



# Test Report Summary

## FCC CFR 47, Part 22

### Subpart H Cellular Radiotelephone Service

**Manufacturer:** ADC Telecommunications, Inc

**Name of Equipment:** FlexWave™ Prism – HDM 850 MIMO

**Model Number(s):** FWP-B4MT000MOD

**Manufacturer's Address:** P.O. Box 1101  
Minneapolis, MN 55440-1101

**Test Report Number:** MN140711 FCC Prism HDM 850 MIMO  
FCC-ID: F8I-PSM0850M

**Test Date(s):** 9 July, 2014 (Intertek)  
25, 30, 31 October & 1, 2, 6, 7, 8 November  
(ADC)

According to testing performed at Intertek, the above-mentioned unit is in accordance with the applicable electromagnetic compatibility (EMC) portions of the requirements defined in FCC Part 22.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.


All testing was done in accordance with the Federal Communications Commission's CFR 47 Part 22. The EUT fulfills the requirements of the Federal Communications Commission's CFR 47 Part 22.

Date: 11 July, 2014

Location: Intertek Testing Services (INTERTEK)  
7250 Hudson Blvd., Suite 100  
Oakdale, MN 55128  
Phone: (651) 730-1188  
Fax: (651) 730-1282

ADC Telecommunications  
1187 Park Place  
Shakopee, MN 55379  
Phone: (952) 403-8322

Testing Conducted by (ADC):  
And Report Written by:



Joshua J. Wittman  
Compliance Engineer



## **EMC Emission – T E S T R E P O R T**

**Test Report File Number:** MN140711 FCC Prism HDM 850 MIMO  
FCC-ID: F8I-PSM0850M

**Date of Issue:** 11 July, 2014

**Model Number(s):** FWP-B4MT000MOD

**Product Name:** FlexWave™ Prism – HDM 850 MHz MIMO

**Product Type:** Industrial Booster/Repeater

**Applicant:** ADC Telecommunications, Inc

**Manufacturer:** ADC Telecommunications, Inc

**License Holder:** ADC Telecommunications, Inc

**Address:** P.O. Box 1101  
Minneapolis, MN 55440-1101

**Test Result:**  **Positive**  Negative

**Test Project Number:** 101716480MIN-001  
**Reference(s)**

**Total pages including Appendices:** 77



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## 2.0 REVISION DESCRIPTION

Rev	Total Pages	Date	Description
A	77	11 July, 2014	Original Release

## 3.0 DOCUMENTATION

### 3.1 Test Regulations

The emissions tests were performed according to the following regulations:

▪ **FCC Part 22**

<u>FCC Section</u>	<u>Test</u>	<u>Results</u>
22.355	Frequency Stability	Pass
22.913	Effective Radiated Power Limits	Pass
22.917	Emissions Limits for Cellular	Pass

### 3.2 Summary:

The requirements according to the technical regulations are

- **met**
- not Met

The equipment under test does

- **fulfill the general approval requirements mentioned in Section 3.1.**
- not fulfill the general approval requirements mentioned in Section 3.1.

### 3.3 Test Operation Mode

- Standby
- Test Program
- Practice Operation
- **Max composite in and out**

### 3.4 Configuration of the Device Under Test:

Normal Operation – Cellular - 869 to 894 MHz

### 3.5 Product Options:

None

### 3.6 Chassis Specifications and Requirements:

Length: 10.0"  
Width: 12.0"  
Height: 40.0"  
Weight: 150 pounds

### 3.7 Cables:

Cable Type	Length	From	To
RF	> 3M	Ancillary Equip	EUT
RF	< 3M	EUT	50 Ohm Load
Power	< 3M	Power	Input Power
Fiber	> 3M	Ancillary Equip	EUT

**3.8 Power Requirements:**

Voltage: 120 VAC

Amps: 5.8 A

**Power Supply Utilized:**

Power Supply System : 120 VAC, Single Phase

**3.9 Typical Installation and/or Operating Environment:**

Outdoor/Indoor - System is typically employed as an outdoor repeater.

**3.10 Other Special Requirements:**

None

**3.11 EUT Software:**

Revision Level: Version V.6 or greater

Description: Internet Explorer

**3.12 EUT System Components**

Description	Model #	Serial #	FCC ID #
Prism Chassis	FP3-0000000000000111	None	
HDM 850 MIMO	FWP-B4MT000MOD	None	

**3.13 Deviations from Standard:**

Modifications required to pass:

As indicated on the data sheet(s)

**None**

Test Specification Deviations; Additions to or Exclusions from:

As indicated in the Test Plan

**None**

### 3.14 General Remarks:

The Prism HDM 850 MHz MIMO module uses identical hardware for both RF outputs. The two RF outputs will have the same rated RF performance. Thus, the report only containing one set of data for one antenna and the FCC Grant listing 2 times the power. See FCC Form 731 for Grant Notes.

The Host unit connects directly to the BTS via coax. The Host unit does not connect to an antenna or amplifier, thus it is a Part 15 device and has been tested and is compliant as such. No FCC ID is necessary in Uplink path.

Industry practice has generally set the input signal power level. Test signal used was  $\approx -25$  dBm input to DHU. Industry practice has generally set the output signal power level.

Prism Remote:

Range: 100 - 240 VAC

Tested @: 120 VAC

Tested @: 5.8 A

Digital Host Unit (DHU):

Range: 21-60 VDC

Tested @: 48 VDC

Tested @: 3.5 A

Application details for 2.1033(c)(8), 2.1033(c)(10), and 2.1033(c)(13):

RF amplifier output stage has three devices with 27.5 VDC voltage applied. Current for device #1 is 3.5A max. Devices #2 and #3 have 1.5A max.

The input to the host unit has a digital attenuation chip (ALC) to provide protection from overdrive with 5-10 millisecond attack time / 100 millisecond decay time and 31 dB of head room, such that single channel operation, or multi-channel operation will not exceed nominal gain of the system.

The frequency stability is derived by the BTS, base transceiver station. This product uses internal frequency stability to keep the signal inside our filter bandwidths. This means that the frequency can change, but the frequency that transmits is still at the original frequency. The remote system uses the data over the fiber optic path to phase/frequency lock to the host. The purpose is to frequency lock the up- and down-conversion local oscillators, and thereby eliminate any end-to-end frequency shift.

The spurious limitation is completed with the duplexer. The ALC also suppresses in-band spurious by preventing PA overdrive, while the duplexer suppresses out-of-band spurious. Internal to the electronics, the use of SAW filters provides for higher Q roll-off at band edges.

This equipment does not modulate the RF, so there is no modulation limiter. This equipment does not change the modulation of the RF or the occupied bandwidth of any channel. It transports the signal, as is, over an optical link. The RF input is not changed in the RF output.

This is a constant gain device, so the setup controls the output. There is an overdrive and overpower limit control that prevents excess power.

## **4.0 TEST SET-UP DRAWINGS AND PHOTOS**

[Table of Contents; Section 1.0](#)

### **4.1 Test Set-up Photo, Radiated Emissions**

Reference Intertek Report 101716480MIN-001



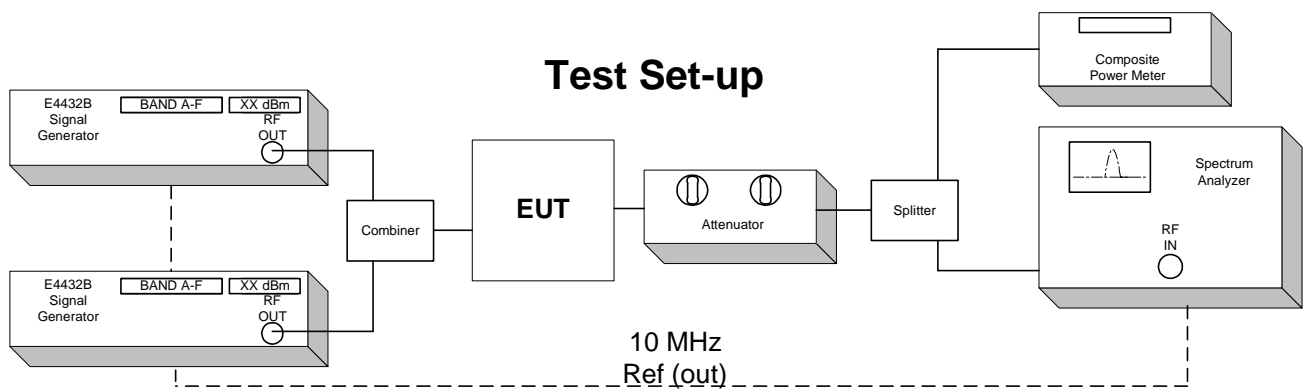
## 4.2 Test Set-up Drawings

### Band Edge Test

### Output Power Test

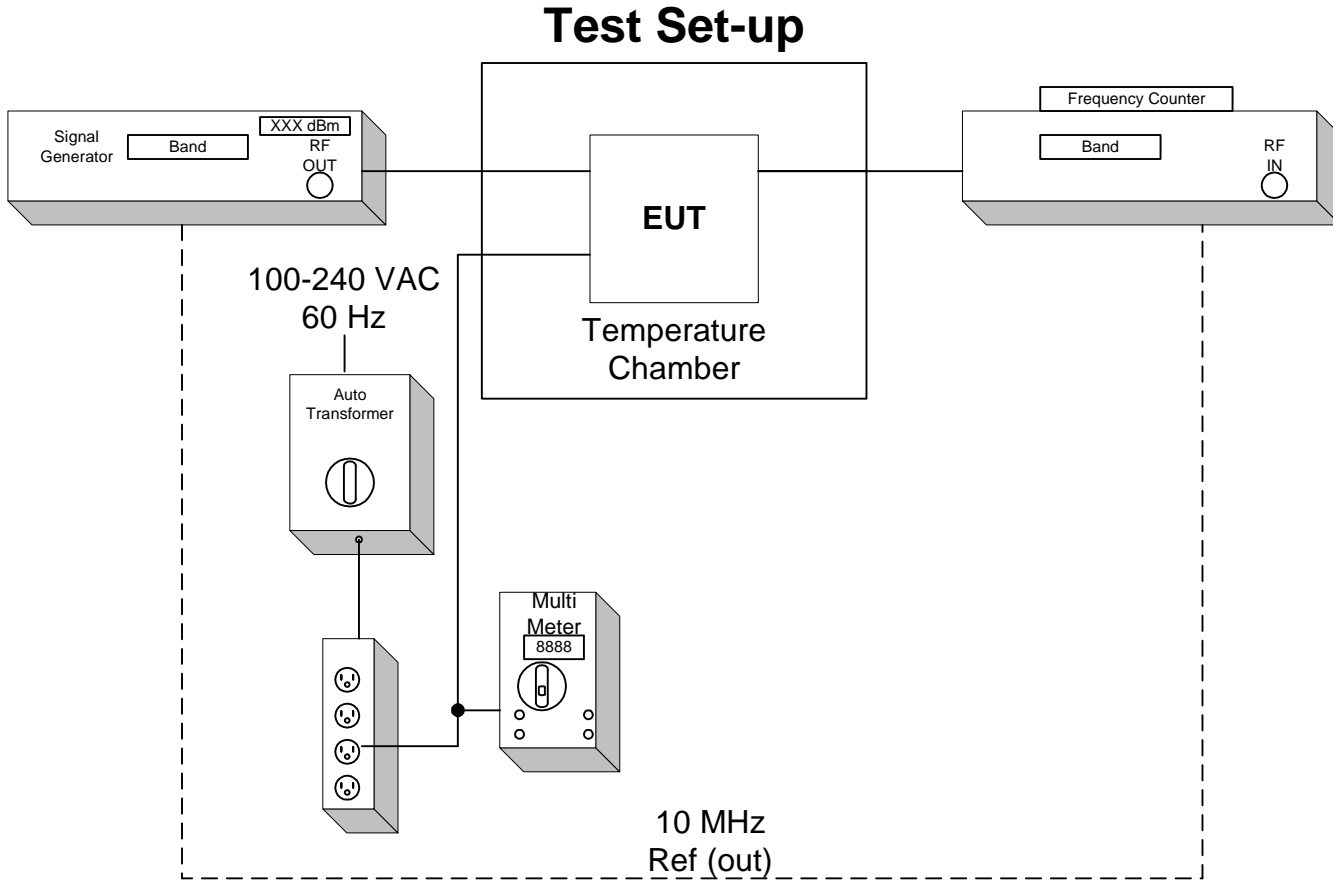
### Spurious Emission Test

### Occupied Bandwidth Test



# Frequency Tolerance Test

EUT is specified for outdoor use with temperature range of  $-30^{\circ}$  to  $+50^{\circ}$  C, and was tested with its range.



## 5.0 TEST EQUIPMENT

### [Table of Contents; Section 1.0](#)

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
1	Spectrum Analyzer	HP	8563E	MC27690	6-30-13	<input checked="" type="checkbox"/>
2	Power Meter	HP	437B	MC27754	6-30-13	<input checked="" type="checkbox"/>
3	Multimeter	Fluke	79	MC16178	10-11-13	<input checked="" type="checkbox"/>
4	Frequency Counter	HP	5347A	MC27569	6-30-13	<input checked="" type="checkbox"/>
5	Temperature Chamber	ESPEC	PSL-4G	MC10075	9-10-13	<input checked="" type="checkbox"/>
6	Signal Generator	Aeroflex	3413	MC57343	2-9-13	<input checked="" type="checkbox"/>
7	Signal Generator	Aeroflex	3413	MC57947	6-26-14	<input checked="" type="checkbox"/>
8	Variable Auto Transformer	Staco	1520CT	MC44655	CNR	<input checked="" type="checkbox"/>
9	Digital Barometer	Fisher Scientific	02-403	MC50719	1-25-13	<input checked="" type="checkbox"/>
10	Attenuator	Aeroflex	49-30-33	N/A	CNR	<input checked="" type="checkbox"/>
11	Attenuator	Aeroflex	86-30-12	N/A	CNR	<input checked="" type="checkbox"/>
12	RF Power Sensor	HP	8482A	MC48747	6-30-13	<input checked="" type="checkbox"/>

Equipment with a Calibration Not Required (CNR) listing is verified and compensated for with NIST traceable calibrated equipment

## 6.0 TEST RESULTS

### 6.1 FCC 22.917 Emissions Limits – Band Edge

#### Test Summary:

- The requirements are:                   • **MET**                   ◦ NOT MET

#### Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 22.917

#### Test Procedure:

The RF Output of the transmitter was connected to input of the spectrum analyzer through sufficient attenuation.

Band Edge compliance is demonstrated using a GSM, EDGE, CDMA, WCDMA, LTE 3 MHz, LTE 5MHz, LTE 10MHz, & LTE 15MHz Channel Bandwidths signal at the upper and lower limits of the band.

#### Test Limit:

Out of band emissions:

Attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB, or -13 dBm.

**Test Dates: 11/1/12 & 11/2/12**

**Tests Conducted By: Joshua J. Wittman**

**Test Equipment: 1, 2, 6, 9, 12**

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
1	Spectrum Analyzer	HP	8563E	MC27690	6-30-13	<input checked="" type="checkbox"/>
2	Power Meter	HP	437B	MC27754	6-30-13	<input checked="" type="checkbox"/>
6	Signal Generator	Aeroflex	3413	MC57343	2-9-13	<input checked="" type="checkbox"/>
9	Digital Barometer	Fisher Scientific	02-403	MC50719	1-25-13	<input checked="" type="checkbox"/>
12	RF Power Sensor	HP	8482A	MC48747	6-30-13	<input checked="" type="checkbox"/>

#### Environmental Conditions in the lab:

**Temperature:** 28° C

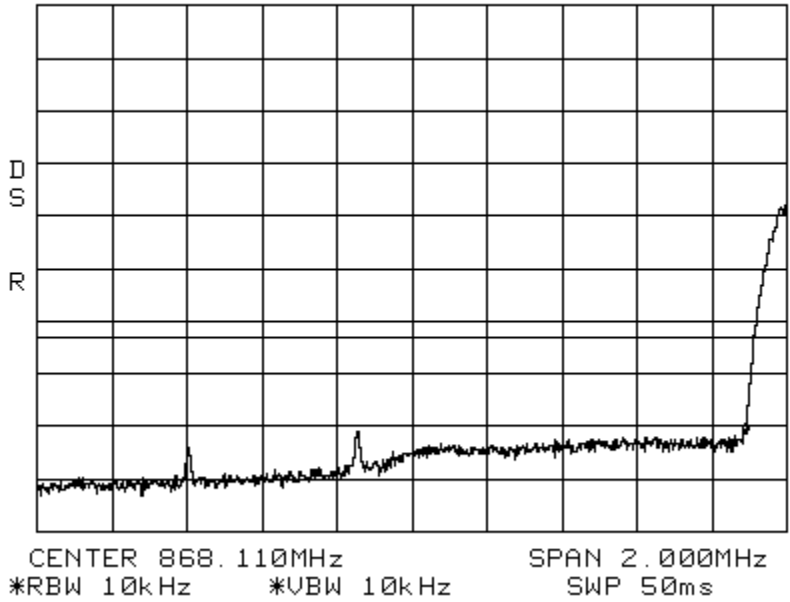
**Relative Humidity:** 20%

**Atmospheric Pressure:** 99.0 kPa

**Test Results:**

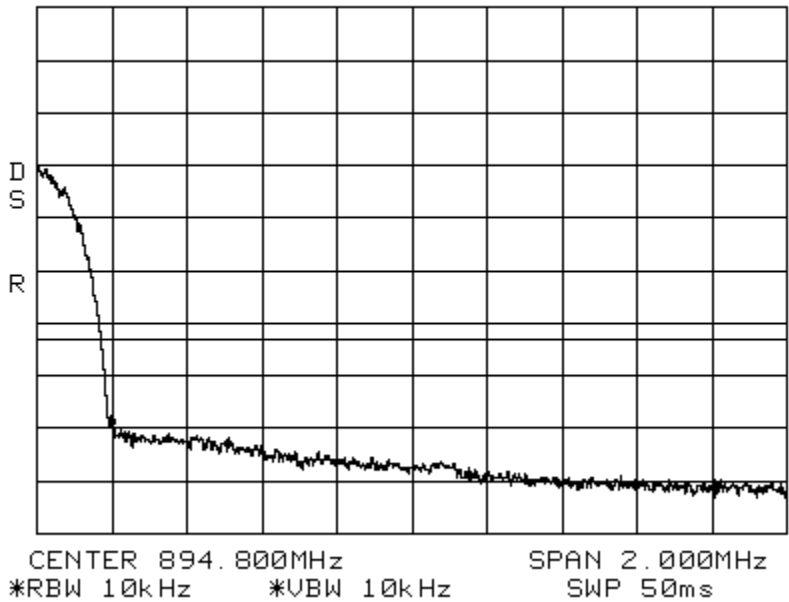
Band\_Edge CDMA CELL  
Center: 869.75 MHz Span: 2 MHz RBW: 10 kHz VBW: 10 kHz

ATTEN 30dB VAUG 100 MKR -31.16dBm  
RL 50.2dBm 10dB/ 869.000MHz



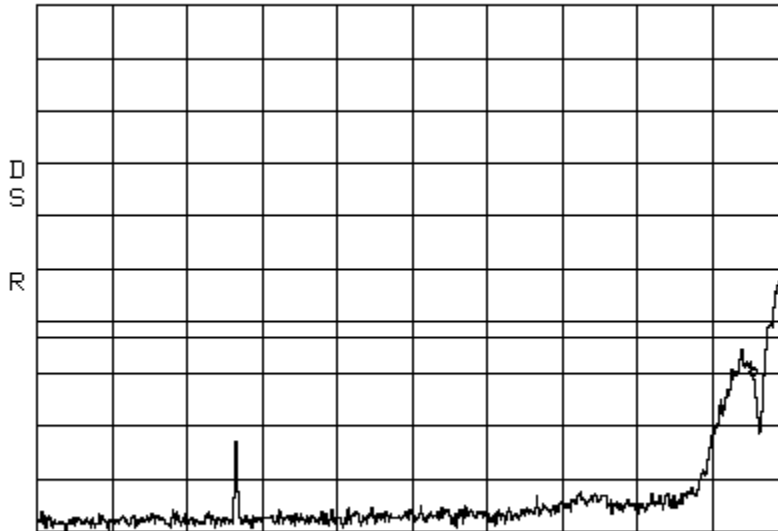
Band\_Edge CDMA CELL  
Center: 893.25 MHz Span: 2 MHz RBW: 10 kHz VBW: 10 kHz

ATTEN 30dB VAUG 100 MKR -29.50dBm  
RL 50.2dBm 10dB/ 894.000MHz



Band\_Edge                      EDGE                      CELL  
Center: 869.2 MHz    Span: 1.5 MHz                      RBW: 3 kHz    VBW: 10 kHz

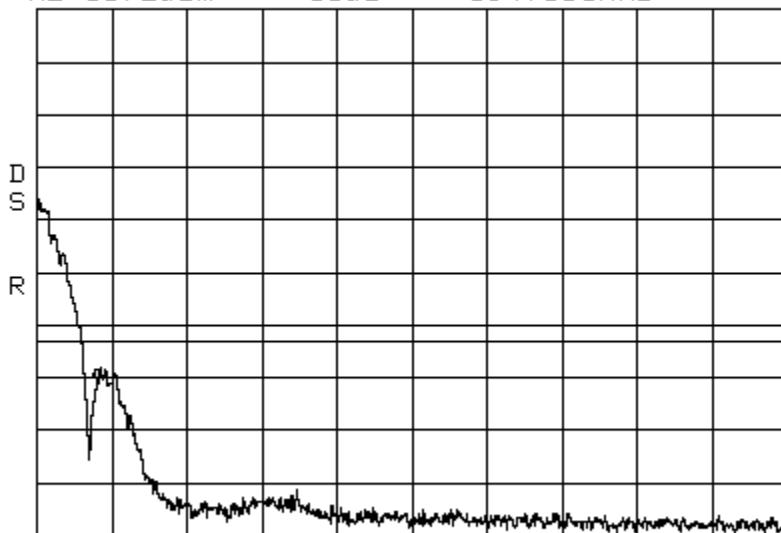
ATTEN 30dB    VAUG 100    MKR -20.50dBm  
RL 50.2dBm    10dB/    869.000MHz



CENTER 868.318MHz                      SPAN 1.500MHz  
\*RBW 3.0kHz    \*VBW 10kHz                      SWP 420ms

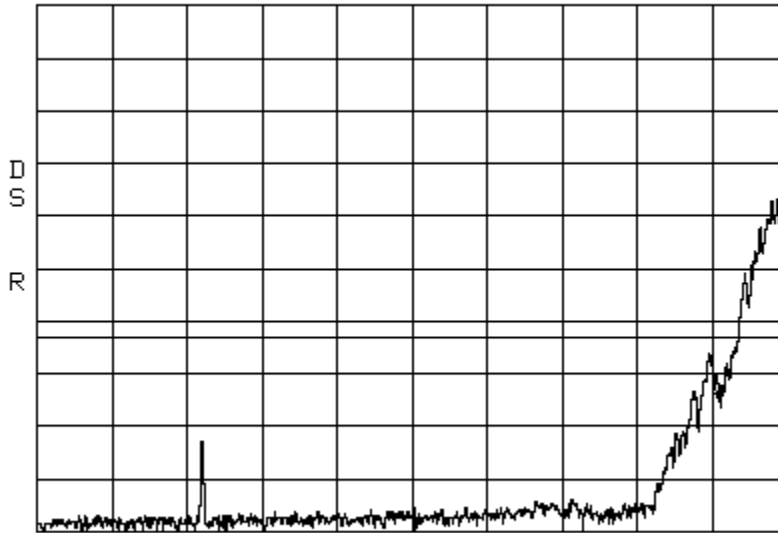
Band\_Edge                      EDGE                      CELL  
Center: 893.8 MHz    Span: 1.5 MHz                      RBW: 3 kHz    VBW: 10 kHz

ATTEN 30dB    VAUG 100    MKR -20.16dBm  
RL 50.2dBm    10dB/    894.000MHz



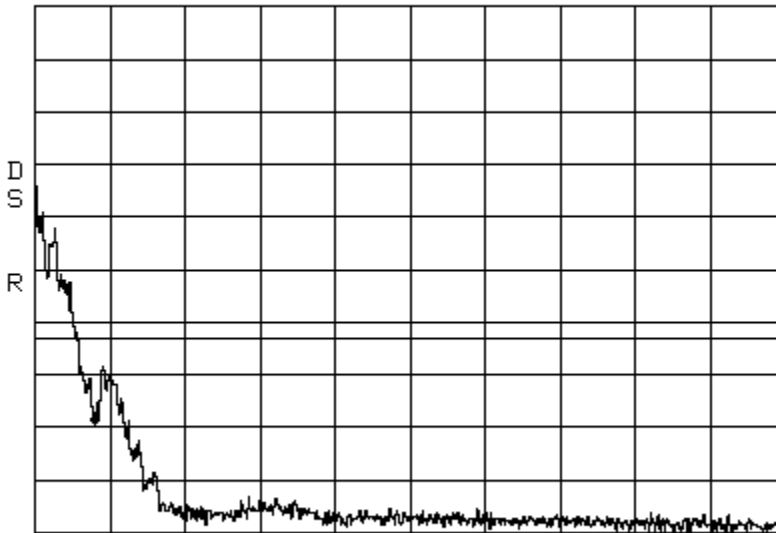
CENTER 894.630MHz                      SPAN 1.500MHz  
\*RBW 3.0kHz    \*VBW 10kHz                      SWP 420ms

Band\_Edge GSM CELL  
 Center: 869.2 MHz Span: 1 MHz RBW: 3 kHz VBW: 10 kHz  
 ATTN 30dB VAUG 100 MKR -24.66dBm  
 RL 50.2dBm 10dB/ 869.000MHz



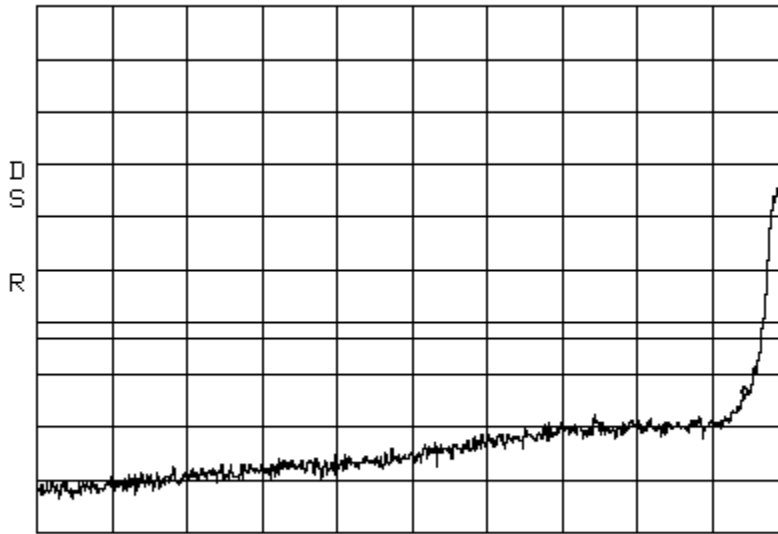
CENTER 868.385MHz SPAN 1.500MHz  
 \*RBW 3.0kHz \*VBW 10kHz SWP 420ms

Band\_Edge GSM CELL  
 Center: 893.8 MHz Span: 1 MHz RBW: 3 kHz VBW: 10 kHz  
 ATTN 30dB VAUG 100 MKR -29.33dBm  
 RL 50.2dBm 10dB/ 894.000MHz



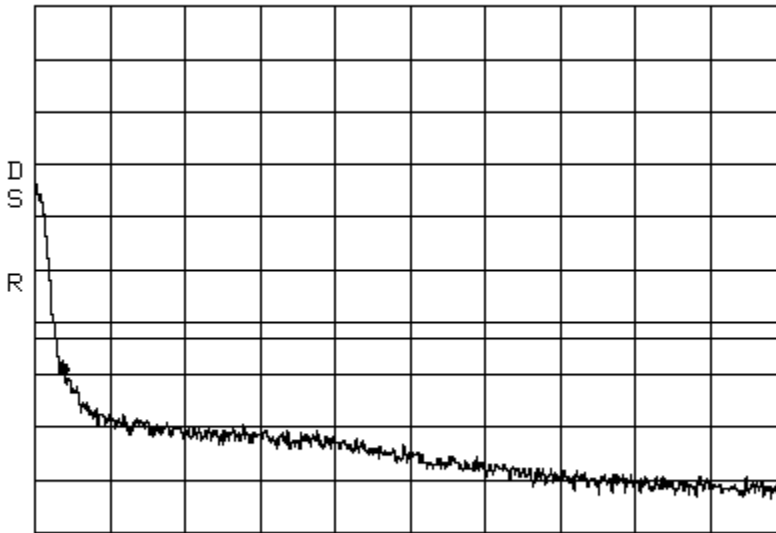
CENTER 894.630MHz SPAN 1.500MHz  
 \*RBW 3.0kHz \*VBW 10kHz SWP 420ms

Band\_Edge LTE 3 MHz Channel Bandwidth CELL  
Center: 870.5 MHz Span: 5 MHz RBW: 30 kHz VBW: 100 kHz  
ATTEN 30dB VAUG 100 MKR -24.00dBm  
RL 50.2dBm 10dB/ 869.002MHz



CENTER 866.785MHz SPAN 5.000MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

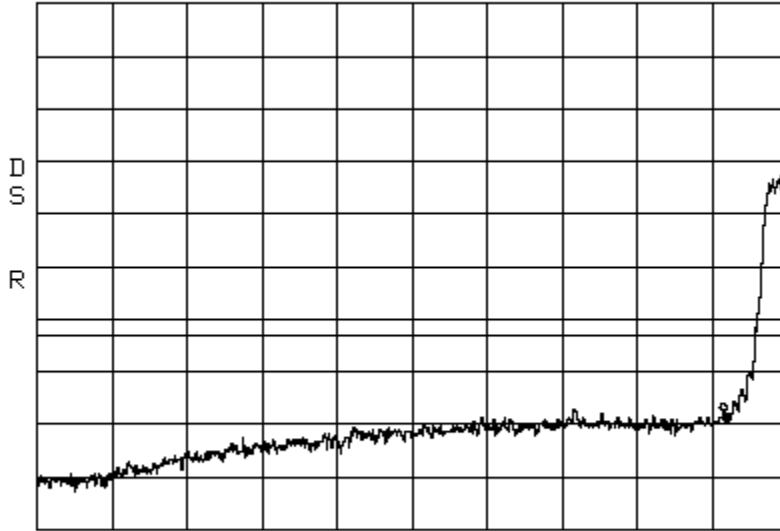
Band\_Edge LTE 3MHz Channel Bandwidth CELL  
Center: 892.5MHz Span: 5 MHz RBW: 30 kHz VBW: 100 kHz  
ATTEN 30dB VAUG 100 MKR -19.83dBm  
RL 50.2dBm 10dB/ 894.000MHz



CENTER 896.300MHz SPAN 5.000MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms



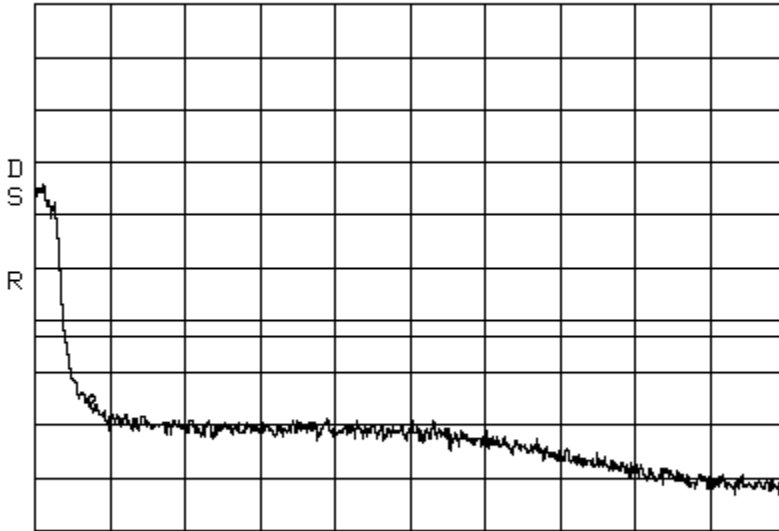
Band\_Edge LTE 5 MHz Channel Bandwidth CELL  
Center: 871.5MHz Span: 5 MHz RBW: 30 kHz VBW: 100 kHz  
ATTEN 30dB VAUG 100 MKR -27.66dBm  
RL 50.2dBm 10dB/ 869.000MHz



CENTER 866.925MHz SPAN 5.000MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

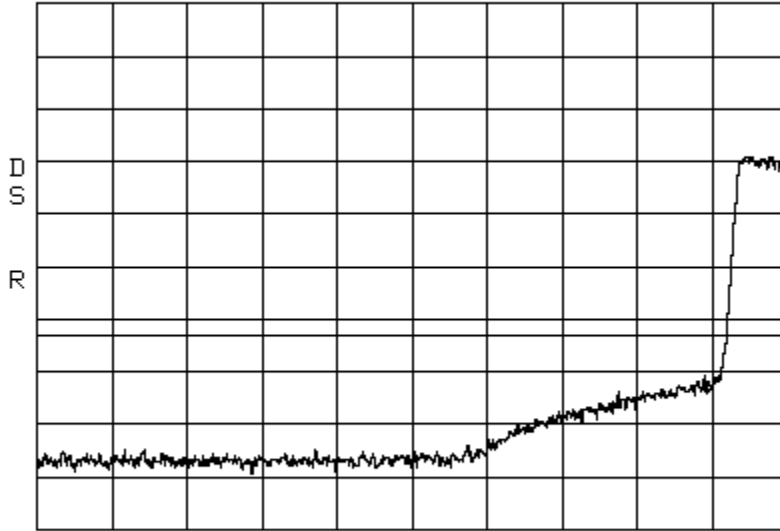
Band\_Edge LTE 5 MHz Channel Bandwidth CELL  
Center: 891.5MHz Span: 5 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 30dB VAUG 100 MKR -25.83dBm  
RL 50.2dBm 10dB/ 894.000MHz



CENTER 896.125MHz SPAN 5.000MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

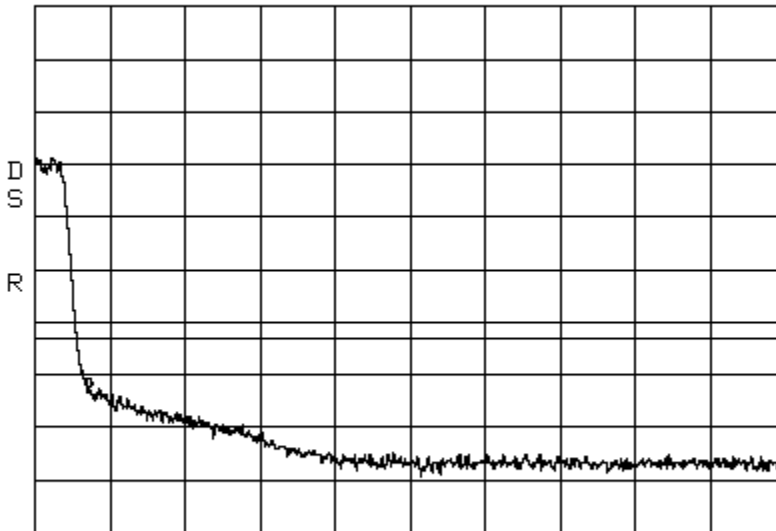
Band\_Edge                      LTE 10 MHz Channel Bandwidth                      CELL  
 Center: 874.0MHz                      Span: 15 MHz                      RBW: 100 kHz                      VBW: 100 kHz  
 ATTN 30dB                      VAUG 100                      MKR -23.83dBm  
 RL 50.2dBm                      10dB/                      869.00MHz



CENTER 863.10MHz                      SPAN 15.00MHz  
 \*RBW 100kHz                      \*VBW 100kHz                      SWP 50ms

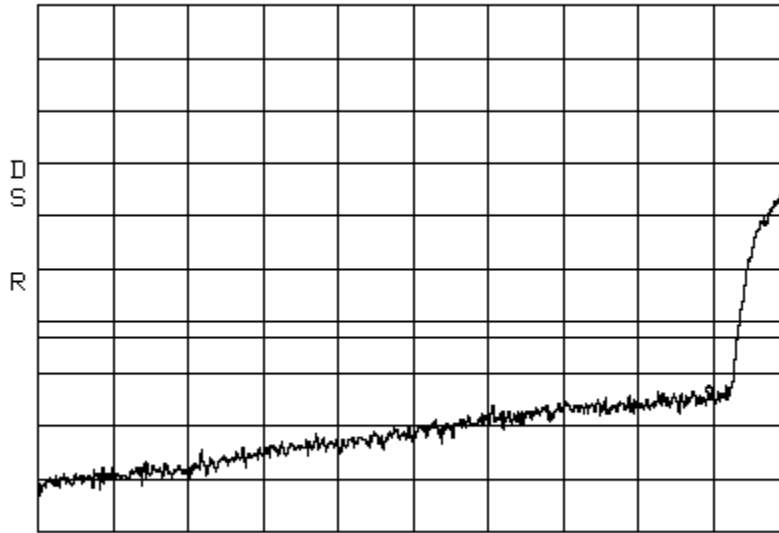
Band\_Edge                      LTE 10 MHz Channel Bandwidth                      CELL  
 Center: 889.0MHz                      Span: 15 MHz                      RBW: 100 kHz                      VBW: 100 kHz

ATTN 30dB                      VAUG 100                      MKR -22.50dBm  
 RL 50.2dBm                      10dB/                      894.00MHz



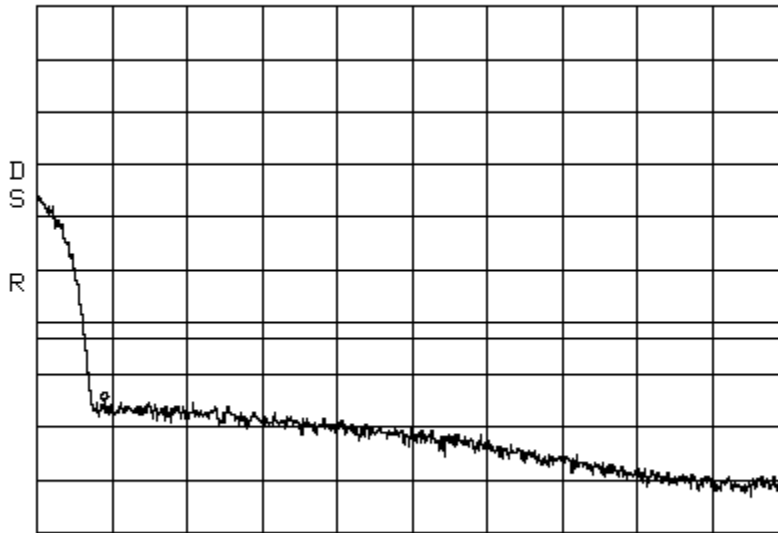
CENTER 900.43MHz                      SPAN 15.00MHz  
 \*RBW 100kHz                      \*VBW 100kHz                      SWP 50ms

Band\_Edge WCDMA CELL  
 Center: 867.125MHz Span: 5.5 MHz RBW: 30 kHz VBW: 100 kHz  
 ATTN 30dB VAUG 100 MKR -24.00dBm  
 RL 50.2dBm 10dB/ 869.000MHz



CENTER 867.025MHz SPAN 5.000MHz  
 \*RBW 30kHz \*VBW 100kHz SWP 50ms

Band\_Edge WCDMA CELL  
 Center: 895.825 MHz Span: 5.5 MHz RBW: 30 kHz VBW: 100 kHz  
 ATTN 30dB VAUG 100 MKR -25.00dBm  
 RL 50.2dBm 10dB/ 894.000MHz



CENTER 896.050MHz SPAN 5.000MHz  
 \*RBW 30kHz \*VBW 100kHz SWP 50ms

## 6.2 FCC 2.1049, 22.917 – Occupied Bandwidth

### Test Summary:

- The requirements are:           • **MET**           ◦ NOT MET

### Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.0149, 22.917

### Test Procedure:

The RF Output of the transmitter was connected to input of the spectrum analyzer through sufficient attenuation.

An input/output Occupied Bandwidth test was done with modulation types: GSM, EDGE, CDMA, WCDMA, LTE 3 MHz, LTE 5MHz, LTE 10MHz, & LTE 15MHz Channel Bandwidths. The purpose was to determine the amount of distortion added to different types of modulation schemes by the EUT.

The resolution bandwidth is reduced to 1% of the estimated emission bandwidth and the video bandwidth is set to 3 times the resolution bandwidth. The markers are moved to the -20 dB points (from the previously established center frequency level) on either side of center frequency.

**Test Date: 10/30/12**

**Tests Conducted By: Joshua J. Wittman**

**Test Equipment: 1, 2, 6, 9, 12**

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
1	Spectrum Analyzer	HP	8563E	MC27690	6-30-13	<input checked="" type="checkbox"/>
2	Power Meter	HP	437B	MC27754	6-30-13	<input checked="" type="checkbox"/>
6	Signal Generator	Aeroflex	3413	MC57343	2-9-13	<input checked="" type="checkbox"/>
9	Digital Barometer	Fisher Scientific	02-403	MC50719	1-25-13	<input checked="" type="checkbox"/>
12	RF Power Sensor	Agilent	8482A	MC48747	6-30-13	<input checked="" type="checkbox"/>

### Environmental Conditions in the lab:

**Temperature:** 28° C

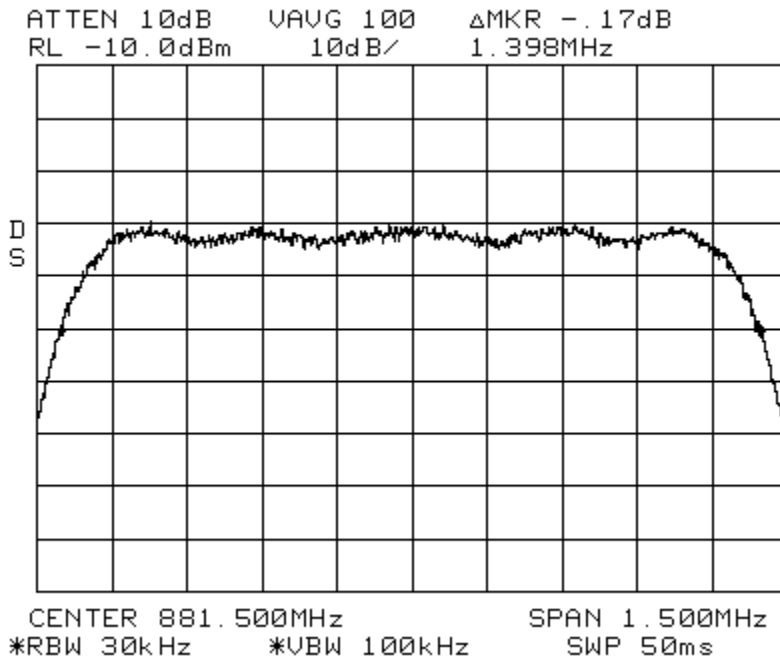
**Relative Humidity:** 20%

**Atmospheric Pressure:** 99.0 kPa

**Test Results:**

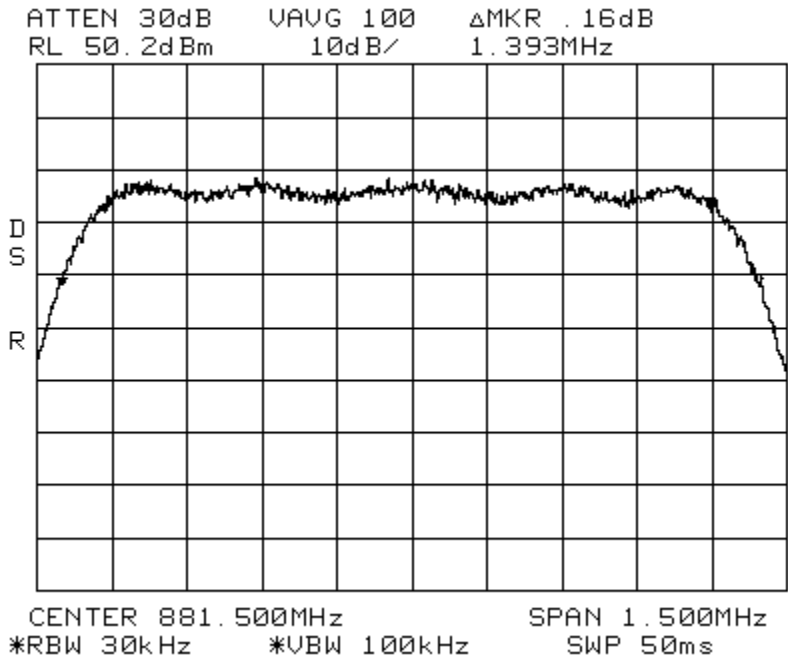
Occupied Bandwidth  
Span: 1.5 MHz

CDMA\_Signal\_In CELL  
RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth  
Span: 1.5 MHz

CDMA\_Signal\_Out CELL  
RBW: 30 kHz VBW: 100 kHz

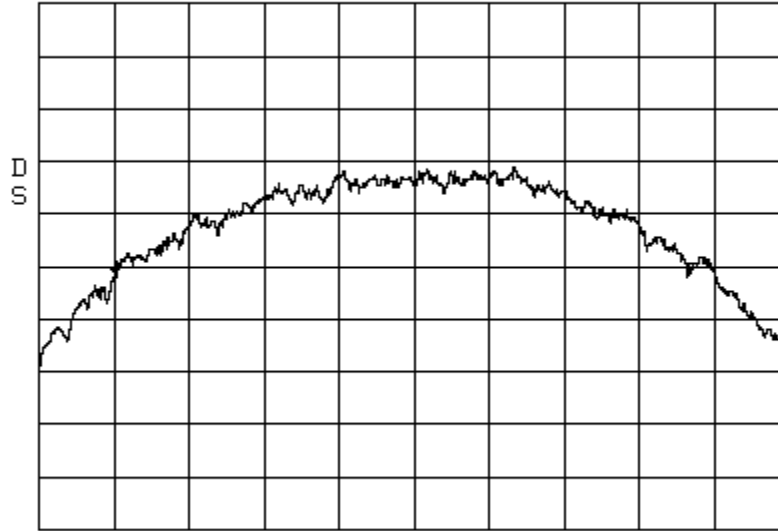


Occupied Bandwidth  
Span: 350 kHz

EDGE\_Signal\_In  
RBW: 3 kHz VBW: 10 kHz

CELL

ATTEN 10dB VAUG 100 ΔMKR .16dB  
RL -10.0dBm 10dB/ 268.3kHz



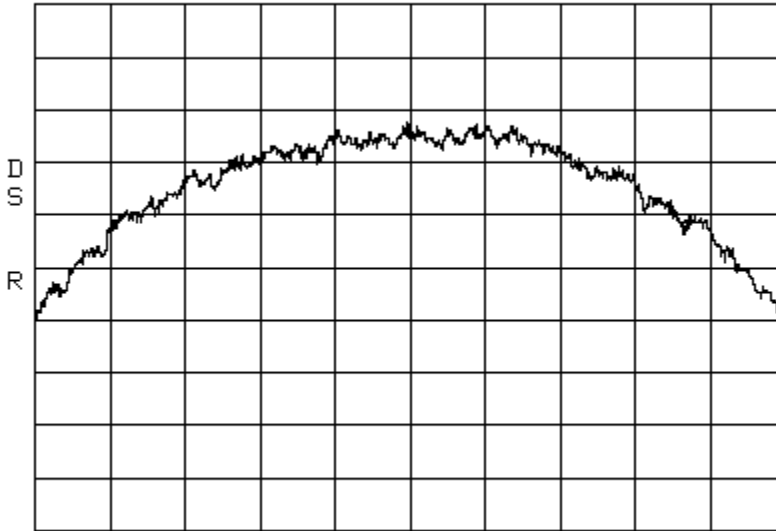
CENTER 881.5000MHz SPAN 350.0kHz  
\*RBW 3.0kHz \*VBW 10kHz SWP 98ms

Occupied Bandwidth  
Span: 350 kHz

EDGE\_Signal\_Out  
RBW: 3 kHz VBW: 10 kHz

CELL

ATTEN 30dB VAUG 100 ΔMKR -.50dB  
RL 50.2dBm 10dB/ 266.6kHz

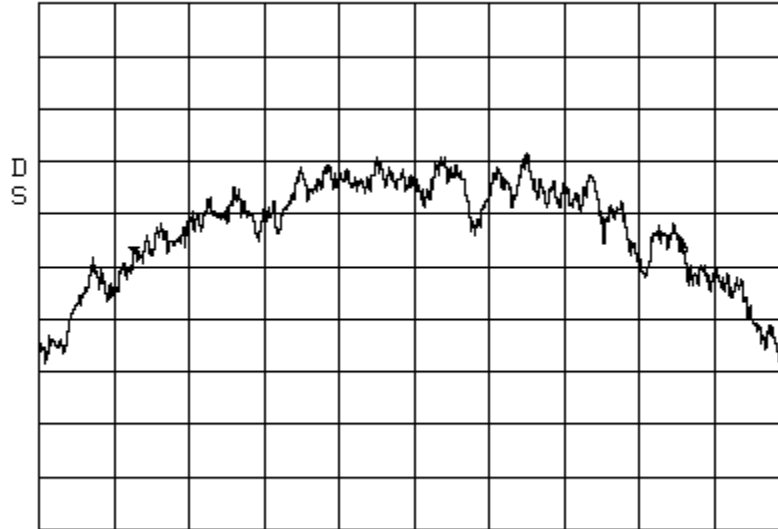


CENTER 881.5000MHz SPAN 350.0kHz  
\*RBW 3.0kHz \*VBW 10kHz SWP 98ms

Occupied Bandwidth  
Span: 350 kHz

GSM\_Signal\_In CELL  
RBW: 3 kHz VBW: 10 kHz

ATTEN 10dB VAUG 100 ΔMKR -.17dB  
RL -10.0dBm 10dB/ 256.7kHz

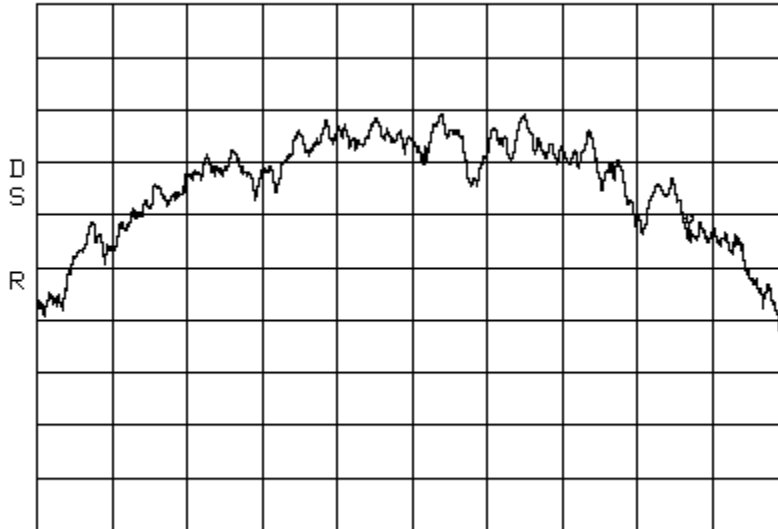


CENTER 881.5000MHz SPAN 350.0kHz  
\*RBW 3.0kHz \*VBW 10kHz SWP 98ms

Occupied Bandwidth  
Span: 350 kHz

GSM\_Signal\_Out CELL  
RBW: 3 kHz VBW: 10 kHz

ATTEN 30dB VAUG 100 ΔMKR -1.00dB  
RL 50.2dBm 10dB/ 258.4kHz

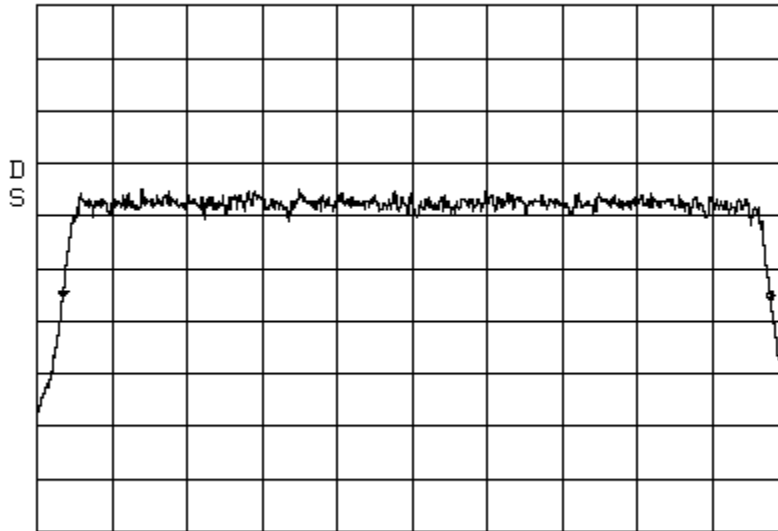


CENTER 881.5000MHz SPAN 350.0kHz  
\*RBW 3.0kHz \*VBW 10kHz SWP 98ms

Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_In

CELL

Span: 3 MHz RBW: 30kHz VBW: 100 kHz  
ATTEN 10dB VAUG 100 ΔMKR -.67dB  
RL -10.0dBm 10dB/ 2.830MHz

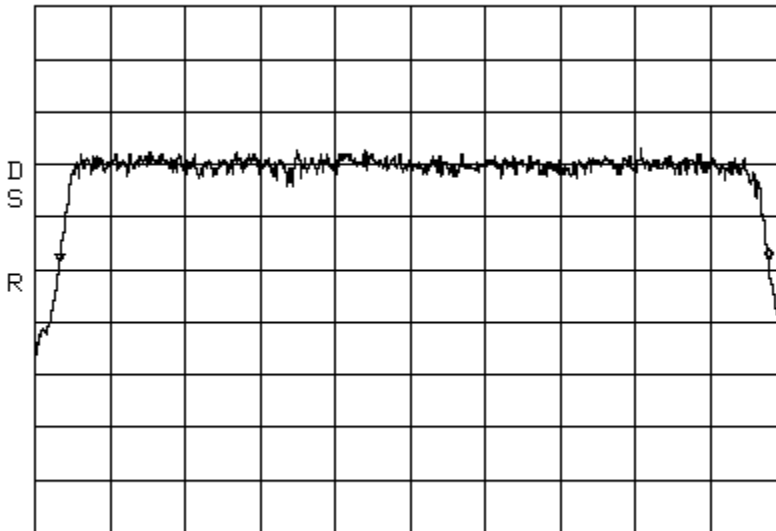


CENTER 881.500MHz SPAN 3.000MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_Out

CELL

Span: 3 MHz RBW: 30 kHz VBW: 100 kHz  
ATTEN 30dB VAUG 100 ΔMKR .33dB  
RL 50.2dBm 10dB/ 2.835MHz

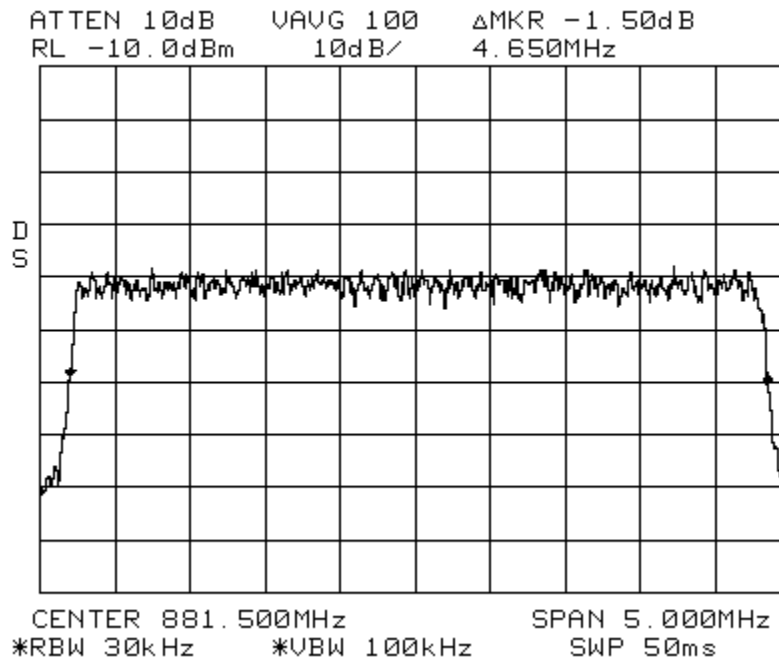


CENTER 881.500MHz SPAN 3.000MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms



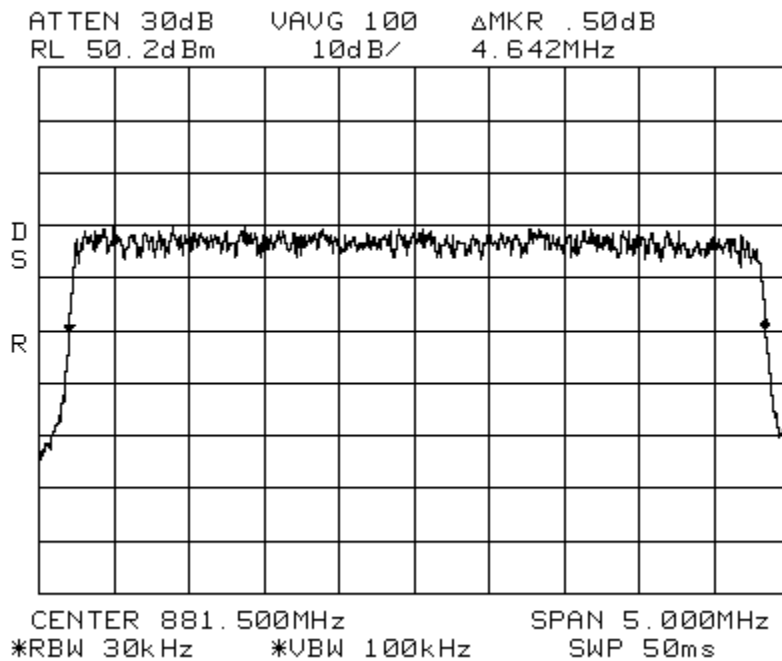
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_In  
Span: 5 MHz RBW: 30 kHz VBW: 100 kHz

CELL

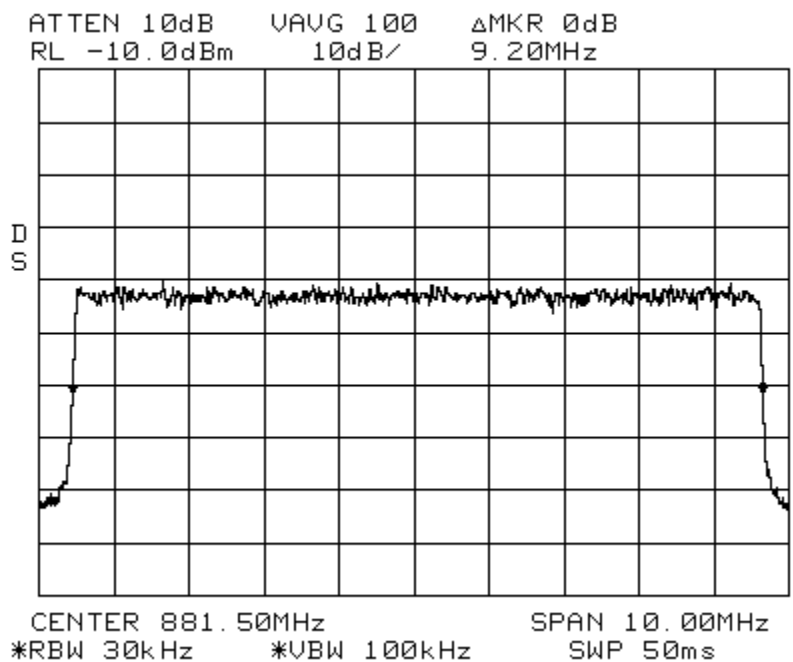


Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_Out  
Span: 5 MHz RBW: 30 kHz VBW: 100 kHz

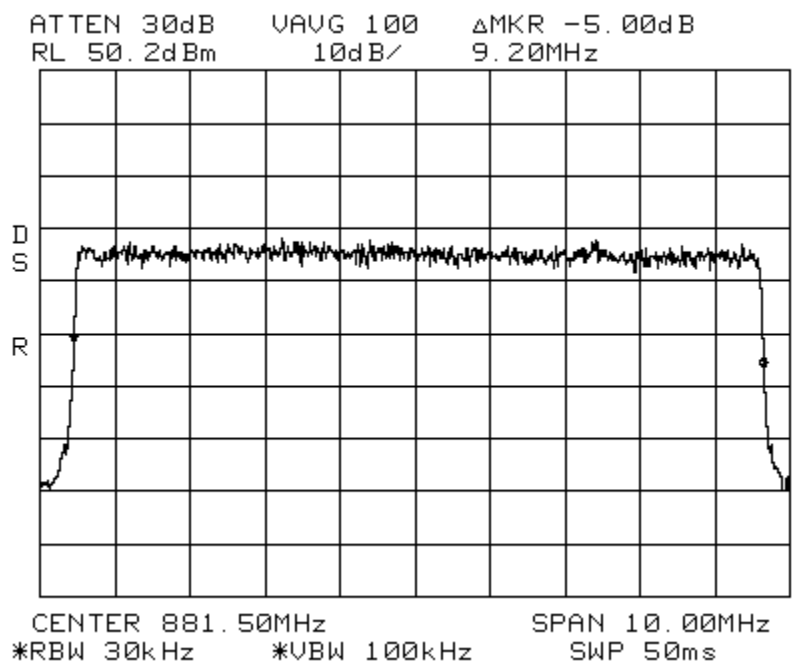
CELL



Occupied Bandwidth      LTE 10 MHz Channel Bandwidth\_Signal\_In      CELL  
Span: 10 MHz      RBW: 30 kHz VBW: 100 kHz

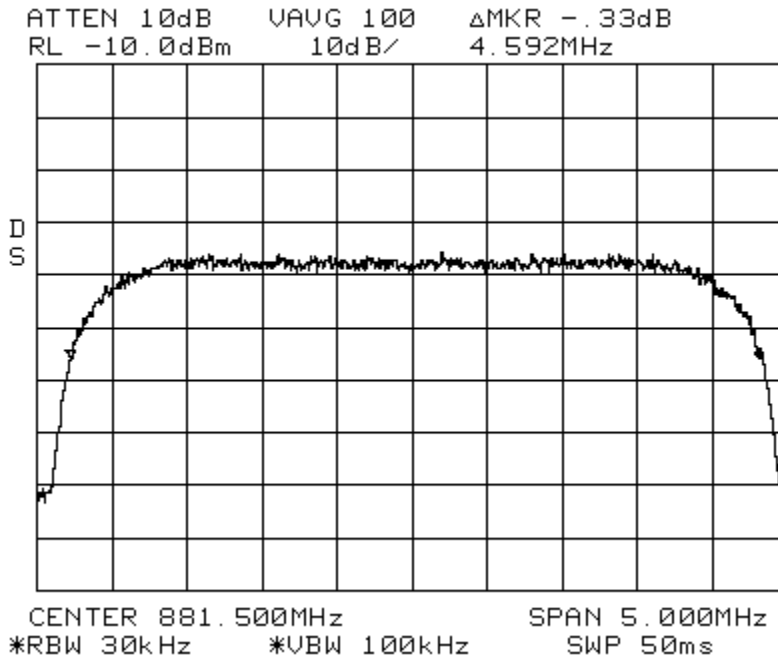


Occupied Bandwidth      LTE 10 MHz Channel Bandwidth\_Signal\_Out      CELL  
Span: 10 MHz      RBW: 30 kHz VBW: 100 kHz



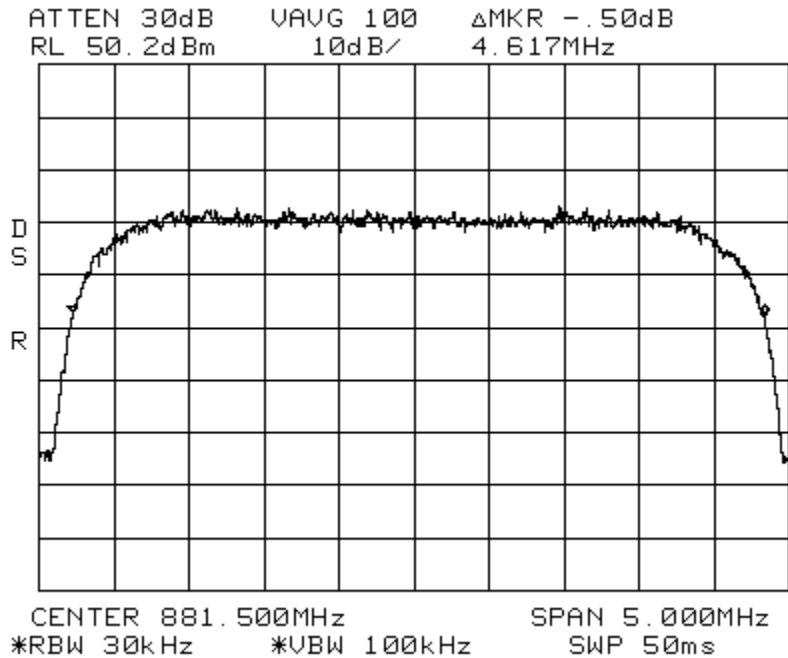
Occupied Bandwidth  
Span: 5.0 MHz

WCDMA\_Signal\_In CELL  
RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth  
Span: 5.0 MHz

WCDMA\_Signal\_Out CELL  
RBW: 30 kHz VBW: 100 kHz



### 6.3 FCC 2.1046, 22.913 Power Limits – Output Power

**Test Summary:**

- The requirements are:                    **• MET**                    ◦ NOT MET
- Minimum margin of compliance is 43.78 dB at 881.5 MHz (CDMA)
- Minimum margin of compliance is 43.68 dB at 881.5 MHz (GSM)
- Minimum margin of compliance is 44.10 dB at 881.5 MHz (EDGE)
- Minimum margin of compliance is 43.34 dB at 881.5 MHz (W-CDMA)
- Minimum margin of compliance is 43.45 dB at 881.5 MHz (LTE3MHz)
- Minimum margin of compliance is 43.14 dB at 881.5 MHz (LTE5MHz)
- Minimum margin of compliance is 43.16 dB at 881.5 MHz (LTE10MHz)

**Test Methods Used:**

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.1046, 22.913

**Test Procedure:**

Conducted: The RF Output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected to the power meter. The carrier output, below, was conducted using a single GSM, EDGE, CDMA, WCDMA, LTE 3 MHz, LTE 5MHz, LTE 10MHz, LTE 15MHz Channel Bandwidths & signal generator.

A signal was used at the low, mid and high parts of the selected band.

**Test Limit:**

100 Watts or 50 dBm Limit

**Test Date: 10/30/12**

**Tests Conducted By: Joshua J. Wittman**

**Test Equipment: 2, 6, 9, 12, 13**

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
2	Power Meter	HP	437B	MC27754	6-30-13	<input checked="" type="checkbox"/>
6	Signal Generator	Aeroflex	3413	MC57343	11-9-12	<input checked="" type="checkbox"/>
9	Digital Barometer	Fisher Scientific	02-403	MC50719	1-25-13	<input checked="" type="checkbox"/>
12	RF Power Sensor	Agilent	8481A	MC48747	6-30-13	<input checked="" type="checkbox"/>
13	Spectrum Analyzer	Rohde & Schwarz	FSQ-8	MC57131	2-15-13	<input checked="" type="checkbox"/>

**Environmental Conditions in the lab:**

**Temperature:** 28° C

**Relative Humidity:** 20%

**Atmospheric Pressure:** 99.0 kPa

## Test Results:

**\*Note: Output power is total conducted for 2x2 MIMO. It will be displayed 2 times the output power listed below on the FCC Grant.**

### CELL

#### **CDMA** 23.878 Watts

Carrier Frequency	Carrier Output
869.8 MHz	<u>42.60</u> dBm
881.5 MHz	<u>43.78</u> dBm
893.2 MHz	<u>42.73</u> dBm

### CELL

#### **GSM** 23.014 Watts

Carrier Frequency	Carrier Output
869.2 MHz	<u>42.62</u> dBm
881.5 MHz	<u>43.62</u> dBm
893.8 MHz	<u>42.57</u> dBm

### CELL

#### **EDGE** 25.703 Watts

Carrier Frequency	Carrier Output
869.2 MHz	<u>43.04</u> dBm
881.5 MHz	<u>44.10</u> dBm
893.8 MHz	<u>43.06</u> dBm

### CELL

#### **WCDMA** 21.577 Watts

Carrier Frequency	Carrier Output
871.5 MHz	<u>42.45</u> dBm
881.5 MHz	<u>43.34</u> dBm
891.5 MHz	<u>42.35</u> dBm

### CELL

#### **LTE 3.0 MHz** 22.130 Watts

Carrier Frequency	Carrier Output
870.5 MHz	<u>42.80</u> dBm
881.5 MHz	<u>43.45</u> dBm
892.5 MHz	<u>42.40</u> dBm

### CELL

#### **LTE 5.0 MHz** 20.606 Watts

Carrier Frequency	Carrier Output
871.5 MHz	<u>42.10</u> dBm
881.5 MHz	<u>43.14</u> dBm
891.5 MHz	<u>42.05</u> dBm

### CELL

#### **LTE 10.0 MHz** 20.701 Watts

Carrier Frequency	Carrier Output
874.0 MHz	<u>42.54</u> dBm
881.5 MHz	<u>43.16</u> dBm
889.0 MHz	<u>42.47</u> dBm

## 6.4 FCC 2.1051, 22.917 Emissions Limits – Spurious Emissions at Antenna

### Test Summary:

- The requirements are:
  - **MET**
  - NOT MET

### Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.1051, 22.917

### Test Procedure:

The RF Output of the transmitter was connected to input of the spectrum analyzer through sufficient attenuation.

The out of band emissions were measured directly from the EUT antenna output in the TX path using a spectrum analyzer from 30 MHz to the 10<sup>th</sup> harmonic of the highest carrier frequency. Test signals used are GSM, EDGE, CDMA, WCDMA, LTE 3 MHz, LTE 5MHz, LTE 10MHz, & LTE 15MHz Channel Bandwidths. The different signals were input one at a time to the EUT.

The inter-modulation products test was performed for the EUT. Three tests were performed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and lower end channels. The modulation types tested were GSM, EDGE, CDMA, WCDMA, 3 MHz, 5MHz, 10MHz, & 15MHz Channel Bandwidths.

### Test Limit:

The spectrum shall be investigated to the tenth harmonics of the highest fundamental frequency as specified in FCC 2.1057

Out of band emissions:

Attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log(P)$  dB, or  $-13$  dBm.

**Test Dates: 10/31/12, 11/1/12, 11/2/12, 11/6/12, 11/7/12, & 11/8/12**

**Tests Conducted By: Joshua J. Wittman**

**Test Equipment: 1, 2, 6, 7, 9, 12, 13**

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
1	Spectrum Analyzer	HP	8563E	MC27690	6-30-13	<input checked="" type="checkbox"/>
2	Power Meter	HP	437B	MC27754	6-30-13	<input checked="" type="checkbox"/>
6	Signal Generator	Aeroflex	3413	MC57343	2-9-13	<input checked="" type="checkbox"/>
7	Signal Generator	Aeroflex	3413	MC57947	6-26-14	<input checked="" type="checkbox"/>
9	Digital Barometer	Fisher Scientific	02-403	MC50719	1-25-13	<input checked="" type="checkbox"/>
12	RF Power Sensor	Agilent	8482A	MC48747	6-30-13	<input checked="" type="checkbox"/>
13	Spectrum Analyzer	Rohde & Schwarz	FSQ-8	MC57131	2-15-13	<input checked="" type="checkbox"/>

### Environmental Conditions in the lab:

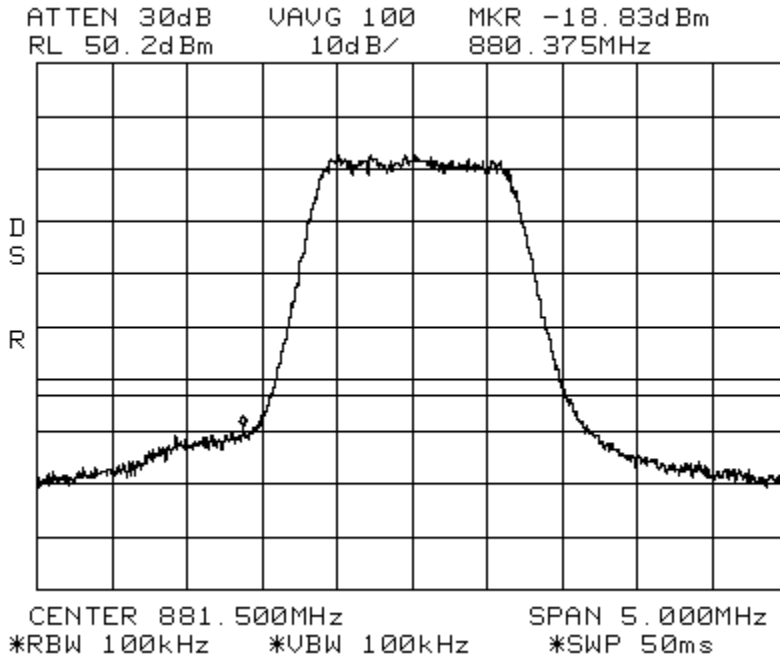
**Temperature:** 28° C

**Relative Humidity:** 20%

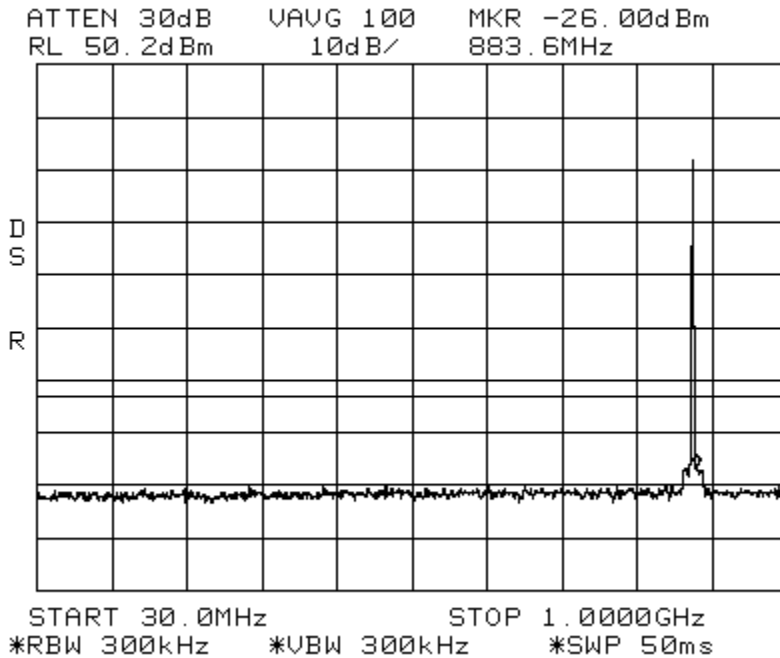
**Atmospheric Pressure:** 99.0 kPa

**Test Results:**

Conducted Emissions      CDMA      CELL  
Center: 881.5 MHz    Span: 5 MHz      RBW/VBW: 100 kHz



Conducted Emissions      CDMA      CELL  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz

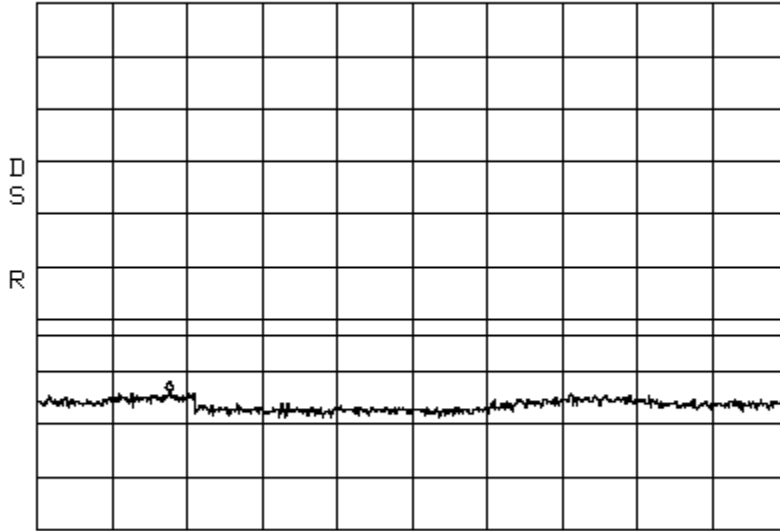


Conducted Emissions  
Span: 1 GHz to 10 GHz

CDMA

CELL  
RBW/VBW: 1 MHz

ATTEN 30dB VAUG 100 MKR -23.83dBm  
RL 50.2dBm 10dB/ 2.590GHz

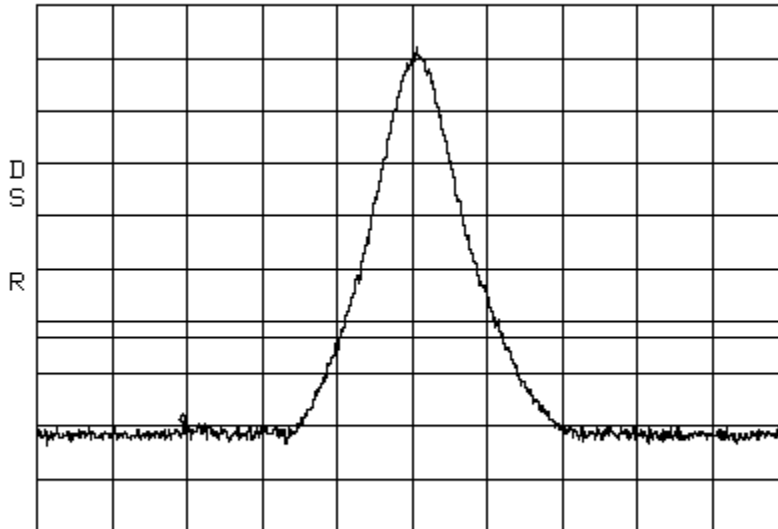


START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

Conducted Emissions  
Center: 881.5 MHz Span: 5 MHz

EDGE  
CELL  
RBW/VBW: 100 kHz

ATTEN 30dB VAUG 100 MKR -29.50dBm  
RL 50.2dBm 10dB/ 879.975MHz



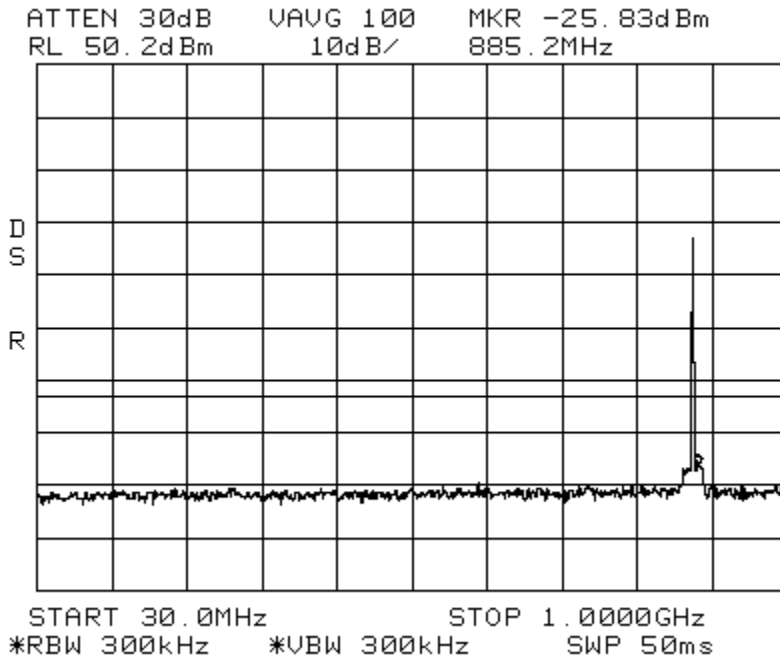
CENTER 881.500MHz SPAN 5.000MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms



Conducted Emissions  
Span: 30 MHz to 1 GHz

EDGE

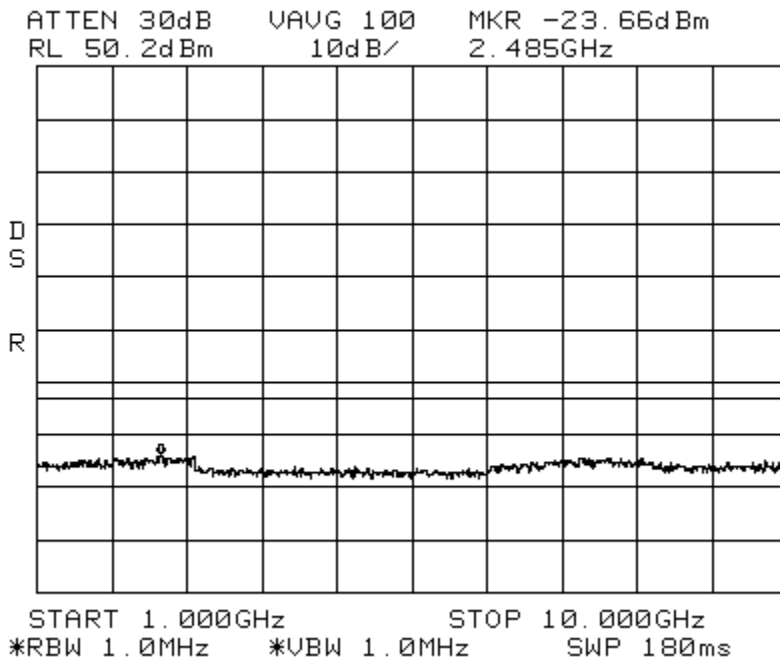
CELL  
RBW/VBW: 300 kHz



Conducted Emissions  
Span: 1 GHz to 10 GHz

EDGE

CELL  
RBW/VBW: 1 MHz

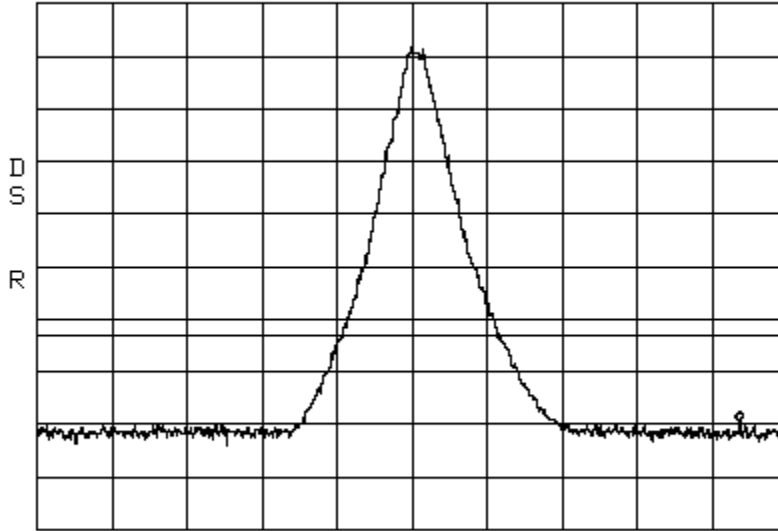


Conducted Emissions  
Center: 881.5 MHz

GSM  
Span: 5 MHz

CELL  
RBW/VBW: 100 kHz

ATTEN 30dB VAUG 100 MKR -29.33dBm  
RL 50.2dBm 10dB/ 883.683MHz



CENTER 881.500MHz SPAN 5.000MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

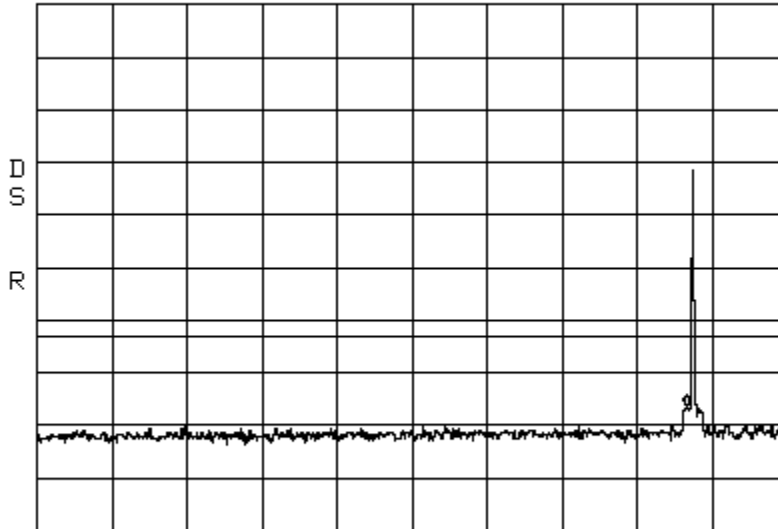
Conducted Emissions  
Span: 30 MHz to 1 GHz

GSM

CELL

RBW/VBW: 300 kHz

ATTEN 30dB VAUG 100 MKR -26.00dBm  
RL 50.2dBm 10dB/ 870.7MHz

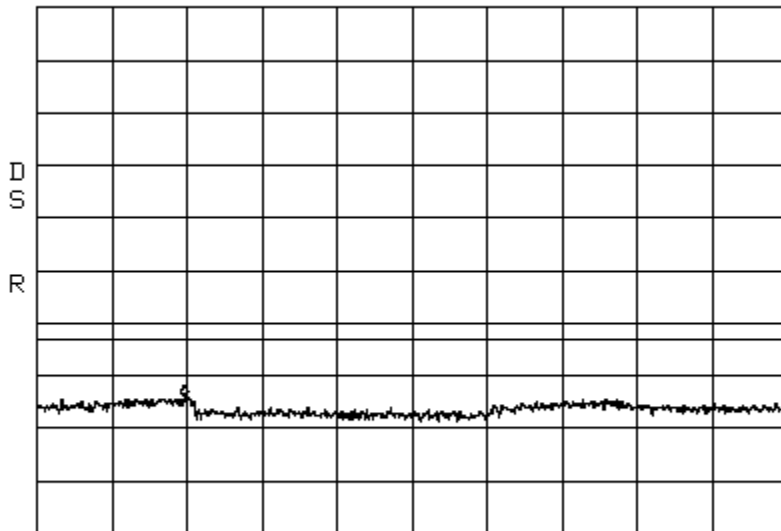


START 30.0MHz STOP 1.0000GHz  
\*RBW 300kHz \*VBW 300kHz SWP 50ms

Conducted Emissions  
Span: 1 GHz to 10 GHz

GSM  
CELL  
RBW/VBW: 1 MHz

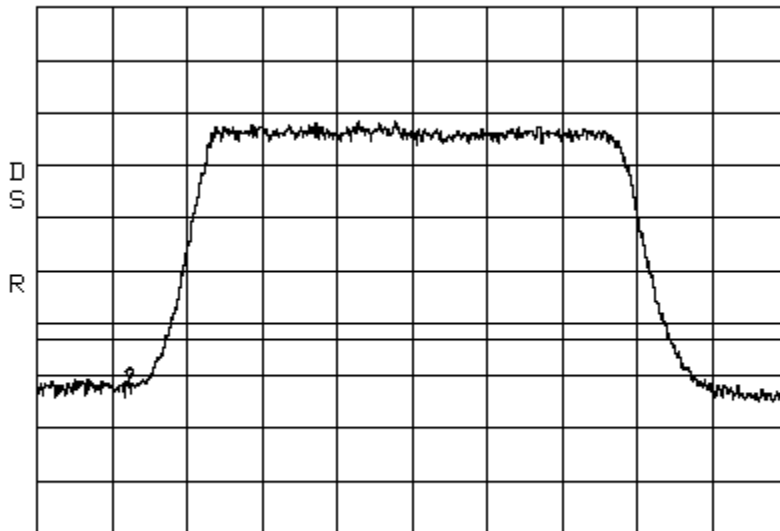
ATTEN 30dB VAUG 100 MKR -23.83dBm  
RL 50.2dBm 10dB/ 2.770GHz



START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

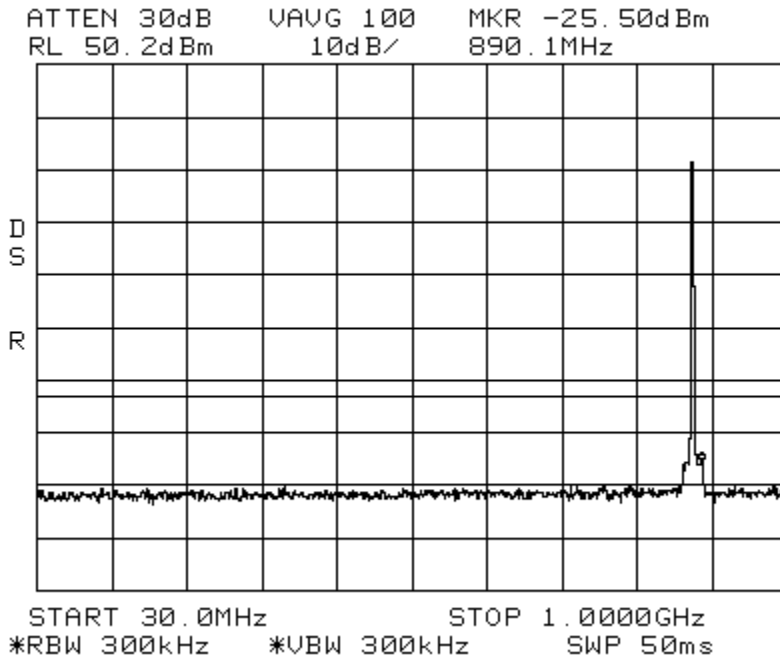
Conducted Emissions LTE 3 MHz Channel Bandwidth CELL  
Center: 881.5 MHz Span: 5 MHz RBW/VBW: 100 kHz

ATTEN 30dB VAUG 100 MKR -20.16dBm  
RL 50.2dBm 10dB/ 879.617MHz

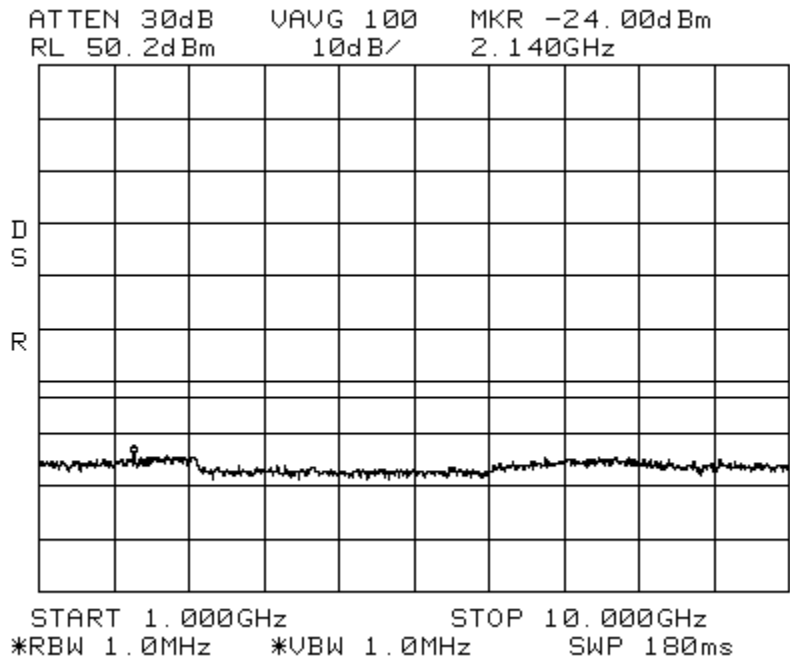


CENTER 881.500MHz SPAN 5.000MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

Conducted Emissions      LTE 3 MHz Channel Bandwidth      CELL  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Conducted Emissions      LTE 3 MHz Channel Bandwidth      CELL  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz

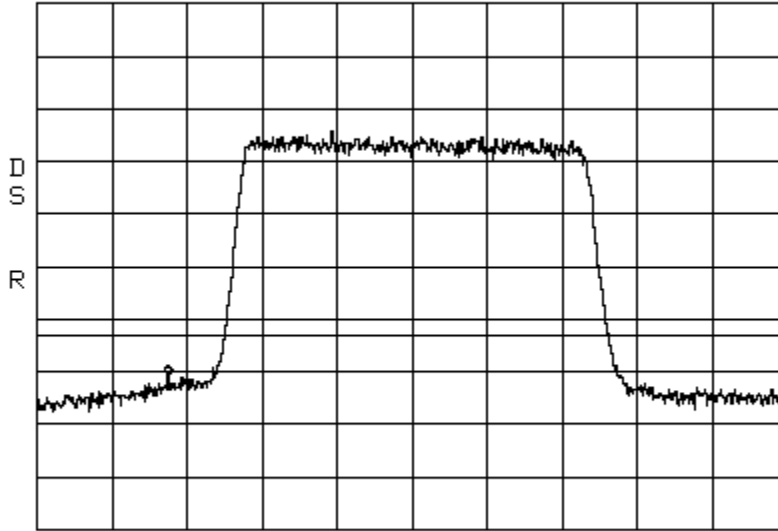


Conducted Emissions  
Center: 881.5 MHz

LTE 5 MHz Channel Bandwidth  
Span: 10 MHz

CELL  
RBW/VBW: 100 kHz

ATTEN 30dB    VAUG 100    MKR -20.50dBm  
RL 50.2dBm    10dB/    878.25MHz



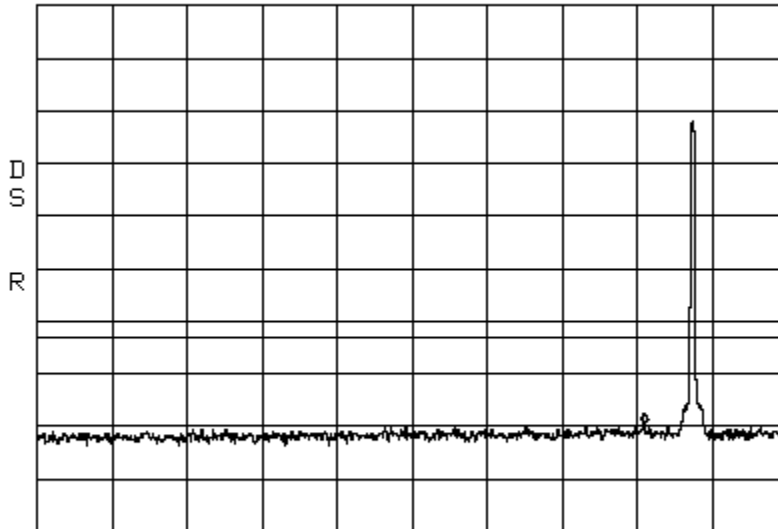
CENTER 881.50MHz    SPAN 10.00MHz  
\*RBW 100kHz    \*VBW 100kHz    SWP 50ms

Conducted Emissions  
Span: 30 MHz to 1 GHz

LTE 5 MHz Channel Bandwidth  
RBW/VBW: 300 kHz

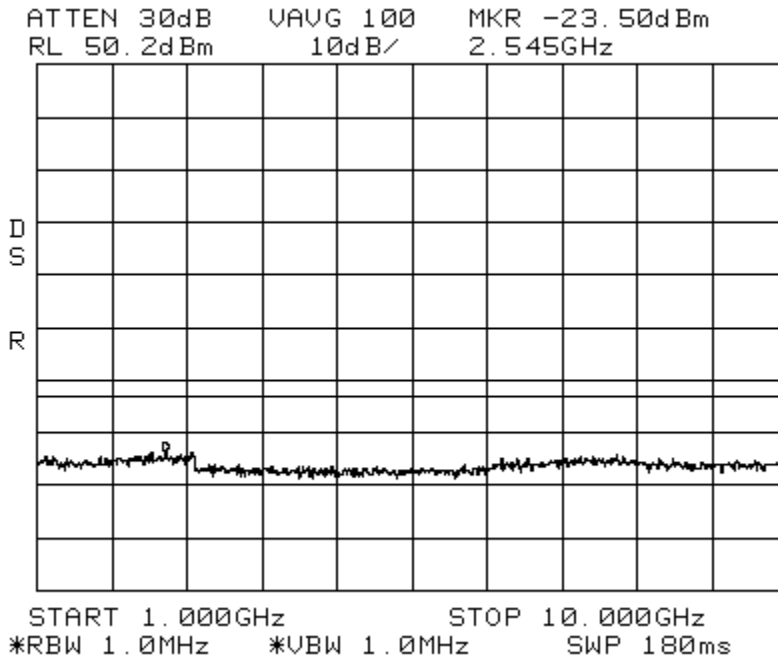
CELL

ATTEN 30dB    VAUG 100    MKR -29.50dBm  
RL 50.2dBm    10dB/    815.7MHz

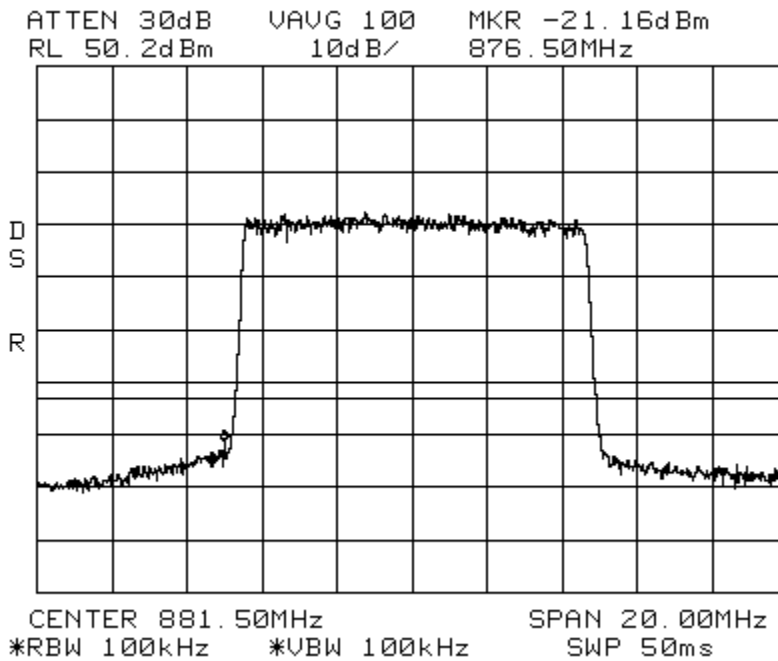


START 30.0MHz    STOP 1.0000GHz  
\*RBW 300kHz    \*VBW 300kHz    SWP 50ms

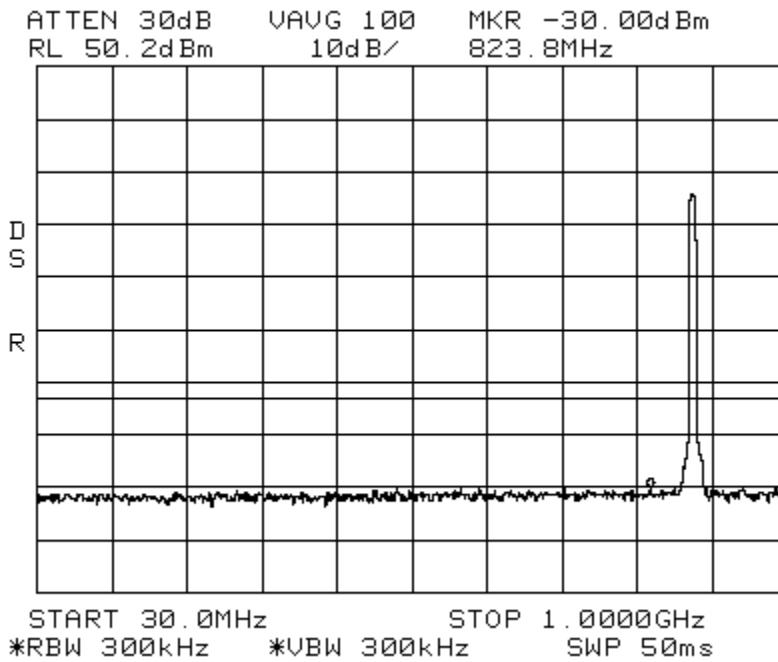
Conducted Emissions      LTE 5 MHz Channel Bandwidth      CELL  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



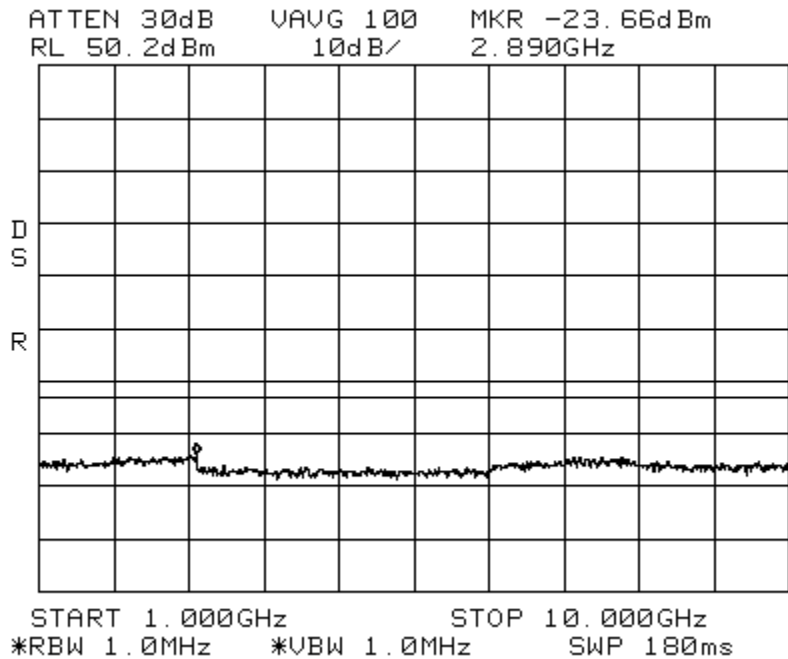
Conducted Emissions      LTE 10 MHz Channel Bandwidth      CELL  
Center: 881.5 MHz      Span: 20MHz      RBW/VBW: 100 kHz



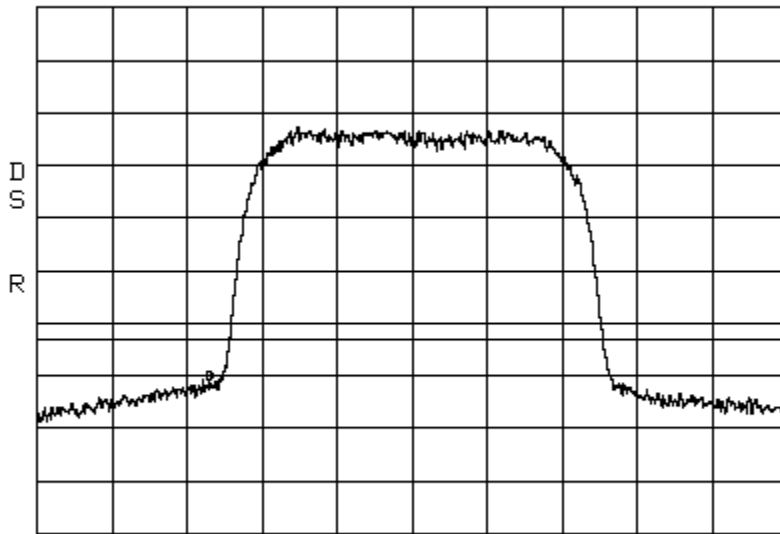
Conducted Emissions      LTE 10 MHz Channel Bandwidth      CELL  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Conducted Emissions      LTE 10 MHz Channel Bandwidth      CELL  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz

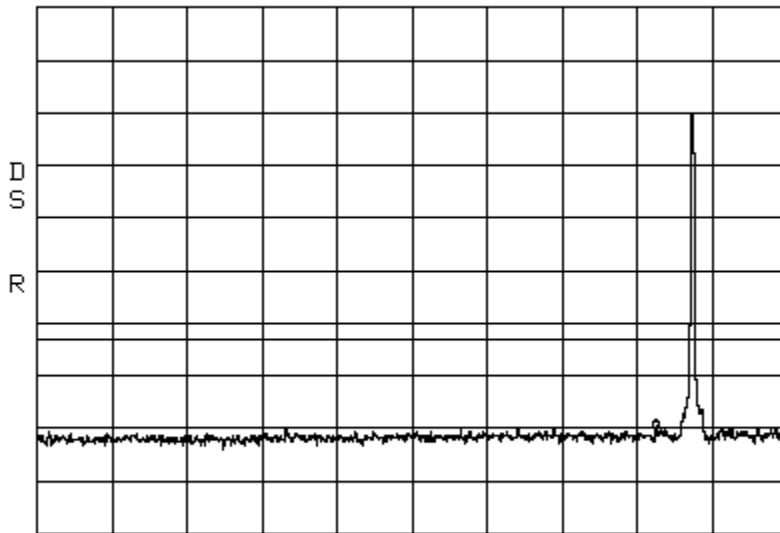


Conducted Emissions      WCDMA      CELL  
 Center: 881.5 MHz      Span: 10 MHz      RBW/VBW: 100 kHz  
 ATTEN 30dB      VAUG 100      MKR -20.83dBm  
 RL 50.2dBm      10dB/      878.80MHz



CENTER 881.50MHz      SPAN 10.00MHz  
 \*RBW 100kHz      \*VBW 100kHz      SWP 50ms

Conducted Emissions      WCDMA      CELL  
 Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz  
 ATTEN 30dB      VAUG 100      MKR -30.00dBm  
 RL 50.2dBm      10dB/      830.3MHz

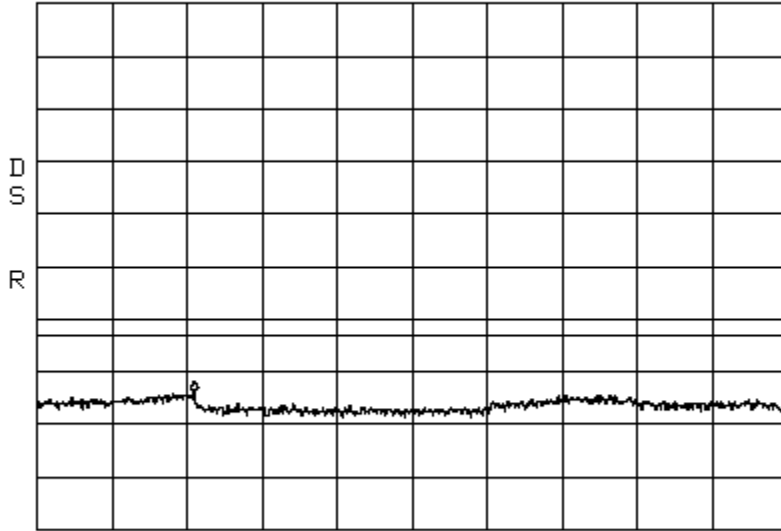


START 30.0MHz      STOP 1.0000GHz  
 \*RBW 300kHz      \*VBW 300kHz      SWP 50ms



Conducted Emissions WCDMA CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

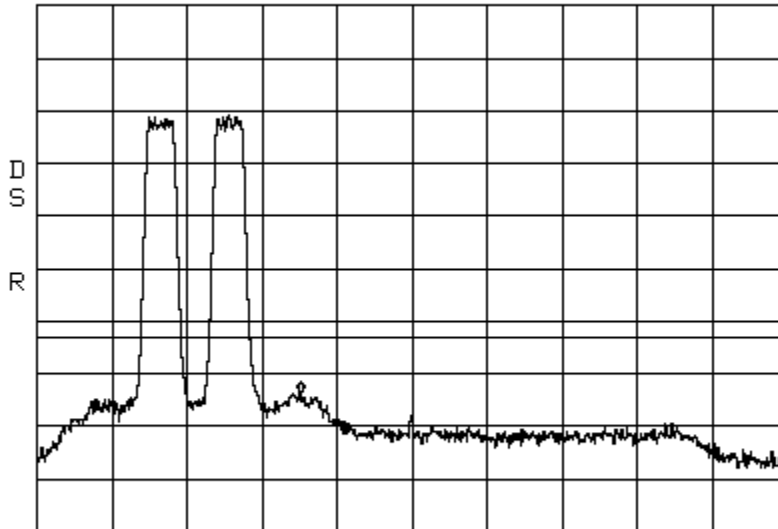
ATTEN 30dB VAUG 100 MKR -23.83dBm  
RL 50.2dBm 10dB/ 2.890GHz



START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

Intermodulation CDMA\_Low CELL  
Center: 881.5 MHz Span: 35 MHz RBW/VBW: 100 kHz

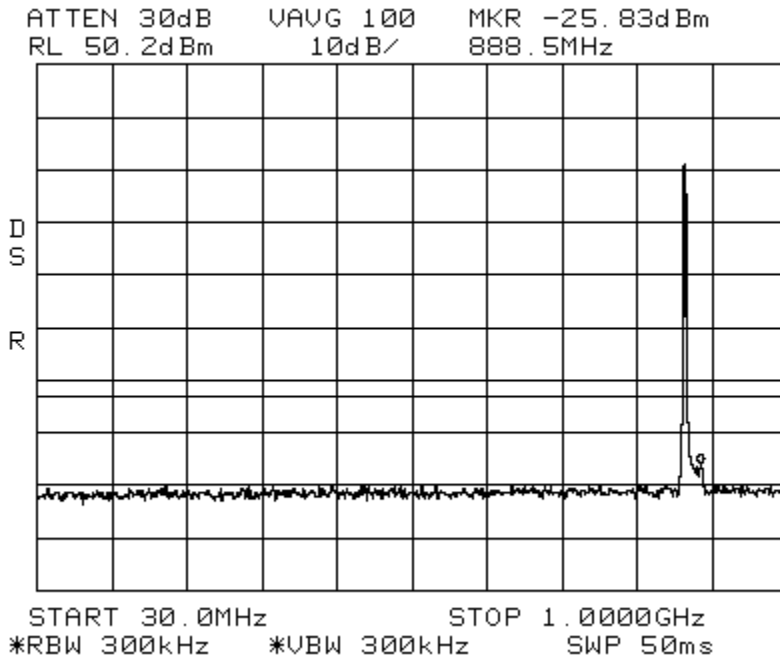
ATTEN 30dB VAUG 100 MKR -23.33dBm  
RL 50.2dBm 10dB/ 876.31MHz



CENTER 881.50MHz SPAN 35.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

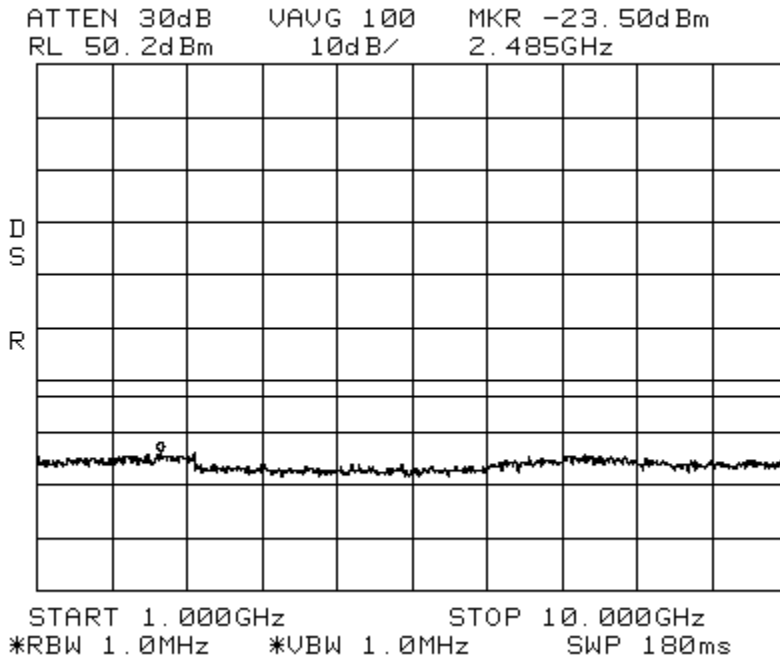
Intermodulation  
Span: 30 MHz to 1 GHz

CDMA\_Low CELL  
RBW/VBW: 300 kHz



Intermodulation  
Span: 1 GHz to 10 GHz

CDMA\_Low CELL  
RBW/VBW: 1 MHz

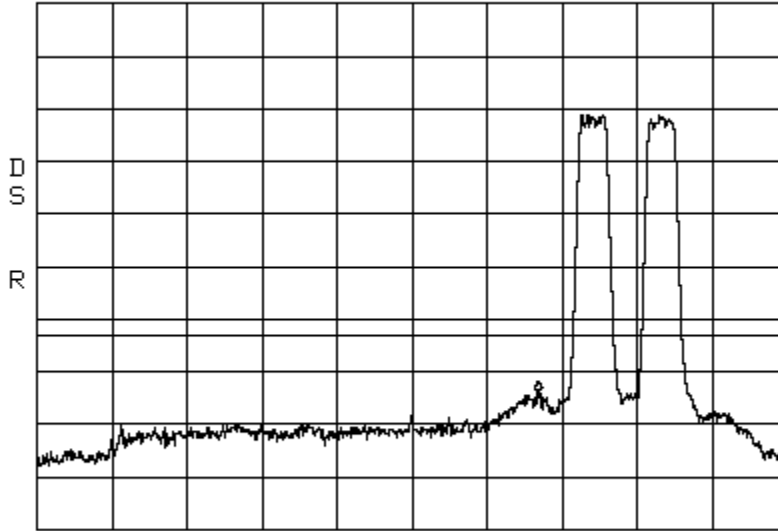


Intermodulation  
Center: 881.5 MHz

CDMA\_High  
Span: 35 MHz

CELL  
RBW/VBW: 100 kHz

ATTEN 30dB VAUG 100 MKR -23.83dBm  
RL 50.2dBm 10dB/ 887.39MHz



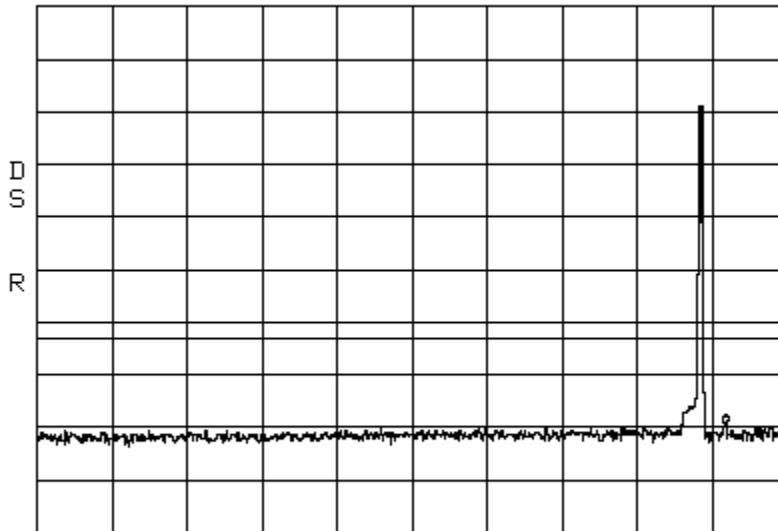
CENTER 881.50MHz SPAN 35.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

Intermodulation  
Span: 30 MHz to 1 GHz

CDMA\_High  
RBW/VBW: 300 kHz

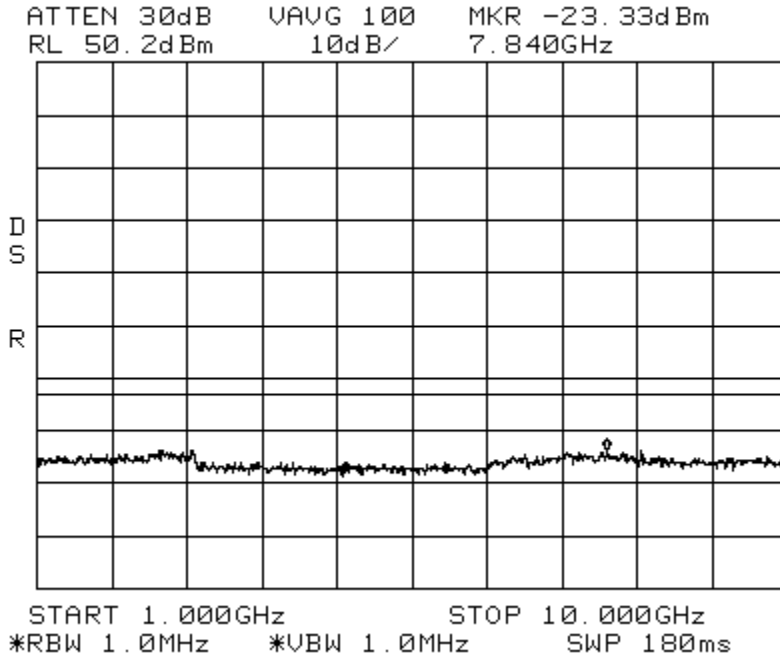
CELL

ATTEN 30dB VAUG 100 MKR -29.33dBm  
RL 50.2dBm 10dB/ 920.8MHz

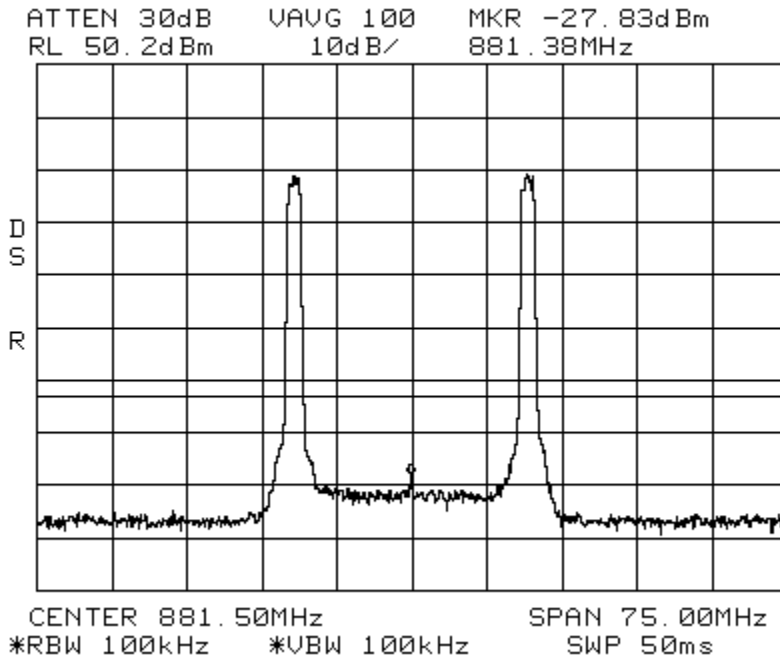


START 30.0MHz STOP 1.0000GHz  
\*RBW 300kHz \*VBW 300kHz SWP 50ms

Intermodulation CDMA\_High CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



Intermodulation CDMA\_Apart CELL  
Center: 881.5 MHz Span: 75 MHz RBW/VBW: 100 kHz



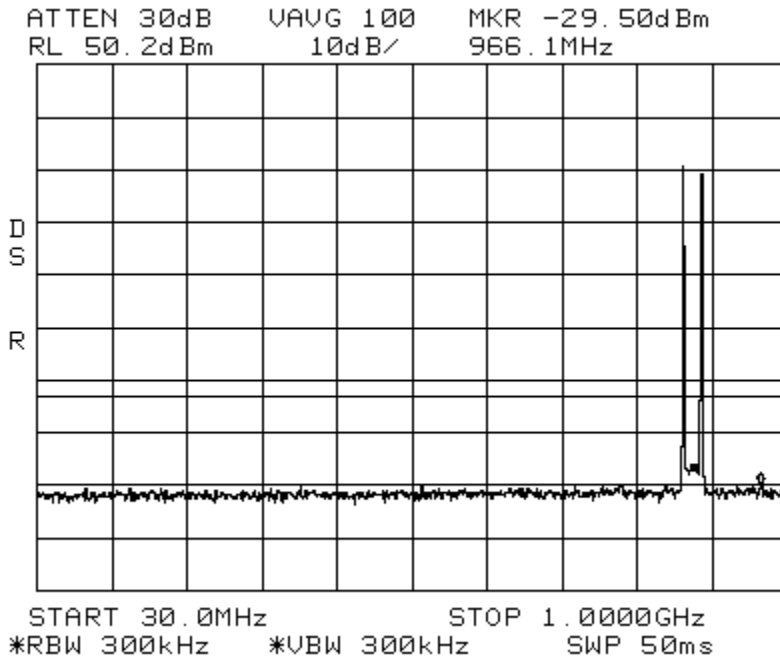
Intermodulation

CDMA\_Apart

CELL

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



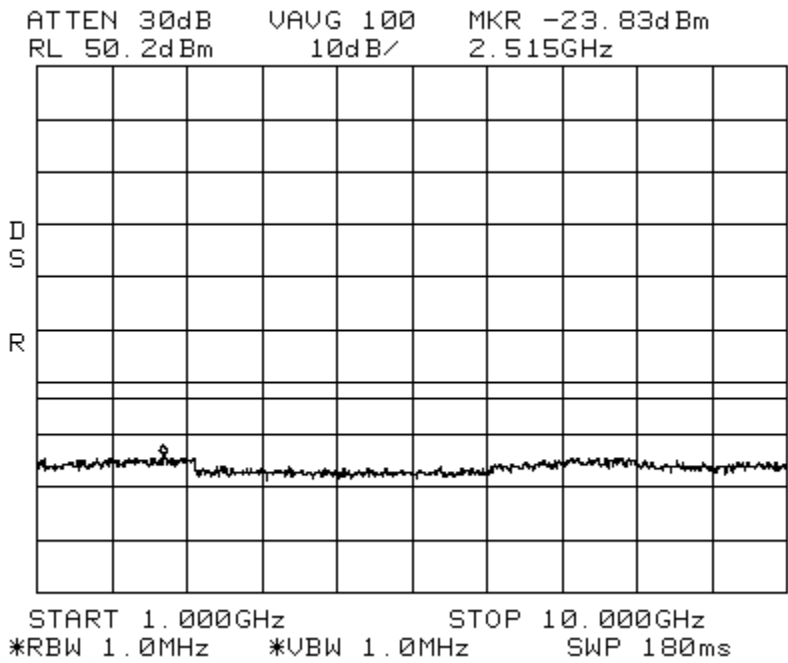
Intermodulation

CDMA\_Apart

CELL

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

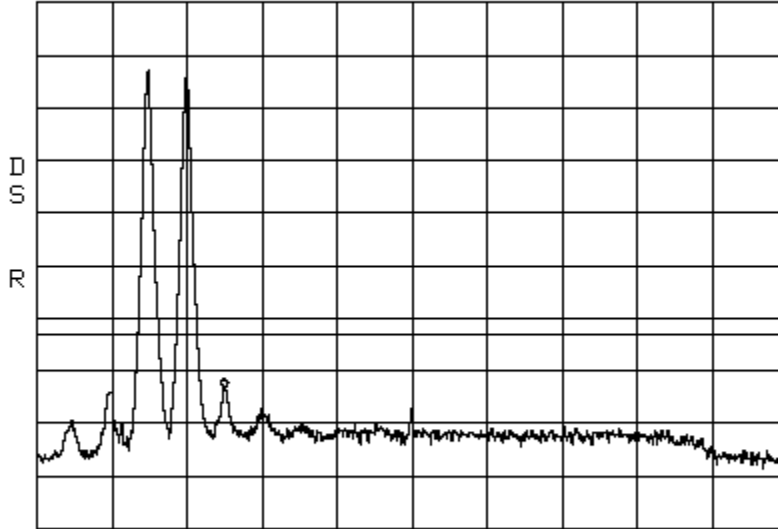


Intermodulation  
Center: 881.5 MHz

EDGE\_Low  
Span: 35 MHz

CELL  
RBW/VBW: 100 kHz

ATTEN 30dB    VAVG 100    MKR -23.16dBm  
RL 50.2dBm    10dB/    872.75MHz

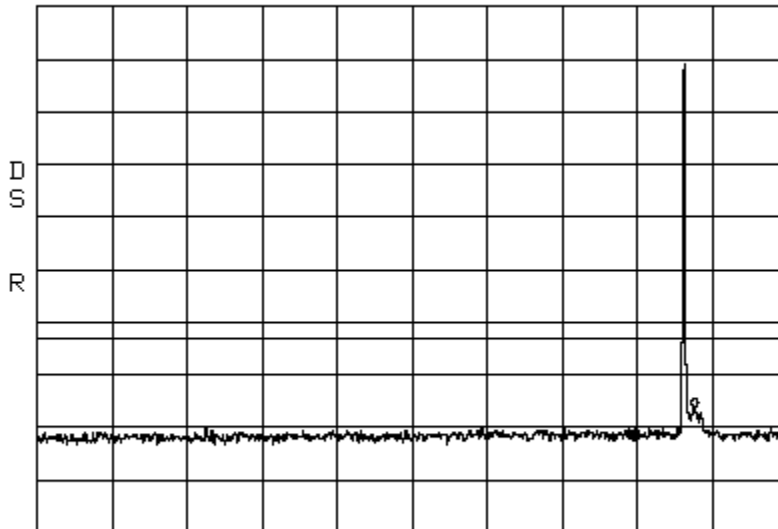


CENTER 881.50MHz    SPAN 35.00MHz  
\*RBW 100kHz    \*VBW 100kHz    SWP 50ms

Intermodulation  
Span: 30 MHz to 1 GHz

EDGE\_Low  
RBW/VBW: 300 kHz

ATTEN 30dB    VAVG 100    MKR -26.16dBm  
RL 50.2dBm    10dB/    880.4MHz



START 30.0MHz    STOP 1.0000GHz  
\*RBW 300kHz    \*VBW 300kHz    SWP 50ms

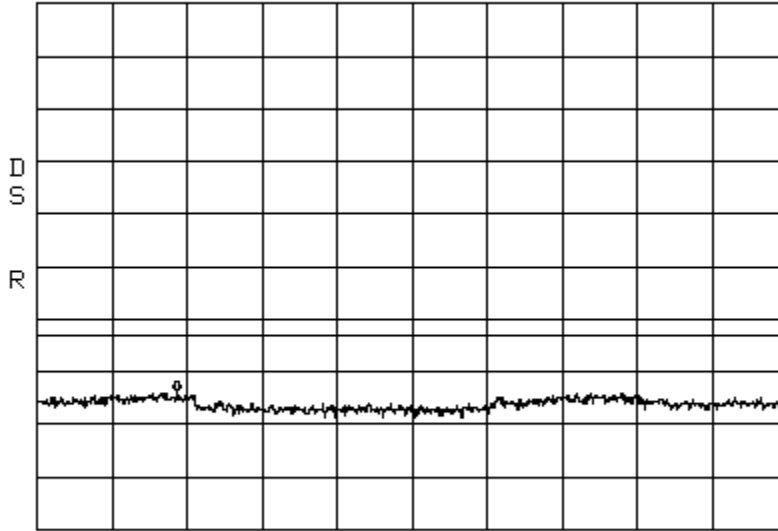
Intermodulation  
Span: 1 GHz to 10 GHz

EDGE\_Low

CELL

RBW/VBW: 1 MHz

ATTEN 30dB    VAVG 100    MKR -23.66dBm  
RL 50.2dBm    10dB/    2.680GHz



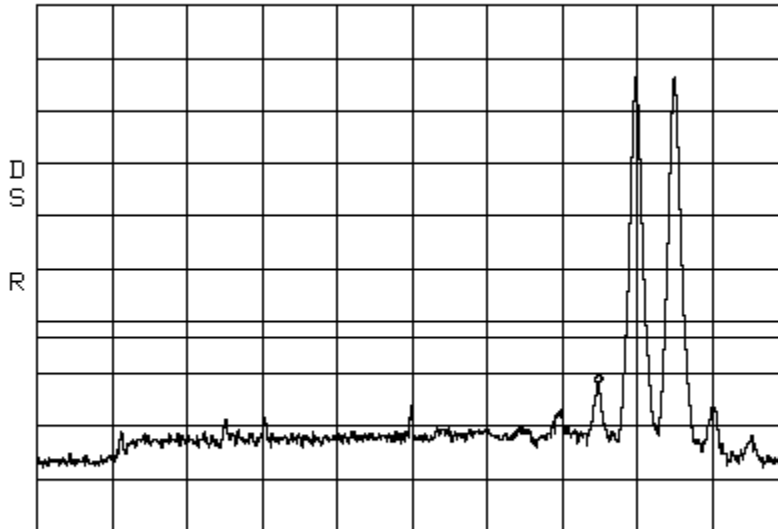
START 1.000GHz    STOP 10.000GHz  
\*RBW 1.0MHz    \*VBW 1.0MHz    SWP 180ms

Intermodulation  
Center: 881.5 MHz

EDGE\_High  
Span: 35 MHz

CELL  
RBW/VBW: 100 kHz

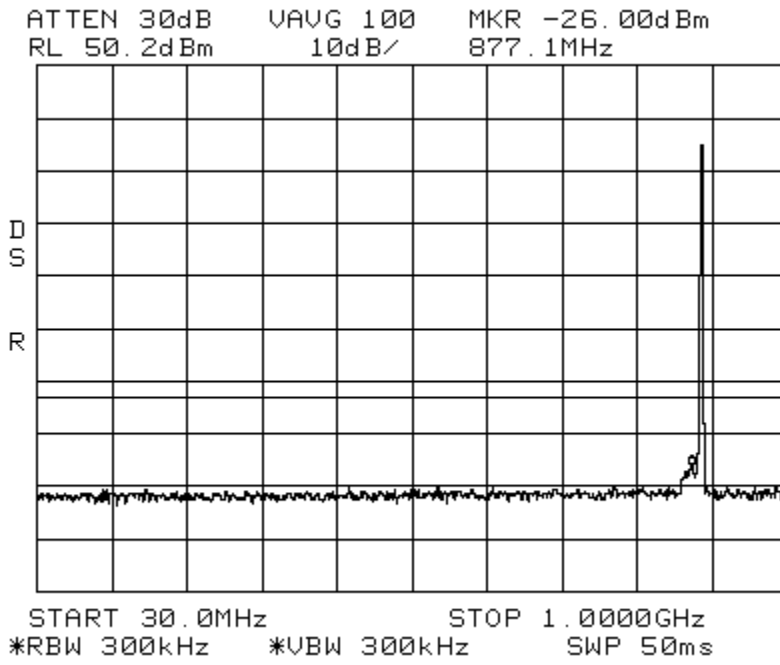
ATTEN 30dB    VAVG 100    MKR -21.83dBm  
RL 50.2dBm    10dB/    890.19MHz



CENTER 881.50MHz    SPAN 35.00MHz  
\*RBW 100kHz    \*VBW 100kHz    SWP 50ms

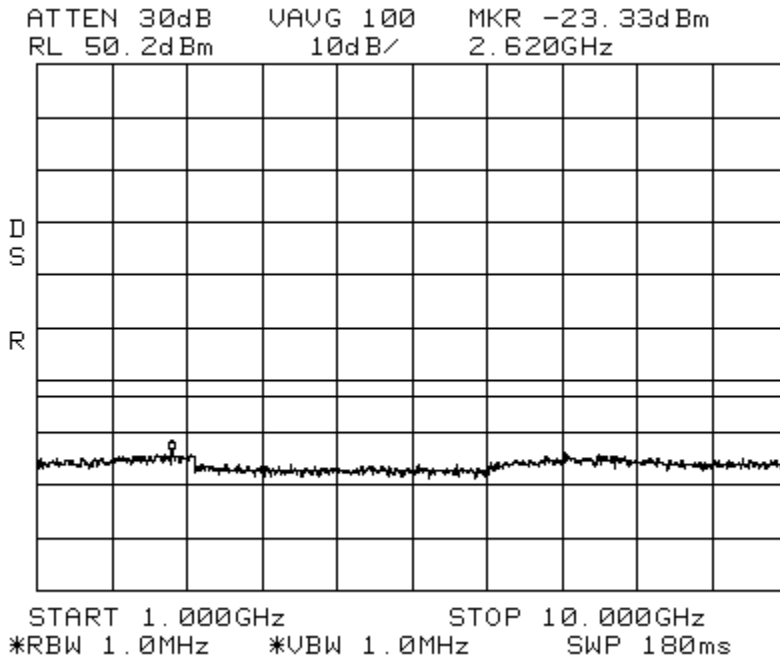
Intermodulation  
Span: 30 MHz to 1 GHz

EDGE\_High CELL  
RBW/VBW: 300 kHz

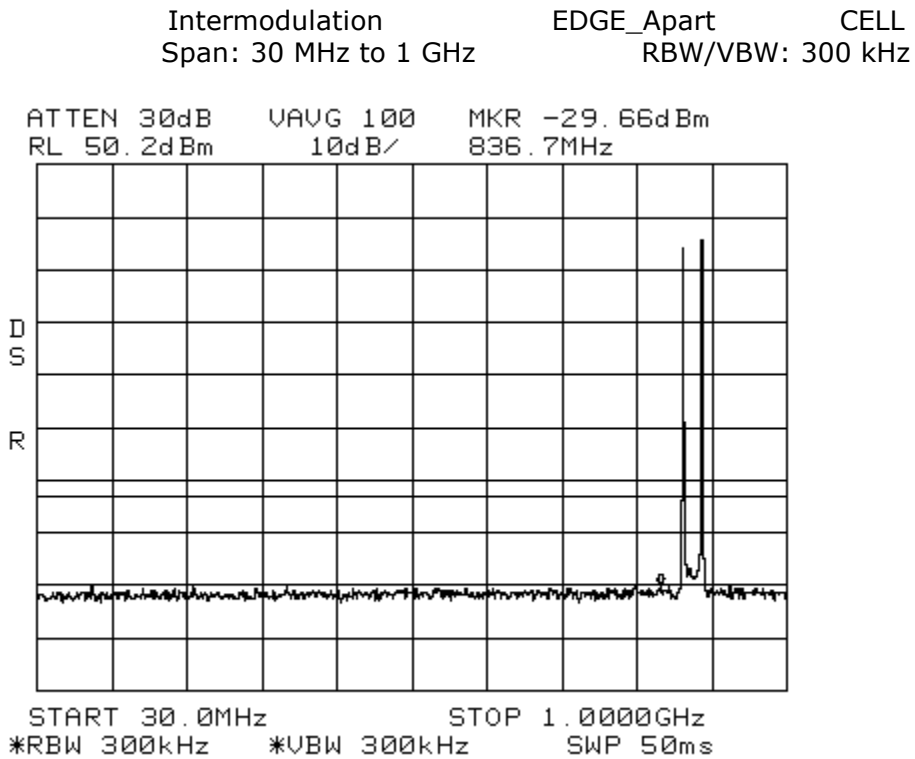
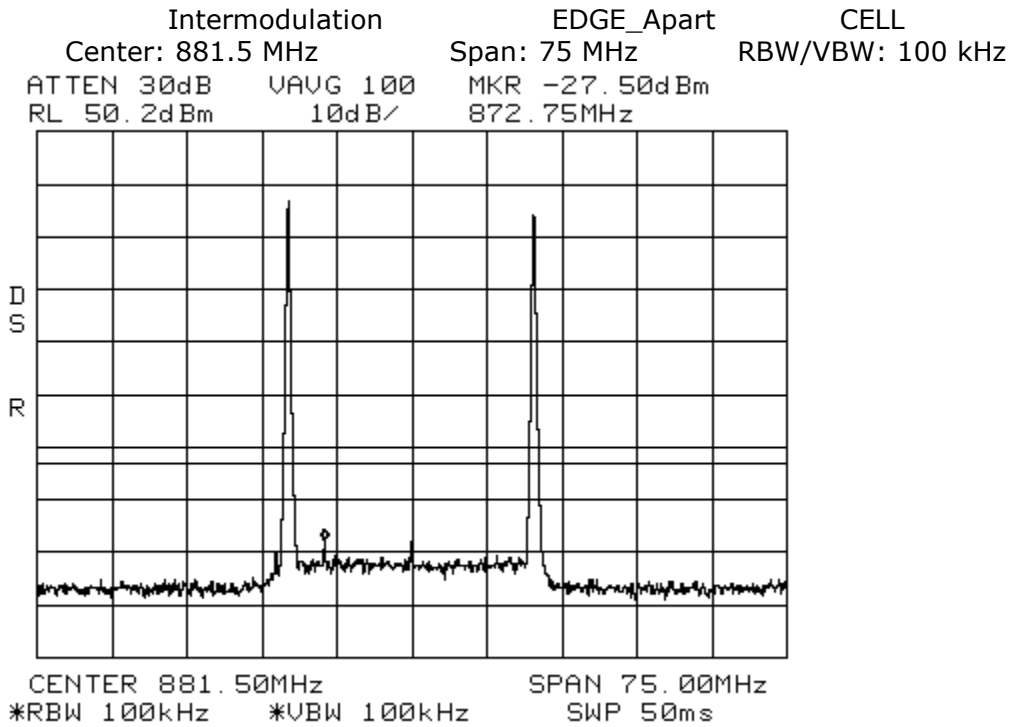


Intermodulation  
Span: 1 GHz to 10 GHz

EDGE\_High CELL  
RBW/VBW: 1 MHz

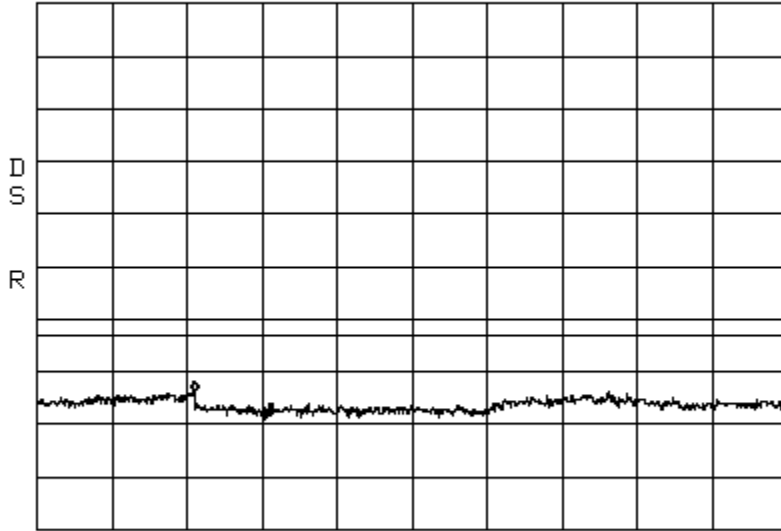






Intermodulation                      EDGE\_Apart                      CELL  
Span: 1 GHz to 10 GHz                      RBW/VBW: 1 MHz

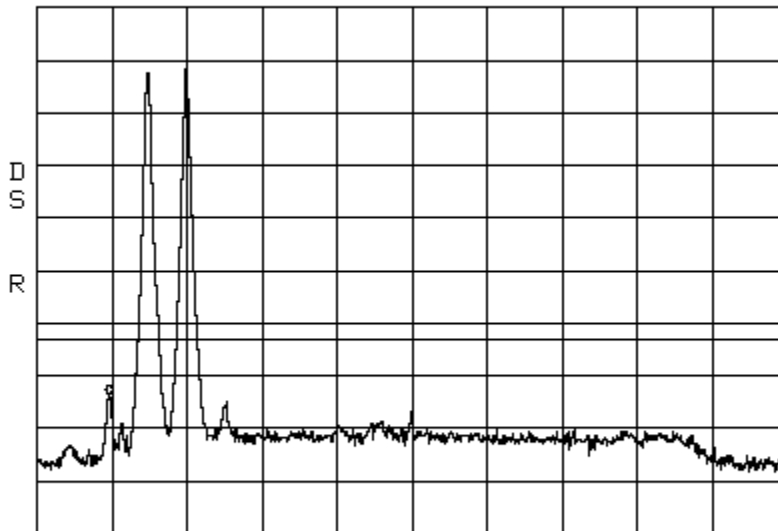
ATTEN 30dB      VAUG 100      MKR -23.66dBm  
RL 50.2dBm      10dB/      2.890GHz



START 1.000GHz                      STOP 10.000GHz  
\*RBW 1.0MHz      \*VBW 1.0MHz      SWP 180ms

Intermodulation                      GSM\_Low                      CELL  
Center: 881.5 MHz                      Span: 35 MHz                      RBW/VBW: 100 kHz

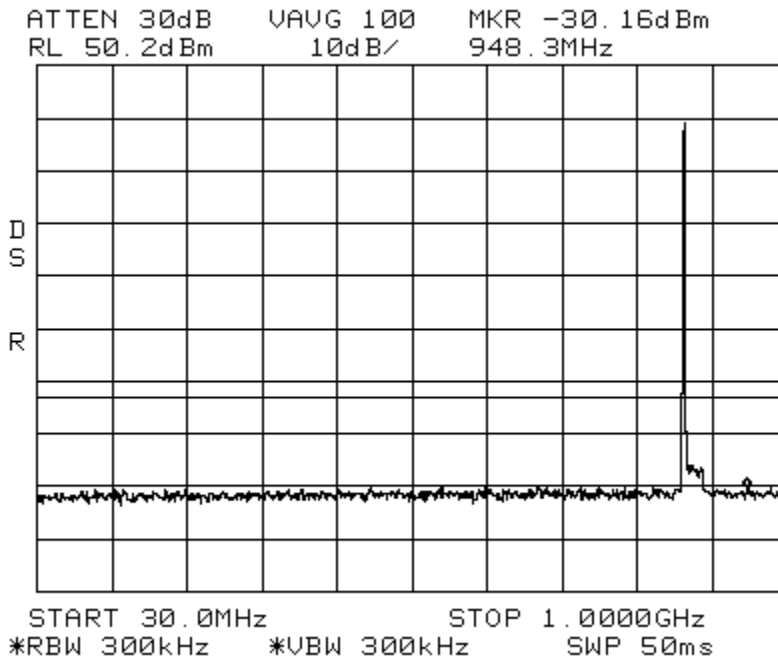
ATTEN 30dB      VAUG 100      MKR -23.50dBm  
RL 50.2dBm      10dB/      867.38MHz



CENTER 881.50MHz                      SPAN 35.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

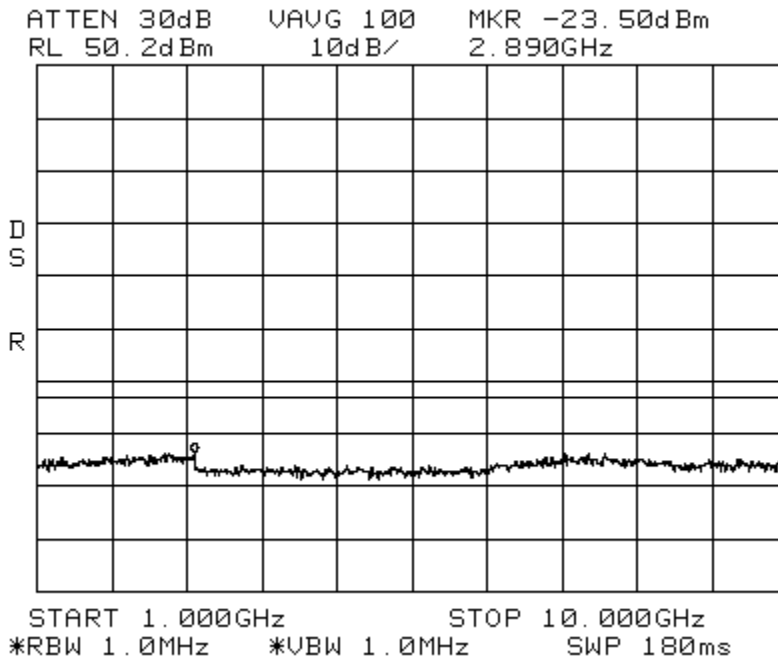
Intermodulation  
Span: 30 MHz to 1 GHz

GSM\_Low CELL  
RBW/VBW: 300 kHz



Intermodulation  
Span: 1 GHz to 10 GHz

GSM\_Low CELL  
RBW/VBW: 1 MHz

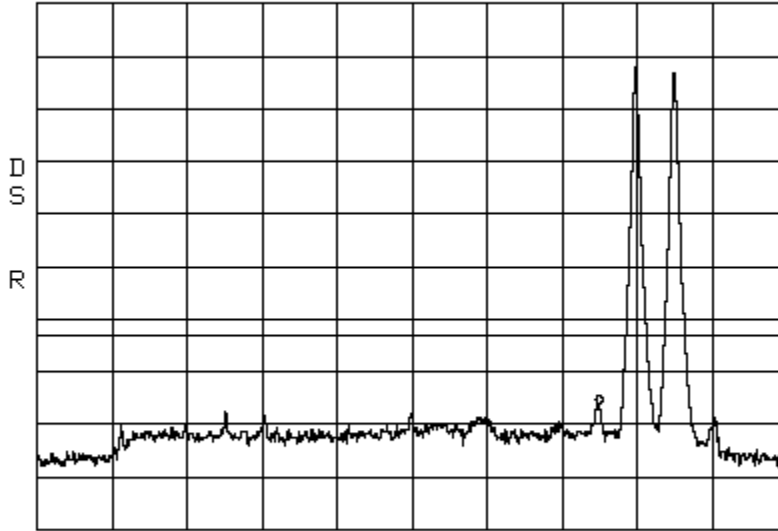


Intermodulation  
Center: 881.5 MHz

GSM\_High  
Span: 35 MHz

CELL  
RBW/VBW: 100 kHz

ATTEN 30dB    VAVG 100    MKR -26.16dBm  
RL 50.2dBm    10dB/    890.25MHz

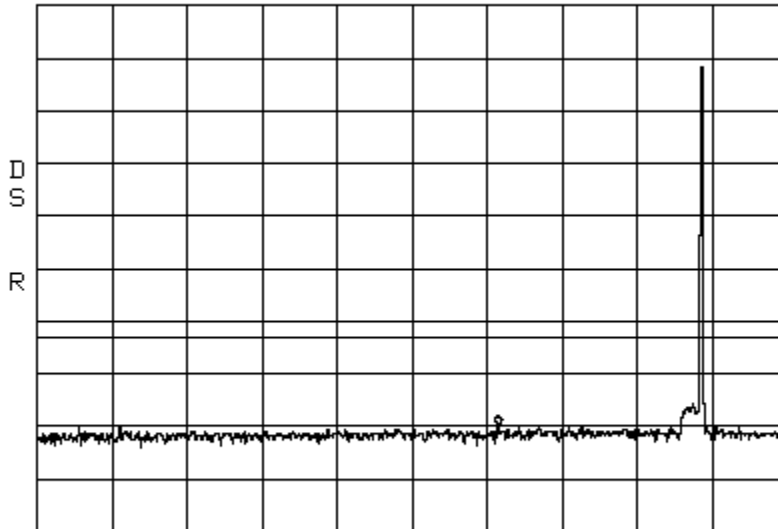


CENTER 881.50MHz    SPAN 35.00MHz  
\*RBW 100kHz    \*VBW 100kHz    SWP 50ms

Intermodulation  
Span: 30 MHz to 1 GHz

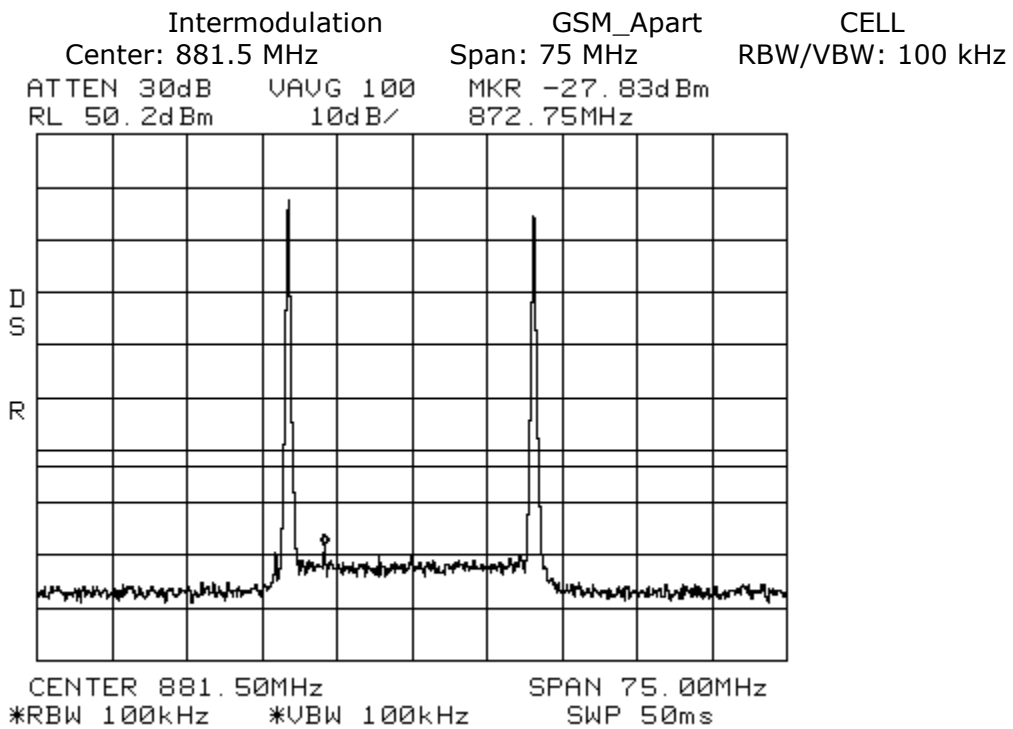
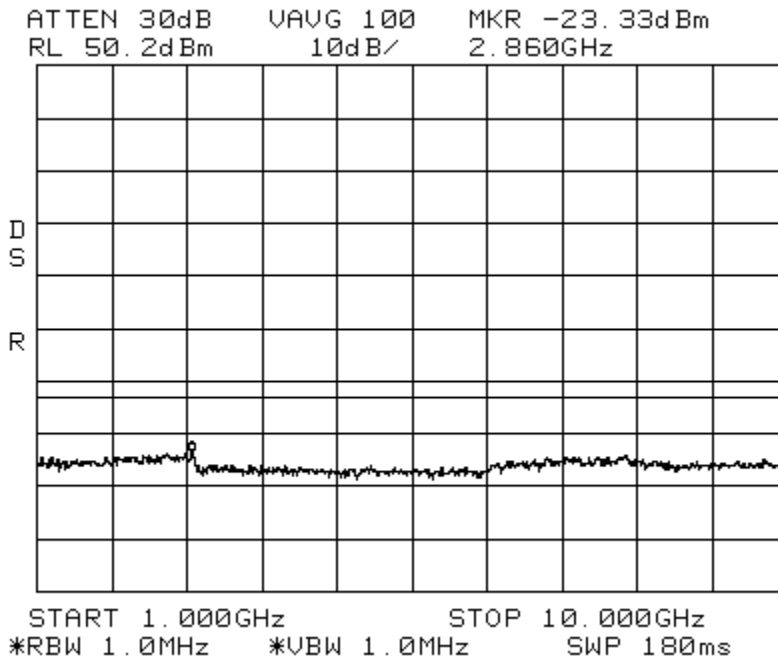
GSM\_High    CELL  
RBW/VBW: 300 kHz

ATTEN 30dB    VAVG 100    MKR -29.66dBm  
RL 50.2dBm    10dB/    626.6MHz



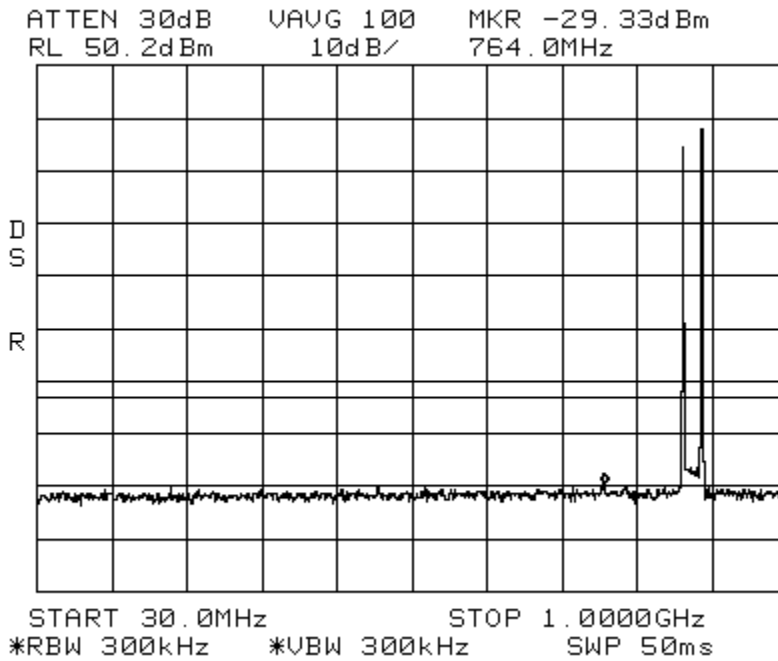
START 30.0MHz    STOP 1.0000GHz  
\*RBW 300kHz    \*VBW 300kHz    SWP 50ms

Intermodulation GSM\_High CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



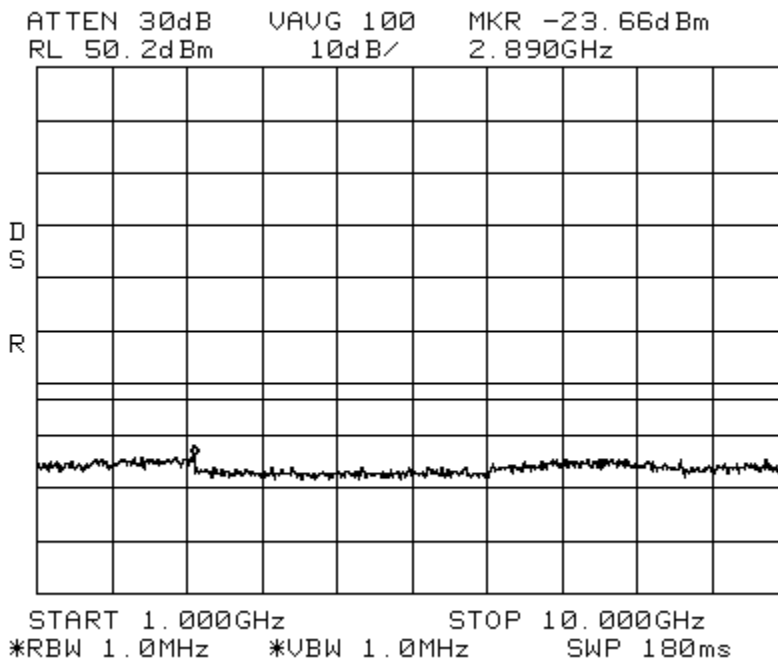
Intermodulation  
Span: 30 MHz to 1 GHz

GSM\_Apart CELL  
RBW/VBW: 300 kHz

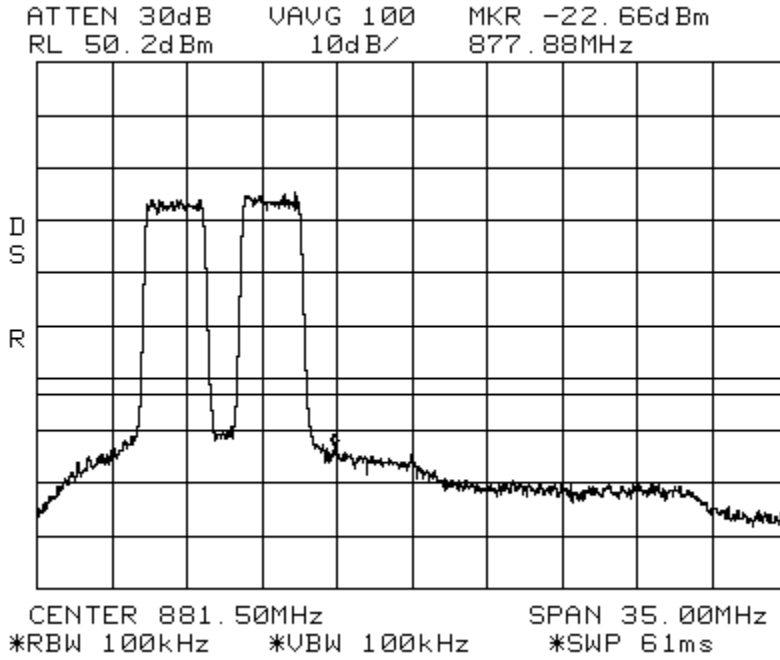


Intermodulation  
Span: 1 GHz to 10 GHz

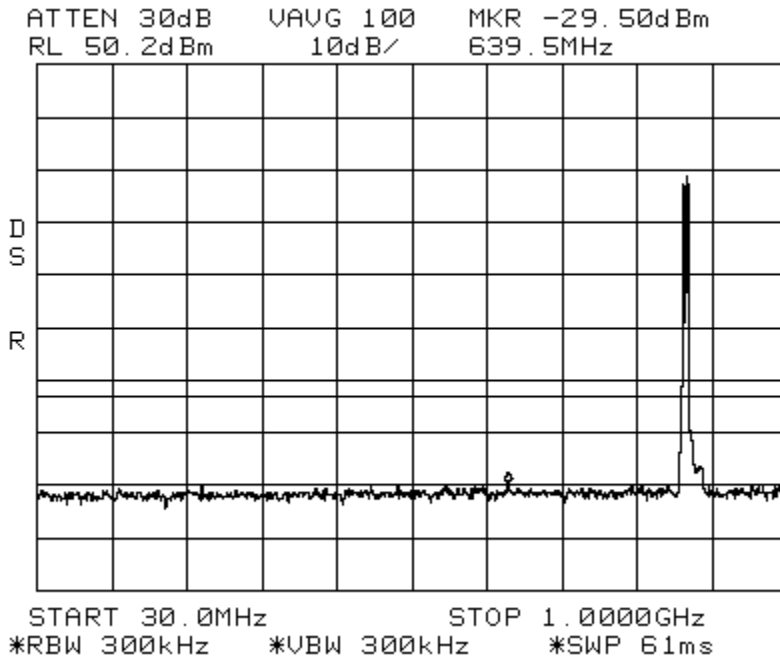
GSM\_Apart CELL  
RBW/VBW: 1 MHz



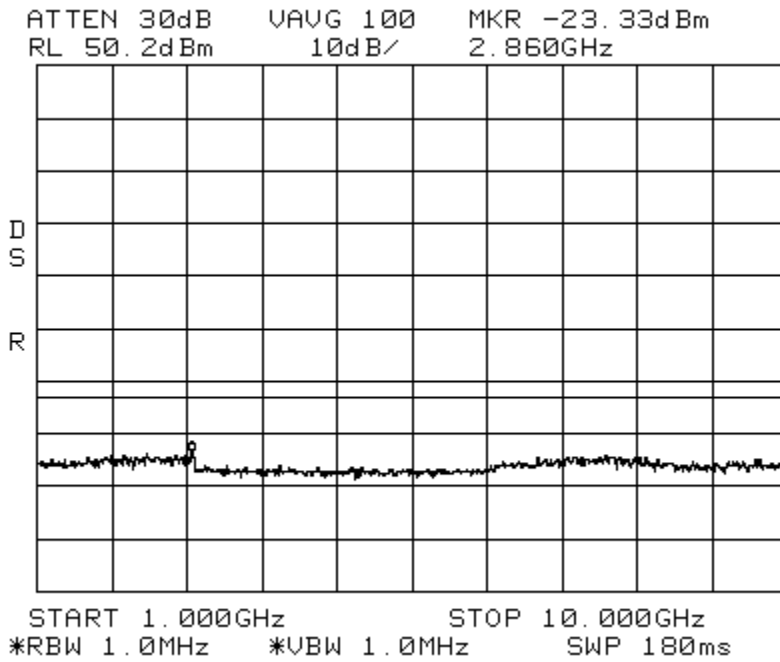
Intermodulation LTE 3MHz Channel Bandwidth \_Low CELL  
Center: 881.5 MHz Span: 35 MHz RBW/VBW: 100 kHz



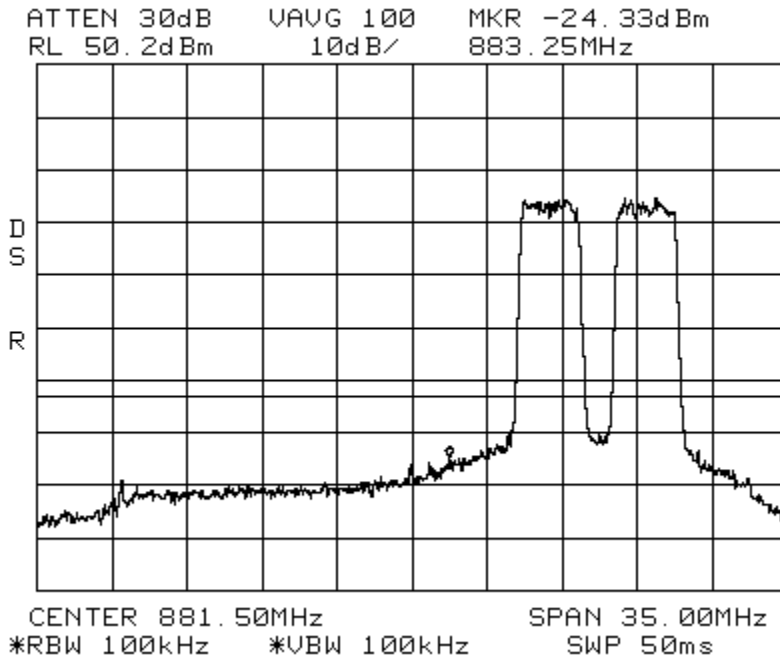
Intermodulation LTE 3MHz Channel Bandwidth \_Low CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation LTE 3 MHz Channel Bandwidth\_Low CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

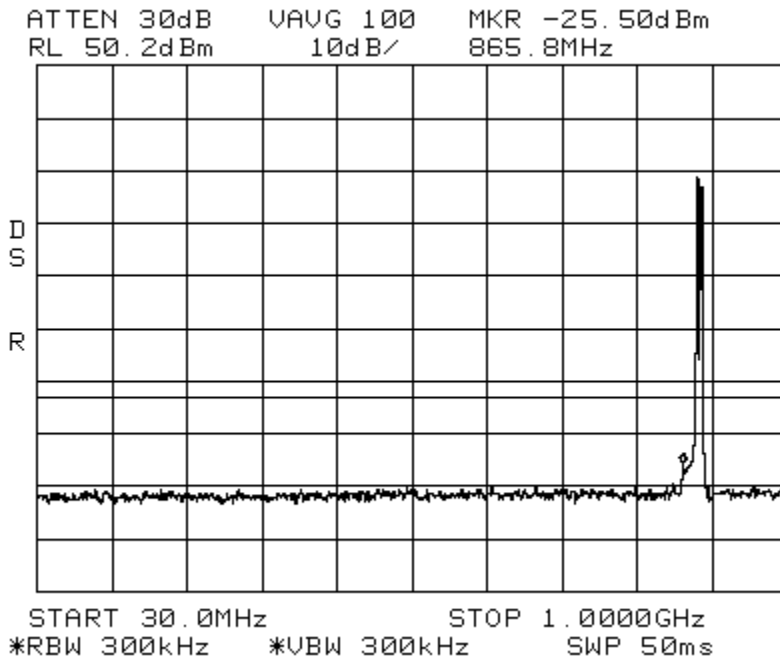


Intermodulation LTE 3 MHz Channel Bandwidth\_High CELL  
Center: 881.5 MHz Span: 35 MHz RBW/VBW: 100 kHz

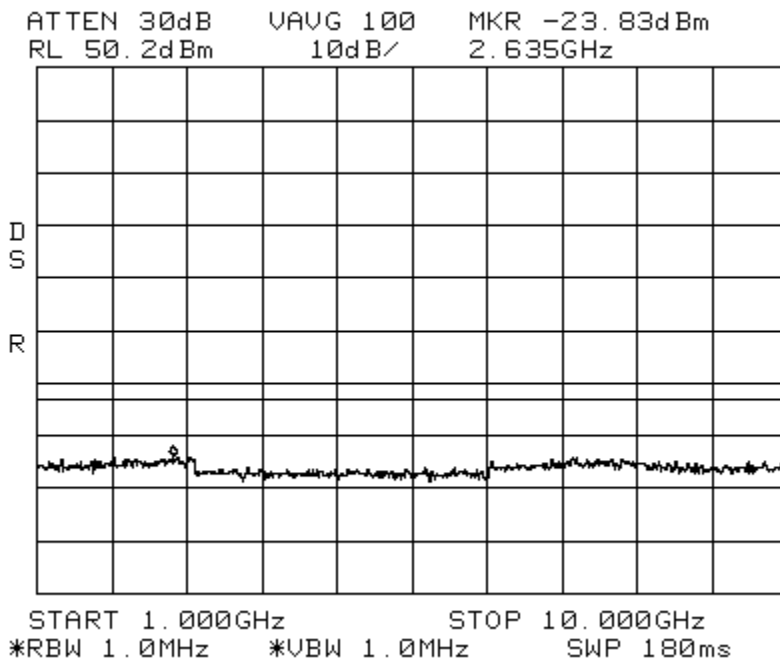




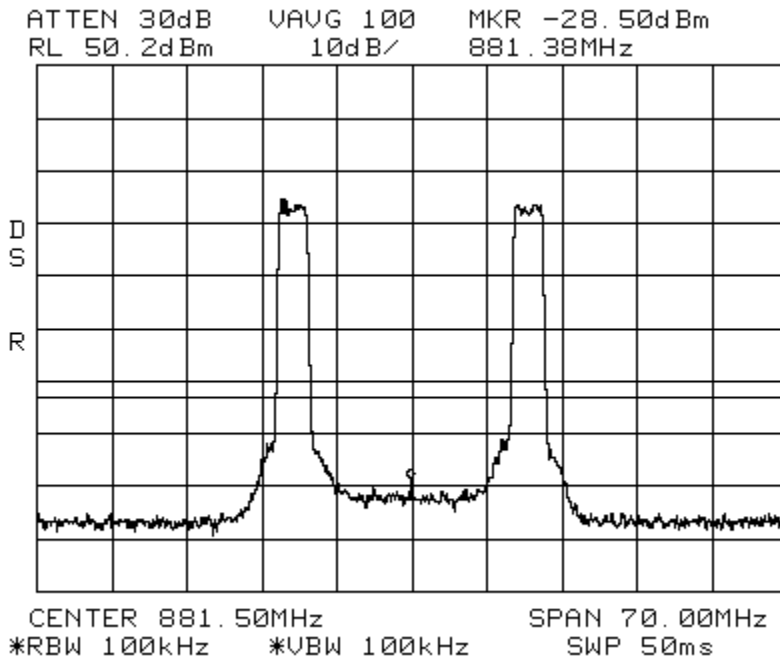
Intermodulation LTE 3 MHz Channel Bandwidth\_High CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



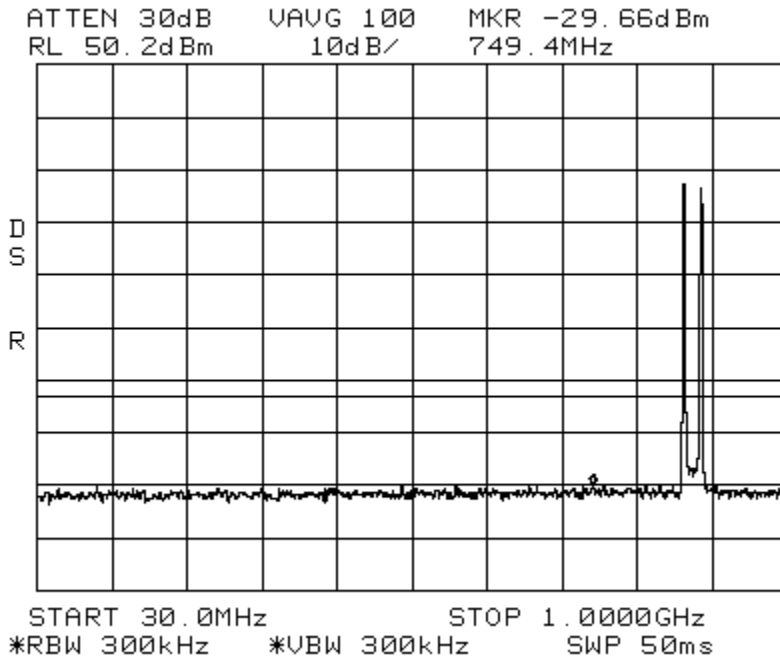
Intermodulation LTE 3 MHz Channel Bandwidth\_High CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



Intermodulation LTE 3 MHz Channel Bandwidth\_Apart CELL  
Center: 881.5 MHz Span: 70 MHz RBW/VBW: 100 kHz

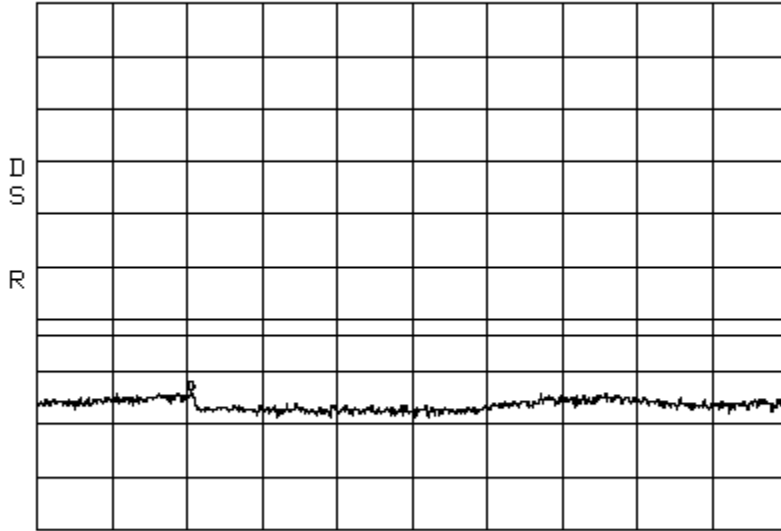


Intermodulation LTE 3 MHz Channel Bandwidth\_Apart CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation LTE 3 MHz Channel Bandwidth\_Apart CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

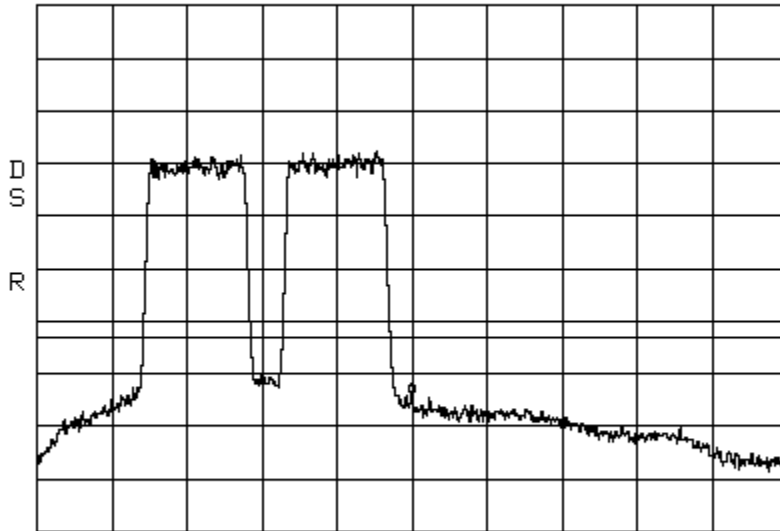
ATTEN 30dB VAUG 100 MKR -23.66dBm  
RL 50.2dBm 10dB/ 2.845GHz



START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

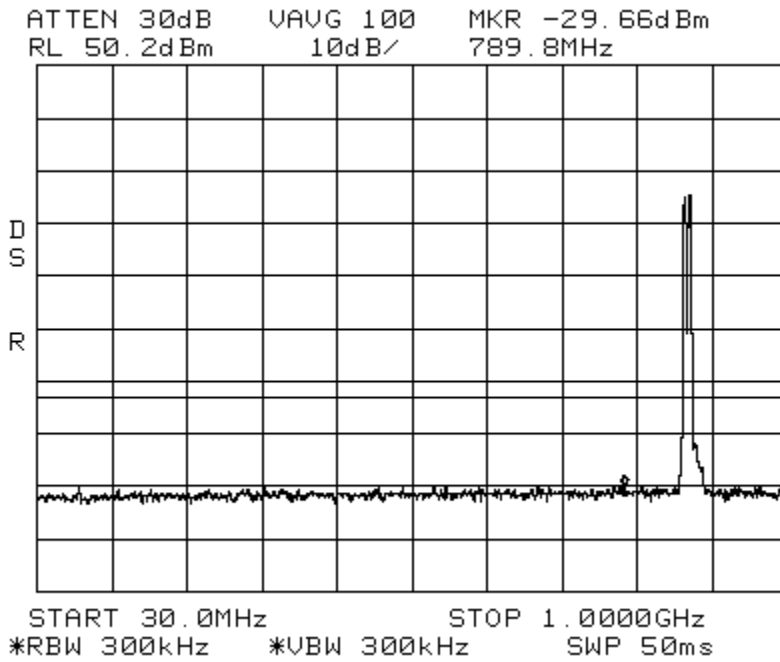
Intermodulation LTE 5 MHz Channel Bandwidth\_Low CELL  
Center: 881.5 MHz Span: 35 MHz RBW/VBW: 100 kHz

ATTEN 30dB VAUG 100 MKR -23.66dBm  
RL 50.2dBm 10dB/ 881.50MHz

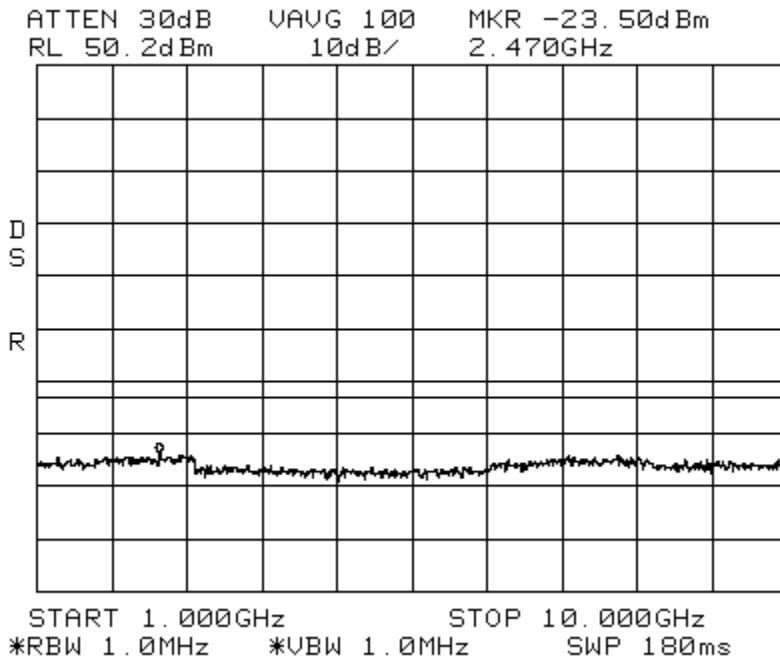


CENTER 881.50MHz SPAN 35.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

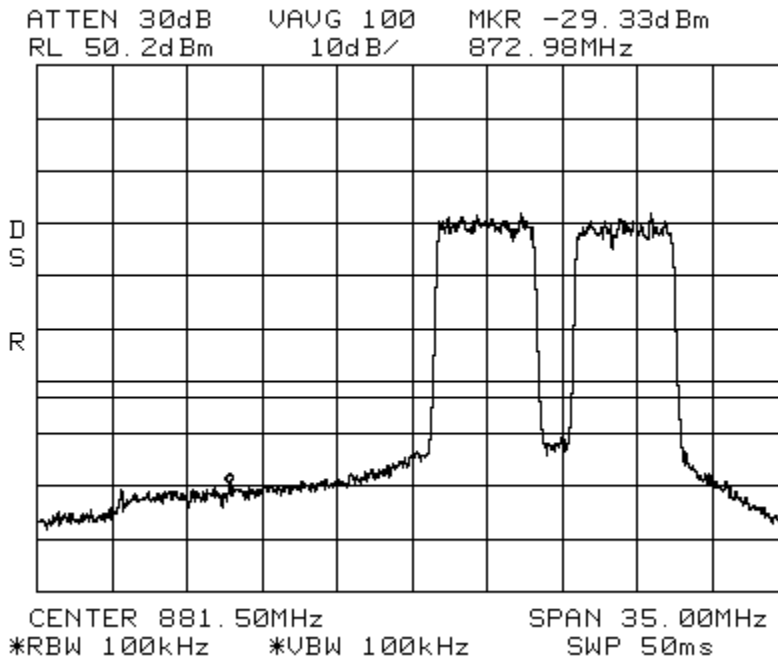
Intermodulation LTE 5 MHz Channel Bandwidth \_Low CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



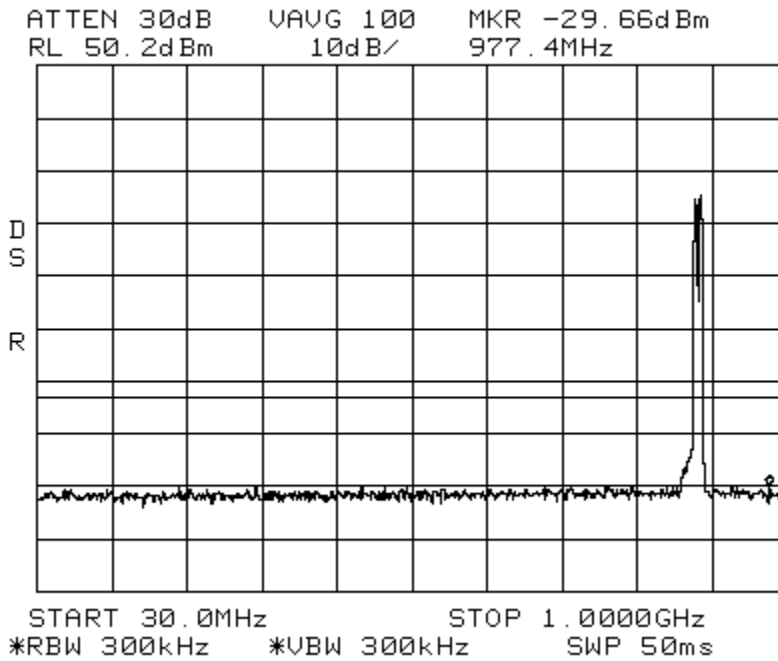
Intermodulation LTE 5 MHz Channel Bandwidth \_Low CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



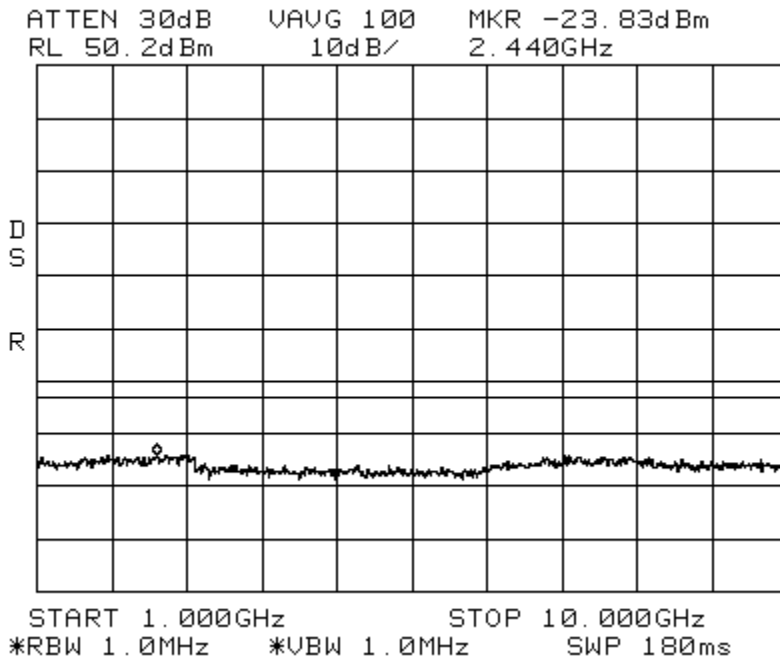
Intermodulation LTE 5 MHz Channel Bandwidth\_High CELL  
Center: 881.5 MHz Span: 35 MHz RBW/VBW: 100 kHz



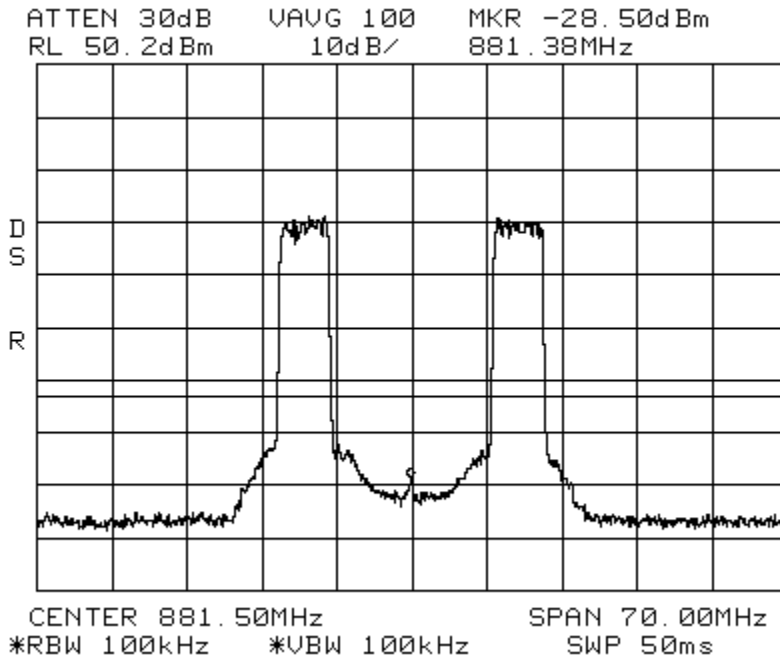
Intermodulation LTE 5 MHz Channel Bandwidth\_High CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



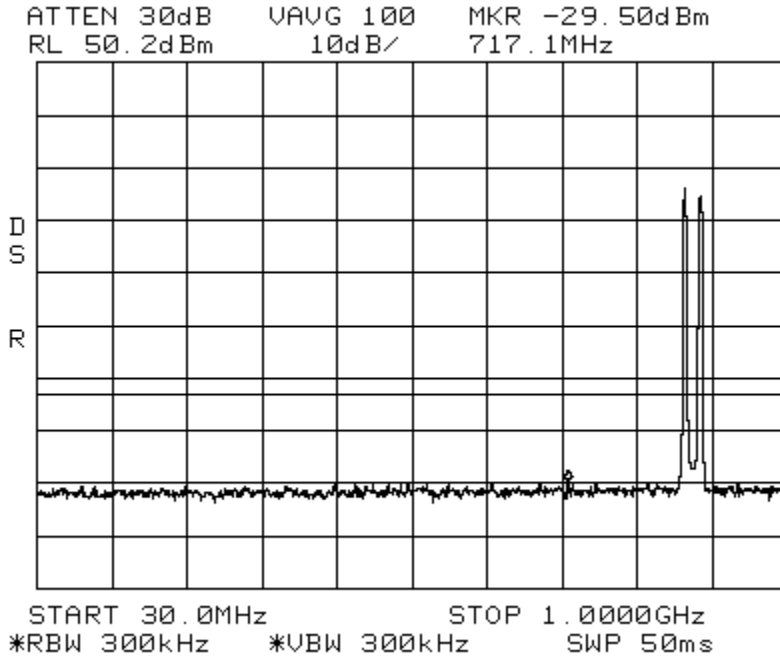
Intermodulation LTE 5 MHz Channel Bandwidth\_High CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



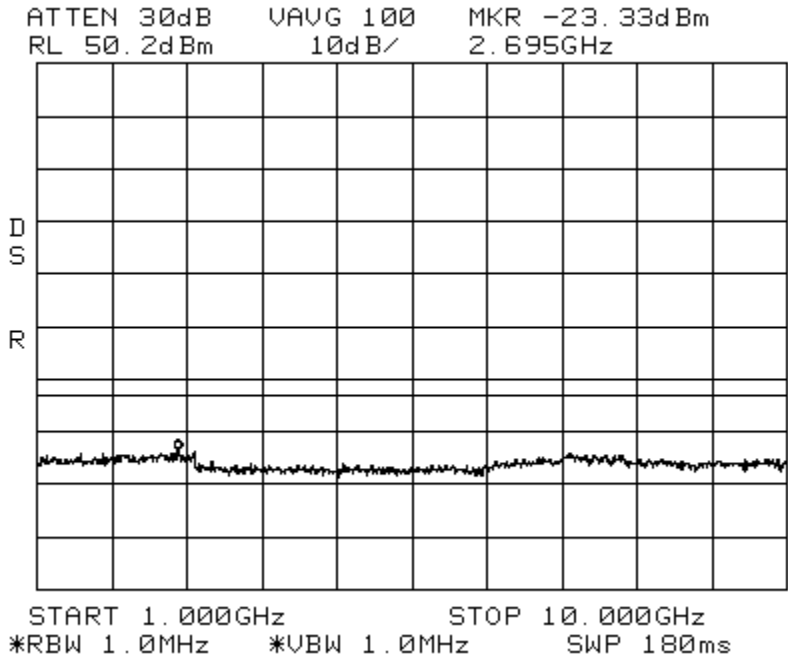
Intermodulation LTE 5 MHz Channel Bandwidth\_Apart CELL  
Center: 881.5 MHz Span: 70 MHz RBW/VBW: 100 kHz



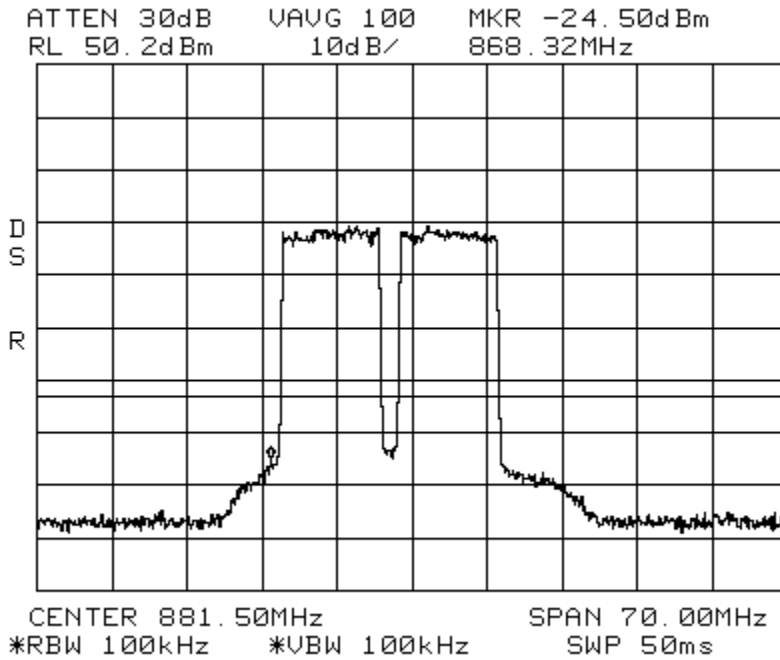
Intermodulation LTE 5 MHz Channel Bandwidth \_Apart CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



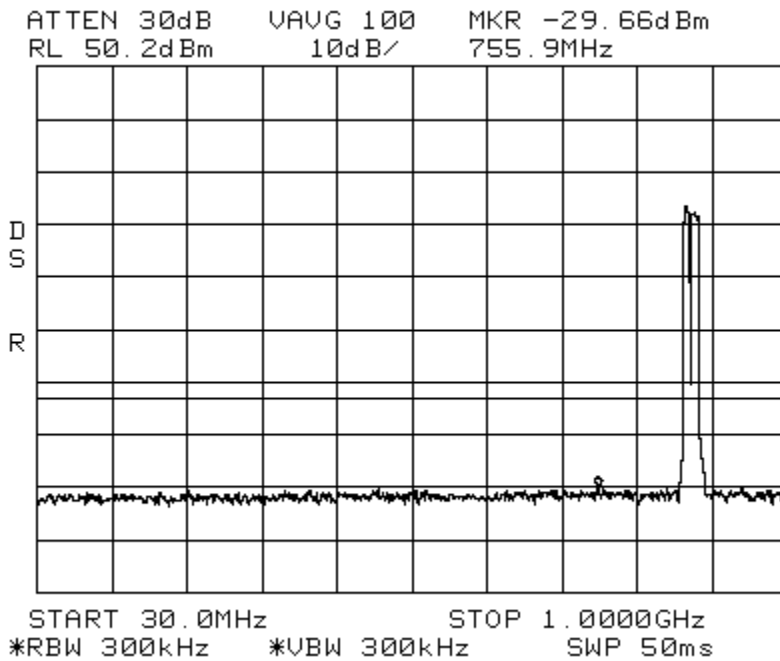
Intermodulation LTE 5 MHz Channel Bandwidth \_Apart CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



Intermodulation LTE 10 MHz Channel Bandwidth\_Low CELL  
Center: 881.5 MHz Span: 70 MHz RBW/VBW: 100 kHz

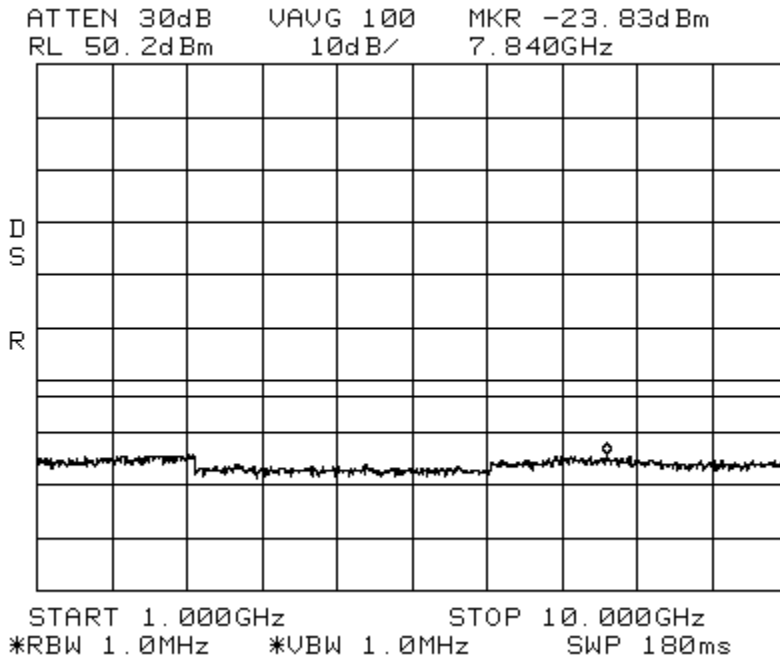


Intermodulation LTE 10 MHz Channel Bandwidth\_Low CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

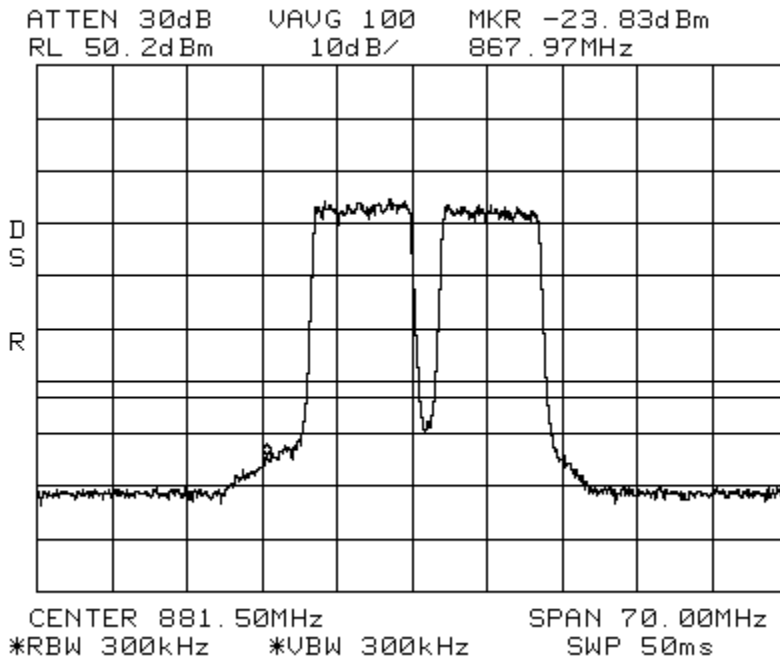




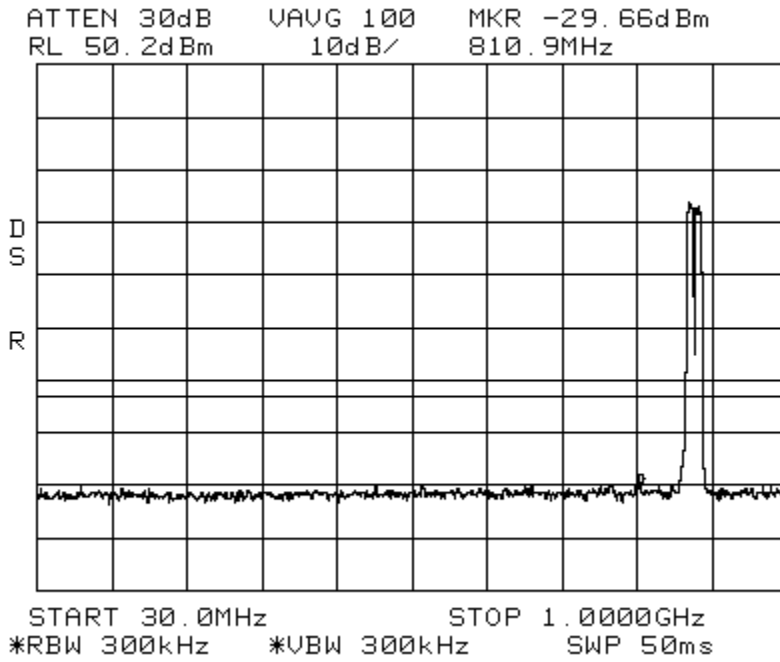
Intermodulation LTE 10 MHz Channel Bandwidth\_Low CELL  
Span: 1 GHz to 10GHz RBW/VBW: 1 MHz



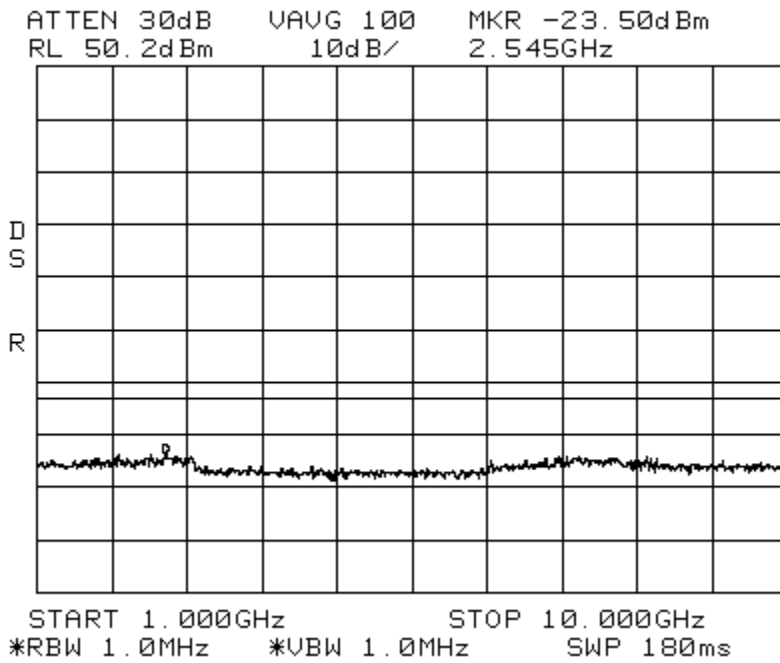
Intermodulation LTE 10 MHz Channel Bandwidth\_High CELL  
Center: 881.5 MHz Span: 70 MHz RBW/VBW: 100 kHz



Intermodulation LTE 10 MHz Channel Bandwidth\_High CELL  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



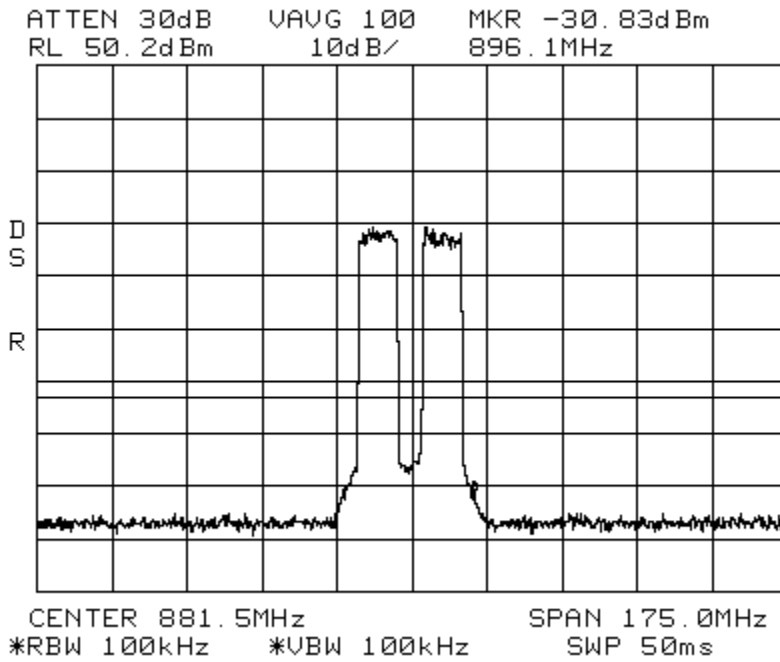
Intermodulation LTE 10 MHz Channel Bandwidth\_High CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



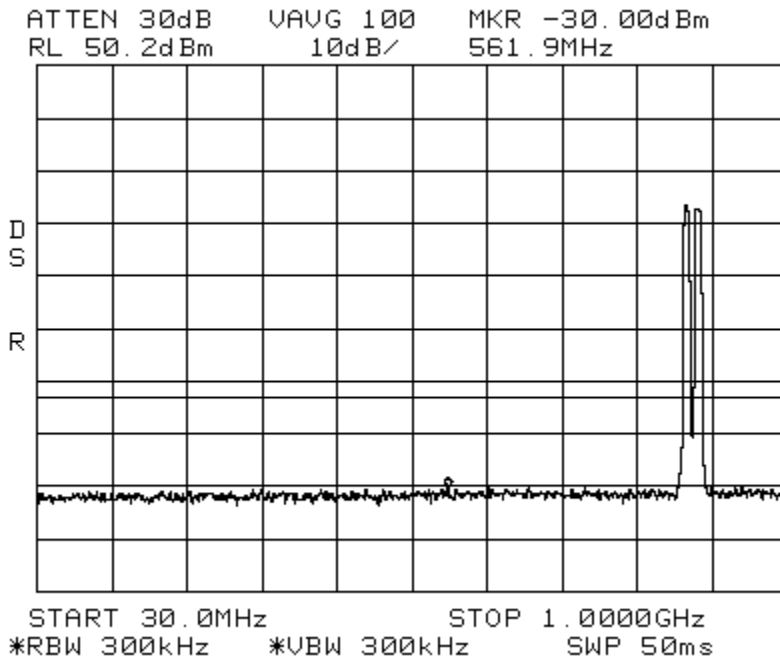
Intermodulation  
Center: 881.5 MHz

LTE 10 MHz Channel Bandwidth\_Apart  
Span: 175 MHz

CELL  
RBW/VBW: 100 kHz

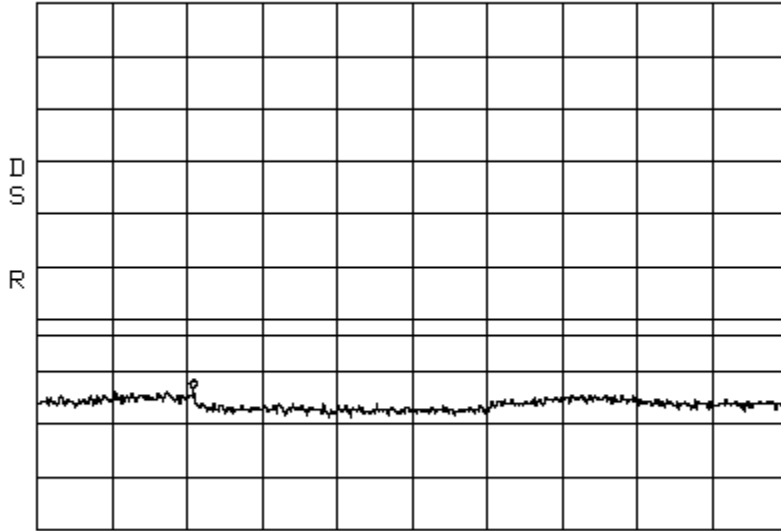


Intermodulation    LTE 10 MHz Channel Bandwidth\_Apart    CELL  
Span: 30 MHz to 1 GHz    RBW/VBW: 300 kHz



Intermodulation LTE 10 MHz Channel Bandwidth\_Apart CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

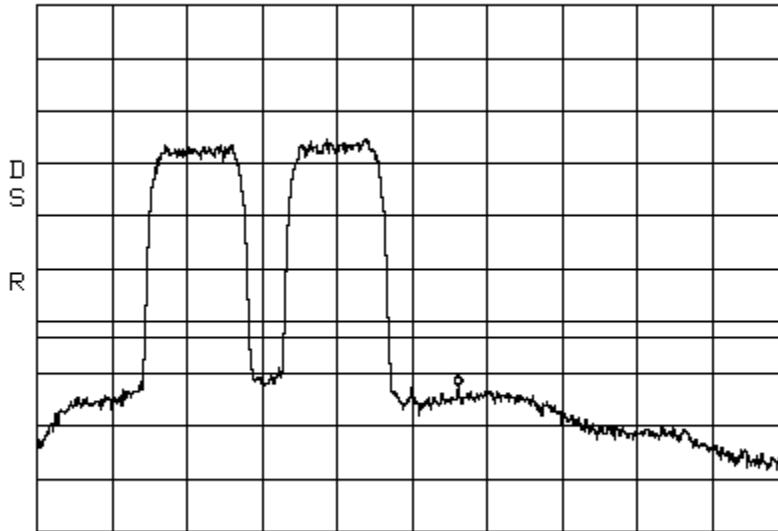
ATTEN 30dB VAUG 100 MKR -23.16dBm  
RL 50.2dBm 10dB/ 2.875GHz



START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

Intermodulation WCDMA\_Low CELL  
Center: 881.5 MHz Span: 35 MHz RBW/VBW: 100 kHz

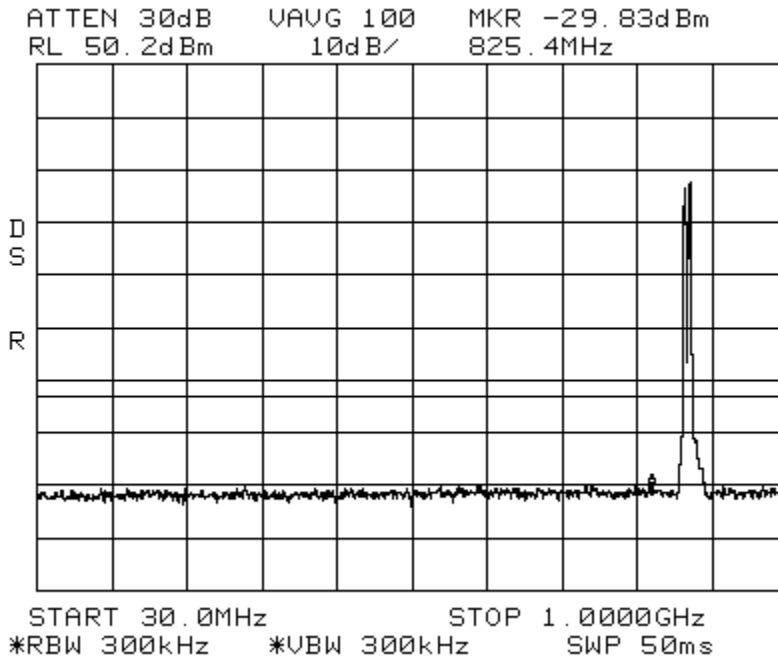
ATTEN 30dB VAUG 100 MKR -22.16dBm  
RL 50.2dBm 10dB/ 883.66MHz



CENTER 881.50MHz SPAN 35.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

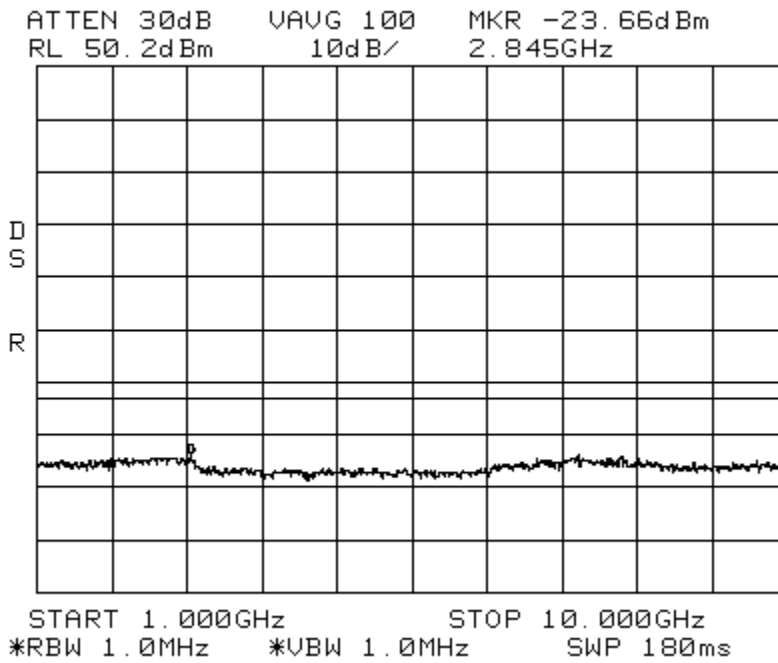
Intermodulation  
Span: 30 MHz to 1 GHz

WCDMA\_Low CELL  
RBW/VBW: 300 kHz



Intermodulation  
Span: 1 GHz to 10 GHz

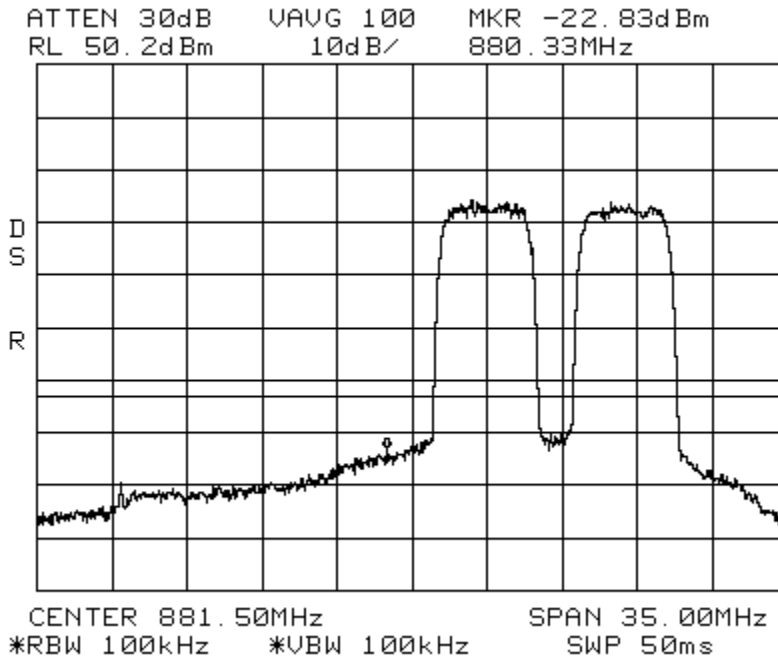
WCDMA\_Low CELL  
RBW/VBW: 1 MHz



Intermodulation  
Center: 881.5 MHz

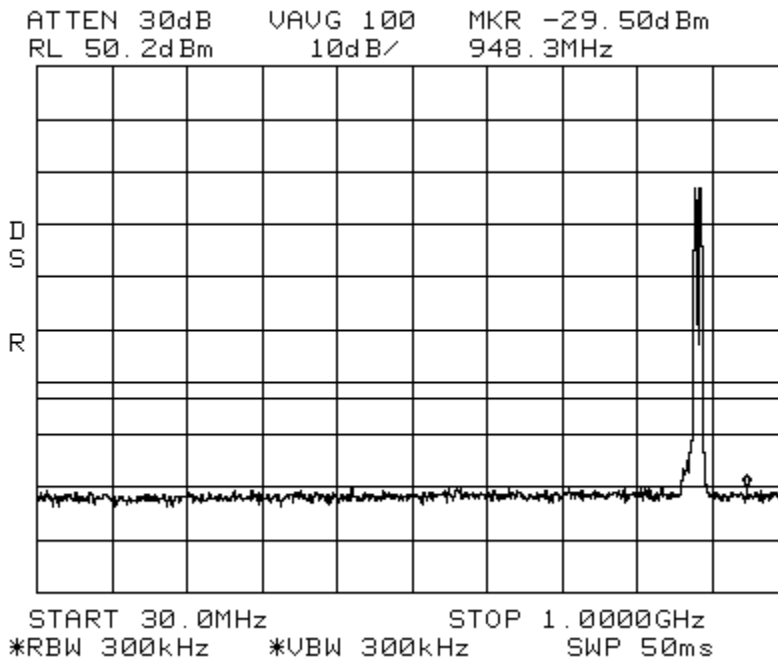
WCDMA\_High  
Span: 35 MHz

CELL  
RBW/VBW: 100 kHz

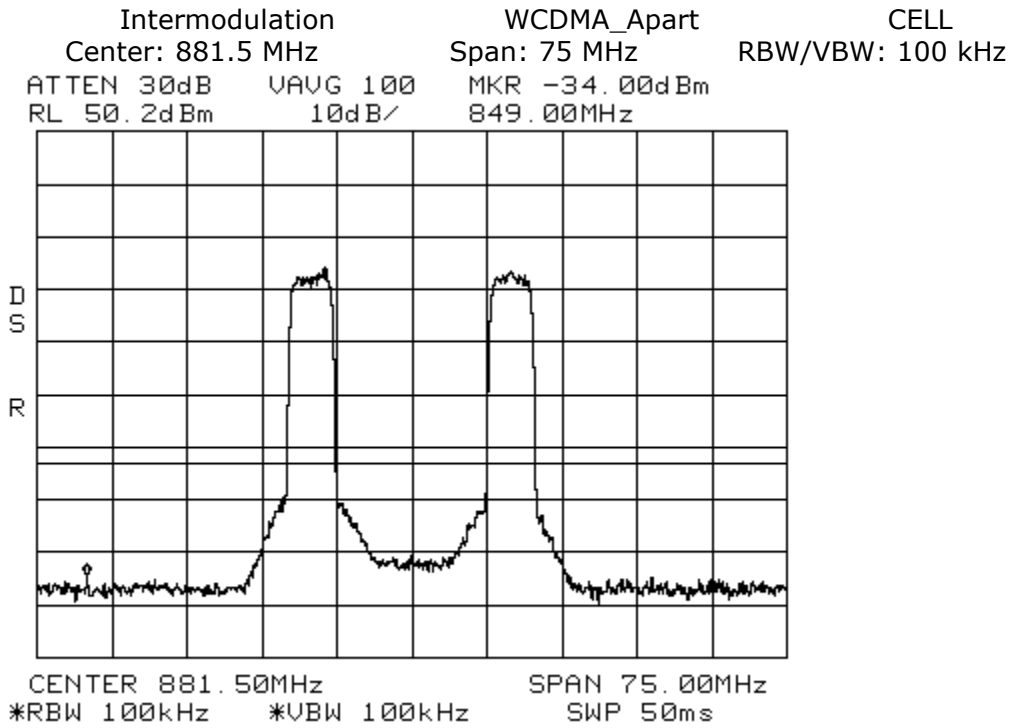
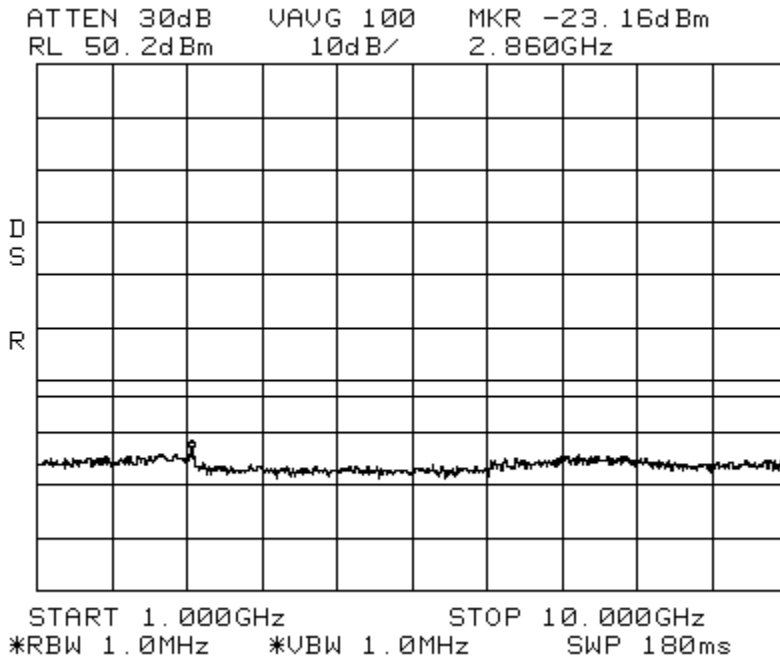


Intermodulation  
Span: 30 MHz to 1 GHz

WCDMA\_High    CELL  
RBW/VBW: 300 kHz



Intermodulation WCDMA\_High CELL  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

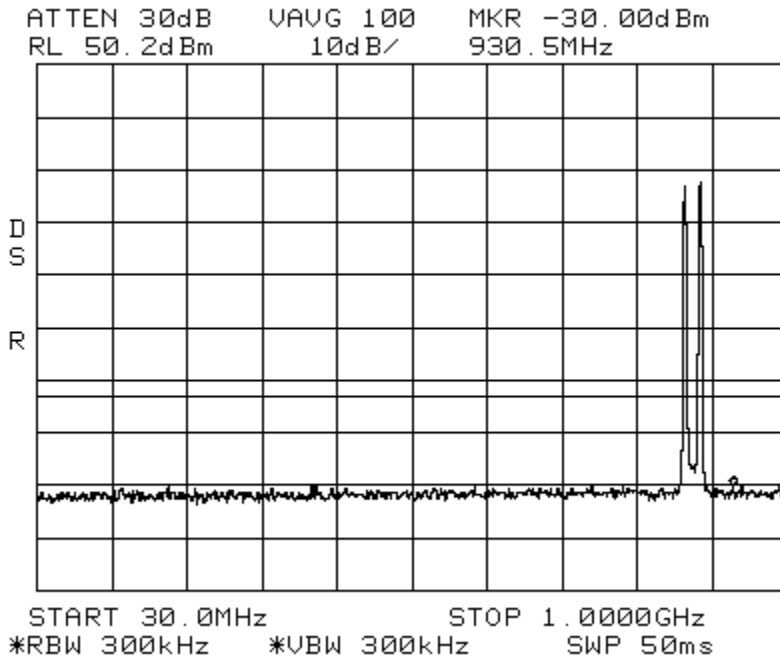


Intermodulation  
Span: 30 MHz to 1 GHz

WCDMA\_Apart

CELL

RBW/VBW: 300 kHz

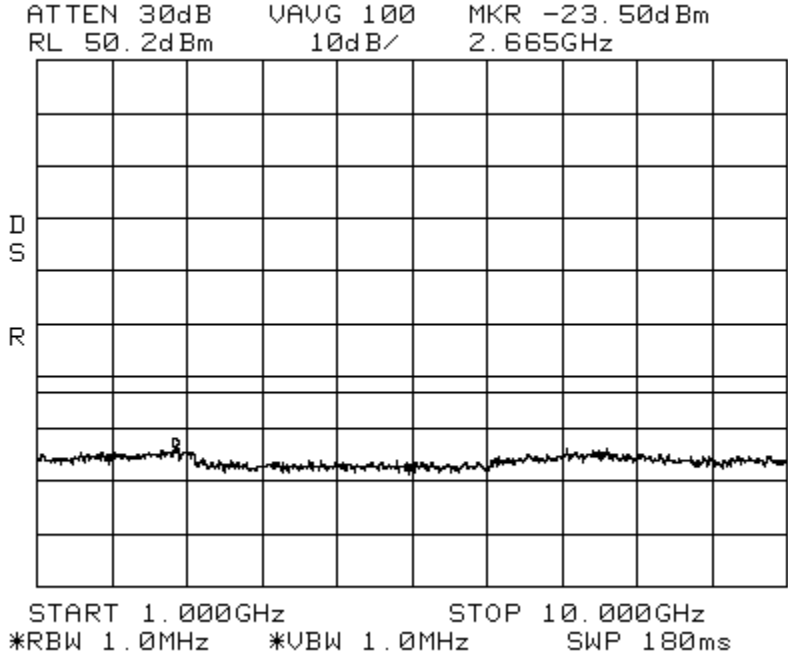


Intermodulation  
Span: 1 GHz to 10 GHz

WCDMA\_Apart

CELL

RBW/VBW: 1 MHz





## 6.5 FCC 2.1055, 22.355 – Frequency Stability

### Test Summary:

- The requirements are: **• MET**      ◦ NOT MET

### Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.1055, 22.355

### Test Procedure:

**Temperature:** The temperature is varied from -30°C to +50°C using an environmental chamber.

**Primary Supply Voltage:** Vary primary voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

### Test Limit:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

**Test Date: 10/25/12**

**Tests Conducted By: Joshua J. Wittman**

**Test Equipment: 3, 4, 5, 6, 9, 11, 12**

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
3	Multimeter	Fluke	79	MC18758	6-30-13	<input checked="" type="checkbox"/>
4	Frequency Counter	HP	5347A	MC27569	6-30-13	<input checked="" type="checkbox"/>
5	Temperature Chamber	ESPEC	PSL-4G	MC10075	9-10-13	<input checked="" type="checkbox"/>
6	Signal Generator	Aeroflex	3413	MC57343	2-9-13	<input checked="" type="checkbox"/>
9	Digital Barometer	Fisher Scientific	02-403	MC50719	1-25-13	<input checked="" type="checkbox"/>
11	Attenuator	Aeroflex	86-30-12	N/A	CNR	<input checked="" type="checkbox"/>
12	RF Power Sensor	HP	8482A	MC48747	6-30-13	<input checked="" type="checkbox"/>

### Environmental Conditions in the lab:

**Temperature:** 26° C

**Relative Humidity:** 24%

**Atmospheric Pressure:** 98.0 kPa

**Test Results:**

HOST	REMOTE			
<b>Input Voltage</b>	<b>Input Voltage</b>	<b>Carrier Frequency</b>	<b>Measured Frequency</b>	<b>Meets Requirements?</b>
21 VDC	100 VAC	869.200 MHz	869.200 MHz	Yes
48 VDC	170 VAC	869.200 MHz	869.200 MHz	Yes
60 VDC	240 VAC	869.200 MHz	869.200 MHz	Yes
21 VDC	100 VAC	881.500 MHz	881.500 MHz	Yes
48 VDC	170 VAC	881.500 MHz	881.500 MHz	Yes
60 VDC	240 VAC	881.500 MHz	881.500 MHz	Yes
21 VDC	100 VAC	893.800 MHz	893.800 MHz	Yes
48 VDC	170 VAC	893.800 MHz	893.800 MHz	Yes
60 VDC	240 VAC	893.800 MHz	893.800 MHz	Yes
<b>Temperature</b>		<b>Carrier Frequency</b>	<b>Measured Frequency</b>	<b>Meets Requirements?</b>
-30 Deg. C		869.200 MHz	869.200 MHz	Yes
-20 Deg. C		869.200 MHz	869.200 MHz	Yes
-10 Deg. C		869.200 MHz	869.200 MHz	Yes
0 Deg. C		869.200 MHz	869.200 MHz	Yes
10 Deg. C		869.200 MHz	869.200 MHz	Yes
20 Deg. C		869.200 MHz	869.200 MHz	Yes
30 Deg. C		869.200 MHz	869.200 MHz	Yes
40 Deg. C		869.200 MHz	869.200 MHz	Yes
50 Deg. C		869.200 MHz	869.200 MHz	Yes
-30 Deg. C		881.500 MHz	881.500 MHz	Yes
-20 Deg. C		881.500 MHz	881.500 MHz	Yes
-10 Deg. C		881.500 MHz	881.500 MHz	Yes
0 Deg. C		881.500 MHz	881.500 MHz	Yes
10 Deg. C		881.500 MHz	881.500 MHz	Yes
20 Deg. C		881.500 MHz	881.500 MHz	Yes
30 Deg. C		881.500 MHz	881.500 MHz	Yes
40 Deg. C		881.500 MHz	881.500 MHz	Yes
50 Deg. C		881.500 MHz	881.500 MHz	Yes
-30 Deg. C		893.800 MHz	893.800 MHz	Yes
-20 Deg. C		893.800 MHz	893.800 MHz	Yes
-10 Deg. C		893.800 MHz	893.800 MHz	Yes
0 Deg. C		893.800 MHz	893.800 MHz	Yes
10 Deg. C		893.800 MHz	893.800 MHz	Yes
20 Deg. C		893.800 MHz	893.800 MHz	Yes
30 Deg. C		893.800 MHz	893.800 MHz	Yes
40 Deg. C		893.800 MHz	893.800 MHz	Yes
50 Deg. C		893.800 MHz	893.800 MHz	Yes

7.0

## **APPENDIX B**

Measurement Protocol

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# Measurement Protocol

## Test Methodology:

Emission testing is performed according to the procedures in ANSI C63.4-2003.

## Measurement Uncertainty

The test system for conducted emissions is defined as the signal generator(s), the power meter, the spectrum analyzer and the coaxial cable. The equipment comprising the test systems is calibrated prior to testing the EUT.

## Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left un-terminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

## Radiated Emissions

The final level, in dBuV/m, equals the reading from the spectrum analyzer (Level dBuV), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Appendix B.

Example:

FREQ (MHz)	LEVEL (dBuV)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dBuV/m)	POL/HGT/AZ (m) (deg)	DELTA1
60.80	42.5Qp +	1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

## Substitution Method

A cabinet (or enclosure) radiated emission scan was also made, at Intertek, with the EUT's antenna replaced with a termination to demonstrate case radiation compliance to the -13 dBm requirement. Radiated emissions from the EUT are measured in the frequency range of 30 to 20,000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The field strength levels were measured per ANSI C63.4. The EUT is then replaced with a tuned dipole antenna (below 1GHz) or horn antenna (above 1 GHz). The substitute antenna was placed in the same polarization as the test antenna. A signal generator was used to generate a signal level that matched the highest level measured from the EUT. The signal generator level minus the cable loss from the signal generator to the substitute antenna plus the substitute antenna gain equals the spurious power level.

## Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

## Radiated Emissions Test Data

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Document Name: *101716480MIN-001.pdf*

**Test Engineer:** Simon Khazon

**Date:** 9 July, 2014

**Test Procedure:**

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

**Test Site Location:**

The test site is a 3 meter Semi-Anechoic Chamber, constructed by Panashield™ Inc. and located inside the building at 7250 Hudson Blvd. Suite 100, Oakdale, MN 55128.

**Test Site Description:**

The 3 meter Semi-Anechoic Chamber is constructed of Panabolt™ modular RF shielding and self-supported with structural steel designed for the local seismic zone rating. The chamber has the nominal size of 20' wide x 29' long x 18' high. All walls and ceiling of the chamber are treated with FFG-1000 Ferrite Grid absorber which was developed specifically to meet international requirements for EMC anechoic chambers for emissions and immunity measurements. To meet high frequency testing white HY-35 hybrid absorber is mounted on the ferrites in specular regions of the chamber.

The chamber has a 2 meter diameter ANSI test volume area and meets the requirements of ANSI C63.4 (1992), EN55022, and FCC Part 15 standards for testing at a 3 meter path length.

FCC Registration Number: 0007355381

IC Registration Number: 4359A