



REPORT No.: SZ23050375W01

# TEST REPORT

**APPLICANT** : MiMOMax Wireless Limited

**PRODUCT NAME** : 700MHz Pyxis Transceiver

**MODEL NAME** : MWL-PYXIS-BHCA

**BRAND NAME** : MiMOMax Wireless

**FCC ID** : XMK-MMXPYXH002

**STANDARD(S)** : 47 CFR Part 2  
47 CFR Part 27

**RECEIPT DATE** : 2023-06-01

**TEST DATE** : 2023-06-06 to 2023-06-21

**ISSUE DATE** : 2023-07-13



Tested by:

*Li Huaiejie*

Li Huaiejie ( Rapporteur)

Approved by:

*Shen Junsheng*

Shen Junsheng( Supervisor)

**NOTE:** This document is issued by Shenzhen Morlab Communication Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.

**MORLAB**

Shenzhen Morlab Communication Technology Co., Ltd.  
FL1-1-3, Building A, FeiYang Science Park, No.8 LongChang Road,  
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

E-mail: service@morlab.cn





# DIRECTORY

|                                                           |           |
|-----------------------------------------------------------|-----------|
| <b>1. Technical Information .....</b>                     | <b>3</b>  |
| <b>1.1. Applicant and Manufacturer Information .....</b>  | <b>3</b>  |
| <b>1.2. Equipment Under Test (EUT) Description .....</b>  | <b>3</b>  |
| <b>1.3. Test Standards and Results .....</b>              | <b>4</b>  |
| <b>1.4. Environmental Conditions .....</b>                | <b>5</b>  |
| <b>2. 47 CFR Part 2 and Part 27 Requirements .....</b>    | <b>6</b>  |
| <b>2.1. Radio Frequency Power Output and E.R.P. ....</b>  | <b>6</b>  |
| <b>2.2. Occupied Bandwidth .....</b>                      | <b>7</b>  |
| <b>2.3. Spurious Emissions At Antenna Terminals .....</b> | <b>9</b>  |
| <b>2.4. Radiated Spurious Emissions .....</b>             | <b>14</b> |
| <b>2.5. Frequency Stability .....</b>                     | <b>28</b> |
| <b>Annex A Test Uncertainty .....</b>                     | <b>31</b> |
| <b>Annex B Testing Laboratory Information .....</b>       | <b>32</b> |

| Change History |            |                   |
|----------------|------------|-------------------|
| Issue          | Date       | Reason for change |
| 1.0            | 2023-07-13 | First edition     |



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

|                              |                                                   |
|------------------------------|---------------------------------------------------|
| <b>Applicant:</b>            | MiMOMax Wireless Limited                          |
| <b>Applicant Address:</b>    | 540 Wairakei Road, Christchurch 8053, New Zealand |
| <b>Manufacturer:</b>         | MiMOMax Wireless Limited                          |
| <b>Manufacturer Address:</b> | 540 Wairakei Road, Christchurch 8053, New Zealand |

## 1.2. Equipment Under Test (EUT) Description

|                                   |                               |          |
|-----------------------------------|-------------------------------|----------|
| <b>Product Name:</b>              | 700MHz Pyxis Transceiver      |          |
| <b>EUT Serial No:</b>             | (N/A, marked 5# by test site) |          |
| <b>Hardware Version:</b>          | MWL-PYXIS-BHCA                |          |
| <b>Software Version:</b>          | 02.06.05                      |          |
| <b>Operating Frequency Range:</b> | 757-758 MHz&787-788 MHz,      |          |
| <b>Channel Bandwidth:</b>         | 25kHz; 50kHz                  |          |
| <b>Modulation Type:</b>           | 4 GFSK                        |          |
| <b>Operating Voltage:</b>         | 10.5-60Vdc                    |          |
| <b>Antenna Type&amp; Gain:</b>    | Omni Antenna                  | 2.0dBi;  |
|                                   |                               | 3.0dBi;  |
|                                   | Yagi Antenna                  | 12.0dBi; |
| <b>Emission Designator:</b>       | 25.0kHz: 20K0W1W              |          |
|                                   | 50.0kHz: 38K0W1W              |          |



### 1.3. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2 and Part 27 for the EUT FCC ID Certification:

| No. | Identity       | Document Title                                                                |
|-----|----------------|-------------------------------------------------------------------------------|
| 1   | 47 CFR Part 2  | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2   | 47 CFR Part 27 | Miscellaneous Wireless Communications Services                                |

Test detailed items/section required by FCC rules and results are listed as below:

| No. | Section                                                                                                | Description                                                                                                                                                                     | Test Date                 | Test Engineer          | Result   |
|-----|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------|----------|
| 1   | 27.50<br>2.1046                                                                                        | Power and antenna height limits<br>Radio frequency power output                                                                                                                 | 2023/06/06-<br>2023/06/09 | Li Huaijie             | Complies |
| 2   | 2.1049                                                                                                 | Occupied bandwidth                                                                                                                                                              | 2023/06/06                | Li Huaijie             | PASS     |
| 3   | 2.1051<br>27.53<br>27.53(c)<br>27.53(c)(1)<br>27.53(c)(2)<br>27.53(c)(3)<br>27.53(c)(5)<br>27.53(c)(6) | Conducted spurious emissions at antenna terminals with DUT<br>Operations in the<br>746 - 758 MHz band<br>776 - 788 MHz band<br>emissions in 763 - 775 MHz and 793 - 805MHz band | 2023/06/06                | Li Huaijie             | PASS     |
| 4   | 2.1053<br>27.53<br>27.53(c)<br>27.53(c)(1)<br>27.53(c)(2)<br>27.53(c)(3)<br>27.53(c)(5)<br>27.53(c)(6) | Field strength of radiated spurious emissions with DUT<br>Operations in the<br>746 - 758 MHz band<br>776 - 788 MHz band<br>Emissions in 763 - 775 MHz and 793 - 805MHz band     | 2023/06/21                | Yang Lian<br>Li Hanbin | PASS     |
| 5   | 27.53(f)                                                                                               | Additional emission requirement in 1559 -1610 MHz band                                                                                                                          | 2023/06/21                | Yang Lian<br>Li Hanbin | PASS     |



|   |                 |                     |            |            |      |
|---|-----------------|---------------------|------------|------------|------|
| 6 | 27.54<br>2.1055 | Frequency stability | 2023/06/06 | Li Huaijie | PASS |
|---|-----------------|---------------------|------------|------------|------|

**Note 1:** The 700MHz Pyxis Transceiver with FCC 47 CFR Part 2 and Part 27 when tested in accordance with the test methods described in 47 CFR Part 2 and Part 27.

**Note 2:** The path loss during the conducted RF test is calibrated to correct the results by the Ext Gain setting. The Ext Gain contains two parts that cable loss of 1.0dB and attenuator of 30.0dB.

**Note 3:** When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

## 1.4. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

|                             |         |
|-----------------------------|---------|
| Temperature (°C):           | 15 - 35 |
| Relative Humidity (%):      | 30 -60  |
| Atmospheric Pressure (kPa): | 86-106  |



## 2.47 CFR Part 2 and Part 27 Requirements

### 2.1. Radio Frequency Power Output and E.R.P.

#### 2.1.1. Test result

Nominal Frequency: 757.050 MHz Tx

| Channel Bandwidth (kHz) | Modulation Type | Voltage (Vdc) | Measured Power (dBm) | Measured Power (Watt) | Rated Power (Watt) | E.R.P. (ANT Gain = 2.0dBi) |       | E.R.P. (ANT Gain = 3.0dBi) |       | E.R.P. (ANT Gain = 12.0dBi) |        |
|-------------------------|-----------------|---------------|----------------------|-----------------------|--------------------|----------------------------|-------|----------------------------|-------|-----------------------------|--------|
|                         |                 |               |                      |                       |                    | dBm                        | Watt  | dBm                        | Watt  | dBm                         | Watt   |
| 25.0                    | 4GFSK           | 24            | 30.77                | 1.194                 | 1.0                | 30.62                      | 1.153 | 31.62                      | 1.452 | 40.62                       | 11.535 |
| 50.0                    | 4GFSK           | 24            | 30.34                | 1.081                 | 1.0                | 30.19                      | 1.045 | 31.19                      | 1.315 | 40.19                       | 10.447 |

Nominal Frequency: 787.950 MHz Tx

| Channel Bandwidth (kHz) | Modulation Type | Voltage (Vdc) | Measured Power (dBm) | Measured Power (Watt) | Rated Power (Watt) | E.R.P. (ANT Gain = 2.0dBi) |       | E.R.P. (ANT Gain = 3.0dBi) |       | E.R.P. (ANT Gain = 12.0dBi) |        |
|-------------------------|-----------------|---------------|----------------------|-----------------------|--------------------|----------------------------|-------|----------------------------|-------|-----------------------------|--------|
|                         |                 |               |                      |                       |                    | dBm                        | Watt  | dBm                        | Watt  | dBm                         | Watt   |
| 25.0                    | 4GFSK           | 24            | 30.69                | 1.172                 | 1.0                | 30.54                      | 1.132 | 31.54                      | 1.426 | 40.54                       | 11.324 |
| 50.0                    | 4GFSK           | 24            | 30.49                | 1.119                 | 1.0                | 30.34                      | 1.081 | 31.34                      | 1.361 | 40.34                       | 10.814 |

**Note1:** Measurements were carried out at the RF output terminals of the transmitter using spectrum analyzer. The path loss during the conducted RF test is calibrated to correct the results by the Ext Gain setting. The Ext Gain contains two parts that cable loss of 1dB and attenuator of 30.0dB.

**Note 2:** The transmitter has a rated output power of 1 Watt(30dBm).The measured power has been shown to be within +/- 1 dB of the rated power.

**Note3:** E.I.R.P. (dBm) = Conducted Output Power (dBm) + Antenna Gain (dBi); E.R.P. (dBm) = E.I.R.P. (dBm) - 2.15.

**Note4:** Part 27 does not specify the transmitter output power.

Subpart C Section 27.50 (b)(1) states that fixed and base station transmitters in the 757-758 MHz band must not exceed 1000 watts ERP.

Subpart C Section 27.50 (b)(9) states that for control stations and mobile stations transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.



## 2.2. Occupied Bandwidth

### 2.2.1. Definition

The client has declared the following occupied bandwidths for each channel bandwidth:

| Frequency(MHz) | Channel Bandwidth(kHz) | Occupied Bandwidth(kHz) |
|----------------|------------------------|-------------------------|
| 757.050        | 25.0, 50.0             | 18.8, 37.7              |
| 787.950        | 25.0, 50.0             | 19.1, 37.1              |

**Note:** The above data combined with uncertainty and rounding calculations are consistent with the actual test data.

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth.

### 2.2.2. Test Description

Measurements have been made to verify these declared bandwidths using the generic frequencies that are listed in the table above.

The occupied bandwidth has been measured and compared against the occupied bandwidth declared by the client.

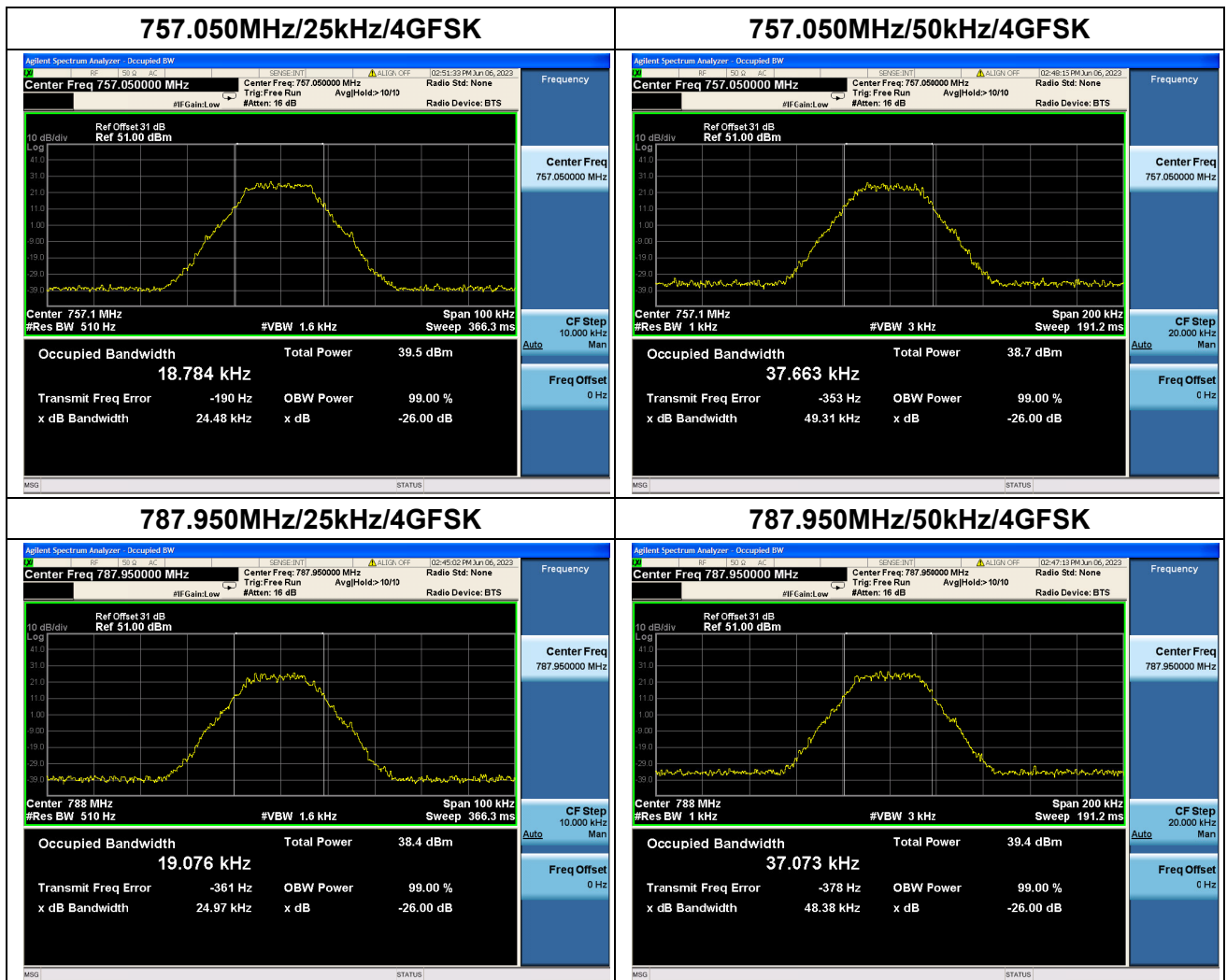
Measurements have been made of each modulation type using a spectrum analyzer operating in occupied bandwidth mode.



## 2.2.3. Test Result

| Frequency  | Channel Bandwidth(kHz) | Emission Type | Occupied Bandwidth(kHz) |
|------------|------------------------|---------------|-------------------------|
| 757.050MHz | 25.0                   | 4GFSK         | 18.784                  |
|            | 50.0                   | 4GFSK         | 37.663                  |

| Frequency  | Channel Bandwidth(kHz) | Emission Type | Occupied Bandwidth(kHz) |
|------------|------------------------|---------------|-------------------------|
| 787.950MHz | 25.0                   | 4GFSK         | 19.076                  |
|            | 50.0                   | 4GFSK         | 37.073                  |





## 2.3. Spurious Emissions At Antenna Terminals

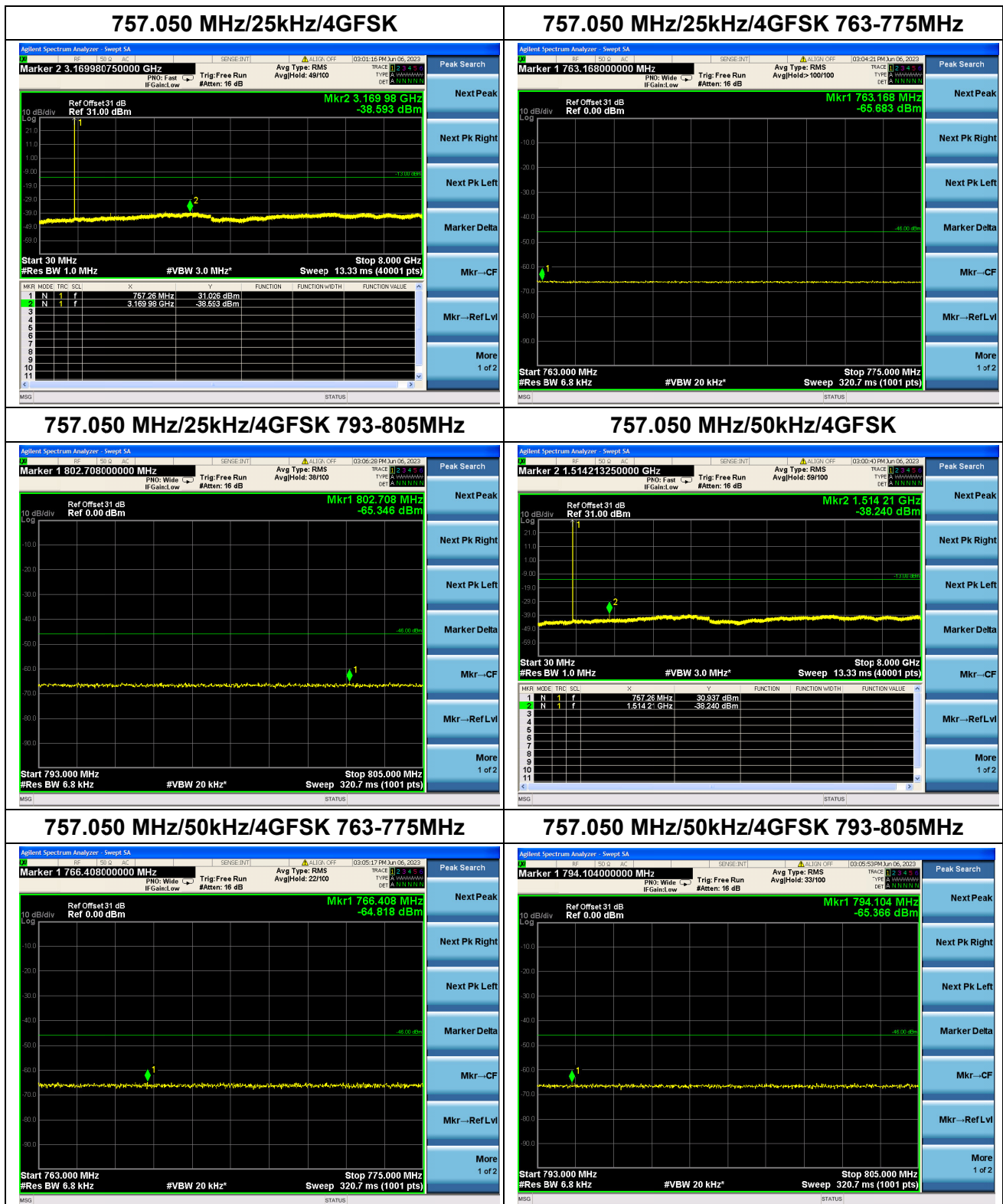
### 2.3.1. Test Requirement

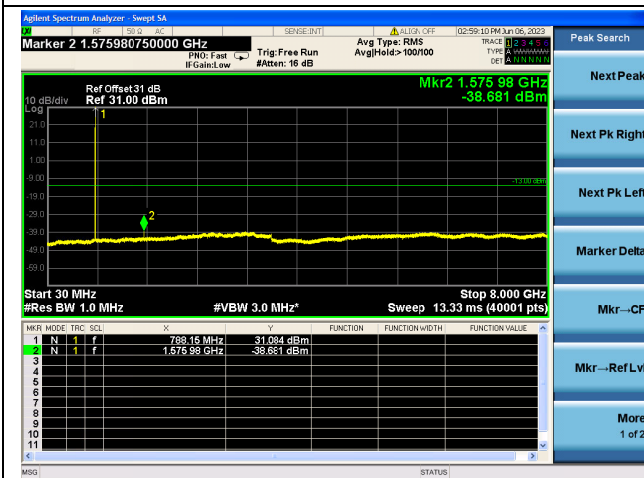
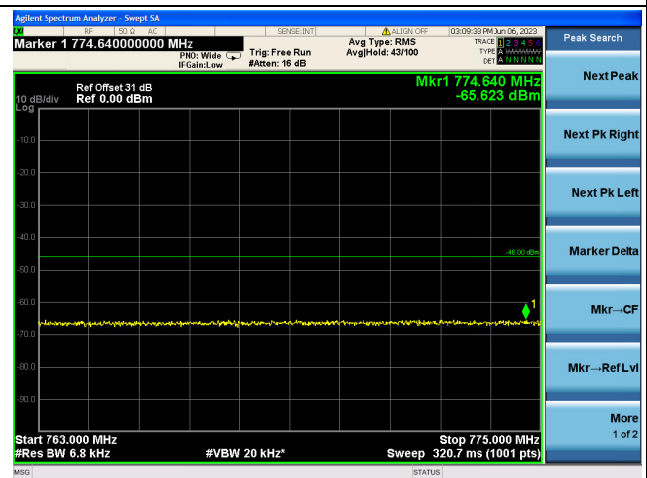
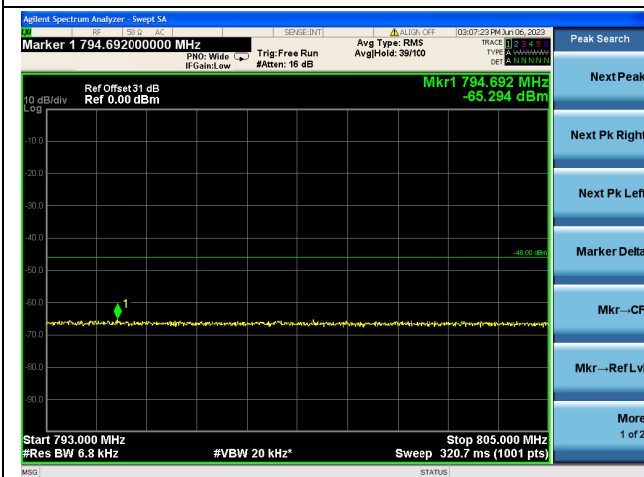
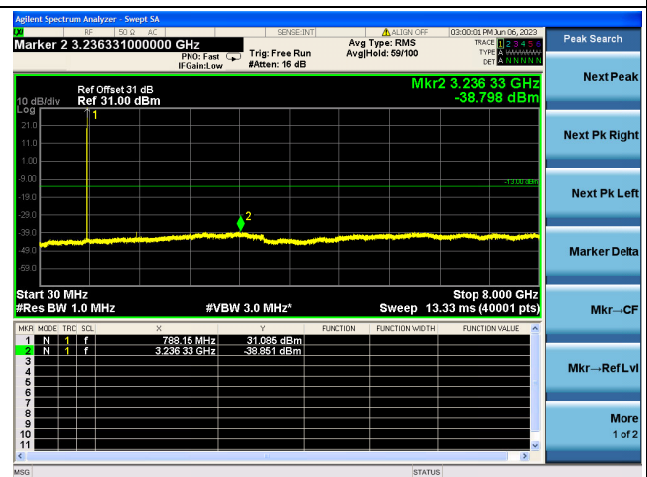
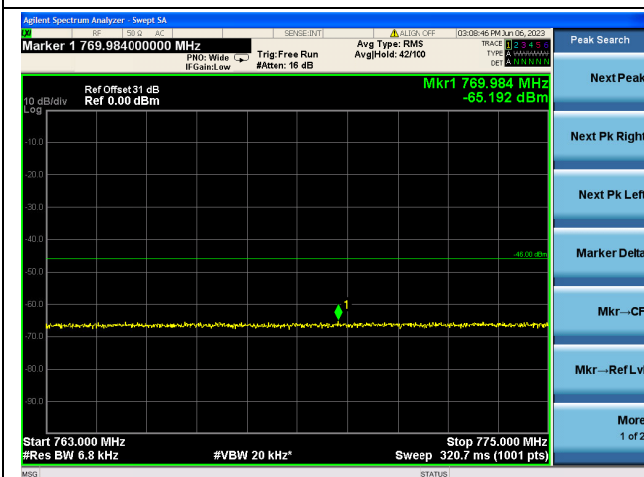
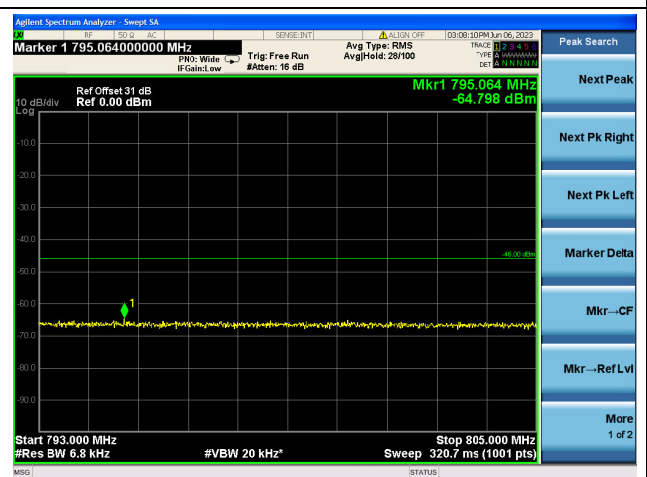
According to FCC section 2.1051 and section 27.53(c). For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.



## 2.3.2. Test Result

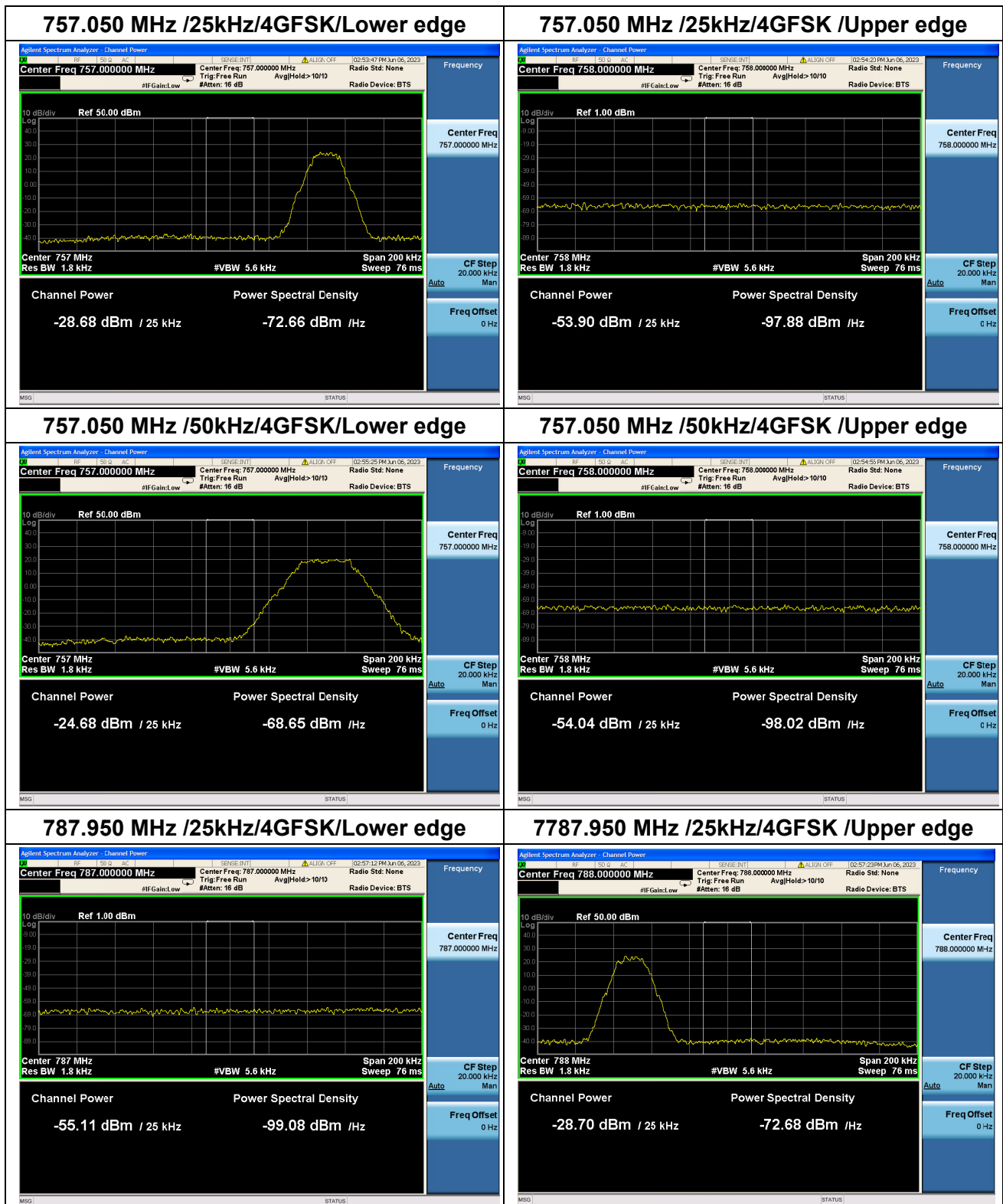


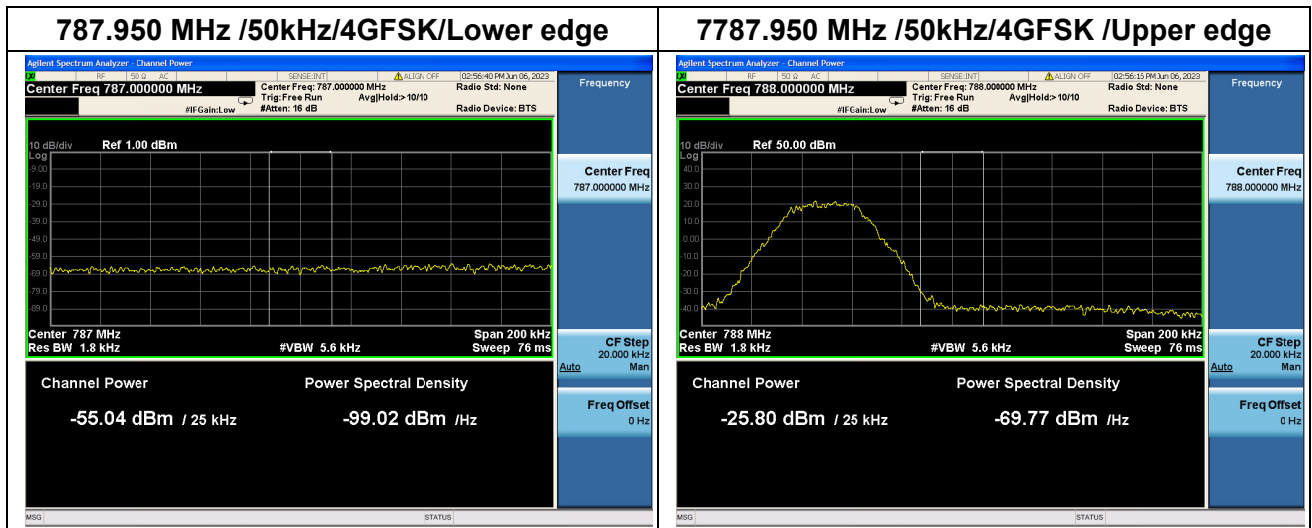
**787.950 MHz/25kHz/4GFSK****787.950 MHz/25kHz/4GFSK 763-775MHz****787.950 MHz/25kHz/4GFSK 793-805MHz****787.950 MHz/50kHz/4GFSK****787.950 MHz/50kHz/4GFSK 763-775MHz****787.950 MHz/50kHz/4GFSK 793-805MHz**



REPORT No.: SZ23050375W01

Attach pictures of close span spectrum with 30KHz RBW here:







## 2.4. Radiated Spurious Emissions

### 2.4.1. Requirement

According to FCC section 2.1053 and section 27.53(c). For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

Additional requirement for operations in the 746-758 MHz, 775-788 MHz:

According to FCC section 27.53(f), for operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropic ally radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

This calculated to be  $-40$  dBm.



#### 2.4.2. Test Result

**Note 1:** An Omni 2dBi antenna was attached to the transmitter which was considered to be typical. Testing was carried out at the test site between 1559-1610 MHz using a peak detector with 1 MHz resolution bandwidth using both vertical and horizontal polarizations.

**Note 2:** No discrete emissions were detected.

**Note 3:** The power of the EUT transmitting frequency should be ignored.

**Note 4:** N/A means the frequency is the basic frequency; they are no need to verdict.

**Note5:** For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements. For measurements above 1GHz (exclude 1559-1610 MHz) the resolution bandwidth is set to 1MHz for peak measurements.

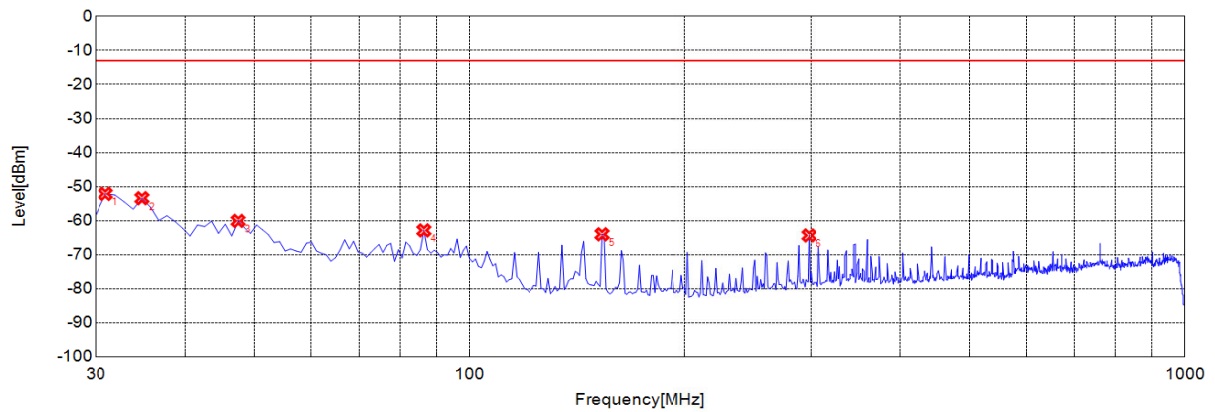
**Note 6:** All bandwidth and modulation were considered and evaluated respectively by performing full test, only the worst cases were recorded in this test report.

**Note 7:** The graph is tested with the antenna gain of 2dBi, the data table of 757.050MHz is calculated from the antenna gain of 12dBi, and the data table of 787.950MHz is calculated from the antenna gain of 12dBi. The calculation formula: PK (dBm) = DATA(reading value of the graph) + 12dB(Difference of the antenna gain).

**Note 8:** The tested RSE at 1559 – 1610MHz is limited by test instruments.



## Test Graph



✘ Final Test

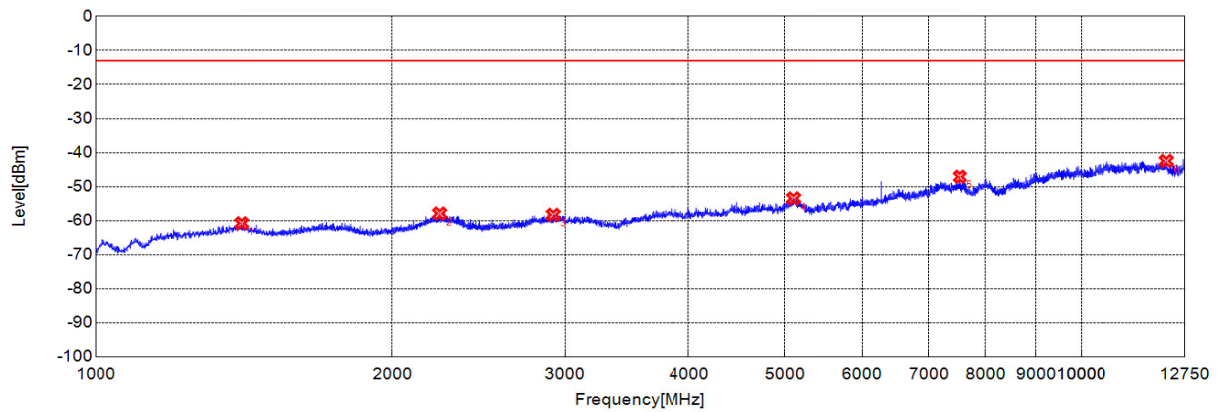
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 30.9710        | -52.14         | -13.00         | 39.14          | -16.94         | -39.59       | 22.65       | Vertical     |
| 2   | 34.8550        | -53.42         | -13.00         | 40.42          | -16.59         | -39.49       | 22.90       | Vertical     |
| 3   | 47.4770        | -60.08         | -13.00         | 47.08          | -15.49         | -39.48       | 23.99       | Vertical     |
| 4   | 86.3160        | -62.88         | -13.00         | 49.88          | -18.74         | -39.64       | 20.90       | Vertical     |
| 5   | 153.3130       | -64.02         | -13.00         | 51.02          | -18.18         | -39.95       | 21.77       | Vertical     |
| 6   | 297.9880       | -64.36         | -13.00         | 51.36          | -14.80         | -39.75       | 24.95       | Vertical     |

757.500MHz 4 GFSK 25.0 kHz 30M-1G V



## Test Graph



✕ Final Test

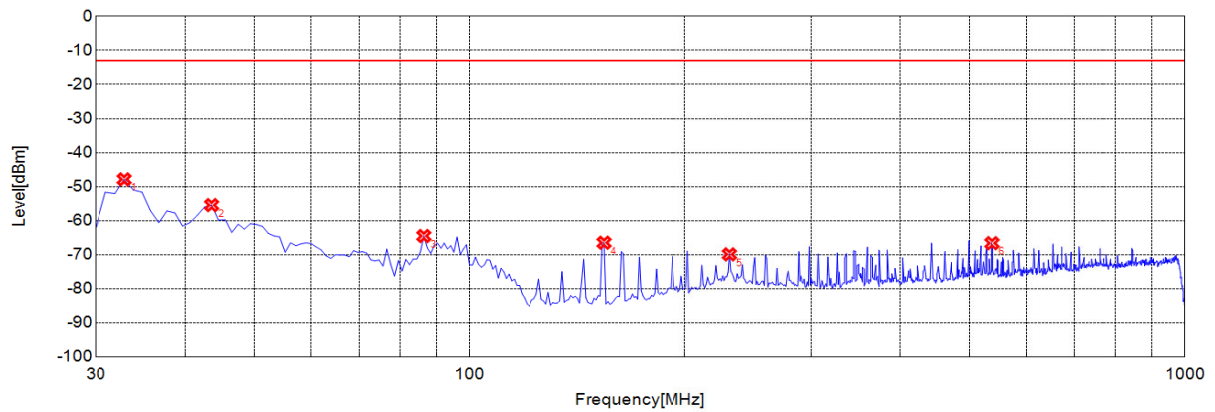
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 1407.4690      | -60.8          | -13.00         | 47.80          | -13.17         | -50.33       | 37.16       | Vertical     |
| 2   | 2234.4110      | -57.93         | -13.00         | 44.93          | -9.98          | -49.32       | 39.34       | Vertical     |
| 3   | 2919.3060      | -58.32         | -13.00         | 45.32          | -9.88          | -48.38       | 38.50       | Vertical     |
| 4   | 5104.7260      | -53.49         | -13.00         | 40.49          | -2.86          | -44.55       | 41.69       | Vertical     |
| 5   | 7532.8800      | -47.11         | -13.00         | 34.11          | 3.83           | -41.76       | 45.59       | Vertical     |
| 6   | 12212.0350     | -42.48         | -13.00         | 29.48          | 11.94          | -36.92       | 48.86       | Vertical     |

757.500MHz 4 GFSK 25.0 kHz 1G-12.75G V



## Test Graph



✘ Final Test

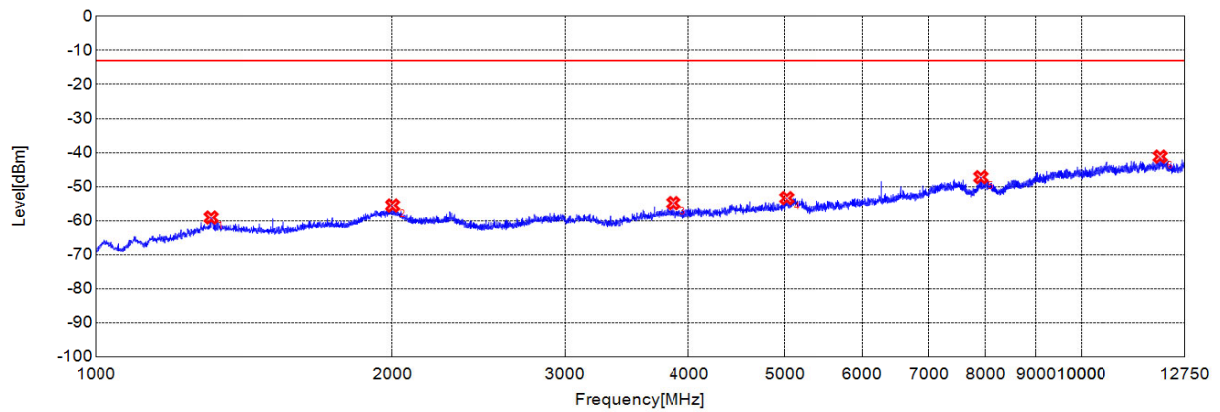
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 32.9130        | -47.88         | -13.00         | 34.88          | -10.22         | -39.57       | 29.35       | Horizontal   |
| 2   | 43.5940        | -55.45         | -13.00         | 42.45          | -7.01          | -39.48       | 32.47       | Horizontal   |
| 3   | 86.3160        | -64.53         | -13.00         | 51.53          | -19.53         | -39.64       | 20.11       | Horizontal   |
| 4   | 154.2840       | -66.5          | -13.00         | 53.50          | -21.87         | -39.98       | 18.11       | Horizontal   |
| 5   | 230.9910       | -69.93         | -13.00         | 56.93          | -13.11         | -39.97       | 26.86       | Horizontal   |
| 6   | 537.8180       | -66.64         | -13.00         | 53.64          | -10.20         | -38.68       | 28.48       | Horizontal   |

757.500MHz 4 GFSK 25.0 kHz 30M-1G H



## Test Graph



✕ Final Test

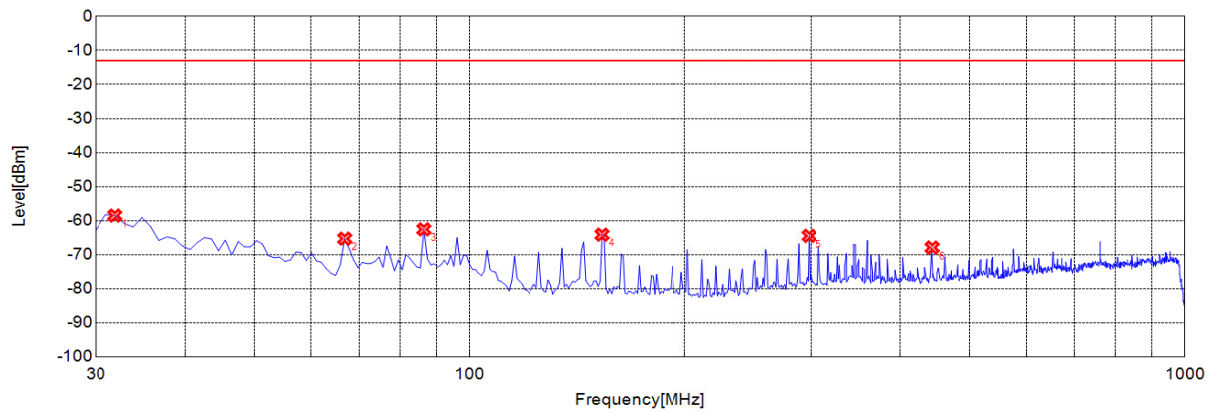
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 1310.1030      | -59.1          | -13.00         | 46.10          | -12.87         | -50.48       | 37.61       | Horizontal   |
| 2   | 2002.3340      | -55.57         | -13.00         | 42.57          | -7.69          | -49.65       | 41.96       | Horizontal   |
| 3   | 3859.7680      | -54.87         | -13.00         | 41.87          | -6.90          | -46.58       | 39.68       | Horizontal   |
| 4   | 5026.7130      | -53.41         | -13.00         | 40.41          | -3.22          | -44.63       | 41.41       | Horizontal   |
| 5   | 7921.3200      | -47.23         | -13.00         | 34.23          | 4.10           | -41.50       | 45.60       | Horizontal   |
| 6   | 12041.3820     | -41.19         | -13.00         | 28.19          | 12.62          | -36.78       | 49.40       | Horizontal   |

757.500MHz 4 GFSK 25.0 kHz 1G-12.75G H



## Test Graph



✕ Final Test

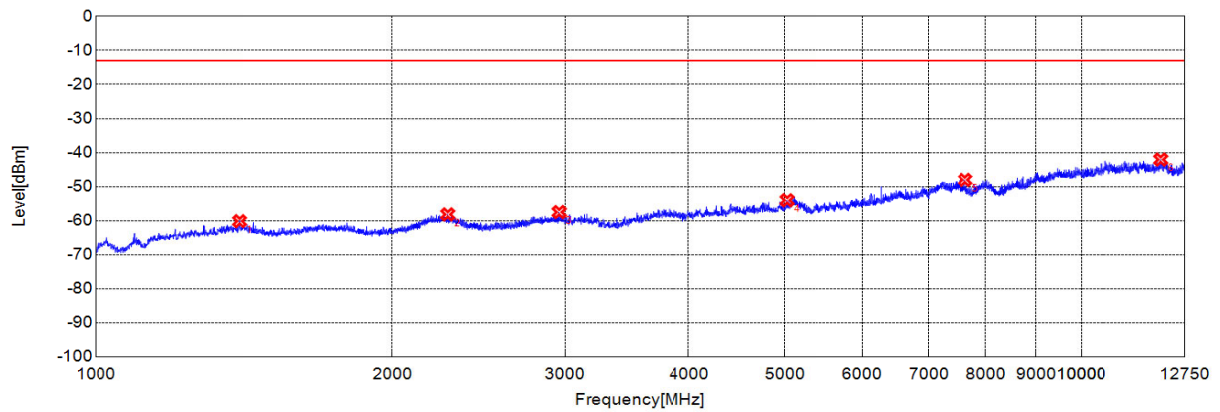
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 31.9420        | -58.51         | -13.00         | 45.51          | -16.95         | -39.66       | 22.71       | Vertical     |
| 2   | 66.8970        | -65.31         | -13.00         | 52.31          | -18.23         | -39.48       | 21.25       | Vertical     |
| 3   | 86.3160        | -62.58         | -13.00         | 49.58          | -18.74         | -39.64       | 20.90       | Vertical     |
| 4   | 153.3130       | -64.14         | -13.00         | 51.14          | -18.18         | -39.95       | 21.77       | Vertical     |
| 5   | 297.9880       | -64.49         | -13.00         | 51.49          | -14.80         | -39.75       | 24.95       | Vertical     |
| 6   | 442.6630       | -67.93         | -13.00         | 54.93          | -12.31         | -38.98       | 26.67       | Vertical     |

787.950MHz 4 GFSK 25.0 kHz 30M-1G V



## Test Graph



✕ Final Test

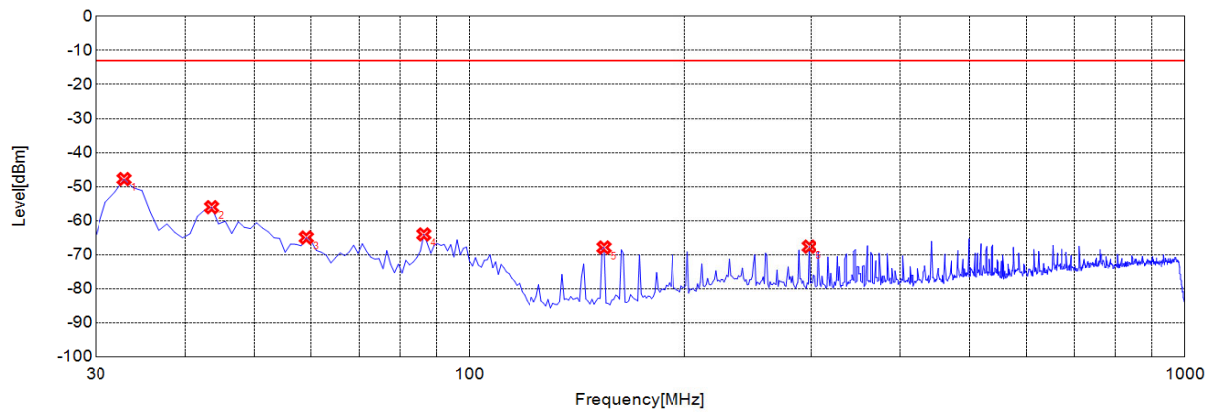
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 1400.1330      | -60.16         | -13.00         | 47.16          | -13.04         | -50.35       | 37.31       | Vertical     |
| 2   | 2277.0920      | -58.17         | -13.00         | 45.17          | -10.16         | -49.29       | 39.13       | Vertical     |
| 3   | 2959.3200      | -57.5          | -13.00         | 44.50          | -9.88          | -48.39       | 38.51       | Vertical     |
| 4   | 5029.9630      | -54.03         | -13.00         | 41.03          | -3.57          | -44.62       | 41.05       | Vertical     |
| 5   | 7628.7710      | -48.04         | -13.00         | 35.04          | 3.44           | -41.69       | 45.13       | Vertical     |
| 6   | 12056.0090     | -42.07         | -13.00         | 29.07          | 12.04          | -36.79       | 48.83       | Vertical     |

787.950MHz 4 GFSK 25.0 kHz 1G-12.75G V



## Test Graph



✕ Final Test

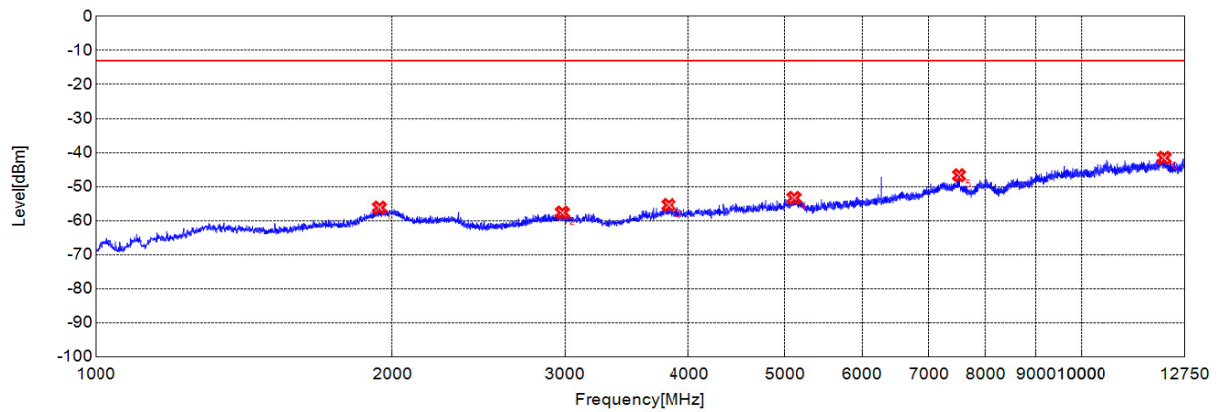
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 32.9130        | -47.79         | -13.00         | 34.79          | -10.22         | -39.57       | 29.35       | Horizontal   |
| 2   | 43.5940        | -56.06         | -13.00         | 43.06          | -7.01          | -39.48       | 32.47       | Horizontal   |
| 3   | 59.1290        | -64.97         | -13.00         | 51.97          | -10.64         | -39.53       | 28.89       | Horizontal   |
| 4   | 86.3160        | -64.06         | -13.00         | 51.06          | -19.53         | -39.64       | 20.11       | Horizontal   |
| 5   | 154.2840       | -67.91         | -13.00         | 54.91          | -21.87         | -39.98       | 18.11       | Horizontal   |
| 6   | 297.9880       | -67.66         | -13.00         | 54.66          | -14.82         | -39.75       | 24.93       | Horizontal   |

787.950MHz 4 GFSK 25.0 kHz 30M-1G H



## Test Graph



✕ Final Test

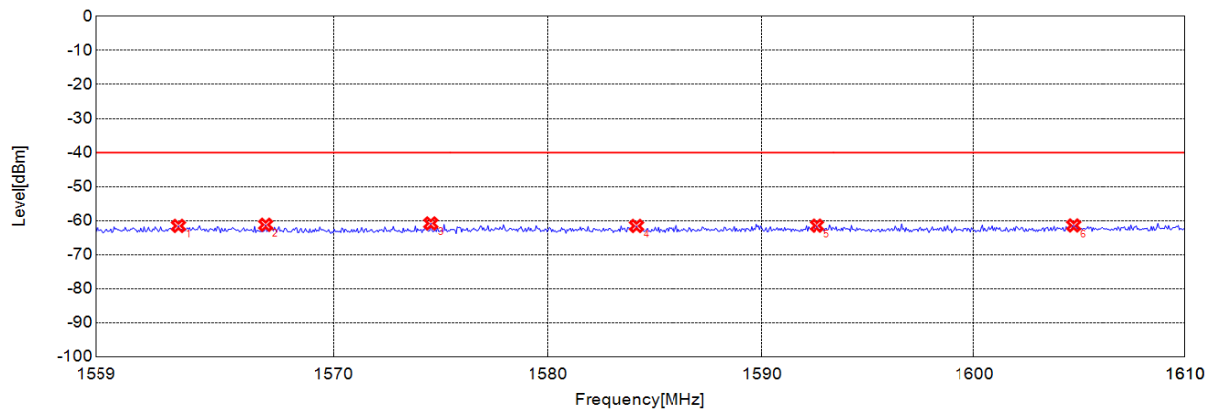
### Suspected List

| NO. | Freq. [MHz] | Level [dBm] | Limit [dBm] | Margin [dB] | Factor [dB] | Path [dB] | Air [dB] | Ant. Pol.  |
|-----|-------------|-------------|-------------|-------------|-------------|-----------|----------|------------|
| 1   | 1940.9800   | -56.21      | -13.00      | 43.21       | -8.46       | -49.67    | 41.21    | Horizontal |
| 2   | 2981.3270   | -57.66      | -13.00      | 44.66       | -9.58       | -48.38    | 38.80    | Horizontal |
| 3   | 3815.8860   | -55.43      | -13.00      | 42.43       | -6.91       | -46.44    | 39.53    | Horizontal |
| 4   | 5111.2270   | -53.35      | -13.00      | 40.35       | -3.03       | -44.54    | 41.51    | Horizontal |
| 5   | 7519.8780   | -46.68      | -13.00      | 33.68       | 4.20        | -41.78    | 45.98    | Horizontal |
| 6   | 12153.5260  | -41.57      | -13.00      | 28.57       | 12.52       | -36.87    | 49.39    | Horizontal |

787.950MHz 4 GFSK 25.0 kHz 1G-12.75G H



## Test Graph



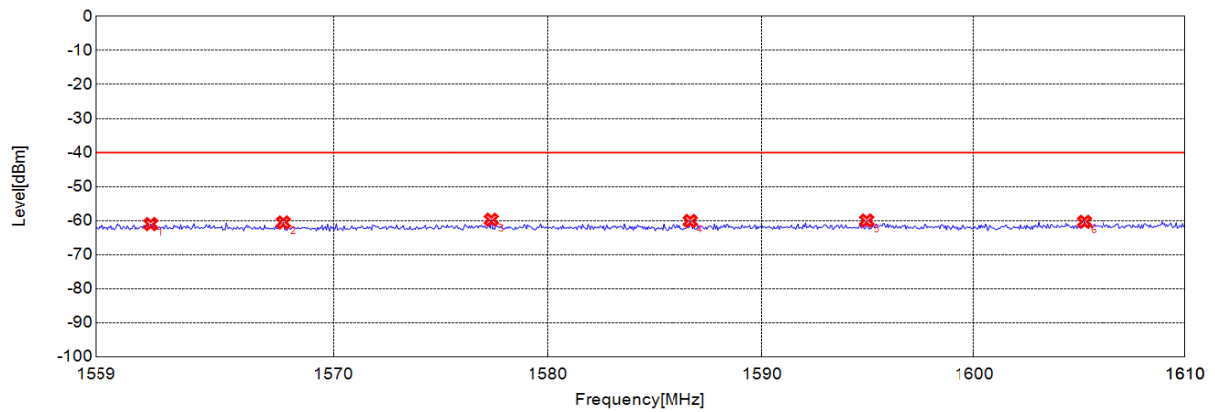
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 1562.8290      | -61.56         | -40.00         | 21.56          | -14.45         | -50.13       | 35.68       | Horizontal   |
| 2   | 1566.8620      | -61.22         | -40.00         | 21.22          | -14.43         | -50.13       | 35.70       | Horizontal   |
| 3   | 1574.5200      | -60.83         | -40.00         | 20.83          | -14.38         | -50.12       | 35.74       | Horizontal   |
| 4   | 1584.1170      | -61.57         | -40.00         | 21.57          | -14.31         | -50.11       | 35.80       | Horizontal   |
| 5   | 1592.5920      | -61.49         | -40.00         | 21.49          | -14.26         | -50.10       | 35.84       | Horizontal   |
| 6   | 1604.6910      | -61.43         | -40.00         | 21.43          | -14.15         | -50.08       | 35.93       | Horizontal   |

757.050MHz 4 GFSK 25.0 kHz 1559M-1610M V



## Test Graph



✕ Final Test

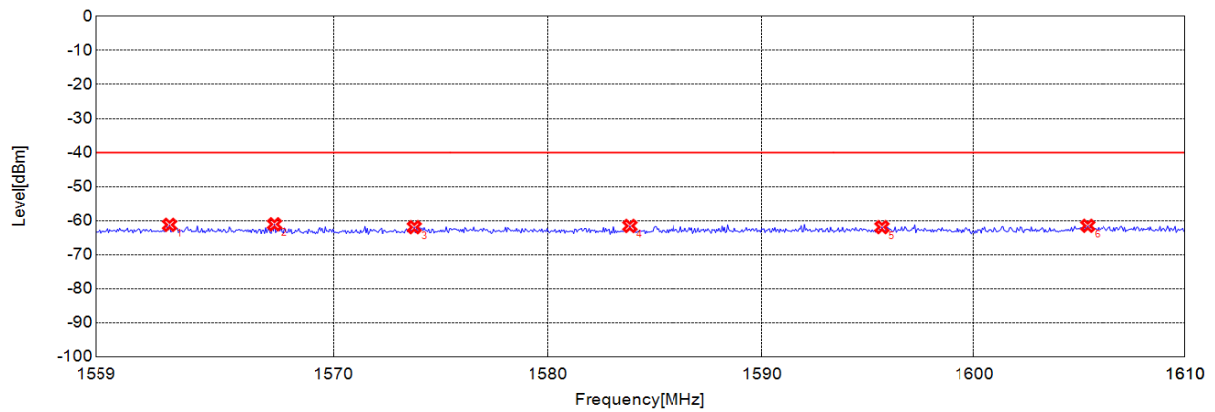
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 1561.5530      | -61.03         | -40.00         | 21.03          | -13.71         | -50.14       | 36.43       | Horizontal   |
| 2   | 1567.6790      | -60.57         | -40.00         | 20.57          | -13.67         | -50.13       | 36.46       | Horizontal   |
| 3   | 1577.3270      | -59.75         | -40.00         | 19.75          | -13.60         | -50.12       | 36.52       | Horizontal   |
| 4   | 1586.6700      | -60.12         | -40.00         | 20.12          | -13.54         | -50.11       | 36.57       | Horizontal   |
| 5   | 1594.9400      | -59.99         | -40.00         | 19.99          | -13.49         | -50.10       | 36.61       | Horizontal   |
| 6   | 1605.2010      | -60.36         | -40.00         | 20.36          | -13.37         | -50.08       | 36.71       | Horizontal   |

757.050MHz 4 GFSK 25.0 kHz 1559M-1610M H



## Test Graph



✕ Final Test

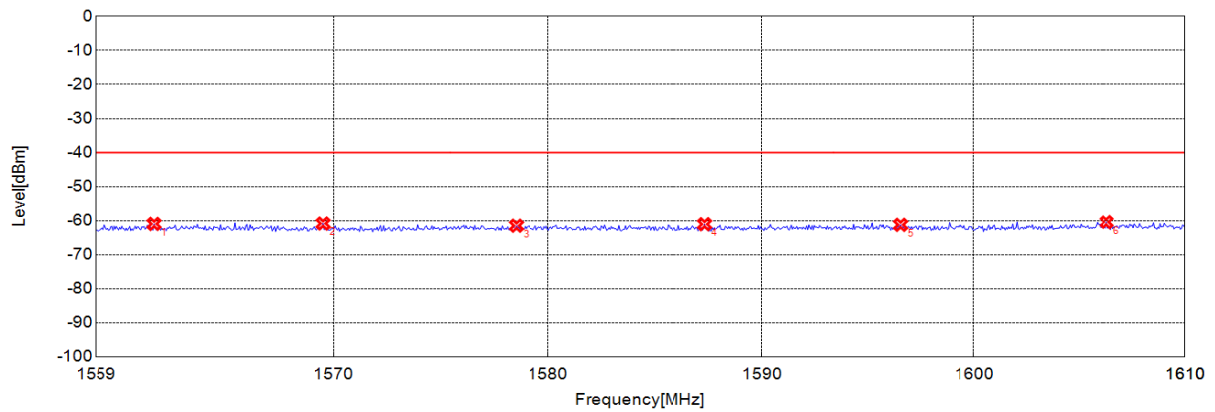
## Suspected List

| NO. | Freq.<br>[MHz] | Level<br>[dBm] | Limit<br>[dBm] | Margin<br>[dB] | Factor<br>[dB] | Path<br>[dB] | Air<br>[dB] | Ant.<br>Pol. |
|-----|----------------|----------------|----------------|----------------|----------------|--------------|-------------|--------------|
| 1   | 1562.4200      | -61.25         | -40.00         | 21.25          | -14.46         | -50.14       | 35.68       | Horizontal   |
| 2   | 1567.2700      | -61.09         | -40.00         | 21.09          | -14.42         | -50.13       | 35.71       | Horizontal   |
| 3   | 1573.7540      | -61.93         | -40.00         | 21.93          | -14.38         | -50.12       | 35.74       | Horizontal   |
| 4   | 1583.8110      | -61.57         | -40.00         | 21.57          | -14.32         | -50.11       | 35.79       | Horizontal   |
| 5   | 1595.6550      | -61.92         | -40.00         | 21.92          | -14.24         | -50.10       | 35.86       | Horizontal   |
| 6   | 1605.3540      | -61.53         | -40.00         | 21.53          | -14.14         | -50.08       | 35.94       | Horizontal   |

787.950MHz 4 GFSK 25.0 kHz 1559M-1610M V



## Test Graph



✕ Final Test

### Suspected List

| NO. | Freq. [MHz] | Level [dBm] | Limit [dBm] | Margin [dB] | Factor [dB] | Path [dB] | Air [dB] | Ant. Pol.  |
|-----|-------------|-------------|-------------|-------------|-------------|-----------|----------|------------|
| 1   | 1561.7060   | -60.97      | -40.00      | 20.97       | -13.71      | -50.14    | 36.43    | Horizontal |
| 2   | 1569.5170   | -60.86      | -40.00      | 20.86       | -13.66      | -50.13    | 36.47    | Horizontal |
| 3   | 1578.5020   | -61.5       | -40.00      | 21.50       | -13.60      | -50.12    | 36.52    | Horizontal |
| 4   | 1587.3330   | -61.06      | -40.00      | 21.06       | -13.54      | -50.11    | 36.57    | Horizontal |
| 5   | 1596.5230   | -61.24      | -40.00      | 21.24       | -13.47      | -50.09    | 36.62    | Horizontal |
| 6   | 1606.2730   | -60.44      | -40.00      | 20.44       | -13.36      | -50.08    | 36.72    | Horizontal |

757.050MHz 4 GFSK 25.0 kHz 1559M-1610M H



## 2.5. Frequency Stability

### 2.5.1. Requirement

According to FCC section 2.1055 and FCC section 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
- (b) Frequency stability also measured at extreme temperature -40°C and +65°C, which the applicant specified.

### 2.5.2. Test Results

The frequency stability of the transmitter shall be maintained within  $\pm 0.0001$  percent ( $\pm 1$  ppm) of the center frequency over a temperature variation of -30 °Celsius to + 50 °Celsius at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20 °Celsius.

| 757.05MHz 4GFSK 25kHz<br>Limit =Within Authorized Band |             |           |                |                 |        |
|--------------------------------------------------------|-------------|-----------|----------------|-----------------|--------|
| Voltage (%)                                            | Power (VDC) | Temp (°C) | Fre. Dev. (Hz) | Deviation (ppm) | Result |
| 100                                                    | 24.0        | +20(Ref)  | 16             | 0.021           | PASS   |
| 100                                                    |             | -40       | 19             | 0.025           |        |
| 100                                                    |             | -30       | 18             | 0.024           |        |
| 100                                                    |             | -20       | -12            | -0.016          |        |
| 100                                                    |             | -10       | 16             | 0.021           |        |
| 100                                                    |             | 0         | 13             | 0.017           |        |
| 100                                                    |             | +10       | -17            | -0.022          |        |
| 100                                                    |             | +20       | 10             | 0.013           |        |
| 100                                                    |             | +30       | 16             | 0.021           |        |
| 100                                                    |             | +40       | 19             | 0.025           |        |
| 100                                                    |             | +50       | 17             | 0.022           |        |
| 100                                                    |             | +60       | -15            | -0.020          |        |
| 100                                                    |             | +65       | 4              | 0.005           |        |
| 115                                                    | 27.6        | +20       | 20             | <b>0.026</b>    |        |
| 85                                                     | 20.4        | +20       | 19             | 0.025           |        |



| 757.05MHz 4GFSK 50kHz         |             |           |                |                 |        |
|-------------------------------|-------------|-----------|----------------|-----------------|--------|
| Limit =Within Authorized Band |             |           |                |                 |        |
| Voltage (%)                   | Power (VDC) | Temp (°C) | Fre. Dev. (Hz) | Deviation (ppm) | Result |
| 100                           | 24.0        | +20(Ref)  | -7             | -0.009          | PASS   |
| 100                           |             | -40       | 18             | 0.024           |        |
| 100                           |             | -30       | 13             | 0.017           |        |
| 100                           |             | -20       | -7             | -0.009          |        |
| 100                           |             | -10       | 19             | 0.025           |        |
| 100                           |             | 0         | 16             | 0.021           |        |
| 100                           |             | +10       | 16             | 0.021           |        |
| 100                           |             | +20       | 14             | 0.018           |        |
| 100                           |             | +30       | 20             | <b>0.026</b>    |        |
| 100                           |             | +40       | -23            | -0.030          |        |
| 100                           |             | +50       | 1              | 0.001           |        |
| 100                           |             | +60       | 13             | 0.017           |        |
| 100                           |             | +65       | 20             | <b>0.026</b>    |        |
| 115                           | 27.6        | +20       | 20             | 0.026           |        |
| 85                            | 20.4        | +20       | -23            | -0.030          |        |

| 787.95MHz 4GFSK 25kHz         |             |           |                |                 |        |
|-------------------------------|-------------|-----------|----------------|-----------------|--------|
| Limit =Within Authorized Band |             |           |                |                 |        |
| Voltage (%)                   | Power (VDC) | Temp (°C) | Fre. Dev. (Hz) | Deviation (ppm) | Result |
| 100                           | 24.0        | +20(Ref)  | 17             | 0.022           | PASS   |
| 100                           |             | -40       | 13             | 0.016           |        |
| 100                           |             | -30       | 15             | 0.019           |        |
| 100                           |             | -20       | 6              | 0.008           |        |
| 100                           |             | -10       | 17             | 0.022           |        |
| 100                           |             | 0         | 6              | 0.008           |        |
| 100                           |             | +10       | 13             | 0.016           |        |
| 100                           |             | +20       | 13             | 0.016           |        |
| 100                           |             | +30       | 14             | 0.018           |        |
| 100                           |             | +40       | 18             | <b>0.023</b>    |        |
| 100                           |             | +50       | 1              | 0.001           |        |
| 100                           |             | +60       | 13             | 0.016           |        |
| 100                           |             | +65       | -9             | -0.011          |        |
| 115                           | 27.6        | +20       | 18             | <b>0.023</b>    |        |



|    |      |     |    |       |  |
|----|------|-----|----|-------|--|
| 85 | 20.4 | +20 | 17 | 0.022 |  |
|----|------|-----|----|-------|--|

| <b>787.95MHz 4GFSK 50kHz</b><br><b>Limit =Within Authorized Band</b> |             |           |                |                 |        |
|----------------------------------------------------------------------|-------------|-----------|----------------|-----------------|--------|
| Voltage (%)                                                          | Power (VDC) | Temp (°C) | Fre. Dev. (Hz) | Deviation (ppm) | Result |
| 100                                                                  | 24.0        | +20(Ref)  | 7              | 0.009           | PASS   |
| 100                                                                  |             | -40       | 15             | 0.019           |        |
| 100                                                                  |             | -30       | 19             | 0.024           |        |
| 100                                                                  |             | -20       | 13             | 0.016           |        |
| 100                                                                  |             | -10       | 10             | 0.013           |        |
| 100                                                                  |             | 0         | 18             | 0.023           |        |
| 100                                                                  |             | +10       | 15             | 0.019           |        |
| 100                                                                  |             | +20       | 21             | 0.027           |        |
| 100                                                                  |             | +30       | -19            | -0.024          |        |
| 100                                                                  |             | +40       | -16            | -0.020          |        |
| 100                                                                  |             | +50       | -1             | -0.001          |        |
| 100                                                                  |             | +60       | 15             | 0.019           |        |
| 100                                                                  |             | +65       | 23             | <b>0.029</b>    |        |
| 115                                                                  | 27.6        | +20       | -2             | -0.003          |        |
| 85                                                                   | 20.4        | +20       | 15             | 0.019           |        |



## Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

| Test items                          | Uncertainty   |
|-------------------------------------|---------------|
| Output Power                        | $\pm 2.22$ dB |
| Bandwidth                           | $\pm 5\%$     |
| Conducted Spurious Emission         | $\pm 2.77$ dB |
| Band Edge                           | $\pm 2.77$ dB |
| Equivalent Isotropic Radiated Power | $\pm 2.22$ dB |
| Radiated Spurious Emissions         | $\pm 6$ dB    |

When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.



## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

|                            |                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Company Name:</b>       | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| <b>Laboratory Address:</b> | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |
| <b>Telephone:</b>          | +86 755 36698555                                                                                                                 |
| <b>Facsimile:</b>          | +86 755 36698525                                                                                                                 |

### 2. Identification of the Responsible Testing Location

|                 |                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Name:</b>    | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| <b>Address:</b> | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China |

### 3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



REPORT No.: SZ23050375W01

#### 4. Test Equipment Utilized

##### 4.1 Conducted Test Equipment

| Equipment Name         | Serial No.  | Type        | versions | Manufacturer | Cal. Date  | Cal. Due   |
|------------------------|-------------|-------------|----------|--------------|------------|------------|
| Power Splitter         | NW521       | 1506A       | N/A      | Weinschel    | N/A        | N/A        |
| Attenuator             | N/A         | 10dB        | N/A      | Resnet       | N/A        | N/A        |
| EXA Signal Analyzer    | MY51511149  | N9020A      | N/A      | Agilent      | 2022.07.04 | 2023.07.03 |
| RF cable (30MHz-26GHz) | CB01        | RF01        | N/A      | Morlab       | N/A        | N/A        |
| Temperature Chamber    | 20171112102 | KMT-36LF1A0 | N/A      | KOMEG        | 2022.11.18 | 2023.11.17 |

##### 4.2 List of Software Used

| Description     | Manufacturer | Software Version |
|-----------------|--------------|------------------|
| TS+ -[JS36-RSE] | DongSheng    | 2.0.1.3          |

**4.3 Radiated Test Equipment**

| Equipment Name                 | Serial No.  | Type                | Manufacturer | Cal. Date  | Cal. Due   |
|--------------------------------|-------------|---------------------|--------------|------------|------------|
| Bi-Log Antenna                 | 9163-519    | VULB 9163           | SCHWARZBECK  | 2022.05.25 | 2025.05.24 |
| Horn Antenna                   | 01774       | BBHA 9120D          | SCHWARZBECK  | 2022.07.13 | 2025.07.12 |
| Receiver                       | MY54130016  | N9038A              | Agilent      | 2022.07.07 | 2023.07.06 |
| Receiver                       | MY56400093  | N9038A              | KEYSIGHT     | 2023.02.09 | 2024.02.08 |
| Signal Analyzer                | MY56060145  | N9020A              | Agilent      | 2022.07.04 | 2023.07.03 |
| Preamplifier<br>(2GHz-18GHz)   | 61171/61172 | S020180L32<br>03    | LUCIX CORP.  | 2022.07.08 | 2023.07.07 |
| Preamplifier<br>(10MHz-6GHz)   | 46732       | S10M100L38<br>02    | LUCIX CORP.  | 2022.07.08 | 2023.07.07 |
| Preamplifier<br>(18GHz-40GHz)  | DS77209     | DCLNA0118-<br>40C-S | Decentest    | 2022.07.23 | 2023.07.22 |
| RF Coaxial Cable<br>(DC-18GHz) | MRE001      | PE330               | Pasternack   | 2022.07.08 | 2023.07.07 |
| RF Coaxial Cable<br>(DC-18GHz) | MRE002      | CLU18               | Pasternack   | 2022.07.08 | 2023.07.07 |
| RF Coaxial Cable<br>(DC-18GHz) | MRE003      | CLU18               | Pasternack   | 2022.07.08 | 2023.07.07 |
| RF Coaxial Cable<br>(DC-40GHz) | 22290045    | QA360-40-K<br>K-0.5 | Qualwave     | 2022.07.08 | 2023.07.07 |
| RF Coaxial Cable<br>(DC-40GHz) | 22290046    | QA360-40-K<br>KF-2  | Qualwave     | 2022.07.08 | 2023.07.07 |
| RF Coaxial Cable<br>(DC-18GHz) | 22120181    | QA500-18-N<br>N-5   | Qualwave     | 2022.07.08 | 2023.07.07 |

\_\_\_\_\_ END OF REPORT \_\_\_\_\_