**SGS-CSTC Standards Technical Services Ltd.**

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com



# Appendix B for Test Report

Authorized Signature:


Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

# 2 Content

# 3 Appendix_B-1: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dBm] | ERP [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|
| GSM850 | GSM/TM1 | LCH | 32.19 | 30.89 | 38.5 | PASS |
| | | MCH | 32.21 | 30.91 | 38.5 | PASS |
| | | HCH | 32.11 | 30.81 | 38.5 | PASS |
| | GSM/TM2 | LCH | 26.54 | 25.24 | 38.5 | PASS |
| | | MCH | 26.57 | 25.27 | 38.5 | PASS |
| | | HCH | 26.48 | 25.18 | 38.5 | PASS |
| WCDMA850 | UMTS/TM1 | LCH | 23.85 | 22.55 | 38.5 | PASS |
| | | MCH | 23.47 | 22.17 | 38.5 | PASS |
| | | HCH | 23.61 | 22.31 | 38.5 | PASS |

Note1:

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

ERP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBd]

b. SGP=Signal Generator Level

Note2:

RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

| Test Band | Test Mode | Test Channel | Measured[dBm] | EIRP [dBm] | Limit [dBm] | Verdict |
|---|---|---|---|---|---|---|
| GSM1900 | GSM/TM1 | LCH | 27.90 | 30.95 | 33 | PASS |
| | | MCH | 27.85 | 30.90 | 33 | PASS |
| | | HCH | 27.62 | 30.67 | 33 | PASS |
| | GSM/TM2 | LCH | 24.00 | 27.05 | 33 | PASS |
| | | MCH | 23.95 | 27.00 | 33 | PASS |
| | | HCH | 23.74 | 26.79 | 33 | PASS |
| WCDMA1900 | UMTS/TM1 | LCH | 22.24 | 25.29 | 33 | PASS |
| | | MCH | 20.79 | 23.84 | 33 | PASS |
| | | HCH | 21.05 | 24.10 | 33 | PASS |

Note1:

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

EIRP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBi]

b. SGP=Signal Generator Level

Note2:

RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

# 4 Appendix_B-2: Peak-to-Average Ratio

Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
|---|---|---|---|---|---|
| GSM850 | GSM/TM1 | LCH | 0.08 | 13 | PASS |
| | | MCH | 0.27 | 13 | PASS |
| | | HCH | 0.17 | 13 | PASS |
| | GSM/TM2 | LCH | 2.86 | 13 | PASS |
| | | MCH | 3.42 | 13 | PASS |
| | | HCH | 3.17 | 13 | PASS |
| GSM1900 | GSM/TM1 | LCH | 0.38 | 13 | PASS |
| | | MCH | 0.14 | 13 | PASS |
| | | HCH | 0.25 | 13 | PASS |
| | GSM/TM2 | LCH | 3.18 | 13 | PASS |
| | | MCH | 3.20 | 13 | PASS |
| | | HCH | 3.19 | 13 | PASS |
| **Test Band** | **Test Mode** | **Test Channel** | **Measured[dB]** | **Limit [dB]** | **Verdict** |
| WCDMA850 | UMTS/TM1 | LCH | 3.27 | 13 | PASS |
| | | MCH | 3.08 | 13 | PASS |
| | | HCH | 3.09 | 13 | PASS |
| WCDMA1900 | UMTS/TM1 | LCH | 2.38 | 13 | PASS |
| | | MCH | 3.06 | 13 | PASS |
| | | HCH | 3.19 | 13 | PASS |

# 5 Appendix_B-3: Bandwidth

**Part I - Test Results**

| Test Band | Test Mode | Test Channel | Occupied Bandwidth [kHz] | Emission Bandwidth [kHz] | Verdict |
|---|---|---|---|---|---|
| GSM850 | GSM/TM1 | LCH | 242.1 | 319.9 | PASS |
| | | MCH | 246.5 | 316.1 | PASS |
| | | HCH | 244.6 | 319.1 | PASS |
| | GSM/TM2 | LCH | 241.7 | 311.2 | PASS |
| | | MCH | 244.6 | 304.1 | PASS |
| | | HCH | 247.7 | 304.1 | PASS |
| GSM1900 | GSM/TM1 | LCH | 246.1 | 317.9 | PASS |
| | | MCH | 243.2 | 310.9 | PASS |
| | | HCH | 246.2 | 314.9 | PASS |
| | GSM/TM2 | LCH | 242.6 | 321.4 | PASS |
| | | MCH | 242.6 | 315.8 | PASS |
| | | HCH | 243.6 | 309.0 | PASS |
| **Test Band** | **Test Mode** | **Test Channel** | **Occupied Bandwidth [MHz]** | **Emission Bandwidth [MHz]** | **Verdict** |
| WCDMA850 | UMTS/TM1 | LCH | 4.16 | 4.67 | PASS |
| | | MCH | 4.16 | 4.67 | PASS |
| | | HCH | 4.17 | 4.67 | PASS |
| WCDMA1900 | UMTS/TM1 | LCH | 4.17 | 4.67 | PASS |
| | | MCH | 4.17 | 4.68 | PASS |
| | | HCH | 4.17 | 4.68 | PASS |

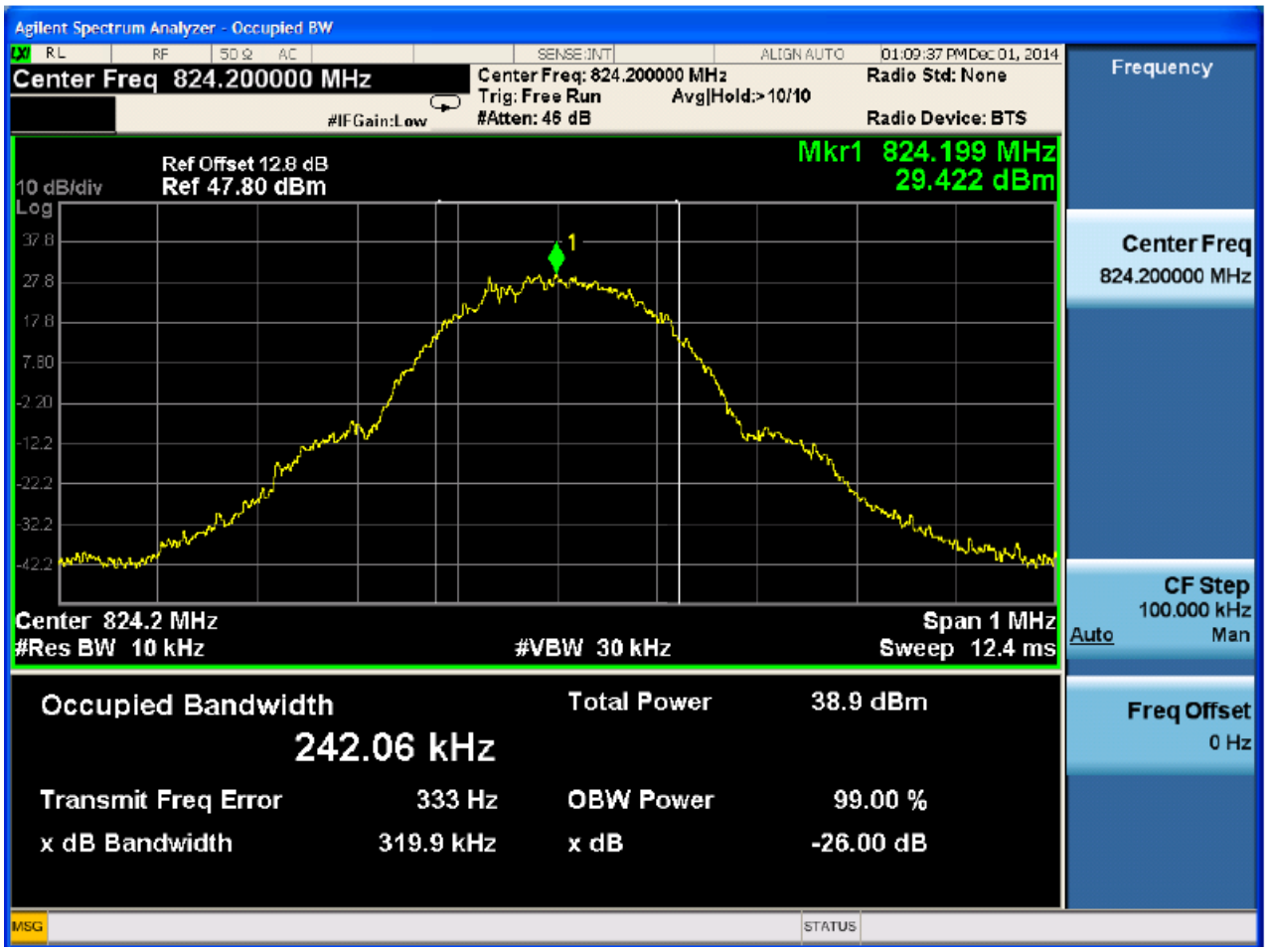
Part II - Test Plots

# 5.1 For GSM

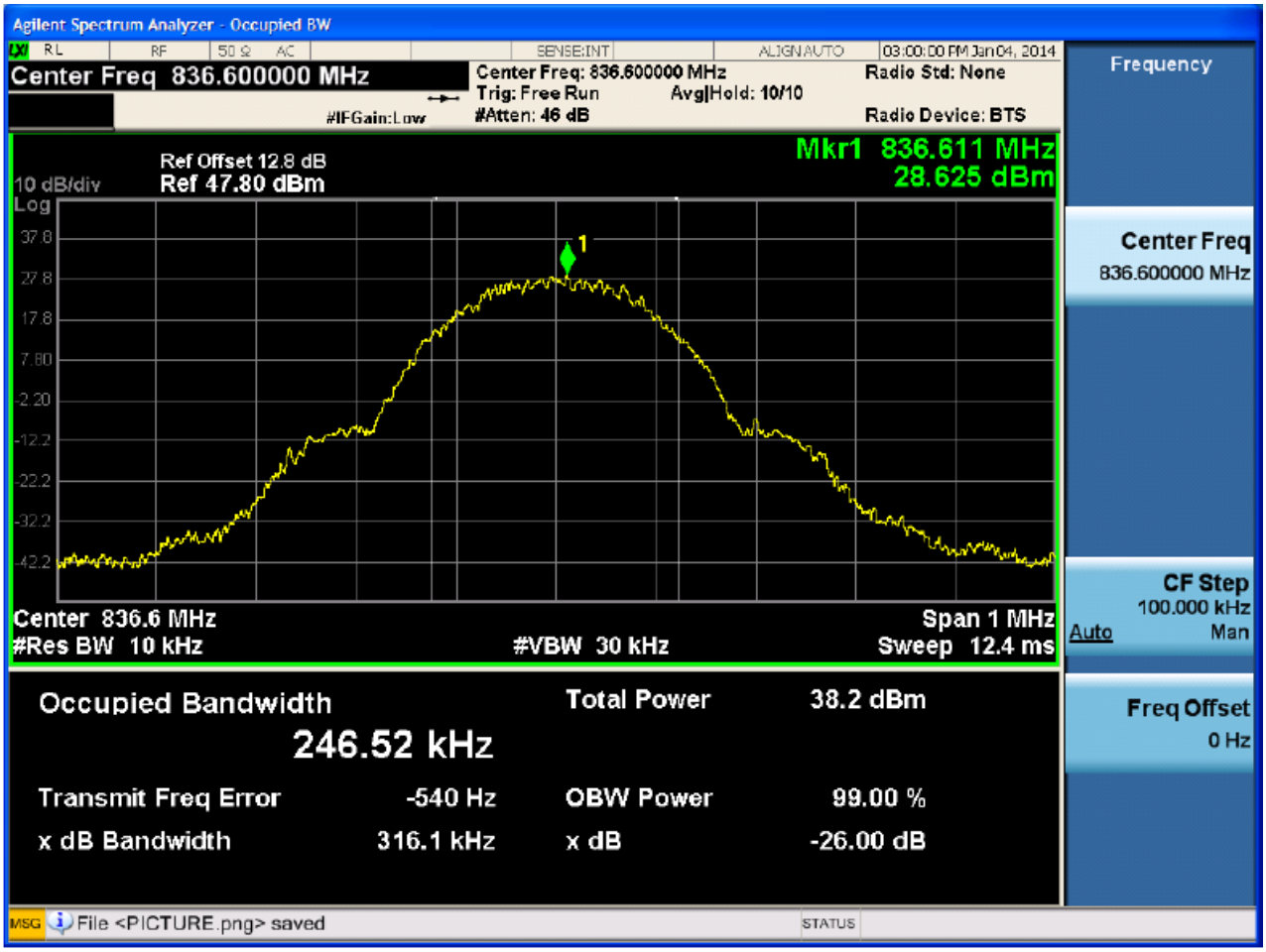
## 5.1.1 Test Band = GSM850

### 5.1.1.1 Test Mode = GSM/TM1

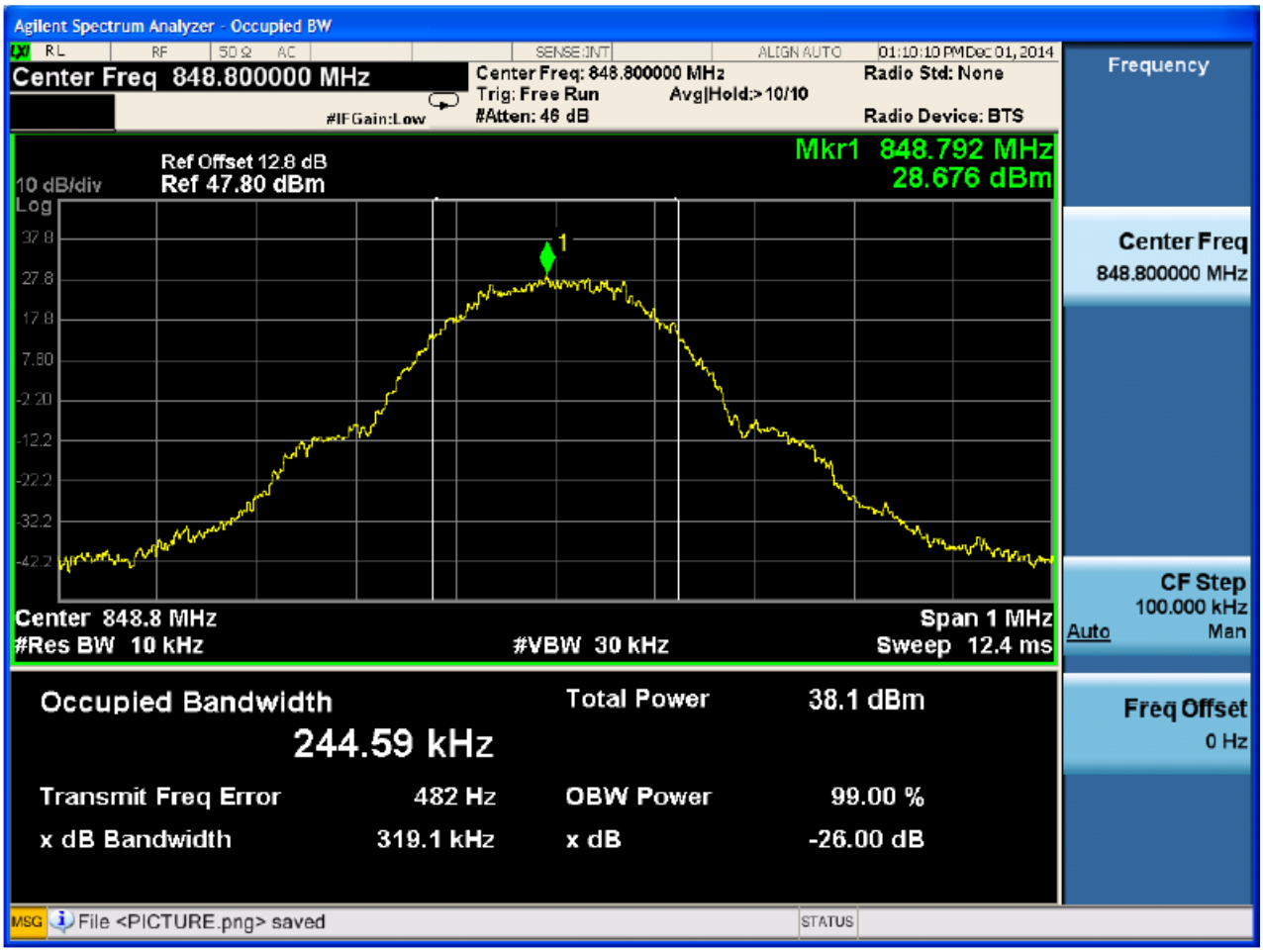
#### 5.1.1.1.1 Test Channel = LCH



#### 5.1.1.1.2 Test Channel = MCH

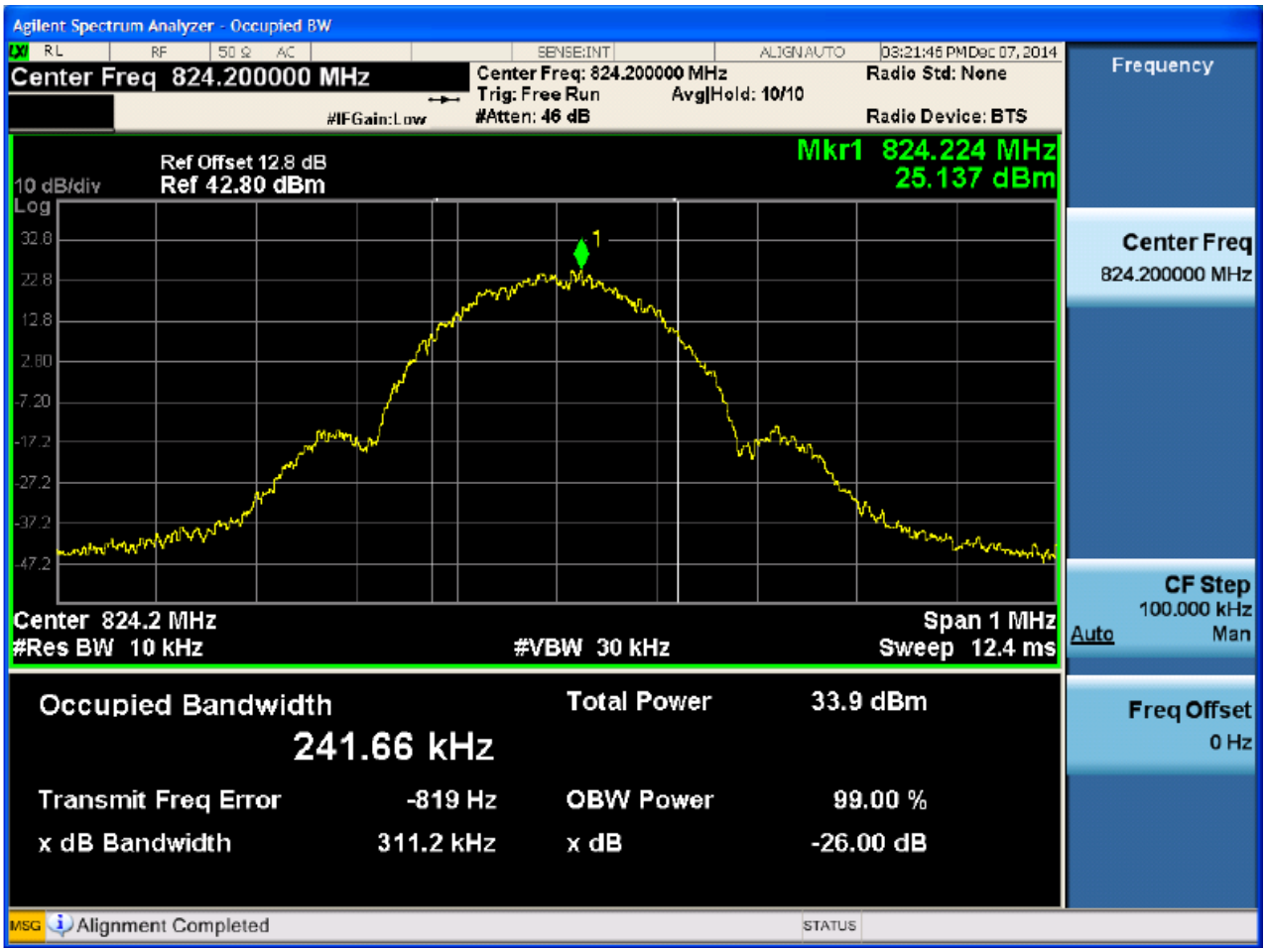


**5.1.1.1.3 Test Channel = HCH**

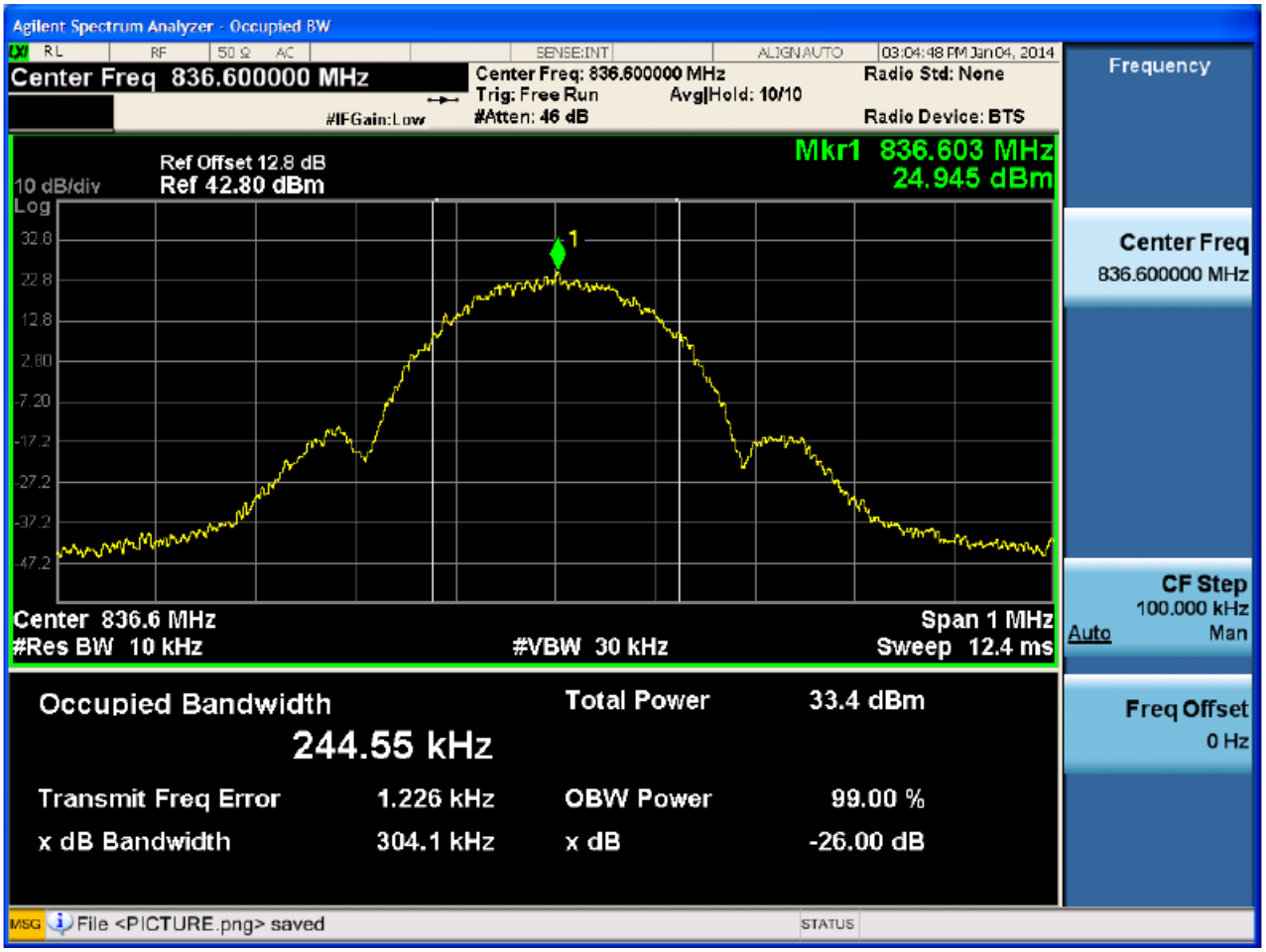


### 5.1.1.2 Test Mode = GSM/TM2

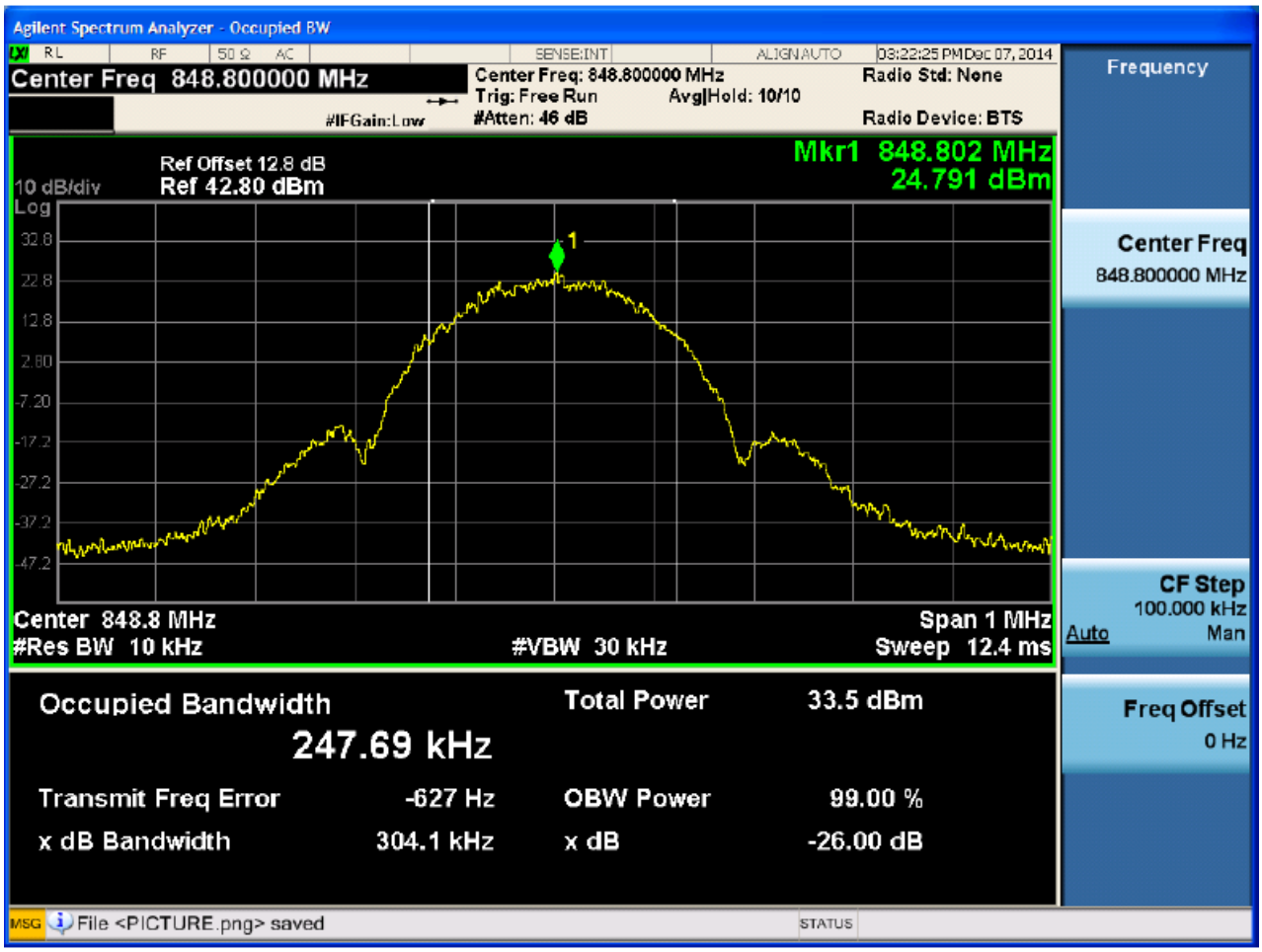
#### 5.1.1.2.1 Test Channel = LCH



**5.1.1.2.2 Test Channel = MCH**



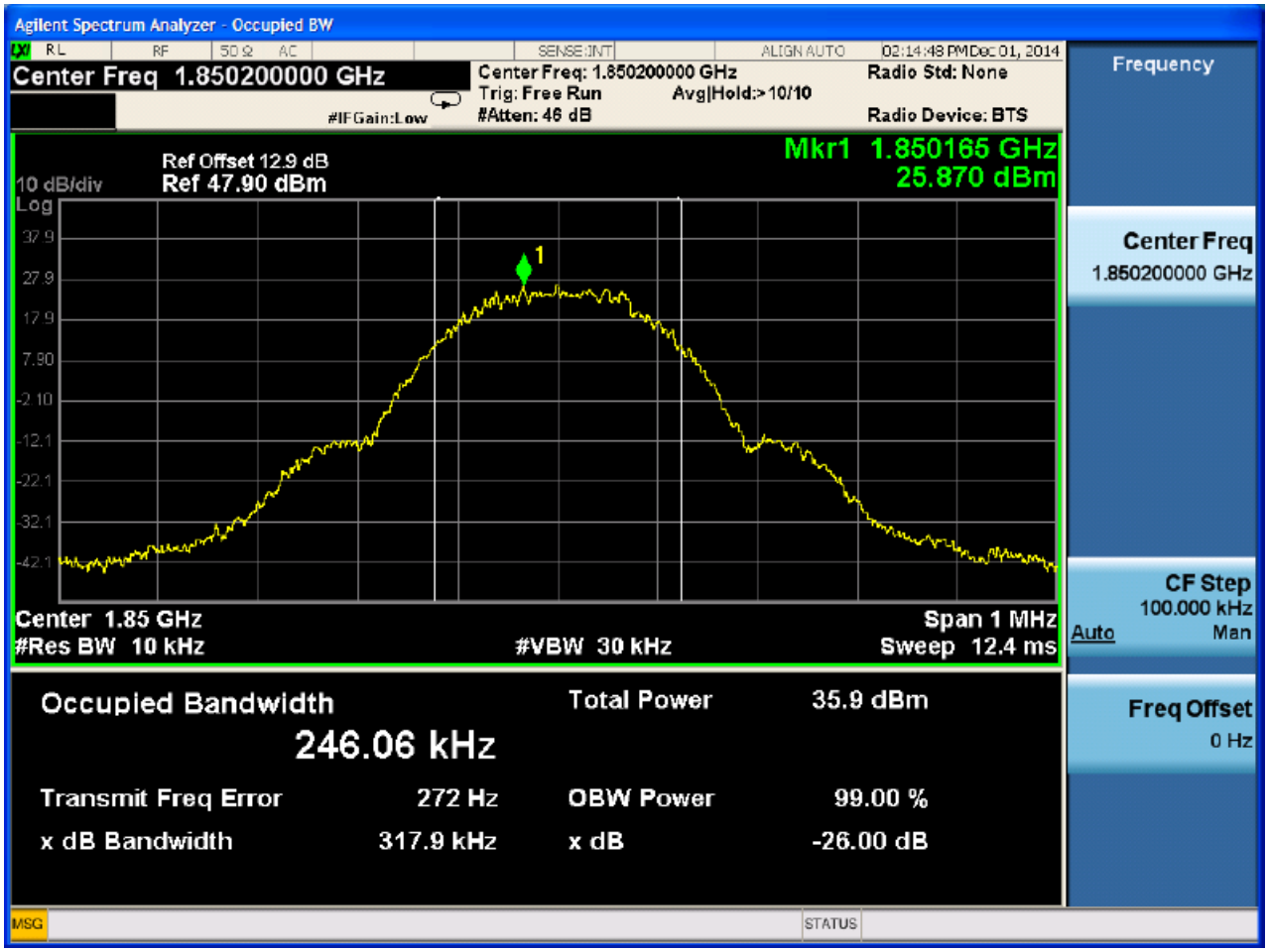
**5.1.1.2.3 Test Channel = HCH**



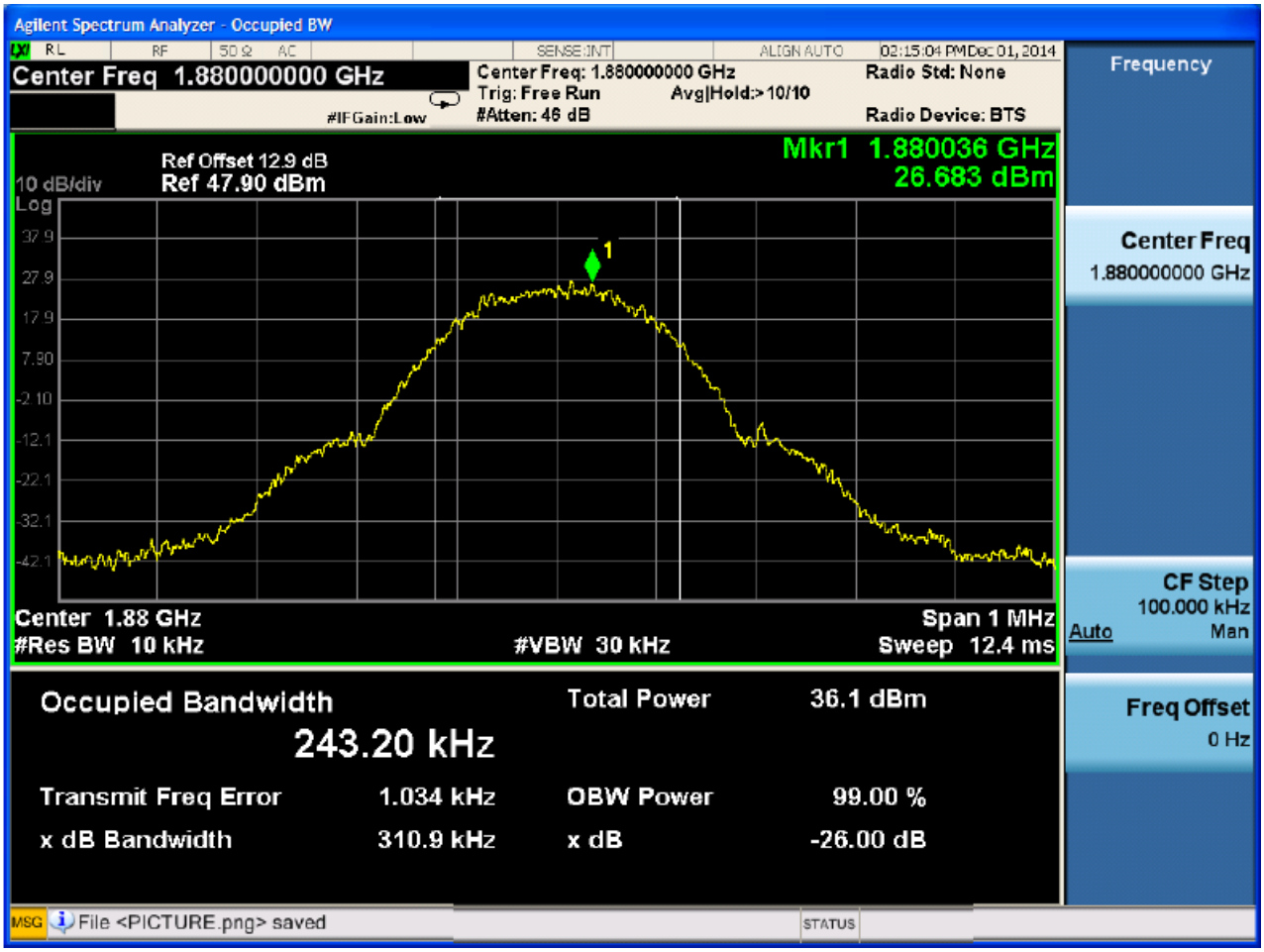
## 5.1.2 Test Band = GSM1900

### 5.1.2.1 Test Mode = GSM/TM1

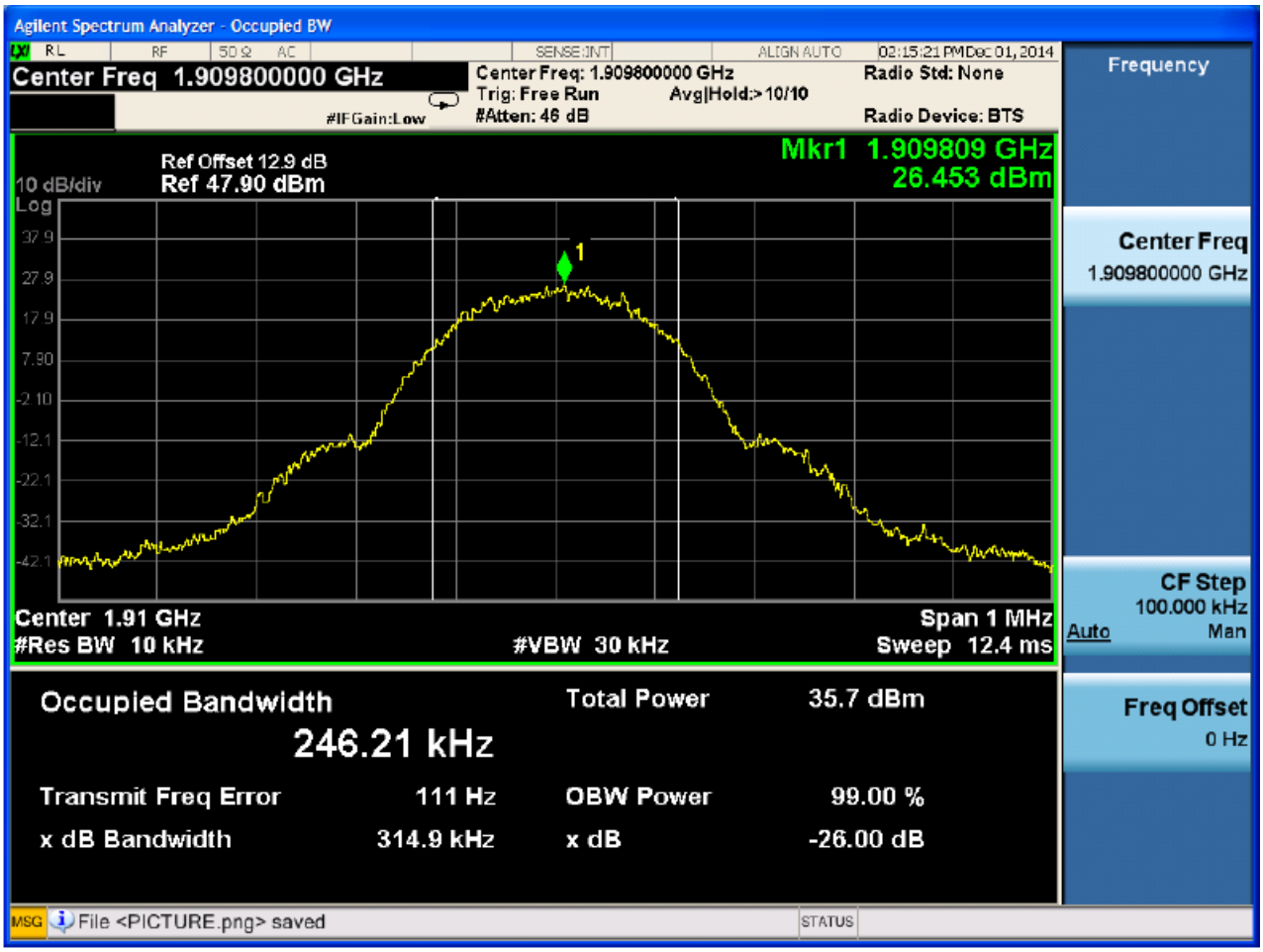
#### 5.1.2.1.1 Test Channel = LCH



**5.1.2.1.2 Test Channel = MCH**

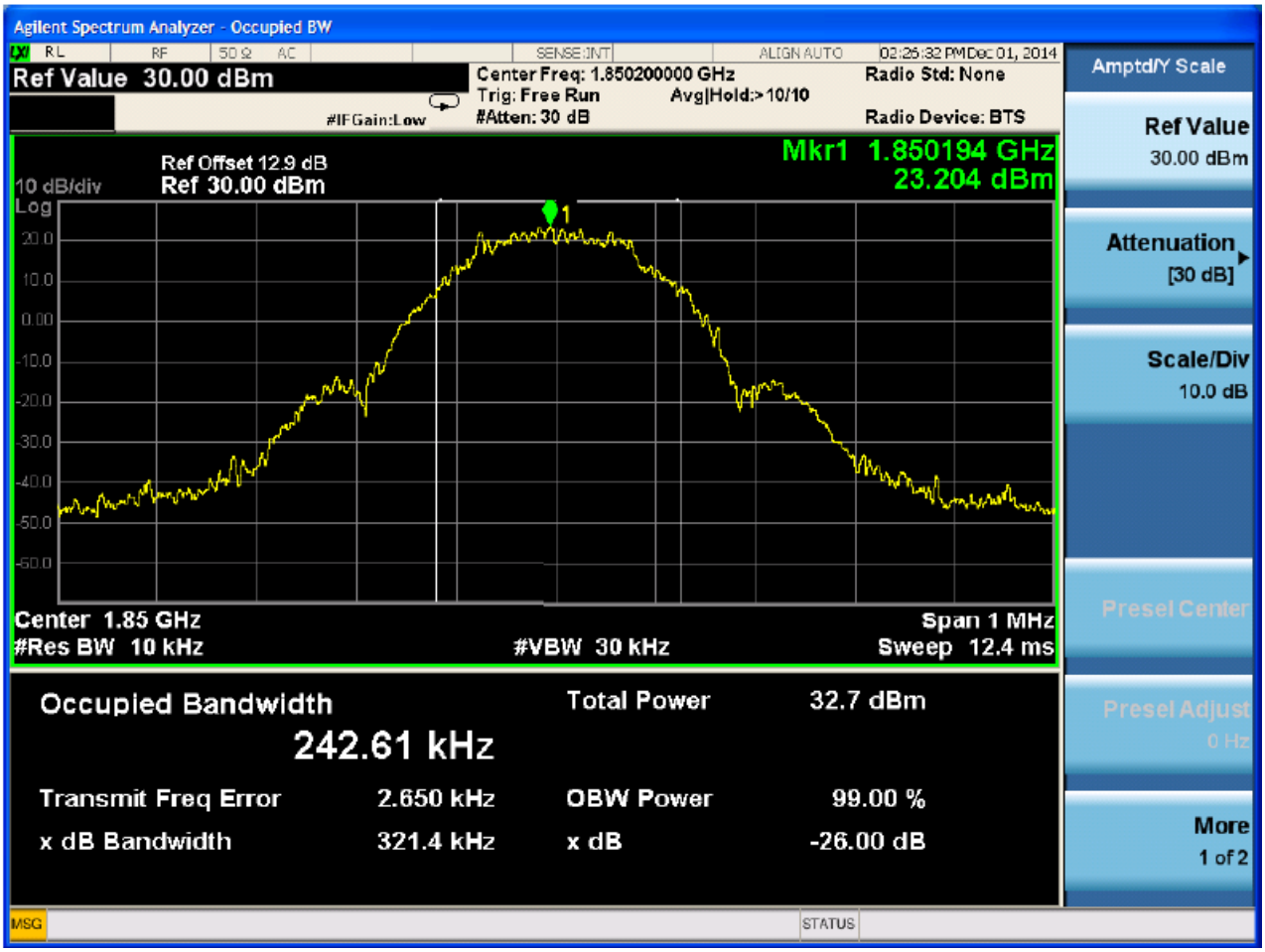


### 5.1.2.1.3 Test Channel = HCH

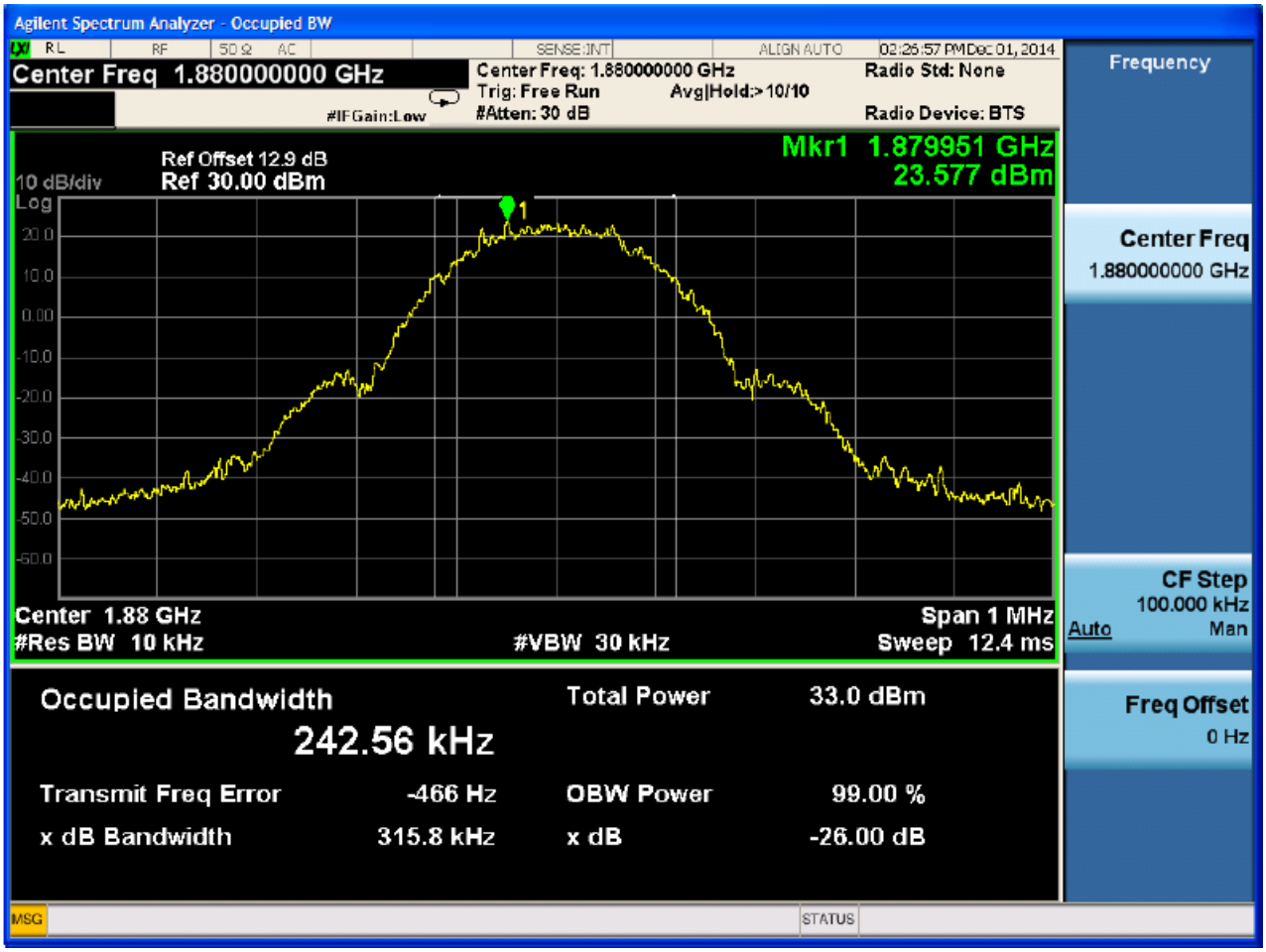


### 5.1.2.2 Test Mode = GSM/TM2

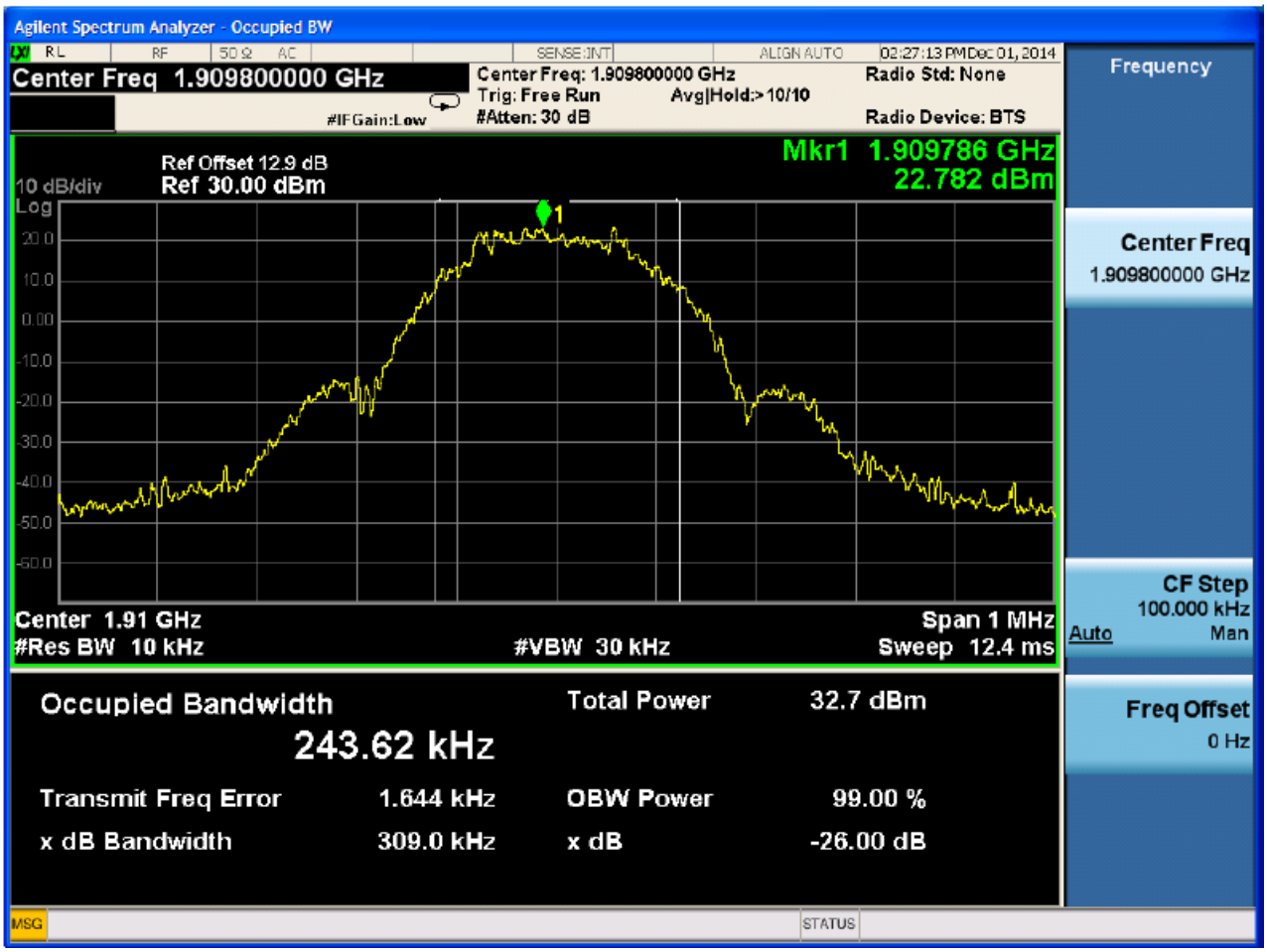
#### 5.1.2.2.1 Test Channel = LCH



**5.1.2.2.2 Test Channel = MCH**



### 5.1.2.2.3 Test Channel = HCH

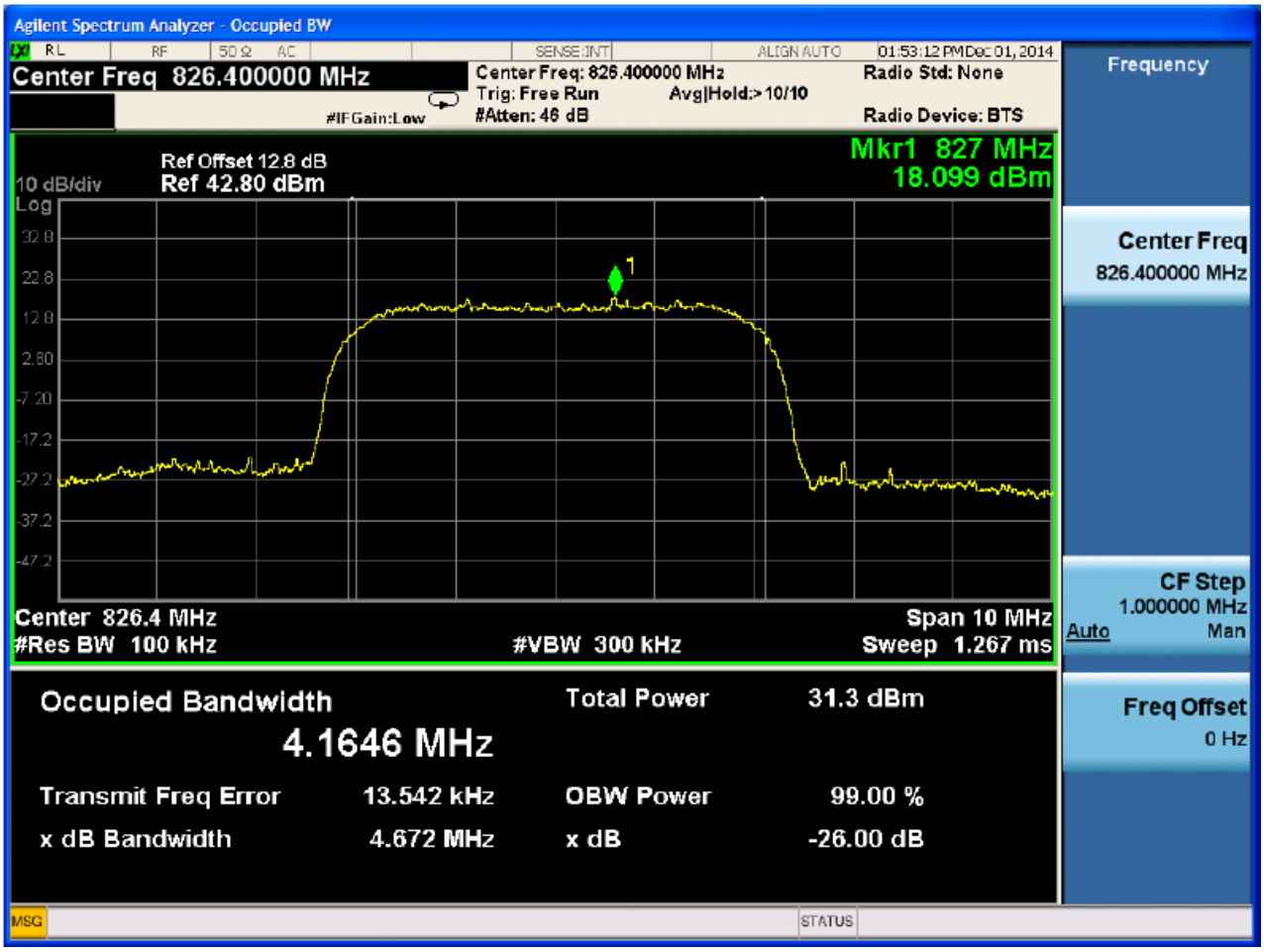


## 5.2 For UMTS

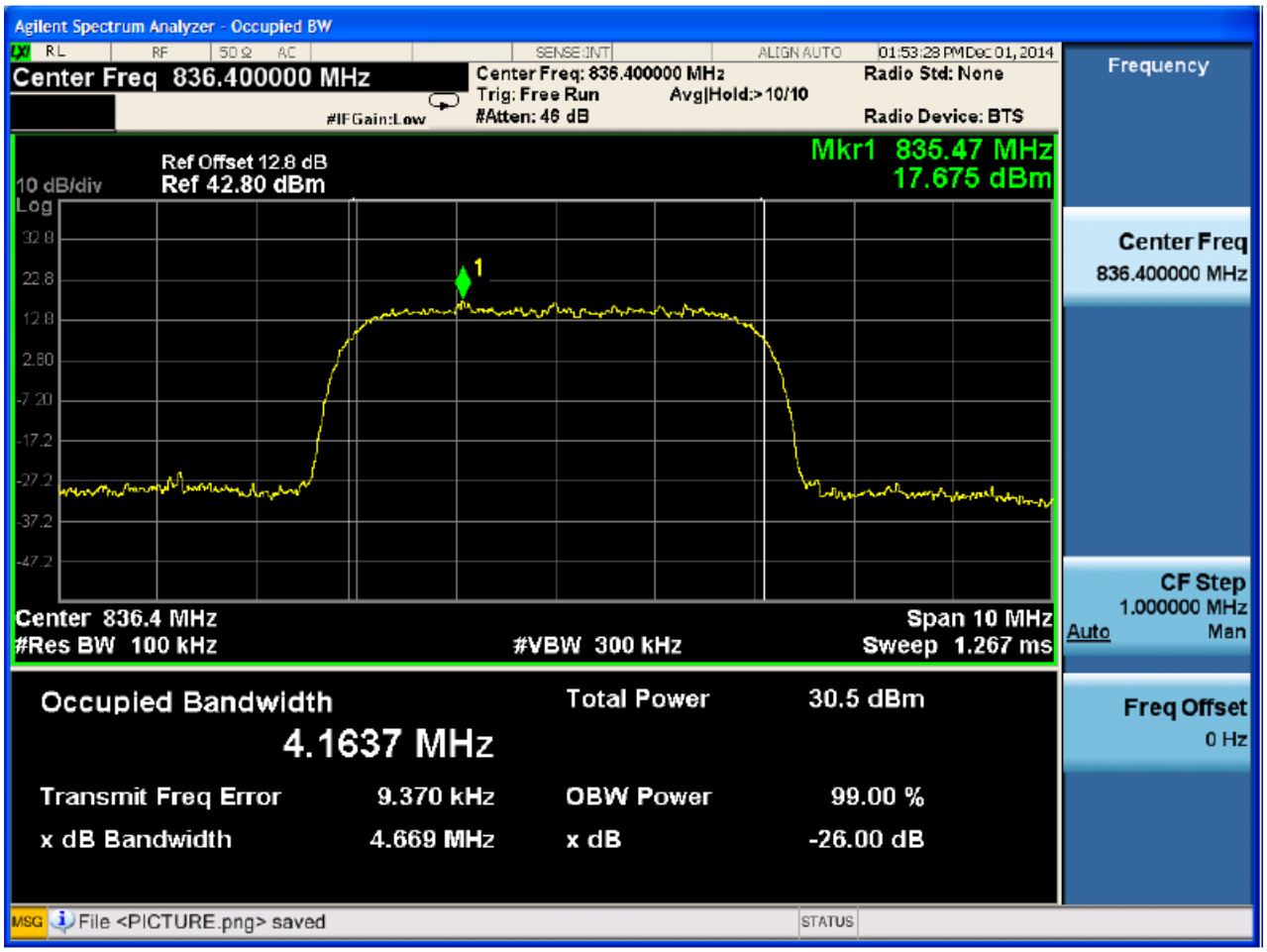
### 5.2.1 Test Band = WCDMA850

#### 5.2.1.1 Test Mode = UMTS/TM1

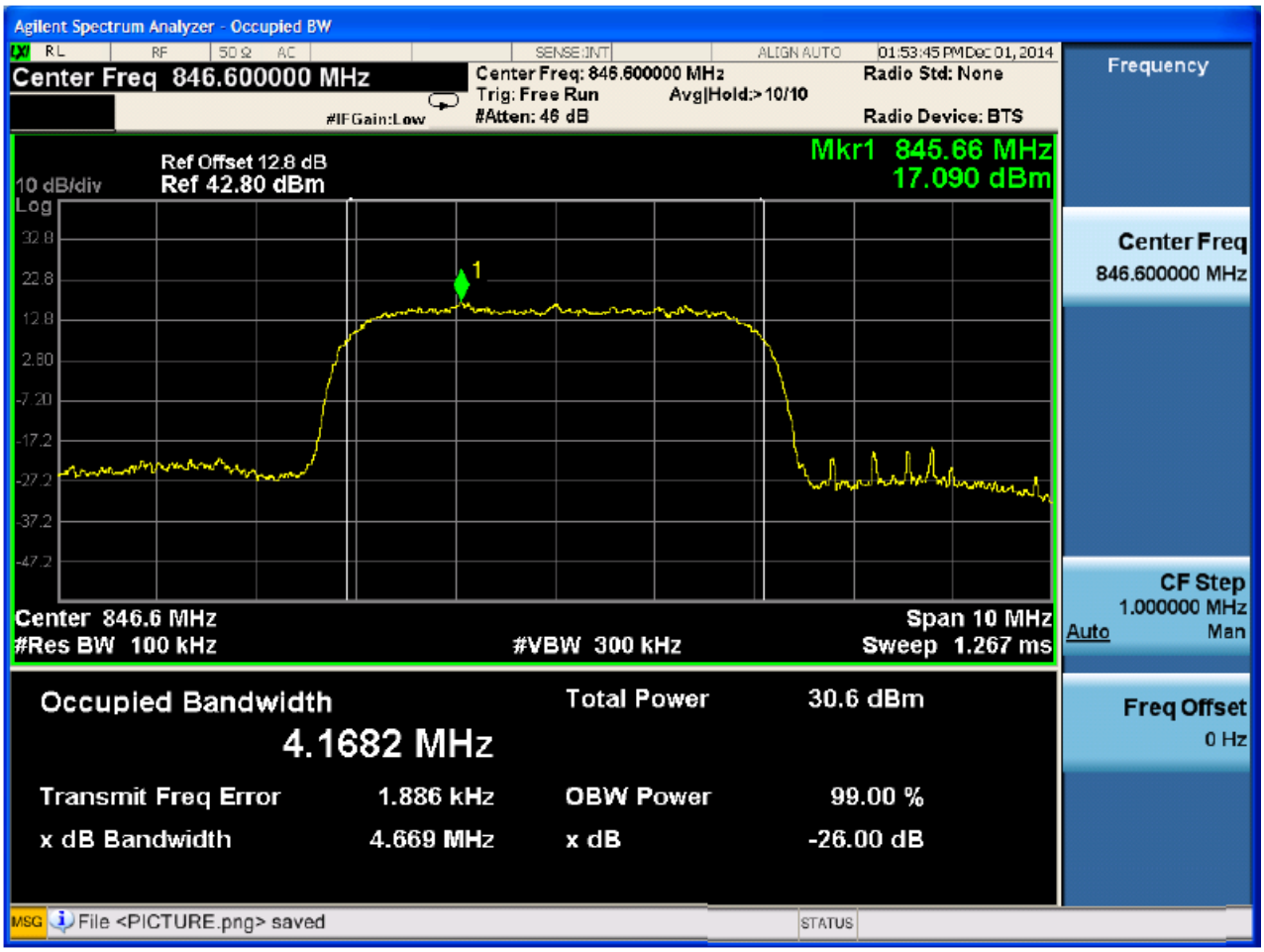
##### 5.2.1.1.1 Test Channel = LCH



**5.2.1.1.2 Test Channel = MCH**



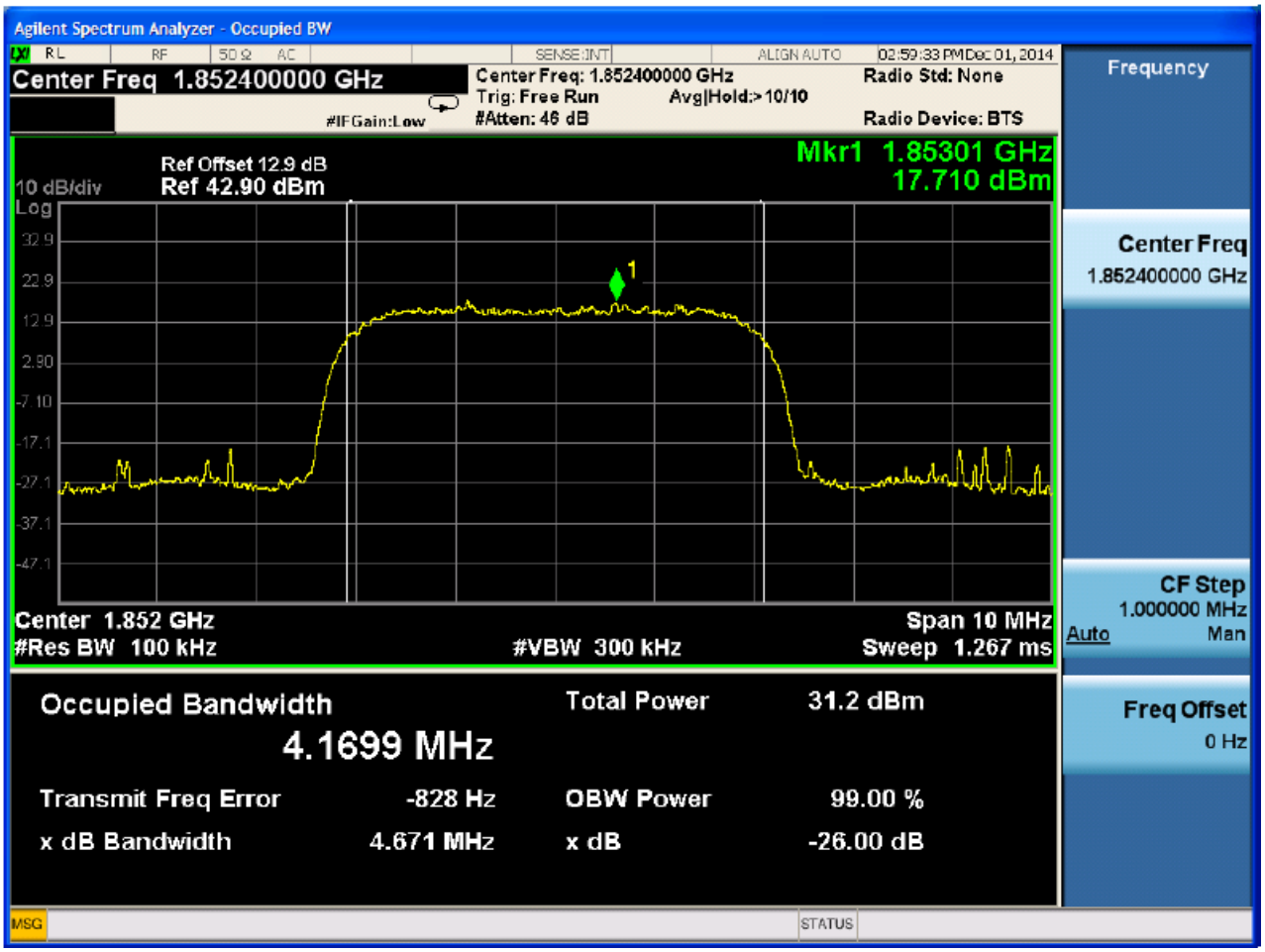
### 5.2.1.1.3 Test Channel = HCH



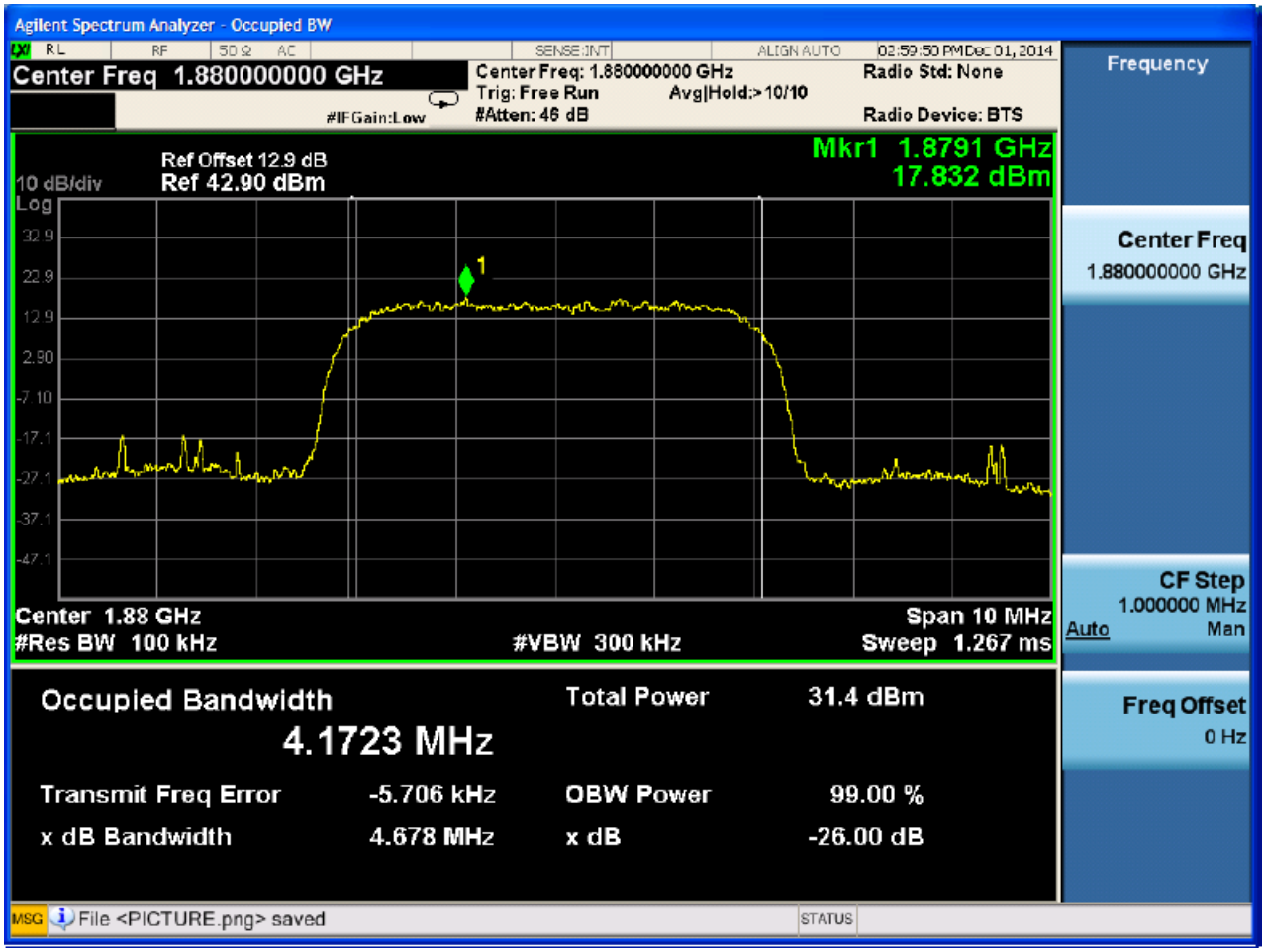
## 5.2.2 Test Band = WCDMA1900

### 5.2.2.1 Test Mode = UMTS/TM1

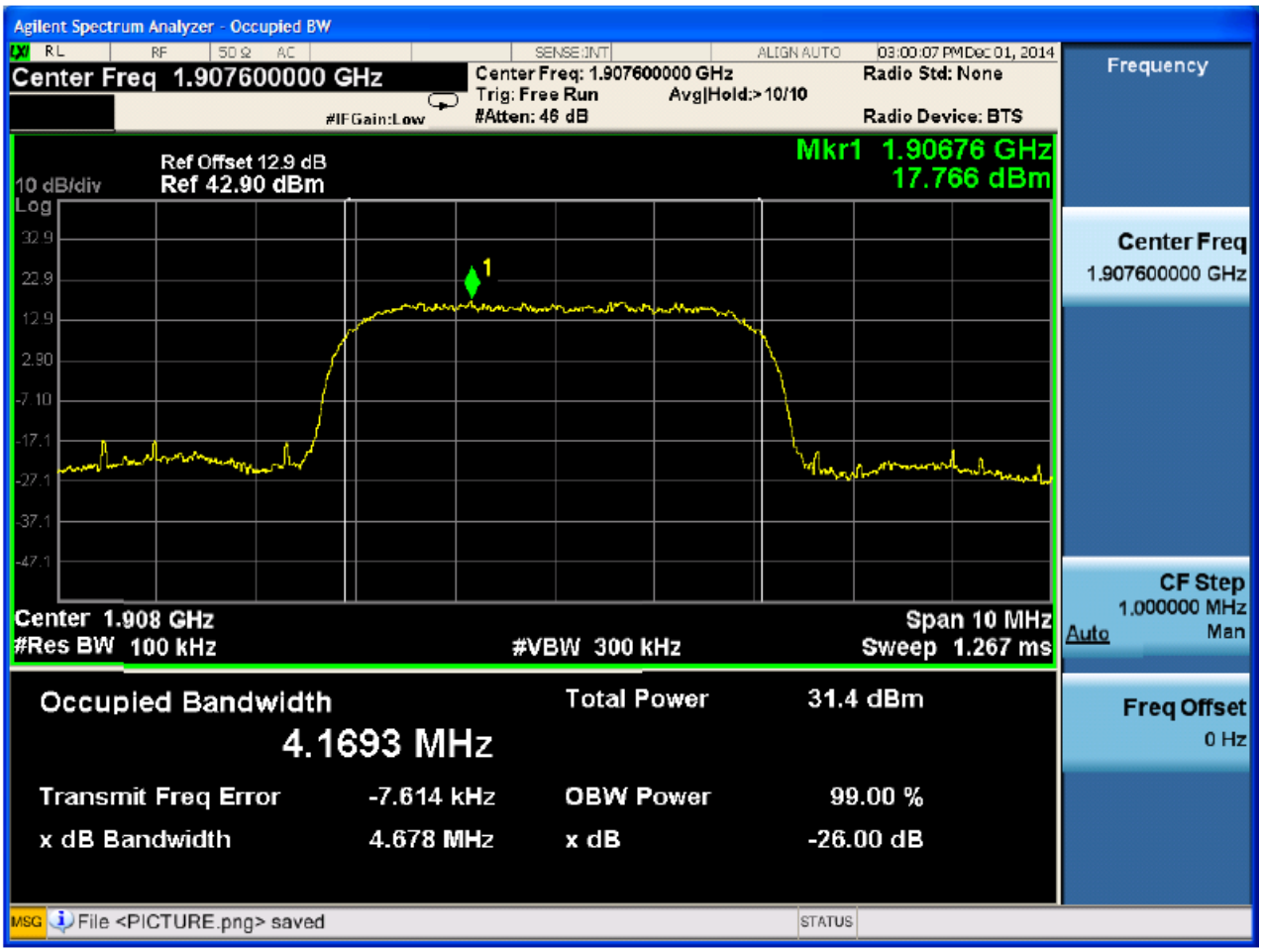
#### 5.2.2.1.1 Test Channel = LCH



**5.2.2.1.2 Test Channel = MCH**



**5.2.2.1.3 Test Channel = HCH**



# 6 Appendix_B-4: Band Edges Compliance

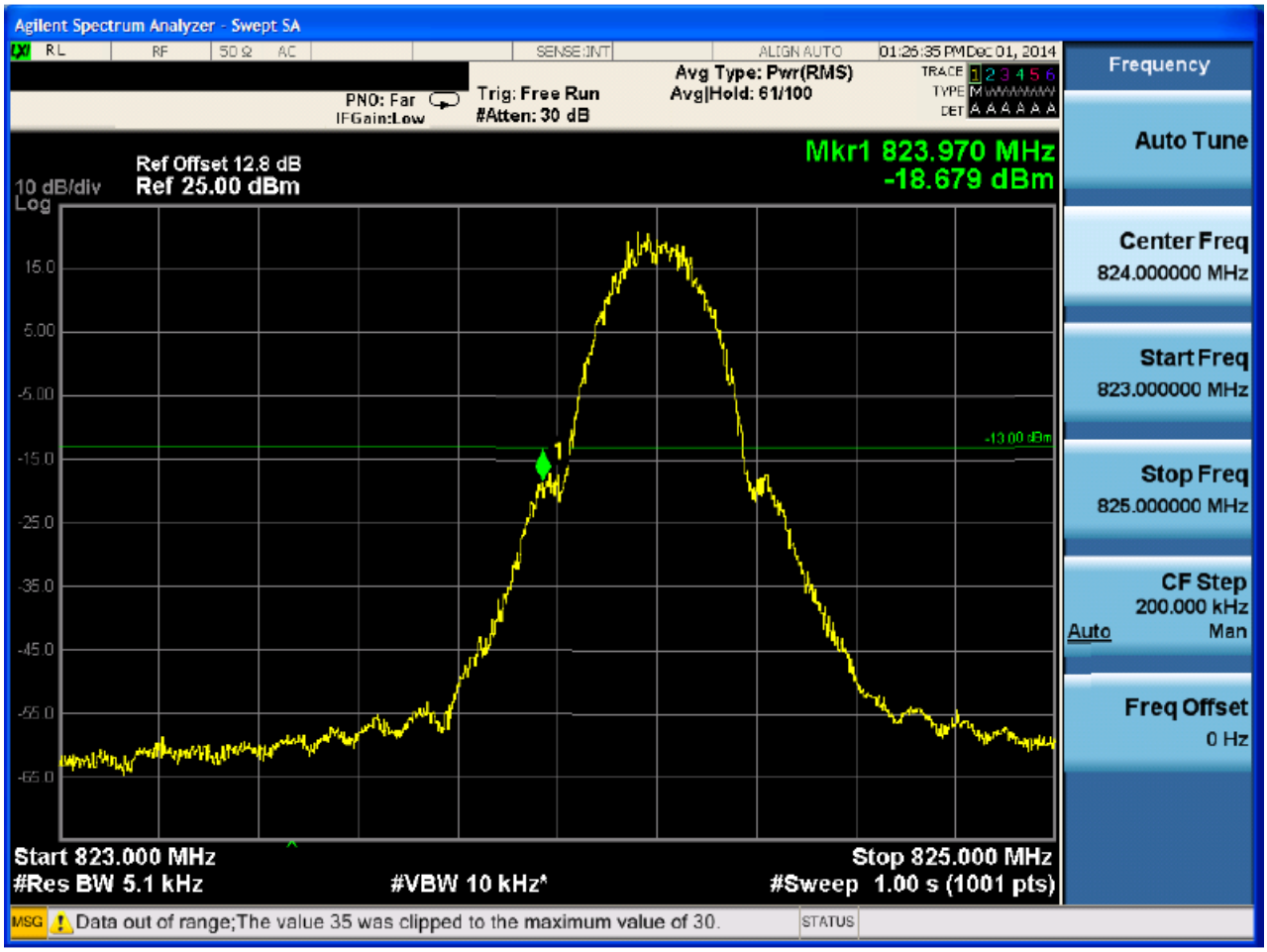
Part I - Test Plots

## 6.1 For GSM

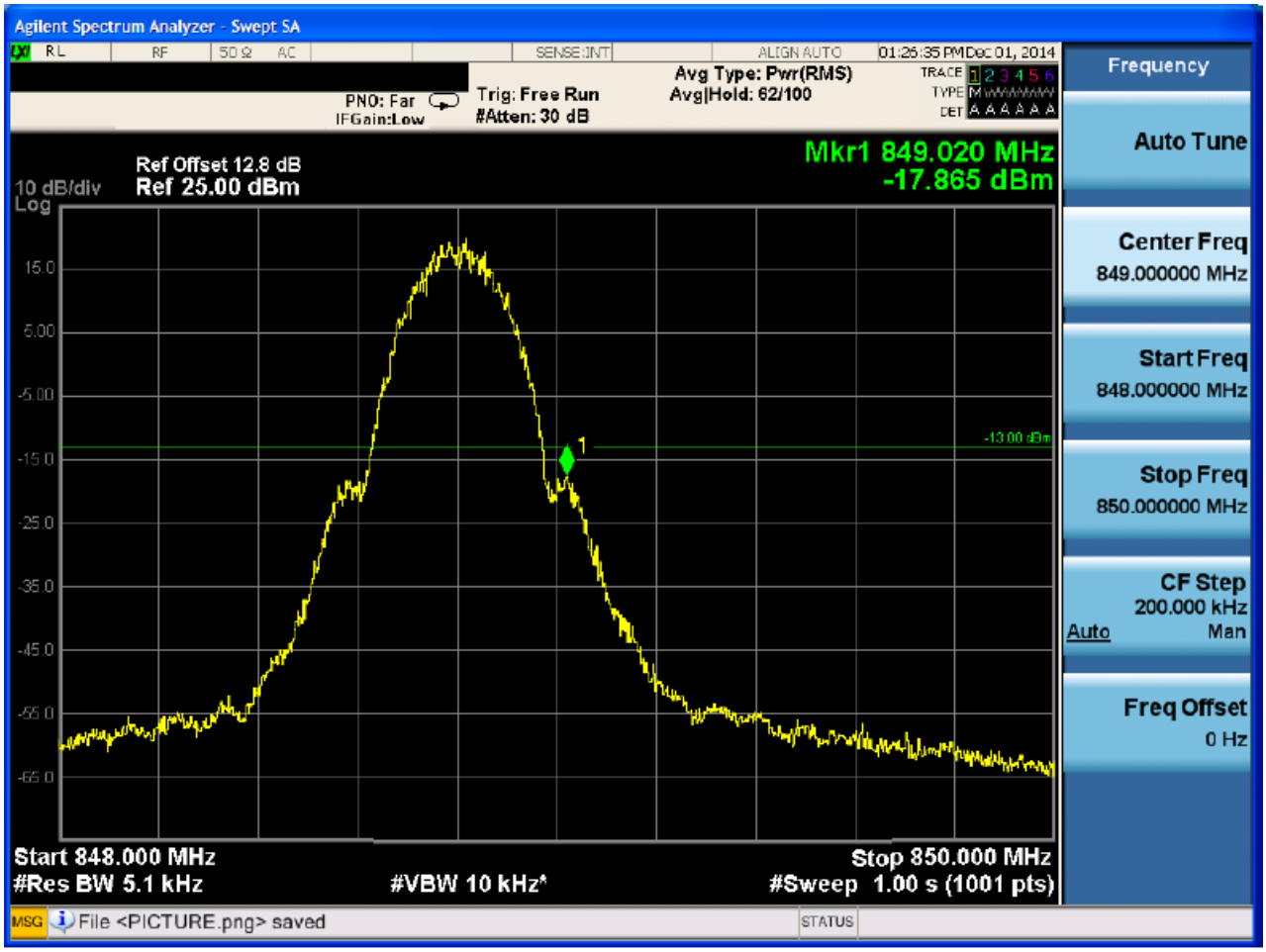
### 6.1.1 Test Band = GSM850

#### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH

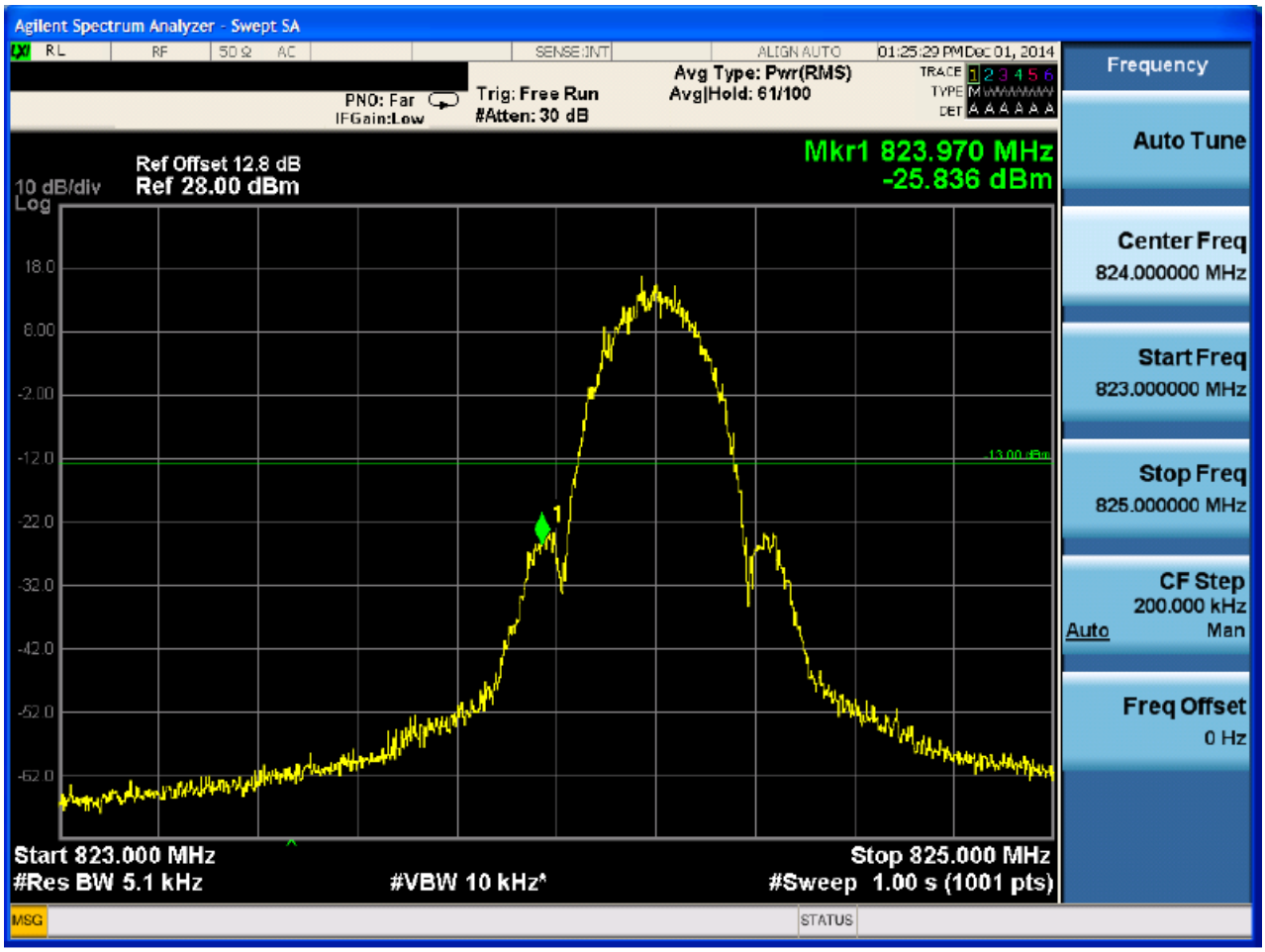


### 6.1.1.1.2 Test Channel = HCH

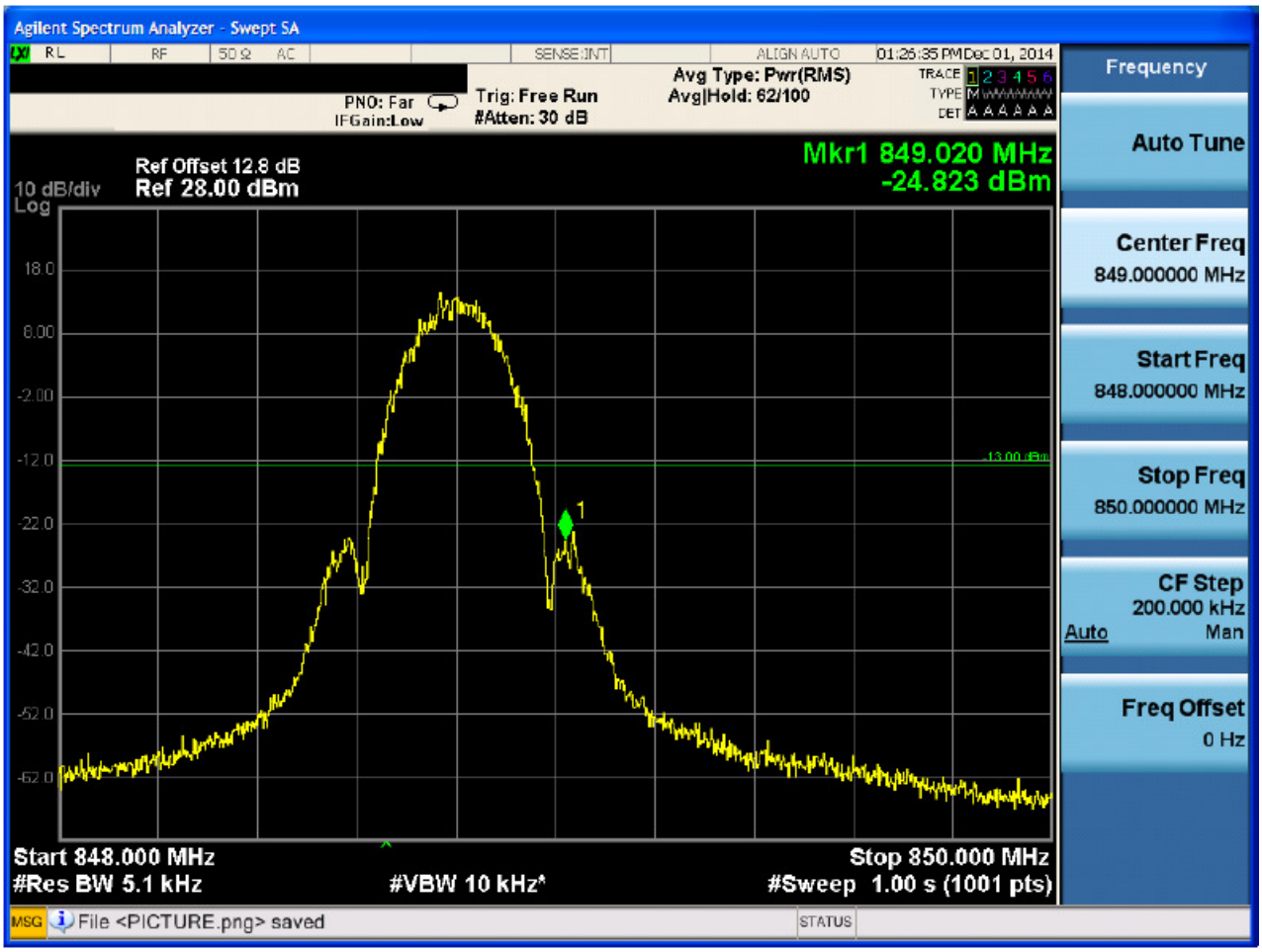


### 6.1.1.2 Test Mode = GSM/TM2

#### 6.1.1.2.1 Test Channel = LCH



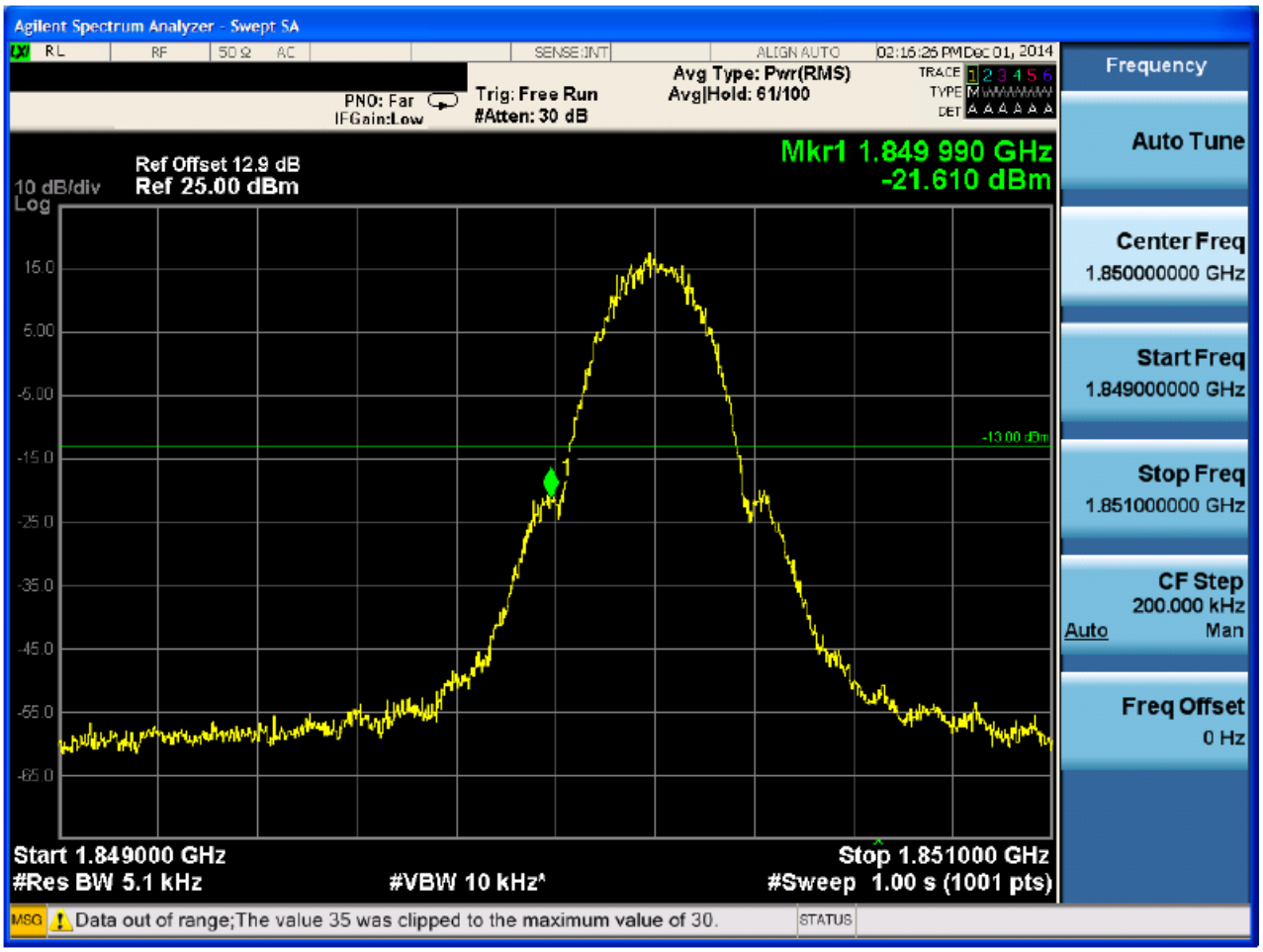
### 6.1.1.2.2 Test Channel = HCH



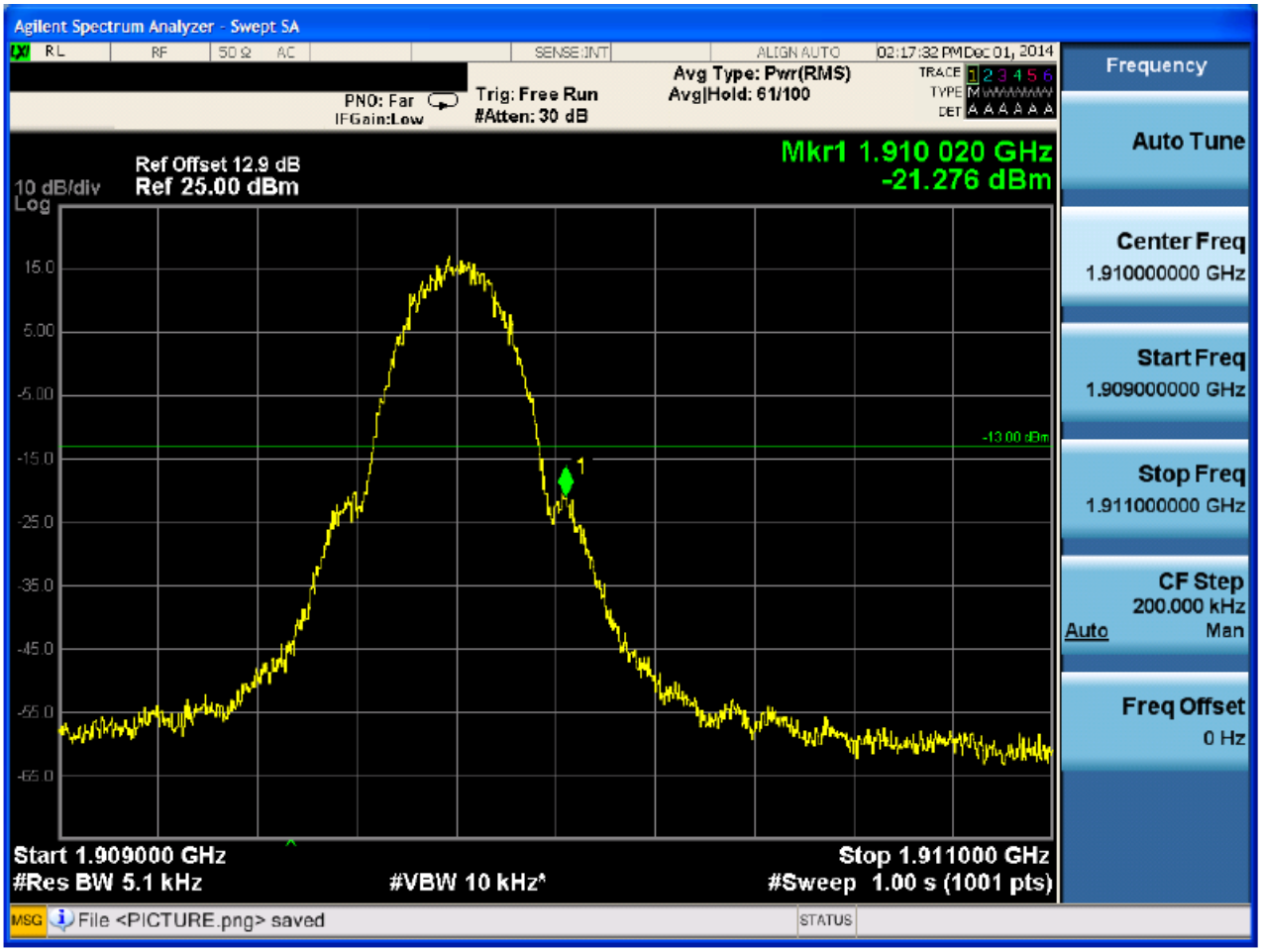
## 6.1.2 Test Band = GSM1900

### 6.1.2.1 Test Mode = GSM/TM1

#### 6.1.2.1.1 Test Channel = LCH

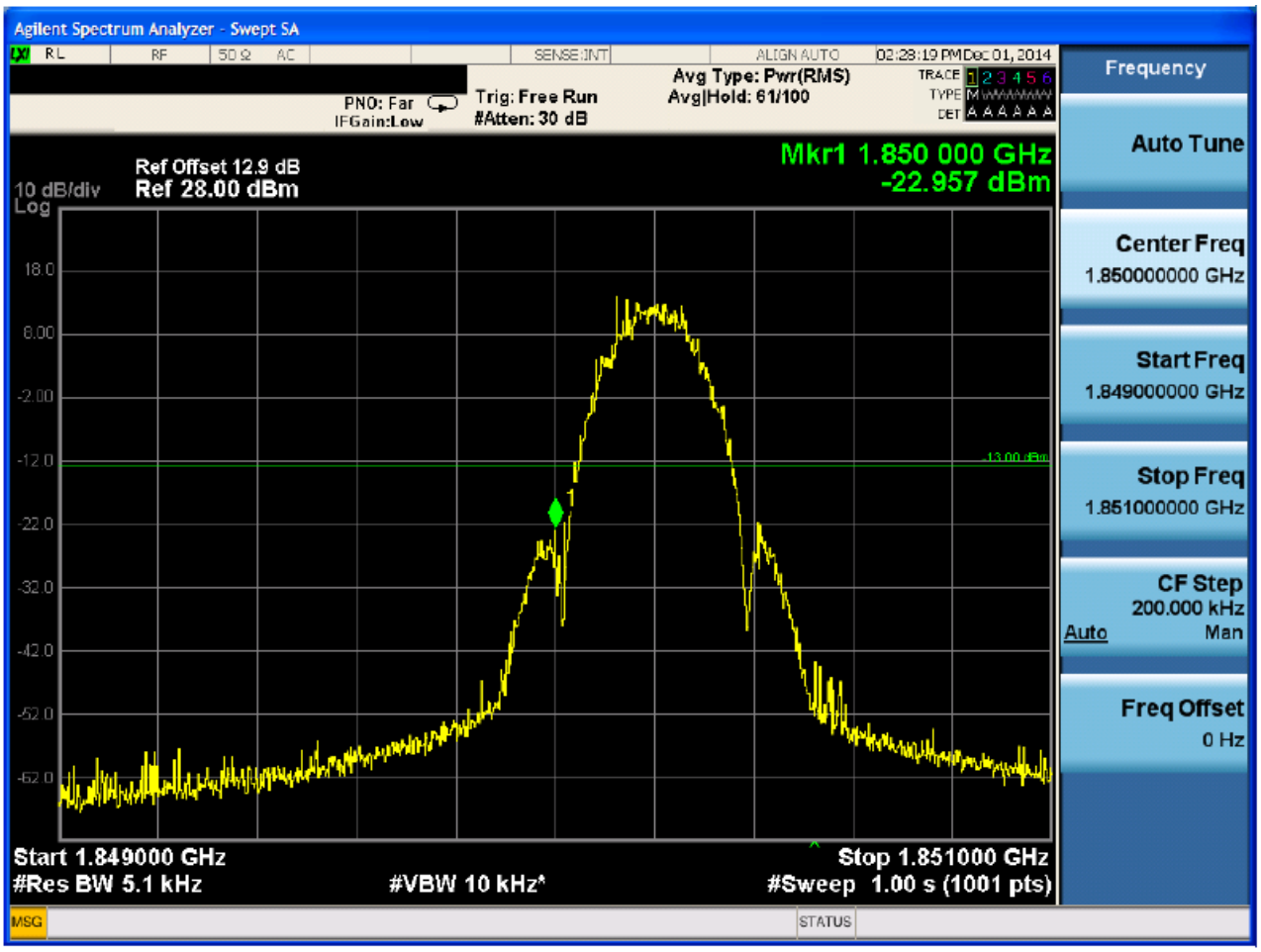


### 6.1.2.1.2 Test Channel = HCH



### 6.1.2.2 Test Mode = GSM/TM2

#### 6.1.2.2.1 Test Channel = LCH



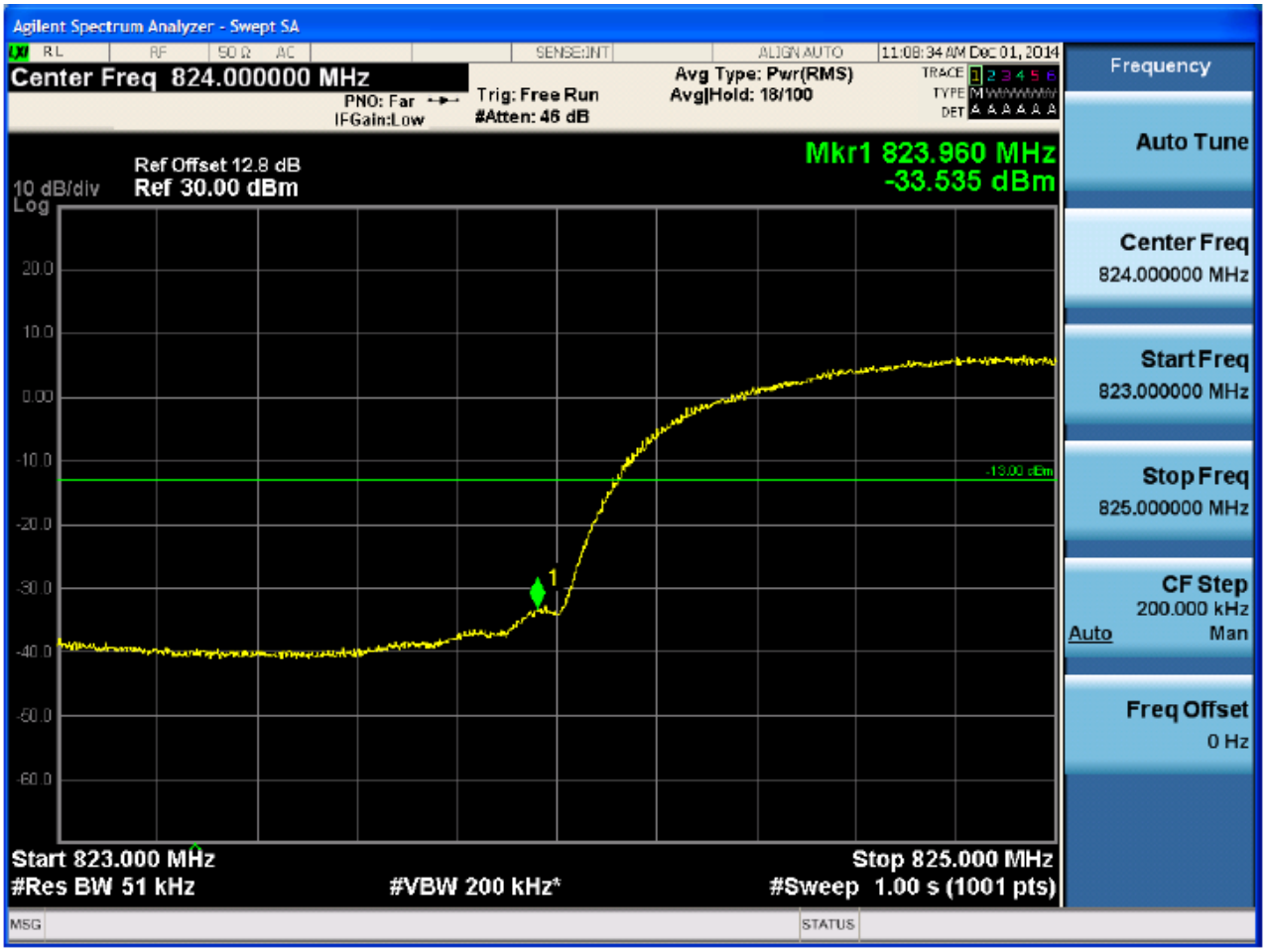
### 6.1.2.2.2 Test Channel = HCH

## 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 = 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 = HCH

# 7 Appendix_B-5: 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.

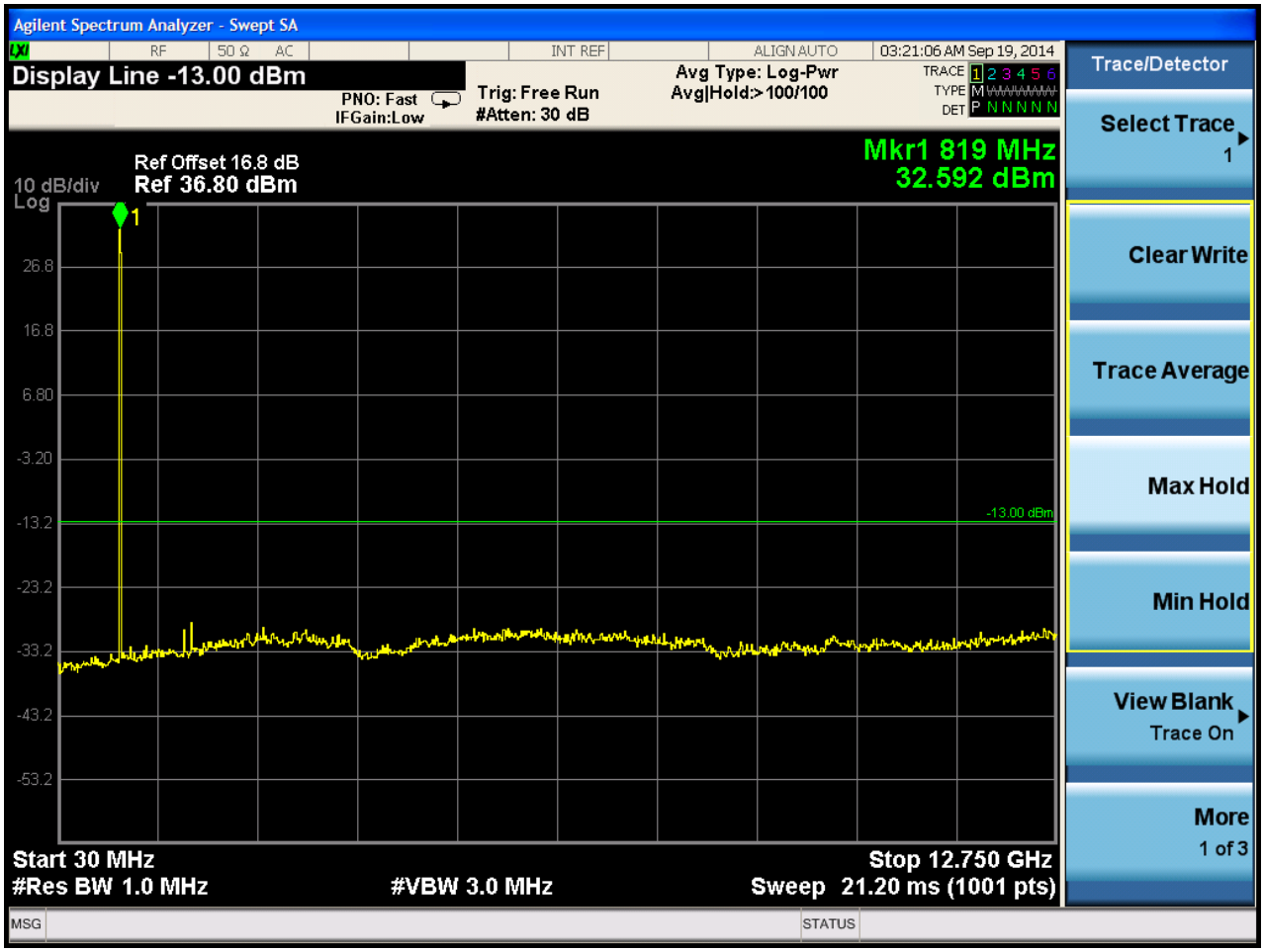
Part I - Test Plots

## 7.1 For GSM

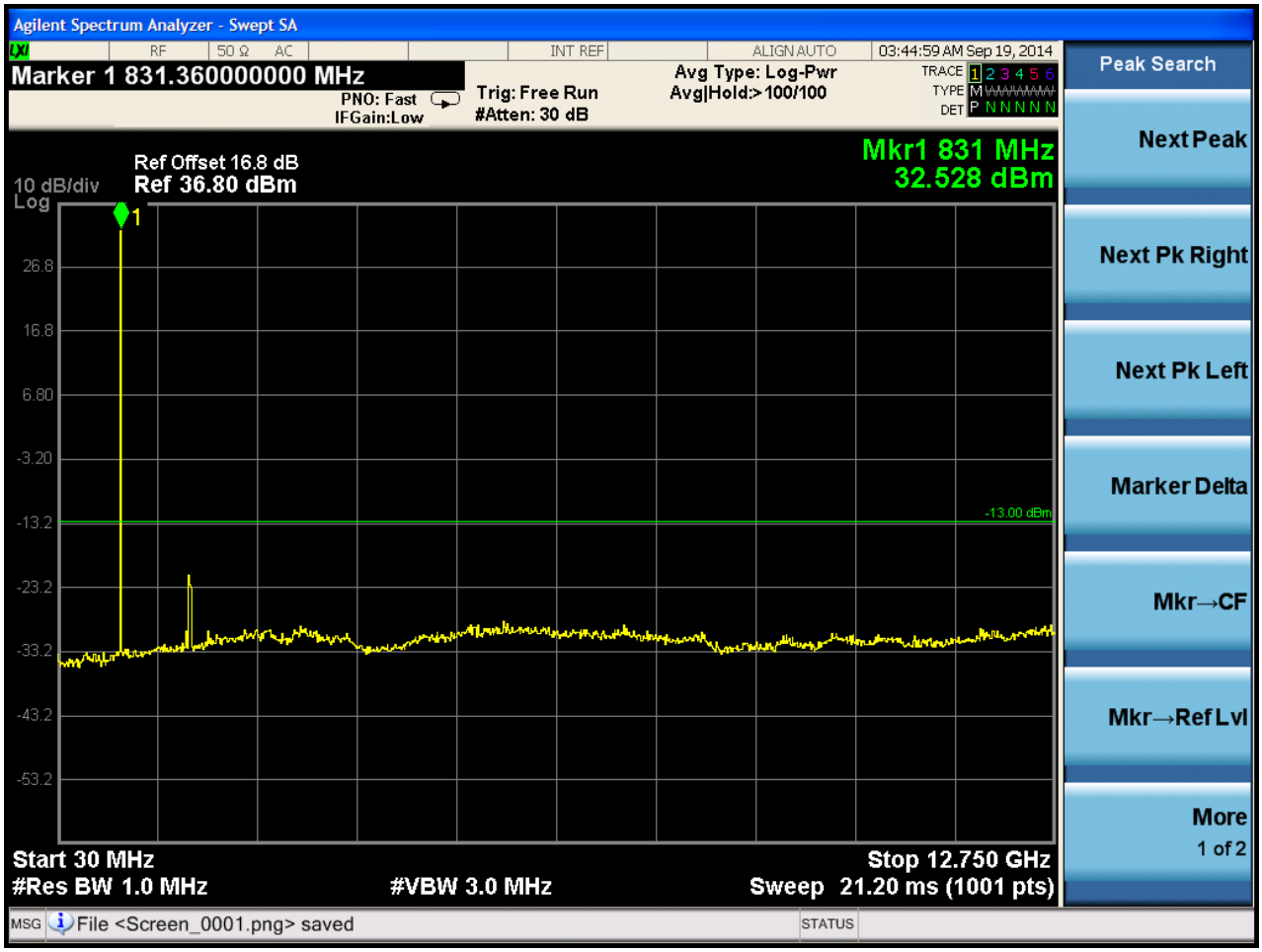
### 7.1.1 Test Band = GSM850

#### 7.1.1.1 Test Mode = GSM/TM1

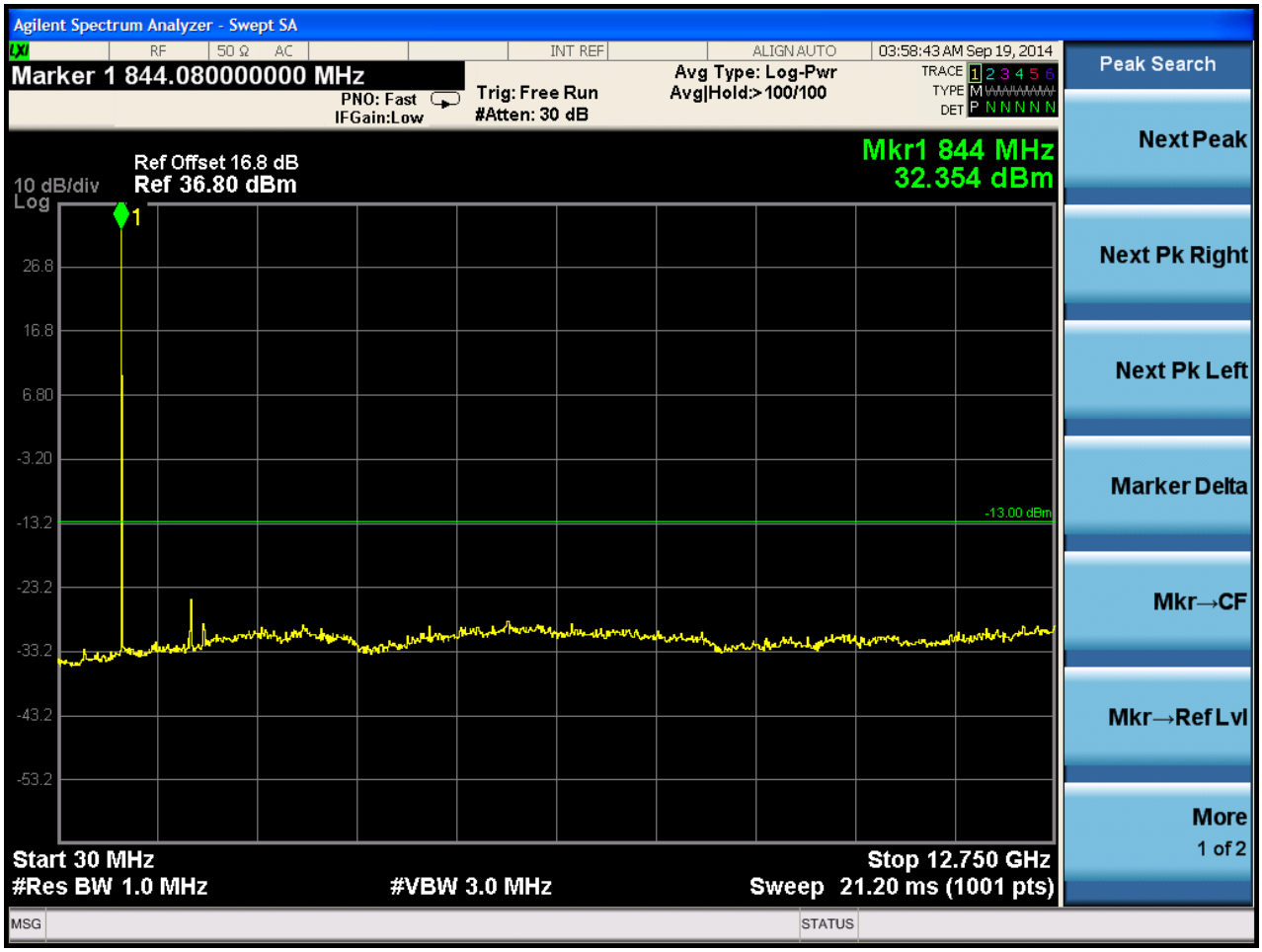
##### 7.1.1.1.1 Test Channel = LCH



### 7.1.1.1.2 Test Channel = MCH

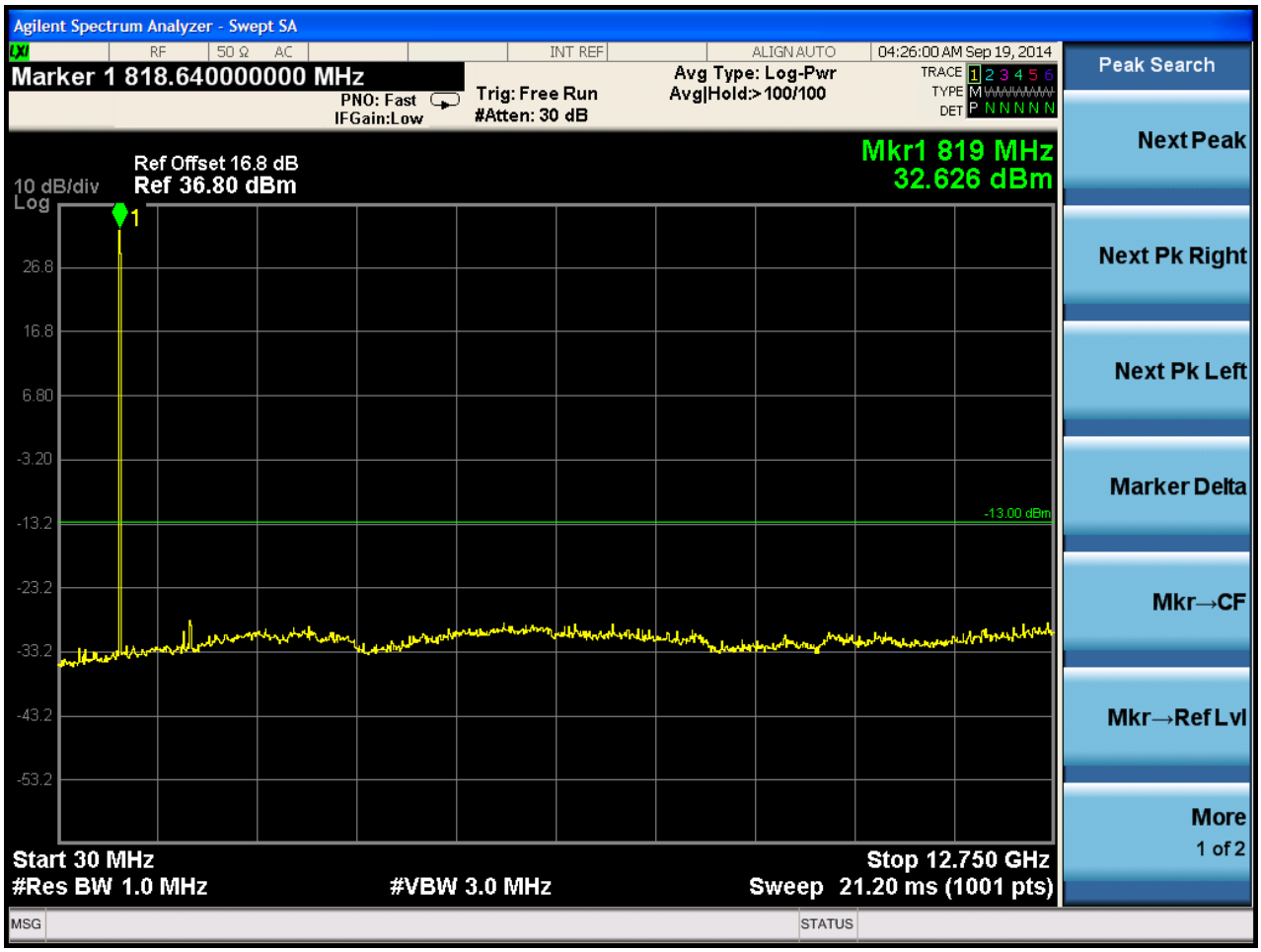


### 7.1.1.1.3 Test Channel = HCH

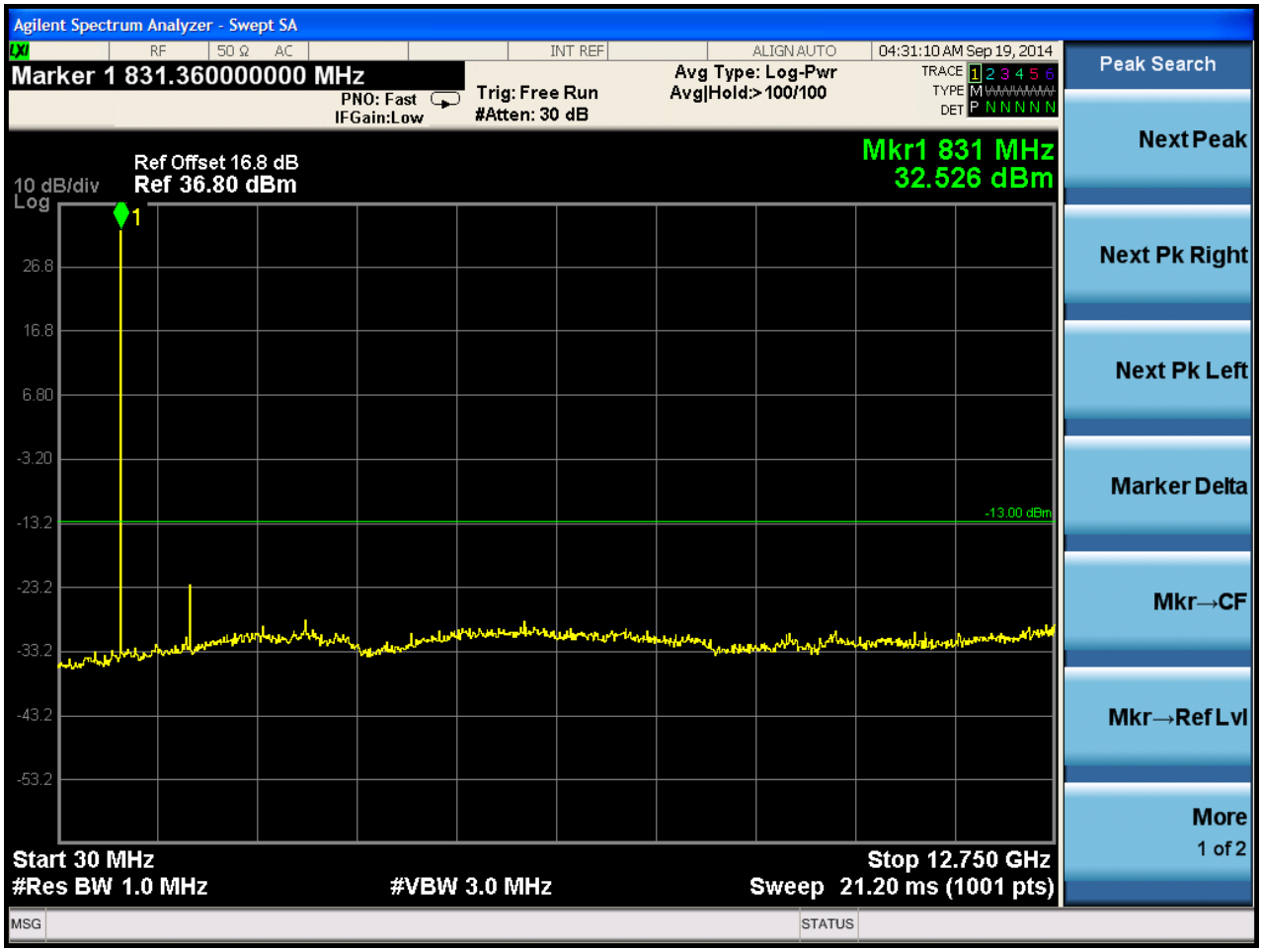


### 7.1.1.2 Test Mode = GSM/TM2

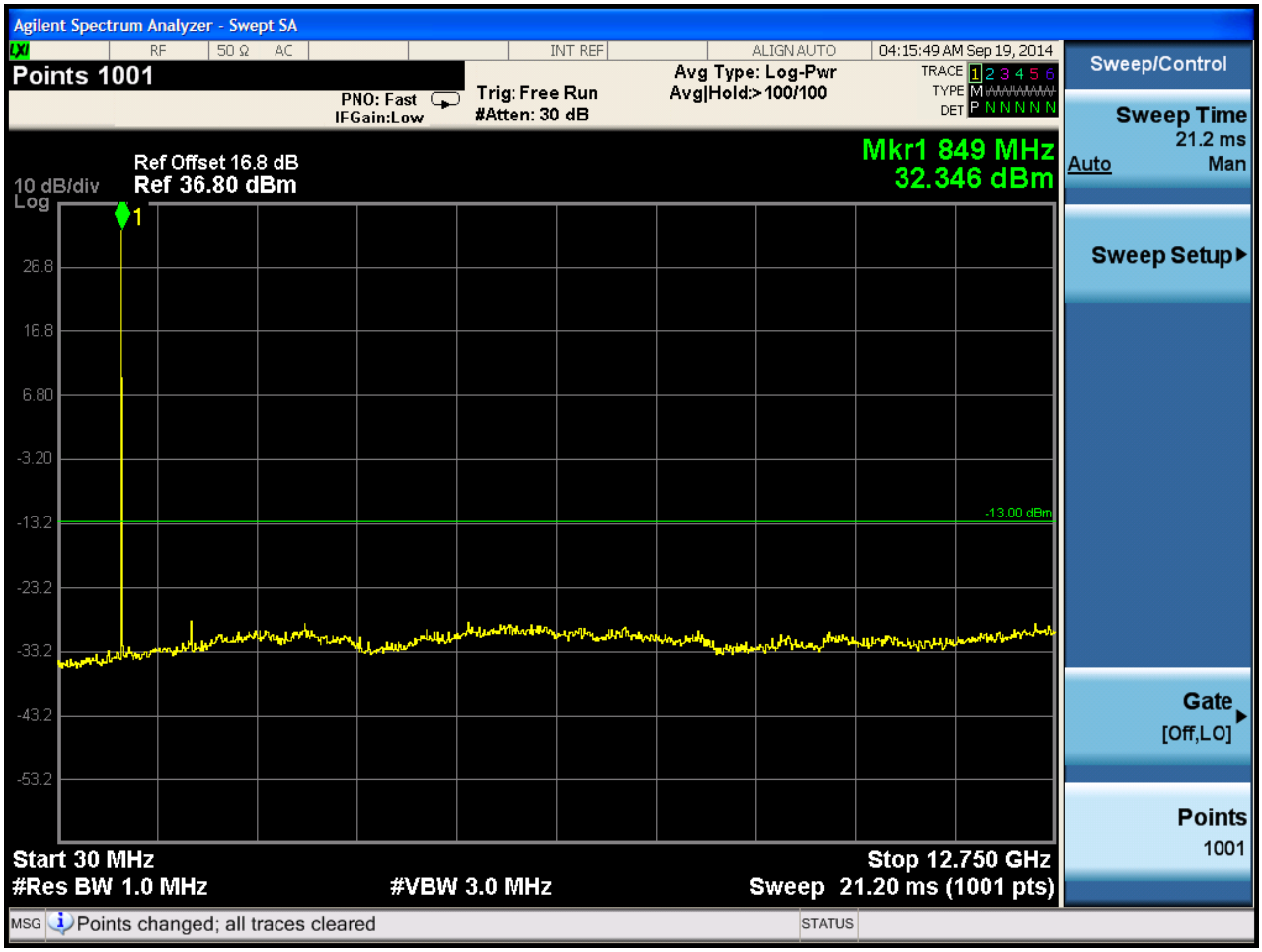
#### 7.1.1.2.1 Test Channel = LCH



### 7.1.1.2.2 Test Channel = MCH



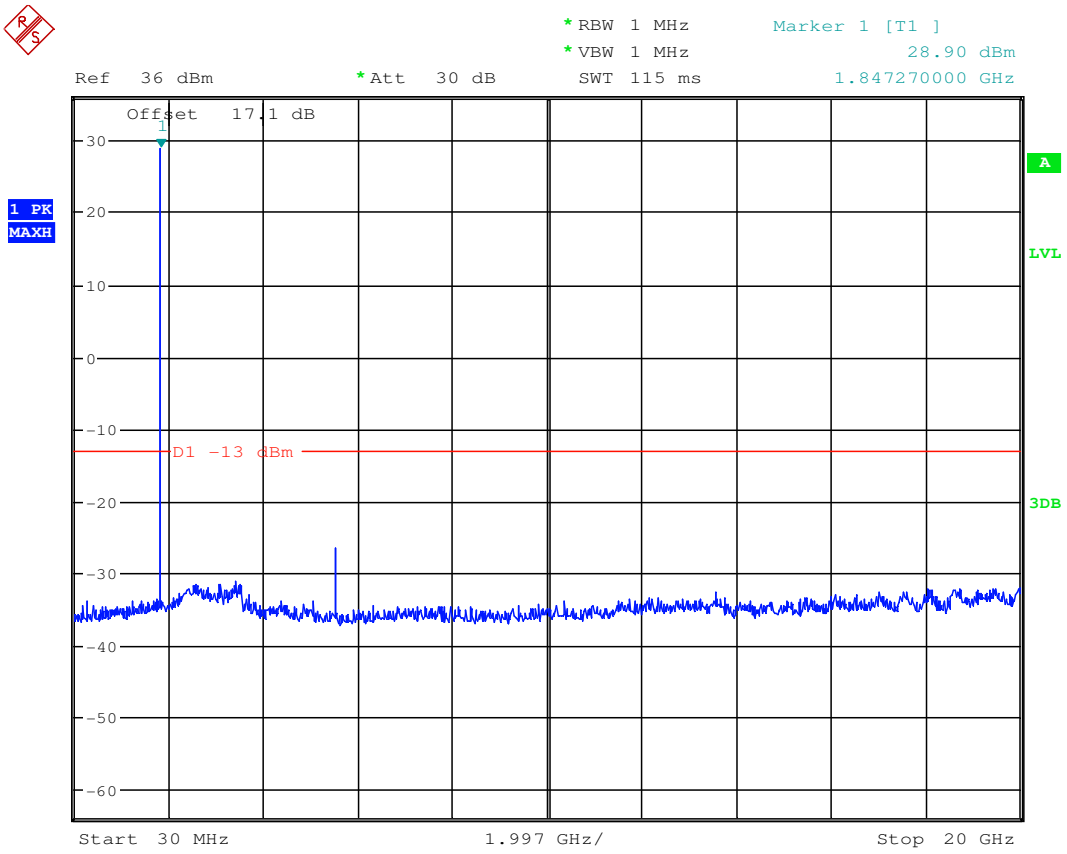
### 7.1.1.2.3 Test Channel = HCH



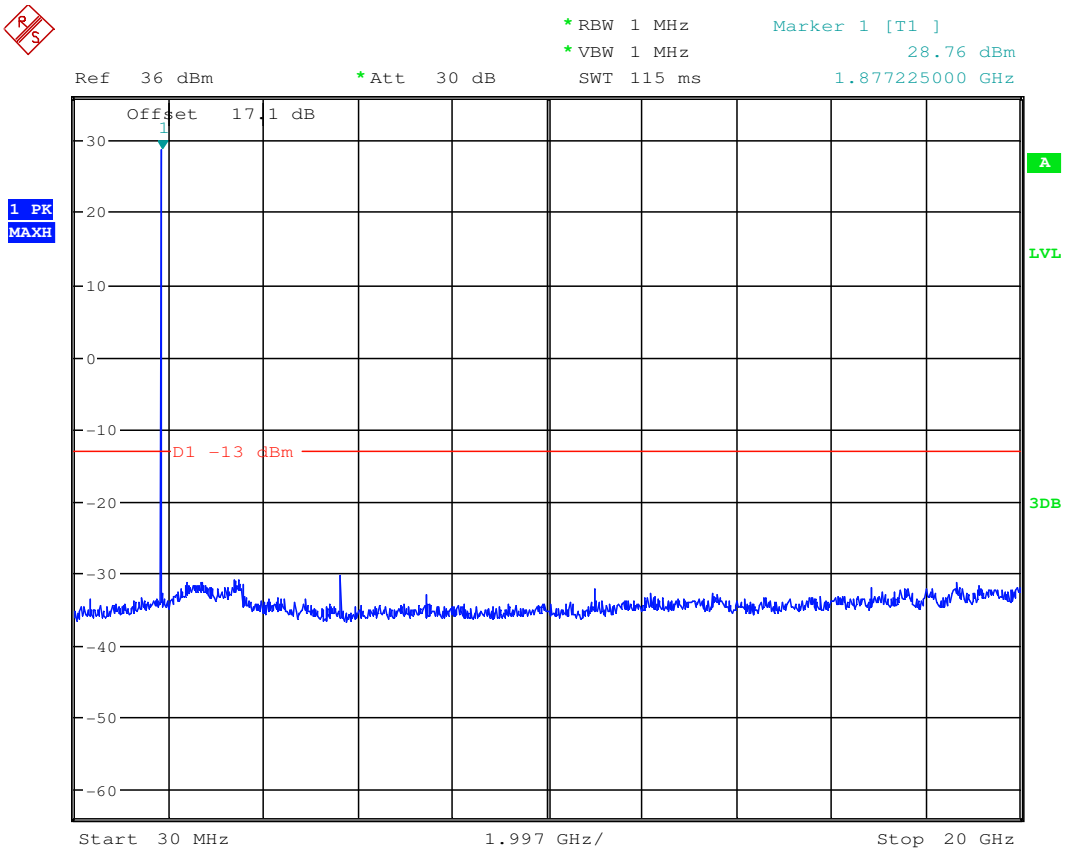
## 7.1.2 Test Band = GSM1900

### 7.1.2.1 Test Mode = GSM/TM1

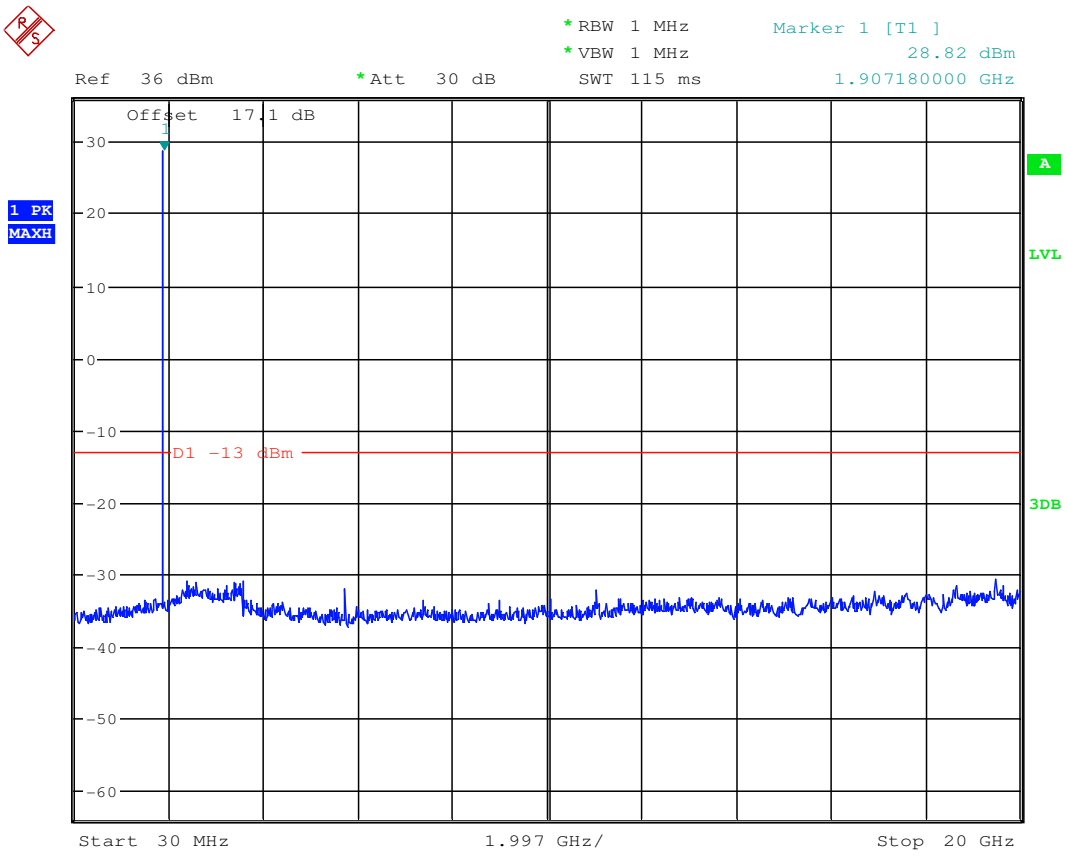
#### 7.1.2.1.1 Test Channel = LCH



### 7.1.2.1.2 Test Channel = MCH

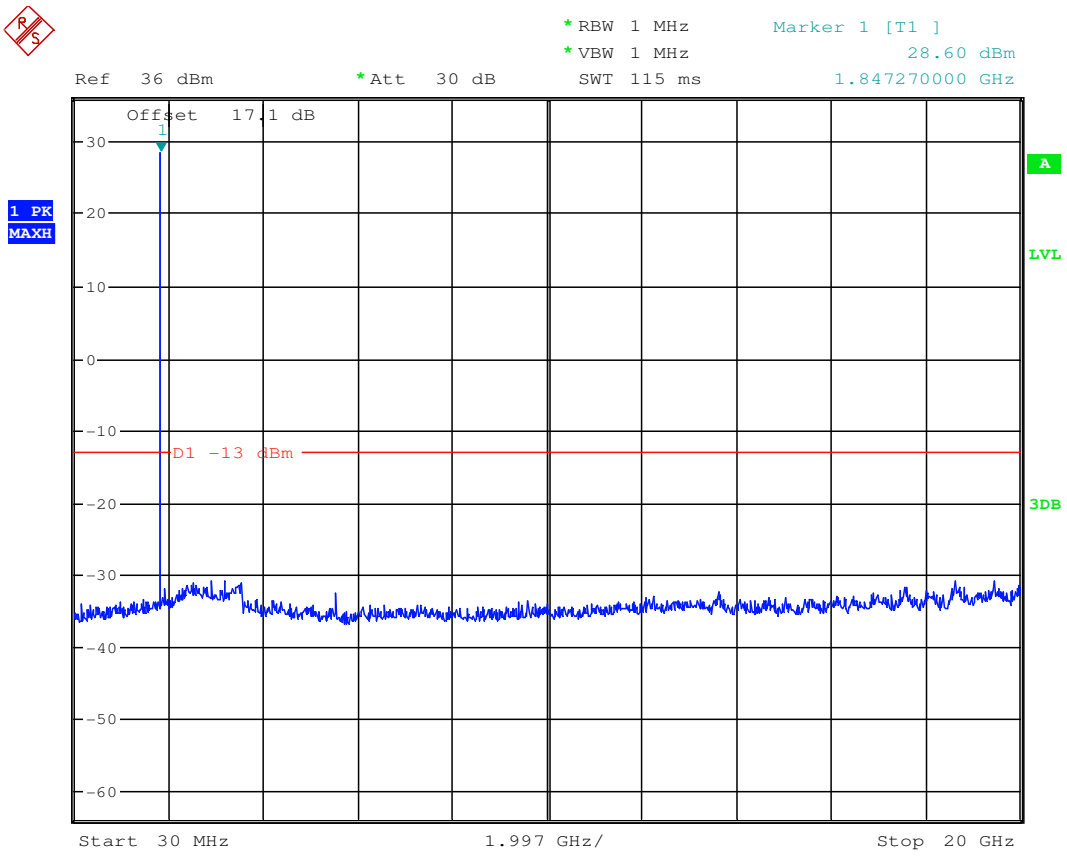


### 7.1.2.1.3 Test Channel = HCH

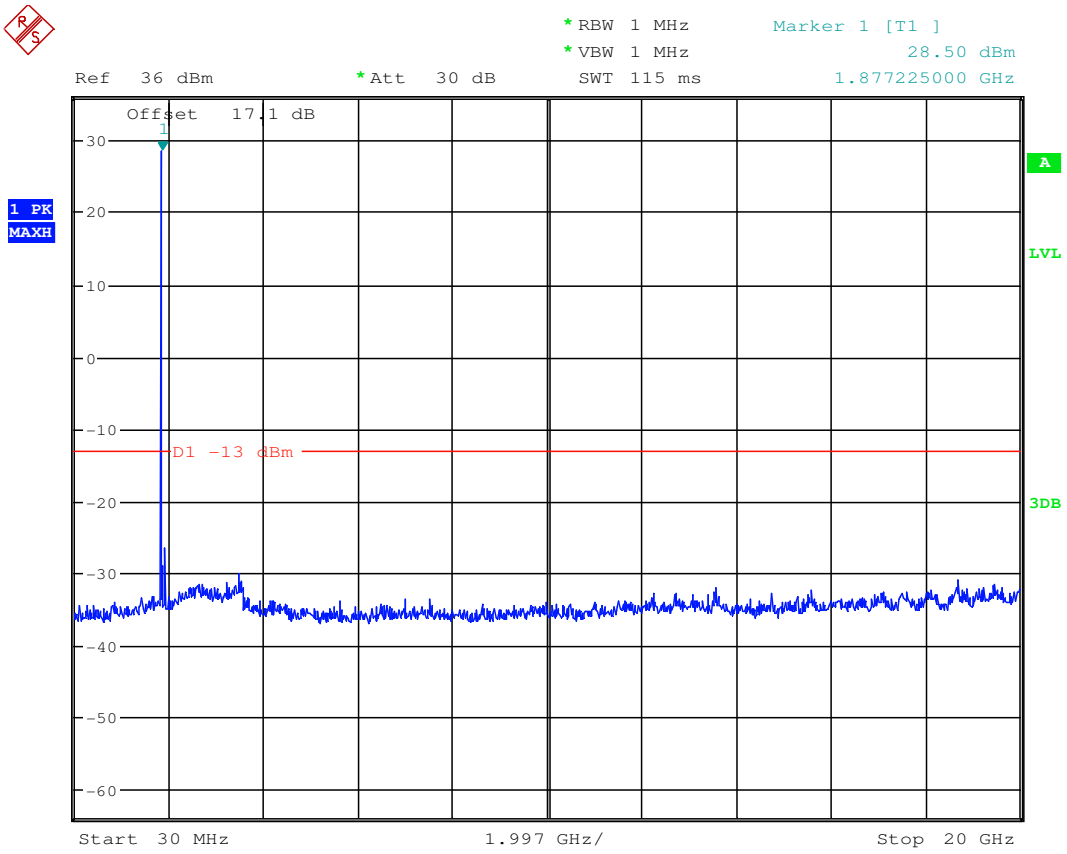


### 7.1.2.2 Test Mode = GSM/TM2

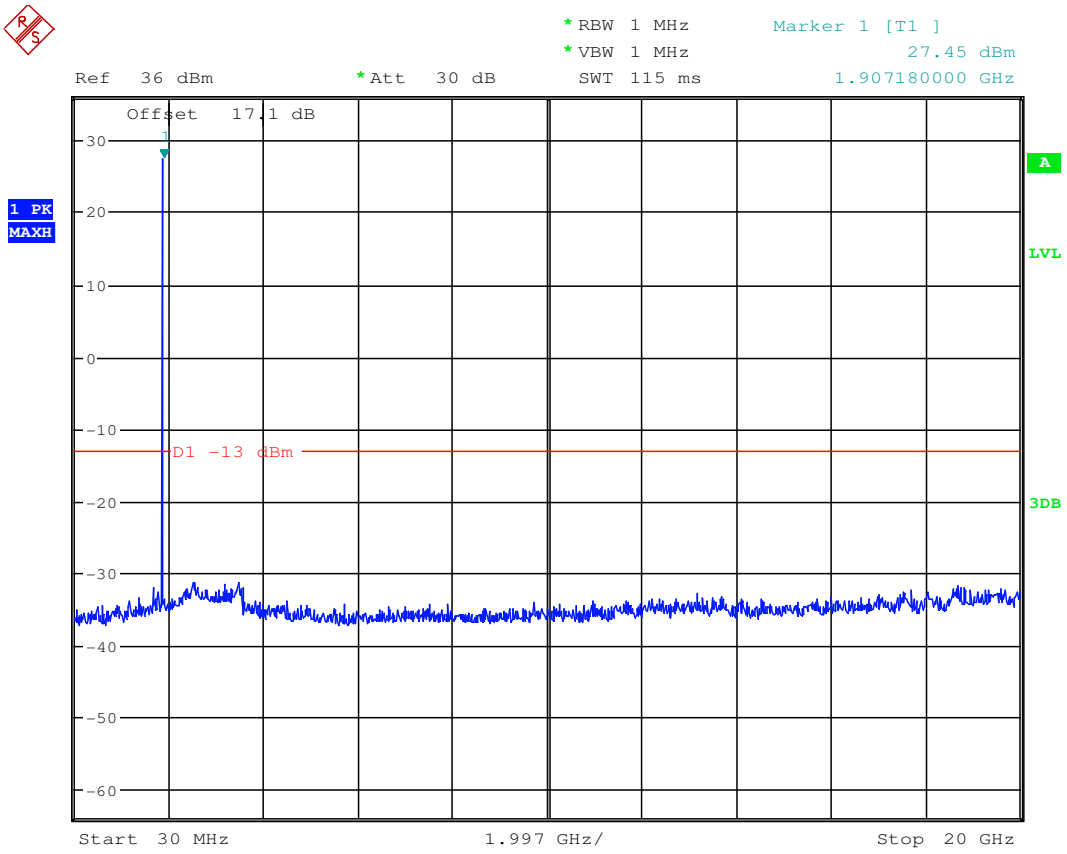
#### 7.1.2.2.1 Test Channel = LCH



### 7.1.2.2.2 Test Channel = MCH



### 7.1.2.2.3 Test Channel = HCH

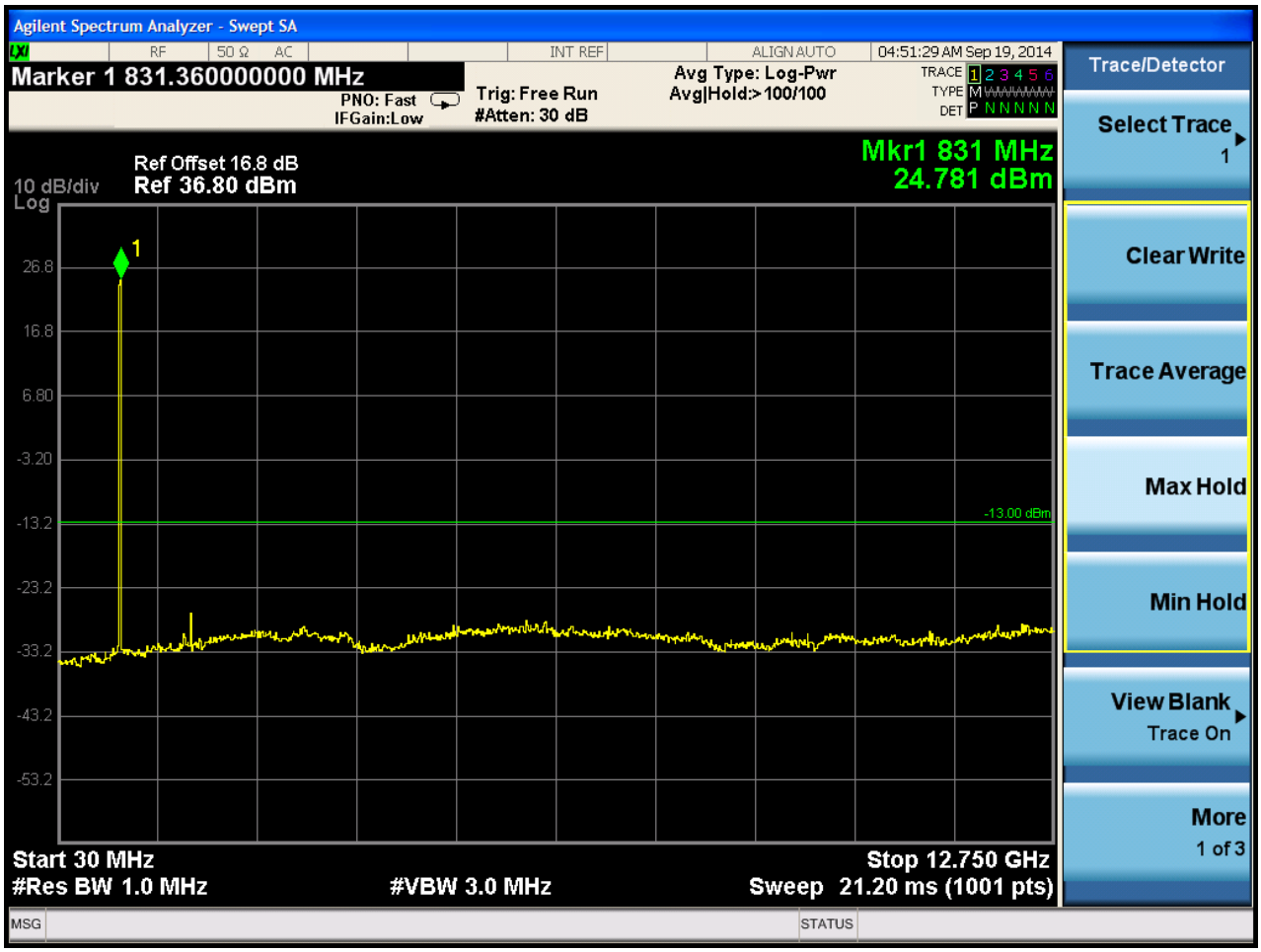


## 7.2 For UMTS

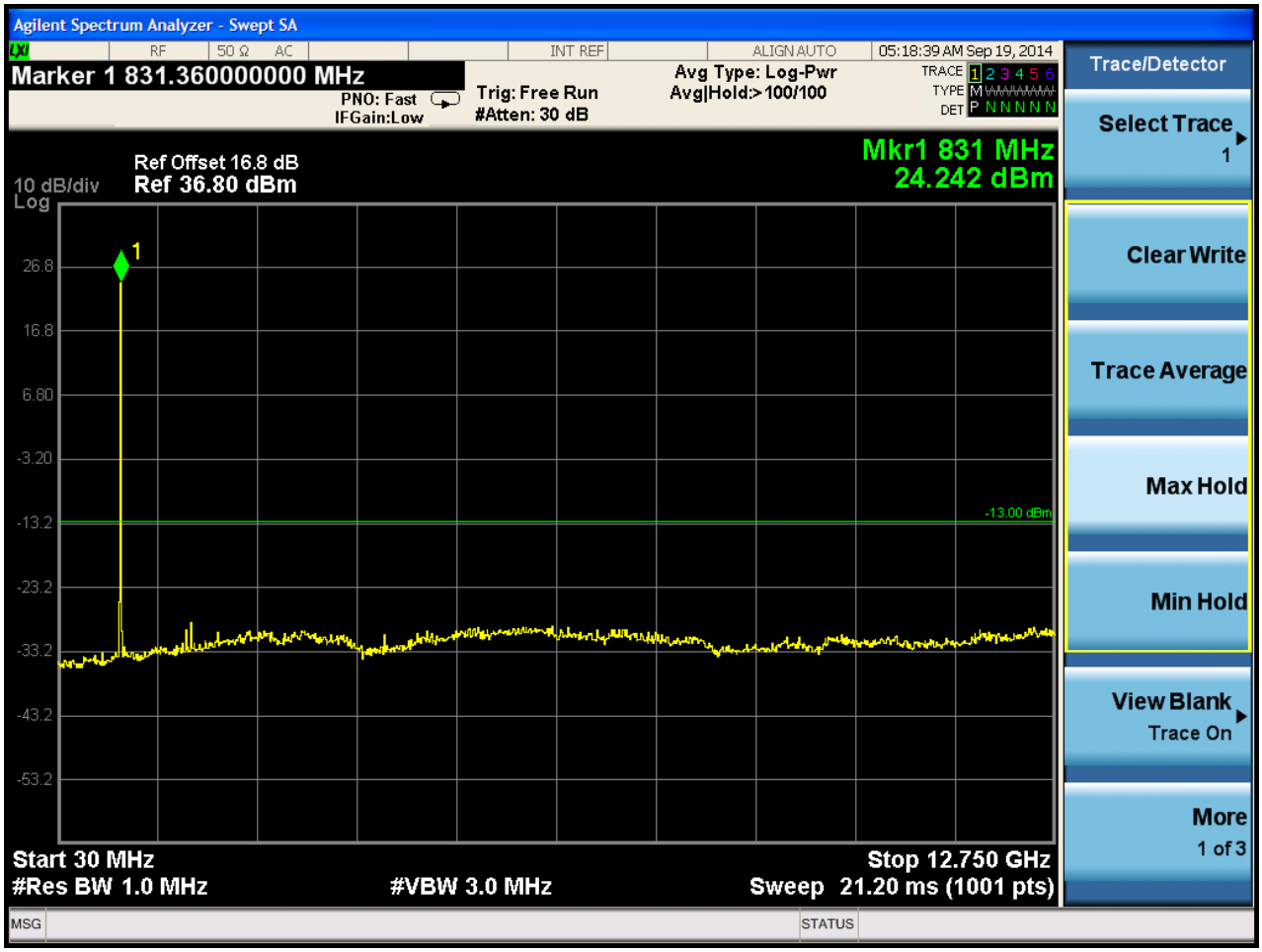
### 7.2.1 Test Band = WCDMA850

#### 7.2.1.1 Test Mode = UMTS/TM1

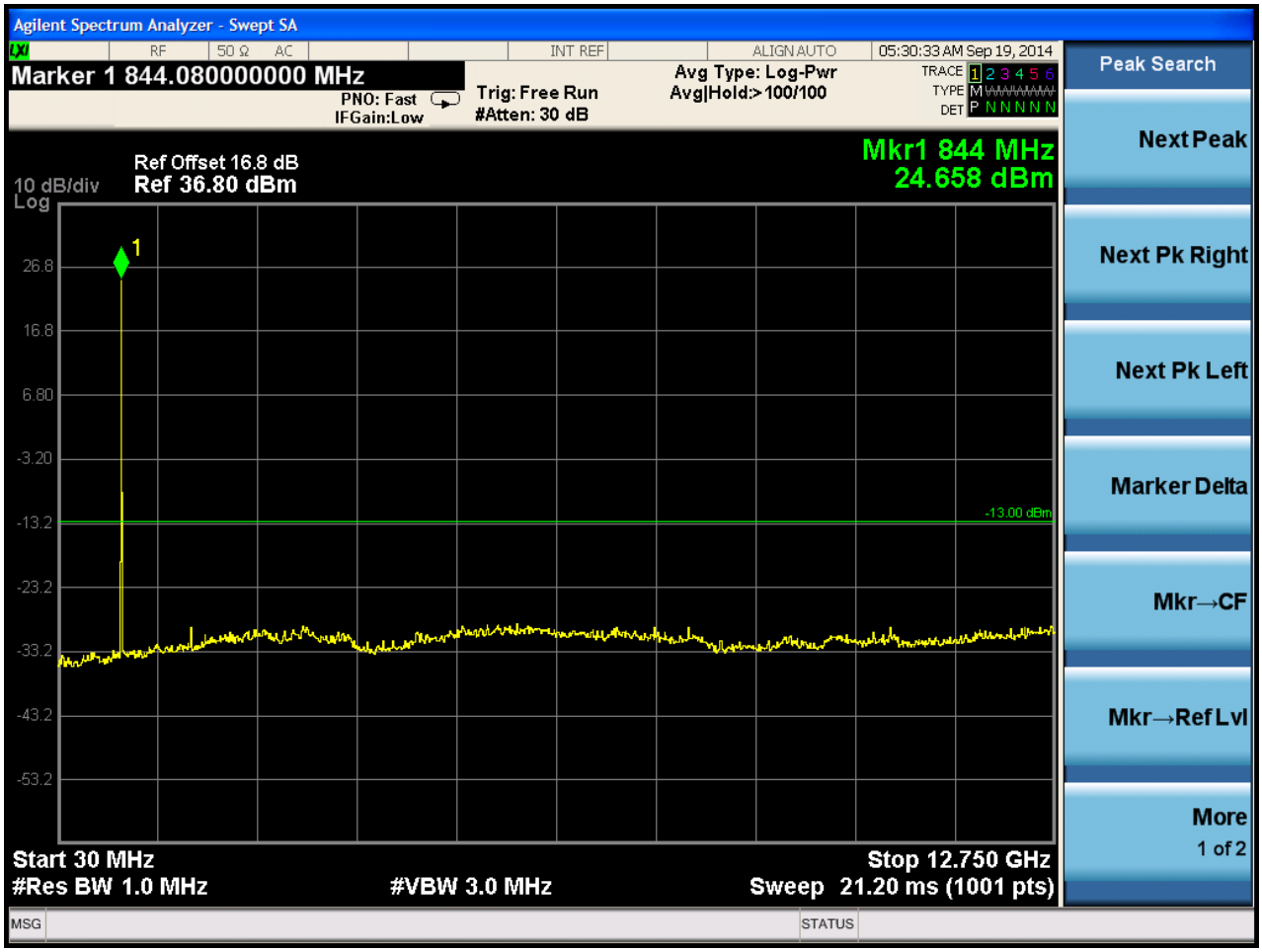
##### 7.2.1.1.1 Test Channel = LCH



### 7.2.1.1.2 Test Channel = MCH



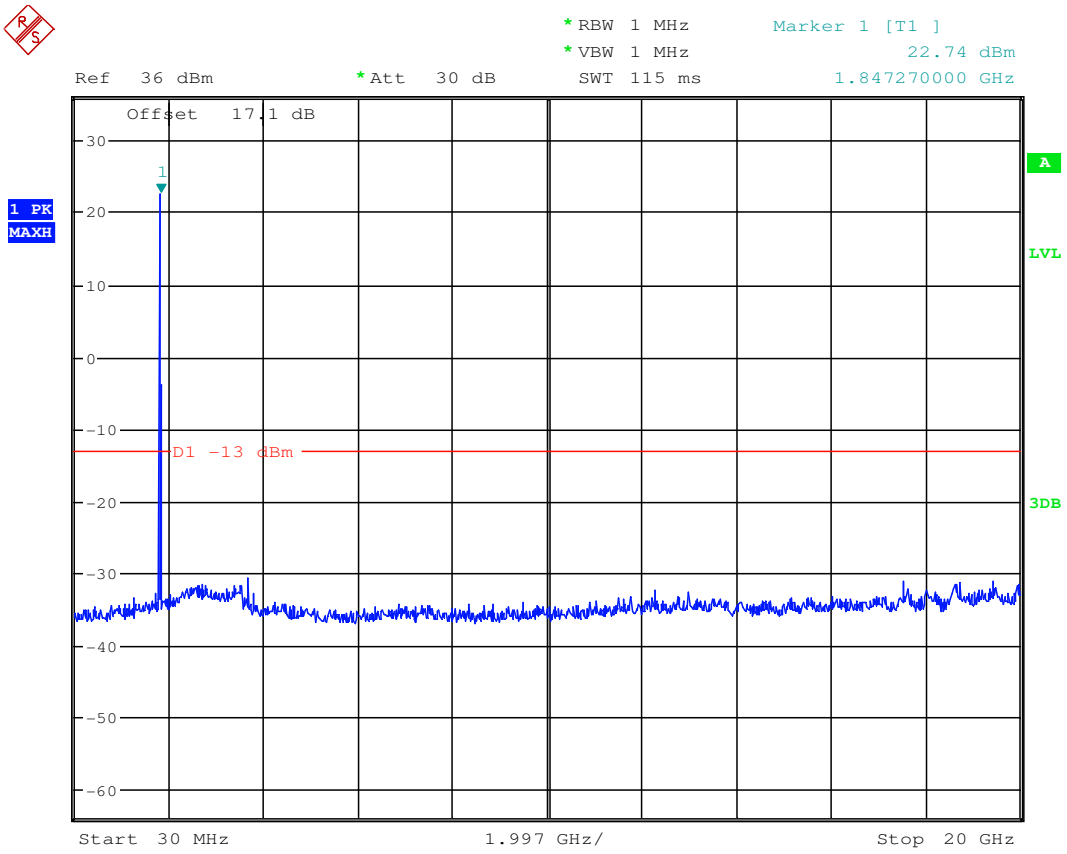
### 7.2.1.1.3 Test Channel = HCH



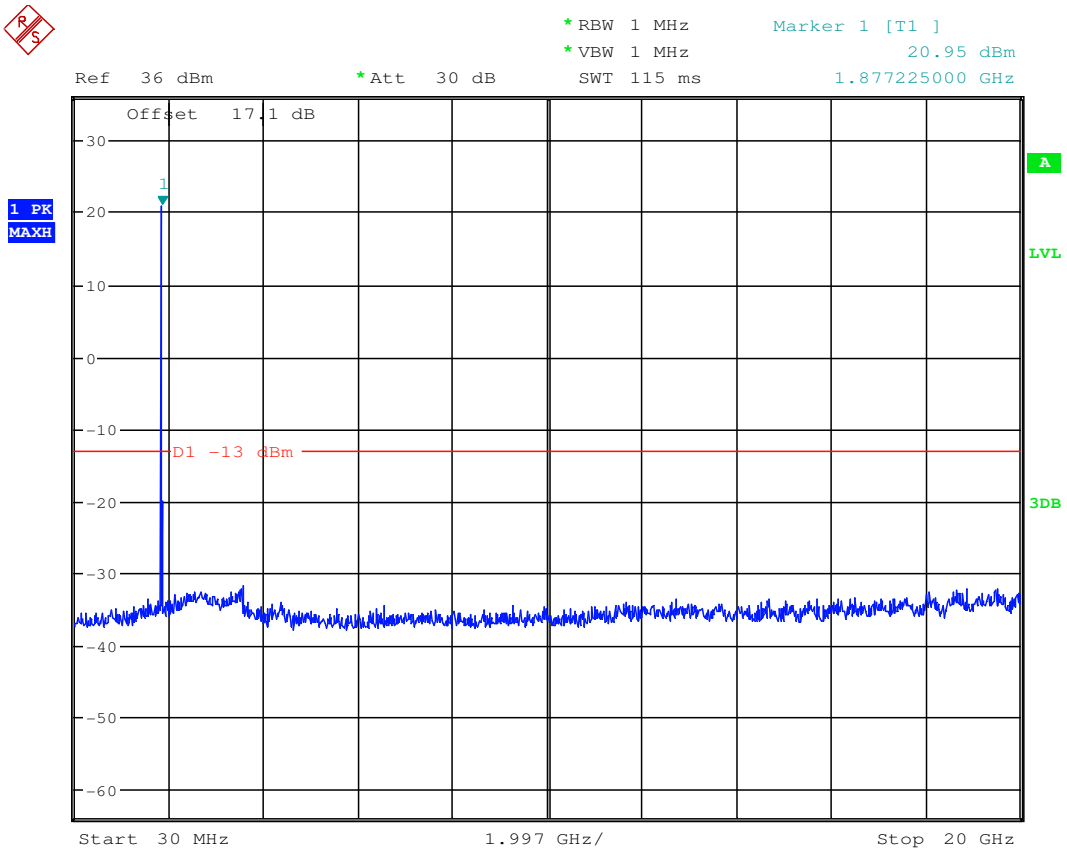
## 7.2.2 Test Band = WCDMA1900

### 7.2.2.1 Test Mode = UMTS/TM1

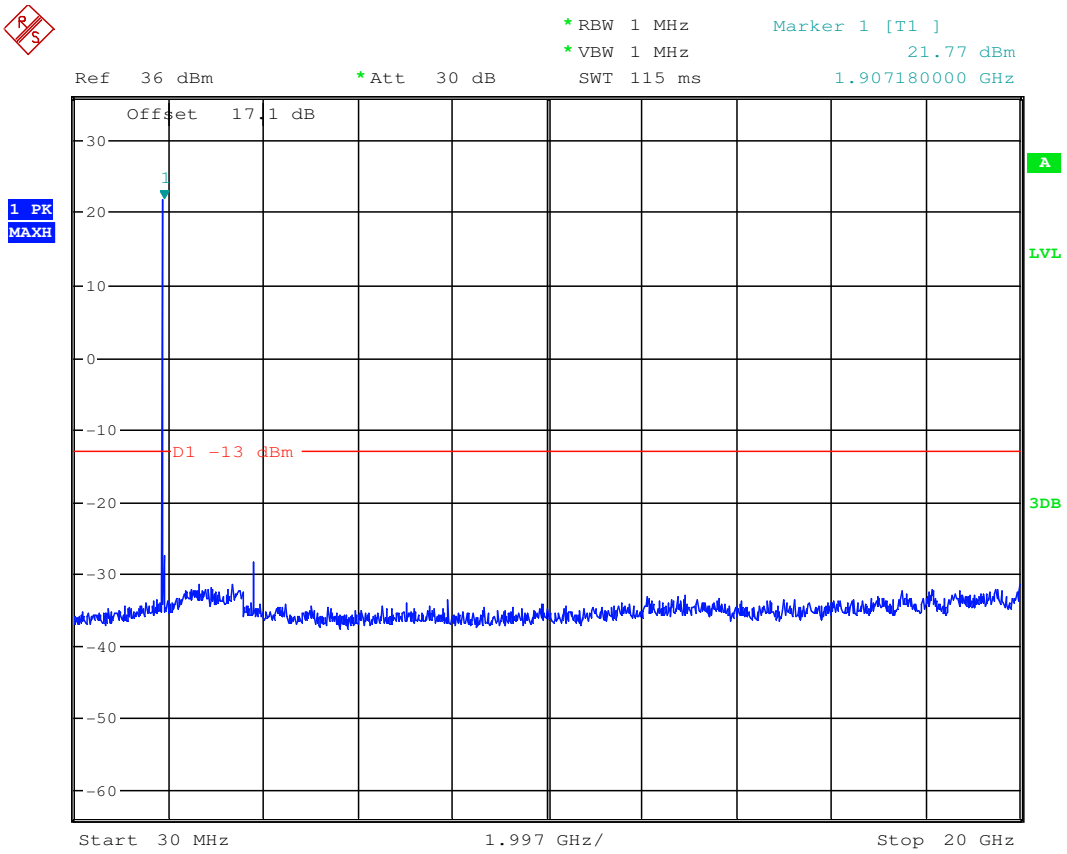
#### 7.2.2.1.1 Test Channel = LCH



### 7.2.2.1.2 Test Channel = MCH



### 7.2.2.1.3 Test Channel = HCH



# 8 Appendix_B-6: Field Strength of Spurious Radiation

Part I - Test Plots

## 8.1 For GSM

### 8.1.1 Test Band = GSM850

#### 8.1.1.1 Test Mode = GSM/TM1

**Below 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 41.125 | -66.3 | -13.0 | -53.3 | Vertical |
| 58.652 | -67.5 | -13.0 | -54.5 | Vertical |
| 147.649 | -62.1 | -13.0 | -49.1 | Vertical |
| 231.384 | -50.9 | -13.0 | -37.9 | Vertical |
| 617.590 | -55.5 | -13.0 | -42.5 | Vertical |
| 745.201 | -53.8 | -13.0 | -40.8 | Vertical |
| 41.315 | -66.9 | -13.0 | -53.9 | Horizontal |
| 52.126 | -67.0 | -13.0 | -54.0 | Horizontal |
| 251.854 | -65.4 | -13.0 | -52.4 | Horizontal |
| 335.126 | -63.6 | -13.0 | -50.6 | Horizontal |
| 441.023 | -62.9 | -13.0 | -49.9 | Horizontal |
| 605.177 | -60.3 | -13.0 | -47.3 | Horizontal |

**Above 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 1648.452 | -50.3 | -13.0 | -37.3 | Vertical |
| 2472.600 | -45.6 | -13.0 | -32.6 | Vertical |
| 3010.267 | -36.9 | -13.0 | -23.9 | Vertical |
| 4644.939 | -45.6 | -13.0 | -32.6 | Vertical |
| 6393.495 | -41.2 | -13.0 | -28.2 | Vertical |
| 8416.947 | -40.1 | -13.0 | -27.1 | Vertical |
| 1829.887 | -49.4 | -13.0 | -36.4 | Horizontal |
| 2472.623 | -35.4 | -13.0 | -22.4 | Horizontal |
| 3459.854 | -46.2 | -13.0 | -33.2 | Horizontal |
| 5112.152 | -40.1 | -13.0 | -27.1 | Horizontal |
| 6571.702 | -42.0 | -13.0 | -29.0 | Horizontal |
| 8089.434 | -39.5 | -13.0 | -26.5 | Horizontal |

### 8.1.1.2 Test Mode = GSM/TM2

**Below 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 39.398 | -68.1 | -13.0 | -55.1 | Vertical |
| 104.469 | -68.2 | -13.0 | -55.2 | Vertical |
| 259.408 | -68.9 | -13.0 | -55.9 | Vertical |
| 362.603 | -64.9 | -13.0 | -51.9 | Vertical |
| 603.194 | -59.2 | -13.0 | -46.2 | Vertical |
| 744.250 | -59.2 | -13.0 | -46.2 | Vertical |
| 45.224 | -69.0 | -13.0 | -56.0 | Horizontal |
| 59.003 | -67.8 | -13.0 | -54.8 | Horizontal |
| 99.449 | -70.5 | -13.0 | -57.5 | Horizontal |
| 240.539 | -65.2 | -13.0 | -52.2 | Horizontal |
| 410.789 | -64.6 | -13.0 | -51.6 | Horizontal |
| 646.252 | -53.1 | -13.0 | -40.1 | Horizontal |

**Above 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 1648.498 | -50.4 | -13.0 | -37.4 | Vertical |
| 2472.687 | -49.4 | -13.0 | -36.4 | Vertical |
| 3236.864 | -46.4 | -13.0 | -33.4 | Vertical |
| 5138.814 | -42.5 | -13.0 | -29.5 | Vertical |
| 7463.233 | -40.0 | -13.0 | -27.0 | Vertical |
| 9206.362 | -39.2 | -13.0 | -26.2 | Vertical |
| 1648.421 | -48.9 | -13.0 | -35.9 | Horizontal |
| 2472.652 | -48.1 | -13.0 | -35.1 | Horizontal |
| 3778.715 | -46.4 | -13.0 | -33.4 | Horizontal |
| 5020.349 | -42.2 | -13.0 | -29.2 | Horizontal |
| 7062.943 | -40.2 | -13.0 | -27.2 | Horizontal |
| 8880.433 | -40.3 | -13.0 | -27.3 | Horizontal |

## 8.1.2 Test Band = GSM1900

### 8.1.2.1 Test Mode = GSM/TM1

**Below 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 39.528 | -69.3 | -13.0 | -56.3 | Vertical |
| 66.624 | -51.7 | -13.0 | -38.7 | Vertical |
| 83.018 | -69.6 | -13.0 | -56.6 | Vertical |
| 251.028 | -69.9 | -13.0 | -56.9 | Vertical |
| 443.012 | -64.6 | -13.0 | -51.6 | Vertical |
| 646.252 | -60.0 | -13.0 | -47.0 | Vertical |
| 44.196 | -68.0 | -13.0 | -55.0 | Horizontal |
| 66.624 | -64.7 | -13.0 | -51.7 | Horizontal |
| 206.141 | -73.6 | -13.0 | -60.6 | Horizontal |
| 320.070 | -71.4 | -13.0 | -58.4 | Horizontal |
| 555.658 | -59.7 | -13.0 | -46.7 | Horizontal |
| 774.159 | -57.5 | -13.0 | -44.5 | Horizontal |

**Above 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 3171.348 | -45.5 | -13.0 | -32.5 | Vertical |
| 5071.303 | -42.0 | -13.0 | -29.0 | Vertical |
| 6132.021 | -40.6 | -13.0 | -27.6 | Vertical |
| 7467.930 | -41.1 | -13.0 | -28.1 | Vertical |
| 10072.830 | -37.6 | -13.0 | -24.6 | Vertical |
| 12289.276 | -35.3 | -13.0 | -22.3 | Vertical |
| 2972.371 | -45.7 | -13.0 | -32.7 | Horizontal |
| 4231.811 | -44.8 | -13.0 | -31.8 | Horizontal |
| 6088.229 | -39.9 | -13.0 | -26.9 | Horizontal |
| 7575.747 | -39.1 | -13.0 | -26.1 | Horizontal |
| 8450.700 | -38.8 | -13.0 | -25.8 | Horizontal |
| 12333.394 | -33.9 | -13.0 | -20.9 | Horizontal |

### 8.1.2.2 Test Mode = GSM/TM2

**Below 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 43.755 | -69.8 | -13.0 | -56.8 | Vertical |
| 58.476 | -70.5 | -13.0 | -57.5 | Vertical |
| 236.845 | -60.2 | -13.0 | -47.2 | Vertical |
| 289.410 | -55.7 | -13.0 | -42.7 | Vertical |
| 398.493 | -54.9 | -13.0 | -41.9 | Vertical |
| 549.862 | -54.6 | -13.0 | -41.6 | Vertical |
| 36.815 | -66.9 | -13.0 | -53.9 | Horizontal |
| 50.153 | -53.2 | -13.0 | -40.2 | Horizontal |
| 307.215 | -47.5 | -13.0 | -34.5 | Horizontal |
| 415.855 | -54.4 | -13.0 | -41.4 | Horizontal |
| 521.318 | -54.6 | -13.0 | -41.6 | Horizontal |
| 622.250 | -54.0 | -13.0 | -41.0 | Horizontal |

**Above 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 3590.694 | -44.6 | -13.0 | -31.6 | Vertical |
| 4850.109 | -41.5 | -13.0 | -28.5 | Vertical |
| 5395.777 | -40.2 | -13.0 | -27.2 | Vertical |
| 7720.234 | -38.6 | -13.0 | -25.6 | Vertical |
| 8336.203 | -37.2 | -13.0 | -24.2 | Vertical |
| 11164.447 | -34.9 | -13.0 | -21.9 | Vertical |
| 2932.268 | -45.2 | -13.0 | -32.2 | Horizontal |
| 4737.671 | -41.5 | -13.0 | -28.5 | Horizontal |
| 7073.957 | -40.3 | -13.0 | -27.3 | Horizontal |
| 9020.532 | -35.9 | -13.0 | -22.9 | Horizontal |
| 9971.409 | -35.8 | -13.0 | -22.8 | Horizontal |
| 12634.211 | -33.6 | -13.0 | -20.6 | Horizontal |

# 8.2 For UMTS

## 8.2.1 Test Band = WCDMA850

### 8.2.1.1 Test Mode = UMTS/TM1

**Below 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 43.763 | -67.6 | -13.0 | -54.6 | Vertical |
| 95.921 | -66.0 | -13.0 | -53.0 | Vertical |
| 198.177 | -69.0 | -13.0 | -56.0 | Vertical |
| 389.765 | -64.3 | -13.0 | -51.3 | Vertical |
| 516.935 | -61.1 | -13.0 | -48.1 | Vertical |
| 646.252 | -54.4 | -13.0 | -41.4 | Vertical |
| 36.653 | -58.6 | -13.0 | -45.6 | Horizontal |
| 95.293 | -68.5 | -13.0 | -55.5 | Horizontal |
| 240.539 | -65.2 | -13.0 | -52.2 | Horizontal |
| 389.765 | -62.5 | -13.0 | -49.5 | Horizontal |
| 516.935 | -61.1 | -13.0 | -48.1 | Horizontal |
| 646.252 | -53.1 | -13.0 | -40.1 | Horizontal |

**Above 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 1652.8 | -43.2 | -13.0 | -30.2 | Vertical |
| 2479.2 | -41.0 | -13.0 | -28.0 | Vertical |
| 4237.097 | -43.1 | -13.0 | -30.1 | Vertical |
| 5149.721 | -41.7 | -13.0 | -28.7 | Vertical |
| 6140.612 | -41.0 | -13.0 | -28.0 | Vertical |
| 7869.506 | -39.9 | -13.0 | -26.9 | Vertical |
| 1652.8 | -43.2 | -13.0 | -30.2 | Horizontal |
| 2479.2 | -46.5 | -13.0 | -33.5 | Horizontal |
| 3115.657 | -45.6 | -13.0 | -32.6 | Horizontal |
| 4515.366 | -43.3 | -13.0 | -30.3 | Horizontal |
| 6024.546 | -40.8 | -13.0 | -27.8 | Horizontal |
| 8055.203 | -39.1 | -13.0 | -26.1 | Horizontal |

## 8.2.2 Test Band = WCDMA1900

### 8.2.2.1 Test Mode = UMTS/TM1

**Below 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 37.876 | -67.8 | -13.0 | -54.8 | Vertical |
| 44.196 | -68.0 | -13.0 | -55.0 | Vertical |
| 66.624 | -64.7 | -13.0 | -51.7 | Vertical |
| 231.246 | -71.1 | -13.0 | -58.1 | Vertical |
| 555.658 | -59.7 | -13.0 | -46.7 | Vertical |
| 774.159 | -57.5 | -13.0 | -44.5 | Vertical |
| 37.752 | -69.3 | -13.0 | -56.3 | Horizontal |
| 46.427 | -68.7 | -13.0 | -55.7 | Horizontal |
| 93.128 | -67.4 | -13.0 | -54.4 | Horizontal |
| 495.334 | -62.3 | -13.0 | -49.3 | Horizontal |
| 903.443 | -50.0 | -13.0 | -37.0 | Horizontal |
| 959.826 | -52.3 | -13.0 | -39.3 | Horizontal |

**Above 1GHz**

| | | | | |
|---|---|---|---|---|
| Frequency (MHz) | Level (dBm) | Limit Line (dBm) | Over Limit (dBm) | Polarization |
| 3087.249 | -45.0 | -13.0 | -32.0 | Vertical |
| 4401.955 | -43.8 | -13.0 | -30.8 | Vertical |
| 5053.163 | -42.3 | -13.0 | -29.3 | Vertical |
| 6088.229 | -39.9 | -13.0 | -26.9 | Vertical |
| 8450.700 | -38.8 | -13.0 | -25.8 | Vertical |
| 12806.303 | -33.5 | -13.0 | -20.5 | Vertical |
| 3702.120 | -42.5 | -13.0 | -29.5 | Horizontal |
| 5071.303 | -42.0 | -13.0 | -29.0 | Horizontal |
| 6132.021 | -40.6 | -13.0 | -27.6 | Horizontal |
| 7643.921 | -40.6 | -13.0 | -27.6 | Horizontal |
| 8634.367 | -38.7 | -13.0 | -25.7 | Horizontal |
| 10629.089 | -36.2 | -13.0 | -23.2 | Horizontal |

NOTE:

1) The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
2) Pretest was performed at the EUT in low, middle, high channel, but only the worst test channel(Channel 192 for GSM850 and Channel 661 for GSM1900)and only the data of the worst case show in the test report.

# 9 Appendix_B-7: Frequency Stability

## 9.1 For GSM

### 9.1.1 Frequency 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 | -3.19 | -0.00387 | PASS |
| | | | | VN | -8.09 | -0.00982 | PASS |
| | | | | VH | 0.43 | 0.00052 | PASS |
| | | MCH | TN | VL | -7.83 | -0.00936 | PASS |
| | | | | VN | -6.61 | -0.00790 | PASS |
| | | | | VH | -5.25 | -0.00628 | PASS |
| | | HCH | TN | VL | -0.47 | -0.00055 | PASS |
| | | | | VN | -5.19 | -0.00611 | PASS |
| | | | | VH | -8.61 | -0.01014 | PASS |
| | GSM/TM2 | LCH | TN | VL | -5.09 | -0.00618 | PASS |
| | | | | VN | -10.55 | -0.01280 | PASS |
| | | | | VH | -4.16 | -0.00505 | PASS |
| | | MCH | TN | VL | -7.22 | -0.00863 | PASS |
| | | | | VN | -15.49 | -0.01852 | PASS |
| | | | | VH | -7.93 | -0.00948 | PASS |
| | | HCH | TN | VL | -8.06 | -0.00950 | PASS |
| | | | | VN | -3.48 | -0.00410 | PASS |
| | | | | VH | -10.74 | -0.01265 | PASS |
| GSM1900 | GSM/TM1 | LCH | TN | VL | -12.61 | -0.00682 | PASS |
| | | | | VN | -9.96 | -0.00538 | PASS |
| | | | | VH | -8.41 | -0.00455 | PASS |
| | | MCH | TN | VL | -2.27 | -0.00121 | PASS |
| | | | | VN | -1.56 | -0.00083 | PASS |
| | | | | VH | -7.25 | -0.00386 | PASS |
| | | HCH | TN | VL | -0.92 | -0.00048 | PASS |
| | | | | VN | -8.15 | -0.00427 | PASS |
| | | | | VH | -18.80 | -0.00984 | PASS |
| | GSM/TM2 | LCH | TN | VL | 3.66 | 0.00198 | PASS |
| | | | | VN | -5.64 | -0.00305 | PASS |
| | | | | VH | -7.90 | -0.00427 | PASS |
| | | MCH | TN | VL | -18.88 | -0.01004 | PASS |
| | | | | VN | -1.76 | -0.00094 | PASS |
| | | | | VH | -14.19 | -0.00755 | PASS |
| | | HCH | TN | VL | -6.70 | -0.00351 | PASS |
| | | | | VN | -10.51 | -0.00550 | PASS |
| | | | | VH | -9.25 | -0.00484 | PASS |

### 9.1.2 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 | -2.23 | -0.00271 | PASS |
| | | | | -20 | -1.52 | -0.00184 | PASS |
| | | | | -10 | -1.84 | -0.00223 | PASS |
| | | | | 0 | -3.78 | -0.00459 | PASS |
| | | | | 10 | 1.00 | 0.00121 | PASS |
| | | | | 20 | 2.23 | 0.00271 | PASS |
| | | | | 30 | 3.16 | 0.00383 | PASS |
| | | | | 40 | 1.68 | 0.00204 | PASS |
| | | | | 50 | 6.78 | 0.00823 | PASS |
| | | MCH | VN | -30 | 0.84 | 0.00100 | PASS |
| | | | | -20 | 3.55 | 0.00424 | PASS |
| | | | | -10 | -0.70 | -0.00084 | PASS |
| | | | | 0 | -2.05 | -0.00245 | PASS |
| | | | | 10 | 0.34 | 0.00041 | PASS |
| | | | | 20 | -1.21 | -0.00145 | PASS |
| | | | | 30 | 0.85 | 0.00102 | PASS |
| | | | | 40 | 1.43 | 0.00171 | PASS |
| | | | | 50 | 2.27 | 0.00271 | PASS |
| | | HCH | VN | -30 | 0.53 | 0.00062 | PASS |
| | | | | -20 | 5.18 | 0.00610 | PASS |
| | | | | -10 | -0.44 | -0.00052 | PASS |
| | | | | 0 | -0.89 | -0.00105 | PASS |
| | | | | 10 | -0.63 | -0.00074 | PASS |
| | | | | 20 | -0.89 | -0.00105 | PASS |
| | | | | 30 | -1.09 | -0.00128 | PASS |
| | | | | 40 | -1.99 | -0.00234 | PASS |
| | | | | 50 | 0.08 | 0.00009 | PASS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GSM850 | GSM/TM2 | LCH | VN | -30 | -4.77 | -0.00579 | PASS |
| | | | | -20 | -1.51 | -0.00183 | PASS |
| | | | | -10 | -5.51 | -0.00669 | PASS |
| | | | | 0 | -4.32 | -0.00524 | PASS |
| | | | | 10 | -3.48 | -0.00422 | PASS |
| | | | | 20 | -2.18 | -0.00264 | PASS |
| | | | | 30 | -9.48 | -0.01150 | PASS |
| | | | | 40 | 1.37 | 0.00166 | PASS |
| | | | | 50 | 1.59 | 0.00193 | PASS |
| | | MCH | VN | -30 | 0.85 | 0.00102 | PASS |
| | | | | -20 | 0.20 | 0.00024 | PASS |
| | | | | -10 | -8.64 | -0.01033 | PASS |
| | | | | 0 | -2.25 | -0.00269 | PASS |
| | | | | 10 | -1.99 | -0.00238 | PASS |
| | | | | 20 | -3.80 | -0.00454 | PASS |
| | | | | 30 | 0.07 | 0.00008 | PASS |
| | | | | 40 | -5.67 | -0.00678 | PASS |
| | | | | 50 | -6.38 | -0.00763 | PASS |
| | | HCH | VN | -30 | -5.41 | -0.00637 | PASS |
| | | | | -20 | -6.89 | -0.00812 | PASS |
| | | | | -10 | -4.76 | -0.00561 | PASS |
| | | | | 0 | -3.50 | -0.00412 | PASS |
| | | | | 10 | -9.93 | -0.01170 | PASS |
| | | | | 20 | -9.34 | -0.01100 | PASS |
| | | | | 30 | -1.21 | -0.00143 | PASS |
| | | | | 40 | -8.28 | -0.00975 | PASS |
| | | | | 50 | -3.34 | -0.00393 | PASS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GSM1900 | GSM/TM1 | LCH | VN | -30 | -15.13 | -0.00818 | PASS |
| | | | | -20 | -9.06 | -0.00490 | PASS |
| | | | | -10 | -14.23 | -0.00769 | PASS |
| | | | | 0 | -2.41 | -0.00130 | PASS |
| | | | | 10 | 1.46 | 0.00079 | PASS |
| | | | | 20 | -5.25 | -0.00284 | PASS |
| | | | | 30 | -13.19 | -0.00713 | PASS |
| | | | | 40 | -9.77 | -0.00528 | PASS |
| | | | | 50 | 1.98 | 0.00107 | PASS |
| | | MCH | VN | -30 | -5.12 | -0.00272 | PASS |
| | | | | -20 | -6.74 | -0.00359 | PASS |
| | | | | -10 | -13.16 | -0.00700 | PASS |
| | | | | 0 | -0.70 | -0.00037 | PASS |
| | | | | 10 | -15.36 | -0.00817 | PASS |
| | | | | 20 | -7.67 | -0.00408 | PASS |
| | | | | 30 | 2.40 | 0.00128 | PASS |
| | | | | 40 | -8.90 | -0.00473 | PASS |
| | | | | 50 | -11.94 | -0.00635 | PASS |
| | | HCH | VN | -30 | -14.41 | -0.00755 | PASS |
| | | | | -20 | -4.92 | -0.00258 | PASS |
| | | | | -10 | -6.47 | -0.00339 | PASS |
| | | | | 0 | -11.44 | -0.00599 | PASS |
| | | | | 10 | 1.34 | 0.00070 | PASS |
| | | | | 20 | 2.89 | 0.00151 | PASS |
| | | | | 30 | -6.02 | -0.00315 | PASS |
| | | | | 40 | -13.32 | -0.00697 | PASS |
| | | | | 50 | -1.89 | -0.00099 | PASS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GSM1900 | GSM/TM2 | LCH | VN | -30 | -12.45 | -0.00673 | PASS |
| | | | | -20 | -10.58 | -0.00572 | PASS |
| | | | | -10 | -12.23 | -0.00661 | PASS |
| | | | | 0 | -15.45 | -0.00835 | PASS |
| | | | | 10 | -12.90 | -0.00697 | PASS |
| | | | | 20 | -15.97 | -0.00863 | PASS |
| | | | | 30 | -15.55 | -0.00840 | PASS |
| | | | | 40 | 2.01 | 0.00109 | PASS |
| | | | | 50 | -17.75 | -0.00959 | PASS |
| | | MCH | VN | -30 | -5.99 | -0.00319 | PASS |
| | | | | -20 | -15.71 | -0.00836 | PASS |
| | | | | -10 | -0.28 | -0.00015 | PASS |
| | | | | 0 | -5.54 | -0.00295 | PASS |
| | | | | 10 | -4.93 | -0.00262 | PASS |
| | | | | 20 | -15.20 | -0.00809 | PASS |
| | | | | 30 | -23.24 | -0.01236 | PASS |
| | | | | 40 | -2.80 | -0.00149 | PASS |
| | | | | 50 | -20.59 | -0.01095 | PASS |
| | | HCH | VN | -30 | -20.39 | -0.01068 | PASS |
| | | | | -20 | -10.18 | -0.00533 | PASS |
| | | | | -10 | -11.48 | -0.00601 | PASS |
| | | | | 0 | -16.51 | -0.00864 | PASS |
| | | | | 10 | -17.03 | -0.00892 | PASS |
| | | | | 20 | -20.71 | -0.01084 | PASS |
| | | | | 30 | -9.63 | -0.00504 | PASS |
| | | | | 40 | -6.92 | -0.00362 | PASS |
| | | | | 50 | -22.19 | -0.01162 | PASS |

## 9.2 For UMTS

### 9.2.1 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 | 0.13 | 0.00016 | PASS |
| | | | | VN | 2.86 | 0.00346 | PASS |
| | | | | VH | 0.59 | 0.00071 | PASS |
| | | MCH | TN | VL | -1.27 | -0.00152 | PASS |
| | | | | VN | 0.15 | 0.00018 | PASS |
| | | | | VH | 0.87 | 0.00104 | PASS |
| | | HCH | TN | VL | -0.98 | -0.00116 | PASS |
| | | | | VN | -2.07 | -0.00245 | PASS |
| | | | | VH | -0.42 | -0.00050 | PASS |
| WCDMA1900 | UMTS/TM1 | LCH | TN | VL | -7.12 | -0.00384 | PASS |
| | | | | VN | -4.04 | -0.00218 | PASS |
| | | | | VH | -7.74 | -0.00418 | PASS |
| | | MCH | TN | VL | -6.25 | -0.00332 | PASS |
| | | | | VN | -9.21 | -0.00490 | PASS |
| | | | | VH | -5.50 | -0.00293 | PASS |
| | | HCH | TN | VL | -5.44 | -0.00285 | PASS |
| | | | | VN | -10.14 | -0.00532 | PASS |
| | | | | VH | -2.01 | -0.00105 | PASS |

### 9.2.2 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 | 2.45 | 0.00296 | PASS |
| | | | | -20 | 1.22 | 0.00148 | PASS |
| | | | | -10 | 0.36 | 0.00044 | PASS |
| | | | | 0 | -2.95 | -0.00357 | PASS |
| | | | | 10 | 0.30 | 0.00036 | PASS |
| | | | | 20 | -2.11 | -0.00255 | PASS |
| | | | | 30 | 1.81 | 0.00219 | PASS |
| | | | | 40 | 0.12 | 0.00015 | PASS |
| | | | | 50 | -0.89 | -0.00108 | PASS |
| | | MCH | VN | -30 | -1.64 | -0.00196 | PASS |
| | | | | -20 | -0.91 | -0.00109 | PASS |
| | | | | -10 | -0.17 | -0.00020 | PASS |
| | | | | 0 | -1.06 | -0.00127 | PASS |
| | | | | 10 | 2.62 | 0.00313 | PASS |
| | | | | 20 | 2.04 | 0.00244 | PASS |
| | | | | 30 | 1.93 | 0.00231 | PASS |
| | | | | 40 | 0.39 | 0.00047 | PASS |
| | | | | 50 | -0.07 | -0.00008 | PASS |
| | | HCH | VN | -30 | -0.43 | -0.00051 | PASS |
| | | | | -20 | 0.39 | 0.00046 | PASS |
| | | | | -10 | 0.30 | 0.00035 | PASS |
| | | | | 0 | -1.80 | -0.00213 | PASS |
| | | | | 10 | 1.29 | 0.00152 | PASS |
| | | | | 20 | -3.09 | -0.00365 | PASS |
| | | | | 30 | 2.83 | 0.00334 | PASS |
| | | | | 40 | -0.40 | -0.00047 | PASS |
| | | | | 50 | -2.43 | -0.00287 | PASS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| WCDMA1900 | UMTS/TM1 | LCH | VN | -30 | -5.26 | -0.00284 | PASS |
| | | | | -20 | -8.73 | -0.00471 | PASS |
| | | | | -10 | -5.74 | -0.00310 | PASS |
| | | | | 0 | -7.15 | -0.00386 | PASS |
| | | | | 10 | -5.30 | -0.00286 | PASS |
| | | | | 20 | -3.76 | -0.00203 | PASS |
| | | | | 30 | -9.61 | -0.00519 | PASS |
| | | | | 40 | -5.36 | -0.00289 | PASS |
| | | | | 50 | -4.39 | -0.00237 | PASS |
| | | MCH | VN | -30 | -7.15 | -0.00380 | PASS |
| | | | | -20 | -8.50 | -0.00452 | PASS |
| | | | | -10 | -4.28 | -0.00228 | PASS |
| | | | | 0 | -7.70 | -0.00410 | PASS |
| | | | | 10 | -5.04 | -0.00268 | PASS |
| | | | | 20 | -6.37 | -0.00339 | PASS |
| | | | | 30 | -9.07 | -0.00482 | PASS |
| | | | | 40 | -7.94 | -0.00422 | PASS |
| | | | | 50 | -5.82 | -0.00310 | PASS |
| | | HCH | VN | -30 | -6.07 | -0.00318 | PASS |
| | | | | -20 | -6.36 | -0.00333 | PASS |
| | | | | -10 | -7.59 | -0.00398 | PASS |
| | | | | 0 | -7.12 | -0.00373 | PASS |
| | | | | 10 | -6.89 | -0.00361 | PASS |
| | | | | 20 | -3.97 | -0.00208 | PASS |
| | | | | 30 | -7.04 | -0.00369 | PASS |
| | | | | 40 | -2.66 | -0.00139 | PASS |
| | | | | 50 | -4.89 | -0.00256 | PASS |

The End