



# Appendix for test report

# 1Appendix\_A: Effective (Isotropic) Radiated Power Output Data

## Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dBm] | ERP [dBm]  | Limit [dBm] | Verdict |
|-----------|-----------|--------------|---------------|------------|-------------|---------|
| WCDMA850  | UMTS/TM1  | LCH          | 24.22         | 16.95      | 38.5        | PASS    |
|           |           | MCH          | 24.18         | 16.84      | 38.5        | PASS    |
|           |           | HCH          | 24.19         | 17.13      | 38.5        | PASS    |
| Test Band | Test Mode | Test Channel | Measured[dBm] | EIRP [dBm] | Limit [dBm] | Verdict |
| WCDMA1900 | UMTS/TM1  | LCH          | 24.17         | 23.88      | 33          | PASS    |
|           |           | MCH          | 24.12         | 23.75      | 33          | PASS    |
|           |           | HCH          | 24.1          | 23.83      | 33          | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | 24.01         | 22.03      | 30          | PASS    |
|           |           | MCH          | 23.82         | 21.68      | 30          | PASS    |
|           |           | HCH          | 23.85         | 21.76      | 30          | PASS    |

Note1:

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

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP = Signal Generator Level

Note2:

$$\text{SET Span} = 1.5 * \text{OBW}$$

SET RBW = 1% of the OBW, not to exceed 1MHz

$$\text{SET VBW} \geq 3 * \text{RBW}$$

SET Sweep time = auto - couple.

Detector: RMS

## 2Appendix\_B: Peak-to-Average Ratio

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
|-----------|-----------|--------------|--------------|------------|---------|
| WCDMA850  | UMTS/TM1  | LCH          | 3.11         | 13         | PASS    |
|           |           | MCH          | 3.12         | 13         | PASS    |
|           |           | HCH          | 3.17         | 13         | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | 3.22         | 13         | PASS    |
|           |           | MCH          | 3.07         | 13         | PASS    |
|           |           | HCH          | 3.1          | 13         | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | 2.78         | 13         | PASS    |
|           |           | MCH          | 3.04         | 13         | PASS    |
|           |           | HCH          | 2.91         | 13         | PASS    |

## 3Appendix\_C: Modulation Characteristics

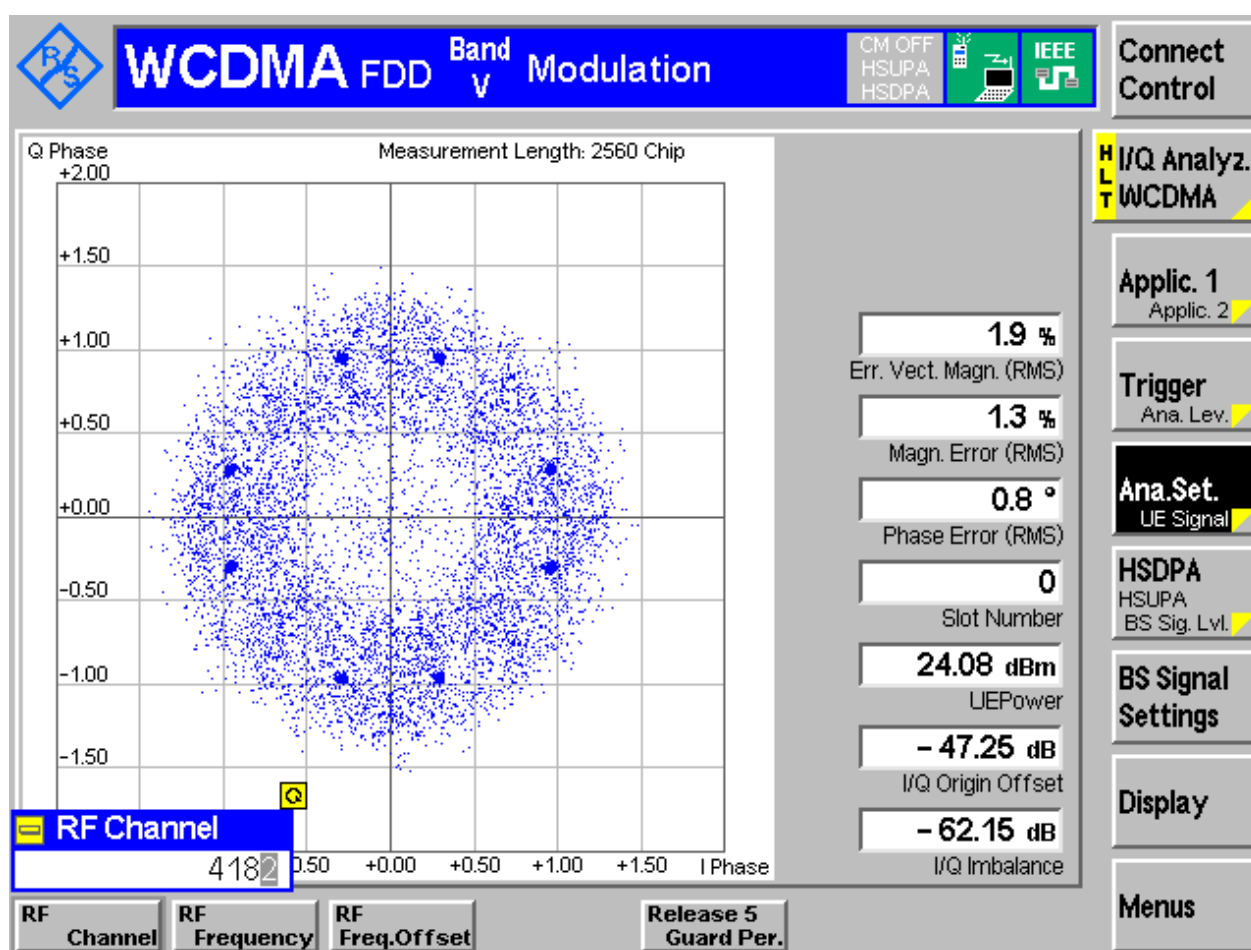
### Part I - Test Plots

#### 3.1 For UMTS

##### 3.1.1 Test Band = WCDMA850

##### 3.1.1.1 Test Mode = UMTS/TM1

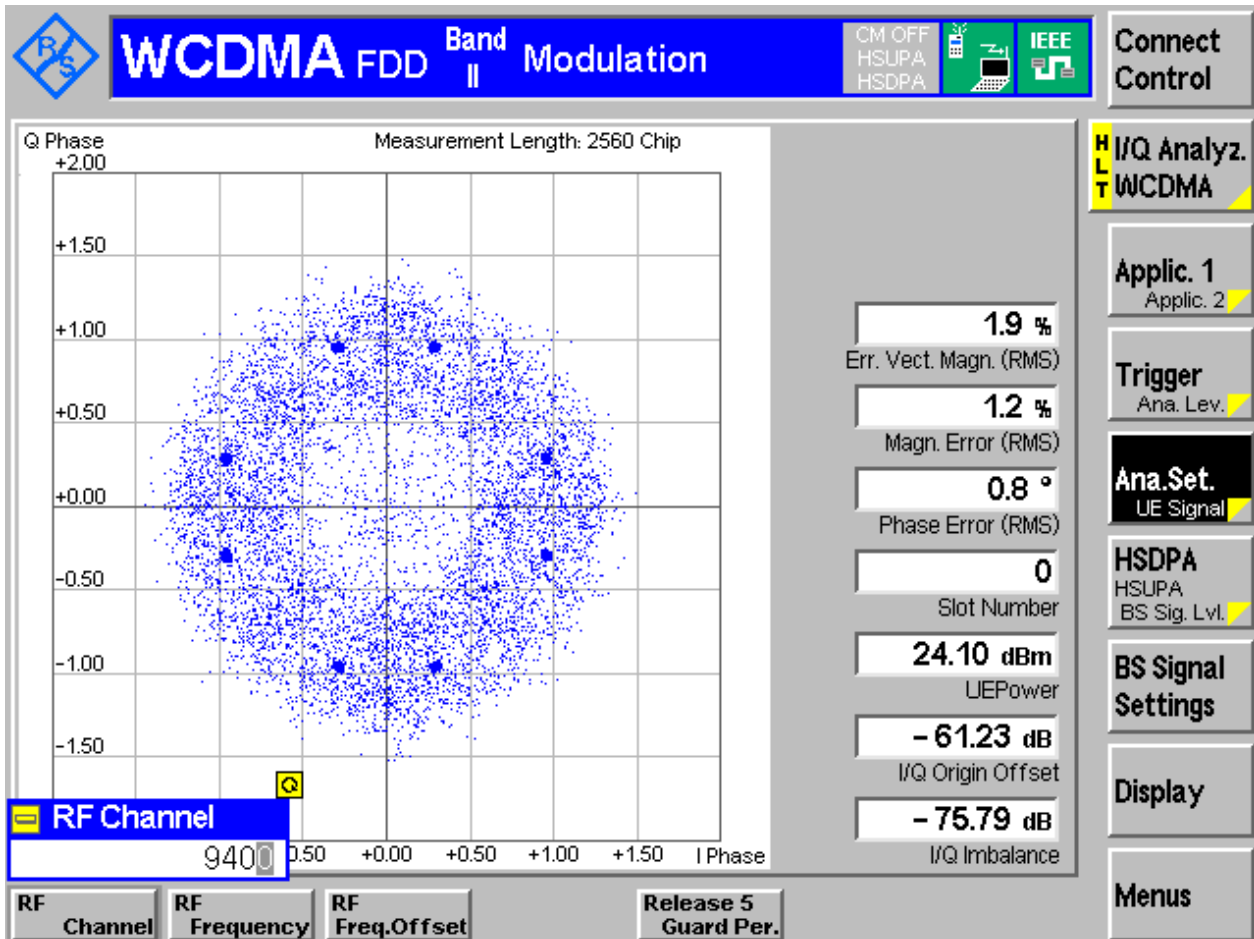
##### 3.1.1.1.1 Test Channel = MCH



### 3.1.2 Test Band = WCDMA1900

#### 3.1.2.1 Test Mode = UMTS/TM1

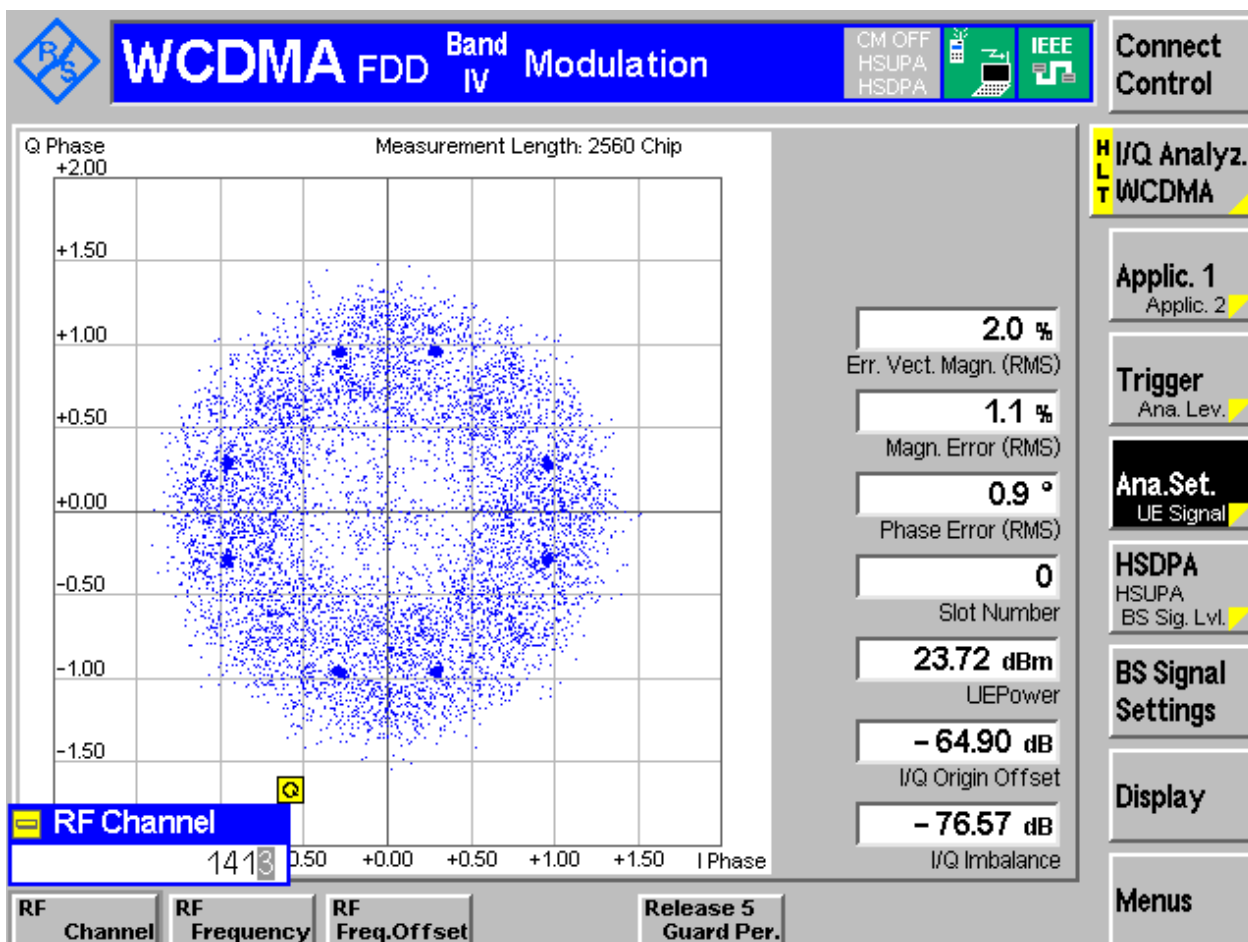
##### 3.1.2.1.1 Test Channel = MCH



### 3.1.3 Test Band = WCDMA1700

#### 3.1.3.1 Test Mode = UMTS/TM1

##### 3.1.3.1.1 Test Channel = MCH



## 4Appendix\_D: Bandwidth

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Occupied Bandwidth [MHz] | Emission Bandwidth [MHz] | Verdict |
|-----------|-----------|--------------|--------------------------|--------------------------|---------|
| WCDMA1900 | UMTS/TM1  | LCH          | 4.16                     | 4.70                     | Pass    |
|           |           | MCH          | 4.16                     | 4.69                     | Pass    |
|           |           | HCH          | 4.15                     | 4.70                     | Pass    |
| WCDMA1700 | UMTS/TM1  | LCH          | 4.16                     | 4.71                     | Pass    |
|           |           | MCH          | 4.15                     | 4.70                     | Pass    |
|           |           | HCH          | 4.16                     | 4.71                     | Pass    |
| WCDMA850  | UMTS/TM1  | LCH          | 4.16                     | 4.70                     | Pass    |
|           |           | MCH          | 4.16                     | 4.70                     | Pass    |
|           |           | HCH          | 4.16                     | 4.70                     | Pass    |

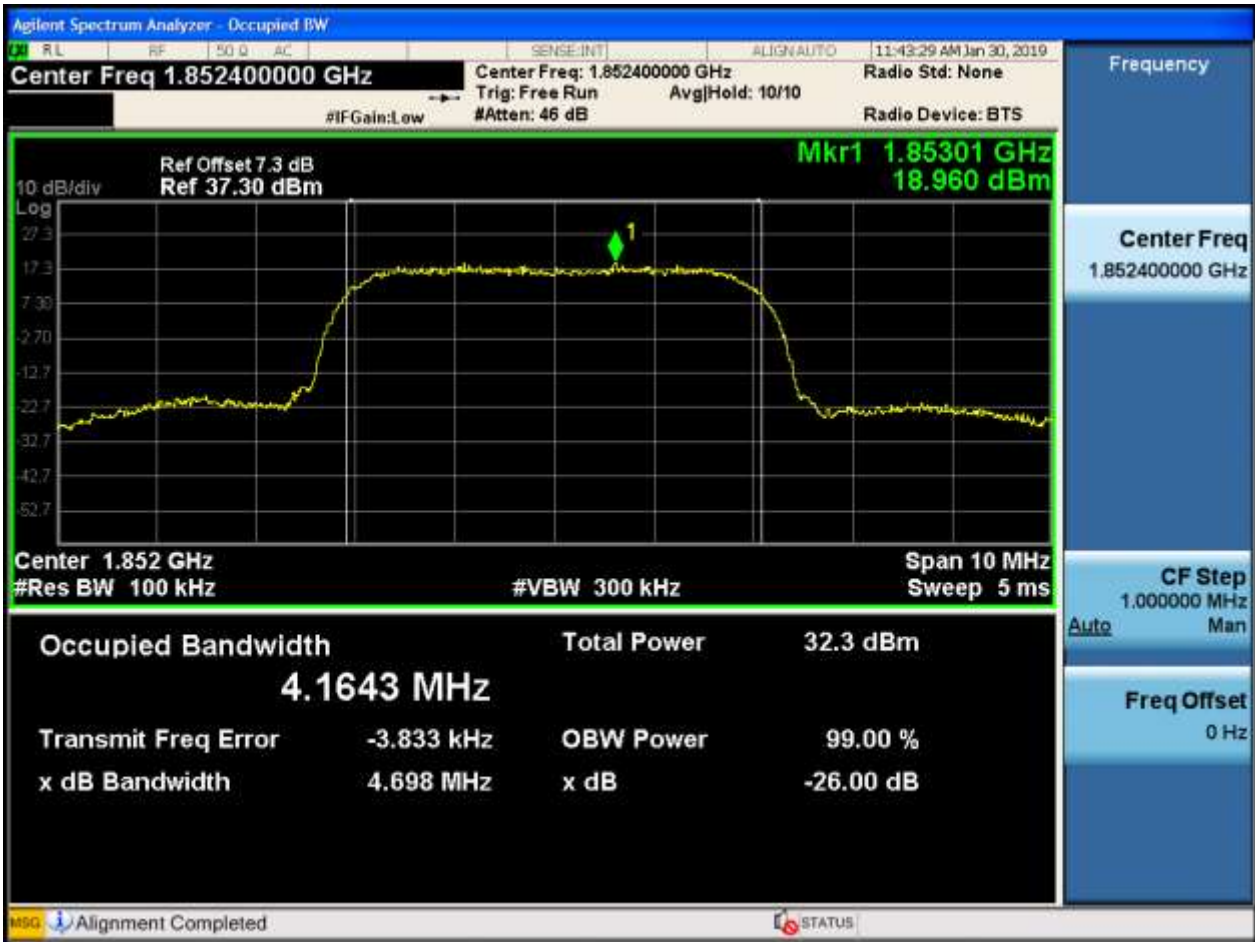
Part II - Test Plots

4.1 For UMTS

4.1.1 Test Band = WCDMA1900

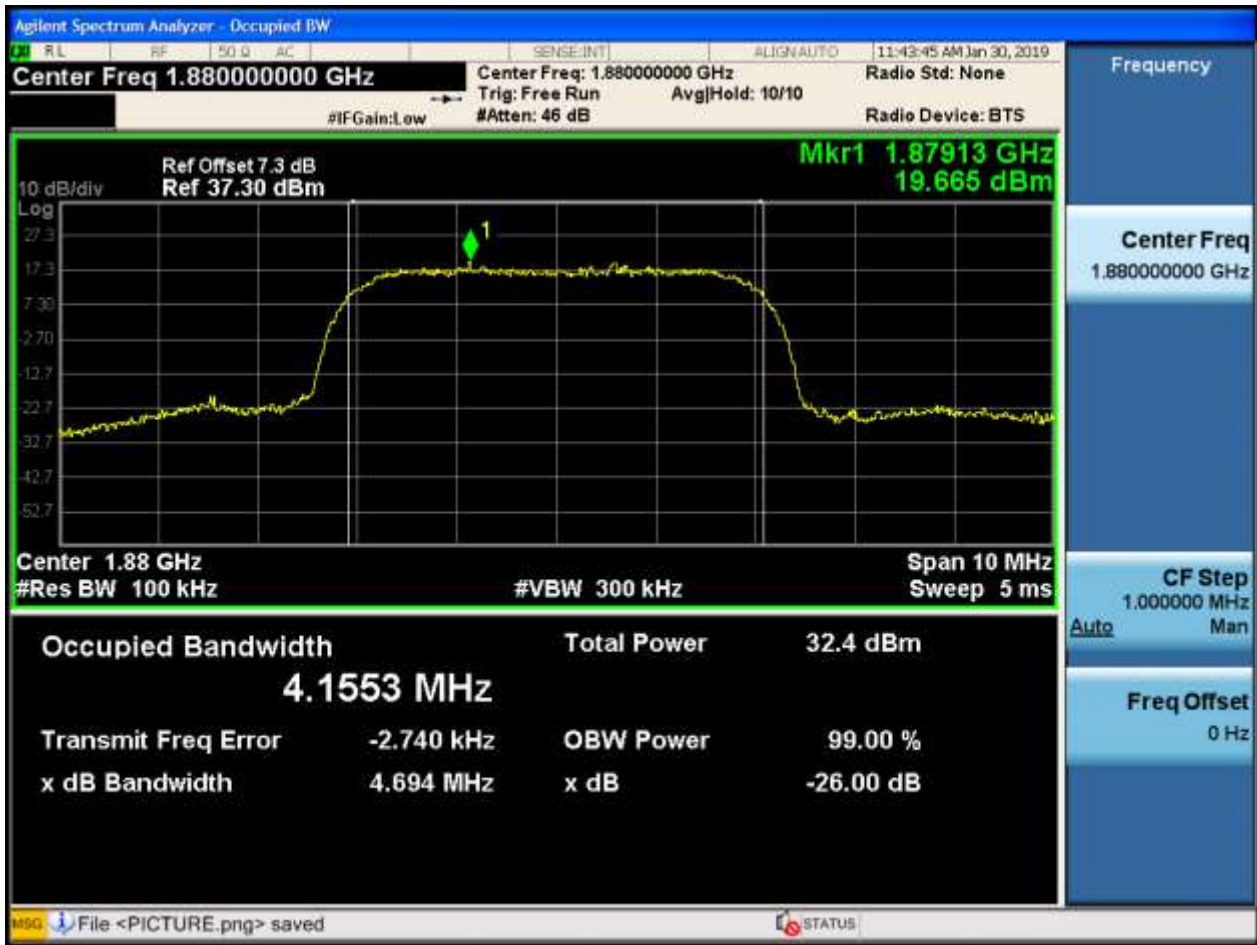
4.1.1.1 Test Mode = UMTS/TM1

4.1.1.1.1 Test Channel = LCH





4.1.1.1.2 Test Channel = MCH



4.1.1.1.3 Test Channel = HCH



4.1.2 Test Band = WCDMA1700

4.1.2.1 Test Mode = UMTS/TM1

4.1.2.1.1 Test Channel = LCH



4.1.2.1.2 Test Channel = MCH



4.1.2.1.3 Test Channel = HCH



4.1.3 Test Band = WCDMA850

4.1.3.1 Test Mode = UMTS/TM1

4.1.3.1.1 Test Channel = LCH



4.1.3.1.2 Test Channel = MCH



4.1.3.1.3 Test Channel = HCH







### 5.1.1.1.2 Test Channel = HCH



### 5.1.2 Test Band = WCDMA1700

#### 5.1.2.1 Test Mode = UMTS/TM1

##### 5.1.2.1.1 Test Channel = LCH



## 5.1.2.1.2 Test Channel = HCH



### 5.1.3 Test Band = WCDMA850

#### 5.1.3.1 Test Mode = UMTS/TM1

##### 5.1.3.1.1 Test Channel = LCH



### 5.1.3.1.2 Test Channel = HCH



## 6Appendix\_F: Spurious Emission at Antenna Terminal

NOTE: 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

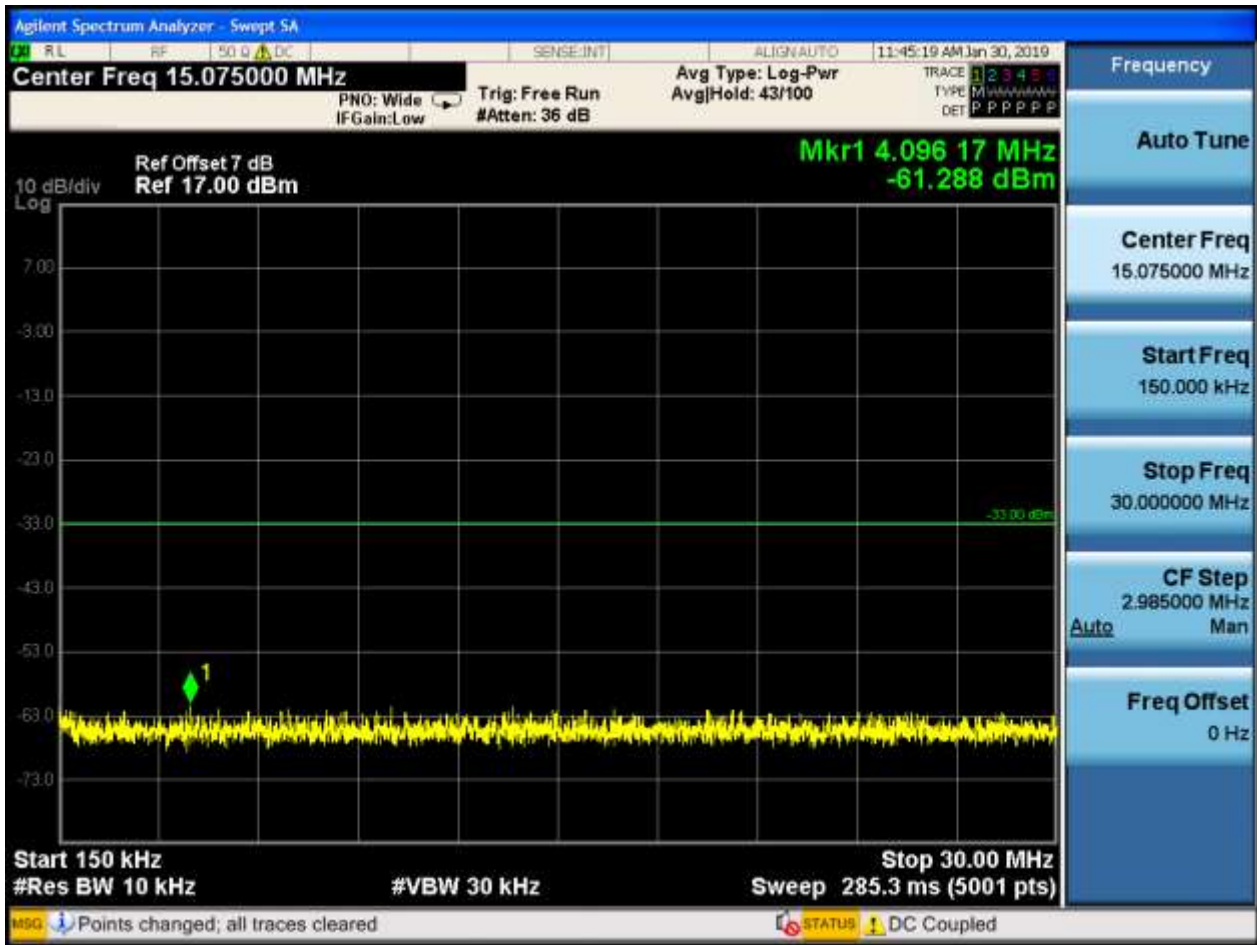
#### 6.1 For UMTS

##### 6.1.1 Test Band = WCDMA1900

##### 6.1.1.1 Test Mode = UMTS/TM1

##### 6.1.1.1.1 Test Channel = LCH









## 6.1.1.1.2 Test Channel = MCH

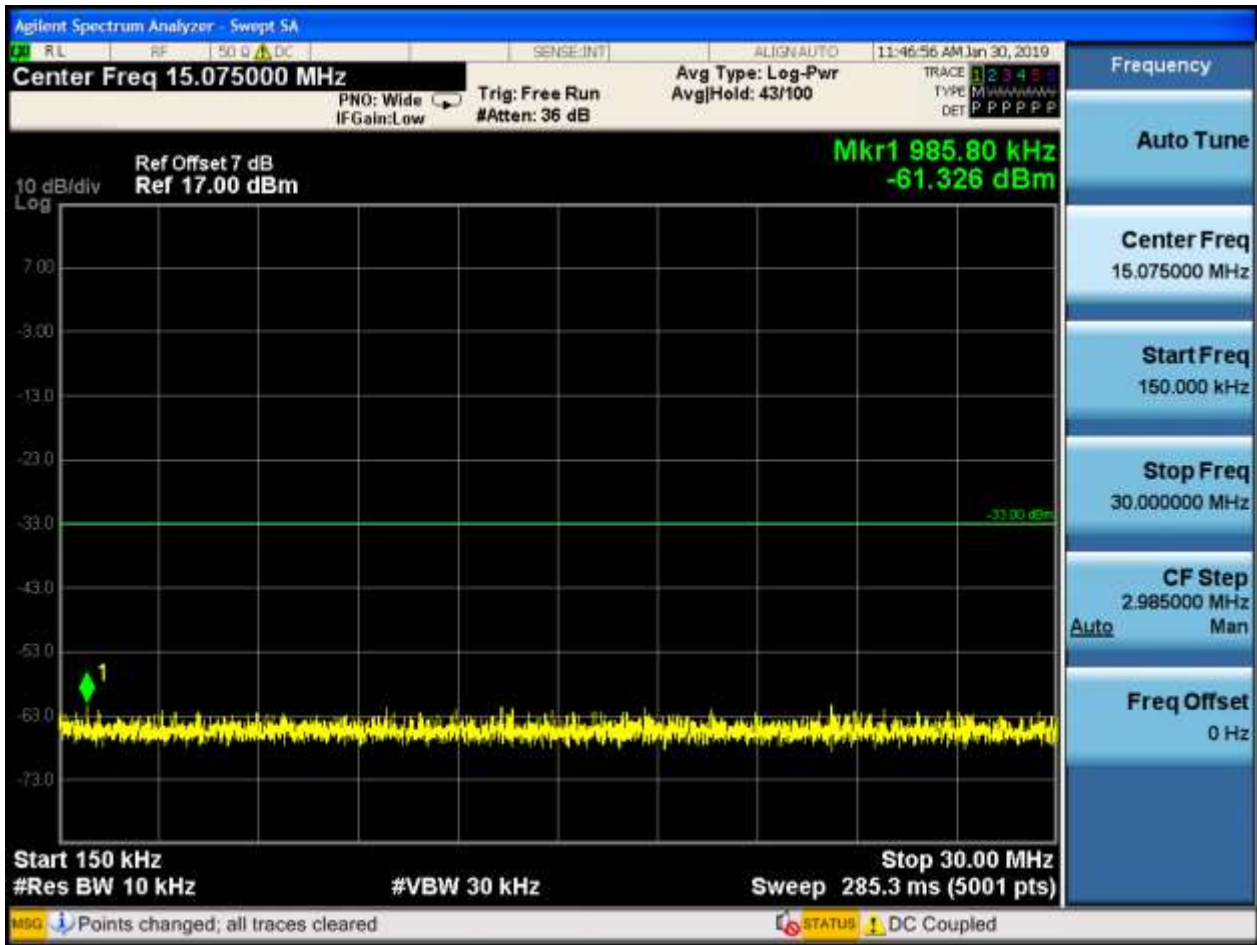






## 6.1.1.1.3 Test Channel = HCH



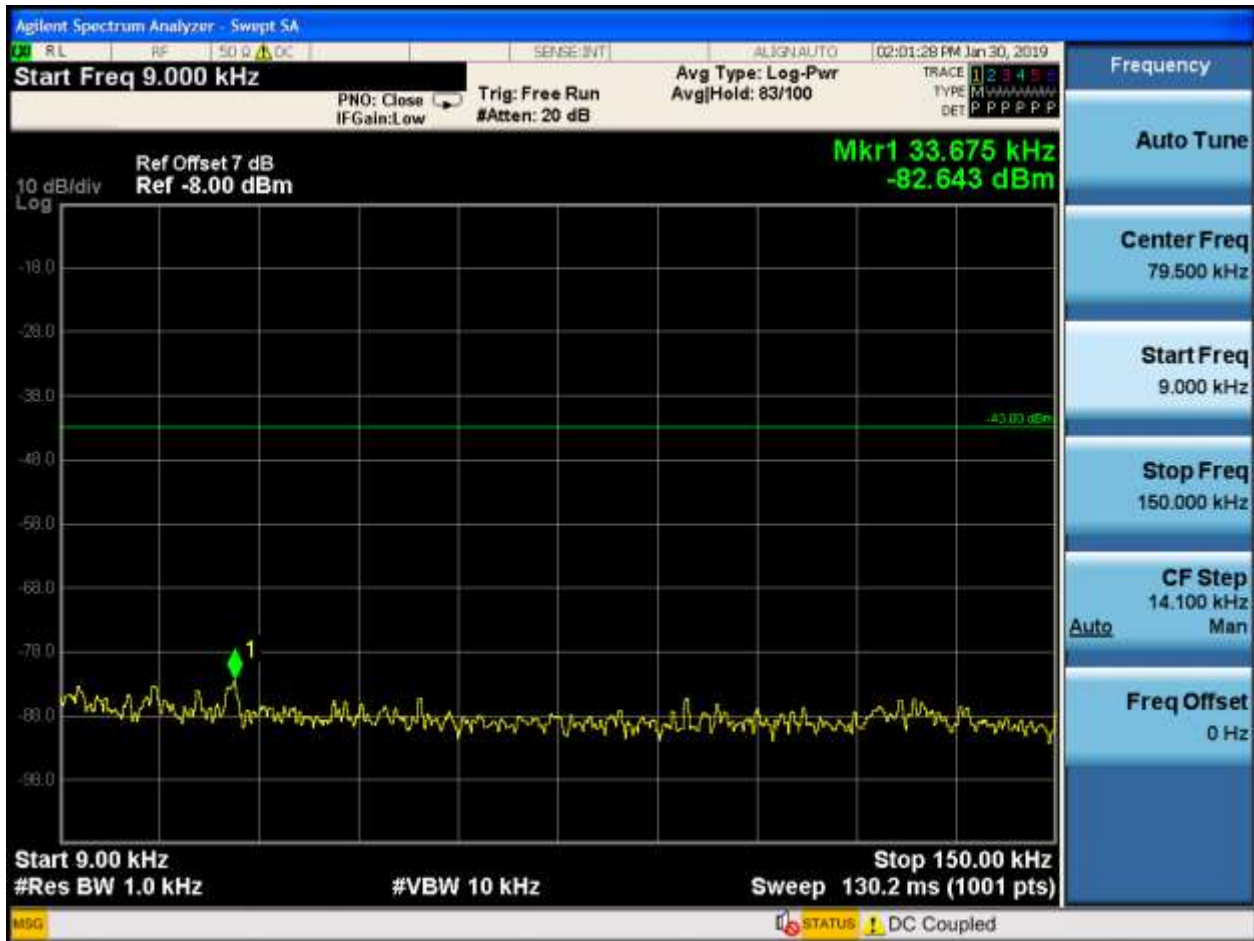




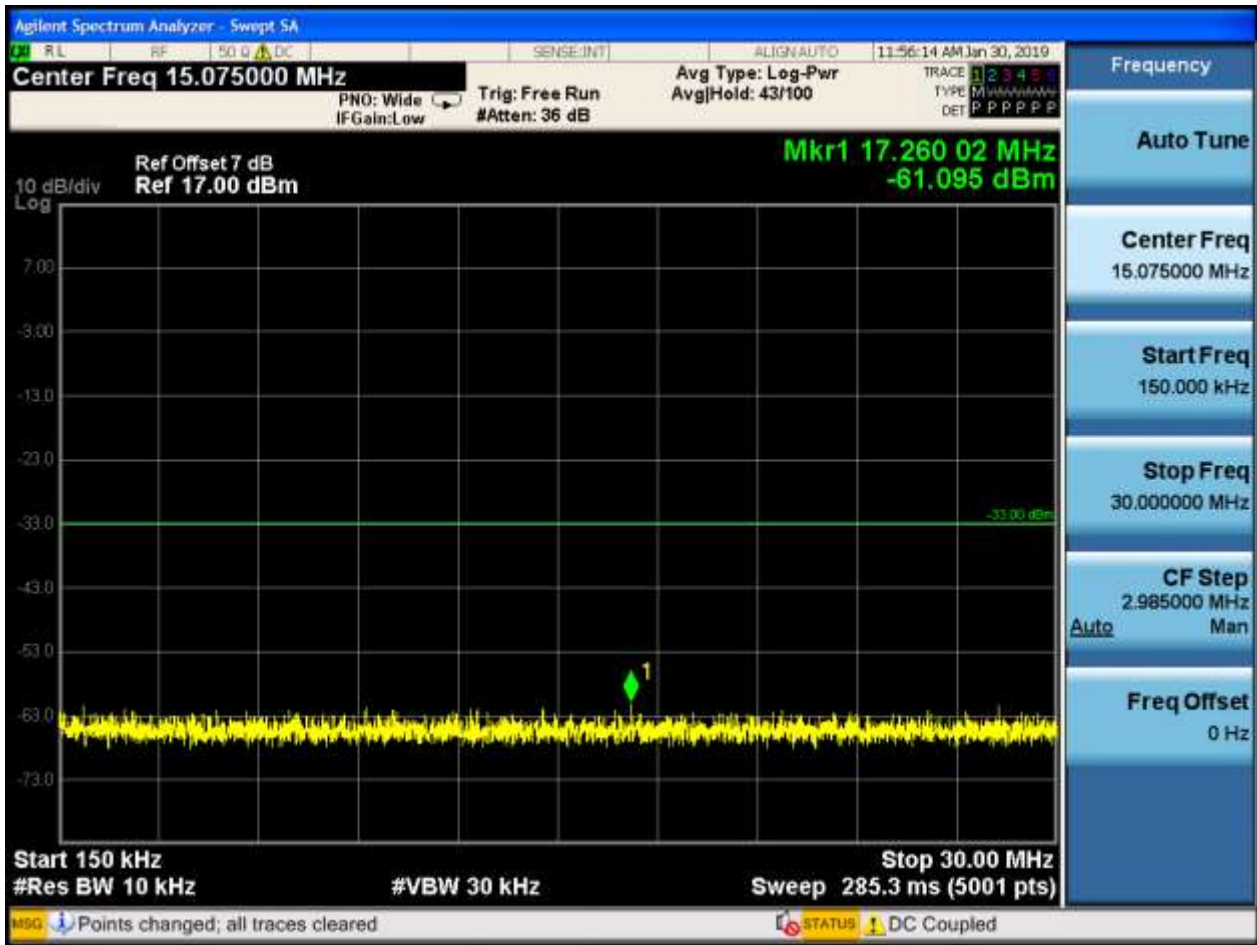
## 6.1.2 Test Band = WCDMA1700

### 6.1.2.1 Test Mode = UMTS/TM1

#### 6.1.2.1.1 Test Channel = LCH

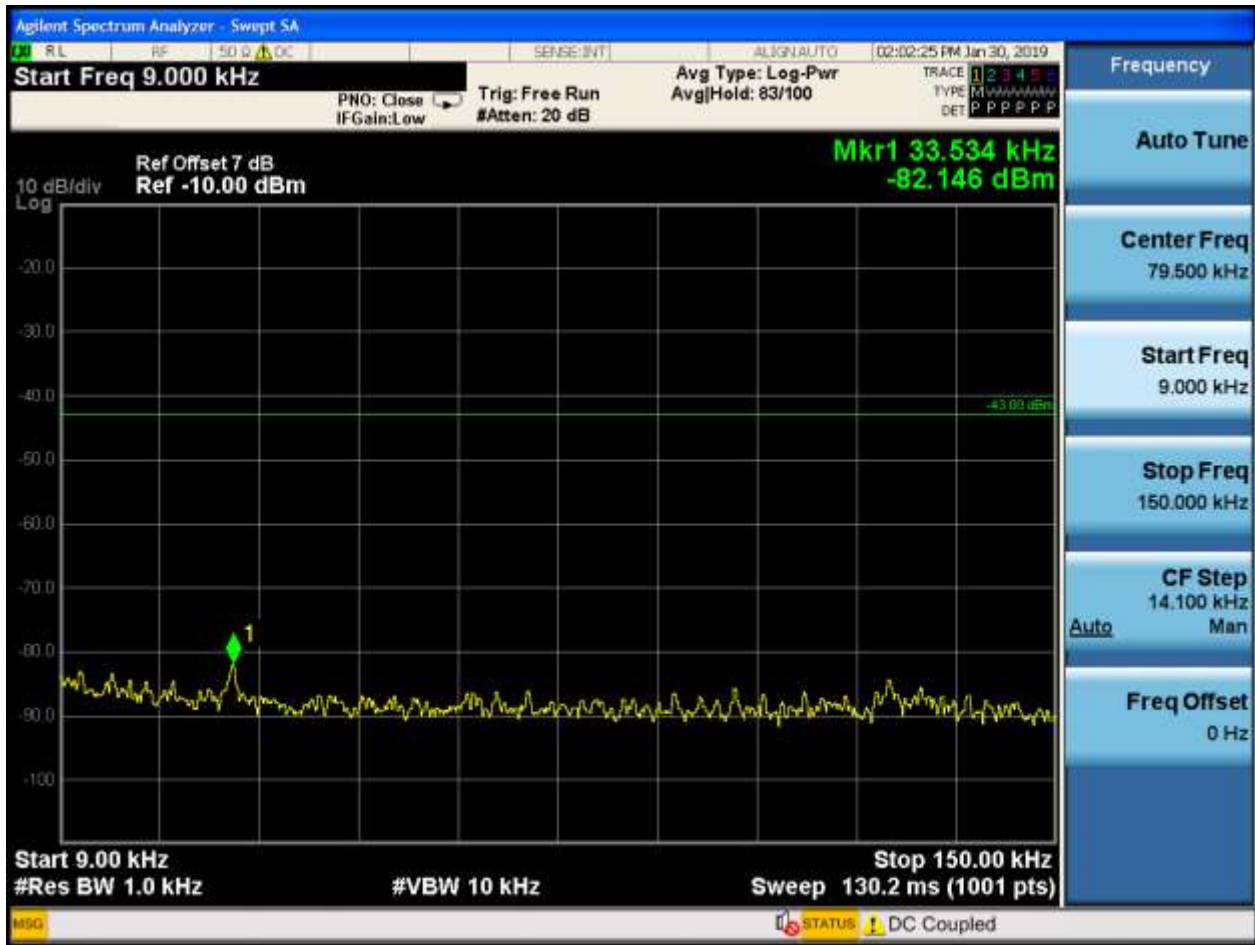


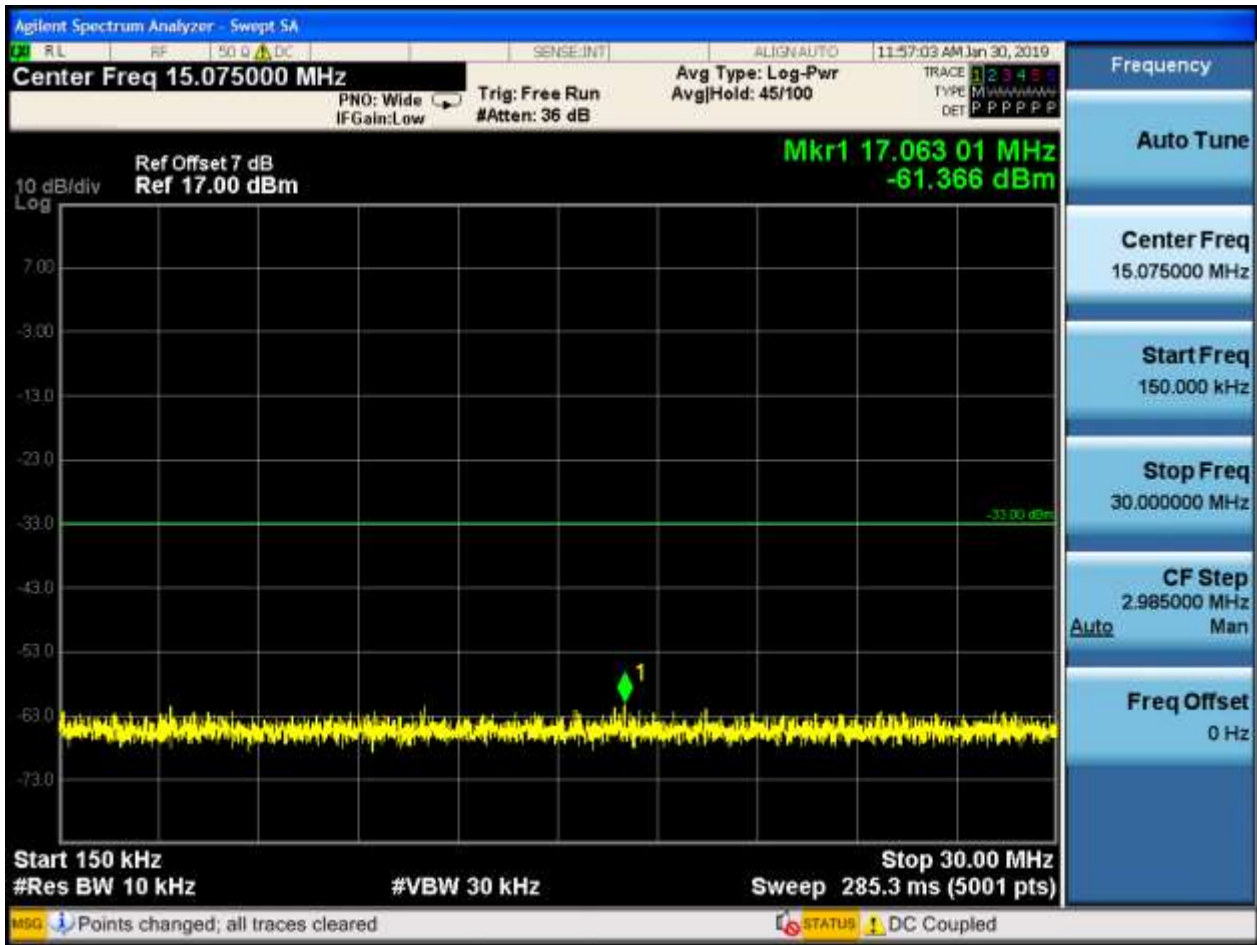


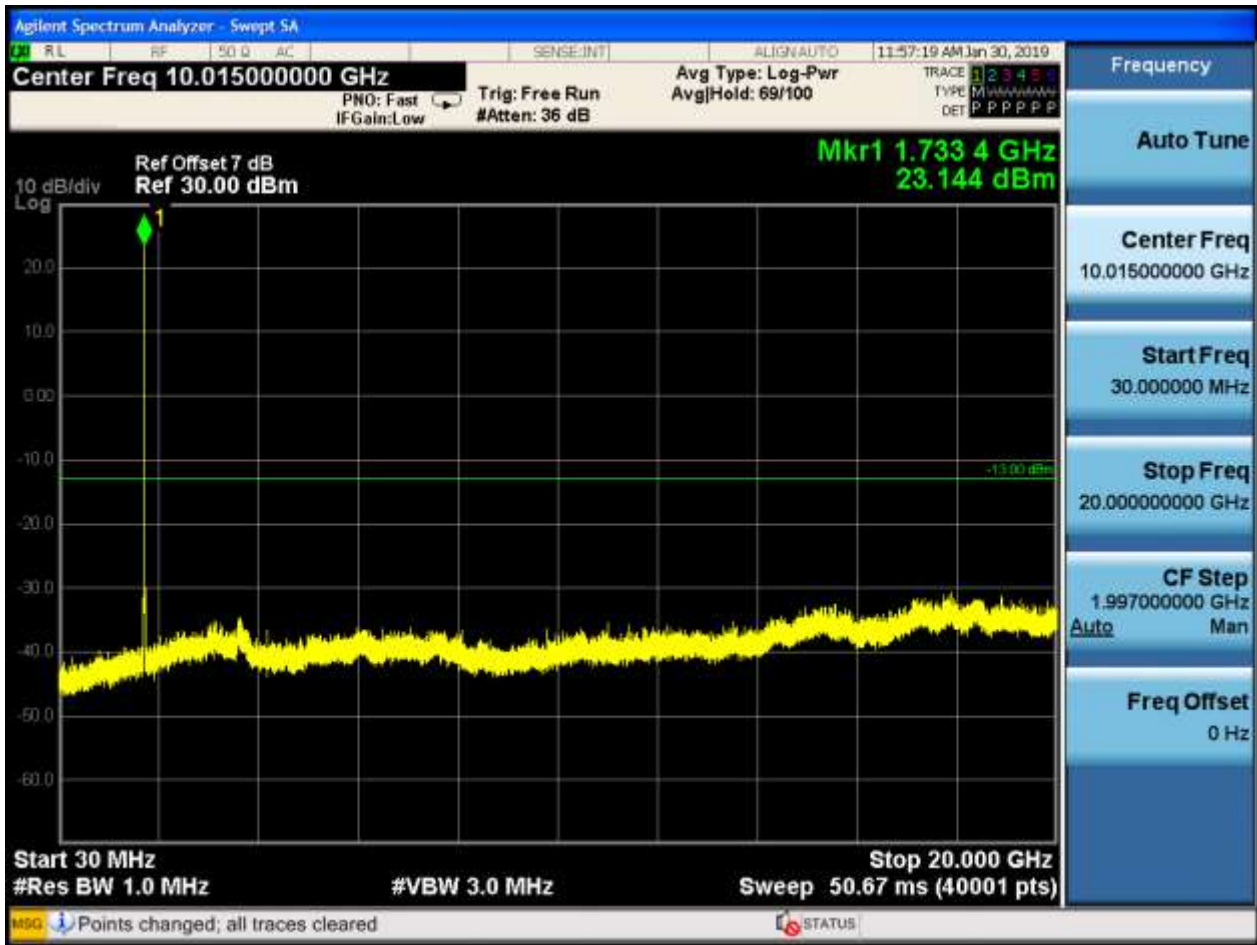




## 6.1.2.1.2 Test Channel = MCH

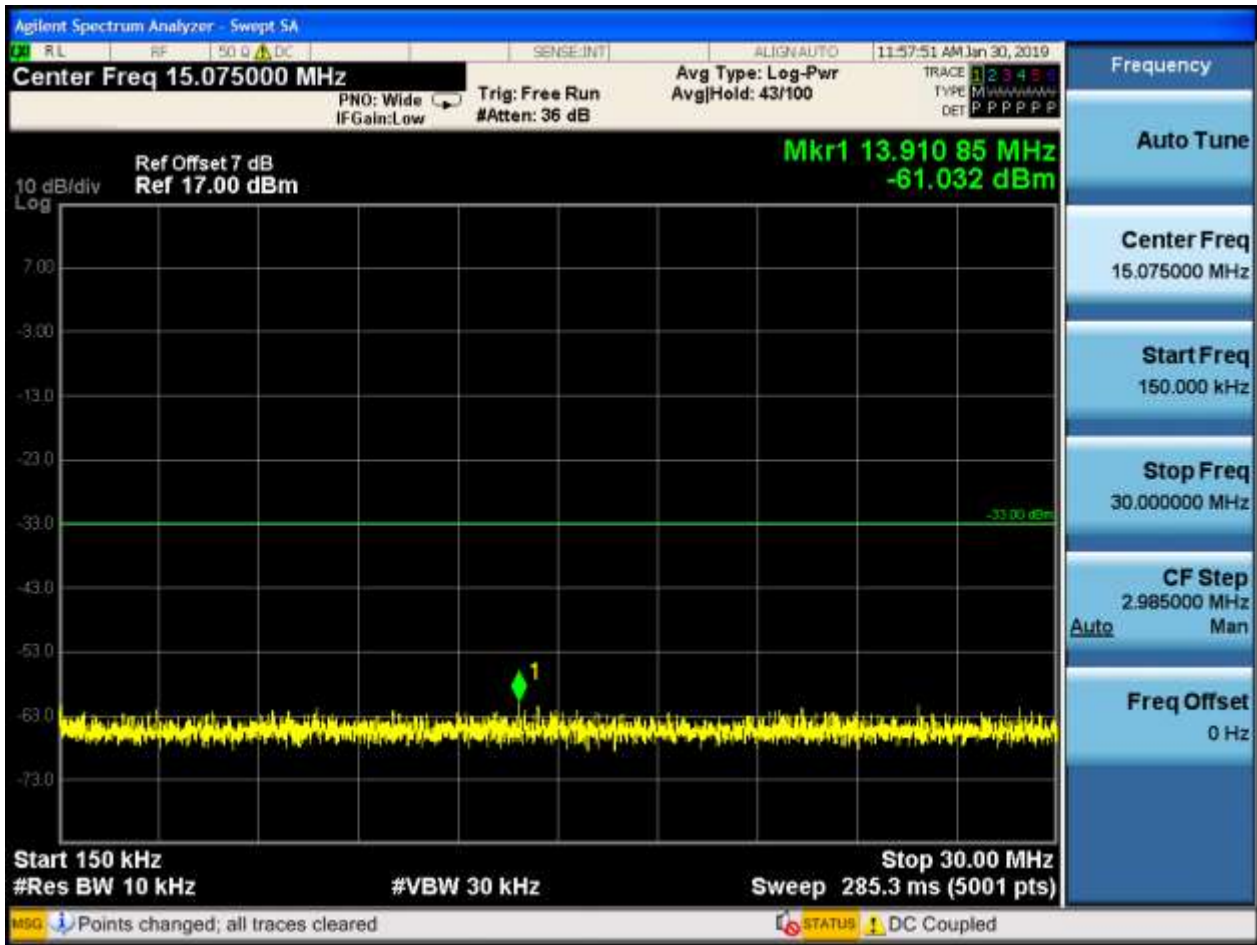






## 6.1.2.1.3 Test Channel = HCH





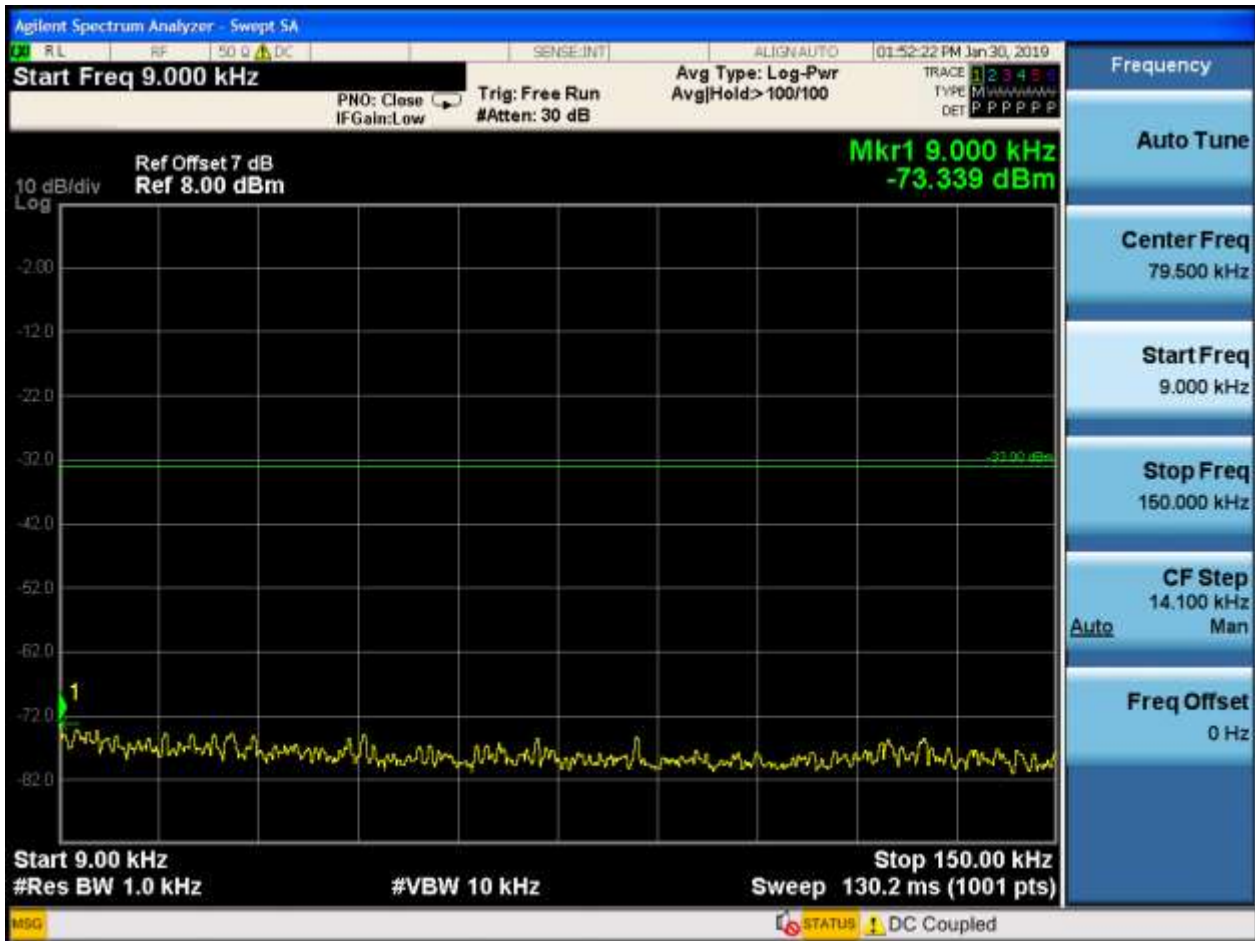


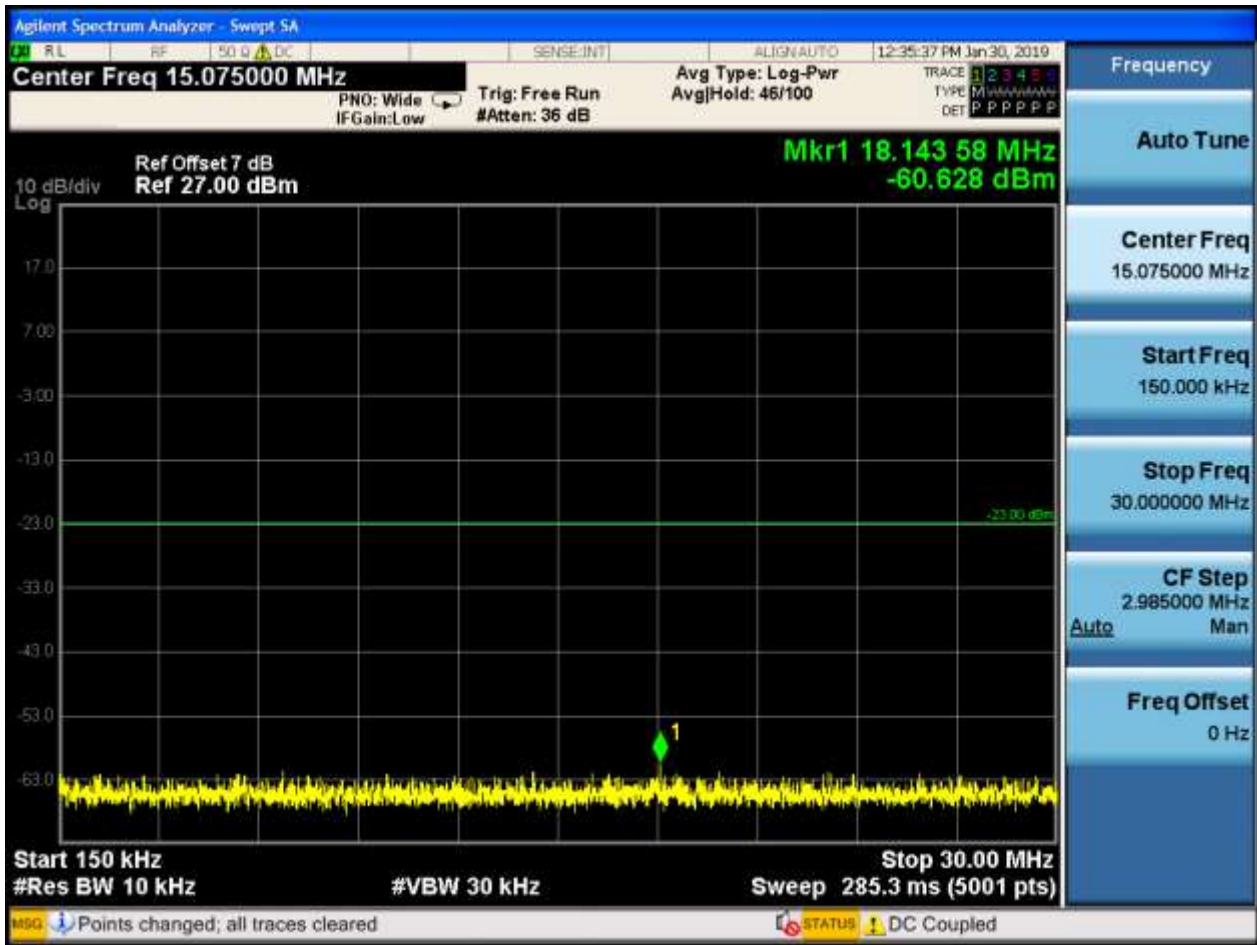


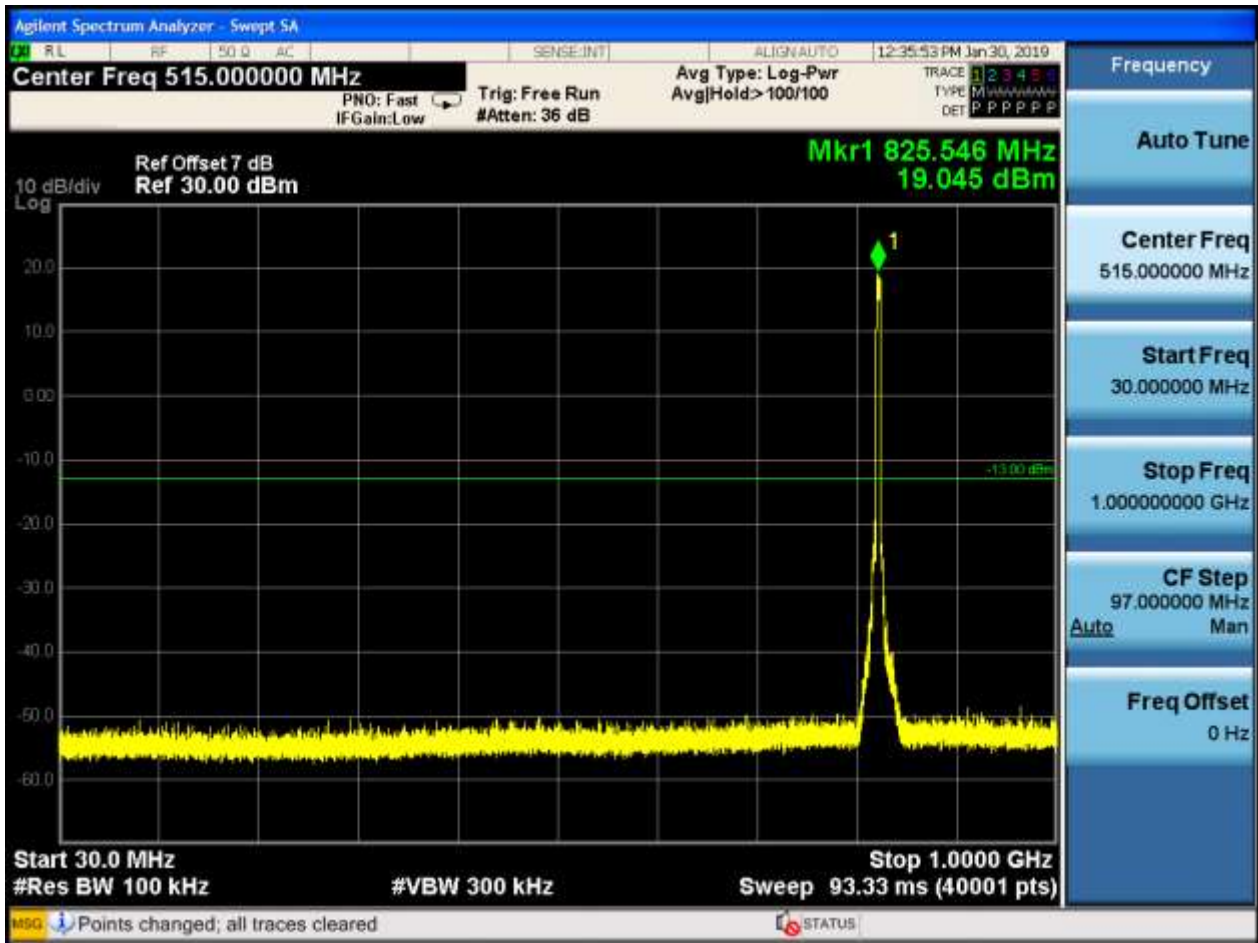
### 6.1.3 Test Band = WCDMA850

#### 6.1.3.1 Test Mode = UMTS/TM1

##### 6.1.3.1.1 Test Channel = LCH

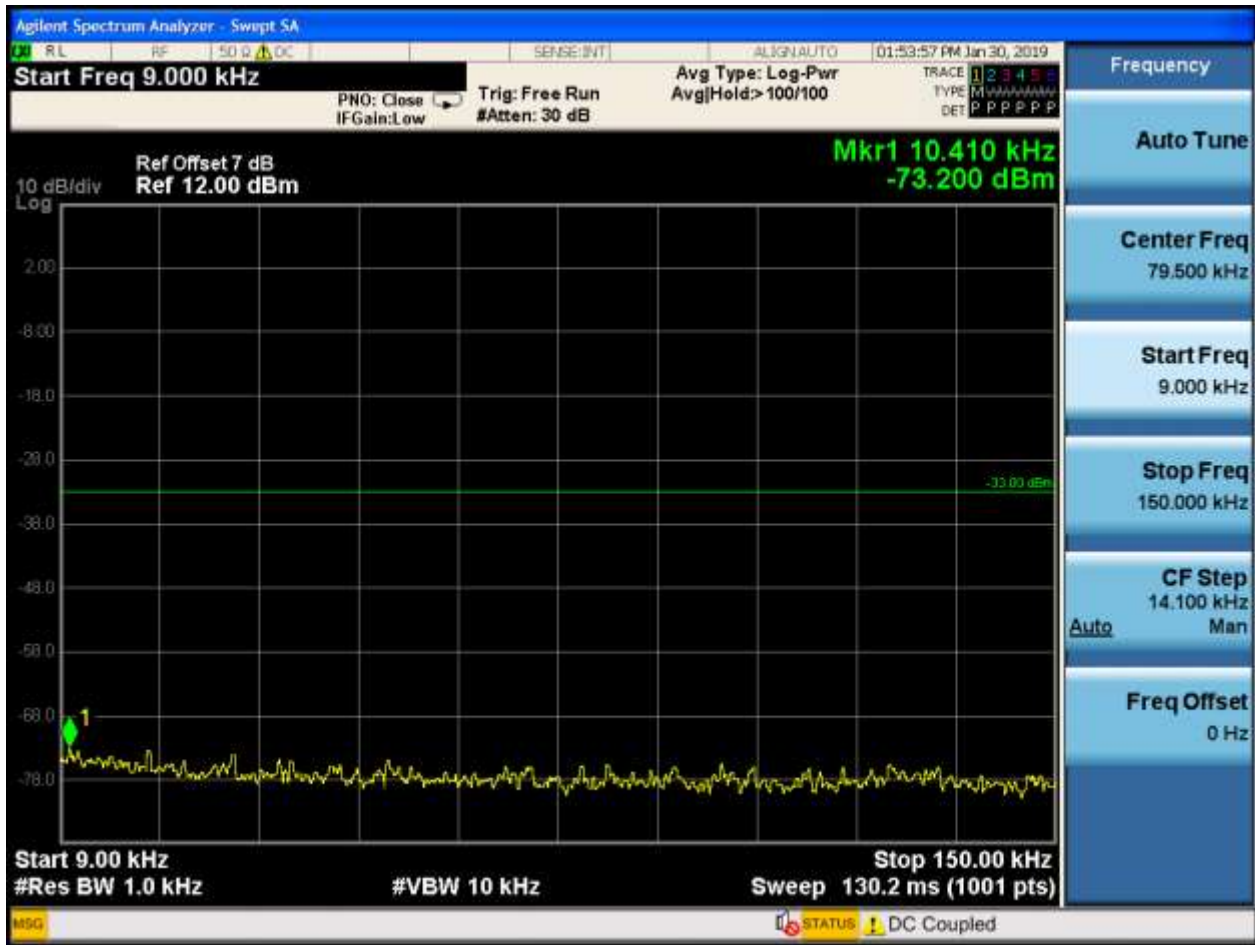


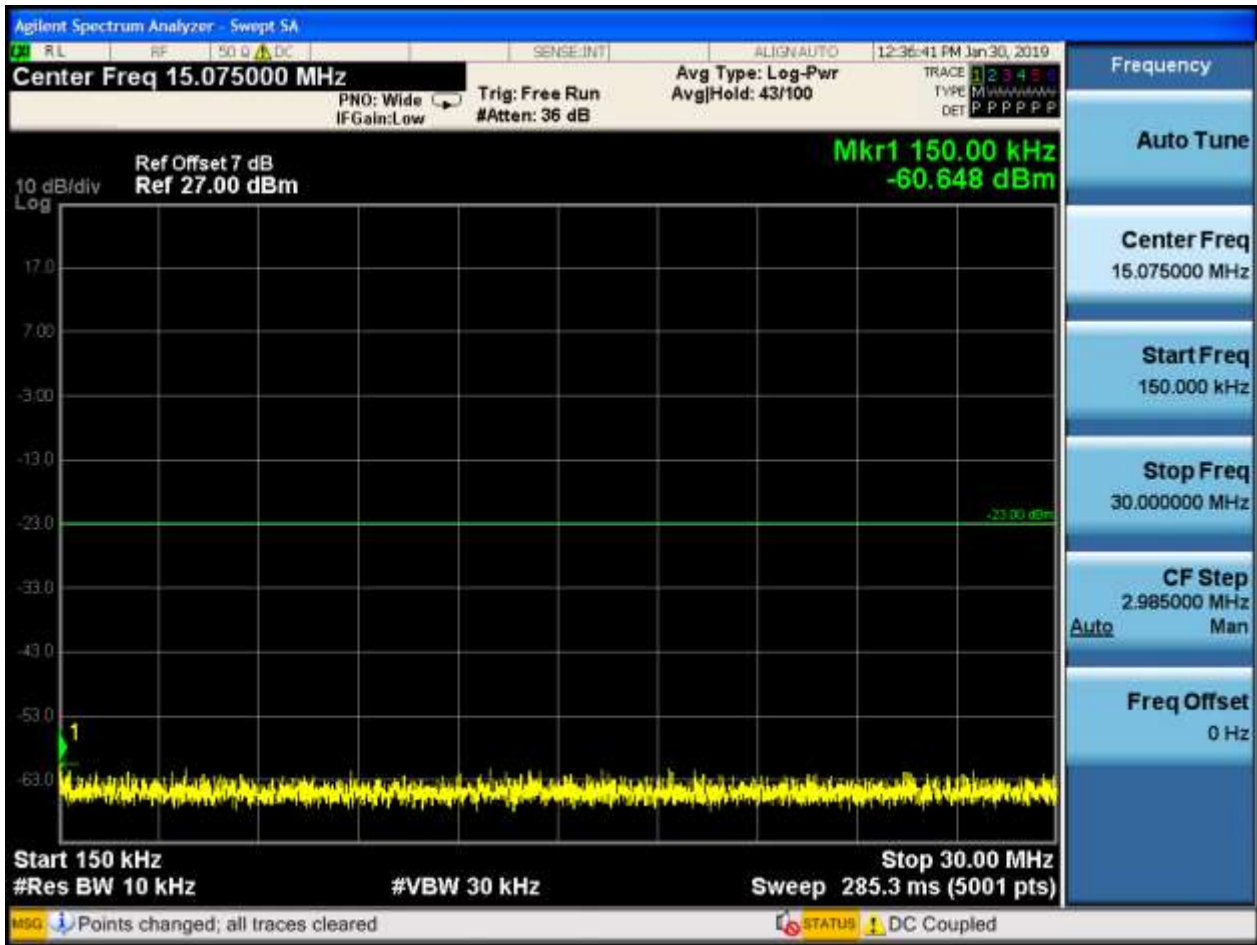


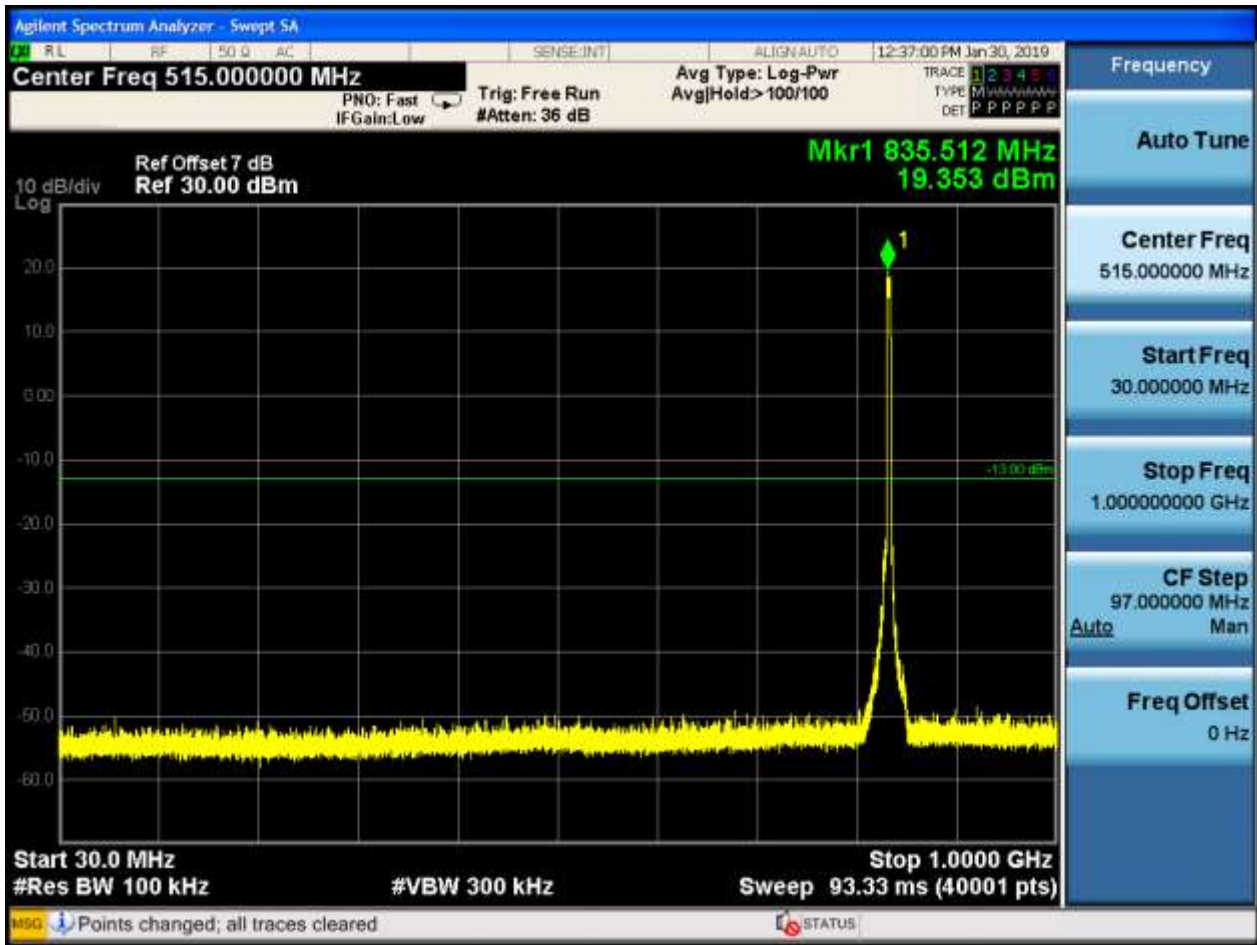


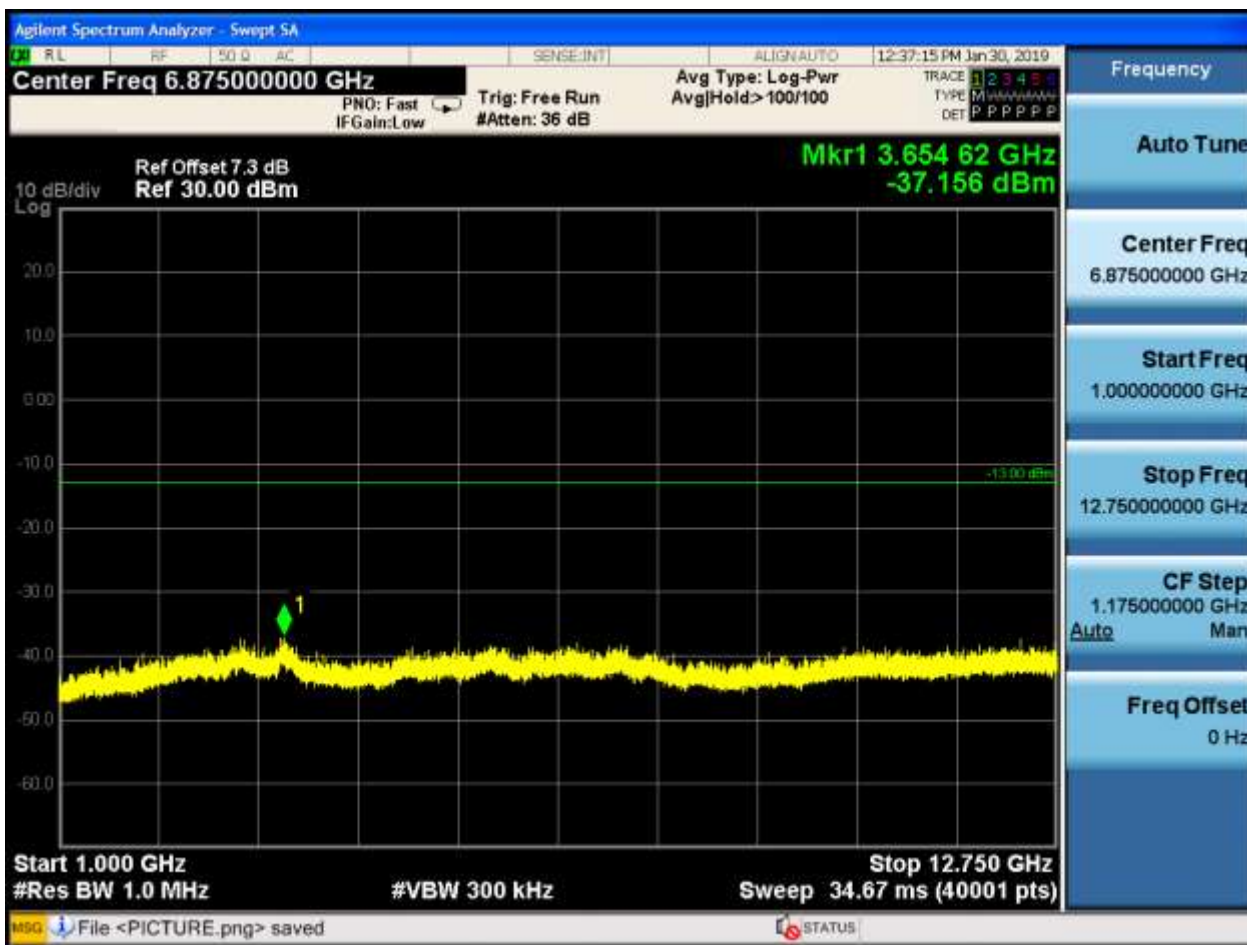


## 6.1.3.1.2 Test Channel = MCH





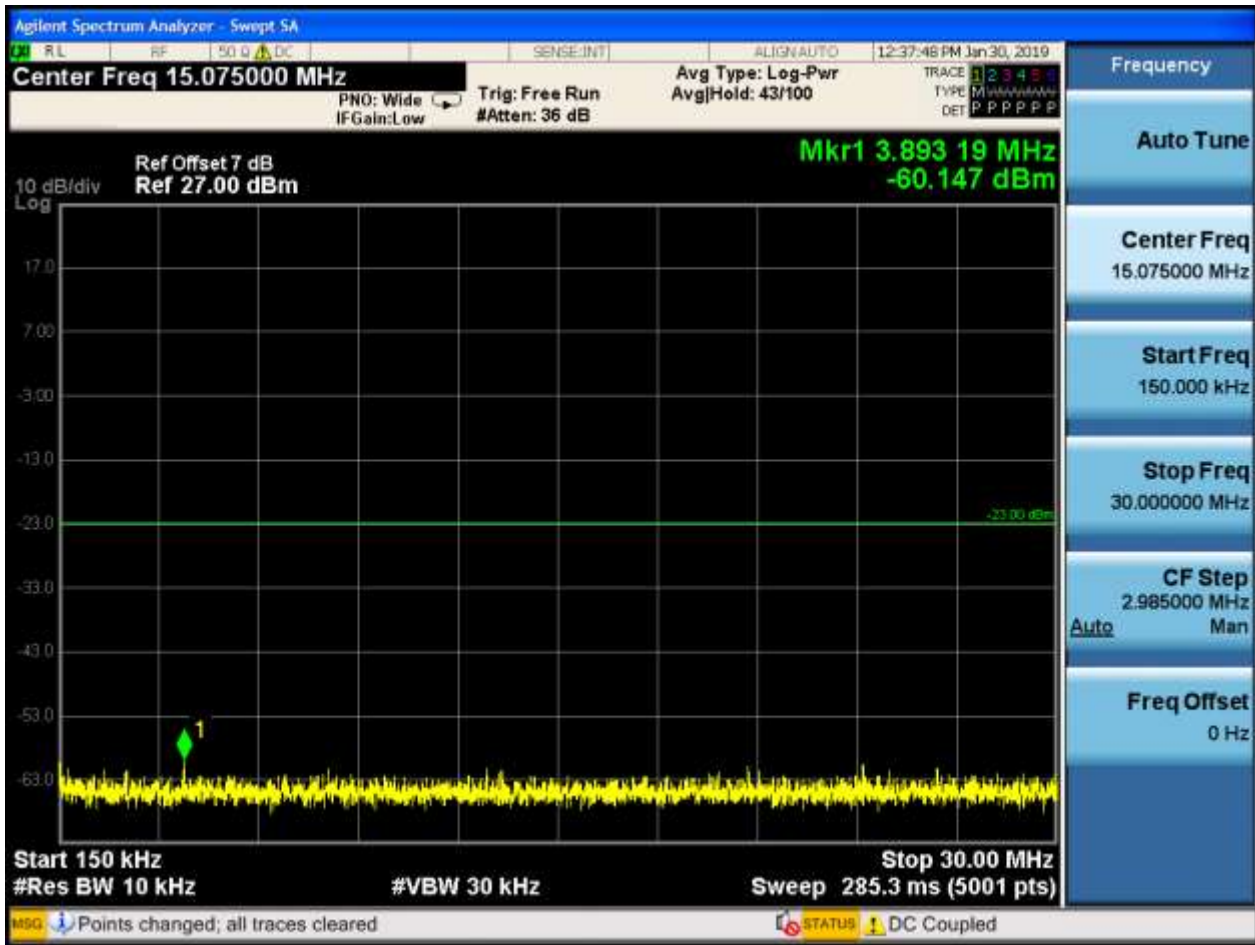


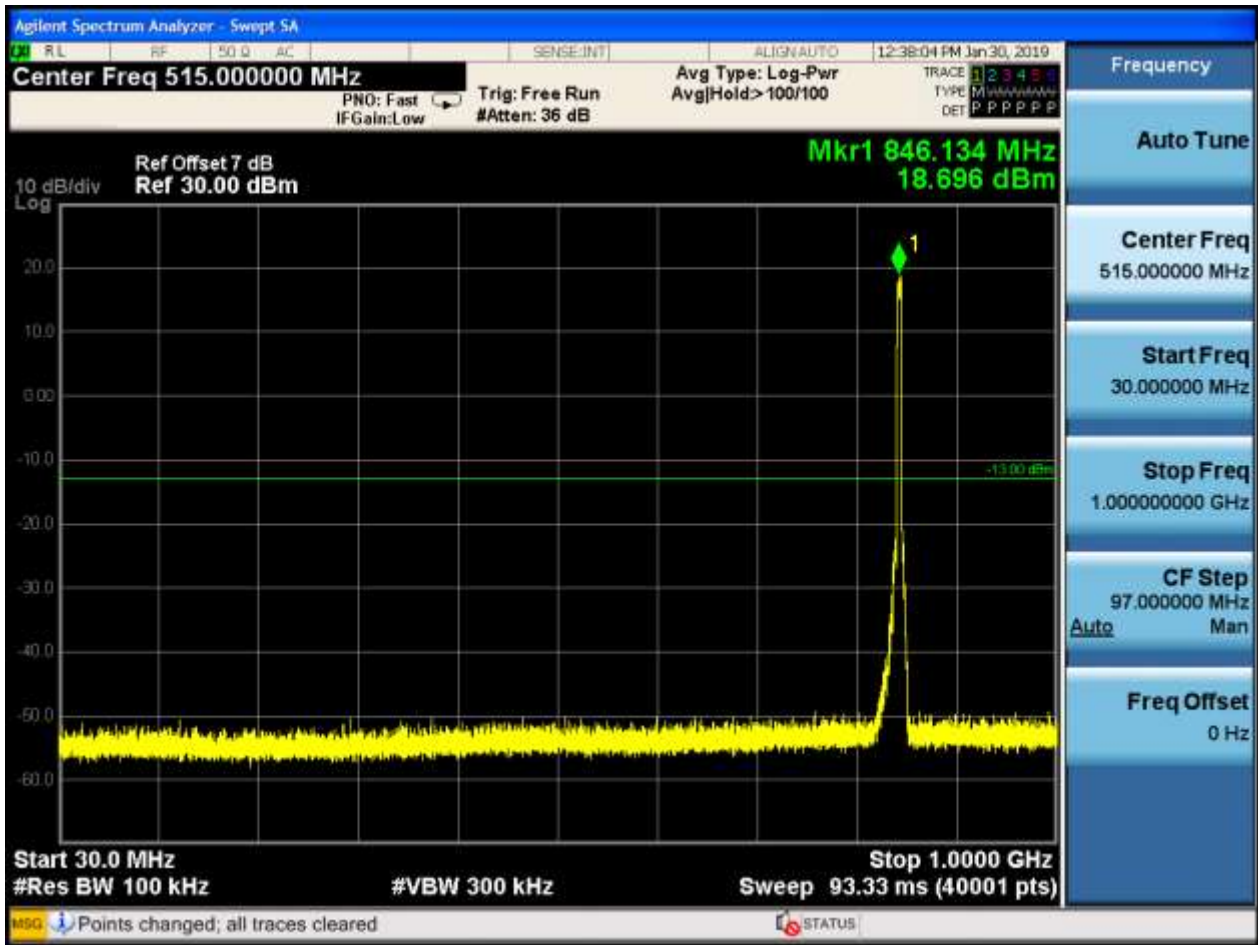




## 6.1.3.1.3 Test Channel = HCH









## 7Appendix\_G: Field Strength of Spurious Radiation

Note: We tested all modes, but the data presented below is the worst case.

9kHz~150kHz, RBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, RBW = 9kHz, VBW = 30k Hz, Detector: PK

30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

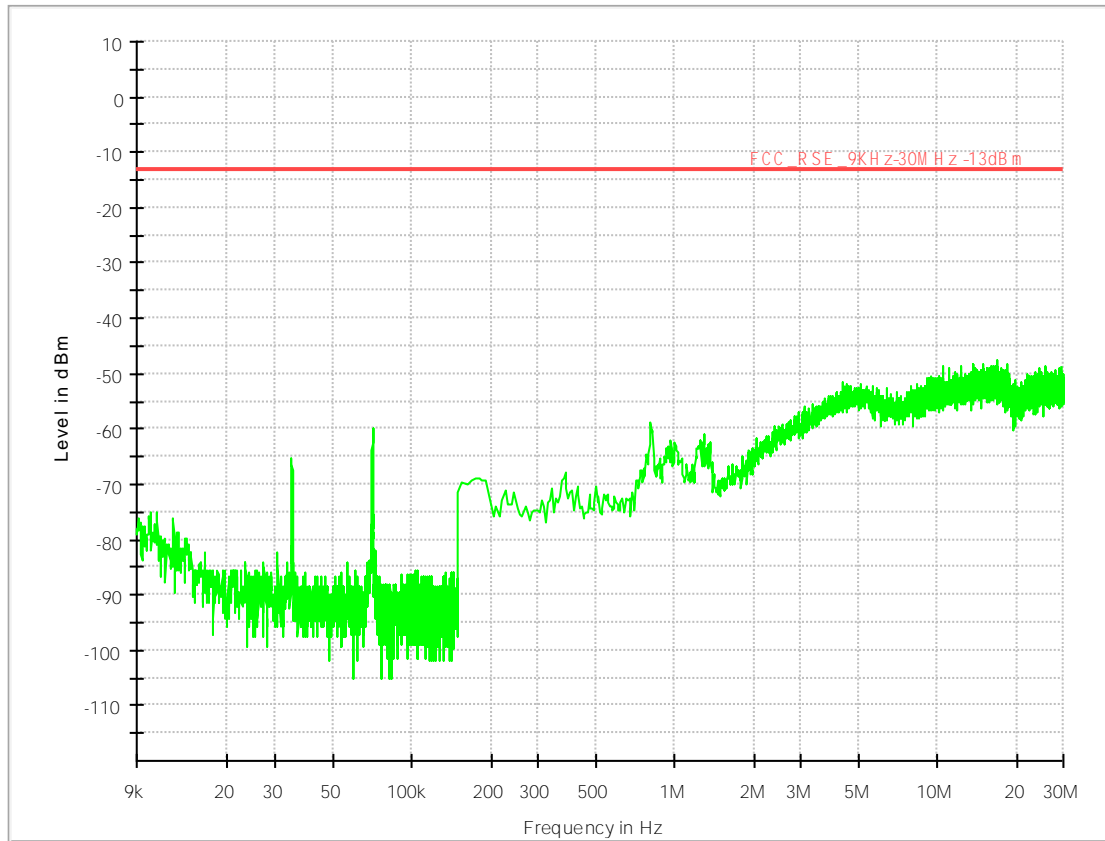
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

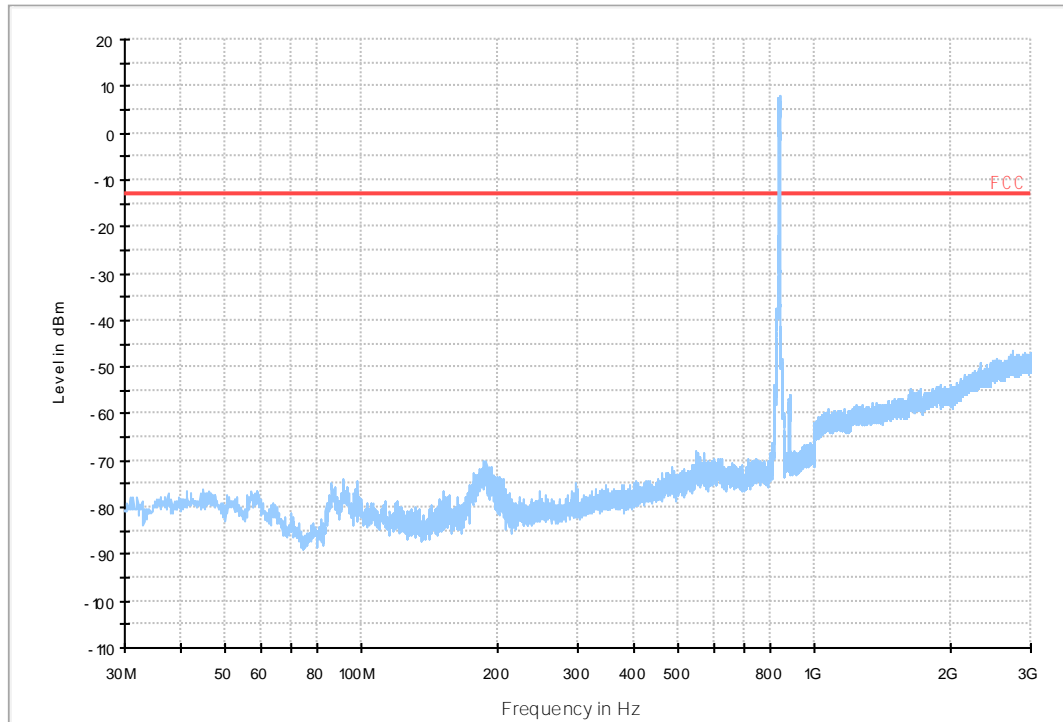
#### 7.1 For UMTS

##### 7.1.1 Test Band = WCDMA850

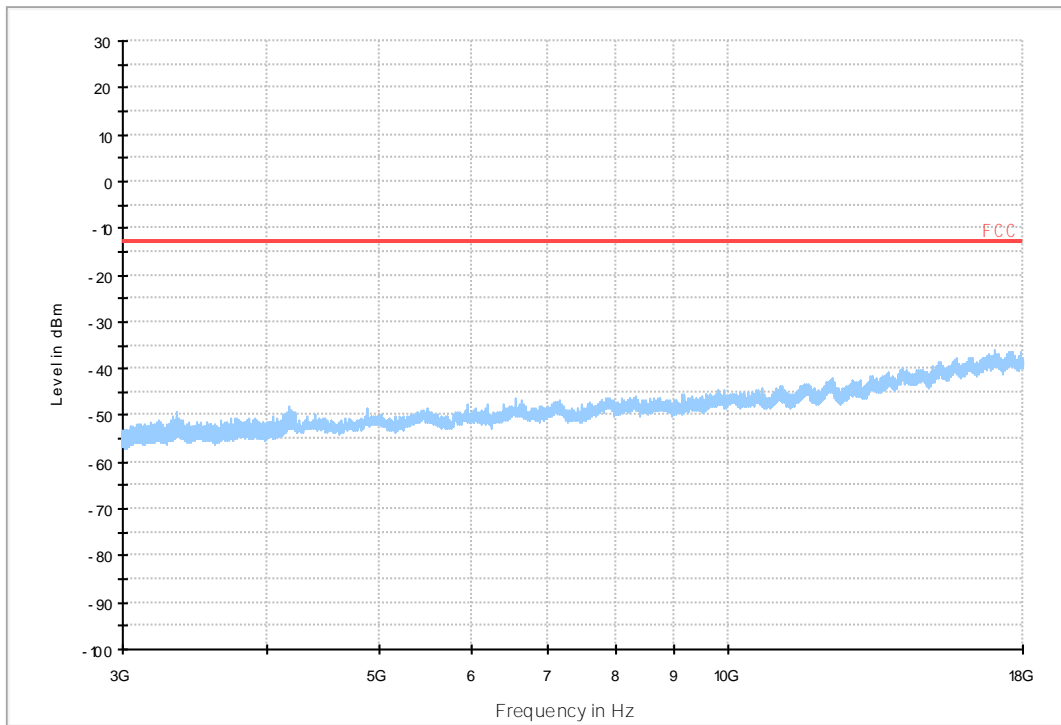
WCDMA850/TM1\_Ant1



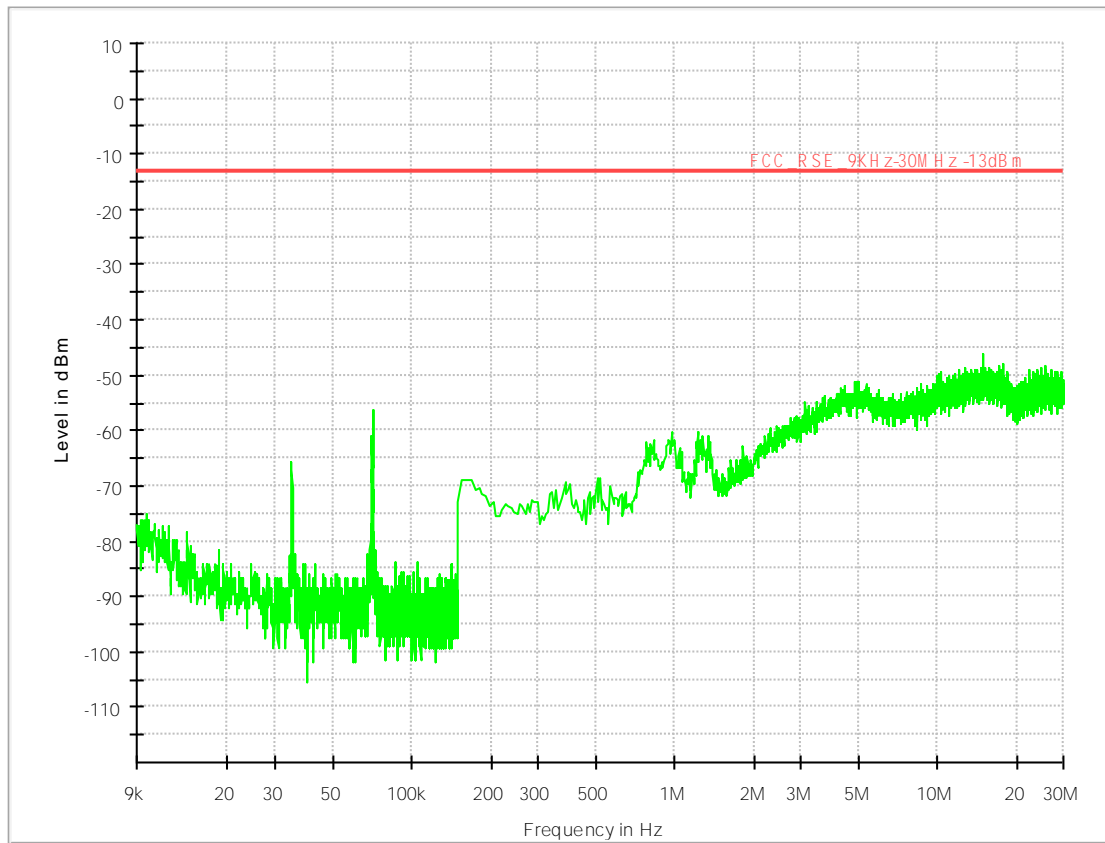
06 FCC PART 22 WCDMA850\_L



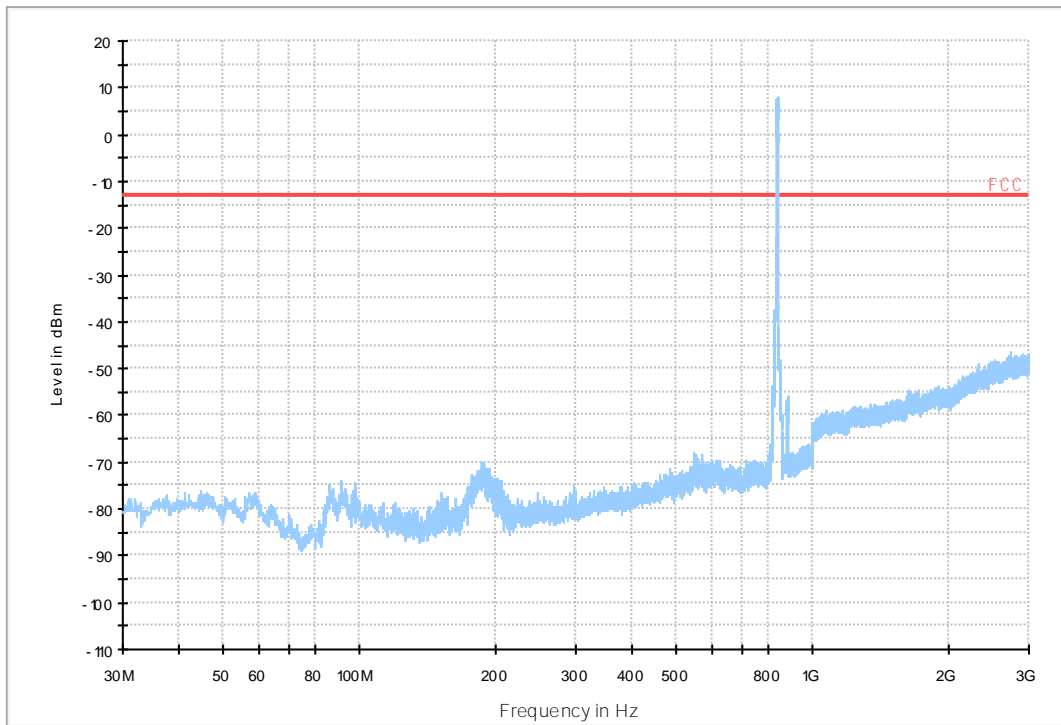
03 FCC PART 22 GSM850\_H



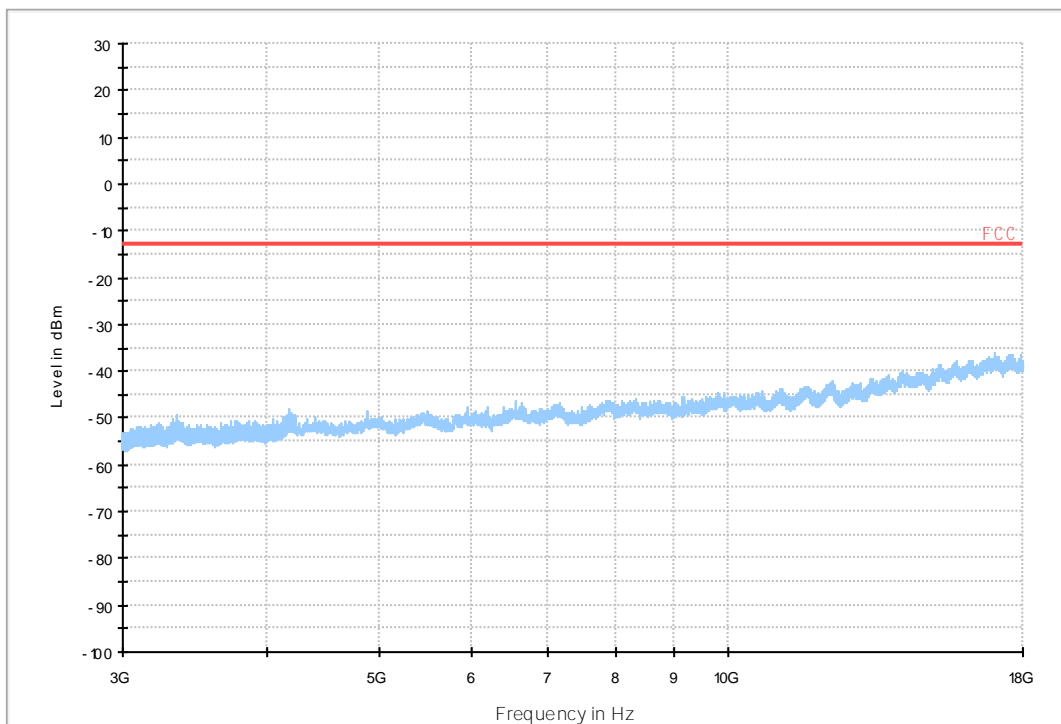
WCDMA850/TM1\_Ant2



06 FCC PART 22 WCDMA850\_L

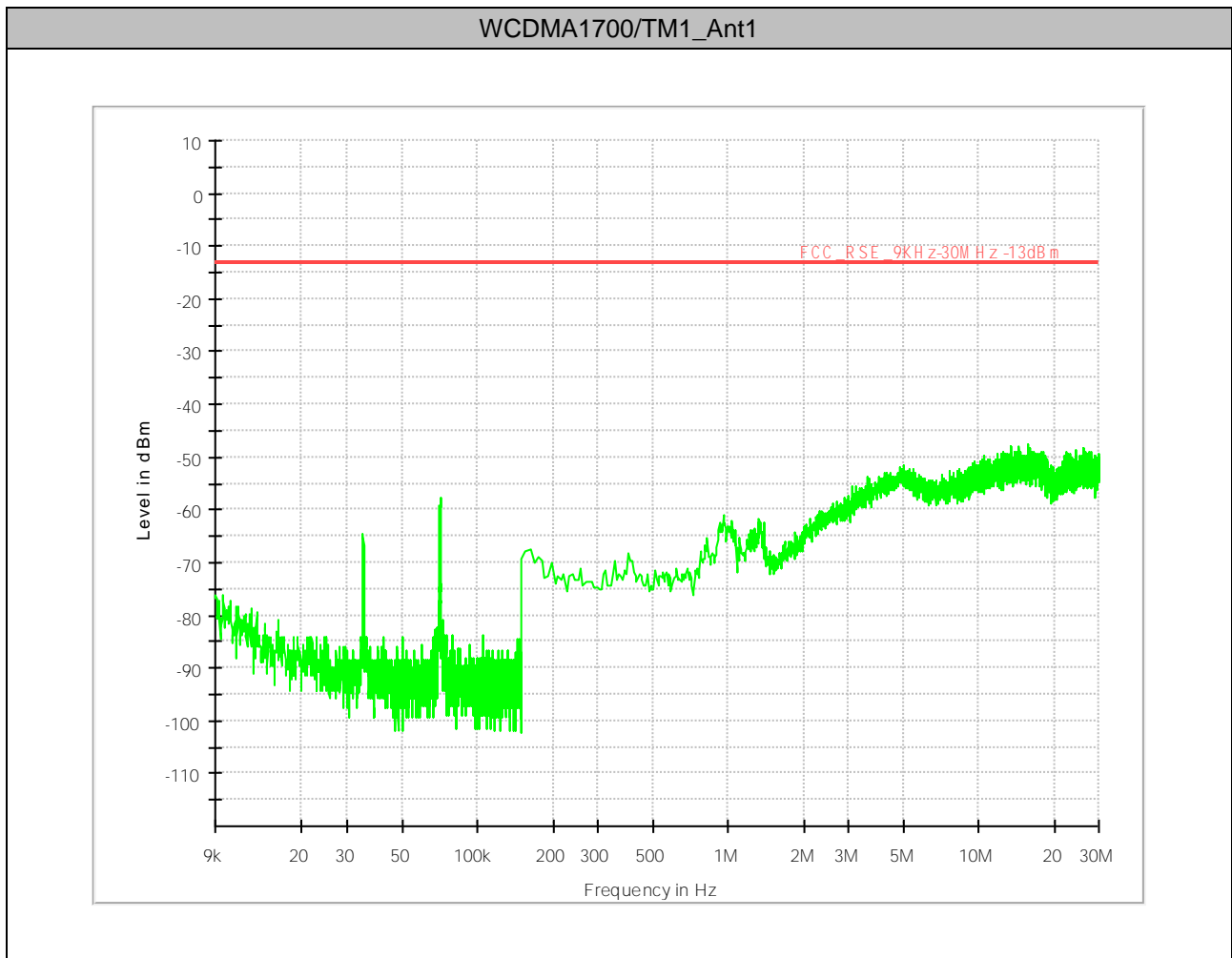


03 FCC PART 22 GSM850\_H

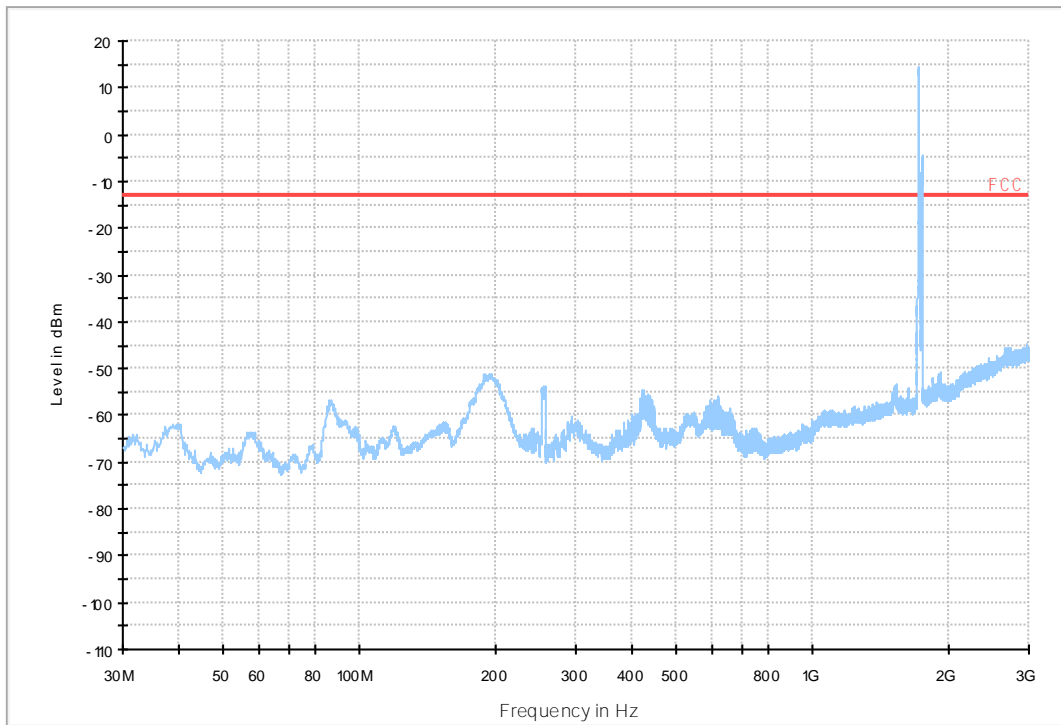




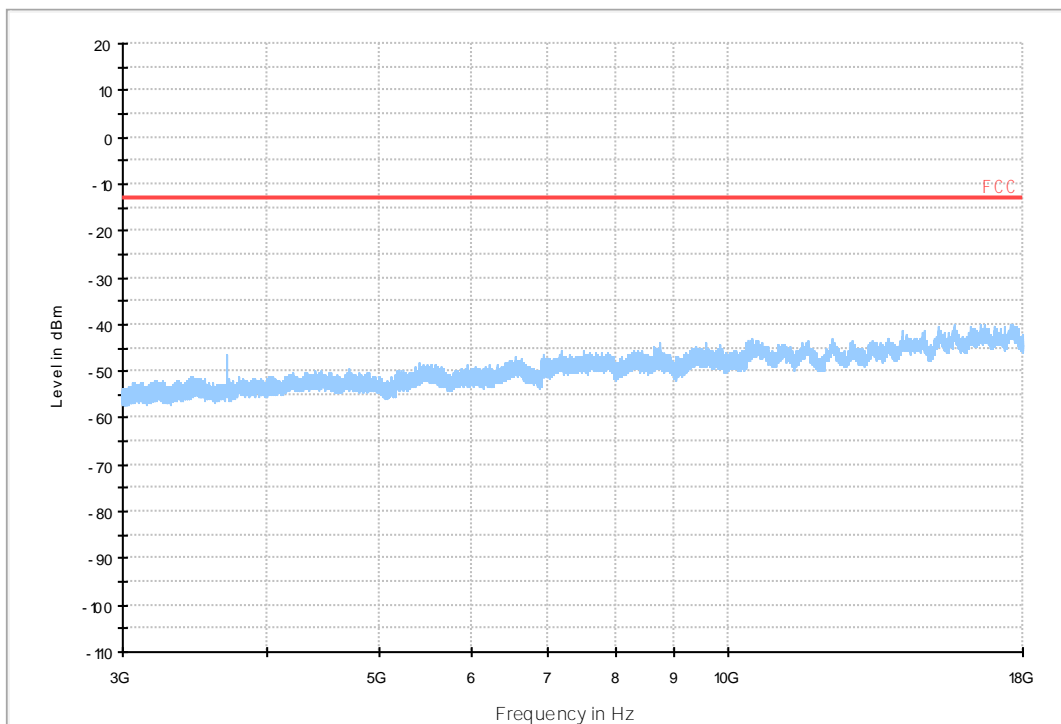
### 7.1.2 Test Band = WCDMA1700



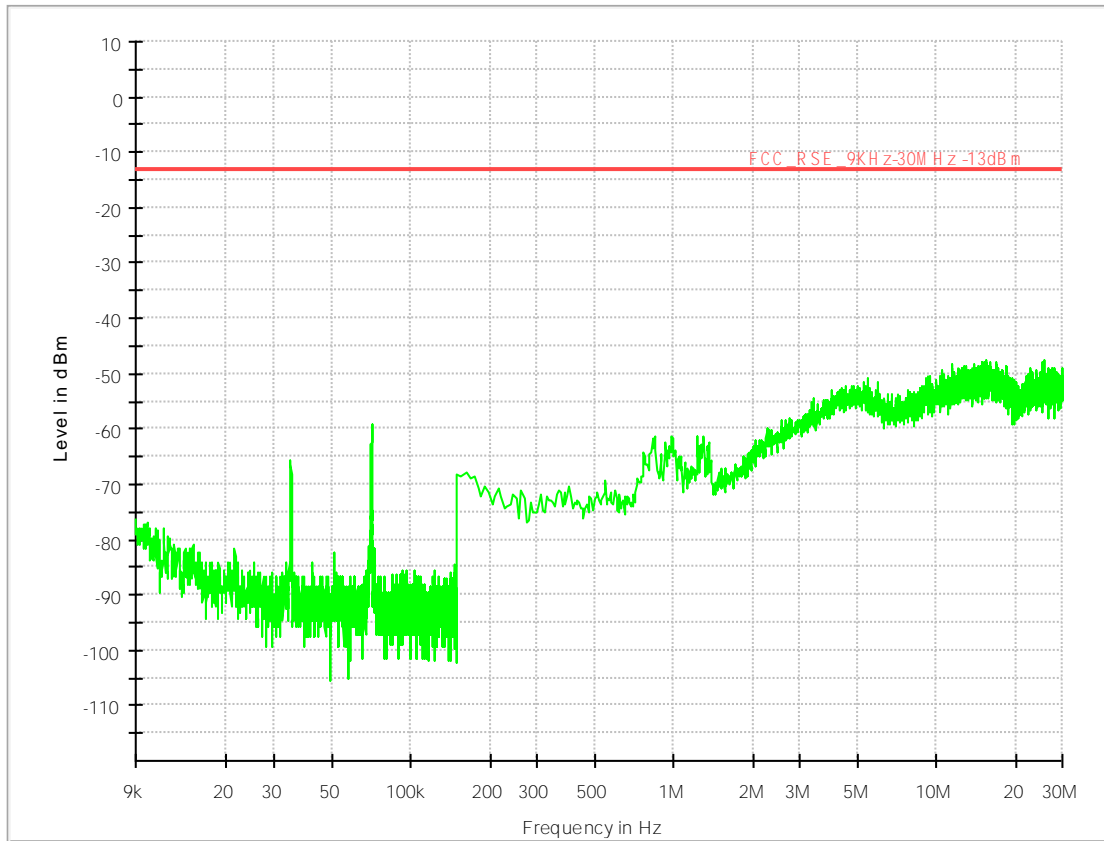
18 FCC PART 27 WCDMA1700\_L



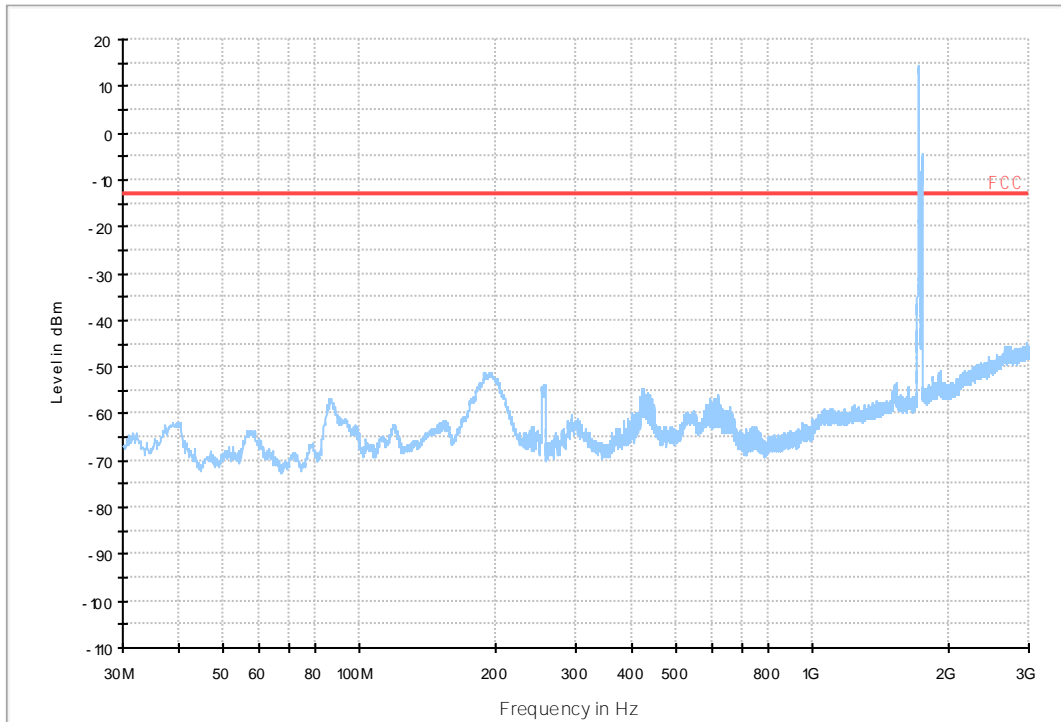
17 FCC PART 27 WCDMA1700\_H

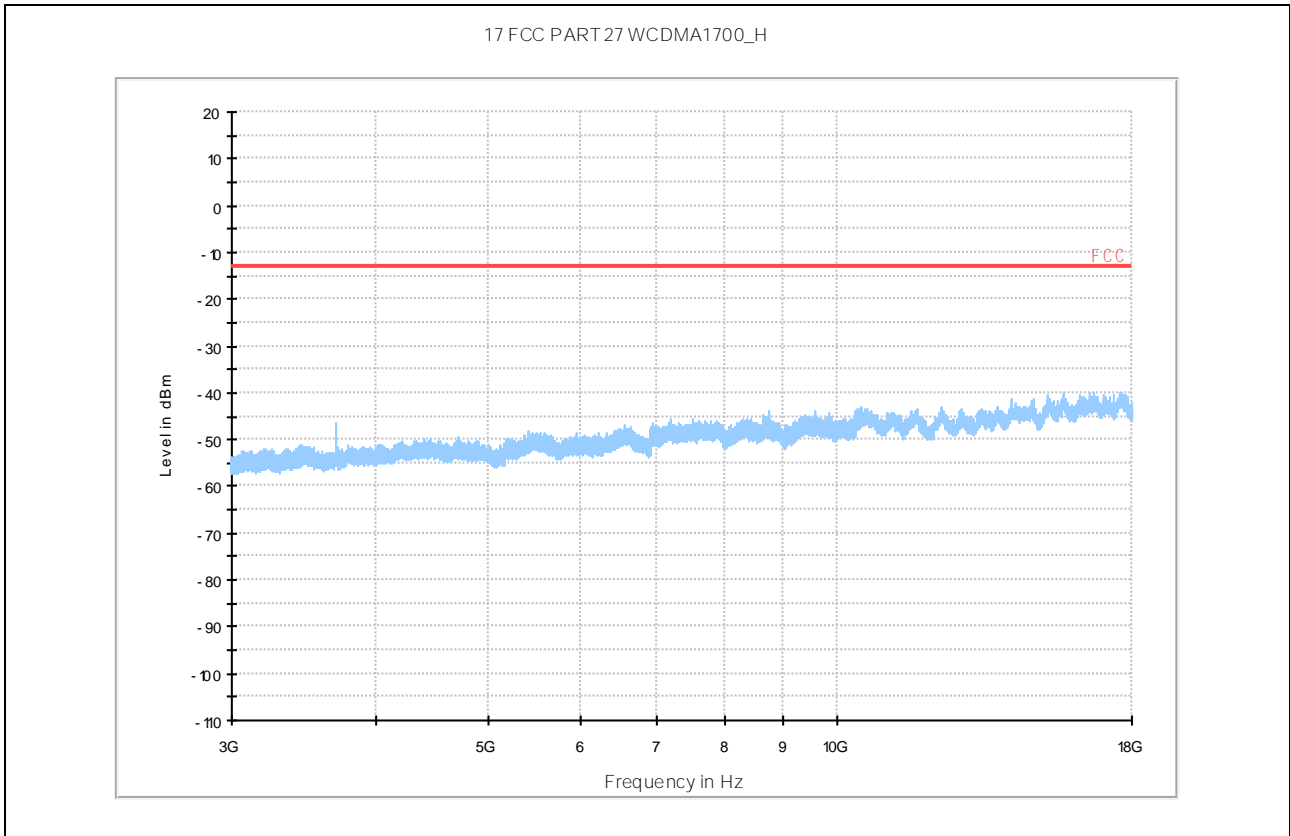


WCDMA1700/TM1\_Ant2

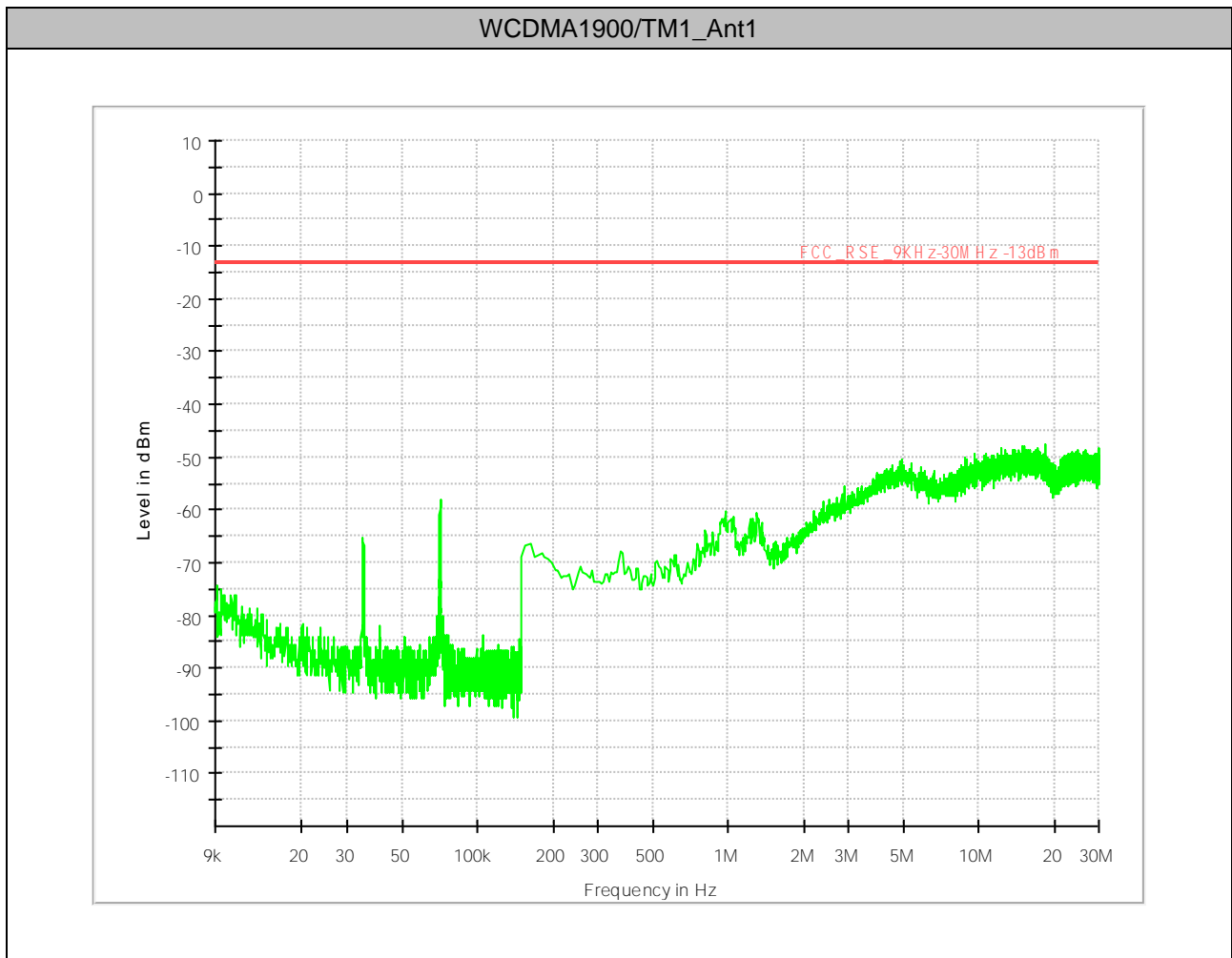


18 FCC PART 27 WCDMA1700\_L

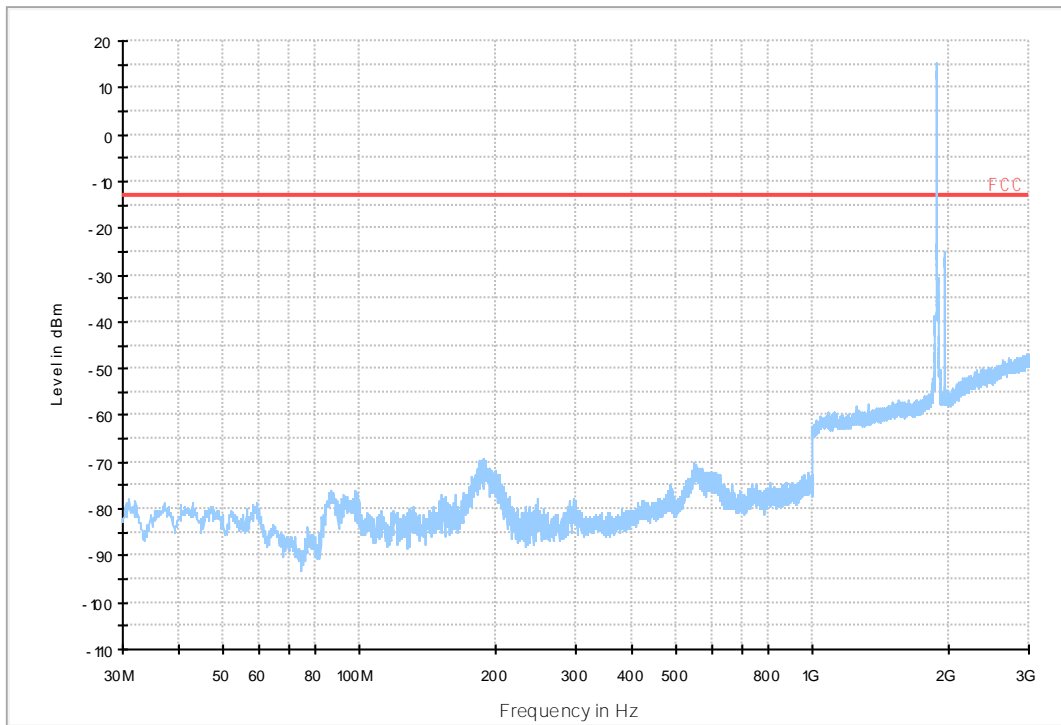




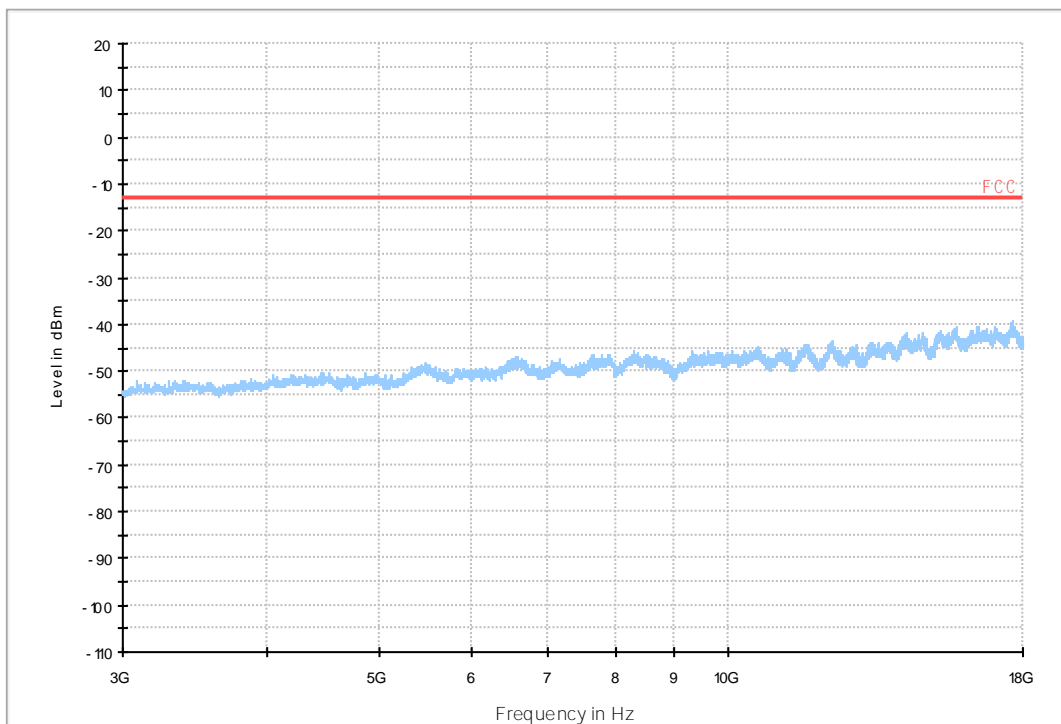
### 7.1.3 Test Band = WCDMA1900



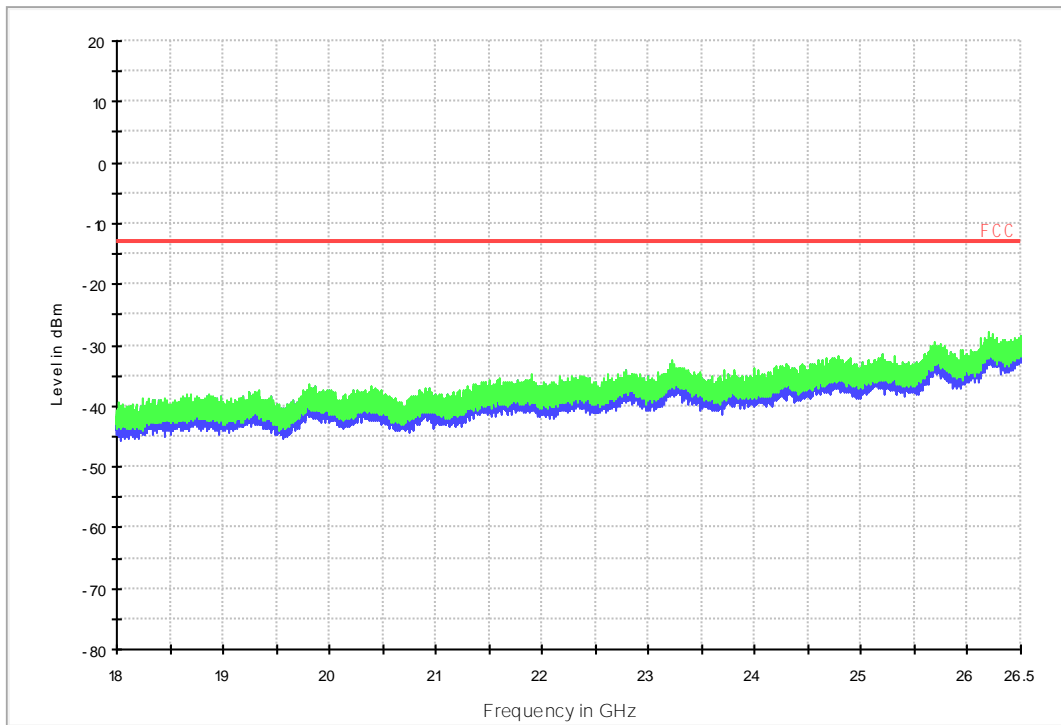
12 FCC PART 24 WCDMA1900\_L



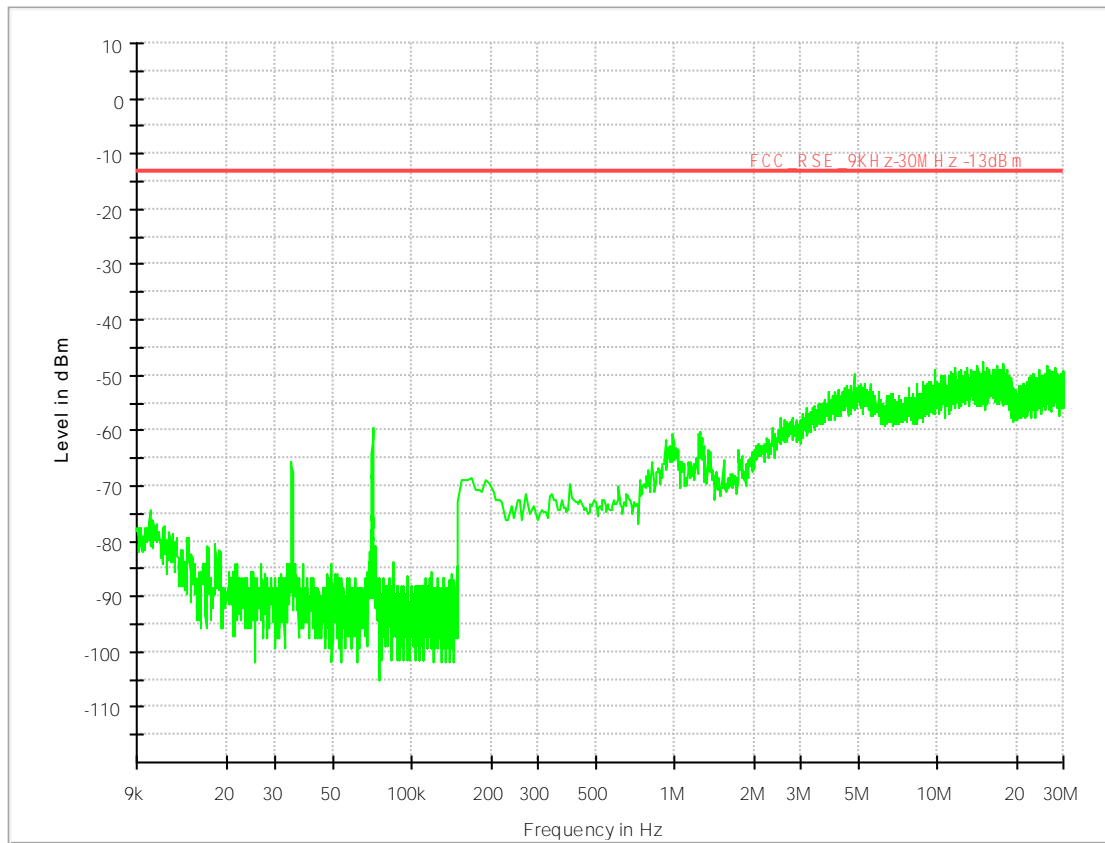
11 FCC PART 24 WCDMA1900\_H



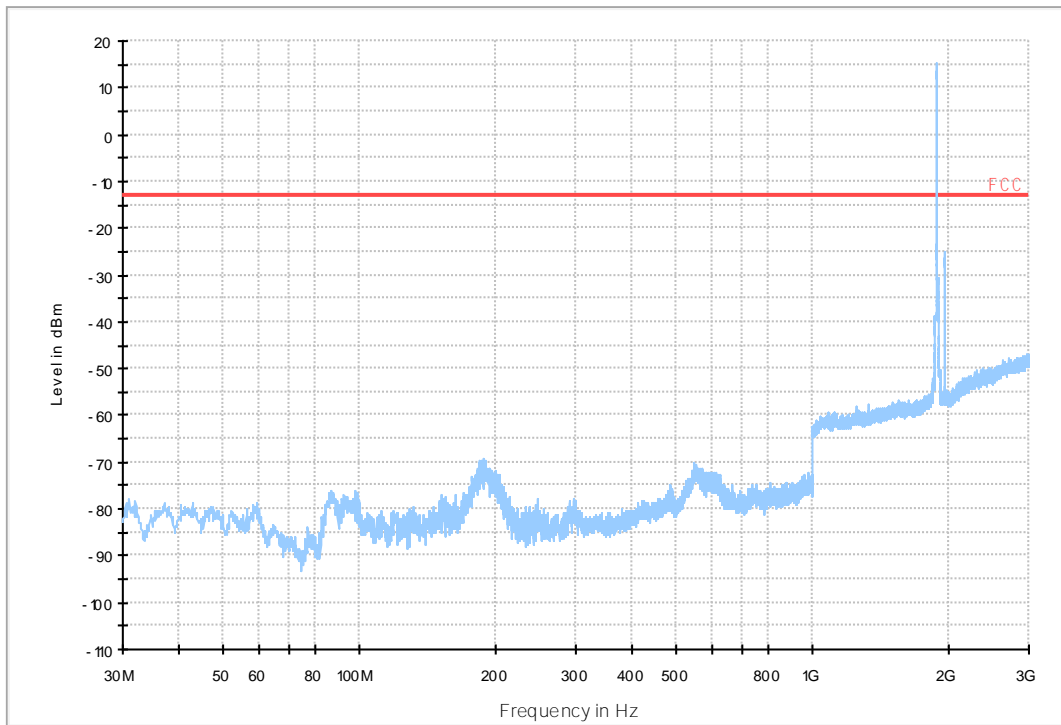
18G~26.5G RSE-TX-DIRECTOR ABOVE 1.5G PK



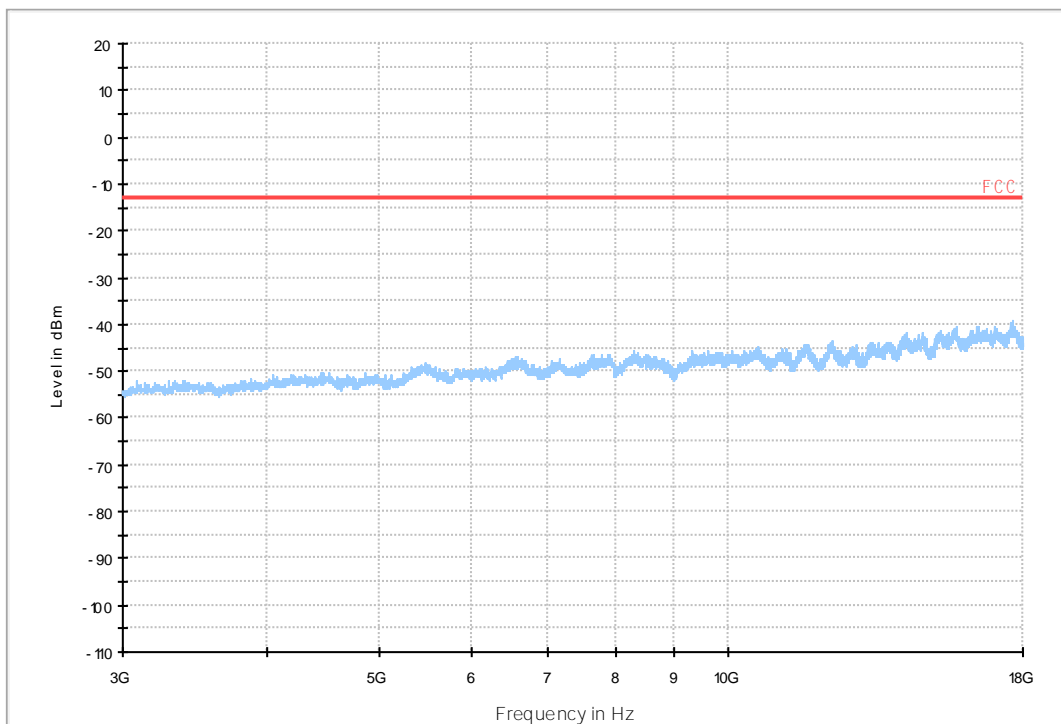
WCDMA1900/TM1\_Ant2



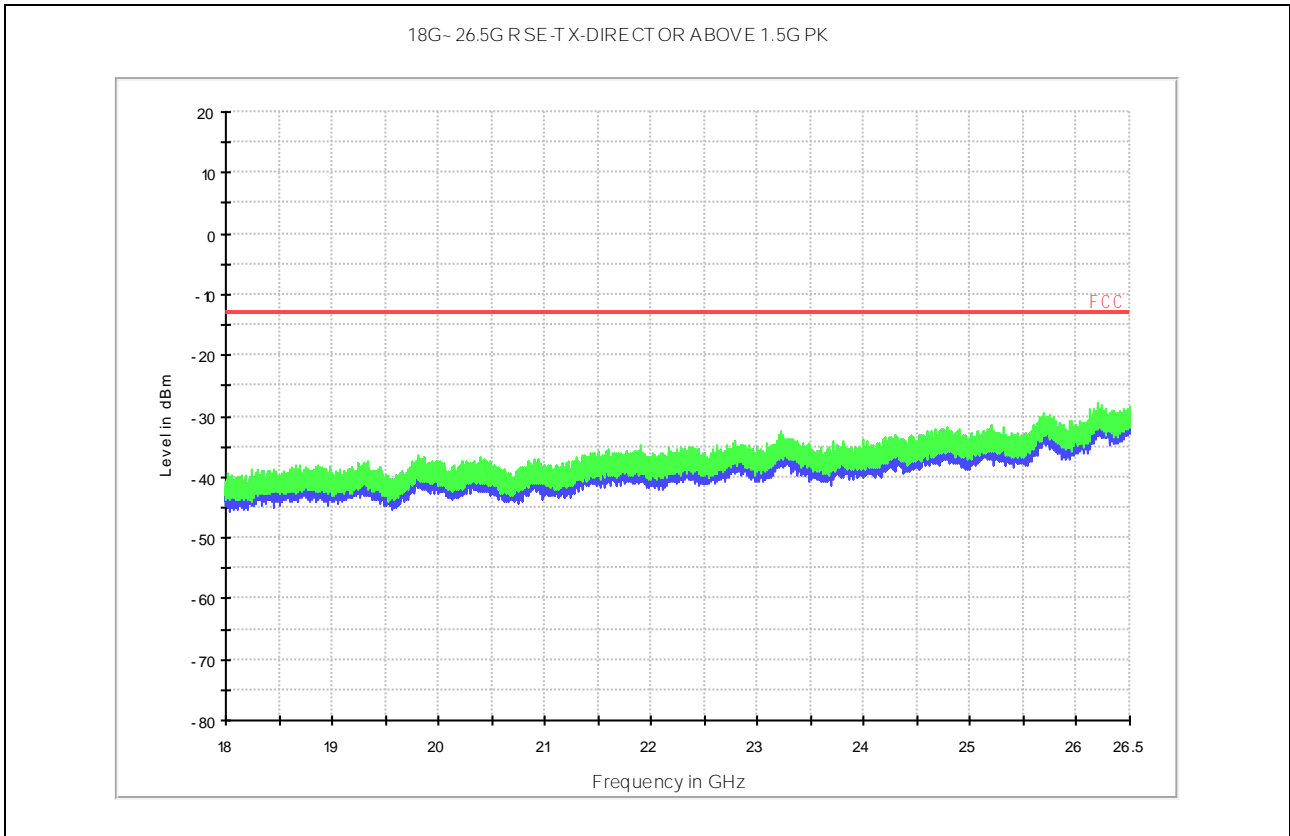
12 FCC PART 24 WCDMA1900\_L



11 FCC PART 24 WCDMA1900\_H







## 8Appendix\_H: Frequency Stability

### 8.1 For UMTS

#### 8.1.1 Frequency Error vs. Voltage:

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| WCDMA1900 | UMTS/TM1  | LCH          | TN         | VL         | 6.94             | 0.00375               | PASS    |
|           |           |              |            | VN         | 8.87             | 0.00479               | PASS    |
|           |           |              |            | VH         | 7.64             | 0.00412               | PASS    |
|           |           | MCH          | TN         | VL         | 4.44             | 0.00236               | PASS    |
|           |           |              |            | VN         | 8.26             | 0.00439               | PASS    |
|           |           |              |            | VH         | 6.27             | 0.00334               | PASS    |
|           |           | HCH          | TN         | VL         | 6.33             | 0.00332               | PASS    |
|           |           |              |            | VN         | 7                | 0.00367               | PASS    |
|           |           |              |            | VH         | 0.2              | 0.0001                | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | TN         | VL         | 9.81             | 0.00573               | PASS    |
|           |           |              |            | VN         | 8.06             | 0.00471               | PASS    |
|           |           |              |            | VH         | 10.67            | 0.00623               | PASS    |
|           |           | MCH          | TN         | VL         | 11.06            | 0.00638               | PASS    |
|           |           |              |            | VN         | 16.13            | 0.00931               | PASS    |
|           |           |              |            | VH         | 14.77            | 0.00852               | PASS    |
|           |           | HCH          | TN         | VL         | 10.16            | 0.0058                | PASS    |
|           |           |              |            | VN         | 7.92             | 0.00452               | PASS    |
|           |           |              |            | VH         | 5.83             | 0.00333               | PASS    |
| WCDMA850  | UMTS/TM1  | LCH          | TN         | VL         | -2.66            | -0.00322              | PASS    |
|           |           |              |            | VN         | 3.33             | 0.00403               | PASS    |
|           |           |              |            | VH         | 7.95             | 0.00962               | PASS    |
|           |           | MCH          | TN         | VL         | 13.52            | 0.01616               | PASS    |
|           |           |              |            | VN         | 2.15             | 0.00257               | PASS    |
|           |           |              |            | VH         | 16.91            | 0.02022               | PASS    |
|           |           | HCH          | TN         | VL         | 5.45             | 0.00644               | PASS    |
|           |           |              |            | VN         | 2.78             | 0.00328               | PASS    |
|           |           |              |            | VH         | 8.42             | 0.00995               | PASS    |

#### 8.1.2 Frequency Error vs. Temperature:

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| WCDMA1900 | UMTS/TM1  | LCH          | VN         | -30        | 3.11             | 0.00168               | PASS    |
|           |           |              |            | -20        | 4.09             | 0.00221               | PASS    |
|           |           |              |            | -10        | 7.89             | 0.00426               | PASS    |
|           |           |              |            | 0          | 8.97             | 0.00484               | PASS    |
|           |           |              |            | 10         | 6.74             | 0.00364               | PASS    |
|           |           |              |            | 20         | 9.09             | 0.00491               | PASS    |
|           |           |              |            | 30         | 4.88             | 0.00263               | PASS    |
|           |           |              |            | 40         | 5.92             | 0.0032                | PASS    |
|           |           |              |            | 50         | 8.93             | 0.00482               | PASS    |
|           |           | MCH          | VN         | -30        | 10.48            | 0.00557               | PASS    |
|           |           |              |            | -20        | 10.1             | 0.00537               | PASS    |
|           |           |              |            | -10        | 6.27             | 0.00334               | PASS    |
|           |           |              |            | 0          | 13.52            | 0.00719               | PASS    |
|           |           |              |            | 10         | 4.71             | 0.00251               | PASS    |
|           |           |              |            | 20         | 2.98             | 0.00159               | PASS    |
|           |           |              |            | 30         | 2.73             | 0.00145               | PASS    |
|           |           |              |            | 40         | 11.89            | 0.00632               | PASS    |
|           |           |              |            | 50         | 3.77             | 0.00201               | PASS    |
|           |           | HCH          | VN         | -30        | 4.67             | 0.00245               | PASS    |
|           |           |              |            | -20        | 2.72             | 0.00143               | PASS    |
|           |           |              |            | -10        | 2.37             | 0.00124               | PASS    |
|           |           |              |            | 0          | 7.92             | 0.00415               | PASS    |
|           |           |              |            | 10         | 9.58             | 0.00502               | PASS    |
|           |           |              |            | 20         | 1.11             | 0.00058               | PASS    |
| 30        | 4.44      |              |            | 0.00233    | PASS             |                       |         |
| 40        | 7.55      |              |            | 0.00396    | PASS             |                       |         |
| 50        | 8.33      |              |            | 0.00437    | PASS             |                       |         |
| WCDMA1700 | UMTS/TM1  | LCH          | VN         | -30        | 7.87             | 0.0046                | PASS    |
|           |           |              |            | -20        | 16.57            | 0.00968               | PASS    |
|           |           |              |            | -10        | 8.83             | 0.00516               | PASS    |
|           |           |              |            | 0          | 18.66            | 0.0109                | PASS    |
|           |           |              |            | 10         | 12.6             | 0.00736               | PASS    |
|           |           |              |            | 20         | 12.59            | 0.00735               | PASS    |
|           |           |              |            | 30         | 6.45             | 0.00377               | PASS    |
|           |           |              |            | 40         | 17.62            | 0.01029               | PASS    |
|           |           |              |            | 50         | 13.82            | 0.00807               | PASS    |
|           |           | MCH          | VN         | -30        | 9.9              | 0.00571               | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | -20        | 16.57            | 0.00956               | PASS    |
|           |           |              |            | -10        | 13.46            | 0.00777               | PASS    |
|           |           |              |            | 0          | 9.81             | 0.00566               | PASS    |
|           |           |              |            | 10         | 16.24            | 0.00937               | PASS    |
|           |           |              |            | 20         | 12.57            | 0.00725               | PASS    |
|           |           |              |            | 30         | 9.84             | 0.00568               | PASS    |
|           |           |              |            | 40         | 17.78            | 0.01026               | PASS    |
|           |           |              |            | 50         | 17.68            | 0.0102                | PASS    |
|           |           |              |            | HCH        | VN               | -30                   | 11.28   |
|           |           | -20          | 10.97      |            |                  | 0.00626               | PASS    |
|           |           | -10          | 8.67       |            |                  | 0.00495               | PASS    |
|           |           | 0            | 12.53      |            |                  | 0.00715               | PASS    |
|           |           | 10           | 6.23       |            |                  | 0.00355               | PASS    |
|           |           | 20           | 17.7       |            |                  | 0.0101                | PASS    |
|           |           | 30           | 13.47      |            |                  | 0.00769               | PASS    |
|           |           | 40           | 5.29       |            |                  | 0.00302               | PASS    |
|           |           | 50           | 14.98      |            |                  | 0.00855               | PASS    |
|           |           | WCDMA850     | UMTS/TM1   | LCH        | VN               | -30                   | 8.76    |
| -20       | 10.38     |              |            |            |                  | 0.01256               | PASS    |
| -10       | 7.8       |              |            |            |                  | 0.00944               | PASS    |
| 0         | 11.31     |              |            |            |                  | 0.01369               | PASS    |
| 10        | 0.96      |              |            |            |                  | 0.00116               | PASS    |
| 20        | 9.03      |              |            |            |                  | 0.01093               | PASS    |
| 30        | 11.47     |              |            |            |                  | 0.01388               | PASS    |
| 40        | 8.01      |              |            |            |                  | 0.00969               | PASS    |
| 50        | 5.2       |              |            |            |                  | 0.00629               | PASS    |
| MCH       | VN        |              |            | -30        | 2.49             | 0.00298               | PASS    |
|           |           |              |            | -20        | 10.39            | 0.01242               | PASS    |
|           |           |              |            | -10        | 10.74            | 0.01284               | PASS    |
|           |           |              |            | 0          | 5.66             | 0.00677               | PASS    |
|           |           |              |            | 10         | 9.49             | 0.01135               | PASS    |
|           |           |              |            | 20         | 13.31            | 0.01591               | PASS    |
|           |           |              |            | 30         | 11.55            | 0.01381               | PASS    |
|           |           |              |            | 40         | 5.43             | 0.00649               | PASS    |
| HCH       | VN        |              |            | -30        | 10.8             | 0.01291               | PASS    |
|           |           |              |            | -30        | 0.63             | 0.00074               | PASS    |
|           |           |              |            | -20        | 8.9              | 0.01051               | PASS    |
|           |           |              |            | -20        | 8.9              | 0.01051               | PASS    |



| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | -10        | 9.93             | 0.01173               | PASS    |
|           |           |              |            | 0          | 12.13            | 0.01433               | PASS    |
|           |           |              |            | 10         | 9.55             | 0.01128               | PASS    |
|           |           |              |            | 20         | 12.89            | 0.01523               | PASS    |
|           |           |              |            | 30         | 9.8              | 0.01158               | PASS    |
|           |           |              |            | 40         | 5.22             | 0.00617               | PASS    |
|           |           |              |            | 50         | 11.15            | 0.01317               | PASS    |

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END