



## Appendix for test report

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dBm] | ERP/EIRP [dBm] | Limit [dBm] | Verdict |
|-----------|-----------|--------------|---------------|----------------|-------------|---------|
| GSM850    | GSM/TM1   | LCH          | 32.86         | 26.93          | 38.5        | PASS    |
|           |           | MCH          | 32.88         | 26.95          | 38.5        | PASS    |
|           |           | HCH          | 32.93         | 27             | 38.5        | PASS    |
|           | GSM/TM2   | LCH          | 26.29         | 20.36          | 38.5        | PASS    |
|           |           | MCH          | 26.28         | 20.35          | 38.5        | PASS    |
|           |           | HCH          | 26.23         | 20.3           | 38.5        | PASS    |
| GSM1900   | GSM/TM1   | LCH          | 29.86         | 30.78          | 33          | PASS    |
|           |           | MCH          | 29.62         | 30.54          | 33          | PASS    |
|           |           | HCH          | 29.68         | 30.6           | 33          | PASS    |
|           | GSM/TM2   | LCH          | 25.56         | 26.48          | 33          | PASS    |
|           |           | MCH          | 25.47         | 26.39          | 33          | PASS    |
|           |           | HCH          | 25.38         | 26.3           | 33          | PASS    |

| Test Band | Test Mode | Test Channel | Measured[dBm] | ERP [dBm] | Limit [dBm] | Verdict |
|-----------|-----------|--------------|---------------|-----------|-------------|---------|
| WCDMA850  | UMTS/TM1  | LCH          | 23.99         | 18.06     | 38.5        | PASS    |
|           |           | MCH          | 24.06         | 18.13     | 38.5        | PASS    |
|           |           | HCH          | 24.11         | 18.18     | 38.5        | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | 23.47         | 24.39     | 33          | PASS    |
|           |           | MCH          | 23.35         | 24.27     | 33          | PASS    |
|           |           | HCH          | 23.39         | 24.31     | 33          | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | 23.4          | 24.32     | 30          | PASS    |
|           |           | MCH          | 23.34         | 24.26     | 30          | PASS    |
|           |           | HCH          | 23.39         | 24.31     | 30          | PASS    |



Note1:

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

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

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

b, SGP=Signal Generator Level

Note2:

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

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

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

$$\text{SET Sweep time} = \text{auto-couple.}$$

Detector: RMS

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
|-----------|-----------|--------------|--------------|------------|---------|
| GSM1900   | GSM/TM1   | LCH          | 0.13         | 13         | PASS    |
|           |           | MCH          | 0.11         | 13         | PASS    |
|           |           | HCH          | 0.14         | 13         | PASS    |
|           | GSM/TM2   | LCH          | 2.98         | 13         | PASS    |
|           |           | MCH          | 3            | 13         | PASS    |
|           |           | HCH          | 3.13         | 13         | PASS    |
| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
| WCDMA1900 | UMTS/TM1  | LCH          | 2.47         | 13         | PASS    |
|           |           | MCH          | 2.35         | 13         | PASS    |
|           |           | HCH          | 2.33         | 13         | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | 2.77         | 13         | PASS    |
|           |           | MCH          | 2.48         | 13         | PASS    |
|           |           | HCH          | 2.61         | 13         | PASS    |

## 3Appendix\_C: Modulation Characteristics

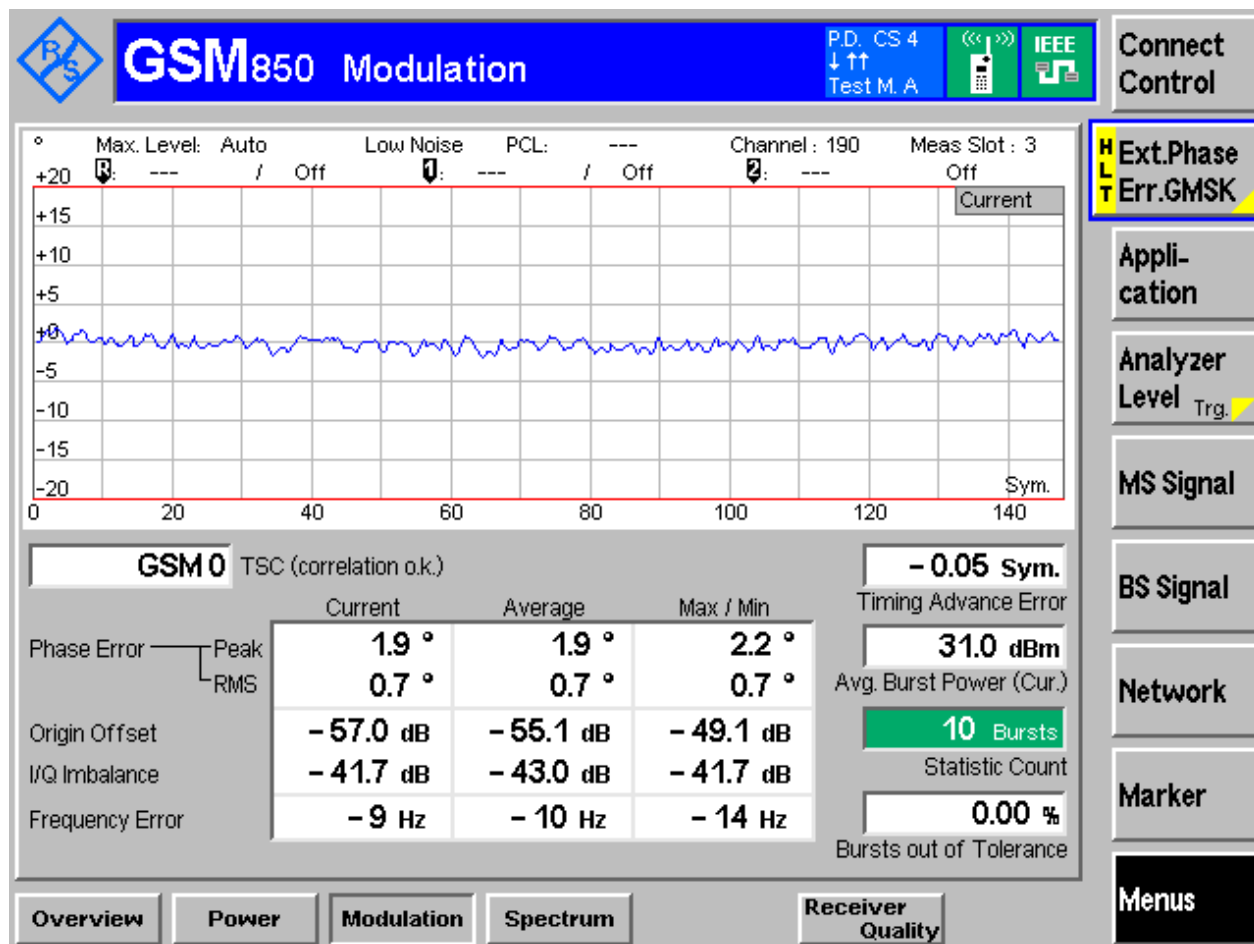
### Part I - Test Plots

#### 3.1 For GSM

##### 3.1.1 Test Band = GSM850

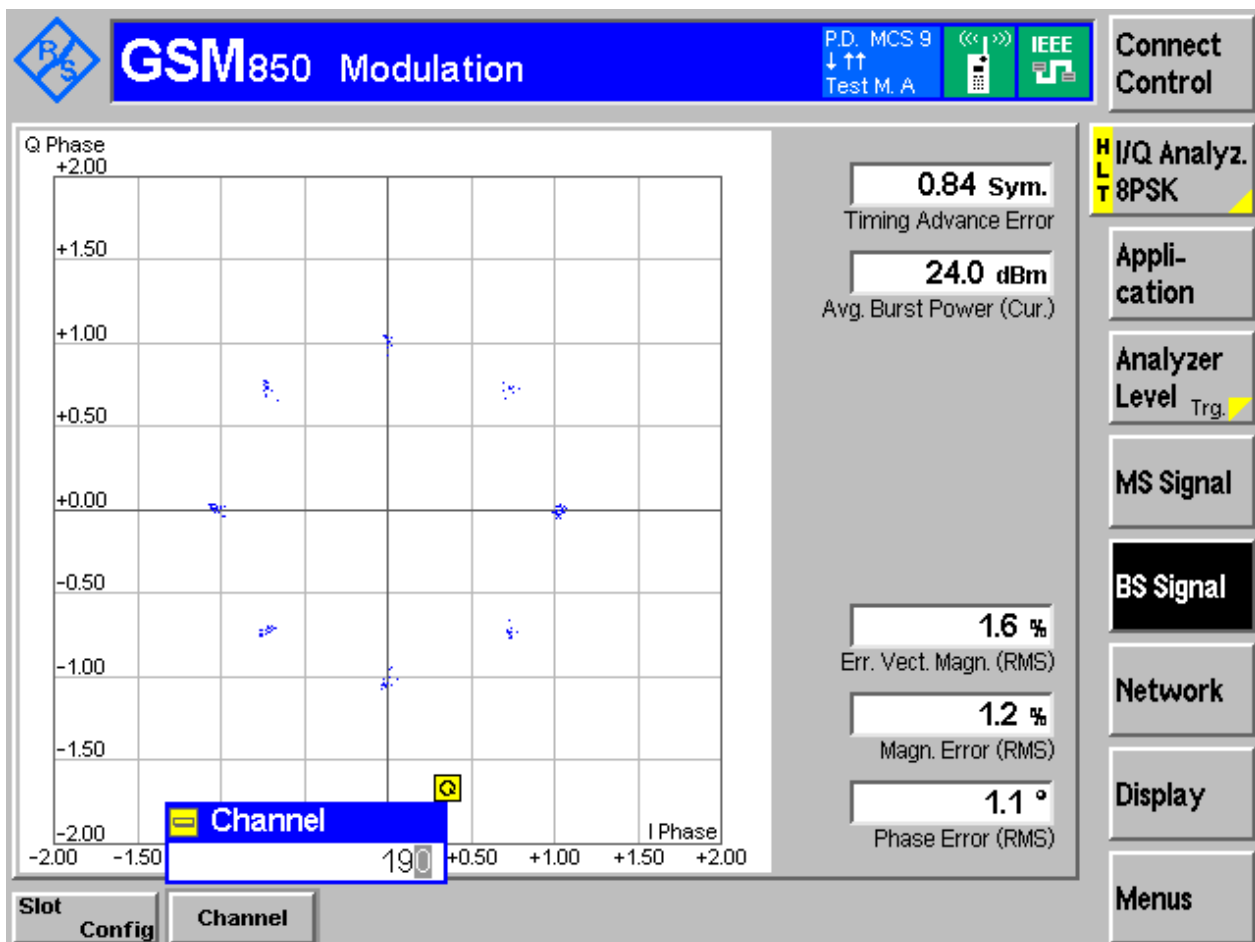
##### 3.1.1.1 Test Mode = GSM/TM1

##### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

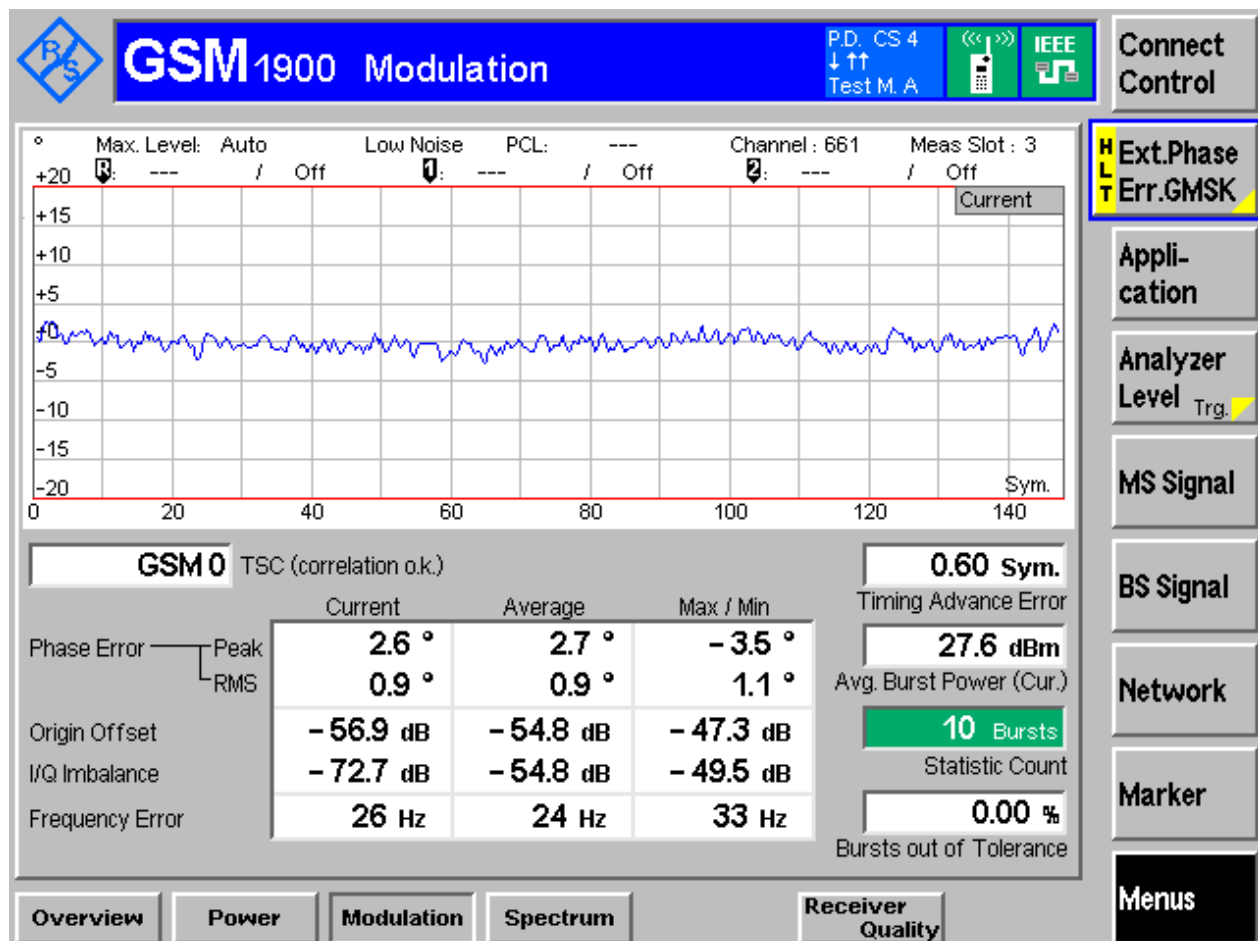
#### 3.1.1.2.1 Test Channel = MCH



### 3.1.2 Test Band = GSM1900

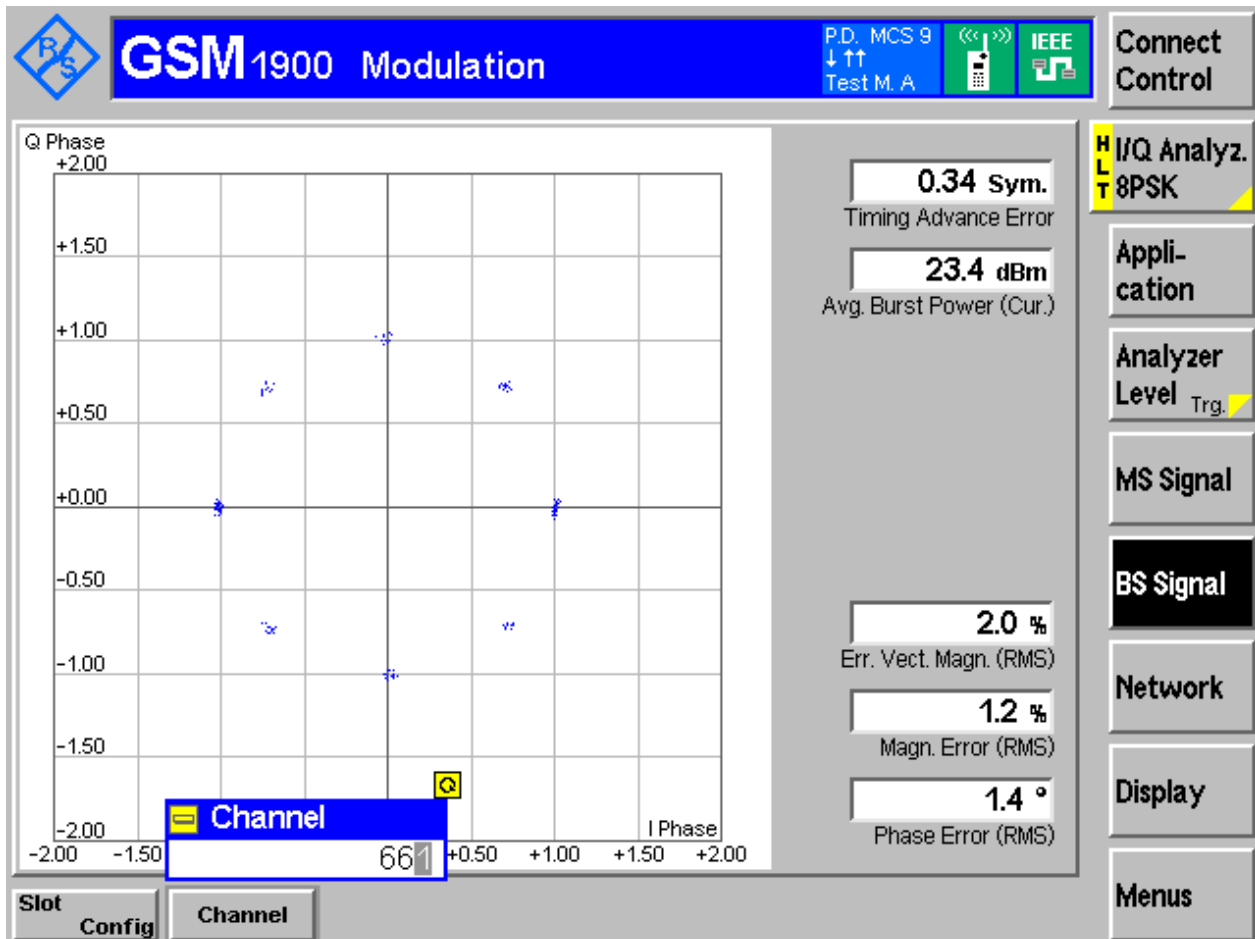
#### 3.1.2.1 Test Mode = GSM/TM1

##### 3.1.2.1.1 Test Channel = MCH



### 3.1.2.2 Test Mode = GSM/TM2

#### 3.1.2.2.1 Test Channel = MCH

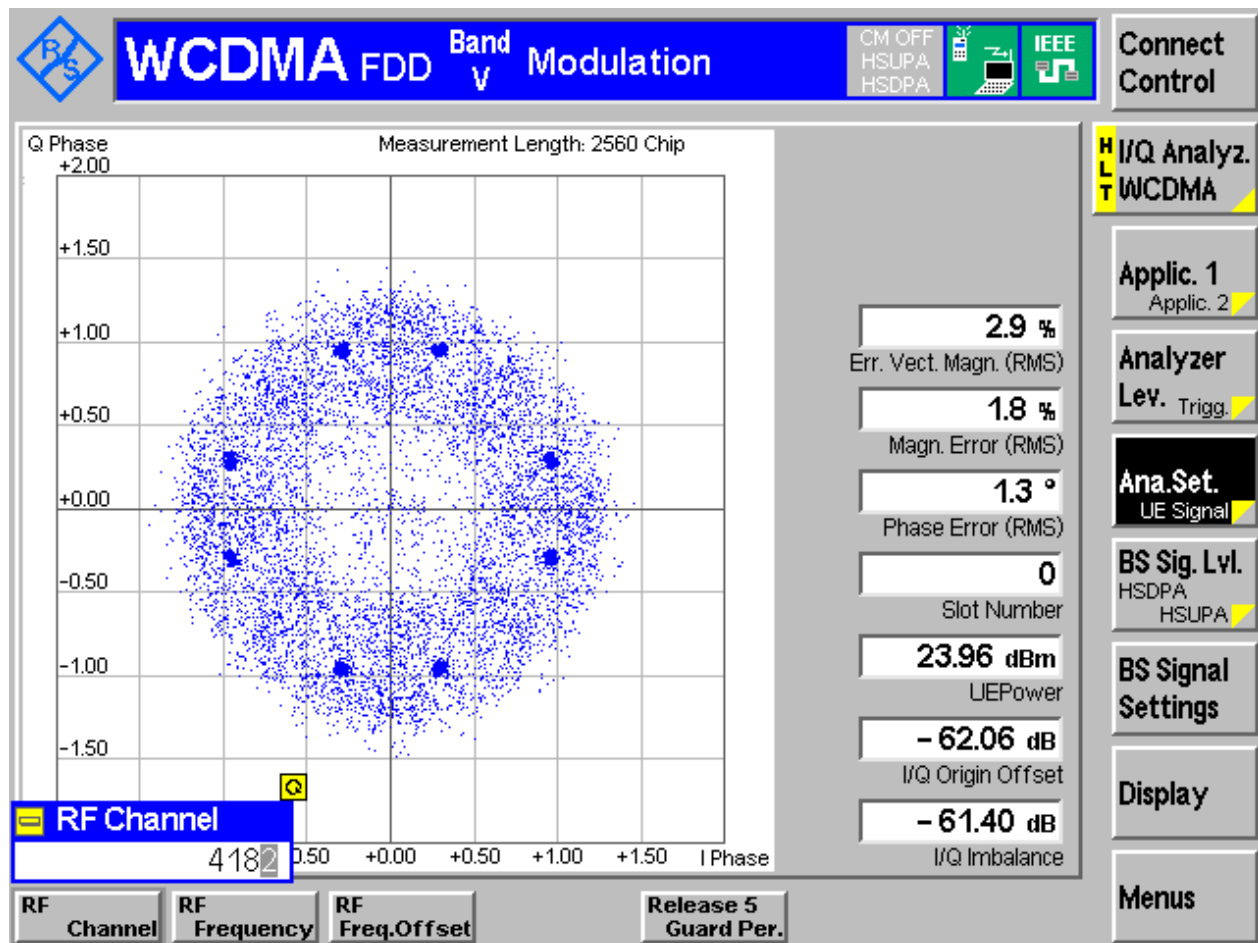


### 3.2 For UMTS

#### 3.2.1 Test Band = WCDMA850

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

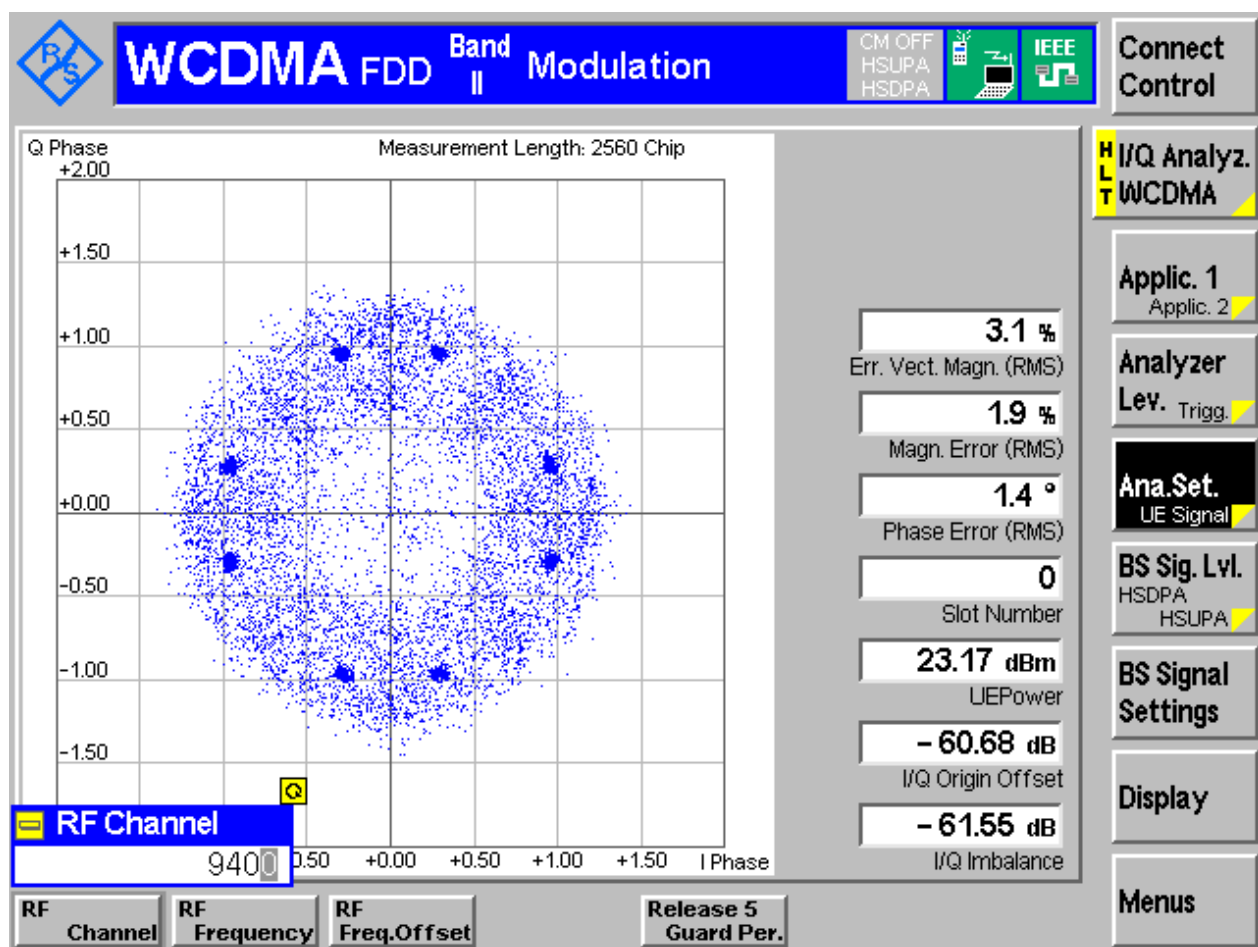
##### 3.2.1.1.1 Test Channel = MCH



### 3.2.2 Test Band = WCDMA1900

#### 3.2.2.1 Test Mode = UMTS/TM1

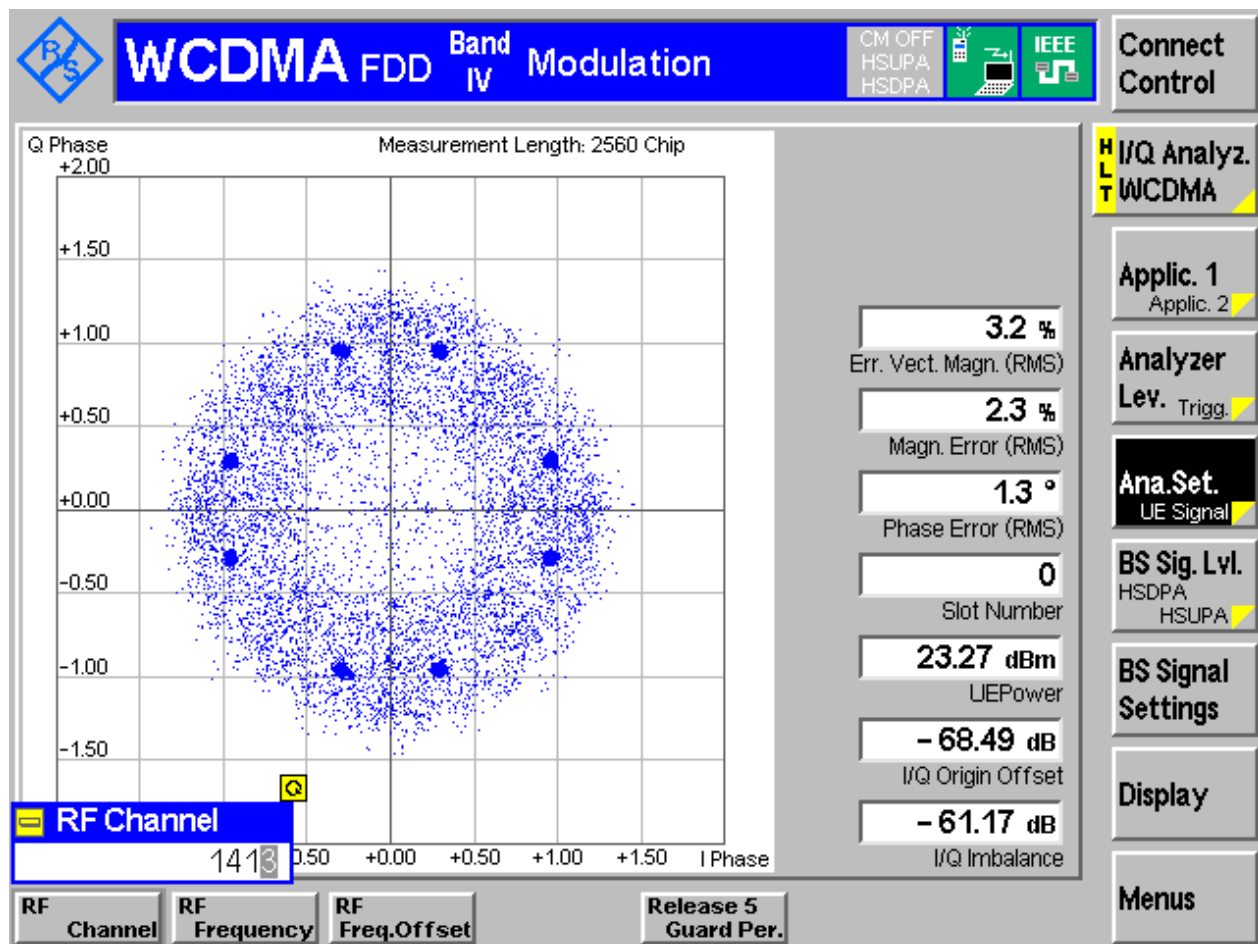
##### 3.2.2.1.1 Test Channel = MCH



### 3.2.3 Test Band = WCDMA1700

#### 3.2.3.1 Test Mode = UMTS/TM1

##### 3.2.3.1.1 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          | 244.97                   | 324.92                   | Pass    |
|           |           | MCH          | 245.23                   | 319.89                   | Pass    |
|           |           | HCH          | 244.86                   | 319.95                   | Pass    |
|           | GSM/TM2   | LCH          | 251.99                   | 323.23                   | Pass    |
|           |           | MCH          | 248.25                   | 323.80                   | Pass    |
|           |           | HCH          | 248.84                   | 318.95                   | Pass    |
| GSM1900   | GSM/TM1   | LCH          | 246.09                   | 320.79                   | Pass    |
|           |           | MCH          | 245.97                   | 315.34                   | Pass    |
|           |           | HCH          | 244.32                   | 320.16                   | Pass    |
|           | GSM/TM2   | LCH          | 249.51                   | 315.22                   | Pass    |
|           |           | MCH          | 249.82                   | 317.23                   | Pass    |
|           |           | HCH          | 243.35                   | 315.94                   | Pass    |
| Test Band | Test Mode | Test Channel | Occupied Bandwidth [MHz] | Emission Bandwidth [MHz] | Verdict |
| WCDMA850  | UMTS/TM1  | LCH          | 4.16                     | 4.74                     | Pass    |
|           |           | MCH          | 4.17                     | 4.72                     | Pass    |
|           |           | HCH          | 4.15                     | 4.73                     | Pass    |
| WCDMA1900 | UMTS/TM1  | LCH          | 4.17                     | 4.75                     | Pass    |
|           |           | MCH          | 4.17                     | 4.76                     | Pass    |
|           |           | HCH          | 4.18                     | 4.80                     | Pass    |
| WCDMA1700 | UMTS/TM1  | LCH          | 4.15                     | 4.73                     | Pass    |
|           |           | MCH          | 4.15                     | 4.73                     | Pass    |
|           |           | HCH          | 4.16                     | 4.73                     | Pass    |



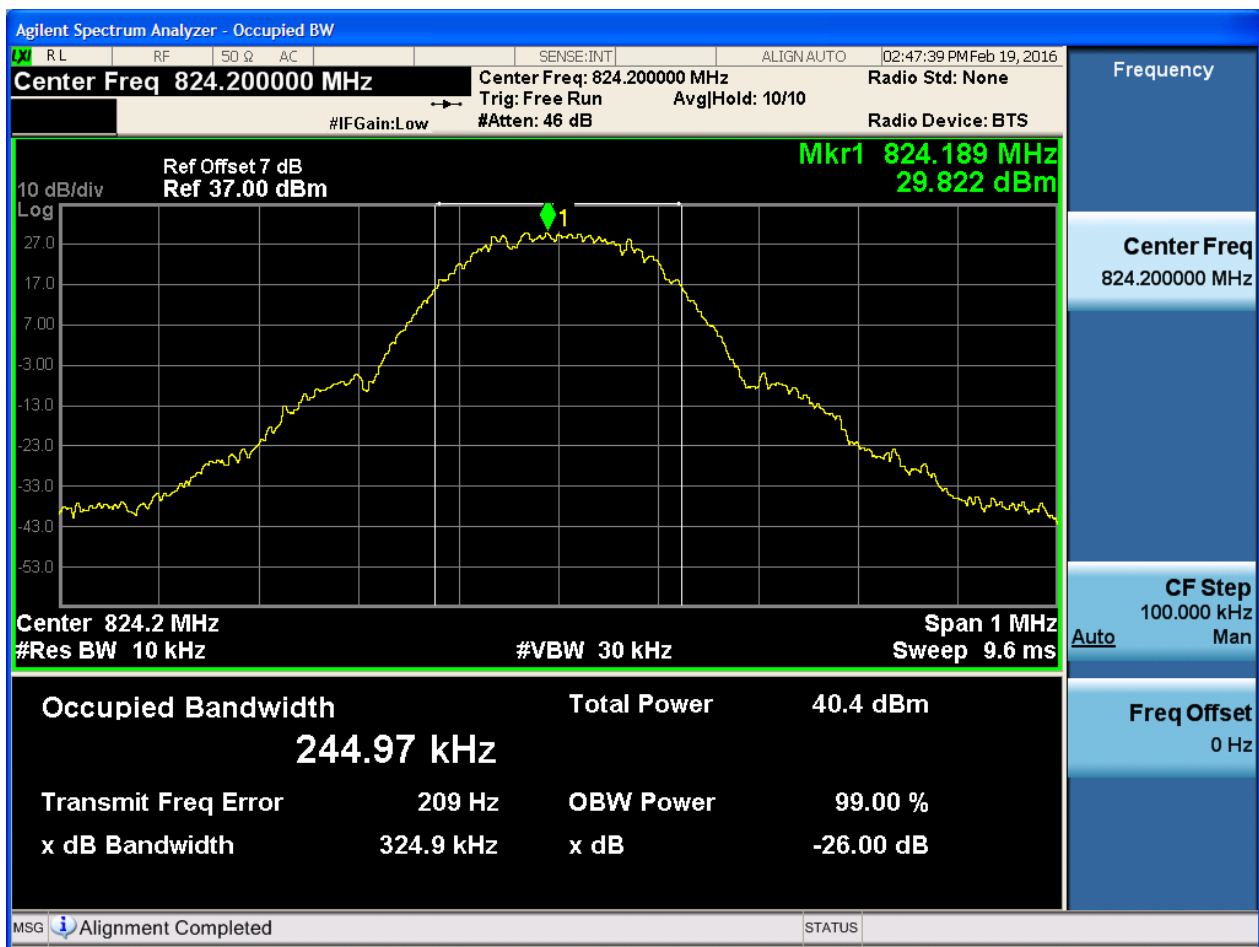
## Part II - Test Plots

### 4.1 For GSM

#### 4.1.1 Test Band = GSM850

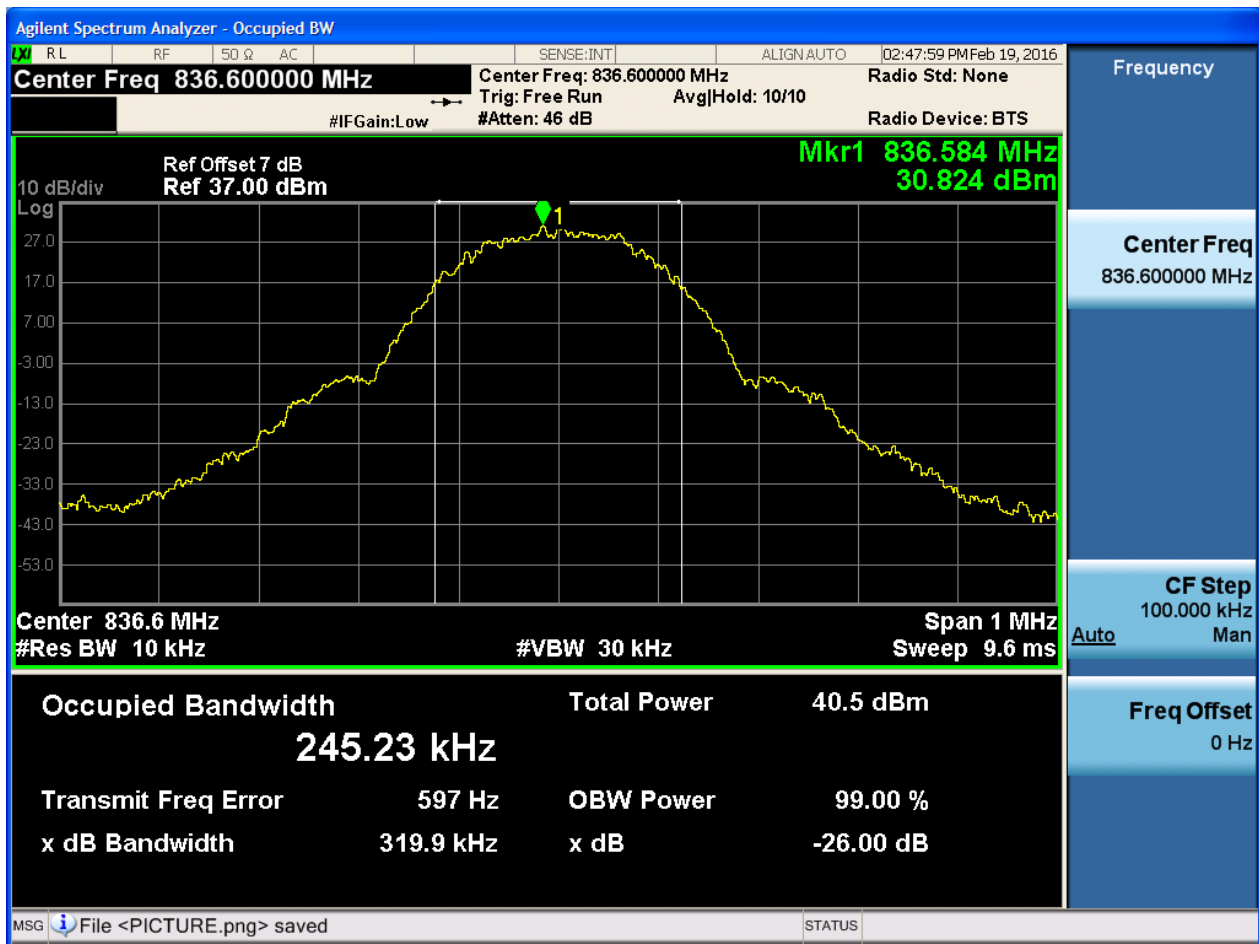
##### 4.1.1.1 Test Mode = GSM/TM1

##### 4.1.1.1.1 Test Channel = LCH



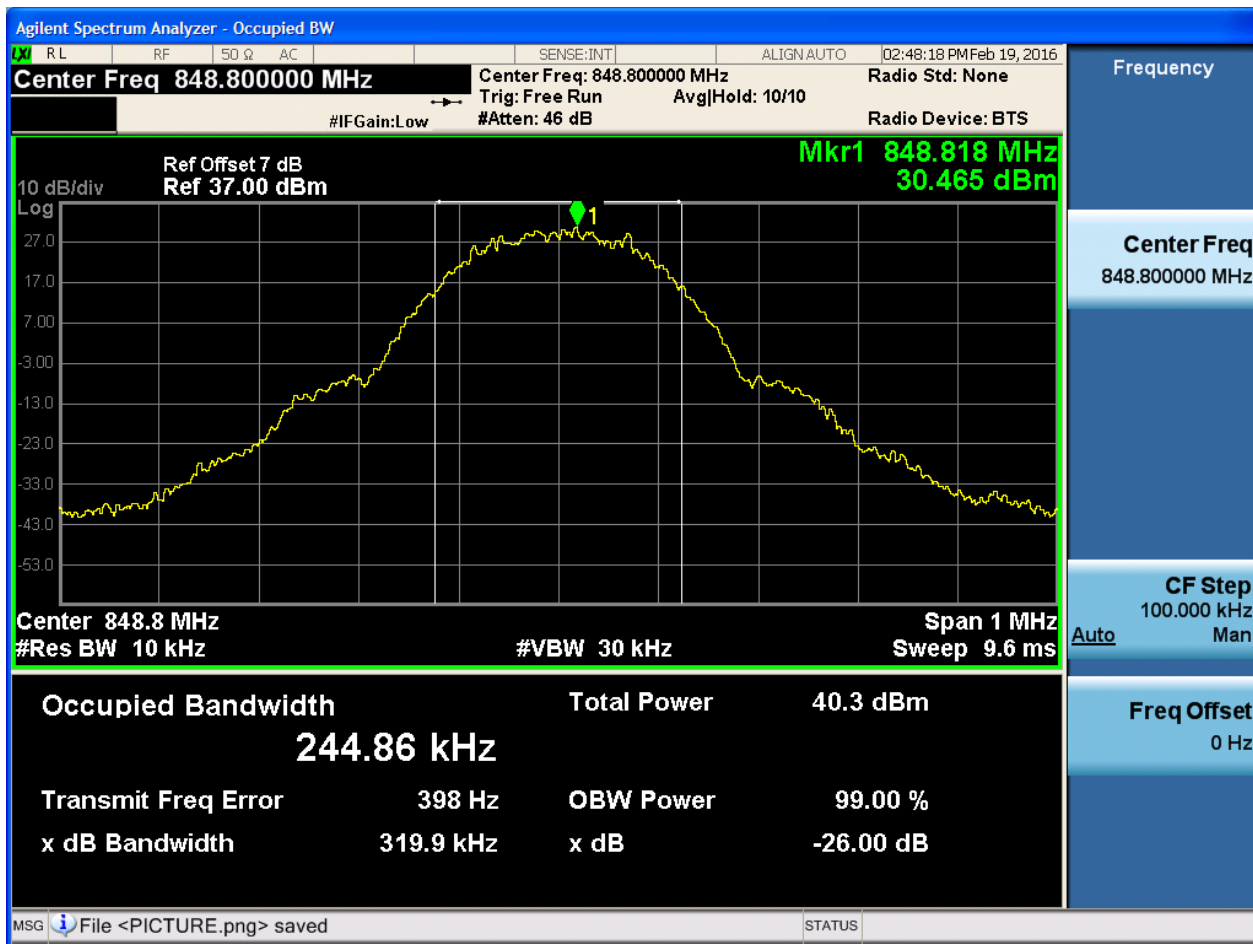


## 4.1.1.1.2 Test Channel = MCH





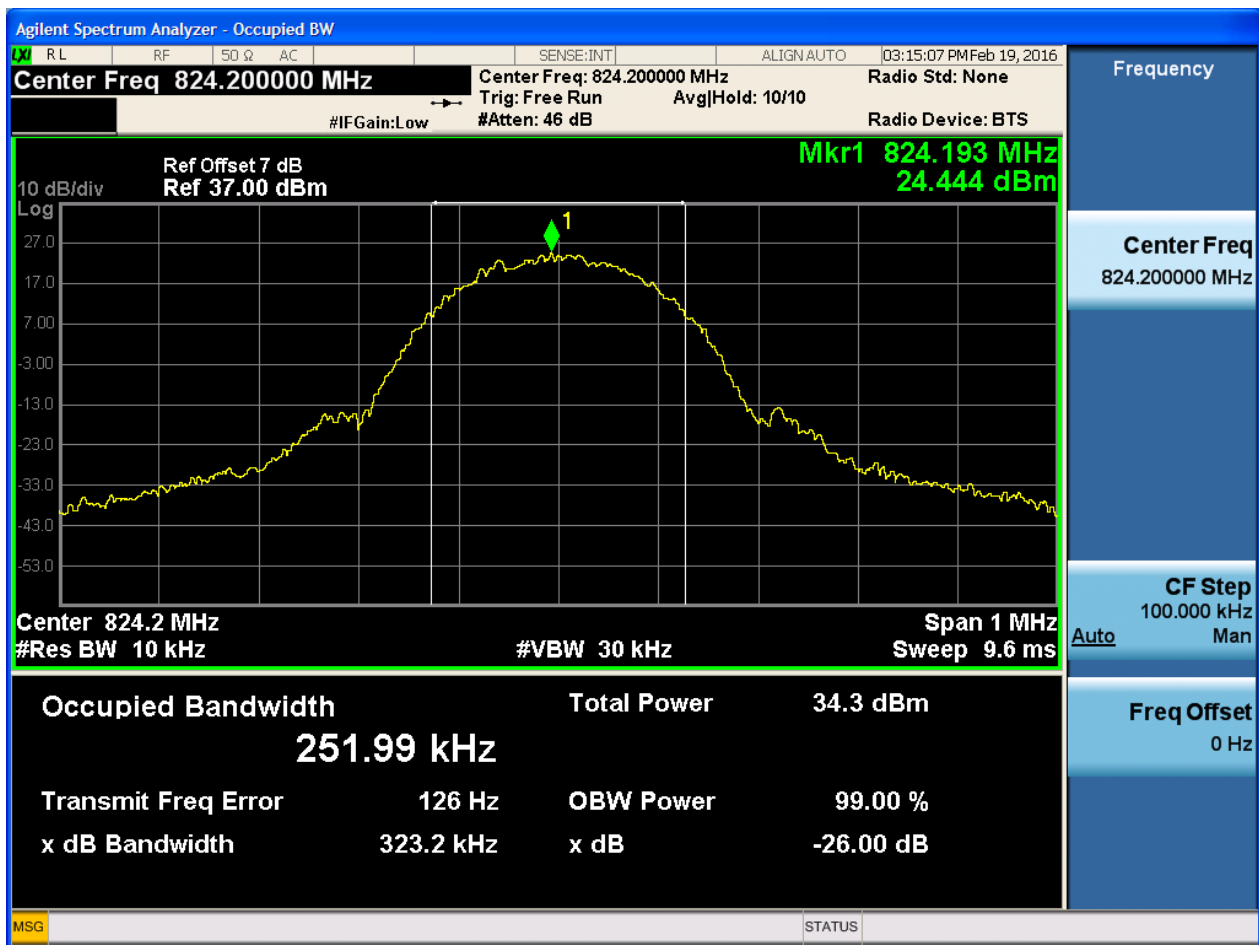
## 4.1.1.1.3 Test Channel = HCH





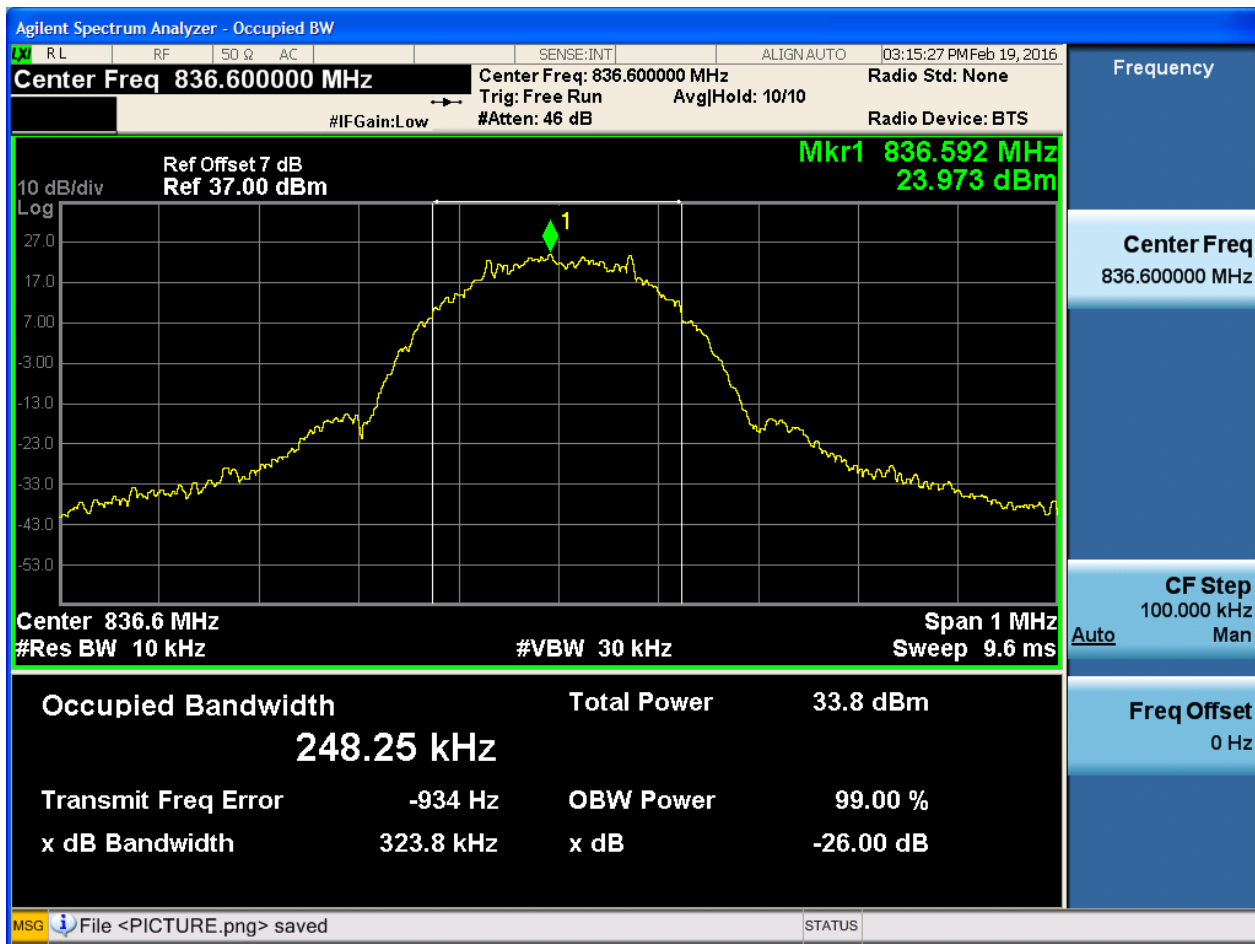
## 4.1.1.2 Test Mode = GSM/TM2

## 4.1.1.2.1 Test Channel = LCH



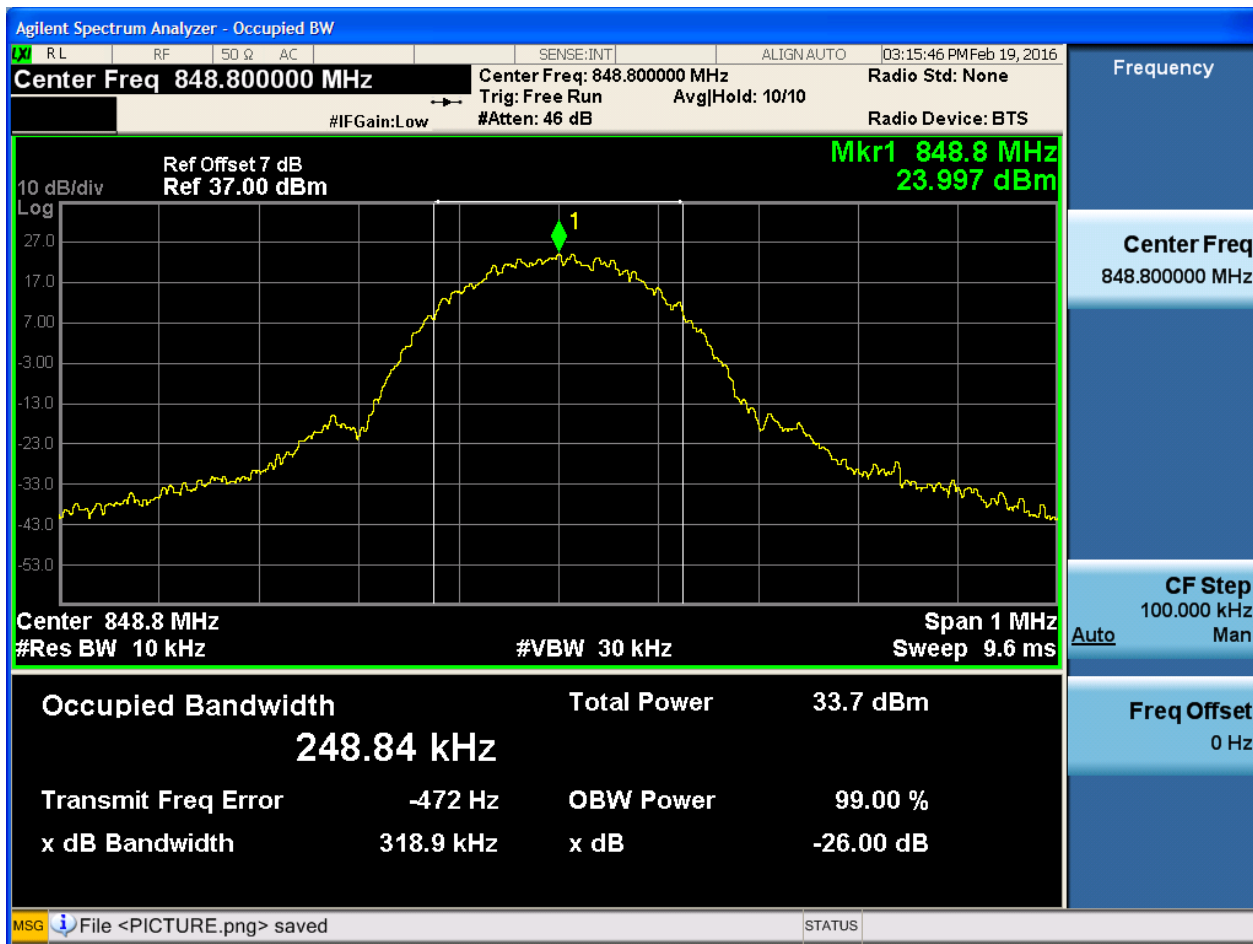


## 4.1.1.2.2 Test Channel = MCH





## 4.1.1.2.3 Test Channel = HCH

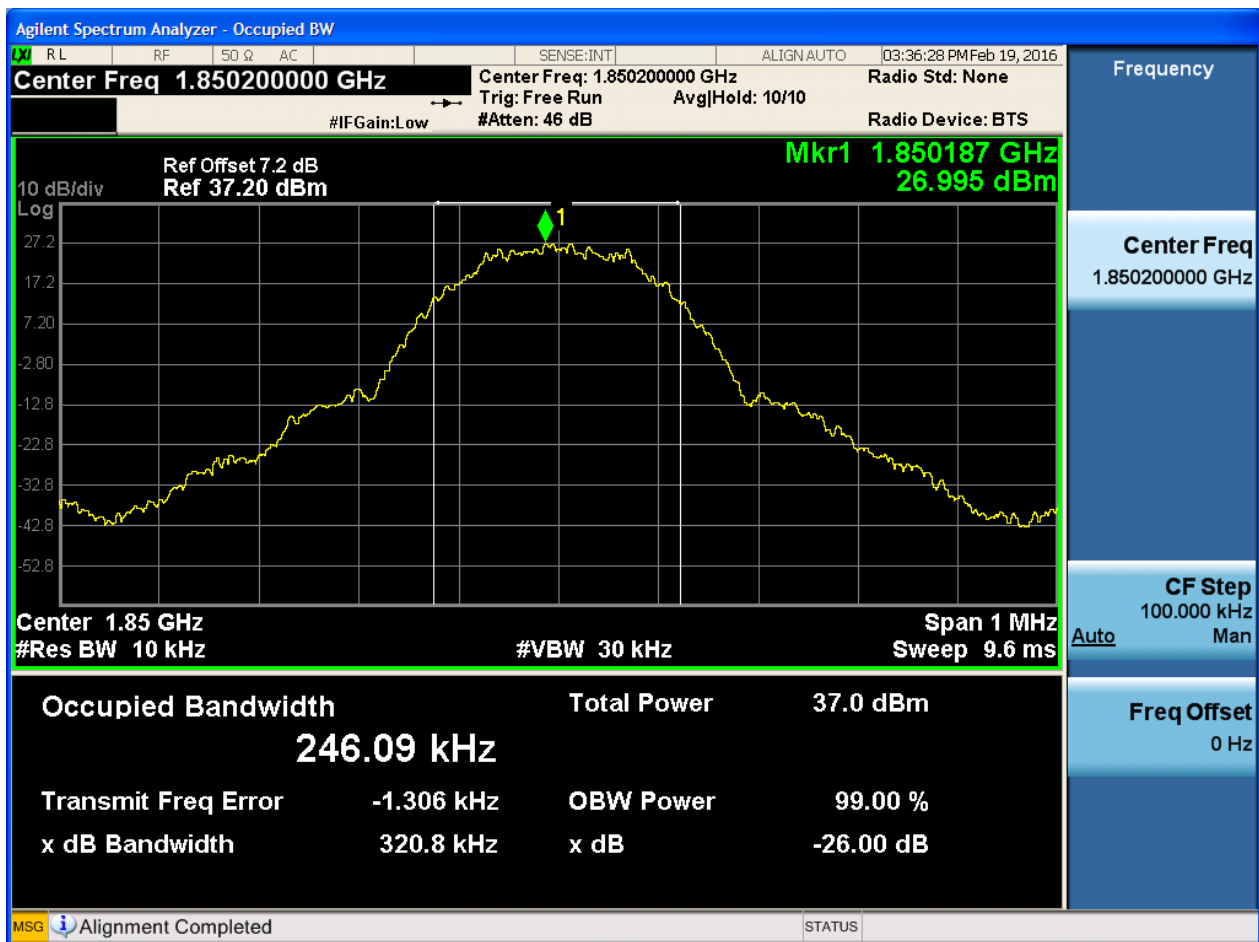




## 4.1.2 Test Band = GSM1900

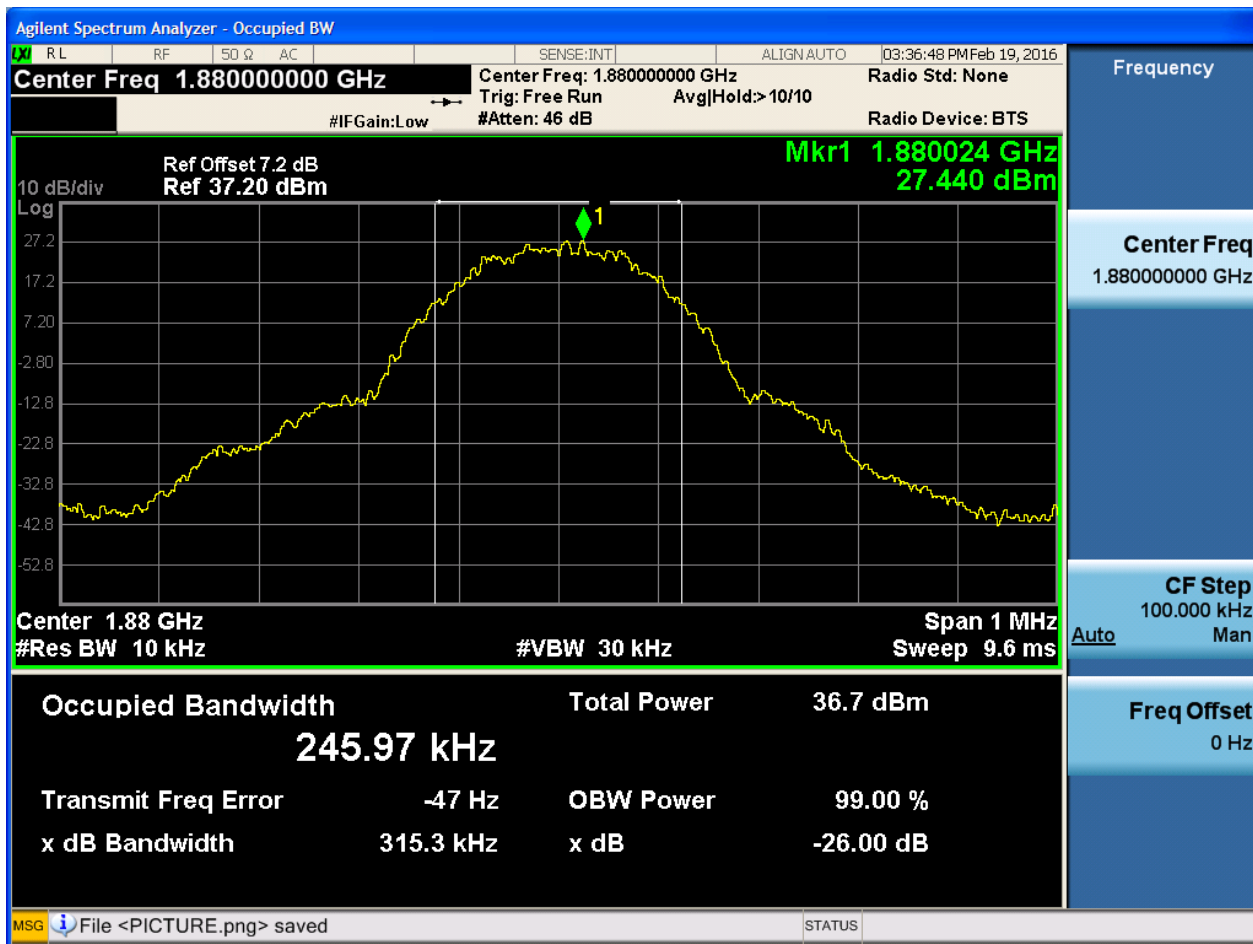
## 4.1.2.1 Test Mode = GSM/TM1

## 4.1.2.1.1 Test Channel = LCH



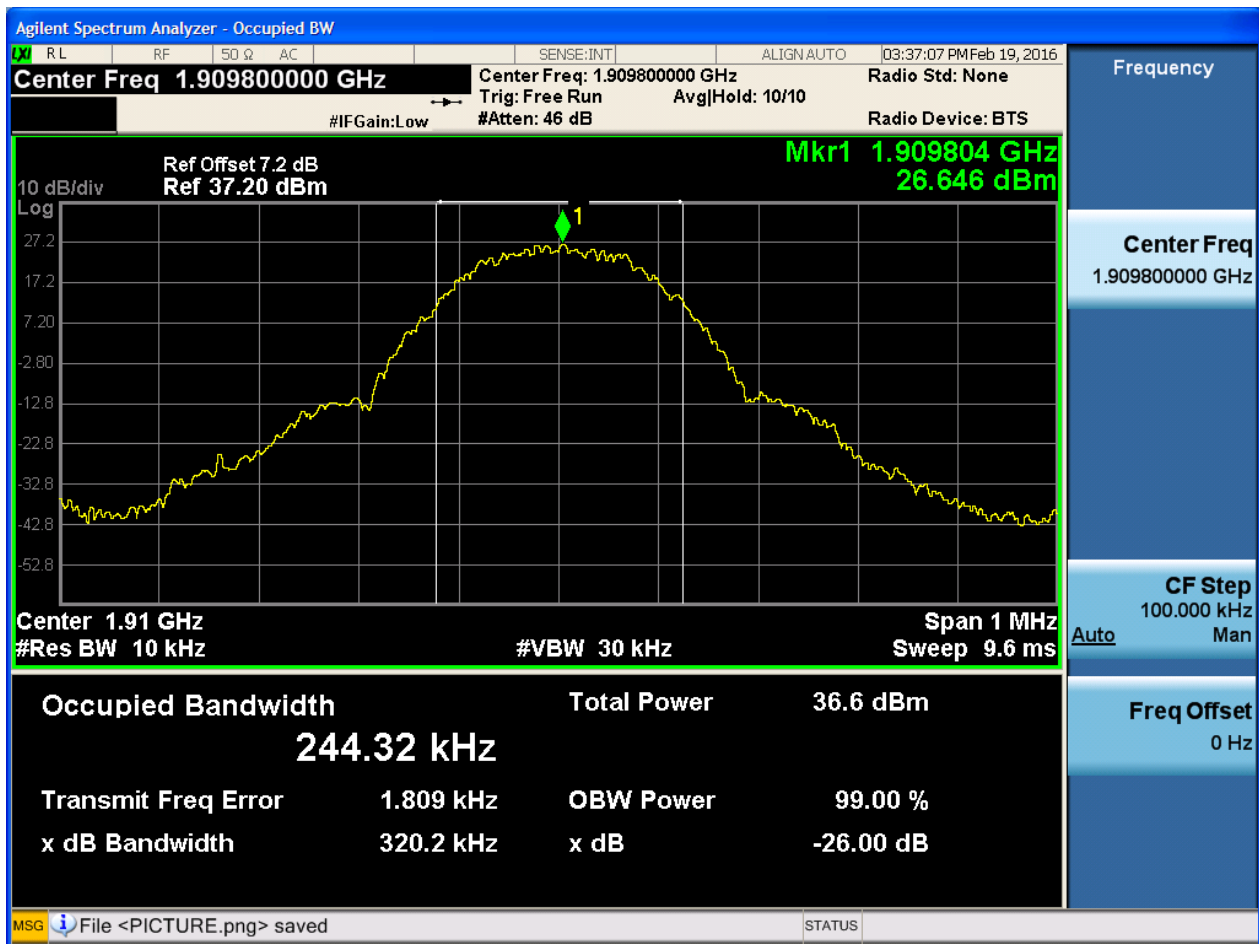


## 4.1.2.1.2 Test Channel = MCH





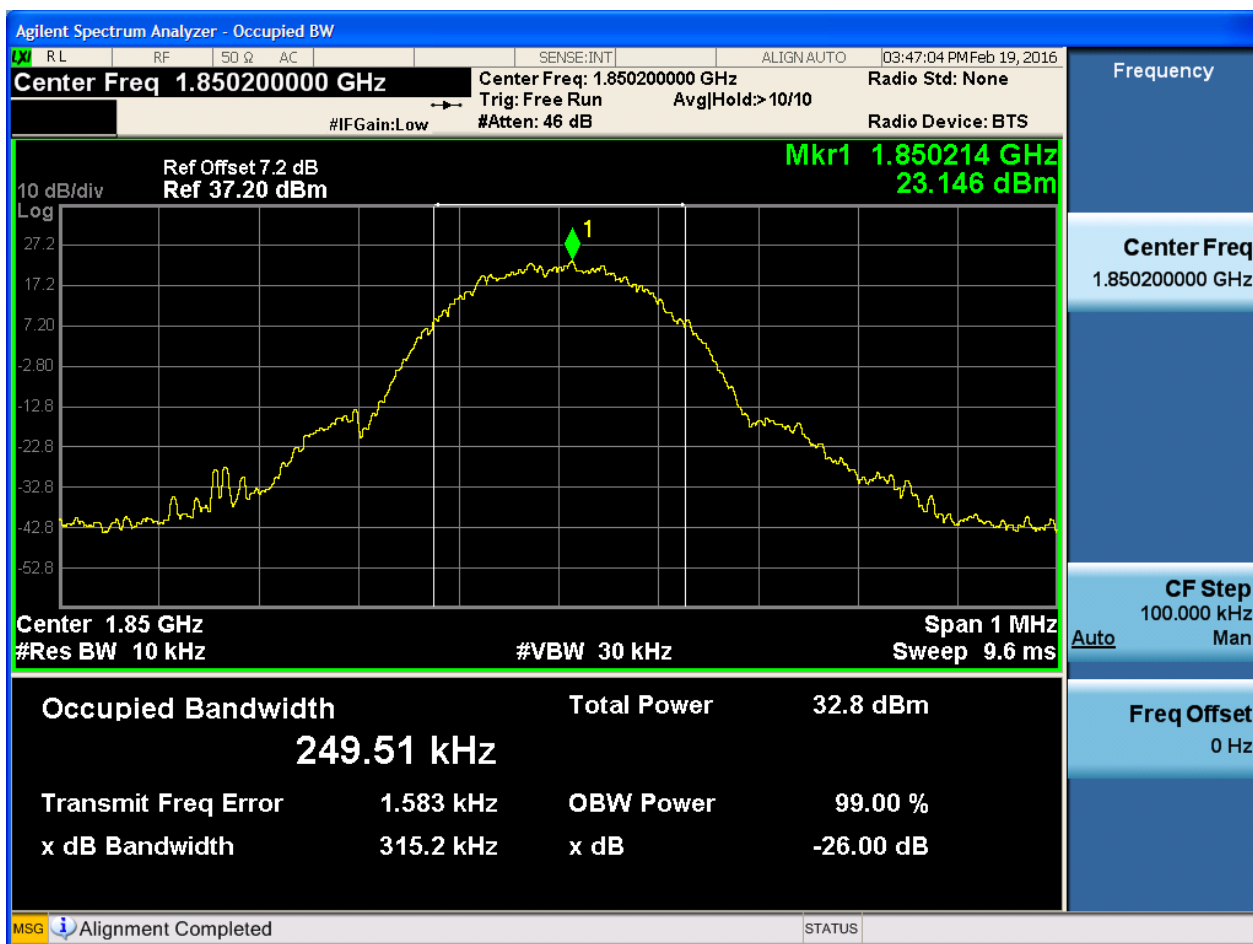
## 4.1.2.1.3 Test Channel = HCH





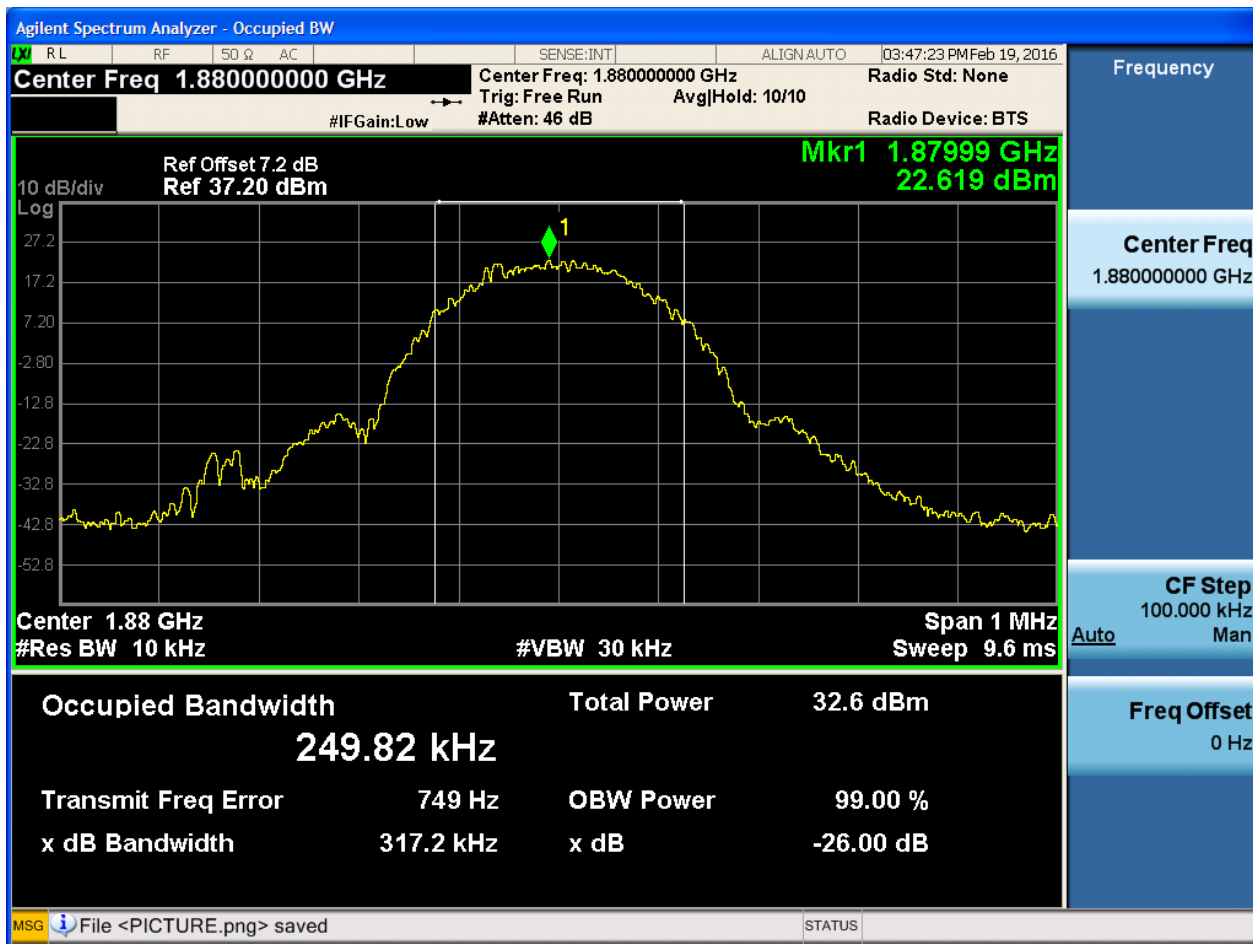
## 4.1.2.2 Test Mode = GSM/TM2

## 4.1.2.2.1 Test Channel = LCH



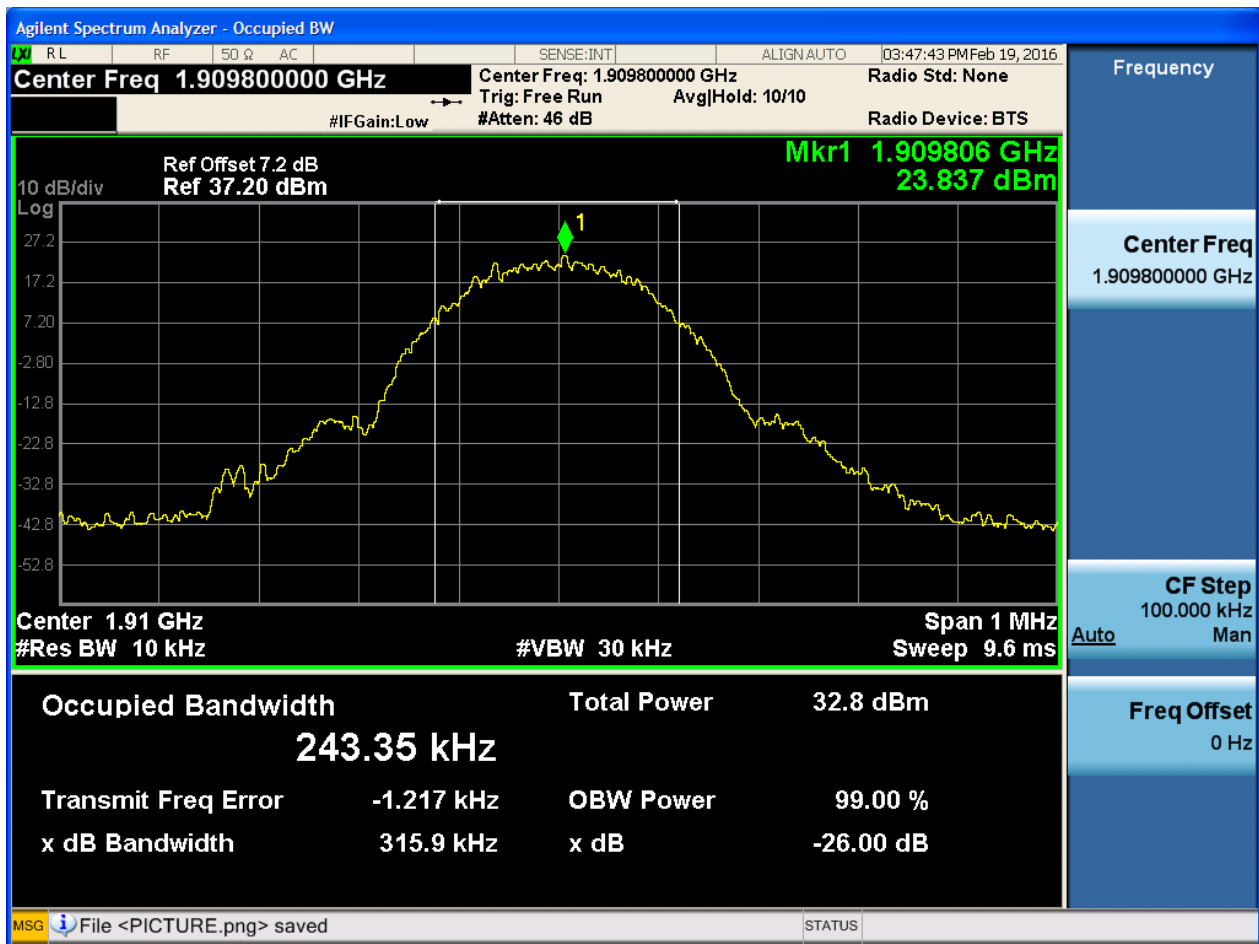


## 4.1.2.2.2 Test Channel = MCH





## 4.1.2.2.3 Test Channel = HCH



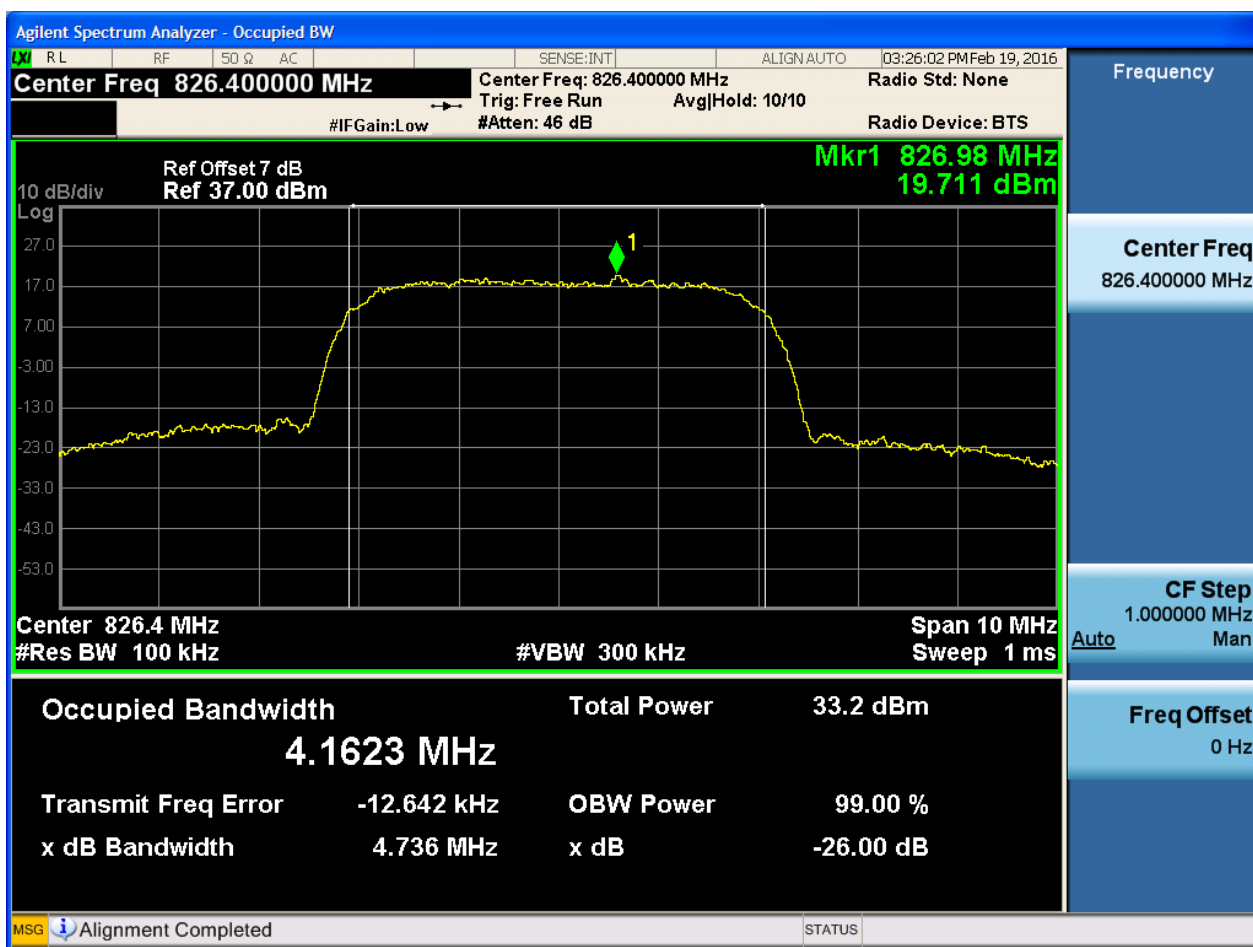


## 4.2 For UMTS

### 4.2.1 Test Band = WCDMA850

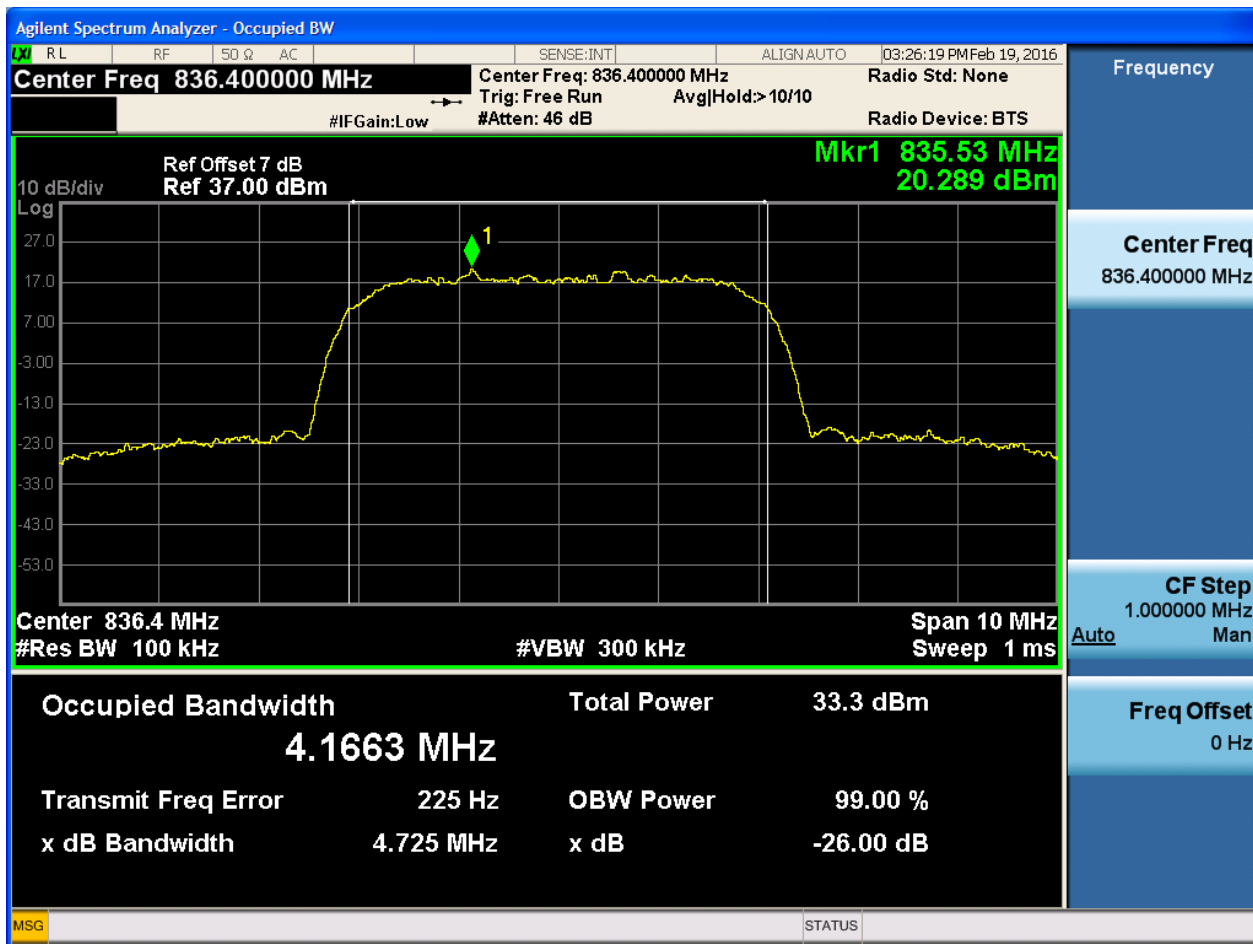
#### 4.2.1.1 Test Mode = UMTS/TM1

##### 4.2.1.1.1 Test Channel = LCH



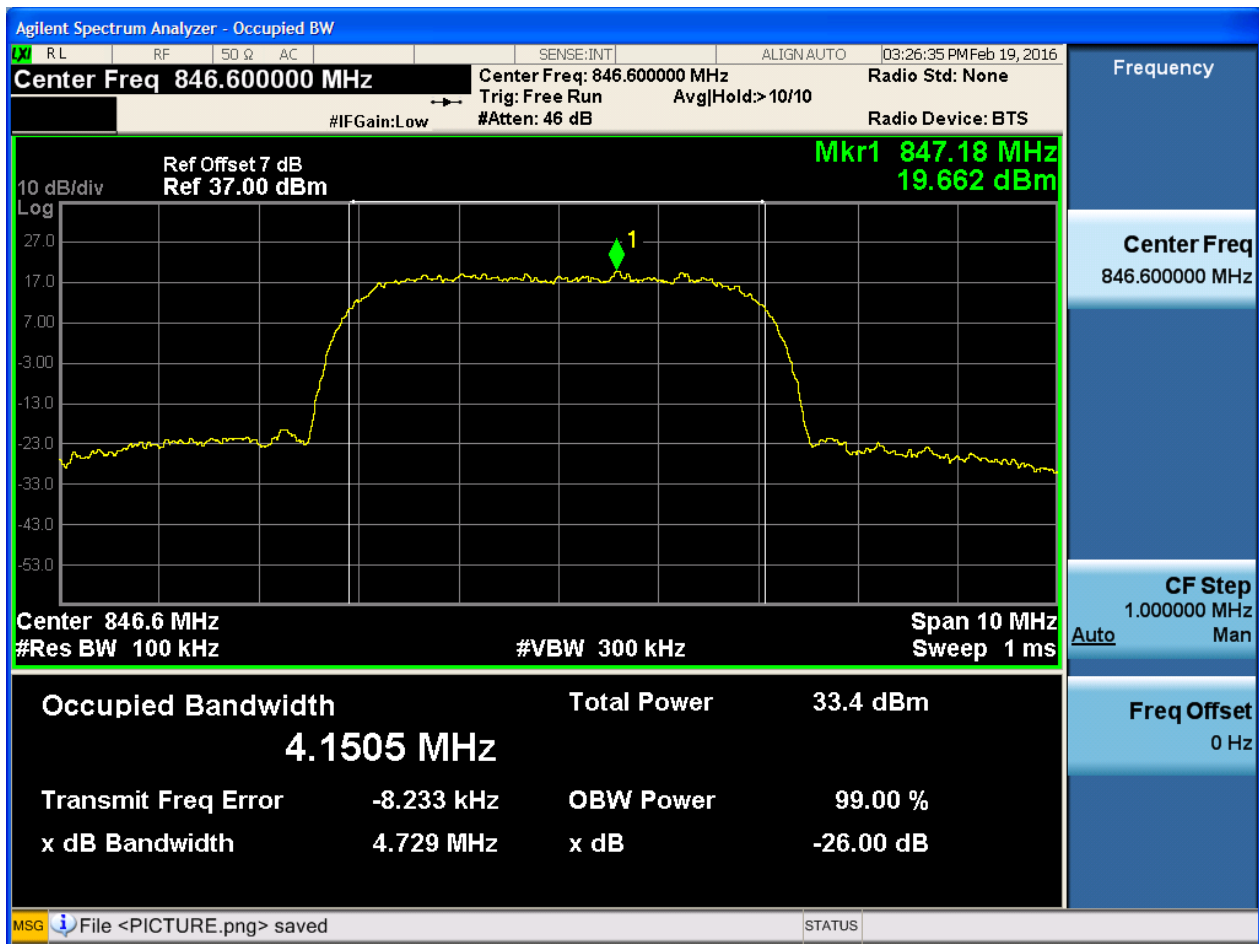


## 4.2.1.1.2 Test Channel = MCH





## 4.2.1.1.3 Test Channel = HCH

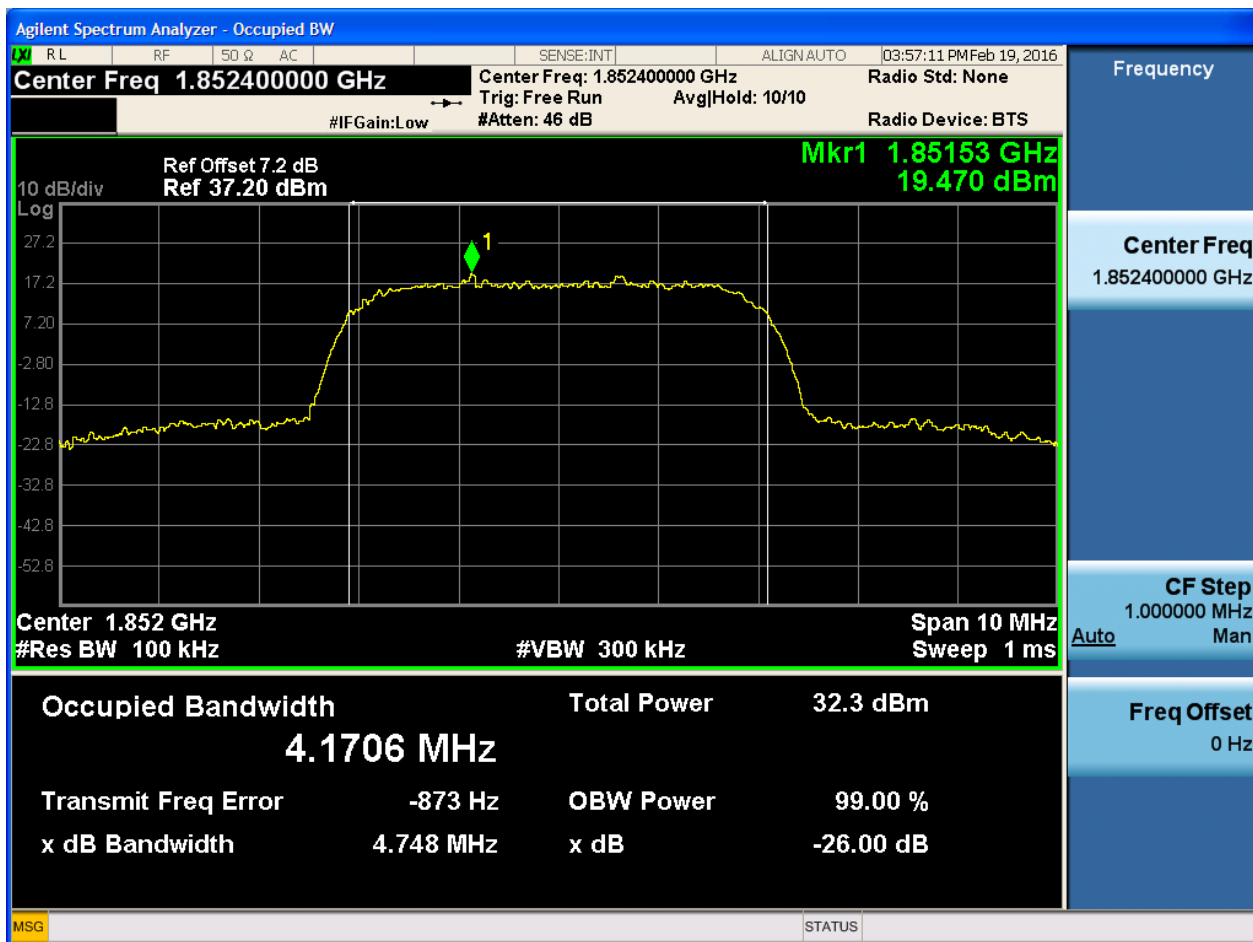




## 4.2.2 Test Band = WCDMA1900

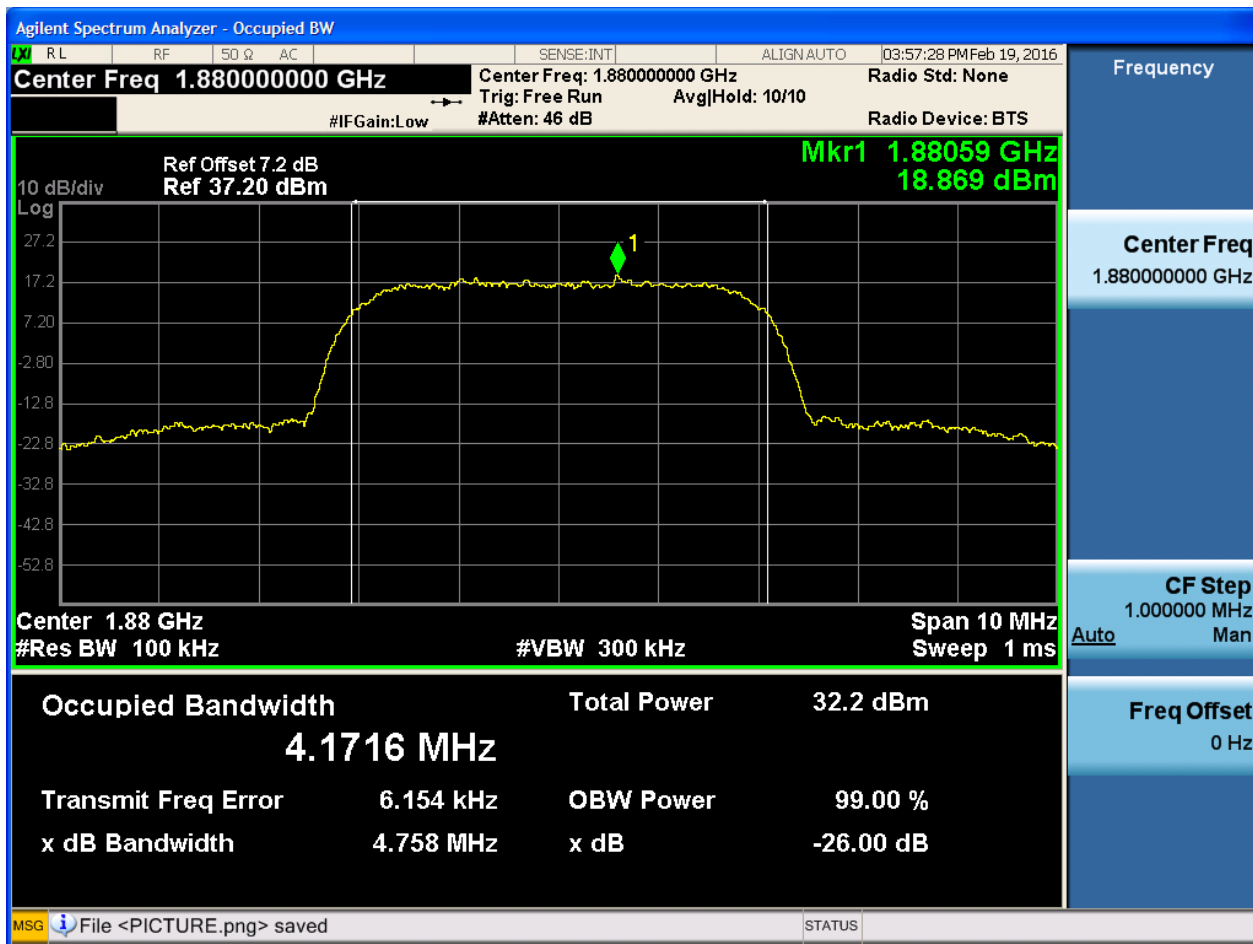
## 4.2.2.1 Test Mode = UMTS/TM1

## 4.2.2.1.1 Test Channel = LCH



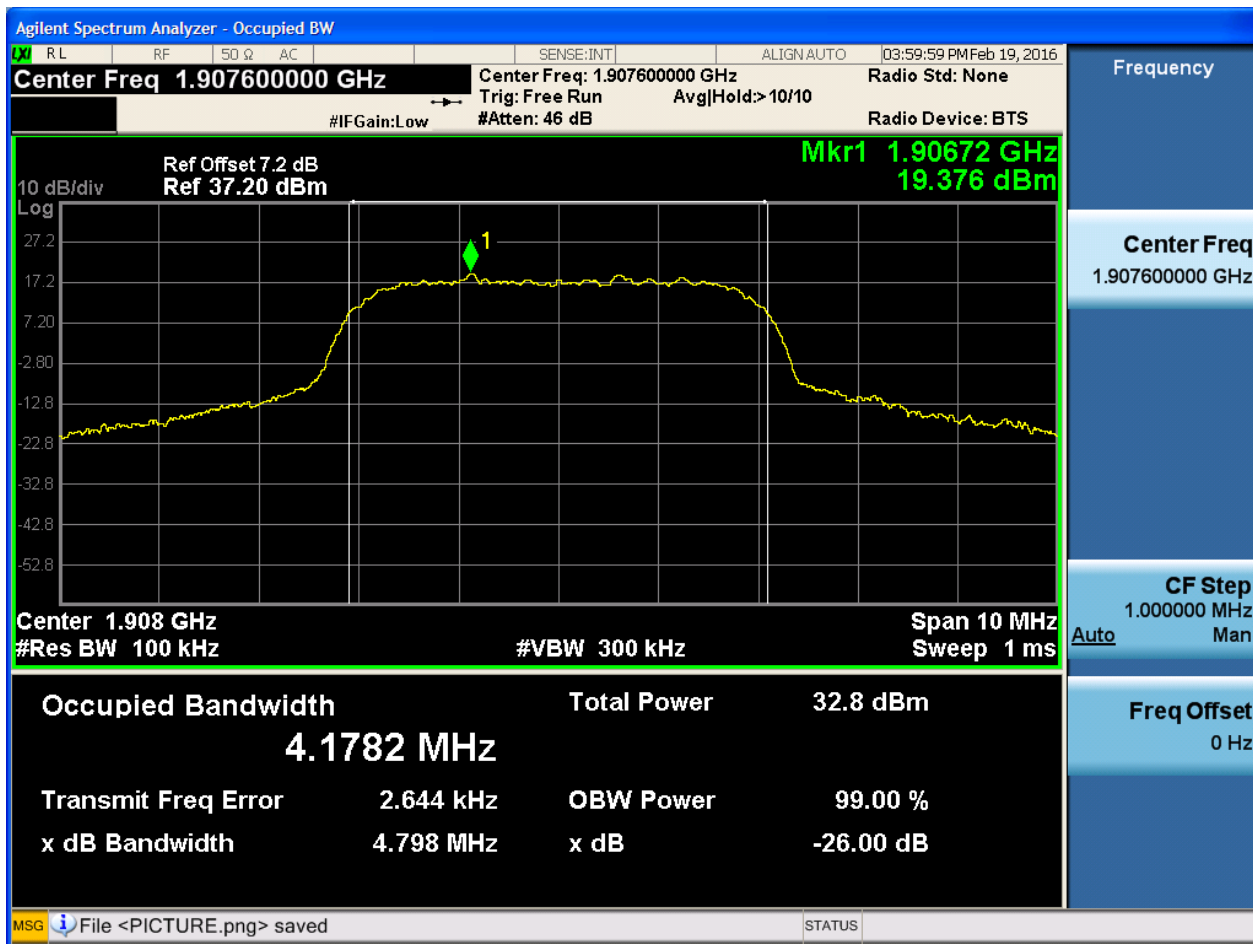


## 4.2.2.1.2 Test Channel = MCH





## 4.2.2.1.3 Test Channel = HCH

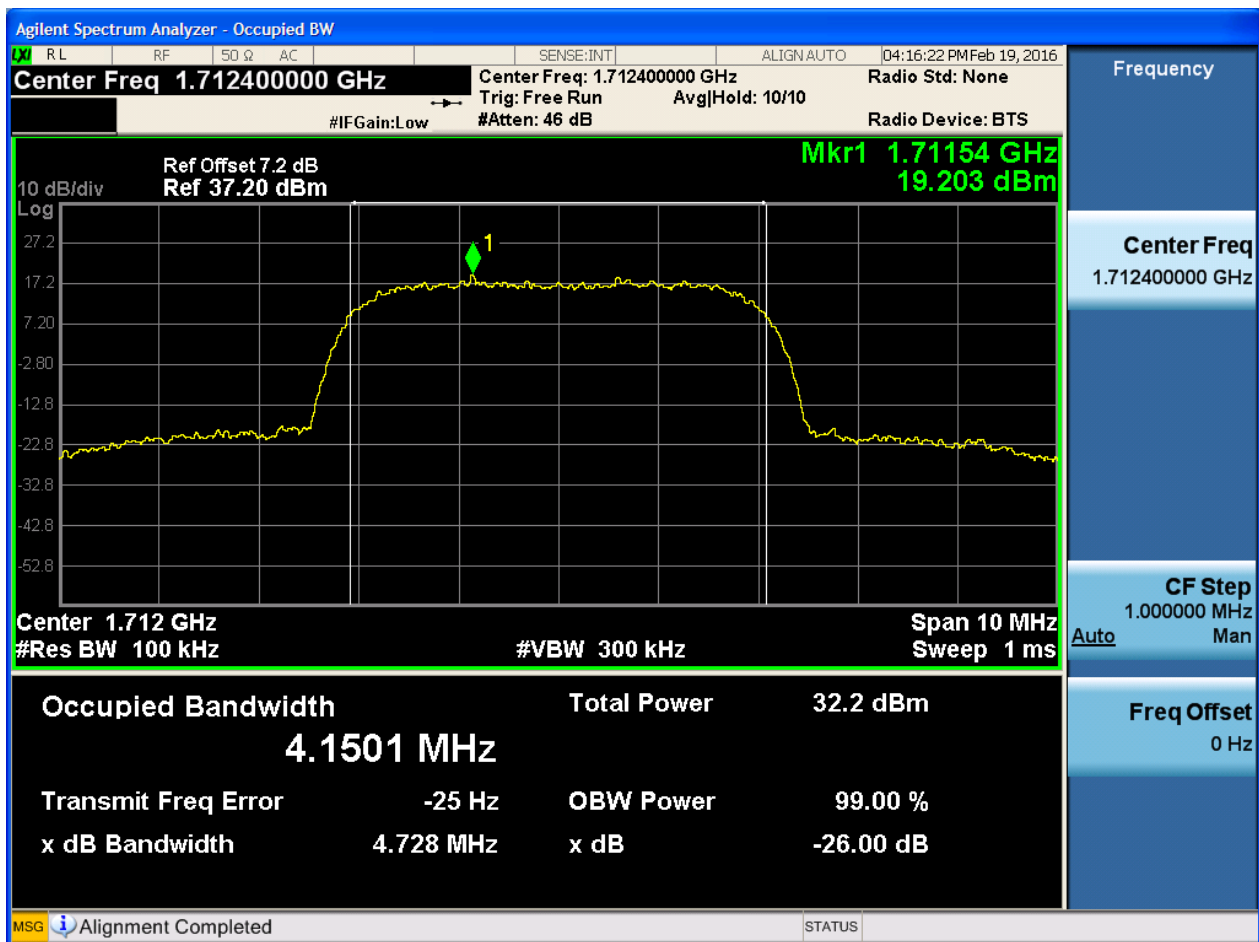




## 4.2.3 Test Band = WCDMA1700

## 4.2.3.1 Test Mode = UMTS/TM1

## 4.2.3.1.1 Test Channel = LCH





Agilent Spectrum Analyzer - Occupied BW

Center Freq 1.732600000 GHz

Center Freq: 1.732600000 GHz  
Trig: Free Run  
#Gain: Low  
#Atten: 46 dB

Radio Std: None  
Avg|Hold: 10/10  
Radio Device: BTS

Frequency

Center Freq  
1.732600000 GHz

CF Step  
1.000000 MHz  
Man

Freq Offset  
0 Hz

10 dB/div  
Log

Ref Offset 7.2 dB  
Ref 37.20 dBm

Mkr1 1.73171 GHz  
19.228 dBm

Center 1.733 GHz  
#Res BW 100 kHz

#VBW 300 kHz

Span 10 MHz  
Sweep 1 ms

Occupied Bandwidth

4.1542 MHz

Total Power

32.4 dBm

Transmit Freq Error

-161 Hz

OBW Power

99.00 %

x dB Bandwidth

4.735 MHz

x dB

-26.00 dB

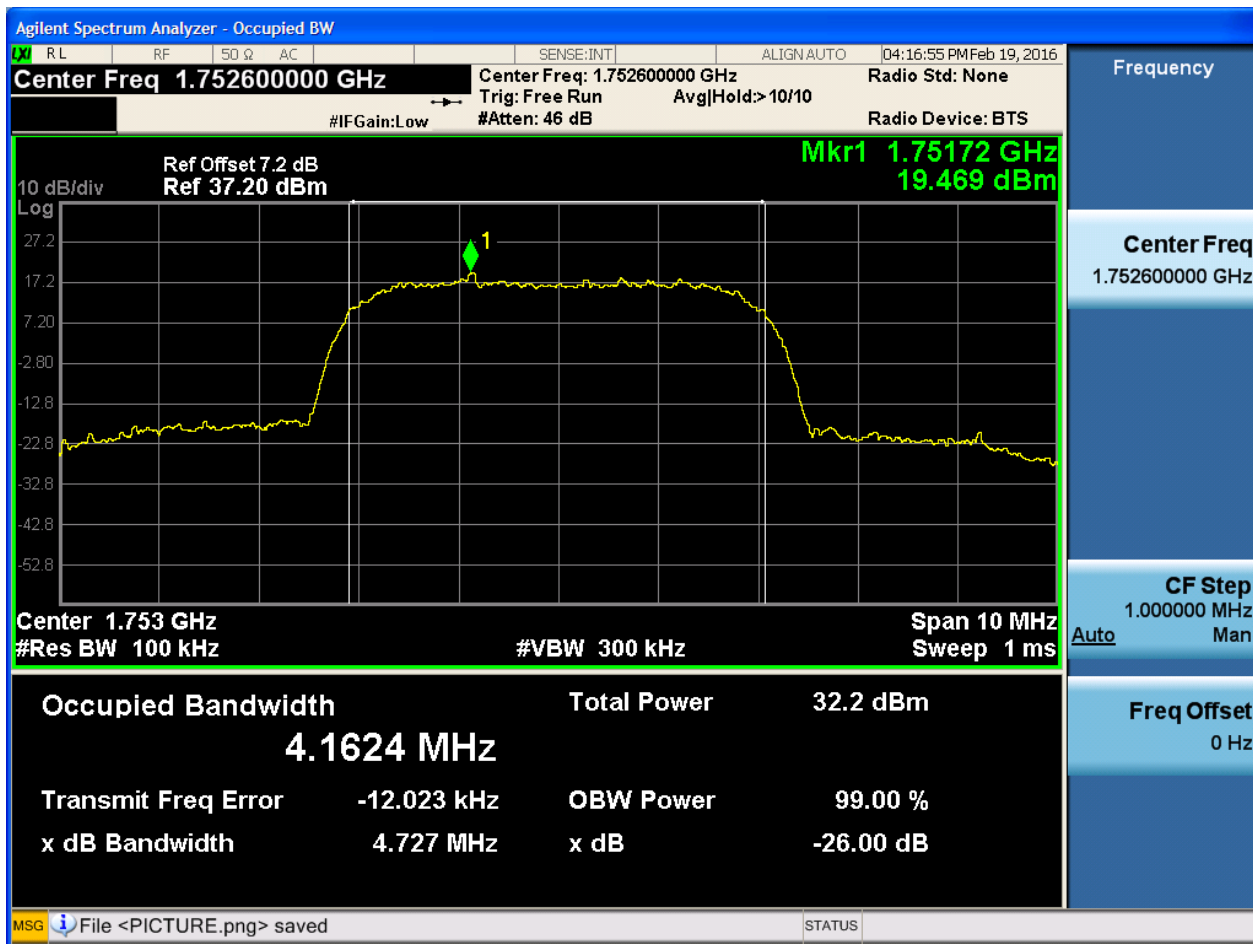
MSG File <PICTURE.png> saved

STATUS

The image shows a screenshot of an Agilent Spectrum Analyzer. The main display area shows a signal spectrum with a peak at 1.733 GHz. The y-axis is labeled '10 dB/div' and 'Log'. The x-axis is labeled 'Center 1.733 GHz' and 'Span 10 MHz'. The signal is a narrowband signal with a bandwidth of 4.1542 MHz. The total power is 32.4 dBm. The transmit frequency error is -161 Hz. The occupied bandwidth (OBW) power is 99.00%. The x dB bandwidth is 4.735 MHz. The x dB value is -26.00 dB. The display also shows a screenshot of the signal waveform, which is a narrowband signal with a bandwidth of 4.1542 MHz. The waveform is shown in a log scale. The peak of the signal is at 1.73171 GHz with a power of 19.228 dBm. The reference offset is 7.2 dB and the reference power is 37.20 dBm. The center frequency is 1.732600000 GHz. The resolution bandwidth (RBW) is 100 kHz. The video bandwidth (VBW) is 300 kHz. The span is 10 MHz. The sweep time is 1 ms. The radio standard is None. The average/hold mode is 10/10. The radio device is BTS. The gain is Low. The attenuation is 46 dB. The trigger is Free Run. The message 'MSG File <PICTURE.png> saved' is displayed at the bottom. The status is shown at the bottom right.



## 4.2.3.1.3 Test Channel = HCH





## 5Appendix\_E: Band Edges Compliance

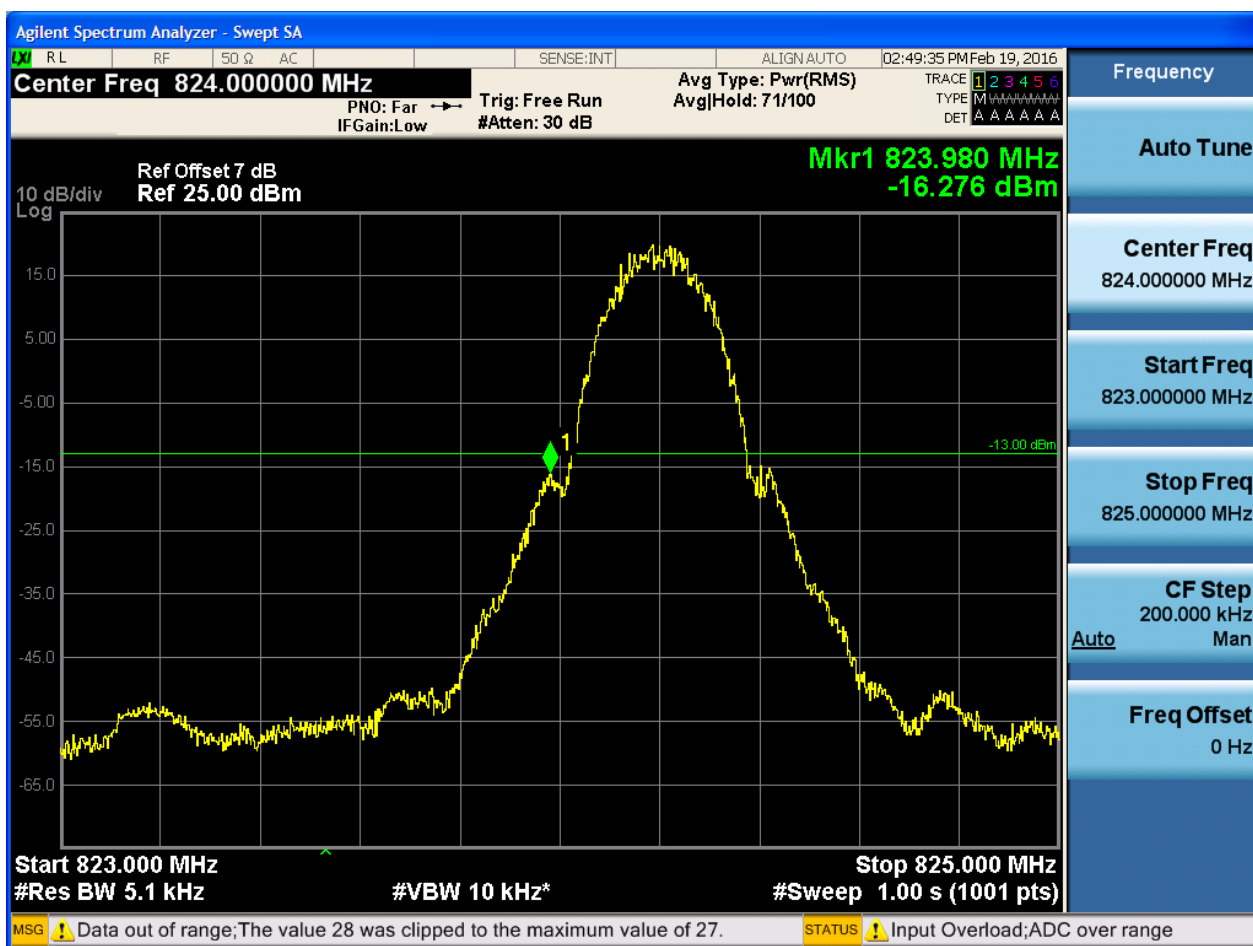
### Part I - Test Plots

#### 5.1 For GSM

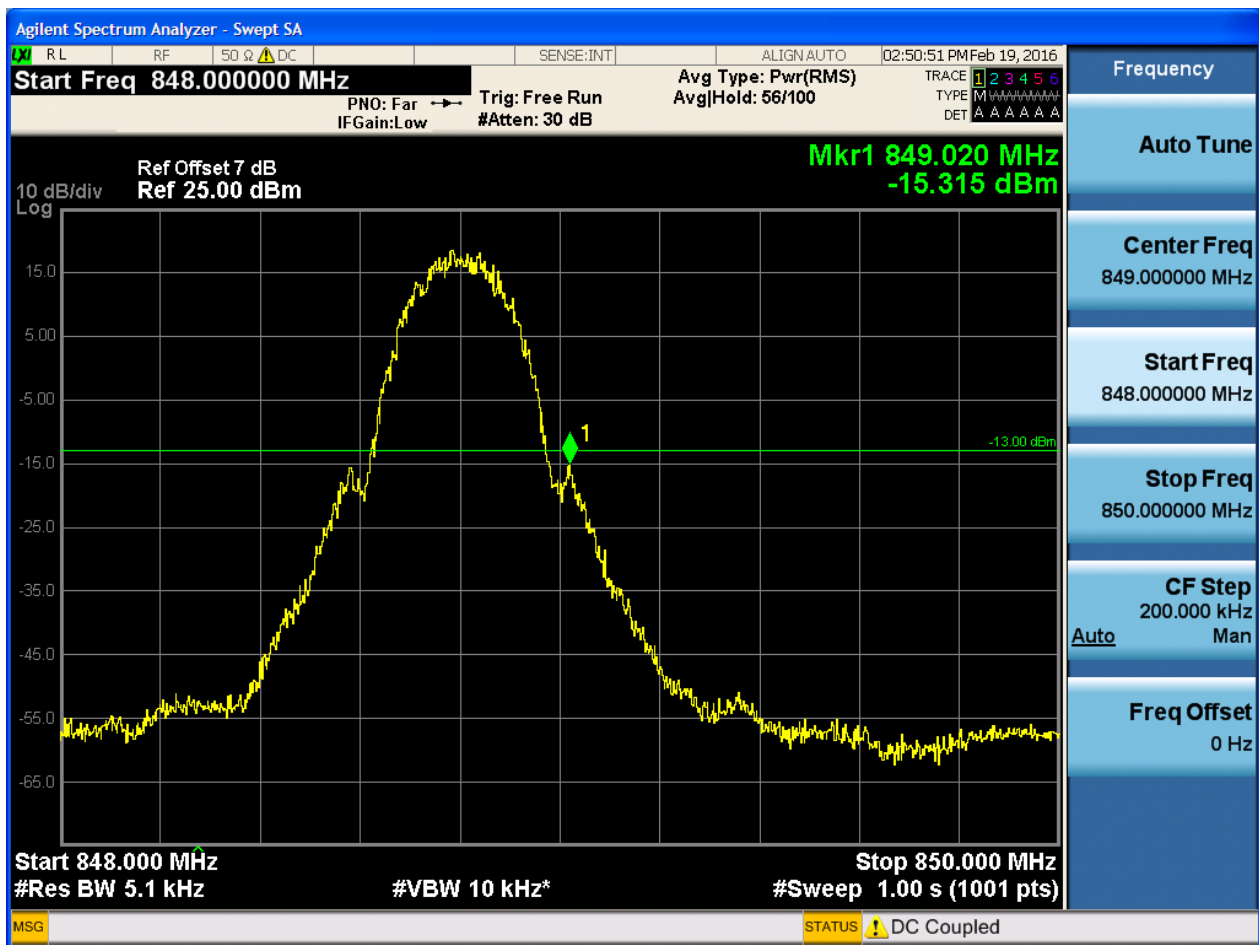
##### 5.1.1 Test Band = GSM850

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

##### 5.1.1.1.1 Test Channel = LCH



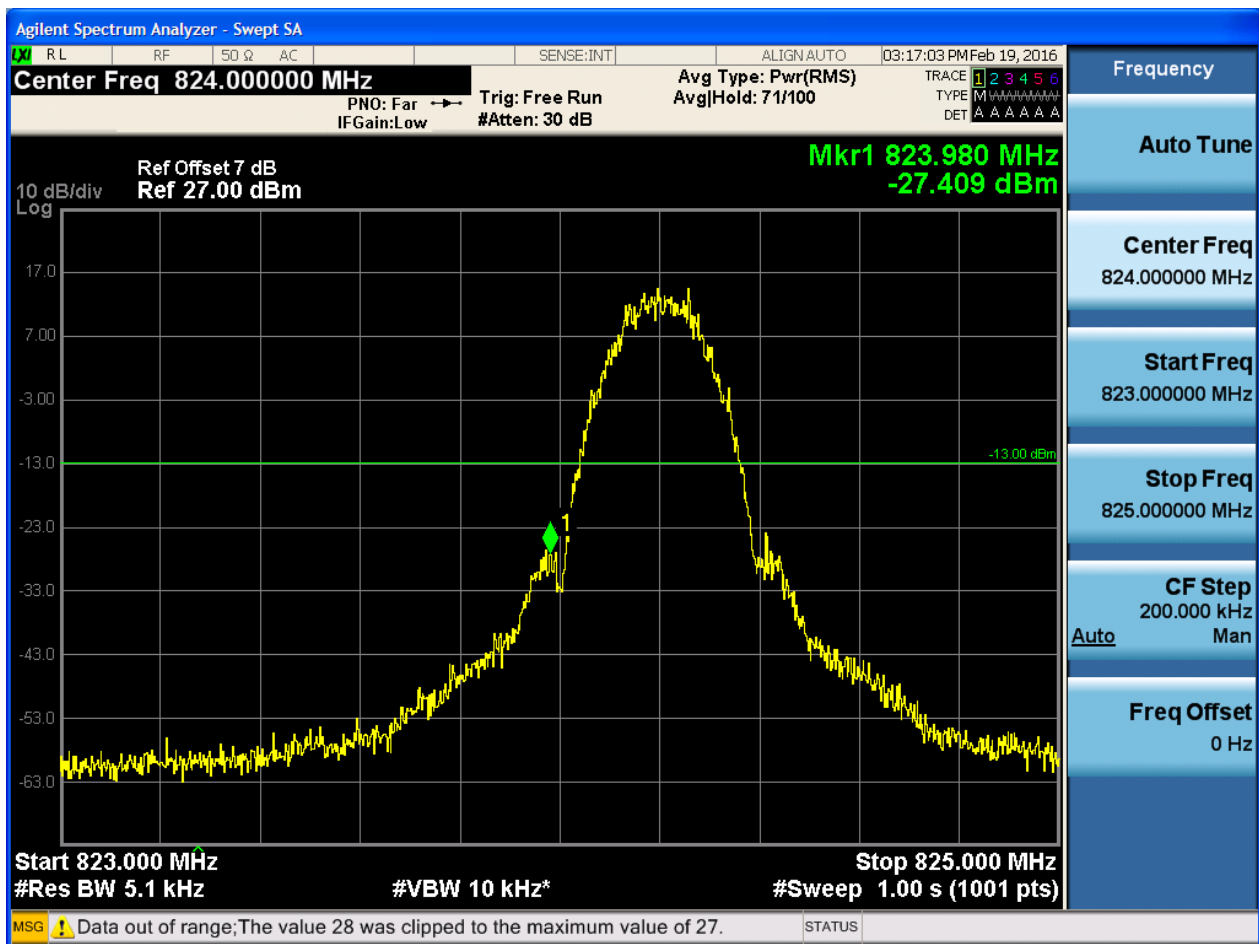
### 5.1.1.1.2 Test Channel = HCH



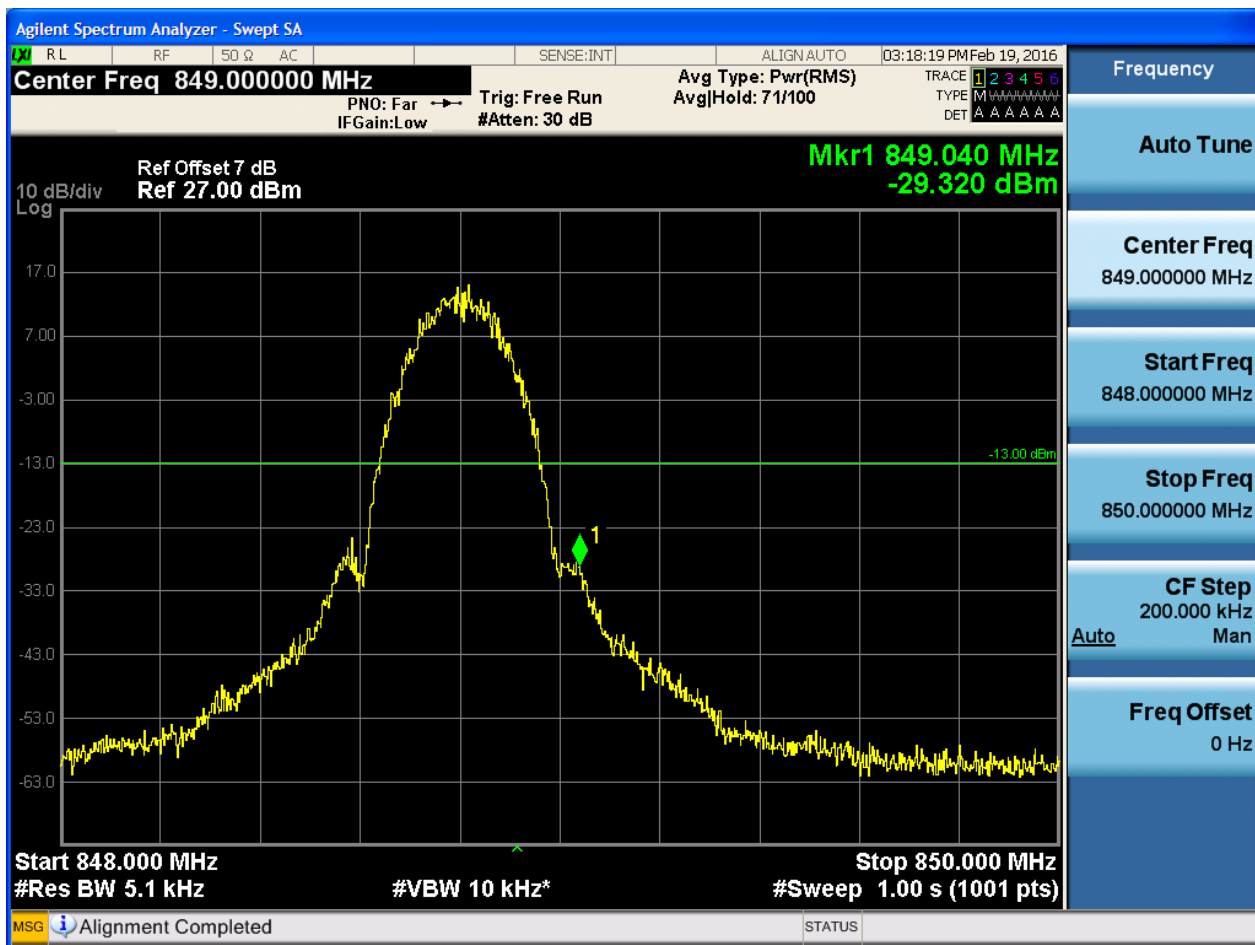


## 5.1.1.2 Test Mode = GSM/TM2

## 5.1.1.2.1 Test Channel = LCH



### 5.1.1.2.2 Test Channel = HCH

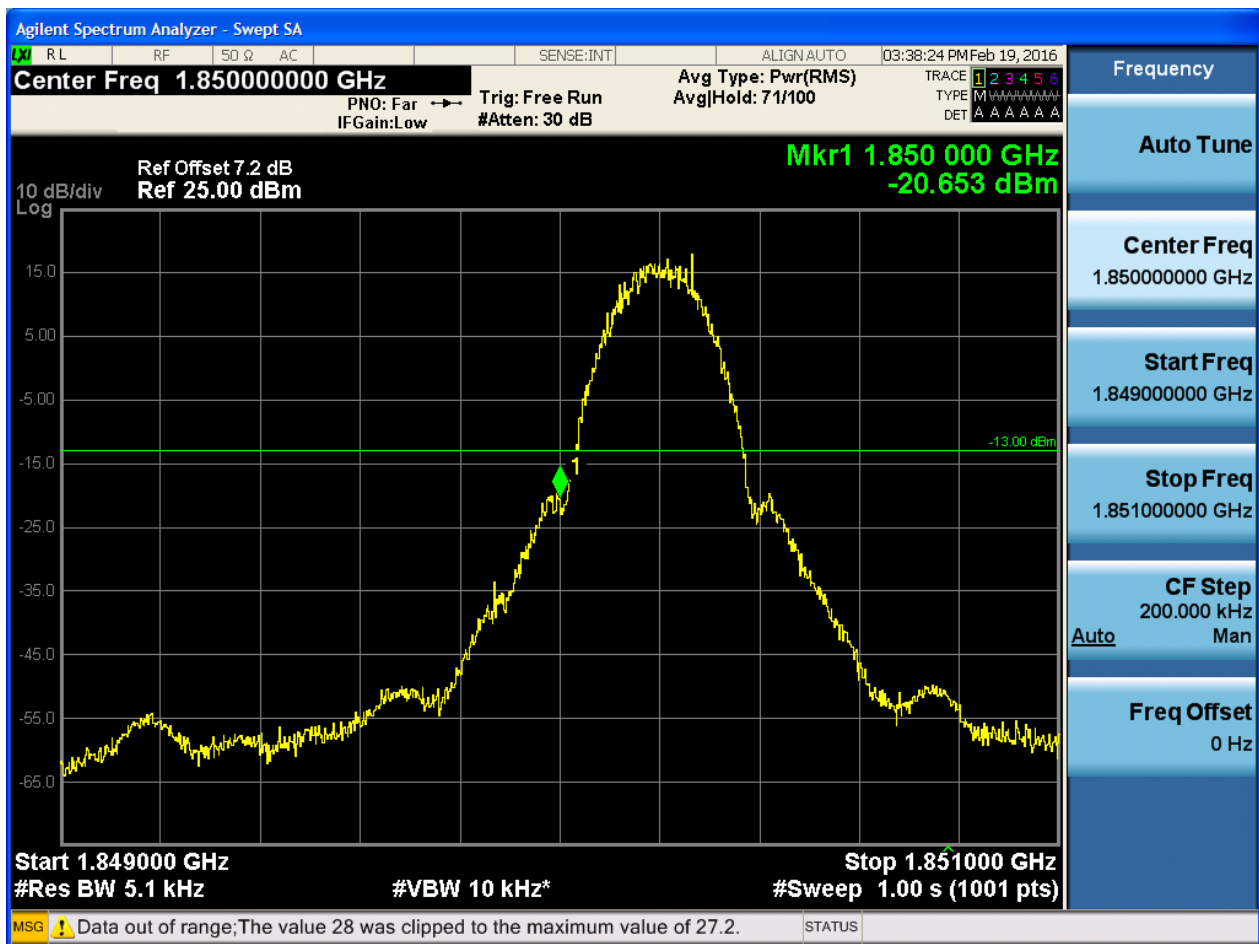




## 5.1.2 Test Band = GSM1900

## 5.1.2.1 Test Mode = GSM/TM1

## 5.1.2.1.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

Center Freq 1.91000000 GHz

Ref Offset 7.2 dB  
Ref 25.00 dBm

Mkr1 1.910 020 GHz  
-20.061 dBm

Start 1.909000 GHz  
#Res BW 5.1 kHz

Stop 1.911000 GHz  
#Sweep 1.00 s (1001 pts)

#VBW 10 kHz\*

10 dB/div  
Log

15.0  
5.00  
-5.00  
-15.0  
-25.0  
-35.0  
-45.0  
-55.0  
-65.0

-13.00 dBm

Auto Tune

Center Freq  
1.91000000 GHz

Start Freq  
1.909000000 GHz

Stop Freq  
1.911000000 GHz

CF Step  
200.000 kHz  
Man

Freq Offset  
0 Hz

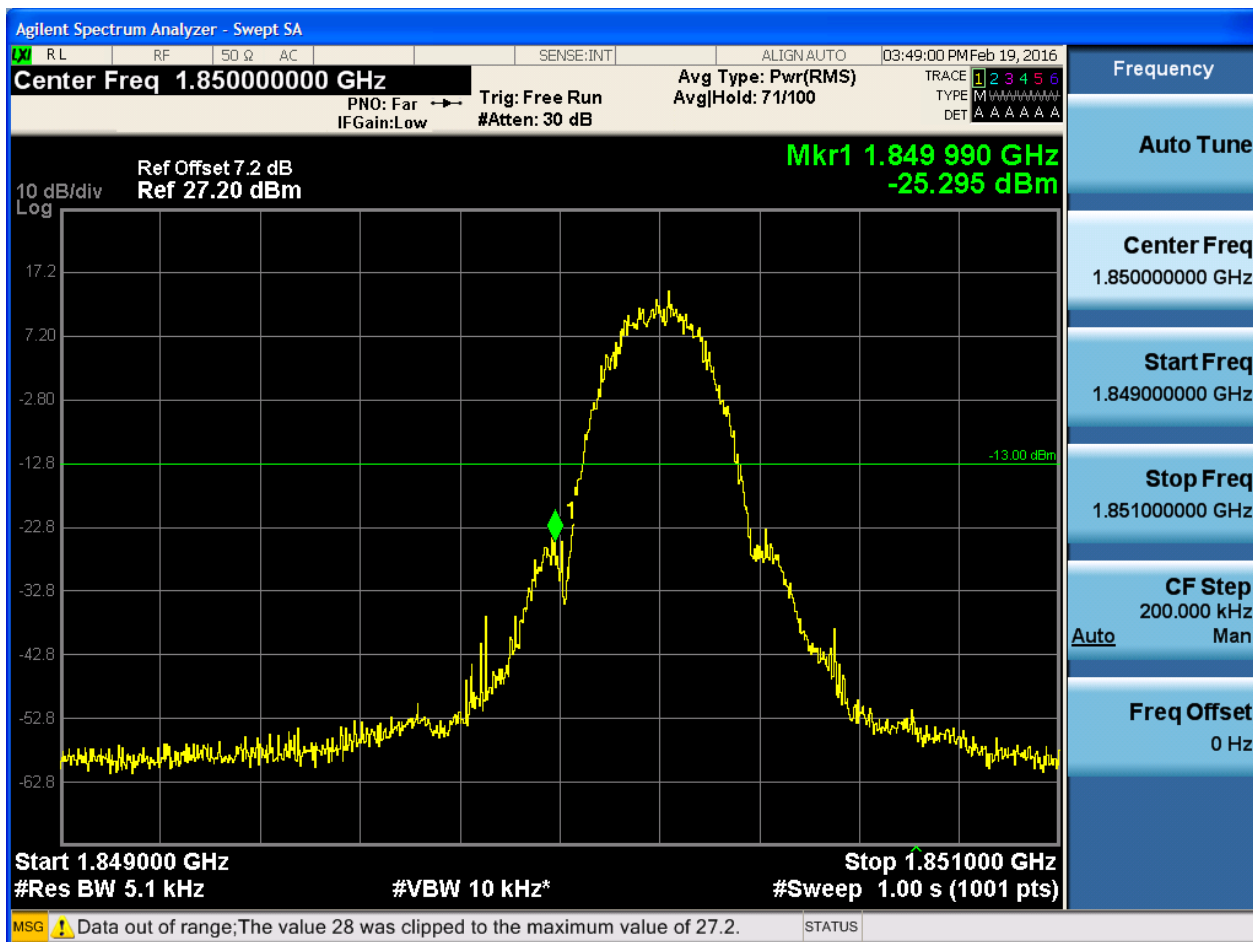
MSG Data out of range;The value 28 was clipped to the maximum value of 27.2.

STATUS

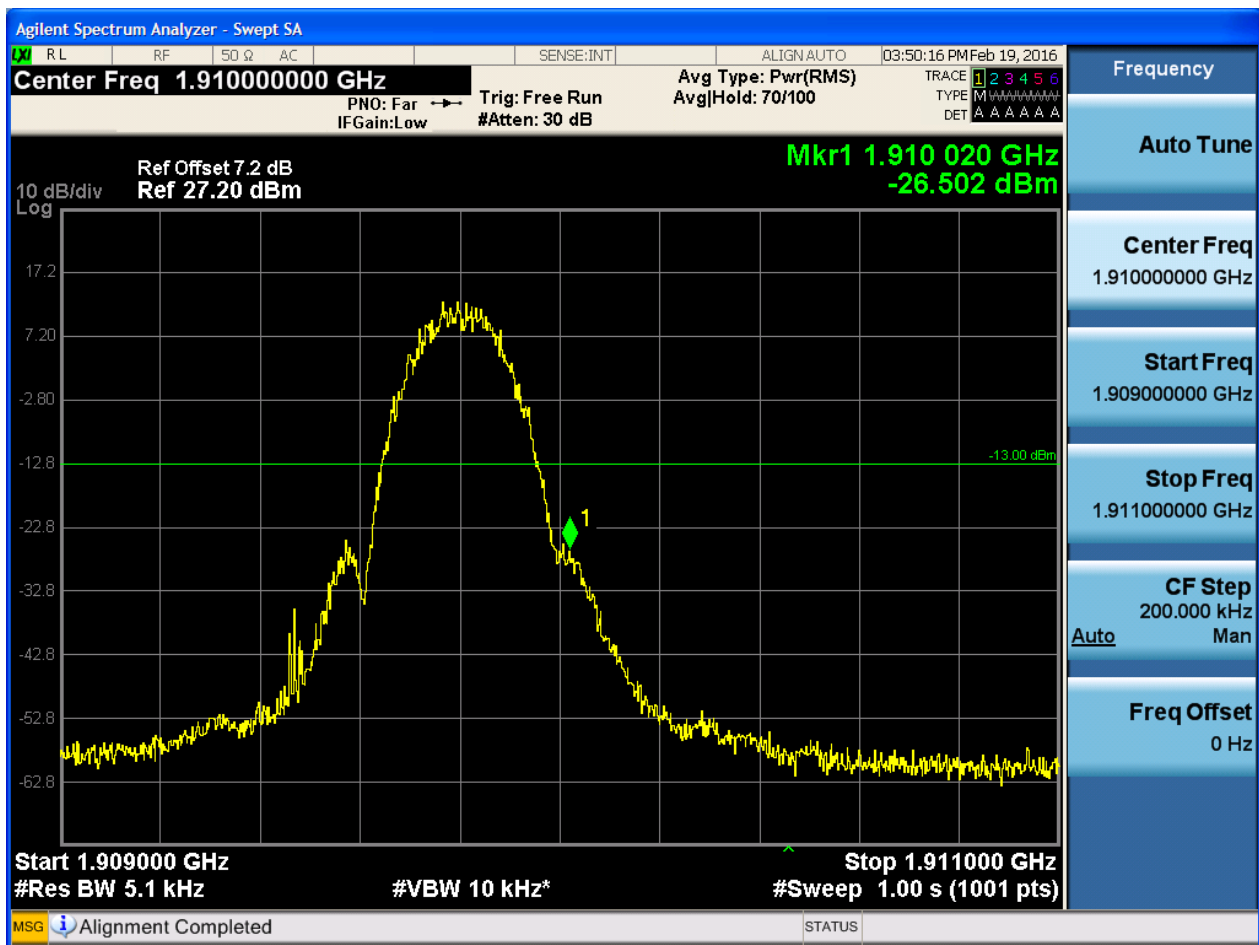


## 5.1.2.2 Test Mode = GSM/TM2

## 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





## 5.2.3 Test Band = WCDMA1700

### 5.2.3.1 Test Mode = UMTS/TM1

#### 5.2.3.1.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

Center Freq 1.755000000 GHz

Ref Offset 7.2 dB  
Ref 30.00 dBm

Mkr1 1.755 GHz  
-23.651 dBm

10 dB/div  
Log

Start 1.754000 GHz  
#Res BW 51 kHz

Stop 1.756000 GHz  
#Sweep 1.00 s (1001 pts)

#VBW 200 kHz\*

Trig: Free Run  
#Atten: 46 dB

Avg Type: Pwr(RMS)  
Avg|Hold: 17/100

Frequency

Auto Tune

Center Freq  
1.755000000 GHz

Start Freq  
1.754000000 GHz

Stop Freq  
1.756000000 GHz

CF Step  
200.000 kHz  
Man

Freq Offset  
0 Hz

MSG File <PICTURE.png> saved

STATUS

## 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.

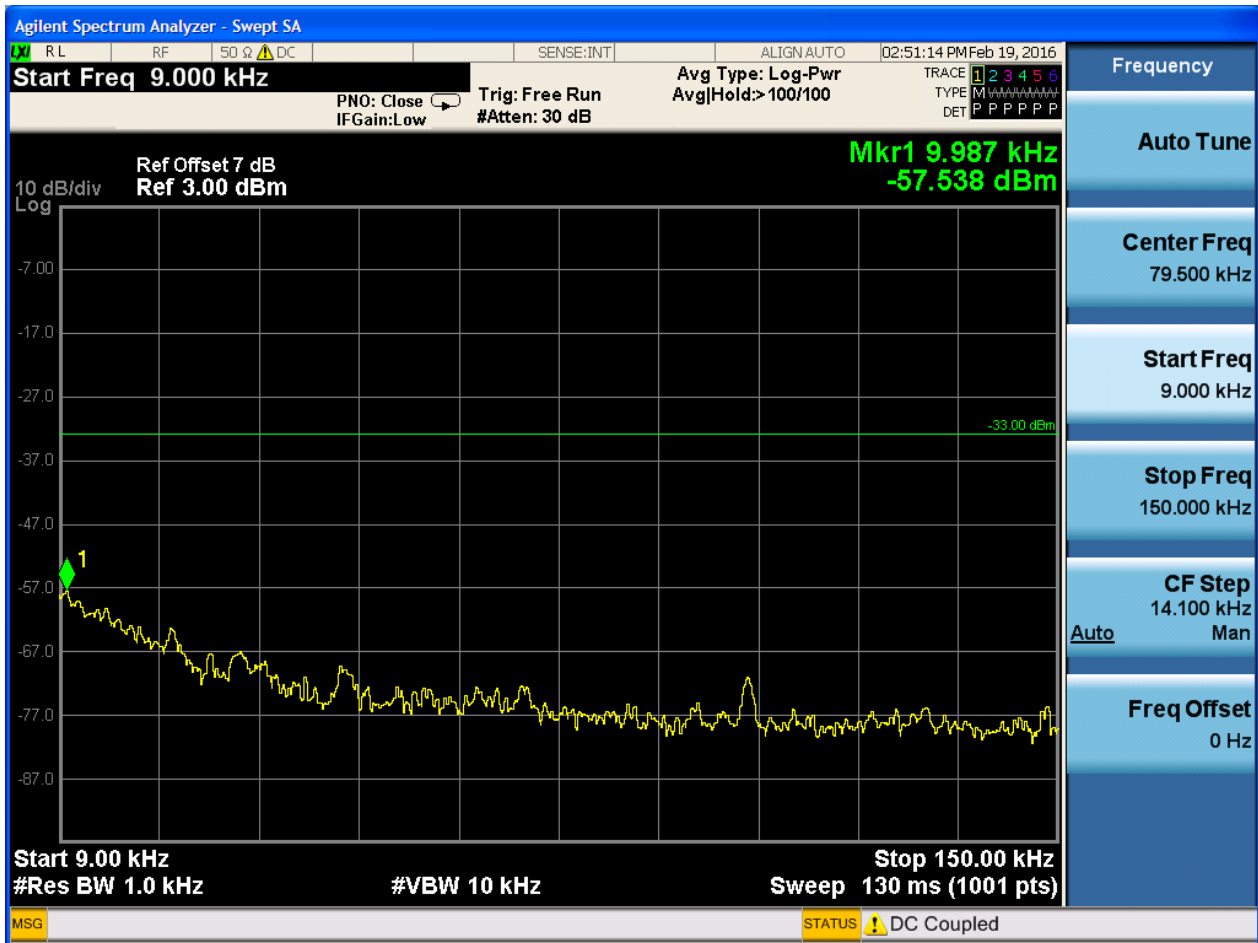
### Part I - Test Plots

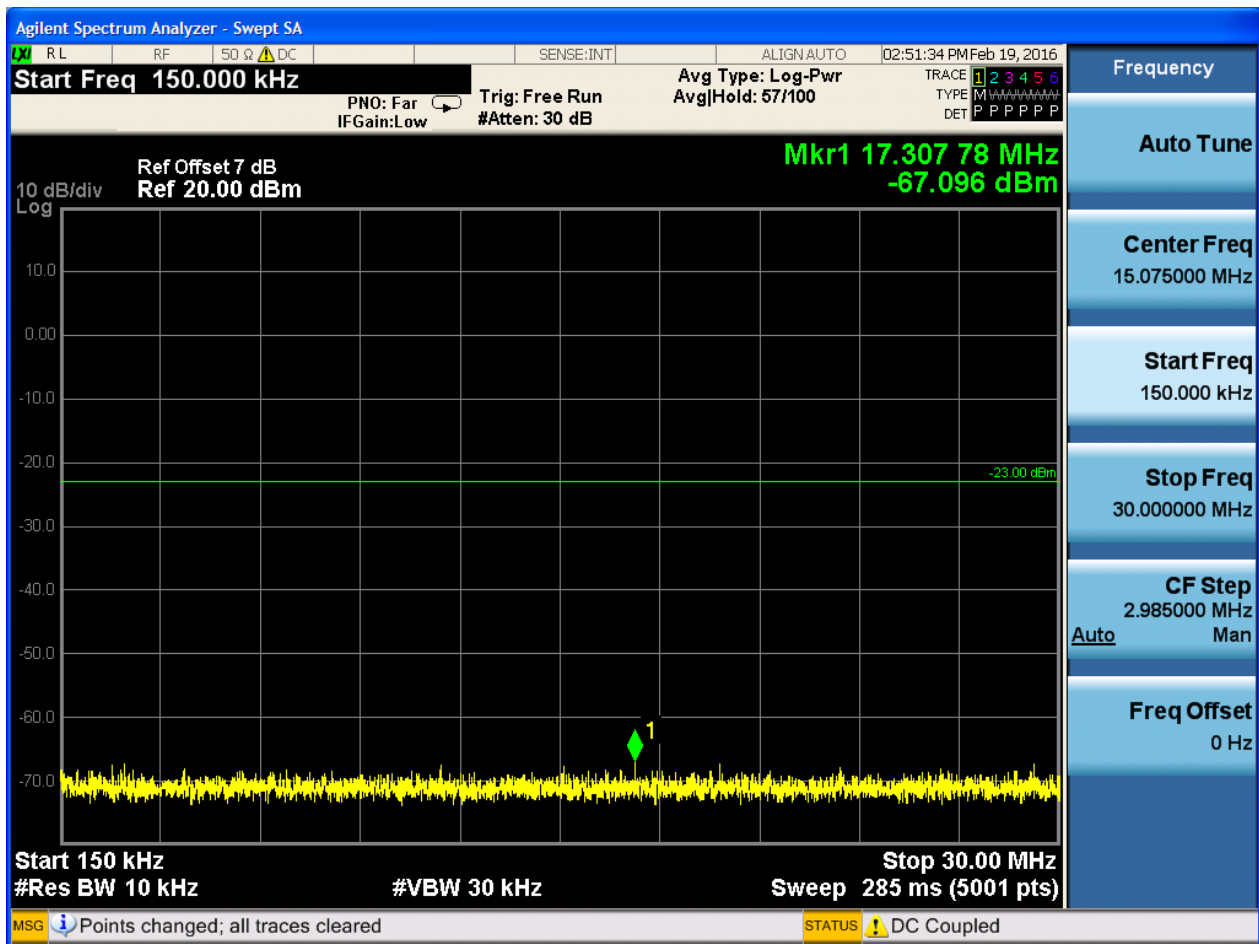
#### 6.1 For GSM

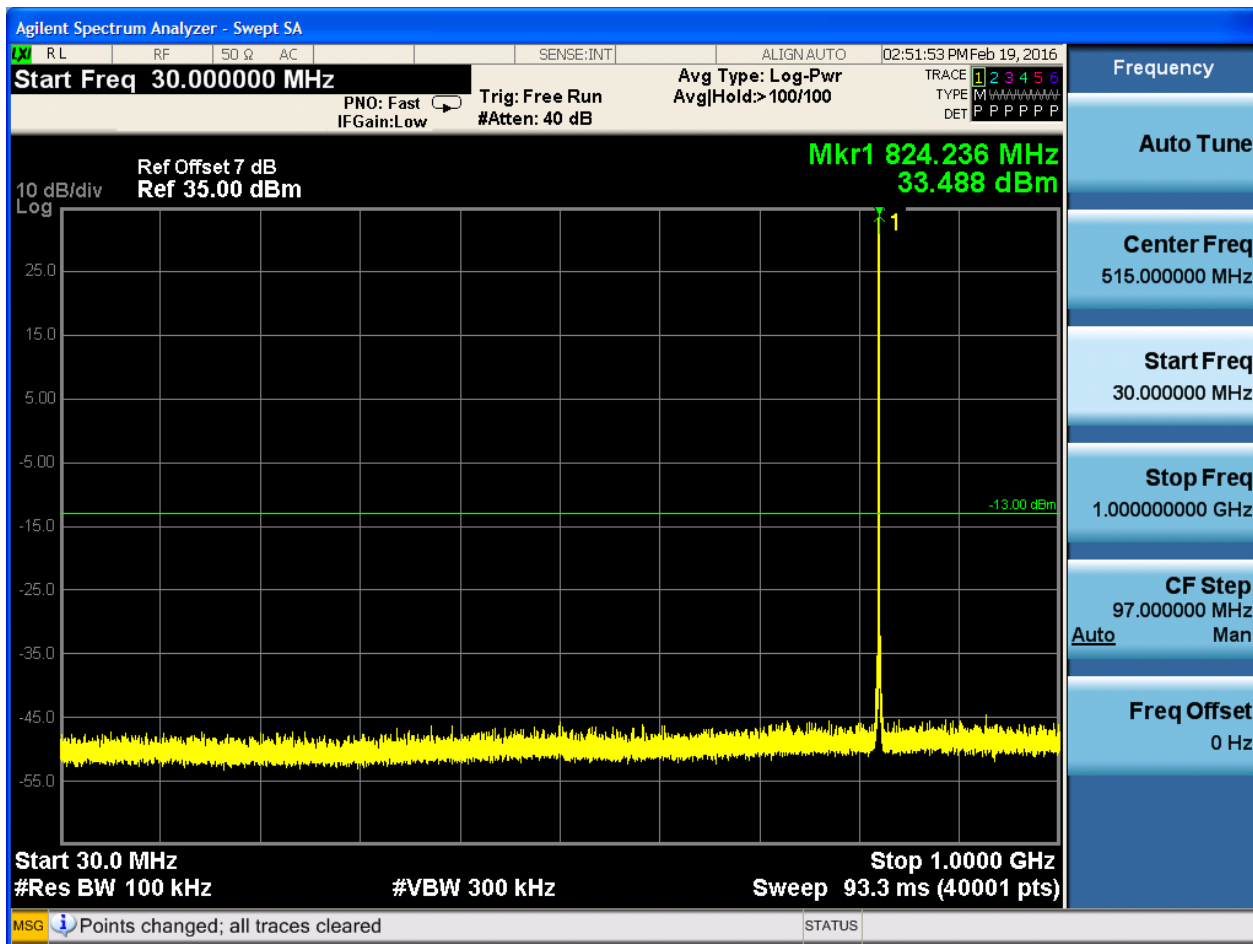
##### 6.1.1 Test Band = GSM850

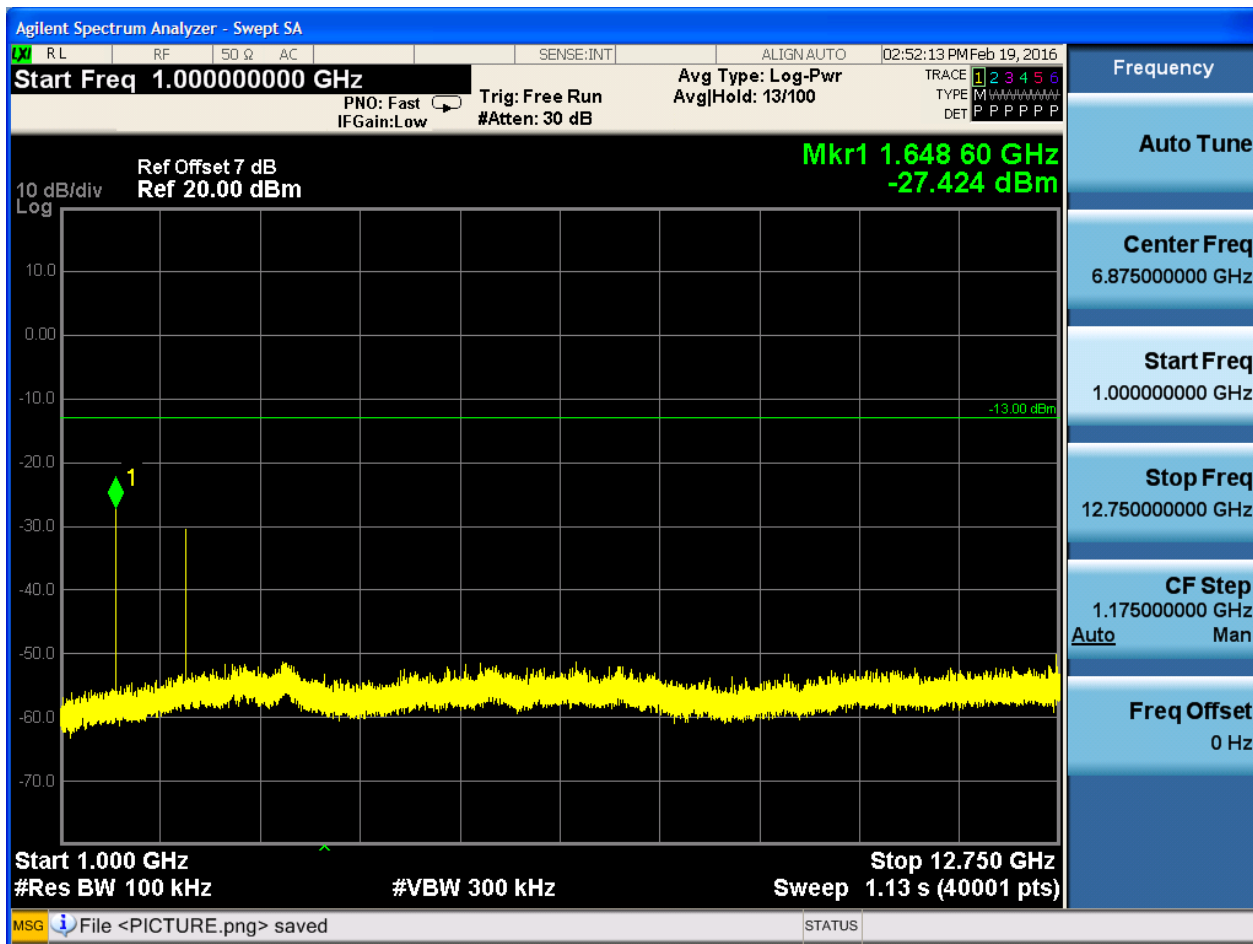
##### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH



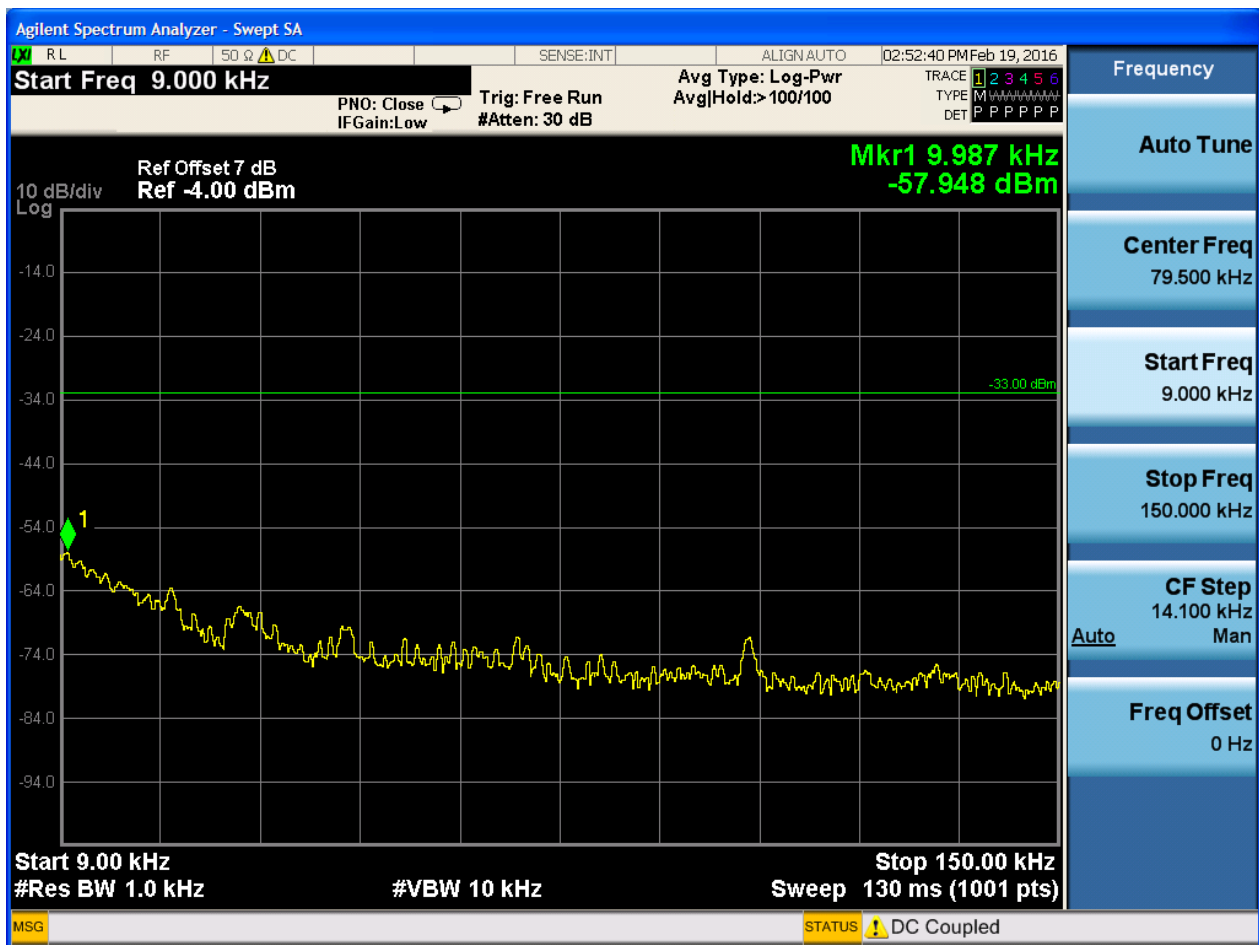


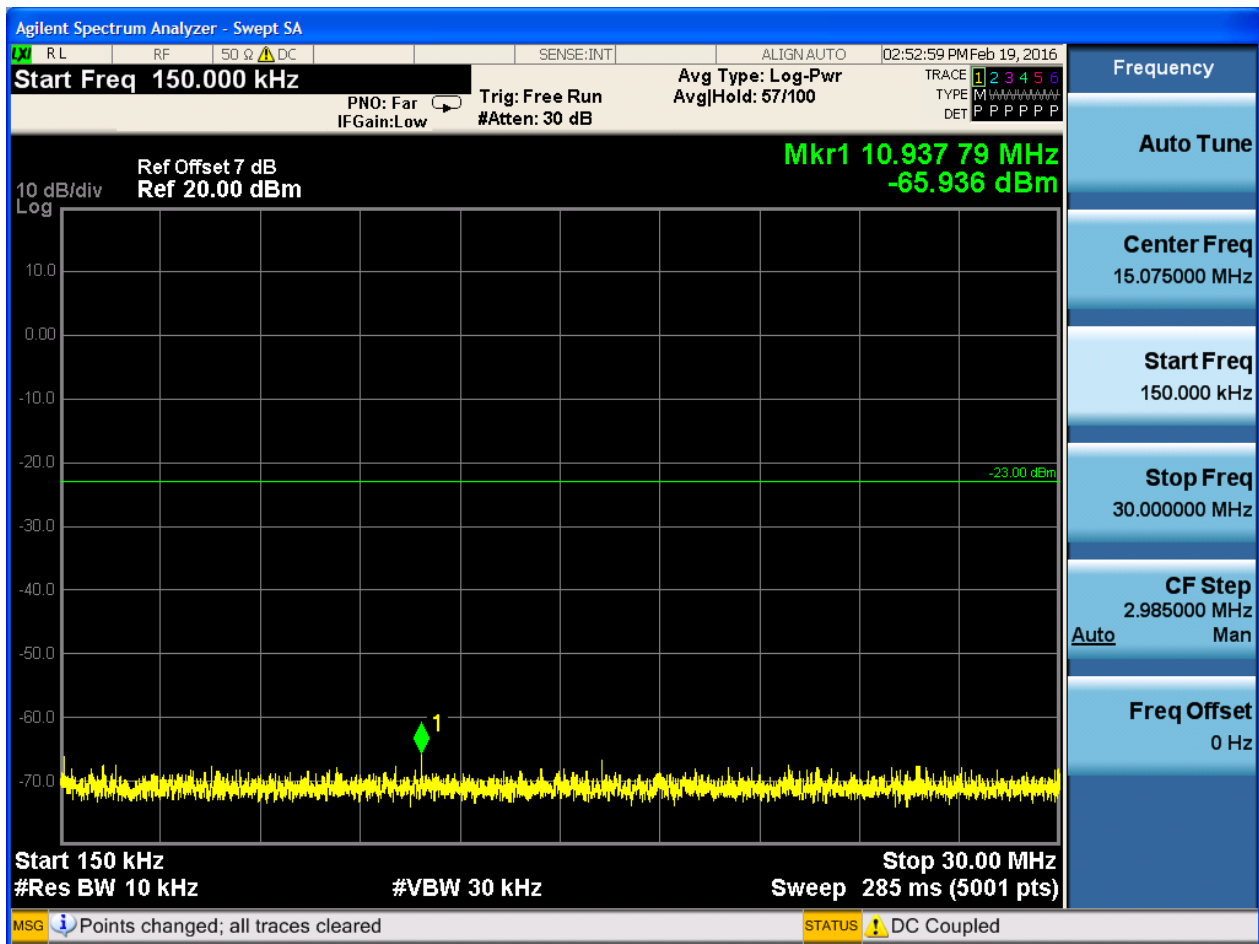


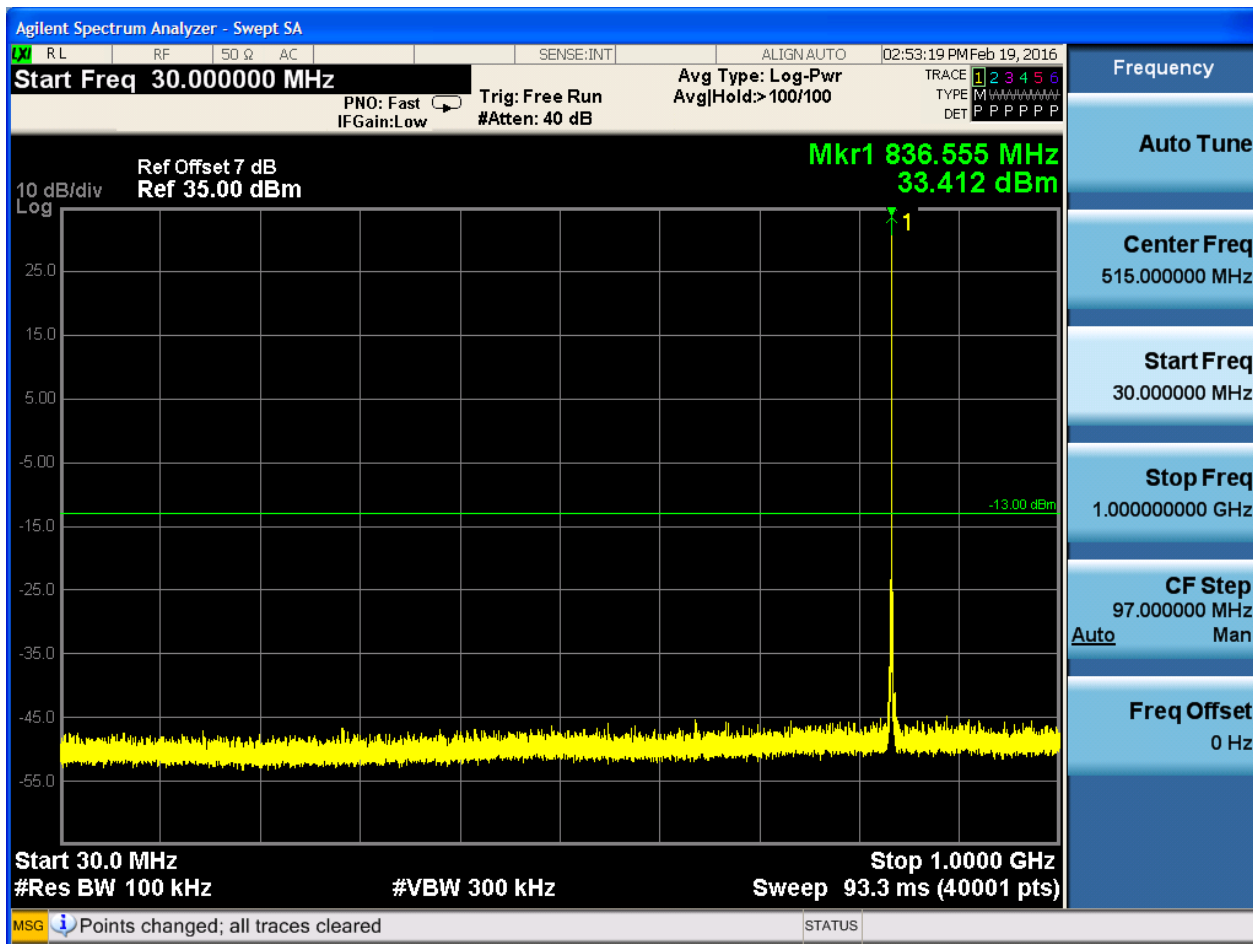


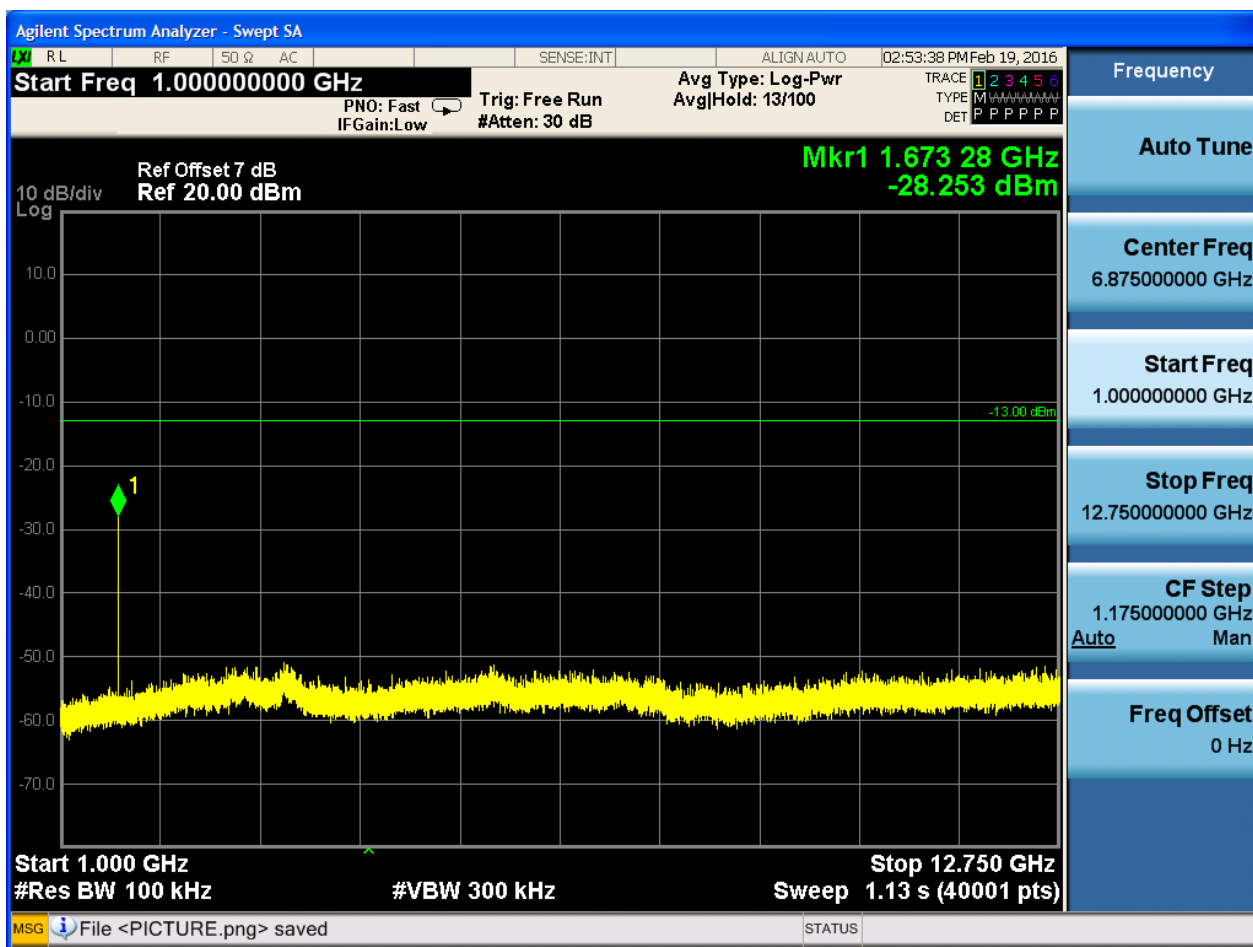


## 6.1.1.1.2 Test Channel = MCH



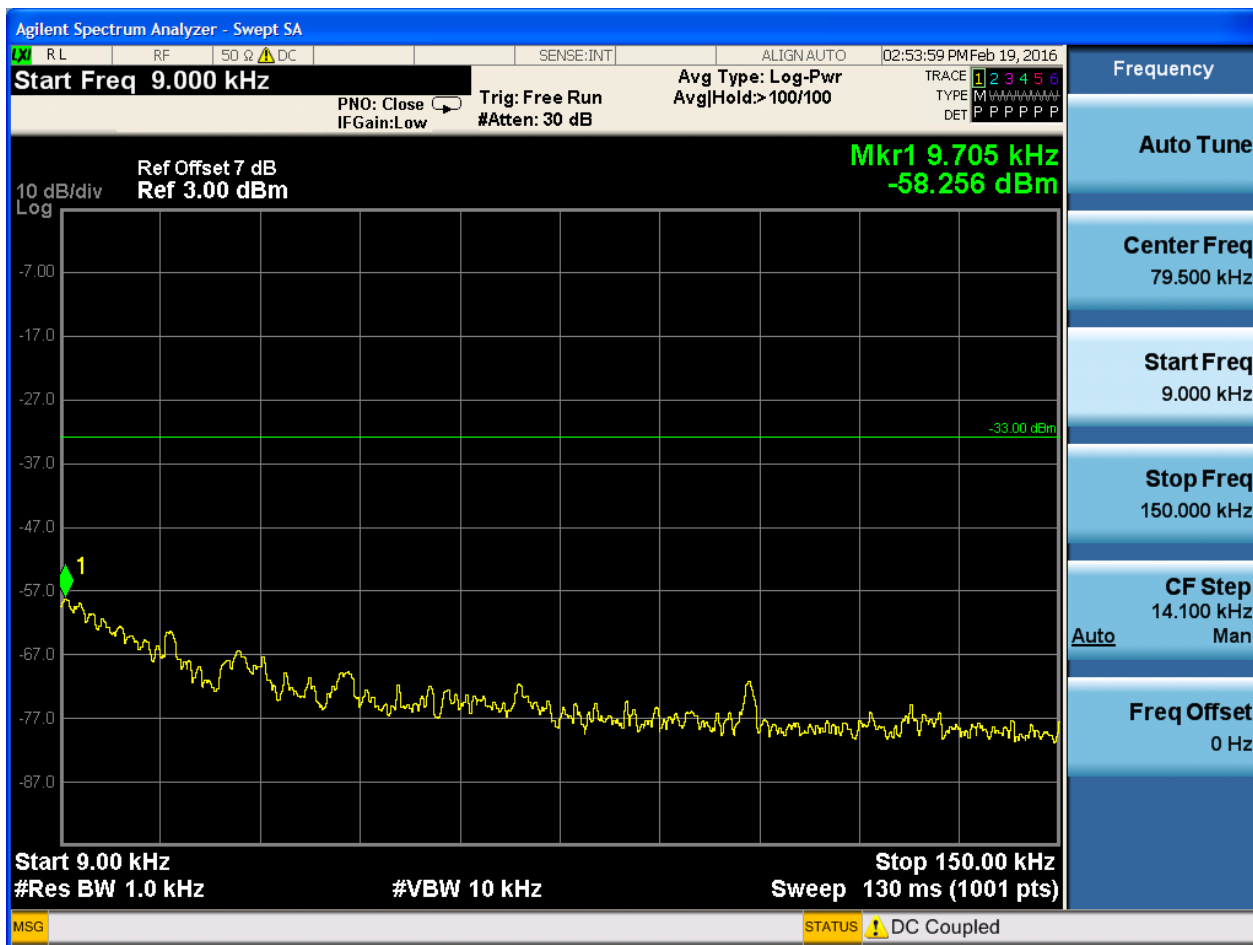


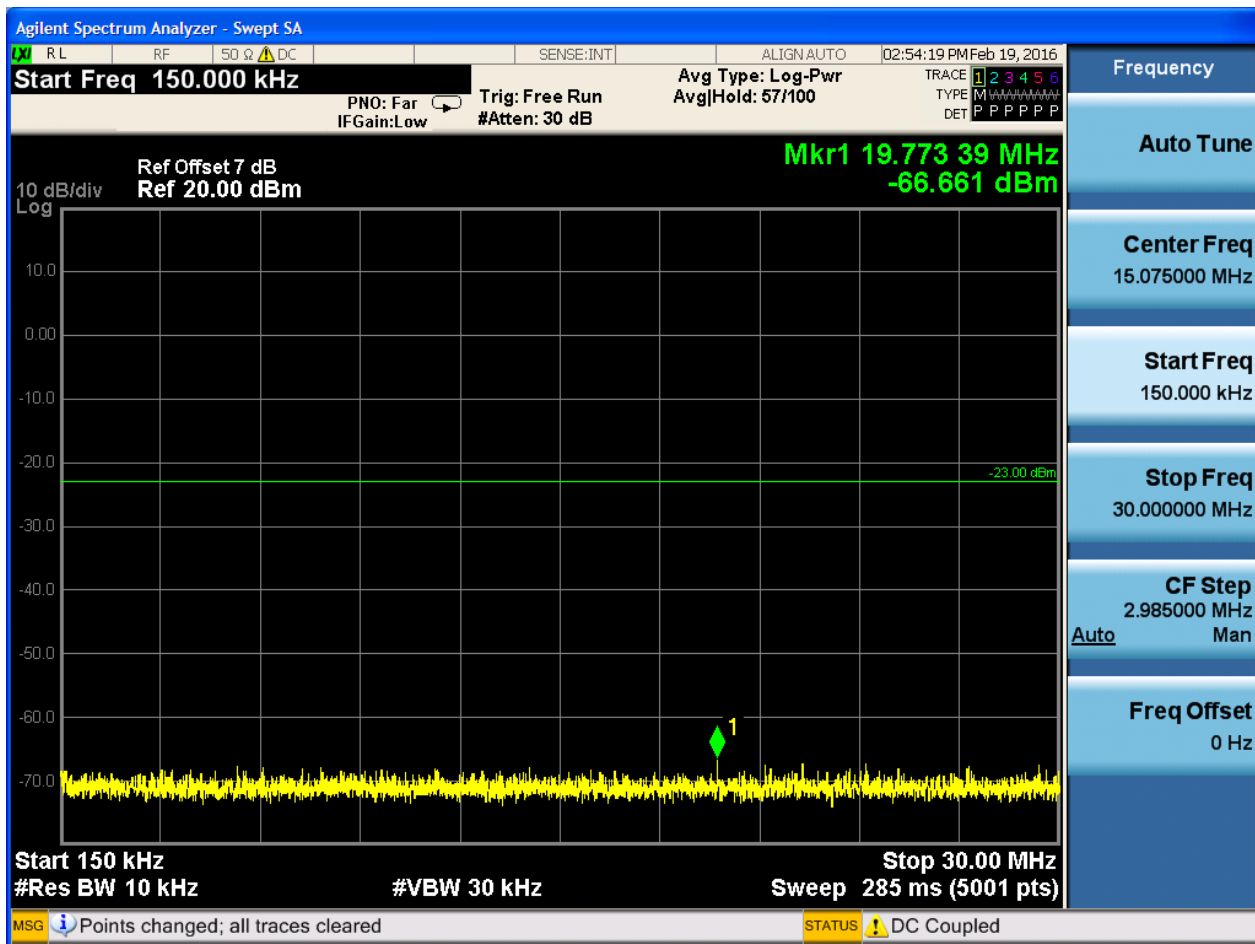


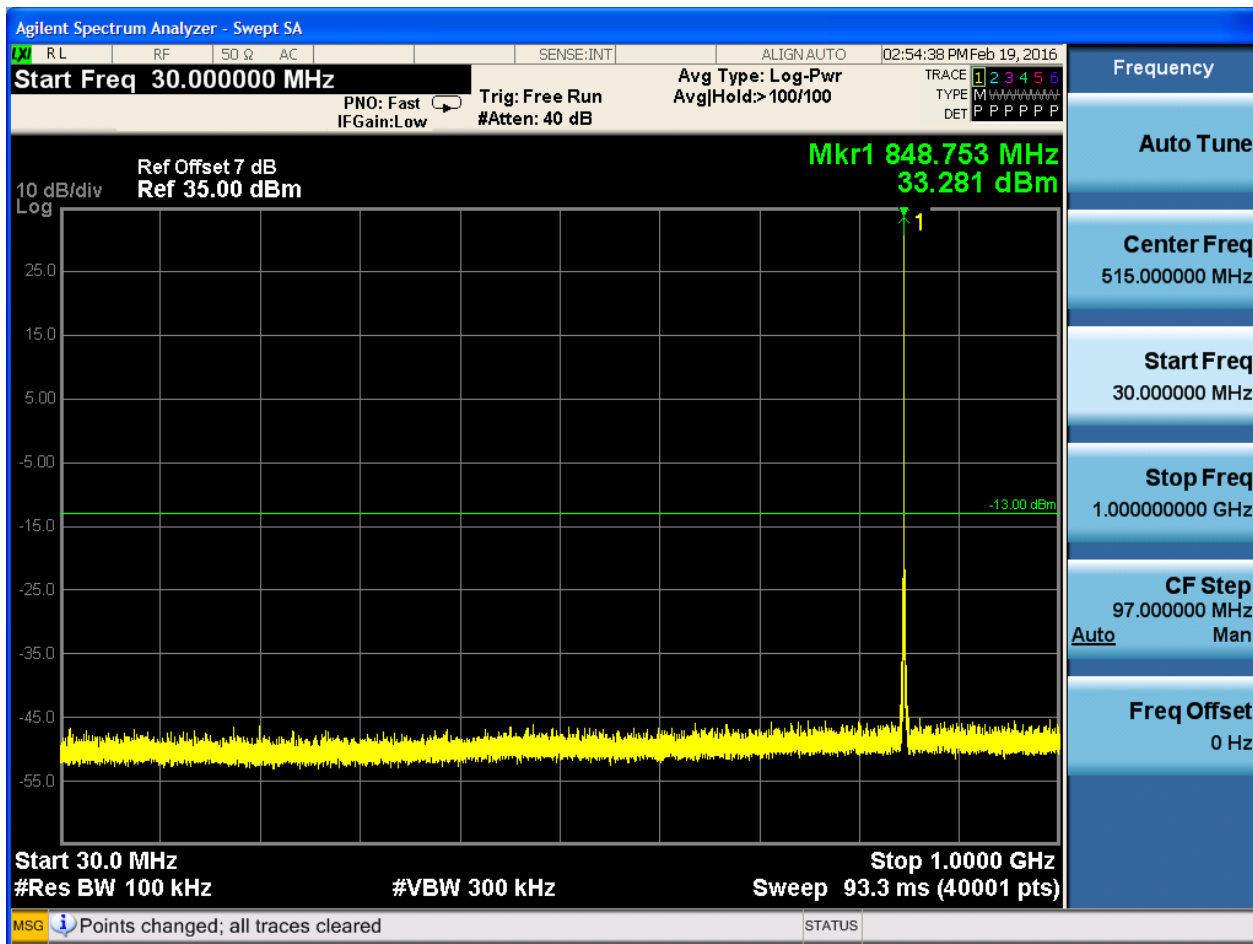


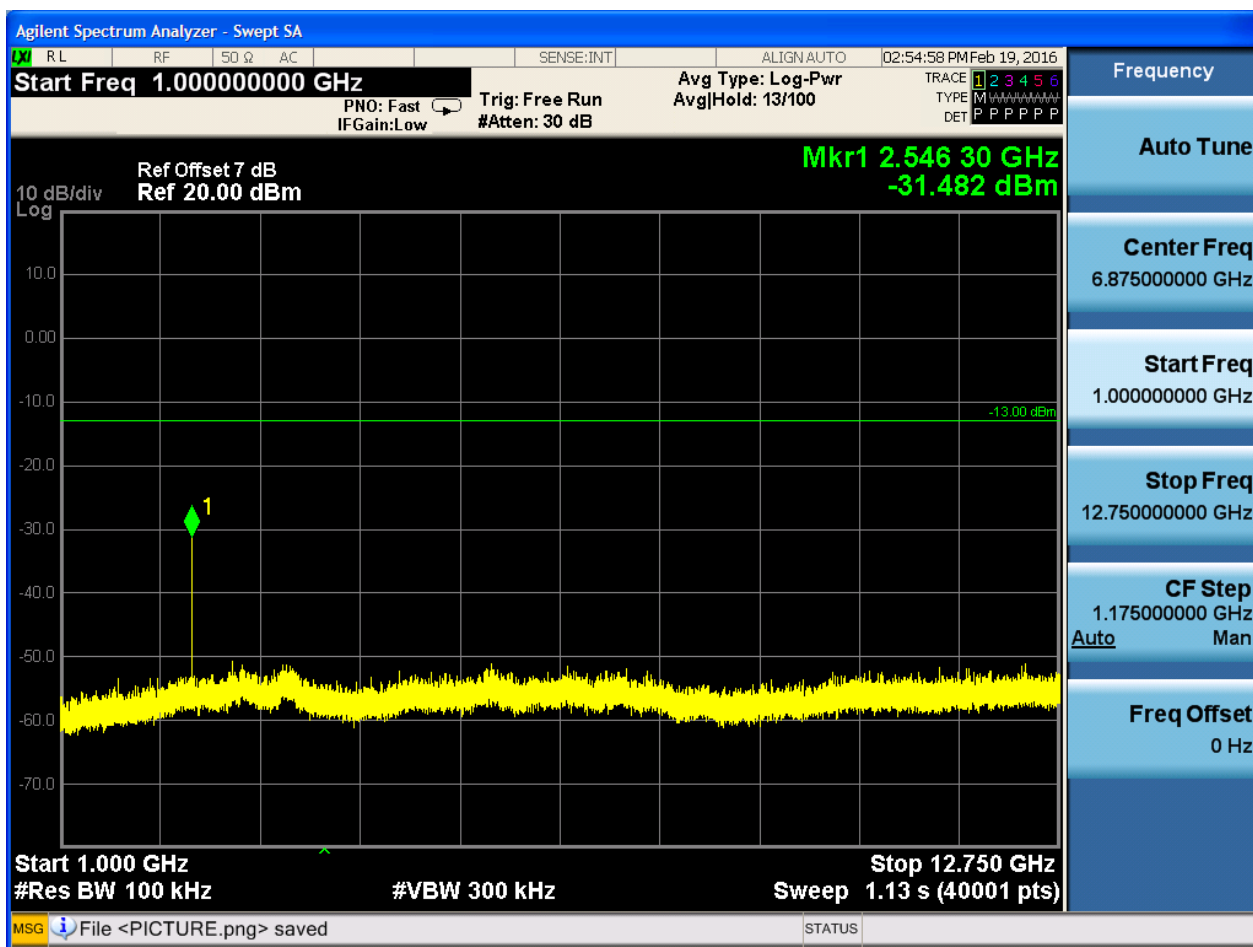


## 6.1.1.1.3 Test Channel = HCH





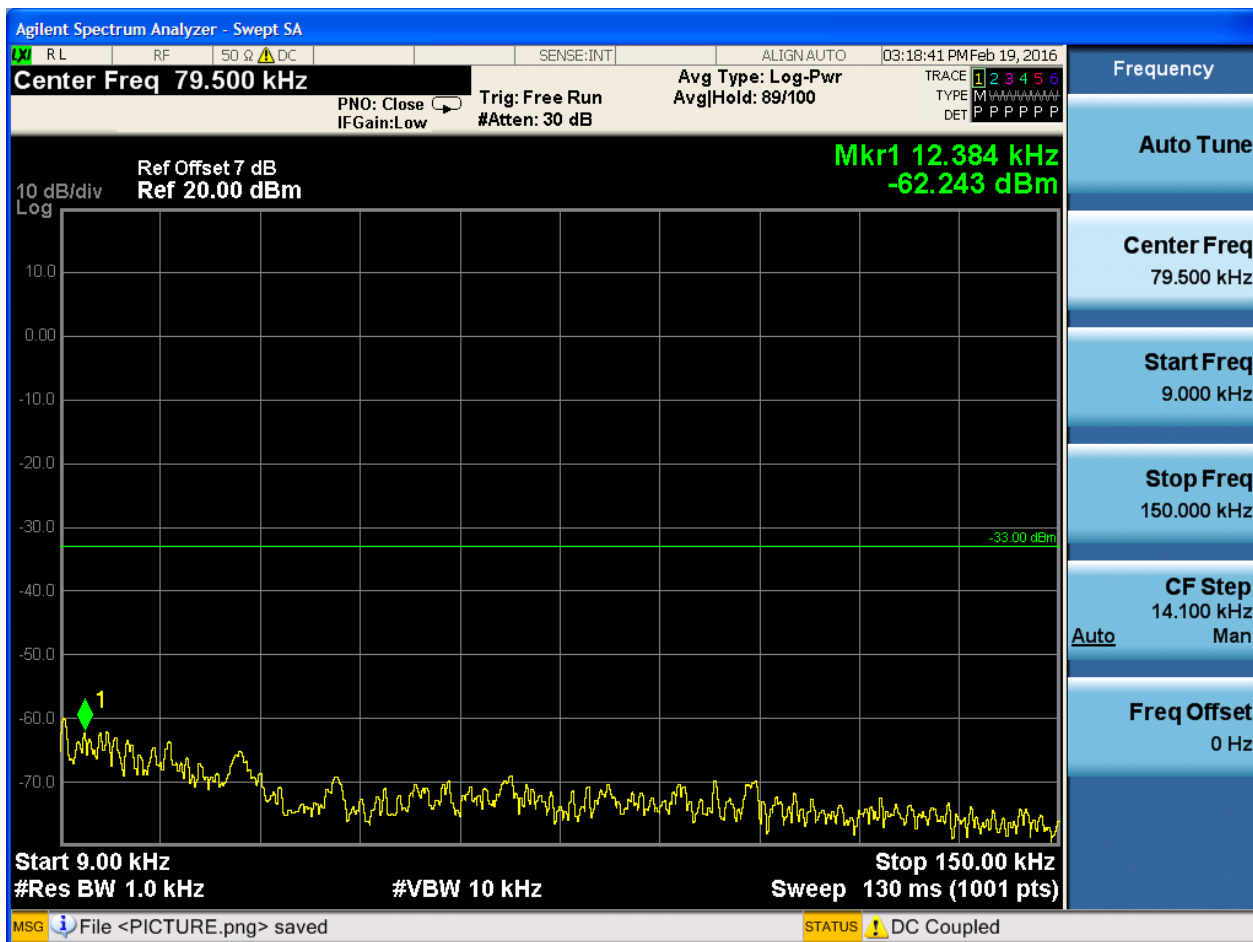


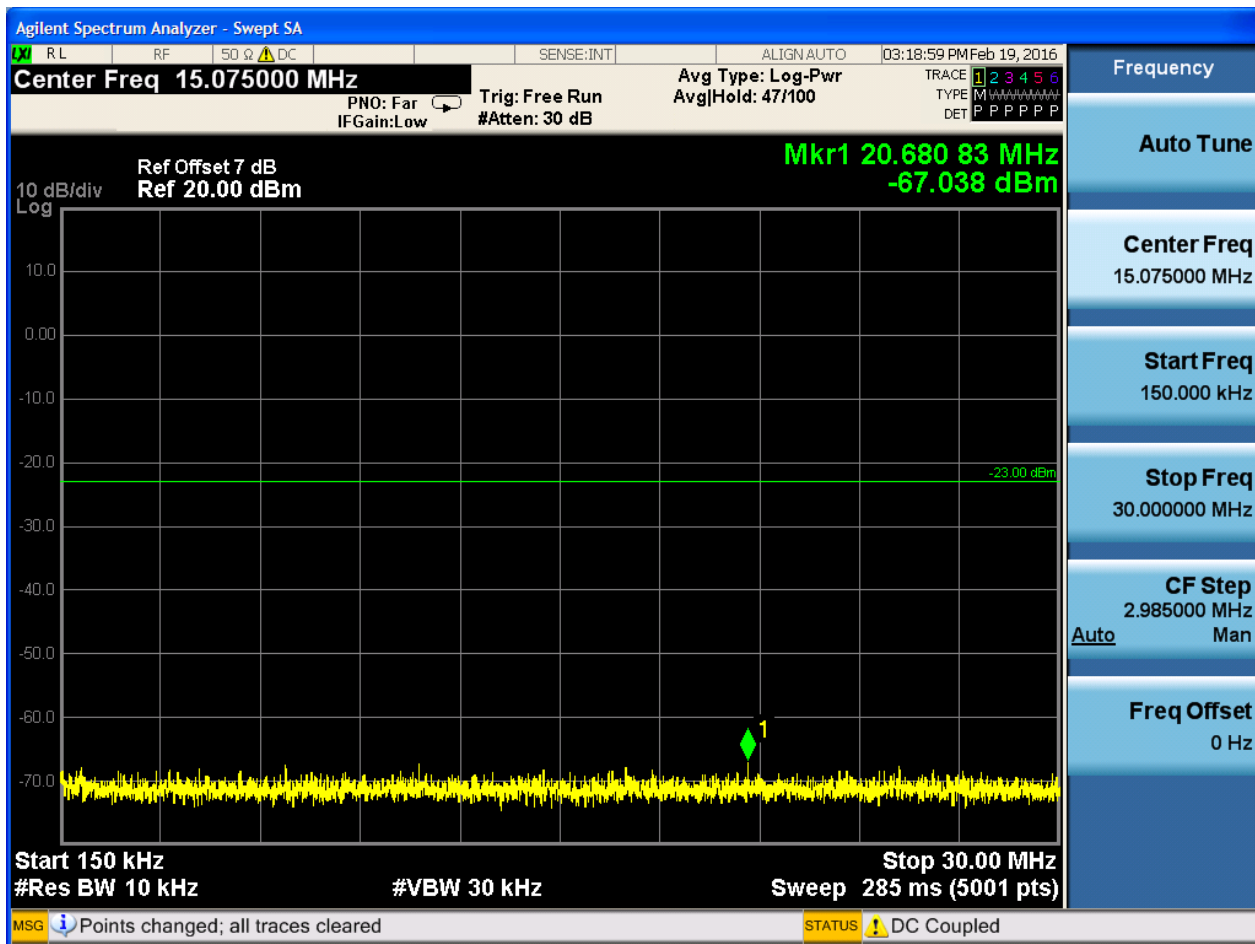


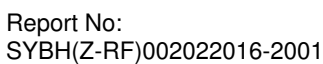


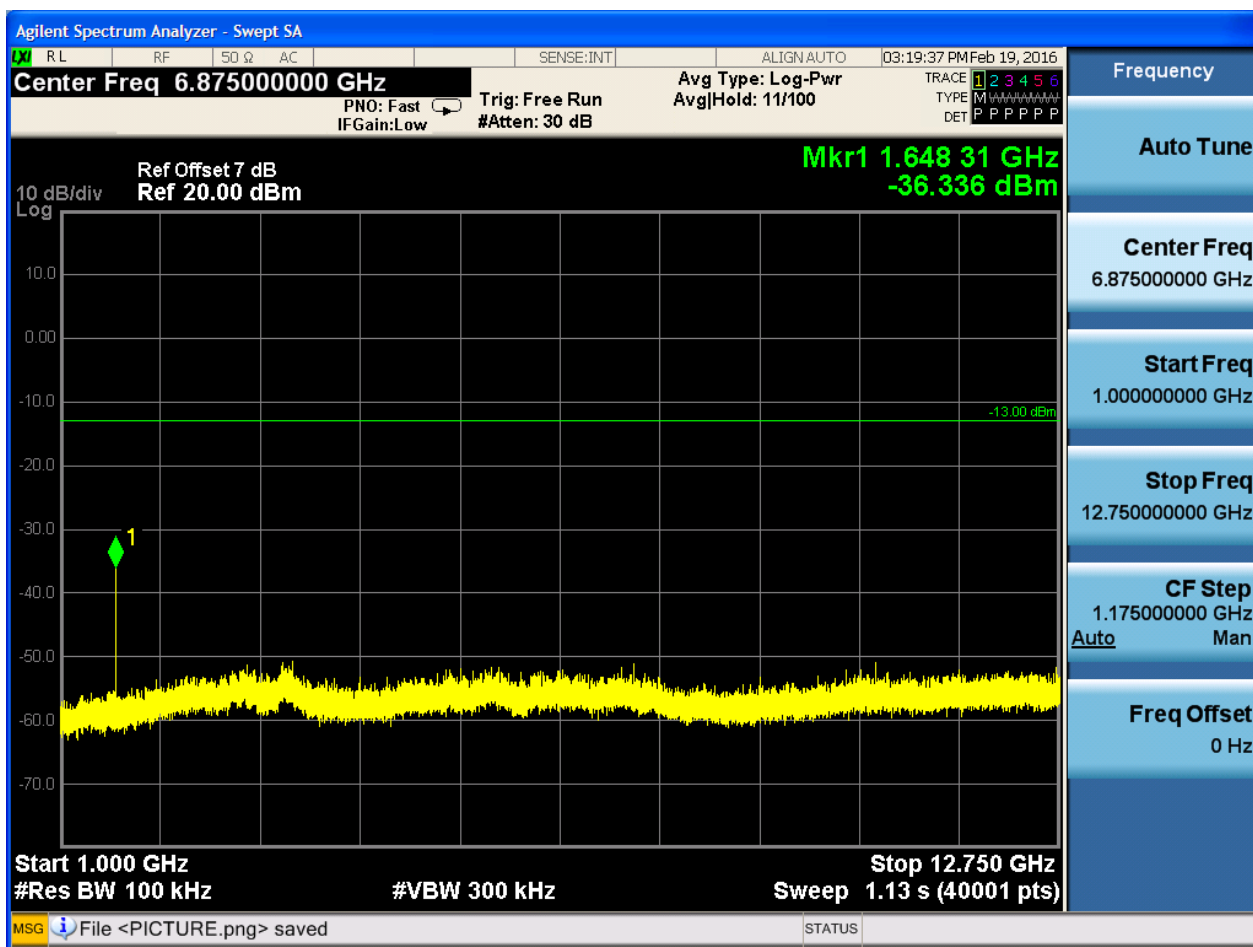
## 6.1.1.2 Test Mode = GSM/TM2

## 6.1.1.2.1 Test Channel = LCH



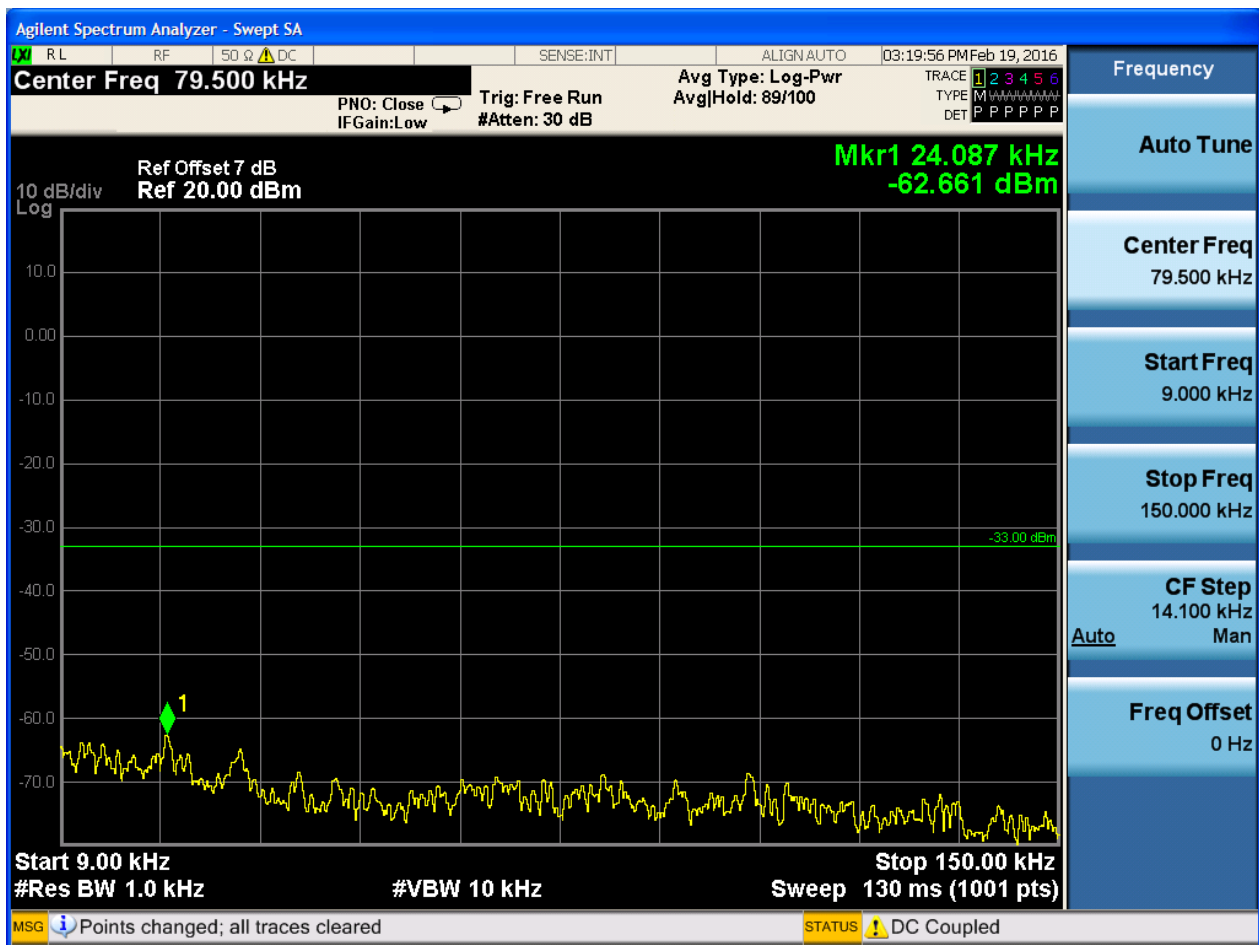


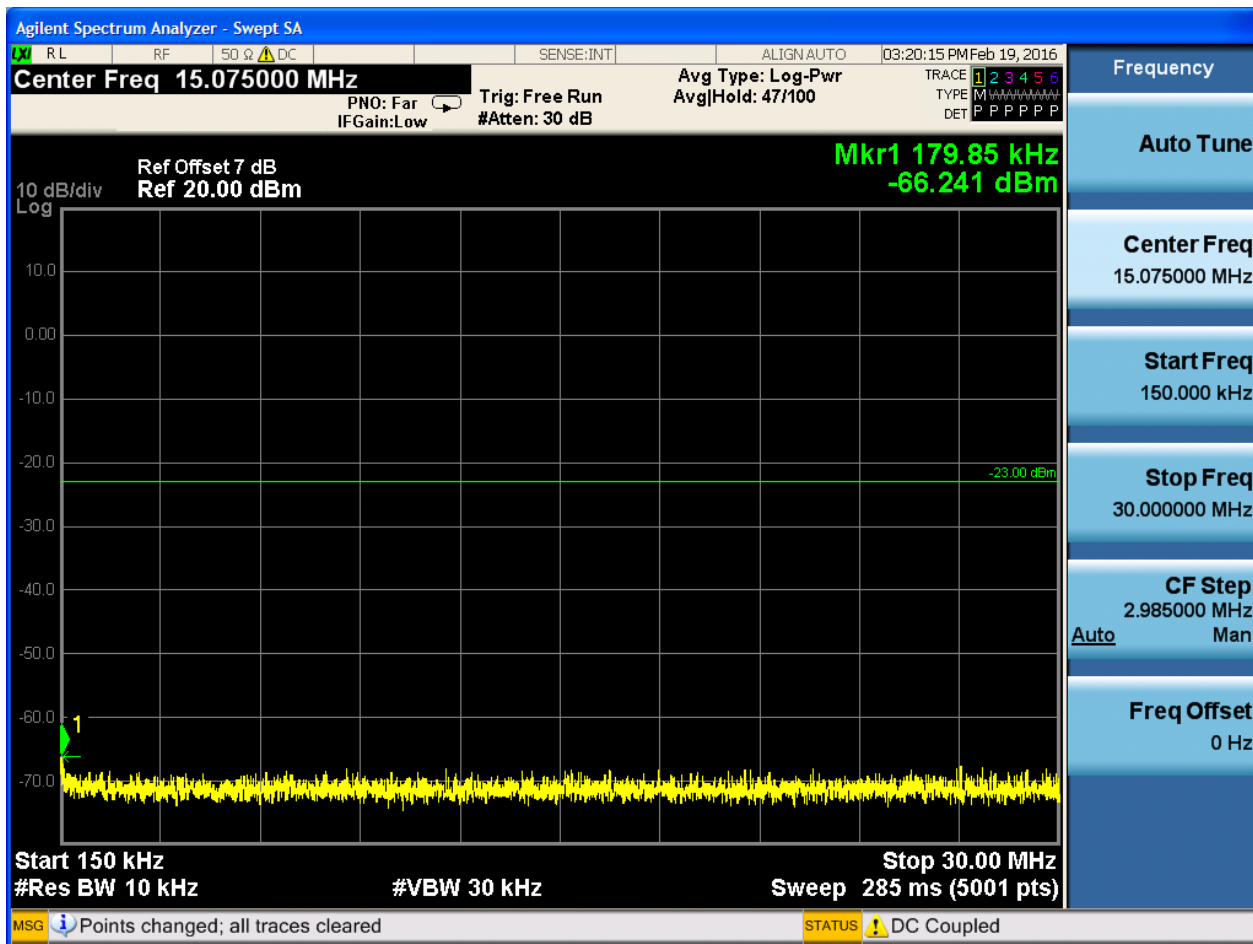


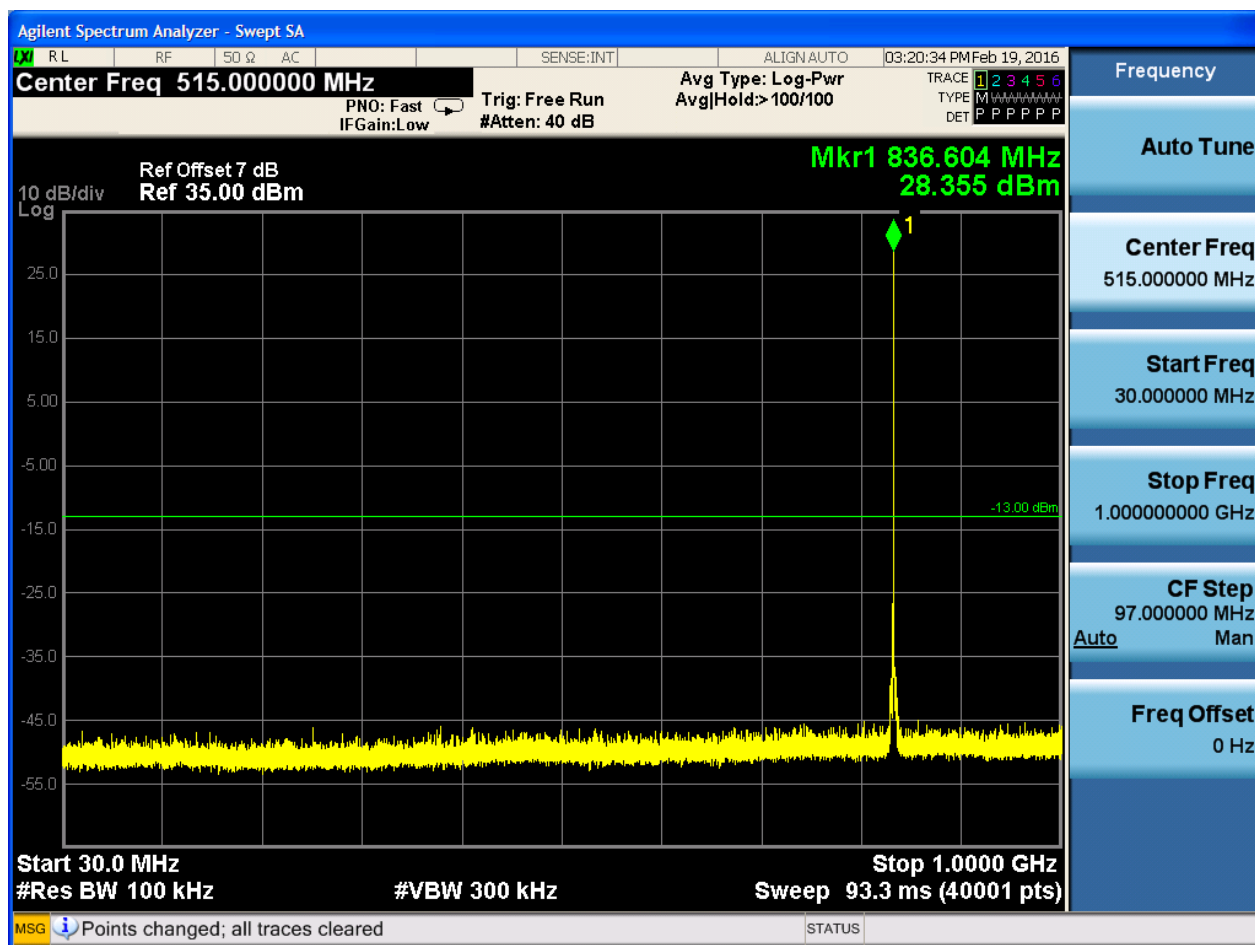


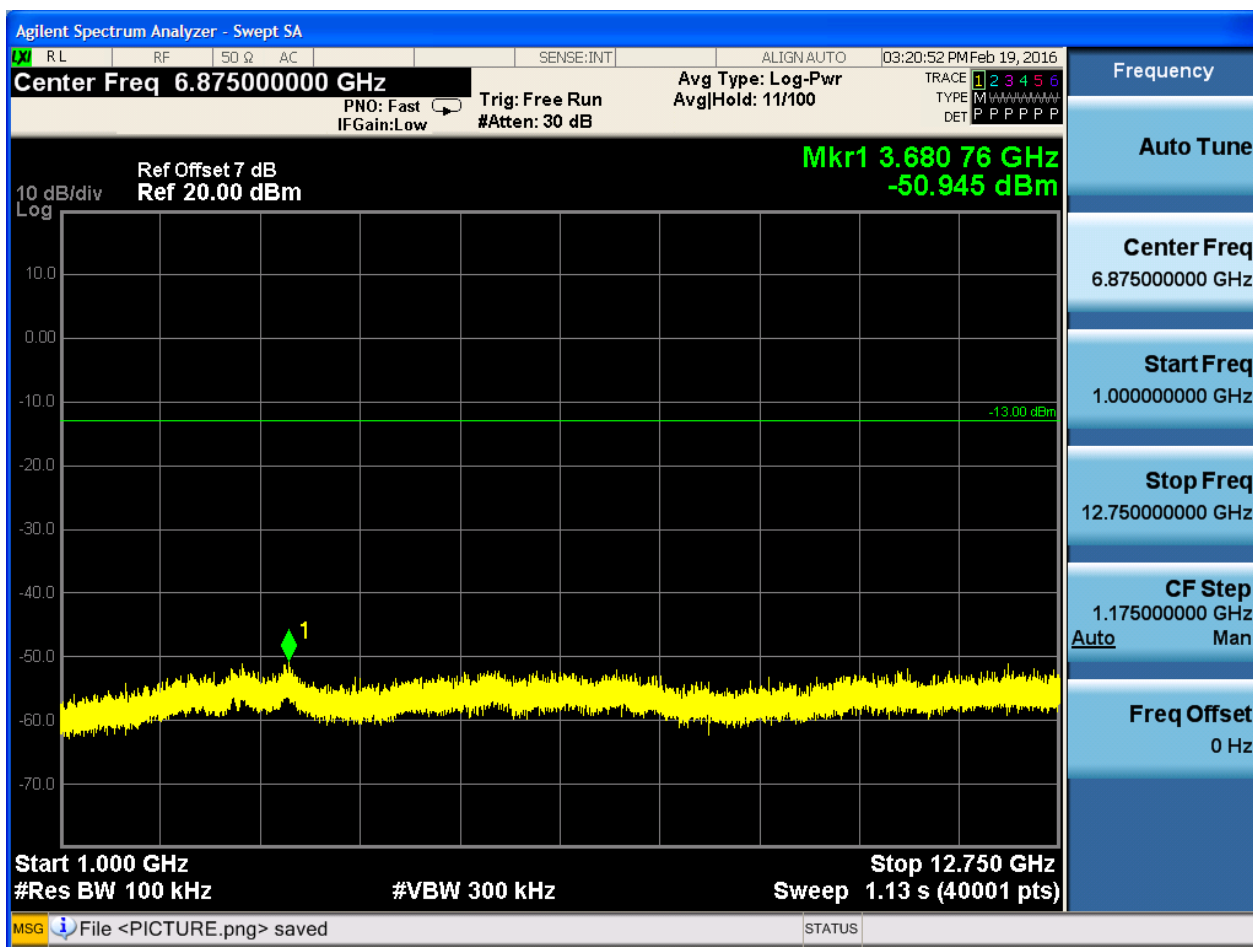


## 6.1.1.2.2 Test Channel = MCH



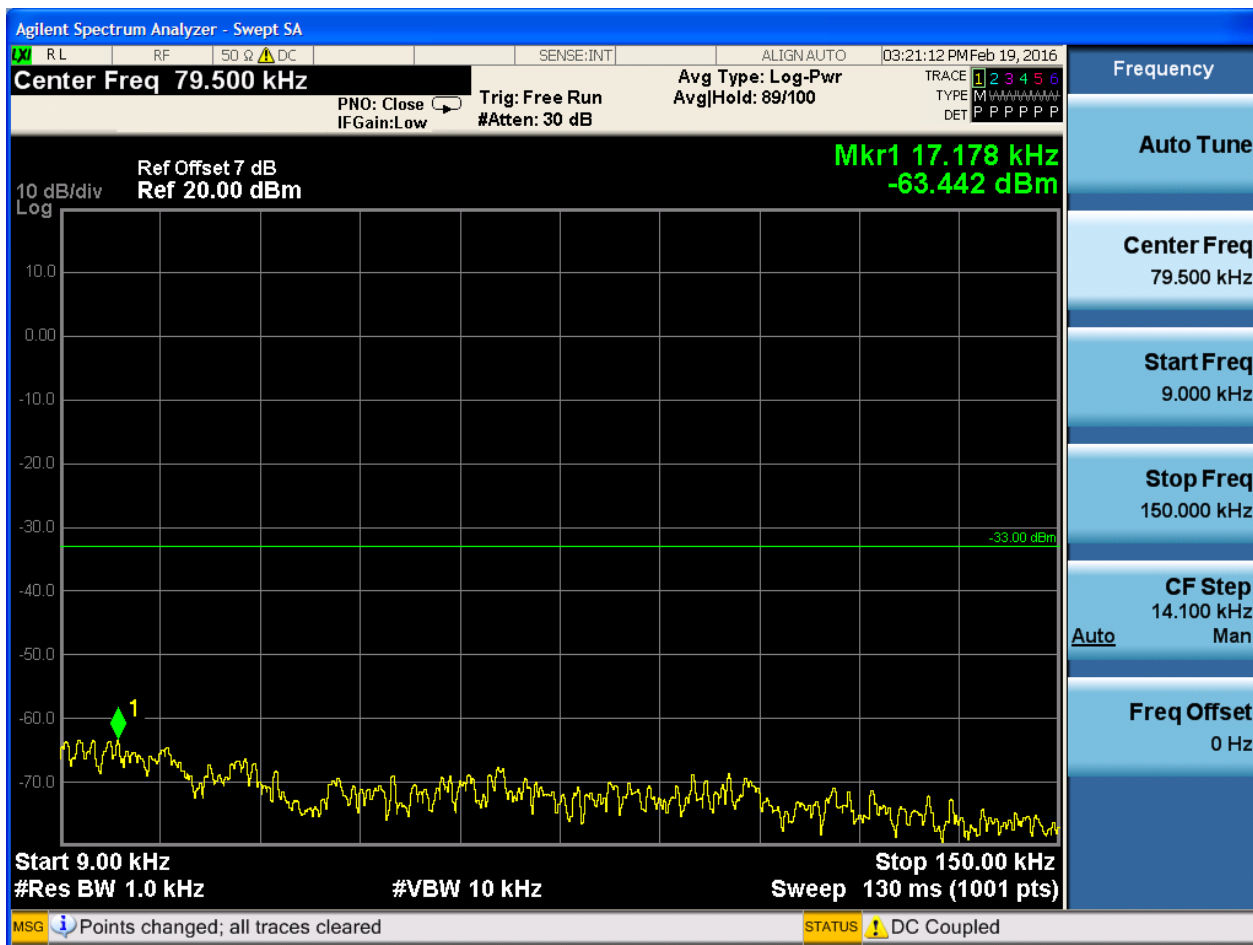


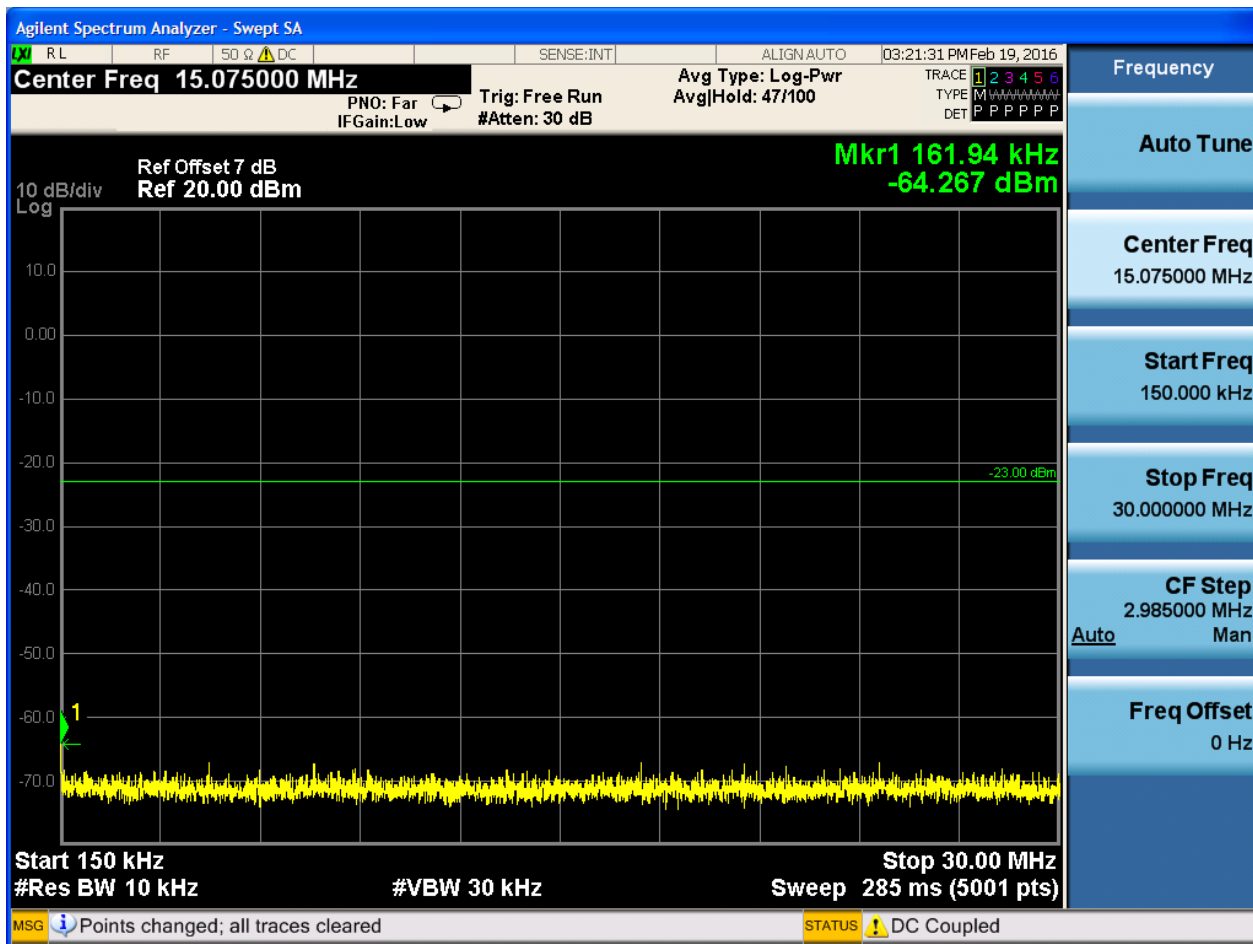


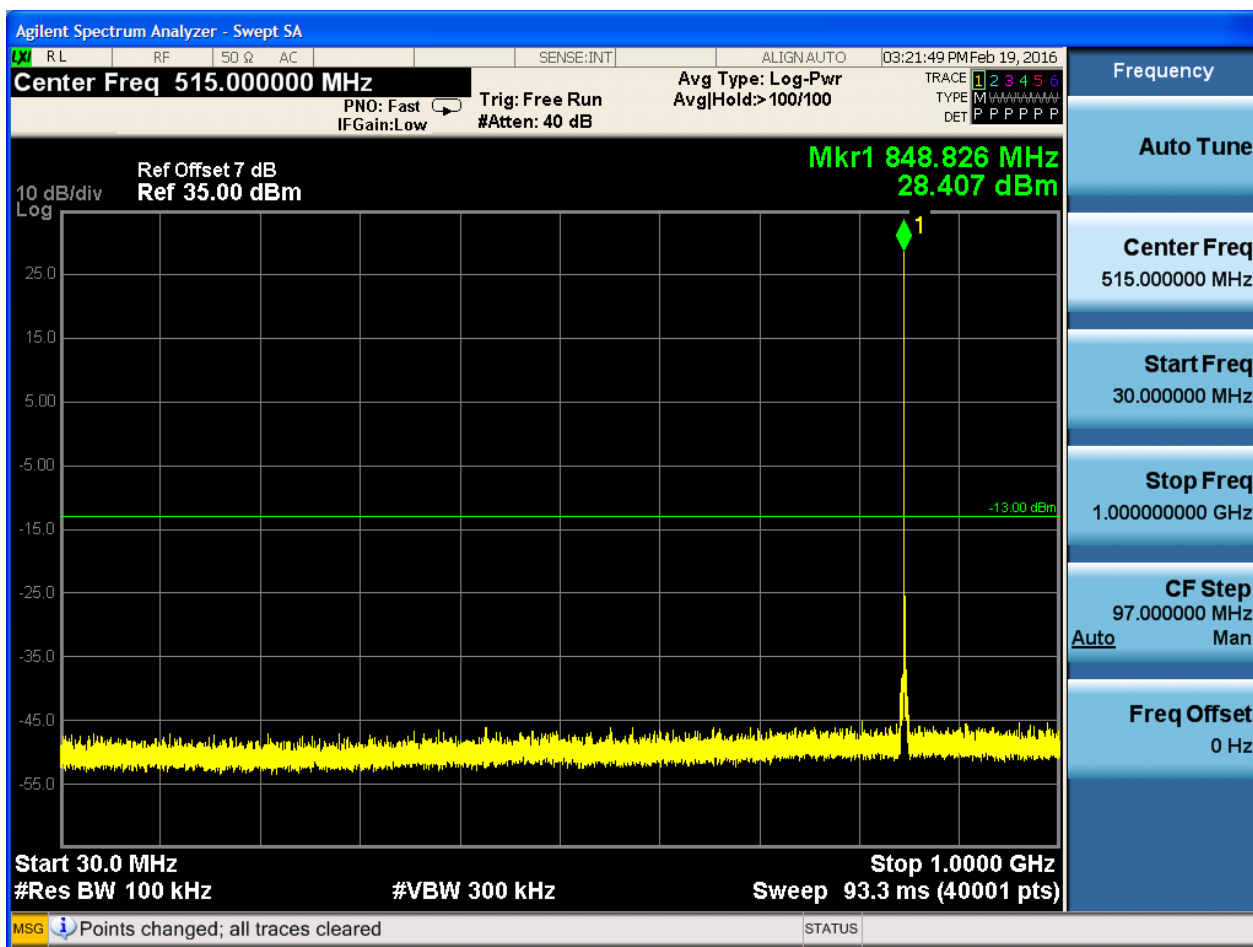


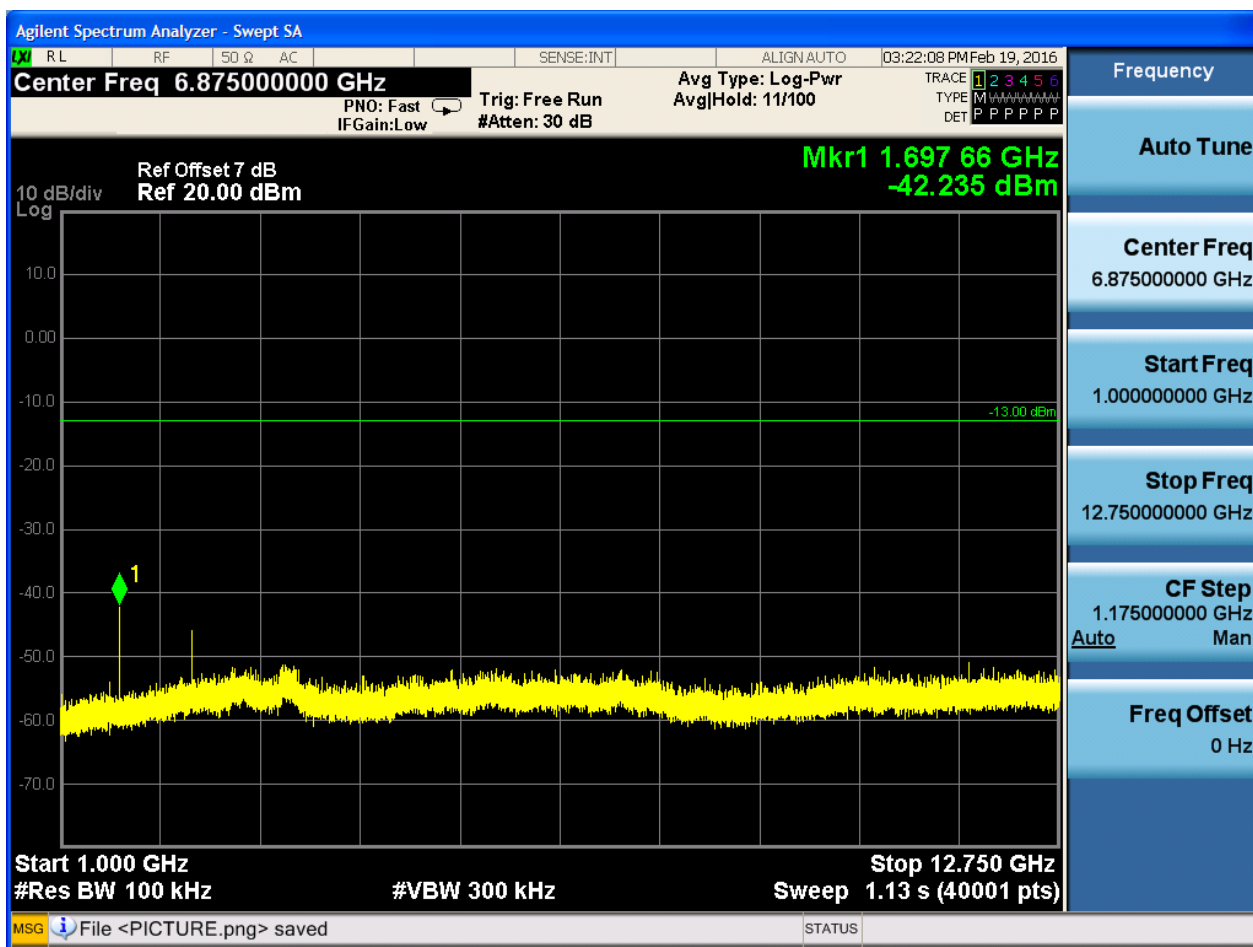


## 6.1.1.2.3 Test Channel = HCH







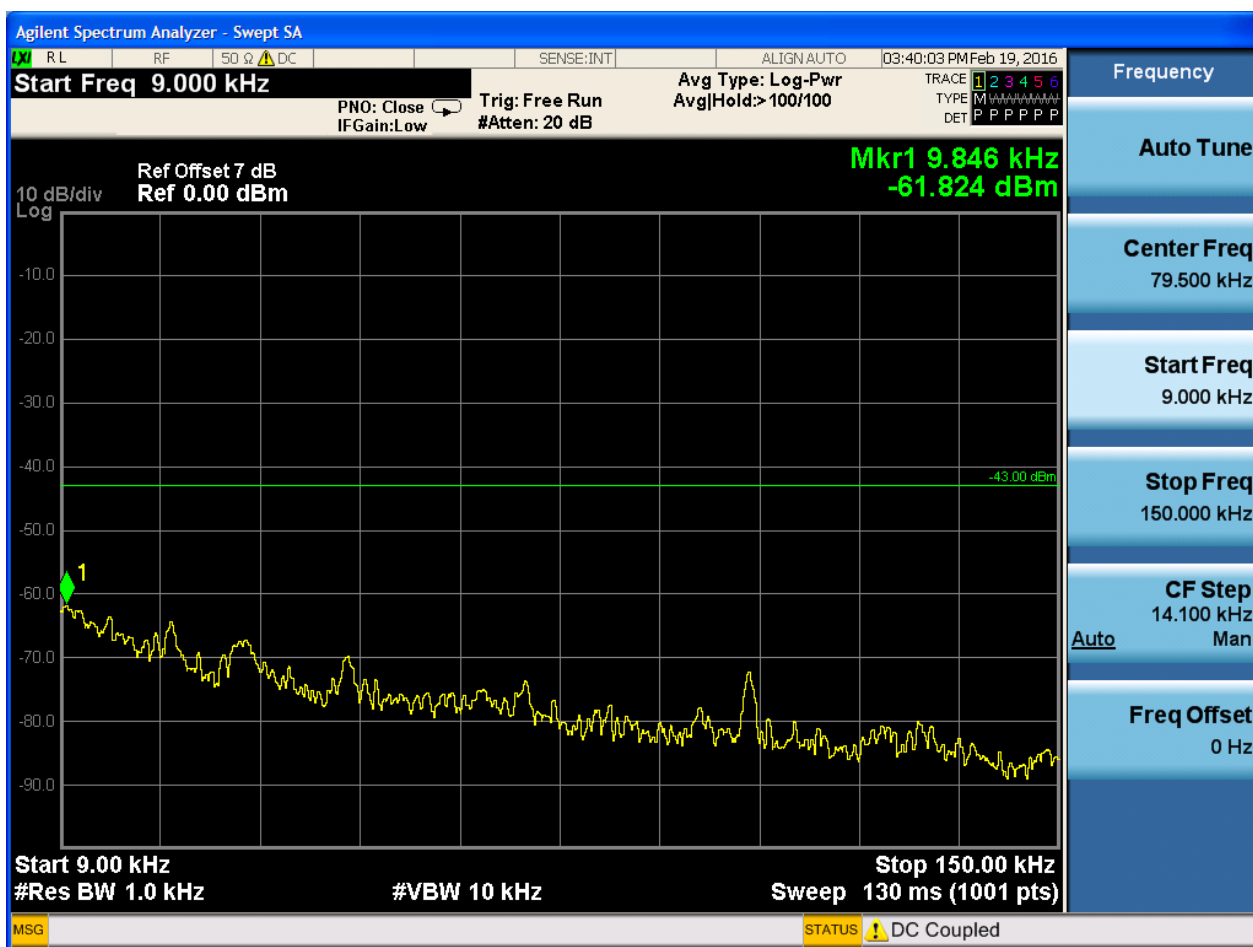


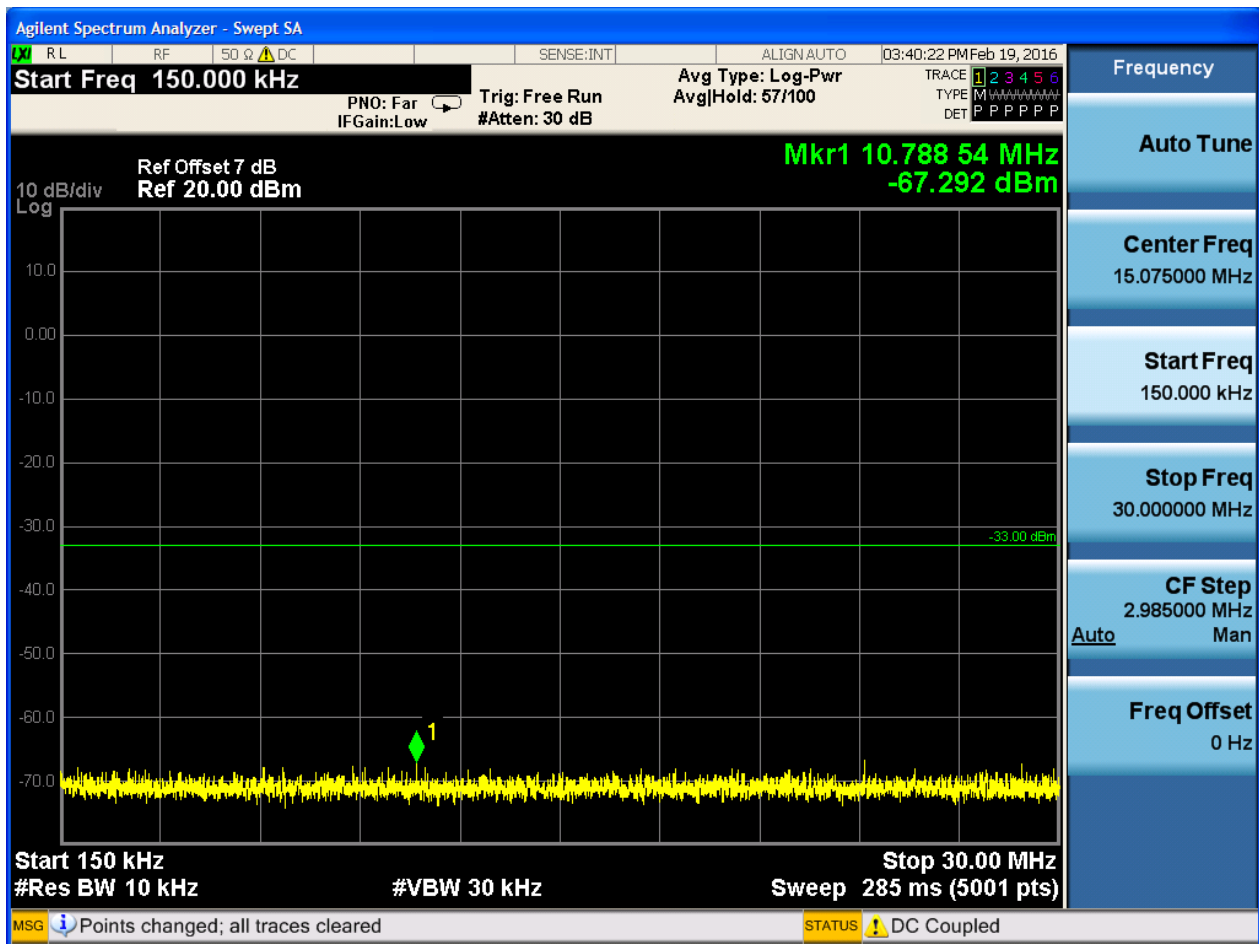


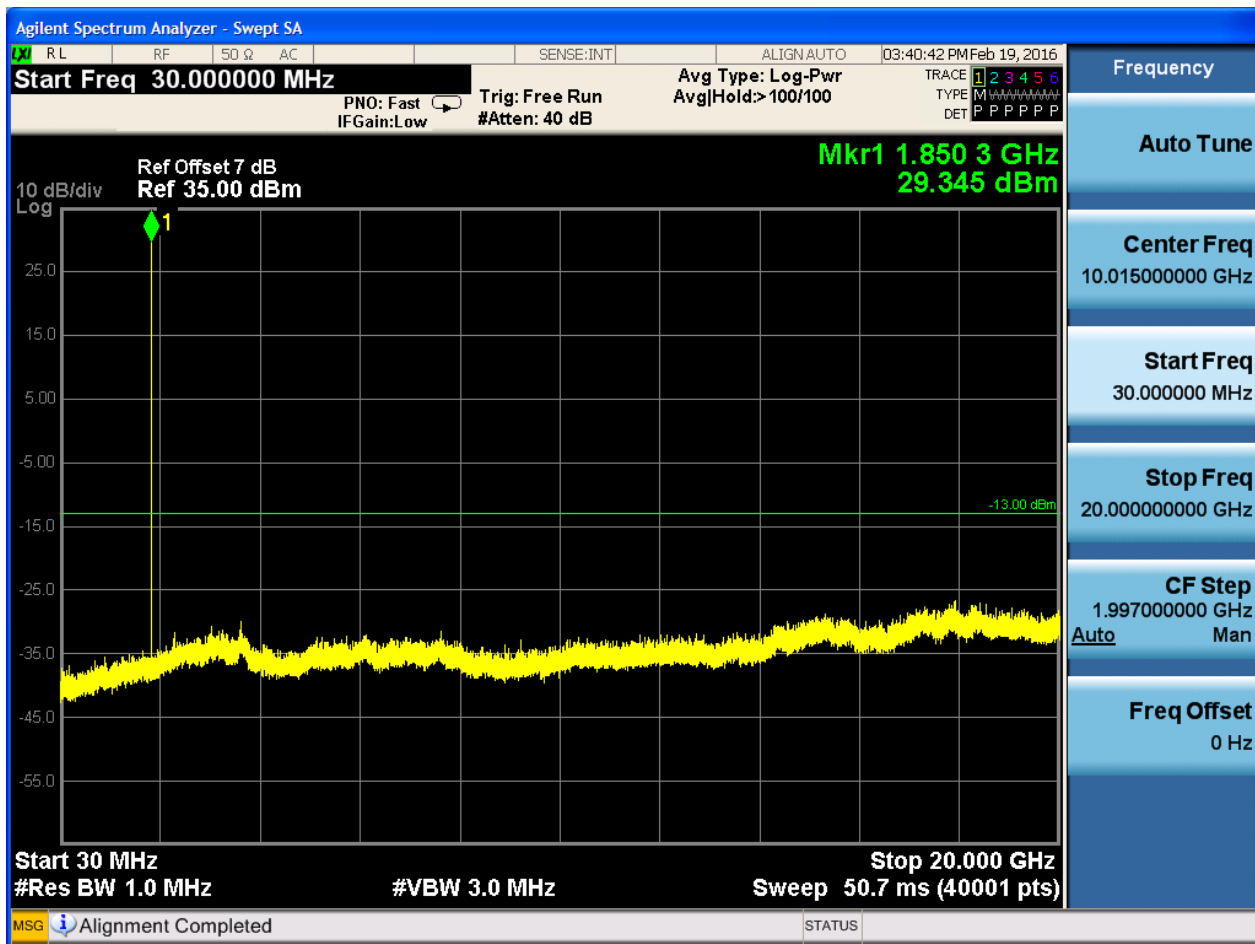
## 6.1.2 Test Band = GSM1900

## 6.1.2.1 Test Mode = GSM/TM1

## 6.1.2.1.1 Test Channel = LCH

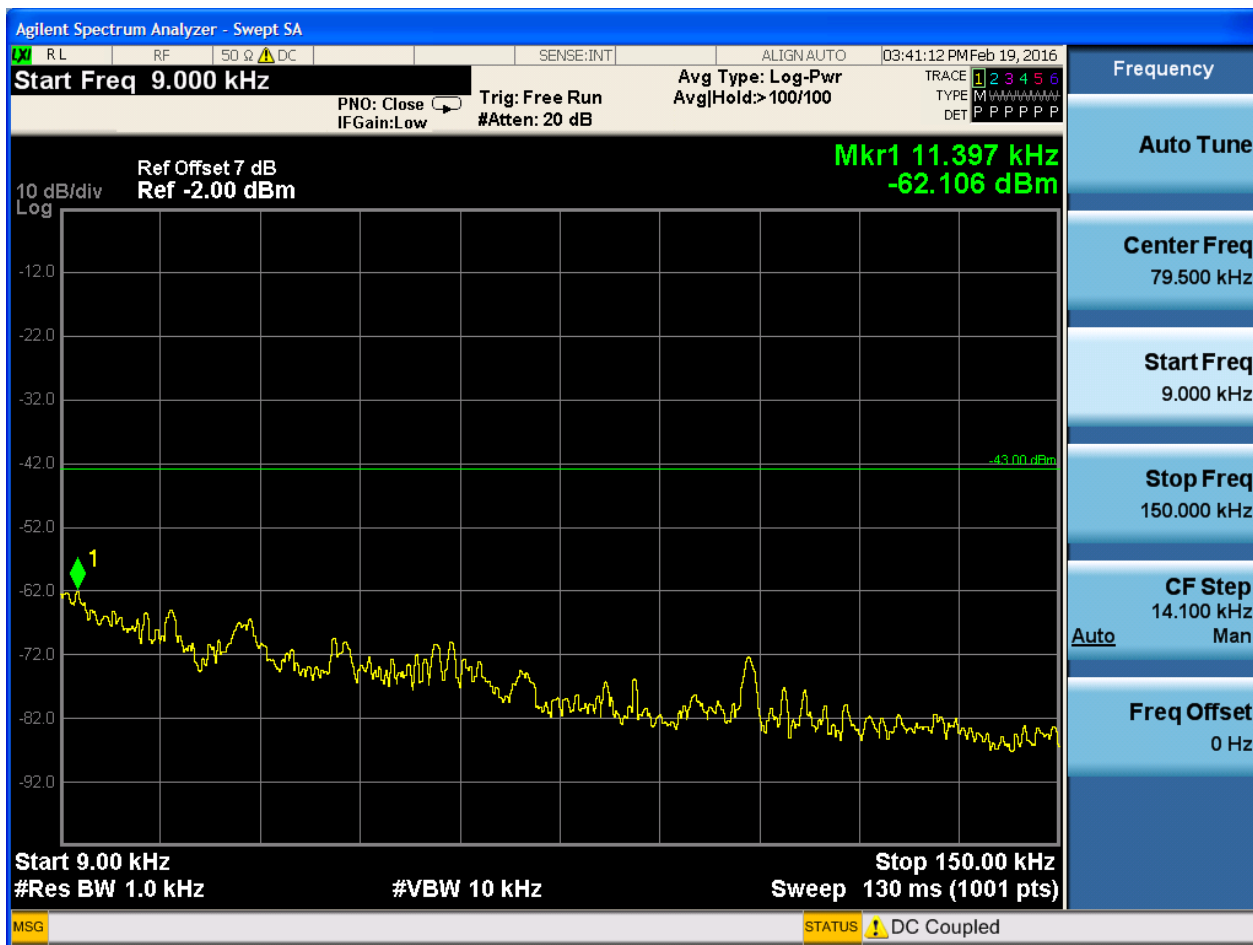


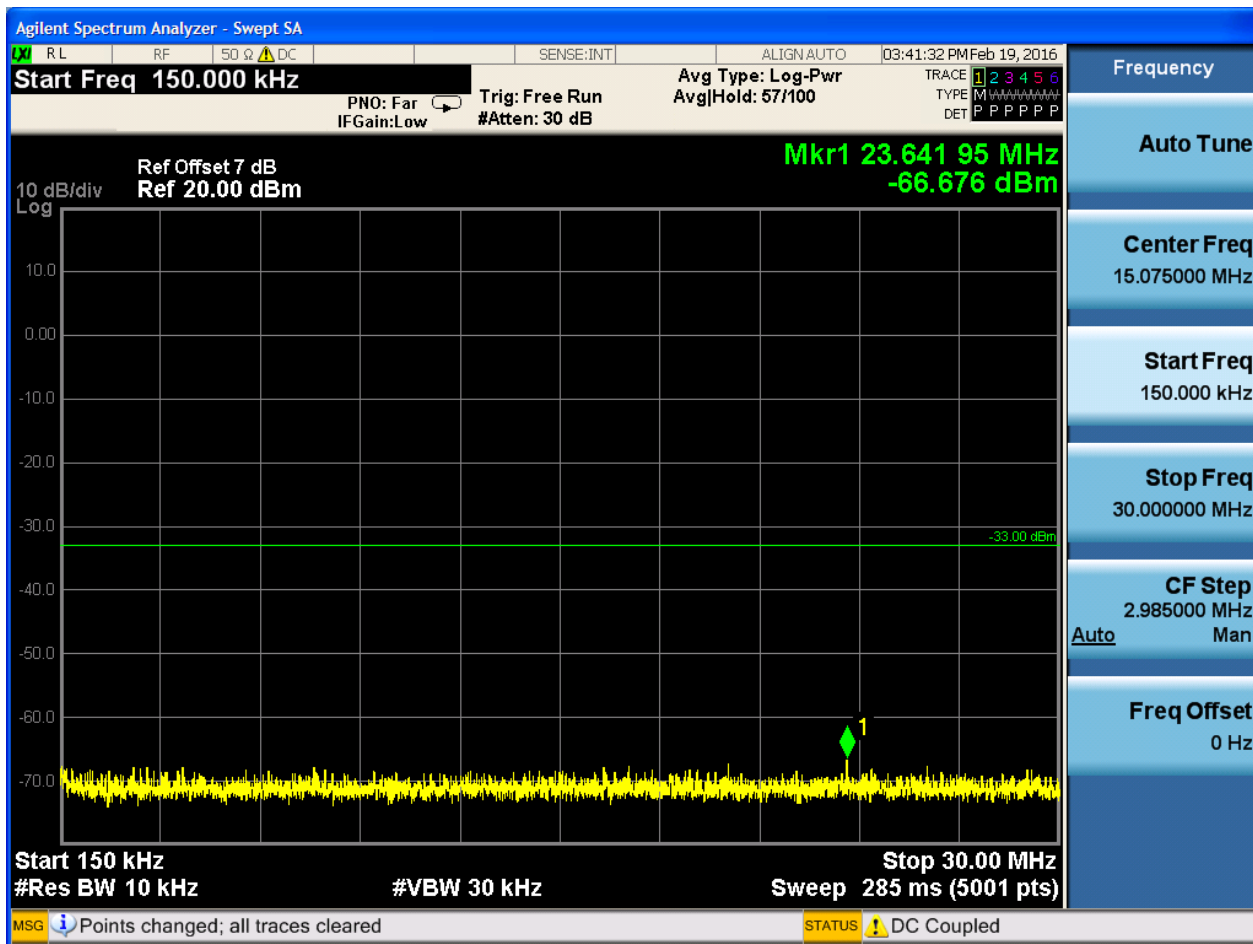


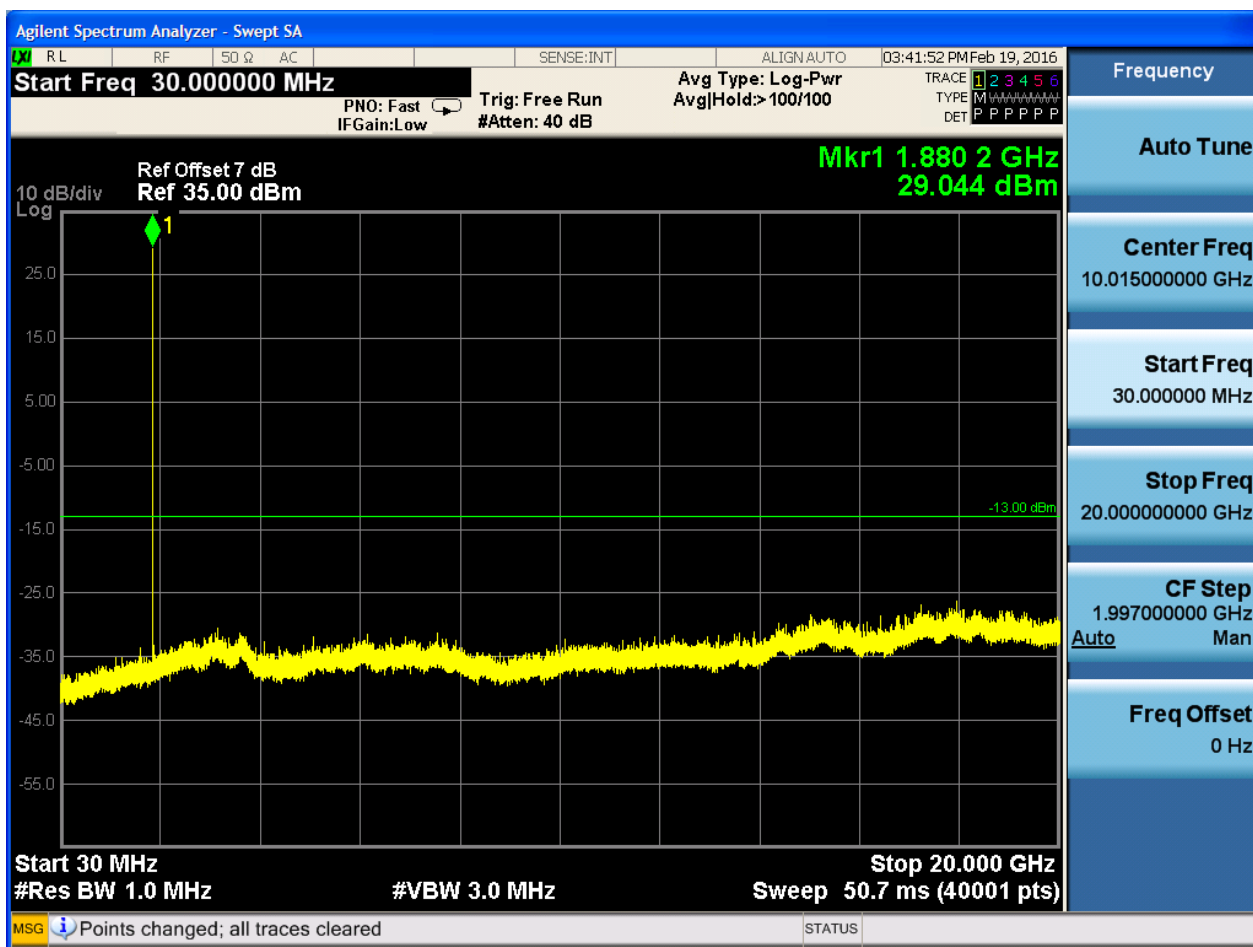




## 6.1.2.1.2 Test Channel = MCH



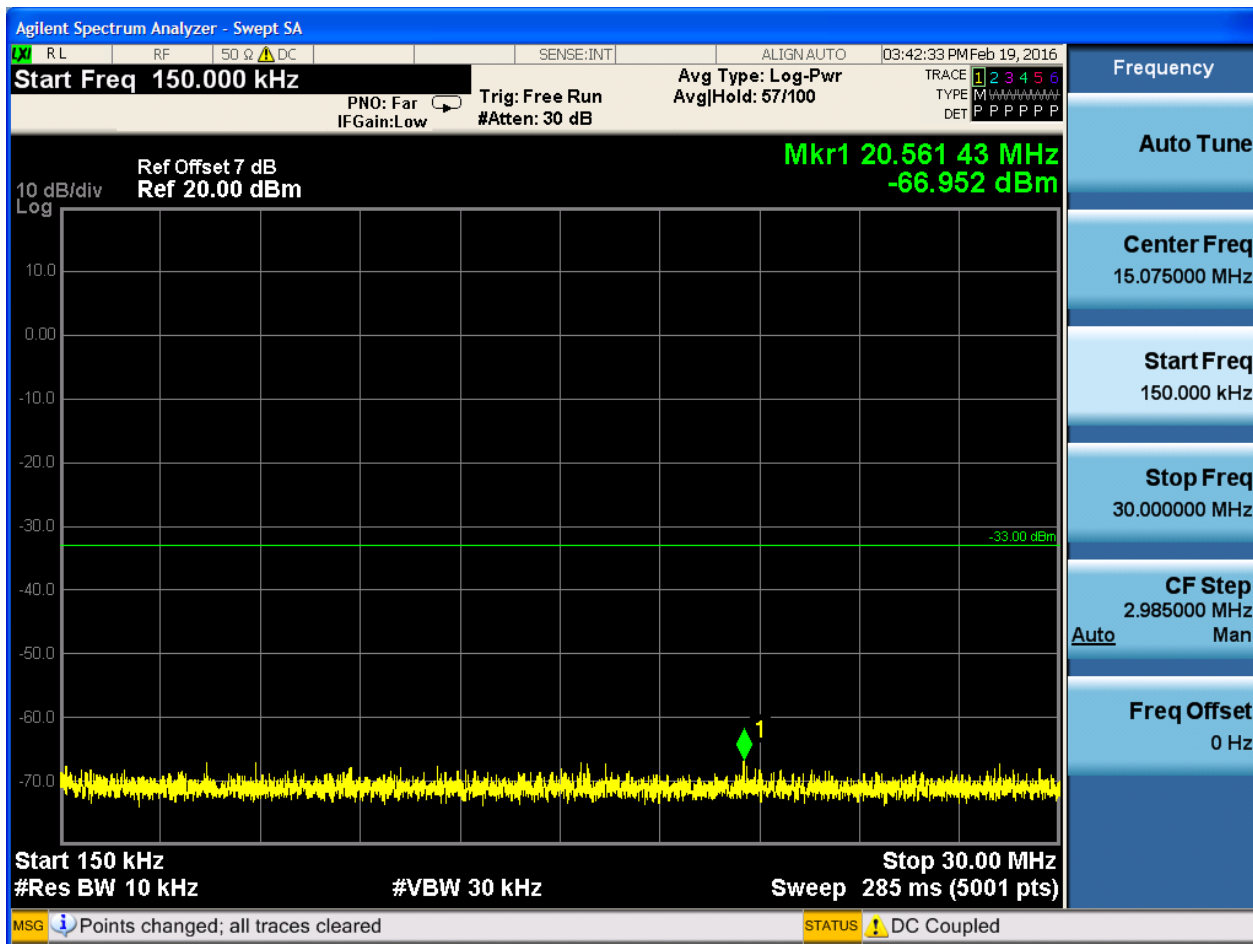


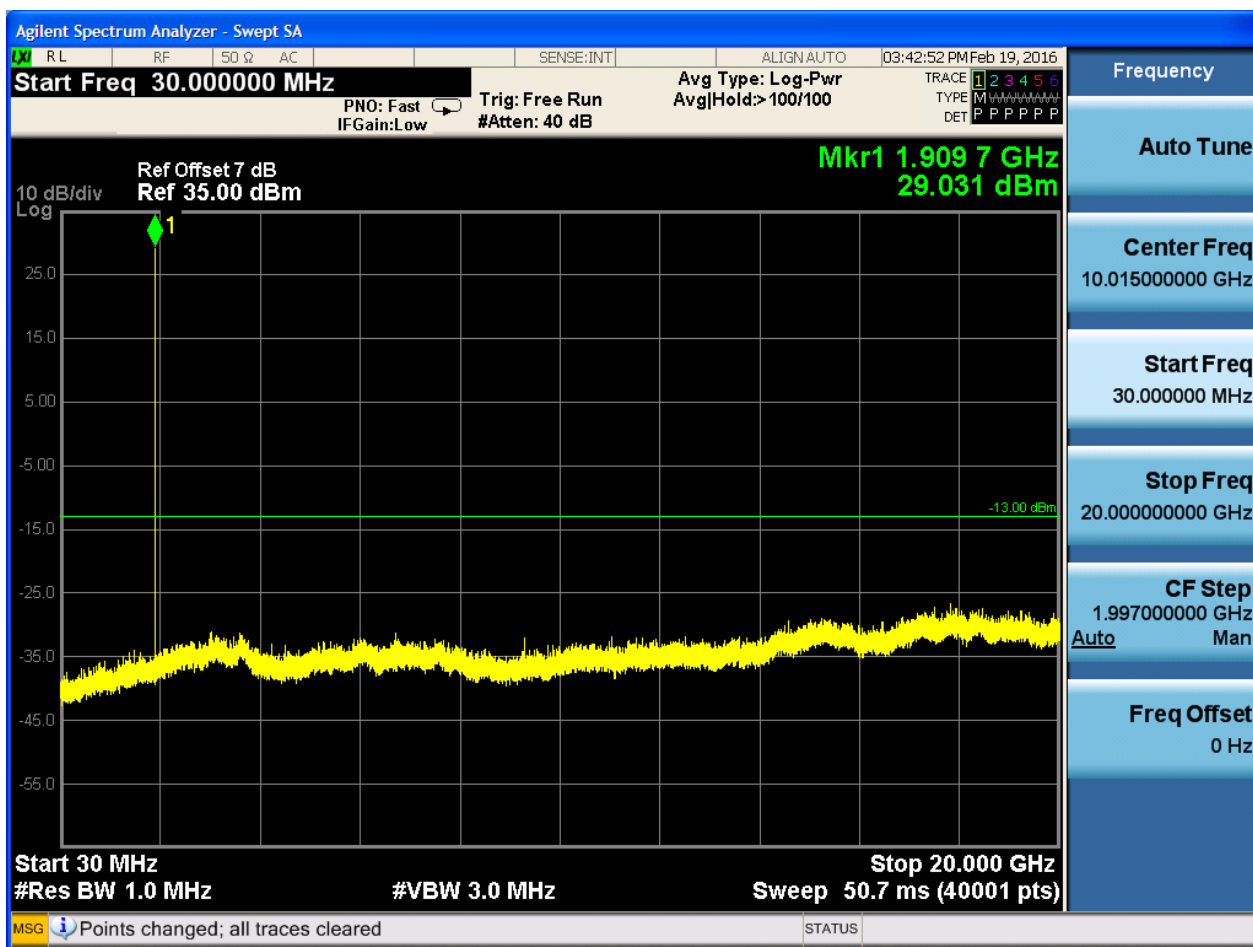




## 6.1.2.1.3 Test Channel = HCH



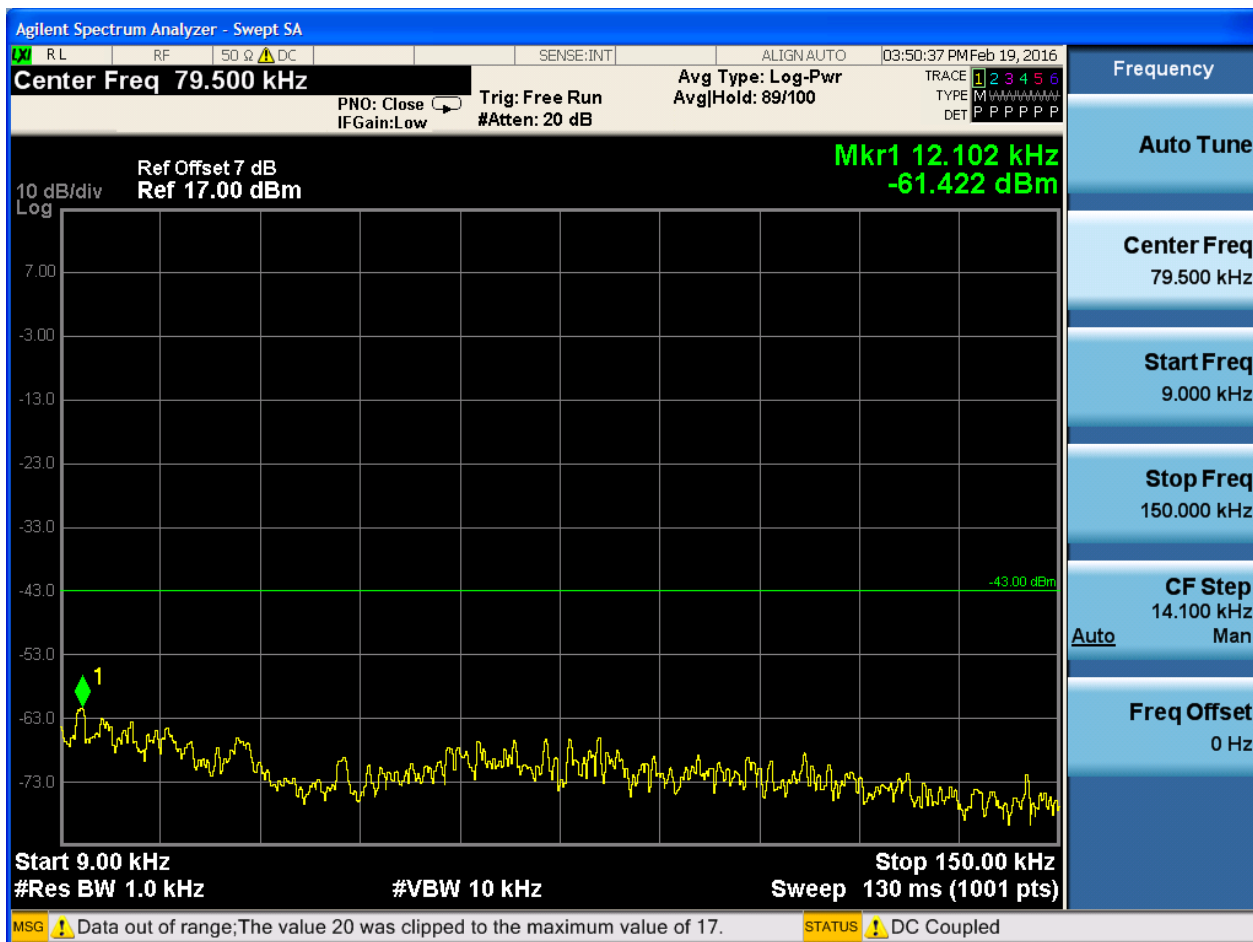


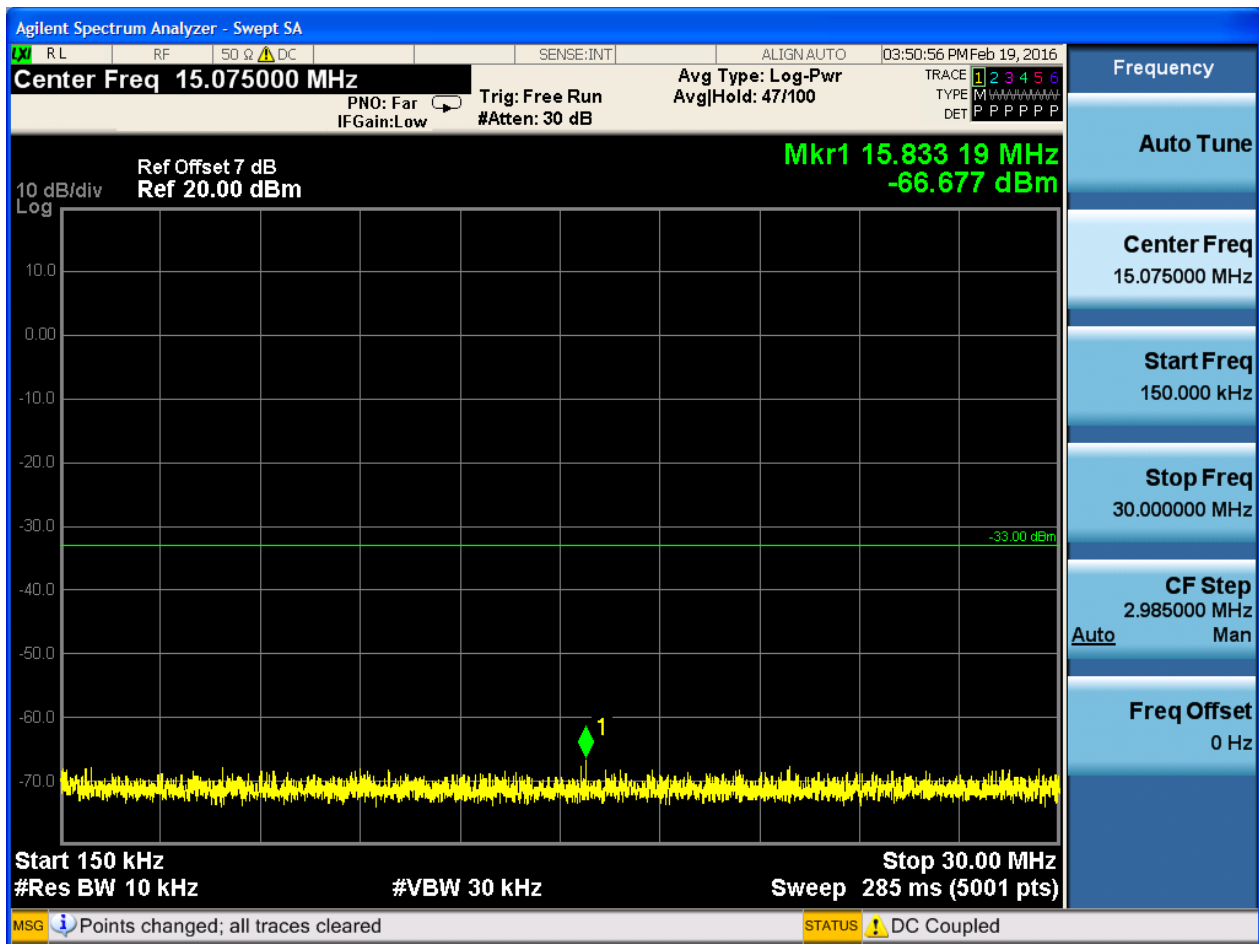




## 6.1.2.2 Test Mode = GSM/TM2

## 6.1.2.2.1 Test Channel = LCH

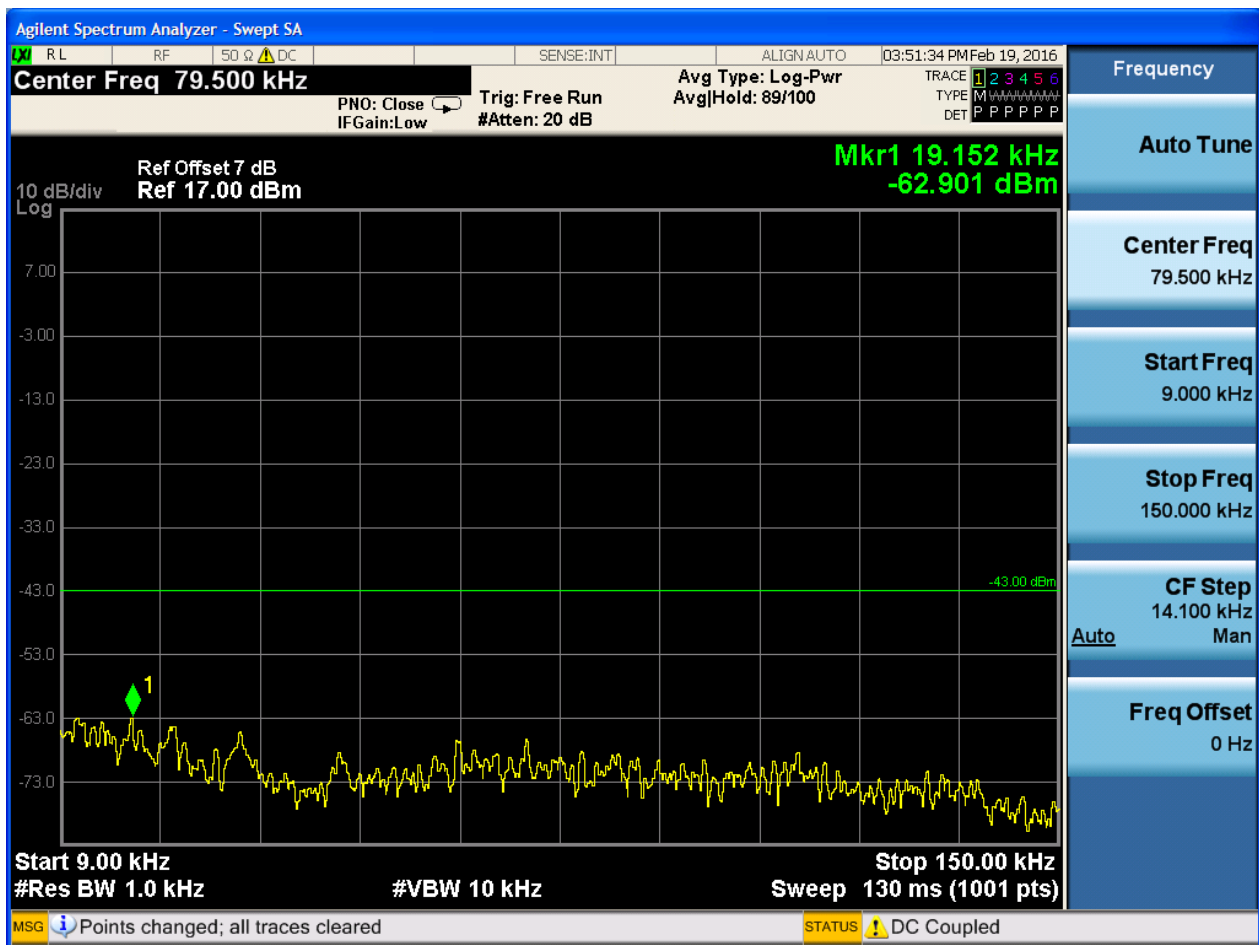


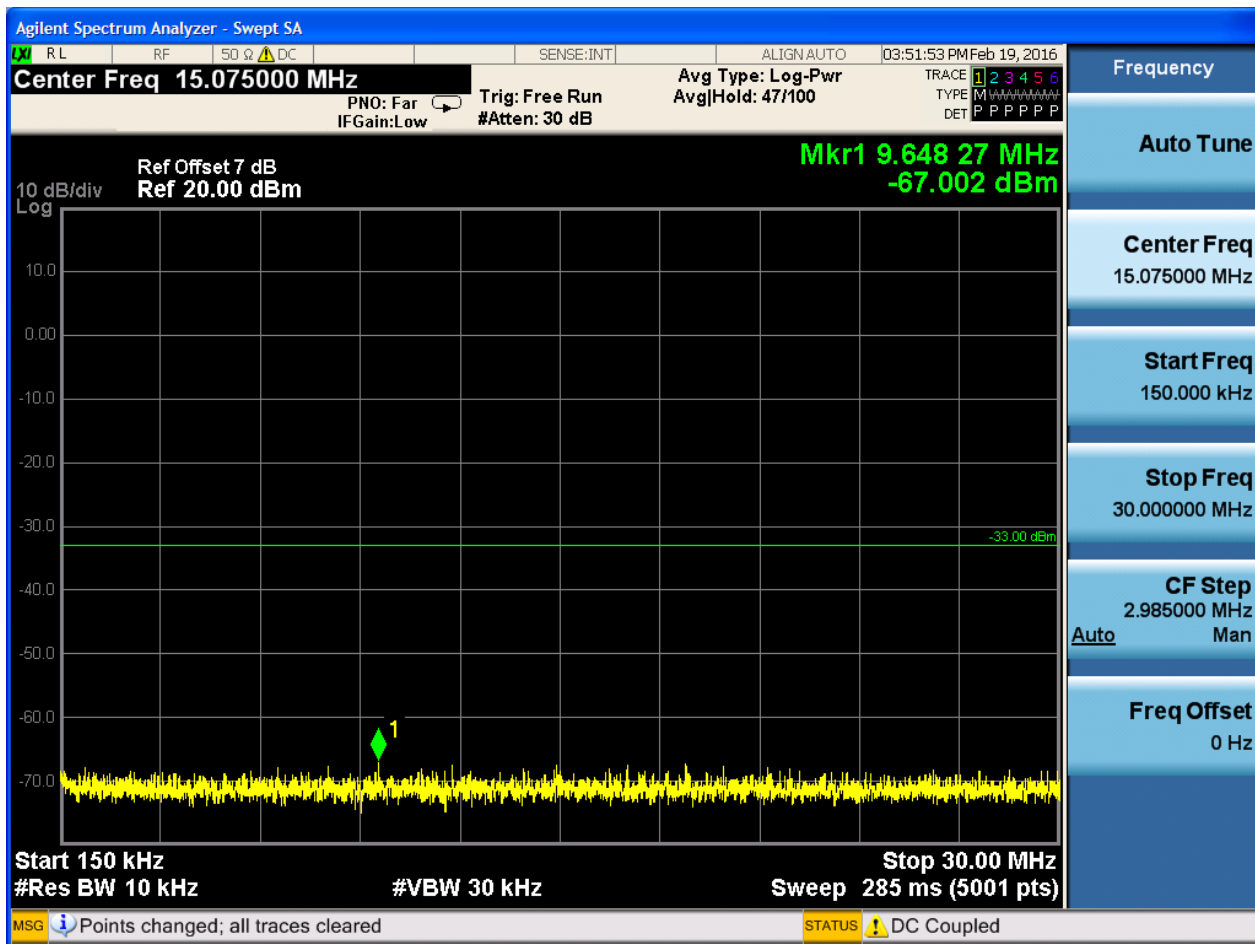


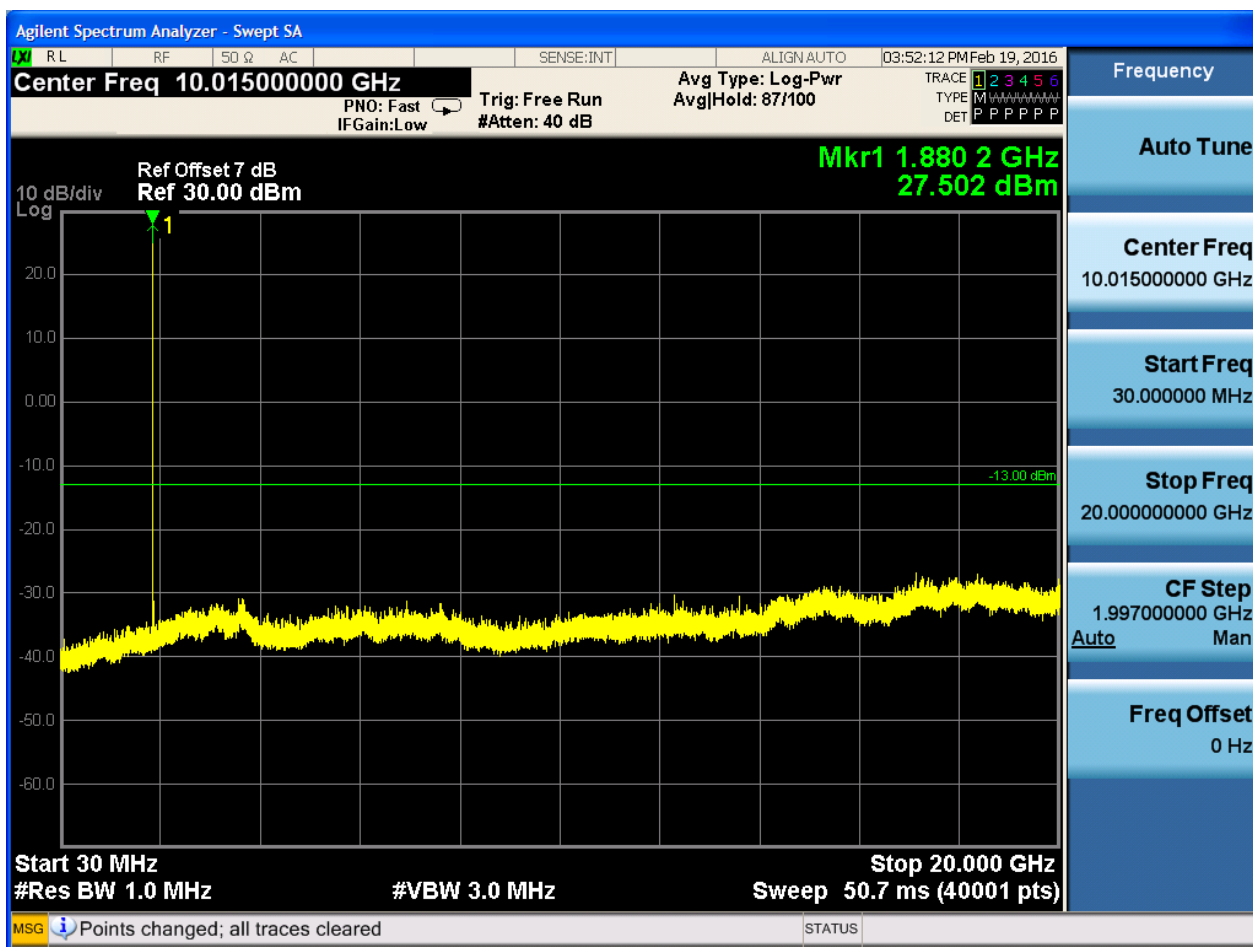




## 6.1.2.2.2 Test Channel = MCH

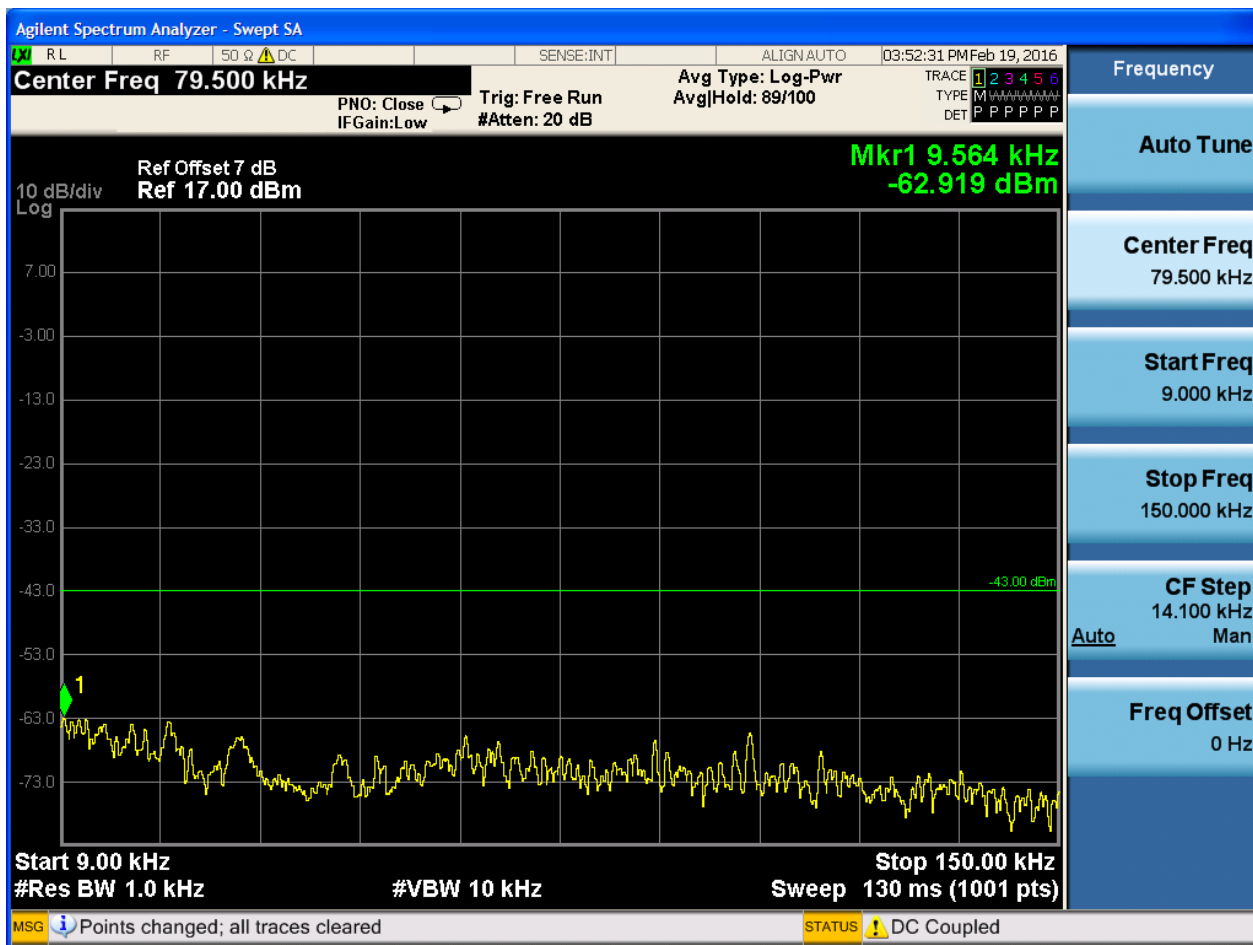


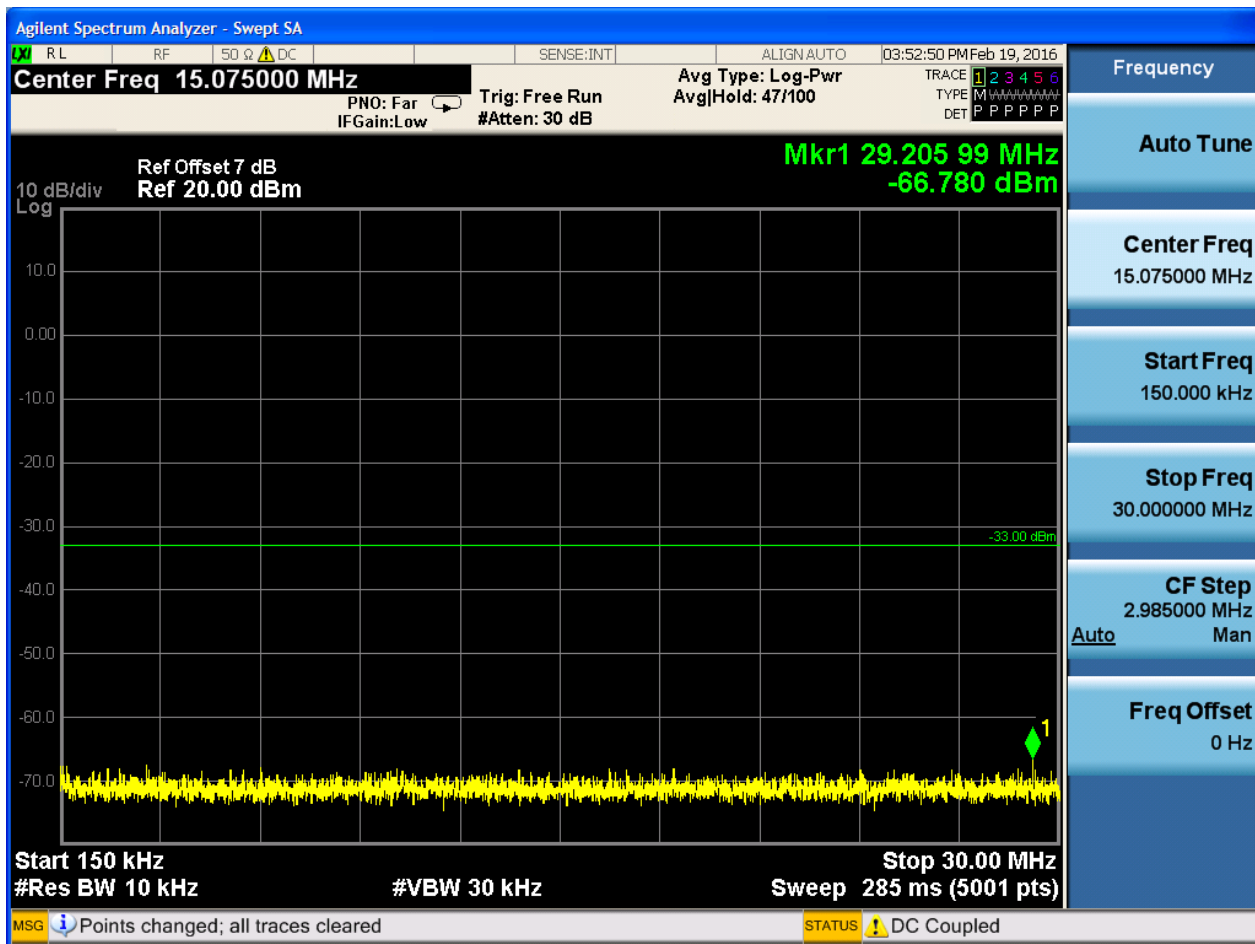


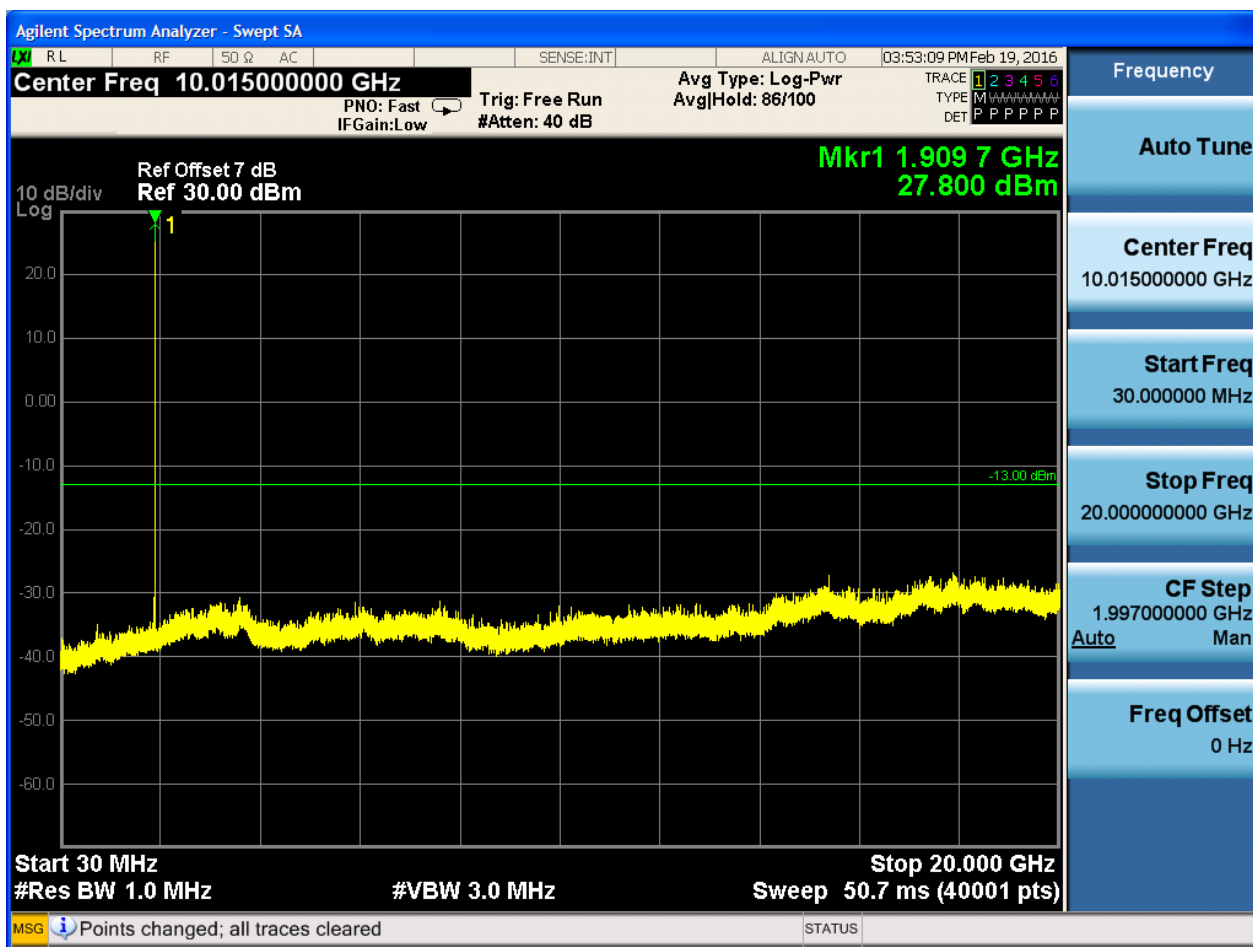




## 6.1.2.2.3 Test Channel = HCH







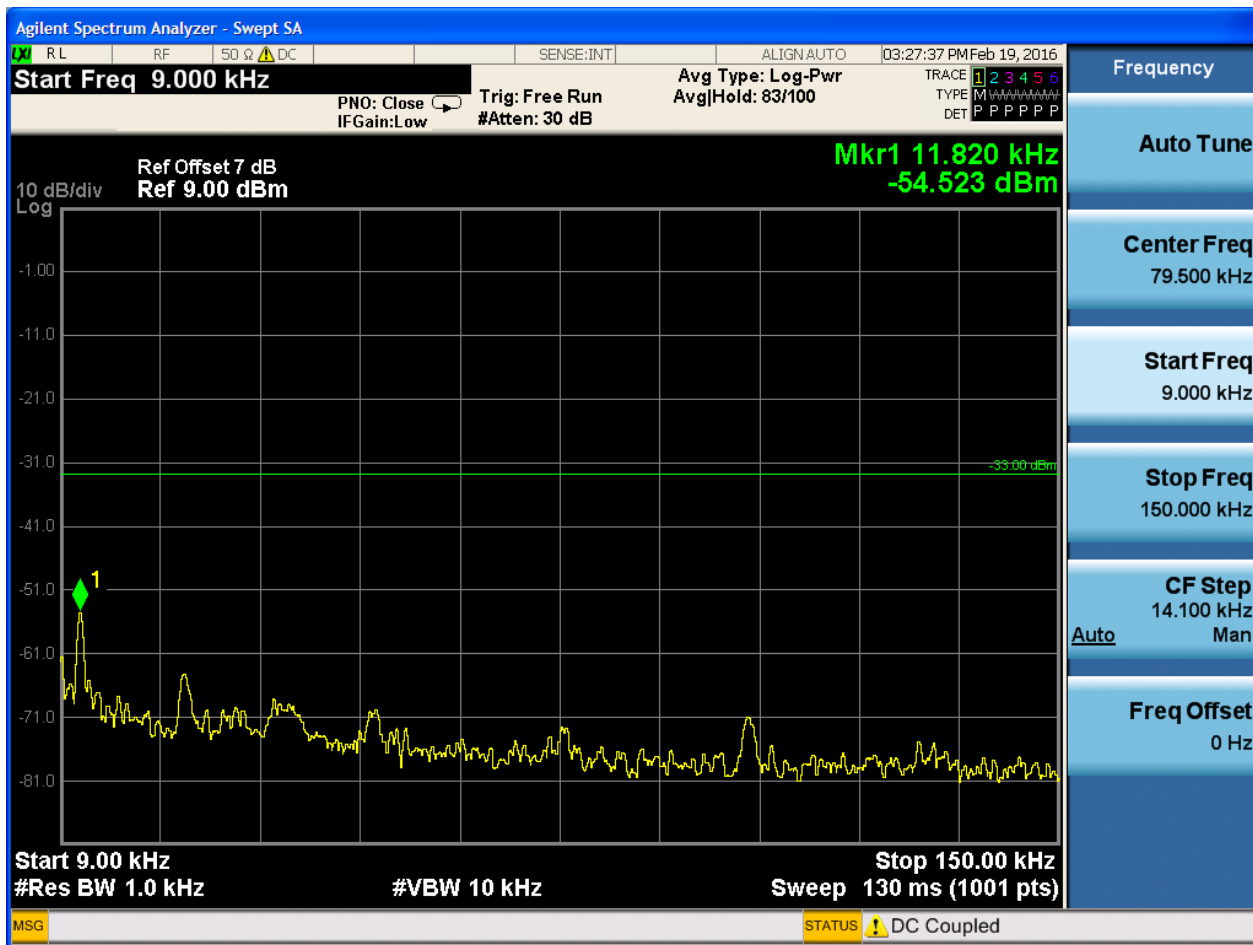


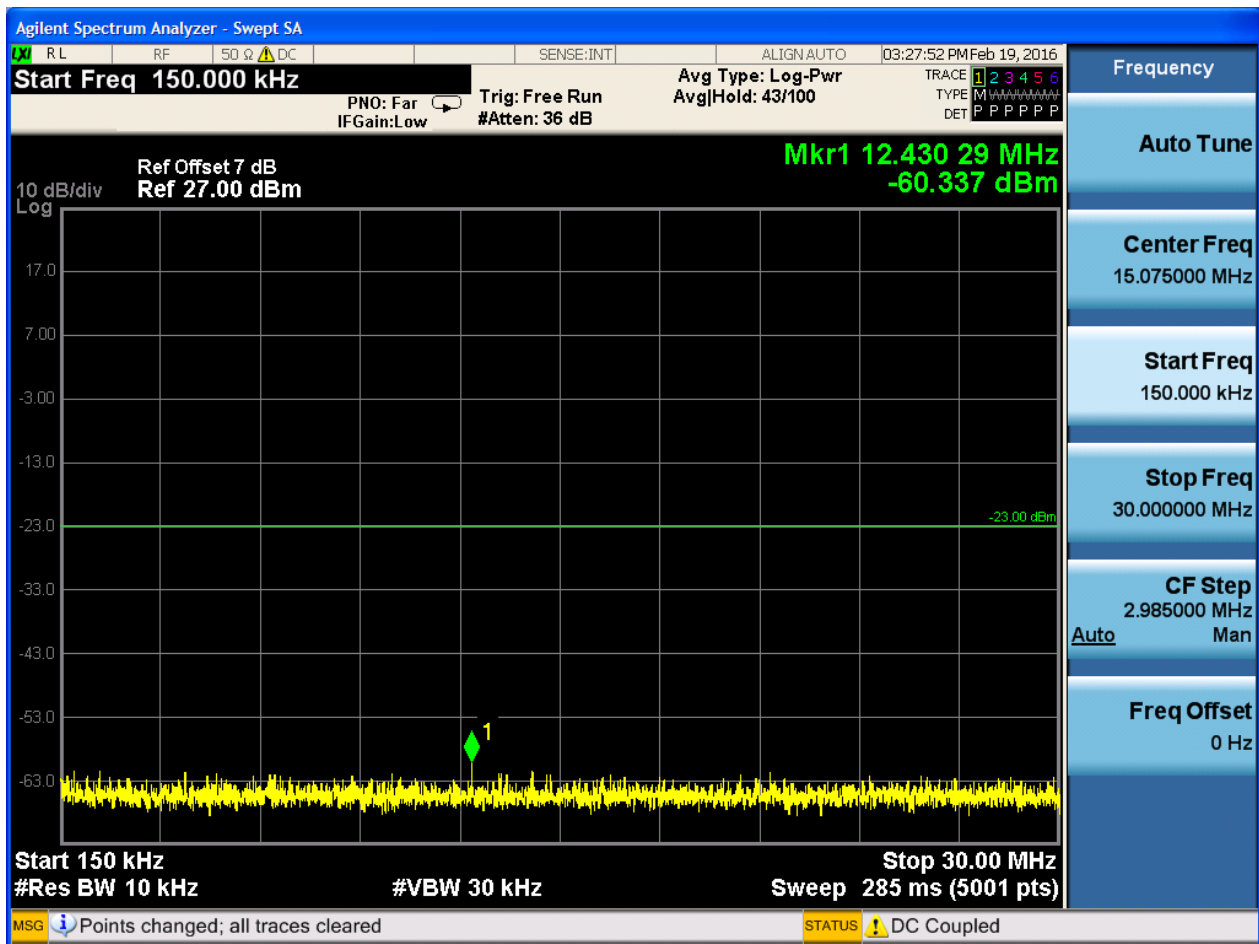
## 6.2 For UMTS

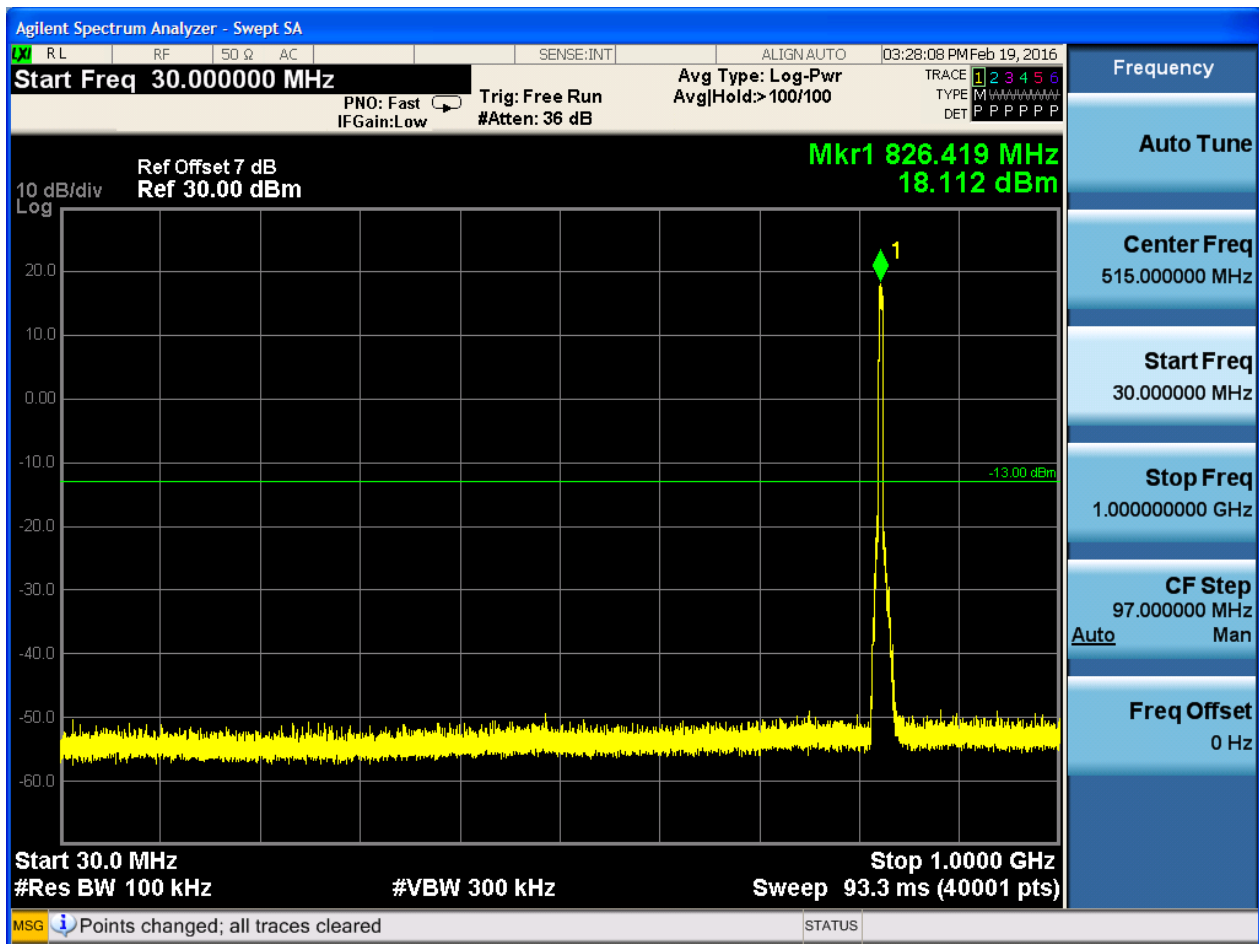
### 6.2.1 Test Band = WCDMA850

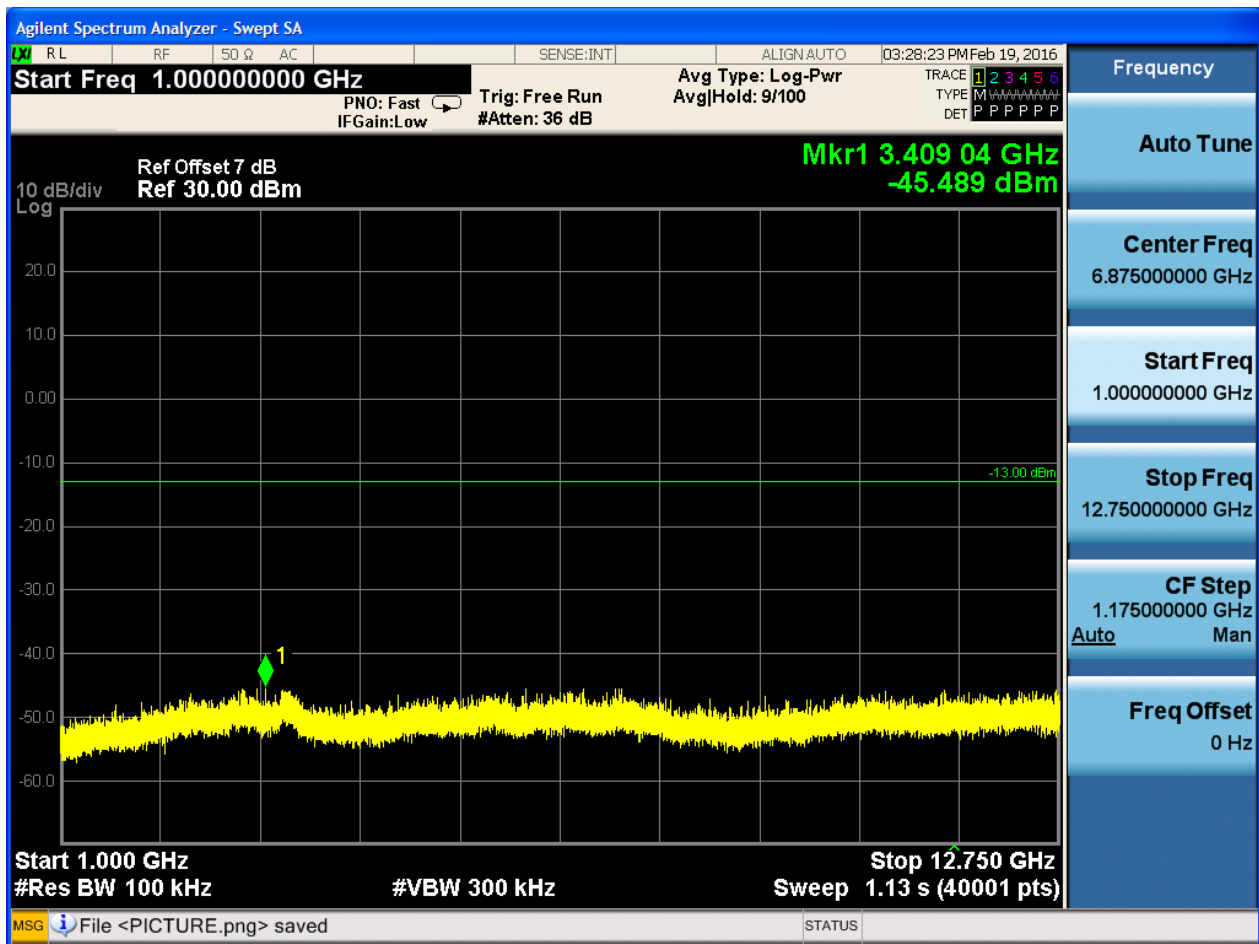
#### 6.2.1.1 Test Mode = UMTS/TM1

##### 6.2.1.1.1 Test Channel = LCH



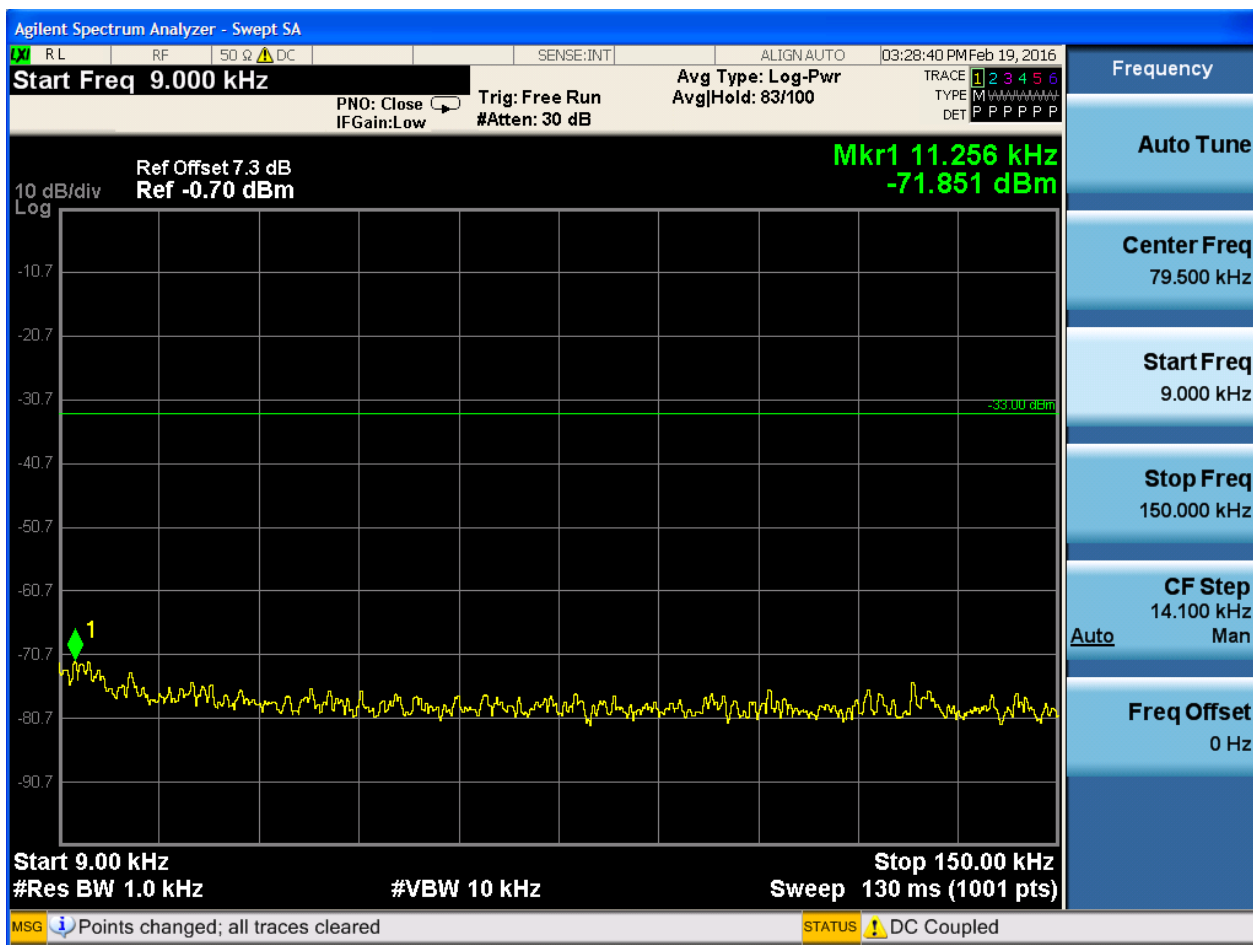


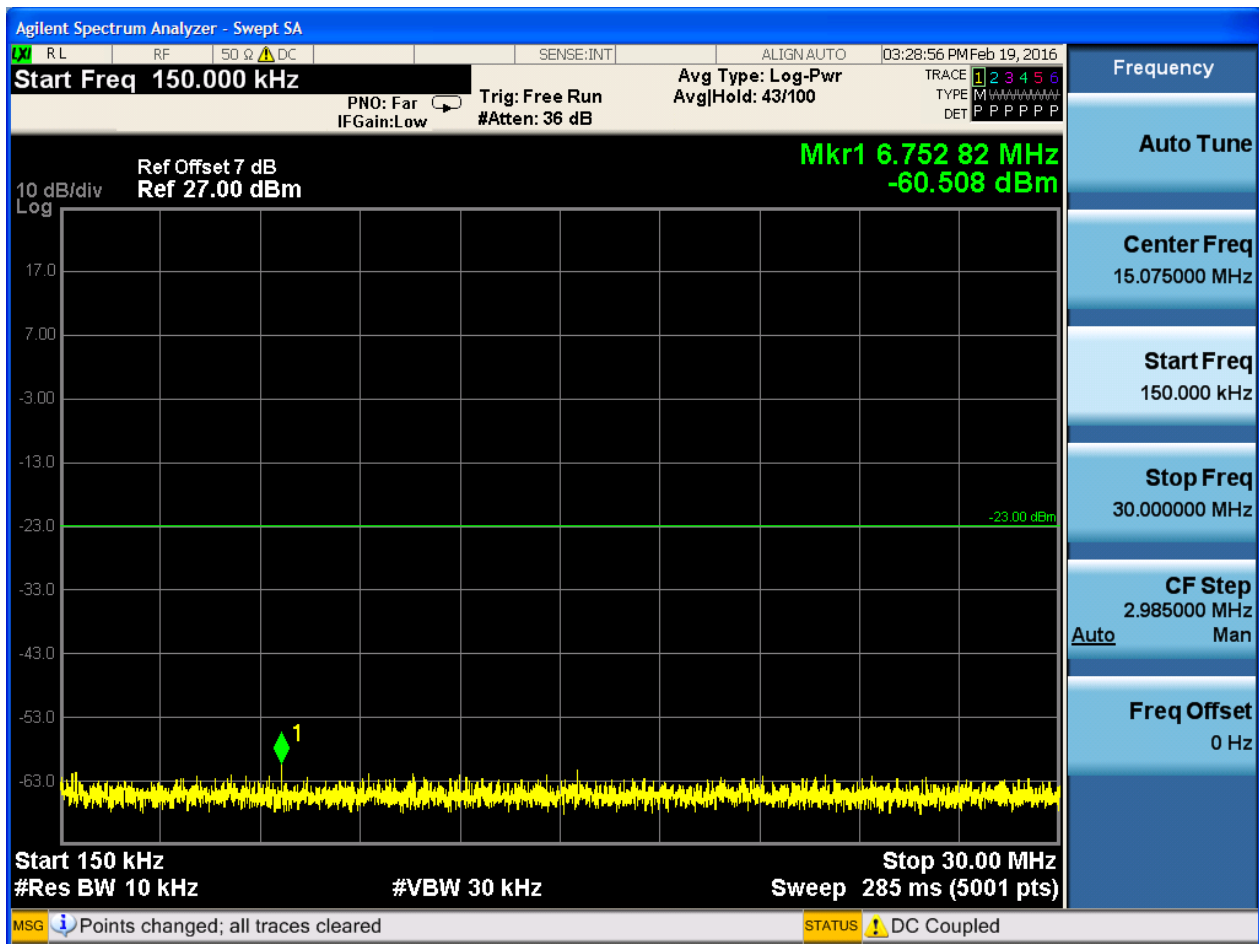


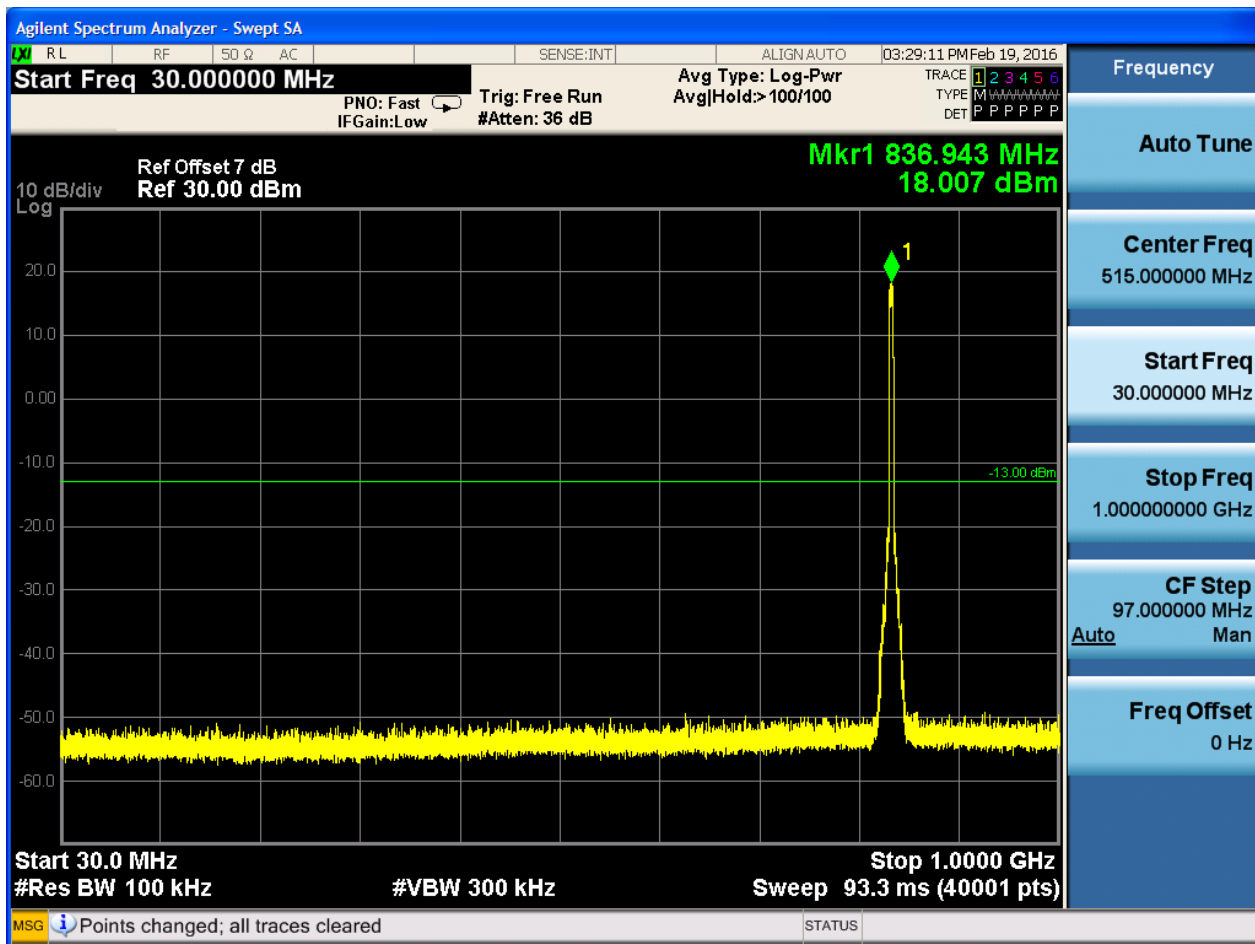


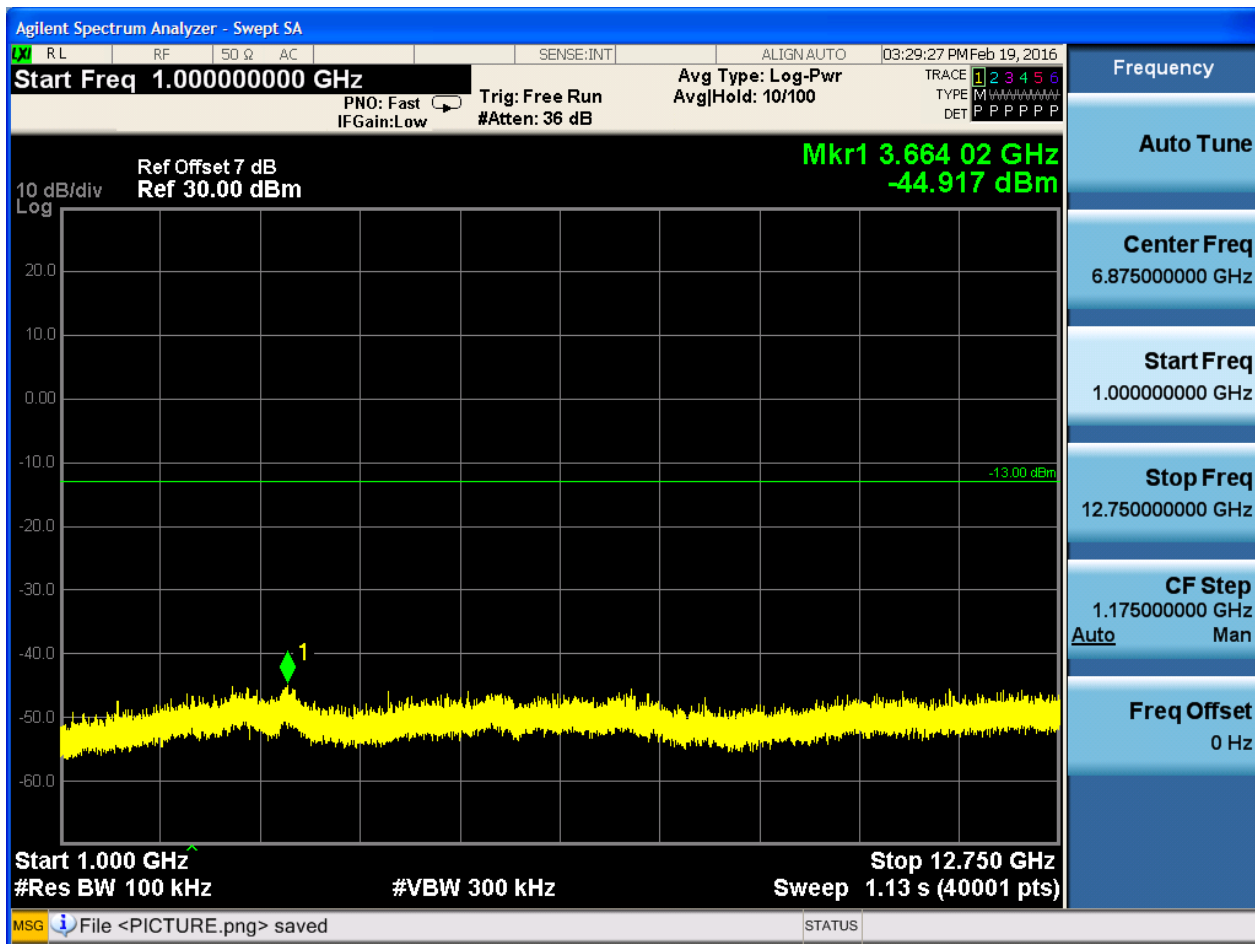


## 6.2.1.1.2 Test Channel = MCH



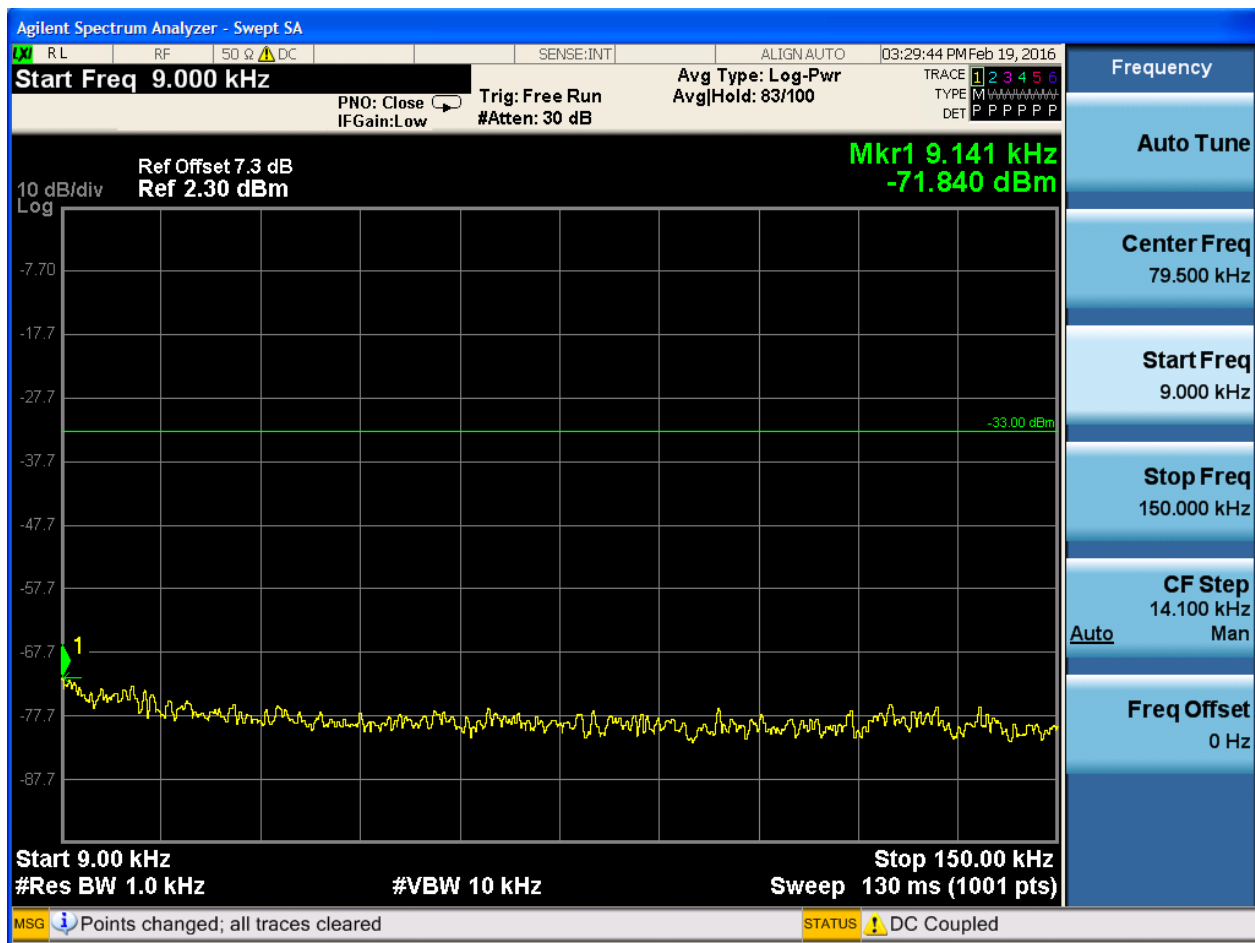


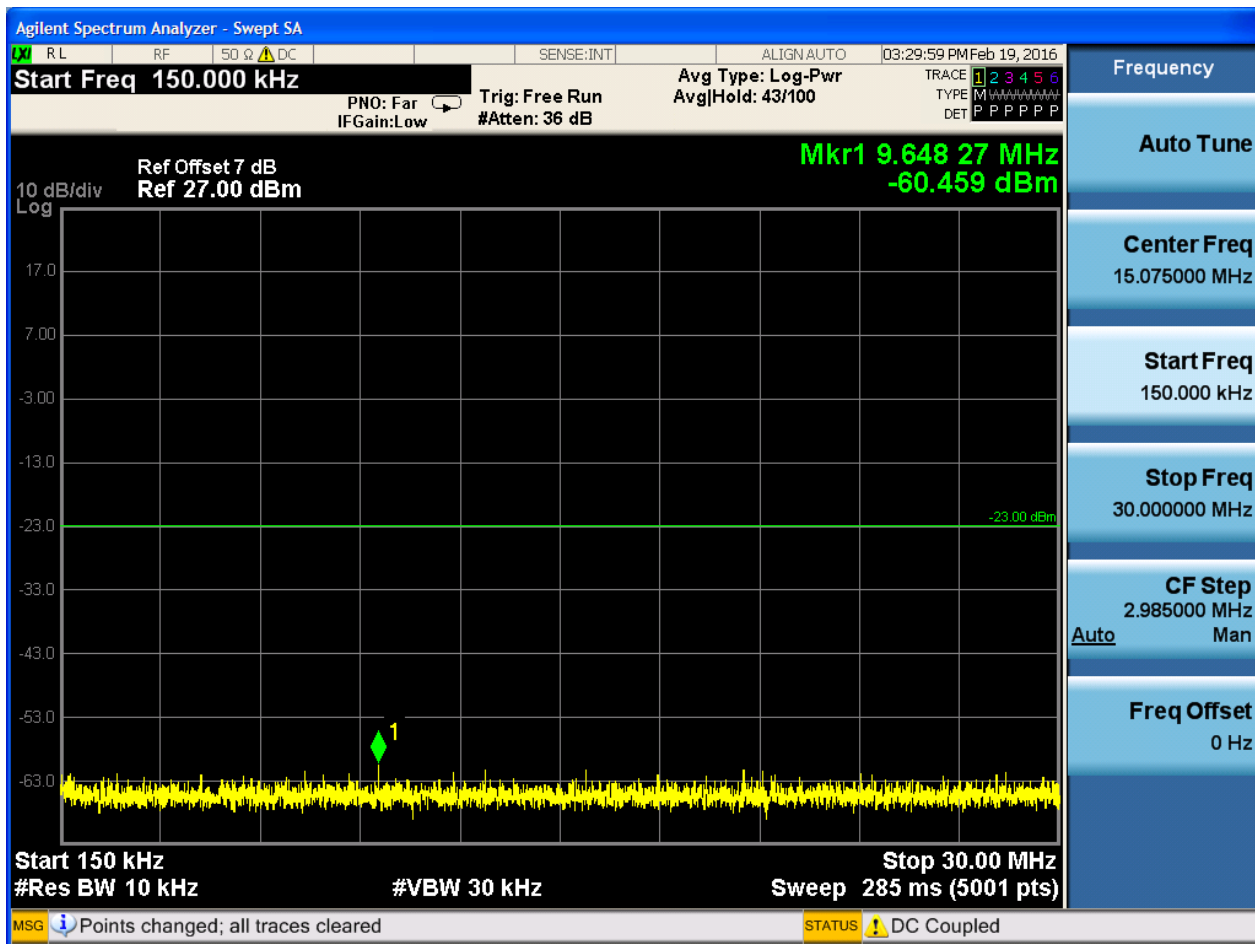


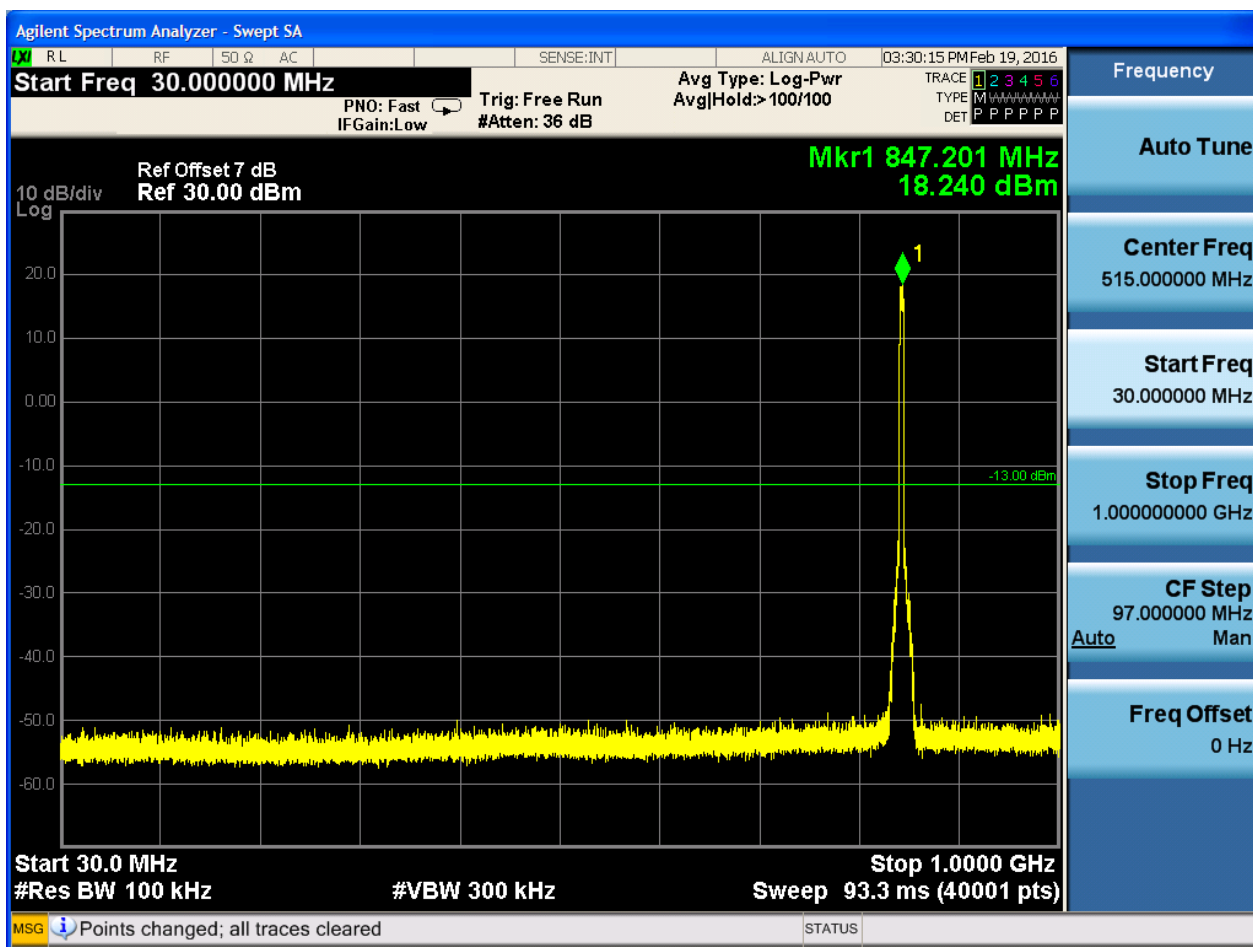


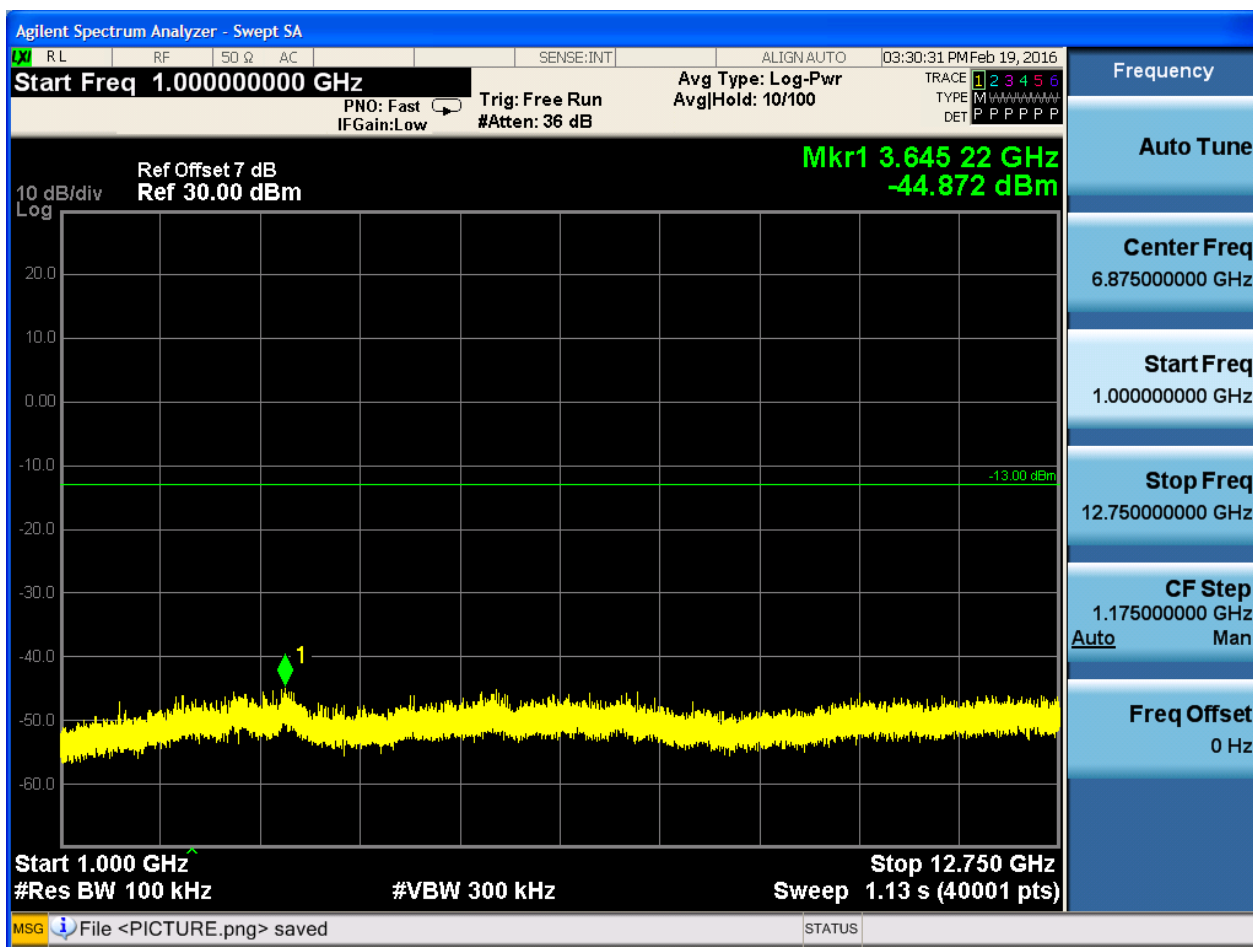


## 6.2.1.1.3 Test Channel = HCH







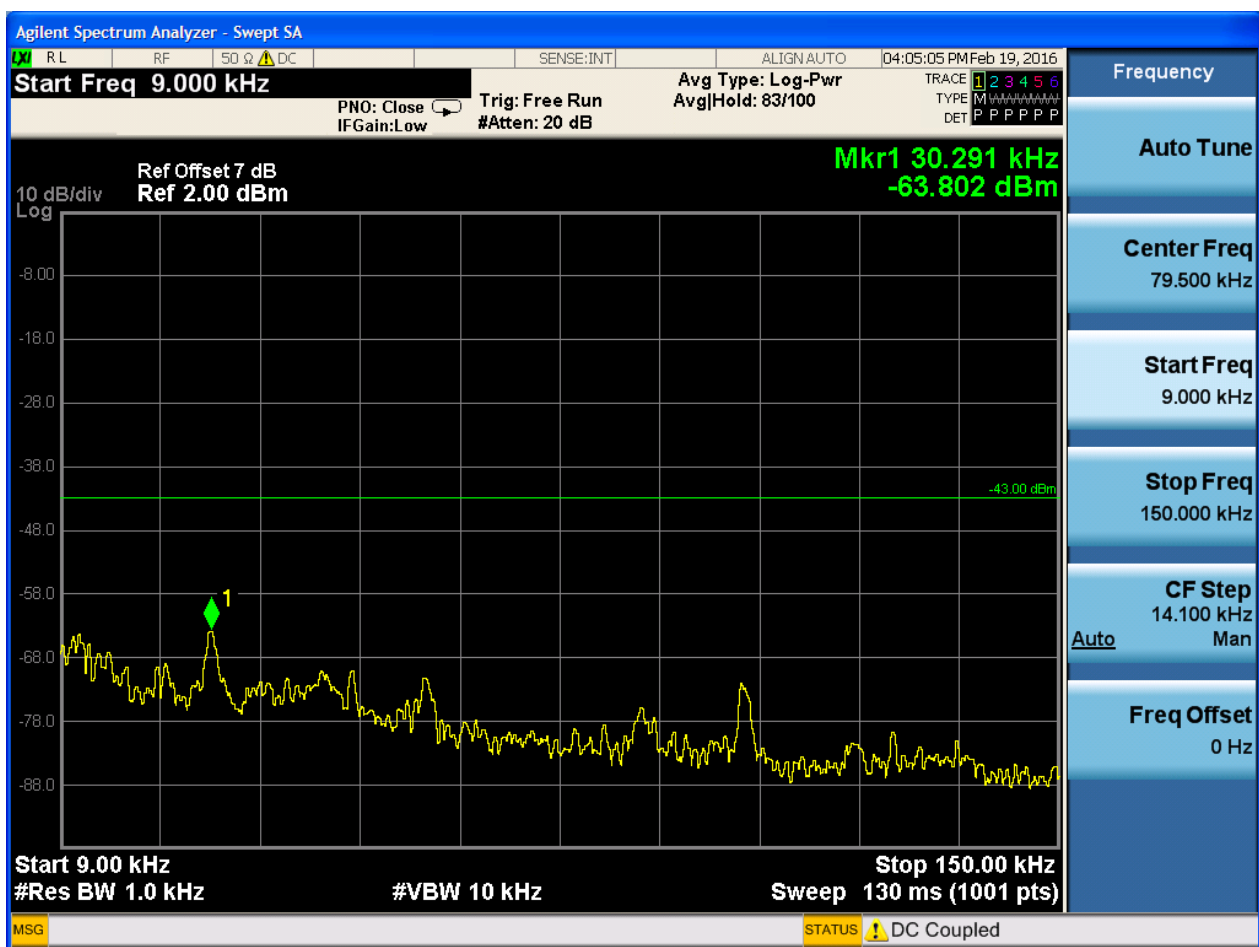


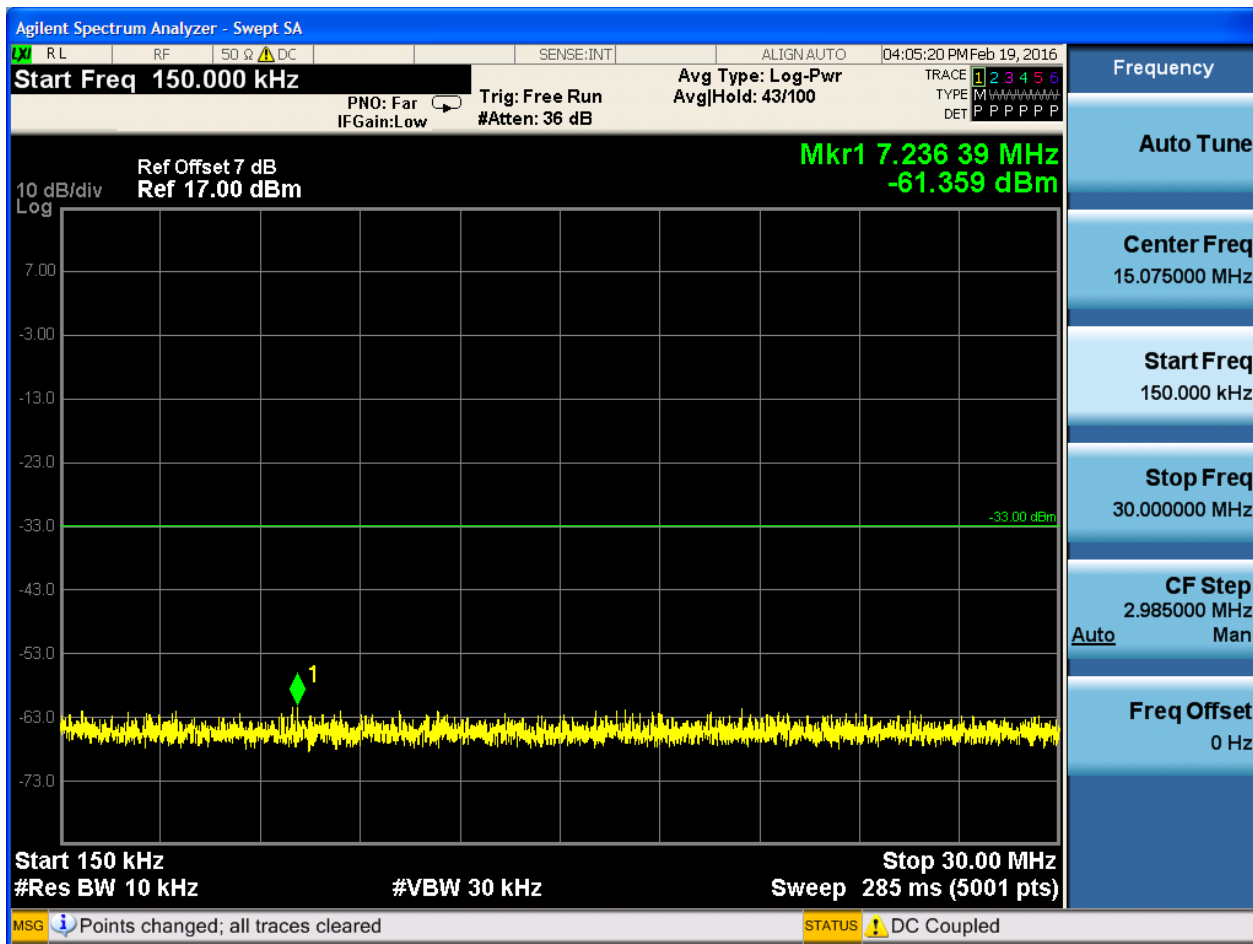


## 6.2.2 Test Band = WCDMA1900

## 6.2.2.1 Test Mode = UMTS/TM1

## 6.2.2.1.1 Test Channel = LCH

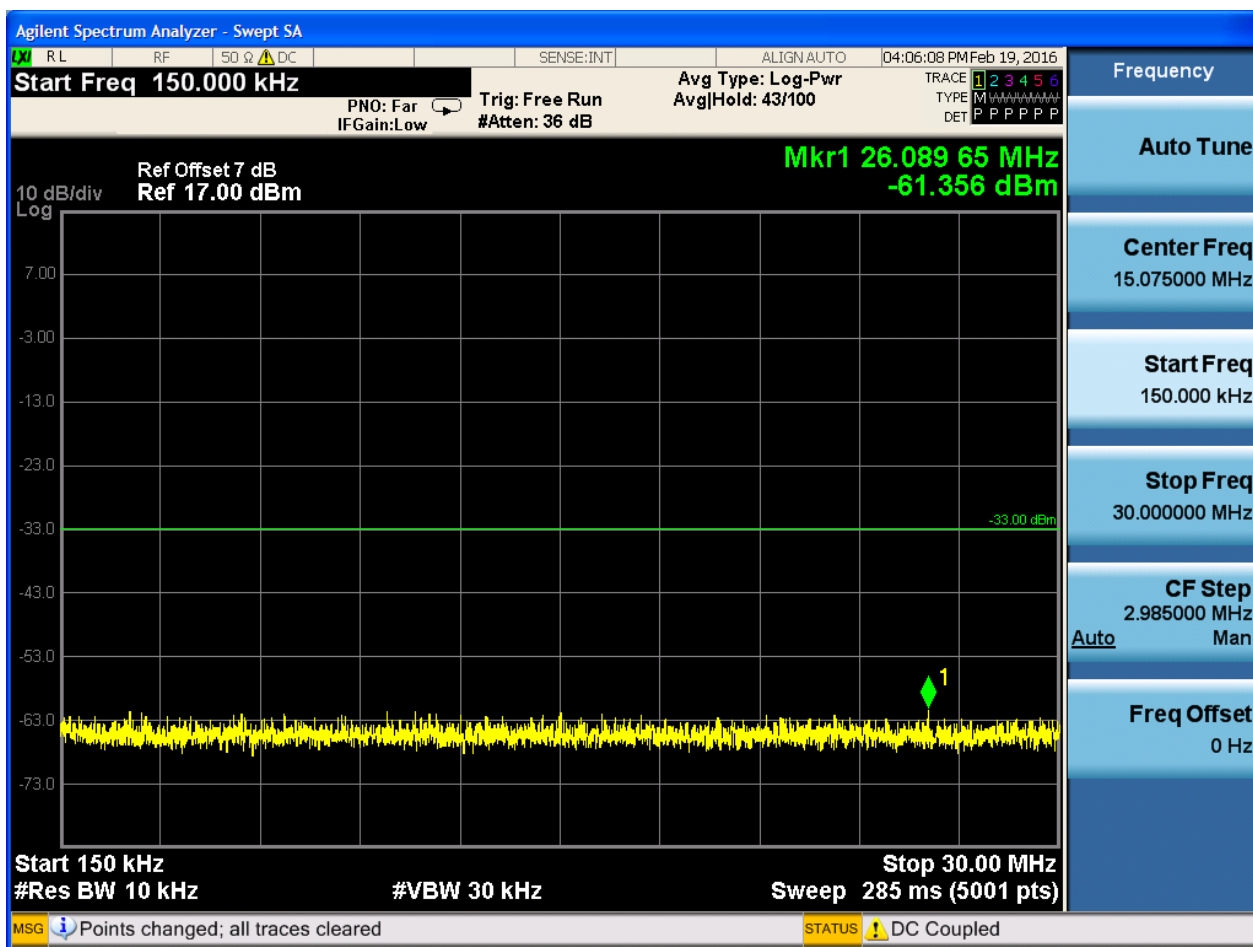


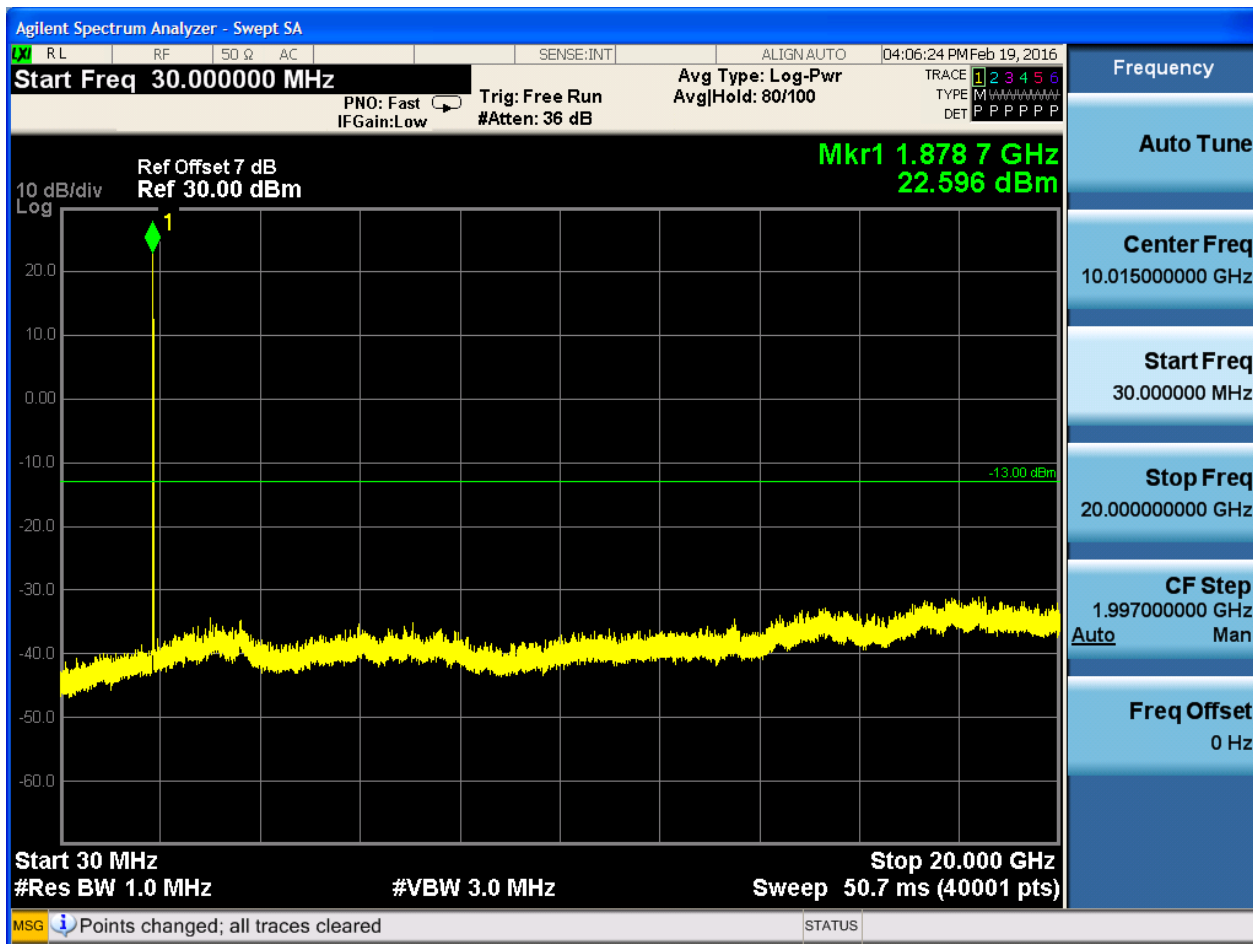




### 6.2.2.1.2 Test Channel = MCH









Agilent Spectrum Analyzer - Swept SA

RL RF 50  $\Omega$   $\Delta$  DC SENSE:INT ALIGN: AUTO 04:06:40 PM Feb 19, 2016

Start Freq 9.000 kHz Avg Type: Log-Pwr Trg: Free Run PNO: Close Trig: Free Run IF Gain: Low #Atten: 20 dB 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 7 dB Mkr1 11.538 kHz  
Ref 6.00 dBm -60.992 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 STATUS  $\Delta$  DC Coupled

Frequency

Auto Tune

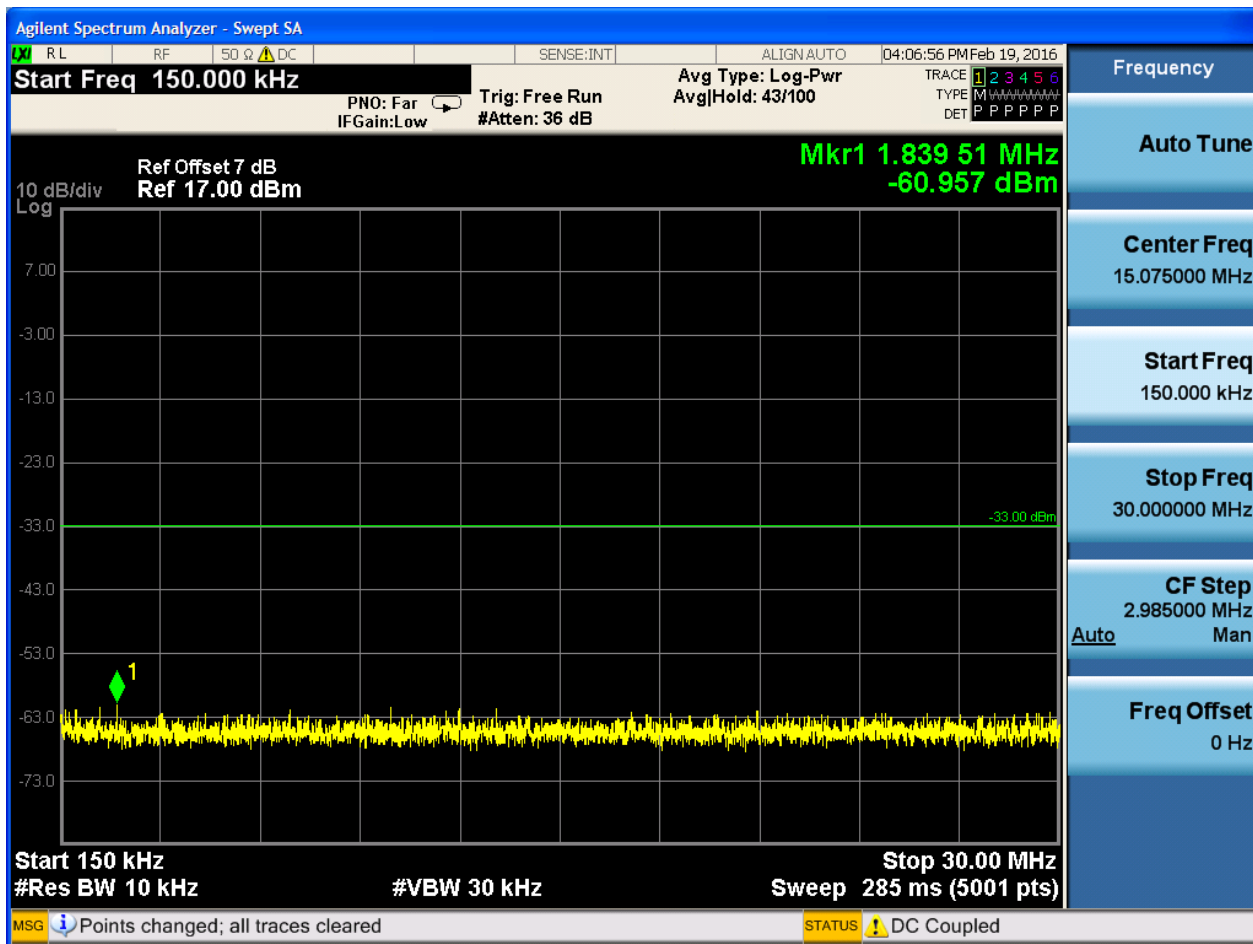
Center Freq 79.500 kHz

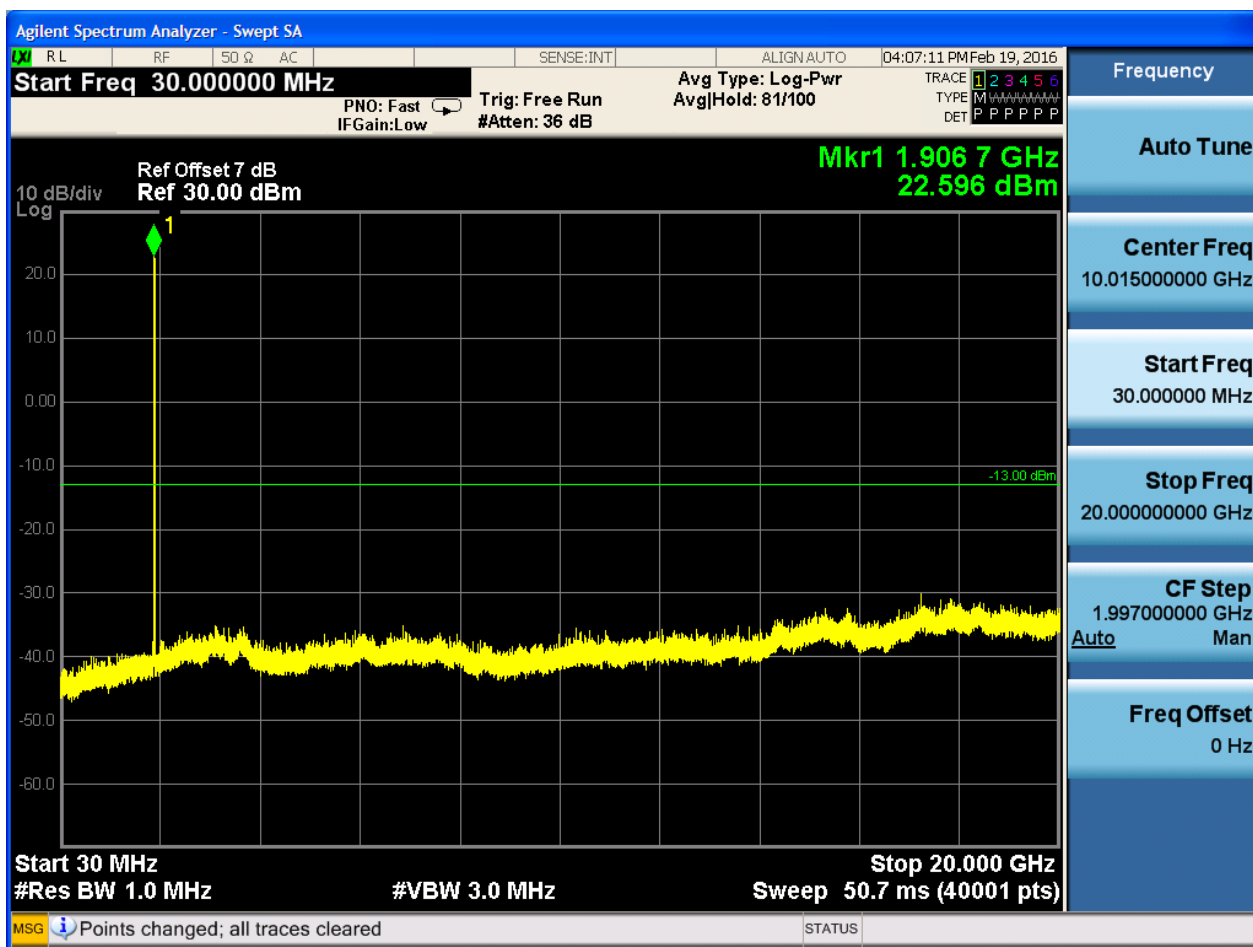
Start Freq 9.000 kHz

Stop Freq 150.000 kHz

CF Step 14.100 kHz Man

Freq Offset 0 Hz



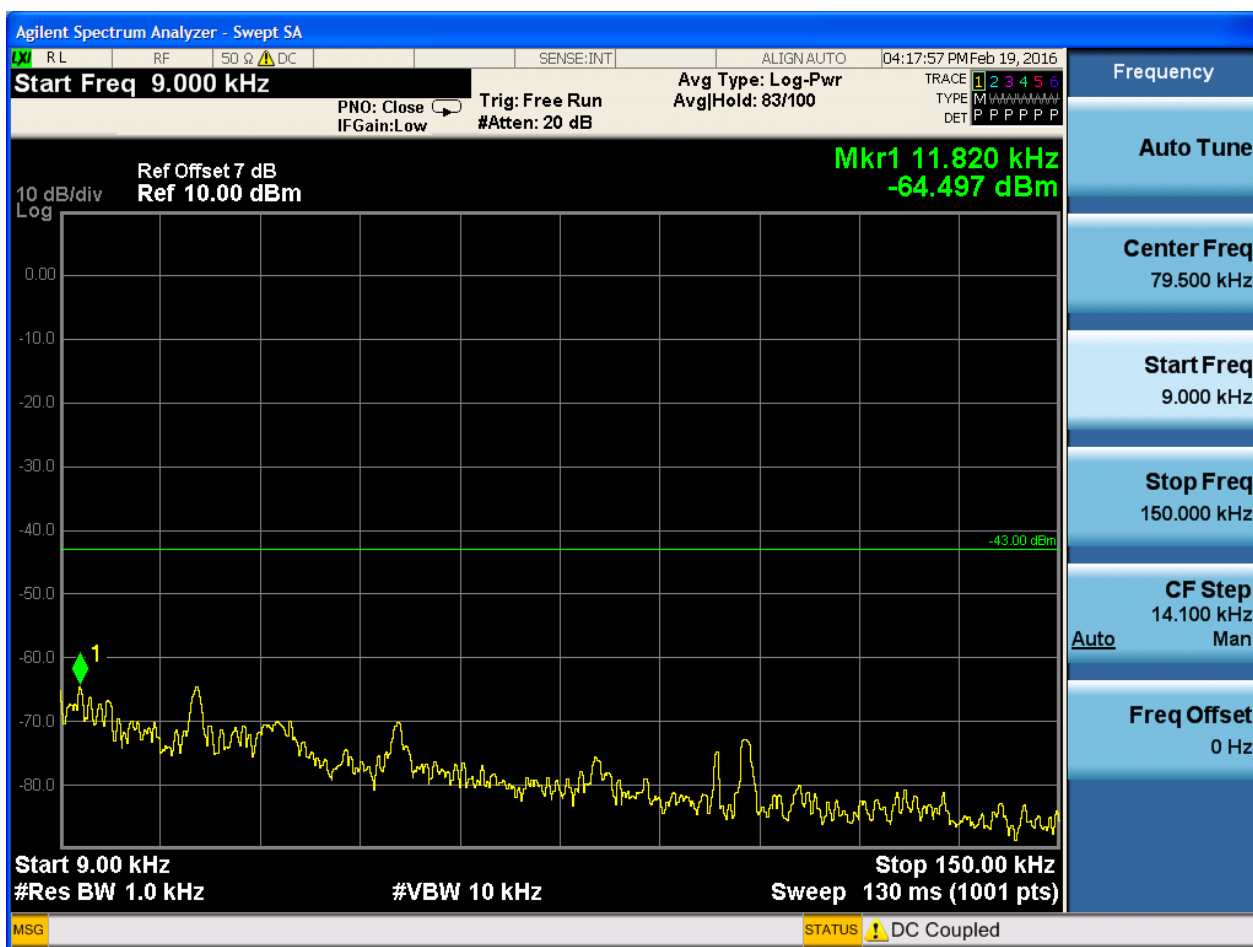


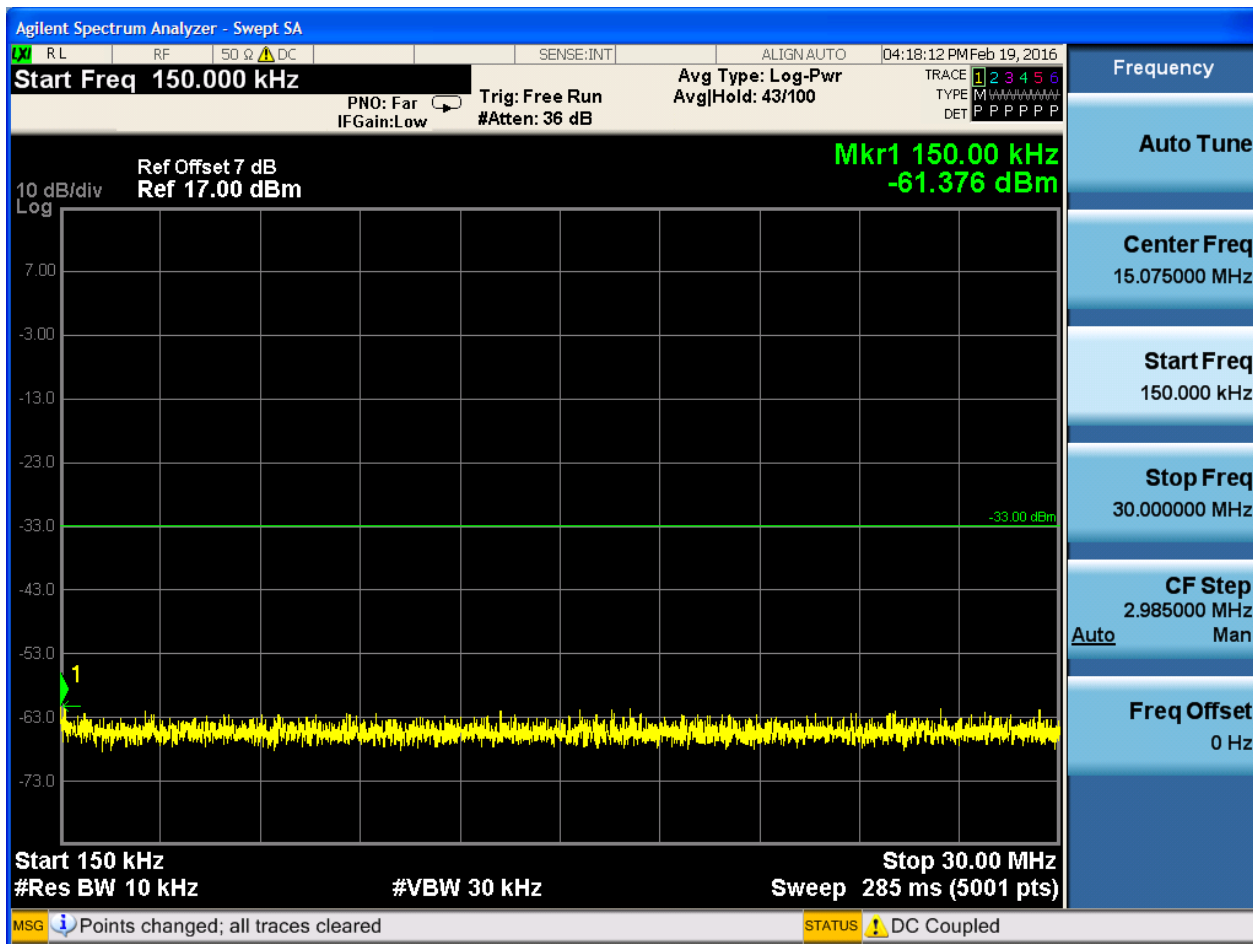


## 6.2.3 Test Band = WCDMA1700

## 6.2.3.1 Test Mode = UMTS/TM1

## 6.2.3.1.1 Test Channel = LCH



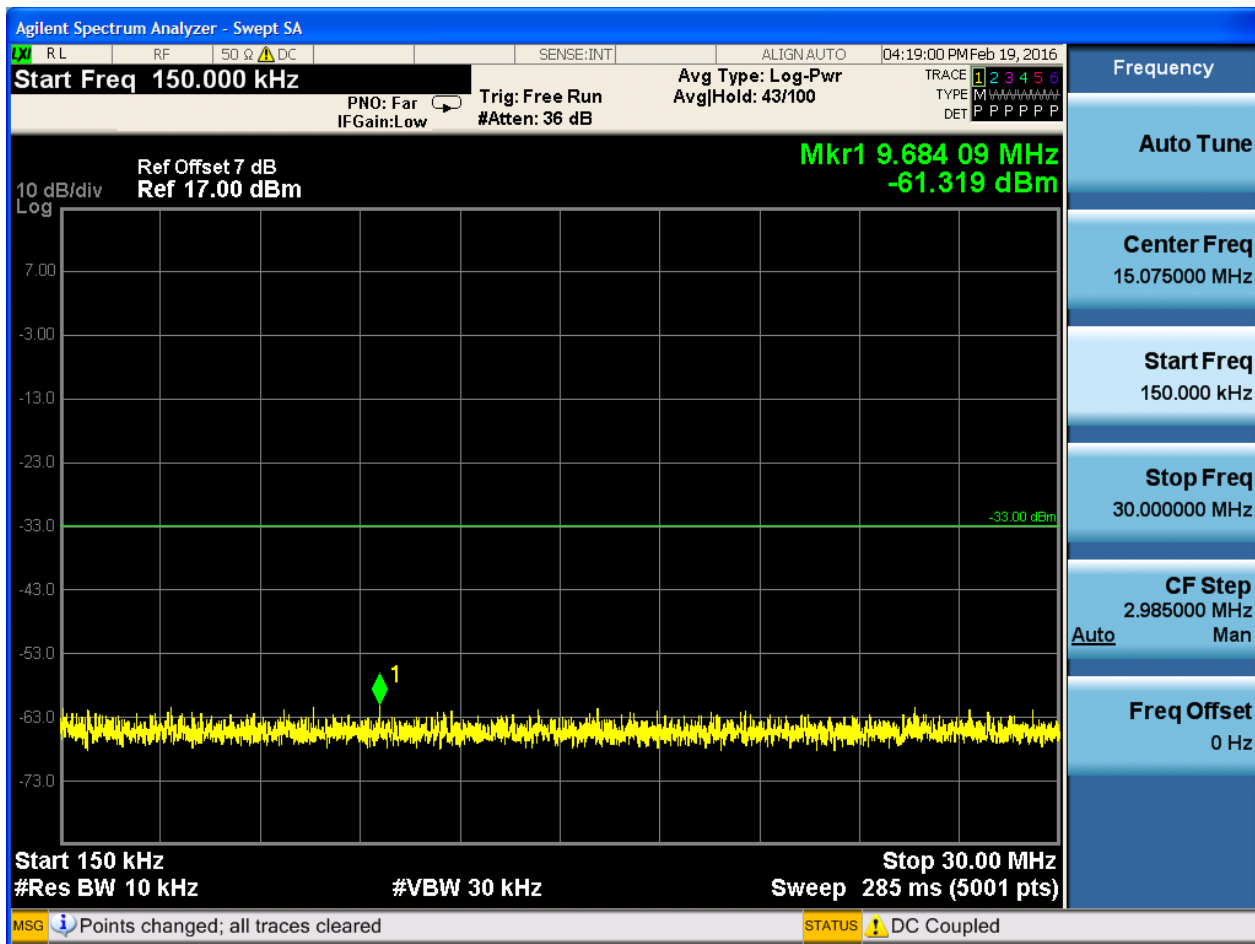






## 6.2.3.1.2 Test Channel = MCH



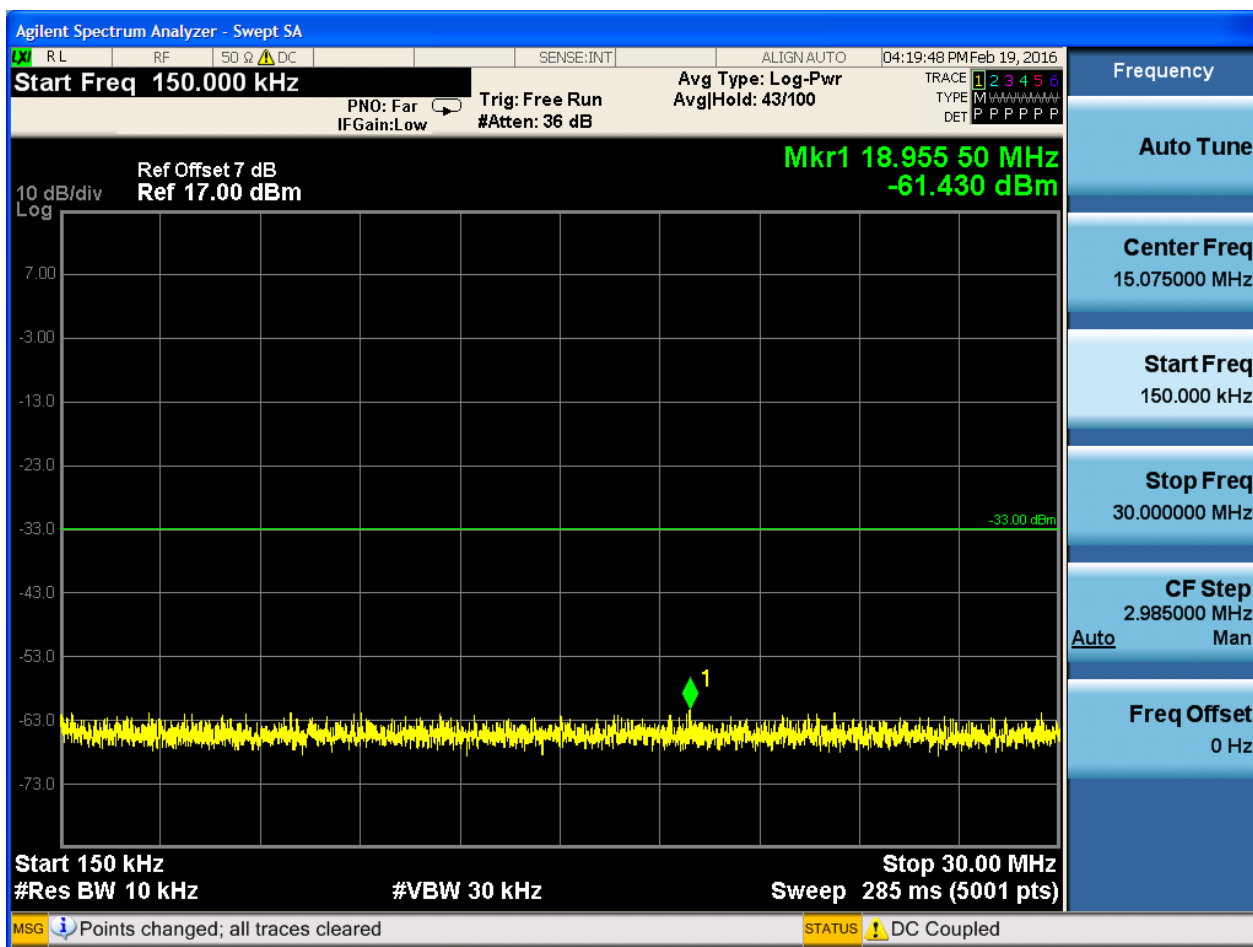


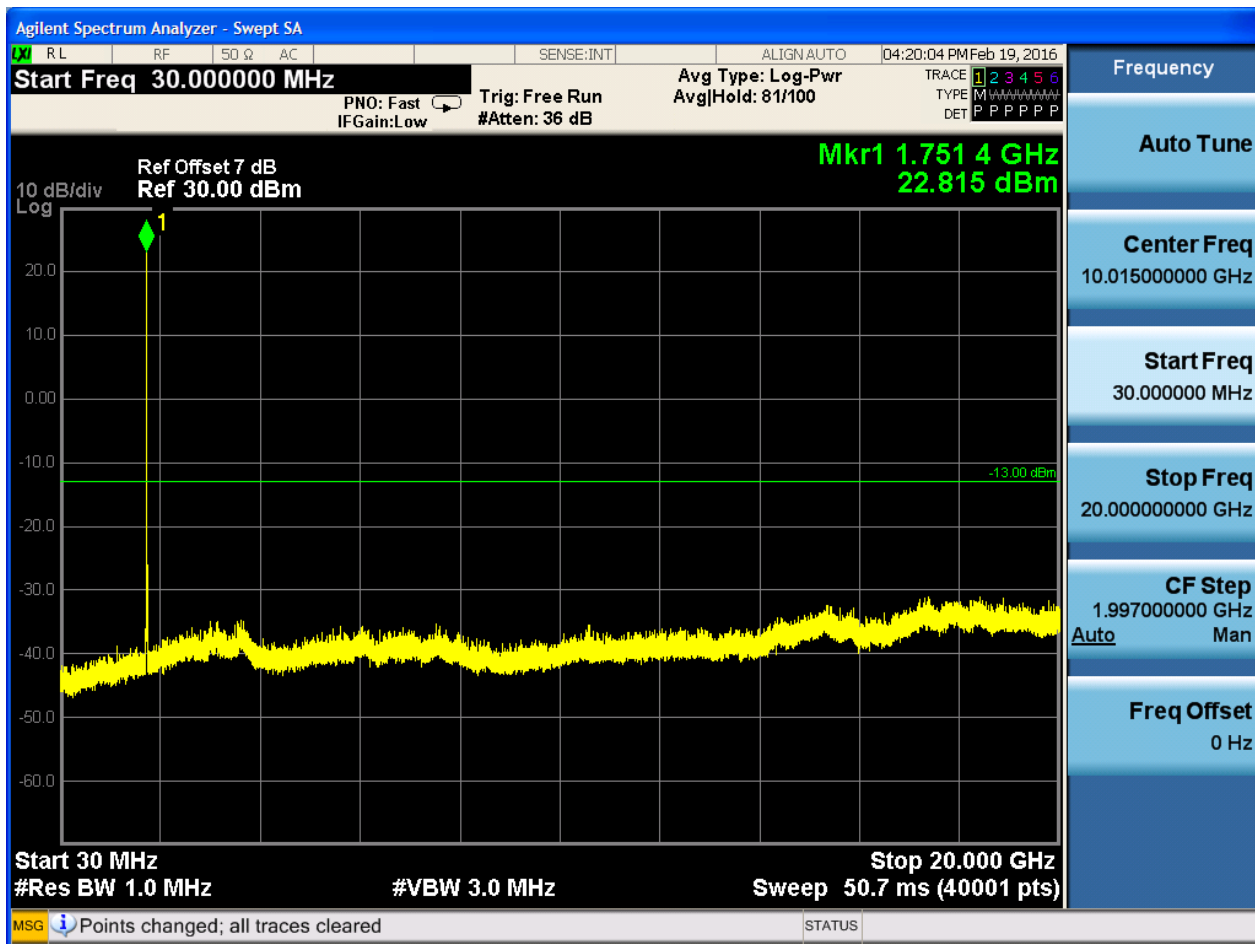




## 6.2.3.1.3 Test Channel = HCH







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

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

9kHz~150kHz, 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

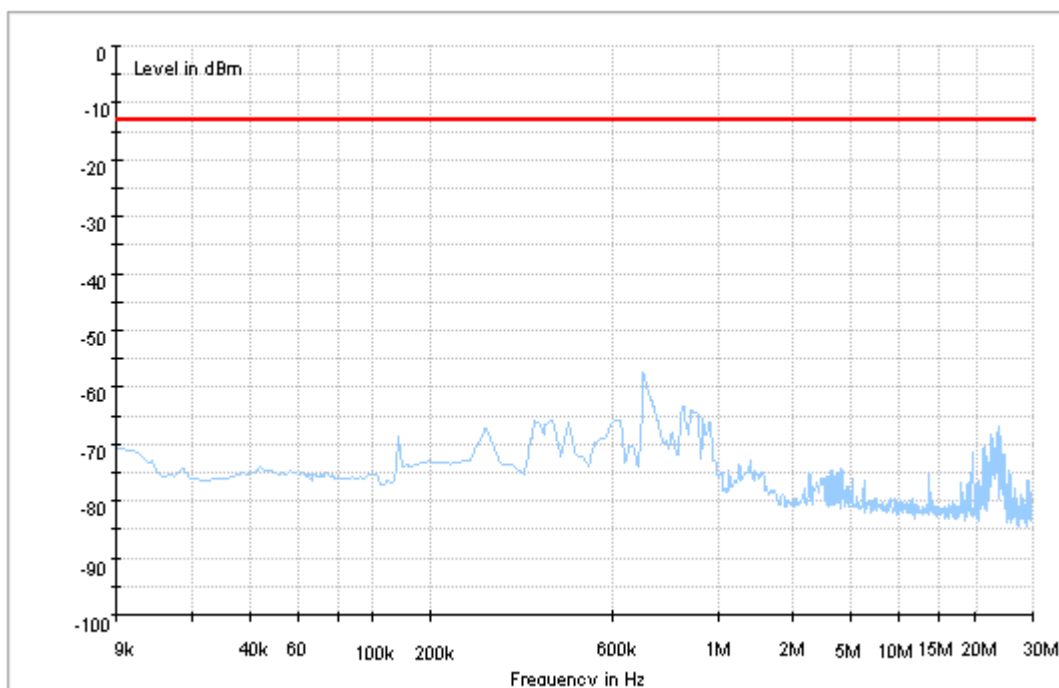
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

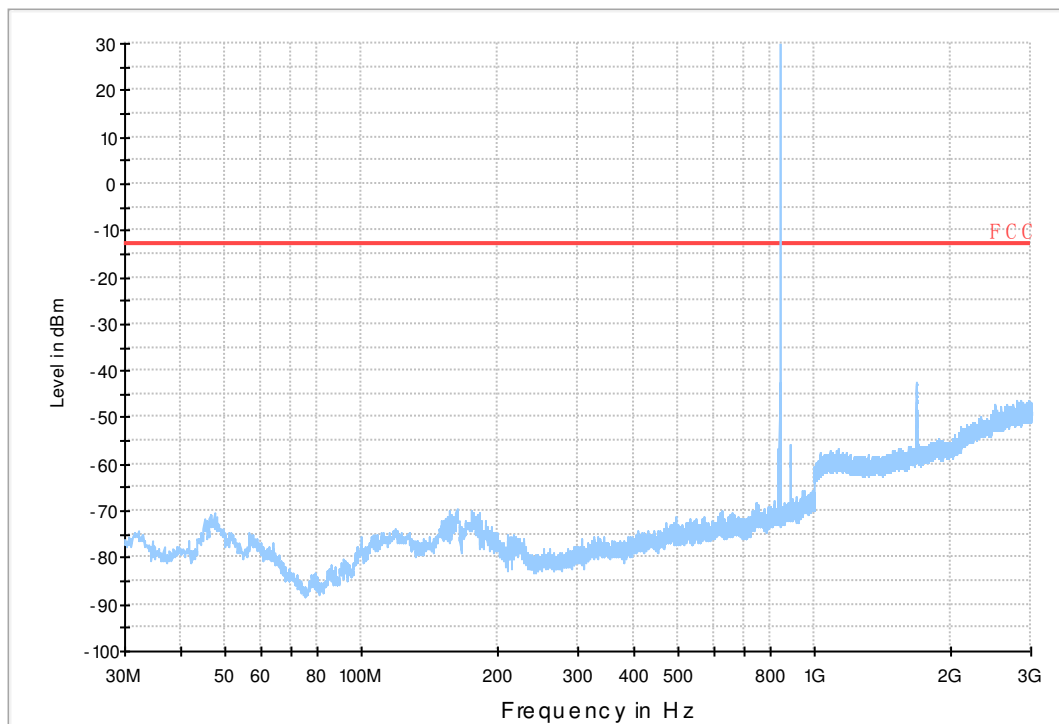
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850

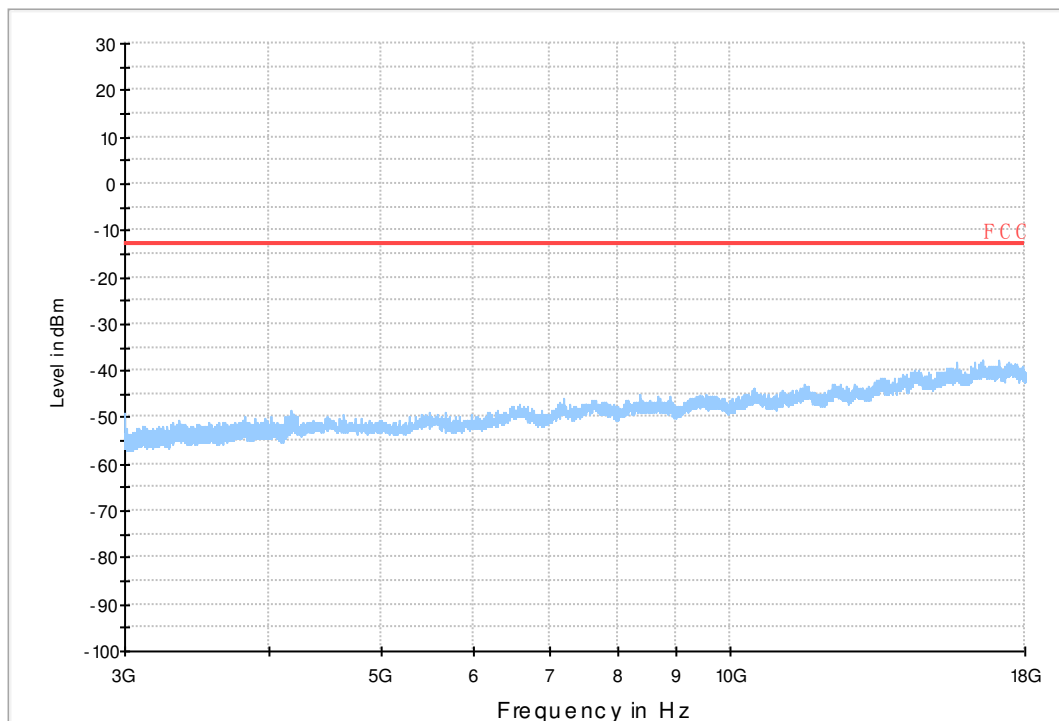
##### 7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850\_L

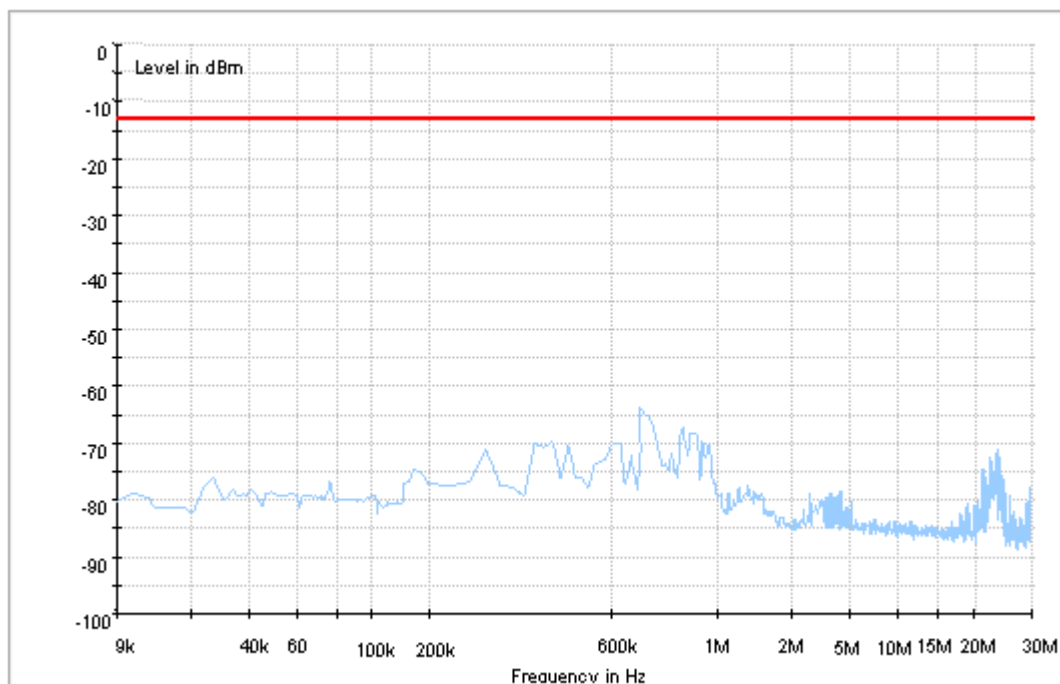


Copy of FCC PART22 GSM850\_H

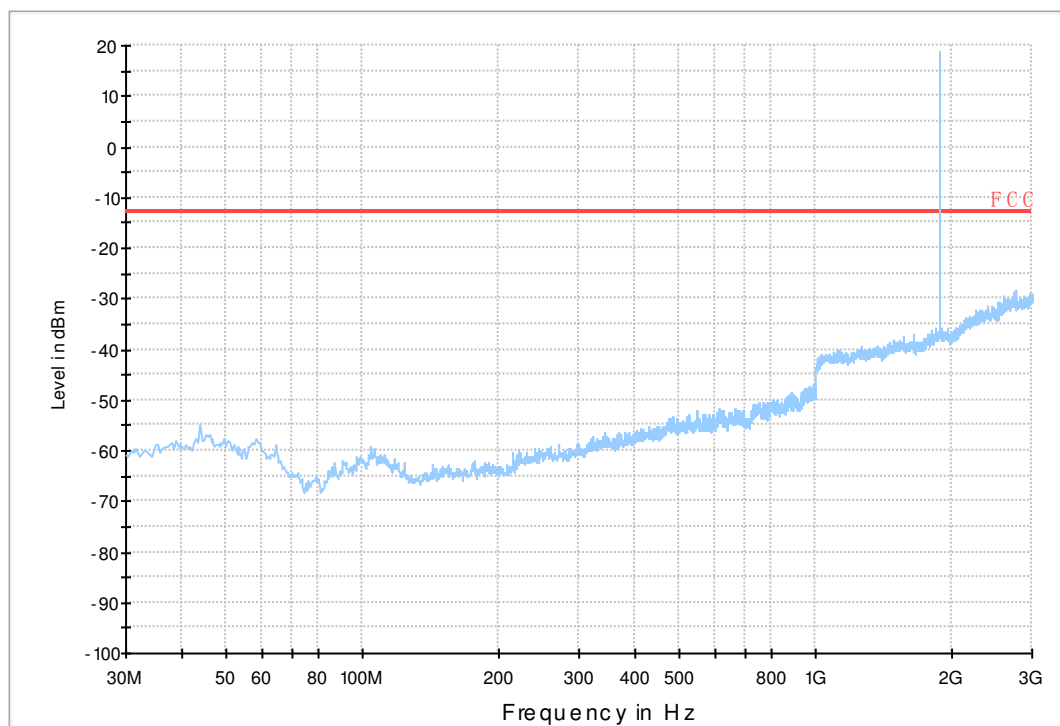


## 7.1.2 Test Band = GSM1900

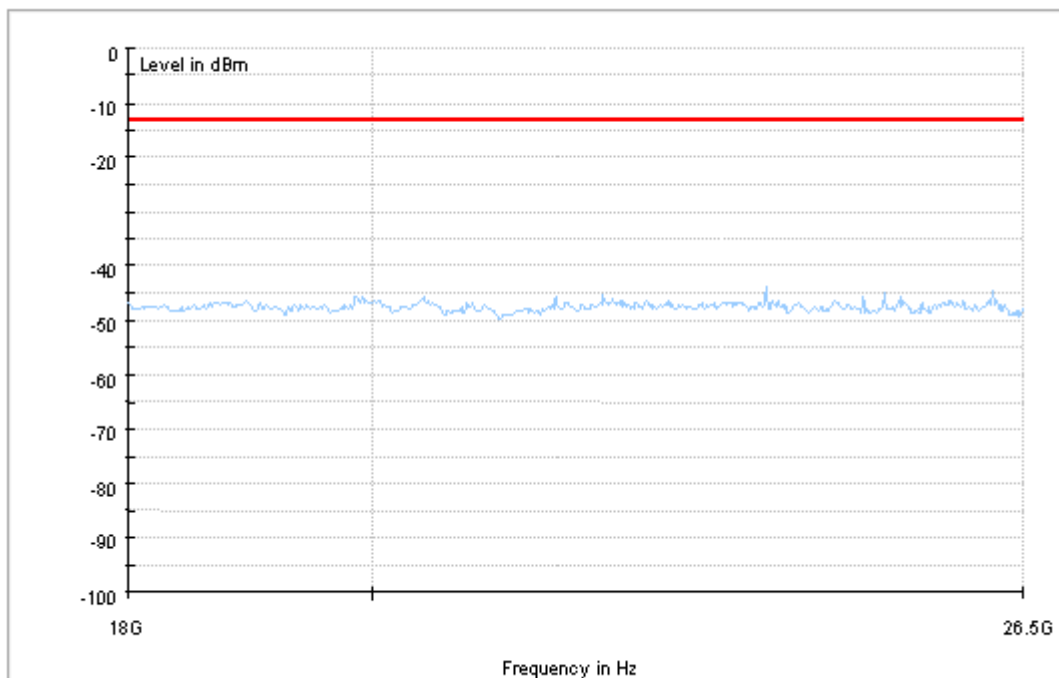
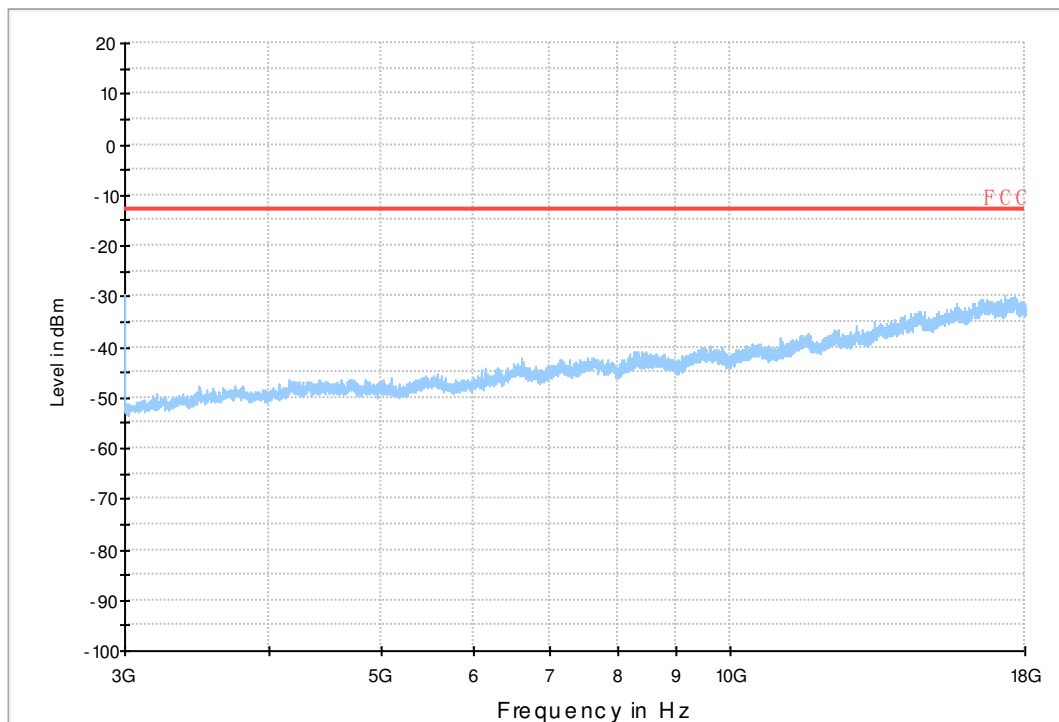
### 7.1.2.1 Test Mode = GSM/TM1



Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_L



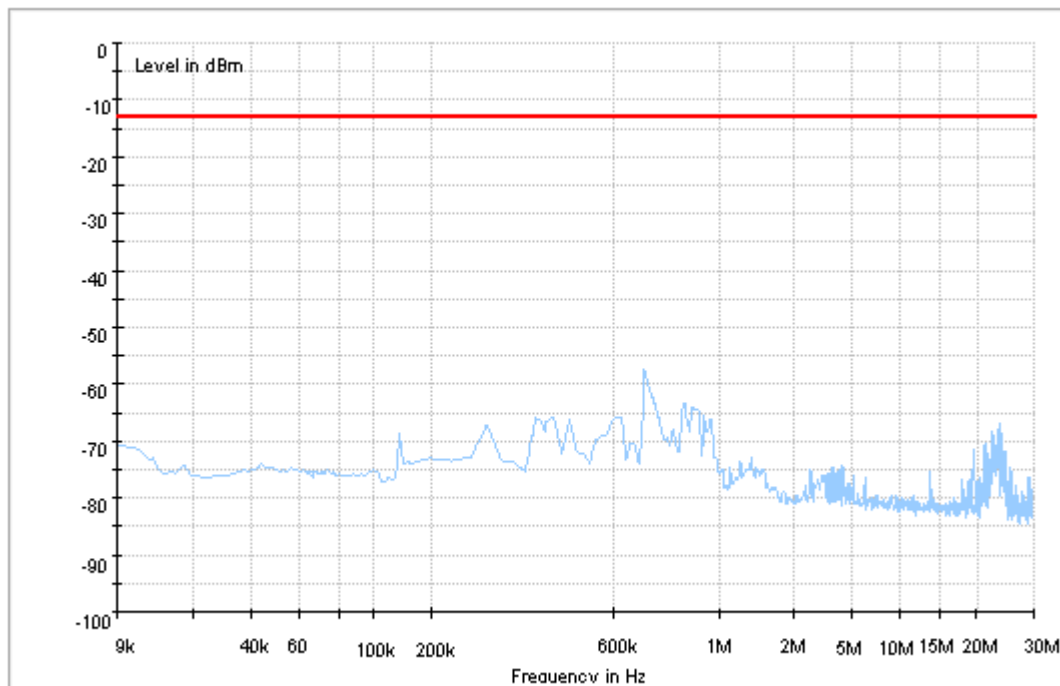
Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_H



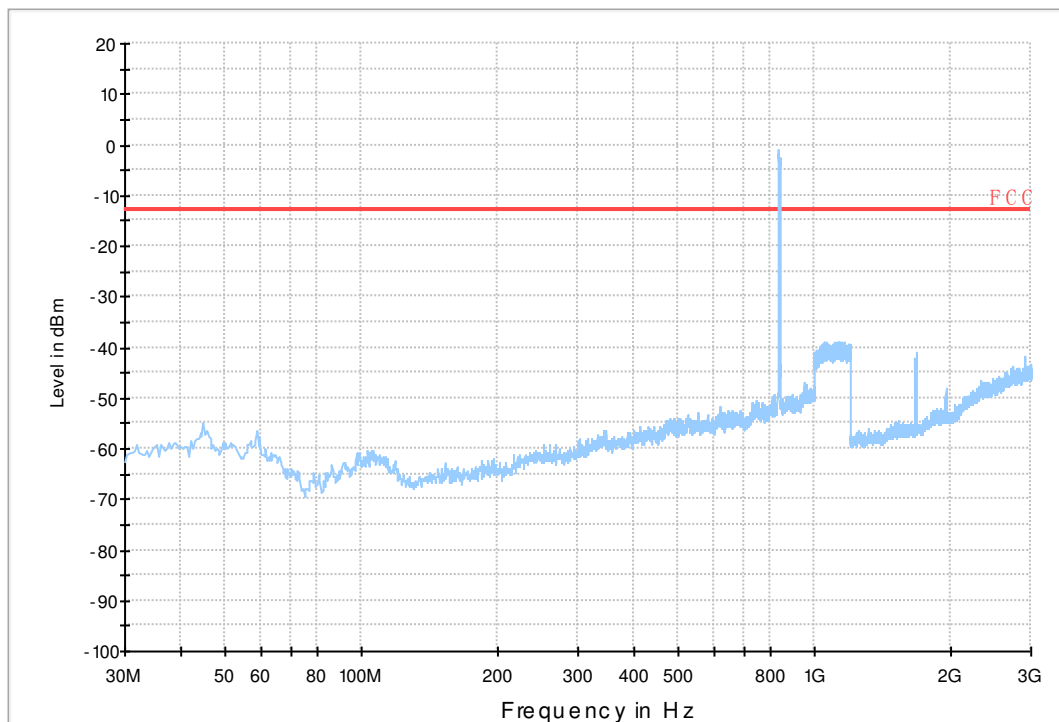
## 7.2 For UMTS

### 7.2.1 Test Band = WCDMA850

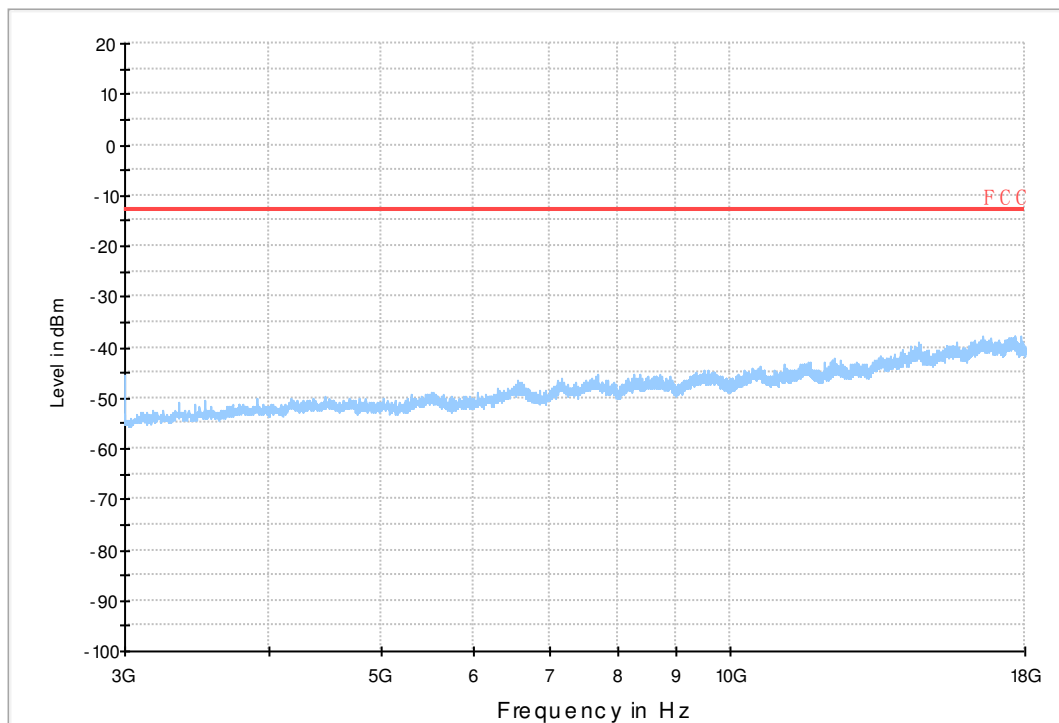
#### 7.2.1.1 Test Mode = UMTS/TM1



## Copy of RSE-TX-DIRECTOR BELOW 1G\_L

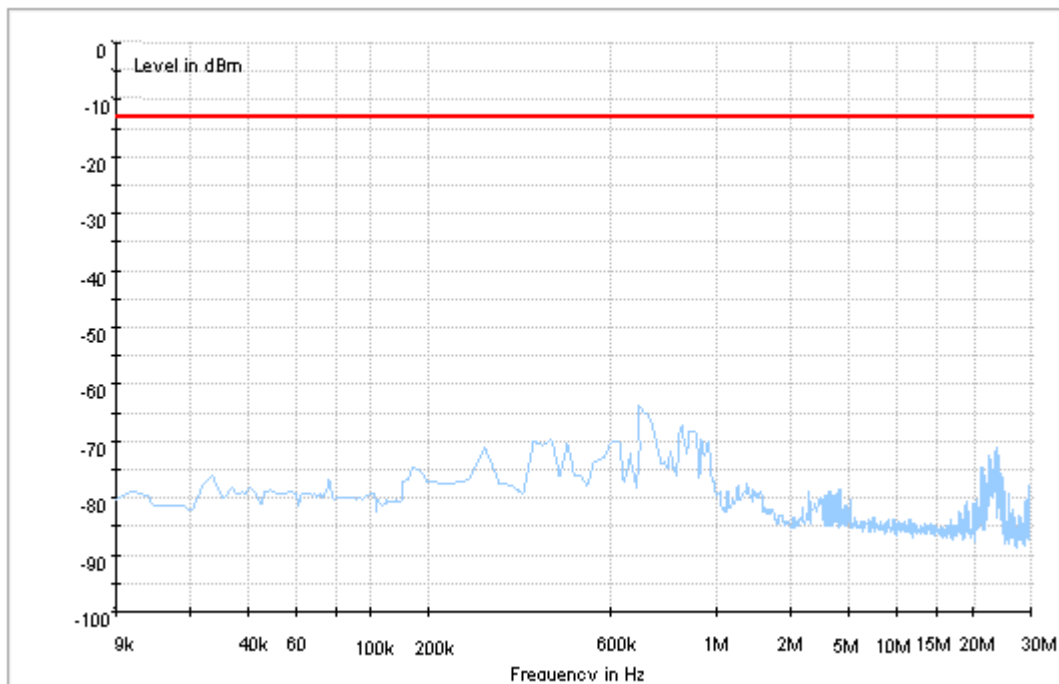


## Copy of RSE-TX-DIRECTOR BELOW 1G\_H

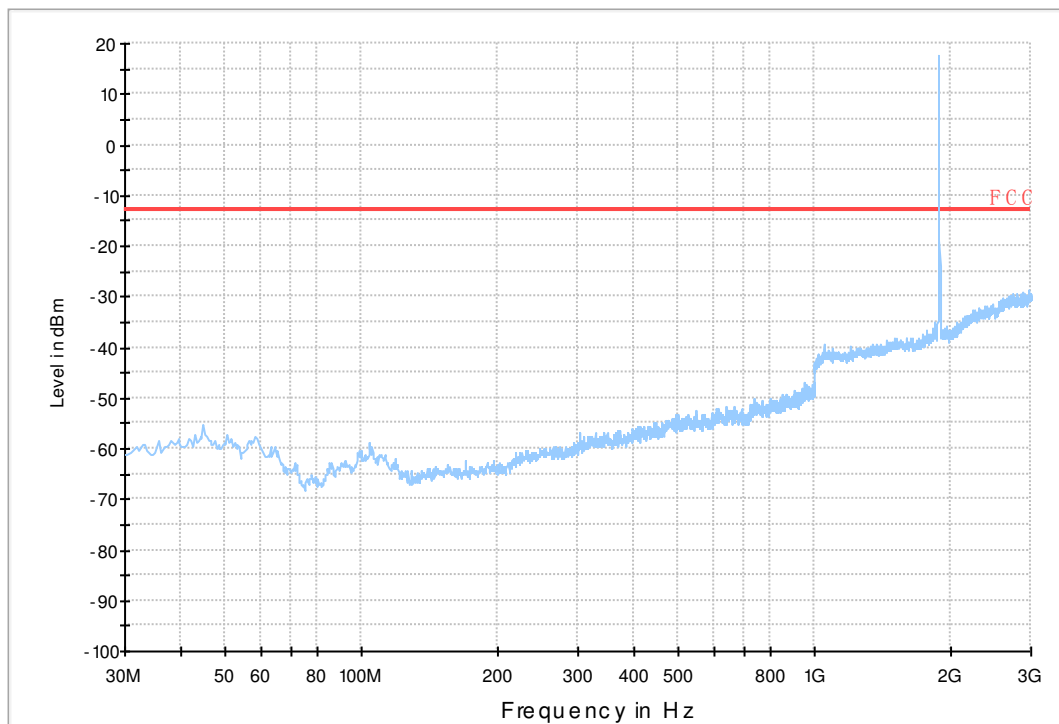


## 7.2.2 Test Band = WCDMA1900

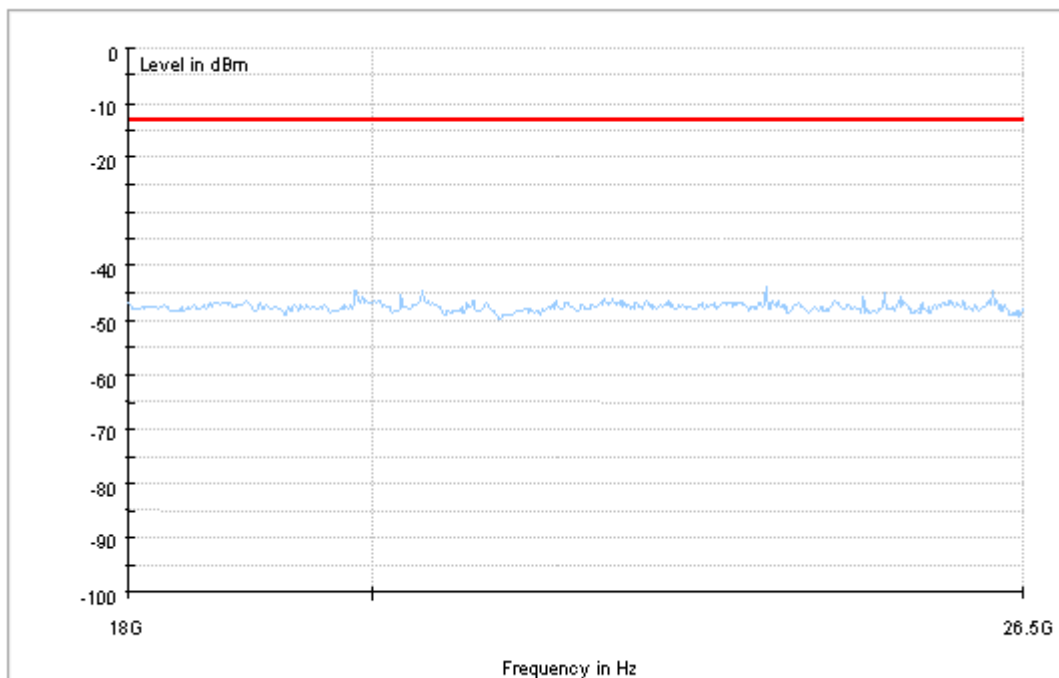
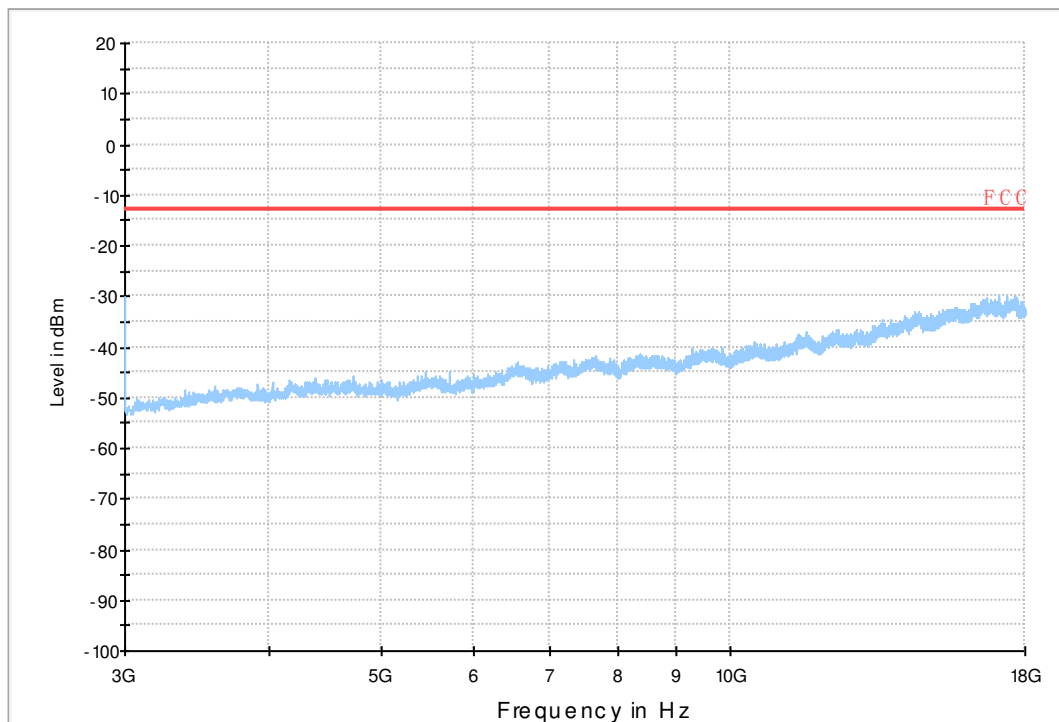
### 7.2.2.1 Test Mode = UMTS/TM1



Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_L

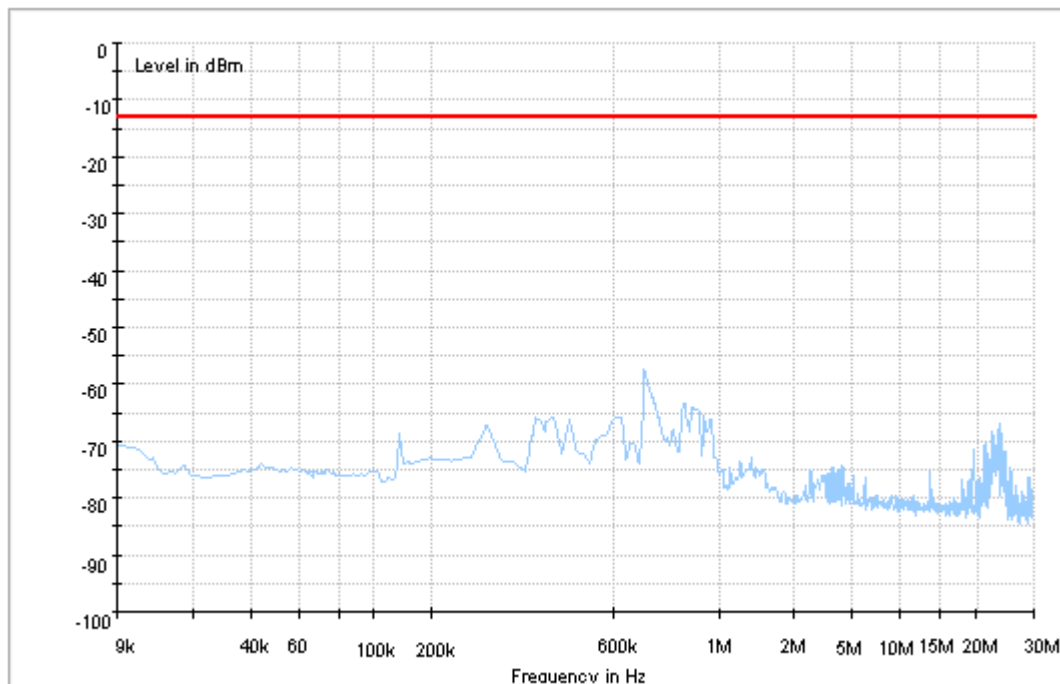


Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_H

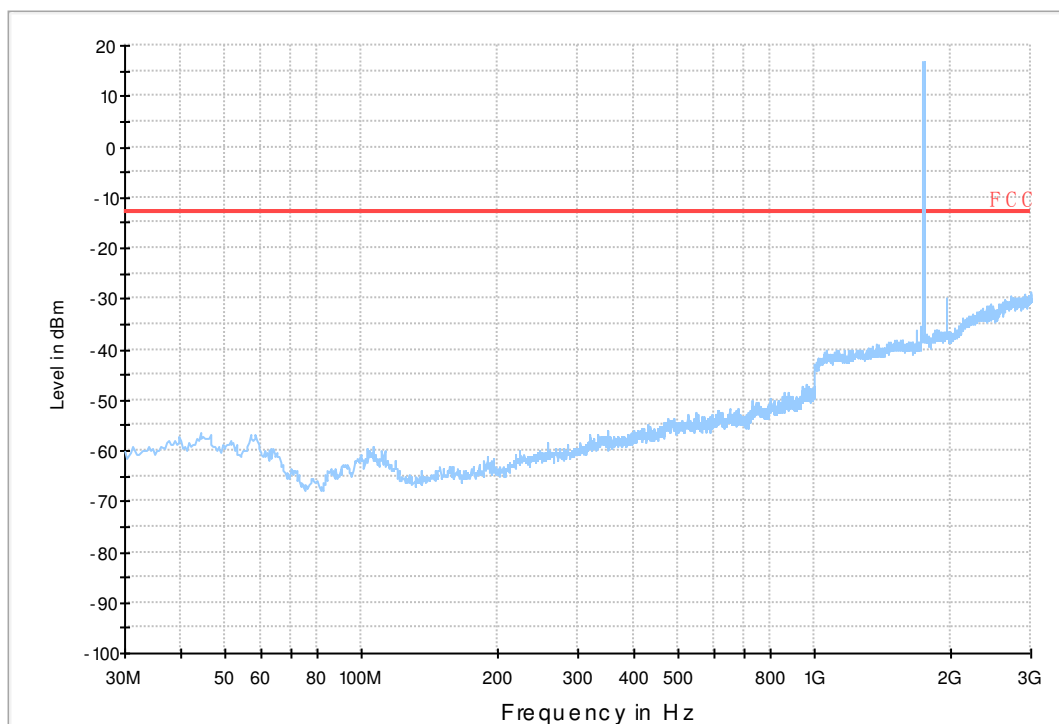


### 7.2.3 Test Band = WCDMA1700

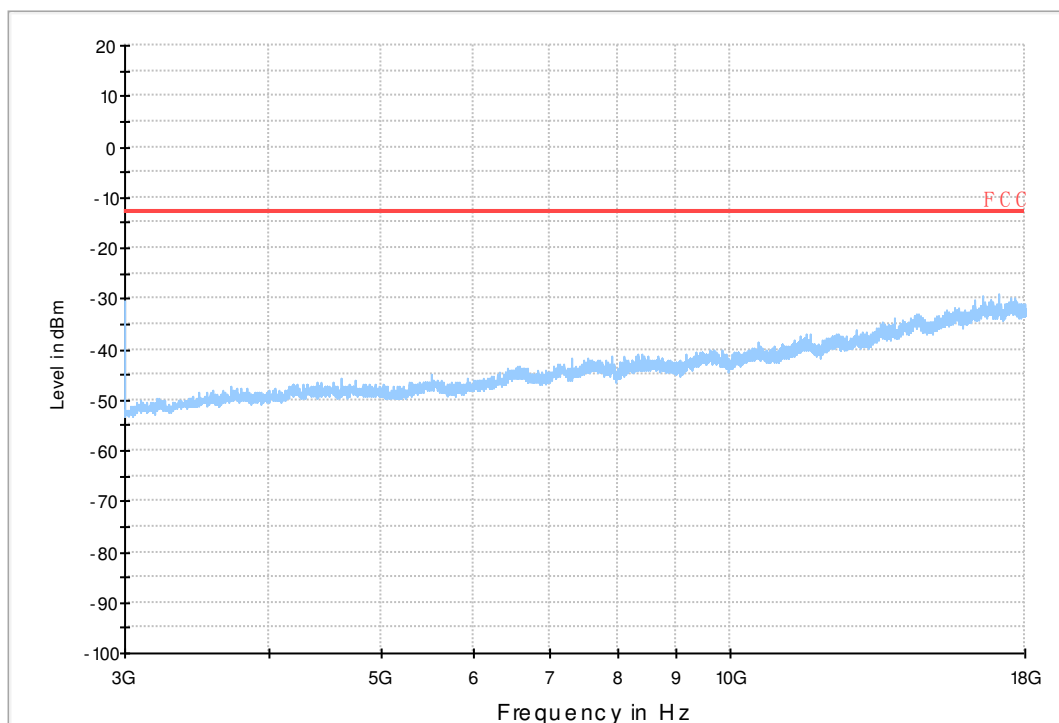
#### 7.2.3.1 Test Mode = UMTS/TM1



Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_L



Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_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         | -13.24           | -0.01606              | PASS    |
|           |           |              |            | VN         | -11.04           | -0.01339              | PASS    |
|           |           |              |            | VH         | -12.85           | -0.01559              | PASS    |
|           |           | MCH          | TN         | VL         | -9.75            | -0.01165              | PASS    |
|           |           |              |            | VN         | -10.01           | -0.01197              | PASS    |
|           |           |              |            | VH         | -12.85           | -0.01536              | PASS    |
|           |           | HCH          | TN         | VL         | -10.91           | -0.01285              | PASS    |
|           |           |              |            | VN         | -12.85           | -0.01514              | PASS    |
|           |           |              |            | VH         | -8.98            | -0.01058              | PASS    |
|           | GSM/TM2   | LCH          | TN         | VL         | -21.37           | -0.02593              | PASS    |
|           |           |              |            | VN         | -18.34           | -0.02225              | PASS    |
|           |           |              |            | VH         | -14.21           | -0.01724              | PASS    |
|           |           | MCH          | TN         | VL         | -11.43           | -0.01366              | PASS    |
|           |           |              |            | VN         | -9.27            | -0.01108              | PASS    |
|           |           |              |            | VH         | -9.49            | -0.01134              | PASS    |
|           |           | HCH          | TN         | VL         | -9.69            | -0.01142              | PASS    |
|           |           |              |            | VN         | -10.78           | -0.0127               | PASS    |
|           |           |              |            | VH         | -8.94            | -0.01053              | PASS    |
| GSM1900   | GSM/TM1   | LCH          | TN         | VL         | 5.68             | 0.00307               | PASS    |
|           |           |              |            | VN         | 20.28            | 0.01096               | PASS    |
|           |           |              |            | VH         | 20.79            | 0.01124               | PASS    |
|           |           | MCH          | TN         | VL         | 26.54            | 0.01412               | PASS    |
|           |           |              |            | VN         | 24.34            | 0.01295               | PASS    |
|           |           |              |            | VH         | 27.51            | 0.01463               | PASS    |
|           |           | HCH          | TN         | VL         | 25.89            | 0.01356               | PASS    |
|           |           |              |            | VN         | 37.77            | 0.01978               | PASS    |
|           |           |              |            | VH         | 31.58            | 0.01654               | PASS    |
|           | GSM/TM2   | LCH          | TN         | VL         | 7.43             | 0.00402               | PASS    |
|           |           |              |            | VN         | 5.29             | 0.00286               | PASS    |
|           |           |              |            | VH         | -1.32            | -0.00071              | PASS    |

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           | MCH          | TN         | VL         | 2.74             | 0.00146               | PASS    |
|           |           |              |            | VN         | 4.33             | 0.0023                | PASS    |
|           |           |              |            | VH         | 12.37            | 0.00658               | PASS    |
|           |           | HCH          | TN         | VL         | 16.34            | 0.00856               | PASS    |
|           |           |              |            | VN         | 18.4             | 0.00963               | PASS    |
|           |           |              |            | VH         | 10.04            | 0.00526               | PASS    |

### 8.1.2 Frequency Error vs. Temperature:

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
| GSM850    | GSM/TM1   | LCH          | VN         | -30        | -12.46           | -0.01512              | PASS    |
|           |           |              |            | -20        | -10.2            | -0.01238              | PASS    |
|           |           |              |            | -10        | -13.69           | -0.01661              | PASS    |
|           |           |              |            | 0          | -10.78           | -0.01308              | PASS    |
|           |           |              |            | 10         | -11.82           | -0.01434              | PASS    |
|           |           |              |            | 20         | -15.69           | -0.01904              | PASS    |
|           |           |              |            | 30         | -8.27            | -0.01003              | PASS    |
|           |           |              |            | 40         | -10.98           | -0.01332              | PASS    |
|           |           |              |            | 50         | -10.59           | -0.01285              | PASS    |
|           |           | MCH          | VN         | -30        | -10.07           | -0.01204              | PASS    |
|           |           |              |            | -20        | -11.82           | -0.01413              | PASS    |
|           |           |              |            | -10        | -12.14           | -0.01451              | PASS    |
|           |           |              |            | 0          | -8.98            | -0.01073              | PASS    |
|           |           |              |            | 10         | -5.81            | -0.00694              | PASS    |
|           |           |              |            | 20         | -13.62           | -0.01628              | PASS    |
|           |           |              |            | 30         | -11.36           | -0.01358              | PASS    |
|           |           |              |            | 40         | -4.97            | -0.00594              | PASS    |
|           |           |              |            | 50         | -9.81            | -0.01173              | PASS    |
|           |           | HCH          | VN         | -30        | -7.36            | -0.00867              | PASS    |
|           |           |              |            | -20        | -10.2            | -0.01202              | PASS    |
|           |           |              |            | -10        | -12.59           | -0.01483              | PASS    |
|           |           |              |            | 0          | -11.24           | -0.01324              | PASS    |
|           |           |              |            | 10         | -10.27           | -0.0121               | PASS    |
|           |           |              |            | 20         | -9.49            | -0.01118              | PASS    |
|           |           |              |            | 30         | -8.85            | -0.01043              | PASS    |
|           |           |              |            | 40         | -10.14           | -0.01195              | PASS    |
|           |           |              |            | 50         | -8.59            | -0.01012              | PASS    |
|           | GSM/TM2   | LCH          | VN         | -30        | -13.33           | -0.01617              | PASS    |
|           |           |              |            | -20        | -17.08           | -0.02072              | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | -10        | -9.17            | -0.01113              | PASS    |
|           |           |              |            | 0          | -14.01           | -0.017                | PASS    |
|           |           |              |            | 10         | -16.27           | -0.01974              | PASS    |
|           |           |              |            | 20         | -14.04           | -0.01703              | PASS    |
|           |           |              |            | 30         | -10.23           | -0.01241              | PASS    |
|           |           |              |            | 40         | -15.4            | -0.01868              | PASS    |
|           |           |              |            | 50         | -9.46            | -0.01148              | PASS    |
|           |           | MCH          | VN         | -30        | -19.02           | -0.02273              | PASS    |
|           |           |              |            | -20        | -15.98           | -0.0191               | PASS    |
|           |           |              |            | -10        | -20.34           | -0.02431              | PASS    |
|           |           |              |            | 0          | -9.85            | -0.01177              | PASS    |
|           |           |              |            | 10         | -16.66           | -0.01991              | PASS    |
|           |           |              |            | 20         | -10.01           | -0.01197              | PASS    |
|           |           |              |            | 30         | -17.6            | -0.02104              | PASS    |
|           |           |              |            | 40         | -13.17           | -0.01574              | PASS    |
|           |           |              |            | 50         | -14.63           | -0.01749              | PASS    |
|           |           | HCH          | VN         | -30        | -13.46           | -0.01586              | PASS    |
|           |           |              |            | -20        | -12.62           | -0.01487              | PASS    |
|           |           |              |            | -10        | -14.11           | -0.01662              | PASS    |
|           |           |              |            | 0          | -16.05           | -0.01891              | PASS    |
|           |           |              |            | 10         | -12.04           | -0.01418              | PASS    |
|           |           |              |            | 20         | -11.33           | -0.01335              | PASS    |
|           |           |              |            | 30         | -8.2             | -0.00966              | PASS    |
|           |           |              |            | 40         | -13.75           | -0.0162               | PASS    |
|           |           |              |            | 50         | -16.76           | -0.01975              | PASS    |
| GSM1900   | GSM/TM1   | LCH          | VN         | -30        | 14.85            | 0.00803               | PASS    |
|           |           |              |            | -20        | 11.62            | 0.00628               | PASS    |
|           |           |              |            | -10        | 21.37            | 0.01155               | PASS    |
|           |           |              |            | 0          | 16.92            | 0.00914               | PASS    |
|           |           |              |            | 10         | 22.28            | 0.01204               | PASS    |
|           |           |              |            | 20         | 15.24            | 0.00824               | PASS    |
|           |           |              |            | 30         | 26.86            | 0.01452               | PASS    |
|           |           |              |            | 40         | 20.66            | 0.01117               | PASS    |
|           |           |              |            | 50         | 15.82            | 0.00855               | PASS    |
|           |           | MCH          | VN         | -30        | 27.18            | 0.01446               | PASS    |
|           |           |              |            | -20        | 27.89            | 0.01484               | PASS    |
|           |           |              |            | -10        | 25.76            | 0.0137                | PASS    |
|           |           |              |            | 0          | 30.61            | 0.01628               | PASS    |
|           |           |              |            | 10         | 26.09            | 0.01388               | PASS    |
|           |           |              |            | 20         | 19.69            | 0.01047               | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 30         | 24.21            | 0.01288               | PASS    |
|           |           |              |            | 40         | 24.92            | 0.01326               | PASS    |
|           |           |              |            | 50         | 29.9             | 0.0159                | PASS    |
|           |           | HCH          | VN         | -30        | 33.32            | 0.01745               | PASS    |
|           |           |              |            | -20        | 29.7             | 0.01555               | PASS    |
|           |           |              |            | -10        | 22.02            | 0.01153               | PASS    |
|           |           |              |            | 0          | 31.51            | 0.0165                | PASS    |
|           |           |              |            | 10         | 29.51            | 0.01545               | PASS    |
|           |           |              |            | 20         | 36.94            | 0.01934               | PASS    |
|           |           |              |            | 30         | 46.94            | 0.02458               | PASS    |
|           |           |              |            | 40         | 25.38            | 0.01329               | PASS    |
|           |           |              |            | 50         | 28.41            | 0.01488               | PASS    |
|           | GSM/TM2   | LCH          | VN         | -30        | 17.37            | 0.00939               | PASS    |
|           |           |              |            | -20        | -0.94            | -0.00051              | PASS    |
|           |           |              |            | -10        | 3.55             | 0.00192               | PASS    |
|           |           |              |            | 0          | 11.46            | 0.00619               | PASS    |
|           |           |              |            | 10         | 9.27             | 0.00501               | PASS    |
|           |           |              |            | 20         | 16.82            | 0.00909               | PASS    |
|           |           |              |            | 30         | 5.55             | 0.003                 | PASS    |
|           |           |              |            | 40         | 18.05            | 0.00976               | PASS    |
|           |           |              |            | 50         | 5.42             | 0.00293               | PASS    |
|           |           | MCH          | VN         | -30        | 22.34            | 0.01188               | PASS    |
|           |           |              |            | -20        | -2.81            | -0.00149              | PASS    |
|           |           |              |            | -10        | 11.43            | 0.00608               | PASS    |
|           |           |              |            | 0          | 15.63            | 0.00831               | PASS    |
|           |           |              |            | 10         | 15.21            | 0.00809               | PASS    |
|           |           |              |            | 20         | 16.43            | 0.00874               | PASS    |
|           |           |              |            | 30         | 4.46             | 0.00237               | PASS    |
|           |           |              |            | 40         | 23.57            | 0.01254               | PASS    |
|           |           |              |            | 50         | 15.01            | 0.00798               | PASS    |
|           |           | HCH          | VN         | -30        | 5.55             | 0.00291               | PASS    |
|           |           |              |            | -20        | 18.76            | 0.00982               | PASS    |
|           |           |              |            | -10        | 15.53            | 0.00813               | PASS    |
|           |           |              |            | 0          | 27.83            | 0.01457               | PASS    |
|           |           |              |            | 10         | 20.89            | 0.01094               | PASS    |
|           |           |              |            | 20         | 14.37            | 0.00752               | PASS    |
|           |           |              |            | 30         | 26.28            | 0.01376               | PASS    |
|           |           |              |            | 40         | 23.67            | 0.01239               | 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         | 7.89             | 0.00955               | PASS    |
|           |           |              |            | VN         | 5.1              | 0.00617               | PASS    |
|           |           |              |            | VH         | 7.83             | 0.00947               | PASS    |
|           |           | MCH          | TN         | VL         | 3.37             | 0.00403               | PASS    |
|           |           |              |            | VN         | -3.01            | -0.0036               | PASS    |
|           |           |              |            | VH         | 13.12            | 0.01569               | PASS    |
|           |           | HCH          | TN         | VL         | 6.9              | 0.00815               | PASS    |
|           |           |              |            | VN         | -5.55            | -0.00656              | PASS    |
|           |           |              |            | VH         | -0.49            | -0.00058              | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | TN         | VL         | -17.85           | -0.00964              | PASS    |
|           |           |              |            | VN         | -10.09           | -0.00545              | PASS    |
|           |           |              |            | VH         | -9.34            | -0.00504              | PASS    |
|           |           | MCH          | TN         | VL         | -6               | -0.00319              | PASS    |
|           |           |              |            | VN         | -18.51           | -0.00985              | PASS    |
|           |           |              |            | VH         | -10.7            | -0.00569              | PASS    |
|           |           | HCH          | TN         | VL         | -5.1             | -0.00267              | PASS    |
|           |           |              |            | VN         | -5.84            | -0.00306              | PASS    |
|           |           |              |            | VH         | 9.02             | 0.00473               | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | TN         | VL         | -10.3            | -0.00601              | PASS    |
|           |           |              |            | VN         | -3.1             | -0.00181              | PASS    |
|           |           |              |            | VH         | -3.17            | -0.00185              | PASS    |
|           |           | MCH          | TN         | VL         | -8.19            | -0.00473              | PASS    |
|           |           |              |            | VN         | 4.67             | 0.0027                | PASS    |
|           |           |              |            | VH         | -15.41           | -0.00889              | PASS    |
|           |           | HCH          | TN         | VL         | -6.99            | -0.00399              | PASS    |
|           |           |              |            | VN         | 1.33             | 0.00076               | PASS    |
|           |           |              |            | VH         | -6.01            | -0.00343              | 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        | 5.33             | 0.00645               | PASS    |
|           |           |              |            | -20        | 4.81             | 0.00582               | PASS    |
|           |           |              |            | -10        | 7.16             | 0.00866               | PASS    |
|           |           |              |            | 0          | -2.03            | -0.00246              | PASS    |
|           |           |              |            | 10         | -0.95            | -0.00115              | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 20         | -3.77            | -0.00456              | PASS    |
|           |           |              |            | 30         | -2.5             | -0.00303              | PASS    |
|           |           |              |            | 40         | 5.13             | 0.00621               | PASS    |
|           |           |              |            | 50         | -13.11           | -0.01586              | PASS    |
|           |           | MCH          | VN         | -30        | -1.53            | -0.00183              | PASS    |
|           |           |              |            | -20        | -1.68            | -0.00201              | PASS    |
|           |           |              |            | -10        | -5.71            | -0.00683              | PASS    |
|           |           |              |            | 0          | 4.44             | 0.00531               | PASS    |
|           |           |              |            | 10         | 3.81             | 0.00456               | PASS    |
|           |           |              |            | 20         | -2.24            | -0.00268              | PASS    |
|           |           |              |            | 30         | -1.22            | -0.00146              | PASS    |
|           |           |              |            | 40         | -2.23            | -0.00267              | PASS    |
|           |           |              |            | 50         | 1.27             | 0.00152               | PASS    |
|           |           | HCH          | VN         | -30        | 2.52             | 0.00298               | PASS    |
|           |           |              |            | -20        | 3.45             | 0.00408               | PASS    |
|           |           |              |            | -10        | -5.08            | -0.006                | PASS    |
|           |           |              |            | 0          | -6.13            | -0.00724              | PASS    |
|           |           |              |            | 10         | -2.75            | -0.00325              | PASS    |
|           |           |              |            | 20         | 4.87             | 0.00575               | PASS    |
|           |           |              |            | 30         | -3.85            | -0.00455              | PASS    |
|           |           |              |            | 40         | -0.31            | -0.00037              | PASS    |
|           |           |              |            | 50         | 11.44            | 0.01351               | PASS    |
| WCDMA1900 | UMTS/TM1  | LCH          | VN         | -30        | 9.87             | 0.00533               | PASS    |
|           |           |              |            | -20        | -14.07           | -0.0076               | PASS    |
|           |           |              |            | -10        | -12.36           | -0.00667              | PASS    |
|           |           |              |            | 0          | -11.17           | -0.00603              | PASS    |
|           |           |              |            | 10         | 4.61             | 0.00249               | PASS    |
|           |           |              |            | 20         | -5.07            | -0.00274              | PASS    |
|           |           |              |            | 30         | -14.3            | -0.00772              | PASS    |
|           |           |              |            | 40         | -9.75            | -0.00526              | PASS    |
|           |           |              |            | 50         | -17.58           | -0.00949              | PASS    |
|           |           | MCH          | VN         | -30        | -9.63            | -0.00512              | PASS    |
|           |           |              |            | -20        | -0.6             | -0.00032              | PASS    |
|           |           |              |            | -10        | -7.81            | -0.00415              | PASS    |
|           |           |              |            | 0          | -4.62            | -0.00246              | PASS    |
|           |           |              |            | 10         | -7.48            | -0.00398              | PASS    |
|           |           |              |            | 20         | -10.96           | -0.00583              | PASS    |
|           |           |              |            | 30         | -2.33            | -0.00124              | PASS    |
|           |           |              |            | 40         | -0.5             | -0.00027              | PASS    |
|           |           |              |            | 50         | -3.46            | -0.00184              | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           | HCH          | VN         | -30        | -14.25           | -0.00747              | PASS    |
|           |           |              |            | -20        | -3.56            | -0.00187              | PASS    |
|           |           |              |            | -10        | -9.26            | -0.00485              | PASS    |
|           |           |              |            | 0          | 5.29             | 0.00277               | PASS    |
|           |           |              |            | 10         | -1.36            | -0.00071              | PASS    |
|           |           |              |            | 20         | -8.96            | -0.0047               | PASS    |
|           |           |              |            | 30         | -4.99            | -0.00262              | PASS    |
|           |           |              |            | 40         | -1.85            | -0.00097              | PASS    |
|           |           |              |            | 50         | 0.95             | 0.0005                | PASS    |
| WCDMA1700 | UMTS/TM1  | LCH          | VN         | -30        | -2.81            | -0.00164              | PASS    |
|           |           |              |            | -20        | 5.16             | 0.00301               | PASS    |
|           |           |              |            | -10        | -4.32            | -0.00252              | PASS    |
|           |           |              |            | 0          | -7.25            | -0.00423              | PASS    |
|           |           |              |            | 10         | -11.35           | -0.00663              | PASS    |
|           |           |              |            | 20         | -2.67            | -0.00156              | PASS    |
|           |           |              |            | 30         | 5.66             | 0.00331               | PASS    |
|           |           |              |            | 40         | -10.16           | -0.00593              | PASS    |
|           |           |              |            | 50         | -5.74            | -0.00335              | PASS    |
|           |           | MCH          | VN         | -30        | -6.81            | -0.00393              | PASS    |
|           |           |              |            | -20        | -1.16            | -0.00067              | PASS    |
|           |           |              |            | -10        | -8.06            | -0.00465              | PASS    |
|           |           |              |            | 0          | -1.33            | -0.00077              | PASS    |
|           |           |              |            | 10         | -4.62            | -0.00267              | PASS    |
|           |           |              |            | 20         | -7.9             | -0.00456              | PASS    |
|           |           |              |            | 30         | -7.66            | -0.00442              | PASS    |
|           |           |              |            | 40         | 0.56             | 0.00032               | PASS    |
|           |           |              |            | 50         | -7.61            | -0.00439              | PASS    |
|           |           | HCH          | VN         | -30        | -4.75            | -0.00271              | PASS    |
|           |           |              |            | -20        | -7.05            | -0.00402              | PASS    |
|           |           |              |            | -10        | -0.63            | -0.00036              | PASS    |
|           |           |              |            | 0          | -3.65            | -0.00208              | PASS    |
|           |           |              |            | 10         | -5.36            | -0.00306              | PASS    |
|           |           |              |            | 20         | 3.04             | 0.00173               | PASS    |
|           |           |              |            | 30         | -8.3             | -0.00474              | PASS    |
|           |           |              |            | 40         | 3.14             | 0.00179               | PASS    |
|           |           |              |            | 50         | 2.03             | 0.00116               | PASS    |

END