



## Appendix for test report

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Conducte<br>d Power<br>[dBm] | ERP [dBm] | Limit [dBm] | Verdict |
|-----------|-----------|--------------|------------------------------|-----------|-------------|---------|
| WCDMA850  | UMTS/TM1  | LCH          | 23.48                        | 20.83     | 38.5        | PASS    |
|           |           | MCH          | 23.47                        | 20.82     | 38.5        | PASS    |
|           |           | HCH          | 23.35                        | 20.7      | 38.5        | PASS    |

| Test Band | Test Mode | Test Channel | Conducte<br>d Power<br>[dBm] | EIRP [dBm] | Limit [dBm] | Verdict |
|-----------|-----------|--------------|------------------------------|------------|-------------|---------|
| WCDMA1700 | UMTS/TM1  | LCH          | 23.86                        | 24.36      | 30          | PASS    |
|           |           | MCH          | 23.56                        | 24.06      | 30          | PASS    |
|           |           | HCH          | 23.54                        | 24.04      | 30          | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | 23.67                        | 24.17      | 33          | PASS    |
|           |           | MCH          | 23.78                        | 24.28      | 33          | PASS    |
|           |           | HCH          | 23.82                        | 24.32      | 33          | 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:

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

$$\text{SET RBW} = 1\% \text{ of the OBW, not to exceed 1MHz}$$

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

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 |
|-----------|-----------|--------------|--------------|------------|---------|
| WCDMA1900 | UMTS/TM1  | LCH          | 3.3          | 13         | PASS    |
|           |           | MCH          | 3.3          | 13         | PASS    |
|           |           | HCH          | 3.15         | 13         | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | 3.22         | 13         | PASS    |
|           |           | MCH          | 3.32         | 13         | PASS    |
|           |           | HCH          | 3.09         | 13         | PASS    |

## 3Appendix\_C: Modulation Characteristics

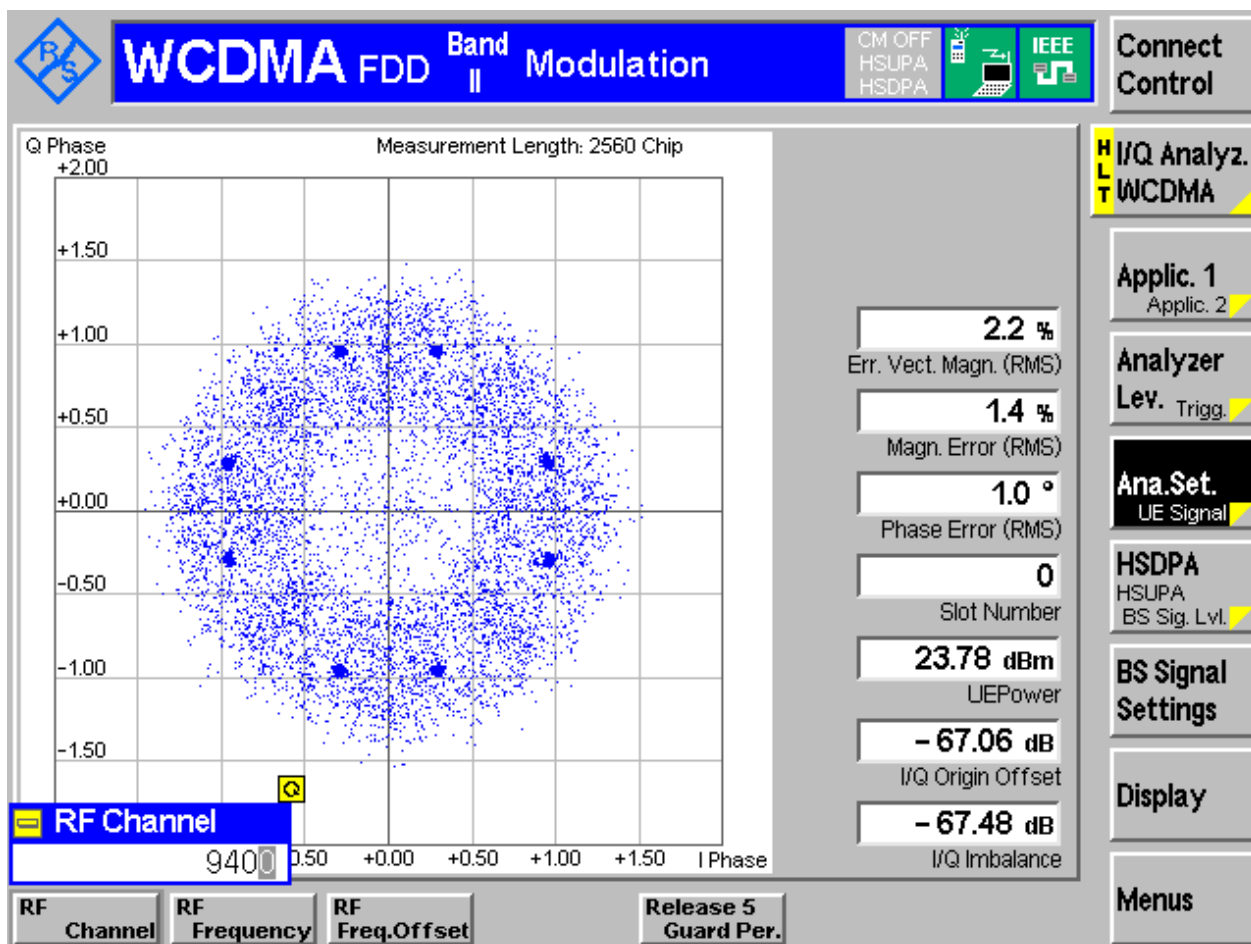
### Part I - Test Plots

#### 3.1 For UMTS

##### 3.1.1 Test Band = WCDMA1900

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

##### 3.1.1.1.1 Test Channel = MCH

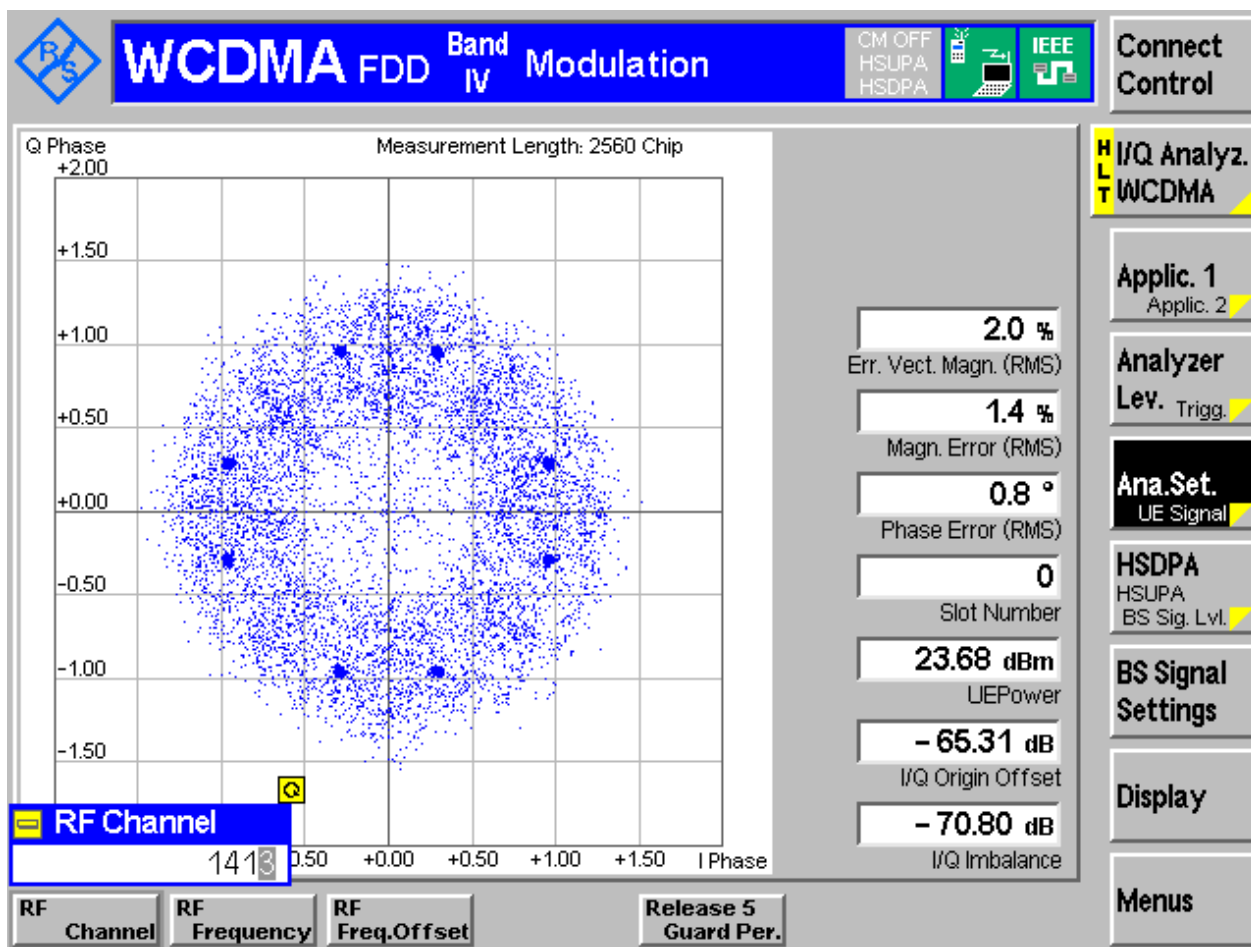


### 3.2 For UMTS

#### 3.2.1 Test Band = WCDMA1700

##### 3.2.1.1 Test Mode = UMTS/TM1

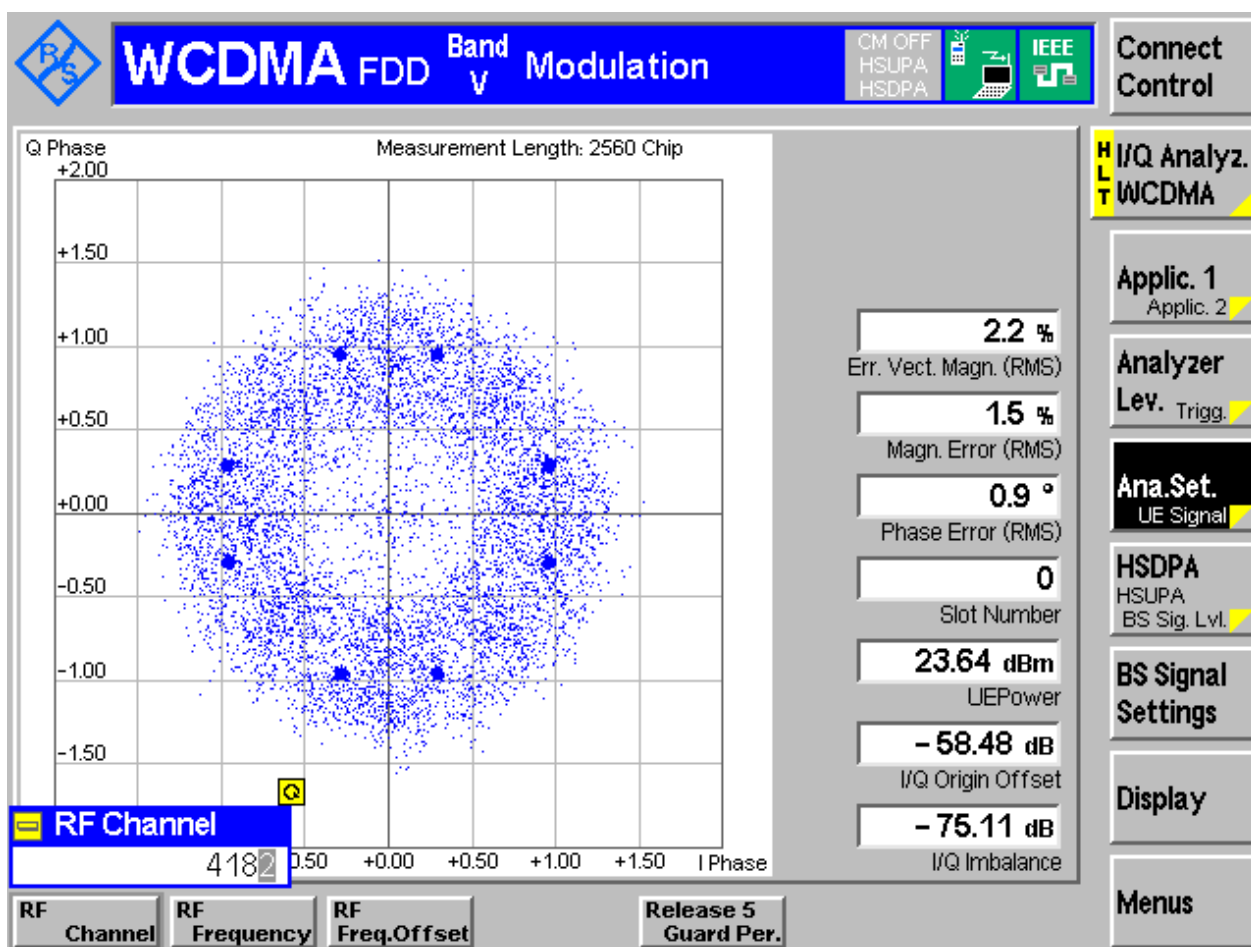
##### 3.2.1.1.1 Test Channel = MCH



### 3.2.2 Test Band = WCDMA850

#### 3.2.2.1 Test Mode = UMTS/TM1

##### 3.2.2.1.1 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          | 4.14                     | 4.70                     | Pass    |
|           |           | MCH          | 4.15                     | 4.71                     | Pass    |
|           |           | HCH          | 4.14                     | 4.71                     | Pass    |
| Test Band | Test Mode | Test Channel | Occupied Bandwidth [MHz] | Emission Bandwidth [MHz] | Verdict |
| WCDMA1700 | UMTS/TM1  | LCH          | 4.15                     | 4.70                     | Pass    |
|           |           | MCH          | 4.16                     | 4.70                     | Pass    |
|           |           | HCH          | 4.15                     | 4.71                     | Pass    |
| WCDMA850  | UMTS/TM1  | LCH          | 4.14                     | 4.71                     | Pass    |
|           |           | MCH          | 4.17                     | 4.70                     | Pass    |
|           |           | HCH          | 4.14                     | 4.69                     | Pass    |



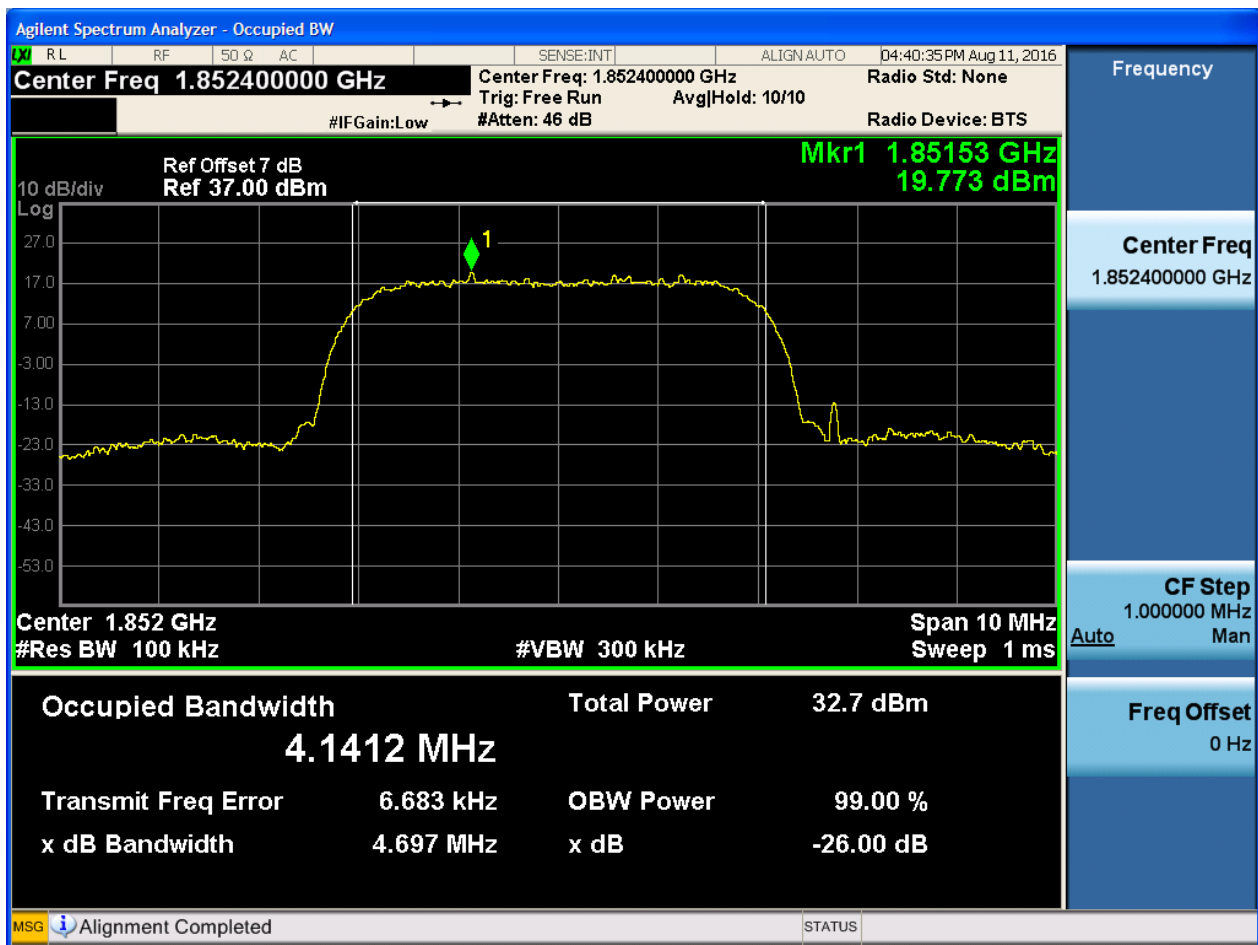
## Part II - Test Plots

### 4.1 For UMTS

#### 4.1.1 Test Band = WCDMA1900

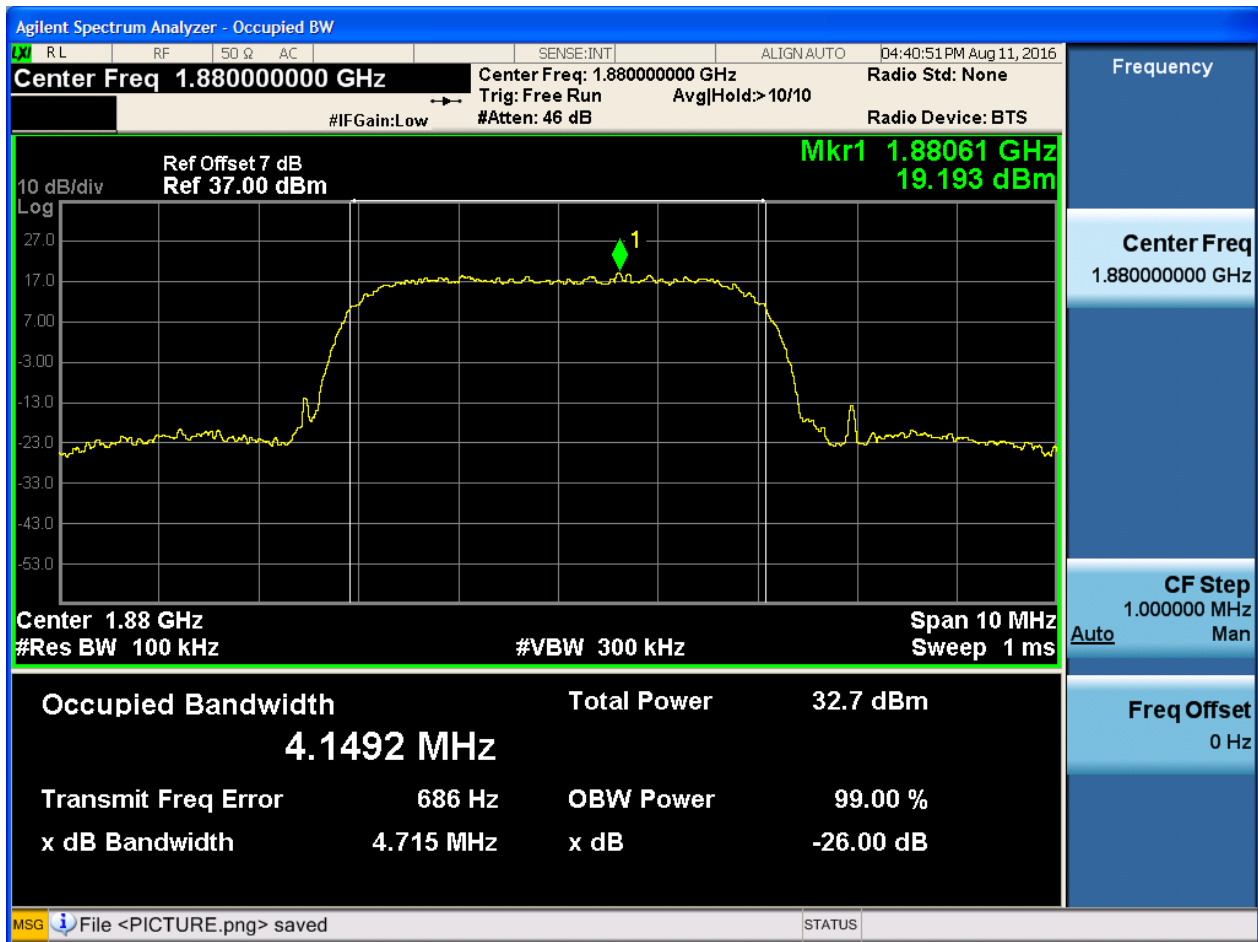
##### 4.1.1.1 Test Mode = UMTS/TM1

##### 4.1.1.1.1 Test Channel = LCH



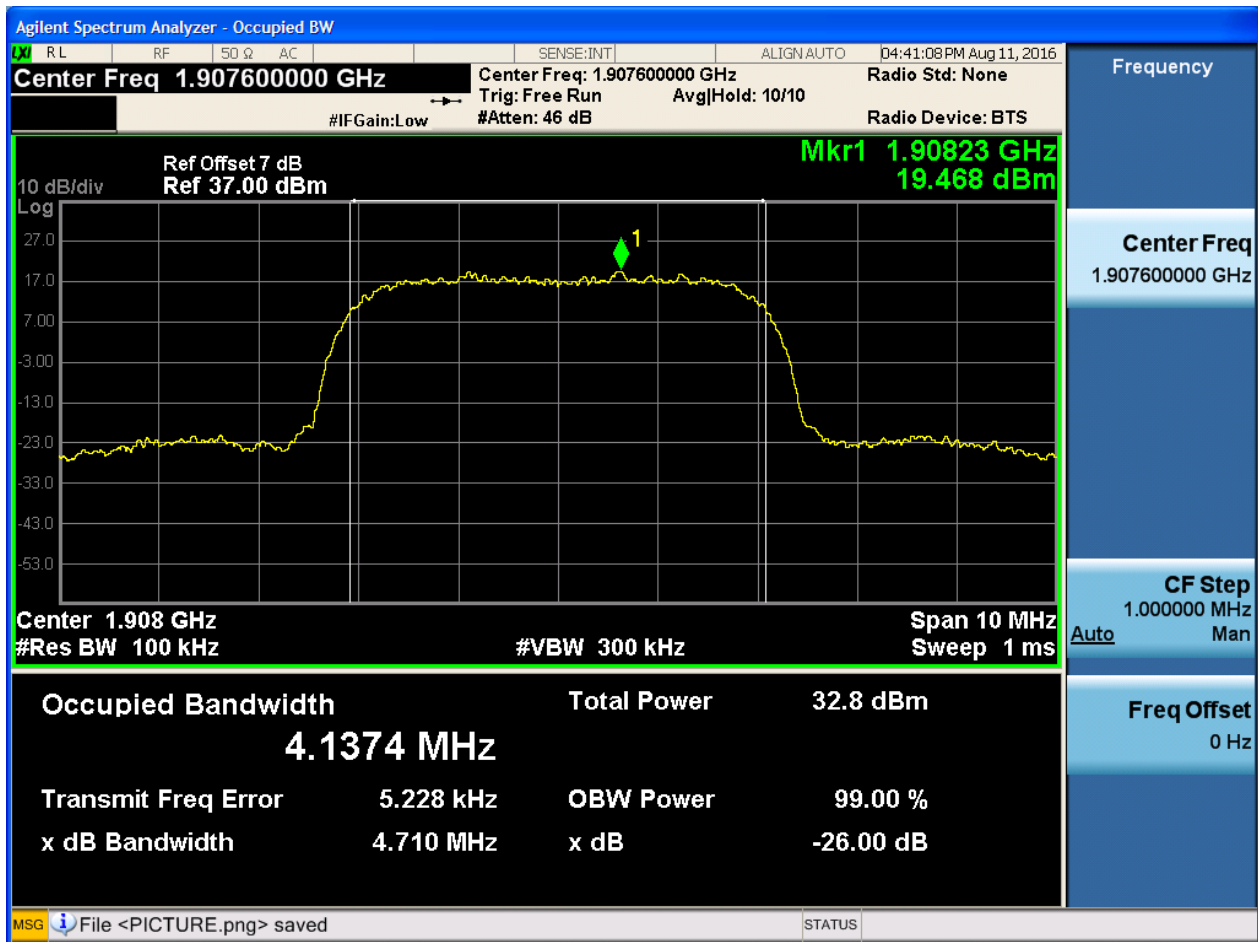


## 4.1.1.1.2 Test Channel = MCH





## 4.1.1.1.3 Test Channel = HCH



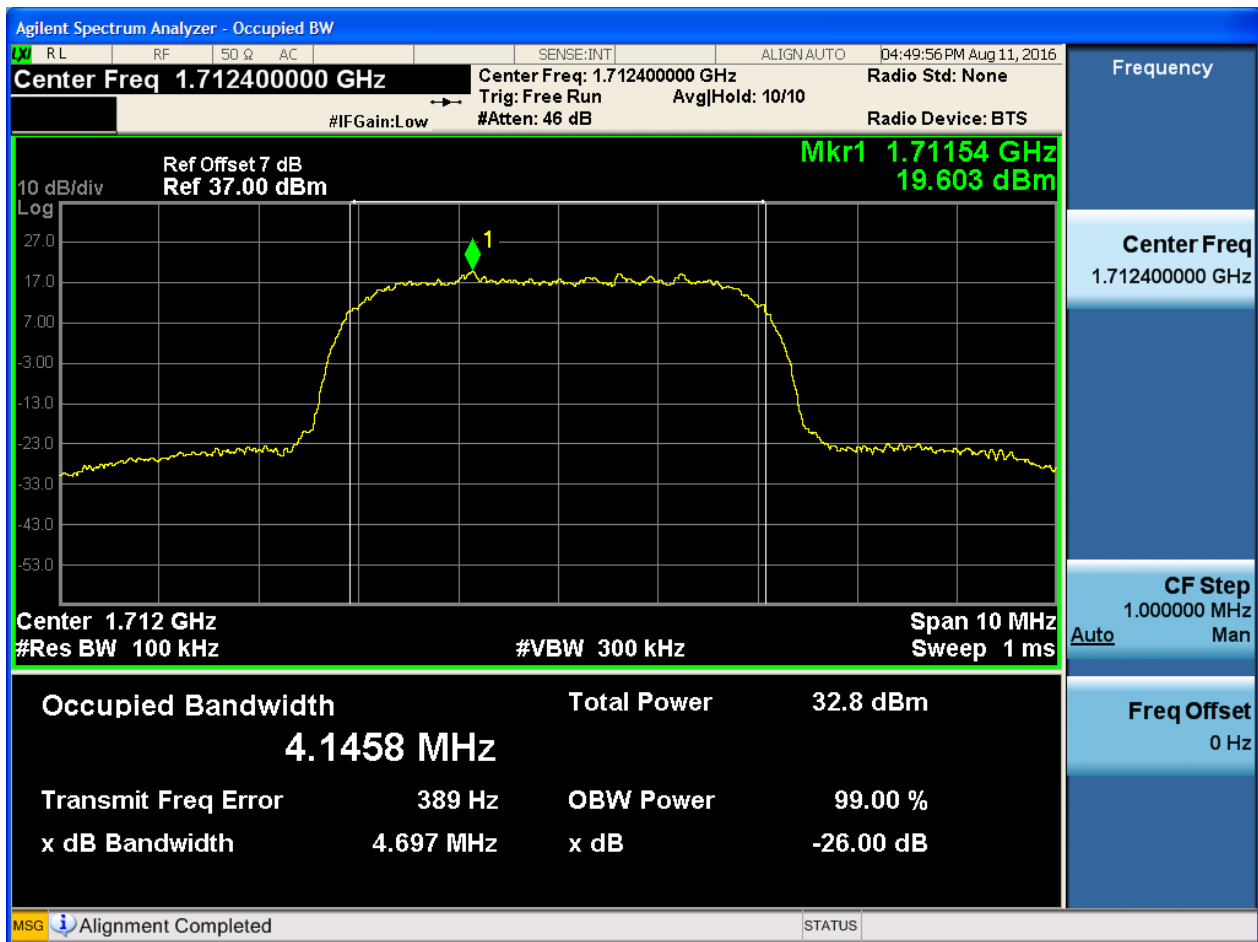


## 4.2 For UMTS

### 4.2.1 Test Band = WCDMA1700

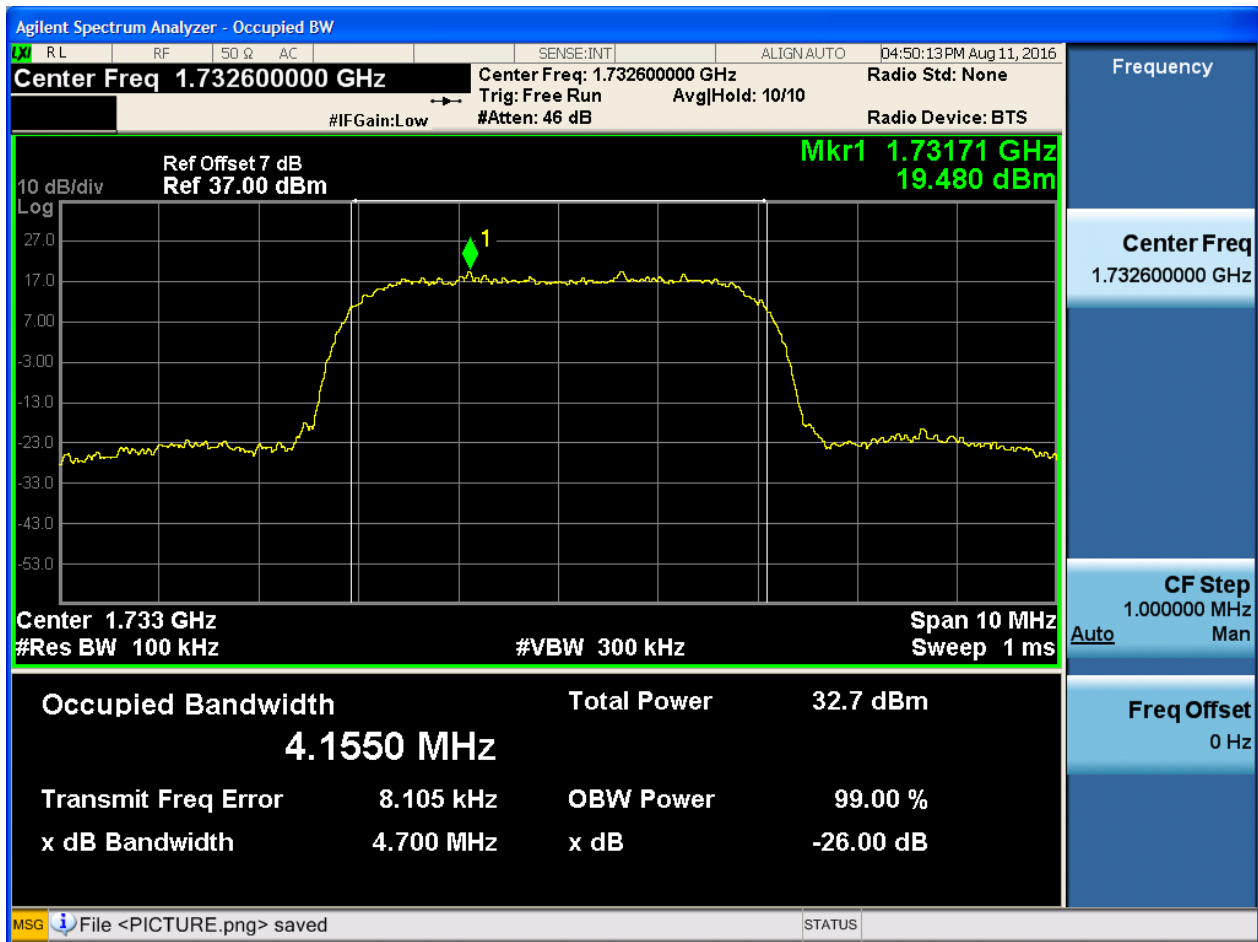
#### 4.2.1.1 Test Mode = UMTS/TM1

##### 4.2.1.1.1 Test Channel = LCH



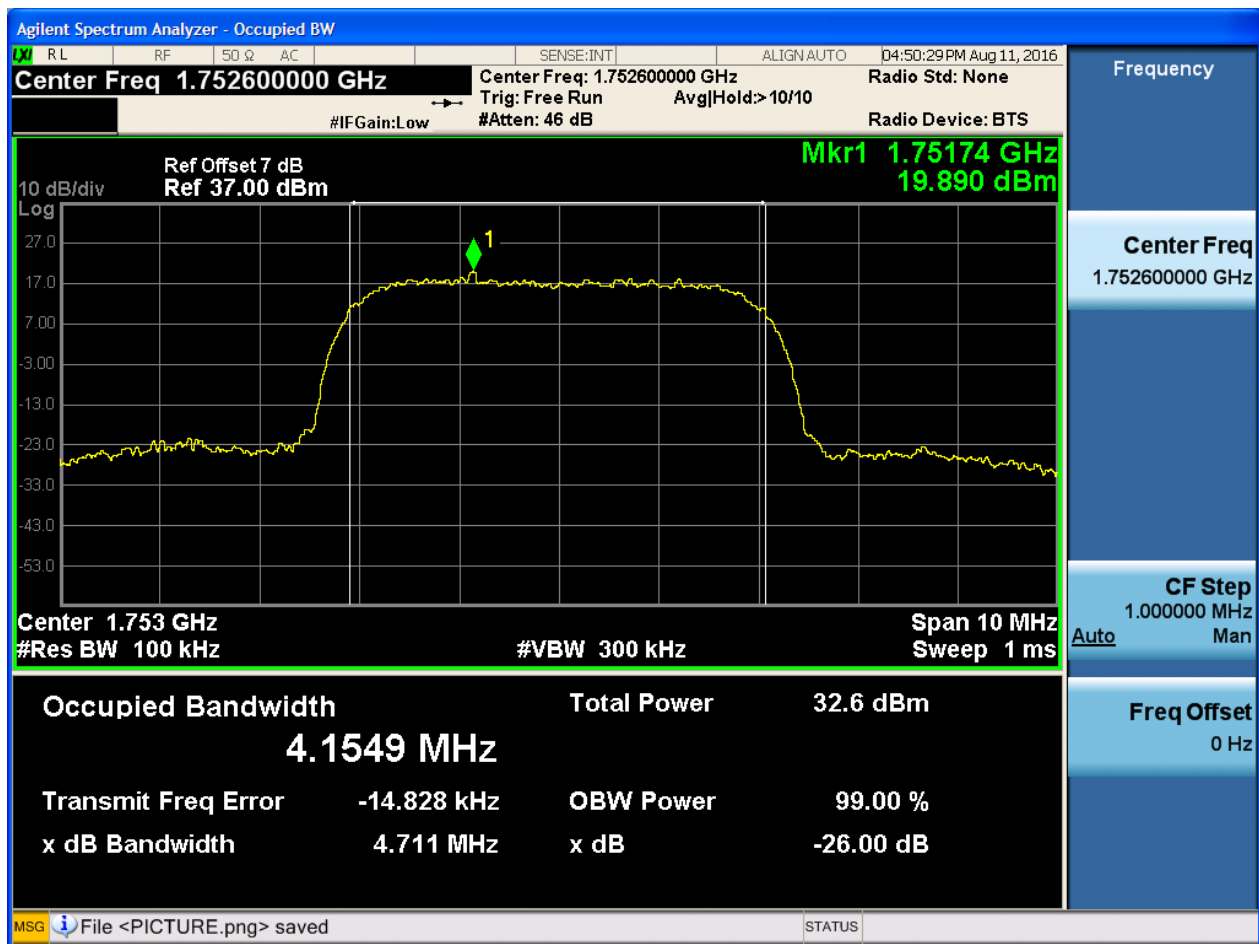


## 4.2.1.1.2 Test Channel = MCH





## 4.2.1.1.3 Test Channel = HCH

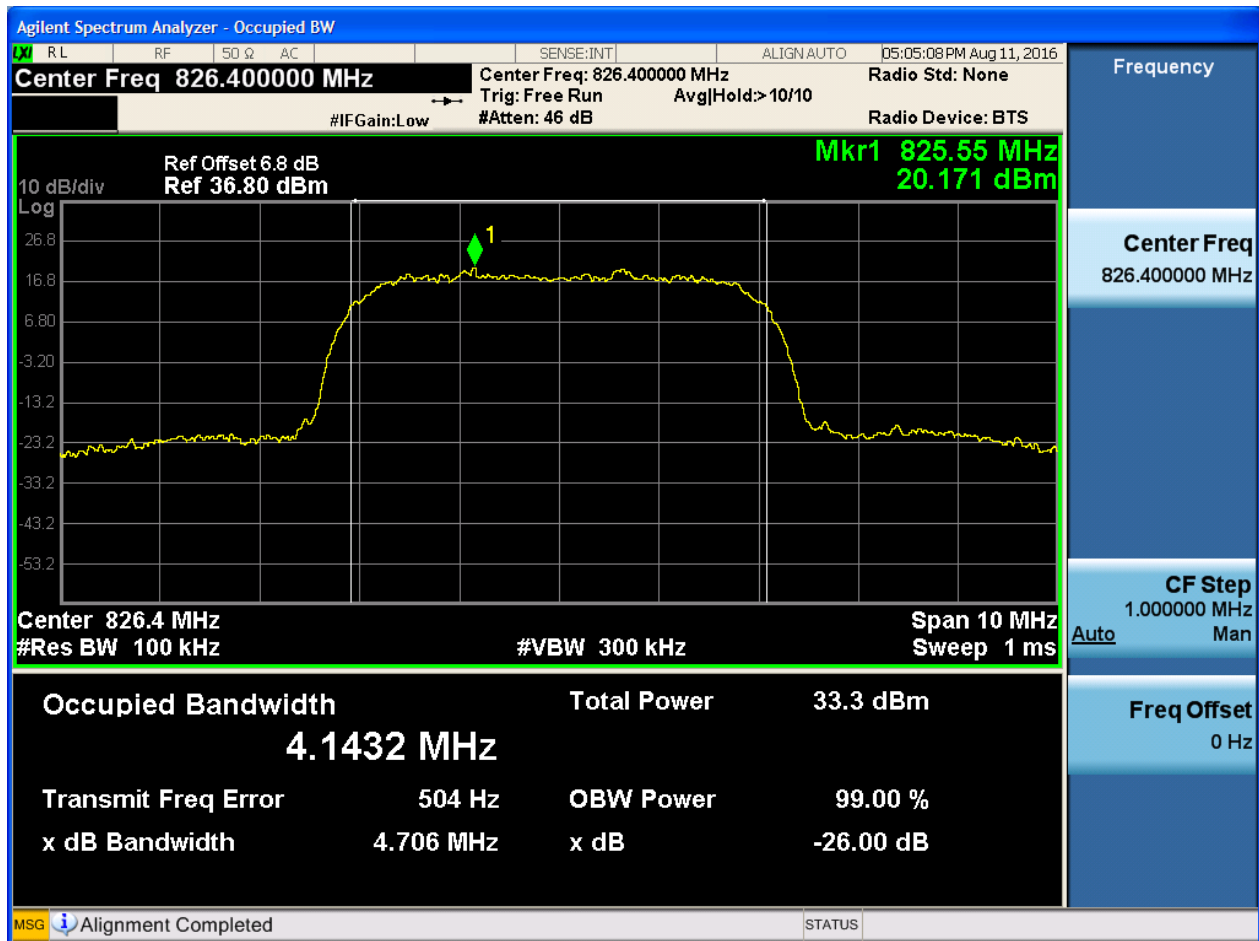




## 4.2.2 Test Band = WCDMA850

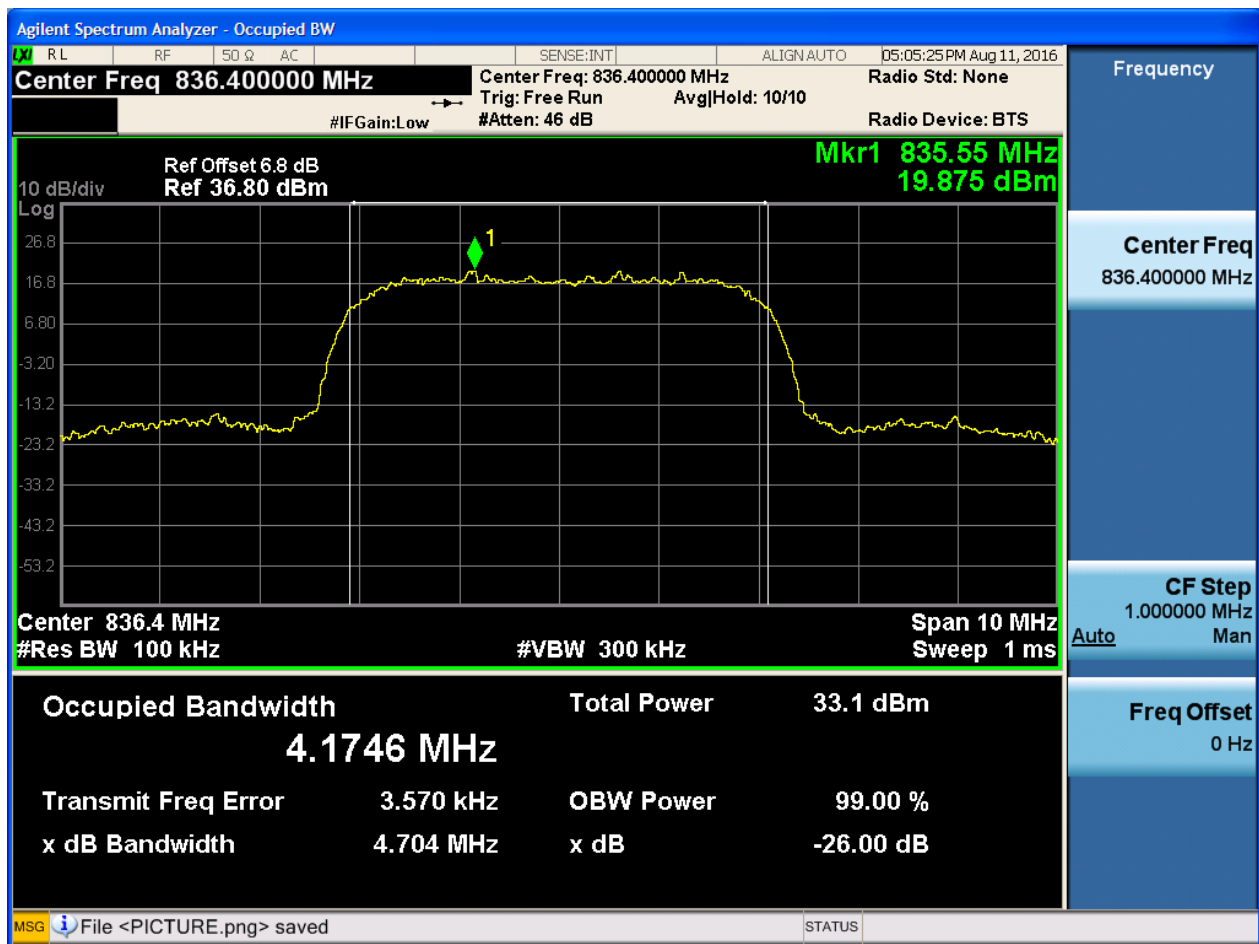
### 4.2.2.1 Test Mode = UMTS/TM1

#### 4.2.2.1.1 Test Channel = LCH



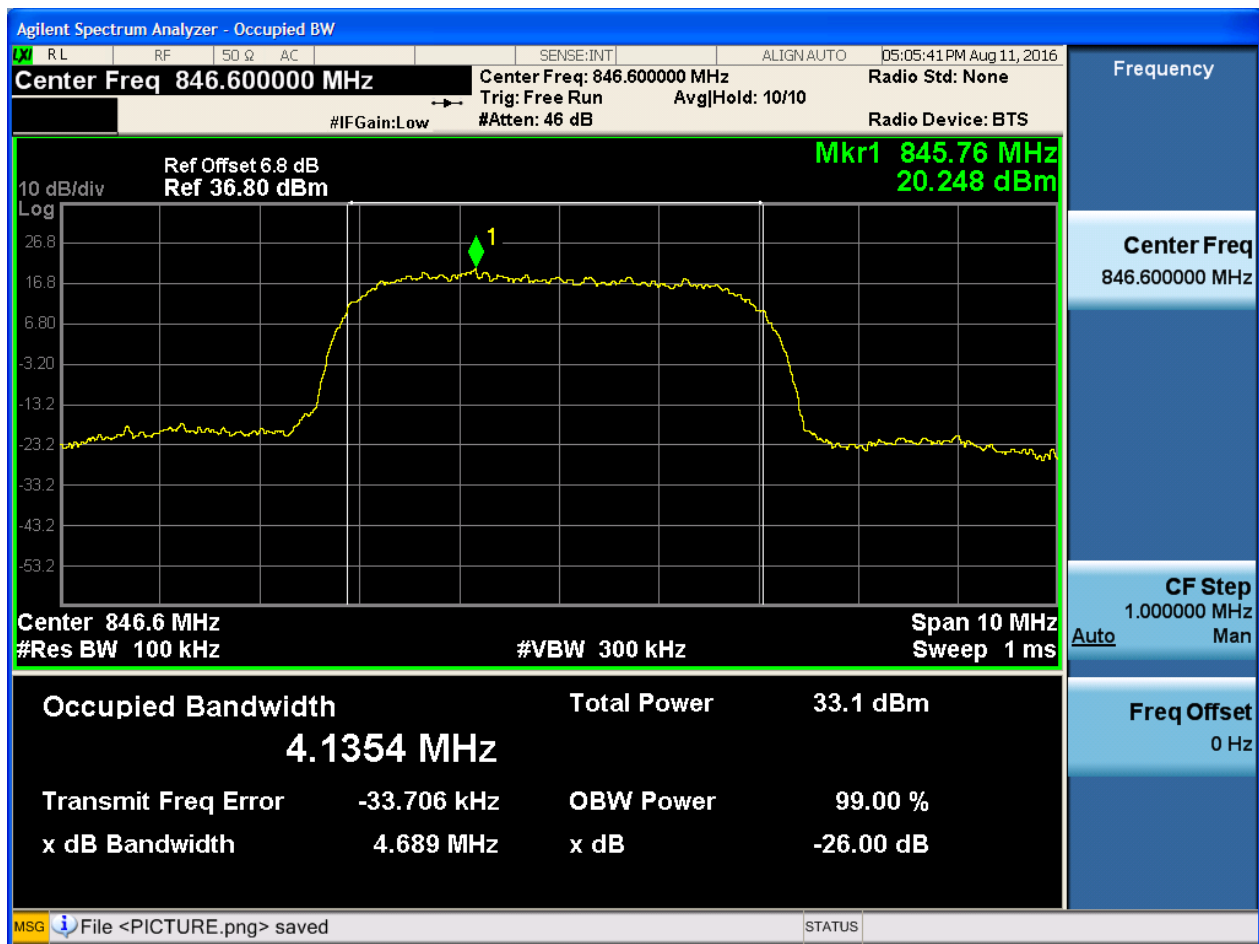


## 4.2.2.1.2 Test Channel = MCH





## 4.2.2.1.3 Test Channel = HCH





## 5Appendix\_E: Band Edges Compliance

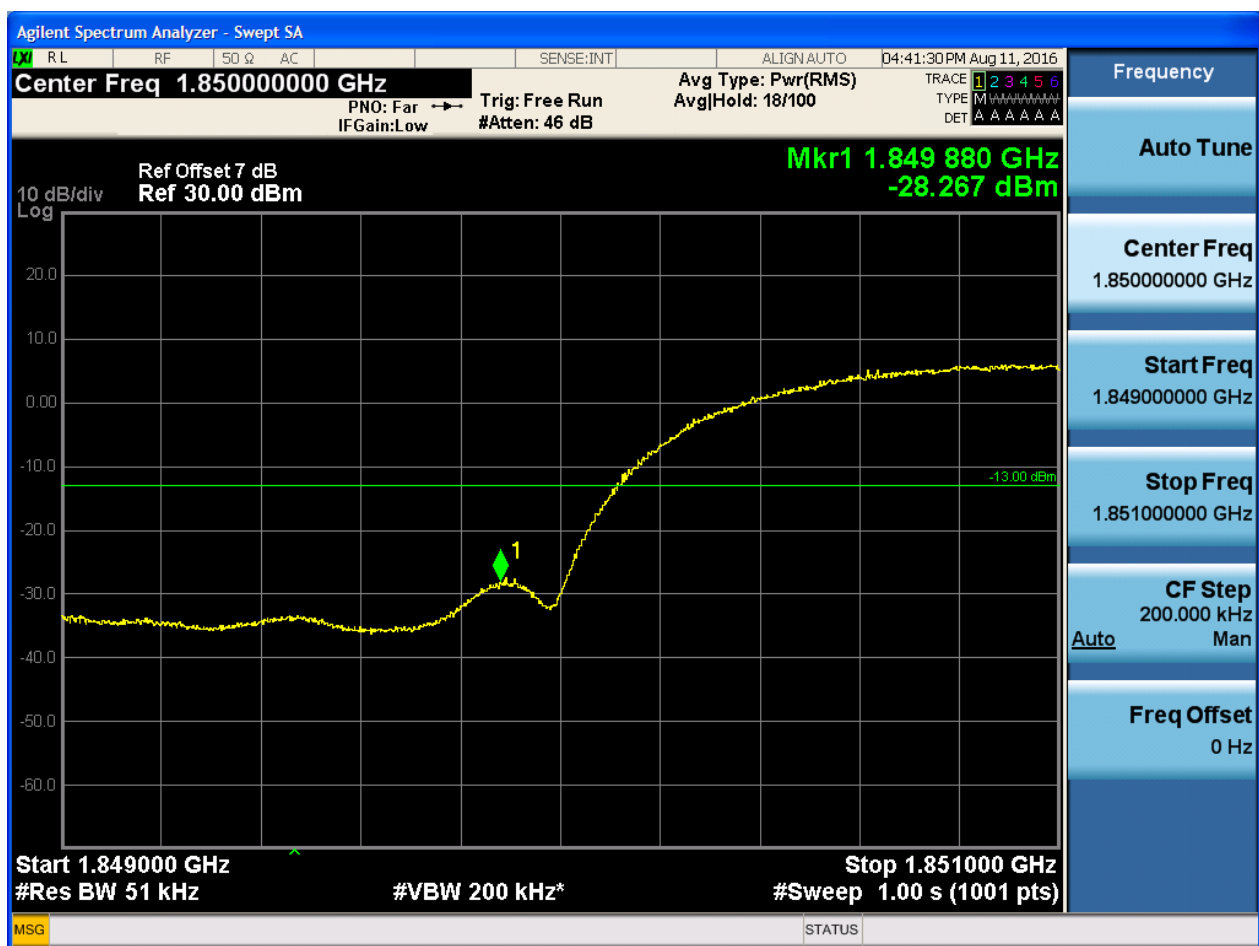
### Part I - Test Plots

#### 5.1 For UMTS

##### 5.1.1 Test Band = WCDMA1900

##### 5.1.1.1 Test Mode = UMTS/TM1

##### 5.1.1.1.1 Test Channel = LCH





## 5.1.1.1.2 Test Channel = HCH





## 5.2 For UMTS

### 5.2.1 Test Band = WCDMA1700

#### 5.2.1.1 Test Mode = UMTS/TM1

##### 5.2.1.1.1 Test Channel = LCH



### 5.2.1.1.2 Test Channel = HCH

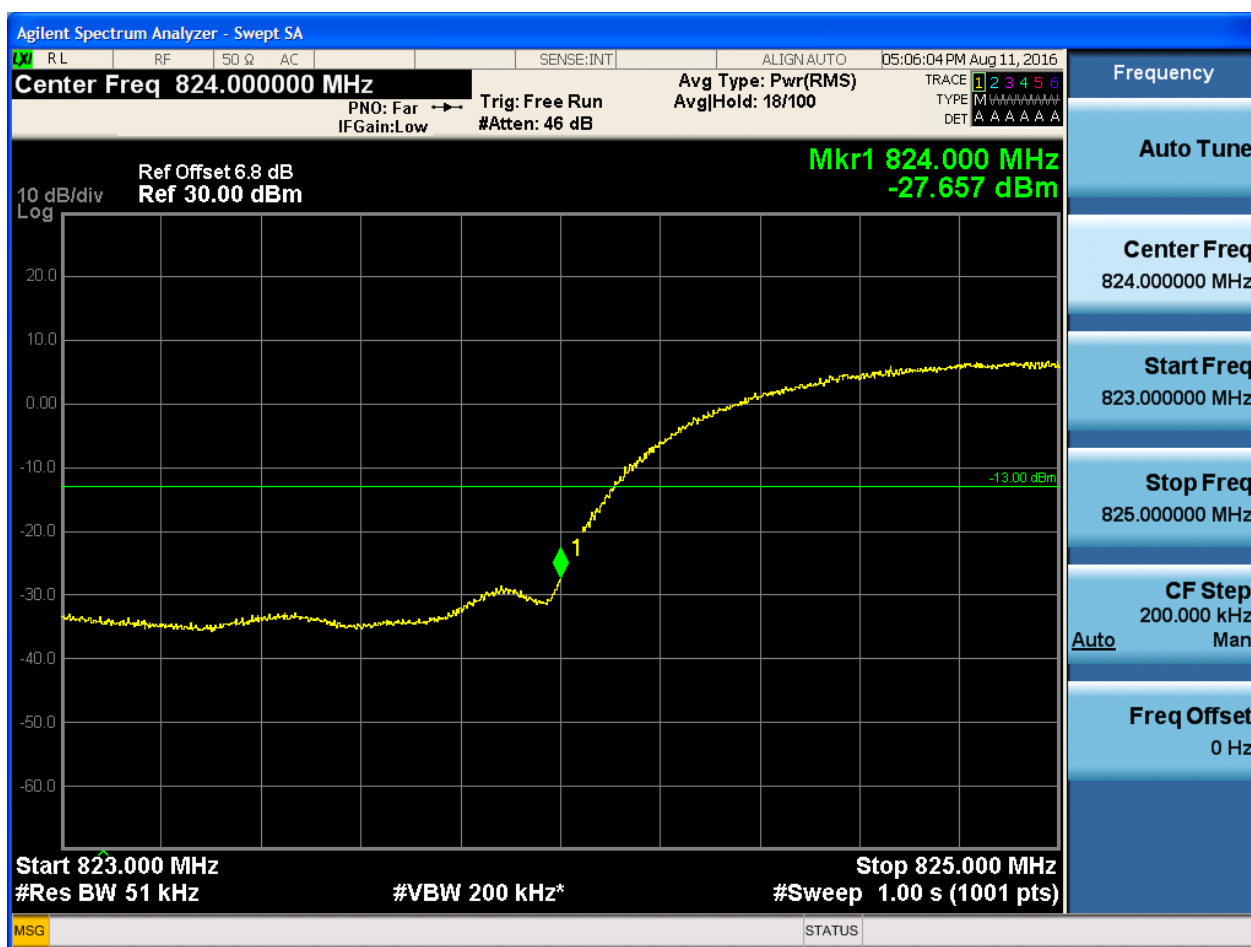




## 5.2.2 Test Band = WCDMA850

### 5.2.2.1 Test Mode = UMTS/TM1

#### 5.2.2.1.1 Test Channel = LCH





## 5.2.2.1.2 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.

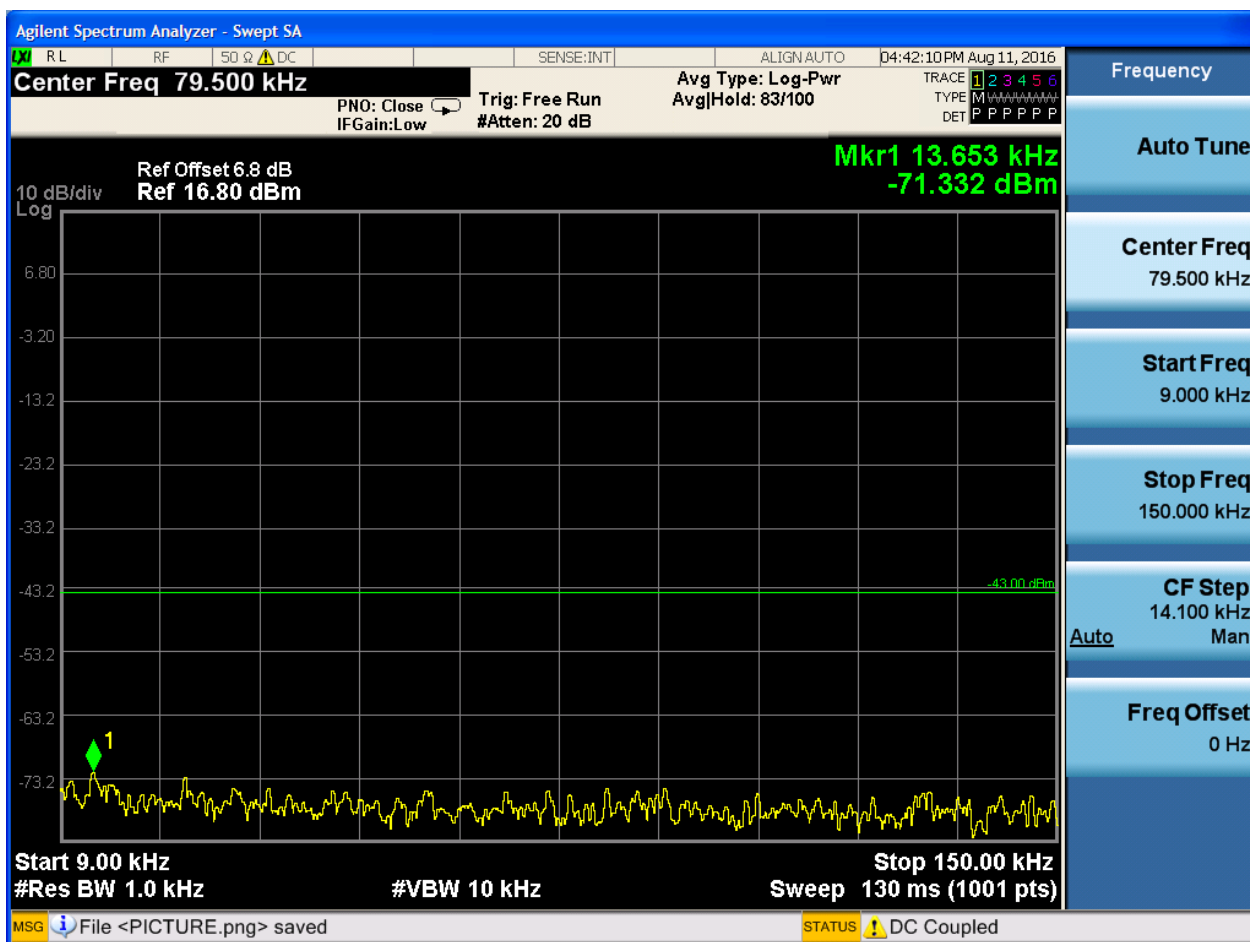
### Part I - Test Plots

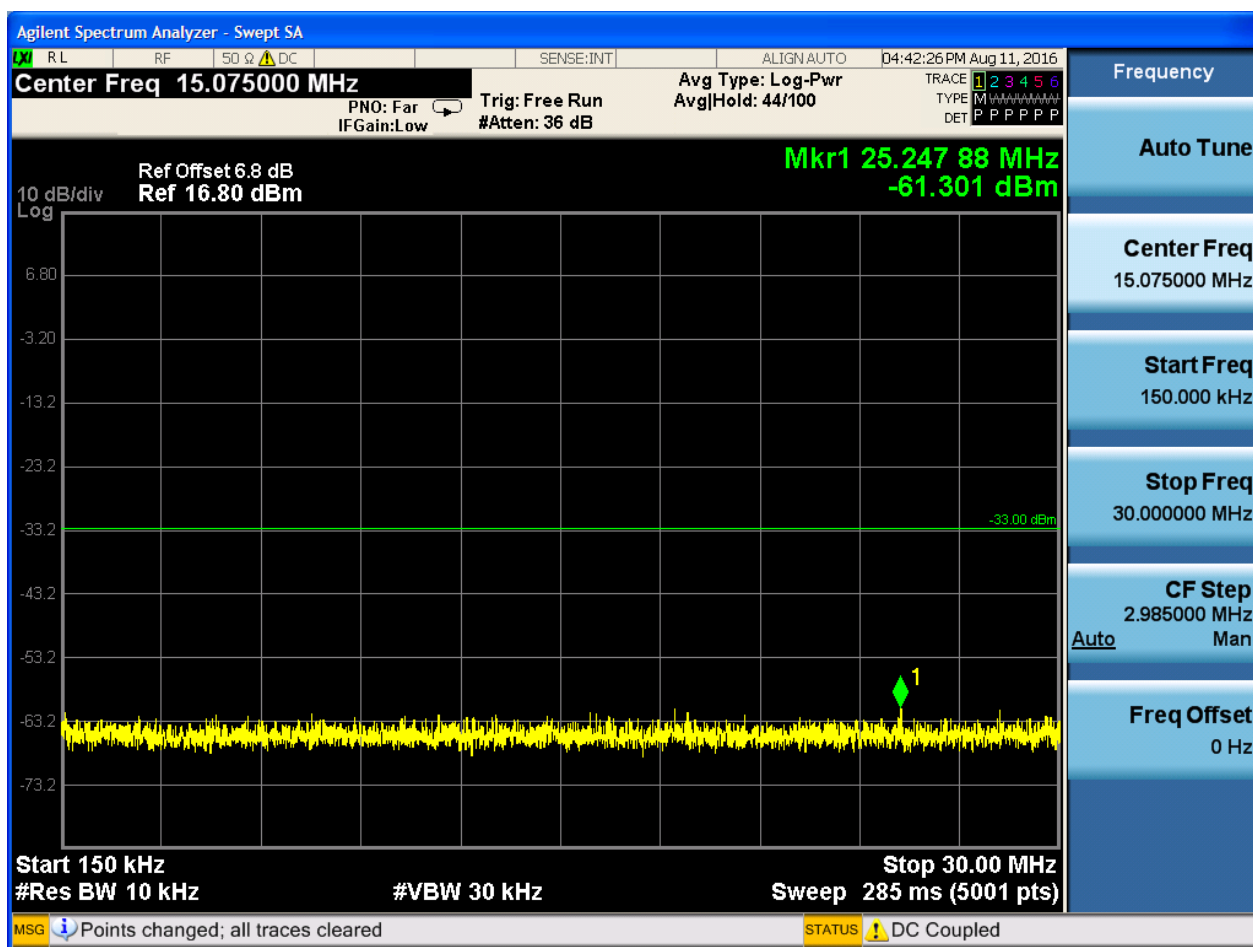
#### 6.1 For UMTS

##### 6.1.1 Test Band = WCDMA1900

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

##### 6.1.1.1.1 Test Channel = LCH

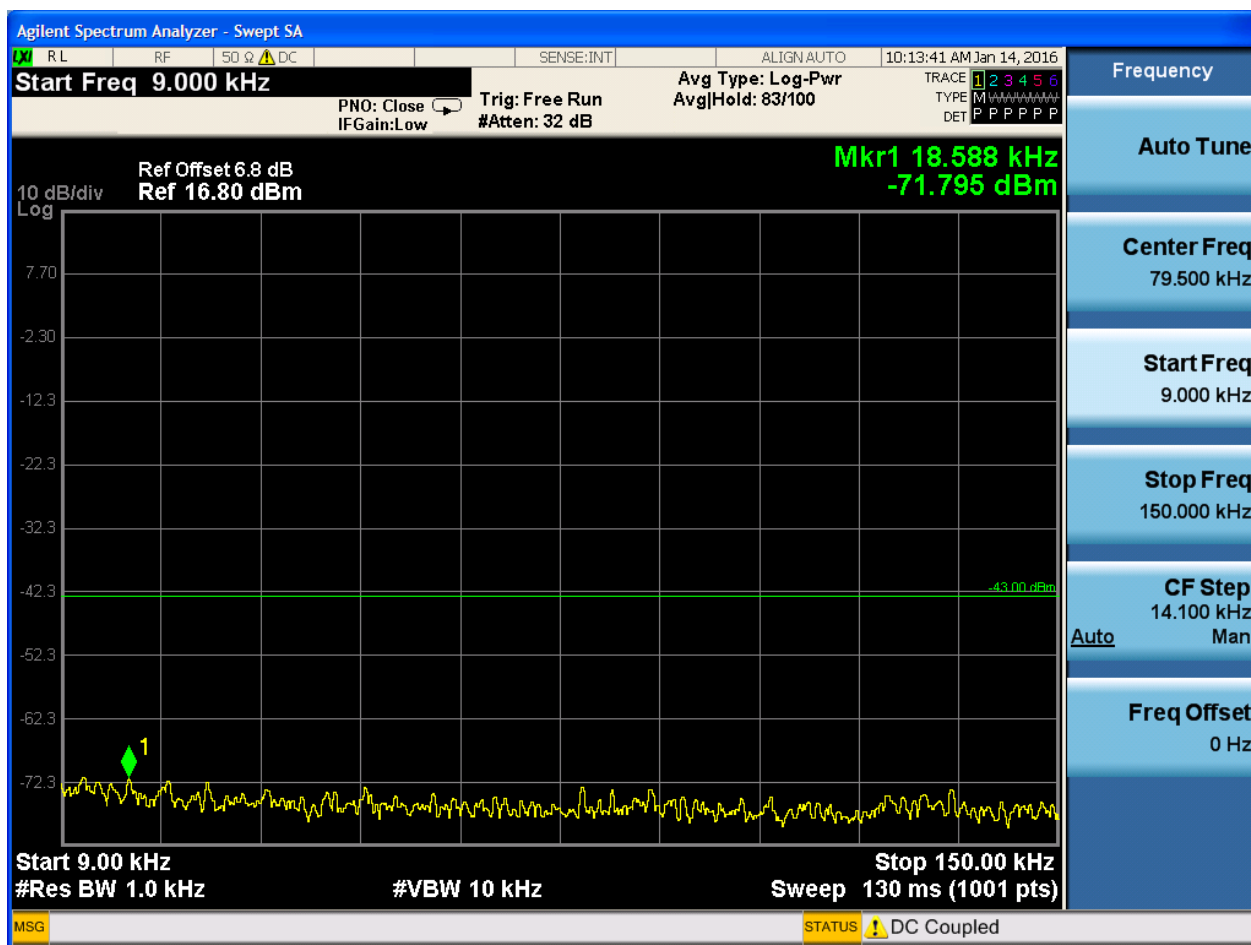


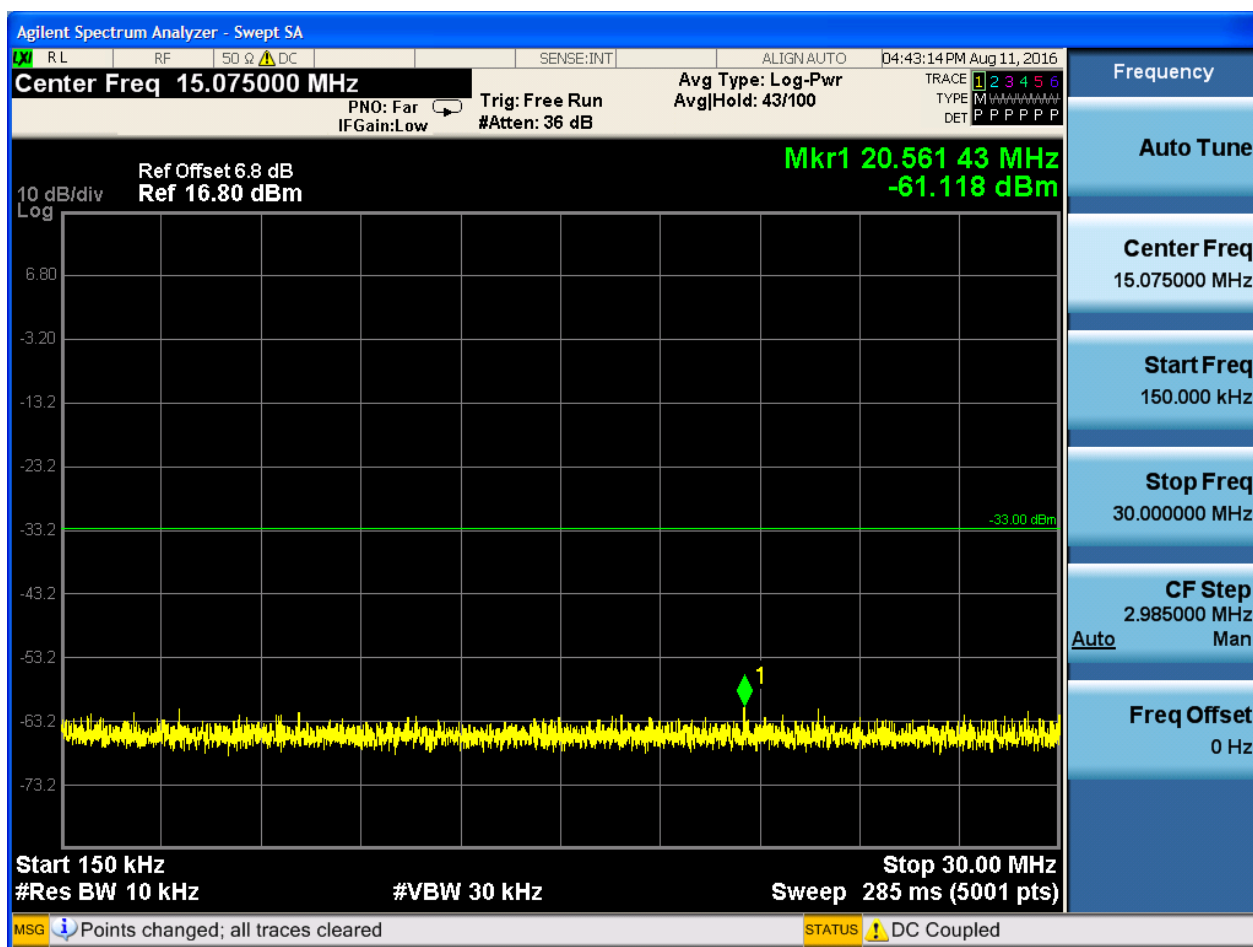


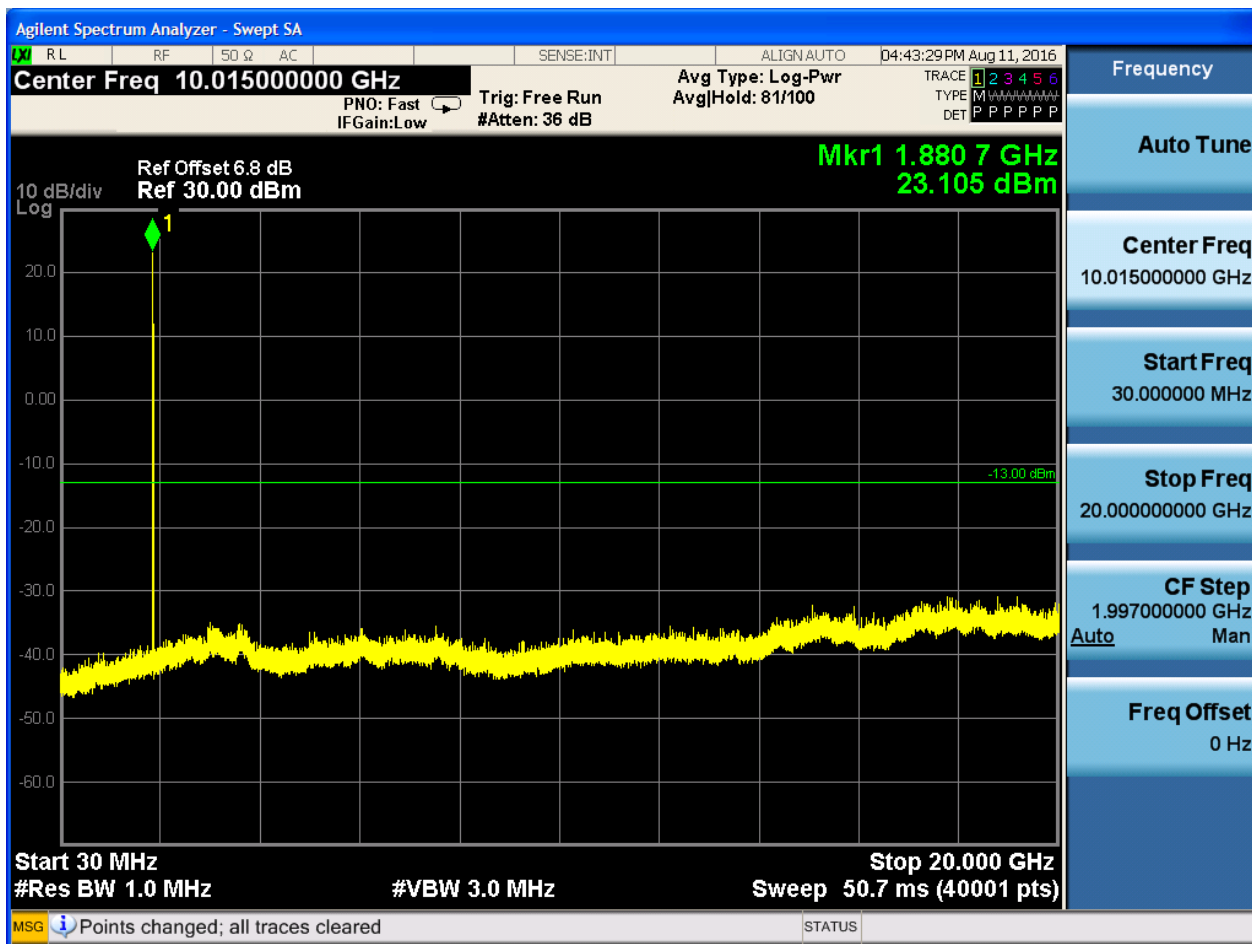




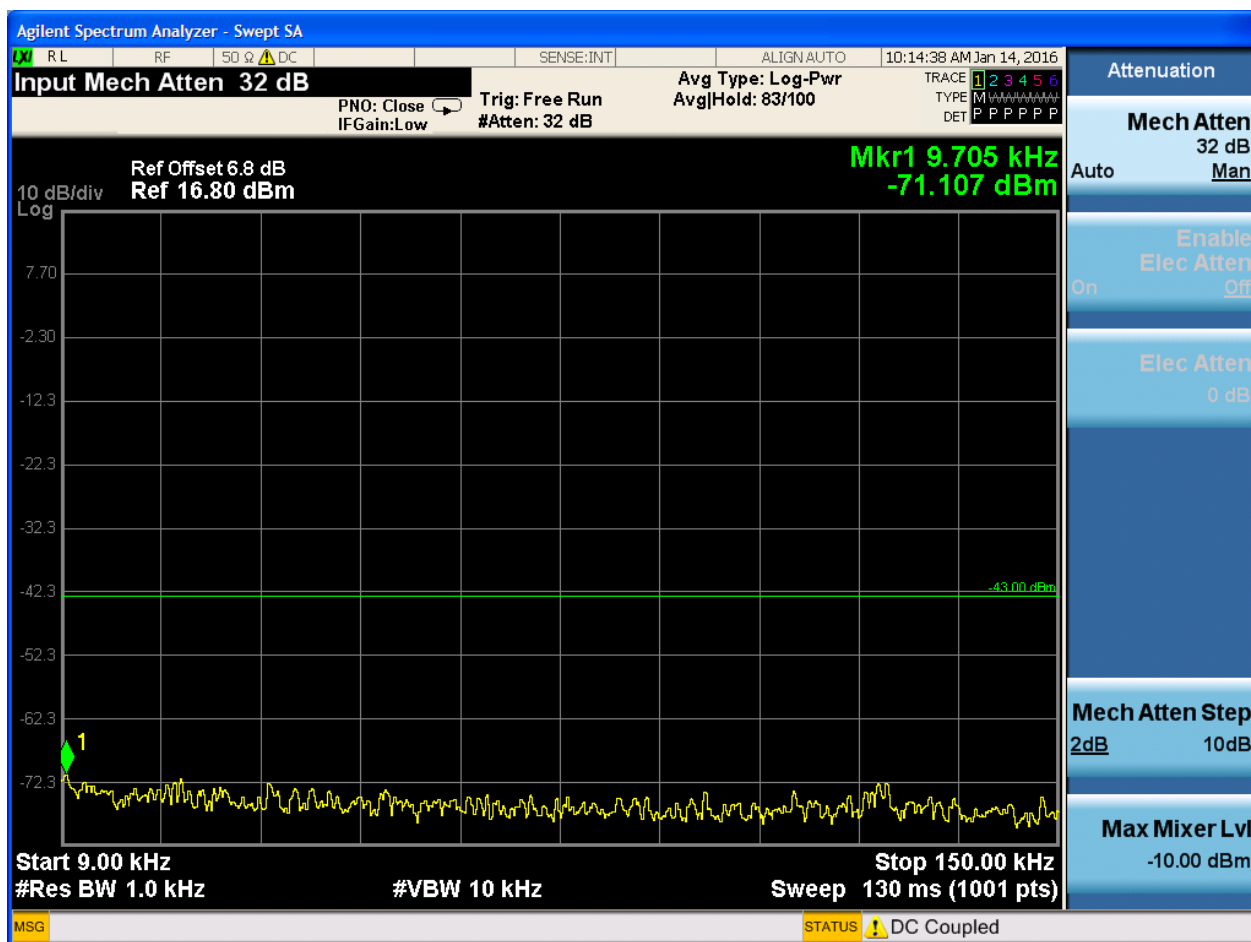
## 6.1.1.1.2 Test Channel = MCH

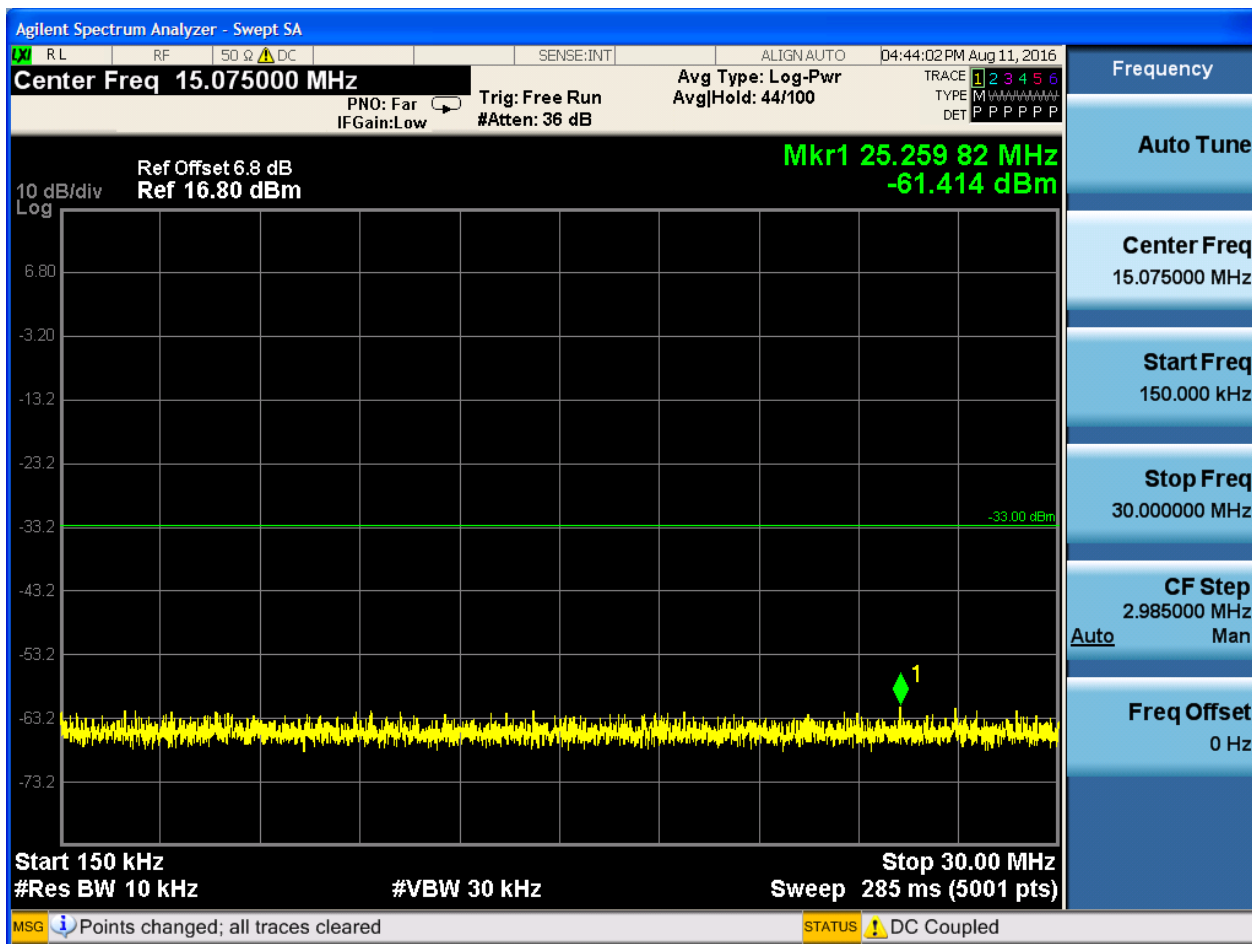


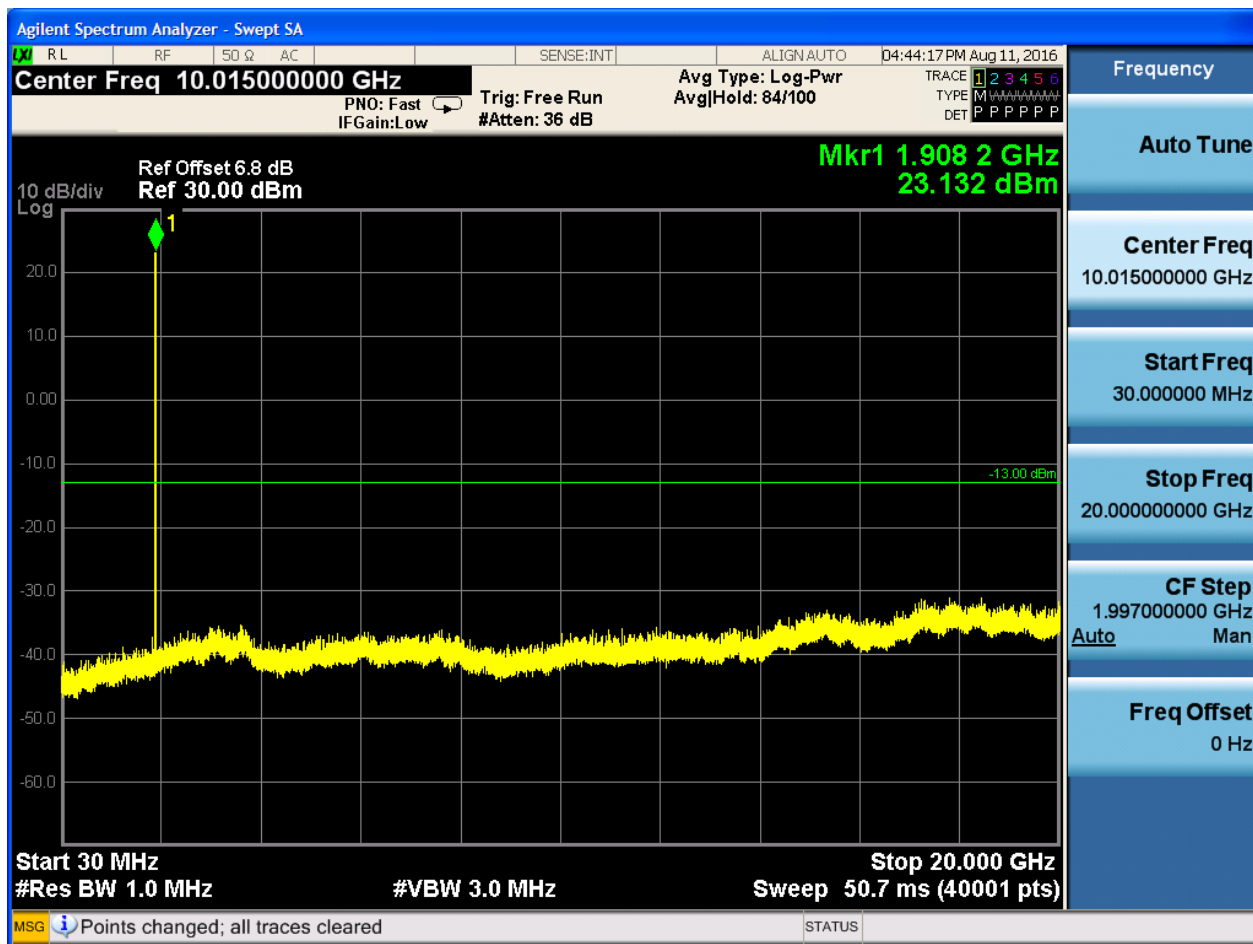




### 6.1.1.1.3 Test Channel = HCH







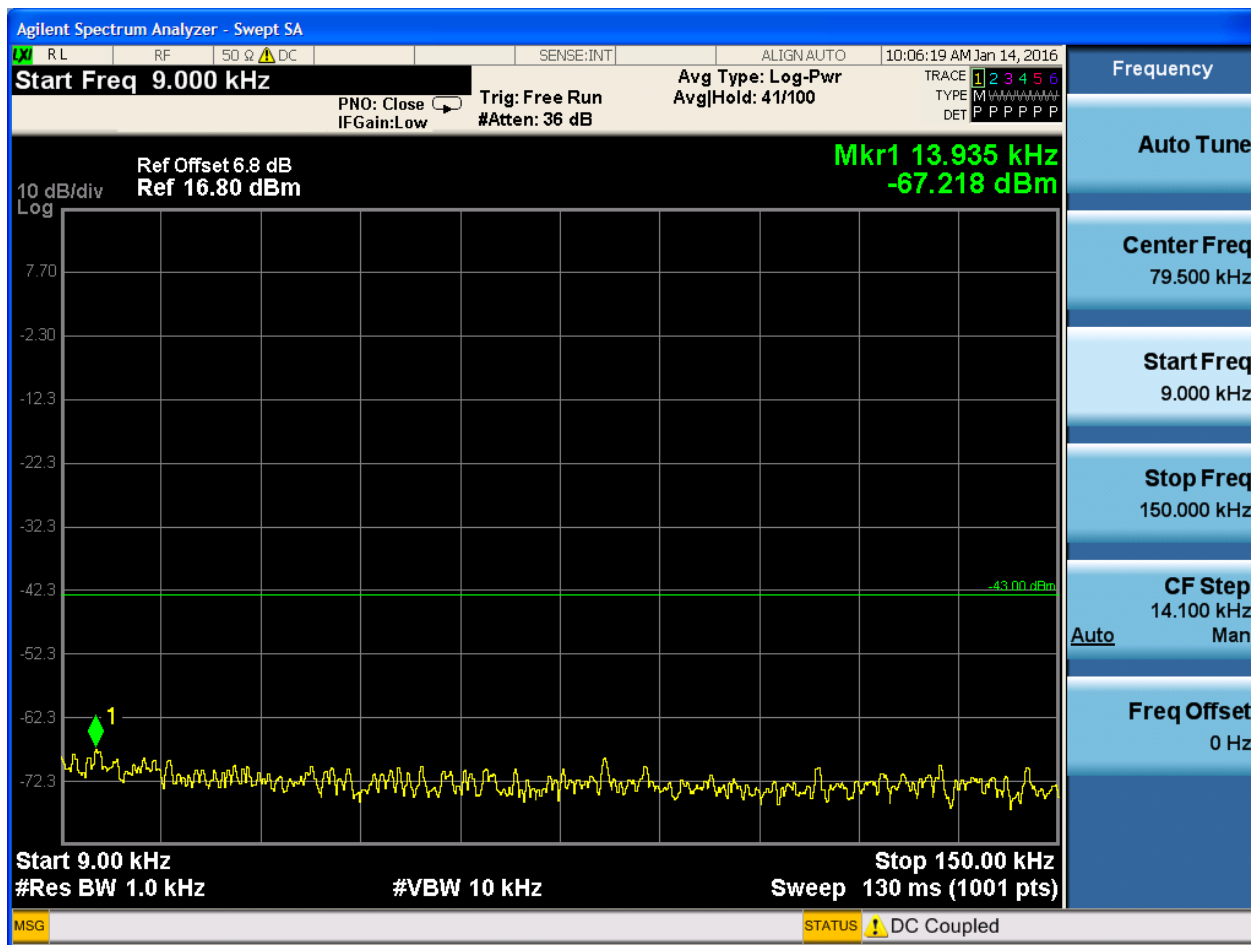


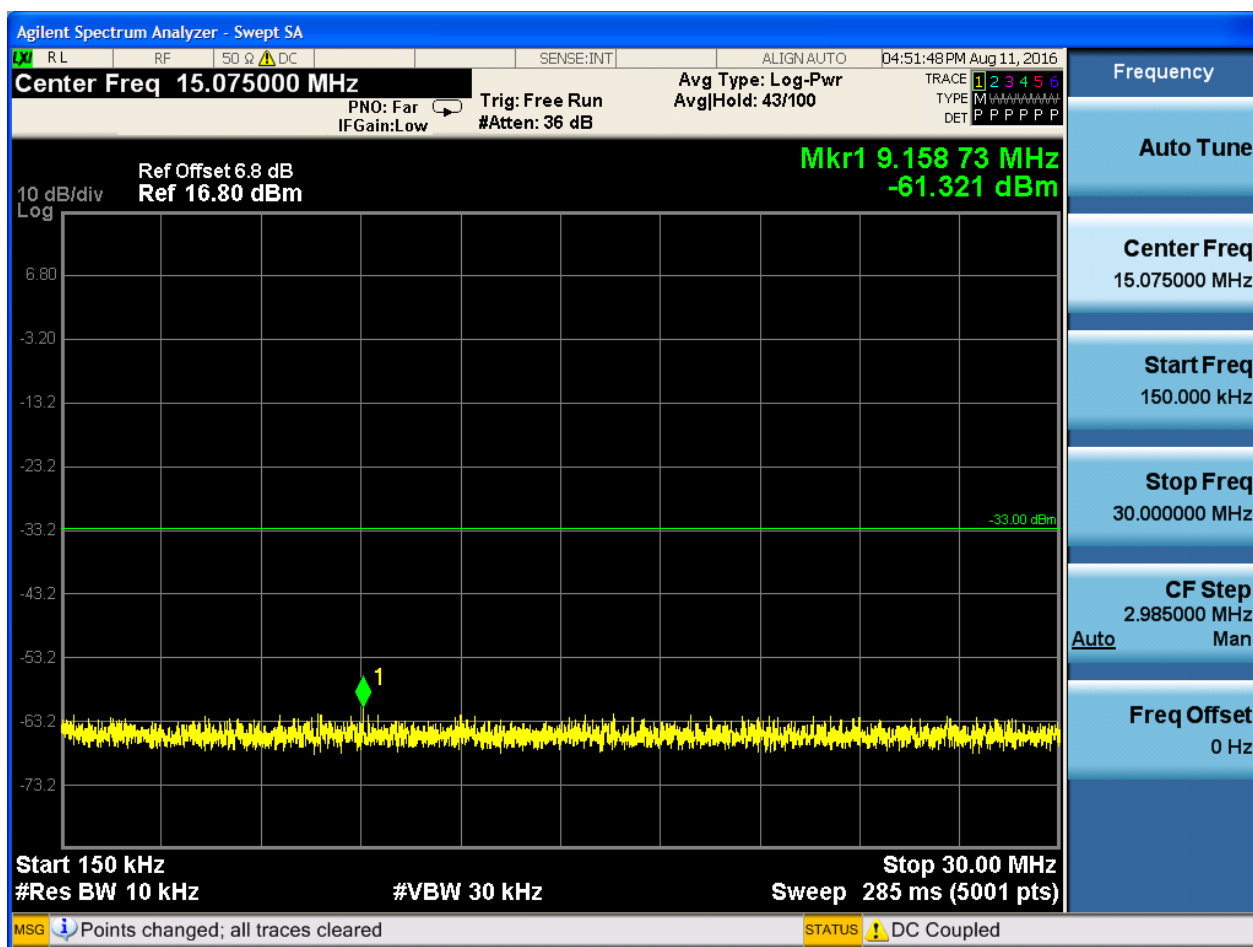
## 6.2 For UMTS

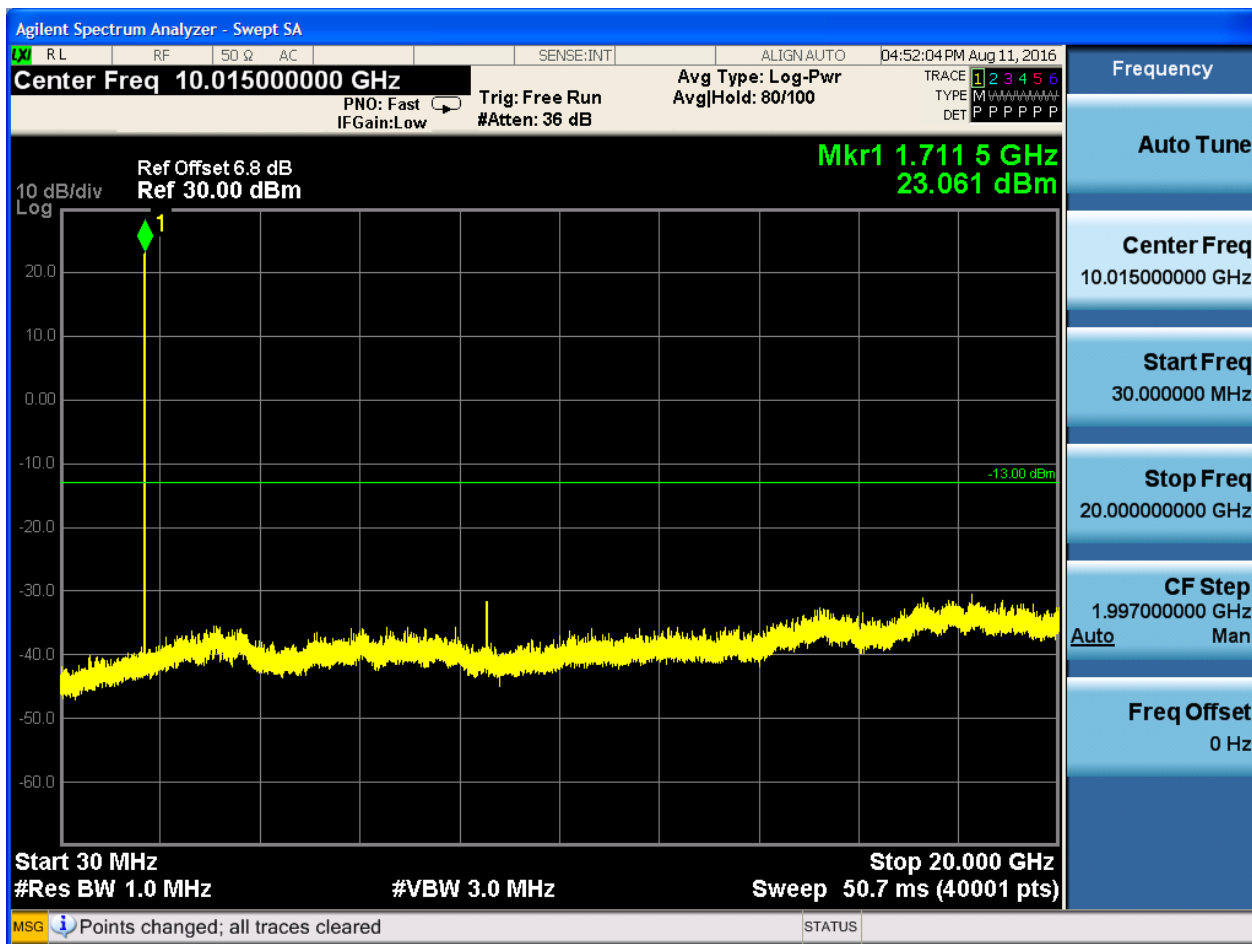
### 6.2.1 Test Band = WCDMA1700

#### 6.2.1.1 Test Mode = UMTS/TM1

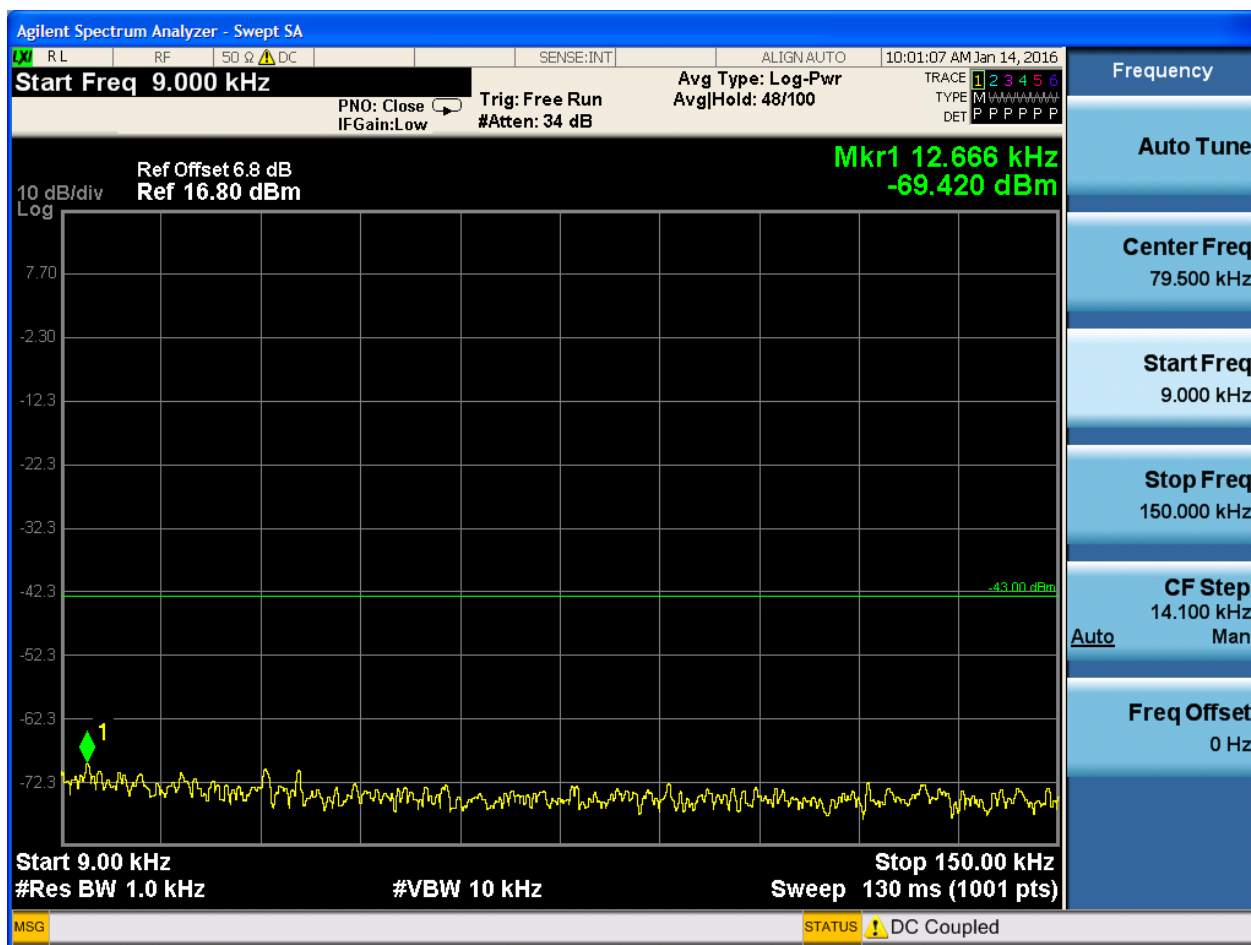
##### 6.2.1.1.1 Test Channel = LCH

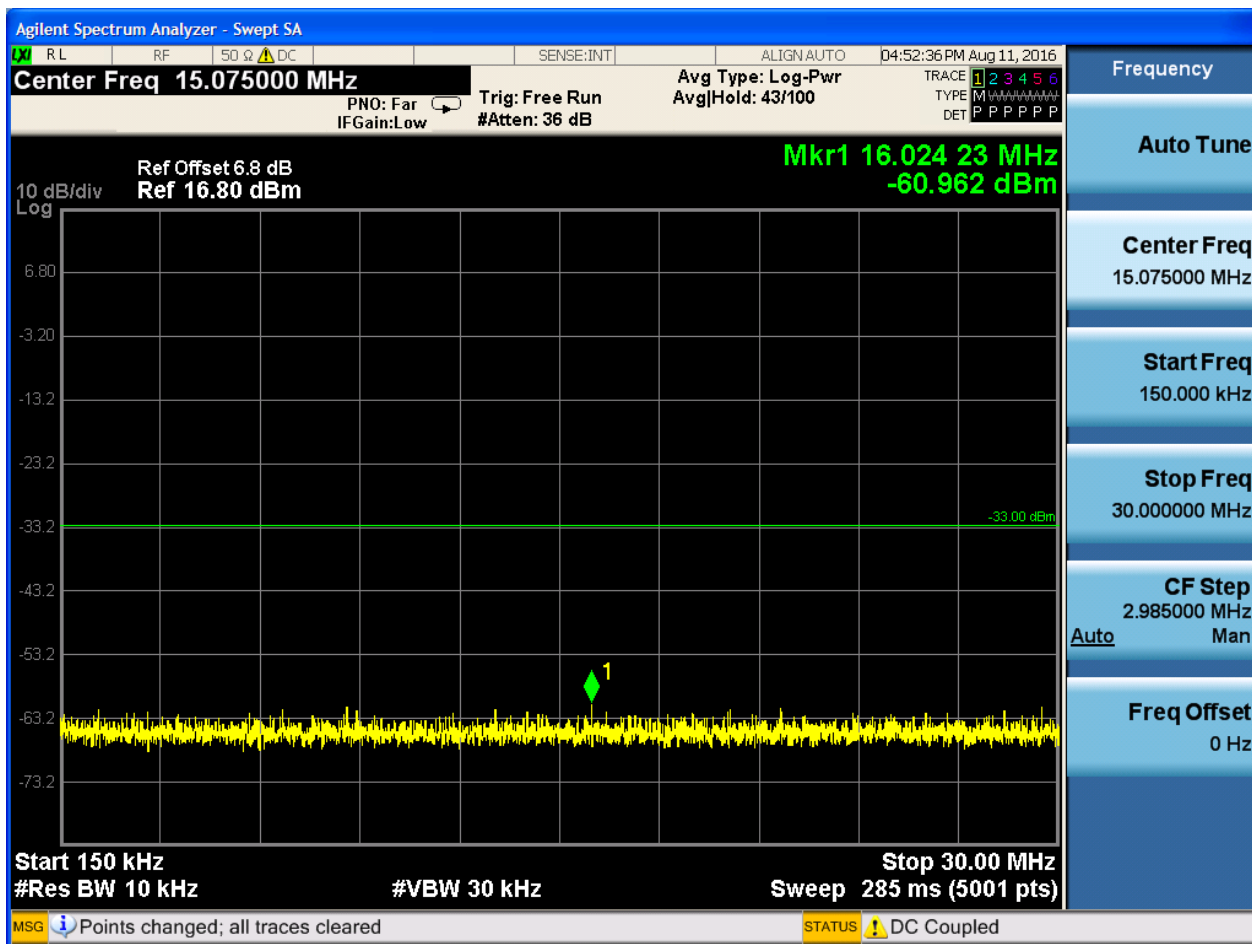


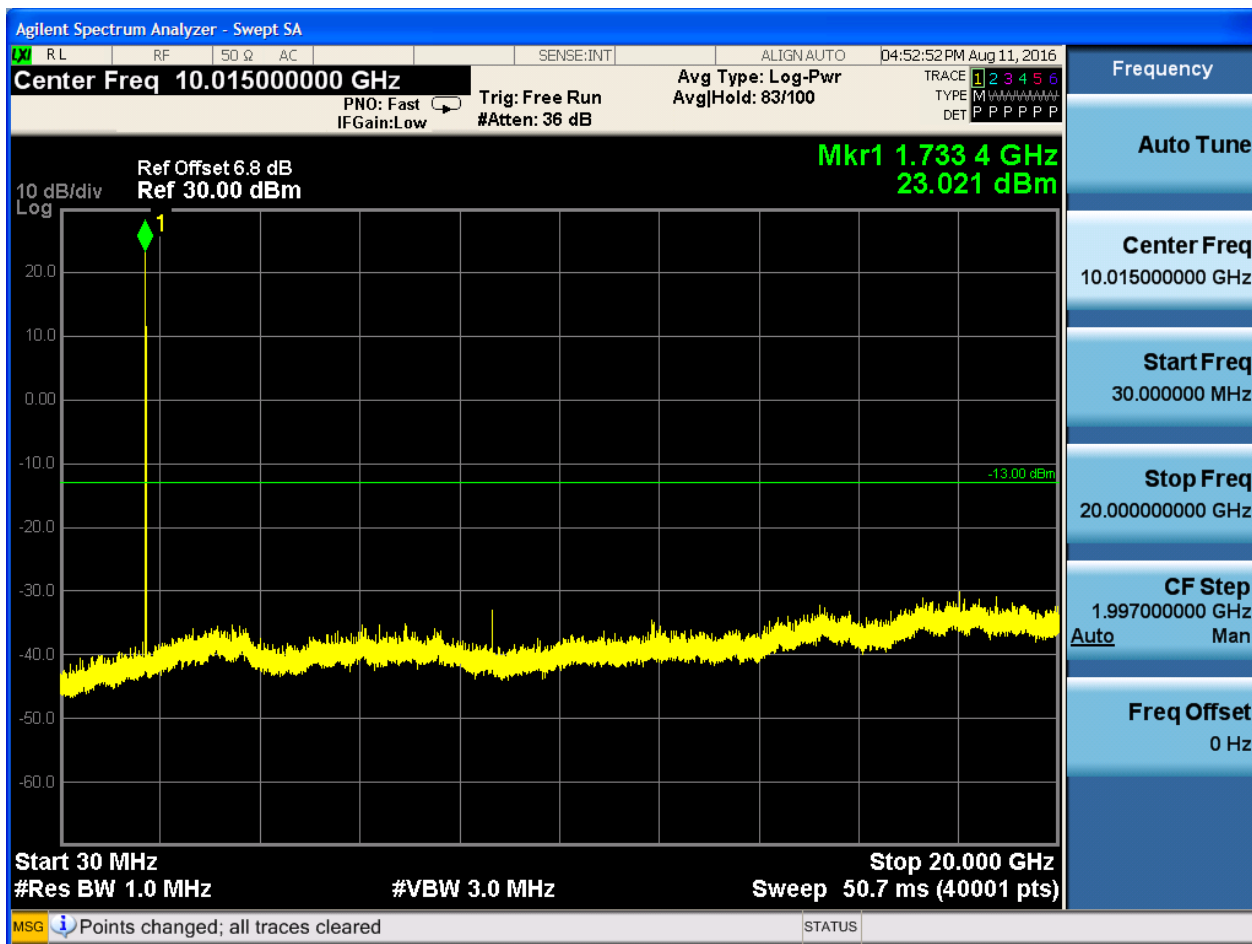




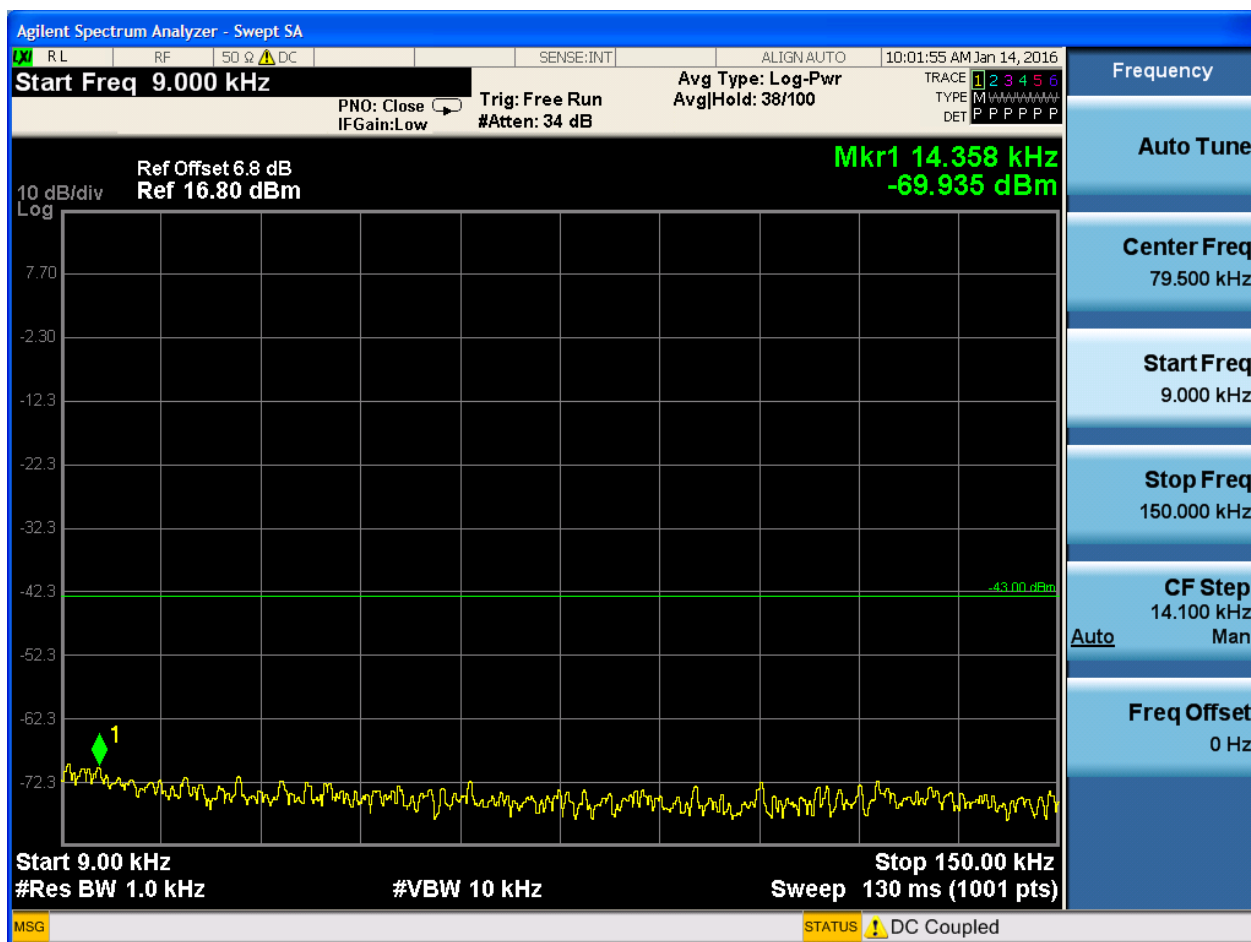
### 6.2.1.1.2 Test Channel = MCH

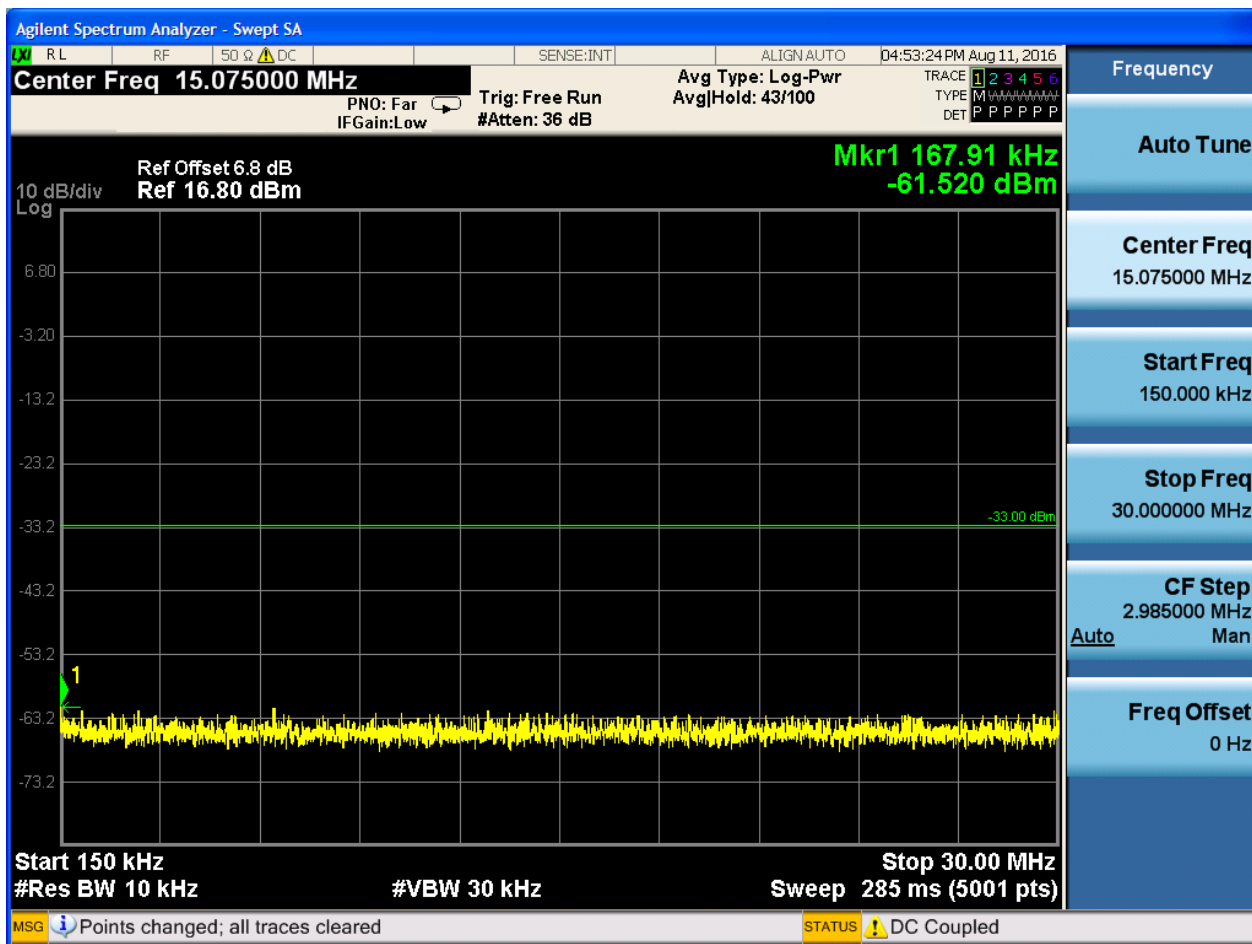


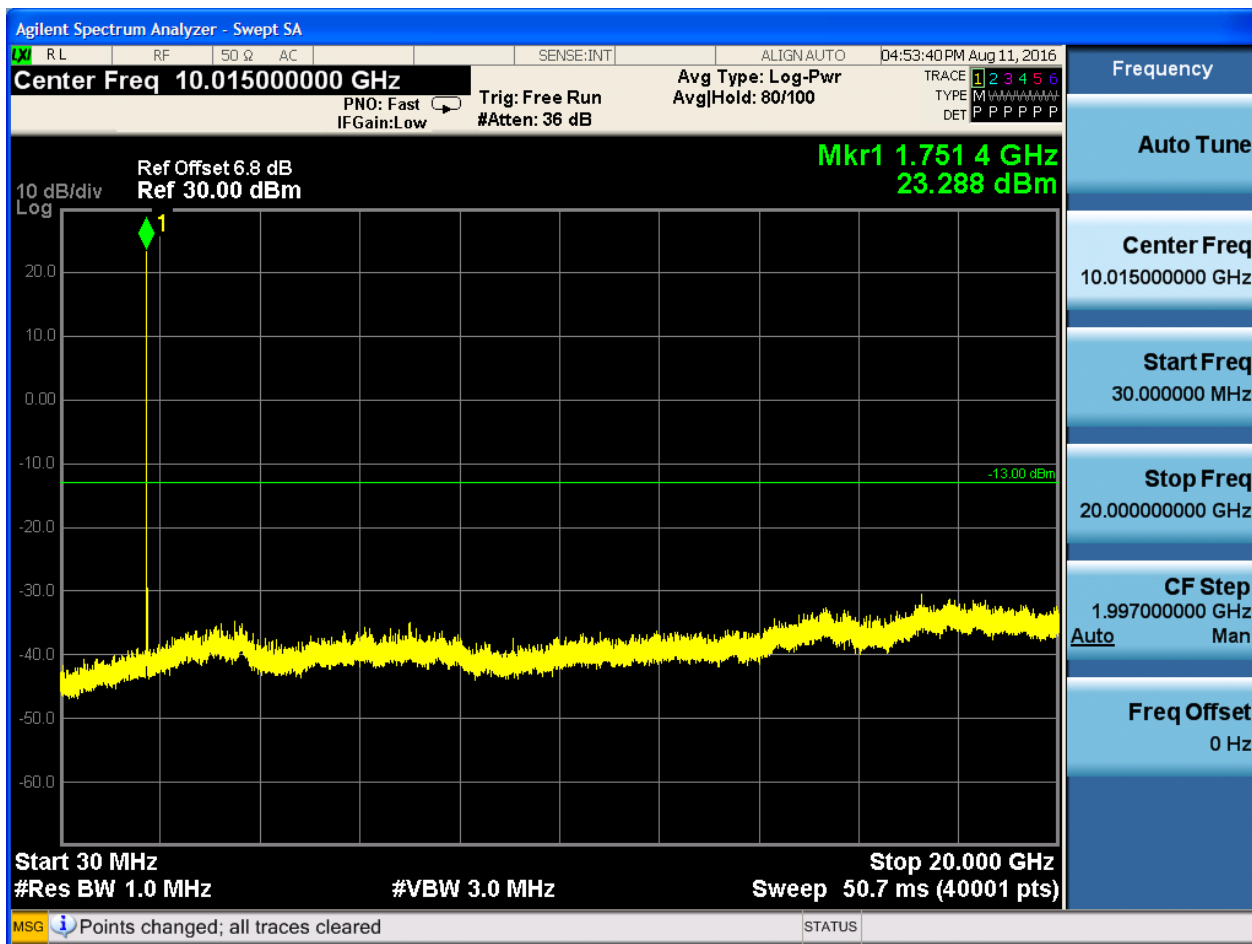




### 6.2.1.1.3 Test Channel = HCH





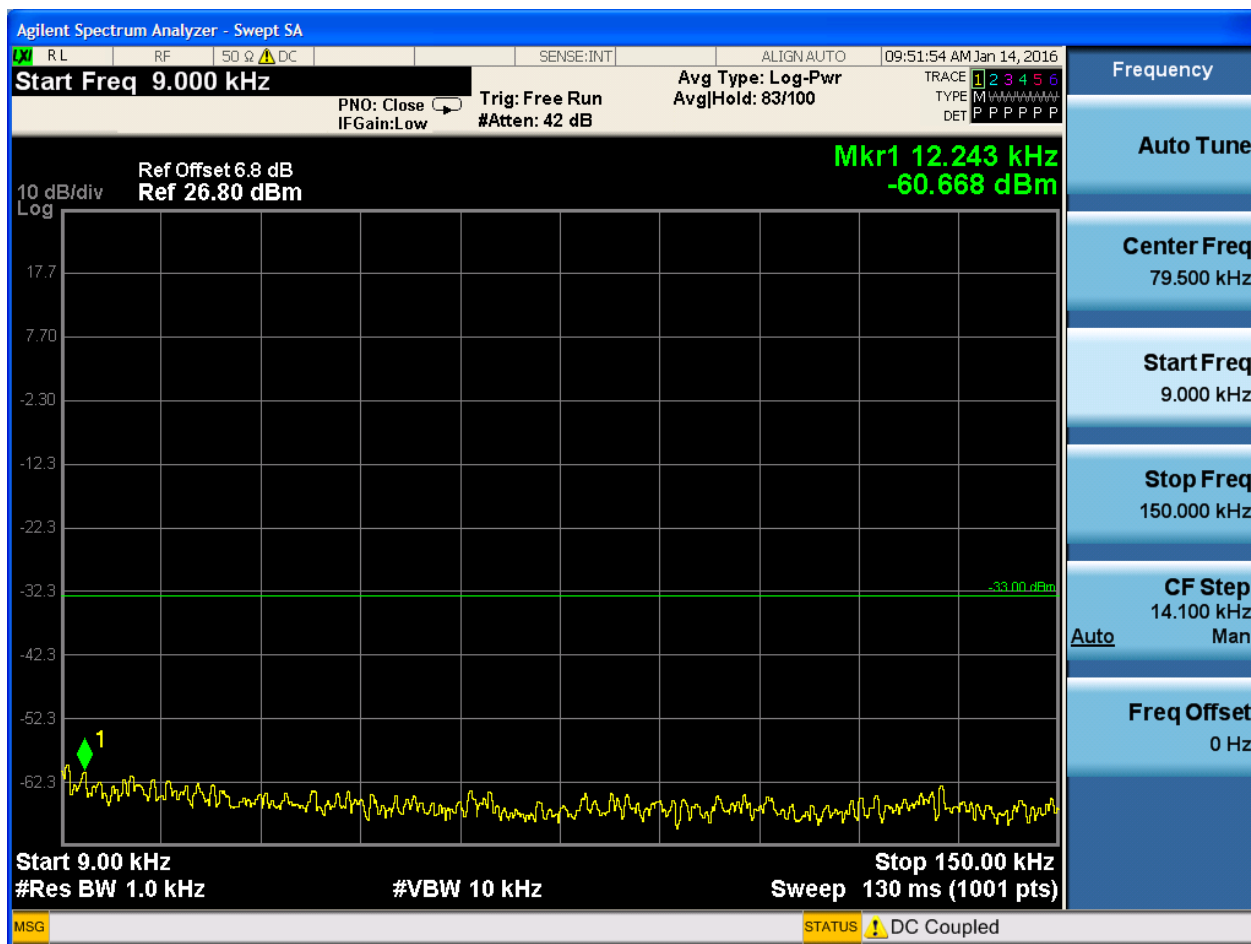


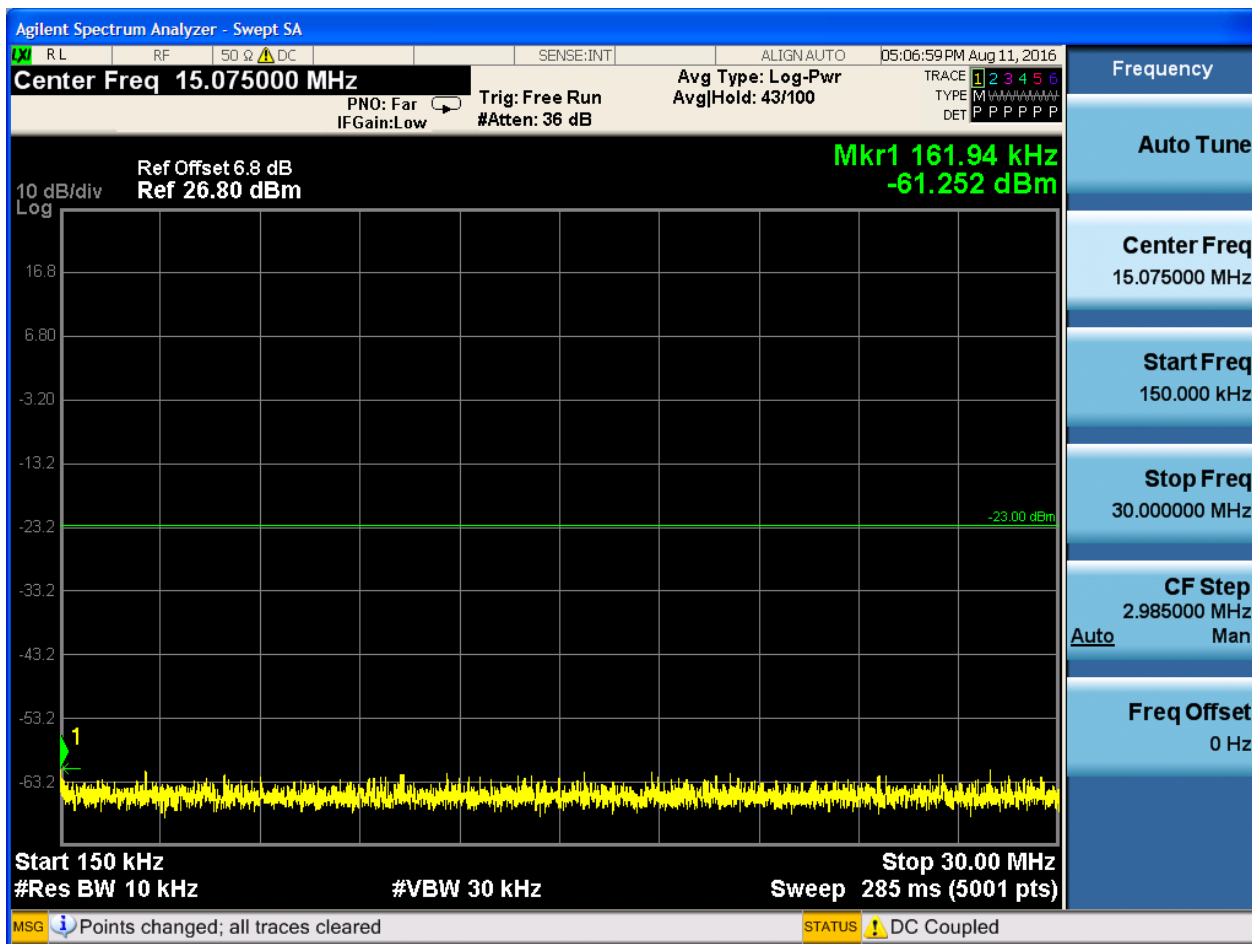


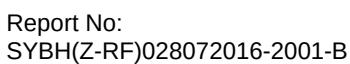
## 6.2.2 Test Band = WCDMA850

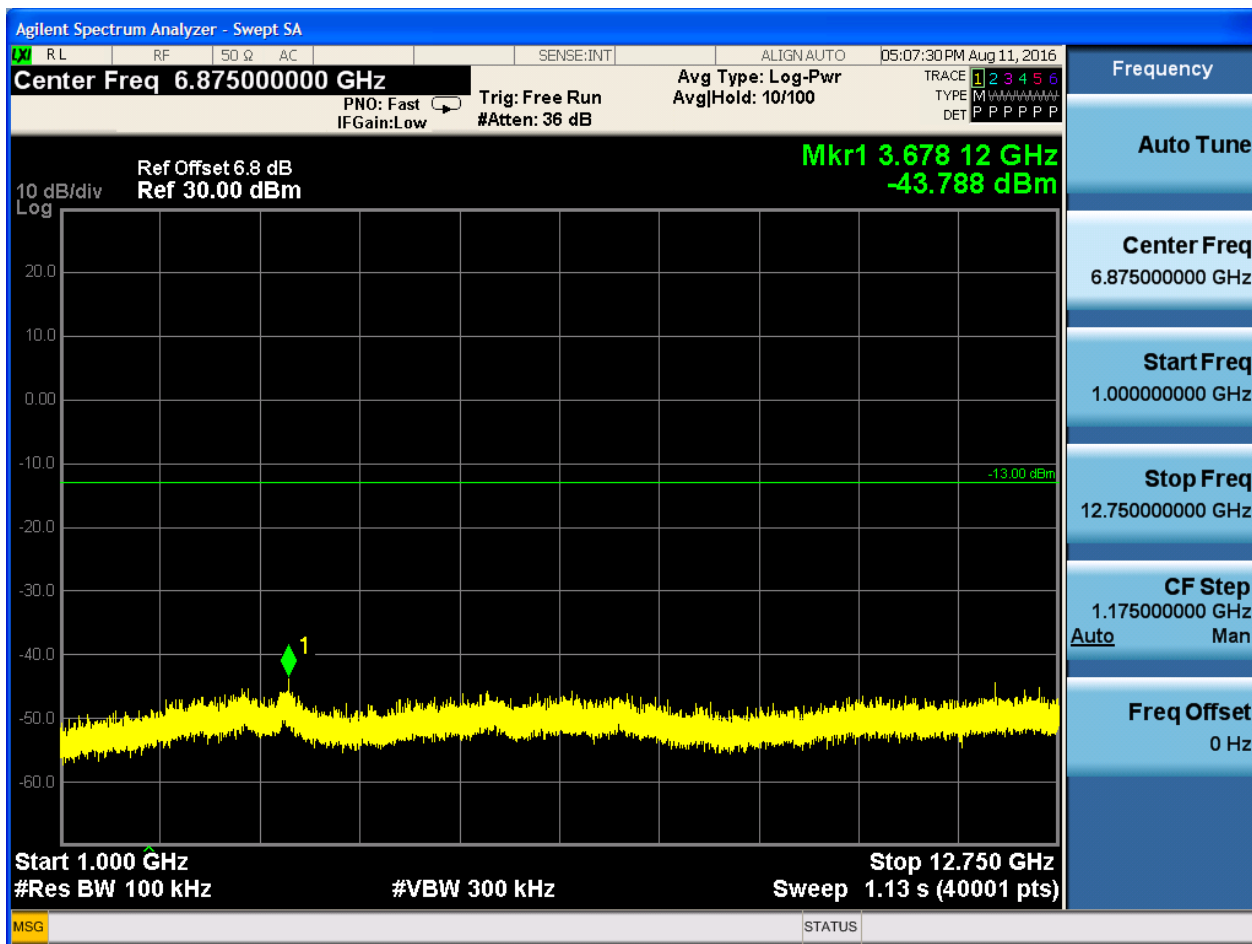
### 6.2.2.1 Test Mode = UMTS/TM1

#### 6.2.2.1.1 Test Channel = LCH



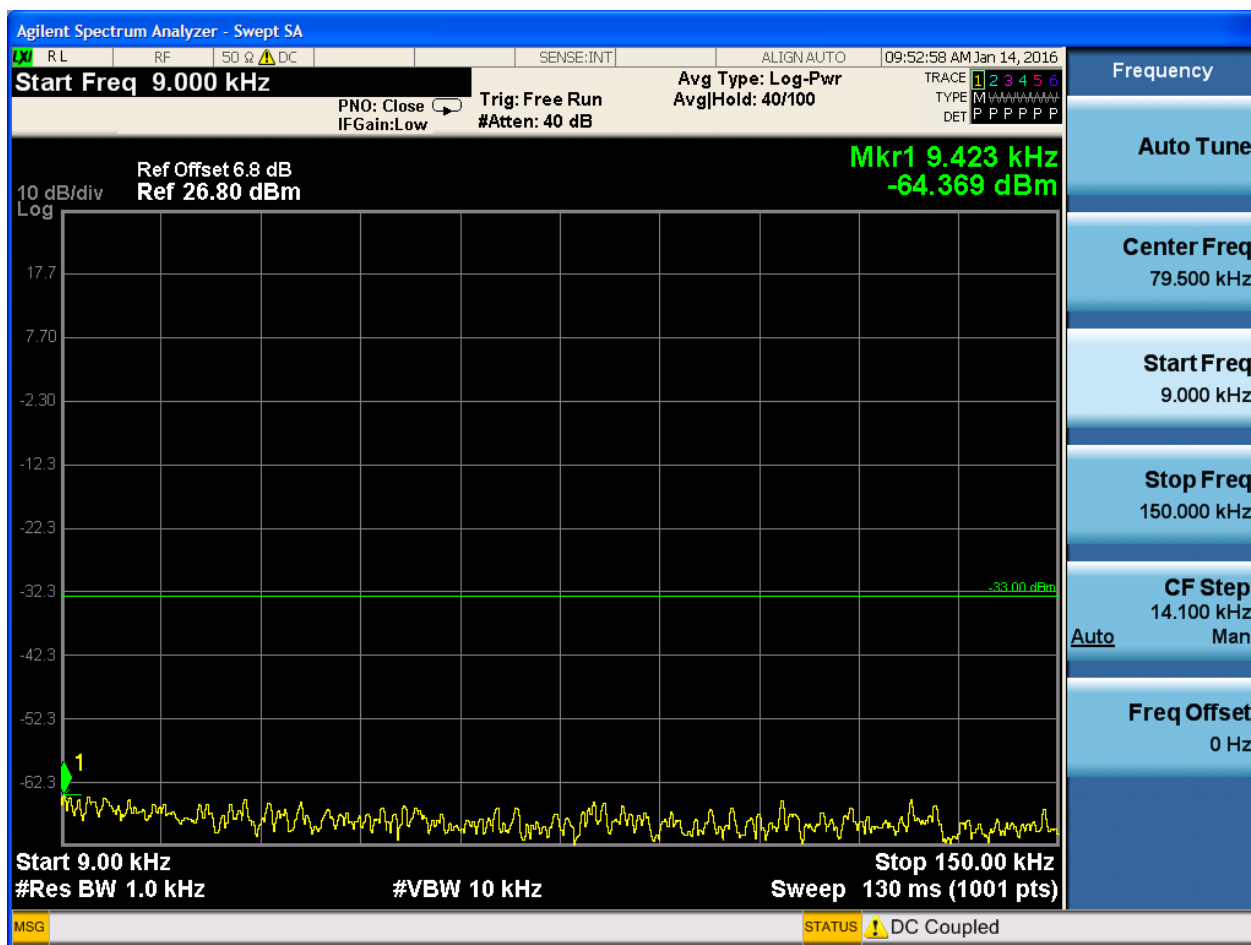


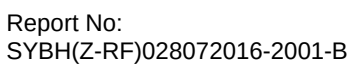


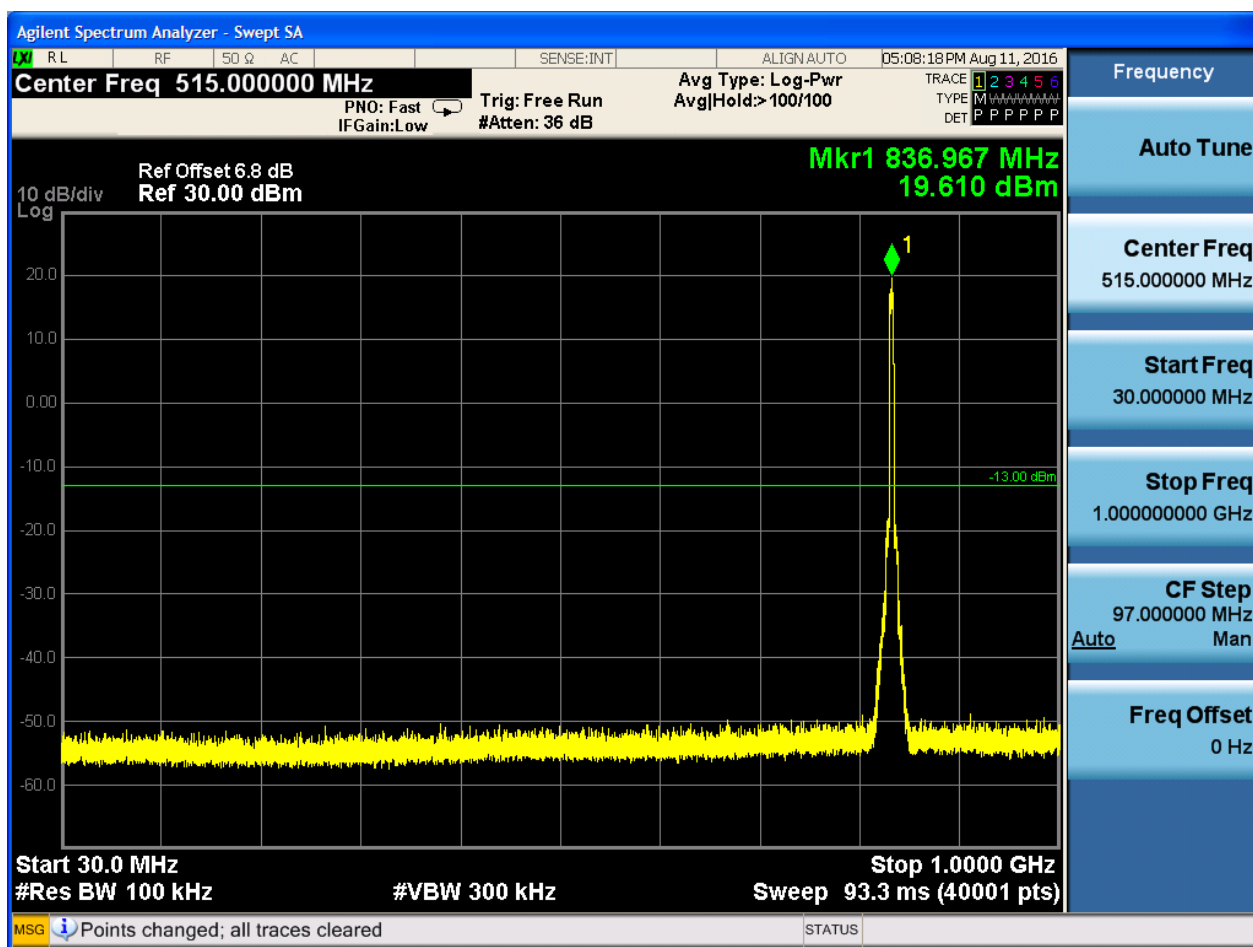


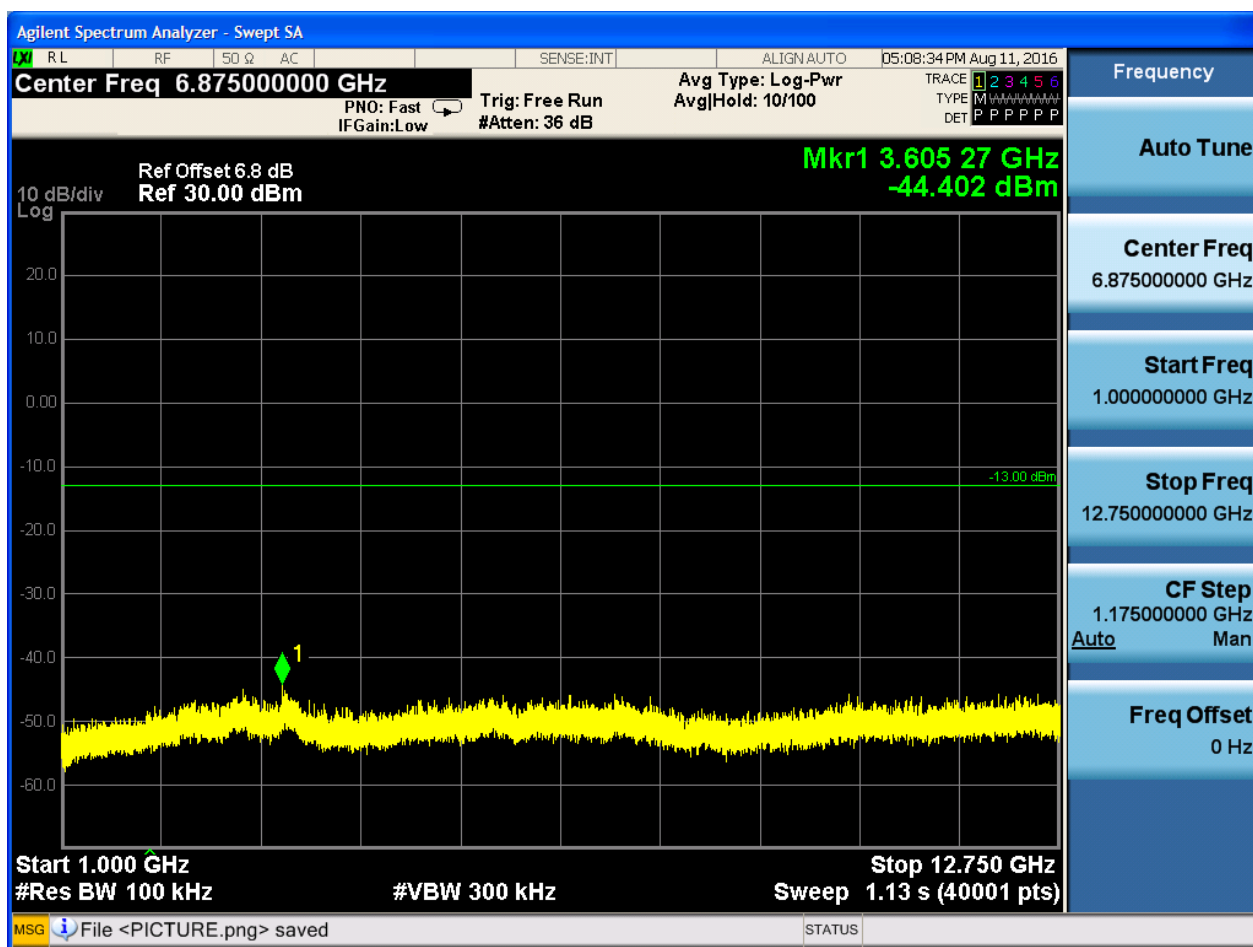


## 6.2.2.1.2 Test Channel = MCH

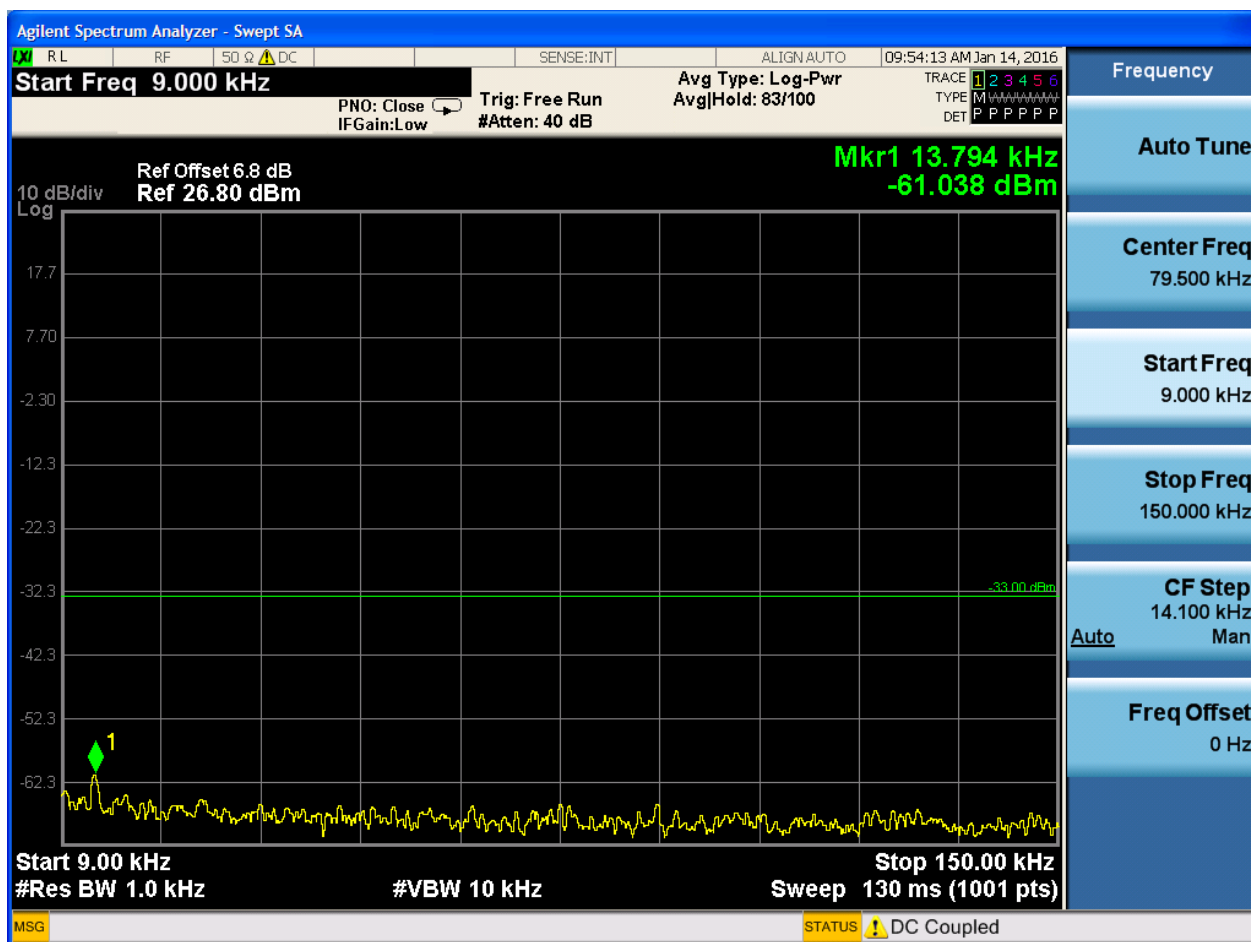


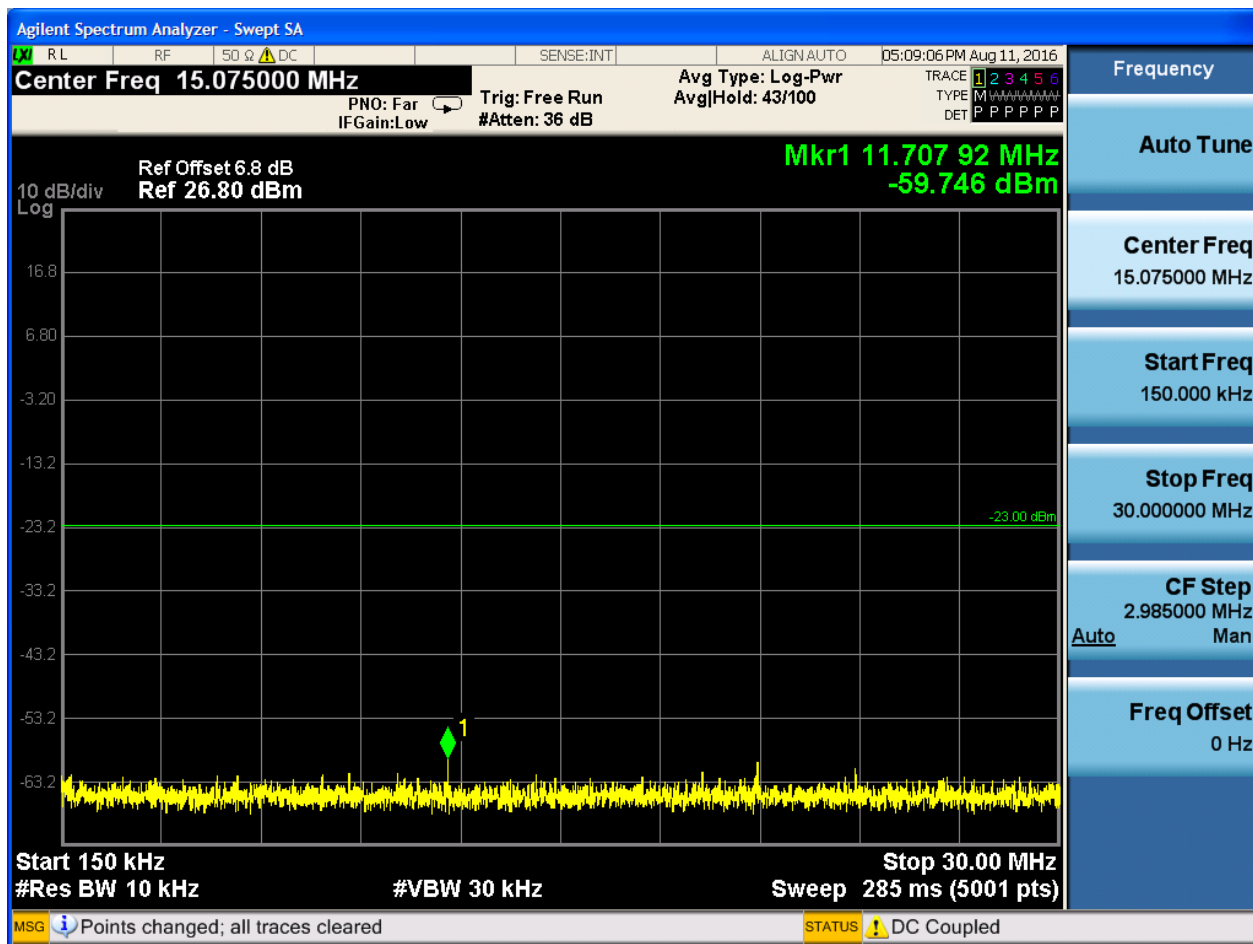


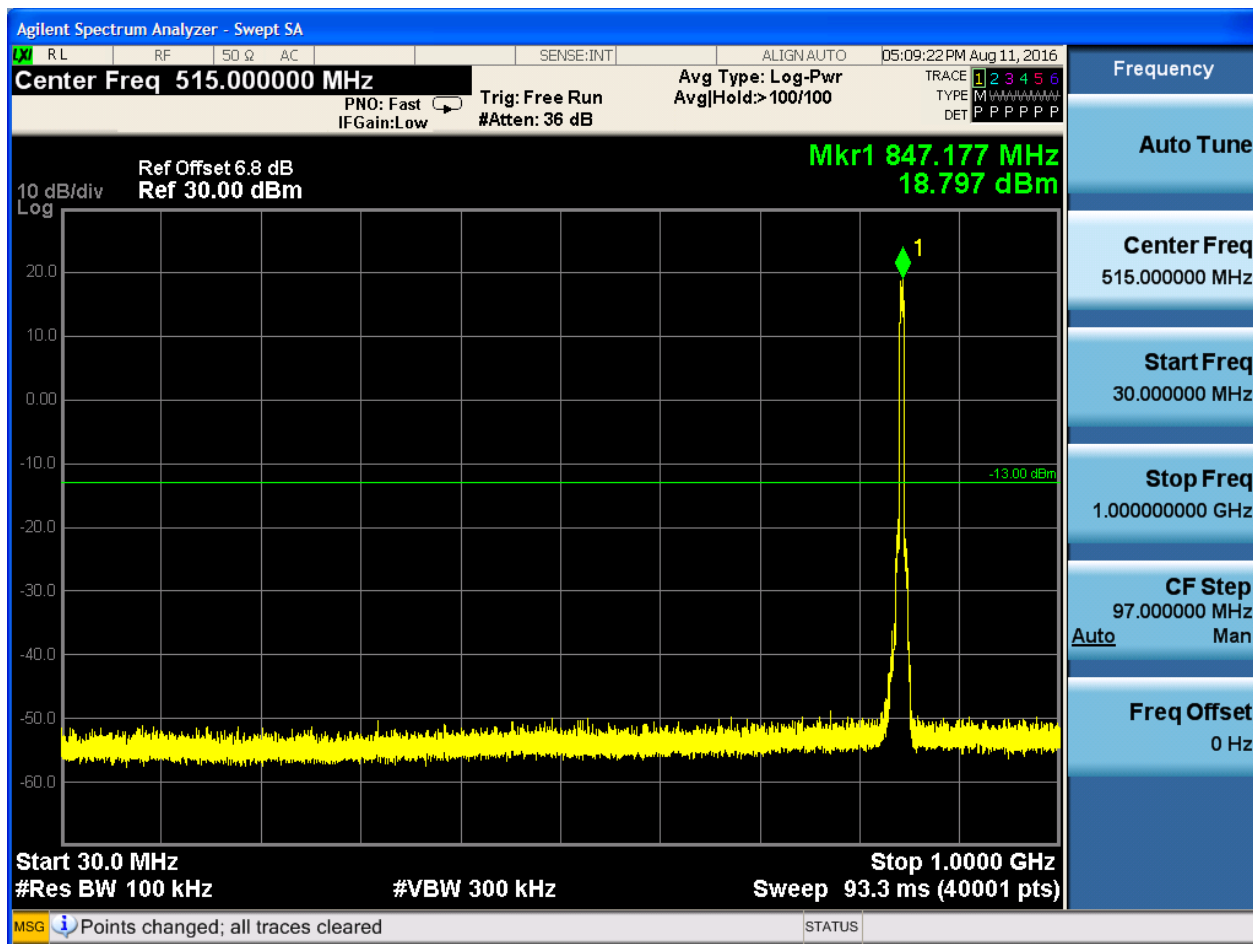


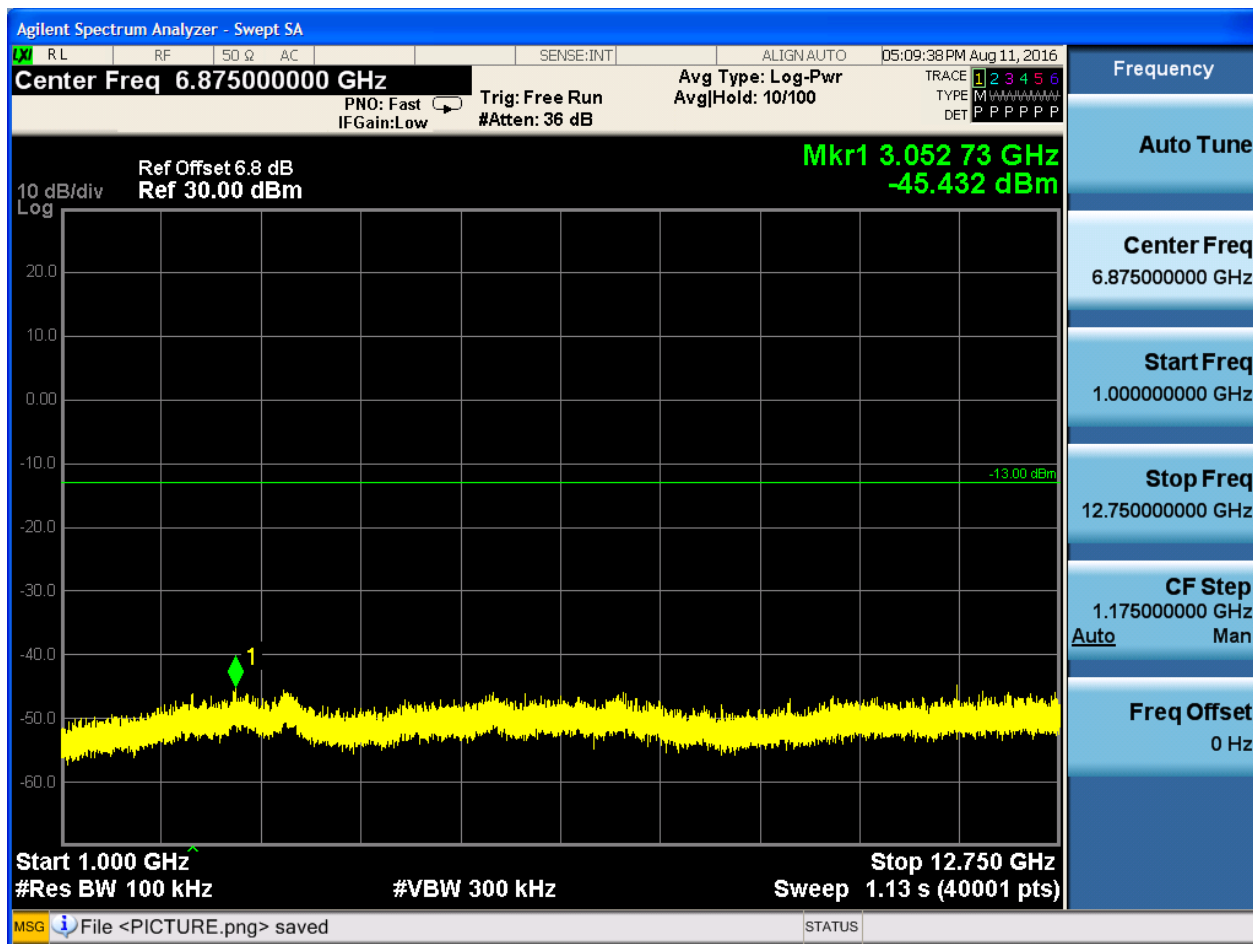


### 6.2.2.1.3 Test Channel = HCH









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

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

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

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

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

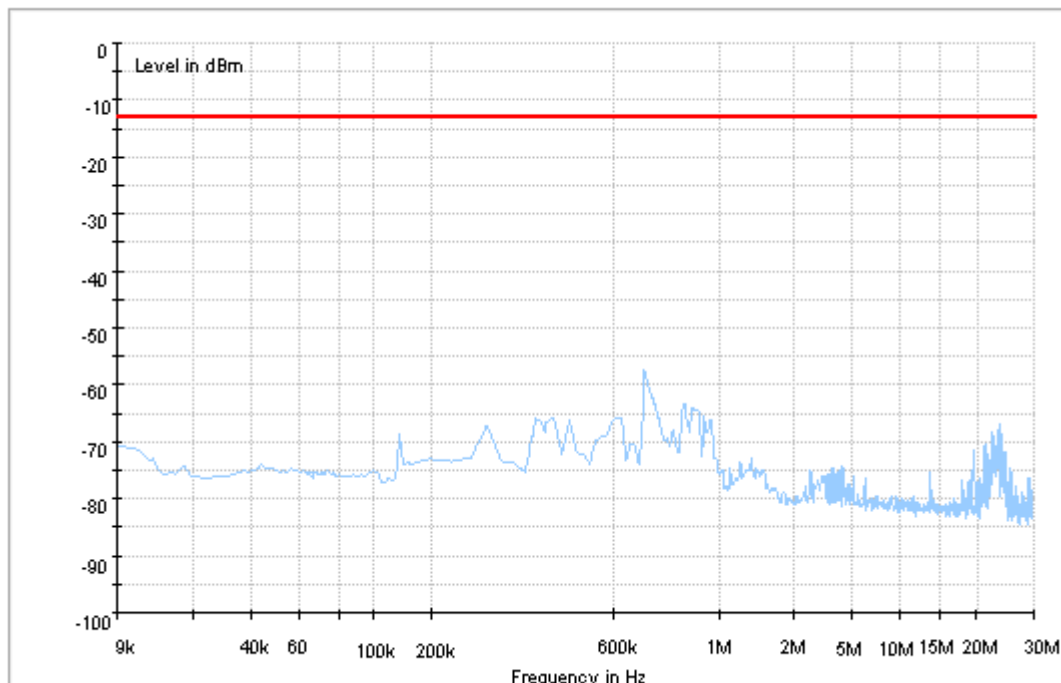
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

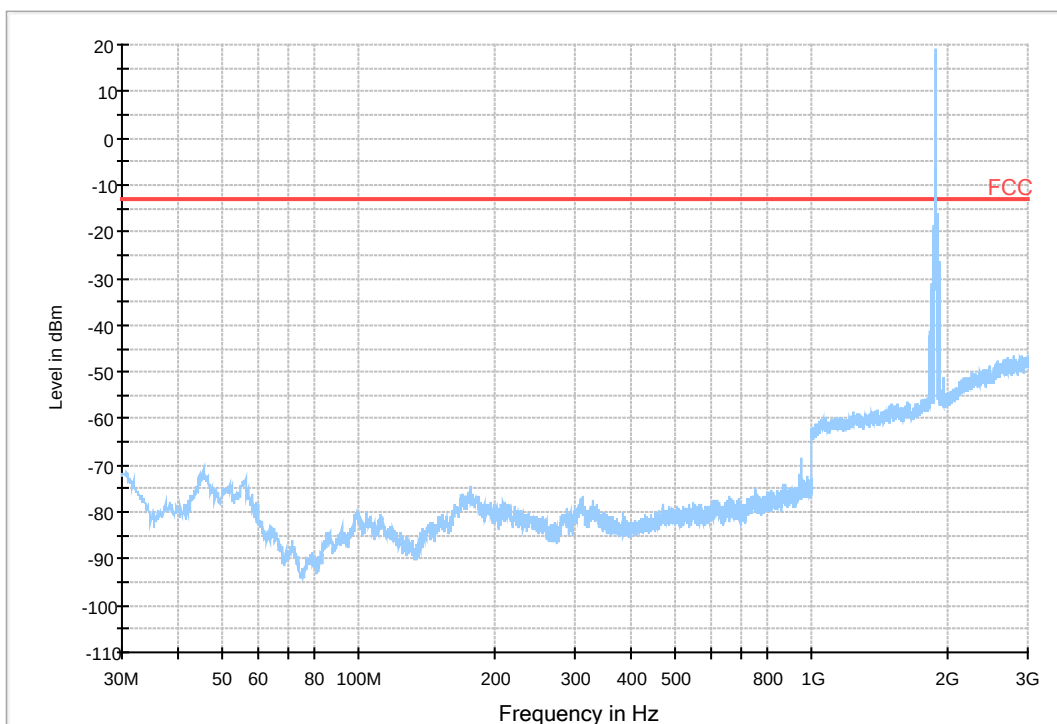
#### 7.1 For UMTS

##### 7.1.1 Test Band = WCDMA1900\_Ant1

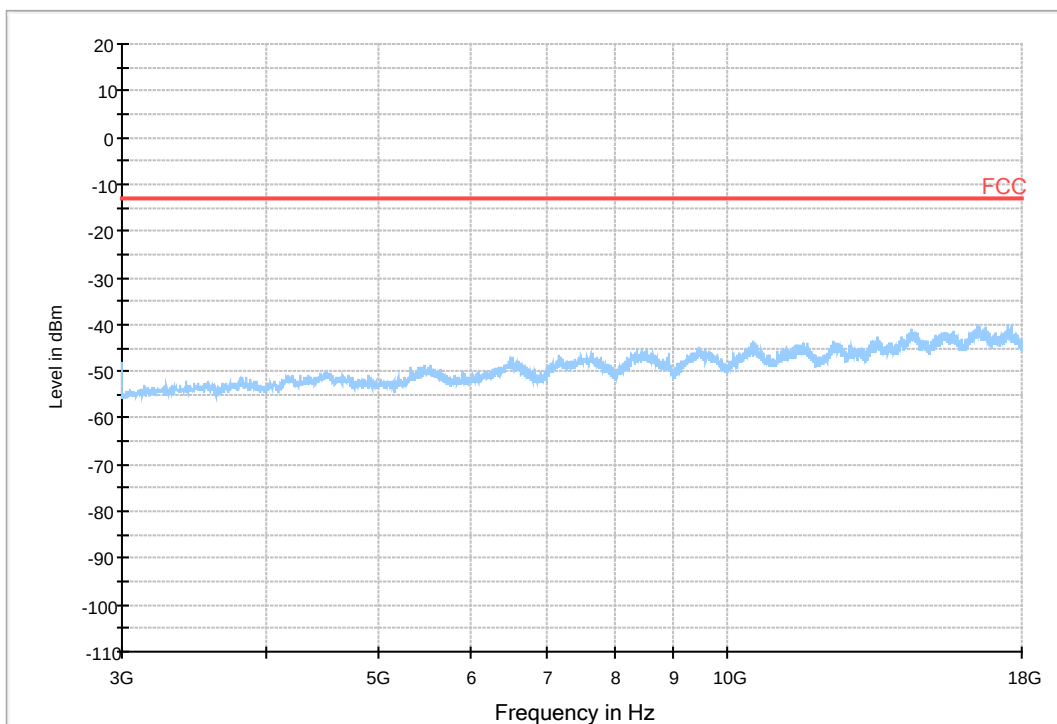
##### 7.1.1.1 Test Mode = UMTS/TM1

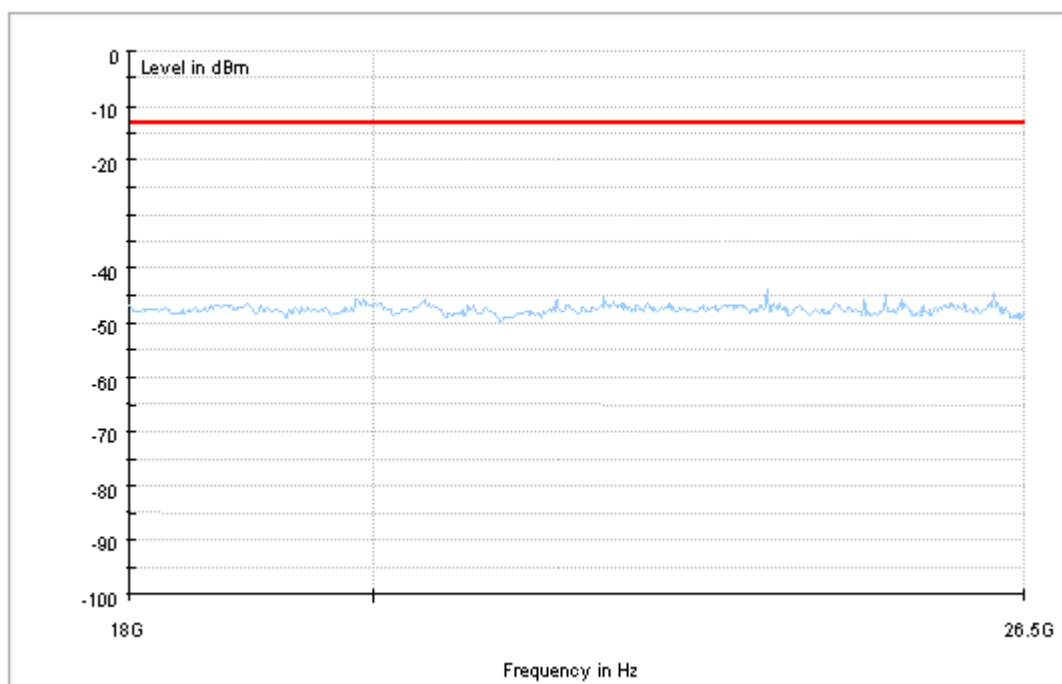


Copy of FCC PART24 WCDMA1900\_L



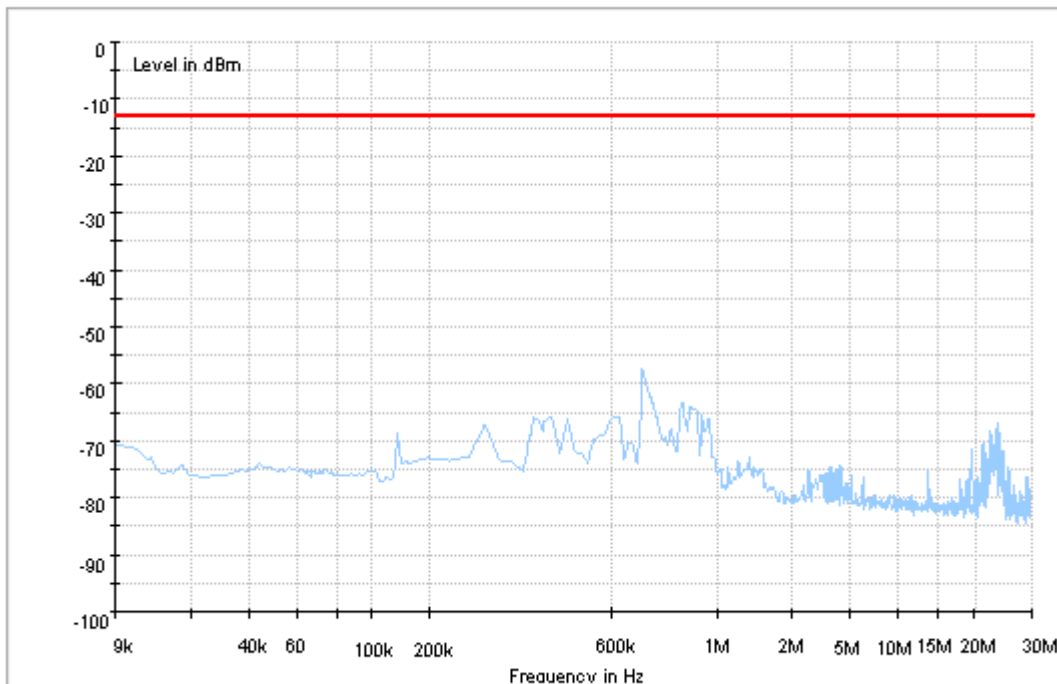
Copy of FCC PART24 WCDMA1900\_H



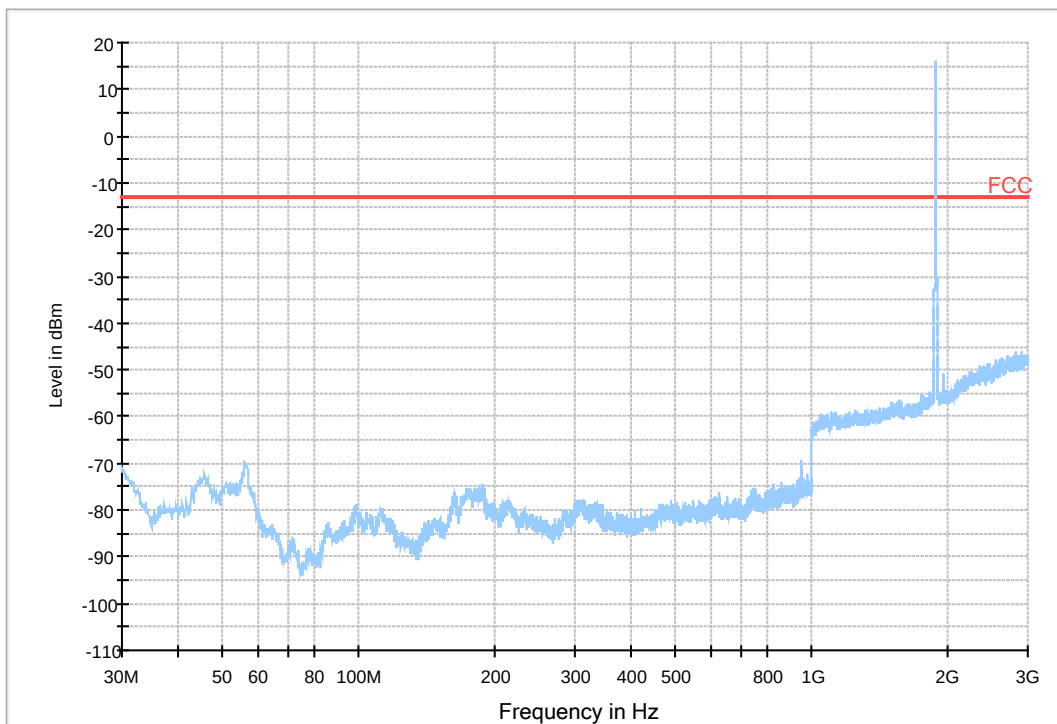


## 7.1.2 Test Band = WCDMA1900\_Ant2

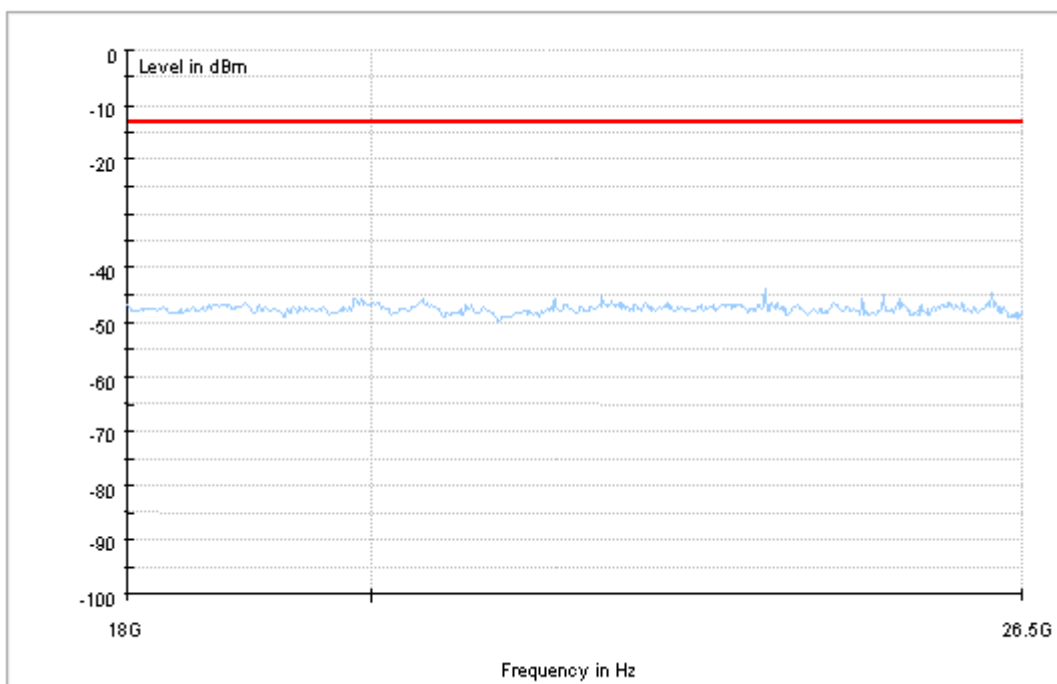
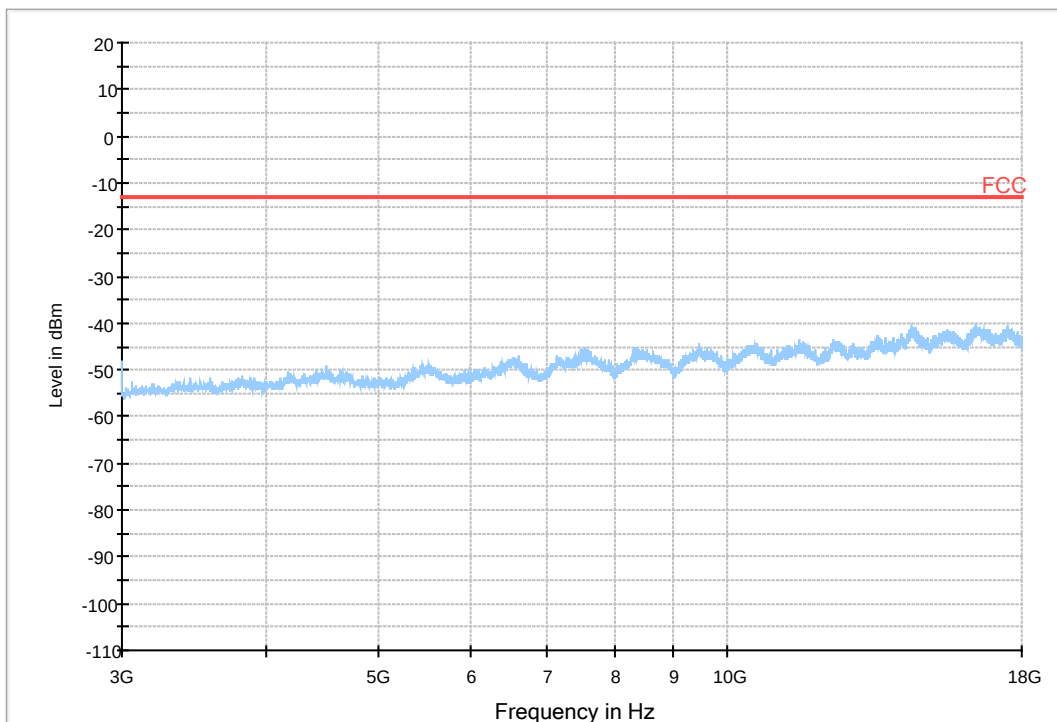
### 7.1.2.1 Test Mode = UMTS/TM1



Copy of FCC PART24 WCDMA1900\_L



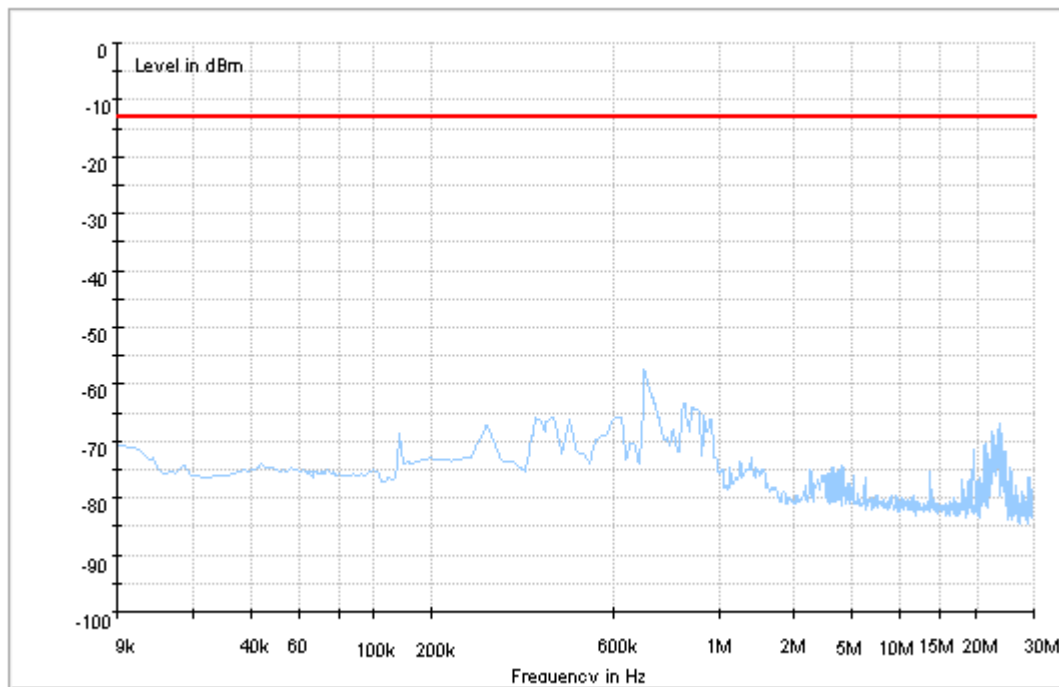
Copy of FCC PART24 WCDMA1900\_H



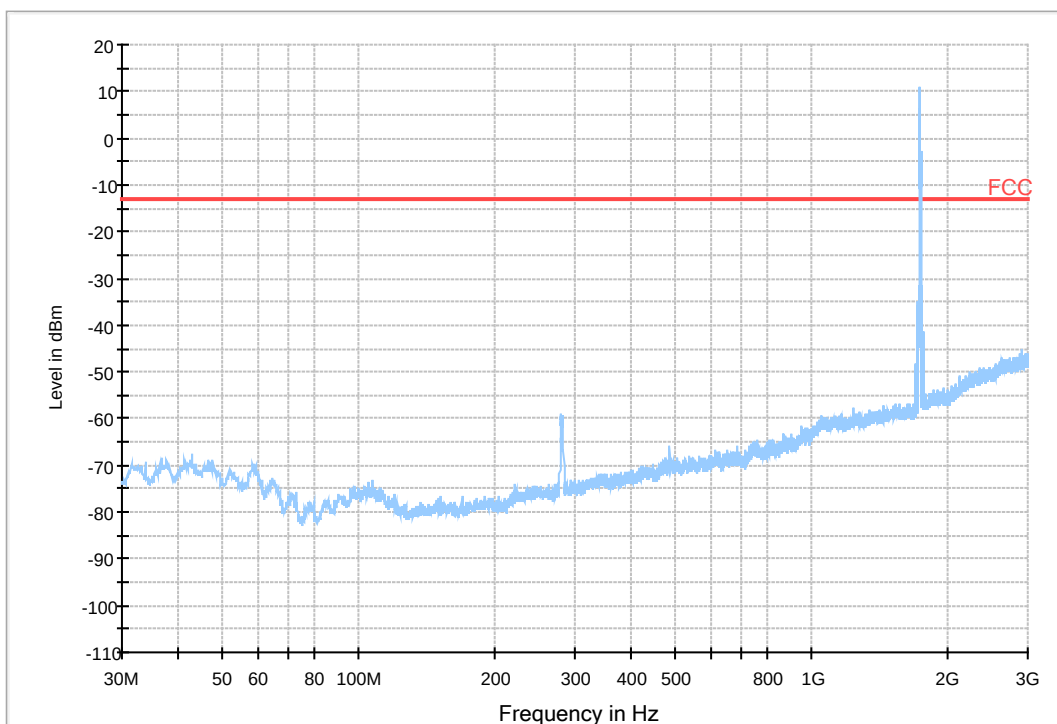
## 7.2 For UMTS

### 7.2.1 Test Band = WCDMA1700\_Ant1

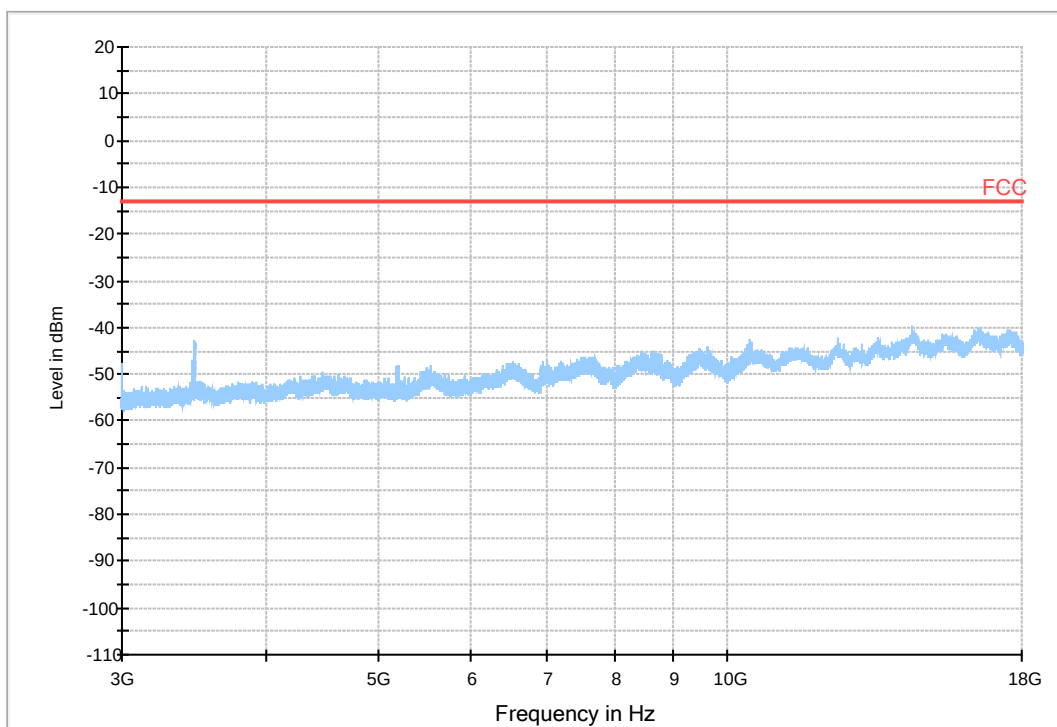
#### 7.2.1.1 Test Mode = UMTS/TM1



Copy of FCC PART27 WCDMA1700\_L

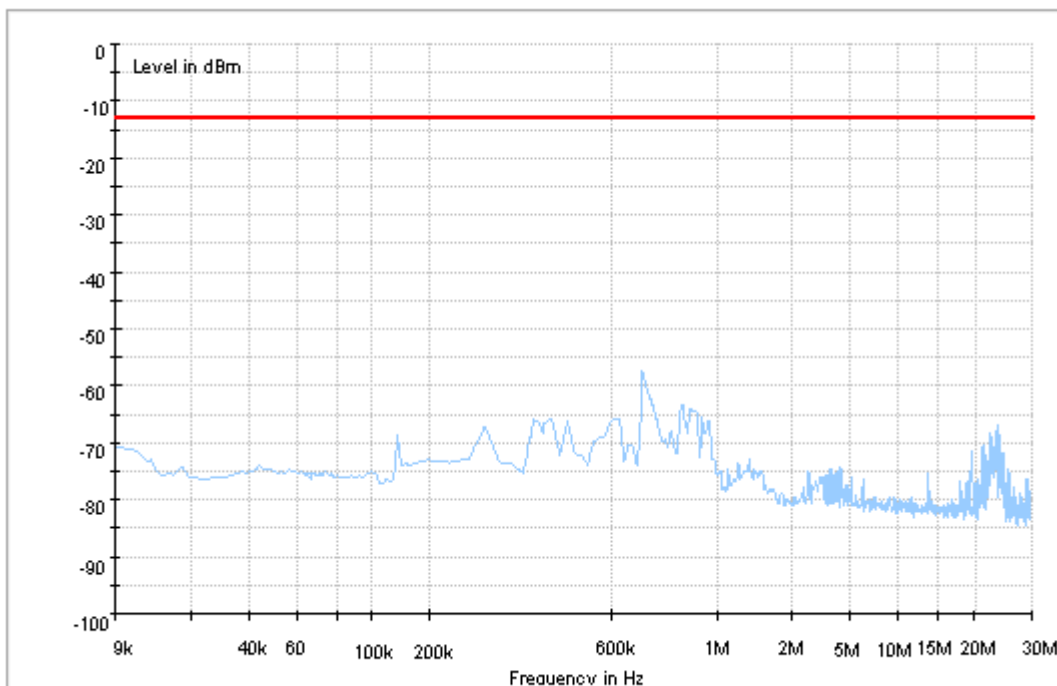


Copy of FCC PART27 WCDMA1700\_H

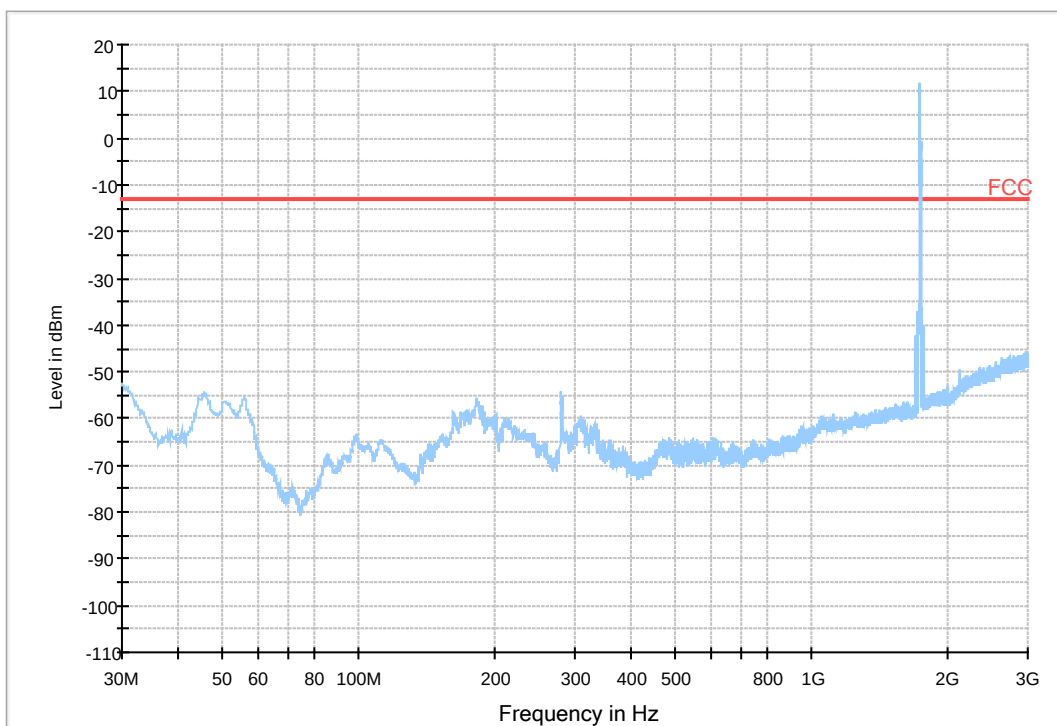


## 7.2.2 Test Band = WCDMA1700\_Ant2

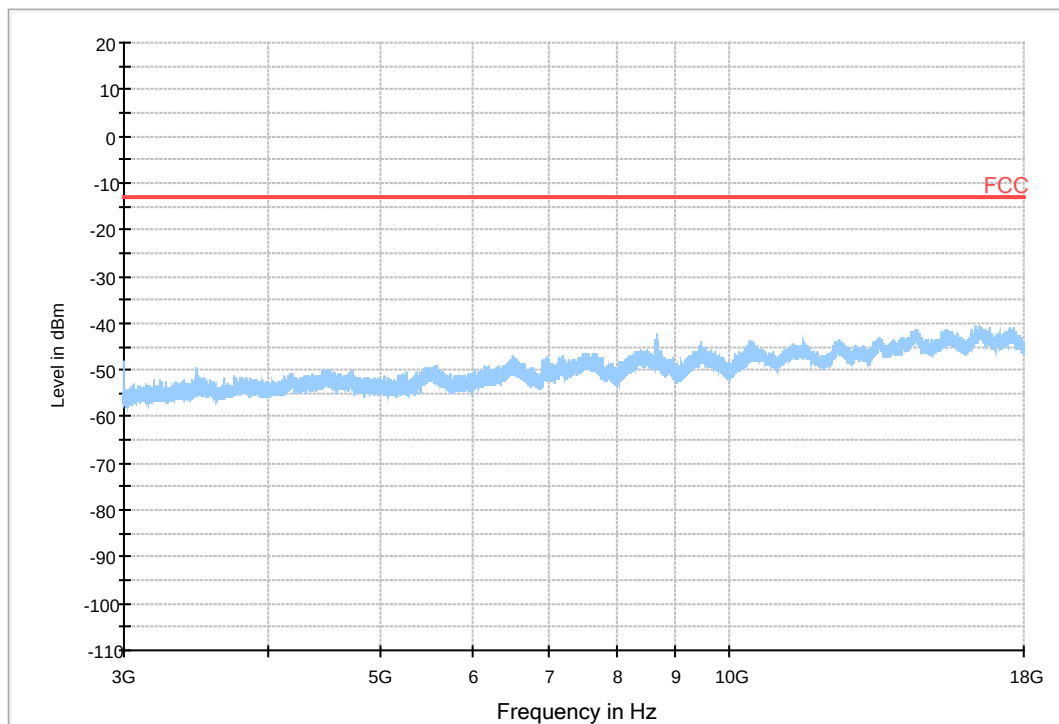
### 7.2.2.1 Test Mode = UMTS/TM1



Copy of FCC PART27 WCDMA1700\_L



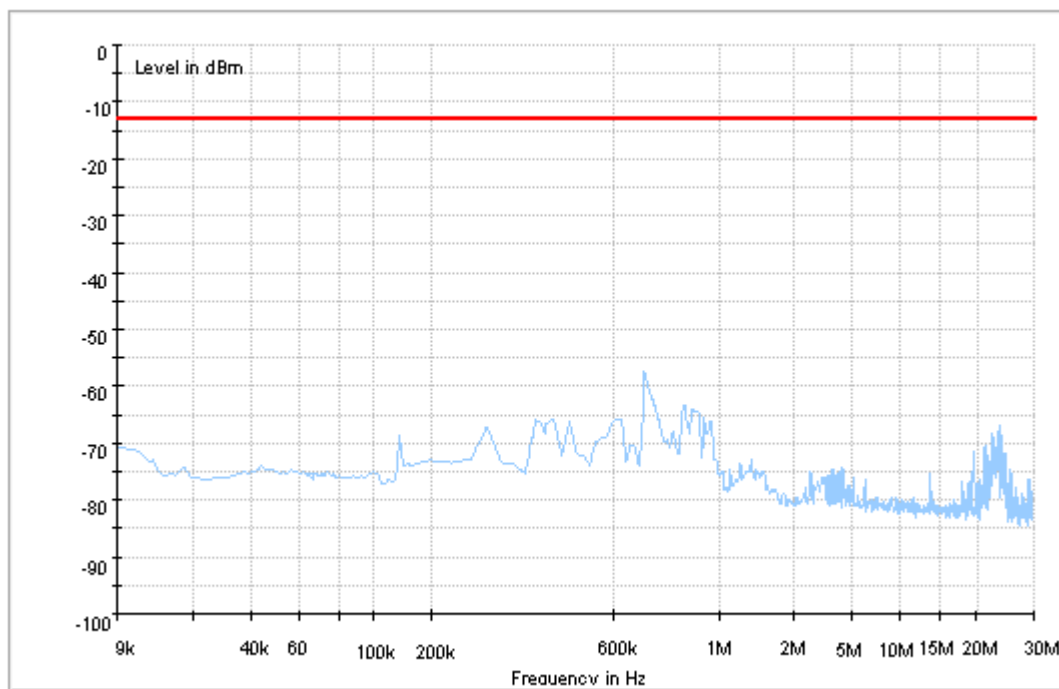
## Copy of FCC PART27 WCDMA1700\_H



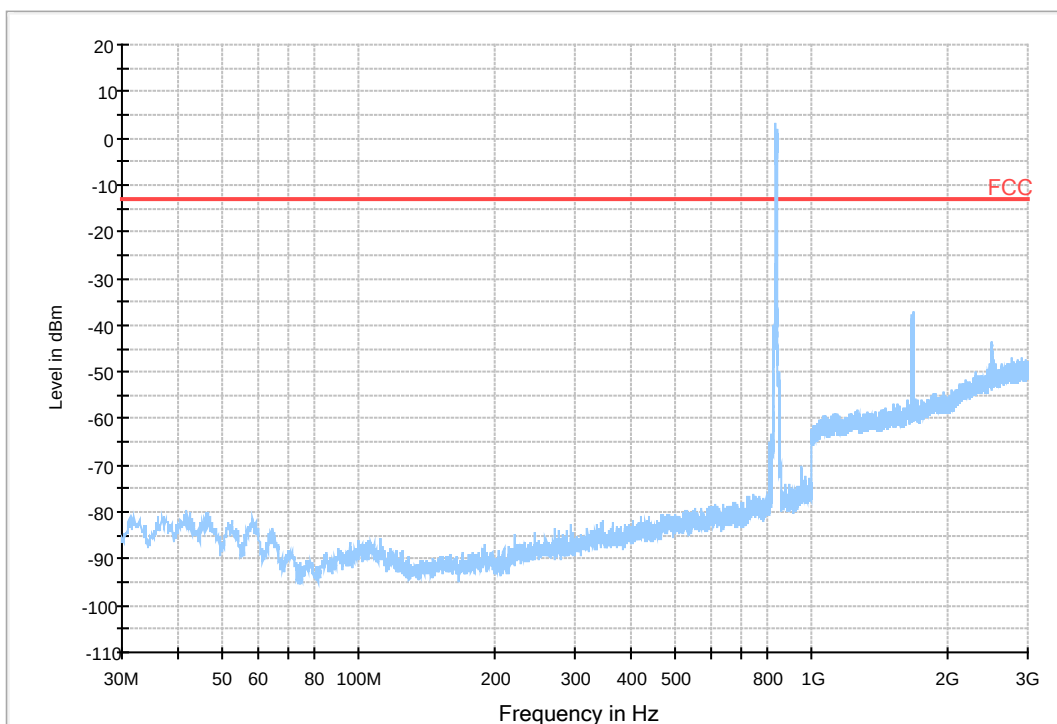
### 7.3 For UMTS

#### 7.3.1 Test Band = WCDMA850\_Ant1

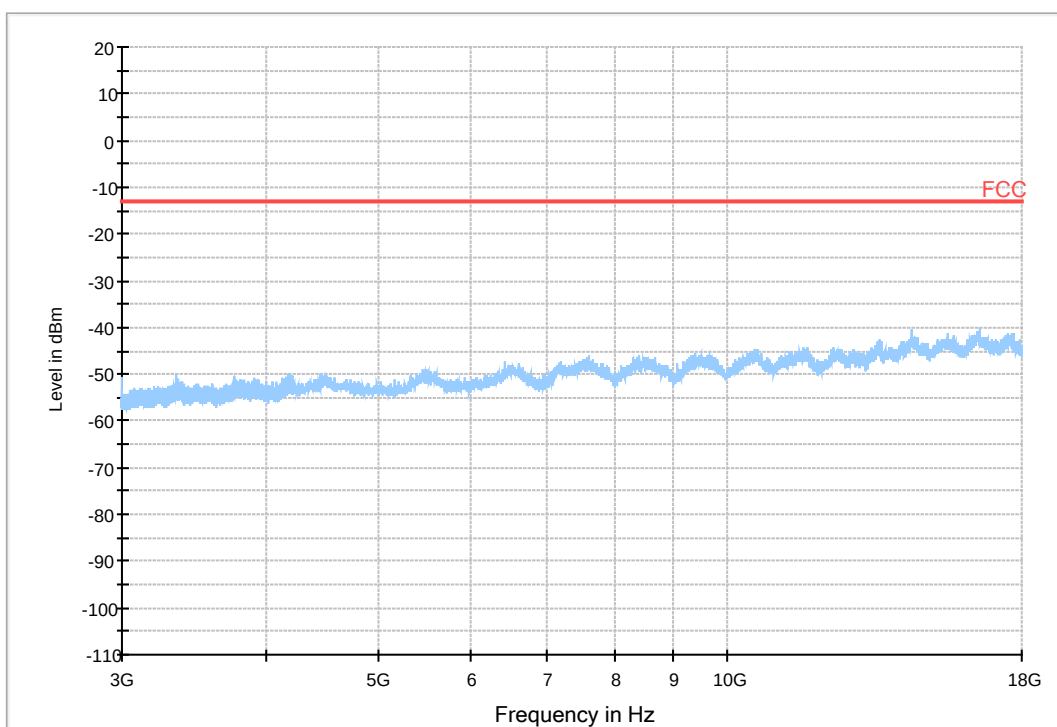
##### 7.3.1.1 Test Mode = UMTS/TM1



Copy of FCC PART22 WCDMA850\_L

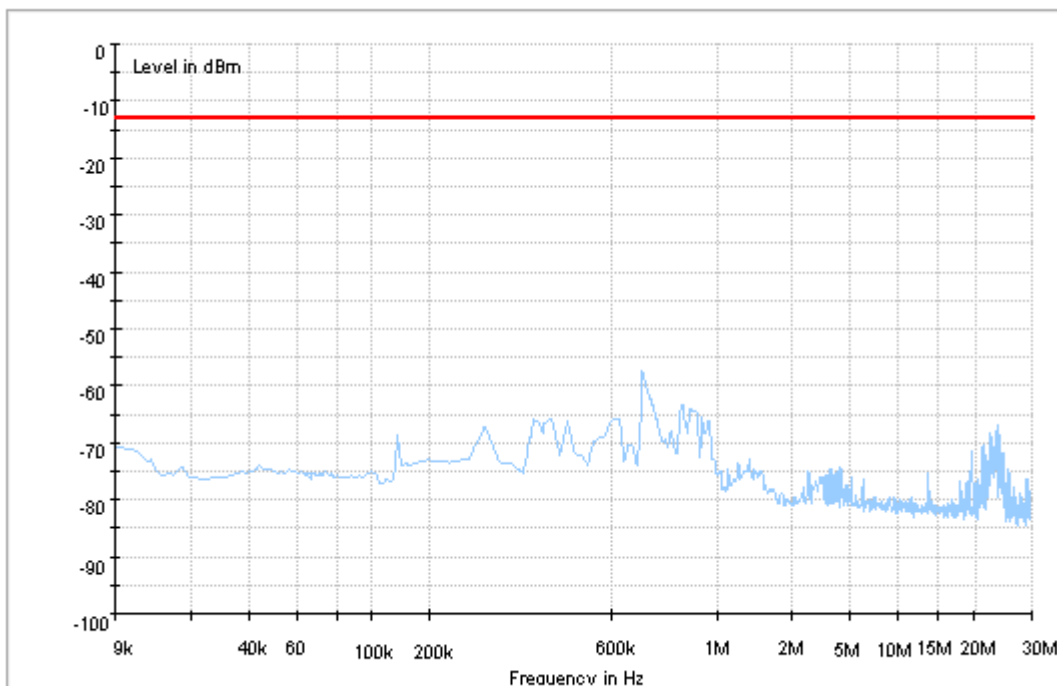


Copy of FCC PART22 WCDMA850\_H

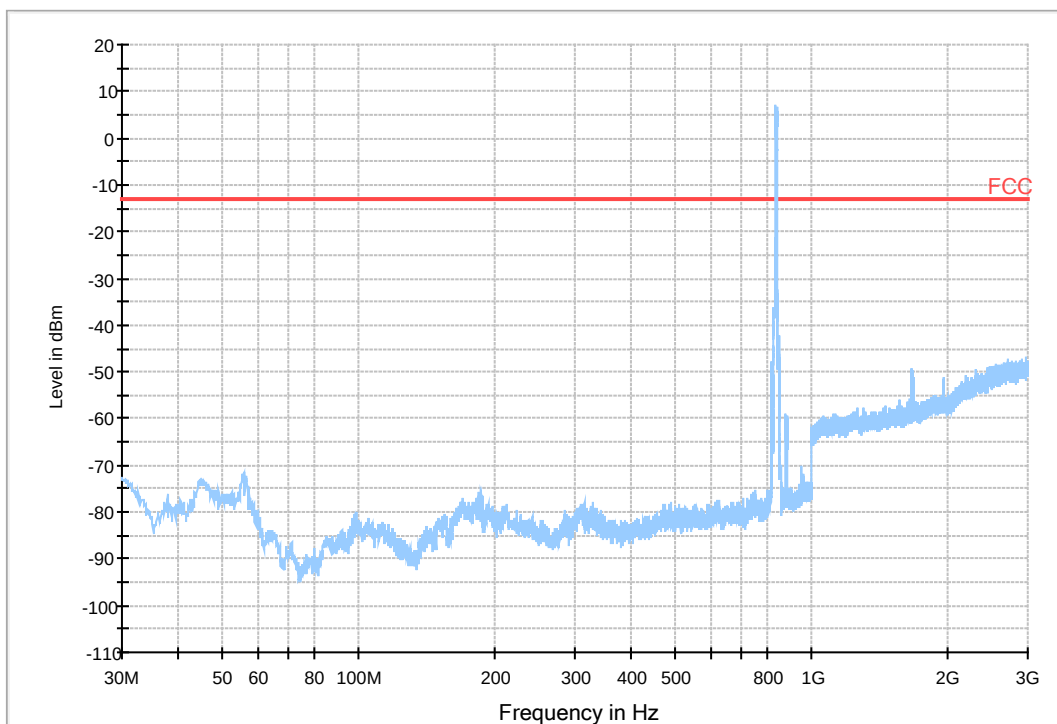


### 7.3.2 Test Band = WCDMA850\_Ant2

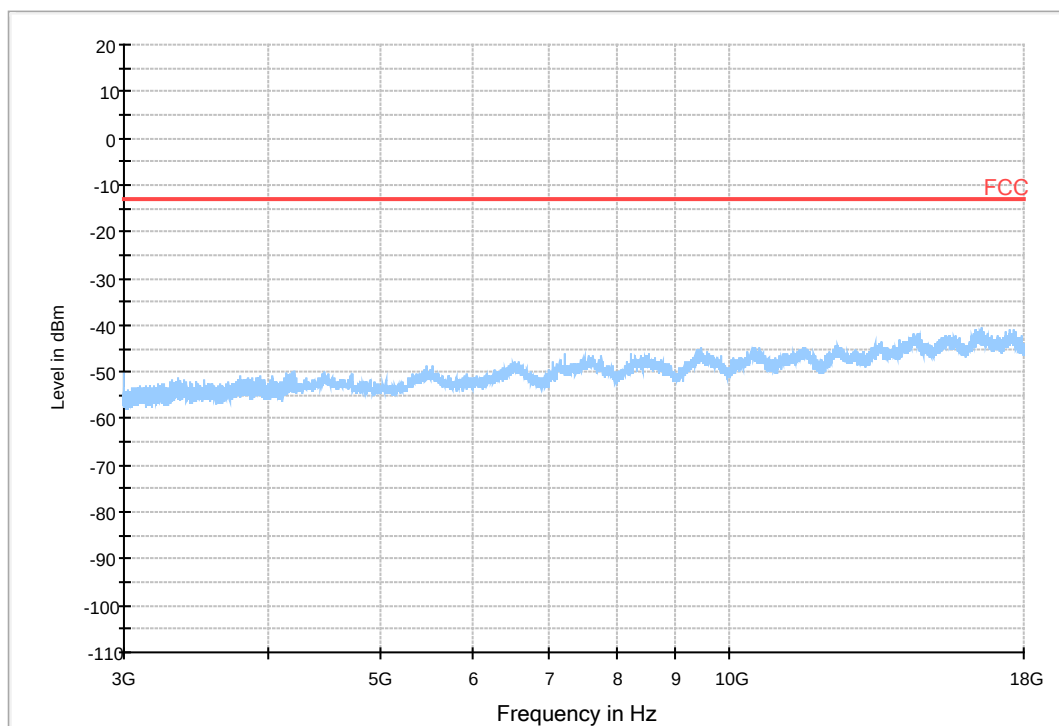
#### 7.3.2.1 Test Mode = UMTS/TM1



Copy of FCC PART22 WCDMA850\_L



Copy of FCC PART22 WCDMA850\_H



## 8Appendix\_H: Frequency Stability

### 8.1 For UMTS

#### 8.1.1Frequency 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         | -1.14            | -0.00062              | PASS    |
|           |           |              |            | VN         | -3.88            | -0.00209              | PASS    |
|           |           |              |            | VH         | -2.81            | -0.00152              | PASS    |
|           |           | MCH          | TN         | VL         | -0.70            | -0.00037              | PASS    |
|           |           |              |            | VN         | 1.66             | 0.00088               | PASS    |
|           |           |              |            | VH         | 4.71             | 0.00251               | PASS    |
|           |           | HCH          | TN         | VL         | -2.33            | -0.00122              | PASS    |
|           |           |              |            | VN         | 7.54             | 0.00395               | PASS    |
|           |           |              |            | VH         | 1.62             | 0.00085               | PASS    |

#### 8.1.2Frequency 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        | -6.77            | -0.00365              | PASS    |
|           |           |              |            | -20        | -2.18            | -0.00118              | PASS    |
|           |           |              |            | -10        | -0.12            | -0.00006              | PASS    |
|           |           |              |            | 0          | -4.97            | -0.00268              | PASS    |
|           |           |              |            | 10         | -2.49            | -0.00134              | PASS    |
|           |           |              |            | 20         | 0.90             | 0.00049               | PASS    |
|           |           |              |            | 30         | -1.56            | -0.00084              | PASS    |
|           |           |              |            | 40         | -2.17            | -0.00117              | PASS    |
|           |           |              |            | 50         | -9.26            | -0.005                | PASS    |
|           |           | MCH          | VN         | -30        | -3.27            | -0.00174              | PASS    |
|           |           |              |            | -20        | -4.76            | -0.00253              | PASS    |
|           |           |              |            | -10        | 6.45             | 0.00343               | PASS    |
|           |           |              |            | 0          | -3.75            | -0.00199              | PASS    |
|           |           |              |            | 10         | 7.60             | 0.00404               | PASS    |
|           |           |              |            | 20         | -2.93            | -0.00156              | PASS    |
|           |           |              |            | 30         | -5.54            | -0.00295              | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 40         | 4.32             | 0.0023                | PASS    |
|           |           |              |            | 50         | -2.20            | -0.00117              | PASS    |
|           |           | HCH          | VN         | -30        | 0.11             | 0.00006               | PASS    |
|           |           |              |            | -20        | -1.50            | -0.00079              | PASS    |
|           |           |              |            | -10        | -11.49           | -0.00602              | PASS    |
|           |           |              |            | 0          | -7.81            | -0.00409              | PASS    |
|           |           |              |            | 10         | -0.23            | -0.00012              | PASS    |
|           |           |              |            | 20         | -3.13            | -0.00164              | PASS    |
|           |           |              |            | 30         | -3.02            | -0.00158              | PASS    |
|           |           |              |            | 40         | 3.01             | 0.00158               | PASS    |
|           |           |              |            | 50         | 0.06             | 0.00003               | PASS    |

## 8.2 For UMTS

### 8.2.1Frequency Error vs. Voltage:

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| WCDMA1700 | UMTS/TM1  | LCH          | TN         | VL         | -8.64            | -0.00505              | PASS    |
|           |           |              |            | VN         | -4.30            | -0.00251              | PASS    |
|           |           |              |            | VH         | 13.15            | 0.00768               | PASS    |
|           |           | MCH          | TN         | VL         | -4.55            | -0.00263              | PASS    |
|           |           |              |            | VN         | 4.56             | 0.00263               | PASS    |
|           |           |              |            | VH         | 1.28             | 0.00074               | PASS    |
|           |           | HCH          | TN         | VL         | 2.27             | 0.0013                | PASS    |
|           |           |              |            | VN         | 4.64             | 0.00265               | PASS    |
|           |           |              |            | VH         | 7.29             | 0.00416               | PASS    |
| WCDMA850  | UMTS/TM1  | LCH          | TN         | VL         | 2.55             | 0.00309               | PASS    |
|           |           |              |            | VN         | 1.86             | 0.00225               | PASS    |
|           |           |              |            | VH         | 2.12             | 0.00257               | PASS    |
|           |           | MCH          | TN         | VL         | -5.02            | -0.006                | PASS    |
|           |           |              |            | VN         | 1.65             | 0.00197               | PASS    |
|           |           |              |            | VH         | 1.69             | 0.00202               | PASS    |
|           |           | HCH          | TN         | VL         | -4.47            | -0.00528              | PASS    |
|           |           |              |            | VN         | 0.14             | 0.00017               | PASS    |
|           |           |              |            | VH         | -3.27            | -0.00386              | PASS    |

### 8.2.2Frequency Error vs. Temperature:

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| WCDMA1700 | UMTS/TM1  | LCH          | VN         | -30        | 14.80            | 0.00864               | PASS    |
|           |           |              |            | -20        | -8.33            | -0.00486              | PASS    |
|           |           |              |            | -10        | 4.58             | 0.00267               | PASS    |
|           |           |              |            | 0          | -1.27            | -0.00074              | PASS    |
|           |           |              |            | 10         | 1.31             | 0.00077               | PASS    |
|           |           |              |            | 20         | -0.02            | -0.00001              | PASS    |
|           |           |              |            | 30         | 12.85            | 0.0075                | PASS    |
|           |           |              |            | 40         | 0.29             | 0.00017               | PASS    |
|           |           |              |            | 50         | 4.61             | 0.00269               | PASS    |
|           |           | MCH          | VN         | -30        | 2.70             | 0.00156               | PASS    |
|           |           |              |            | -20        | -0.18            | -0.0001               | PASS    |
|           |           |              |            | -10        | -0.85            | -0.00049              | PASS    |
|           |           |              |            | 0          | 4.53             | 0.00261               | PASS    |
|           |           |              |            | 10         | 4.44             | 0.00256               | PASS    |
|           |           |              |            | 20         | 0.38             | 0.00022               | PASS    |
|           |           |              |            | 30         | 1.34             | 0.00077               | PASS    |
|           |           |              |            | 40         | -1.36            | -0.00078              | PASS    |
|           |           |              |            | 50         | 8.65             | 0.00499               | PASS    |
|           |           | HCH          | VN         | -30        | 2.96             | 0.00169               | PASS    |
|           |           |              |            | -20        | -2.43            | -0.00139              | PASS    |
|           |           |              |            | -10        | 0.05             | 0.00003               | PASS    |
|           |           |              |            | 0          | 1.88             | 0.00107               | PASS    |
|           |           |              |            | 10         | 6.45             | 0.00368               | PASS    |
|           |           |              |            | 20         | 2.11             | 0.0012                | PASS    |
|           |           |              |            | 30         | -0.90            | -0.00051              | PASS    |
|           |           |              |            | 40         | 1.88             | 0.00107               | PASS    |
|           |           |              |            | 50         | 0.87             | 0.0005                | PASS    |
| WCDMA850  | UMTS/TM1  | LCH          | VN         | -30        | -5.40            | -0.00653              | PASS    |
|           |           |              |            | -20        | -2.98            | -0.00361              | PASS    |
|           |           |              |            | -10        | 0.31             | 0.00038               | PASS    |
|           |           |              |            | 0          | 3.49             | 0.00422               | PASS    |
|           |           |              |            | 10         | 9.51             | 0.01151               | PASS    |
|           |           |              |            | 20         | -0.31            | -0.00038              | PASS    |
|           |           |              |            | 30         | 1.98             | 0.0024                | PASS    |
|           |           |              |            | 40         | 7.28             | 0.00881               | PASS    |
|           |           |              |            | 50         | 3.27             | 0.00396               | PASS    |
|           |           | MCH          | VN         | -30        | 11.40            | 0.01363               | PASS    |
|           |           |              |            | -20        | 4.96             | 0.00593               | PASS    |
|           |           |              |            | -10        | -4.70            | -0.00562              | PASS    |
|           |           |              |            | 0          | 3.74             | 0.00447               | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 10         | -4.00            | -0.00478              | PASS    |
|           |           |              |            | 20         | 8.67             | 0.01037               | PASS    |
|           |           |              |            | 30         | -4.53            | -0.00542              | PASS    |
|           |           |              |            | 40         | 14.50            | 0.01734               | PASS    |
|           |           |              |            | 50         | 8.18             | 0.00978               | PASS    |
|           |           | HCH          | VN         | -30        | -9.08            | -0.01073              | PASS    |
|           |           |              |            | -20        | -5.55            | -0.00656              | PASS    |
|           |           |              |            | -10        | -5.62            | -0.00664              | PASS    |
|           |           |              |            | 0          | 9.52             | 0.01124               | PASS    |
|           |           |              |            | 10         | -6.00            | -0.00709              | PASS    |
|           |           |              |            | 20         | -1.82            | -0.00215              | PASS    |
|           |           |              |            | 30         | 11.55            | 0.01364               | PASS    |
|           |           |              |            | 40         | -6.71            | -0.00793              | PASS    |
|           |           |              |            | 50         | -0.29            | -0.00034              | PASS    |

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END