



# Appendix for test report

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dBm] | ERP [dBm]  | Limit [dBm] | Verdict |
|-----------|-----------|--------------|---------------|------------|-------------|---------|
| GSM850    | GSM/TM1   | LCH          | 32.71         | 28.46      | 38.5        | PASS    |
|           |           | MCH          | 32.83         | 28.58      | 38.5        | PASS    |
|           |           | HCH          | 32.69         | 28.44      | 38.5        | PASS    |
|           | GSM/TM2   | LCH          | 26.70         | 22.45      | 38.5        | PASS    |
|           |           | MCH          | 26.90         | 22.65      | 38.5        | PASS    |
|           |           | HCH          | 26.88         | 22.63      | 38.5        | PASS    |
| Test Band | Test Mode | Test Channel | Measured[dBm] | EIRP [dBm] | Limit [dBm] | Verdict |
| PCS1900   | GSM/TM1   | LCH          | 30.11         | 31.21      | 33          | PASS    |
|           |           | MCH          | 30.71         | 31.81      | 33          | PASS    |
|           |           | HCH          | 30.74         | 31.84      | 33          | PASS    |
|           | GSM/TM2   | LCH          | 25.82         | 26.92      | 33          | PASS    |
|           |           | MCH          | 25.57         | 26.67      | 33          | PASS    |
|           |           | HCH          | 25.48         | 26.58      | 33          | PASS    |

Note1:

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

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

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

b, SGP = Signal Generator Level

Note2:

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

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

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

SET Sweep time = auto - couple.

Detector: RMS

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

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Measured[dB] | Limit [dB] | Verdict |
|-----------|-----------|--------------|--------------|------------|---------|
| GSM850    | GSM/TM1   | LCH          | 1.68         | 13         | PASS    |
|           |           | MCH          | 1.96         | 13         | PASS    |
|           |           | HCH          | 1.74         | 13         | PASS    |
|           | GSM/TM2   | LCH          | 4.89         | 13         | PASS    |
|           |           | MCH          | 4.86         | 13         | PASS    |
|           |           | HCH          | 5.25         | 13         | PASS    |
| PCS1900   | GSM/TM1   | LCH          | 1.83         | 13         | PASS    |
|           |           | MCH          | 1.89         | 13         | PASS    |
|           |           | HCH          | 1.83         | 13         | PASS    |
|           | GSM/TM2   | LCH          | 4.83         | 13         | PASS    |
|           |           | MCH          | 4.70         | 13         | PASS    |
|           |           | HCH          | 4.51         | 13         | PASS    |

## 3Appendix\_C: Modulation Characteristics

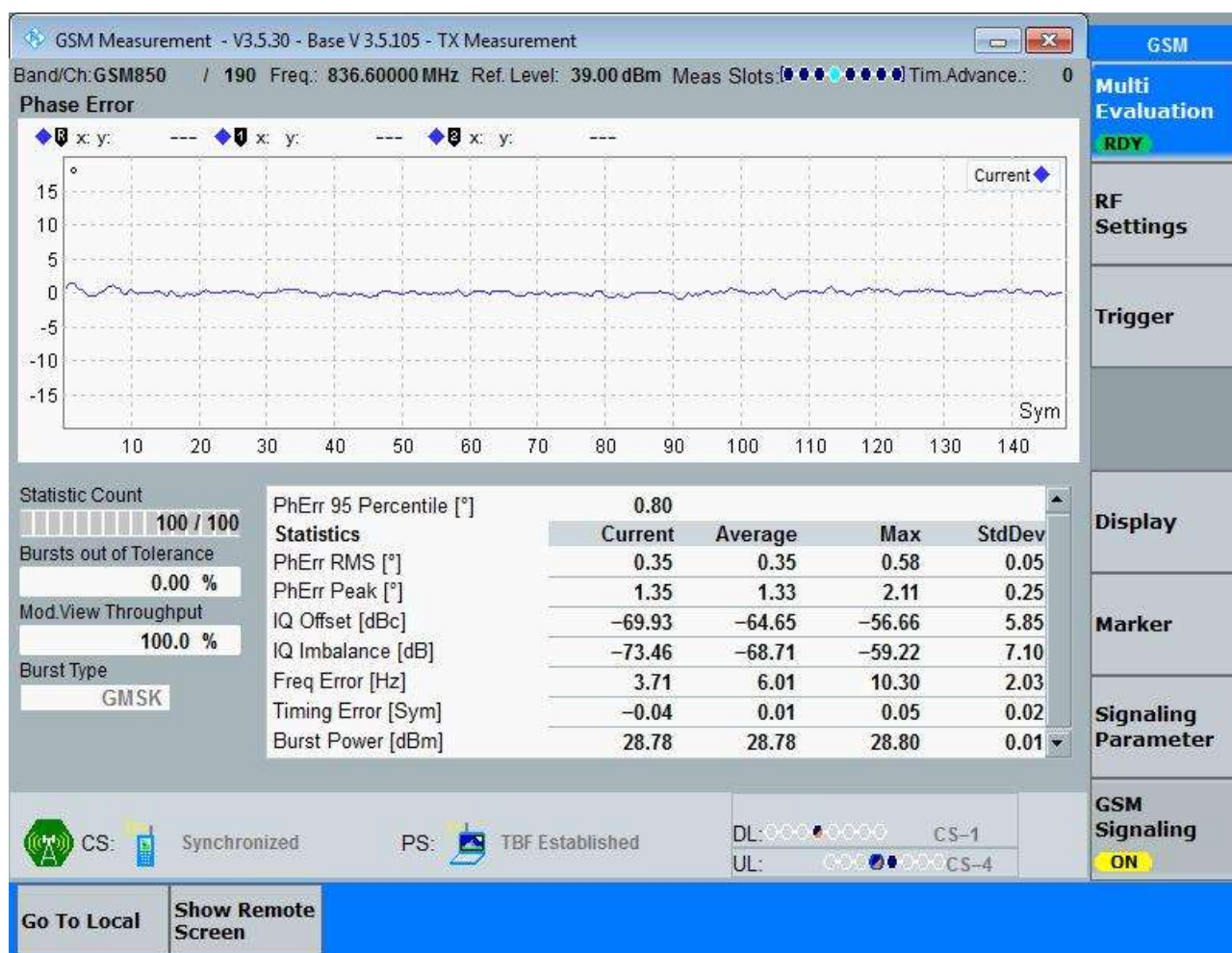
### Part I - Test Plots

#### 3.1 For GSM

##### 3.1.1 Test Band = GSM850

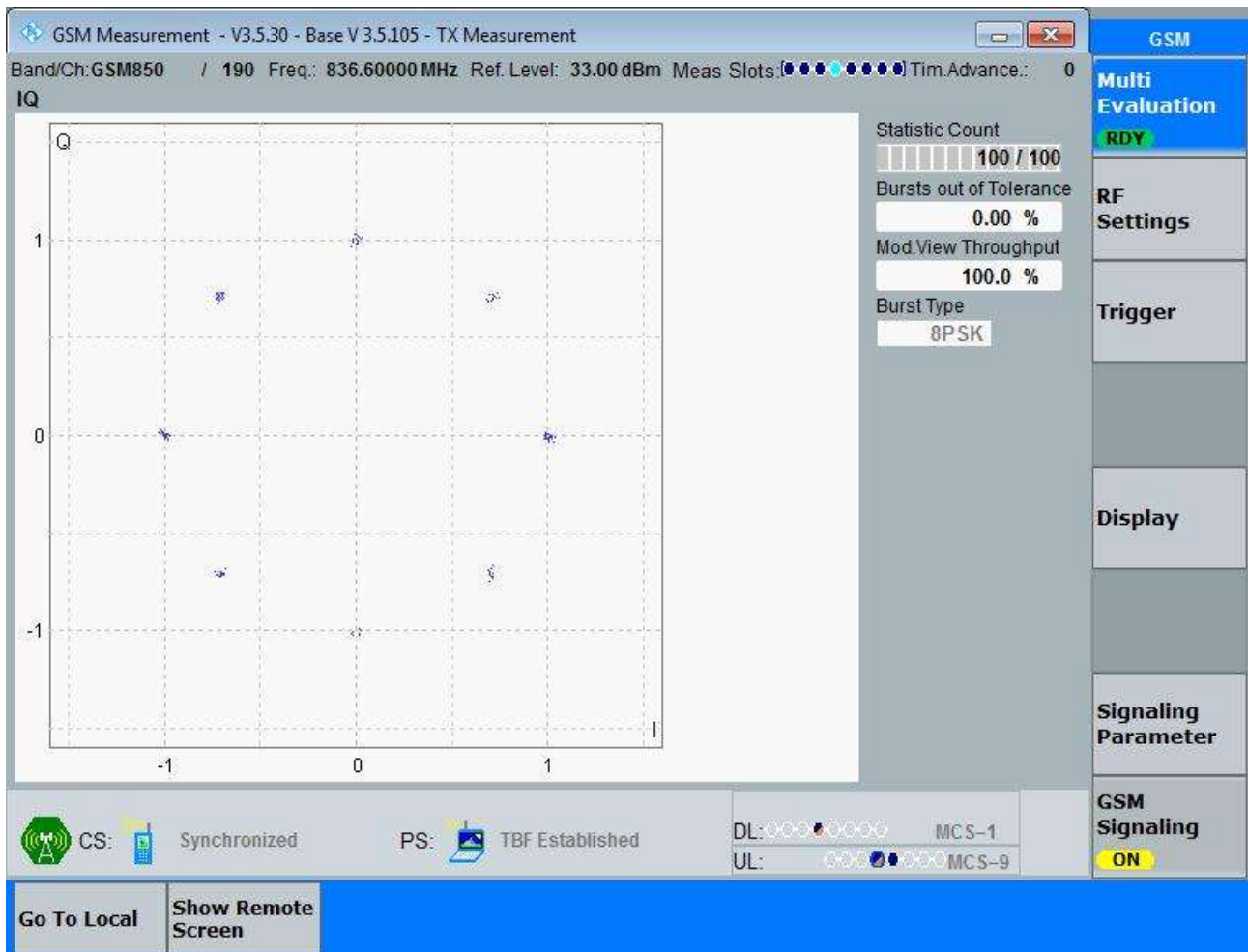
##### 3.1.1.1 Test Mode = GSM/TM1

##### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

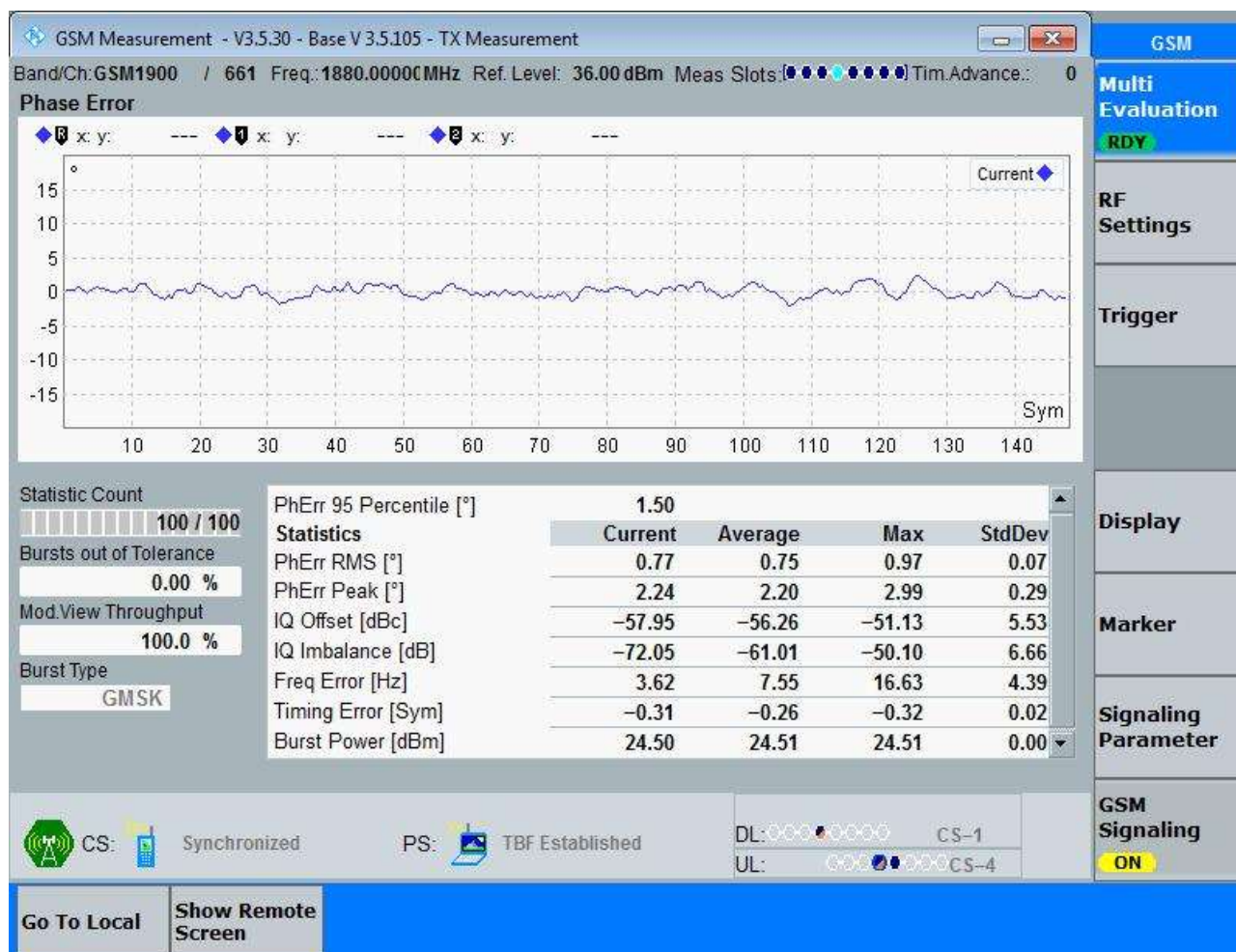
#### 3.1.1.2.1 Test Channel = MCH



### 3.1.2 Test Band = PCS1900

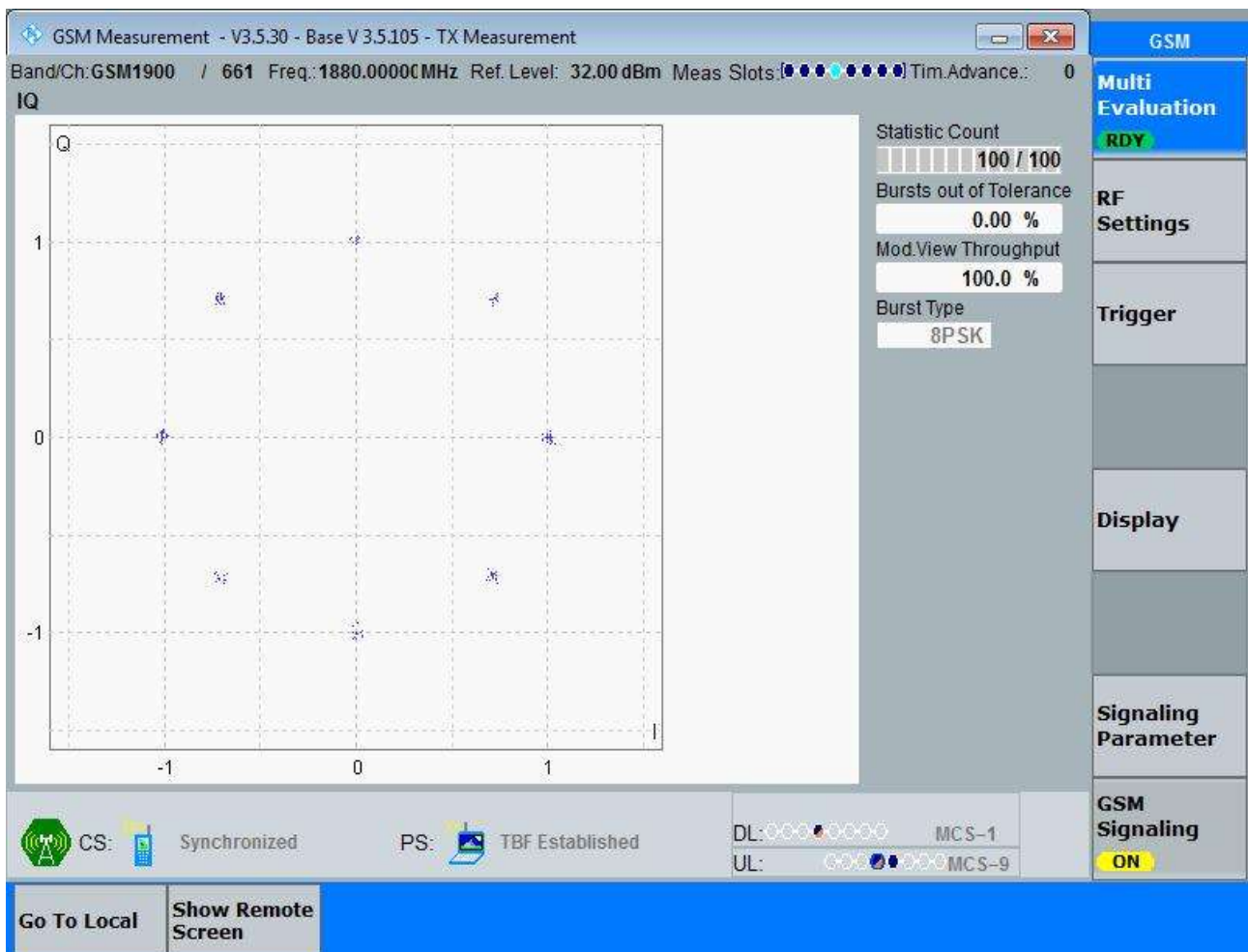
#### 3.1.2.1 Test Mode = GSM/TM1

##### 3.1.2.1.1 Test Channel = MCH



### 3.1.2.2 Test Mode = GSM/TM2

#### 3.1.2.2.1 Test Channel = MCH



## 4Appendix\_D: Bandwidth

### Part I - Test Results

| Test Band | Test Mode | Test Channel | Occupied Bandwidth [kHz] | Emission Bandwidth [kHz] | Verdict |
|-----------|-----------|--------------|--------------------------|--------------------------|---------|
| GSM850    | GSM/TM1   | LCH          | 244.90                   | 314.8                    | Pass    |
|           |           | MCH          | 244.61                   | 315.7                    | Pass    |
|           |           | HCH          | 244.56                   | 315.6                    | Pass    |
|           | GSM/TM2   | LCH          | 248.69                   | 323.0                    | Pass    |
|           |           | MCH          | 251.89                   | 310.8                    | Pass    |
|           |           | HCH          | 248.63                   | 313.5                    | Pass    |
| PCS1900   | GSM/TM1   | LCH          | 244.43                   | 317.6                    | Pass    |
|           |           | MCH          | 243.52                   | 315.8                    | Pass    |
|           |           | HCH          | 246.86                   | 317.4                    | Pass    |
|           | GSM/TM2   | LCH          | 244.74                   | 307.9                    | Pass    |
|           |           | MCH          | 247.82                   | 308.9                    | Pass    |
|           |           | HCH          | 247.20                   | 314.2                    | 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 = PCS1900

##### 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



## 5Appendix\_E: Band Edges Compliance

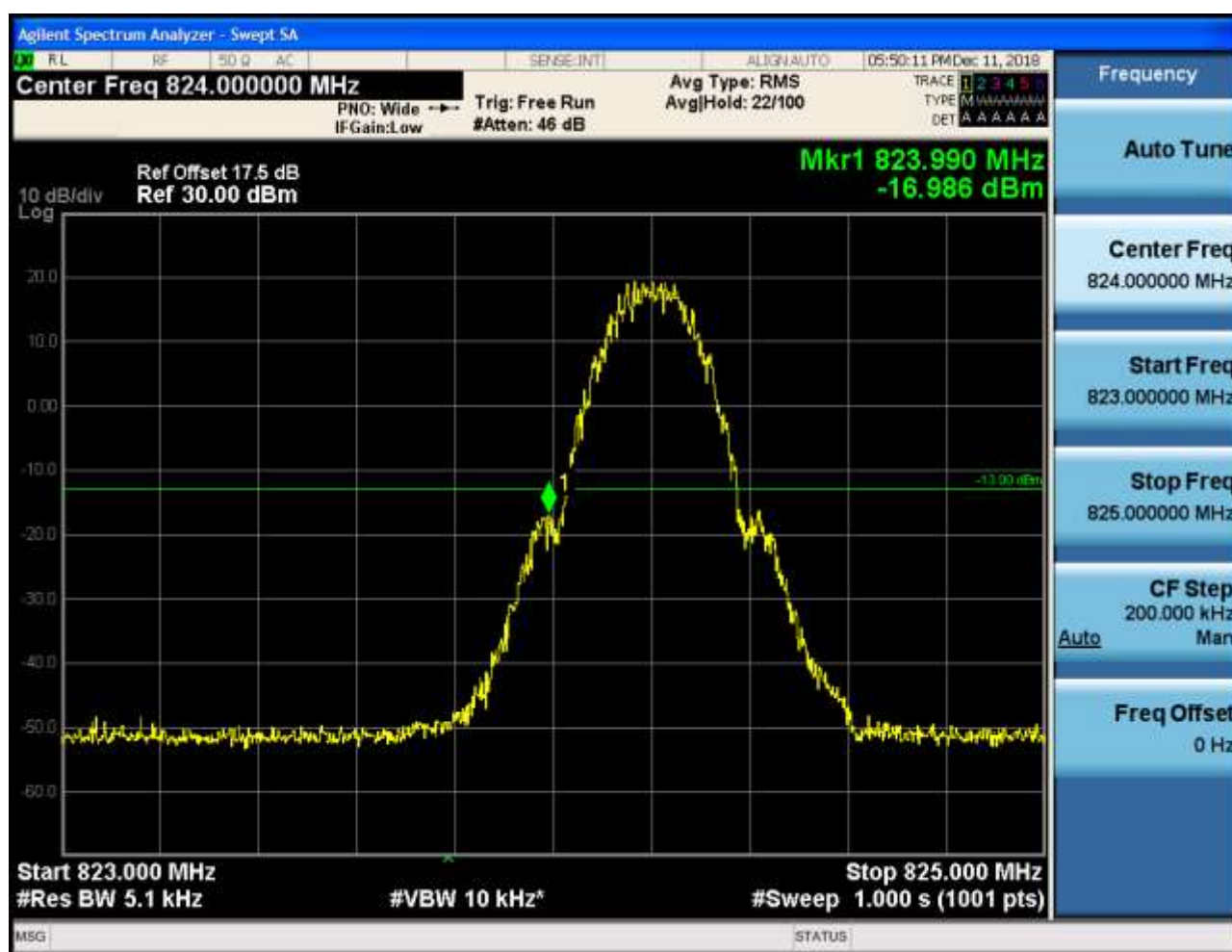
### Part I - Test Plots

#### 5.1 For GSM

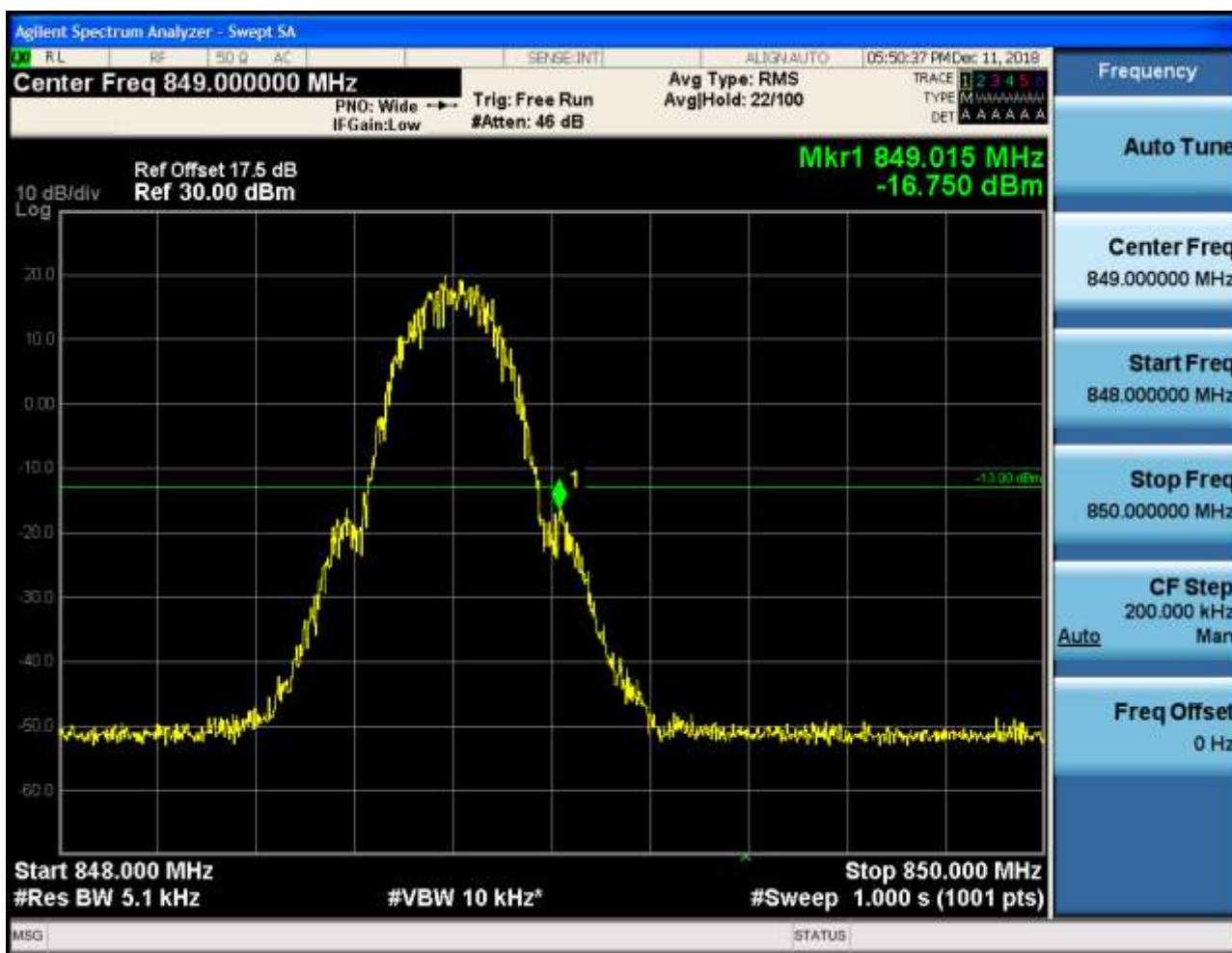
##### 5.1.1 Test Band = GSM850

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

##### 5.1.1.1.1 Test Channel = LCH

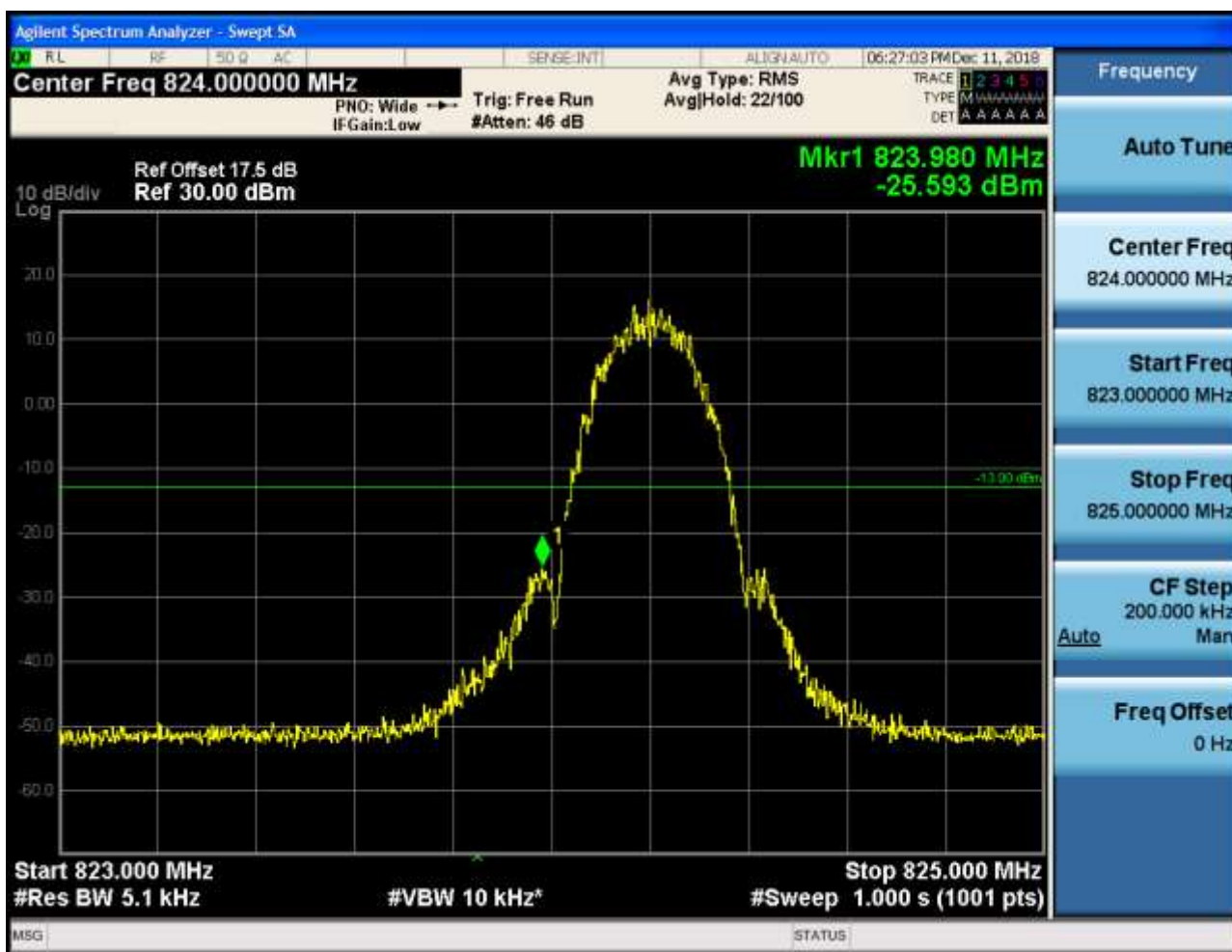


### 5.1.1.1.2 Test Channel = HCH

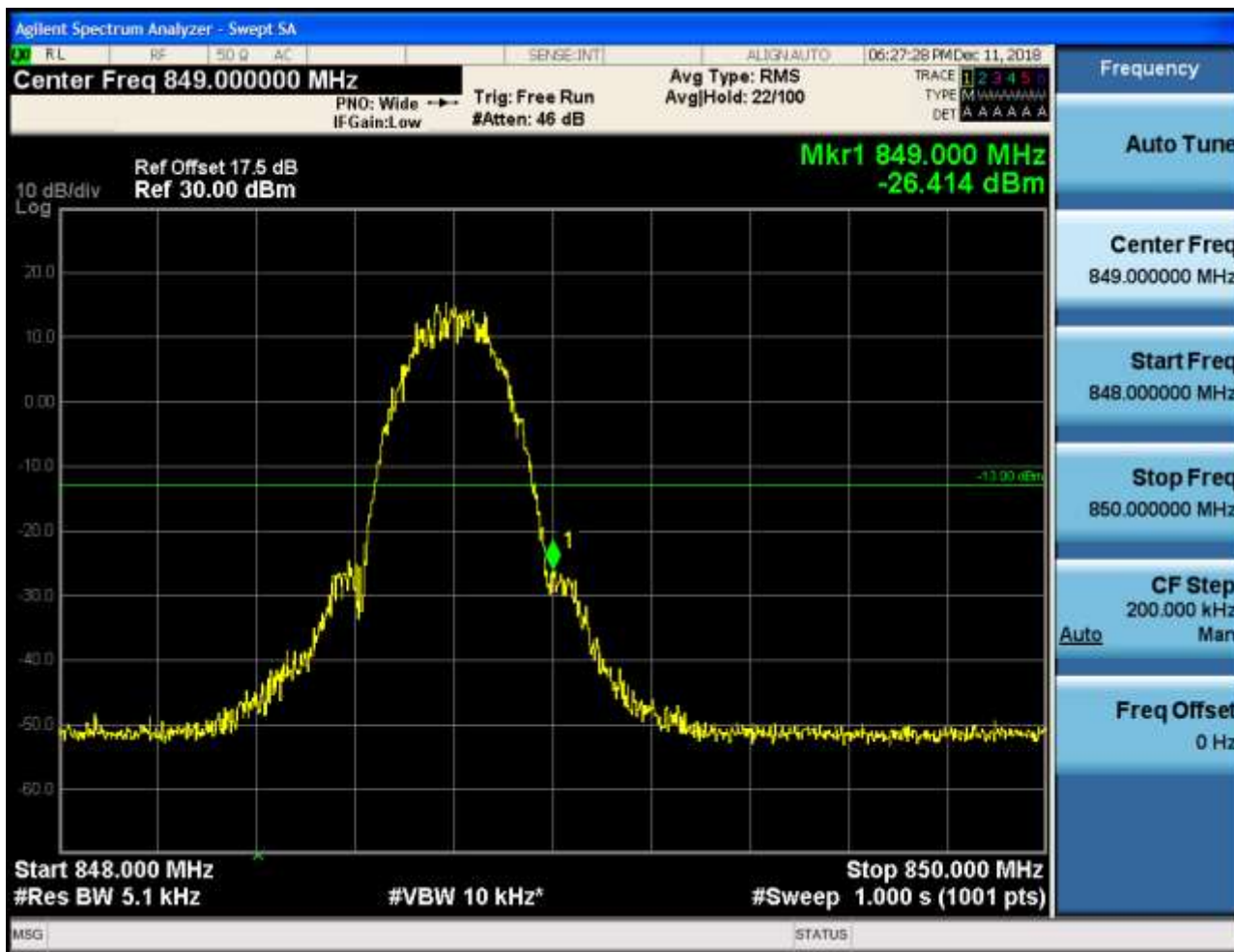


### 5.1.1.2 Test Mode = GSM/TM2

#### 5.1.1.2.1 Test Channel = LCH



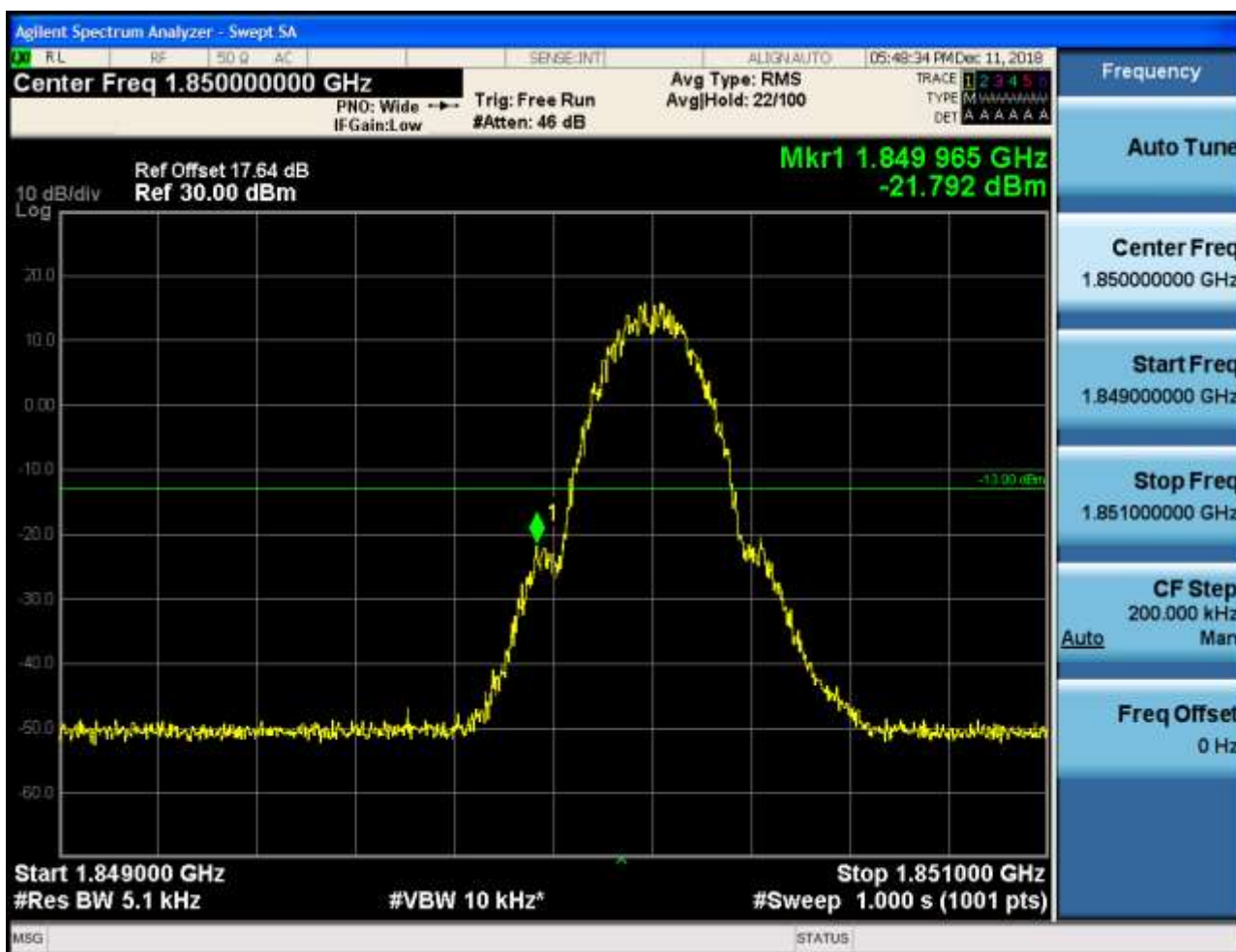
### 5.1.1.2.2 Test Channel = HCH



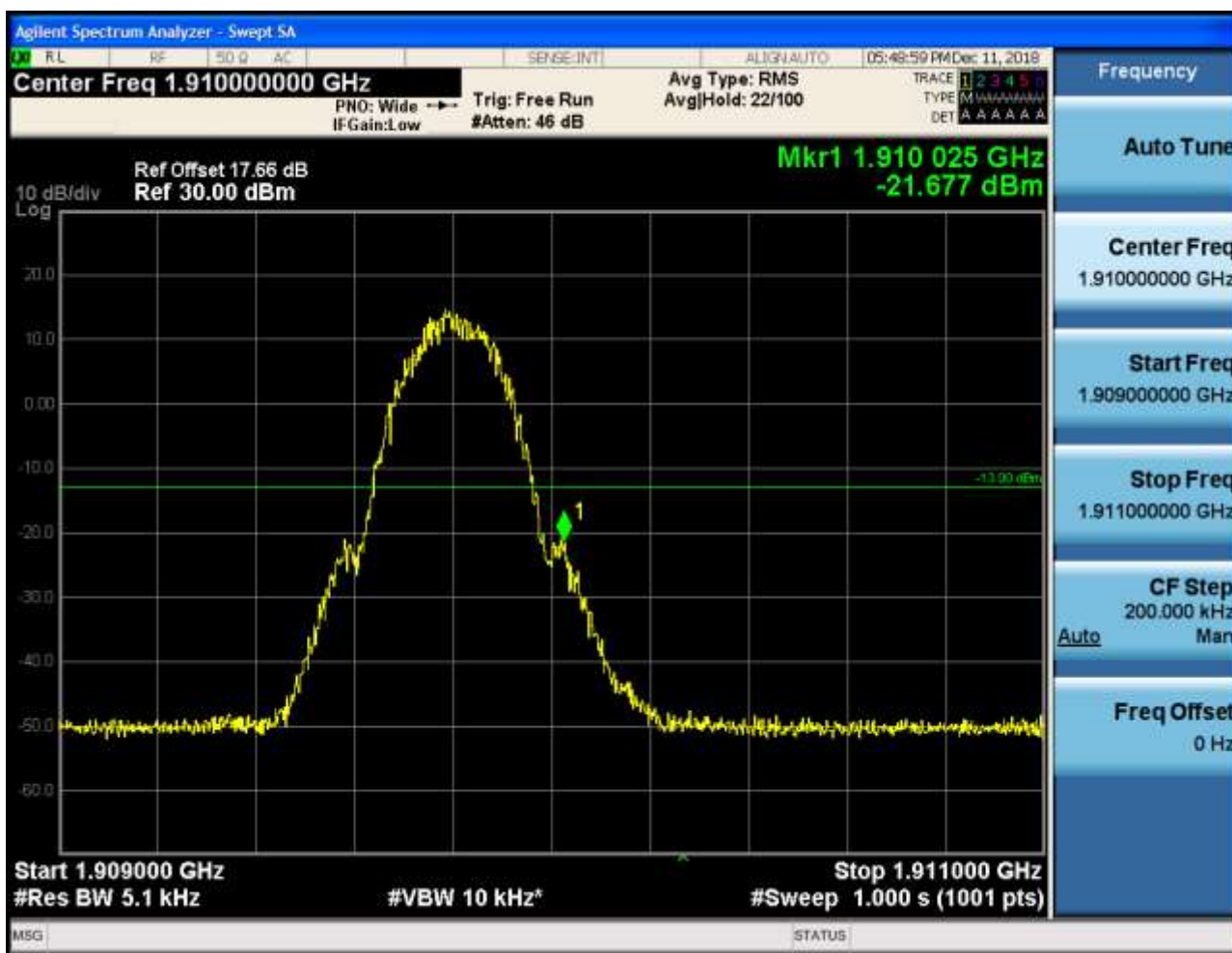
## 5.1.2 Test Band = PCS1900

### 5.1.2.1 Test Mode = GSM/TM1

#### 5.1.2.1.1 Test Channel = LCH

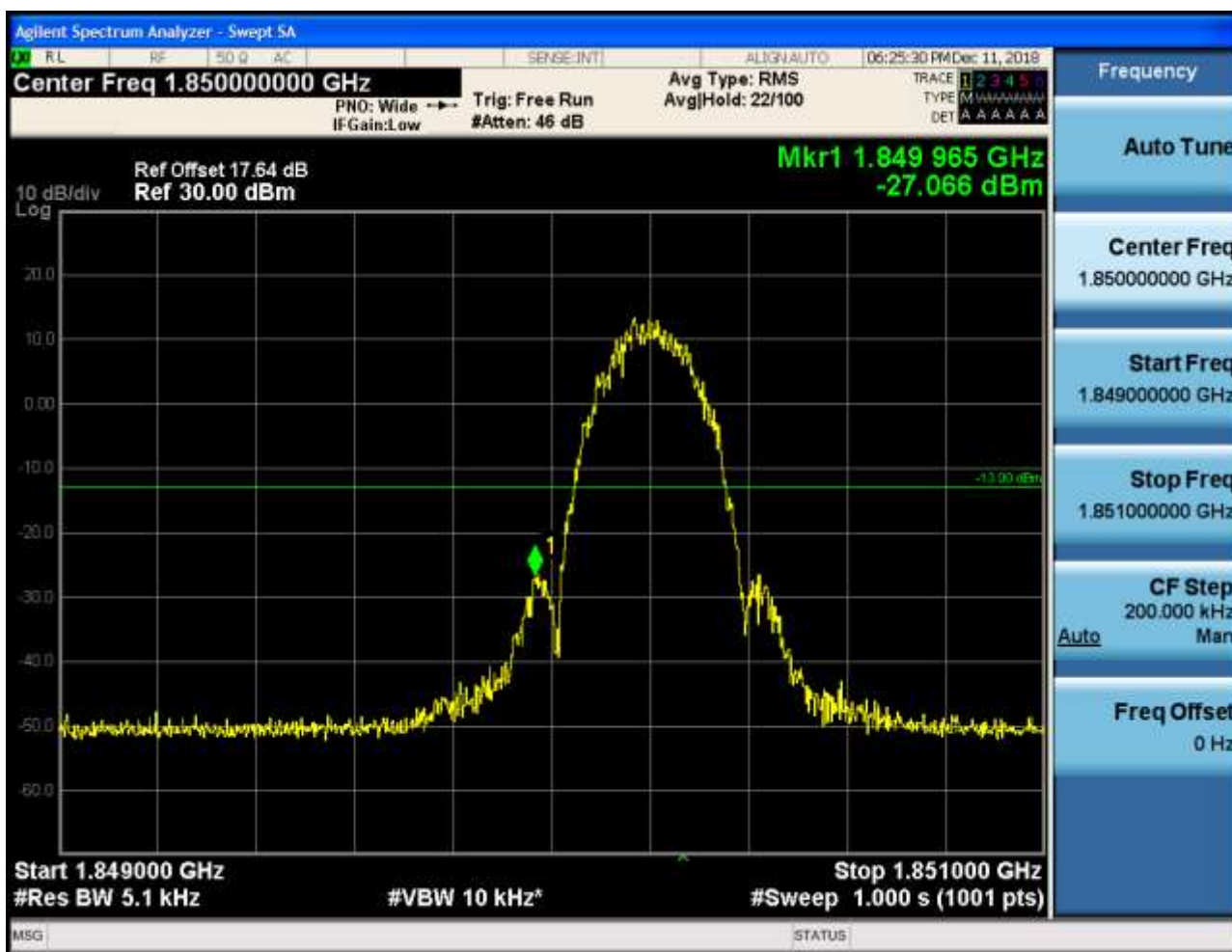


### 5.1.2.1.2 Test Channel = HCH

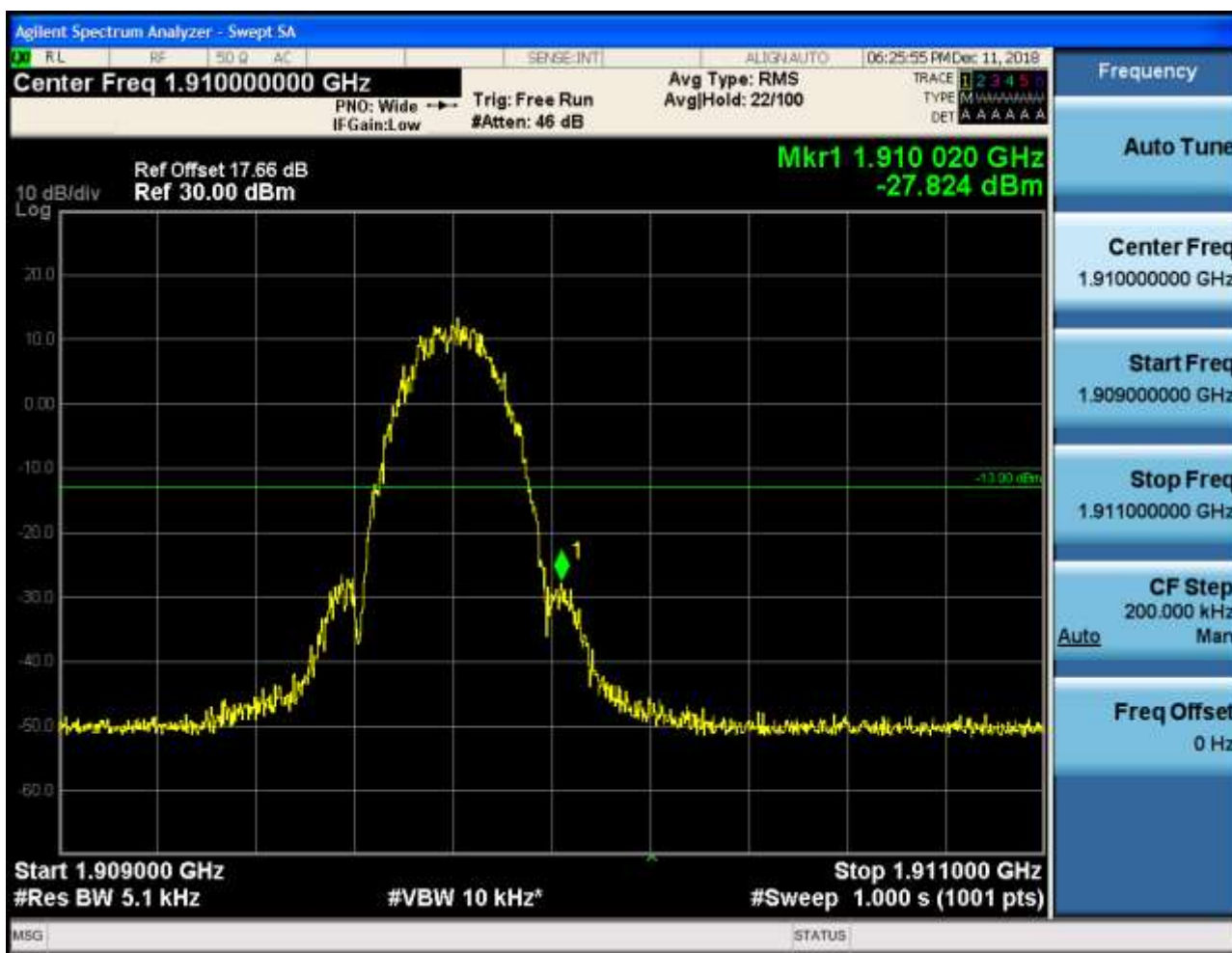


### 5.1.2.2 Test Mode = GSM/TM2

#### 5.1.2.2.1 Test Channel = LCH



### 5.1.2.2.2 Test Channel = HCH



## 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

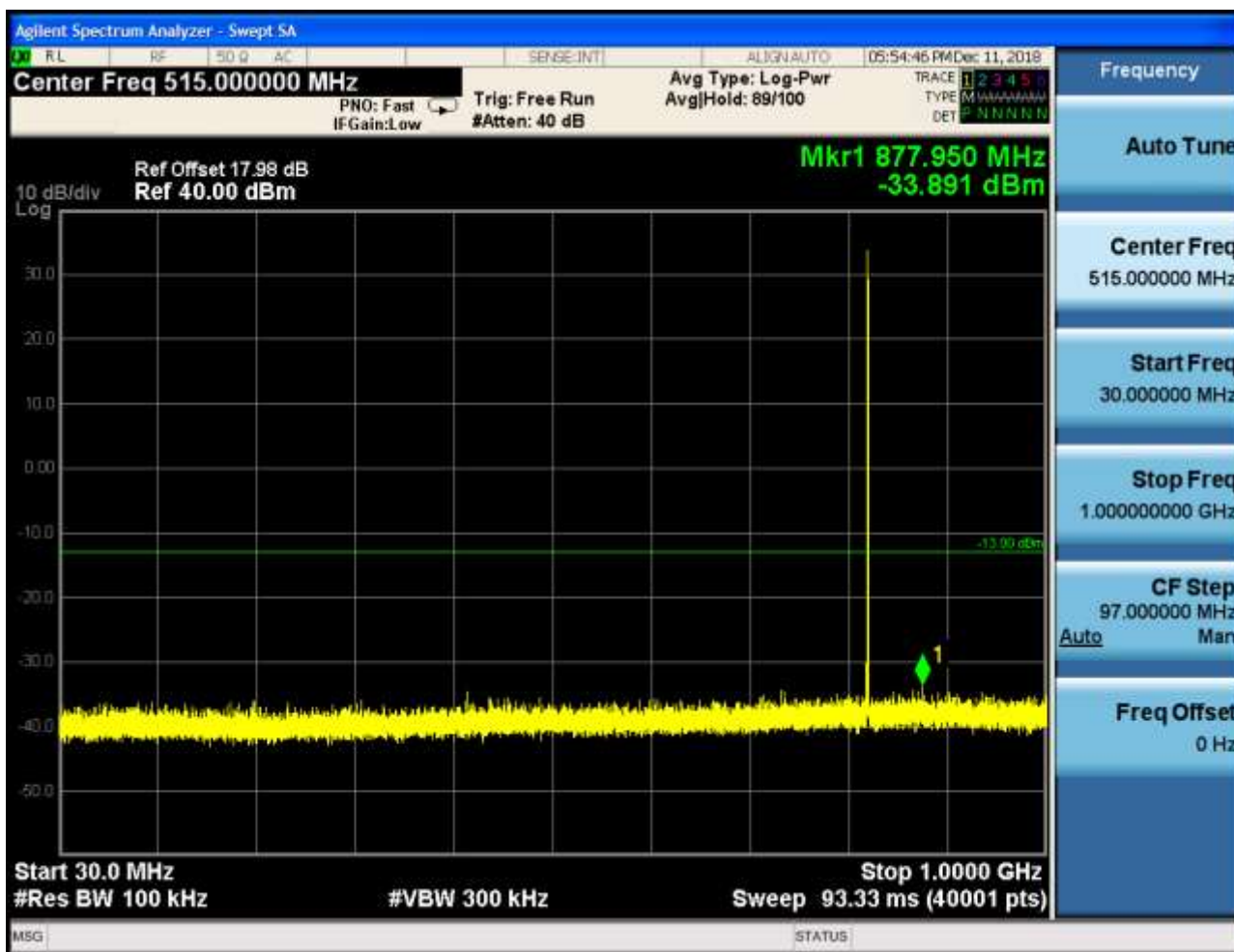
##### 6.1.1 Test Band = GSM850

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

##### 6.1.1.1.1 Test Channel = LCH





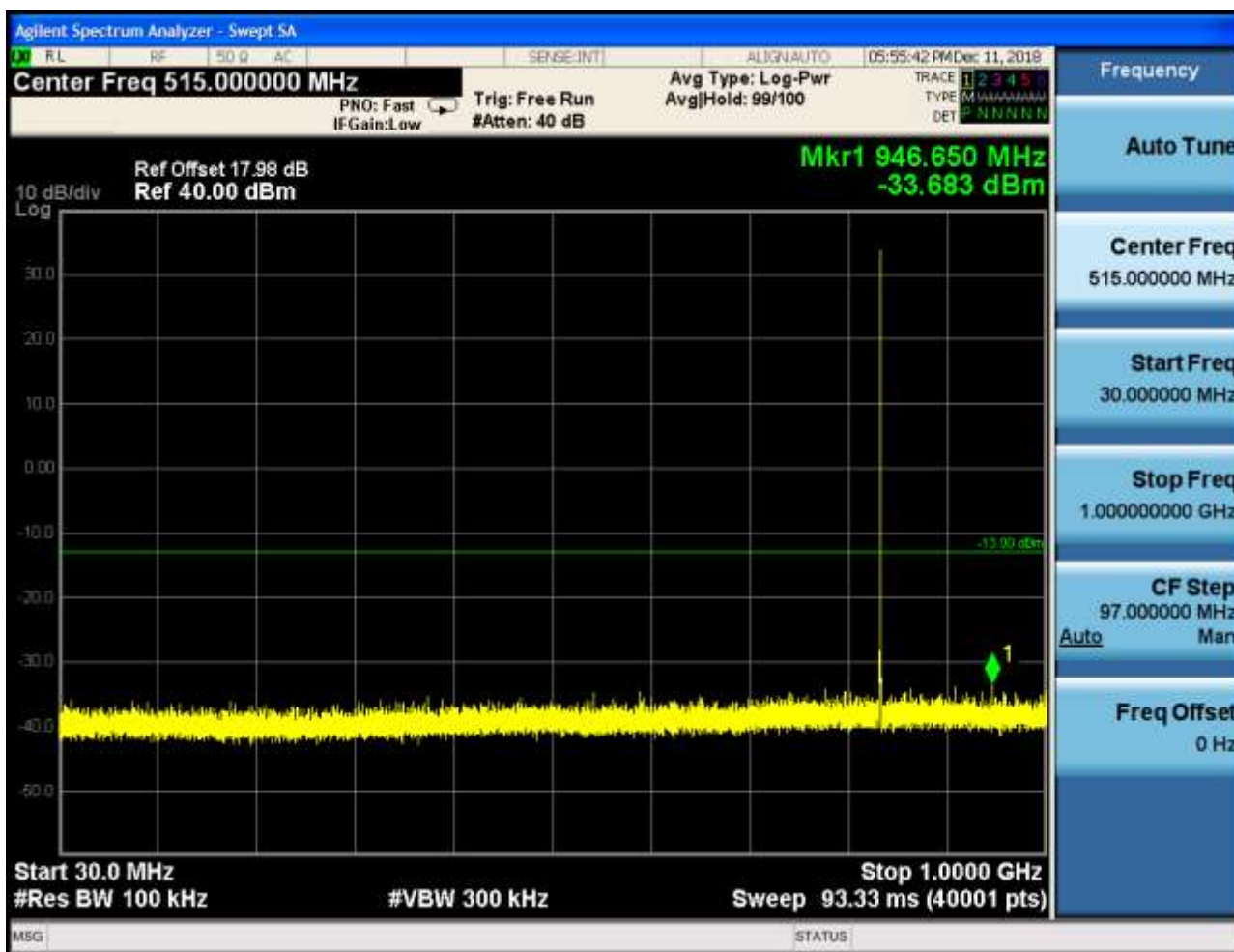




### 6.1.1.1.2 Test Channel = MCH

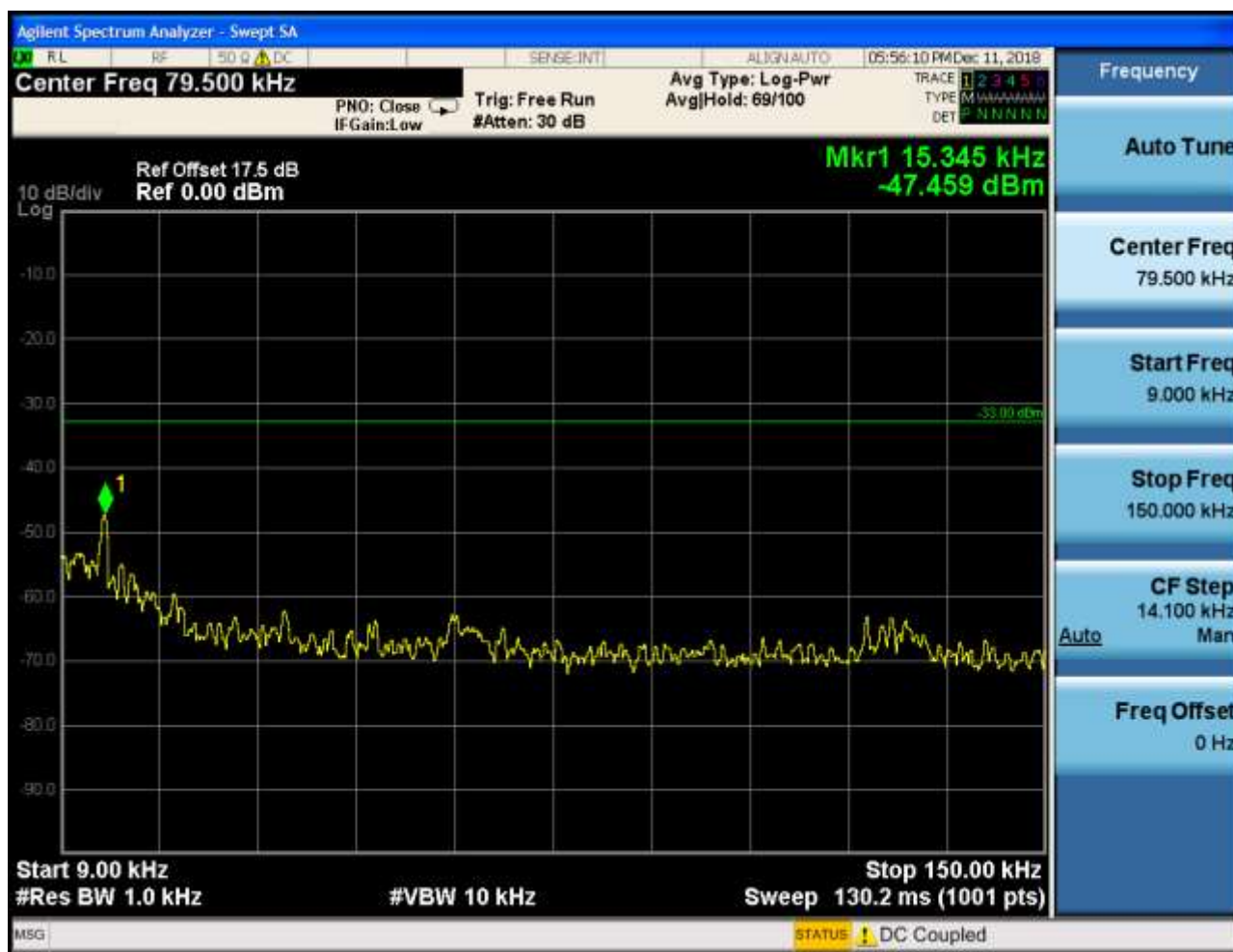




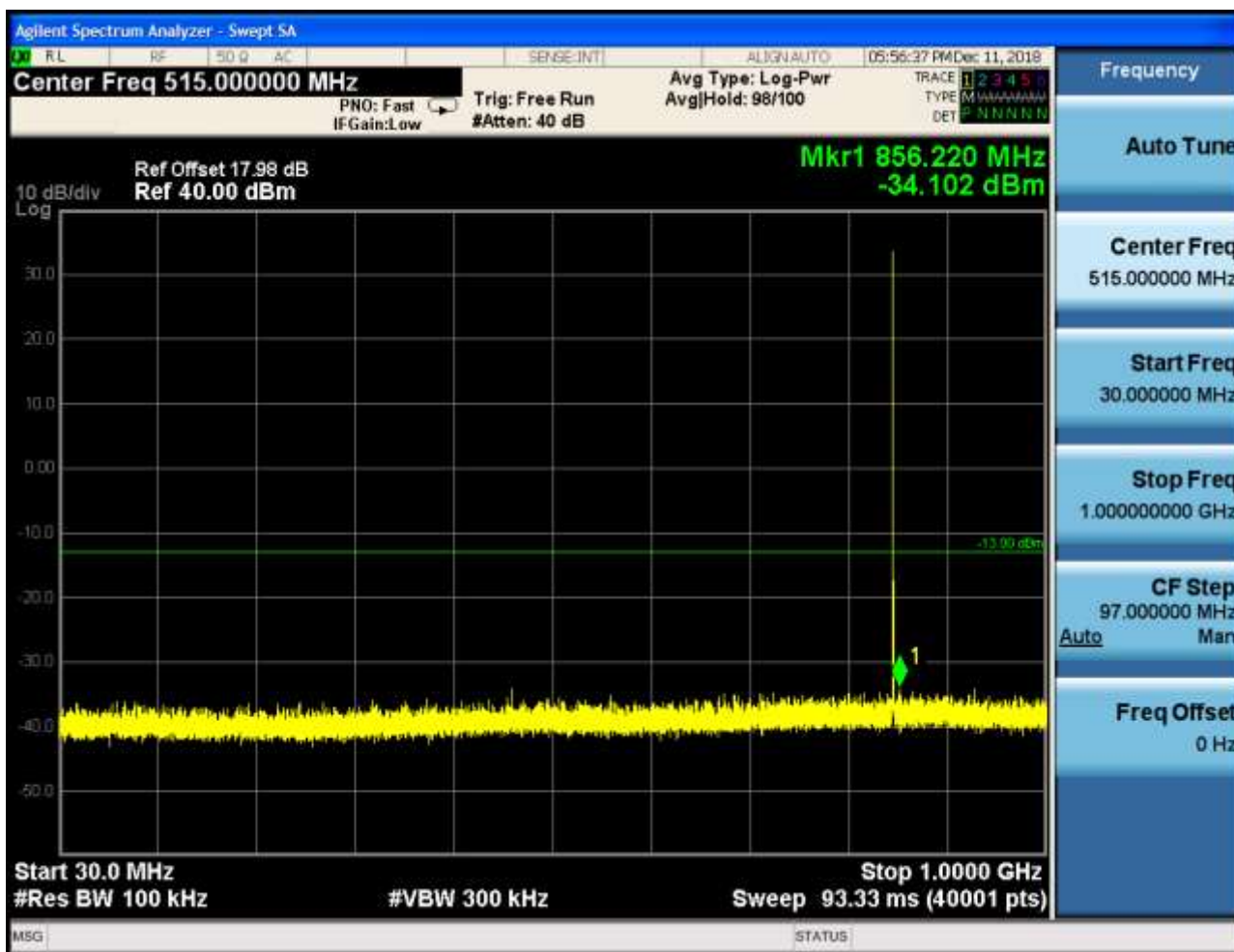




#### 6.1.1.1.3 Test Channel = HCH







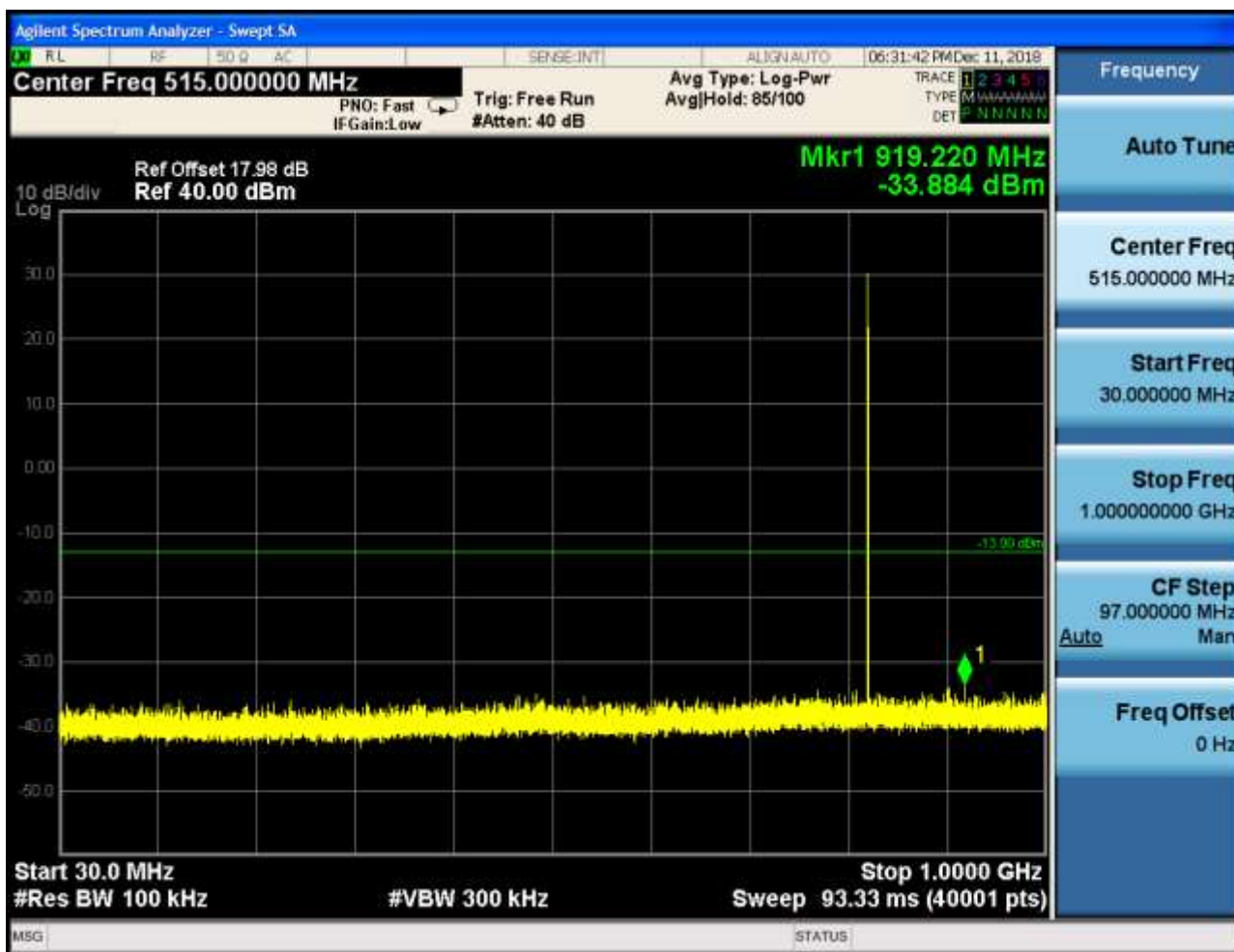


### 6.1.1.2 Test Mode = GSM/TM2

#### 6.1.1.2.1 Test Channel = LCH





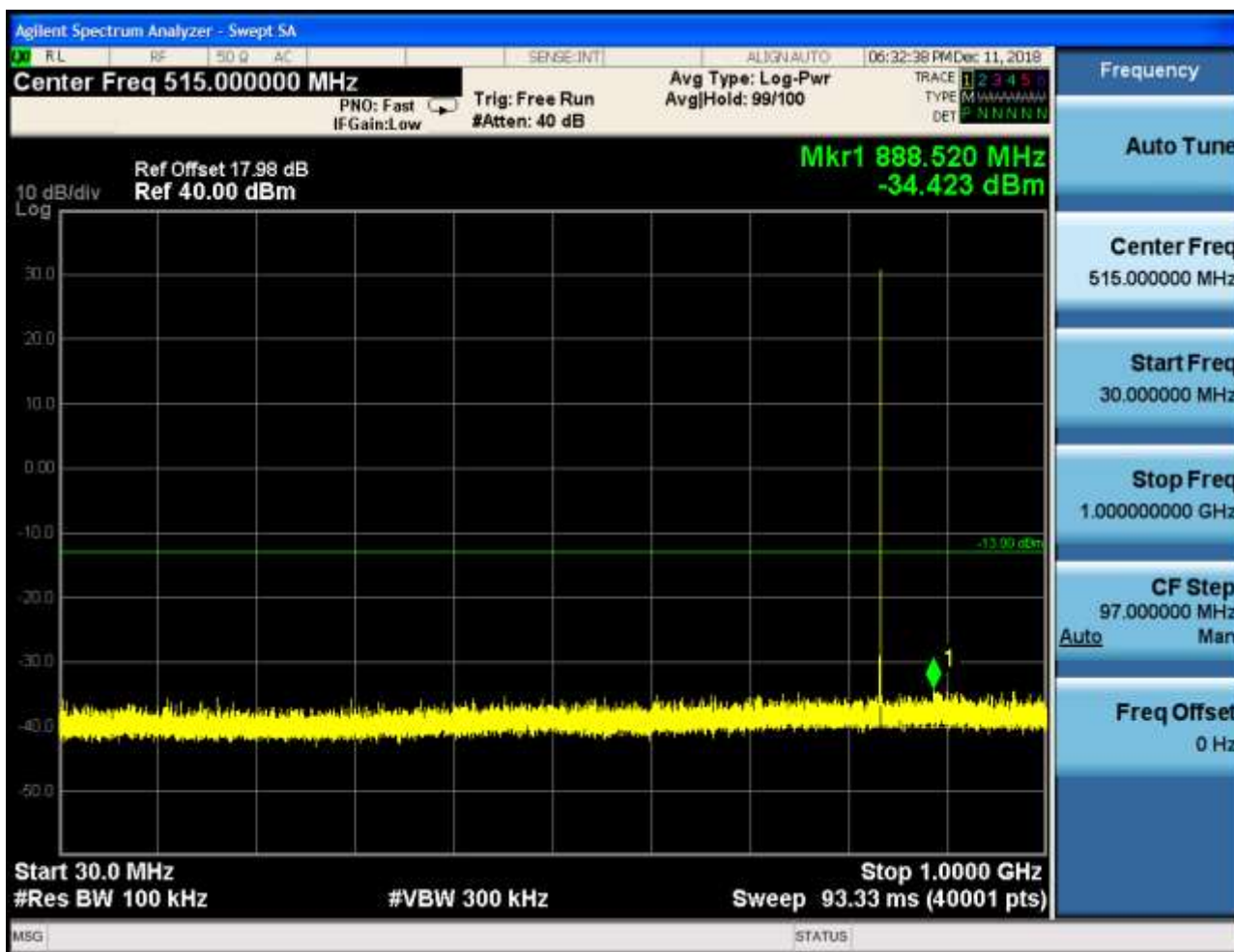




### 6.1.1.2.2 Test Channel = MCH





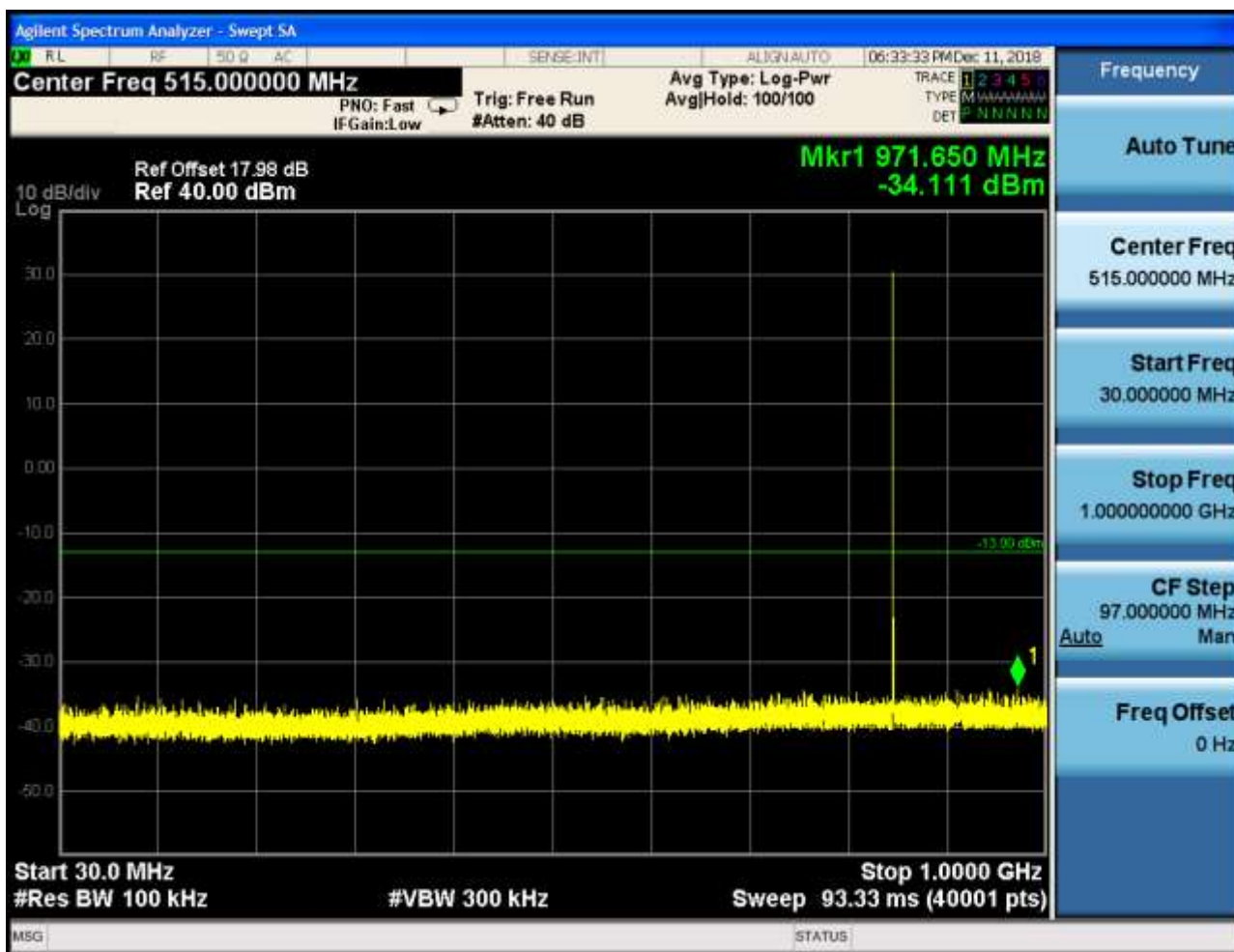




### 6.1.1.2.3 Test Channel = HCH









## 6.1.2 Test Band = PCS1900

### 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

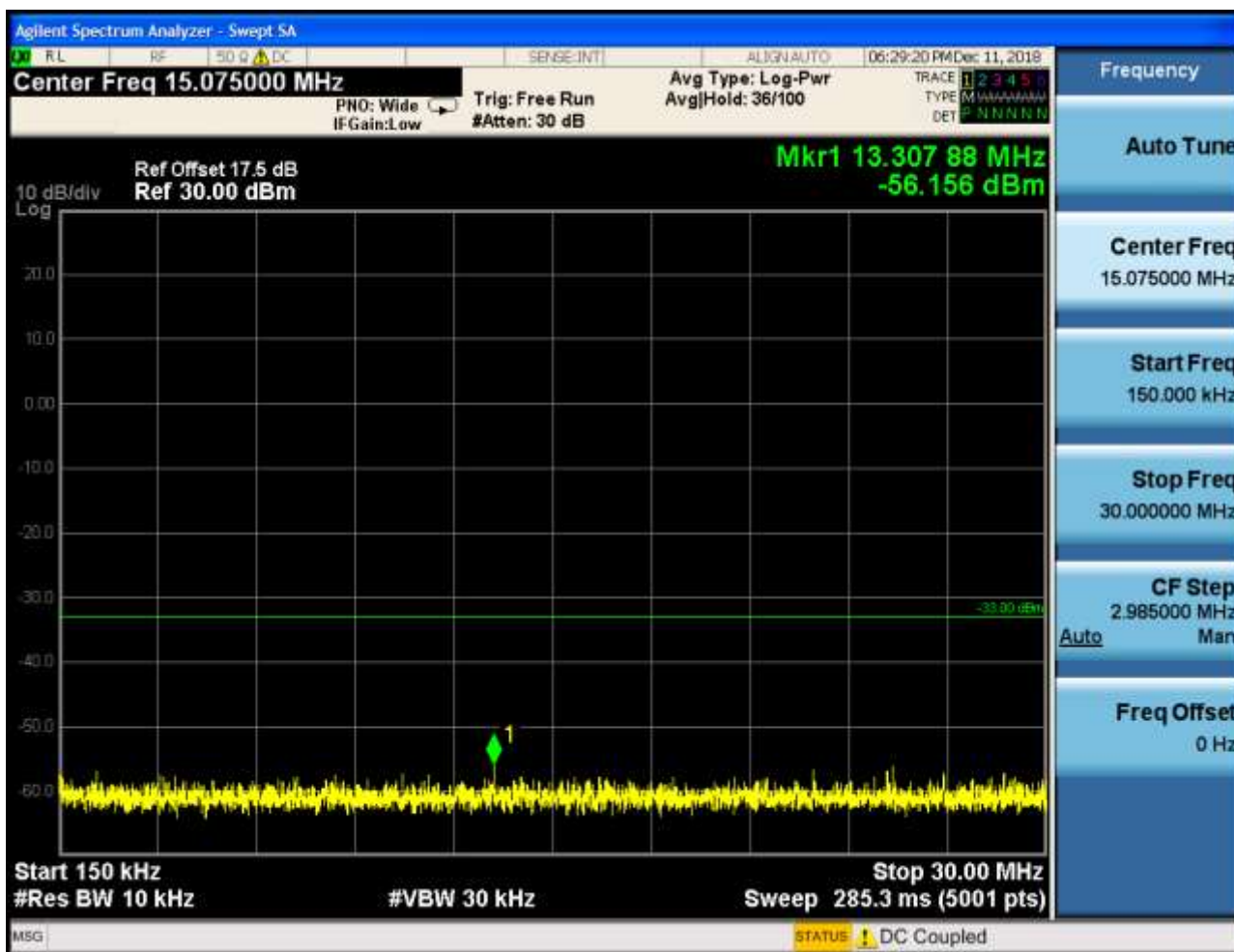






### 6.1.2.2.2 Test Channel = MCH

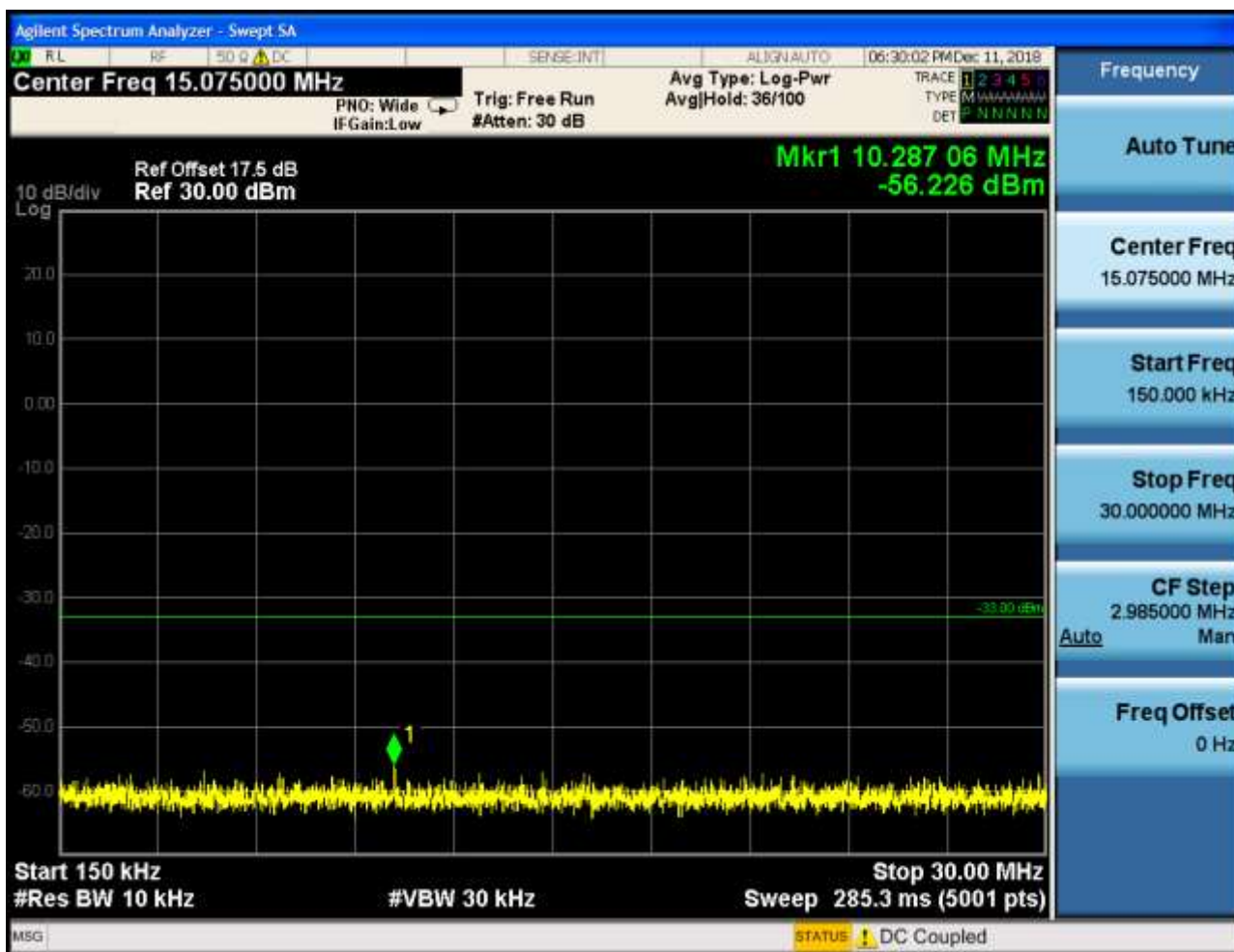






### 6.1.2.2.3 Test Channel = HCH







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

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

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

150 kHz ~30MHz, RBW = 9 kHz, 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

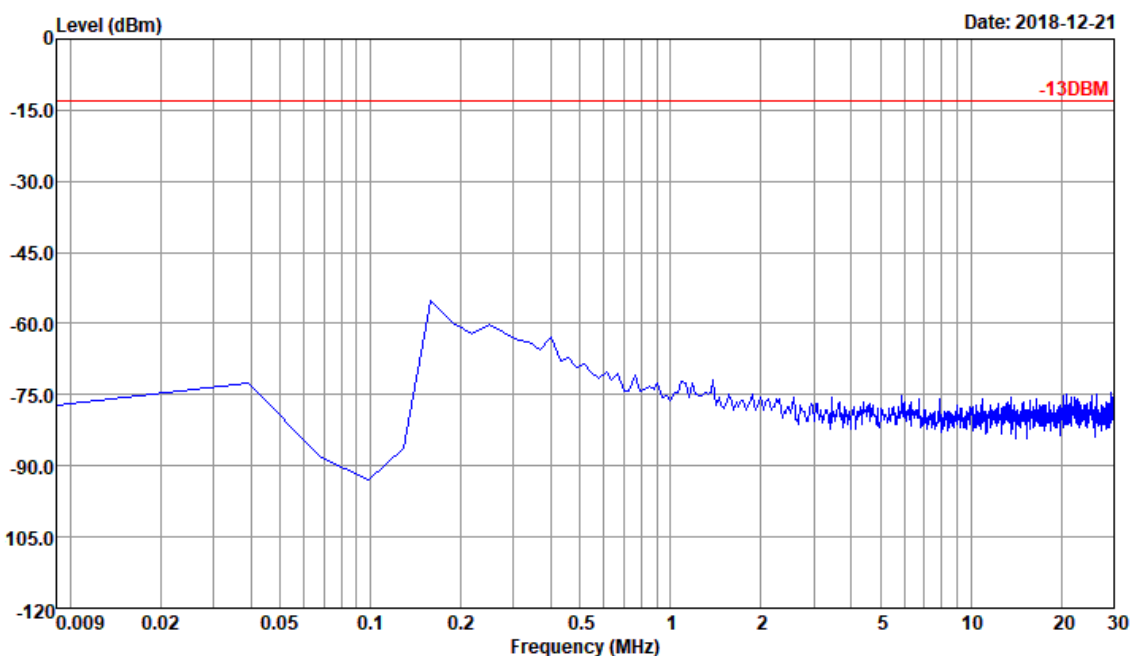
#### 7.1 For GSM\_ANT1

##### 7.1.1 Test Band = GSM850

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

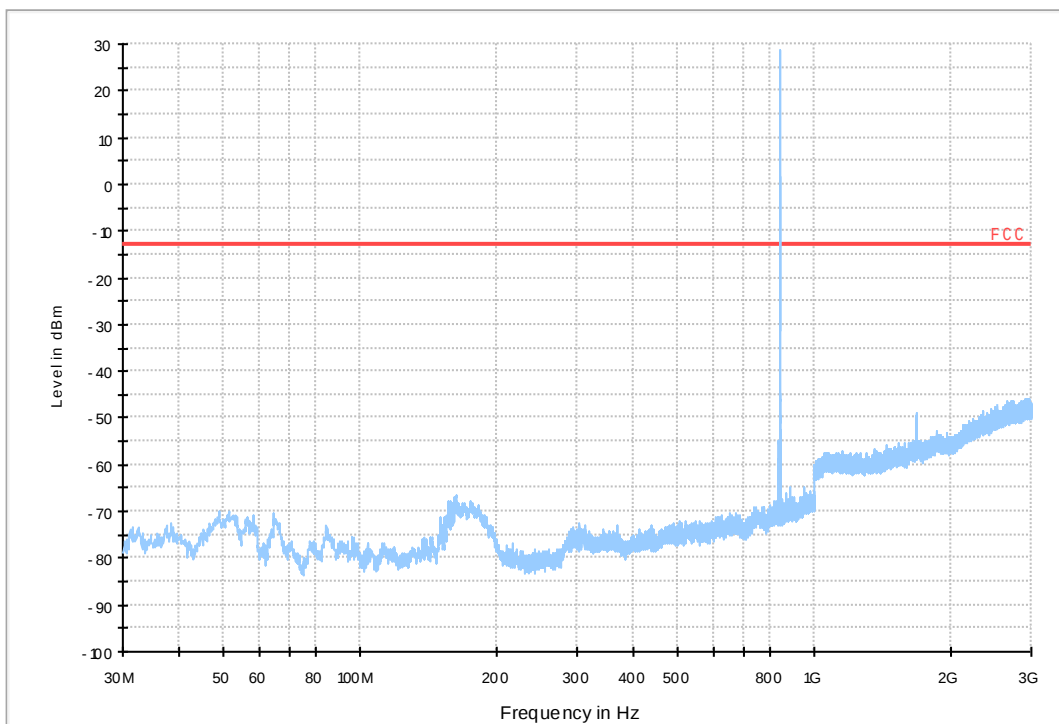


Data: 34

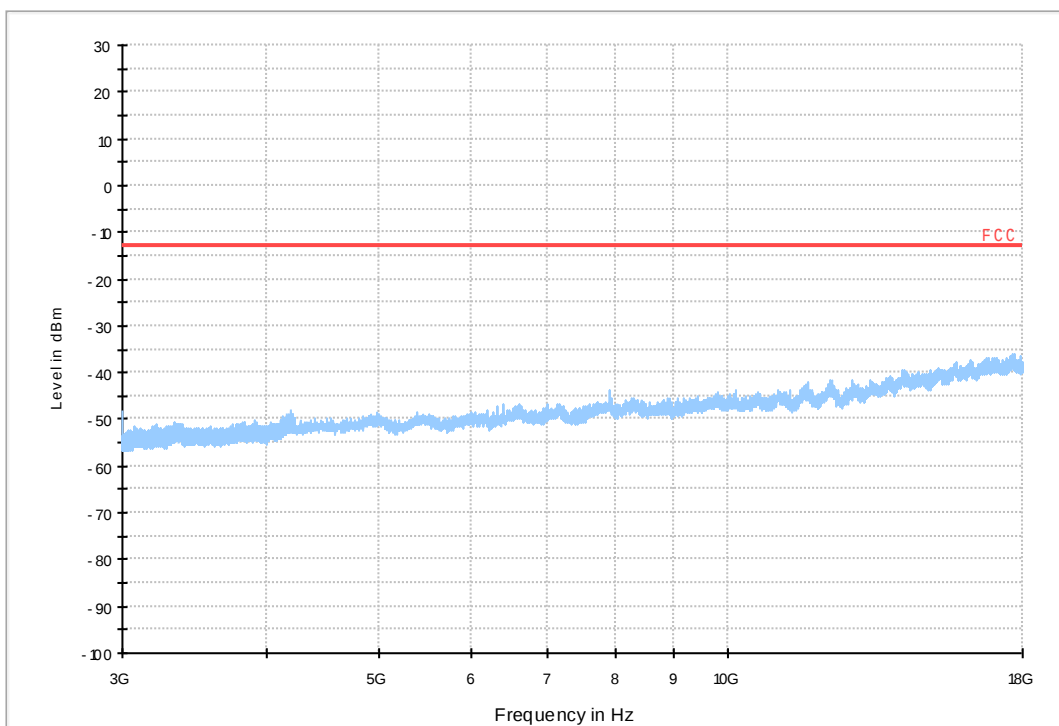


Site : 03CH01-SZ  
Condition : -13DBM 9K-30M AMP NEUTRAL  
: RBW:9.000KHz VBW:30.000KHz

04 FCC PART 22 GSM850\_L

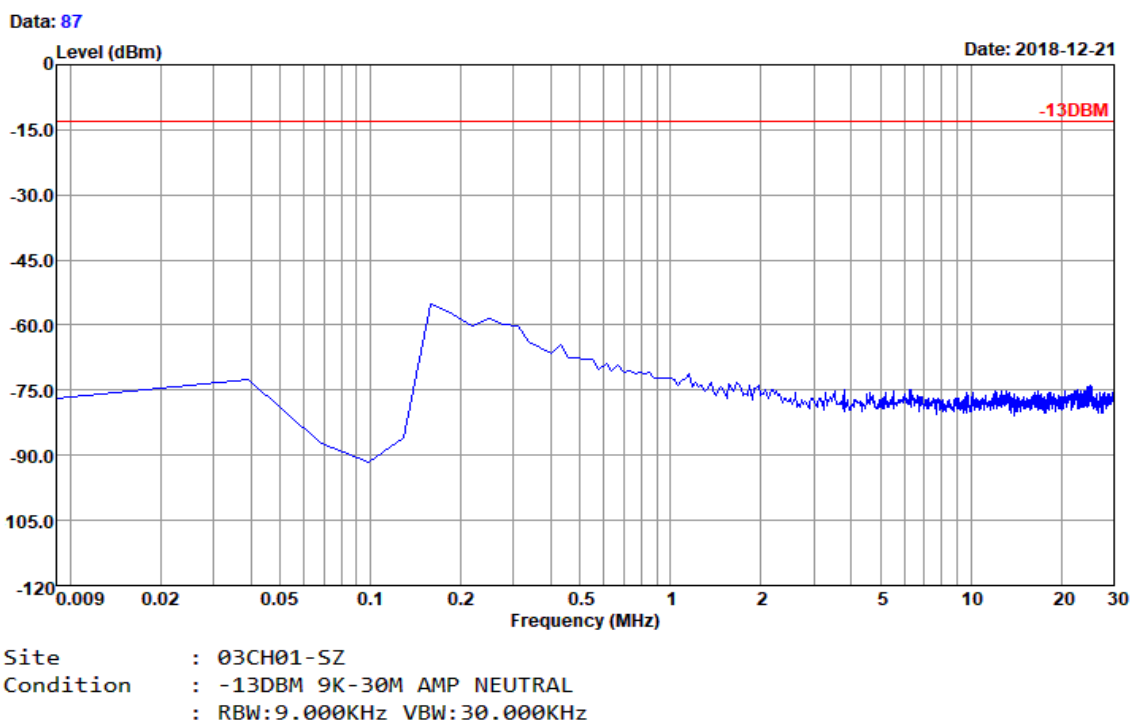


03 FCC PART 22 GSM850\_H

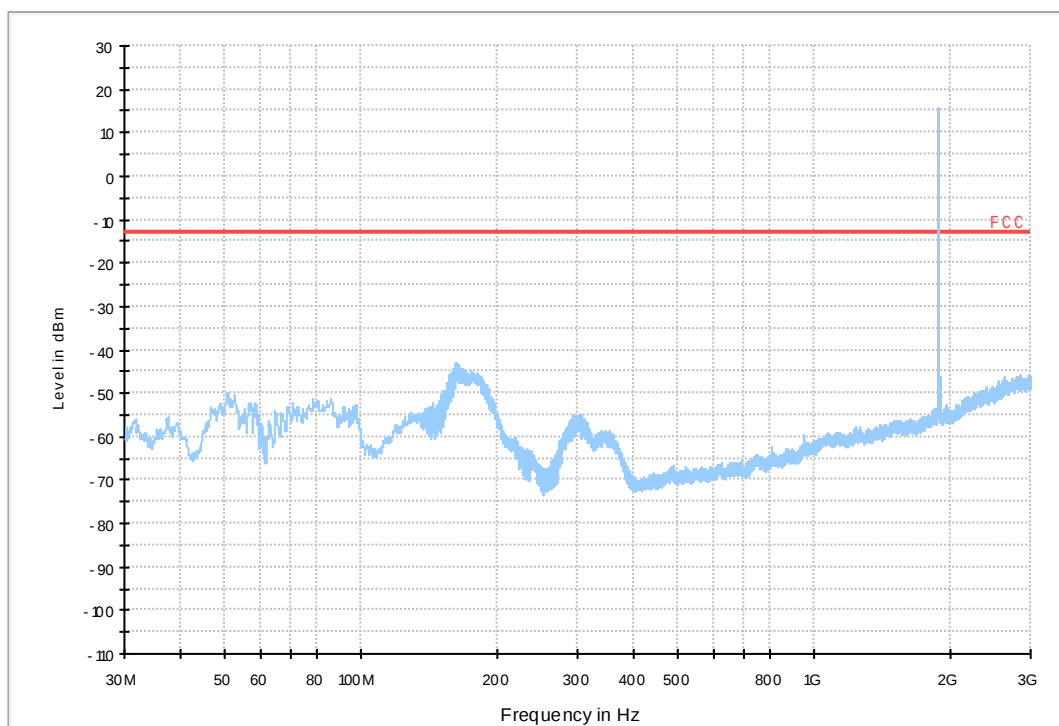


## 7.1.2 Test Band = PCS1900

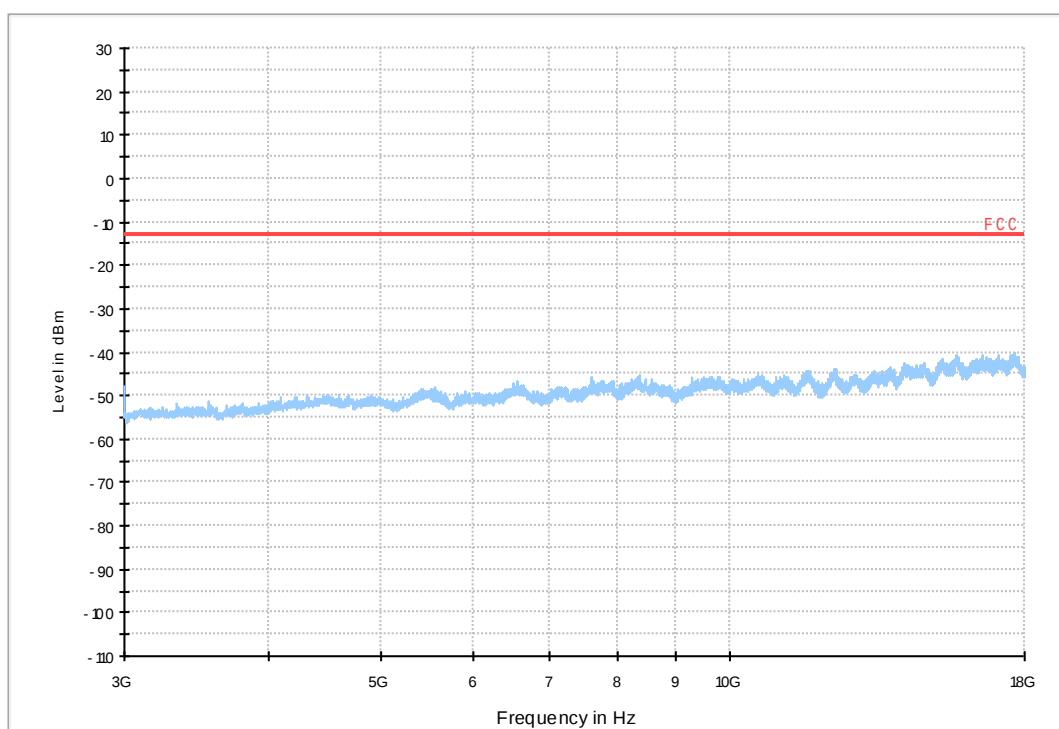
### 7.1.2.1 Test Mode = GSM/TM1



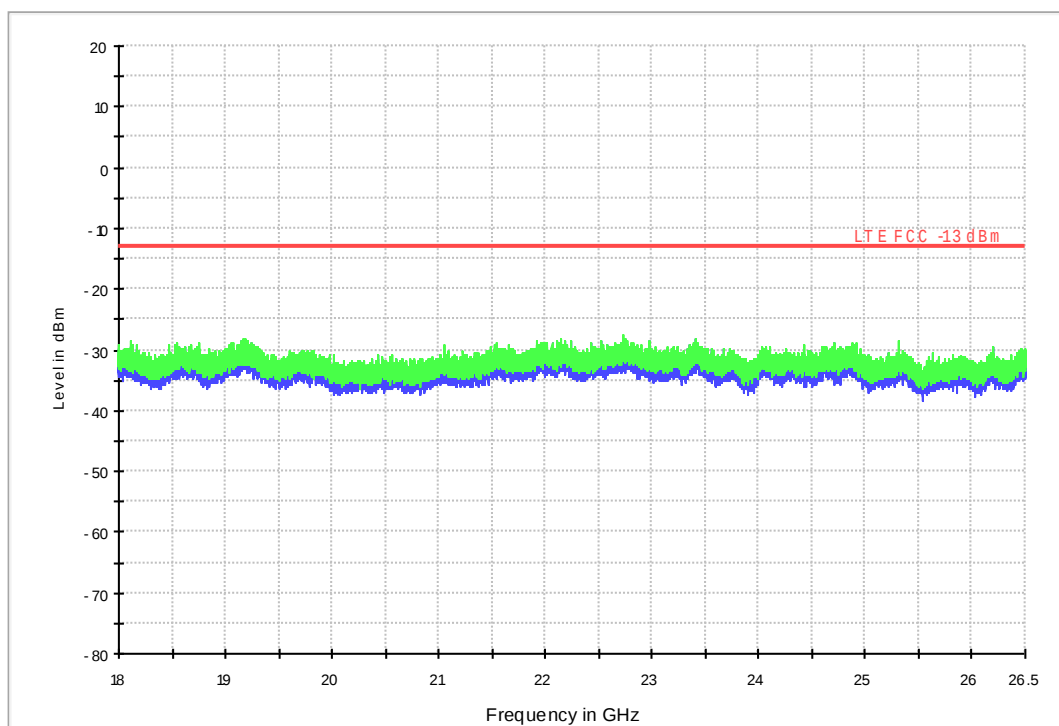
10 FCC PART 24 GSM1900\_L



09 FCC PART 24 GSM1900\_H



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



## 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         | 11.62291         | 0.01410               | PASS    |
|           |           |              |            | VN         | 13.49548         | 0.01637               | PASS    |
|           |           |              |            | VH         | 12.72062         | 0.01543               | PASS    |
|           |           | MCH          | TN         | VL         | 12.52691         | 0.01497               | PASS    |
|           |           |              |            | VN         | 14.33492         | 0.01713               | PASS    |
|           |           |              |            | VH         | 11.39690         | 0.01362               | PASS    |
|           |           | HCH          | TN         | VL         | 11.04176         | 0.01301               | PASS    |
|           |           |              |            | VN         | 15.43264         | 0.01818               | PASS    |
|           |           |              |            | VH         | 13.04348         | 0.01537               | PASS    |
|           | GSM/TM2   | LCH          | TN         | VL         | 12.62377         | 0.01532               | PASS    |
|           |           |              |            | VN         | 14.23806         | 0.01728               | PASS    |
|           |           |              |            | VH         | 13.68920         | 0.01661               | PASS    |
|           |           | MCH          | TN         | VL         | 13.17263         | 0.01575               | PASS    |
|           |           |              |            | VN         | 14.10892         | 0.01686               | PASS    |
|           |           |              |            | VH         | 14.17349         | 0.01694               | PASS    |
|           |           | HCH          | TN         | VL         | 16.43350         | 0.01936               | PASS    |
|           |           |              |            | VN         | 15.69092         | 0.01849               | PASS    |
|           |           |              |            | VH         | 15.30349         | 0.01803               | PASS    |
| PCS1900   | GSM/TM1   | LCH          | TN         | VL         | 19.04865         | 0.01030               | PASS    |
|           |           |              |            | VN         | 21.01809         | 0.01136               | PASS    |
|           |           |              |            | VH         | 18.88722         | 0.01021               | PASS    |
|           |           | MCH          | TN         | VL         | 18.75808         | 0.00998               | PASS    |
|           |           |              |            | VN         | 20.85666         | 0.01109               | PASS    |
|           |           |              |            | VH         | 17.01464         | 0.00905               | PASS    |
|           |           | HCH          | TN         | VL         | 19.88808         | 0.01030               | PASS    |
|           |           |              |            | VN         | 19.01637         | 0.01136               | PASS    |
|           |           |              |            | VH         | 18.17693         | 0.01021               | PASS    |
|           | GSM/TM2   | LCH          | TN         | VL         | 19.62980         | 0.01061               | PASS    |
|           |           |              |            | VN         | 24.27896         | 0.01312               | PASS    |
|           |           |              |            | VH         | 22.24495         | 0.01202               | PASS    |
|           |           | MCH          | TN         | VL         | 20.92123         | 0.01113               | PASS    |
|           |           |              |            | VN         | 18.08008         | 0.00962               | PASS    |
|           |           |              |            | VH         | 19.43608         | 0.01034               | PASS    |

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           | HCH          | TN         | VL         | 18.82265         | 0.01061               | PASS    |
|           |           |              |            | VN         | 16.11064         | 0.01312               | PASS    |
|           |           |              |            | VH         | 17.85407         | 0.01202               | 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        | 13.43091         | 0.01630               | PASS    |
|           |           |              |            | -20        | 13.49548         | 0.01637               | PASS    |
|           |           |              |            | -10        | 14.75463         | 0.01790               | PASS    |
|           |           |              |            | 0          | 13.17263         | 0.01598               | PASS    |
|           |           |              |            | 10         | 12.10719         | 0.01469               | PASS    |
|           |           |              |            | 20         | 13.49548         | 0.01637               | PASS    |
|           |           |              |            | 30         | 14.62549         | 0.01775               | PASS    |
|           |           |              |            | 40         | 14.46406         | 0.01755               | PASS    |
|           |           |              |            | 50         | 13.30177         | 0.01614               | PASS    |
|           |           | MCH          | VN         | -30        | 14.04434         | 0.01679               | PASS    |
|           |           |              |            | -20        | 14.17349         | 0.01694               | PASS    |
|           |           |              |            | -10        | 13.46320         | 0.01609               | PASS    |
|           |           |              |            | 0          | 14.98063         | 0.01791               | PASS    |
|           |           |              |            | 10         | 12.07491         | 0.01443               | PASS    |
|           |           |              |            | 20         | 14.33492         | 0.01713               | PASS    |
|           |           |              |            | 30         | 14.04434         | 0.01679               | PASS    |
|           |           |              |            | 40         | 13.91520         | 0.01663               | PASS    |
|           |           |              |            | 50         | 13.72149         | 0.01640               | PASS    |
|           |           | HCH          | VN         | -30        | 15.43264         | 0.01818               | PASS    |
|           |           |              |            | -20        | 15.07749         | 0.01776               | PASS    |
|           |           |              |            | -10        | 13.62463         | 0.01605               | PASS    |
|           |           |              |            | 0          | 14.65778         | 0.01727               | PASS    |
|           |           |              |            | 10         | 16.75636         | 0.01974               | PASS    |
|           |           |              |            | 20         | 15.43264         | 0.01818               | PASS    |
|           |           |              |            | 30         | 15.36806         | 0.01811               | PASS    |
|           |           |              |            | 40         | 14.39949         | 0.01696               | PASS    |
|           |           |              |            | 50         | 15.01292         | 0.01769               | PASS    |
|           | GSM/TM2   | LCH          | VN         | -30        | 14.56000         | 0.01767               | PASS    |
|           |           |              |            | -20        | 14.39949         | 0.01747               | PASS    |
|           |           |              |            | -10        | 14.78692         | 0.01794               | PASS    |
|           |           |              |            | 0          | 9.36290          | 0.01136               | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 10         | 12.39777         | 0.01504               | PASS    |
|           |           |              |            | 20         | 14.23806         | 0.01728               | PASS    |
|           |           |              |            | 30         | 12.52691         | 0.01520               | PASS    |
|           |           |              |            | 40         | 13.81834         | 0.01677               | PASS    |
|           |           |              |            | 50         | 14.27035         | 0.01731               | PASS    |
|           |           | MCH          | VN         | -30        | 15.43000         | 0.01844               | PASS    |
|           |           |              |            | -20        | 11.81662         | 0.01412               | PASS    |
|           |           |              |            | -10        | 10.71890         | 0.01281               | PASS    |
|           |           |              |            | 0          | 13.75377         | 0.01644               | PASS    |
|           |           |              |            | 10         | 13.04348         | 0.01559               | PASS    |
|           |           |              |            | 20         | 14.10892         | 0.01686               | PASS    |
|           |           |              |            | 30         | 12.59148         | 0.01505               | PASS    |
|           |           |              |            | 40         | 13.68920         | 0.01636               | PASS    |
|           |           |              |            | 50         | 11.97805         | 0.01432               | PASS    |
|           |           | HCH          | VN         | -30        | 13.95001         | 0.01643               | PASS    |
|           |           |              |            | -20        | 14.01206         | 0.01651               | PASS    |
|           |           |              |            | -10        | 14.62549         | 0.01723               | PASS    |
|           |           |              |            | 0          | 14.56092         | 0.01715               | PASS    |
|           |           |              |            | 10         | 15.07749         | 0.01776               | PASS    |
|           |           |              |            | 20         | 15.69092         | 0.01849               | PASS    |
|           |           |              |            | 30         | 14.33492         | 0.01689               | PASS    |
|           |           |              |            | 40         | 11.71976         | 0.01381               | PASS    |
|           |           |              |            | 50         | 14.81920         | 0.01746               | PASS    |
| PCS1900   | GSM/TM1   | LCH          | VN         | -30        | 22.14809         | 0.01197               | PASS    |
|           |           |              |            | -20        | 18.49979         | 0.01000               | PASS    |
|           |           |              |            | -10        | 18.59665         | 0.01005               | PASS    |
|           |           |              |            | 0          | 21.01809         | 0.01136               | PASS    |
|           |           |              |            | 10         | 22.18038         | 0.01199               | PASS    |
|           |           |              |            | 20         | 21.01809         | 0.01136               | PASS    |
|           |           |              |            | 30         | 22.18038         | 0.01199               | PASS    |
|           |           |              |            | 40         | 19.56522         | 0.01057               | PASS    |
|           |           |              |            | 50         | 22.56781         | 0.01220               | PASS    |
|           |           | MCH          | VN         | -30        | 18.17693         | 0.00967               | PASS    |
|           |           |              |            | -20        | 20.01723         | 0.01065               | PASS    |
|           |           |              |            | -10        | 18.37065         | 0.00977               | PASS    |
|           |           |              |            | 0          | 20.53380         | 0.01092               | PASS    |
|           |           |              |            | 10         | 18.62894         | 0.00991               | PASS    |
|           |           |              |            | 20         | 20.85666         | 0.01109               | PASS    |
|           |           |              |            | 30         | 18.49979         | 0.00984               | PASS    |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|-----------|-----------|--------------|------------|------------|------------------|-----------------------|---------|
|           |           |              |            | 40         | 23.14895         | 0.01231               | PASS    |
|           |           |              |            | 50         | 17.95093         | 0.00955               | PASS    |
|           |           | HCH          | VN         | -30        | 18.72579         | 0.00981               | PASS    |
|           |           |              |            | -20        | 20.53380         | 0.01075               | PASS    |
|           |           |              |            | -10        | 20.01723         | 0.01048               | PASS    |
|           |           |              |            | 0          | 16.14292         | 0.00845               | PASS    |
|           |           |              |            | 10         | 20.08180         | 0.01052               | PASS    |
|           |           |              |            | 20         | 19.01637         | 0.00996               | PASS    |
|           |           |              |            | 30         | 19.24237         | 0.01008               | PASS    |
|           |           |              |            | 40         | 20.69523         | 0.01084               | PASS    |
|           |           |              |            | 50         | 17.56350         | 0.00920               | PASS    |
|           | GSM/TM2   | LCH          | VN         | -30        | 21.63152         | 0.01169               | PASS    |
|           |           |              |            | -20        | 19.43608         | 0.01050               | PASS    |
|           |           |              |            | -10        | 20.01724         | 0.01048               | PASS    |
|           |           |              |            | 0          | 18.08008         | 0.00977               | PASS    |
|           |           |              |            | 10         | 20.27551         | 0.01096               | PASS    |
|           |           |              |            | 20         | 24.27896         | 0.01312               | PASS    |
|           |           |              |            | 30         | 19.88808         | 0.01075               | PASS    |
|           |           |              |            | 40         | 22.79381         | 0.01232               | PASS    |
|           |           |              |            | 50         | 17.85407         | 0.00965               | PASS    |
|           |           | MCH          | VN         | -30        | 20.56609         | 0.01094               | PASS    |
|           |           |              |            | -20        | 18.04779         | 0.00960               | PASS    |
|           |           |              |            | -10        | 18.59665         | 0.01005               | PASS    |
|           |           |              |            | 0          | 18.11236         | 0.00963               | PASS    |
|           |           |              |            | 10         | 17.33750         | 0.00922               | PASS    |
|           |           |              |            | 20         | 18.08008         | 0.00962               | PASS    |
|           |           |              |            | 30         | 19.27465         | 0.01025               | PASS    |
|           |           |              |            | 40         | 19.24237         | 0.01024               | PASS    |
|           |           | HCH          | VN         | 50         | 16.95007         | 0.00902               | PASS    |
|           |           |              |            | -30        | 17.95093         | 0.00940               | PASS    |
|           |           |              |            | -20        | 19.95265         | 0.01045               | PASS    |
|           |           |              |            | -10        | 20.24323         | 0.01060               | PASS    |
|           |           |              |            | 0          | 17.14379         | 0.00898               | PASS    |
|           |           |              |            | 10         | 16.40121         | 0.00859               | PASS    |
|           |           |              |            | 20         | 16.11064         | 0.00844               | PASS    |
|           |           |              |            | 30         | 14.78692         | 0.00774               | PASS    |
|           |           |              |            | 40         | 18.40293         | 0.00964               | PASS    |
|           |           |              |            | 50         | 18.53208         | 0.00970               | PASS    |



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END