



## Appendix for test report

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Conducted Power [dBm] | ERP [dBm]  | Limit [dBm] | Verdict |
|-----------|-----------|--------------|-----------------------|------------|-------------|---------|
| GSM850    | GSM/TM1   | LCH          | 32.94                 | 30.42      | 38.5        | PASS    |
|           |           | MCH          | 32.91                 | 30.39      | 38.5        | PASS    |
|           |           | HCH          | 32.76                 | 30.24      | 38.5        | PASS    |
|           | GSM/TM2   | LCH          | 26.8                  | 24.28      | 38.5        | PASS    |
|           |           | MCH          | 26.77                 | 24.25      | 38.5        | PASS    |
|           |           | HCH          | 26.97                 | 24.45      | 38.5        | PASS    |
| WCDMA850  | UMTS/TM1  | LCH          | 23.7                  | 21.18      | 38.5        | PASS    |
|           |           | MCH          | 23.73                 | 21.21      | 38.5        | PASS    |
|           |           | HCH          | 23.59                 | 21.07      | 38.5        | PASS    |
| Test Band | Test Mode | Test Channel | Conducted Power [dBm] | EIRP [dBm] | Limit [dBm] | Verdict |
| GSM1900   | GSM/TM1   | LCH          | 30.01                 | 30.33      | 33          | PASS    |
|           |           | MCH          | 29.76                 | 30.08      | 33          | PASS    |
|           |           | HCH          | 29.89                 | 30.21      | 33          | PASS    |
|           | GSM/TM2   | LCH          | 25.49                 | 25.81      | 33          | PASS    |
|           |           | MCH          | 25.44                 | 25.76      | 33          | PASS    |
|           |           | HCH          | 25.43                 | 25.75      | 33          | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | 23.92                 | 24.24      | 33          | PASS    |
|           |           | MCH          | 23.54                 | 23.86      | 33          | PASS    |
|           |           | HCH          | 23.14                 | 23.46      | 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: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
|-----------|-----------|--------------|--------------|------------|---------|
| GSM850    | GSM/TM1   | LCH          | 0.3          | 13         | PASS    |
|           |           | MCH          | 0.31         | 13         | PASS    |
|           |           | HCH          | 0.31         | 13         | PASS    |
|           | GSM/TM2   | LCH          | 3.15         | 13         | PASS    |
|           |           | MCH          | 3.29         | 13         | PASS    |
|           |           | HCH          | 3.26         | 13         | PASS    |
| GSM1900   | GSM/TM1   | LCH          | 0.33         | 13         | PASS    |
|           |           | MCH          | 0.32         | 13         | PASS    |
|           |           | HCH          | 0.36         | 13         | PASS    |
|           | GSM/TM2   | LCH          | 3.12         | 13         | PASS    |
|           |           | MCH          | 3.21         | 13         | PASS    |
|           |           | HCH          | 3.07         | 13         | PASS    |
| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
| WCDMA850  | UMTS/TM1  | LCH          | 3.09         | 13         | PASS    |
|           |           | MCH          | 3.26         | 13         | PASS    |
|           |           | HCH          | 3.21         | 13         | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | 3.23         | 13         | PASS    |
|           |           | MCH          | 3.52         | 13         | PASS    |
|           |           | HCH          | 3.33         | 13         | PASS    |

## 3Appendix\_C: Modulation Characteristics

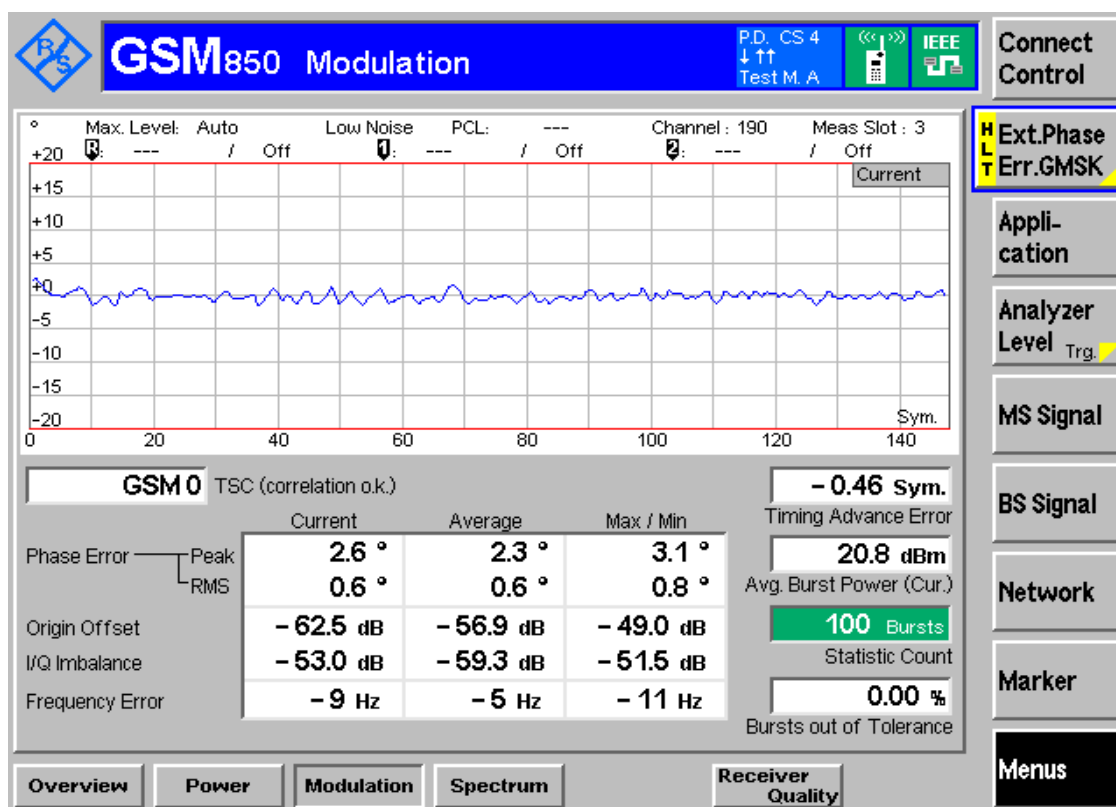
### Part I - Test Plots

#### 3.1 For GSM

##### 3.1.1 Test Band = GSM850

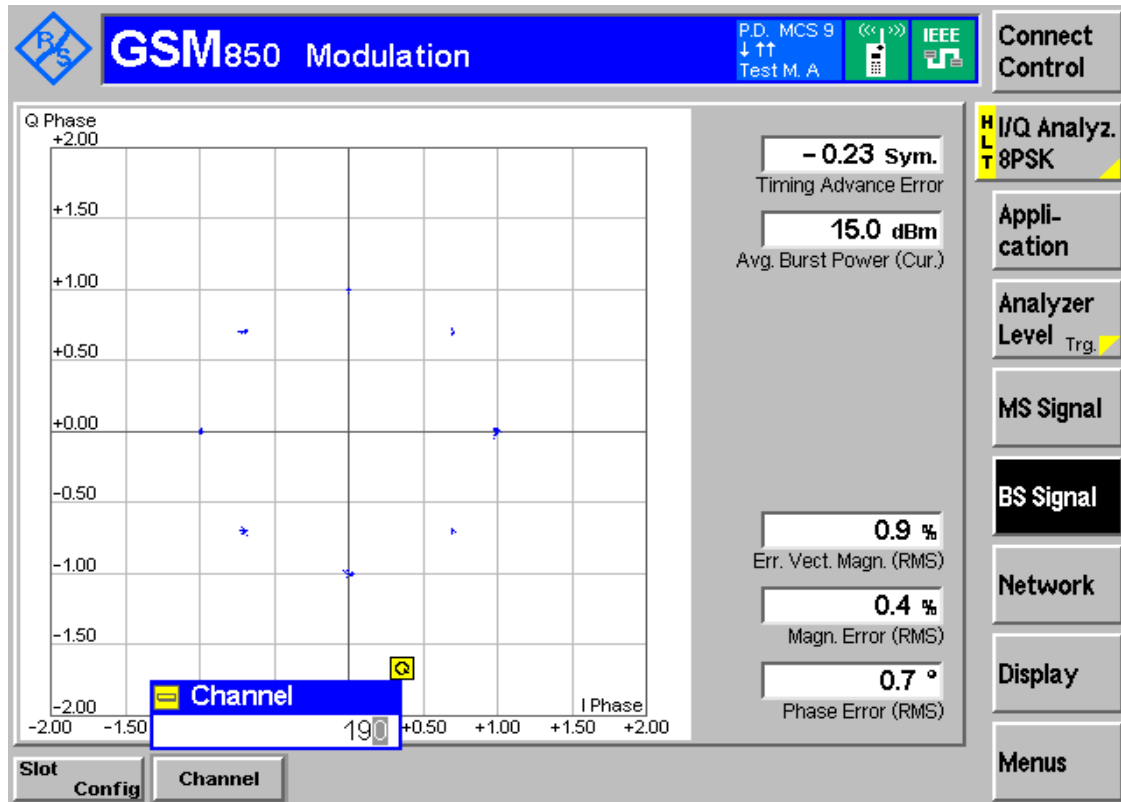
##### 3.1.1.1 Test Mode = GSM/TM1

##### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

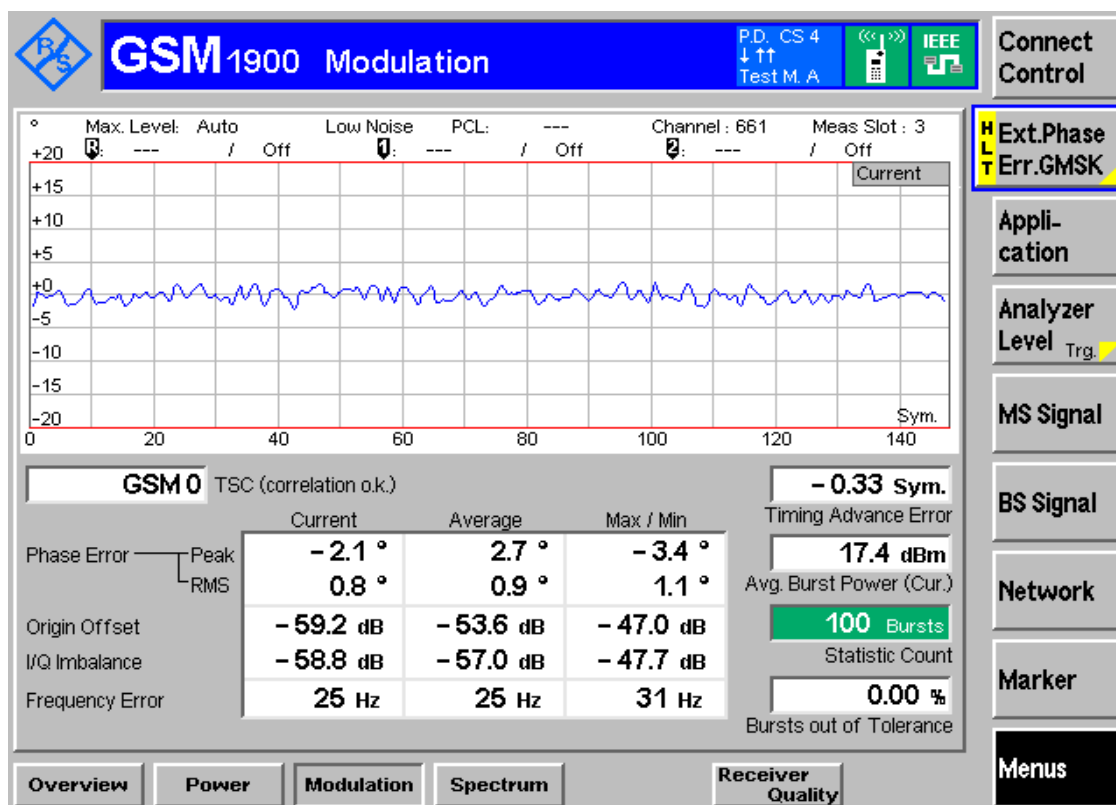
#### 3.1.1.2.1 Test Channel = MCH



### 3.1.2 Test Band = GSM1900

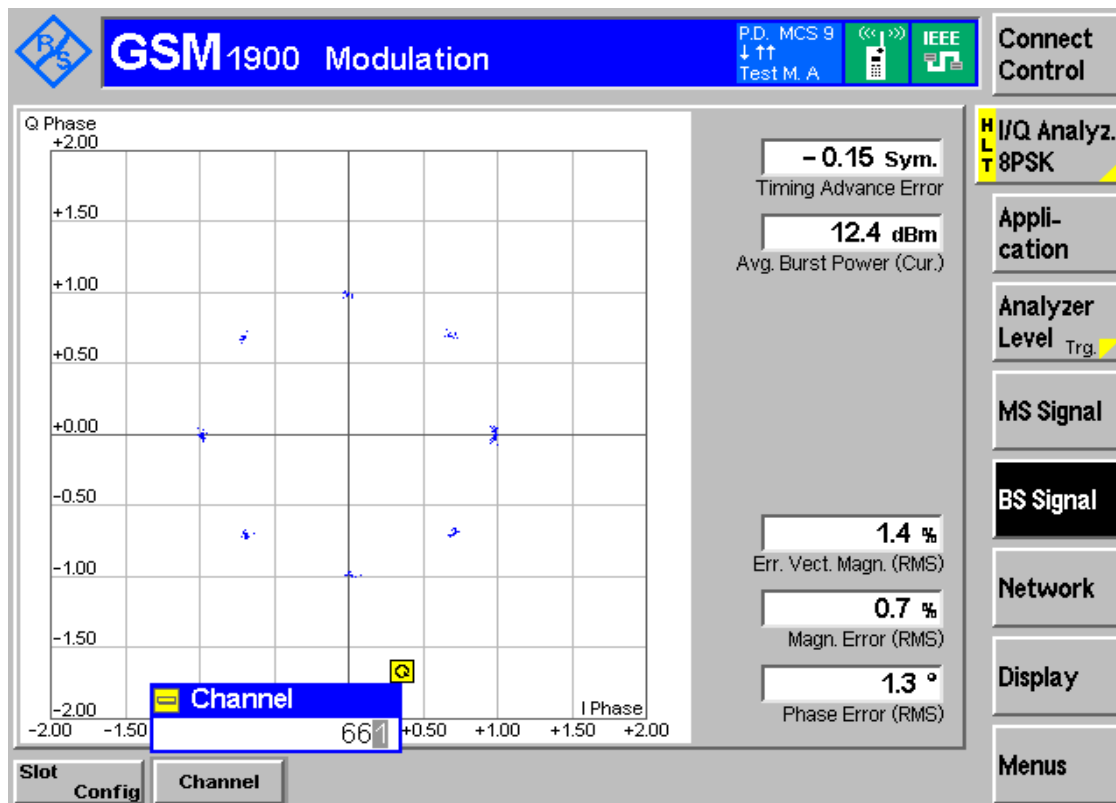
#### 3.1.2.1 Test Mode = GSM/TM1

##### 3.1.2.1.1 Test Channel = MCH



### 3.1.2.2 Test Mode = GSM/TM2

#### 3.1.2.2.1 Test Channel = MCH

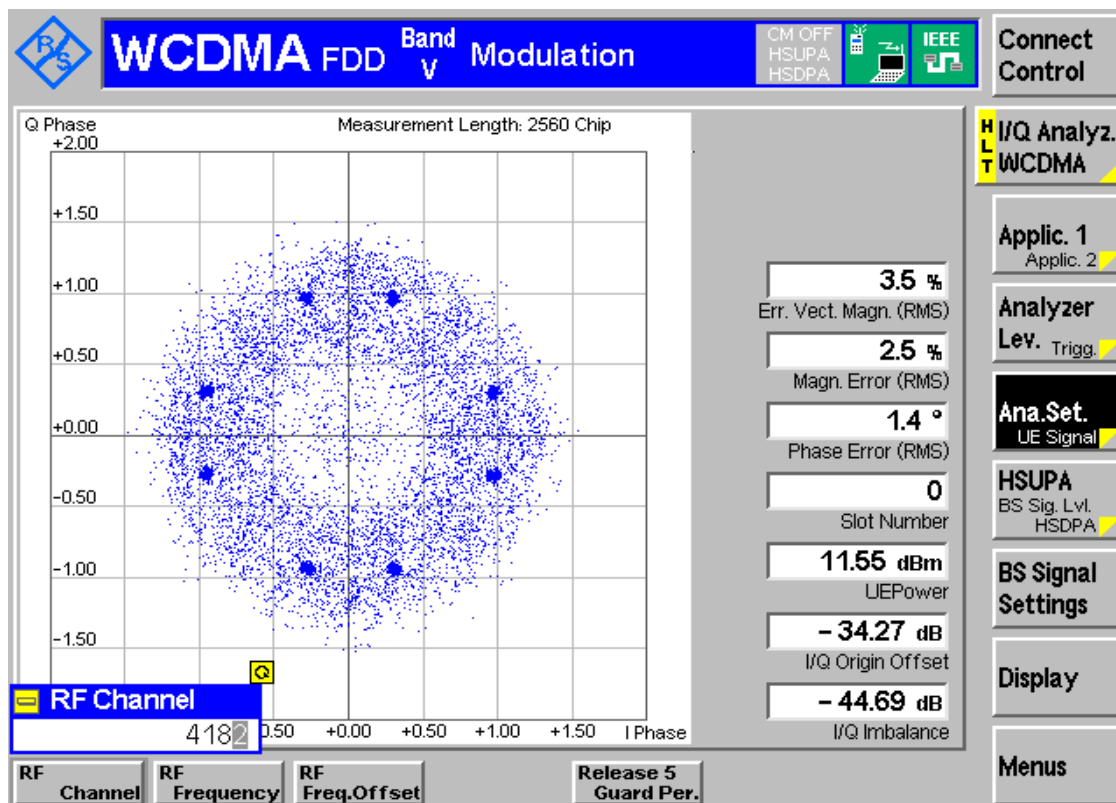


## 3.2 For UMTS

### 3.2.1 Test Band = WCDMA850

#### 3.2.1.1 Test Mode = UMTS/TM1

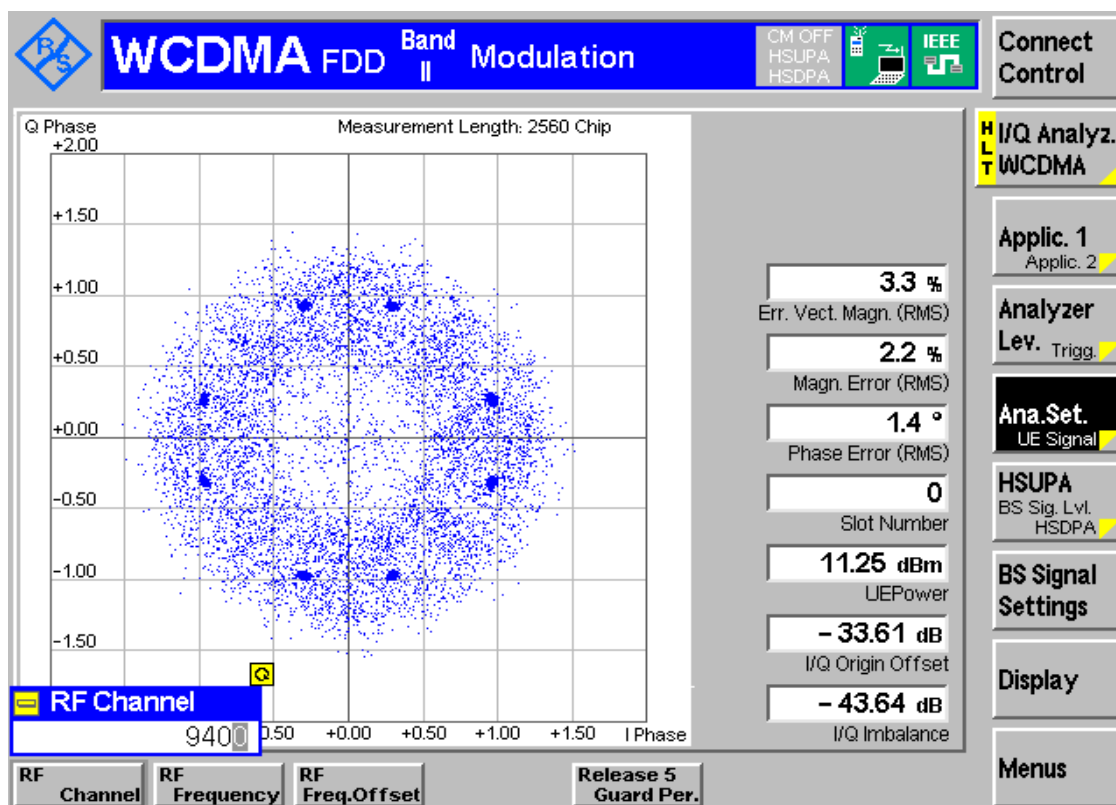
##### 3.2.1.1.1 Test Channel = MCH



### 3.2.2 Test Band = WCDMA1900

#### 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 [kHz] | Emission Bandwidth [kHz] | Verdict |
|-----------|-----------|--------------|--------------------------|--------------------------|---------|
| GSM850    | GSM/TM1   | LCH          | 246.81                   | 320.92                   | Pass    |
|           |           | MCH          | 242.37                   | 312.34                   | Pass    |
|           |           | HCH          | 243.29                   | 313.16                   | Pass    |
|           | GSM/TM2   | LCH          | 239.33                   | 303.49                   | Pass    |
|           |           | MCH          | 235.52                   | 301.39                   | Pass    |
|           |           | HCH          | 243.95                   | 296.89                   | Pass    |
| GSM1900   | GSM/TM1   | LCH          | 245.46                   | 318.64                   | Pass    |
|           |           | MCH          | 242.10                   | 313.15                   | Pass    |
|           |           | HCH          | 244.83                   | 316.43                   | Pass    |
|           | GSM/TM2   | LCH          | 243.93                   | 317.91                   | Pass    |
|           |           | MCH          | 240.10                   | 305.67                   | Pass    |
|           |           | HCH          | 242.17                   | 311.94                   | Pass    |
| Test Band | Test Mode | Test Channel | Occupied Bandwidth [MHz] | Emission Bandwidth [MHz] | Verdict |
| WCDMA850  | UMTS/TM1  | LCH          | 4.17                     | 4.75                     | Pass    |
|           |           | MCH          | 4.17                     | 4.74                     | Pass    |
|           |           | HCH          | 4.16                     | 4.74                     | Pass    |
| WCDMA1900 | UMTS/TM1  | LCH          | 4.16                     | 4.74                     | Pass    |
|           |           | MCH          | 4.17                     | 4.73                     | Pass    |
|           |           | HCH          | 4.16                     | 4.74                     | Pass    |

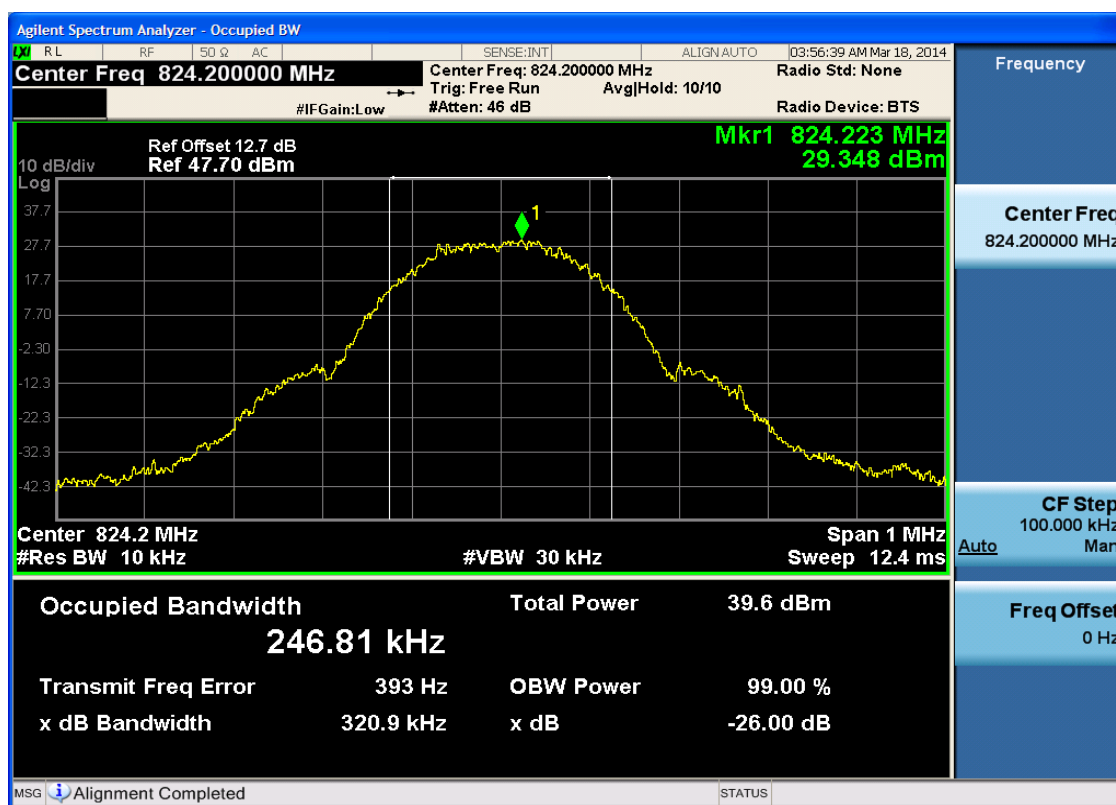
## Part II - Test Plots

### 4.1 For GSM

#### 4.1.1 Test Band = GSM850

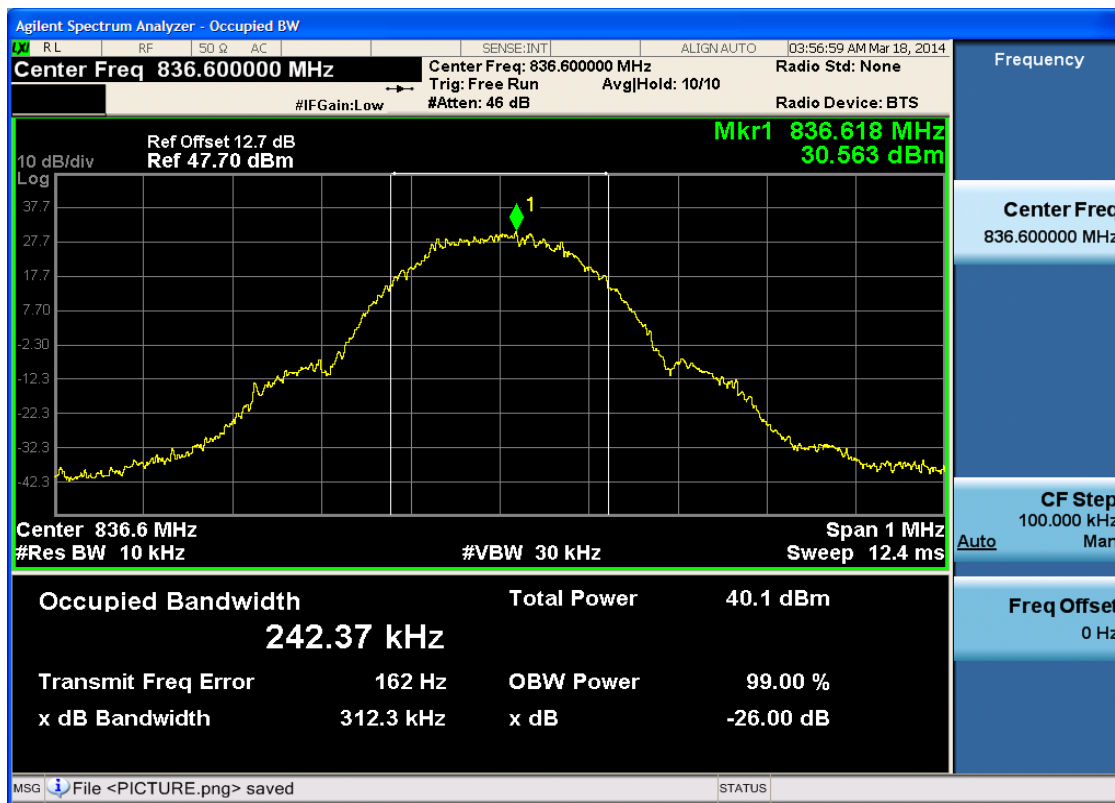
##### 4.1.1.1 Test Mode = GSM/TM1

##### 4.1.1.1.1 Test Channel = LCH



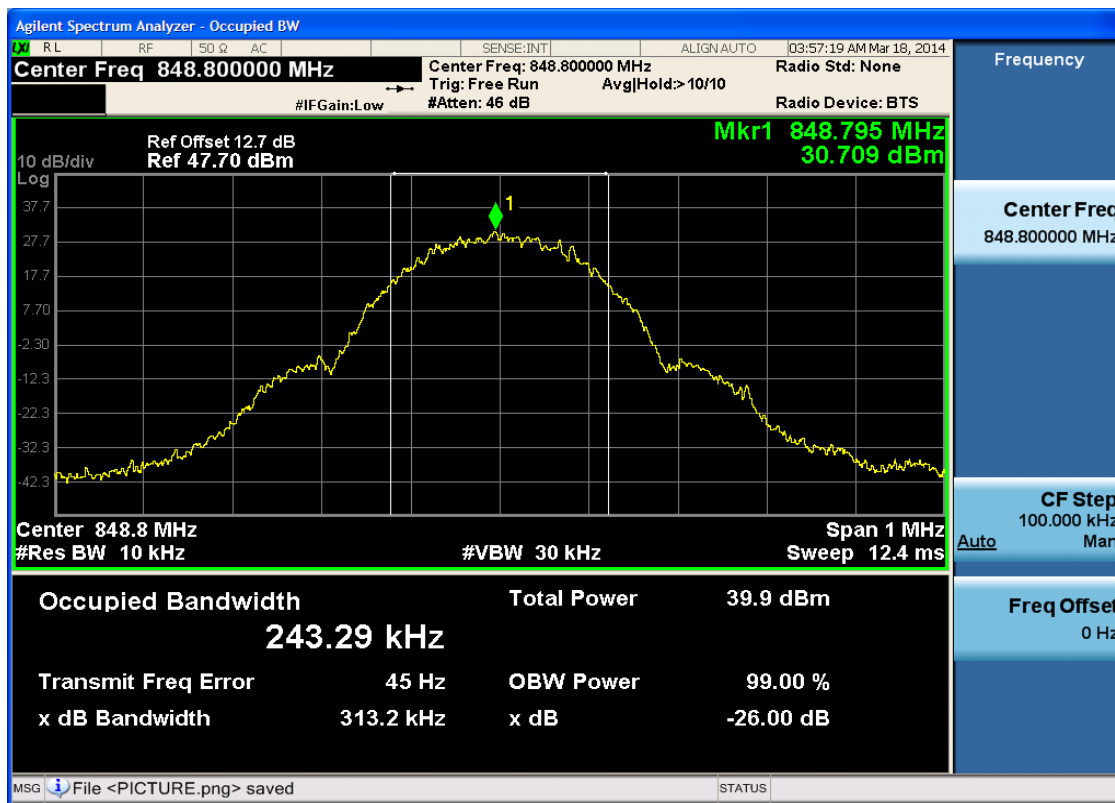


## 4.1.1.1.2 Test Channel = MCH





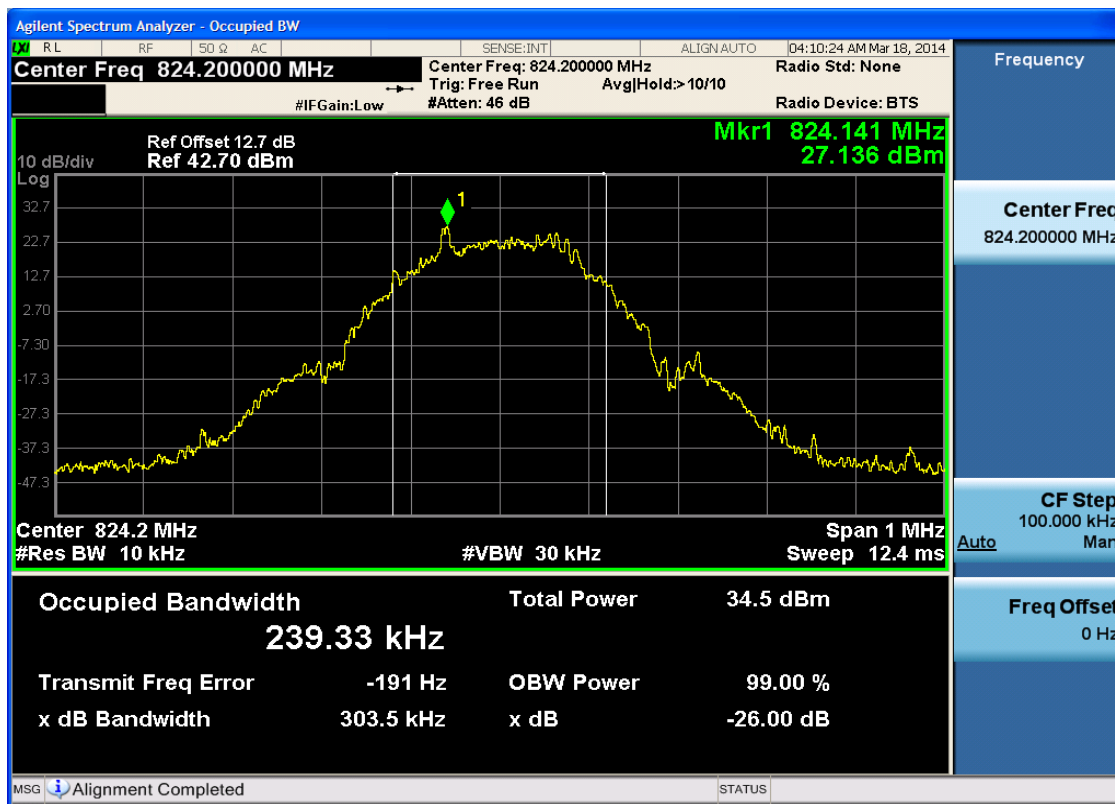
## 4.1.1.1.3 Test Channel = HCH





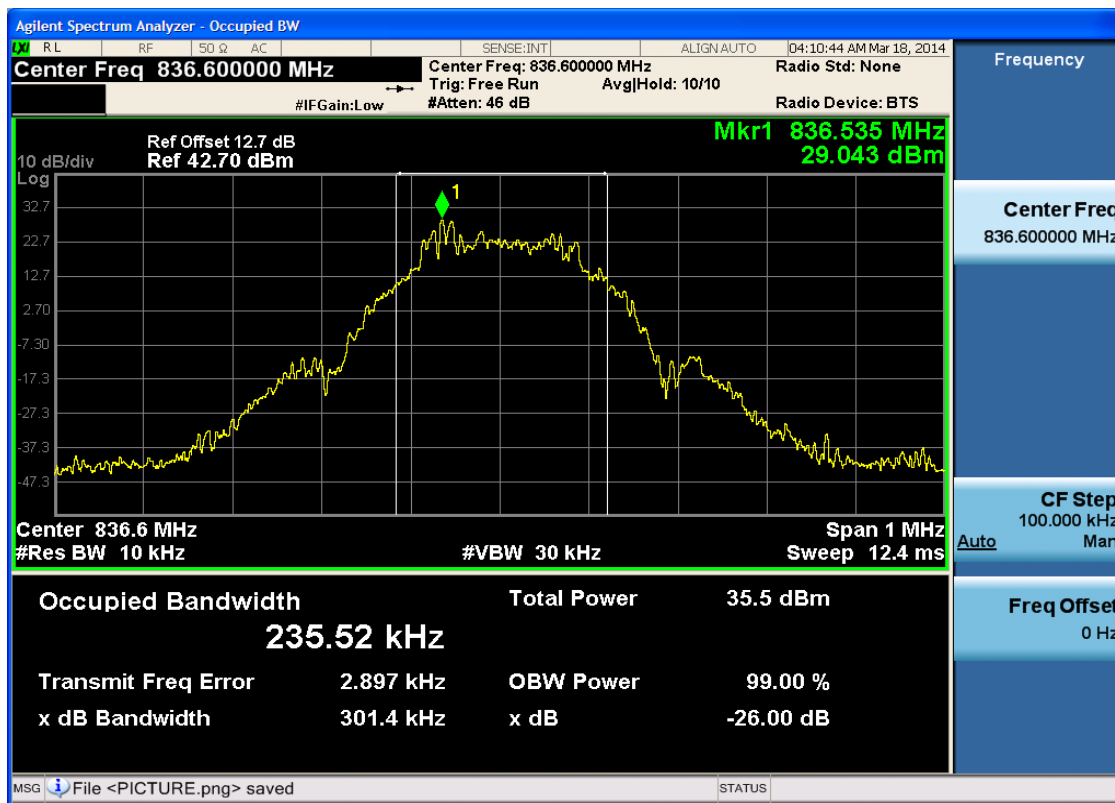
## 4.1.1.2 Test Mode = GSM/TM2

## 4.1.1.2.1 Test Channel = LCH



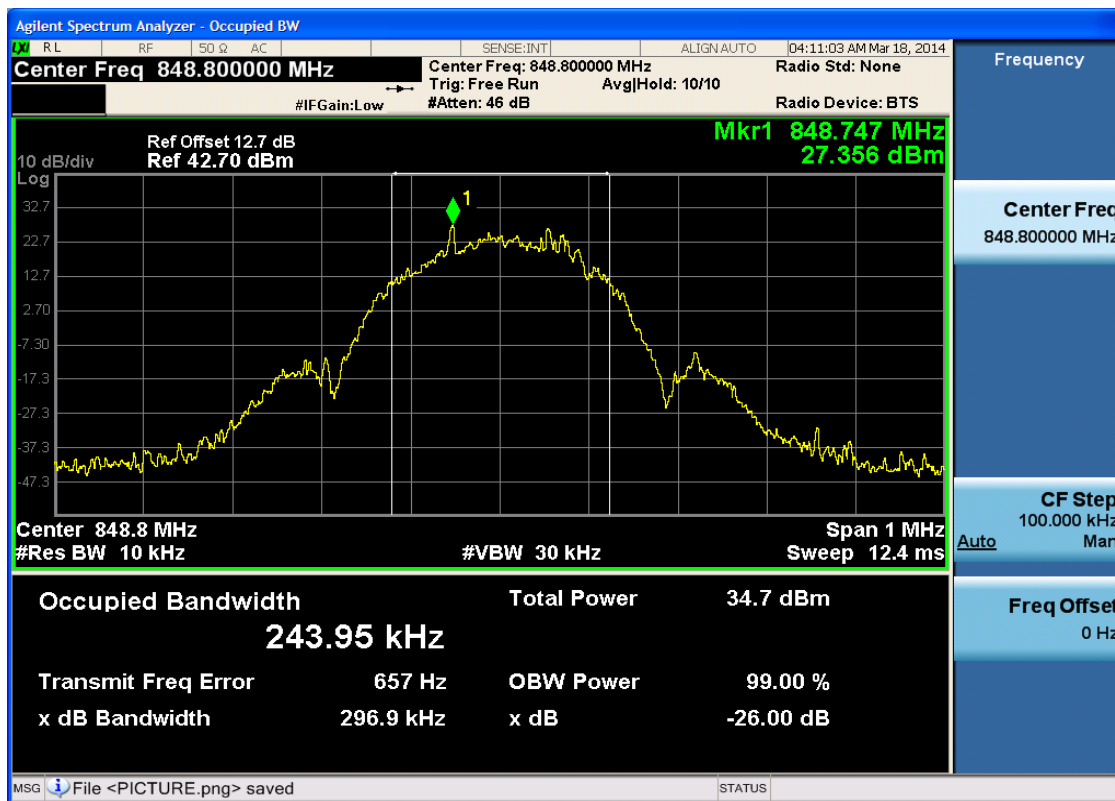


## 4.1.1.2.2 Test Channel = MCH





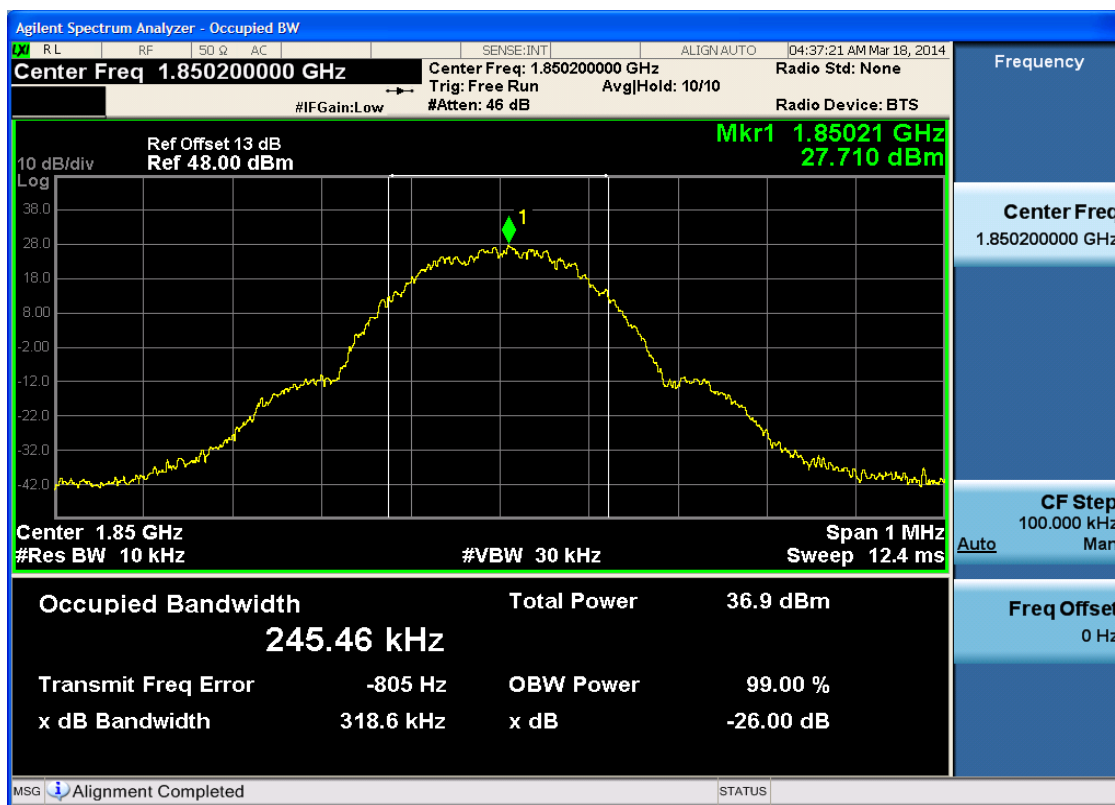
## 4.1.1.2.3 Test Channel = HCH



#### 4.1.2 Test Band = GSM1900

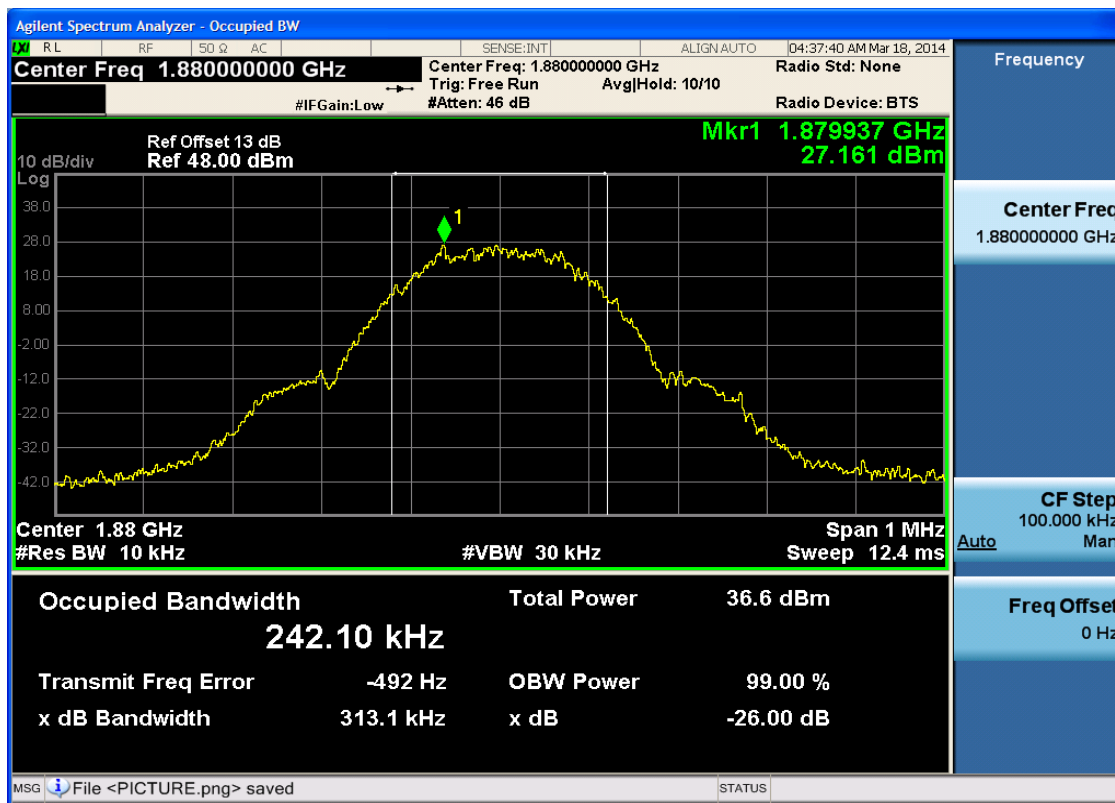
##### 4.1.2.1 Test Mode = GSM/TM1

##### 4.1.2.1.1 Test Channel = LCH



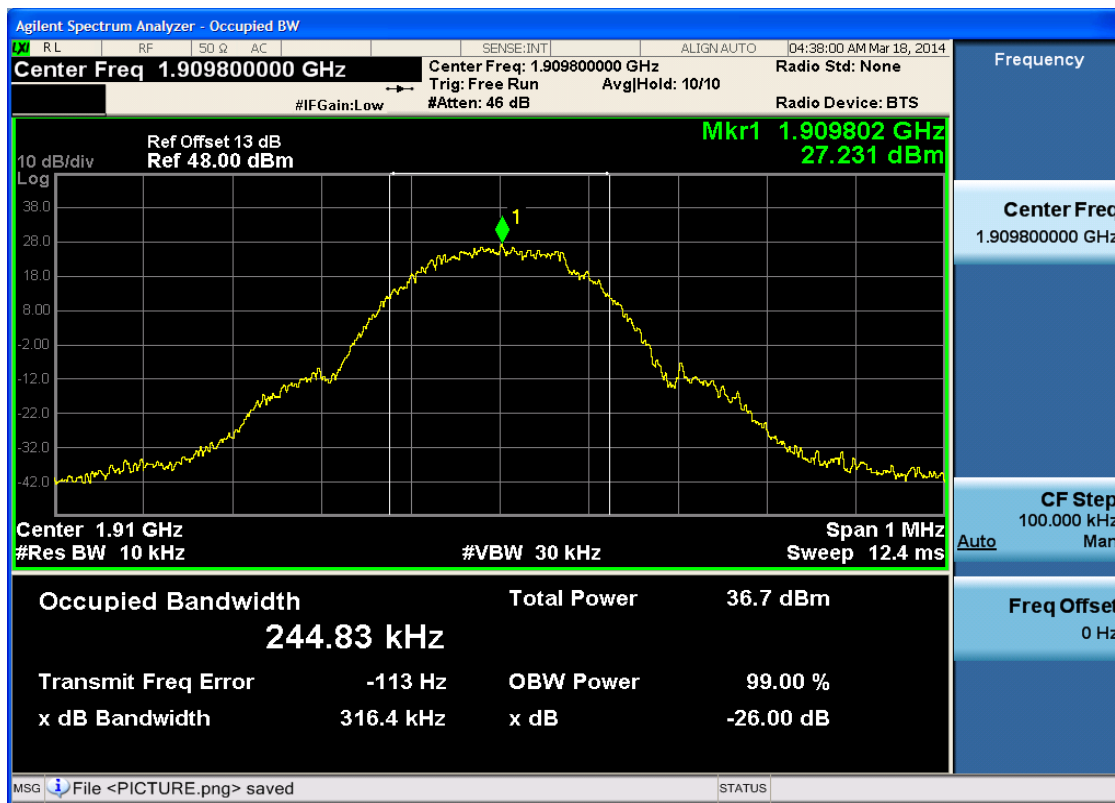


## 4.1.2.1.2 Test Channel = MCH





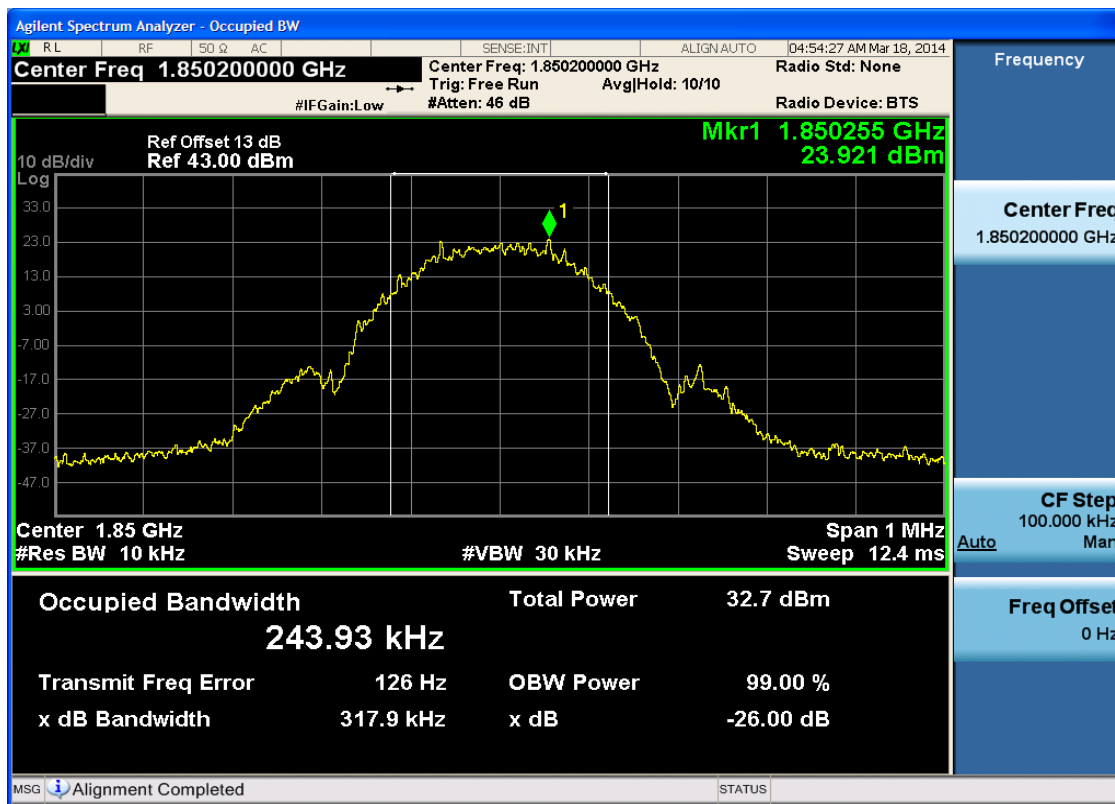
## 4.1.2.1.3 Test Channel = HCH





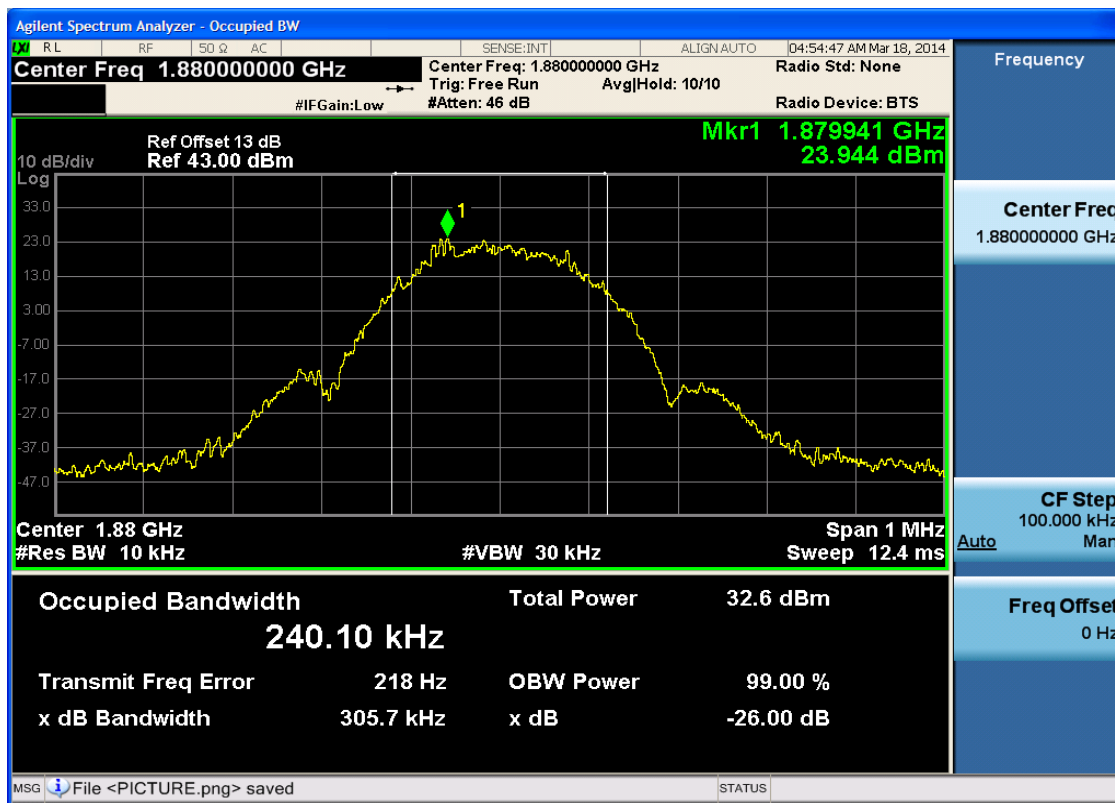
## 4.1.2.2 Test Mode = GSM/TM2

## 4.1.2.2.1 Test Channel = LCH



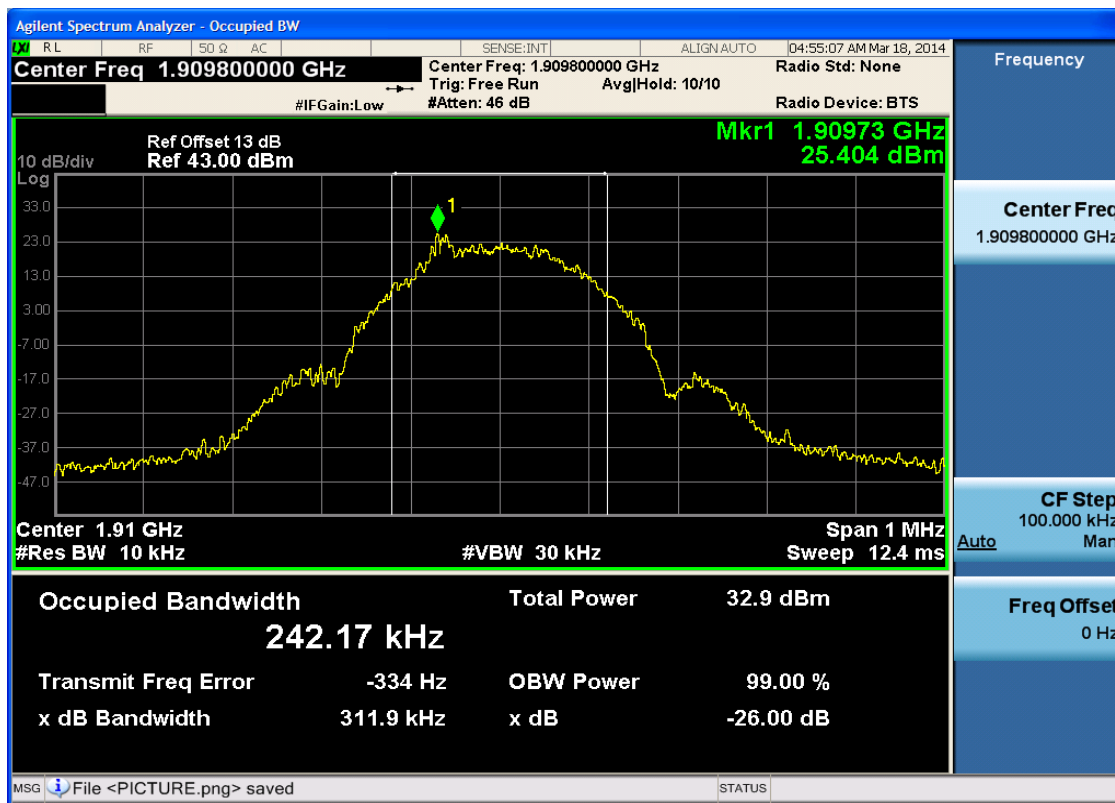


## 4.1.2.2.2 Test Channel = MCH





## 4.1.2.2.3 Test Channel = HCH



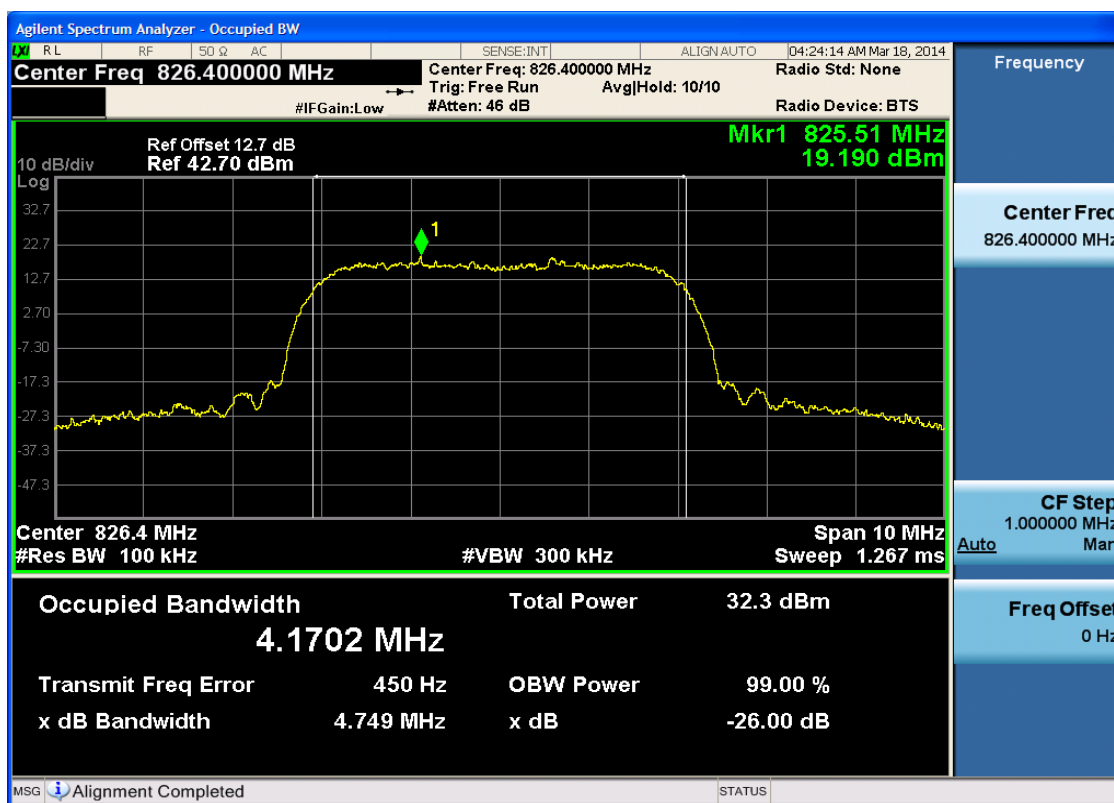


## 4.2 For UMTS

### 4.2.1 Test Band = WCDMA850

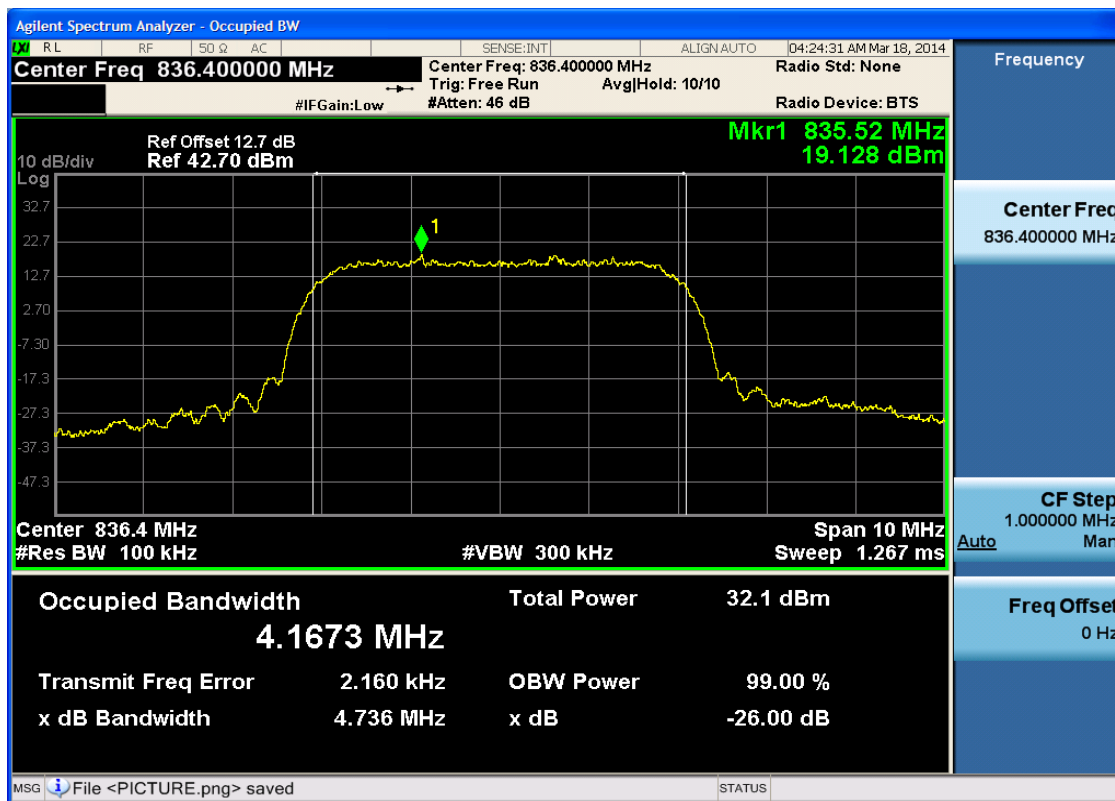
#### 4.2.1.1 Test Mode = UMTS/TM1

##### 4.2.1.1.1 Test Channel = LCH



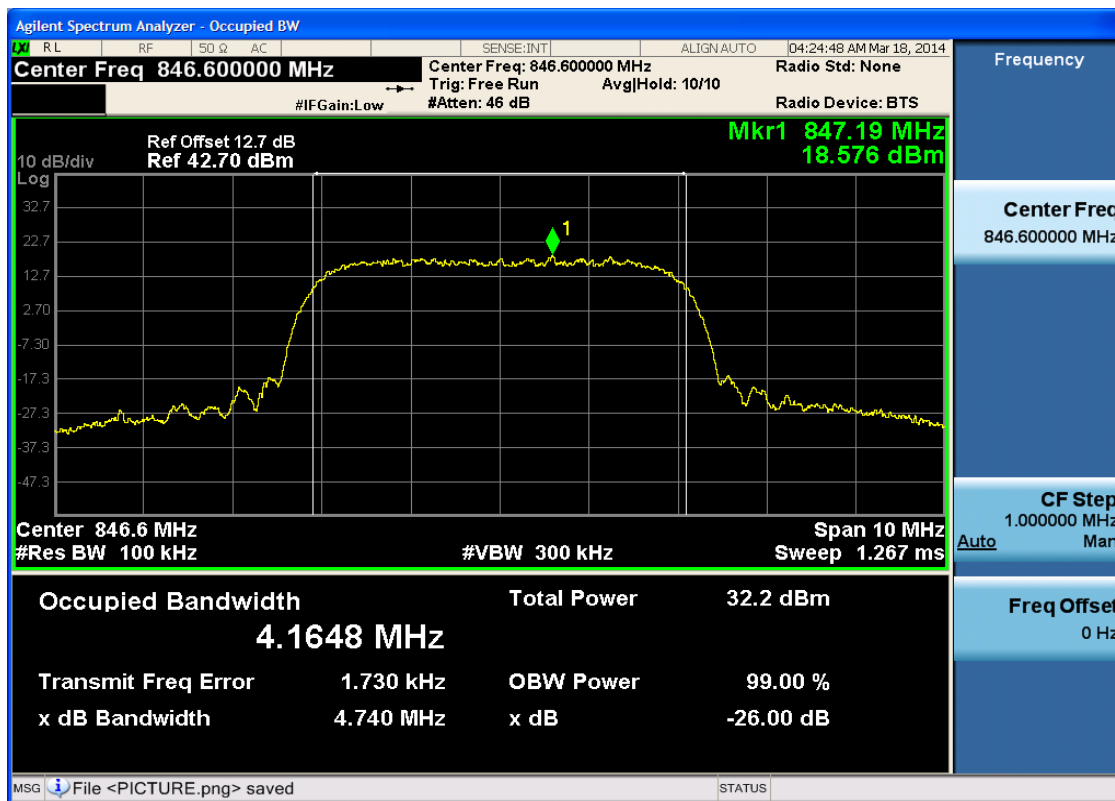


## 4.2.1.1.2 Test Channel = MCH





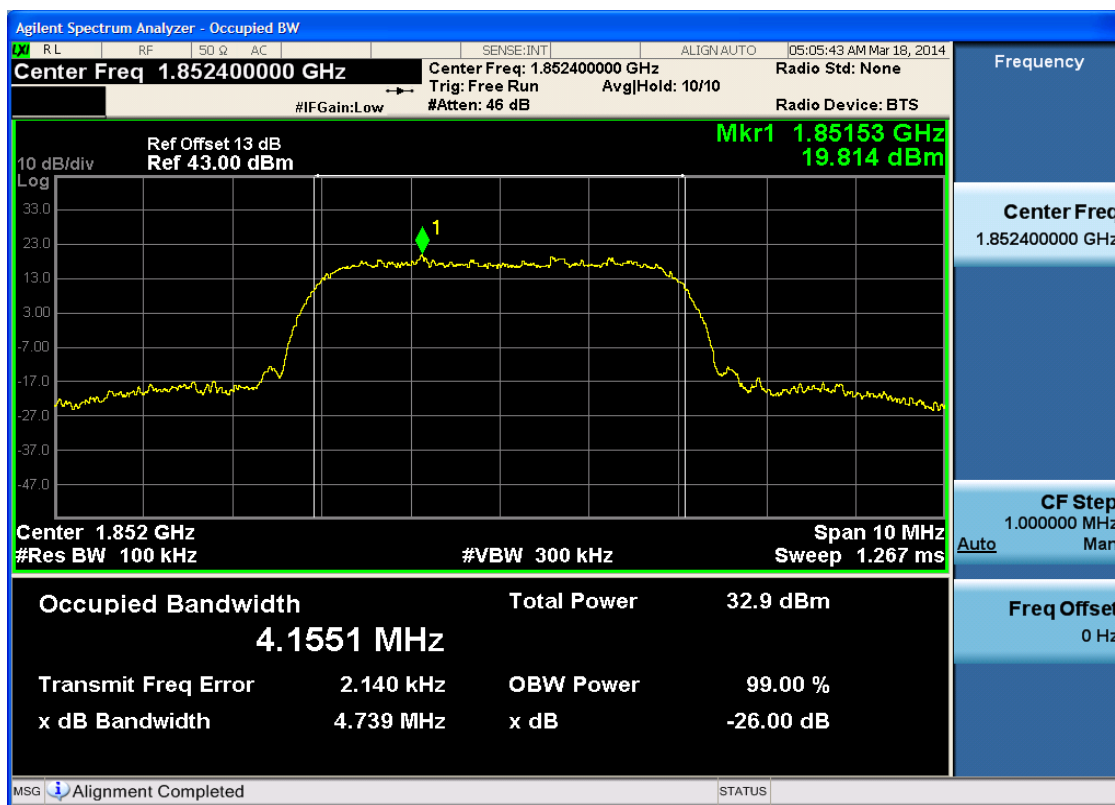
## 4.2.1.1.3 Test Channel = HCH



## 4.2.2 Test Band = WCDMA1900

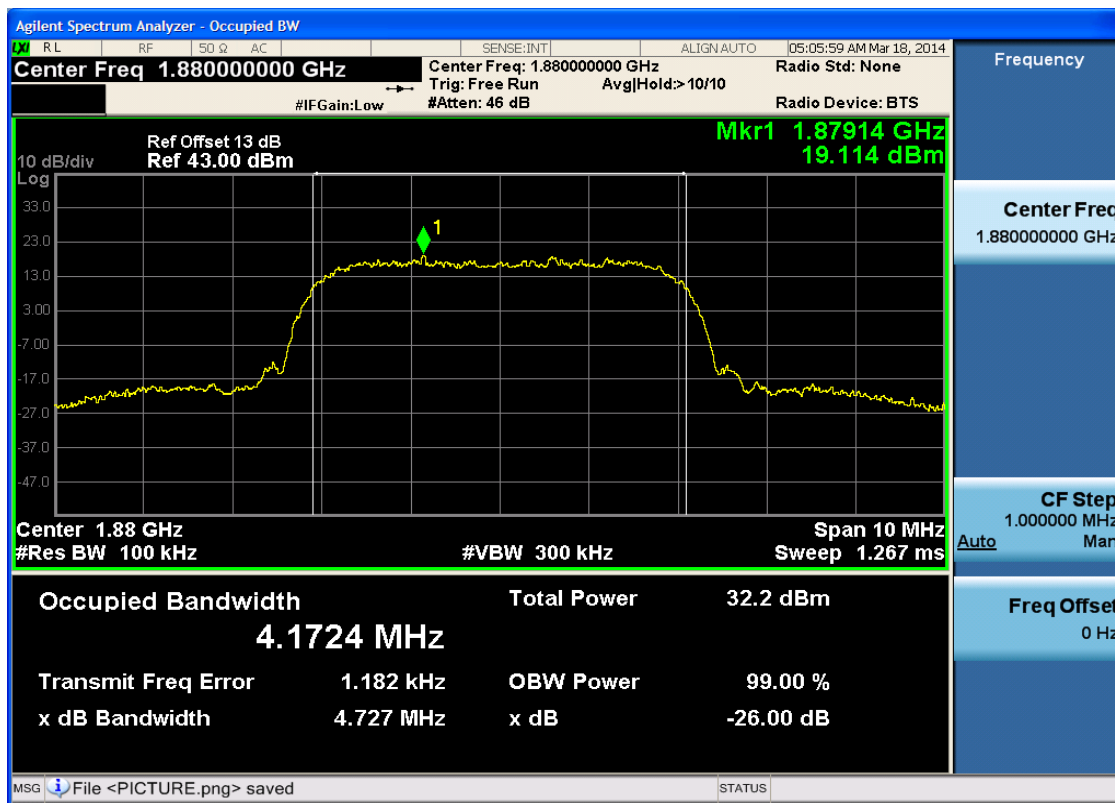
### 4.2.2.1 Test Mode = UMTS/TM1

#### 4.2.2.1.1 Test Channel = LCH



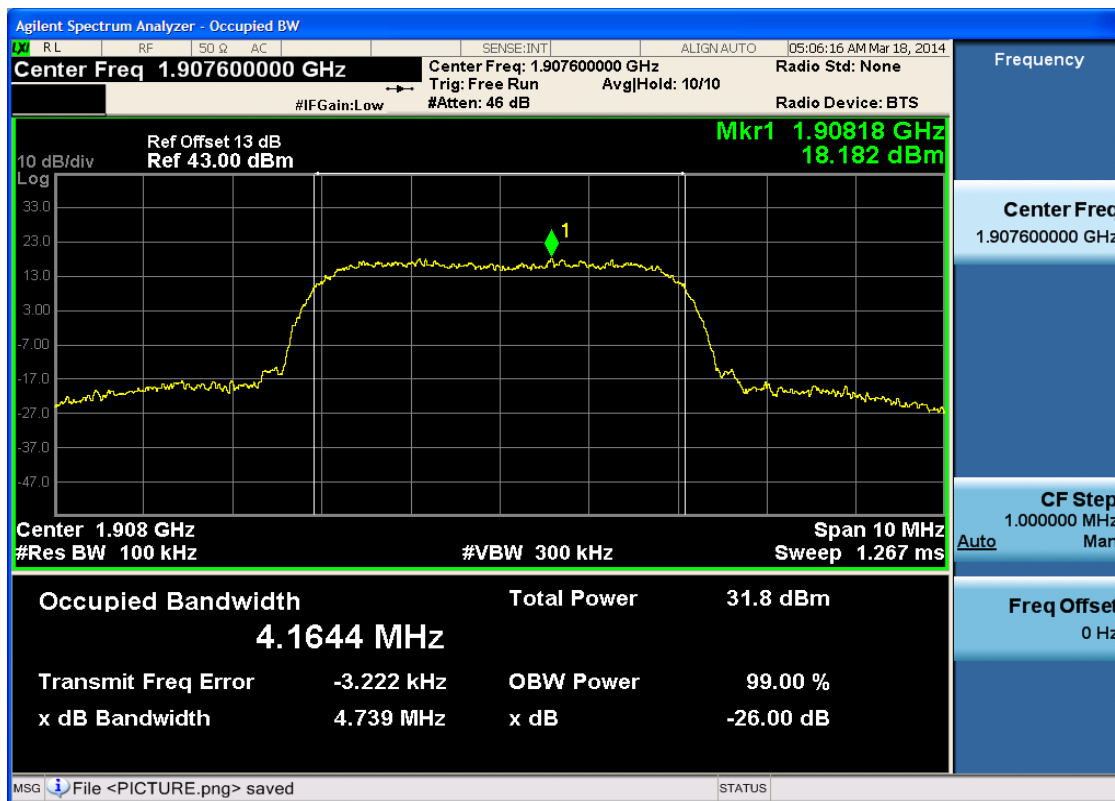


## 4.2.2.1.2 Test Channel = MCH





## 4.2.2.1.3 Test Channel = HCH



## 5Appendix\_E: Band Edges Compliance

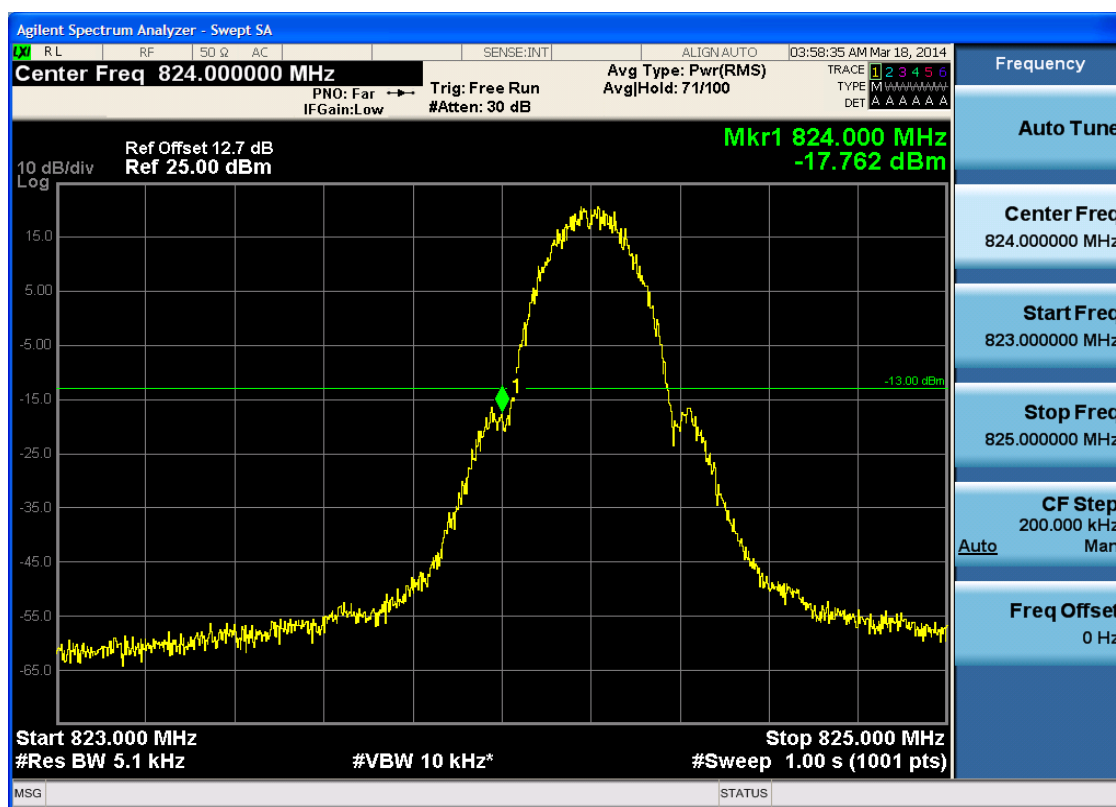
### Part I - Test Plots

#### 5.1 For GSM

##### 5.1.1 Test Band = GSM850

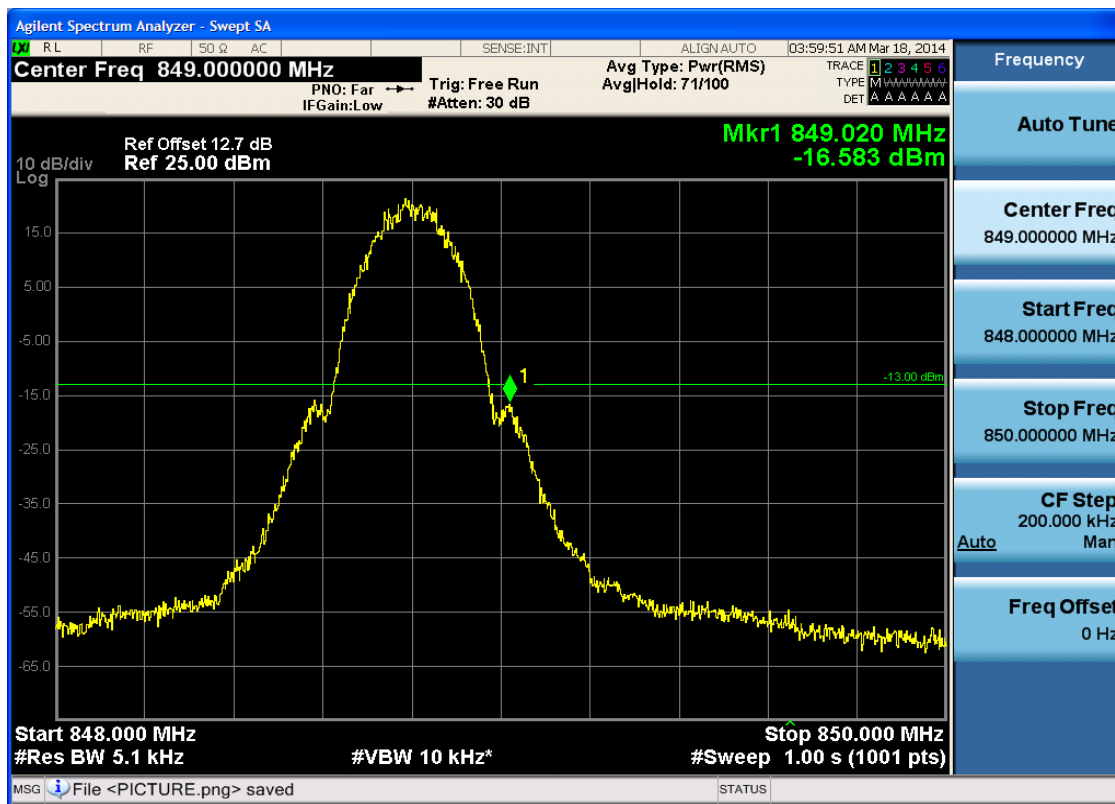
##### 5.1.1.1 Test Mode = GSM/TM1

##### 5.1.1.1.1 Test Channel = LCH



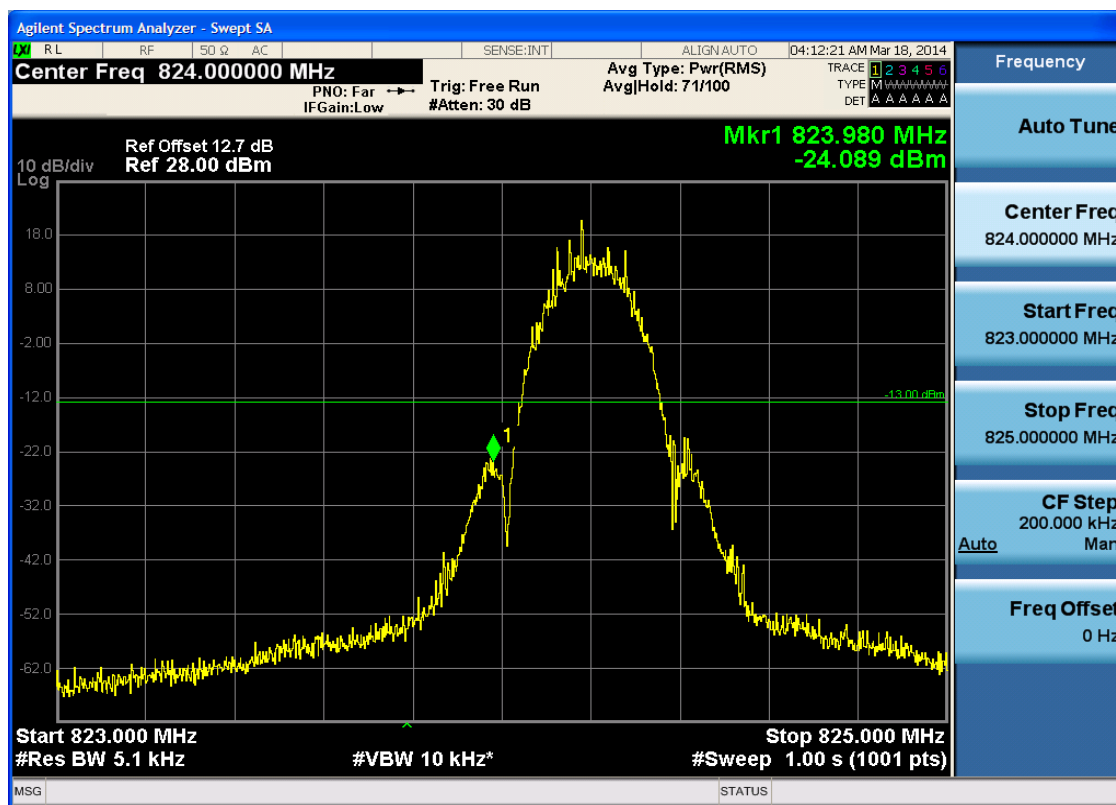


## 5.1.1.1.2 Test Channel = HCH

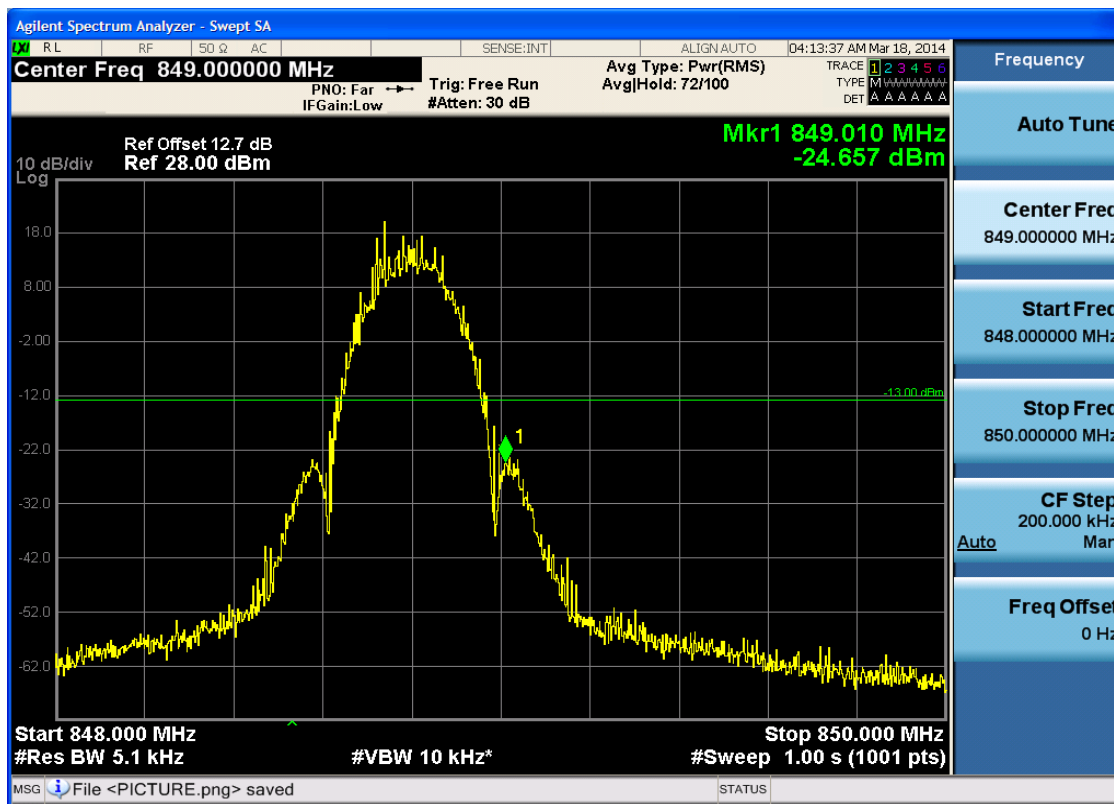


### 5.1.1.2 Test Mode = GSM/TM2

#### 5.1.1.2.1 Test Channel = LCH



### 5.1.1.2.2 Test Channel = HCH

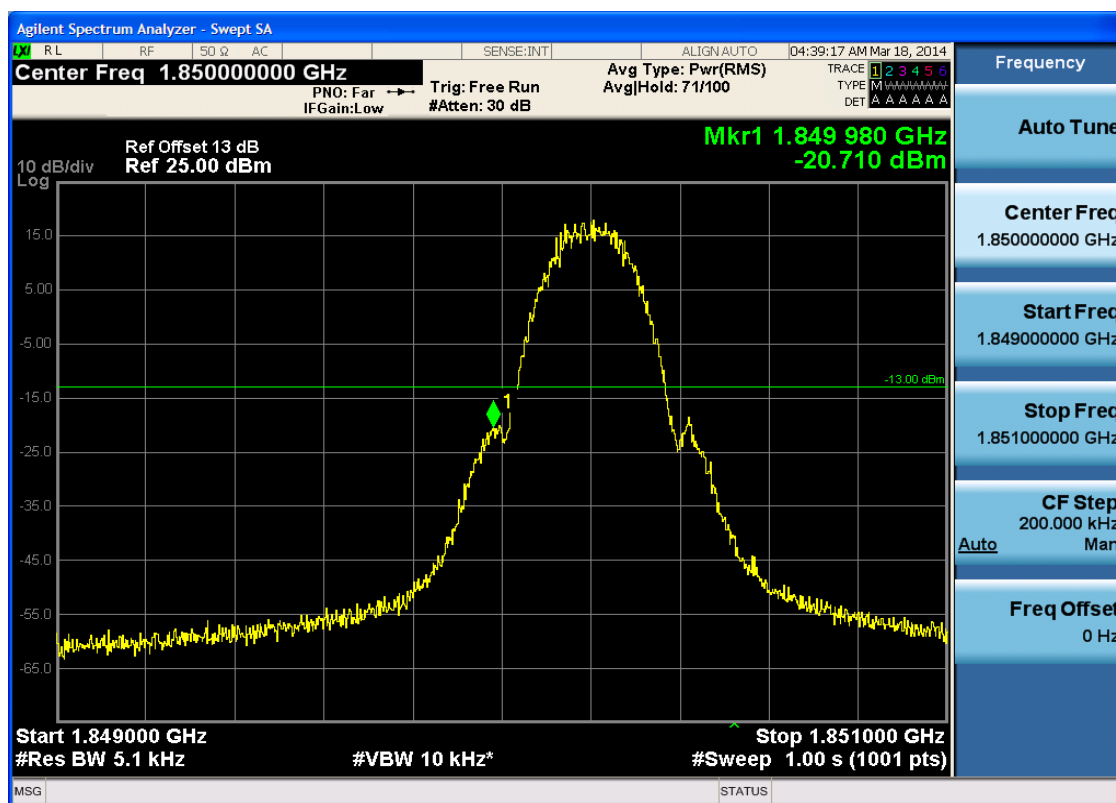




## 5.1.2 Test Band = GSM1900

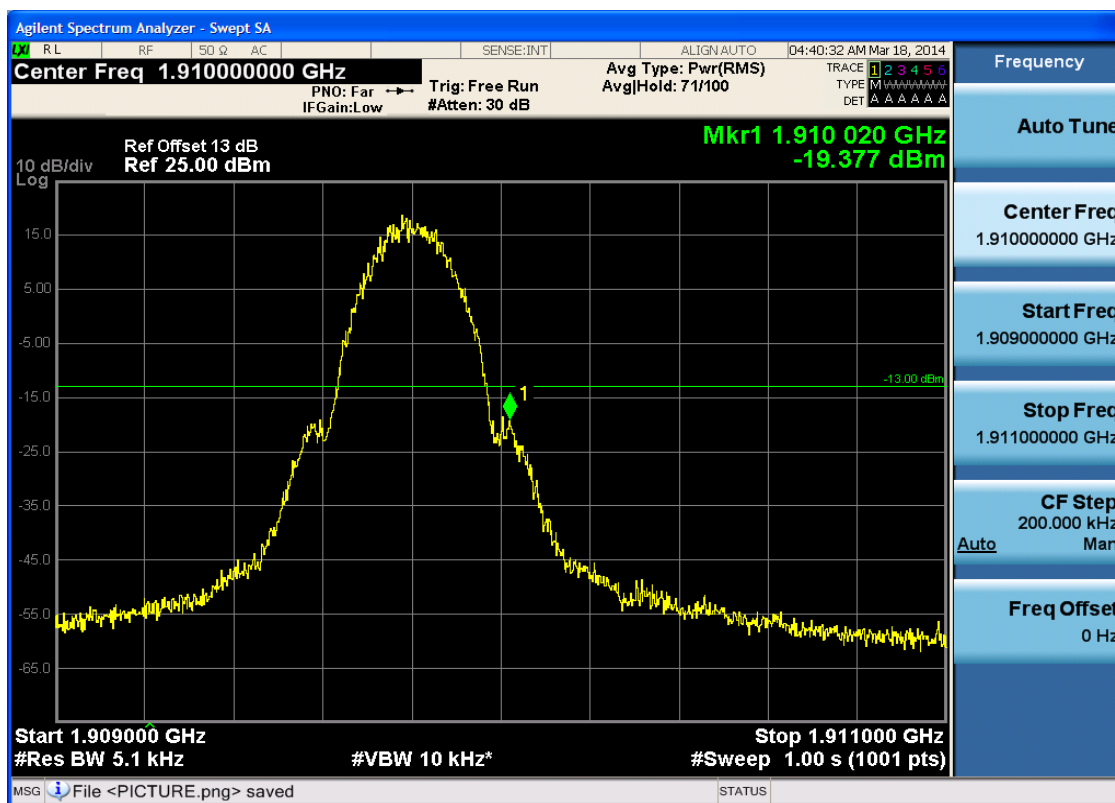
### 5.1.2.1 Test Mode = GSM/TM1

#### 5.1.2.1.1 Test Channel = LCH



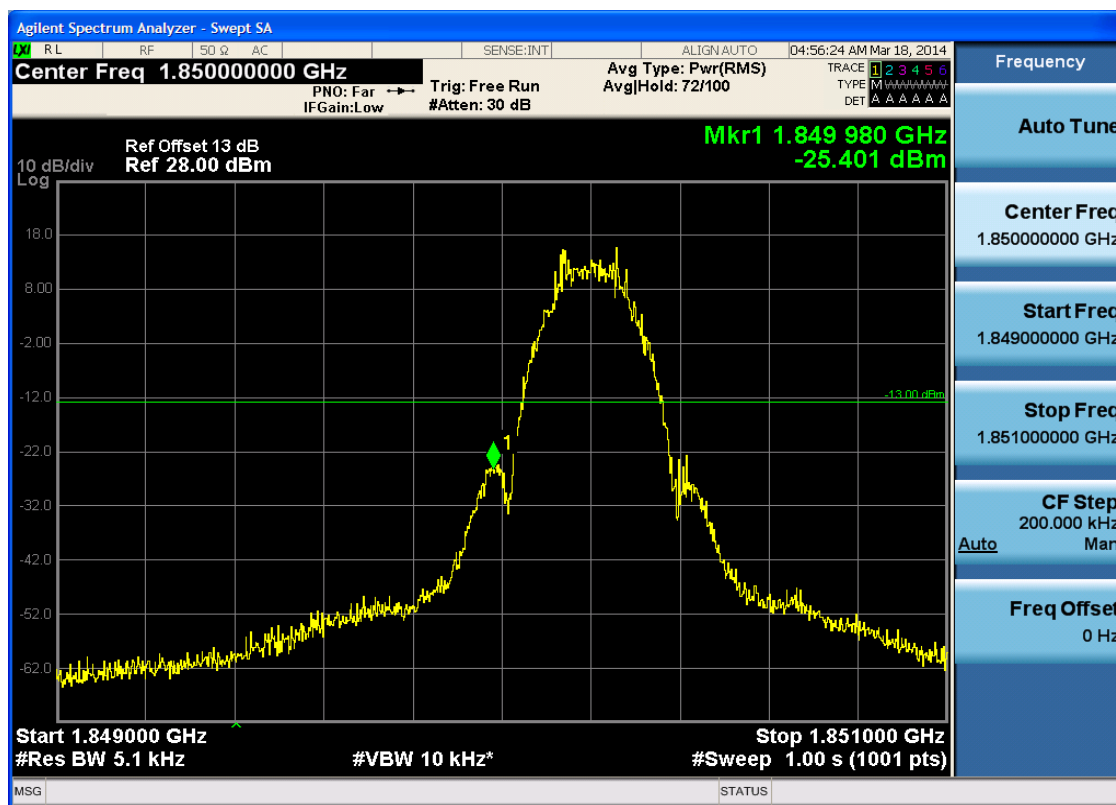


## 5.1.2.1.2 Test Channel = HCH

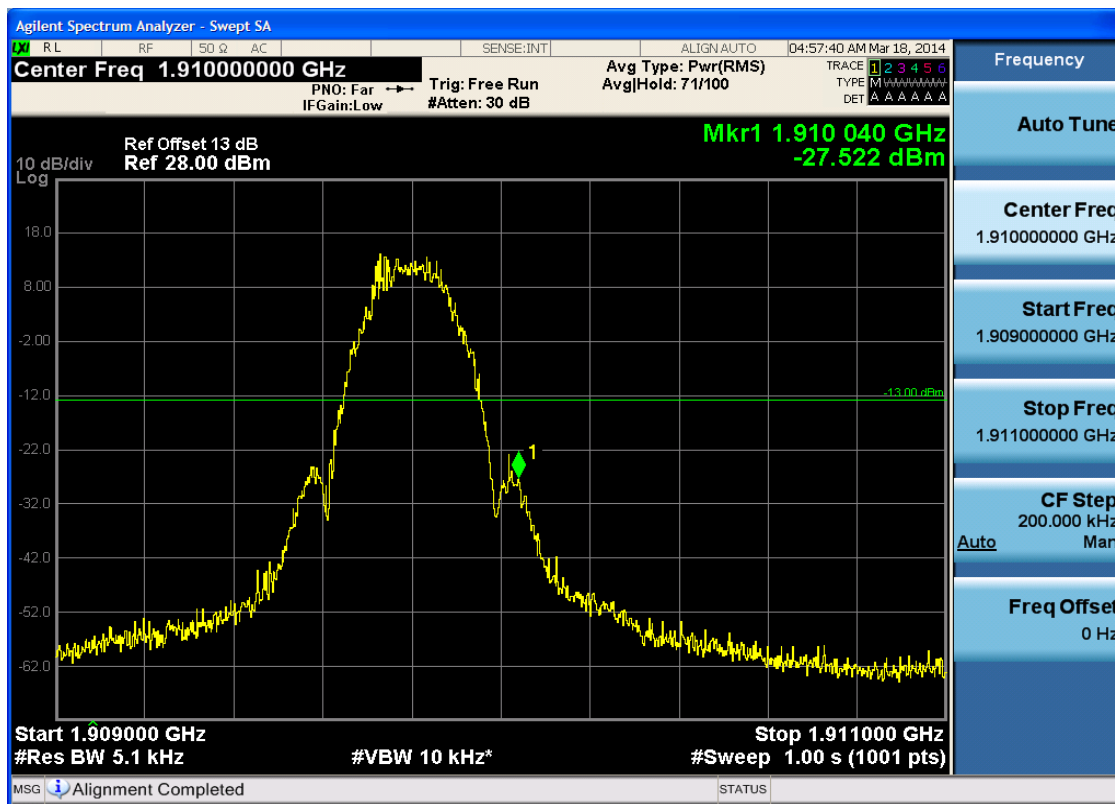


### 5.1.2.2 Test Mode = GSM/TM2

#### 5.1.2.2.1 Test Channel = LCH



### 5.1.2.2.2 Test Channel = HCH

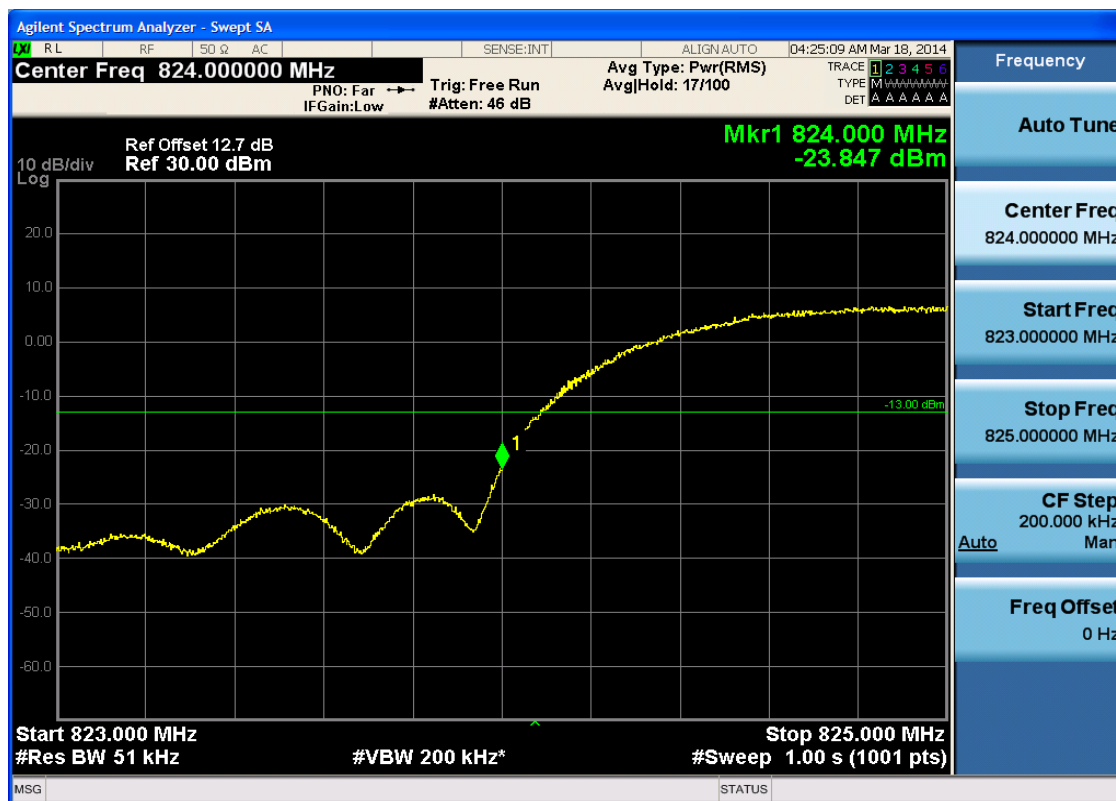


## 5.2 For UMTS

### 5.2.1 Test Band = WCDMA850

#### 5.2.1.1 Test Mode = UMTS/TM1

##### 5.2.1.1.1 Test Channel = LCH



### 5.2.1.1.2 Test Channel = HCH

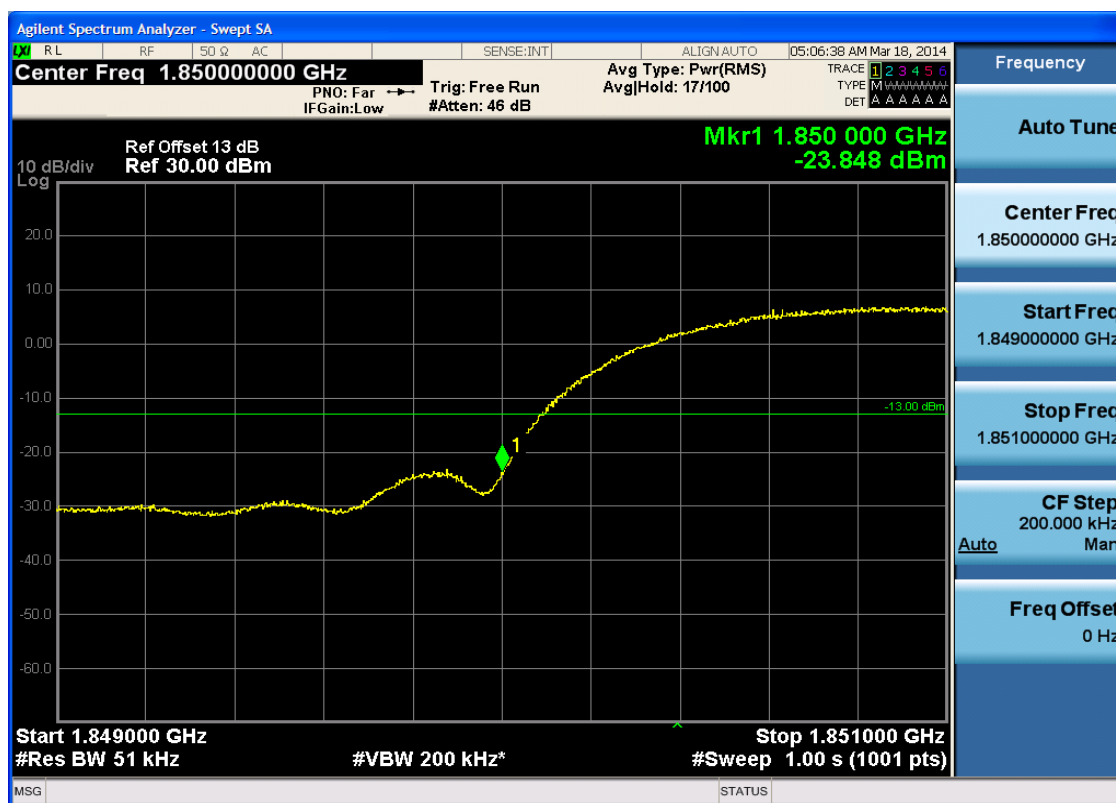




## 5.2.2 Test Band = WCDMA1900

### 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.

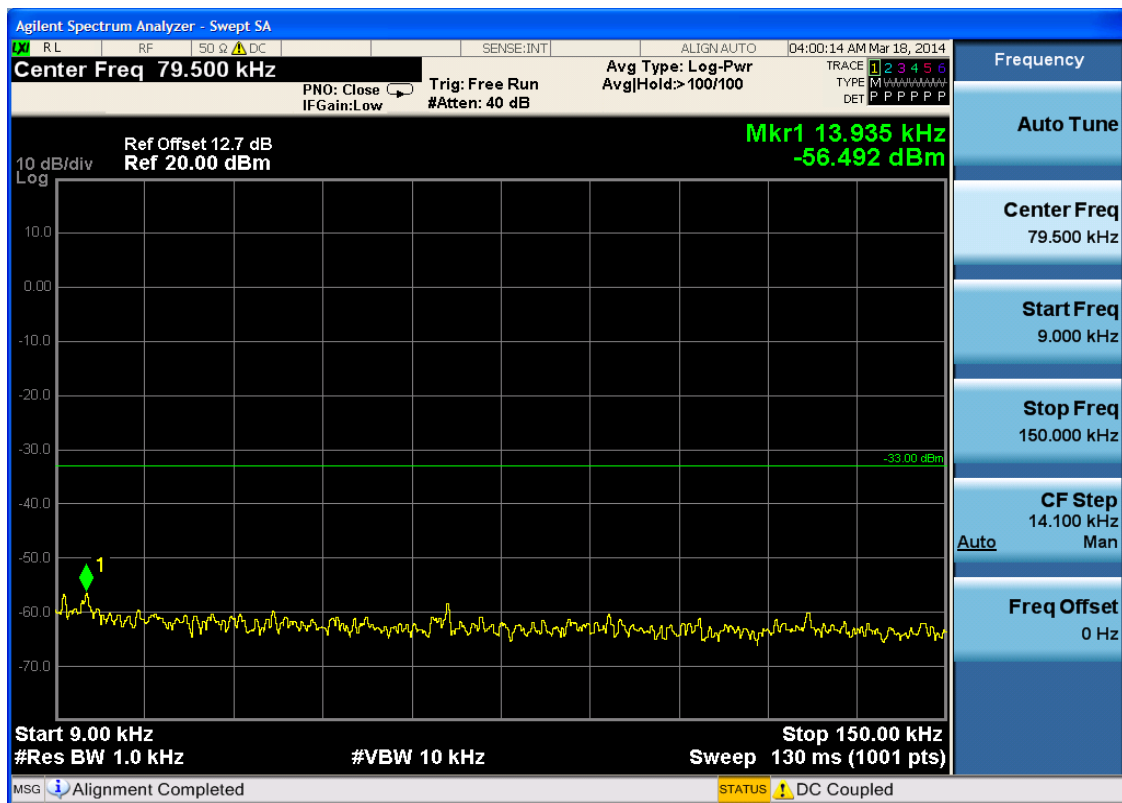
### Part I - Test Plots

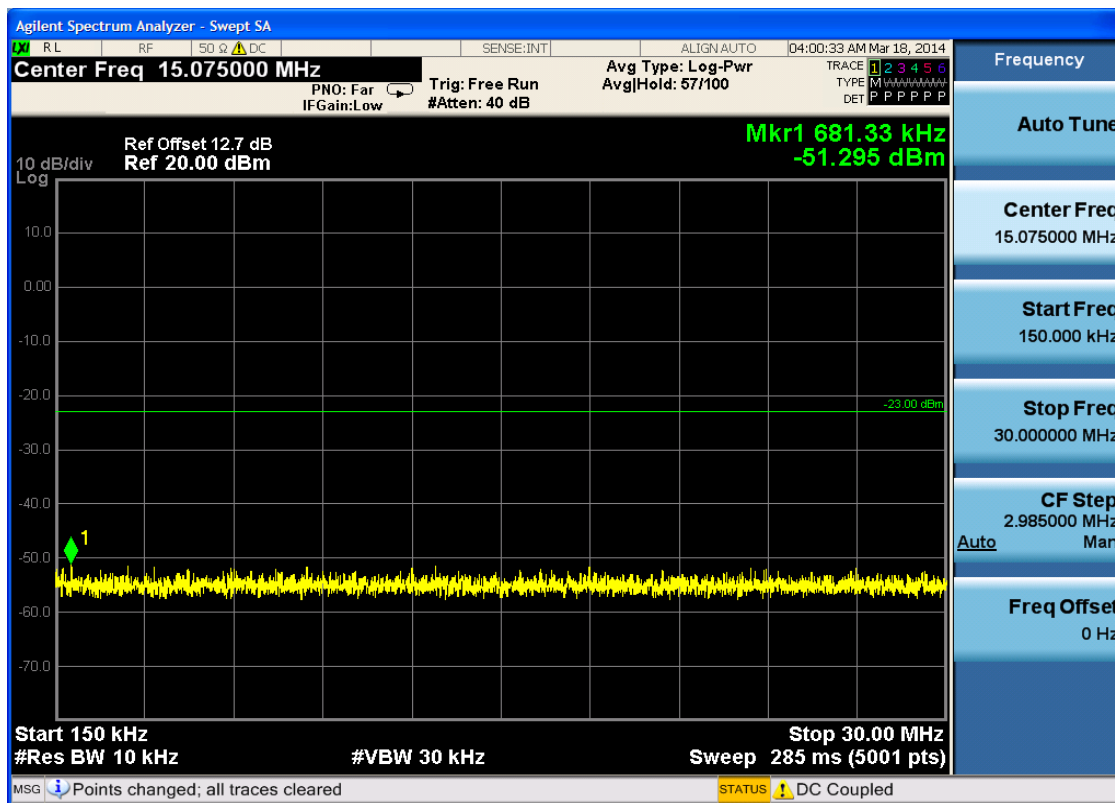
#### 6.1 For GSM

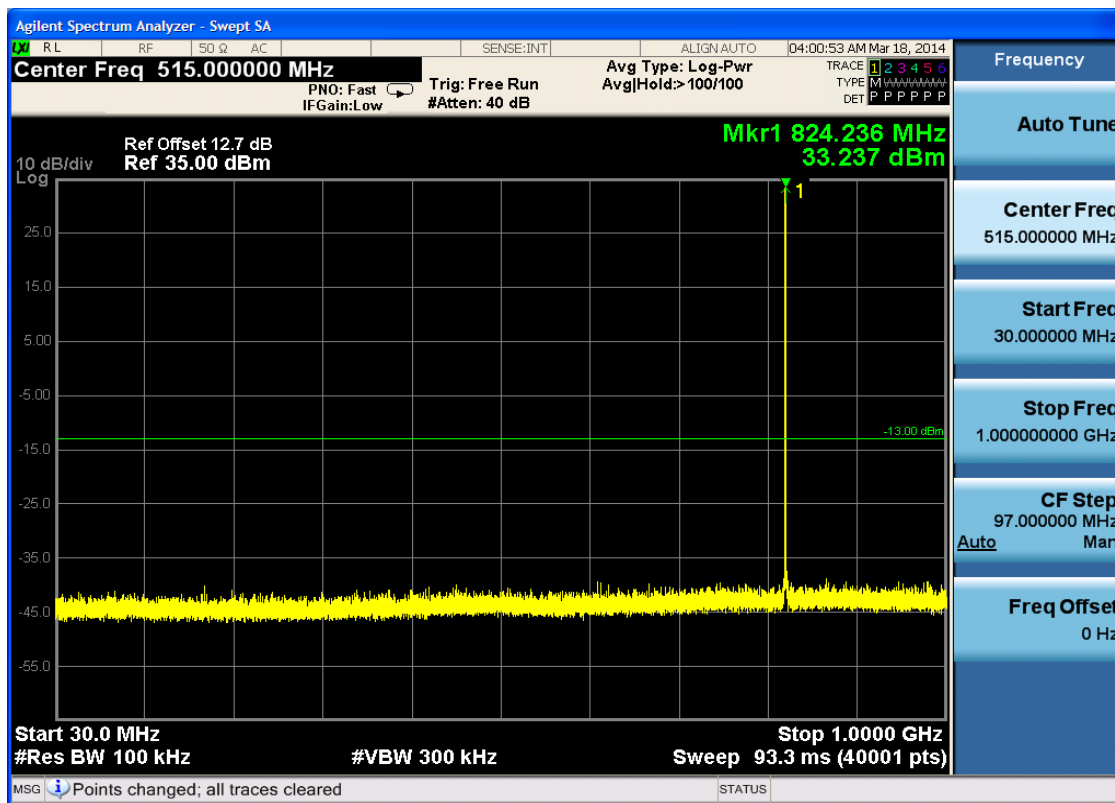
##### 6.1.1 Test Band = GSM850

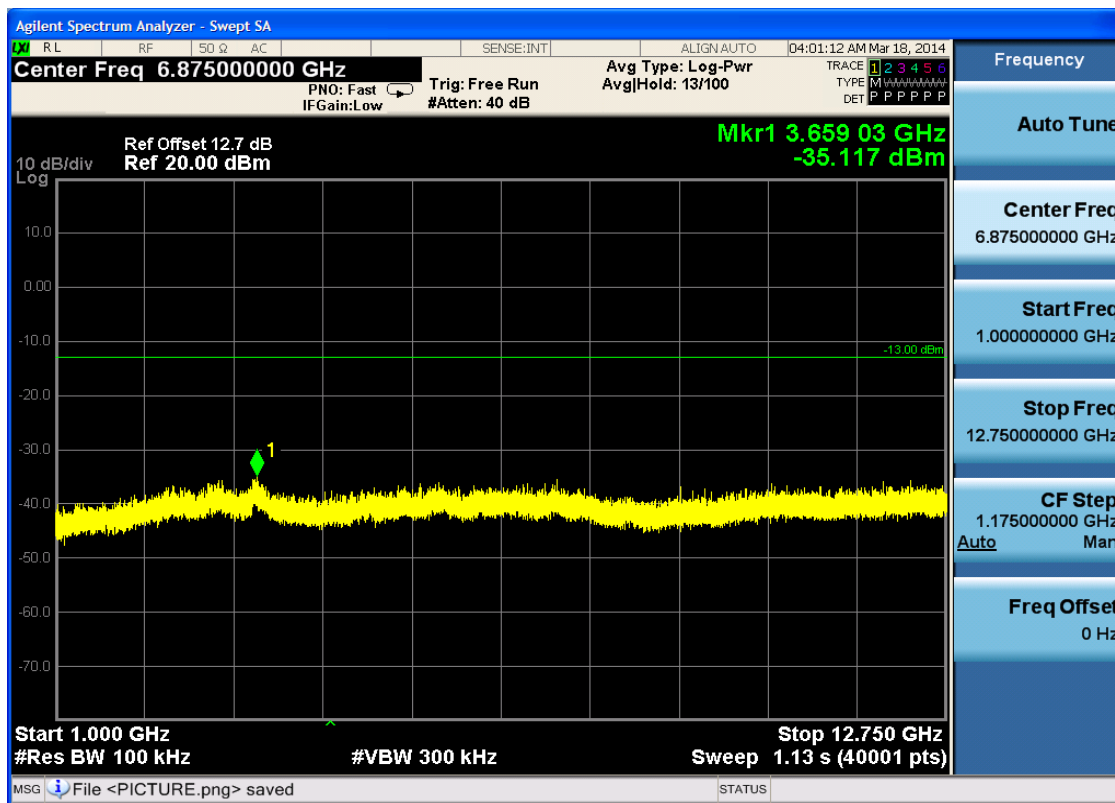
##### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH











**Agilent Spectrum Analyzer - Swept SA**

RL RF 50 Ω DC SENSE:INT ALIGN:AUTO [04:01:33 AM Mar 18, 2014]

**Center Freq 79.500 kHz** PNO: Close Trig: Free Run Avg Type: Log-Pwr  
IFGain:Low #Atten: 40 dB Avg|Hold:> 100/100

TRACE 1 2 3 4 5 6 TYPE M W W W W W W W W DET P P P P P P

Ref Offset 12.7 dB  
Ref 20.00 dBm

Mkr1 20.985 kHz  
-58.611 dBm

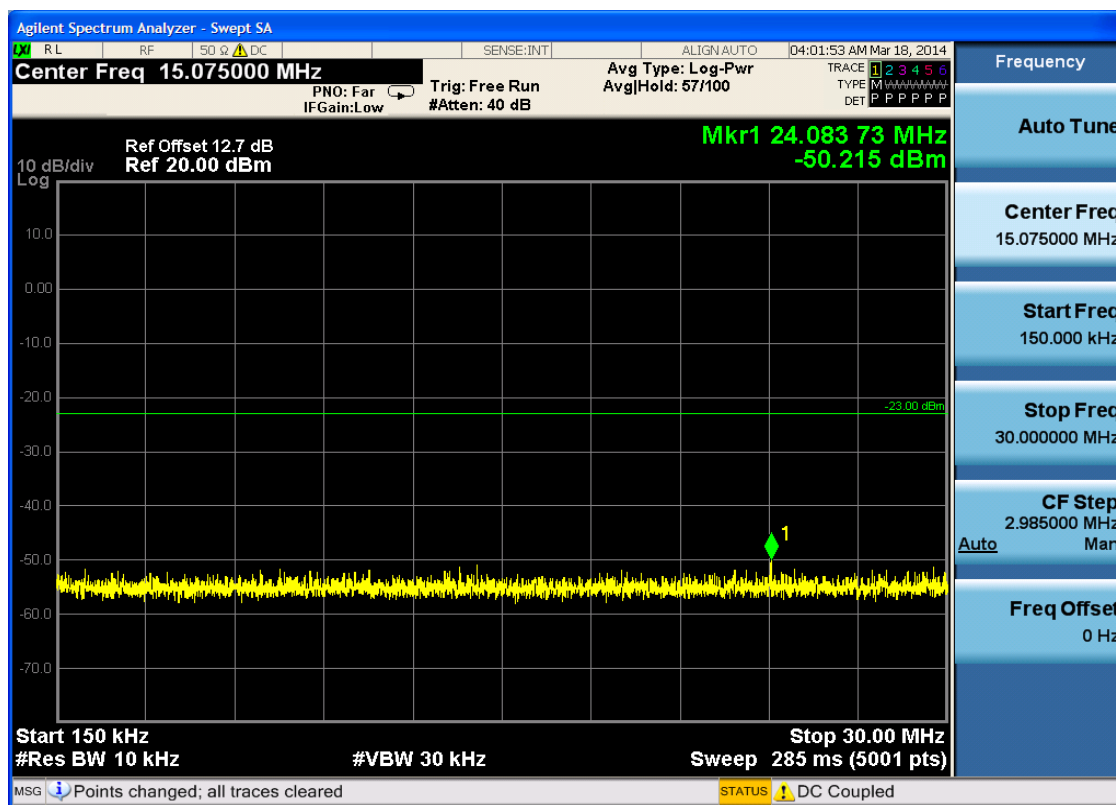
10 dB/div  
Log

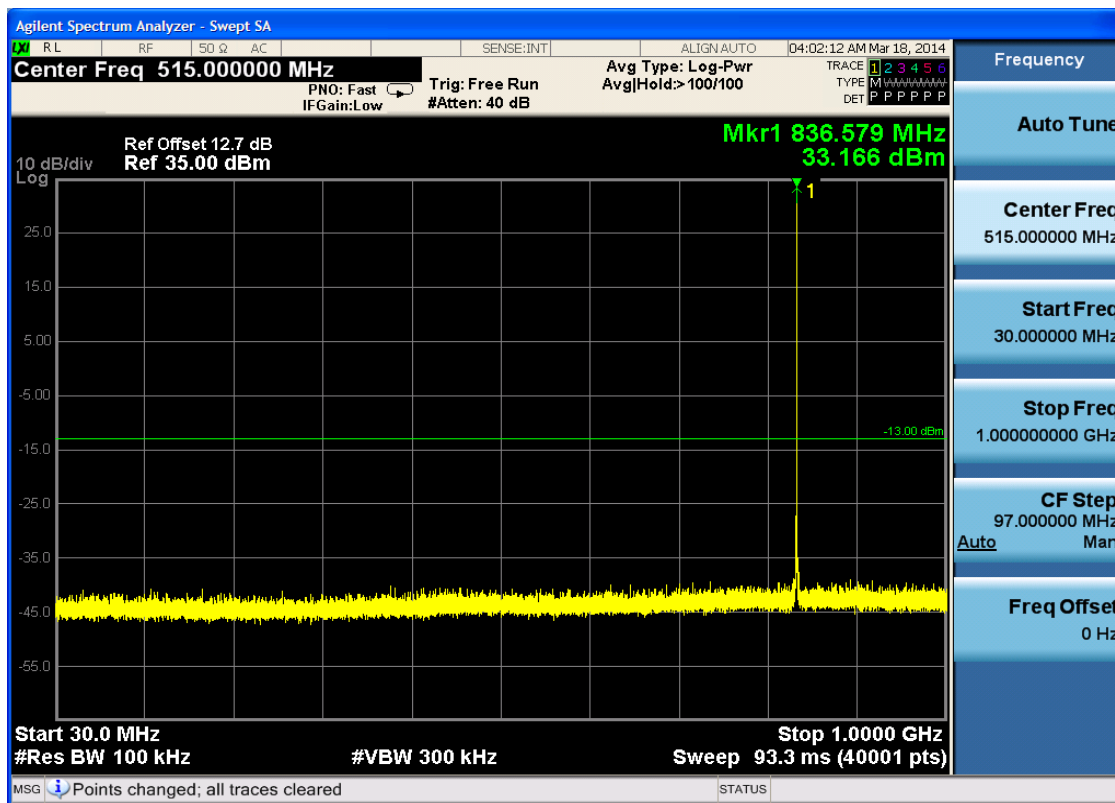
-33.00 dBm

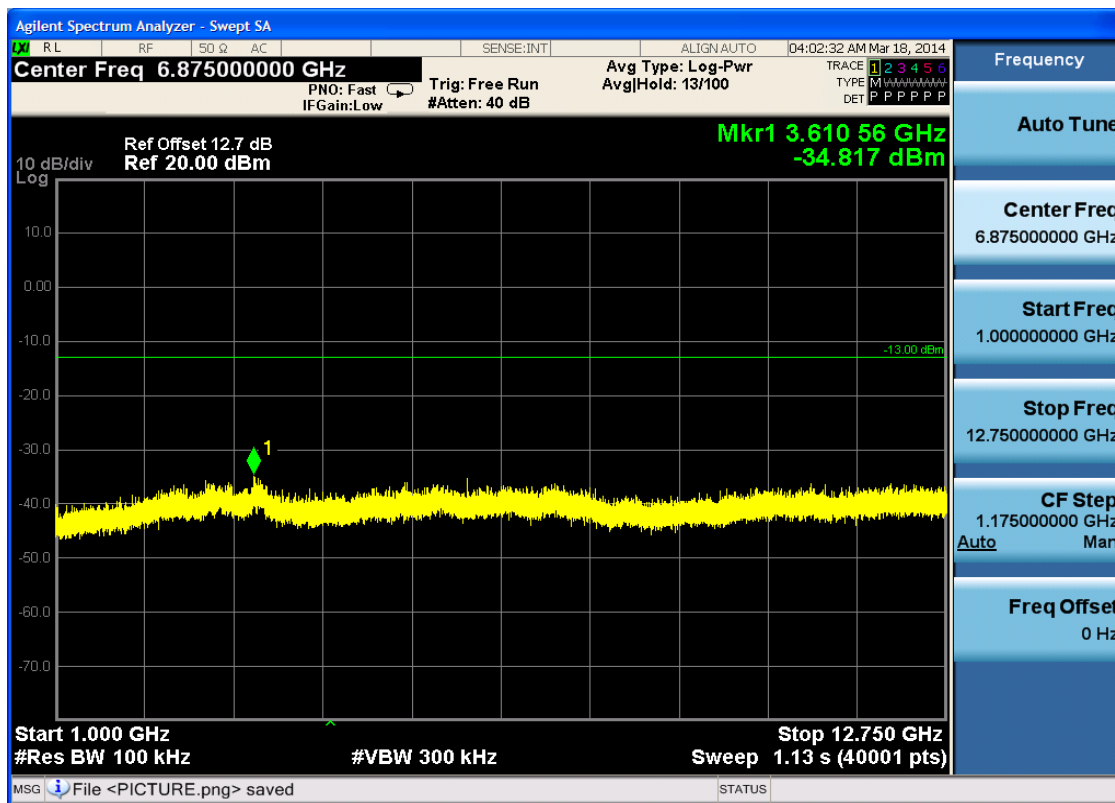
**Start 9.00 kHz** **Stop 150.00 kHz**  
**#Res BW 1.0 kHz** **#VBW 10 kHz** **Sweep 130 ms (1001 pts)**

MSG Points changed; all traces cleared STATUS DC Coupled

| Frequency                    |
|------------------------------|
| Auto Tune                    |
| Center Freq<br>79.500 kHz    |
| Start Freq<br>9.000 kHz      |
| Stop Freq<br>150.000 kHz     |
| CF Step<br>14.100 kHz<br>Man |
| Freq Offset<br>0 Hz          |









**Agilent Spectrum Analyzer - Swept SA**

|         |    |         |           |            |                          |
|---------|----|---------|-----------|------------|--------------------------|
| Z F R L | RF | 50 Ω DC | SENSE:INT | ALIGN AUTO | 04:02:53 AM Mar 18, 2014 |
|---------|----|---------|-----------|------------|--------------------------|

**Center Freq 79.500 kHz**      PNO: Close IFGain:Low      Trig: Free Run #Atten: 40 dB      Avg Type: Log-Pwr AvgJHold:> 100/100      TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P P P P P P

Ref Offset 12.7 dB  
Ref 20.00 dBm

Mkr1 12.102 kHz  
-58.328 dBm

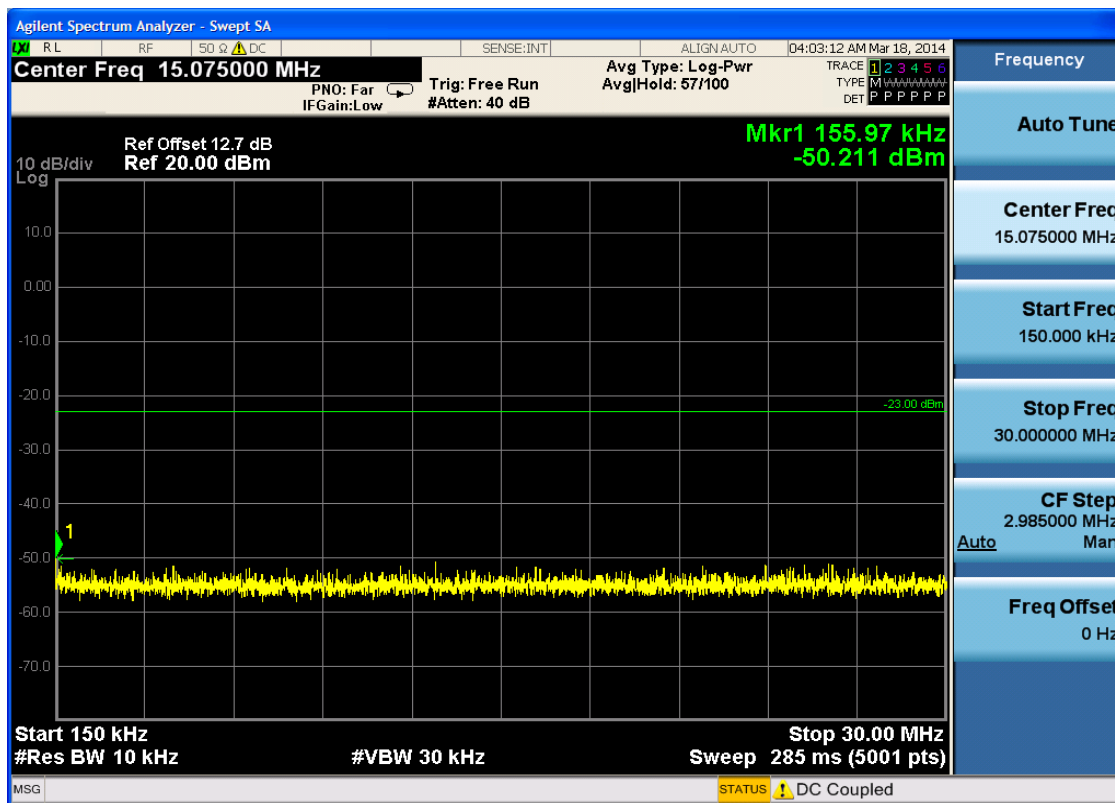
10 dB/div  
Log

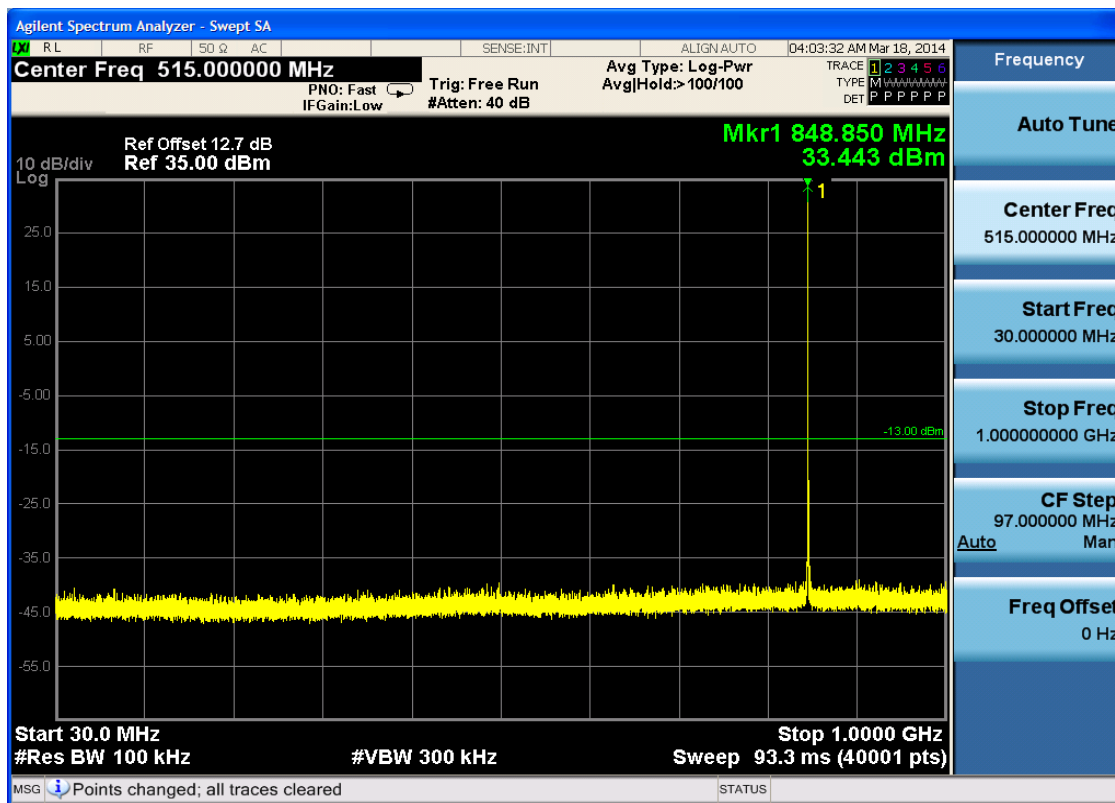
Start 9.00 kHz      Stop 150.00 kHz  
#Res BW 1.0 kHz      #VBW 10 kHz      Sweep 130 ms (1001 pts)

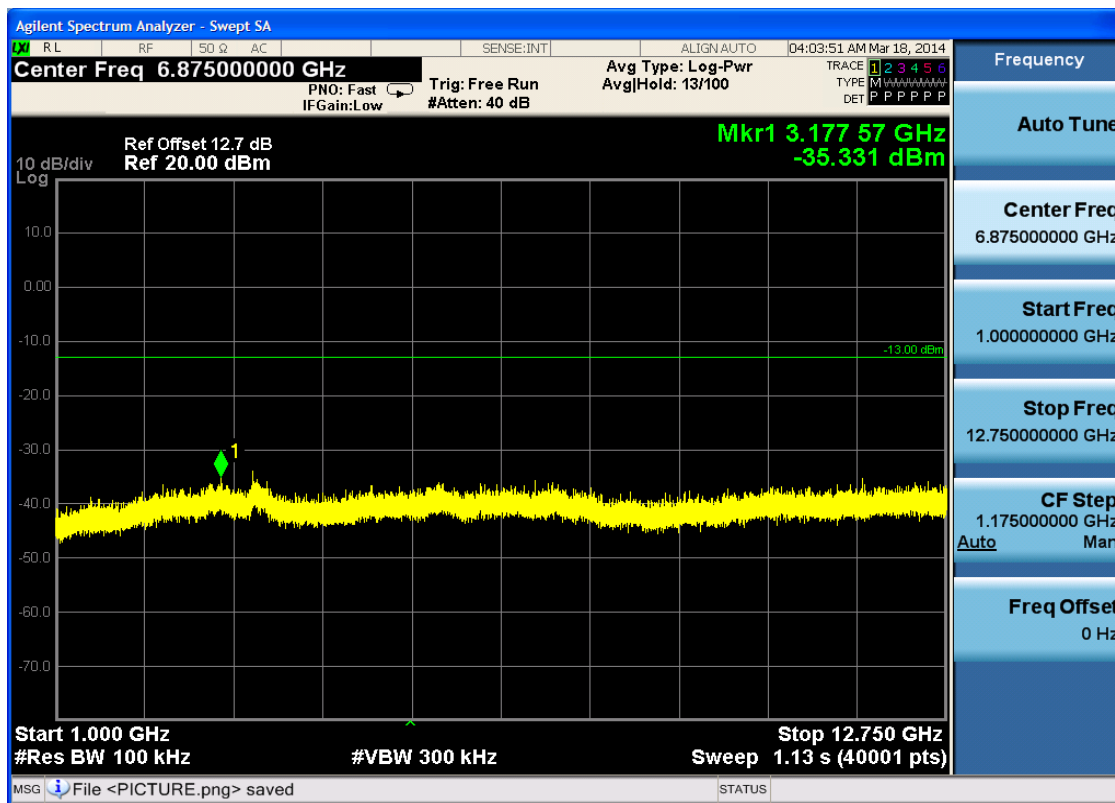
MSG ⓘ Points changed; all traces cleared      STATUS ⓘ DC Coupled

**Frequency**

- Auto Tune
- Center Freq 79.500 kHz
- Start Freq 9.000 kHz
- Stop Freq 150.000 kHz
- CF Step 14.100 kHz Man
- Freq Offset 0 Hz

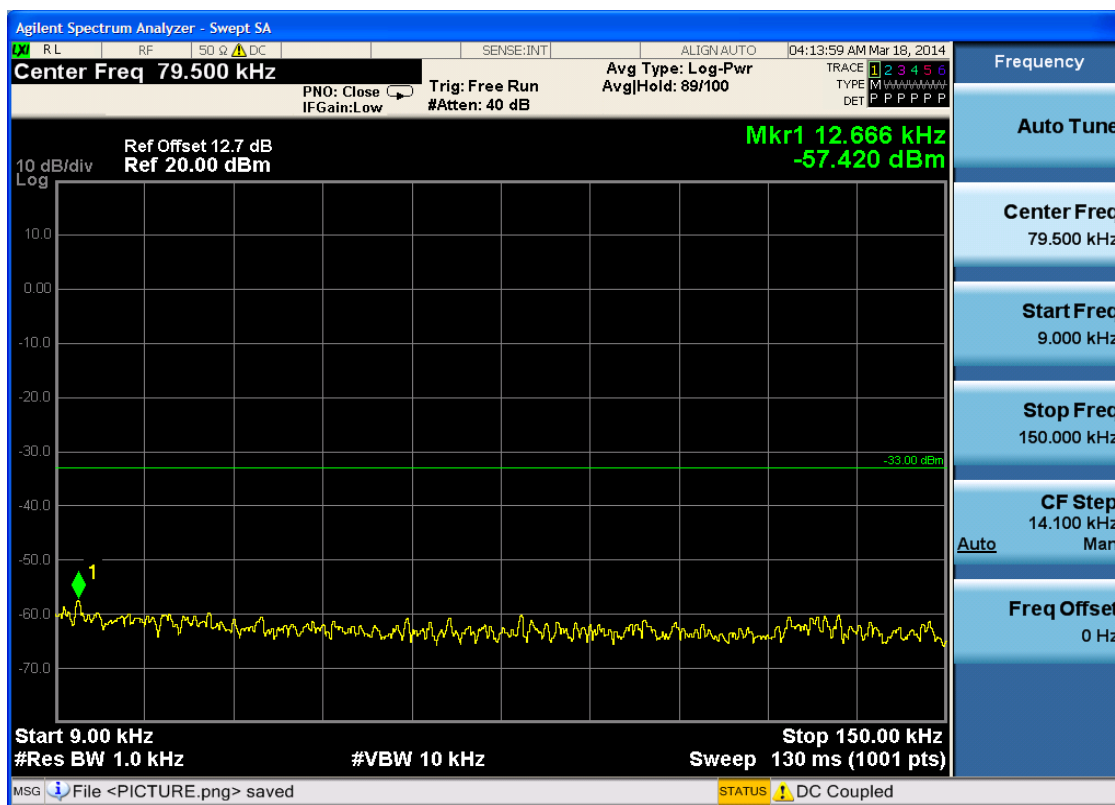


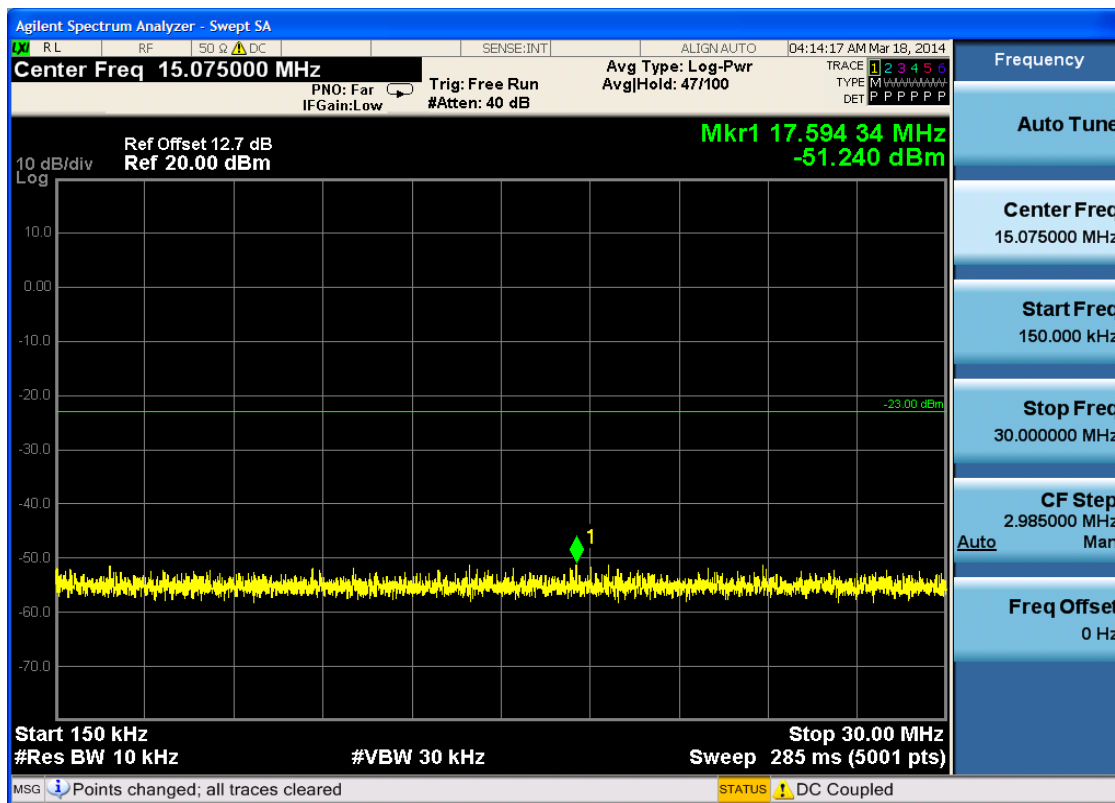


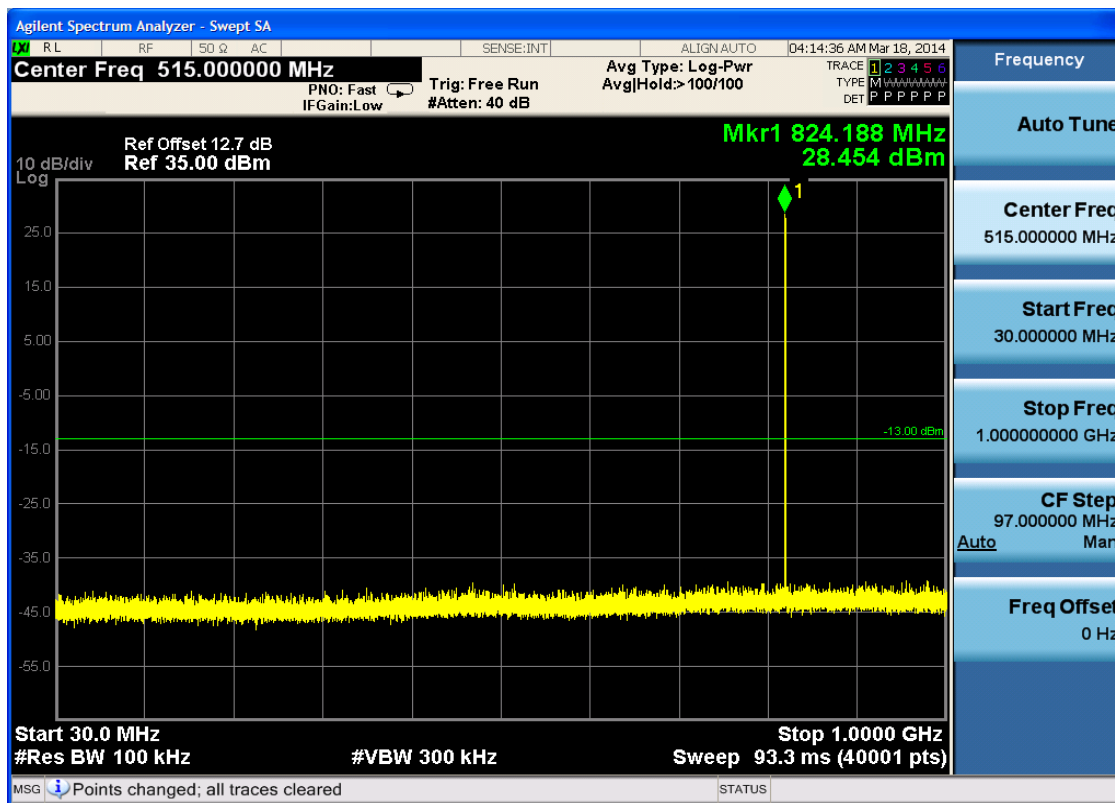


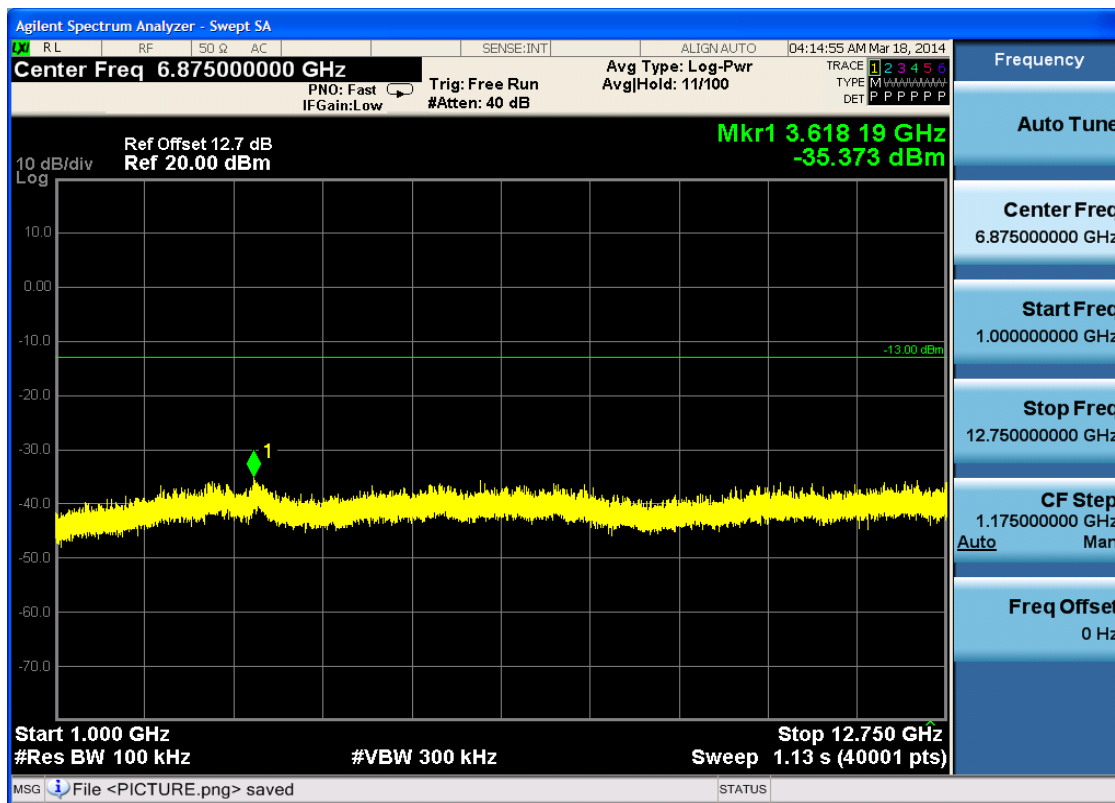
### 6.1.1.2 Test Mode = GSM/TM2

#### 6.1.1.2.1 Test Channel = LCH



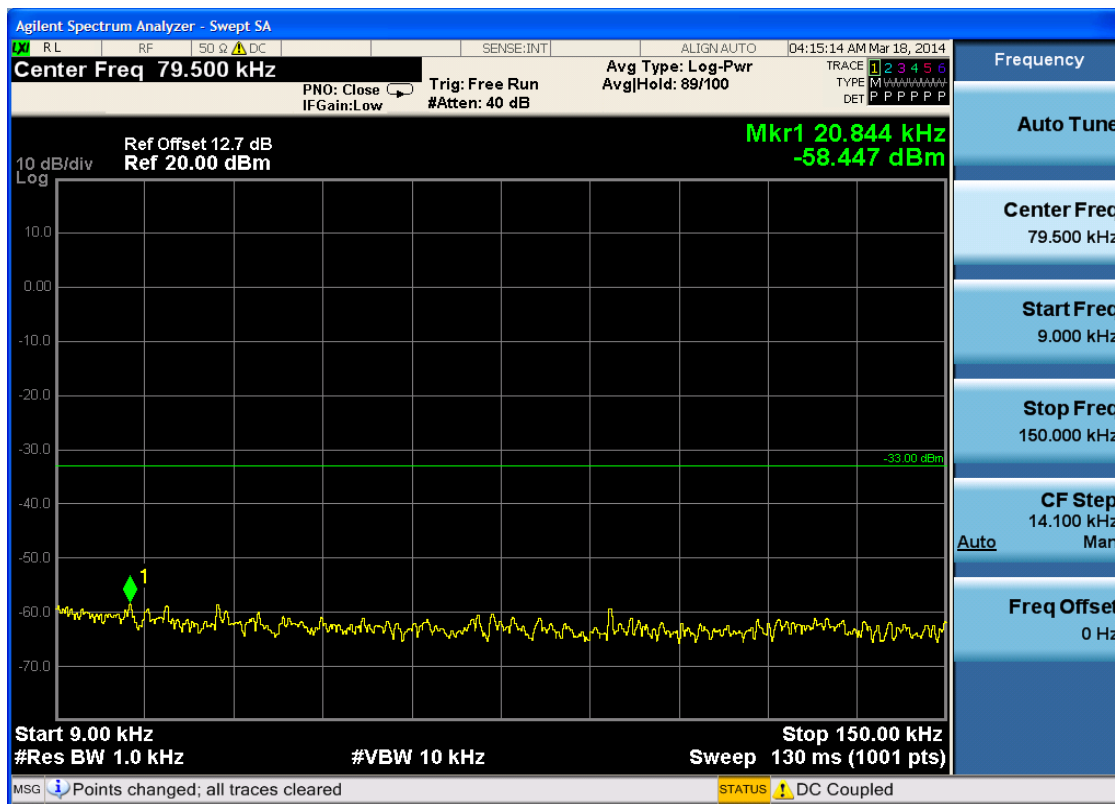


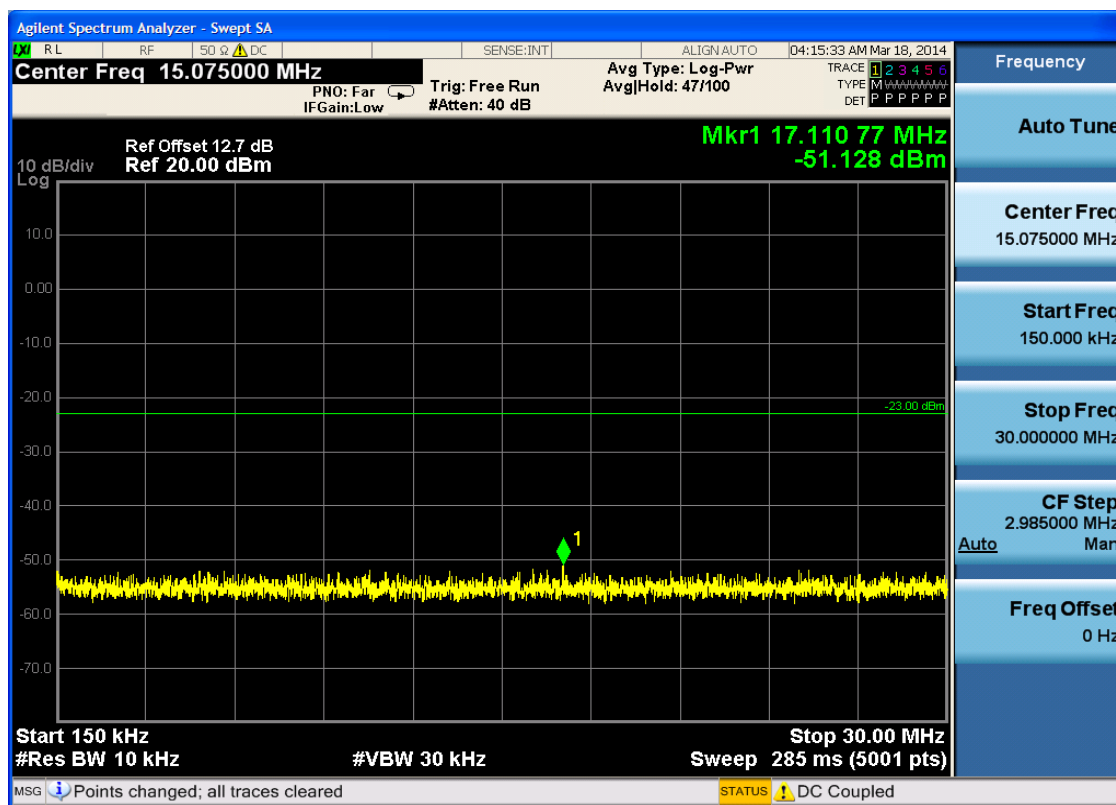


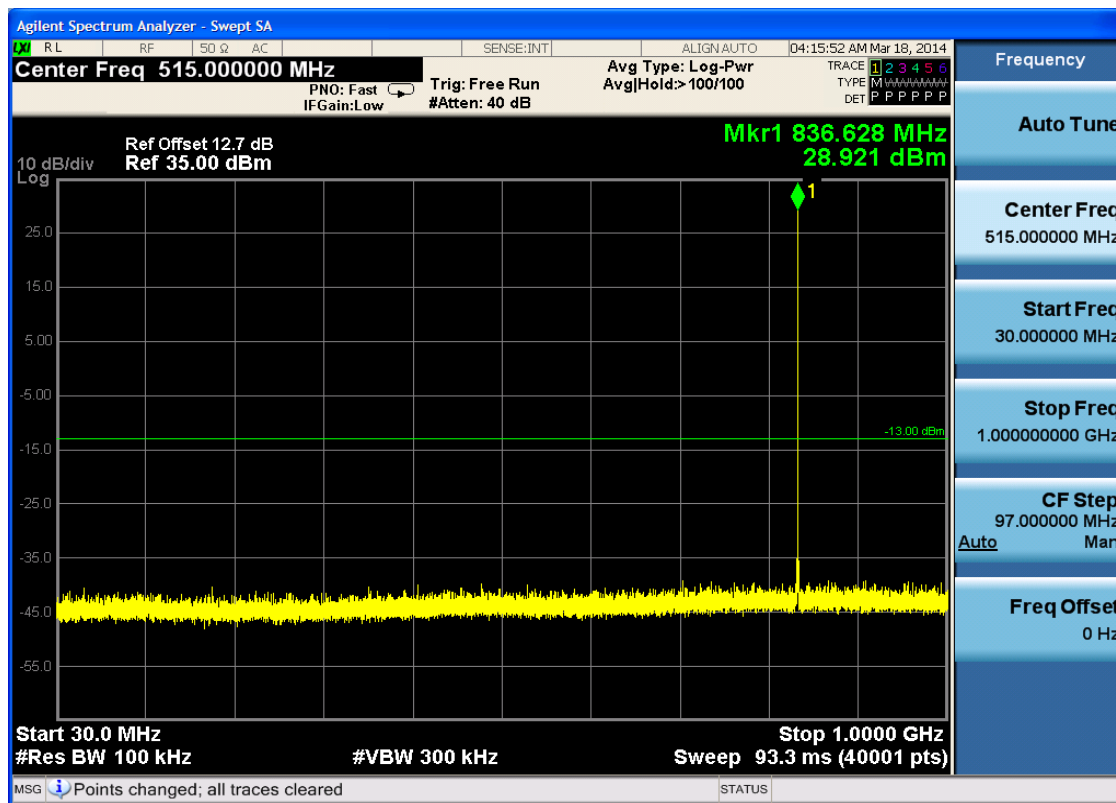


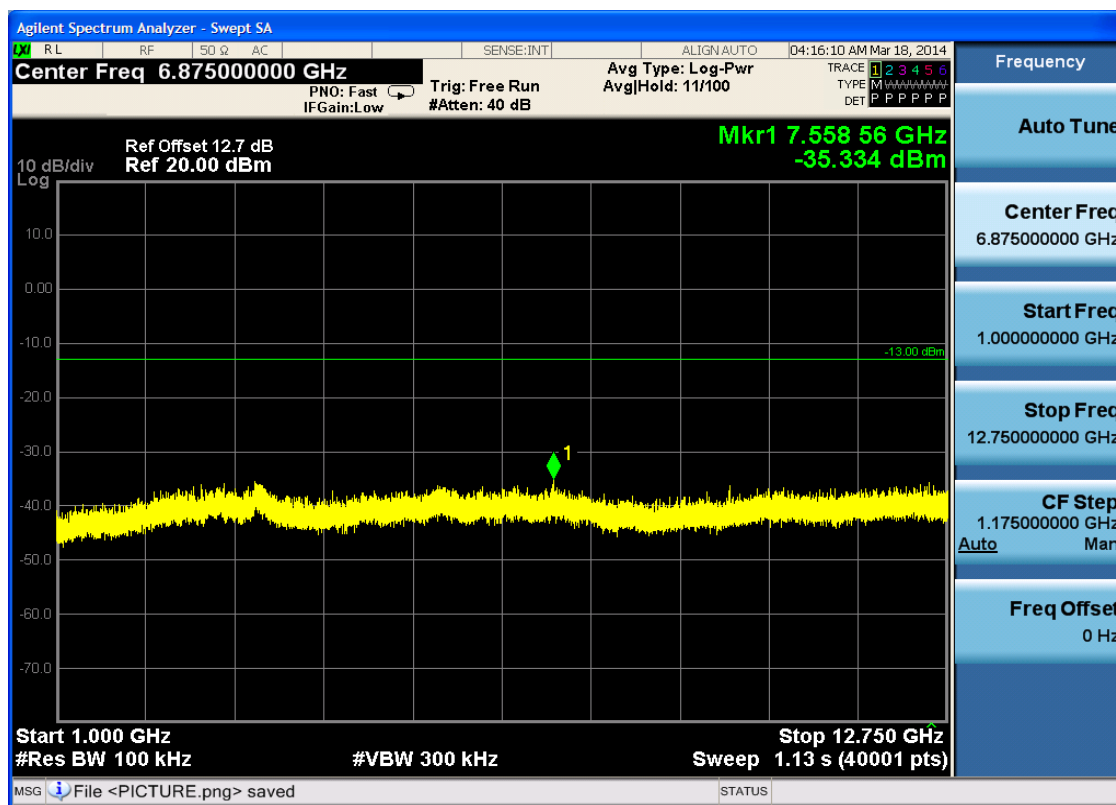


## 6.1.1.2.2 Test Channel = MCH



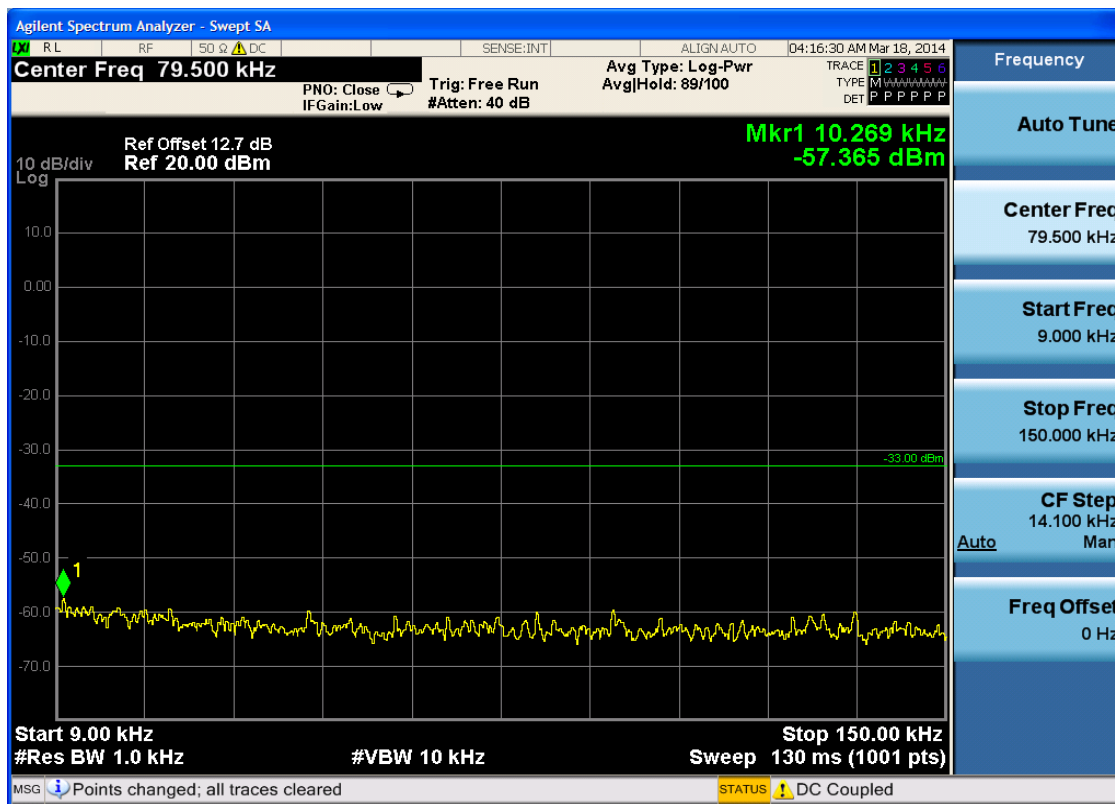


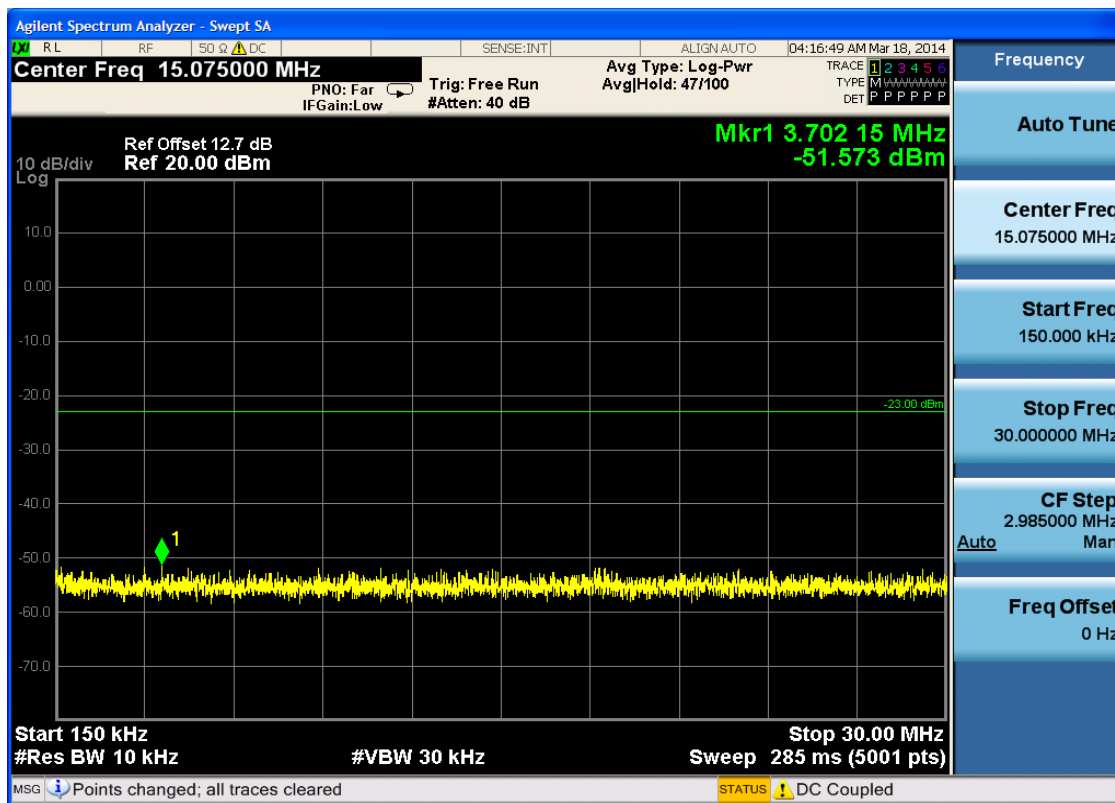


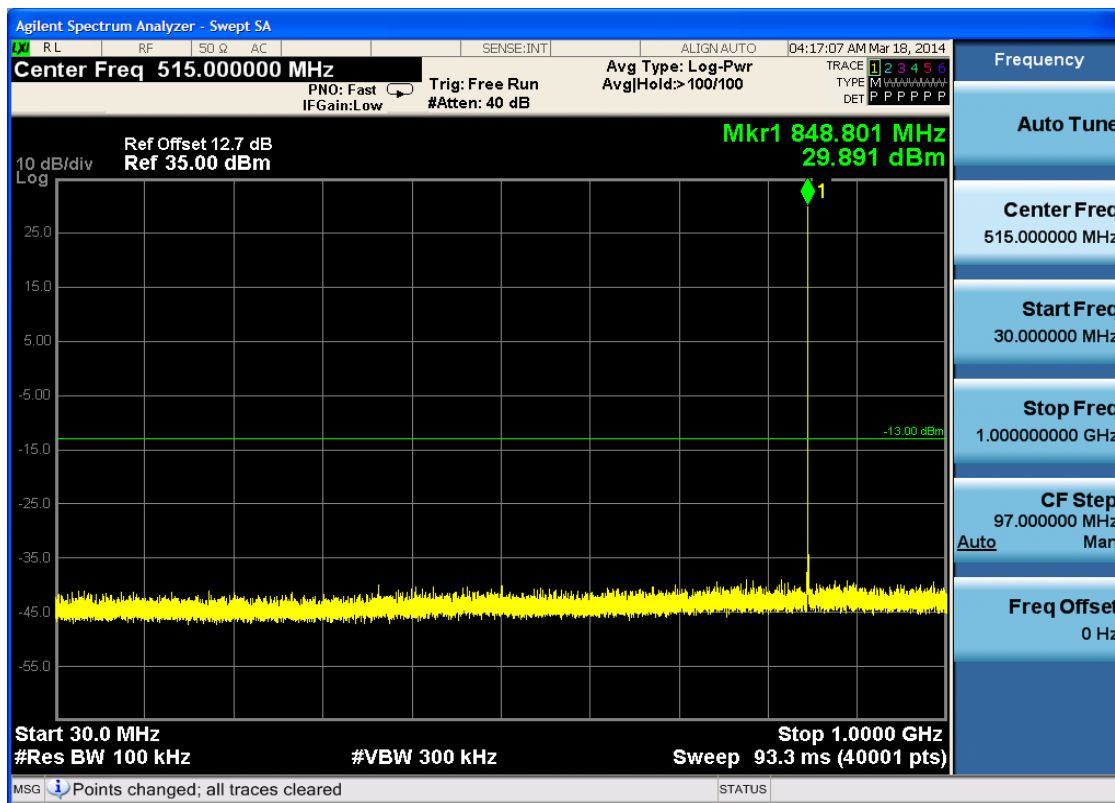


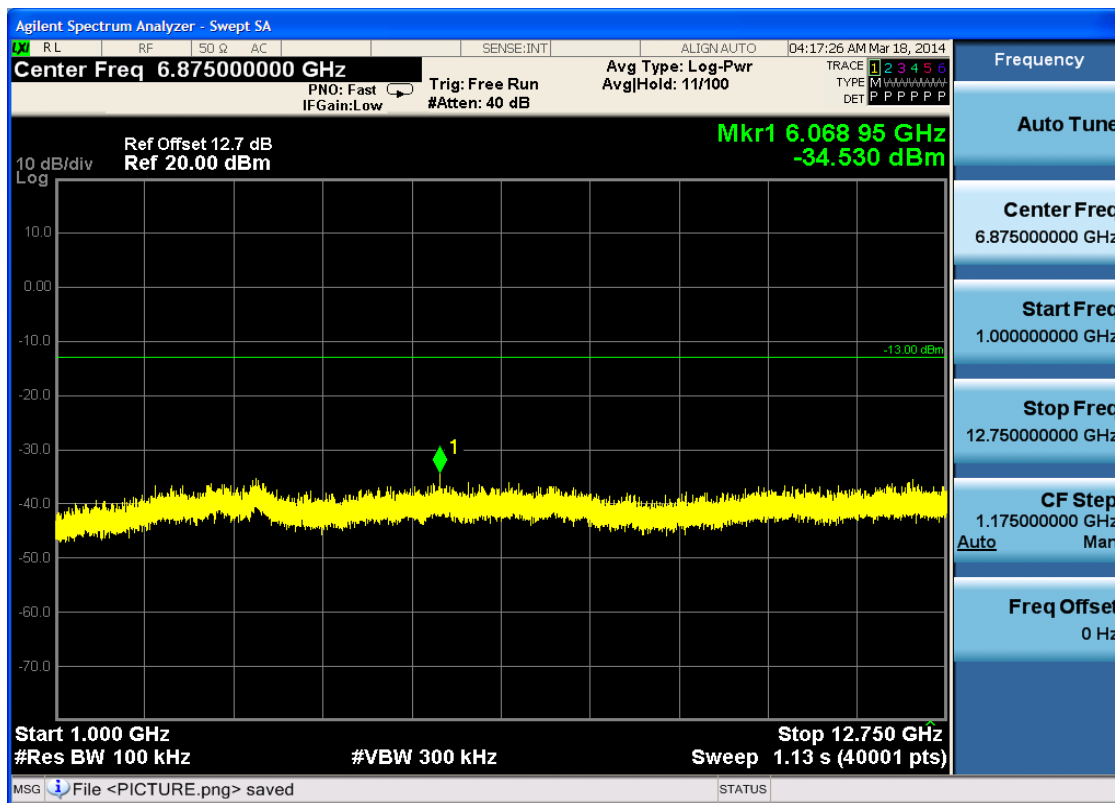


## 6.1.1.2.3 Test Channel = HCH







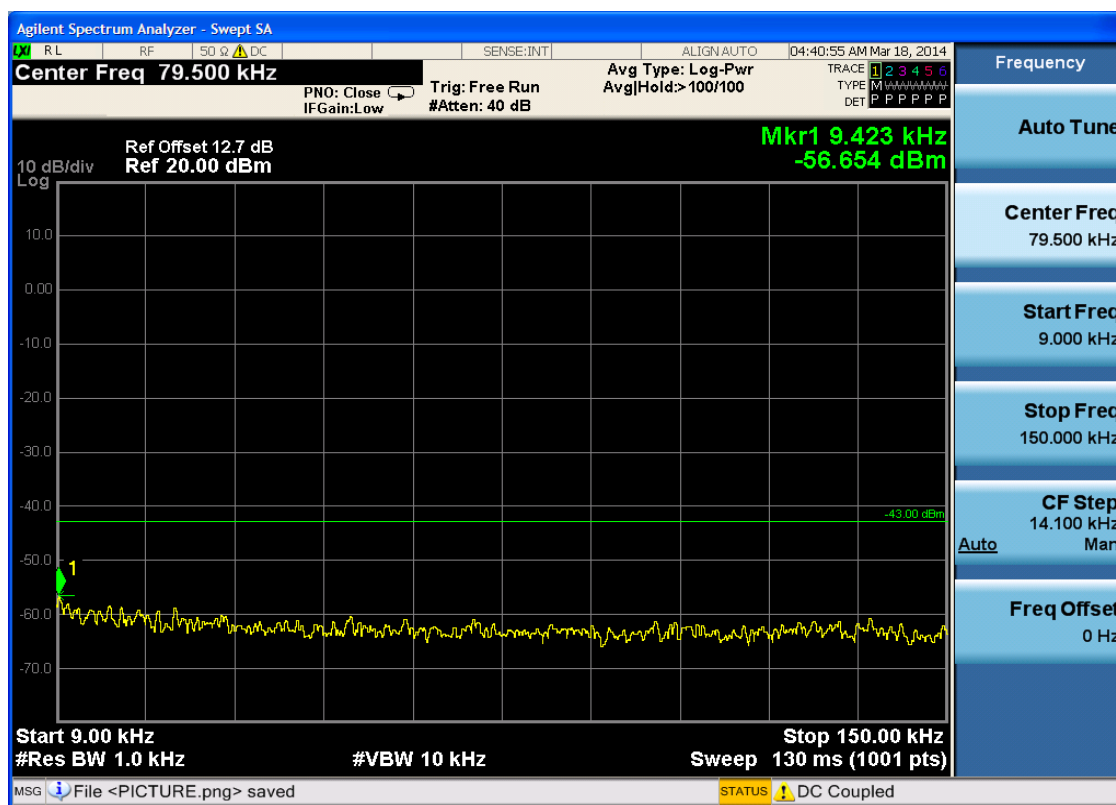


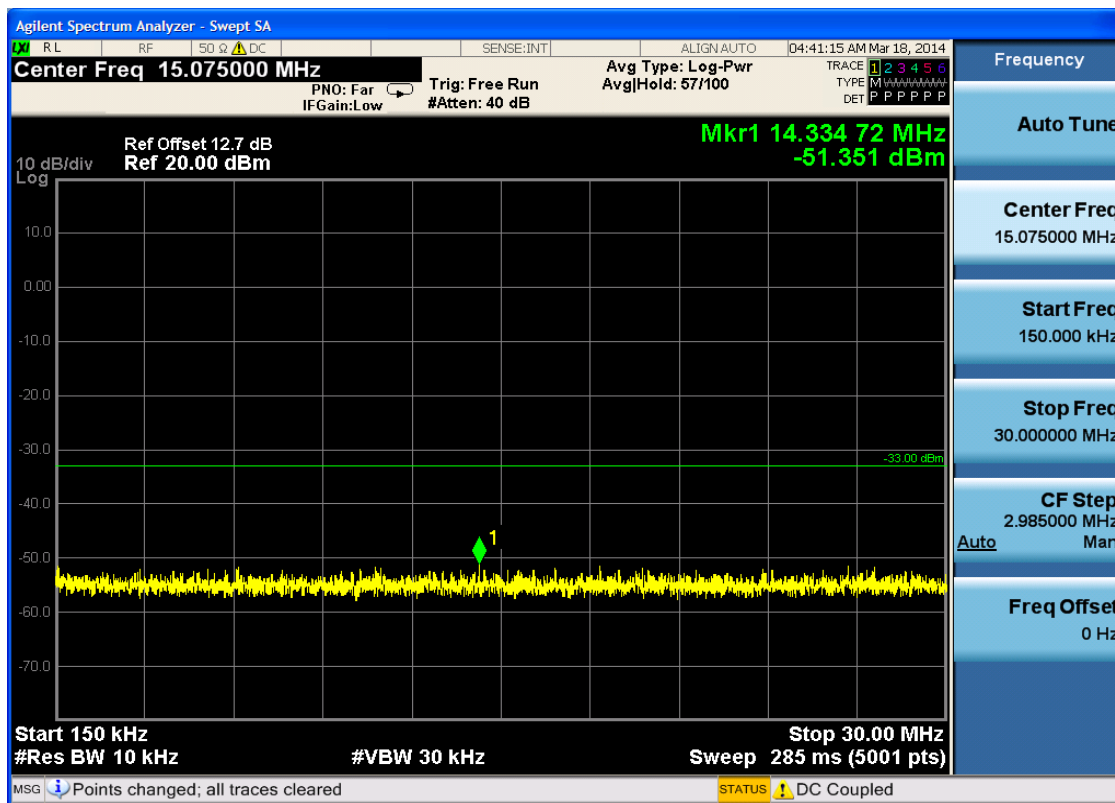


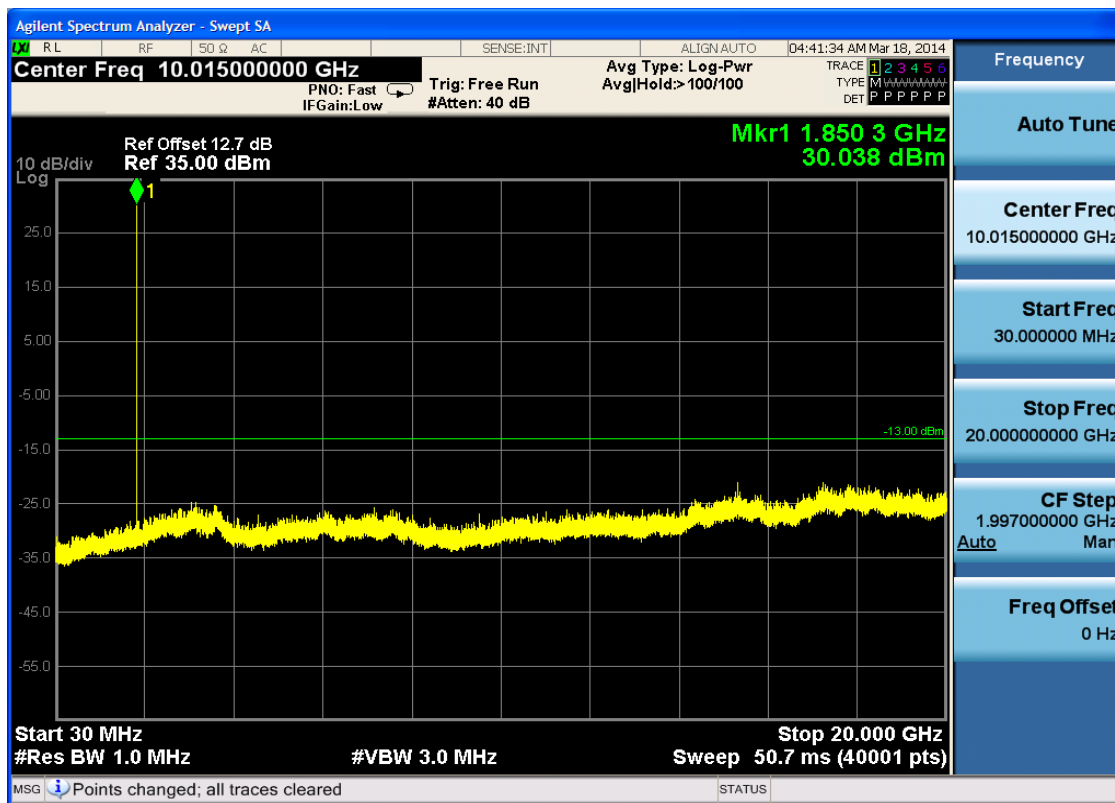
## 6.1.2 Test Band = GSM1900

### 6.1.2.1 Test Mode = GSM/TM1

#### 6.1.2.1.1 Test Channel = LCH

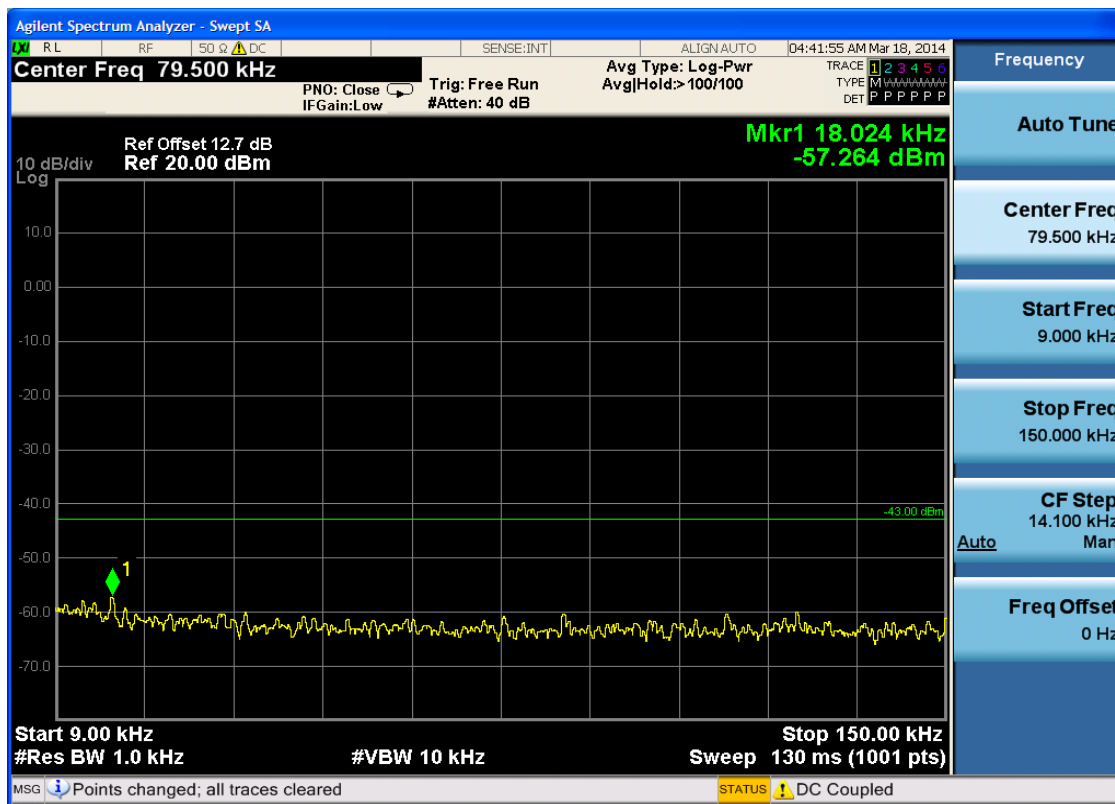


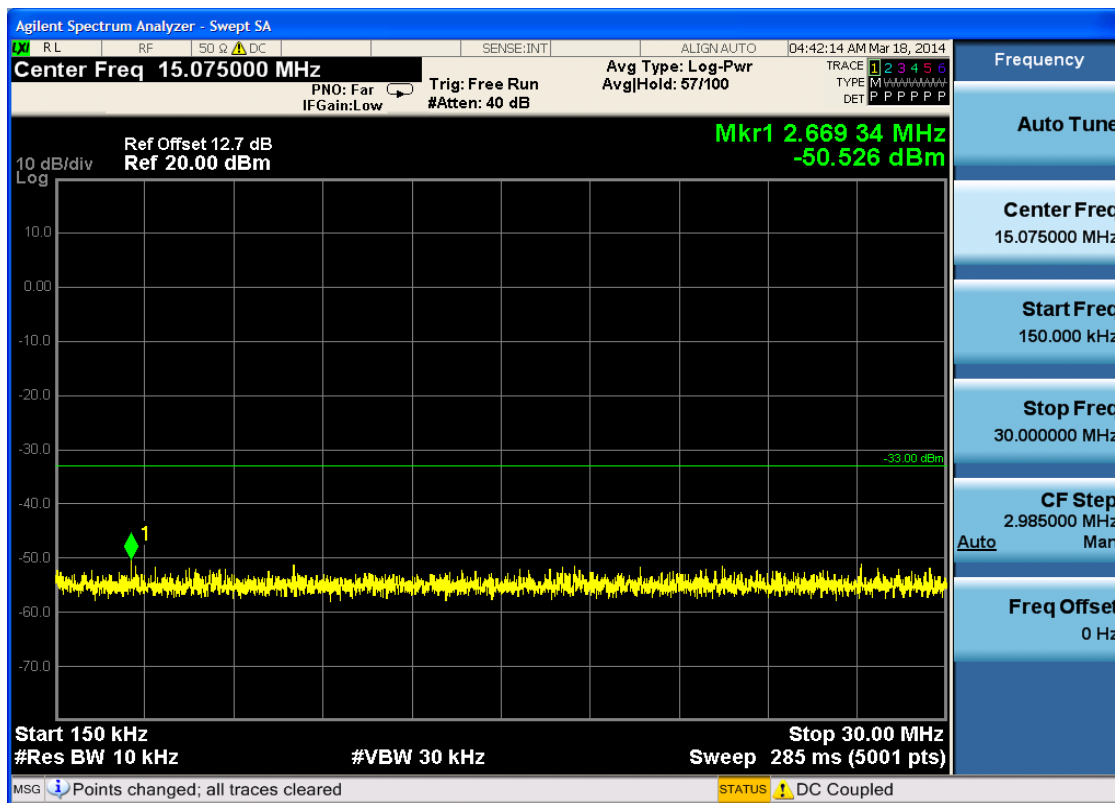


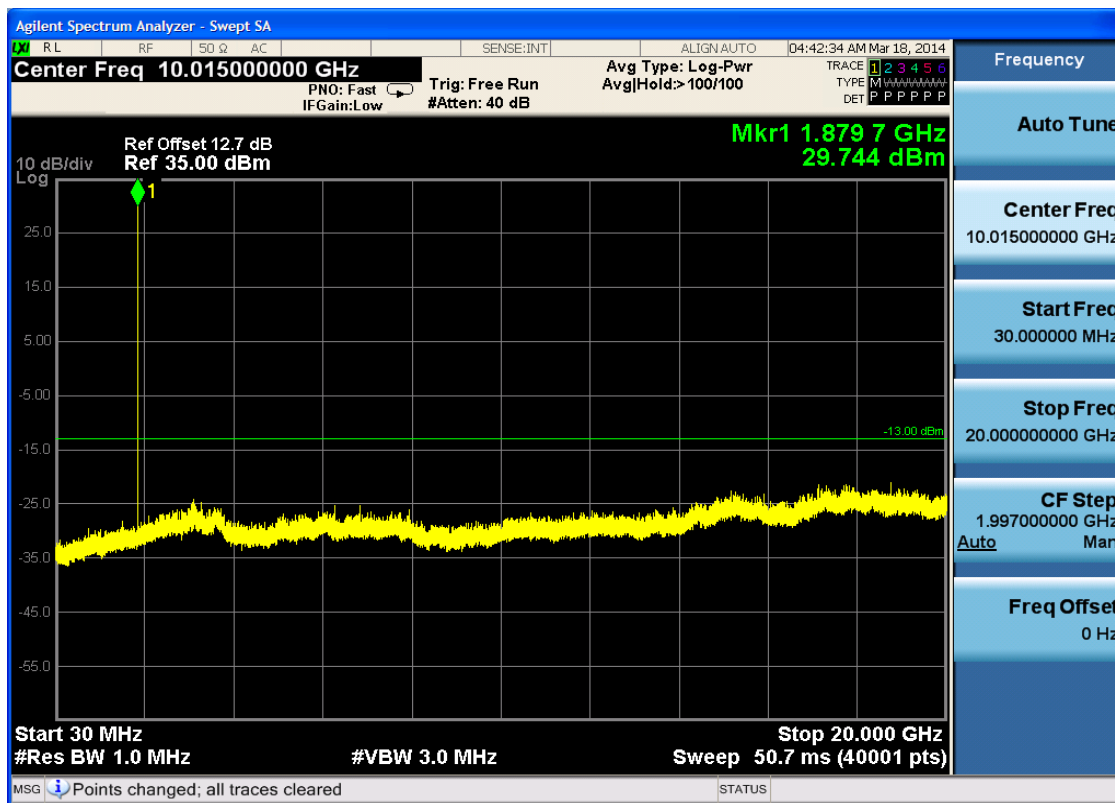




## 6.1.2.1.2 Test Channel = MCH

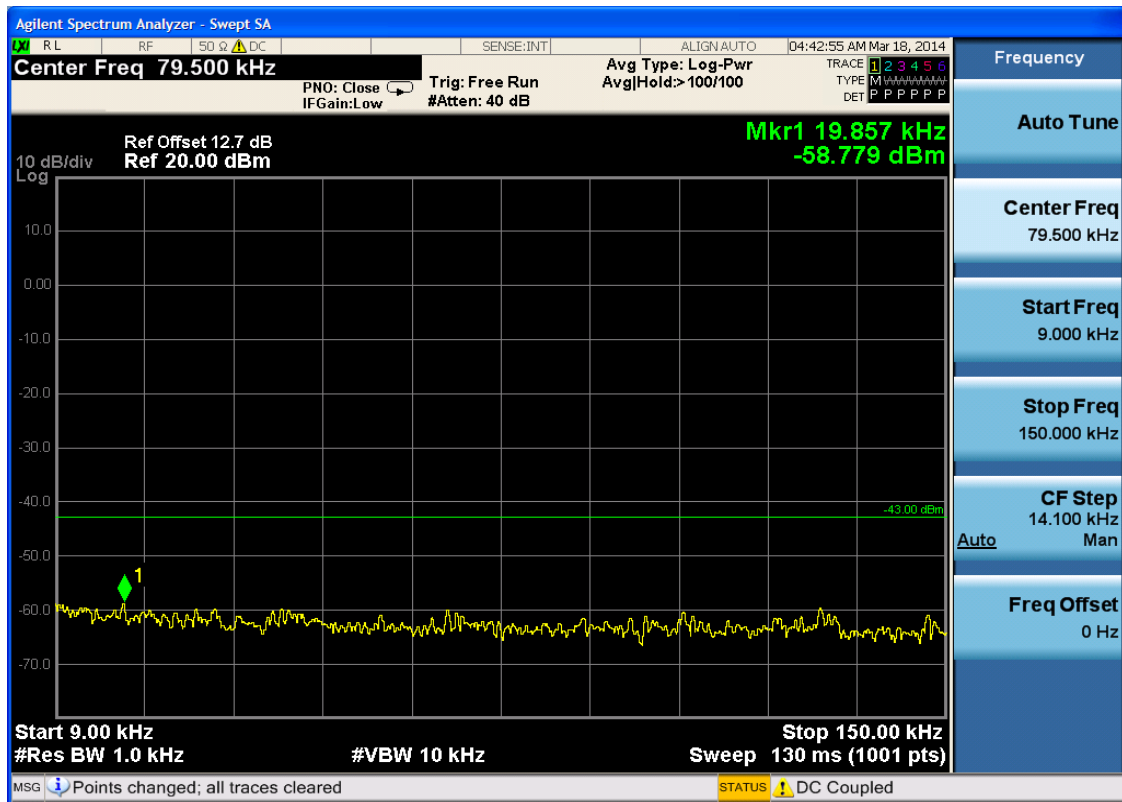


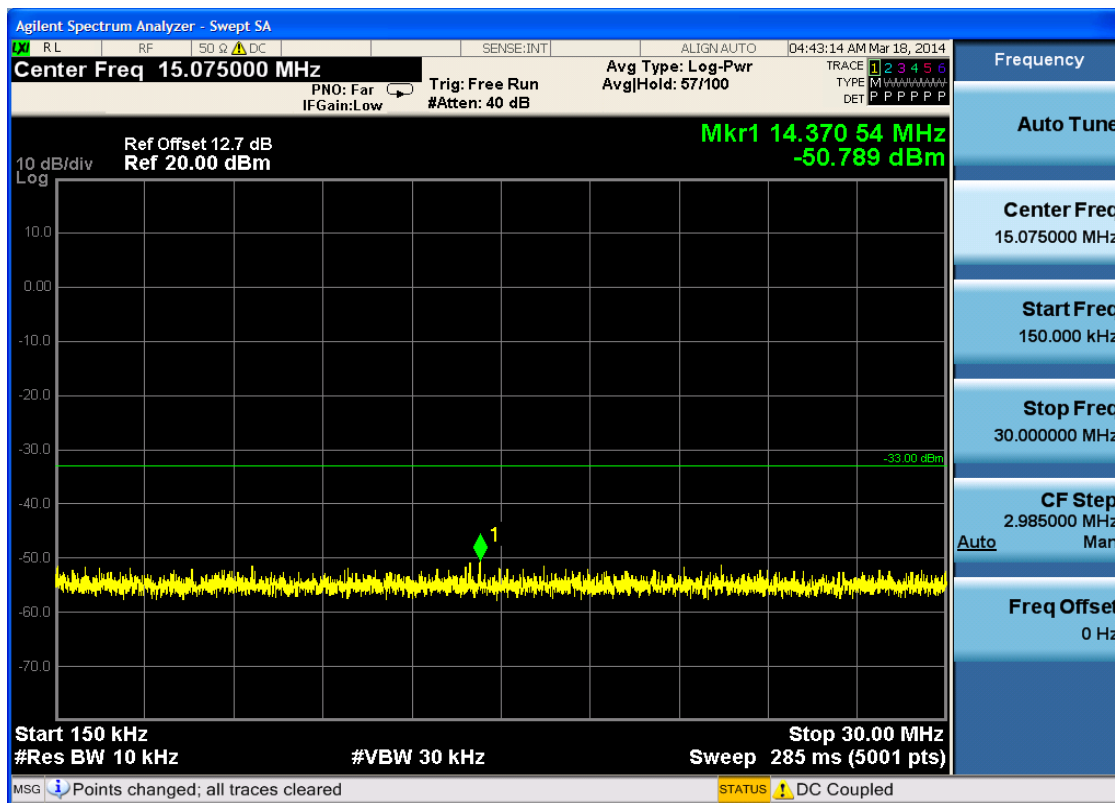


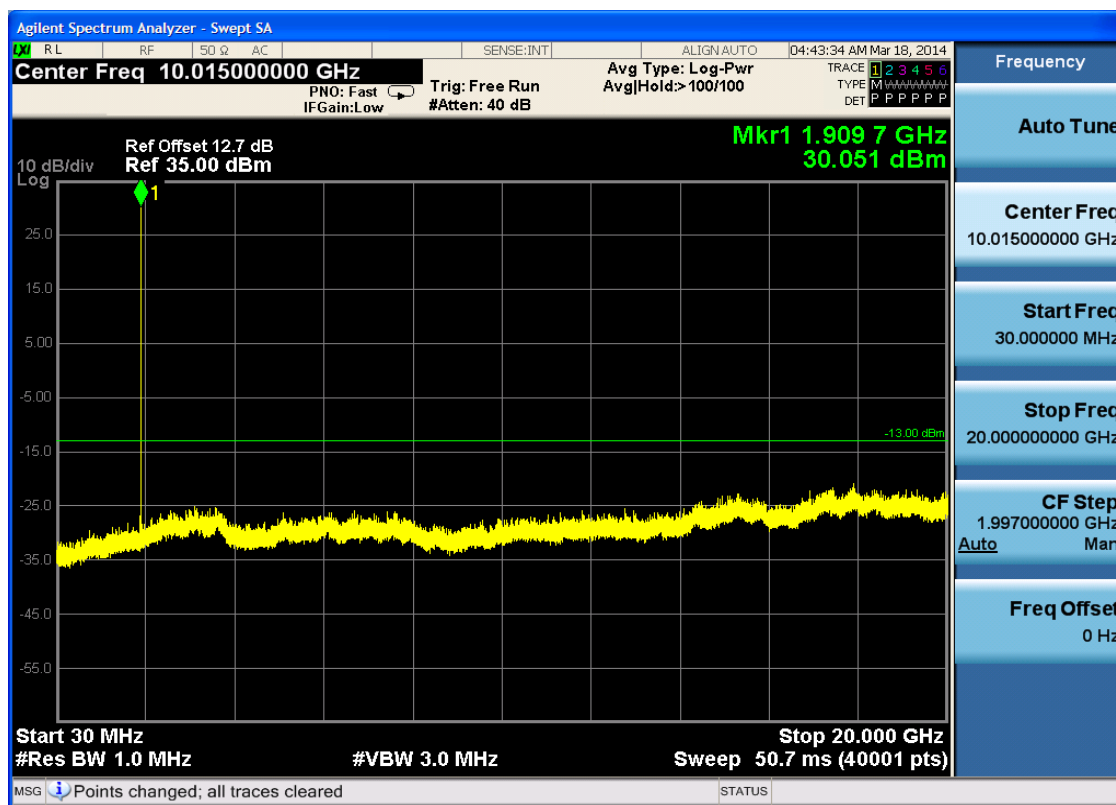




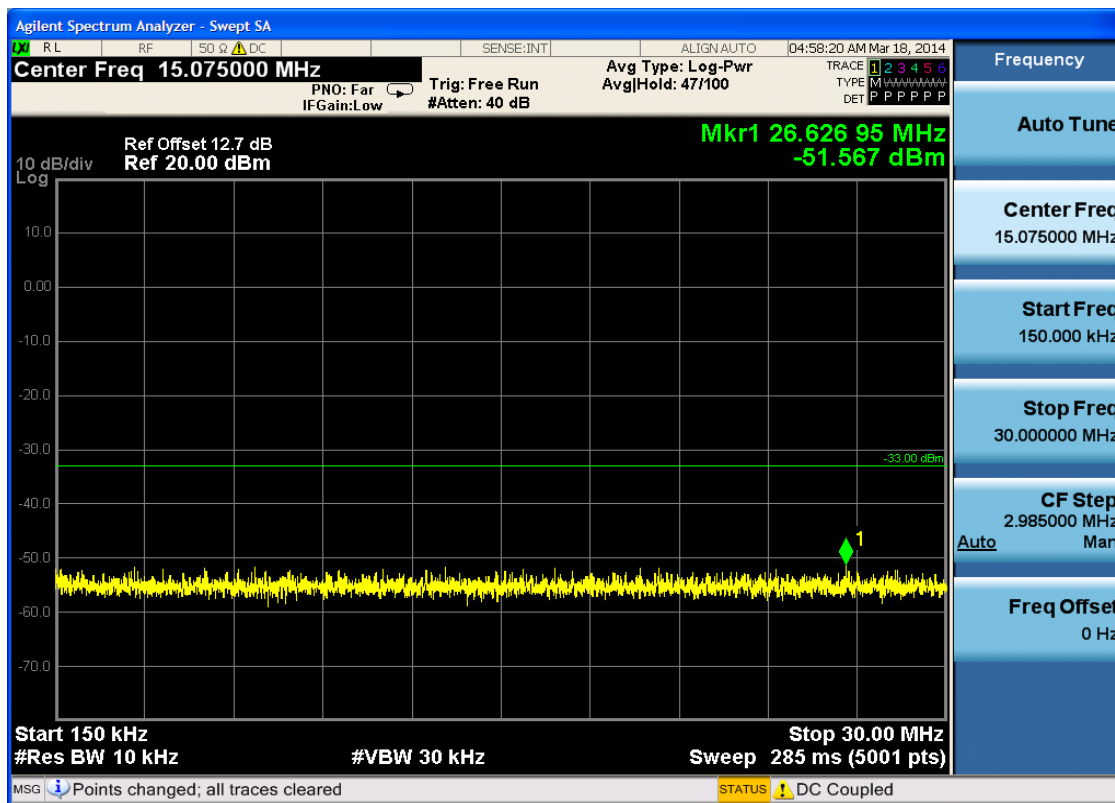
### 6.1.2.1.3 Test Channel = HCH

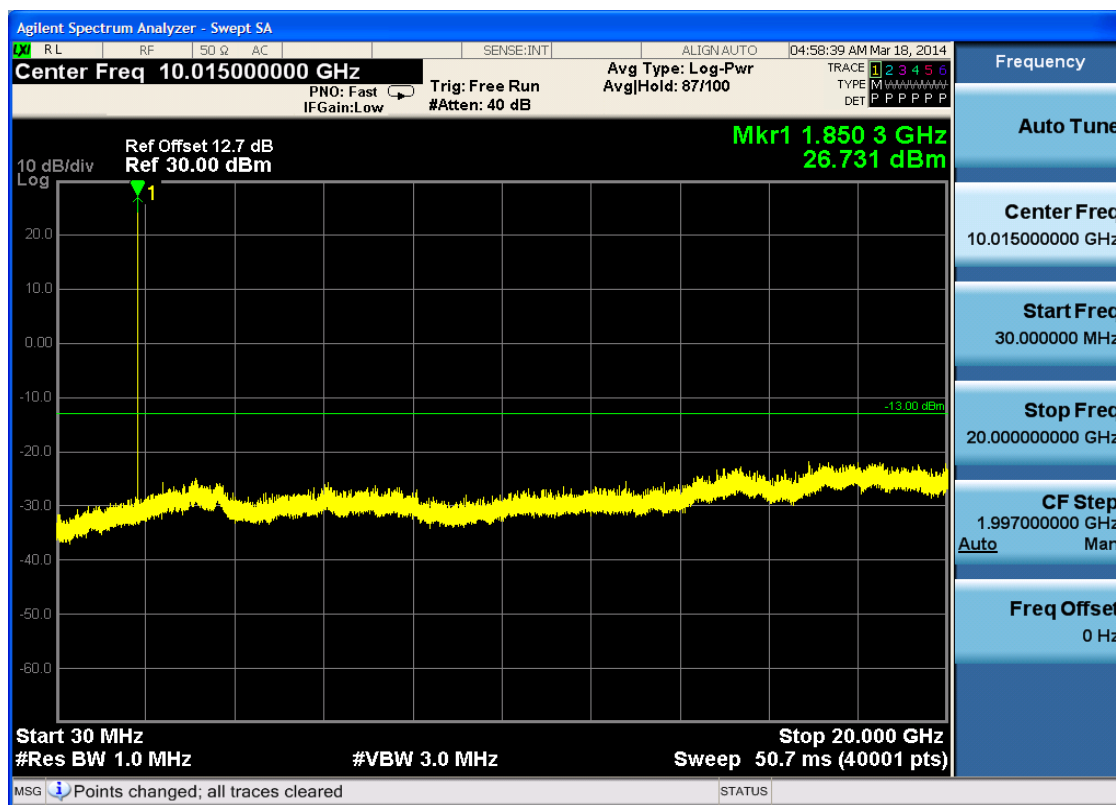






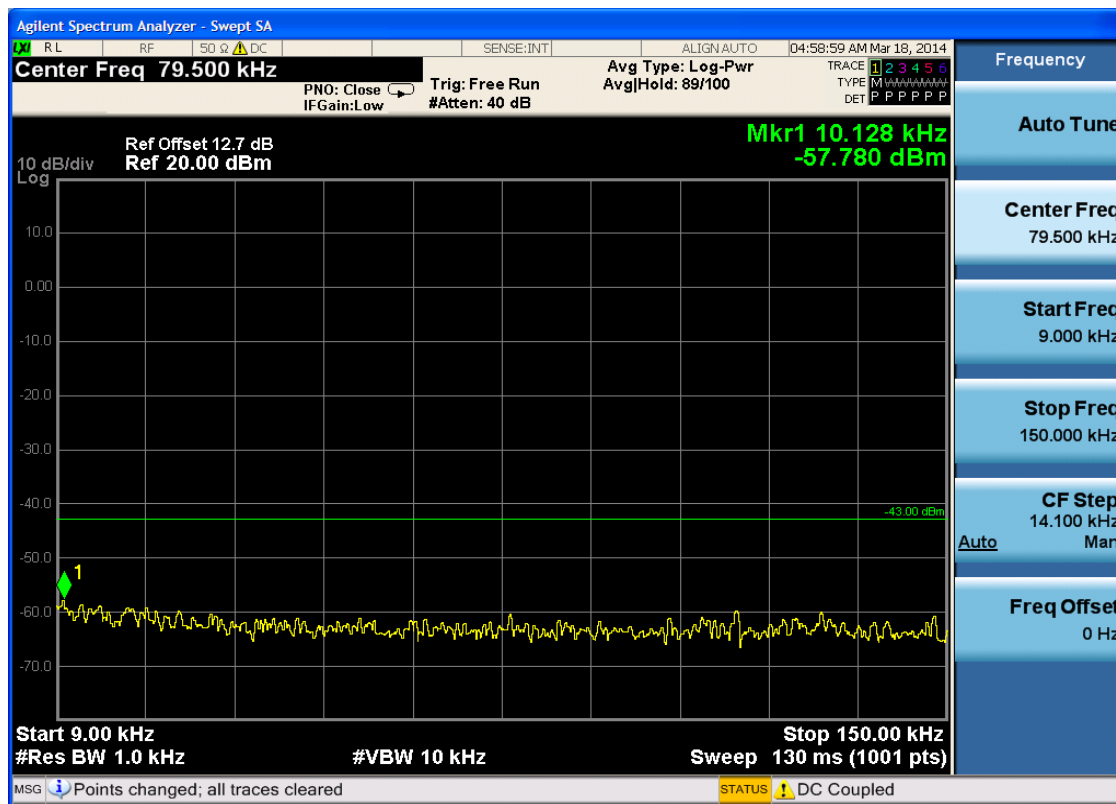


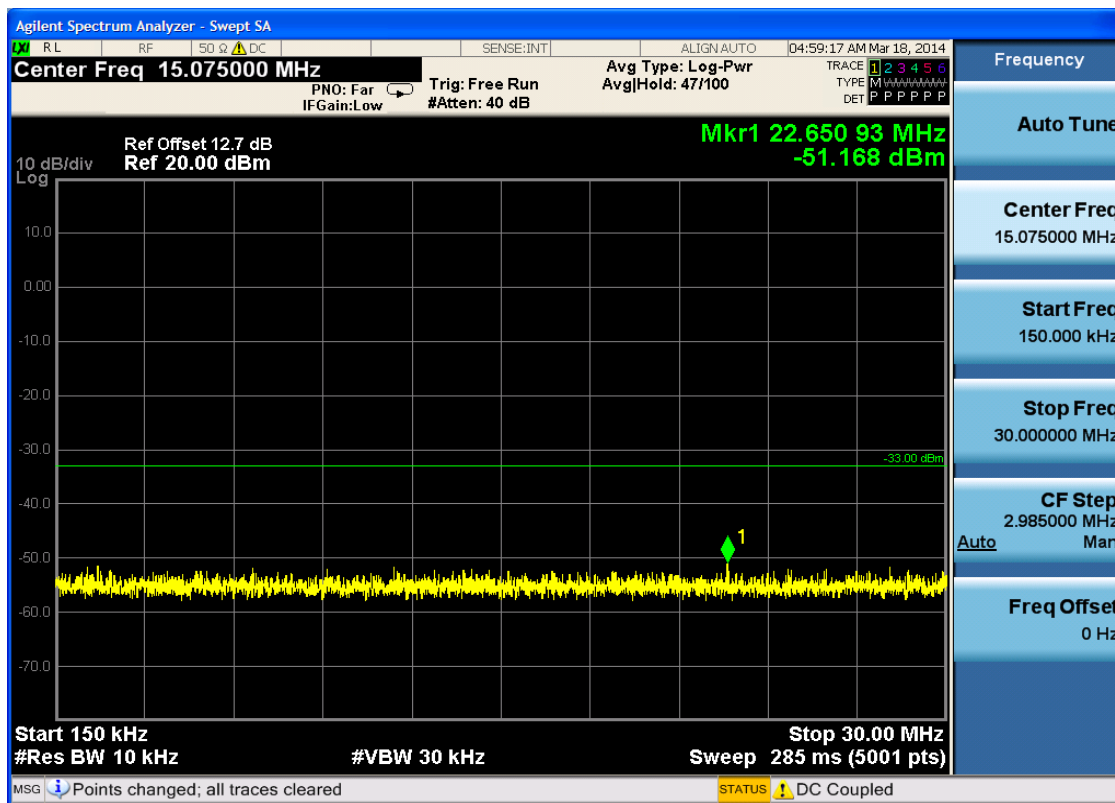


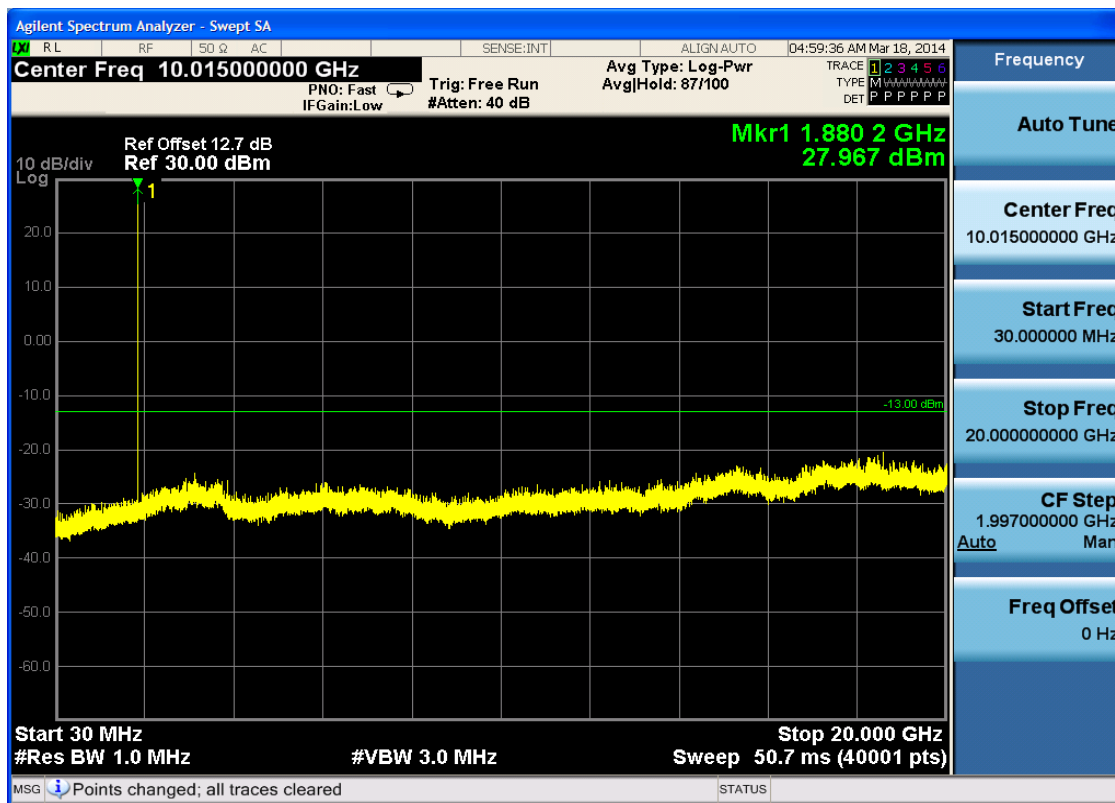




## 6.1.2.2.2 Test Channel = MCH









**Agilent Spectrum Analyzer - Swept SA**

|     |    |         |           |            |                          |
|-----|----|---------|-----------|------------|--------------------------|
| R/L | RF | 50 Ω DC | SENSE:INT | ALIGN AUTO | 04:59:56 AM Mar 18, 2014 |
|-----|----|---------|-----------|------------|--------------------------|

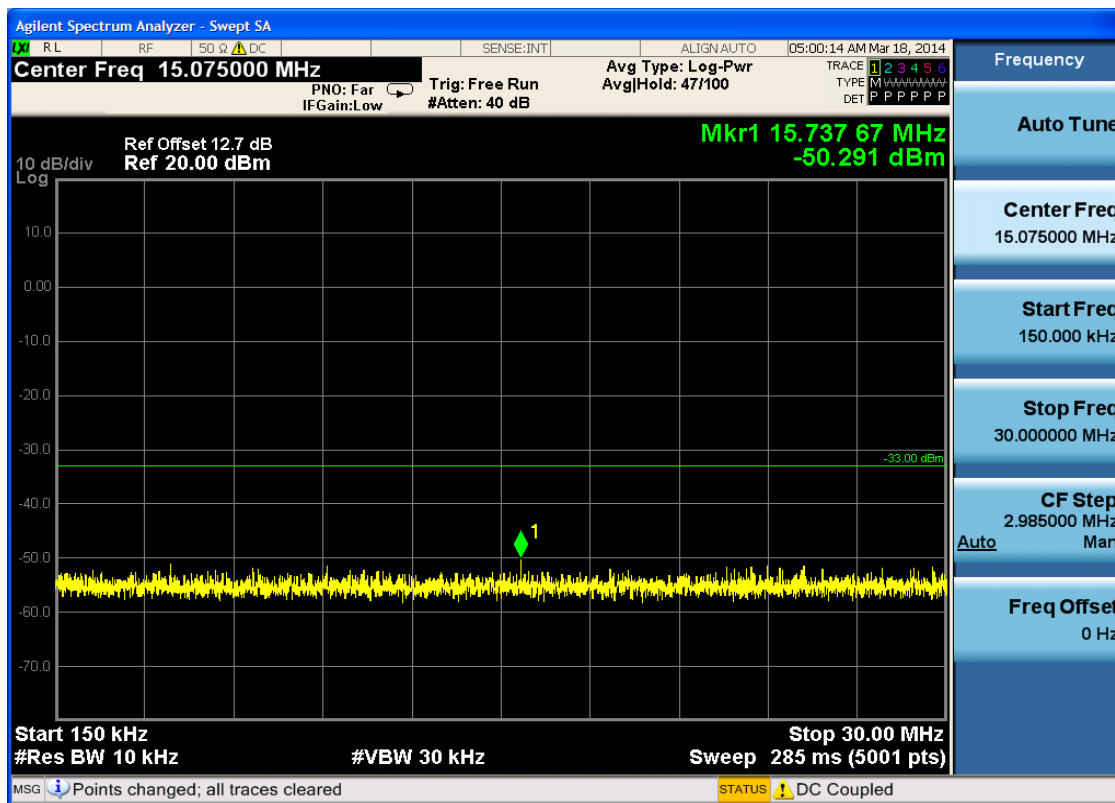
**Center Freq 79.500 kHz**      PNO: Close IF Gain: Low      Trig: Free Run #Atten: 40 dB      Avg Type: Log-Pwr Avg/Hold: 89/100      TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P P P P P P P

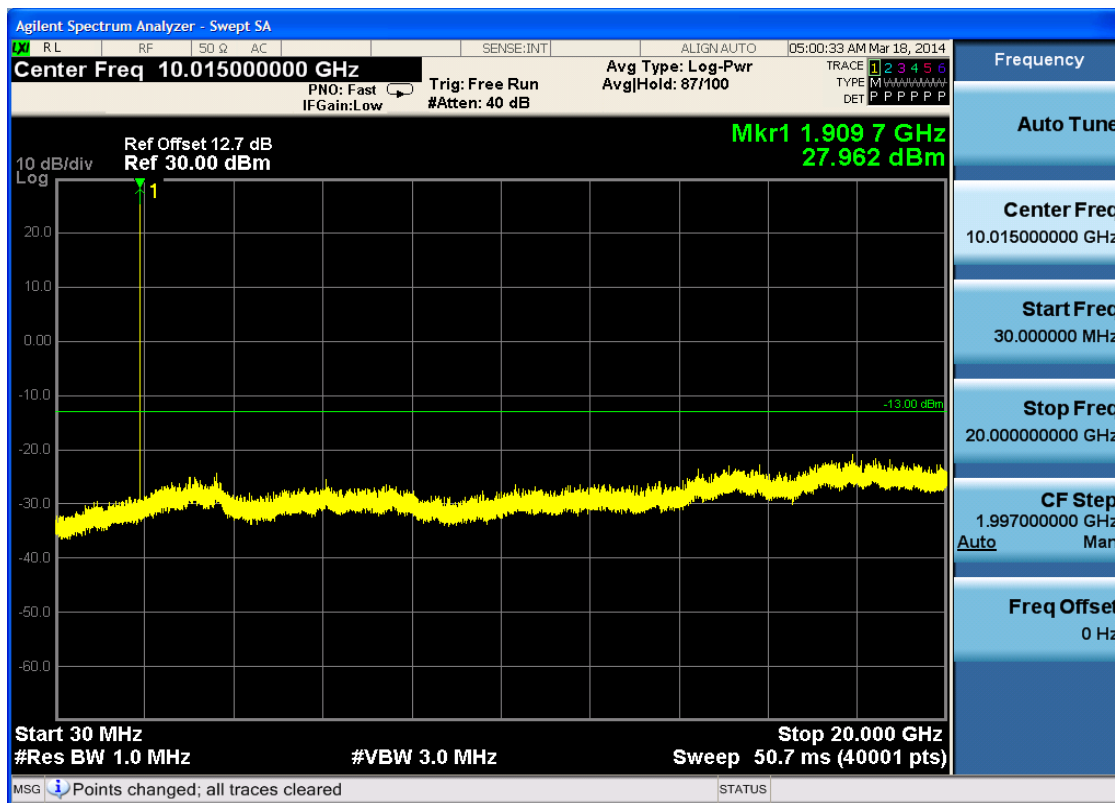
Ref Offset 12.7 dB  
Ref 20.00 dBm

Mkr1 10.269 kHz  
-58.024 dBm

Start 9.00 kHz      Stop 150.00 kHz  
#Res BW 1.0 kHz      #VBW 10 kHz      Sweep 130 ms (1001 pts)

MSG [Icon] Points changed; all traces cleared      STATUS [Icon] DC Coupled



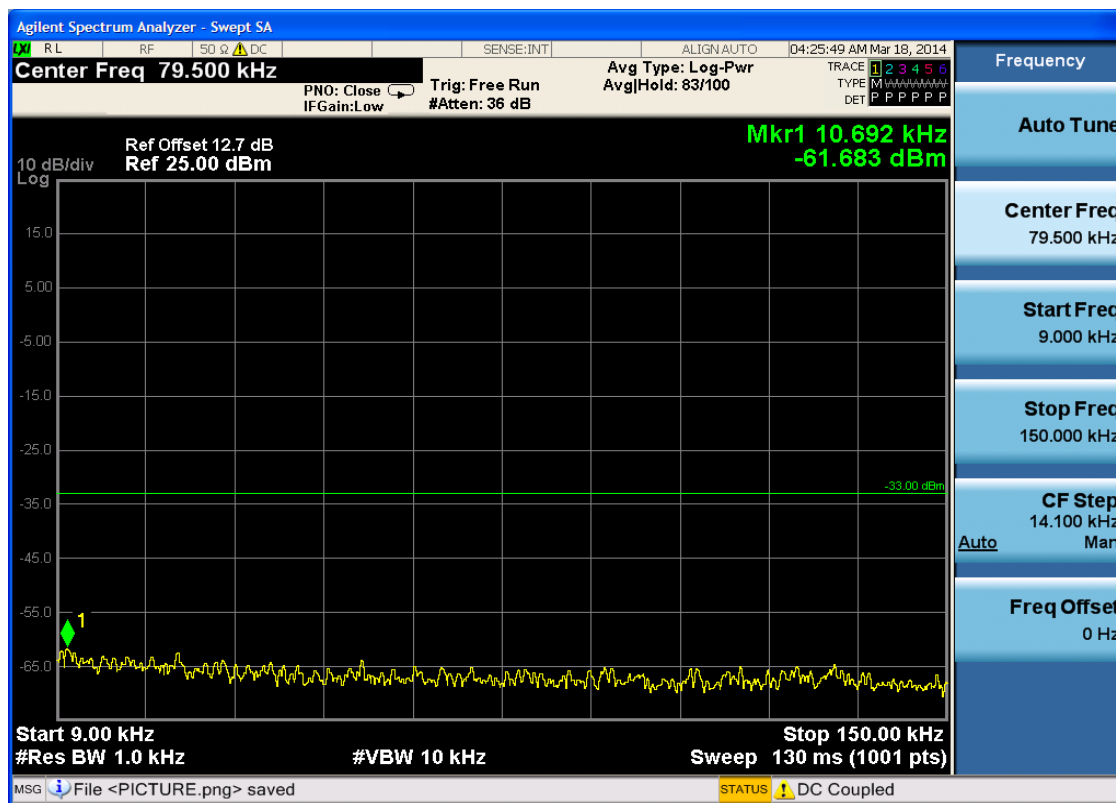


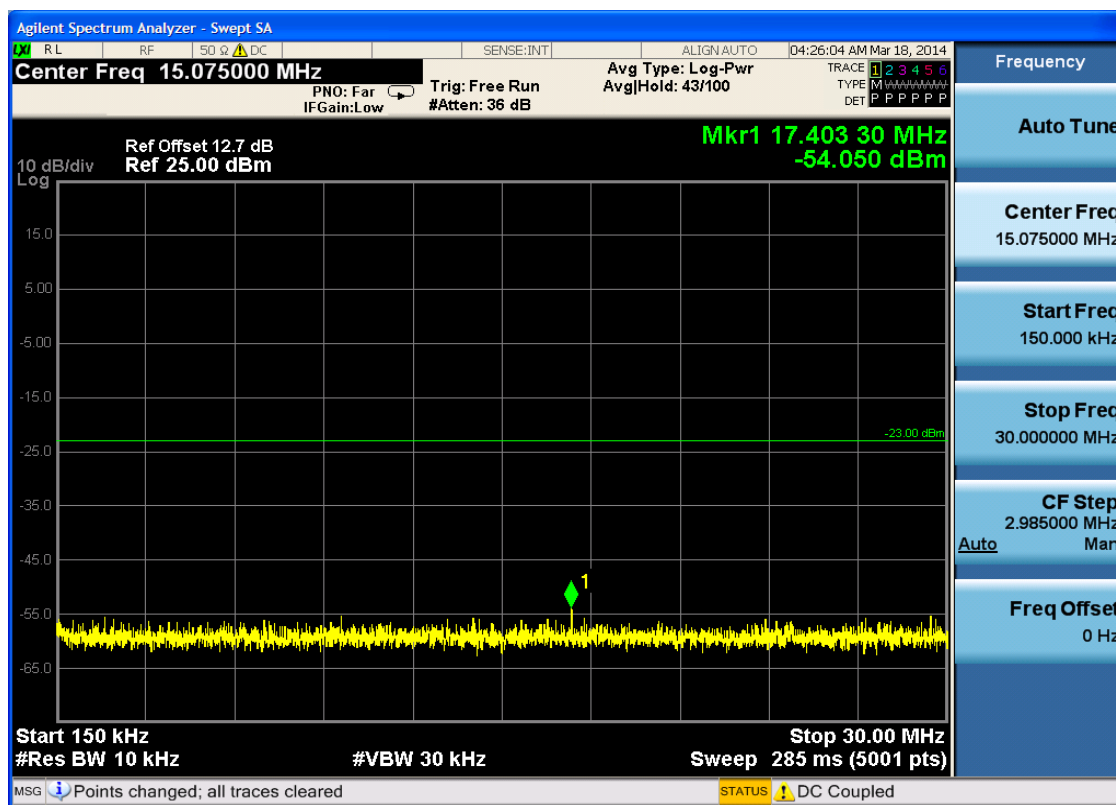
## 6.2 For UMTS

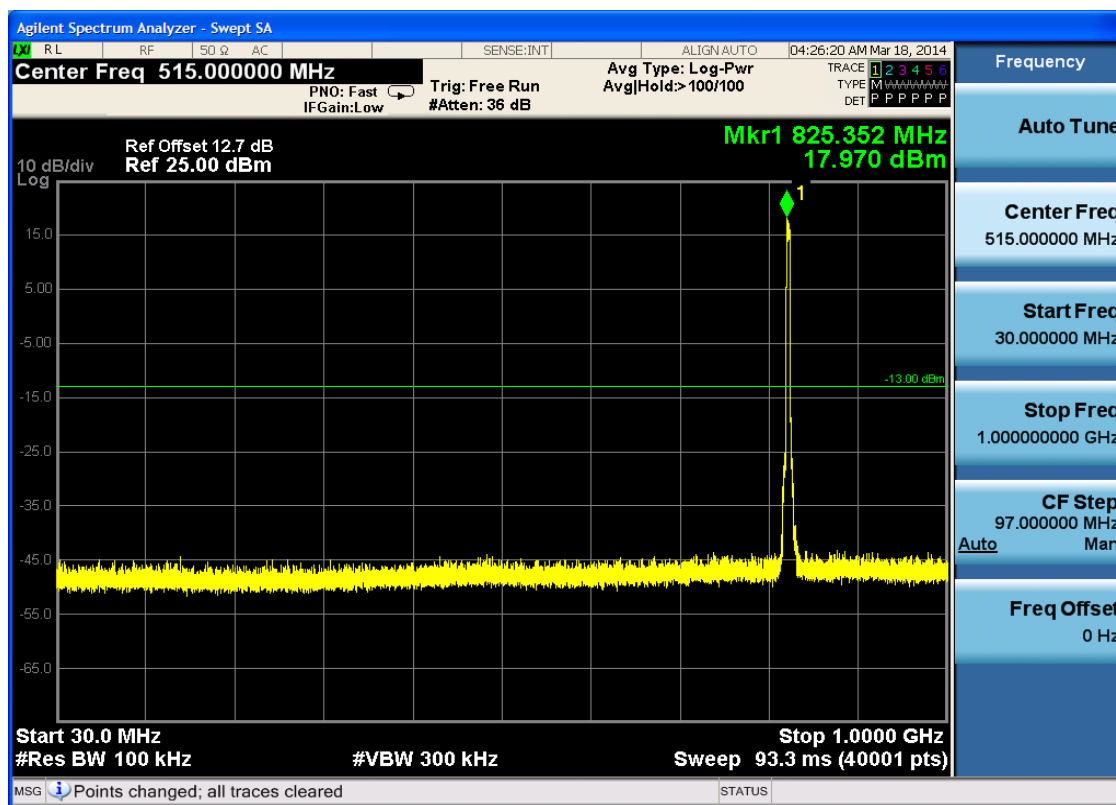
### 6.2.1 Test Band = WCDMA850

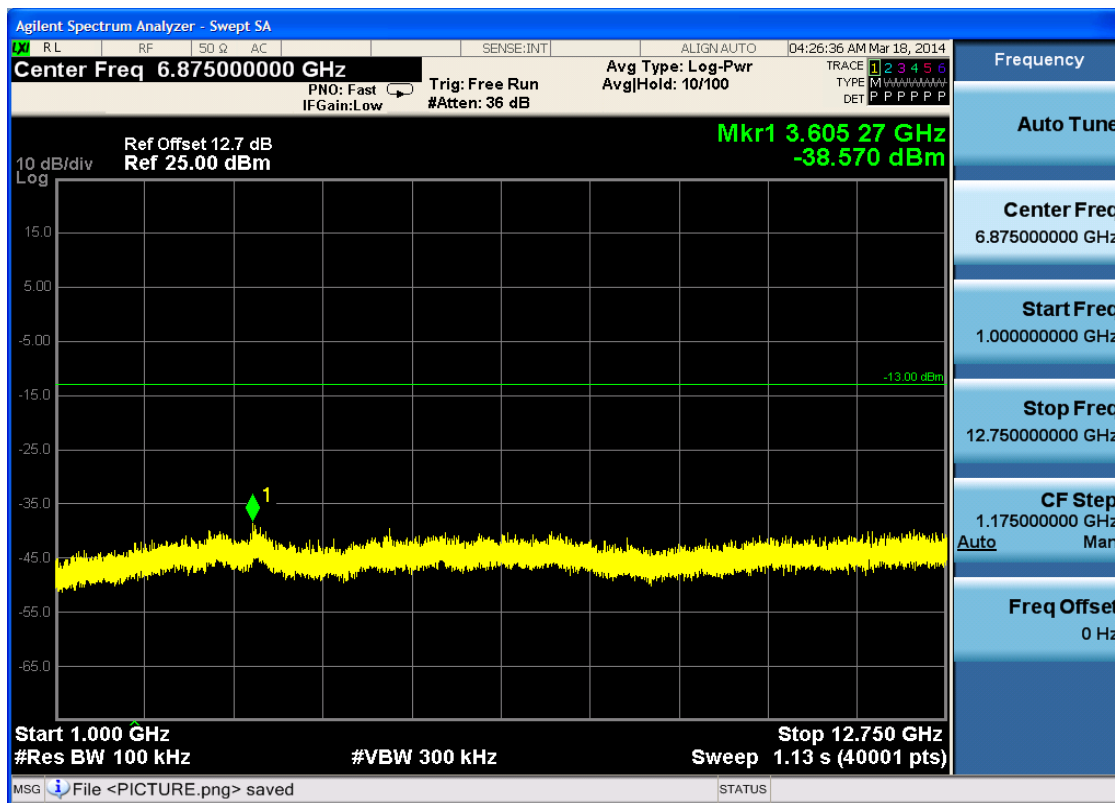
#### 6.2.1.1 Test Mode = UMTS/TM1

##### 6.2.1.1.1 Test Channel = LCH



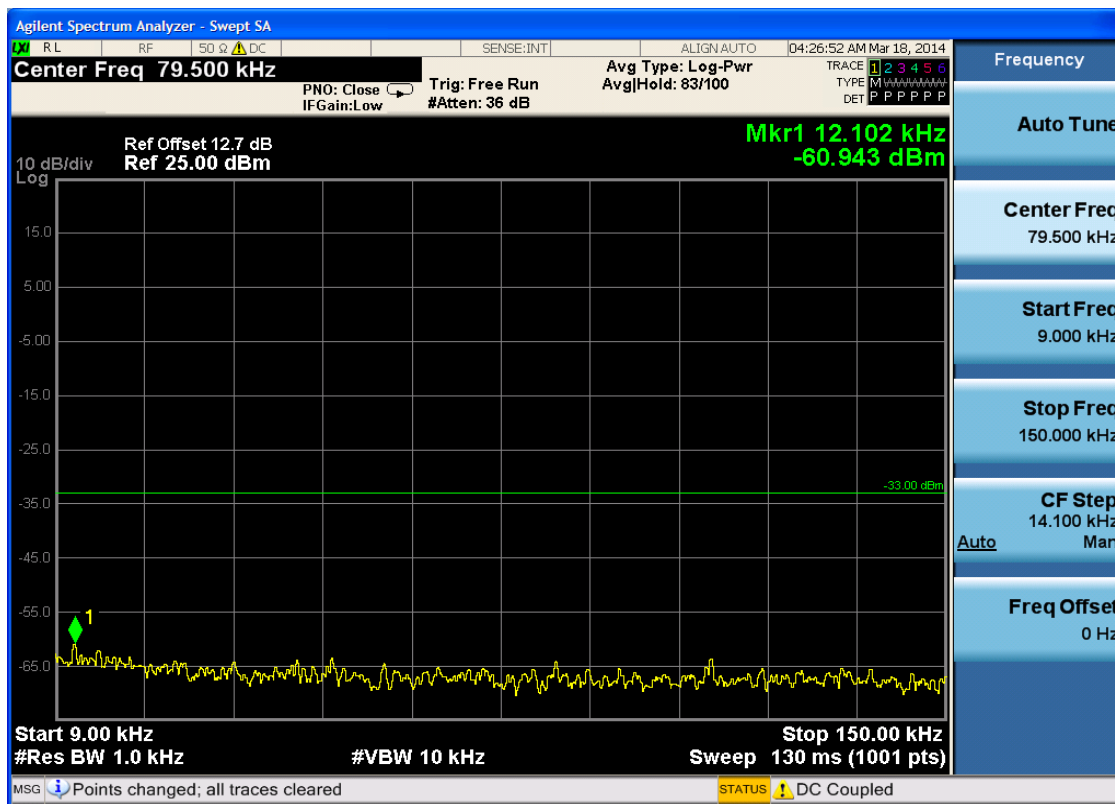


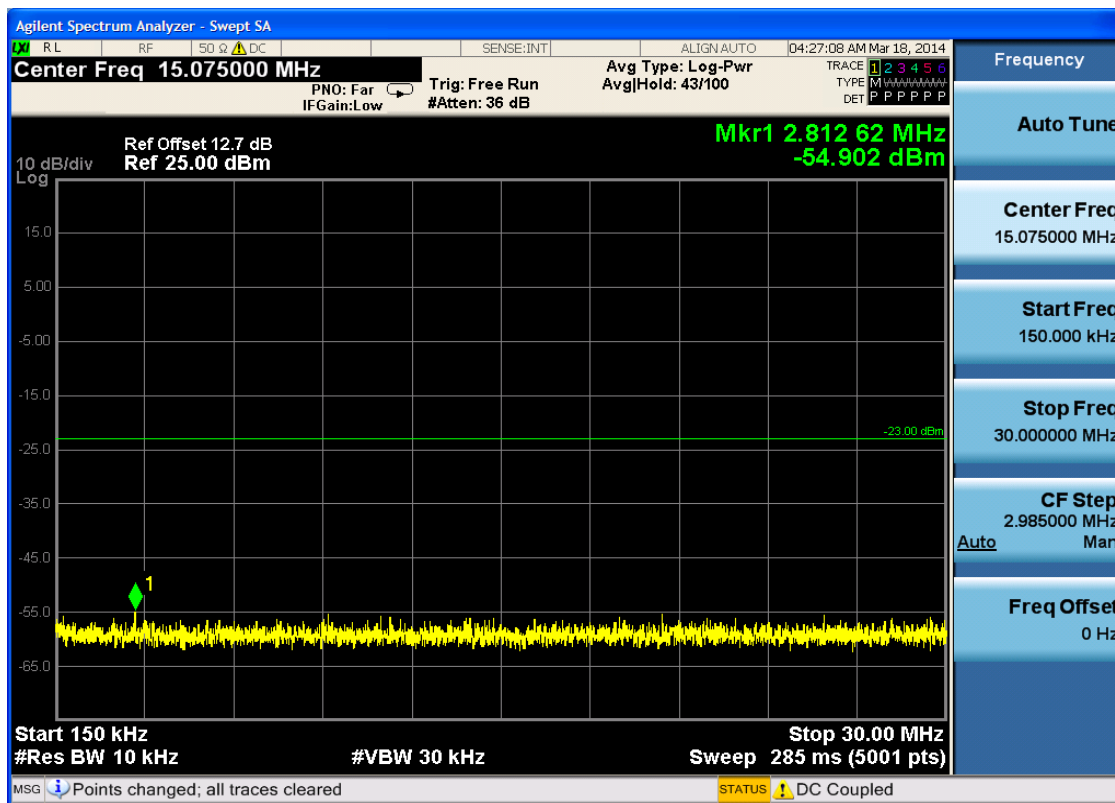


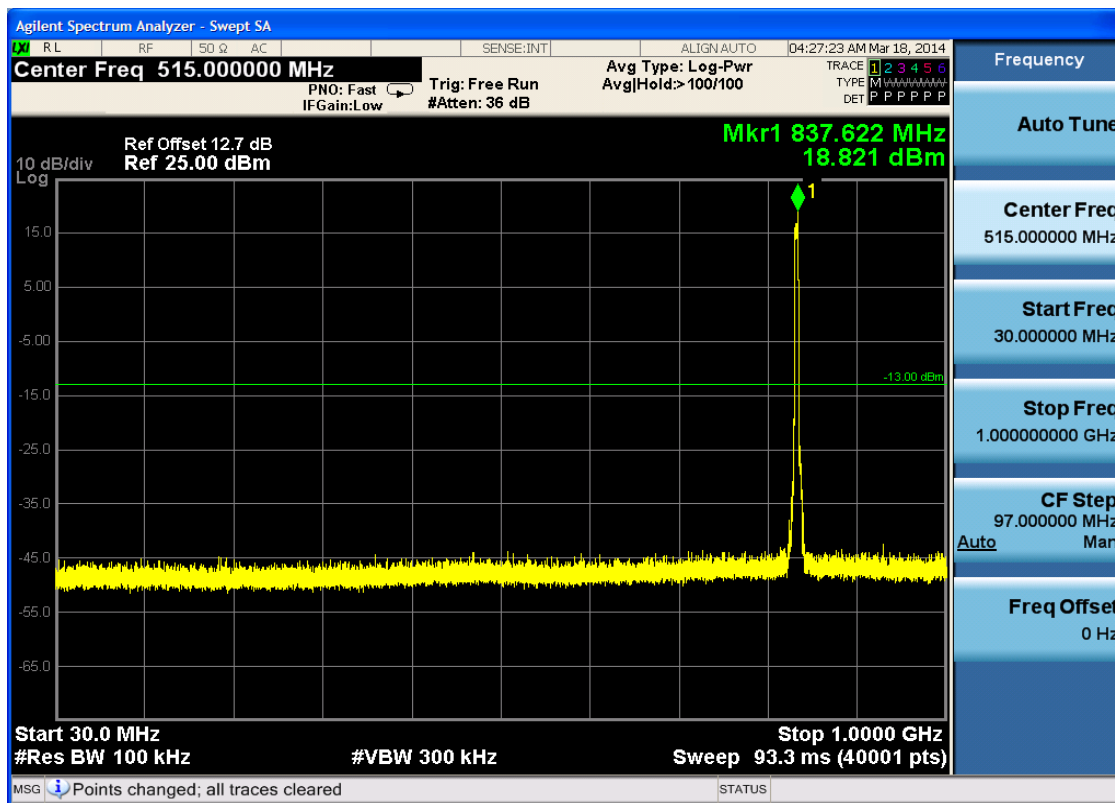


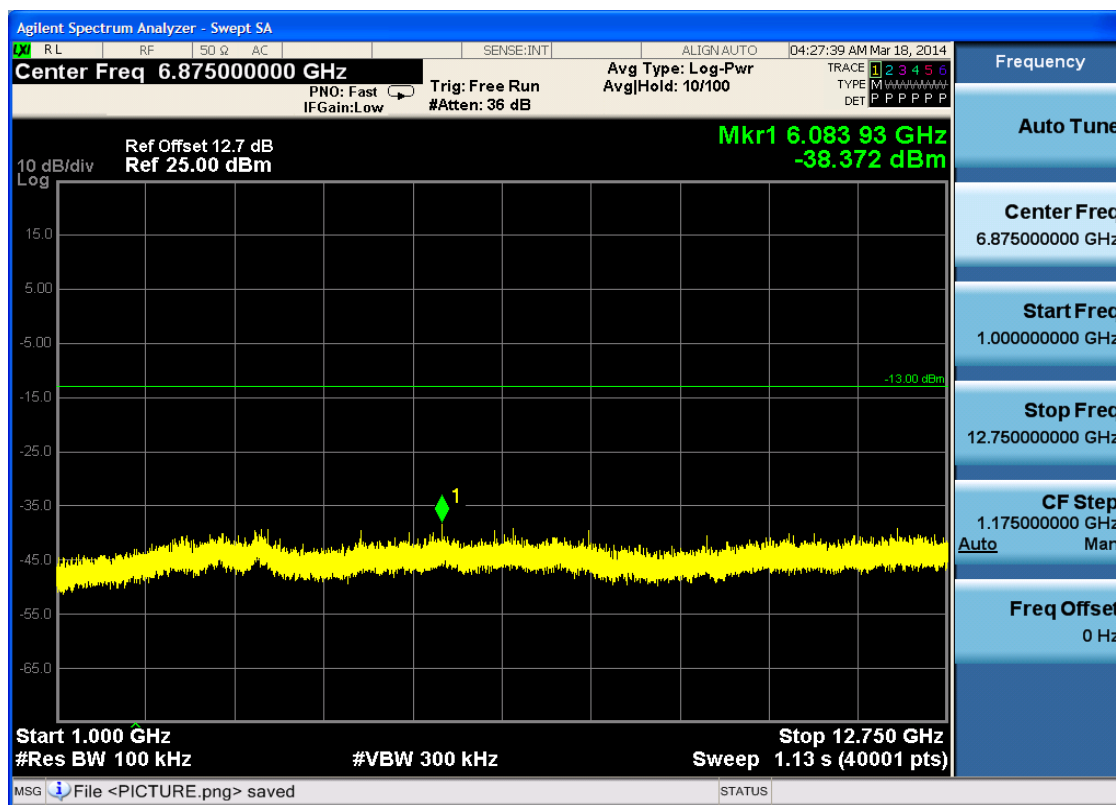


## 6.2.1.1.2 Test Channel = MCH



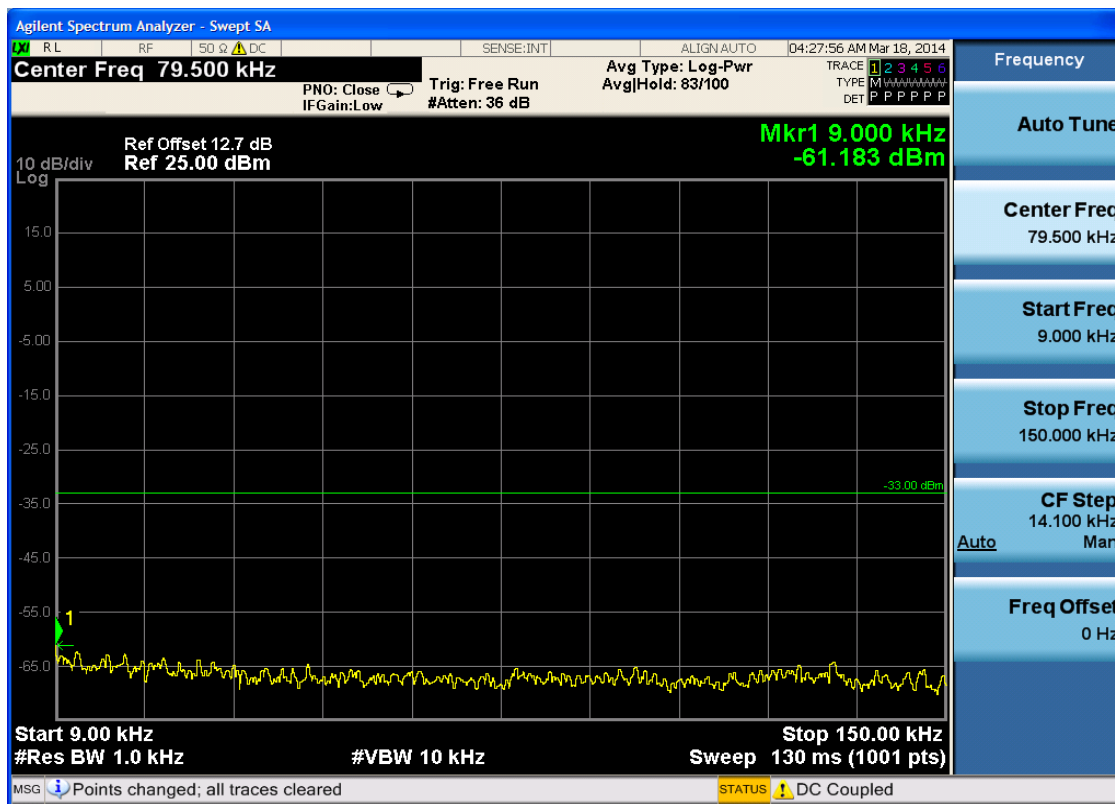


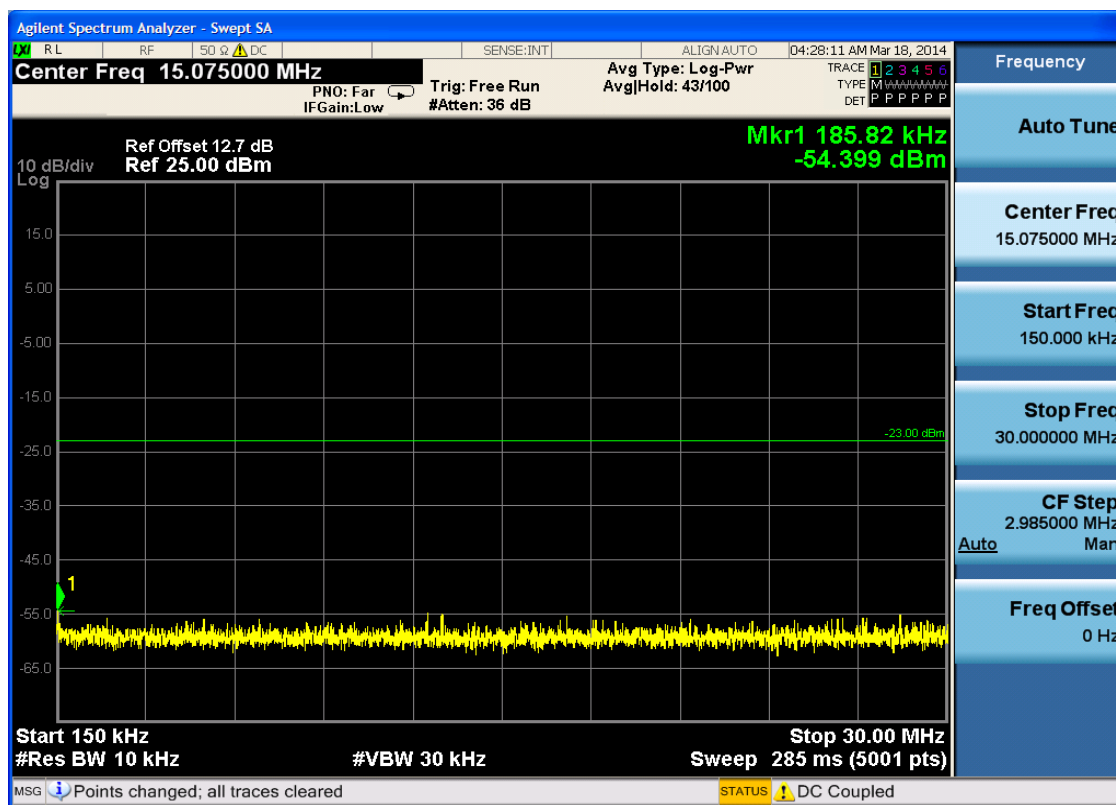


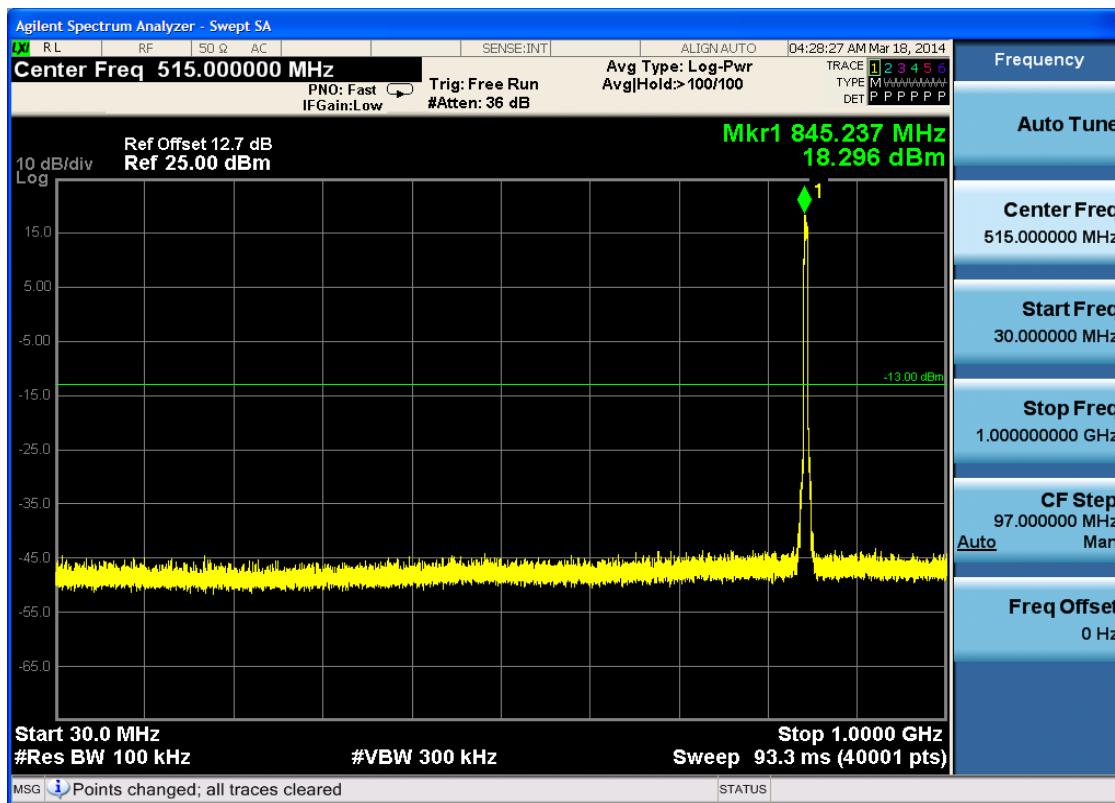


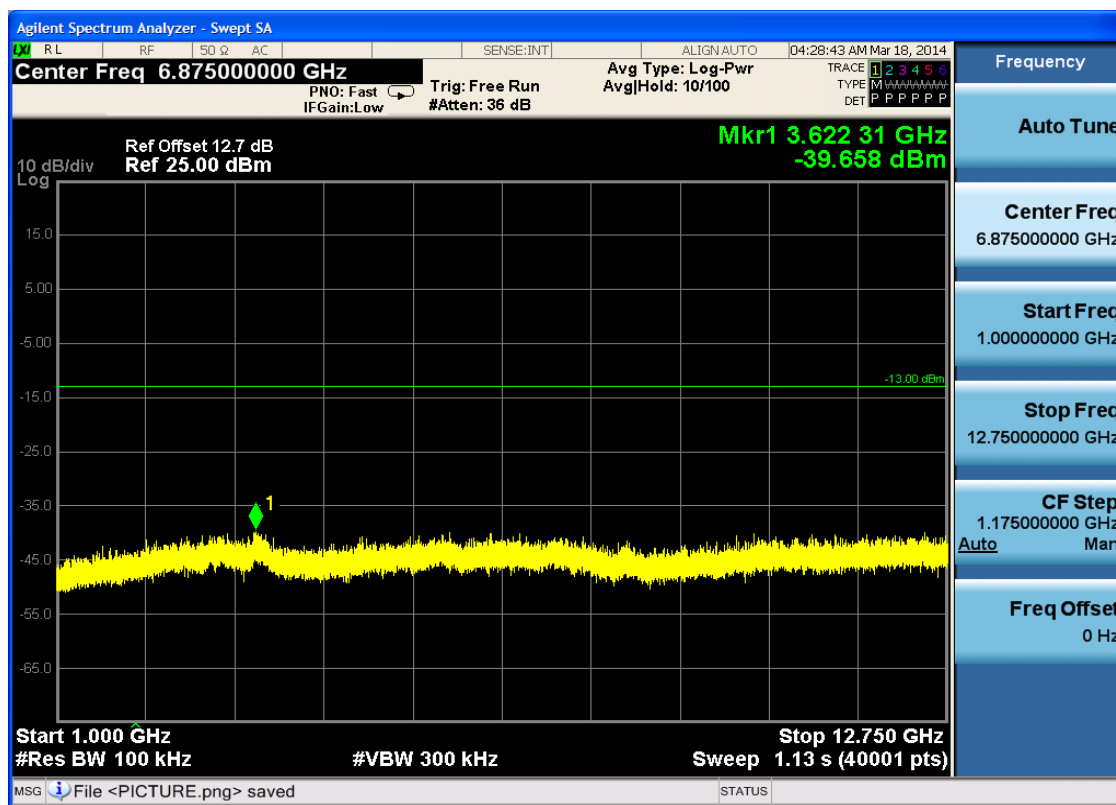


## 6.2.1.1.3 Test Channel = HCH





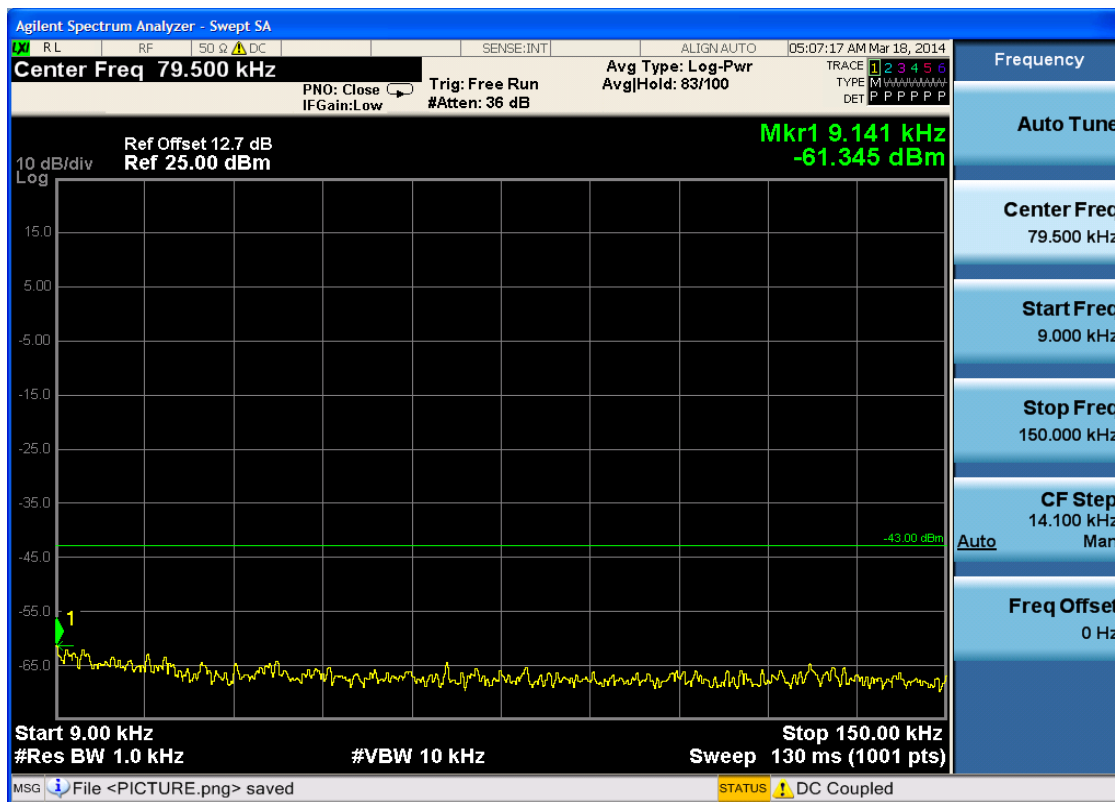


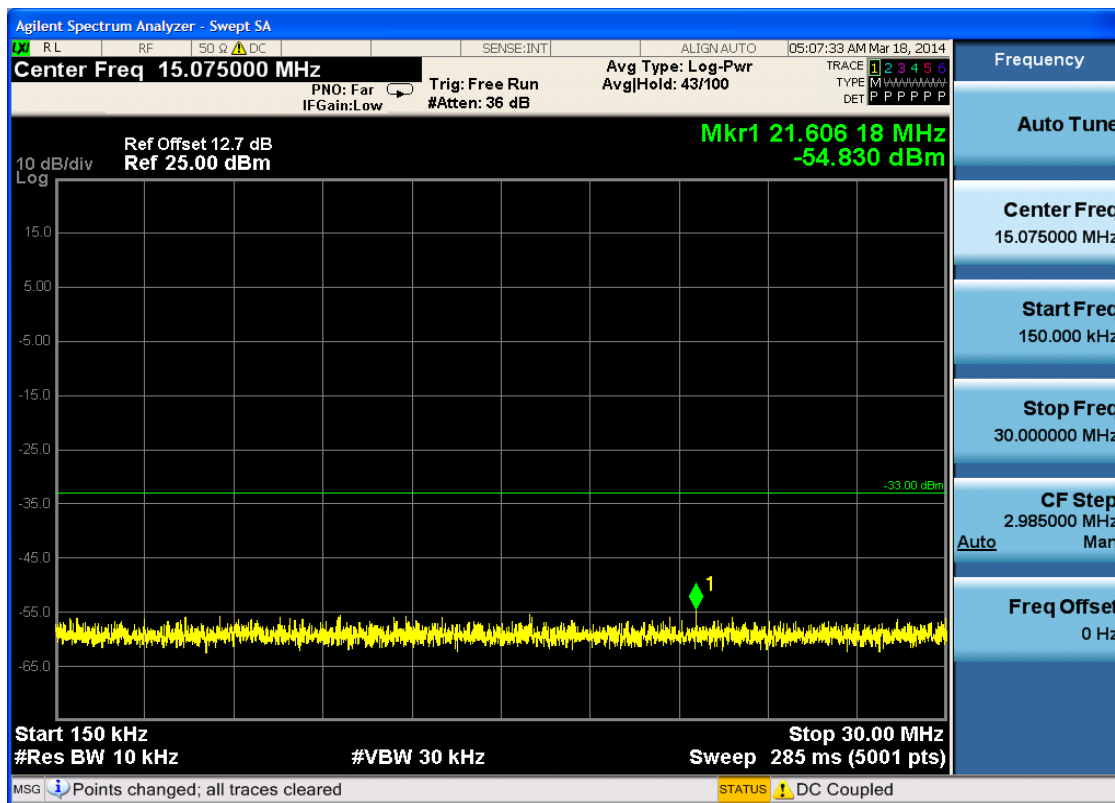


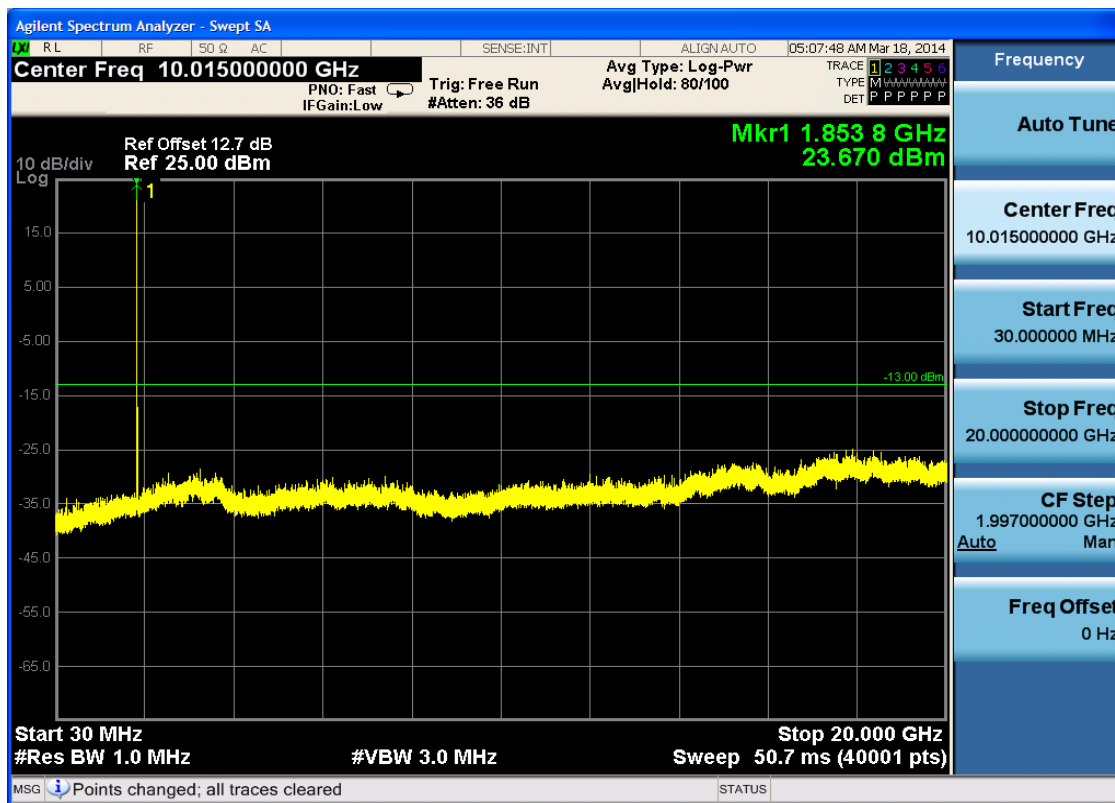
## 6.2.2 Test Band = WCDMA1900

### 6.2.2.1 Test Mode = UMTS/TM1

#### 6.2.2.1.1 Test Channel = LCH









**Agilent Spectrum Analyzer - Swept SA**

|    |    |         |           |            |                          |
|----|----|---------|-----------|------------|--------------------------|
| RL | RF | 50 Ω DC | SENSE:INT | ALIGN AUTO | 05:08:05 AM Mar 18, 2014 |
|----|----|---------|-----------|------------|--------------------------|

**Center Freq 79.500 kHz**      PNO: Close IF Gain: Low      Trig: Free Run #Atten: 36 dB      Avg Type: Log-Pwr Avg/Hold: 83/100      TRACE 1 2 3 4 5 6 TYPE M M M M M M M M DET P P P P P P

Ref Offset 12.7 dB  
Ref 25.00 dBm

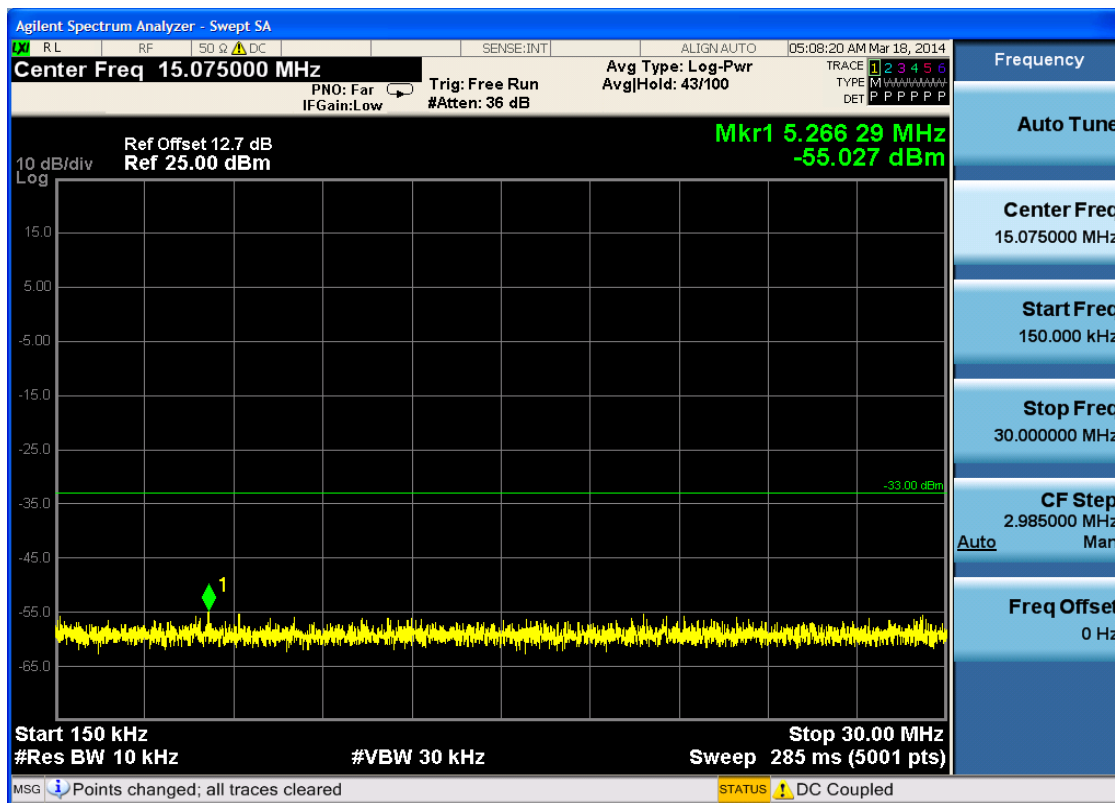
Mkr1 11.538 kHz  
-61.219 dBm

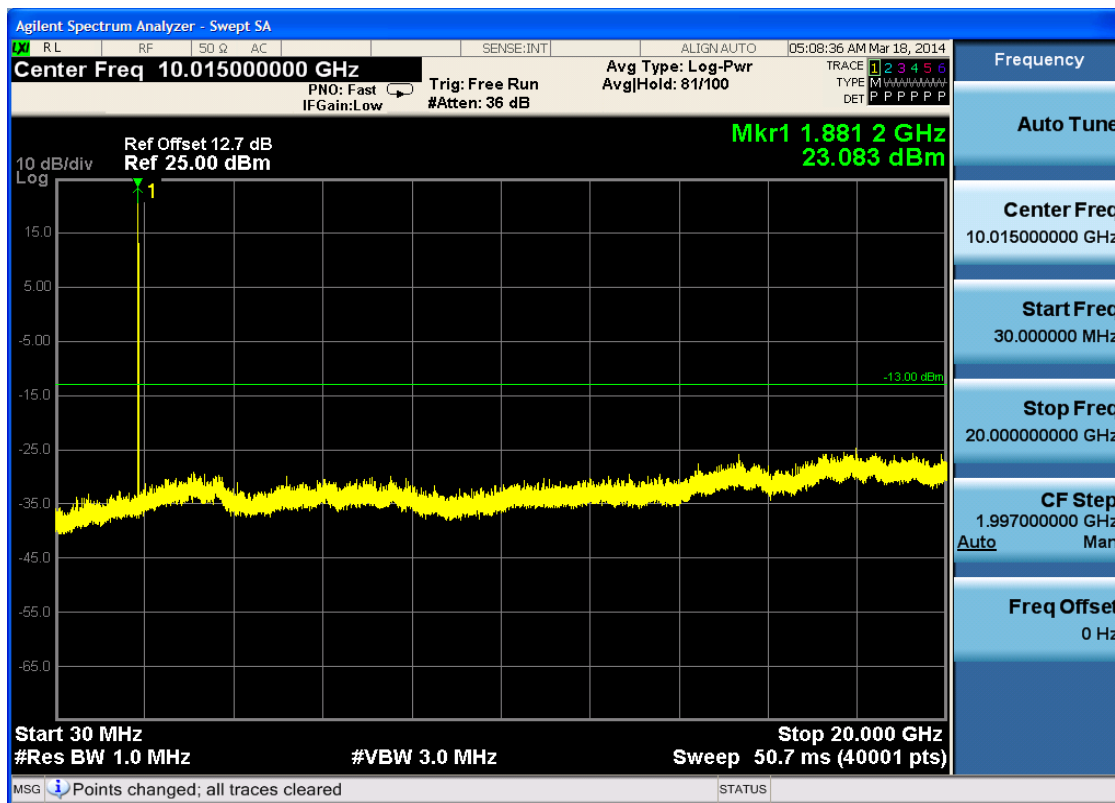
10 dB/div  
Log

Start 9.00 kHz      Stop 150.00 kHz  
#Res BW 1.0 kHz      #VBW 10 kHz      Sweep 130 ms (1001 pts)

MSG ⓘ Points changed; all traces cleared      STATUS ⓘ DC Coupled

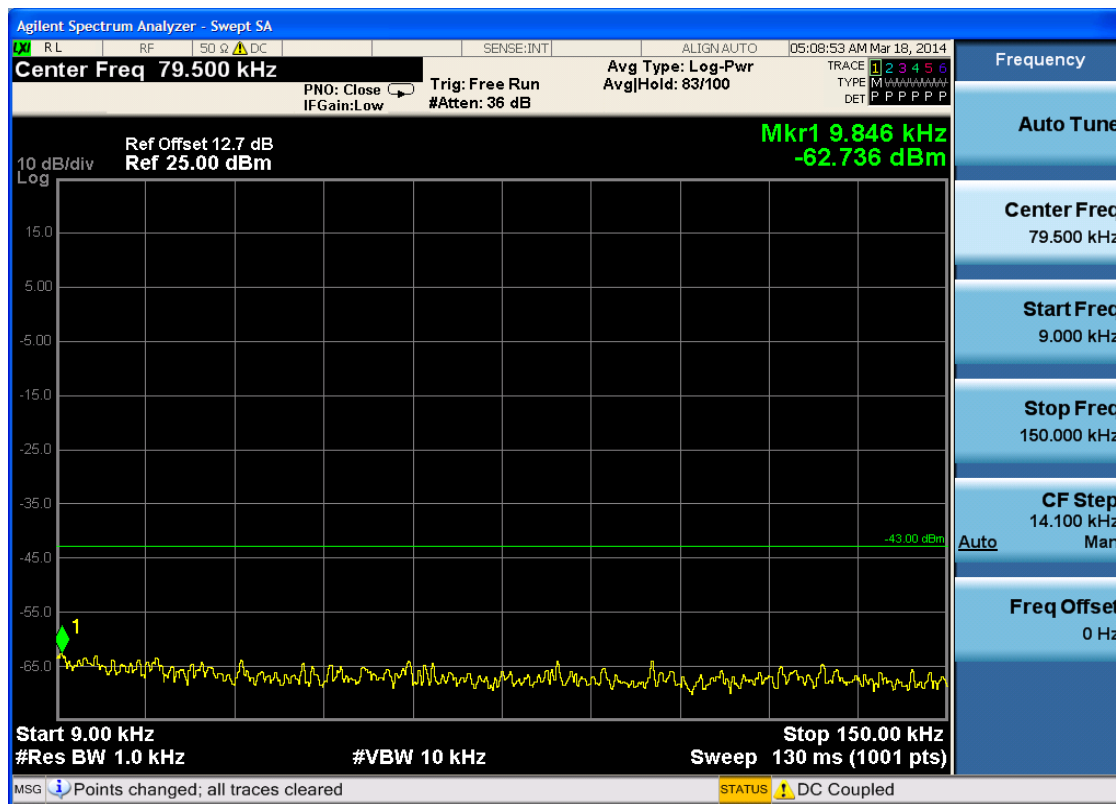
**Frequency**  
  
 Auto Tune  
  
 Center Freq  
79.500 kHz  
  
 Start Freq  
9.000 kHz  
  
 Stop Freq  
150.000 kHz  
  
 CF Step  
14.100 kHz  
Auto Man  
  
 Freq Offset  
0 Hz

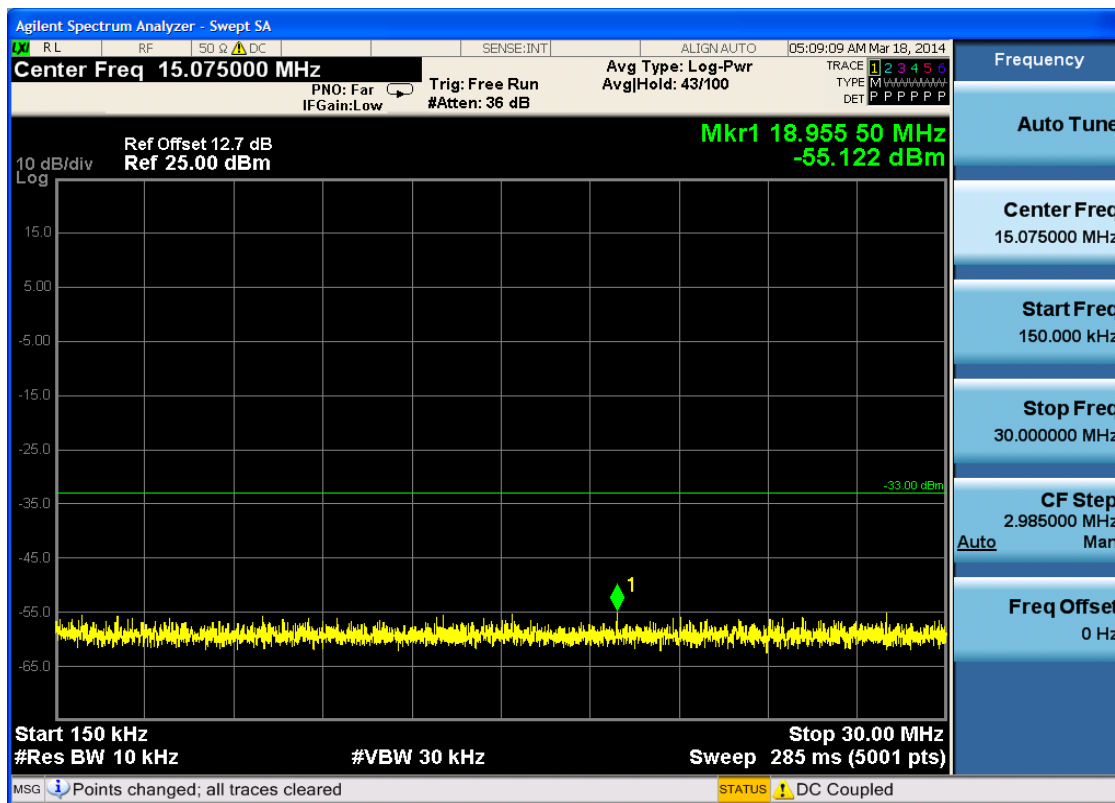


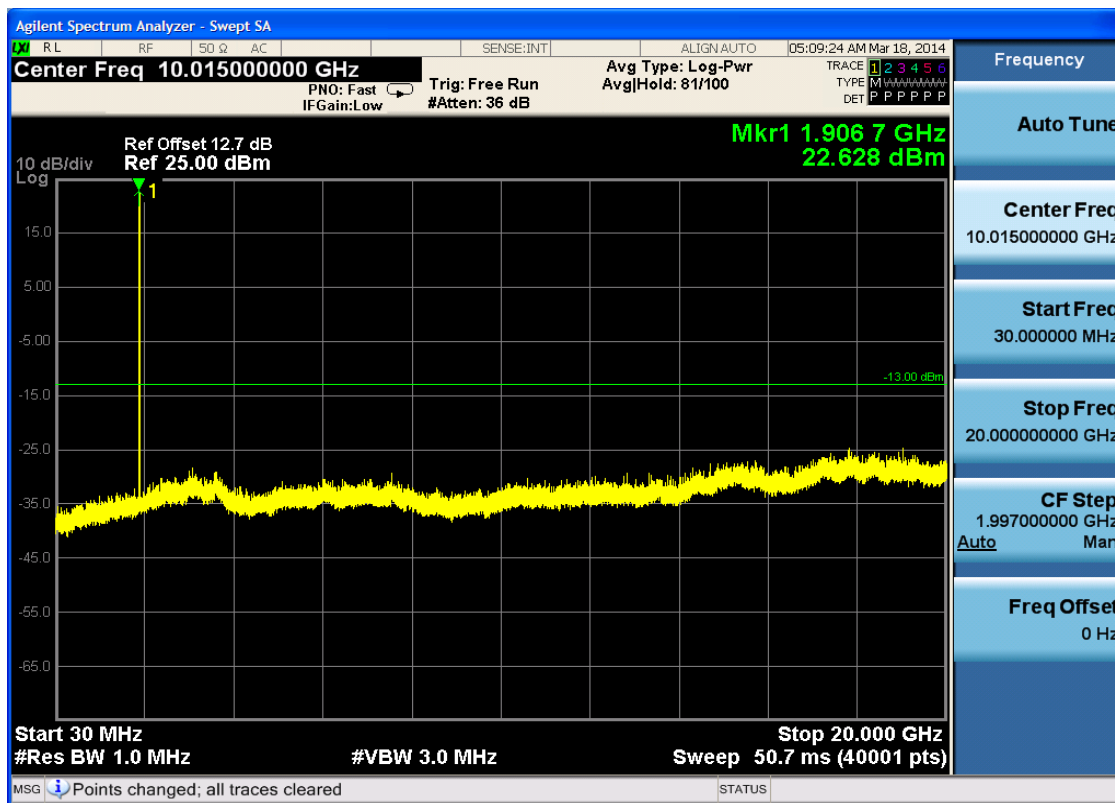




## 6.2.2.1.3 Test Channel = HCH







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

Note:

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

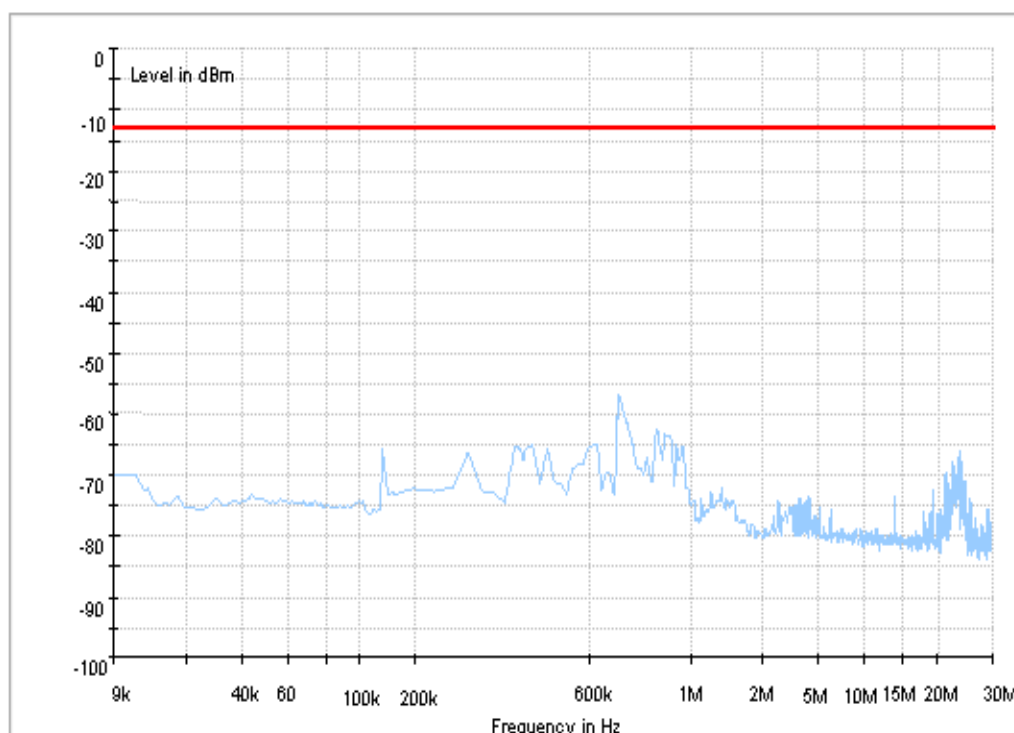
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

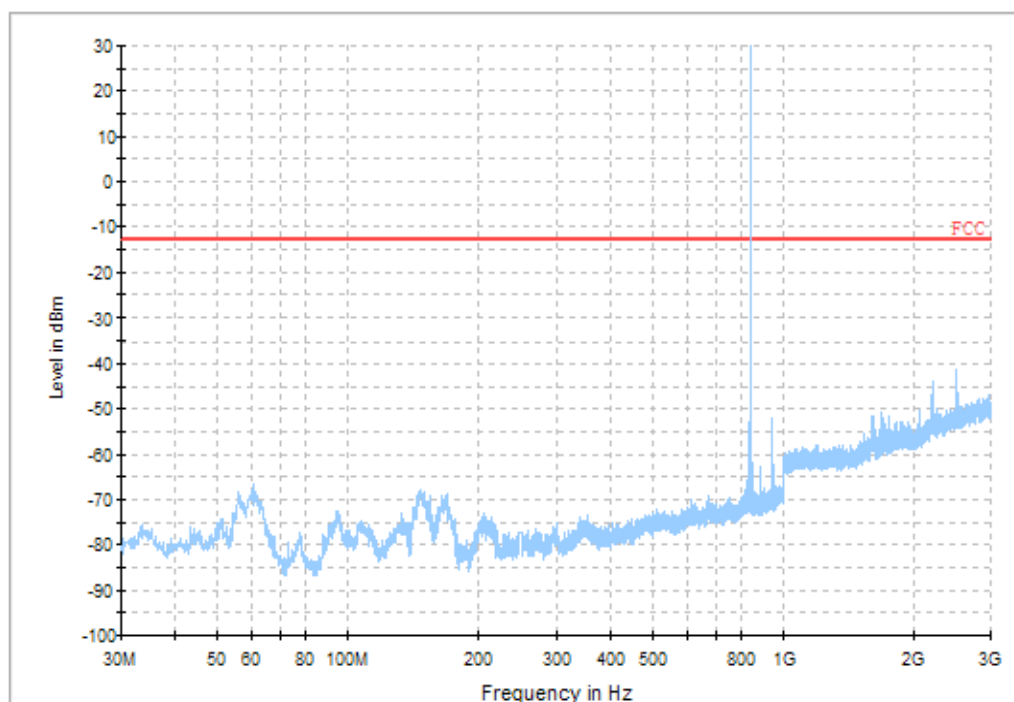
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850

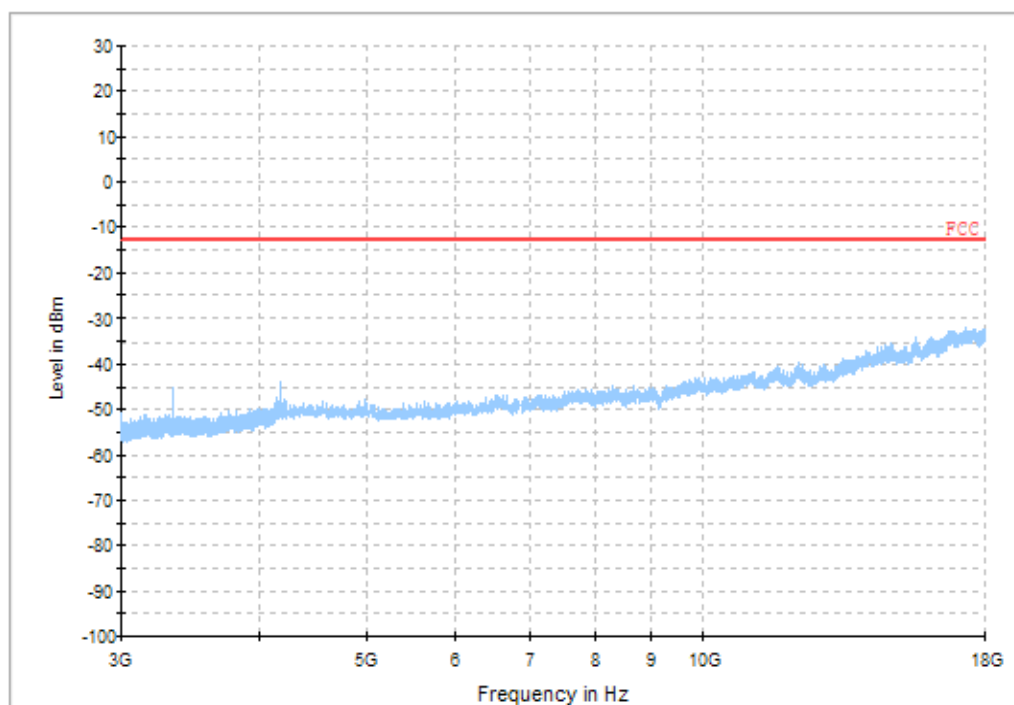
##### 7.1.1.1 Test Mode = GSM/TM1



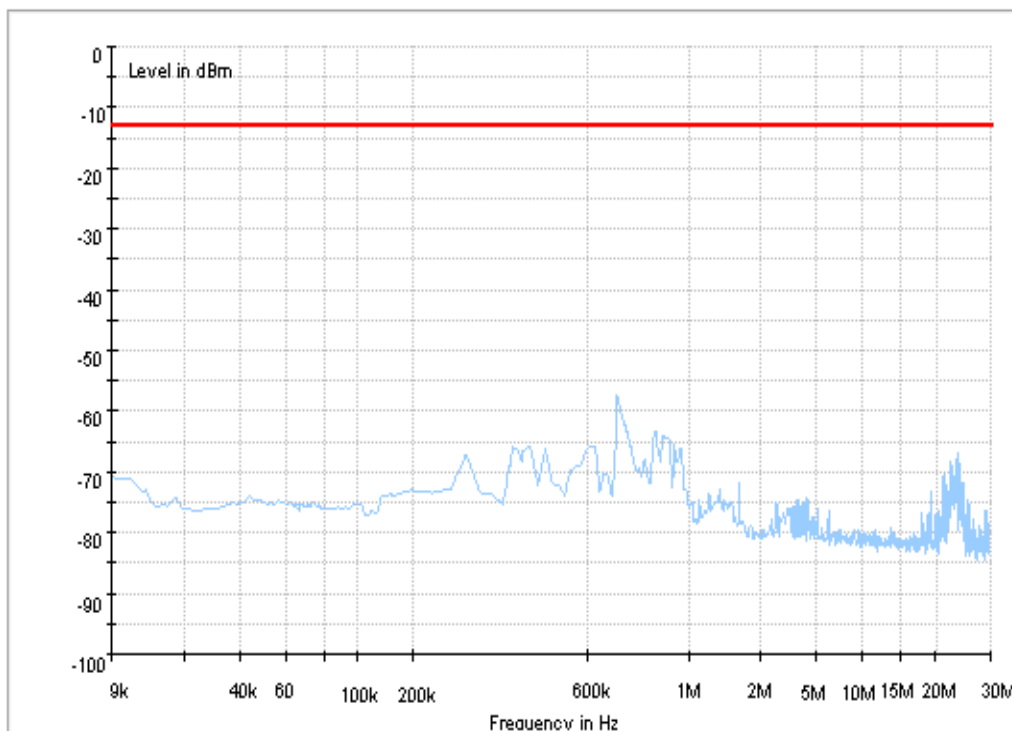
Copy of FCC PART22 GSM850\_L



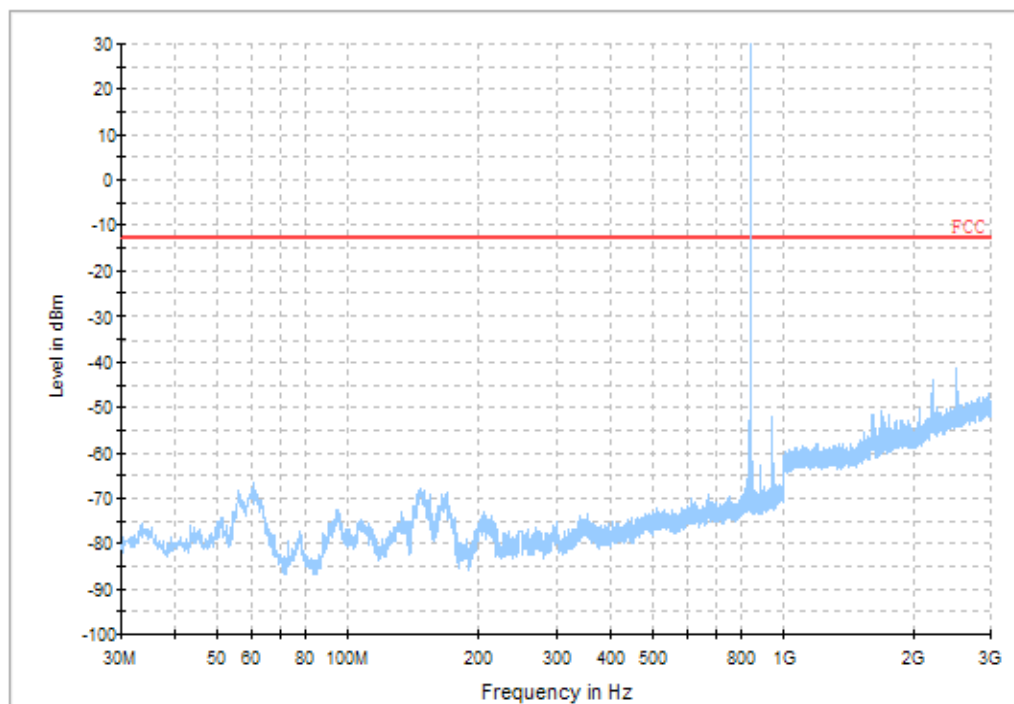
Copy of FCC PART22 GSM850\_H



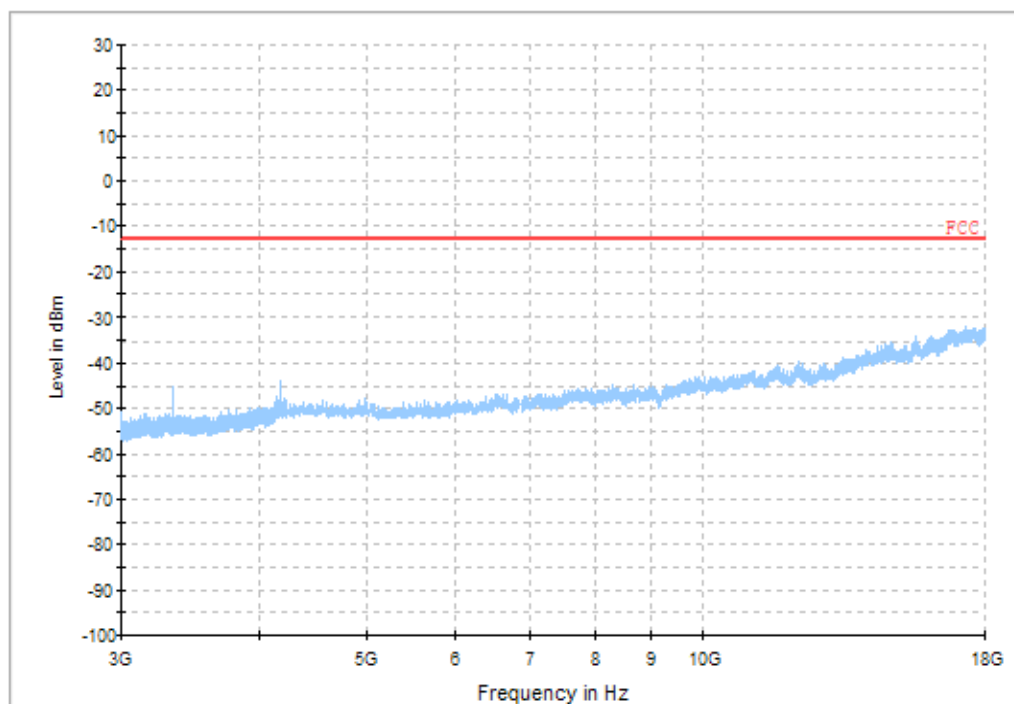
### 7.1.1.2 Test Mode = GSM/TM2



Copy of FCC PART22 GSM850\_L

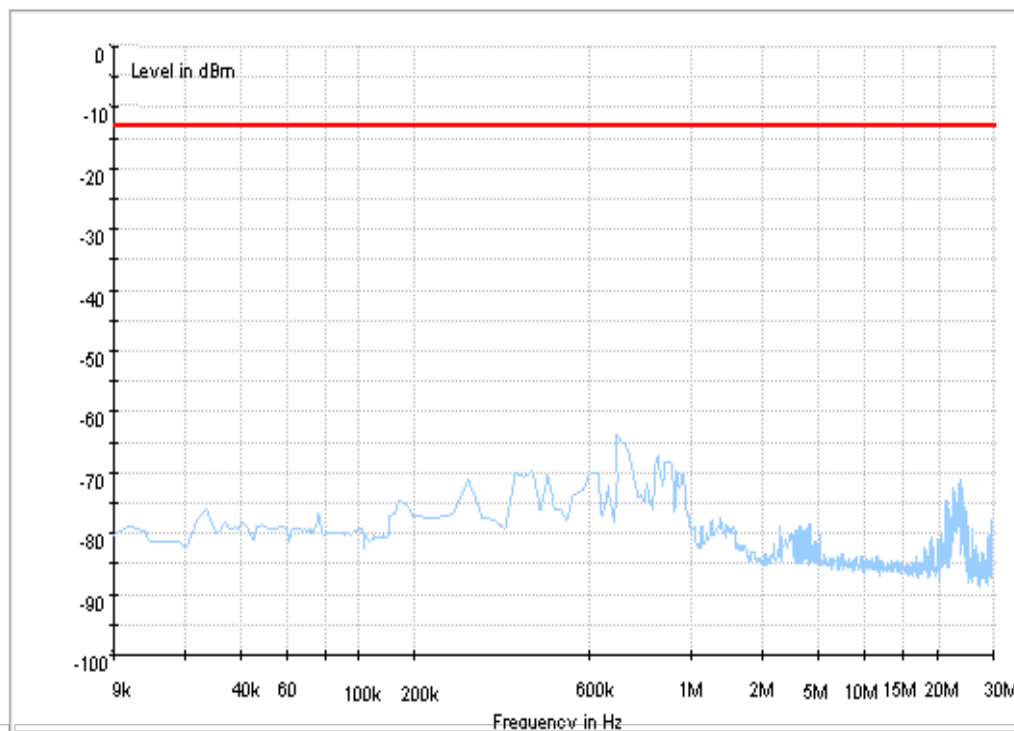


Copy of FCC PART22 GSM850\_H

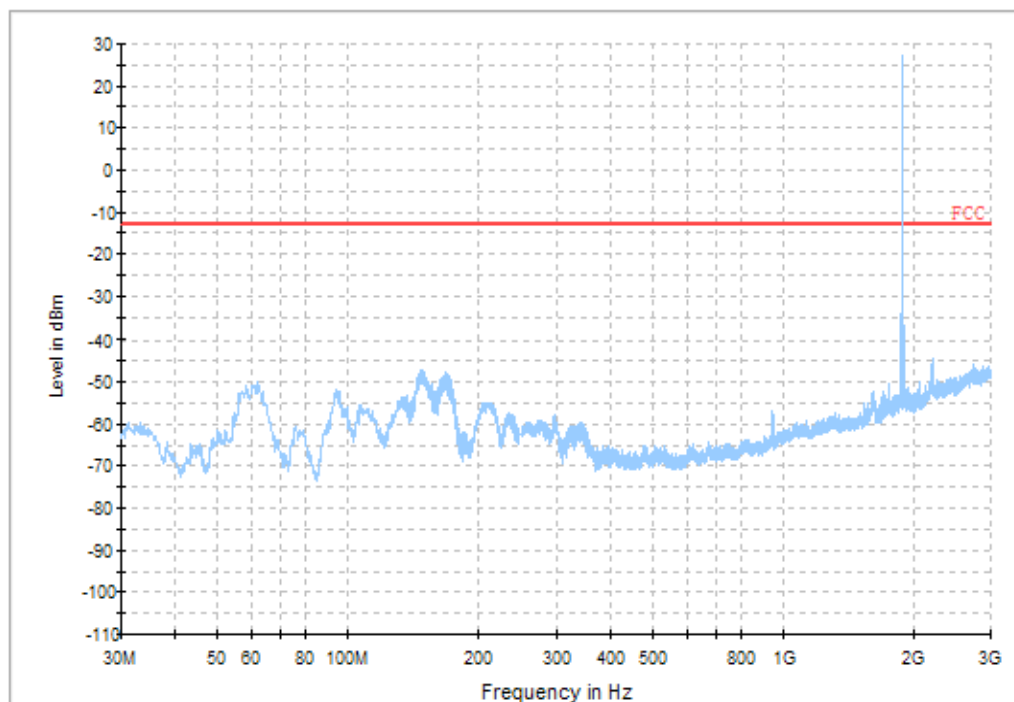


## 7.1.2 Test Band = GSM1900

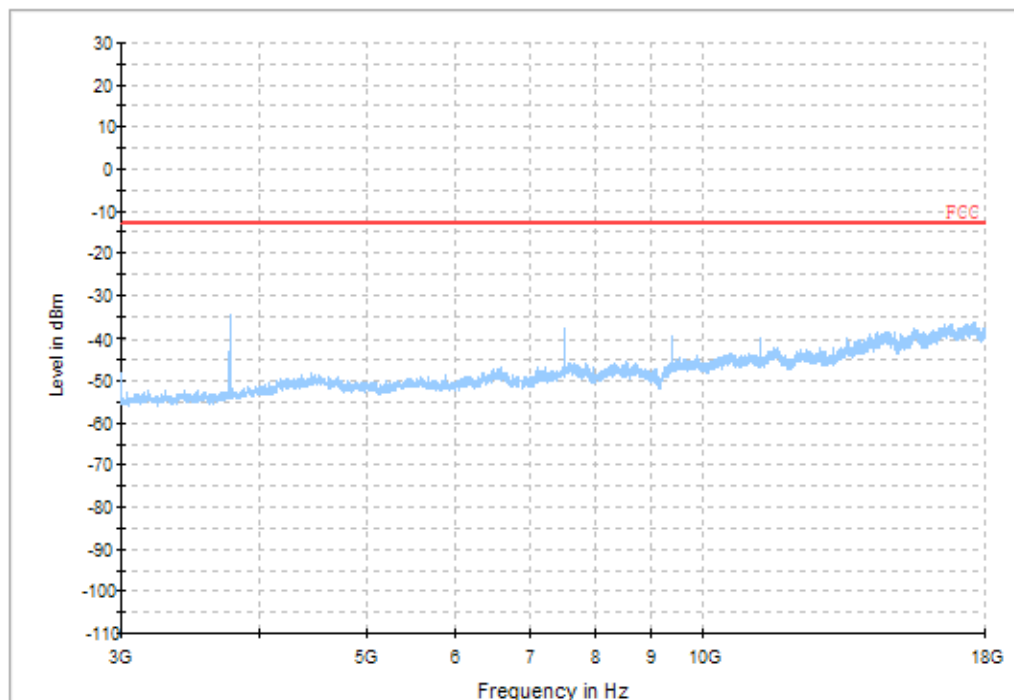
### 7.1.2.1 Test Mode = GSM/TM1

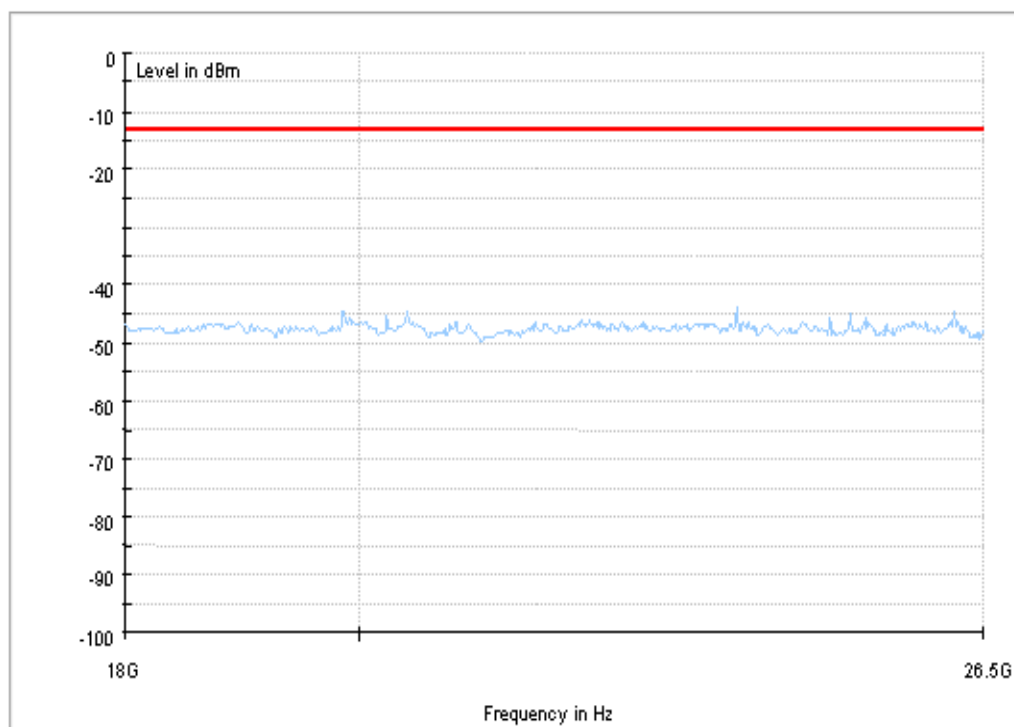


Copy of FCC PART24 GSM1900\_L

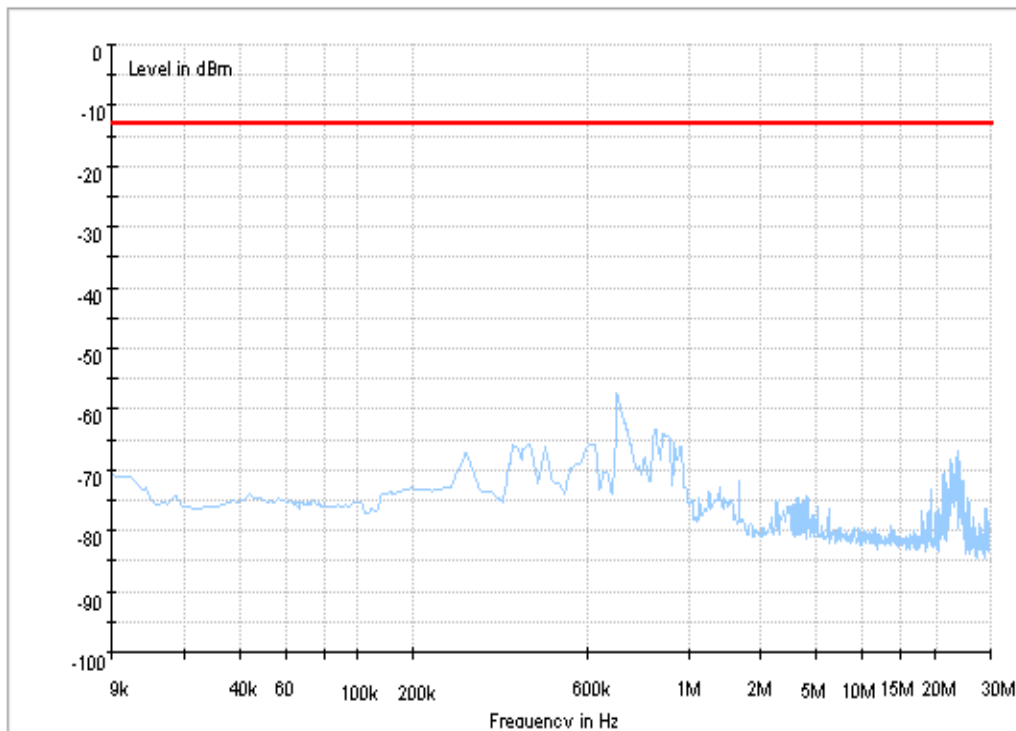


Copy of FCC PART24 GSM1900\_H

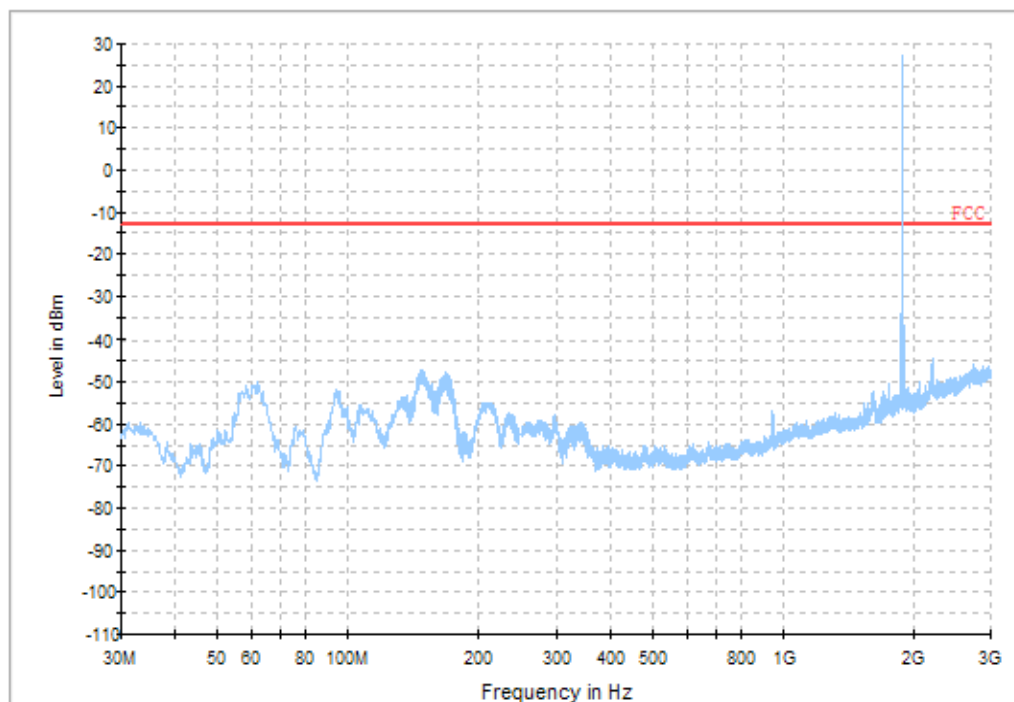




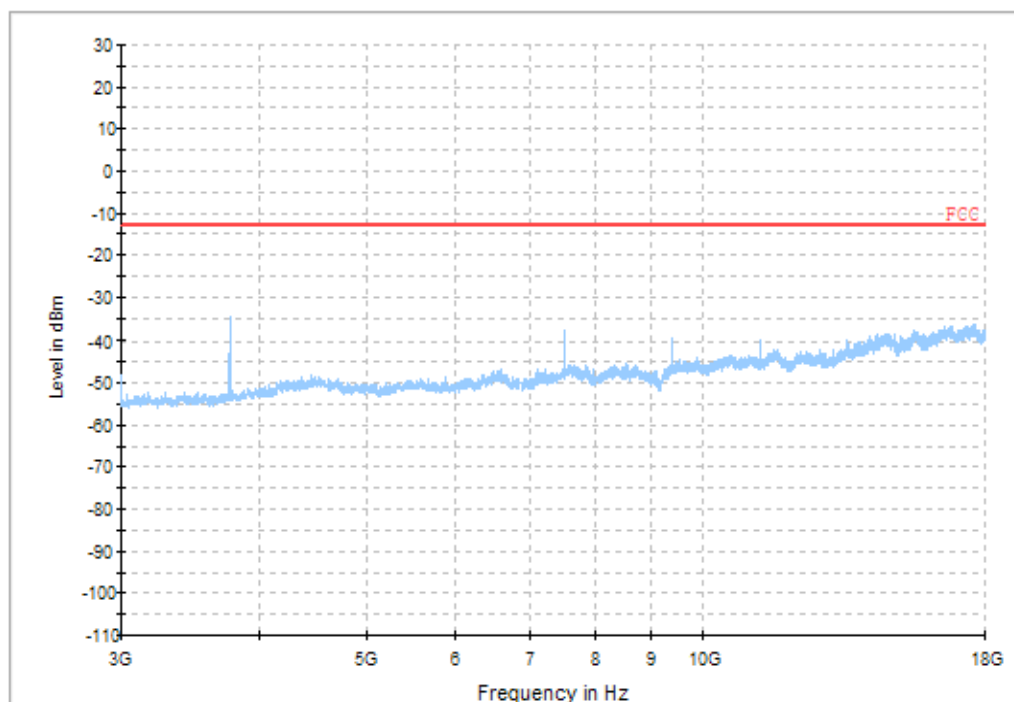
### 7.1.2.2 Test Mode = GSM/TM2

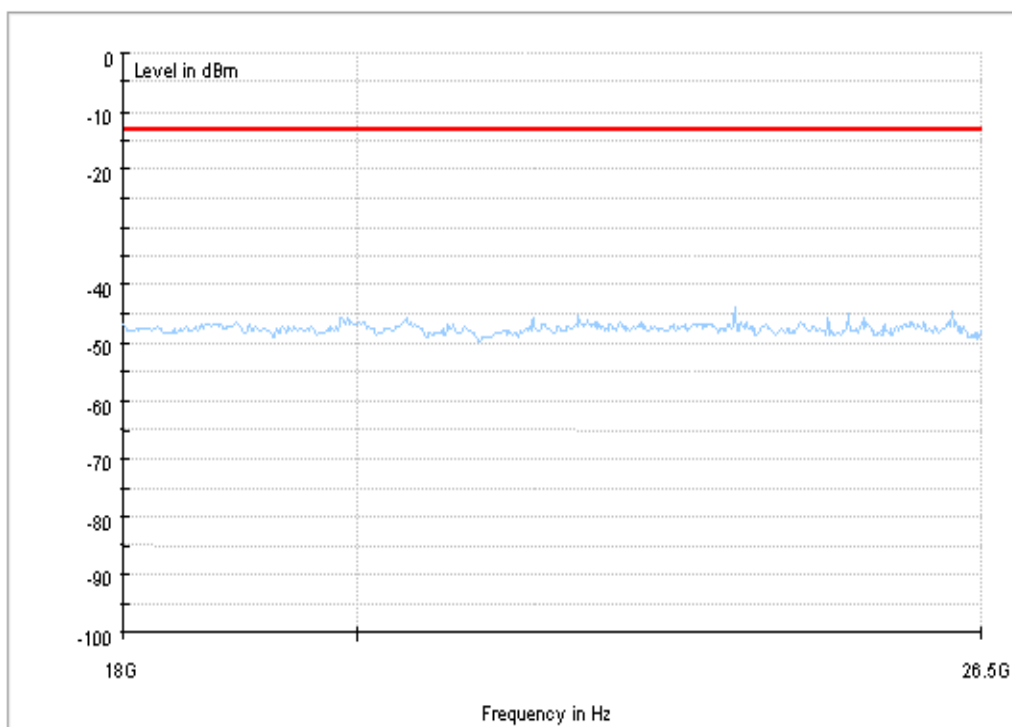


Copy of FCC PART24 GSM1900\_L



Copy of FCC PART24 GSM1900\_H

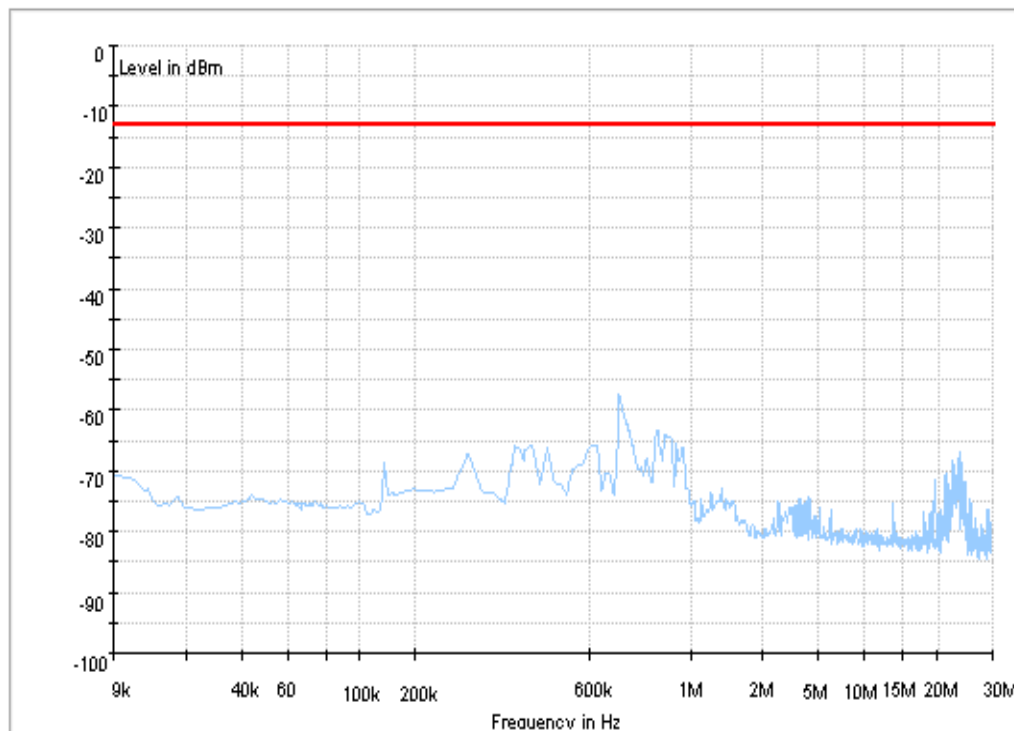




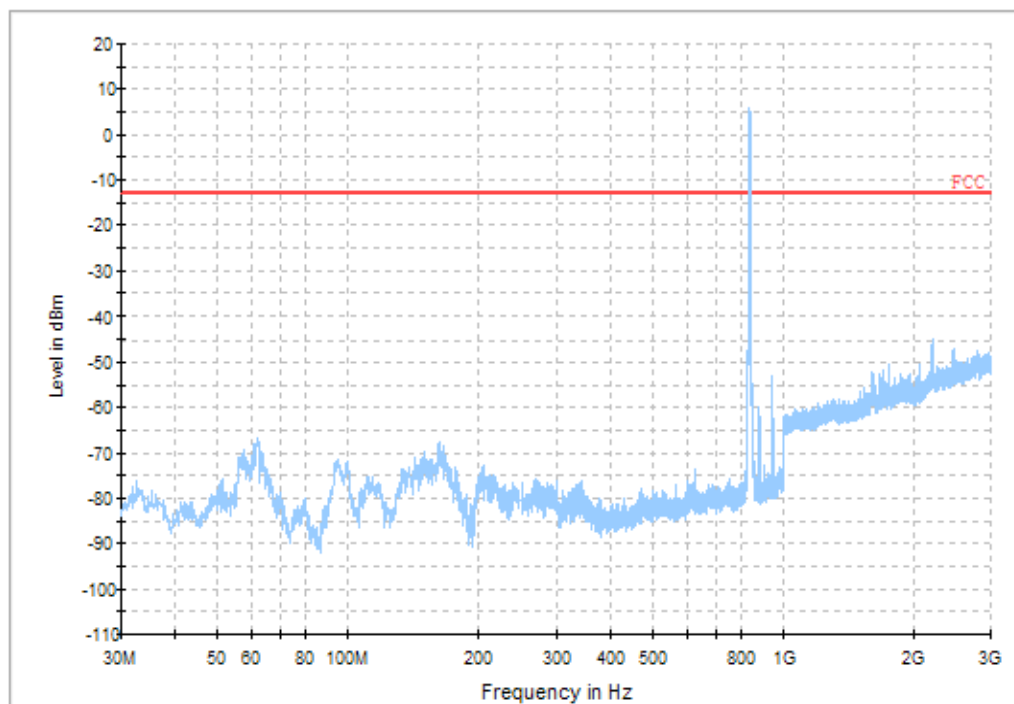
## 7.2 For UMTS

### 7.2.1 Test Band = WCDMA850

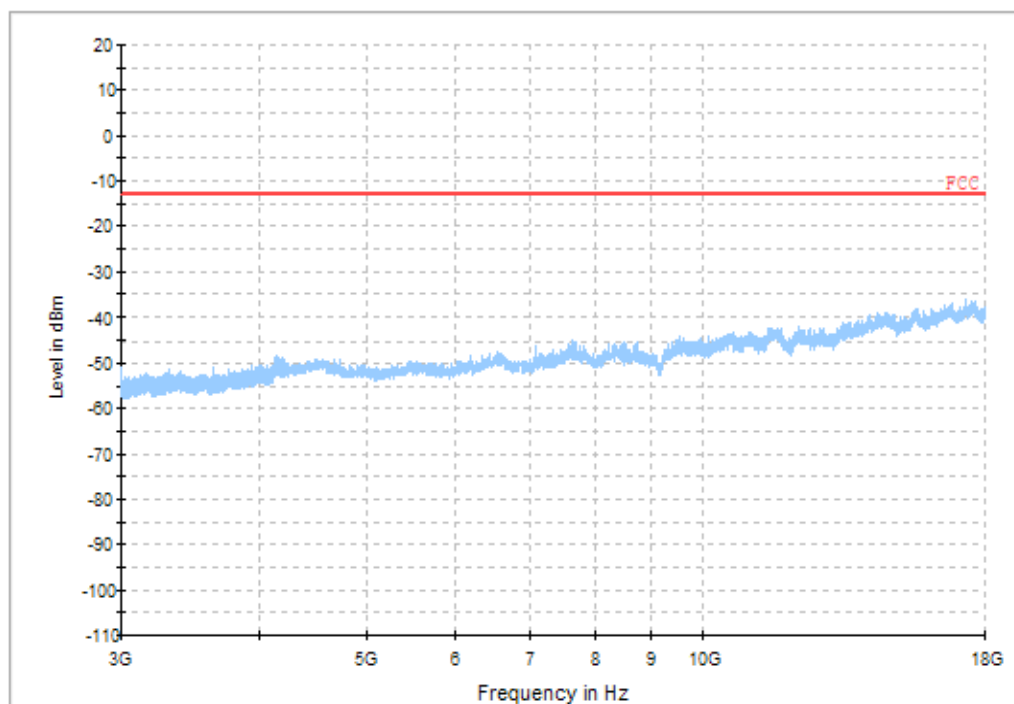
#### 7.2.1.1 Test Mode = UMTS/TM1



Copy of FCC PART22 WCDMA850\_L

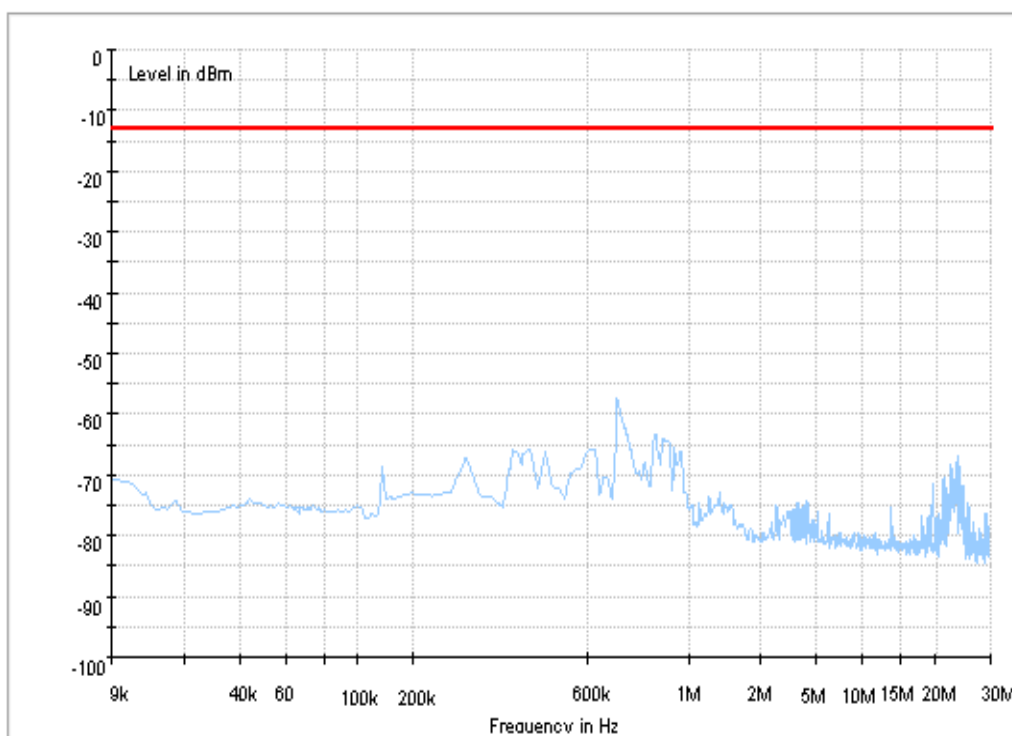


Copy of FCC PART22 WCDMA850\_H

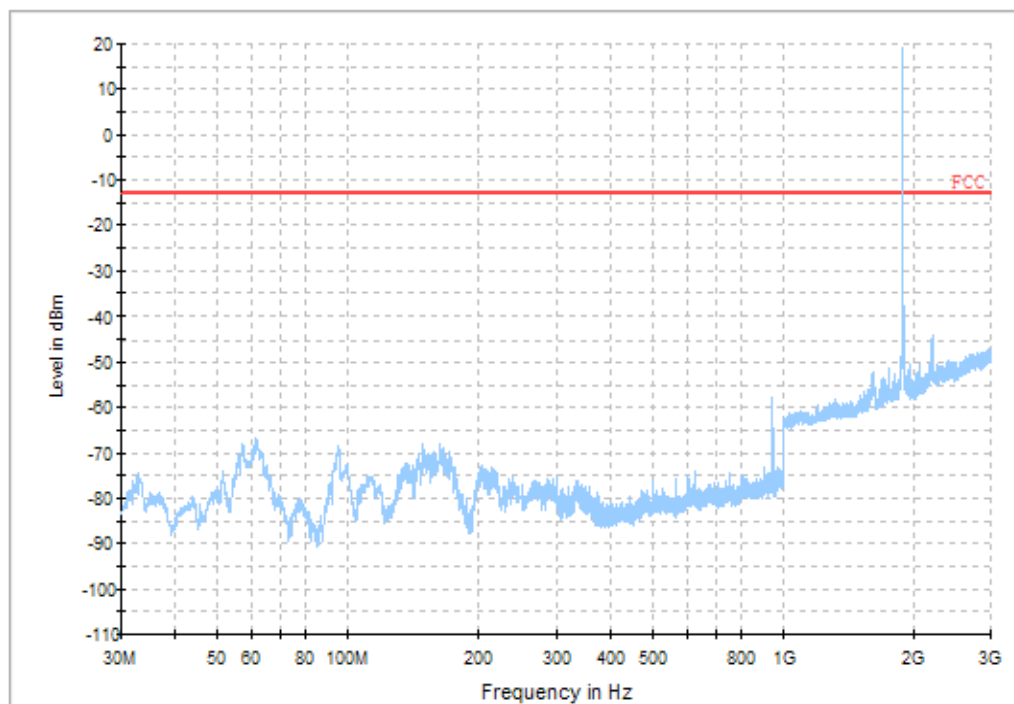


## 7.2.2 Test Band = WCDMA1900

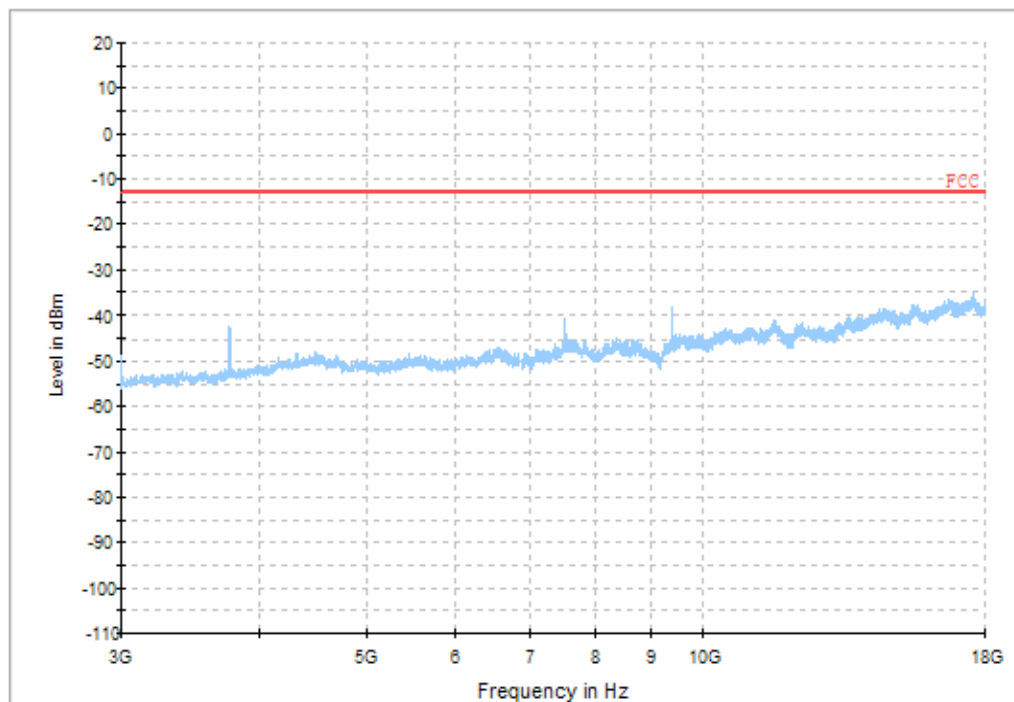
### 7.2.2.1 Test Mode = UMTS/TM1

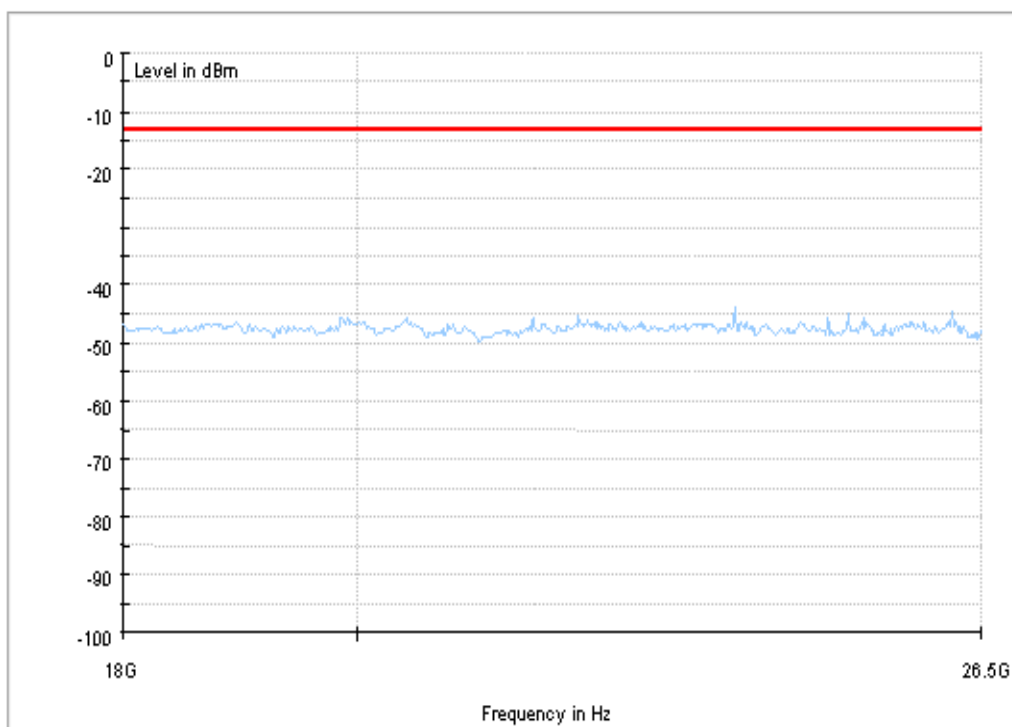


Copy of FCC PART24 WCDMA1900\_L



Copy of FCC PART24 WCDMA1900\_H





## 8Appendix\_H: Frequency Stability

### 8.1 For GSM

#### 8.1.1Frequency Error vs. Voltage:

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| GSM850    | GSM/TM1   | LCH          | TN         | VL         | -6.07            | -0.00736              | PASS    |
|           |           |              |            | VN         | -3.16            | -0.00383              | PASS    |
|           |           |              |            | VH         | -9.56            | -0.0116               | PASS    |
|           |           | MCH          | TN         | VL         | -9.1             | -0.01088              | PASS    |
|           |           |              |            | VN         | -3.23            | -0.00386              | PASS    |
|           |           |              |            | VH         | -9.81            | -0.01173              | PASS    |
|           |           | HCH          | TN         | VL         | -9.75            | -0.01149              | PASS    |
|           |           |              |            | VN         | -7.81            | -0.0092               | PASS    |
|           |           |              |            | VH         | -5.42            | -0.00639              | PASS    |
|           | GSM/TM2   | LCH          | TN         | VL         | -5.26            | -0.00638              | PASS    |
|           |           |              |            | VN         | -9.78            | -0.01187              | PASS    |
|           |           |              |            | VH         | -2.39            | -0.0029               | PASS    |
|           |           | MCH          | TN         | VL         | 0.74             | 0.00088               | PASS    |
|           |           |              |            | VN         | -7.3             | -0.00873              | PASS    |
|           |           |              |            | VH         | 6.68             | 0.00798               | PASS    |
|           |           | HCH          | TN         | VL         | -6.65            | -0.00783              | PASS    |
|           |           |              |            | VN         | -3.36            | -0.00396              | PASS    |
|           |           |              |            | VH         | -5.23            | -0.00616              | PASS    |
| GSM1900   | GSM/TM1   | LCH          | TN         | VL         | 3.16             | 0.00171               | PASS    |
|           |           |              |            | VN         | -7.04            | -0.0038               | PASS    |
|           |           |              |            | VH         | -9.43            | -0.0051               | PASS    |
|           |           | MCH          | TN         | VL         | -1.03            | -0.00055              | PASS    |
|           |           |              |            | VN         | 6.97             | 0.00371               | PASS    |
|           |           |              |            | VH         | 9.23             | 0.00491               | PASS    |
|           |           | HCH          | TN         | VL         | -9.23            | -0.00483              | PASS    |
|           |           |              |            | VN         | -1.23            | -0.00064              | PASS    |
|           |           |              |            | VH         | -6.46            | -0.00338              | PASS    |
|           | GSM/TM2   | LCH          | TN         | VL         | -15.4            | -0.00832              | PASS    |
|           |           |              |            | VN         | -3.23            | -0.00175              | PASS    |
|           |           |              |            | VH         | -15.3            | -0.00827              | PASS    |

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           | MCH          | TN         | VL         | 14.53            | 0.00773               | PASS    |
|           |           |              |            | VN         | 19.82            | 0.01054               | PASS    |
|           |           |              |            | VH         | -2.45            | -0.0013               | PASS    |
|           |           | HCH          | TN         | VL         | -1.26            | -0.00066              | PASS    |
|           |           |              |            | VN         | -4               | -0.00209              | PASS    |
|           |           |              |            | VH         | -15.46           | -0.0081               | 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 |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| GSM850    | GSM/TM1   | LCH          | VN         | -30        | -8.07            | -0.00979              | PASS    |
|           |           |              |            | -20        | -6.33            | -0.00768              | PASS    |
|           |           |              |            | -10        | -8.65            | -0.0105               | PASS    |
|           |           |              |            | 0          | -7.81            | -0.00948              | PASS    |
|           |           |              |            | 10         | -2               | -0.00243              | PASS    |
|           |           |              |            | 20         | -15.37           | -0.01865              | PASS    |
|           |           |              |            | 30         | -2.97            | -0.0036               | PASS    |
|           |           |              |            | 40         | -1.87            | -0.00227              | PASS    |
|           |           |              |            | 50         | -11.69           | -0.01418              | PASS    |
|           |           | MCH          | VN         | -30        | -3.1             | -0.00371              | PASS    |
|           |           |              |            | -20        | -5.49            | -0.00656              | PASS    |
|           |           |              |            | -10        | -7.81            | -0.00934              | PASS    |
|           |           |              |            | 0          | -4.78            | -0.00571              | PASS    |
|           |           |              |            | 10         | 0.84             | 0.001                 | PASS    |
|           |           |              |            | 20         | -7.36            | -0.0088               | PASS    |
|           |           |              |            | 30         | -5.62            | -0.00672              | PASS    |
|           |           |              |            | 40         | -2.32            | -0.00277              | PASS    |
|           |           |              |            | 50         | -4.71            | -0.00563              | PASS    |
|           |           | HCH          | VN         | -30        | -9.17            | -0.0108               | PASS    |
|           |           |              |            | -20        | -7.04            | -0.00829              | PASS    |
|           |           |              |            | -10        | -7.43            | -0.00875              | PASS    |
|           |           |              |            | 0          | -6.46            | -0.00761              | PASS    |
|           |           |              |            | 10         | -3.87            | -0.00456              | PASS    |
|           |           |              |            | 20         | -4.26            | -0.00502              | PASS    |
|           |           |              |            | 30         | -3.87            | -0.00456              | PASS    |
|           |           |              |            | 40         | -1.03            | -0.00121              | PASS    |
|           |           |              |            | 50         | -1.55            | -0.00183              | PASS    |
|           | GSM/TM2   | LCH          | VN         | -30        | -0.16            | -0.00019              | PASS    |
|           |           |              |            | -20        | -2.26            | -0.00274              | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | -10        | 1.39             | 0.00169               | PASS    |
|           |           |              |            | 0          | -5.75            | -0.00698              | PASS    |
|           |           |              |            | 10         | -11.95           | -0.0145               | PASS    |
|           |           |              |            | 20         | -1.23            | -0.00149              | PASS    |
|           |           |              |            | 30         | -10.33           | -0.01253              | PASS    |
|           |           |              |            | 40         | -11.04           | -0.01339              | PASS    |
|           |           |              |            | 50         | -6.1             | -0.0074               | PASS    |
|           |           | MCH          | VN         | -30        | -8.2             | -0.0098               | PASS    |
|           |           |              |            | -20        | -4.78            | -0.00571              | PASS    |
|           |           |              |            | -10        | -0.39            | -0.00047              | PASS    |
|           |           |              |            | 0          | -6.42            | -0.00767              | PASS    |
|           |           |              |            | 10         | -1.84            | -0.0022               | PASS    |
|           |           |              |            | 20         | 1.68             | 0.00201               | PASS    |
|           |           |              |            | 30         | -3.42            | -0.00409              | PASS    |
|           |           |              |            | 40         | -8.2             | -0.0098               | PASS    |
|           |           |              |            | 50         | 0.1              | 0.00012               | PASS    |
|           |           | HCH          | VN         | -30        | -9.81            | -0.01156              | PASS    |
|           |           |              |            | -20        | 1.84             | 0.00217               | PASS    |
|           |           |              |            | -10        | 0.77             | 0.00091               | PASS    |
|           |           |              |            | 0          | -8.85            | -0.01043              | PASS    |
|           |           |              |            | 10         | -4.94            | -0.00582              | PASS    |
|           |           |              |            | 20         | -8.07            | -0.00951              | PASS    |
|           |           |              |            | 30         | -4.91            | -0.00578              | PASS    |
|           |           |              |            | 40         | -4.07            | -0.0048               | PASS    |
|           |           |              |            | 50         | -6.81            | -0.00802              | PASS    |
| GSM1900   | GSM/TM1   | LCH          | VN         | -30        | -10.65           | -0.00576              | PASS    |
|           |           |              |            | -20        | 5.17             | 0.00279               | PASS    |
|           |           |              |            | -10        | -2.2             | -0.00119              | PASS    |
|           |           |              |            | 0          | -4.07            | -0.0022               | PASS    |
|           |           |              |            | 10         | 5.88             | 0.00318               | PASS    |
|           |           |              |            | 20         | -4.46            | -0.00241              | PASS    |
|           |           |              |            | 30         | -2.97            | -0.00161              | PASS    |
|           |           |              |            | 40         | 5.36             | 0.0029                | PASS    |
|           |           |              |            | 50         | -10.98           | -0.00593              | PASS    |
|           |           | MCH          | VN         | -30        | -2.97            | -0.00158              | PASS    |
|           |           |              |            | -20        | 7.62             | 0.00405               | PASS    |
|           |           |              |            | -10        | 13.37            | 0.00711               | PASS    |
|           |           |              |            | 0          | 4.84             | 0.00257               | PASS    |
|           |           |              |            | 10         | 1.49             | 0.00079               | PASS    |
|           |           |              |            | 20         | 11.36            | 0.00604               | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 30         | 2.2              | 0.00117               | PASS    |
|           |           |              |            | 40         | 17.37            | 0.00924               | PASS    |
|           |           |              |            | 50         | 5.88             | 0.00313               | PASS    |
|           |           | HCH          | VN         | -30        | 1.23             | 0.00064               | PASS    |
|           |           |              |            | -20        | 3.16             | 0.00165               | PASS    |
|           |           |              |            | -10        | -7.75            | -0.00406              | PASS    |
|           |           |              |            | 0          | -9.88            | -0.00517              | PASS    |
|           |           |              |            | 10         | -0.06            | -0.00003              | PASS    |
|           |           |              |            | 20         | -11.49           | -0.00602              | PASS    |
|           |           |              |            | 30         | -1.68            | -0.00088              | PASS    |
|           |           |              |            | 40         | -2.71            | -0.00142              | PASS    |
|           |           |              |            | 50         | -2.58            | -0.00135              | PASS    |
|           | GSM/TM2   | LCH          | VN         | -30        | -1.42            | -0.00077              | PASS    |
|           |           |              |            | -20        | 9.4              | 0.00508               | PASS    |
|           |           |              |            | -10        | -2.71            | -0.00146              | PASS    |
|           |           |              |            | 0          | -12.79           | -0.00691              | PASS    |
|           |           |              |            | 10         | -3.33            | -0.0018               | PASS    |
|           |           |              |            | 20         | 2.68             | 0.00145               | PASS    |
|           |           |              |            | 30         | -3.33            | -0.0018               | PASS    |
|           |           |              |            | 40         | -9.91            | -0.00536              | PASS    |
|           |           |              |            | 50         | -4.55            | -0.00246              | PASS    |
|           |           | MCH          | VN         | -30        | 16.43            | 0.00874               | PASS    |
|           |           |              |            | -20        | 9.46             | 0.00503               | PASS    |
|           |           |              |            | -10        | 1                | 0.00053               | PASS    |
|           |           |              |            | 0          | 2.84             | 0.00151               | PASS    |
|           |           |              |            | 10         | 19.27            | 0.01025               | PASS    |
|           |           |              |            | 20         | 10.46            | 0.00556               | PASS    |
|           |           |              |            | 30         | 26.99            | 0.01436               | PASS    |
|           |           |              |            | 40         | 10.72            | 0.0057                | PASS    |
|           |           |              |            | 50         | -0.32            | -0.00017              | PASS    |
|           |           | HCH          | VN         | -30        | 3.87             | 0.00203               | PASS    |
|           |           |              |            | -20        | -23.18           | -0.01214              | PASS    |
|           |           |              |            | -10        | 1.97             | 0.00103               | PASS    |
|           |           |              |            | 0          | -6.04            | -0.00316              | PASS    |
|           |           |              |            | 10         | 2.94             | 0.00154               | PASS    |
|           |           |              |            | 20         | -11.27           | -0.0059               | PASS    |
|           |           |              |            | 30         | 14.56            | 0.00762               | PASS    |
|           |           |              |            | 40         | 16.08            | 0.00842               | PASS    |
|           |           |              |            | 50         | -8.36            | -0.00438              | PASS    |

## 8.2 For UMTS

### 8.2.1 Frequency Error vs. Voltage:

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| WCDMA850  | UMTS/TM1  | LCH          | TN         | VL         | 3.02             | 0.00365               | PASS    |
|           |           |              |            | VN         | 4.04             | 0.00489               | PASS    |
|           |           |              |            | VH         | 1.82             | 0.0022                | PASS    |
|           |           | MCH          | TN         | VL         | -0.34            | -0.00041              | PASS    |
|           |           |              |            | VN         | 0.96             | 0.00115               | PASS    |
|           |           |              |            | VH         | 0.32             | 0.00038               | PASS    |
|           |           | HCH          | TN         | VL         | -0.37            | -0.00044              | PASS    |
|           |           |              |            | VN         | 1.05             | 0.00124               | PASS    |
|           |           |              |            | VH         | 0.2              | 0.00024               | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | TN         | VL         | -5.46            | -0.00295              | PASS    |
|           |           |              |            | VN         | -1.51            | -0.00082              | PASS    |
|           |           |              |            | VH         | -1.36            | -0.00073              | PASS    |
|           |           | MCH          | TN         | VL         | -4.38            | -0.00233              | PASS    |
|           |           |              |            | VN         | -4.76            | -0.00253              | PASS    |
|           |           |              |            | VH         | -4.81            | -0.00256              | PASS    |
|           |           | HCH          | TN         | VL         | -6.12            | -0.00321              | PASS    |
|           |           |              |            | VN         | -4.43            | -0.00232              | PASS    |
|           |           |              |            | VH         | -7.68            | -0.00403              | PASS    |

### 8.2.2 Frequency Error vs. Temperature:

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| WCDMA850  | UMTS/TM1  | LCH          | VN         | -30        | 1.92             | 0.00232               | PASS    |
|           |           |              |            | -20        | -0.12            | -0.00015              | PASS    |
|           |           |              |            | -10        | 2.4              | 0.0029                | PASS    |
|           |           |              |            | 0          | -0.08            | -0.0001               | PASS    |
|           |           |              |            | 10         | 0.7              | 0.00085               | PASS    |
|           |           |              |            | 20         | 0.55             | 0.00067               | PASS    |
|           |           |              |            | 30         | -0.14            | -0.00017              | PASS    |
|           |           |              |            | 40         | -1.11            | -0.00134              | PASS    |
|           |           |              |            | 50         | 1.24             | 0.0015                | PASS    |
|           |           | MCH          | VN         | -30        | -1.02            | -0.00122              | PASS    |
|           |           |              |            | -20        | -2.32            | -0.00277              | PASS    |
|           |           |              |            | -10        | -1.5             | -0.00179              | PASS    |
|           |           |              |            | 0          | 1.77             | 0.00212               | PASS    |
|           |           |              |            | 10         | -0.64            | -0.00077              | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 20         | -1.17            | -0.0014               | PASS    |
|           |           |              |            | 30         | -1.51            | -0.00181              | PASS    |
|           |           |              |            | 40         | -0.81            | -0.00097              | PASS    |
|           |           |              |            | 50         | 2.84             | 0.0034                | PASS    |
|           |           | HCH          | VN         | -30        | 0.18             | 0.00021               | PASS    |
|           |           |              |            | -20        | -1.45            | -0.00171              | PASS    |
|           |           |              |            | -10        | -0.92            | -0.00109              | PASS    |
|           |           |              |            | 0          | -0.93            | -0.0011               | PASS    |
|           |           |              |            | 10         | 2.44             | 0.00288               | PASS    |
|           |           |              |            | 20         | -0.2             | -0.00024              | PASS    |
|           |           |              |            | 30         | 2.85             | 0.00337               | PASS    |
|           |           |              |            | 40         | 2.24             | 0.00265               | PASS    |
|           |           |              |            | 50         | -0.14            | -0.00017              | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | VN         | -30        | -3.33            | -0.0018               | PASS    |
|           |           |              |            | -20        | -6.79            | -0.00367              | PASS    |
|           |           |              |            | -10        | -3.75            | -0.00202              | PASS    |
|           |           |              |            | 0          | -5.71            | -0.00308              | PASS    |
|           |           |              |            | 10         | -5.05            | -0.00273              | PASS    |
|           |           |              |            | 20         | -5.63            | -0.00304              | PASS    |
|           |           |              |            | 30         | -6.15            | -0.00332              | PASS    |
|           |           |              |            | 40         | -4.99            | -0.00269              | PASS    |
|           |           |              |            | 50         | -6.35            | -0.00343              | PASS    |
|           |           | MCH          | VN         | -30        | -6.01            | -0.0032               | PASS    |
|           |           |              |            | -20        | -7.25            | -0.00386              | PASS    |
|           |           |              |            | -10        | -5.62            | -0.00299              | PASS    |
|           |           |              |            | 0          | -6.12            | -0.00326              | PASS    |
|           |           |              |            | 10         | -5.71            | -0.00304              | PASS    |
|           |           |              |            | 20         | -6.5             | -0.00346              | PASS    |
|           |           |              |            | 30         | -5.1             | -0.00271              | PASS    |
|           |           |              |            | 40         | -7.14            | -0.0038               | PASS    |
|           |           |              |            | 50         | -5.16            | -0.00274              | PASS    |
|           |           | HCH          | VN         | -30        | -6.2             | -0.00325              | PASS    |
|           |           |              |            | -20        | -5.6             | -0.00294              | PASS    |
|           |           |              |            | -10        | -5.69            | -0.00298              | PASS    |
|           |           |              |            | 0          | -4.76            | -0.0025               | PASS    |
|           |           |              |            | 10         | -8.56            | -0.00449              | PASS    |
|           |           |              |            | 20         | -5.46            | -0.00286              | PASS    |
|           |           |              |            | 30         | -5.19            | -0.00272              | PASS    |
|           |           |              |            | 40         | -7.31            | -0.00383              | PASS    |
|           |           |              |            | 50         | -9.09            | -0.00477              | PASS    |



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END