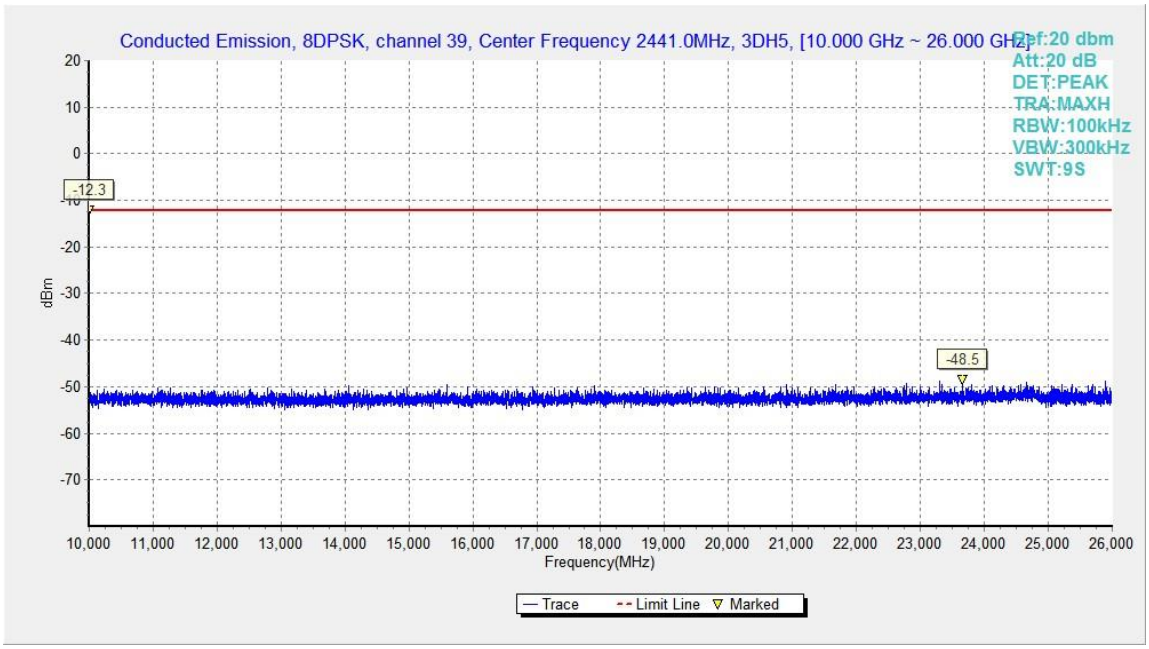



Fig.58. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

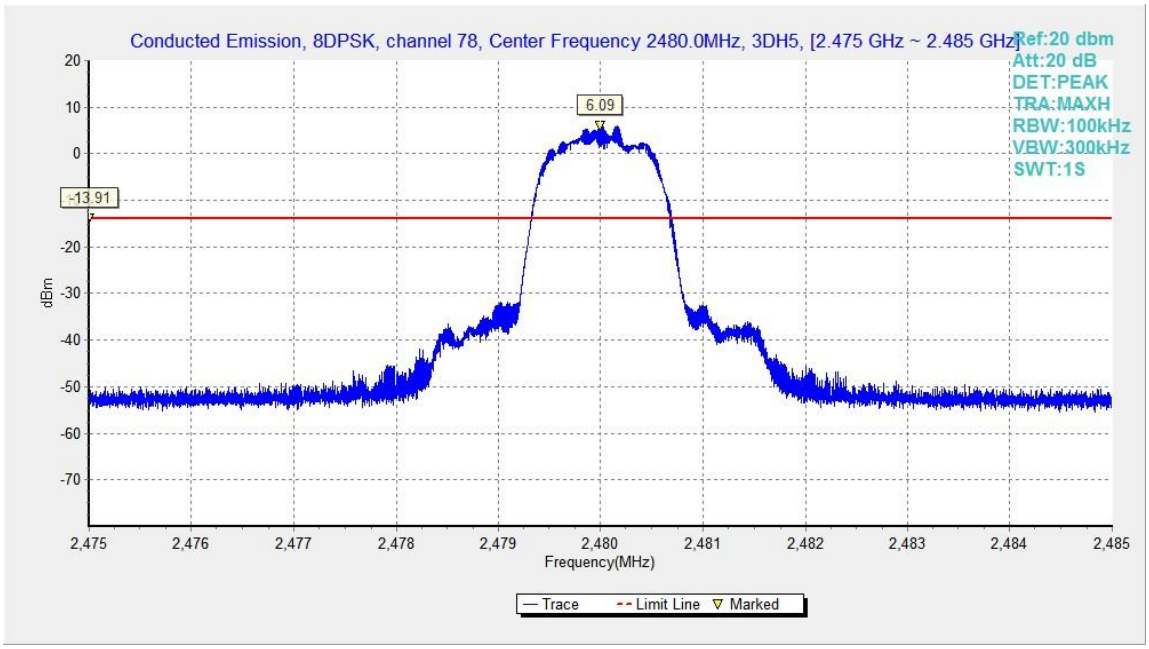



Fig.59. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

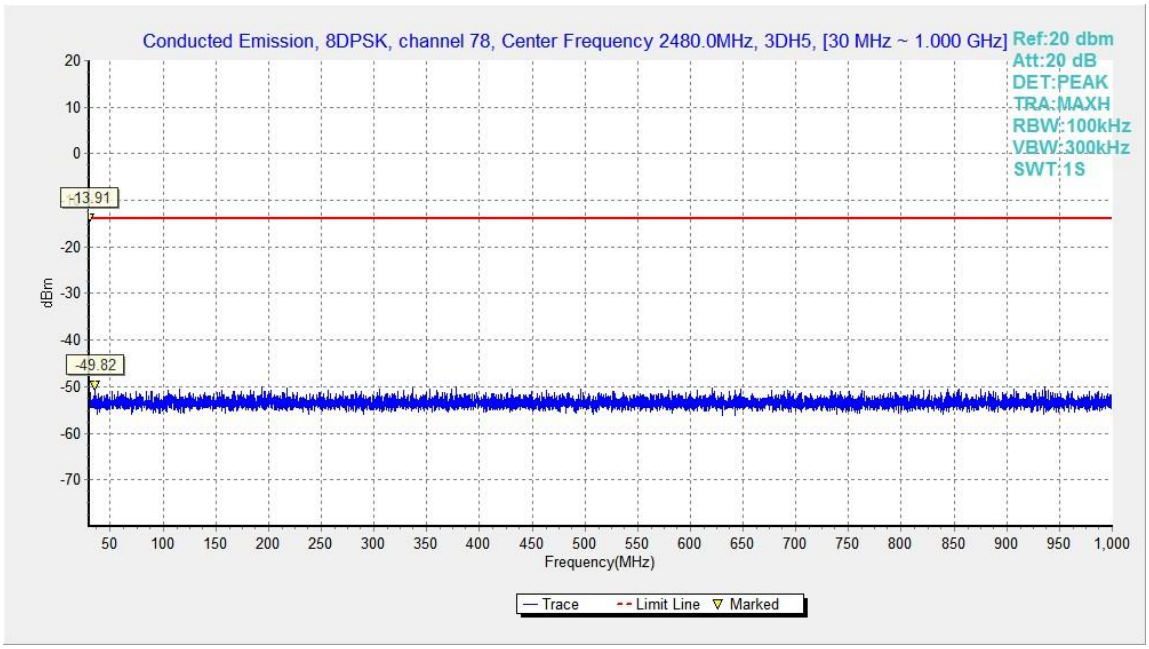



Fig.60. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

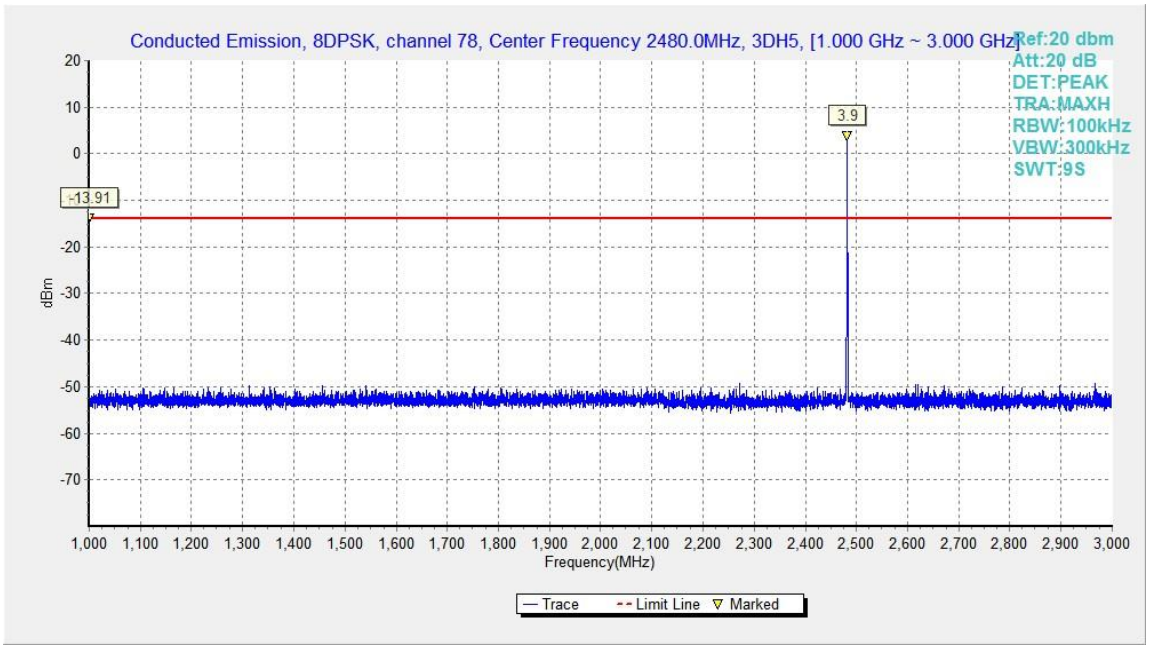



Fig.61. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

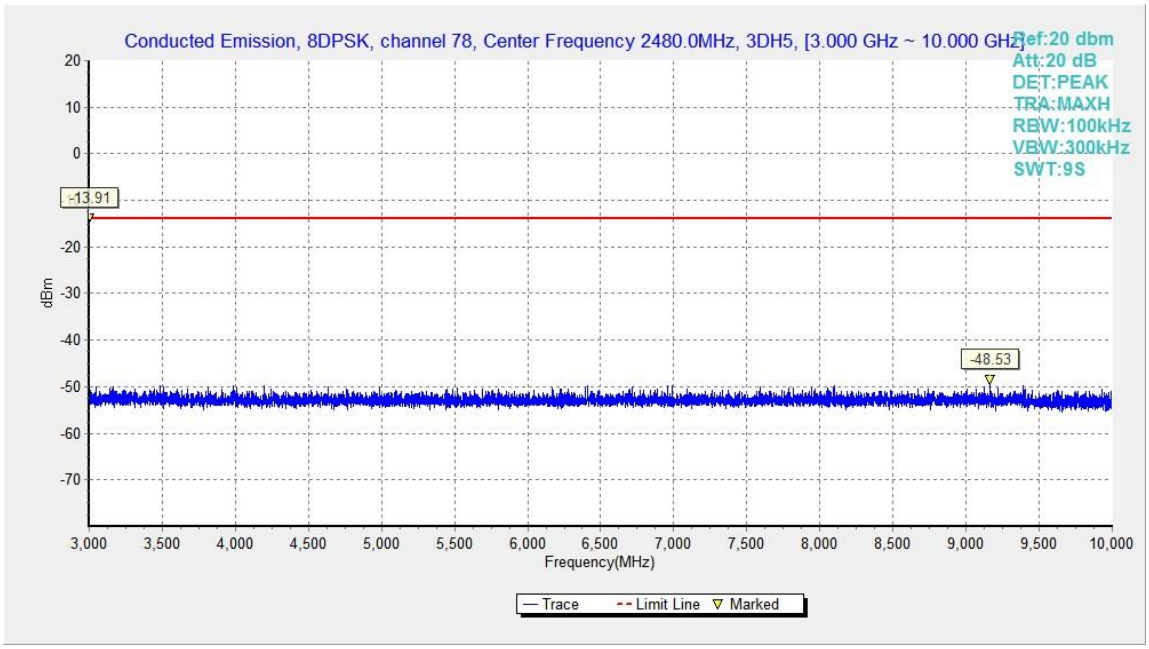



Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

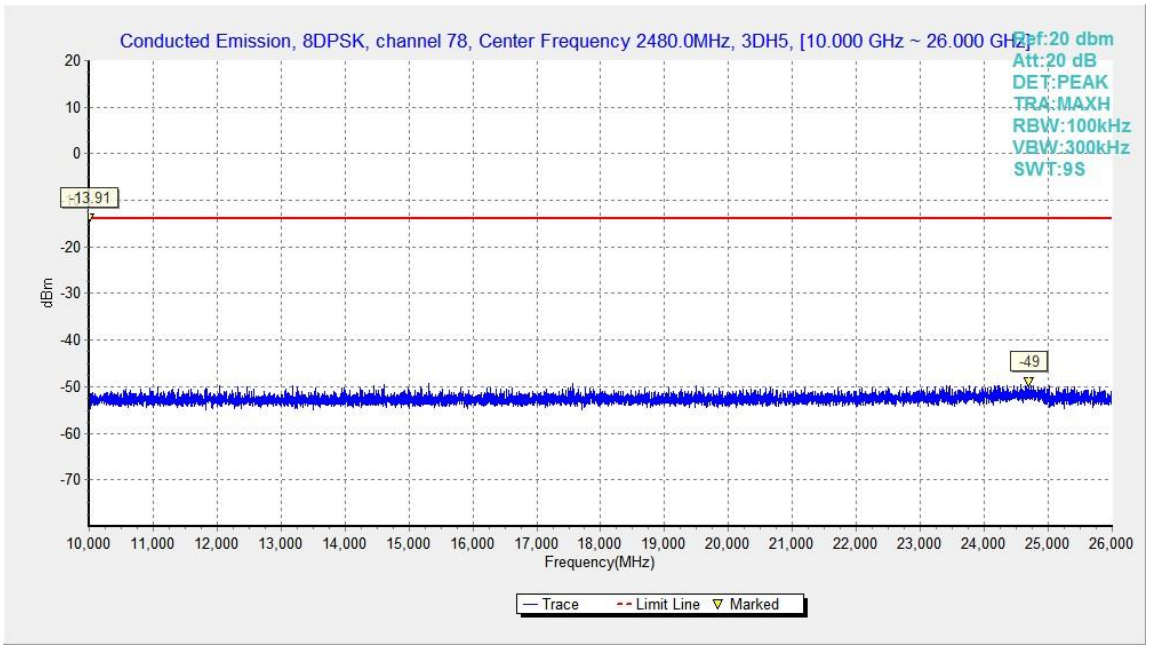



Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

## 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:

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) |
|---|---|---|---|---|---|---|---|
| 17980.500 | 57.18 | -25.50 | 46.70 | 35.98 | 74.00 | 16.82 | V |
| 14406.500 | 51.84 | -28.60 | 42.50 | 37.94 | 74.00 | 22.16 | H |
| 12796.500 | 47.94 | -30.70 | 39.10 | 39.44 | 74.00 | 26.06 | H |
| 8659.500 | 45.06 | -34.40 | 37.90 | 41.46 | 74.00 | 28.94 | H |
| 7959.000 | 43.81 | -34.80 | 37.10 | 41.51 | 74.00 | 30.19 | V |
| 2377.200 | 54.94 | -20.00 | 28.10 | 46.94 | 74.00 | 19.06 | 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) |
|---|---|---|---|---|---|---|---|
| 17986.500 | 56.70 | -25.50 | 46.70 | 35.50 | 74.00 | 17.30 | V |
| 14500.500 | 51.62 | -28.60 | 42.50 | 37.72 | 74.00 | 22.38 | H |
| 12929.500 | 47.37 | -30.50 | 39.20 | 38.67 | 74.00 | 26.63 | V |
| 6647.000 | 46.40 | -35.60 | 35.40 | 46.60 | 74.00 | 27.60 | V |
| 8341.500 | 45.59 | -34.50 | 37.70 | 42.39 | 74.00 | 28.41 | H |
| 4930.500 | 39.81 | -37.10 | 33.30 | 43.61 | 74.00 | 34.19 | 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) |
|---|---|---|---|---|---|---|---|
| 17906.500 | 56.44 | -25.50 | 46.70 | 35.24 | 74.00 | 17.56 | H |
| 14352.500 | 51.69 | -28.40 | 42.30 | 37.79 | 74.00 | 22.31 | V |
| 12682.000 | 47.31 | -30.50 | 39.10 | 38.71 | 74.00 | 26.69 | H |
| 9829.500 | 44.96 | -33.50 | 38.00 | 40.46 | 74.00 | 29.04 | H |
| 7909.000 | 43.76 | -34.90 | 37.10 | 41.56 | 74.00 | 30.24 | H |
| 2494.300 | 54.58 | -20.00 | 28.30 | 46.28 | 74.00 | 19.42 | 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) |
|---|---|---|---|---|---|---|---|
| 17979.000 | 57.30 | -25.50 | 46.70 | 36.10 | 74.00 | 16.70 | V |
| 14309.500 | 51.15 | -28.40 | 42.30 | 37.25 | 74.00 | 22.85 | H |
| 12905.000 | 47.71 | -30.50 | 39.20 | 39.01 | 74.00 | 26.29 | V |
| 5323.500 | 46.45 | -37.00 | 34.00 | 49.45 | 74.00 | 27.55 | V |
| 9204.500 | 44.98 | -33.70 | 38.00 | 40.68 | 74.00 | 29.02 | H |
| 2351.800 | 54.87 | -20.10 | 28.00 | 46.97 | 74.00 | 19.13 | 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) |
|---|---|---|---|---|---|---|---|
| 17993.000 | 57.87 | -25.50 | 46.70 | 36.67 | 74.00 | 16.13 | H |
| 14026.500 | 51.91 | -29.40 | 41.70 | 39.71 | 74.00 | 22.09 | H |
| 12619.500 | 48.18 | -31.00 | 39.00 | 40.28 | 74.00 | 25.82 | V |
| 9148.500 | 45.89 | -33.80 | 38.10 | 41.69 | 74.00 | 28.11 | V |
| 6663.000 | 44.34 | -35.60 | 35.40 | 44.54 | 74.00 | 29.66 | V |
| 4633.500 | 39.64 | -37.50 | 32.80 | 44.34 | 74.00 | 34.36 | 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) |
|---|---|---|---|---|---|---|---|
| 17964.000 | 56.78 | -25.50 | 46.70 | 35.58 | 74.00 | 17.22 | H |
| 14090.500 | 51.56 | -29.40 | 41.70 | 39.36 | 74.00 | 22.44 | H |
| 12773.500 | 47.19 | -30.70 | 39.10 | 38.69 | 74.00 | 26.81 | H |
| 8488.000 | 45.18 | -34.40 | 37.80 | 41.78 | 74.00 | 28.82 | V |
| 7662.000 | 43.67 | -34.70 | 36.90 | 41.37 | 74.00 | 30.33 | V |
| 2499.500 | 55.07 | -20.00 | 28.40 | 46.67 | 74.00 | 18.93 | 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) |
|---|---|---|---|---|---|---|---|
| 17959.500 | 56.59 | -25.50 | 46.70 | 35.39 | 74.00 | 17.41 | H |
| 14360.000 | 51.86 | -28.40 | 42.30 | 37.96 | 74.00 | 22.14 | V |
| 12657.000 | 47.66 | -30.50 | 39.10 | 39.06 | 74.00 | 26.34 | V |
| 8978.000 | 45.63 | -33.30 | 38.20 | 40.73 | 74.00 | 28.37 | V |
| 7519.000 | 43.98 | -34.50 | 36.80 | 41.68 | 74.00 | 30.02 | H |
| 2387.400 | 55.24 | -20.00 | 28.10 | 47.24 | 74.00 | 18.76 | 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) |
|---|---|---|---|---|---|---|---|
| 17955.000 | 56.48 | -25.50 | 46.70 | 35.28 | 74.00 | 17.52 | H |
| 14380.000 | 51.49 | -28.40 | 42.30 | 37.59 | 74.00 | 22.51 | V |
| 12955.500 | 47.74 | -30.50 | 39.20 | 39.04 | 74.00 | 26.26 | H |
| 9356.500 | 45.38 | -33.90 | 38.00 | 41.28 | 74.00 | 28.62 | V |
| 7462.500 | 44.21 | -35.20 | 36.70 | 42.61 | 74.00 | 29.79 | H |
| 4868.500 | 39.97 | -37.20 | 33.20 | 43.97 | 74.00 | 34.03 | 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) |
|---|---|---|---|---|---|---|---|
| 17996.500 | 57.37 | -25.50 | 46.70 | 36.17 | 74.00 | 16.63 | V |
| 14392.500 | 51.64 | -28.60 | 42.50 | 37.74 | 74.00 | 22.36 | H |
| 11763.500 | 47.35 | -32.00 | 39.00 | 40.35 | 74.00 | 26.65 | H |
| 9836.500 | 45.63 | -33.50 | 38.00 | 41.13 | 74.00 | 28.37 | V |
| 7536.000 | 44.13 | -34.50 | 36.80 | 41.83 | 74.00 | 29.87 | H |
| 2487.000 | 55.32 | -20.00 | 28.30 | 47.02 | 74.00 | 18.68 | 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) |
|---|---|---|---|---|---|---|---|
| 17994.500 | 45.65 | -25.50 | 46.70 | 24.45 | 54.00 | 8.35 | V |
| 14380.000 | 40.14 | -28.40 | 42.30 | 26.24 | 54.00 | 13.86 | V |
| 12945.500 | 35.79 | -30.50 | 39.20 | 27.09 | 54.00 | 18.21 | H |
| 9081.000 | 33.19 | -33.80 | 38.10 | 28.79 | 54.00 | 20.81 | H |
| 7903.000 | 31.79 | -34.90 | 37.10 | 29.59 | 54.00 | 22.21 | V |
| 2386.400 | 41.66 | -20.00 | 28.10 | 33.66 | 54.00 | 12.34 | 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) |
|---|---|---|---|---|---|---|---|
| 17990.000 | 45.43 | -25.50 | 46.70 | 24.23 | 54.00 | 8.57 | V |
| 14384.000 | 39.72 | -28.40 | 42.30 | 25.82 | 54.00 | 14.28 | H |
| 12632.500 | 35.84 | -31.00 | 39.00 | 27.94 | 54.00 | 18.16 | V |
| 9193.500 | 33.43 | -33.80 | 38.10 | 29.23 | 54.00 | 20.57 | V |
| 7991.500 | 32.20 | -34.80 | 37.10 | 29.90 | 54.00 | 21.80 | V |
| 4881.500 | 28.77 | -37.20 | 33.20 | 32.77 | 54.00 | 25.23 | 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) |
|---|---|---|---|---|---|---|---|
| 17988.500 | 45.39 | -25.50 | 46.70 | 24.19 | 54.00 | 8.61 | H |
| 14489.500 | 39.93 | -28.60 | 42.50 | 26.03 | 54.00 | 14.07 | V |
| 12967.500 | 35.95 | -30.50 | 39.20 | 27.25 | 54.00 | 18.05 | H |
| 9093.500 | 33.48 | -33.80 | 38.10 | 29.08 | 54.00 | 20.52 | V |
| 7995.500 | 31.99 | -34.80 | 37.10 | 29.69 | 54.00 | 22.01 | V |
| 2497.400 | 41.61 | -20.00 | 28.30 | 33.31 | 54.00 | 12.39 | 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) |
|---|---|---|---|---|---|---|---|
| 17988.000 | 45.15 | -25.50 | 46.70 | 23.95 | 54.00 | 8.85 | V |
| 14398.500 | 39.87 | -28.60 | 42.50 | 25.97 | 54.00 | 14.13 | V |
| 12945.500 | 35.94 | -30.50 | 39.20 | 27.24 | 54.00 | 18.06 | V |
| 8974.500 | 33.32 | -33.30 | 38.20 | 28.42 | 54.00 | 20.68 | V |
| 7520.500 | 31.83 | -34.50 | 36.80 | 29.53 | 54.00 | 22.17 | H |
| 2386.000 | 41.68 | -20.00 | 28.10 | 33.68 | 54.00 | 12.32 | 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) |
|---|---|---|---|---|---|---|---|
| 17986.000 | 45.55 | -25.50 | 46.70 | 24.35 | 54.00 | 8.45 | H |
| 14490.000 | 39.87 | -28.60 | 42.50 | 25.97 | 54.00 | 14.13 | V |
| 12946.000 | 35.91 | -30.50 | 39.20 | 27.21 | 54.00 | 18.09 | V |
| 9189.500 | 33.59 | -33.80 | 38.10 | 29.39 | 54.00 | 20.41 | V |
| 7937.500 | 31.85 | -34.80 | 37.10 | 29.55 | 54.00 | 22.15 | H |
| 4951.500 | 28.25 | -37.10 | 33.30 | 32.05 | 54.00 | 25.75 | 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) |
|---|---|---|---|---|---|---|---|
| 17998.000 | 45.51 | -25.50 | 46.70 | 24.31 | 54.00 | 8.49 | H |
| 14382.000 | 39.88 | -28.40 | 42.30 | 25.98 | 54.00 | 14.12 | H |
| 12855.500 | 35.75 | -30.70 | 39.10 | 27.25 | 54.00 | 18.25 | V |
| 9517.000 | 33.60 | -33.20 | 37.90 | 28.90 | 54.00 | 20.40 | V |
| 4960.000 | 32.11 | -37.10 | 33.30 | 35.91 | 54.00 | 21.89 | H |
| 2485.300 | 42.03 | -20.00 | 28.30 | 33.73 | 54.00 | 11.97 | 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) |
|---|---|---|---|---|---|---|---|
| 17982.000 | 45.44 | -25.50 | 46.70 | 24.24 | 54.00 | 8.56 | V |
| 14503.000 | 39.96 | -28.60 | 42.50 | 26.06 | 54.00 | 14.04 | V |
| 12942.000 | 35.74 | -30.50 | 39.20 | 27.04 | 54.00 | 18.26 | V |
| 9196.000 | 33.28 | -33.80 | 38.10 | 29.08 | 54.00 | 20.72 | H |
| 7977.000 | 31.97 | -34.80 | 37.10 | 29.67 | 54.00 | 22.03 | V |
| 2389.800 | 41.91 | -20.00 | 28.10 | 33.91 | 54.00 | 12.09 | 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) |
|---|---|---|---|---|---|---|---|
| 17979.000 | 45.21 | -25.50 | 46.70 | 24.01 | 54.00 | 8.79 | H |
| 14370.000 | 39.75 | -28.40 | 42.30 | 25.85 | 54.00 | 14.25 | V |
| 12643.000 | 36.04 | -31.00 | 39.00 | 28.14 | 54.00 | 17.96 | V |
| 8984.000 | 33.35 | -33.30 | 38.20 | 28.45 | 54.00 | 20.65 | H |
| 7918.000 | 32.27 | -34.90 | 37.10 | 30.07 | 54.00 | 21.73 | H |
| 4981.000 | 27.94 | -36.60 | 33.40 | 31.14 | 54.00 | 26.06 | 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) |
|---|---|---|---|---|---|---|---|
| 17999.000 | 45.37 | -25.50 | 46.70 | 24.17 | 54.00 | 8.63 | V |
| 14395.500 | 39.87 | -28.60 | 42.50 | 25.97 | 54.00 | 14.13 | H |
| 12649.500 | 35.96 | -30.50 | 39.10 | 27.36 | 54.00 | 18.04 | V |
| 9084.500 | 33.42 | -33.80 | 38.10 | 29.02 | 54.00 | 20.58 | V |
| 7553.500 | 32.00 | -35.00 | 36.90 | 30.20 | 54.00 | 22.00 | H |
| 2498.800 | 42.03 | -20.00 | 28.40 | 33.63 | 54.00 | 11.97 | V |

**Conclusion: Pass**

## B.7. Time of Occupancy (Dwell Time)

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

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

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

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

**Measurement Limit:**

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

**Measurement Result:**

**For GFSK**

| Channel | Packet | Pulse time (ms) | | Number of Transmissions | | Dwell Time (ms) | Conclusion |
|---|---|---|---|---|---|---|---|
| 39 | DH1 | Fig.64 | 0.38 | Fig.65 | 318 | 120.84 | P |
| | DH3 | Fig.66 | 1.64 | Fig.67 | 110 | 180.4 | P |
| | DH5 | Fig.68 | 2.89 | Fig.69 | 63 | 182.07 | P |

**For π/4 DQPSK**

| Channel | Packet | Pulse time (ms) | | Number of Transmissions | | Dwell Time (ms) | Conclusion |
|---|---|---|---|---|---|---|---|
| 39 | 2DH1 | Fig.70 | 0.39 | Fig.71 | 320 | 124.8 | P |
| | 2DH3 | Fig.72 | 1.64 | Fig.73 | 112 | 183.68 | P |
| | 2DH5 | Fig.74 | 2.89 | Fig.75 | 65 | 187.85 | P |

**For 8DPSK**

| Channel | Packet | Pulse time (ms) | | Number of Transmissions | | Dwell Time (ms) | Conclusion |
|---|---|---|---|---|---|---|---|
| 39 | 3DH1 | Fig.76 | 0.39 | Fig.77 | 319 | 124.41 | P |
| | 3DH3 | Fig.78 | 1.64 | Fig.79 | 114 | 186.96 | P |
| | 3DH5 | Fig.80 | 2.89 | Fig.81 | 68 | 196.52 | P |

**Conclusion: PASS**

**Test graphs as below:**

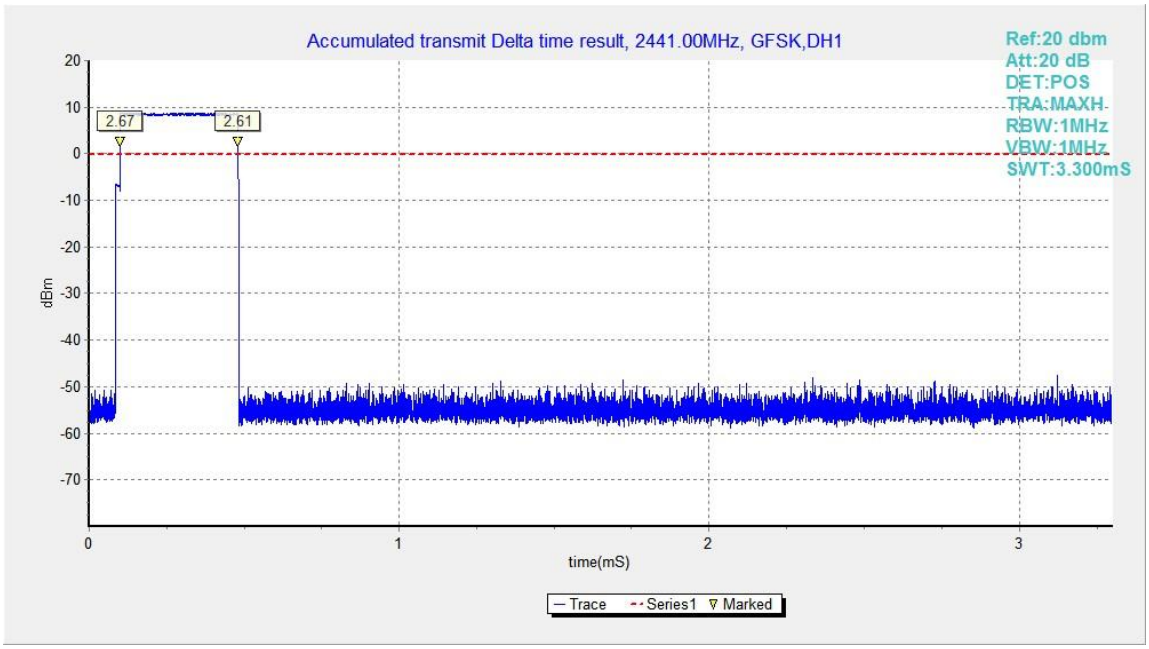



Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet DH1

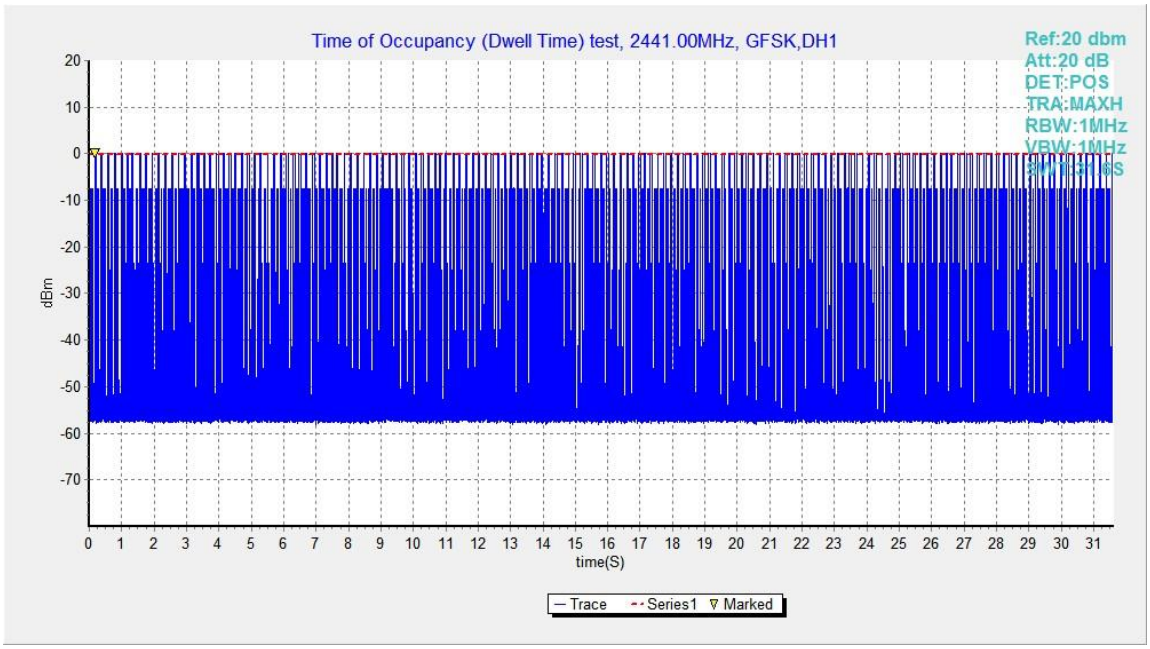



Fig.65. Number of Transmissions Measurement: Channel 39,Packet DH1

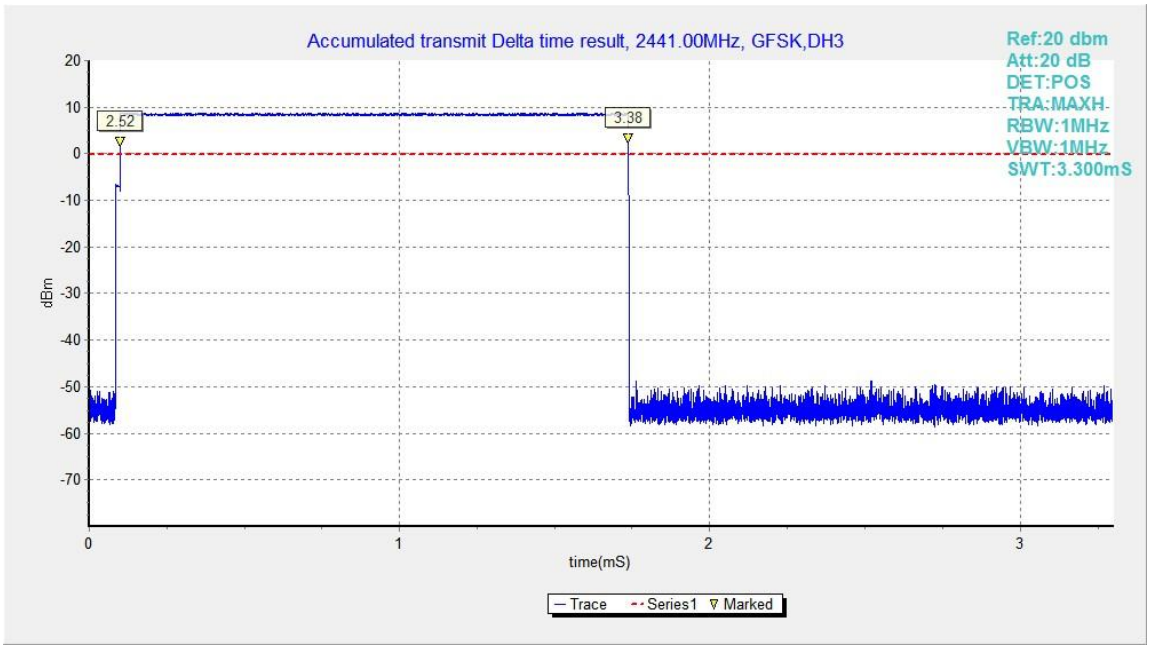



Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet DH3

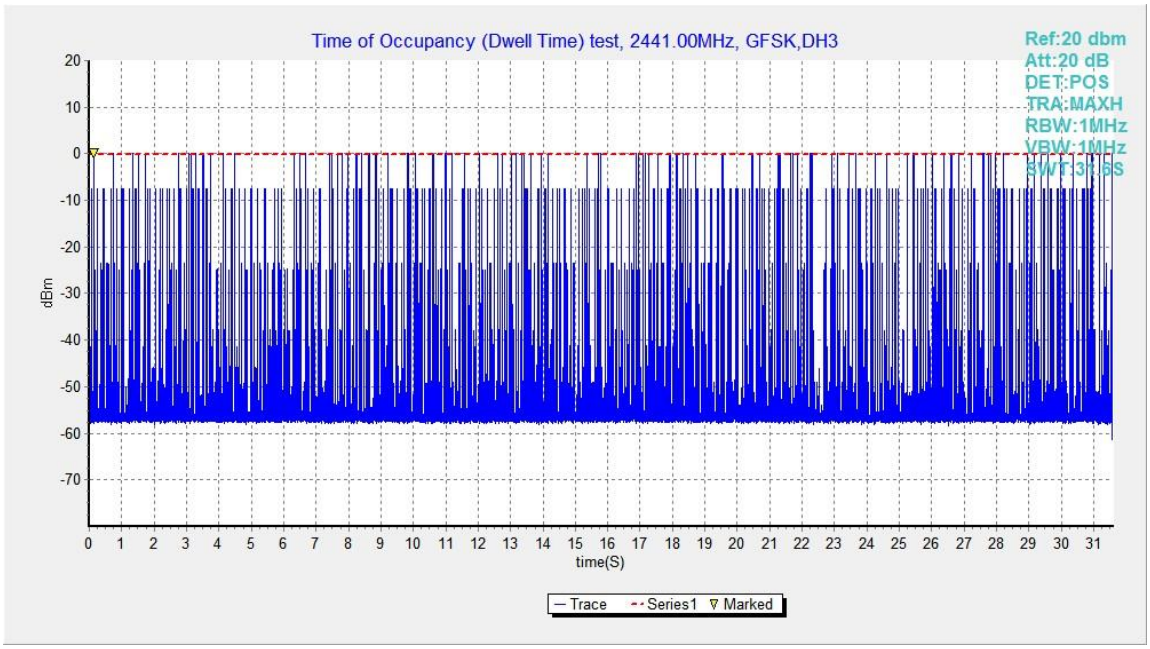



Fig.67. Number of Transmissions Measurement: Channel 39,Packet DH3

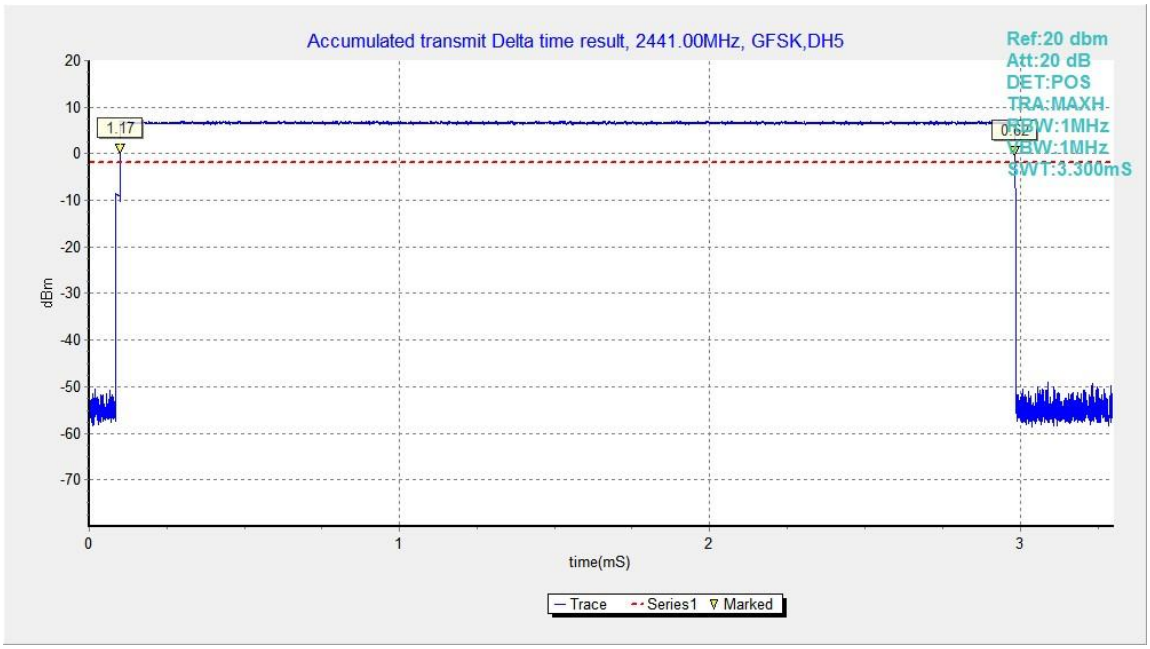



Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet DH5

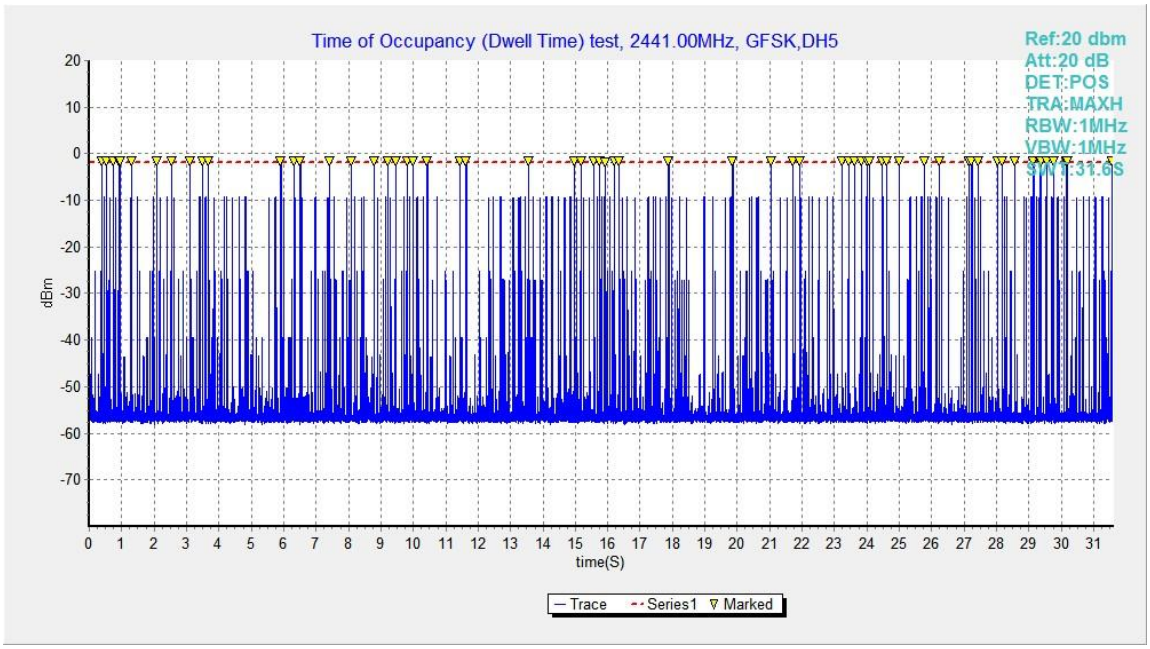



Fig.69. Number of Transmissions Measurement: Channel 39,Packet DH5

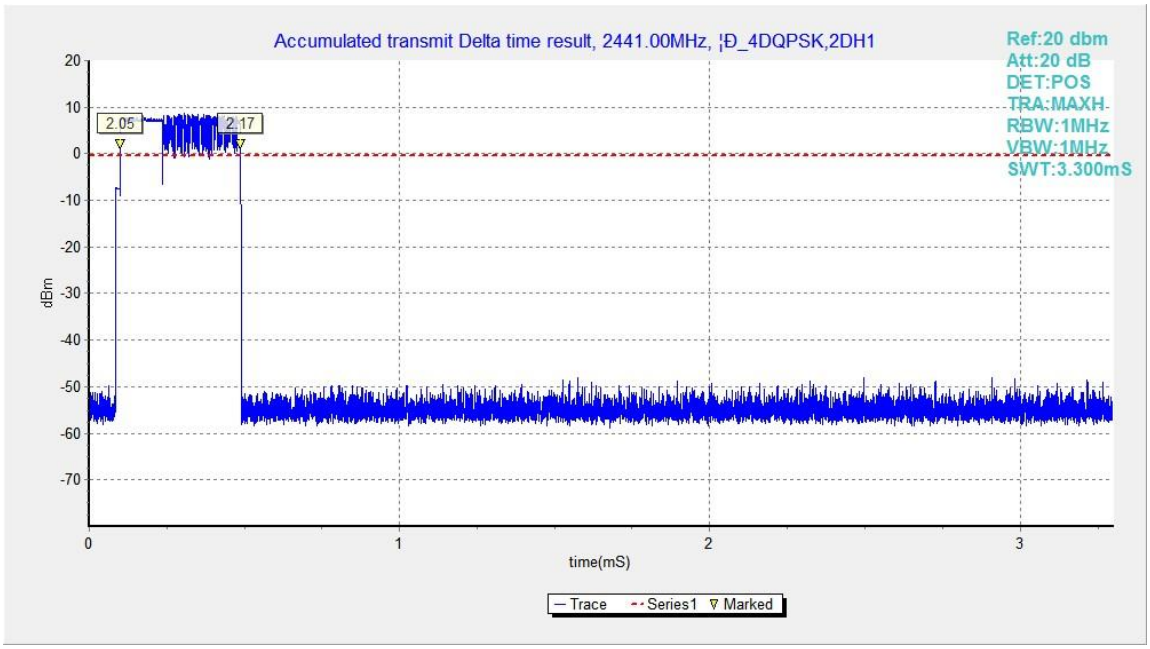



Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

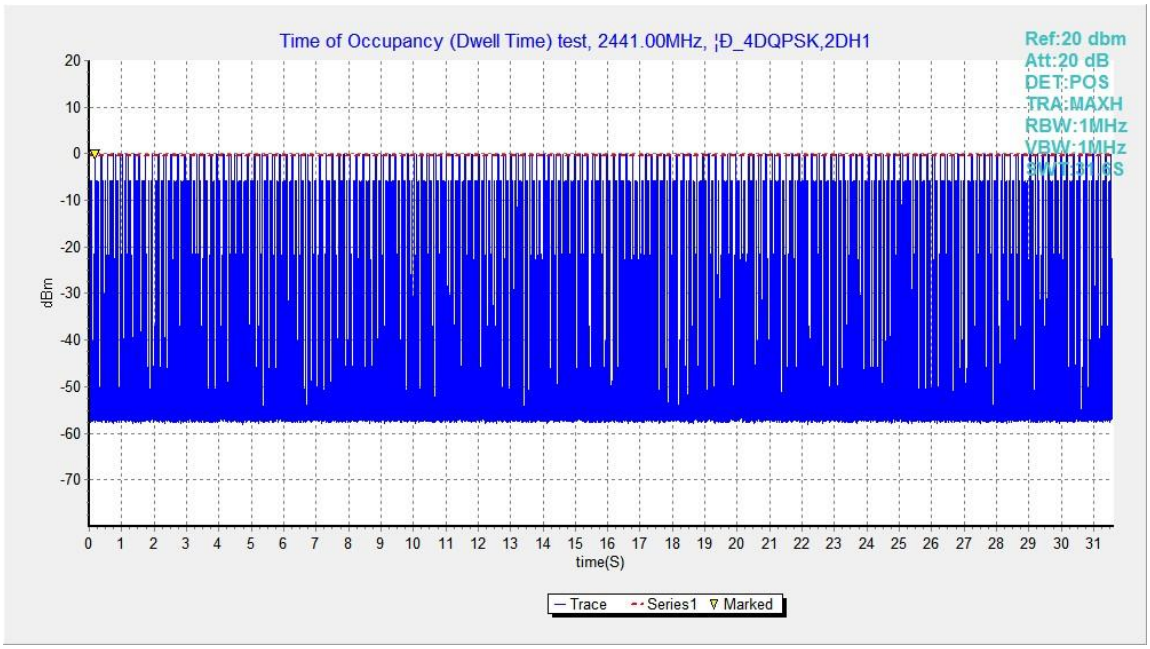



Fig.71. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

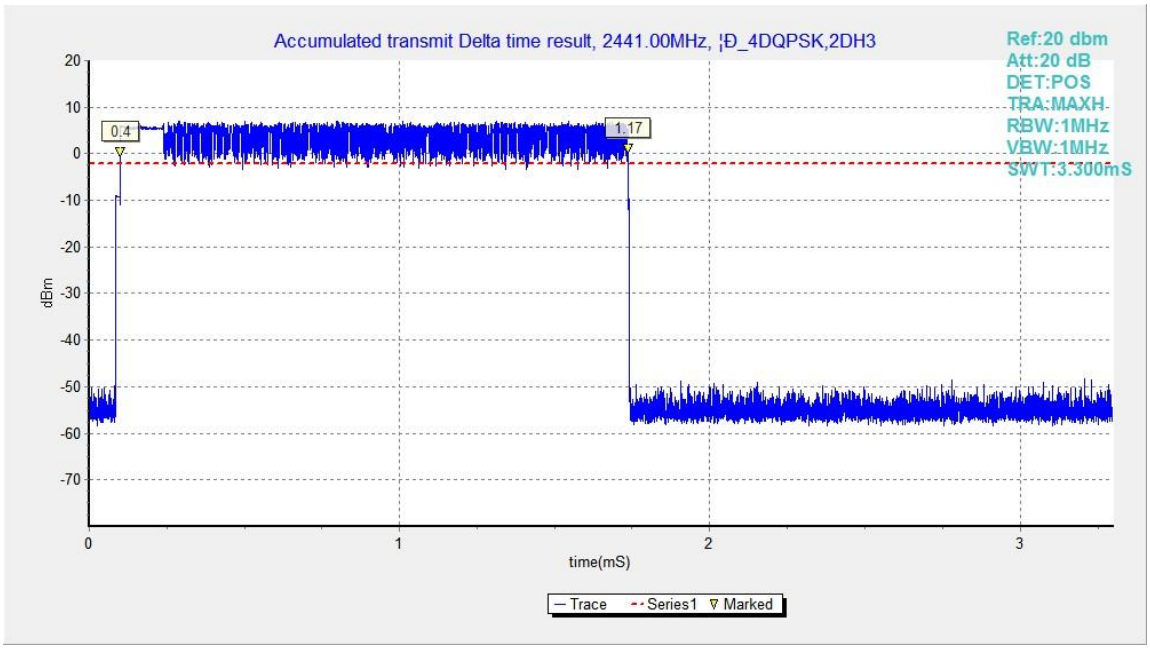



Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

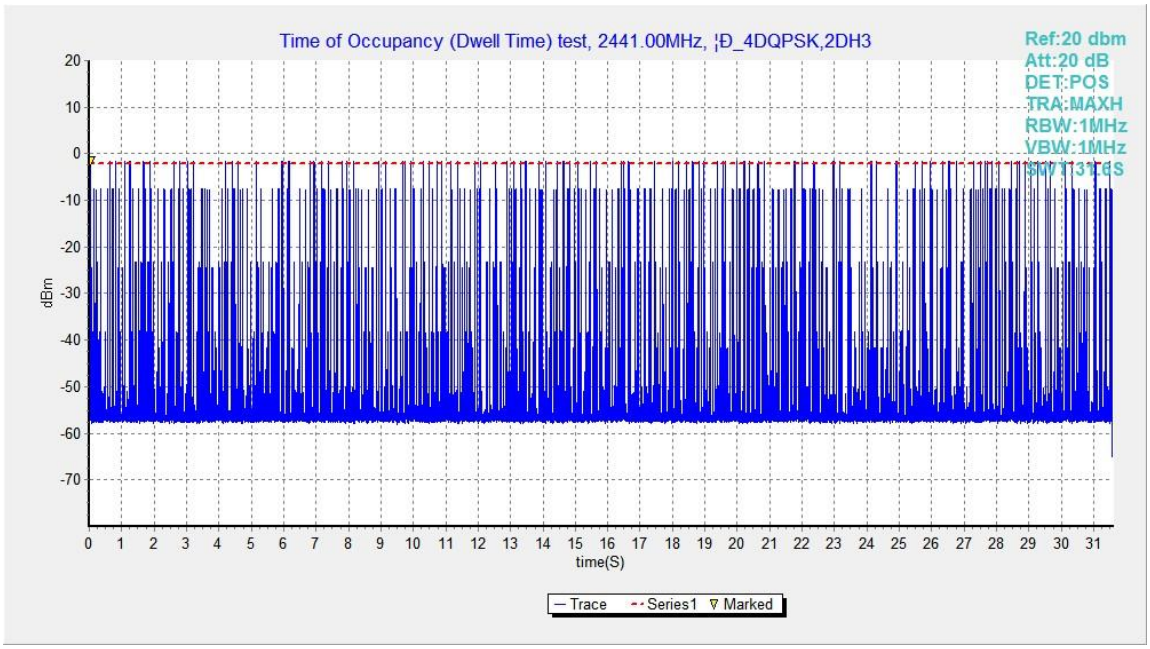



Fig.73. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

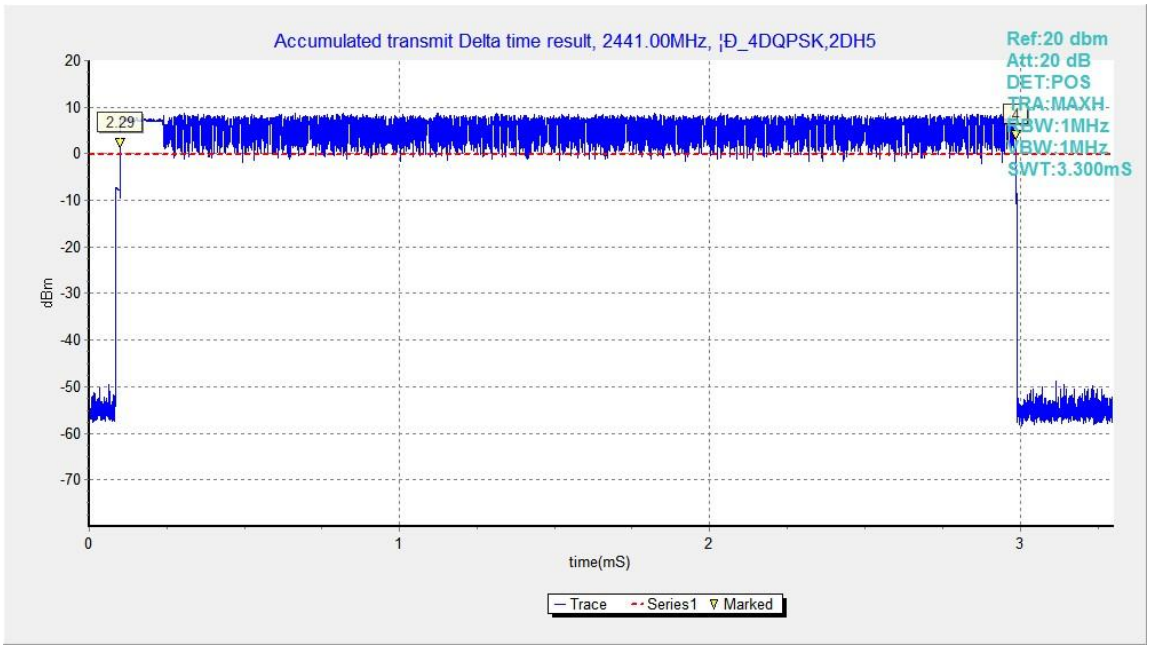



Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

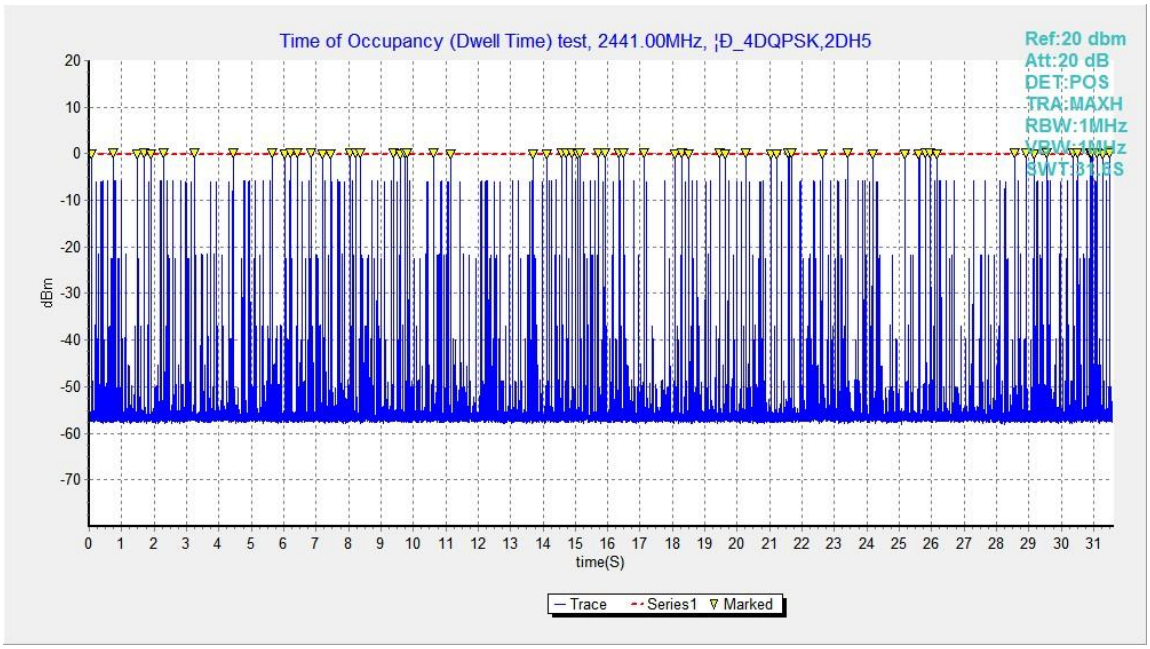



Fig.75. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

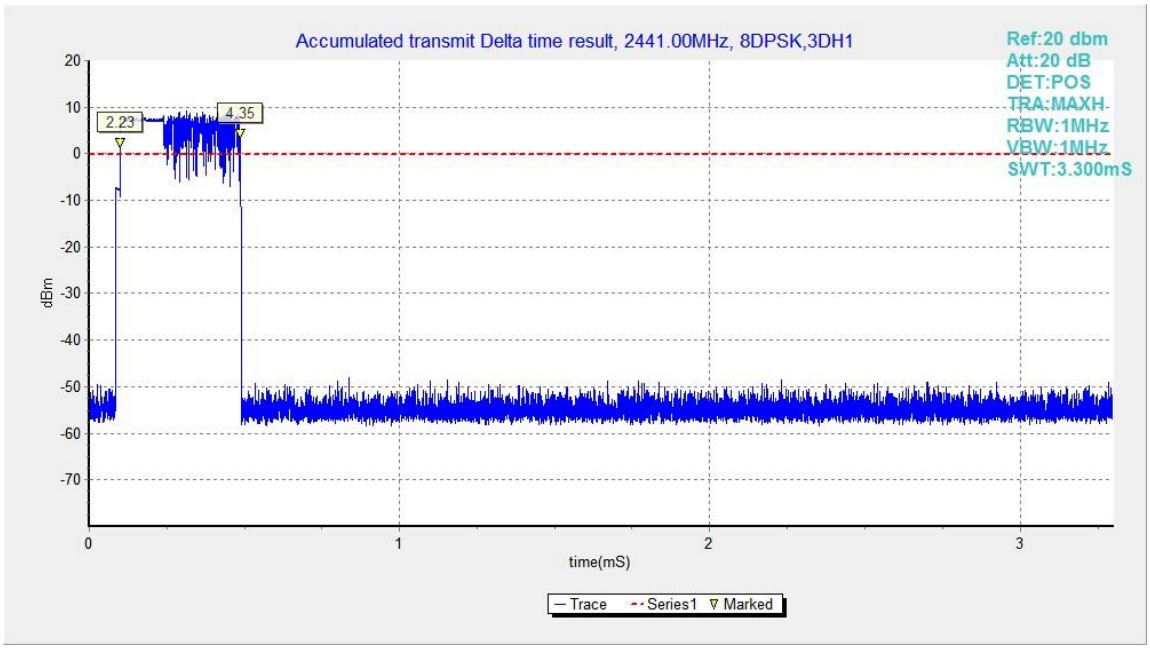



Fig.76. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

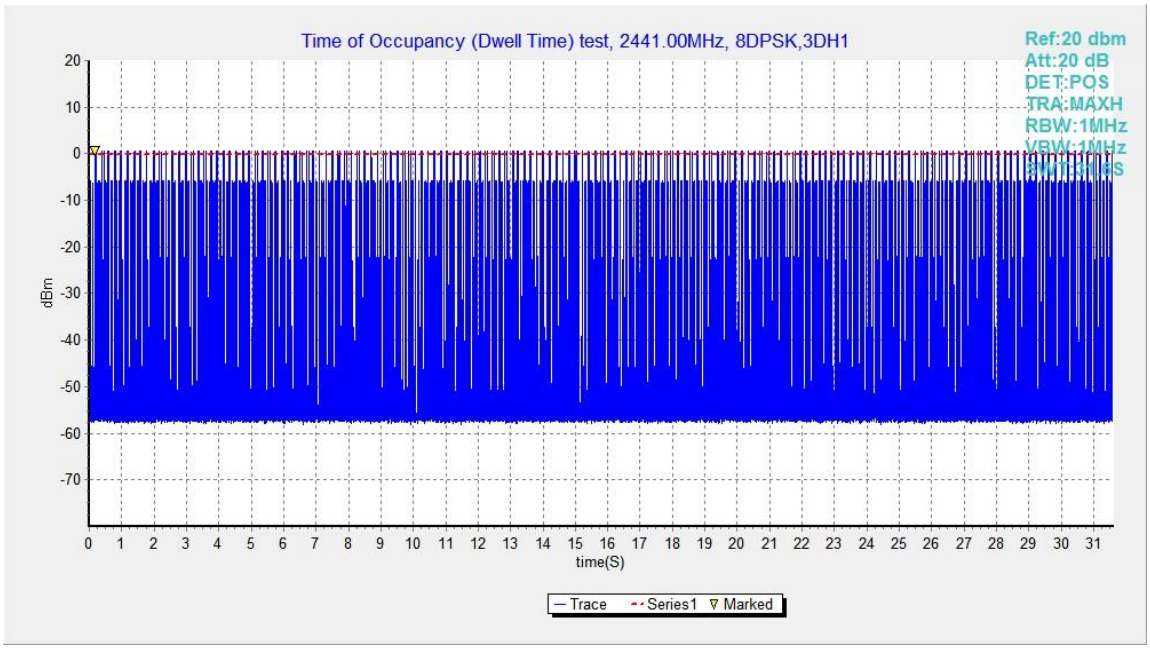



Fig.77. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

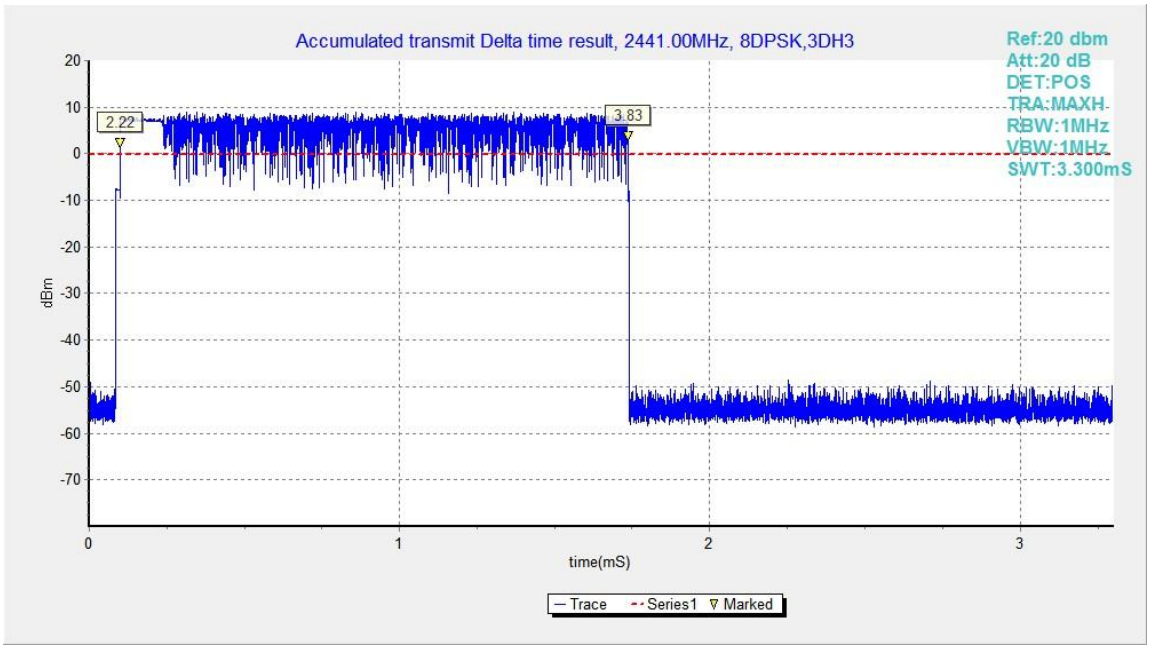



Fig.78. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

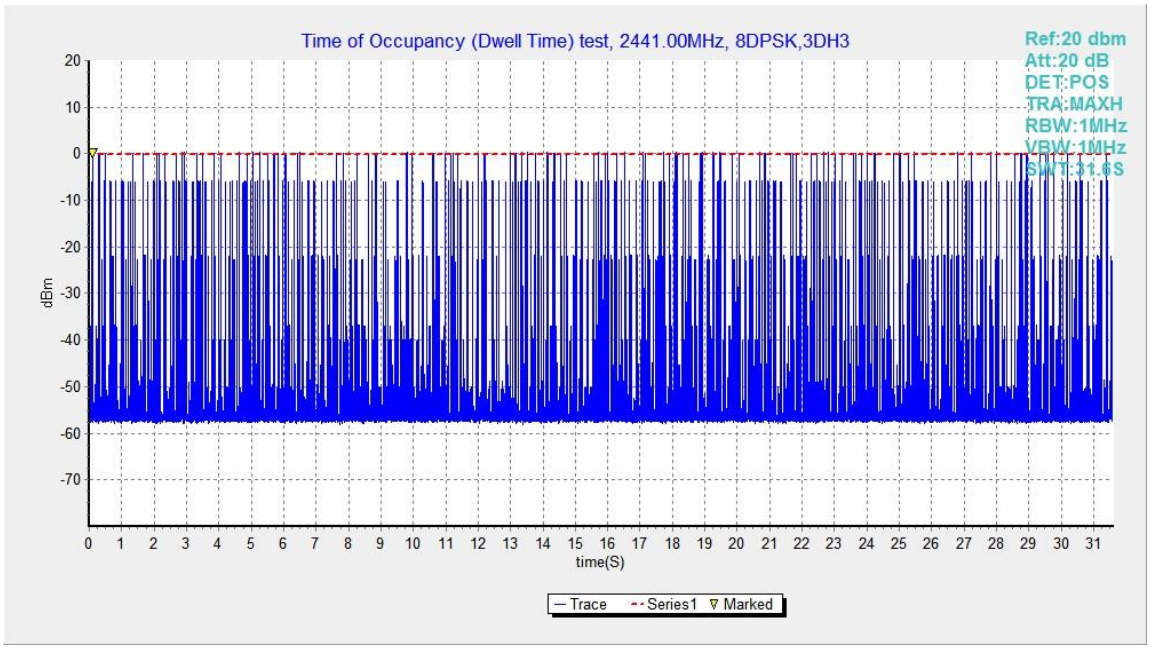



Fig.79. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

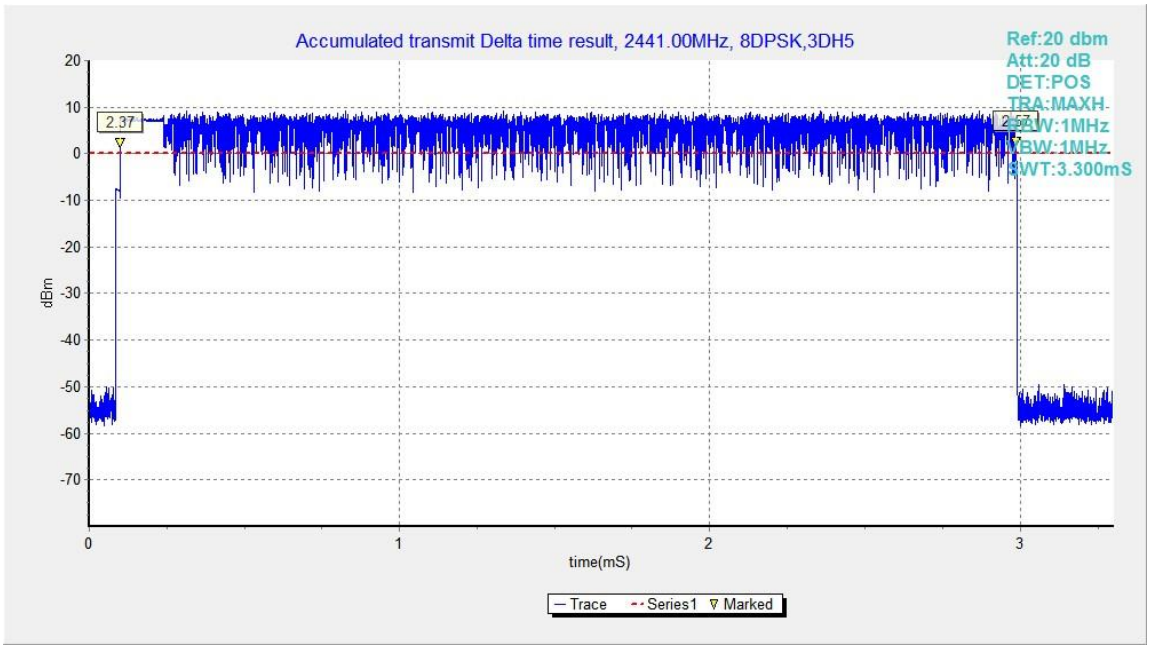



Fig.80. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

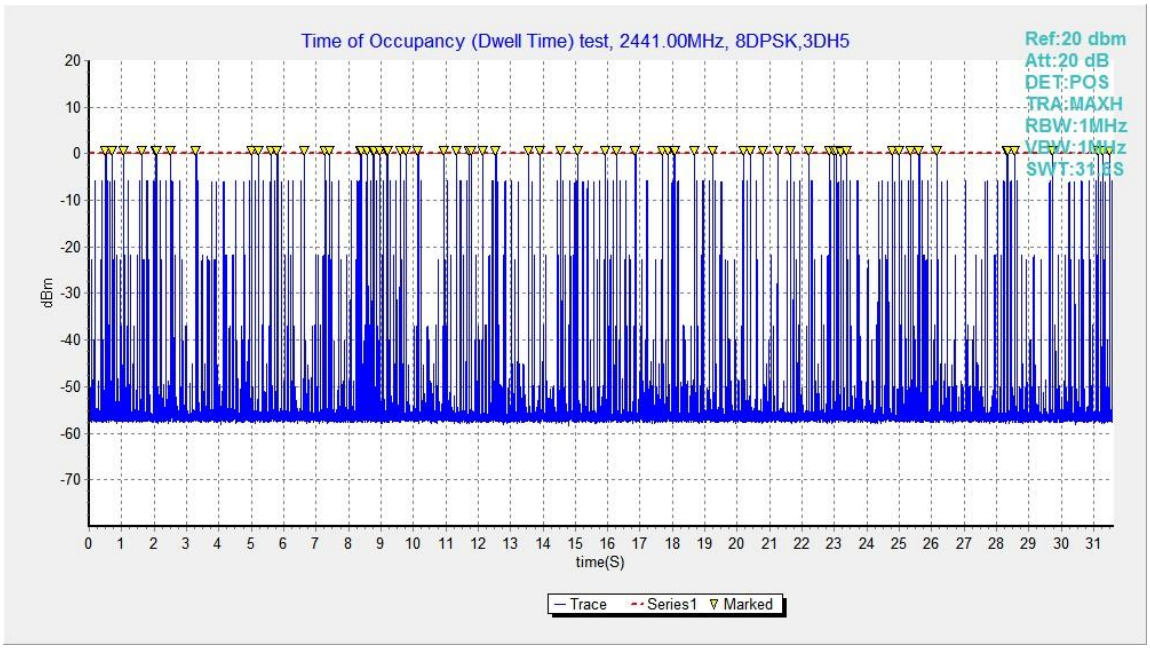



Fig.81. Number of Transmissions Measurement: Channel 39,Packet 3-DH5

## 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 | 937.50 | NA |
| 39 | Fig.83 | 937.50 | NA |
| 78 | Fig.84 | 943.50 | NA |

**For π/4 DQPSK**

| Channel | 20dB Bandwidth (kHz) | | Conclusion |
|---|---|---|---|
| 0 | Fig.85 | 1287.00 | NA |
| 39 | Fig.86 | 1278.75 | NA |
| 78 | Fig.87 | 1278.75 | NA |

**For 8DPSK**

| Channel | 20dB Bandwidth (kHz) | | Conclusion |
|---|---|---|---|
| 0 | Fig.88 | 1275.00 | NA |
| 39 | Fig.89 | 1294.50 | NA |
| 78 | Fig.90 | 1277.25 | NA |

**Conclusion: NA**

**Test graphs as below:**

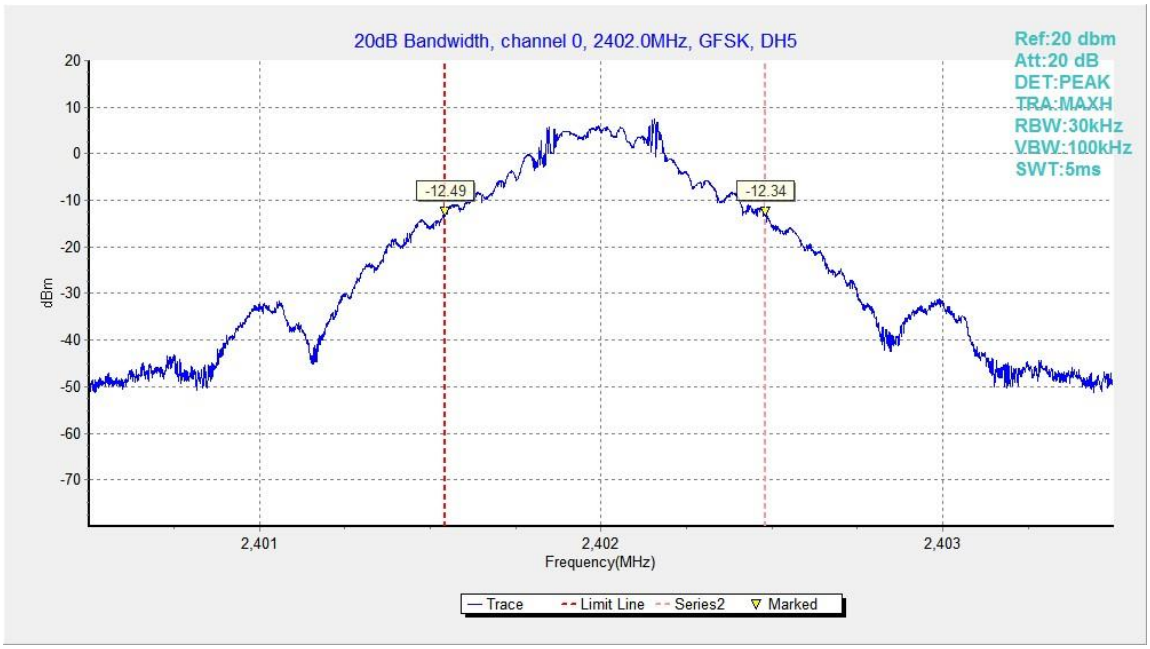



Fig.82. 20dB Bandwidth: GFSK, Channel 0

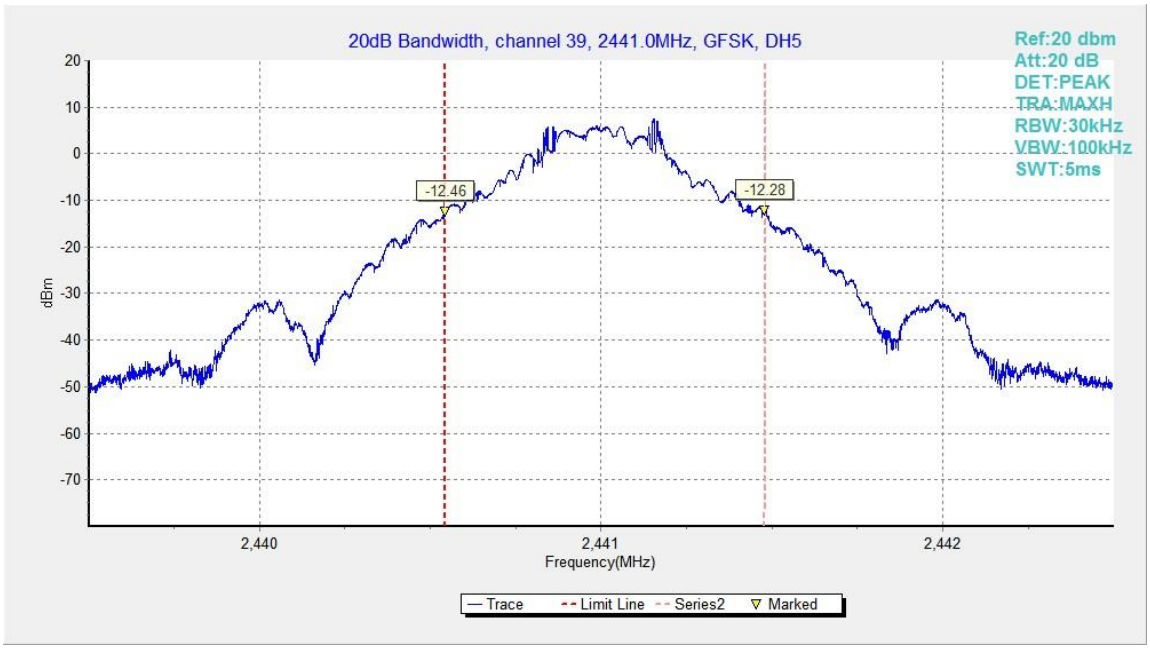



Fig.83. 20dB Bandwidth: GFSK, Channel 39

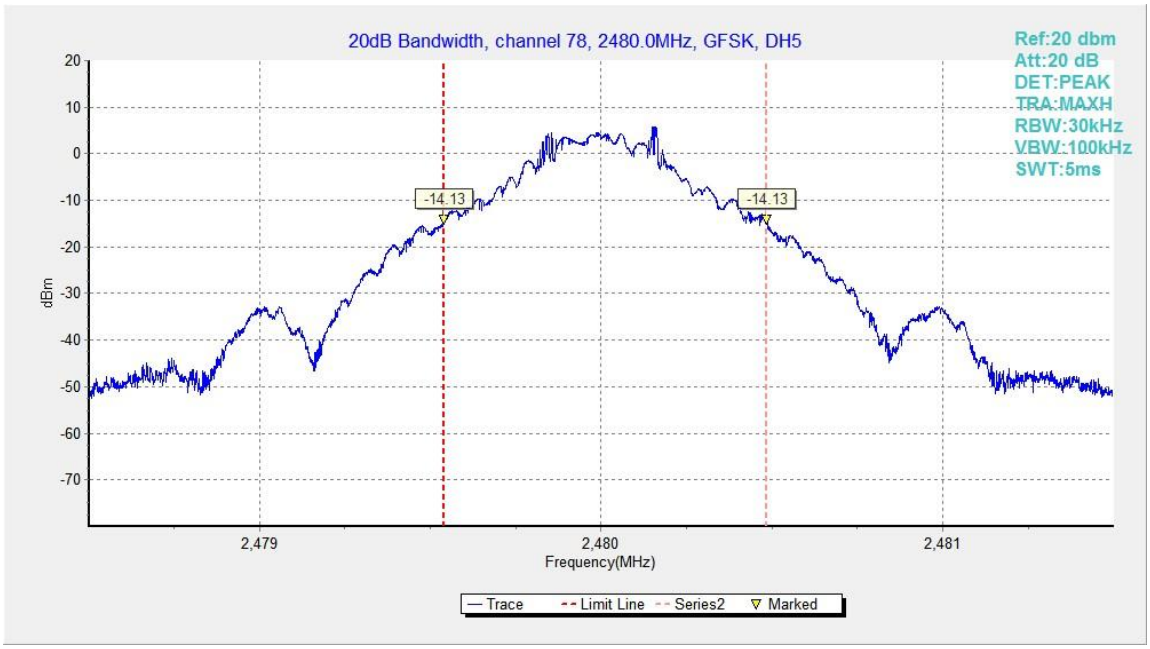



Fig.84. 20dB Bandwidth: GFSK, Channel 78

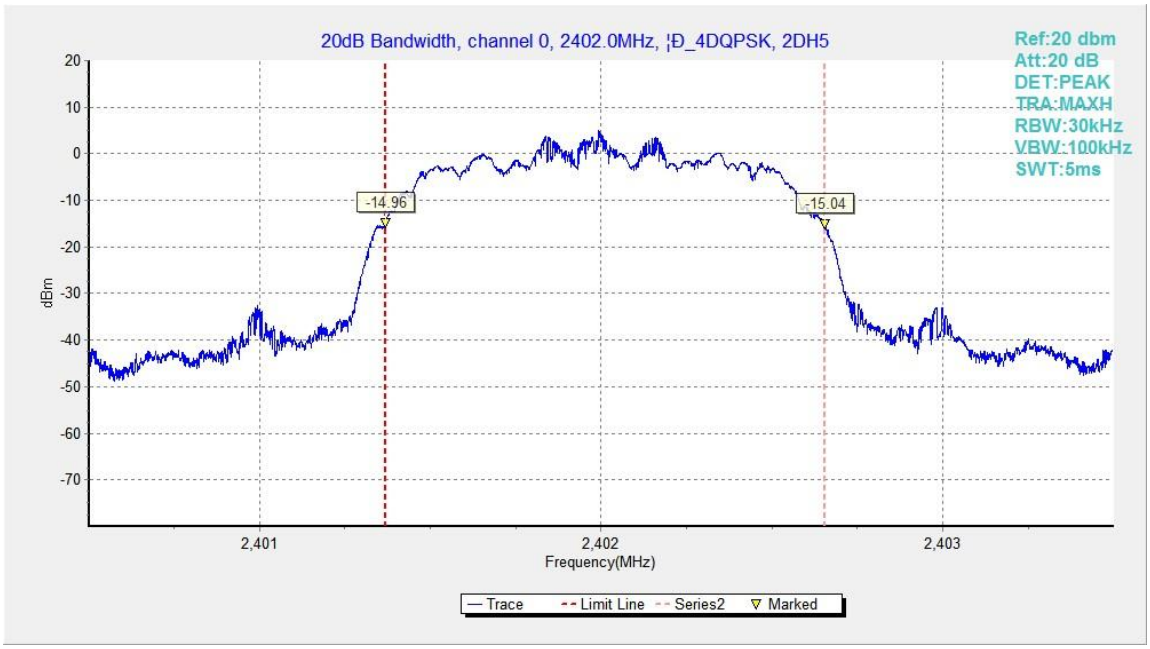



Fig.85. 20dB Bandwidth: π/4 DQPSK, Channel 0

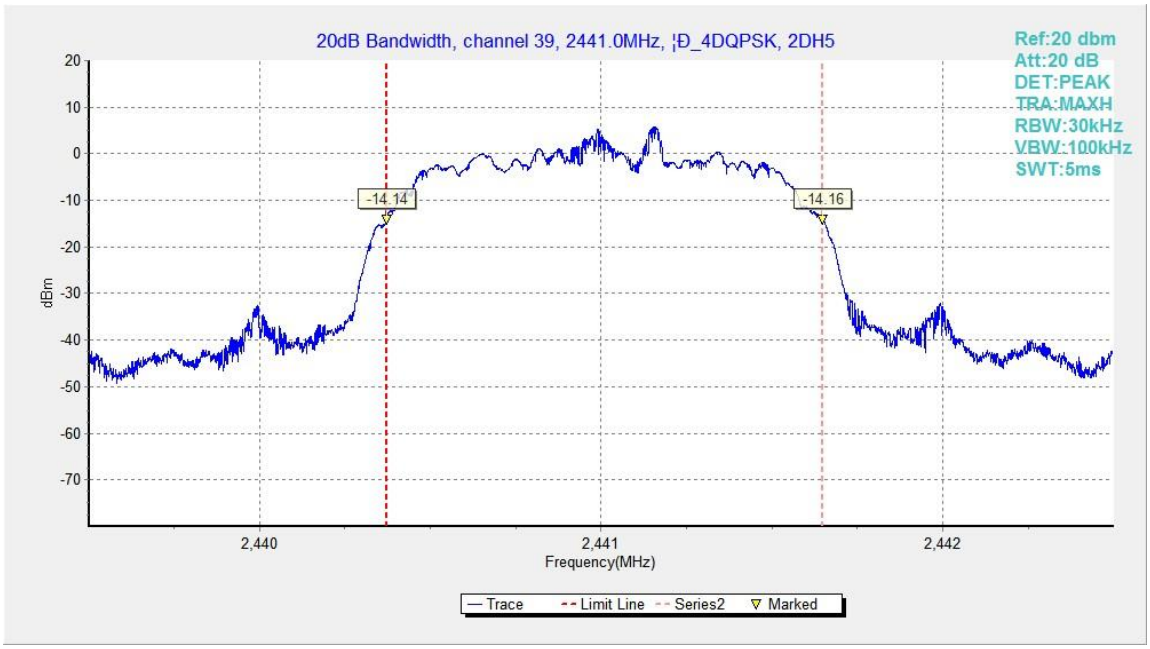



Fig.86. 20dB Bandwidth: π/4 DQPSK, Channel 39

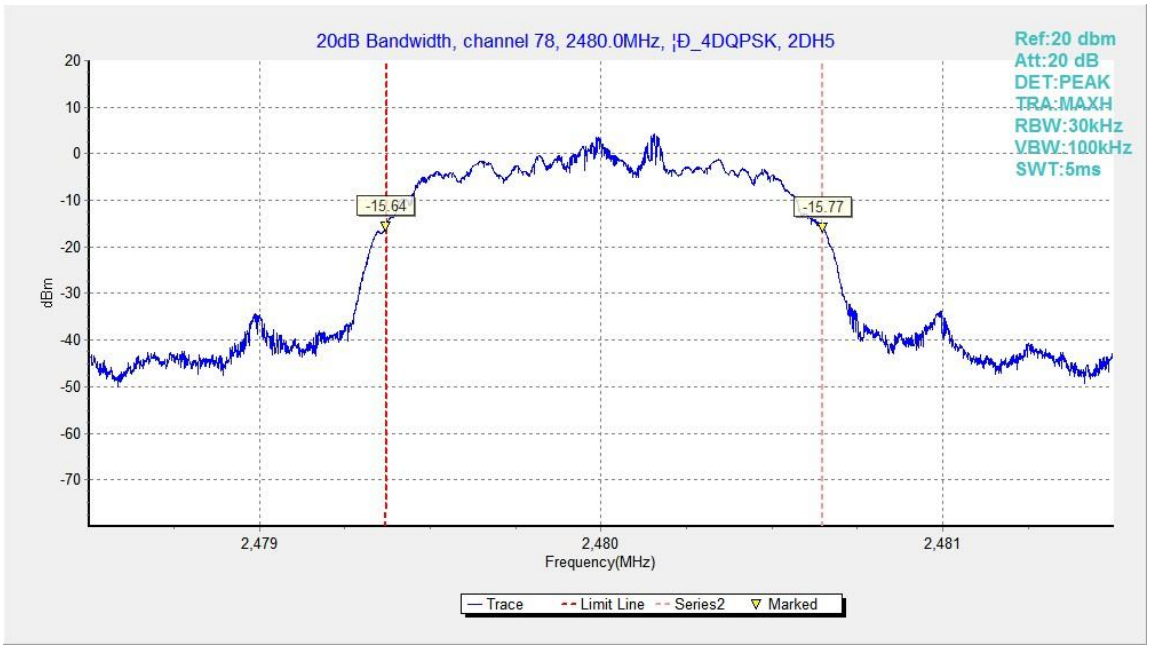



Fig.87. 20dB Bandwidth: π/4 DQPSK, Channel 78

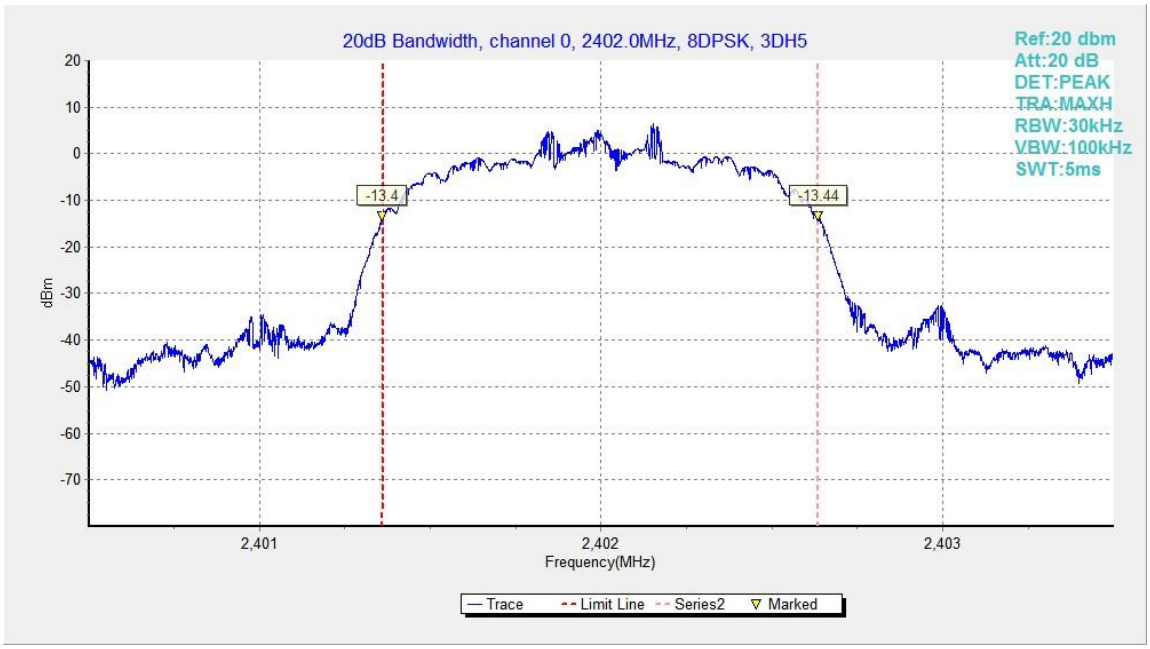



Fig.88. 20dB Bandwidth: 8DPSK, Channel 0

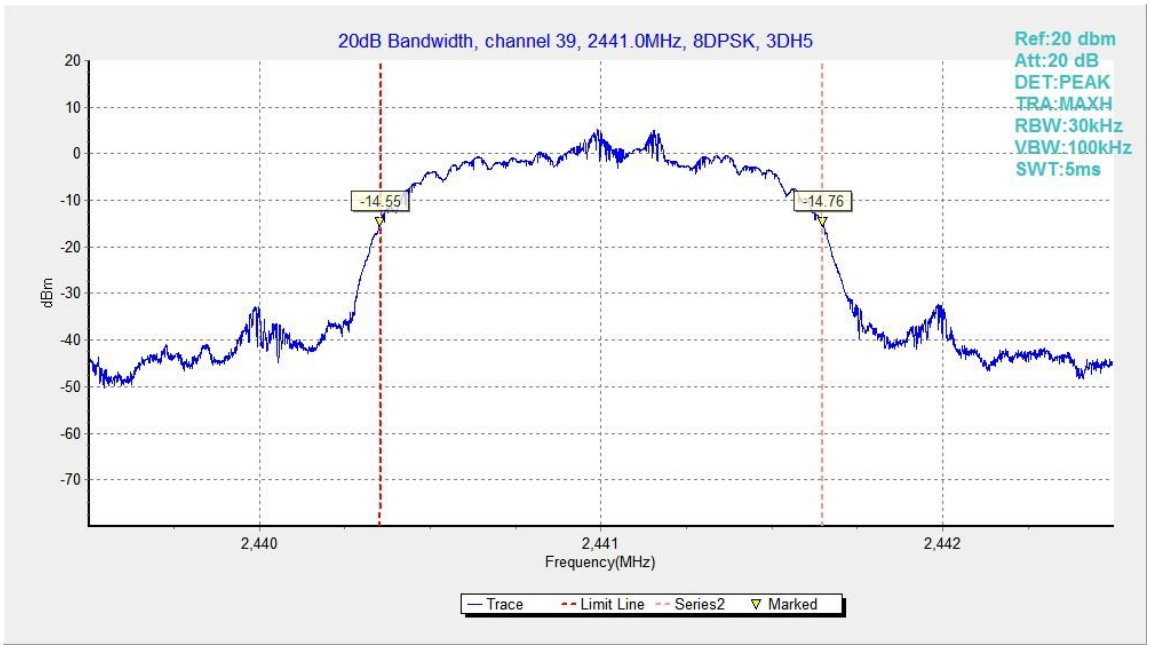



Fig.89. 20dB Bandwidth: 8DPSK, Channel 39

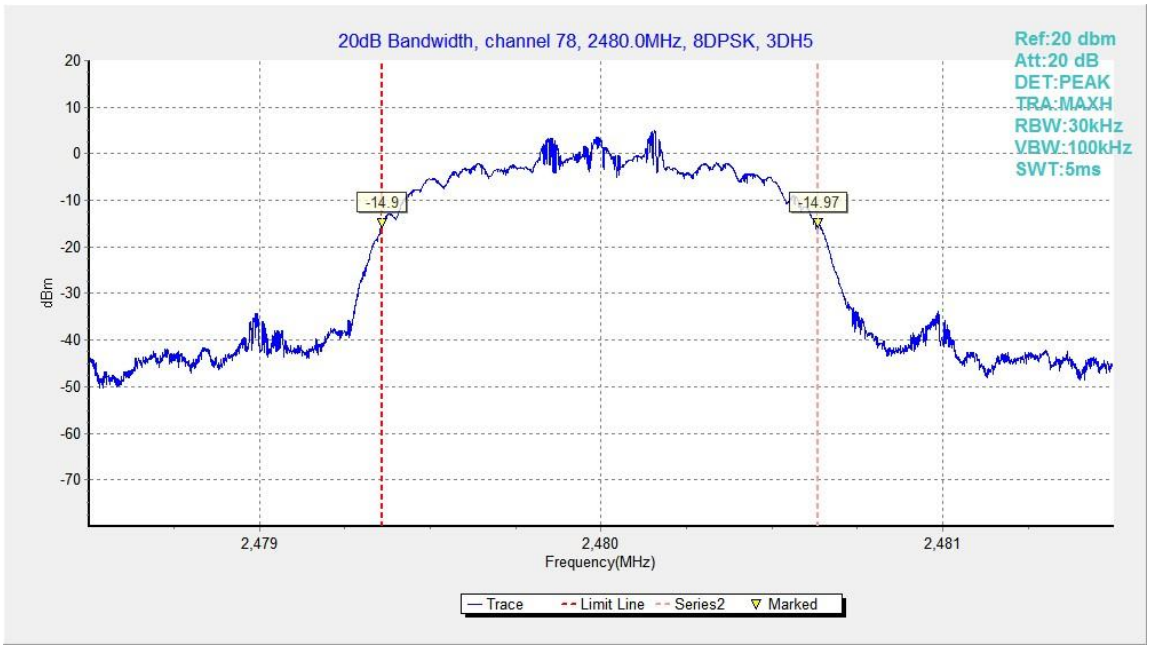



Fig.90. 20dB Bandwidth: 8DPSK, Channel 78

## 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 | 982.50 | P |

**For π/4 DQPSK**

| Channel | Carrier frequency separation (kHz) | | Conclusion |
|---|---|---|---|
| 39 | Fig.92 | 1038.75 | P |

**For 8DPSK**

| Channel | Carrier frequency separation (kHz) | | Conclusion |
|---|---|---|---|
| 39 | Fig.93 | 1008.00 | P |

**Conclusion: PASS**

**Test graphs as below:**

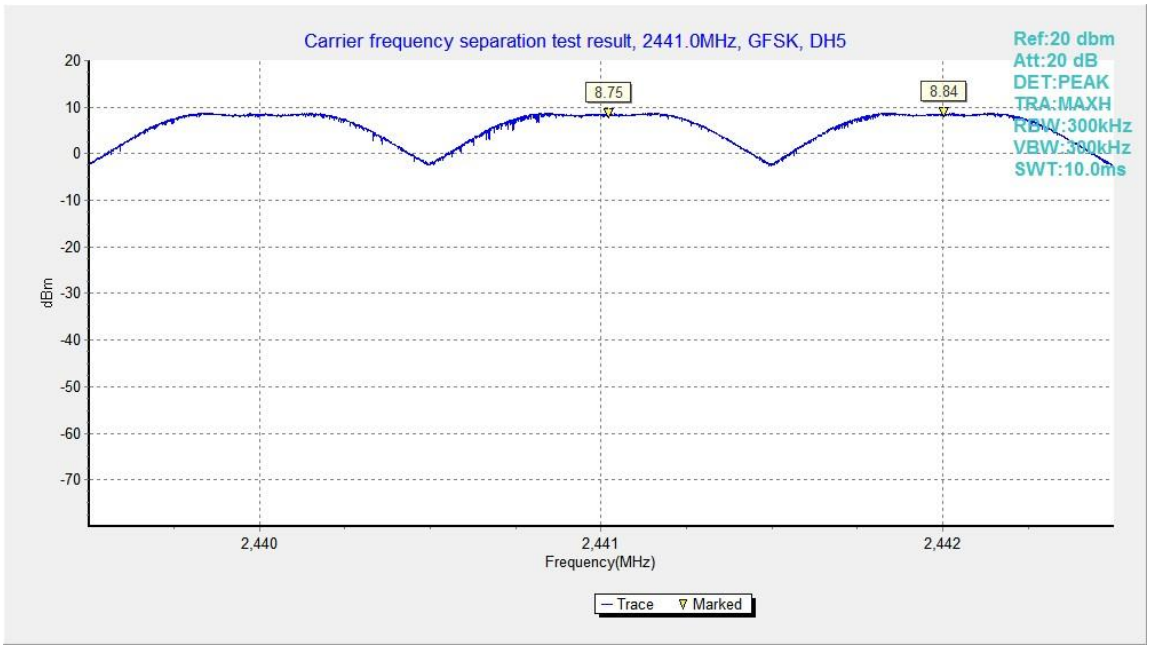



Fig.91. Carrier frequency separation measurement: GFSK, Channel 39

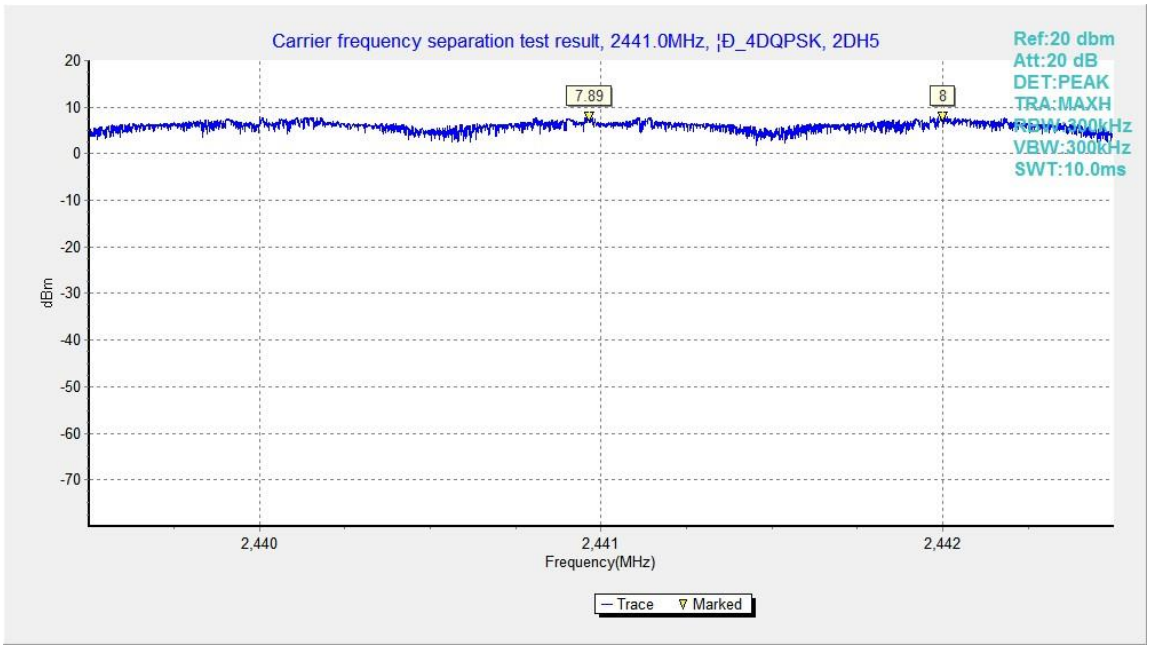



Fig.92. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

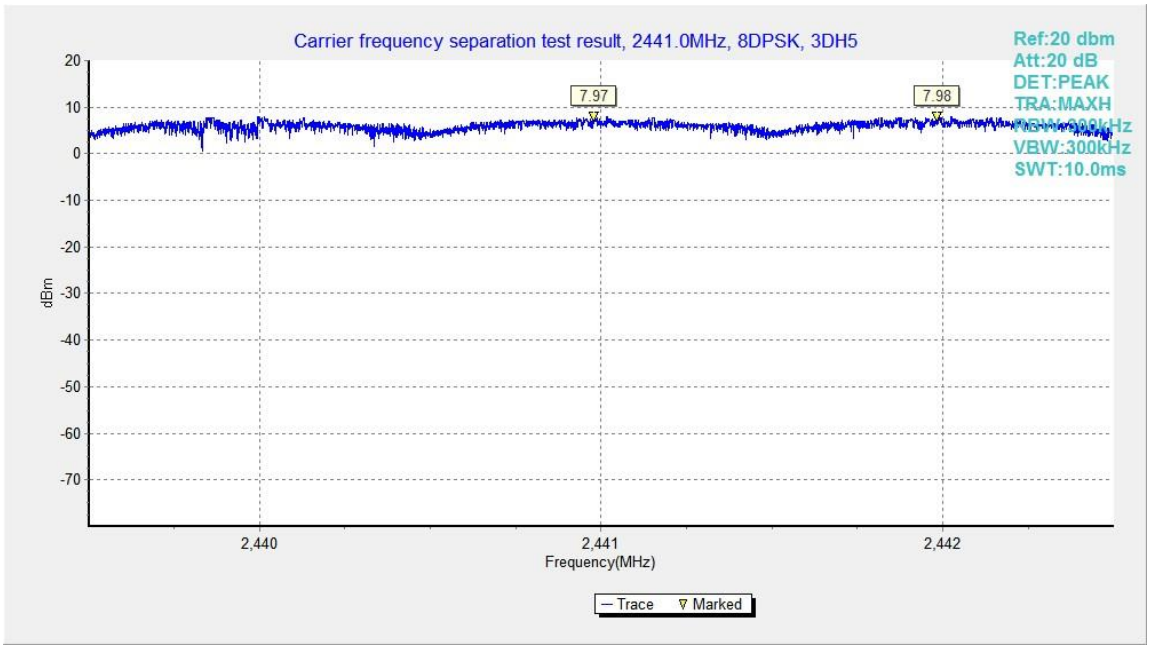



Fig.93. Carrier frequency separation measurement: 8DPSK, Channel 39

## B.10. Number of Hopping Channels

**Method of Measurement: See ANSI C63.10-clause 7.8.3**

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

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

**Measurement Limit:**

| Standard | Limit |
|---|---|
| FCC 47 CFR Part 15.247(a) (1)(iii) | At least 15 non-overlapping channels |

**Measurement Result:**

**For GFSK**

| Channel | Number of hopping channels | | Conclusion |
|---|---|---|---|
| 0~39 | Fig.94 | 79 | P |
| 40~78 | Fig.95 | | |

**Forπ/4 DQPSK**

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

**For 8DPSK**

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

**Conclusion: PASS**

**Test graphs as below:**

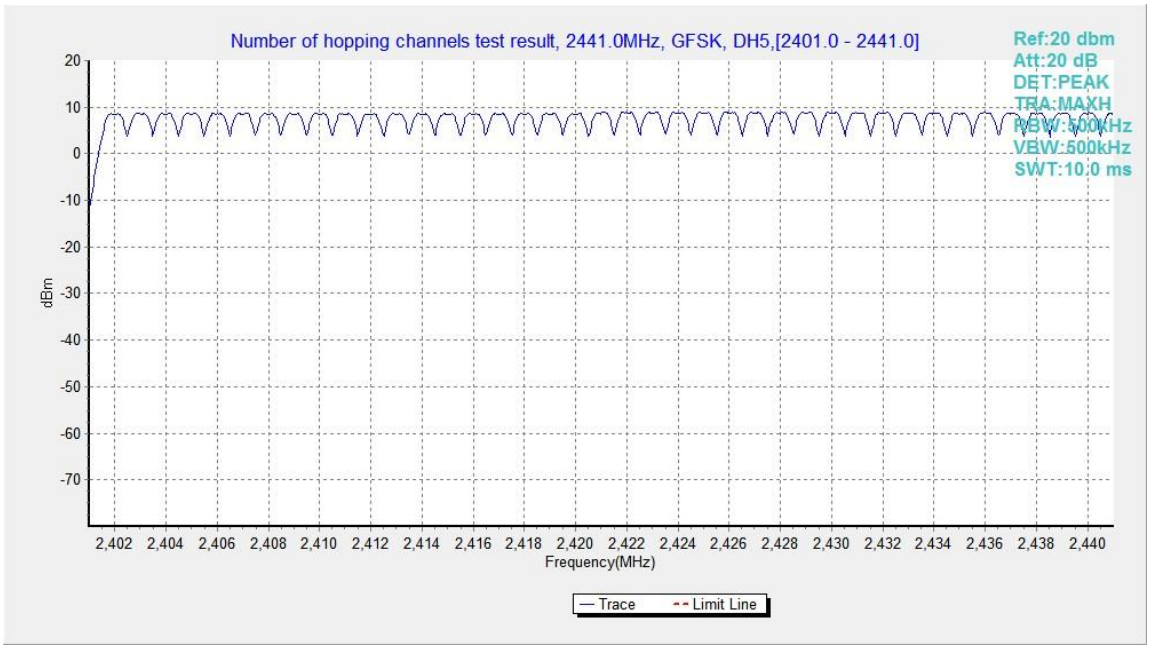



Fig.94. Number of hopping frequencies: GFSK, Channel 0 - 39

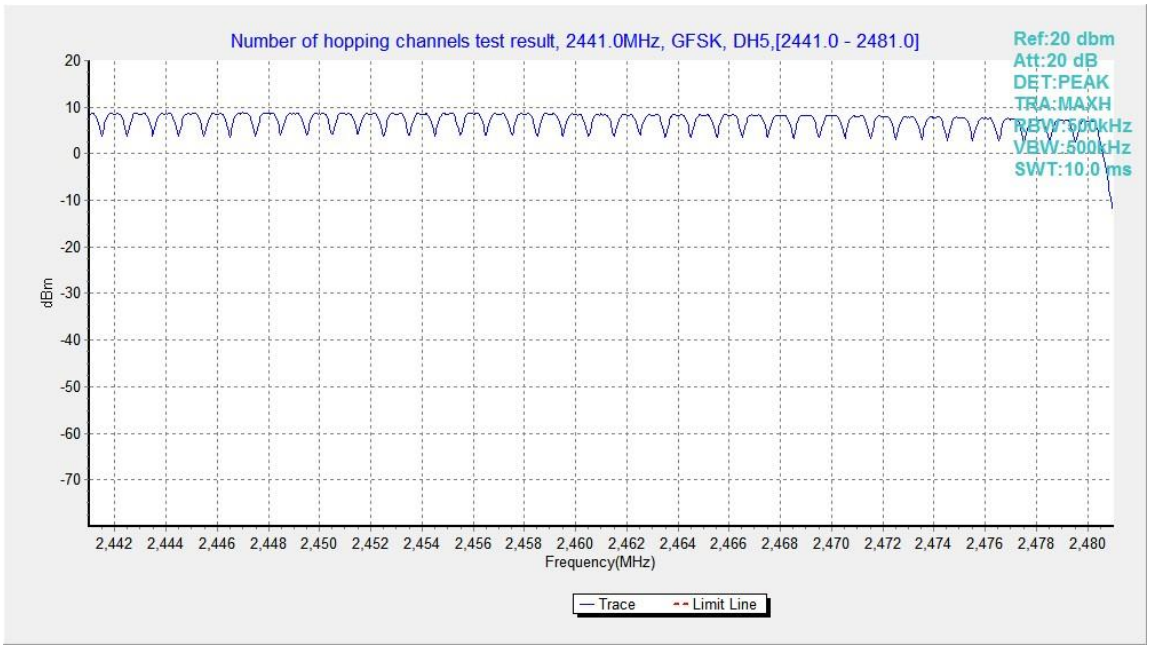



Fig.95. Number of hopping frequencies: GFSK, Channel 40 - 78

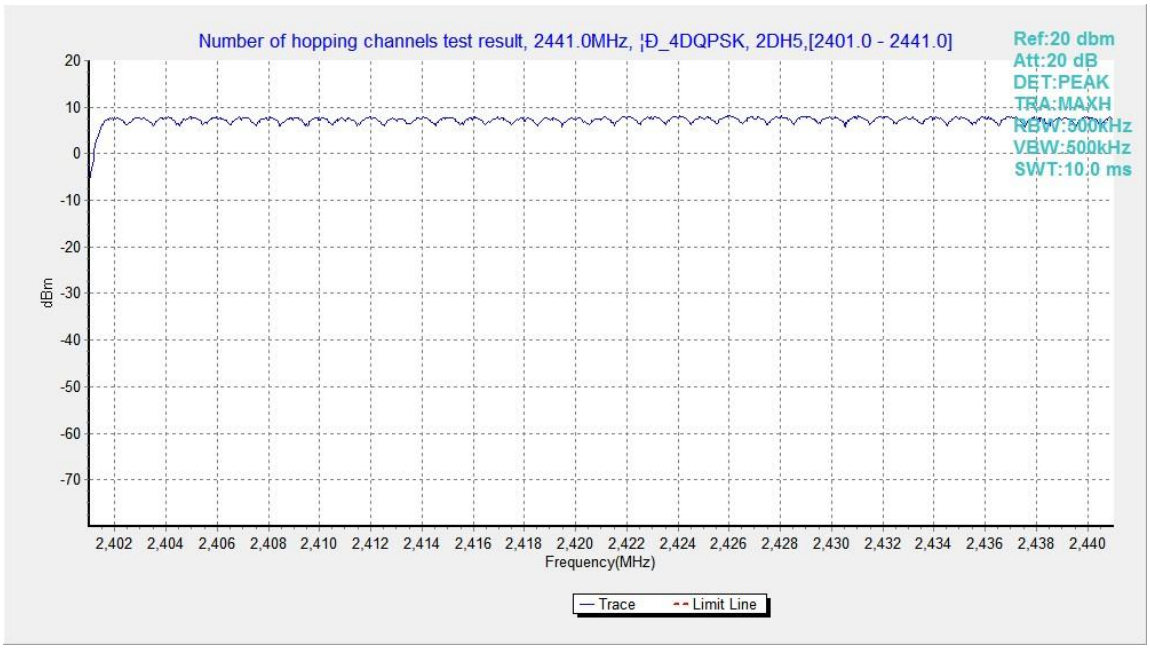



Fig.96. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

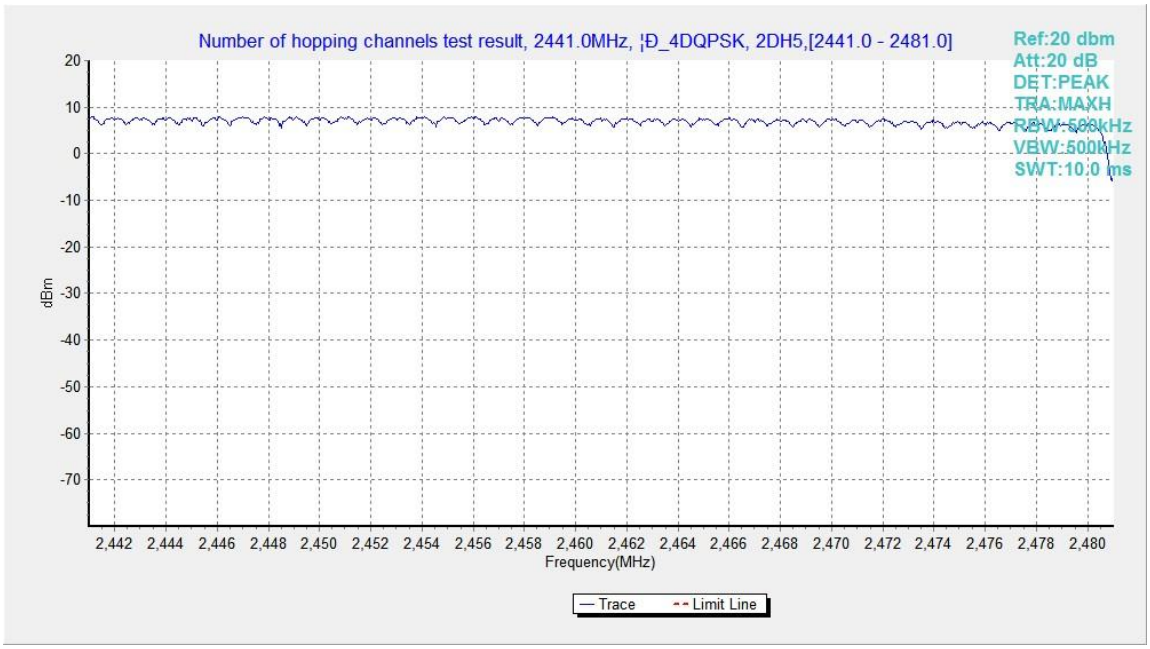



Fig.97. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

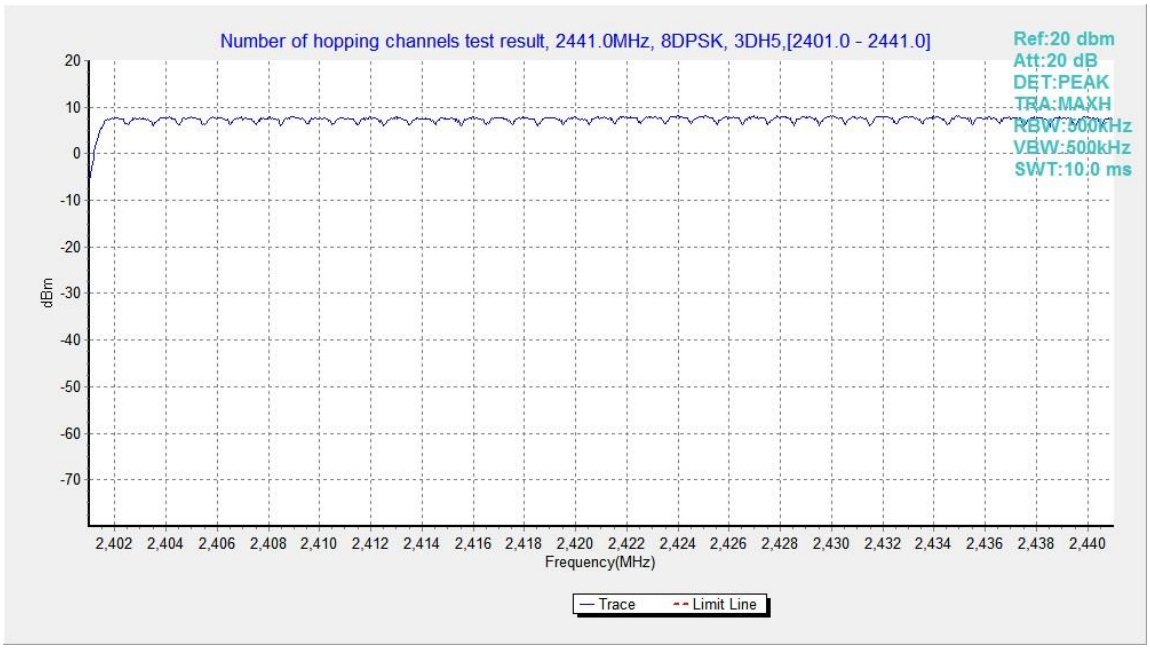



Fig.98. Number of hopping frequencies: 8DPSK, Channel 0 - 39

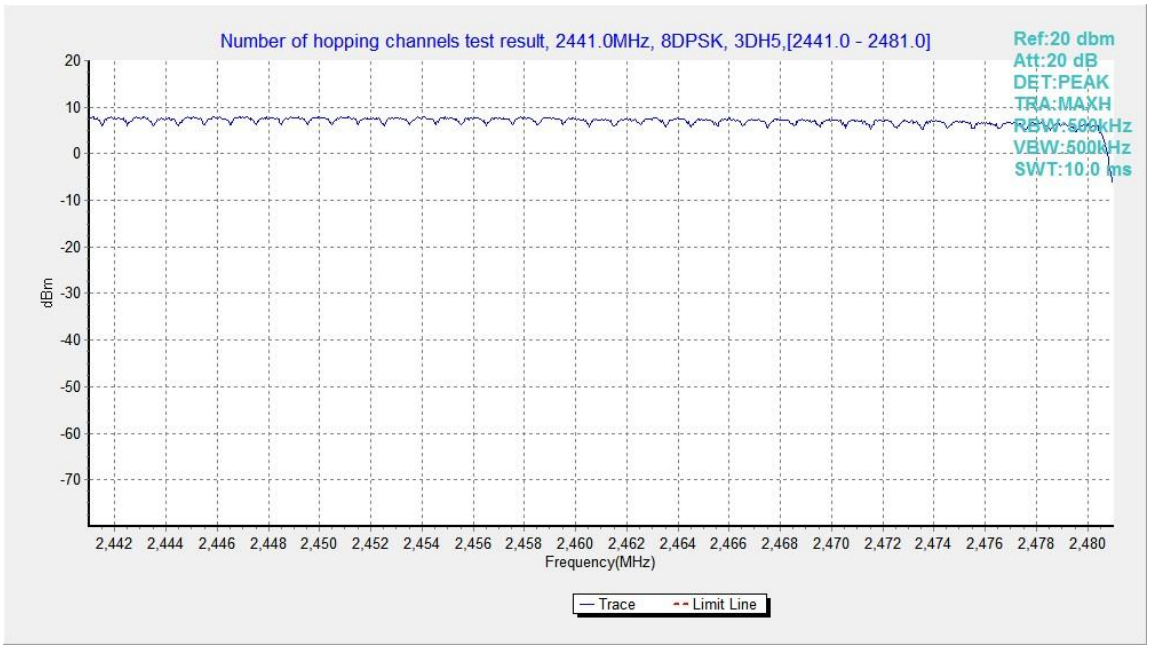



Fig.99. Number of hopping frequencies: 8DPSK, Channel 40 - 78

## B.11. AC Powerline Conducted Emission

**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.

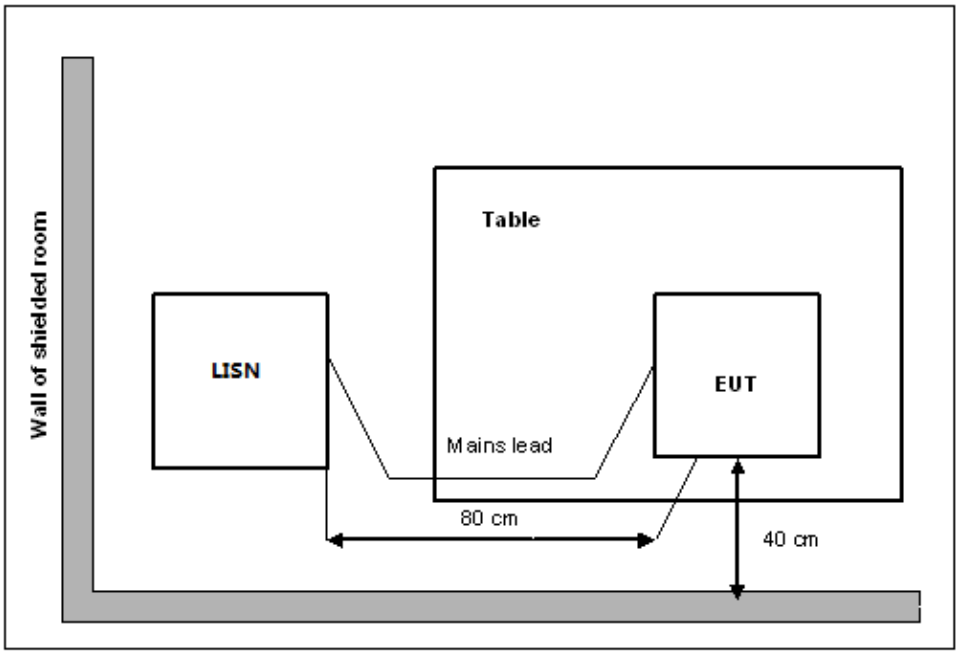
The measurement bandwidth is:

| 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: EUT1**

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:**

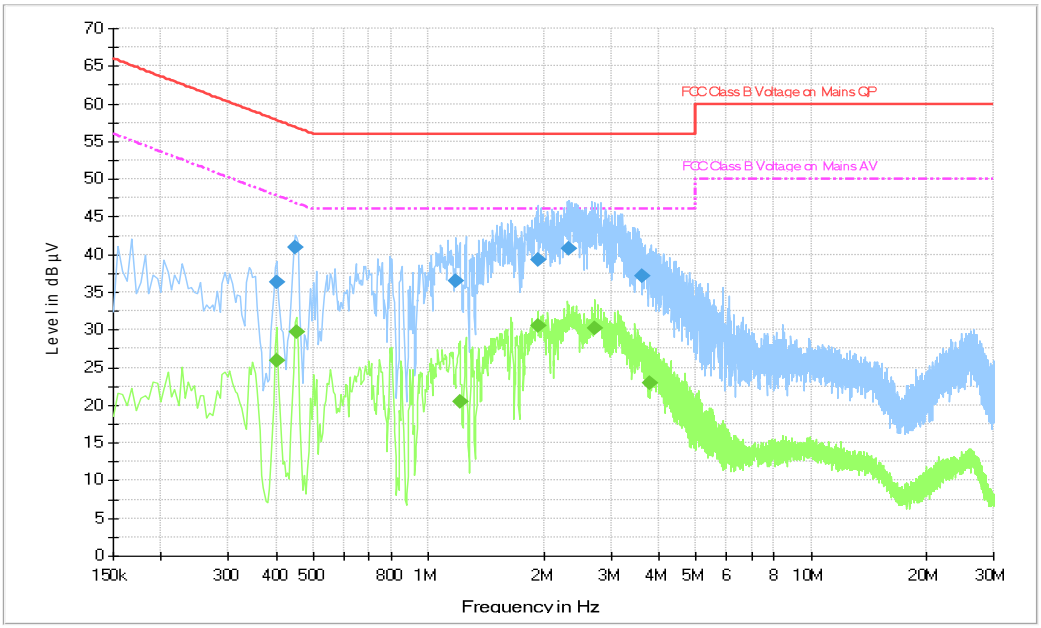



**Fig.B.11.1 AC Powerline Conducted Emission- bluetooth**

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) |
|---|---|---|---|---|---|---|---|
| 0.402000 | 36.4 | 1000. | 9.000 | L1 | 19.9 | 21.4 | 57.8 |
| 0.447000 | 41.0 | 1000. | 9.000 | L1 | 19.9 | 15.9 | 56.9 |
| 1.180500 | 36.5 | 1000. | 9.000 | L1 | 19.5 | 19.5 | 56.0 |
| 1.927500 | 39.3 | 1000. | 9.000 | L1 | 19.4 | 16.7 | 56.0 |
| 2.332500 | 40.8 | 1000. | 9.000 | L1 | 19.5 | 15.2 | 56.0 |
| 3.606000 | 37.1 | 1000. | 9.000 | L1 | 19.5 | 18.9 | 56.0 |

**Final Result 2**

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 0.402000 | 25.9 | 1000.0 | 9.000 | L1 | 19.9 | 22.0 | 47.8 |
| 0.451500 | 29.7 | 1000.0 | 9.000 | L1 | 19.9 | 17.2 | 46.8 |
| 1.207500 | 20.4 | 1000.0 | 9.000 | L1 | 19.5 | 25.6 | 46.0 |
| 1.927500 | 30.5 | 1000.0 | 9.000 | L1 | 19.4 | 15.5 | 46.0 |
| 2.715000 | 30.2 | 1000.0 | 9.000 | L1 | 19.5 | 15.8 | 46.0 |
| 3.772500 | 22.9 | 1000.0 | 9.000 | L1 | 19.5 | 23.1 | 46.0 |

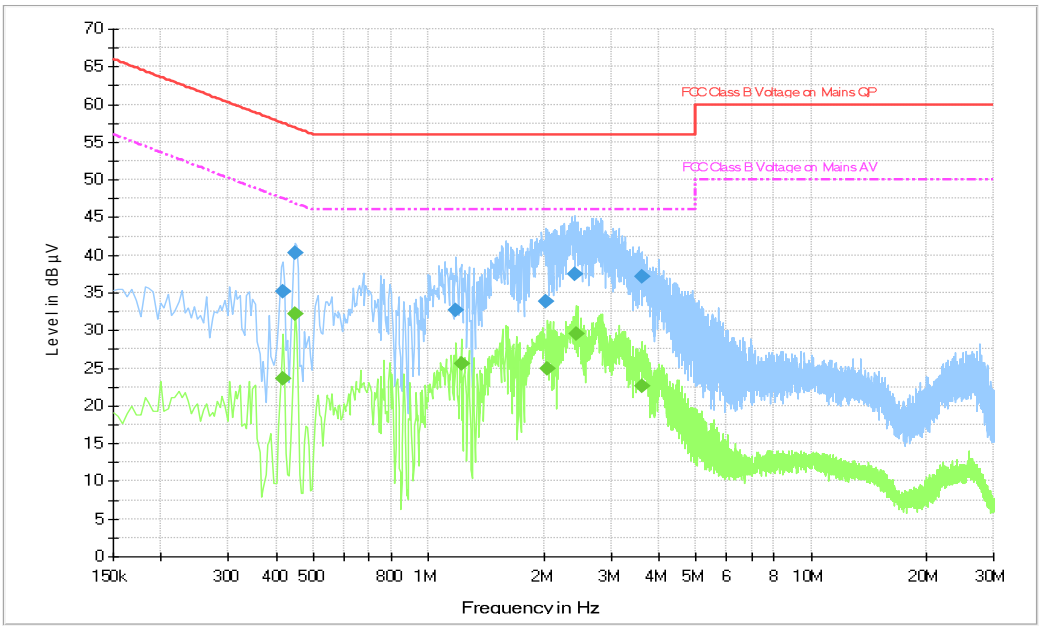



**Fig.B.11.2 AC Powerline Conducted Emission-Idle**

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

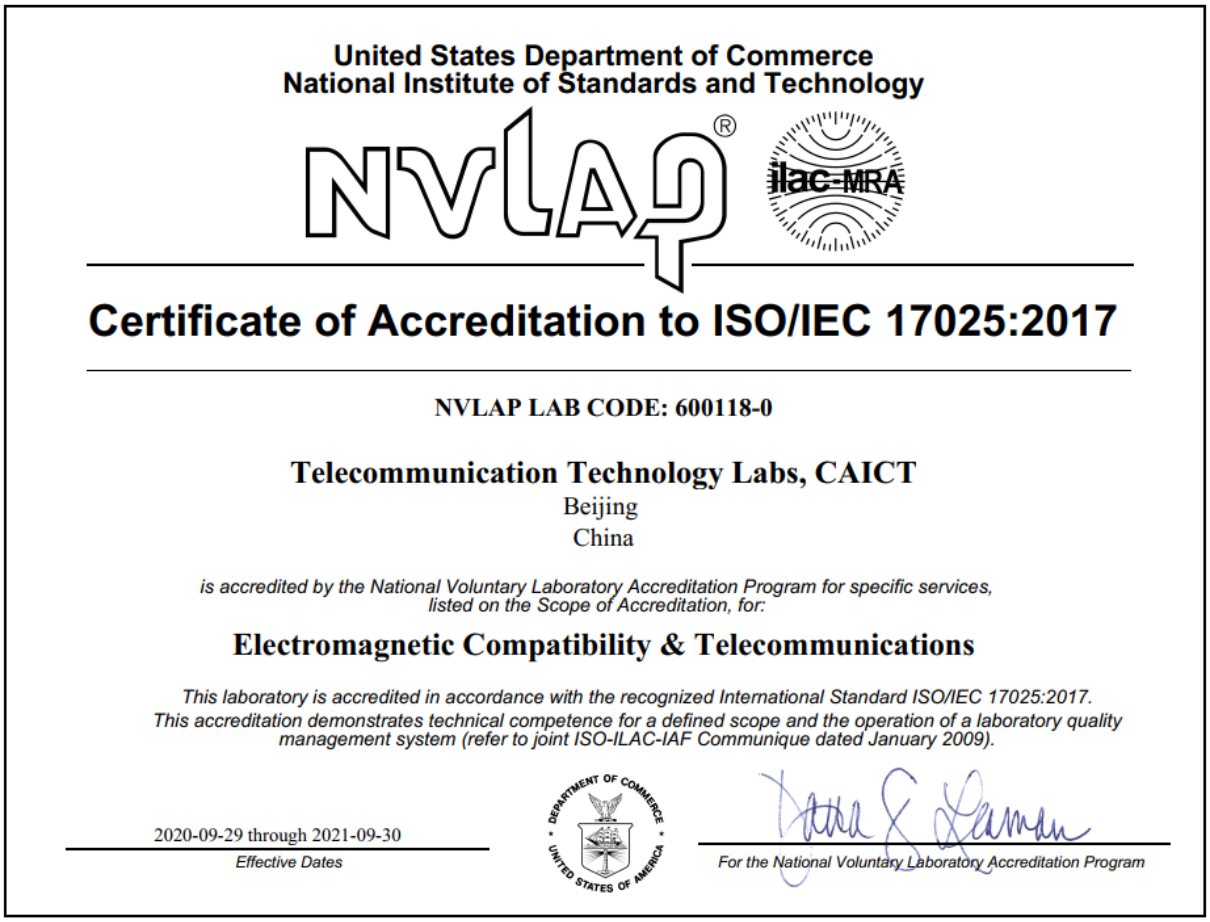
**Final Result 1**

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 0.415500 | 35.2 | 1000. | 9.000 | L1 | 19.9 | 22.4 | 57.5 |
| 0.447000 | 40.3 | 1000. | 9.000 | L1 | 19.9 | 16.6 | 56.9 |
| 1.180500 | 32.7 | 1000. | 9.000 | L1 | 19.5 | 23.3 | 56.0 |
| 2.022000 | 33.9 | 1000. | 9.000 | L1 | 19.4 | 22.1 | 56.0 |
| 2.413500 | 37.5 | 1000. | 9.000 | L1 | 19.5 | 18.5 | 56.0 |
| 3.619500 | 37.2 | 1000. | 9.000 | L1 | 19.5 | 18.8 | 56.0 |

**Final Result 2**

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|---|
| 0.415500 | 23.6 | 1000.0 | 9.000 | L1 | 19.9 | 23.9 | 47.5 |
| 0.447000 | 32.3 | 1000.0 | 9.000 | L1 | 19.9 | 14.7 | 46.9 |
| 1.216500 | 25.5 | 1000.0 | 9.000 | L1 | 19.5 | 20.5 | 46.0 |
| 2.044500 | 24.9 | 1000.0 | 9.000 | L1 | 19.5 | 21.1 | 46.0 |
| 2.427000 | 29.6 | 1000.0 | 9.000 | L1 | 19.5 | 16.4 | 46.0 |
| 3.610500 | 22.5 | 1000.0 | 9.000 | L1 | 19.5 | 23.5 | 46.0 |

## ANNEX C: Accreditation Certificate



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

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**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).*

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*****