

RF TEST REPORT

Test item : Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Phone with Bluetooth and WLAN
Model No. : LG-D160g, LG-D160G, D160g, D160G, LGD160g, LG-D160G
Order No. : DEMC1401-00323
Date of receipt : 2014-01-28
Test duration : 2014-02-03 ~ 2014-02-09
Date of issue : 2014-02-12
Use of report : FCC Original Grant

Applicant : LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Test laboratory : Digital EMC Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification : §22(H), §24(E)
Test environment : See appended test report
Test result : Pass Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:



Engineer
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Witnessed by:

N/A

Reviewed by:



General Manager
Geunki Son

Test Report Version

| Test Report No. | Date | Description |
|--------------------|---------------|---|
| DRTFCC1402-0184 | Feb. 12, 2014 | Initial issue |
| DRTFCC1402-0184(1) | Feb. 17, 2014 | Specify source reference of the test procedure, Revise ERP/EIRP test procedure. |
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1. GENERAL INFORMATION

Applicant Name: LG Electronics MobileComm U.S.A., Inc.

Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632

- FCC ID** : ZNFD160G
- FCC Classification** : Licensed Portable Transmitter Held to Ear (PCE)
- EUT** : Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Phone with Bluetooth and WLAN
- Model Name** : LG-D160g
- Add Model Name** : LG-D160g, LG-D160G, D160g, D160G, LGD160g, LG-D160G
 ※ 6 models are same mechanical, electrical and functional.
 ※ The only difference is the model name, which are changed for marketing purpose.
- Supplying power** : Standard Battery
 - Type: Li-ion Battery
 - M/N: BL-44JR
 - Rating: DC 3.7 V & 1540 mAh / 5.7 Wh
- Antenna Information** : Internal Antenna
 - Type: Built-In type
- Tx Frequency** : GSM850: 824.2 ~ 848.8 MHz
 GSM1900: 1850.2 ~ 1909.8 MHz
 EDGE850: 824.2 ~ 848.8 MHz
 EDGE1900: 1850.2 ~ 1909.8 MHz
 WCDMA850: 826.4 ~ 846.6 MHz
 WCDMA1900: 1852.4 ~ 1907.6 MHz
 HSUPA850: 826.4 ~ 846.6 MHz
 HSUPA1900: 1852.4 ~ 1907.6 MHz
- Rx Frequency** : GSM850: 869.2 ~ 893.8 MHz
 GSM1900: 1930.2 ~ 1989.8 MHz
 EDGE850: 869.2 ~ 893.8 MHz
 EDGE1900: 1930.2 ~ 1989.8 MHz
 WCDMA850: 871.4 ~ 891.6 MHz
 WCDMA1900: 1932.4 ~ 1987.6 MHz
 HSUPA850: 871.4 ~ 891.6 MHz
 HSUPA1900: 1932.4 ~ 1987.6 MHz
- Max. RF Output Power** : GSM850: 1.114 W ERP(30.47 dBm)
 GSM1900: 1.105 W EIRP(30.44 dBm)
 EDGE850: 0.347 W ERP(25.40 dBm)
 EDGE1900: 0.309 W EIRP(24.90 dBm)
 WCDMA850: 0.128 W ER (21.07 dBm)
 WCDMA1900: 0.214 W EIRP(23.31 dBm)
 HSUPA850: 0.108 W ERP(20.33 dBm)
 HSUPA1900: 0.185 W EIRP(22.68 dBm)
- Emission Designator(s)** : GSM850: 243KGXW
 GSM1900: 242KGXW
 EDGE850: 244KG7W
 EDGE1900: 247KG7W
 WCDMA850: 4M18F9W
 WCDMA1900: 4M19F9W
 HSUPA850: 4M17F9W
 HSUPA1900: 4M18F9W

2. INTRODUCTION

2.1. EUT DESCRIPTION

The Equipment Under Test (EUT) supports a dual band (Cellular/PCS) with GSM/GPRS/EDGE, WCDMA/HSPA, Bluetooth and WLAN.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

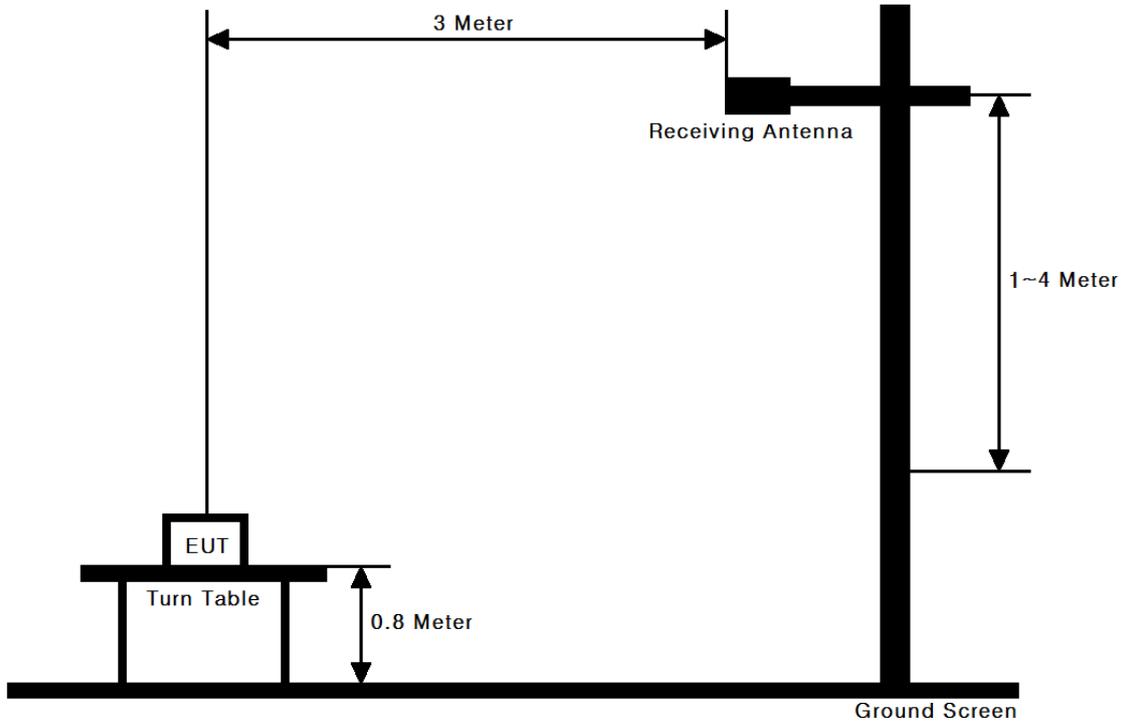
The 3 & 10m test site and conducted measurement facility used to collect the radiated data are located at the 38, Yurim-ro, 154 beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935. The site is constructed in conformance with the requirements.

- 3 & 10m test site registration Number: 678747

3. DESCRIPTION OF TESTS

3.1 ERP&EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up



These measurements were performed at 3 & 10m test site. The equipment under test is placed on a wooden turntable 0.8-meters above the ground plane and 3-meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading.

For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

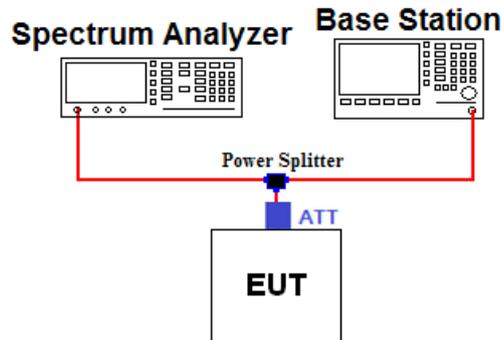
Test Procedure

- **ANSI/TIA-603-C-2004 - Section 2.2.17**
- **KDB971168 v02r01- Section 5.2.1**

1. Set span to at least 1.5 times the OBW.
2. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
3. Set VBW $\geq 3 \times$ RBW.
4. Set number of points in sweep $\geq 2 \times$ span / RBW.
5. Sweep time = auto-couple.
6. Detector = RMS (power averaging).
7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

3.2 PEAK TO AVERAGE RATIO

Test set-up



Test Procedure

A peak to average ratio measurement is performed using the following procedure.

■ CCDF Procedure

- KDB971168 v02r01-Section 5.7.1

1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Set the measurement interval as follows:
 - 1) For continuous transmissions, set to 1 ms
 - 2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1%

■ Alternate Procedure**- KDB971168 v02r01-Section 5.7.2**

Use one of the measurement procedures of the peak power and record as P_{PK} .

Use one of the measurement procedures of the average power and record as P_{Avg} .

Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = P_{PK} \text{ (dBm)} - P_{Avg} \text{ (dBm)}.$$

- Peak Power Measurement

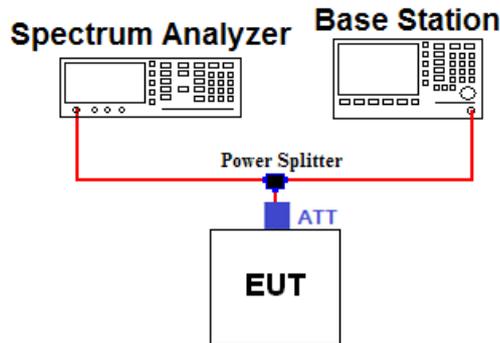
1. Set the RBW \geq OBW
2. Set VBW $\geq 3 \times$ RBW
3. Set span $\geq 2 \times$ RBW
4. Sweep time = auto couple
5. Detector = peak
6. Ensure that the number of measurement points \geq span/RBW.
7. Trace mode = max hold
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the peak amplitude level.

- Average Power Measurement

1. Set span to at least 1.5 times the OBW.
2. Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
3. Set VBW $\geq 3 \times$ RBW.
4. Set number of points in sweep $\geq 2 \times$ span / RBW.
5. Sweep time = auto-couple.
6. Detector = RMS (power averaging).
7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep.
Ensure that the sweep time is less than or equal to the transmission burst duration.
9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

3.3 OCCUPIED BANDWIDTH.

Test set-up



Offset value information

| Frequency (MHz) | Offset Value (dB) | Frequency (MHz) | Offset Value (dB) |
|-----------------|-------------------|-----------------|-------------------|
| 824.2 | 19.12 | 1850.2 | 19.77 |
| 826.4 | 19.11 | 1852.4 | 19.77 |
| 836.6 | 19.16 | 1880.0 | 19.84 |
| 846.6 | 19.18 | 1907.6 | 19.86 |
| 848.8 | 19.20 | 1909.8 | 19.86 |

Note. 1: The offset values from EUT to Spectrum analyzer were measured and used for test.
 Offset value = Cable A + Splitter + ATT + Cable B

Test Procedure

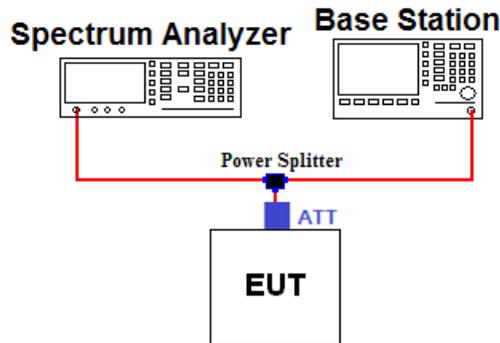
- KDB971168 v02r01-Section 4.2

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

1. The signal analyzer`s automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 ~ 5% of the expected OBW
3. VBW ≥ 3 X RBW
4. Detector = Peak
5. Trance mode = Max hold
6. Sweep = Auto couple
7. The trace was allowed to stabilize
8. If necessary, step 2 ~ 7 were repeated after changing the RBW such that it would be within 1 ~ 5% of the 99% occupied bandwidth observed in step 7.

3.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.

Test set-up



Offset value information

| Frequency (MHz) | Offset Value (dB) | Frequency (MHz) | Offset Value (dB) | Frequency (MHz) | Offset Value (dB) |
|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| 821.0 | 19.10 | 1847.0 | 19.74 | 5000.0 | 21.04 |
| 824.0 | 19.12 | 1850.0 | 19.76 | 10000.0 | 21.69 |
| 849.0 | 19.21 | 1910.0 | 19.86 | 15000.0 | 22.10 |
| 852.0 | 19.21 | 1913.0 | 19.87 | 20000.0 | 23.08 |

Note. 1: The offset value from EUT to Spectrum analyzer was measured and used for test.
 Offset value = Cable A + Splitter + ATT + Cable B

Test Procedure

- KDB971168 v02r01 - Section 6.0

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer.

The EUT was setup to maximum output power at its lowest channel. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

1. RBW = 1MHz & VBW ≥ 3MHz
2. Detector = Positive peak
3. Trace mode = Max hold
4. Sweep time = Auto
5. The trace was allowed to stabilize

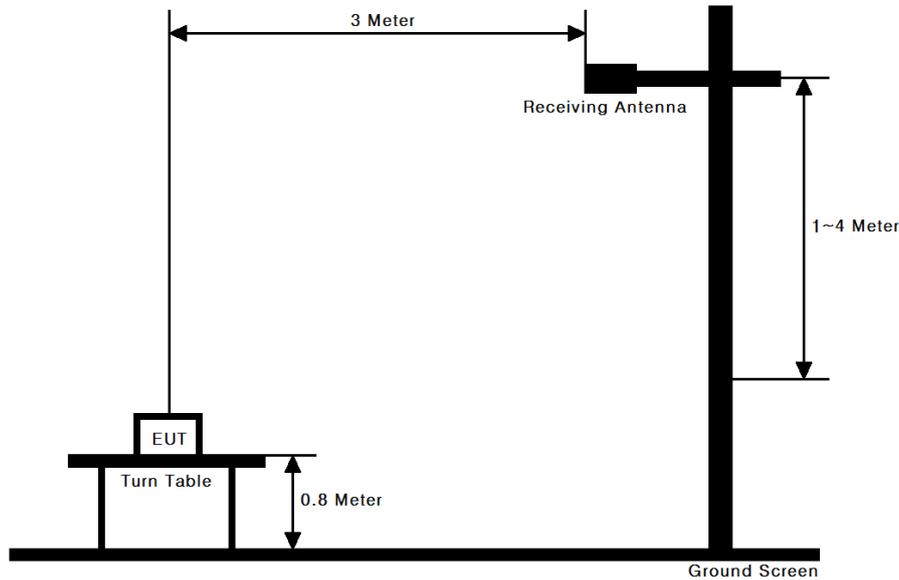
The highest, lowest and a middle channel were tested for out of band measurements. The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P[\text{Watts}])$, where P is the transmitter power in Watts.

Note 1: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter was employed to measure the out of band Emissions.

Note 2: Compliance with the applicable limits is based on the use of measurement instrumentation employing a RBW of 100 KHz or greater for Part 22 and 1 MHz or greater for Part 24.

3.5 RADIATED SPURIOUS EMISSIONS

Test Set-up



Test Procedure

- ANSI/TIA-603-C-2004 - Section 2.2.12
- KDB971168 v02r01 - Section 5.8

This measurement was performed at 3-meter test range. The equipment under test is placed on a wooden turntable 0.8-meters above the ground plane and 3-meters from the receive antenna.

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

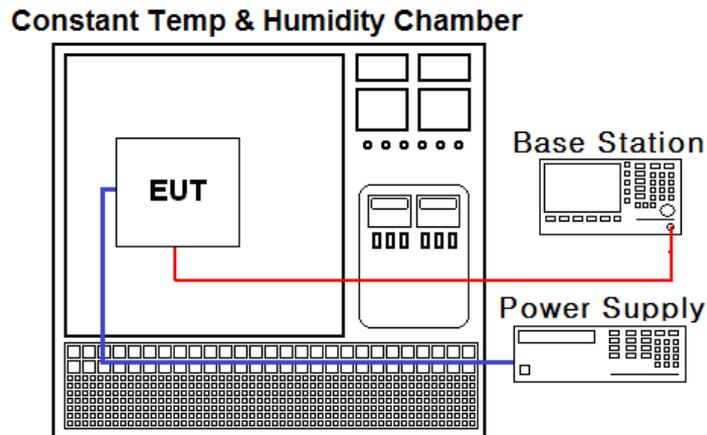
For radiated power measurements below 1GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.6 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

Test Set-up



Test Procedure

- ANSI/TIA-603-C-2004

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification - the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature. (25°C to provide a reference).
2. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

NOTE: The EUT is tested down to the battery endpoint.

4. LIST OF TEST EQUIPMENT

| Type | Manufacturer | Model | Cal.Date (yy/mm/dd) | Next.Cal. Date (yy/mm/dd) | S/N |
|--|---------------|-------------|------------------------|------------------------------|------------------|
| Spectrum Analyzer | Agilent | N9030A | 13/10/29 | 14/10/29 | MY53310140 |
| Spectrum Analyzer | Agilent | N9020A | 13/03/28 | 14/03/28 | MY50510026 |
| Multimeter | H.P | 34401A | 13/02/27 | 14/02/27 | 3146A13475 |
| DC Power Supply | H.P | 6622A | 13/02/27 | 14/02/27 | 3448A03760 |
| Temp & Humi Test Chamber | SJ Science | TEMI2500 | 13/10/22 | 14/10/22 | SJ-TH-S50-130930 |
| Power Splitter | Anritsu | K241B | 13/10/22 | 14/10/22 | 1701099 |
| Attenuator(3dB) | SMAJK | SMAJK-2-3 | 13/10/22 | 14/10/22 | 3 |
| Attenuator(10dB) | SMAJK | SMAJK-50-10 | 13/10/23 | 14/10/23 | 2-50-10 |
| Thermo hygrometer | BODYCOM | BJ5478 | 13/06/01 | 14/06/01 | 120612-2 |
| Dipole Antenna | Schwarzbeck | VHA9103 | 13/10/24 | 15/10/24 | 2116 |
| Dipole Antenna | Schwarzbeck | VHA9103 | 12/03/22 | 14/03/22 | 2117 |
| Dipole Antenna | Schwarzbeck | UHA9105 | 13/10/24 | 15/10/24 | 2261 |
| Dipole Antenna | Schwarzbeck | UHA9105 | 12/03/22 | 14/03/22 | 2262 |
| Bilog Antenna | SCHAFFNER | CBL6112B | 12/11/06 | 14/11/06 | 2737 |
| HORN ANT | ETS | 3115 | 12/02/20 | 14/02/20 | 6419 |
| HORN ANT | ETS | 3115 | 13/02/28 | 15/02/28 | 00021097 |
| HORN ANT | A.H.Systems | SAS-574 | 13/03/20 | 15/03/20 | 154 |
| HORN ANT | A.H.Systems | SAS-574 | 13/05/27 | 15/05/27 | 155 |
| Amplifier (22dB) | H.P | 8447E | 14/01/07 | 15/01/07 | 2945A02865 |
| Amplifier (30dB) | Agilent | 8449B | 13/02/27 | 14/02/27 | 3008A00370 |
| High-pass filter | Wainwright | WHKX1.0 | 13/09/12 | 14/09/12 | 9 |
| High-Pass Filter | Wainwright | WHNX2.1 | 13/09/12 | 14/09/12 | 1 |
| 8960 Series 10 Wireless Comms Test Set | Agilent | E5515C | 13/02/28 | 14/02/28 | GB43461134 |
| Universal Radio Communication Tester | Rohde Schwarz | CMU200 | 13/02/28 | 14/02/28 | 106760 |
| Vector Signal Generator | Rohde Schwarz | SMJ100A | 14/01/07 | 15/01/07 | 100148 |
| Signal Generator | Rohde Schwarz | SMF100A | 13/07/22 | 14/07/22 | 102341 |
| Amplifier | EMPOWER | BBS3Q7ELU | 13/09/12 | 14/09/12 | 1020 |

5. SUMMARY OF TEST RESULTS

| FCC Part Section(s) | RSS Section(s) | Parameter | Status Note 1 |
|--|--|--|------------------|
| 2.1046 | RSS-132 (4.4) RSS-133 (4.1) | Conducted Output Power | C |
| 22.913(a) 24.232(c) | RSS-132 (4.4) [SRSP-503(5.1.3)] RSS-133 (6.4) [SRSP-510(5.1.2)] | Effective Radiated Power Equivalent Isotropic Radiated Power | C |
| 22.917(a) 24.238(a) 2.1049 | RSS-Gen (4.6.1) RSS-133 (2.3) | Occupied Bandwidth | C |
| 22.917(a) 24.238(a) 2.1051 | RSS-132 (4.5.1) RSS-133 (6.5.1) | Band Edge Spurious and Harmonic Emissions at Antenna Terminal | C |
| 24.232(d) | RSS-133 (6.4) | Peak to Average Ratio | C |
| 22.917(a) 24.238(a) 2.1053 | RSS-132 (4.5.1) RSS-133 (6.5.1) | Radiated Spurious and Harmonic Emissions | C |
| 22.355 24.235 2.1055 | RSS-132 (4.3) RSS-133 (6.3) | Frequency Stability | C |
| <p>Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable</p> | | | |

The sample was tested according to the following specification:
ANSI/TIA/EIA-603-C-2004 and KDB 971168 D01 v02r01

6. SAMPLE CALCULATION

A. Emission Designator

GSM850 Emission Designator

Emission Designator = **243KGXW**
GSM OBW = 243.46 kHz
(Measured at the 99.75 % power bandwidth)
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

EDGE850 Emission Designator

Emission Designator = **244KG7W**
GSM OBW = 244.02 kHz
(Measured at the 99.75 % power bandwidth)
G = Phase Modulation
7 = Two or more channels containing
quantized or digital information
W = Combination (Audio/Data)

WCDMA850 Emission Designator

Emission Designator = **4M18F9W**
WCDMA OBW = 4.1783 MHz
(Measured at the 99.75 % power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

HSUPA850 Emission Designator

Emission Designator = **4M17F9W**
HSUPA OBW = 4.1660 MHz
(Measured at the 99.75 % power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

GSM1900 Emission Designator

Emission Designator = **242KGXW**
GSM OBW = 242.03 kHz
(Measured at the 99.75 % power bandwidth)
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

EDGE1900 Emission Designator

Emission Designator = **247KG7W**
GSM OBW = 247.31 kHz
(Measured at the 99.75 % power bandwidth)
G = Phase Modulation
7 = Two or more channels containing
quantized or digital information
W = Combination (Audio/Data)

WCDMA1900 Emission Designator

Emission Designator = **4M19F9W**
WCDMA OBW = 4.1864 MHz
(Measured at the 99.75 % power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

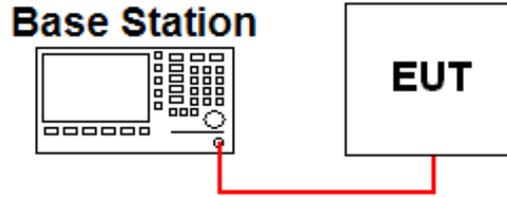
HSUPA1900 Emission Designator

Emission Designator = **4M18F9W**
HSUPA OBW = 4.1784 MHz
(Measured at the 99.75 % power bandwidth)
F = Frequency Modulation
9 = Composite Digital Information
W = Combination (Audio/Data)

7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



▪ GSM / GPRS / EDGE

| Band | Channel | Test Result(dBm) | | | | | | | | |
|----------|---------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | GSM | GPRS 1 TX Slot | GPRS 2 TX Slot | GPRS 3 TX Slot | GPRS 4 TX Slot | EDGE 1 TX Slot | EDGE 2 TX Slot | EDGE 3 TX Slot | EDGE 4 TX Slot |
| Cellular | 128 | 33.0 | 32.9 | 30.5 | 28.4 | 27.4 | 26.4 | 25.8 | 24.8 | 23.7 |
| | 190 | 33.0 | 33.0 | 30.5 | 28.5 | 27.4 | 26.5 | 25.9 | 24.9 | 23.8 |
| | 251 | 33.0 | 33.0 | 30.5 | 28.4 | 27.4 | 26.5 | 25.9 | 24.9 | 23.8 |
| PCS | 512 | 30.0 | 29.9 | 28.1 | 25.9 | 24.9 | 24.9 | 24.5 | 23.4 | 22.0 |
| | 661 | 30.0 | 30.0 | 28.2 | 26.0 | 24.8 | 25.0 | 24.5 | 23.5 | 22.1 |
| | 810 | 30.0 | 30.0 | 28.2 | 26.0 | 24.9 | 25.0 | 24.5 | 23.5 | 22.1 |

▪ WCDMA / HSDPA / HSUPA

| 3GPP Release Version | Mode | 3GPP 34.121 Subtest | Cellular Band (dBm) | | | PCS Band (dBm) | | | 3GPP MPR (dB) |
|----------------------|-------|---------------------|---------------------|-------|-------|----------------|-------|-------|---------------|
| | | | 4132 | 4183 | 4233 | 9262 | 9400 | 9538 | |
| 99 | WCDMA | 12.2 kbps RMC | 22.88 | 22.89 | 22.83 | 23.21 | 23.19 | 23.17 | - |
| 99 | | 12.2 kbps AMR | 22.84 | 22.81 | 22.78 | 23.19 | 23.15 | 23.14 | - |
| 5 | HSDPA | Subtest 1 | 21.85 | 21.97 | 21.99 | 22.24 | 22.12 | 22.27 | 0 |
| 5 | | Subtest 2 | 21.74 | 21.92 | 21.94 | 22.22 | 22.1 | 22.26 | 0 |
| 5 | | Subtest 3 | 21.25 | 21.43 | 21.48 | 21.82 | 21.51 | 21.76 | 0.5 |
| 5 | | Subtest 4 | 21.24 | 21.32 | 21.46 | 21.80 | 21.40 | 21.76 | 0.5 |
| 6 | HSUPA | Subtest 1 | 21.83 | 21.93 | 21.95 | 22.20 | 22.05 | 22.20 | 0 |
| 6 | | Subtest 2 | 20.04 | 20.13 | 20.15 | 20.53 | 20.39 | 20.56 | 2 |
| 6 | | Subtest 3 | 21.14 | 21.23 | 21.24 | 21.15 | 20.85 | 21.10 | 1 |
| 6 | | Subtest 4 | 20.00 | 20.08 | 20.10 | 20.50 | 20.38 | 20.54 | 2 |
| 6 | | Subtest 5 | 21.78 | 21.88 | 21.89 | 22.17 | 22.02 | 22.16 | 0 |

7.2 PEAK TO AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown in Clause 8.1

7.3 OCCUPIED BANDWIDTH

| Band | Channel | Frequency | Test Result (kHz) |
|-----------|-------------|---------------|-------------------|
| GSM850 | 128 | 824.2 | 243.46 |
| | 190 | 836.6 | 242.54 |
| | 251 | 848.8 | 242.16 |
| GSM1900 | 512 | 1850.2 | 241.19 |
| | 661 | 1880.0 | 241.84 |
| | 810 | 1909.8 | 242.03 |
| EDGE850 | 128 | 824.2 | 244.02 |
| | 190 | 836.6 | 239.36 |
| | 251 | 848.8 | 238.49 |
| EDGE1900 | 512 | 1850.2 | 242.93 |
| | 661 | 1880.0 | 247.31 |
| | 810 | 1909.8 | 240.52 |
| WCDMA850 | 4132 | 826.4 | 4175.60 |
| | 4183 | 836.6 | 4172.20 |
| | 4233 | 846.6 | 4178.30 |
| WCDMA1900 | 9262 | 1852.4 | 4186.40 |
| | 9400 | 1880.0 | 4186.40 |
| | 9538 | 1907.6 | 4178.40 |
| HSUPA850 | 4132 | 826.4 | 4139.70 |
| | 4183 | 836.6 | 4160.40 |
| | 4233 | 846.6 | 4166.00 |
| HSUPA1900 | 9262 | 1852.4 | 4178.40 |
| | 9400 | 1880.0 | 4165.70 |
| | 9538 | 1907.6 | 4155.30 |

- Plots of the EUT's Occupied Bandwidth are shown in Clause 8.2

7.4 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

- Plots of the EUT's Conducted Spurious Emissions are shown in Clause 8.3

7.5 BAND EDGE

- Plots of the EUT's Band Edge are shown in Clause 8.4

7.6 EFFECTIVE RADIATED POWER

- GSM850 data

| CH. | EUT Position (Axis) | Test Conditions(Power Step: 5) | | | | | | | |
|-------------------------|---------------------|--------------------------------|------------|----------------------------------|--------------------|--------------|--------------|----------------|------------|
| | | Reading Value (dBm) | Pol. (H/V) | LEVEL@ TX ANTENNA TERMINAL (dBm) | Antenna Gain (dBd) | ERP (dBm) | ERP (W) | Power Supply | Note. |
| 824.2 128 CH | Z | - 5.06 | H | 27.65 | 1.20 | 28.85 | 0.767 | DC 3.7V | GSM |
| 836.6 190 CH | X | - 4.94 | H | 29.06 | 1.15 | 30.21 | 1.050 | DC 3.7V | GSM |
| 848.8 251 CH | X | - 4.18 | H | 29.42 | 1.05 | 30.47 | 1.114 | DC 3.7V | GSM |
| 848.8 251 CH | X | - 9.25 | H | 24.35 | 1.05 | 25.40 | 0.347 | DC 3.7V | EDGE |

- WCDMA850 data

| CH. | EUT Position (Axis) | Test Conditions(TPC bits all set to "1") | | | | | | | |
|-----------------------|---------------------|--|------------|----------------------------------|--------------------|--------------|--------------|----------------|-------|
| | | Reading Value (dBm) | Pol. (H/V) | LEVEL@ TX ANTENNA TERMINAL (dBm) | Antenna Gain (dBd) | ERP (dBm) | ERP (W) | Power Supply | Note. |
| 826.4 4132 | Y | - 17.65 | V | 18.65 | 1.19 | 19.84 | 0.096 | DC 3.7V | - |
| 836.6 4183 | Z | - 14.34 | H | 19.92 | 1.15 | 21.07 | 0.128 | DC 3.7V | - |
| 846.6 4233 | Y | - 14.50 | V | 19.74 | 1.10 | 20.84 | 0.121 | DC 3.7V | - |

- HSUPA850 data

| CH. | EUT Position (Axis) | Test Conditions(TPC bits all set to "1") | | | | | | | |
|-----------------------|---------------------|--|------------|----------------------------------|--------------------|--------------|--------------|----------------|-------|
| | | Reading Value (dBm) | Pol. (H/V) | LEVEL@ TX ANTENNA TERMINAL (dBm) | Antenna Gain (dBd) | ERP (dBm) | ERP (W) | Power Supply | Note. |
| 826.4 4132 | Y | -17.77 | V | 18.53 | 1.19 | 19.72 | 0.094 | DC 3.7V | - |
| 836.6 4183 | Z | -15.08 | H | 19.18 | 1.15 | 20.33 | 0.108 | DC 3.7V | - |
| 846.6 4233 | Y | -15.03 | V | 19.21 | 1.10 | 20.31 | 0.107 | DC 3.7V | - |

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and in GSM mode using a Power Control Level of "0" in PCS Band and "5" in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna. The worst case data is reported.

7.7 EQUIVALENT ISOTROPIC RADIATED POWER

- GSM1900 data

| CH. | EUT Position (Axis) | TEST CONDITIONS(Power Step: 0) | | | | | | | |
|------------|---------------------|--------------------------------|------------|----------------------------------|--------------------|------------|----------|--------------|-------|
| | | Reading Value (dBm) | Pol. (H/V) | LEVEL@ TX ANTENNA TERMINAL (dBm) | Antenna Gain (dBi) | EIRP (dBm) | EIRP (W) | Power Supply | Note. |
| 1850.2 512 | Y | - 7.52 | V | 22.38 | 8.06 | 30.44 | 1.105 | DC 3.7V | GSM |
| 1880.0 661 | Y | - 7.89 | V | 21.75 | 8.12 | 29.87 | 0.970 | DC 3.7V | GSM |
| 1909.8 810 | X | - 5.84 | H | 21.91 | 8.18 | 30.09 | 1.021 | DC 3.7V | GSM |
| 1850.2 512 | Y | -13.06 | V | 16.84 | 8.06 | 24.90 | 0.309 | DC 3.7V | EDGE |

- WCDMA1900 data

| CH. | EUT Position (Axis) | Test Conditions(TPC bits all set to "1") | | | | | | | |
|-------------|---------------------|--|------------|----------------------------------|--------------------|------------|----------|--------------|-------|
| | | Reading Value (dBm) | Pol. (H/V) | LEVEL@ TX ANTENNA TERMINAL (dBm) | Antenna Gain (dBi) | EIRP (dBm) | EIRP (W) | Power Supply | Note. |
| 1852.4 9262 | Y | - 14.86 | V | 14.93 | 8.06 | 22.99 | 0.199 | DC 3.7V | - |
| 1880.0 9400 | X | - 13.40 | H | 15.19 | 8.12 | 23.31 | 0.214 | DC 3.7V | - |
| 1907.6 9538 | X | - 13.66 | H | 14.76 | 8.18 | 22.94 | 0.197 | DC 3.7V | - |

- HSPA1900 data

| CH. | EUT Position (Axis) | Test Conditions(TPC bits all set to "1") | | | | | | | |
|-------------|---------------------|--|------------|----------------------------------|--------------------|------------|----------|--------------|-------|
| | | Reading Value (dBm) | Pol. (H/V) | LEVEL@ TX ANTENNA TERMINAL (dBm) | Antenna Gain (dBi) | EIRP (dBm) | EIRP (W) | Power Supply | Note. |
| 1852.4 9262 | Y | -15.17 | V | 14.62 | 8.06 | 22.68 | 0.185 | DC 3.7V | - |
| 1880.0 9400 | X | -14.11 | H | 14.48 | 8.12 | 22.60 | 0.182 | DC 3.7V | - |
| 1907.6 9538 | X | -14.23 | H | 14.19 | 8.18 | 22.37 | 0.172 | DC 3.7V | - |

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and in GSM mode using a Power Control Level of "0" in PCS Band and "5" in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna. The worst case data is reported.

7.8 RADIATED SPURIOUS EMISSIONS

7.8.1 RADIATED SPURIOUS EMISSIONS (GSM850)

| Channel (ERP) | Freq. (MHz) | EUT Position (Axis) | POL (H/V) | Level at Substitute Antenna Terminal (dBm) | Substitute Antenna Gain (dBd) | Correct Generator Level (dBm) | Result (dBc) | Limit (dBc) |
|------------------|-------------|---------------------|-----------|--|-------------------------------|-------------------------------|--------------|-------------|
| 128 (0.767 W) | 1648.53 | X | H | - 63.35 | 5.48 | - 57.87 | 86.72 | 41.85 |
| | 3296.00 | X | H | - 59.00 | 7.68 | - 51.32 | 80.17 | |
| | - | - | - | - | - | - | - | |
| 190 (1.050 W) | 1673.35 | X | H | - 61.69 | 5.53 | - 56.16 | 86.37 | 43.21 |
| | 3345.28 | X | H | - 56.86 | 7.69 | - 49.17 | 79.38 | |
| | - | - | - | - | - | - | - | |
| 251 (1.114 W) | 1697.68 | X | H | - 62.93 | 5.59 | - 57.34 | 87.81 | 43.47 |
| | 3395.22 | X | H | - 58.02 | 7.70 | - 50.32 | 80.79 | |
| | - | - | - | - | - | - | - | |

- Limit Calculation= 43 + 10 log₁₀(ERP [W]) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to "1" and in GSM mode using a Power Control Level of "0" in PCS Band and "5" in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.2 RADIATED SPURIOUS EMISSIONS (WCDMA850)

| Channel (ERP) | Freq. (MHz) | EUT Position (Axis) | POL (H/V) | LEVEL@ ANTENNA TERMINAL (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | Result (dBc) | Limit (dBc) |
|-------------------|-------------|---------------------|-----------|-------------------------------|-------------------------------|-------------------------------|--------------|-------------|
| 4132 (0.096 W) | 1654.08 | X | H | - 64.40 | 5.49 | - 58.91 | 78.75 | 32.84 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 4183 (0.128 W) | 1675.50 | X | H | - 63.74 | 5.54 | - 58.20 | 79.27 | 34.07 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 4233 (0.121 W) | 1691.22 | X | H | - 63.80 | 5.57 | - 58.23 | 79.07 | 33.84 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |

- Limit Calculation = $43 + 10 \log_{10} (\text{ERP [W]})$ [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.3 RADIATED SPURIOUS EMISSIONS (HSUPA850)

| Channel (ERP) | Freq. (MHz) | EUT Position (Axis) | POL (H/V) | LEVEL@ ANTENNA TERMINAL (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | CORRECT GENERATOR LEVEL (dBm) | Result (dBc) | Limit (dBc) |
|-------------------|-------------|---------------------|-----------|-------------------------------|-------------------------------|-------------------------------|--------------|-------------|
| 4132 (0.094 W) | 1650.24 | X | H | - 64.33 | 5.49 | -58.84 | 78.56 | 32.72 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 4183 (0.108 W) | 1675.42 | X | H | - 63.40 | 5.54 | -57.86 | 78.19 | 33.33 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 4233 (0.107 W) | 1695.34 | X | H | - 64.16 | 5.58 | -58.58 | 78.89 | 33.31 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |

- Limit Calculation = $43 + 10 \log_{10} (ERP [W])$ [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.4 RADIATED SPURIOUS EMISSIONS (GSM1900)

| Channel (EIRP) | Freq. (MHz) | EUT Position (Axis) | POL (H/V) | Level at Substitute Antenna Terminal (dBm) | Substitute Antenna Gain (dBi) | Correct Generator Level (dBm) | Result (dBc) | Limit (dBc) |
|------------------|-------------|---------------------|-----------|--|-------------------------------|-------------------------------|--------------|-------------|
| 512 (1.105 W) | 7400.79 | Z | H | - 47.26 | 11.64 | - 35.62 | 66.06 | 43.44 |
| | 9251.20 | Z | H | - 45.34 | 11.65 | - 33.69 | 64.12 | |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 661 (0.970 W) | 7519.78 | Z | H | - 44.19 | 11.59 | - 32.60 | 62.47 | 42.87 |
| | 9400.00 | Z | H | - 47.24 | 11.75 | - 35.49 | 65.36 | |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 810 (1.021 W) | 7639.56 | Z | H | - 50.82 | 11.54 | - 39.28 | 69.37 | 43.09 |
| | 9548.77 | Z | H | - 47.01 | 11.84 | - 35.17 | 65.26 | |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |

- Limit Calculation = 43 + 10 log₁₀(EIRP [W]) [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.5 RADIATED SPURIOUS EMISSIONS (WCDMA1900)

| Channel (EIRP) | Freq. (MHz) | EUT Position (Axis) | POL (H/V) | LEVEL@ ANTENNA TERMINAL (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | Result (dBc) | Limit (dBc) |
|-------------------|-------------|---------------------|-----------|-------------------------------|-------------------------------|-------------------------------|--------------|-------------|
| 9262 (0.199 W) | 3702.64 | Y | H | - 51.70 | 9.90 | - 41.80 | 64.79 | 35.99 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 9400 (0.214 W) | 3757.74 | Y | H | - 53.89 | 9.90 | - 43.99 | 67.29 | 36.31 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 9538 (0.197 W) | 3813.49 | Y | H | - 53.86 | 9.91 | - 43.95 | 66.88 | 35.94 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |

- Limit Calculation = $43 + 10 \log_{10} (\text{EIRP [W]})$ [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

The worst case data is reported.

7.8.6 RADIATED SPURIOUS EMISSIONS (HSUPA1900)

| Channel (EIRP) | Freq. (MHz) | EUT Position (Axis) | POL (H/V) | LEVEL@ ANTENNA TERMINAL (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | CORRECT GENERATOR LEVEL (dBm) | Result (dBc) | Limit (dBc) |
|-------------------|-------------|---------------------|-----------|-------------------------------|-------------------------------|-------------------------------|--------------|-------------|
| 9262 (0.185 W) | 3702.55 | Y | H | - 51.96 | 9.90 | -42.06 | 64.74 | 35.68 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 9400 (0.182 W) | 3758.10 | Y | H | - 53.24 | 9.90 | -43.34 | 65.93 | 35.60 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |
| 9538 (0.172 W) | 3817.32 | Y | H | - 52.54 | 9.91 | -42.63 | 64.99 | 35.37 |
| | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | |

- Limit Calculation = $43 + 10 \log_{10} (\text{EIRP [W]})$ [dBc]

- No other spurious and harmonic emissions were reported greater than listed emissions above table.

NOTES:

This EUT was tested under all configurations and the highest power is reported in GSM mode and WCDMA mode with HSDPA inactive at 12.2 kbps RMC and TPC bits set to “1” and in GSM mode using a Power Control Level of “0” in PCS Band and “5” in the Cellular Band. This EUT was tested with the fully charged battery. Also, we have done x, y, z planes in EUT and horizontal and vertical polarization of detecting antenna.

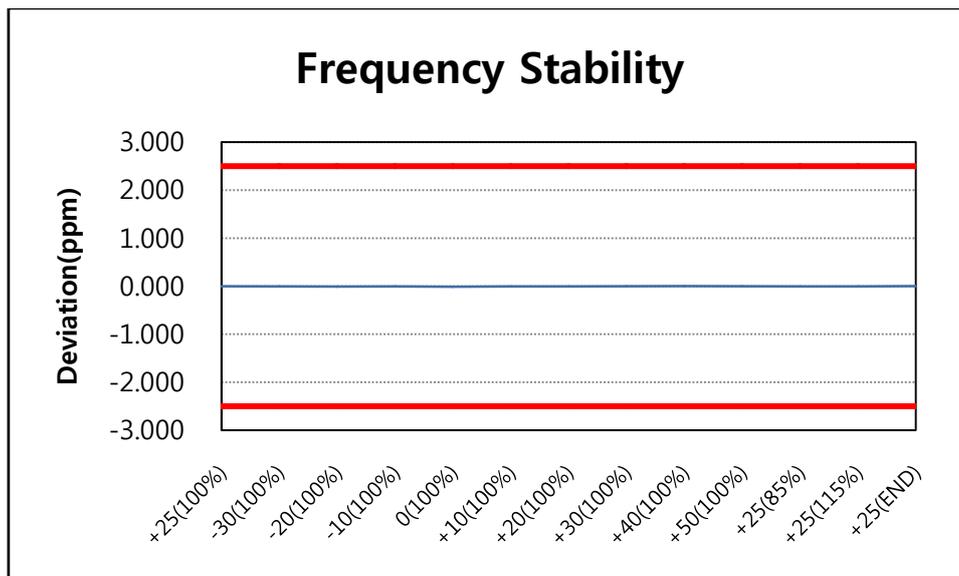
The worst case data is reported.

7.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

7.9.1 FREQUENCY STABILITY (GSM850)

OPERATING FREQUENCY : 836,599,990 Hz
 CHANNEL : 190(Mid)
 REFERENCE VOLTAGE : 3.700 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

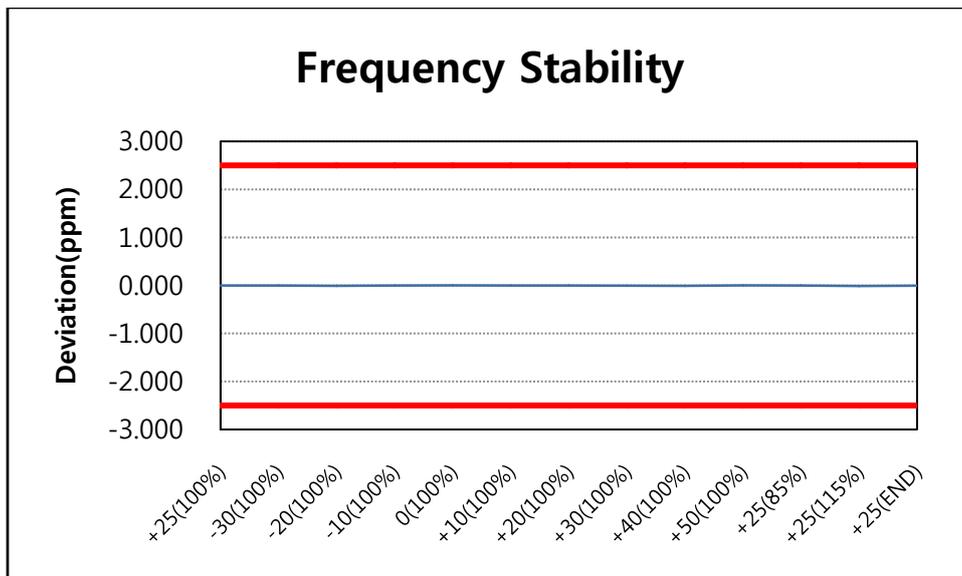
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|-------------|-------------|--------------|
| | | | | (ppm) | (%) |
| 100 % | 3.700 | + 25(Ref) | 836,599,990 | 0.000 | 0.00000000 |
| 100 % | | - 30 | 836,599,986 | - 0.005 | - 0.00000048 |
| 100 % | | - 20 | 836,599,983 | - 0.008 | - 0.00000084 |
| 100 % | | - 10 | 836,599,987 | - 0.004 | - 0.00000036 |
| 100 % | | 0 | 836,599,982 | - 0.010 | - 0.00000096 |
| 100 % | | + 10 | 836,599,988 | - 0.002 | - 0.00000024 |
| 100 % | | + 20 | 836,599,986 | - 0.005 | - 0.00000048 |
| 100 % | | + 30 | 836,599,989 | - 0.001 | - 0.00000012 |
| 100 % | | + 40 | 836,599,993 | 0.004 | 0.00000036 |
| 100 % | | + 50 | 836,599,990 | 0.000 | 0.00000000 |
| 85 % | | 3.145 | + 25 | 836,599,987 | - 0.004 |
| 115 % | 4.255 | + 25 | 836,599,987 | - 0.004 | - 0.00000036 |
| BATT.ENDPOINT | 2.650 | + 25 | 836,599,993 | 0.004 | 0.00000036 |



7.9.2 FREQUENCY STABILITY (WCDMA850)

OPERATING FREQUENCY : 836,599,995 Hz
 CHANNEL : 4183(Mid)
 REFERENCE VOLTAGE : 3.700 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

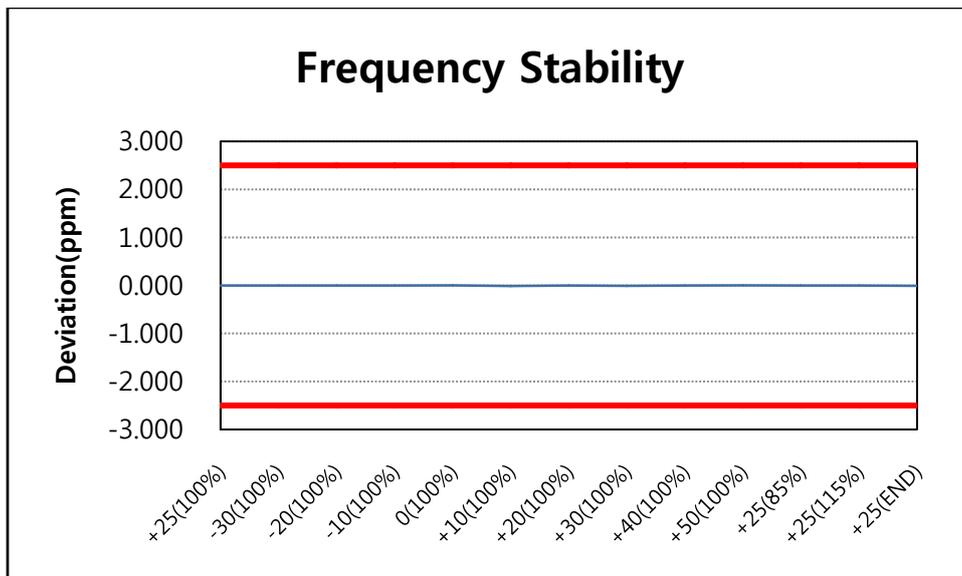
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|-------------|-------------|--------------|
| | | | | (ppm) | (%) |
| 100% | 3.700 | + 25(Ref) | 836,600,004 | 0.000 | 0.00000000 |
| 100% | | - 30 | 836,600,005 | 0.001 | 0.00000012 |
| 100% | | - 20 | 836,599,997 | - 0.008 | - 0.00000084 |
| 100% | | - 10 | 836,600,005 | 0.001 | 0.00000012 |
| 100% | | 0 | 836,600,006 | 0.002 | 0.00000024 |
| 100% | | + 10 | 836,600,005 | 0.001 | 0.00000012 |
| 100% | | + 20 | 836,600,003 | - 0.001 | - 0.00000012 |
| 100% | | + 30 | 836,600,001 | - 0.004 | - 0.00000036 |
| 100% | | + 40 | 836,599,998 | - 0.007 | - 0.00000072 |
| 100% | | + 50 | 836,600,007 | 0.004 | 0.00000036 |
| 85% | | 3.145 | + 25 | 836,600,004 | 0.000 |
| 115% | 4.255 | + 25 | 836,599,996 | - 0.010 | - 0.00000096 |
| BATT.ENDPOINT | 2.650 | + 25 | 836,600,001 | - 0.004 | - 0.00000036 |



7.9.3 FREQUENCY STABILITY (HSUPA850)

OPERATING FREQUENCY : 836,600,003 Hz
 CHANNEL : 4183(Mid)
 REFERENCE VOLTAGE : 3.700 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

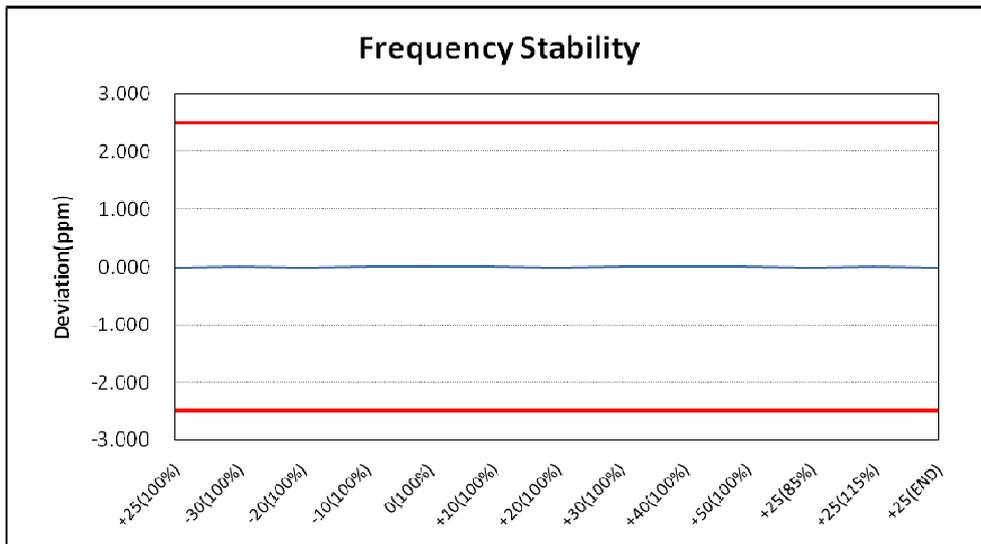
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|-------------|-------------|--------------|
| | | | | (ppm) | (%) |
| 100% | 3.700 | + 25(Ref) | 836,600,003 | 0.000 | 0.00000000 |
| 100% | | - 30 | 836,600,004 | 0.001 | 0.00000012 |
| 100% | | - 20 | 836,600,004 | 0.001 | 0.00000012 |
| 100% | | - 10 | 836,600,003 | 0.000 | 0.00000000 |
| 100% | | 0 | 836,600,005 | 0.002 | 0.00000024 |
| 100% | | + 10 | 836,599,993 | - 0.012 | - 0.00000120 |
| 100% | | + 20 | 836,600,004 | 0.001 | 0.00000012 |
| 100% | | + 30 | 836,599,998 | - 0.006 | - 0.00000060 |
| 100% | | + 40 | 836,600,003 | 0.000 | 0.00000000 |
| 100% | | + 50 | 836,600,005 | 0.002 | 0.00000024 |
| 85% | | 3.145 | + 25 | 836,600,003 | 0.000 |
| 115% | 4.255 | + 25 | 836,600,004 | 0.001 | 0.00000012 |
| BATT.ENDPOINT | 2.650 | + 25 | 836,599,996 | - 0.008 | - 0.00000084 |



7.9.4 FREQUENCY STABILITY (GSM1900)

OPERATING FREQUENCY : 1,879,999,981 Hz
 CHANNEL : 661(Mid)
 REFERENCE VOLTAGE : 3.700 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

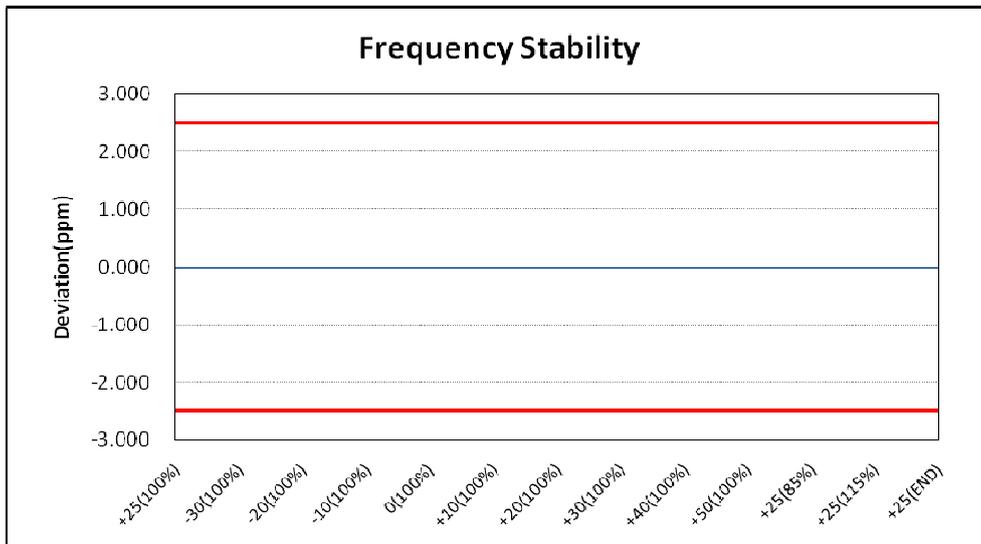
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|---------------|-----------|------------|
| | | | | (ppm) | (%) |
| 100 % | 3.700 | + 25(Ref) | 1,879,999,981 | 0.000 | 0.00000000 |
| 100 % | | - 30 | 1,879,999,985 | 0.002 | 0.00000021 |
| 100 % | | - 20 | 1,879,999,983 | 0.001 | 0.00000011 |
| 100 % | | - 10 | 1,879,999,989 | 0.004 | 0.00000043 |
| 100 % | | 0 | 1,879,999,987 | 0.003 | 0.00000032 |
| 100 % | | + 10 | 1,879,999,990 | 0.005 | 0.00000048 |
| 100 % | | + 20 | 1,879,999,984 | 0.002 | 0.00000016 |
| 100 % | | + 30 | 1,879,999,987 | 0.003 | 0.00000032 |
| 100 % | | + 40 | 1,879,999,988 | 0.004 | 0.00000037 |
| 100 % | | + 50 | 1,879,999,987 | 0.003 | 0.00000032 |
| 85 % | 3.145 | + 25 | 1,879,999,983 | 0.001 | 0.00000011 |
| 115 % | 4.255 | + 25 | 1,879,999,986 | 0.003 | 0.00000027 |
| BATT.ENDPOINT | 2.650 | + 25 | 1,879,999,984 | 0.002 | 0.00000016 |



7.9.5 FREQUENCY STABILITY (WCDMA1900)

OPERATING FREQUENCY : 1,879,999,992 Hz
 CHANNEL : 9400(Mid)
 REFERENCE VOLTAGE : 3.700 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

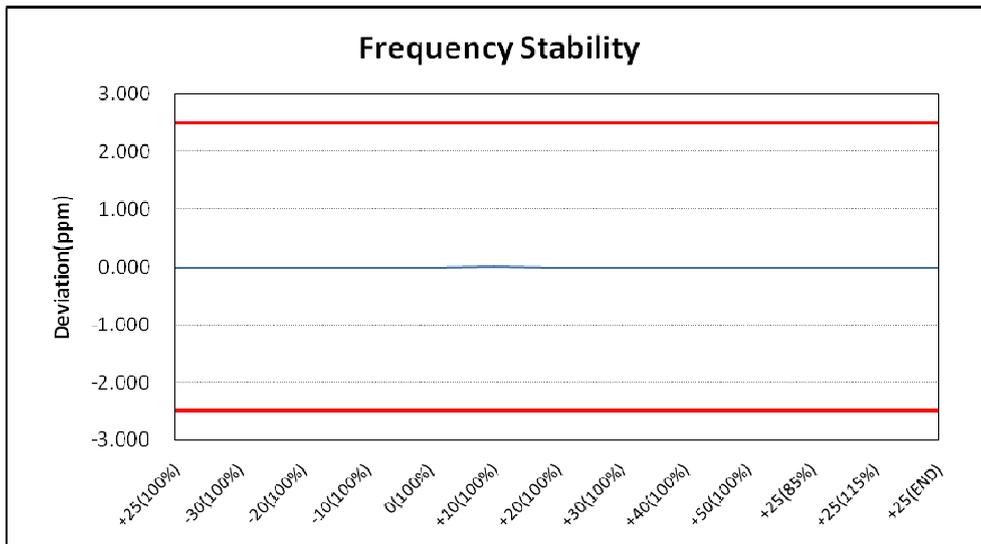
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|---------------|-----------|--------------|
| | | | | (ppm) | (%) |
| 100% | 3.700 | + 25(Ref) | 1,879,999,992 | 0.000 | 0.00000000 |
| 100% | | - 30 | 1,879,999,989 | - 0.002 | - 0.00000016 |
| 100% | | - 20 | 1,879,999,990 | - 0.001 | - 0.00000011 |
| 100% | | - 10 | 1,879,999,988 | - 0.002 | - 0.00000021 |
| 100% | | 0 | 1,879,999,993 | 0.001 | 0.00000005 |
| 100% | | + 10 | 1,879,999,986 | - 0.003 | - 0.00000032 |
| 100% | | + 20 | 1,879,999,991 | - 0.001 | - 0.00000005 |
| 100% | | + 30 | 1,879,999,990 | - 0.001 | - 0.00000011 |
| 100% | | + 40 | 1,879,999,989 | - 0.002 | - 0.00000016 |
| 100% | | + 50 | 1,879,999,991 | - 0.001 | - 0.00000005 |
| 85% | 3.145 | + 25 | 1,879,999,993 | 0.001 | 0.00000005 |
| 115% | 4.255 | + 25 | 1,879,999,988 | - 0.002 | - 0.00000021 |
| BATT.ENDPOINT | 2.650 | + 25 | 1,879,999,989 | - 0.002 | - 0.00000016 |



7.9.6 FREQUENCY STABILITY (HSUPA1900)

OPERATING FREQUENCY : 1,879,999,989 Hz
 CHANNEL : 9400(Mid)
 REFERENCE VOLTAGE : 3.700 V DC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

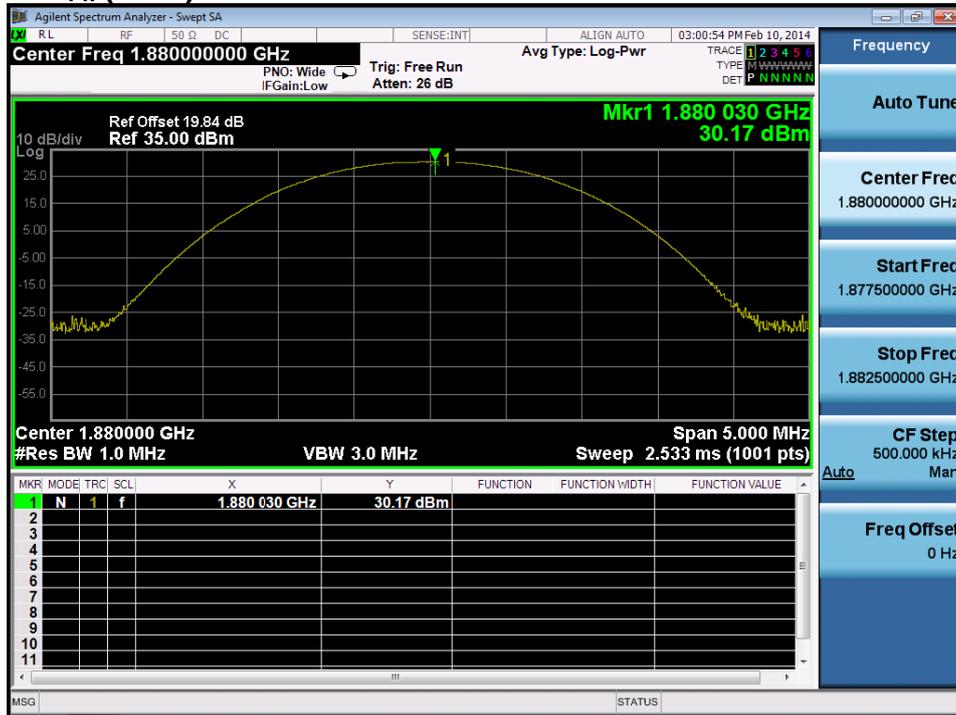
| VOLTAGE (%) | POWER (V DC) | TEMP (°C) | FREQ (Hz) | Deviation | |
|---------------|--------------|-----------|---------------|-----------|--------------|
| | | | | (ppm) | (%) |
| 100% | 3.700 | + 25(Ref) | 1,879,999,989 | 0.000 | 0.00000000 |
| 100% | | - 30 | 1,879,999,990 | 0.001 | 0.00000005 |
| 100% | | - 20 | 1,879,999,989 | 0.000 | 0.00000000 |
| 100% | | - 10 | 1,879,999,990 | 0.001 | 0.00000005 |
| 100% | | 0 | 1,879,999,988 | - 0.001 | - 0.00000005 |
| 100% | | + 10 | 1,879,999,993 | 0.002 | 0.00000021 |
| 100% | | + 20 | 1,879,999,989 | 0.000 | 0.00000000 |
| 100% | | + 30 | 1,879,999,992 | 0.002 | 0.00000016 |
| 100% | | + 40 | 1,879,999,991 | 0.001 | 0.00000011 |
| 100% | | + 50 | 1,879,999,988 | - 0.001 | - 0.00000005 |
| 85% | 3.145 | + 25 | 1,879,999,990 | 0.001 | 0.00000005 |
| 115% | 4.255 | + 25 | 1,879,999,987 | - 0.001 | - 0.00000011 |
| BATT.ENDPOINT | 2.650 | + 25 | 1,879,999,991 | 0.001 | 0.00000011 |



8. TEST PLOTS

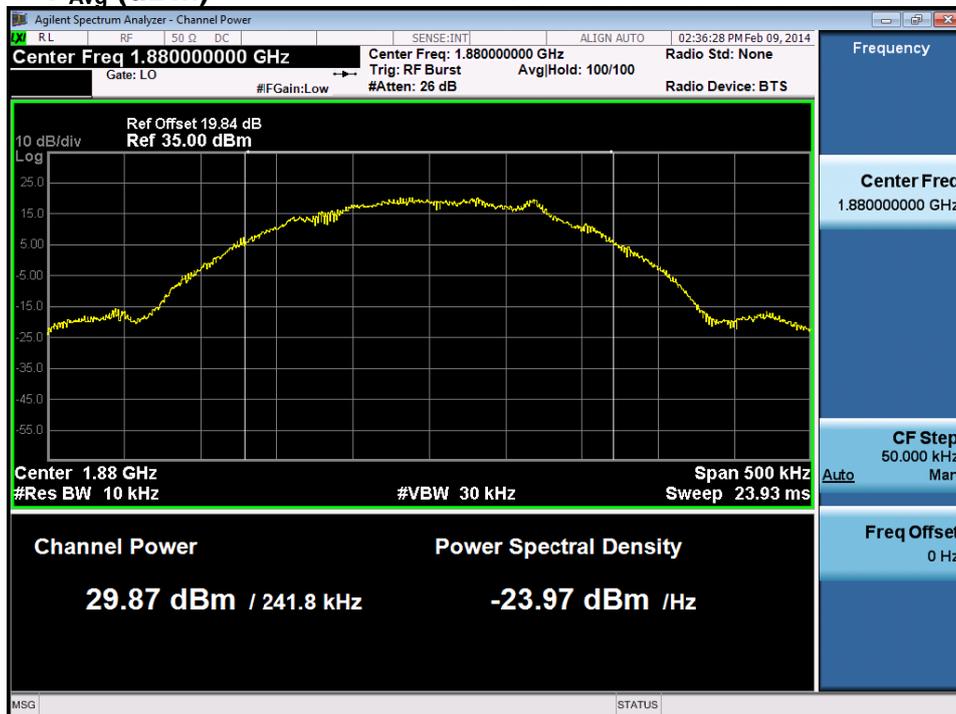
8.1 Peak to Average Ratio - P_{PK} (dBm)

GSM1900 & Channel: 661

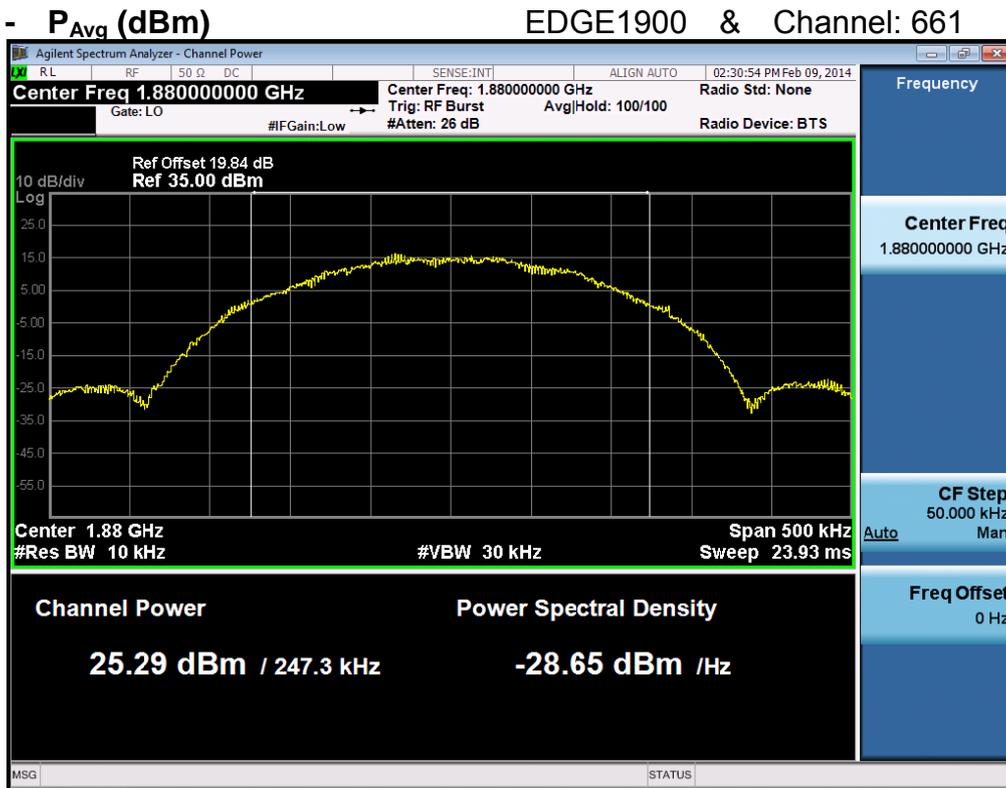
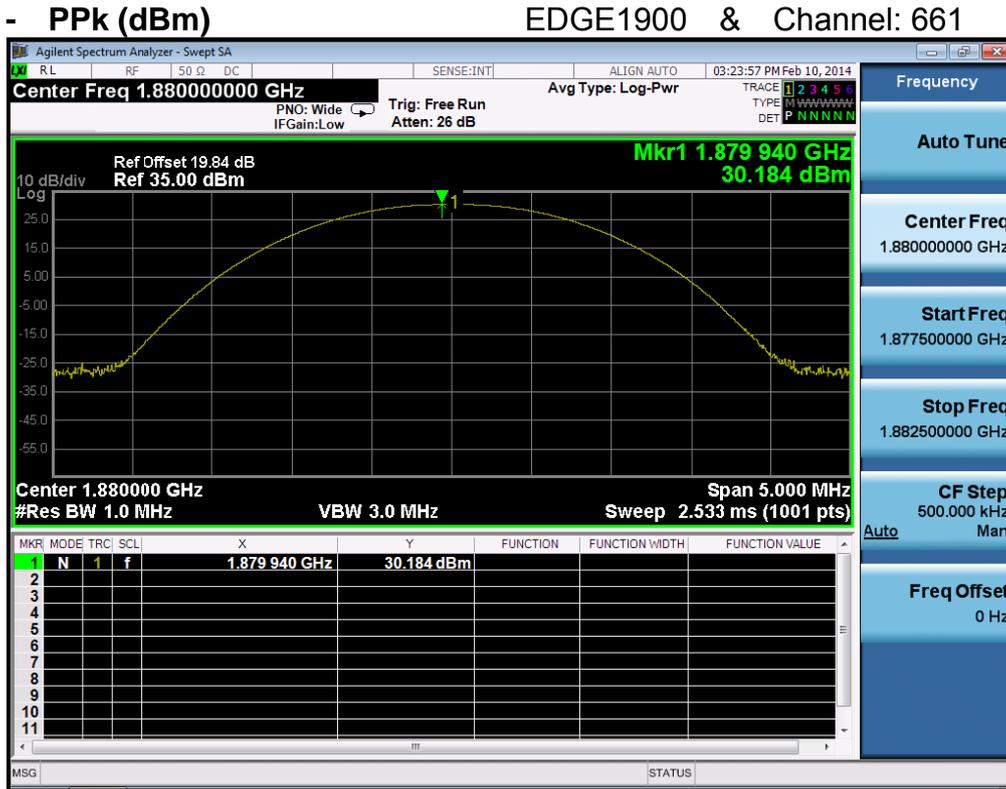


- P_{Avg} (dBm)

GSM1900 & Channel: 661

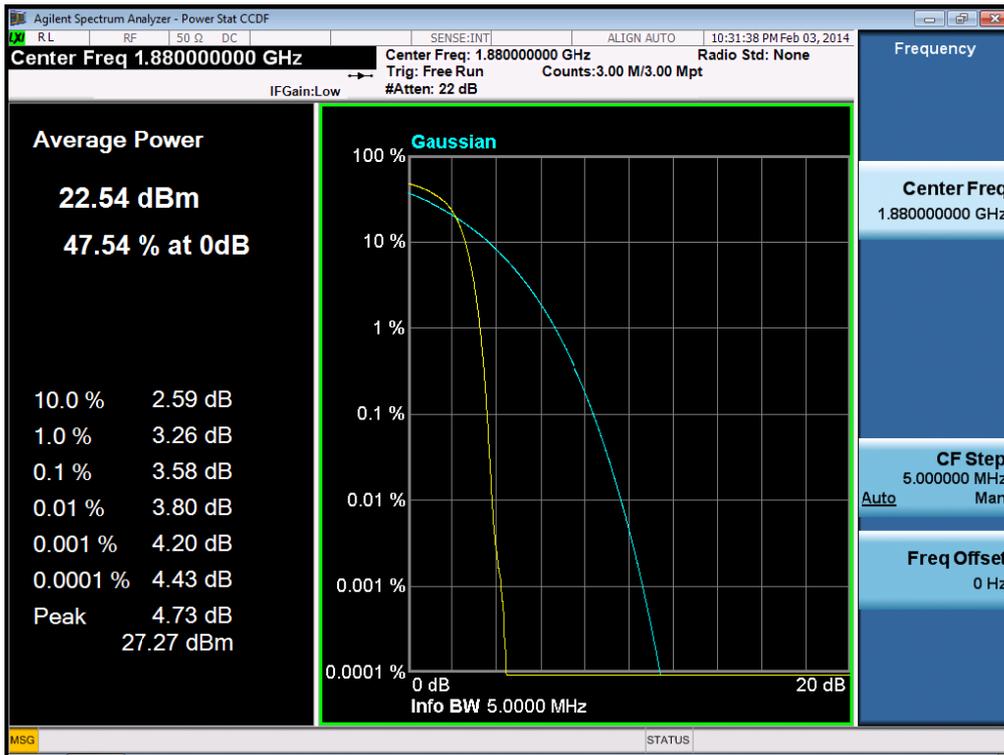


$$\text{PAPR (dB)} = P_{PK} \text{ (dBm)} - P_{Avg} \text{ (dBm)} = 30.17 \text{ dBm} - 29.87 \text{ dBm} = 0.30 \text{ dB}$$

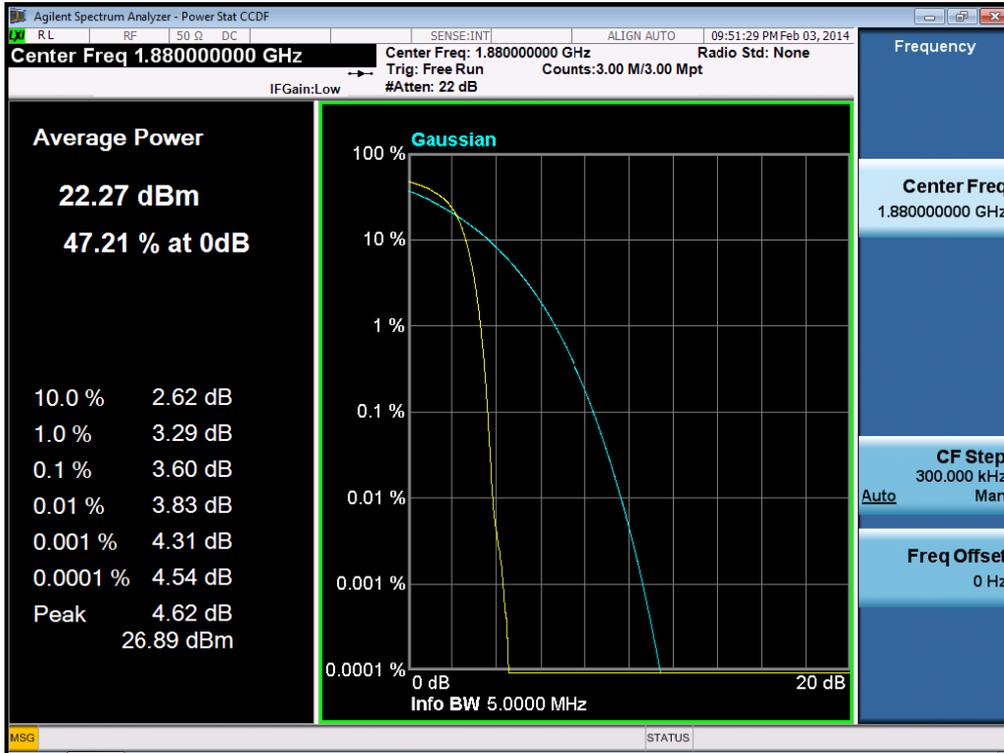


PAPR (dB) = P_{Pk} (dBm) - P_{Avg} (dBm) = 30.18 dBm – 25.29 dBm = 4.89 dB

WCDMA1900 & Channel: 9400

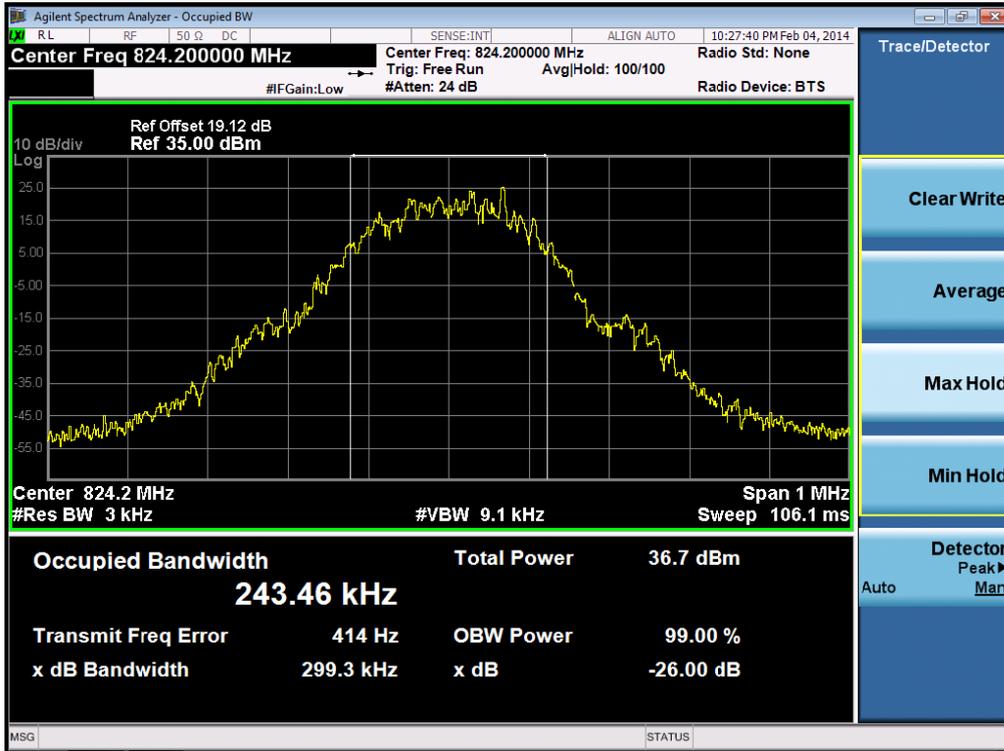


HSUPA1900 & Channel: 9400

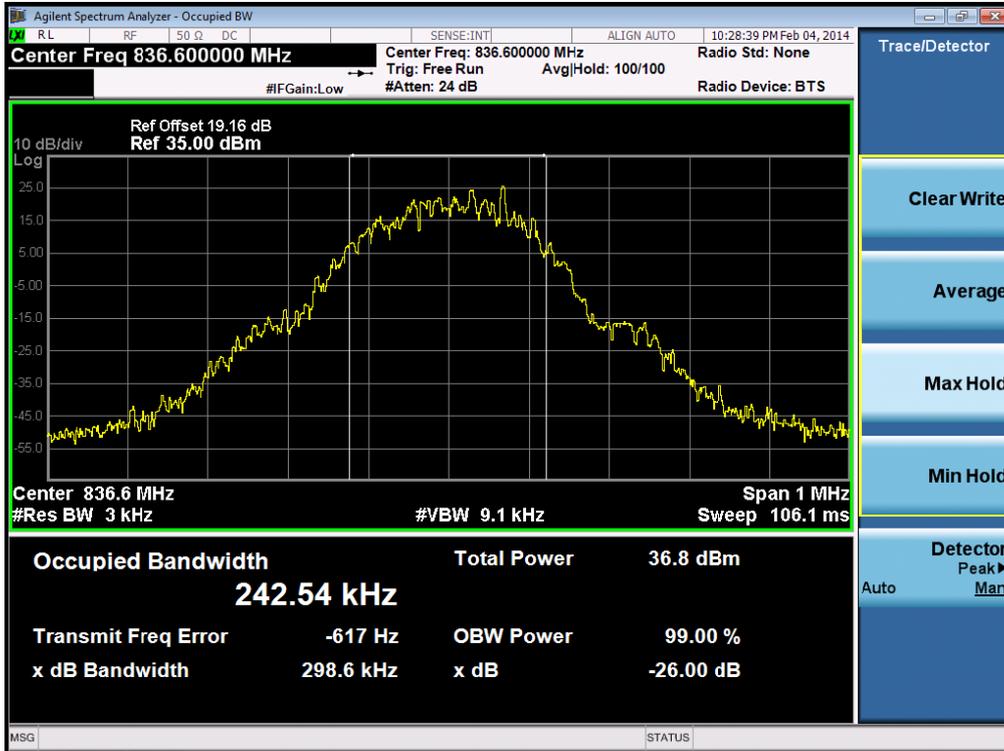


8.2 Occupied Bandwidth 99 % Bandwidth

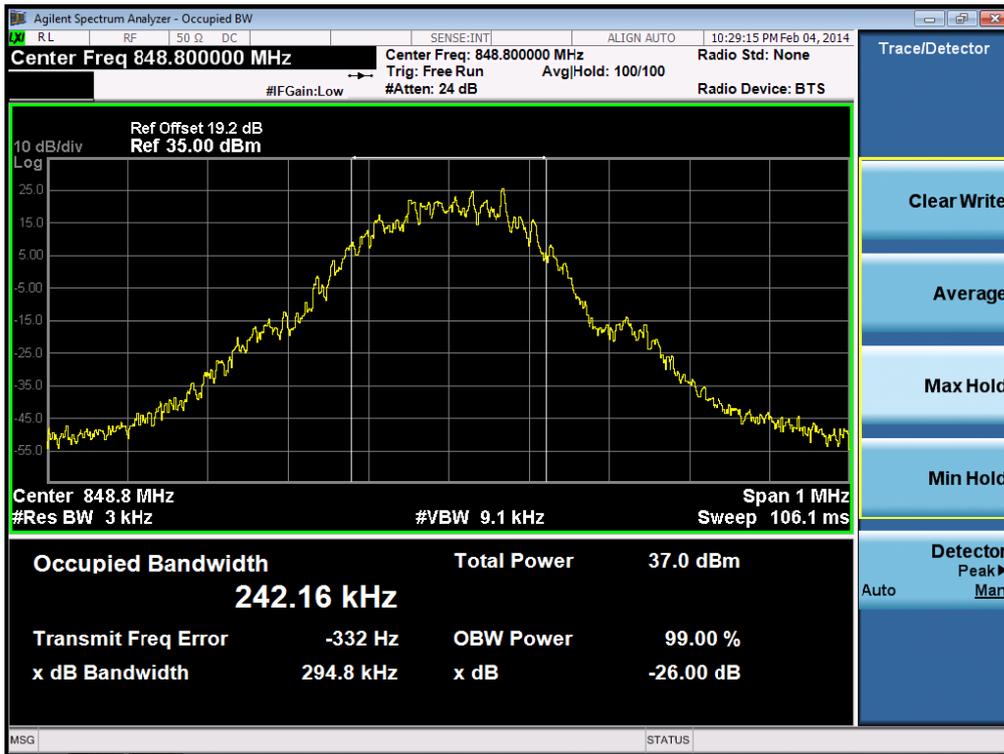
GSM850 & Channel: 128



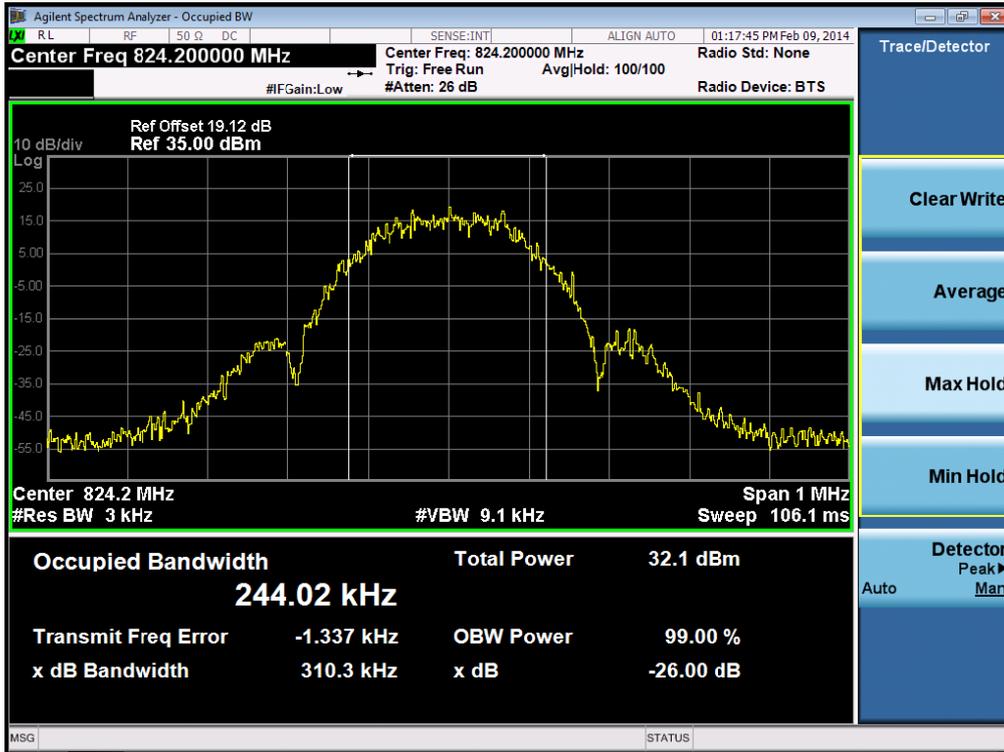
GSM850 & Channel: 190



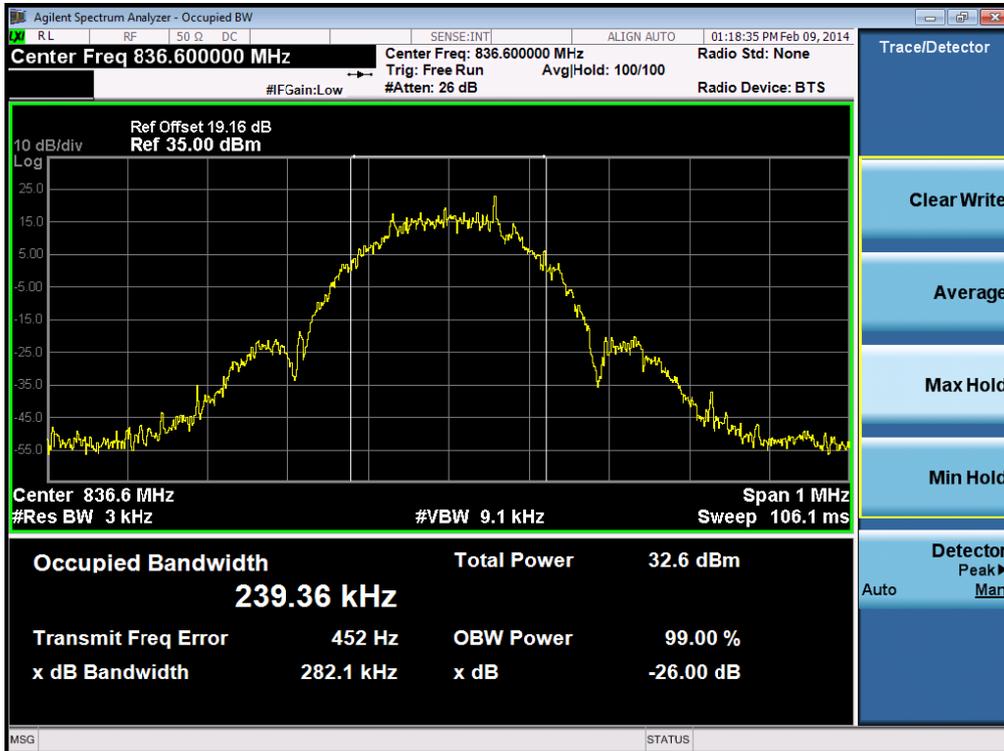
GSM850 & Channel: 251



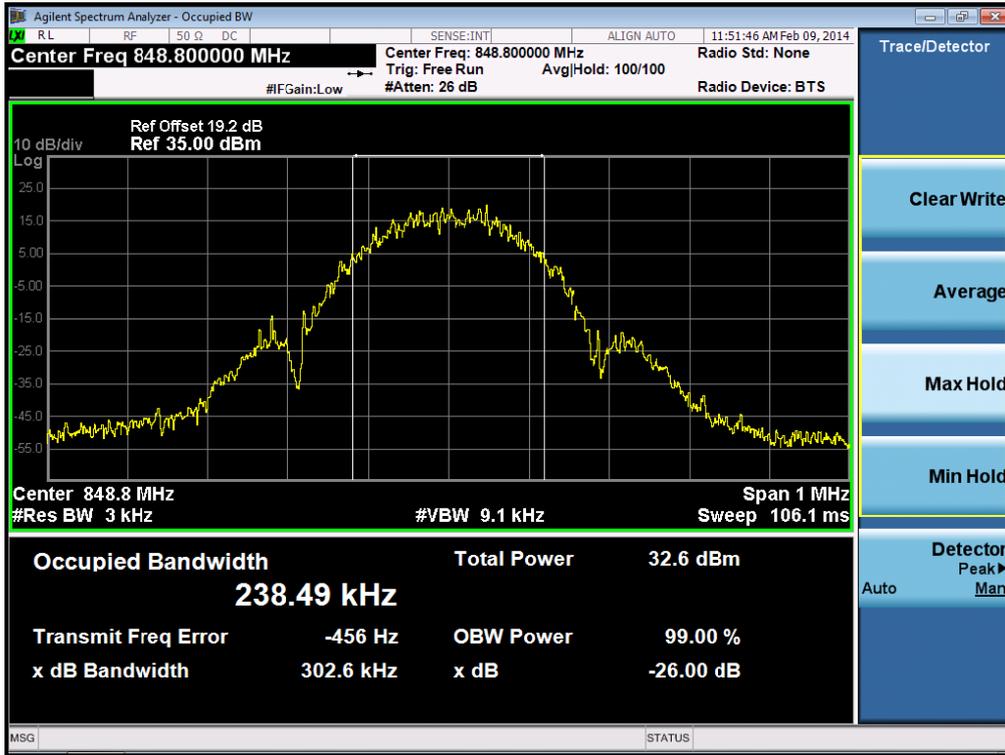
EDGE 850 & Channel: 128



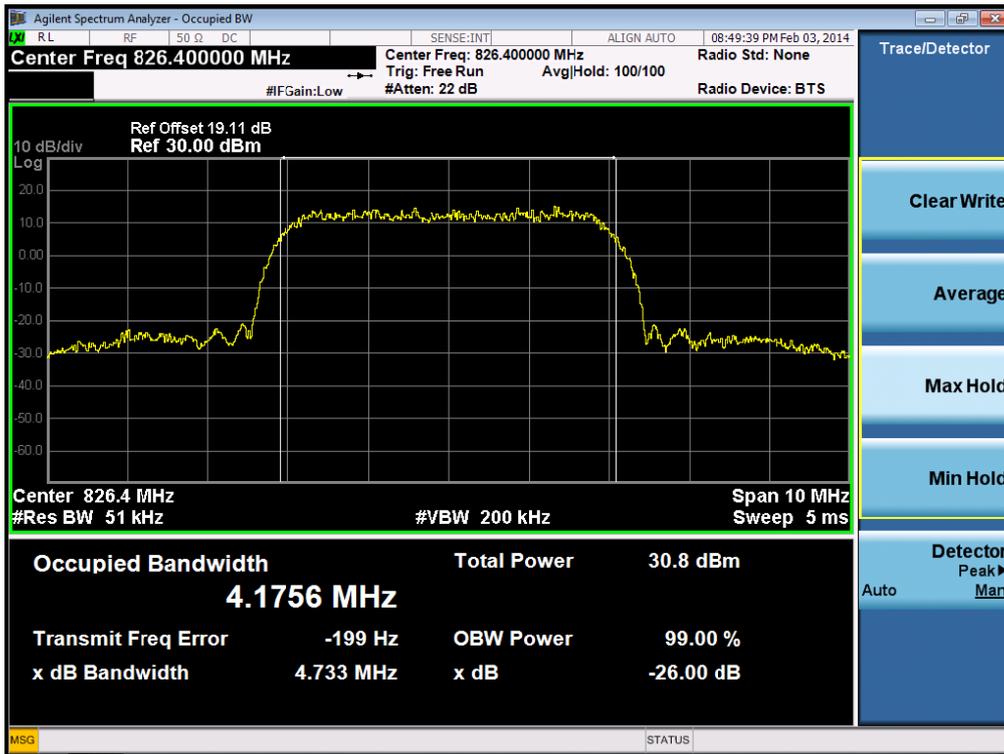
EDGE 850 & Channel: 190



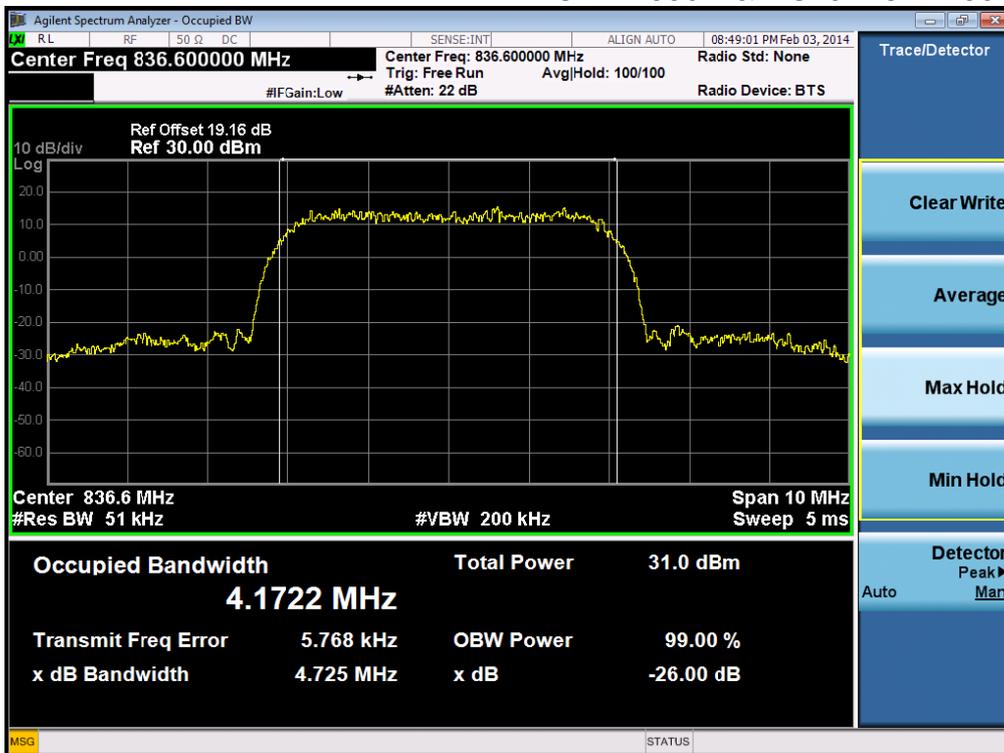
EDGE 850 & Channel: 251



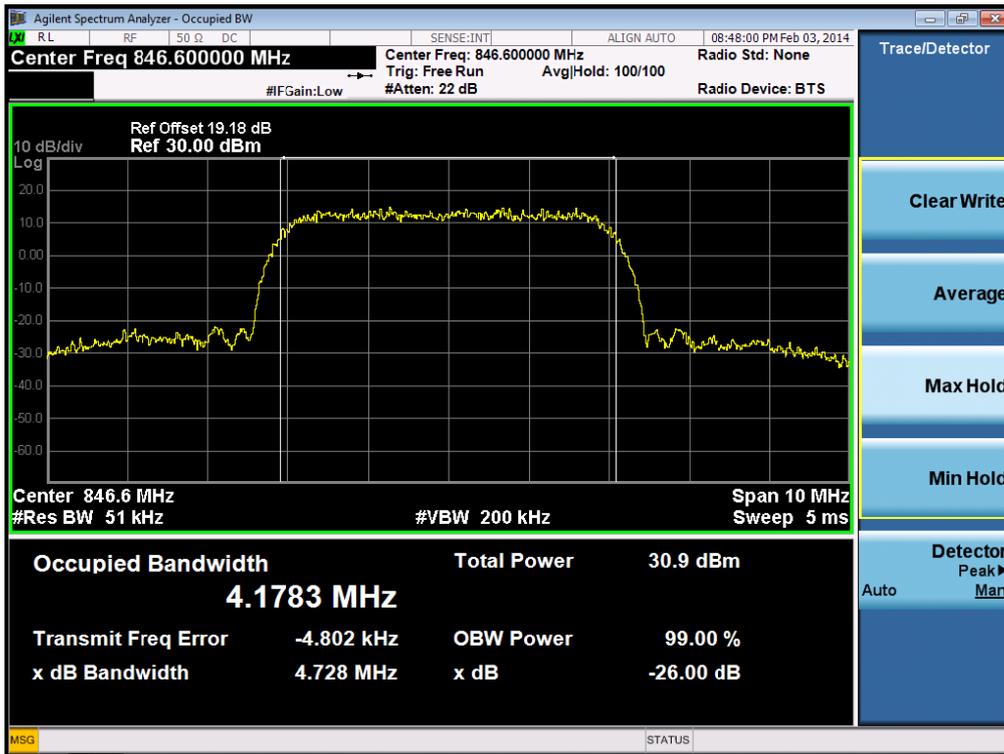
WCDMA850 & Channel: 4132



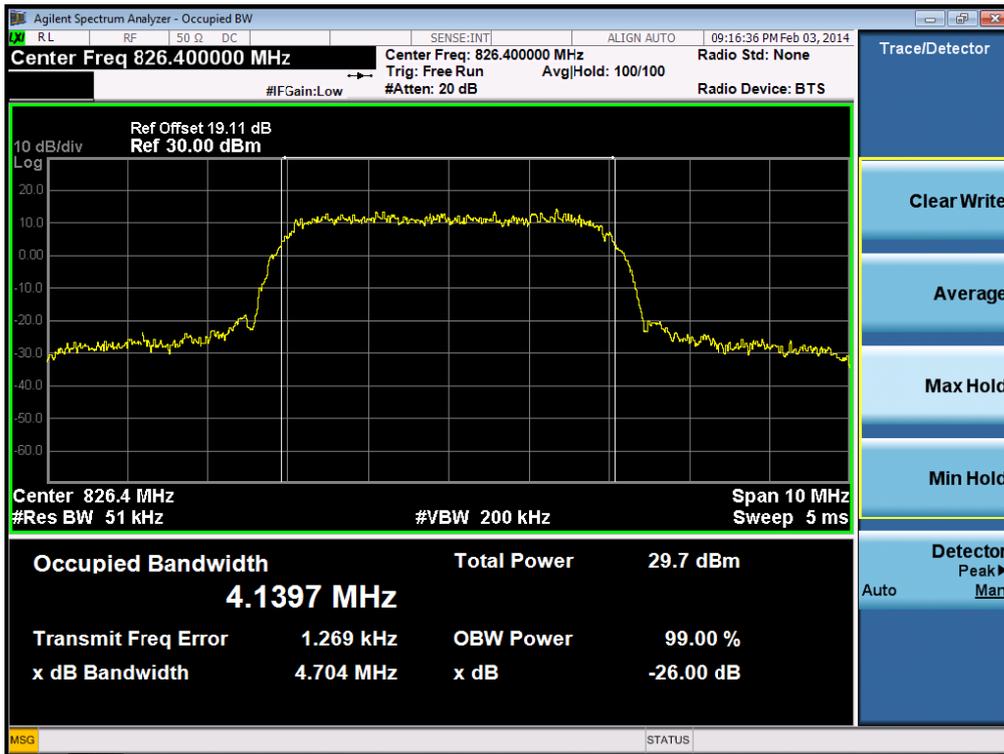
WCDMA850 & Channel: 4183



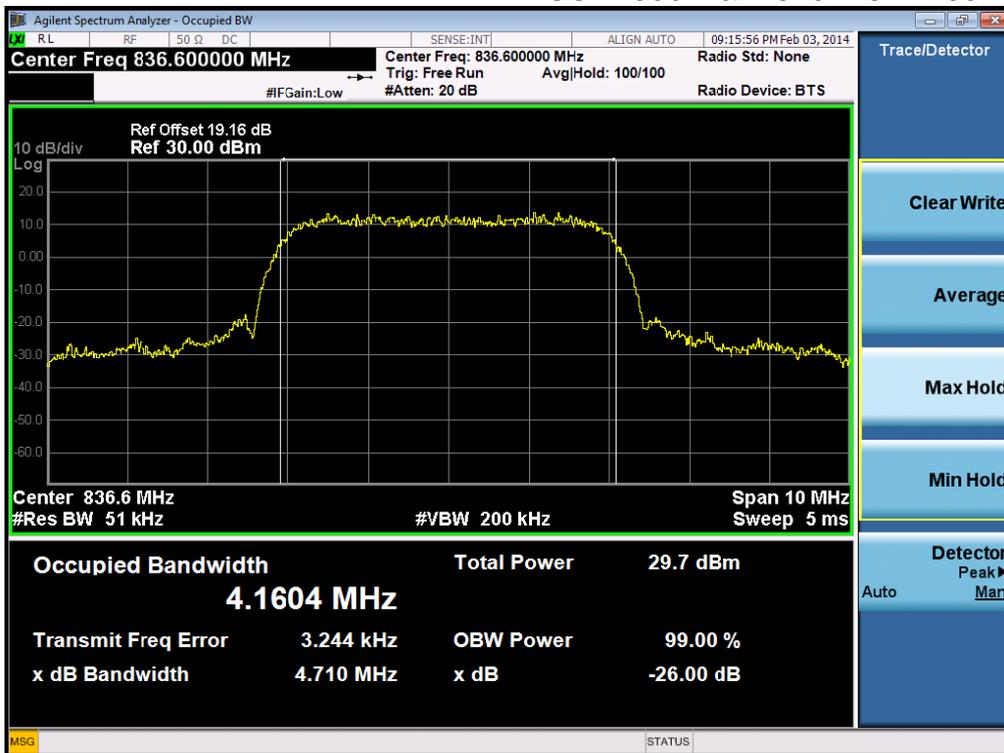
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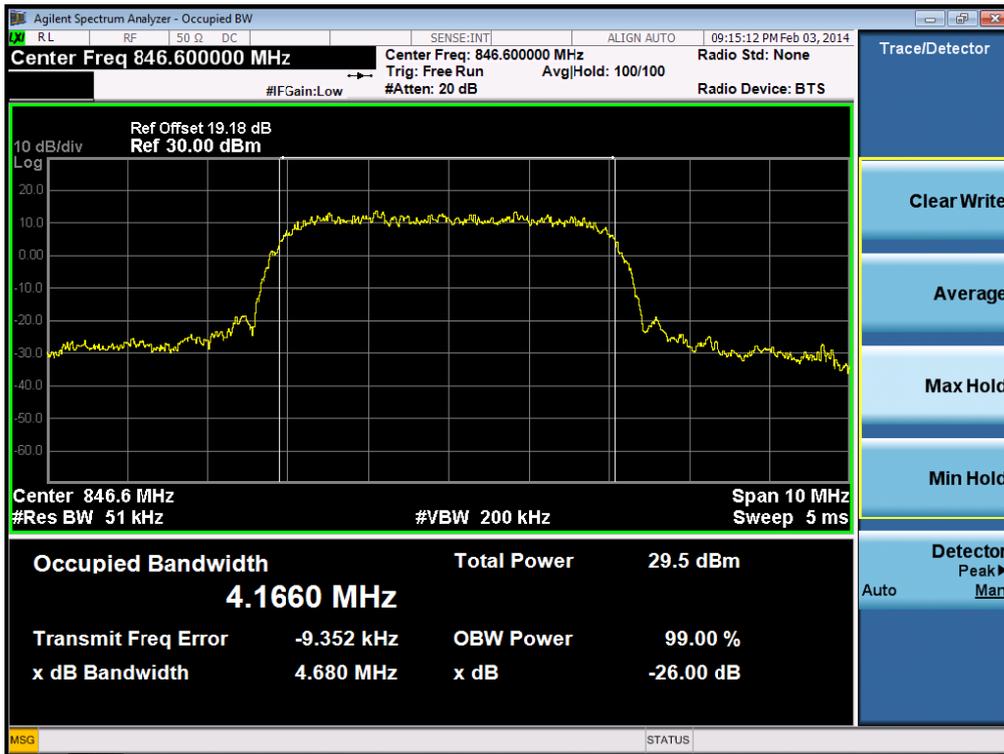
HSUPA850 & Channel: 4132



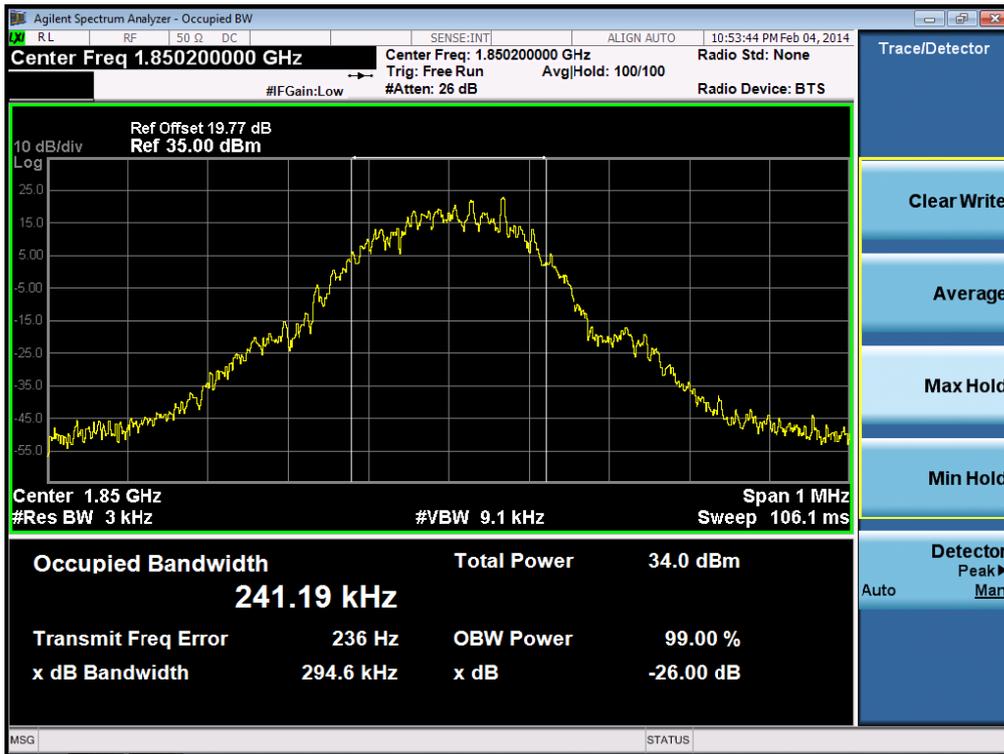
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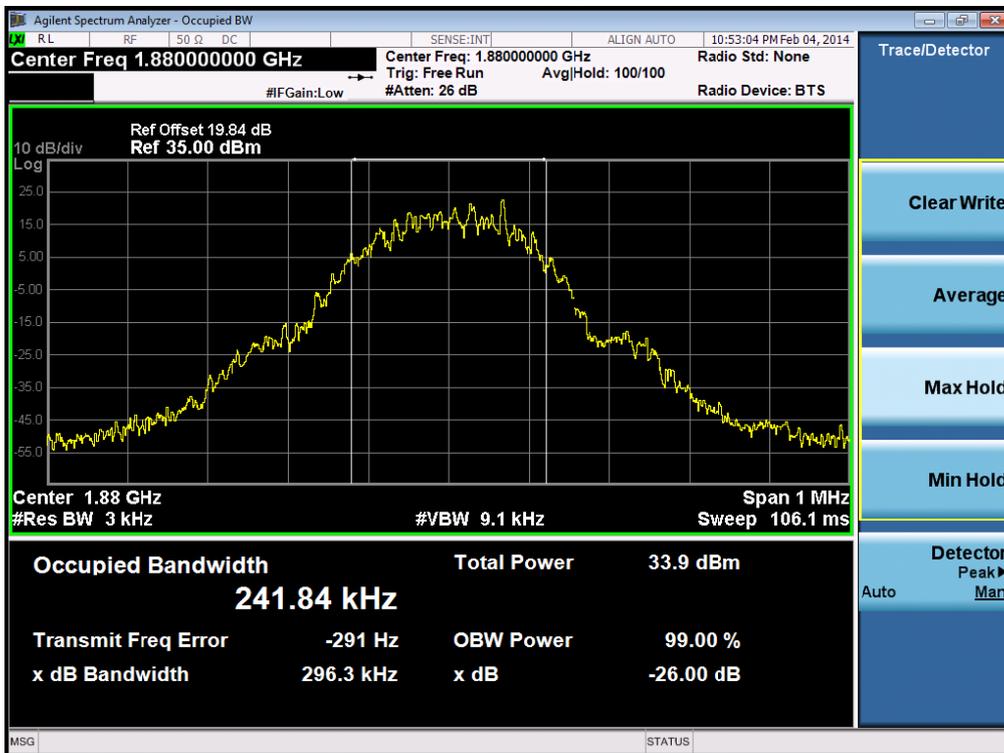
HSUPA850 & Channel: 4233



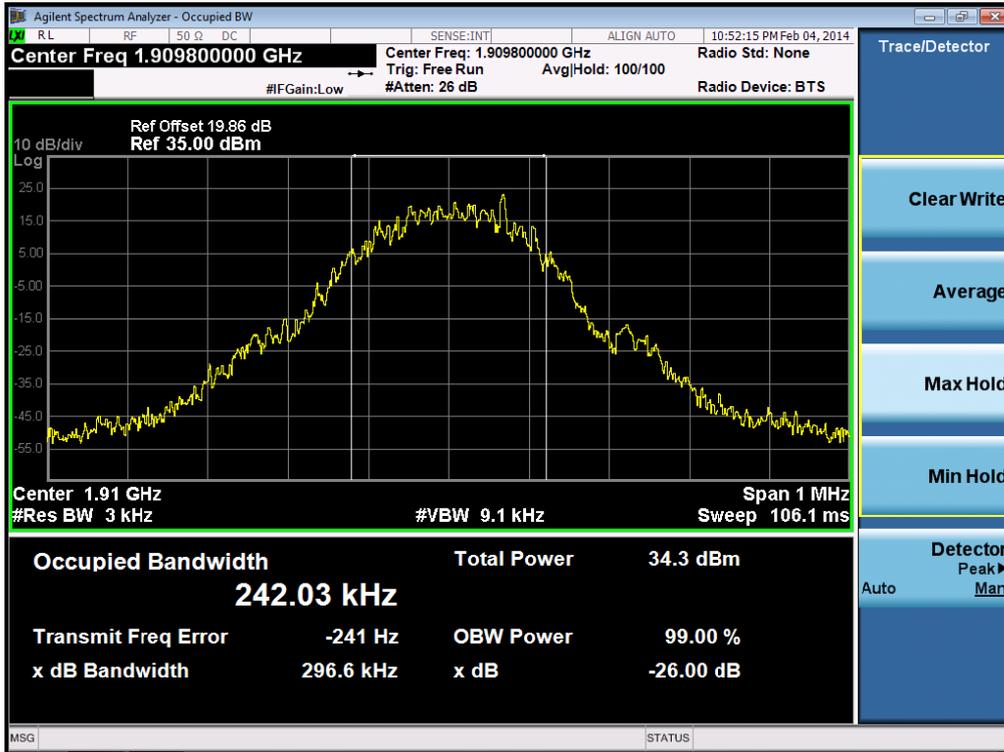
GSM 1900 & Channel: 512



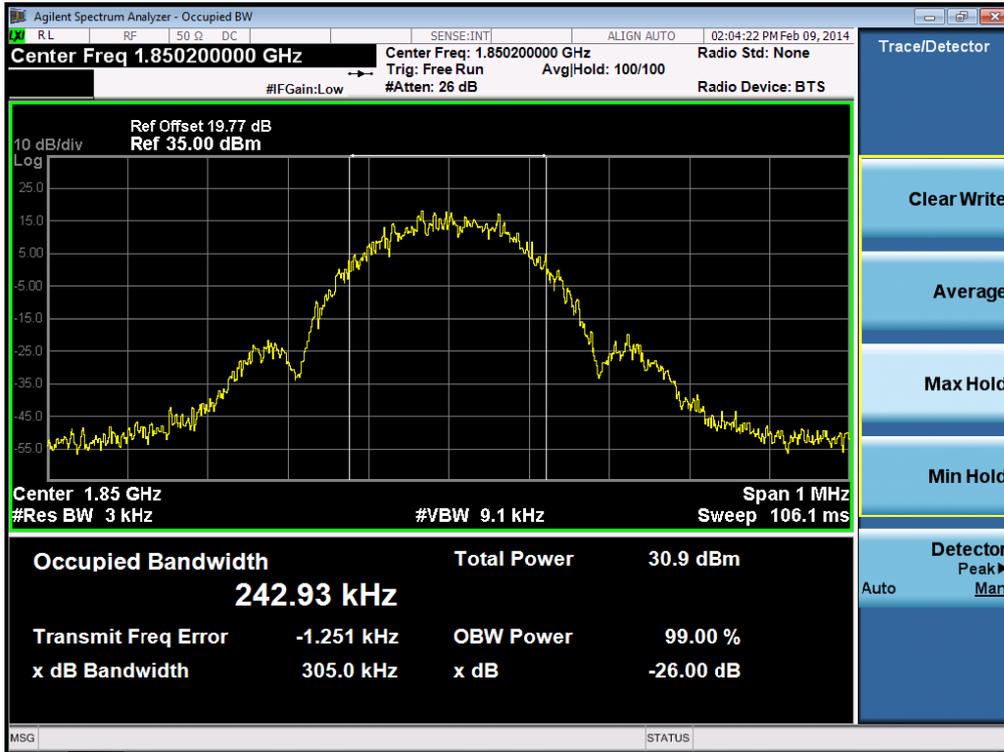
GSM 1900 & Channel: 661



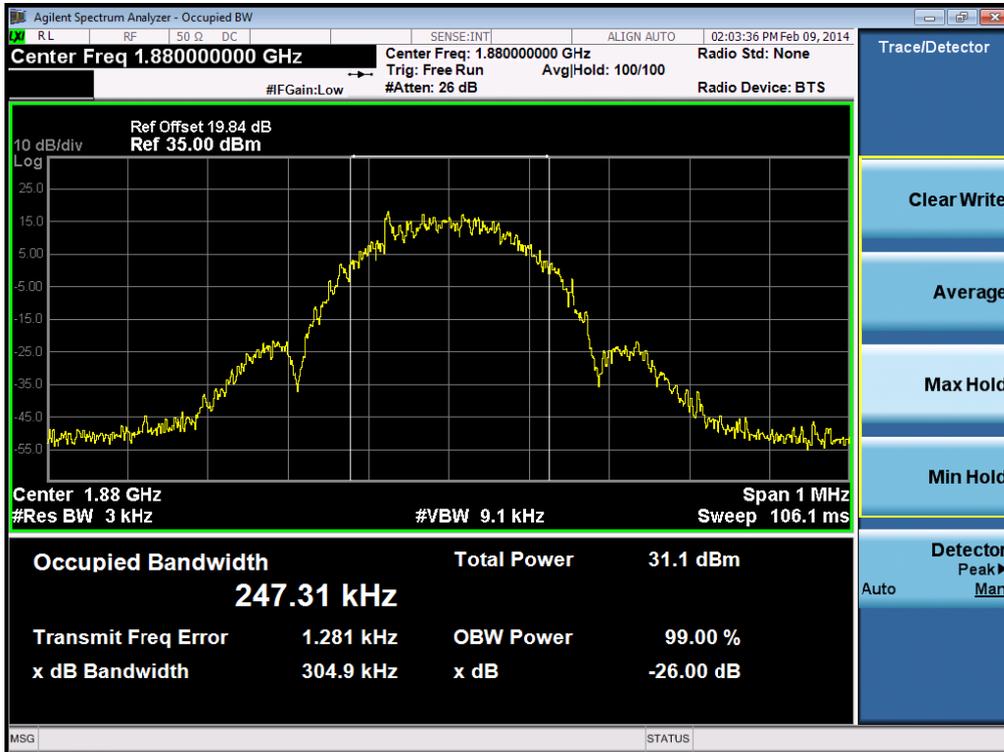
GSM 1900 & Channel: 810



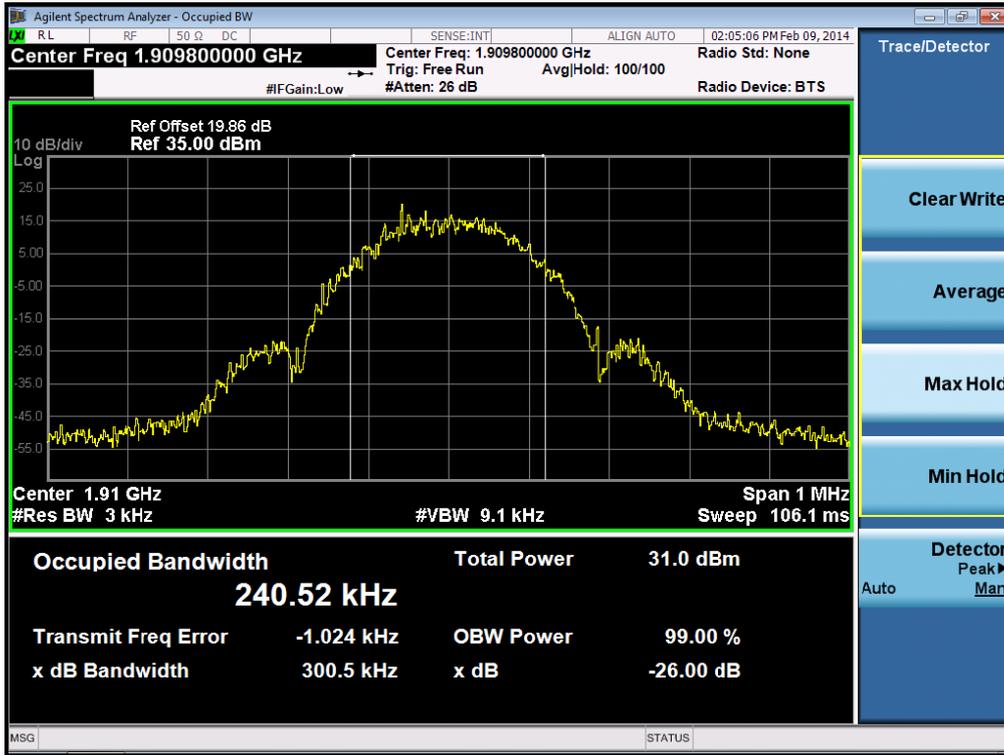
EDGE 1900 & Channel: 512



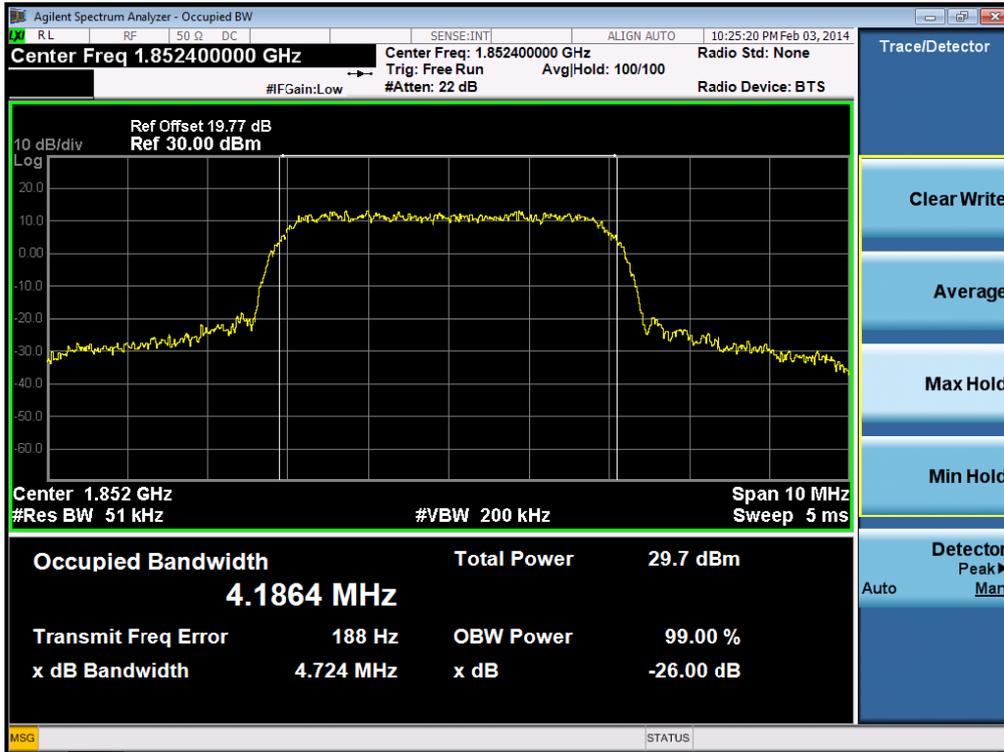
EDGE 1900 & Channel: 661



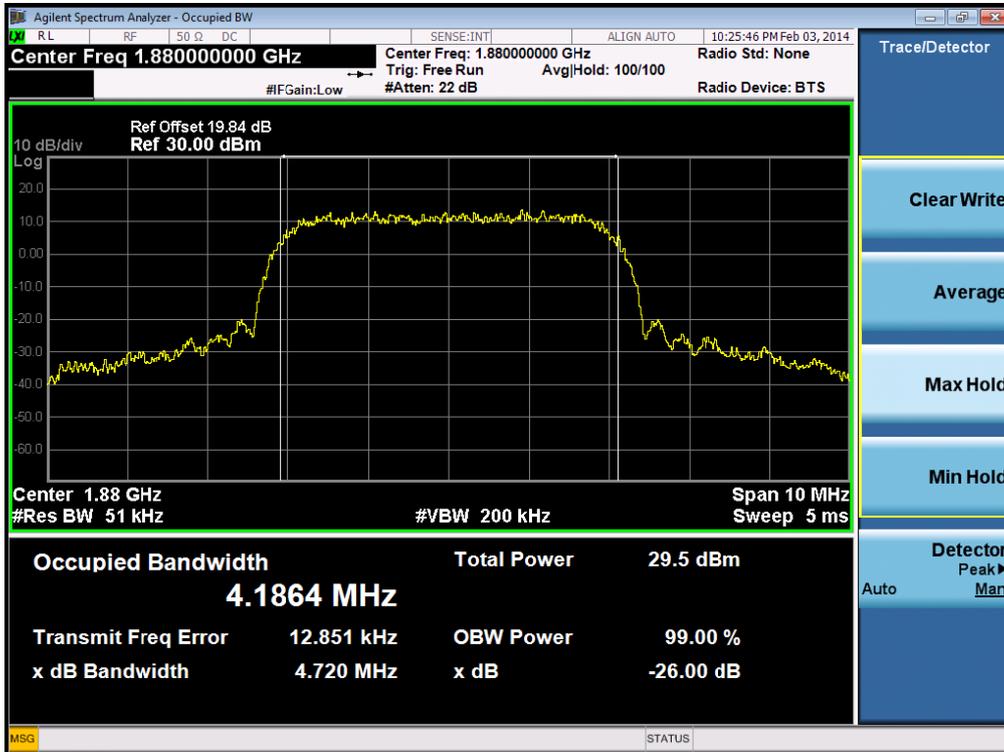
EDGE 1900 & Channel: 810



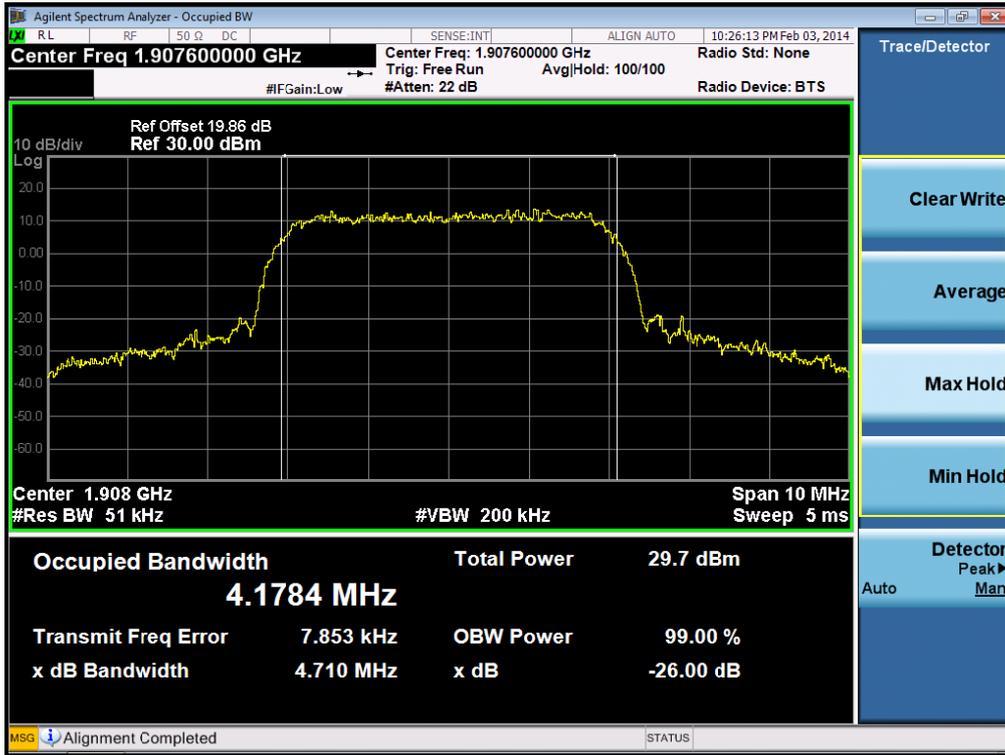
WCDMA1900 & Channel: 9262



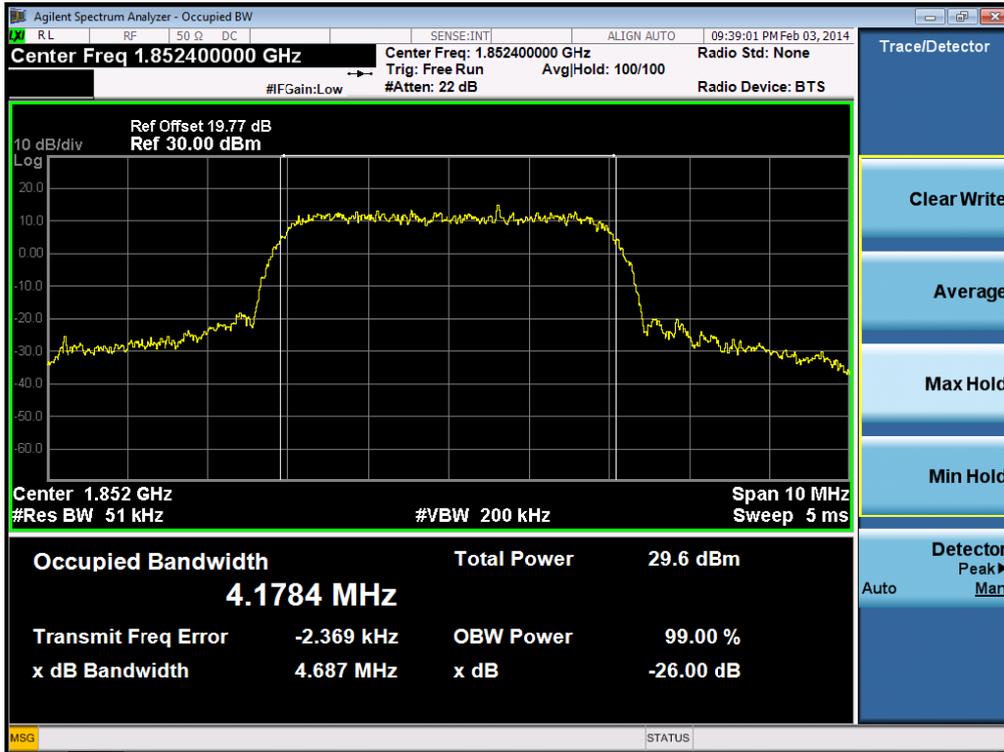
WCDMA1900 & Channel: 9400



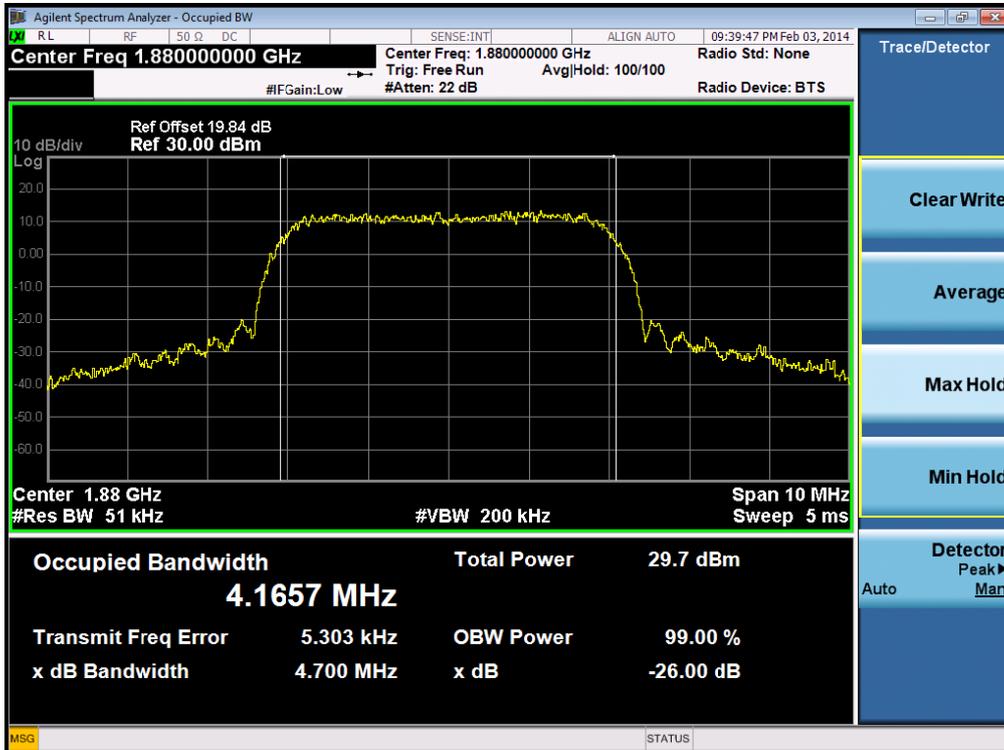
WCDMA1900 & Channel: 9538



HSUPA1900 & Channel: 9262

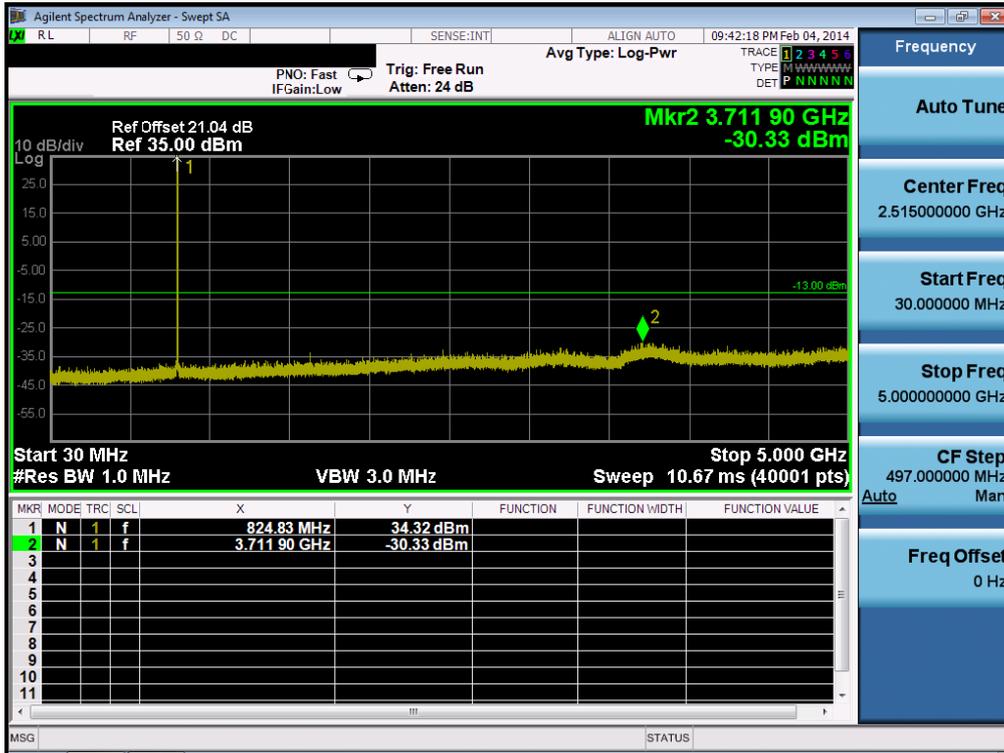


HSUPA1900 & Channel: 9400

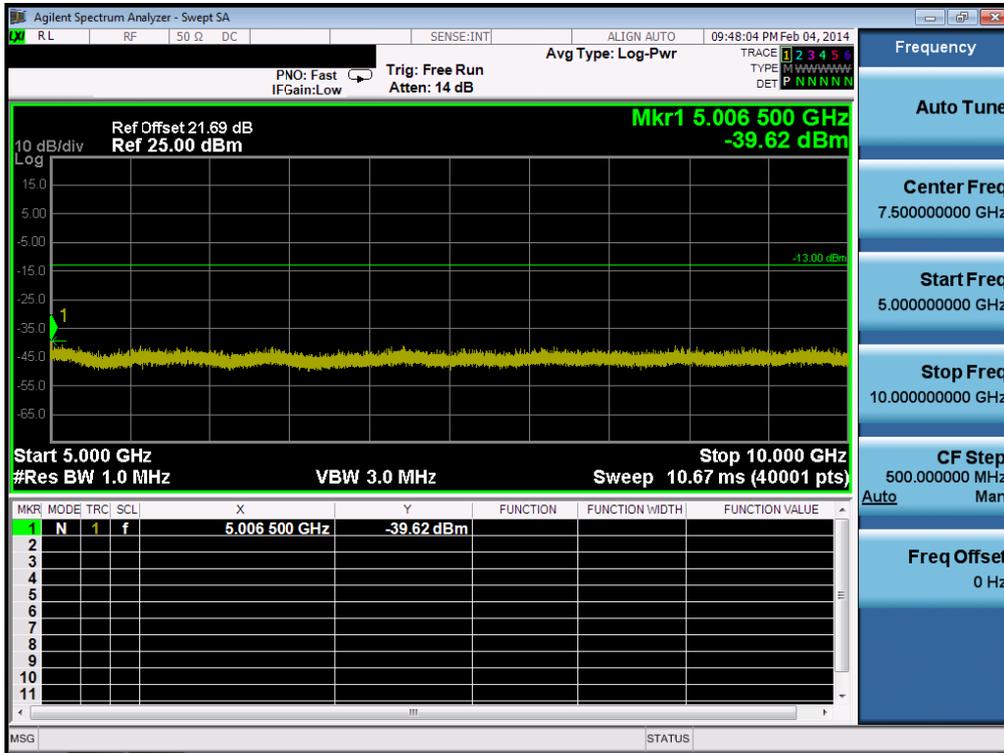


8.3 Spurious Emissions at Antenna Terminal

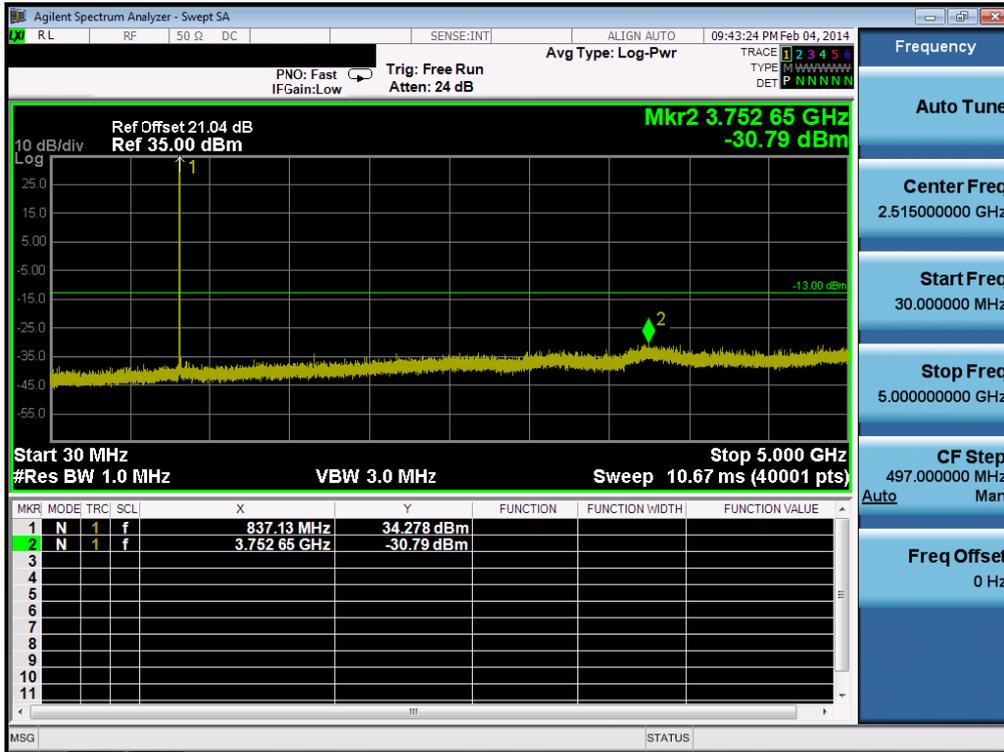
GSM850 & Channel: 128



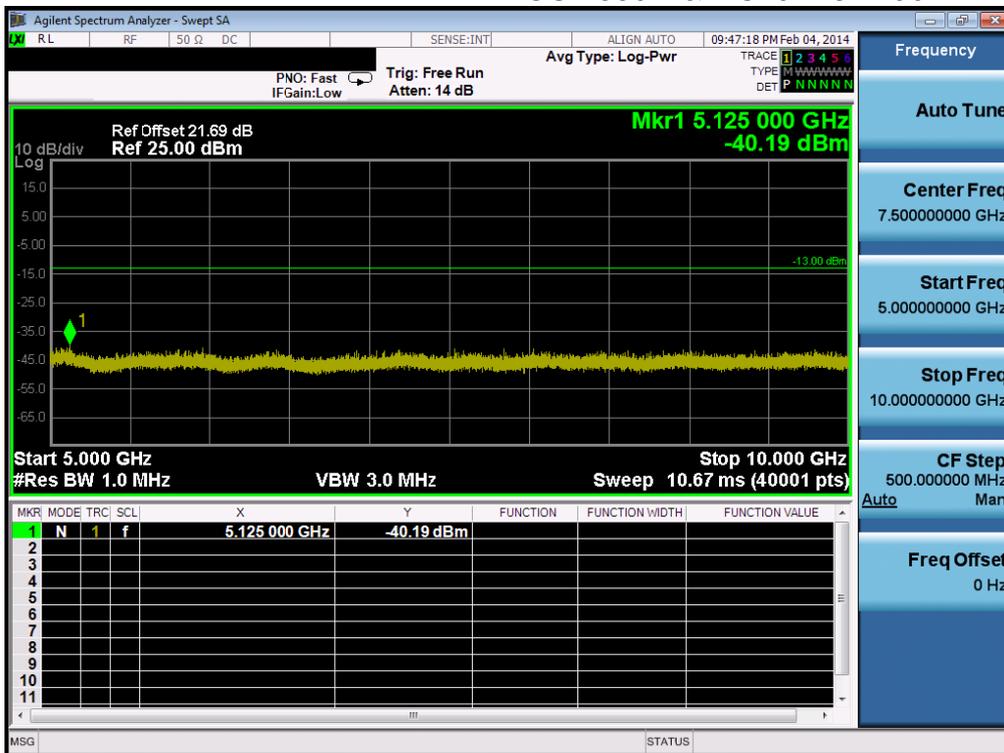
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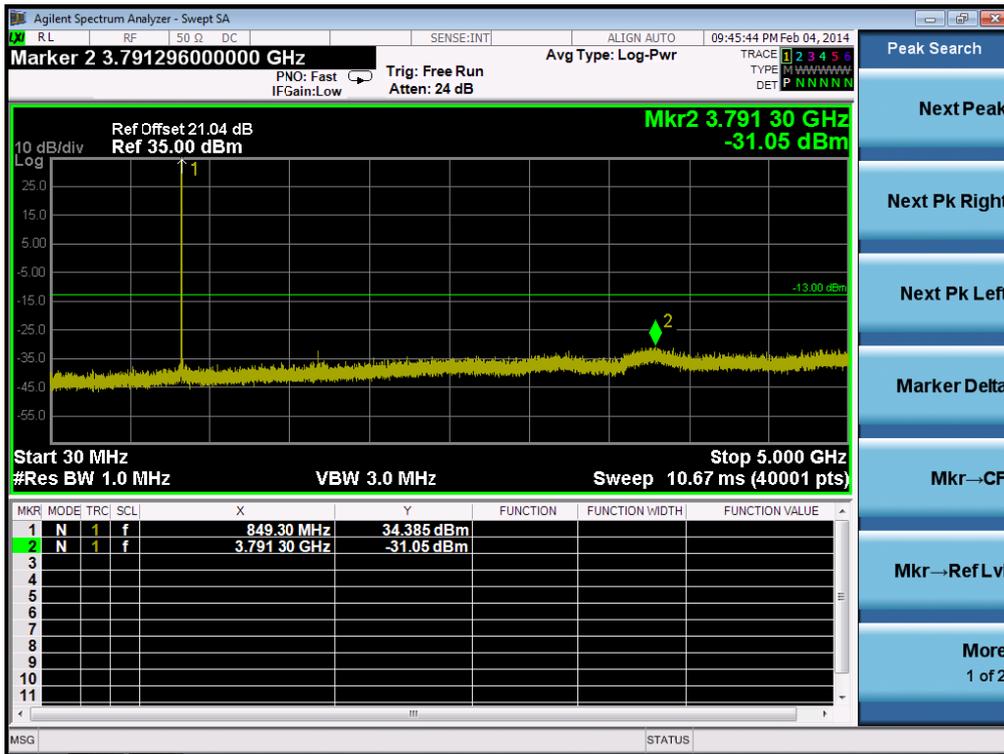
GSM850 & Channel: 190



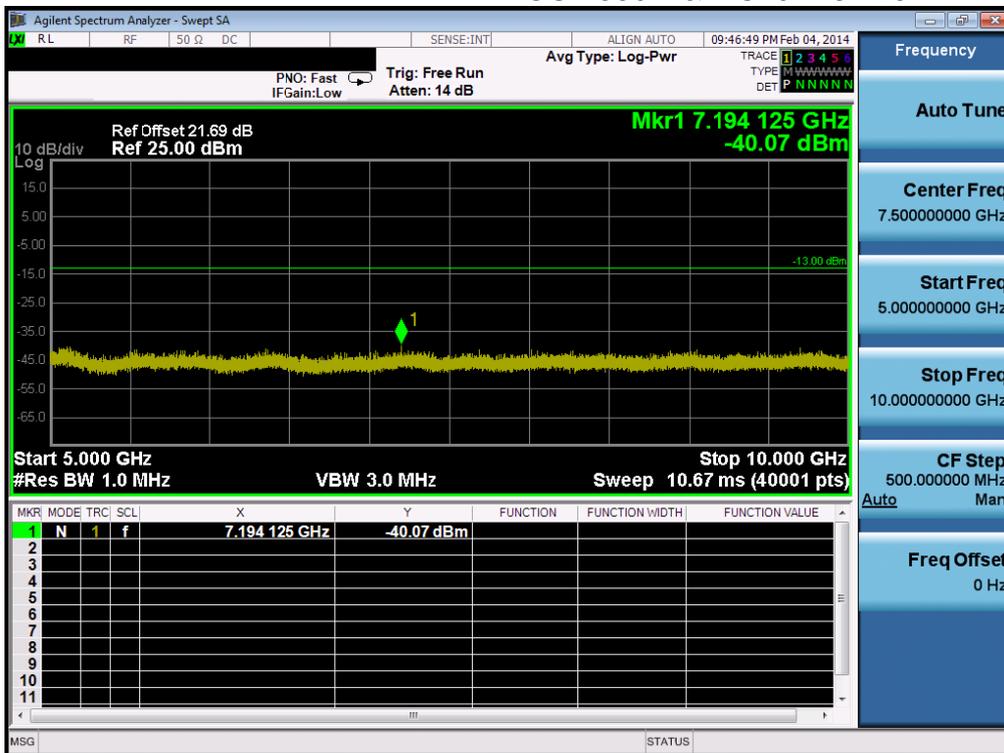
GSM850 & Channel: 190



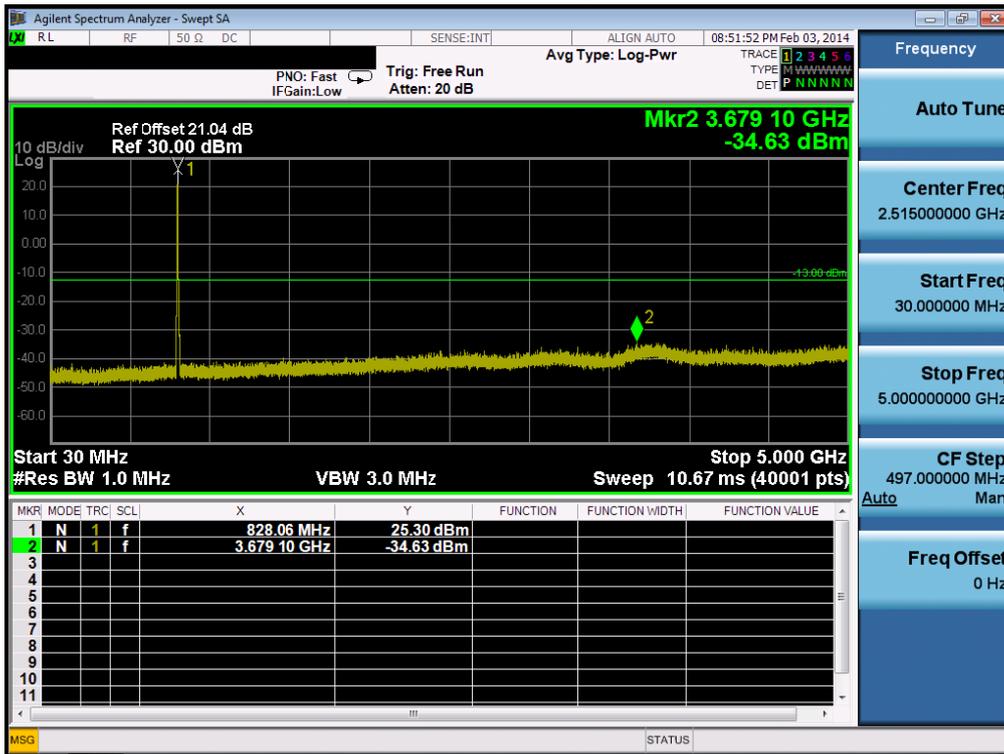
GSM850 & Channel: 251



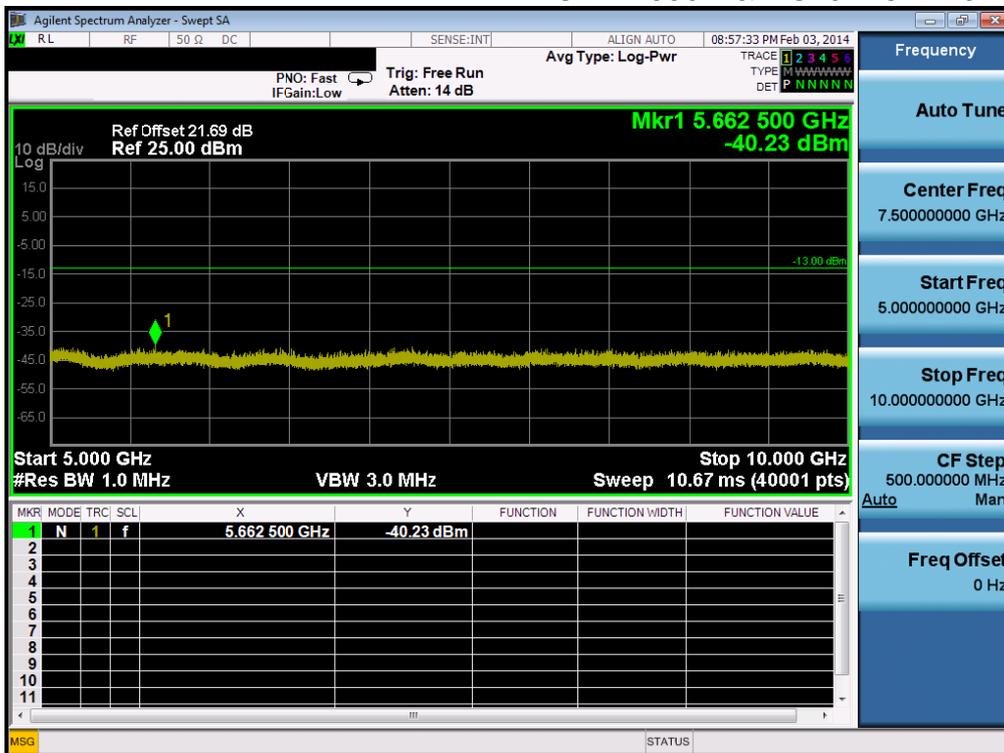
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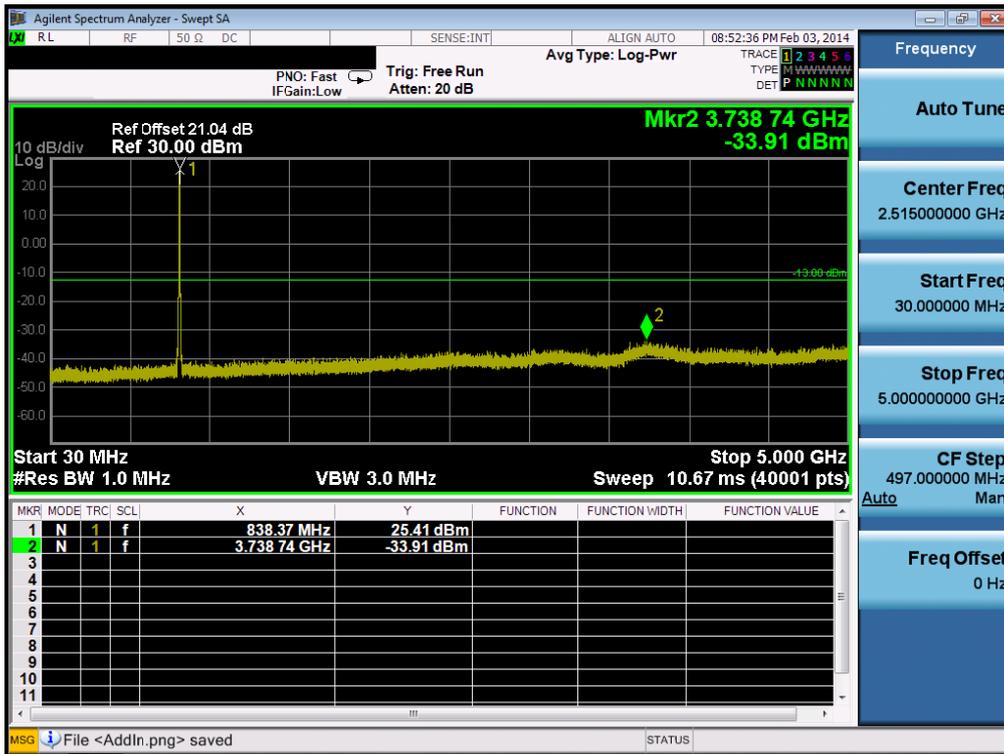
WCDMA850 & Channel: 4132



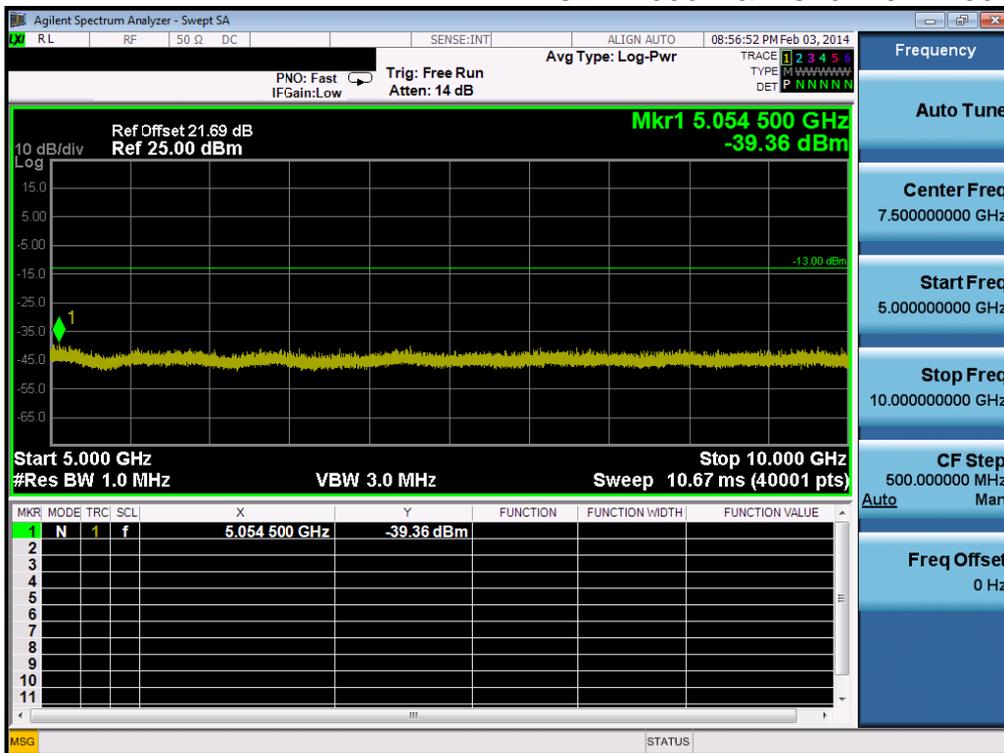
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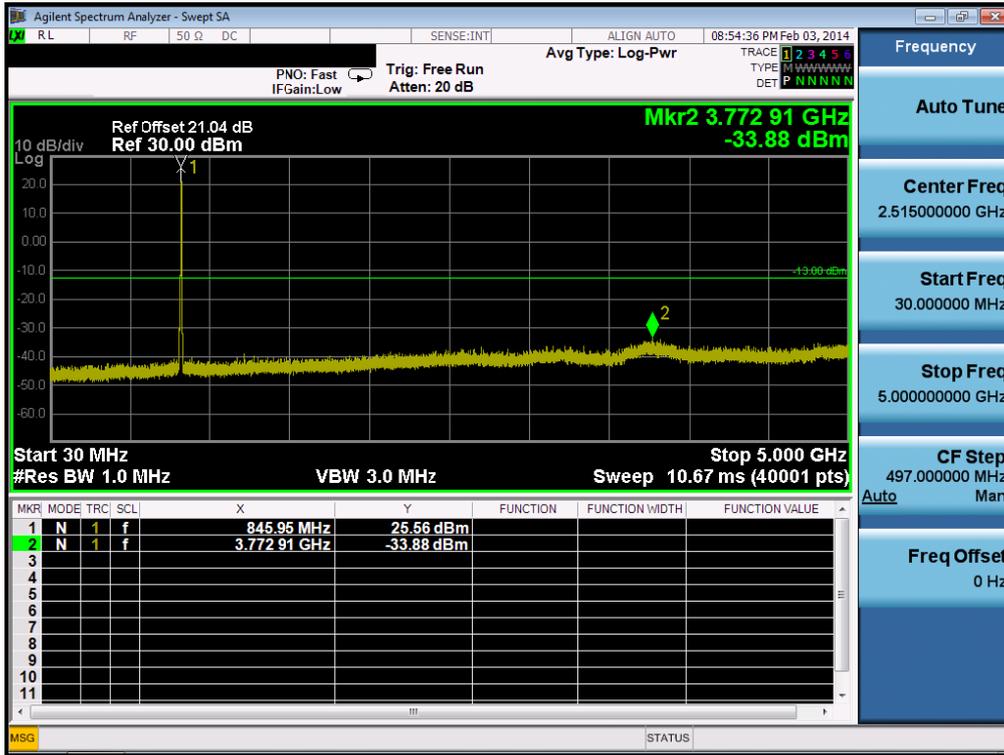
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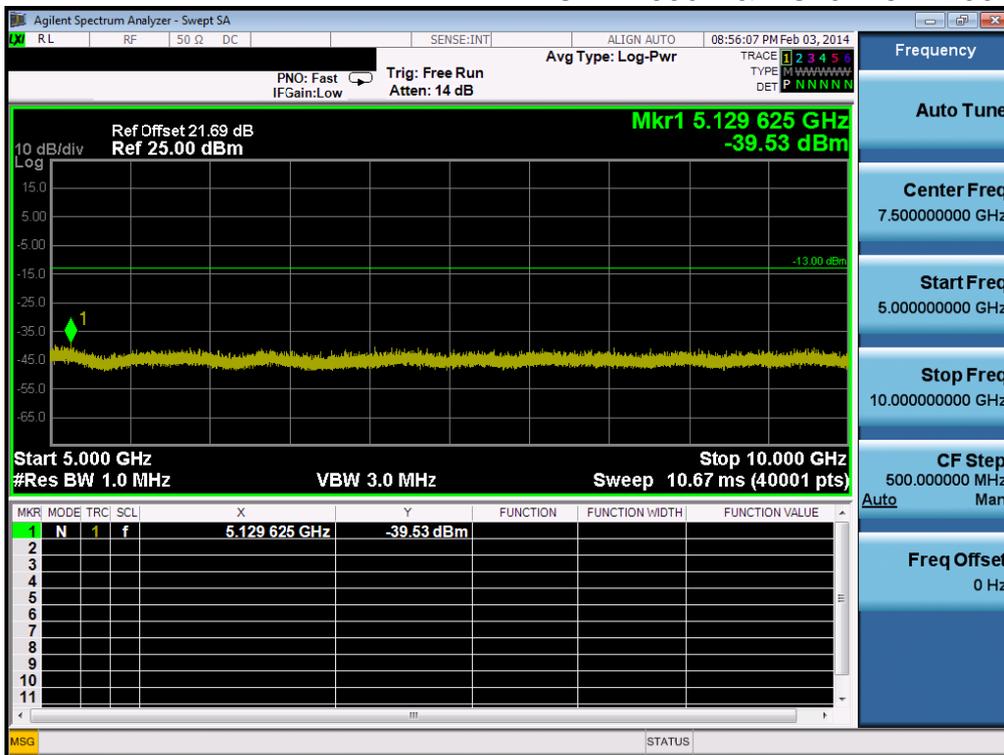
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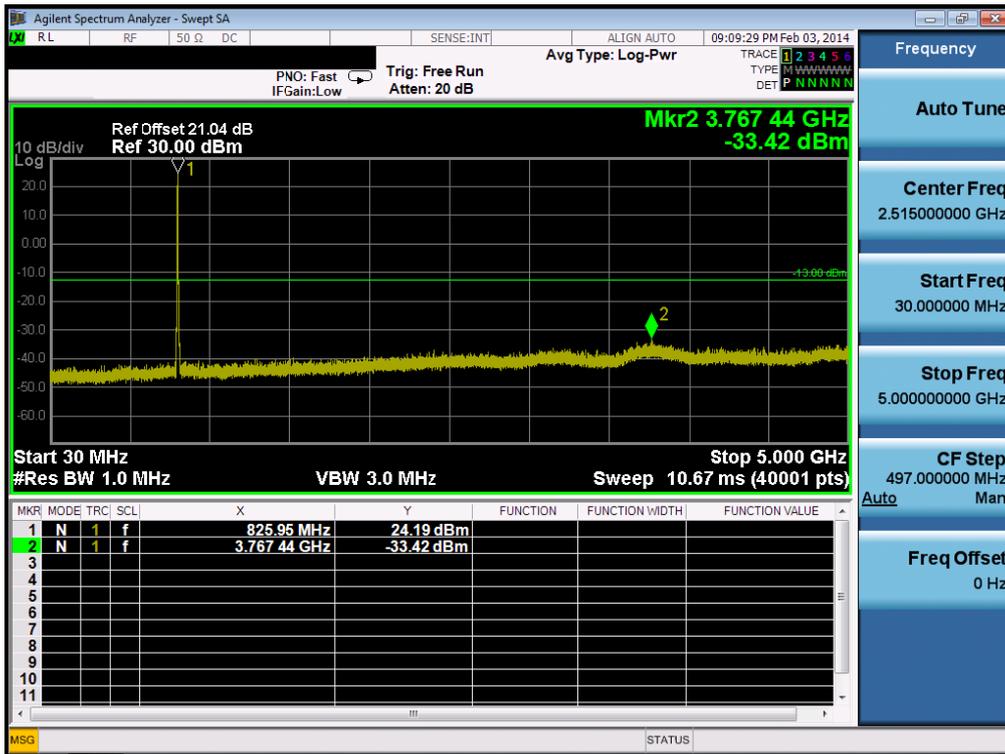
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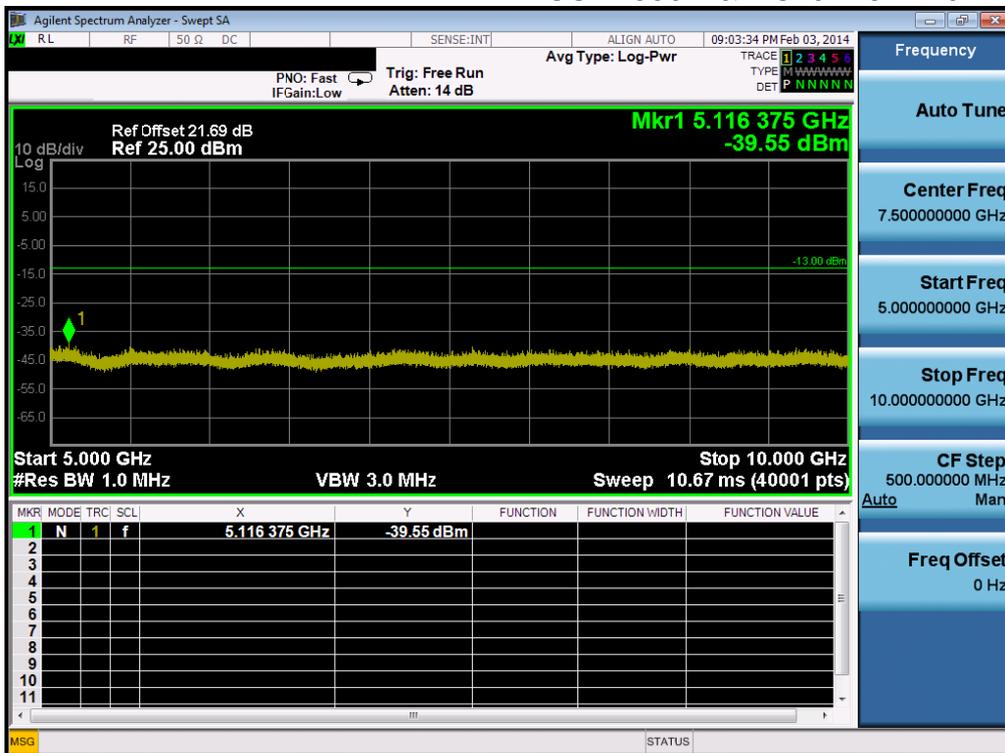
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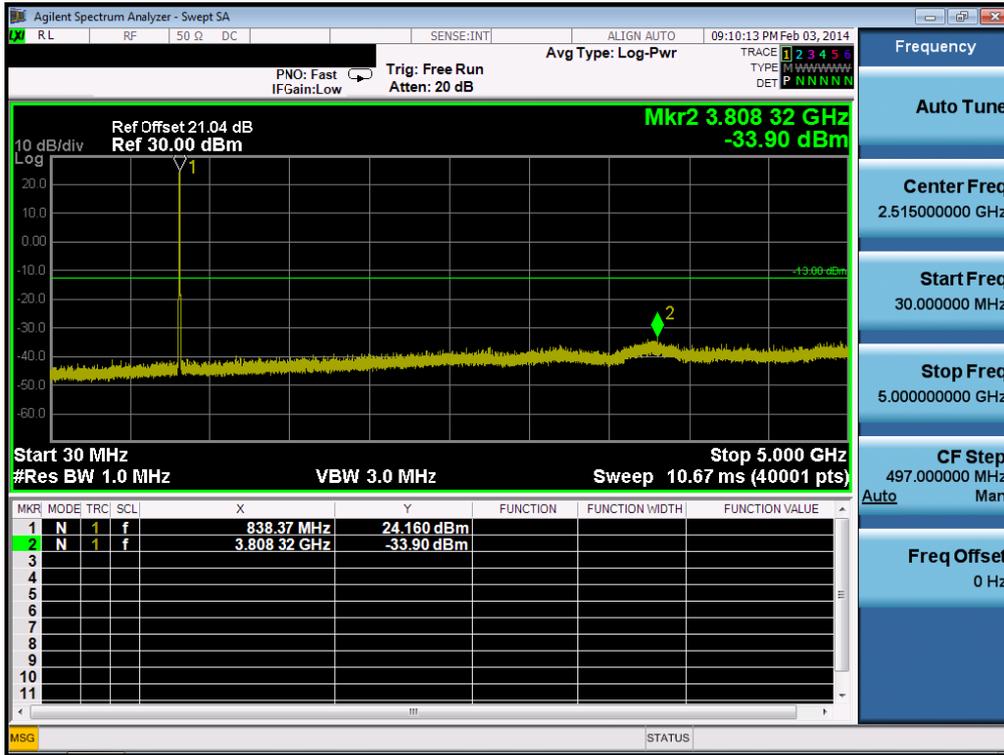
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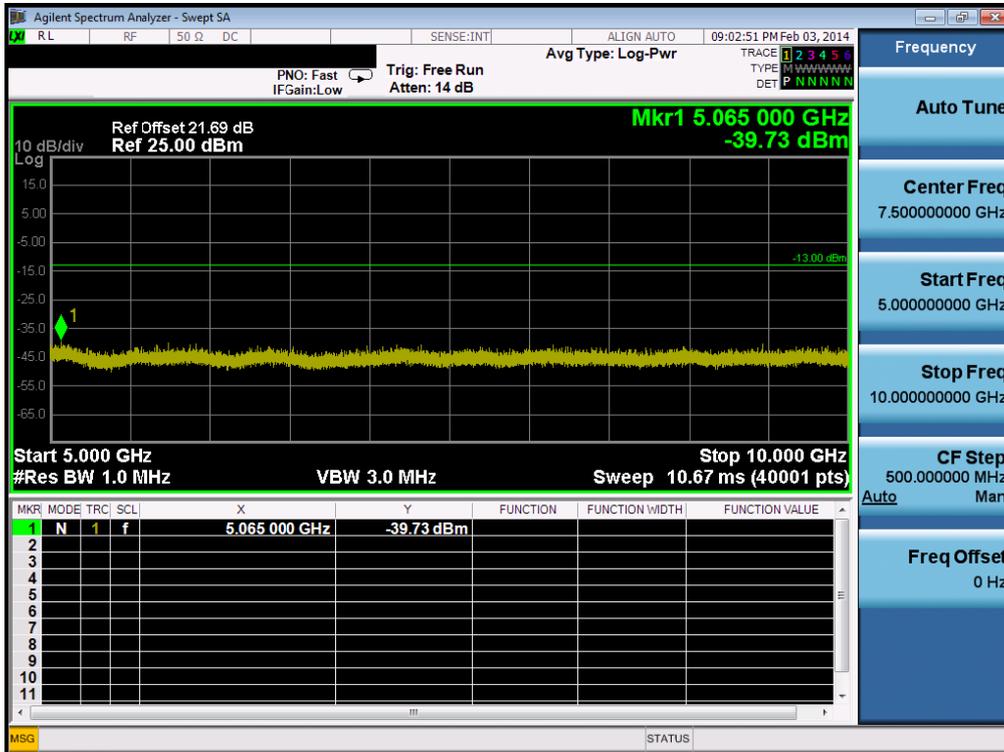
HSUPA850 & Channel: 4132



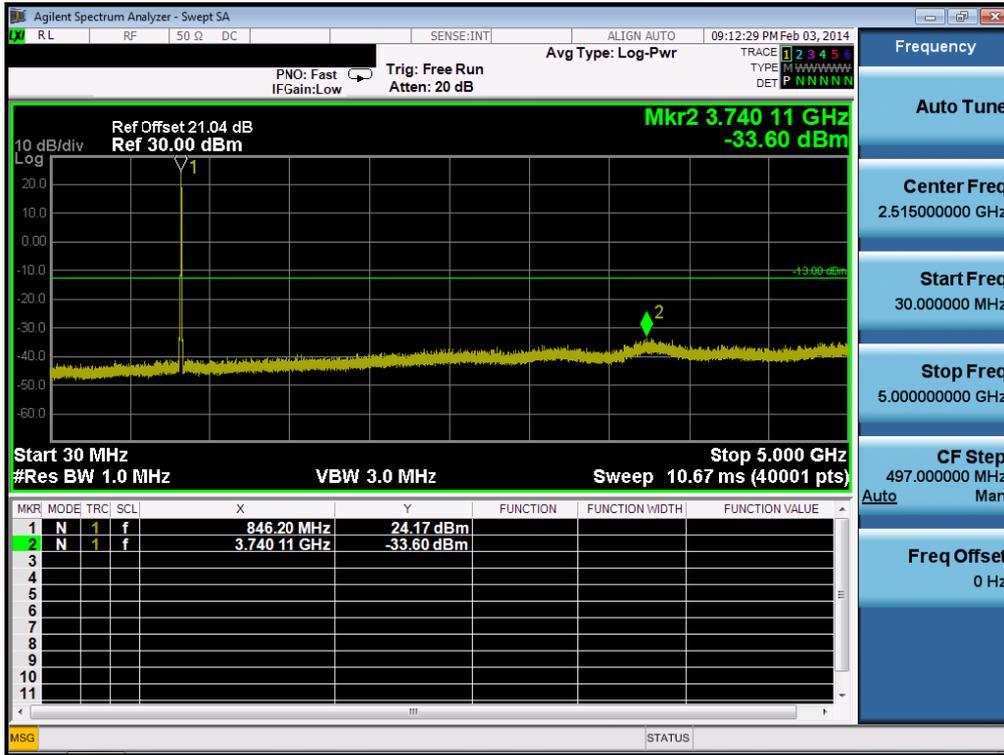
HSUPA850 & Channel: 4183



HSUPA850 & Channel: 4183



HSUPA850 & Channel: 4233



HSUPA850 & Channel: 4233

