



# Appendix B

## LTE-CatM1 Band 12



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## 1 Effective Radiated Power Output Data

**Effective Radiated Power of Transmitter (ERP) for LTE-CatM1 Band 12**

| Test Band     | Test Mode | Test Bandwidth | Test channel | Test RB | Conducted Power (dBm) | ERP (dBm) | limit (dBm) | Verdict |
|---------------|-----------|----------------|--------------|---------|-----------------------|-----------|-------------|---------|
| CatM1 Band 12 | QPSK      | 1.4M           | LCH          | 1RB#0   | 21.02                 | 17.47     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | LCH          | 5RB#0   | 20.22                 | 16.67     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | LCH          | 6RB#0   | 19.14                 | 15.59     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | MCH          | 1RB#0   | 20.83                 | 17.28     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | MCH          | 5RB#0   | 19.88                 | 16.33     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | MCH          | 6RB#0   | 18.77                 | 15.22     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | HCH          | 1RB#0   | 21.01                 | 17.46     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | HCH          | 5RB#0   | 20.12                 | 16.57     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 1.4M           | HCH          | 6RB#0   | 18.89                 | 15.34     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 1.4M           | LCH          | 1RB#0   | 20.05                 | 16.50     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 1.4M           | LCH          | 5RB#0   | 19.17                 | 15.62     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 1.4M           | MCH          | 1RB#0   | 19.83                 | 16.28     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 1.4M           | MCH          | 5RB#0   | 18.99                 | 15.44     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 1.4M           | HCH          | 1RB#0   | 19.91                 | 16.36     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 1.4M           | HCH          | 5RB#0   | 19.11                 | 15.56     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | LCH          | 1RB#0   | 20.96                 | 17.41     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | LCH          | 5RB#0   | 19.93                 | 16.38     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | LCH          | 6RB#0   | 18.81                 | 15.26     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | MCH          | 1RB#0   | 20.89                 | 17.34     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | MCH          | 5RB#0   | 19.88                 | 16.33     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | MCH          | 6RB#0   | 18.78                 | 15.23     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | HCH          | 1RB#0   | 20.91                 | 17.36     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | HCH          | 5RB#0   | 19.87                 | 16.32     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 3M             | HCH          | 6RB#0   | 18.83                 | 15.28     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 3M             | LCH          | 1RB#0   | 19.78                 | 16.23     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 3M             | LCH          | 5RB#0   | 18.74                 | 15.19     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 3M             | MCH          | 1RB#0   | 19.79                 | 16.24     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 3M             | MCH          | 5RB#0   | 18.78                 | 15.23     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 3M             | HCH          | 1RB#0   | 19.85                 | 16.30     | 34.77       | PASS    |
| CatM1 Band 12 | 16QAM     | 3M             | HCH          | 5RB#0   | 18.82                 | 15.27     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | LCH          | 1RB#0   | 21.21                 | 17.66     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | LCH          | 5RB#0   | 20.09                 | 16.54     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | LCH          | 6RB#0   | 20.03                 | 16.48     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | MCH          | 1RB#0   | 21.14                 | 17.59     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | MCH          | 5RB#0   | 20.01                 | 16.46     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | MCH          | 6RB#0   | 19.99                 | 16.44     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | HCH          | 1RB#0   | 21.05                 | 17.50     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | HCH          | 5RB#0   | 19.97                 | 16.42     | 34.77       | PASS    |
| CatM1 Band 12 | QPSK      | 5M             | HCH          | 6RB#0   | 19.95                 | 16.40     | 34.77       | PASS    |



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|               |       |     |     |       |       |       |       |      |
|---------------|-------|-----|-----|-------|-------|-------|-------|------|
| CatM1 Band 12 | 16QAM | 5M  | LCH | 1RB#0 | 20.83 | 17.28 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 5M  | LCH | 5RB#0 | 19.97 | 16.42 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 5M  | MCH | 1RB#0 | 20.74 | 17.19 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 5M  | MCH | 5RB#0 | 19.82 | 16.27 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 5M  | HCH | 1RB#0 | 20.71 | 17.16 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 5M  | HCH | 5RB#0 | 19.97 | 16.42 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | LCH | 1RB#0 | 21.09 | 17.54 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | LCH | 5RB#0 | 21.04 | 17.49 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | LCH | 6RB#0 | 19.92 | 16.37 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | MCH | 1RB#0 | 20.96 | 17.41 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | MCH | 5RB#0 | 21.12 | 17.57 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | MCH | 6RB#0 | 20.09 | 16.54 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | HCH | 1RB#0 | 21.12 | 17.57 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | HCH | 5RB#0 | 21.02 | 17.47 | 34.77 | PASS |
| CatM1 Band 12 | QPSK  | 10M | HCH | 6RB#0 | 19.88 | 16.33 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 10M | LCH | 1RB#0 | 20.86 | 17.31 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 10M | LCH | 5RB#0 | 20.83 | 17.28 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 10M | MCH | 1RB#0 | 20.93 | 17.38 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 10M | MCH | 5RB#0 | 20.91 | 17.36 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 10M | HCH | 1RB#0 | 20.71 | 17.16 | 34.77 | PASS |
| CatM1 Band 12 | 16QAM | 10M | HCH | 5RB#0 | 20.79 | 17.24 | 34.77 | PASS |

**Note:**

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

$EIRP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi]$

$ERP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi] - 2.15$



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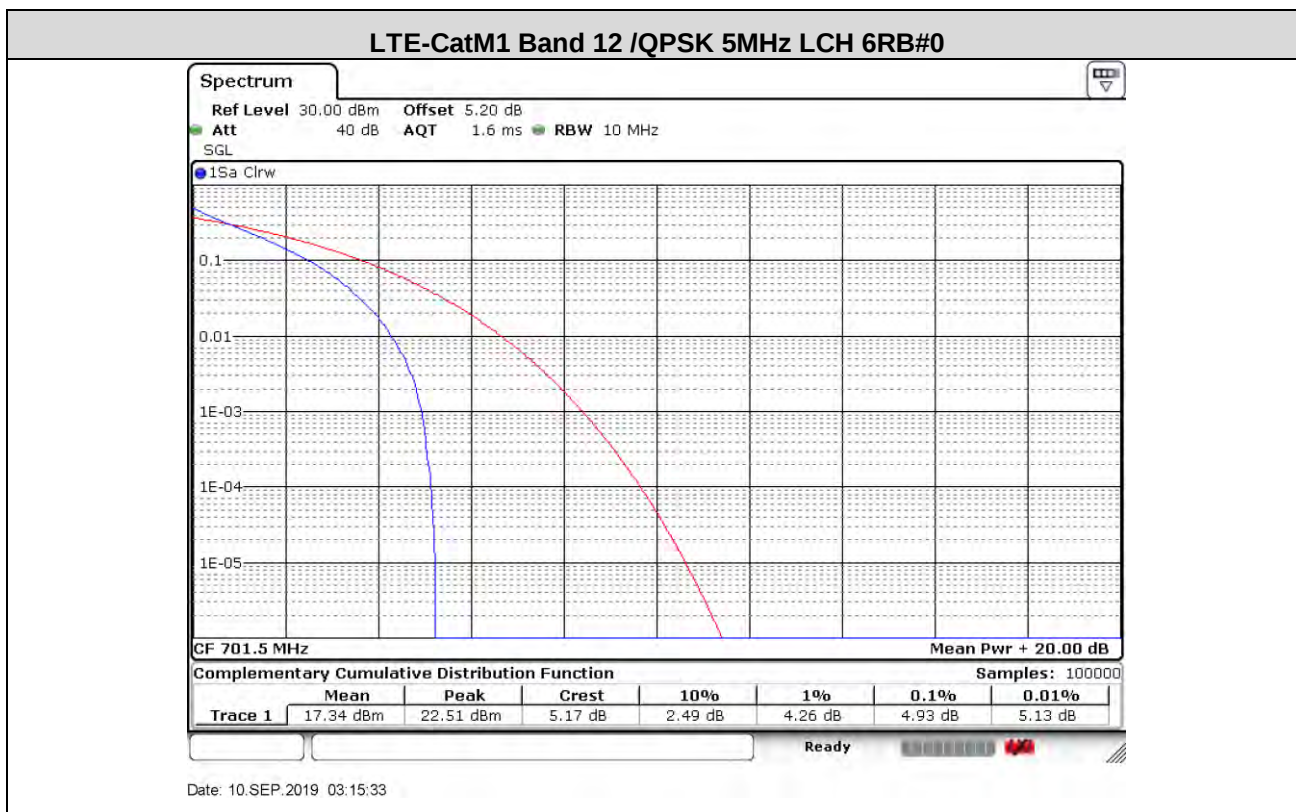


## 2 Peak-to-Average Ratio

### 2.1 Test Results

| Test Band     | Test Mode | RB Config | Test Channel | Measured [dB] | Limit [dB] | Verdict |
|---------------|-----------|-----------|--------------|---------------|------------|---------|
| CatM1 Band 12 | QPSK/5M   | 6RB#0     | LCH          | 4.93          | 13         | PASS    |
| CatM1 Band 12 | QPSK/5M   | 6RB#0     | MCH          | 4.72          | 13         | PASS    |
| CatM1 Band 12 | QPSK/5M   | 6RB#0     | HCH          | 3.97          | 13         | PASS    |
| CatM1 Band 12 | 16QAM/5M  | 5RB#0     | LCH          | 3.88          | 13         | PASS    |
| CatM1 Band 12 | 16QAM/5M  | 5RB#0     | MCH          | 4.35          | 13         | PASS    |
| CatM1 Band 12 | 16QAM/5M  | 5RB#0     | HCH          | 5.59          | 13         | PASS    |

### 2.2 Test Plots



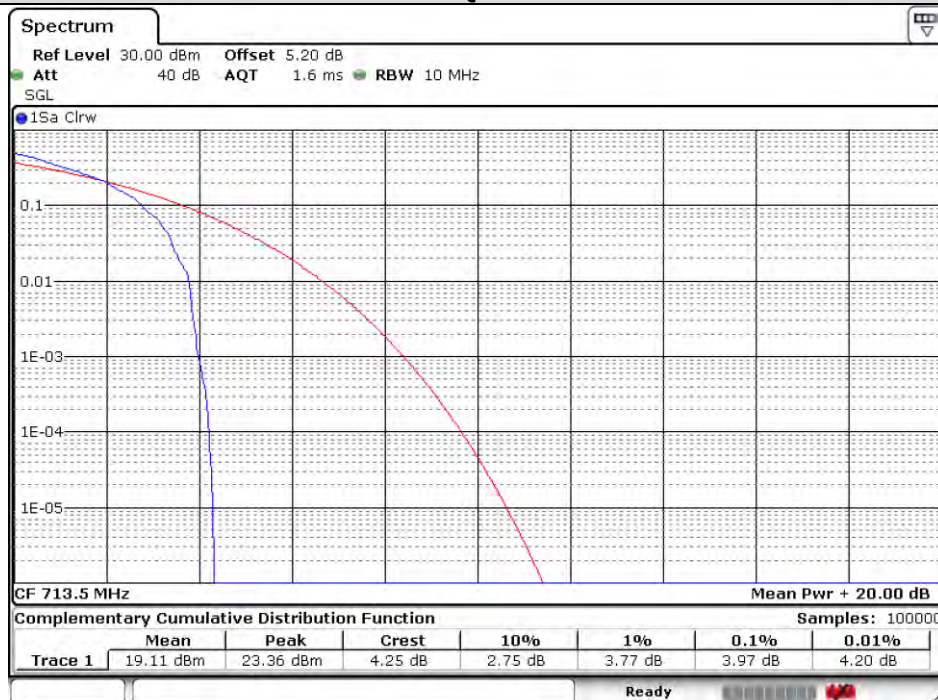


LTE-CatM1 Band 12 /QPSK 5MHz MCH 6RB#0



Date: 10.SEP.2019 03:16:45

LTE-CatM1 Band 12 /QPSK 5MHz HCH 6RB#0



Date: 10.SEP.2019 03:17:56



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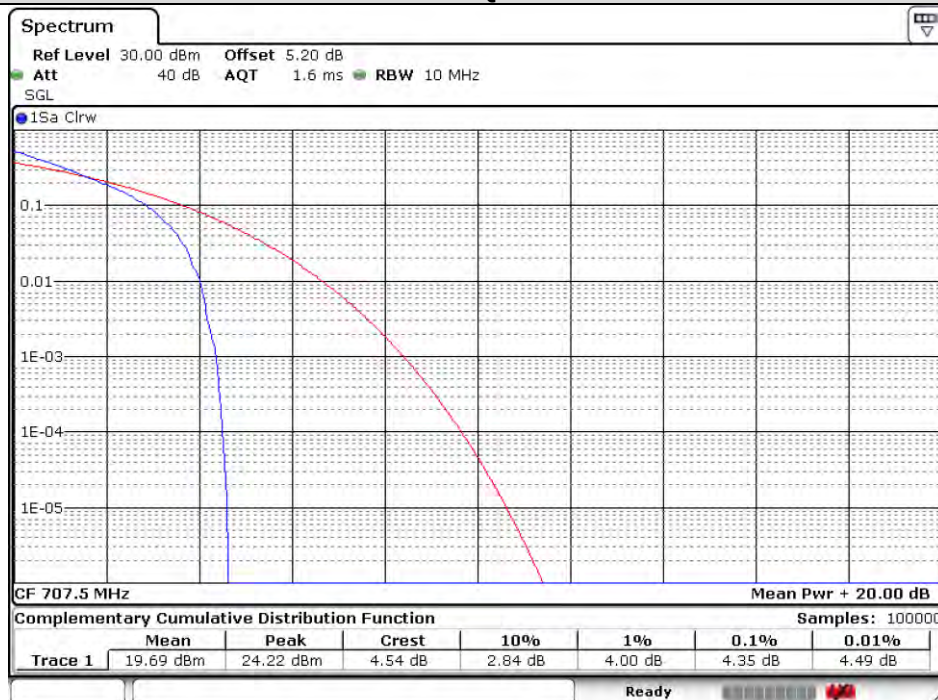


LTE-CatM1 Band 12 /16QAM 5MHz LCH 5RB#0



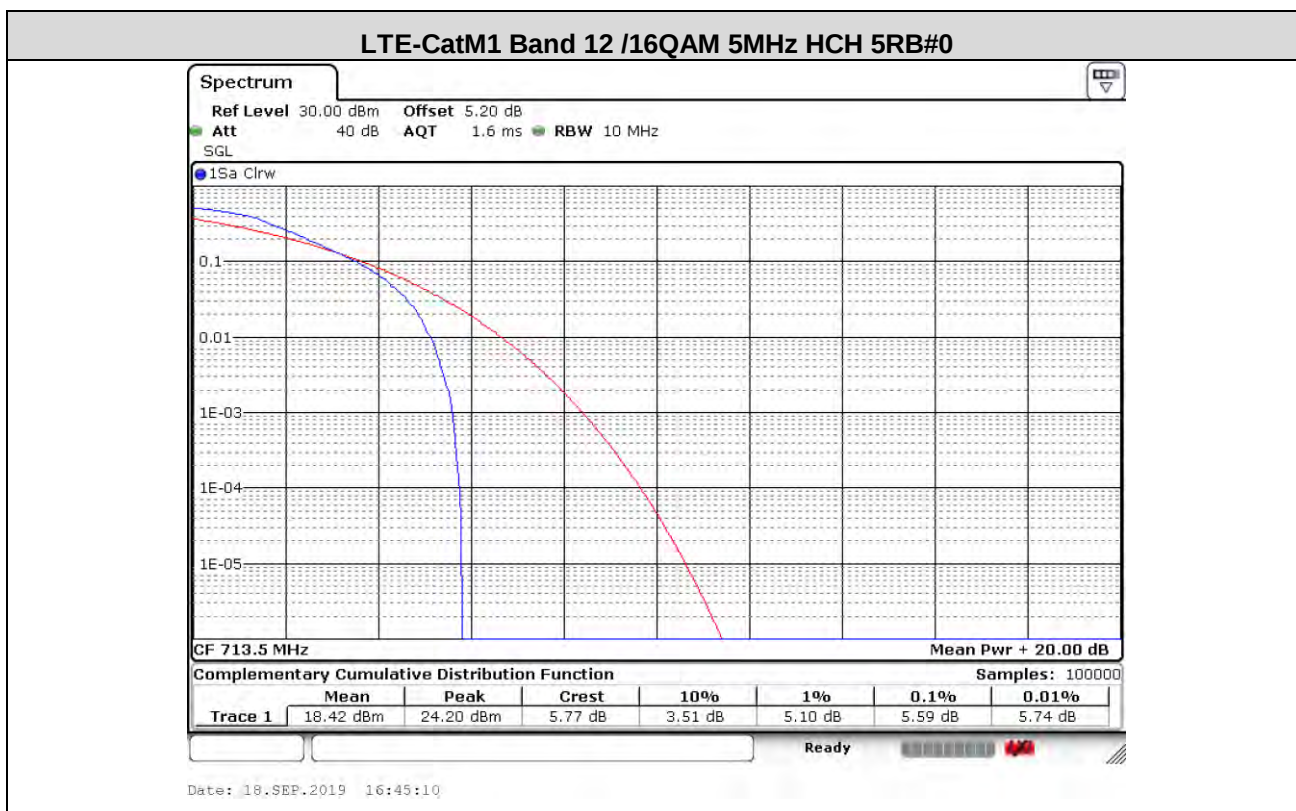
Date: 18.SEP.2019 16:46:53

LTE-CatM1 Band 12 /16QAM 5MHz MCH 5RB#0



Date: 18.SEP.2019 16:46:17





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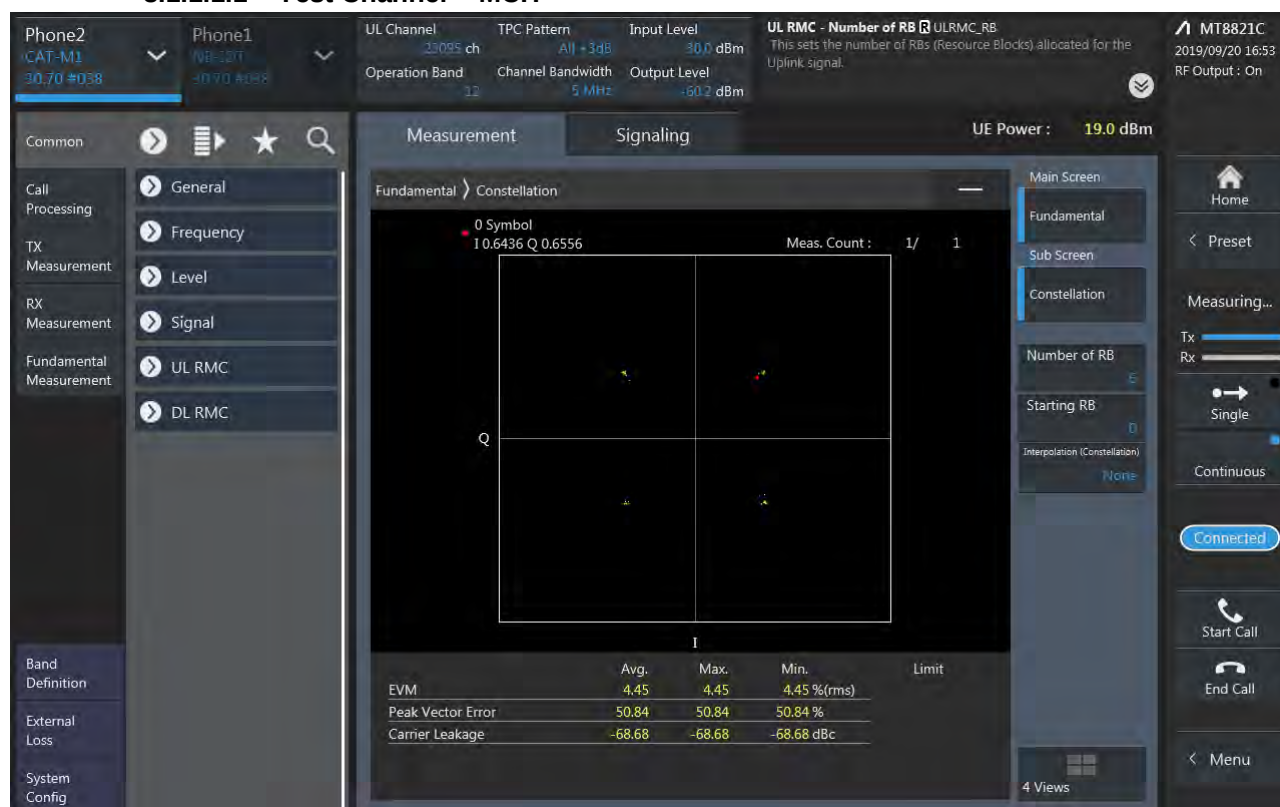
## 3 Modulation Characteristics

### 3.1 For LTE-CatM1

#### 3.1.1 Test Band = LTE-CatM1 Band 12

##### 3.1.1.1 Test Mode = LTE-CatM1 /QPSK 5MHz

##### 3.1.1.1.1 Test Channel = MCH



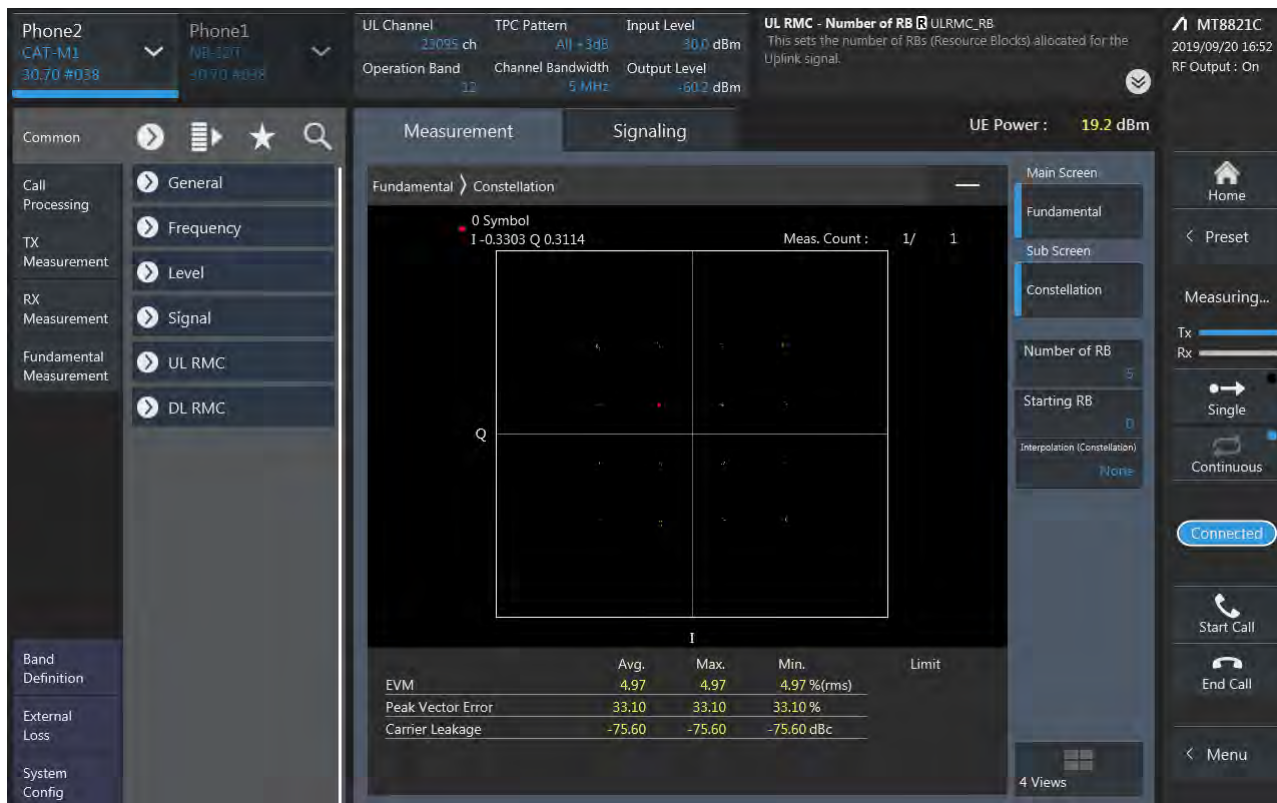
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### 3.1.1.2 Test Mode = LTE-CatM1 /16QAM 5MHz

#### 3.1.1.2.1 Test Channel = MCH



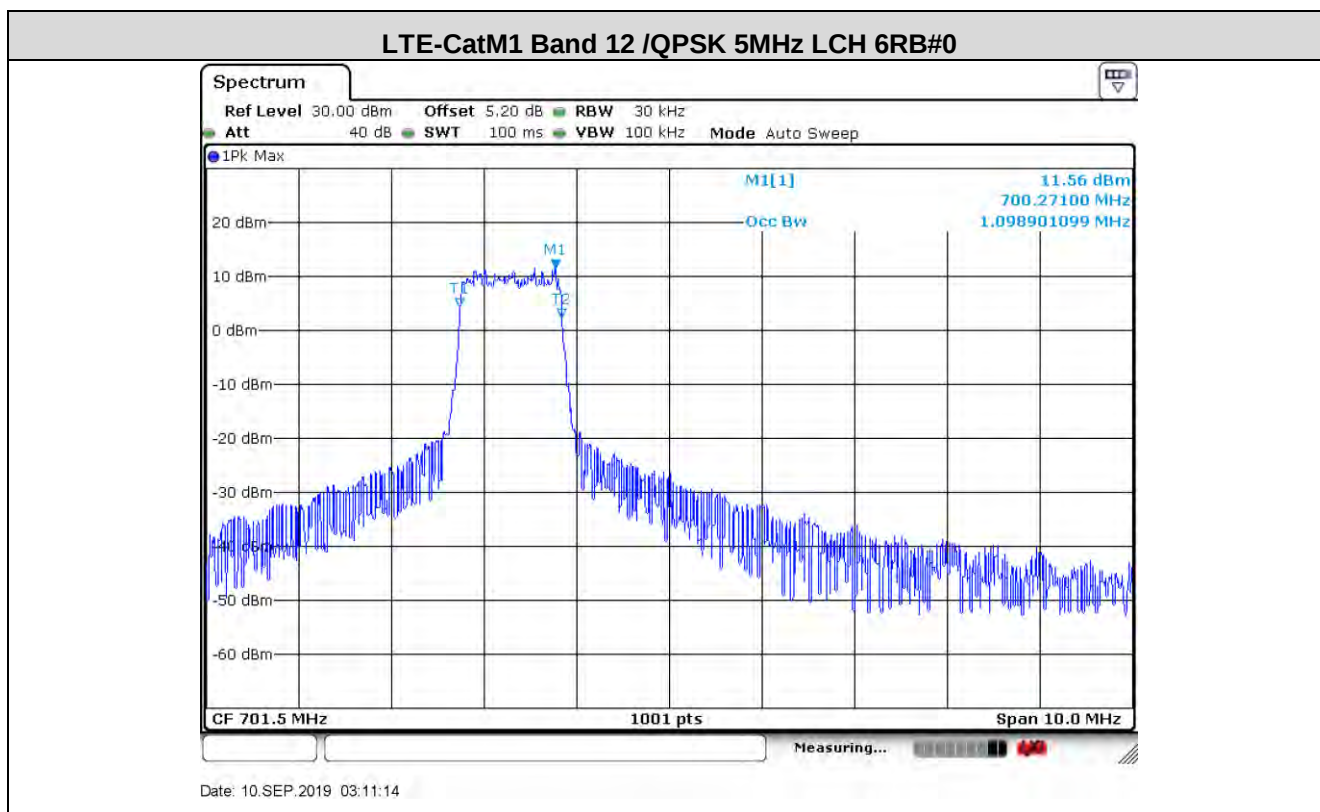


## 4 26dB Bandwidth and Occupied Bandwidth

### 4.1 Test Results

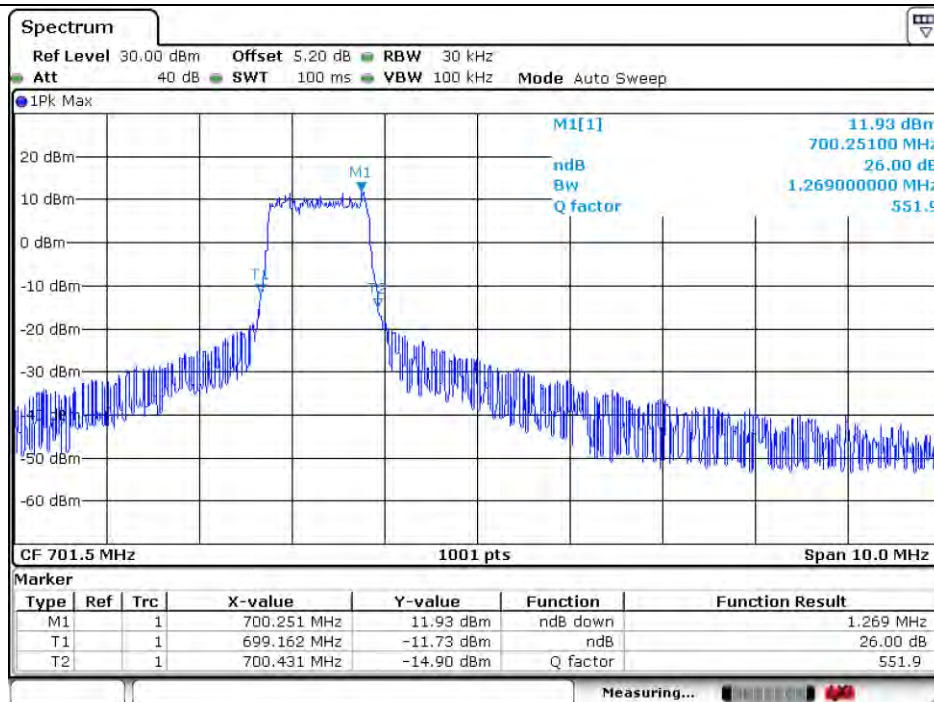
| Test Band     | Test Mode   | Test Channel | Occupied Bandwidth [MHz] | 26dB Emission Bandwidth [MHz] | Verdict |
|---------------|-------------|--------------|--------------------------|-------------------------------|---------|
| CatM1 Band 12 | QPSK/ 5MHz  | LCH          | 1.10                     | 1.27                          | PASS    |
| CatM1 Band 12 | QPSK/ 5MHz  | MCH          | 1.09                     | 1.29                          | PASS    |
| CatM1 Band 12 | QPSK/ 5MHz  | HCH          | 1.10                     | 1.28                          | PASS    |
| CatM1 Band 12 | 16QAM/ 5MHz | LCH          | 0.92                     | 1.12                          | PASS    |
| CatM1 Band 12 | 16QAM/ 5MHz | MCH          | 0.93                     | 1.10                          | PASS    |
| CatM1 Band 12 | 16QAM/ 5MHz | HCH          | 0.92                     | 1.11                          | PASS    |

### 4.2 Test Plots



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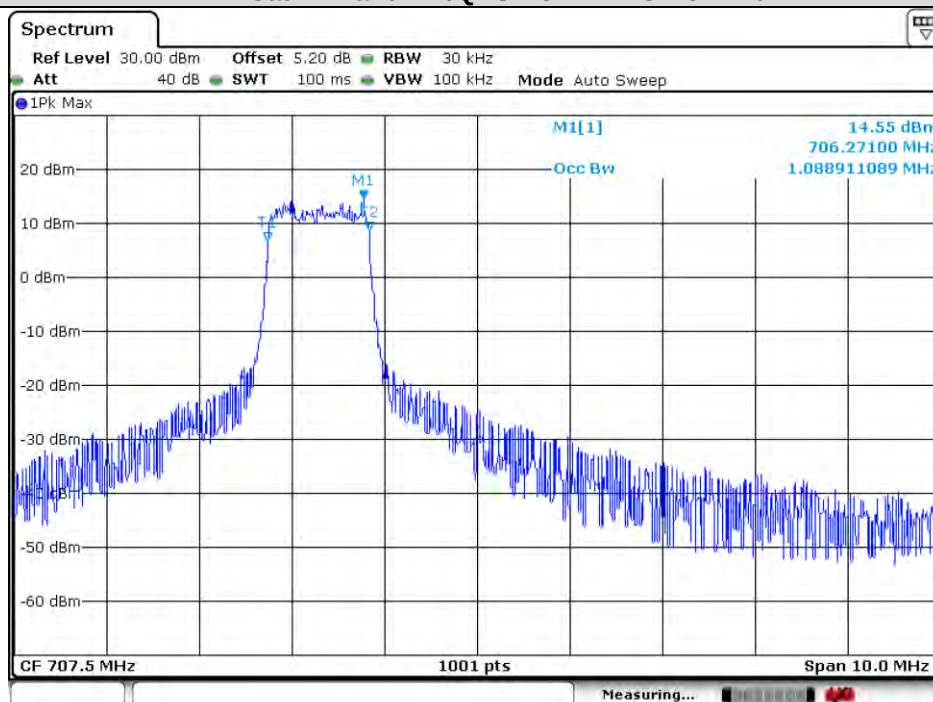
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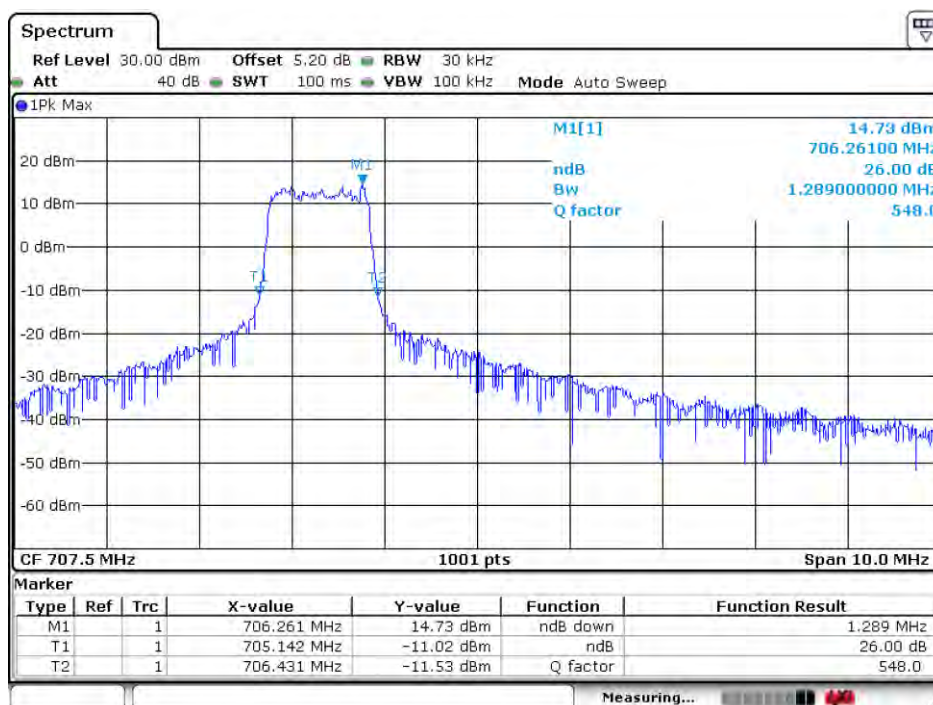
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LTE-CatM1 Band 12 /QPSK 5MHz MCH 6RB#0



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Date: 10.SEP.2019 03:06:43



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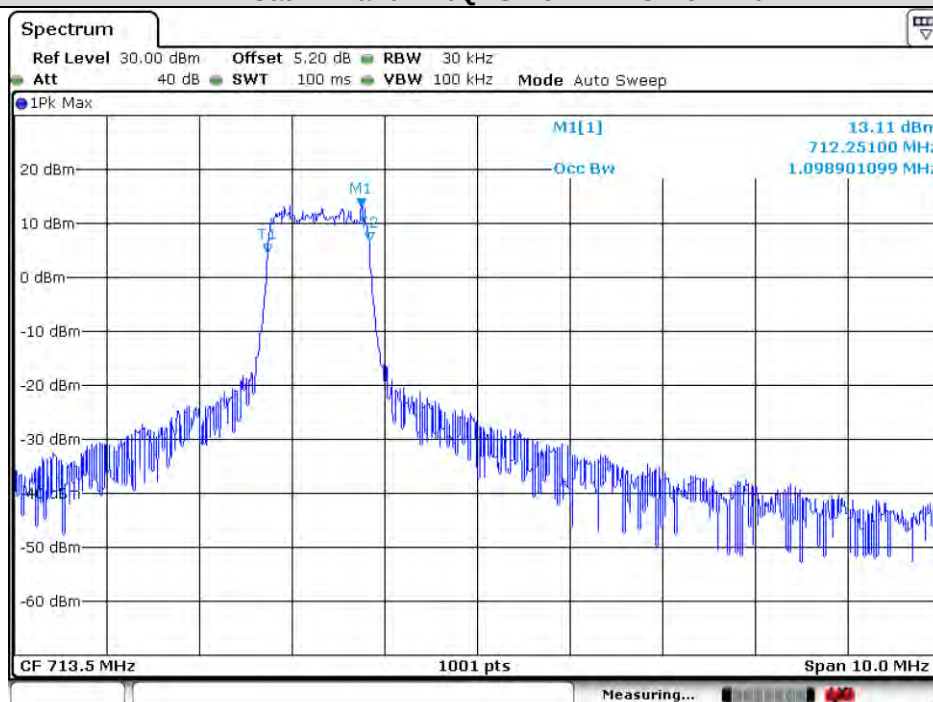
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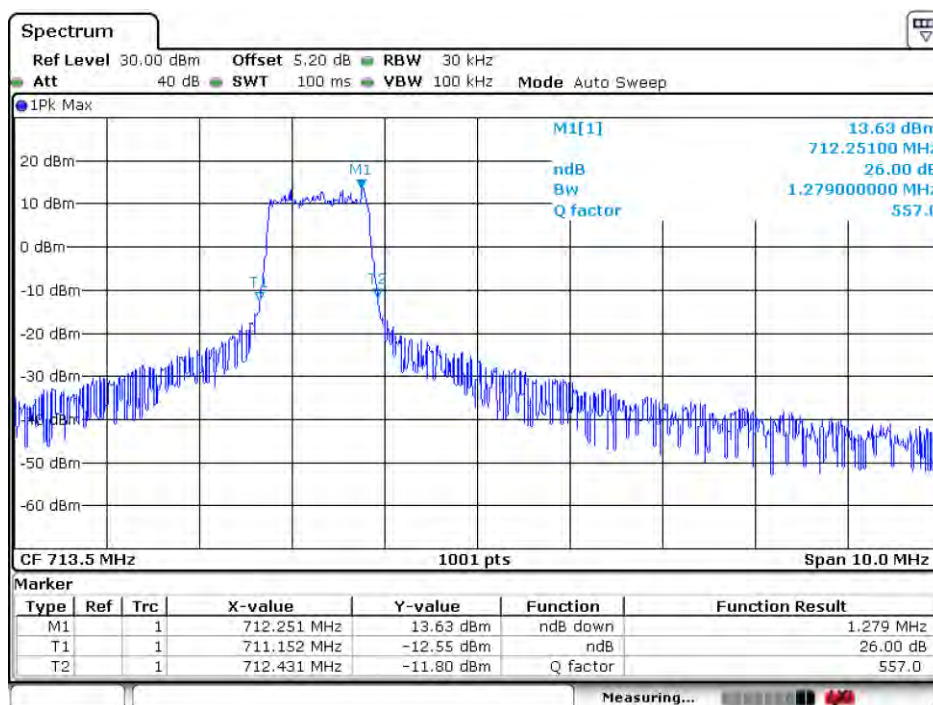
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LTE-CatM1 Band 12 /QPSK 5MHz HCH 6RB#0



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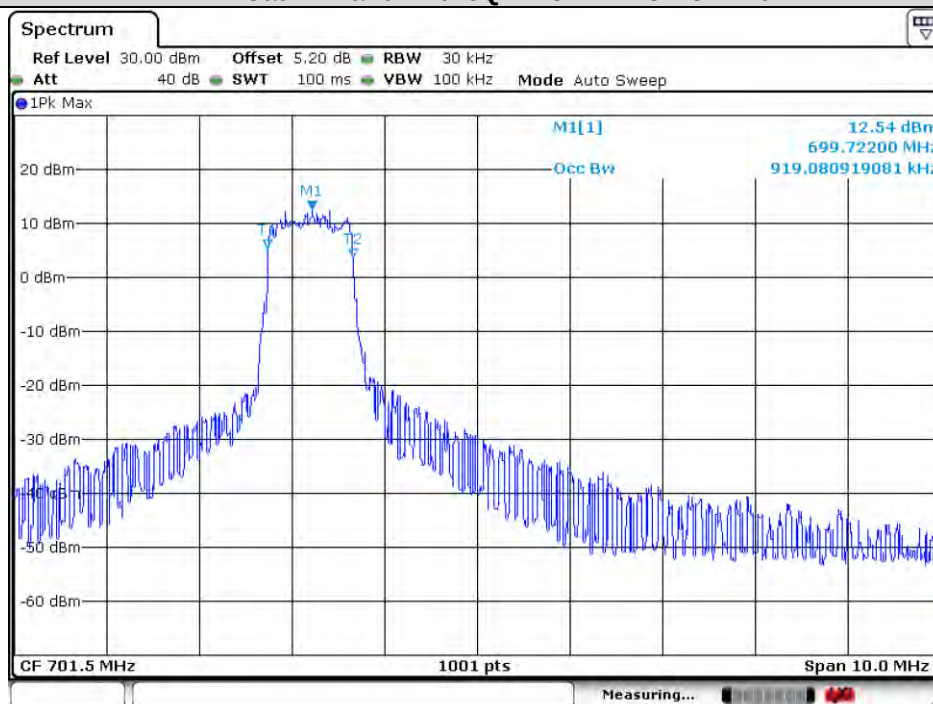
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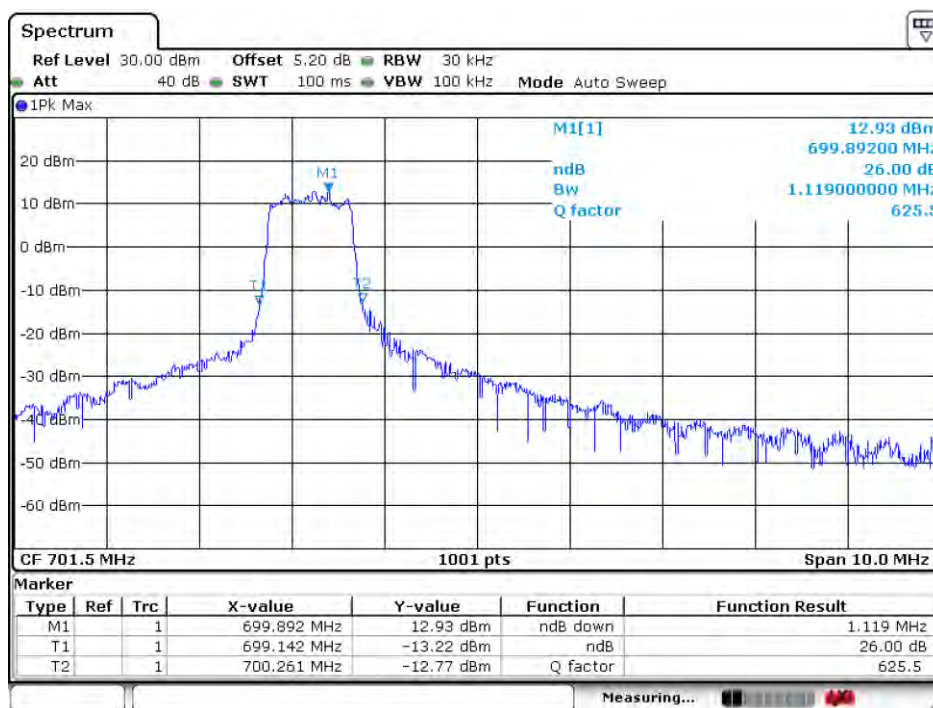
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LTE-CatM1 Band 12 /16QAM 5MHz LCH 5RB#0



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Date: 10.SEP.2019 03:12:36



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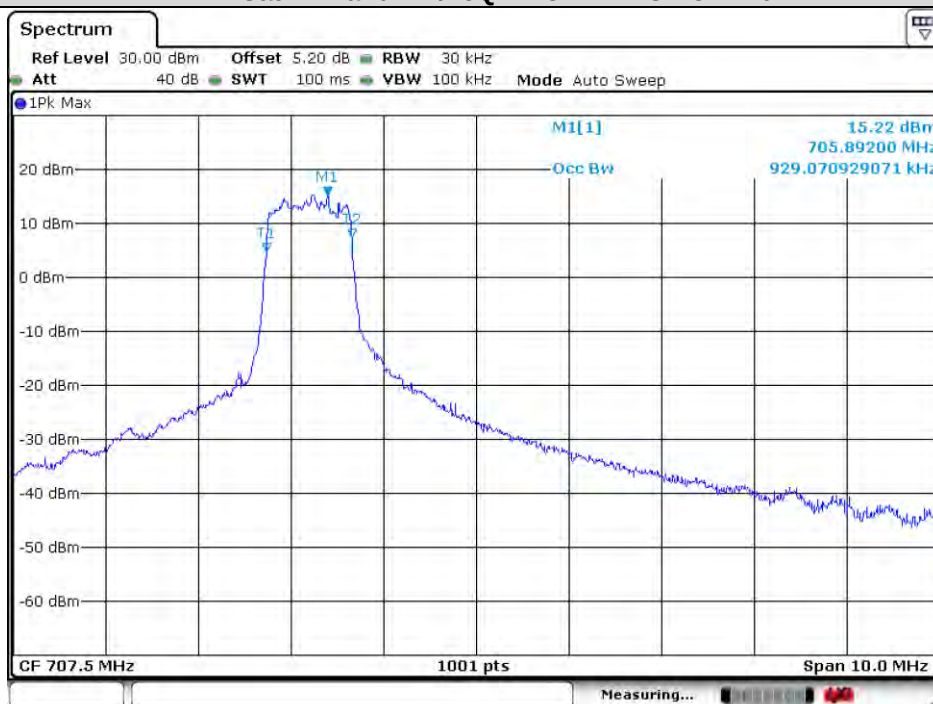
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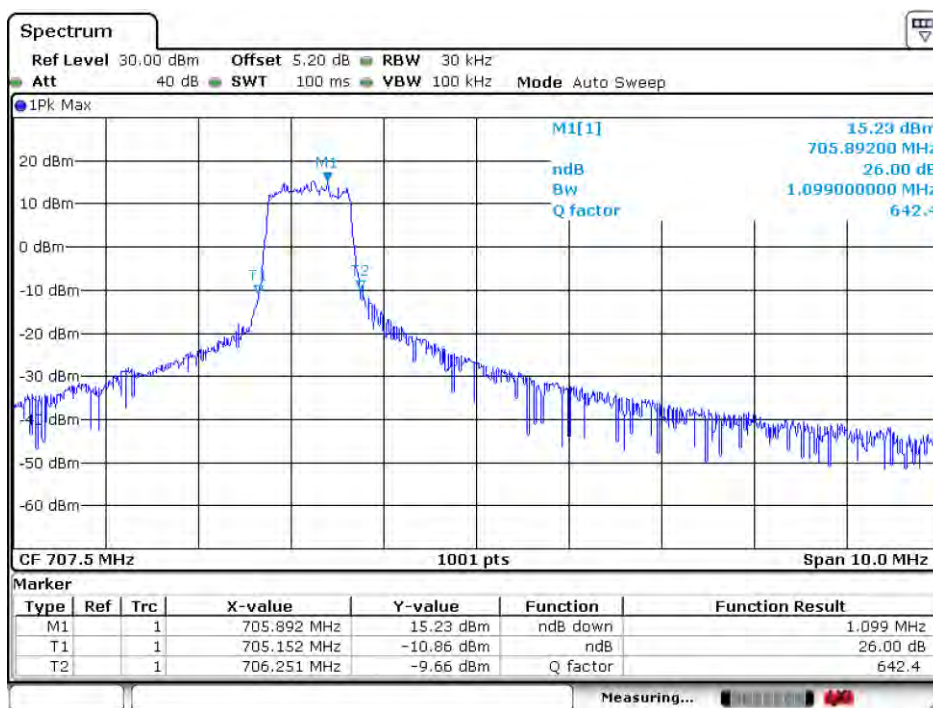
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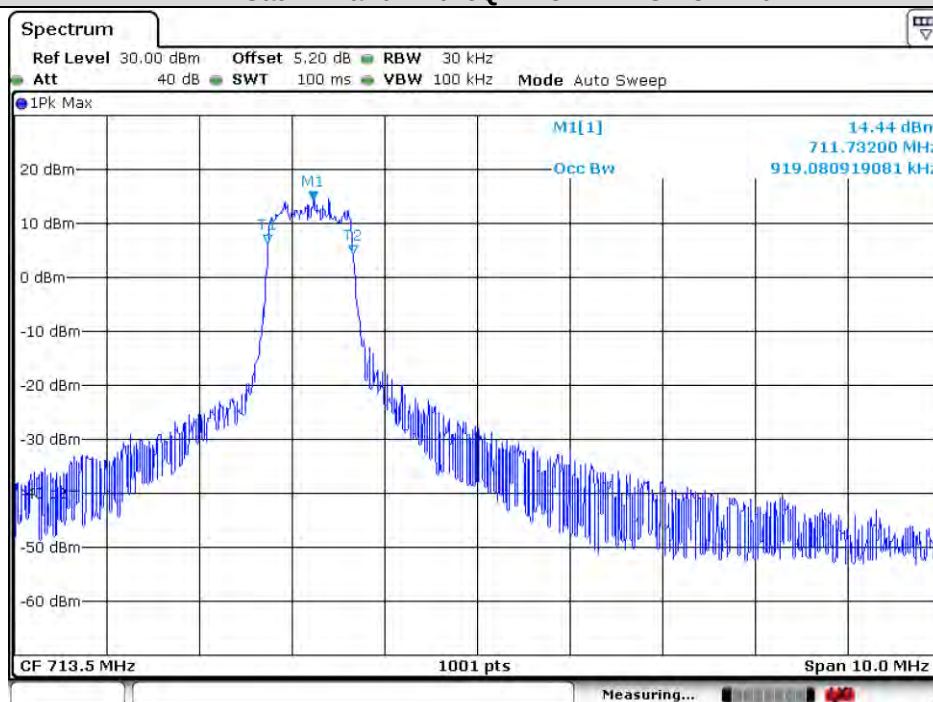
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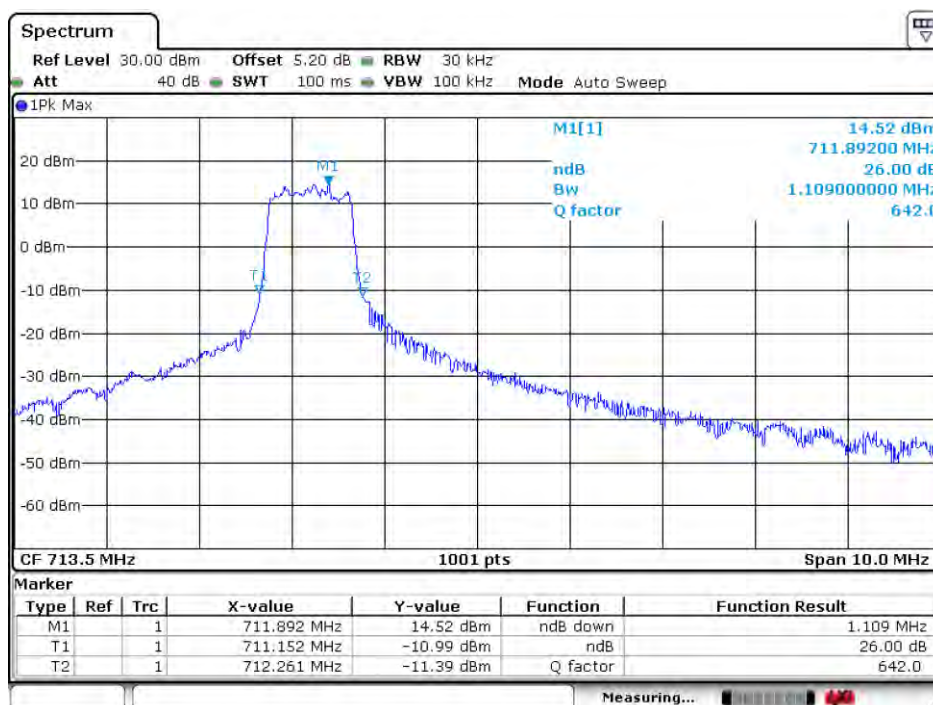
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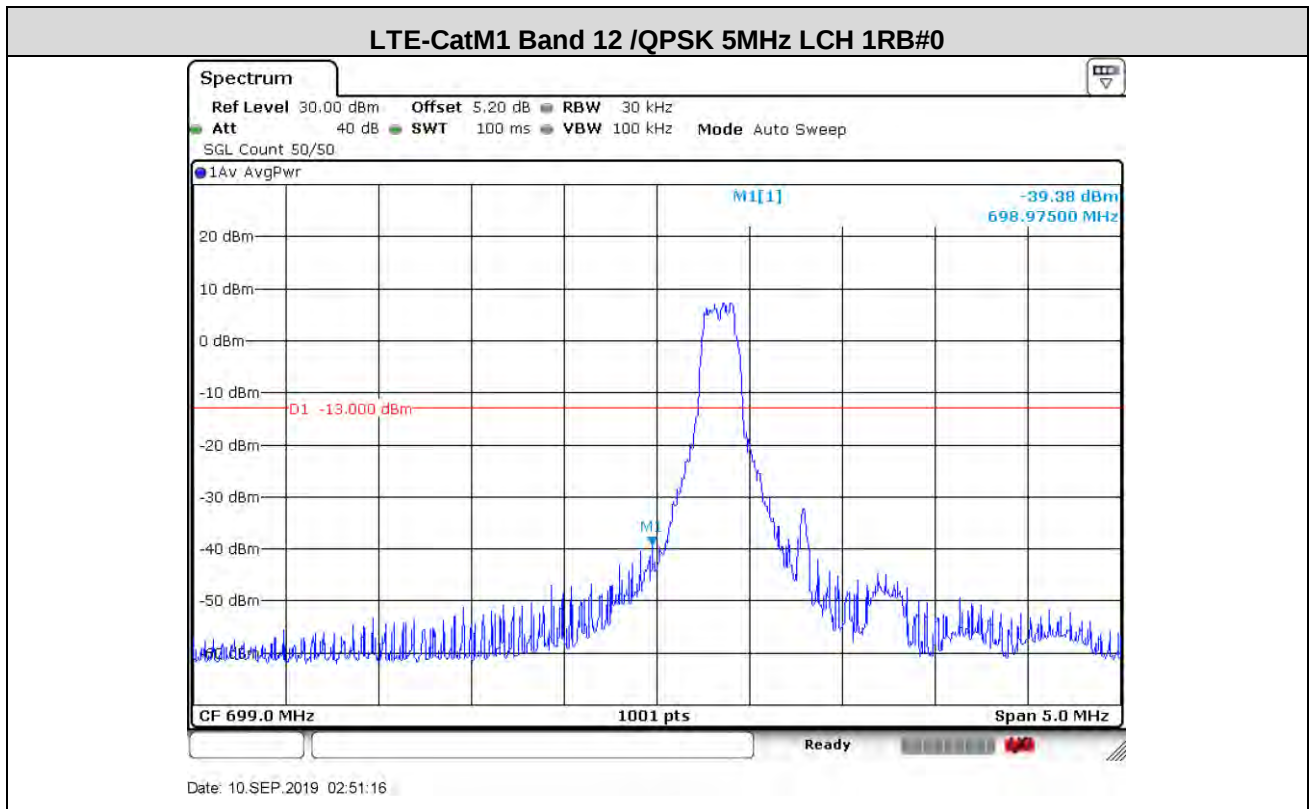
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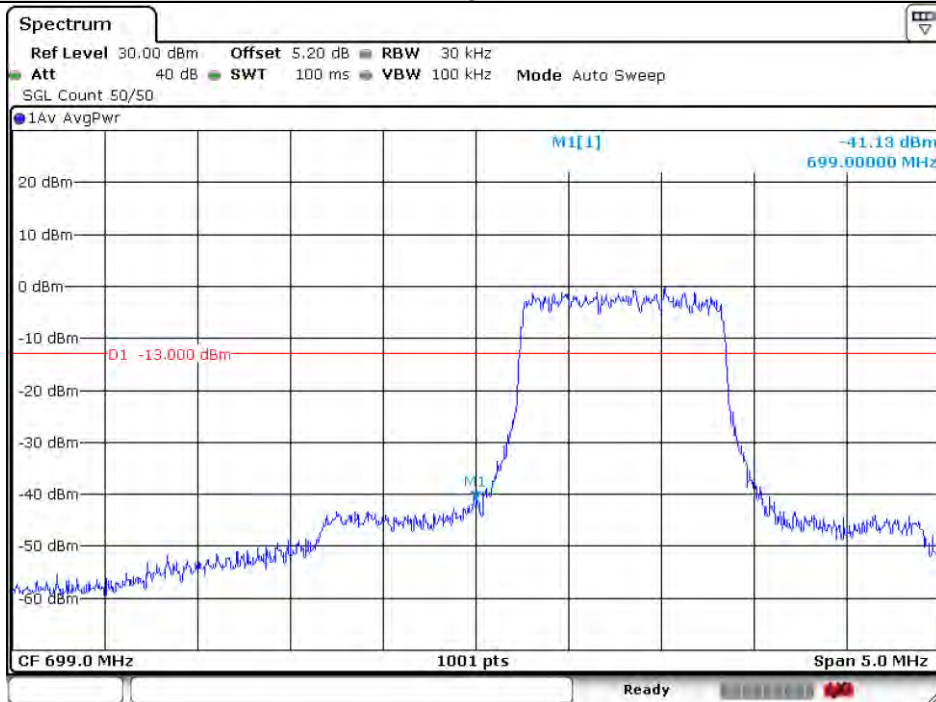
## 5 Band Edges Compliance

### 5.1 Test Plots



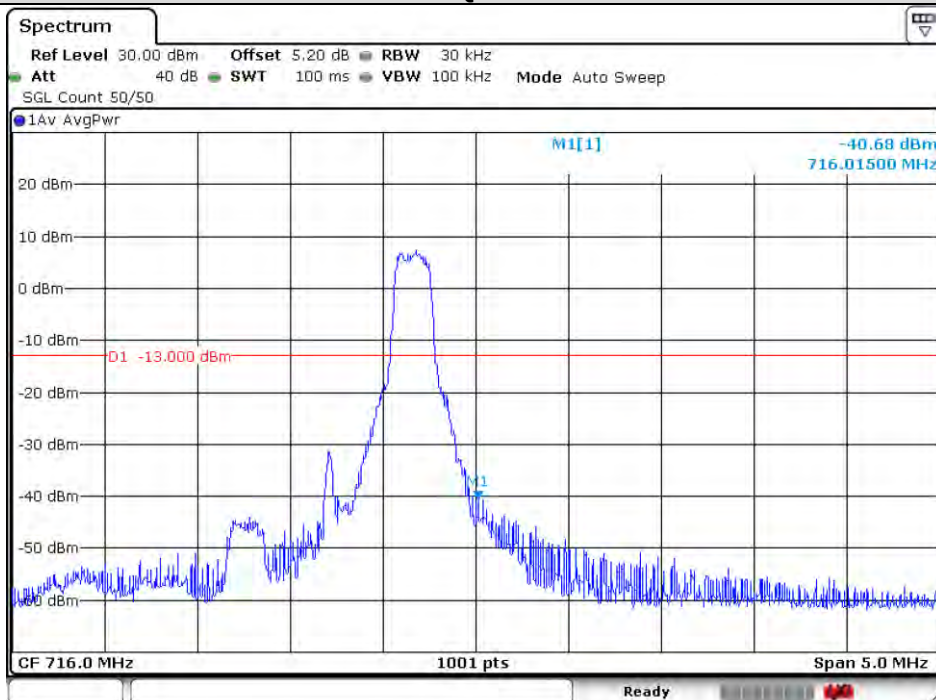


LTE-CatM1 Band 12 /QPSK 5MHz LCH 6RB#0



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LTE-CatM1 Band 12 /QPSK 5MHz HCH 1RB#0



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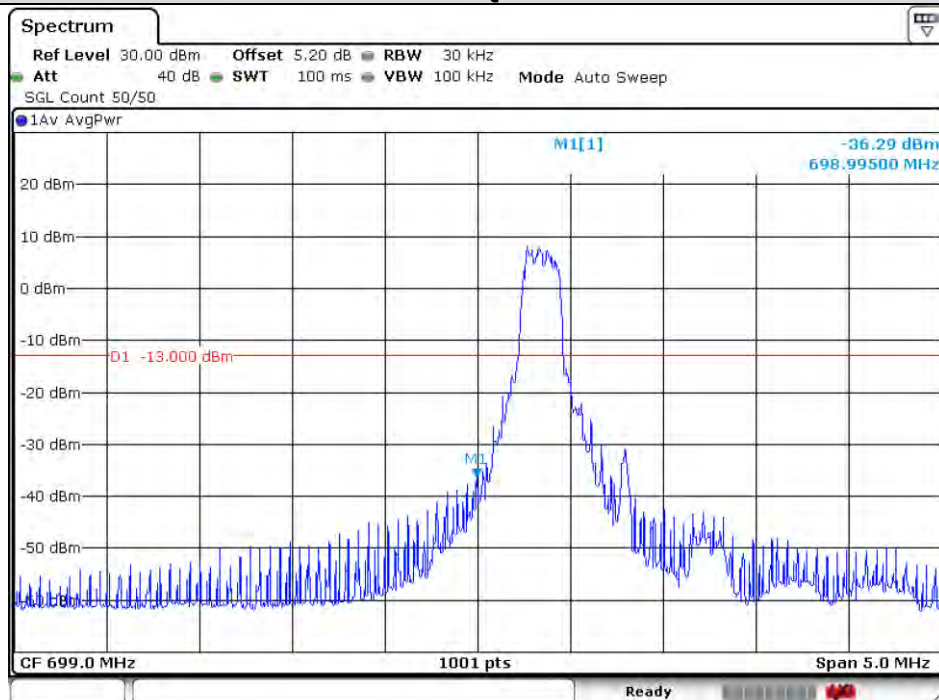
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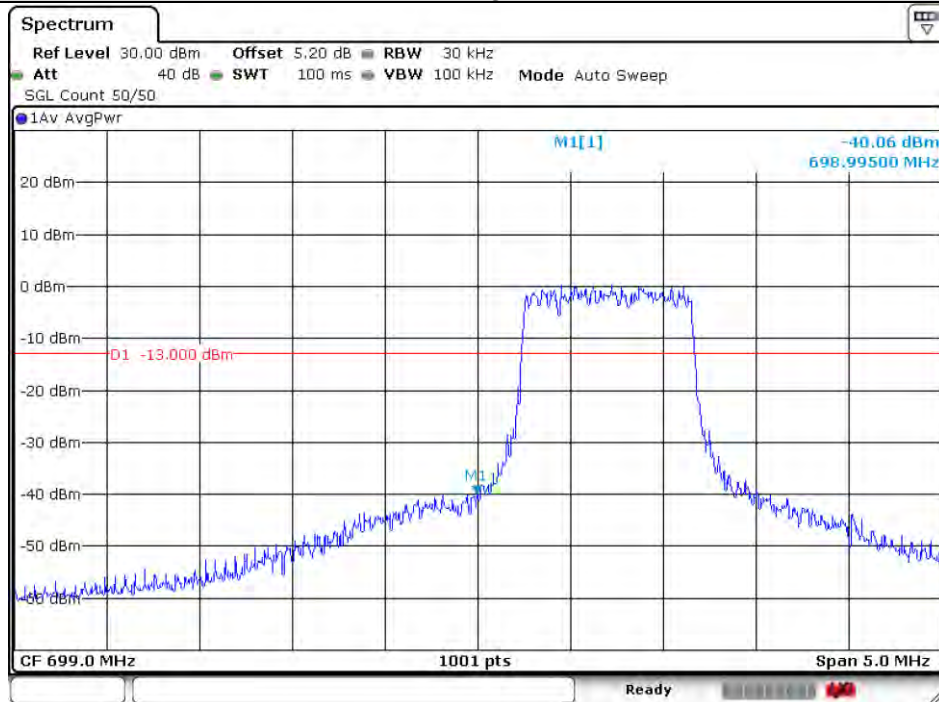
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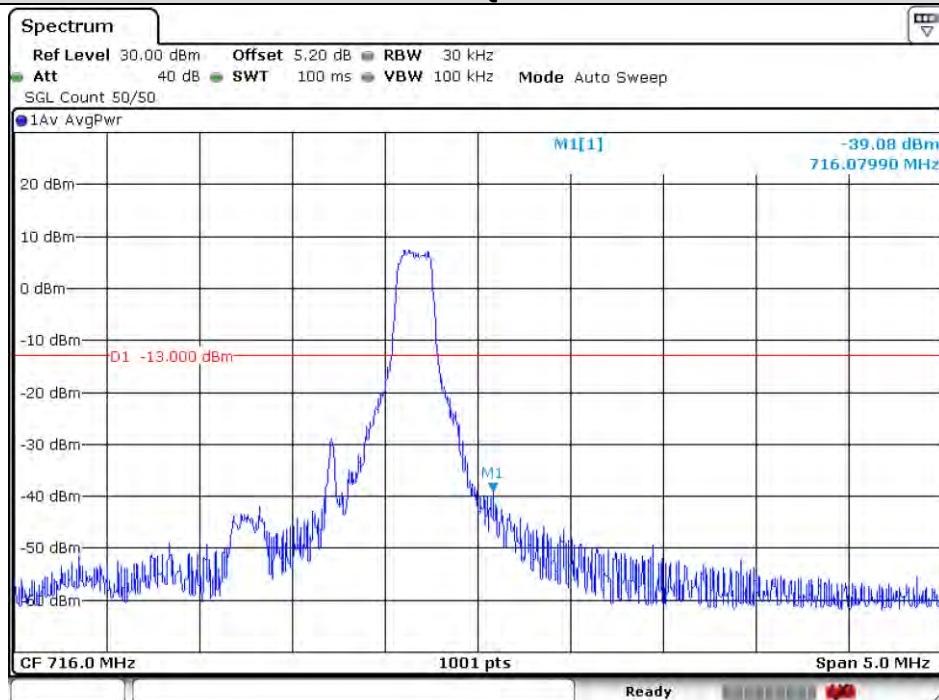
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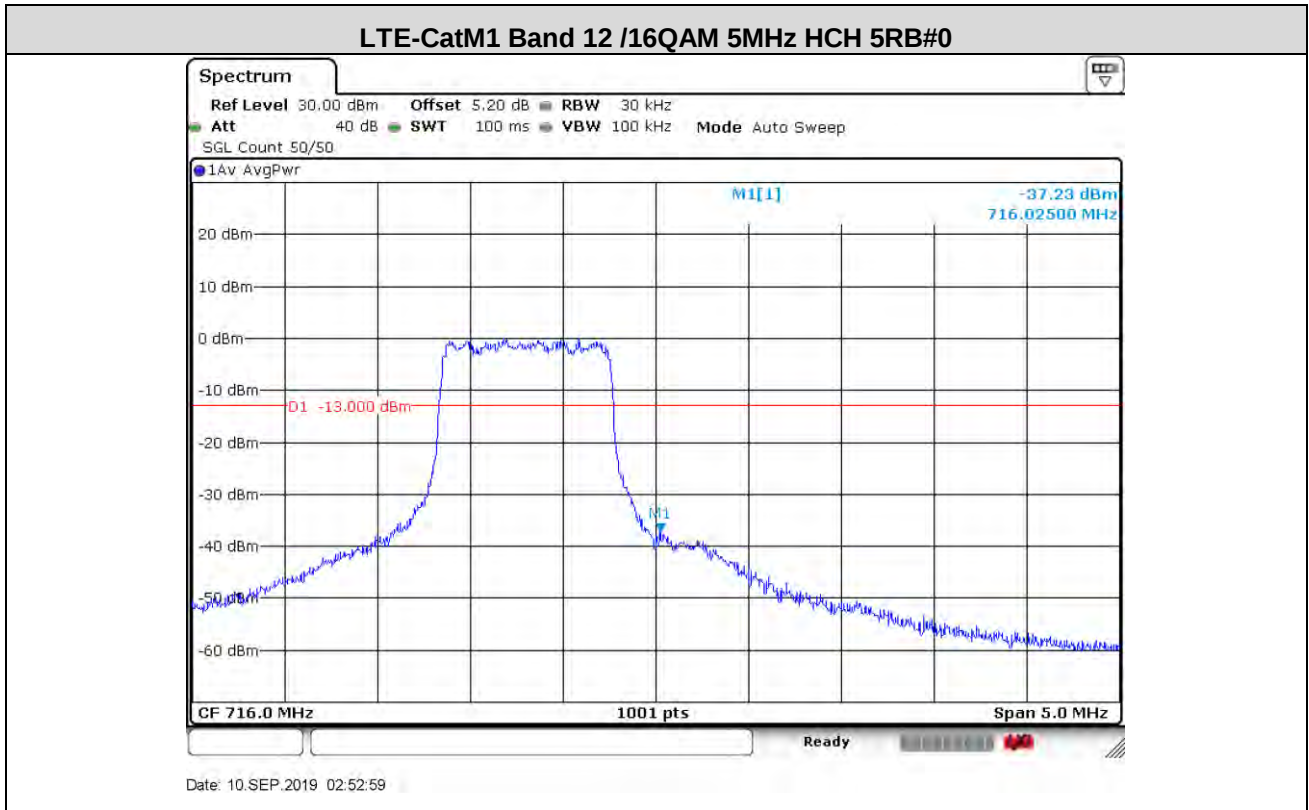


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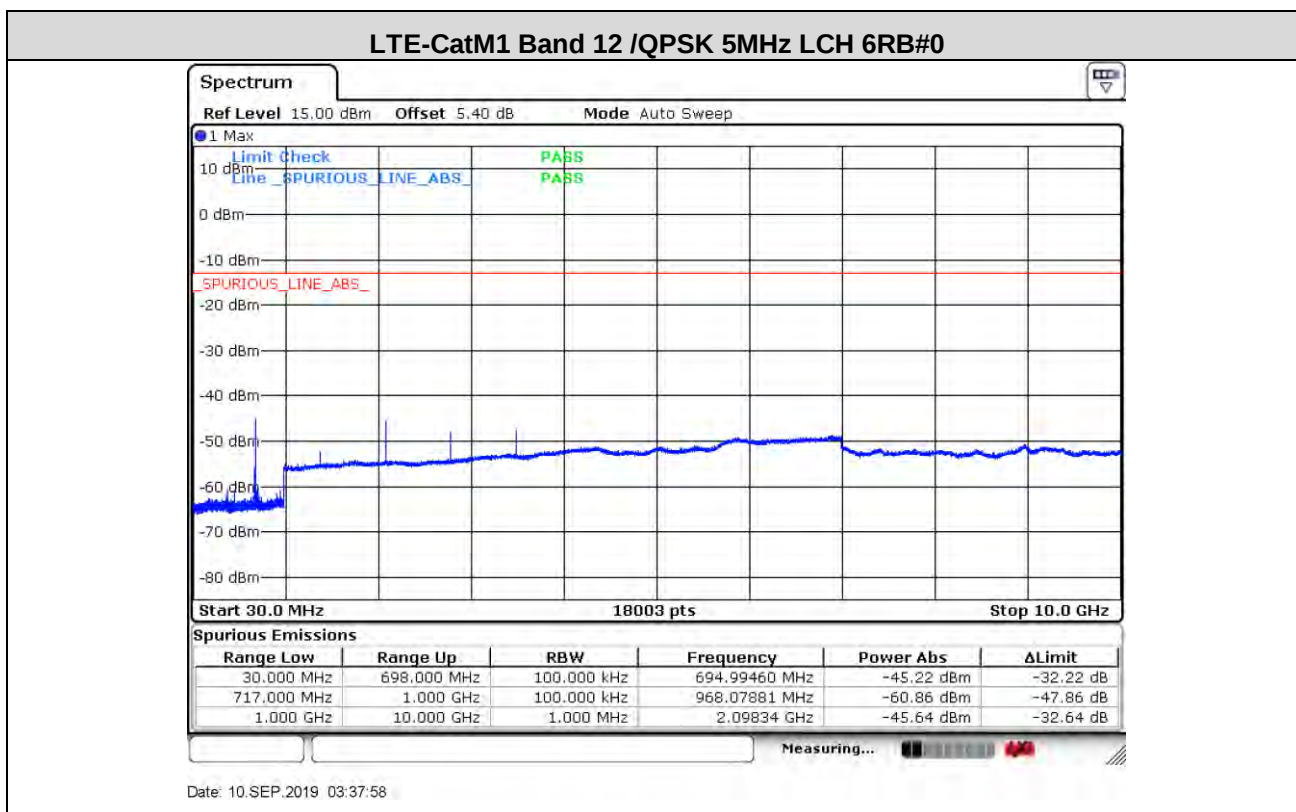


## 6 Spurious Emission at Antenna Terminal

NOTE1: 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  $< RBW/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (Span / RBW)$ " with  $k$  between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Part I - Test Plots

### 6.1 Test Plots



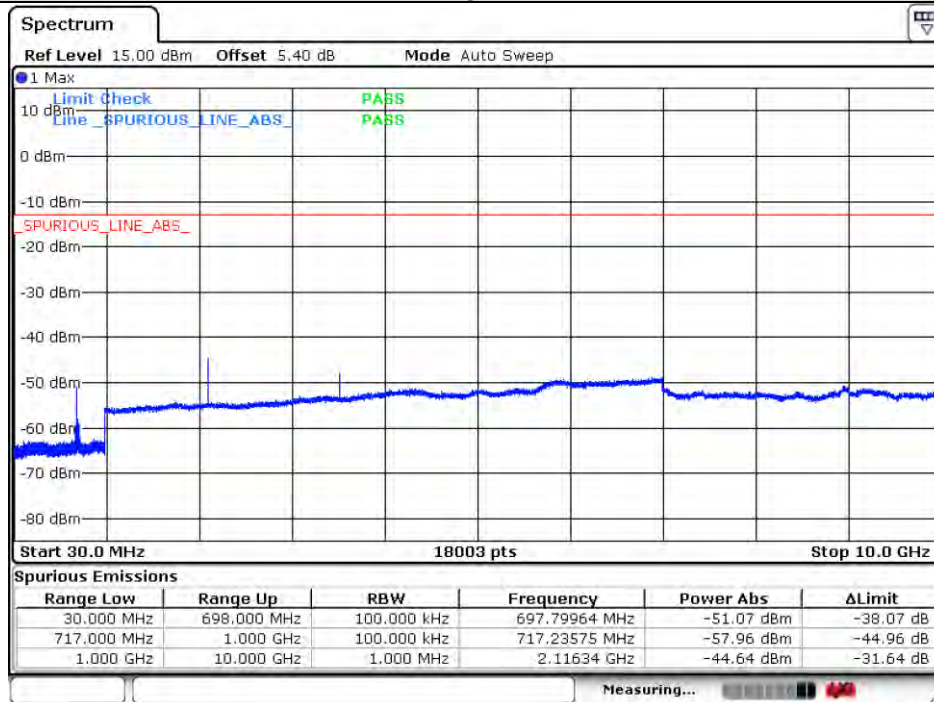
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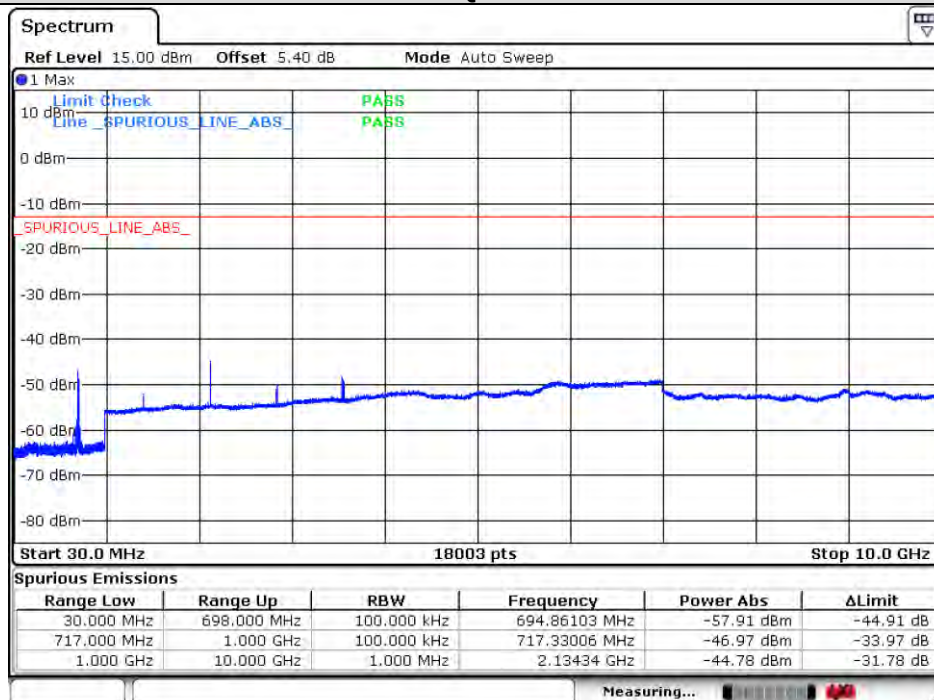
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## LTE-CatM1 Band 12 /QPSK 5MHz MCH 6RB#0



Date: 10.SEP.2019 03:36:47

## LTE-CatM1 Band 12 /QPSK 5MHz HCH 6RB#0



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## 7 Field Strength of Spurious Radiation

### 7.1 For LTE-CatM1

#### 7.1.1 Test Band = LTE-CatM1 Band 12

##### 7.1.1.1 Test Mode =LTE-CatM1/QPSK

###### 7.1.1.1.1 Test Channel = LCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 111.0476        | -63.68      | -13.00           | 50.68           | Vertical     |
| 598.0119        | -64.60      | -13.00           | 51.60           | Vertical     |
| 1398.4797       | -57.24      | -13.00           | 44.24           | Vertical     |
| 1941.7884       | -38.99      | -13.00           | 25.99           | Vertical     |
| 2410.2821       | -33.79      | -13.00           | 20.79           | Vertical     |
| 17998.1999      | -34.96      | -13.00           | 21.96           | Vertical     |
| 40.6220         | -64.02      | -13.00           | 51.02           | Horizontal   |
| 232.0611        | -68.14      | -13.00           | 55.14           | Horizontal   |
| 1398.4797       | -53.93      | -13.00           | 40.93           | Horizontal   |
| 2465.4931       | -38.76      | -13.00           | 25.76           | Horizontal   |
| 3496.8199       | -53.07      | -13.00           | 40.07           | Horizontal   |
| 17979.5992      | -38.83      | -13.00           | 25.83           | Horizontal   |

###### 7.1.1.1.2 Test Channel = MCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 109.6410        | -65.30      | -13.00           | 52.30           | Vertical     |
| 557.3669        | -66.59      | -13.00           | 53.59           | Vertical     |
| 2116.2232       | -53.00      | -13.00           | 40.00           | Vertical     |
| 2821.5643       | -55.73      | -13.00           | 42.73           | Vertical     |
| 14707.0683      | -43.10      | -13.00           | 30.10           | Vertical     |
| 17994.5998      | -33.55      | -13.00           | 20.55           | Vertical     |
| 40.2825         | -64.01      | -13.00           | 51.01           | Horizontal   |
| 1410.4821       | -54.25      | -13.00           | 41.25           | Horizontal   |
| 2116.2232       | -41.31      | -13.00           | 28.31           | Horizontal   |
| 2821.5643       | -48.19      | -13.00           | 35.19           | Horizontal   |
| 3526.8211       | -51.96      | -13.00           | 38.96           | Horizontal   |
| 17991.5997      | -38.33      | -13.00           | 25.33           | Horizontal   |



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7.1.1.1.3 Test Channel = HCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 110.0290        | -65.44      | -13.00           | 52.44           | Vertical     |
| 575.0218        | -65.98      | -13.00           | 52.98           | Vertical     |
| 1422.4845       | -55.40      | -13.00           | 42.40           | Vertical     |
| 2465.4931       | -43.13      | -13.00           | 30.13           | Vertical     |
| 16916.3567      | -40.89      | -13.00           | 27.89           | Vertical     |
| 17957.9983      | -34.58      | -13.00           | 21.58           | Vertical     |
| 43.2897         | -64.32      | -13.00           | 51.32           | Horizontal   |
| 243.5077        | -68.48      | -13.00           | 55.48           | Horizontal   |
| 1422.4845       | -50.94      | -13.00           | 37.94           | Horizontal   |
| 2134.2268       | -50.54      | -13.00           | 37.54           | Horizontal   |
| 2465.4931       | -42.25      | -13.00           | 29.25           | Horizontal   |
| 16904.9562      | -39.11      | -13.00           | 26.11           | Horizontal   |

NOTE:

- 1) The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) only the worst case data presented in this report.



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## 8 Frequency Stability

### 8.1 Frequency Error VS. Voltage

| Test Band     | Test Mode  | Test Channel | RB Config | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|------------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 12 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VL         | -14.53           | -0.020708             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VN         | 13.85            | 0.019740              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VH         | 10.50            | 0.014972              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VL         | -4.85            | -0.006862             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VN         | 7.41             | 0.010473              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VH         | 13.13            | 0.018560              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VL         | 0.56             | 0.000788              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VN         | -6.70            | -0.009384             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VH         | 7.34             | 0.010289              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VL         | 14.84            | 0.021157              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VN         | -1.70            | -0.002427             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VH         | -12.14           | -0.017313             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VL         | -11.75           | -0.016606             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VN         | 14.91            | 0.021080              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VH         | -6.69            | -0.009453             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VL         | -12.46           | -0.017457             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VN         | 5.46             | 0.007650              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VH         | 9.33             | 0.013072              | ±2.5        | PASS    |



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## 8.2 Frequency Error VS. Temperature

| Test Band     | Test Mode | Test Channel | RB Config | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|-----------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -30        | -0.59            | -0.000838             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -20        | -5.82            | -0.008301             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -10        | -9.68            | -0.013796             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 0          | 0.33             | 0.000467              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 10         | 3.44             | 0.004903              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 20         | 13.19            | 0.018804              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 30         | -3.36            | -0.004794             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 40         | -4.57            | -0.006522             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 50         | -10.53           | -0.015004             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -30        | -0.70            | -0.000992             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -20        | -13.55           | -0.019150             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -10        | 8.98             | 0.012692              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 0          | 14.95            | 0.021129              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 10         | -6.72            | -0.009500             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 20         | 14.12            | 0.019956              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 30         | -5.62            | -0.007945             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 40         | 1.37             | 0.001938              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 50         | -6.41            | -0.009058             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -30        | -12.25           | -0.017168             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -20        | -5.14            | -0.007202             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -10        | 9.91             | 0.013894              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 0          | 4.09             | 0.005730              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 10         | -4.80            | -0.006725             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 20         | -10.60           | -0.014863             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 30         | 13.65            | 0.019136              | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 40         | -14.43           | -0.020228             | ±2.5        | PASS    |
| CatM1 Band 12 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 50         | -8.87            | -0.012433             | ±2.5        | PASS    |



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| Test Band     | Test Mode  | Test Channel | RB Config | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|------------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -30        | -2.25            | -0.003209             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -20        | -3.15            | -0.004492             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -10        | -5.78            | -0.008236             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 0          | -3.70            | -0.005270             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 10         | 0.17             | 0.000243              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 20         | 8.84             | 0.012603              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 30         | -3.36            | -0.004794             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 40         | -14.80           | -0.021101             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 50         | -4.04            | -0.005755             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -30        | -10.81           | -0.015273             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -20        | 6.44             | 0.009099              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -10        | -5.37            | -0.007585             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 0          | -7.69            | -0.010862             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 10         | -14.71           | -0.020796             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 20         | -4.42            | -0.006254             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 30         | 5.34             | 0.007551              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 40         | 10.86            | 0.015347              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 50         | 0.09             | 0.000131              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -30        | 10.16            | 0.014235              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -20        | -10.72           | -0.015024             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -10        | 3.14             | 0.004407              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 0          | 10.43            | 0.014618              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 10         | -9.83            | -0.013770             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 20         | -7.27            | -0.010183             | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 30         | 13.53            | 0.018964              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 40         | 12.19            | 0.017085              | ±2.5        | PASS    |
| CatM1 Band 12 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 50         | 3.53             | 0.004949              | ±2.5        | PASS    |

The End



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# Appendix B

## LTE-CatM1 Band 13



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## 1 Effective Radiated Power Output Data

### Effective Radiated Power of Transmitter (ERP) for LTE-CatM1 Band 13

| Test Band     | Test Mode | Test Bandwidth | Test channel | Test RB | Conducted Power (dBm) | ERP (dBm) | limit (dBm) | Verdict |
|---------------|-----------|----------------|--------------|---------|-----------------------|-----------|-------------|---------|
| CatM1 Band 13 | QPSK      | 5M             | LCH          | 1RB#0   | 20.60                 | 19.56     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | LCH          | 5RB#0   | 19.20                 | 18.16     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | LCH          | 6RB#0   | 19.18                 | 18.14     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | MCH          | 1RB#0   | 20.70                 | 19.66     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | MCH          | 5RB#0   | 19.29                 | 18.25     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | MCH          | 6RB#0   | 19.28                 | 18.24     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | HCH          | 1RB#0   | 20.71                 | 19.67     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | HCH          | 5RB#0   | 19.24                 | 18.20     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 5M             | HCH          | 6RB#0   | 19.22                 | 18.18     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 5M             | LCH          | 1RB#0   | 20.48                 | 19.44     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 5M             | LCH          | 5RB#0   | 19.26                 | 18.22     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 5M             | MCH          | 1RB#0   | 20.27                 | 19.23     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 5M             | MCH          | 5RB#0   | 19.31                 | 18.27     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 5M             | HCH          | 1RB#0   | 20.31                 | 19.27     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 5M             | HCH          | 5RB#0   | 19.34                 | 18.30     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 10M            | MCH          | 1RB#0   | 20.92                 | 19.88     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 10M            | MCH          | 5RB#0   | 20.62                 | 19.58     | 34.77       | PASS    |
| CatM1 Band 13 | QPSK      | 10M            | MCH          | 6RB#0   | 19.39                 | 18.35     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 10M            | MCH          | 1RB#0   | 20.44                 | 19.40     | 34.77       | PASS    |
| CatM1 Band 13 | 16QAM     | 10M            | MCH          | 5RB#0   | 20.59                 | 19.55     | 34.77       | PASS    |

Note:

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

$EIRP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi]$

$ERP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi] - 2.15$



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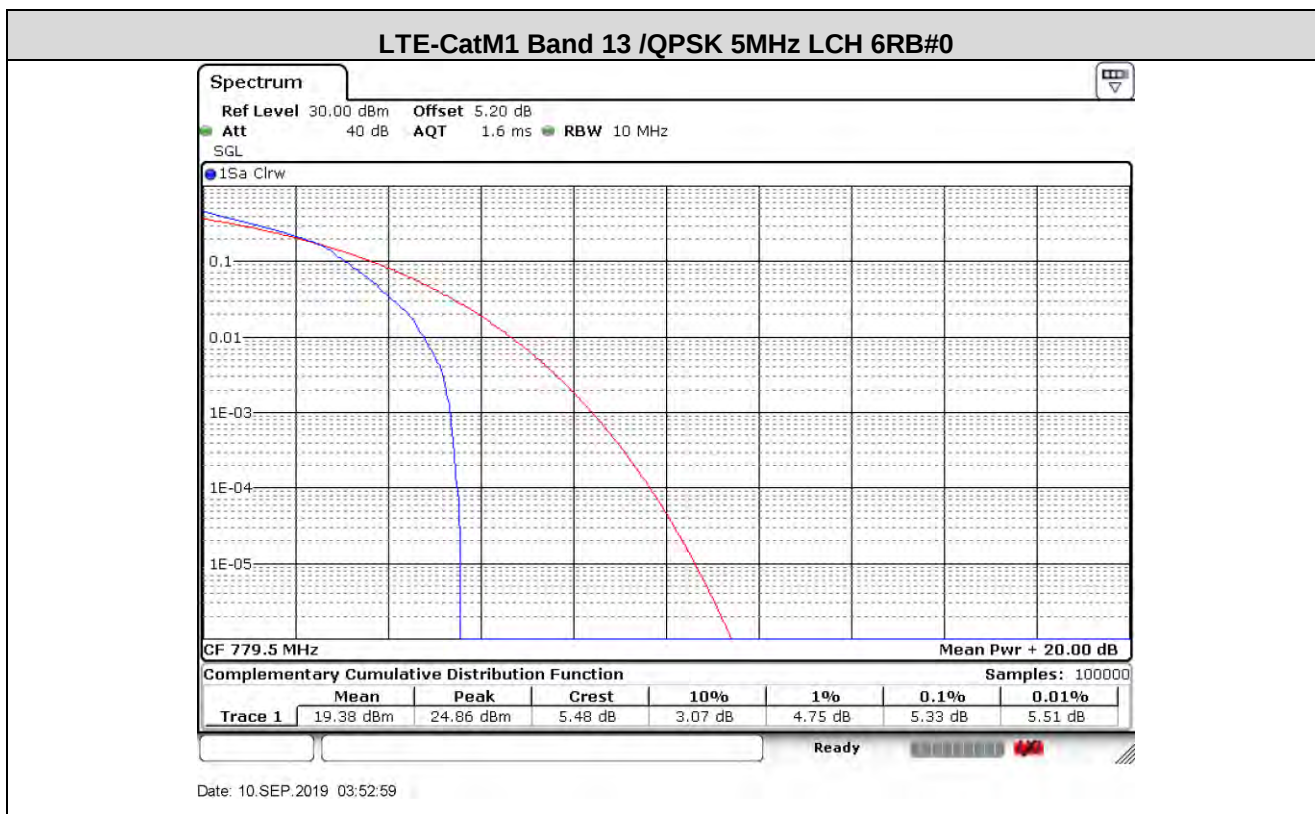


## 2 Peak-to-Average Ratio

### 2.1 Test Results

| Test Band     | Test Mode | RB Config | Test Channel | Measured [dB] | Limit [dB] | Verdict |
|---------------|-----------|-----------|--------------|---------------|------------|---------|
| CatM1 Band 13 | QPSK/5M   | 6RB#0     | LCH          | 5.33          | 13         | PASS    |
| CatM1 Band 13 | QPSK/5M   | 6RB#0     | MCH          | 4.87          | 13         | PASS    |
| CatM1 Band 13 | QPSK/5M   | 6RB#0     | HCH          | 4.06          | 13         | PASS    |
| CatM1 Band 13 | 16QAM/5M  | 5RB#0     | LCH          | 4.41          | 13         | PASS    |
| CatM1 Band 13 | 16QAM/5M  | 5RB#0     | MCH          | 3.74          | 13         | PASS    |
| CatM1 Band 13 | 16QAM/5M  | 5RB#0     | HCH          | 3.88          | 13         | PASS    |

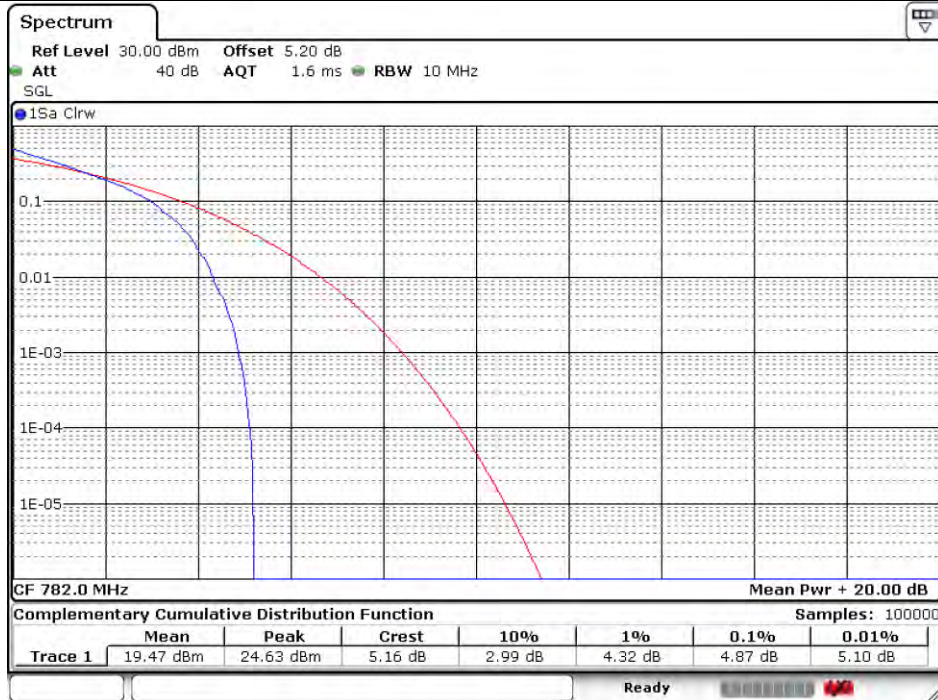
### 2.2 Test Plots



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## LTE-CatM1 Band 13 /QPSK 5MHz MCH 6RB#0



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## LTE-CatM1 Band 13 /QPSK 5MHz HCH 6RB#0



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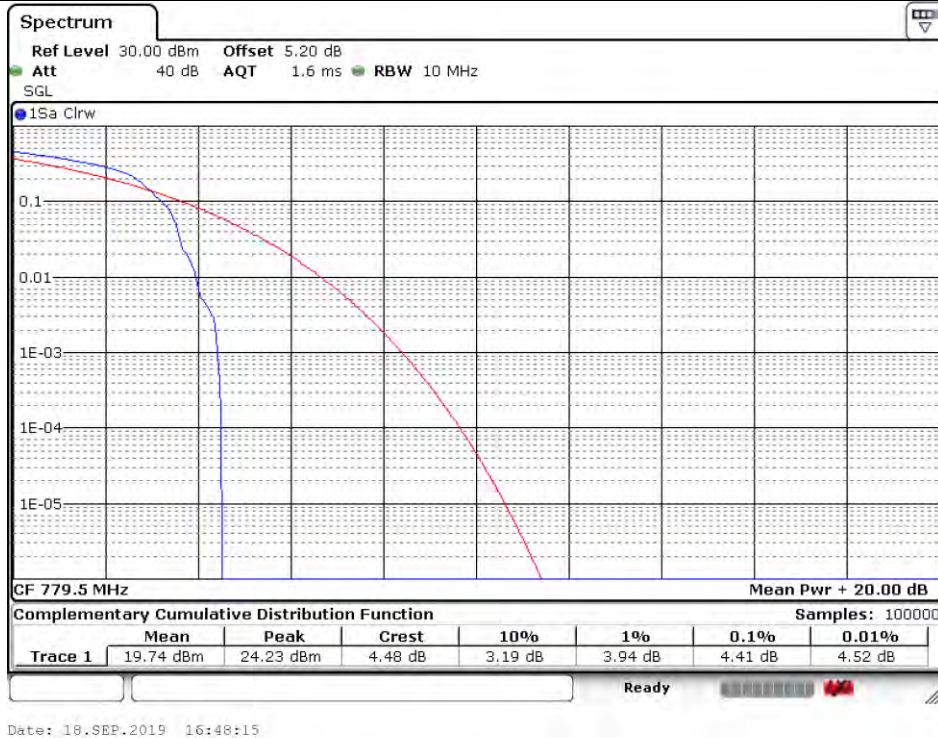
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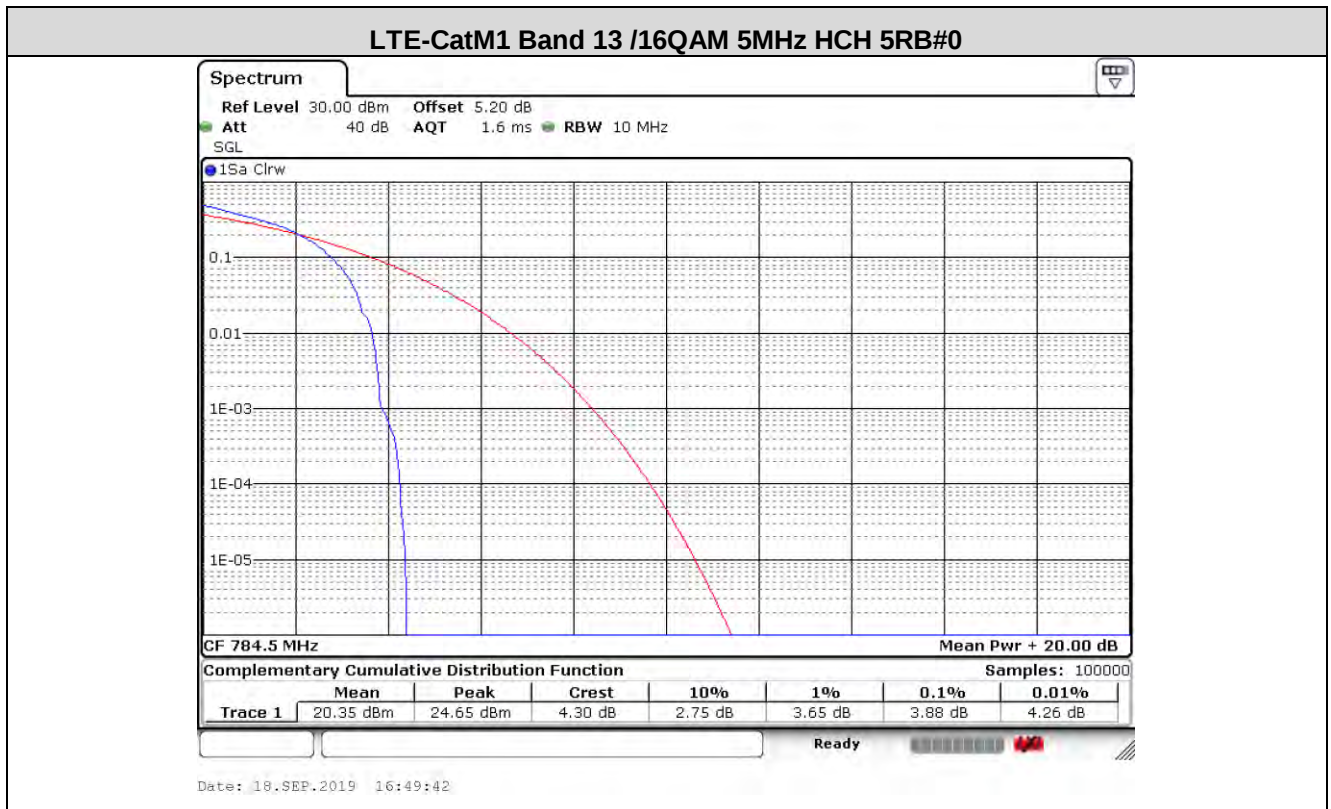
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## LTE-CatM1 Band 13 /16QAM 5MHz LCH 5RB#0



## LTE-CatM1 Band 13 /16QAM 5MHz MCH 5RB#0





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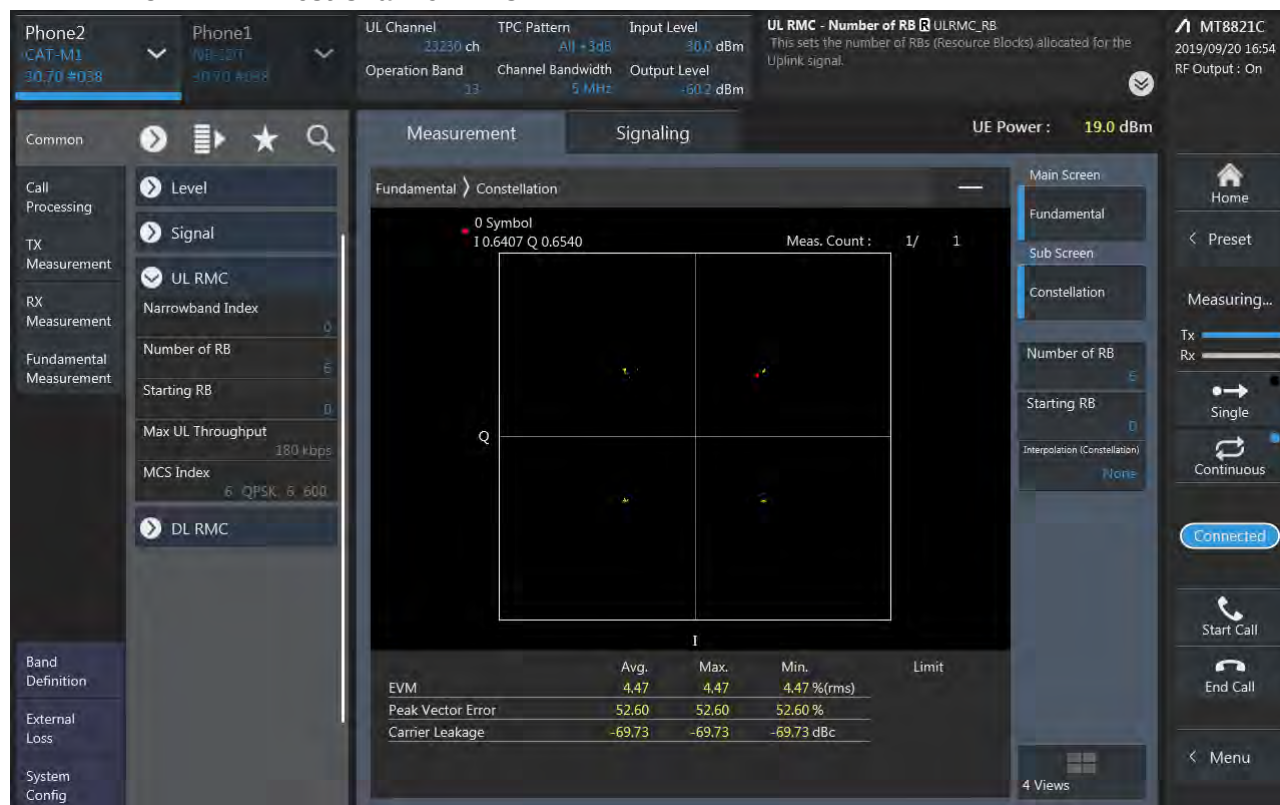
## 3 Modulation Characteristics

### 3.1 For LTE-CatM1

#### 3.1.1 Test Band = LTE-CatM1 Band 13

##### 3.1.1.1 Test Mode = LTE-CatM1 /QPSK 5MHz

##### 3.1.1.1.1 Test Channel = MCH

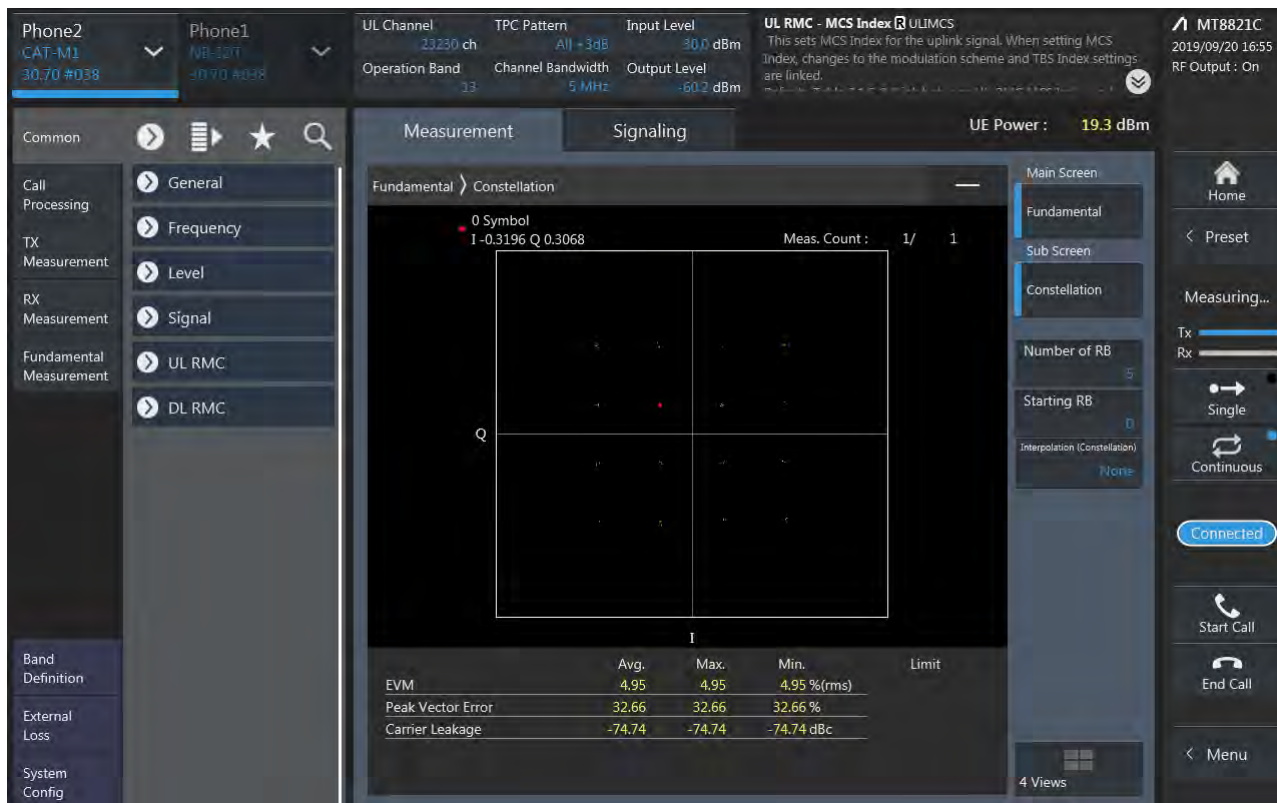


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### 3.1.1.2 Test Mode = LTE-CatM1 /16QAM 5MHz

#### 3.1.1.2.1 Test Channel = MCH



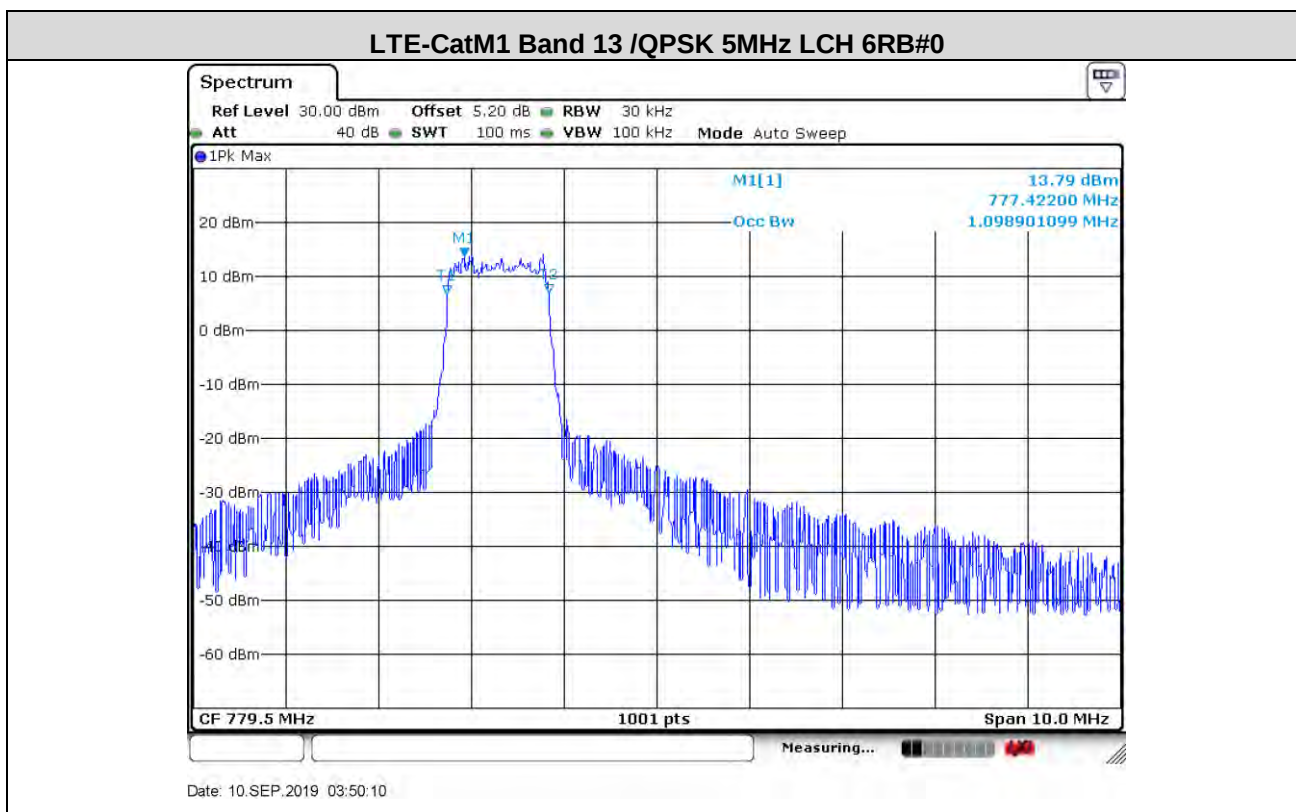


## 4 26dB Bandwidth and Occupied Bandwidth

### 4.1 Test Results

| Test Band     | Test Mode   | Test Channel | Occupied Bandwidth [MHz] | 26dB Emission Bandwidth [MHz] | Verdict |
|---------------|-------------|--------------|--------------------------|-------------------------------|---------|
| CatM1 Band 13 | QPSK/ 5MHz  | LCH          | 1.10                     | 1.28                          | PASS    |
| CatM1 Band 13 | QPSK/ 5MHz  | MCH          | 1.10                     | 1.26                          | PASS    |
| CatM1 Band 13 | QPSK/ 5MHz  | HCH          | 1.11                     | 1.30                          | PASS    |
| CatM1 Band 13 | 16QAM/ 5MHz | LCH          | 0.91                     | 1.08                          | PASS    |
| CatM1 Band 13 | 16QAM/ 5MHz | MCH          | 0.92                     | 1.09                          | PASS    |
| CatM1 Band 13 | 16QAM/ 5MHz | HCH          | 0.91                     | 1.09                          | PASS    |

### 4.2 Test Plots

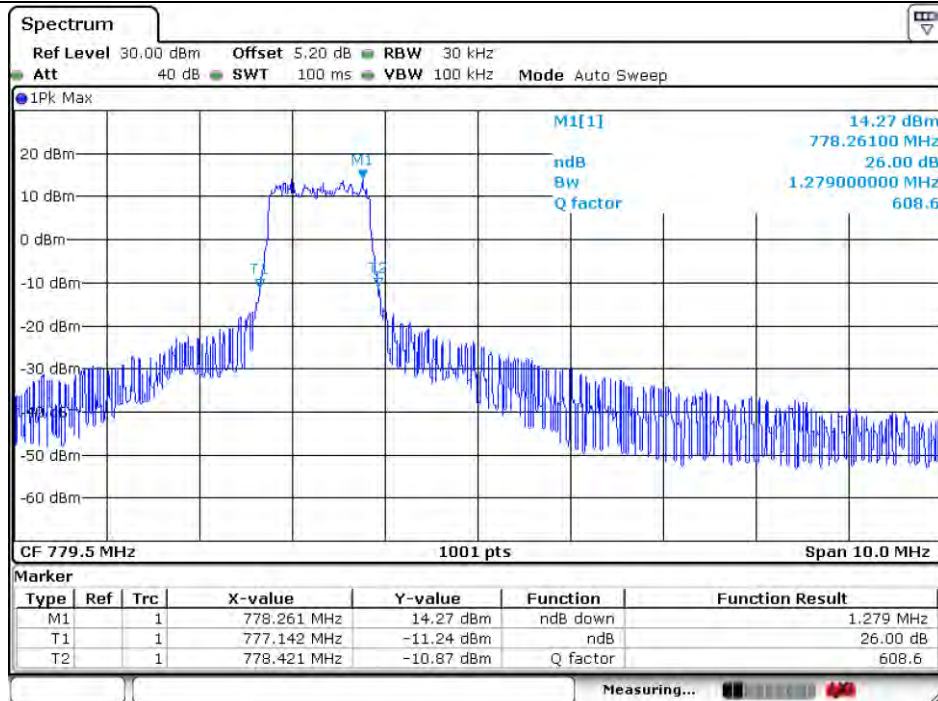


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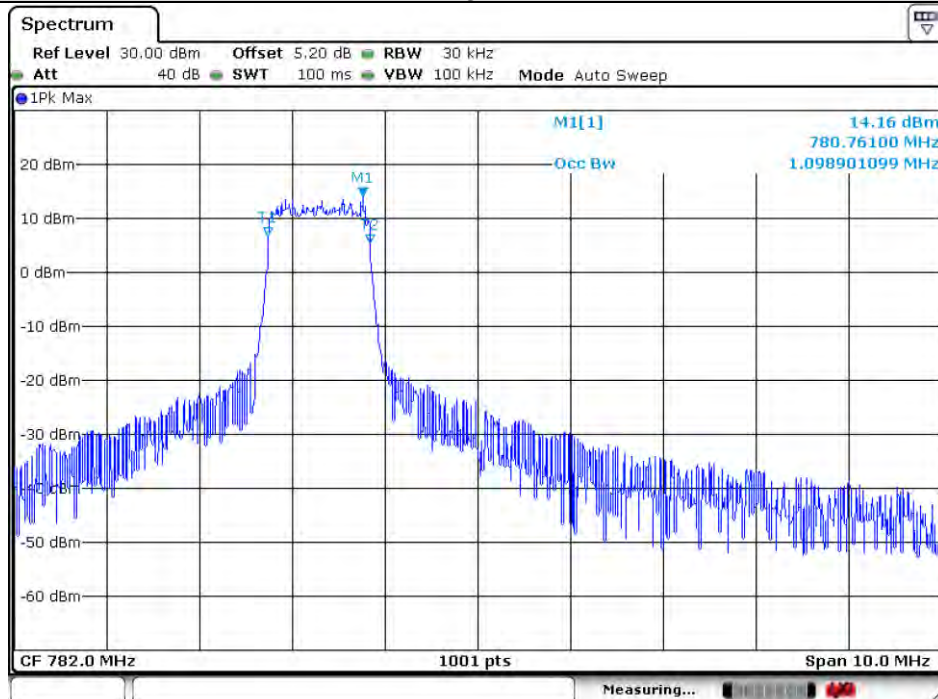


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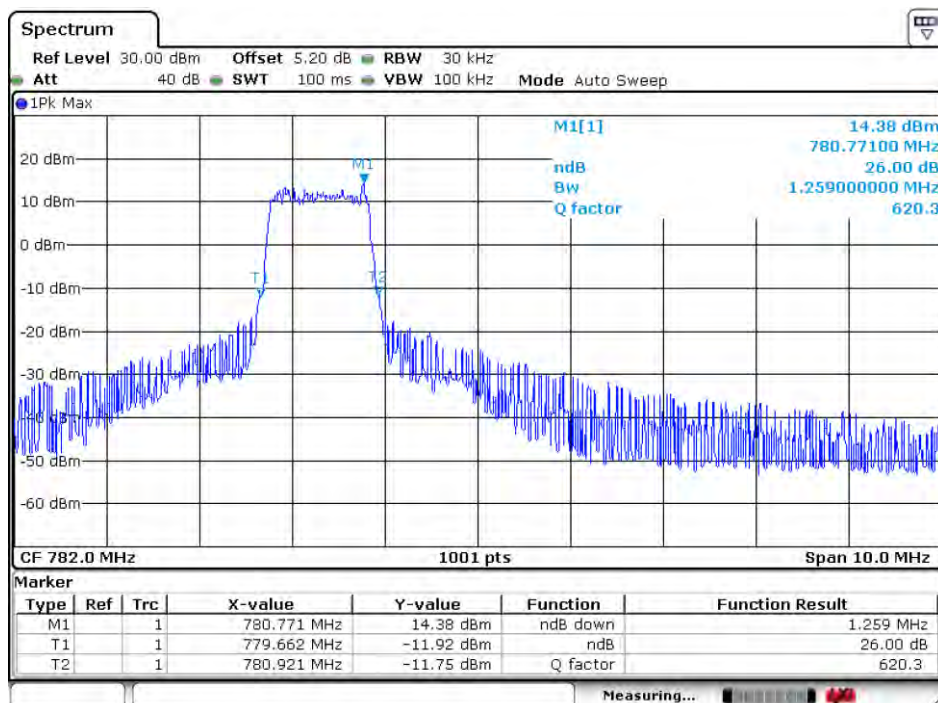




LTE-CatM1 Band 13 /QPSK 5MHz MCH 6RB#0



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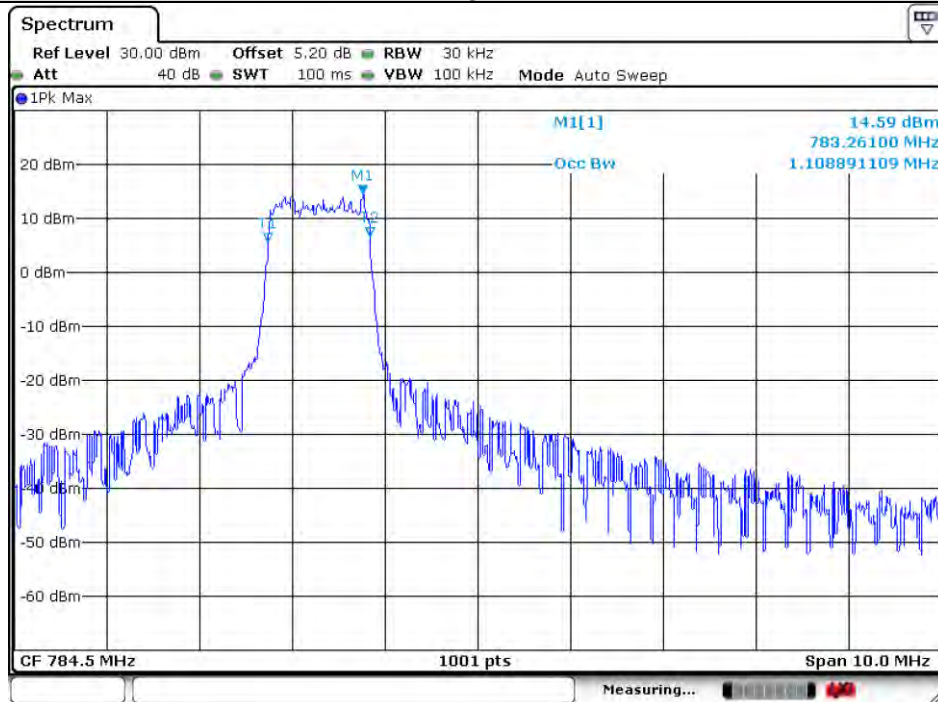
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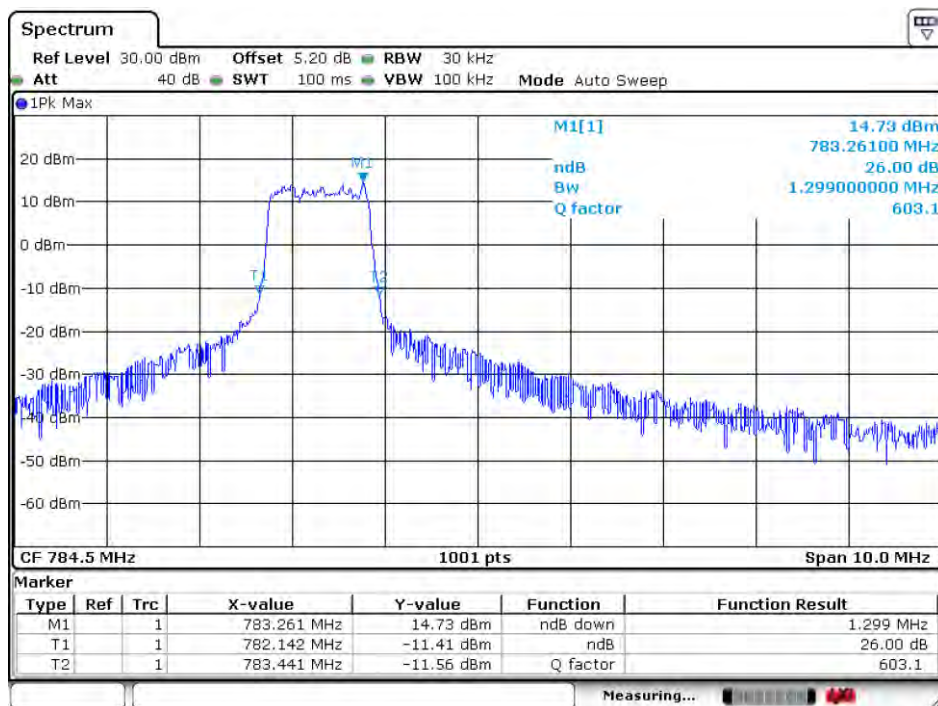
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## LTE-CatM1 Band 13 /QPSK 5MHz HCH 6RB#0



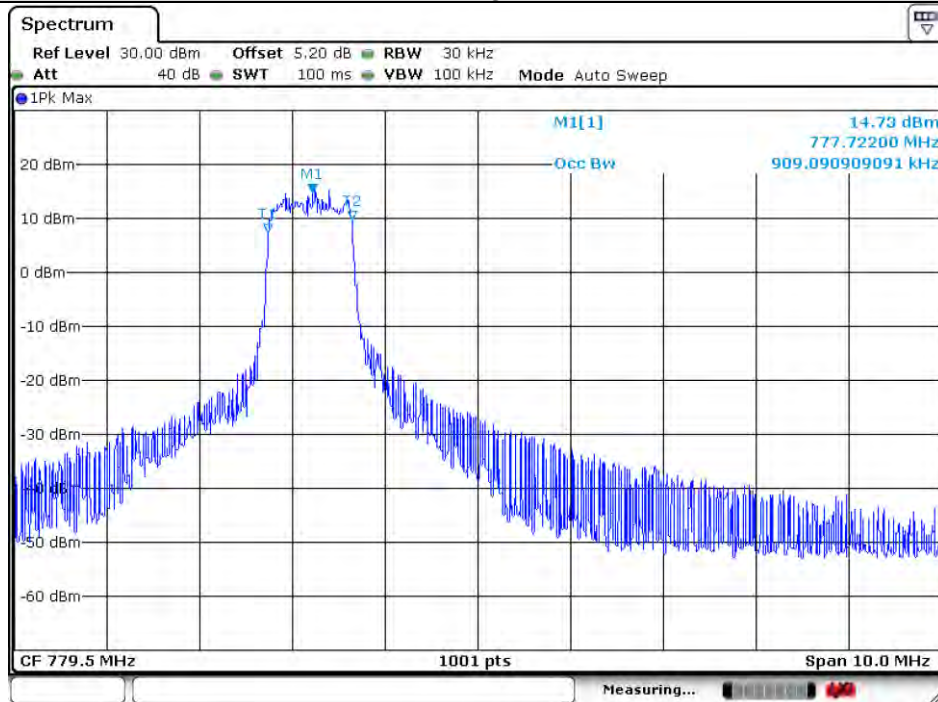
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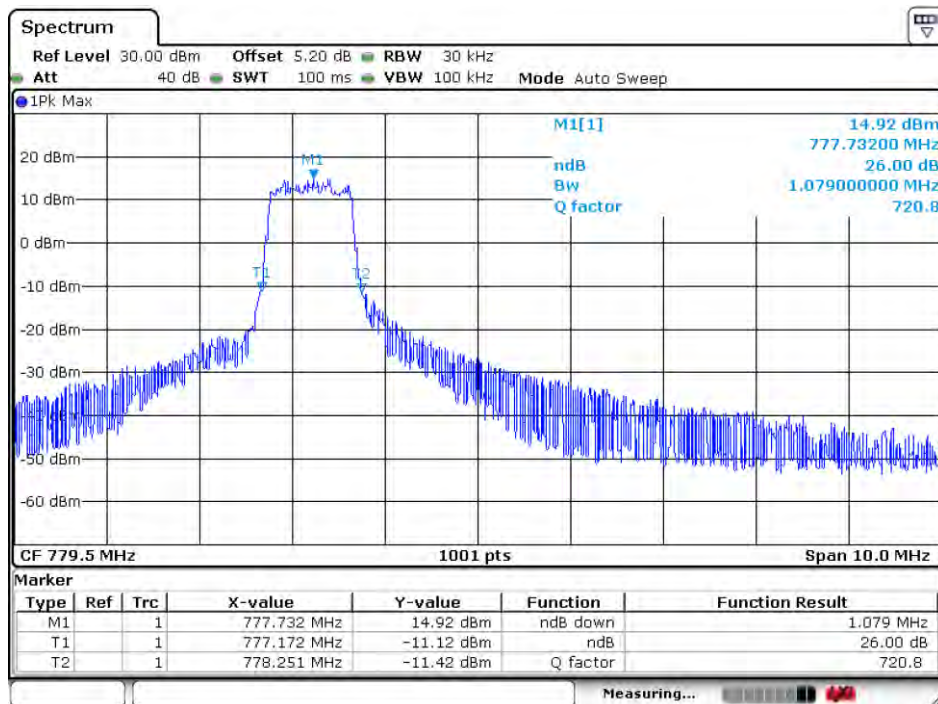
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## LTE-CatM1 Band 13 /16QAM 5MHz LCH 5RB#0



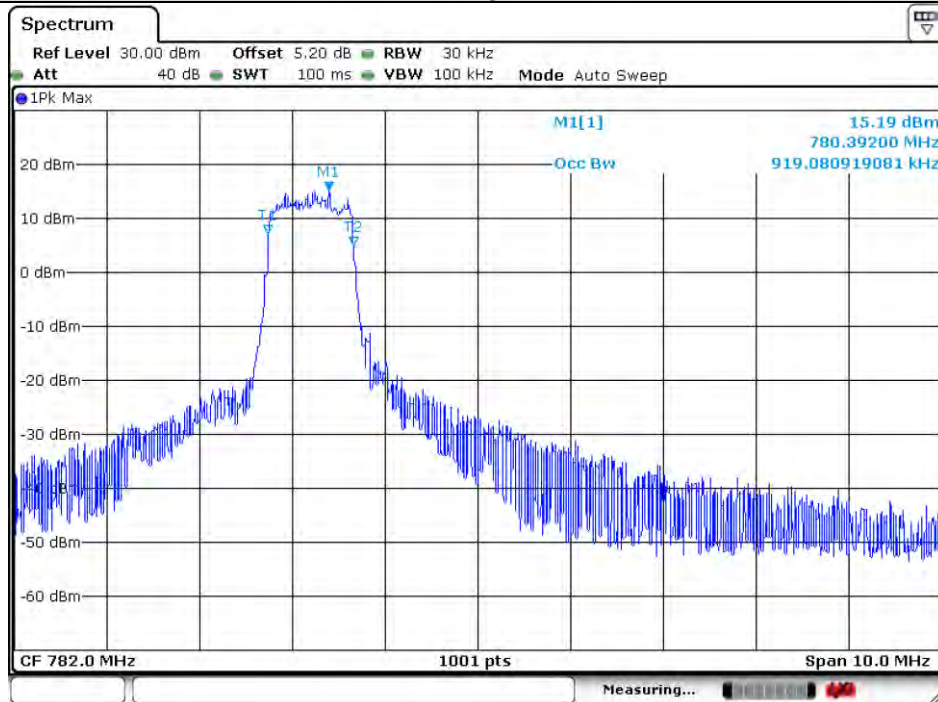
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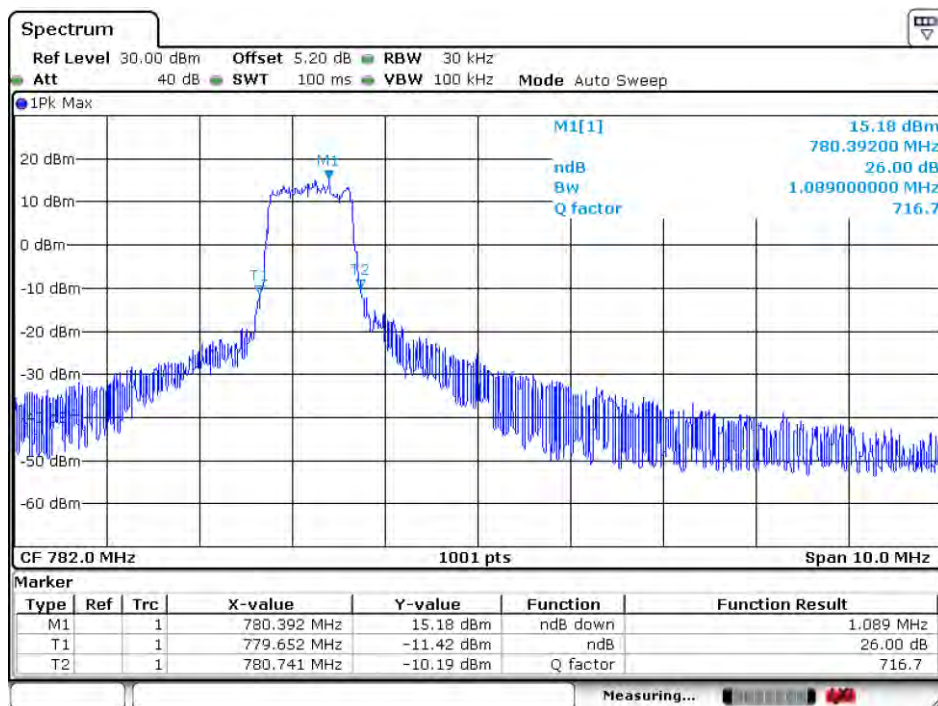
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Date: 10.SEP.2019 03:47:36



Date: 10.SEP.2019 03:47:55



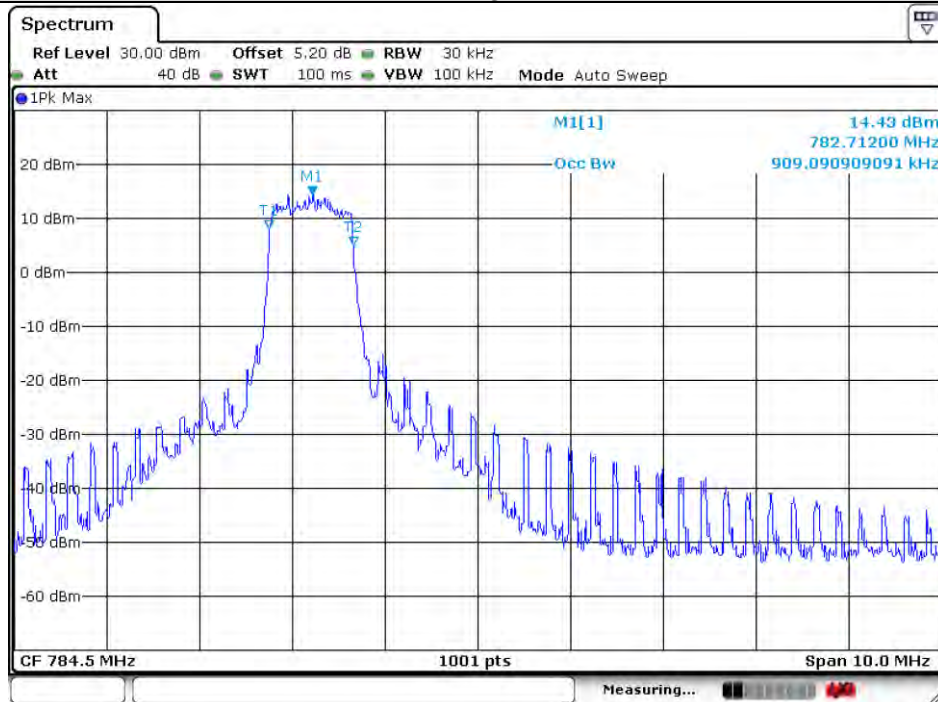
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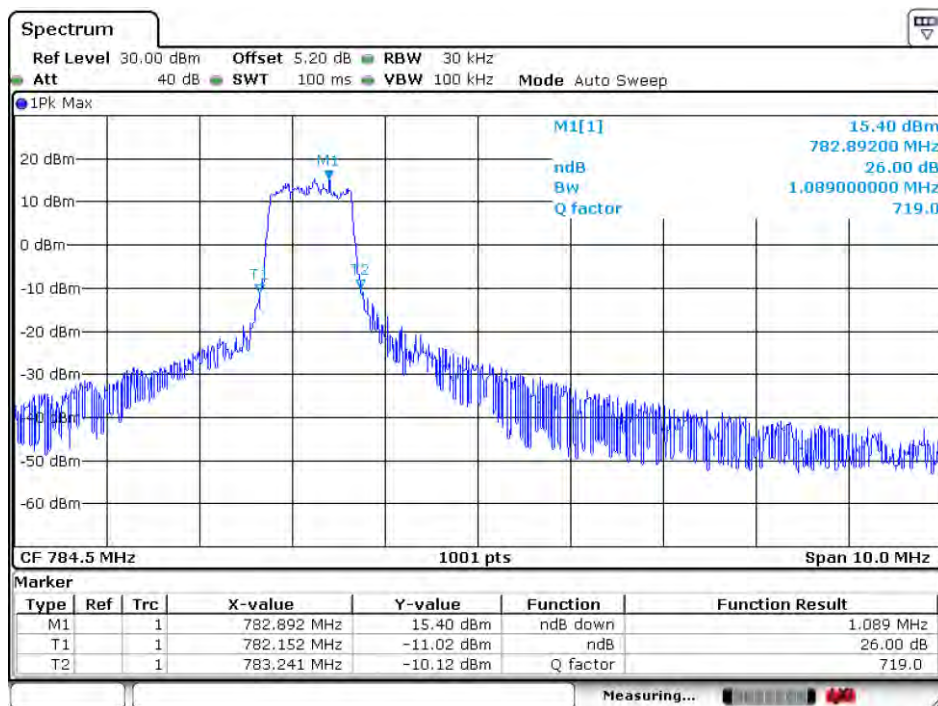
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## LTE-CatM1 Band 13 /16QAM 5MHz HCH 5RB#0



Date: 10.SEP.2019 03:46:37



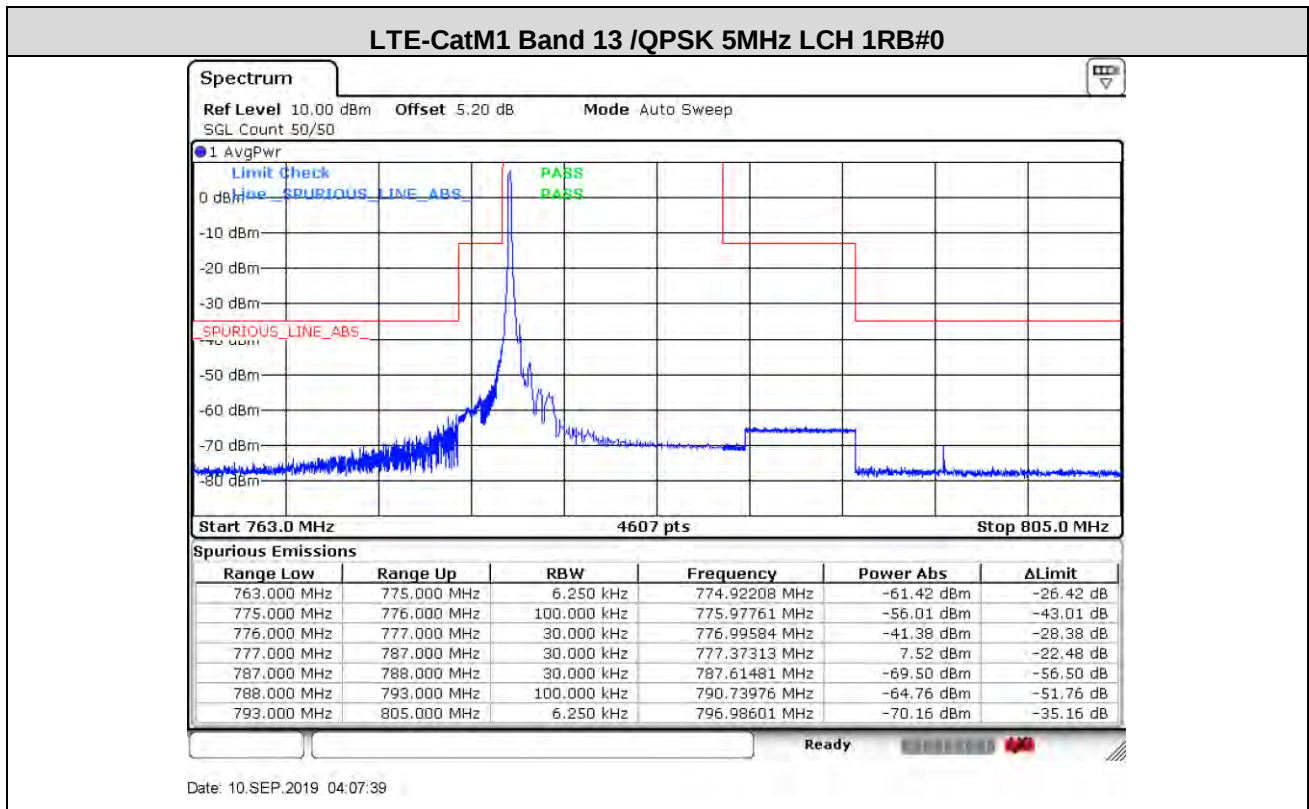
Date: 10.SEP.2019 03:46:22





## 5 Band Edges Compliance

### 5.1 Test Plots

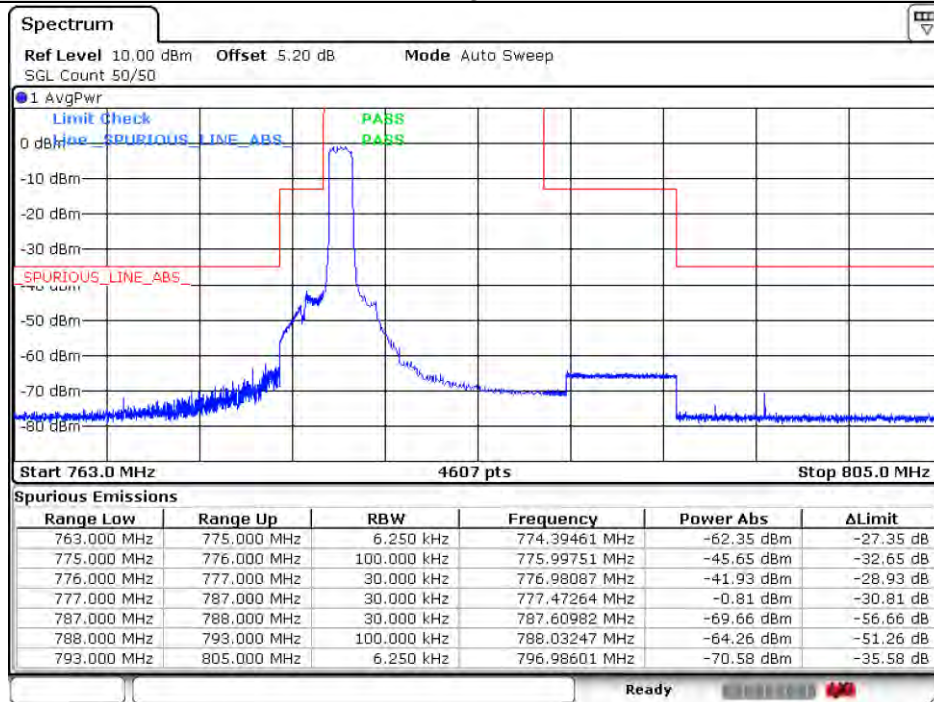


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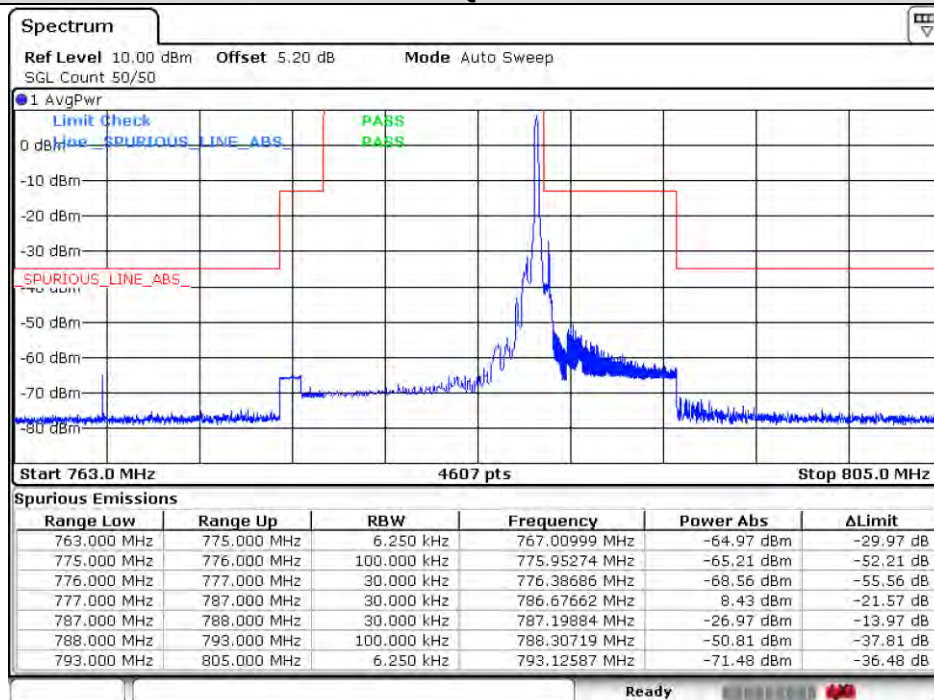
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## LTE-CatM1 Band 13 /QPSK 5MHz LCH 6RB#0



Date: 10.SEP.2019 04:08:42

## LTE-CatM1 Band 13 /QPSK 5MHz HCH 1RB#0



Date: 10.SEP.2019 04:12:24



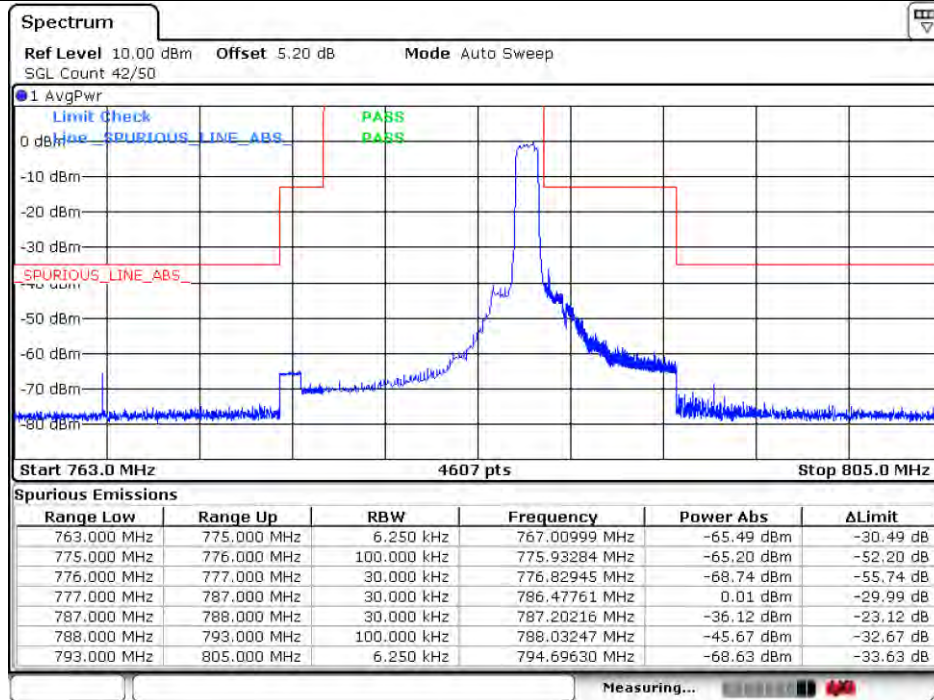
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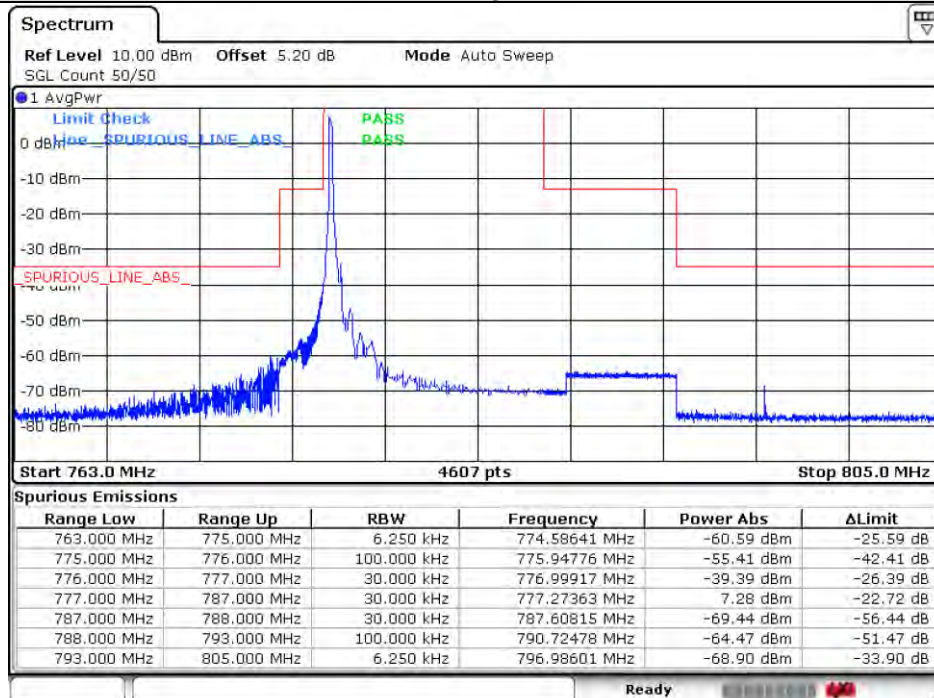
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## LTE-CatM1 Band 13 /QPSK 5MHz HCH 6RB#0



Date: 10.SEP.2019 04:10:31

## LTE-CatM1 Band 13 /16QAM 5MHz LCH 1RB#0



Date: 10.SEP.2019 04:04:13



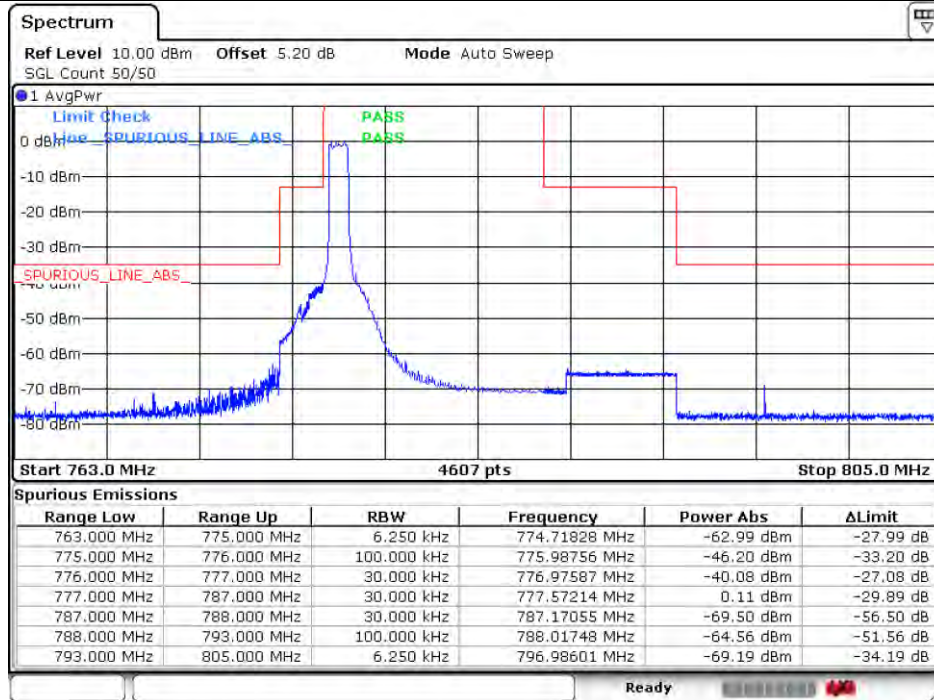
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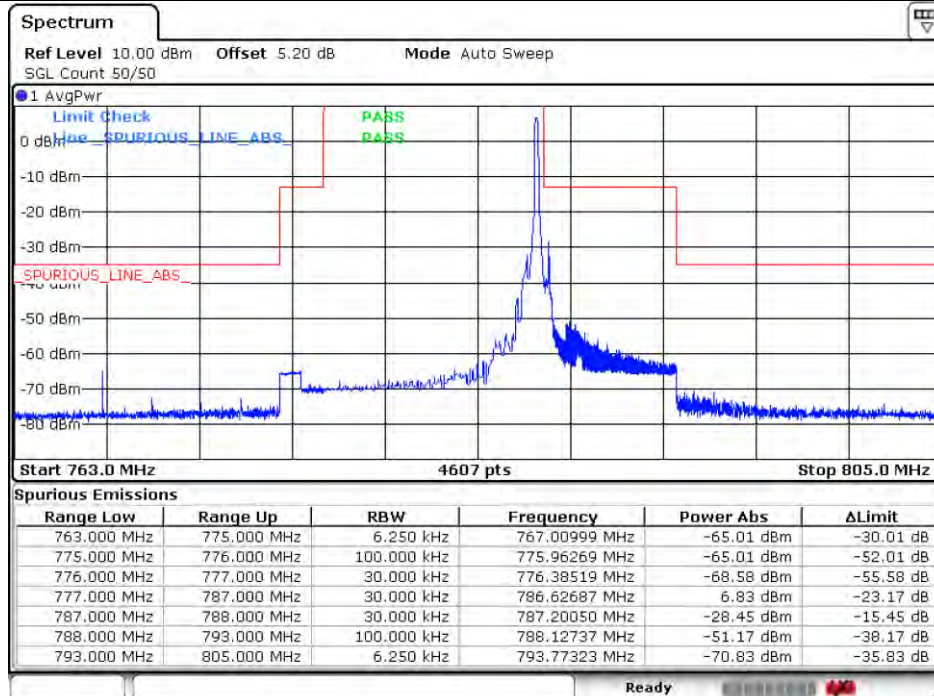
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## LTE-CatM1 Band 13 /16QAM 5MHz LCH 5RB#0



Date: 10.SEP.2019 03:57:42

## LTE-CatM1 Band 13 /16QAM 5MHz HCH 1RB#0



Date: 10.SEP.2019 04:13:55



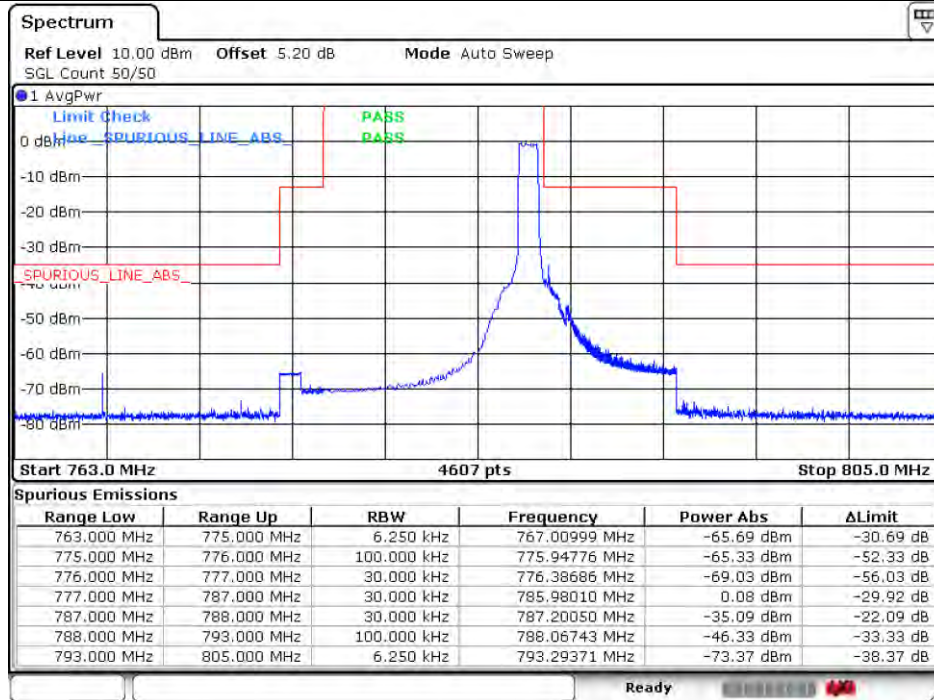
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LTE-CatM1 Band 13 /16QAM 5MHz HCH 5RB#0



Date: 10.SEP.2019 04:15:04



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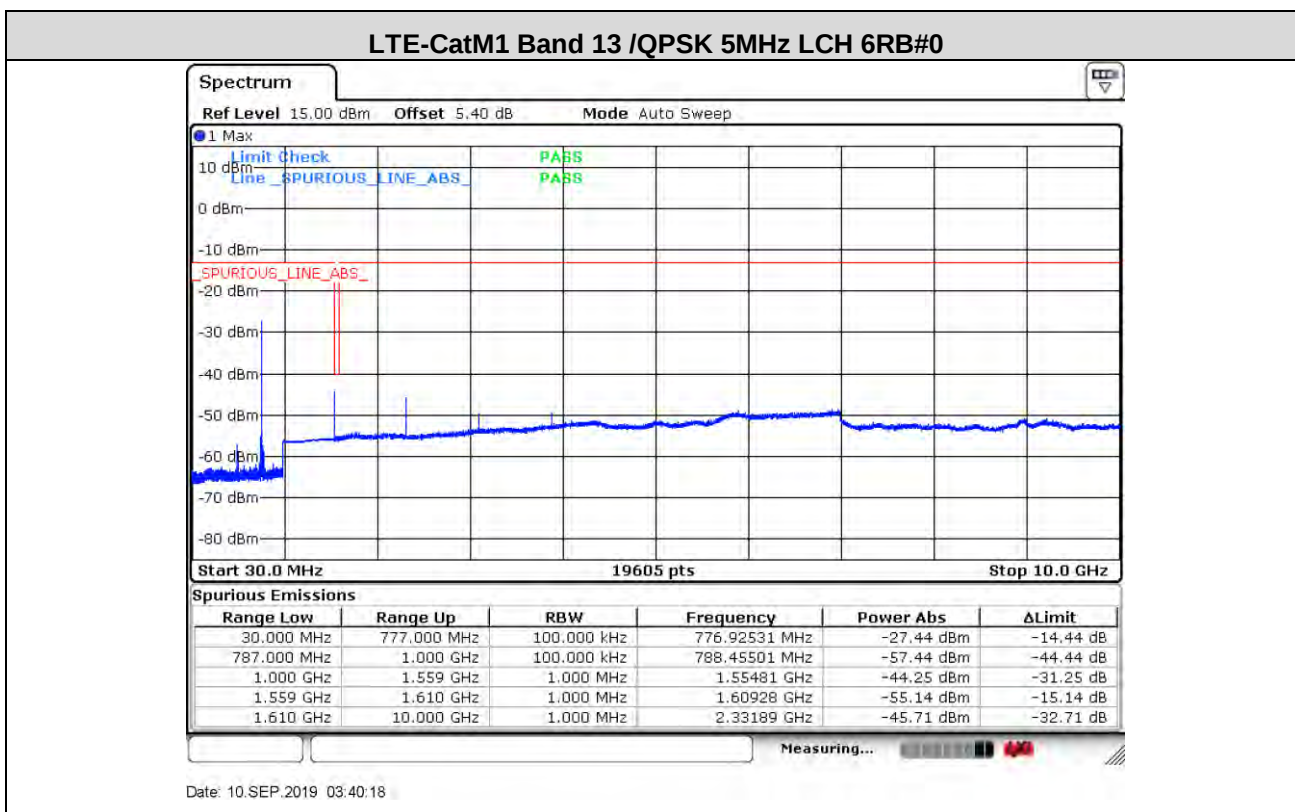


## 6 Spurious Emission at Antenna Terminal

NOTE1: 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  $< RBW/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (Span / RBW)$ " with  $k$  between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Part I - Test Plots

### 6.1 Test Plots



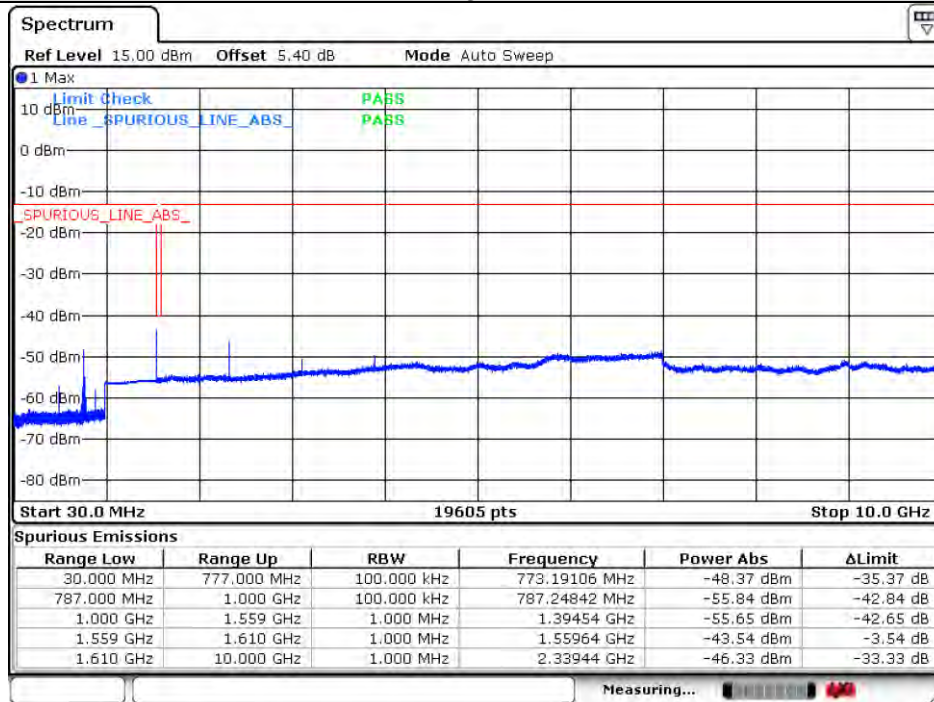
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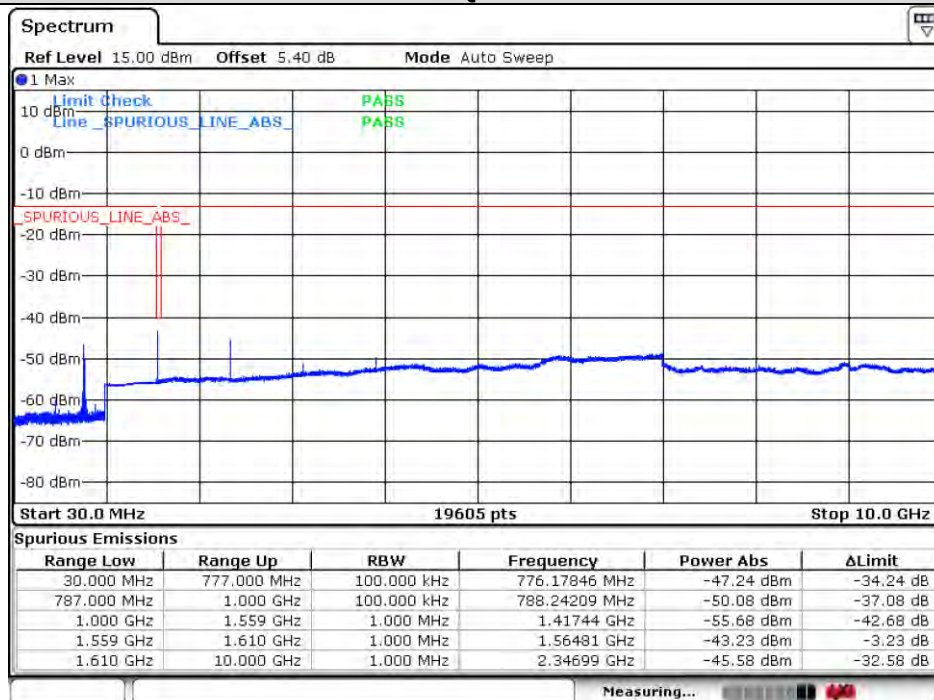
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## LTE-CatM1 Band 13 /QPSK 5MHz MCH 6RB#0



Date: 10.SEP.2019 03:41:38

## LTE-CatM1 Band 13 /QPSK 5MHz HCH 6RB#0



Date: 10.SEP.2019 03:42:49

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## 7 Field Strength of Spurious Radiation

### 7.1 For LTE-CatM1

#### 7.1.1 Test Band = LTE-CatM1 Band 13

##### 7.1.1.1 Test Mode =LTE-CatM1/QPSK

###### 7.1.1.1.1 Test Channel = LCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 108.5739        | -66.15      | -13.00           | 53.15           | Vertical     |
| 604.6567        | -64.44      | -13.00           | 51.44           | Vertical     |
| 1559.5109       | -58.84      | -40.00           | 18.84           | Vertical     |
| 2465.8932       | -42.25      | -13.00           | 29.25           | Vertical     |
| 16855.1542      | -41.55      | -13.00           | 28.55           | Vertical     |
| 17996.9999      | -34.37      | -13.00           | 21.37           | Vertical     |
| 43.2897         | -65.10      | -13.00           | 52.10           | Horizontal   |
| 590.5425        | -64.18      | -13.00           | 51.18           | Horizontal   |
| 1559.5109       | -53.32      | -40.00           | 13.32           | Horizontal   |
| 2465.8932       | -41.17      | -13.00           | 28.17           | Horizontal   |
| 3109.2044       | -52.56      | -13.00           | 39.56           | Horizontal   |
| 16994.9598      | -38.76      | -13.00           | 25.76           | Horizontal   |

###### 7.1.1.1.2 Test Channel = MCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 113.9577        | -65.02      | -13.00           | 52.02           | Vertical     |
| 577.9319        | -65.33      | -13.00           | 52.33           | Vertical     |
| 1605.4931       | -53.64      | -40.00           | 13.64           | Vertical     |
| 10088.0835      | -48.95      | -13.00           | 35.95           | Vertical     |
| 14669.8668      | -43.08      | -13.00           | 30.08           | Vertical     |
| 17997.5999      | -33.36      | -13.00           | 20.36           | Vertical     |
| 43.7747         | -63.94      | -13.00           | 50.94           | Horizontal   |
| 1559.7119       | -55.69      | -40.00           | 15.69           | Horizontal   |
| 2339.4679       | -43.22      | -13.00           | 30.22           | Horizontal   |
| 2459.4919       | -32.68      | -13.00           | 19.68           | Horizontal   |
| 16393.1357      | -38.77      | -13.00           | 25.77           | Horizontal   |
| 17996.3999      | -38.51      | -13.00           | 25.51           | Horizontal   |



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7.1.1.1.3 Test Channel = HCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 106.7308        | -64.97      | -13.00           | 51.97           | Vertical     |
| 599.9035        | -64.43      | -13.00           | 51.43           | Vertical     |
| 1564.5129       | -55.97      | -40.00           | 15.97           | Vertical     |
| 2465.8932       | -44.69      | -13.00           | 31.69           | Vertical     |
| 16912.1565      | -40.95      | -13.00           | 27.95           | Vertical     |
| 17998.1999      | -34.89      | -13.00           | 21.89           | Vertical     |
| 41.8831         | -64.96      | -13.00           | 51.96           | Horizontal   |
| 237.0569        | -68.40      | -13.00           | 55.40           | Horizontal   |
| 1564.5129       | -52.27      | -40.00           | 12.27           | Horizontal   |
| 2465.8932       | -42.37      | -13.00           | 29.37           | Horizontal   |
| 3129.6052       | -50.59      | -13.00           | 37.59           | Horizontal   |
| 16993.1597      | -39.45      | -13.00           | 26.45           | Horizontal   |

NOTE:

- 1) The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) only the worst case data presented in this report.



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## 8 Frequency Stability

### 8.1 Frequency Error VS. Voltage

| Test Band     | Test Mode  | Test Channel | RB Config | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|------------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 13 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VL         | -9.02            | -0.011566             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VN         | -11.72           | -0.015037             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VH         | -4.31            | -0.005528             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VL         | 6.56             | 0.008383              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VN         | -0.09            | -0.000109             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VH         | 8.04             | 0.010285              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VL         | -1.50            | -0.001909             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VN         | -12.45           | -0.015867             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VH         | 4.54             | 0.005792              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VL         | 2.40             | 0.003081              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VN         | 7.70             | 0.009876              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VH         | -0.03            | -0.000043             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VL         | -4.13            | -0.005284             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VN         | -4.34            | -0.005544             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VH         | -5.50            | -0.007035             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VL         | 7.97             | 0.010164              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VN         | 7.57             | 0.009648              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VH         | 13.58            | 0.017312              | ±2.5        | PASS    |



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## 8.2 Frequency Error VS. Temperature

| Test Band     | Test Mode | Test Channel | RB Config | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|-----------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -30        | 13.65            | 0.017508              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -20        | -9.78            | -0.012547             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -10        | -10.92           | -0.014003             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 0          | 4.82             | 0.006187              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 10         | 5.42             | 0.006955              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 20         | -13.02           | -0.016698             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 30         | 9.28             | 0.011909              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 40         | 0.95             | 0.001220              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 50         | 6.18             | 0.007929              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -30        | 12.96            | 0.016568              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -20        | 12.86            | 0.016446              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -10        | 1.88             | 0.002400              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 0          | 12.52            | 0.016012              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 10         | 11.87            | 0.015179              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 20         | -12.21           | -0.015610             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 30         | -1.28            | -0.001632             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 40         | 10.09            | 0.012904              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 50         | -2.97            | -0.003795             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -30        | 2.48             | 0.003163              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -20        | -4.84            | -0.006167             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -10        | 1.29             | 0.001641              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 0          | 10.03            | 0.012780              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 10         | -7.39            | -0.009422             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 20         | -1.55            | -0.001980             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 30         | -11.26           | -0.014349             | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 40         | 11.65            | 0.014852              | ±2.5        | PASS    |
| CatM1 Band 13 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 50         | -5.21            | -0.006637             | ±2.5        | PASS    |



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| Test Band     | Test Mode  | Test Channel | RB Config | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|------------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -30        | 2.80             | 0.003594              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -20        | 1.87             | 0.002393              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -10        | -2.38            | -0.003052             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 0          | 0.43             | 0.000549              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 10         | -4.93            | -0.006326             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 20         | -9.83            | -0.012607             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 30         | -2.75            | -0.003524             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 40         | 9.05             | 0.011604              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 50         | 14.10            | 0.018083              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -30        | 12.88            | 0.016472              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -20        | -13.21           | -0.016890             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -10        | -5.33            | -0.006811             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 0          | -13.07           | -0.016711             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 10         | -9.93            | -0.012702             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 20         | 6.97             | 0.008911              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 30         | -1.26            | -0.001607             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 40         | -12.24           | -0.015650             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 50         | -14.70           | -0.018798             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -30        | -6.32            | -0.008062             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -20        | -4.61            | -0.005881             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -10        | -5.06            | -0.006449             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 0          | -9.83            | -0.012527             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 10         | -10.24           | -0.013053             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 20         | 6.78             | 0.008646              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 30         | 1.19             | 0.001522              | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 40         | -2.87            | -0.003656             | ±2.5        | PASS    |
| CatM1 Band 13 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 50         | -1.40            | -0.001781             | ±2.5        | PASS    |

The End



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# Appendix B

## LTE-CatM1 Band 14



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## 1 Effective Radiated Power Output Data

Effective Radiated Power of Transmitter (ERP) for LTE-CatM1 Band 14

| Test Band     | Test Mode | Test Bandwidth | Test channel | Test RB | Conducted Power (dBm) | ERP (dBm) | limit (dBm) | Verdict |
|---------------|-----------|----------------|--------------|---------|-----------------------|-----------|-------------|---------|
| CatM1 Band 14 | QPSK      | 5M             | LCH          | 1RB#0   | 20.68                 | 17.83     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | LCH          | 5RB#0   | 19.48                 | 16.63     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | LCH          | 6RB#0   | 19.39                 | 16.54     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | MCH          | 1RB#0   | 20.67                 | 17.82     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | MCH          | 5RB#0   | 19.48                 | 16.63     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | MCH          | 6RB#0   | 19.45                 | 16.60     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | HCH          | 1RB#0   | 20.71                 | 17.86     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | HCH          | 5RB#0   | 19.52                 | 16.67     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 5M             | HCH          | 6RB#0   | 19.37                 | 16.52     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 5M             | LCH          | 1RB#0   | 20.19                 | 17.34     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 5M             | LCH          | 5RB#0   | 18.05                 | 15.20     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 5M             | MCH          | 1RB#0   | 20.24                 | 17.39     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 5M             | MCH          | 5RB#0   | 18.18                 | 15.33     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 5M             | HCH          | 1RB#0   | 20.21                 | 17.36     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 5M             | HCH          | 5RB#0   | 18.13                 | 15.28     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 10M            | MCH          | 1RB#0   | 20.71                 | 17.86     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 10M            | MCH          | 5RB#0   | 19.56                 | 16.71     | 34.77       | PASS    |
| CatM1 Band 14 | QPSK      | 10M            | MCH          | 6RB#0   | 19.44                 | 16.59     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 10M            | MCH          | 1RB#0   | 20.18                 | 17.33     | 34.77       | PASS    |
| CatM1 Band 14 | 16QAM     | 10M            | MCH          | 5RB#0   | 19.49                 | 16.64     | 34.77       | PASS    |

Note:

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

$EIRP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi]$

$ERP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi] - 2.15$



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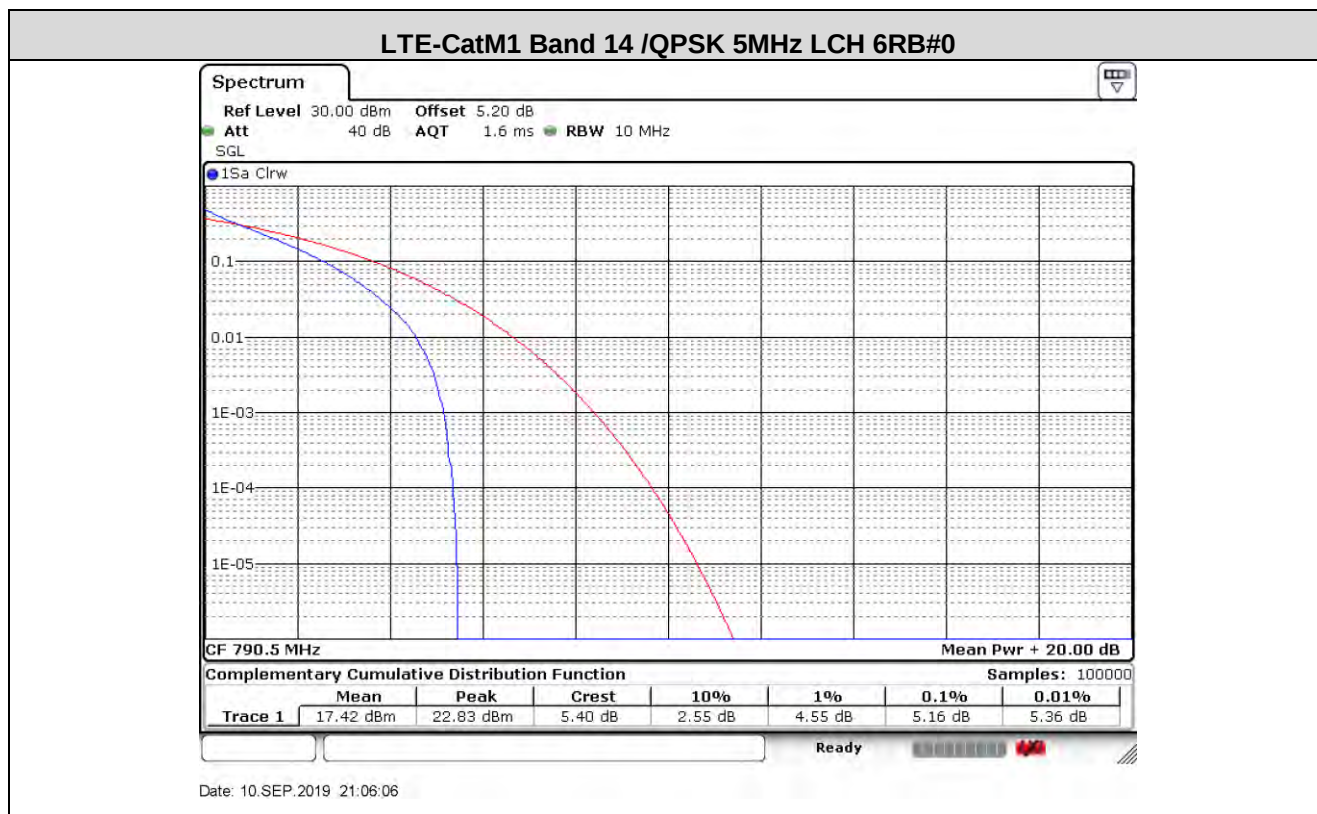


## 2 Peak-to-Average Ratio

### 2.1 Test Results

| Test Band     | Test Mode | RB Config | Test Channel | Measured [dB] | Limit [dB] | Verdict |
|---------------|-----------|-----------|--------------|---------------|------------|---------|
| CatM1 Band 14 | QPSK/5M   | 6RB#0     | LCH          | 5.16          | 13         | PASS    |
| CatM1 Band 14 | QPSK/5M   | 6RB#0     | MCH          | 4.81          | 13         | PASS    |
| CatM1 Band 14 | QPSK/5M   | 6RB#0     | HCH          | 5.01          | 13         | PASS    |
| CatM1 Band 14 | 16QAM/5M  | 5RB#0     | LCH          | 3.54          | 13         | PASS    |
| CatM1 Band 14 | 16QAM/5M  | 5RB#0     | MCH          | 3.77          | 13         | PASS    |
| CatM1 Band 14 | 16QAM/5M  | 5RB#0     | HCH          | 3.45          | 13         | PASS    |

### 2.2 Test Plots



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## LTE-CatM1 Band 14 /QPSK 5MHz HCH 6RB#0



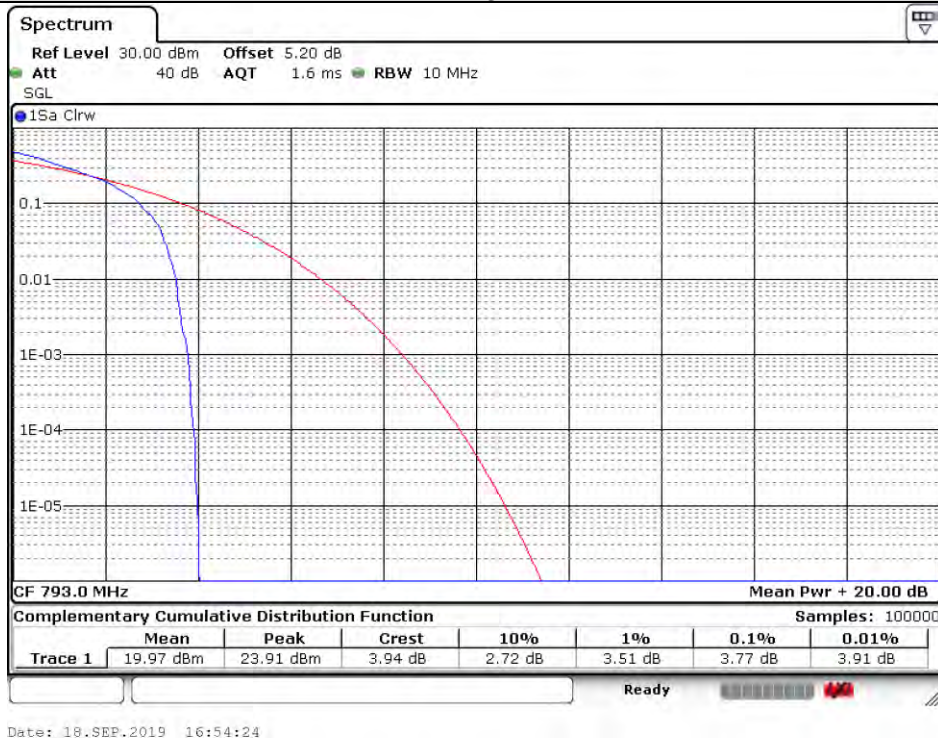
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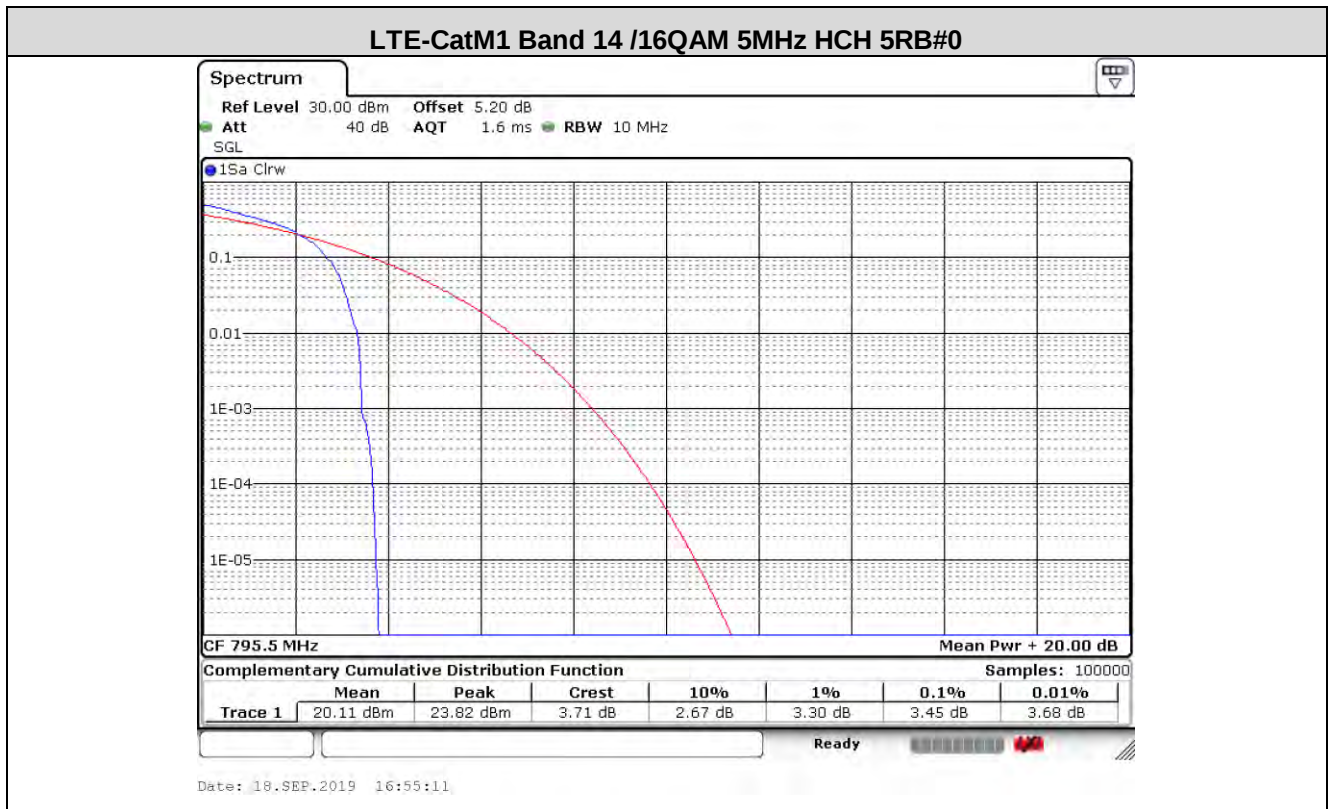


**LTE-CatM1 Band 14 /16QAM 5MHz LCH 5RB#0**



**LTE-CatM1 Band 14 /16QAM 5MHz MCH 5RB#0**





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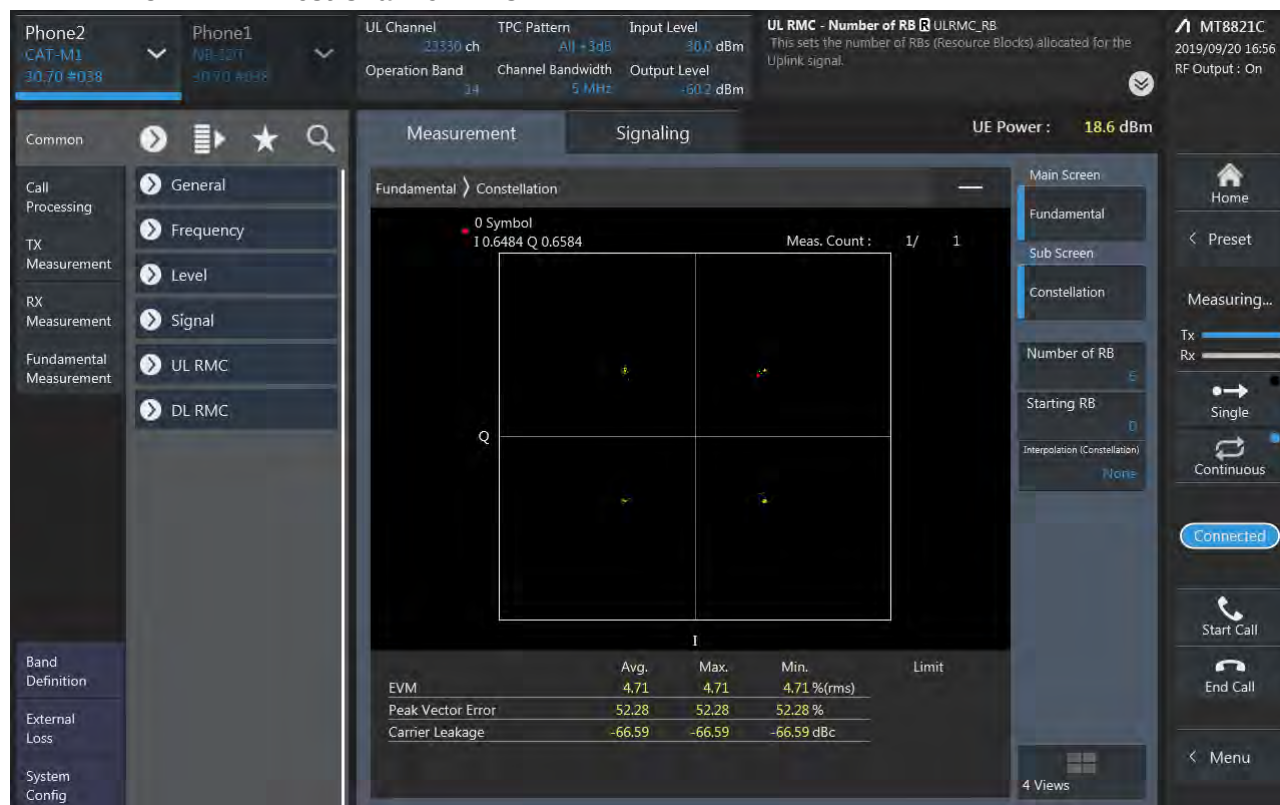
## 3 Modulation Characteristics

### 3.1 For LTE-CatM1

#### 3.1.1 Test Band = LTE-CatM1 Band 14

##### 3.1.1.1 Test Mode = LTE-CatM1 /QPSK 5MHz

##### 3.1.1.1.1 Test Channel = MCH



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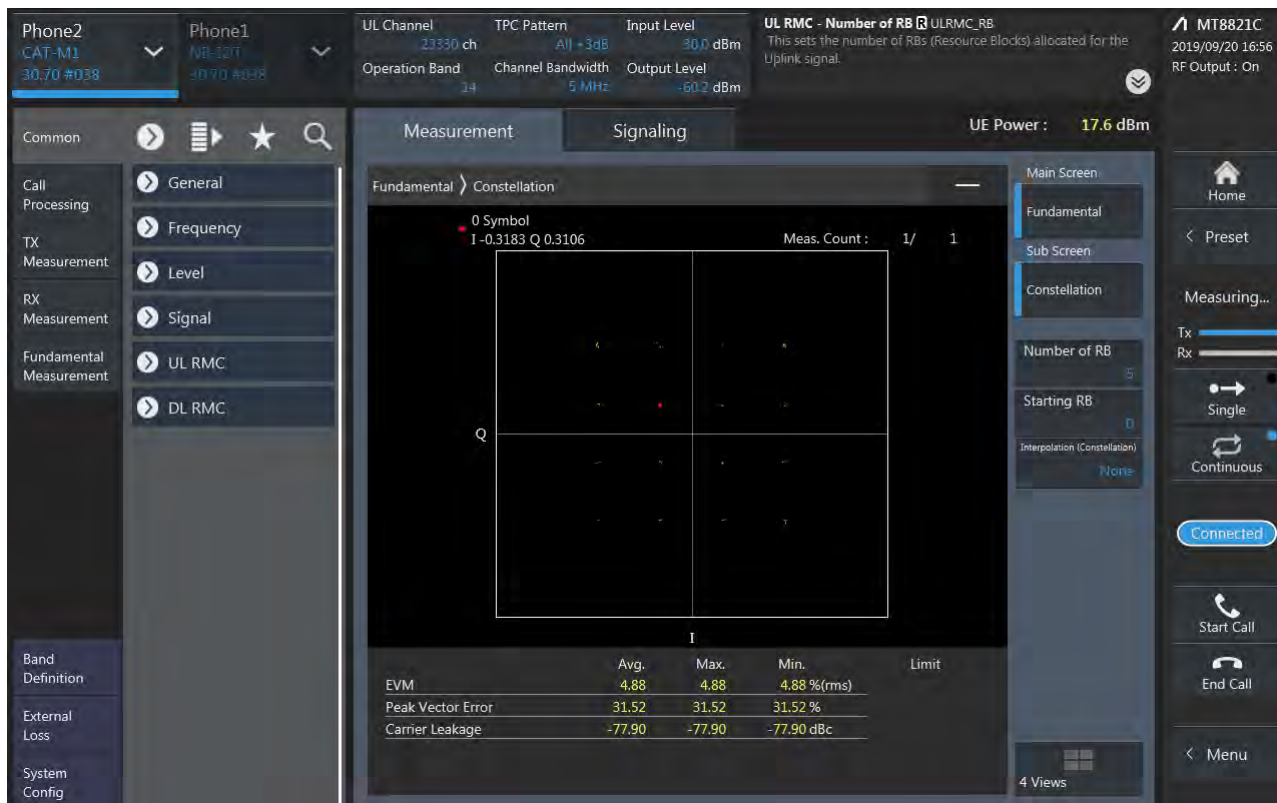
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### 3.1.1.2 Test Mode = LTE-CatM1 /16QAM 5MHz

#### 3.1.1.2.1 Test Channel = MCH



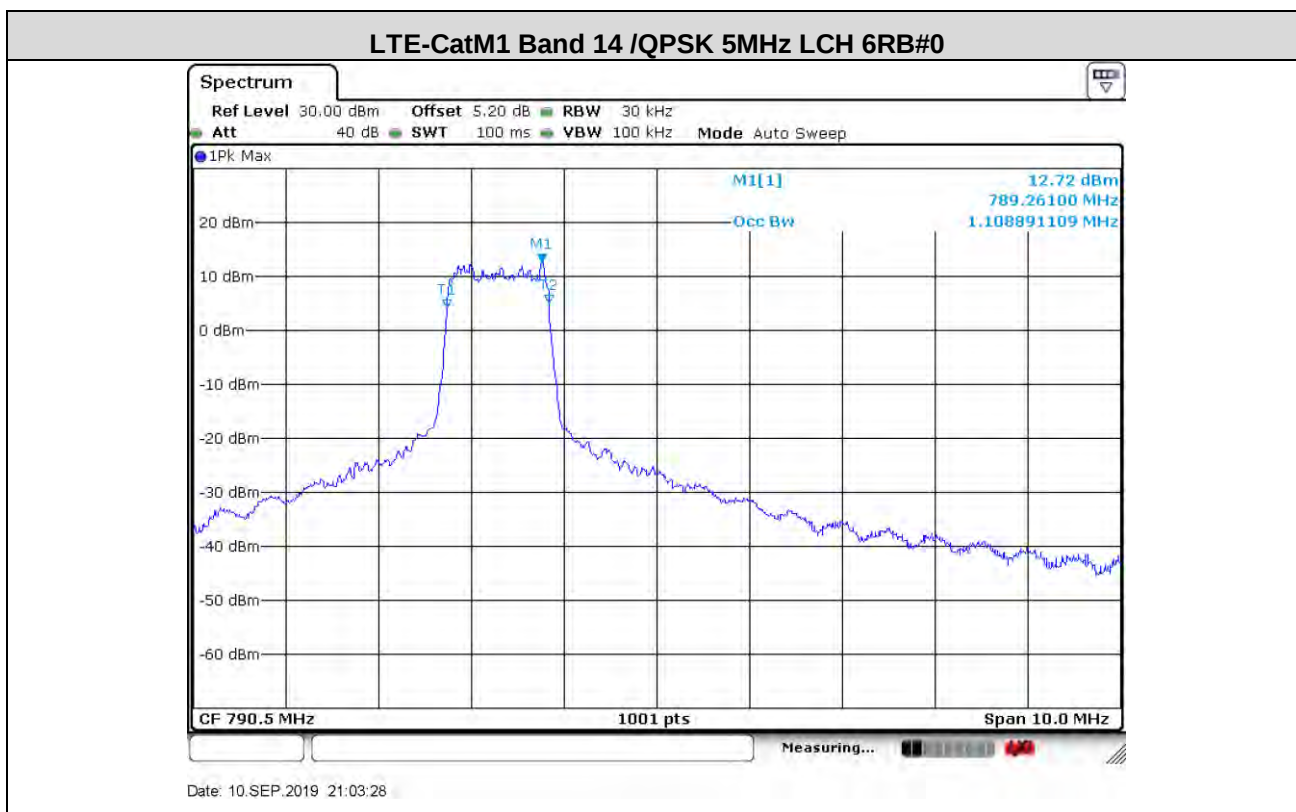


## 4 26dB Bandwidth and Occupied Bandwidth

### 4.1 Test Results

| Test Band     | Test Mode   | Test Channel | Occupied Bandwidth [MHz] | 26dB Emission Bandwidth [MHz] | Verdict |
|---------------|-------------|--------------|--------------------------|-------------------------------|---------|
| CatM1 Band 14 | QPSK/ 5MHz  | LCH          | 1.11                     | 1.29                          | PASS    |
| CatM1 Band 14 | QPSK/ 5MHz  | MCH          | 1.11                     | 1.28                          | PASS    |
| CatM1 Band 14 | QPSK/ 5MHz  | HCH          | 1.11                     | 1.30                          | PASS    |
| CatM1 Band 14 | 16QAM/ 5MHz | LCH          | 0.92                     | 1.09                          | PASS    |
| CatM1 Band 14 | 16QAM/ 5MHz | MCH          | 0.93                     | 1.09                          | PASS    |
| CatM1 Band 14 | 16QAM/ 5MHz | HCH          | 0.91                     | 1.07                          | PASS    |

### 4.2 Test Plots

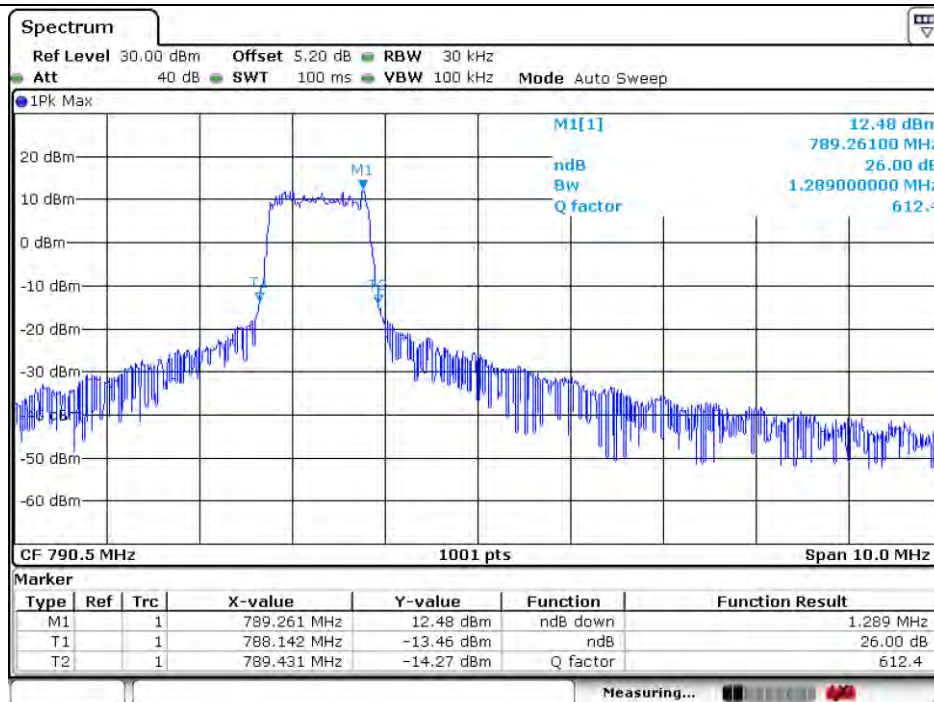


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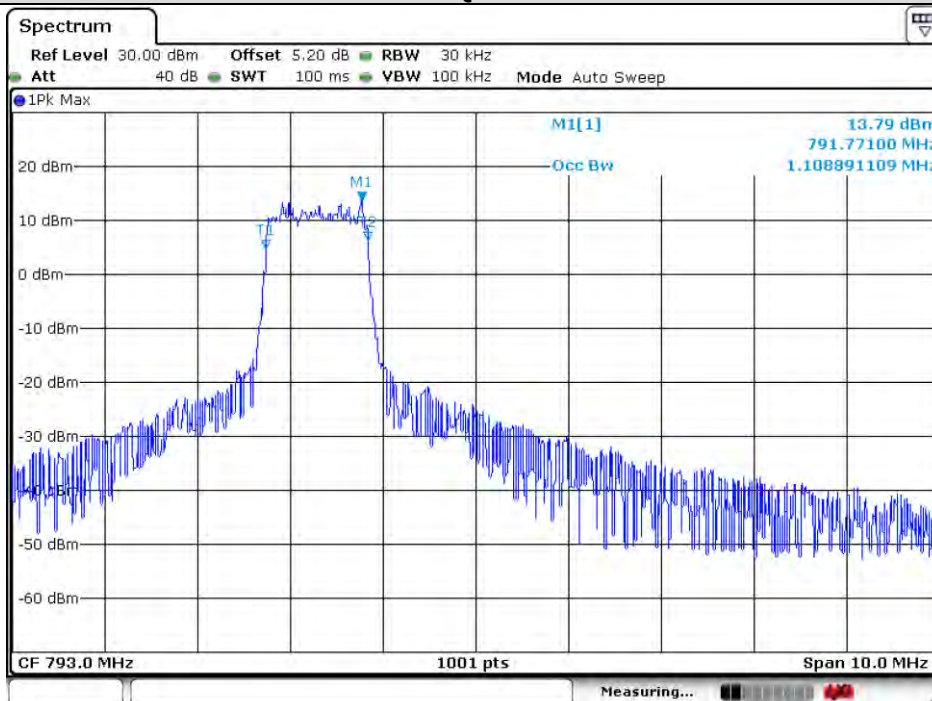
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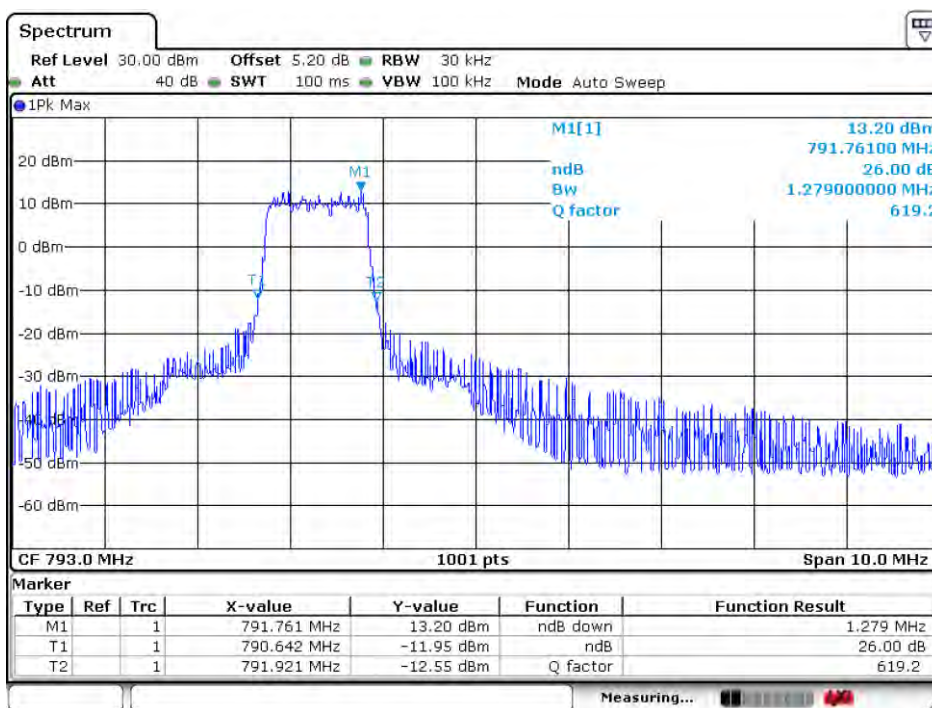
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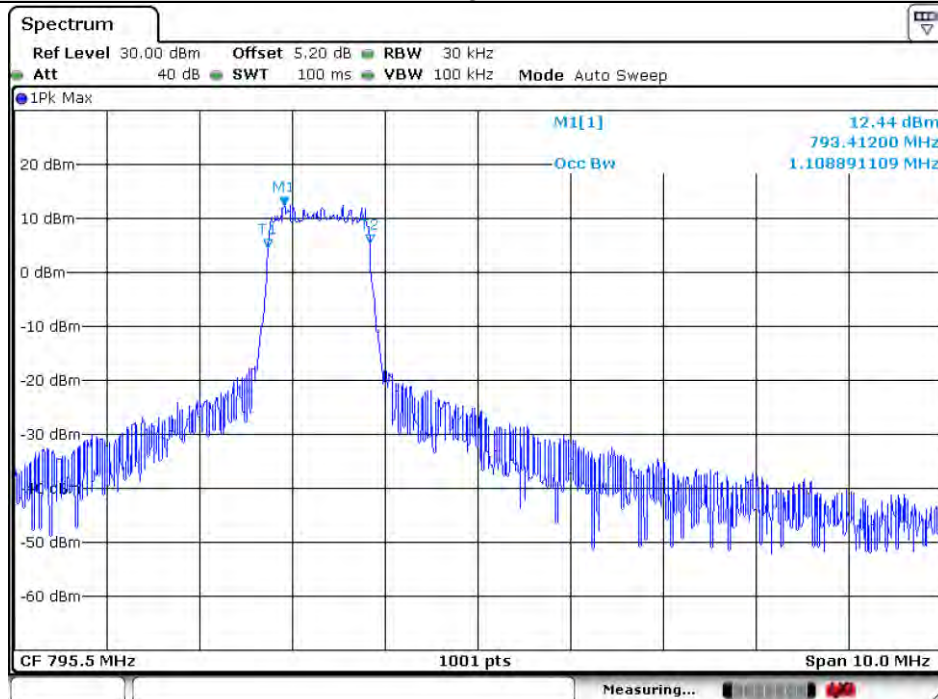
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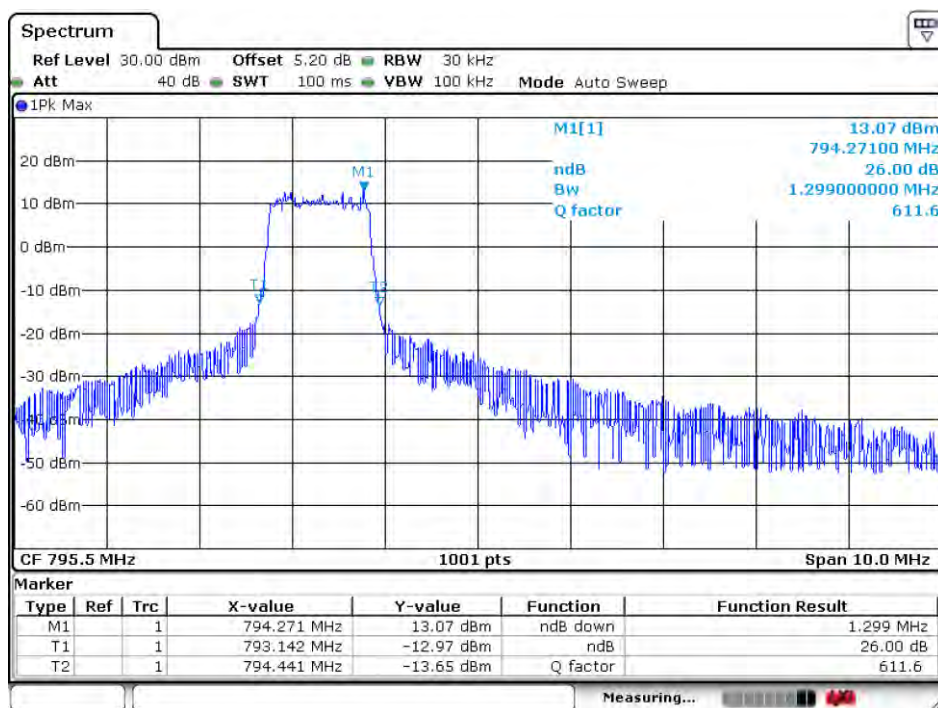
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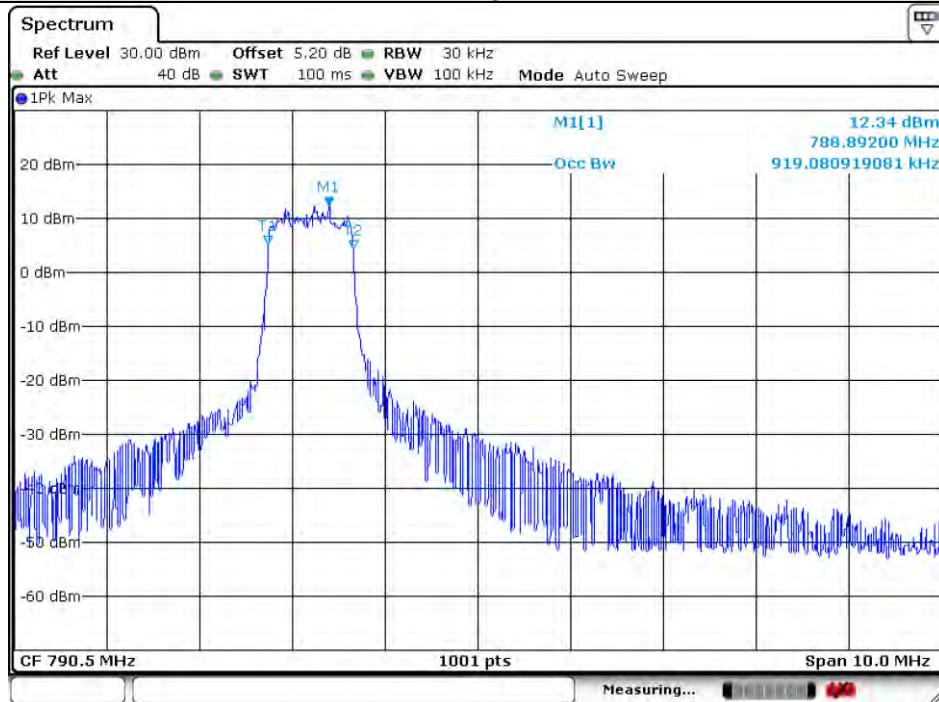
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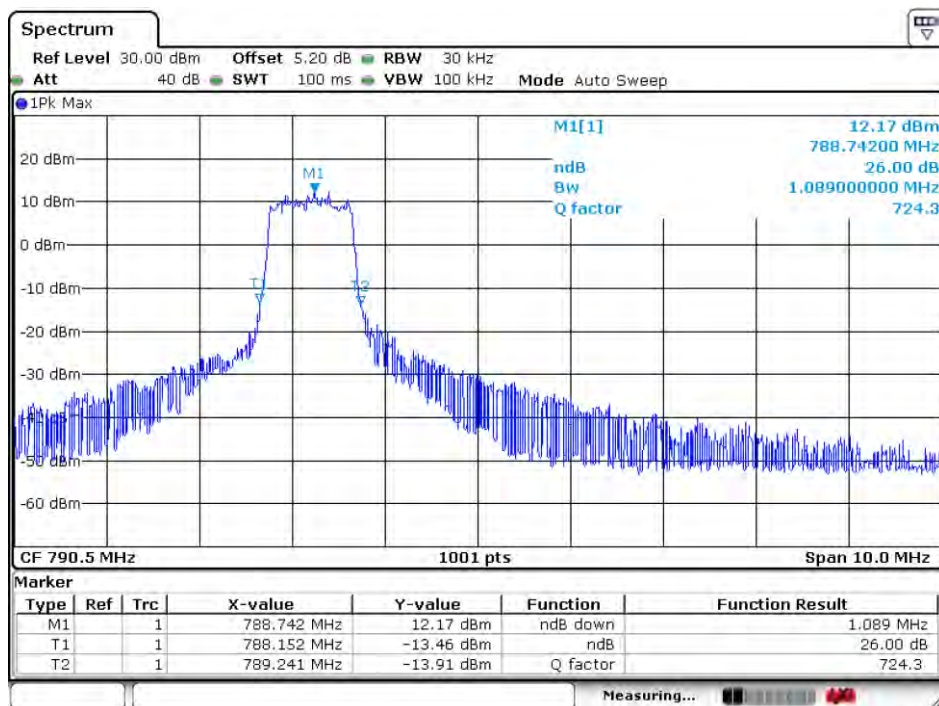
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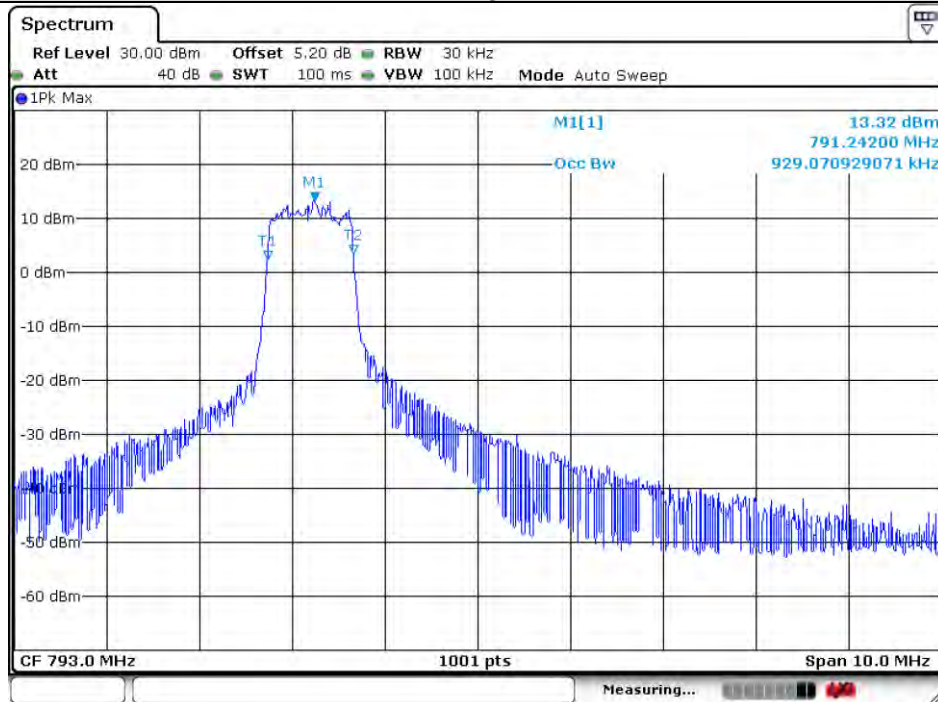
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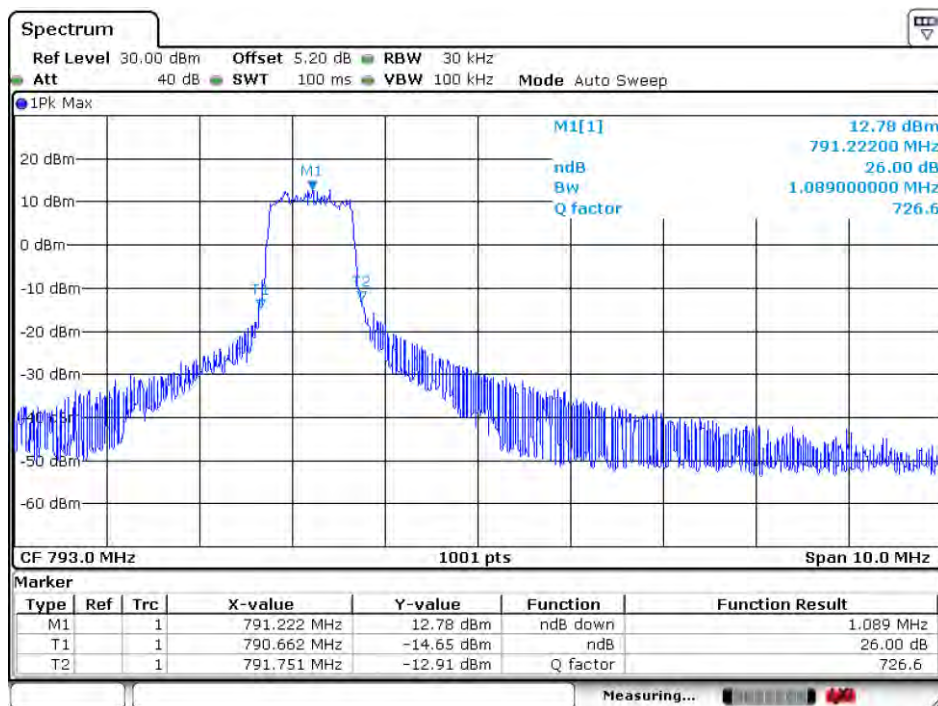
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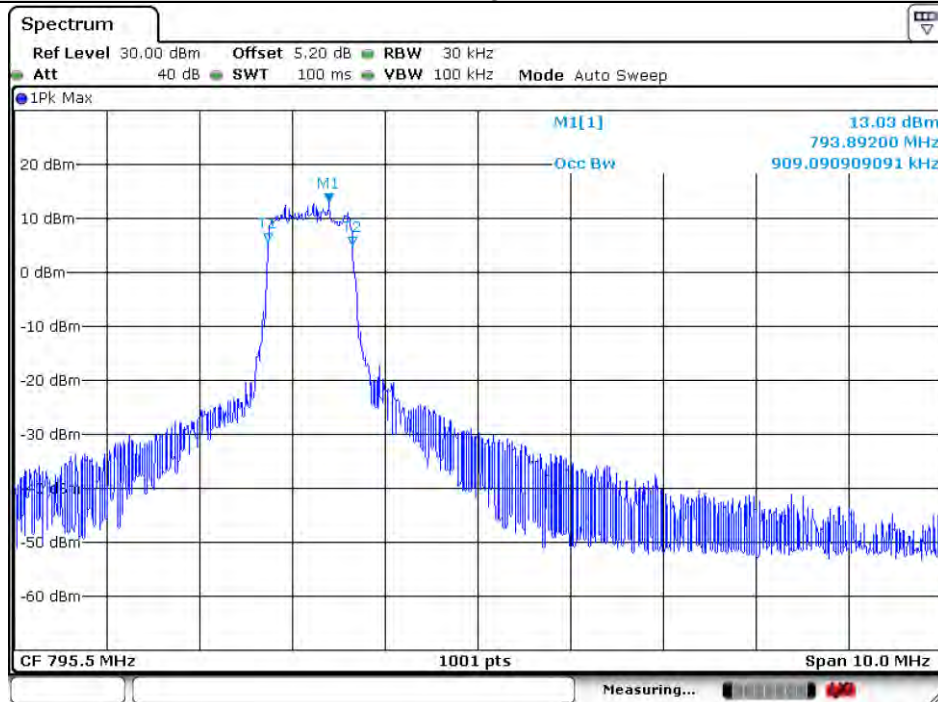
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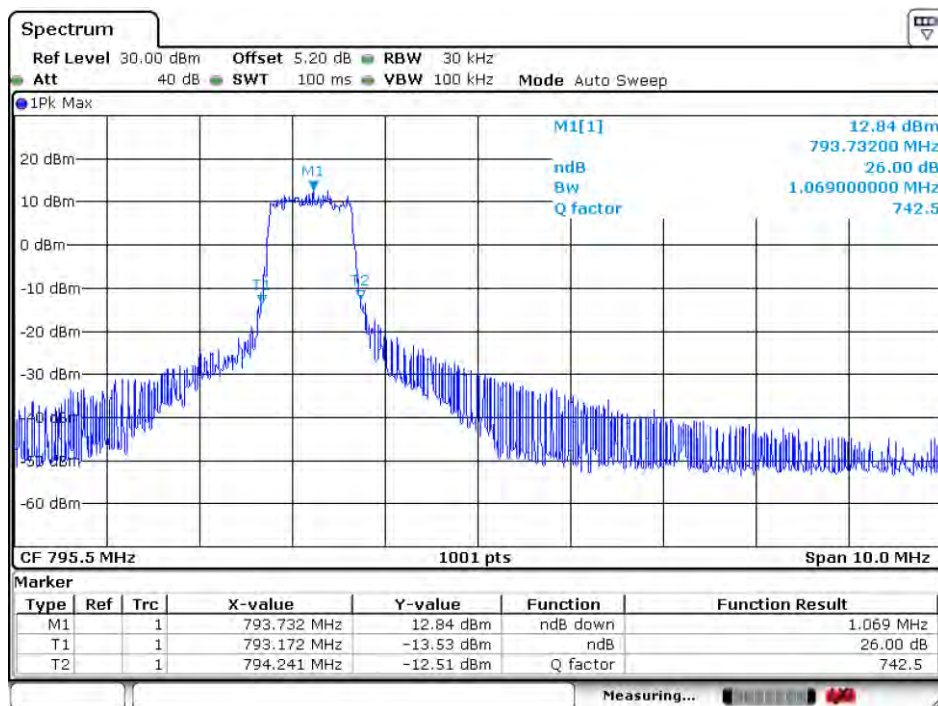
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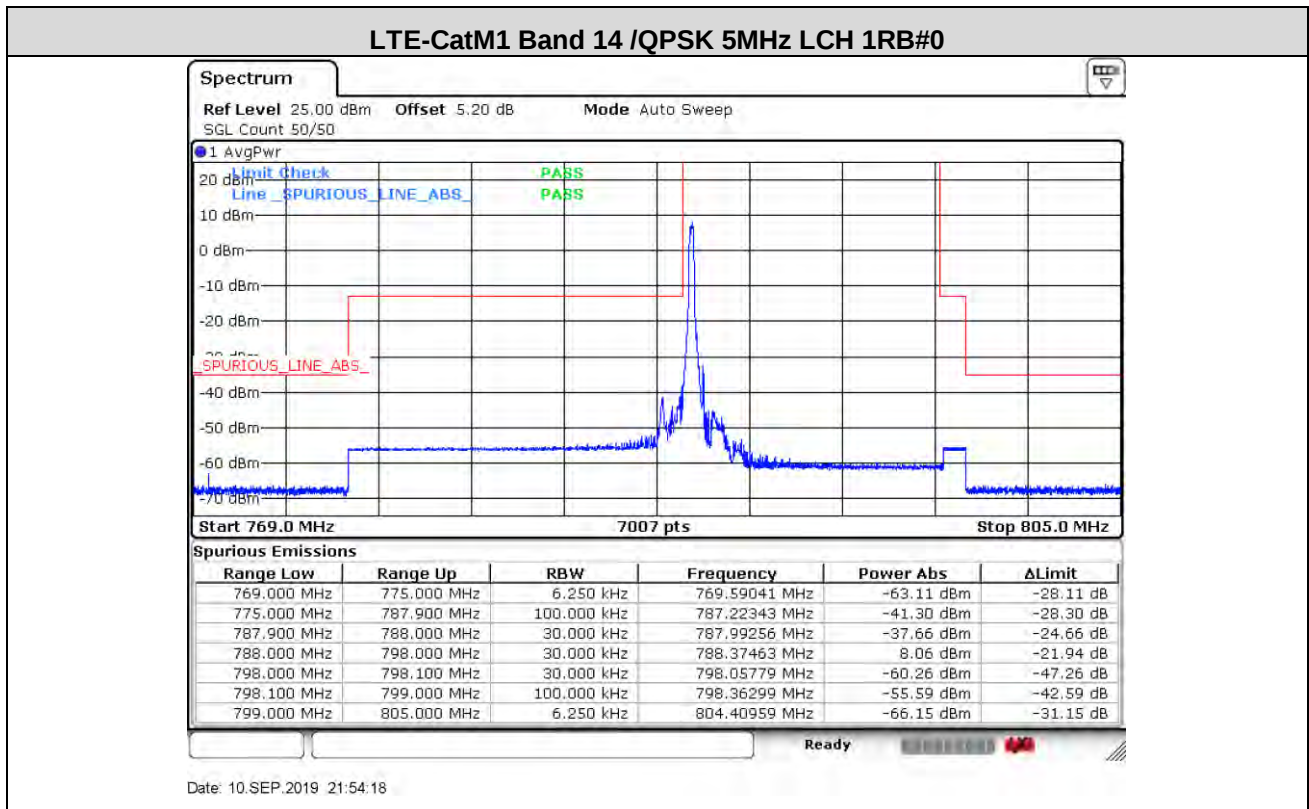
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## 5 Band Edges Compliance

### 5.1 Test Plots



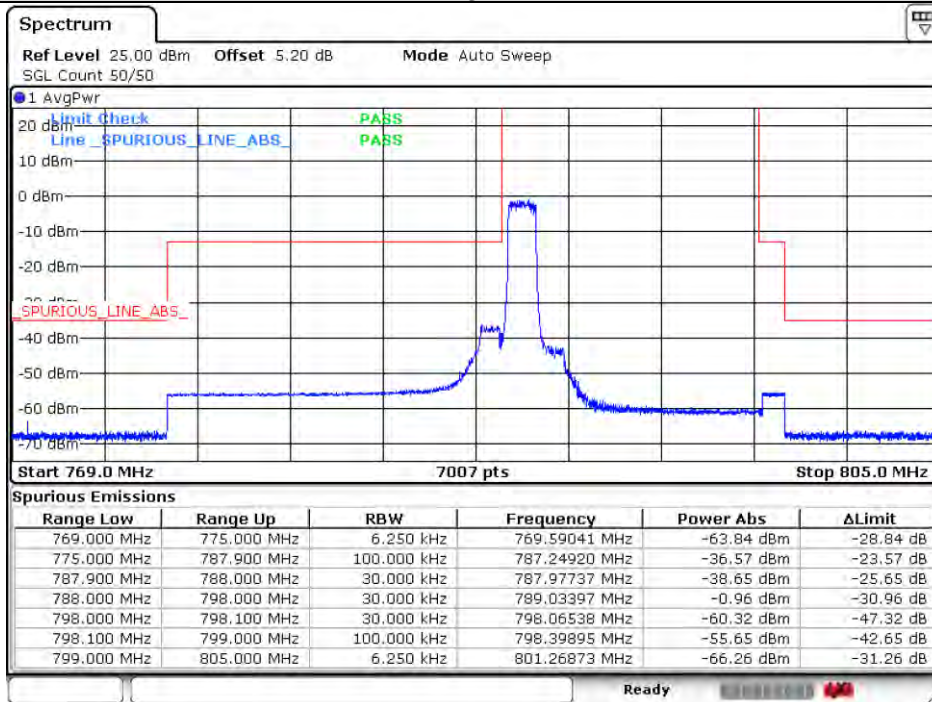
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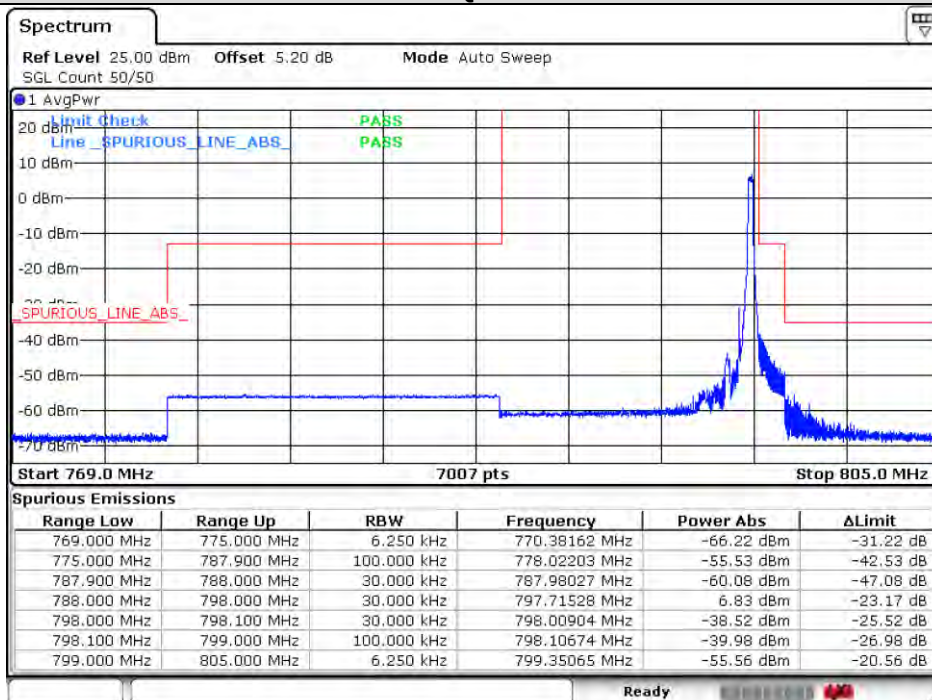
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## LTE-CatM1 Band 14 /QPSK 5MHz LCH 6RB#0



Date: 10.SEP.2019 21:58:16

## LTE-CatM1 Band 14 /QPSK 5MHz HCH 1RB#0



Date: 10.SEP.2019 21:47:08



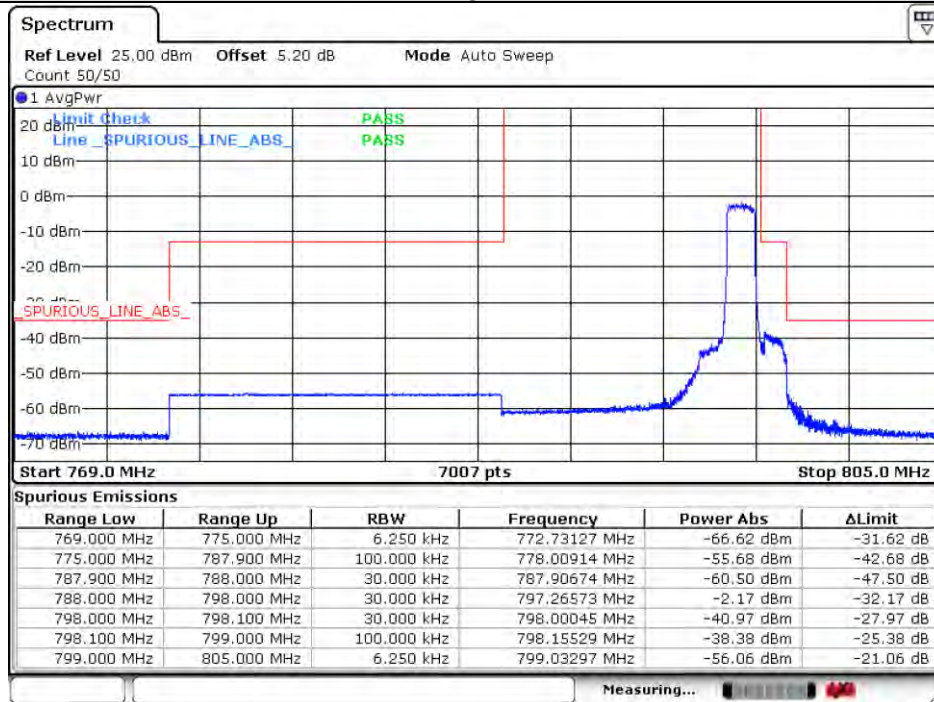
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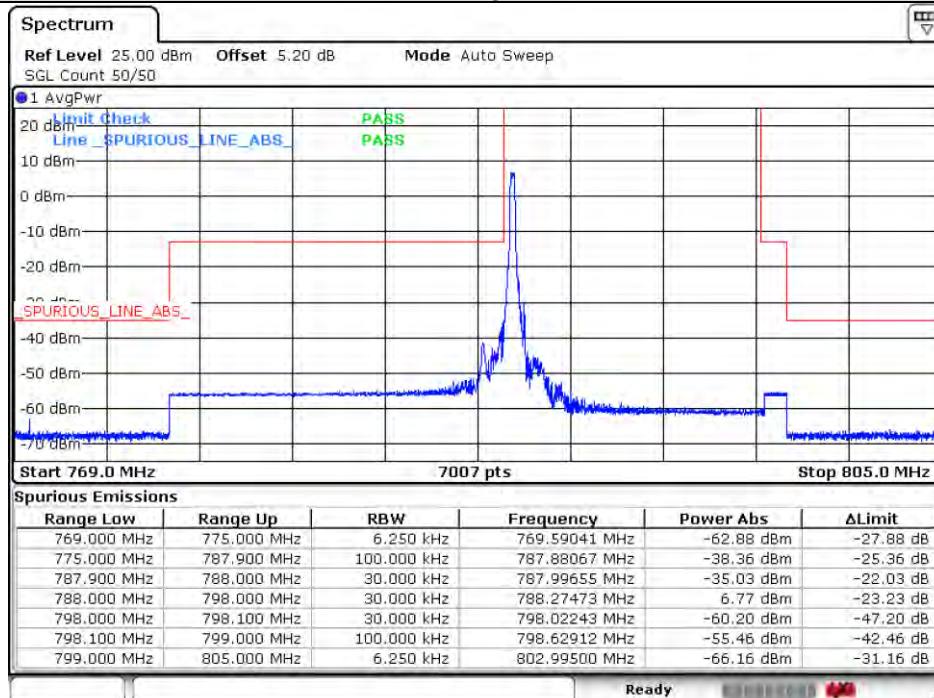
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## LTE-CatM1 Band 14 /QPSK 5MHz HCH 6RB#0



Date: 10.SEP.2019 21:45:55

## LTE-CatM1 Band 14 /16QAM 5MHz LCH 1RB#0



Date: 10.SEP.2019 21:52:14



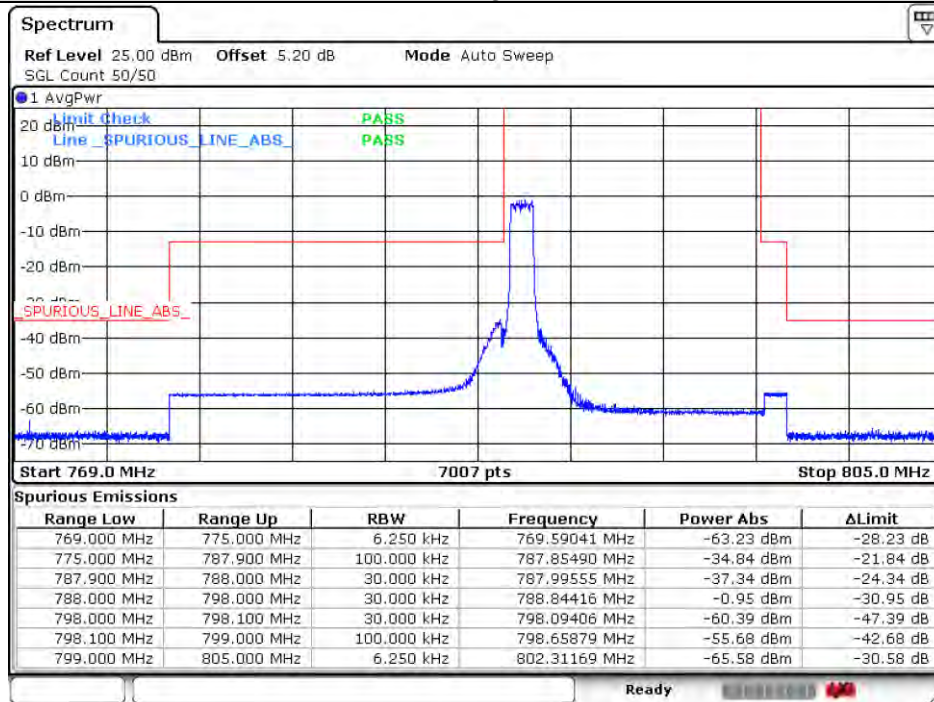
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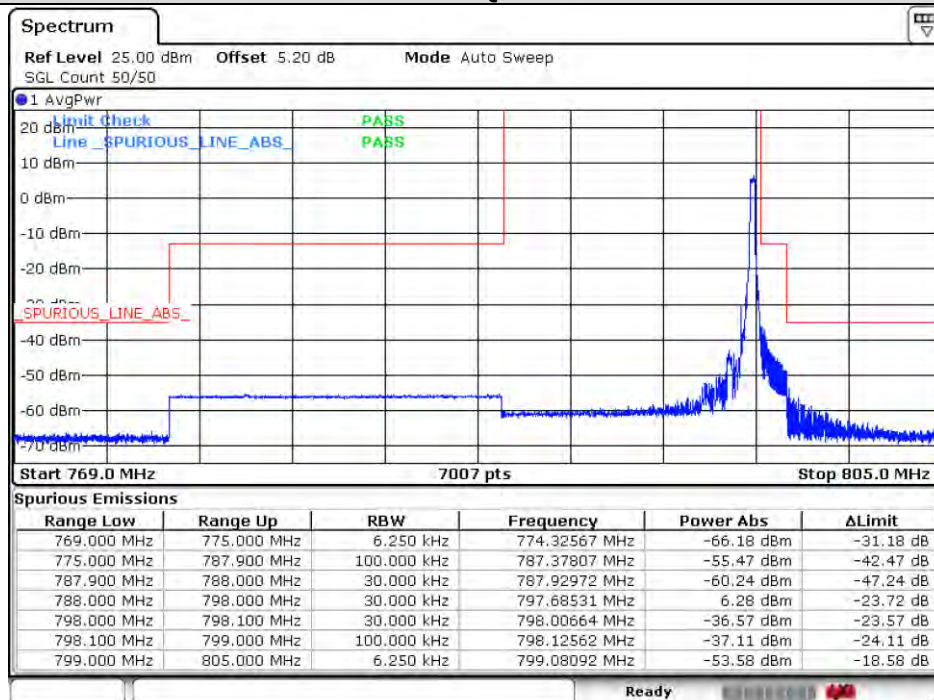
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## LTE-CatM1 Band 14 /16QAM 5MHz LCH 5RB#0



Date: 10.SEP.2019 21:50:53

## LTE-CatM1 Band 14 /16QAM 5MHz HCH 1RB#0



Date: 10.SEP.2019 21:48:05



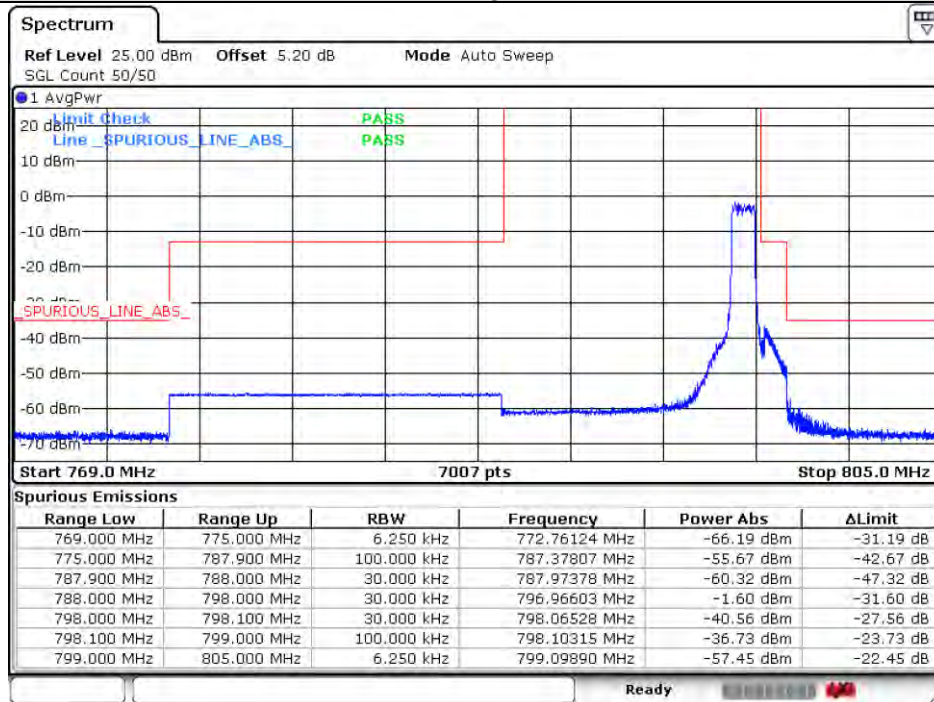
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LTE-CatM1 Band 14 /16QAM 5MHz HCH 5RB#0



Date: 10.SEP.2019 21:49:08



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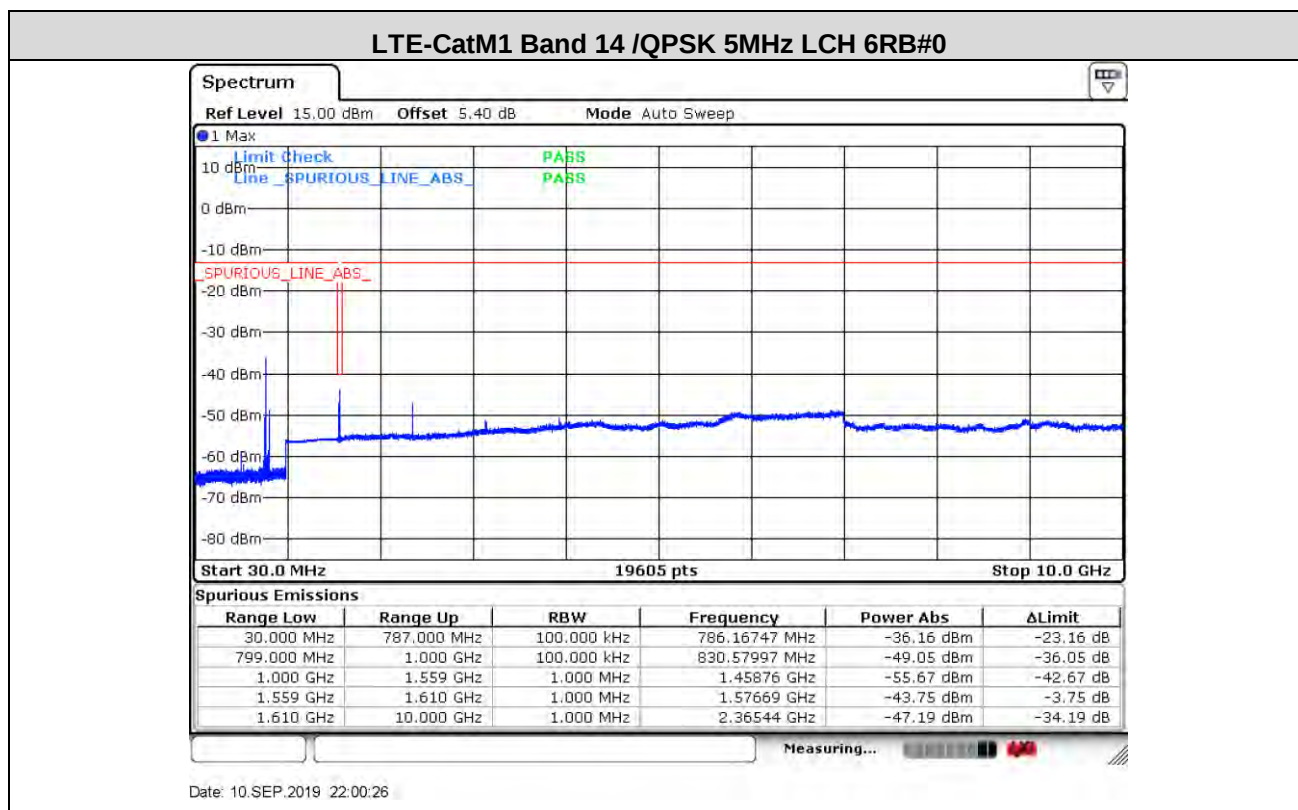


## 6 Spurious Emission at Antenna Terminal

NOTE1: 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  $< RBW/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (Span / RBW)$ " with  $k$  between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Part I - Test Plots

### 6.1 Test Plots



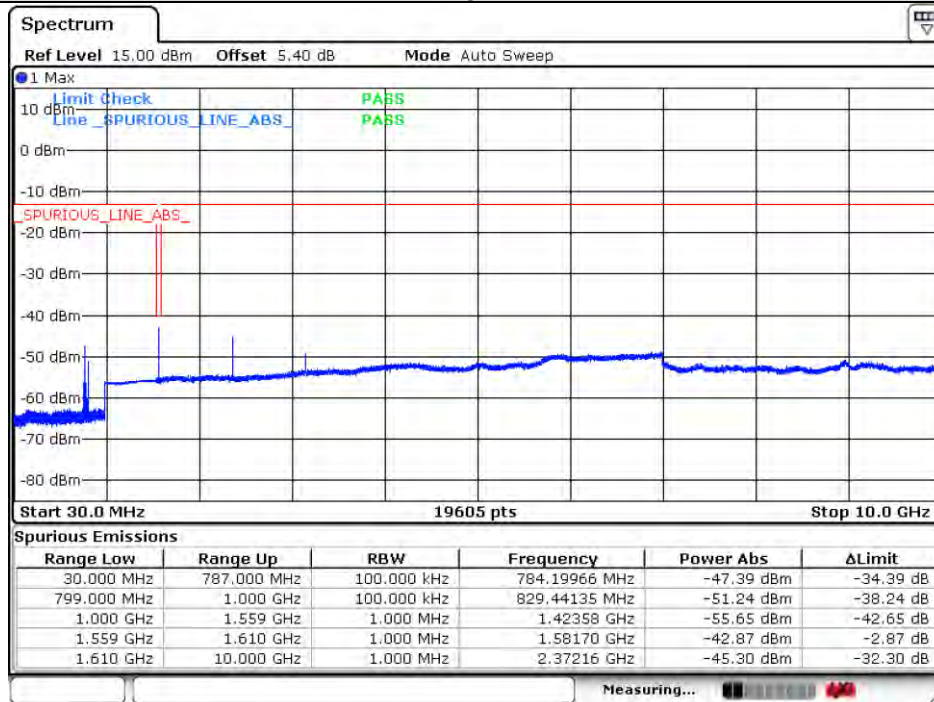
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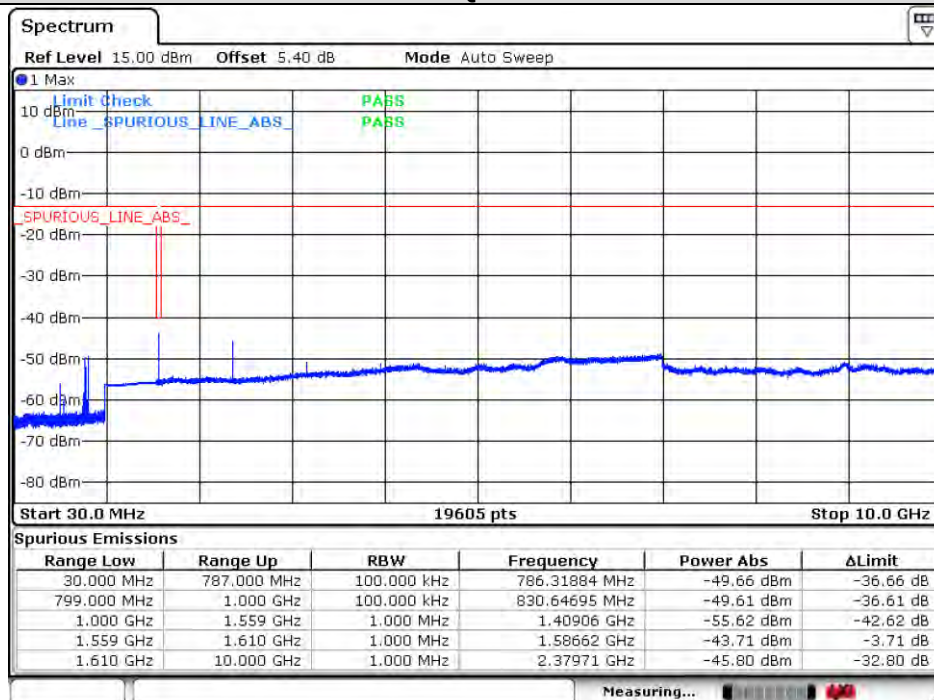
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## LTE-CatM1 Band 14 /QPSK 5MHz MCH 6RB#0



Date: 10.SEP.2019 22:02:10

## LTE-CatM1 Band 14 /QPSK 5MHz HCH 6RB#0



Date: 10.SEP.2019 22:03:18



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## 7 Field Strength of Spurious Radiation

### 7.1 For LTE-CatM1

#### 7.1.1 Test Band = LTE-CatM1 Band 14

##### 7.1.1.1 Test Mode =LTE-CatM1/QPSK

###### 7.1.1.1.1 Test Channel = LCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 112.5996        | -64.32      | -13.00           | 51.32           | Vertical     |
| 608.9249        | -63.81      | -13.00           | 50.81           | Vertical     |
| 1586.5173       | -57.27      | -40.00           | 17.27           | Vertical     |
| 2465.8932       | -41.21      | -13.00           | 28.21           | Vertical     |
| 14551.6621      | -42.95      | -13.00           | 29.95           | Vertical     |
| 17977.1991      | -35.15      | -13.00           | 22.15           | Vertical     |
| 41.2041         | -65.34      | -13.00           | 52.34           | Horizontal   |
| 233.3222        | -68.73      | -13.00           | 55.73           | Horizontal   |
| 1586.5173       | -53.36      | -40.00           | 13.36           | Horizontal   |
| 2465.8932       | -42.16      | -13.00           | 29.16           | Horizontal   |
| 3172.8069       | -51.22      | -13.00           | 38.22           | Horizontal   |
| 17989.7996      | -39.39      | -13.00           | 26.39           | Horizontal   |

###### 7.1.1.1.2 Test Channel = MCH

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 109.8835        | -64.54      | -13.00           | 51.54           | Vertical     |
| 997.1384        | -55.43      | -13.00           | 42.43           | Vertical     |
| 1603.4927       | -59.98      | -40.00           | 19.98           | Vertical     |
| 7306.3723       | -53.91      | -13.00           | 40.91           | Vertical     |
| 14537.2615      | -43.41      | -13.00           | 30.41           | Vertical     |
| 17813.3925      | -37.48      | -13.00           | 24.48           | Vertical     |
| 43.2897         | -64.01      | -13.00           | 51.01           | Horizontal   |
| 249.3280        | -68.92      | -13.00           | 55.92           | Horizontal   |
| 1581.7163       | -50.89      | -40.00           | 10.89           | Horizontal   |
| 2457.8916       | -24.03      | -13.00           | 11.03           | Horizontal   |
| 3163.2065       | -52.13      | -13.00           | 39.13           | Horizontal   |
| 17995.7998      | -38.32      | -13.00           | 25.32           | Horizontal   |



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**7.1.1.1.3 Test Channel = HCH**

| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dB) | Polarization |
|-----------------|-------------|------------------|-----------------|--------------|
| 105.5668        | -66.06      | -13.00           | 53.06           | Vertical     |
| 563.8662        | -66.12      | -13.00           | 53.12           | Vertical     |
| 1576.5153       | -55.30      | -40.00           | 15.30           | Vertical     |
| 2365.0730       | -54.89      | -13.00           | 41.89           | Vertical     |
| 16900.7560      | -40.80      | -13.00           | 27.80           | Vertical     |
| 17994.5998      | -34.61      | -13.00           | 21.61           | Vertical     |
| 42.6106         | -64.33      | -13.00           | 51.33           | Horizontal   |
| 233.0797        | -68.73      | -13.00           | 55.73           | Horizontal   |
| 1576.5153       | -52.51      | -40.00           | 12.51           | Horizontal   |
| 2468.2937       | -21.94      | -13.00           | 8.94            | Horizontal   |
| 3153.0061       | -50.21      | -13.00           | 37.21           | Horizontal   |
| 16994.9598      | -39.49      | -13.00           | 26.49           | Horizontal   |

**NOTE:**

- 1) The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) only the worst case data presented in this report.



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## 8 Frequency Stability

### 8.1 Frequency Error VS. Voltage

| Test Band     | Test Mode  | Test Channel | RB Config | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|------------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 14 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VL         | -6.25            | -0.00791              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VN         | -1.80            | -0.00227              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | LCH          | 6RB#0     | TN         | VH         | 4.42             | 0.00559               | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VL         | -3.04            | -0.00383              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VN         | -0.12            | -0.00016              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | MCH          | 6RB#0     | TN         | VH         | -4.00            | -0.00505              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VL         | 6.58             | 0.00827               | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VN         | -8.20            | -0.01030              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz  | HCH          | 6RB#0     | TN         | VH         | 6.35             | 0.00799               | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VL         | 8.20             | 0.01037               | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VN         | -6.69            | -0.00846              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | TN         | VH         | 6.68             | 0.00845               | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VL         | -1.51            | -0.00190              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VN         | 5.14             | 0.00648               | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | TN         | VH         | 2.27             | 0.00286               | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VL         | 1.91             | 0.00241               | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VN         | -4.86            | -0.00611              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | TN         | VH         | -8.92            | -0.01121              | ±2.5        | PASS    |



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## 8.2 Frequency Error VS. Temperature

| Test Band     | Test Mode | Test Channel | RB Config | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|-----------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -8.86      | -0.01121         | 0.017508              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -9.36      | -0.01184         | -0.012547             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -8.53      | -0.01078         | -0.014003             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 6.03       | 0.00763          | 0.006187              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | 5.76       | 0.00729          | 0.006955              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -6.49      | -0.00821         | -0.016698             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -1.05      | -0.00133         | 0.011909              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -2.35      | -0.00298         | 0.001220              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | LCH          | 6RB#0     | VN         | -3.56      | -0.00451         | 0.007929              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -3.71      | -0.00467         | 0.016568              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 0.34       | 0.00043          | 0.016446              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -7.20      | -0.00909         | 0.002400              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -2.83      | -0.00357         | 0.016012              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 1.24       | 0.00157          | 0.015179              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -7.81      | -0.00985         | -0.015610             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 7.15       | 0.00902          | -0.001632             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | 9.66       | 0.01218          | 0.012904              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | MCH          | 6RB#0     | VN         | -8.05      | -0.01015         | -0.003795             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 6.21       | 0.00780          | 0.003163              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -5.43      | -0.00682         | -0.006167             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -8.51      | -0.01070         | 0.001641              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 1.56       | 0.00196          | 0.012780              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 9.11       | 0.01145          | -0.009422             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -4.43      | -0.00557         | -0.001980             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | 4.59       | 0.00577          | -0.014349             | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -7.17      | -0.00901         | 0.014852              | ±2.5        | PASS    |
| CatM1 Band 14 | QPSK 5MHz | HCH          | 6RB#0     | VN         | -7.32      | -0.00921         | -0.006637             | ±2.5        | PASS    |



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| Test Band     | Test Mode  | Test Channel | RB Config | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Limit (ppm) | Verdict |
|---------------|------------|--------------|-----------|------------|------------|------------------|-----------------------|-------------|---------|
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 4.58       | 0.00579          | 0.003594              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -4.13      | -0.00523         | 0.002393              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -4.77      | -0.00604         | -0.003052             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -3.93      | -0.00498         | 0.000549              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -1.54      | -0.00194         | -0.006326             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -2.84      | -0.00359         | -0.012607             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 8.01       | 0.01013          | -0.003524             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | 2.84       | 0.00359          | 0.011604              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | LCH          | 5RB#0     | VN         | -1.57      | -0.00199         | 0.018083              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 0.75       | 0.00095          | 0.016472              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 7.00       | 0.00883          | -0.016890             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 6.98       | 0.00880          | -0.006811             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -6.72      | -0.00848         | -0.016711             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 2.92       | 0.00368          | -0.012702             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -7.07      | -0.00891         | 0.008911              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | -4.85      | -0.00612         | -0.001607             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 0.35       | 0.00045          | -0.015650             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | MCH          | 5RB#0     | VN         | 2.16       | 0.00272          | -0.018798             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 9.89       | 0.01243          | -0.008062             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -3.15      | -0.00396         | -0.005881             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | 0.07       | 0.00008          | -0.006449             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -3.08      | -0.00387         | -0.012527             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -5.83      | -0.00733         | -0.013053             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -0.31      | -0.00039         | 0.008646              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -5.23      | -0.00657         | 0.001522              | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -1.31      | -0.00164         | -0.003656             | ±2.5        | PASS    |
| CatM1 Band 14 | 16QAM 5MHz | HCH          | 5RB#0     | VN         | -0.83      | -0.00104         | -0.001781             | ±2.5        | PASS    |

The End



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