



REPORT No.: SZ15090021W01

# FCC RF TEST REPORT

APPLICANT : Observa Telecom

PRODUCT NAME : LTE Cat 4 USB Dongle

MODEL NAME : QX610C

TRADE NAME : QX610C

BRAND NAME : Observa Mobile

FCC ID : 2AFTXQX610C

STANDARD(S) : 47 CFR Part 22 Subpart H  
47 CFR Part 24 Subpart E

ISSUE DATE : 2015-10-08



SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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| Change History |            |                   |
|----------------|------------|-------------------|
| Issue          | Date       | Reason for change |
| 1.0            | 2015-10-08 | First edition     |
|                |            |                   |



REPORT No.: SZ15090021W01

**TEST REPORT DECLARATION**

|                      |                                                       |
|----------------------|-------------------------------------------------------|
| Applicant            | Observa Telecom                                       |
| Applicant Address    | c/ Monte Esquinza, 28 1º Drcha Madrid P.C.28010 SPAIN |
| Manufacturer         | Observa Telecom                                       |
| Manufacturer Address | c/ Monte Esquinza, 28 1º Drcha Madrid P.C.28010 SPAIN |
| Product Name         | LTE Cat 4 USB Dongle                                  |
| Model Name           | QX610C                                                |
| Brand Name           | Observa Mobile                                        |
| HW Version           | 1.0                                                   |
| SW Version           | 1.0                                                   |
| Test Standards       | 47 CFR Part 22 Subpart H<br>47 CFR Part 24 Subpart E  |
| Test Date            | 2015-9-10 to 2015-09-25                               |
| Test Result          | PASS                                                  |

Tested by : Zou Jian  
Zou Jian (Test Engineer)

Reviewed by : Peng Huarui  
Peng Huarui(RF Manager)

Approved by : Zeng Dexin  
Zeng Dexin(Chief Engineer)



## 1. GENERAL INFORMATION

### 1.1 EUT Description

EUT Type .....: LTE Cat 4 USB Dongle  
Serial No. ....: (n.a, marked #1 by test site)  
Hardware Version .....: 1.0  
Software Version .....: 1.0  
Applicant .....: Observa Telecom  
c/ Monte Esquinza, 28 1º Drcha Madrid P.C.28010 SPAIN  
Manufacturer .....: Observa Telecom  
c/ Monte Esquinza, 28 1º Drcha Madrid P.C.28010 SPAIN  
Frequency Range .....: GSM 850MHz:  
Tx: 824.20 - 848.80MHz (at intervals of 200kHz);  
Rx: 869.20 - 893.80MHz (at intervals of 200kHz)  
GSM 1900MHz:  
Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz);  
Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)  
WCDMA 850MHz  
Tx: 826.4 - 846.6MHz (at intervals of 200kHz);  
Rx: 871.4 - 891.6MHz (at intervals of 200kHz)  
WCDMA 1900MHz  
Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);  
Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)  
Modulation Type.....: GSM,GPRS Mode with GMSK Modulation  
EDGE Mode with 8PSK Modulation  
WCDMA Mode with QPSK Modulation  
HSDPA Mode with QPSK Modulation  
HSUPA Mode with QPSK Modulation  
HSPA+ Mode with QPSK Modulation  
Multislot Class .....: GPRS: Multislot Class33; EGPRS: Multislot Class33  
Antenna Type .....: PIFA Antenna  
Emission Designators .....: GSM 850:248KGXW,GSM 1900:247KGXW  
EGPRS850:254KG7W, EGPRS1900:256KG7W,  
WCDMA 850:4M16F9W ,WCDMA1900:4M17F9W



**Note 1:** The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula  $F(n)=824.2+0.2*(n-128)$ ,  $128 \leq n \leq 251$ ; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128 (824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

**Note 2:** The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula  $F(n)=1850.2+0.2*(n-512)$ ,  $512 \leq n \leq 810$ ; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

**Note 3:** The transmitter (Tx) frequency arrangement of the WCDMA 850MHz band used by the EUT can be represented with the formula  $F(n)=826.4+0.2*(n-4132)$ ,  $4132 \leq n \leq 4233$ ; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 4132 (826.4MHz), 4175(835MHz) and 4233 (846.6MHz).

**Note 4:** The transmitter (Tx) frequency arrangement of the WCDMA 1900MHz band used by the EUT can be represented with the formula  $F(n)=1852.4+0.2*(n-9262)$ ,  $9262 \leq n \leq 9538$ ; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 9262 (1852.4MHz), 9400 (1880MHz) and 9538 (1907.6MHz).

**Note 5:** For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

## 1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22 and Part 24 for the EUT FCC ID Certification:

| No. | Identity                            | Document Title                                                                |
|-----|-------------------------------------|-------------------------------------------------------------------------------|
| 1   | 47 CFR Part 2<br>(10-1-12 Edition)  | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2   | 47 CFR Part 22<br>(10-1-12 Edition) | Public Mobile Services                                                        |
| 3   | 47 CFR Part 24<br>(10-1-12 Edition) | Personal Communications Services                                              |



Test detailed items/section required by FCC rules and results are as below:

| No. | Section                        | Description                           | Result |
|-----|--------------------------------|---------------------------------------|--------|
| 1   | 2.1046                         | Conducted RF Output Power             | PASS   |
| 2.  | 24.232(d)                      | Peak to average ratio                 | PASS   |
| 2   | 2.1049,22.917, 24.238,         | 99% Occupied Bandwidth                | PASS   |
| 3   | 2.1055,22.355, 24.235          | Frequency Stability                   | PASS   |
| 4   | 2.1051,2.1057, 22.917, 24.238, | Conducted Out of Band Emissions       | PASS   |
| 5   | 2.1051, 2.1057, 22.917, 24.238 | Band Edge                             | PASS   |
| 6   | 22.913, 24.232                 | Transmitter Radiated Power (EIPR/ERP) | PASS   |
| 7   | 2.1053, 2.1057, 22.917, 24.238 | Radiated Out of Band Emissions        | PASS   |

NOTE: Measurement method according to TIA/EIA 603.D-2010

## 1.3 Facilities and Accreditations

### 1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District, ShenZhen, Guangdong Province,P. R. China 518101. The test site is constructed in conformance with the requirements of ANSI C63.7-2009, ANSI C63.4-2009 and CISPR Publication 22:2010; the FCC registration number is 695796.

### 1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

|                             |         |
|-----------------------------|---------|
| Temperature (°C):           | 15 - 35 |
| Relative Humidity (%):      | 30 -60  |
| Atmospheric Pressure (kPa): | 86-106  |

## 2. 47 CFR PART 2, PART 22H & 24E REQUIREMENTS

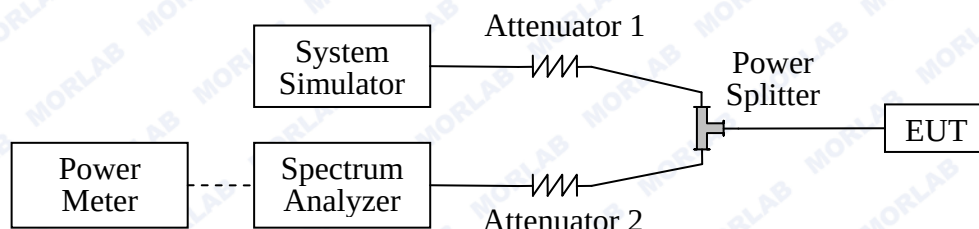
### 2.1 Conducted RF Output Power

#### 2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

#### 2.1.2 Test Description

Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

The Power Meter was just used for the Conducted RF Output Power test of WCDMA Model.

Equipments List:

| Description       | Manufacturer | Model  | Serial No. | Cal. Date  | Cal. Due   |
|-------------------|--------------|--------|------------|------------|------------|
| System Simulator  | Agilent      | E5515C | GB43130131 | 2015.02.26 | 2016.02.25 |
| Spectrum Analyzer | Agilent      | E7405A | US44210471 | 2015.02.26 | 2016.02.25 |
| Power Meter       | Agilent      | E4418B | GB43318055 | 2015.02.26 | 2016.02.25 |
| Power Sensor      | Agilent      | 8482A  | MY41091706 | 2015.02.26 | 2016.02.25 |
| Power Splitter    | Weinschel    | 1506A  | NW521      | 2015.02.26 | 2016.02.25 |
| Attenuator 1      | Resnet       | 20dB   | (n.a.)     | 2015.02.26 | 2016.02.25 |
| Attenuator 2      | Resnet       | 3dB    | (n.a.)     | 2015.02.26 | 2016.02.25 |



### 2.1.3 Test Results

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

GSM Model Test Verdict:

| Band             | Channel | Frequency<br>(MHz) | Measured Output Power |                                    | Limit | Verdict |
|------------------|---------|--------------------|-----------------------|------------------------------------|-------|---------|
|                  |         |                    | dBm                   | Refer to Plot                      | dBm   |         |
| GSM<br>850MHz    | 128     | 824.2              | 33.50                 | Plot A1 to<br>A3                   | 35    | PASS    |
|                  | 190     | 836.6              | 33.69                 |                                    |       | PASS    |
|                  | 251     | 848.8              | 33.59                 |                                    |       | PASS    |
| GSM<br>1900MHz   | 512     | 1850.2             | 30.08                 | Plot B1 to<br>B3                   | 32    | PASS    |
|                  | 661     | 1880.0             | 30.09                 |                                    |       | PASS    |
|                  | 810     | 1909.8             | 30.20                 |                                    |       | PASS    |
| GPRS<br>850MHz   | 128     | 824.2              | 31.52                 | Plot C1 to<br>C3 <sup>Note 1</sup> | 35    | PASS    |
|                  | 190     | 836.6              | 31.75                 |                                    |       | PASS    |
|                  | 251     | 848.8              | 31.65                 |                                    |       | PASS    |
| GPRS<br>1900MHz  | 512     | 1850.2             | 27.96                 | Plot D1 to<br>D3 <sup>Note 1</sup> | 32    | PASS    |
|                  | 661     | 1880.0             | 27.98                 |                                    |       | PASS    |
|                  | 810     | 1909.8             | 28.22                 |                                    |       | PASS    |
| EGPRS<br>850MHz  | 128     | 824.2              | 27.92                 | Plot E1 to<br>E3 <sup>Note 1</sup> | 35    | PASS    |
|                  | 190     | 836.6              | 27.65                 |                                    |       | PASS    |
|                  | 251     | 848.8              | 27.88                 |                                    |       | PASS    |
| EGPRS<br>1900MHz | 512     | 1850.2             | 25.55                 | Plot F1 to<br>F3 <sup>Note 1</sup> | 32    | PASS    |
|                  | 661     | 1880.0             | 25.63                 |                                    |       | PASS    |
|                  | 810     | 1909.8             | 25.77                 |                                    |       | PASS    |

Note 1: For the GPRS and EGPRS model, all the slots were tested and just the worst data was record in this report.

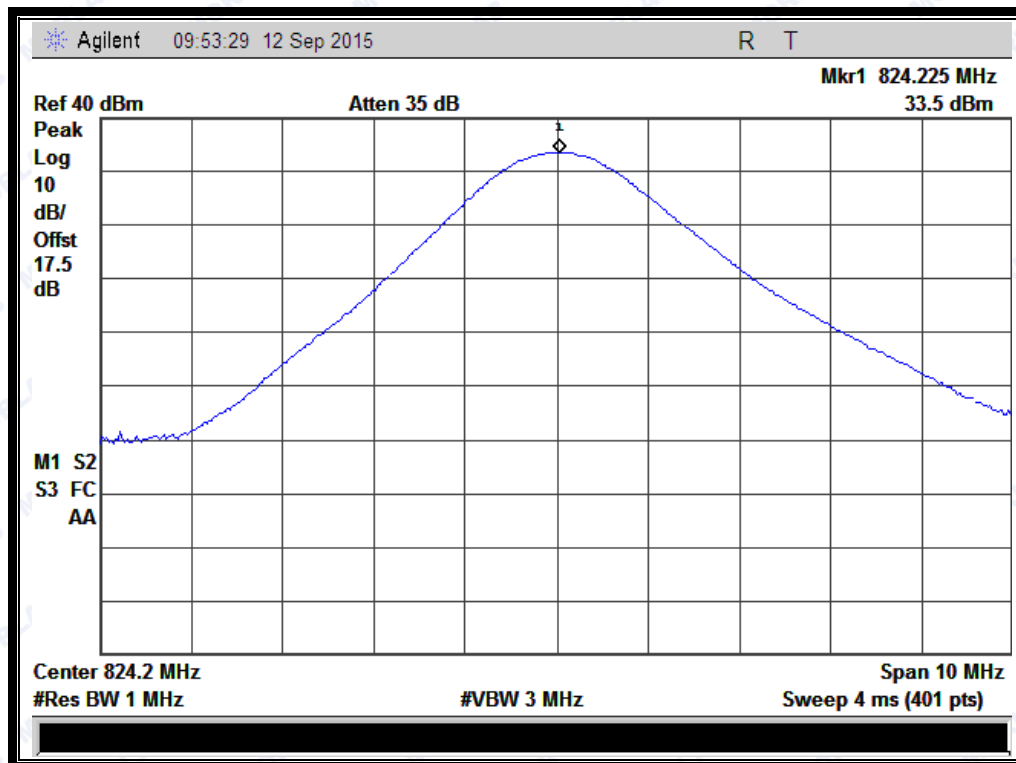


WCDMA Model Test Verdict:

| Item       | band    | WCDMA 850 |       |       | WCDMA 1900 |       |       |
|------------|---------|-----------|-------|-------|------------|-------|-------|
|            | ARFCN   | 4132      | 4175  | 4233  | 9262       | 9400  | 9538  |
|            | subtest | dBm       |       |       | dBm        |       |       |
| 5.2(WCDMA) | non     | 23.96     | 23.84 | 23.78 | 22.72      | 23.09 | 22.76 |
| HSDPA      | 1       | 24.05     | 24.35 | 23.95 | 22.94      | 23.41 | 22.92 |
|            | 2       | 24.07     | 24.32 | 24.00 | 23.01      | 23.38 | 22.95 |
|            | 3       | 23.54     | 23.86 | 23.44 | 22.43      | 22.92 | 22.41 |
|            | 4       | 23.56     | 23.83 | 23.51 | 22.52      | 22.87 | 22.46 |
| HSUPA      | 1       | 24.05     | 23.92 | 23.94 | 22.91      | 23.30 | 22.63 |
|            | 2       | 22.04     | 21.93 | 21.95 | 20.90      | 21.31 | 20.64 |
|            | 3       | 23.06     | 22.91 | 22.93 | 21.92      | 22.32 | 21.62 |
|            | 4       | 22.03     | 21.90 | 21.92 | 20.89      | 21.32 | 20.65 |
|            | 5       | 24.04     | 23.93 | 23.91 | 22.90      | 23.29 | 22.62 |
| HSPA+      | 1       | 23.97     | 23.97 | 24.11 | 22.93      | 23.24 | 22.73 |

Note: The Conducted RF Output Power test of WCDMA /HSDPA /HSUPA /HSPA+ was tested by power meter.

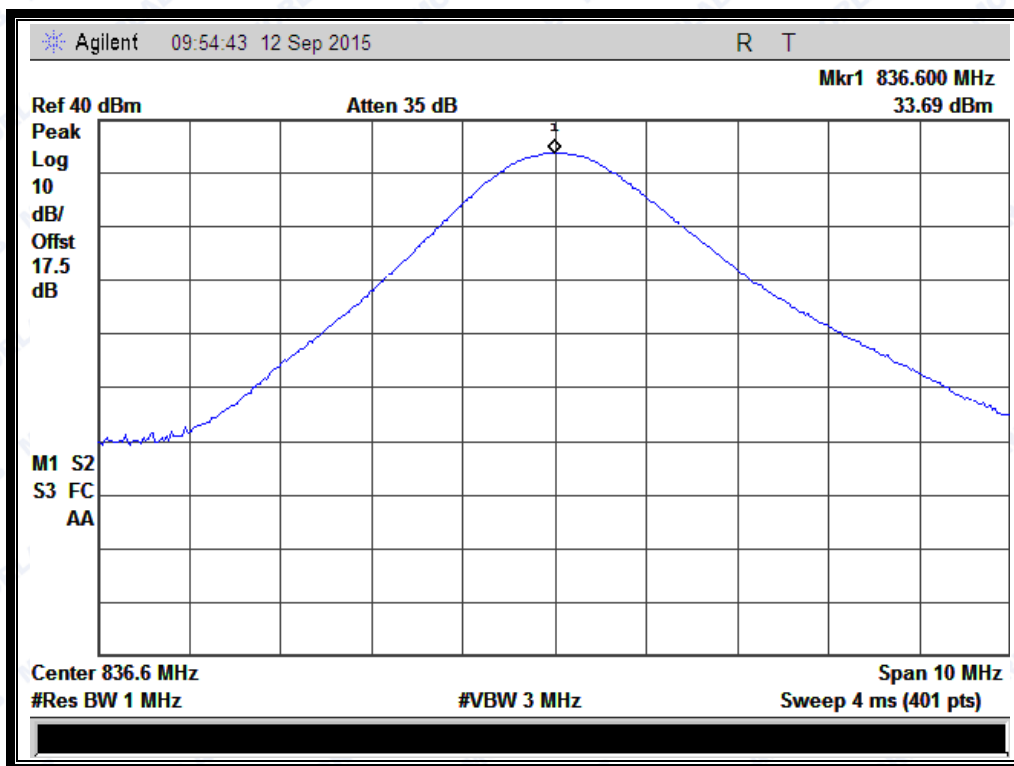
GSM Model Test Plots:



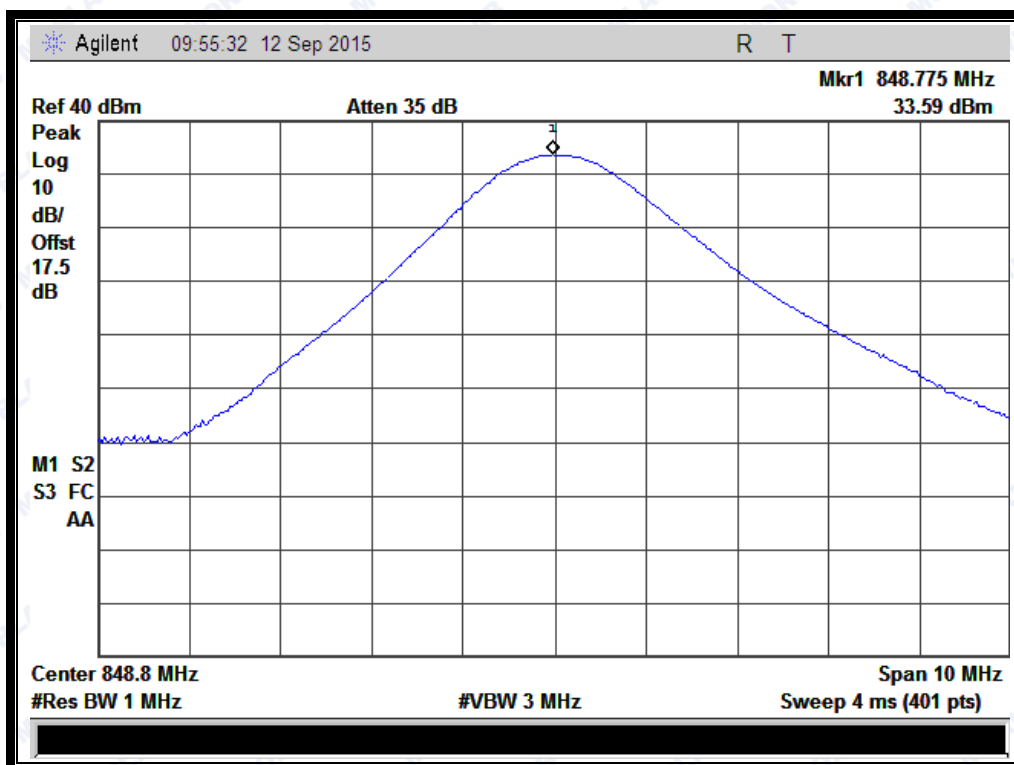
(Plot A1: GSM 850MHz Channel = 128)



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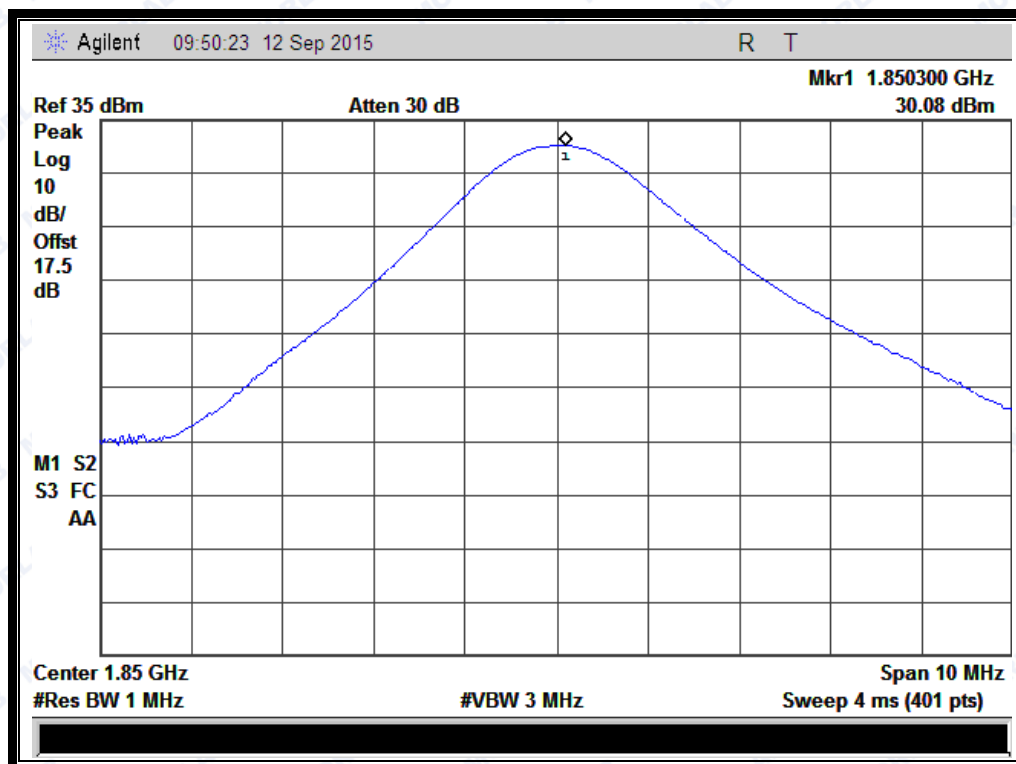
(Plot A2: GSM 850MHz Channel = 190)



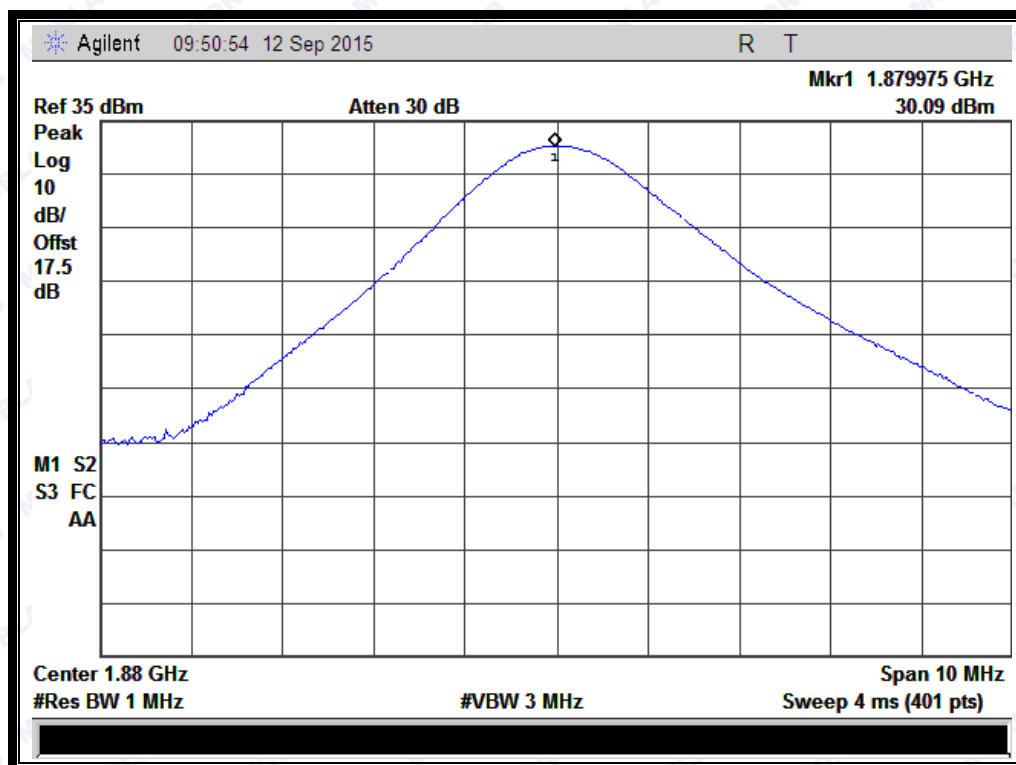
(Plot A3: GSM 850MHz Channel = 251)



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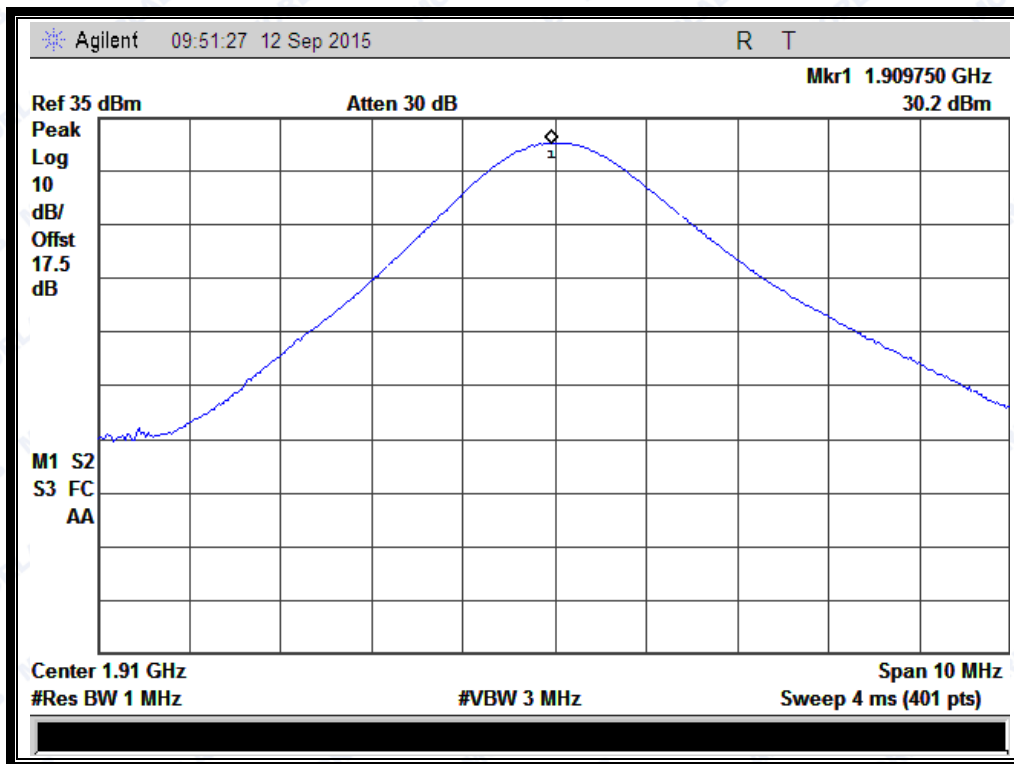
(Plot B1: GSM 1900MHz Channel = 512)



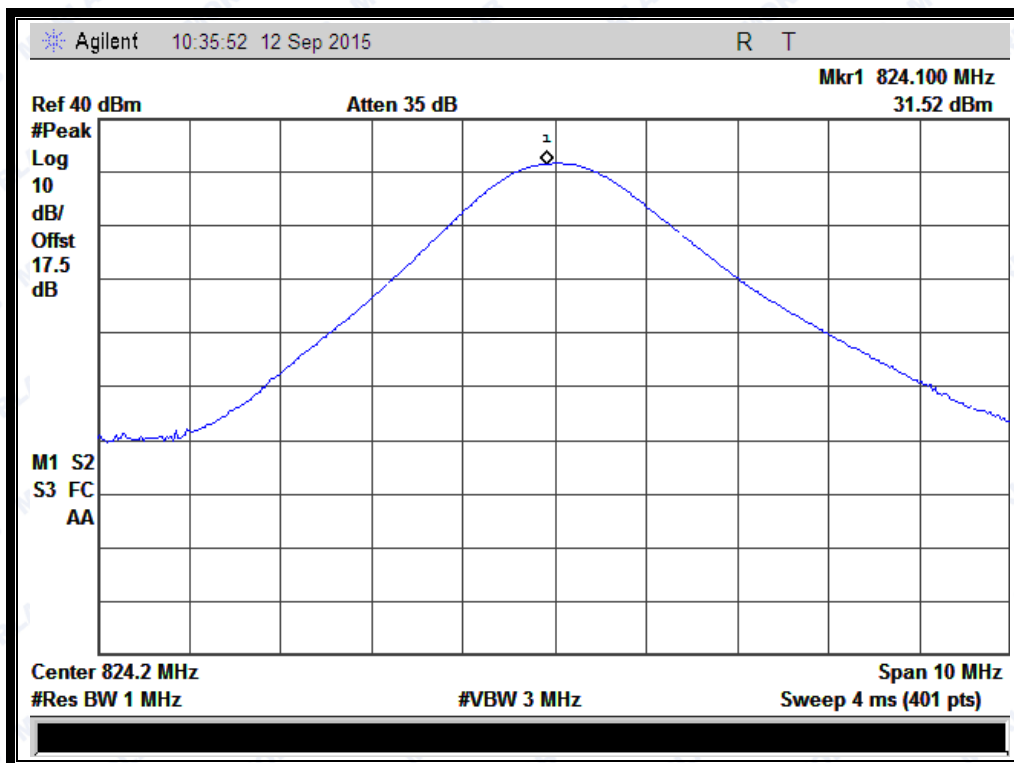
(Plot B2: GSM 1900MHz Channel = 661)



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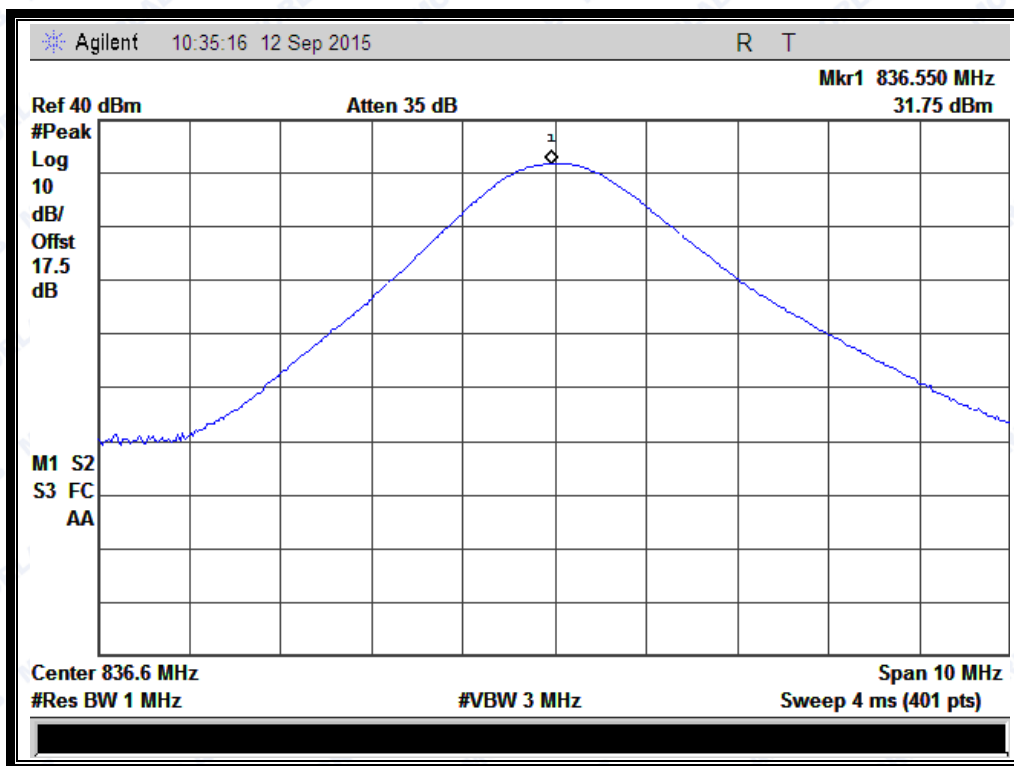
(Plot B3: GSM 1900Hz Channel = 810)



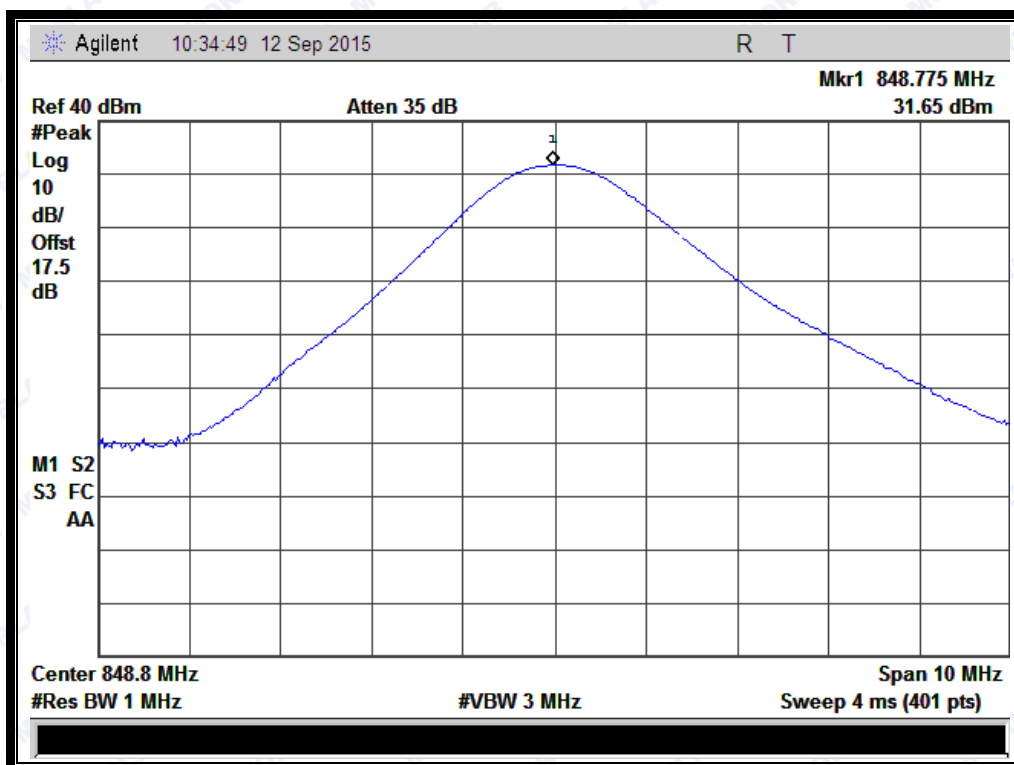
(Plot C1: GPRS 850MHz Channel = 128)



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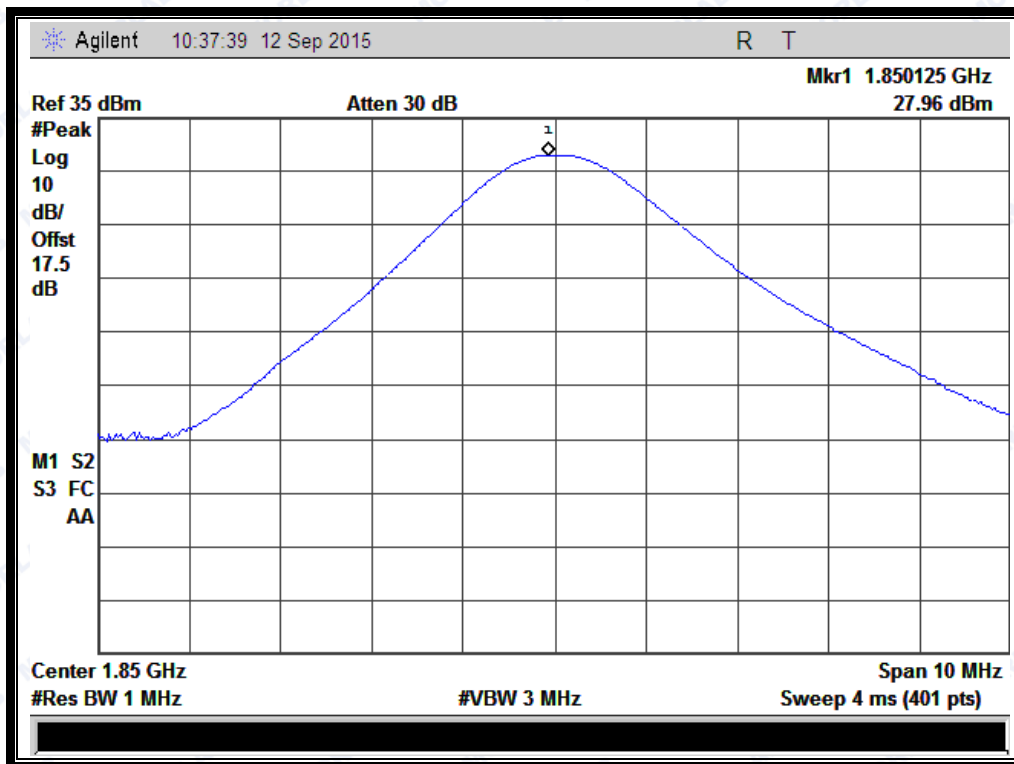
(Plot C2: GPRS 850MHz Channel = 190)



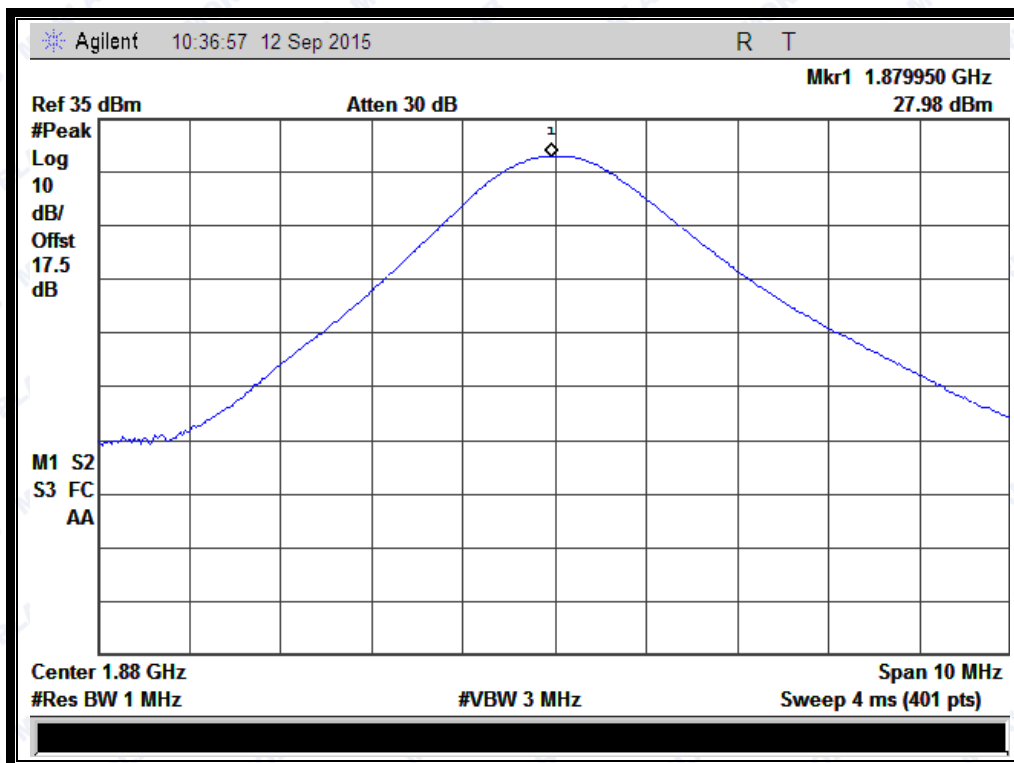
(Plot C3: GPRS 850MHz Channel = 251)



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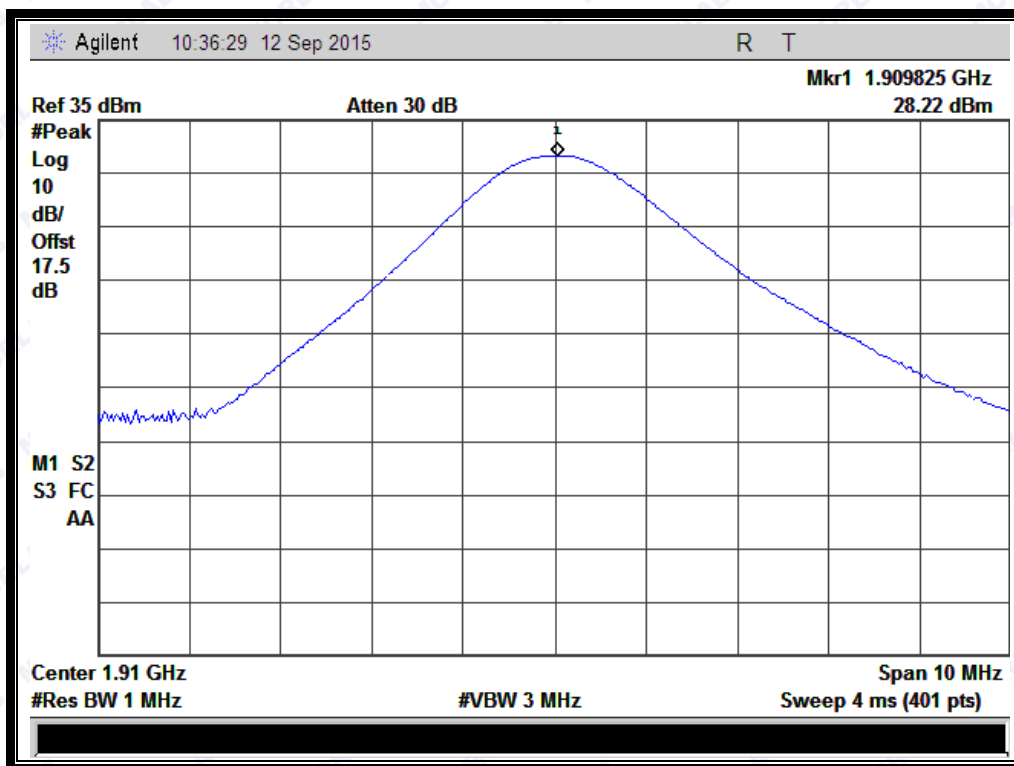
(Plot D1: GPRS 1900MHz Channel = 512)



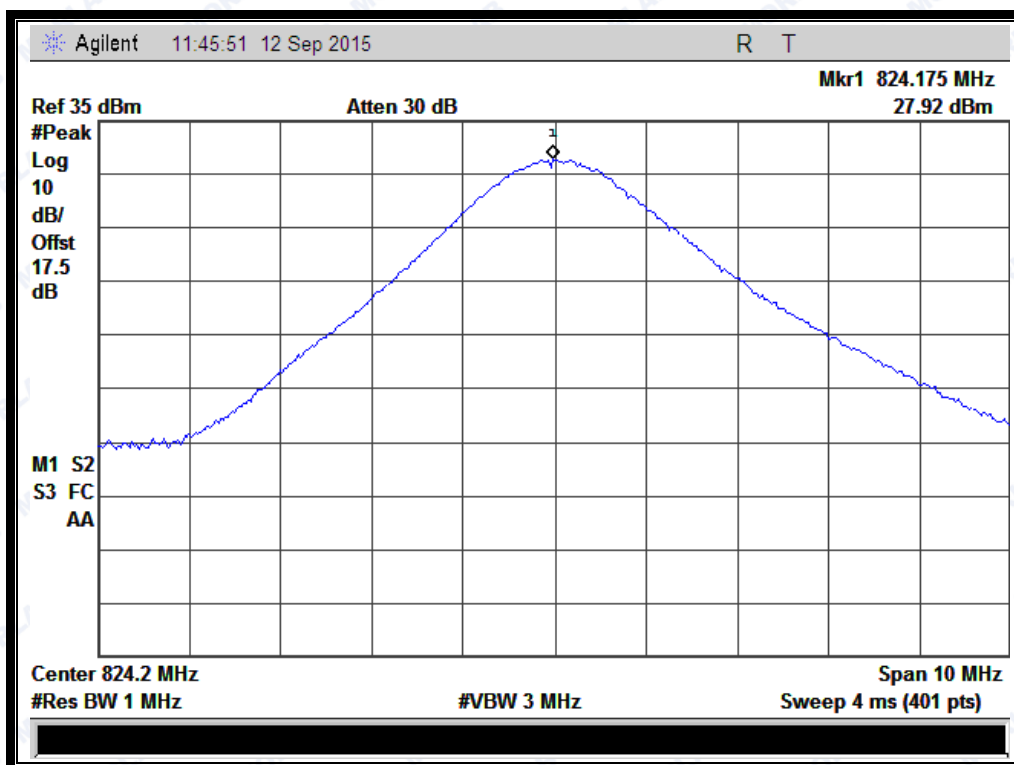
(Plot D2: GPRS 1900MHz Channel = 661)



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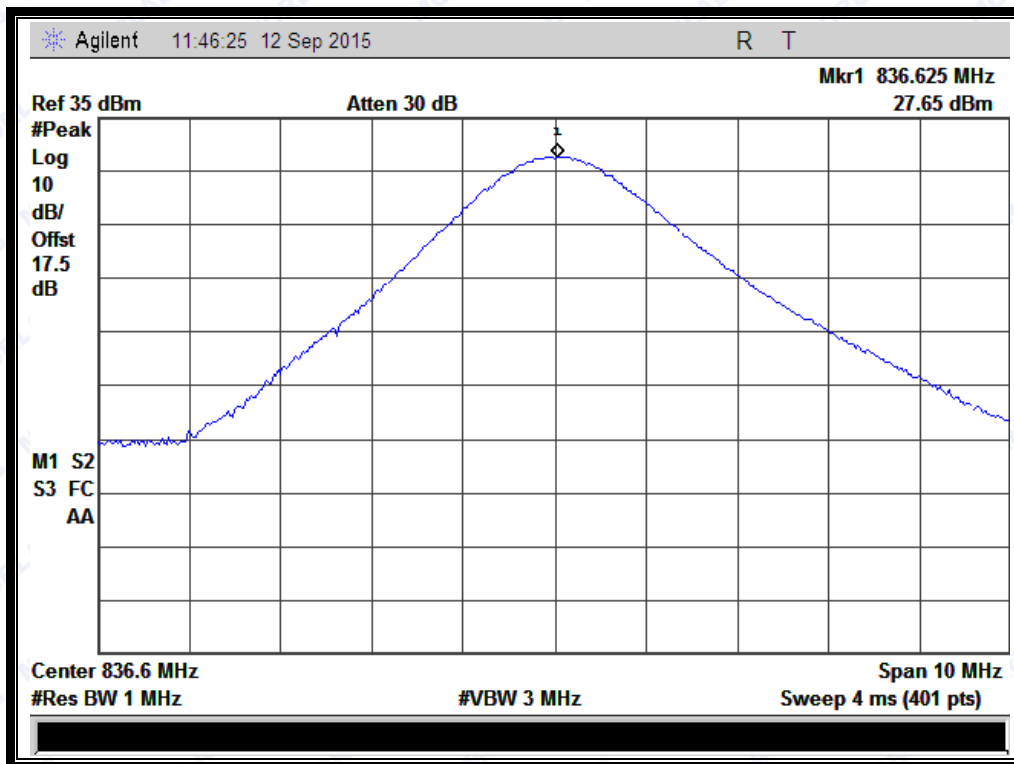
(Plot D3: GPRS 1900Hz Channel = 810)



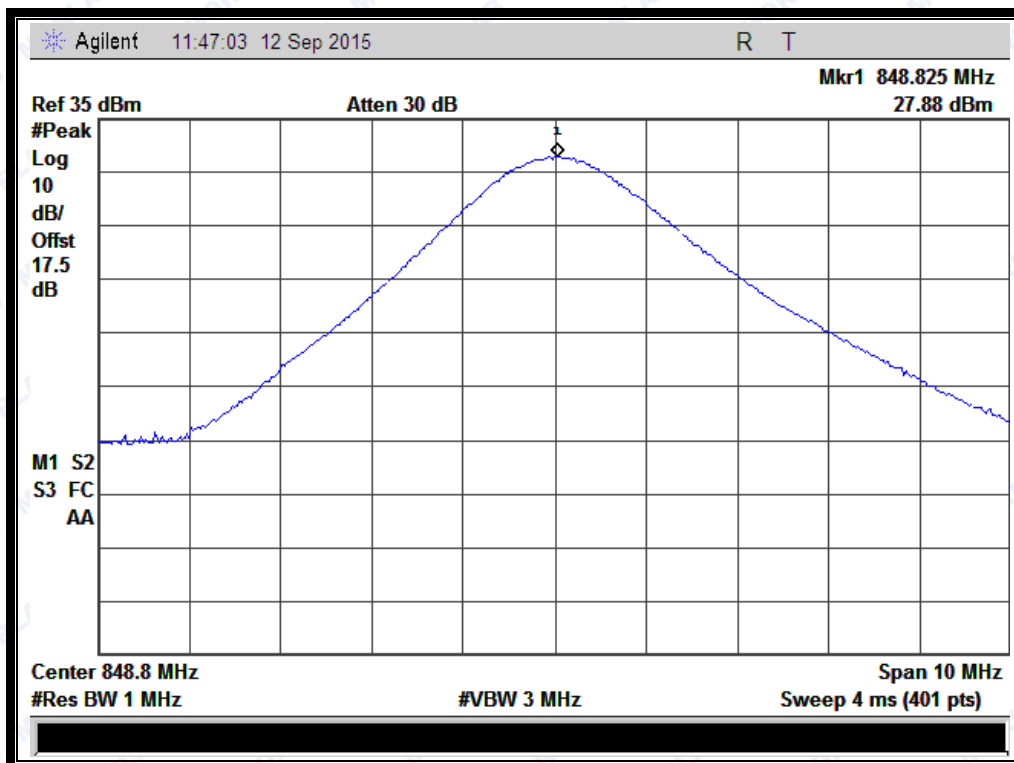
(Plot E1: EGPRS 850MHz Channel = 128)



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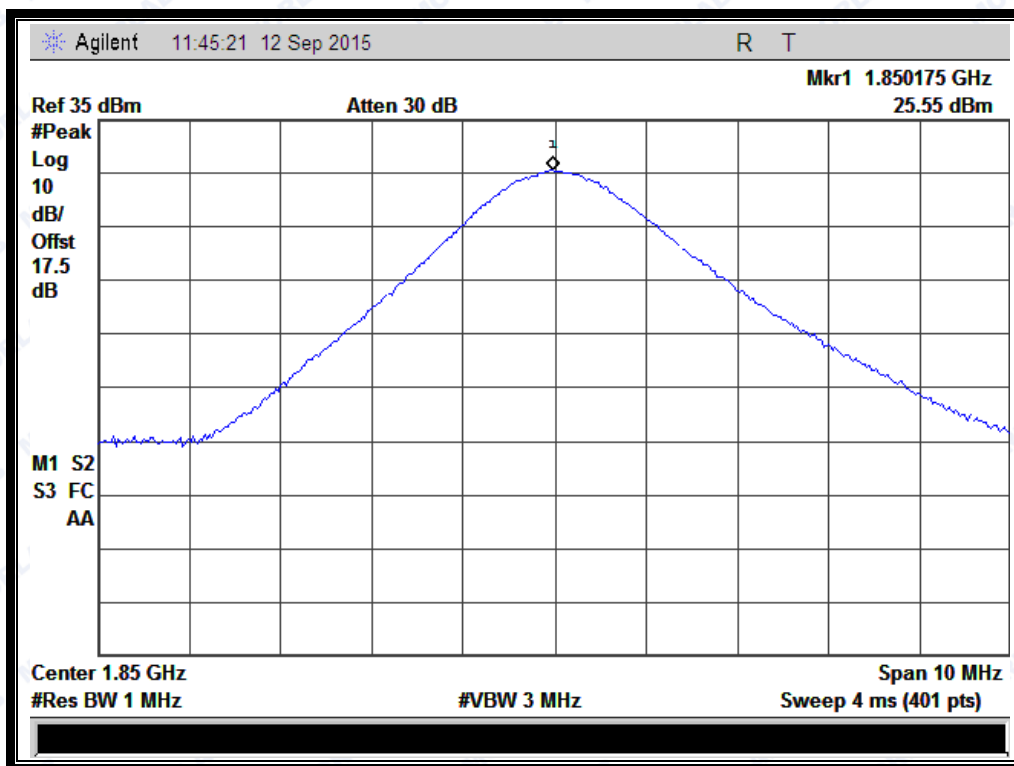
(Plot E2: EGPRS 850MHz Channel = 190)



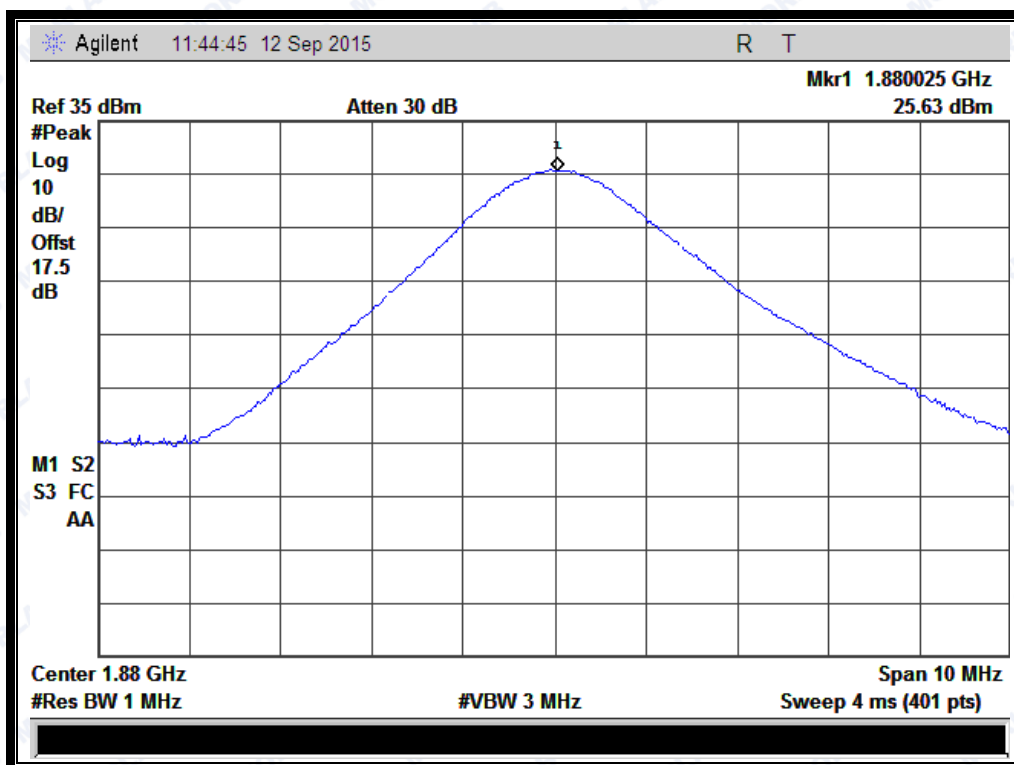
(Plot E3: EGPRS 850MHz Channel = 251)



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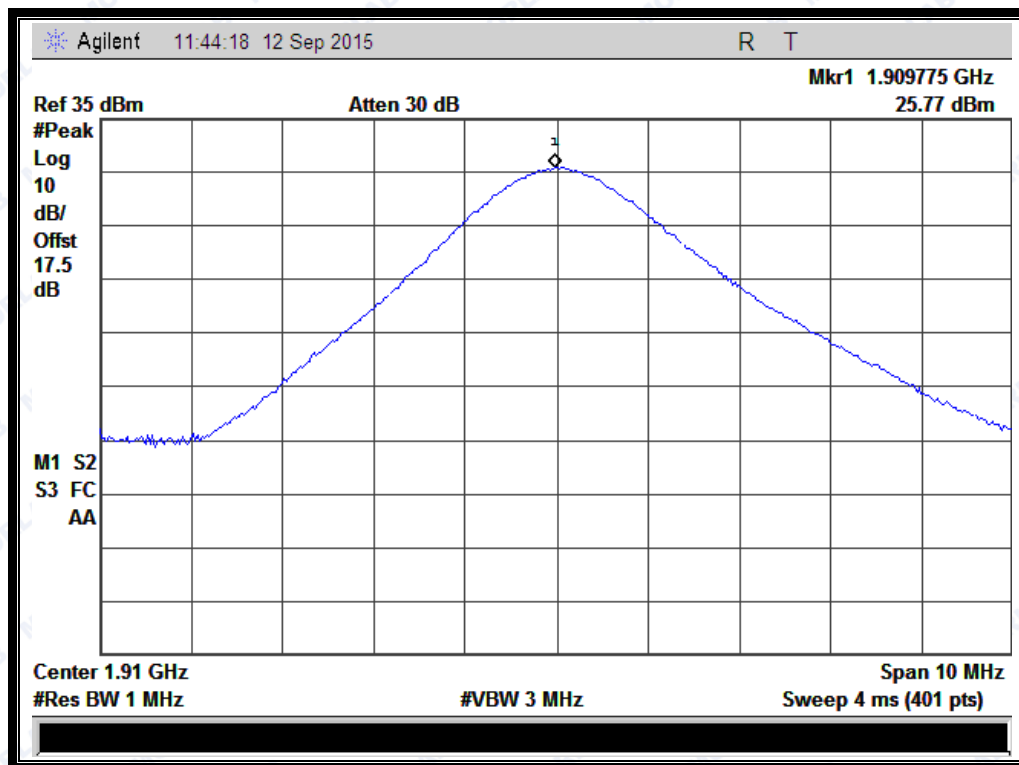
(Plot F1: EGPRS 1900MHz Channel = 512)



(Plot F2: EGPRS 1900MHz Channel = 661)



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(Plot F3: EGPRS 1900Hz Channel = 810)



## 2.2 Peak to Average Ratio

### 2.2.1 Definition

According to FCC section 2.1049 and FCC 24.232(d) the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 2.2.2 Test Description

See section 2.1.2 of this report.

### 2.2.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

A .For GSM/EGPRS operating mode:

- Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.
- Set EUT in maximum output power, and triggered the bust signal.
- Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

B. For UMTS operating mode:

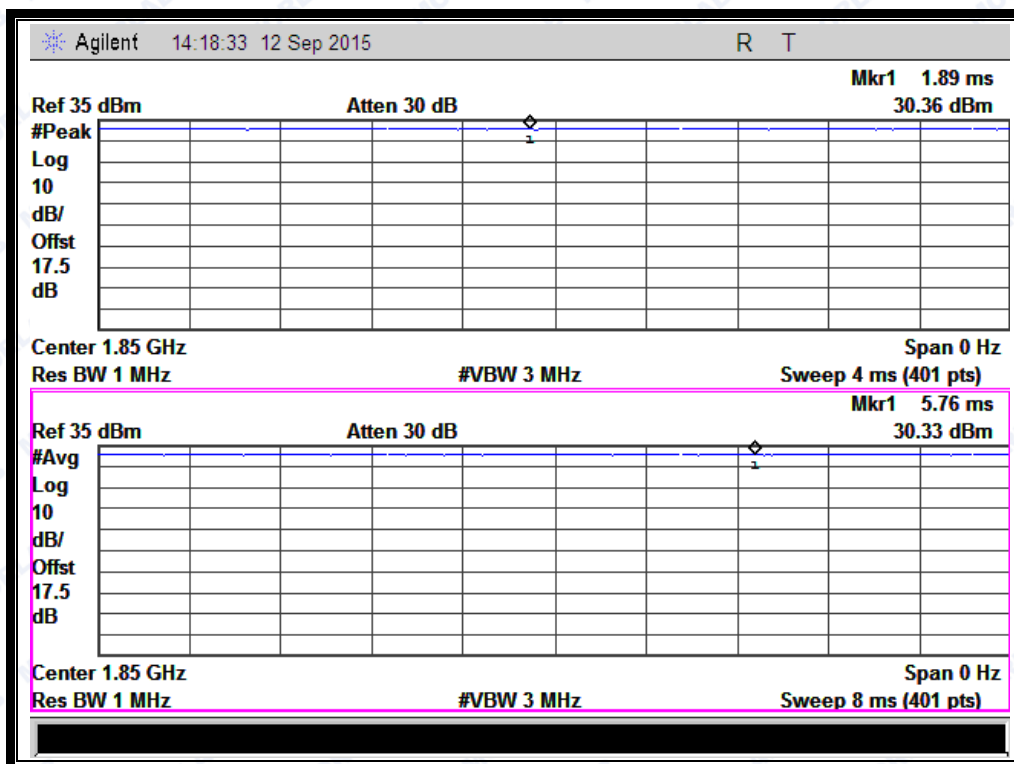
- Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
- The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

Test Verdict:

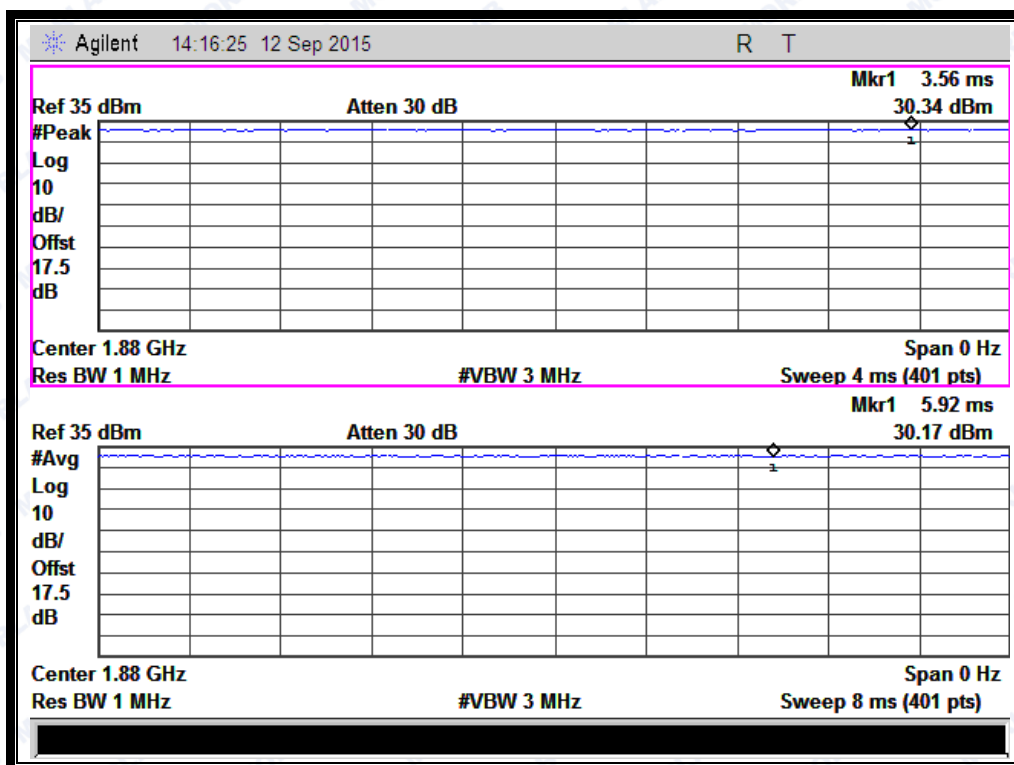
| Band             | Channel | Frequency<br>(MHz) | Peak to Average radio |               | Limit | Verdict |
|------------------|---------|--------------------|-----------------------|---------------|-------|---------|
|                  |         |                    | dB                    | Refer to Plot | dB    |         |
| GSM<br>1900MHz   | 512     | 1850.2             | 0.03                  | Plot A1 to A3 | 13    | PASS    |
|                  | 661     | 1880.0             | 0.17                  |               |       | PASS    |
|                  | 810     | 1909.8             | 0.05                  |               |       | PASS    |
| EGPRS<br>1900MHz | 512     | 1850.2             | 0.10                  | Plot B1 to B3 | 13    | PASS    |
|                  | 661     | 1880.0             | 0.21                  |               |       | PASS    |
|                  | 810     | 1909.8             | 0.04                  |               |       | PASS    |
| WCDMA<br>1900MHz | 9262    | 1852.4             | 2.92                  | Plot C1 to C3 | 13    | PASS    |
|                  | 9400    | 1880.0             | 3.00                  |               |       | PASS    |
|                  | 9538    | 1907.6             | 3.04                  |               |       | PASS    |



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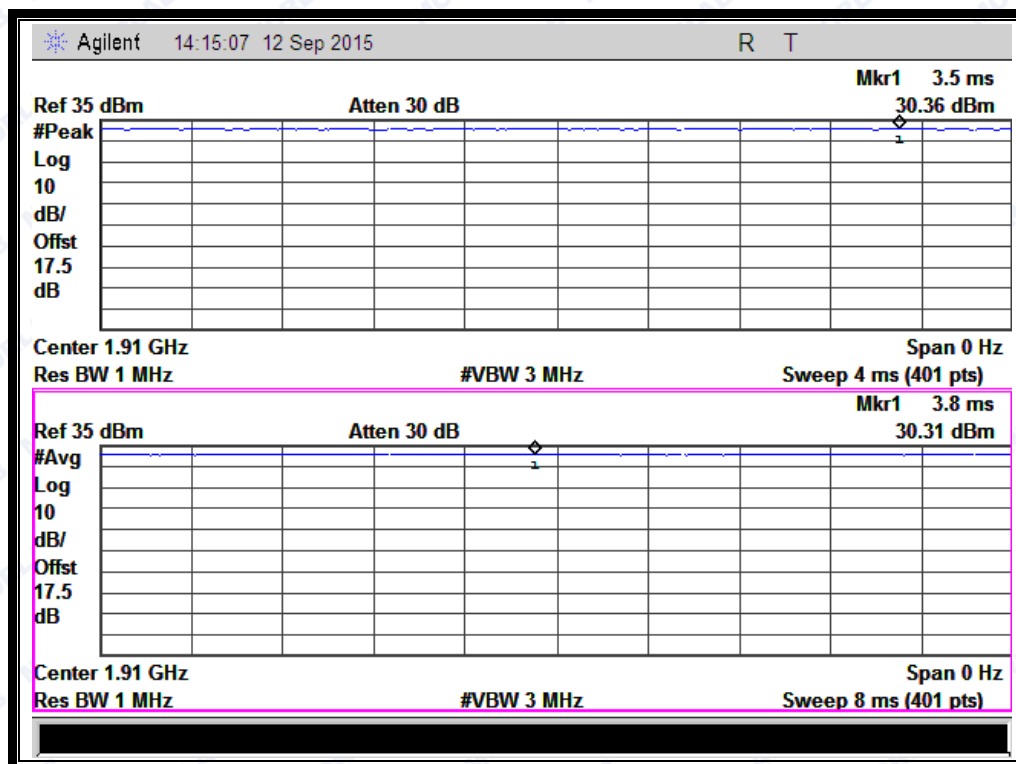
(Plot A1: GSM 1900 MHz Channel = 512)



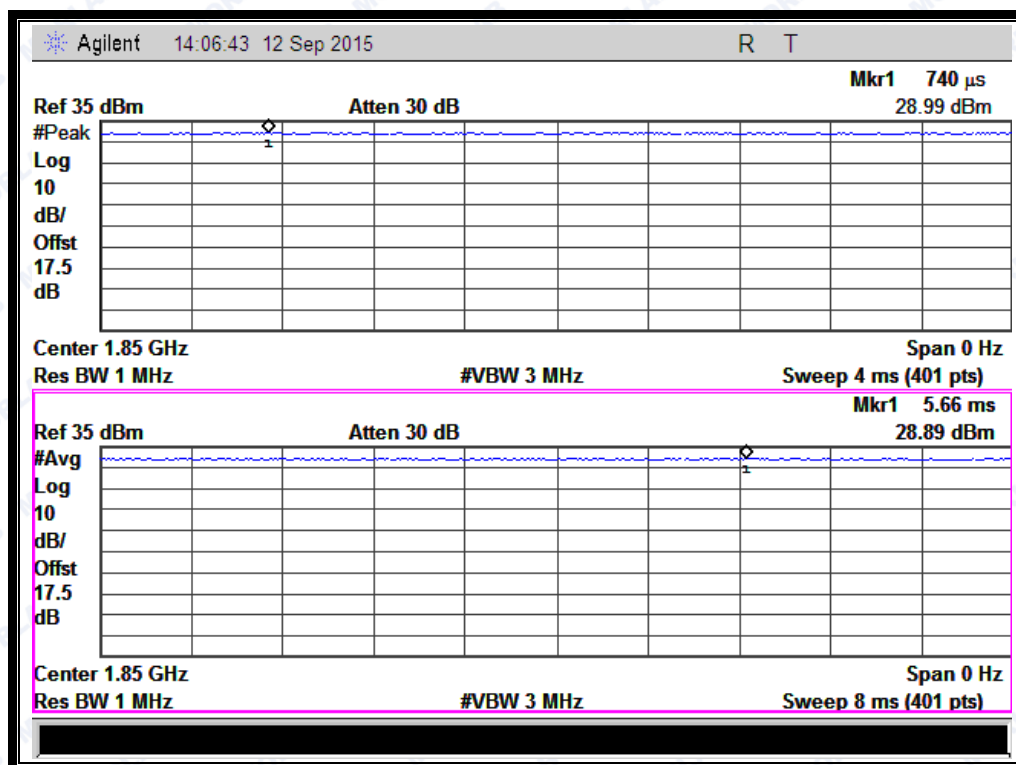
(Plot A2: GSM 1900 MHz Channel = 661)



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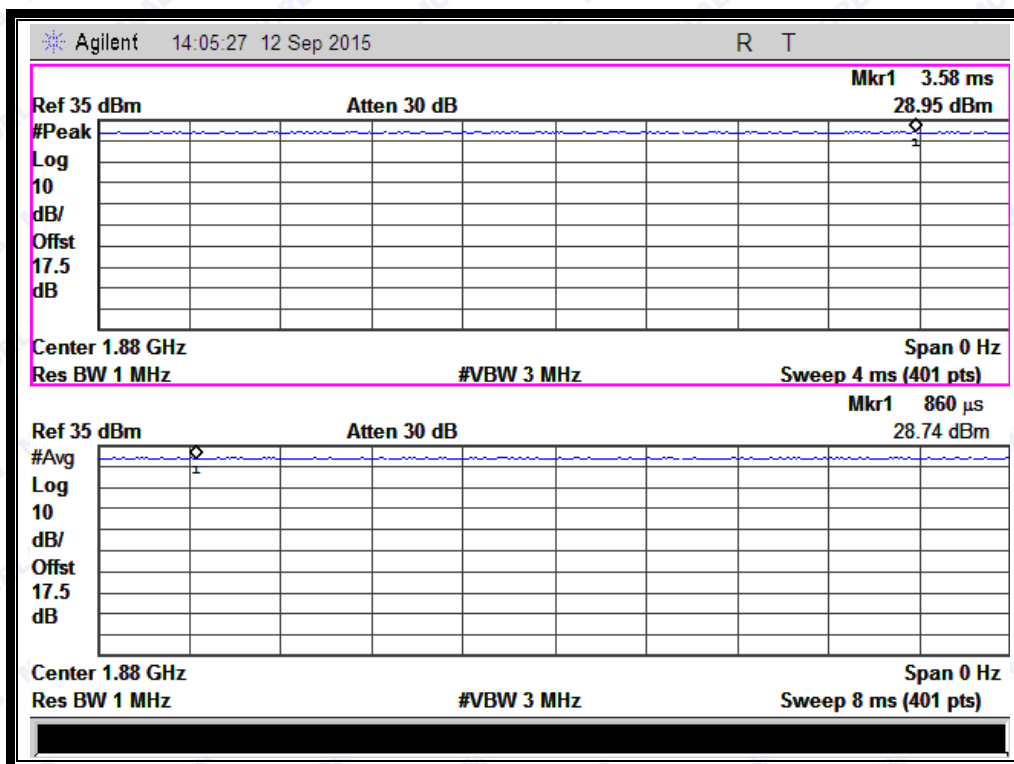
(Plot A3: GSM 1900MHz Channel = 810)



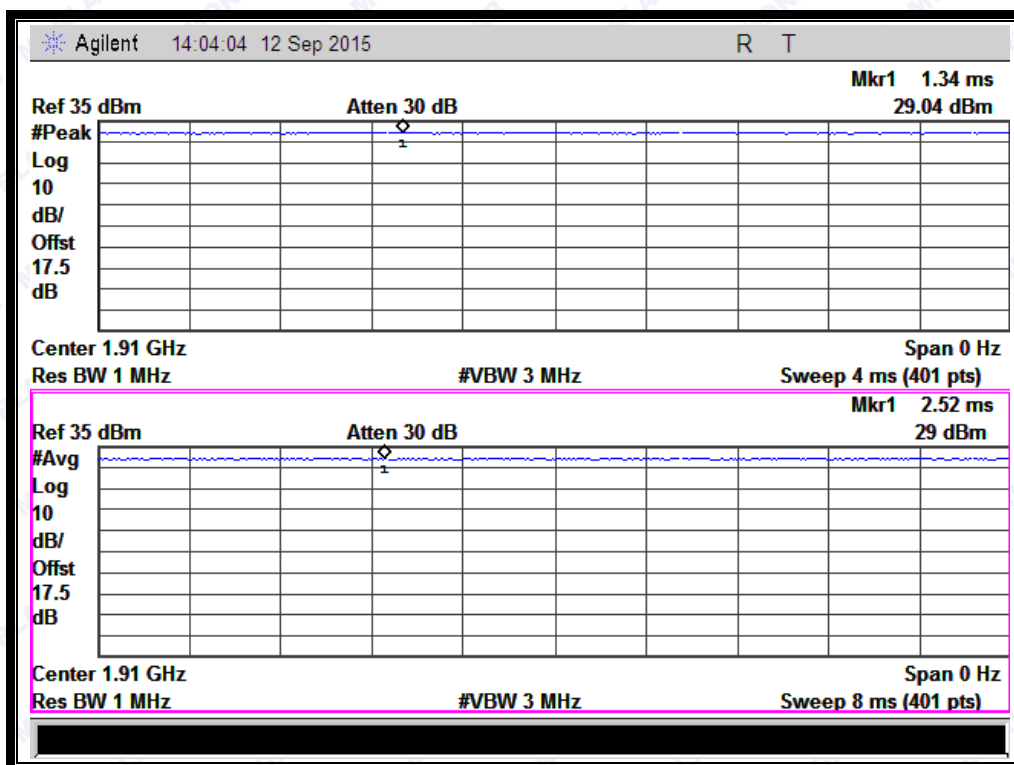
(Plot B1: EGPRS 1900 MHz Channel = 512)



REPORT No.: SZ15090021W01



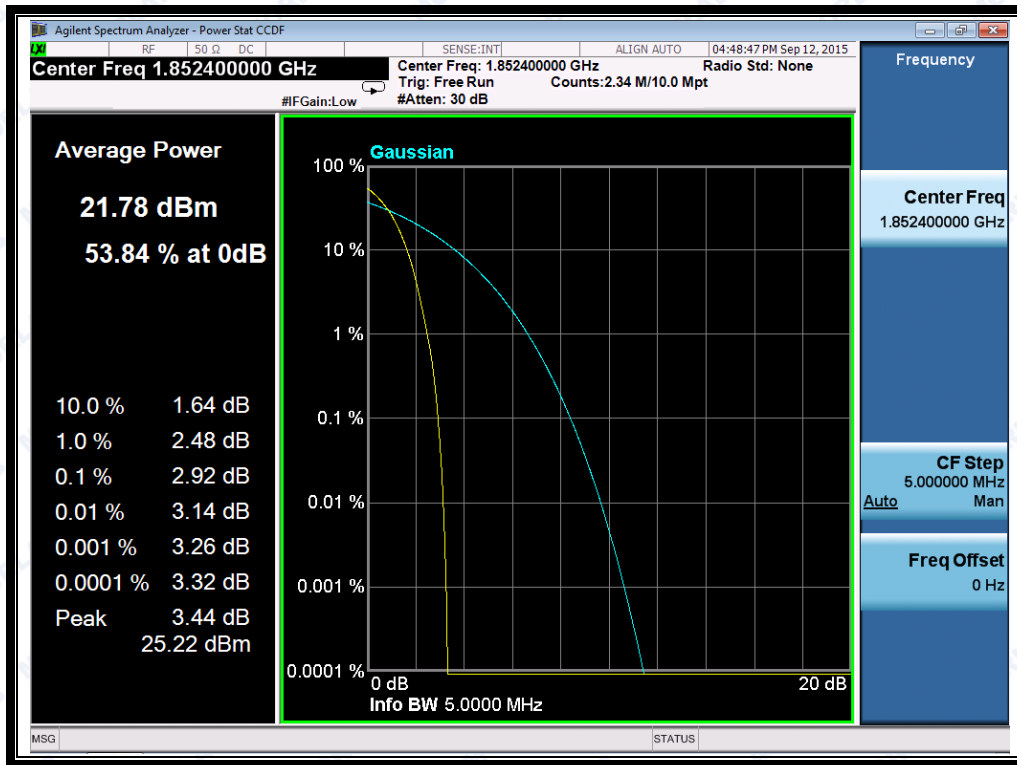
(Plot B2: EGPRS 1900 MHz Channel = 661)



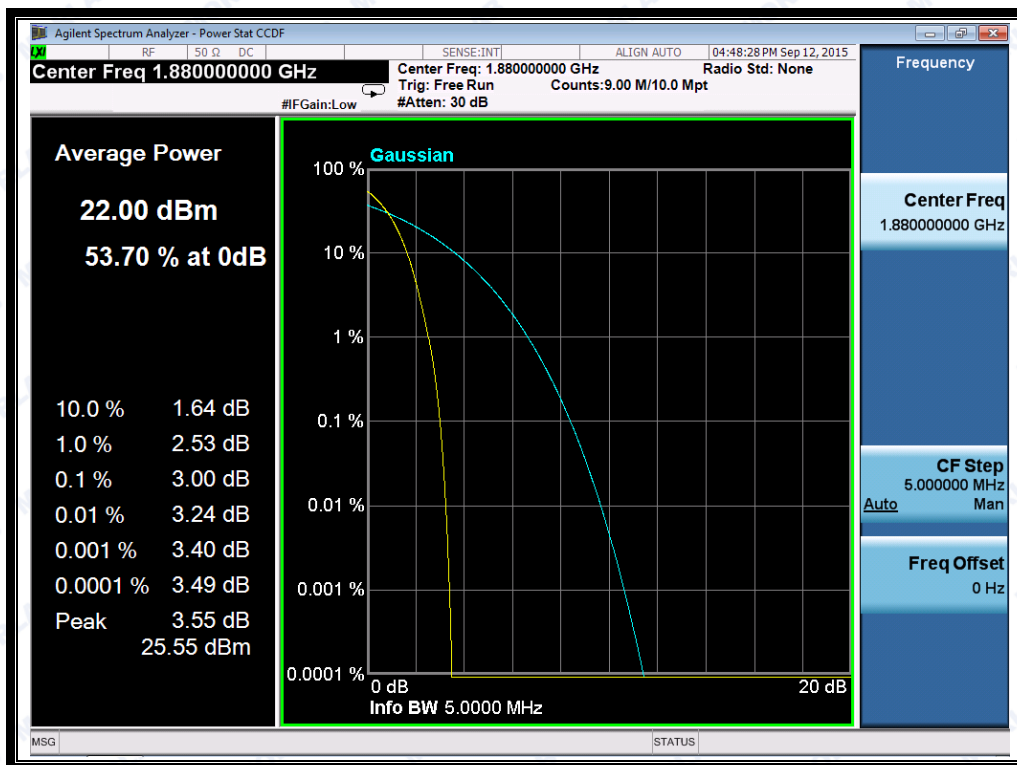
(Plot B3: EGPRS 1900MHz Channel = 810)



REPORT No.: SZ15090021W01



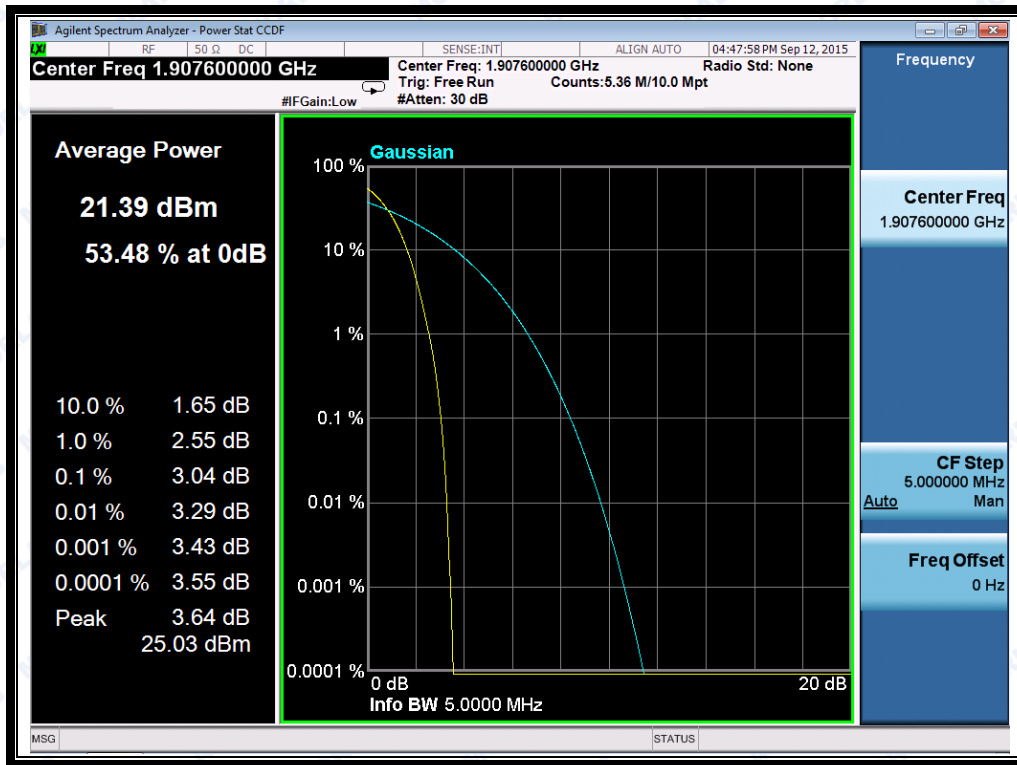
(Plot C1: WCDMA 1900MHz Channel = 9262)



(Plot C2: WCDMA 1900MHz Channel = 9400)



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(Plot C3: WCDMA 1900MHz Channel = 9538)



## 2.3 99% Occupied Bandwidth

### 2.3.1 Definition

According to FCC section 2.1049 and FCC § 22.917 & 24.238, the occupied bandwidth 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 radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

### 2.3.2 Test Description

See section 2.1.2 of this report.

### 2.3.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

Test Verdict:

| Band          | Channel | Frequency (MHz) | 26dB bandwidth | 99% Occupied Bandwidth | Refer to Plot |
|---------------|---------|-----------------|----------------|------------------------|---------------|
| GSM 850MHz    | 128     | 824.2           | 309.162 KHz    | 240.4074 KHz           | Plot A1 to A3 |
|               | 190     | 836.6           | 307.036 KHz    | 239.6530 KHz           |               |
|               | 251     | 848.8           | 309.218 KHz    | 241.4378 KHz           |               |
| GSM 1900MHz   | 512     | 1850.2          | 309.421 KHz    | 238.1488 KHz           | Plot B1 to B3 |
|               | 661     | 1880.0          | 309.900 KHz    | 238.6998 KHz           |               |
|               | 810     | 1909.8          | 306.990 KHz    | 239.0182 KHz           |               |
| GPRS 850MHz   | 128     | 824.2           | 323.942 KHz    | 247.5856 KHz           | Plot C1 to C3 |
|               | 190     | 836.6           | 321.851 KHz    | 244.5518 KHz           |               |
|               | 251     | 848.8           | 318.608 KHz    | 244.8062 KHz           |               |
| GPRS 1900MHz  | 512     | 1850.2          | 320.614 KHz    | 246.5857 KHz           | Plot D1 to D3 |
|               | 661     | 1880.0          | 320.061 KHz    | 246.8731 KHz           |               |
|               | 810     | 1909.8          | 321.416 KHz    | 243.3120 KHz           |               |
| EGPRS 850MHz  | 128     | 824.2           | 322.865 KHz    | 254.1257 KHz           | Plot E1 to E3 |
|               | 190     | 836.6           | 319.402 KHz    | 245.9465 KHz           |               |
|               | 251     | 848.8           | 320.105 KHz    | 251.7809 KHz           |               |
| EGPRS 1900MHz | 512     | 1850.2          | 328.697 KHz    | 249.2528 KHz           | Plot F1 to F3 |
|               | 661     | 1880.0          | 322.391 KHz    | 247.8301 KHz           |               |
|               | 810     | 1909.8          | 329.605 KHz    | 255.5700 KHz           |               |
| WCDMA 850MHz  | 4132    | 826.4           | 4.628 MHz      | 4.1417 MHz             | Plot G1 to G3 |
|               | 4175    | 835.0           | 4.624 MHz      | 4.1585 MHz             |               |
|               | 4233    | 846.6           | 4.628 MHz      | 4.1406 MHz             |               |



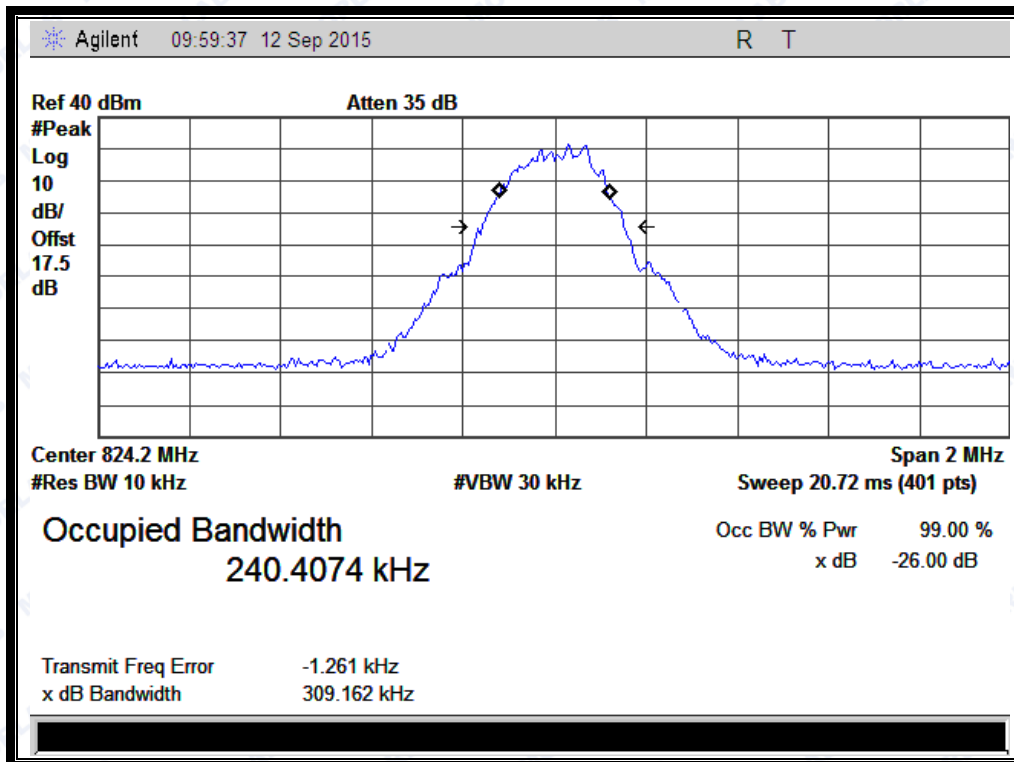
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| Band             | Channel | Frequency (MHz) | 26dB bandwidth | 99% Occupied Bandwidth | Refer to Plot    |
|------------------|---------|-----------------|----------------|------------------------|------------------|
| WCDMA<br>1900MHz | 9262    | 1852.4          | 4.643 MHz      | 4.1445 MHz             | Plot<br>H1 to H3 |
|                  | 9400    | 1880.0          | 4.629 MHz      | 4.1433 MHz             |                  |
|                  | 9538    | 1907.6          | 4.640 MHz      | 4.1383 MHz             |                  |
| HSDPA<br>850MHz  | 4132    | 826.4           | 4.632 MHz      | 4.1485 MHz             | Plot<br>I1 to I3 |
|                  | 4175    | 835.0           | 4.636 MHz      | 4.1581 MHz             |                  |
|                  | 4233    | 846.6           | 4.636 MHz      | 4.1484 MHz             |                  |
| HSDPA<br>1900MHz | 9262    | 1852.4          | 4.630 MHz      | 4.1689 MHz             | Plot<br>J1 to J3 |
|                  | 9400    | 1880.0          | 4.644 MHz      | 4.1485 MHz             |                  |
|                  | 9538    | 1907.6          | 4.628 MHz      | 4.1455 MHz             |                  |
| HSUPA<br>850MHz  | 4132    | 826.4           | 4.625 MHz      | 4.1361 MHz             | Plot<br>K1 to K3 |
|                  | 4175    | 835.0           | 4.629 MHz      | 4.1506 MHz             |                  |
|                  | 4233    | 846.6           | 4.626 MHz      | 4.1225 MHz             |                  |
| HSUPA<br>1900MHz | 9262    | 1852.4          | 4.641 MHz      | 4.1295 MHz             | Plot<br>L1 to L3 |
|                  | 9400    | 1880.0          | 4.632 MHz      | 4.1301 MHz             |                  |
|                  | 9538    | 1907.6          | 4.631 MHz      | 4.1446 MHz             |                  |
| HSPA+<br>850MHz  | 4132    | 826.4           | 4.628 MHz      | 4.1390 MHz             | Plot<br>M1 to M3 |
|                  | 4175    | 835.0           | 4.631 MHz      | 4.1622 MHz             |                  |
|                  | 4233    | 846.6           | 4.627 MHz      | 4.1436 MHz             |                  |
| HSPA+<br>1900MHz | 9262    | 1852.4          | 4.646 MHz      | 4.1540 MHz             | Plot<br>N1 to N3 |
|                  | 9400    | 1880.0          | 4.639 MHz      | 4.1364 MHz             |                  |
|                  | 9538    | 1907.6          | 4.639 MHz      | 4.1496 MHz             |                  |

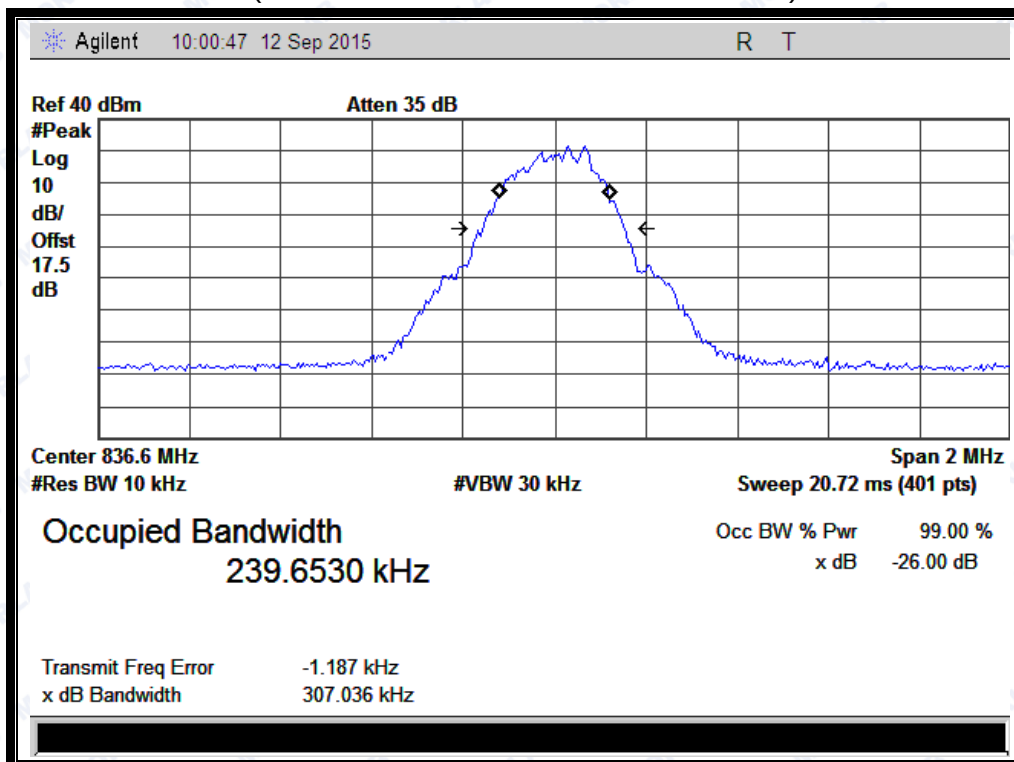


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Test Plots:



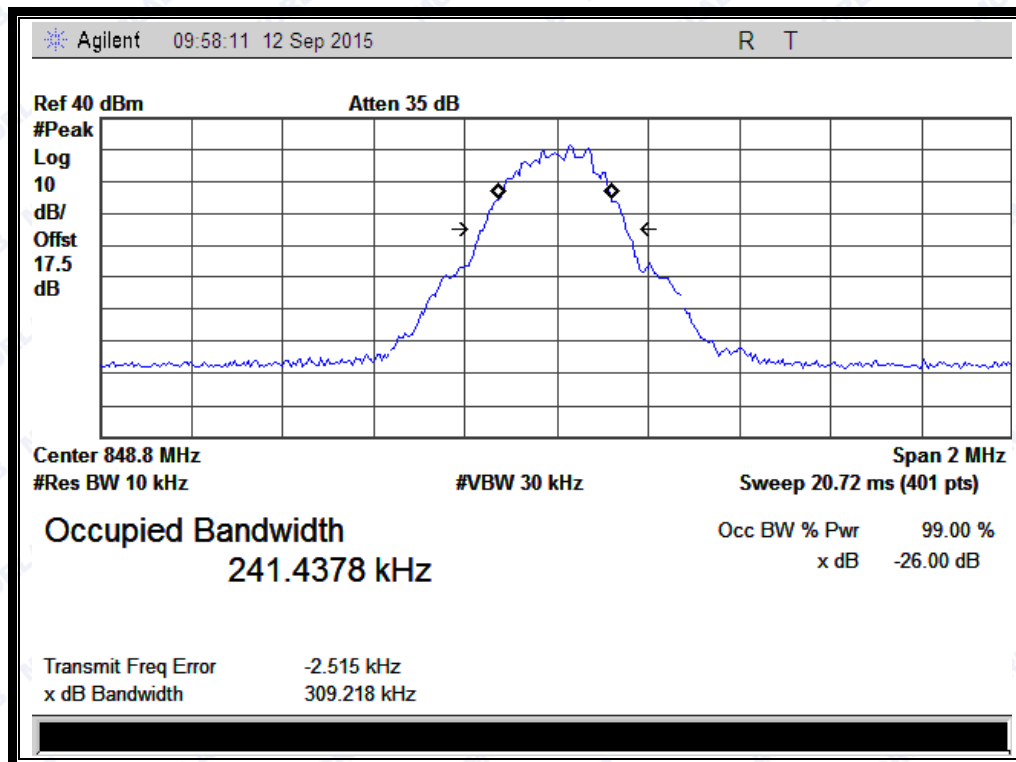
(Plot A1: GSM 850MHz Channel = 128)



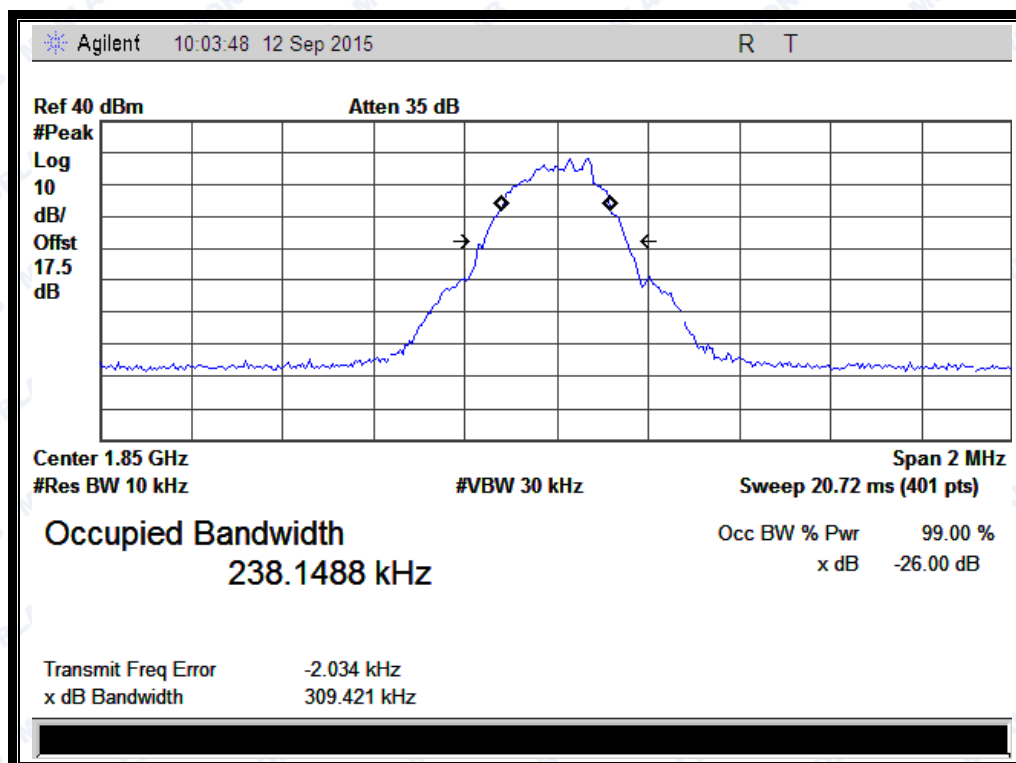
(Plot A2: GSM 850MHz Channel = 190)



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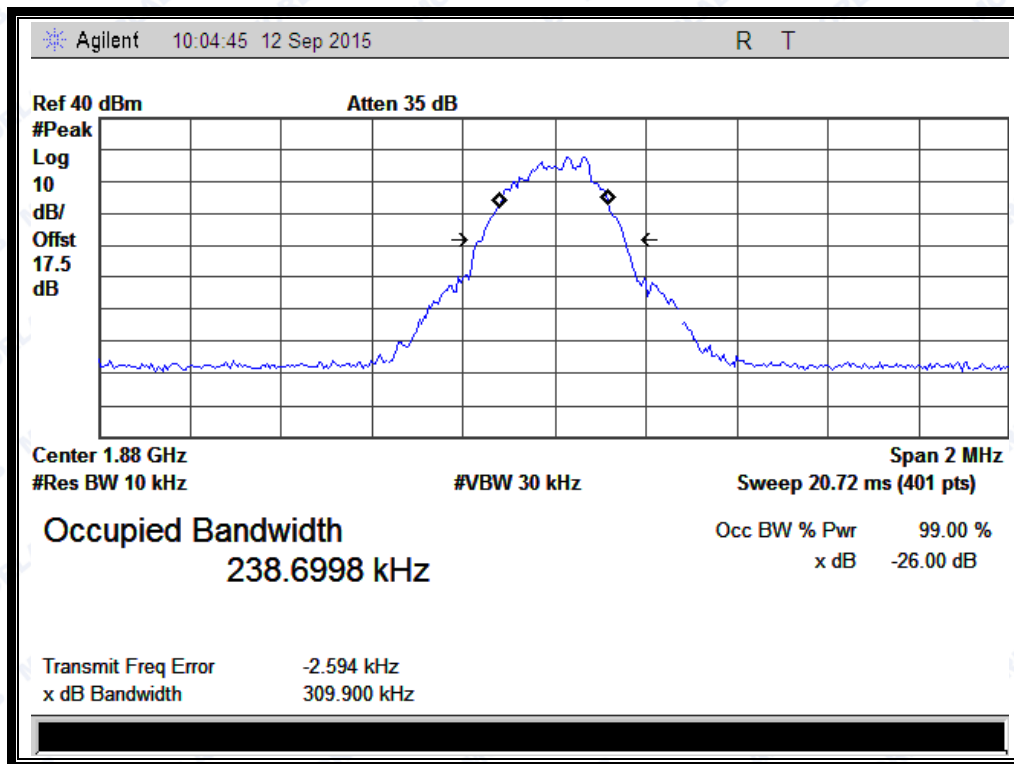
(Plot A3: GSM 850MHz Channel = 251)



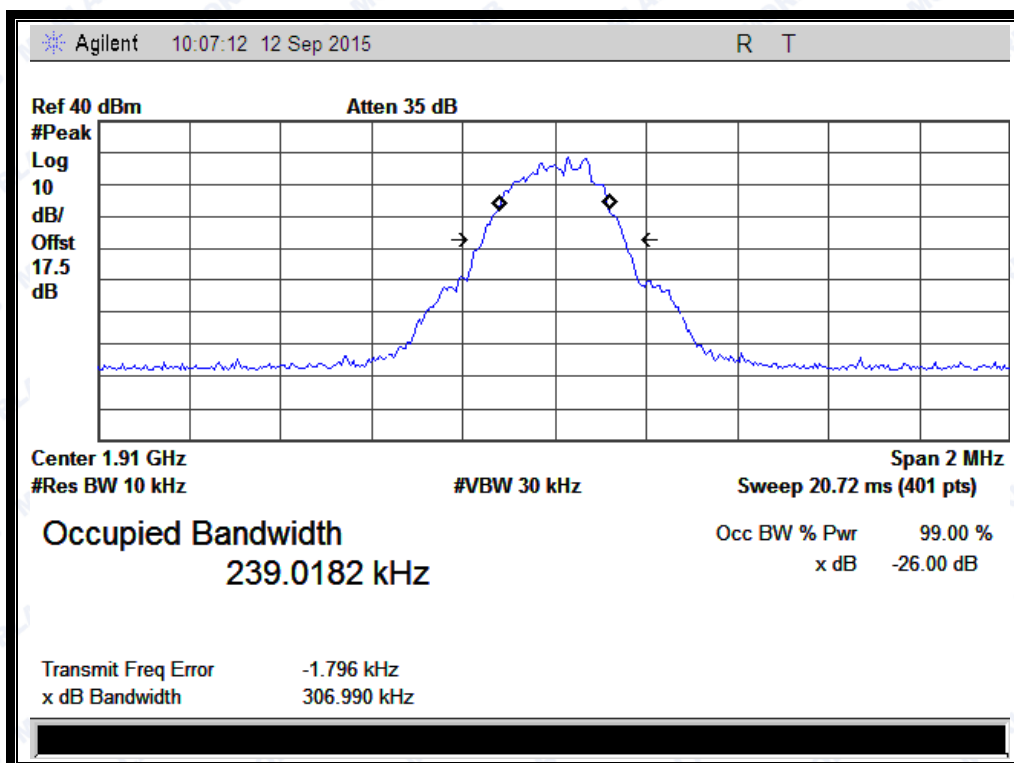
(Plot B1: GSM1900MHz Channel = 512)



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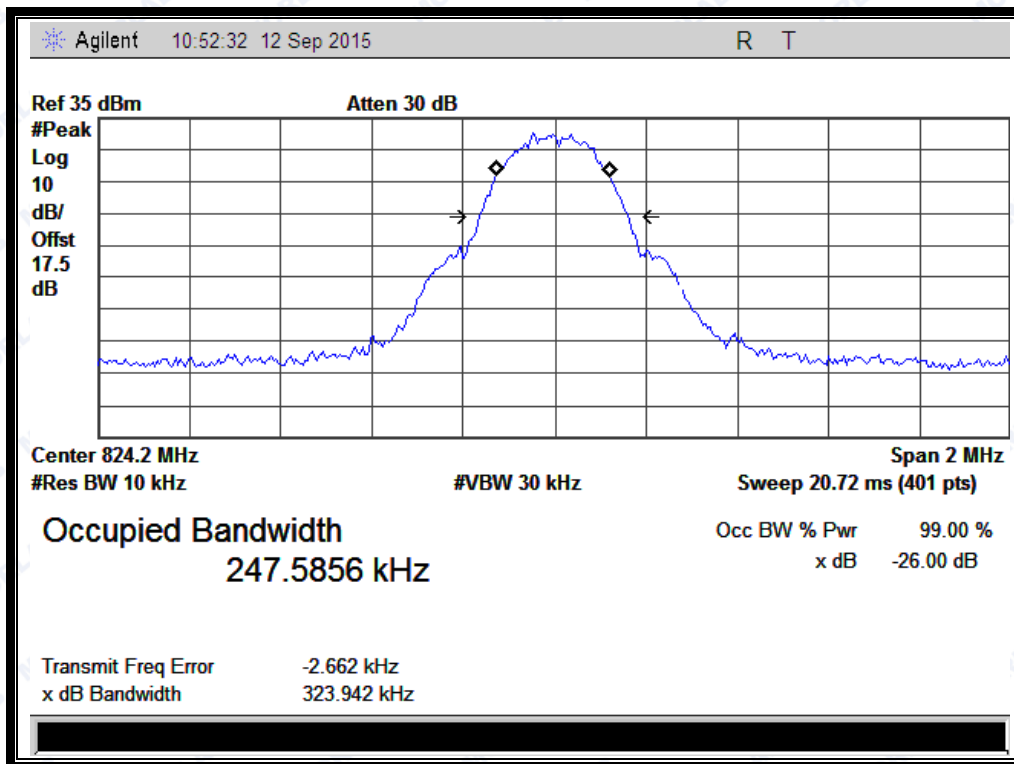
(Plot B2: GSM1900MHz Channel = 661)



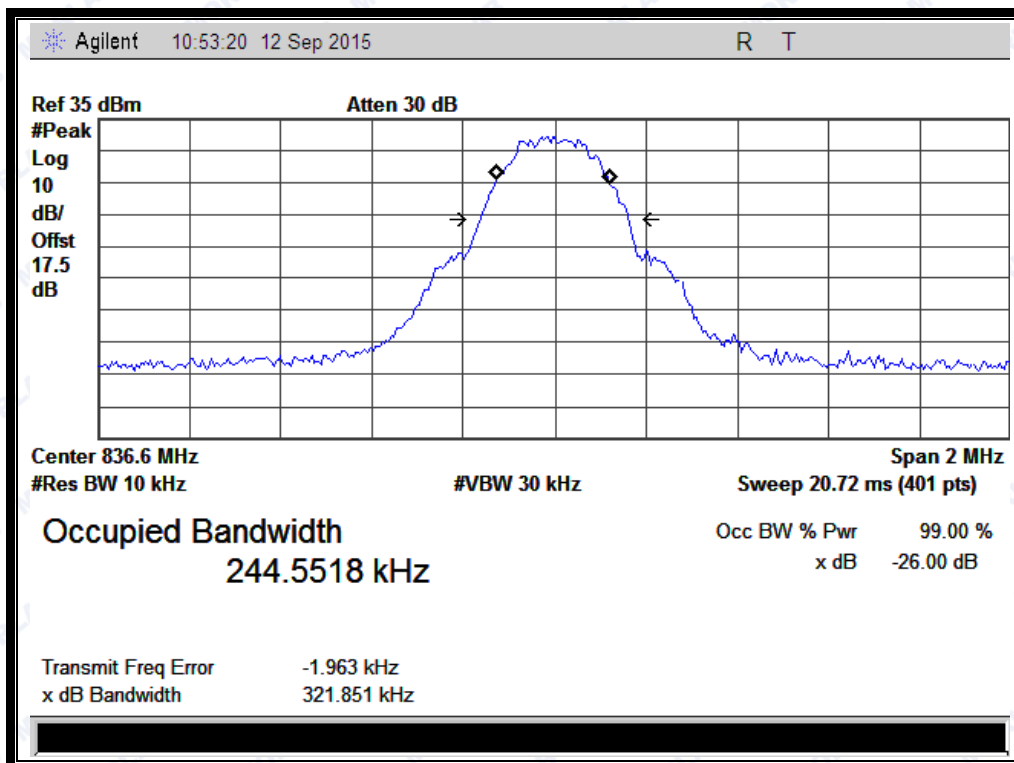
(Plot B3: GSM 1900MHz Channel = 810)



REPORT No.: SZ15090021W01



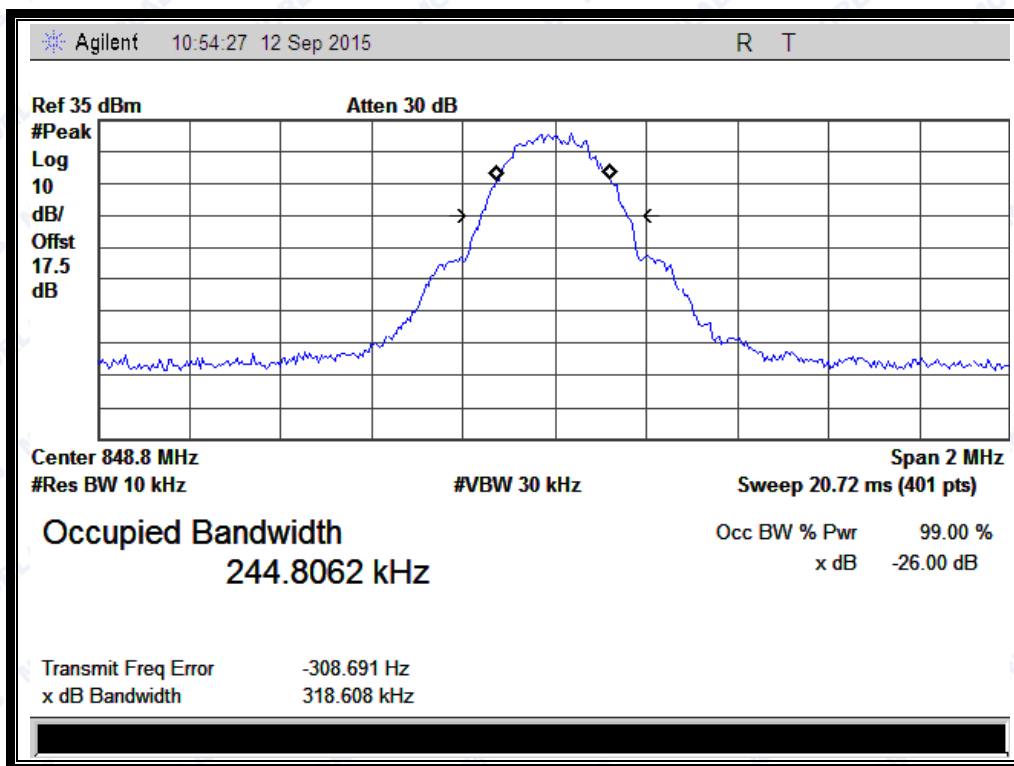
(Plot C1: GPRS 850MHz Channel = 128)



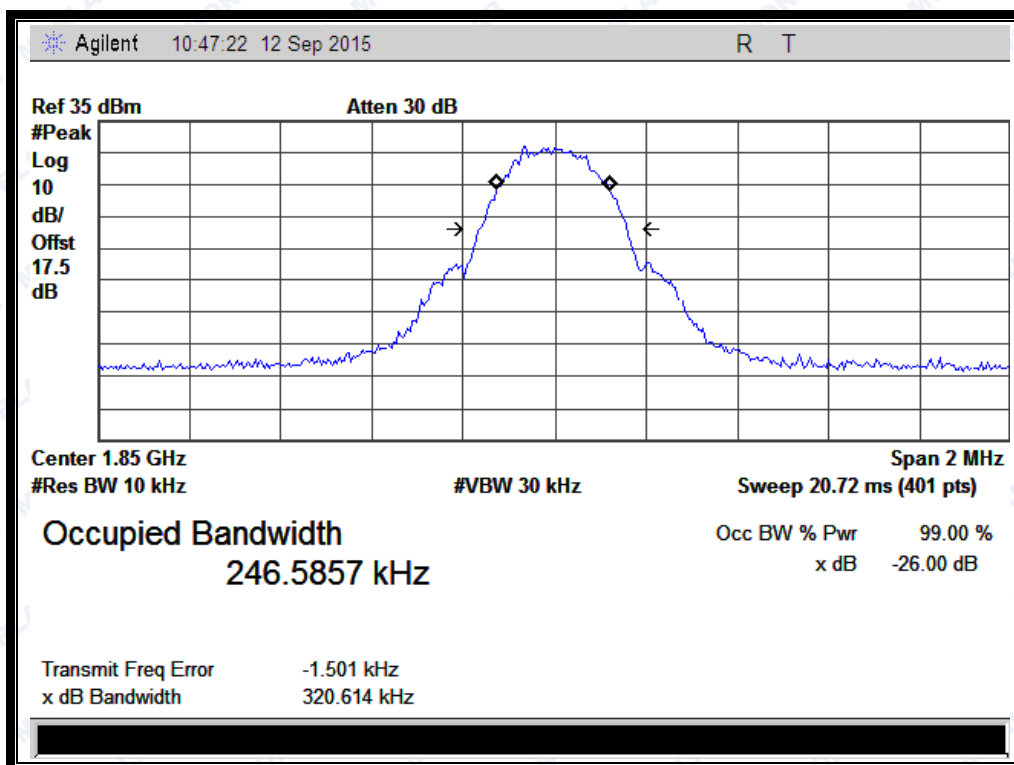
(Plot C2: GPRS 850MHz Channel = 190)



REPORT No.: SZ15090021W01



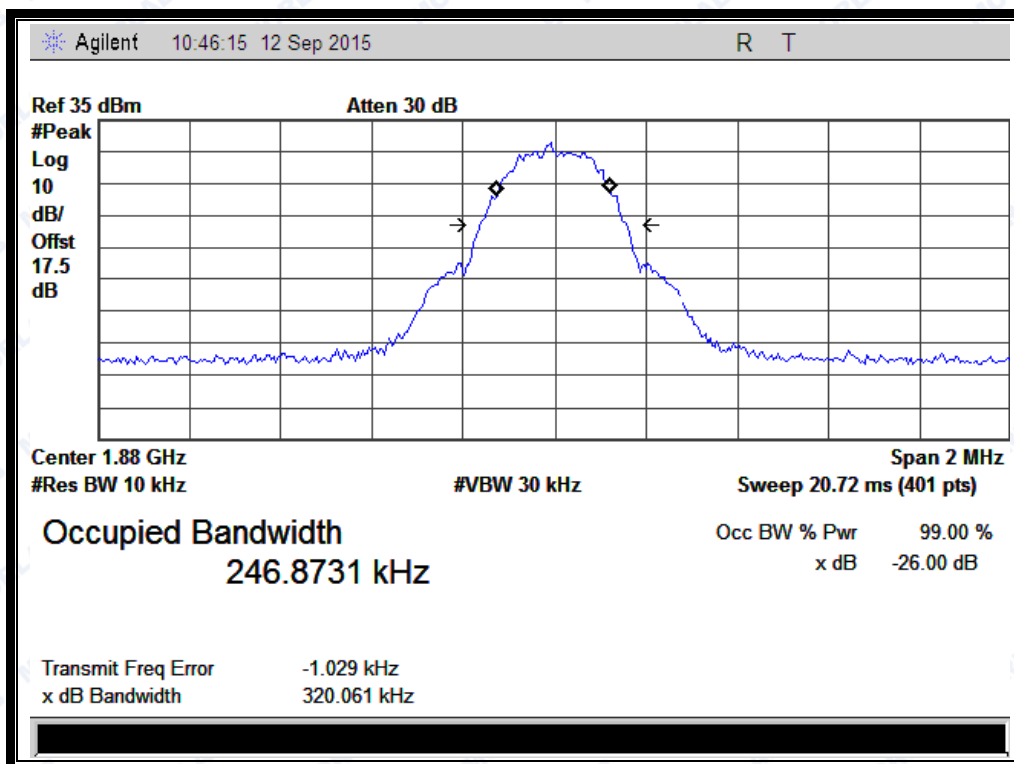
(Plot C3: GPRS 850MHz Channel = 251)



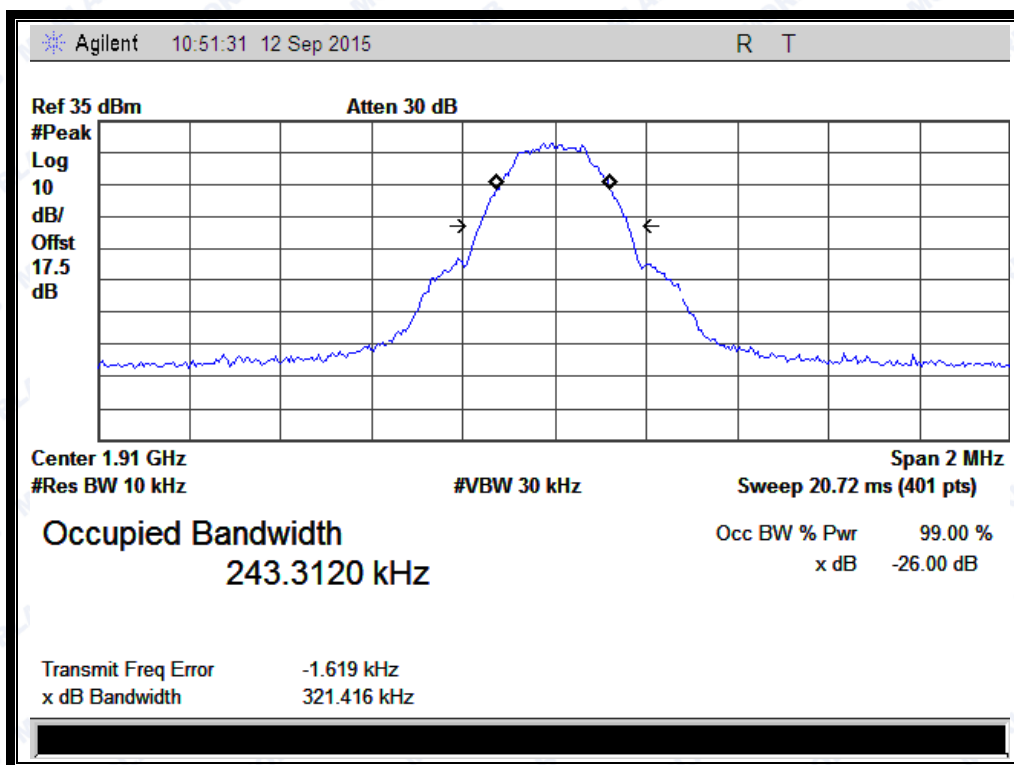
(Plot D1: GPRS1900MHz Channel = 512)



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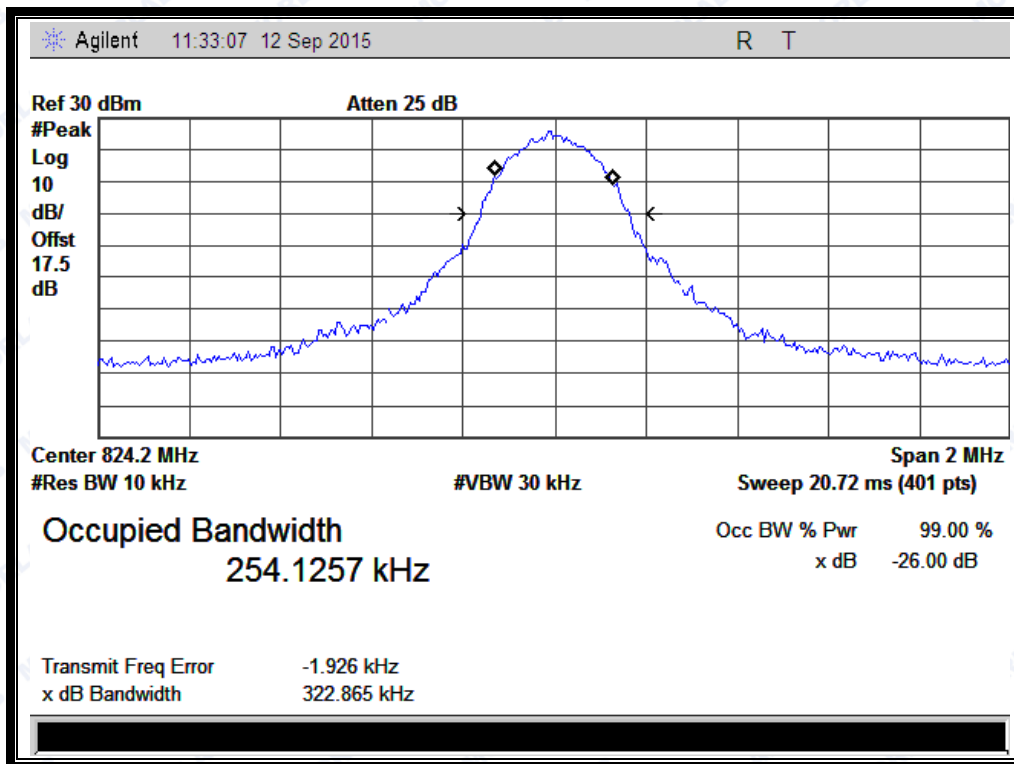
(Plot D2: GPRS1900MHz Channel = 661)



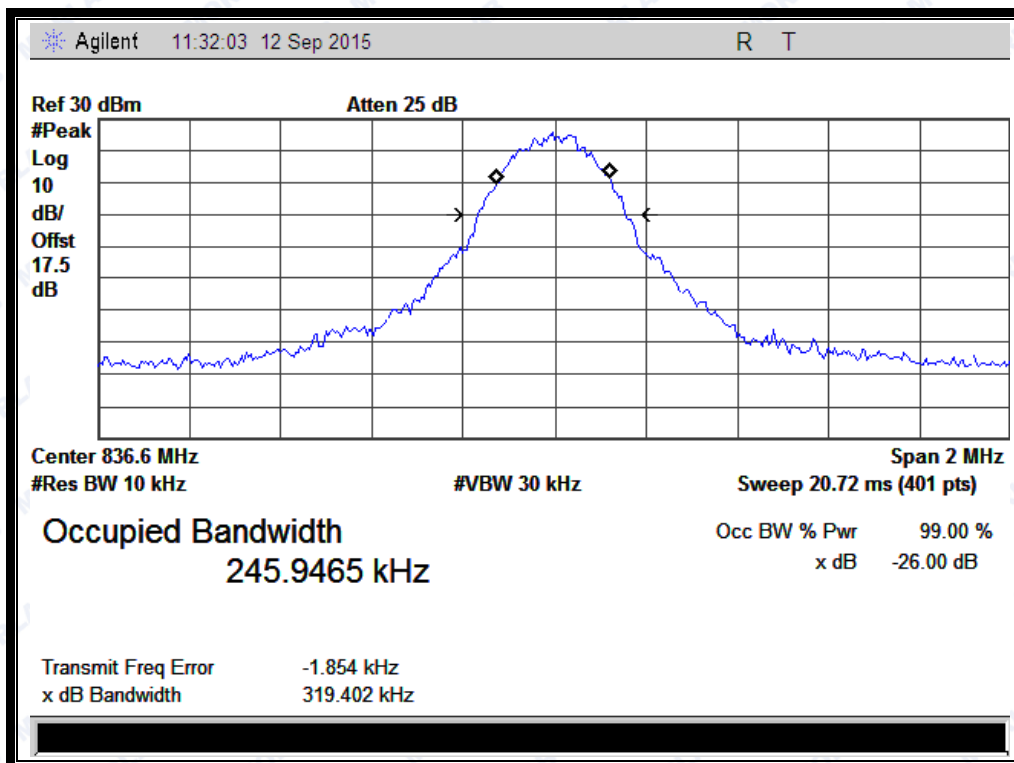
(Plot D3: GPRS 1900MHz Channel = 810)



REPORT No.: SZ15090021W01



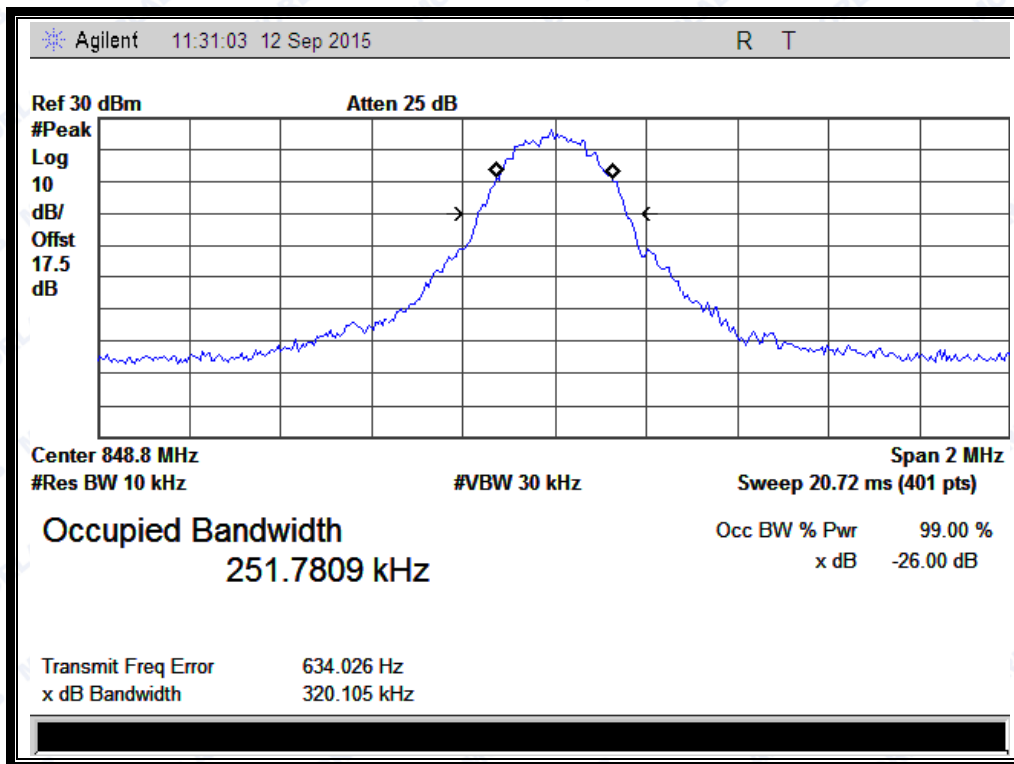
(Plot E1: EGPRS 850MHz Channel = 128)



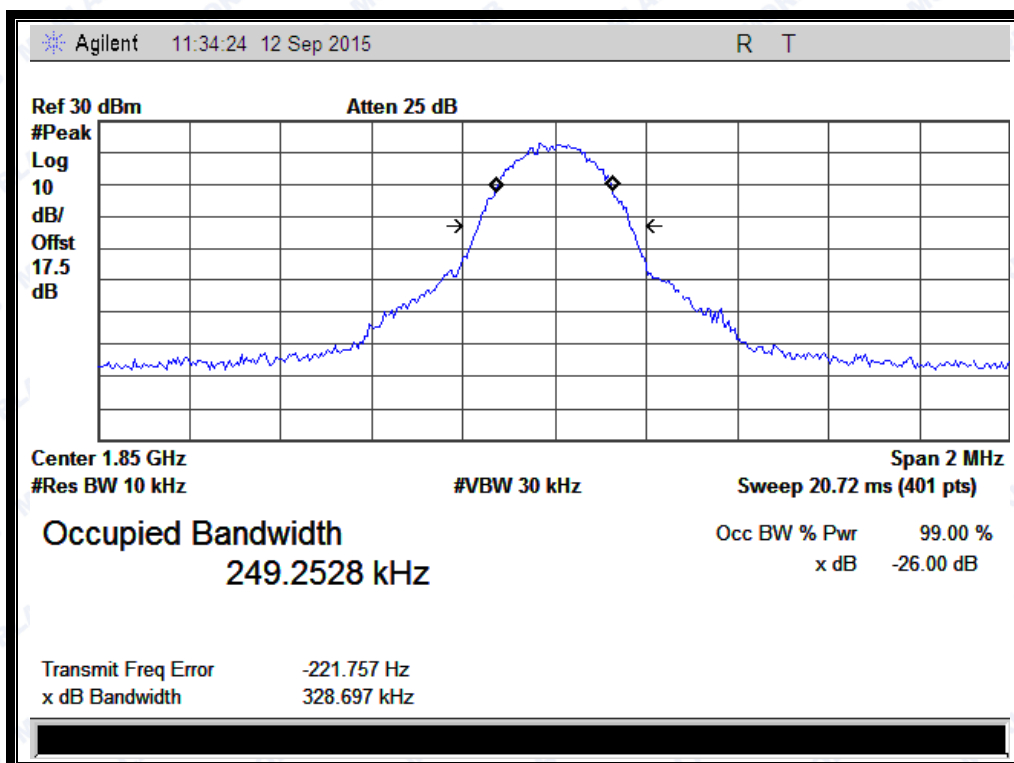
(Plot E2: EGPRS 850MHz Channel = 190)



REPORT No.: SZ15090021W01



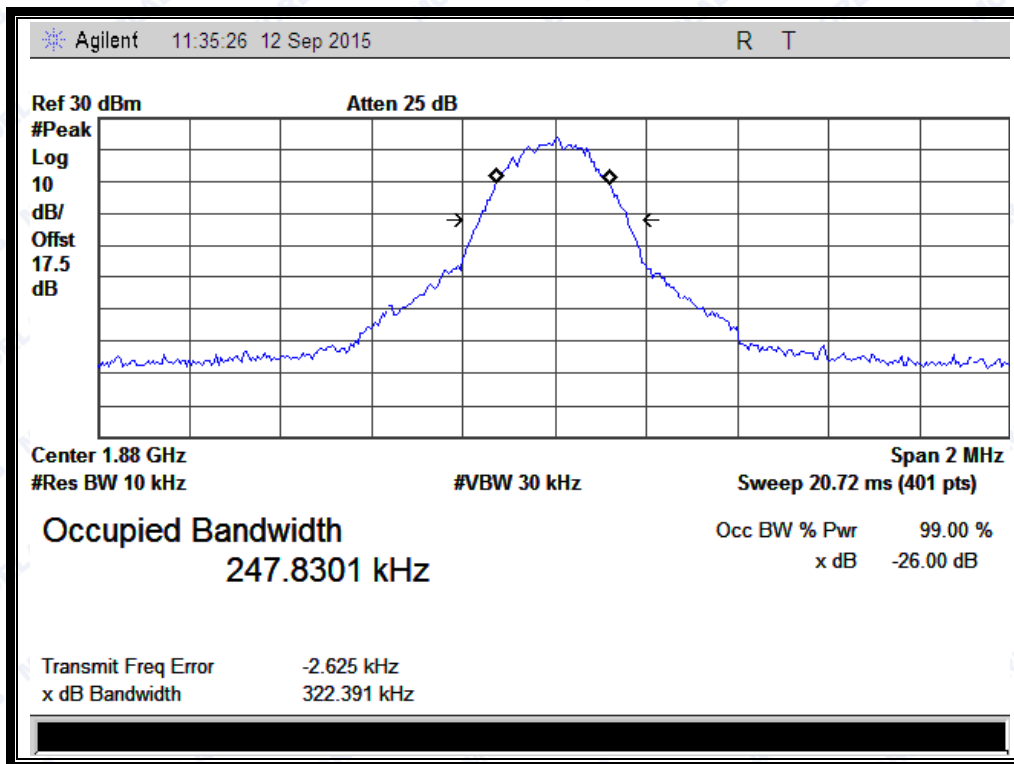
(Plot E3: EGPRS 850MHz Channel = 251)



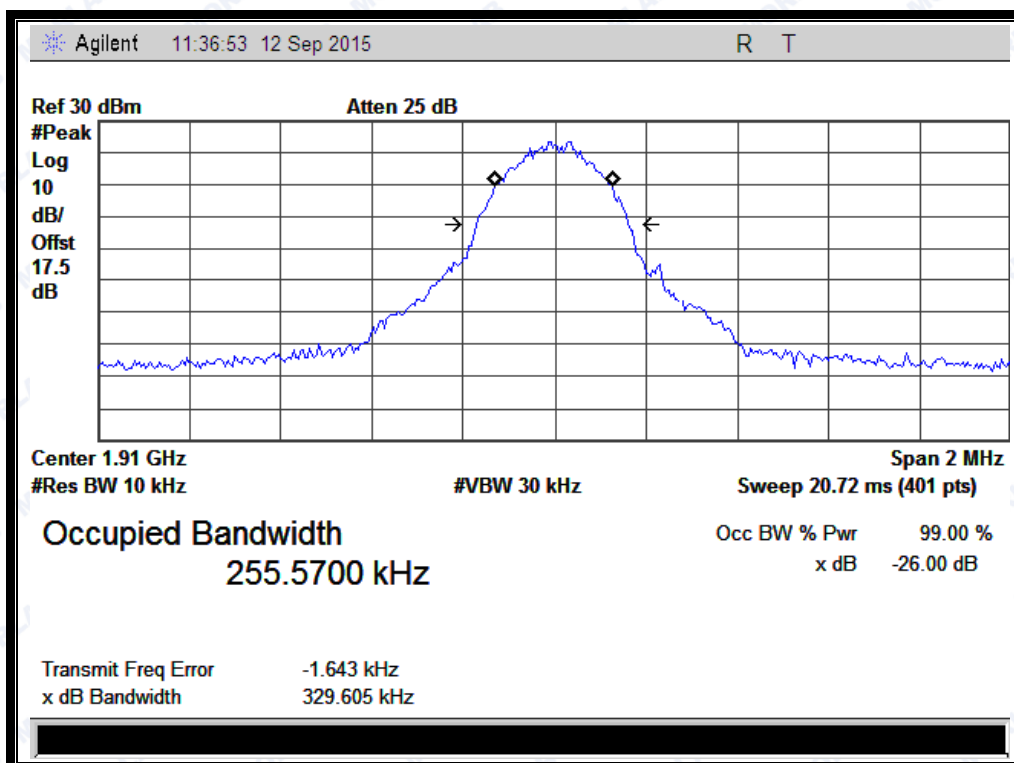
(Plot F1: EGPRS1900MHz Channel = 512)



REPORT No.: SZ15090021W01



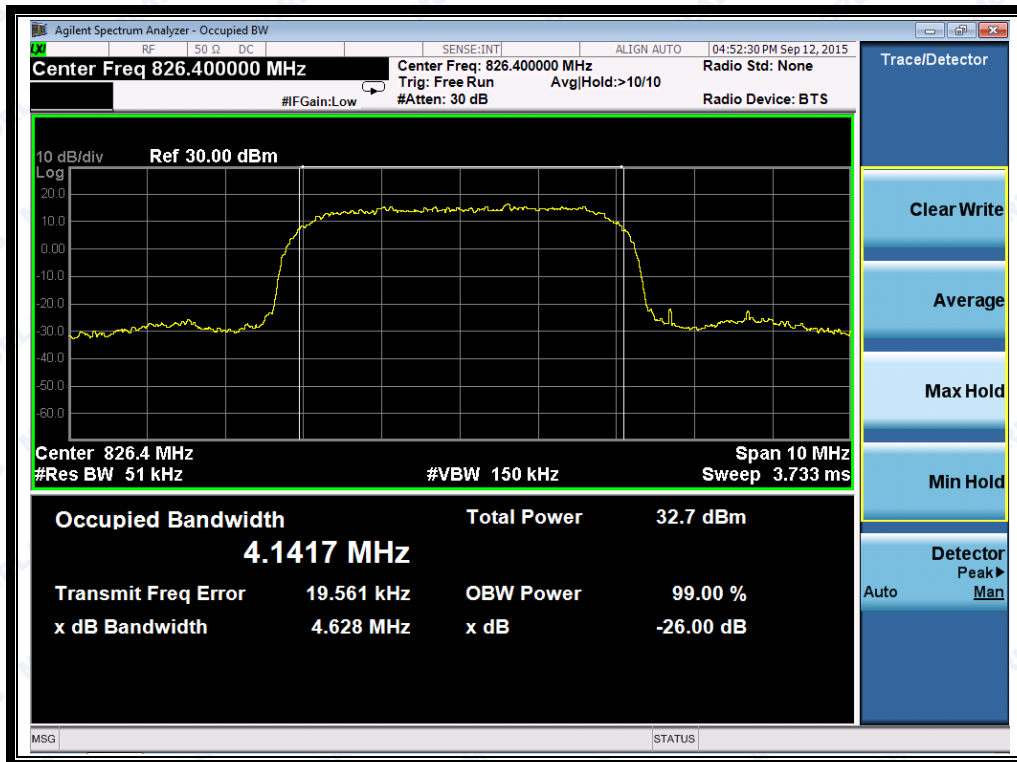
(Plot F2: EGPRS1900MHz Channel = 661)



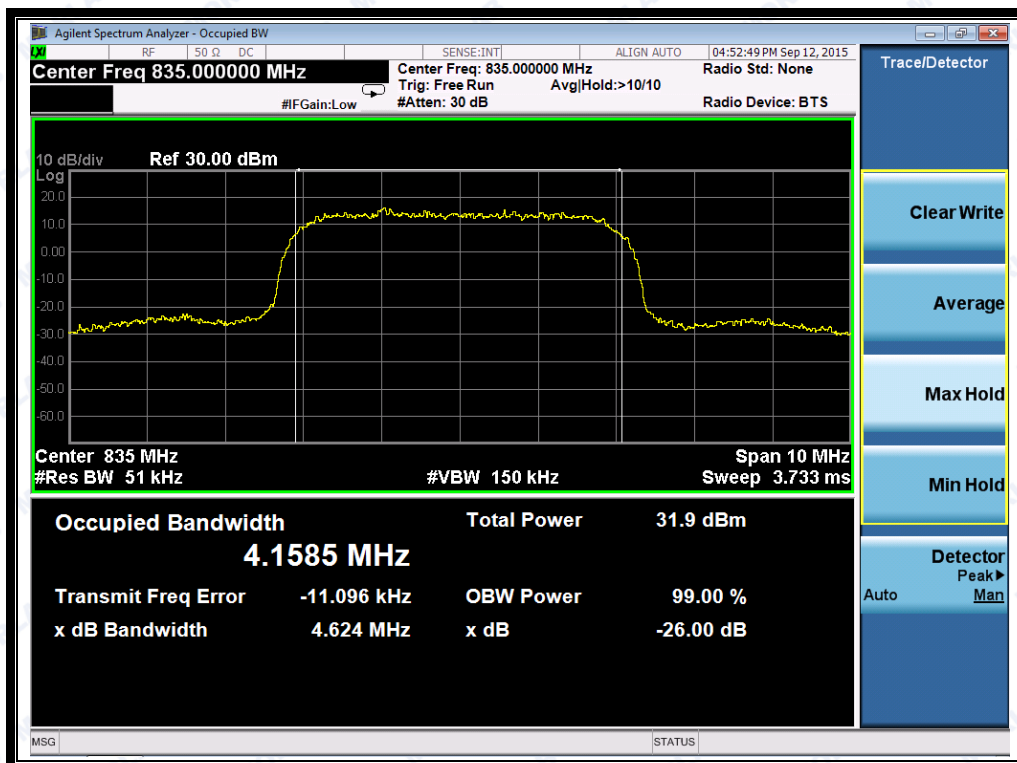
(Plot F3: EGPRS 1900MHz Channel = 810)



REPORT No.: SZ15090021W01



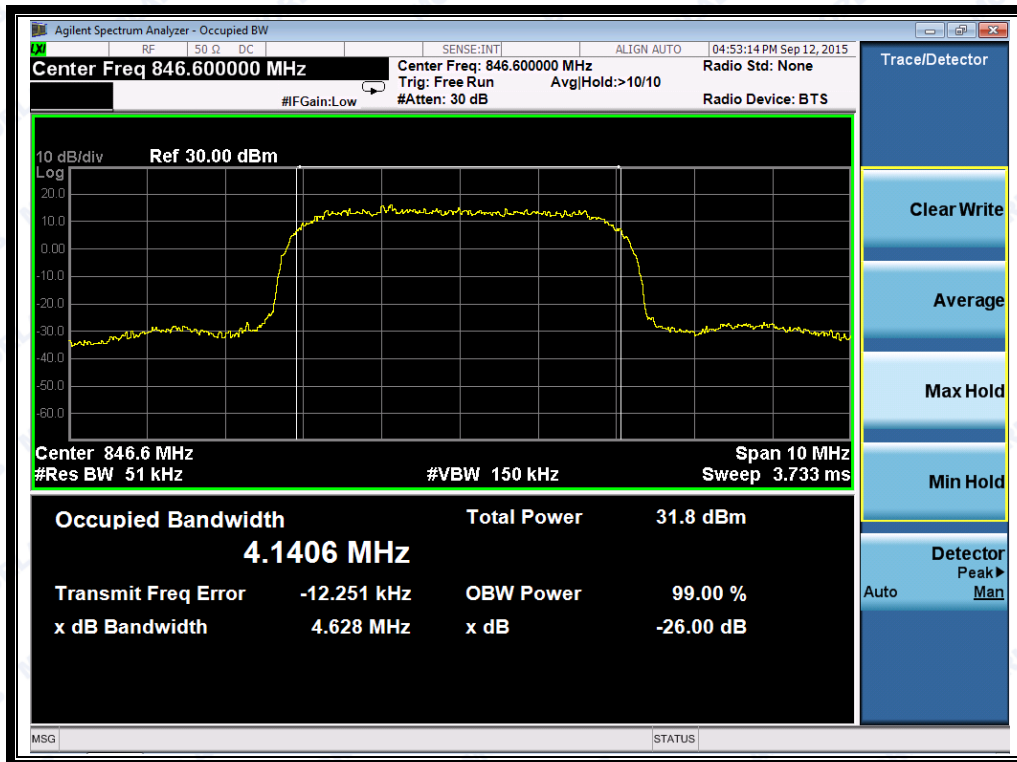
(Plot G1: WCDMA 850MHz Channel = 4132)



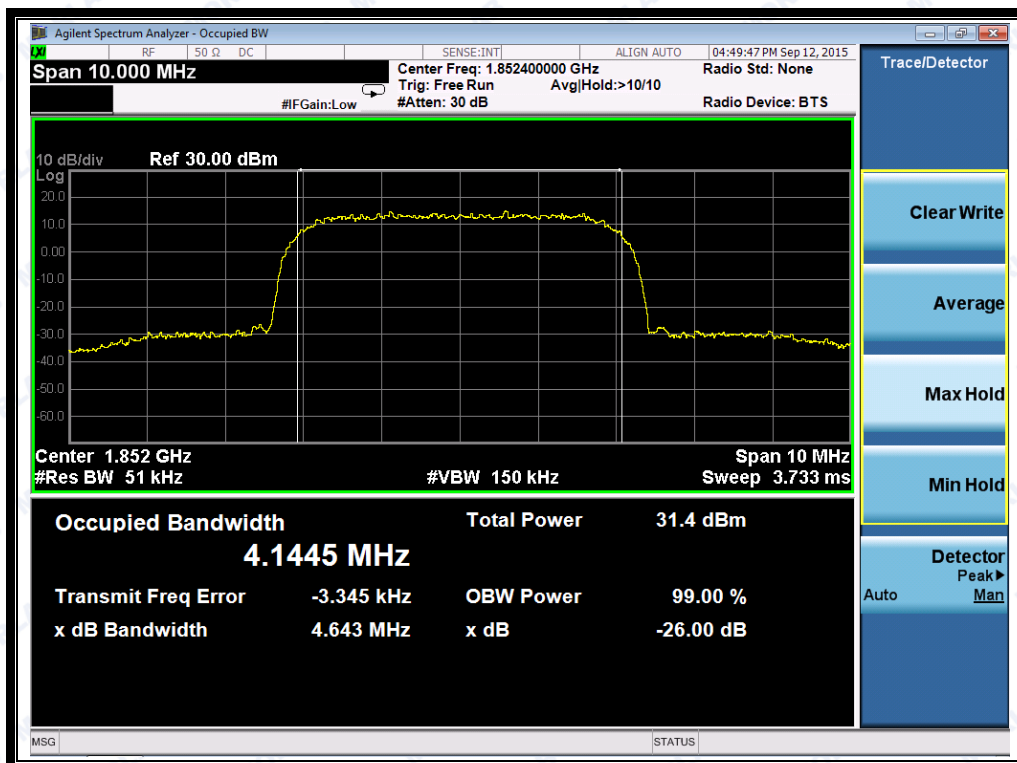
(Plot G2: WCDMA 850 MHz Channel = 4175)



REPORT No.: SZ15090021W01



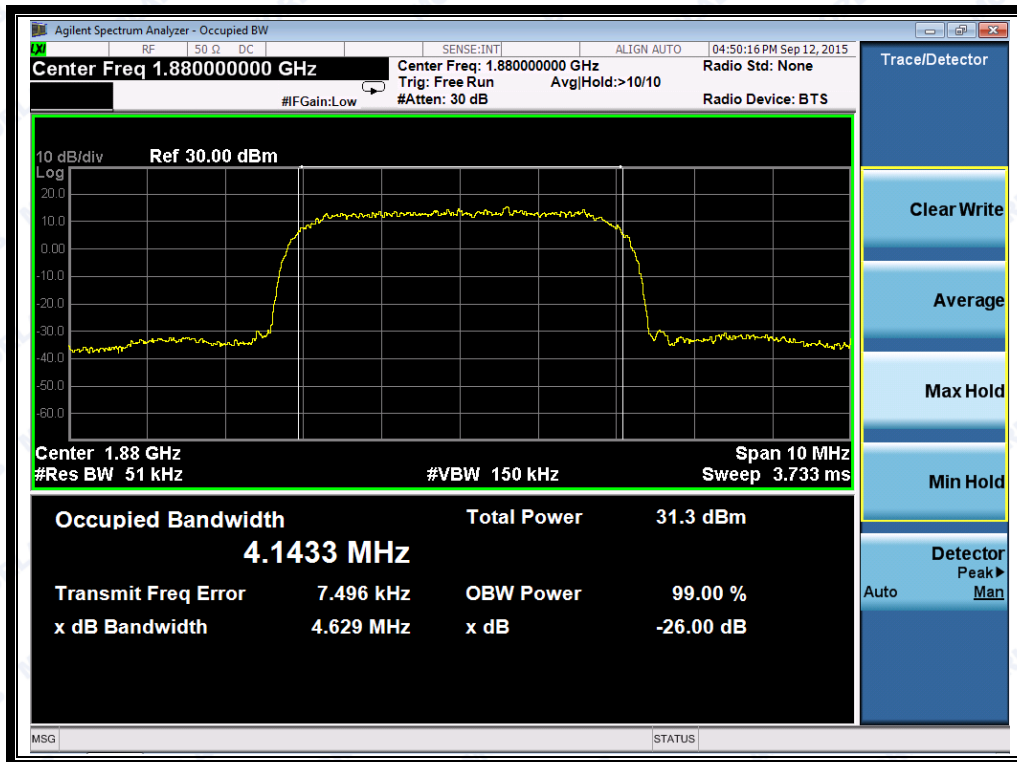
(Plot G3: WCDMA 850MHz Channel = 4233)



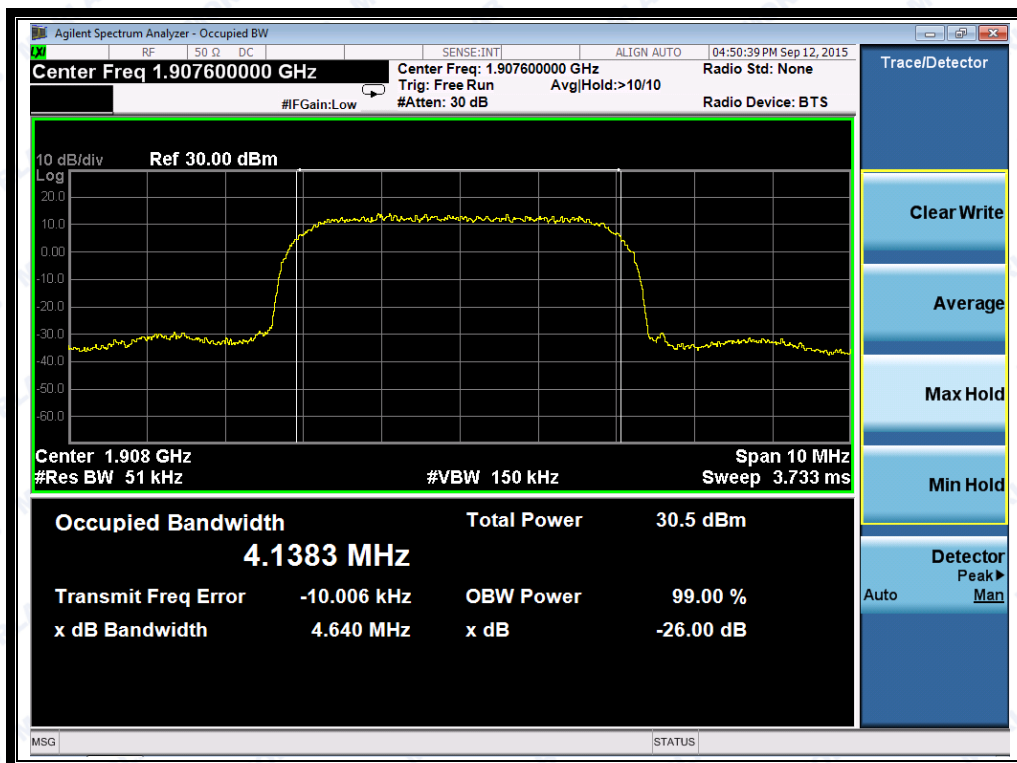
(Plot H1: WCDMA 1900MHz Channel = 9262)



REPORT No.: SZ15090021W01



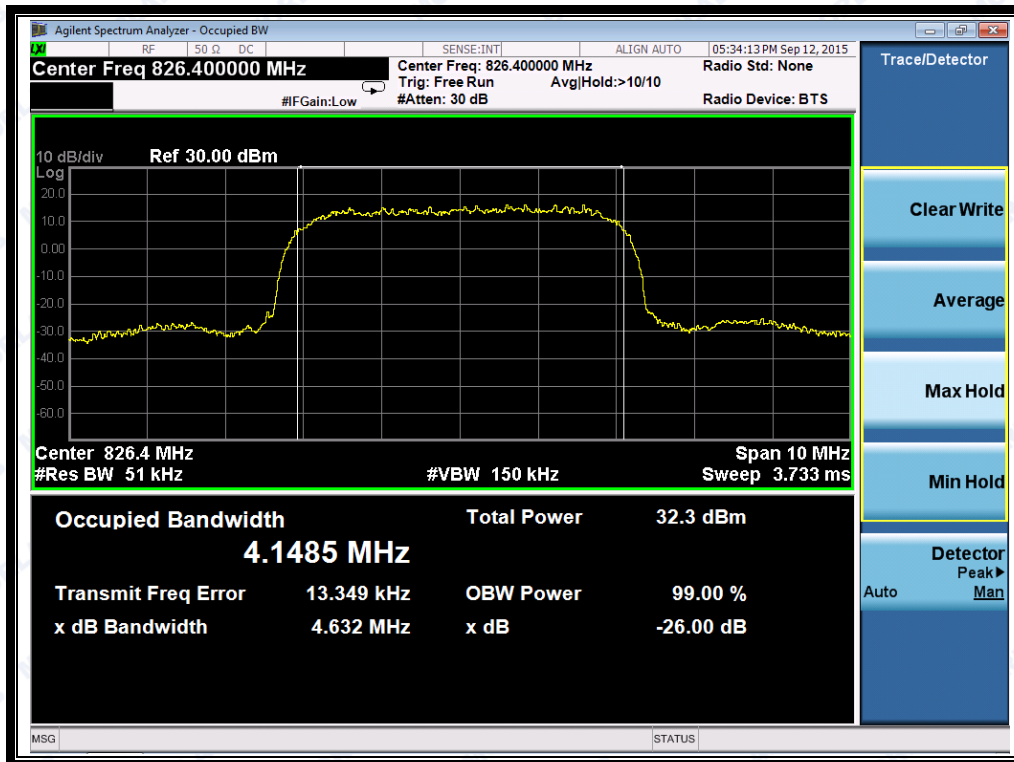
(Plot H2: WCDMA 1900 MHz Channel = 9400)



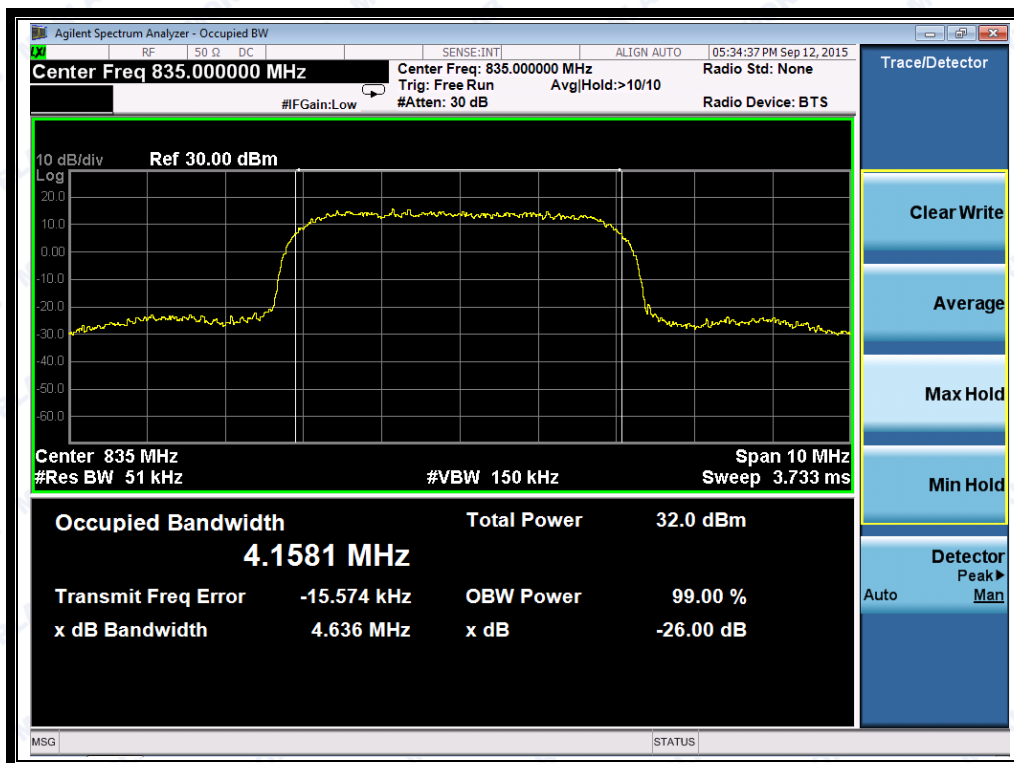
(Plot H3: WCDMA1900MHz Channel = 9538)



REPORT No.: SZ15090021W01



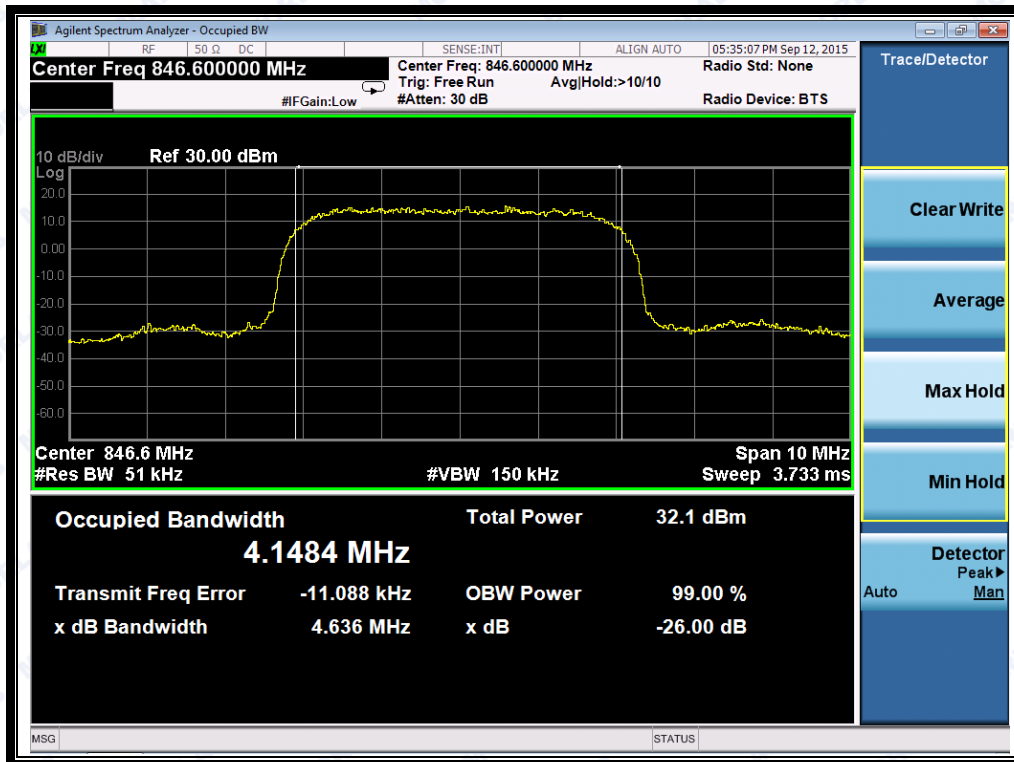
(Plot I1: HSDPA 850MHz Channel = 4132)



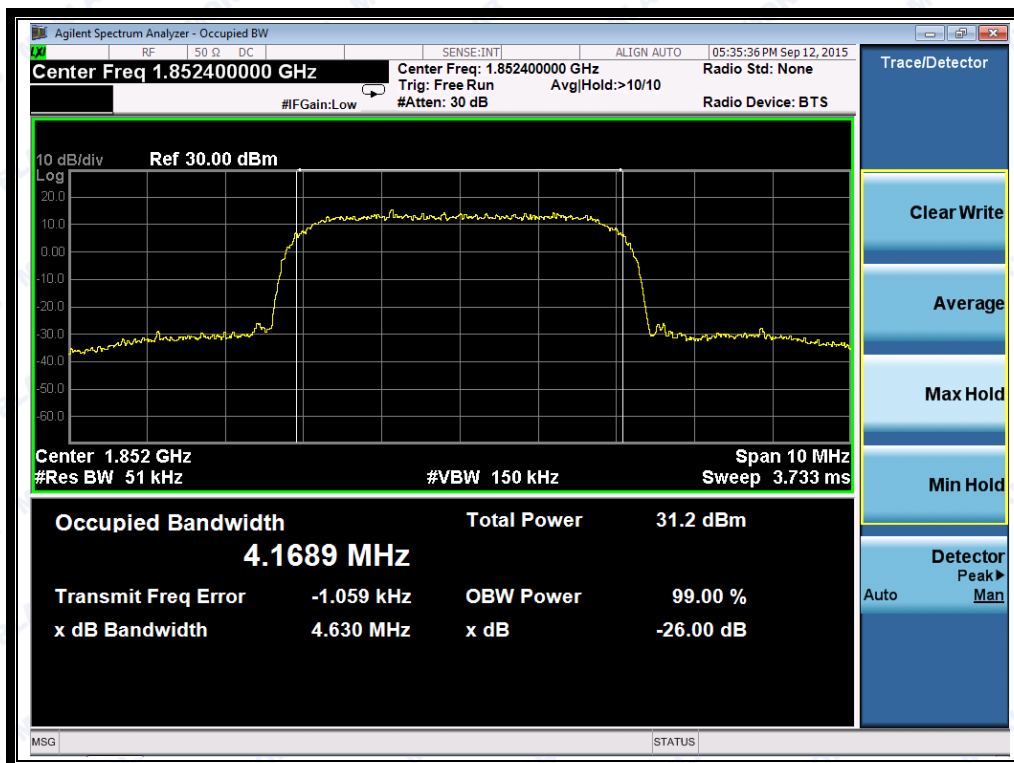
(Plot I2: HSDPA 850 MHz Channel = 4175)



REPORT No.: SZ15090021W01



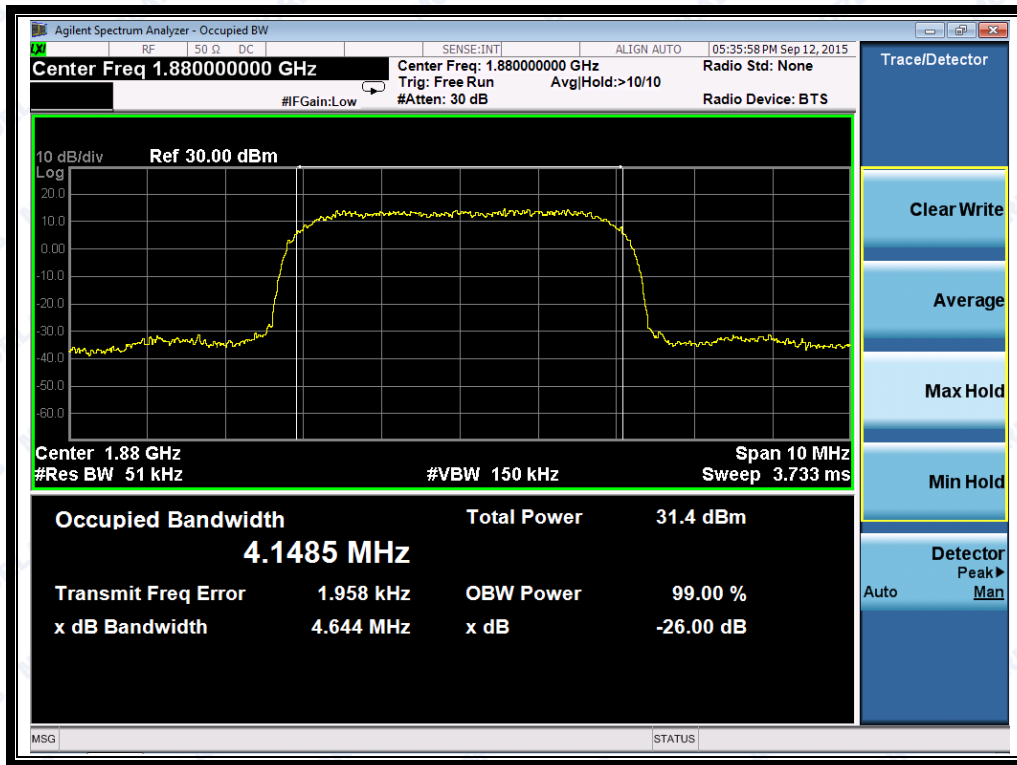
(Plot I3: HSDPA 850MHz Channel = 4233)



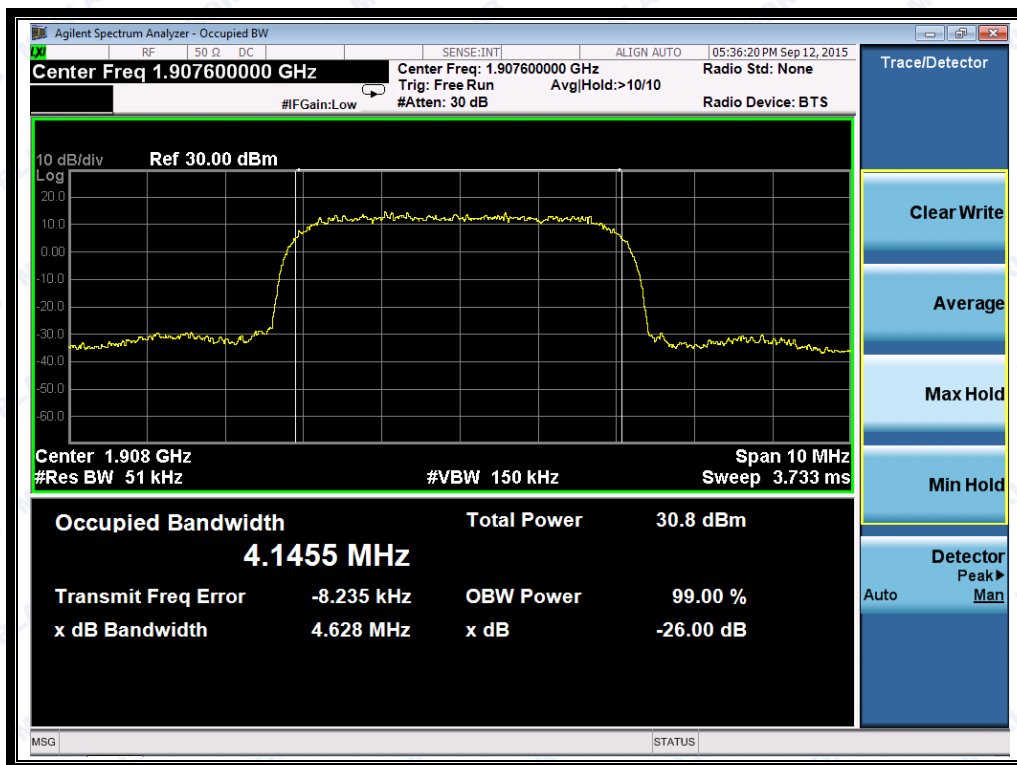
(Plot J1: HSDPA 1900MHz Channel = 9262)



REPORT No.: SZ15090021W01



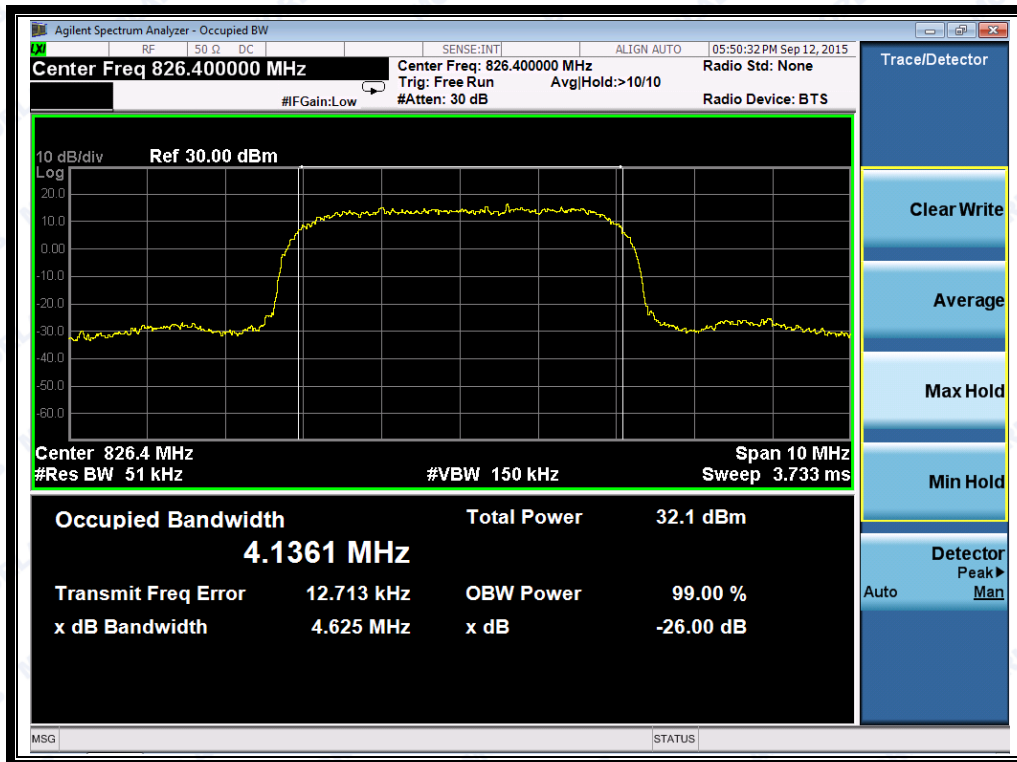
(Plot J2: HSDPA 1900 MHz Channel = 9400)



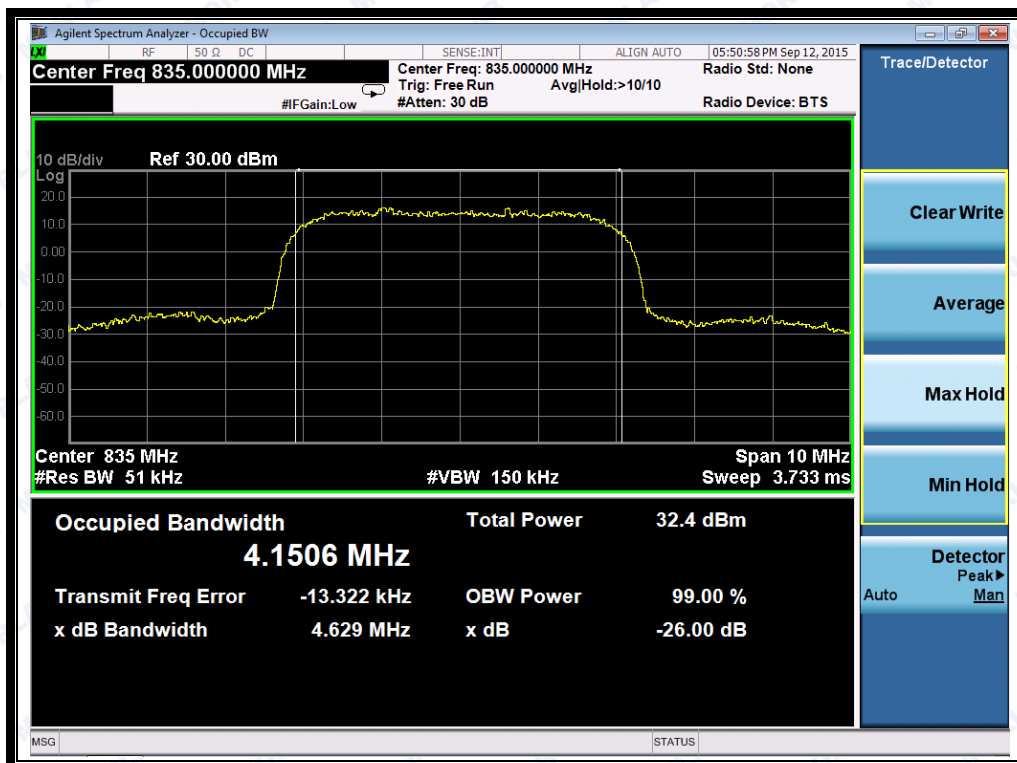
(Plot J3: HSDPA 1900MHz Channel = 9538)



REPORT No.: SZ15090021W01



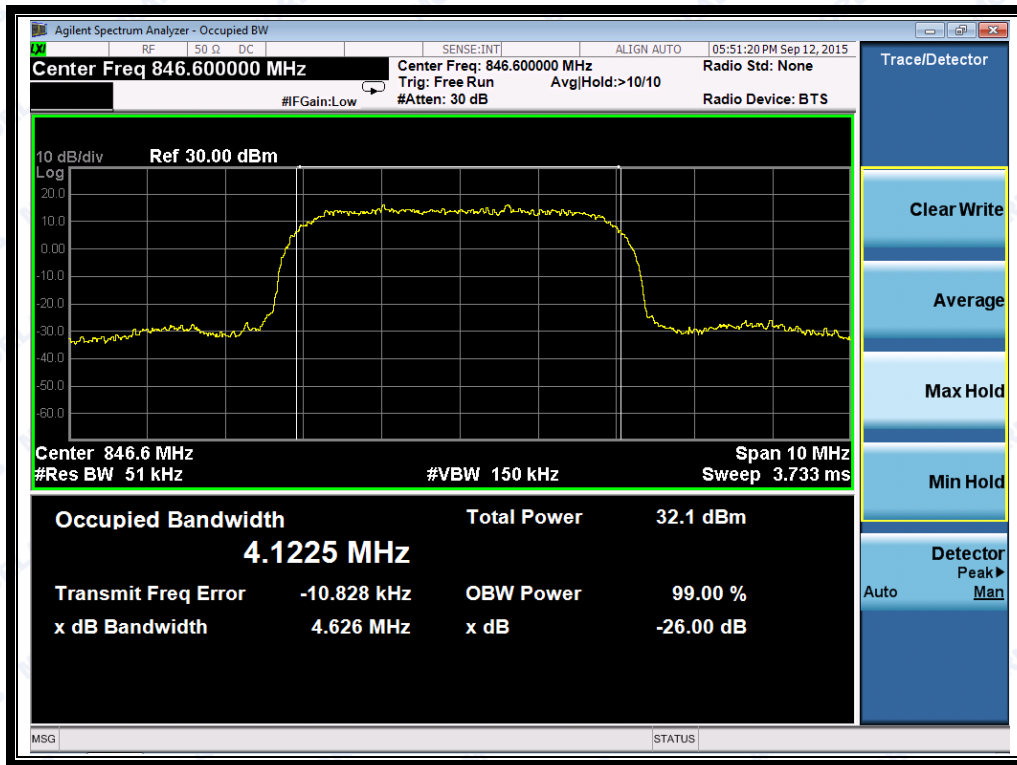
(Plot K1: HSUPA 850MHz Channel = 4132)



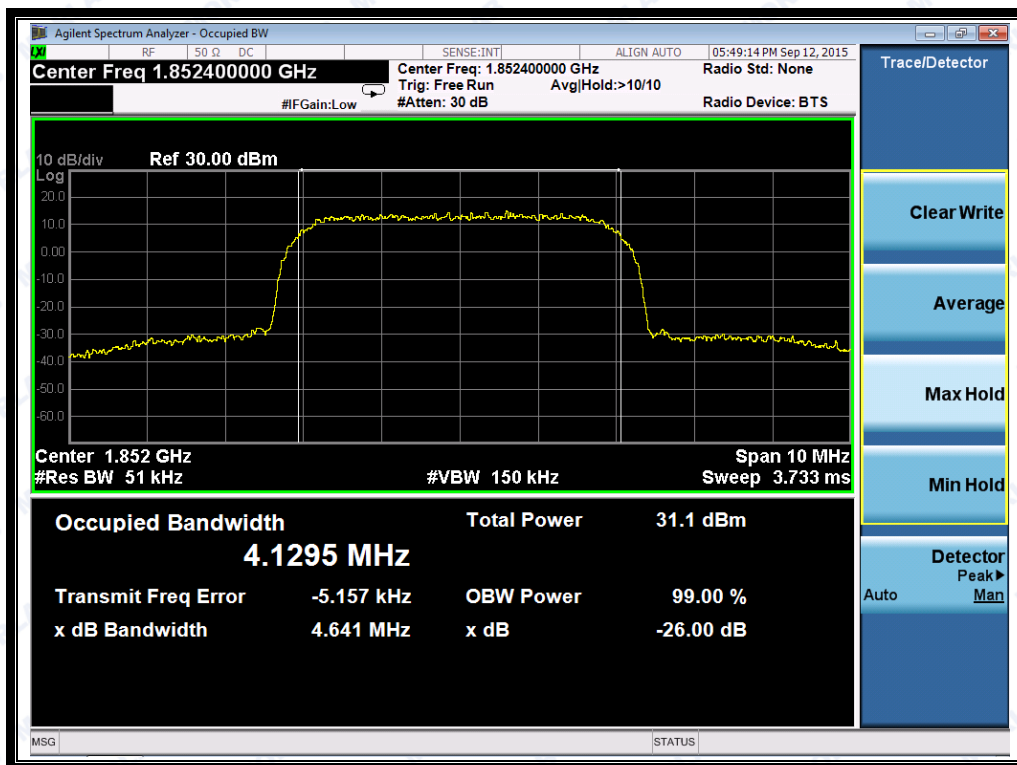
(Plot K2: HSUPA 850 MHz Channel = 4175)



REPORT No.: SZ15090021W01



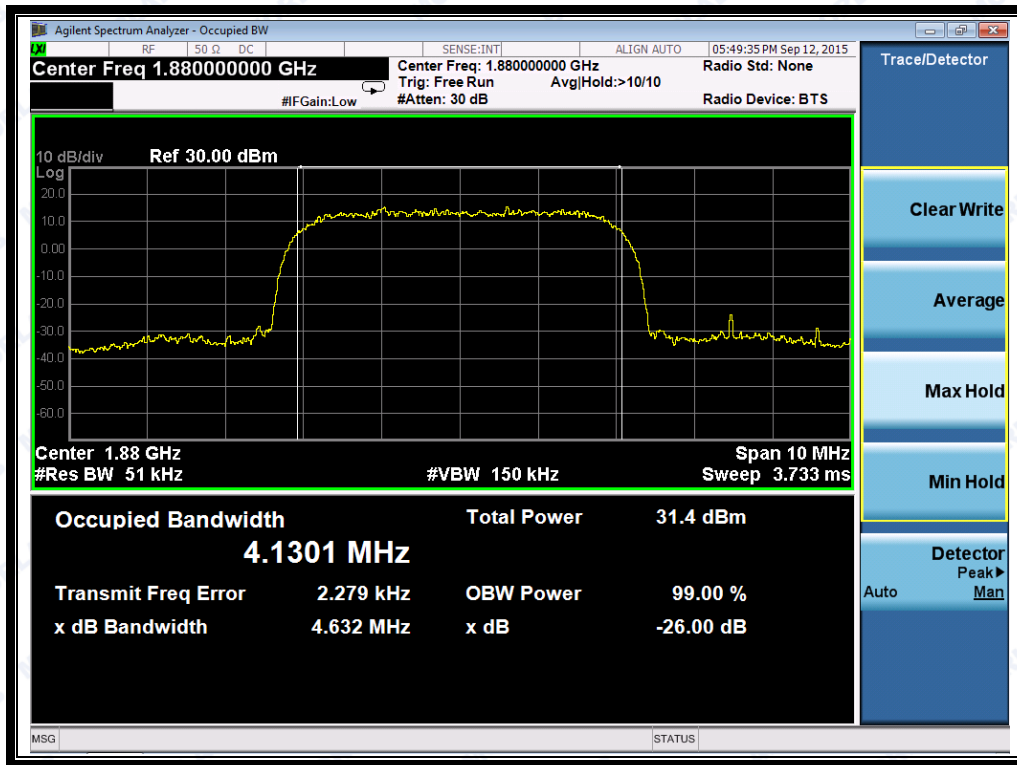
(Plot K3: HSUPA 850MHz Channel = 4233)



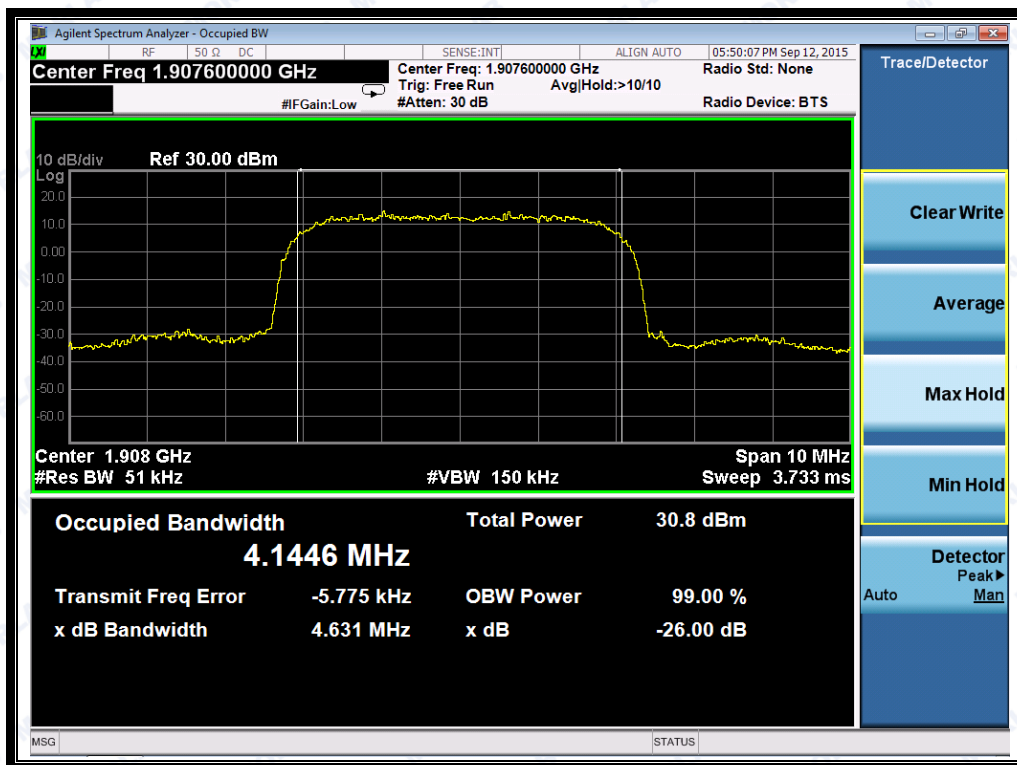
(Plot L1: HSUPA 1900MHz Channel = 9262)



REPORT No.: SZ15090021W01



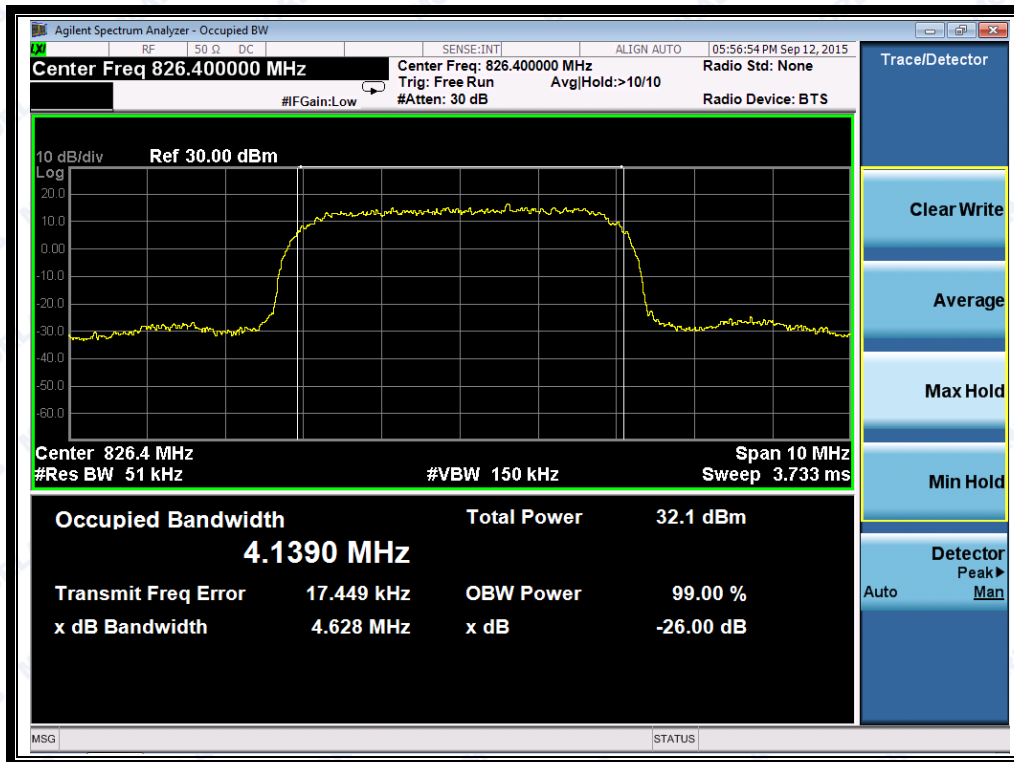
(Plot L2: HSUPA 1900 MHz Channel = 9400)



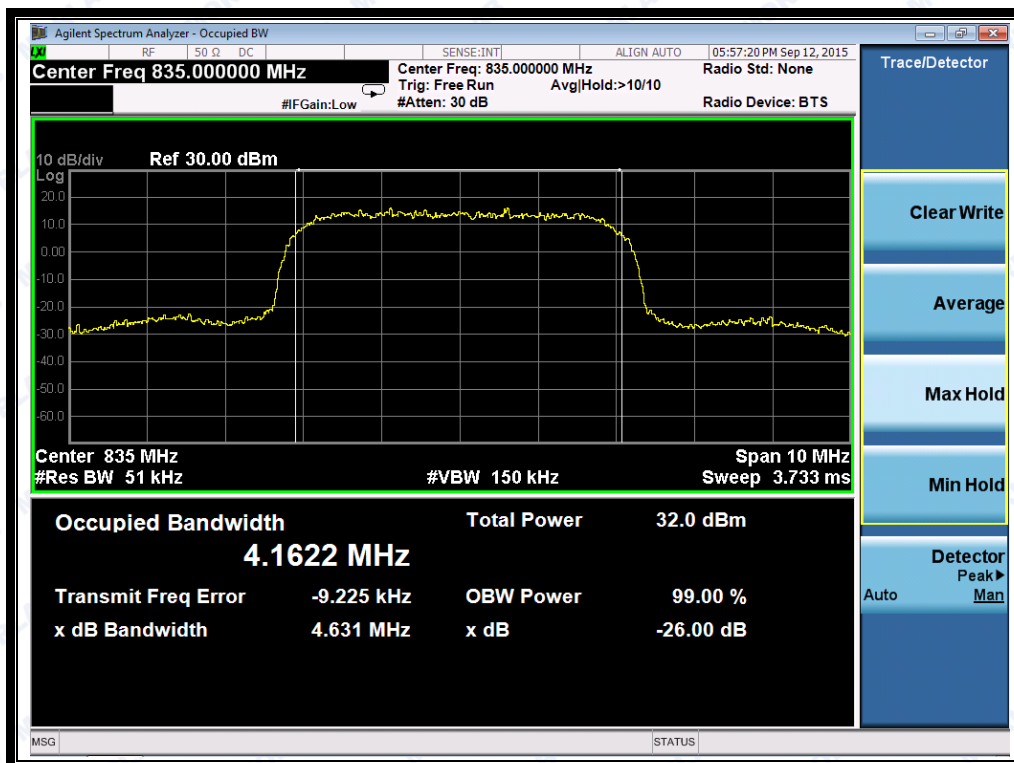
(Plot L3: HSUPA 1900MHz Channel = 9538)



REPORT No.: SZ15090021W01



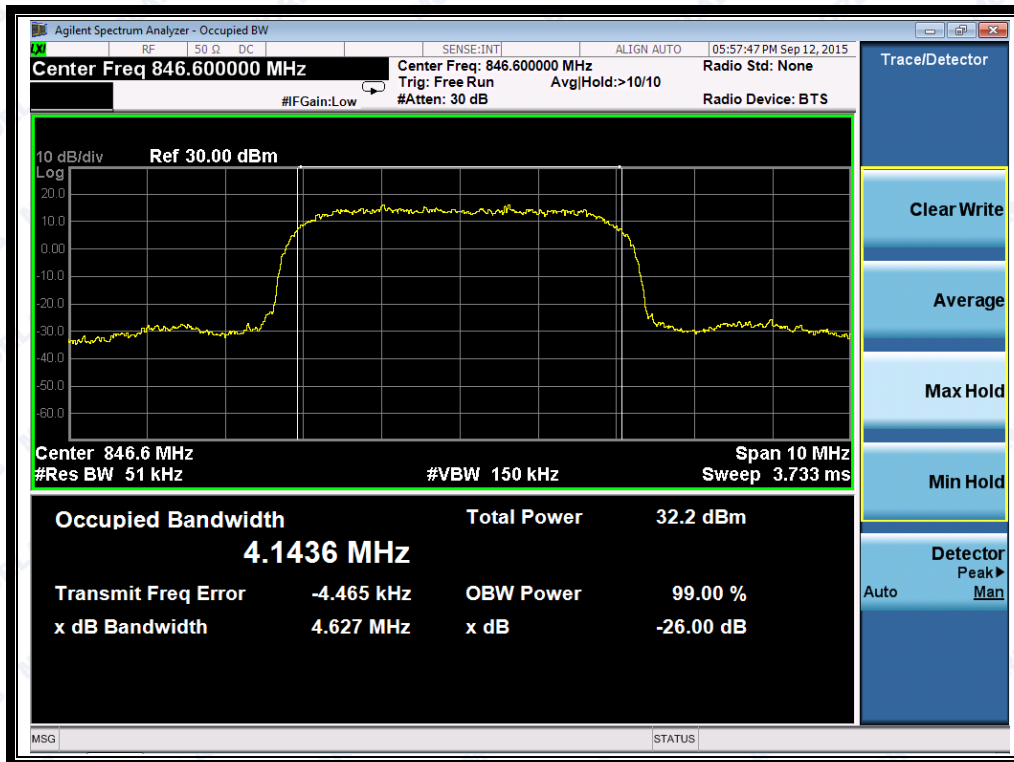
(Plot M1: HSPA+ 850MHz Channel = 4132)



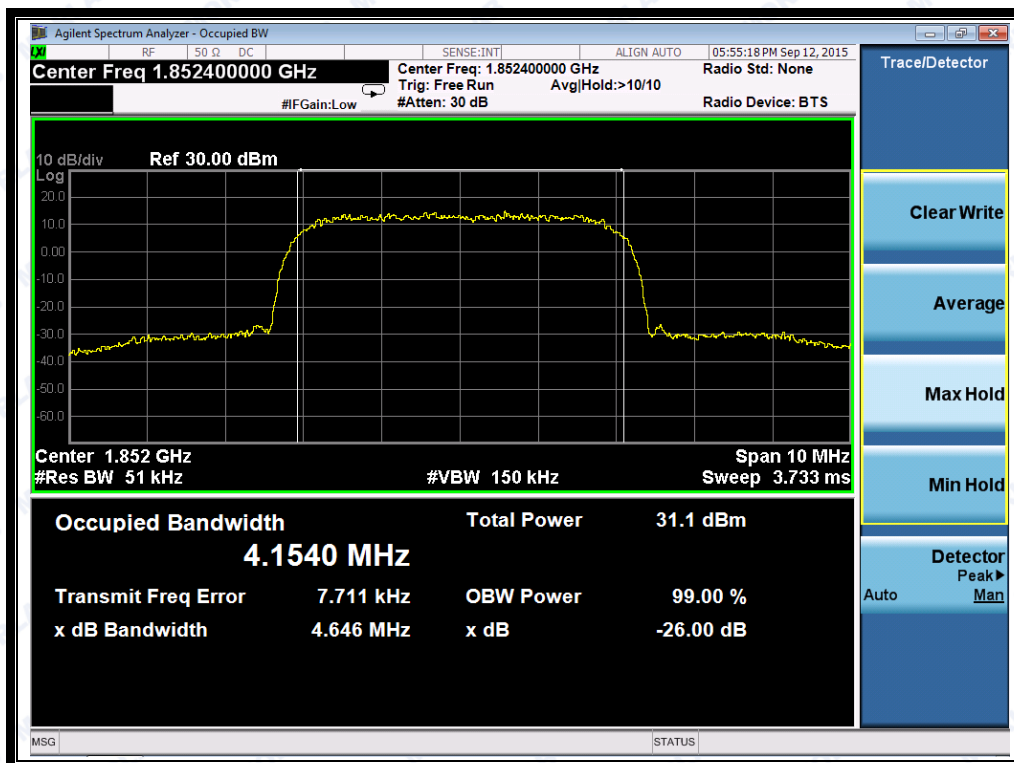
(Plot M2: HSPA+ 850 MHz Channel = 4175)



REPORT No.: SZ15090021W01



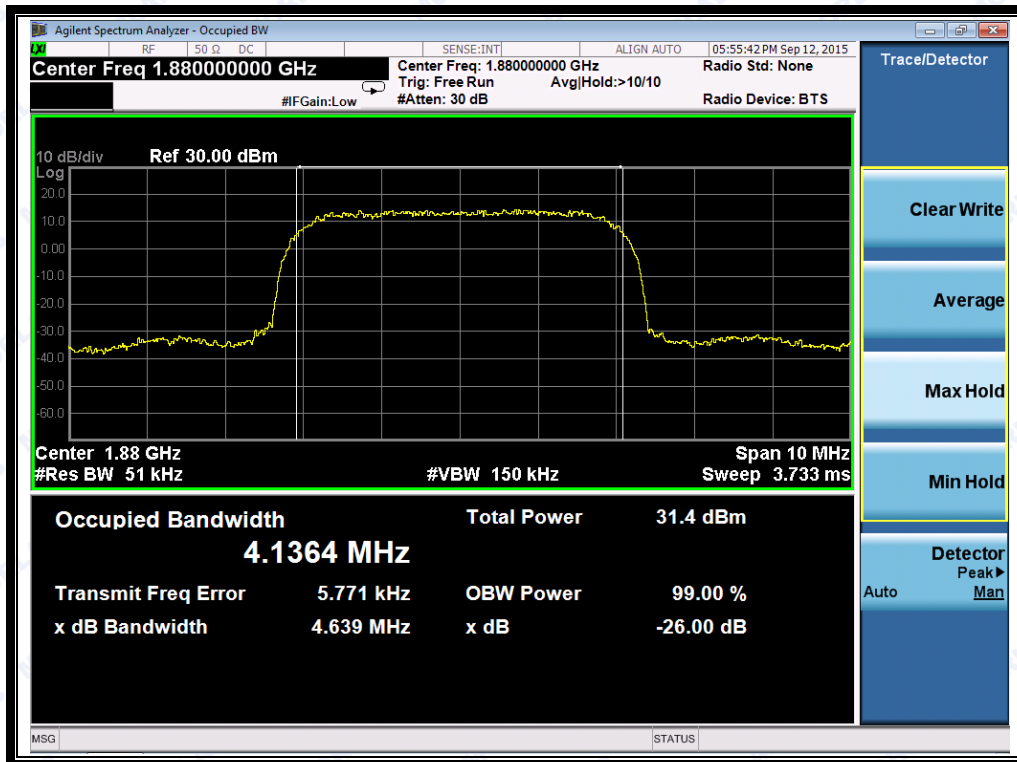
(Plot M3: HSPA+ 850MHz Channel = 4233)



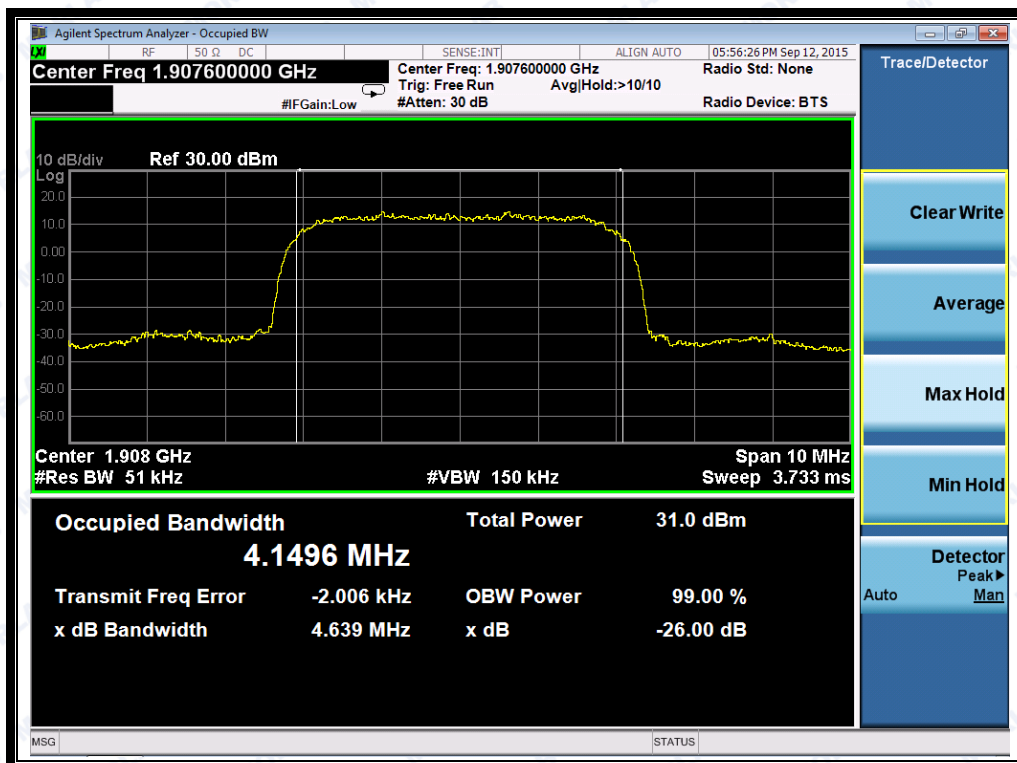
(Plot N1: HSPA+ 1900MHz Channel = 9262)



REPORT No.: SZ15090021W01



(Plot N2: HSPA+ 1900 MHz Channel = 9400)



(Plot N3: HSPA+ 1900MHz Channel = 9538)

## 2.4 Frequency Stability

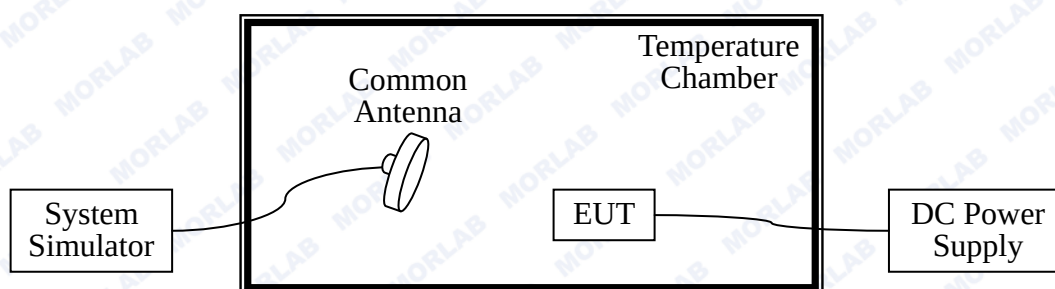
### 2.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- The temperature is varied from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

### 2.4.2 Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

Equipments List:

| Description         | Manufacturer              | Model       | Serial No. | Cal. Date  | Cal. Due   |
|---------------------|---------------------------|-------------|------------|------------|------------|
| System Simulator    | Agilent                   | E5515C      | GB43130131 | 2015.02.26 | 2016.02.25 |
| DC Power Supply     | Good Will                 | GPS -3030DD | EF920938   | 2015.02.26 | 2016.02.25 |
| Temperature Chamber | YinHe Experimental Equip. | HL4003T     | (n.a.)     | 2015.02.26 | 2016.02.25 |



### 2.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.2VDC and 3.45VDC, which are specified by the applicant; the normal temperature here used is 25°C. The frequency deviation limit of 850MHz band is  $\pm 2.5\text{ppm}$ , and 1900MHz is  $\pm 1\text{ppm}$ .

#### 1. GSM 850MHz Band

| Test Conditions |                  | Frequency Deviation      |         |                          |         |                          |        | Verdict |
|-----------------|------------------|--------------------------|---------|--------------------------|---------|--------------------------|--------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 128 (824.2MHz) |         | Channel = 190 (836.6MHz) |         | Channel = 251 (848.8MHz) |        |         |
|                 |                  | Hz                       | Limits  | Hz                       | Limits  | Hz                       | Limits |         |
| 5.25            | -30              | -10.82                   | ±2060.5 | 10.67                    | ±2091.5 | 5.86                     | ±2122  | PASS    |
|                 | -20              | 10.99                    |         | -11.96                   |         | 4.74                     |        |         |
|                 | -10              | -18.15                   |         | -7.45                    |         | 4.82                     |        |         |
|                 | 0                | 22.58                    |         | 6.7                      |         | 8.94                     |        |         |
|                 | +10              | 23.99                    |         | -2.79                    |         | 1.96                     |        |         |
|                 | +20              | -12.14                   |         | 10.63                    |         | 8.28                     |        |         |
|                 | +30              | 22.58                    |         | 28.6                     |         | -4.04                    |        |         |
|                 | +40              | 17.19                    |         | -11.46                   |         | -1.91                    |        |         |
|                 | +55              | -10.78                   |         | -1.77                    |         | 8.16                     |        |         |
| 5               | +25              | 10.99                    |         | -11.96                   |         | 9.73                     |        |         |
| 4.75            | +25              | -12.22                   |         | -7.45                    |         | 11.96                    |        |         |

#### 2. GSM 1900MHz Band

| Test Conditions |                  | Frequency Deviation       |         |                           |         |                           |         | Verdict |
|-----------------|------------------|---------------------------|---------|---------------------------|---------|---------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 512 (1850.2MHz) |         | Channel = 661 (1880.0MHz) |         | Channel = 810 (1909.8MHz) |         |         |
|                 |                  | Hz                        | Limits  | Hz                        | Limits  | Hz                        | Limits  |         |
| 5.25            | -30              | -11.68                    | ±1850.2 | 9.79                      | ±1880.0 | -15.7                     | ±1909.8 | PASS    |
|                 | -20              | 31.84                     |         | 19.58                     |         | -2.06                     |         |         |
|                 | -10              | -7.67                     |         | -16.76                    |         | 22.66                     |         |         |
|                 | 0                | -13.31                    |         | -15.39                    |         | 21.07                     |         |         |
|                 | +10              | -23.67                    |         | 33.78                     |         | -14.14                    |         |         |
|                 | +20              | 13.49                     |         | -9.74                     |         | 23.66                     |         |         |
|                 | +30              | -14.11                    |         | -15.35                    |         | 17.27                     |         |         |
|                 | +40              | 24.01                     |         | 12.98                     |         | -10.32                    |         |         |
|                 | +55              | 17.66                     |         | 20.12                     |         | 11.28                     |         |         |
| 5               | +25              | 35.87                     |         | -25.8                     |         | -2.06                     |         |         |
| 4.75            | +25              | -17.43                    |         | 9.59                      |         | 22.68                     |         |         |



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## 3. EDGE 850MHz Band

| Test Conditions |                  | Frequency Deviation      |         |                          |         |                          |        | Verdict     |
|-----------------|------------------|--------------------------|---------|--------------------------|---------|--------------------------|--------|-------------|
| Power (VDC)     | Temperature (°C) | Channel = 128 (824.2MHz) |         | Channel = 190 (836.6MHz) |         | Channel = 251 (848.8MHz) |        |             |
|                 |                  | Hz                       | Limits  | Hz                       | Limits  | Hz                       | Limits |             |
| 5.25            | -30              | -0.34                    | ±2060.5 | 13.16                    | ±2091.5 | -15.75                   | ±2122  | <u>PASS</u> |
|                 | -20              | 21.7                     |         | 28.93                    |         | 30.42                    |        |             |
|                 | -10              | 15.7                     |         | 29.82                    |         | 46.44                    |        |             |
|                 | 0                | 2.56                     |         | -10.23                   |         | -14.99                   |        |             |
|                 | +10              | -11.27                   |         | 23.96                    |         | 13.31                    |        |             |
|                 | +20              | 31.87                    |         | 8.85                     |         | 9.03                     |        |             |
|                 | +30              | 14.7                     |         | -8.42                    |         | 31.33                    |        |             |
|                 | +40              | -11.27                   |         | -14.93                   |         | 21.62                    |        |             |
|                 | +55              | 0.66                     |         | 34.62                    |         | 24.59                    |        |             |
| 5               | +25              | 16.85                    | 0.77    | 29.19                    |         |                          |        |             |
| 4.75            | +25              | -35.76                   | 10.94   | 21.33                    |         |                          |        |             |

## 4. EDGE 1900MHz Band

| Test Conditions |                  | Frequency Deviation       |         |                           |         |                           |         | Verdict |
|-----------------|------------------|---------------------------|---------|---------------------------|---------|---------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 512 (1850.2MHz) |         | Channel = 661 (1880.0MHz) |         | Channel = 810 (1909.8MHz) |         |         |
|                 |                  | Hz                        | Limits  | Hz                        | Limits  | Hz                        | Limits  |         |
| 5.25            | -30              | 14.86                     | ±1850.2 | -11.37                    | ±1880.0 | 5.31                      | ±1909.8 | PASS    |
|                 | -20              | -14.92                    |         | -8.86                     |         | -23.7                     |         |         |
|                 | -10              | 40.73                     |         | 14.68                     |         | -2.18                     |         |         |
|                 | 0                | -19.43                    |         | 6.68                      |         | -19.6                     |         |         |
|                 | +10              | -13.48                    |         | 36.61                     |         | -22.53                    |         |         |
|                 | +20              | 20.39                     |         | -25.43                    |         | 13.66                     |         |         |
|                 | +30              | 18.27                     |         | 20.89                     |         | -1.6                      |         |         |
|                 | +40              | 19.96                     |         | -15.32                    |         | 35.95                     |         |         |
|                 | +55              | -14.92                    |         | 28.14                     |         | 2.75                      |         |         |
| 5               | +25              | -14.08                    | -9.41   | 16.03                     |         |                           |         |         |
| 4.75            | +25              | -13.07                    | 9.13    | 34.31                     |         |                           |         |         |



5. WCDMA 850MHz Band

| Test Conditions |                  | Frequency Deviation       |       |                         |         |                           |         | Verdict |
|-----------------|------------------|---------------------------|-------|-------------------------|---------|---------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 4123 (826.4MHz) |       | Channel = 4175 (835MHz) |         | Channel = 4233 (846.6MHz) |         |         |
|                 |                  | Hz                        | Limit | Hz                      | Limit   | Hz                        | Limit   |         |
| 5.25            | -30              | 12.99                     | ±2066 | -13.68                  | ±2087.5 | 28.18                     | ±2116.5 | PASS    |
|                 | -20              | 13.91                     |       | 33.19                   |         | 13.69                     |         |         |
|                 | -10              | 4.85                      |       | 14.59                   |         | 25.69                     |         |         |
|                 | 0                | -8.38                     |       | 50.77                   |         | -10.74                    |         |         |
|                 | +10              | 0.27                      |       | 66.5                    |         | 11.29                     |         |         |
|                 | +20              | 15.71                     |       | -0.06                   |         | 9.91                      |         |         |
|                 | +30              | 7.71                      |       | 7.04                    |         | 17.53                     |         |         |
|                 | +40              | 7.71                      |       | 4.7                     |         | 11.73                     |         |         |
|                 | +55              | -0.18                     |       | 4.76                    |         | 14.29                     |         |         |
| 5               | +25              | 19.98                     |       | 13                      |         | 27.58                     |         |         |
| 4.75            | +25              | -15.63                    |       | 11.73                   |         | 12.66                     |         |         |

6. WCDMA 1900MHz Band

| Test Conditions |                  | Frequency Deviation        |         |                            |        |                            |         | Verdict |
|-----------------|------------------|----------------------------|---------|----------------------------|--------|----------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 9262 (1852.4MHz) |         | Channel = 9400 (1880.0MHz) |        | Channel = 9538 (1907.6MHz) |         |         |
|                 |                  | Hz                         | Limits  | Hz                         | Limits | Hz                         | Limits  |         |
| 5.25            | -30              | 14.66                      | ±1852.4 | -13.92                     | ±1880  | 11.29                      | ±1907.6 | PASS    |
|                 | -20              | -6.86                      |         | 39.25                      |        | 2.23                       |         |         |
|                 | -10              | 8.4                        |         | -20.96                     |        | -11                        |         |         |
|                 | 0                | 11.29                      |         | -15.01                     |        | -2.35                      |         |         |
|                 | +10              | 9.44                       |         | 18.86                      |        | 13.09                      |         |         |
|                 | +20              | 6.83                       |         | 16.74                      |        | 5.09                       |         |         |
|                 | +30              | -20.44                     |         | 4.77                       |        | -2.8                       |         |         |
|                 | +40              | -6.03                      |         | 15.05                      |        | 10.37                      |         |         |
|                 | +55              | -16.92                     |         | -16.45                     |        | 12.27                      |         |         |
| 5               | +25              | -11.46                     |         | 15.05                      |        | 11.29                      |         |         |
| 4.75            | +25              | 12.14                      |         | 17.32                      |        | -18.01                     |         |         |



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## 7. HSDPA 850MHz Band

| Test Conditions |                  | Frequency Deviation       |       |                         |         |                           |         | Verdict |
|-----------------|------------------|---------------------------|-------|-------------------------|---------|---------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 4123 (826.4MHz) |       | Channel = 4175 (835MHz) |         | Channel = 4233 (846.6MHz) |         |         |
|                 |                  | Hz                        | Limit | Hz                      | Limit   | Hz                        | Limit   |         |
| 5.25            | -30              | -0.34                     | ±2066 | 14.54                   | ±2087.5 | 12.07                     | ±2116.5 | PASS    |
|                 | -20              | -9.38                     |       | -6.98                   |         | 21.11                     |         |         |
|                 | -10              | 14.57                     |       | 8.28                    |         | 12.57                     |         |         |
|                 | 0                | -37.2                     |       | 11.17                   |         | 4.27                      |         |         |
|                 | +10              | -0.34                     |       | 9.32                    |         | -4.77                     |         |         |
|                 | +20              | -9.38                     |       | 6.71                    |         | 19.18                     |         |         |
|                 | +30              | 15.56                     |       | -20.56                  |         | -32.59                    |         |         |
|                 | +40              | -34.7                     |       | -6.15                   |         | 28.12                     |         |         |
|                 | +55              | 18.71                     |       | -17.04                  |         | 24.75                     |         |         |
| 5               | +25              | -0.34                     |       | -11.58                  |         | -36.05                    |         |         |
| 4.75            | +25              | -19.73                    |       | 12.02                   |         | 22.54                     |         |         |

## 8. HSDPA 1900MHz Band

| Test Conditions |                  | Frequency Deviation        |         |                            |        |                            |         | Verdict |
|-----------------|------------------|----------------------------|---------|----------------------------|--------|----------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 9262 (1852.4MHz) |         | Channel = 9400 (1880.0MHz) |        | Channel = 9538 (1907.6MHz) |         |         |
|                 |                  | Hz                         | Limits  | Hz                         | Limits | Hz                         | Limits  |         |
| 5.25            | -30              | 15.45                      | ±1852.4 | 25.8                       | ±1880  | 13.76                      | ±1907.6 | PASS    |
|                 | -20              | 19.26                      |         | -16.72                     |        | -18.45                     |         |         |
|                 | -10              | 27.99                      |         | -12.13                     |        | -3.18                      |         |         |
|                 | 0                | -20.28                     |         | -12.61                     |        | -0.73                      |         |         |
|                 | +10              | -17.57                     |         | 0.1                        |        | -17.05                     |         |         |
|                 | +20              | 18.29                      |         | -11.37                     |        | -12.53                     |         |         |
|                 | +30              | -9                         |         | 30.05                      |        | -1.18                      |         |         |
|                 | +40              | 10.72                      |         | -11.31                     |        | -0.73                      |         |         |
|                 | +55              | 25.39                      |         | 0.04                       |        | 23.02                      |         |         |
| 5               | +25              | 26.05                      |         | 9.19                       |        | -5.31                      |         |         |
| 4.75            | +25              | -10.81                     |         | 13.02                      |        | 15.51                      |         |         |



## 9. HSUPA 850MHz Band

| Test Conditions |                  | Frequency Deviation       |       |                         |         |                           |         | Verdict |
|-----------------|------------------|---------------------------|-------|-------------------------|---------|---------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 4123 (826.4MHz) |       | Channel = 4175 (835MHz) |         | Channel = 4233 (846.6MHz) |         |         |
|                 |                  | Hz                        | Limit | Hz                      | Limit   | Hz                        | Limit   |         |
| 5.25            | -30              | 32.94                     | ±2066 | -12.22                  | ±2087.5 | 6.69                      | ±2116.5 | PASS    |
|                 | -20              | 28.5                      |       | 0.23                    |         | 2.01                      |         |         |
|                 | -10              | 7.99                      |       | 0.58                    |         | -5.75                     |         |         |
|                 | 0                | 2.68                      |       | 14.39                   |         | 15.38                     |         |         |
|                 | +10              | -4.36                     |       | -14.68                  |         | -2.76                     |         |         |
|                 | +20              | 16.59                     |       | -11.22                  |         | 22.52                     |         |         |
|                 | +30              | -1.18                     |       | 0.13                    |         | -1.38                     |         |         |
|                 | +40              | 23.53                     |       | 1.72                    |         | -12.85                    |         |         |
|                 | +55              | 14.16                     |       | -7.37                   |         | -6.91                     |         |         |
| 5               | +25              | -6.71                     |       | 7.38                    |         | 24.48                     |         |         |
| 4.75            | +25              | 21.95                     |       | -2.26                   |         | -17.78                    |         |         |

## 10. HSUPA 1900MHz Band

| Test Conditions |                  | Frequency Deviation        |         |                            |        |                            |         | Verdict |
|-----------------|------------------|----------------------------|---------|----------------------------|--------|----------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 9262 (1852.4MHz) |         | Channel = 9400 (1880.0MHz) |        | Channel = 9538 (1907.6MHz) |         |         |
|                 |                  | Hz                         | Limits  | Hz                         | Limits | Hz                         | Limits  |         |
| 5.25            | -30              | 14.08                      | ±1852.4 | 16.54                      | ±1880  | 29.02                      | ±1907.6 | PASS    |
|                 | -20              | 27.95                      |         | -15.59                     |        | 24.58                      |         |         |
|                 | -10              | 36.54                      |         | -10.05                     |        | 4.07                       |         |         |
|                 | 0                | -7.79                      |         | 1.3                        |        | -1.24                      |         |         |
|                 | +10              | -5.38                      |         | 1.75                       |        | -8.28                      |         |         |
|                 | +20              | 20.88                      |         | -4.9                       |        | 12.67                      |         |         |
|                 | +30              | -6.41                      |         | 25.99                      |        | -5.1                       |         |         |
|                 | +40              | 13.31                      |         | 11.37                      |        | 19.61                      |         |         |
|                 | +55              | 27.98                      |         | 25.5                       |        | 10.24                      |         |         |
| 5               | +25              | 28.64                      |         | -2.83                      |        | -10.63                     |         |         |
| 4.75            | +25              | -8.27                      |         | 6.79                       |        | 18.03                      |         |         |



## 11. HSPA+ 850MHz Band

| Test Conditions |                  | Frequency Deviation       |       |                         |         |                           |         | Verdict |
|-----------------|------------------|---------------------------|-------|-------------------------|---------|---------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 4123 (826.4MHz) |       | Channel = 4175 (835MHz) |         | Channel = 4233 (846.6MHz) |         |         |
|                 |                  | Hz                        | Limit | Hz                      | Limit   | Hz                        | Limit   |         |
| 5.25            | -30              | 9.38                      | ±2066 | 0.95                    | ±2087.5 | -7.81                     | ±2116.5 | PASS    |
|                 | -20              | -18.04                    |       | -11.24                  |         | 17.91                     |         |         |
|                 | -10              | 18.63                     |       | -15.68                  |         | 10.57                     |         |         |
|                 | 0                | -4.5                      |       | -11.17                  |         | -15.01                    |         |         |
|                 | +10              | 20.22                     |       | 2.98                    |         | 6.8                       |         |         |
|                 | +20              | 18.63                     |       | -6.51                   |         | -8.61                     |         |         |
|                 | +30              | -16.5                     |       | 6.91                    |         | 30.51                     |         |         |
|                 | +40              | 21.22                     |       | 24.88                   |         | 4.56                      |         |         |
|                 | +55              | 14.83                     |       | -15.18                  |         | -29.68                    |         |         |
| 5               | +25              | -11.77                    |       | -5.49                   |         | 25.73                     |         |         |
| 4.75            | +25              | 9.14                      |       | 13.76                   |         | -6.17                     |         |         |

## 12. HSPA+ 1900MHz Band

| Test Conditions |                  | Frequency Deviation        |         |                            |        |                            |         | Verdict |
|-----------------|------------------|----------------------------|---------|----------------------------|--------|----------------------------|---------|---------|
| Power (VDC)     | Temperature (°C) | Channel = 9262 (1852.4MHz) |         | Channel = 9400 (1880.0MHz) |        | Channel = 9538 (1907.6MHz) |         |         |
|                 |                  | Hz                         | Limits  | Hz                         | Limits | Hz                         | Limits  |         |
| 5.25            | -30              | 12.66                      | ±1852.4 | -22.85                     | ±1880  | 24.92                      | ±1907.6 | PASS    |
|                 | -20              | 13.26                      |         | -12.44                     |        | -11.1                      |         |         |
|                 | -10              | 19.42                      |         | 37.75                      |        | 19.11                      |         |         |
|                 | 0                | -26.52                     |         | -5.79                      |        | 11.34                      |         |         |
|                 | +10              | -16.11                     |         | -11.43                     |        | -16.29                     |         |         |
|                 | +20              | 33.08                      |         | -21.85                     |        | 7.24                       |         |         |
|                 | +30              | -10.46                     |         | 15.4                       |        | -3.03                      |         |         |
|                 | +40              | -16.1                      |         | -12.23                     |        | 15.6                       |         |         |
|                 | +55              | 24.22                      |         | 25.89                      |        | -25.15                     |         |         |
| 5               | +25              | 5.77                       |         | 10.45                      |        | 28.49                      |         |         |
| 4.75            | +25              | 0.63                       |         | -29.69                     |        | 16.97                      |         |         |



## 2.5 Conducted Out of Band Emissions

### 2.5.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a) the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43+10\log(P)$ dB. This calculated to be -13dBm.

### 2.5.2 Test Description

See section 2.1.2 of this report.

### 2.5.3 Test Result

The measurement frequency range is from 30MHz to the 10<sup>th</sup> harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

#### 1. Equipment List

| Description       | Manufacturer | Model  | Serial No. | Cal. Date  | Cal. Due   |
|-------------------|--------------|--------|------------|------------|------------|
| System Simulator  | Agilent      | E5515C | GB43130131 | 2015.02.26 | 2016.02.25 |
| Spectrum Analyzer | Agilent      | E7405A | US44210471 | 2015.02.26 | 2016.02.25 |
| Power Meter       | Agilent      | E4418B | GB43318055 | 2015.02.26 | 2016.02.25 |
| Power Sensor      | Agilent      | 8482A  | MY41091706 | 2015.02.26 | 2016.02.25 |
| Power Splitter    | Weinschel    | 1506A  | NW521      | 2015.02.26 | 2016.02.25 |
| Attenuator 1      | Resnet       | 20dB   | (n.a.)     | 2015.02.26 | 2016.02.25 |
| Attenuator 2      | Resnet       | 3dB    | (n.a.)     | 2015.02.26 | 2016.02.25 |

#### 2. Test Verdict:

| Band          | Channel | Frequency (MHz) | Measured Max. Spurious Emission (dBm) | Refer to Plot   | Limit (dBm) | Verdict |
|---------------|---------|-----------------|---------------------------------------|-----------------|-------------|---------|
| GSM 850MHz    | 128     | 824.2           | < -25                                 | Plot A1 to A1.1 | -13         | PASS    |
|               | 190     | 836.6           | < -25                                 | Plot A2 to A2.1 |             | PASS    |
|               | 251     | 848.8           | < -25                                 | Plot A3 to A3.1 |             | PASS    |
| GSM 1900MHz   | 512     | 1850.2          | -21.1                                 | Plot B1 to B1.1 | -13         | PASS    |
|               | 661     | 1880.0          | -19.69                                | Plot B2 to B2.1 |             | PASS    |
|               | 810     | 1909.8          | -20.11                                | Plot B3 to B3.1 |             | PASS    |
| EGPRS 850MHz  | 128     | 824.2           | -24.22                                | Plot E1 to E1.1 | -13         | PASS    |
|               | 190     | 836.6           | -25.00                                | Plot E2 to E2.1 |             | PASS    |
|               | 251     | 848.8           | -24.95                                | Plot E3 to E3.1 |             | PASS    |
| EGPRS 1900MHz | 512     | 1850.2          | -18.56                                | Plot F1 to F1.1 | -13         | PASS    |
|               | 661     | 1880.0          | -19.45                                | Plot F2 to F2.1 |             | PASS    |
|               | 810     | 1909.8          | -20.34                                | Plot F3 to F3.1 |             | PASS    |



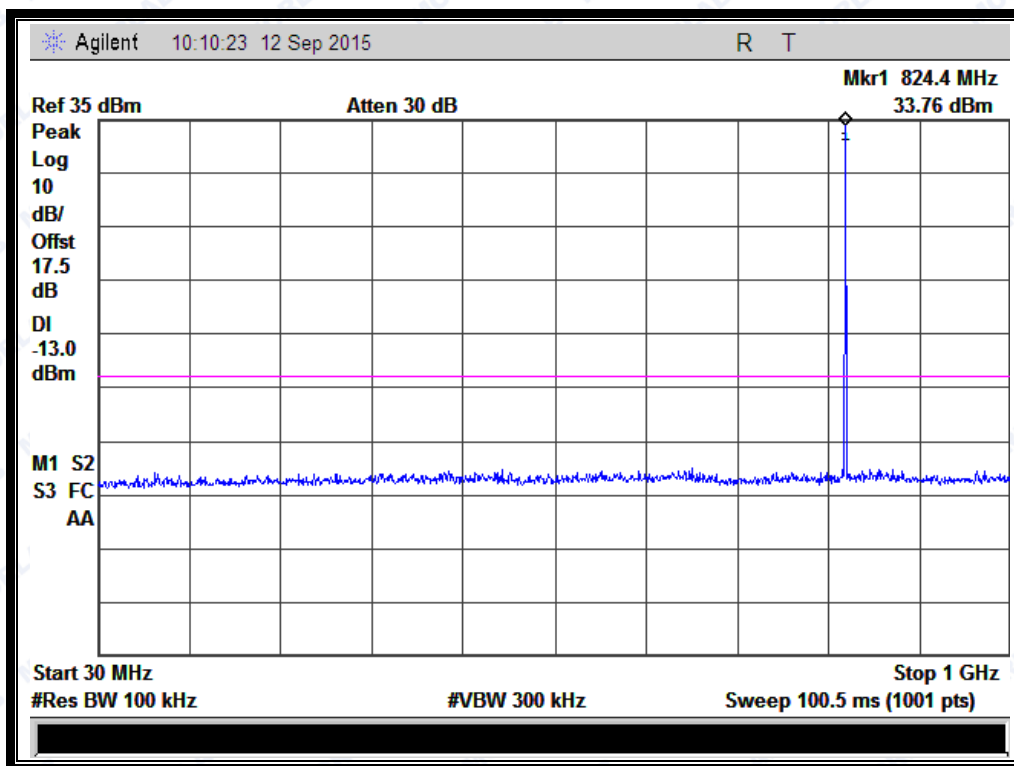
| Band          | Channel | Frequency (MHz) | Measured Max. Spurious Emission (dBm) | Refer to Plot   | Limit (dBm) | Verdict |
|---------------|---------|-----------------|---------------------------------------|-----------------|-------------|---------|
| WCDMA 850MHz  | 4132    | 826.4           | < -25                                 | Plot G1 to G1.1 | -13         | PASS    |
|               | 4175    | 835.0           | < -25                                 | Plot G2 to G2.1 |             | PASS    |
|               | 4233    | 846.6           | < -25                                 | Plot G3 to G3.1 |             | PASS    |
| WCDMA 1900MHz | 9262    | 1852.4          | < -25                                 | Plot H1 to H1.1 | -13         | PASS    |
|               | 9400    | 1880.0          | < -25                                 | Plot H2 to H2.1 |             | PASS    |
|               | 9538    | 1907.6          | < -25                                 | Plot H3 to H3.1 |             | PASS    |
| HSDPA 850MHz  | 4132    | 826.4           | < -25                                 | Plot I1 to I1.1 | -13         | PASS    |
|               | 4175    | 835.0           | < -25                                 | Plot I2 to I2.1 |             | PASS    |
|               | 4233    | 846.6           | < -25                                 | Plot I3 to I3.1 |             | PASS    |
| HSDPA 1900MHz | 9262    | 1852.4          | < -25                                 | Plot J1 to J1.1 | -13         | PASS    |
|               | 9400    | 1880.0          | < -25                                 | Plot J2 to J2.1 |             | PASS    |
|               | 9538    | 1907.6          | < -25                                 | Plot J3 to J3.1 |             | PASS    |
| HSUPA 850MHz  | 4132    | 826.4           | < -25                                 | Plot K1 to K1.1 | -13         | PASS    |
|               | 4175    | 835.0           | < -25                                 | Plot K2 to K2.1 |             | PASS    |
|               | 4233    | 846.6           | < -25                                 | Plot K3 to K3.1 |             | PASS    |
| HSUPA 1900MHz | 9262    | 1852.4          | < -25                                 | Plot L1 to L1.1 | -13         | PASS    |
|               | 9400    | 1880.0          | < -25                                 | Plot L2 to L2.1 |             | PASS    |
|               | 9538    | 1907.6          | < -25                                 | Plot L3 to L3.1 |             | PASS    |
| HSPA+ 850MHz  | 4132    | 826.4           | < -25                                 | Plot M1 to M1.1 | -13         | PASS    |
|               | 4175    | 835.0           | < -25                                 | Plot M2 to M2.1 |             | PASS    |
|               | 4233    | 846.6           | < -25                                 | Plot M3 to M3.1 |             | PASS    |
| HSPA+ 1900MHz | 9262    | 1852.4          | < -25                                 | Plot N1 to N1.1 | -13         | PASS    |
|               | 9400    | 1880.0          | < -25                                 | Plot N2 to N2.1 |             | PASS    |
|               | 9538    | 1907.6          | < -25                                 | Plot N3 to N3.1 |             | PASS    |

Test Plots for the Whole Measurement Frequency Range:

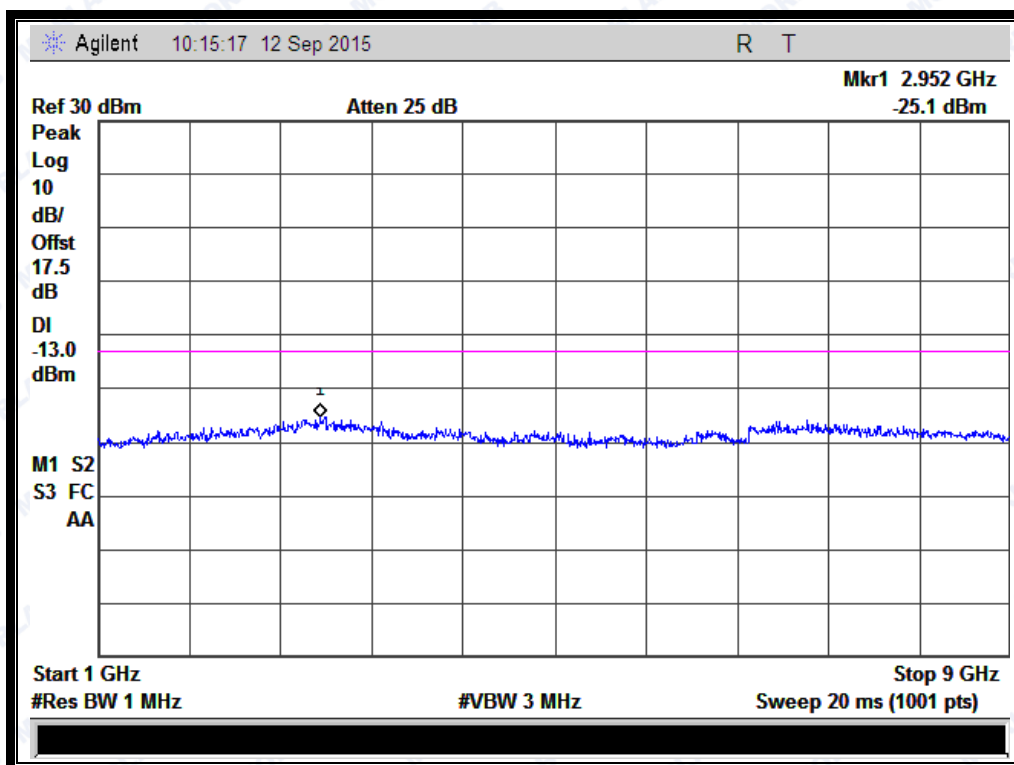
Note: the power of the EUT transmitting frequency should be ignored.



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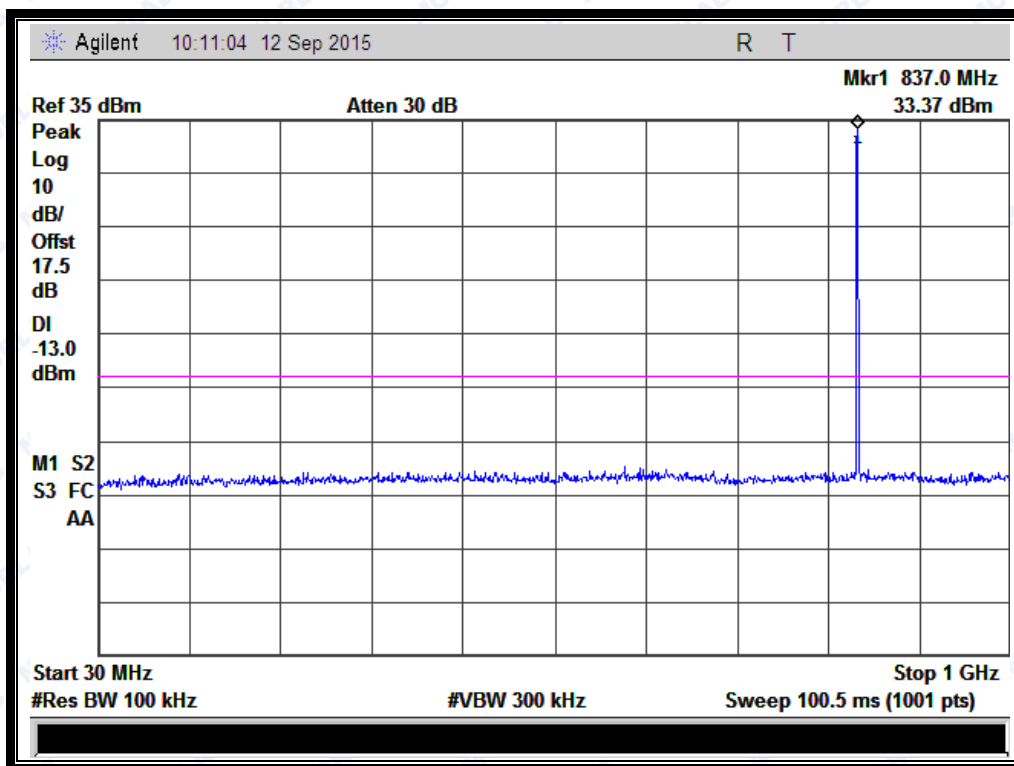
(Plot A1: GSM 850MHz Channel = 128, 30MHz to 1GHz)



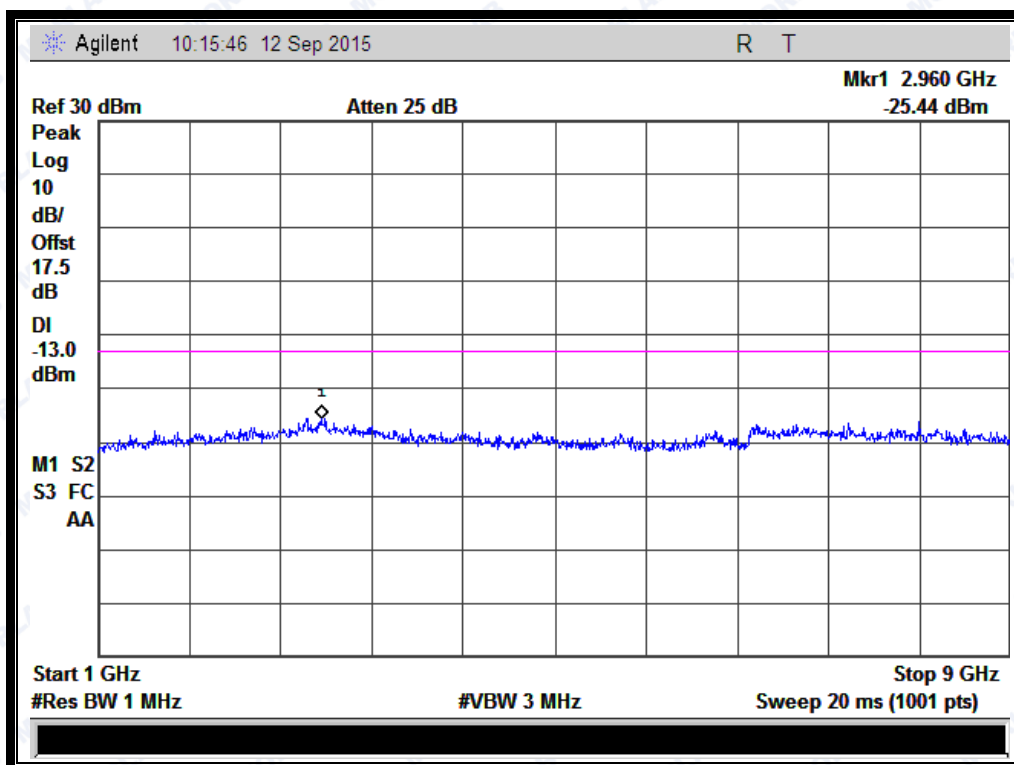
(Plot A1.1: GSM 850MHz Channel = 128, 1GHz to 9GHz)



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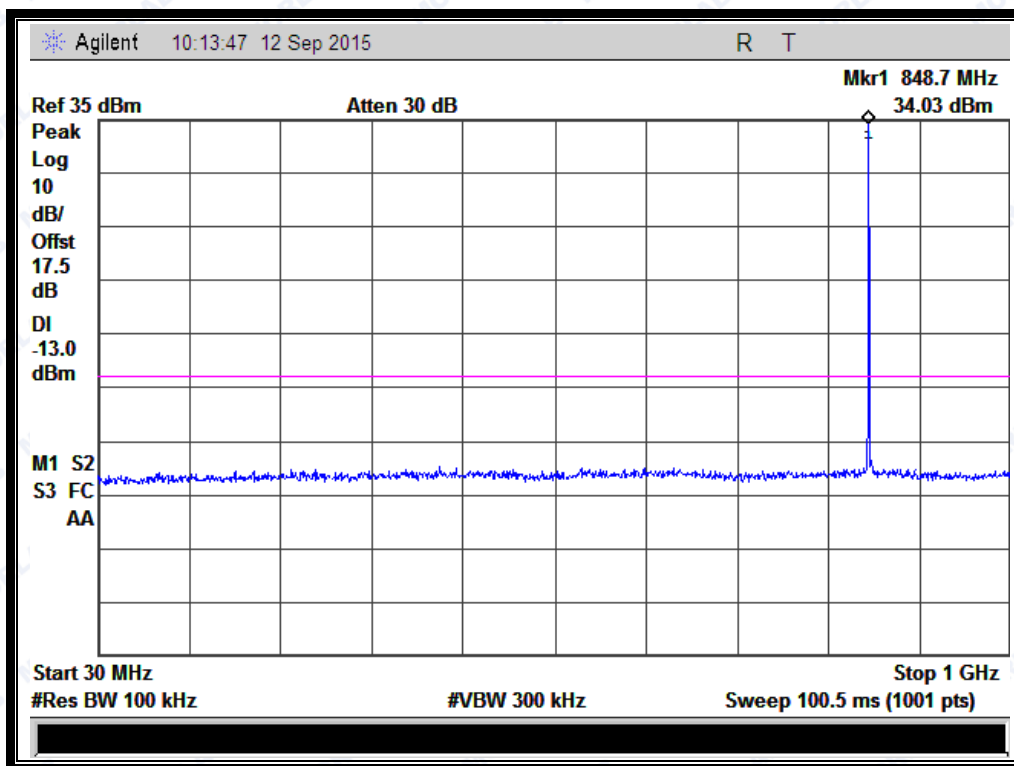
(Plot A2: GSM 850MHz Channel = 190, 30MHz to 1GHz)



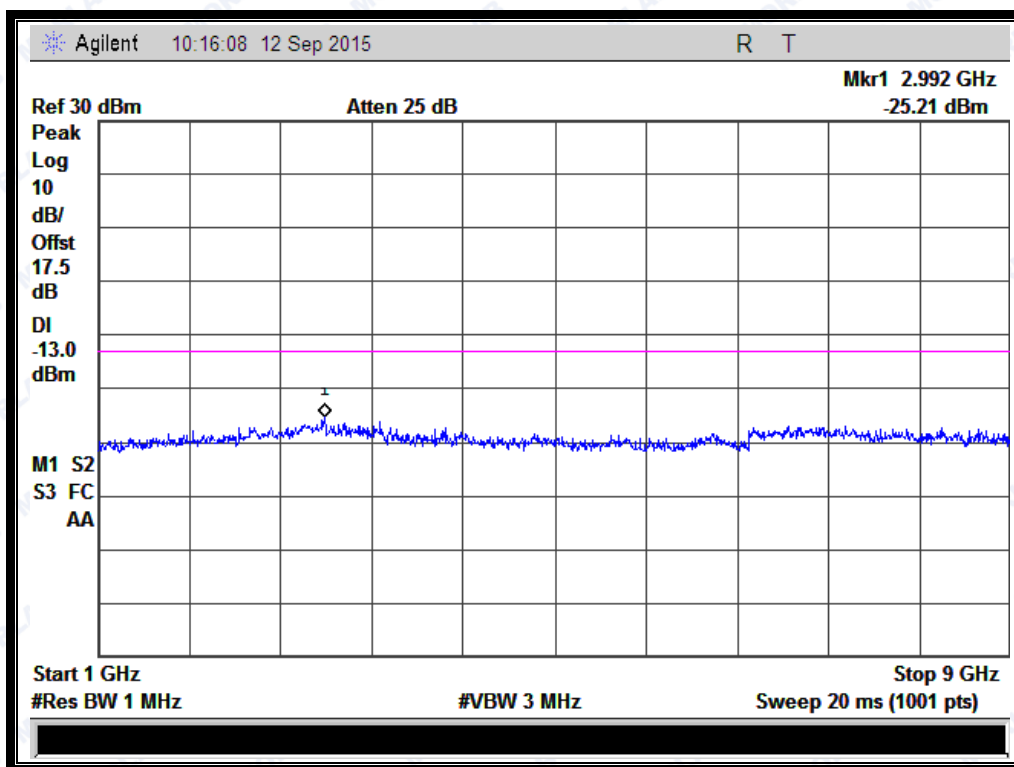
(Plot A2.1: GSM 850MHz Channel = 190, 1GHz to 9GHz)



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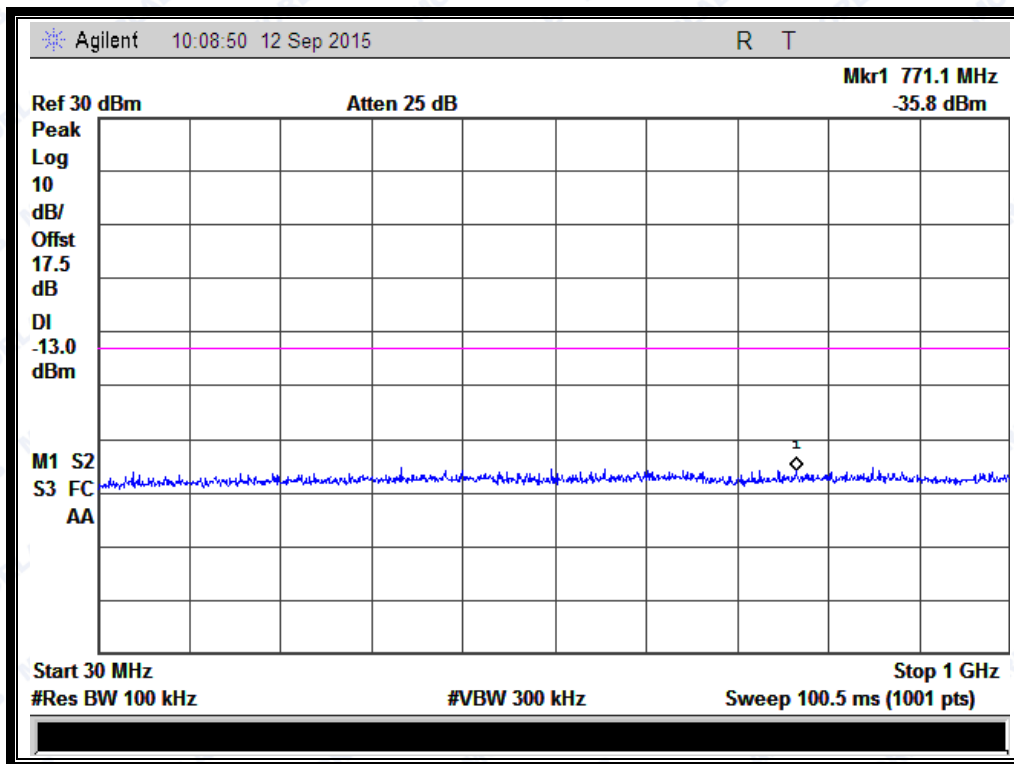
(Plot A3: GSM 850MHz Channel = 251, 30MHz to 1GHz)



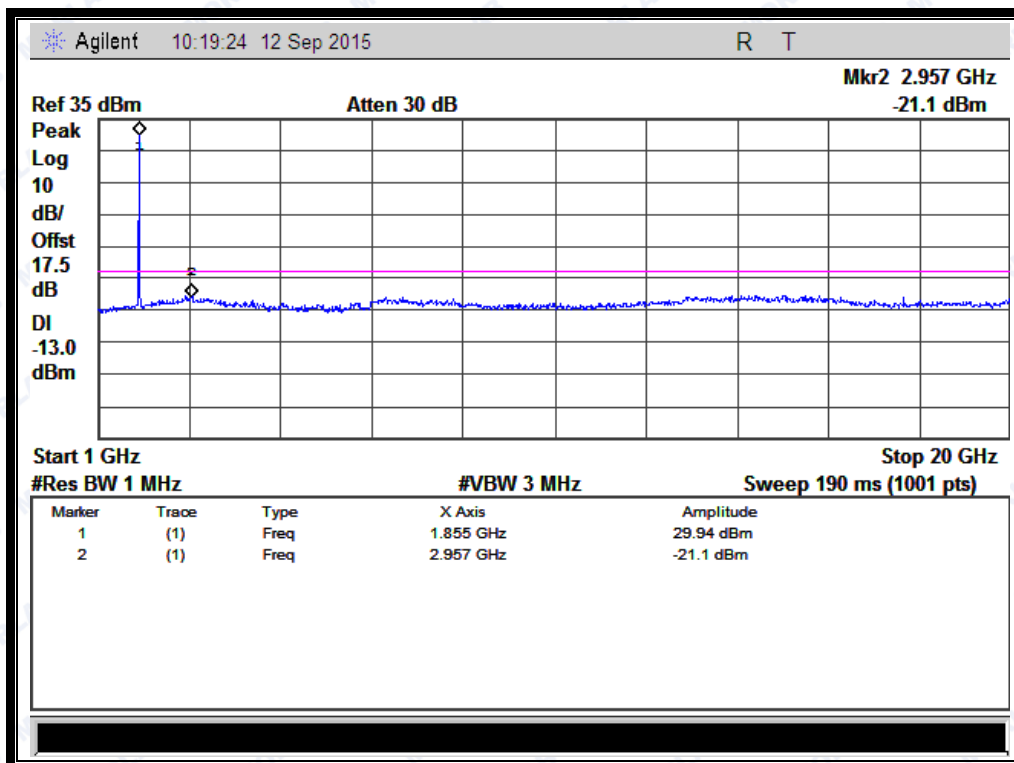
(Plot A3.1: GSM 850MHz Channel = 251, 1GHz to 9GHz)



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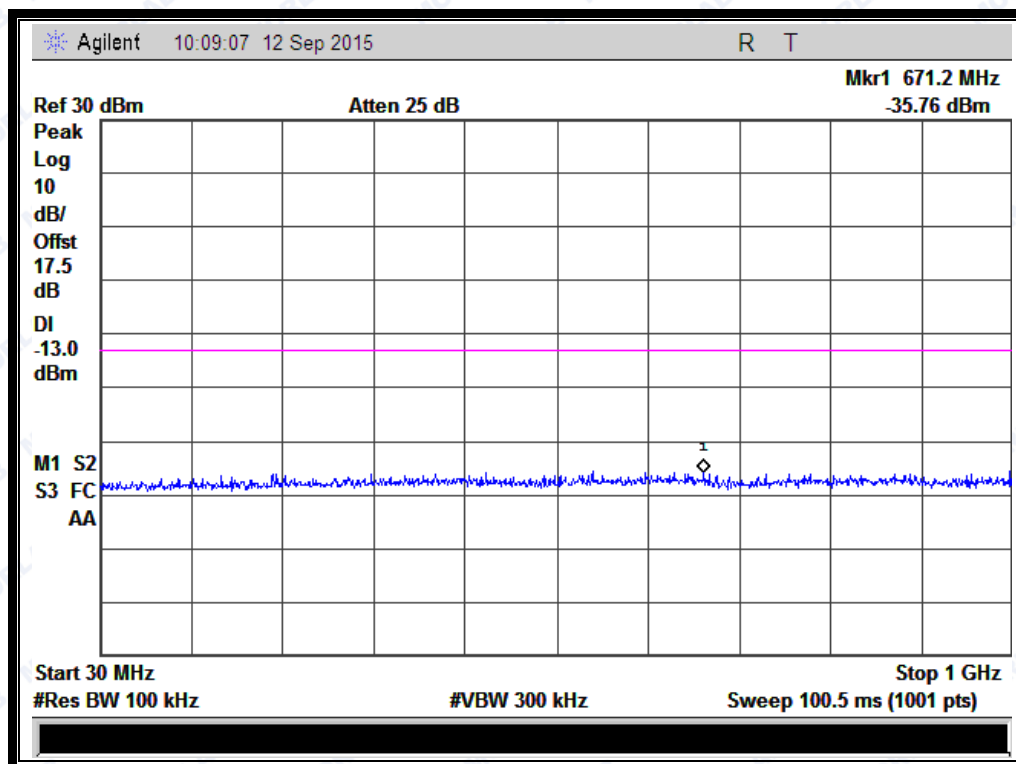
(Plot B1: GSM 1900MHz Channel = 512, 30MHz to 1GHz)



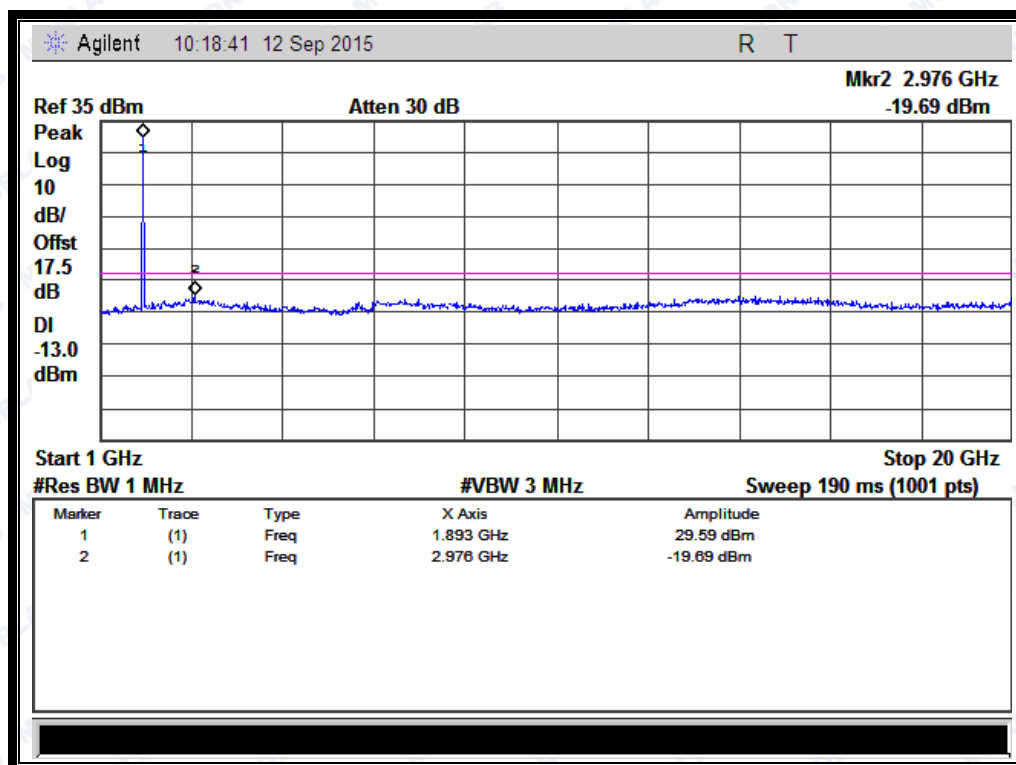
(Plot B1.1: GSM 1900MHz Channel = 512, 1GHz to 20GHz)



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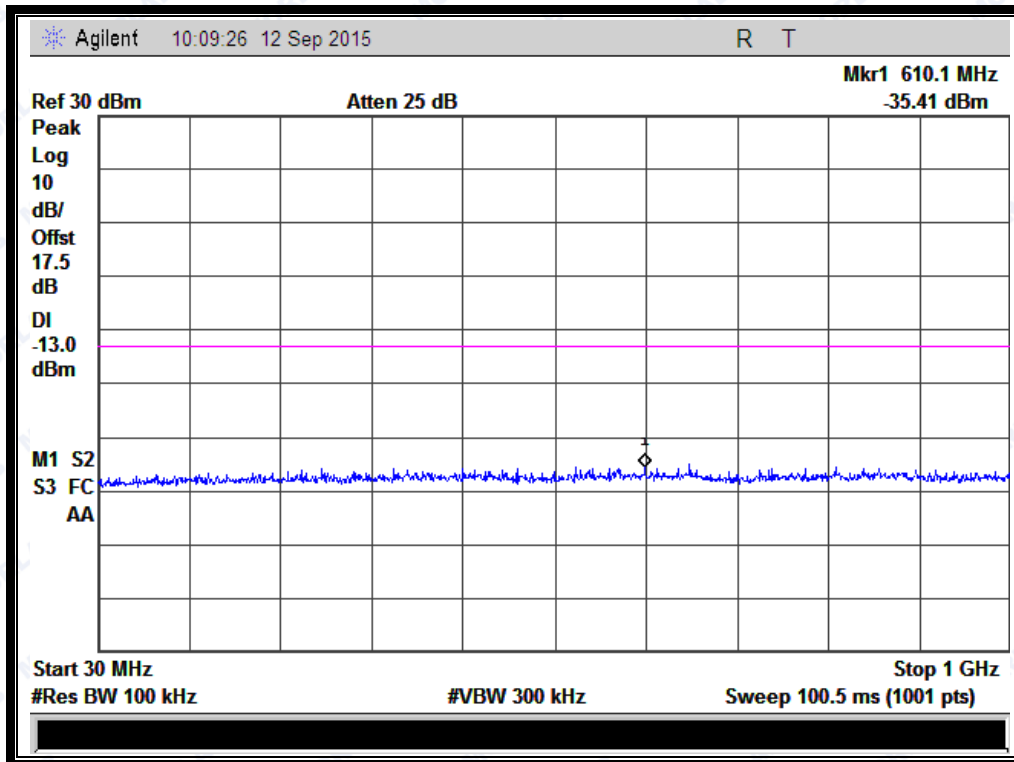
(Plot B2: GSM 1900MHz Channel = 661, 30MHz to 1GHz)



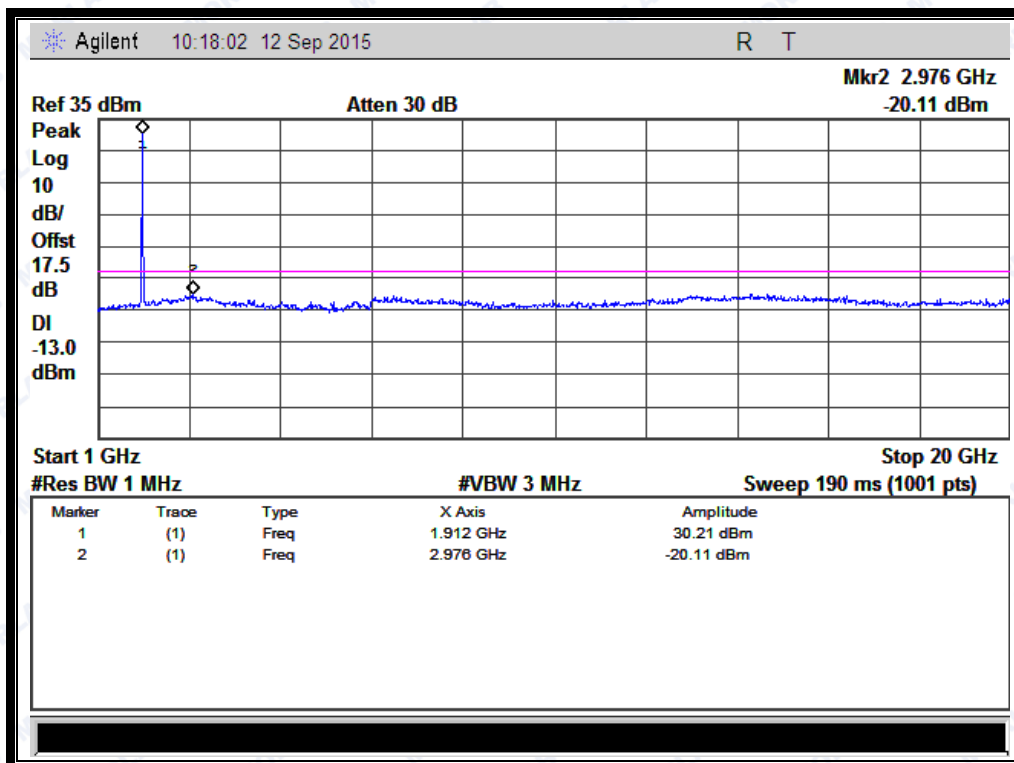
(Plot B2.1: GSM 1900MHz Channel = 661, 1GHz to 20GHz)



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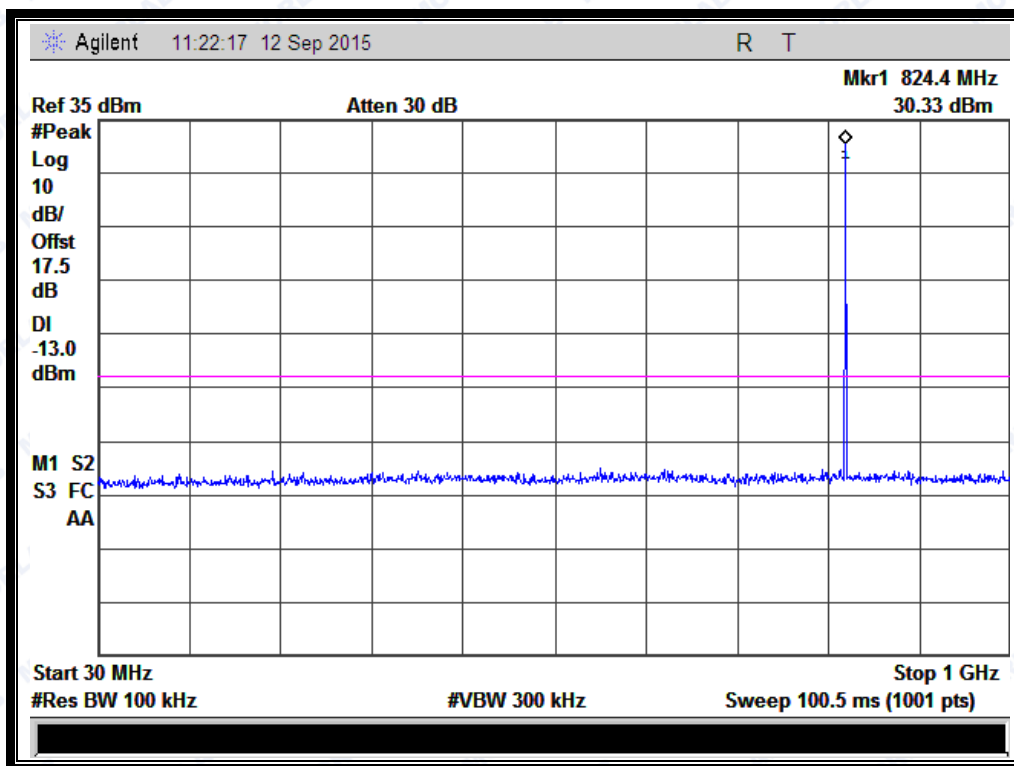
(Plot B3: GSM 1900MHz Channel = 810, 30MHz to 1GHz)



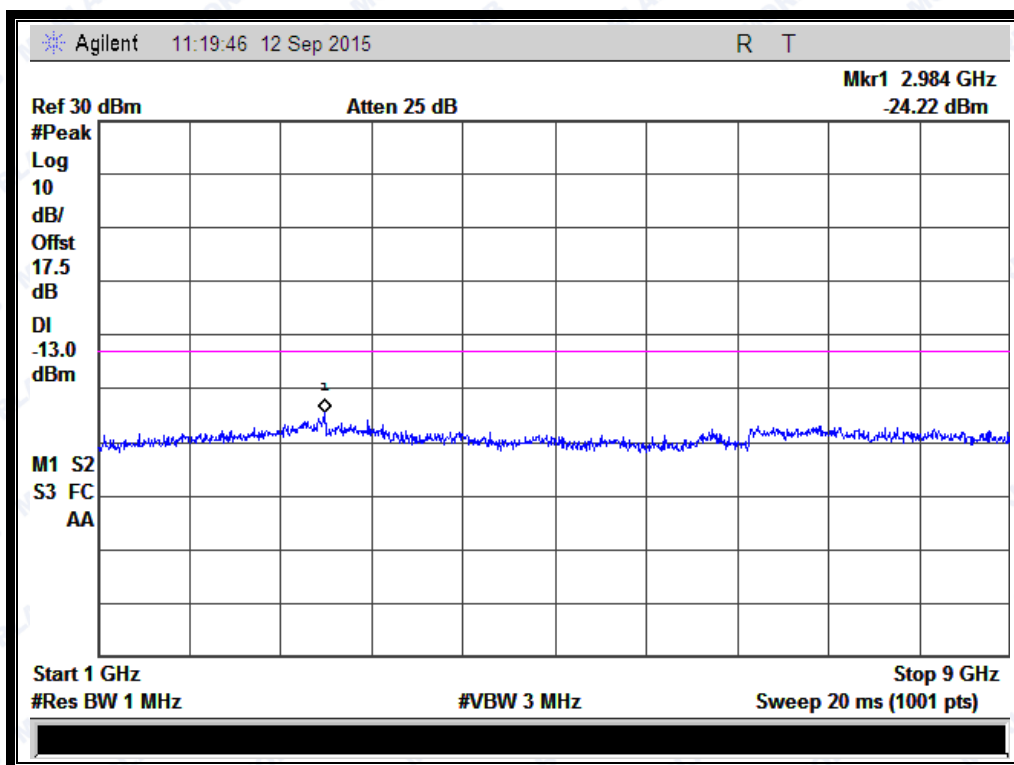
(Plot B3.1: GSM 1900MHz Channel = 810, 1GHz to 20GHz)



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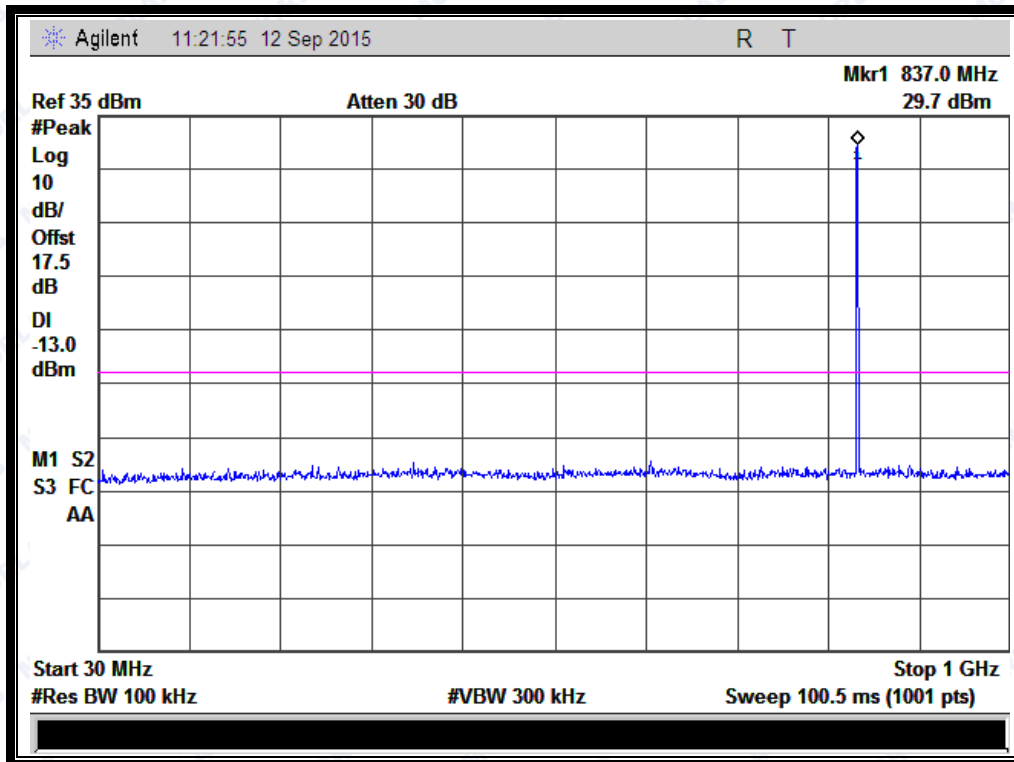
(Plot E1: EGPRS 850MHz Channel = 128, 30MHz to 1GHz)



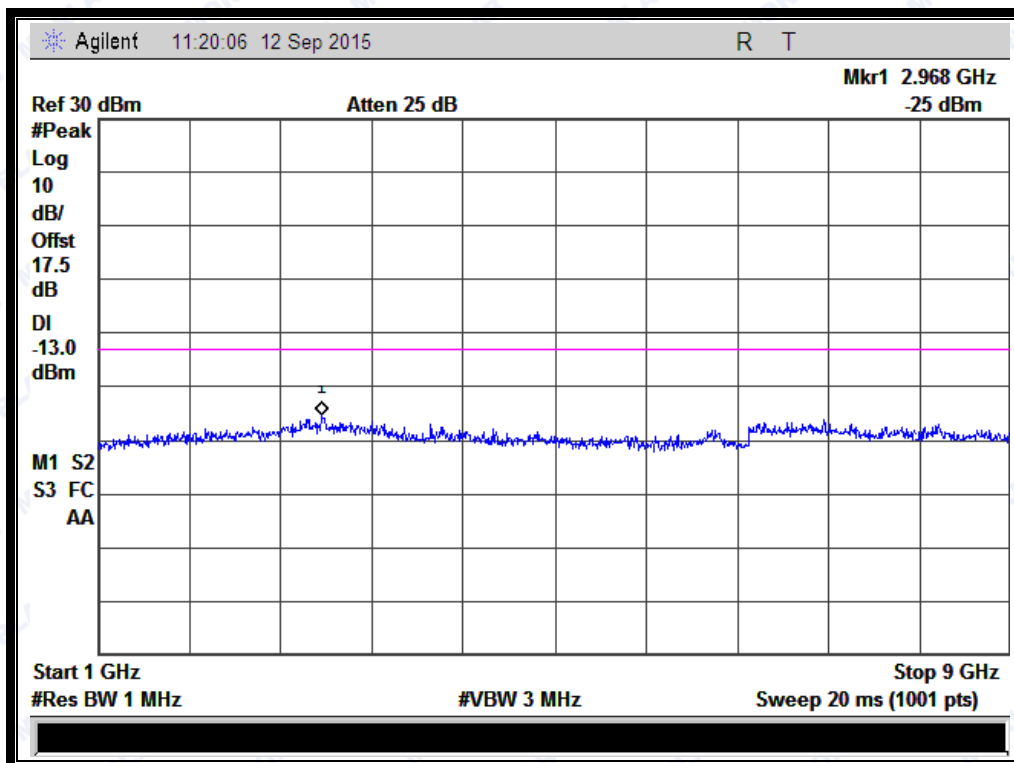
(Plot E1.1: EGPRS 850MHz Channel = 128, 1GHz to 9GHz)



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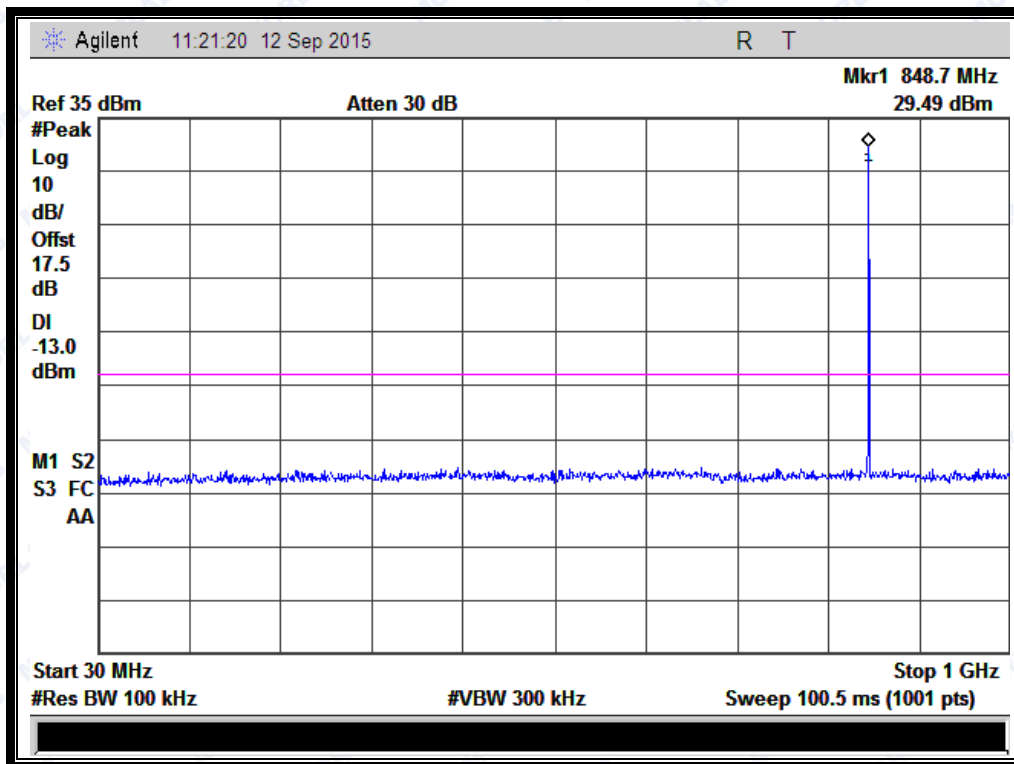
(Plot E2: EGPRS 850MHz Channel = 190, 30MHz to 1GHz)



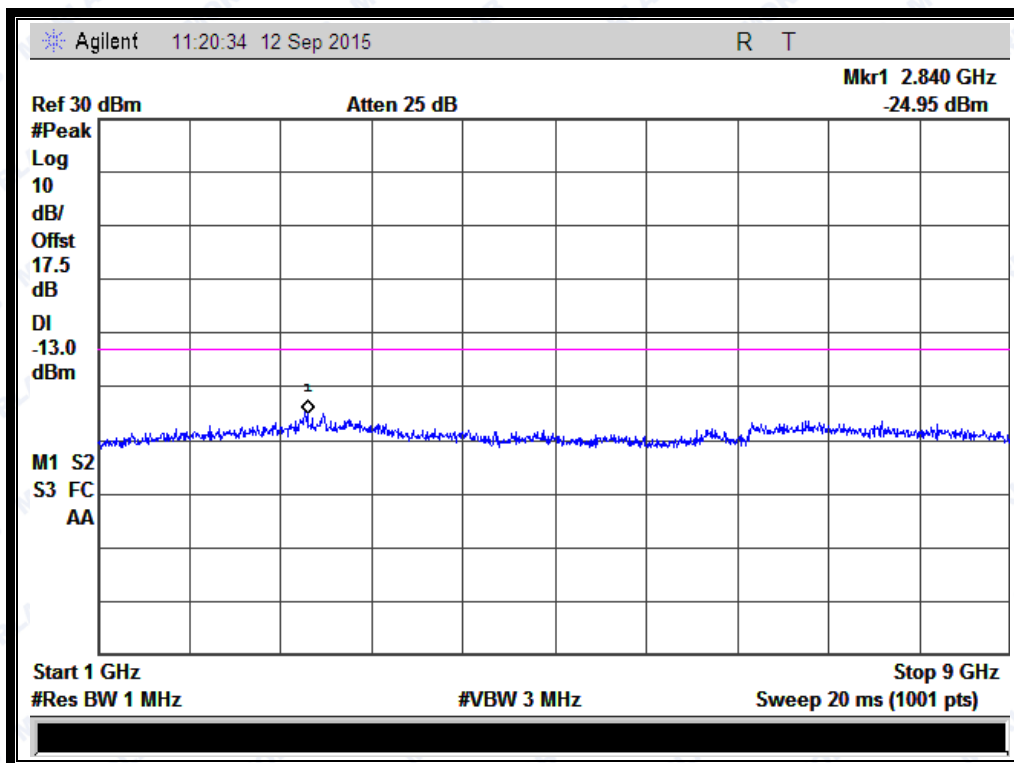
(Plot E2.1: EGPRS 850MHz Channel = 190, 1GHz to 9GHz)



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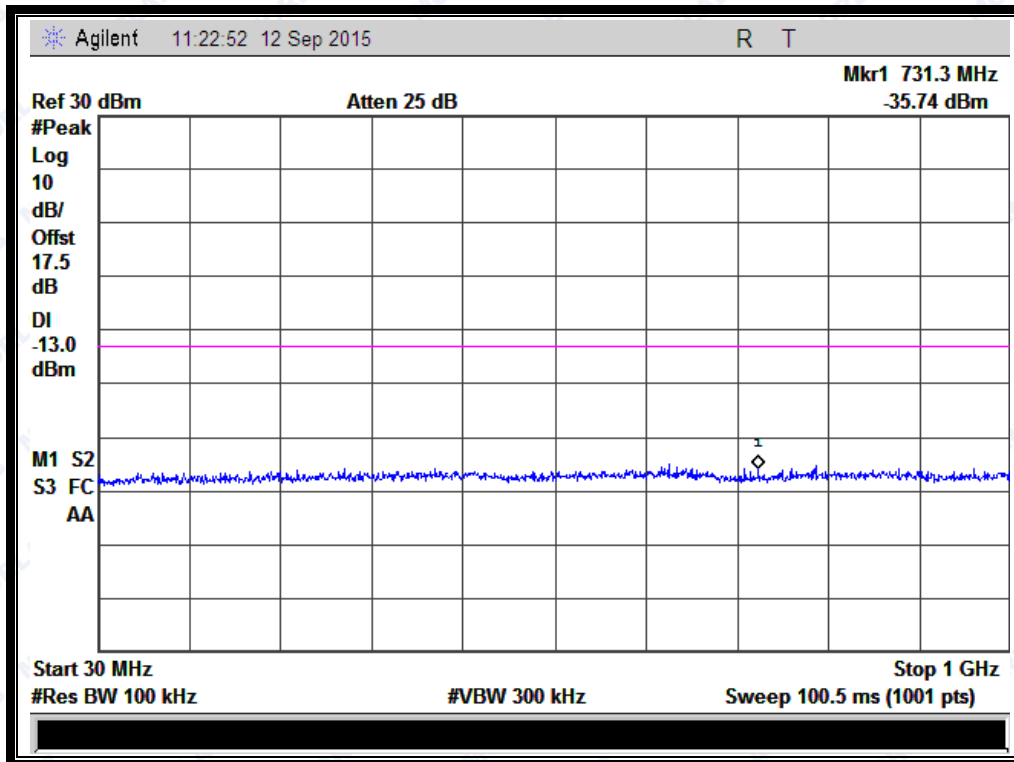
(Plot E3: EGPRS 850MHz Channel = 251, 30MHz to 1GHz)



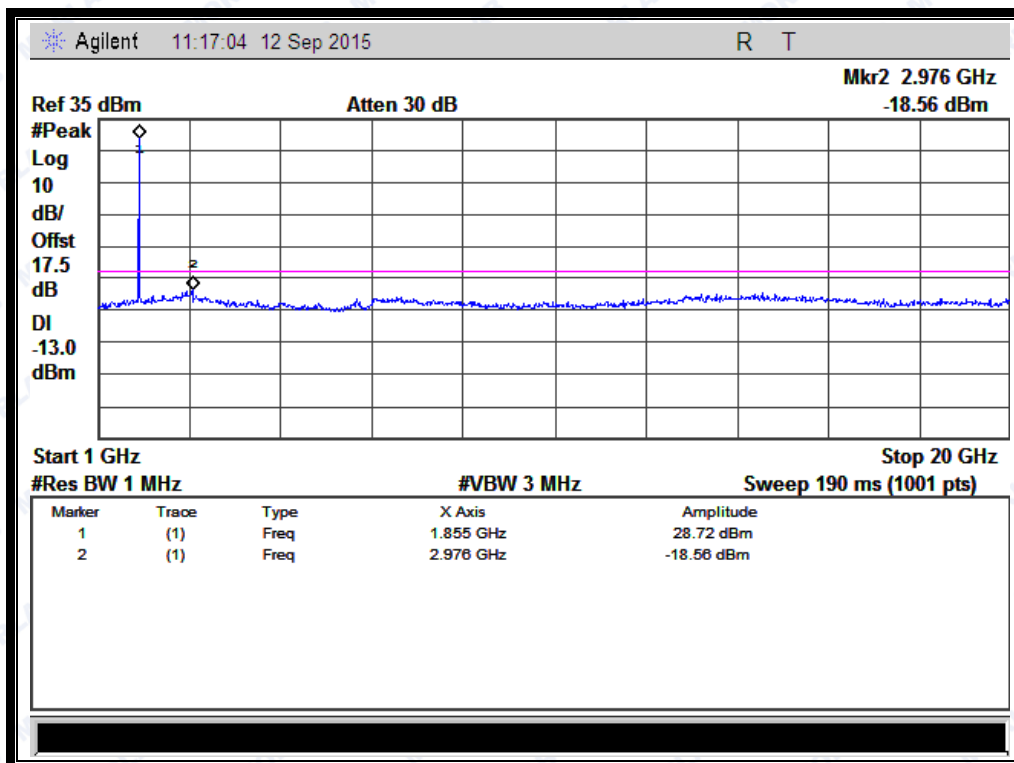
(Plot E3.1: EGPRS 850MHz Channel = 251, 1GHz to 9GHz)



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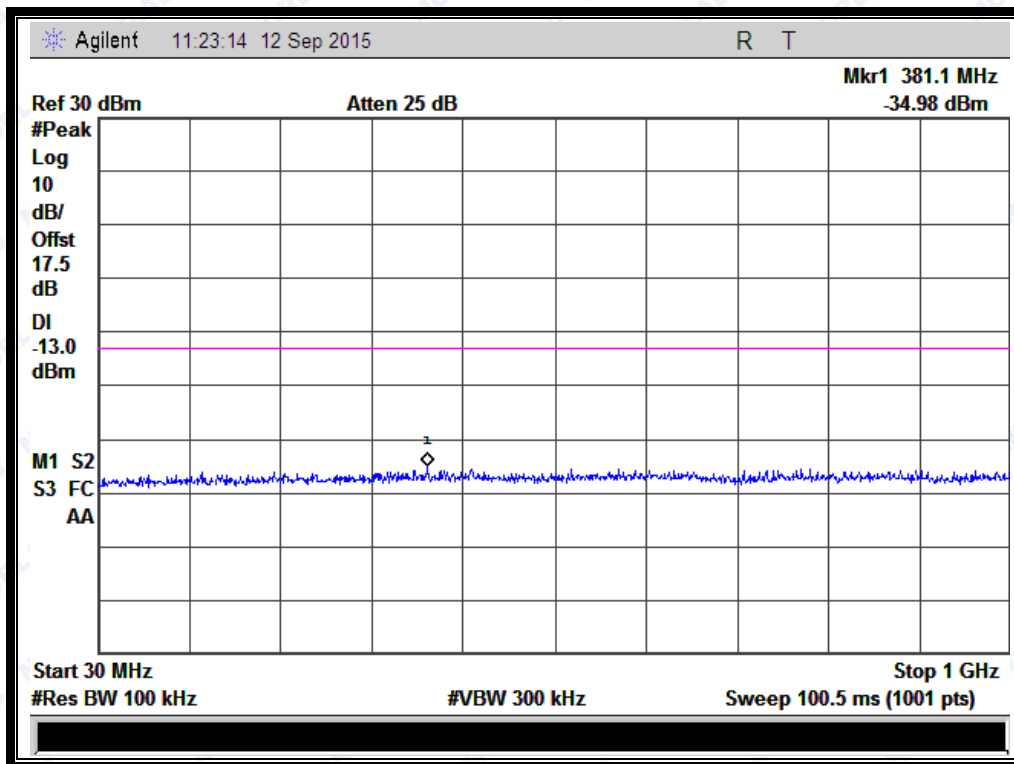
(Plot F1: EGPRS 1900MHz Channel = 512, 30MHz to 1GHz)



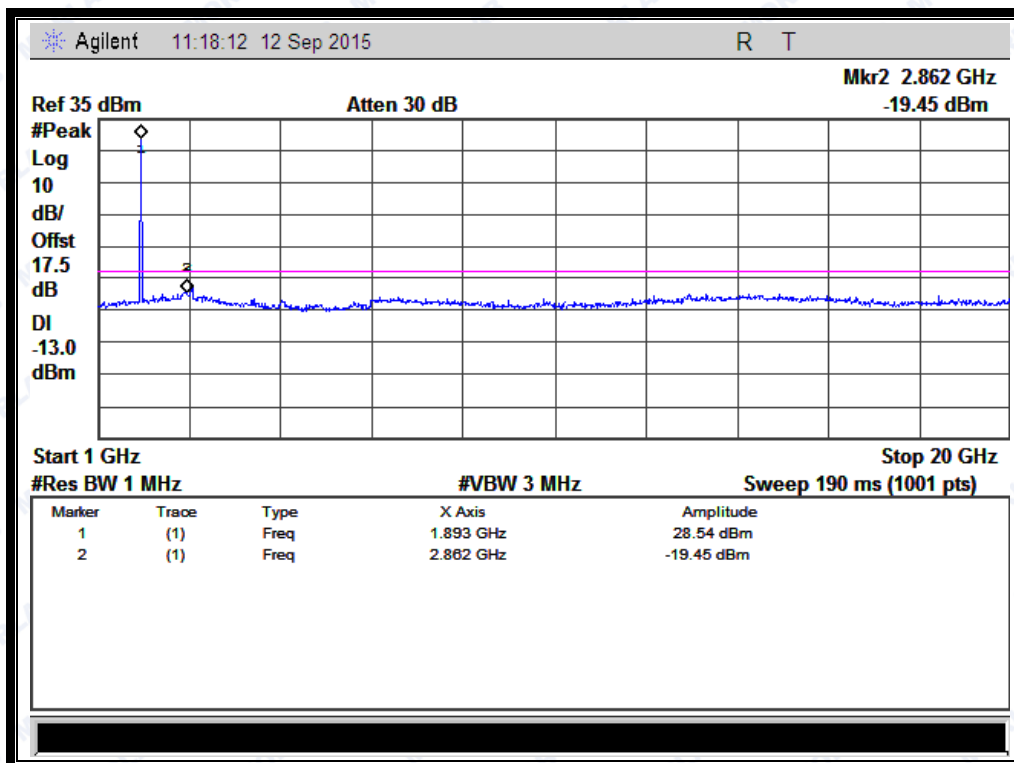
(Plot F1.1: EGPRS 1900MHz Channel = 512, 1GHz to 20GHz)



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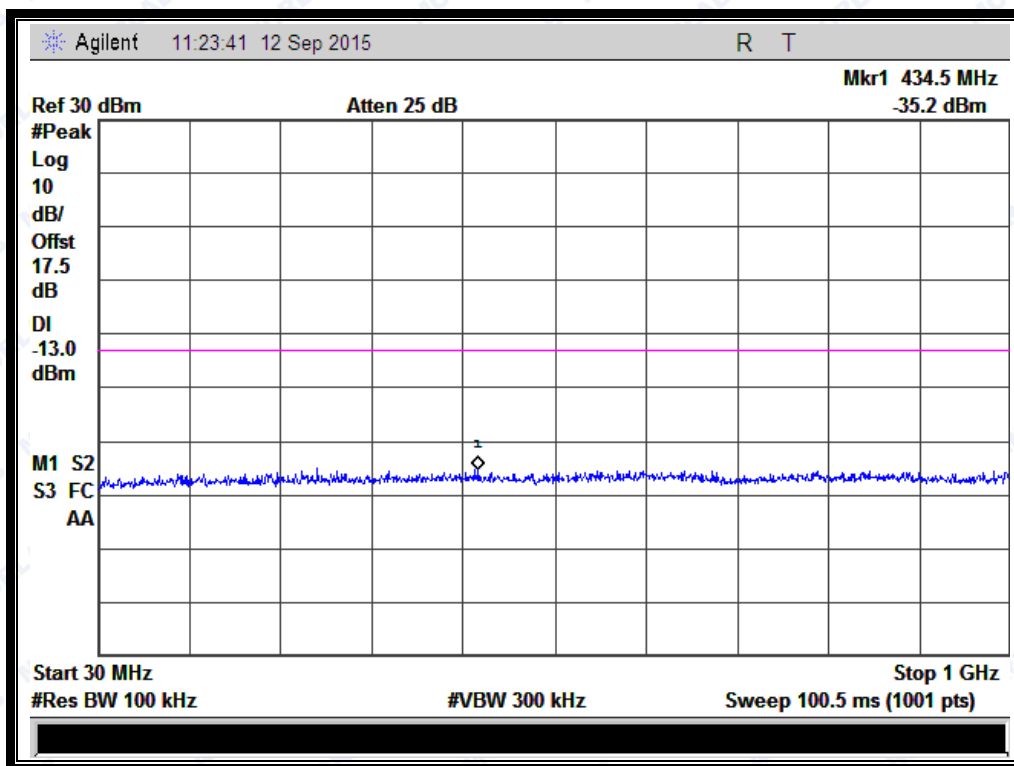
(Plot F2: EGPRS 1900MHz Channel = 661, 30MHz to 1GHz)



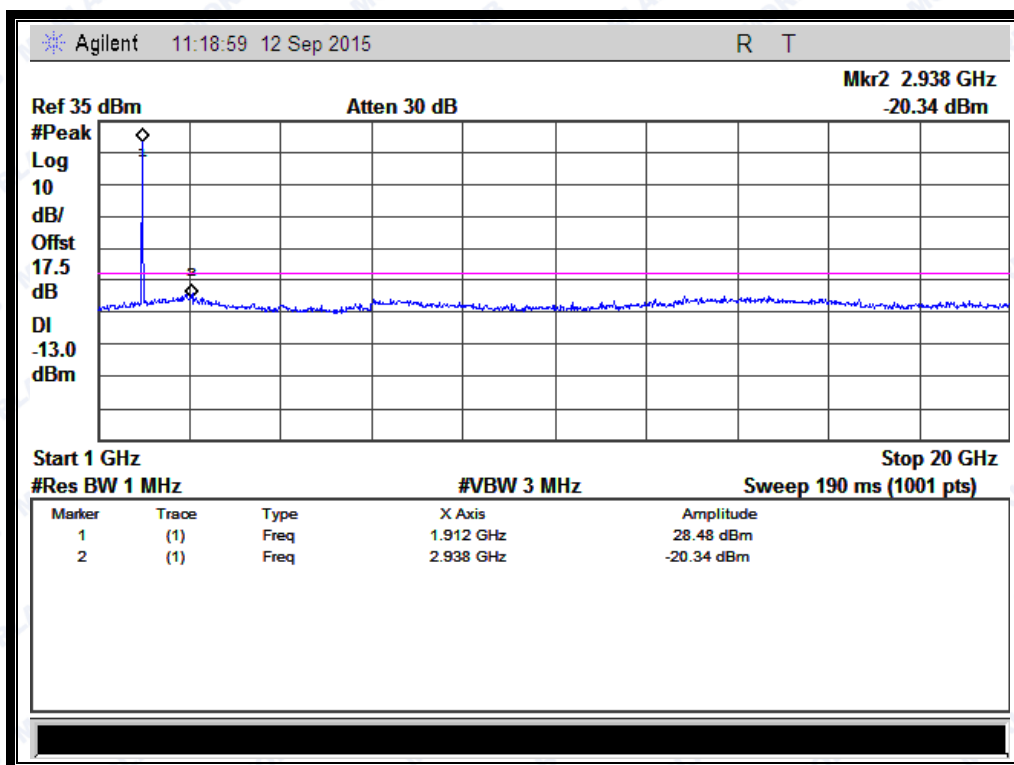
(Plot F2.1: EGPRS 1900MHz Channel = 661, 1GHz to 20GHz)



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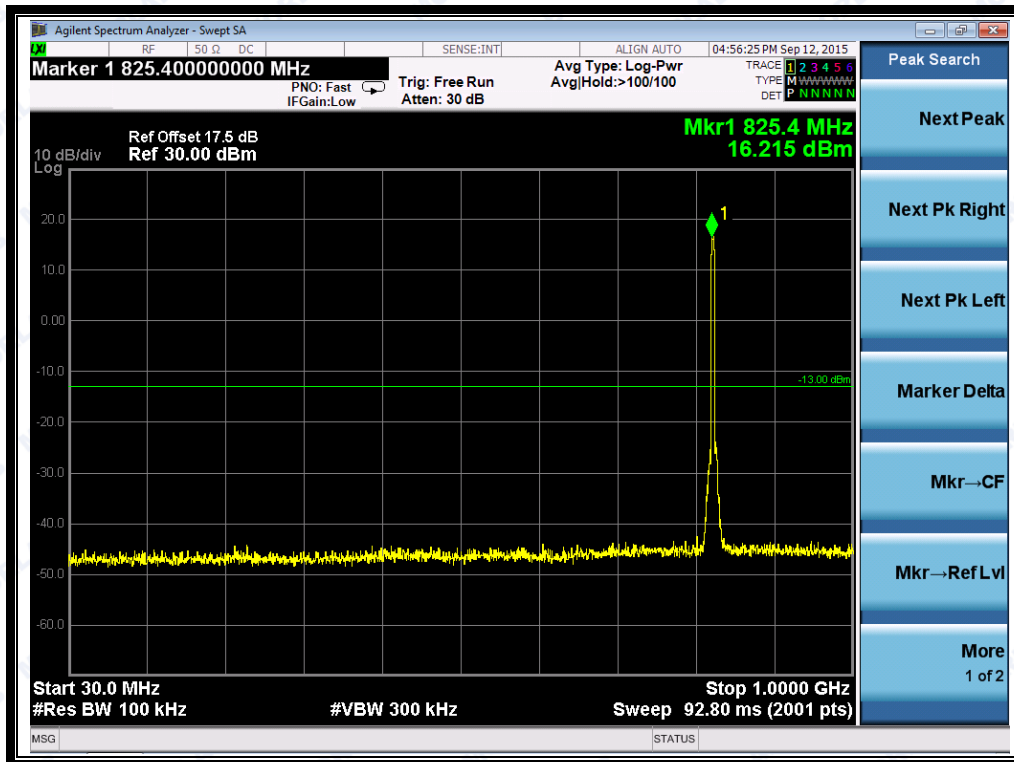
(Plot F3: EGPRS 1900MHz Channel = 810, 30MHz to 1GHz)



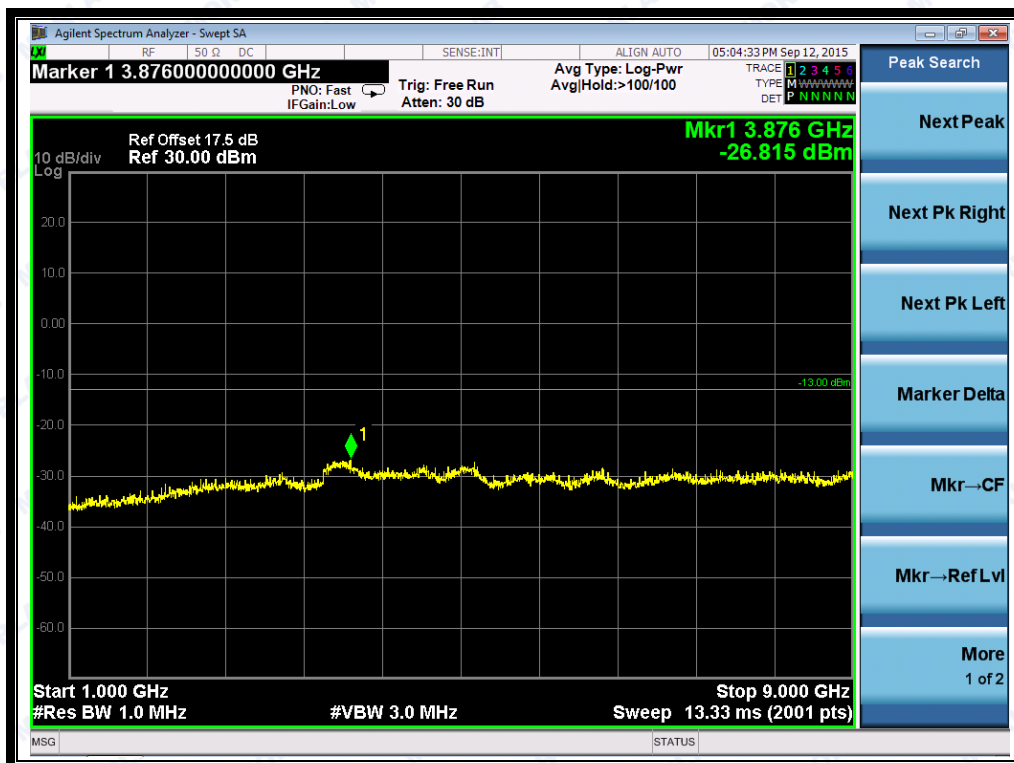
(Plot F3.1: EGPRS 1900MHz Channel = 810, 1GHz to 20GHz)



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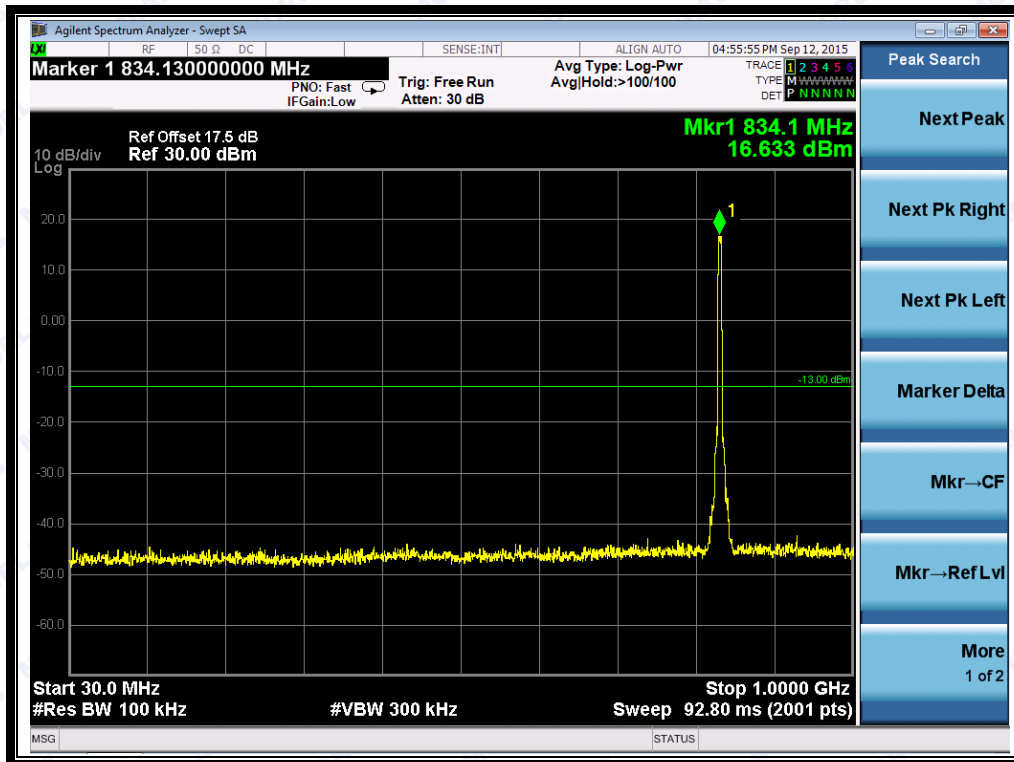
(Plot G1: WCDMA850MHz Channel = 4132, 30MHz to 1GHz)



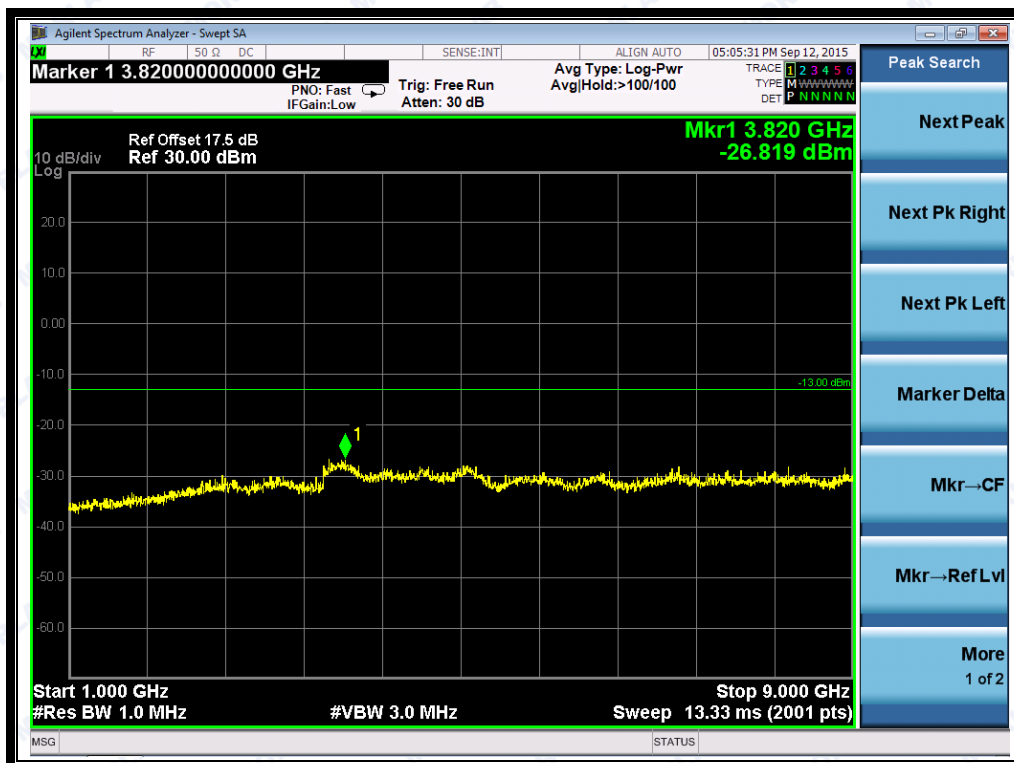
(Plot G1.1: WCDMA850MHz Channel = 4132, 1GHz to 9GHz)



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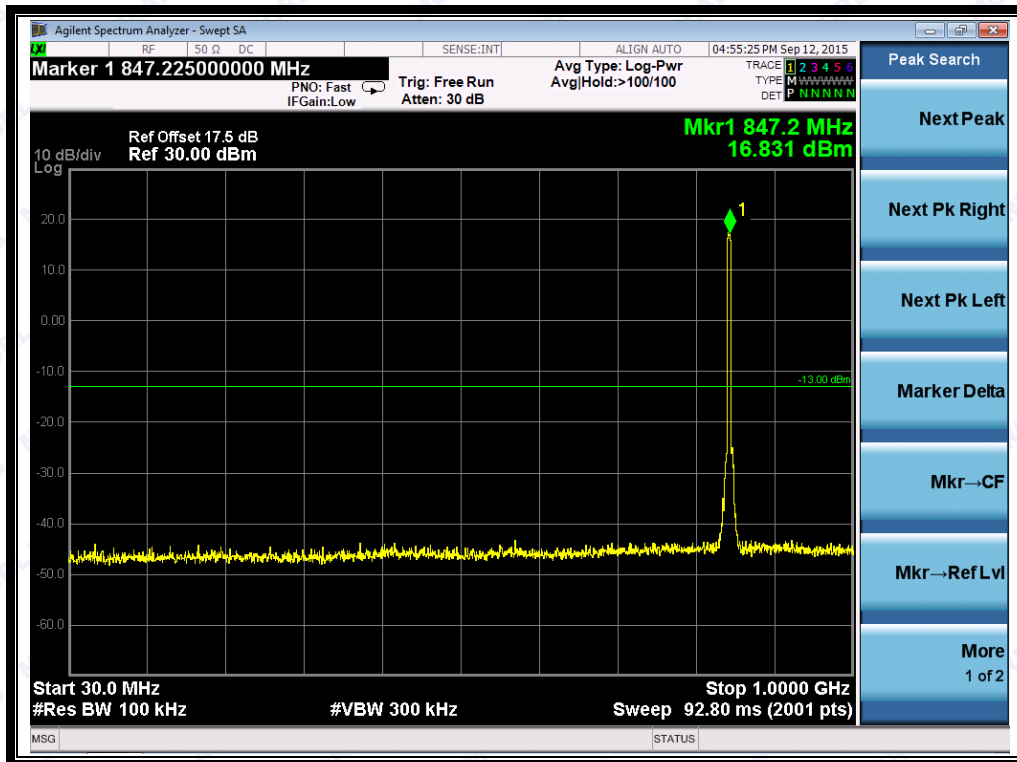
(Plot G2: WCDMA850MHz Channel = 4175, 30MHz to 1GHz)



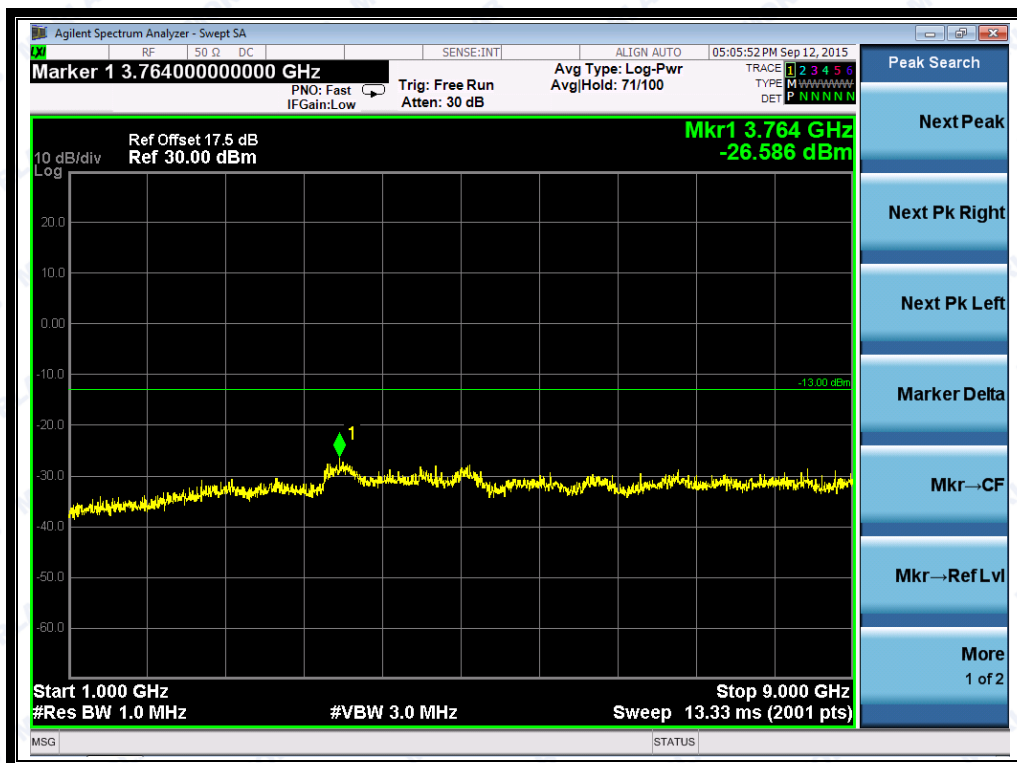
(Plot G2.1: WCDMA850MHz Channel = 4175, 1GHz to 9GHz)



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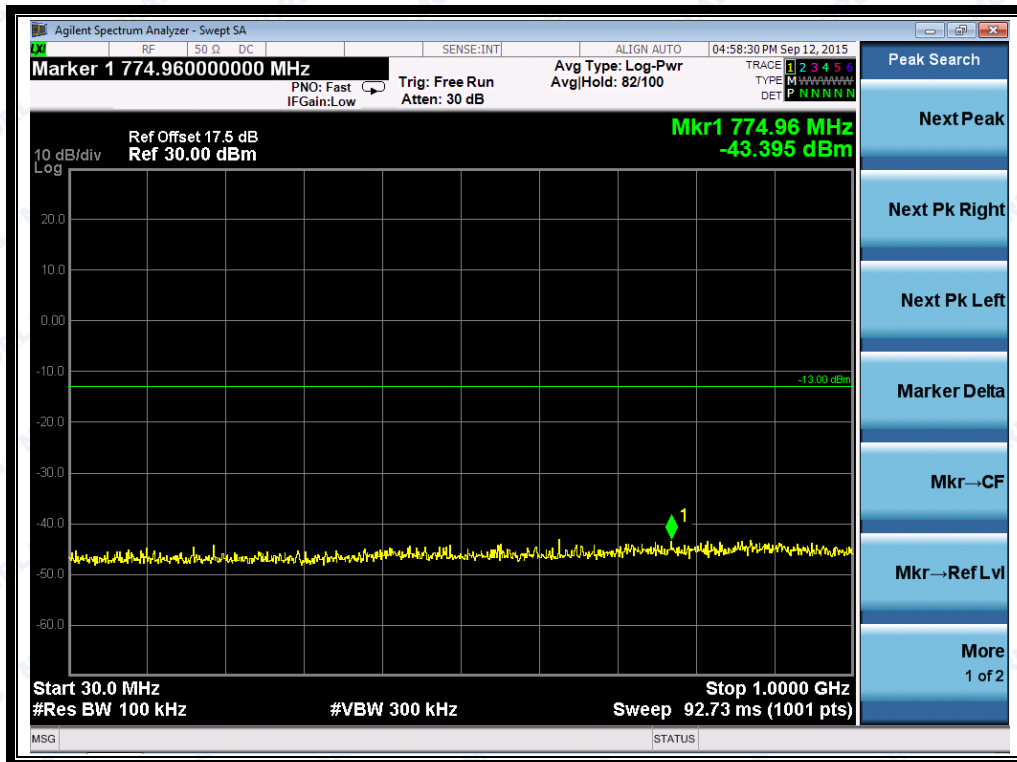
(Plot G3: WCDMA850MHz Channel = 4233, 30MHz to 1GHz)



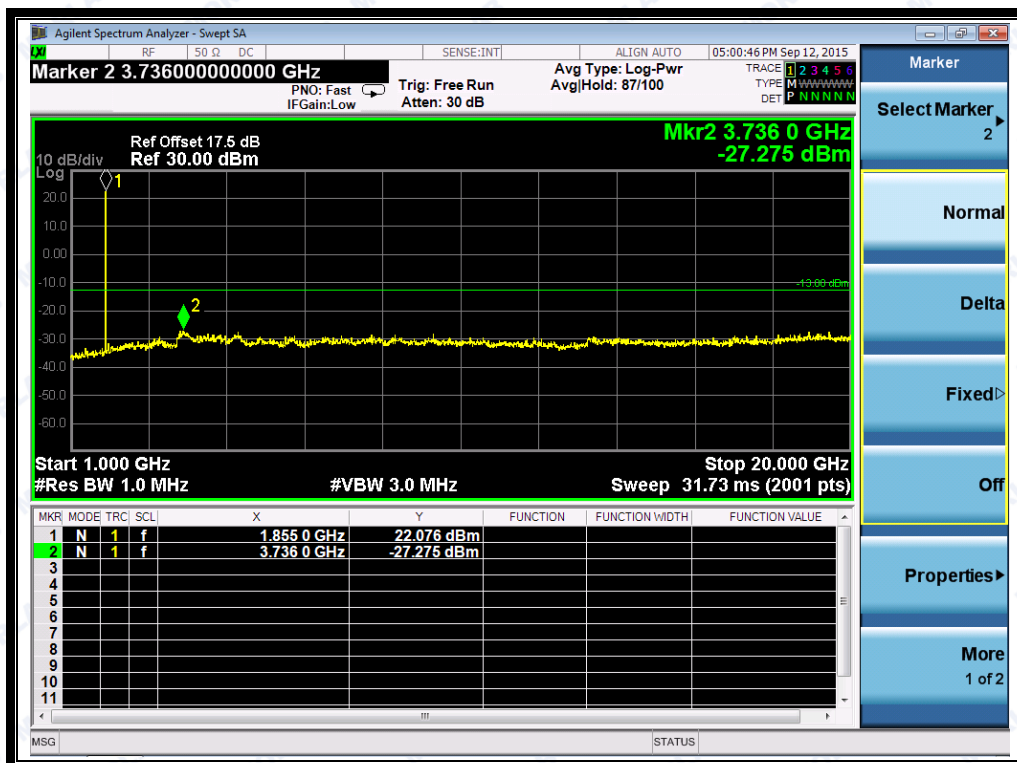
(Plot G3.1: WCDMA850MHz Channel = 4233, 1GHz to 9GHz)



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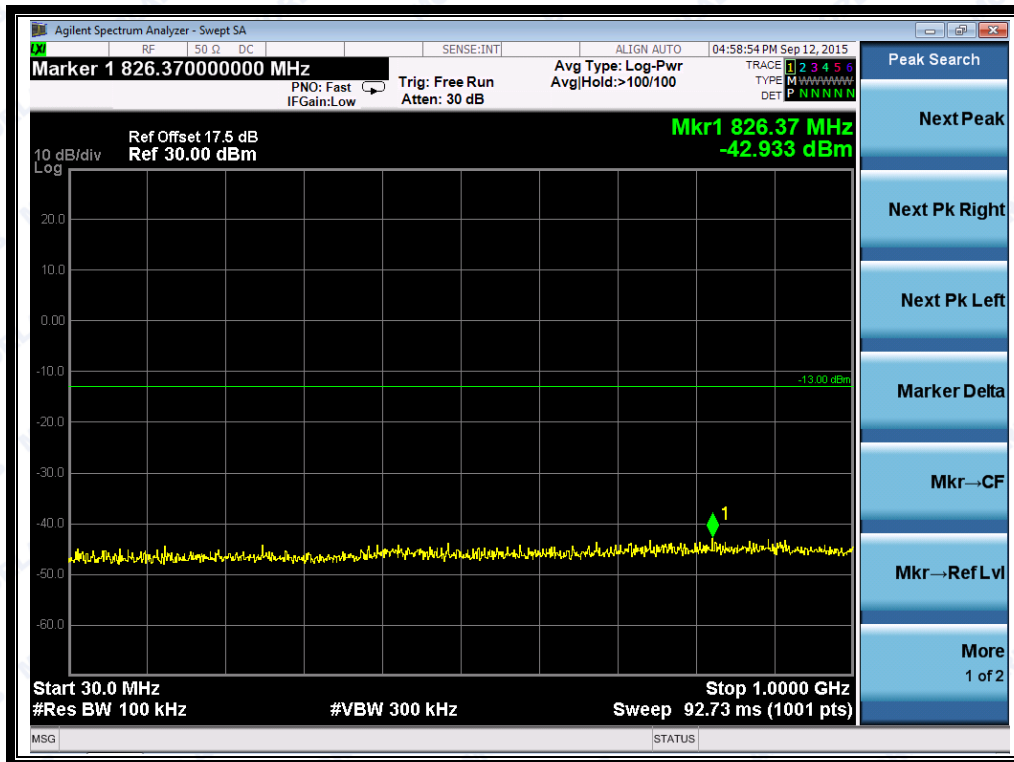
(Plot H1: WCDMA1900MHz Channel = 9262, 30MHz to 1GHz)



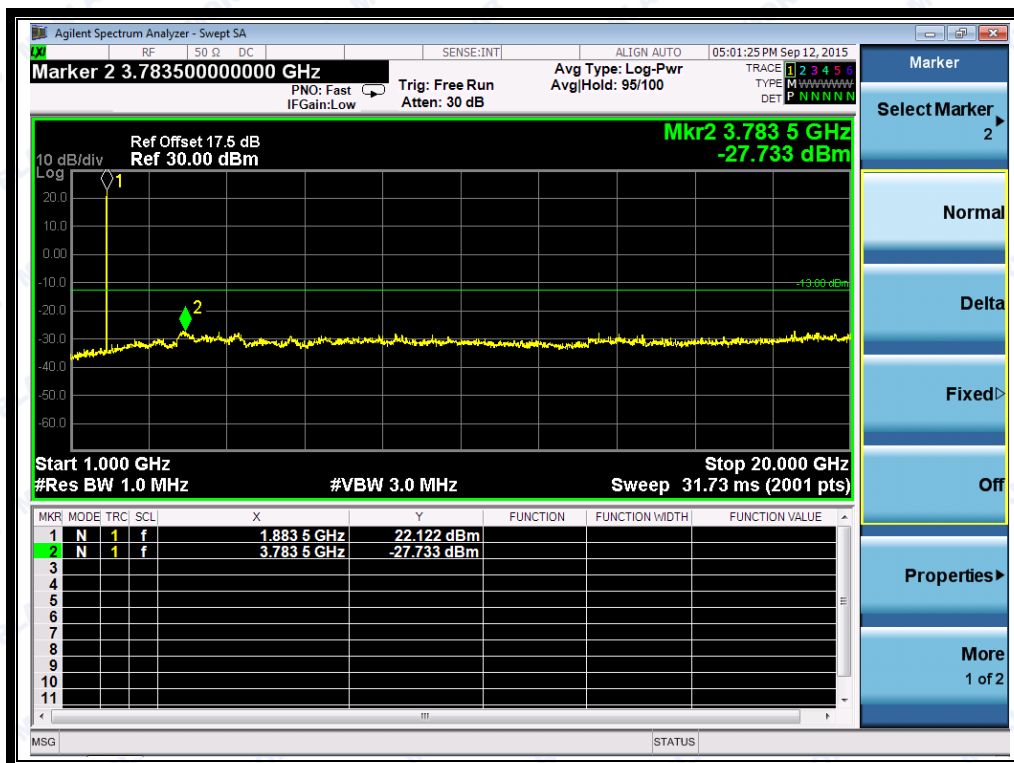
(Plot H1.1: WCDMA1900MHz Channel = 9262, 1GHz to 20GHz)



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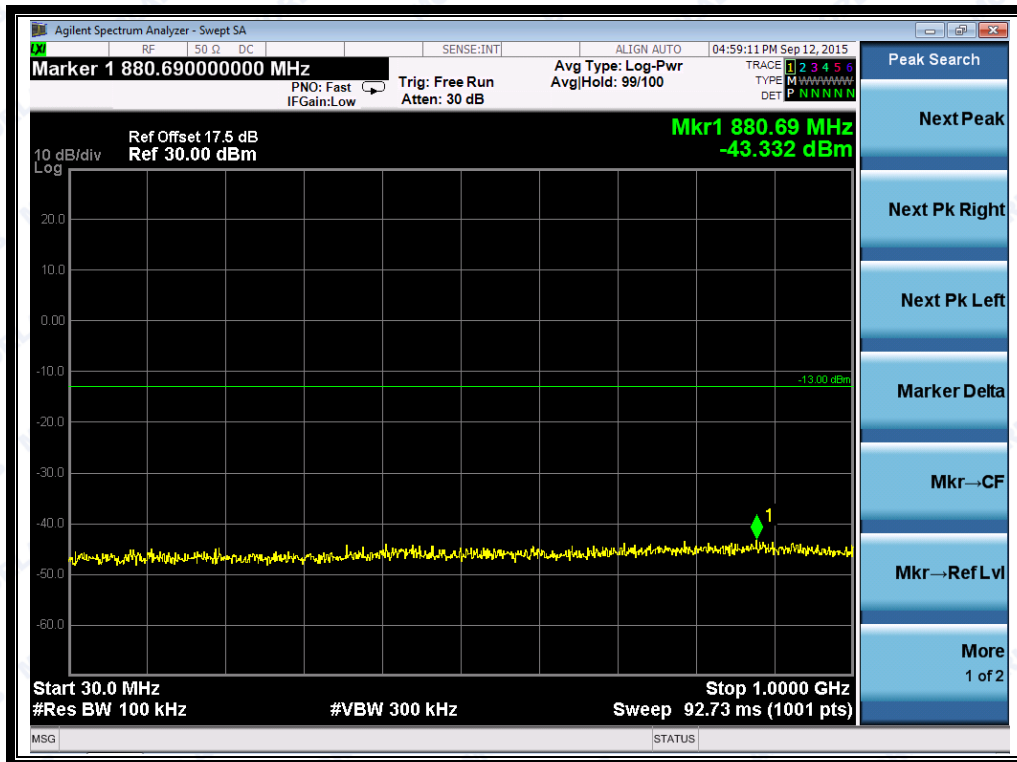
(Plot H2: WCDMA1900MHz Channel = 9400, 30MHz to 1GHz)



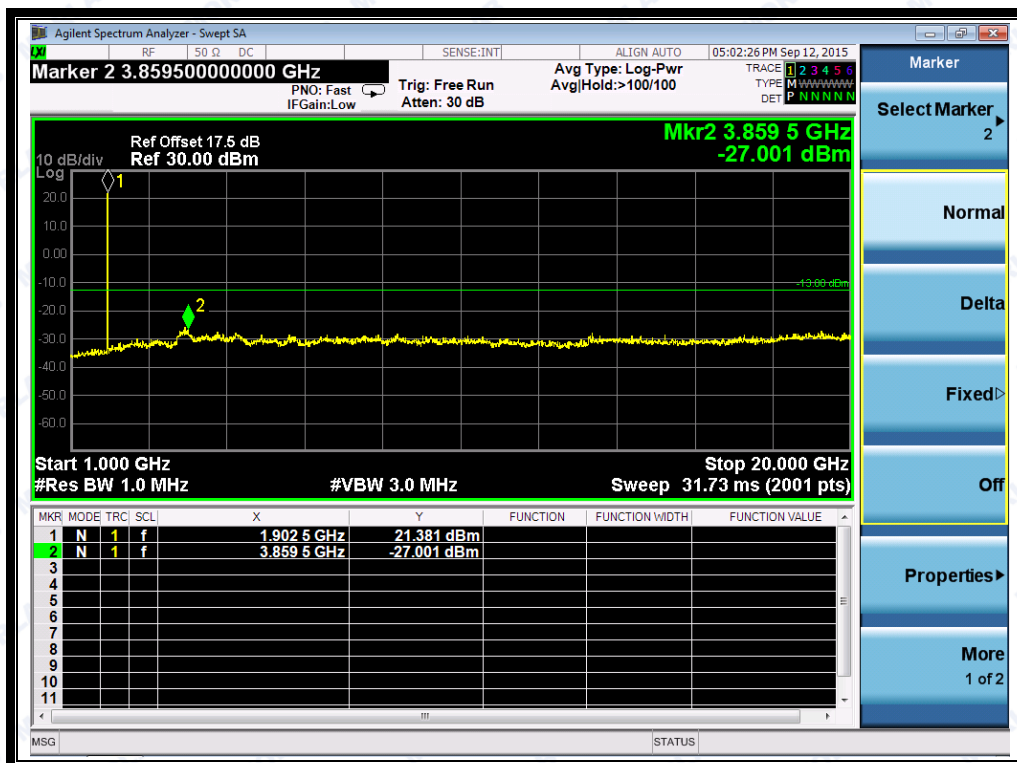
(Plot H2.1: WCDMA1900MHz Channel = 9400, 1GHz to 20GHz)



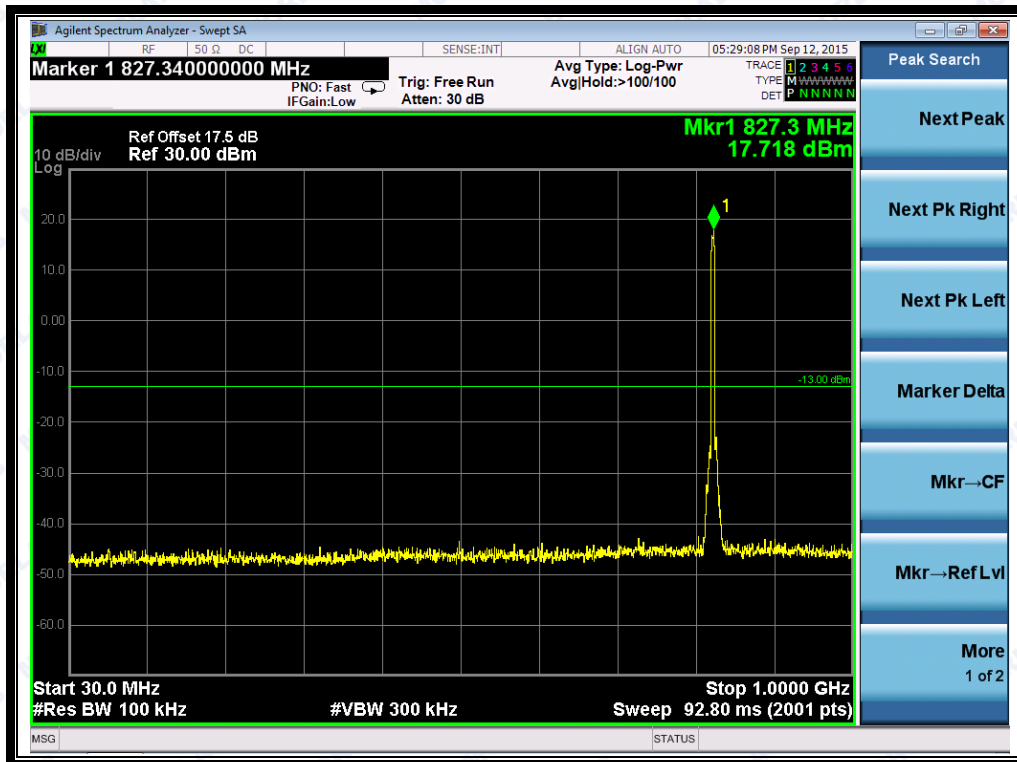
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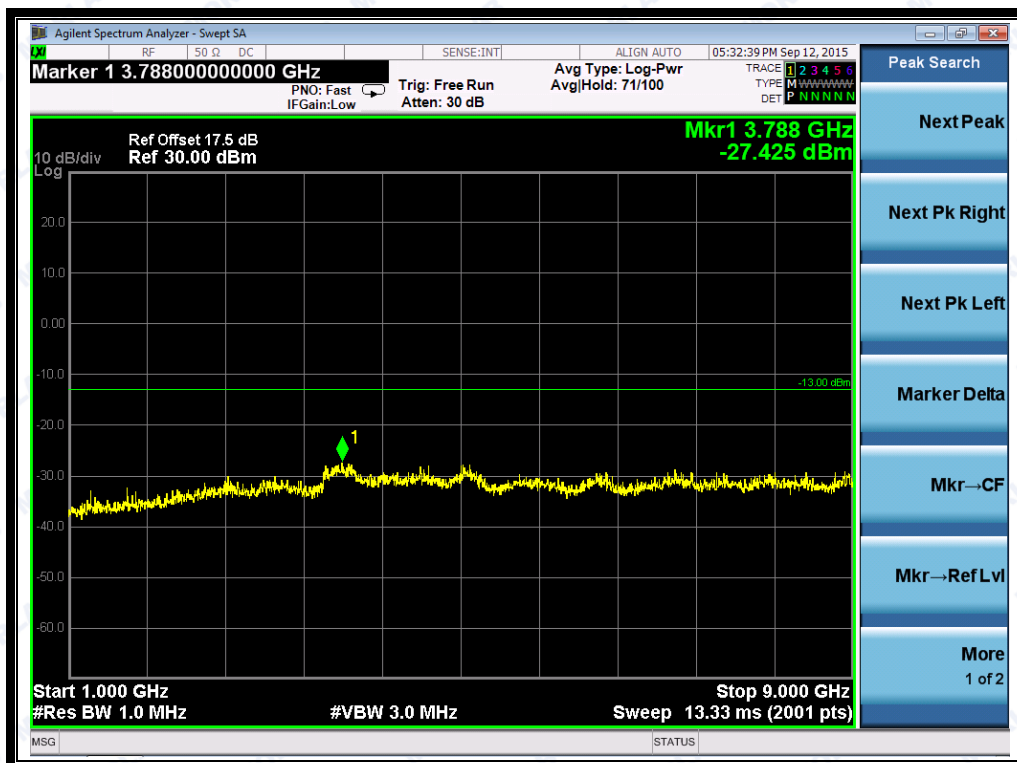
(Plot H3: WCDMA1900MHz Channel = 9538, 30MHz to 1GHz)



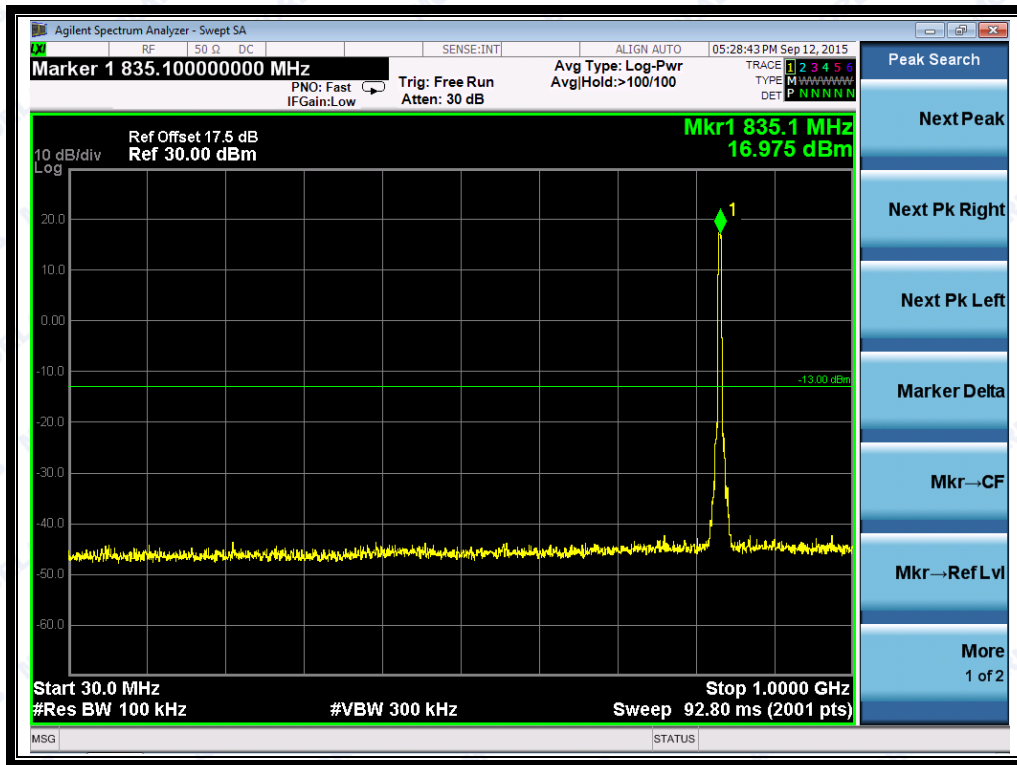
(Plot H3.1: WCDMA1900MHz Channel = 9538 1GHz to 20GHz)



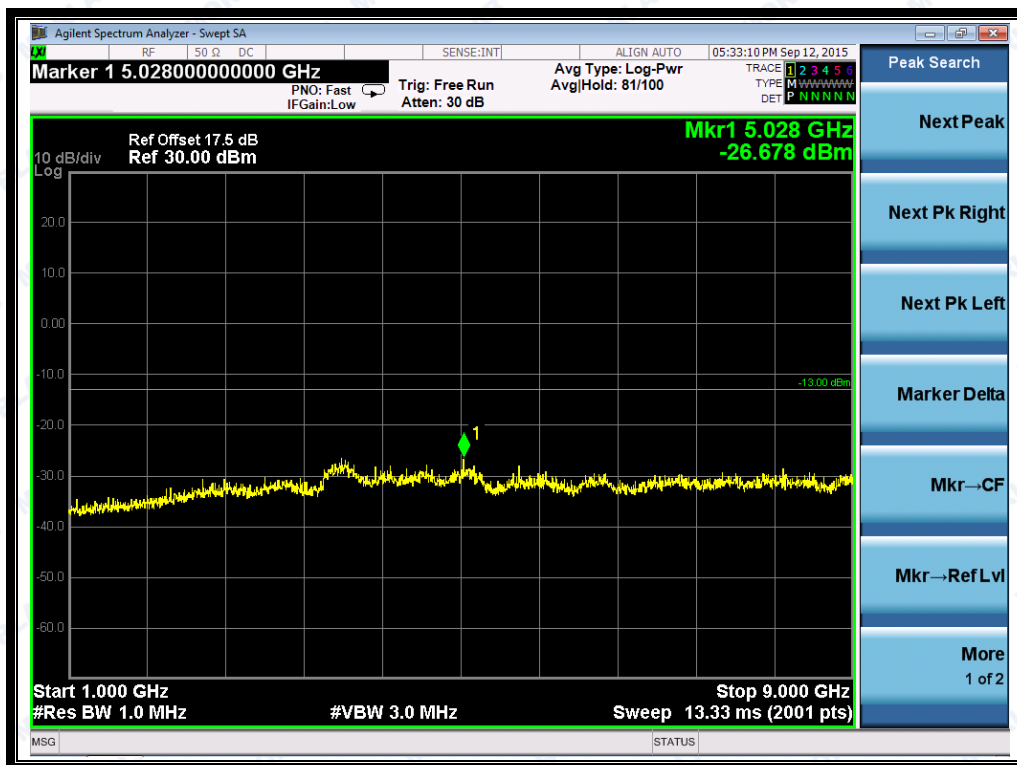
(Plot I1: HSDPA 850MHz Channel = 4132, 30MHz to 1GHz)



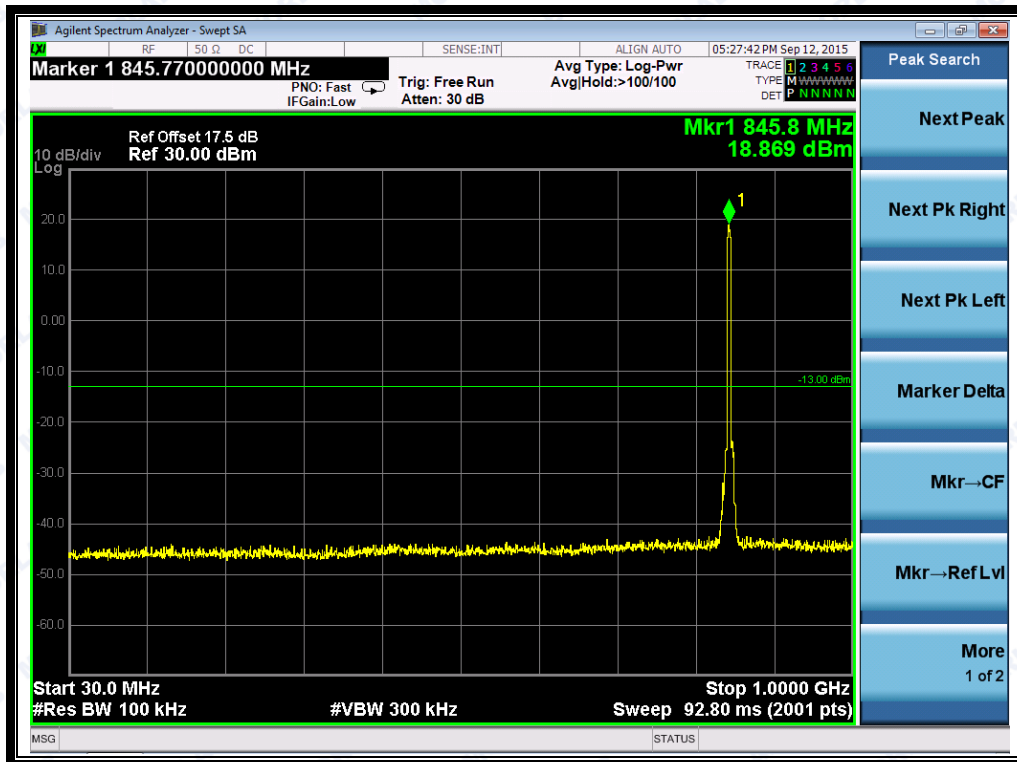
(Plot I1.1: HSDPA 850MHz Channel = 4132, 1GHz to 9GHz)



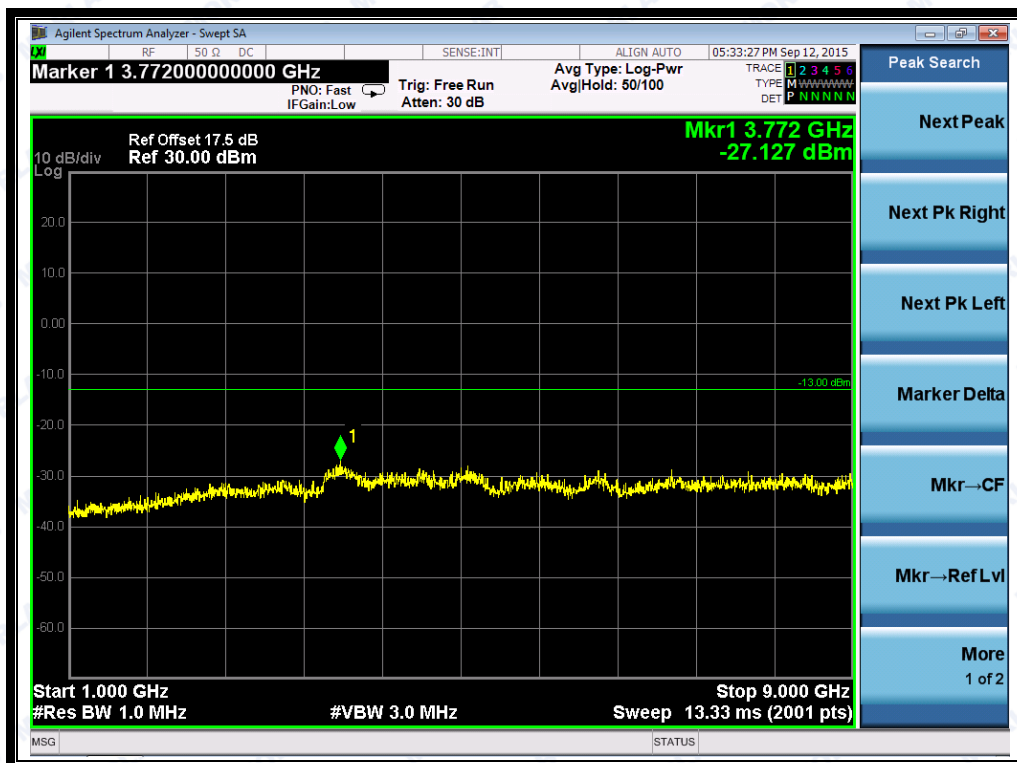
(Plot I2: HSDPA 850MHz Channel = 4175, 30MHz to 1GHz)



(Plot I2.1: HSDPA 850MHz Channel = 4175, 1GHz to 9GHz)



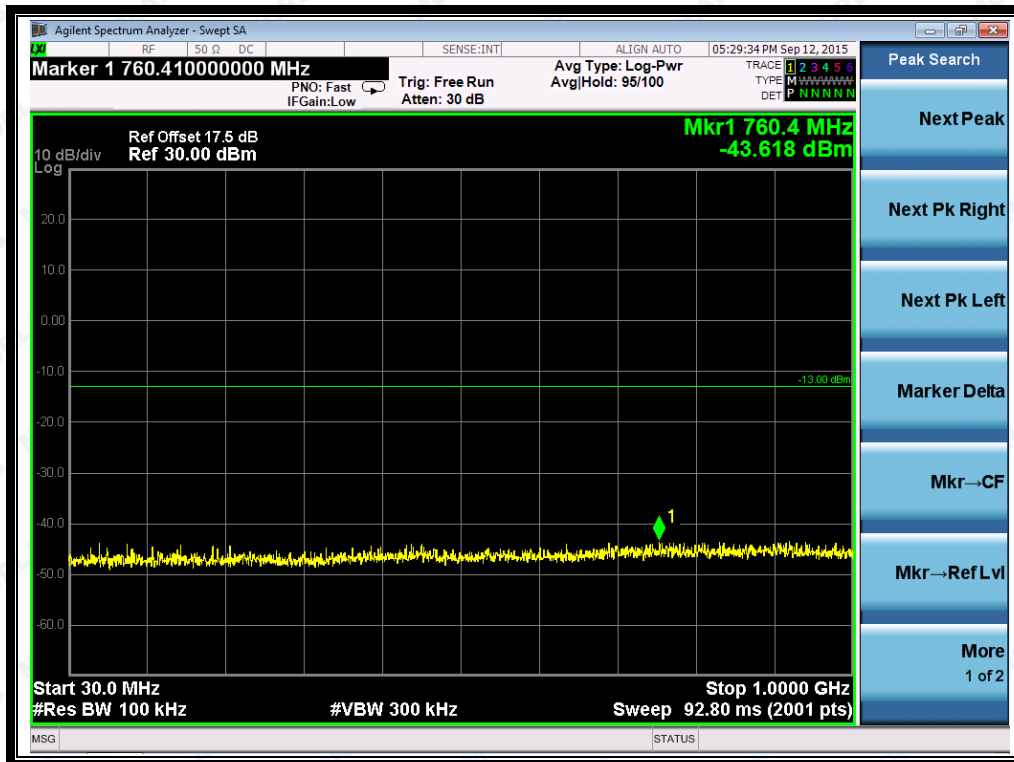
(Plot I3: HSDPA 850MHz Channel = 4233, 30MHz to 1GHz)



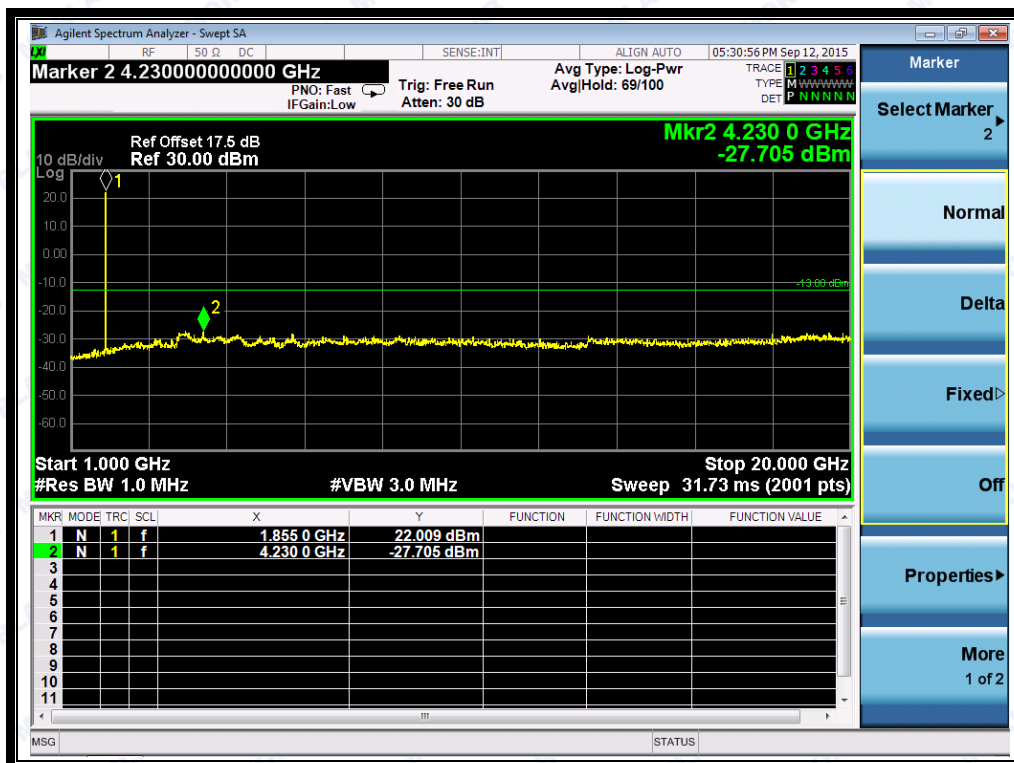
(Plot I3.1: HSDPA 850MHz Channel = 4233, 1GHz to 9GHz)



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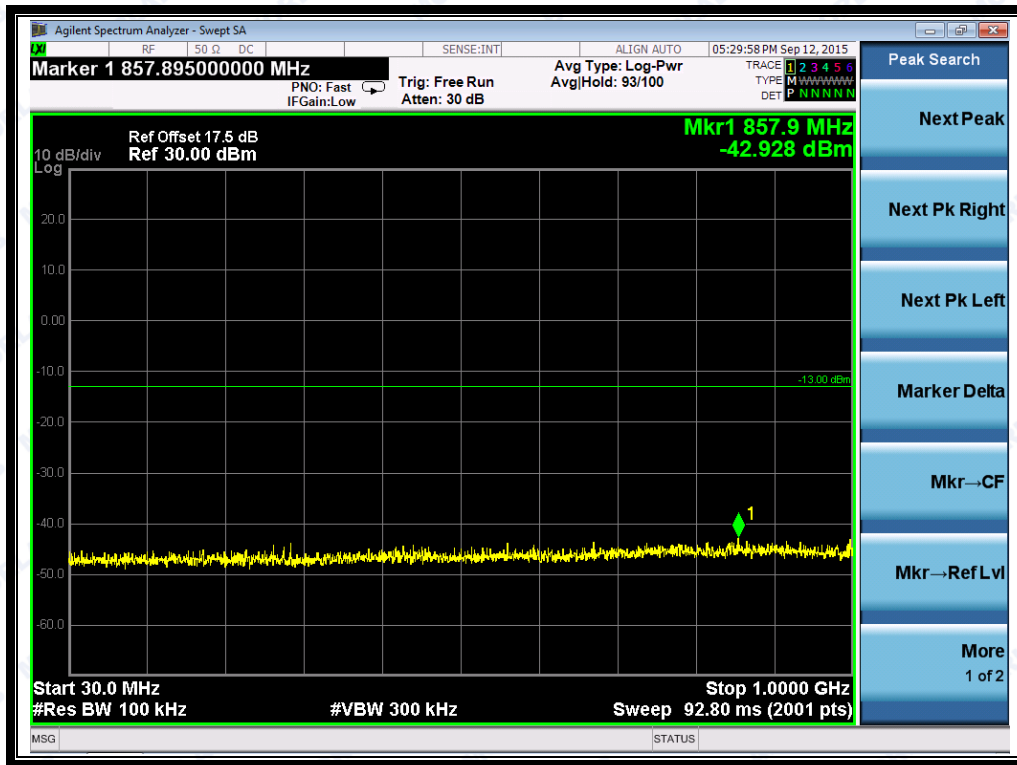
(Plot J1: HSDPA 1900MHz Channel = 9262, 30MHz to 1GHz)



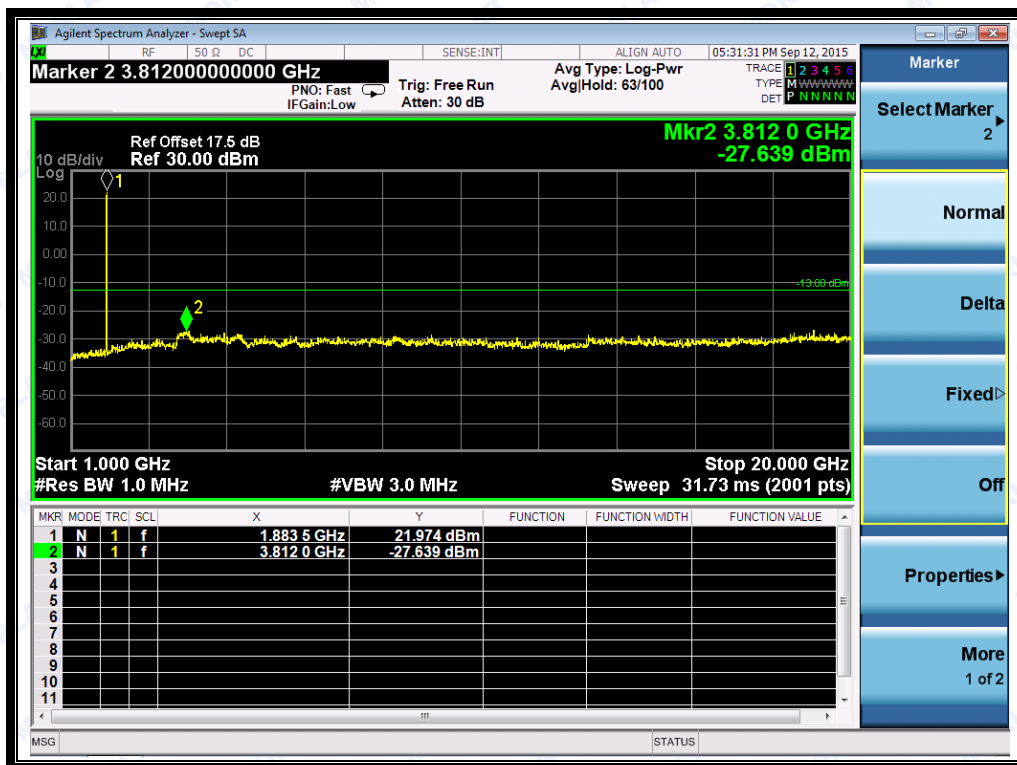
(Plot J1.1: HSDPA 1900MHz Channel = 9262, 1GHz to 20GHz)



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(Plot J2: HSDPA 1900MHz Channel = 9400, 30MHz to 1GHz)



(Plot J2.1: HSDPA1900MHz Channel = 9400, 1GHz to 20GHz)