



# Appendix B

## E-UTRA Band 13



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## 1 Effective (Isotropic) Radiated Power

### 1.1. Test Result

| Band   | Bandwidth<br>h | Modulation | Channel | RB<br>Configuration | Conducted<br>Power(dBm) | ERP<br>(dBm) | limit<br>(dBm) | Verdict |
|--------|----------------|------------|---------|---------------------|-------------------------|--------------|----------------|---------|
| Band13 | 5MHz           | QPSK       | 23205   | 1RB#12              | 23.81                   | 22.16        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23205   | 1RB#24              | 23.47                   | 21.82        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23205   | 1RB#0               | 23.86                   | 22.21        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23205   | 12RB#0              | 22.96                   | 21.31        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23205   | 12RB#6              | 22.92                   | 21.27        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23205   | 12RB#13             | 22.82                   | 21.17        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23205   | 25RB#0              | 22.88                   | 21.23        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 1RB#0               | 23.81                   | 22.16        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 1RB#12              | 23.94                   | 22.29        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 1RB#24              | 23.34                   | 21.69        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 12RB#0              | 22.95                   | 21.3         | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 12RB#6              | 22.91                   | 21.26        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 12RB#13             | 22.59                   | 20.94        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23230   | 25RB#0              | 22.84                   | 21.19        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 1RB#24              | 23.65                   | 22           | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 1RB#0               | 23.86                   | 22.21        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 1RB#12              | 23.43                   | 21.78        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 12RB#6              | 22.71                   | 21.06        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 12RB#0              | 22.81                   | 21.16        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 12RB#13             | 22.74                   | 21.09        | 34.77          | PASS    |
| Band13 | 5MHz           | QPSK       | 23255   | 25RB#0              | 22.82                   | 21.17        | 34.77          | PASS    |
| Band13 | 5MHz           | 16QAM      | 23205   | 1RB#12              | 22.73                   | 21.08        | 34.77          | PASS    |
| Band13 | 5MHz           | 16QAM      | 23205   | 1RB#0               | 22.38                   | 20.73        | 34.77          | PASS    |
| Band13 | 5MHz           | 16QAM      | 23205   | 1RB#24              | 22.36                   | 20.71        | 34.77          | PASS    |
| Band13 | 5MHz           | 16QAM      | 23205   | 12RB#13             | 21.68                   | 20.03        | 34.77          | PASS    |
| Band13 | 5MHz           | 16QAM      | 23205   | 12RB#6              | 21.80                   | 20.15        | 34.77          | PASS    |
| Band13 | 5MHz           | 16QAM      | 23205   | 12RB#0              | 21.70                   | 20.05        | 34.77          | PASS    |





|        |       |       |       |         |       |       |       |      |
|--------|-------|-------|-------|---------|-------|-------|-------|------|
| Band13 | 5MHz  | 16QAM | 23205 | 25RB#0  | 21.81 | 20.16 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 1RB#0   | 22.43 | 20.78 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 1RB#12  | 22.74 | 21.09 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 1RB#24  | 22.13 | 20.48 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 12RB#0  | 21.70 | 20.05 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 12RB#6  | 21.79 | 20.14 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 12RB#13 | 21.69 | 20.04 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23230 | 25RB#0  | 21.86 | 20.21 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 1RB#0   | 22.37 | 20.72 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 1RB#12  | 22.42 | 20.77 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 1RB#24  | 22.24 | 20.59 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 12RB#13 | 21.83 | 20.18 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 12RB#0  | 21.60 | 19.95 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 12RB#6  | 21.61 | 19.96 | 34.77 | PASS |
| Band13 | 5MHz  | 16QAM | 23255 | 25RB#0  | 21.92 | 20.27 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 1RB#49  | 23.08 | 21.43 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 1RB#24  | 23.97 | 22.32 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 1RB#0   | 23.80 | 22.15 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 25RB#0  | 23.12 | 21.47 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 25RB#12 | 22.88 | 21.23 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 25RB#25 | 22.44 | 20.79 | 34.77 | PASS |
| Band13 | 10MHz | QPSK  | 23230 | 50RB#0  | 22.81 | 21.16 | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 1RB#49  | 22.29 | 20.64 | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 1RB#0   | 22.28 | 20.63 | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 1RB#24  | 22.61 | 20.96 | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 25RB#0  | 21.85 | 20.2  | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 25RB#12 | 21.84 | 20.19 | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 25RB#25 | 21.68 | 20.03 | 34.77 | PASS |
| Band13 | 10MHz | 16QAM | 23230 | 50RB#0  | 21.84 | 20.19 | 34.77 | PASS |

Remark:

a: For getting the EIRP (Efficient Isotropic Radiated Power), the following formula should be taken to calculate it,

ERP [dBm] = Conducted Power [dBm] + Gain [dBd]

EIRP [dBm] = Conducted Power [dBm] + Gain [dBi]



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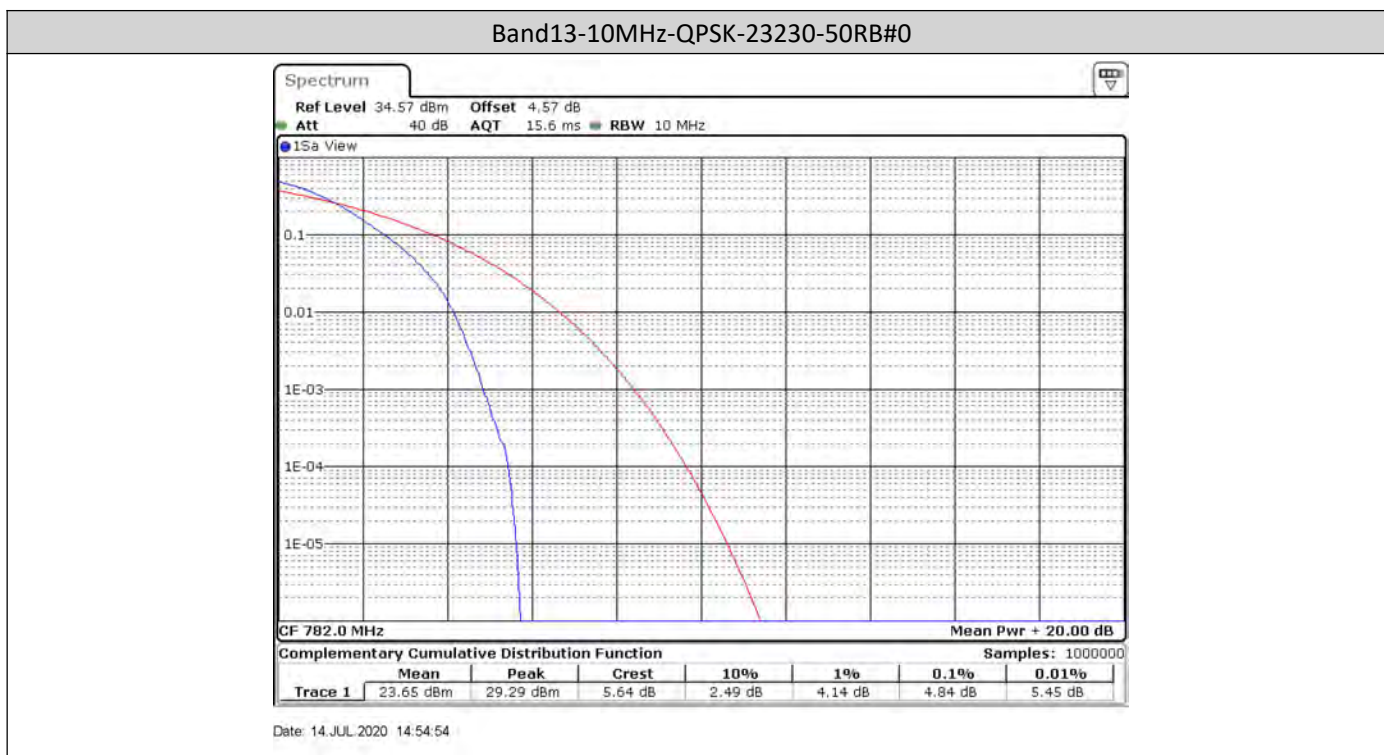


## 2. Peak-to-Average Ratio (CCDF)

### 2.1. Test Result

| Band   | Bandwidth | Modulation | Channel | RB Configuration | Result(dB) | Limit(dB) | Verdict |
|--------|-----------|------------|---------|------------------|------------|-----------|---------|
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0           | 4.84       | 13        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0           | 5.86       | 13        | PASS    |

### 2.2. Test Plots





Band13-10MHz-16QAM-23230-50RB#0



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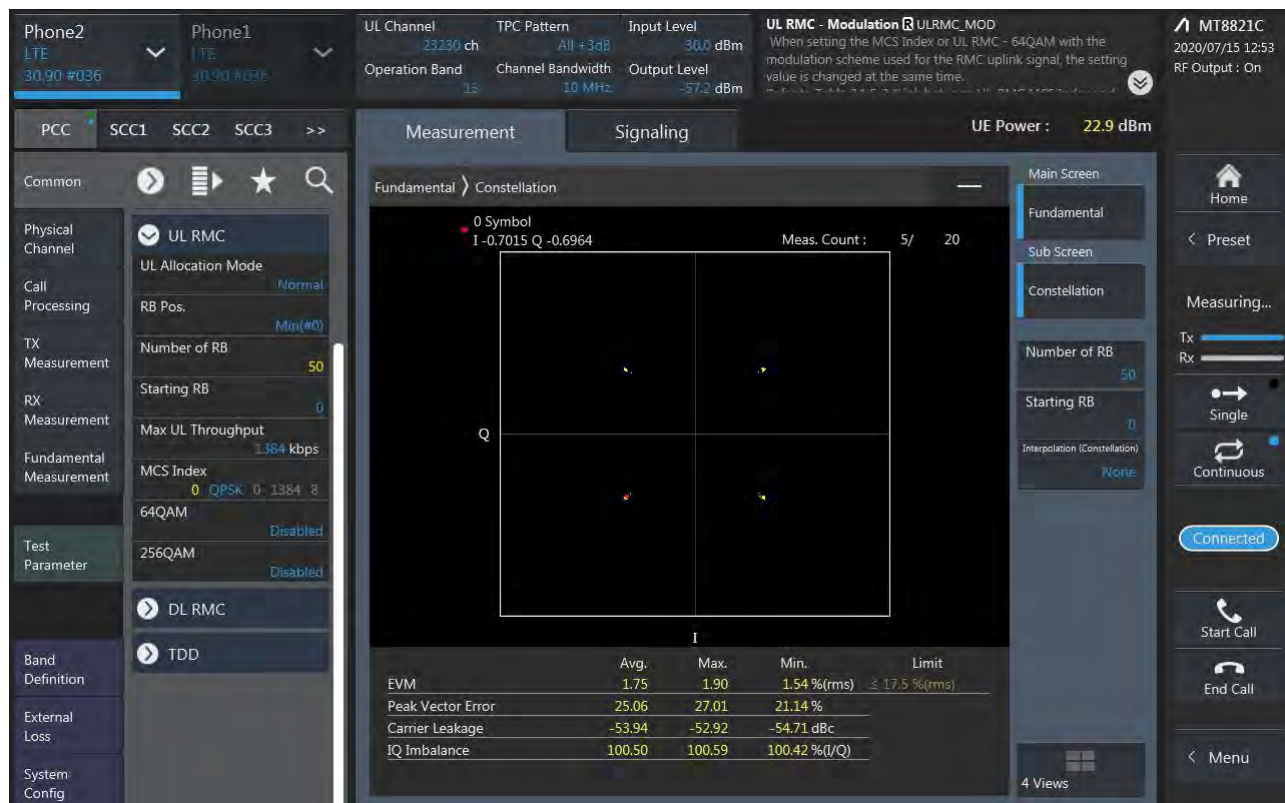
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### 3. Modulation Characteristics

#### 3.1. Test Mode = LTE /TM1 10MHz

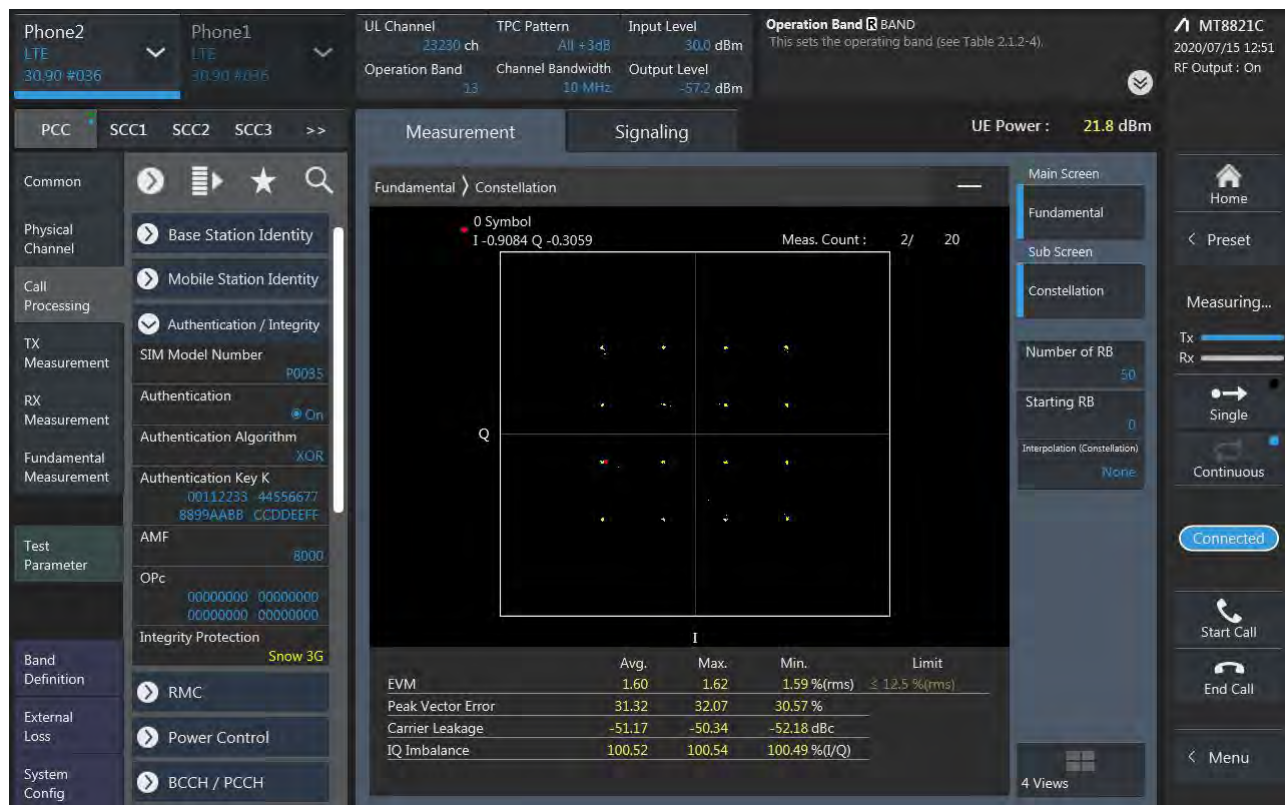
##### 3.1.1. Test Channel = MCH





## 3.2. Test Mode = LTE /TM2 10MHz

### 3.2.1. Test Channel = MCH



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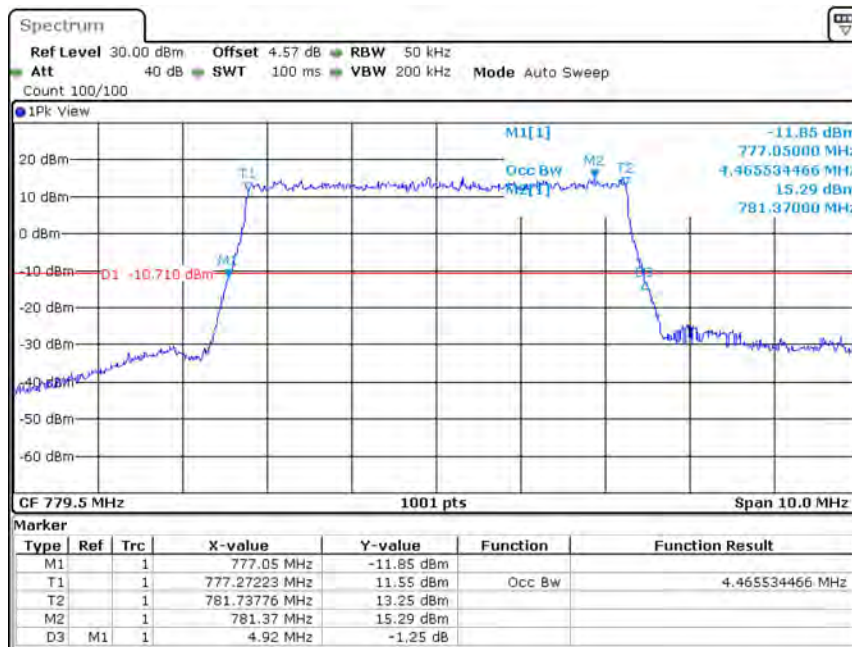
## 4. 26dB Bandwidth and Occupied Bandwidth

### 4.1. Test Result

| Band   | Bandwidth | Modulation | Channel | RB Configuration | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Verdict |
|--------|-----------|------------|---------|------------------|--------------------------|----------------------|---------|
| Band13 | 5MHz      | QPSK       | 23205   | 25RB#0           | 4.466                    | 4.920                | PASS    |
| Band13 | 5MHz      | QPSK       | 23230   | 25RB#0           | 4.466                    | 4.930                | PASS    |
| Band13 | 5MHz      | QPSK       | 23255   | 25RB#0           | 4.476                    | 4.920                | PASS    |
| Band13 | 5MHz      | 16QAM      | 23205   | 25RB#0           | 4.486                    | 4.940                | PASS    |
| Band13 | 5MHz      | 16QAM      | 23230   | 25RB#0           | 4.486                    | 4.960                | PASS    |
| Band13 | 5MHz      | 16QAM      | 23255   | 25RB#0           | 4.476                    | 4.960                | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0           | 8.911                    | 9.680                | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0           | 8.931                    | 9.700                | PASS    |

### 4.2. Test Plots

Band13-5MHz-QPSK-23205-25RB#0-4.466

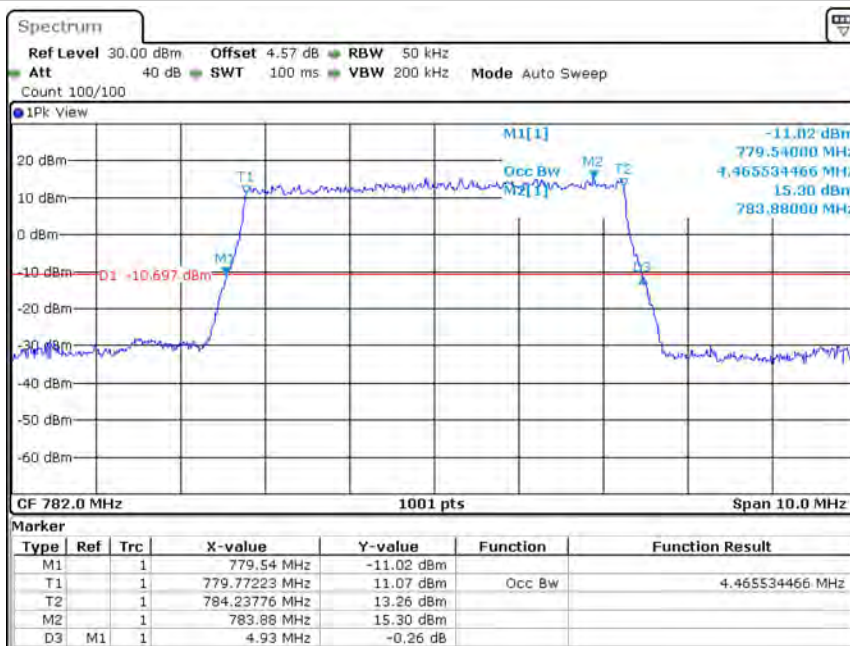


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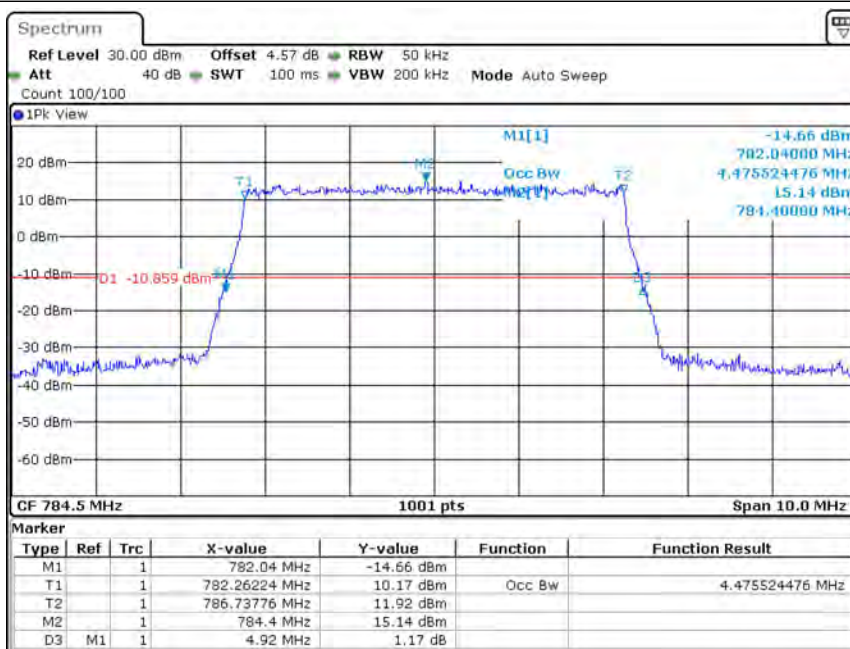


Band13-5MHz-QPSK-23230-25RB#0-4.466



Date: 14 JUL 2020 14:47:30

Band13-5MHz-QPSK-23255-25RB#0-4.476



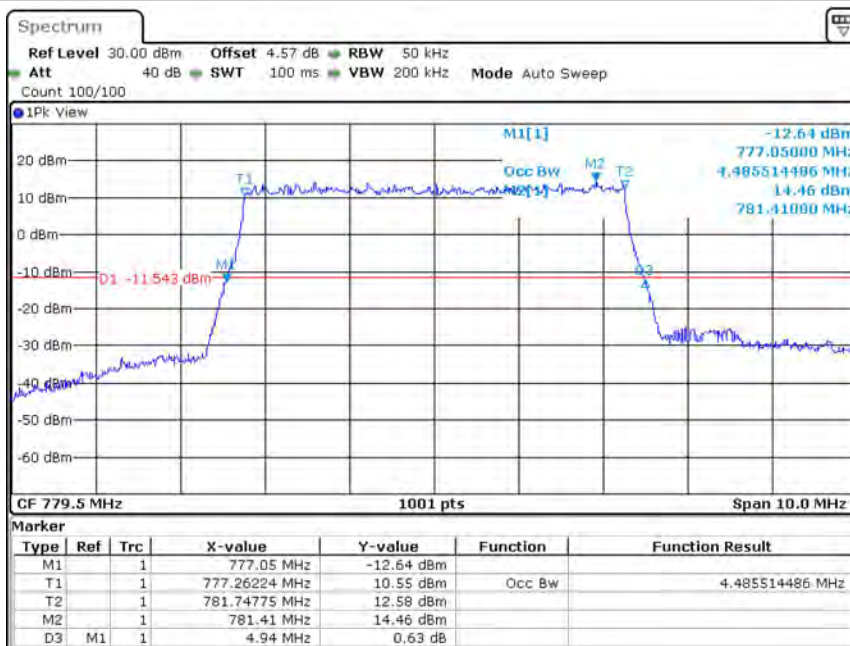
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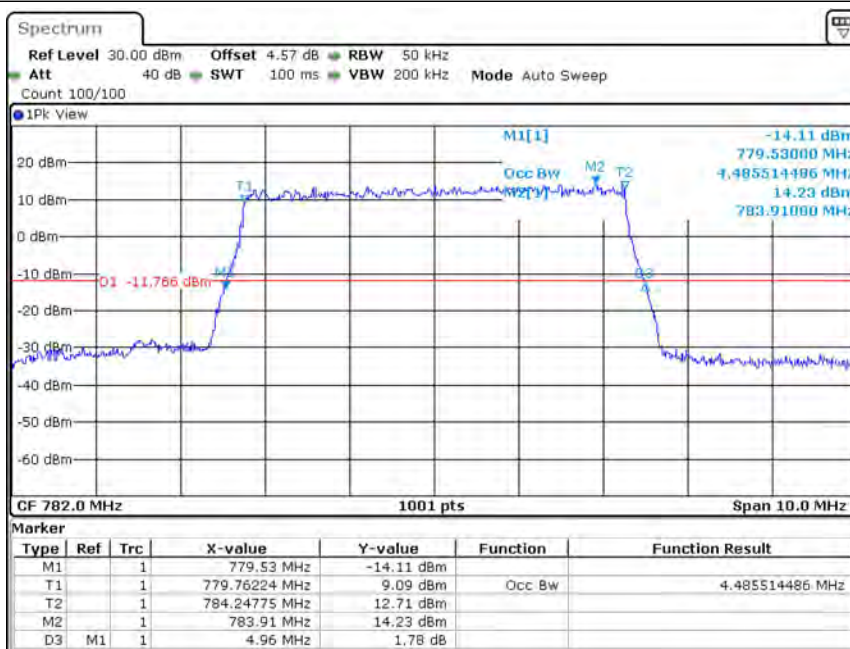
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## Band13-5MHz-16QAM-23205-25RB#0-4.486



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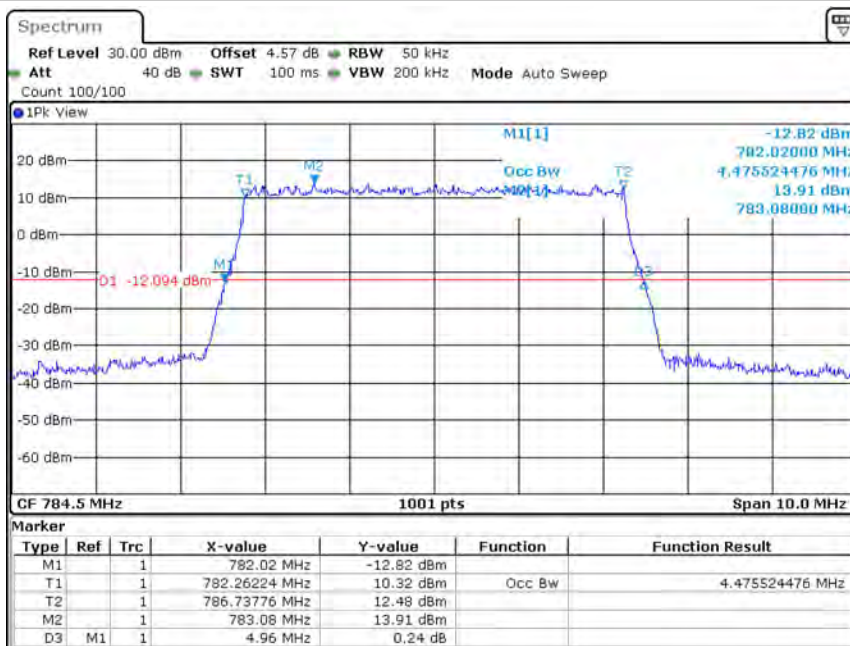
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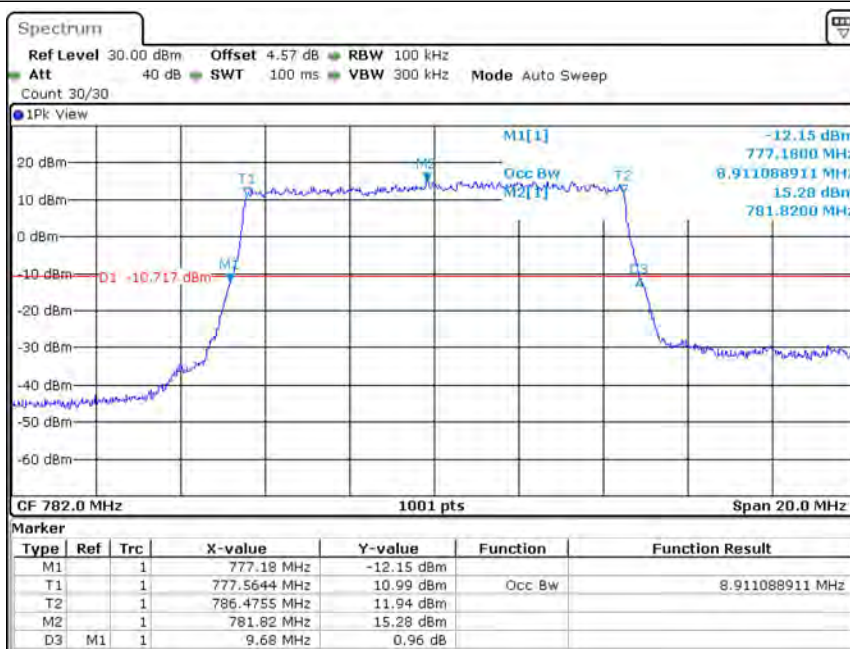


## Band13-5MHz-16QAM-23255-25RB#0-4.476



Date: 14 JUL 2020 14:48:29

## Band13-10MHz-QPSK-23230-50RB#0-8.911



Date: 14 JUL 2020 14:49:00

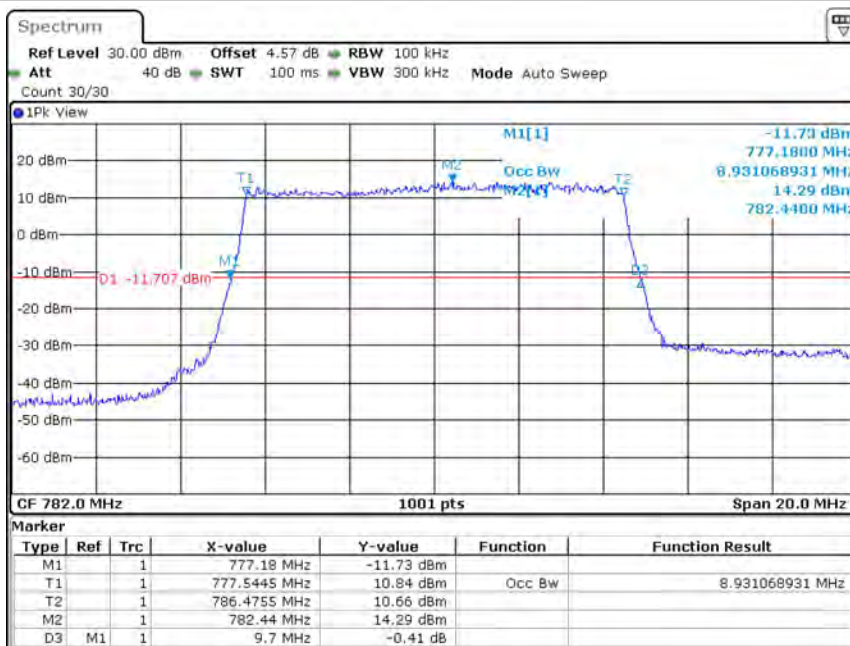


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Band13-10MHz-16QAM-23230-50RB#0-8.931



Date: 14 JUL 2020 14:49:35



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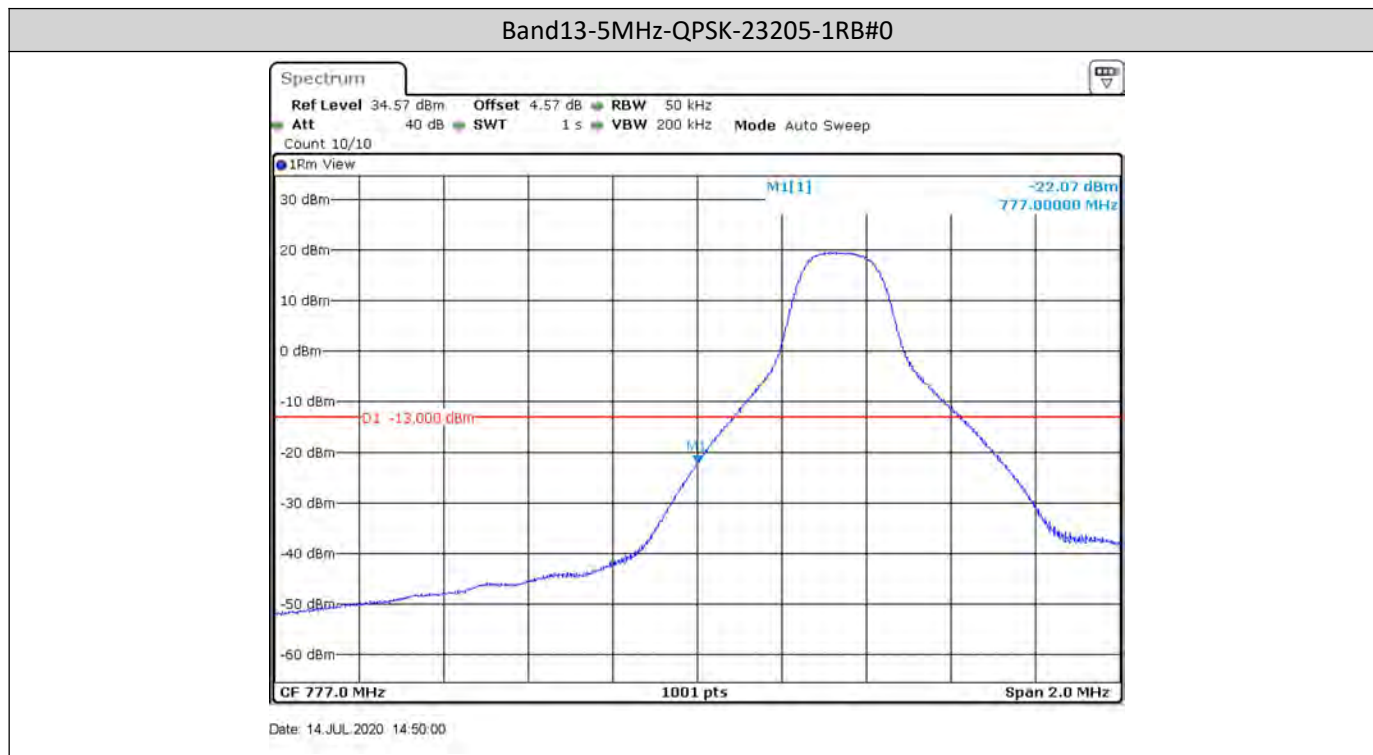
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## 5. Band Edge Compliance

## 5.1. Test Plots



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Band13-5MHz-QPSK-23205-25RB#0



Date: 14 JUL 2020 14:50:41

Band13-5MHz-QPSK-23255-1RB#24



Date: 14 JUL 2020 14:51:26



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Band13-5MHz-QPSK-23255-25RB#0



Date: 14 JUL 2020 14:52:07

Band13-5MHz-16QAM-23205-1RB#0



Date: 14 JUL 2020 14:50:21



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Band13-5MHz-16QAM-23205-25RB#0



Date: 14 JUL 2020 14:51:02

Band13-5MHz-16QAM-23255-1RB#24



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Band13-5MHz-16QAM-23255-25RB#0



Date: 14 JUL 2020 14:52:28

Band13-10MHz-QPSK-23230\_Left-1RB#0



Date: 14 JUL 2020 14:52:53



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**Band13-10MHz-QPSK-23230\_Right-1RB#49**



Date: 14 JUL 2020 14:53:38

**Band13-10MHz-QPSK-23230\_Right-50RB#0**



Date: 14 JUL 2020 14:54:19





Band13-10MHz-16QAM-23230\_Left-1RB#0



Date: 14 JUL 2020 14:53:13

Band13-10MHz-16QAM-23230\_Right-1RB#49



Date: 14 JUL 2020 14:53:58



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Band13-10MHz-16QAM-23230\_Right-50RB#0



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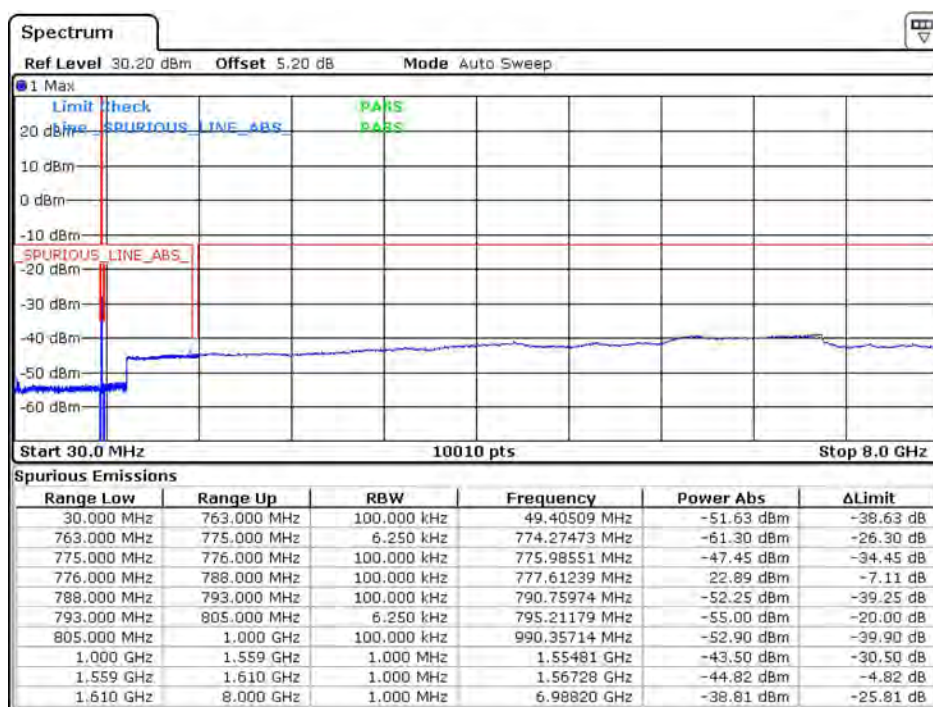
## 6. Spurious Emission at Antenna Terminal

Remark1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of  $< \text{RBW}/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (\text{Span} / \text{RBW})$ " with  $k$  between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Remark2: only the worst case data displayed in this report.

### 6.1. Test Plots

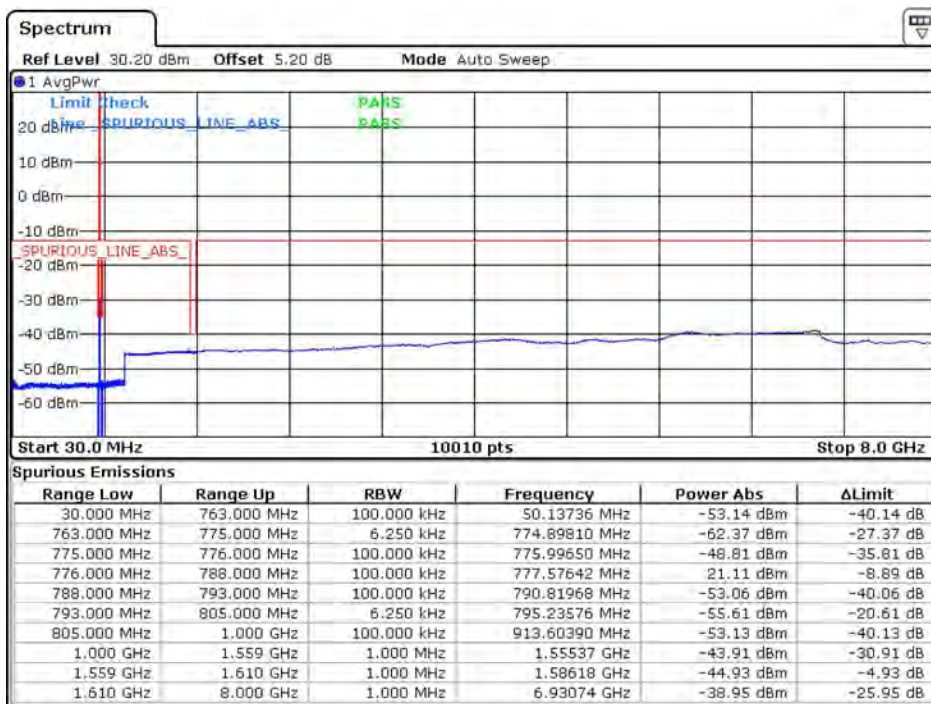
Band13-10MHz-QPSK-23230-50RB#0-Range2:30~8000MHz



Date: 14.JUL.2020 14:58:52



## Band13-10MHz-16QAM-23230-50RB#0-Range1:30~8000MHz



Date: 14 JUL 2020 14:58:01





## 7. Field Strength of Spurious Radiation

### 7.1. Test Mode =LTE/TM1 10MHz

#### 7.1.1.Test Channel = MCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Margin (dB) | Polarization |
|-----------------|-------------|------------------|-------------|--------------|
| 32.2311         | -53.30      | -13.00           | 40.30       | Vertical     |
| 77.1929         | -49.93      | -13.00           | 36.93       | Vertical     |
| 1555.3111       | -59.71      | -13.00           | 46.71       | Vertical     |
| 2133.8268       | -52.42      | -13.00           | 39.42       | Vertical     |
| 14508.4603      | -47.69      | -13.00           | 34.69       | Vertical     |
| 17996.9999      | -40.76      | -13.00           | 27.76       | Vertical     |
| 41.5921         | -56.93      | -13.00           | 43.93       | Horizontal   |
| 65.1643         | -55.47      | -13.00           | 42.47       | Horizontal   |
| 223.5732        | -67.46      | -13.00           | 54.46       | Horizontal   |
| 1555.3111       | -61.77      | -13.00           | 48.77       | Horizontal   |
| 3110.4044       | -53.64      | -13.00           | 40.64       | Horizontal   |
| 16388.9356      | -44.24      | -13.00           | 31.24       | Horizontal   |

#### Remark:

- 1 According to 971168 D01 Power Meas License Digital Systems, The amplitudes of unwanted emissions that are attenuated more than 20 dB below the applicable limit are not required to be reported.
- 2 The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the worst case data displayed in this report.
- 3 all modulation and all Bandwidth had been tested, but only the worst case data displayed in this report.



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## 8. Frequency Stability

### 8.1. Frequency Vs Voltage

| Band   | Bandwidth | Modulation | Channel | RB Configure | Voltage [Vdc] | Temperature (°C) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
|--------|-----------|------------|---------|--------------|---------------|------------------|----------------|-----------------|-------------|---------|
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | VL            | NT               | -8.50          | -0.010870       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | VN            | NT               | -11.20         | -0.014322       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | VH            | NT               | -7.60          | -0.009719       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | VL            | NT               | -8.90          | -0.011381       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | VN            | NT               | -0.30          | -0.000384       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | VH            | NT               | -8.20          | -0.010486       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | VL            | NT               | -11.30         | -0.014450       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | VN            | NT               | 0.70           | 0.000895        | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | VH            | NT               | -1.30          | -0.001662       | ±2.5        | PASS    |





## 8.2. Frequency Vs Temperature

| Band   | Bandwidth | Modulation | Channel | RB Configure | Voltage [Vdc] | Temperature (°C) | Deviation (Hz) | Deviation (ppm) | Limit (ppm) | Verdict |
|--------|-----------|------------|---------|--------------|---------------|------------------|----------------|-----------------|-------------|---------|
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | -30              | -1.10          | -0.001407       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | -20              | -7.00          | -0.008951       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | 0                | -3.00          | -0.003836       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | 10               | -13.30         | -0.017008       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | 20               | -9.20          | -0.011765       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | 30               | -10.50         | -0.013427       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | 40               | -10.40         | -0.013299       | ±2.5        | PASS    |
| Band13 | 10MHz     | QPSK       | 23230   | 50RB#0       | NV            | 50               | 0.20           | 0.000256        | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | -30              | -3.90          | -0.004987       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | -20              | -6.90          | -0.008824       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | 0                | -6.40          | -0.008184       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | 10               | -12.30         | -0.015729       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | 20               | -10.70         | -0.013683       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | 30               | -10.30         | -0.013171       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | 40               | -4.00          | -0.005115       | ±2.5        | PASS    |
| Band13 | 10MHz     | 64QAM      | 23230   | 50RB#0       | NV            | 50               | -4.00          | -0.005115       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | -30              | -3.00          | -0.003836       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | -20              | -5.30          | -0.006777       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | 0                | -3.50          | -0.004476       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | 10               | -13.70         | -0.017519       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | 20               | -9.10          | -0.011637       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | 30               | -4.40          | -0.005627       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | 40               | -1.50          | -0.001918       | ±2.5        | PASS    |
| Band13 | 10MHz     | 16QAM      | 23230   | 50RB#0       | NV            | 50               | -11.00         | -0.014066       | ±2.5        | PASS    |



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