

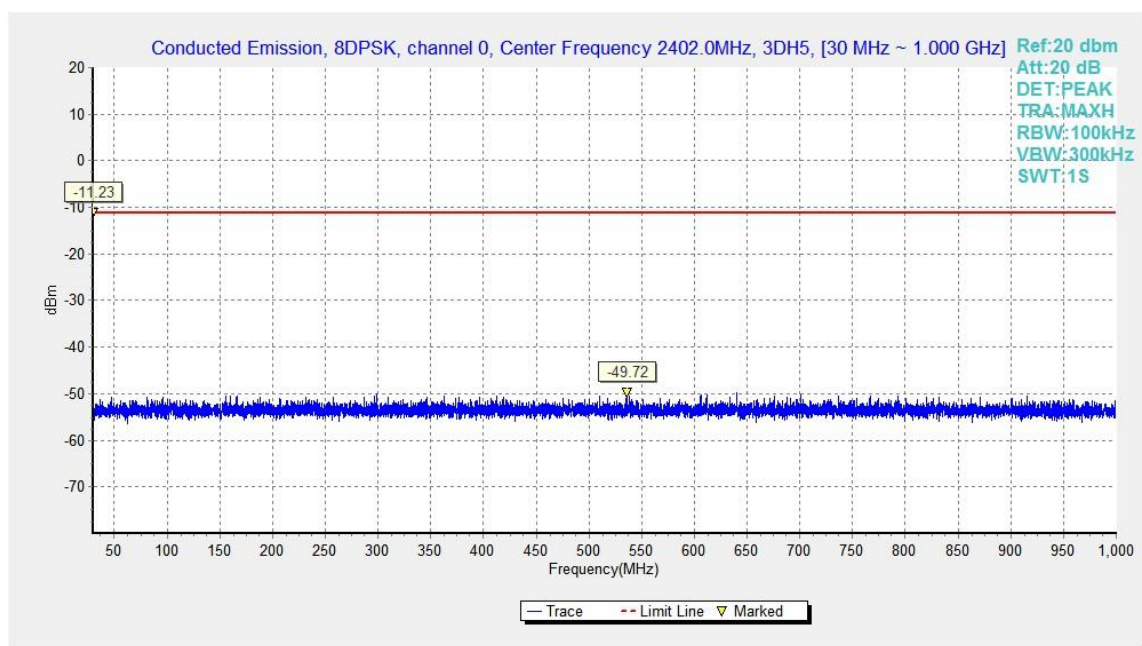


Fig.53. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

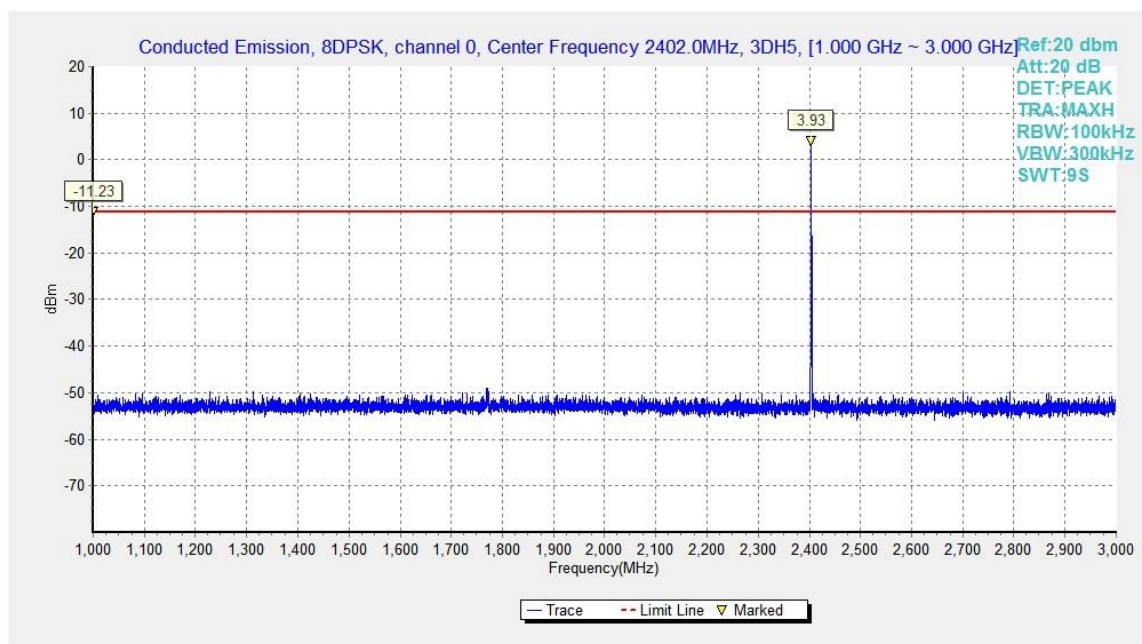


Fig.54. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

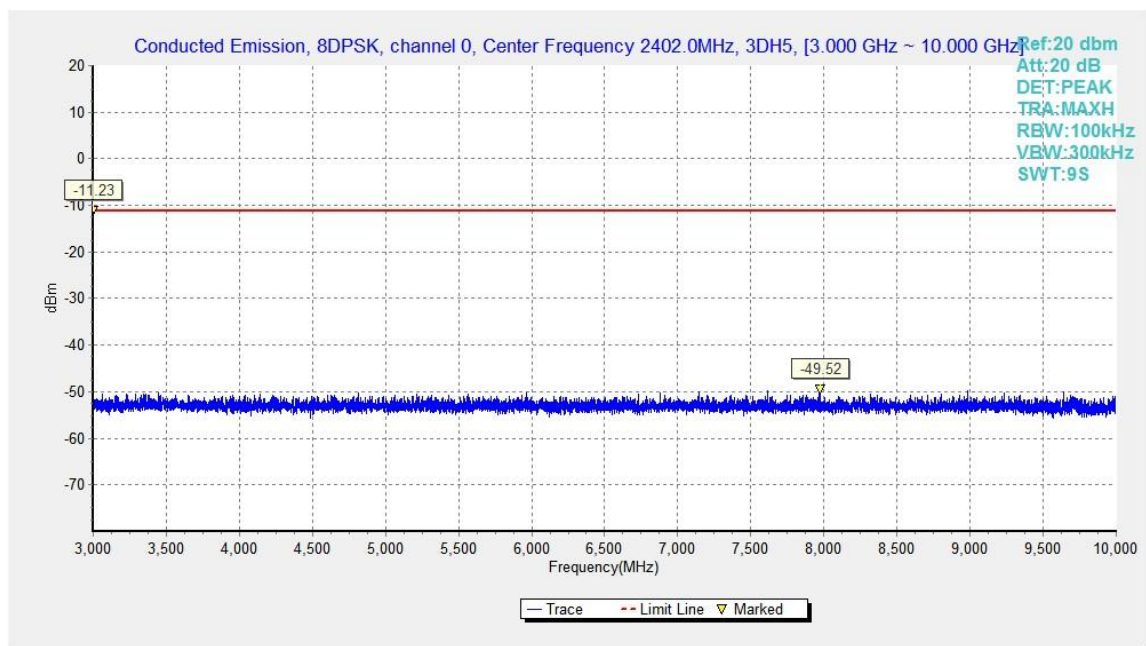


Fig.55. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

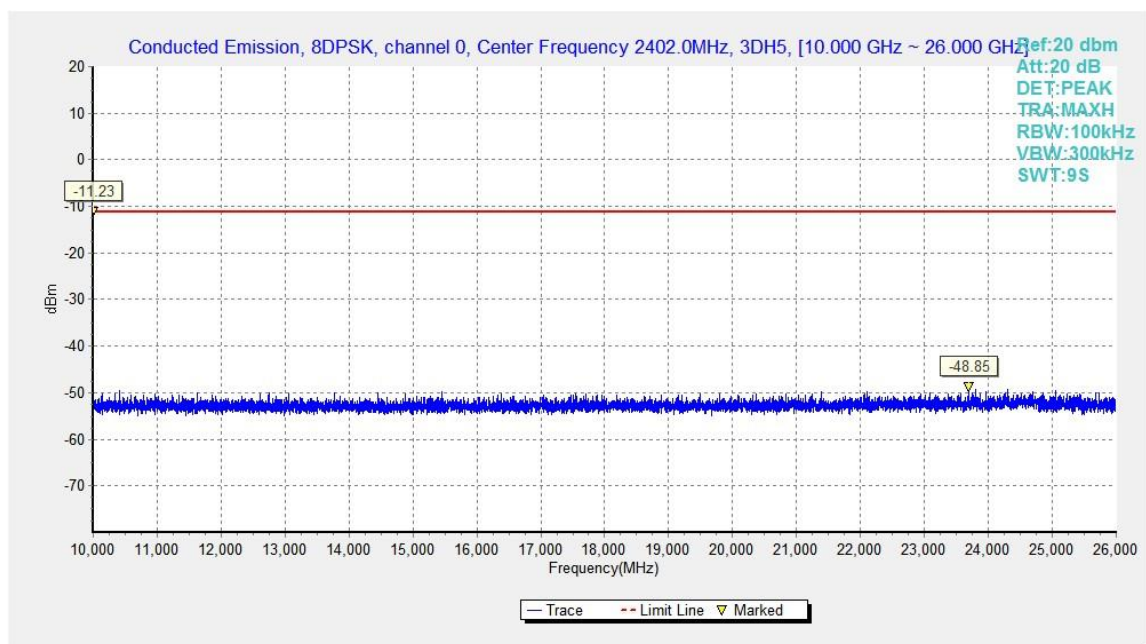


Fig.56. Conducted spurious emission: 8DPSK, Channel 0, 10GHz - 26GHz

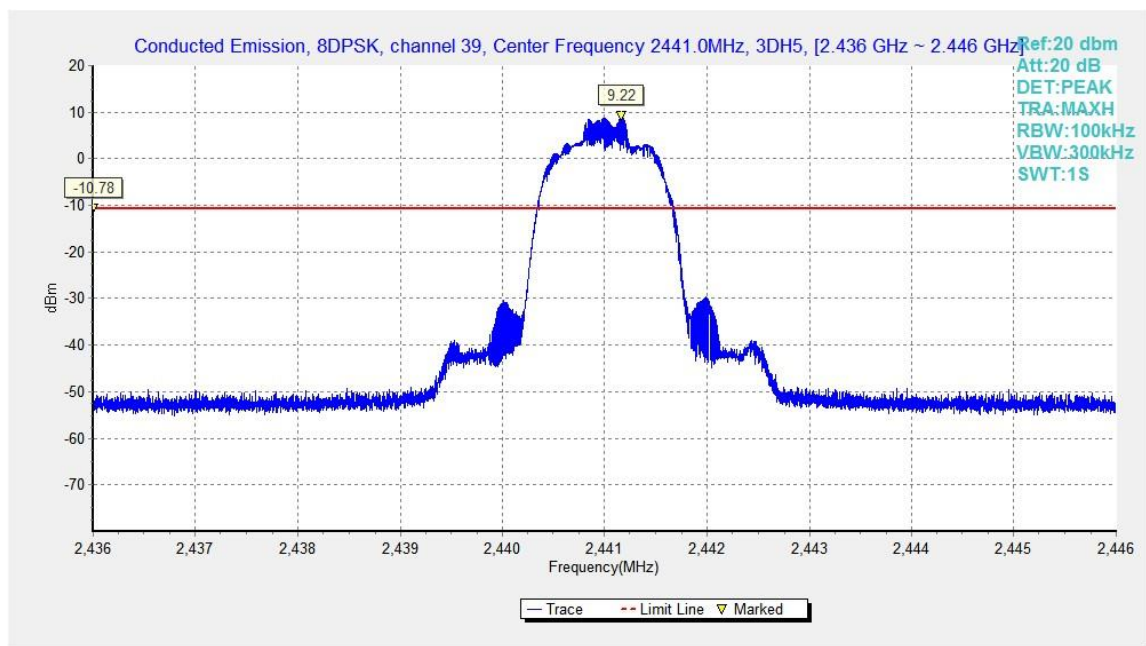


Fig.57. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

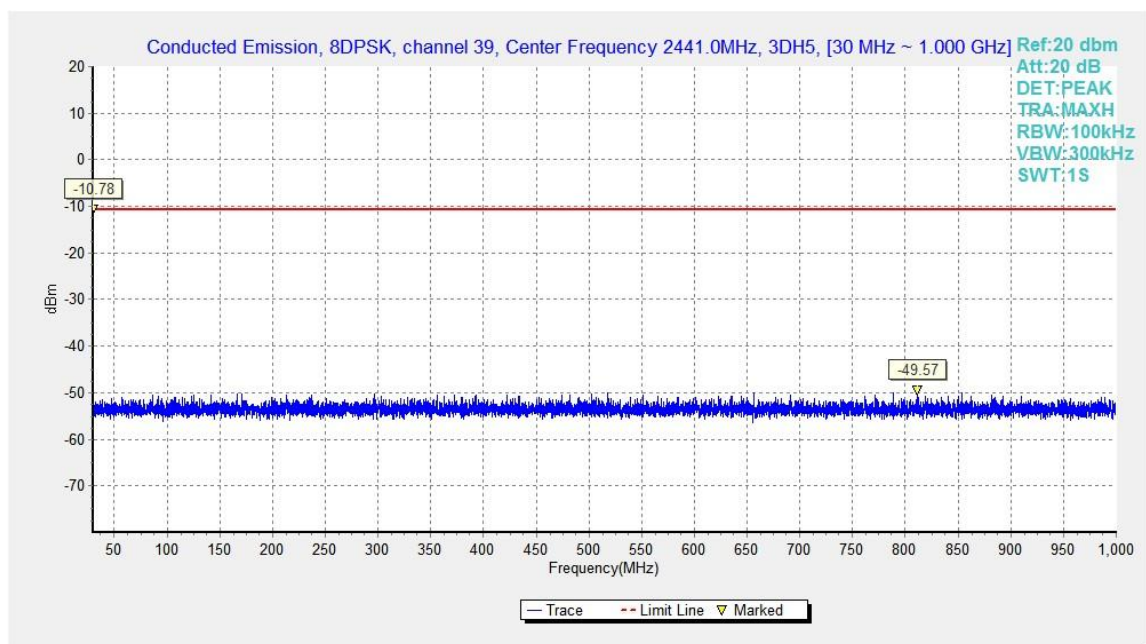


Fig.58. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

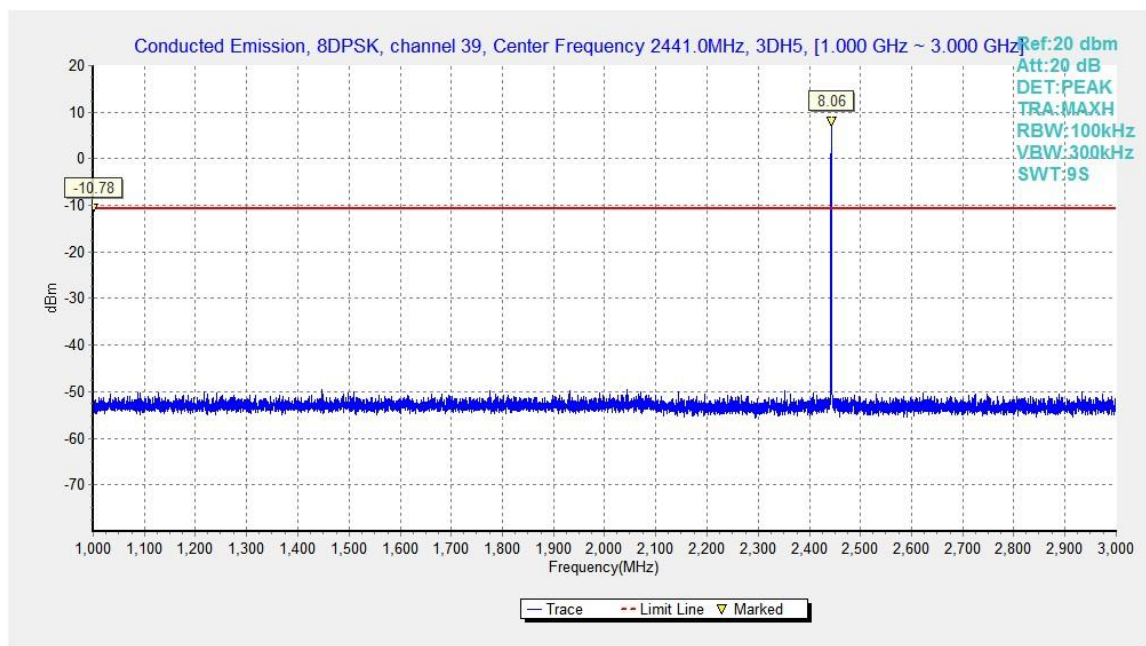


Fig.59. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

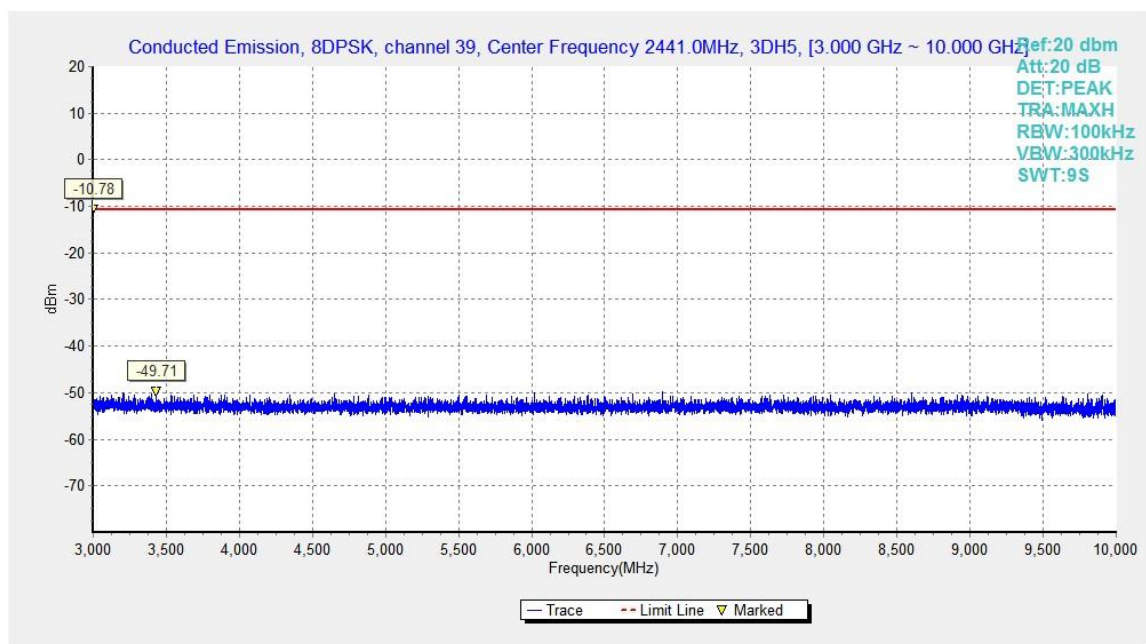


Fig.60. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

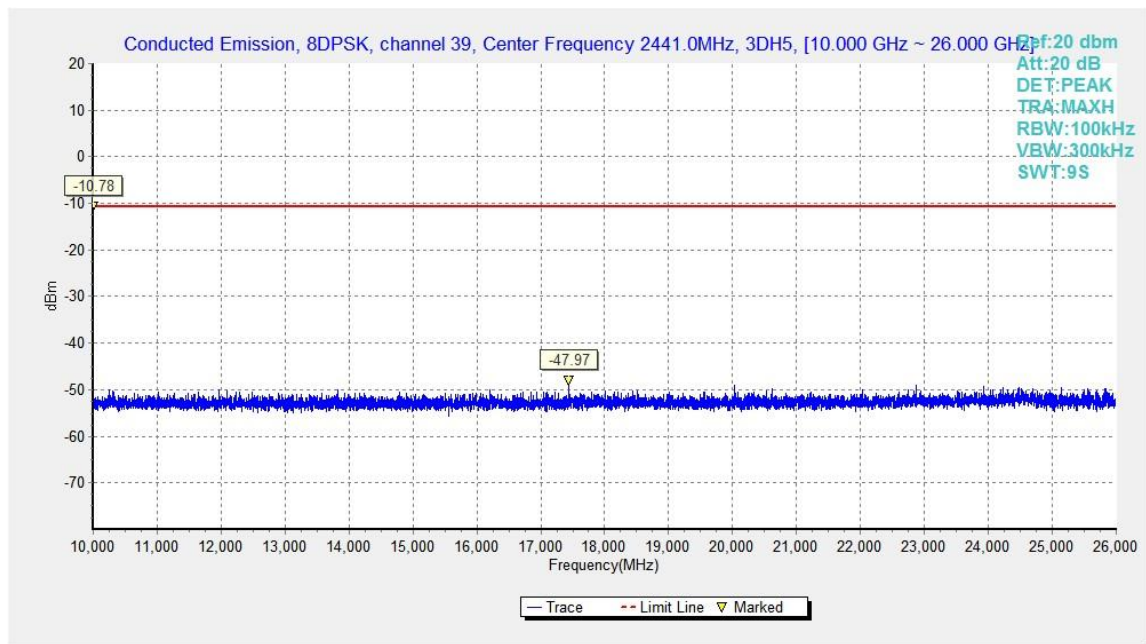


Fig.61. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

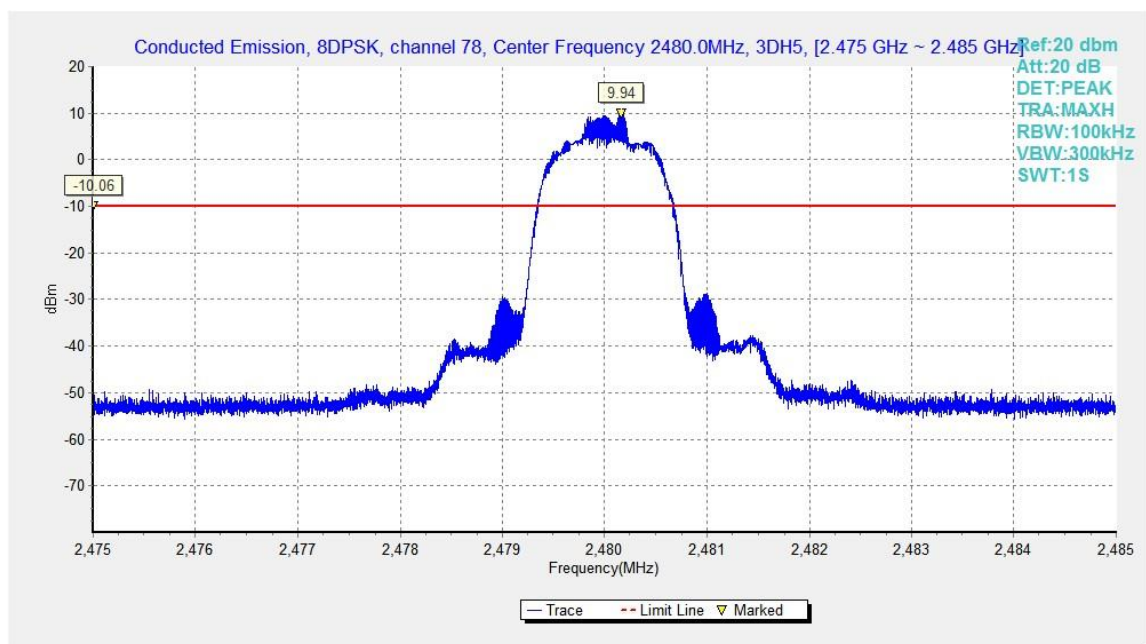


Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

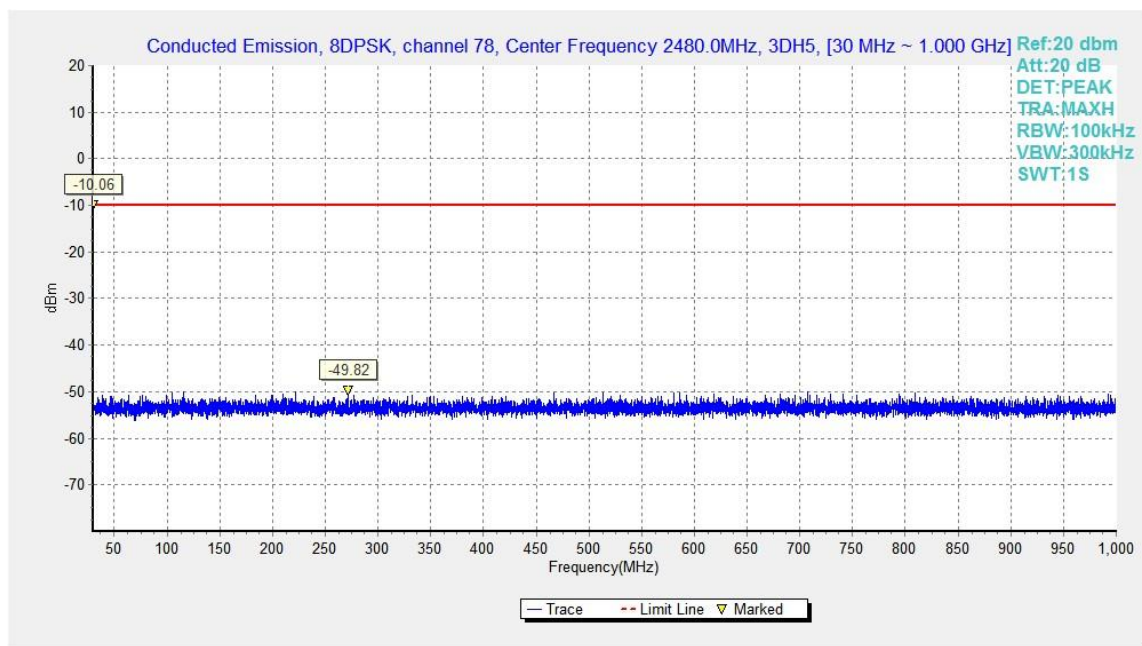


Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

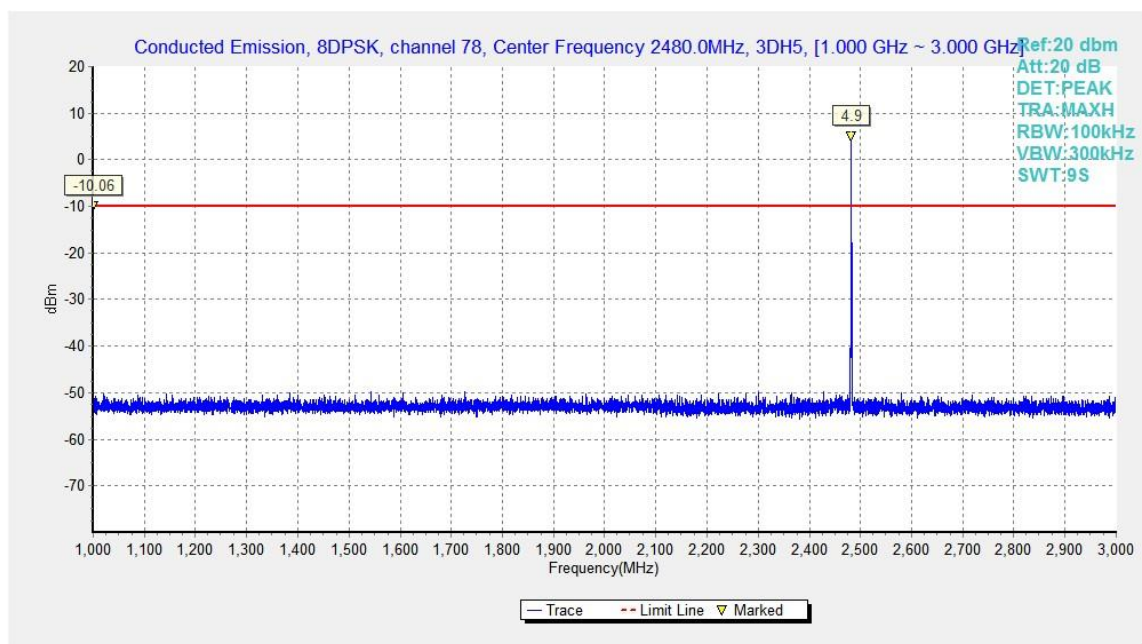


Fig.64. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

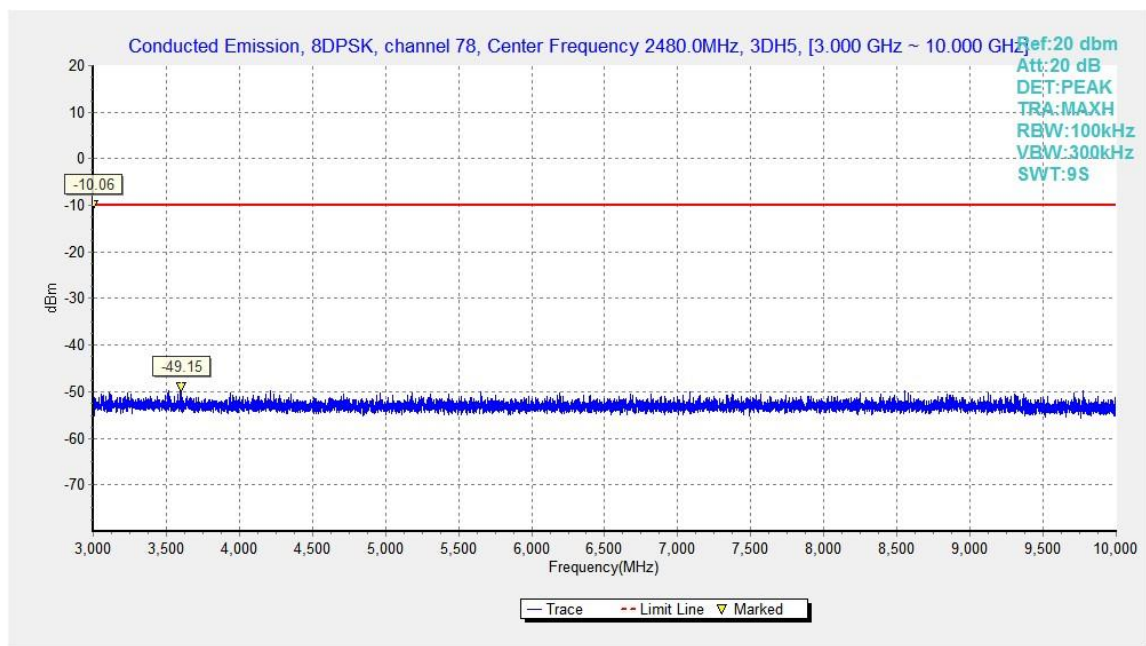


Fig.65. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

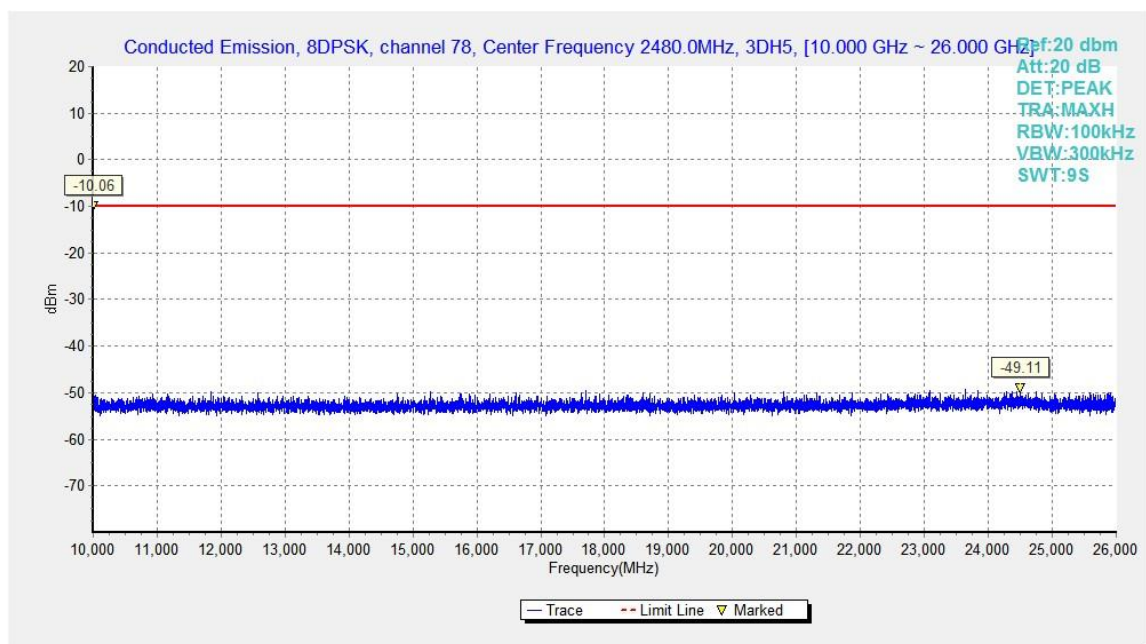


Fig.66. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

## B.5. Radiated Unwanted Emission

### Limits

#### Measurement Limit

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

In addition, 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( $\mu\text{V/m}$ ) | Measurement distance (m) |
|-----------------|-----------------------------------|--------------------------|
| 0.009 - 0.490   | $2400/F(\text{kHz})$              | 300                      |
| 0.490 - 1.705   | $24000/F(\text{kHz})$             | 30                       |
| 1.705 – 30.0    | 30                                | 30                       |

| Frequency of emission (MHz) | Field strength ( $\mu\text{V/m}$ ) | 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                        |

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor.

### Test setup

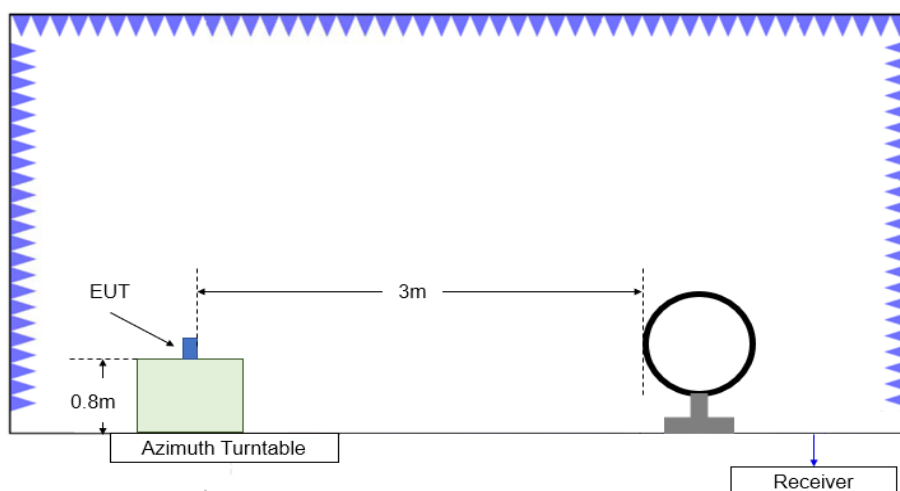
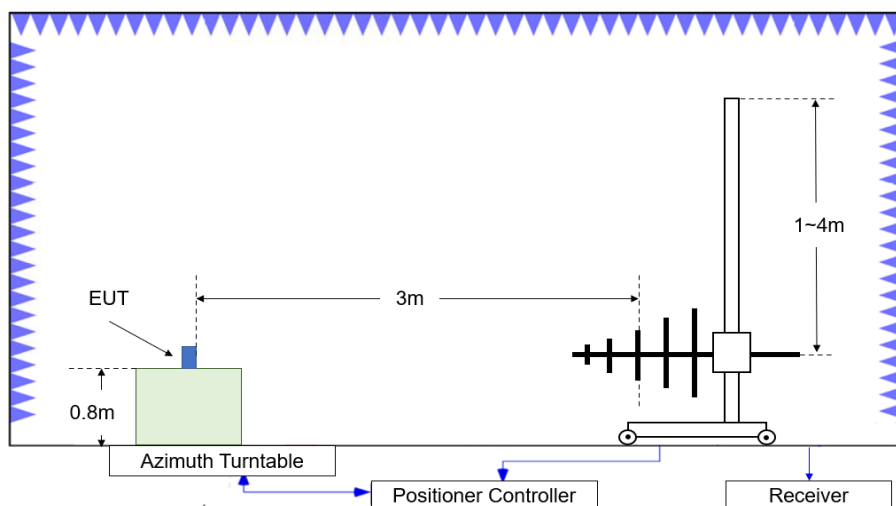
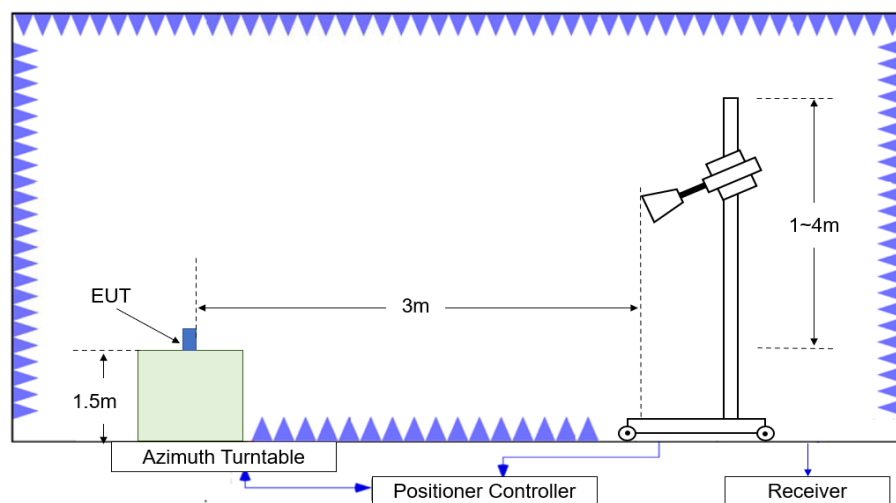


Figure B.5.1. Test Site Diagram (9kHz-30MHz)



**Figure B.5.2. Test Site Diagram (30MHz-1GHz)**



**Figure B.5.3. Test Site Diagram (1GHz-40GHz)**

### Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10-2013 (ANSI C63.10-2020).

Test setting

| Frequency of emission (MHz) | RBW/VBW       | Sweep Time(s) |
|-----------------------------|---------------|---------------|
| 30-1000                     | 100kHz/300kHz | 5             |
| 1000-3000                   | 1MHz/3MHz     | 15            |
| 3000-18000                  | 1MHz/3MHz     | 40            |
| 18000-26500                 | 1MHz/3MHz     | 20            |

### Sample Calculation

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= $P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + \text{CableLoss} + \text{Antenna Factor}$

**Test note**

1. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
2. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB.
3. Measurement frequencies were performed from 9 kHz to the 10<sup>th</sup> harmonic of highest fundamental frequency or 40GHz, whichever is lower.
4. No spurious emissions were detected within 20dB of the limit below 30MHz. OFS and semi-chamber comparison testing had been performed and the result came out very similar.  
(KDB 414788)

## Test Result

EUT ID:EUT1

### Radiated Spurious Emission

#### 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17899.500       | 55.75                       | -25.90          | 46.00                 | 35.65                   | 74.00          | 18.25       | H                  |
| 13738.000       | 51.74                       | -29.10          | 41.10                 | 39.74                   | 74.00          | 22.26       | V                  |
| 12996.000       | 49.68                       | -29.40          | 40.10                 | 38.98                   | 74.00          | 24.32       | V                  |
| 8417.500        | 47.64                       | -33.80          | 37.40                 | 44.04                   | 74.00          | 26.36       | H                  |
| 7429.500        | 46.89                       | -34.50          | 36.50                 | 44.89                   | 74.00          | 27.11       | H                  |
| 2348.800        | 55.93                       | -19.30          | 28.20                 | 47.03                   | 74.00          | 18.07       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17924.500       | 56.22                       | -25.90          | 46.00                 | 36.12                   | 74.00          | 17.78       | V                  |
| 13782.000       | 51.77                       | -29.00          | 41.20                 | 39.57                   | 74.00          | 22.23       | V                  |
| 12829.000       | 48.99                       | -30.30          | 39.90                 | 39.39                   | 74.00          | 25.01       | H                  |
| 9418.000        | 46.55                       | -33.50          | 37.90                 | 42.15                   | 74.00          | 27.45       | V                  |
| 7411.500        | 46.53                       | -34.40          | 36.60                 | 44.33                   | 74.00          | 27.47       | V                  |
| 4770.000        | 41.92                       | -37.00          | 33.10                 | 45.82                   | 74.00          | 32.08       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17917.000       | 56.00                       | -25.90          | 46.00                 | 35.90                   | 74.00          | 18.00       | V                  |
| 14107.000       | 51.43                       | -29.10          | 41.70                 | 38.83                   | 74.00          | 22.57       | V                  |
| 12763.000       | 49.01                       | -30.50          | 39.60                 | 39.91                   | 74.00          | 24.99       | V                  |
| 9583.500        | 46.80                       | -33.00          | 37.50                 | 42.30                   | 74.00          | 27.20       | H                  |
| 7632.500        | 46.10                       | -34.60          | 36.30                 | 44.40                   | 74.00          | 27.90       | H                  |
| 2486.400        | 56.32                       | -19.00          | 28.20                 | 47.12                   | 74.00          | 17.68       | H                  |

#### $\pi/4$ 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17910.000       | 55.82                       | -25.90          | 46.00                 | 35.72                   | 74.00          | 18.18       | V                  |
| 13817.000       | 52.52                       | -28.90          | 41.20                 | 40.22                   | 74.00          | 21.48       | V                  |
| 11843.500       | 48.74                       | -31.10          | 39.10                 | 40.74                   | 74.00          | 25.26       | H                  |
| 9609.000        | 46.55                       | -33.00          | 37.60                 | 41.95                   | 74.00          | 27.45       | V                  |
| 7204.000        | 46.39                       | -34.50          | 36.20                 | 44.69                   | 74.00          | 27.61       | H                  |
| 2342.100        | 56.01                       | -19.30          | 28.20                 | 47.11                   | 74.00          | 17.99       | V                  |

#### $\pi/4$ 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17945.500       | 55.87                       | -25.90          | 46.00                 | 35.77                   | 74.00          | 18.13       | H                  |
| 14038.000       | 51.37                       | -28.90          | 41.60                 | 38.67                   | 74.00          | 22.63       | H                  |
| 11832.000       | 49.56                       | -31.10          | 39.10                 | 41.56                   | 74.00          | 24.44       | H                  |
| 9027.500        | 46.51                       | -33.50          | 37.80                 | 42.21                   | 74.00          | 27.49       | V                  |
| 7612.500        | 46.21                       | -34.70          | 36.30                 | 44.61                   | 74.00          | 27.79       | H                  |
| 4881.500        | 42.36                       | -36.90          | 33.40                 | 45.86                   | 74.00          | 31.64       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17417.000       | 55.40                       | -27.30          | 43.80                 | 38.90                   | 74.00          | 18.60       | H                  |
| 13846.500       | 51.12                       | -28.90          | 41.20                 | 38.82                   | 74.00          | 22.88       | H                  |
| 12955.500       | 48.83                       | -29.70          | 40.00                 | 38.43                   | 74.00          | 25.17       | V                  |
| 9076.000        | 48.08                       | -33.60          | 37.70                 | 43.98                   | 74.00          | 25.92       | V                  |
| 7187.500        | 46.32                       | -34.50          | 36.20                 | 44.62                   | 74.00          | 27.68       | V                  |
| 2493.600        | 56.83                       | -19.00          | 28.20                 | 47.63                   | 74.00          | 17.17       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17907.000       | 55.63                       | -25.90          | 46.00                 | 35.53                   | 74.00          | 18.37       | H                  |
| 13699.500       | 51.68                       | -29.30          | 41.00                 | 39.98                   | 74.00          | 22.32       | H                  |
| 11859.000       | 49.79                       | -31.10          | 39.10                 | 41.79                   | 74.00          | 24.21       | V                  |
| 9540.500        | 46.88                       | -33.10          | 37.60                 | 42.38                   | 74.00          | 27.12       | H                  |
| 7623.500        | 46.34                       | -34.70          | 36.30                 | 44.74                   | 74.00          | 27.66       | V                  |
| 2386.900        | 56.24                       | -19.20          | 28.20                 | 47.24                   | 74.00          | 17.76       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17922.000       | 56.08                       | -25.90          | 46.00                 | 35.98                   | 74.00          | 17.92       | V                  |
| 13588.500       | 51.69                       | -29.80          | 40.80                 | 40.69                   | 74.00          | 22.31       | V                  |
| 12261.500       | 48.58                       | -30.40          | 39.00                 | 40.08                   | 74.00          | 25.42       | V                  |
| 9199.000        | 47.19                       | -33.80          | 37.70                 | 43.29                   | 74.00          | 26.81       | H                  |
| 7526.500        | 46.27                       | -34.80          | 36.30                 | 44.77                   | 74.00          | 27.73       | V                  |
| 4882.500        | 41.55                       | -36.90          | 33.40                 | 45.05                   | 74.00          | 32.45       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17948.000       | 56.11                       | -25.90          | 46.00                 | 36.01                   | 74.00          | 17.89       | H                  |
| 14069.000       | 51.74                       | -29.10          | 41.70                 | 39.14                   | 74.00          | 22.26       | H                  |
| 12561.000       | 48.99                       | -30.40          | 39.20                 | 40.19                   | 74.00          | 25.01       | V                  |
| 8956.500        | 47.32                       | -33.60          | 37.70                 | 43.22                   | 74.00          | 26.68       | V                  |
| 7532.000        | 46.29                       | -34.80          | 36.30                 | 44.79                   | 74.00          | 27.71       | H                  |
| 2499.600        | 56.97                       | -19.00          | 28.20                 | 47.77                   | 74.00          | 17.03       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17893.000       | 46.28                       | -25.90          | 46.00                 | 26.18                   | 54.00          | 7.72        | H                  |
| 14088.000       | 42.04                       | -29.10          | 41.70                 | 29.44                   | 54.00          | 11.96       | V                  |
| 4803.500        | 41.65                       | -36.90          | 33.00                 | 45.55                   | 54.00          | 12.35       | H                  |
| 12832.500       | 39.69                       | -30.30          | 39.90                 | 30.09                   | 54.00          | 14.31       | H                  |
| 9081.000        | 36.92                       | -33.60          | 37.70                 | 32.82                   | 54.00          | 17.08       | H                  |
| 2361.200        | 44.28                       | -19.30          | 28.20                 | 35.38                   | 54.00          | 9.72        | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17924.500       | 46.61                       | -25.90          | 46.00                 | 26.51                   | 54.00          | 7.39        | V                  |
| 14116.500       | 41.61                       | -29.40          | 41.70                 | 29.31                   | 54.00          | 12.39       | V                  |
| 12841.000       | 39.44                       | -30.30          | 39.90                 | 29.84                   | 54.00          | 14.56       | V                  |
| 9611.500        | 37.21                       | -33.00          | 37.60                 | 32.61                   | 54.00          | 16.79       | H                  |
| 7436.500        | 36.31                       | -34.50          | 36.50                 | 34.31                   | 54.00          | 17.69       | V                  |
| 4882.000        | 35.81                       | -36.90          | 33.40                 | 39.31                   | 54.00          | 18.19       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17913.500       | 46.34                       | -25.90          | 46.00                 | 26.24                   | 54.00          | 7.66        | H                  |
| 13802.500       | 42.28                       | -29.00          | 41.20                 | 30.08                   | 54.00          | 11.72       | H                  |
| 12837.500       | 39.32                       | -30.30          | 39.90                 | 29.72                   | 54.00          | 14.68       | V                  |
| 4960.000        | 39.22                       | -36.80          | 33.60                 | 42.42                   | 54.00          | 14.78       | H                  |
| 9054.500        | 37.13                       | -33.50          | 37.80                 | 32.83                   | 54.00          | 16.87       | H                  |
| 2496.900        | 45.00                       | -19.00          | 28.20                 | 35.80                   | 54.00          | 9.00        | H                  |

#### $\pi/4$ 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17920.000       | 46.28                       | -25.90          | 46.00                 | 26.18                   | 54.00          | 7.72        | V                  |
| 4803.500        | 42.13                       | -36.90          | 33.00                 | 46.03                   | 54.00          | 11.87       | H                  |
| 13824.500       | 41.97                       | -28.90          | 41.20                 | 29.67                   | 54.00          | 12.03       | V                  |
| 12979.500       | 39.29                       | -29.40          | 40.10                 | 28.59                   | 54.00          | 14.71       | V                  |
| 8525.500        | 37.06                       | -33.80          | 37.40                 | 33.46                   | 54.00          | 16.94       | H                  |
| 2373.600        | 44.31                       | -19.30          | 28.20                 | 35.41                   | 54.00          | 9.69        | V                  |

#### $\pi/4$ 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17918.500       | 46.25                       | -25.90          | 46.00                 | 26.15                   | 54.00          | 7.75        | H                  |
| 13712.000       | 41.76                       | -29.30          | 41.00                 | 30.06                   | 54.00          | 12.24       | H                  |
| 12401.500       | 38.97                       | -30.10          | 38.90                 | 30.17                   | 54.00          | 15.03       | H                  |
| 9426.500        | 37.35                       | -33.50          | 37.90                 | 32.95                   | 54.00          | 16.65       | H                  |
| 7526.500        | 37.10                       | -34.80          | 36.30                 | 35.60                   | 54.00          | 16.90       | H                  |
| 4881.500        | 35.85                       | -36.90          | 33.40                 | 39.35                   | 54.00          | 18.15       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17893.500       | 46.39                       | -25.90          | 46.00                 | 26.29                   | 54.00          | 7.61        | H                  |
| 4960.000        | 42.35                       | -36.80          | 33.60                 | 45.55                   | 54.00          | 11.65       | H                  |
| 13789.000       | 41.82                       | -29.00          | 41.20                 | 29.62                   | 54.00          | 12.18       | H                  |
| 12983.500       | 39.03                       | -29.40          | 40.10                 | 28.33                   | 54.00          | 14.97       | V                  |
| 9814.500        | 37.17                       | -33.10          | 37.90                 | 32.37                   | 54.00          | 16.83       | H                  |
| 2485.800        | 44.77                       | -19.00          | 28.20                 | 35.57                   | 54.00          | 9.23        | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17932.000       | 46.59                       | -25.90          | 46.00                 | 26.49                   | 54.00          | 7.41        | V                  |
| 14125.500       | 41.63                       | -29.40          | 41.70                 | 29.33                   | 54.00          | 12.37       | H                  |
| 4804.000        | 39.68                       | -36.90          | 33.00                 | 43.58                   | 54.00          | 14.32       | H                  |
| 12400.500       | 39.41                       | -30.10          | 38.90                 | 30.61                   | 54.00          | 14.59       | V                  |
| 9626.500        | 37.30                       | -33.00          | 37.60                 | 32.70                   | 54.00          | 16.70       | H                  |
| 2385.000        | 44.54                       | -19.20          | 28.20                 | 35.54                   | 54.00          | 9.46        | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17905.500       | 46.41                       | -25.90          | 46.00                 | 26.31                   | 54.00          | 7.59        | H                  |
| 13834.000       | 42.18                       | -28.90          | 41.20                 | 29.88                   | 54.00          | 11.82       | V                  |
| 12384.000       | 39.16                       | -30.10          | 38.90                 | 30.36                   | 54.00          | 14.84       | V                  |
| 9721.000        | 37.26                       | -33.10          | 37.80                 | 32.56                   | 54.00          | 16.74       | H                  |
| 7433.500        | 36.77                       | -34.50          | 36.50                 | 34.77                   | 54.00          | 17.23       | H                  |
| 4882.000        | 36.30                       | -36.90          | 33.40                 | 39.80                   | 54.00          | 17.70       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17967.500       | 46.22                       | -25.90          | 46.00                 | 26.12                   | 54.00          | 7.78        | H                  |
| 13813.000       | 41.66                       | -28.90          | 41.20                 | 29.36                   | 54.00          | 12.34       | H                  |
| 4960.000        | 40.23                       | -36.80          | 33.60                 | 43.43                   | 54.00          | 13.77       | H                  |
| 12988.000       | 39.19                       | -29.40          | 40.10                 | 28.49                   | 54.00          | 14.81       | V                  |
| 9929.000        | 37.42                       | -33.30          | 37.90                 | 32.82                   | 54.00          | 16.58       | V                  |
| 2499.800        | 44.76                       | -19.00          | 28.20                 | 35.56                   | 54.00          | 9.24        | V                  |

**Conclusion: Pass**

Note: the spurious emission above 18G is noise only and did not show on the report.

**Band edge compliance**

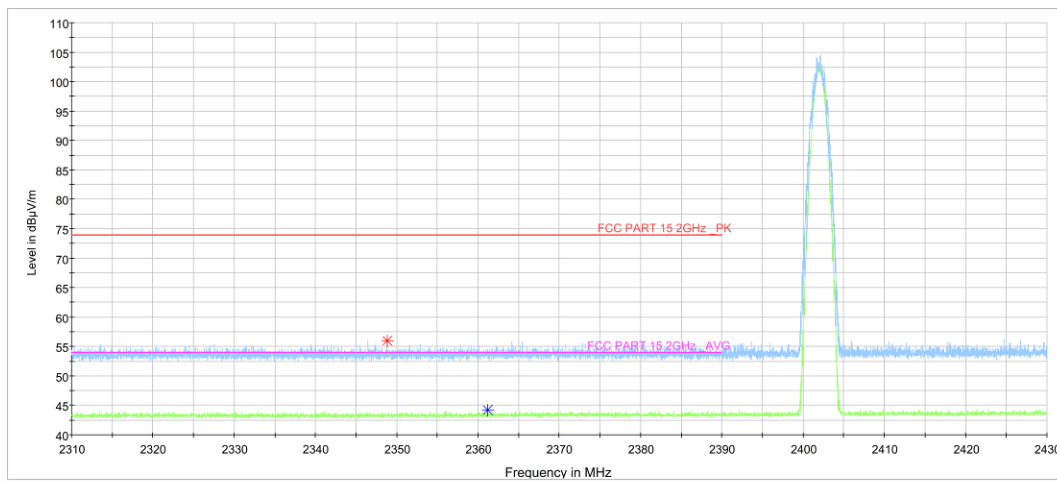
| Mode | Channel | Frequency Range  | Test Results | Conclusion |
|------|---------|------------------|--------------|------------|
| GFSK | 0       | 2.31GHz ~2.43GHz | Fig.67       | P          |
|      | 78      | 2.45GHz ~2.5GHz  | Fig.68       | P          |

| Mode          | Channel | Frequency Range  | Test Results | Conclusion |
|---------------|---------|------------------|--------------|------------|
| $\pi/4$ DQPSK | 0       | 2.31GHz ~2.43GHz | Fig.69       | P          |
|               | 78      | 2.45GHz ~2.5GHz  | Fig.70       | P          |

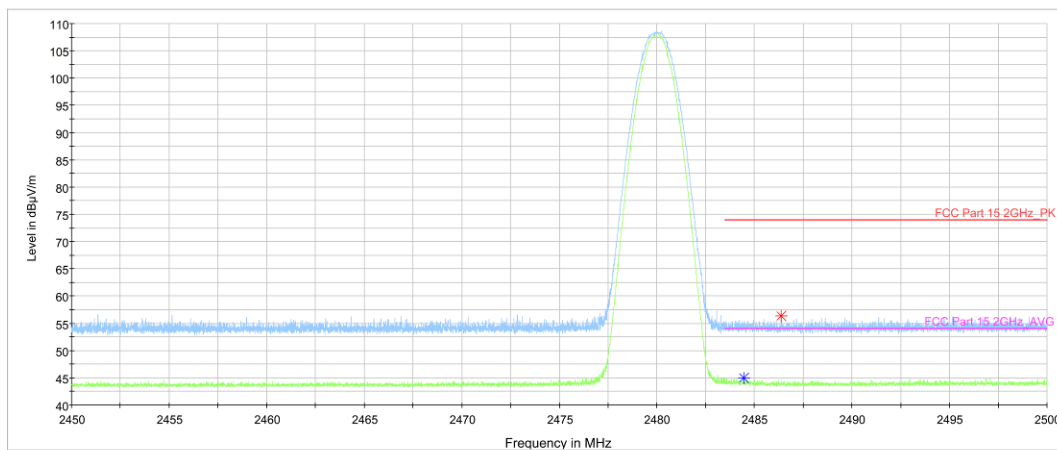
| Mode  | Channel | Frequency Range  | Test Results | Conclusion |
|-------|---------|------------------|--------------|------------|
| 8DPSK | 0       | 2.31GHz ~2.43GHz | Fig.71       | P          |
|       | 78      | 2.45GHz ~2.5GHz  | Fig.72       | P          |

**Conclusion: PASS**

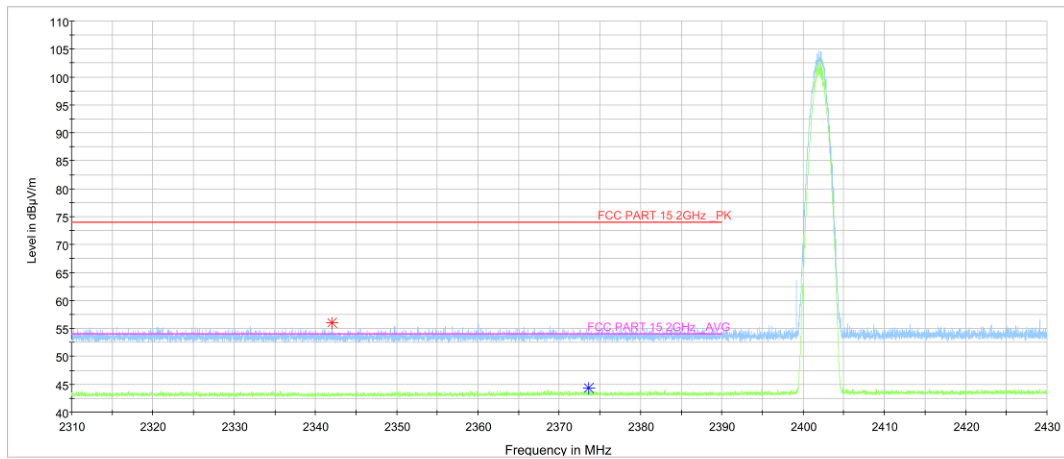
**Test graphs as below**



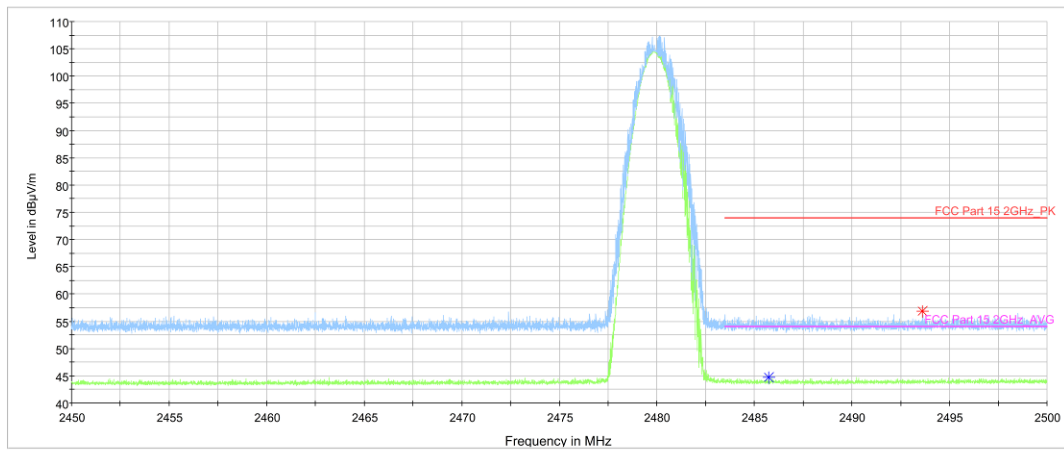
**Fig.67. Frequency Band Edges: GFSK, Channel 0, Hopping Off, 2.31 GHz – 2.45GHz**



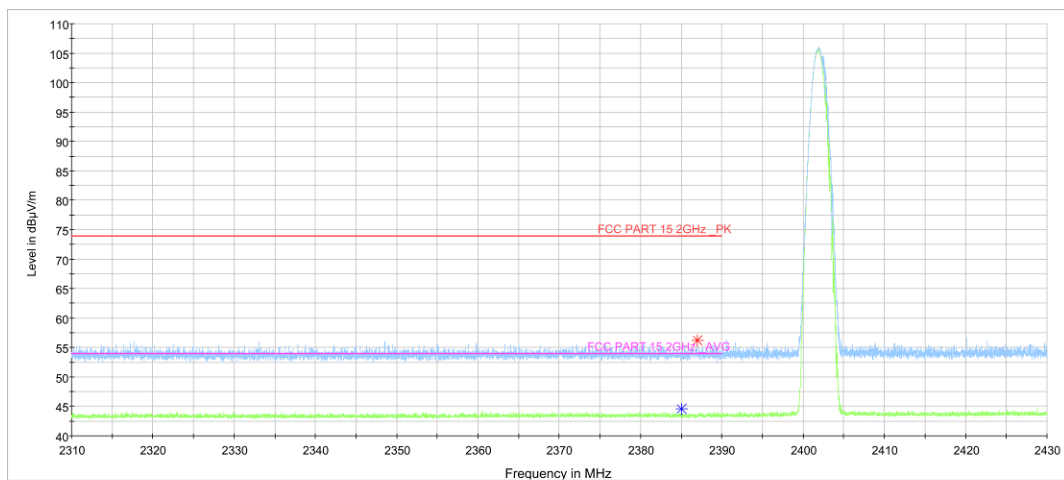
**Fig.68. Frequency Band Edges: GFSK, Channel 78, Hopping Off, ch11, 2.45 GHz - 2.50GHz**



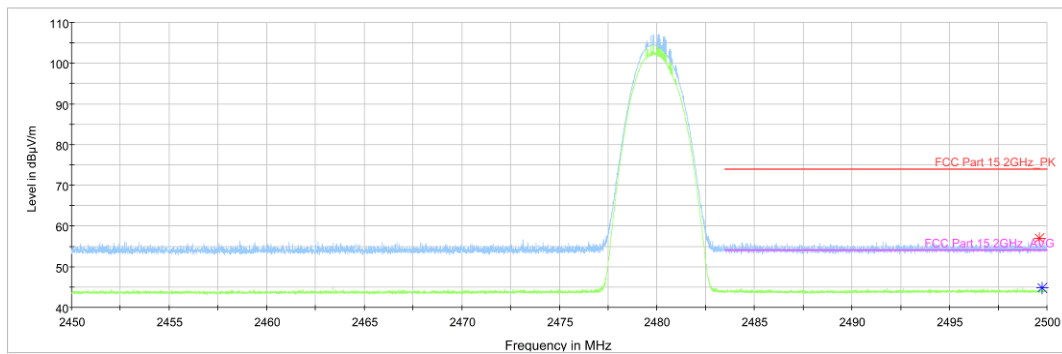
**Fig.69. Frequency Band Edges:  $\pi/4$  DQPSK, Channel 0, Hopping Off, 2.31 GHz - 2.45GHz**



**Fig.70. Frequency Band Edges:  $\pi/4$  DQPSK, Channel 78, Hopping Off, 2.45 GHz - 2.50GHz**



**Fig.71. Frequency Band Edges: 8DPSK, Channel 0, 2.31 GHz - 2.45GHz**



**Fig.72. Frequency Band Edges: 8DPSK, Channel 78, 2.45 GHz - 2.50GHz**

## B.6. 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 |
|---------|--------|-----------------|------|-------------------------|-----|-----------------|------------|
| 39      | DH1    | Fig.73          | 0.37 | Fig.74                  | 320 | 118.4           | P          |
|         | DH3    | Fig.75          | 1.63 | Fig.76                  | 110 | 179.3           | P          |
|         | DH5    | Fig.77          | 2.88 | Fig.78                  | 59  | 169.92          | P          |

#### For $\pi/4$ DQPSK

| Channel | Packet | Pulse time (ms) |      | Number of Transmissions |     | Dwell Time (ms) | Conclusion |
|---------|--------|-----------------|------|-------------------------|-----|-----------------|------------|
| 39      | 2DH1   | Fig.79          | 0.38 | Fig.80                  | 321 | 121.98          | P          |
|         | 2DH3   | Fig.81          | 1.63 | Fig.82                  | 102 | 166.26          | P          |
|         | 2DH5   | Fig.83          | 2.88 | Fig.84                  | 64  | 184.32          | P          |

### For 8DPSK

| Channel | Packet | Pulse time (ms) |      | Number of Transmissions |     | Dwell Time (ms) | Conclusion |
|---------|--------|-----------------|------|-------------------------|-----|-----------------|------------|
| 39      | 3DH1   | Fig.85          | 0.38 | Fig.86                  | 320 | 121.6           | P          |
|         | 3DH3   | Fig.87          | 1.63 | Fig.88                  | 102 | 166.26          | P          |
|         | 3DH5   | Fig.89          | 2.88 | Fig.90                  | 64  | 184.32          | P          |

**Conclusion: PASS**

**Test graphs as below:**

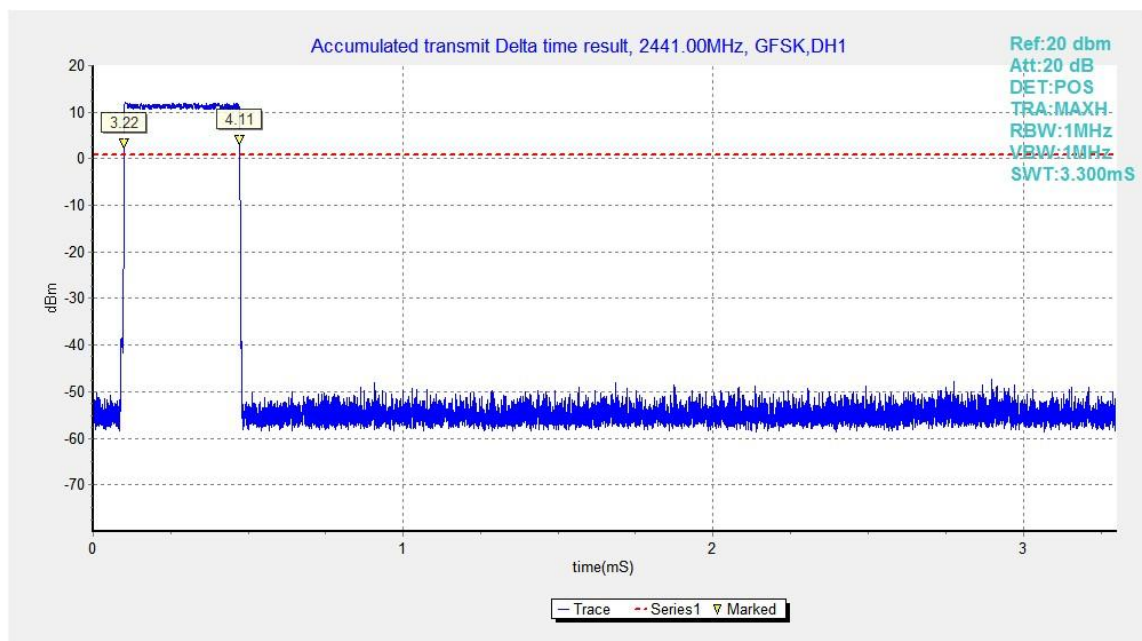


Fig.73. Time of occupancy (Dwell Time): Channel 39, Packet DH1

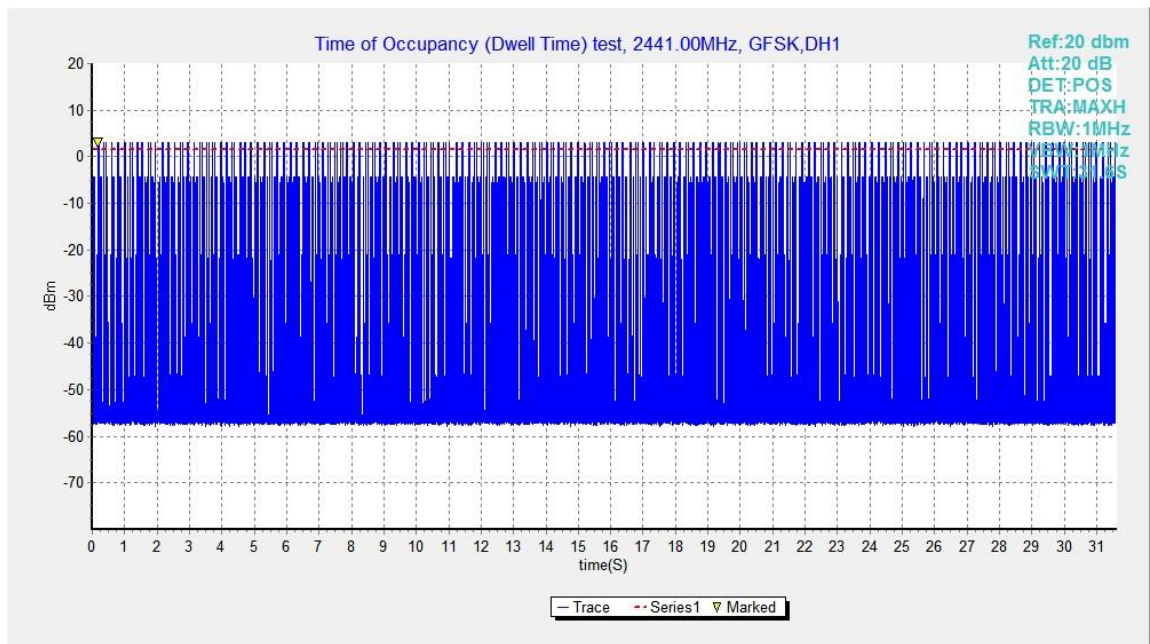


Fig.74. Number of Transmissions Measurement:Channel 39,Packet DH1

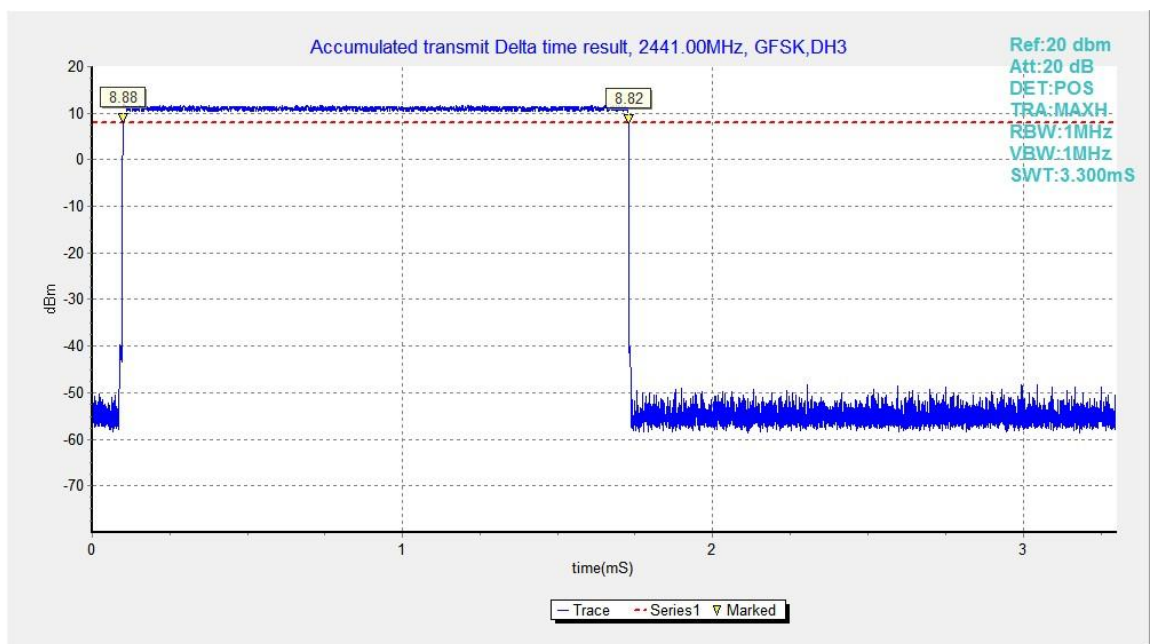


Fig.75. Time of occupancy (Dwell Time): Channel 39, Packet DH3

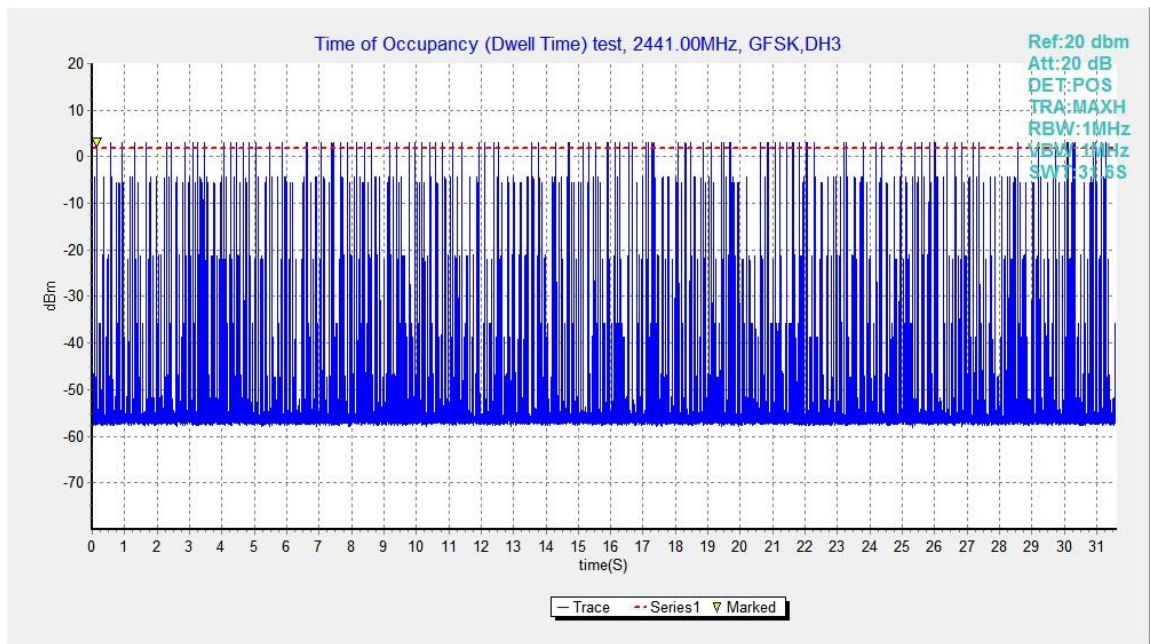


Fig.76. Number of Transmissions Measurement:Channel 39,Packet DH3

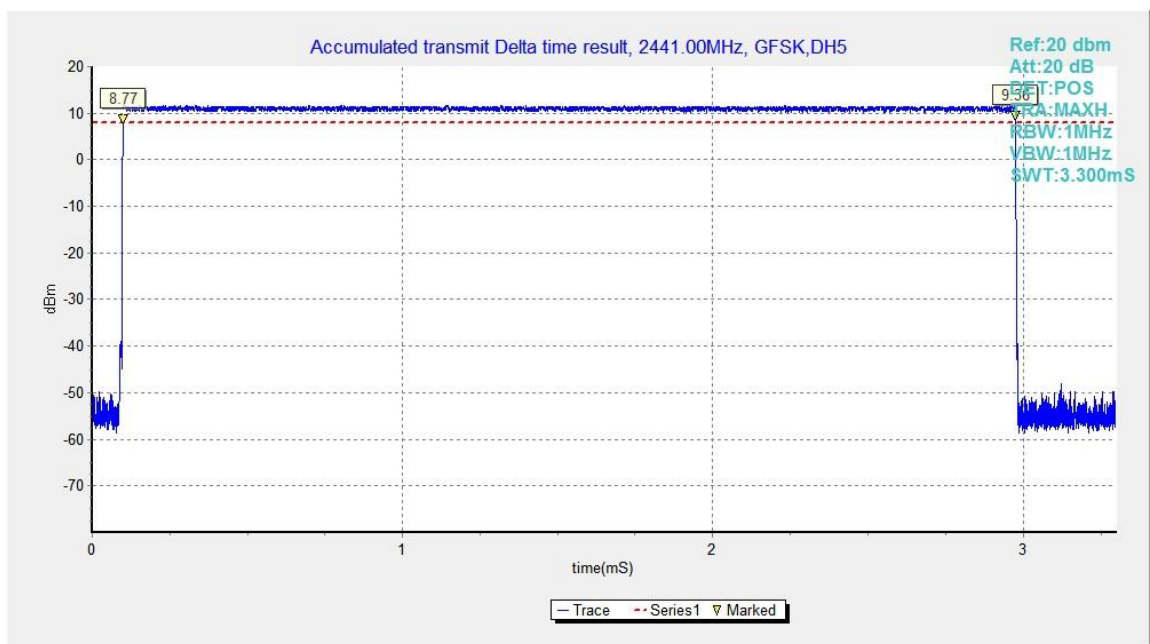


Fig.77. Time of occupancy (Dwell Time): Channel 39, Packet DH5

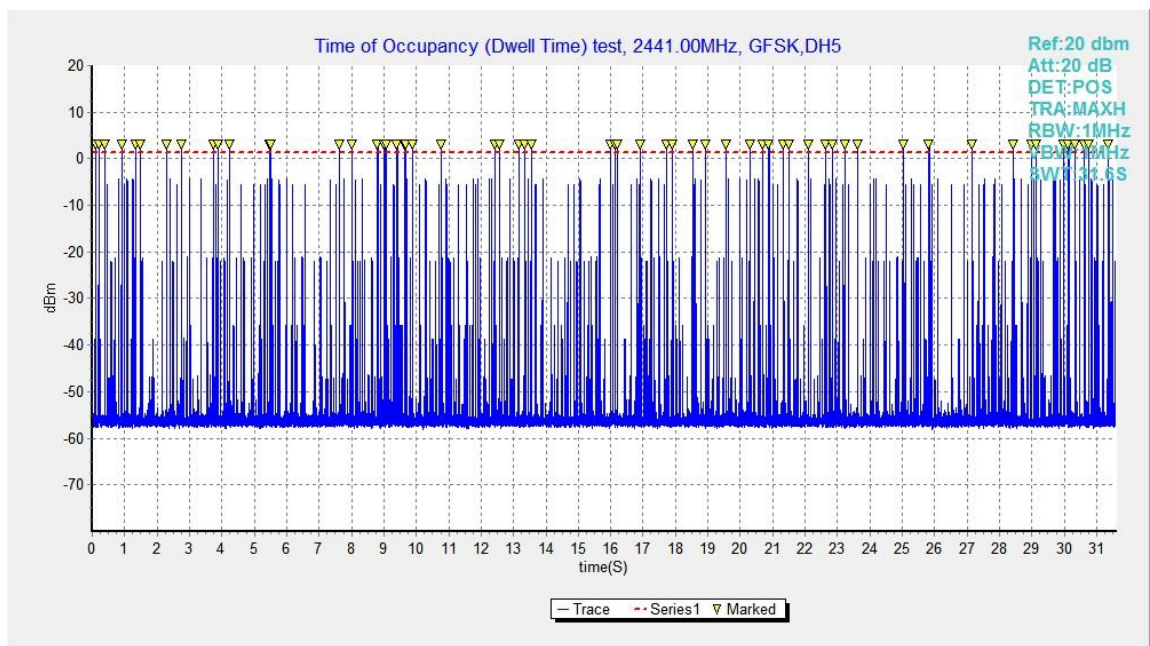


Fig.78. Number of Transmissions Measurement:Channel 39,Packet DH5

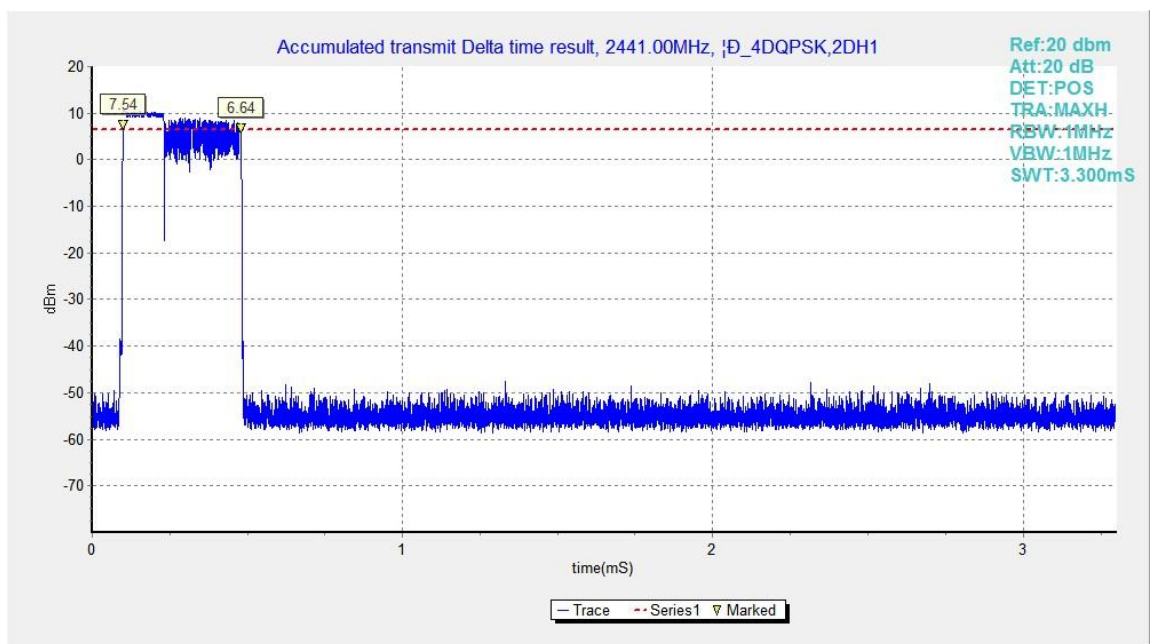


Fig.79. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

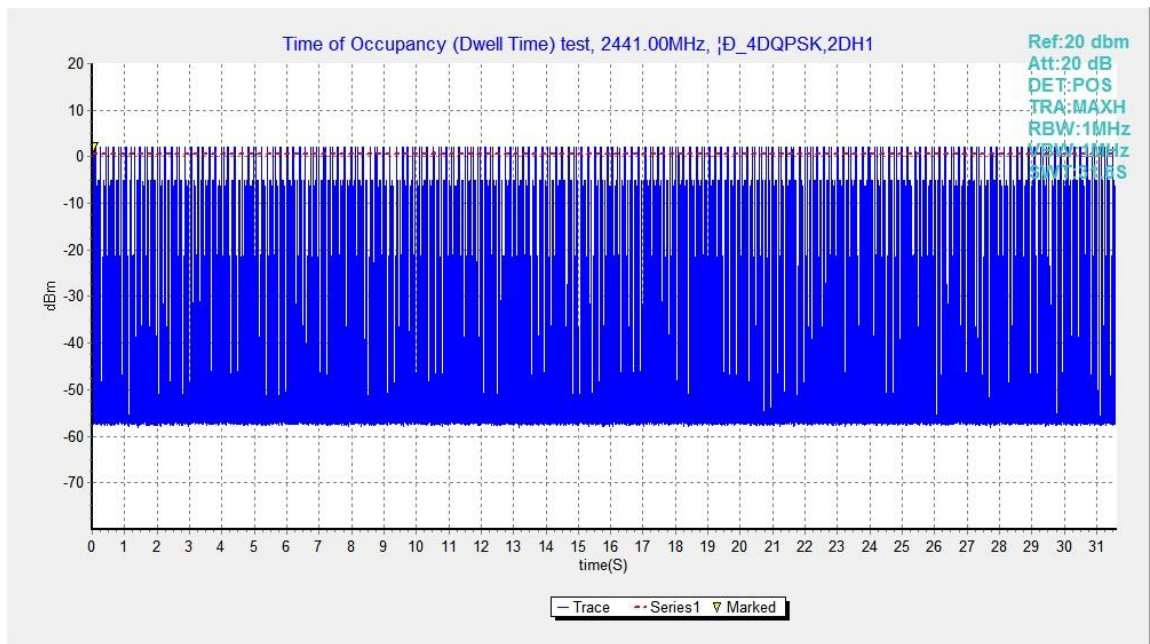


Fig.80. Number of Transmissions Measurement:Channel 39,Packet 2-DH1

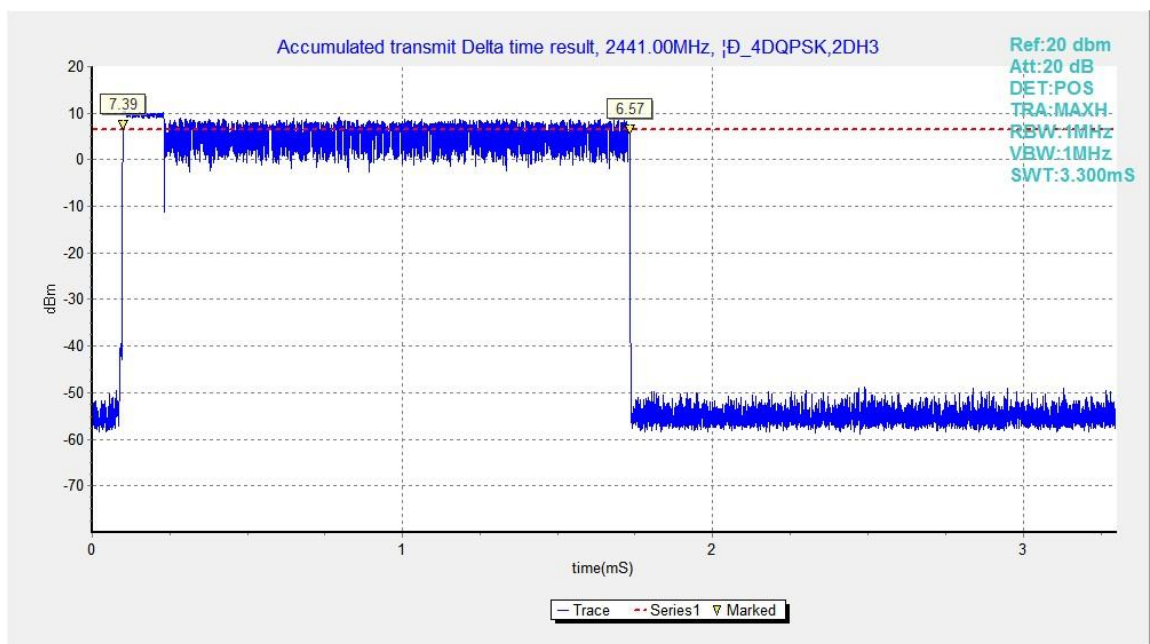


Fig.81. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

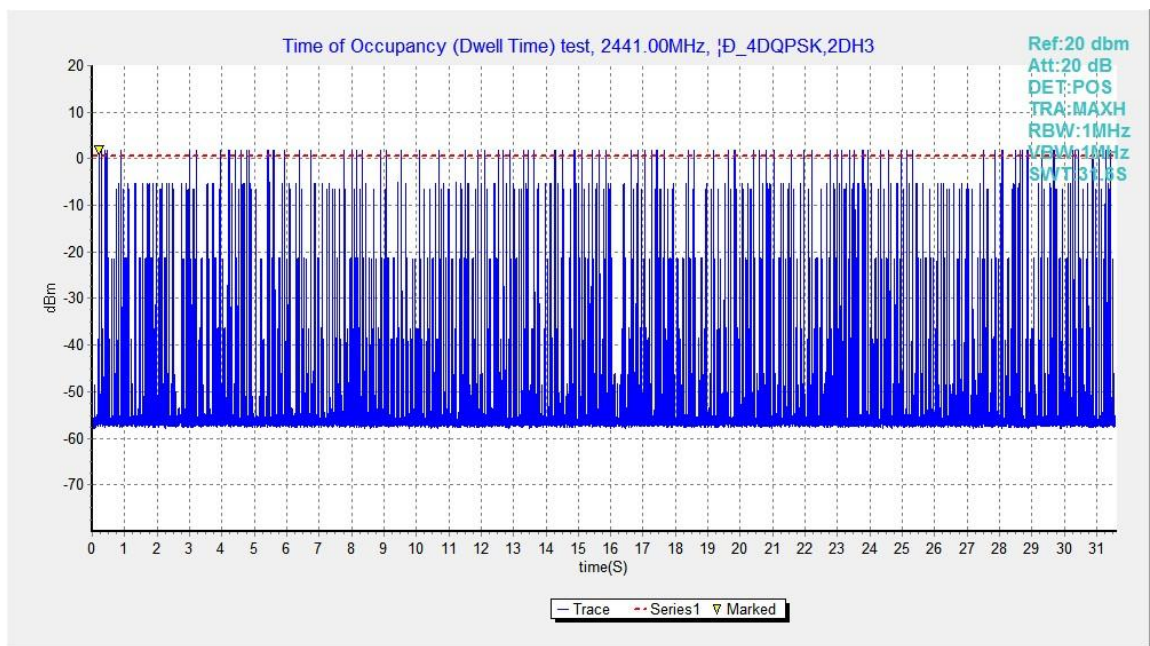


Fig.82. Number of Transmissions Measurement:Channel 39,Packet 2-DH3

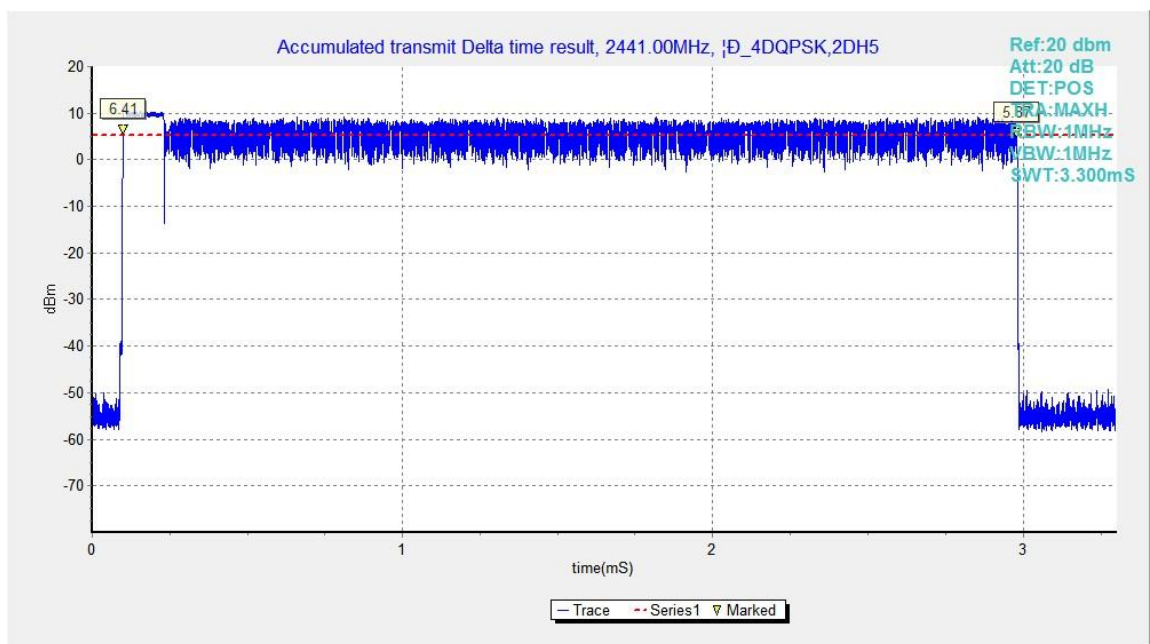


Fig.83. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

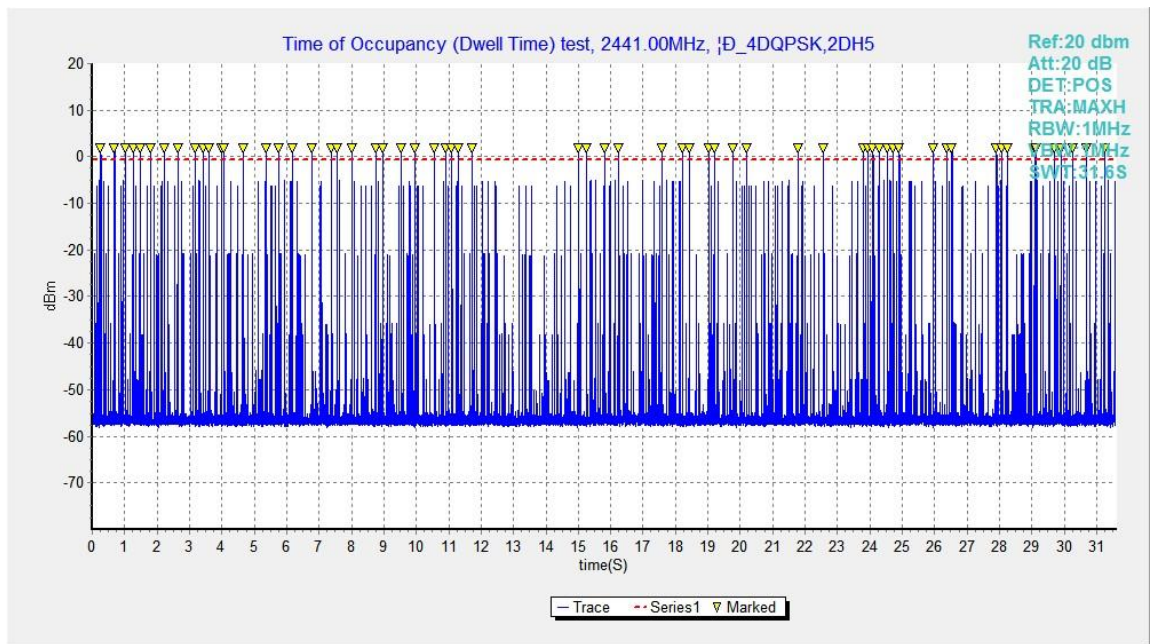


Fig.84. Number of Transmissions Measurement:Channel 39,Packet 2-DH5

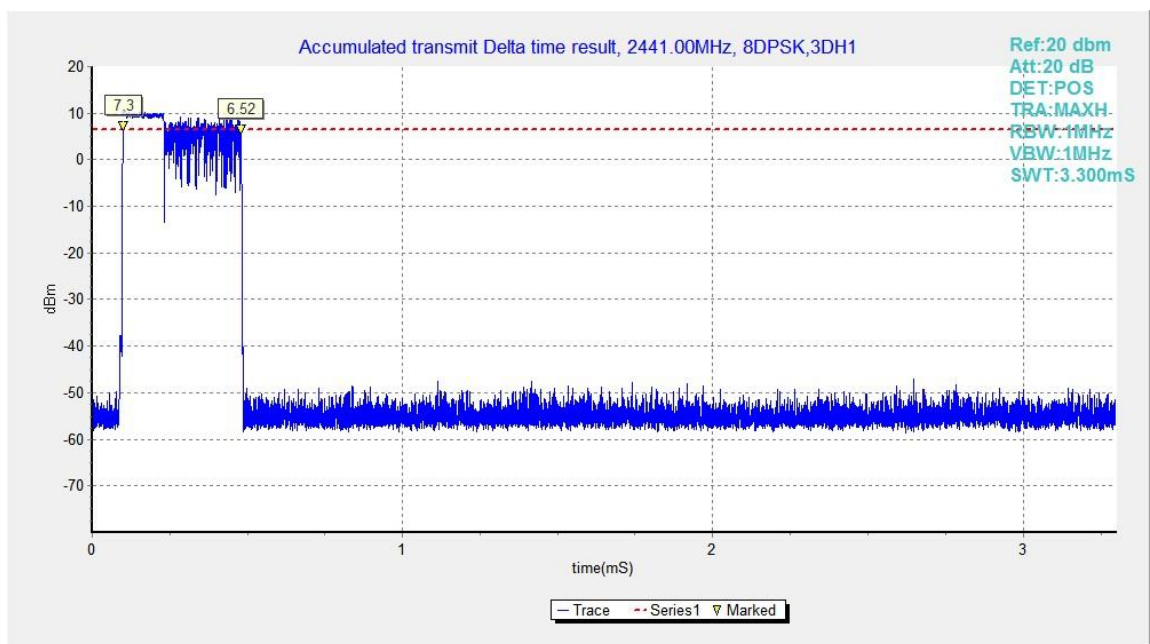


Fig.85. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

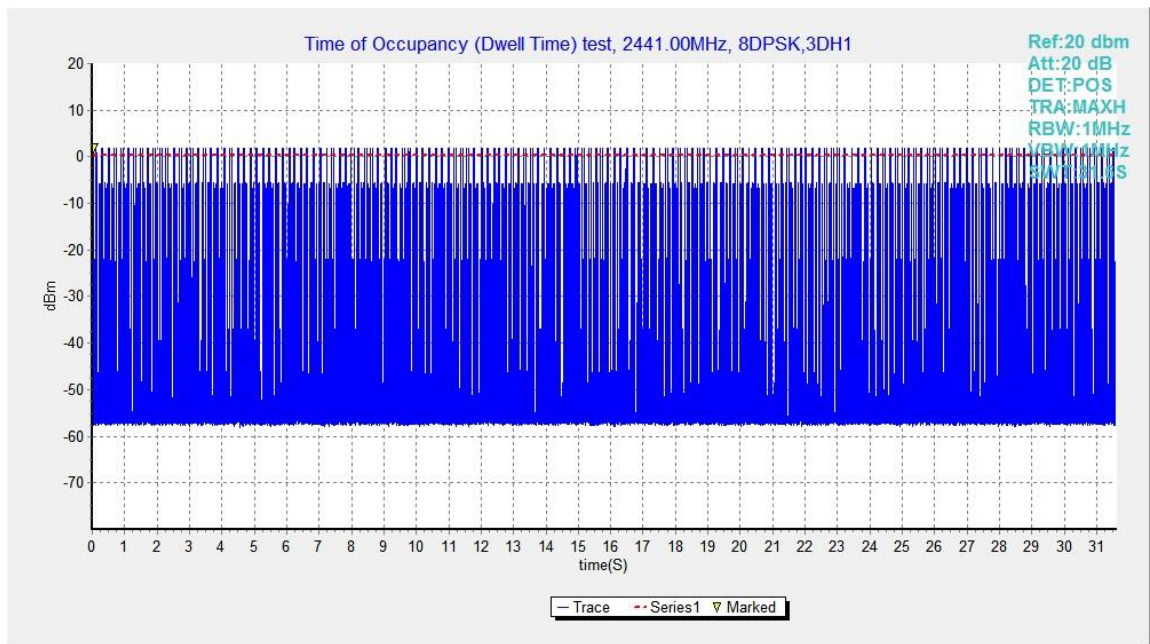


Fig.86. Number of Transmissions Measurement:Channel 39,Packet 3-DH1

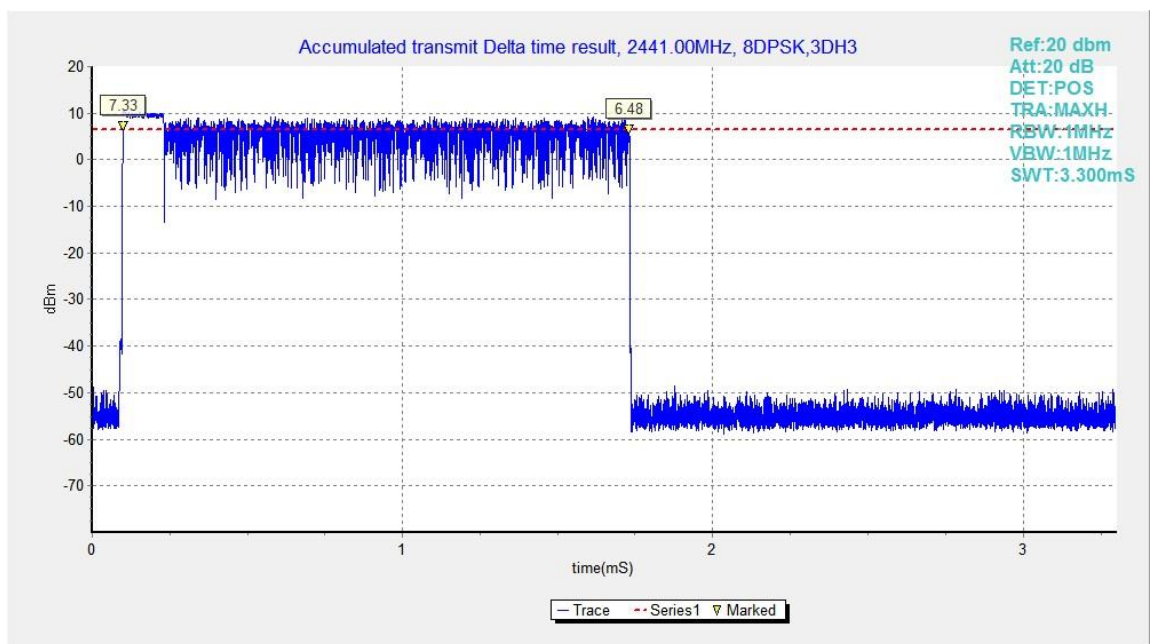


Fig.87. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

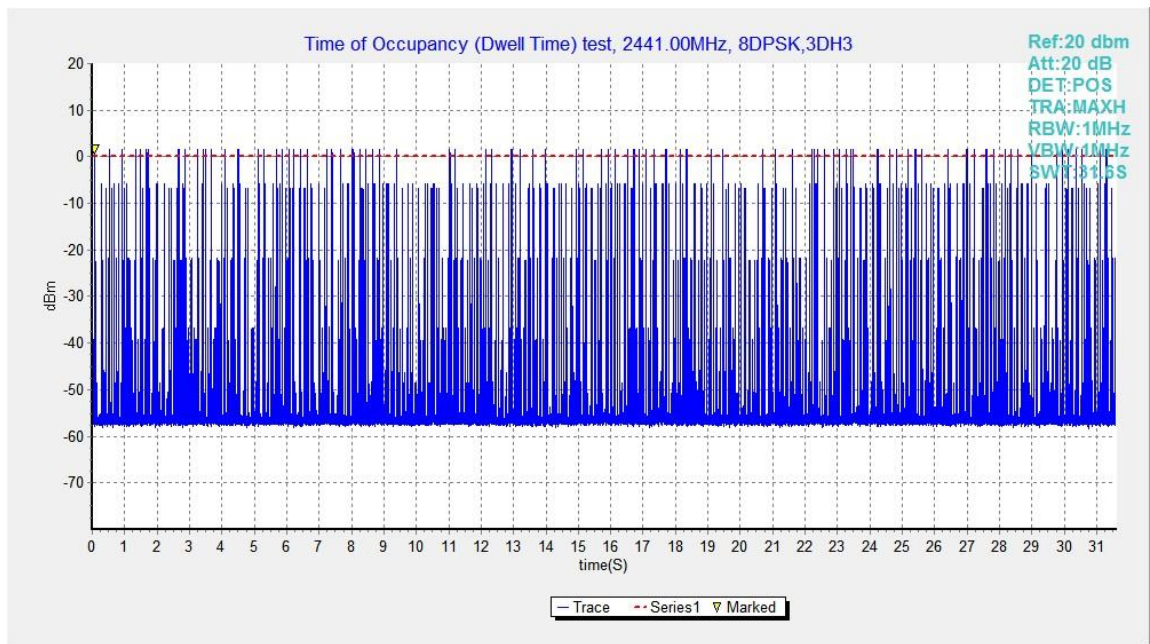


Fig.88. Number of Transmissions Measurement:Channel 39,Packet 3-DH3

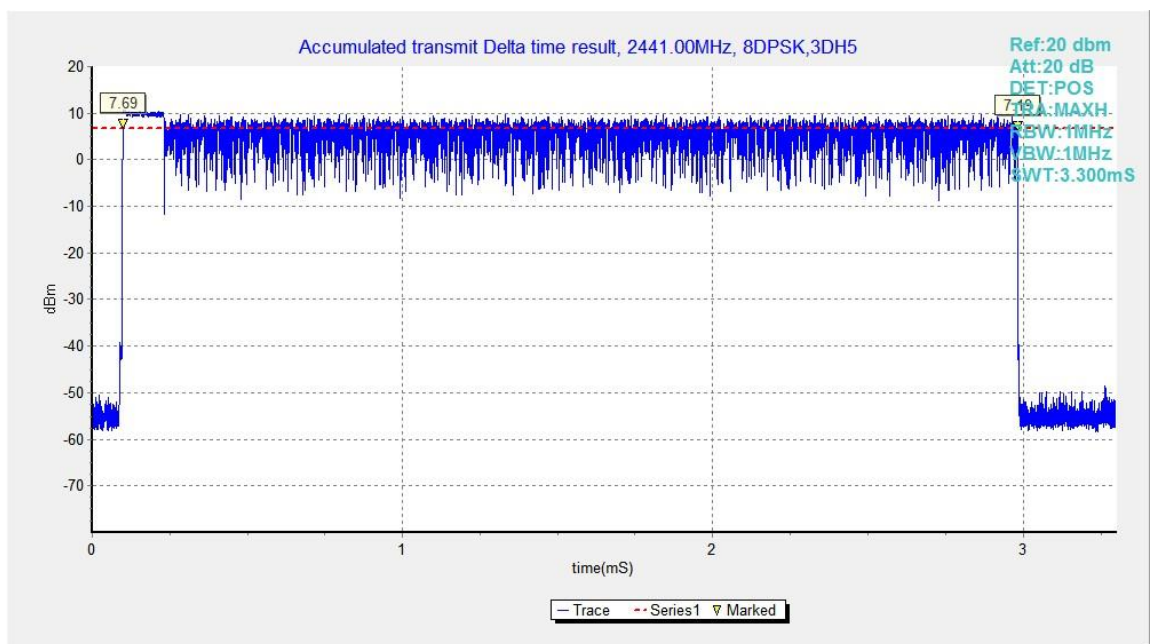


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

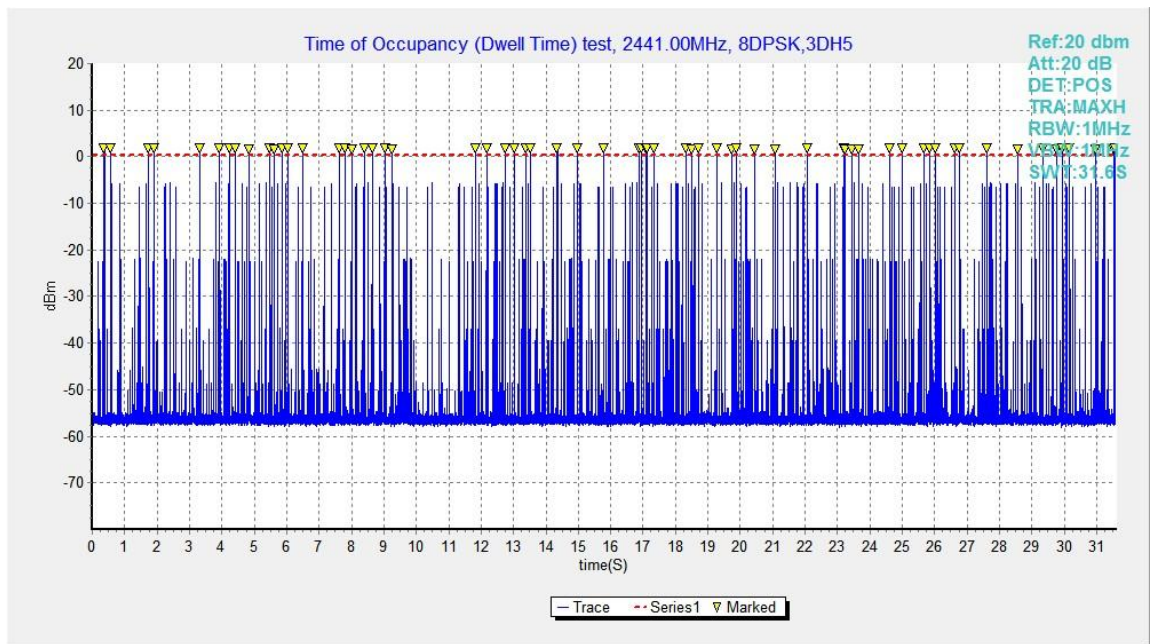


Fig.90. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

## B.7. 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.91               | 943.50 | NA         |
| 39      | Fig.92               | 939.75 | NA         |
| 78      | Fig.93               | 942.75 | NA         |

**For  $\pi/4$  DQPSK**

| Channel | 20dB Bandwidth (kHz) |         | Conclusion |
|---------|----------------------|---------|------------|
| 0       | Fig.94               | 1257.00 | NA         |
| 39      | Fig.95               | 1208.25 | NA         |
| 78      | Fig.96               | 1254.75 | NA         |

**For 8DPSK**

| Channel | 20dB Bandwidth (kHz) |         | Conclusion |
|---------|----------------------|---------|------------|
| 0       | Fig.97               | 1200.75 | NA         |
| 39      | Fig.98               | 1200.75 | NA         |
| 78      | Fig.99               | 1252.50 | NA         |

**Conclusion: NA**

**Test graphs as below:**

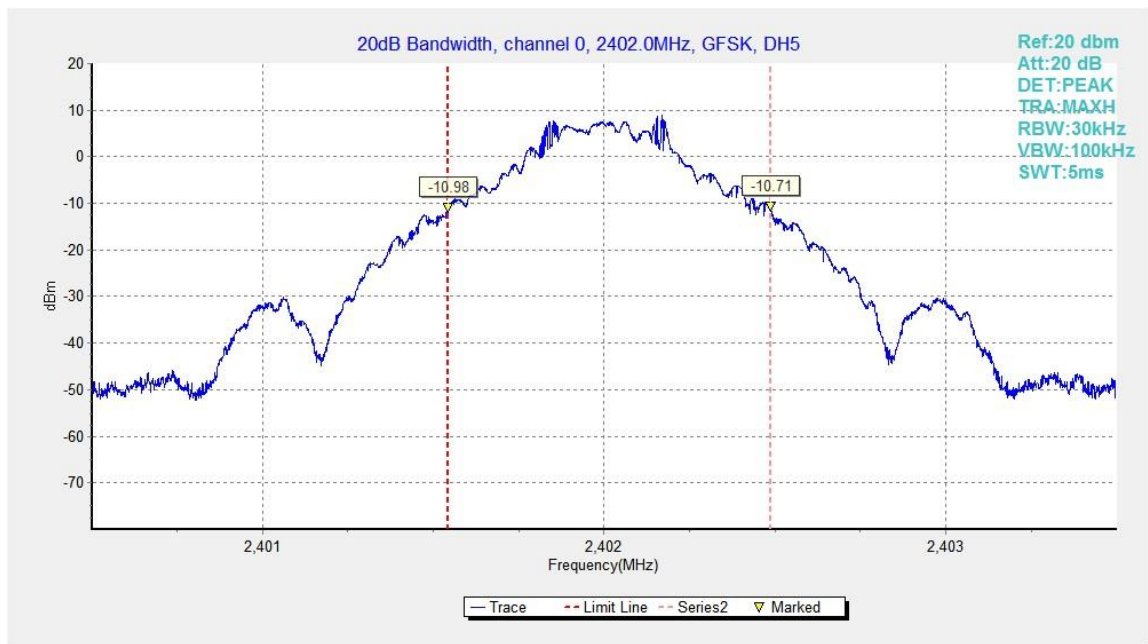


Fig.91. 20dB Bandwidth: GFSK, Channel 0

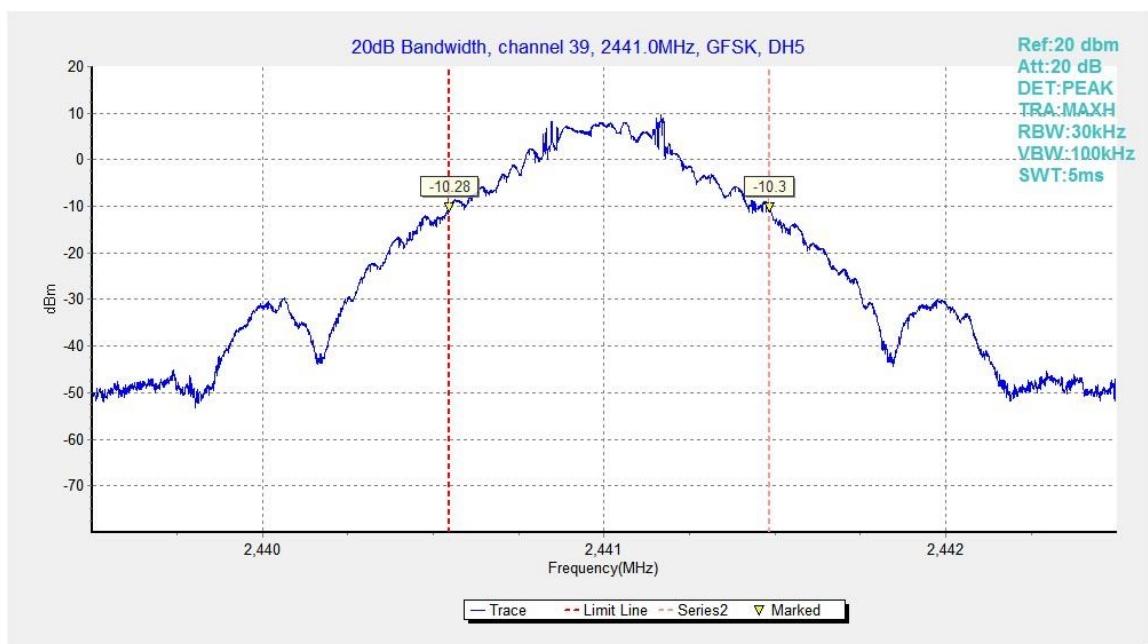


Fig.92. 20dB Bandwidth: GFSK, Channel 39

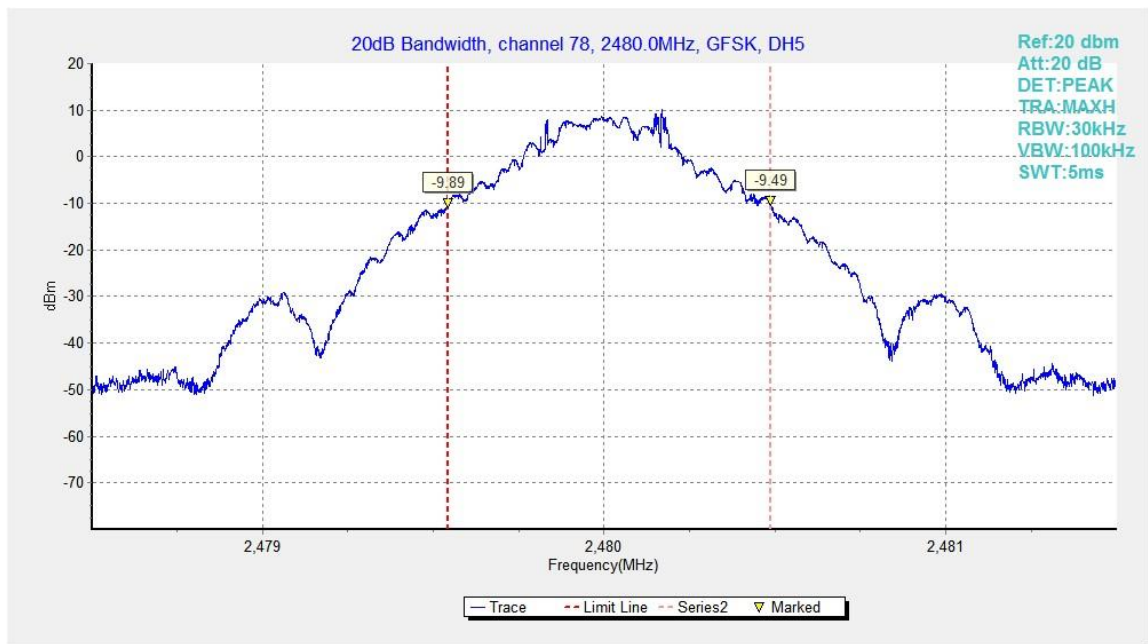


Fig.93. 20dB Bandwidth: GFSK, Channel 78

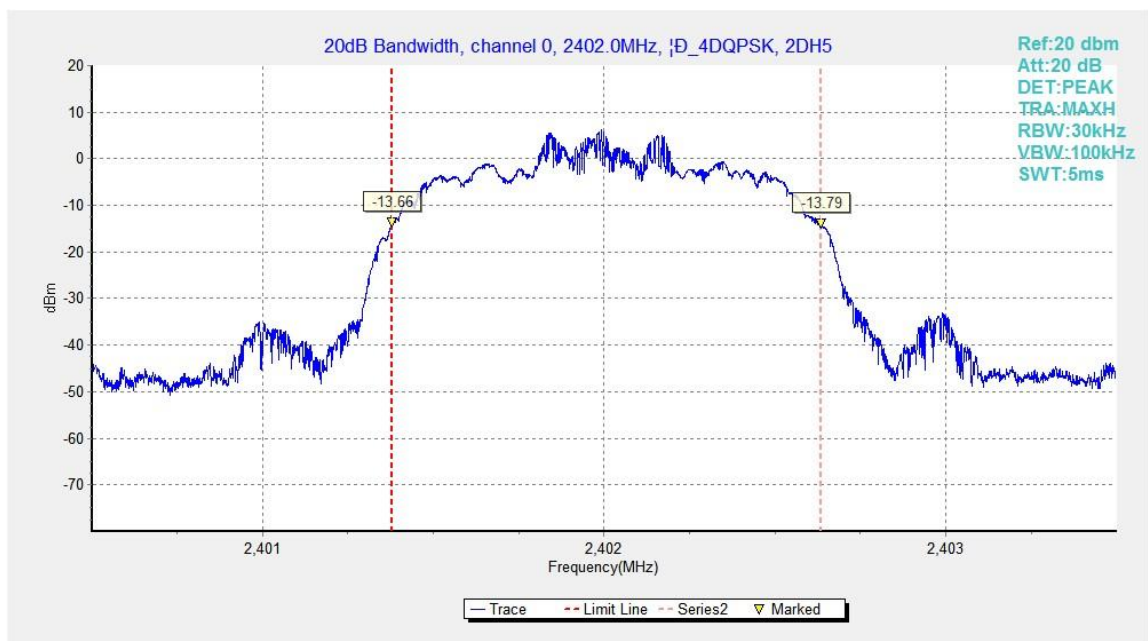
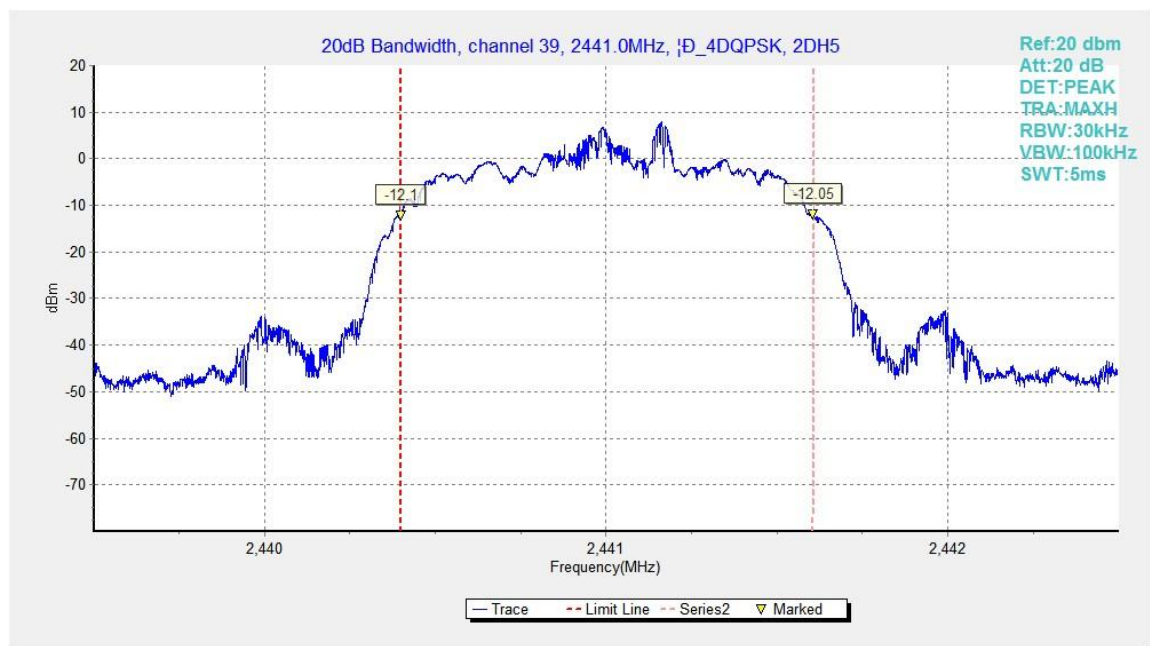
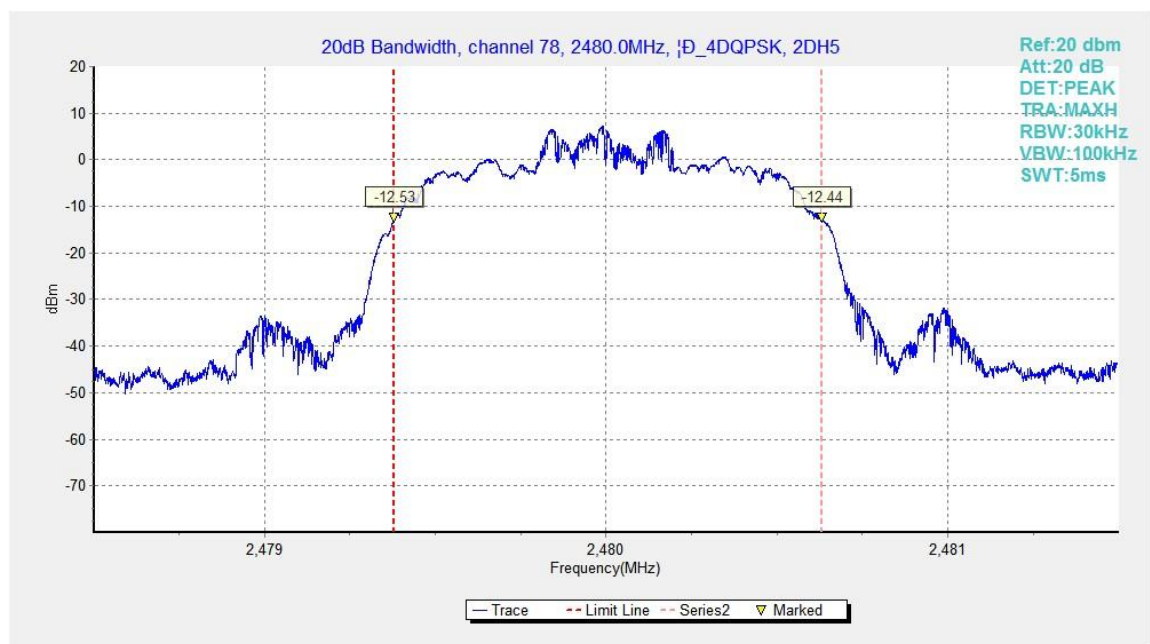


Fig.94. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 0


Fig.95. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 39

Fig.96. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 78

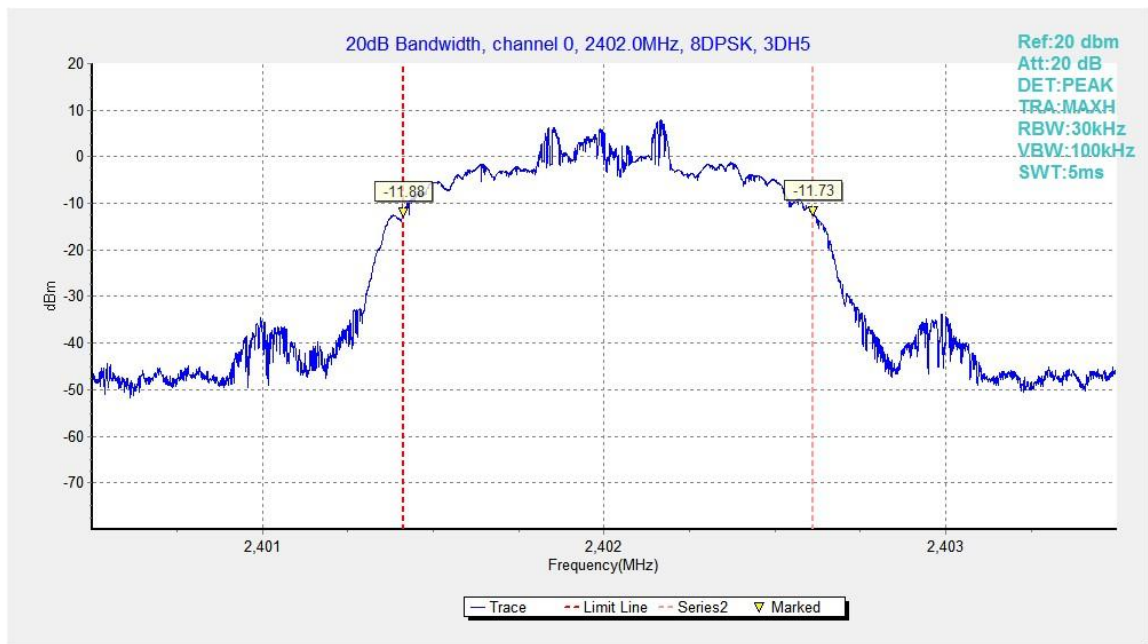


Fig.97. 20dB Bandwidth: 8DPSK, Channel 0

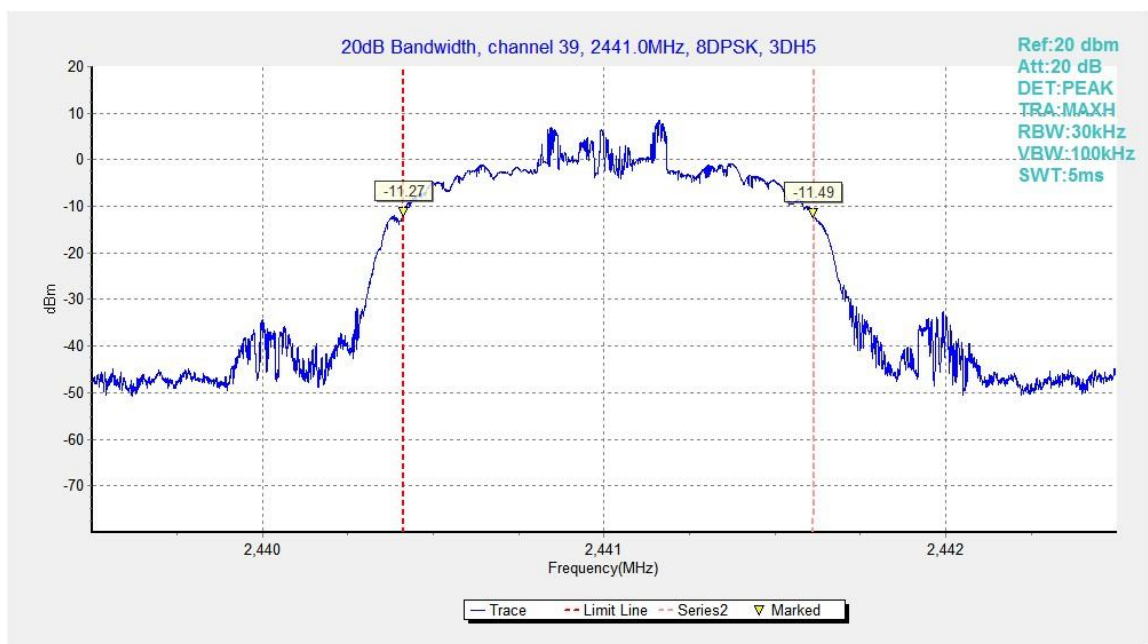


Fig.98. 20dB Bandwidth: 8DPSK, Channel 39

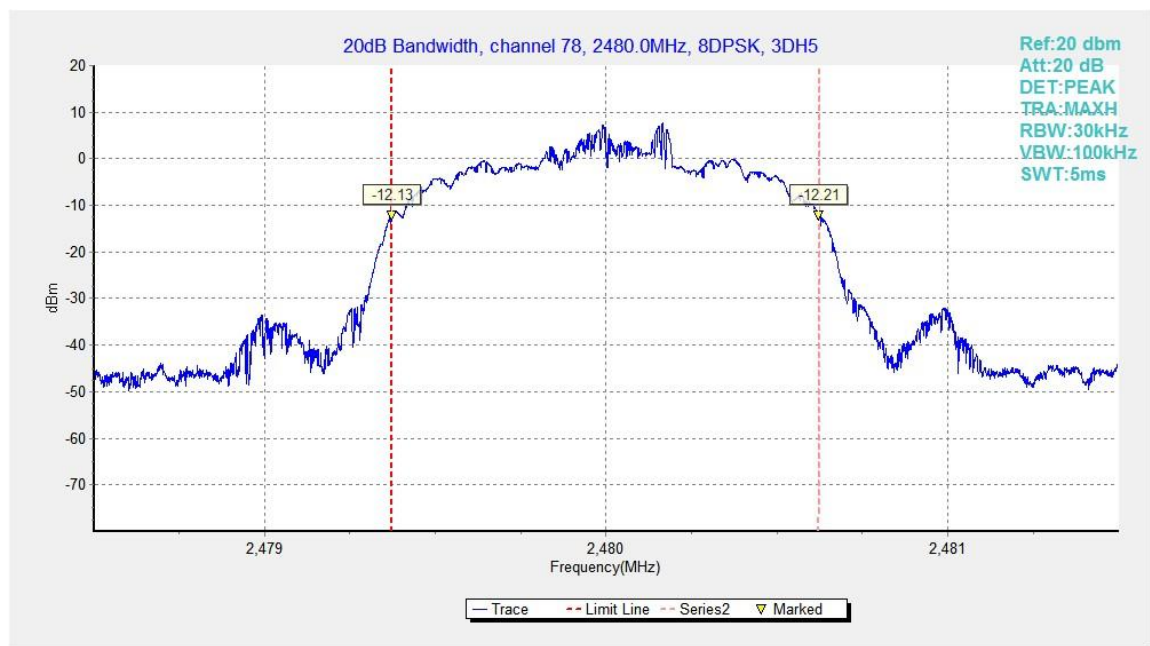


Fig.99. 20dB Bandwidth: 8DPSK, Channel 78

## B.8. 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.100                            | 1133.25 | P          |

#### For $\pi/4$ DQPSK

| Channel | Carrier frequency separation (kHz) |         | Conclusion |
|---------|------------------------------------|---------|------------|
| 39      | Fig.101                            | 1029.75 | P          |

#### For 8DPSK

| Channel | Carrier frequency separation (kHz) |         | Conclusion |
|---------|------------------------------------|---------|------------|
| 39      | Fig.102                            | 1110.00 | P          |

**Conclusion: PASS**

**Test graphs as below:**

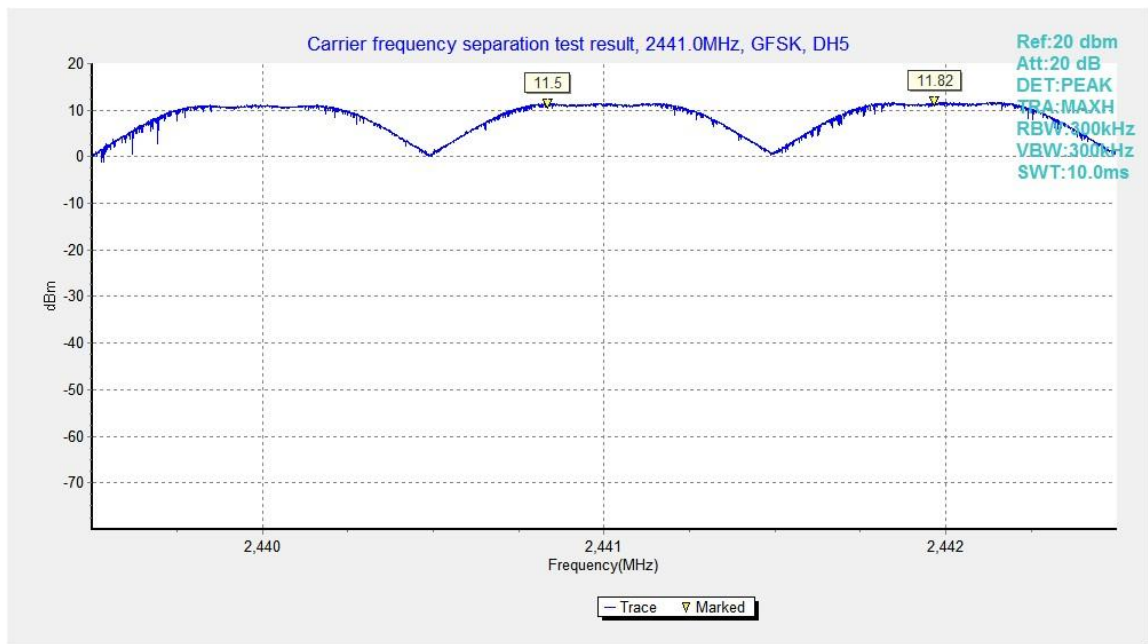


Fig.100. Carrier frequency separation measurement: GFSK, Channel 39

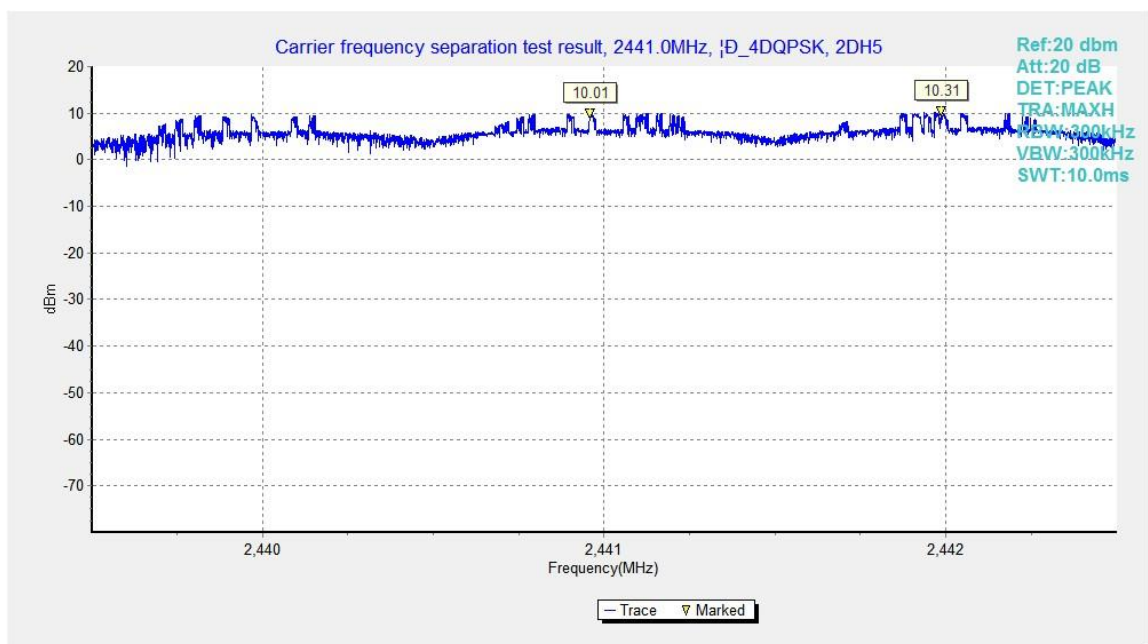


Fig.101. Carrier frequency separation measurement:  $\pi/4$  DQPSK, Channel 39