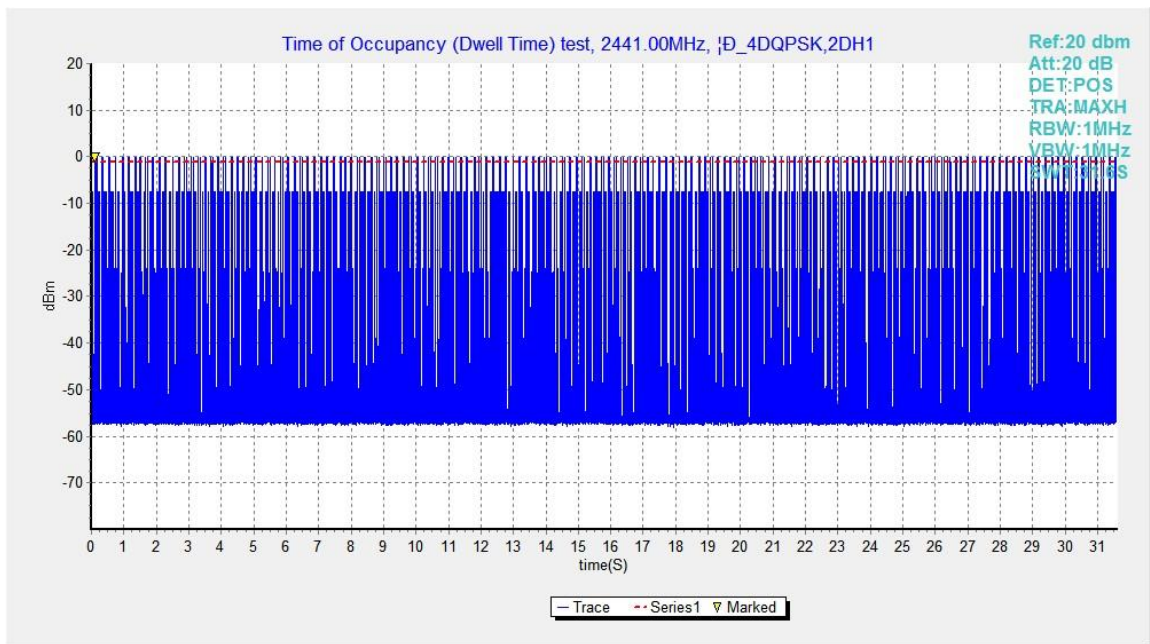


Fig.71. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

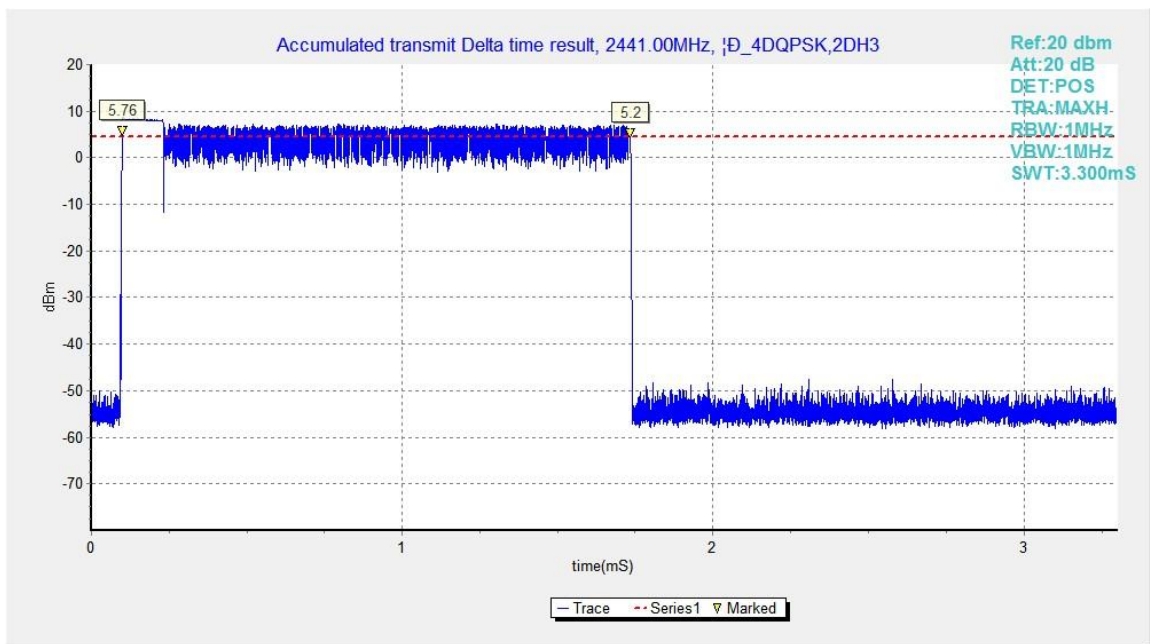


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

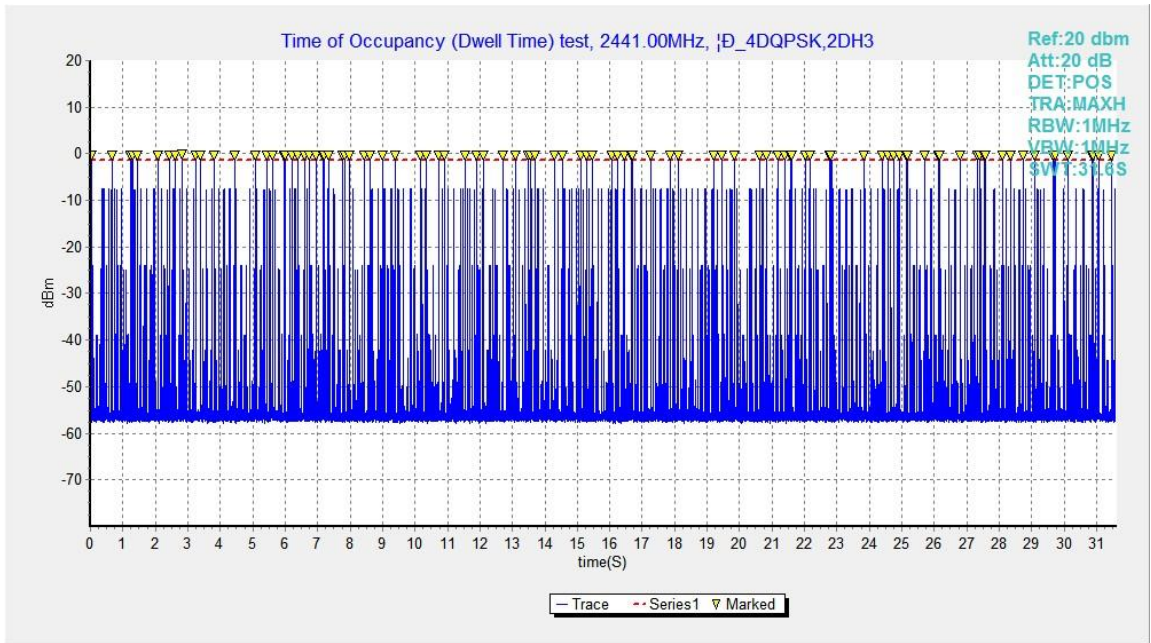


Fig.73. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

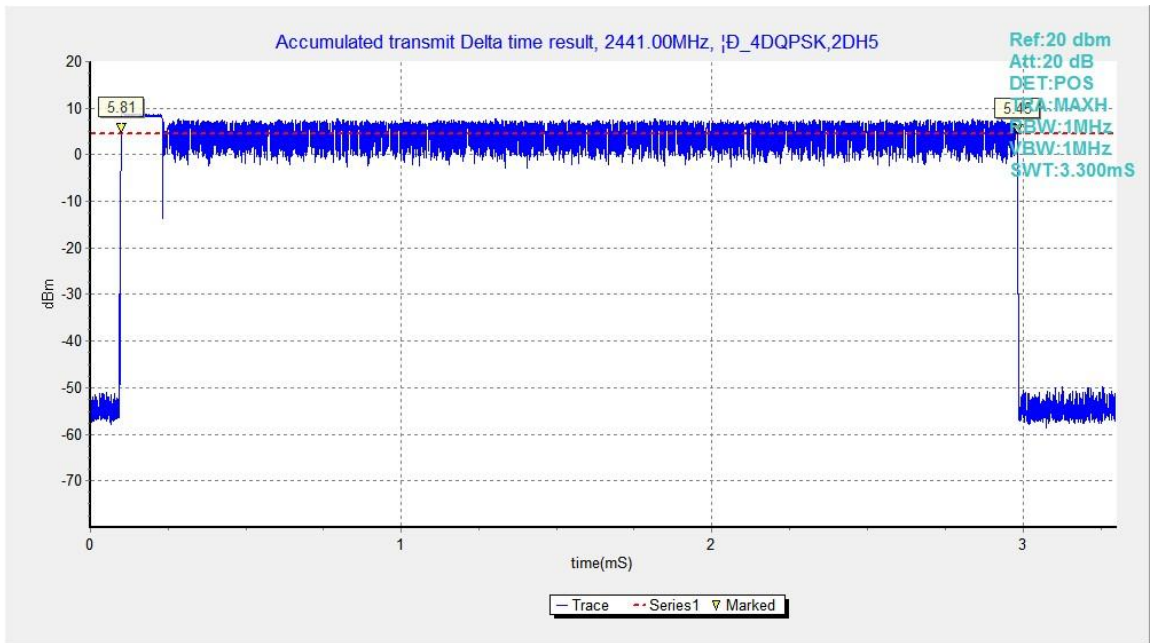


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

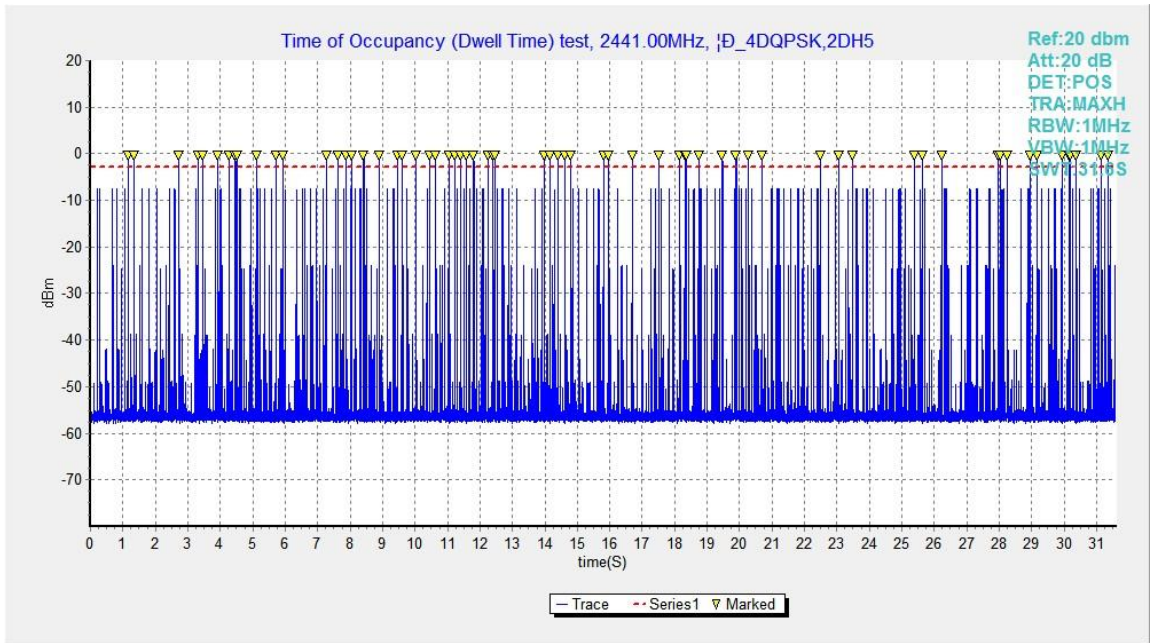


Fig.75. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

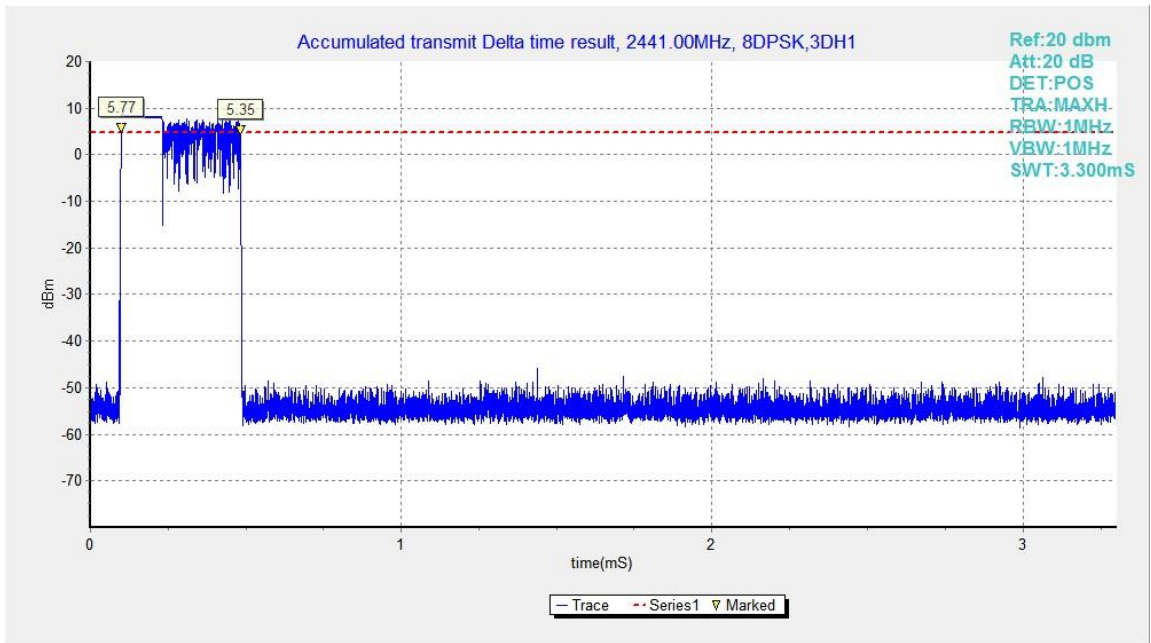


Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

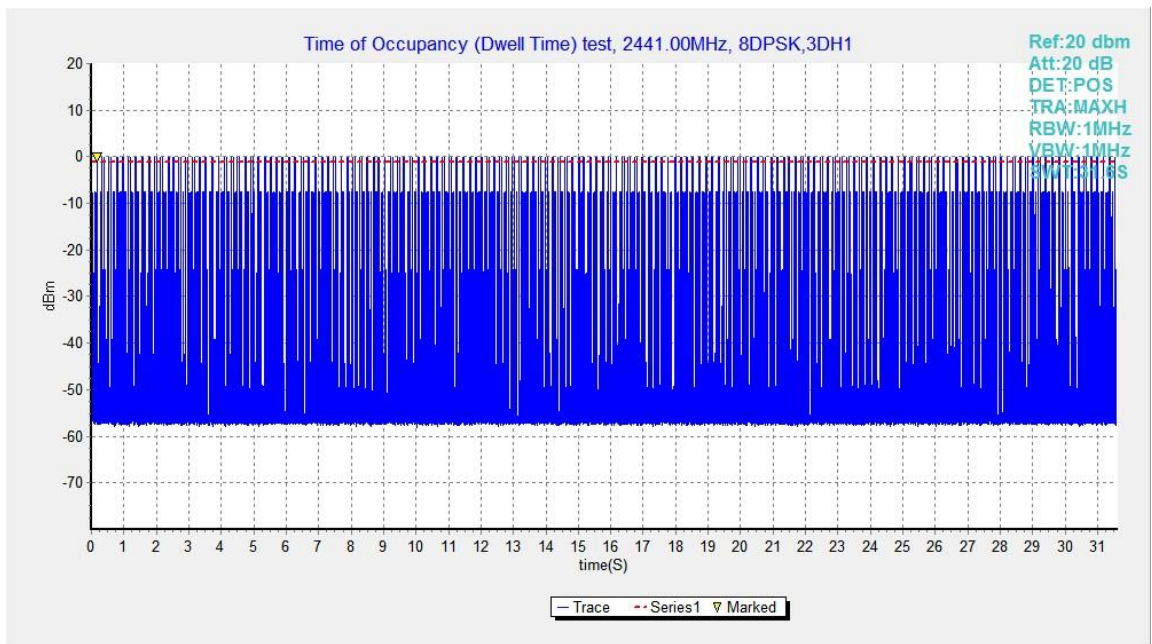


Fig.77. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

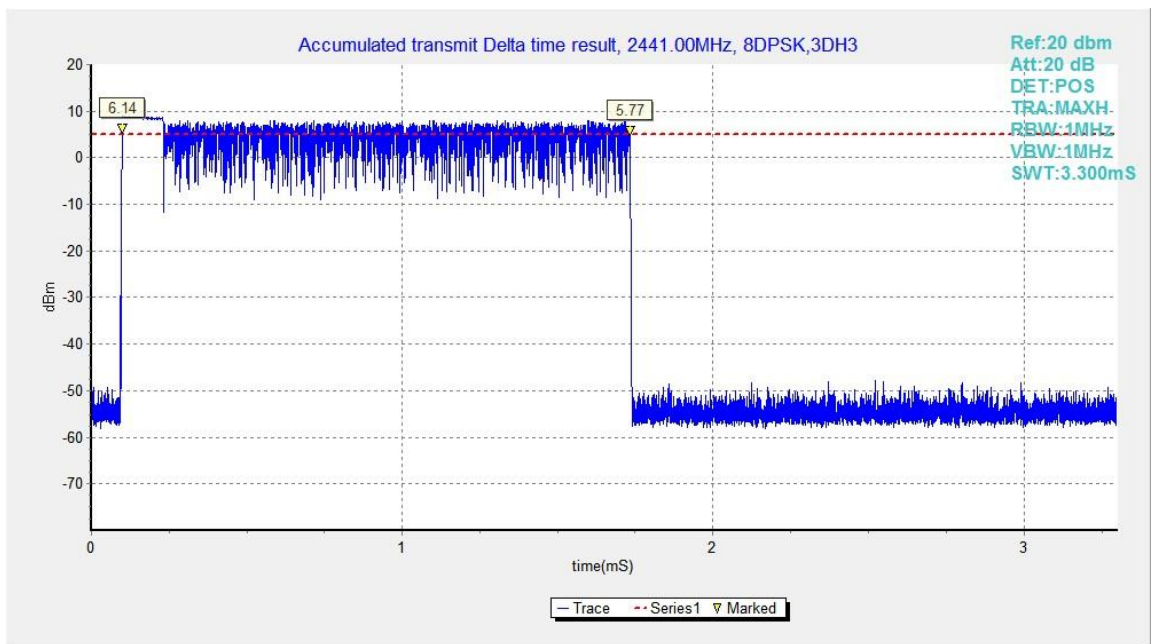


Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

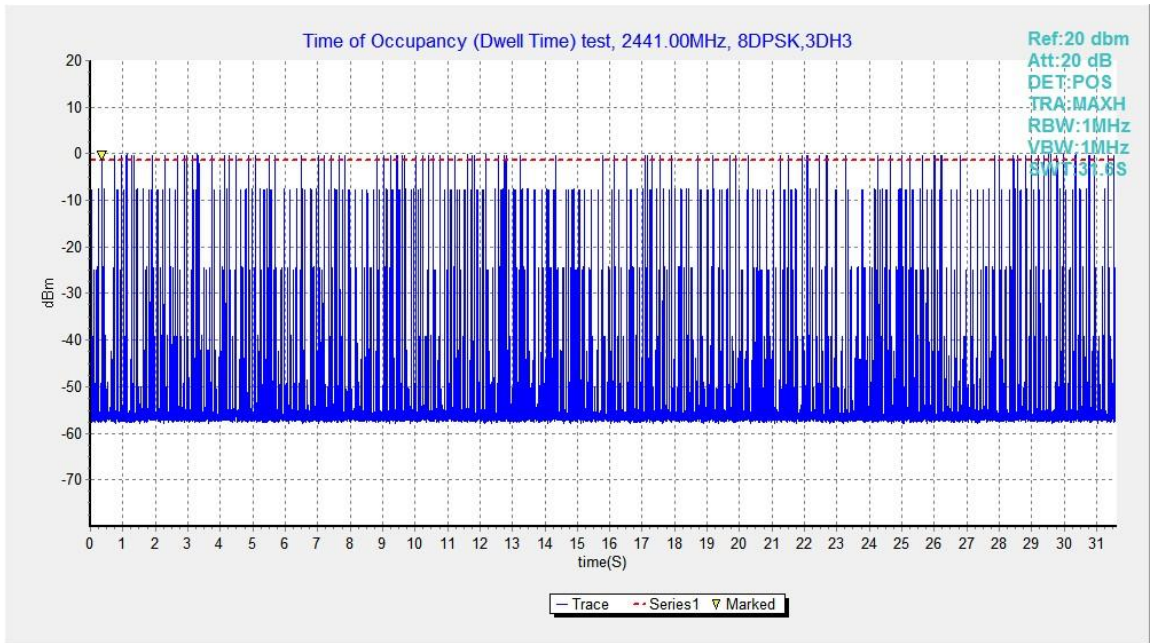


Fig.79. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

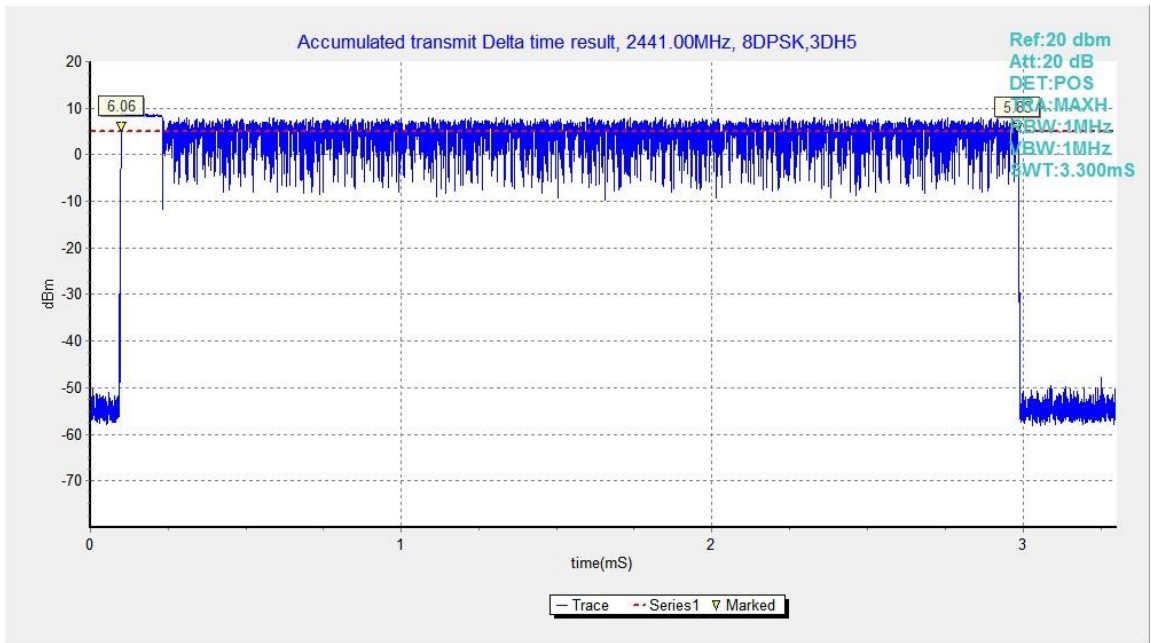


Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

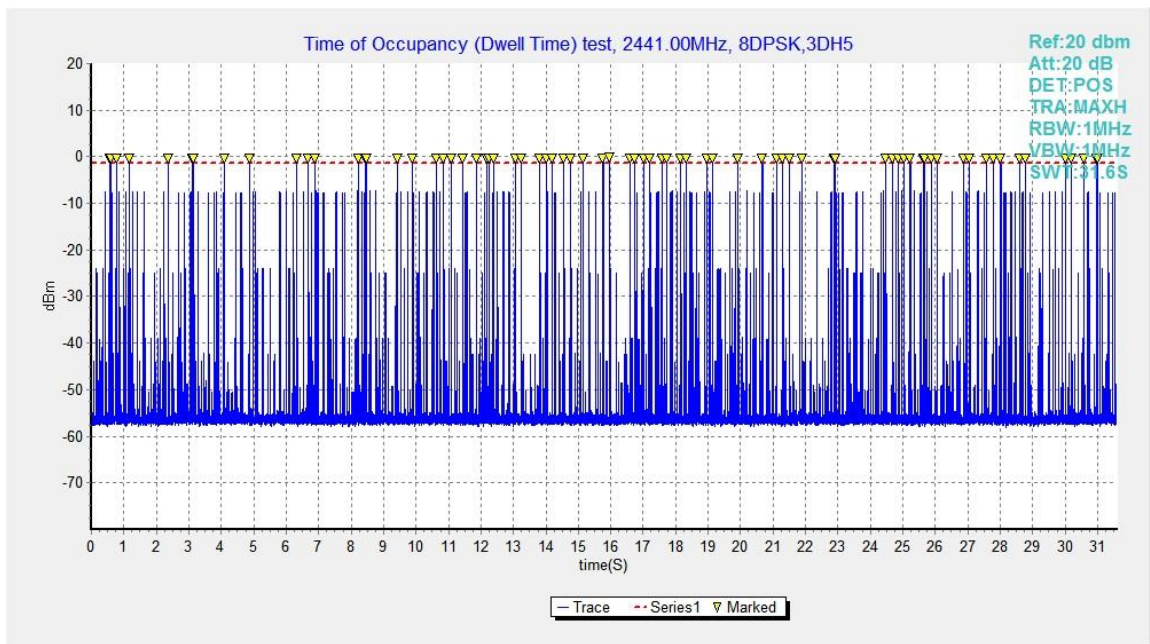


Fig.81. Number of Transmissions Measurement: Channel 39,Packet 3-DH5

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	940.50	NA
39	Fig.83	940.50	NA
78	Fig.84	940.50	NA

For $\pi/4$ DQPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.85	1223.25	NA
39	Fig.86	1224.00	NA
78	Fig.87	1222.50	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.88	1261.50	NA
39	Fig.89	1257.75	NA
78	Fig.90	1233.00	NA

Conclusion: NA

Test graphs as below:

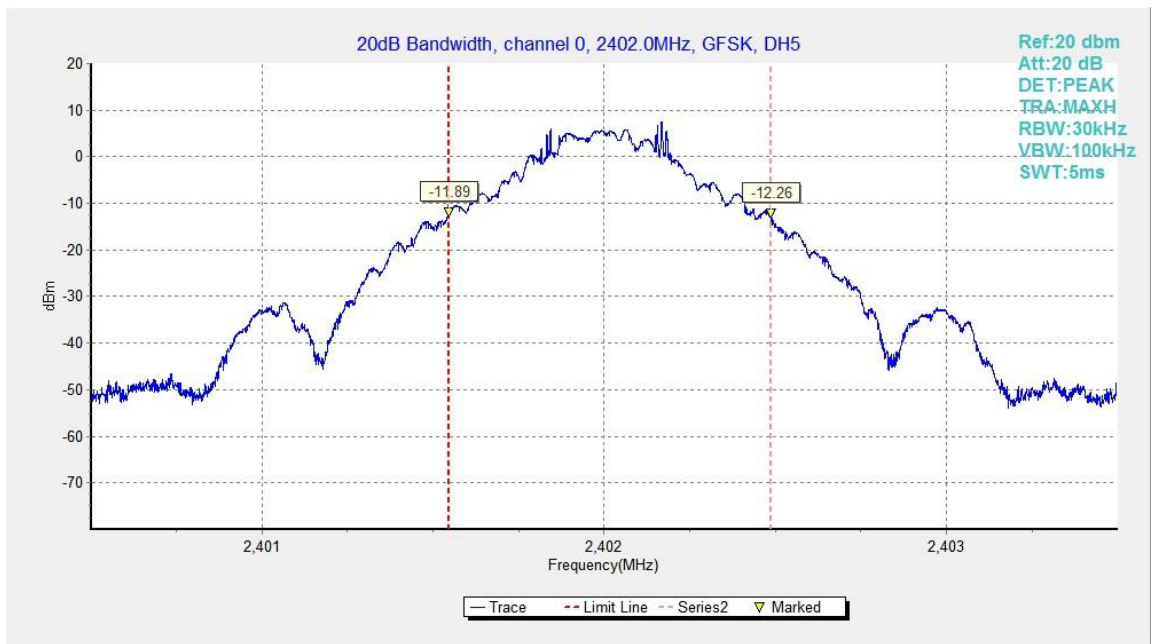


Fig.82. 20dB Bandwidth: GFSK, Channel 0

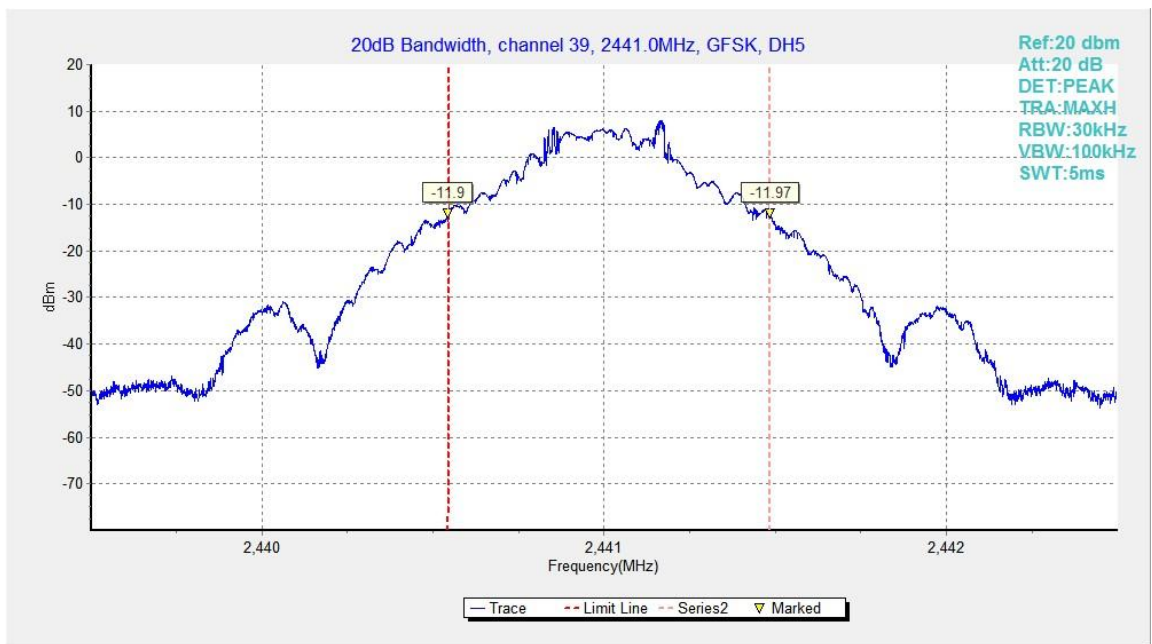


Fig.83. 20dB Bandwidth: GFSK, Channel 39

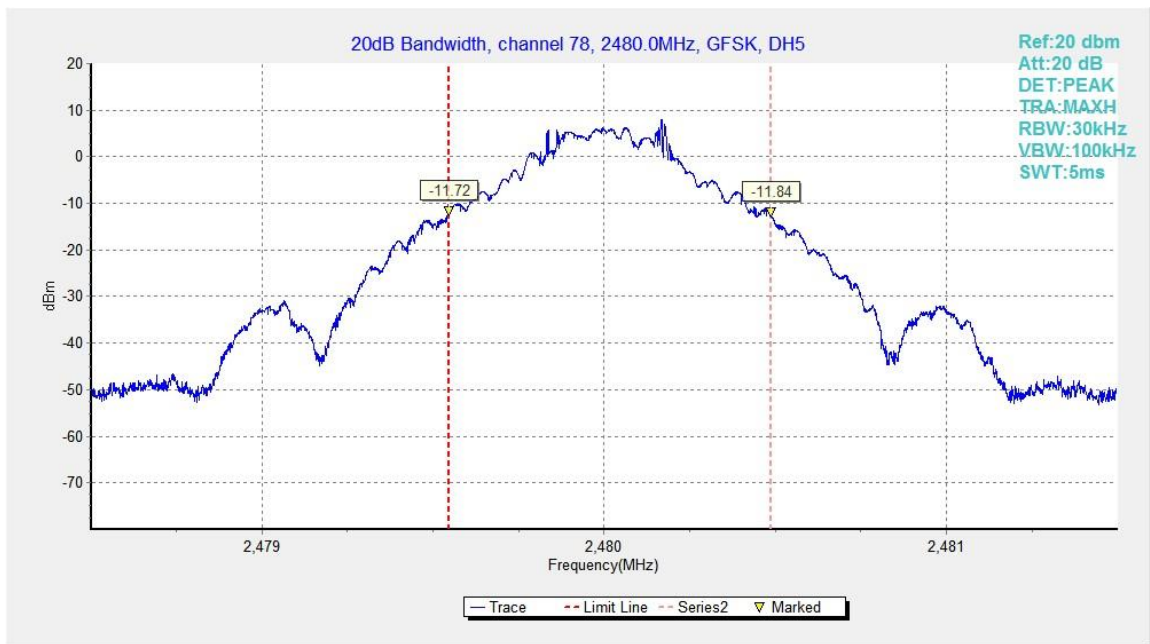


Fig.84. 20dB Bandwidth: GFSK, Channel 78

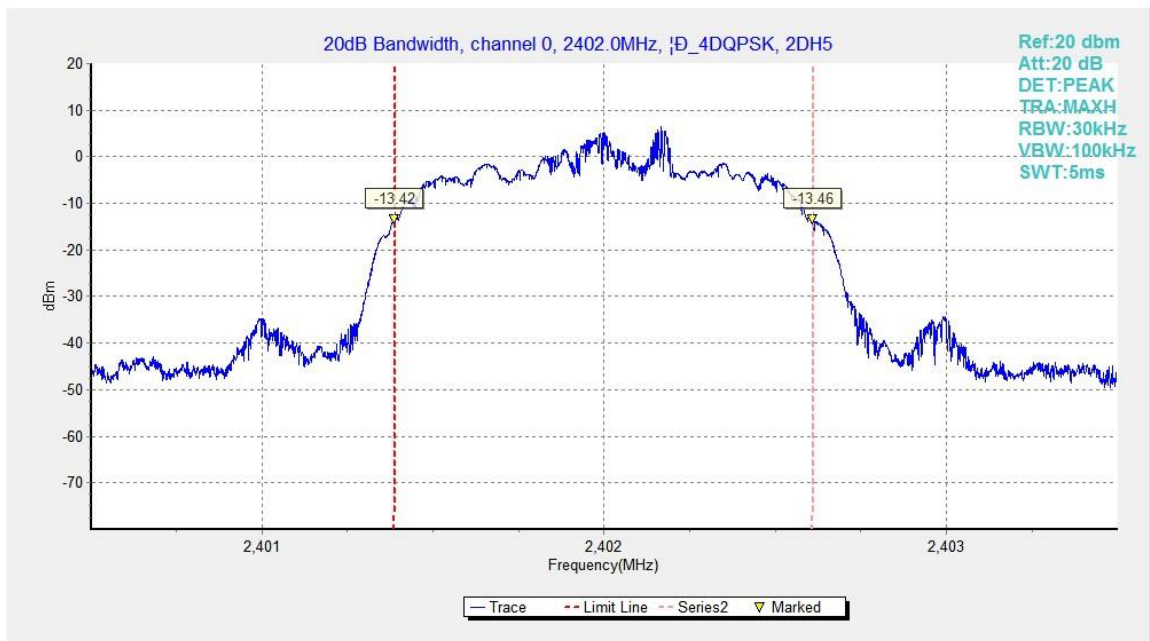


Fig.85. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0

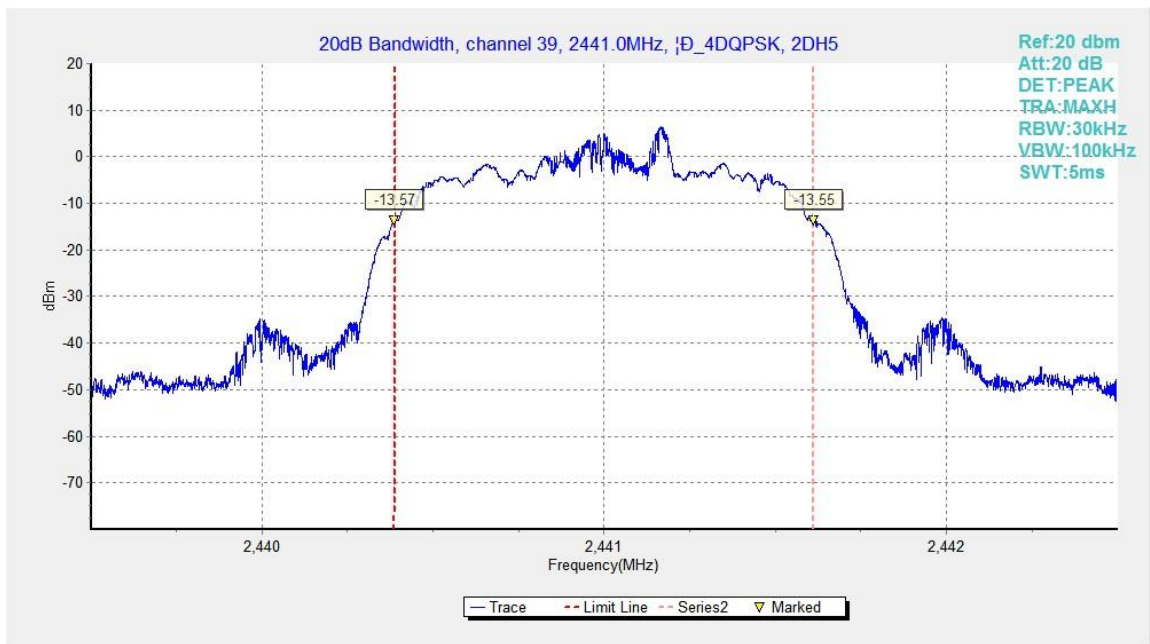


Fig.86. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39

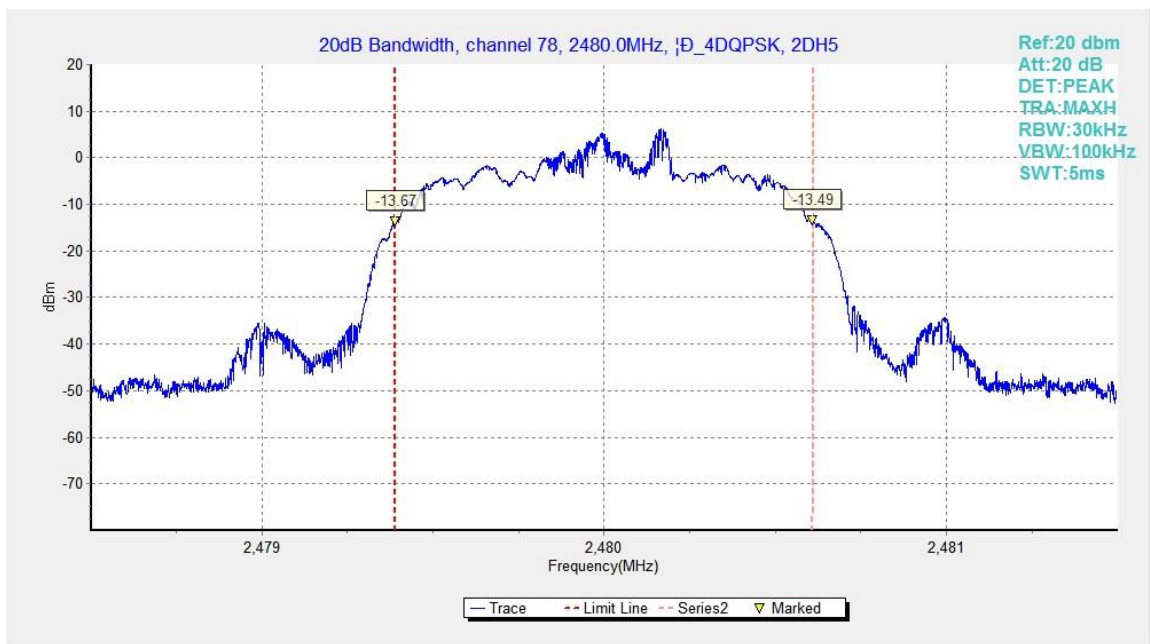


Fig.87. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78

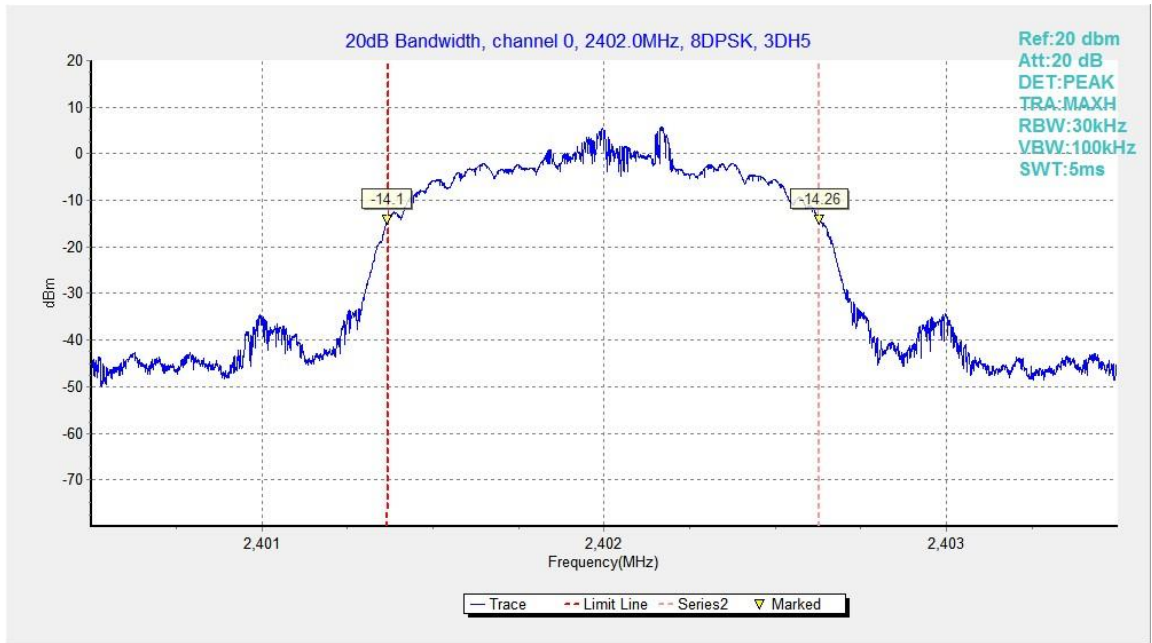


Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

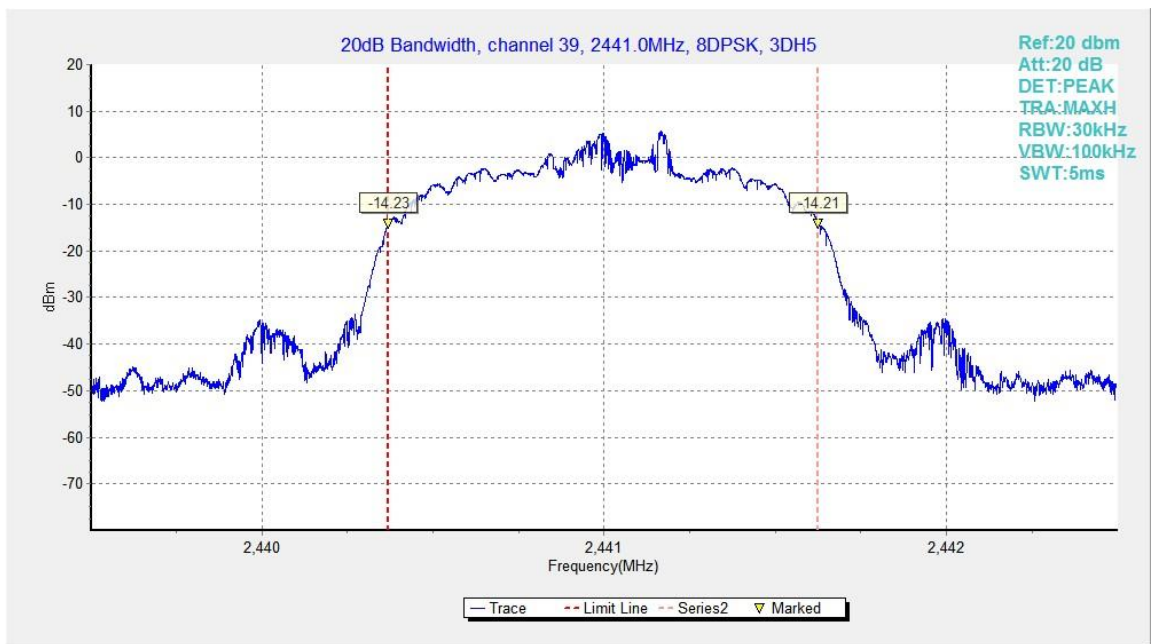


Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

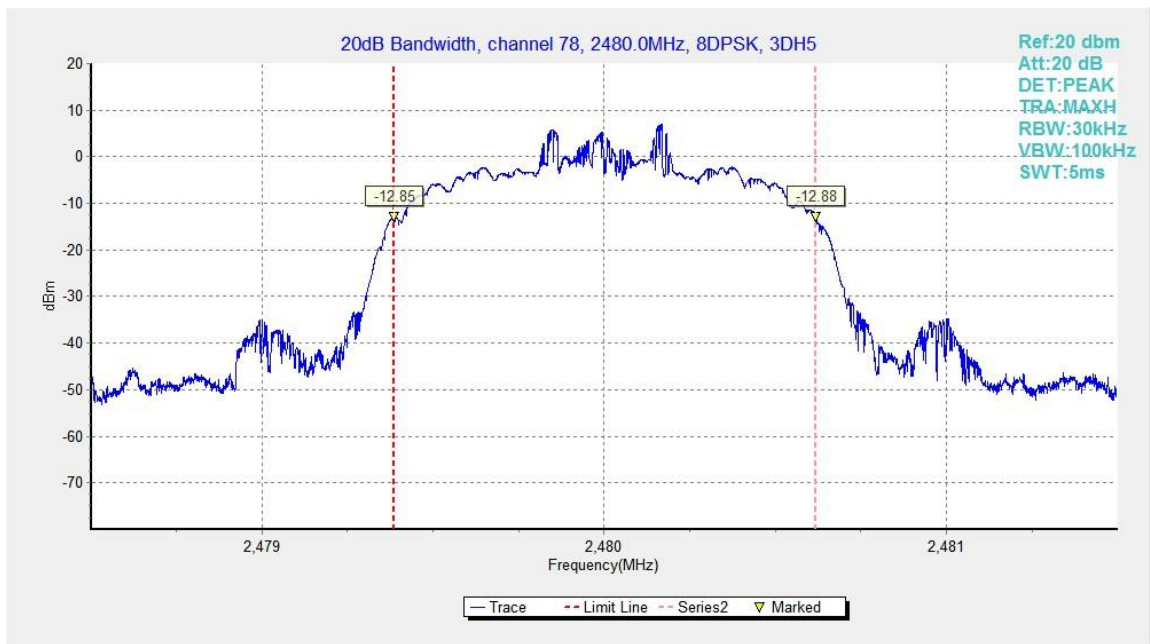


Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

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 $(2/3) * 20\text{dB}$ bandwidth, whichever is greater.

Measurement Limit:

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

Measurement Result:

For GFSK

Channel	Carrier frequency separation (kHz)	Conclusion	
39	Fig.91	1008.75	P

For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)	Conclusion	
39	Fig.92	985.50	P

For 8DPSK

Channel	Carrier frequency separation (kHz)	Conclusion	
39	Fig.93	1035.75	P

Conclusion: PASS

Test graphs as below:

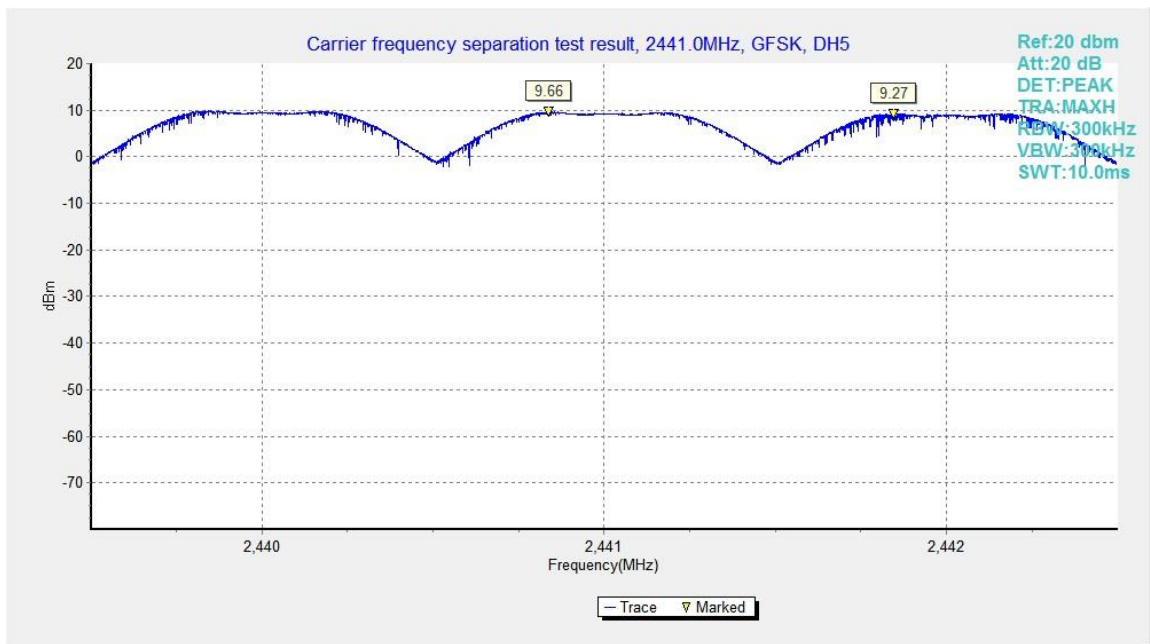


Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

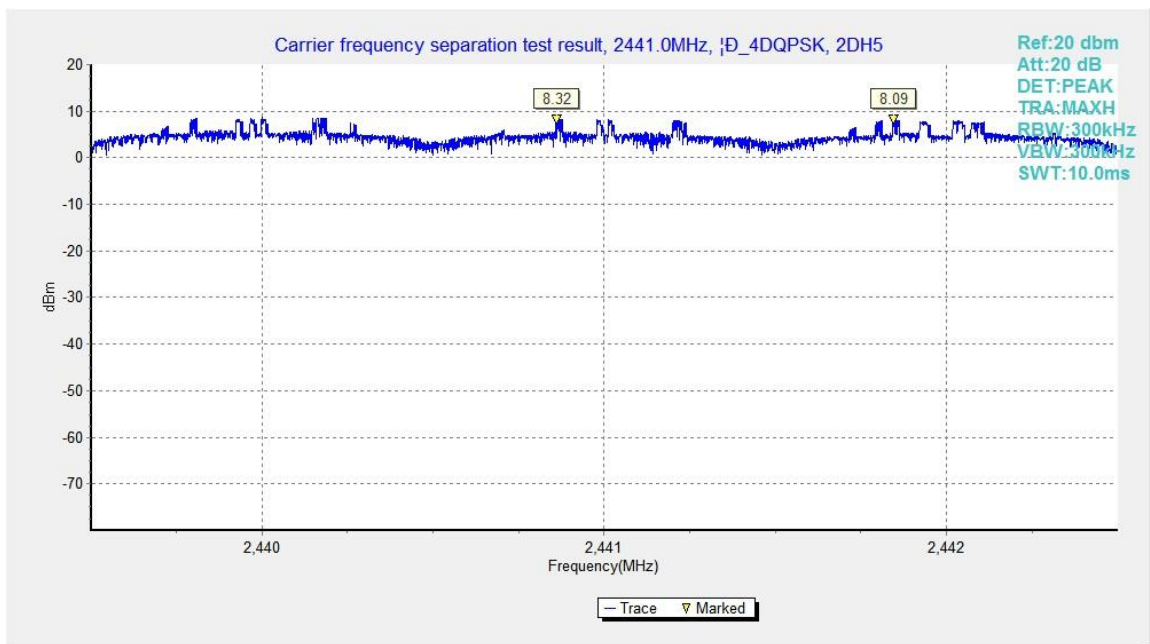


Fig.92. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39

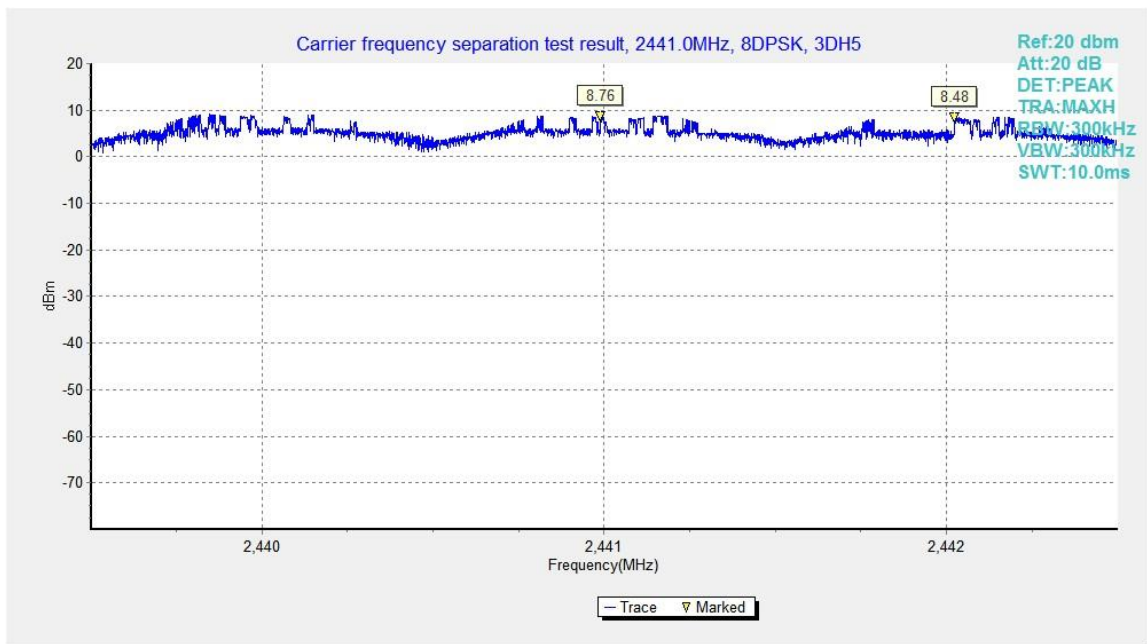


Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

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		

For $\pi/4$ 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:

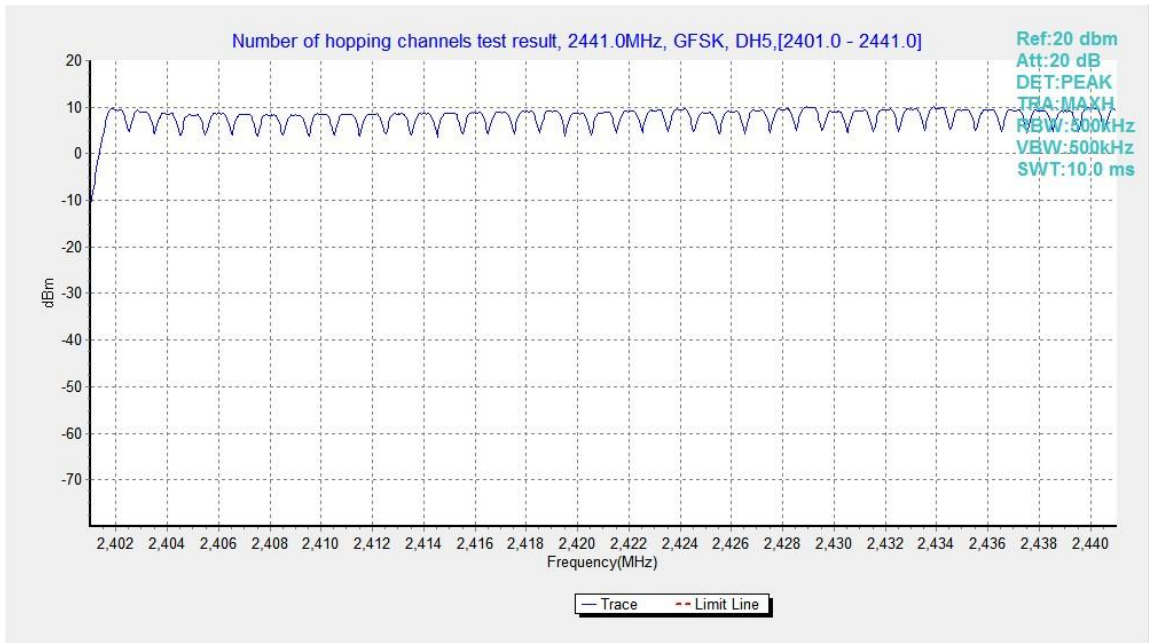


Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

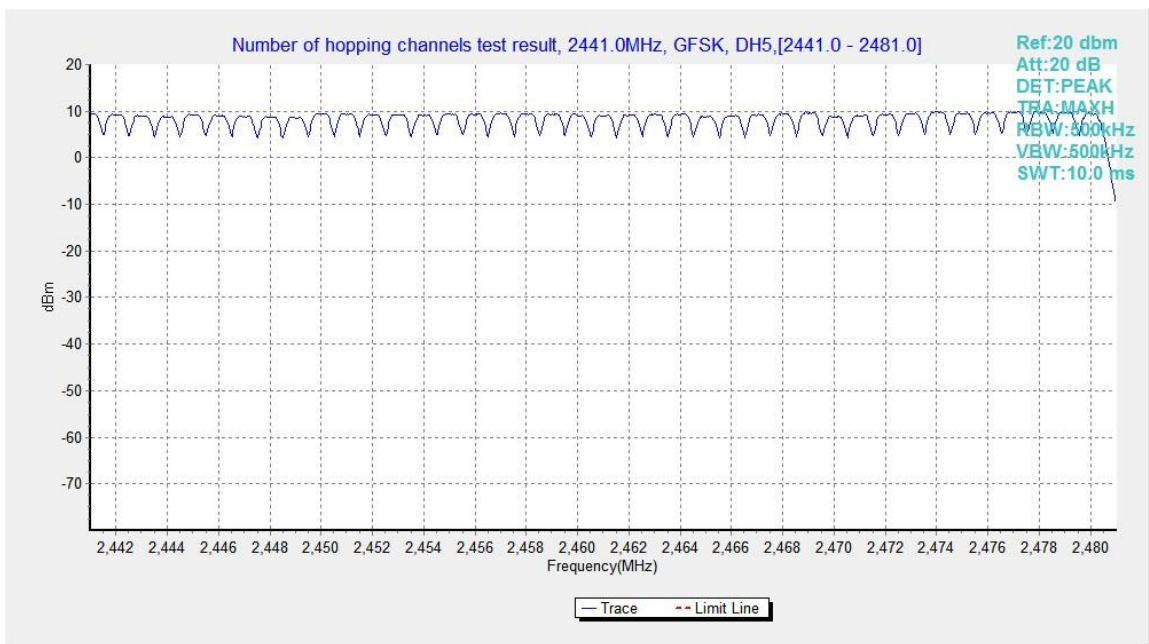


Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

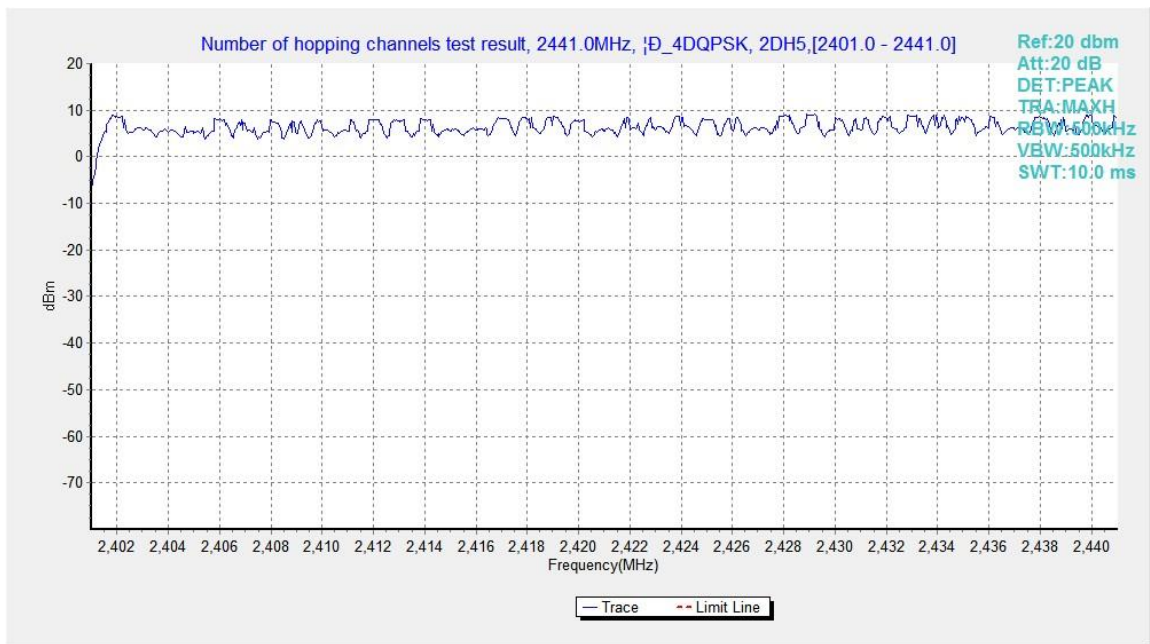


Fig.96. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39

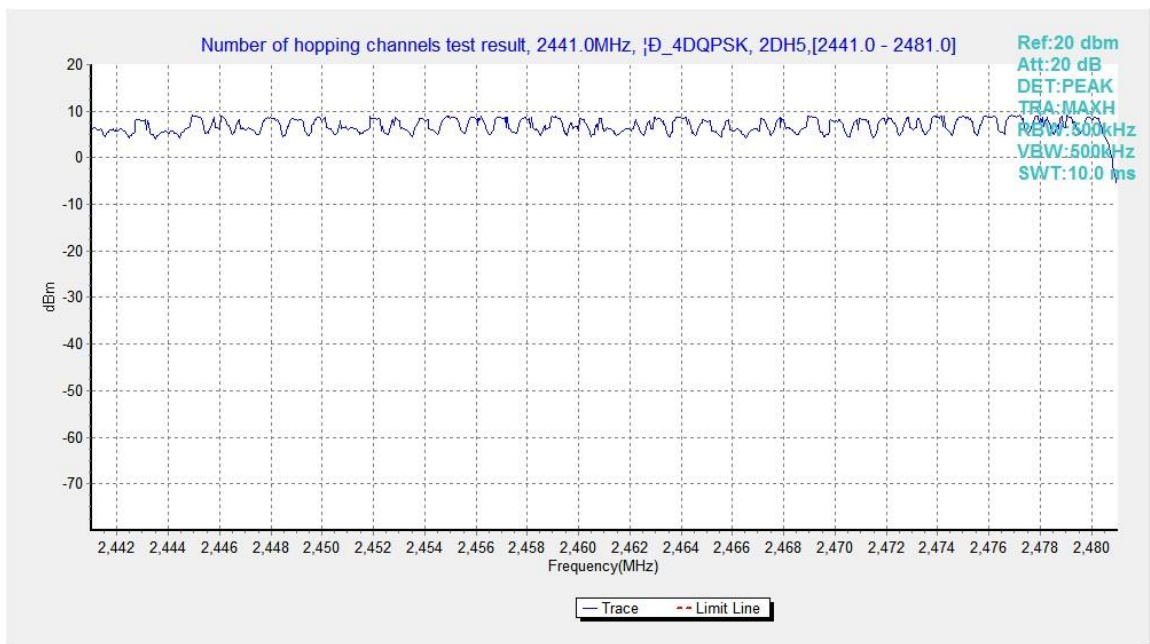


Fig.97. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78

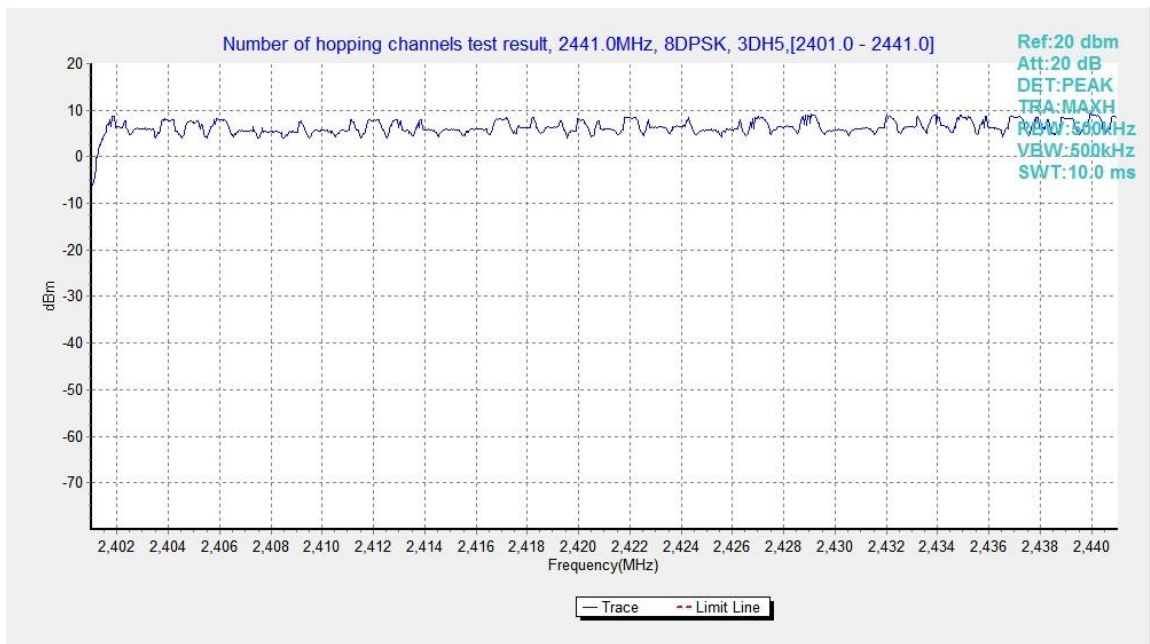


Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

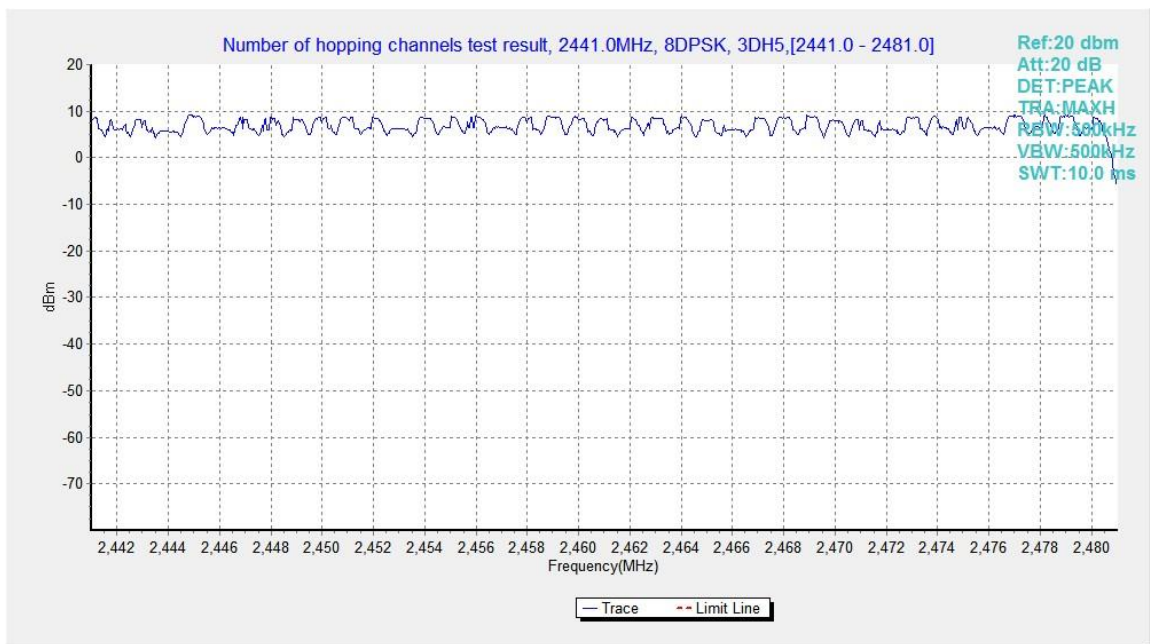


Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

B.11. AC Powerline Conducted Emission

Method of Measurement:

See Clause 6.2 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 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.

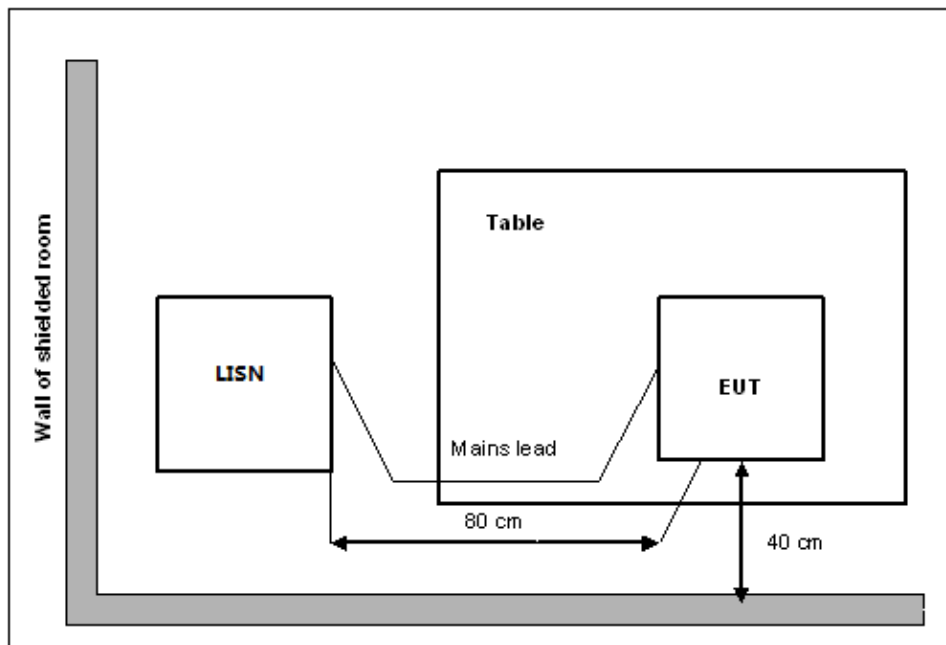
The measurement bandwidth is:

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: UT18a

Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		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 (dB μ V)	Result (dB μ V)		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:

Note: The measurement results showed here are worst cases.

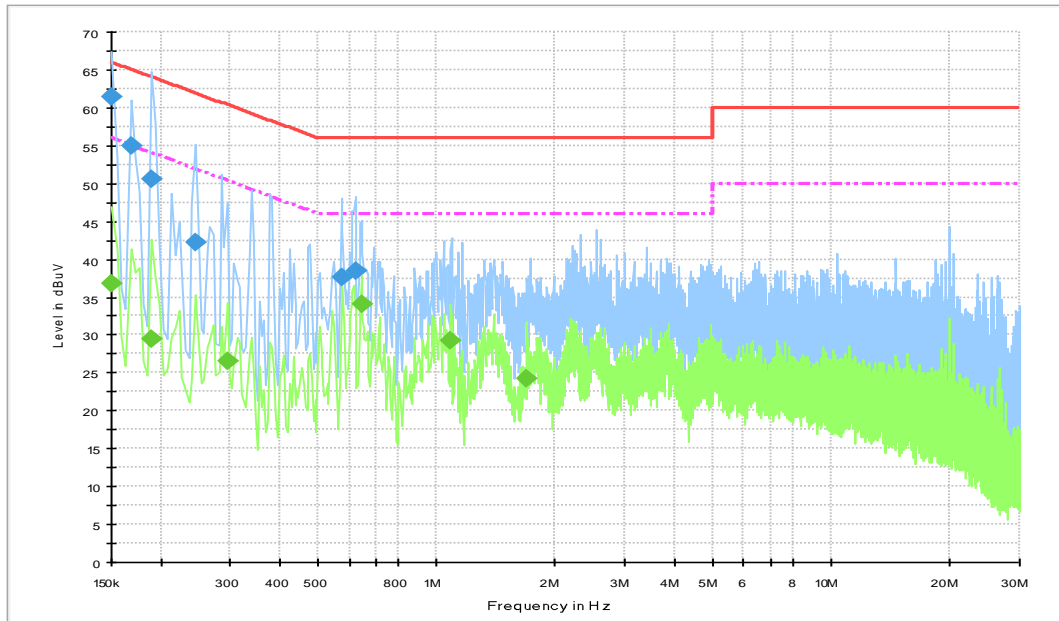


Fig.B.11.1 AC Powerline Conducted Emission- bluetooth

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	61.4	1000.0	9.000	On	L1	28.6	4.6	66.0
0.168000	55.0	1000.0	9.000	On	L1	25.1	10.0	65.1
0.190500	50.5	1000.0	9.000	On	N	21.2	13.5	64.0
0.244500	42.2	1000.0	9.000	On	L1	19.7	19.8	61.9
0.573000	37.7	1000.0	9.000	On	L1	19.8	18.3	56.0
0.622500	38.5	1000.0	9.000	On	L1	19.7	17.5	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	36.9	1000.0	9.000	On	L1	28.6	19.1	56.0
0.190500	29.5	1000.0	9.000	On	N	21.2	24.5	54.0
0.294000	26.5	1000.0	9.000	On	N	19.7	23.9	50.4
0.645000	34.1	1000.0	9.000	On	N	19.7	11.9	46.0
1.086000	29.3	1000.0	9.000	On	L1	19.6	16.7	46.0
1.698000	24.2	1000.0	9.000	On	N	19.6	21.8	46.0

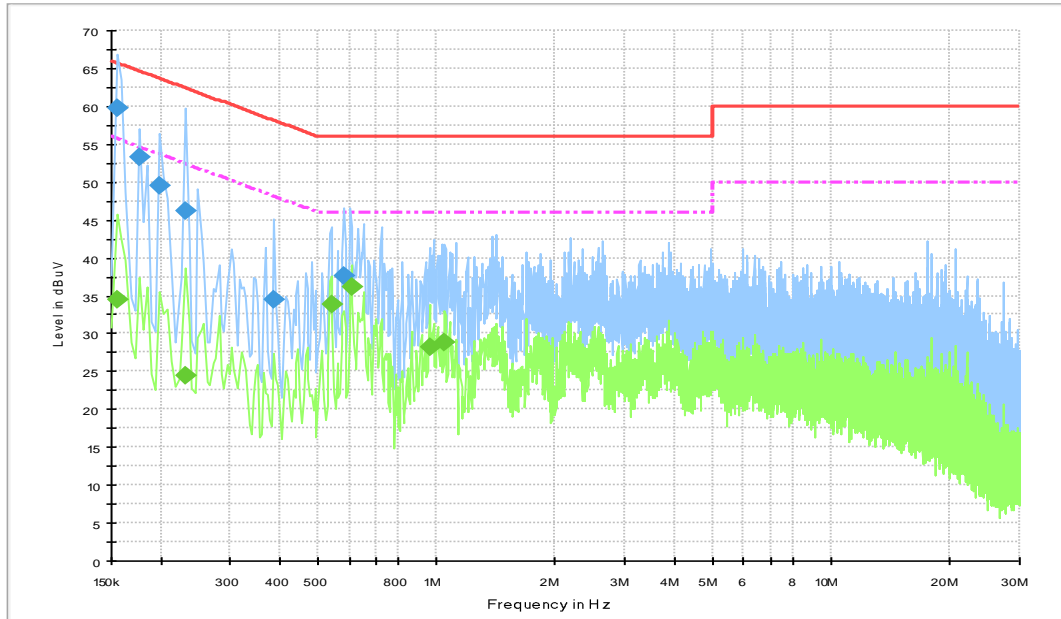


Fig.B.11.2 AC Powerline Conducted Emission-Idle

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	59.7	1000.0	9.000	On	L1	27.7	6.1	65.8
0.177000	53.3	1000.0	9.000	On	L1	23.5	11.3	64.6
0.199500	49.6	1000.0	9.000	On	N	19.8	14.0	63.6
0.231000	46.2	1000.0	9.000	On	N	19.7	16.2	62.4
0.388500	34.6	1000.0	9.000	On	L1	19.7	23.5	58.1
0.582000	37.6	1000.0	9.000	On	L1	19.7	18.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	34.4	1000.0	9.000	On	L1	27.7	21.3	55.8
0.231000	24.5	1000.0	9.000	On	L1	19.7	27.9	52.4
0.541500	34.0	1000.0	9.000	On	L1	19.8	12.0	46.0
0.609000	36.1	1000.0	9.000	On	N	19.7	9.9	46.0
0.960000	28.3	1000.0	9.000	On	N	19.7	17.7	46.0
1.050000	28.9	1000.0	9.000	On	L1	19.6	17.1	46.0

ANNEX C: Accreditation Certificate

United States Department of Commerce
National Institute of Standards and Technology

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




For the National Voluntary Laboratory Accreditation Program

END OF REPORT