



**SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch**

EMC-ARF-05 Rev 1.1

Page: 1 of 26

FCC ID: PX8CFNG-MRU

# Appendix -

## Test Data and Result for report

### GZCR241100135103

(For FirstNet Band DL)



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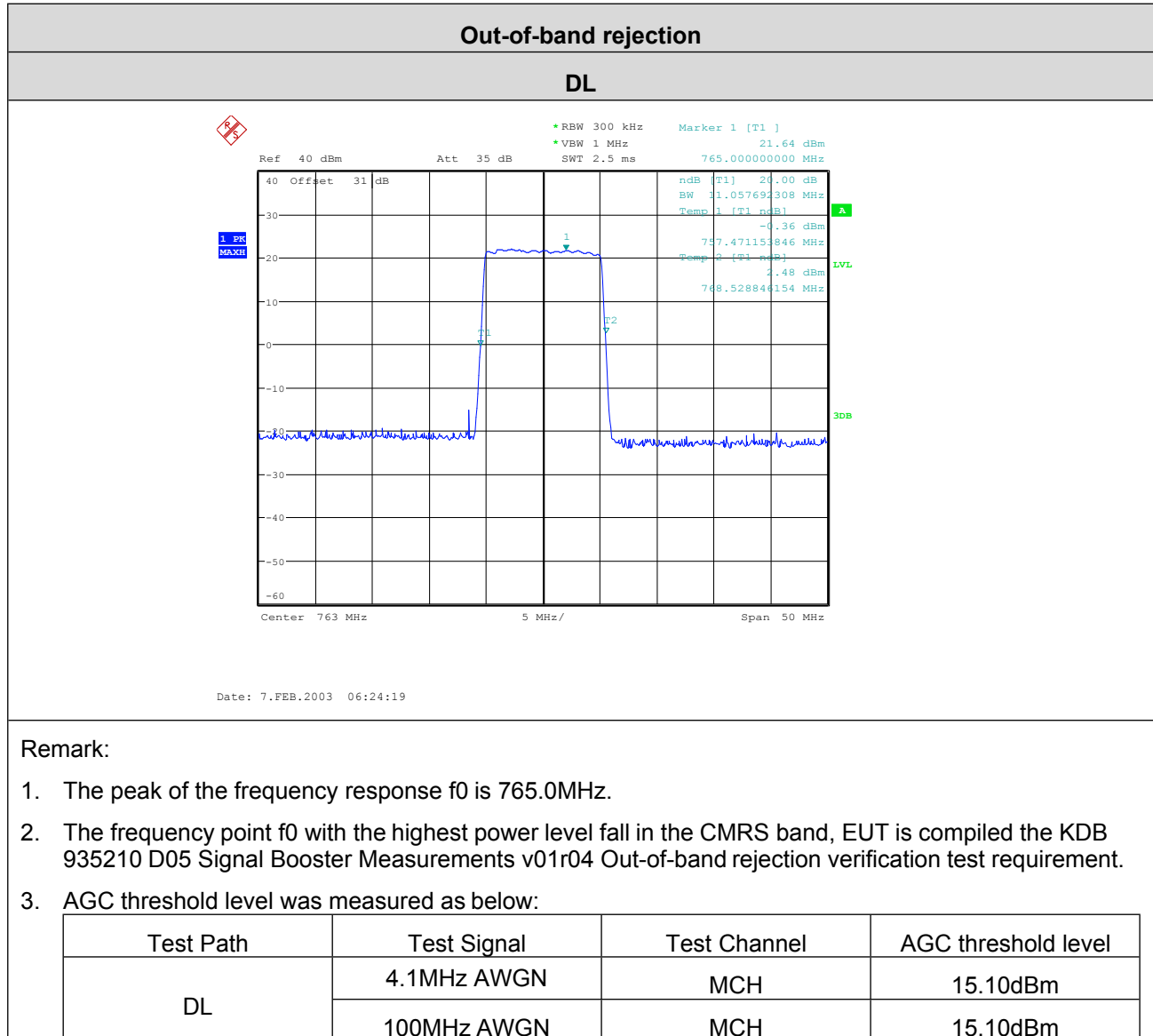
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Guangzhou Branch Testing Laboratory

No. 198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663  
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t (86-20) 82155555 sgs.china@sgs.com

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### 1 Out-of-band rejection



## 2 Input versus Output comparison

| Occupied Bandwidth |                |              |               |         |
|--------------------|----------------|--------------|---------------|---------|
| Test Path          | Test Signal    | Test Channel | Signal Level  | Verdict |
| DL                 | 4.1MHz<br>AWGN | MCH          | Pre-AGC       | PASS    |
|                    |                |              | 3dB above AGC | PASS    |
|                    | 100MHz<br>AWGN | MCH          | Pre-AGC       | PASS*   |
|                    |                |              | 3dB above AGC | PASS*   |

Remark:

- \* The band supports maximum channel BW is 10MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN was as stimulus signal.
- Compare the spectral plot of the input signal to the output signal affirm that they are similar (in passband and roll off characteristic features and relative spectral locations). The test result complies with the requirement.

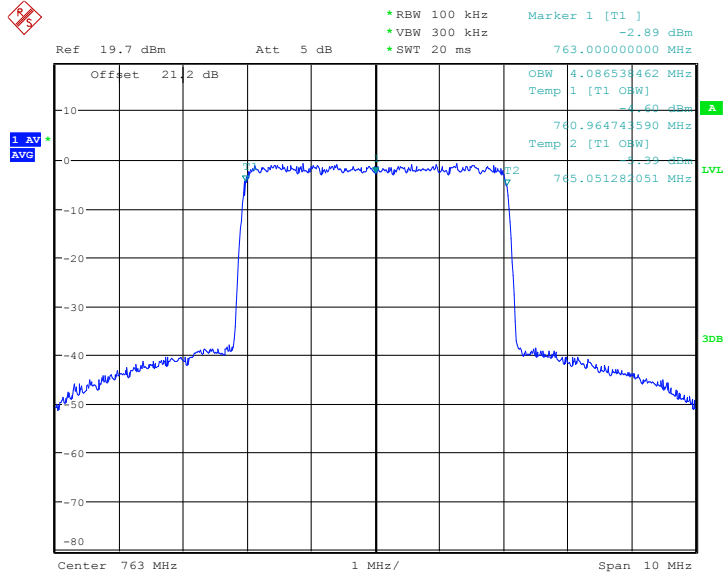


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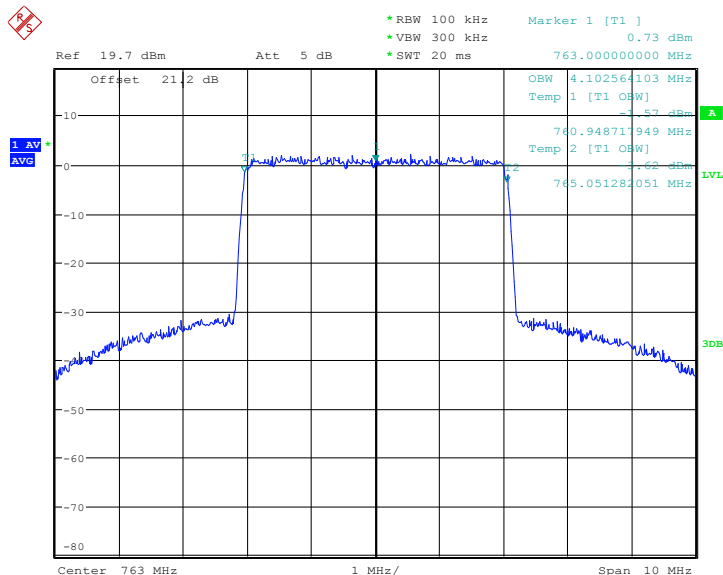
### 99% OBW

#### DL\_4.1MHz AWGN\_MCH\_Input\_Pre-AGC



Date: 19.NOV.2024 12:32:59

#### DL\_4.1MHz AWGN\_MCH\_Input\_3dB above AGC



Date: 19.NOV.2024 12:33:07



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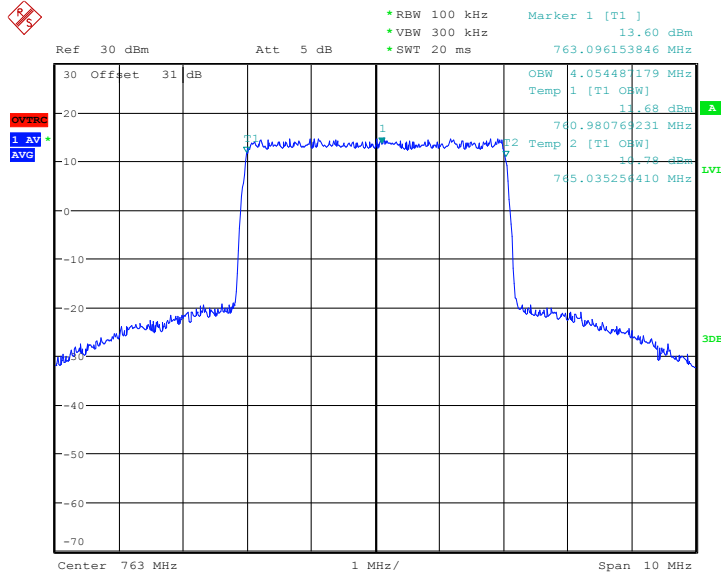
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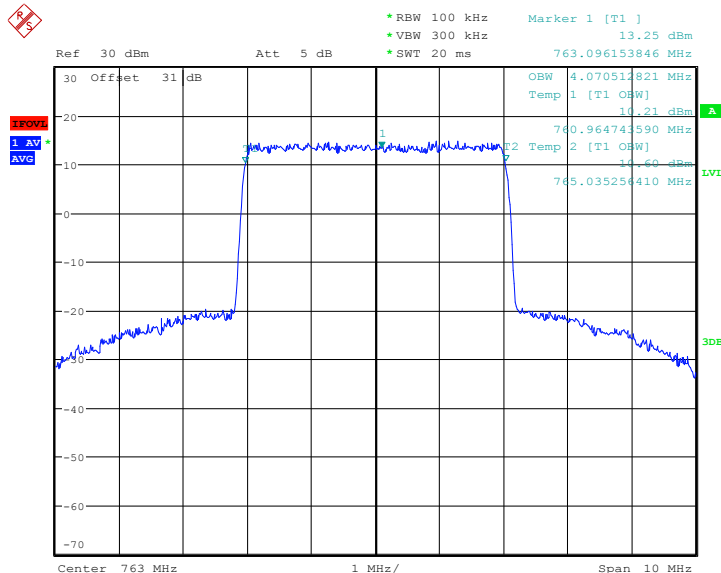
### 99% OBW

#### DL\_4.1MHz AWGN\_MCH\_Output\_Pre-AGC



Date: 15.NOV.2024 08:41:14

#### DL\_4.1MHz AWGN\_MCH\_Output\_3dB above AGC



Date: 15.NOV.2024 08:41:32



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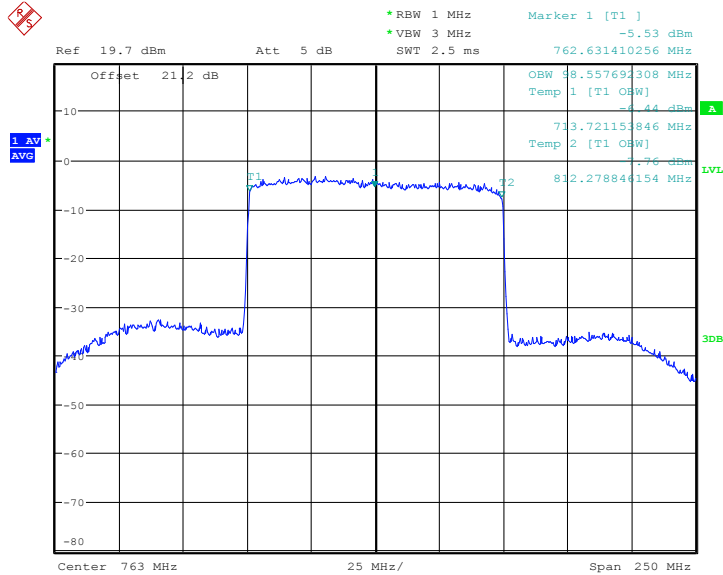
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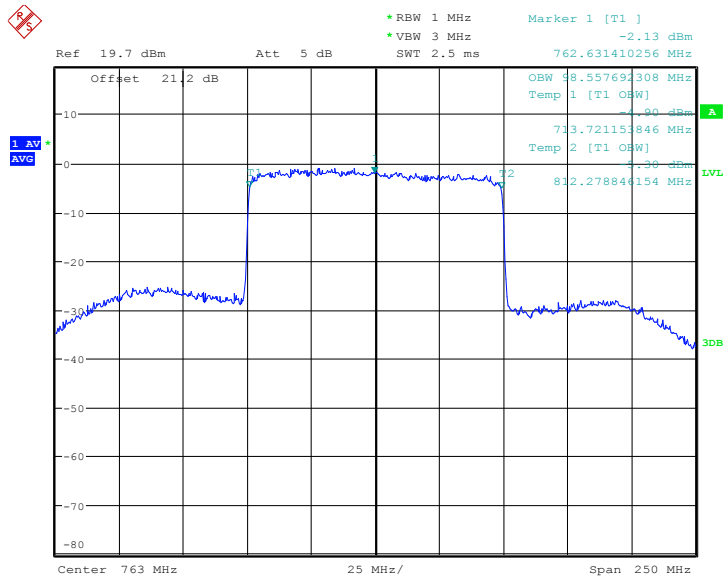
### 99% OBW

#### DL\_100MHz AWGN\_MCH\_Input\_Pre-AGC



Date: 19.NOV.2024 12:28:17

#### DL\_100MHz AWGN\_MCH\_Input\_3dB above AGC



Date: 19.NOV.2024 12:28:33

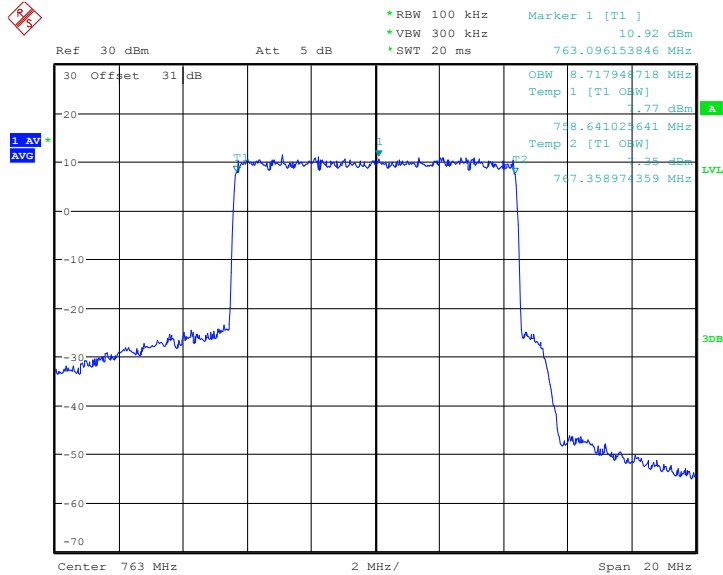


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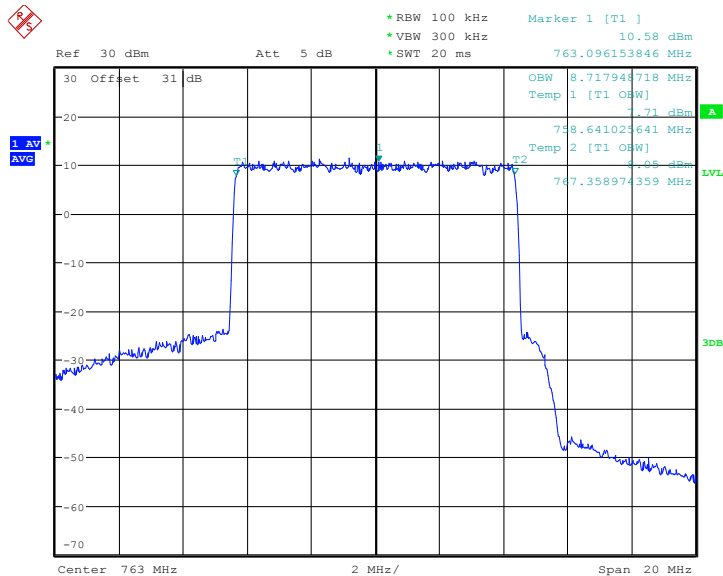
### 99% OBW

#### DL\_100MHz AWGN\_MCH\_Output\_Pre-AGC



Date: 15.NOV.2024 08:40:34

#### DL\_100MHz AWGN\_MCH\_Output\_3dB above AGC



Date: 15.NOV.2024 08:40:45



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## 3 Emission Mask

| Emission Masks |                |              |               |               |         |
|----------------|----------------|--------------|---------------|---------------|---------|
| Test path      | Test signal    | Test channel | Signal level  | Emission mask | Verdict |
| DL             | 4.1MHz<br>AWGN | MCH          | Pre-AGC       | Mask B        | PASS    |
|                |                |              | 3dB above AGC |               | PASS    |
|                | 100MHz<br>AWGN | MCH          | Pre-AGC       | Mask B        | PASS*   |
|                |                |              | 3dB above AGC |               | PASS*   |

Remark:

\* The band supports maximum channel BW is 10MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN was as stimulus signal.



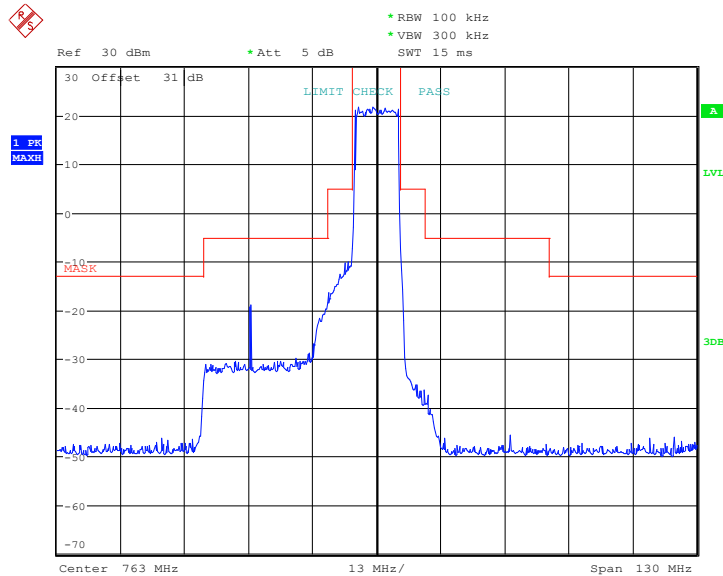
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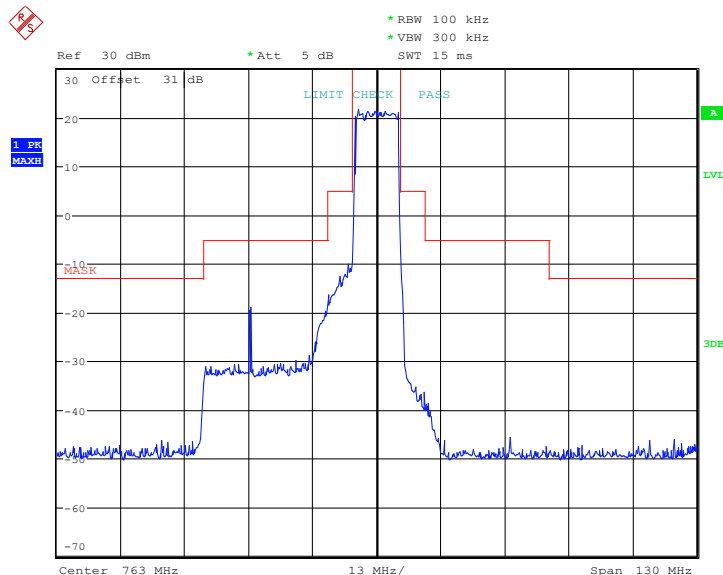
### Emission Mask B

#### DL\_100MHz AWGN\_MCH\_Output\_Pre-AGC



Date: 15.NOV.2024 09:46:13

#### DL\_100MHz AWGN\_MCH\_Output\_3dB above AGC



Date: 15.NOV.2024 09:45:54



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## 4 Input/output power and amplifier/booster gain

| Mean output power and gain                                                                                                                                                         |                     |             |               |                   |                    |           |         |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|---------------|-------------------|--------------------|-----------|---------|-----------|
| Test Path                                                                                                                                                                          | Test Freq. f0 (MHz) | Test Signal | Signal Level  | Input power (dBm) | Output Power (dBm) | ERP (dBm) | ERP (W) | Gain (dB) |
| DL                                                                                                                                                                                 | 765.0               | 4.1MHz AWGN | Pre-AGC       | 15                | 29.65              | 32.50     | 1.78    | 14.65     |
|                                                                                                                                                                                    |                     |             | 3dB above AGC | 18                | 30.11              | 32.96     | 1.98    | /         |
|                                                                                                                                                                                    |                     | 100MHz AWGN | Pre-AGC       | 15                | 29.32              | 32.17     | 1.65    | 14.32     |
|                                                                                                                                                                                    |                     |             | 3dB above AGC | 18                | 29.86              | 32.71     | 1.87    | /         |
| Remark:<br>1. f0 is from Out-of-band Rejection test in the report.<br>2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 5dBi declared by the manufacturer. |                     |             |               |                   |                    |           |         |           |

| Mean output power                                                                                                                                                                                                                             |                     |             |               |                        |               |             |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------|---------------|------------------------|---------------|-------------|---------|
| Test Path                                                                                                                                                                                                                                     | Test Freq. f0 (MHz) | Test Signal | Signal Level  | Output Power (dBm/MHz) | ERP (dBm/MHz) | ERP (W/MHz) | Verdict |
| DL                                                                                                                                                                                                                                            | 765.0               | 4.1MHz AWGN | Pre-AGC       | 23.53                  | 26.38         | 0.44        | PASS    |
|                                                                                                                                                                                                                                               |                     |             | 3dB above AGC | 23.99                  | 26.84         | 0.49        | PASS    |
|                                                                                                                                                                                                                                               |                     | 100MHz AWGN | Pre-AGC       | 19.79                  | 22.64         | 0.19        | PASS    |
|                                                                                                                                                                                                                                               |                     |             | 3dB above AGC | 20.33                  | 23.18         | 0.21        | PASS    |
| Remark:<br>1. f0 is from Out-of-band Rejection test in the report.<br>2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 5dBi declared by the manufacturer.<br>3. The output power is limited to an EIRP of 1000W/MHz. |                     |             |               |                        |               |             |         |



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Page: 12 of 26

### 5 Noise Figure

| Noise Figure |                              |               |         |
|--------------|------------------------------|---------------|---------|
| Test Path    | Maximum Noise Figure<br>(dB) | Limit<br>(dB) | Verdict |
| DL           | 7.78                         | ≤9            | PASS    |



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## 6 Intermodulation emissions

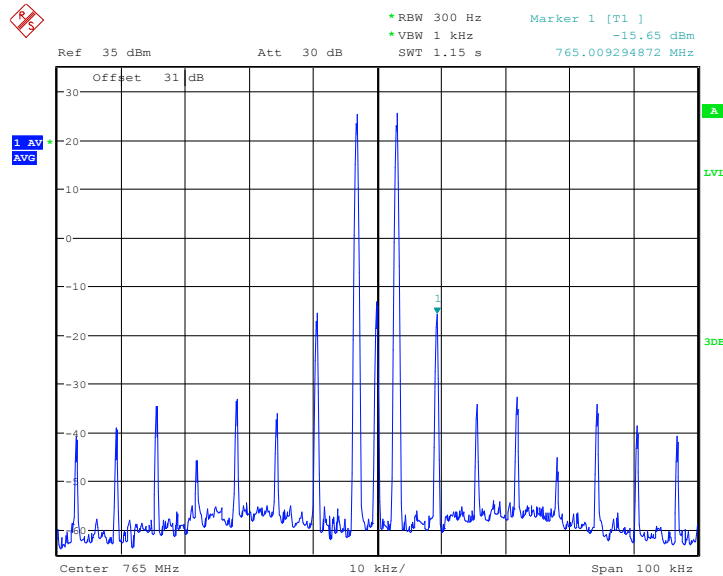
| Intermodulation emissions |                     |                          |               |                                  |        |
|---------------------------|---------------------|--------------------------|---------------|----------------------------------|--------|
| Test Path                 | Test Freq. f0 (MHz) | CW signals spacing (kHz) | Signal Level  | Worst conducted test level (dBm) |        |
|                           |                     |                          |               | /300Hz                           | /10kHz |
| DL                        | 765.0               | 6.25                     | Pre-AGC       | -15.65                           | -0.42  |
|                           |                     |                          | 3dB above AGC | -15.11                           | 0.12   |
|                           |                     | 12.5                     | Pre-AGC       | -19.57                           | -4.34  |
|                           |                     |                          | 3dB above AGC | -18.44                           | -3.21  |
|                           |                     | 25                       | Pre-AGC       | -14.67                           | 0.56   |
|                           |                     |                          | 3dB above AGC | -13.41                           | 1.82   |

### Remark:

- f0 is from Out-of-band Rejection test in the report.
- The level in 10kHz measurement bandwidth= the level in 300Hz measurement bandwidth+ 10lg(10000/300).
- ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the maximum antenna gain is 5dBi declared by the manufacturer.
- The maximum ERP of intermodulation product is 1.82dBm/10kHz+ 5- 2.15= 4.67dBm/10kHz, which exceeded the limit -30dBm/10kHz, the applicant must use good engineering practice to eliminate the intermodulation products interference.

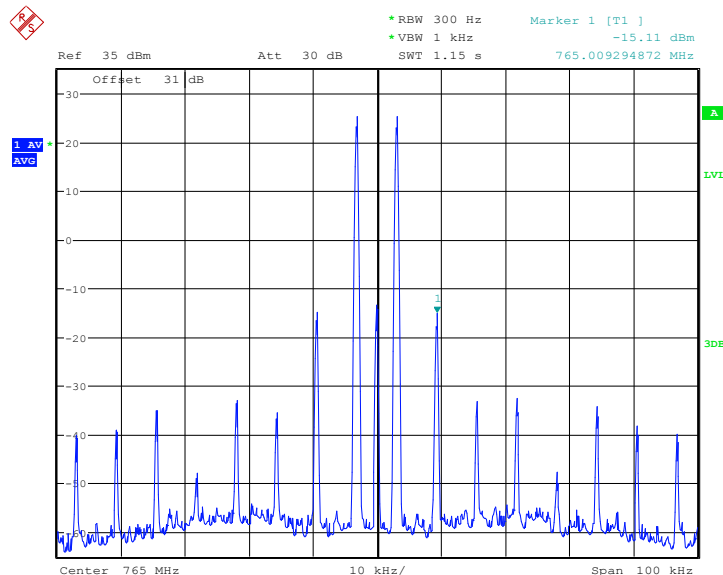
### Intermodulation emissions

#### DL\_6.25kHz spacing\_Pre-AGC



Date: 15.NOV.2024 09:00:03

#### DL\_6.25kHz spacing\_3dB above AGC



Date: 15.NOV.2024 09:00:22



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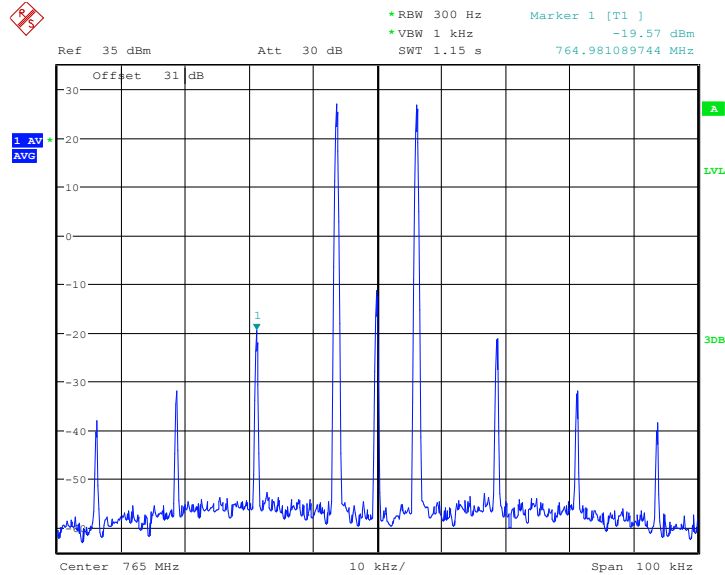
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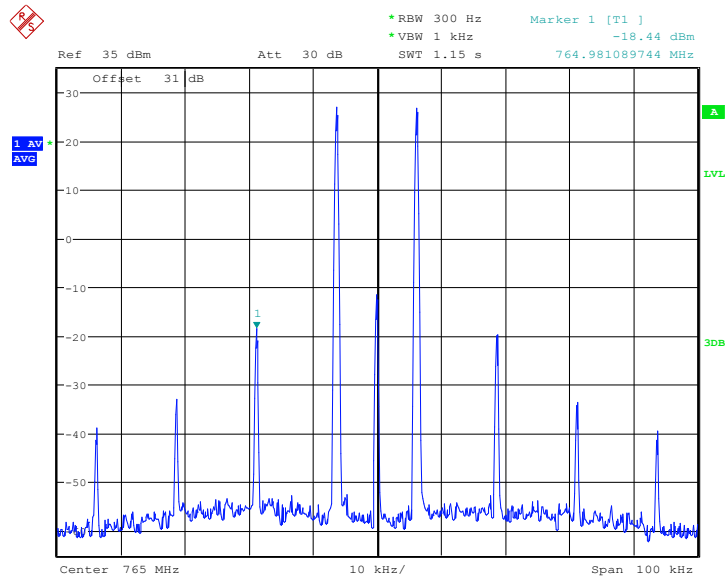
### Intermodulation emissions

#### DL\_12.5kHz spacing\_Pre-AGC



Date: 15.NOV.2024 09:01:07

#### DL\_12.5kHz spacing\_3dB above AGC



Date: 15.NOV.2024 09:01:18



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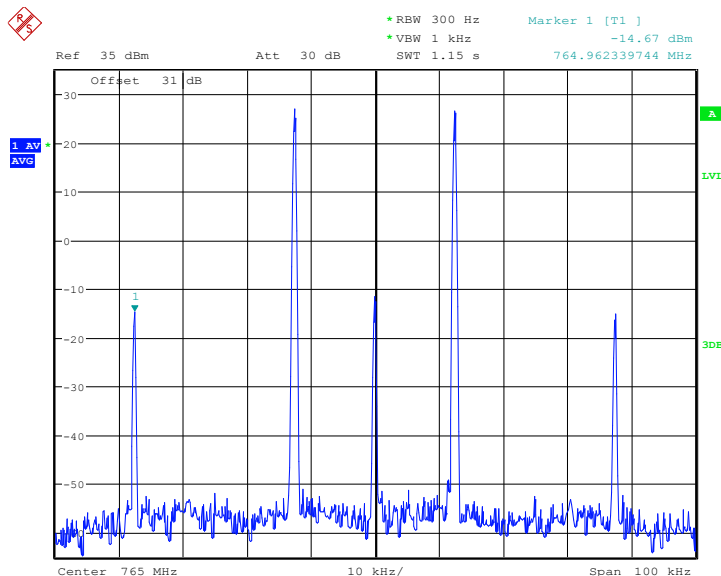
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Guangzhou Branch Test and Calibration Laboratory

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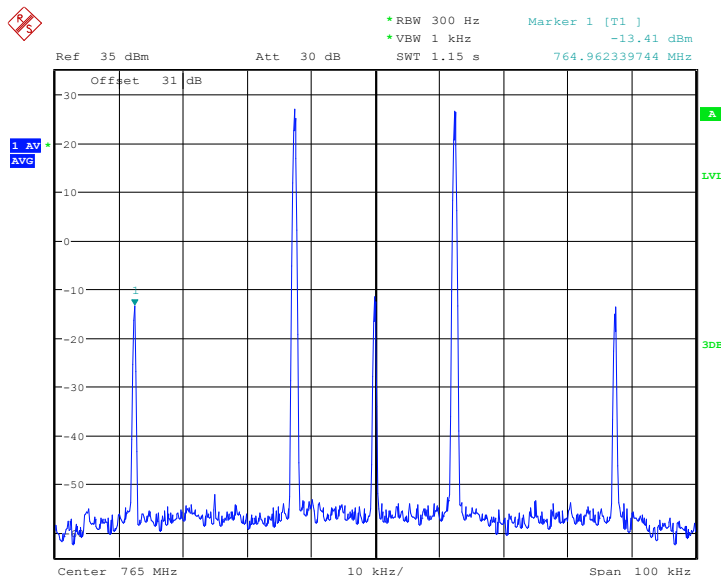
### Intermodulation emissions

#### DL\_25kHz spacing\_Pre-AGC



Date: 15.NOV.2024 09:01:47

#### DL\_25kHz spacing\_3dB above AGC



Date: 15.NOV.2024 09:02:01



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## 7 Conducted Spurious emissions

| Conducted Spurious emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |              |                       |                        |             |         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-----------------------|------------------------|-------------|---------|
| Test path                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Test signal | Test channel | Frequency range (MHz) | Worst test level (dBm) | Limit (dBm) | Verdict |
| DL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 4.1MHz AWGN | LCH          | 0.09-758              | -19.33                 | ≤-13        | PASS    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | HCH          | 768-1000              | -27.97                 | ≤-13        | PASS    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |              | 1000-7680             | -16.06                 | ≤-13        | PASS    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |              | 769-775               | -55.87                 | ≤-46        | PASS    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |              | 799-805               | -56.21                 | ≤-46        | PASS    |
| Remark:<br>1. On all frequencies between 769-775MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations, here<br>P= 30dBm= 1W<br>Limit= 30dBm- $[76 + 10 \log_{10} (1W)]$ dB= -46dBm<br>2. The conducted spurious emissions 769MHz to 775MHz and 799MHz to 805MHz were very low and not displayed test plots in this report.<br>3. All modes (LCH/MCH/HCH, with 4.1MHz AWGN signal/ with 100MHz AWGN signal) had been tested, only show the worst-case in this report. |             |              |                       |                        |             |         |

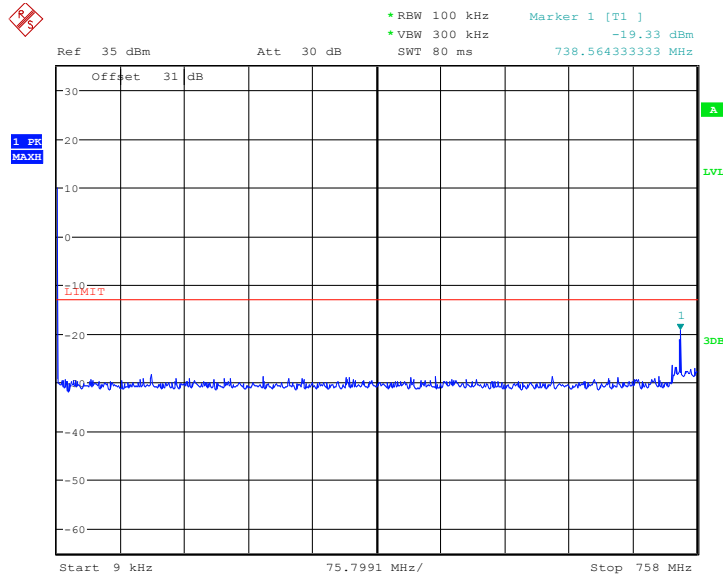


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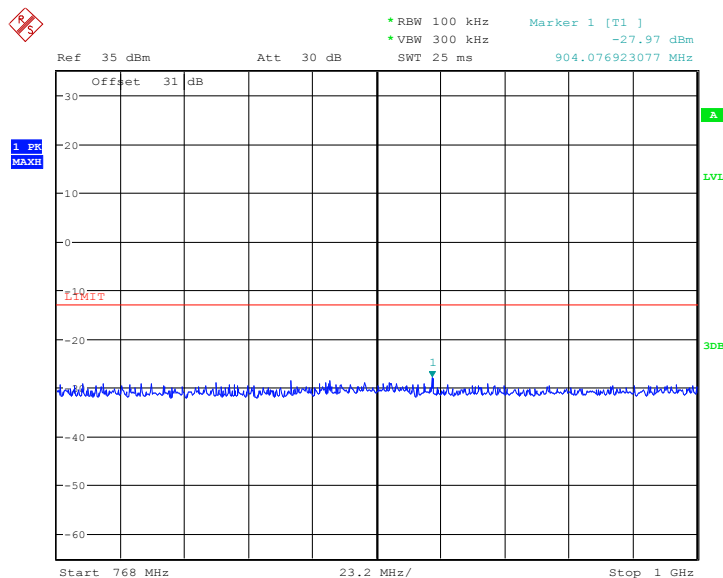
### Conducted spurious emissions

#### DL\_4.1MHz AWGN\_LCH\_Pre-AGC



Date: 15.NOV.2024 09:04:19

#### DL\_4.1MHz AWGN\_HCH\_Pre-AGC



Date: 15.NOV.2024 09:04:41

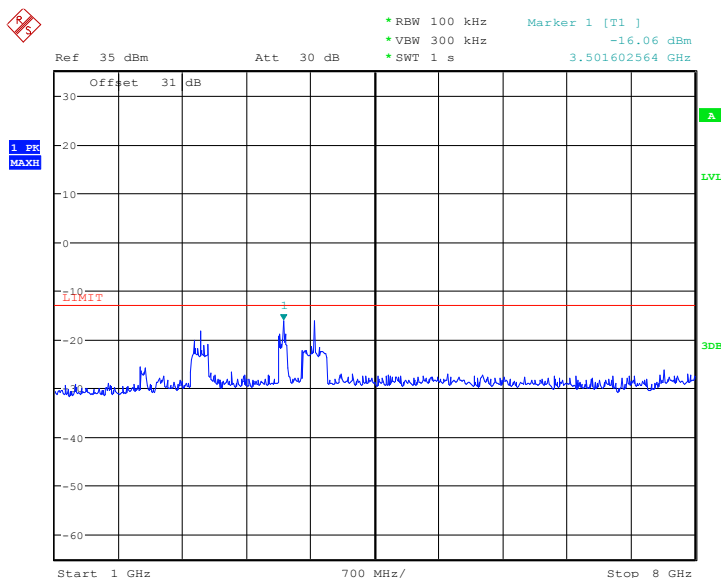


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## Conducted spurious emissions

### DL\_4.1MHz AWGN\_HCH\_Pre-AGC



Date: 15.NOV.2024 09:05:47

## 8 Noise

| Noise within the passband     |                       |                                  |
|-------------------------------|-----------------------|----------------------------------|
| Test path                     | Frequency range (MHz) | Worst conducted test level (dBm) |
| DL                            | 758-768               | -47.22                           |
| Noise outside of the passband |                       |                                  |
| Test path                     | Frequency range (MHz) | Worst conducted test level (dBm) |
| DL                            | 0.009-757             | -31.58                           |
|                               | 769-7680              | -31.17                           |

Remark:

1. ERP= conducted test level (dBm)+ antenna gain (dBi)- 2.15dB, the maximum antenna gain is 5dBi declared by the manufacturer.
2. The ERP of worst noise within the passband is -47.22/10kHz+ 5dBi- 2.15dB= -44.37dBm, which complies the limit -43dBm in 10kHz measurement bandwidth.
3. The ERP of worst noise outside of the passband is -31.17/10kHz+ 5dBi- 2.15dB= -28.32dBm, the applicant must use good engineering practice to make sure that the ERP of noise outside the passband should not exceed -70dBm in 10kHz measurement bandwidth.



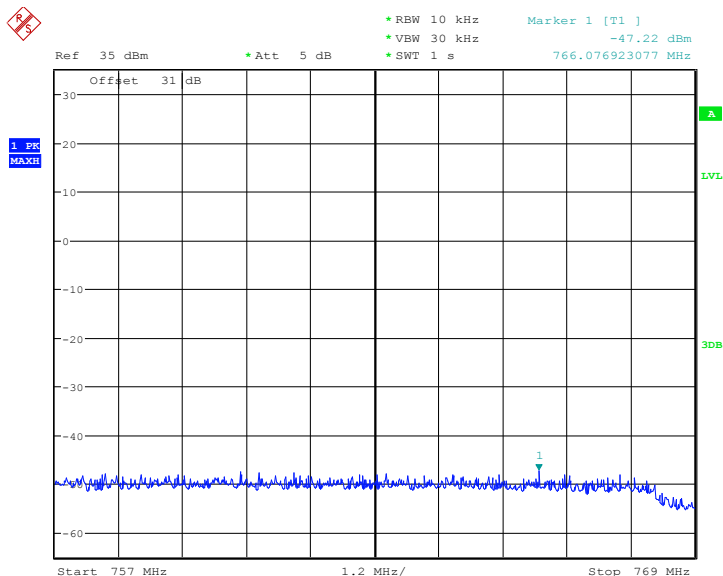
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EMC-ARF-05 Rev 1.1

Page: 21 of 26

## Noise\_ Within the passband

DL



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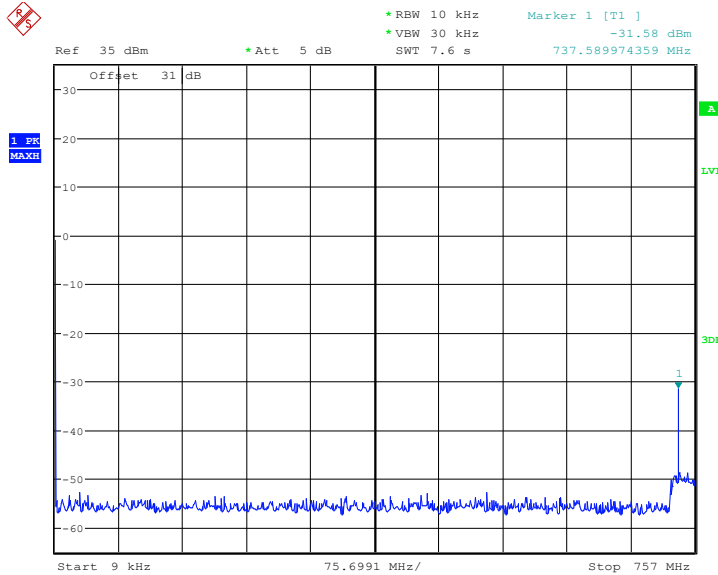
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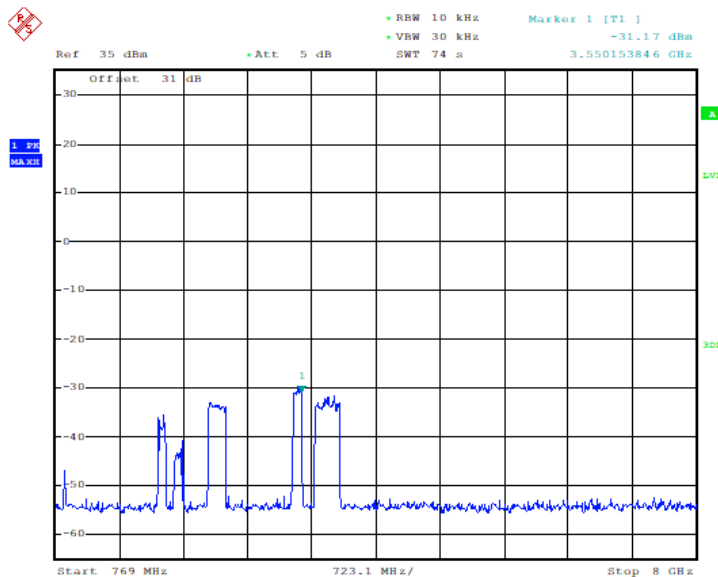
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### Noise\_Out of the passband

#### DL



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Date: 15.NOV.2024 09:15:36



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## 9 Frequency Stability

| Frequency stability vs voltage |              |             |             |         |                  |                 |         |
|--------------------------------|--------------|-------------|-------------|---------|------------------|-----------------|---------|
| Test path                      | Test Channel | Test Signal | Temperature | Voltage | Freq. error (Hz) | Tolerance (ppm) | Verdict |
| DL                             | MCH          | 4.1MHz      | TN          | VL      | 14.2             | 0.01861         | PASS    |
|                                |              | AWGN        | TN          | VH      | 10.7             | 0.01402         | PASS    |
|                                |              | 100MHz      | TN          | VL      | 13.8             | 0.01809         | PASS    |
|                                |              | AWGN        | TN          | VH      | 13.9             | 0.01822         | PASS    |



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| Frequency stability vs temperature |              |                |         |                     |                     |                    |         |
|------------------------------------|--------------|----------------|---------|---------------------|---------------------|--------------------|---------|
| Test Path                          | Test Channel | Test Signal    | Voltage | Temperature<br>(°C) | Freq. error<br>(Hz) | Tolerance<br>(ppm) | Verdict |
| DL                                 | MCH          | 4.1MHz<br>AWGN | VN      | +50                 | 7.4                 | 0.00970            | PASS    |
|                                    |              |                | VN      | +40                 | 8.0                 | 0.01048            | PASS    |
|                                    |              |                | VN      | +30                 | 11.3                | 0.01481            | PASS    |
|                                    |              |                | VN      | +20                 | 13.7                | 0.01796            | PASS    |
|                                    |              |                | VN      | +10                 | 12.4                | 0.01625            | PASS    |
|                                    |              |                | VN      | 0                   | 8.8                 | 0.01153            | PASS    |
|                                    |              |                | VN      | -10                 | 14.2                | 0.01861            | PASS    |
|                                    |              |                | VN      | -20                 | 10.8                | 0.01415            | PASS    |
|                                    |              |                | VN      | -30                 | 12.2                | 0.01599            | PASS    |
|                                    | MCH          | 100MHz<br>AWGN | VN      | +50                 | 9.3                 | 0.01219            | PASS    |
|                                    |              |                | VN      | +40                 | 15.3                | 0.02005            | PASS    |
|                                    |              |                | VN      | +30                 | 16.1                | 0.02110            | PASS    |
|                                    |              |                | VN      | +20                 | 12.7                | 0.01664            | PASS    |
|                                    |              |                | VN      | +10                 | 8.4                 | 0.01101            | PASS    |
|                                    |              |                | VN      | 0                   | 11.7                | 0.01533            | PASS    |
|                                    |              |                | VN      | -10                 | 14.8                | 0.01940            | PASS    |
|                                    |              |                | VN      | -20                 | 11.5                | 0.01507            | PASS    |
|                                    |              |                | VN      | -30                 | 8.0                 | 0.01048            | PASS    |



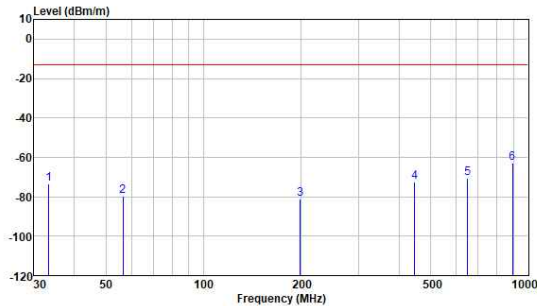
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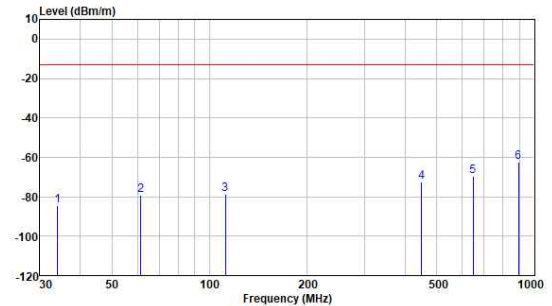
### 10 Radiated Spurious emissions

#### Radiated Spurious emissions

##### DL\_4.1MHz AWGN\_MCH\_30MHz-1GHz

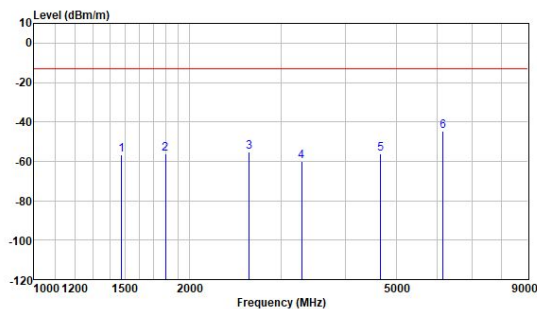


|   | Freq   | Read Level | Correction Factor | Level  | Limit  | Over Limit | Pol/Phase  |
|---|--------|------------|-------------------|--------|--------|------------|------------|
|   | MHz    | dBm        | dB                | dBm    | dBm    | dB         |            |
| 1 | 33.33  | -76.48     | 3.04              | -73.44 | -13.00 | -60.44     | HORIZONTAL |
| 2 | 56.39  | -77.44     | -2.18             | -79.62 | -13.00 | -66.62     | HORIZONTAL |
| 3 | 198.59 | -74.31     | -6.70             | -81.01 | -13.00 | -68.01     | HORIZONTAL |
| 4 | 446.41 | -72.77     | 0.24              | -72.53 | -13.00 | -59.53     | HORIZONTAL |
| 5 | 649.66 | -74.24     | 3.79              | -70.45 | -13.00 | -57.45     | HORIZONTAL |
| 6 | 893.86 | -72.00     | 9.15              | -62.85 | -13.00 | -49.85     | HORIZONTAL |

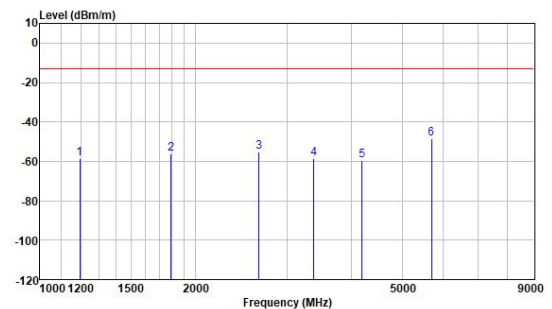


|   | Freq   | Read Level | Correction Factor | Level  | Limit  | Over Limit | Pol/Phase |
|---|--------|------------|-------------------|--------|--------|------------|-----------|
|   | MHz    | dBm        | dB                | dBm    | dBm    | dB         |           |
| 1 | 34.04  | -76.98     | -7.59             | -84.57 | -13.00 | -71.57     | VERTICAL  |
| 2 | 61.35  | -76.45     | -2.67             | -79.12 | -13.00 | -66.12     | VERTICAL  |
| 3 | 111.74 | -74.67     | -4.31             | -78.98 | -13.00 | -65.98     | VERTICAL  |
| 4 | 449.56 | -73.96     | 1.48              | -72.48 | -13.00 | -59.48     | VERTICAL  |
| 5 | 647.39 | -74.24     | 4.70              | -69.54 | -13.00 | -56.54     | VERTICAL  |
| 6 | 893.86 | -72.70     | 10.26             | -62.44 | -13.00 | -49.44     | VERTICAL  |

##### DL\_4.1MHz AWGN\_MCH\_above 1GHz



|   | Freq    | Read Level | Correction Factor | Level  | Limit  | Over Limit | Pol/Phase  |
|---|---------|------------|-------------------|--------|--------|------------|------------|
|   | MHz     | dBm        | dB                | dBm    | dBm    | dB         |            |
| 1 | 1475.37 | -61.42     | 4.70              | -56.72 | -13.00 | -43.72     | HORIZONTAL |
| 2 | 1794.03 | -62.02     | 5.68              | -56.34 | -13.00 | -43.34     | HORIZONTAL |
| 3 | 2600.73 | -60.77     | 5.74              | -55.03 | -13.00 | -42.03     | HORIZONTAL |
| 4 | 3290.03 | -62.24     | 2.22              | -60.02 | -13.00 | -47.02     | HORIZONTAL |
| 5 | 4665.78 | -63.68     | 7.59              | -56.09 | -13.00 | -43.09     | HORIZONTAL |
| 6 | 6154.02 | -63.75     | 19.07             | -44.68 | -13.00 | -31.68     | HORIZONTAL |



|   | Freq    | Read Level | Correction Factor | Level  | Limit  | Over Limit | Pol/Phase |
|---|---------|------------|-------------------|--------|--------|------------|-----------|
|   | MHz     | dBm        | dB                | dBm    | dBm    | dB         |           |
| 1 | 1194.00 | -61.58     | 3.01              | -58.57 | -13.00 | -45.57     | VERTICAL  |
| 2 | 1790.09 | -61.95     | 5.75              | -56.20 | -13.00 | -43.20     | VERTICAL  |
| 3 | 2646.85 | -60.70     | 5.42              | -55.28 | -13.00 | -42.28     | VERTICAL  |
| 4 | 3377.93 | -61.62     | 3.07              | -58.55 | -13.00 | -45.55     | VERTICAL  |
| 5 | 4189.54 | -63.55     | 4.16              | -59.39 | -13.00 | -46.39     | VERTICAL  |
| 6 | 5698.49 | -64.02     | 15.66             | -48.36 | -13.00 | -35.36     | VERTICAL  |

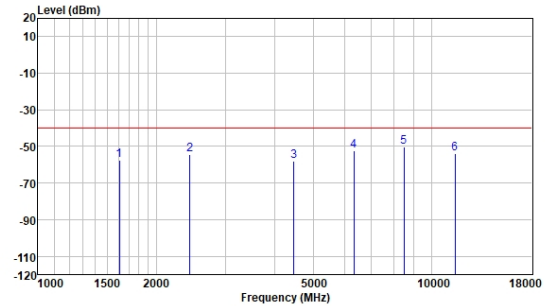
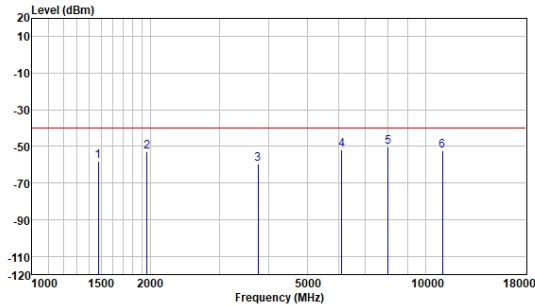


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## Radiated Spurious emissions

## DL\_4.1MHz AWGN\_MCH\_1559MHz-1610MHz



## Remark:

Pre-test was performed for all modes (LCH/MCH/HCH, with 4.1MHz AWGN signals/ with 100MHz AWGN signals), the test result always keeps more than 20dB margin, the spurious emissions 9kHz to 30MHz were very low and not displayed in this report. Therefore, only show the worst-case in this report.

--End of Appendix--

