# 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 | 32.10 | 27.85 | 38.5 | PASS |
| | | MCH | 32.22 | 27.97 | 38.5 | PASS |
| | | HCH | 32.26 | 28.01 | 38.5 | PASS |
| | GSM/TM2 | LCH | 26.71 | 22.46 | 38.5 | PASS |
| | | MCH | 26.74 | 22.49 | 38.5 | PASS |
| | | HCH | 26.75 | 22.50 | 38.5 | PASS |
| **Test Band** | **Test Mode** | **Test Channel** | **Measured[dBm]** | **EIRP [dBm]** | **Limit [dBm]** | **Verdict** |
| PCS1900 | GSM/TM1 | LCH | 30.45 | 31.55 | 33 | PASS |
| | | MCH | 30.36 | 31.46 | 33 | PASS |
| | | HCH | 30.43 | 31.53 | 33 | PASS |
| | GSM/TM2 | LCH | 25.78 | 26.88 | 33 | PASS |
| | | MCH | 25.57 | 26.67 | 33 | PASS |
| | | HCH | 25.45 | 26.55 | 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,

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

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

b, SGP = Signal Generator Level

Note2:

SET Span = 1.5 * OBW

SET RBW = 1% of the OBW, not to exceed 1MHz

SET VBW >= 3 * 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 | 1.82 | 13 | PASS |
| | | MCH | 1.78 | 13 | PASS |
| | | HCH | 1.79 | 13 | PASS |
| | GSM/TM2 | LCH | 4.85 | 13 | PASS |
| | | MCH | 5.12 | 13 | PASS |
| | | HCH | 4.72 | 13 | PASS |
| PCS1900 | GSM/TM1 | LCH | 1.72 | 13 | PASS |
| | | MCH | 1.81 | 13 | PASS |
| | | HCH | 2.01 | 13 | PASS |
| | GSM/TM2 | LCH | 4.43 | 13 | PASS |
| | | MCH | 4.65 | 13 | PASS |
| | | HCH | 4.48 | 13 | PASS |

# 3Appendix_C: Modulation Characteristics

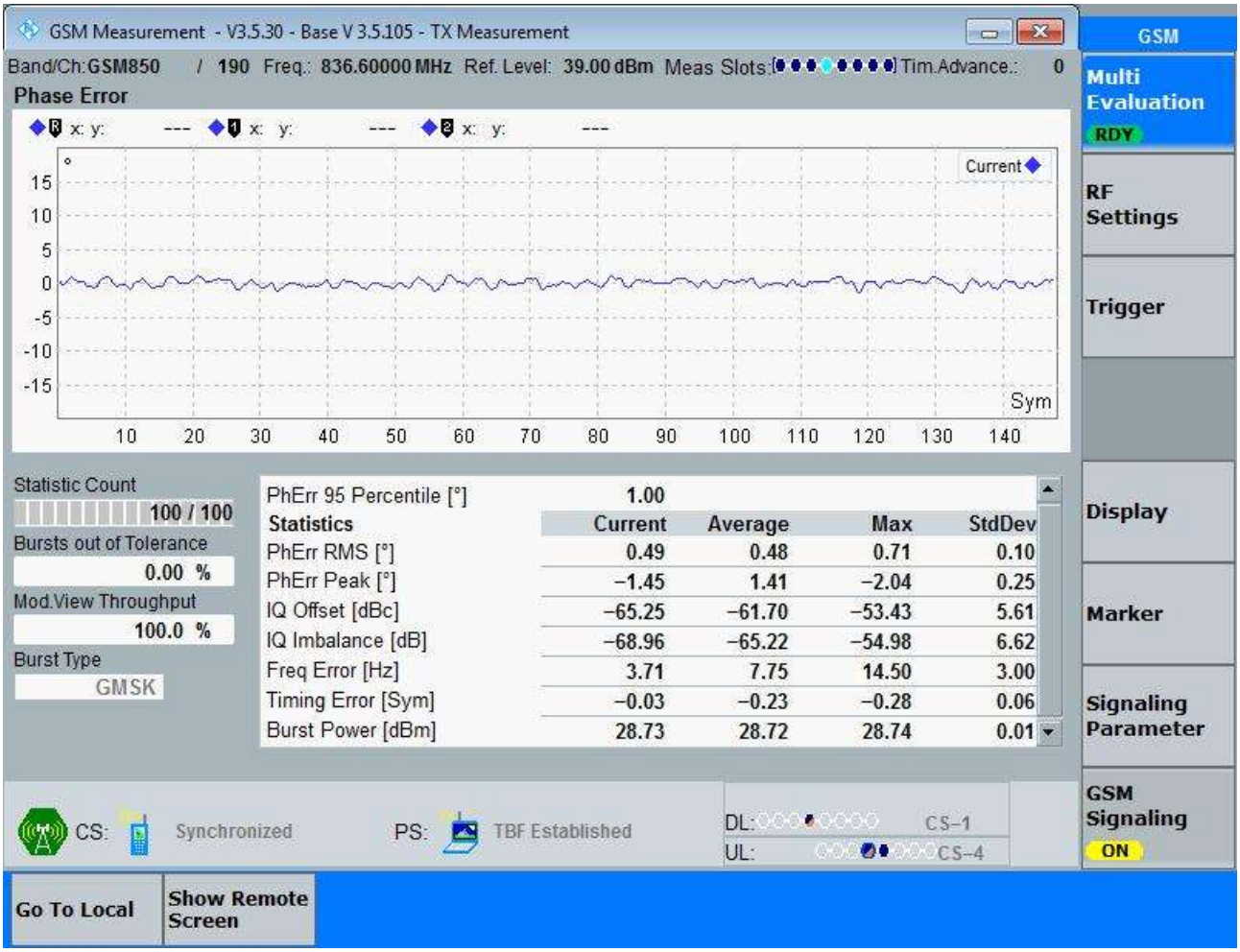
**Part I - Test Plots**

**3.1 For GSM**

**3.1.1 Test Band = GSM850**

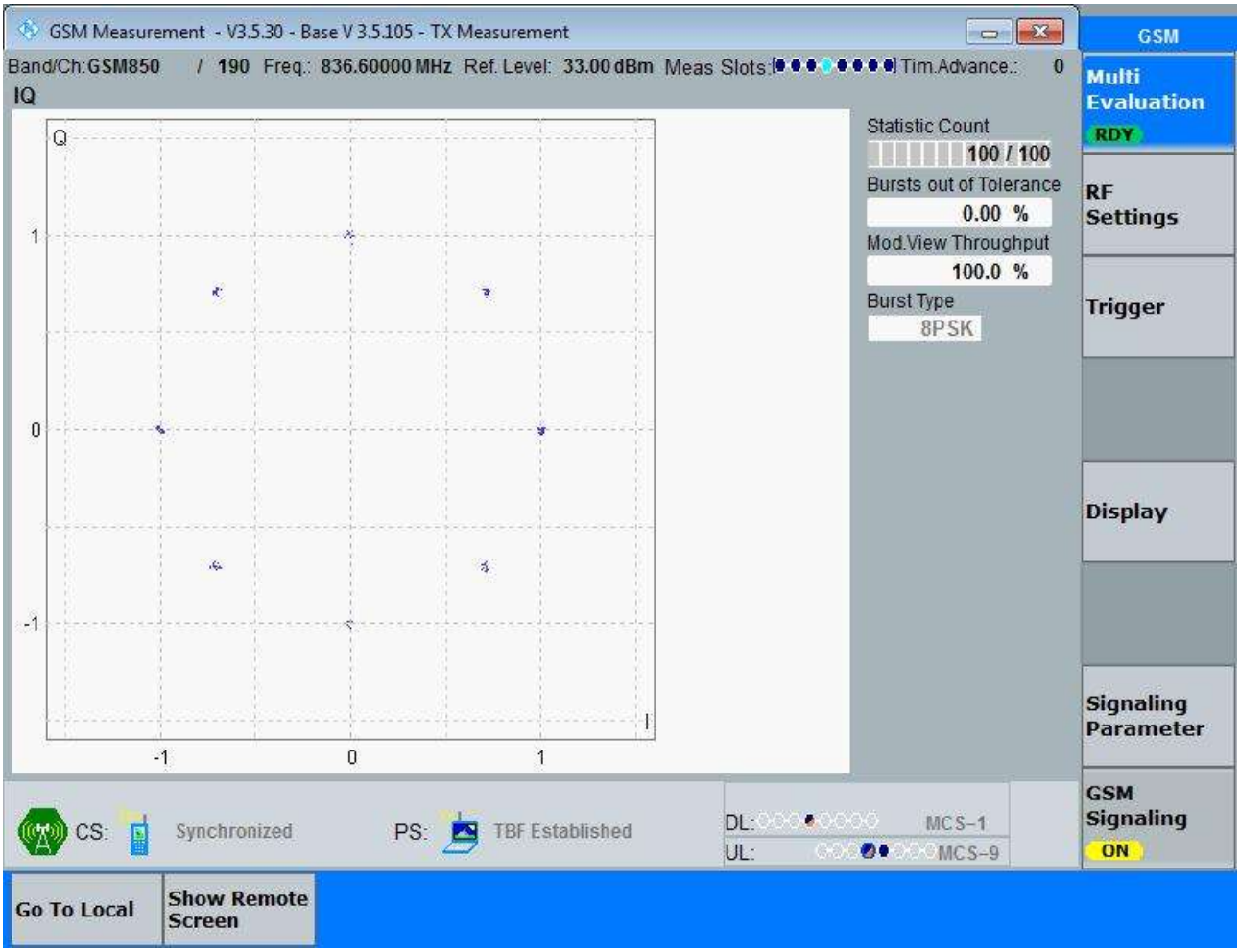
**3.1.1.1 Test Mode = GSM/TM1**

**3.1.1.1.1 Test Channel = MCH**



### 3.1.1.2 Test Mode = GSM/TM2

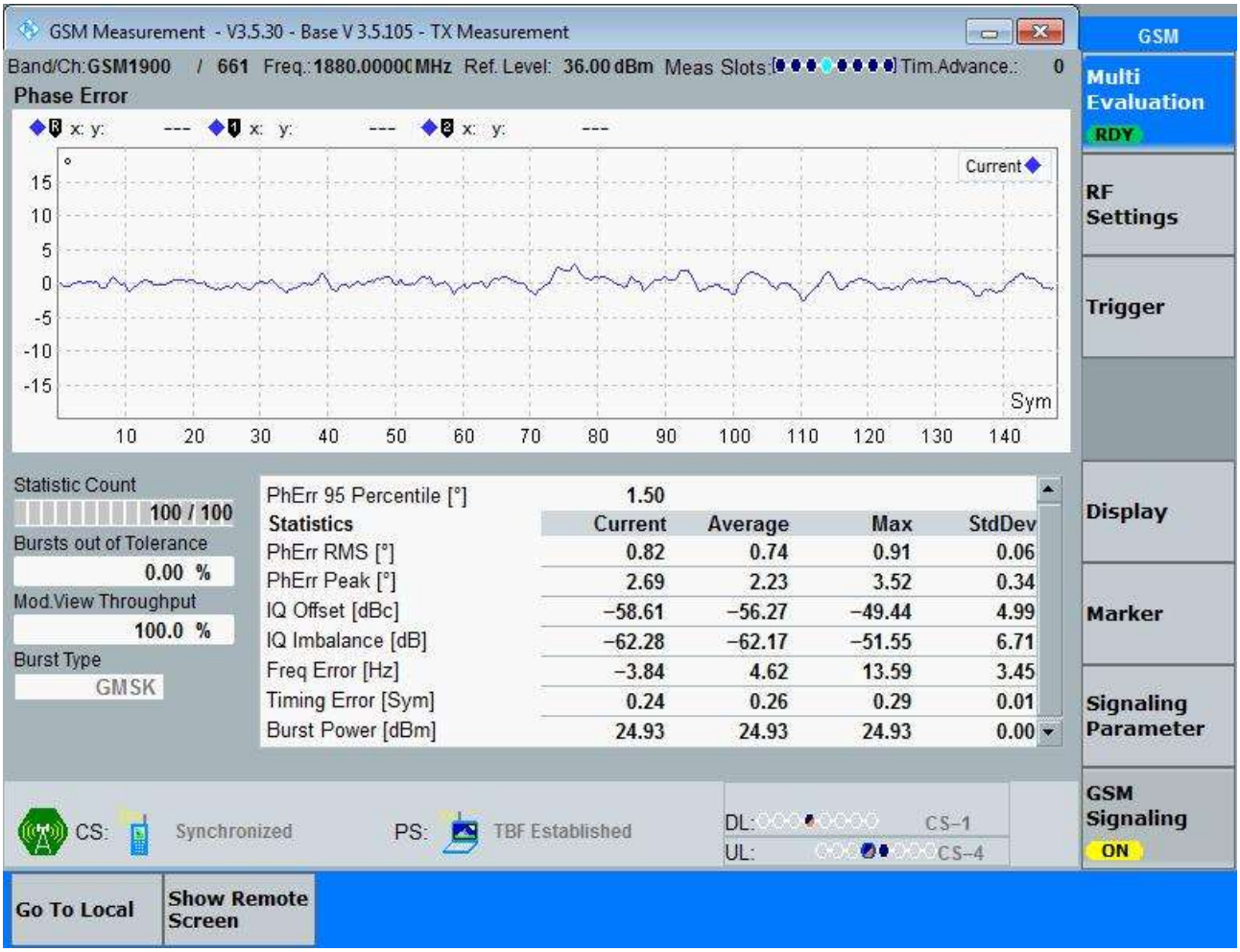
#### 3.1.1.2.1 Test Channel = MCH



### 3.1.2 Test Band = PCS1900

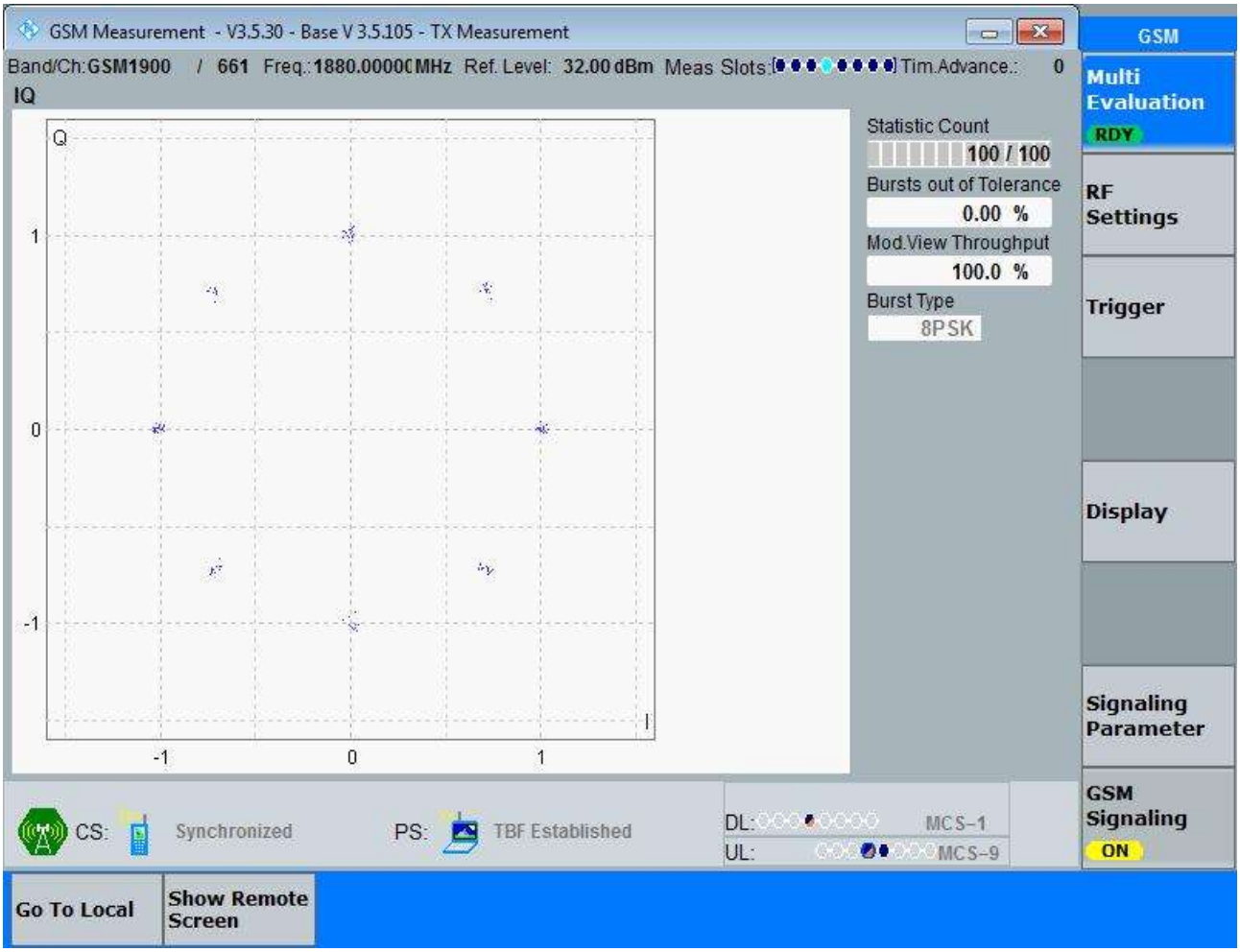
#### 3.1.2.1 Test Mode = GSM/TM1

##### 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 | 246.70 | 317.2 | Pass |
| | | MCH | 248.38 | 314.2 | Pass |
| | | HCH | 247.79 | 313.1 | Pass |
| | GSM/TM2 | LCH | 245.97 | 318.8 | Pass |
| | | MCH | 243.22 | 311.6 | Pass |
| | | HCH | 245.99 | 316.3 | Pass |
| PCS1900 | GSM/TM1 | LCH | 244.06 | 314.7 | Pass |
| | | MCH | 248.22 | 317.5 | Pass |
| | | HCH | 247.73 | 319.5 | Pass |
| | GSM/TM2 | LCH | 250.82 | 316.9 | Pass |
| | | MCH | 250.96 | 316.1 | Pass |
| | | HCH | 242.38 | 313.5 | 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

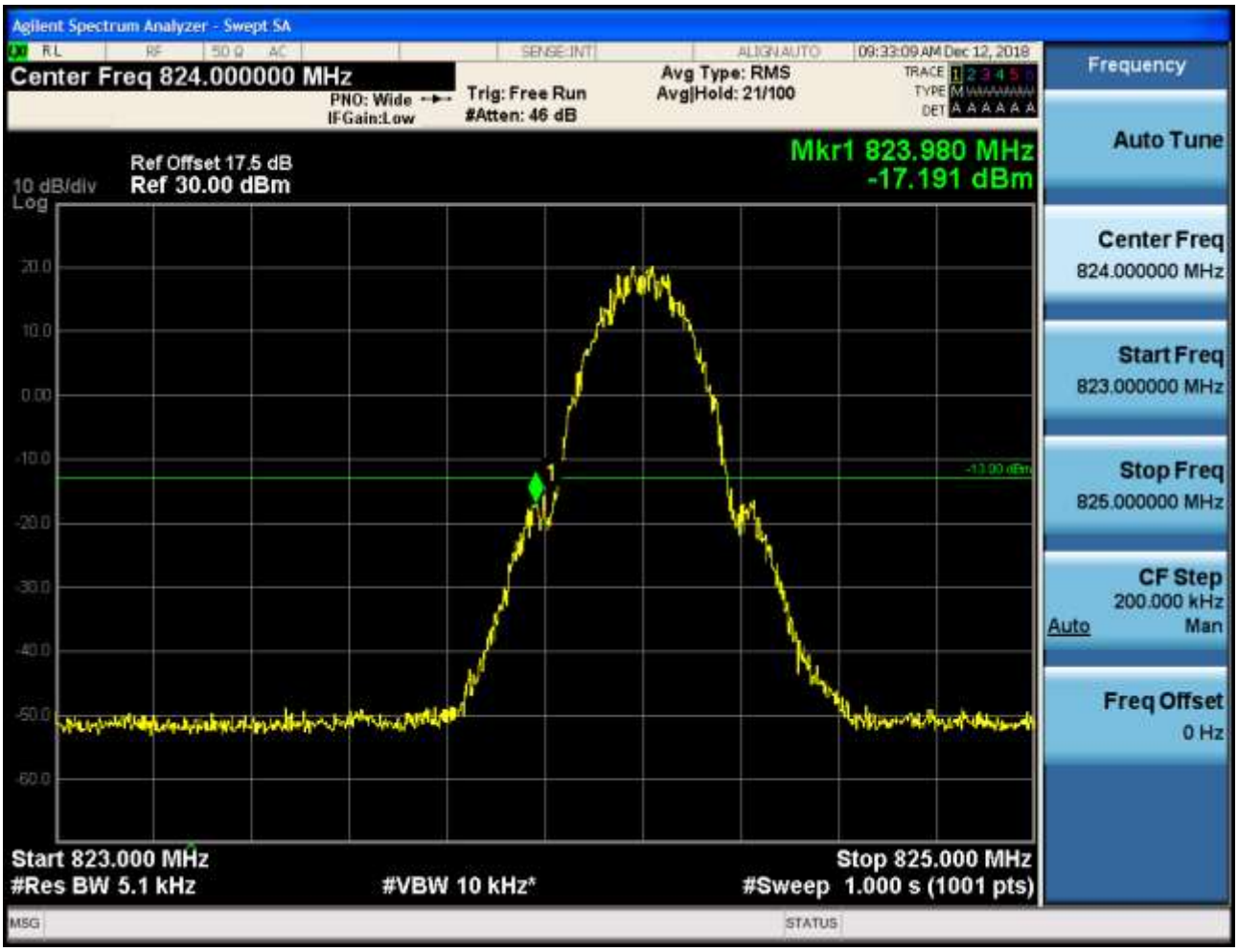
**Part I - Test Plots**

**5.1 For GSM**

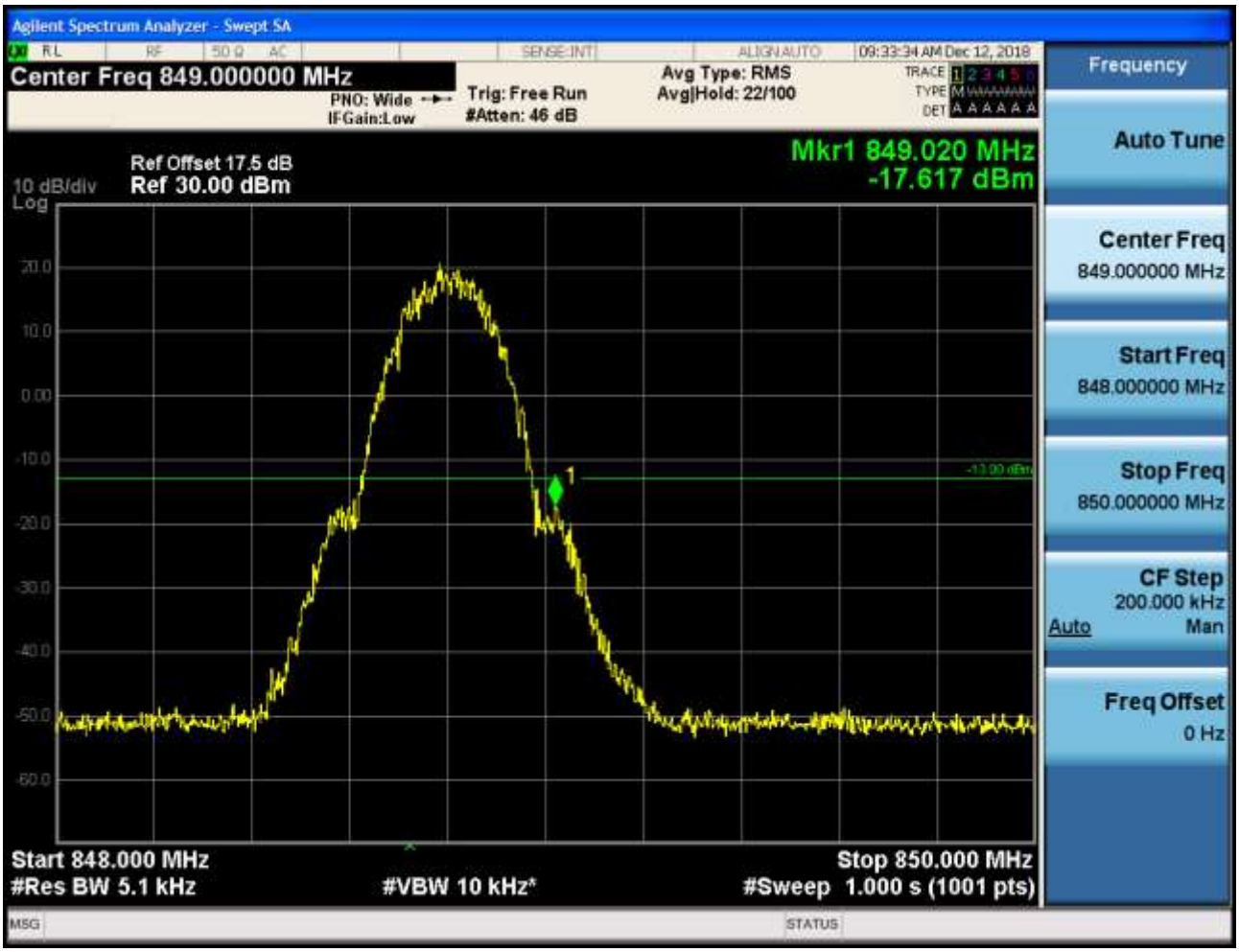
**5.1.1 Test Band = GSM850**

**5.1.1.1 Test Mode = GSM/TM1**

**5.1.1.1.1 Test Channel = LCH**

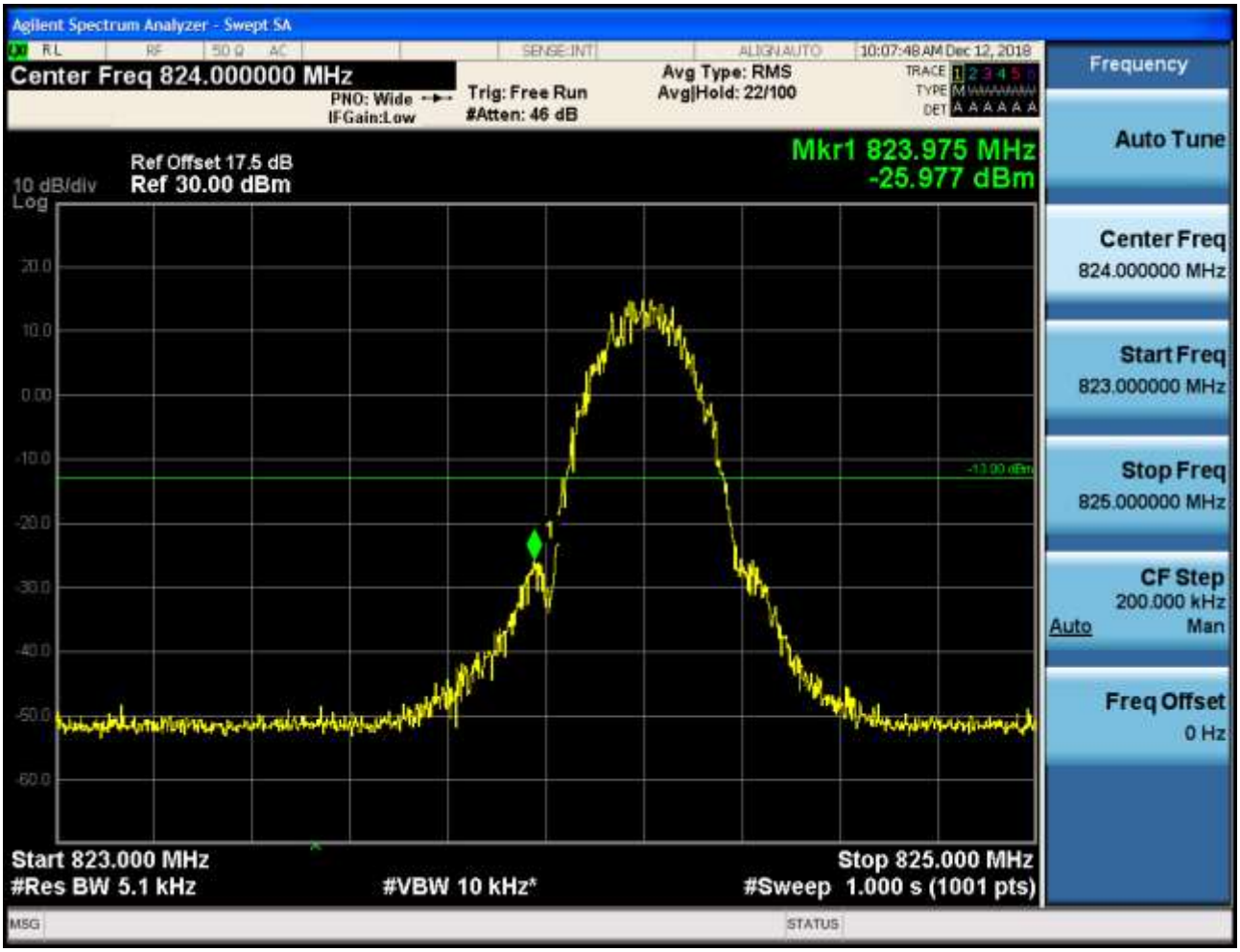


#### 5.1.1.1.2 Test Channel = HCH

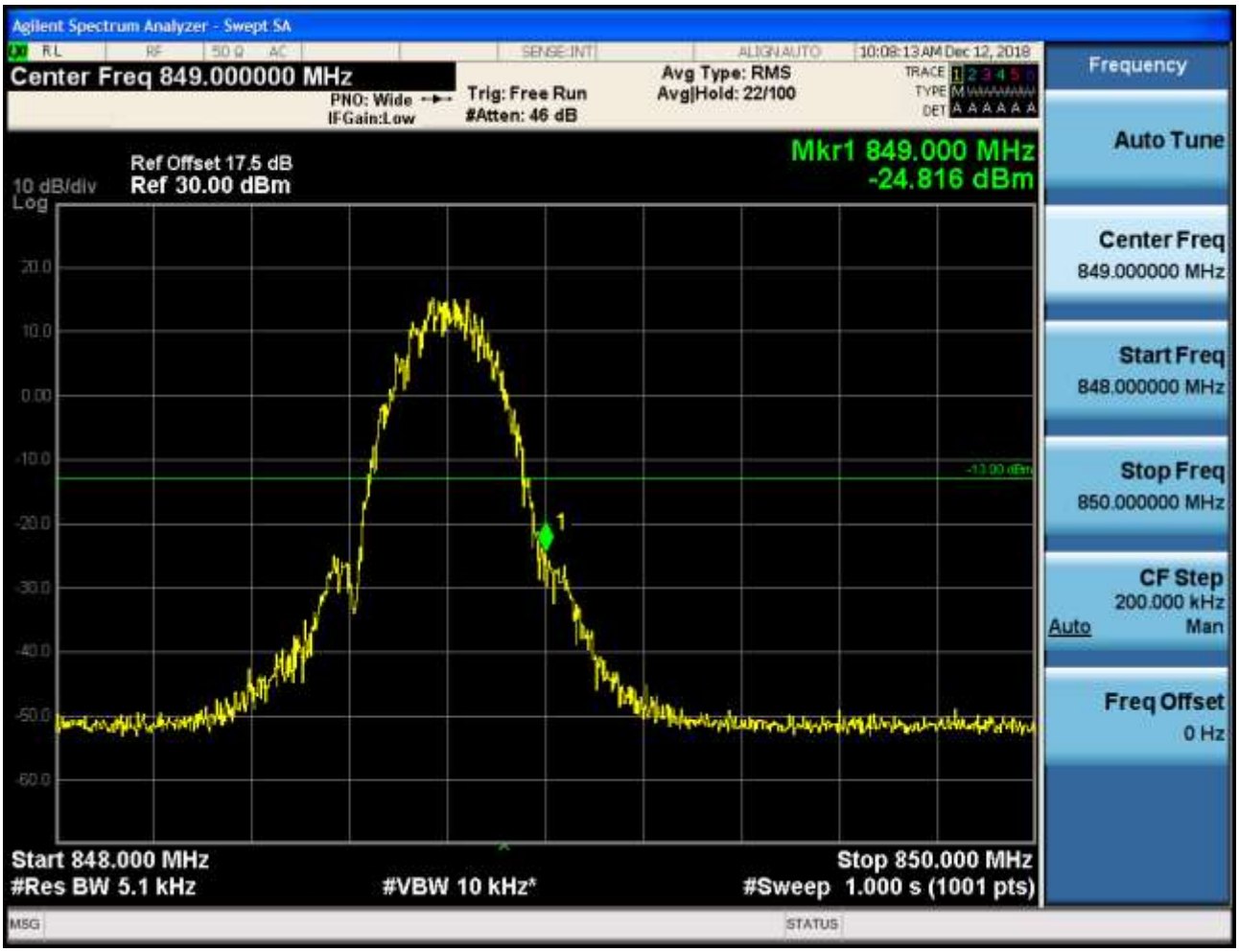


#### 5.1.1.2 Test Mode = GSM/TM2

##### 5.1.1.2.1 Test Channel = LCH



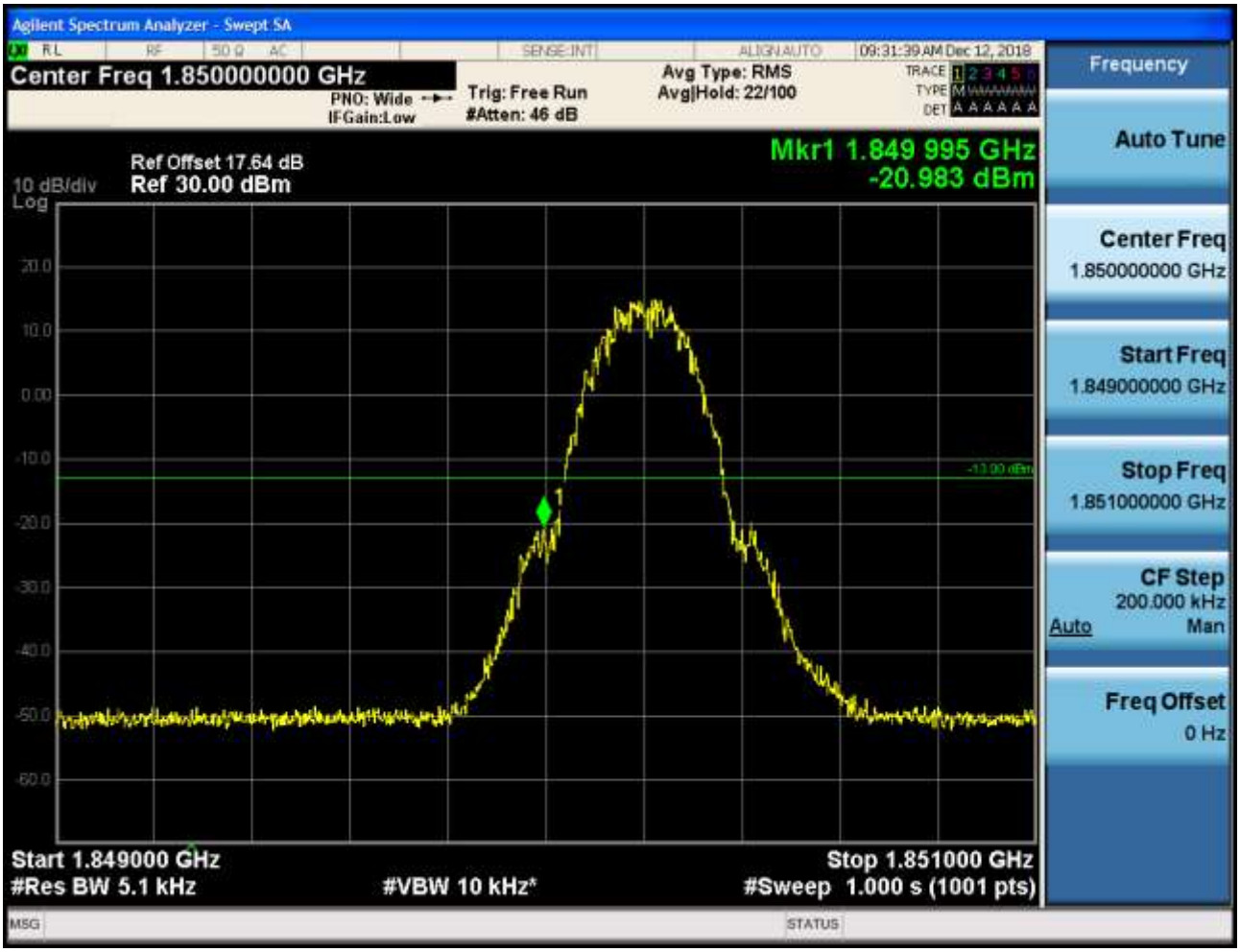
#### 5.1.1.2.2 Test Channel = HCH



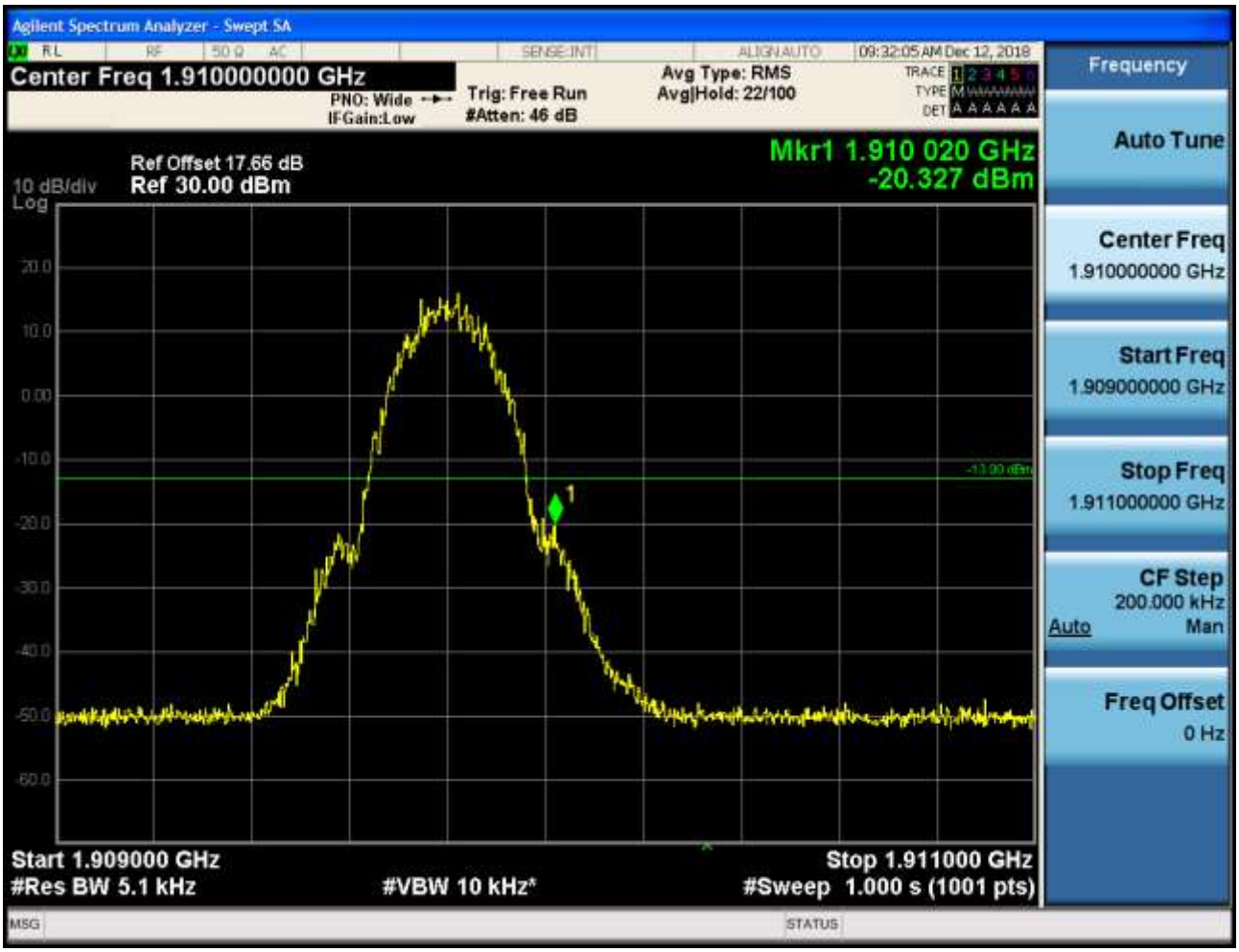
### 5.1.2 Test Band = PCS1900

#### 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.

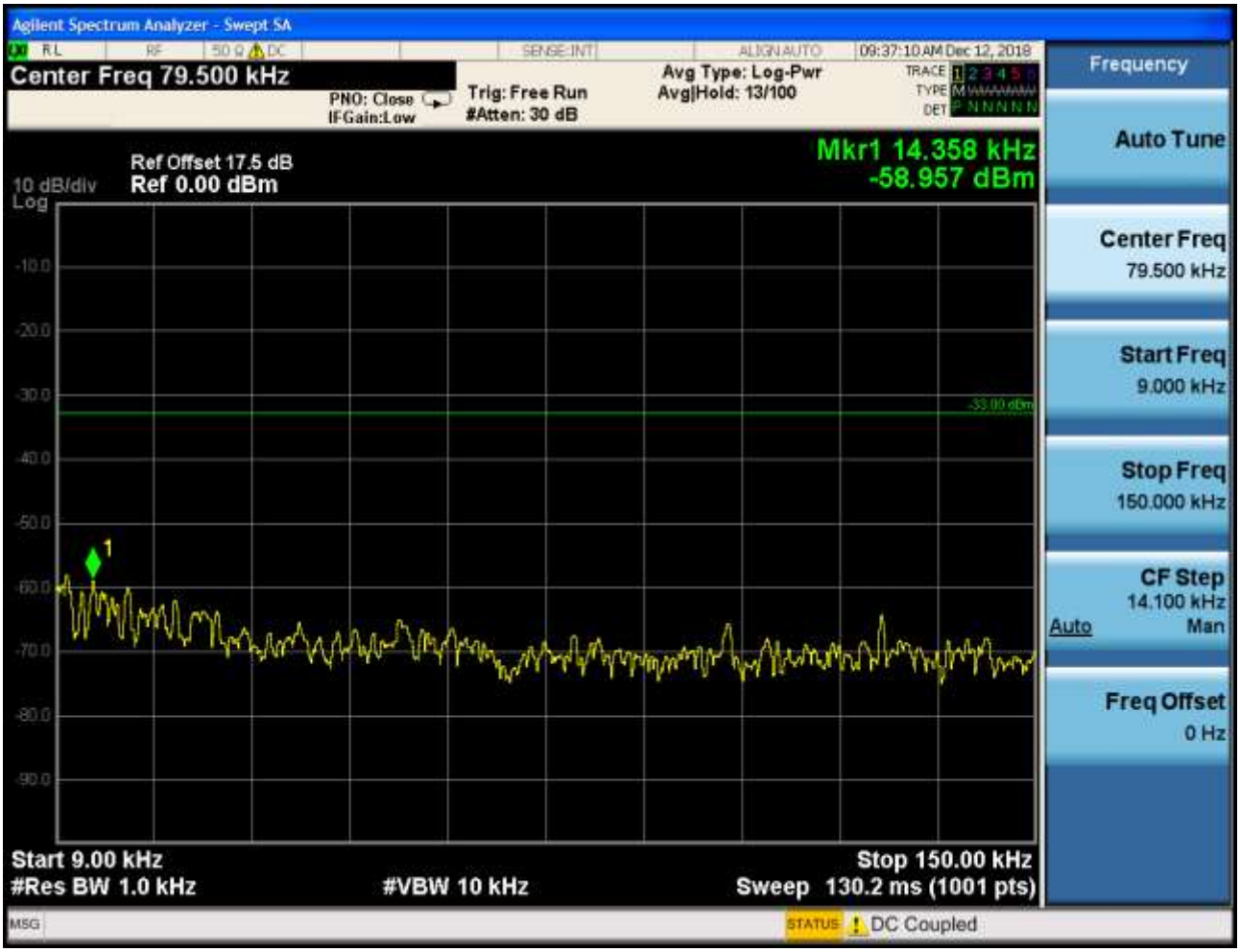
**Part I - Test Plots**

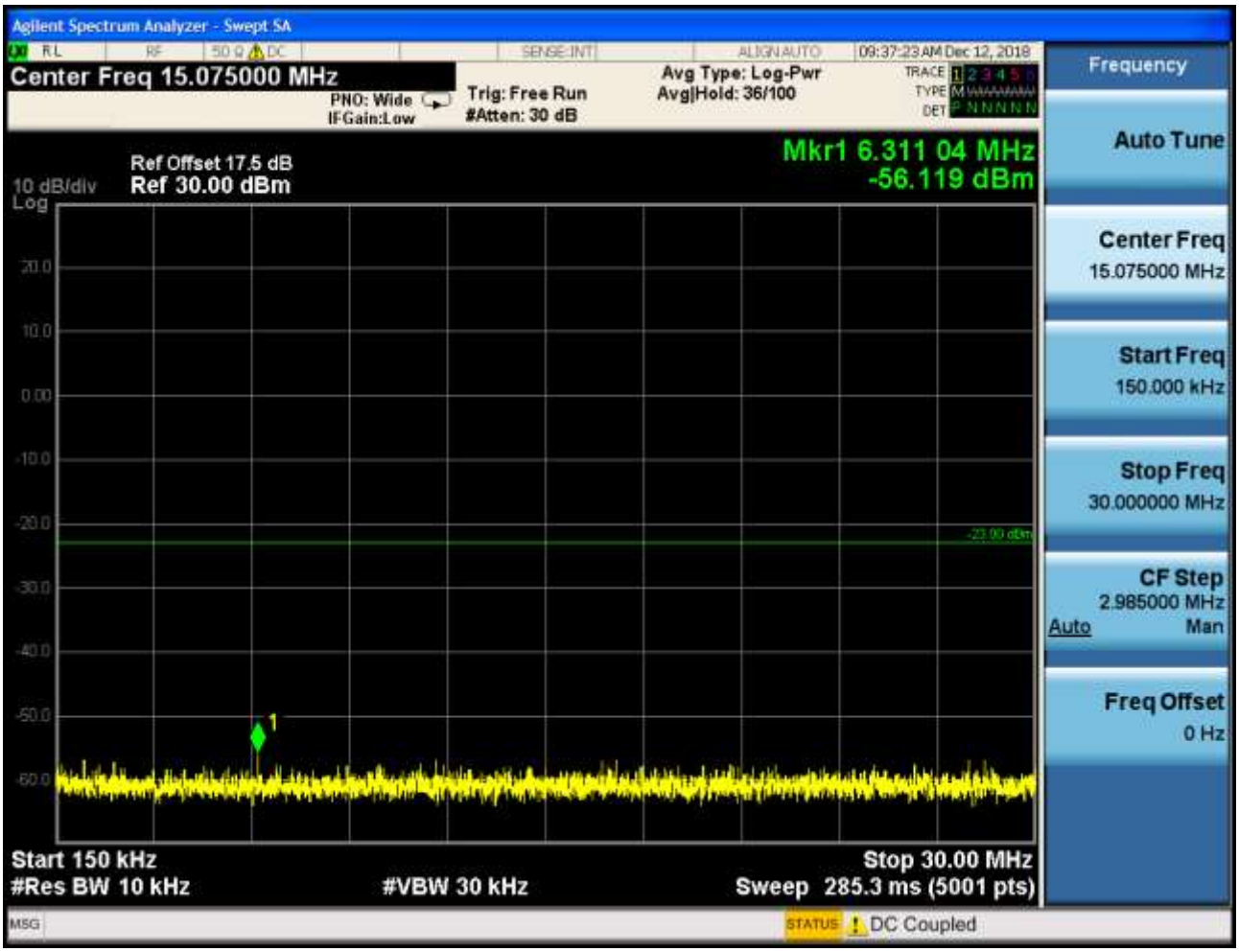
**6.1 For GSM**

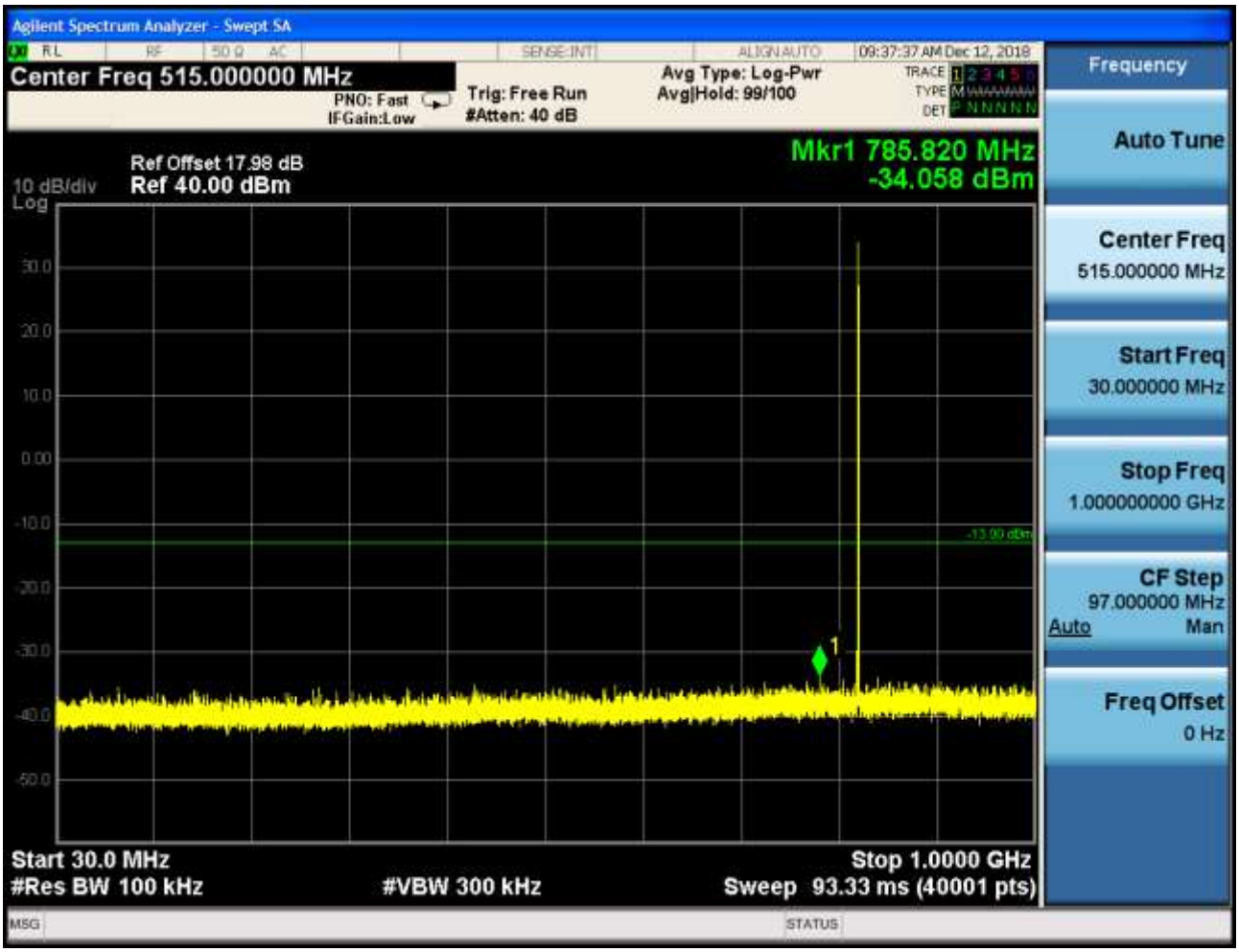
**6.1.1 Test Band = GSM850**

**6.1.1.1 Test Mode = GSM/TM1**

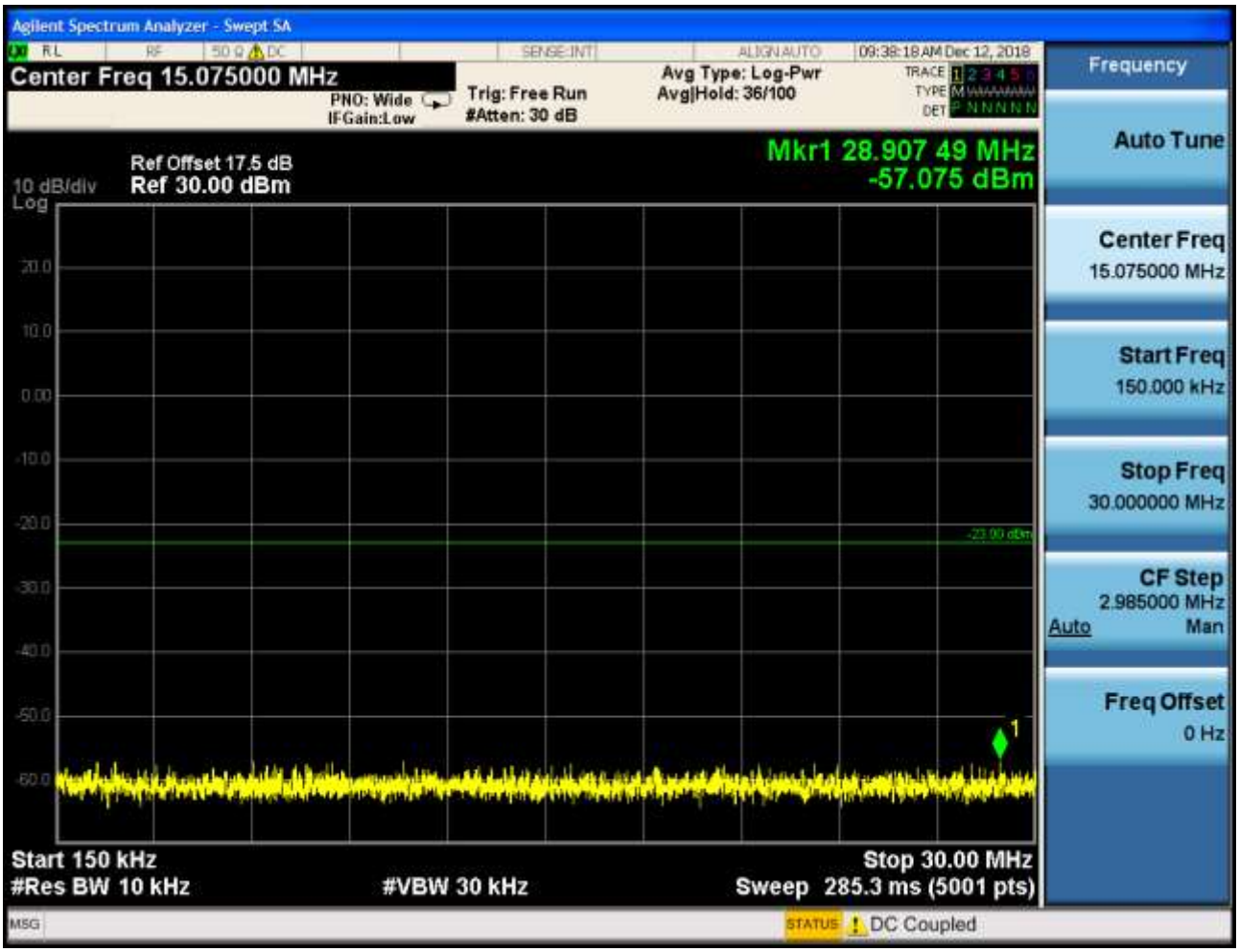
**6.1.1.1.1 Test Channel = LCH**

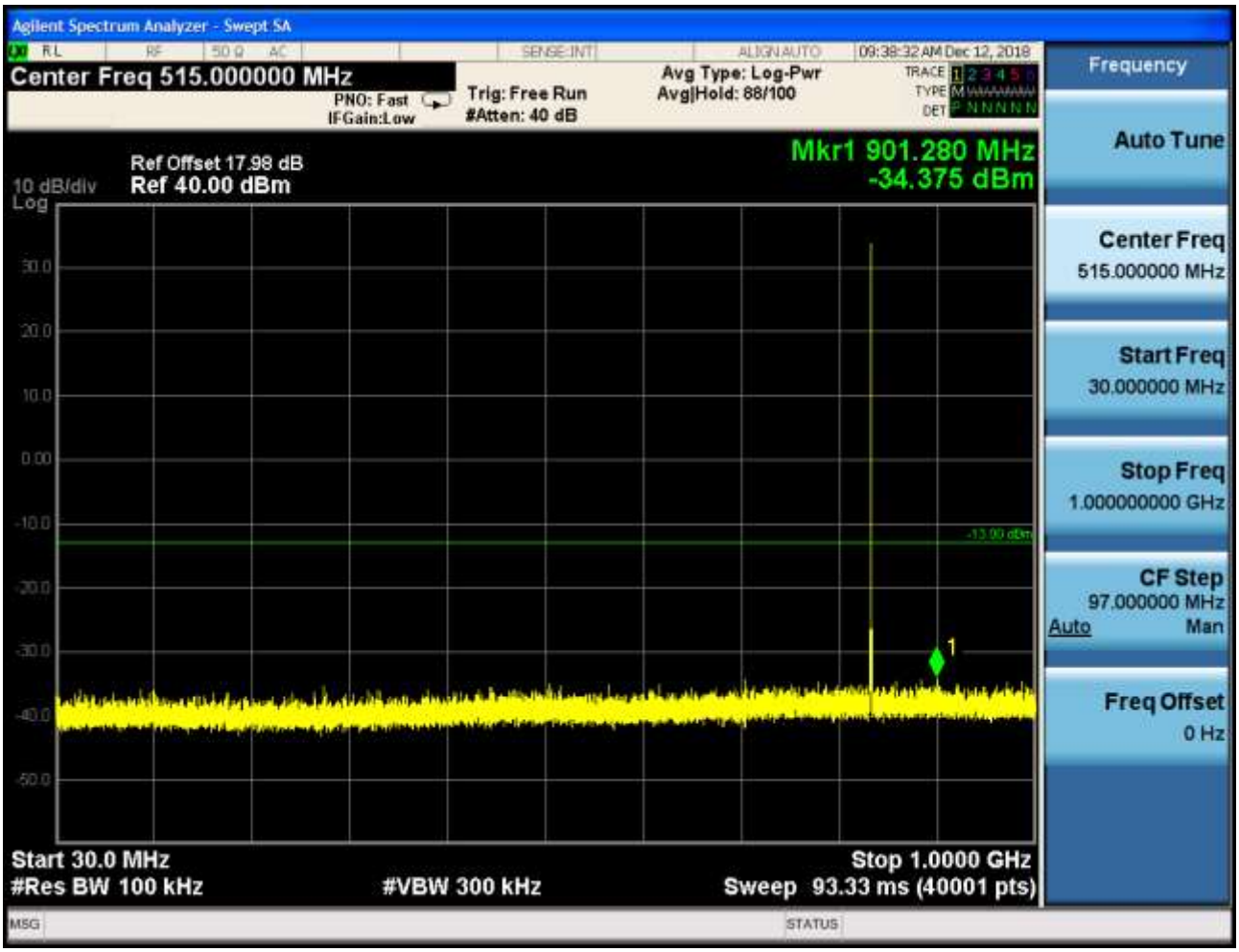




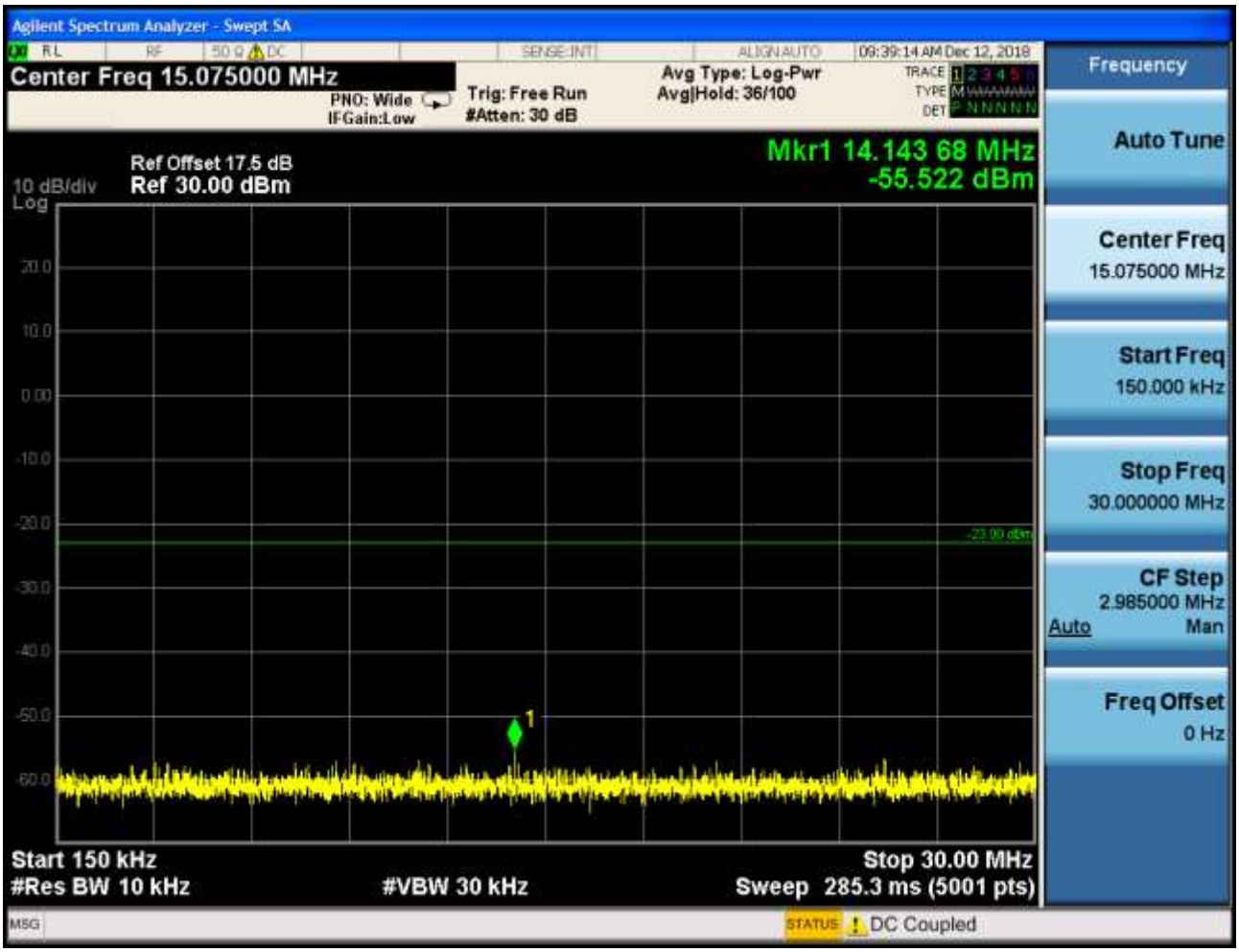


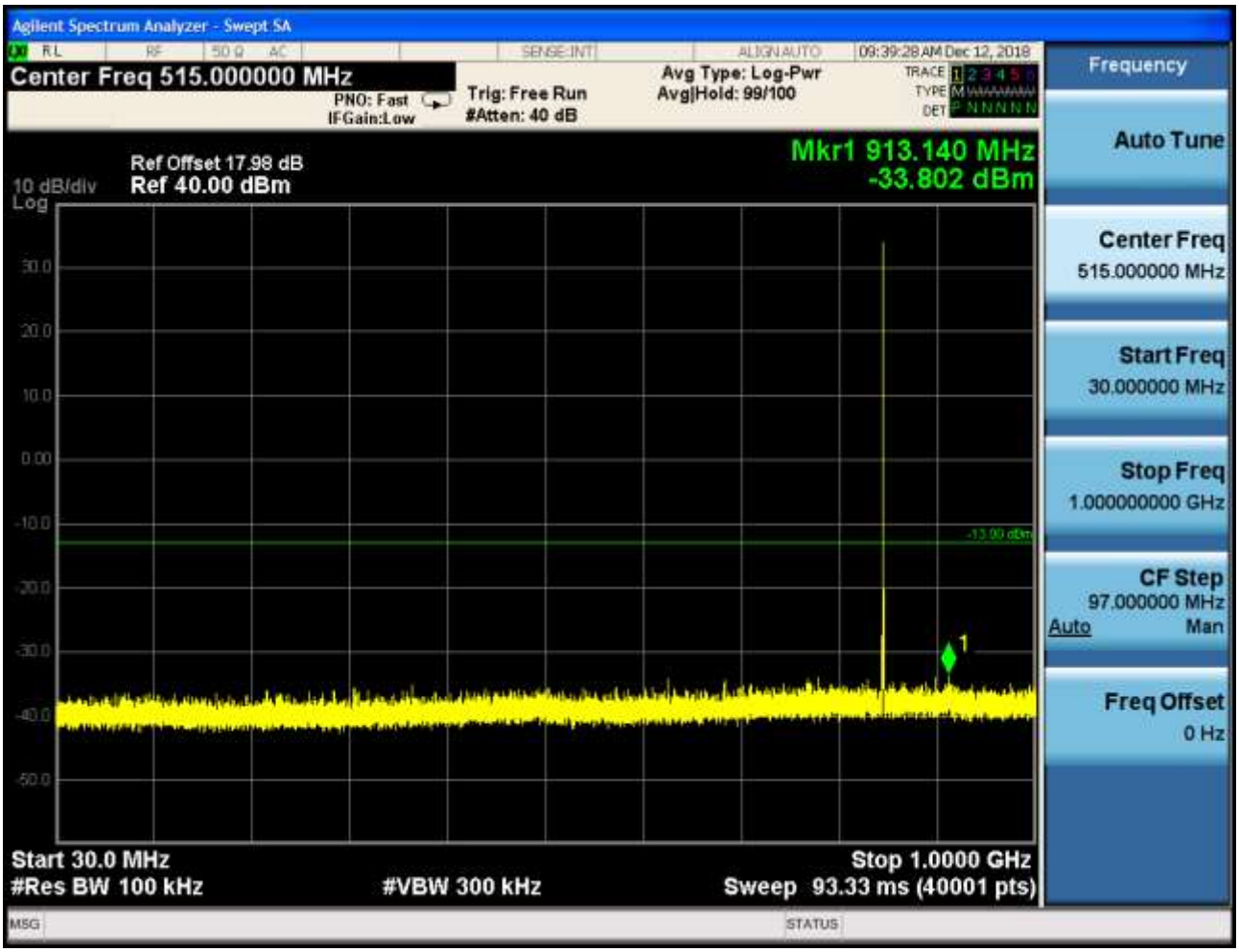
#### 6.1.1.1.2 Test Channel = MCH





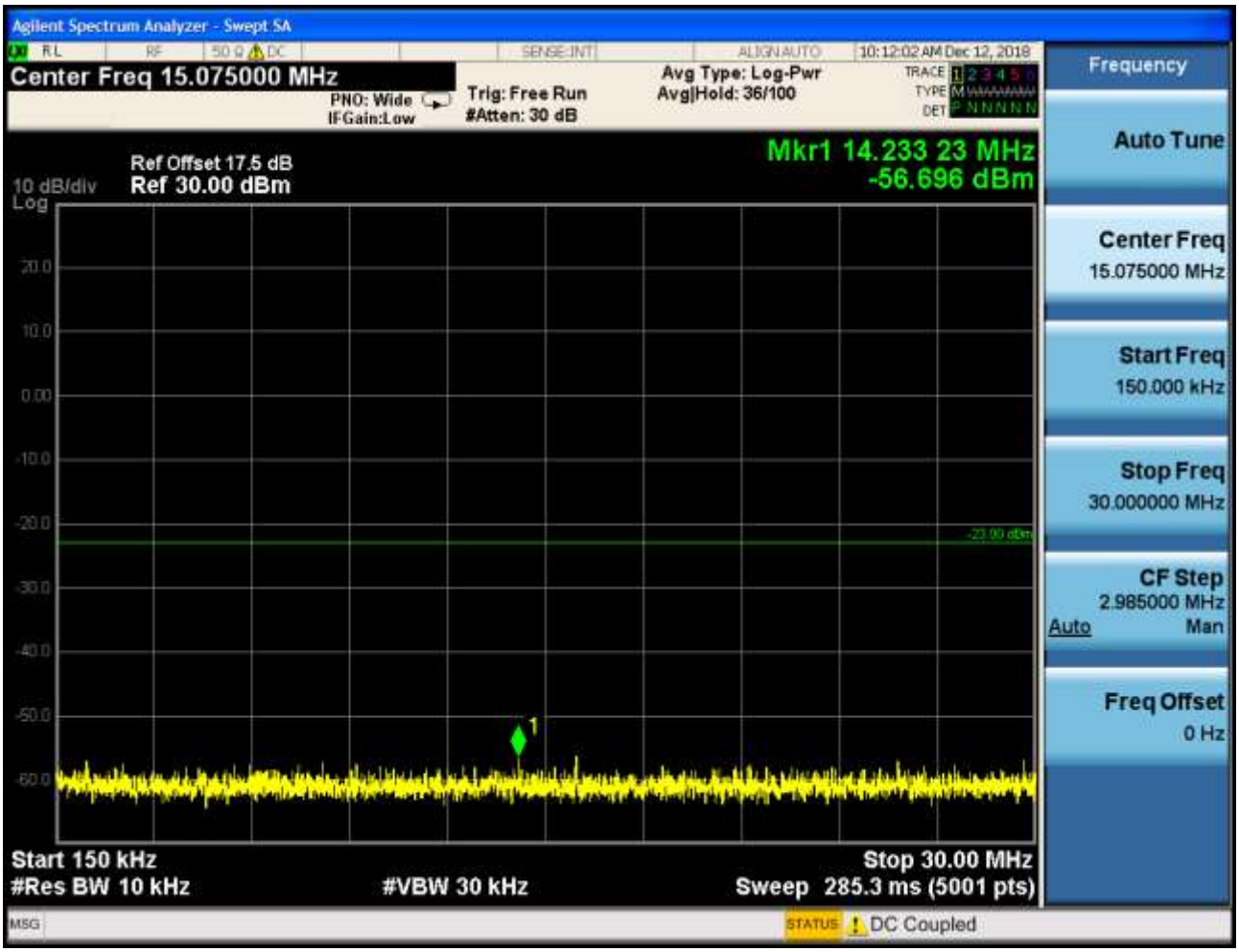
#### 6.1.1.1.3 Test Channel = HCH

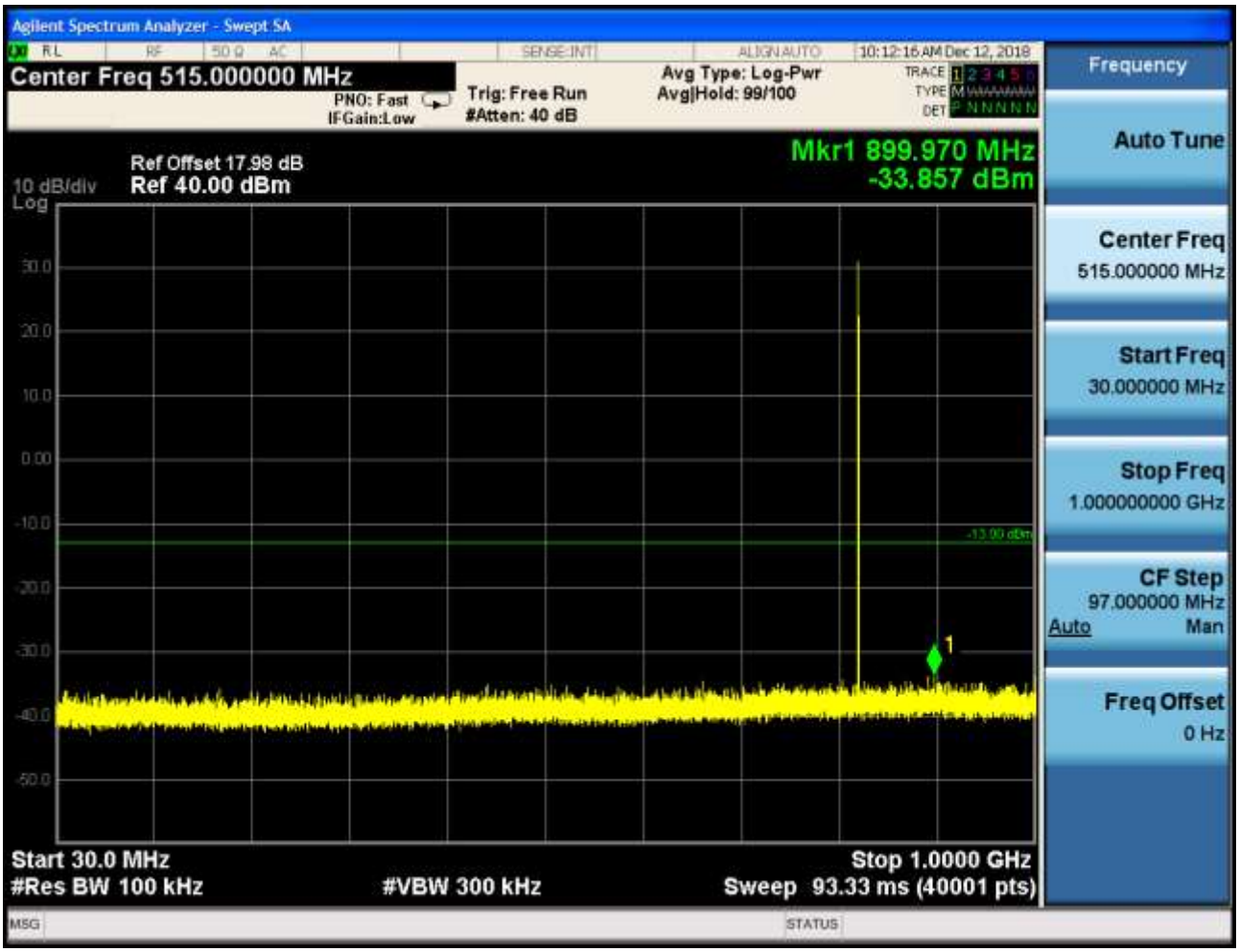




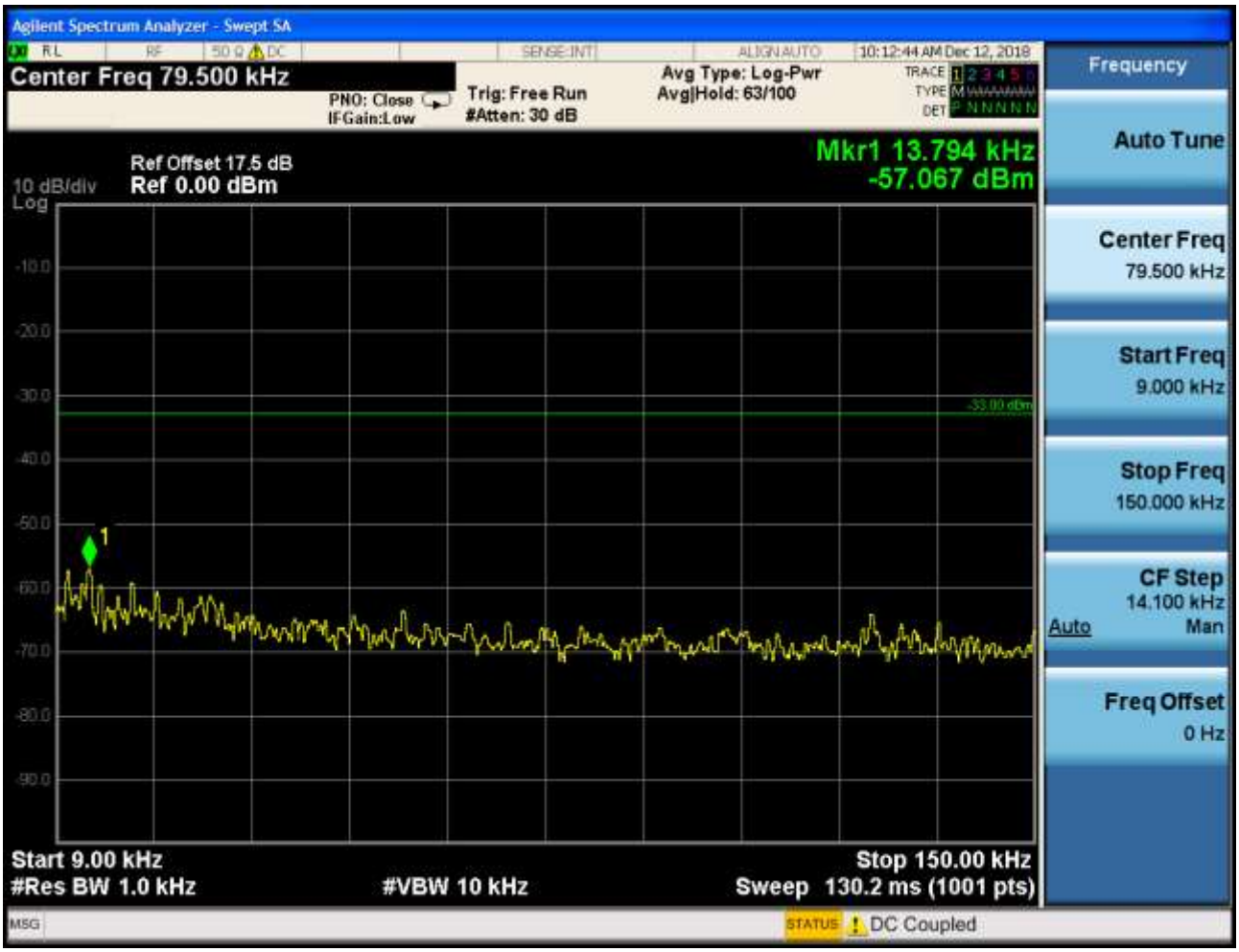
#### 6.1.1.2 Test Mode = GSM/TM2

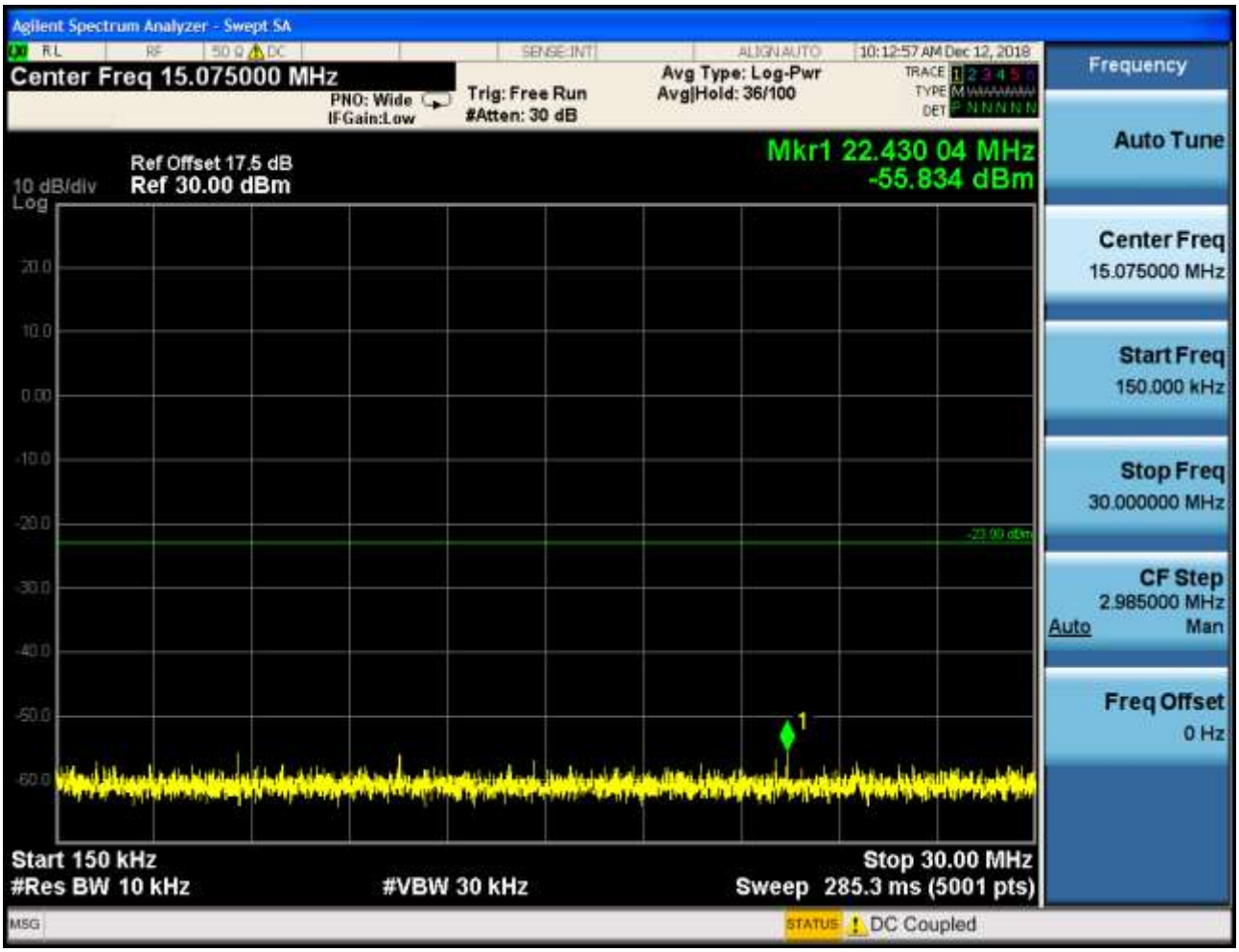
##### 6.1.1.2.1 Test Channel = LCH

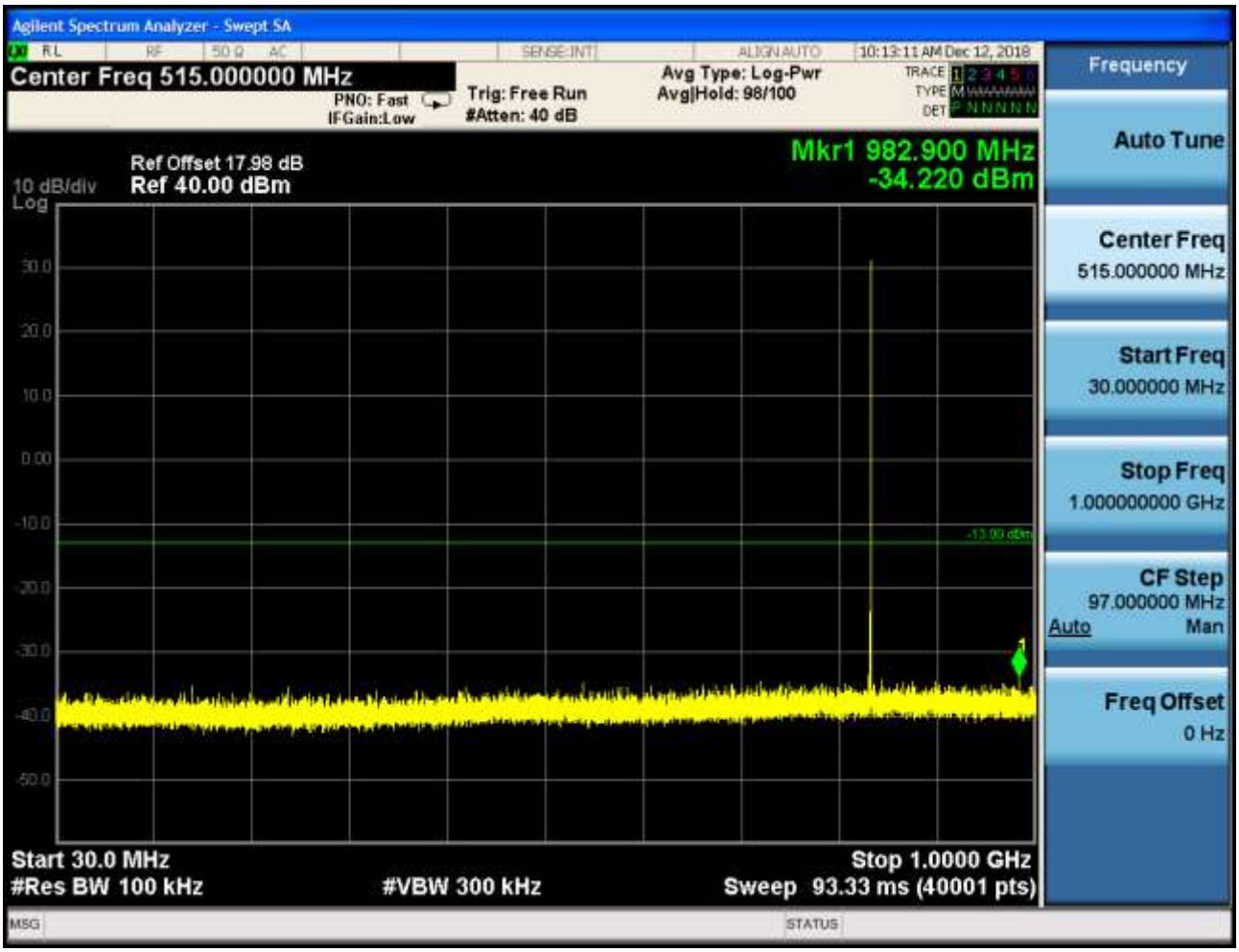




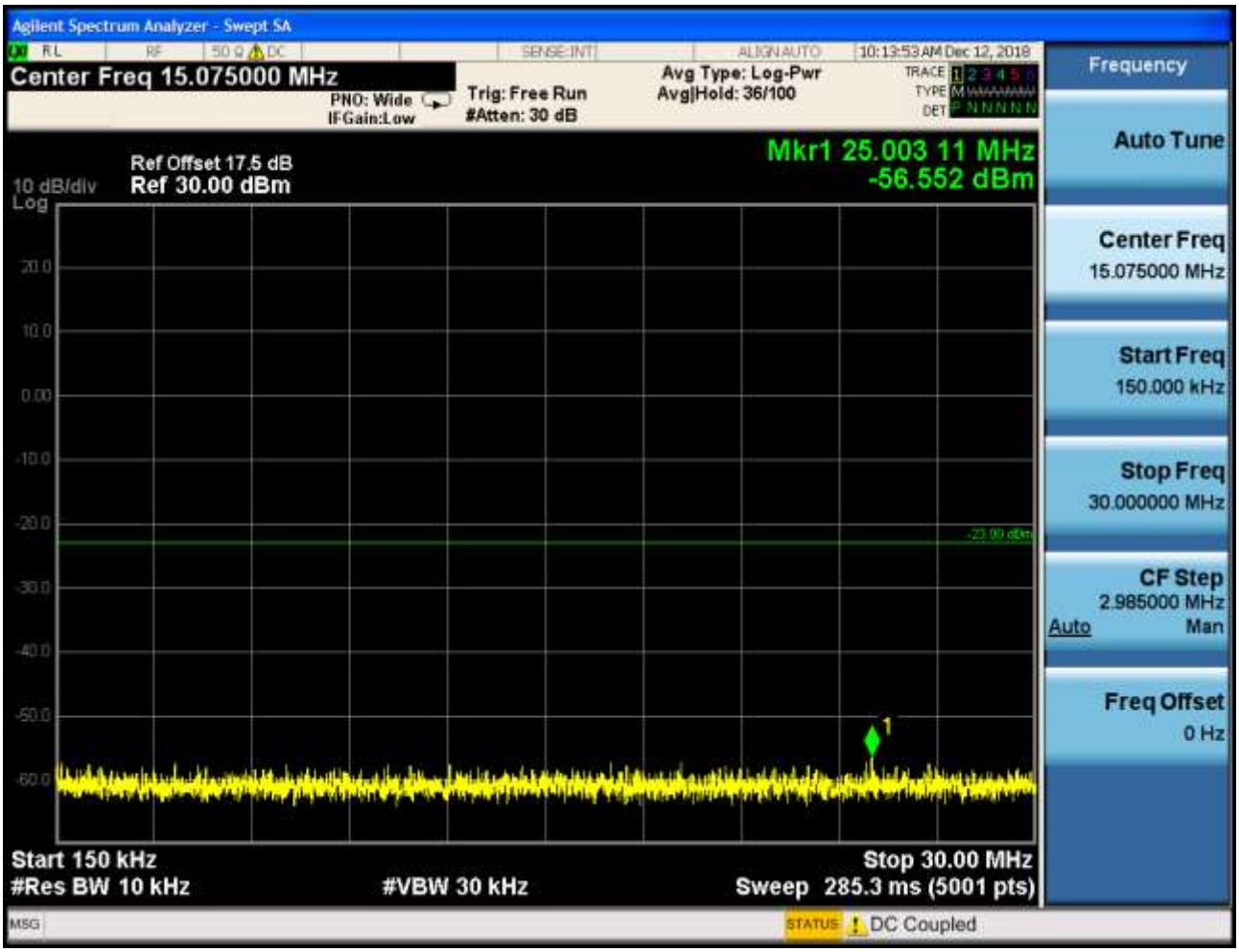
#### 6.1.1.2.2 Test Channel = MCH

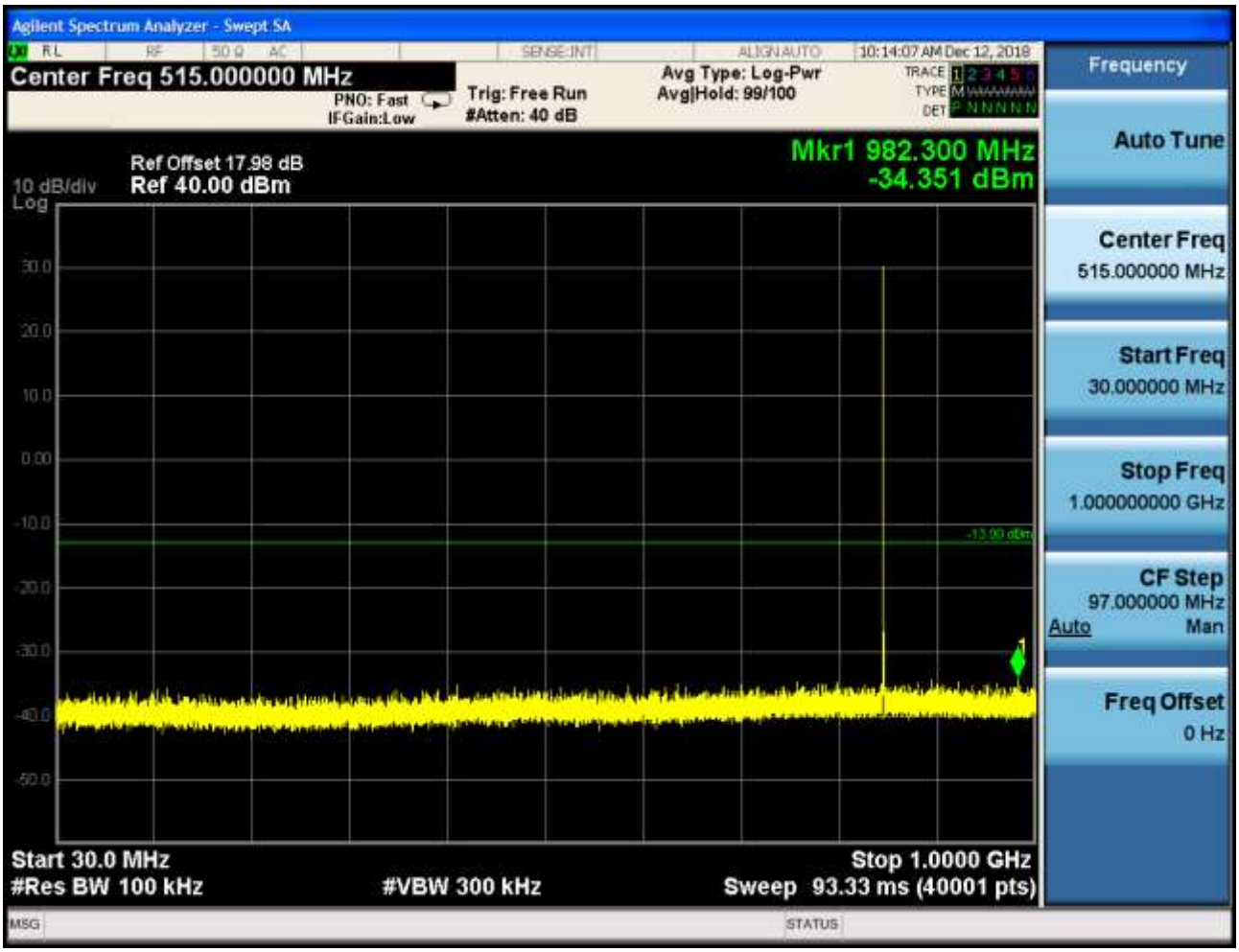






#### 6.1.1.2.3 Test Channel = HCH

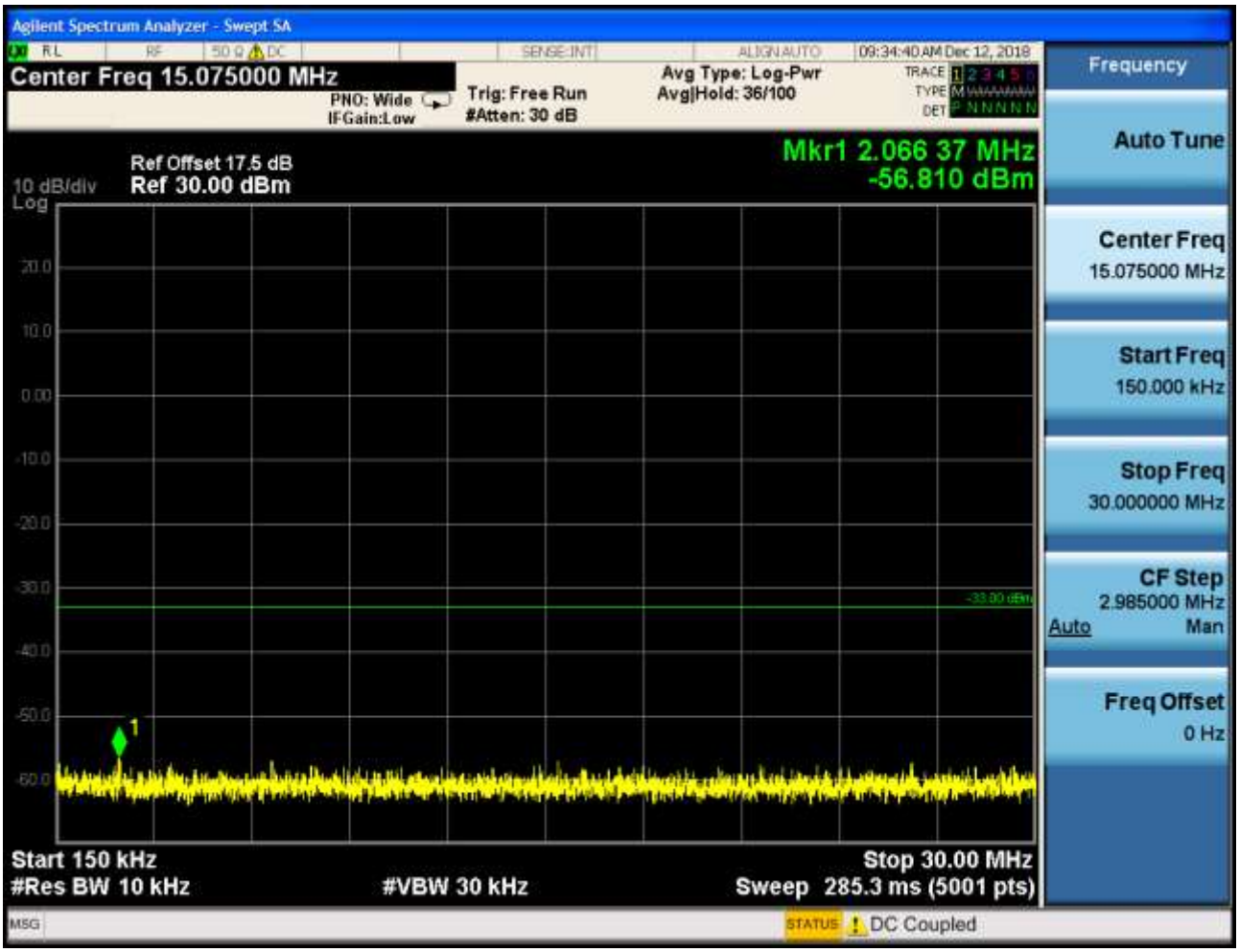




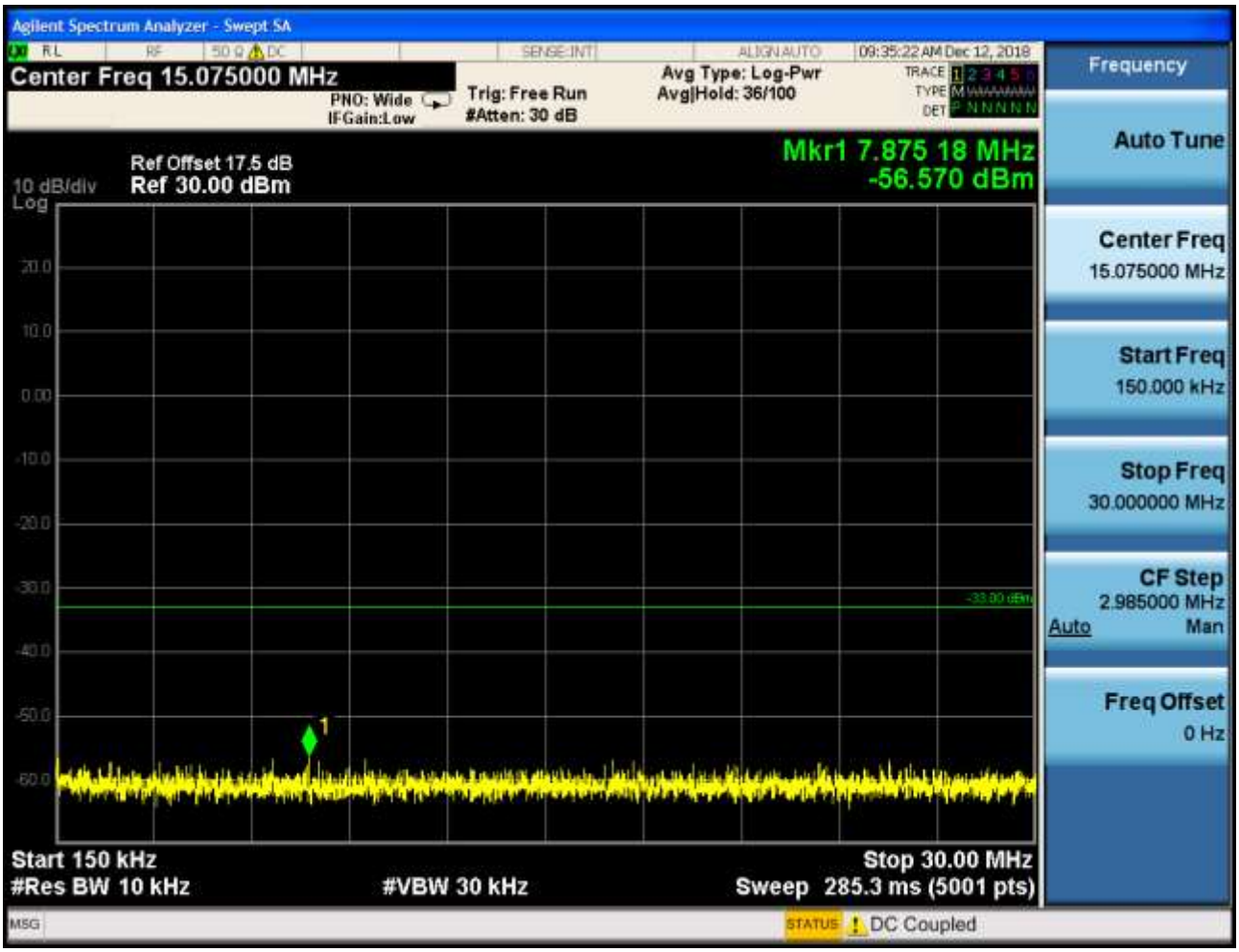
### 6.1.2 Test Band = PCS1900

#### 6.1.2.1 Test Mode = GSM/TM1

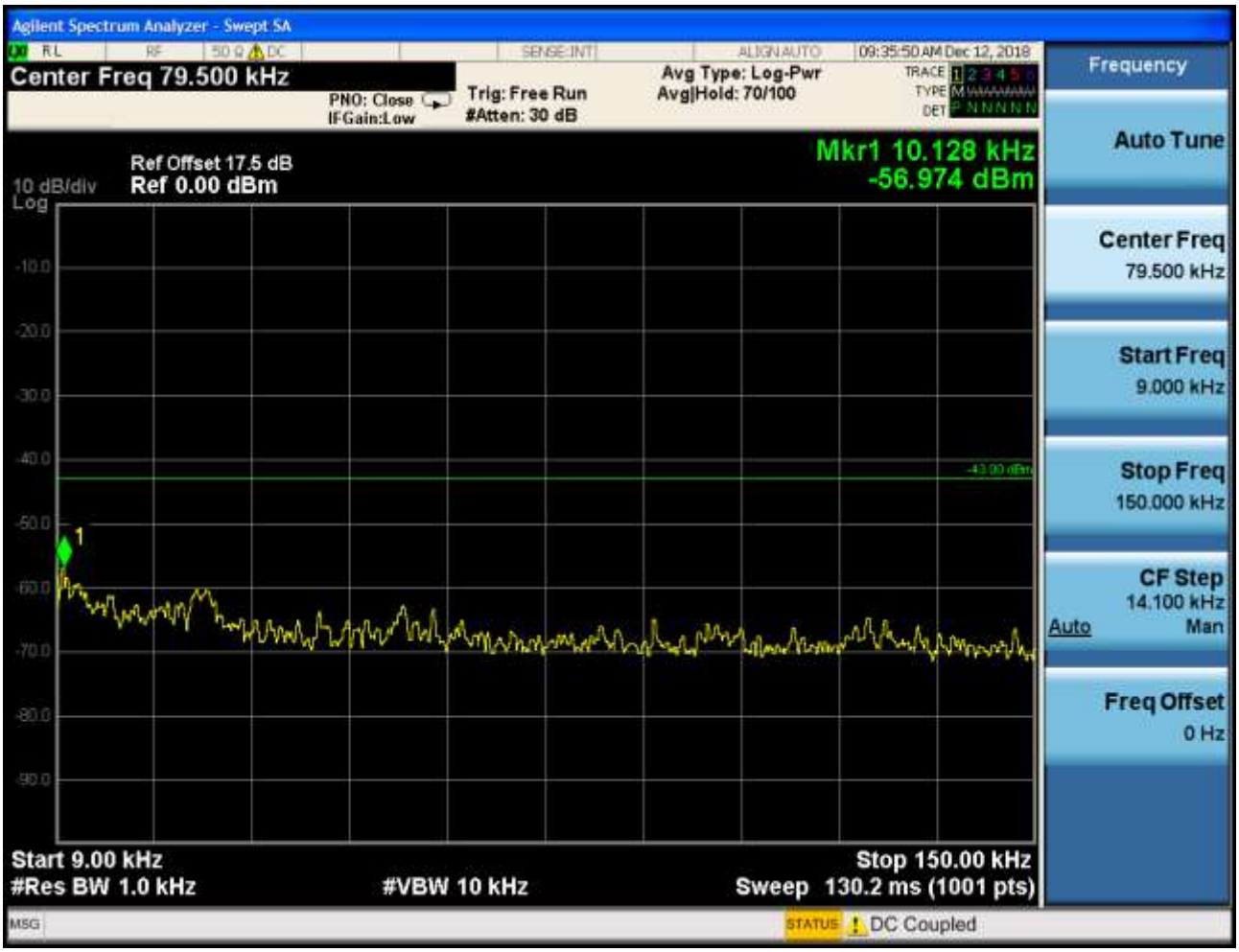
##### 6.1.2.1.1 Test Channel = LCH

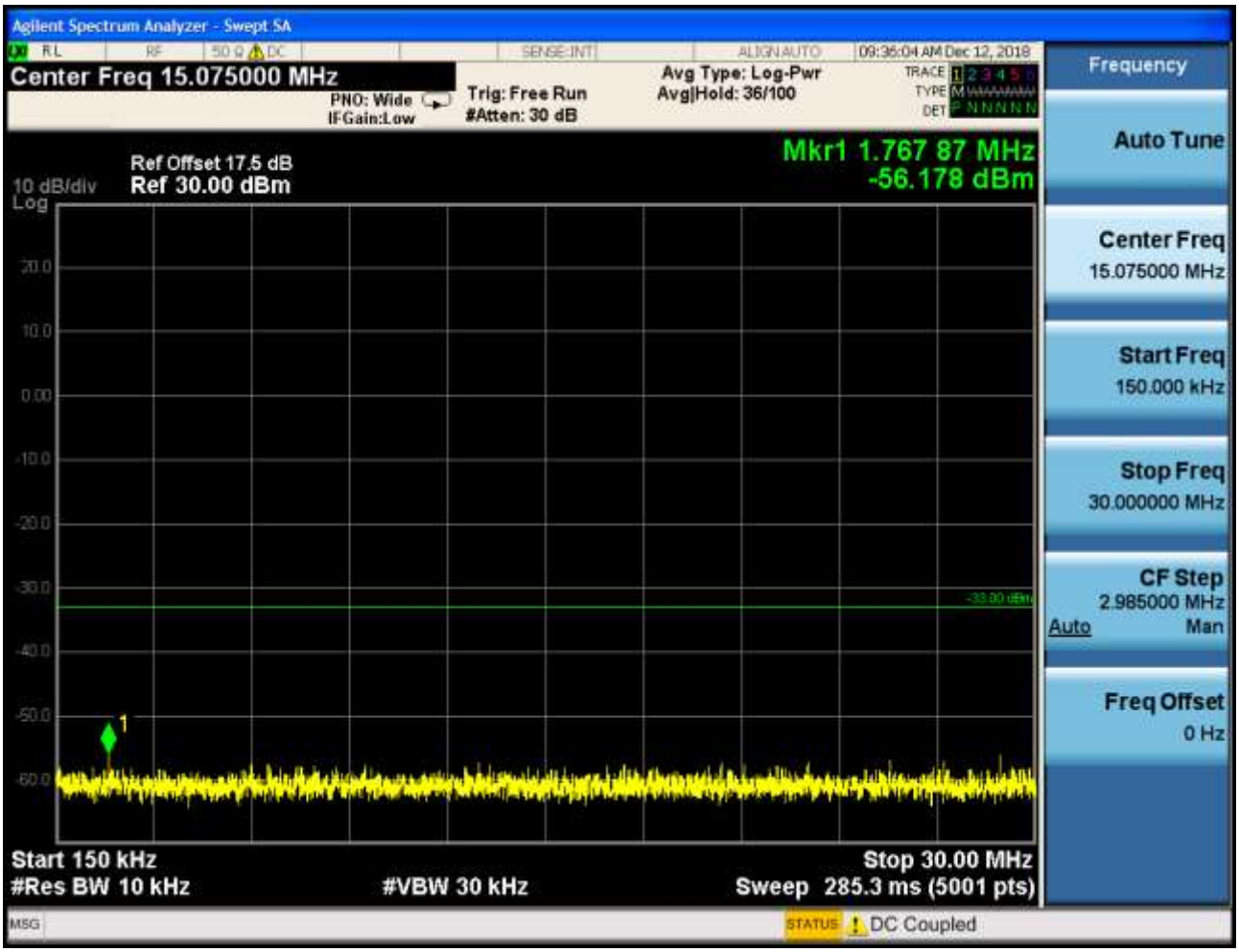


#### 6.1.2.1.2 Test Channel = MCH



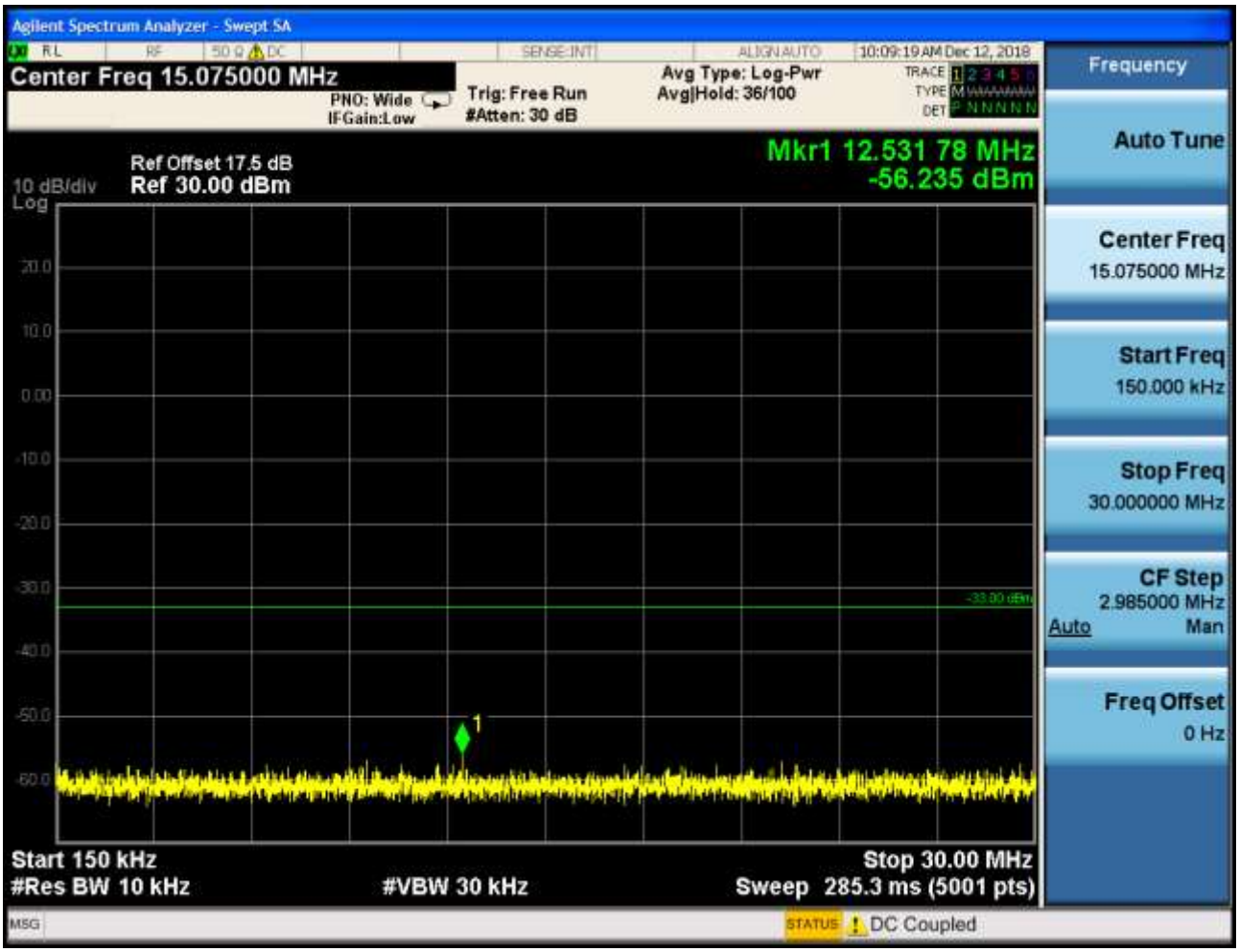
#### 6.1.2.1.3 Test Channel = HCH



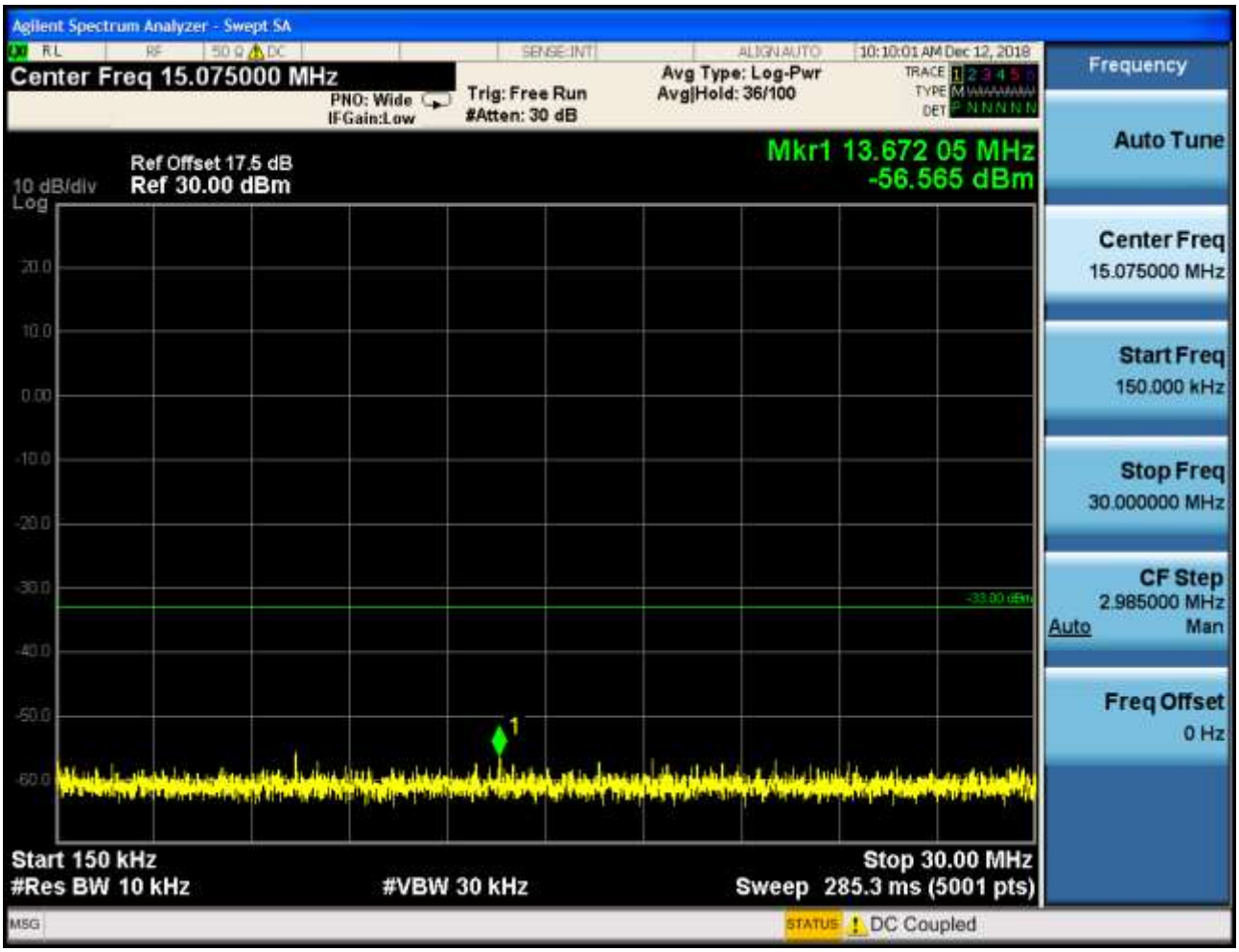


#### 6.1.2.2 Test Mode = GSM/TM2

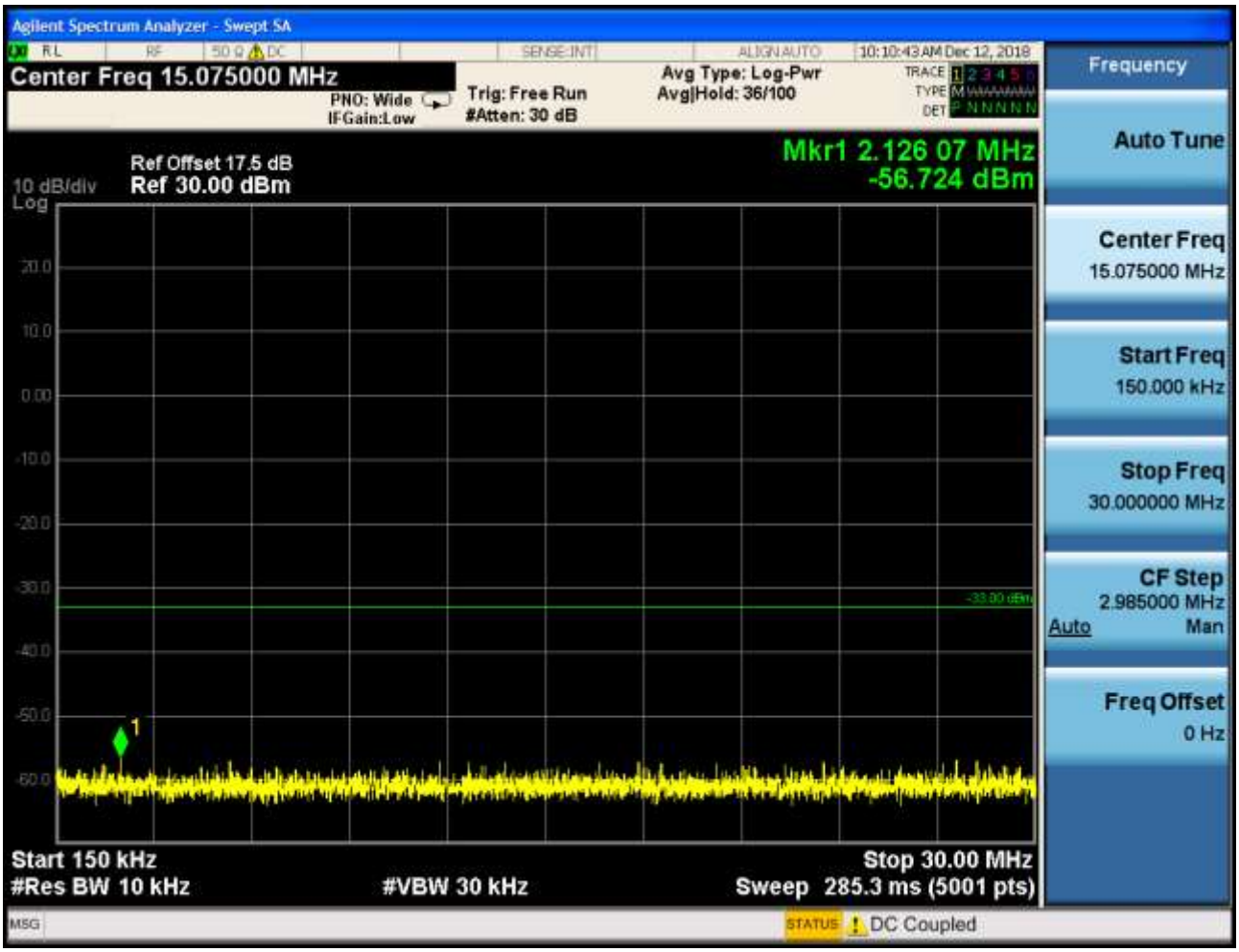
##### 6.1.2.2.1 Test Channel = LCH



#### 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.

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

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

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

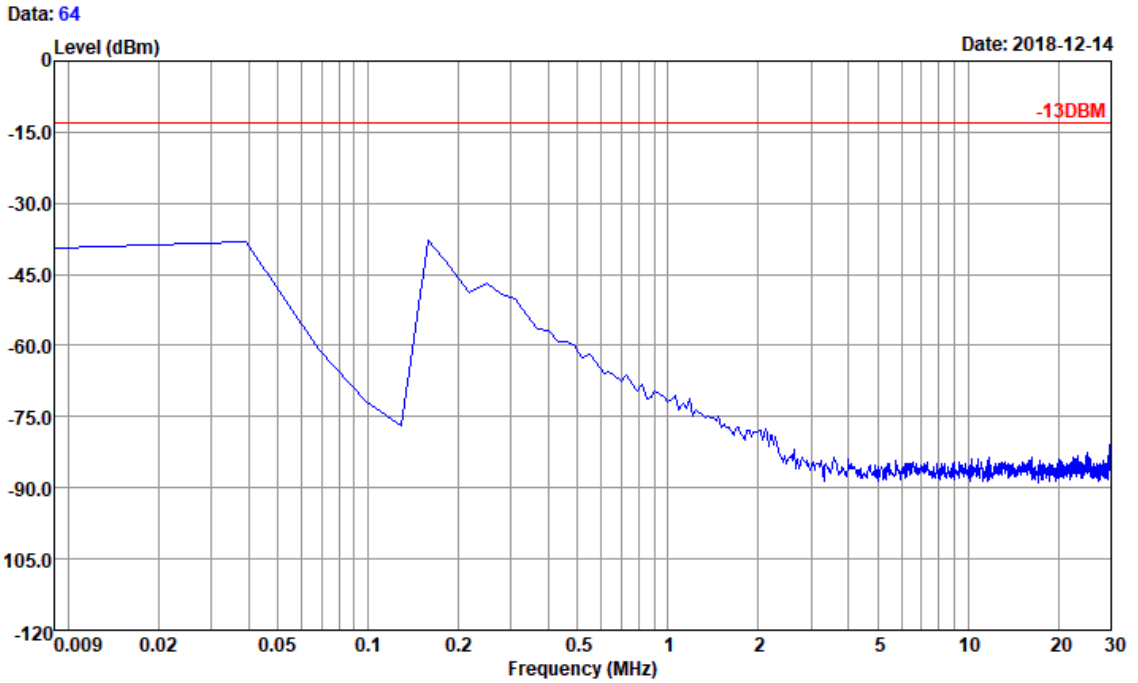
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

**Part I - Test Plots**

**7.1 For GSM_ANT1**

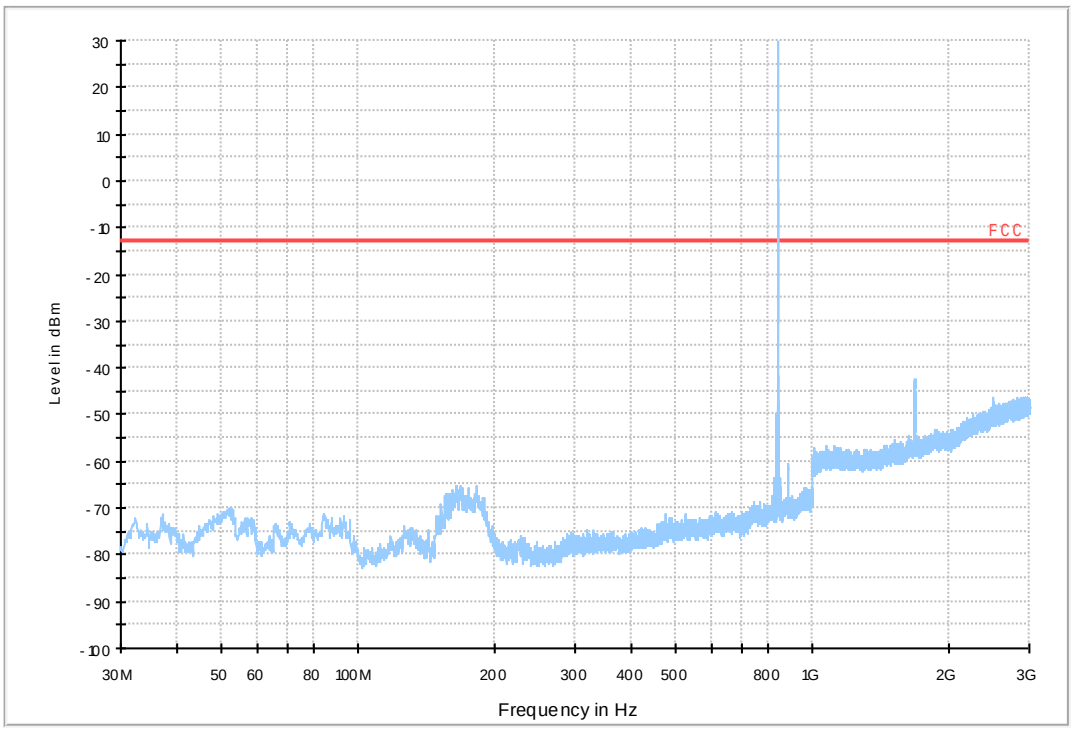
**7.1.1 Test Band = GSM850**

**7.1.1.1 Test Mode = GSM/TM1**

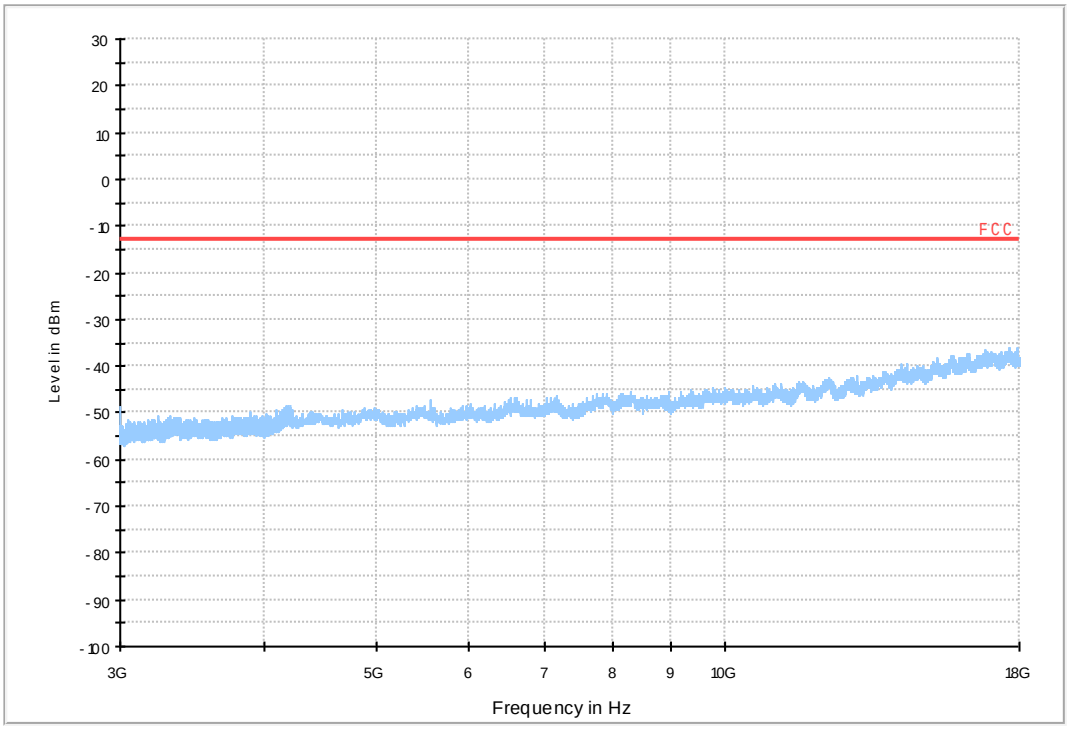



Site : 03CH01-SZ
Condition : -13DBM
: RBW:9.000KHz VBW:30.000KHz

04 FCC PART 22 GSM850_L

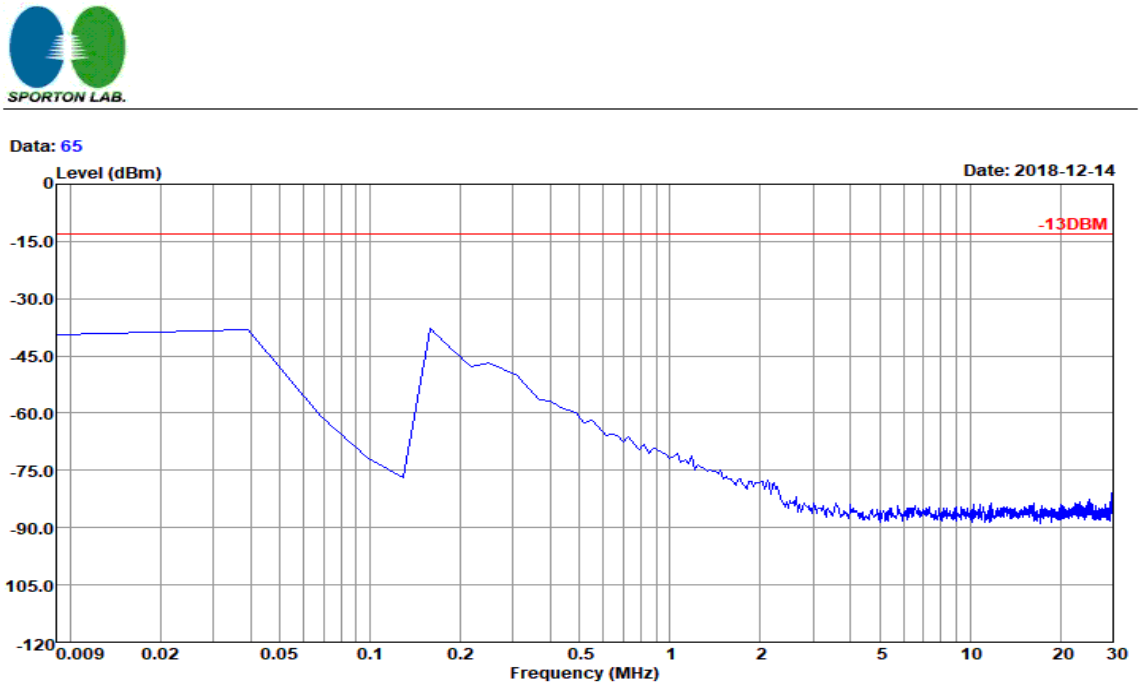



03 FCC PART 22 GSM850_H



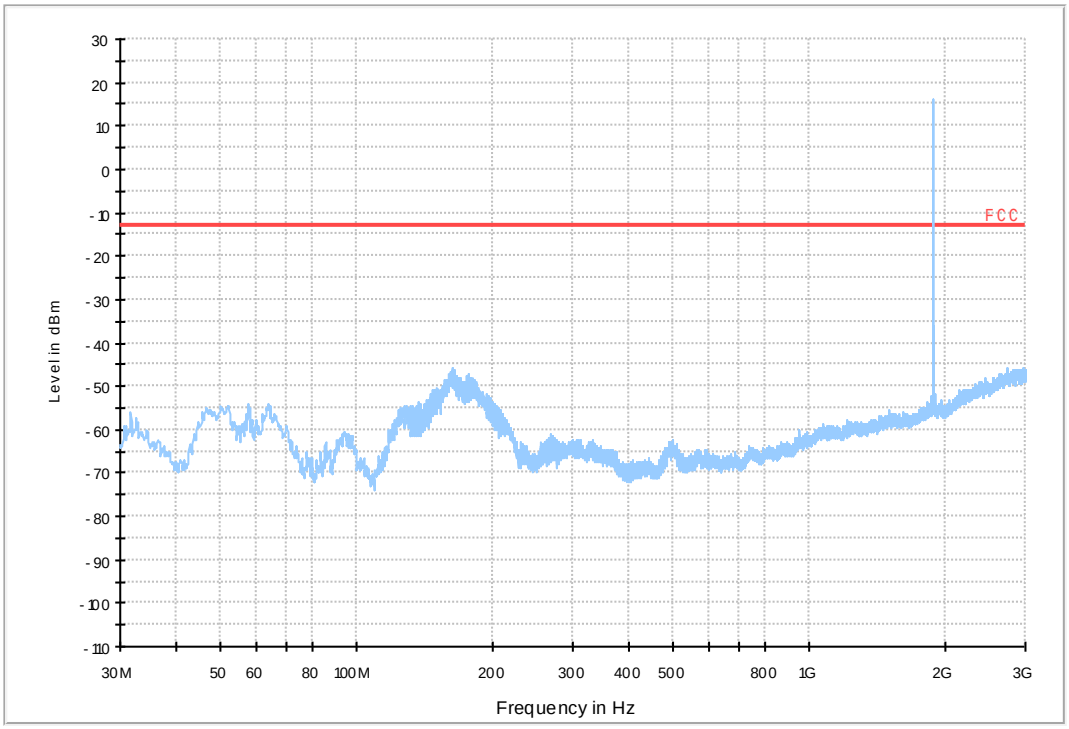
### 7.1.2 Test Band = PCS1900

#### 7.1.2.1 Test Mode = GSM/TM1

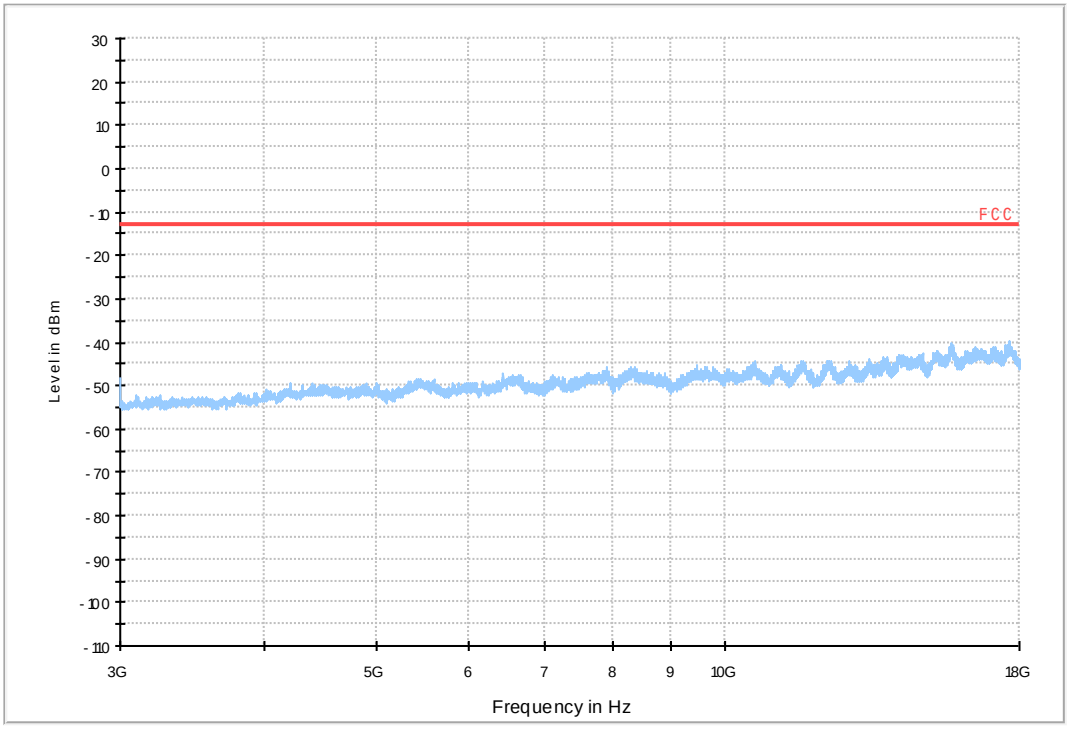



Site : 03CH01-SZ
Condition : -13DBM
: RBW:9.000KHz VBW:30.000KHz

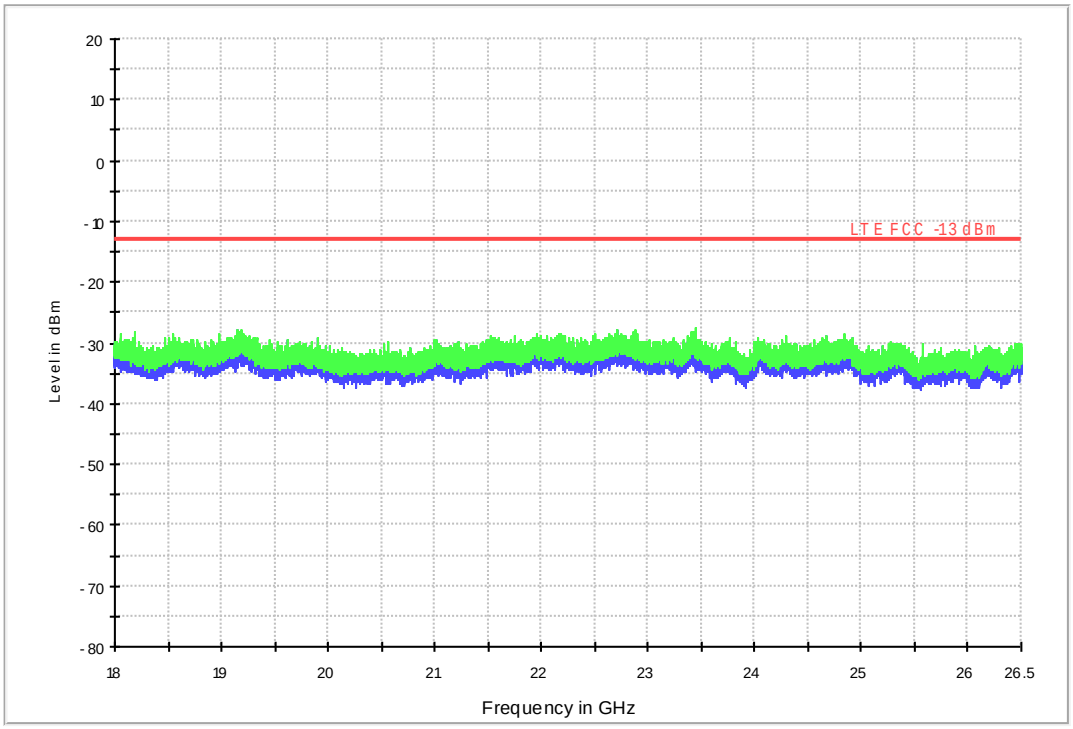
10 FCC PART 24 GSM1900_L




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 | 11.42919 | 0.01387 | PASS |
| | | | | VN | 10.58976 | 0.01285 | PASS |
| | | | | VH | 11.17090 | 0.01355 | PASS |
| | | MCH | TN | VL | 15.23892 | 0.01822 | PASS |
| | | | | VN | 14.88378 | 0.01779 | PASS |
| | | | | VH | 12.17177 | 0.01455 | PASS |
| | | HCH | TN | VL | 13.36634 | 0.01575 | PASS |
| | | | | VN | 12.65605 | 0.01491 | PASS |
| | | | | VH | 14.72235 | 0.01734 | PASS |
| | GSM/TM2 | LCH | TN | VL | 13.52777 | 0.01641 | PASS |
| | | | | VN | 13.01120 | 0.01579 | PASS |
| | | | | VH | 12.94663 | 0.01571 | PASS |
| | | MCH | TN | VL | 14.10892 | 0.01686 | PASS |
| | | | | VN | 11.49376 | 0.01374 | PASS |
| | | | | VH | 12.43005 | 0.01486 | PASS |
| | | HCH | TN | VL | 15.04521 | 0.01773 | PASS |
| | | | | VN | 10.71890 | 0.01263 | PASS |
| | | | | VH | 14.01206 | 0.01651 | PASS |
| PCS1900 | GSM/TM1 | LCH | TN | VL | 19.14551 | 0.01035 | PASS |
| | | | | VN | 15.52949 | 0.00839 | PASS |
| | | | | VH | 19.27465 | 0.01042 | PASS |
| | | MCH | TN | VL | 21.53466 | 0.01145 | PASS |
| | | | | VN | 20.88894 | 0.01111 | PASS |
| | | | | VH | 20.69523 | 0.01101 | PASS |
| | | HCH | TN | VL | 19.37151 | 0.01035 | PASS |
| | | | | VN | 18.14465 | 0.00839 | PASS |
| | | | | VH | 17.33750 | 0.01042 | PASS |
| | GSM/TM2 | LCH | TN | VL | 15.98150 | 0.00864 | PASS |
| | | | | VN | 16.98236 | 0.00918 | PASS |
| | | | | VH | 20.92123 | 0.01131 | PASS |
| | | MCH | TN | VL | 20.82437 | 0.01108 | PASS |
| | | | | VN | 19.98494 | 0.01063 | PASS |
| | | | | VH | 21.43780 | 0.01140 | PASS |
| | | HCH | TN | VL | 21.27637 | 0.00864 | PASS |

| Test Band | Test Mode | Test Channel | Test Temp. | Test Volt. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|---|---|---|---|---|---|---|---|
| | | | | VN | 20.63066 | 0.00918 | PASS |
| | | | | VH | 21.56695 | 0.01131 | PASS |

**8.1.2Frequency Error vs. Temperature:**

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|---|---|---|---|---|---|---|---|
| GSM850 | GSM/TM1 | LCH | VN | -30 | 11.55833 | 0.01402 | PASS |
| | | | | -20 | 12.39777 | 0.01504 | PASS |
| | | | | -10 | 12.04262 | 0.01461 | PASS |
| | | | | 0 | 12.33319 | 0.01496 | PASS |
| | | | | 10 | 15.72321 | 0.01908 | PASS |
| | | | | 20 | 10.58976 | 0.01285 | PASS |
| | | | | 30 | 14.27035 | 0.01731 | PASS |
| | | | | 40 | 14.04434 | 0.01704 | PASS |
| | | | | 50 | 12.07491 | 0.01465 | PASS |
| | | MCH | VN | -30 | 12.68834 | 0.01517 | PASS |
| | | | | -20 | 14.07663 | 0.01683 | PASS |
| | | | | -10 | 15.49721 | 0.01852 | PASS |
| | | | | 0 | 13.75377 | 0.01644 | PASS |
| | | | | 10 | 14.56092 | 0.01740 | PASS |
| | | | | 20 | 14.88378 | 0.01779 | PASS |
| | | | | 30 | 13.39863 | 0.01602 | PASS |
| | | | | 40 | 13.39863 | 0.01602 | PASS |
| | | | | 50 | 13.39863 | 0.01602 | PASS |
| | | HCH | VN | -30 | 11.71976 | 0.01381 | PASS |
| | | | | -20 | 13.14034 | 0.01548 | PASS |
| | | | | -10 | 12.26862 | 0.01445 | PASS |
| | | | | 0 | 12.81748 | 0.01510 | PASS |
| | | | | 10 | 17.56350 | 0.02069 | PASS |
| | | | | 20 | 12.65605 | 0.01491 | PASS |
| | | | | 30 | 13.49548 | 0.01590 | PASS |
| | | | | 40 | 12.68834 | 0.01495 | PASS |
| | | | | 50 | 13.30177 | 0.01567 | PASS |
| | GSM/TM2 | LCH | VN | -30 | 14.20577 | 0.01724 | PASS |
| | | | | -20 | 11.84891 | 0.01438 | PASS |
| | | | | -10 | 10.84805 | 0.01316 | PASS |
| | | | | 0 | 15.10978 | 0.01833 | PASS |
| | | | | 10 | 14.65778 | 0.01778 | PASS |
| | | | | 20 | 13.01120 | 0.01579 | PASS |
| | | | | 30 | 13.75377 | 0.01669 | PASS |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|---|---|---|---|---|---|---|---|
| | | | | 40 | 13.23720 | 0.01606 | PASS |
| | | | | 50 | 11.84881 | 0.01438 | PASS |
| | | MCH | VN | -30 | 14.85149 | 0.01775 | PASS |
| | | | | -20 | 13.78606 | 0.01648 | PASS |
| | | | | -10 | 14.78692 | 0.01768 | PASS |
| | | | | 0 | 14.56092 | 0.01740 | PASS |
| | | | | 10 | 11.33233 | 0.01355 | PASS |
| | | | | 20 | 11.49376 | 0.01374 | PASS |
| | | | | 30 | 10.42833 | 0.01247 | PASS |
| | | | | 40 | 11.33233 | 0.01355 | PASS |
| | | | | 50 | 13.30179 | 0.01567 | PASS |
| | | HCH | VN | -30 | 15.17435 | 0.01788 | PASS |
| | | | | -20 | 14.30263 | 0.01685 | PASS |
| | | | | -10 | 12.33319 | 0.01453 | PASS |
| | | | | 0 | 14.46406 | 0.01704 | PASS |
| | | | | 10 | 12.36548 | 0.01457 | PASS |
| | | | | 20 | 10.71890 | 0.01263 | PASS |
| | | | | 30 | 13.59234 | 0.01601 | PASS |
| | | | | 40 | 13.17263 | 0.01552 | PASS |
| | | | | 50 | 12.52691 | 0.01476 | PASS |
| PCS1900 | GSM/TM1 | LCH | VN | -30 | 16.88550 | 0.00913 | PASS |
| | | | | -20 | 17.30522 | 0.00935 | PASS |
| | | | | -10 | 18.30608 | 0.00989 | PASS |
| | | | | 0 | 18.37065 | 0.00993 | PASS |
| | | | | 10 | 18.24150 | 0.00986 | PASS |
| | | | | 20 | 15.52949 | 0.00839 | PASS |
| | | | | 30 | 16.88550 | 0.00913 | PASS |
| | | | | 40 | 19.24237 | 0.01040 | PASS |
| | | | | 50 | 20.01723 | 0.01082 | PASS |
| | | MCH | VN | -30 | 20.43694 | 0.01087 | PASS |
| | | | | -20 | 19.75894 | 0.01051 | PASS |
| | | | | -10 | 19.08094 | 0.01015 | PASS |
| | | | | 0 | 19.50065 | 0.01037 | PASS |
| | | | | 10 | 22.37409 | 0.01190 | PASS |
| | | | | 20 | 20.88894 | 0.01111 | PASS |
| | | | | 30 | 18.01550 | 0.00958 | PASS |
| | | | | 40 | 20.17866 | 0.01073 | PASS |
| | | | | 50 | 18.59665 | 0.00989 | PASS |
| | | HCH | VN | -30 | 17.36979 | 0.00910 | PASS |
| | | | | -20 | 17.91865 | 0.00938 | PASS |

| Test Band | Test Mode | Test Channel | Test Volt. | Test Temp. | Freq. Error [Hz] | Freq. vs. rated [ppm] | Verdict |
|---|---|---|---|---|---|---|---|
| | | | | -10 | 20.46923 | 0.01072 | PASS |
| | | | | 0 | 18.20922 | 0.00953 | PASS |
| | | | | 10 | 17.33750 | 0.00908 | PASS |
| | | | | 20 | 18.14465 | 0.00950 | PASS |
| | | | | 30 | 14.88378 | 0.00779 | PASS |
| | | | | 40 | 20.01723 | 0.01048 | PASS |
| | | | | 50 | 20.40466 | 0.01068 | PASS |
| | GSM/TM2 | LCH | VN | -30 | 18.66122 | 0.01009 | PASS |
| | | | | -20 | 18.24150 | 0.00986 | PASS |
| | | | | -10 | 18.08008 | 0.00977 | PASS |
| | | | | 0 | 19.24237 | 0.01040 | PASS |
| | | | | 10 | 19.04865 | 0.01030 | PASS |
| | | | | 20 | 16.98236 | 0.00918 | PASS |
| | | | | 30 | 15.52949 | 0.00839 | PASS |
| | | | | 40 | 15.56178 | 0.00841 | PASS |
| | | | | 50 | 17.20836 | 0.00930 | PASS |
| | | MCH | VN | -30 | 18.46751 | 0.00982 | PASS |
| | | | | -20 | 19.53294 | 0.01039 | PASS |
| | | | | -10 | 20.59837 | 0.01096 | PASS |
| | | | | 0 | 20.95352 | 0.01115 | PASS |
| | | | | 10 | 18.46751 | 0.00982 | PASS |
| | | | | 20 | 19.98494 | 0.01063 | PASS |
| | | | | 30 | 19.30694 | 0.01027 | PASS |
| | | | | 40 | 18.20922 | 0.00969 | PASS |
| | | | | 50 | 16.85321 | 0.00896 | PASS |
| | | HCH | VN | -30 | 17.69265 | 0.00926 | PASS |
| | | | | -20 | 17.04693 | 0.00893 | PASS |
| | | | | -10 | 19.14551 | 0.01002 | PASS |
| | | | | 0 | 19.92037 | 0.01043 | PASS |
| | | | | 10 | 17.98322 | 0.00942 | PASS |
| | | | | 20 | 20.63066 | 0.01080 | PASS |
| | | | | 30 | 19.08094 | 0.00999 | PASS |
| | | | | 40 | 25.44125 | 0.01332 | PASS |
| | | | | 50 | 18.11236 | 0.00948 | PASS |

END