



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

EMC-ARF-05 Rev 1.1

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# Appendix -

## Test Data and Result for report

### GZCR250300027205

(For Cellular Band UL)



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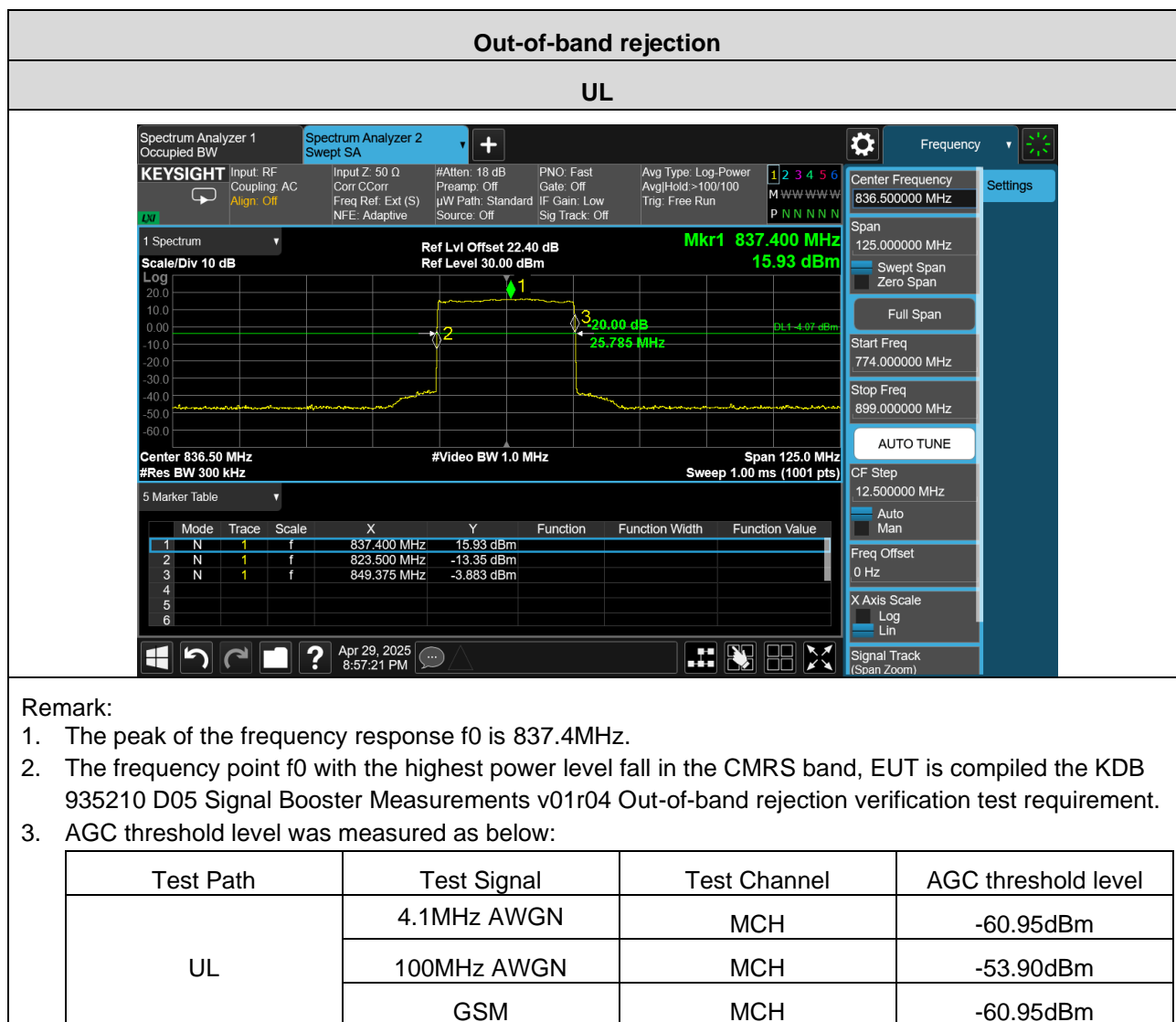
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Guangzhou Branch Testing Center EMC Laboratory

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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 |
| UL                 | 4.1MHz<br>AWGN | MCH          | Pre-AGC       | PASS    |
|                    |                |              | 3dB above AGC | PASS    |
|                    | 100MHz<br>AWGN | MCH          | Pre-AGC       | PASS*   |
|                    |                |              | 3dB above AGC | PASS*   |
|                    | GSM            | MCH          | Pre-AGC       | PASS    |
|                    |                |              | 3dB above AGC | PASS    |

### Remark:

- \* The band supports maximum channel BW is 20MHz 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.

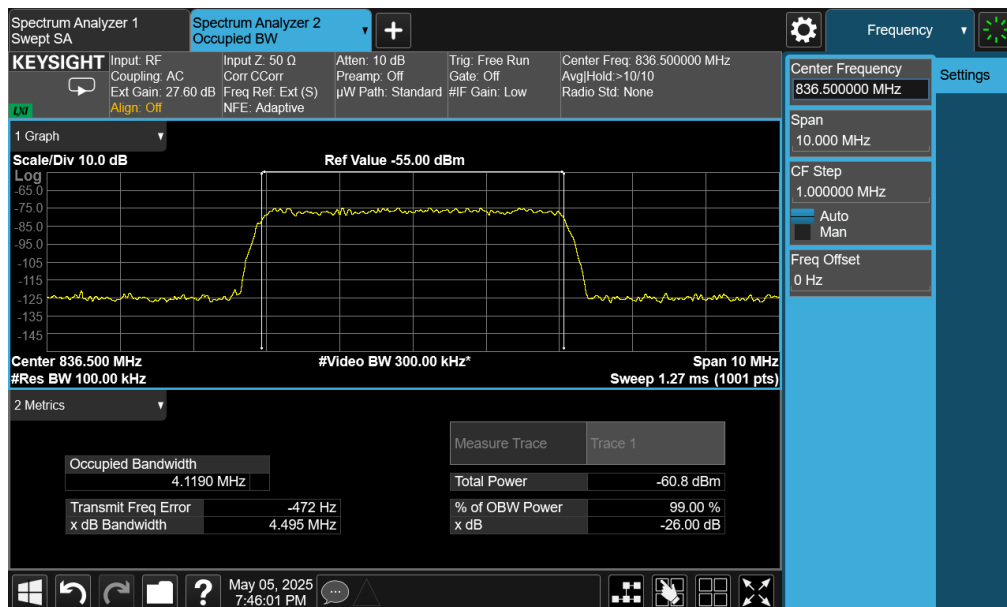


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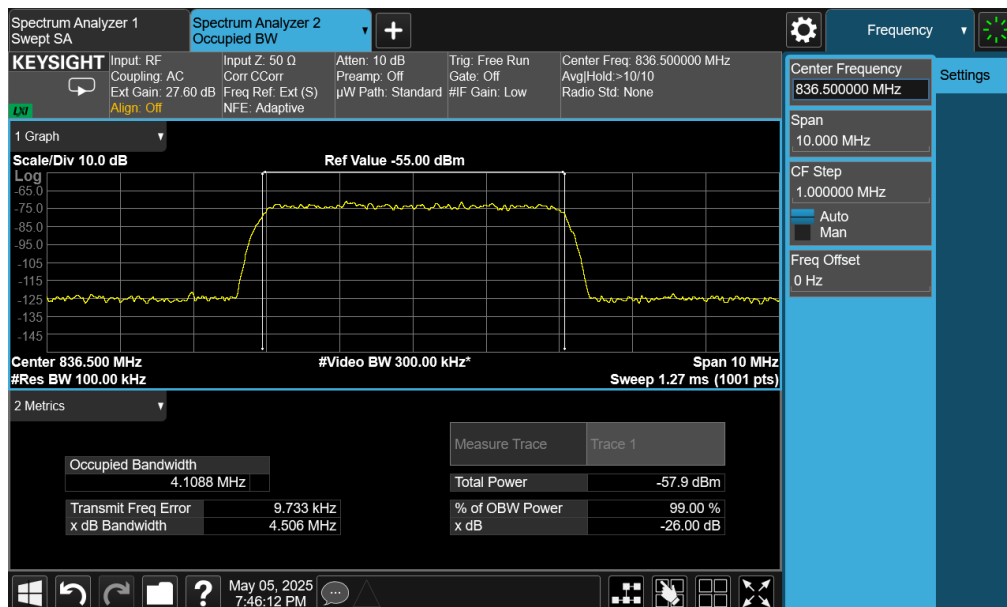
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### 99% OBW

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



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

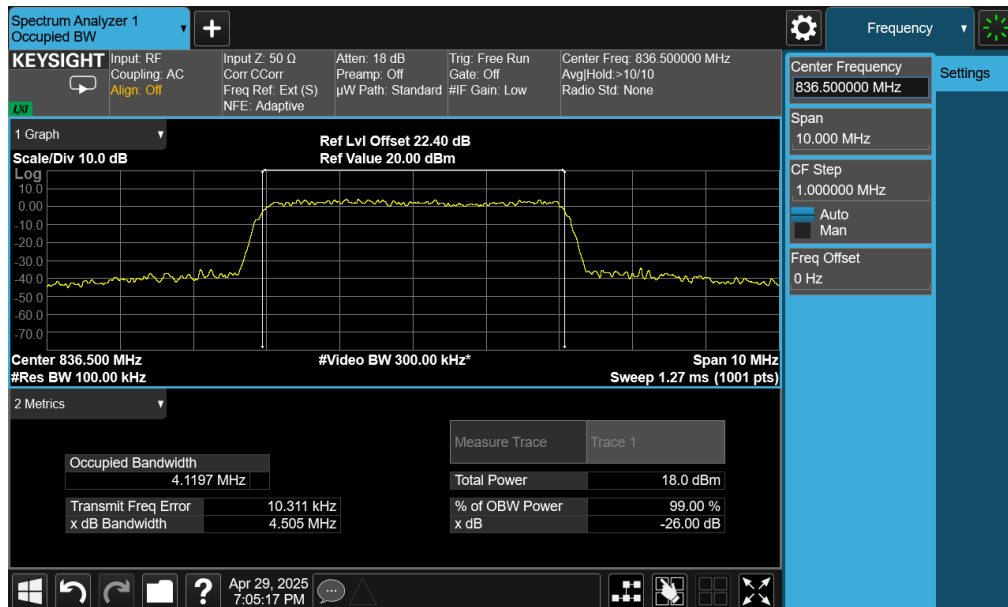


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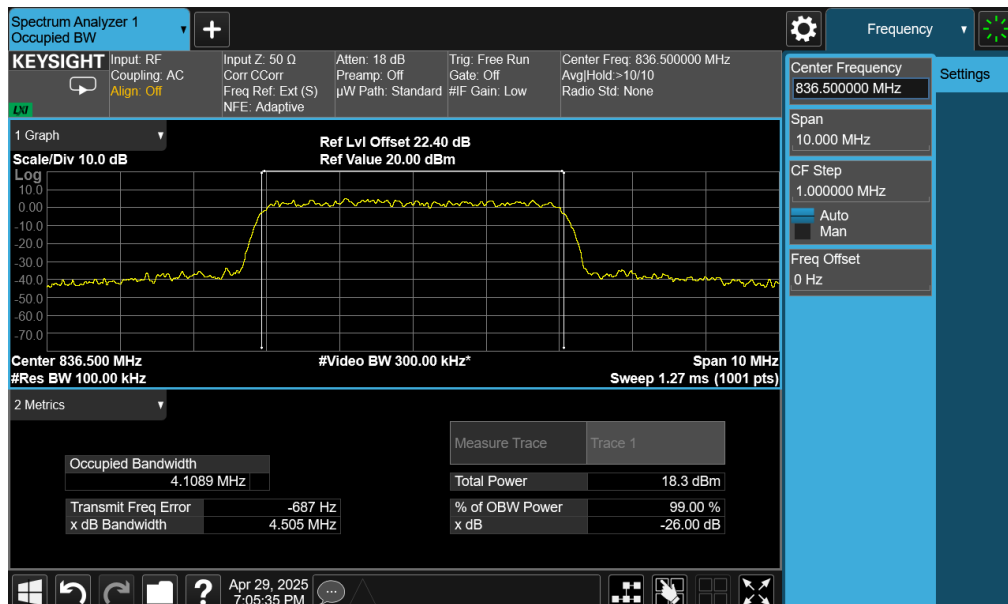
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### 99% OBW

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



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



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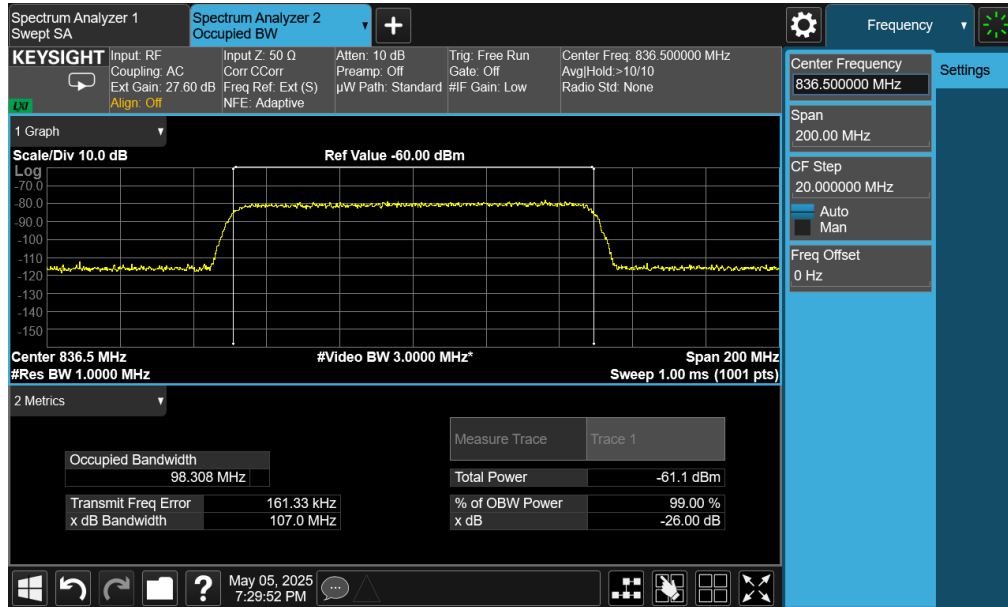
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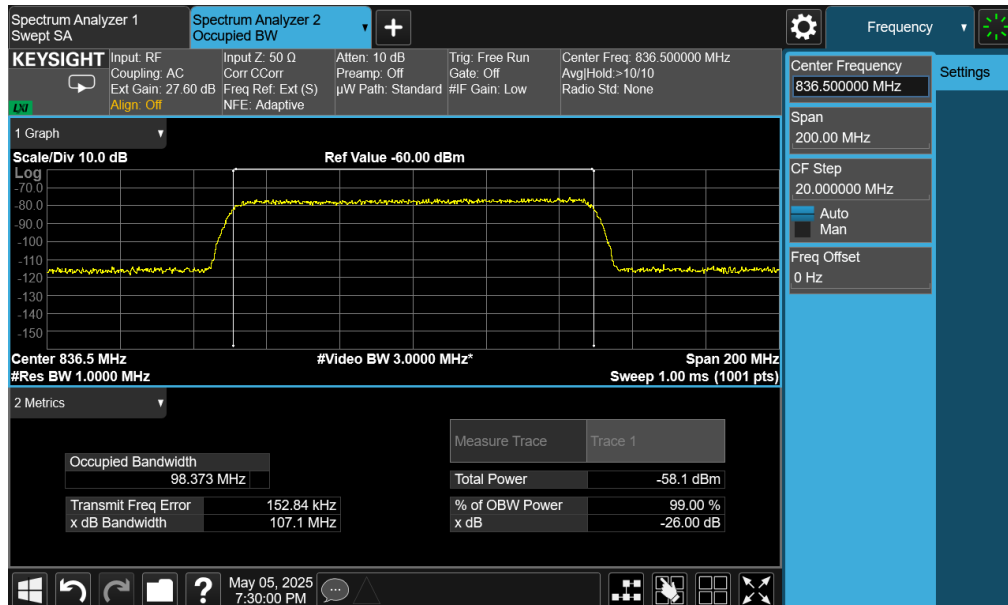


### 99% OBW

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



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



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| 99% OBW                        |
|--------------------------------|
| UL_GSM_MCH_Input_Pre-AGC       |
|                                |
| UL_GSM_MCH_Input_3dB above AGC |
|                                |



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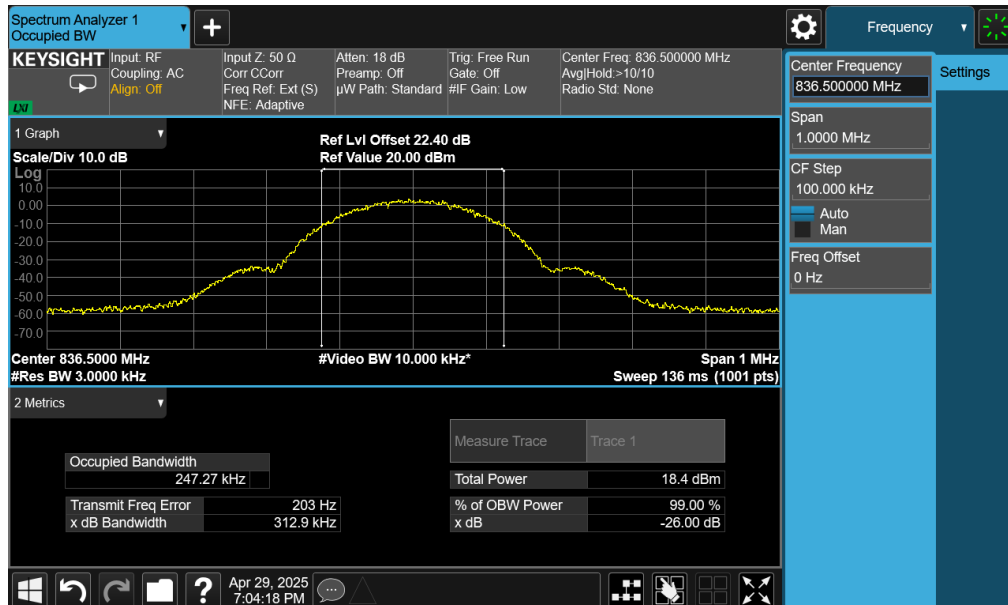


### 99% OBW

### UL\_GSM\_MCH\_Output\_Pre-AGC



### UL\_GSM\_MCH\_Output\_3dB above AGC





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### 3 Mean 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) |
| UL   | 837.4               | 4.1MHz AWGN | Pre-AGC       | -61               | 18.10              | 29.95     | 0.99    | 79.10     |
|  |                     |             | 3dB above AGC | -58               | 18.41              | 30.26     | 1.07    | /         |
|  |                     | 100MHz AWGN | Pre-AGC       | -54               | 18.06              | 29.91     | 0.98    | 72.06     |
|  |                     |             | 3dB above AGC | -51               | 18.24              | 30.09     | 1.03    | /         |
|  |                     | GSM         | Pre-AGC       | -61               | 18.38              | 30.23     | 1.06    | 79.38     |
|  |                     |             | 3dB above AGC | -58               | 18.56              | 30.41     | 1.10    | /         |
| 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 14dBi declared by the manufacturer.<br>3. The output power is limited to an ERP of 500W and the total ERP does not exceed the limit. |                     |             |               |                   |                    |           |         |           |



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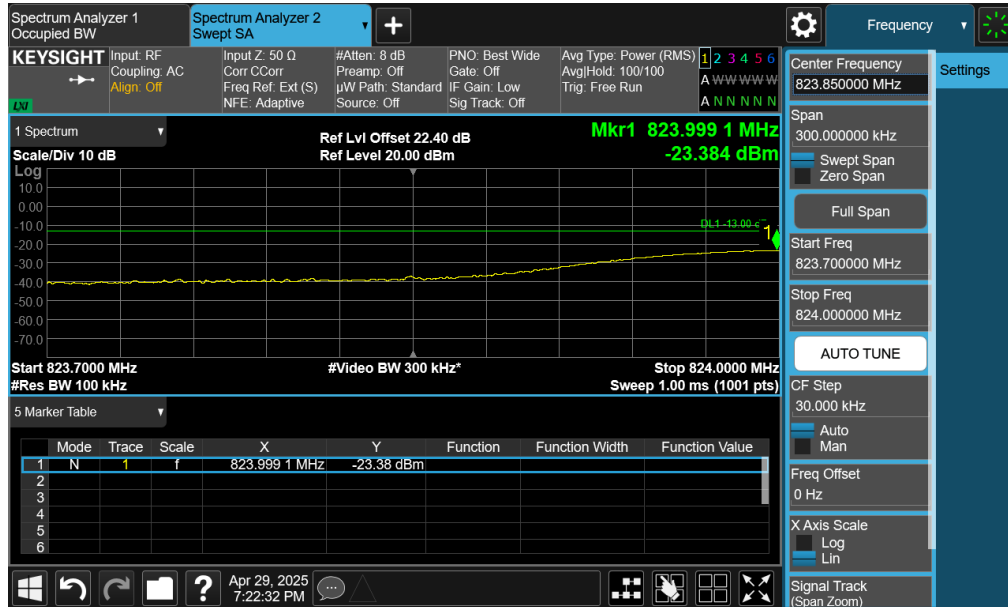
## 4 Out-of-band/out-of-block(including intermodulation) emissions

| Out-of-band/out-of-block(including intermodulation) emissions  |               |             |                    |               |                                  |             |         |
|--|---------------|-------------|--------------------|---------------|----------------------------------|-------------|---------|
| Test Path  | Test Channel  | Test Signal | Stimulus Condition | Signal Level  | Worst conducted test level (dBm) | Limit (dBm) | Verdict |
| UL   | LCH           | 4.1MHz AWGN | One signal input   | Pre-AGC       | -23.38                           | ≤-13        | PASS    |
|  |               |             |                    | 3dB above AGC | -23.07                           |             | PASS    |
|  |               |             | Two signals input  | Pre-AGC       | -22.99                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -23.51                           |             | PASS    |
|  | HCH           |             | One signal input   | Pre-AGC       | -28.06                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -27.76                           |             | PASS    |
|  |               |             | Two signals input  | Pre-AGC       | -34.86                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -35.12                           |             | PASS    |
| UL   | LCH           | 100MHz AWGN | One signal input   | Pre-AGC       | -17.39                           | ≤-13        | PASS    |
|  | 3dB above AGC |             |                    | -16.41        | PASS                             |             |         |
|  | HCH           |             | One signal input   | Pre-AGC       | -17.99                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -16.76                           |             | PASS    |
| UL   | LCH           | GSM         | One signal input   | Pre-AGC       | -24.88                           | ≤-13        | PASS    |
|  |               |             |                    | 3dB above AGC | -24.74                           |             | PASS    |
|  |               |             | Two signals input  | Pre-AGC       | -24.84                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -25.09                           |             | PASS    |
|  | HCH           |             | One signal input   | Pre-AGC       | -34.16                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -33.74                           |             | PASS    |
|  |               |             | Two signals input  | Pre-AGC       | -35.28                           |             | PASS    |
|  |               |             |                    | 3dB above AGC | -35.33                           |             | PASS    |
| Remark:<br>The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10log10 (P) dB, here,<br>P= 19dBm= 0.08W<br>the limit= 19dBm- [43+ 10log10(0.08W)]dB= -13dBm |               |             |                    |               |                                  |             |         |

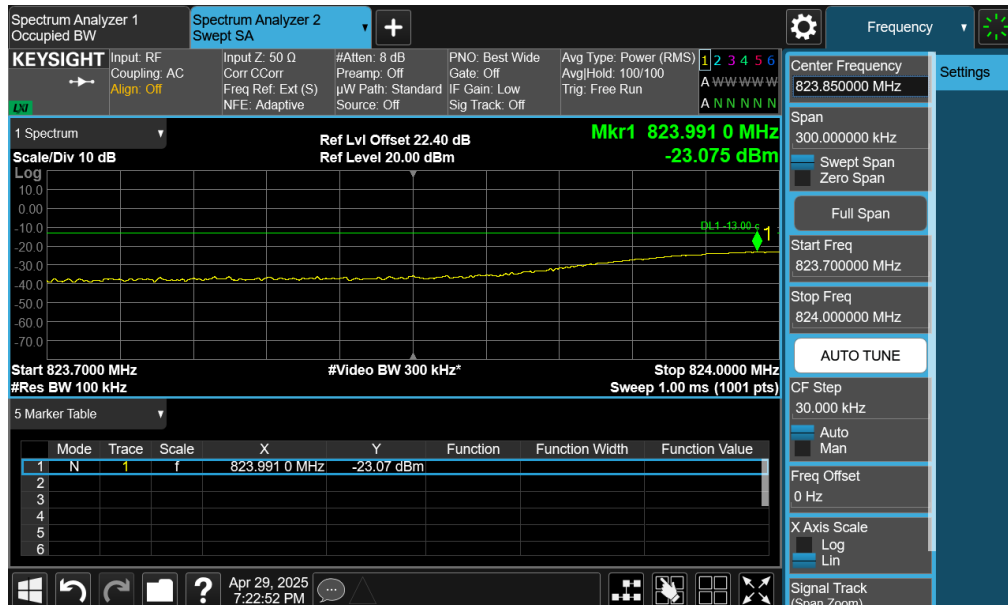


### Out-of-band/out-of-block emissions

#### UL\_4.1MHz AWGN\_LCH\_a single test signal\_Pre-AGC



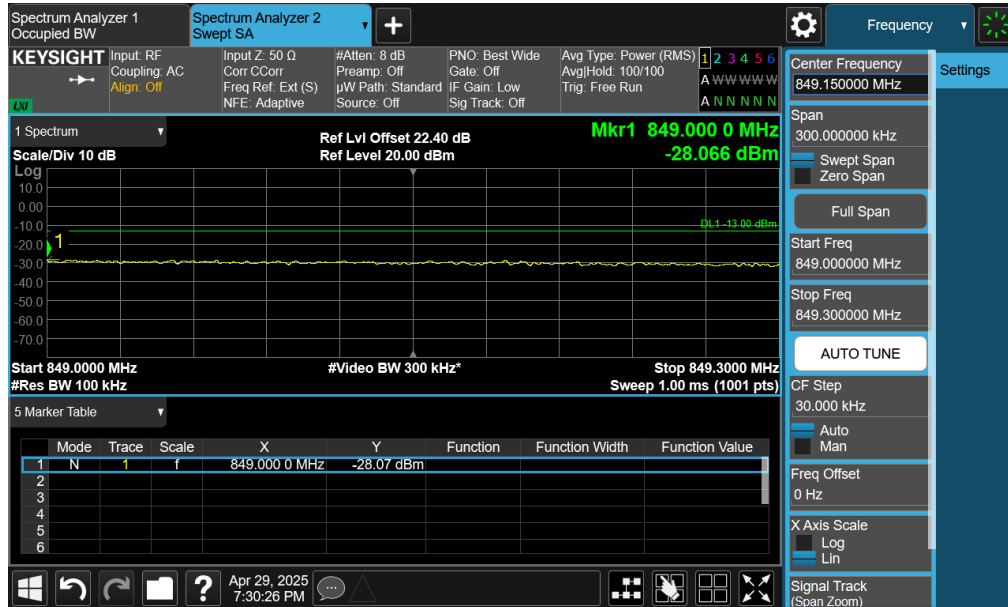
#### UL\_4.1MHz AWGN\_LCH\_a single test signal\_3dB above AGC



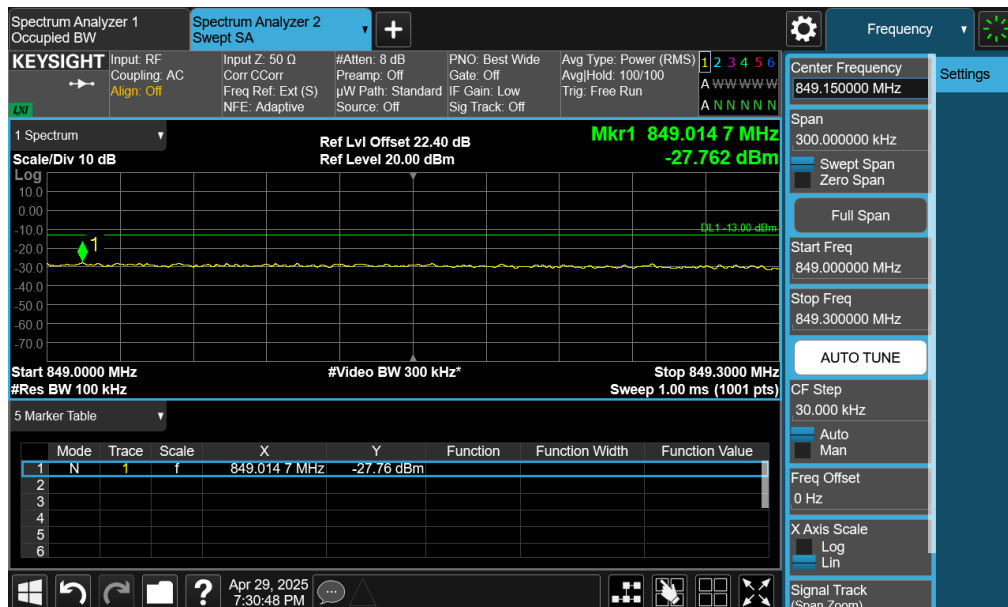


### Out-of-band/out-of-block emissions

#### UL\_4.1MHz AWGN\_HCH\_a single test signal\_Pre-AGC



#### UL\_4.1MHz AWGN\_HCH\_a single test signal\_3dB above AGC



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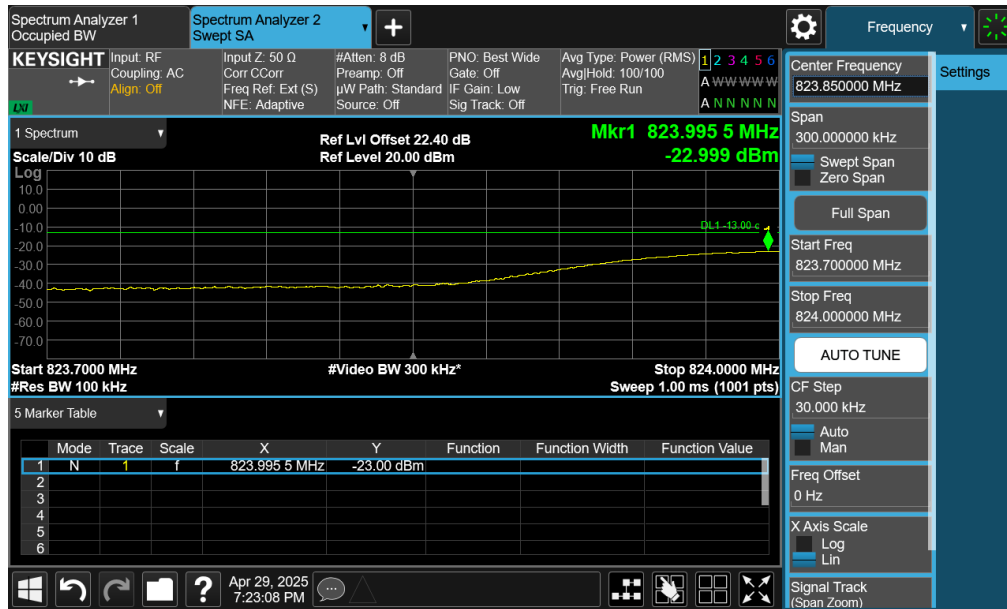
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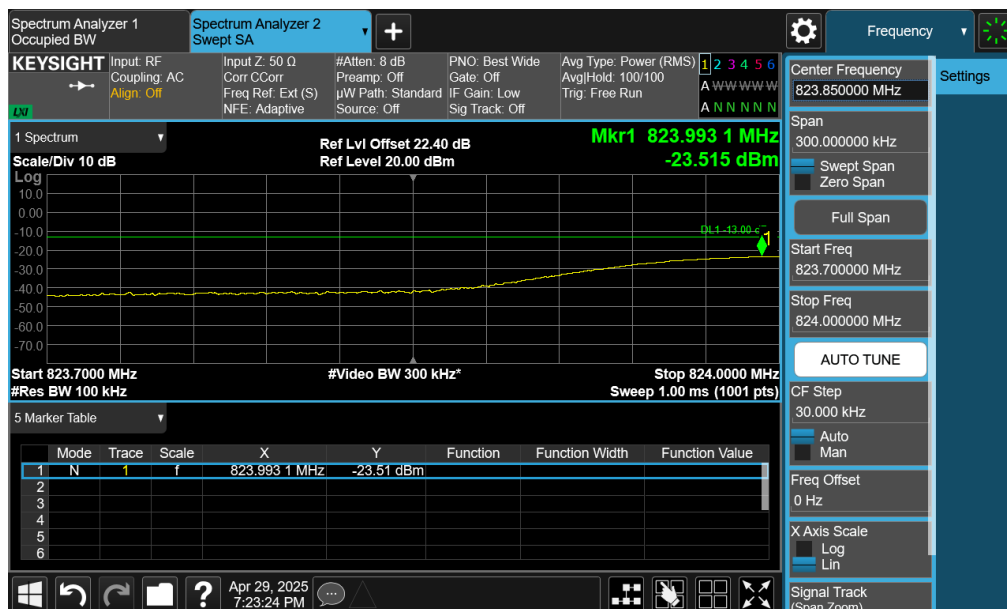


### Out-of-band/out-of-block emissions

#### UL\_4.1MHz AWGN\_LCH\_two adjacent test signals\_Pre-AGC

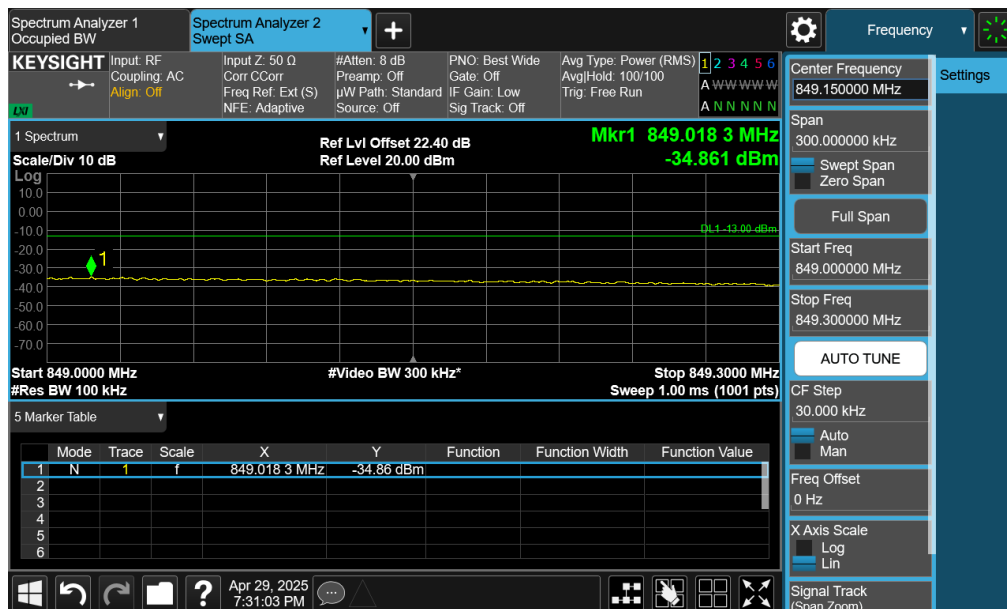


#### UL\_4.1MHz AWGN\_LCH\_two adjacent test signals\_3dB above AGC

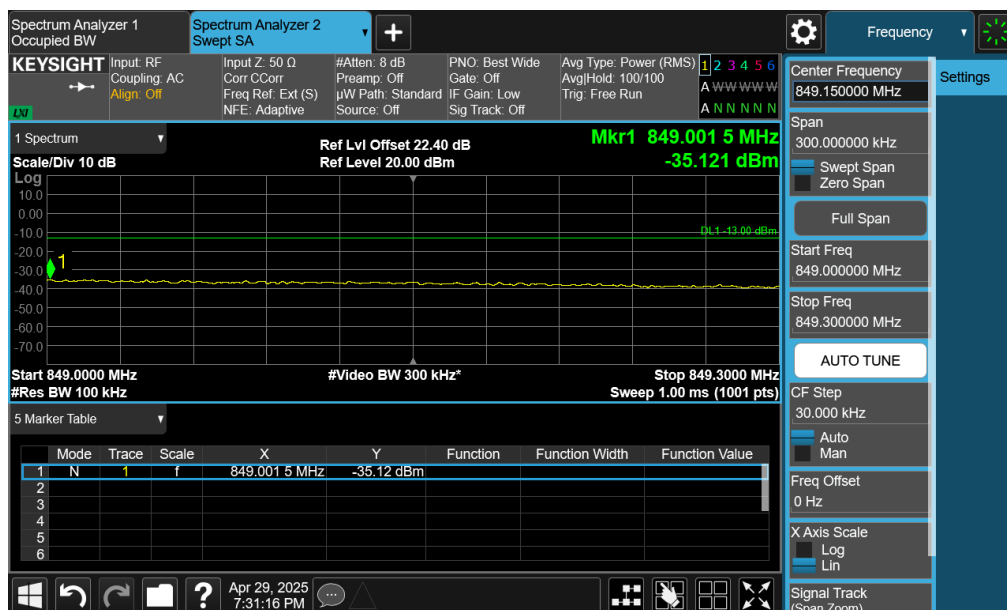


### Out-of-band/out-of-block emissions

#### UL\_4.1MHz AWGN\_HCH\_two adjacent test signals\_Pre-AGC



#### UL\_4.1MHz AWGN\_HCH\_two adjacent test signals\_3dB above AGC



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### Out-of-band/out-of-block emissions

#### UL\_100MHz AWGN\_LCH\_a single test signal\_Pre-AGC

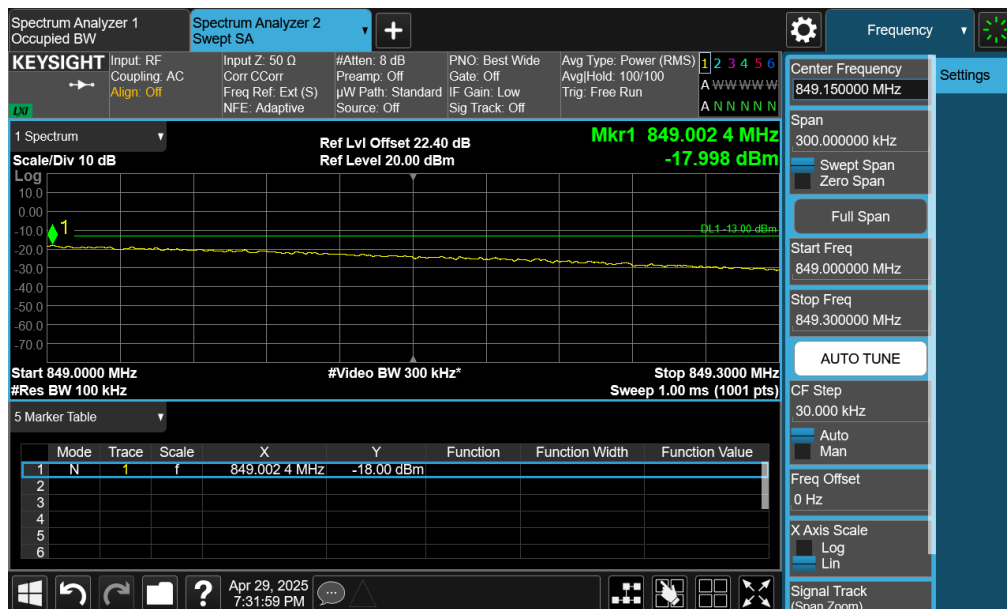


#### UL\_100MHz AWGN\_LCH\_a single test signal\_3dB above AGC

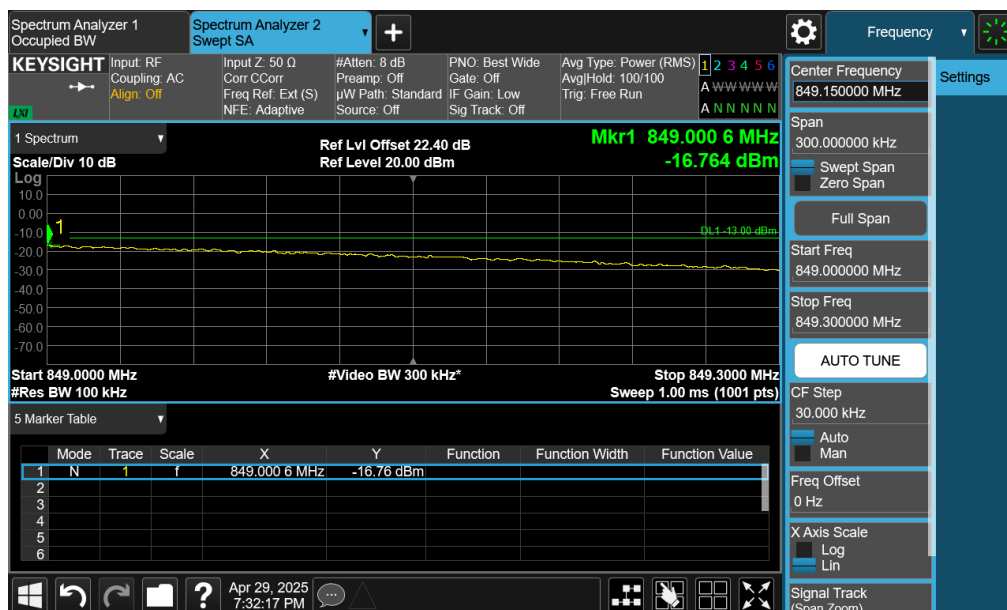


### Out-of-band/out-of-block emissions

#### UL\_100MHz AWGN\_HCH\_a single test signal\_Pre-AGC



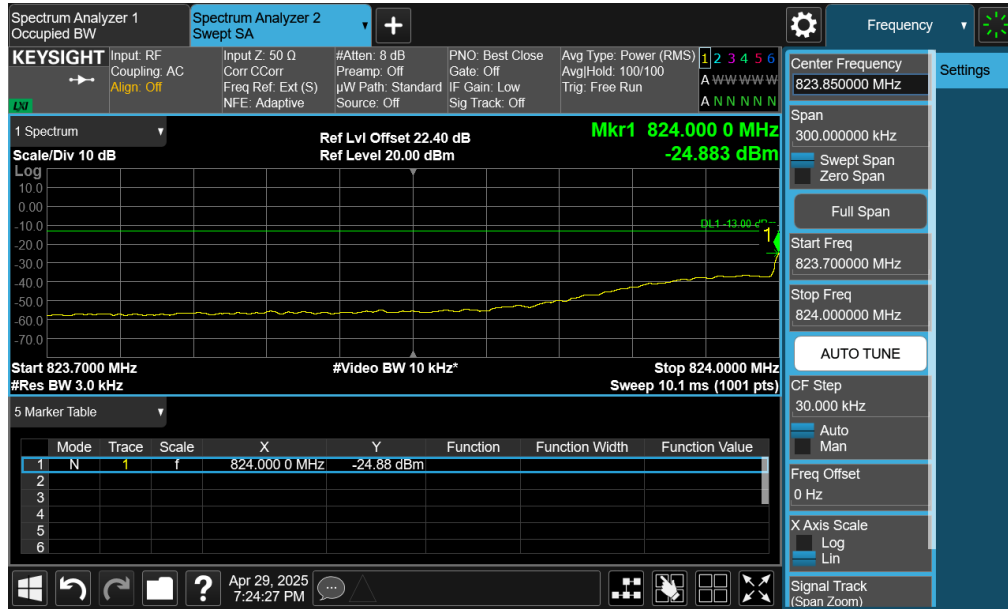
#### UL\_100MHz AWGN\_HCH\_a single test signal\_3dB above AGC



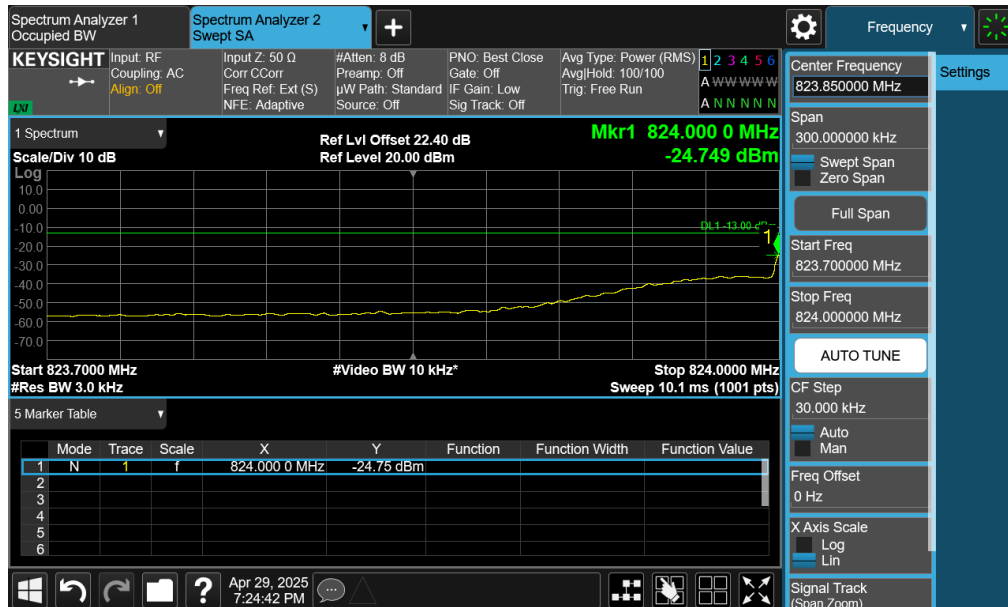


### Out-of-band/out-of-block emissions

#### UL\_GSM\_LCH\_a single test signal\_Pre-AGC



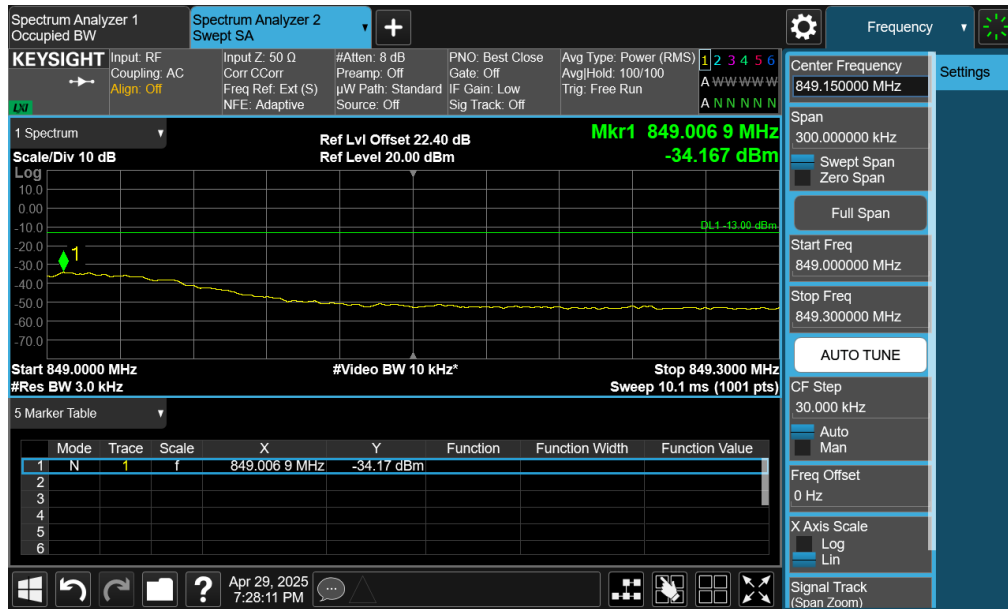
#### UL\_GSM\_LCH\_a single test signal\_3dB above AGC



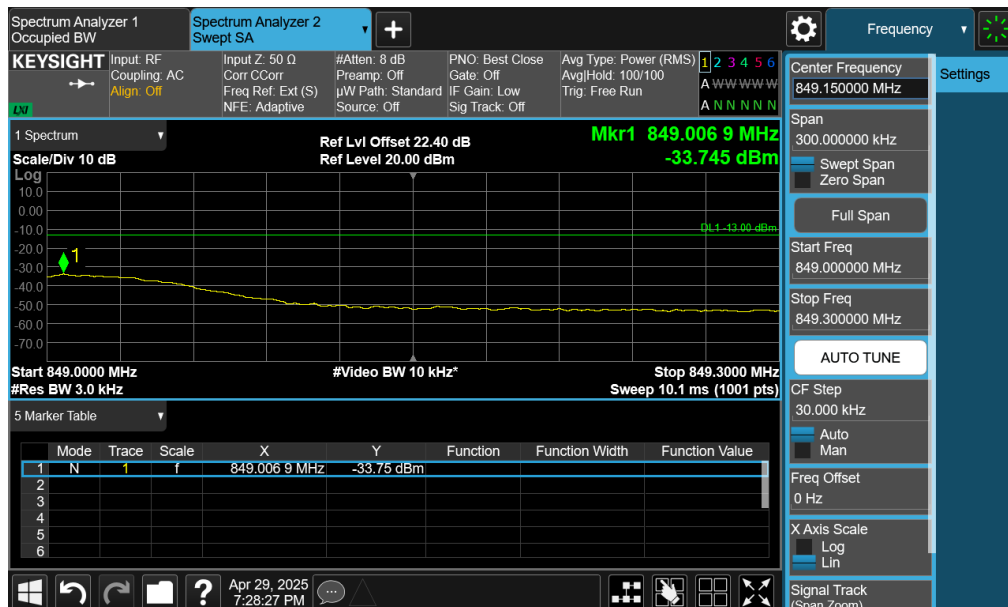


### Out-of-band/out-of-block emissions

#### UL\_GSM\_HCH\_a single test signal\_Pre-AGC

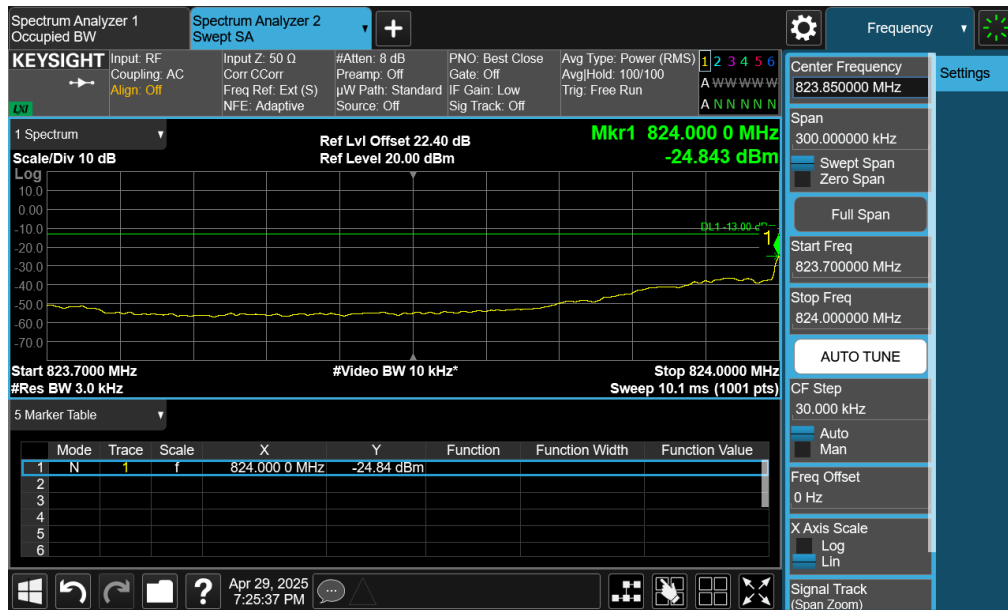


#### UL\_GSM\_HCH\_a single test signal\_3dB above AGC

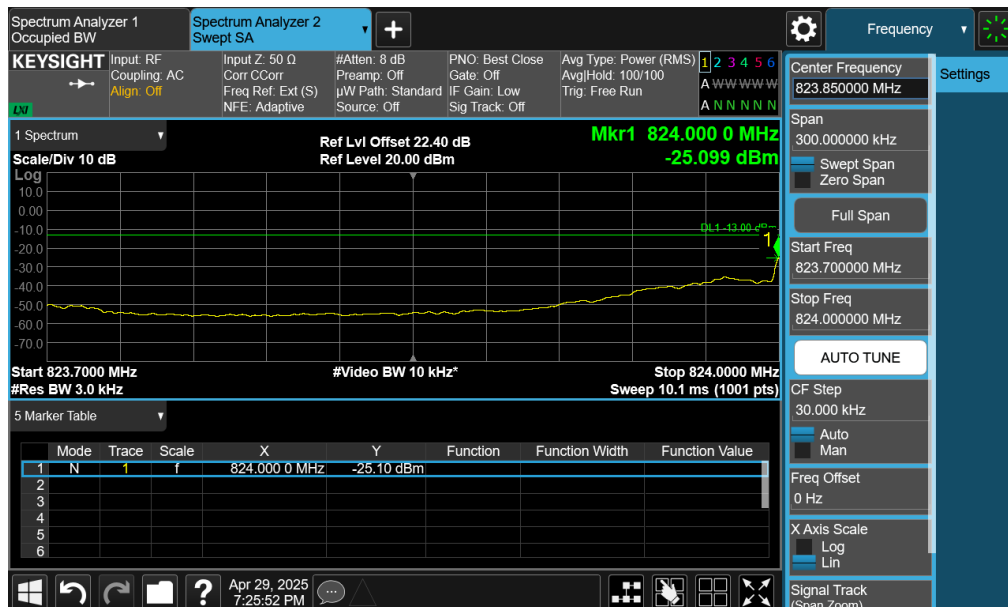


### Out-of-band/out-of-block emissions

#### UL\_GSM\_LCH\_two adjacent test signals\_Pre-AGC

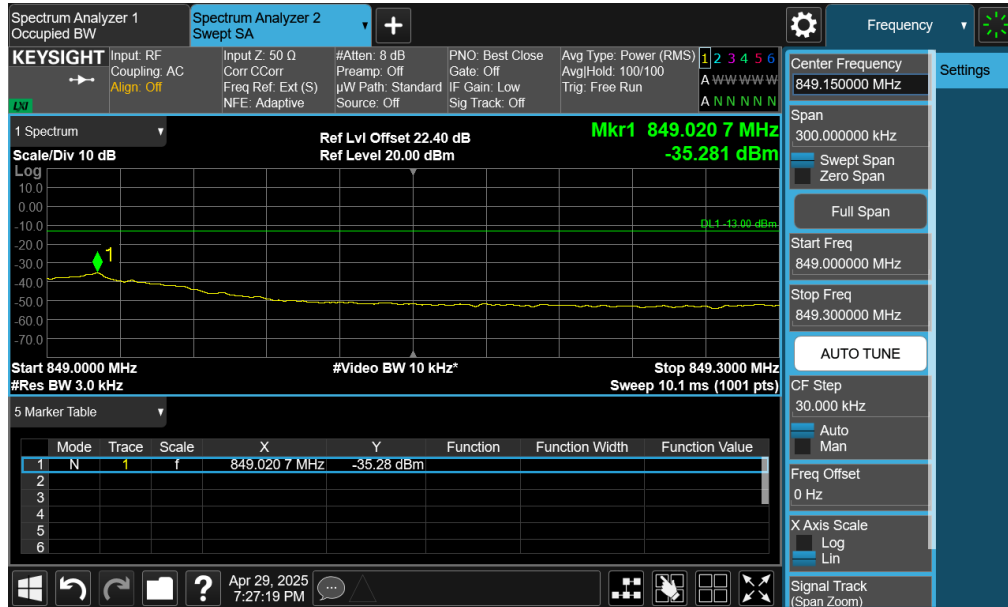


#### UL\_GSM\_LCH\_two adjacent test signals\_3dB above AGC

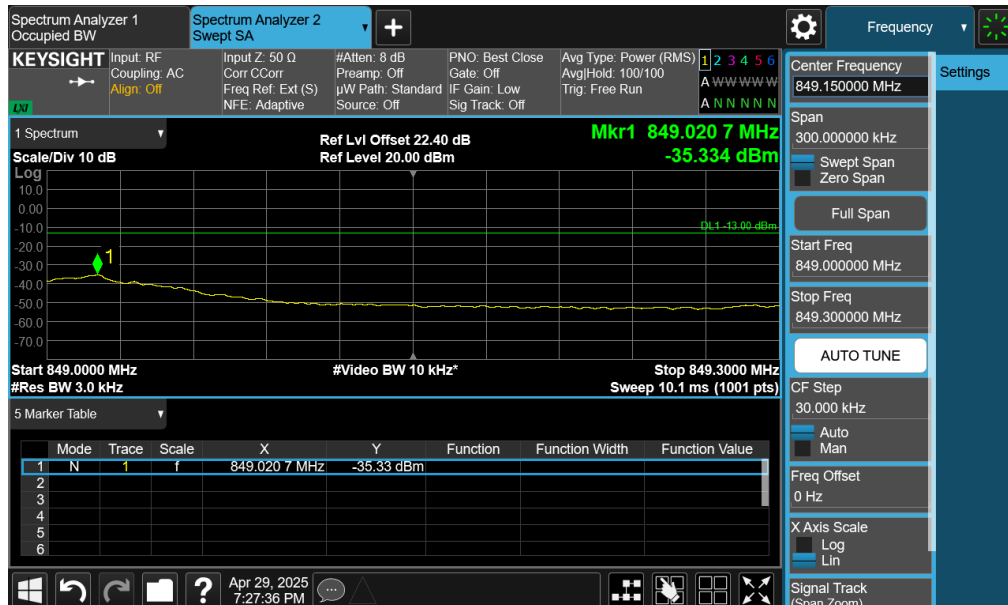


### Out-of-band/out-of-block emissions

#### UL\_GSM\_HCH\_two adjacent test signals\_Pre-AGC



#### UL\_GSM\_HCH\_two adjacent test signals\_3dB above AGC



## 5 Conducted Spurious emissions

| Conducted Spurious emissions |             |              |                       |                        |             |         |
|------------------------------|-------------|--------------|-----------------------|------------------------|-------------|---------|
| Test path                    | Test signal | Test channel | Frequency range (MHz) | Worst test level (dBm) | Limit (dBm) | Verdict |
| UL                           | 4.1MHz AWGN | LCH          | 0.09-823.9            | -22.68                 | ≤-13        | PASS    |
|                              |             | HCH          | 849.1-1000            | -26.17                 | ≤-13        | PASS    |
|                              |             |              | 1000-8490             | -33.54                 | ≤-13        | PASS    |

### Remark:

1. The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10\log_{10}(P)$  dB, here,  
 $P = 19\text{dBm} = 0.08\text{W}$   
 $\text{limit} = 19\text{dBm} - [43 + 10\log_{10}(0.08\text{W})] \text{ dB} = -13\text{dBm}$
2. All modes (LCH/MCH/HCH, with 4.1MHz AWGN signal/ with 100MHz AWGN signal/ with GSM signal) had been tested, only show the worst-case in this report.
3. The spurious emissions 9kHz to 30MHz were very low and not displayed test plots in this report.



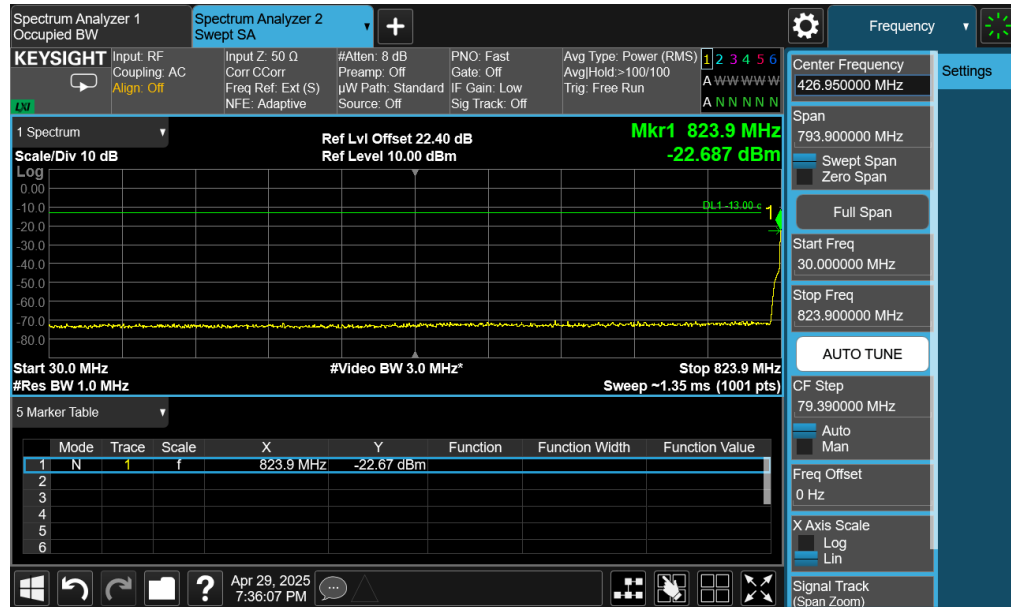
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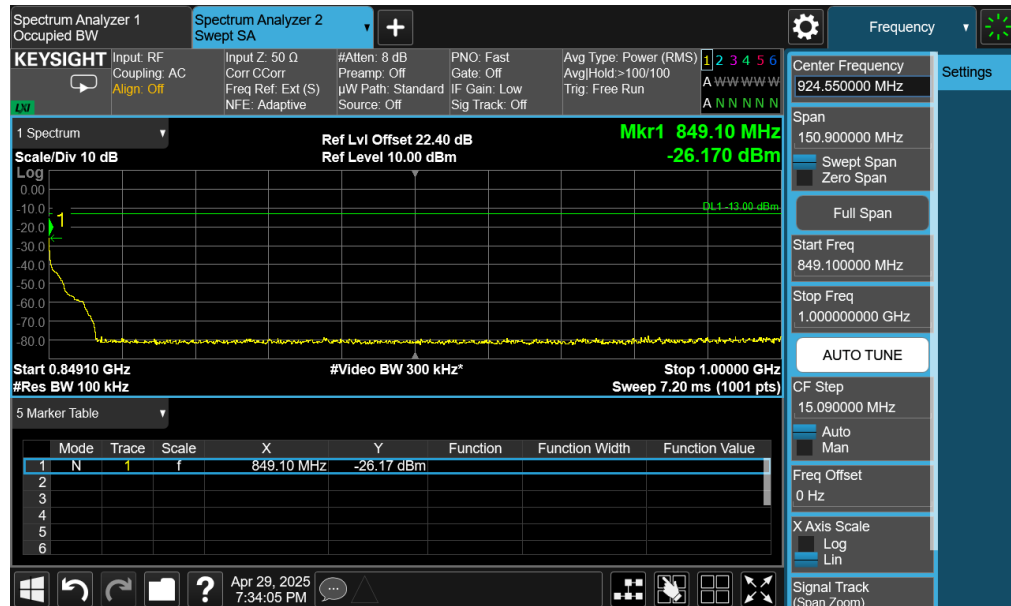


### Conducted spurious emissions

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



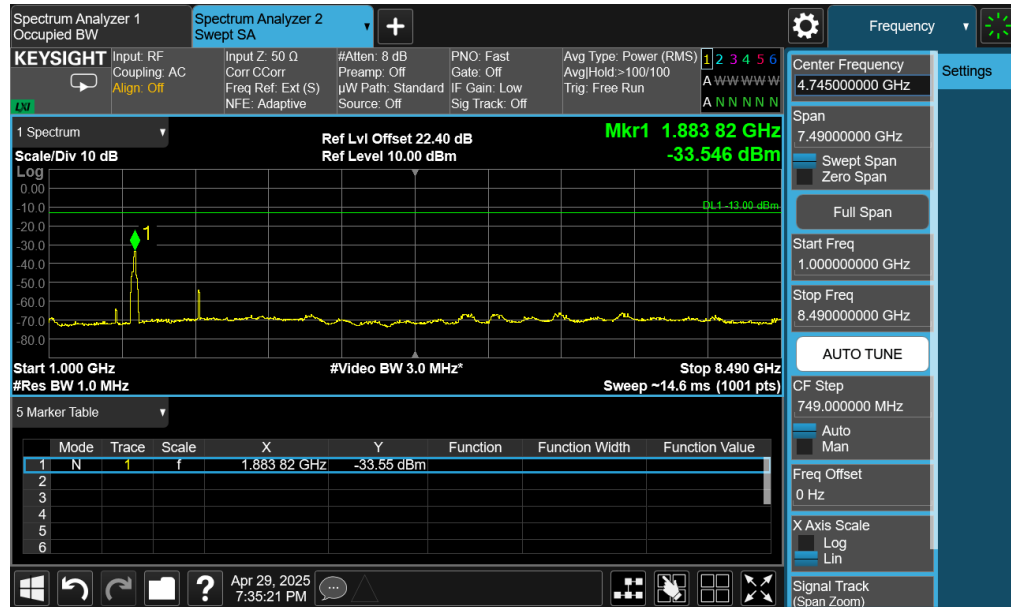
#### UL\_4.1MHz AWGN\_HCH\_Pre-AGC





### Conducted spurious emissions

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



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### 6 Frequency Stability

| Frequency stability vs voltage |              |             |             |         |                  |                 |         |
|--------------------------------|--------------|-------------|-------------|---------|------------------|-----------------|---------|
| Test path                      | Test Channel | Test Signal | Temperature | Voltage | Freq. error (Hz) | Tolerance (ppm) | Verdict |
| UL                             | MCH          | 4.1MHz AWGN | TN          | VL      | 5.8              | 0.00693         | PASS    |
|                                |              |             | TN          | VH      | 5.8              | 0.00693         | PASS    |
|                                |              | 100MHz AWGN | TN          | VL      | 6.0              | 0.00717         | PASS    |
|                                |              |             | TN          | VH      | 6.0              | 0.00717         | PASS    |
|                                |              | GSM         | TN          | VL      | 4.8              | 0.00574         | PASS    |
|                                |              |             | TN          | VH      | 4.8              | 0.00574         | PASS    |



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| Frequency stability vs temperature |              |             |         |                  |                  |                 |         |
|------------------------------------|--------------|-------------|---------|------------------|------------------|-----------------|---------|
| Test Path                          | Test Channel | Test Signal | Voltage | Temperature (°C) | Freq. error (Hz) | Tolerance (ppm) | Verdict |
| UL                                 | MCH          | 4.1MHz AWGN | VN      | +50              | 6.4              | 0.00765         | PASS    |
|                                    |              |             | VN      | +40              | 5.2              | 0.00622         | PASS    |
|                                    |              |             | VN      | +30              | 7.4              | 0.00885         | PASS    |
|                                    |              |             | VN      | +20              | 5.2              | 0.00622         | PASS    |
|                                    |              |             | VN      | +10              | 5.6              | 0.00669         | PASS    |
|                                    |              |             | VN      | 0                | 7.2              | 0.00861         | PASS    |
|                                    |              |             | VN      | -10              | 7.4              | 0.00885         | PASS    |
|                                    |              |             | VN      | -20              | 7.9              | 0.00944         | PASS    |
|                                    |              |             | VN      | -30              | 6.5              | 0.00777         | PASS    |
|                                    | MCH          | 100MHz AWGN | VN      | +50              | 6.4              | 0.00765         | PASS    |
|                                    |              |             | VN      | +40              | 5.8              | 0.00693         | PASS    |
|                                    |              |             | VN      | +30              | 5.3              | 0.00634         | PASS    |
|                                    |              |             | VN      | +20              | 7.2              | 0.00861         | PASS    |
|                                    |              |             | VN      | +10              | 4.3              | 0.00514         | PASS    |
|                                    |              |             | VN      | 0                | 7.8              | 0.00932         | PASS    |
|                                    |              |             | VN      | -10              | 4.6              | 0.00550         | PASS    |
|                                    |              |             | VN      | -20              | 7.3              | 0.00873         | PASS    |
|                                    |              |             | VN      | -30              | 7.9              | 0.00944         | PASS    |
|                                    | MCH          | GSM         | VN      | +50              | 5.0              | 0.00598         | PASS    |
|                                    |              |             | VN      | +40              | 7.5              | 0.00897         | PASS    |
|                                    |              |             | VN      | +30              | 4.1              | 0.00490         | PASS    |
|                                    |              |             | VN      | +20              | 4.9              | 0.00586         | PASS    |
|                                    |              |             | VN      | +10              | 5.9              | 0.00705         | PASS    |
|                                    |              |             | VN      | 0                | 5.8              | 0.00693         | PASS    |
|                                    |              |             | VN      | -10              | 4.5              | 0.00538         | PASS    |
|                                    |              |             | VN      | -20              | 6.8              | 0.00813         | PASS    |
|                                    |              |             | VN      | -30              | 5.8              | 0.00693         | PASS    |



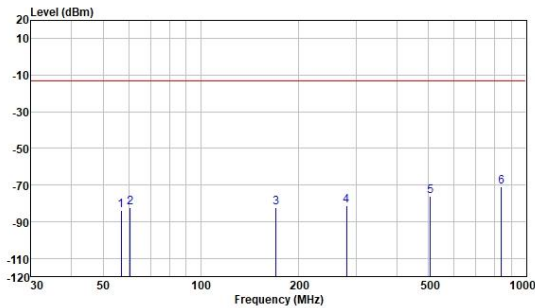
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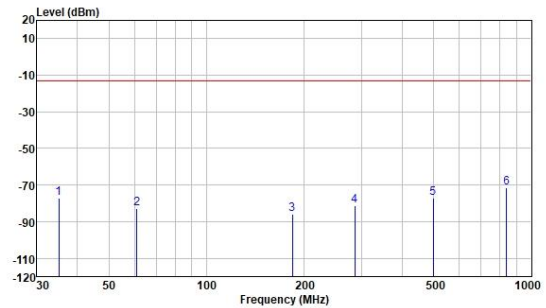
### 7 Radiated Spurious emissions

#### Radiated Spurious emissions

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

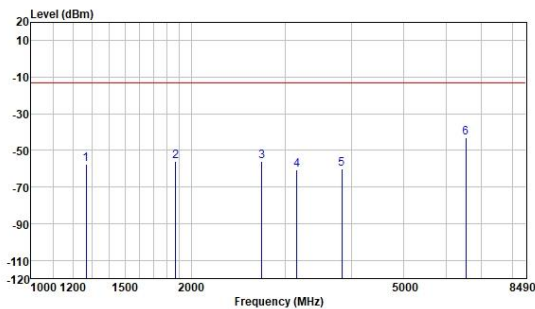


|   | Freq   | Read Level | Correction Factor | Level  | Limit Line | Over Limit | Pol/Phase |
|---|--------|------------|-------------------|--------|------------|------------|-----------|
|   | MHz    | dBm        | dB                | dBm    | dBm        | dB         |           |
| 1 | 56.79  | -80.75     | -3.18             | -83.93 | -13.00     | -70.93     | VERTICAL  |
| 2 | 60.49  | -79.87     | -2.28             | -82.15 | -13.00     | -69.15     | VERTICAL  |
| 3 | 170.19 | -78.56     | -3.94             | -82.50 | -13.00     | -69.50     | VERTICAL  |
| 4 | 280.02 | -78.45     | -2.71             | -81.16 | -13.00     | -68.16     | VERTICAL  |
| 5 | 506.48 | -77.46     | 1.56              | -75.90 | -13.00     | -62.90     | VERTICAL  |
| 6 | 839.18 | -78.81     | 7.78              | -71.03 | -13.00     | -58.03     | VERTICAL  |

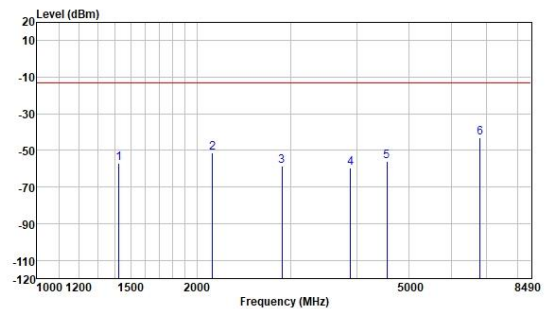


|   | Freq   | Read Level | Correction Factor | Level  | Limit Line | Over Limit | Pol/Phase  |
|---|--------|------------|-------------------|--------|------------|------------|------------|
|   | MHz    | dBm        | dB                | dBm    | dBm        | dB         |            |
| 1 | 35.00  | -80.23     | 2.87              | -77.36 | -13.00     | -64.36     | HORIZONTAL |
| 2 | 60.92  | -80.17     | -2.75             | -82.92 | -13.00     | -69.92     | HORIZONTAL |
| 3 | 183.84 | -79.72     | -6.10             | -85.82 | -13.00     | -72.82     | HORIZONTAL |
| 4 | 285.98 | -78.67     | -2.58             | -81.25 | -13.00     | -68.25     | HORIZONTAL |
| 5 | 499.42 | -77.30     | 0.39              | -76.91 | -13.00     | -63.91     | HORIZONTAL |
| 6 | 839.18 | -78.45     | 7.19              | -71.26 | -13.00     | -58.26     | HORIZONTAL |

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



|   | Freq    | Read Level | Correction Factor | Level  | Limit Line | Over Limit | Pol/Phase |
|---|---------|------------|-------------------|--------|------------|------------|-----------|
|   | MHz     | dBm        | dB                | dBm    | dBm        | dB         |           |
| 1 | 1267.97 | -61.97     | 4.27              | -57.70 | -13.00     | -44.70     | VERTICAL  |
| 2 | 1867.42 | -62.65     | 6.61              | -56.04 | -13.00     | -43.04     | VERTICAL  |
| 3 | 2709.39 | -60.68     | 4.95              | -55.73 | -13.00     | -42.73     | VERTICAL  |
| 4 | 3153.72 | -63.28     | 2.66              | -60.62 | -13.00     | -47.62     | VERTICAL  |
| 5 | 3831.37 | -62.89     | 2.91              | -59.98 | -13.00     | -46.98     | VERTICAL  |
| 6 | 6540.05 | -63.40     | 20.22             | -43.18 | -13.00     | -30.18     | VERTICAL  |



|   | Freq    | Read Level | Correction Factor | Level  | Limit Line | Over Limit | Pol/Phase  |
|---|---------|------------|-------------------|--------|------------|------------|------------|
|   | MHz     | dBm        | dB                | dBm    | dBm        | dB         |            |
| 1 | 1426.26 | -61.60     | 4.63              | -56.97 | -13.00     | -43.97     | HORIZONTAL |
| 2 | 2136.79 | -60.67     | 9.38              | -51.29 | -13.00     | -38.29     | HORIZONTAL |
| 3 | 2888.94 | -62.55     | 4.09              | -58.46 | -13.00     | -45.46     | HORIZONTAL |
| 4 | 3880.86 | -62.68     | 3.04              | -59.64 | -13.00     | -46.64     | HORIZONTAL |
| 5 | 4546.39 | -62.70     | 6.71              | -55.99 | -13.00     | -42.99     | HORIZONTAL |
| 6 | 6796.75 | -63.42     | 20.44             | -42.98 | -13.00     | -29.98     | HORIZONTAL |



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### Remark:

Pre-test was performed for all modes (LCH/MCH/HCH, with GSM signal/ 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. The spurious emissions 9kHz to 30MHz were very low and not displayed in this report.

--End of Appendix--



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