

Fig.98. 20dB Bandwidth: GFSK, Channel 0

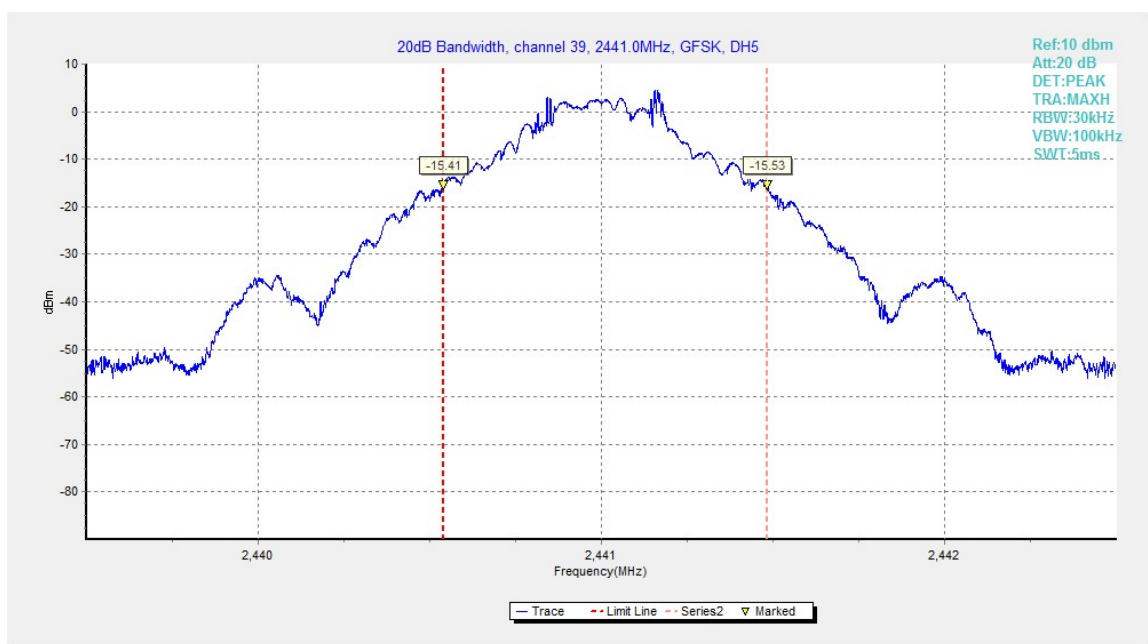


Fig.99. 20dB Bandwidth: GFSK, Channel 39

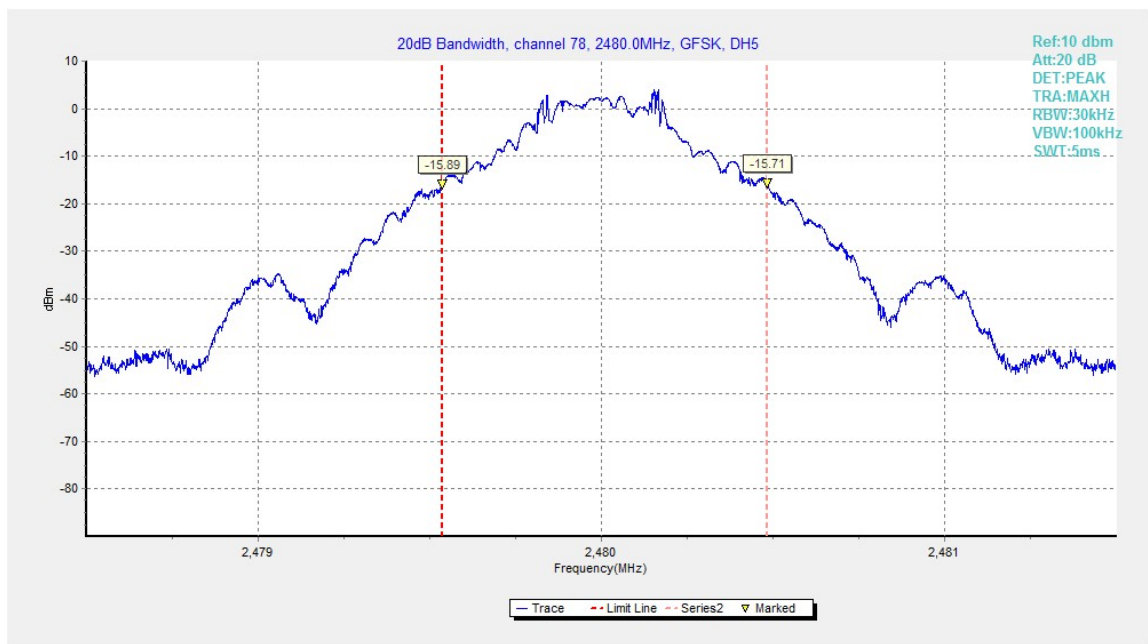


Fig.100. 20dB Bandwidth: GFSK, Channel 78

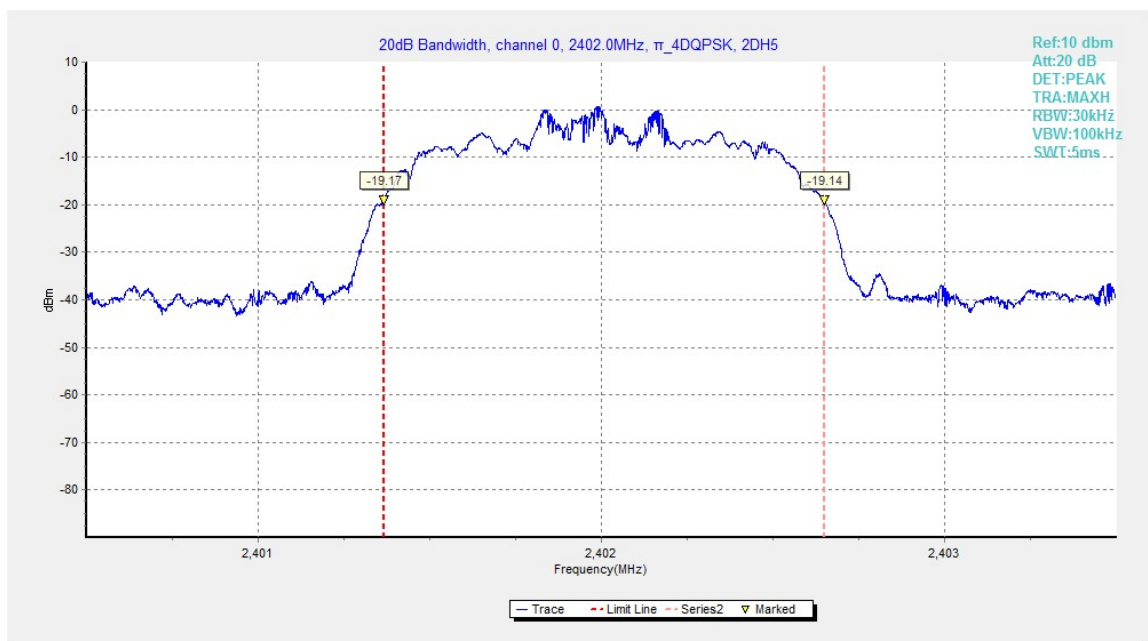


Fig.101. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 0

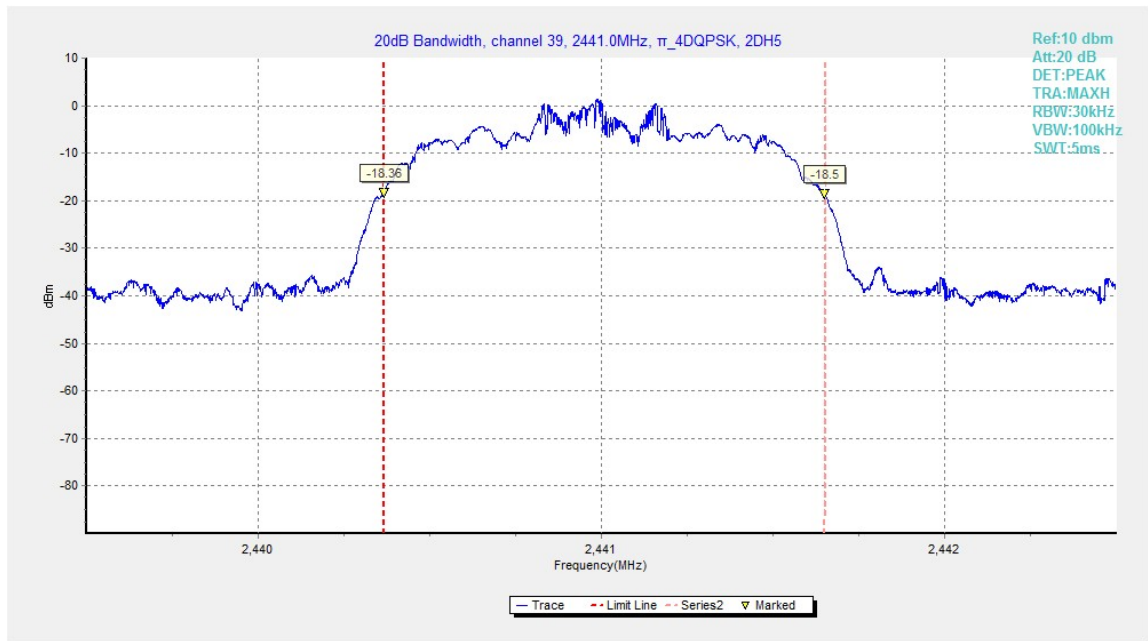


Fig.102. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 39

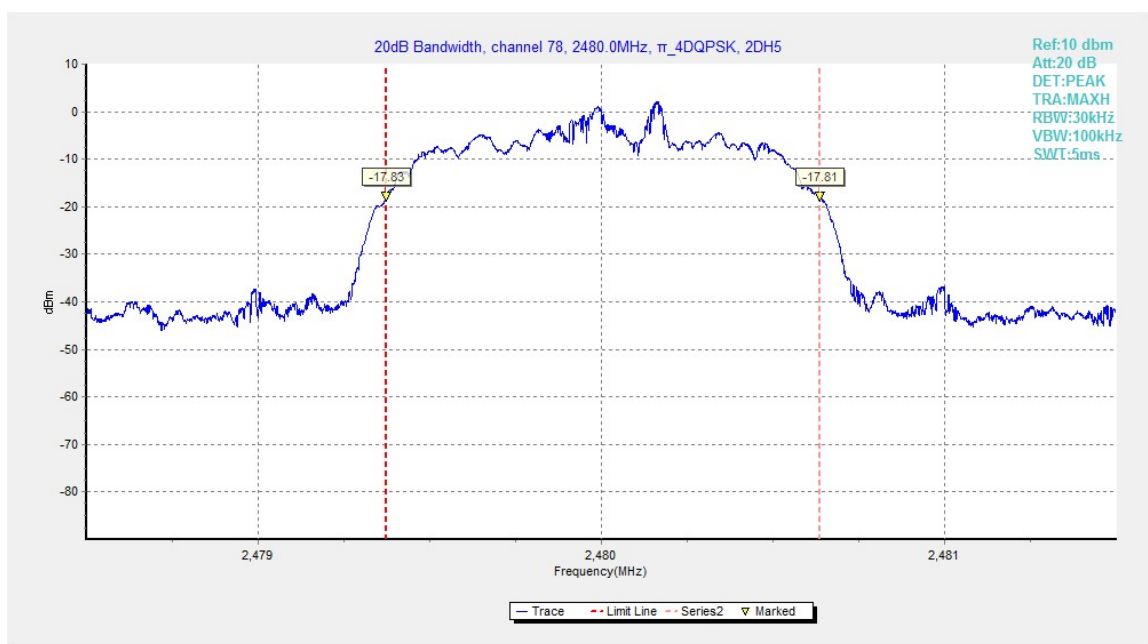


Fig.103. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 78

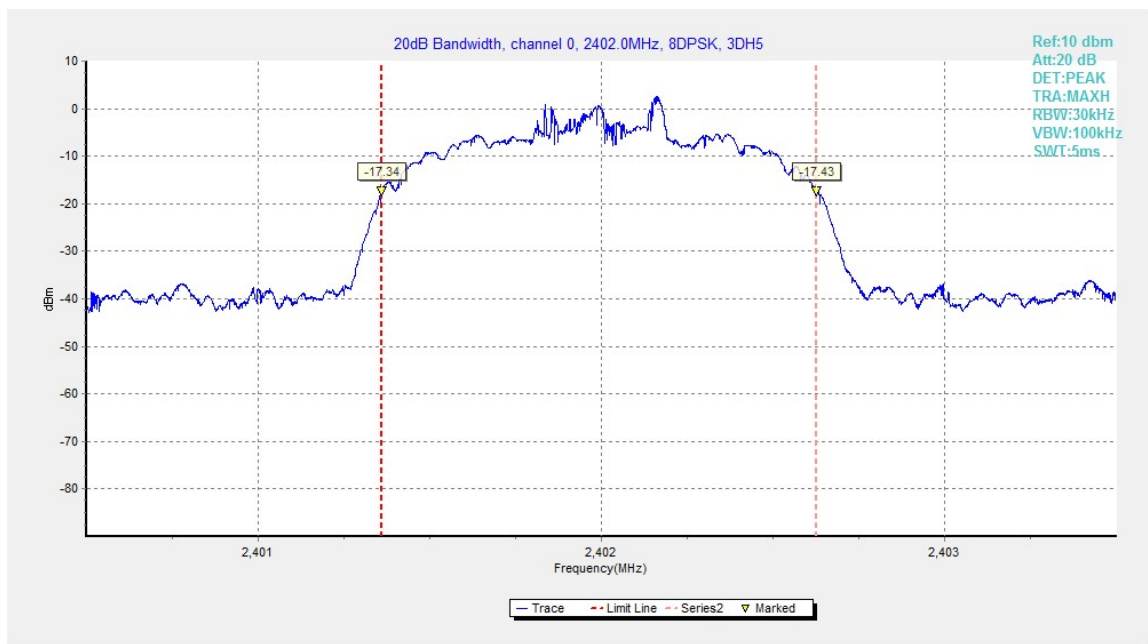


Fig.104. 20dB Bandwidth: 8DPSK, Channel 0

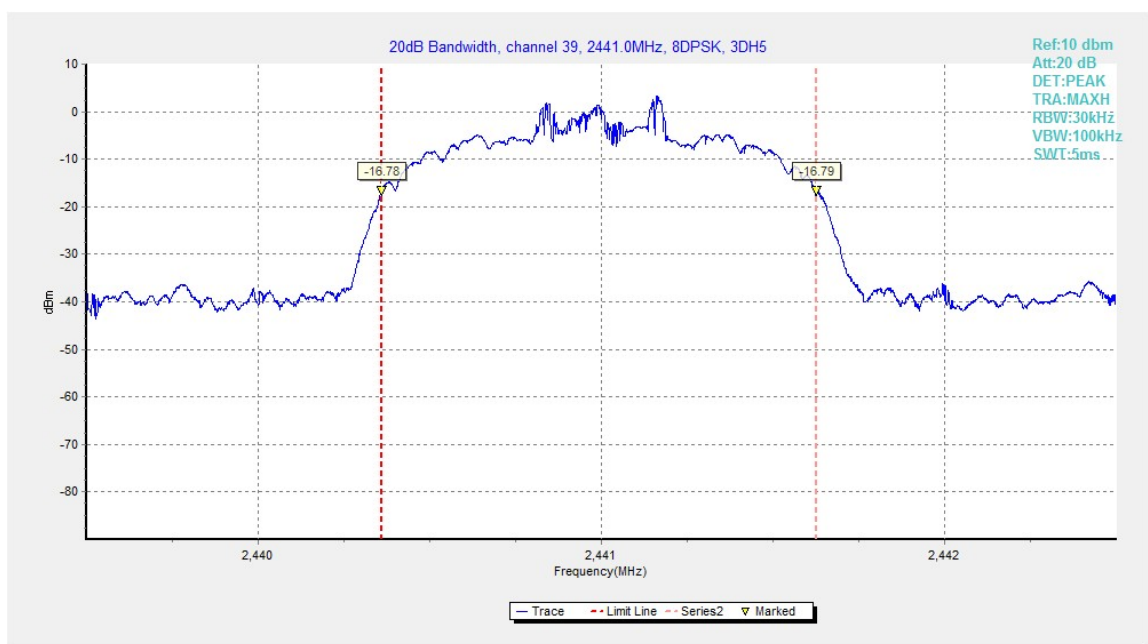


Fig.105. 20dB Bandwidth: 8DPSK, Channel 39

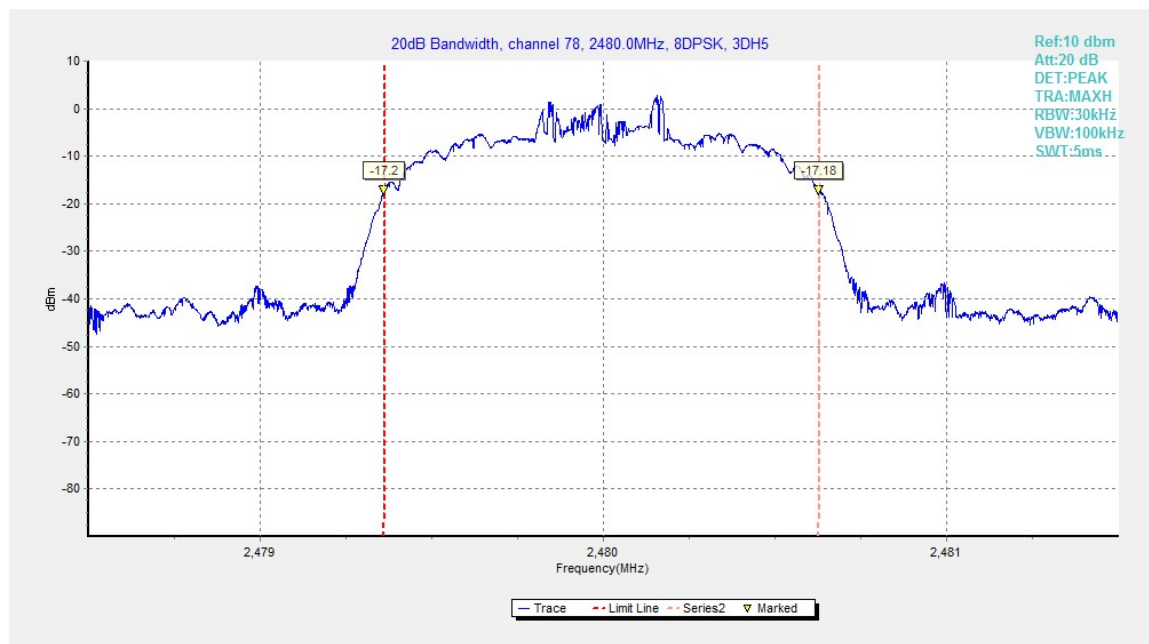


Fig.106. 20dB Bandwidth: 8DPSK, Channel 78

## A.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.107                            | 1124.00 | P          |

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

| Channel | Carrier frequency separation (kHz) |         | Conclusion |
|---------|------------------------------------|---------|------------|
| 39      | Fig.108                            | 1325.00 | P          |

#### For 8DPSK

| Channel | Carrier frequency separation (kHz) |        | Conclusion |
|---------|------------------------------------|--------|------------|
| 39      | Fig.109                            | 990.00 | P          |

**Conclusion: PASS**

**Test graphs as below:**

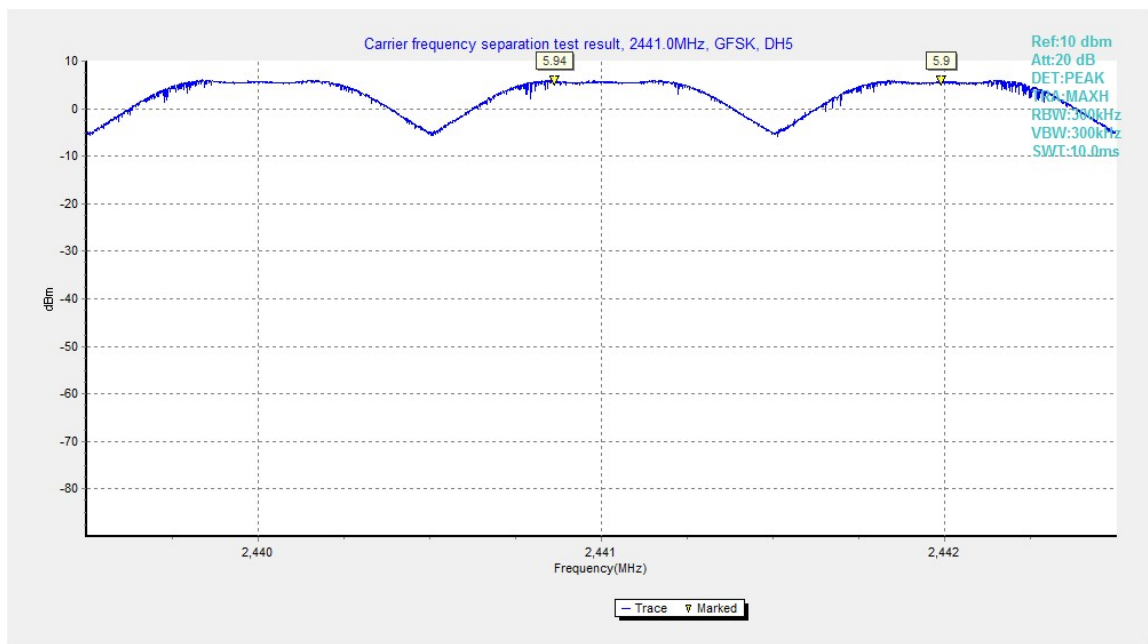


Fig.107. Carrier frequency separation measurement: GFSK, Channel 39

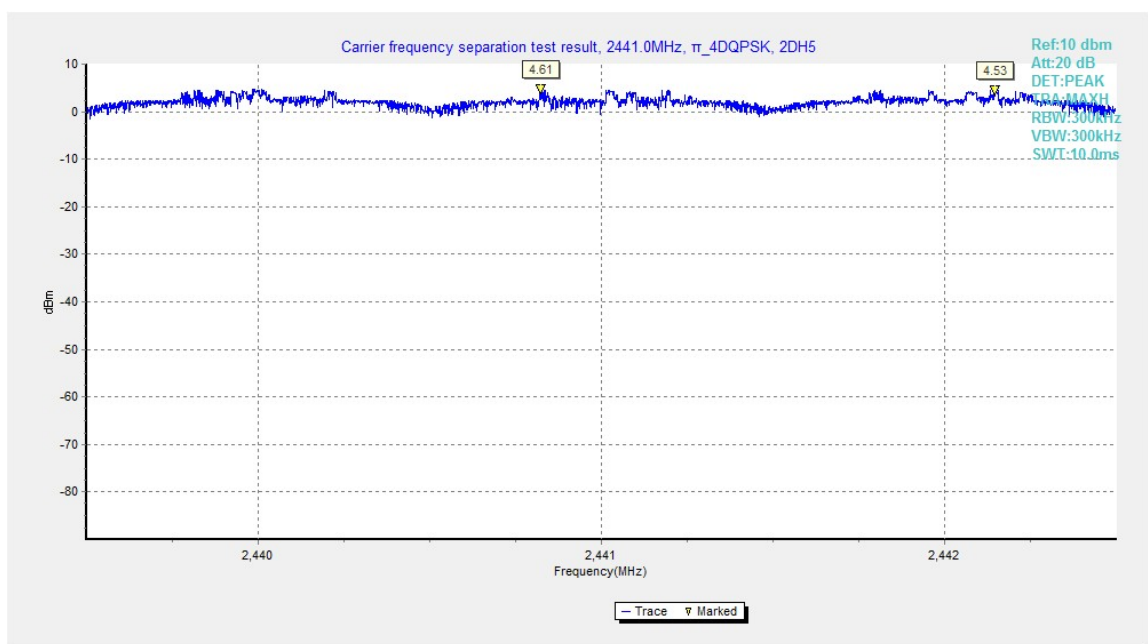


Fig.108. Carrier frequency separation measurement:  $\pi/4$  DQPSK, Channel 39



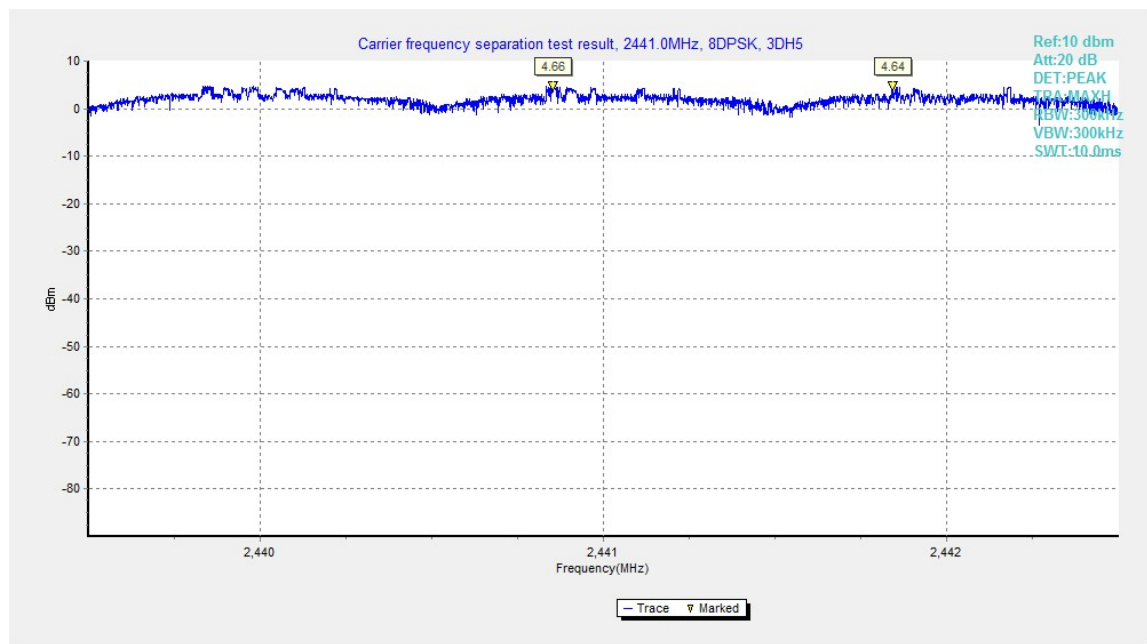


Fig.109. Carrier frequency separation measurement: 8DPSK, Channel 39



## A.9. 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.110                    | 79 | P          |
| 40~78   | Fig.111                    |    |            |

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

| Channel | Number of hopping channels |    | Conclusion |
|---------|----------------------------|----|------------|
| 0~39    | Fig.112                    | 79 | P          |
| 40~78   | Fig.113                    |    |            |

#### For 8DPSK

| Channel | Number of hopping channels |    | Conclusion |
|---------|----------------------------|----|------------|
| 0~39    | Fig.114                    | 79 | P          |
| 40~78   | Fig.115                    |    |            |

**Conclusion: PASS**

**Test graphs as below:**

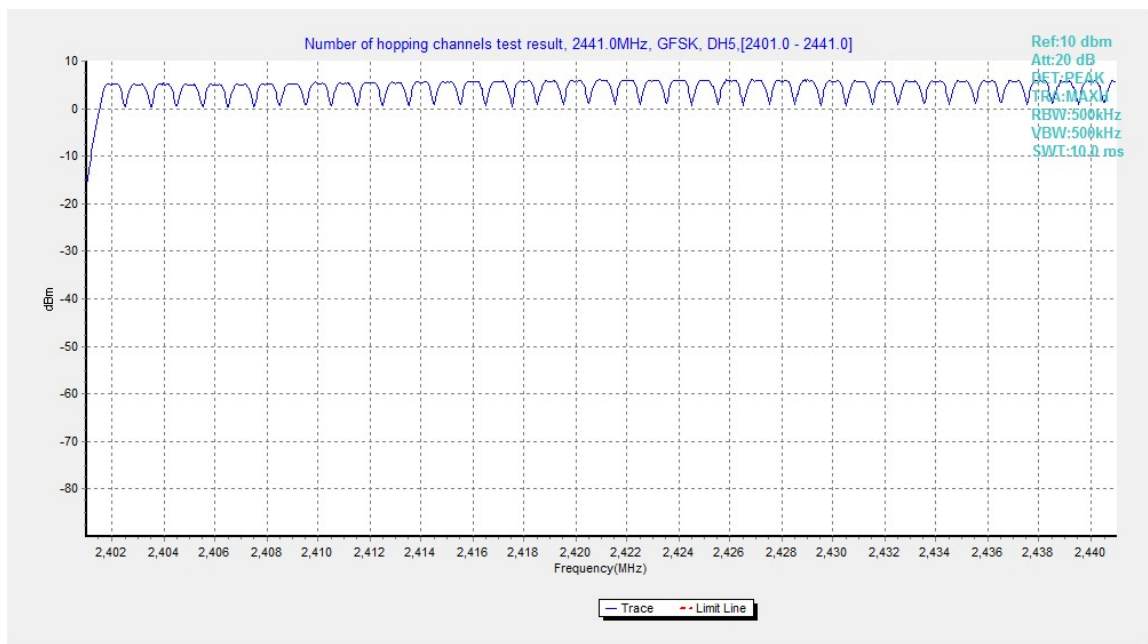


Fig.110. Number of hopping frequencies: GFSK, Channel 0 - 39

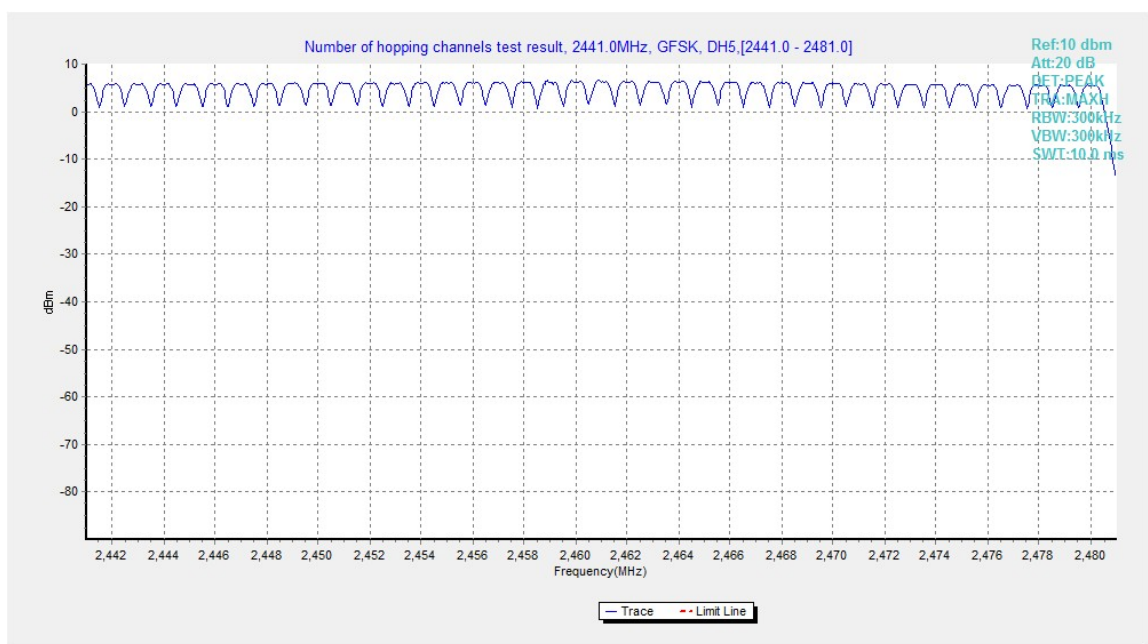


Fig.111. Number of hopping frequencies: GFSK, Channel 40 - 78

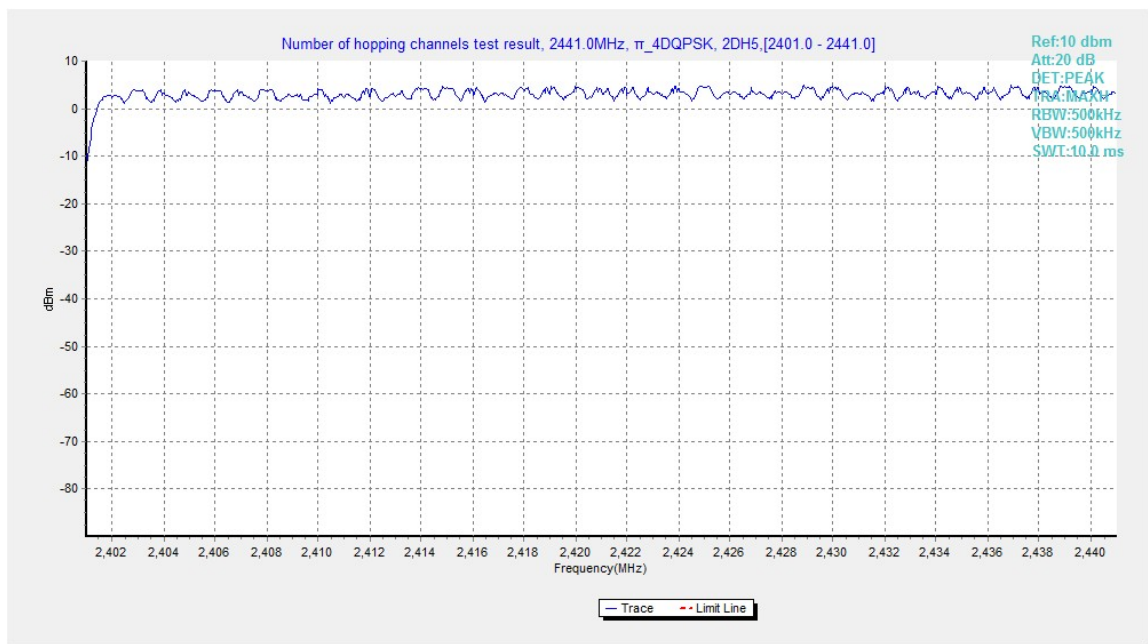


Fig.112. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 0 - 39

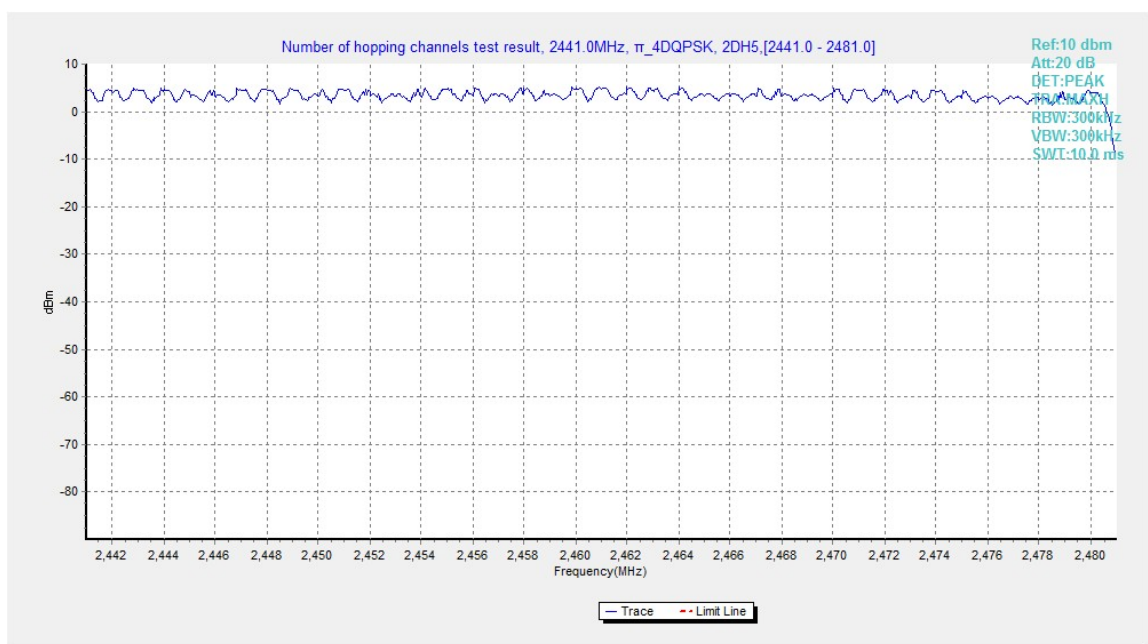


Fig.113. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 40 - 78

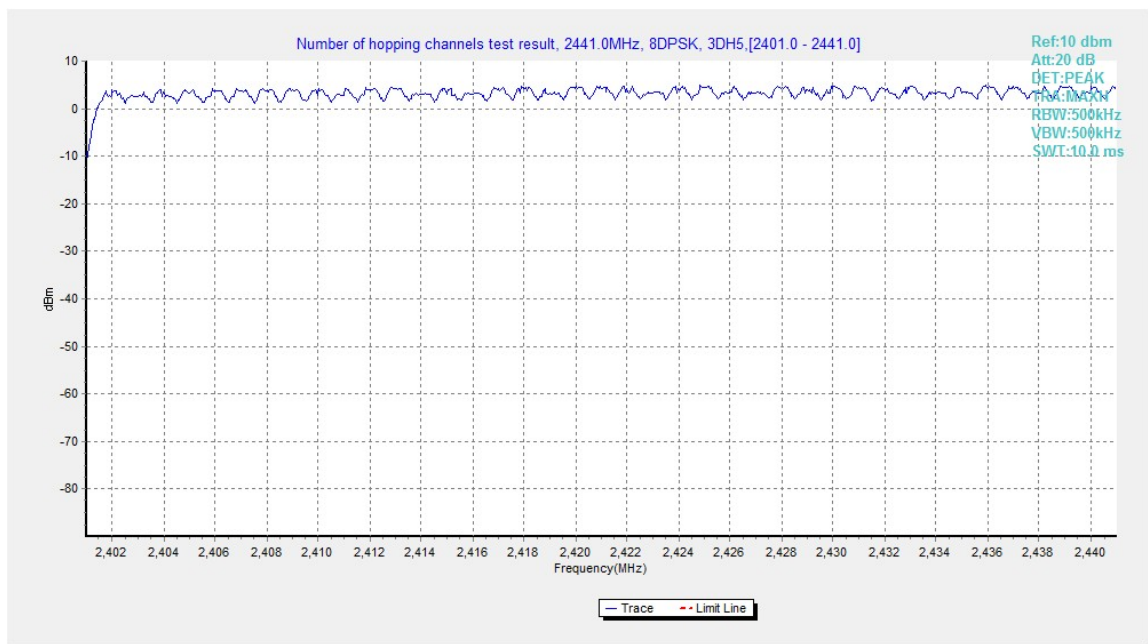


Fig.114. Number of hopping frequencies: 8DPSK, Channel 0 - 39

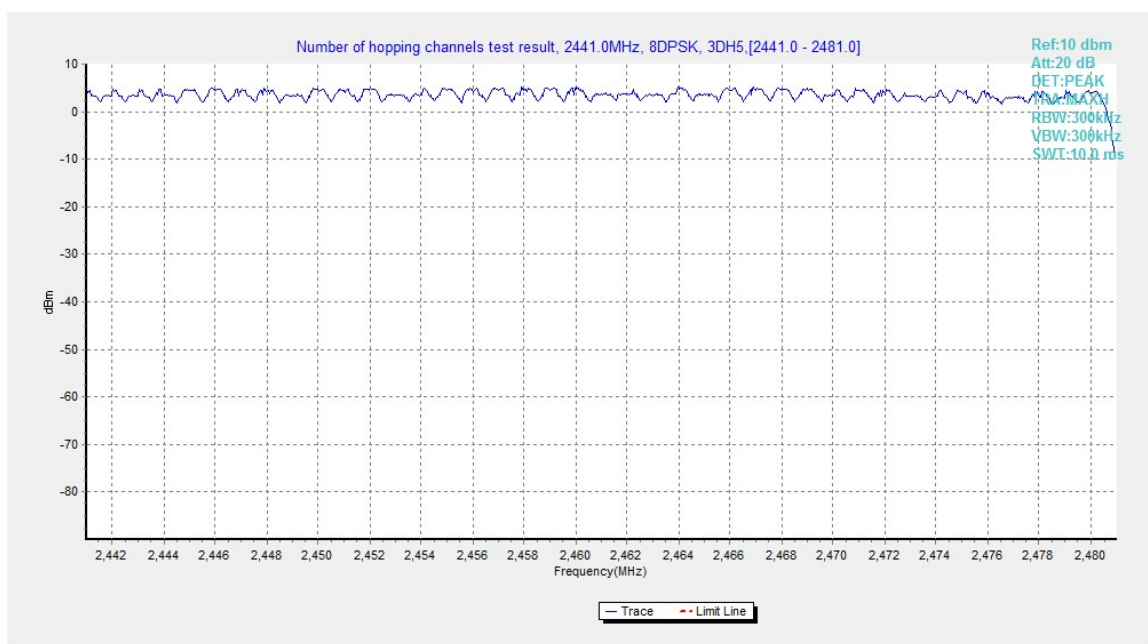


Fig.115. Number of hopping frequencies: 8DPSK, Channel 40 - 78

**A.10. AC Powerline Conducted Emission****Test Condition**

| Voltage (V) | Frequency (Hz) |
|-------------|----------------|
| 120         | 60             |

**Measurement Result and limit:****Bluetooth (Quasi-peak Limit)**

| Frequency range (MHz) | Quasi-peak Limit (dB $\mu$ V) | Conclusion |
|-----------------------|-------------------------------|------------|
| 0.15 to 0.5           | 66 to 56                      | 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)**

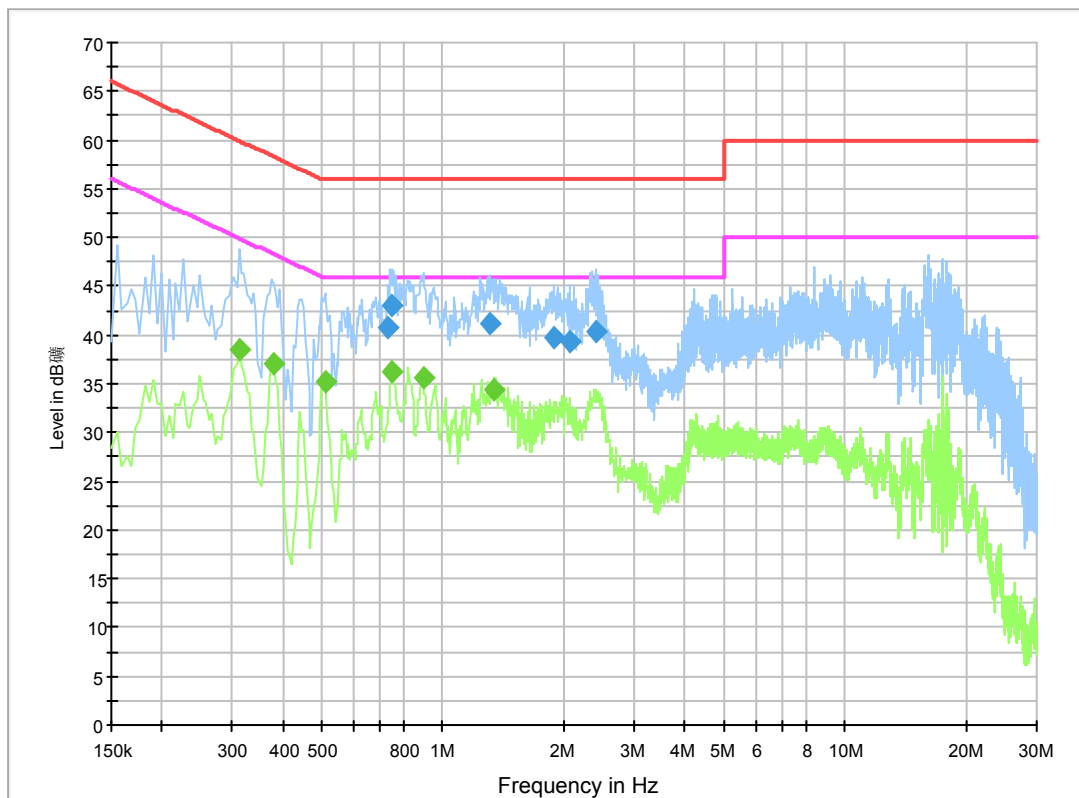
| Frequency range (MHz) | Average Limit (dB $\mu$ V) | Conclusion |
|-----------------------|----------------------------|------------|
| 0.15 to 0.5           | 56 to 46                   | P          |
| 0.5 to 5              | 46                         |            |
| 5 to 30               | 50                         |            |

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

**Conclusion: PASS**

**Traffic: Set.10**



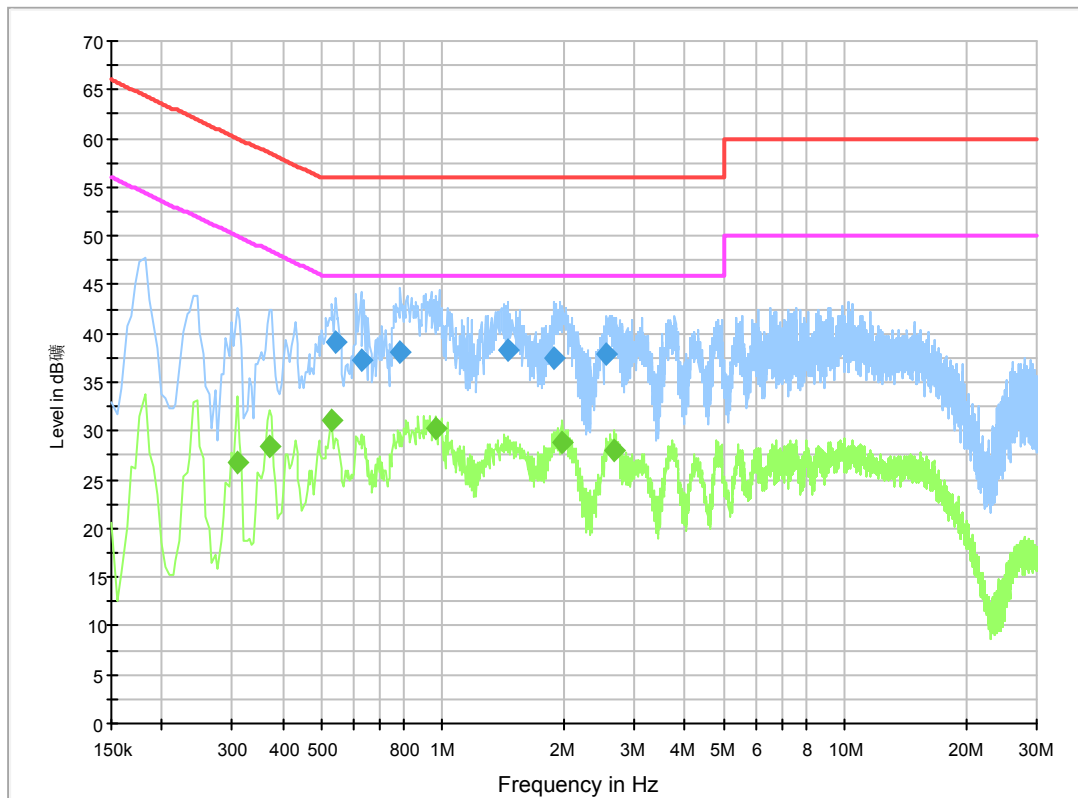
## Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | PE  | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|-----|------|---------------|----------------|-----------------|
| 0.730500           | 40.8                | GND | L1   | 10.3          | 15.2           | 56.0            |
| 0.748500           | 43.0                | GND | L1   | 10.3          | 13.0           | 56.0            |
| 1.306500           | 41.2                | GND | L1   | 10.3          | 14.8           | 56.0            |
| 1.896000           | 39.8                | GND | L1   | 10.4          | 16.2           | 56.0            |
| 2.067000           | 39.4                | GND | L1   | 10.4          | 16.6           | 56.0            |
| 2.395500           | 40.3                | GND | L1   | 10.4          | 15.7           | 56.0            |

## Final Result 2

| Frequency<br>(MHz) | Average<br>(dBμV) | PE  | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|-------------------|-----|------|---------------|----------------|-----------------|
| 0.312000           | 38.4              | GND | L1   | 10.3          | 11.5           | 49.9            |
| 0.379500           | 37.0              | GND | L1   | 10.3          | 11.2           | 48.3            |
| 0.510000           | 35.1              | GND | L1   | 10.3          | 10.9           | 46.0            |
| 0.748500           | 36.3              | GND | L1   | 10.3          | 9.7            | 46.0            |
| 0.892500           | 35.7              | GND | L1   | 10.3          | 10.3           | 46.0            |
| 1.342500           | 34.4              | GND | L1   | 10.3          | 11.6           | 46.0            |

### Traffic: Set.11



### Final Result 1

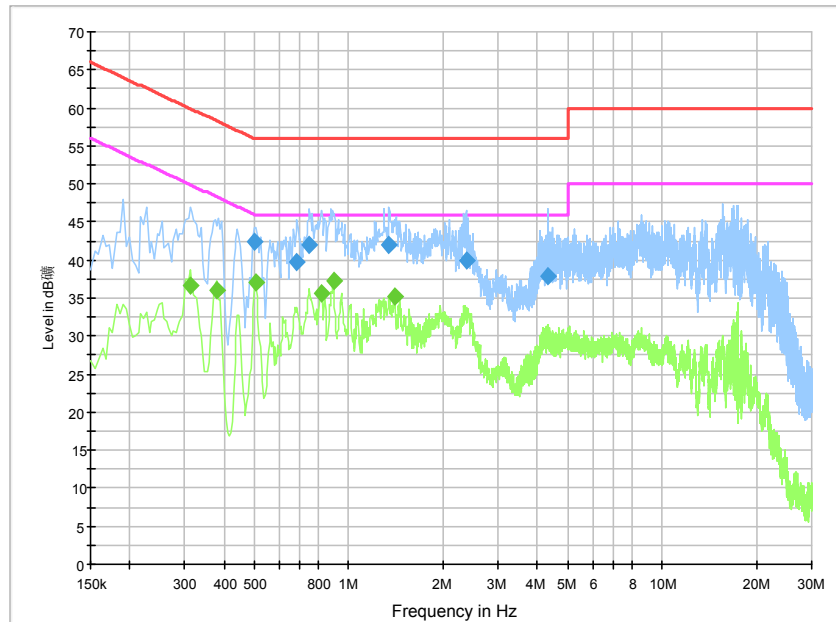
| Frequency (MHz) | QuasiPeak (dBμV) | PE  | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----|------|------------|-------------|--------------|
| 0.541500        | 39.1             | GND | L1   | 10.3       | 16.9        | 56.0         |
| 0.627000        | 37.3             | GND | L1   | 10.3       | 18.7        | 56.0         |
| 0.784500        | 38.2             | GND | L1   | 10.3       | 17.8        | 56.0         |
| 1.455000        | 38.2             | GND | L1   | 10.3       | 17.8        | 56.0         |
| 1.887000        | 37.5             | GND | L1   | 10.4       | 18.5        | 56.0         |
| 2.562000        | 37.9             | GND | L1   | 10.4       | 18.1        | 56.0         |

### Final Result 2

| Frequency (MHz) | Average (dBμV) | PE  | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----|------|------------|-------------|--------------|
| 0.307500        | 26.8           | GND | L1   | 10.3       | 23.2        | 50.0         |
| 0.370500        | 28.4           | GND | L1   | 10.3       | 20.1        | 48.5         |
| 0.528000        | 31.1           | GND | L1   | 10.3       | 14.9        | 46.0         |
| 0.964500        | 30.3           | GND | L1   | 10.3       | 15.7        | 46.0         |
| 1.990500        | 28.9           | GND | L1   | 10.4       | 17.1        | 46.0         |
| 2.679000        | 28.0           | GND | L1   | 10.4       | 18.0        | 46.0         |



Idle: Set.10



## Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | PE  | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----|------|------------|-------------|--------------|
| 0.501000        | 42.4             | GND | L1   | 10.3       | 13.6        | 56.0         |
| 0.685500        | 39.7             | GND | L1   | 10.3       | 16.3        | 56.0         |
| 0.748500        | 42.1             | GND | L1   | 10.3       | 13.9        | 56.0         |
| 1.347000        | 42.0             | GND | L1   | 10.3       | 14.0        | 56.0         |
| 2.368500        | 39.9             | GND | L1   | 10.4       | 16.1        | 56.0         |
| 4.317000        | 37.9             | GND | L1   | 10.5       | 18.1        | 56.0         |

## Final Result 2

| Frequency (MHz) | Average (dBμV) | PE  | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|-----|------|------------|-------------|--------------|
| 0.312000        | 36.7           | GND | L1   | 10.3       | 13.3        | 49.9         |
| 0.379500        | 36.1           | GND | L1   | 10.3       | 12.2        | 48.3         |
| 0.505500        | 37.0           | GND | L1   | 10.3       | 9.0         | 46.0         |
| 0.820500        | 35.6           | GND | L1   | 10.3       | 10.4        | 46.0         |
| 0.892500        | 37.3           | GND | L1   | 10.3       | 8.7         | 46.0         |
| 1.401000        | 35.3           | GND | L1   | 10.3       | 10.7        | 46.0         |

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