



Test Report Summary

FCC CFR 47, Part 27

Wireless Communications Service

Manufacturer: ADC Telecommunications, Inc.

Name of Equipment: Spectrum 700 Path 1/HP AWS Path1 SRAU

Model Number(s): SPT-S3-70AWS-11-HP

Manufacturer's Address: 1187 Park Place
Shakopee, MN 55739

Test Report Number: MN120905 700P1 HP AWSP1 SRAU

Test Date(s): 27 August, 2012 (Intertek)
25, 26, 27 June, 2012 (ADC)
23, 28, 29 August, 2012 (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 27.

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 27. The EUT fulfills the requirements of the Federal Communications Commission's CFR 47 Part 27.

Date: 5 September, 2012

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 55739
Phone: (952) 403-8340
Fax: (952) 403-8858

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: MN120905 700P1 HP AWSP1 SRAU

Date of Issue: 5 September, 2012

Model Number(s): SPT-S3-70AWS-11-HP

Product Name: Spectrum 700 Path 1/HP AWS Path1 SRAU

Product Type: Booster

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: **100856639MIN-001**
Reference(s)

Total pages including Appendices: 134



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2.0 REVISION DESCRIPTION

| Rev | Total Pages | Date | Description |
|-----|-------------|-------------------|------------------|
| A | 134 | 5 September, 2012 | Original Release |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

3.0 DOCUMENTATION

3.1 Test Regulations

Results

| | | |
|-------|---------------------|------|
| 27.50 | Power Limits | Pass |
| 27.53 | Emission Limits | Pass |
| 27.54 | Frequency Stability | Pass |

The emissions tests were performed according to the following regulations:

☐ FCC Part 22

☐ FCC Part 24

■ **FCC Part 27**

☐ FCC Part 90

☐ IC RSS-131 Issue 2

Environmental Conditions in the lab:

ADC

Temperature: 24° C
Relative Humidity: 31%
Atmospheric Pressure: 97.7 kPa

Intertek

15-35° C
30-60%
86-106 kPa

Power Supply Utilized:

Power Supply System : 1 phase, 60 Hz, 120 VAC

3.2 Test Operation Mode

- Standby
- Test Program
- Practice Operation

■ Max composite in and out

3.3 Configuration of the Device Under Test:

Normal Operation – 700 – 728 to 757 MHz (728 to 746 MHz (Lower ABC) 746 to 757 MHz (Upper C))

Normal Operation – AWS – 2110 to 2155 MHz

3.4 Product Options:

None

3.5 EUT Specifications and Requirements:

Length: 11.50"

Width: 9.00"

Height: 3.50"

Weight: 7.49 pounds

3.6 Cables:

| Cable Type | Length | From | To |
|---------------|--------|-----------------|-------------------------|
| RF | > 3M | Ancillary Equip | EUT |
| RF | < 3M | EUT | 50 Ohm Load |
| Power (2) | < 3M | Power | Input Power (Ancillary) |
| Coax (75 Ohm) | > 3M | Ancillary Equip | EUT |

3.7 Power Requirements:

Voltage: 54 VDC

3.8 Typical Installation and/or Operating Environment:

Indoor. System is typically employed as an indoor booster.

3.9 Other Special Requirements:

None

3.10 EUT Software:

Revision Level: Version V.6 or greater

Description: Internet Explorer

3.11 EUT System Components

| Description | Model # | Serial # | FCC ID # |
|-----------------------|--------------------|----------|----------|
| Prism Host Unit | FWP-0000HUII | None | |
| Spectrum DRU | SPT-0000DRUII | None | |
| Spectrum IFEU | 742735-0 | None | |
| Spectrum Power Supply | LTPCPR1U3C-Z-527 | | |
| Remote Access Unit | SPT-S3-70AWS-11-HP | None | |

3.12 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**

3.13 General Remarks:

The Prism Host, Spectrum DRU, and Spectrum IFEU are Part 15 devices and have been tested and are compliant as such.

Industry practice has generally set the input signal power level. Test signal used was ≈ -11 dBm input to Prism Host in the TX Path.

Industry practice has generally set the output signal power level.

| | | | |
|--------------------|--------------------|------------------|--------------------------|
| Prism Host: | Spectrum DRU: | Spectrum IFEU | Remote Access Unit(RAU): |
| Range: 21 - 60 VDC | Range: 21 - 60 VDC | Range: 54 VDC | Range: 54 VDC |
| Tested @: 54 VDC | Tested @: 54 VDC | Tested @: 54 VDC | Tested @: 54 VDC |

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

Final RF Amplifier Input DC Voltage and Current: 7.3V at 400mA

PLL creates all the Local Oscillators that convert signal to IF and RF signals. When PLL is unlocked the band is shut down, this is to avoid transmission of any incorrect frequency.

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 TV (IF) coax cable. 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.

3.14 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.

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: 100856639MIN-001

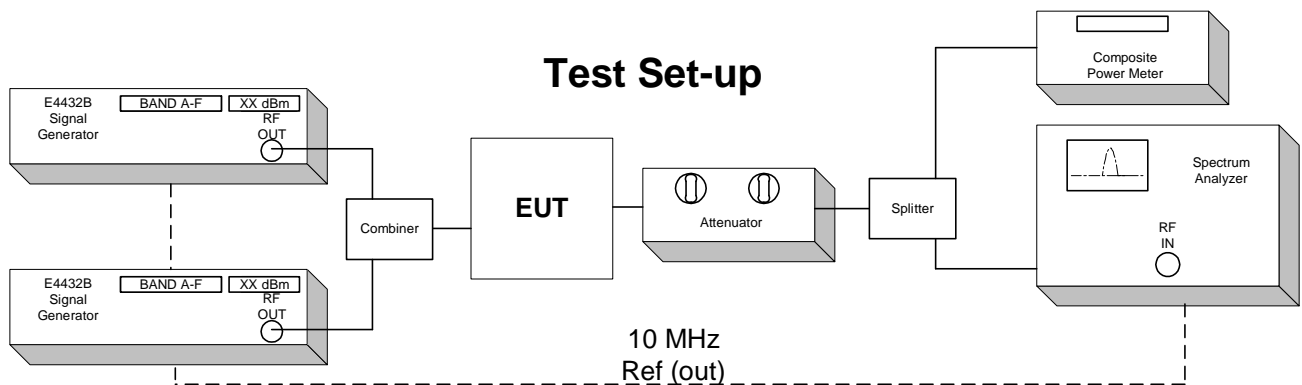
4.2 Test Set-up Drawings

Conducted and Radiated Emission Limits Test

Conducted Output Power Test

Inter-Modulation Test

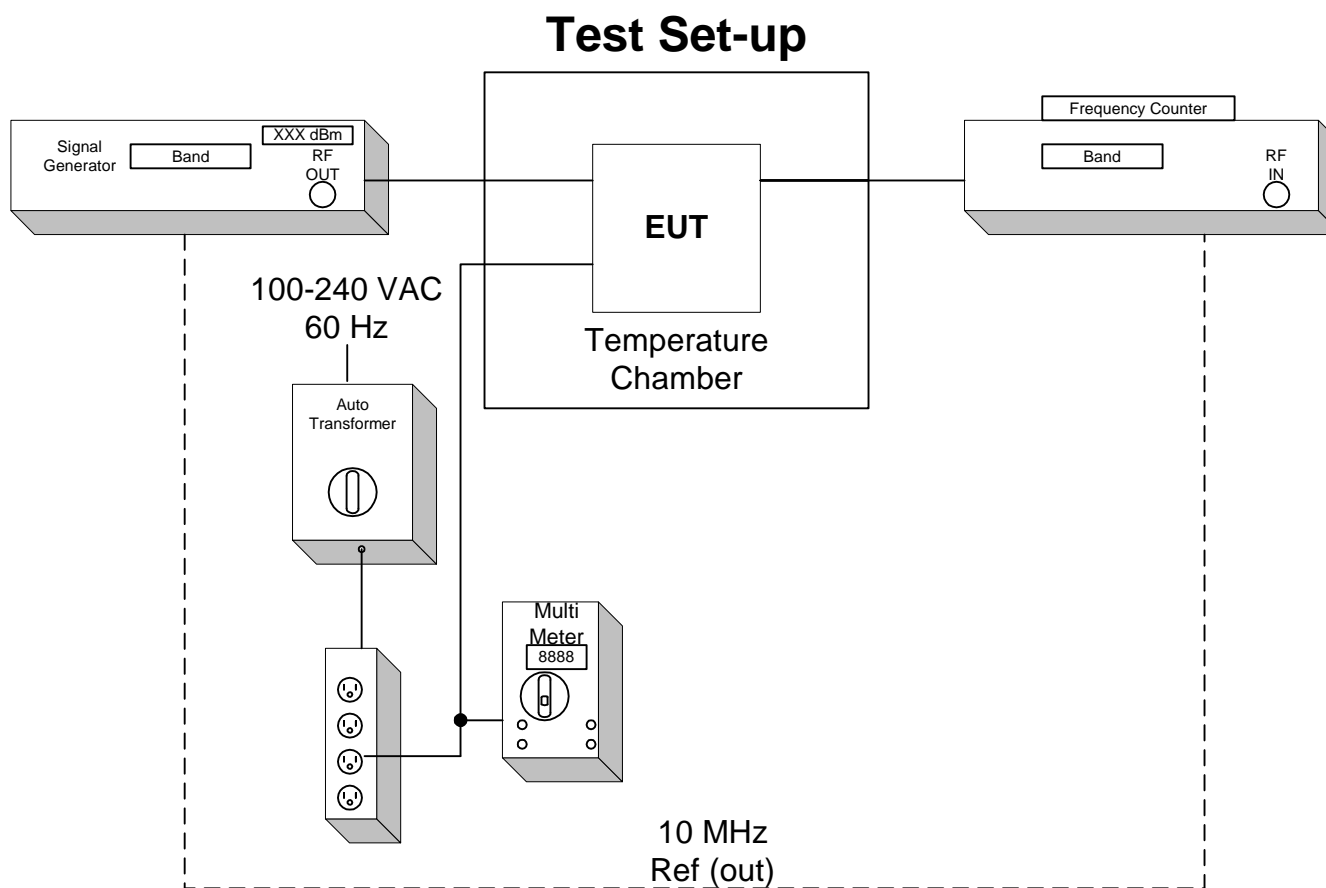
Occupied Bandwidth Modulation Test



Frequency Tolerance Test

The Host, DRU, and IFEU EUT are specified for indoor use with temperature range of 0° to +50° C, and were tested within their range.

The Remote Access Unit EUT is specified for indoor use with temperature range of -30° to +50° C, and was tested with its range.



5.0 TEST EQUIPMENT

[Table of Contents; Section 1.0](#)

| Number | Description | Manufacturer | Model | ADC TELECOMMUNICAT IONS 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 | 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 | 9-8-12 | <input checked="" type="checkbox"/> |
| 6 | Signal Generator | Aeroflex | 3413 | MC57343 | 11-9-12 | <input checked="" type="checkbox"/> |
| 7 | Signal Generator | Aeroflex | 3414 | 341001/259 | 6-13-13 | <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 | Agilent | 8481A | MC27649 | 6-30-13 | <input checked="" type="checkbox"/> |
| 13 | Spectrum Analyzer | Rohde & Schwarz | FSQ-8 | MC57131 | 2-15-13 | <input checked="" type="checkbox"/> |

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

6.0 OVERALL TEST RESULTS

6.1 FCC 2.1046 & 27.50 Power Limits – Output Power

Test Summary:

- The requirements are: **• MET** ▫ NOT MET
- Minimum margin of compliance is 20.22 dB at 737.0 MHz(LTE 1.4MHz)(LowerABC)(Path1)
- Minimum margin of compliance is 21.10 dB at 737.0 MHz(LTE 3 MHz)(LowerABC)(Path1)
- Minimum margin of compliance is 20.44 dB at 737.0 MHz(LTE 5 MHz)(LowerABC)(Path1)
- Minimum margin of compliance is 19.90 dB at 737.0 MHz(LTE 10 MHz)(LowerABC)(Path1)
- Minimum margin of compliance is 19.80 dB at 751.5 MHz(LTE 1.4 MHz)(UpperC)(Path1)
- Minimum margin of compliance is 20.45 dB at 751.5 MHz(LTE 3 MHz)(UpperC)(Path1)
- Minimum margin of compliance is 19.40 dB at 748.5 MHz(LTE 5 MHz)(UpperC)(Path1)
- Minimum margin of compliance is 19.26 dB at 751.5 MHz(LTE 10 MHz)(UpperC)(Path1)
- Minimum margin of compliance is 24.70 dB at 2152.5 MHz (W-CDMA) (Path 1)
- Minimum margin of compliance is 24.38 dB at 2153.5 MHz (LTE 3MHz) (Path 1)
- Minimum margin of compliance is 23.60 dB at 2152.5 MHz (LTE 5MHz) (Path 1)
- Minimum margin of compliance is 23.80 dB at 2150.0 MHz (LTE 10MHz) (Path 1)
- Minimum margin of compliance is 23.43 dB at 2147.5 MHz (LTE 15MHz) (Path 1)
- Minimum margin of compliance is 23.30 dB at 2145.0 MHz (LTE 20MHz) (Path 1)

Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.1046 & 27.50

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 LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz, 15MHz, 20MHz Channel Bandwidths & WCDMA 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: 6/25/12 & 8/23/12

Tests Conducted By: Joshua J. Wittman

Test Equipment: 2, 6, 7, 12, 13

| Number | Description | Manufacturer | Model | ADC TELECOMMUNICATIONS Serial Number | Cal Due | Used |
|--------|-------------------|-----------------|-------|--------------------------------------|---------|------|
| 2 | Power Meter | HP | 437B | MC27754 | 6-30-13 | ☒ |
| 6 | Signal Generator | Aeroflex | 3413 | MC57343 | 11-9-12 | ☒ |
| 7 | Signal Generator | Aeroflex | 3414 | 341001/259 | 6-13-13 | ☒ |
| 12 | RF Power Sensor | Agilent | 8481A | MC27649 | 6-30-12 | ☒ |
| 13 | Spectrum Analyzer | Rohde & Schwarz | FSQ-8 | MC57131 | 2-15-13 | ☒ |

Environmental Conditions in the lab:

Temperature: 24° C

Relative Humidity: 31%

Atmospheric Pressure: 97.7 kPa

Test Results:

700 Lower ABC Path 1

LTE 1.4 MHz Ch. BW 0.1051 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 728.70 MHz | 18.92 dBm |
| 737.00 MHz | 20.22 dBm |
| 745.30 MHz | 19.60 dBm |

700 Lower ABC Path 1

LTE 3.0 MHz Ch. BW 0.1288 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 729.50 MHz | 20.09 dBm |
| 737.00 MHz | 21.10 dBm |
| 744.50 MHz | 20.09 dBm |

700 Lower ABC Path 1

LTE 5.0 MHz Ch. BW 0.1106 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 730.50 MHz | 19.75 dBm |
| 737.00 MHz | 20.44dBm |
| 743.50 MHz | 19.70 dBm |

700 Lower ABC Path 1

LTE 10.0 MHz Ch. BW 0.0977 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 733.00 MHz | 19.64 dBm |
| 737.00 MHz | 19.90 dBm |
| 741.00 MHz | 19.65 dBm |

700 Upper C Path 1

LTE 1.4 MHz Ch. BW 0.0954 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 746.70 MHz | 18.76 dBm |
| 751.50 MHz | 19.80 dBm |
| 756.30 MHz | 18.14 dBm |

700 Upper C Path 1

LTE 3.0 MHz Ch. BW 0.1109 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 747.50 MHz | 19.78 dBm |
| 751.50 MHz | 20.45 dBm |
| 755.50 MHz | 19.58 dBm |

700 Upper C Path 1
LTE 5.0 MHz Ch. BW 0.0870 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 748.50 MHz | 19.02 dBm |
| 751.50 MHz | 19.40 dBm |
| 754.50 MHz | 18.65 dBm |

700 Upper C Path 1
LTE 10.0 MHz Ch. BW 0.0843 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 751.50 MHz | 19.26 dBm |

AWS Path 1
WCDMA 0.2951 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 2112.5 MHz | 23.06 dBm |
| 2132.5 MHz | 23.48 dBm |
| 2152.5 MHz | 24.70 dBm |

AWS Path 1
LTE 3MHz 0.2741 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 2111.5 MHz | 23.06 dBm |
| 2132.5 MHz | 23.45 dBm |
| 2153.5 MHz | 24.38 dBm |

AWS Path 1
LTE 5MHz 0.2290 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 2112.5 MHz | 22.22 dBm |
| 2132.5 MHz | 22.90 dBm |
| 2152.5 MHz | 23.60 dBm |

AWS Path 1
LTE 10MHz 0.2398 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 2115.0 MHz | 22.45 dBm |
| 2132.5 MHz | 23.01 dBm |
| 2150.0 MHz | 23.80 dBm |

AWS Path 1
LTE 15MHz 0.2202 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 2117.5 MHz | 22.05 dBm |
| 2132.5 MHz | 22.60 dBm |
| 2147.5 MHz | 23.43 dBm |

AWS Path 1
LTE 20MHz 0.2137 Watts

| Carrier Frequency | Carrier Output |
|-------------------|----------------|
| 2120.0 MHz | 22.14 dBm |
| 2132.5 MHz | 22.56 dBm |
| 2145.0 MHz | 23.30 dBm |

6.2 FCC 2.1051 & 27.53 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 & 27.53

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 10th harmonic of the highest carrier frequency. Test signals used are LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz, 15MHz, 20 MHz Channel Bandwidths & WCDMA. 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 LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz, 15MHz, 20MHz Channel Bandwidths, & WCDMA.

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 Date: 6/25/12, 6/28/12, 8/23/12, & 8/29/12

Tests Conducted By: Joshua J. Wittman

Test Equipment: 1, 2, 6, 7, 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 | 11-9-12 | <input checked="" type="checkbox"/> |
| 7 | Signal Generator | Aeroflex | 3414 | 341001/259 | 6-13-13 | <input checked="" type="checkbox"/> |
| 12 | RF Power Sensor | Agilent | 8481A | MC27649 | 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: 24° C

Relative Humidity: 31%

Atmospheric Pressure: 97.7 kPa

Test Results:

Conducted Emissions

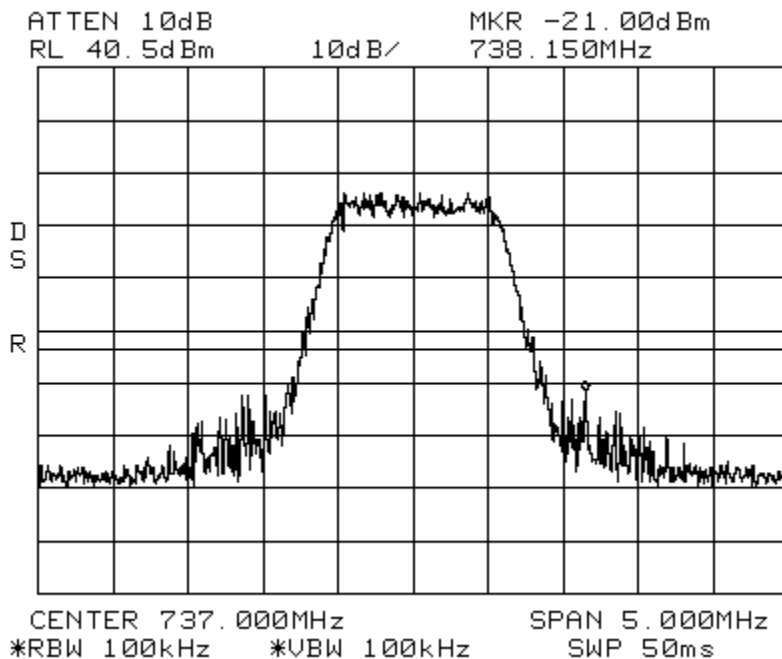
LTE 1.4 MHz Channel Bandwidth
Lower ABC Path 1

Spectrum 700 MHz

Center: 737 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



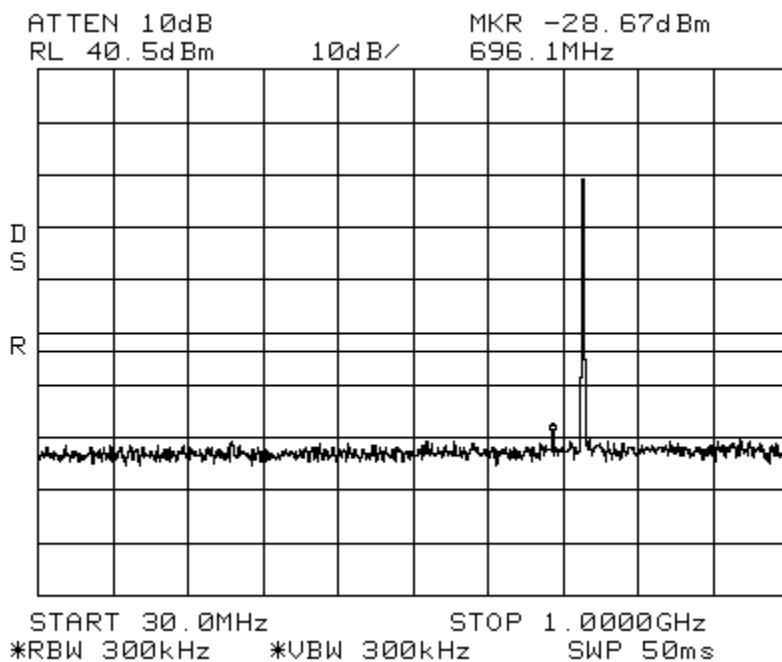
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth
Lower ABC Path 1

Spectrum 700 MHz

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



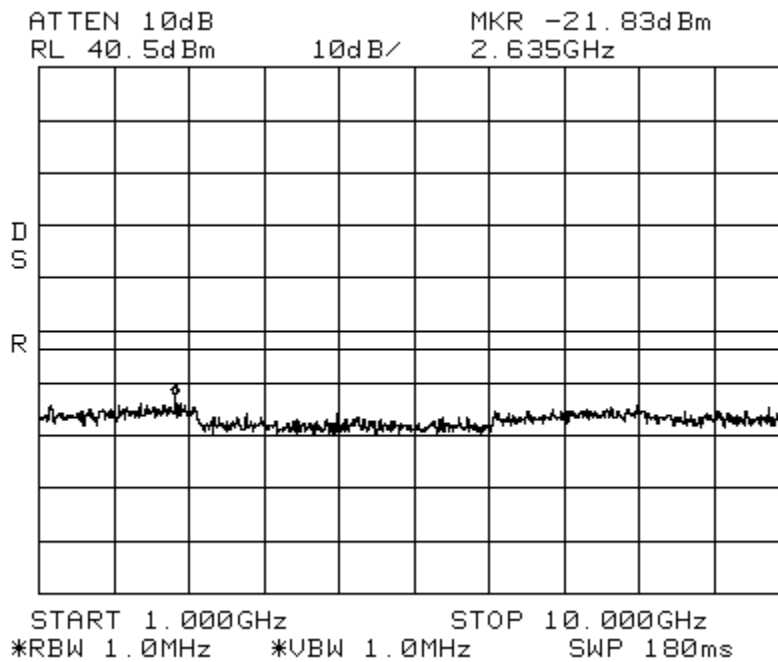
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth
Lower ABC Path 1

Spectrum 700 MHz

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

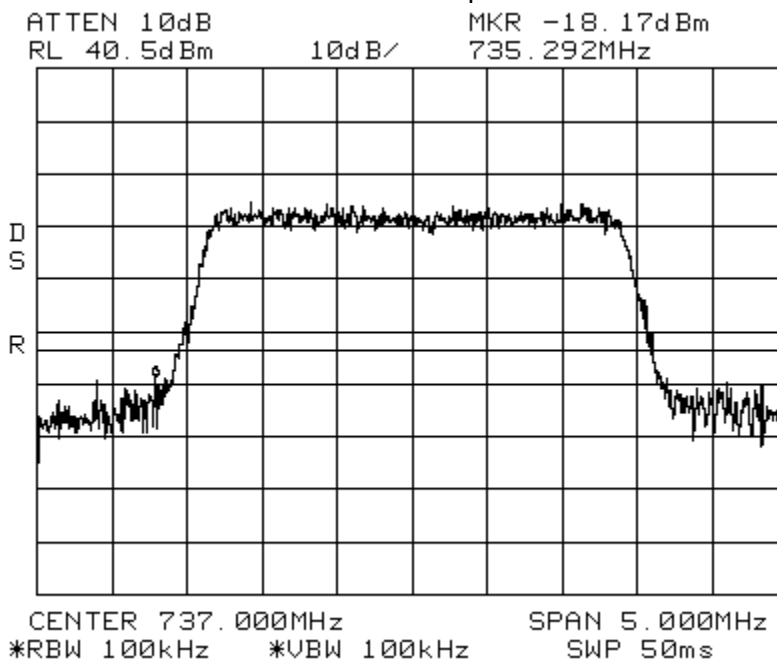
LTE 3 MHz Channel Bandwidth
Lower ABC Path 1

Spectrum 700 MHz

Center: 737 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



Conducted Emissions

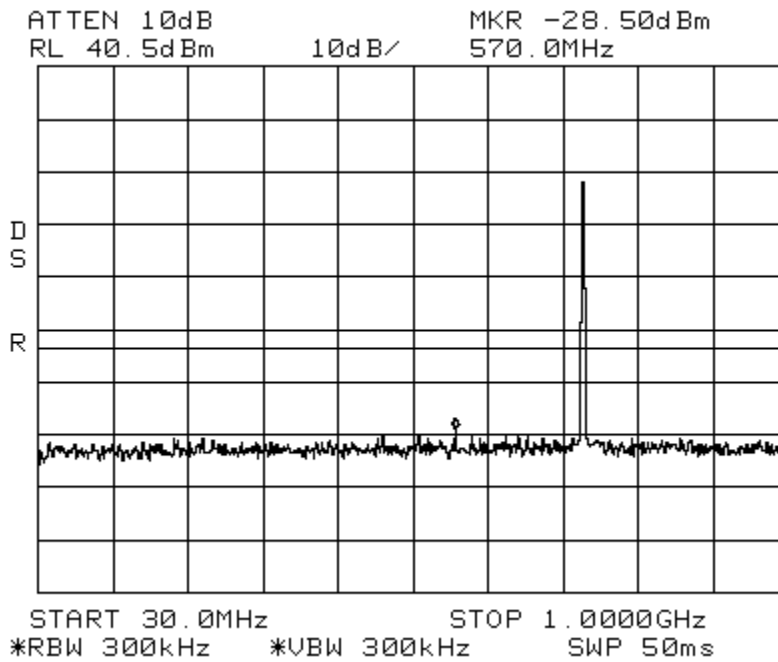
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Conducted Emissions

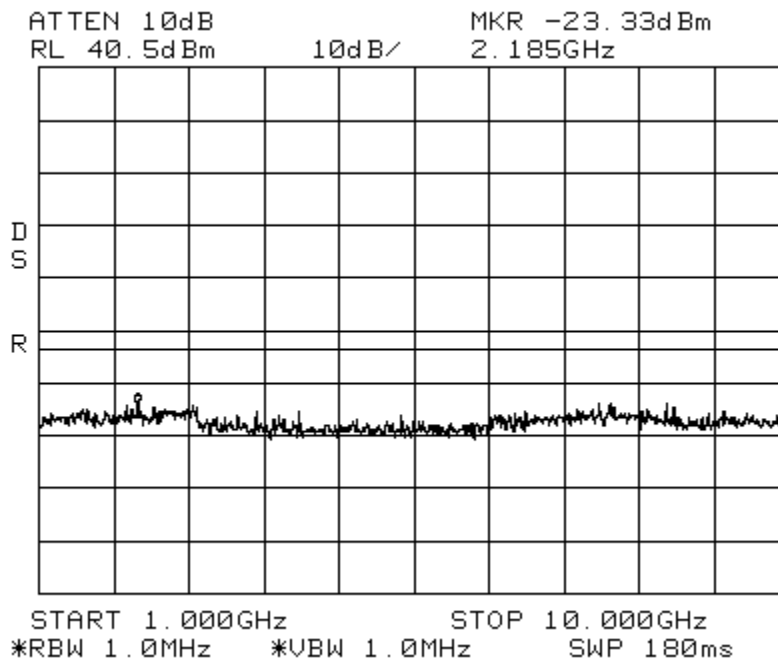
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 5 MHz Channel Bandwidth

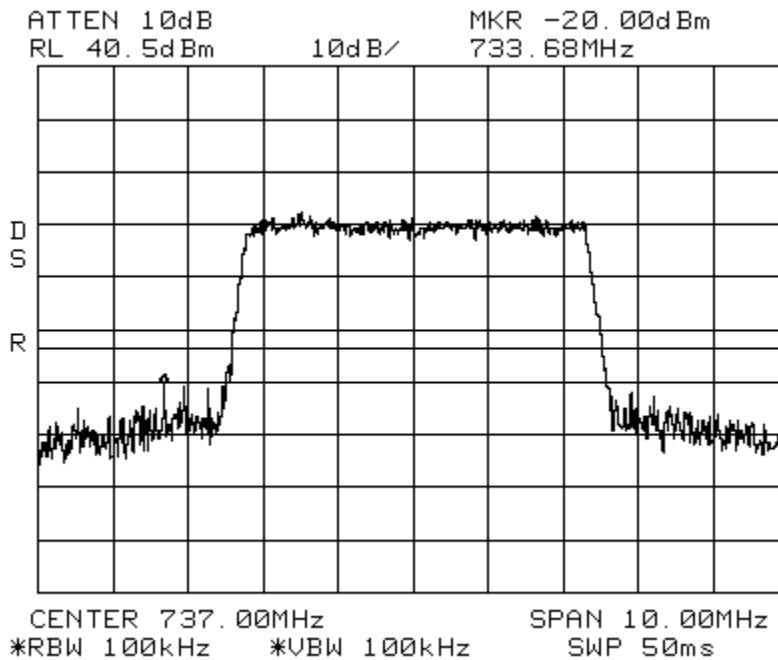
Spectrum 700 MHz

Center: 737 MHz

Lower ABC Path 1

Span: 10 MHz

RBW/VBW: 100 kHz



Conducted Emissions

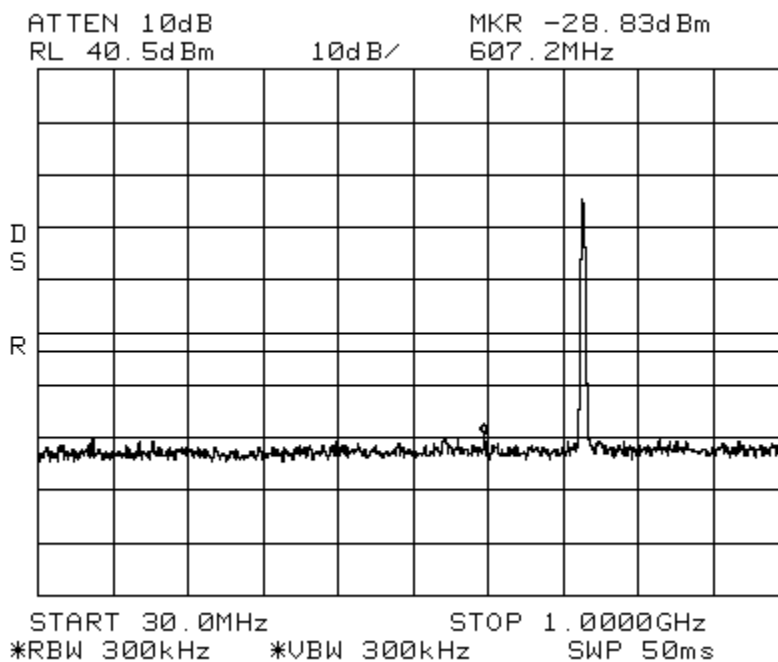
LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Conducted Emissions

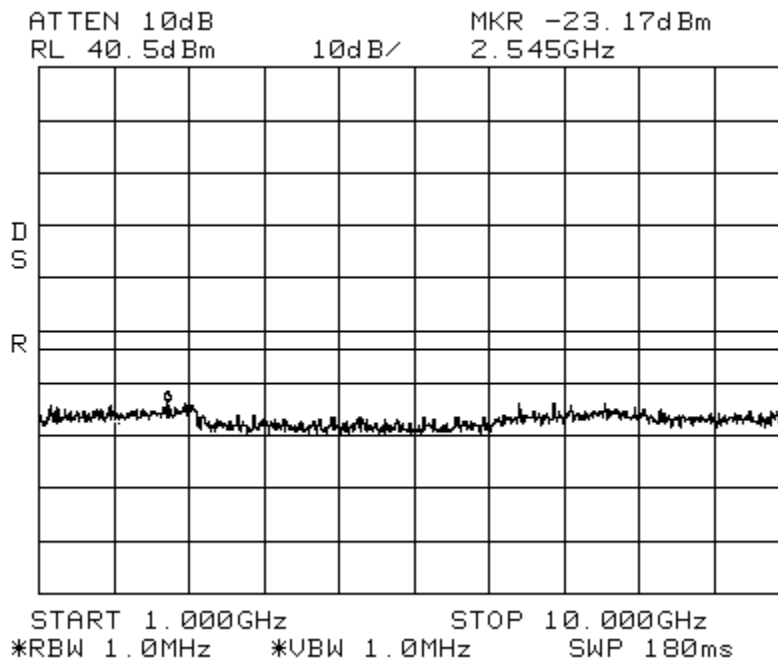
LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 10 MHz Channel Bandwidth

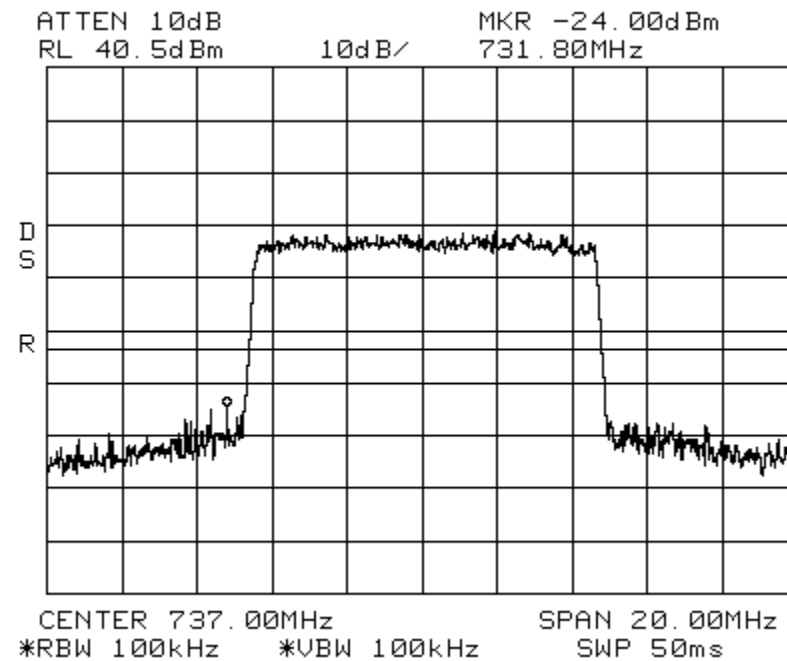
Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 20MHz

RBW/VBW: 100 kHz



Conducted Emissions

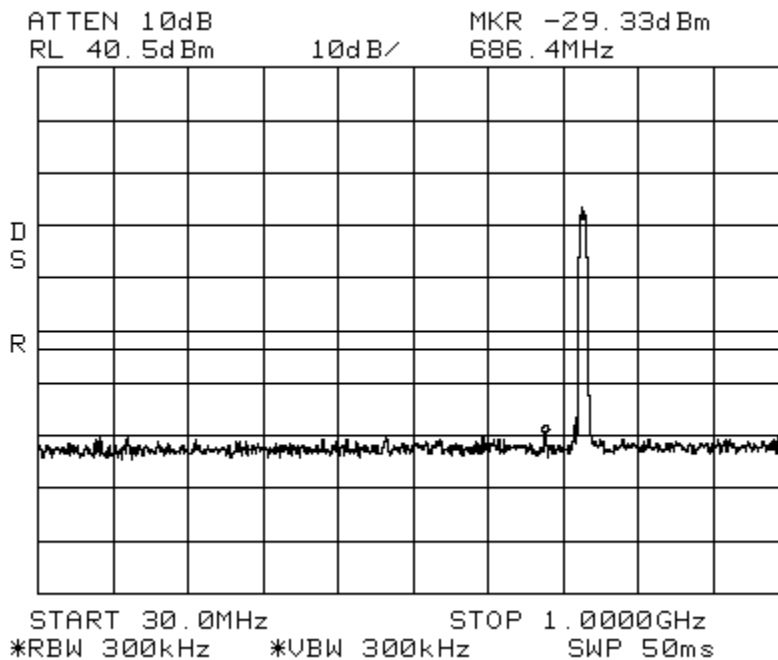
LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Conducted Emissions

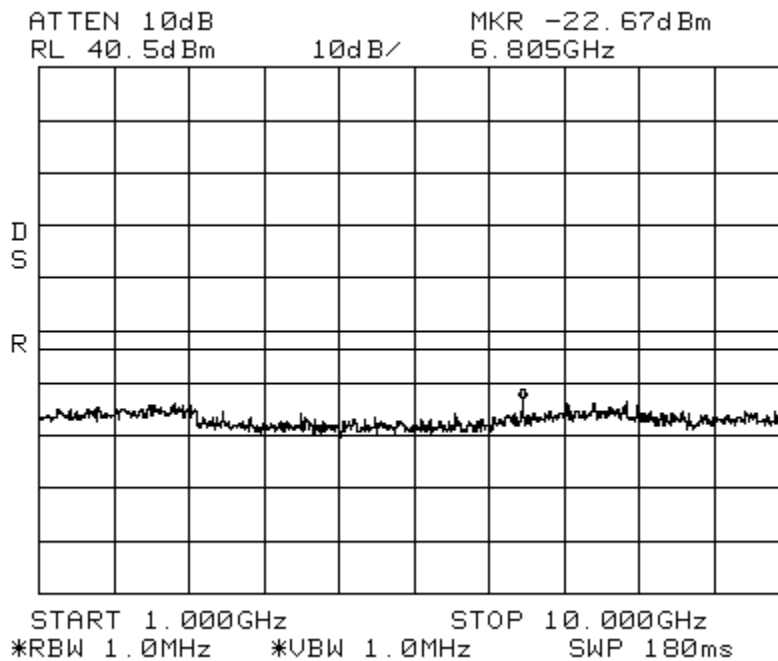
LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 1.4 MHz Channel Bandwidth

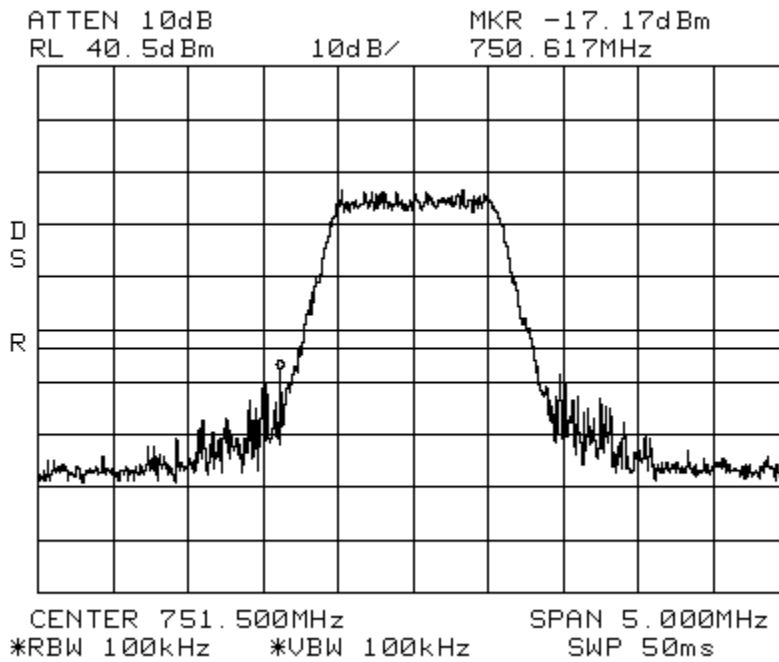
Spectrum 700 MHz

Upper C Path 1

Center: 751.5 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



Conducted Emissions

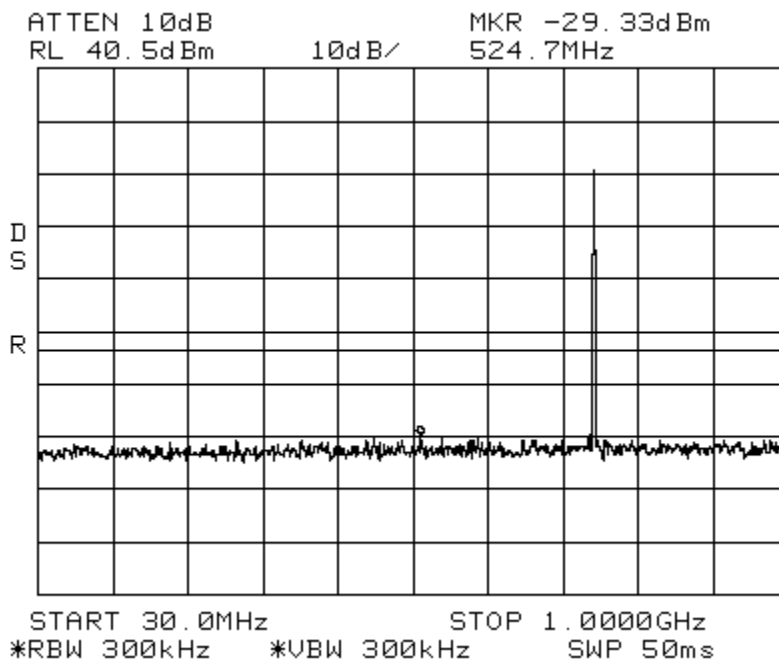
LTE 1.4 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Conducted Emissions

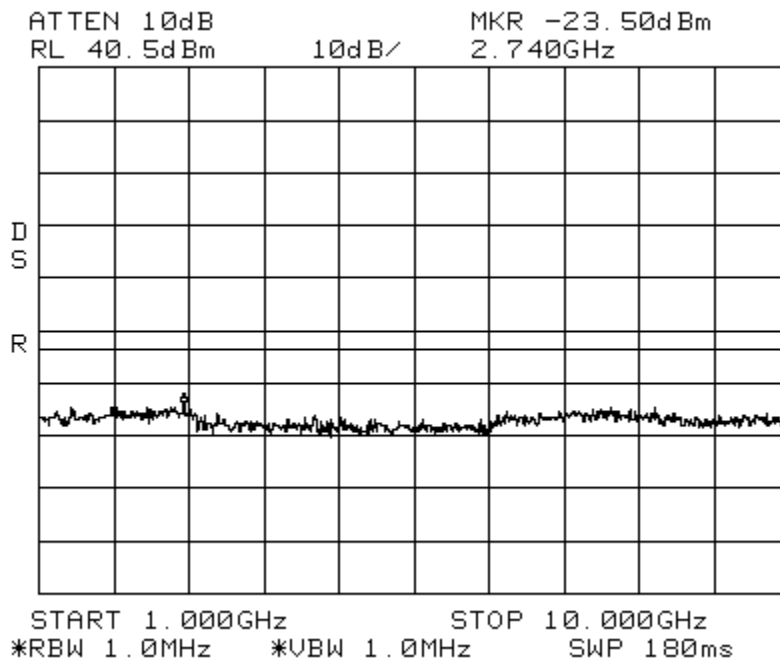
LTE 1.4 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 3 MHz Channel Bandwidth

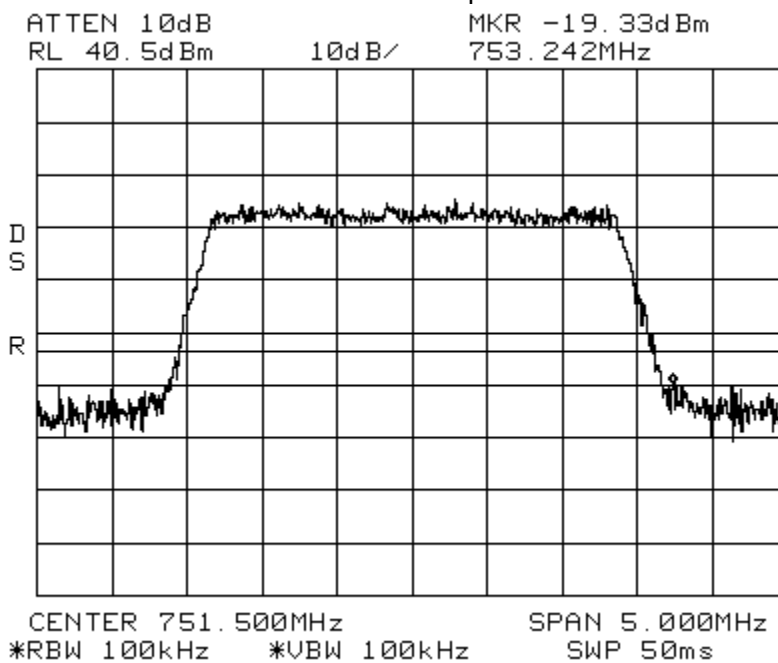
Spectrum 700 MHz

Upper C Path 1

Center: 751 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



Conducted Emissions

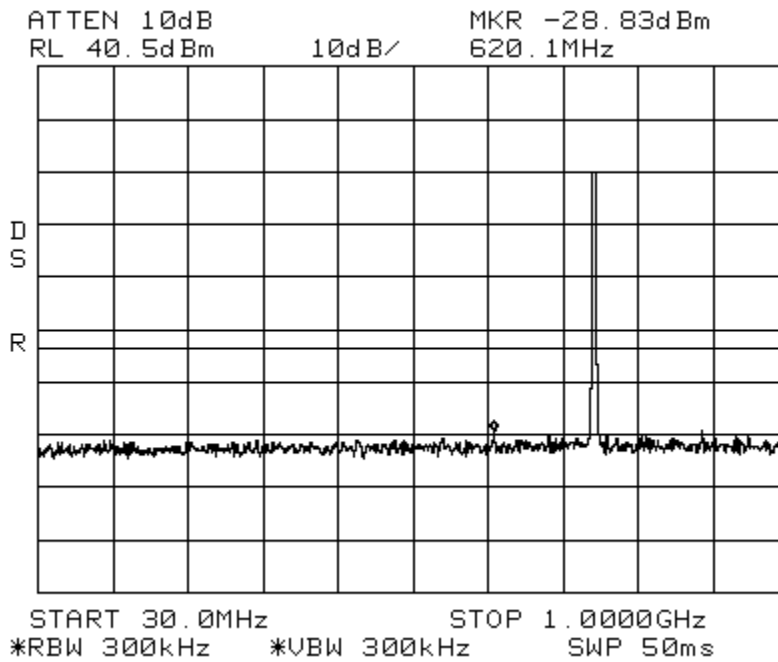
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Conducted Emissions

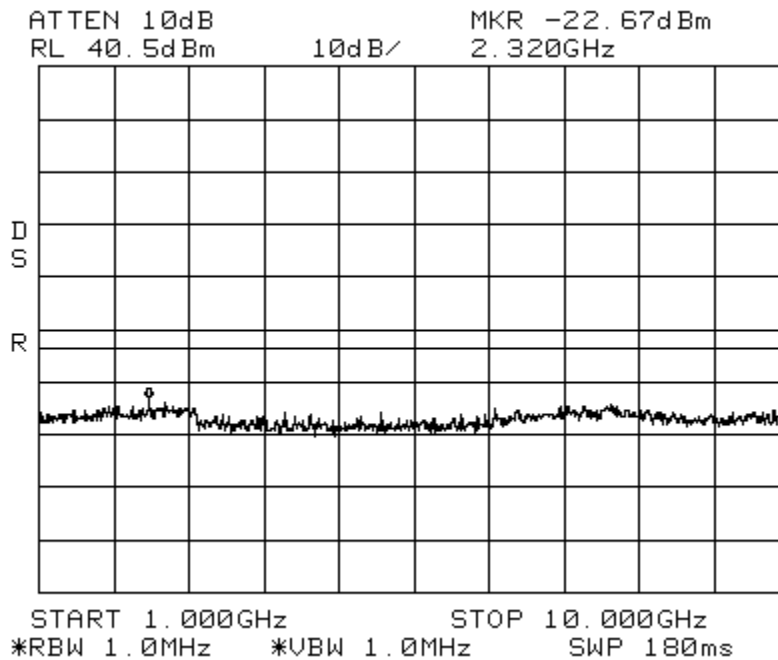
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

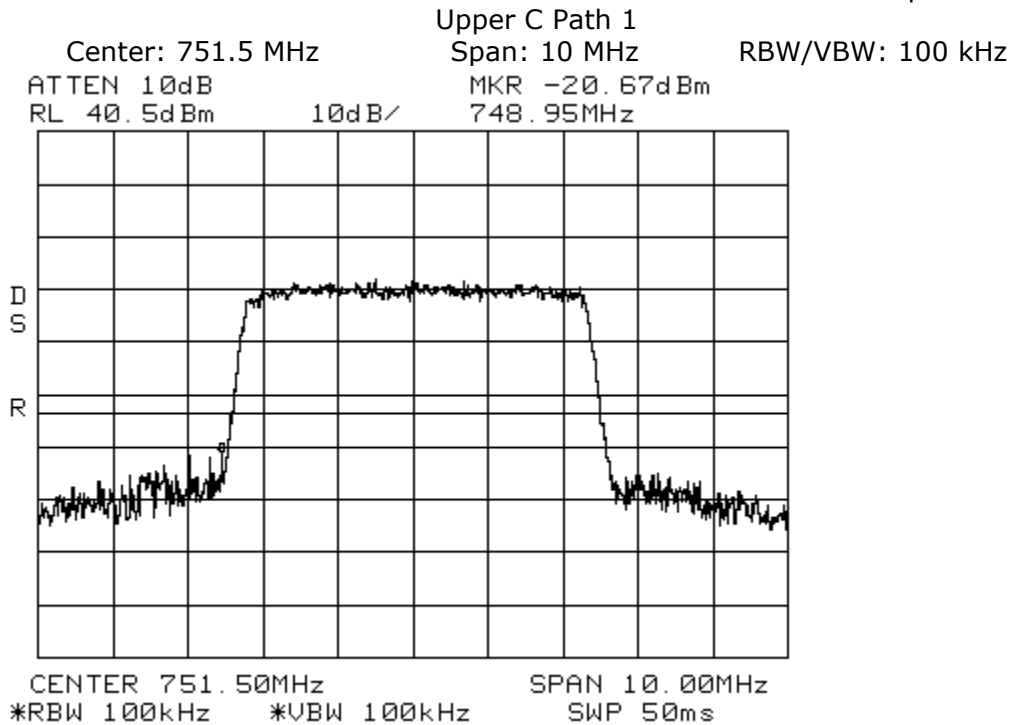
RBW/VBW: 1 MHz



Conducted Emissions

LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

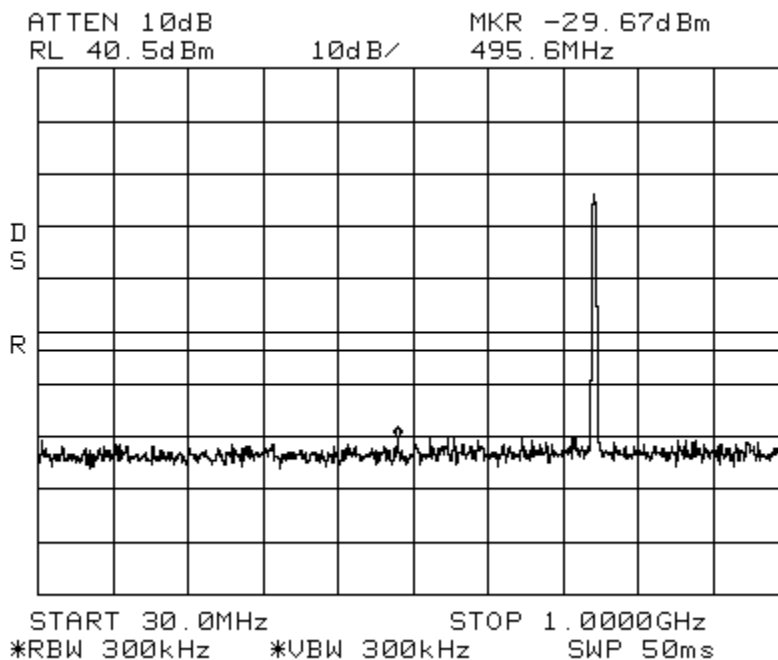


Conducted Emissions

LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Conducted Emissions

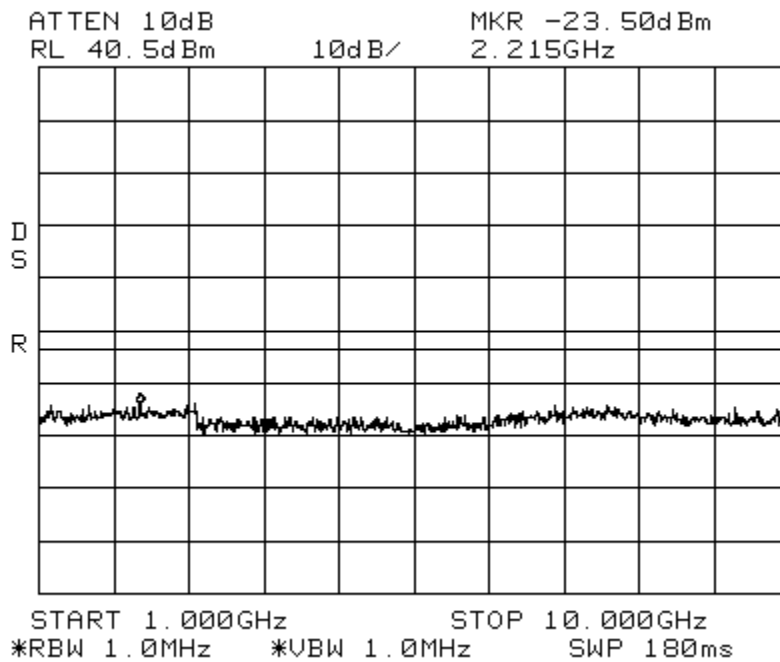
LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 10 MHz Channel Bandwidth

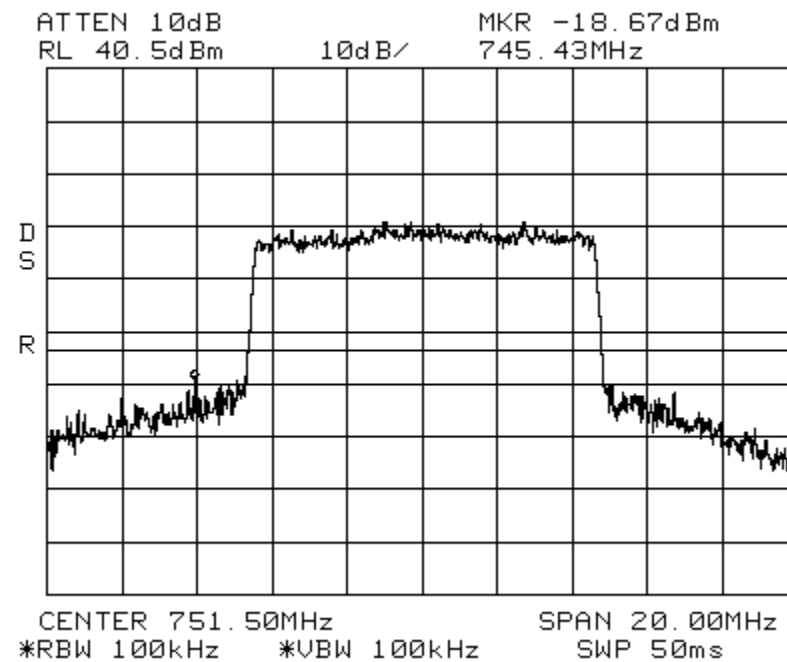
Spectrum 700 MHz

Upper C Path 1

Center: 751.5 MHz

Span: 20MHz

RBW/VBW: 100 kHz



Conducted Emissions

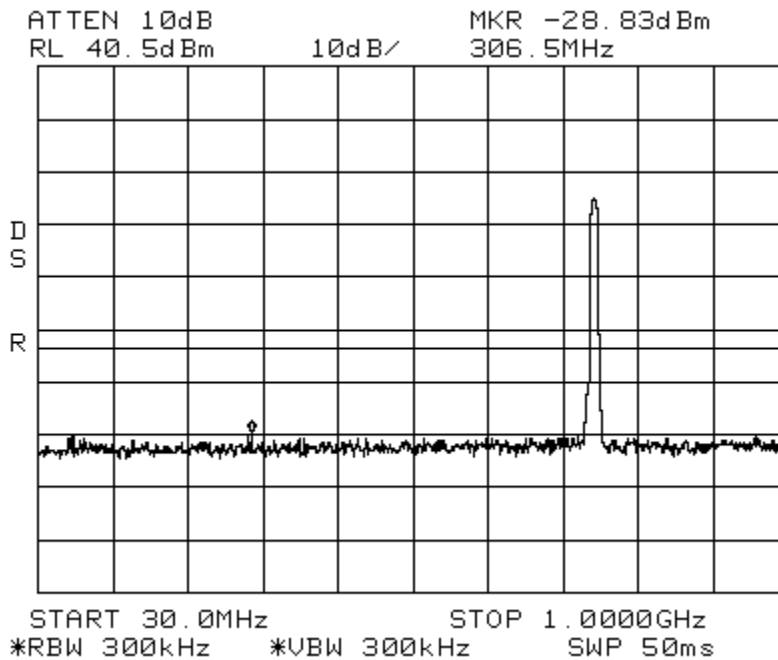
LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Conducted Emissions

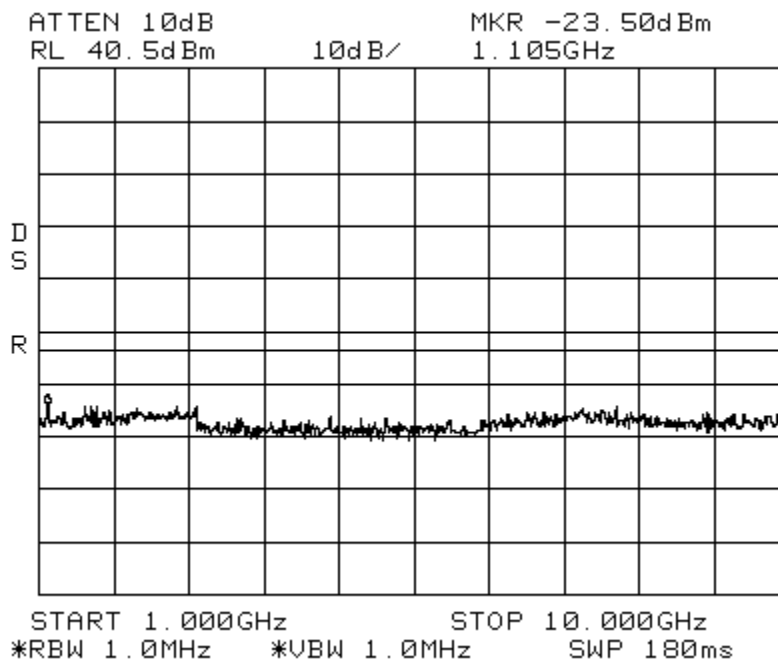
LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

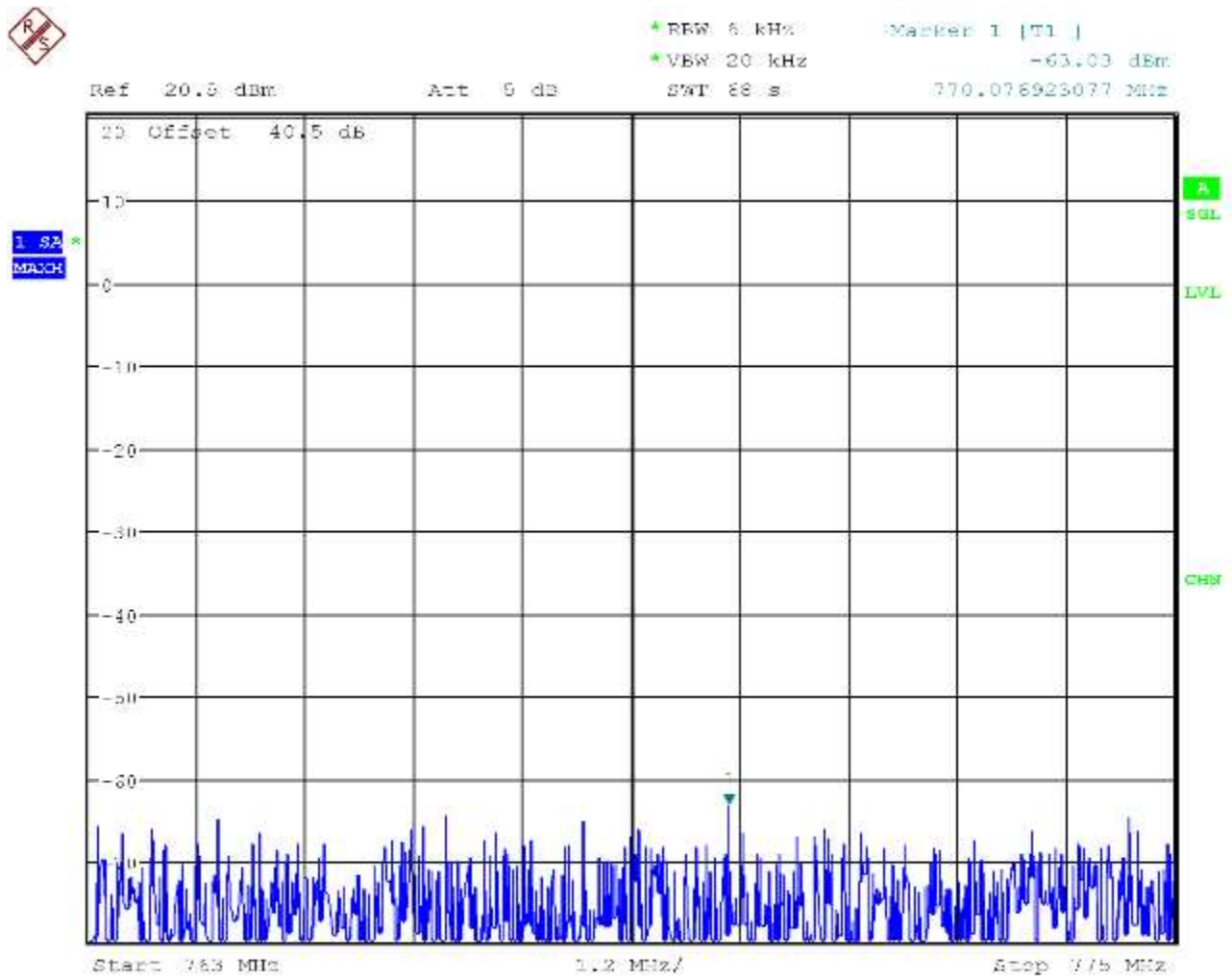
Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions LTE 1.4 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 763 MHz Stop 775 MHz RBW 6.0kHz VBW 20 kHz

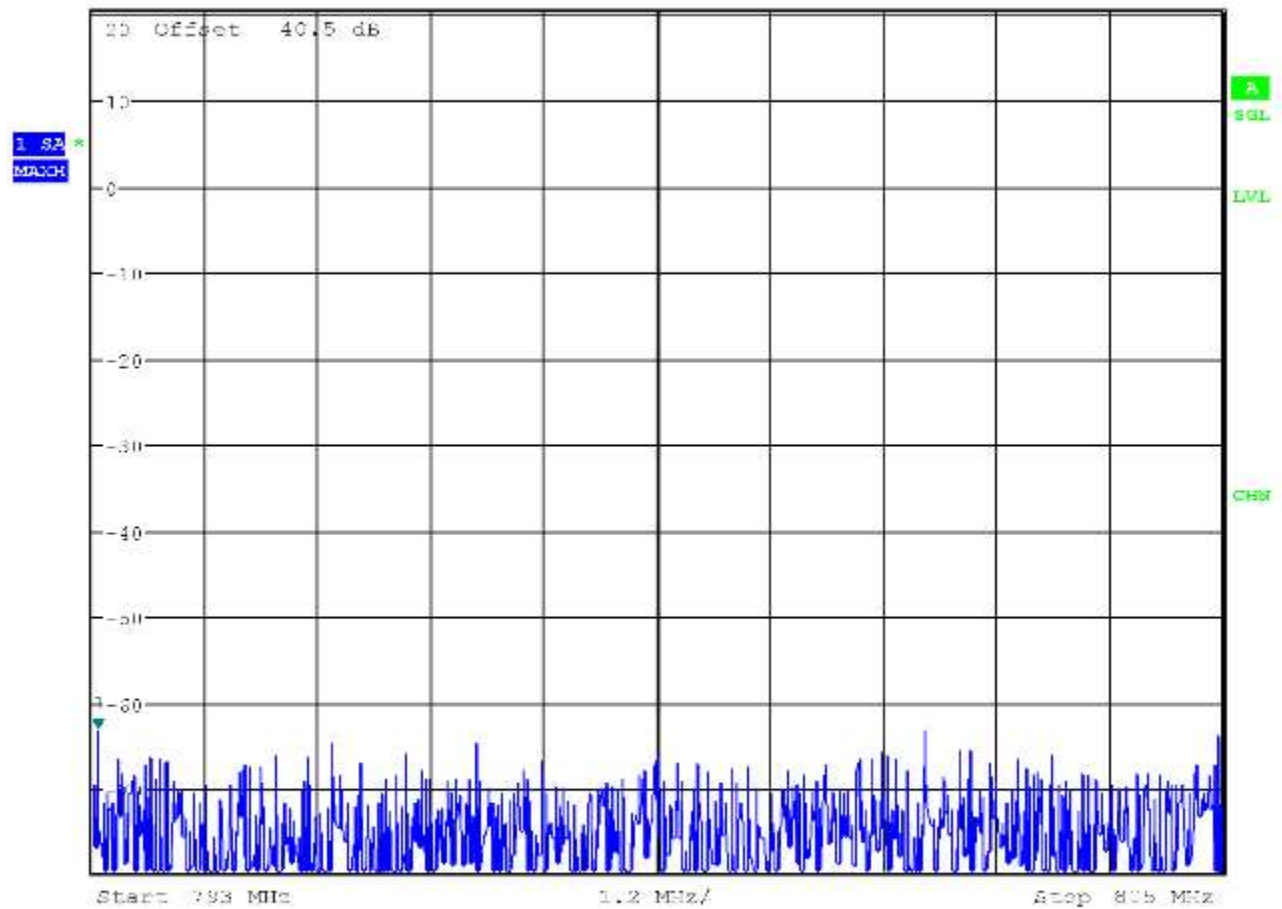


Date: 28.JUN.2012 14:26:28

Conducted Emissions LTE 1.4 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 793 MHz Stop 805 MHz RBW 6.0kHz VBW 20 kHz

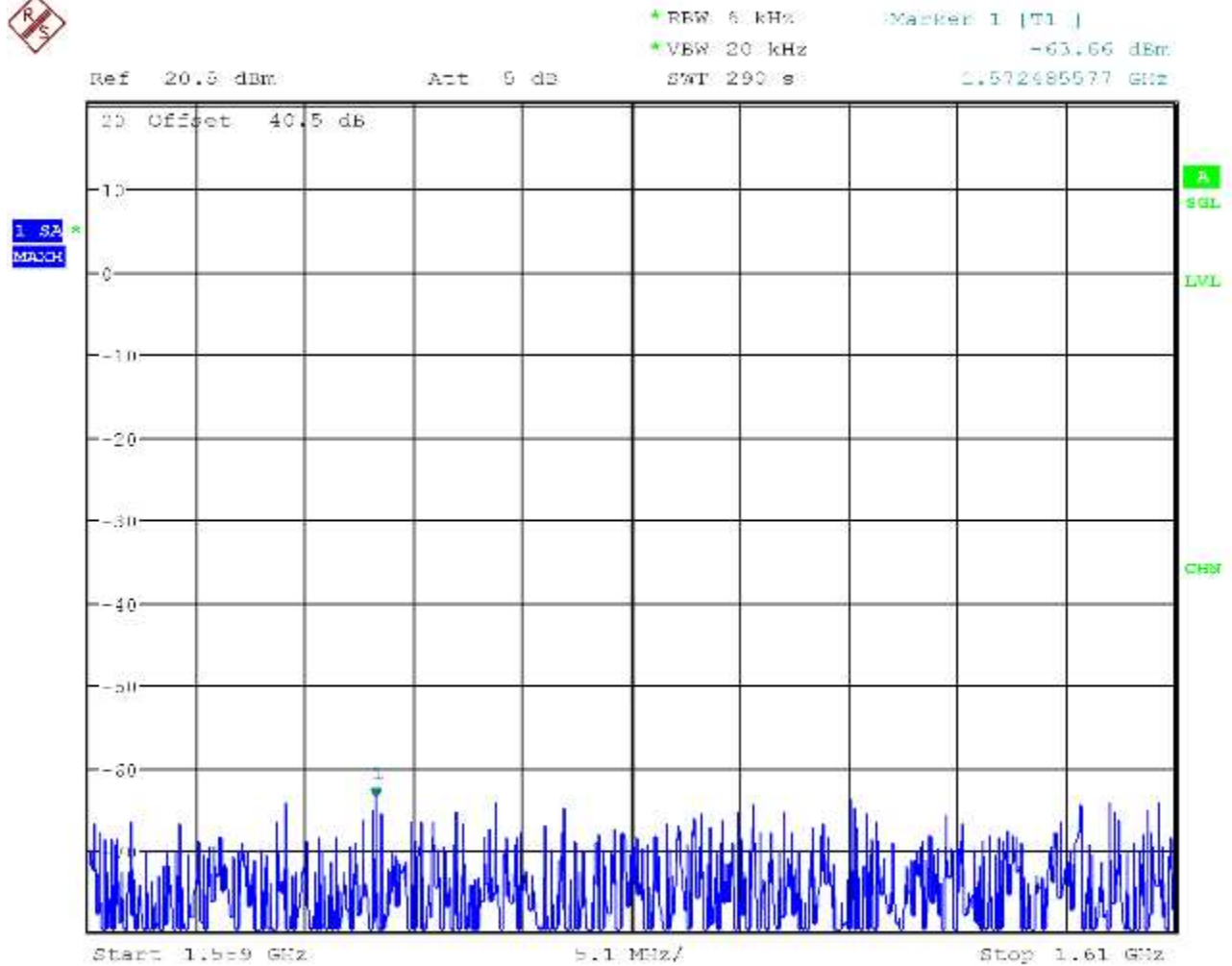


*RBW 6.0kHz Marker 1 [T1]
 *VBW 20.0kHz -63.03 dBm
 Ref 20.0 dBm Att 9 dB SWT 28 s 793.057692308 MHz



Date: 28.JUN.2012 14:57:13

Conducted Emissions LTE 1.4 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 1559 MHz Stop 1610 MHz RBW 6.0kHz VBW 20 kHz

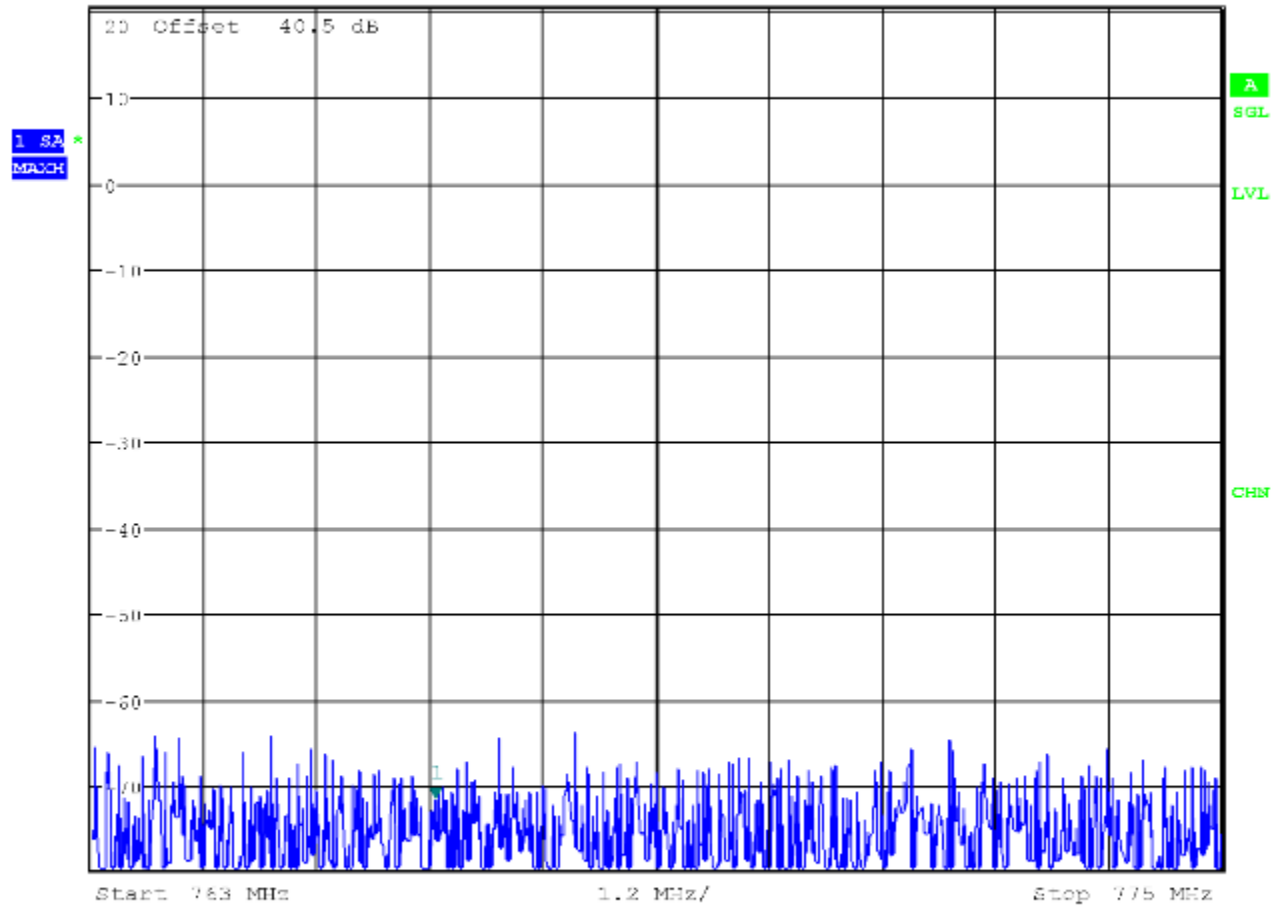


Date: 28.JUN.2012 15:31:43

Conducted Emissions LTE 3.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 763 MHz Stop 775 MHz RBW 6.0kHz VBW 20 kHz

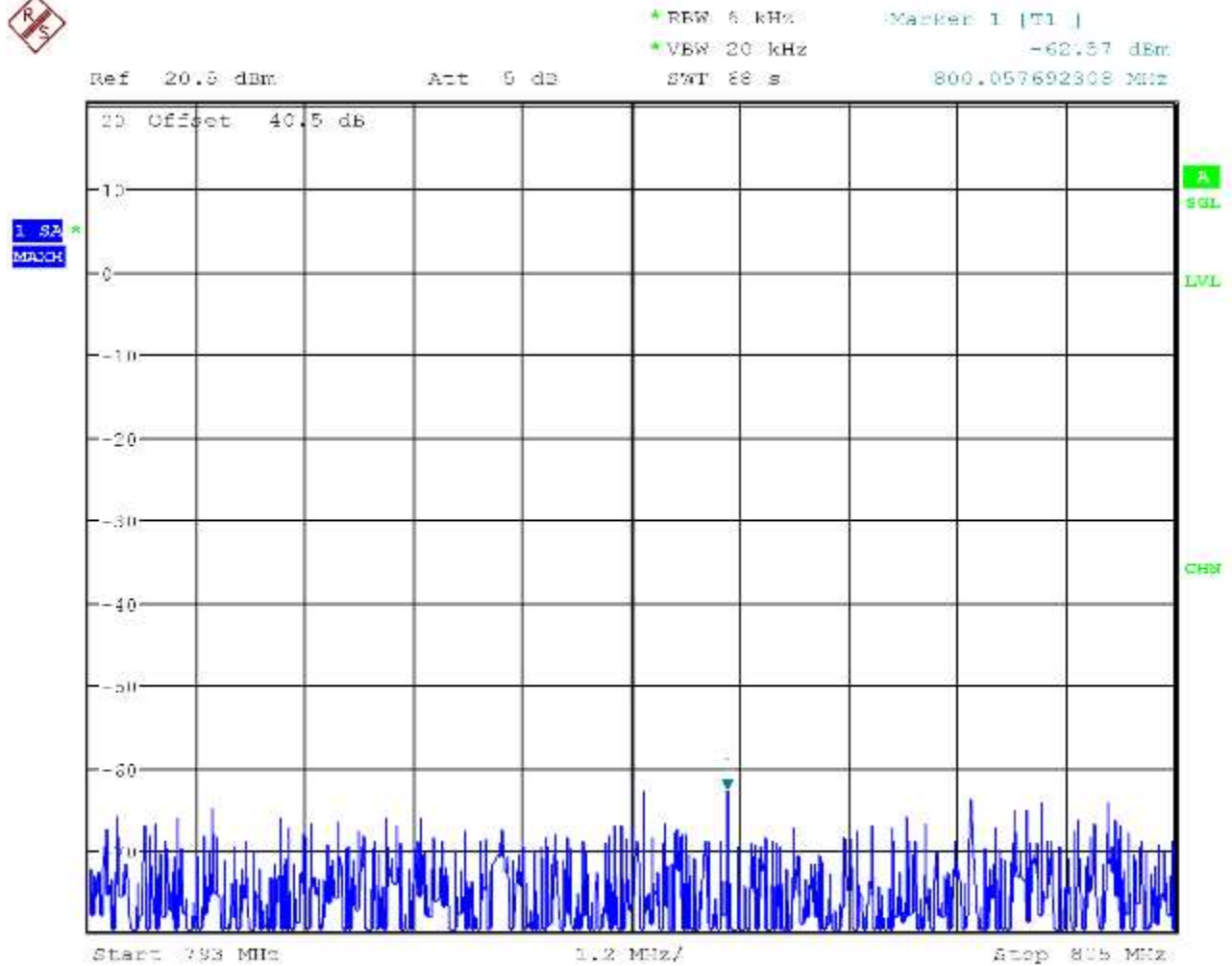


*RBW 6 kHz Marker 1 [T1]
 *VBW 20 kHz -71.31 dBm
 Ref 20.5 dBm Att 9 dB SWT 88 s 766.653846154 MHz



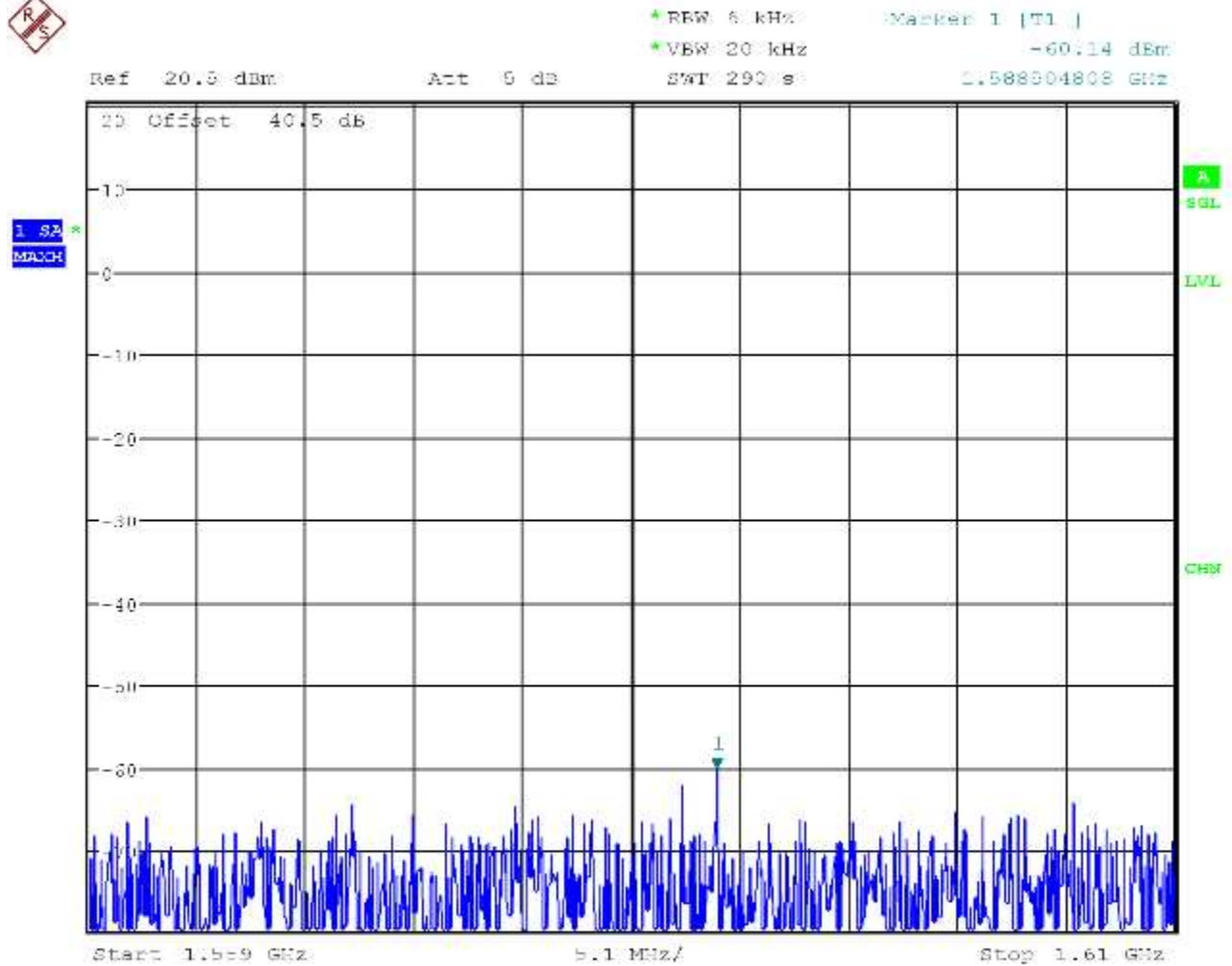
Date: 28.JUN.2012 14:38:02

Conducted Emissions LTE 3.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 793 MHz Stop 805 MHz RBW 6.0kHz VBW 20 kHz



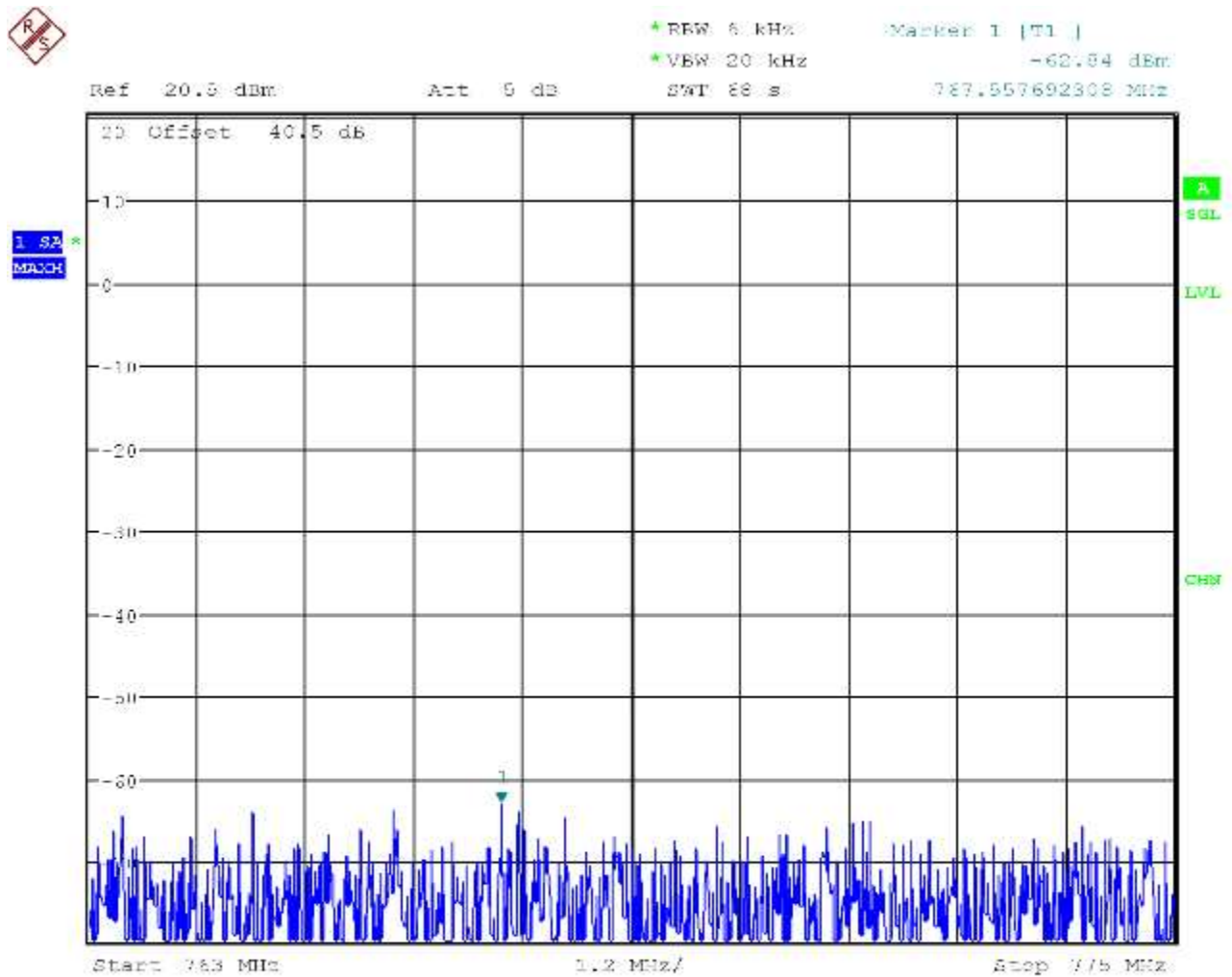
Date: 28.JUN.2012 15:00:53

Conducted Emissions LTE 3.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 1559 MHz Stop 1610 MHz RBW 6.0kHz VBW 20 kHz



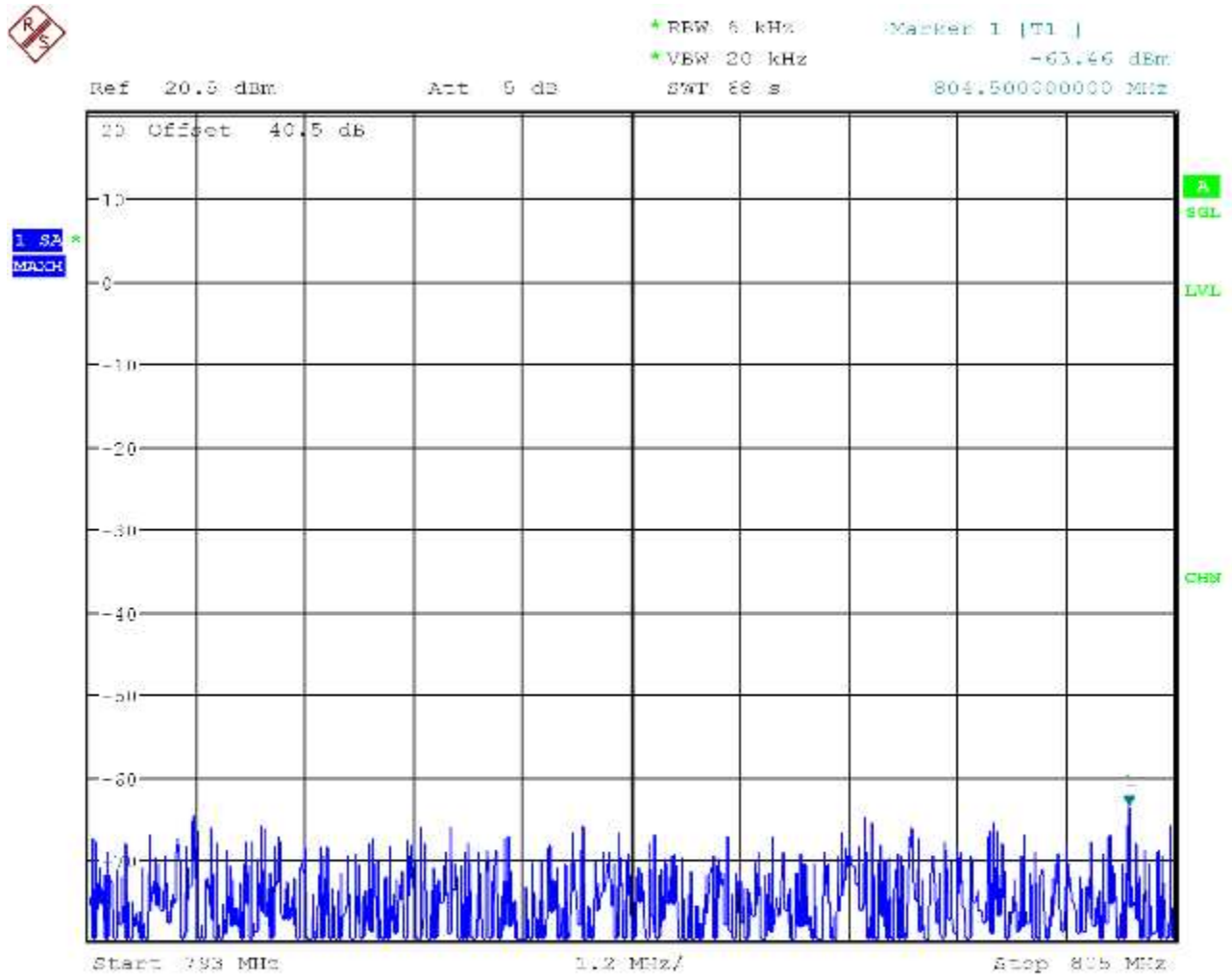
Date: 28.JUN.2012 15:40:13

Conducted Emissions LTE 5.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 763 MHz Stop 775 MHz RBW 6.0kHz VBW 20 kHz



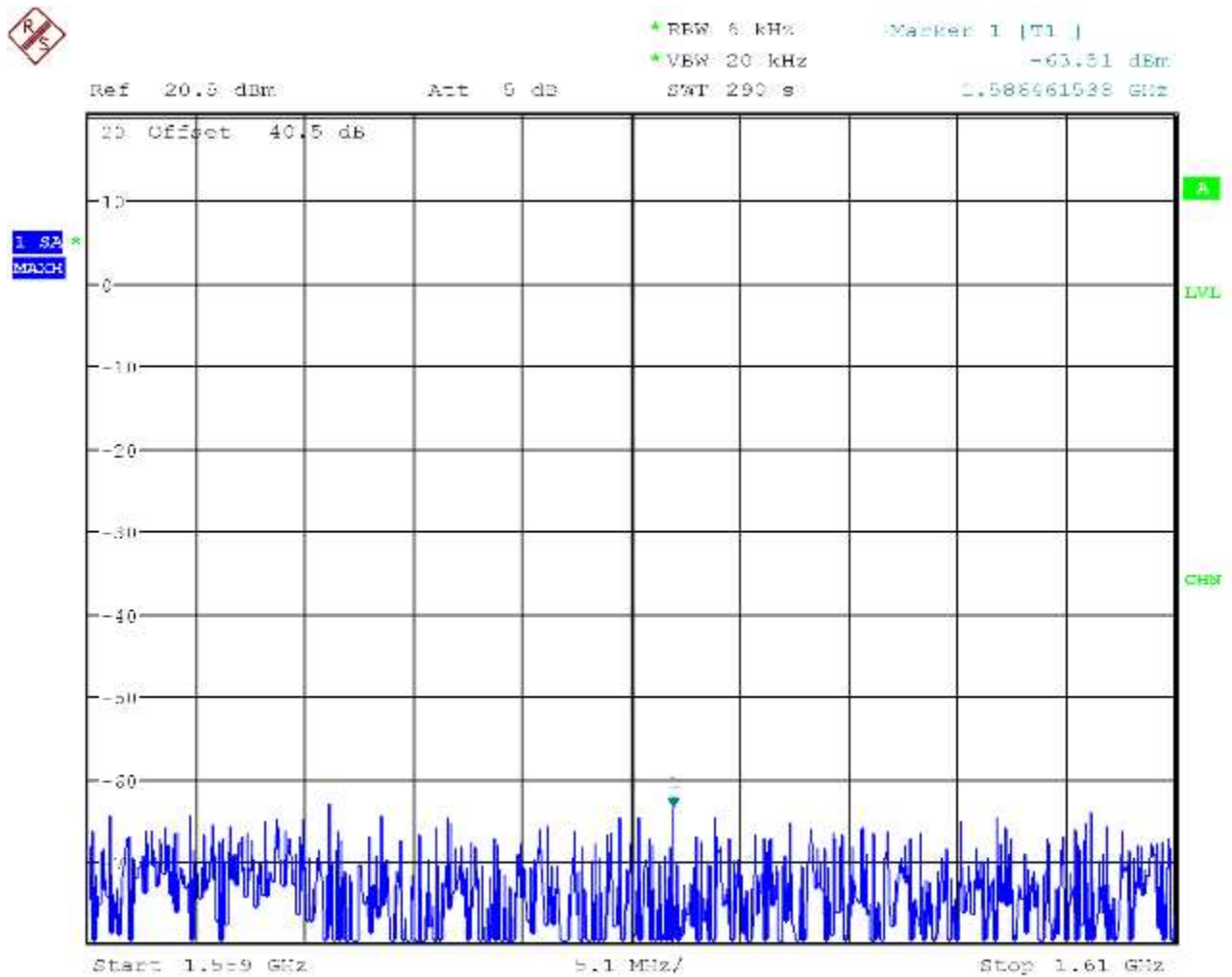
Date: 28.JUN.2012 14:42:03

Conducted Emissions LTE 5.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 793 MHz Stop 805 MHz RBW 6.0kHz VBW 20 kHz



Date: 28.JUN.2012 15:07:46

Conducted Emissions LTE 5.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 1559 MHz Stop 1610 MHz RBW 6.0kHz VBW 20 kHz

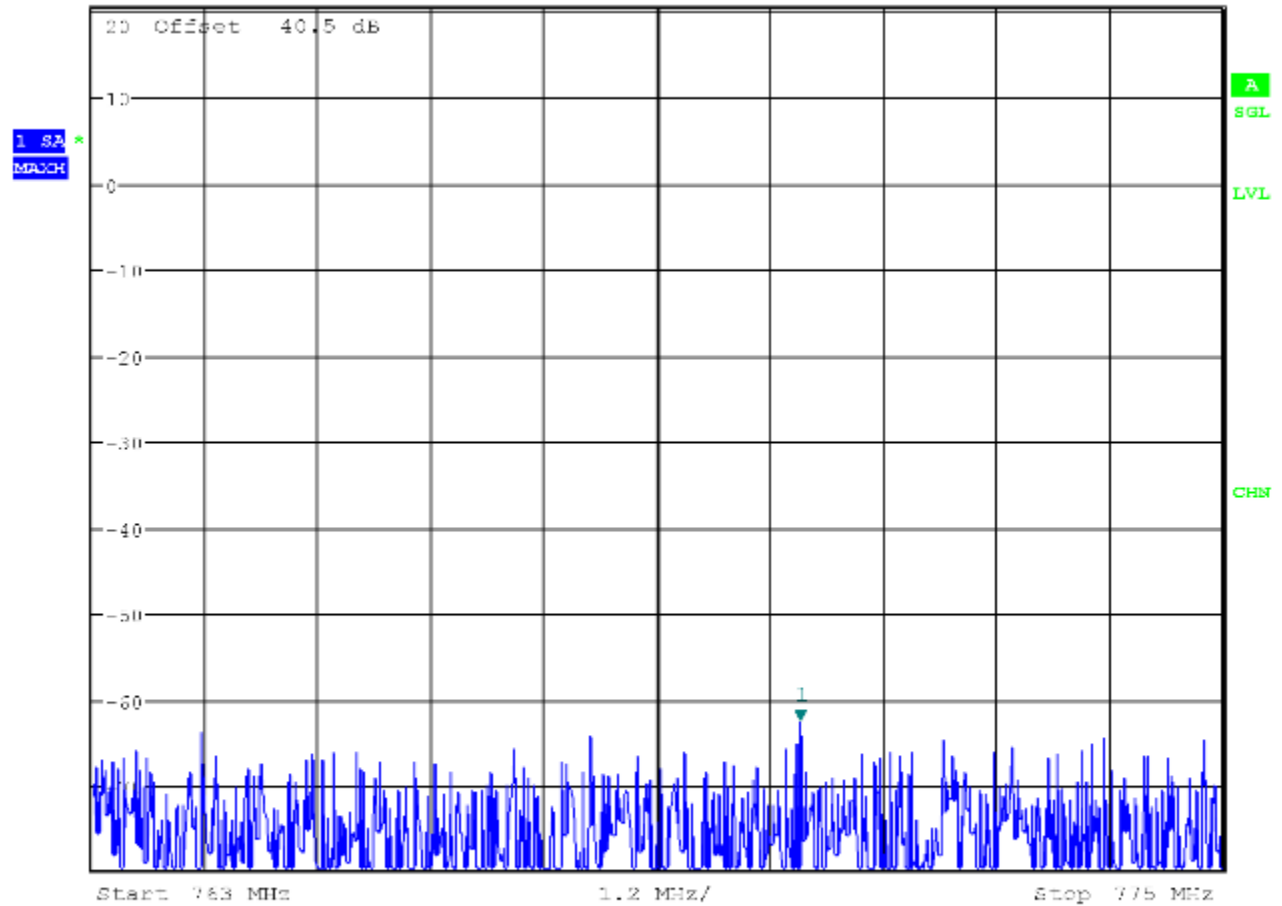


Date: 28.JUN.2012 15:15:12

Conducted Emissions LTE 10.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 763 MHz Stop 775 MHz RBW 6.0kHz VBW 20 kHz



*RBW 6 kHz Marker 1 [T1]
 *VBW 20 kHz -62.31 dBm
 Ref 20.0 dBm Att 9 dB SWT 88 s 770.519230769 MHz

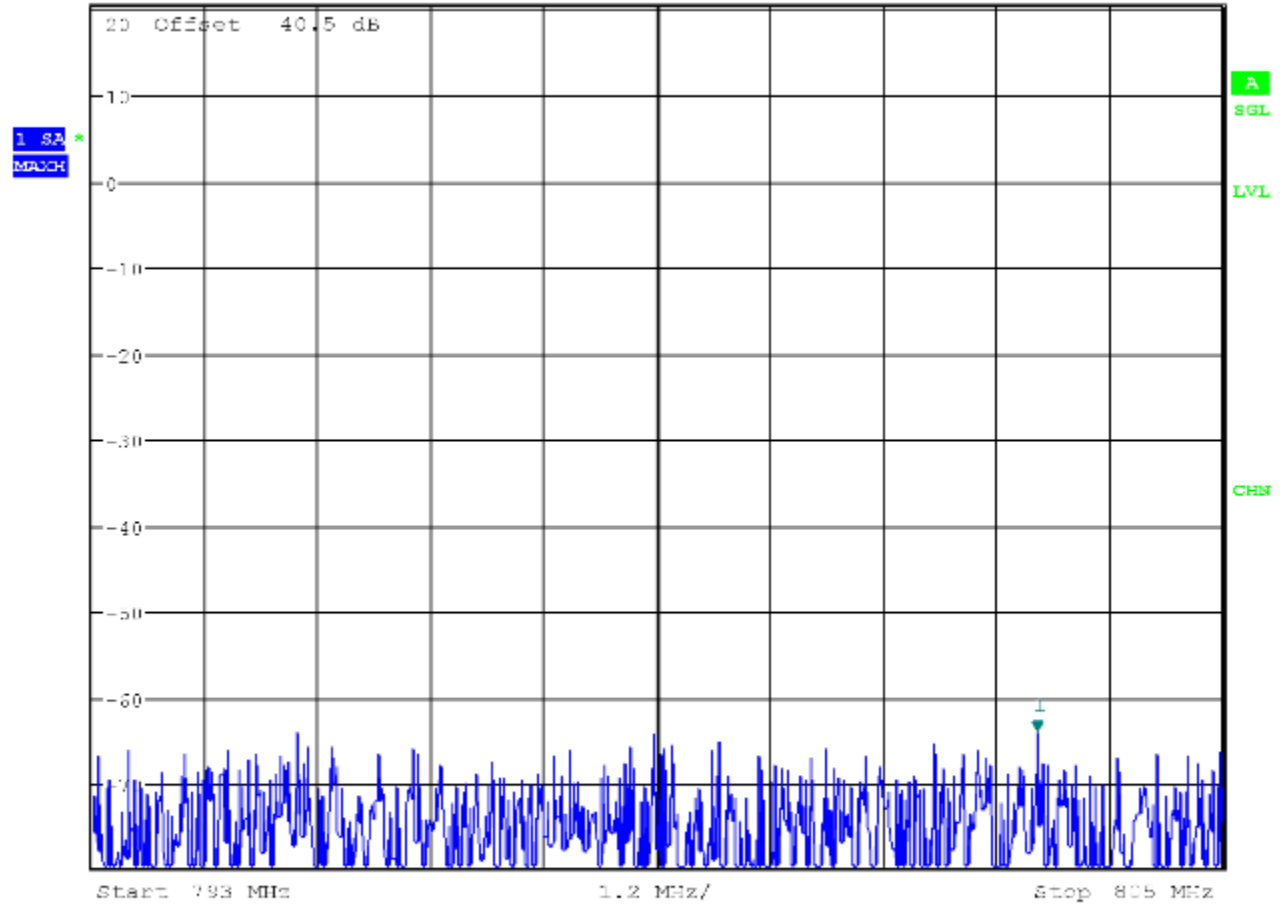


Date: 28.JUN.2012 14:45:41

Conducted Emissions LTE 10.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 793 MHz Stop 805 MHz RBW 6.0kHz VBW 20 kHz

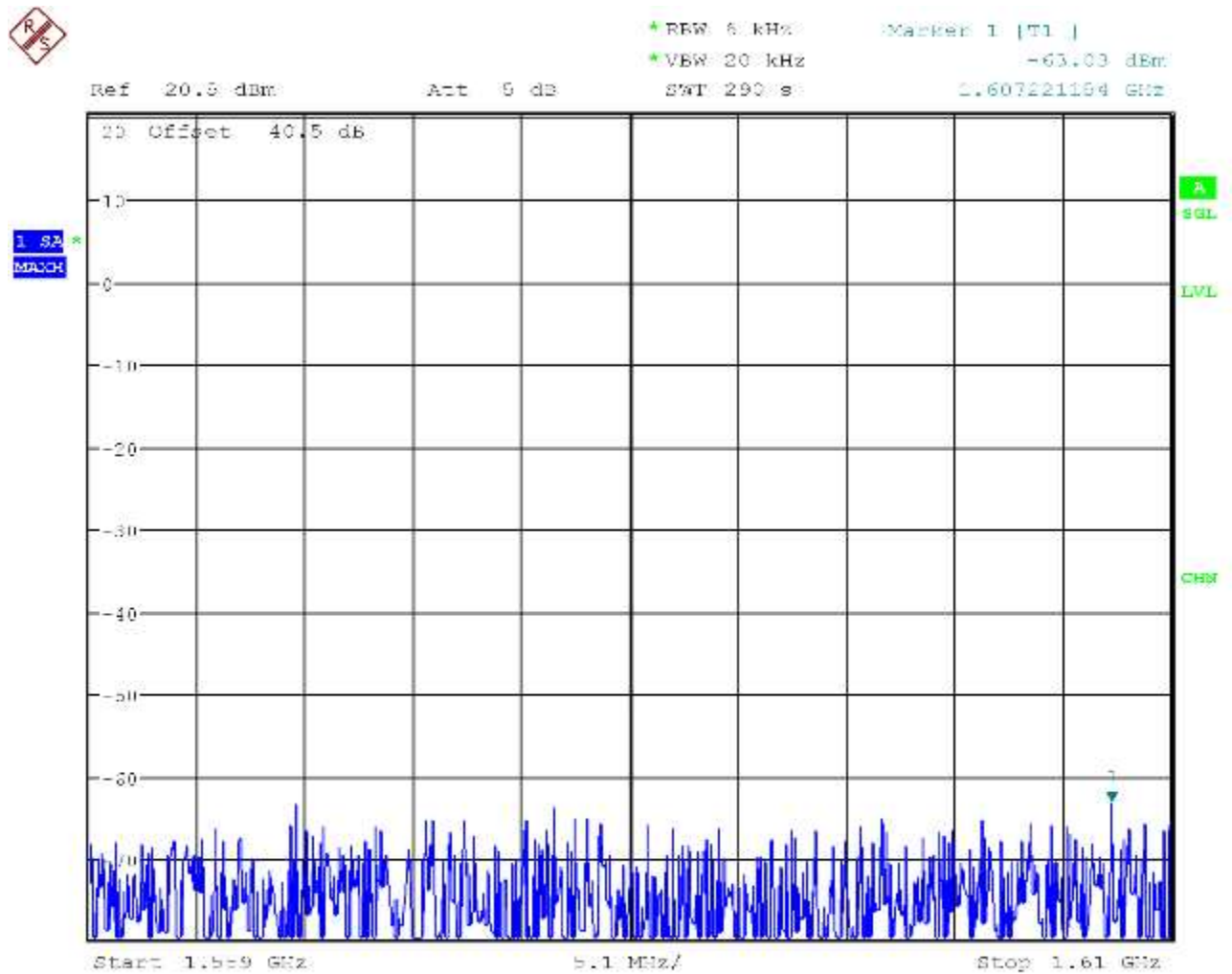


*RBW 6 kHz Marker 1 [T1]
 *VBW 20 kHz -63.81 dBm
 Ref 20.5 dBm Att 5 dB SWT 88 s 803.038461538 MHz

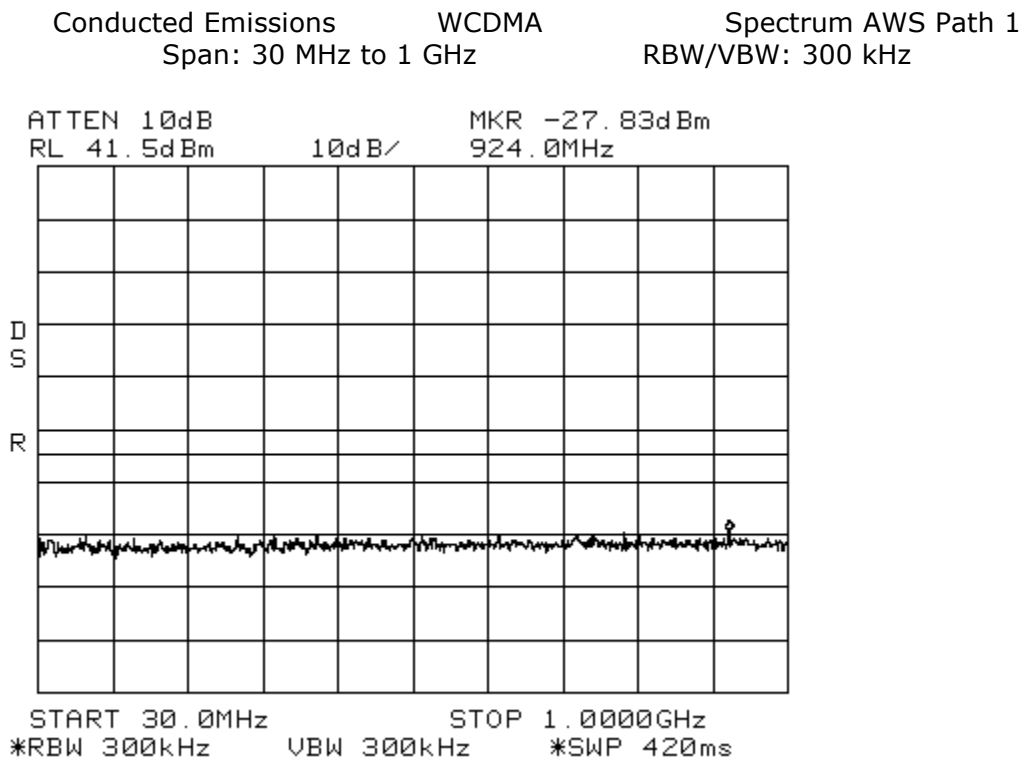
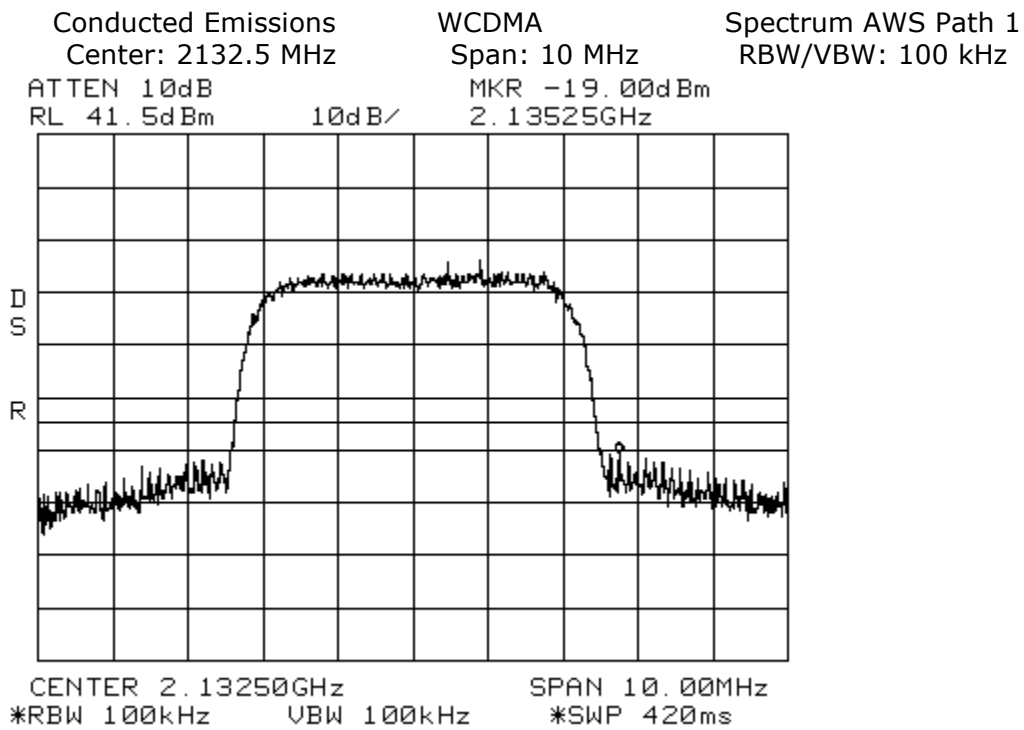


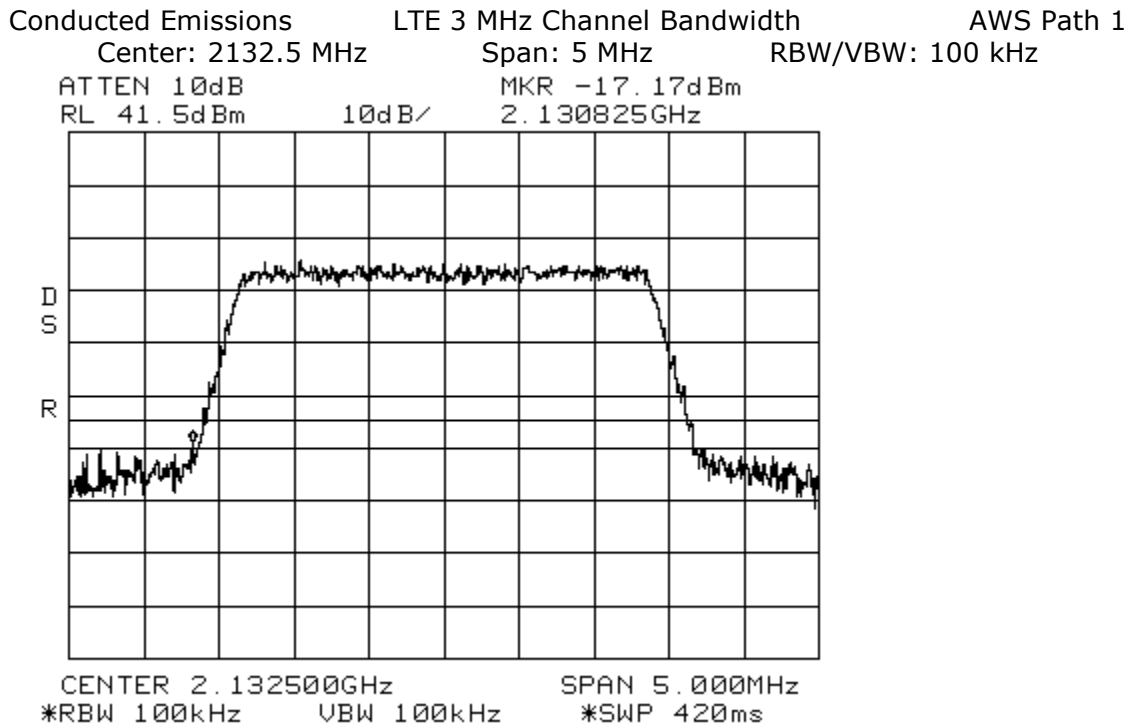
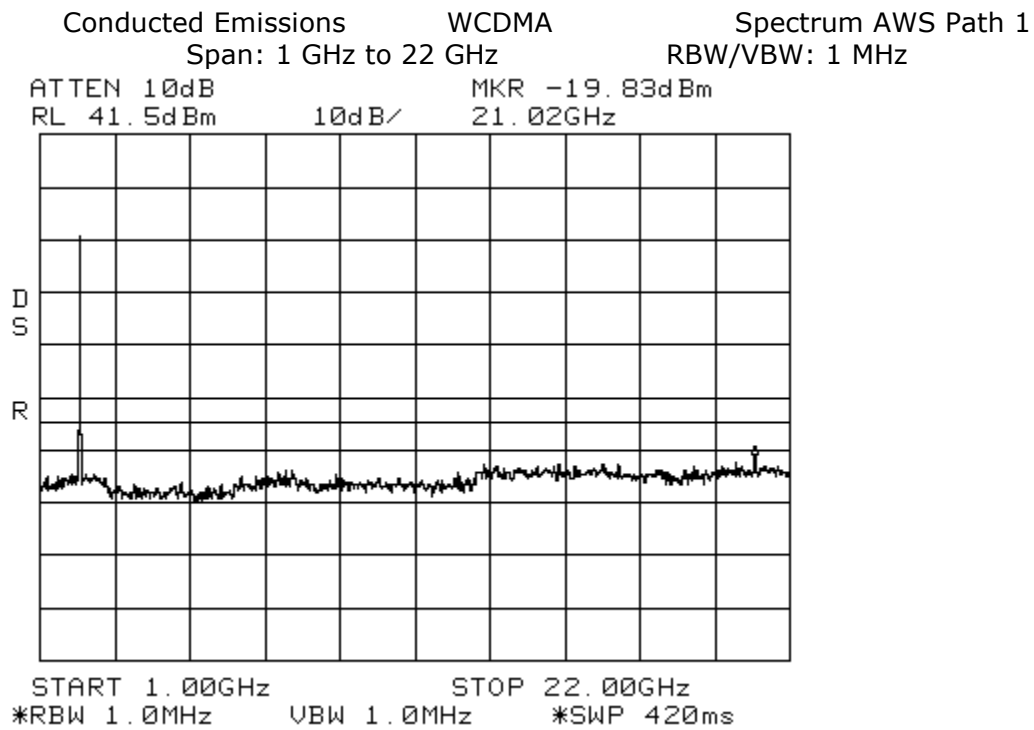
Date: 28.JUN.2012 14:50:54

Conducted Emissions LTE 10.0 MHz Channel Bandwidth Spectrum 700 MHz Path 1
 Start 1559 MHz Stop 1610 MHz RBW 6.0kHz VBW 20 kHz

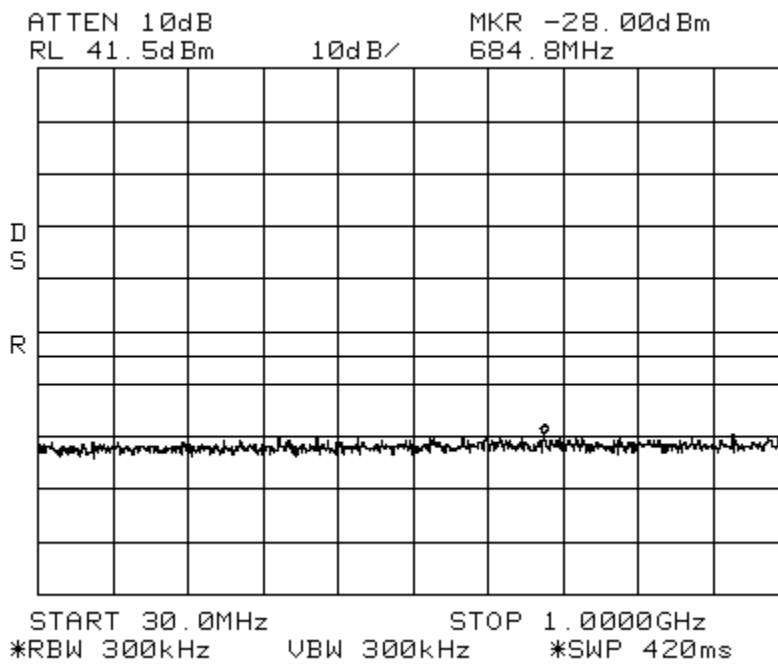


Date: 28.JUN.2012 15:56:54

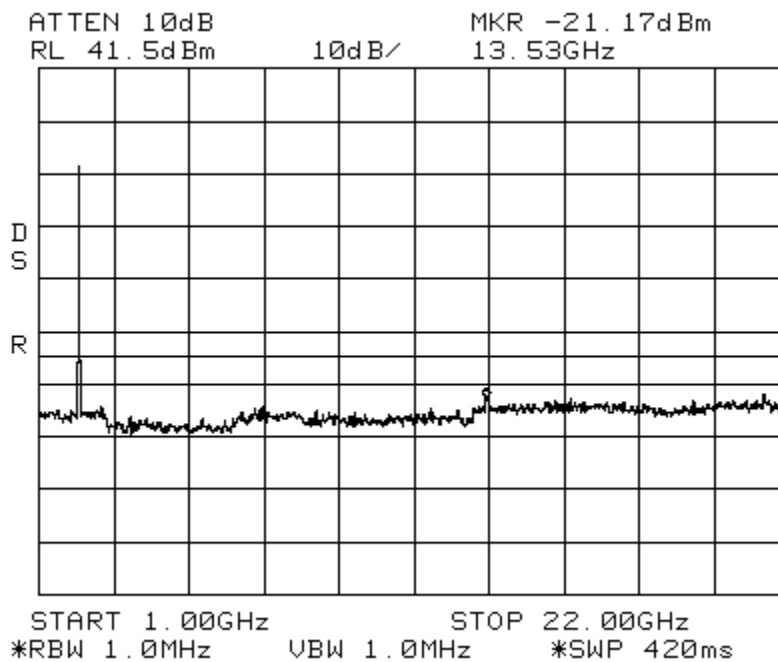




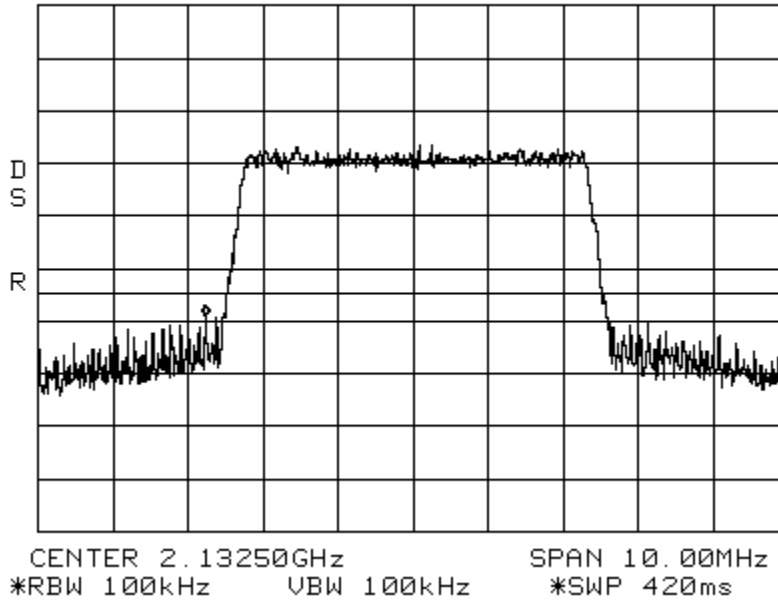
Conducted Emissions LTE 3 MHz Channel Bandwidth AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



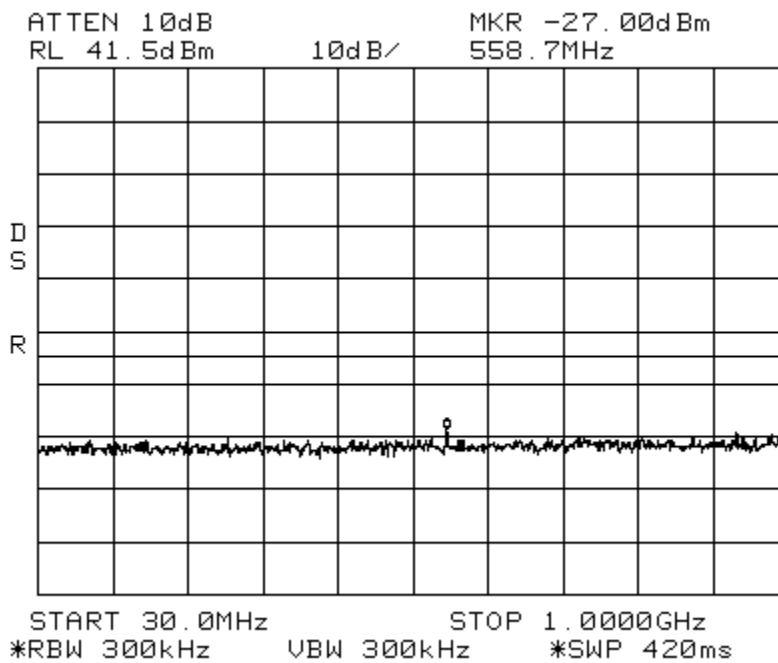
Conducted Emissions LTE 3 MHz Channel Bandwidth AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



Conducted Emissions LTE 5 MHz Channel Bandwidth AWS Path 1
Center: 2132.5 MHz Span: 10 MHz RBW/VBW: 100 kHz
ATTEN 10dB MKR -17.50dBm
RL 41.5dBm 10dB/ 2.12973GHz



Conducted Emissions LTE 5 MHz Channel Bandwidth AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



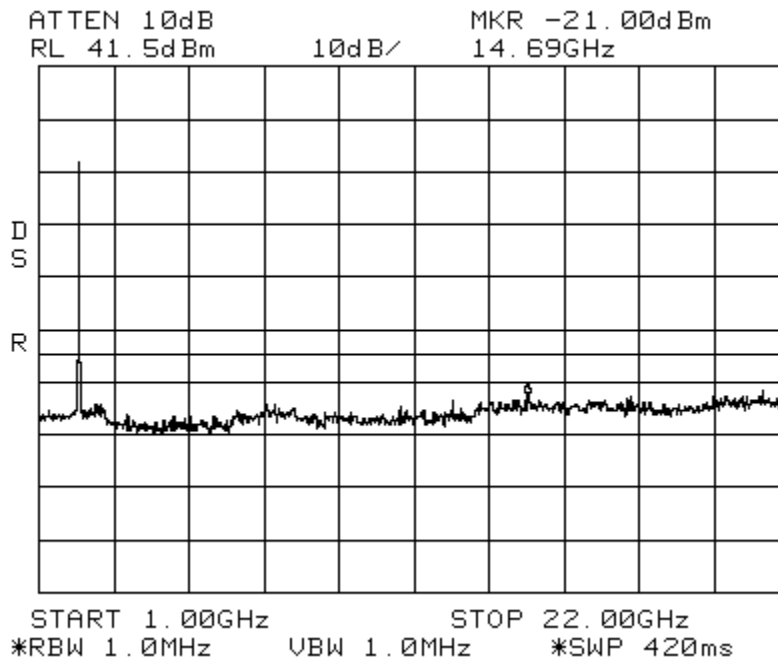
Conducted Emissions

LTE 5 MHz Channel Bandwidth

AWS Path 1

Span: 1 GHz to 22GHz

RBW/VBW: 1 MHz



Conducted Emissions

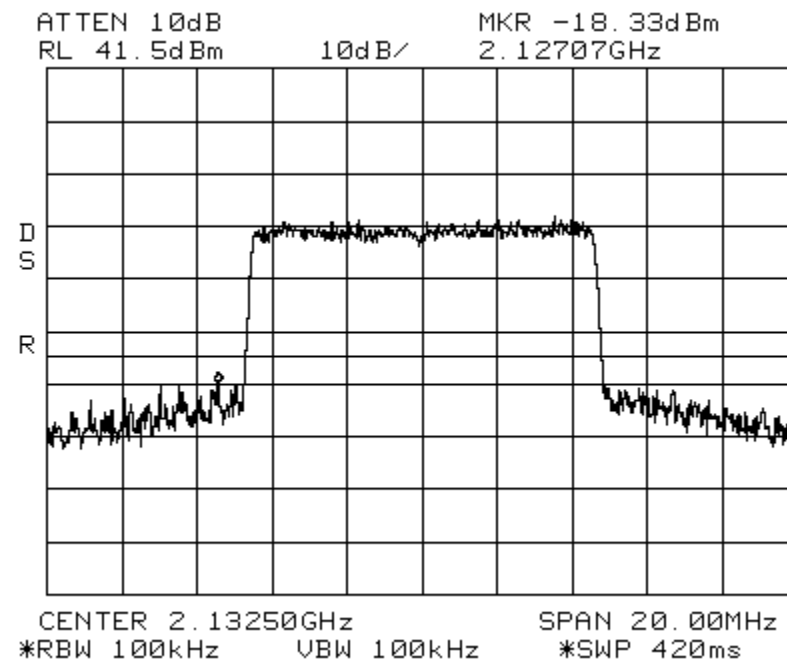
LTE 10 MHz Channel Bandwidth

AWS Path 1

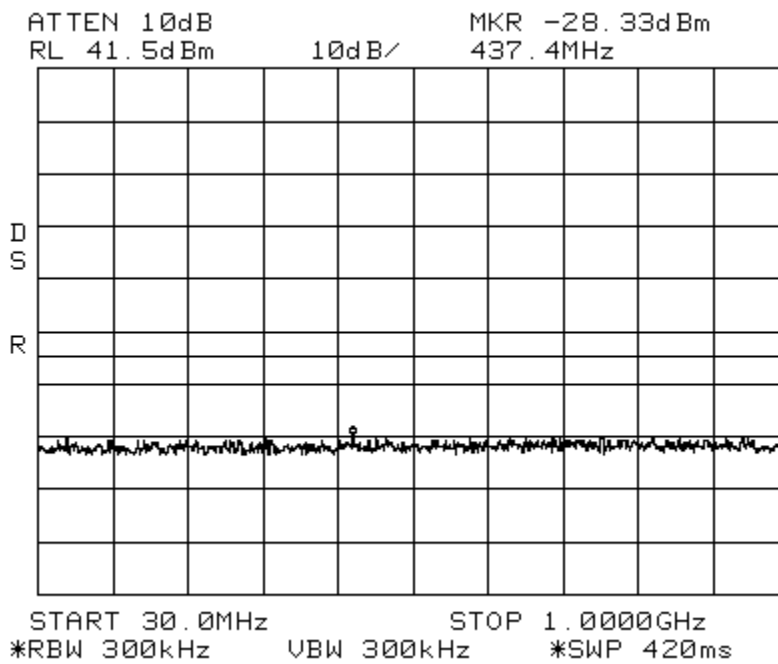
Center: 2132.5 MHz

Span: 20MHz

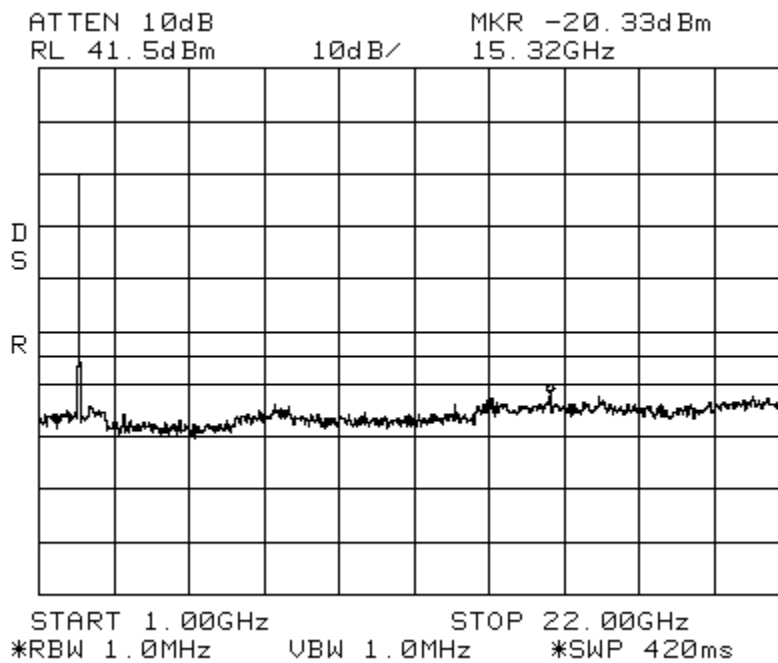
RBW/VBW: 100 kHz



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



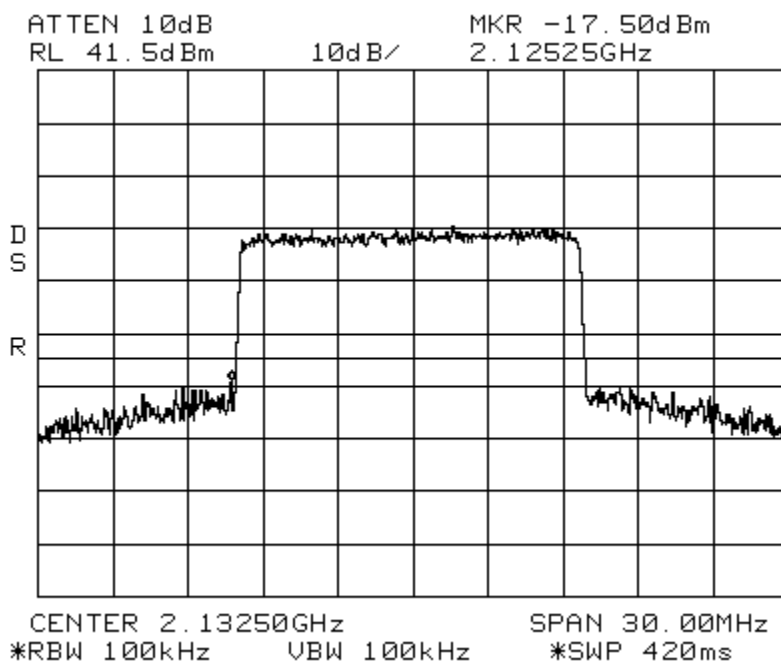
Conducted Emissions LTE 10 MHz Channel Bandwidth AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



Conducted Emissions
Center: 2132.5 MHz

LTE 15 MHz Channel Bandwidth
Span: 30 MHz

AWS Path 1
RBW/VBW: 100 kHz

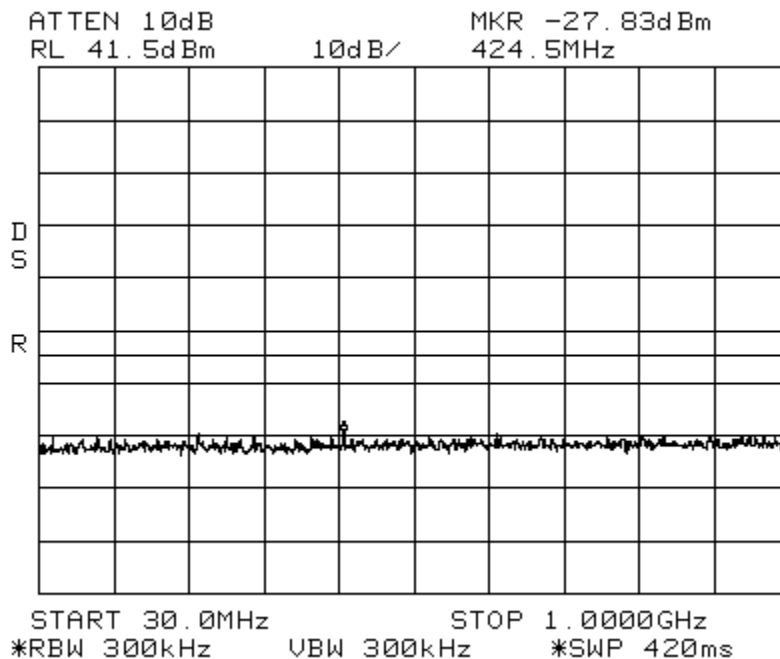


Conducted Emissions

LTE 15 MHz Channel Bandwidth
Span: 30 MHz to 1 GHz

AWS Path 1

RBW/VBW: 300 kHz



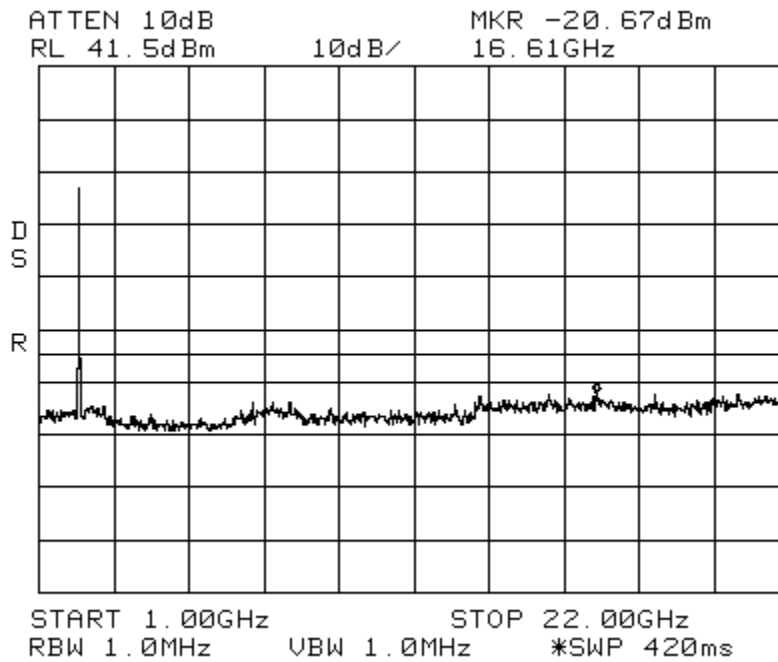
Conducted Emissions

LTE 15 MHz Channel Bandwidth

AWS Path 1

Span: 1 GHz to 22 GHz

RBW/VBW: 1 MHz



Conducted Emissions

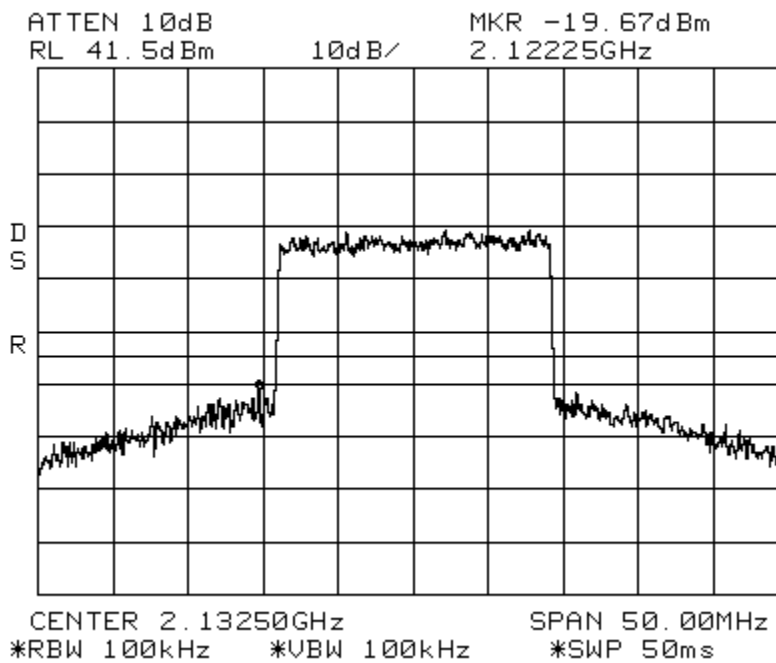
LTE 20 MHz Channel Bandwidth

AWS Path 1

Center: 2132.5 MHz

Span: 50MHz

RBW/VBW: 100 kHz



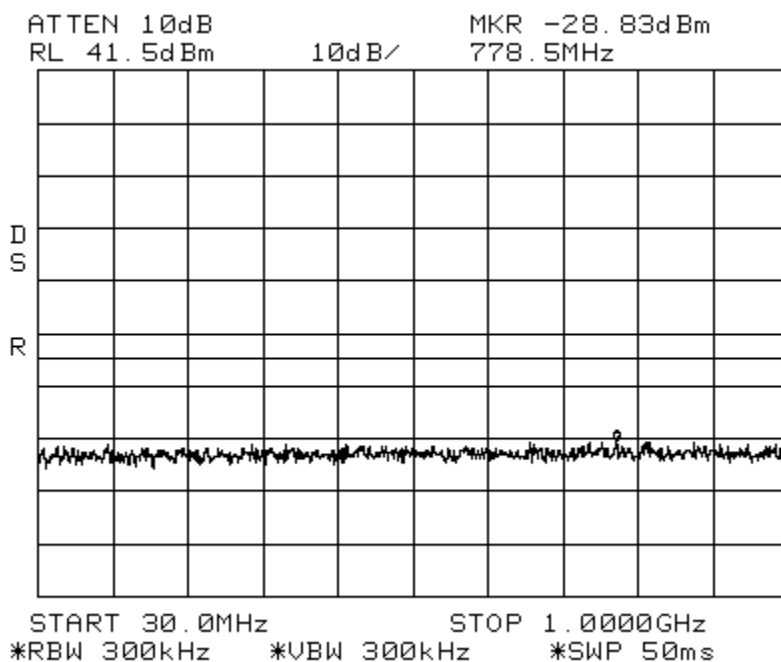
Conducted Emissions

LTE 20 MHz Channel Bandwidth

AWS Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



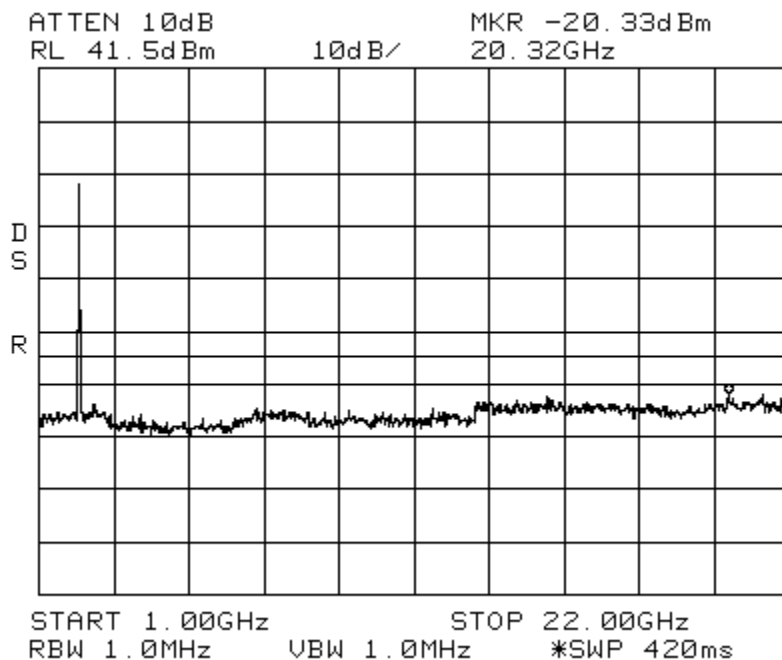
Conducted Emissions

LTE 20 MHz Channel Bandwidth

AWS Path 1

Span: 1 GHz to 22 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth_Low

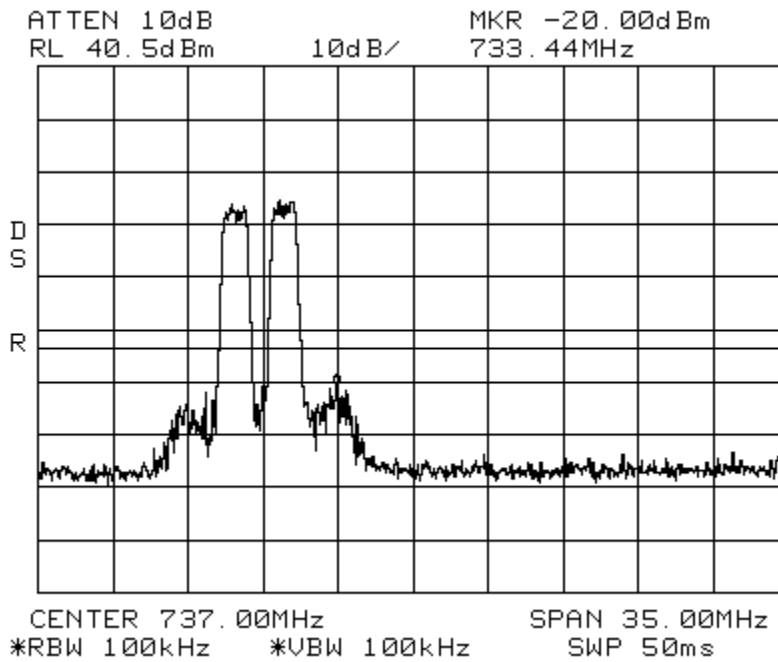
Spectrum 700 MHz

Lower ABC

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz



Intermodulation

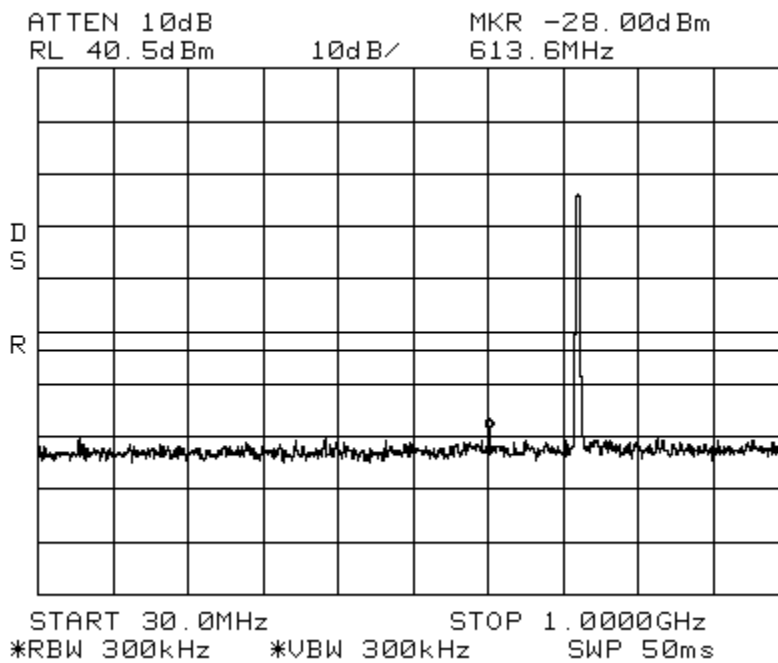
LTE 1.4 MHz Channel Bandwidth_Low

Spectrum 700 MHz

Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



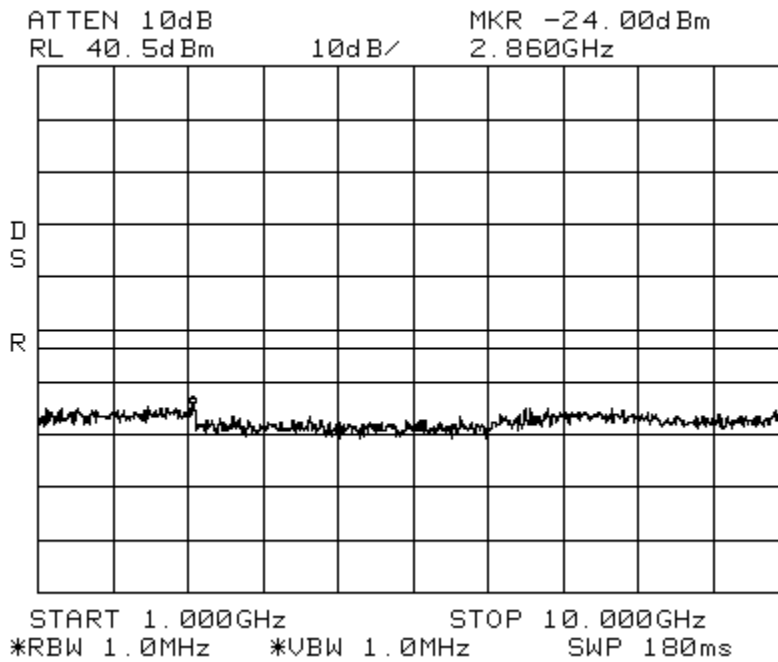
Intermodulation

LTE 1.4 MHz Channel Bandwidth _Low
Lower ABC

Spectrum 700 MHz

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

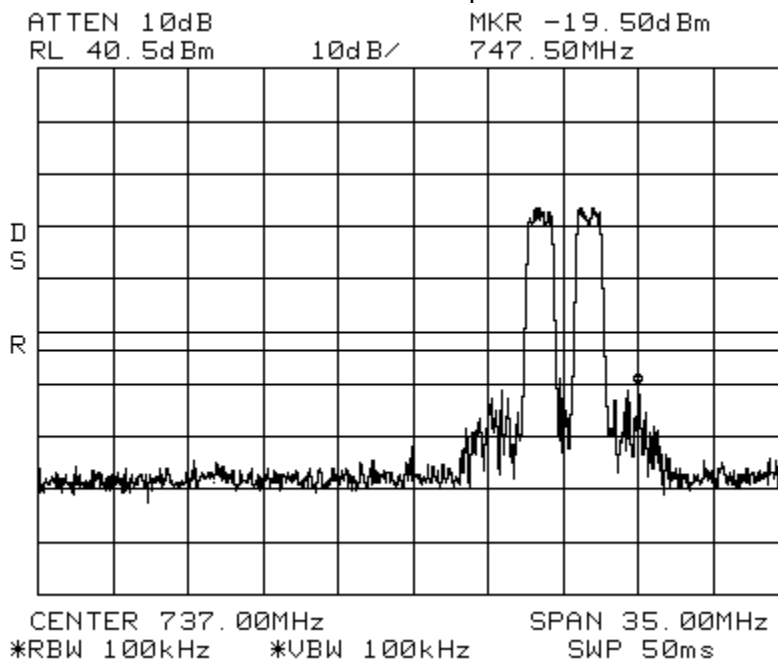
LTE 1.4 MHz Channel Bandwidth _High
MHz Lower ABC

Spectrum 700

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

ATTEN 10dB

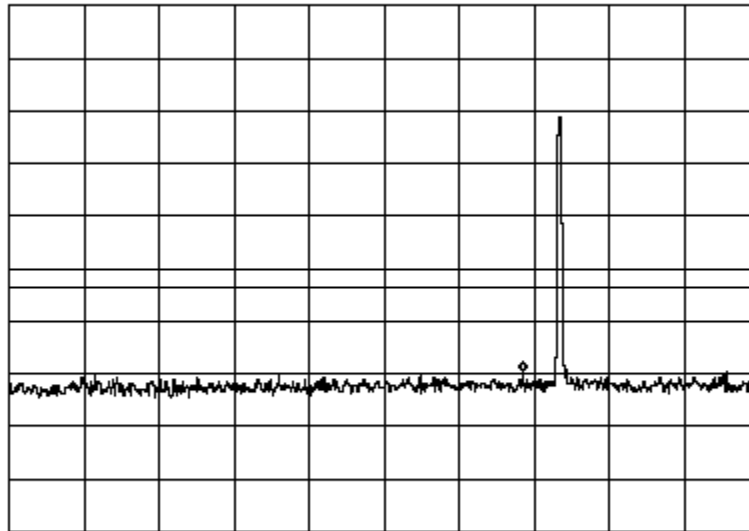
MKR -29.17dBm

RL 40.5dBm

10dB/

694.5MHz

D
S
R



START 30.0MHz

STOP 1.000GHz

*RBW 300kHz

*VBW 300kHz

SWP 50ms

Intermodulation

LTE 1.4 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

ATTEN 10dB

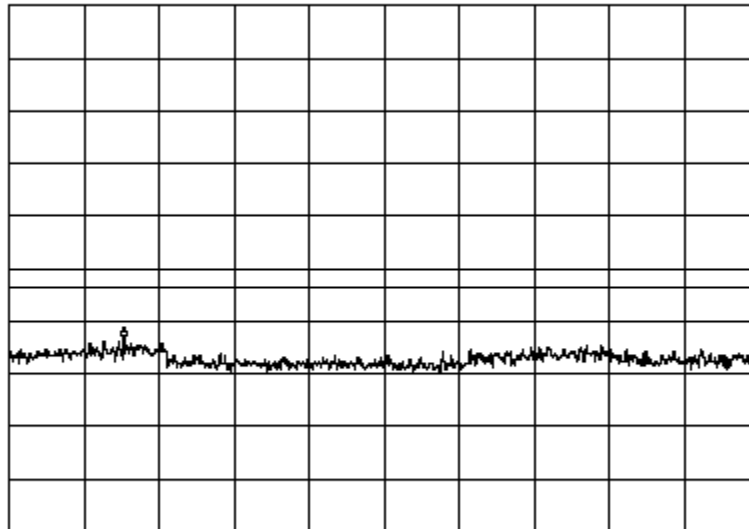
MKR -22.83dBm

RL 40.5dBm

10dB/

2.380GHz

D
S
R



START 1.000GHz

STOP 10.000GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 180ms

Intermodulation

LTE 1.4 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Lower ABC

Center: 737 MHz

Span: 70 MHz

RBW/VBW: 100 kHz

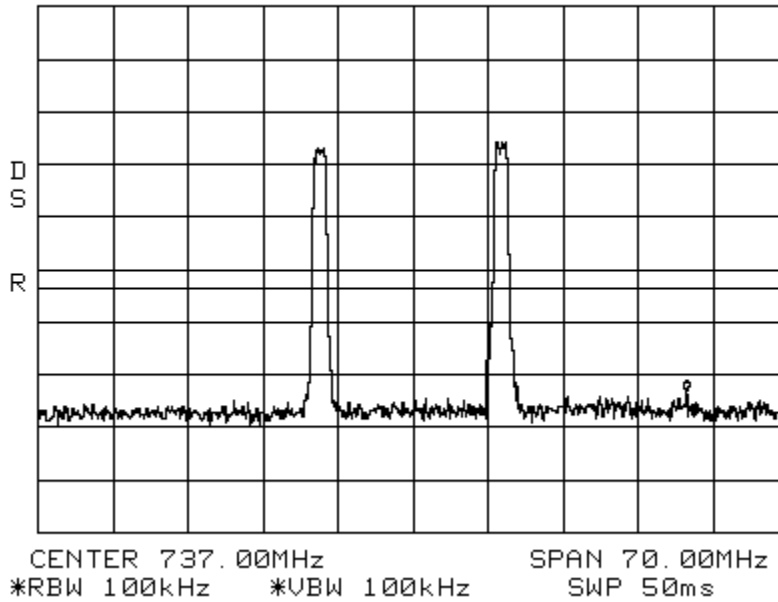
ATTEN 10dB

MKR -32.50dBm

RL 40.5dBm

10dB/

762.55MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

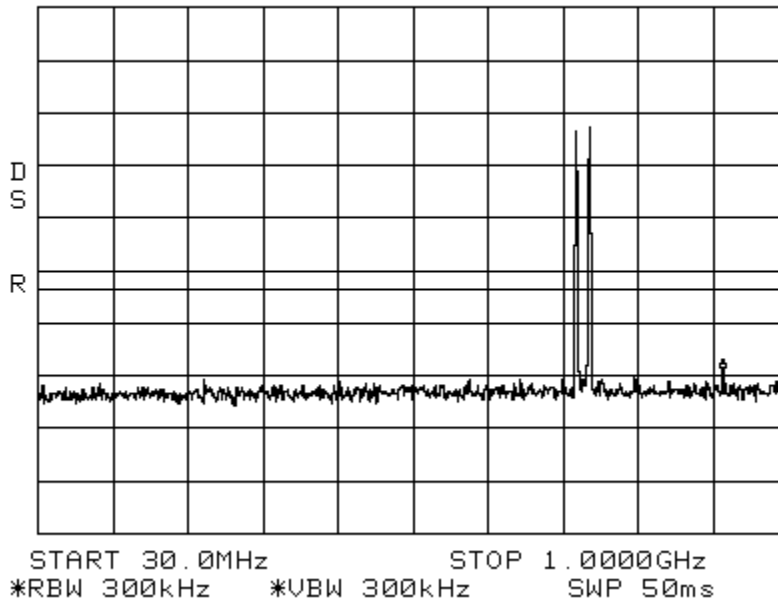
ATTEN 10dB

MKR -28.50dBm

RL 40.5dBm

10dB/

915.9MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

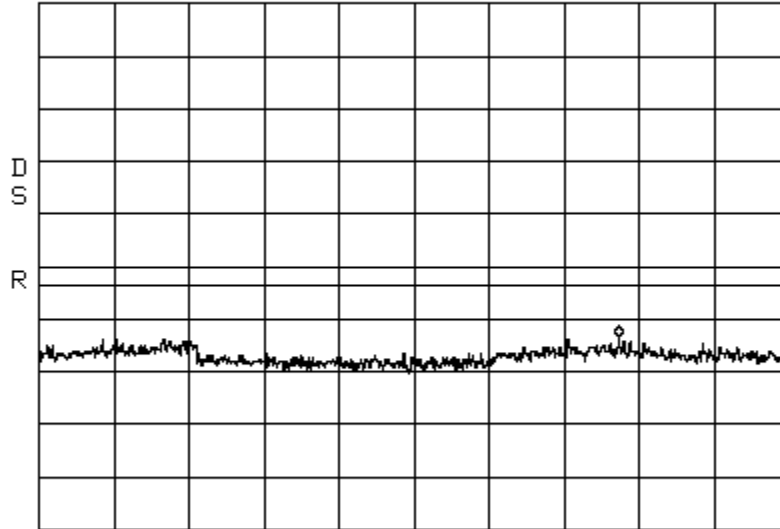
ATTEN 10dB

MKR -22.83dBm

RL 40.5dBm

10dB/

7.960GHz



START 1.000GHz

STOP 10.000GHz

*RBW 1.0MHz

*VBW 1.0MHz

SWP 180ms

Intermodulation

LTE 3 MHz Channel Bandwidth **Low**

Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

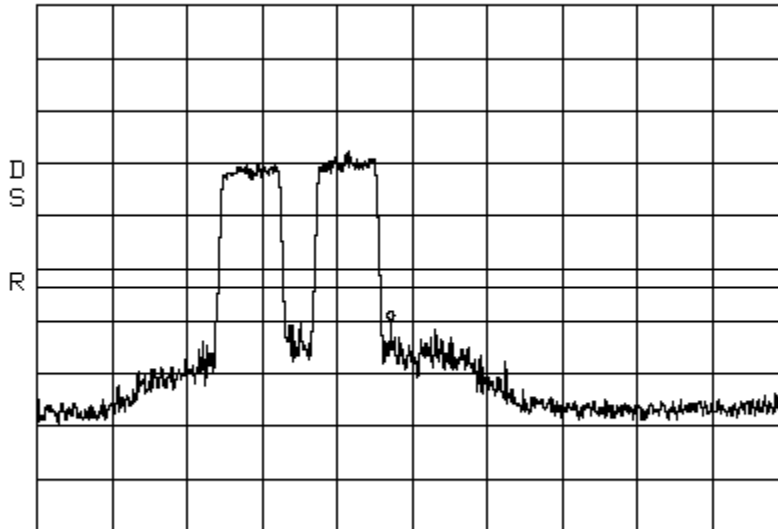
ATTEN 10dB

MKR -19.50dBm

RL 40.5dBm

10dB/

736.01MHz



CENTER 737.00MHz

SPAN 35.00MHz

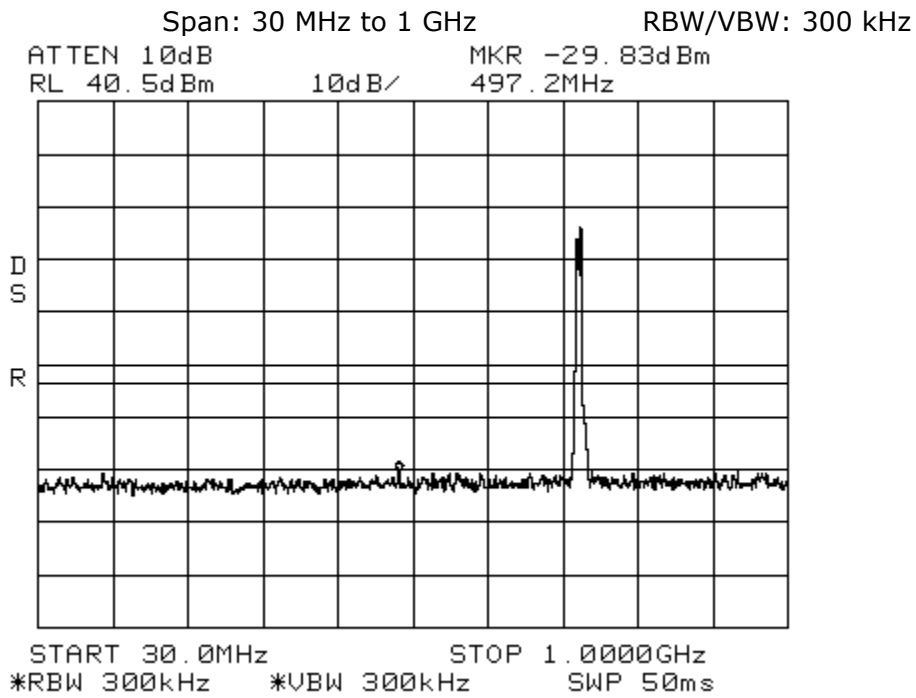
*RBW 100kHz

*VBW 100kHz

SWP 50ms

Intermodulation

LTE 3MHz Channel Bandwidth _LowSpectrum 700 MHz Lower ABC
Path 1

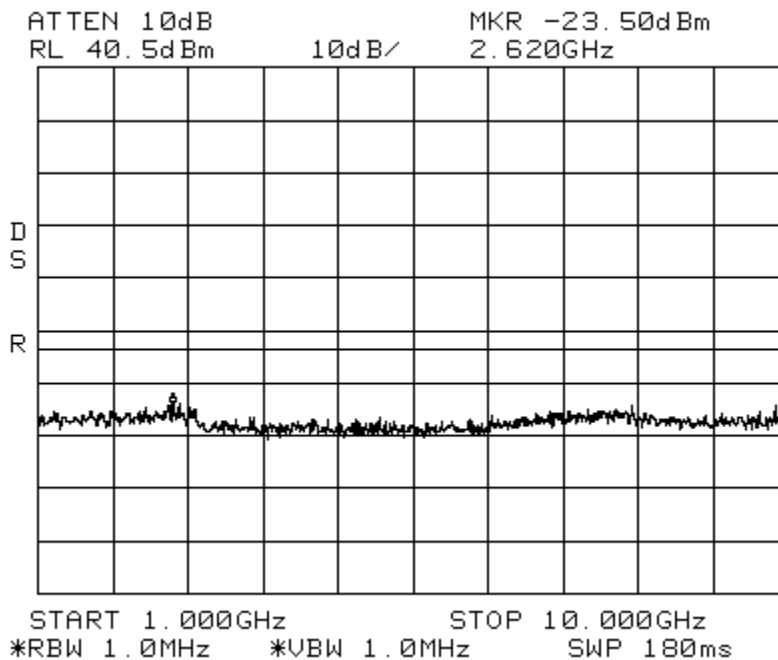


Intermodulation

LTE 3 MHz Channel Bandwidth _Low
Lower ABC Path 1

Spectrum 700 MHz

Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



Intermodulation

LTE 3 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

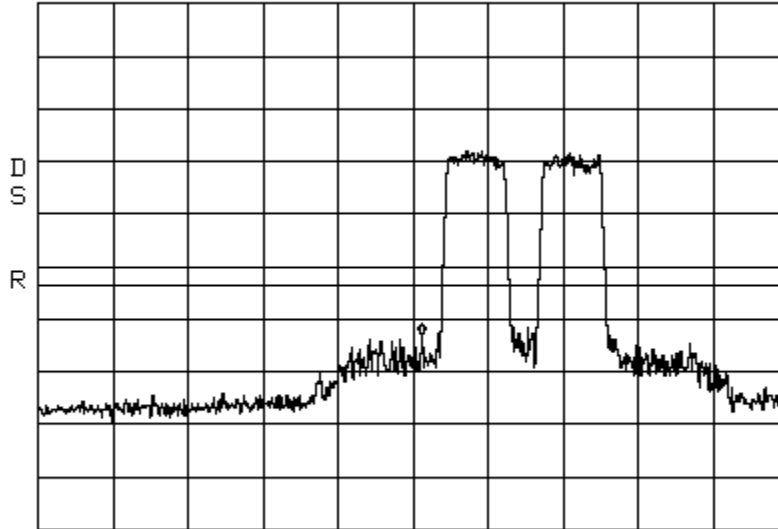
ATTEN 10dB

MKR -22.33dBm

RL 40.5dBm

10dB/

737.41MHz



CENTER 737.00MHz SPAN 35.00MHz
*RBW 100kHz *VBW 100kHz SWP 50ms

Intermodulation

LTE 3 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

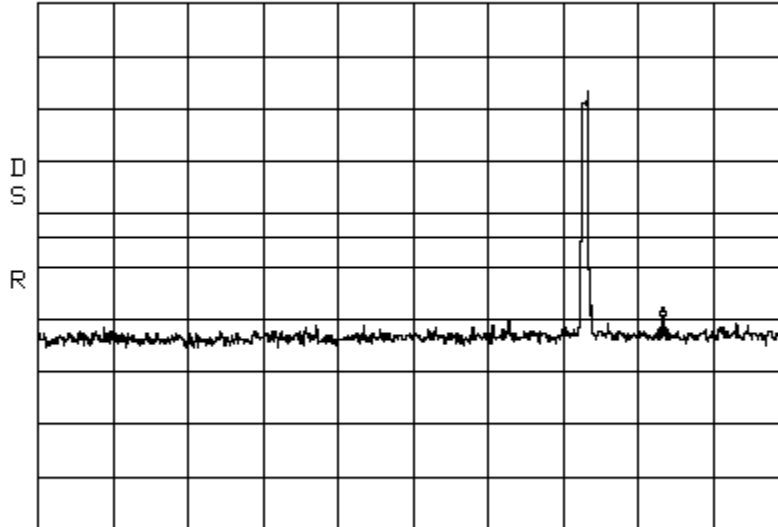
*ATTEN 10dB

MKR -28.33dBm

RL 31.5dBm

10dB/

838.3MHz



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

Intermodulation

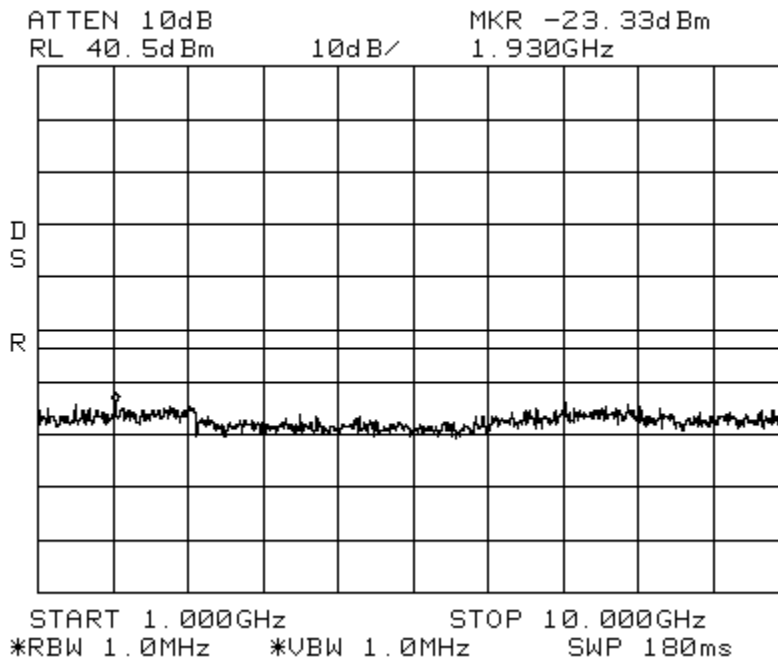
LTE 3 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 3 MHz Channel Bandwidth _Apart

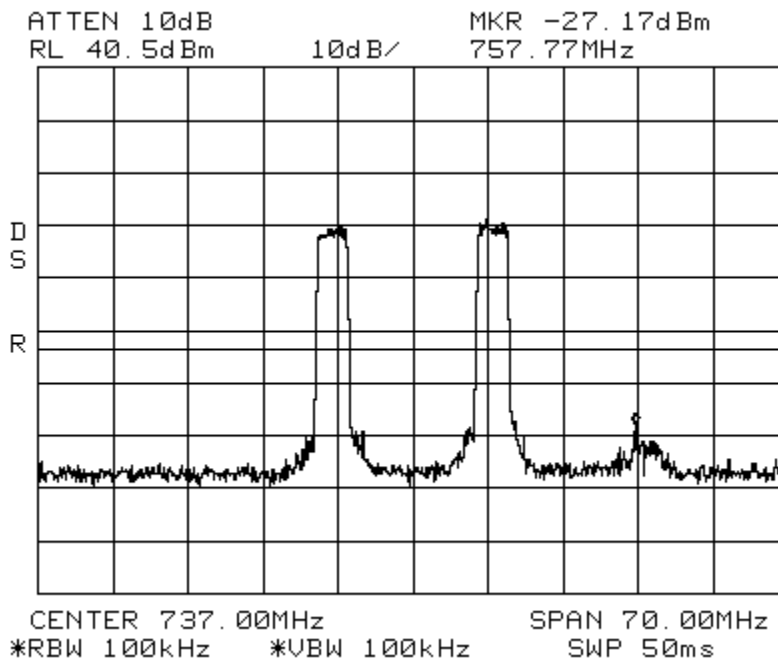
Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 70 MHz

RBW/VBW: 100 kHz



Intermodulation

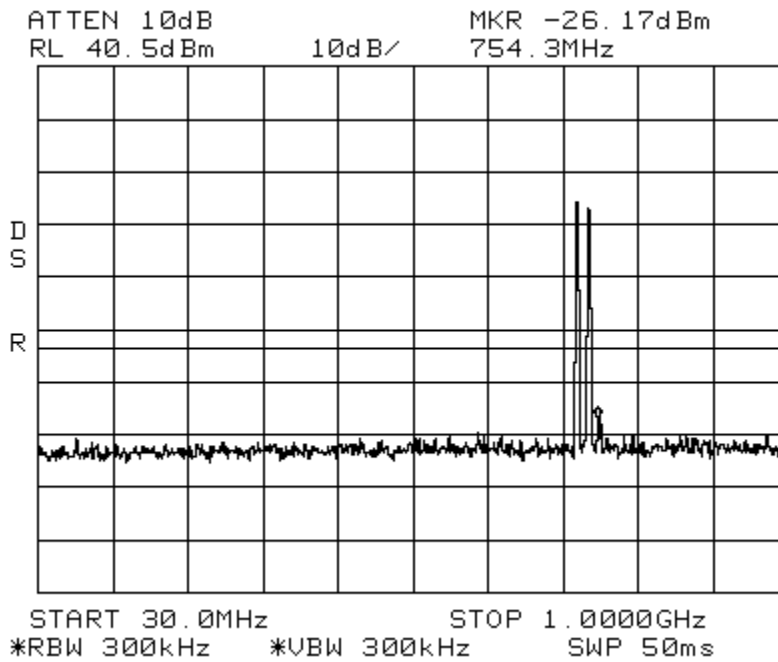
LTE 3 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

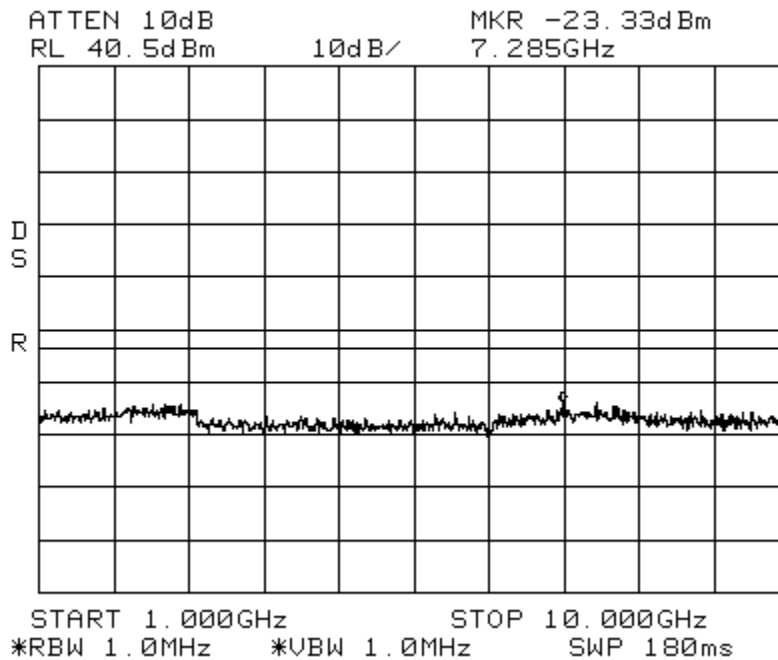
LTE 3 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 5 MHz Channel Bandwidth **Low**

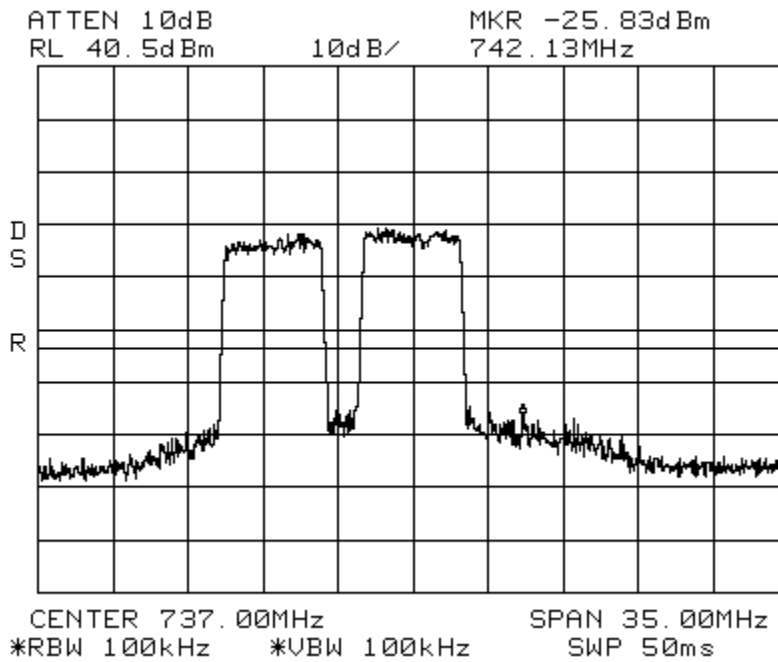
Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz



Intermodulation

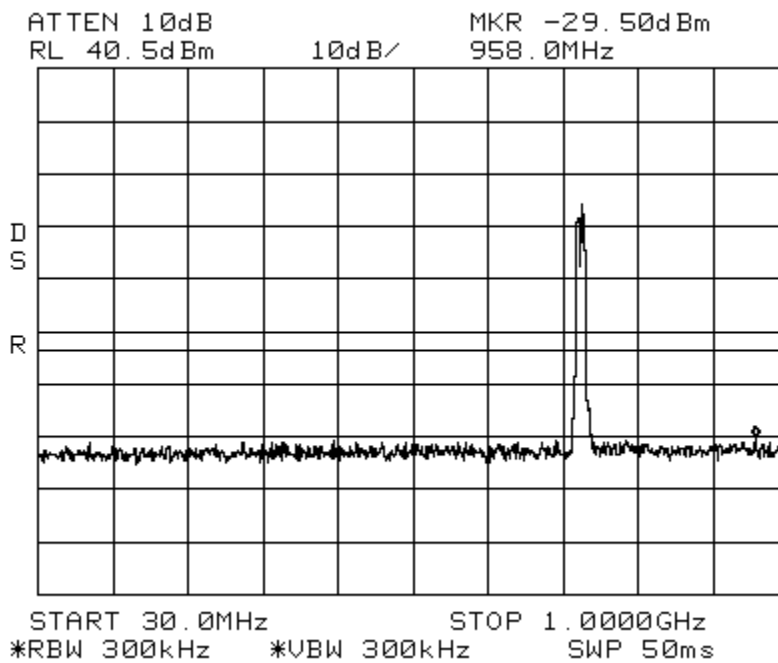
LTE 5 MHz Channel Bandwidth **Low**

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

LTE 5 MHz Channel Bandwidth _Low

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

ATTEN 10dB

MKR -23.00dBm

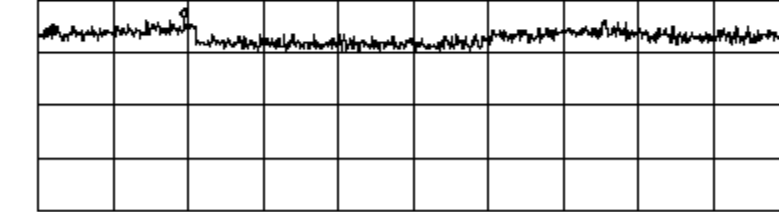
RL 40.5dBm

10dB/

2.755GHz

D
S

R



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

Intermodulation

LTE 5 MHz Channel Bandwidth_High

Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

ATTEN 10dB

MKR -24.00dBm

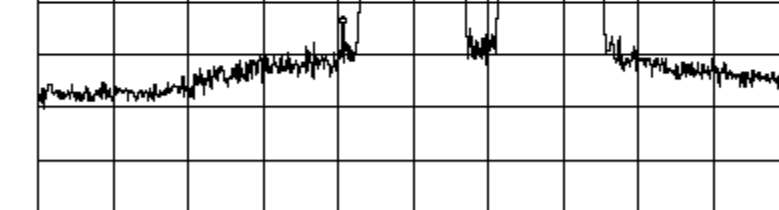
RL 40.5dBm

10dB/

733.73MHz

D
S

R



CENTER 737.00MHz SPAN 35.00MHz
*RBW 100kHz *VBW 100kHz SWP 50ms

Intermodulation

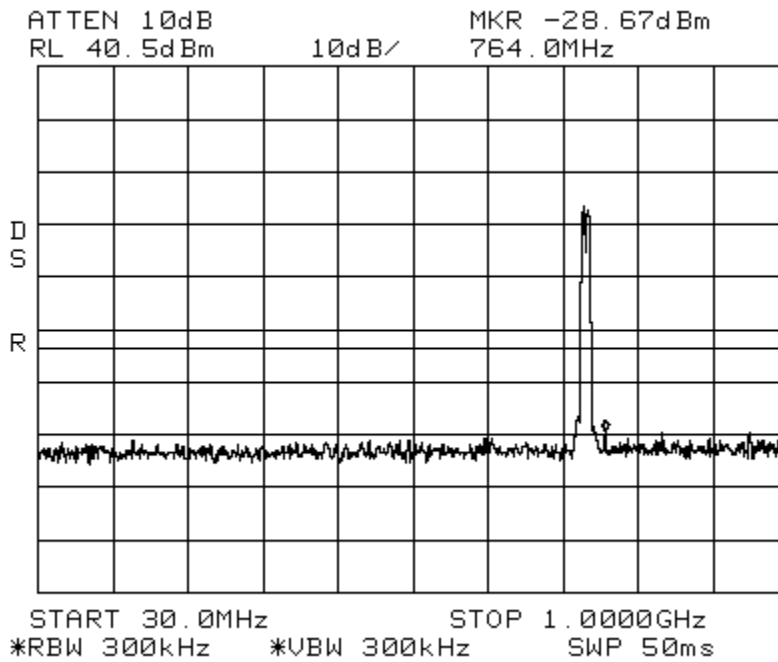
LTE 5 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

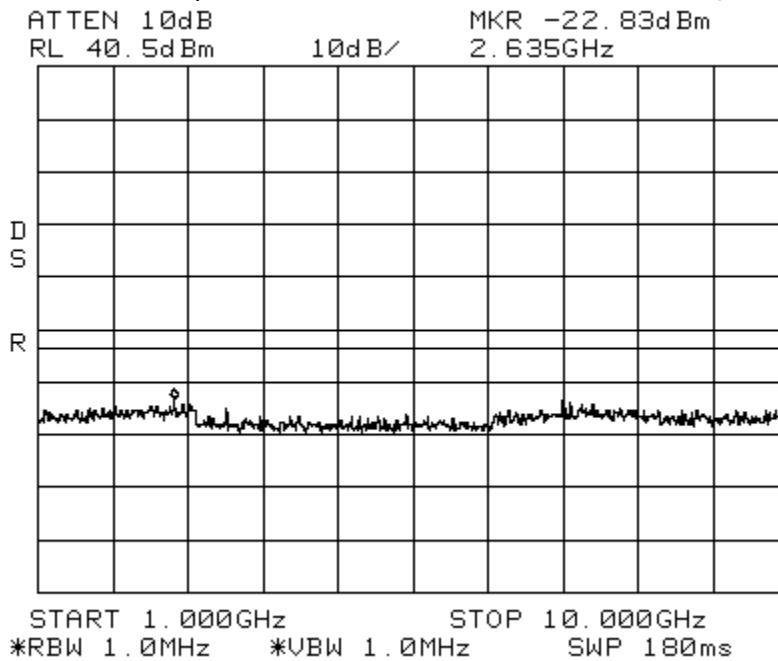
LTE 5 MHz Channel Bandwidth _High

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 5 MHz Channel Bandwidth_Apart

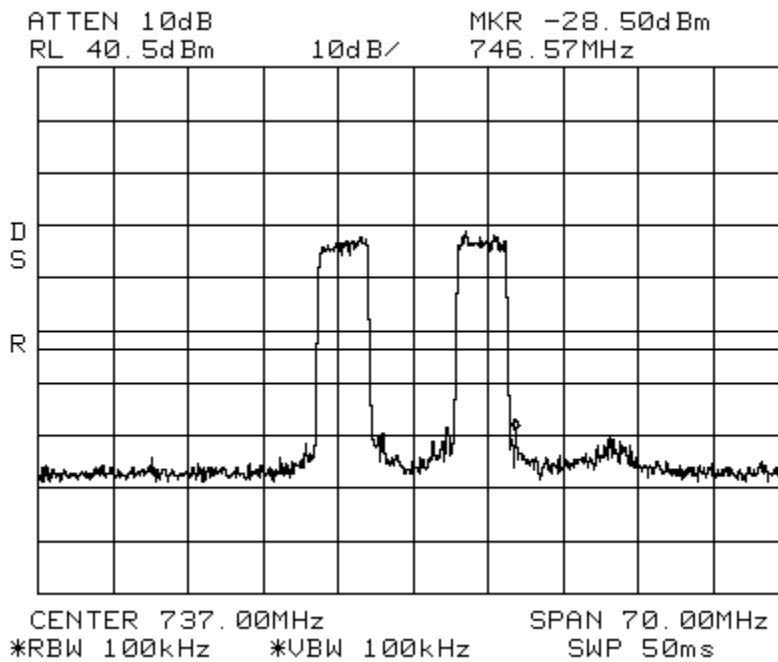
Spectrum 700 MHz

Lower ABC Path 1

Center: 737 MHz

Span: 70 MHz

RBW/VBW: 100 kHz



Intermodulation

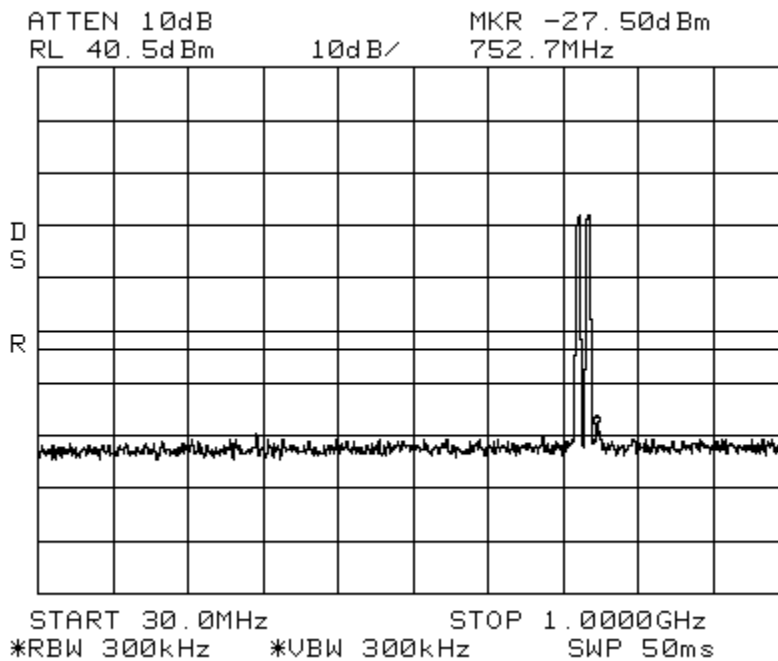
LTE 5 MHz Channel Bandwidth_Apart

Spectrum 700 MHz

Lower ABC Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

LTE 5 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Lower ABC Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

ATTEN 10dB

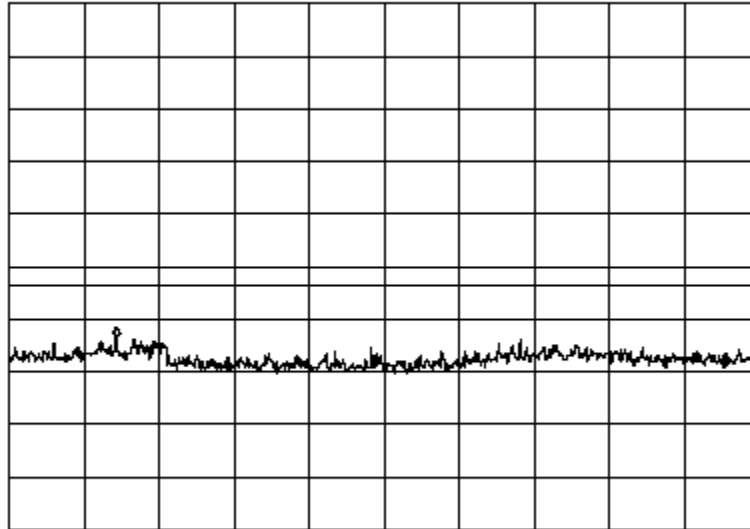
MKR -23.17dBm

RL 40.5dBm

10dB/

2.290GHz

D
S
R



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

Intermodulation

LTE 1.4 MHz Channel Bandwidth **Low**

Spectrum 700 MHz

Upper C Path 1

Center: 751.5 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

ATTEN 10dB

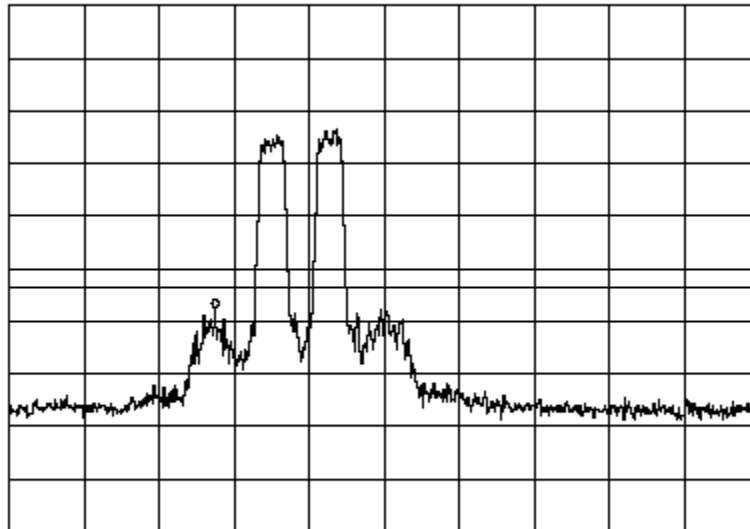
MKR -17.17dBm

RL 40.5dBm

10dB/

743.63MHz

D
S
R



CENTER 751.50MHz SPAN 35.00MHz
*RBW 100kHz *VBW 100kHz SWP 50ms

Intermodulation

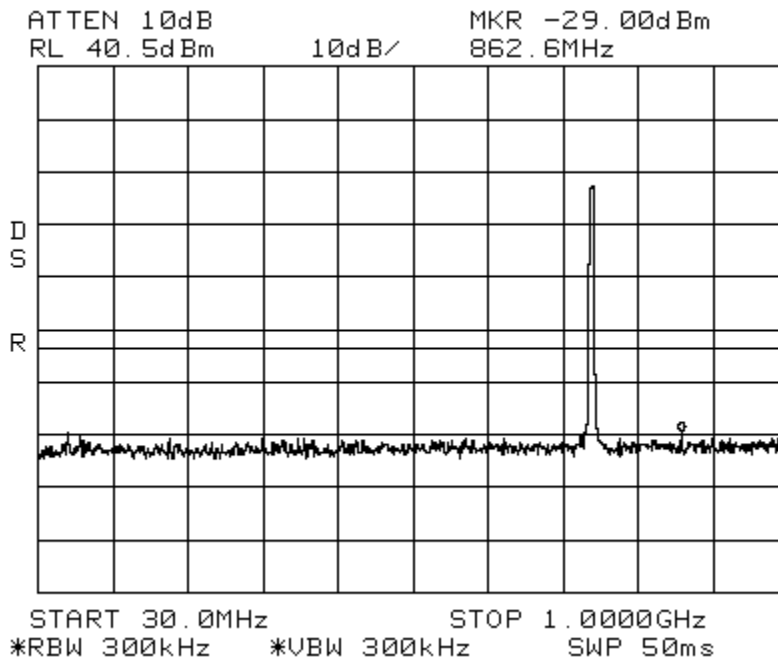
LTE 1.4 MHz Channel Bandwidth _Low

Spectrum 700 MHz

Upper C Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

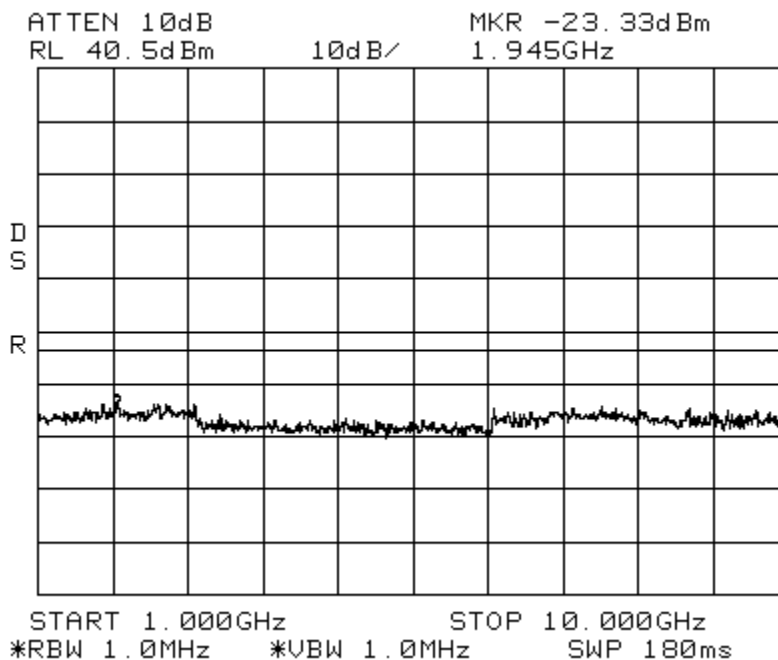
LTE 1.4 MHz Channel Bandwidth _Low

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

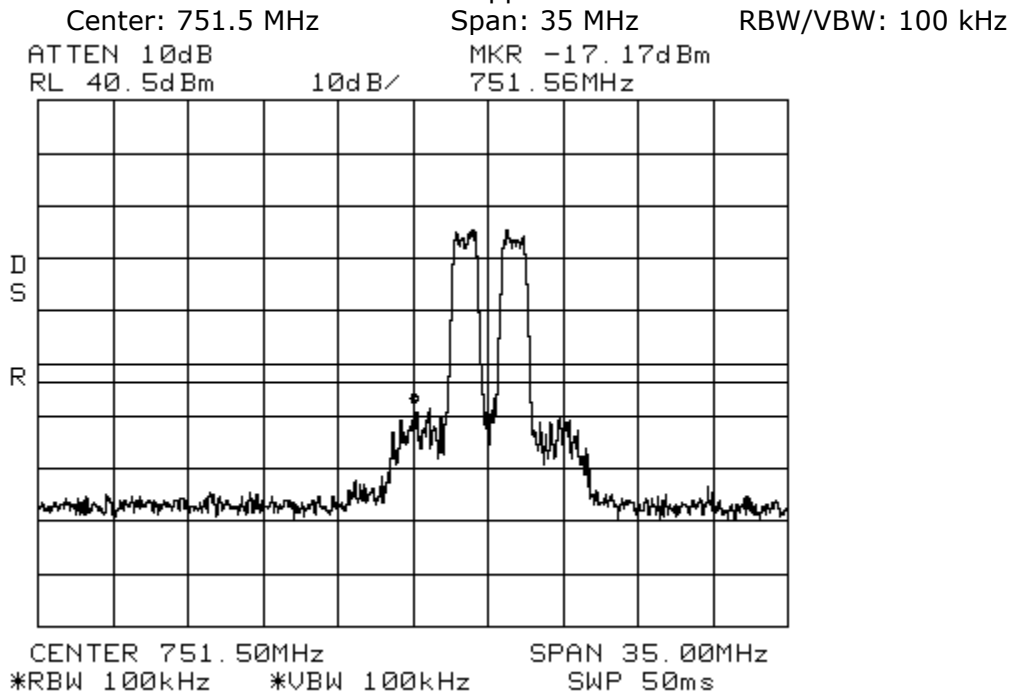
RBW/VBW: 1 MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth _High
MHz Upper C Path 1

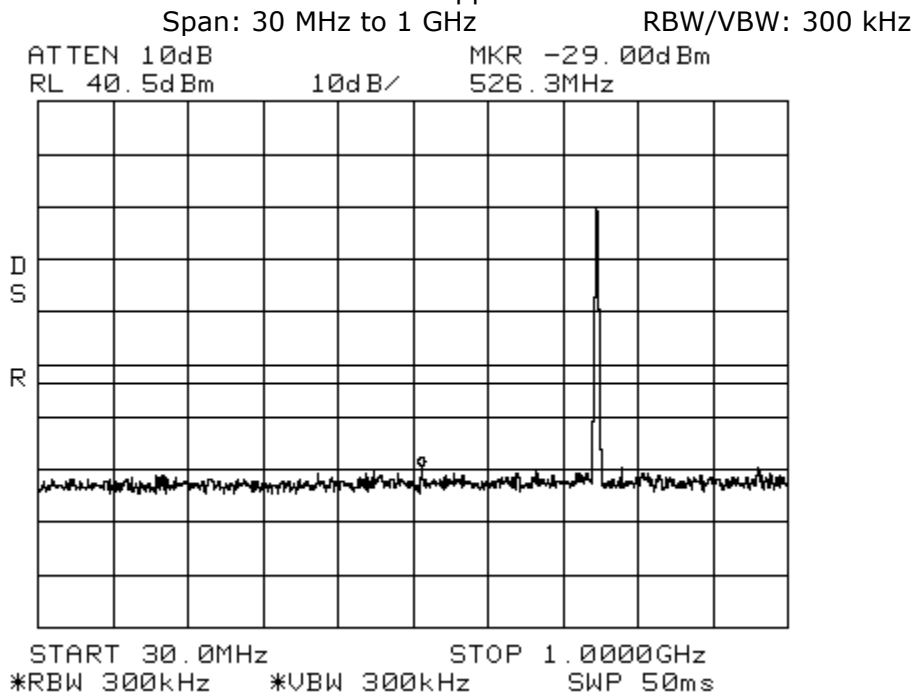
Spectrum 700



Intermodulation

LTE 1.4 MHz Channel Bandwidth _High
Upper C Path 1

Spectrum 700 MHz



Intermodulation

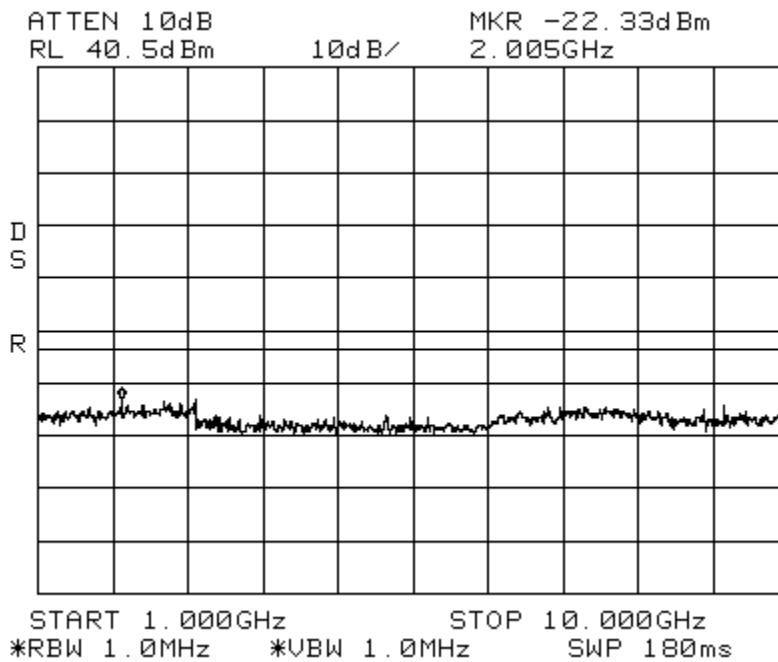
LTE 1.4 MHz Channel Bandwidth _High

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Upper C Path 1

Center: 751.5 MHz

Span: 70 MHz

RBW/VBW: 100 kHz

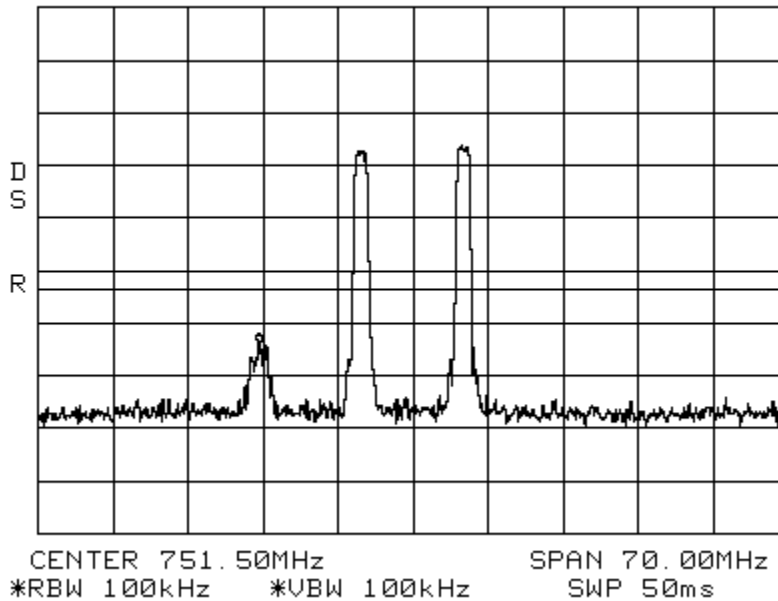
ATTEN 10dB

RL 40.5dBm

10dB/

MKR -23.33dBm

737.15MHz



Intermodulation

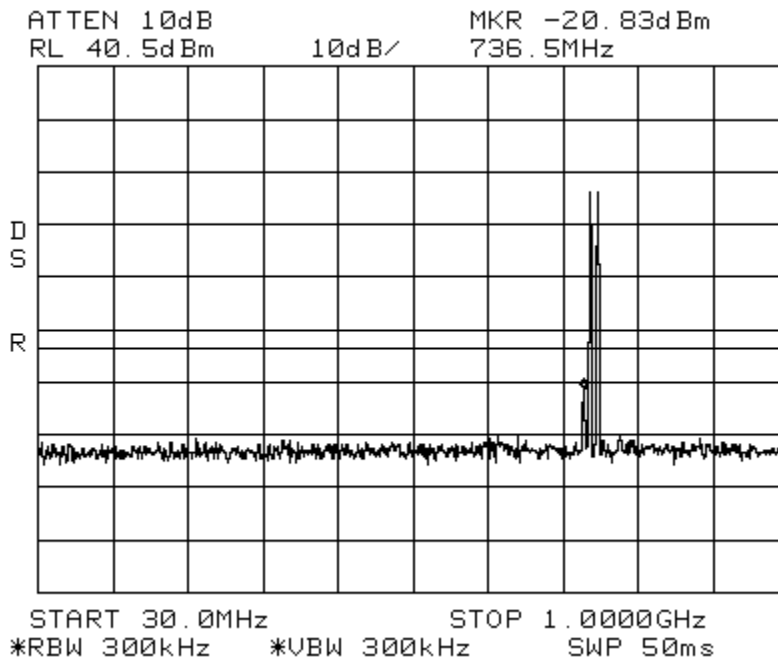
LTE 1.4 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Upper C Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

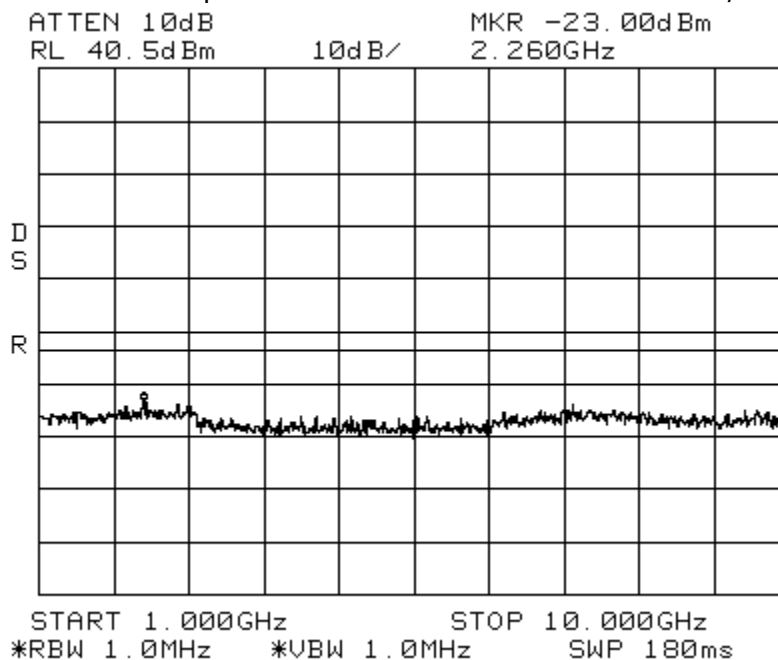
LTE 1.4 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 3 MHz Channel Bandwidth_Low

Spectrum 700 MHz

Upper C Path 1

Center: 751.5 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

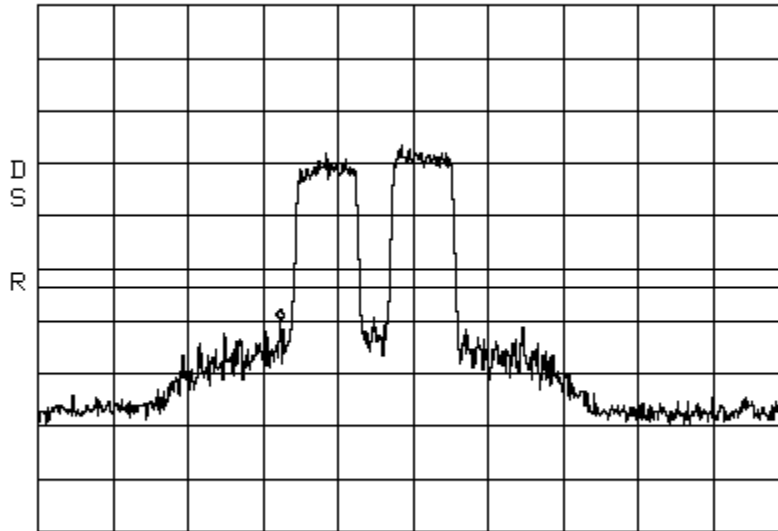
ATTEN 10dB

MKR -19.33dBm

RL 40.5dBm

10dB/

745.32MHz



CENTER 751.50MHz

SPAN 35.00MHz

*RBW 100kHz

*VBW 100kHz

SWP 50ms

Intermodulation

LTE 3MHz Channel Bandwidth _LowSpectrum 700 MHz Upper C

Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

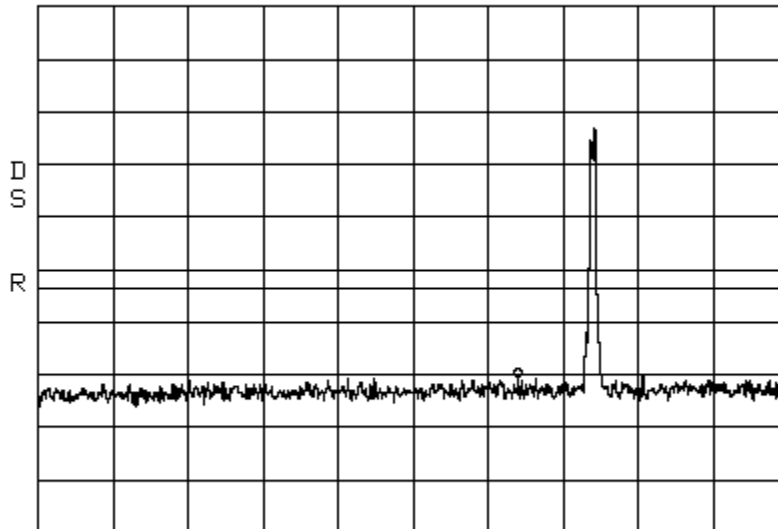
ATTEN 10dB

MKR -30.17dBm

RL 40.5dBm

10dB/

650.8MHz



START 30.0MHz

STOP 1.0000GHz

*RBW 300kHz

*VBW 300kHz

SWP 50ms

Intermodulation

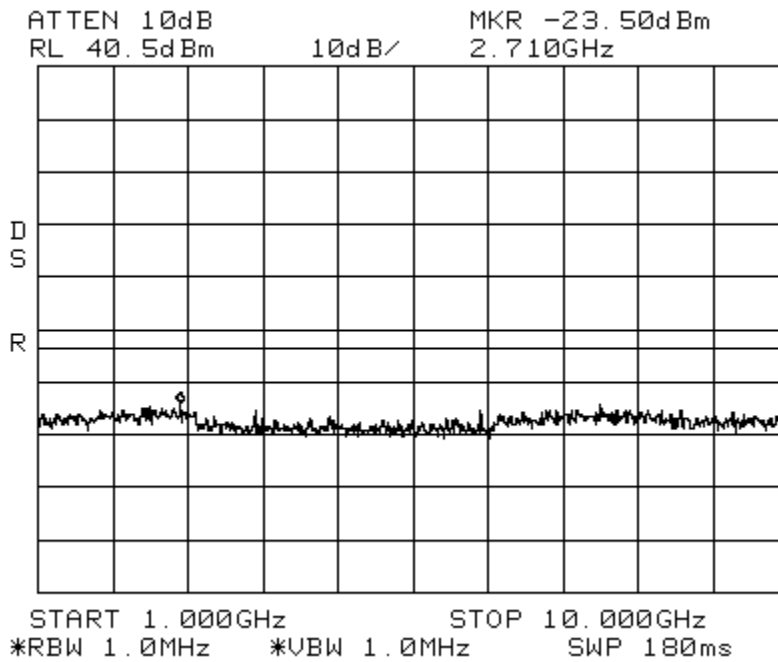
LTE 3 MHz Channel Bandwidth _Low

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 3 MHz Channel Bandwidth _High

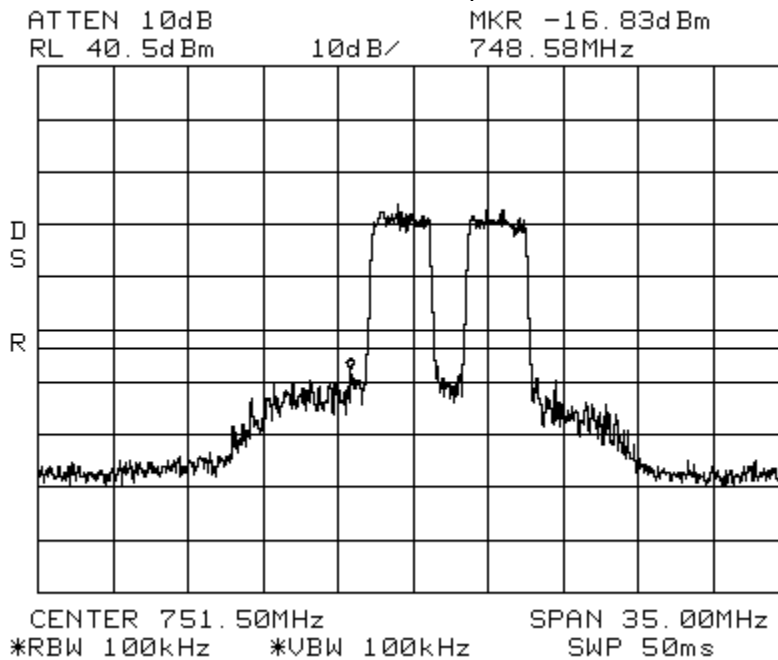
Spectrum 700 MHz

Upper C Path 1

Center: 751 MHz

Span: 35 MHz

RBW/VBW: 100 kHz



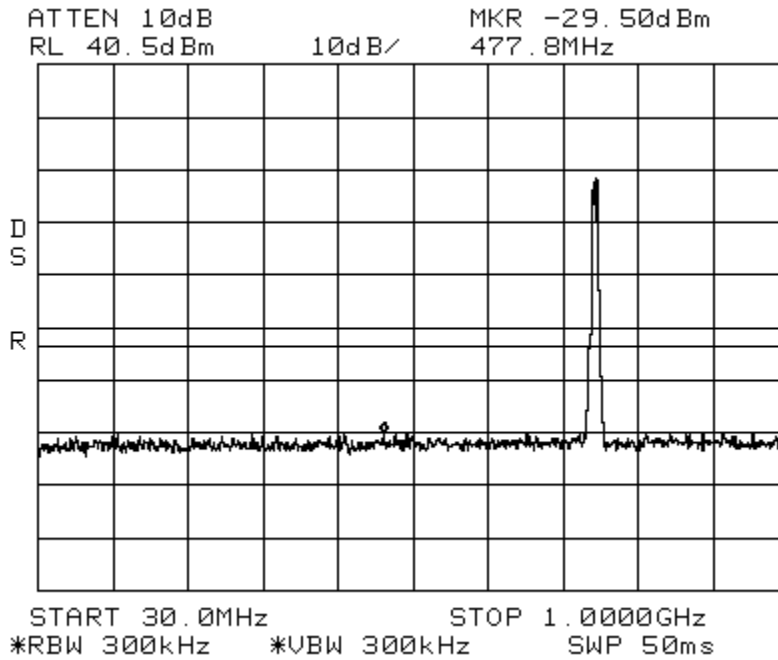
Intermodulation

LTE 3 MHz Channel Bandwidth _High
Upper C Path 1

Spectrum 700 MHz

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



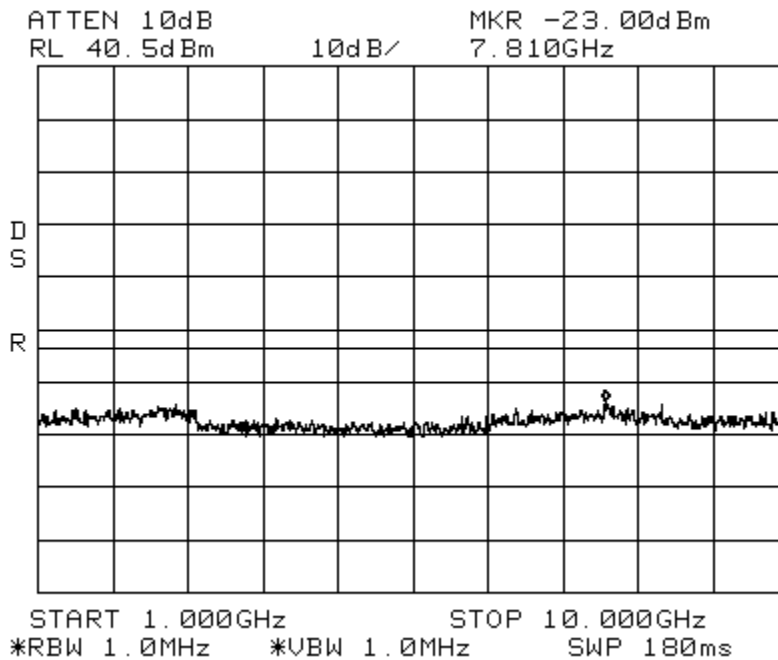
Intermodulation

LTE 3 MHz Channel Bandwidth _High
Upper C Path 1

Spectrum 700 MHz

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 3 MHz Channel Bandwidth _Apart

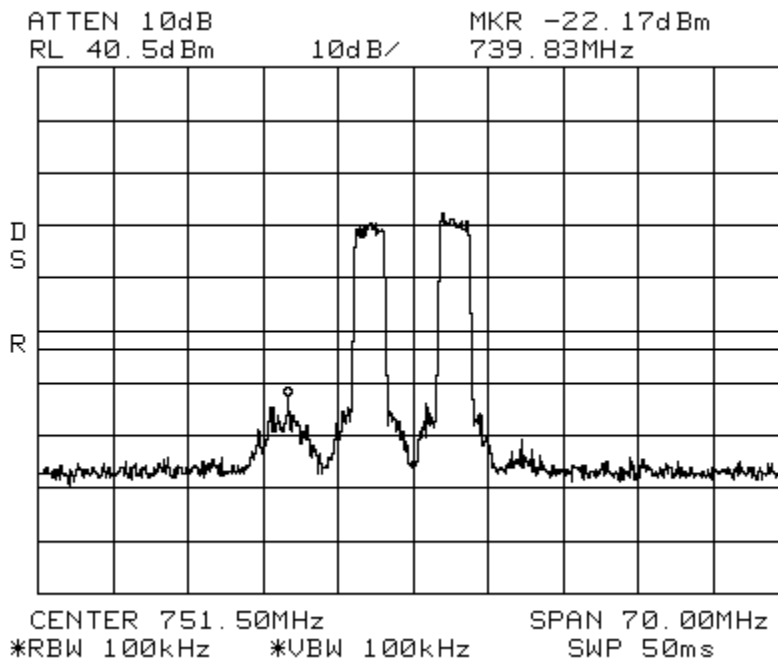
Spectrum 700 MHz

Upper C Path 1

Center: 751.5 MHz

Span: 70 MHz

RBW/VBW: 100 kHz



Intermodulation

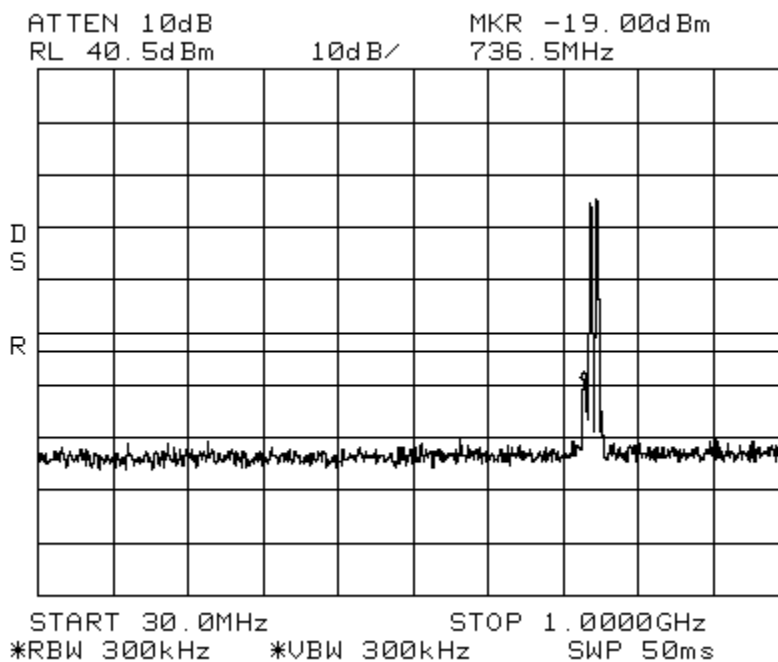
LTE 3 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Upper C Path 1

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation

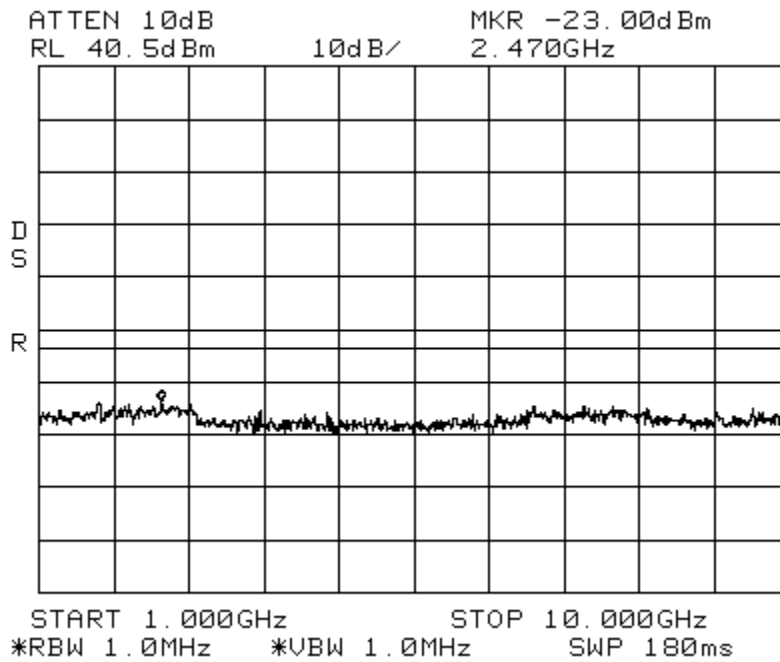
LTE 3 MHz Channel Bandwidth _Apart

Spectrum 700 MHz

Upper C Path 1

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

LTE 5 MHz Channel Bandwidth

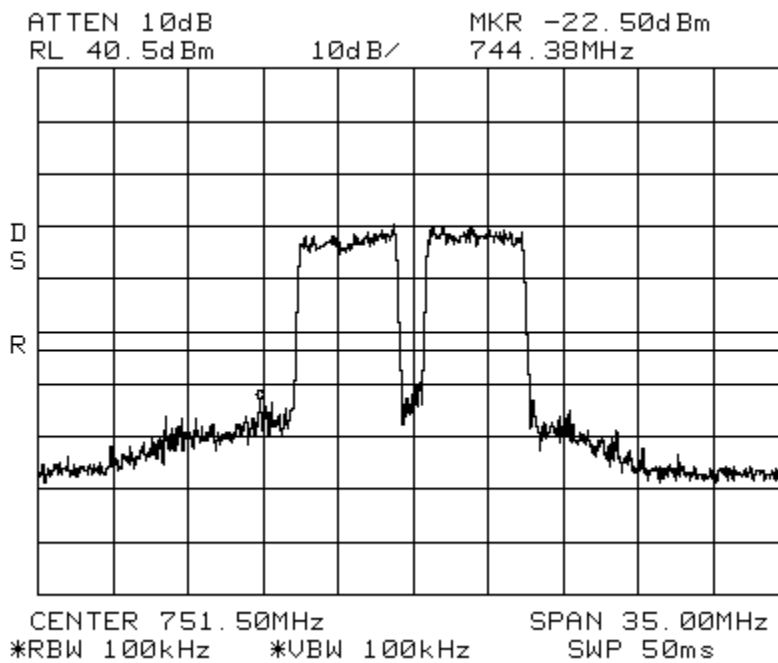
Spectrum 700 MHz Upper C

Path 1

Center: 751.5 MHz

Span: 35 MHz

RBW/VBW: 100 kHz



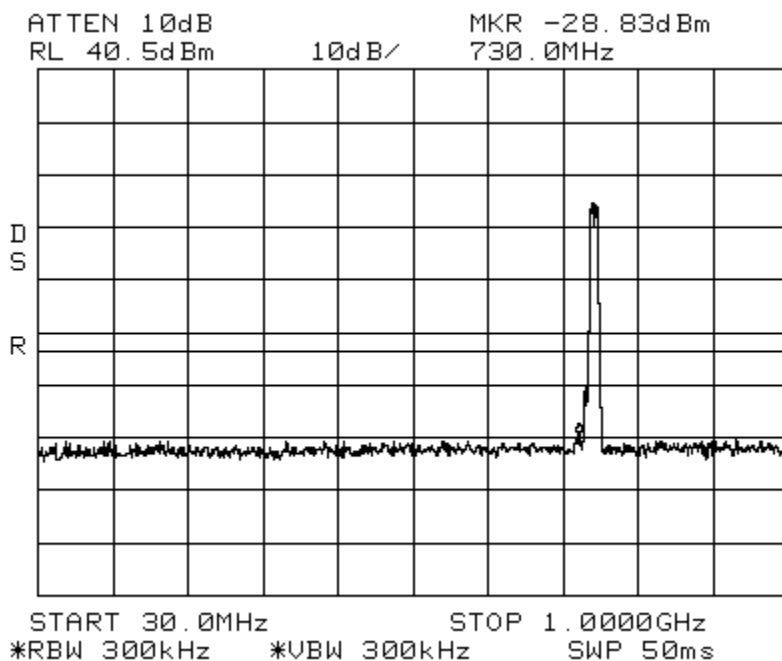
Intermodulation

LTE 5 MHz Channel Bandwidth
Path 1

Spectrum 700 MHz Upper C

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



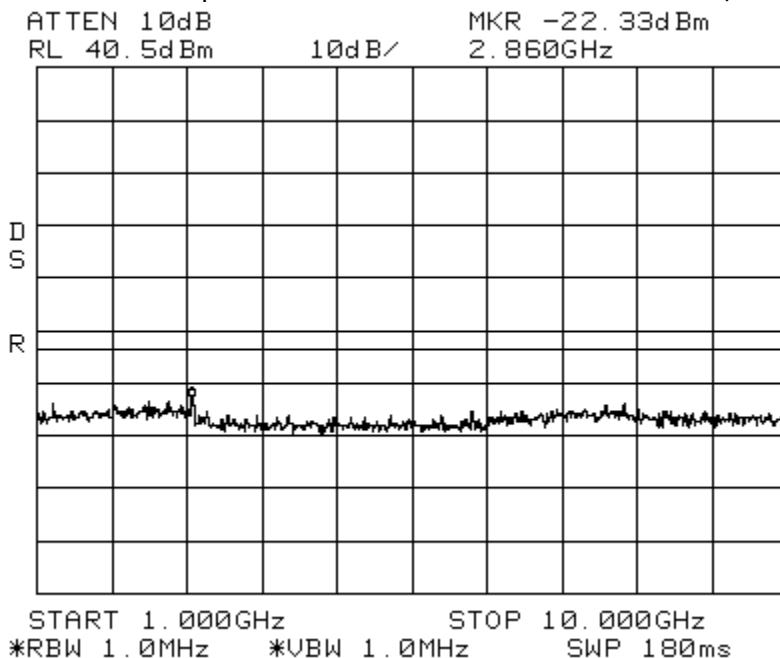
Intermodulation

LTE 5 MHz Channel Bandwidth
Path 1

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

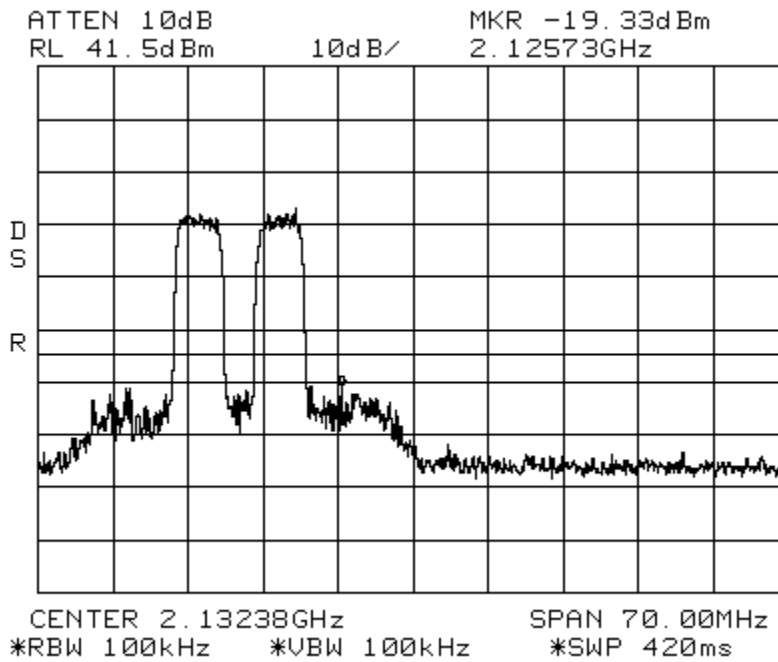
RBW/VBW: 1 MHz



Intermodulation
Center: 2132.5 MHz

WCDMA_Low
Span: 70 MHz

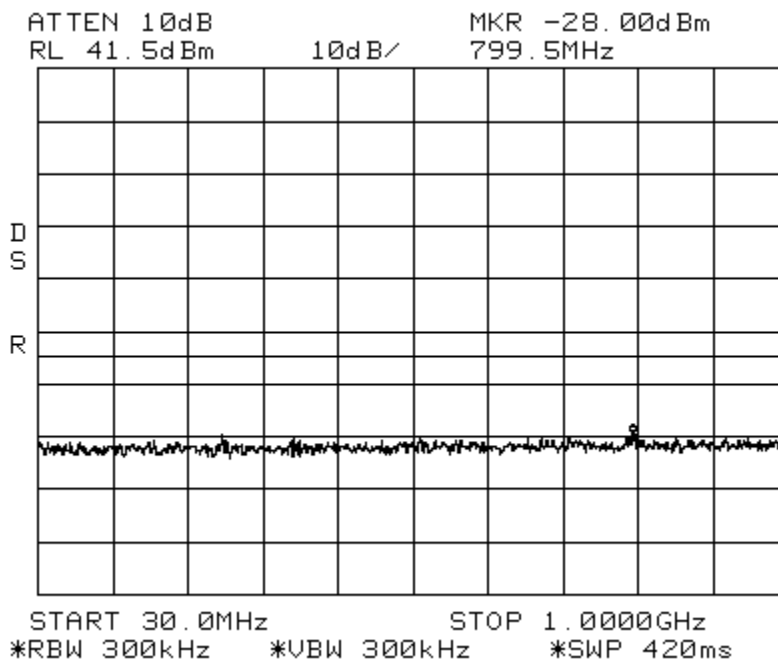
Spectrum AWS Path 1
RBW/VBW: 100 kHz



Intermodulation
Span: 30 MHz to 1 GHz

WCDMA_Low

Spectrum AWS Path 1
RBW/VBW: 300 kHz



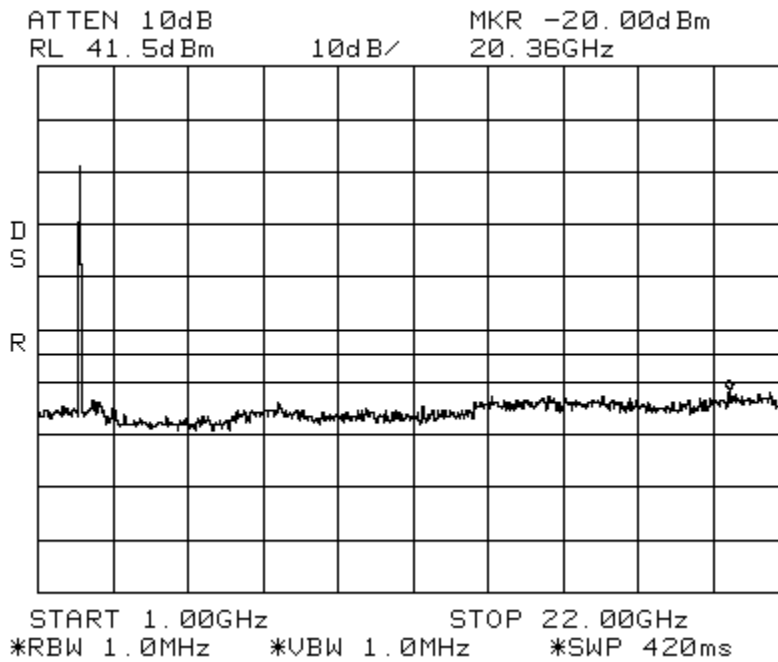
Intermodulation

WCDMA_Low

Spectrum AWS Path 1

Span: 1 GHz to 22 GHz

RBW/VBW: 1 MHz



Intermodulation

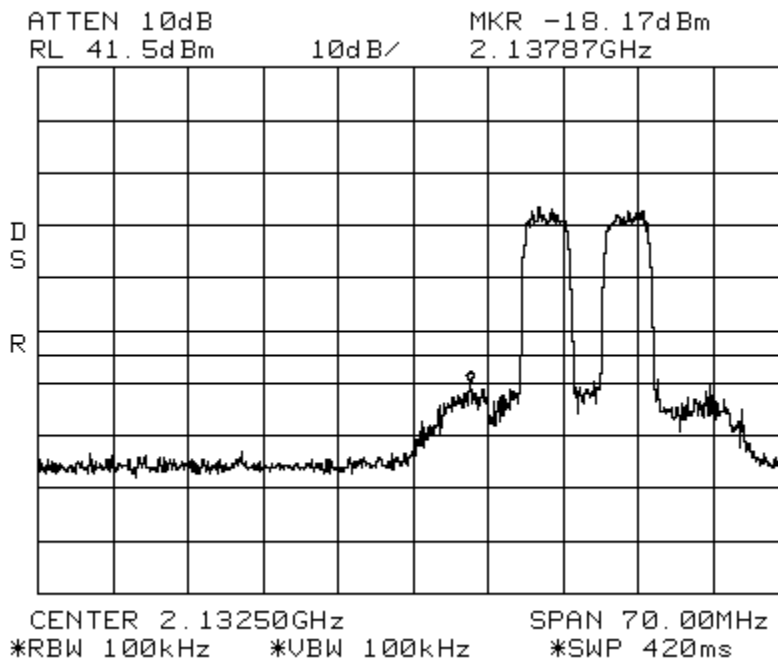
WCDMA_High

Spectrum AWS Path 1

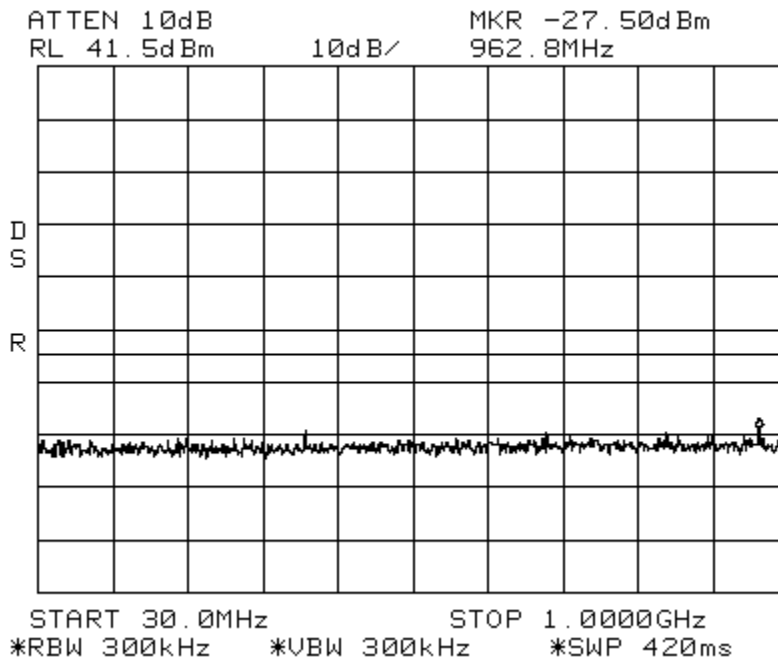
Center: 2132.5 MHz

Span: 70 MHz

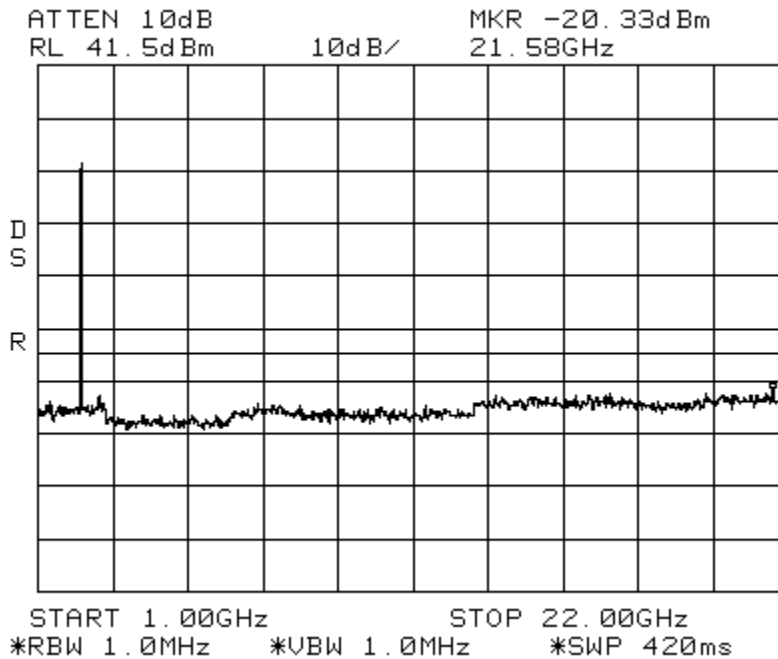
RBW/VBW: 100 kHz



Intermodulation WCDMA_High Spectrum AWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



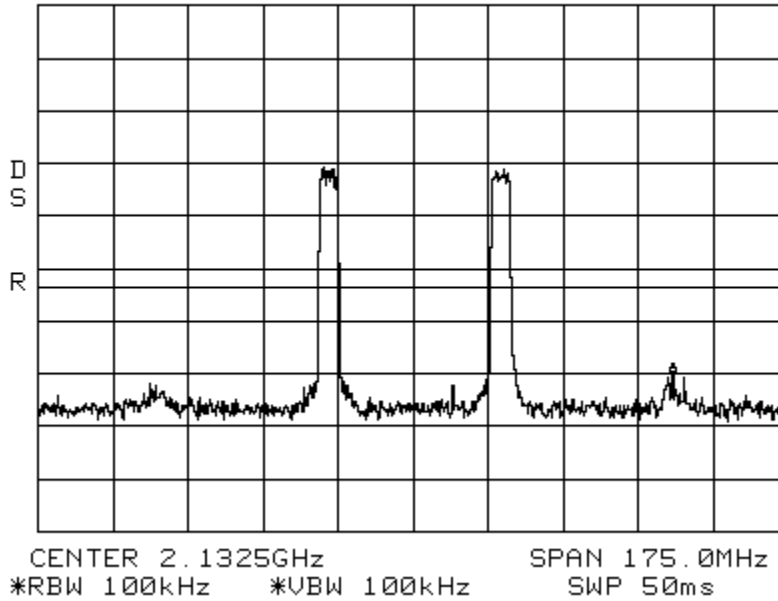
Intermodulation WCDMA_High Spectrum AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



Intermodulation
Center: 2132.5 MHz
ATTEN 10dB
RL 40.5dBm

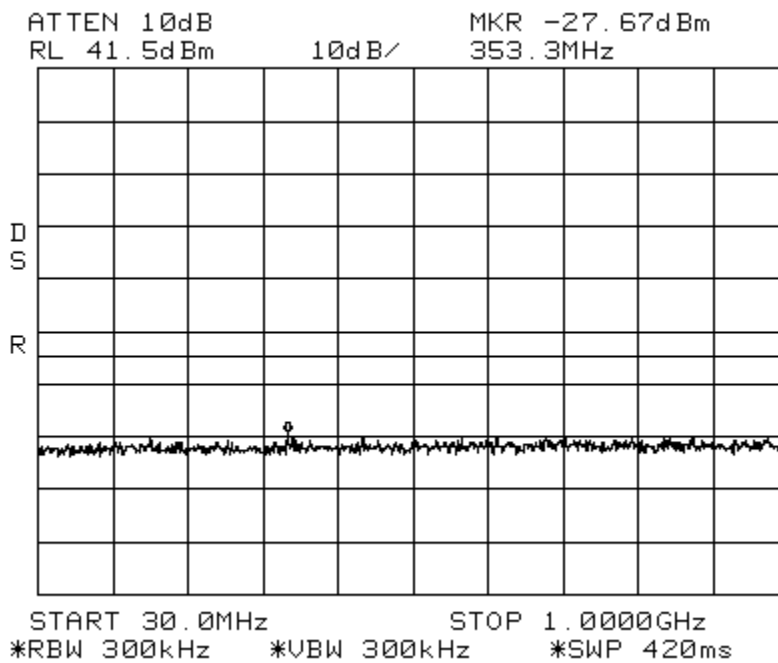
WCDMA_Apart
Span: 175 MHz
MKR -29.67dBm
2.1932GHz

Spectrum AWS Path 1
RBW/VBW: 100 kHz

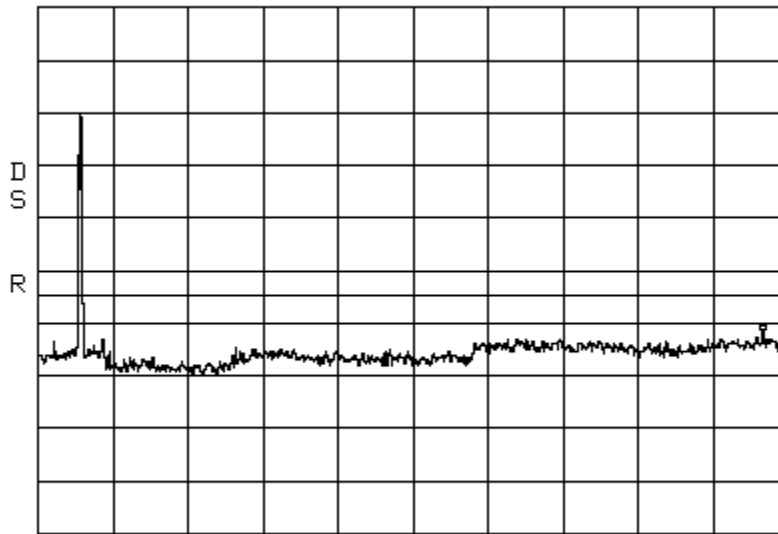


Intermodulation
Span: 30 MHz to 1 GHz

WCDMA_Apart
Spectrum AWS Path 1
RBW/VBW: 300 kHz

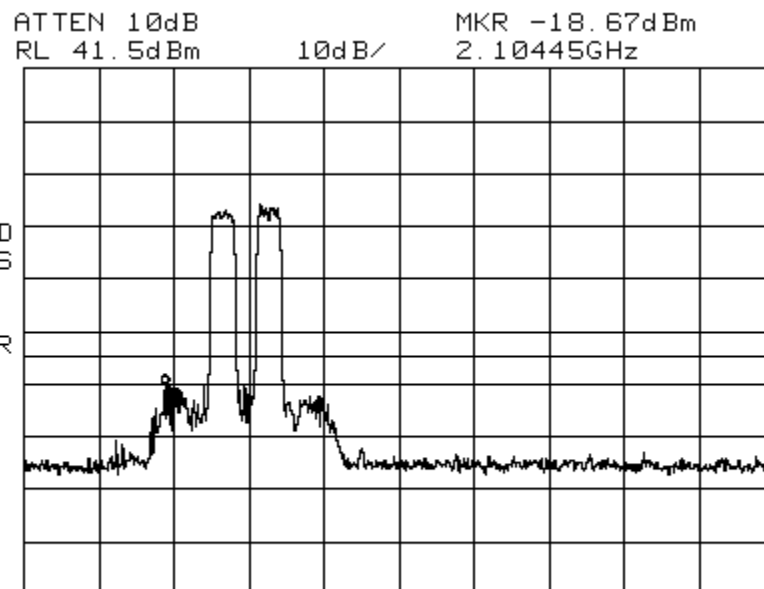


Intermodulation WCDMA_Apart Spectrum AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz
 ATTN 10dB MKR -20.33dBm
 RL 41.5dBm 10dB/ 21.30GHz



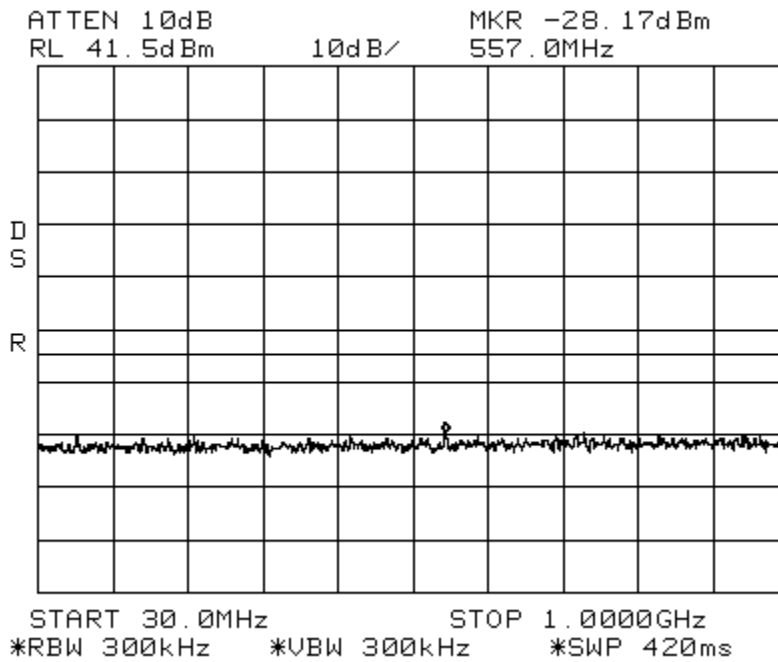
START 1.00GHz STOP 22.00GHz
 *RBW 1.0MHz *VBW 1.0MHz *SWP 420ms

Intermodulation LTE 3 MHz Channel Bandwidth_Low AWS Path 1
 Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz

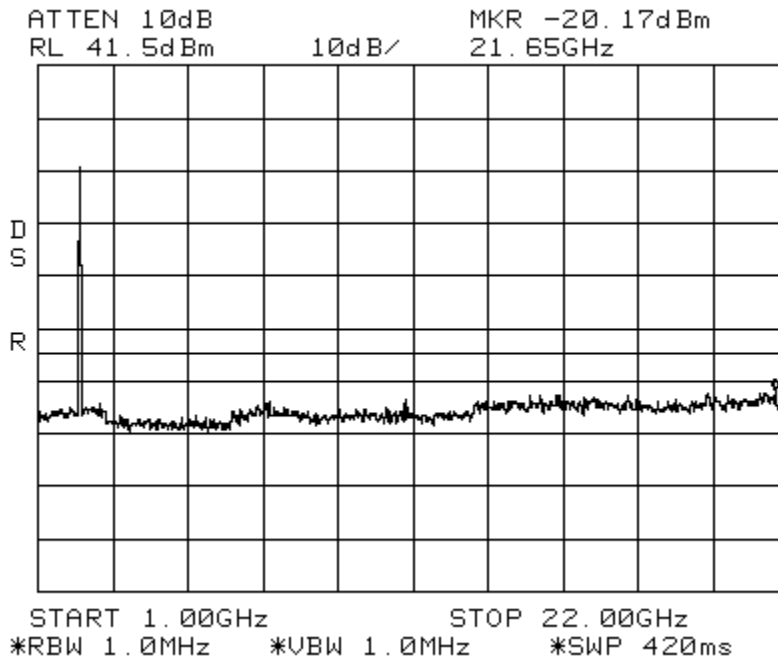


CENTER 2.1325GHz SPAN 90.00MHz
 *RBW 100kHz *VBW 100kHz *SWP 420ms

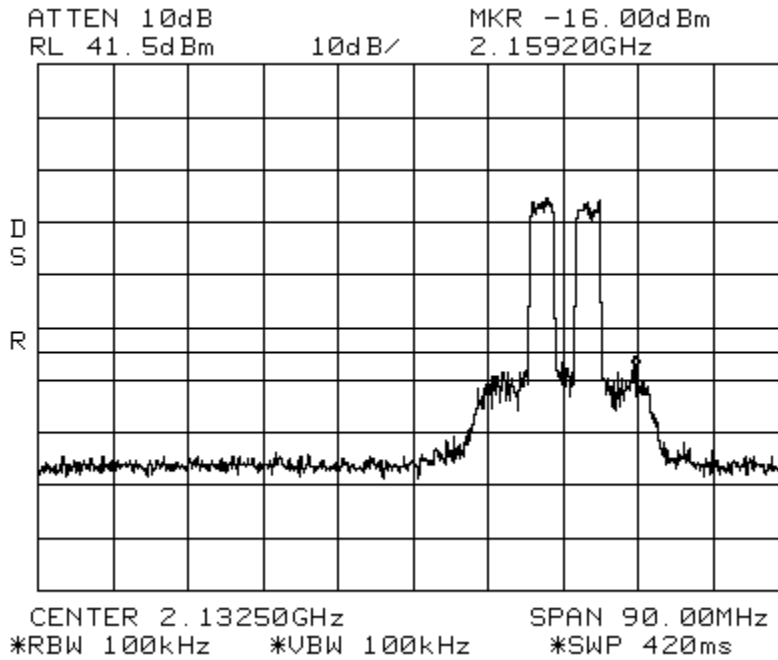
Intermodulation LTE 3MHz Channel Bandwidth _LowAWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



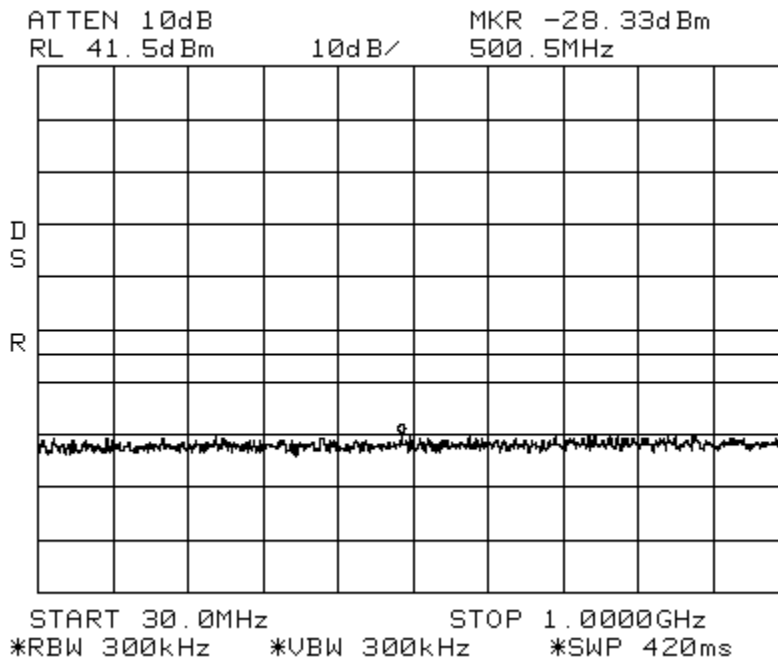
Intermodulation LTE 3 MHz Channel Bandwidth _Low AWS Path 1
 Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



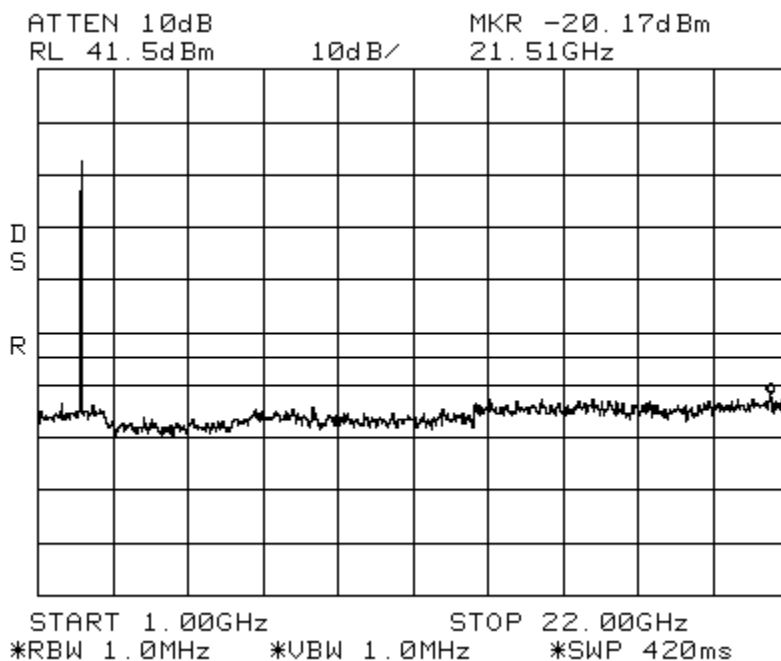
Intermodulation LTE 3 MHz Channel Bandwidth _High AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



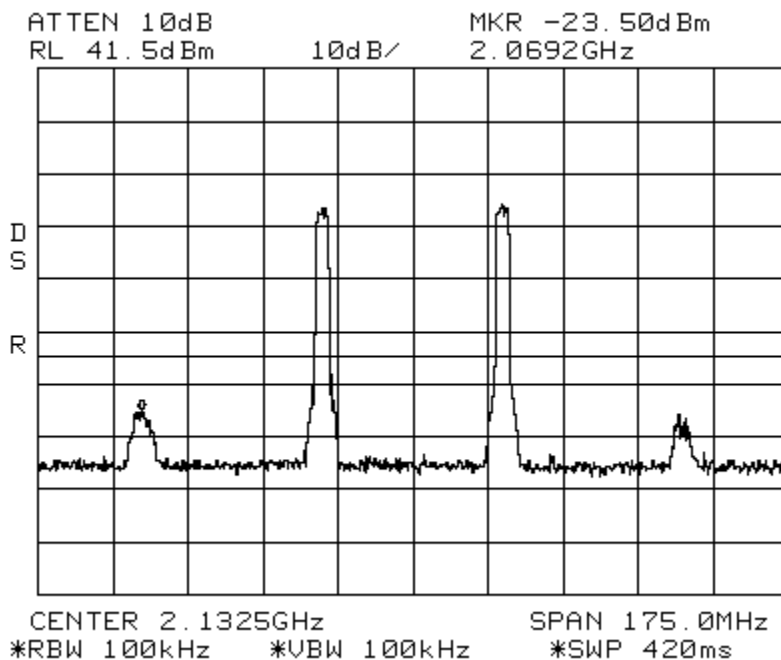
Intermodulation LTE 3 MHz Channel Bandwidth _High AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



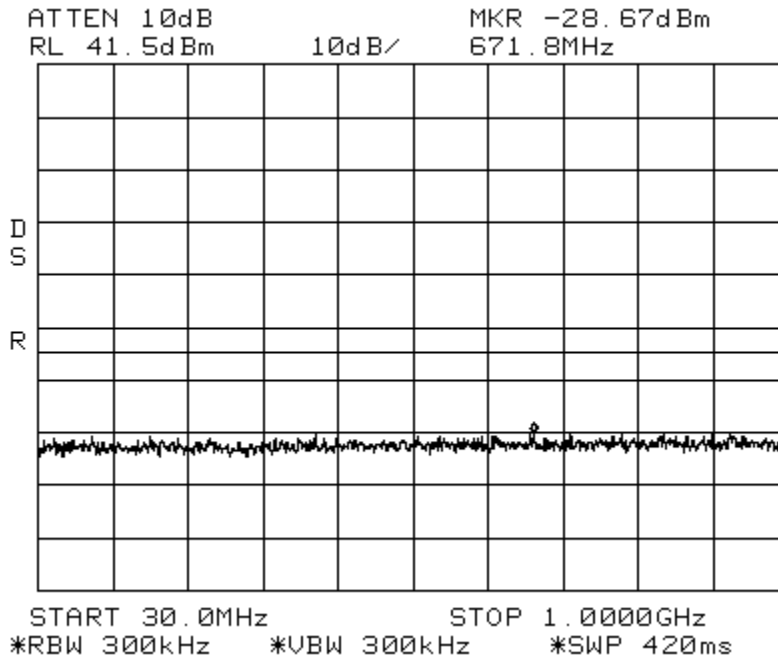
Intermodulation LTE 3 MHz Channel Bandwidth _High AWS Path 1
 Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



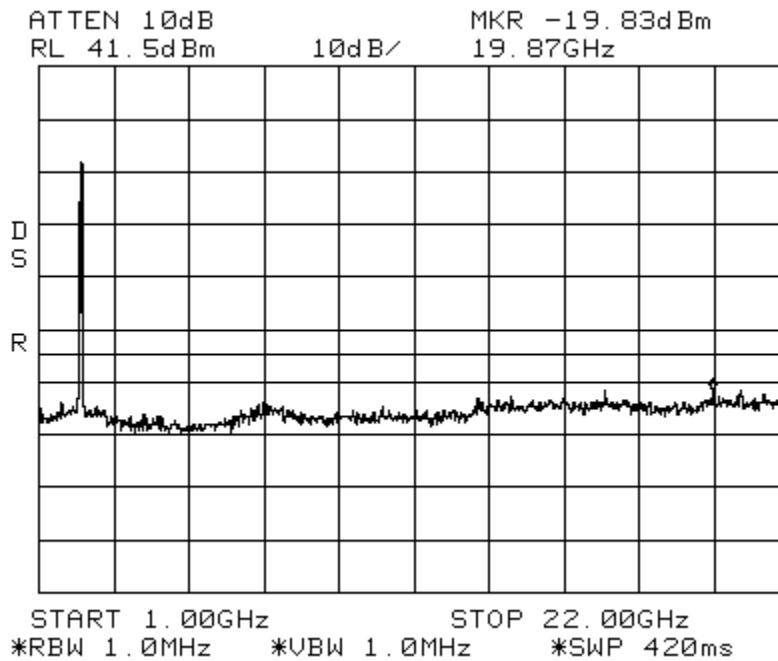
Intermodulation LTE 3 MHz Channel Bandwidth _Apart AWS Path 1
 Center: 2132.5 MHz Span: 175 MHz RBW/VBW: 100 kHz



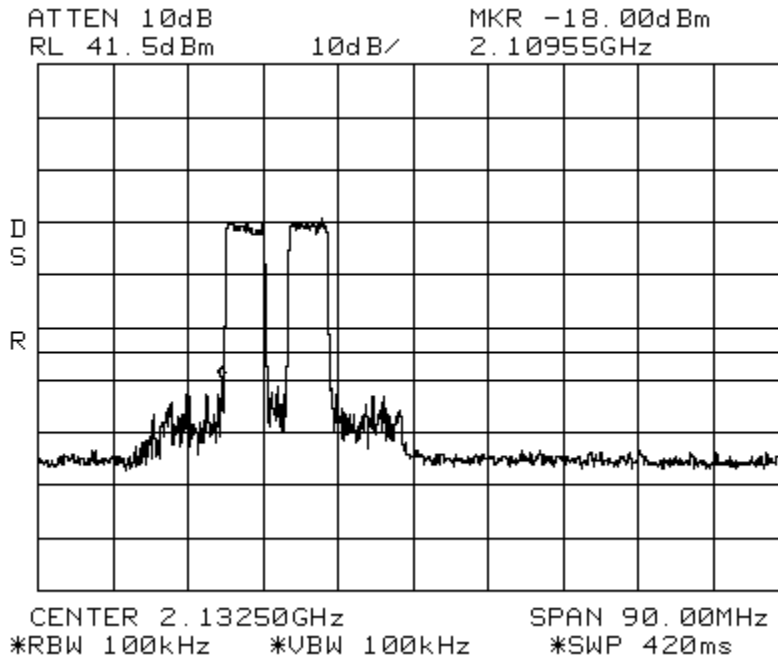
Intermodulation LTE 3 MHz Channel Bandwidth _Apart AWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



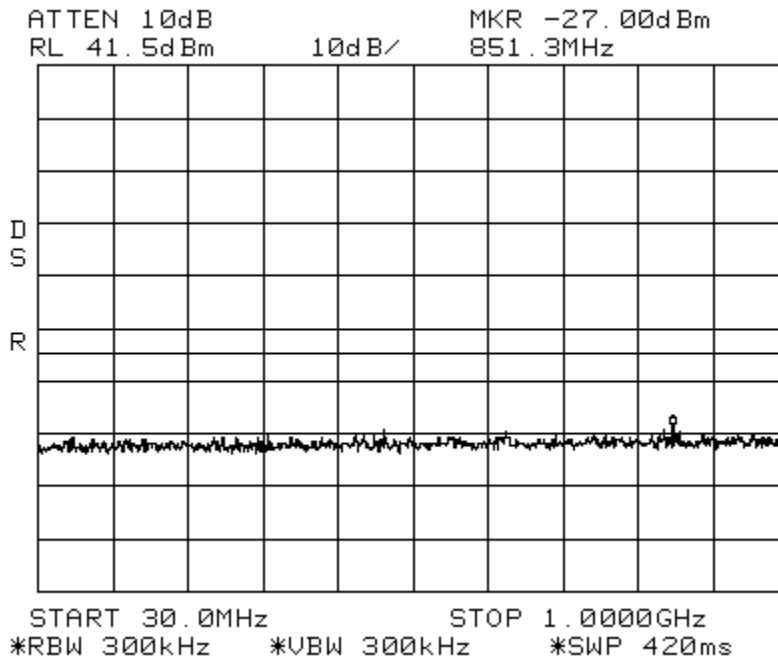
Intermodulation LTE 3 MHz Channel Bandwidth _Apart AWS Path 1
 Span: 1 GHz to 20 GHz RBW/VBW: 1 MHz



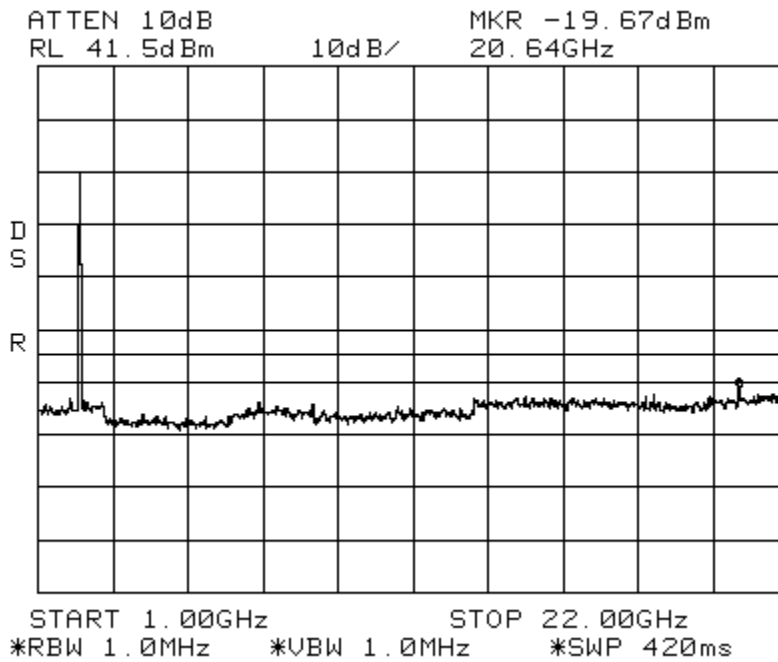
Intermodulation LTE 5 MHz Channel Bandwidth_Low AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



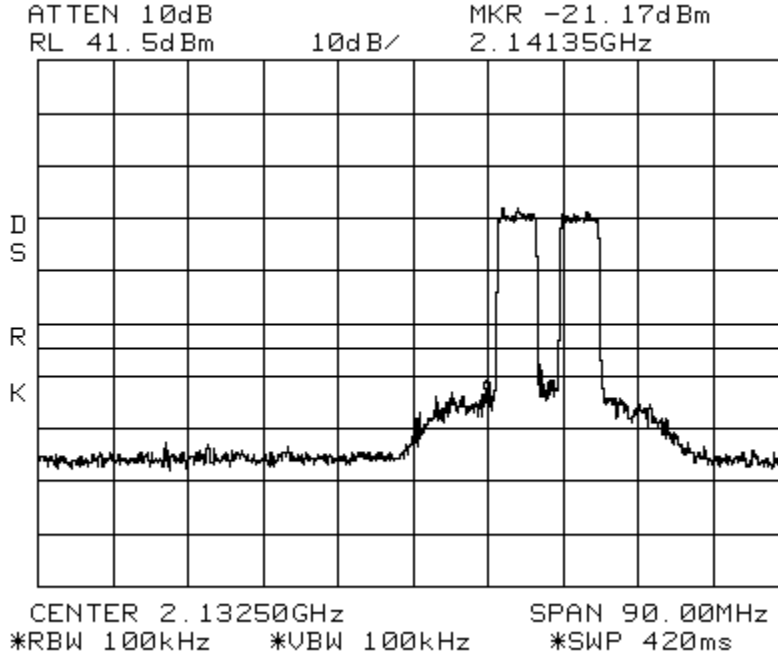
Intermodulation LTE 5 MHz Channel Bandwidth_Low AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



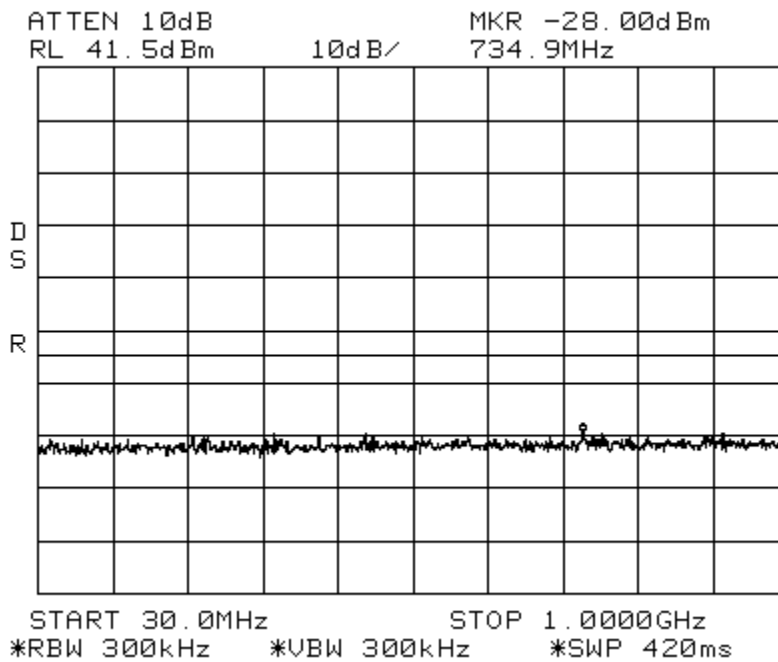
Intermodulation LTE 5 MHz Channel Bandwidth _Low AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



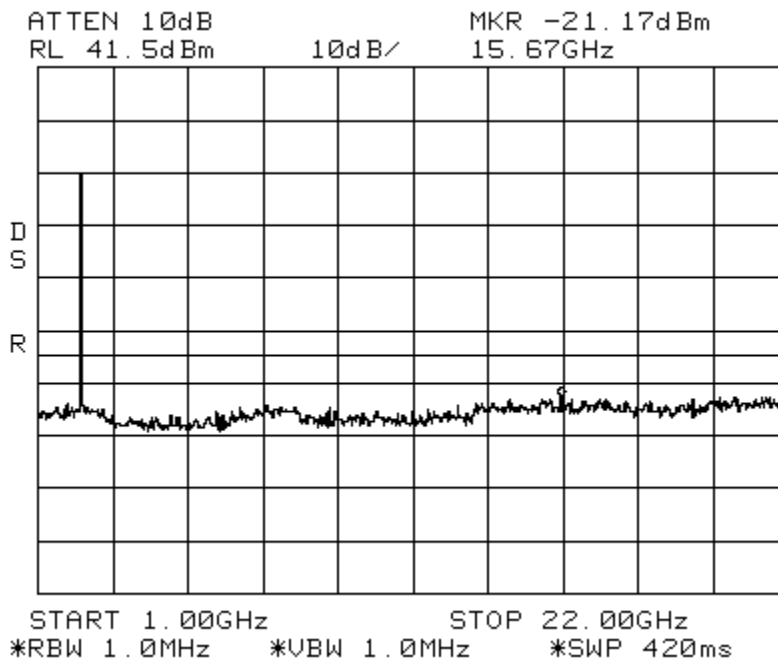
Intermodulation LTE 5 MHz Channel Bandwidth _High AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



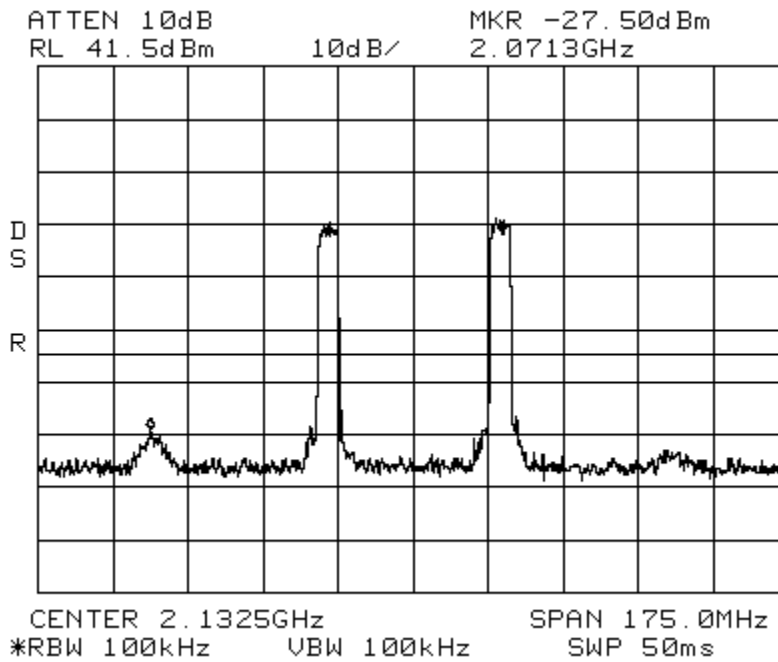
Intermodulation LTE 5 MHz Channel Bandwidth _High AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



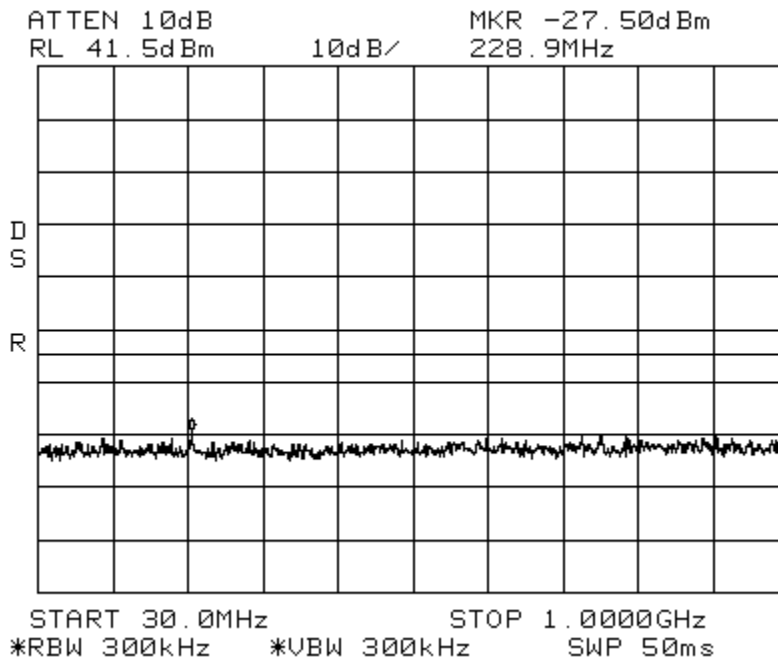
Intermodulation LTE 5 MHz Channel Bandwidth _High AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



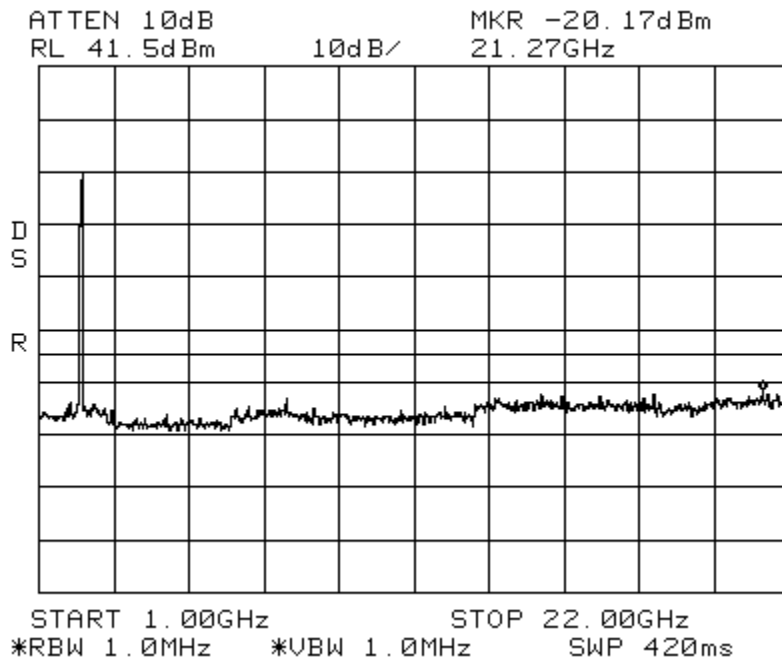
Intermodulation LTE 5 MHz Channel Bandwidth _Apart AWS Path 1
Center: 2132.5 MHz Span: 175 MHz RBW/VBW: 100 kHz



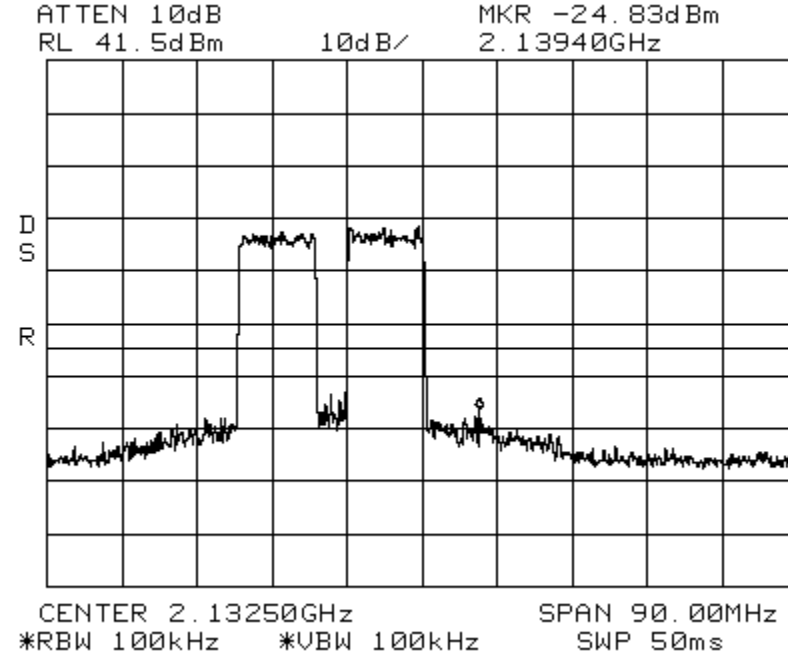
Intermodulation LTE 5 MHz Channel Bandwidth _Apart AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



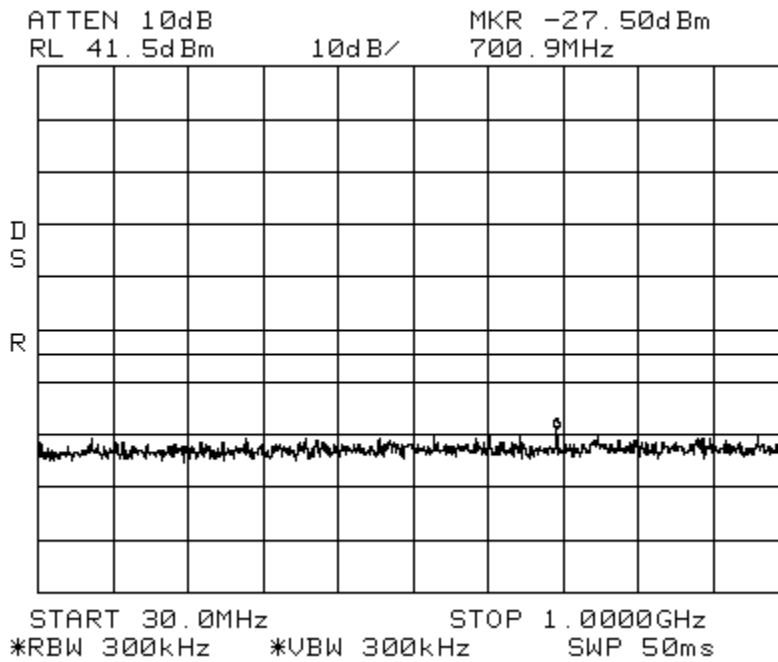
Intermodulation LTE 5 MHz Channel Bandwidth_Apart AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



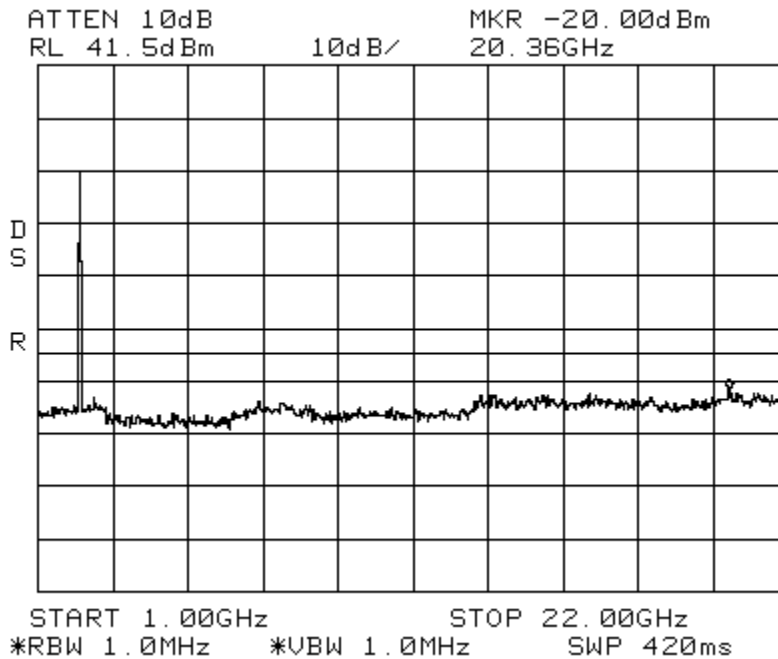
Intermodulation LTE 10 MHz Channel Bandwidth_Low AWS Path 1
 Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



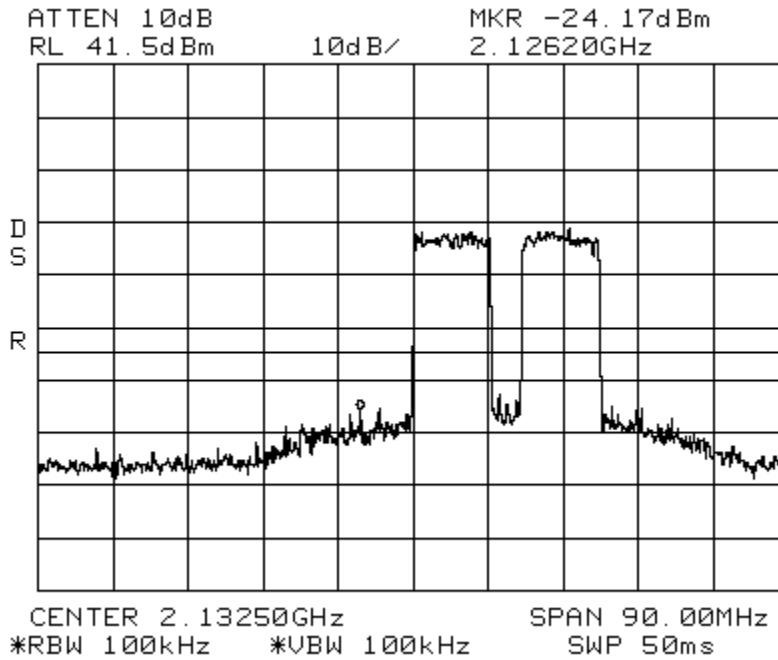
Intermodulation LTE 10 MHz Channel Bandwidth _Low AWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



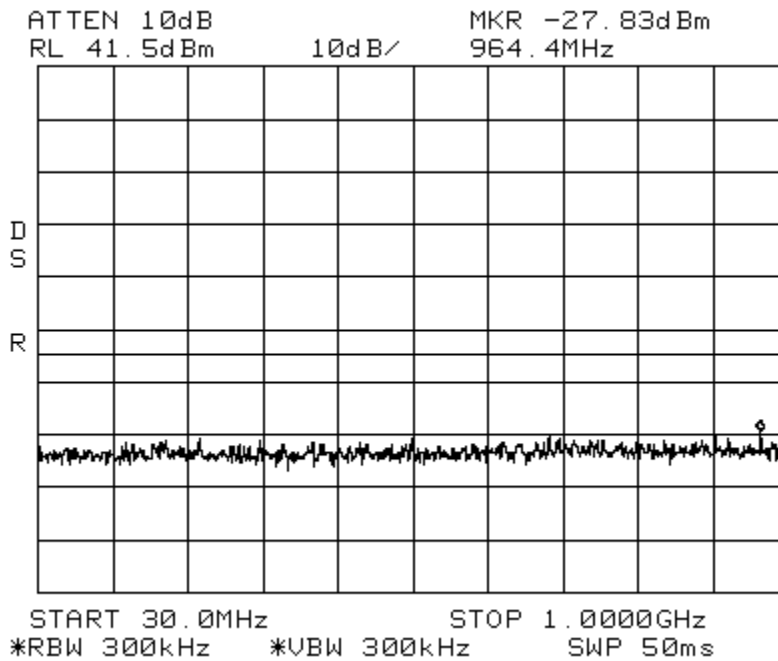
Intermodulation LTE 10 MHz Channel Bandwidth _Low AWS Path 1
 Span: 1 GHz to 22GHz RBW/VBW: 1 MHz



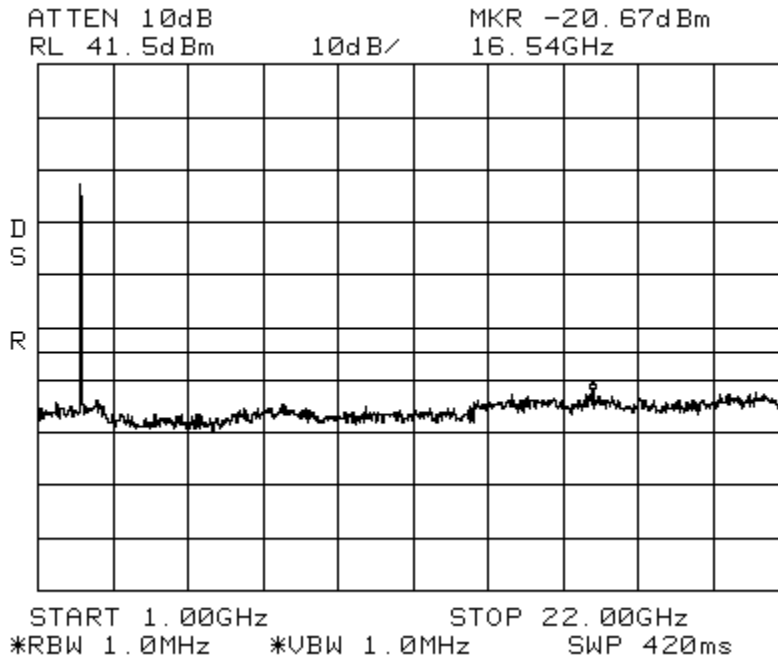
Intermodulation LTE 10 MHz Channel Bandwidth_High AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



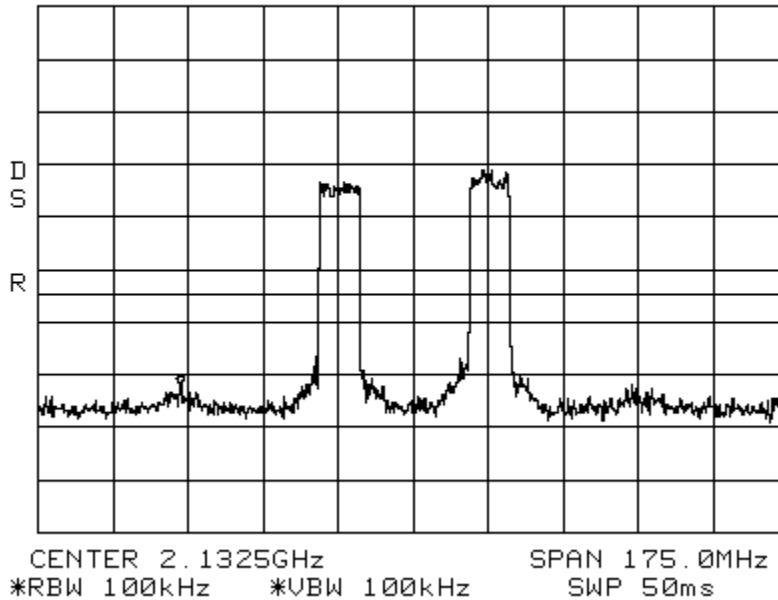
Intermodulation LTE 10 MHz Channel Bandwidth_High AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



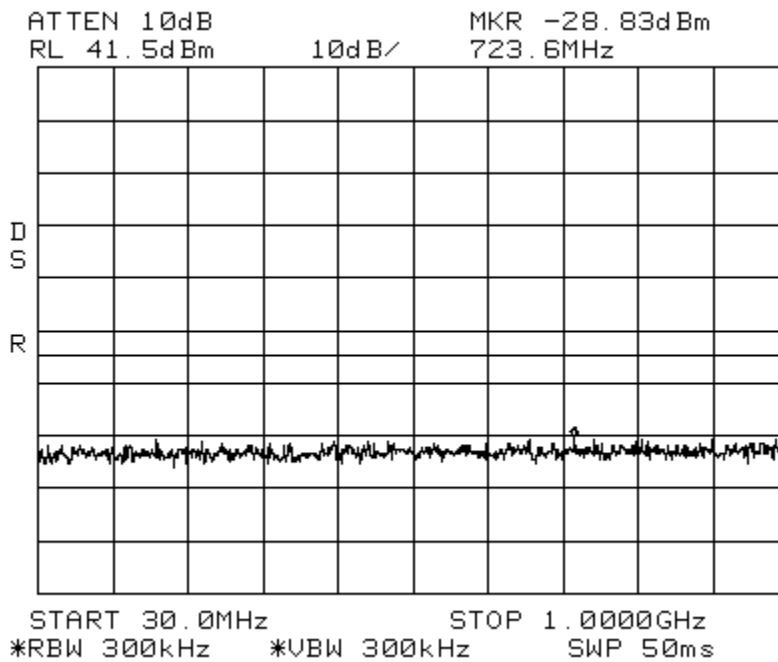
Intermodulation LTE 10 MHz Channel Bandwidth_High AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



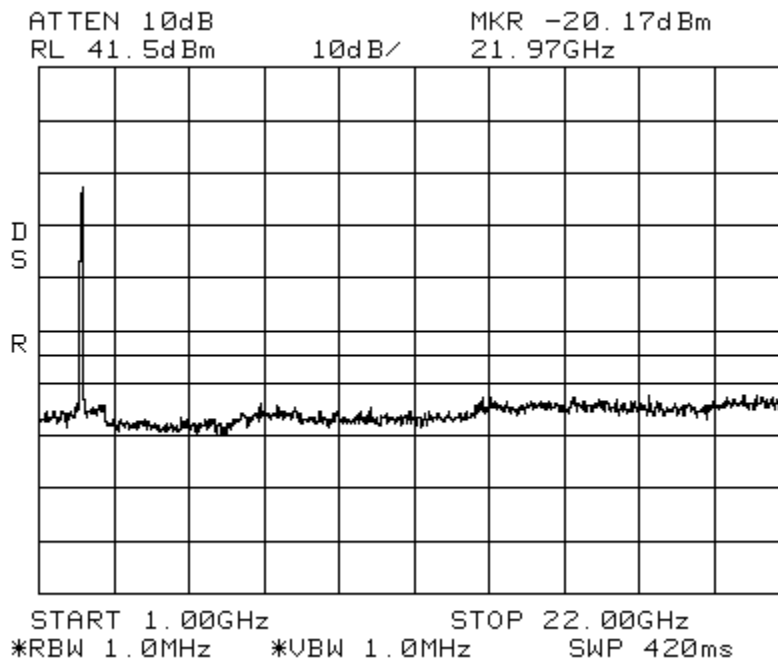
Intermodulation LTE 10 MHz Channel Bandwidth_Apart AWS Path 1
Center: 2132.5 MHz Span: 175 MHz RBW/VBW: 100 kHz
ATTEN 10dB MKR -30.33dBm
RL 41.5dBm 10dB/ 2.0783GHz



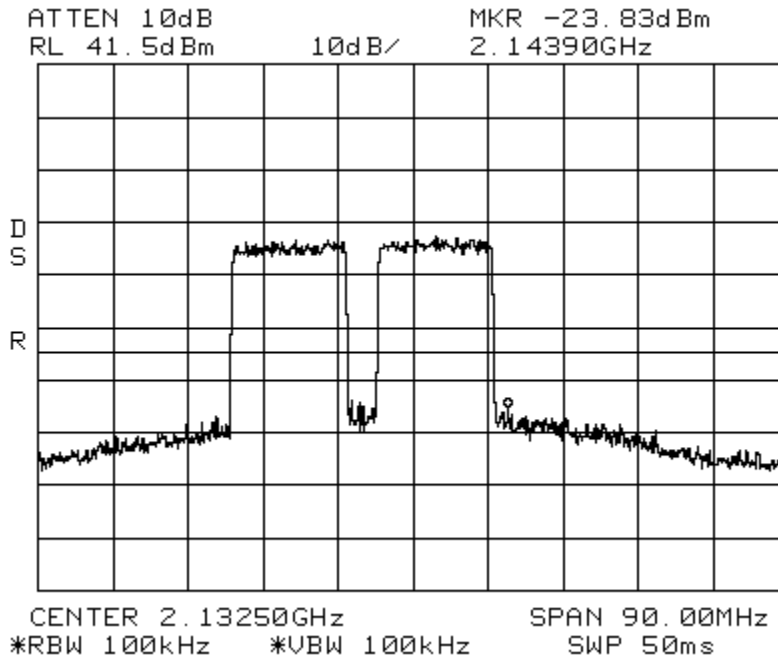
Intermodulation LTE 10 MHz Channel Bandwidth _Apart AWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



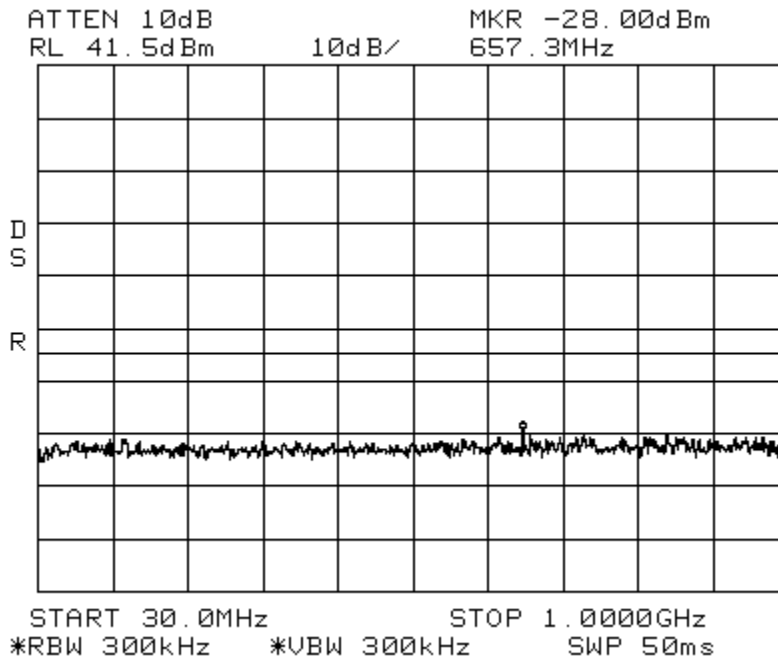
Intermodulation LTE 10 MHz Channel Bandwidth _Apart AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



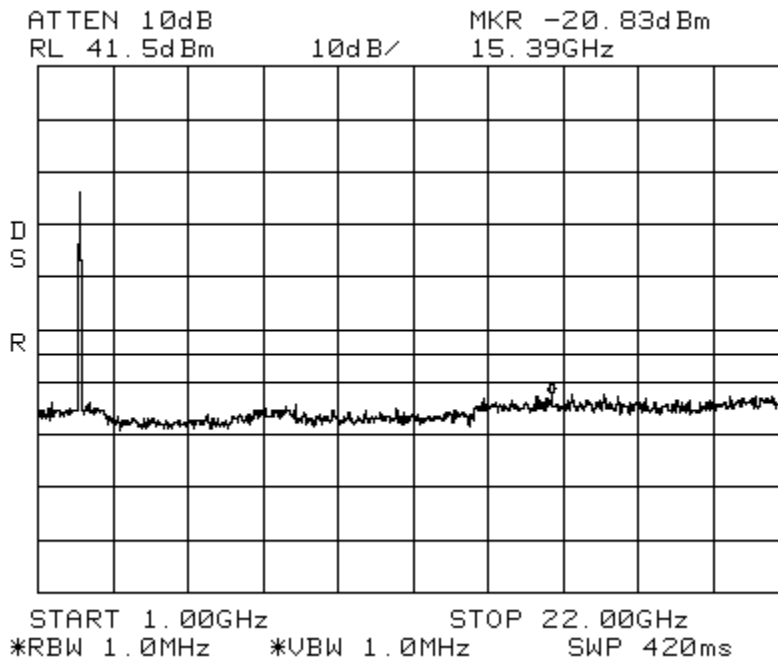
Intermodulation LTE 15 MHz Channel Bandwidth **Low** AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



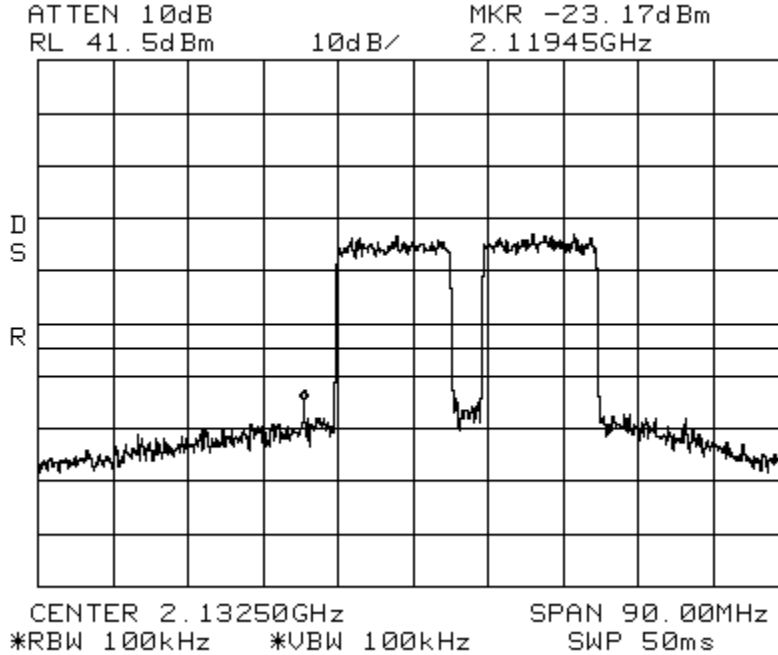
Intermodulation LTE 15 MHz Channel Bandwidth **Low** AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



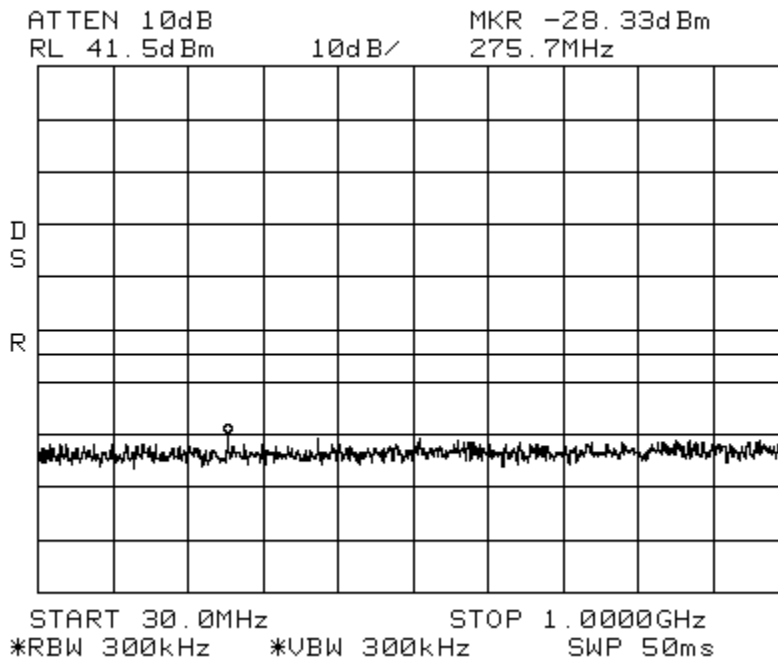
Intermodulation LTE 15 MHz Channel Bandwidth _Low AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



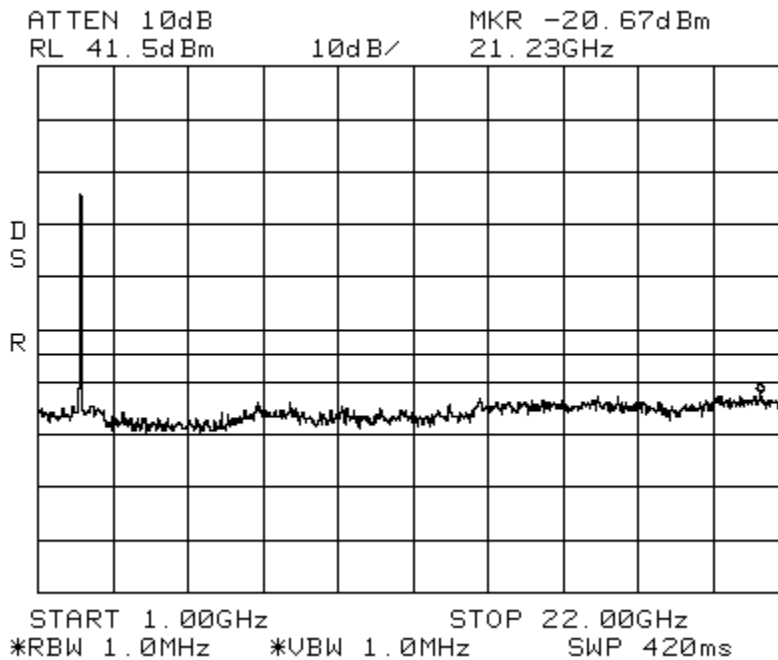
Intermodulation LTE 15 MHz Channel Bandwidth _High AWS Path 1
 Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



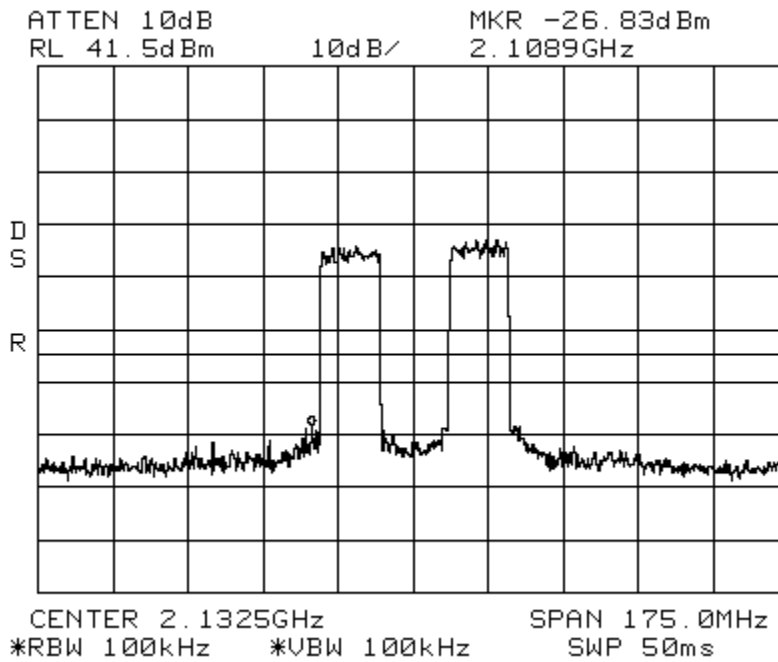
Intermodulation LTE 15 MHz Channel Bandwidth_High AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



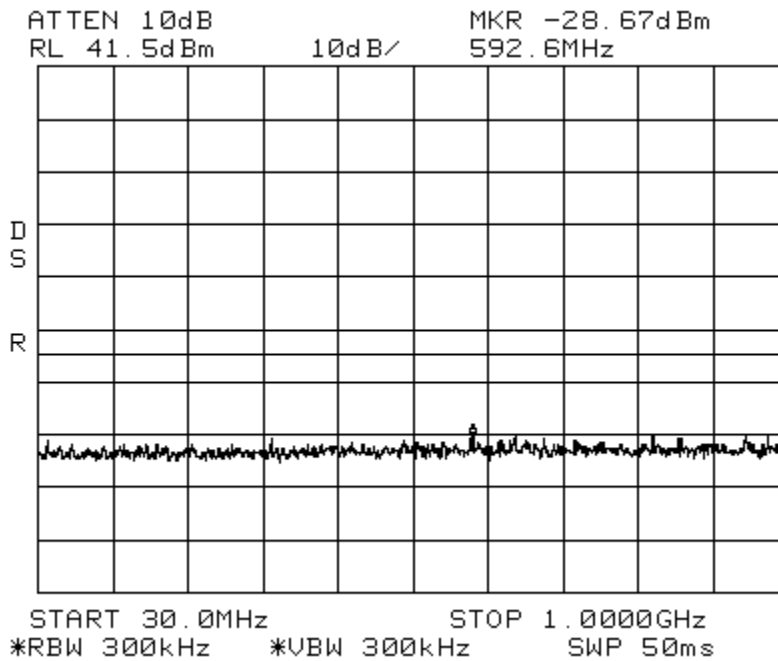
Intermodulation LTE 15 MHz Channel Bandwidth_High AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



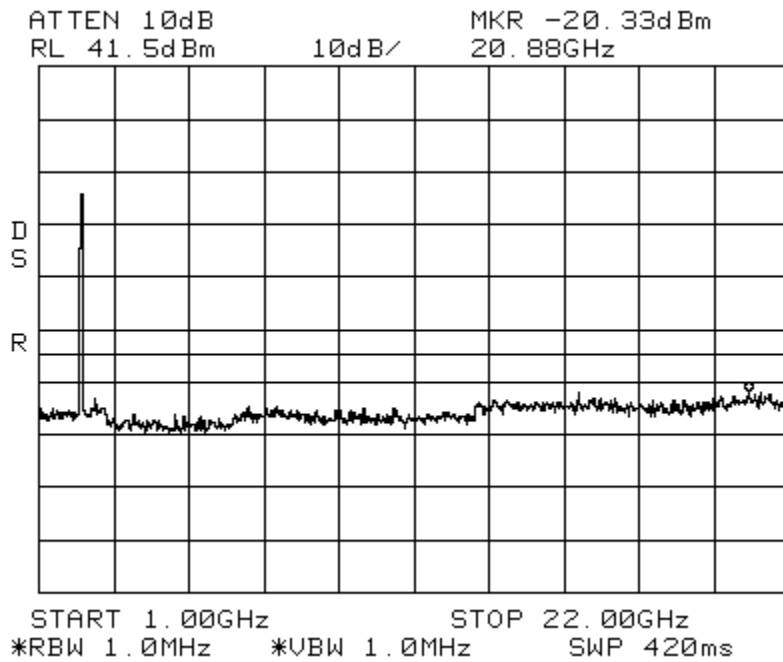
Intermodulation LTE 15 MHz Channel Bandwidth _Apart AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



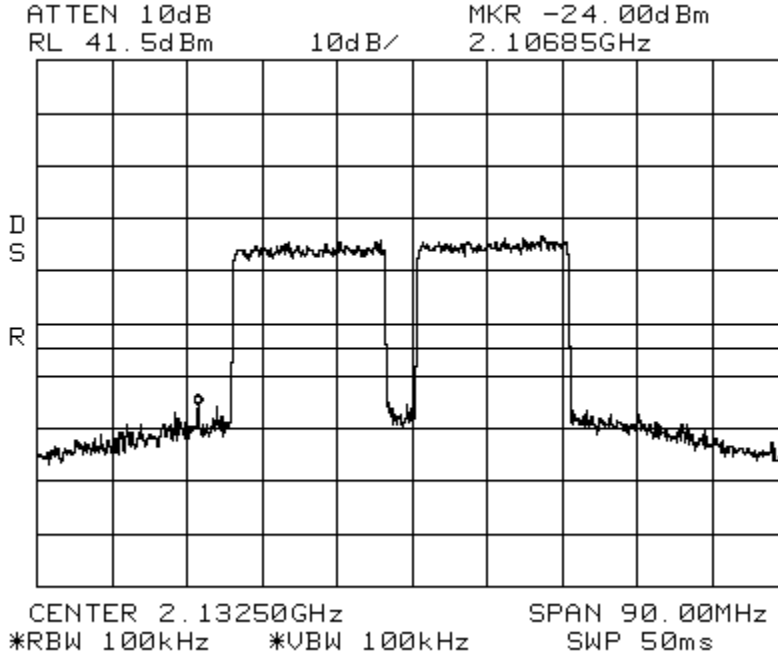
Intermodulation LTE 15 MHz Channel Bandwidth _Apart AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



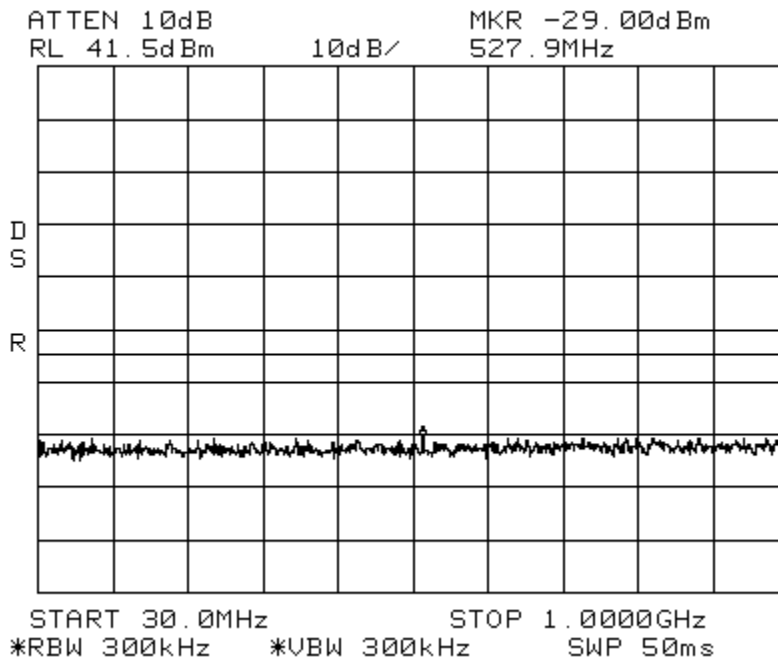
Intermodulation LTE 15 MHz Channel Bandwidth_Apart AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



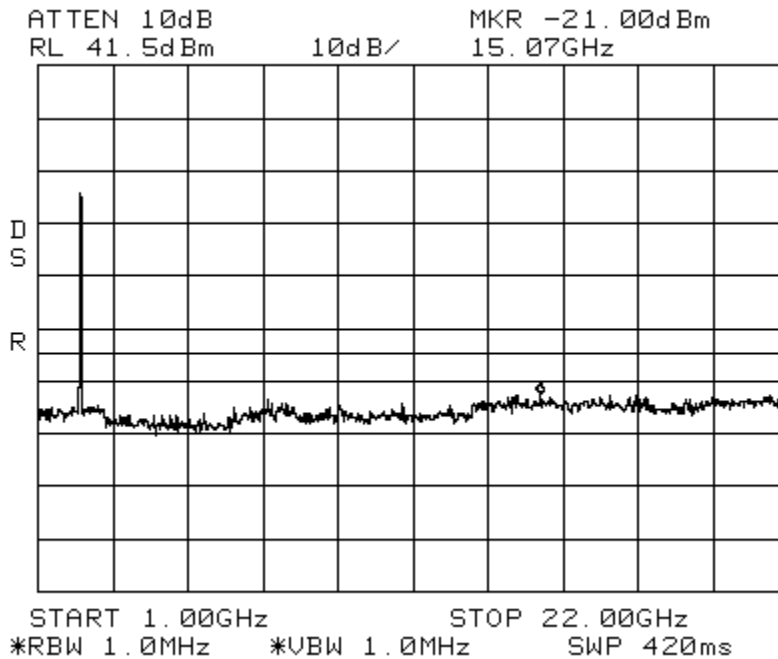
Intermodulation LTE 20 MHz Channel Bandwidth_**Low** AWS Path 1
 Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



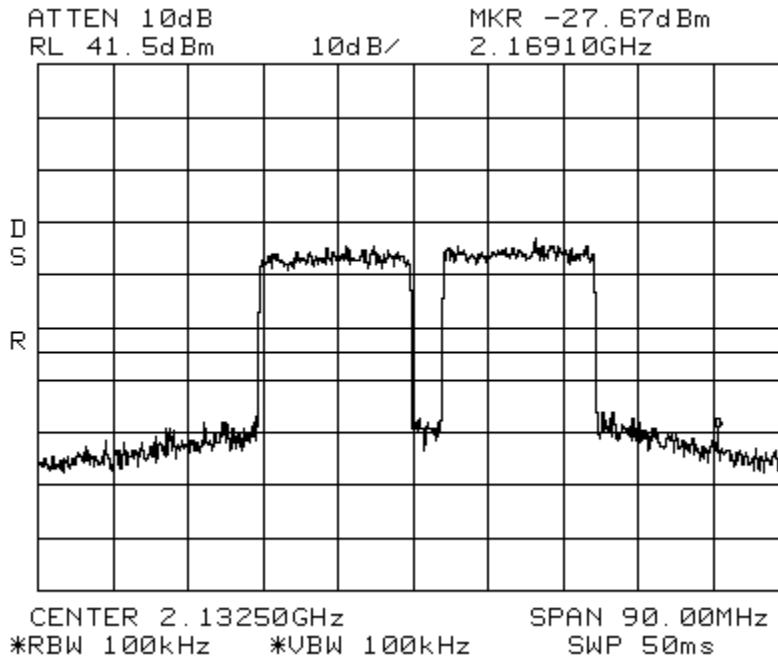
Intermodulation LTE 20 MHz Channel Bandwidth _Low AWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



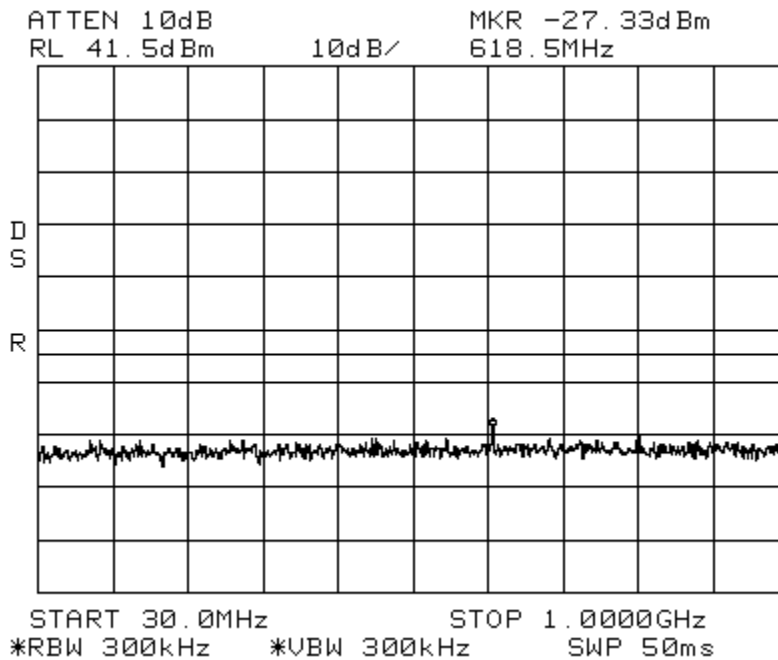
Intermodulation LTE 20 MHz Channel Bandwidth _Low AWS Path 1
 Span: 1 GHz to 22GHz RBW/VBW: 1 MHz



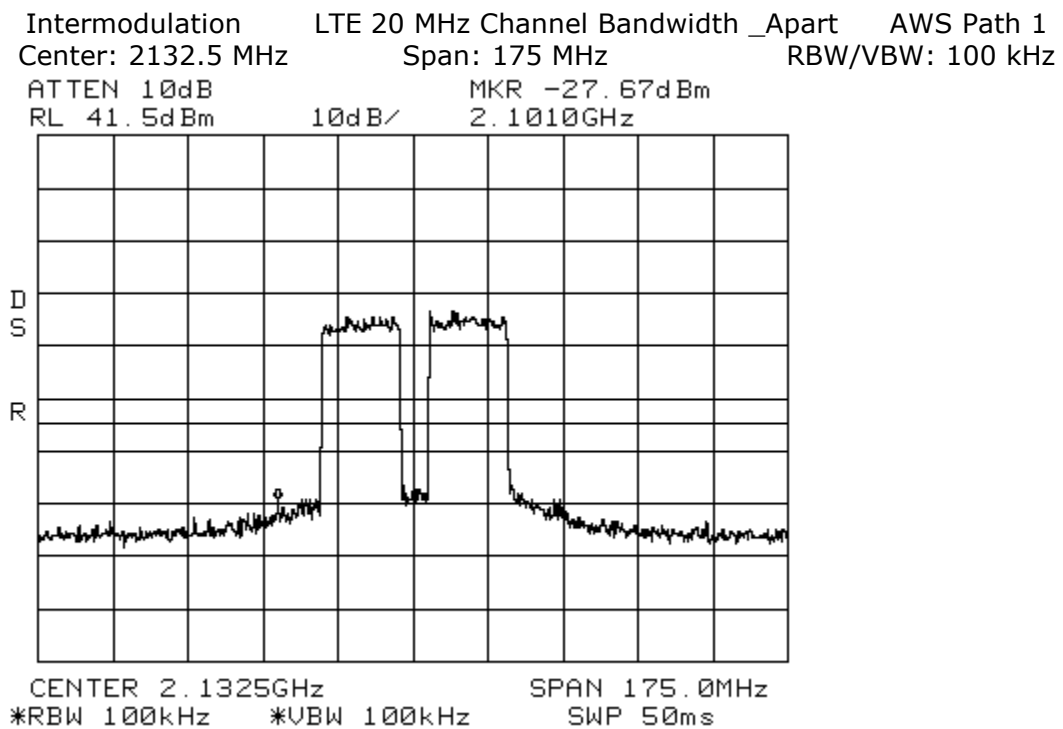
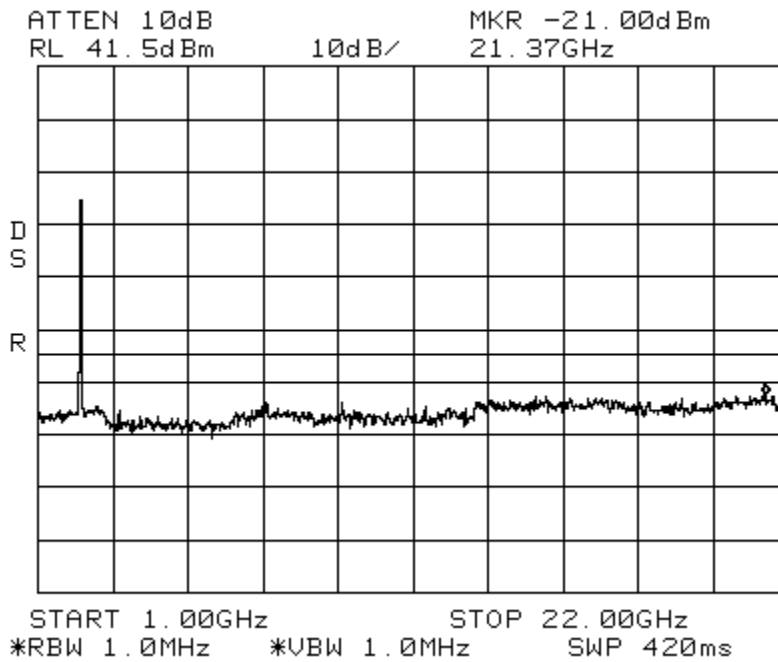
Intermodulation LTE 20 MHz Channel Bandwidth_High AWS Path 1
Center: 2132.5 MHz Span: 90 MHz RBW/VBW: 100 kHz



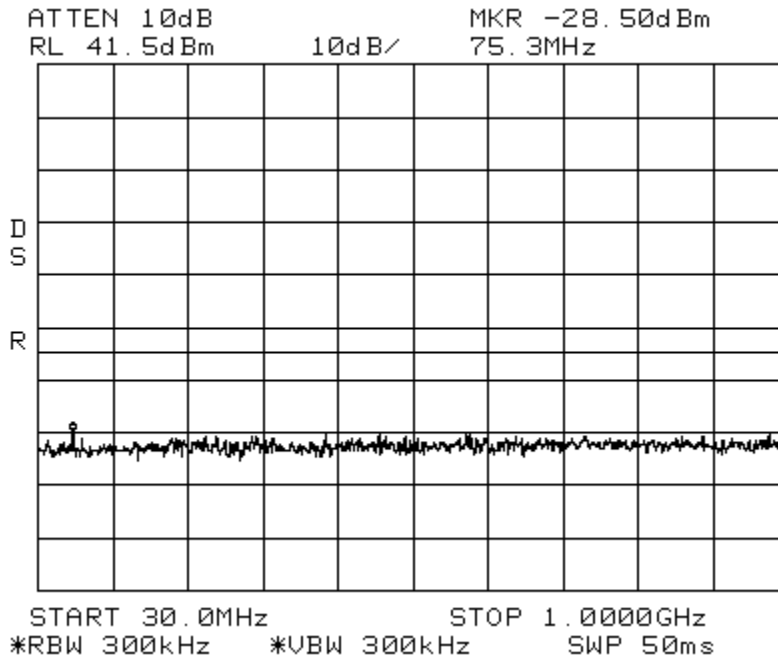
Intermodulation LTE 20 MHz Channel Bandwidth_High AWS Path 1
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



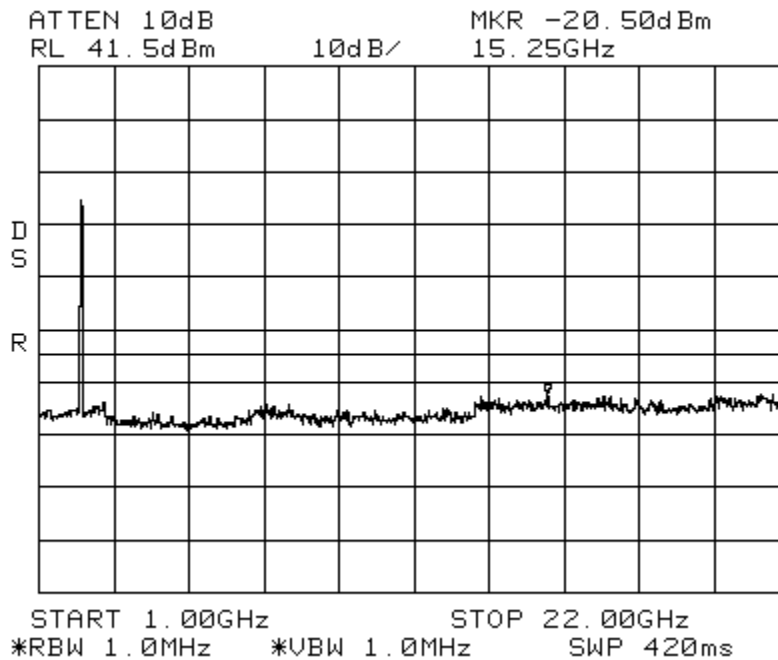
Intermodulation LTE 20 MHz Channel Bandwidth_High AWS Path 1
Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



Intermodulation LTE 20 MHz Channel Bandwidth _Apart AWS Path 1
 Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation LTE 20 MHz Channel Bandwidth _Apart AWS Path 1
 Span: 1 GHz to 22 GHz RBW/VBW: 1 MHz



6.3 FCC 27.53 Emissions Limits – Band Edge

Test Summary:

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

Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 27.53

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 LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz, 15MHz, 20MHz Channel Bandwidths & WCDMA 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 $43 + 10\log(P)$ dB, or -13 dBm.

Test Dates: 6/25/12 & 8/23/12

Tests Conducted By: Joshua J. Wittman

Test Equipment: 1, 2, 6, 7, 12

| Number | Description | Manufacturer | Model | ADC TELECOMMUNICAT IONS 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 | 11-9-12 | <input checked="" type="checkbox"/> |
| 7 | Signal Generator | Aeroflex | 3414 | 341001/259 | 6-13-13 | <input checked="" type="checkbox"/> |
| 12 | RF Power Sensor | Agilent | 8481A | MC27649 | 6-30-13 | <input checked="" type="checkbox"/> |

Environmental Conditions in the lab:

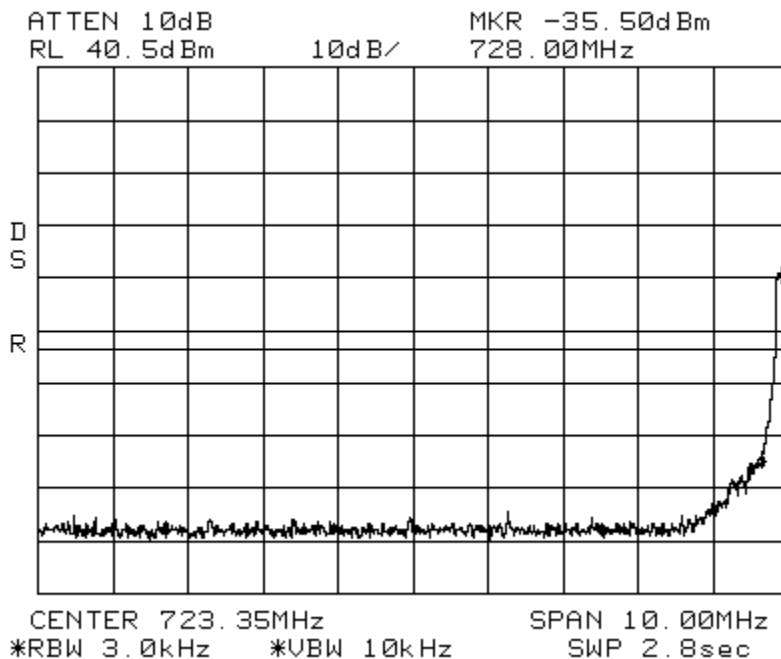
Temperature: 24° C

Relative Humidity: 31%

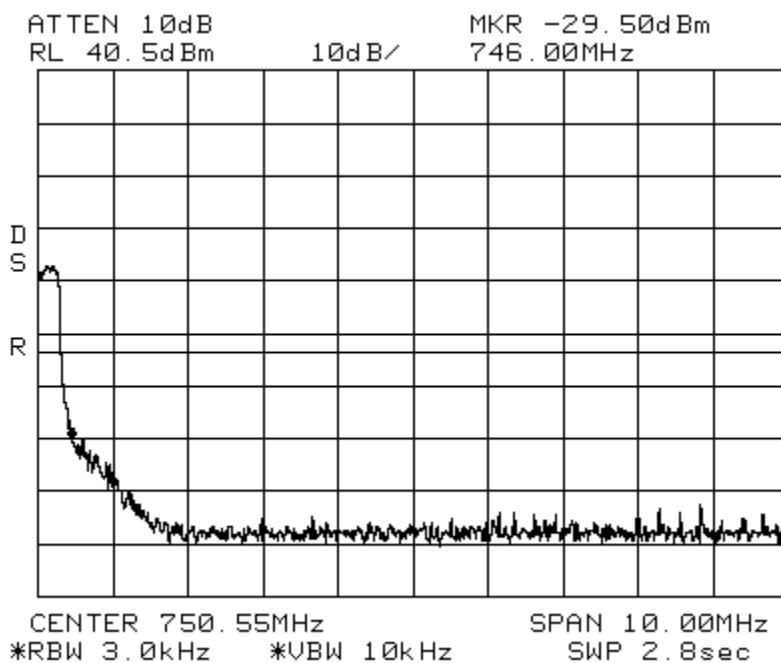
Atmospheric Pressure: 97.7 kPa

Test Results:

Band_Edge LTE 1.4 MHz Channel Bandwidth Spectrum 700 Lower
ABC MHz Path 1
Center: 728.7MHz Span: 10 MHz RBW: 3 kHz VBW: 10 kHz



Band_Edge LTE 1.4 MHz Channel Bandwidth Spectrum 700 Lower
ABC MHz Path 1
Center: 745.3 MHz Span: 10 MHz RBW: 3 kHz VBW: 10 kHz



Band_Edge

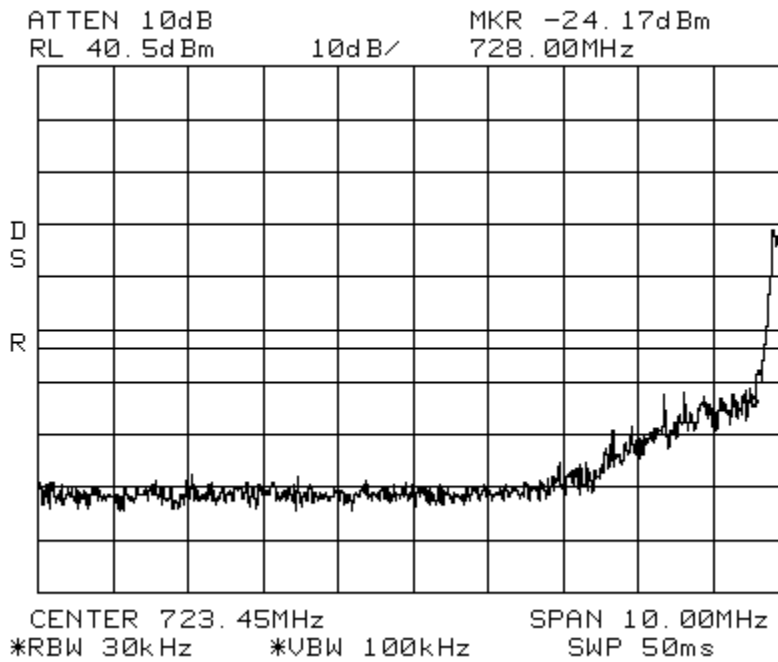
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 729.5 MHz Span: 10 MHz

RBW: 30 kHz VBW: 100 kHz



Band_Edge

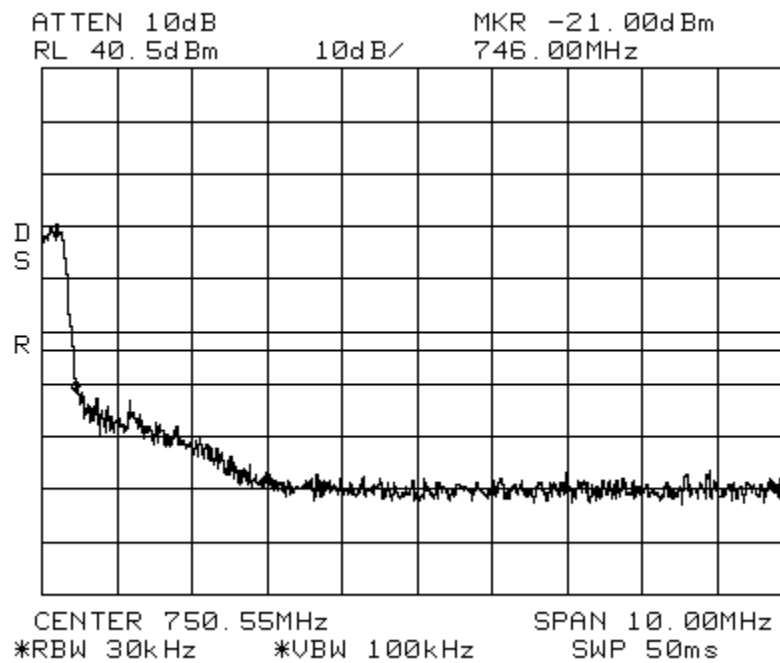
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 744.5 MHz Span: 10 MHz

RBW: 30 kHz VBW: 100 kHz



Band_Edge

LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 730.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB

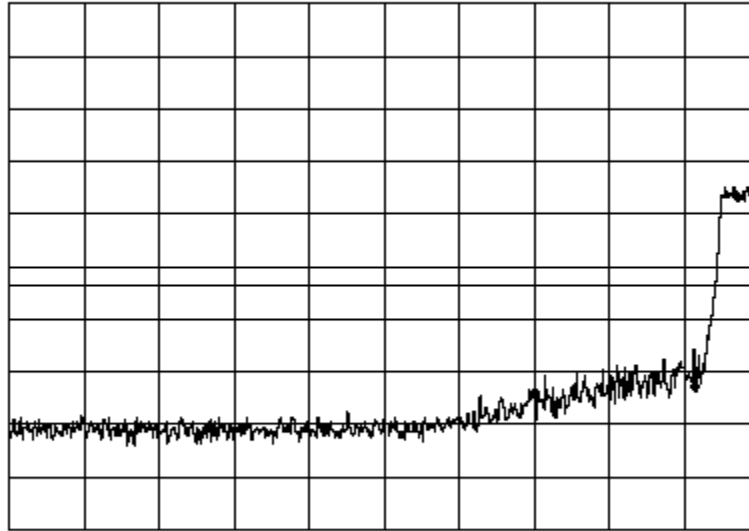
MKR -33.33dBm

RL 40.5dBm

10dB/

728.00MHz

D
S
R



CENTER 723.85MHz SPAN 10.00MHz
*RBW 30kHz *VBW 100kHz SWP 50ms

Band_Edge

LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 743.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB

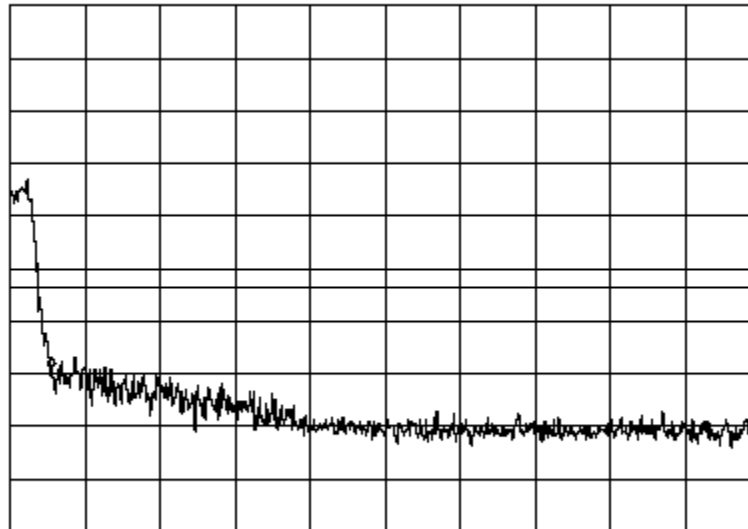
MKR -28.50dBm

RL 40.5dBm

10dB/

746.00MHz

D
S
R



CENTER 750.45MHz SPAN 10.00MHz
*RBW 30kHz *VBW 100kHz SWP 50ms

Band_Edge

LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 733 MHz

Span: 20 MHz

RBW: 100 kHz

VBW: 100 kHz

ATTEN 10dB

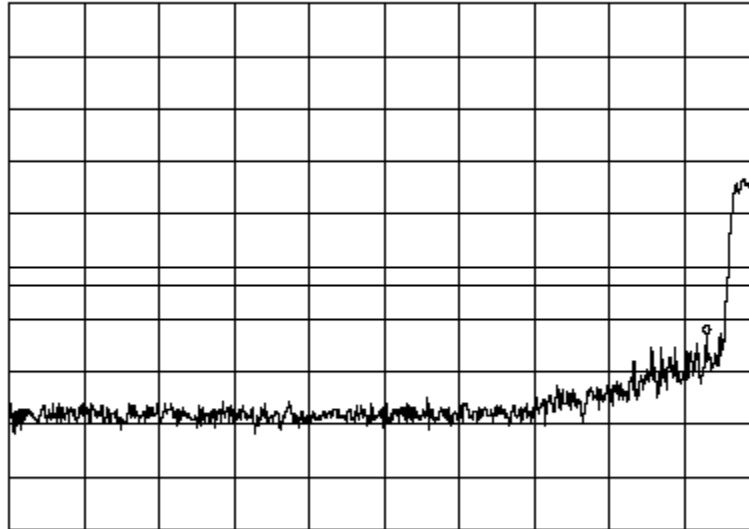
MKR -22.50dBm

RL 40.5dBm

10dB/

728.00MHz

D
S
R



CENTER 719.40MHz

SPAN 20.00MHz

*RBW 100kHz

*VBW 100kHz

SWP 50ms

Band_Edge

LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 741 MHz

Span: 20 MHz

RBW: 100 kHz

VBW: 100 kHz

ATTEN 10dB

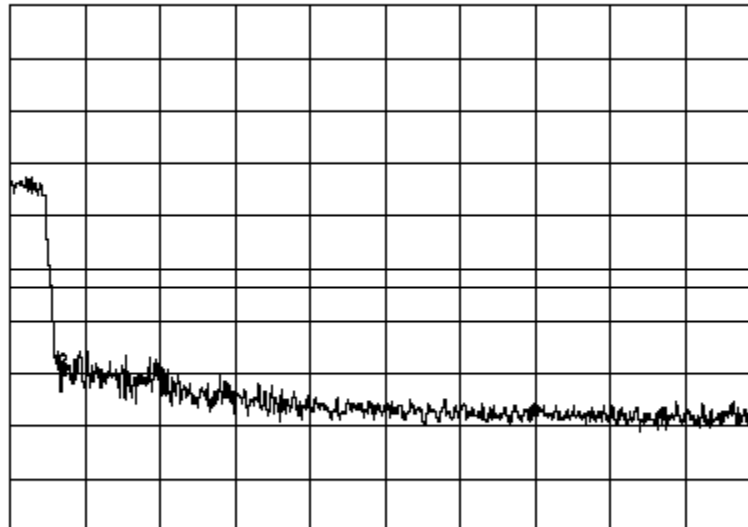
MKR -27.50dBm

RL 40.5dBm

10dB/

746.00MHz

D
S
R



CENTER 754.60MHz

SPAN 20.00MHz

*RBW 100kHz

*VBW 100kHz

SWP 50ms

Band_Edge

LTE 1.4 MHz Channel Bandwidth

Spectrum 700 MHz

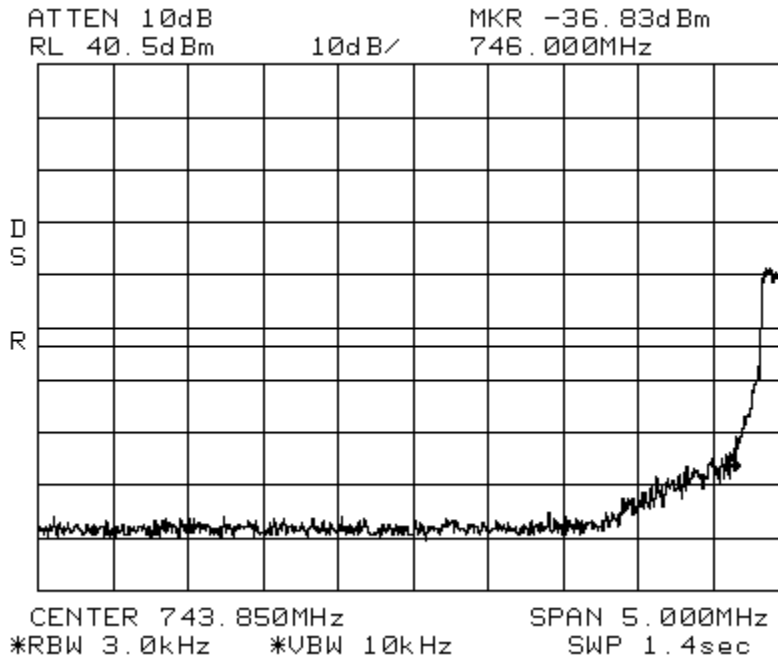
Upper C Path 1

Center: 746.7MHz

Span: 5 MHz

RBW: 3 kHz

VBW: 10 kHz



Band_Edge

LTE 1.4 MHz Channel Bandwidth

Spectrum 700 MHz

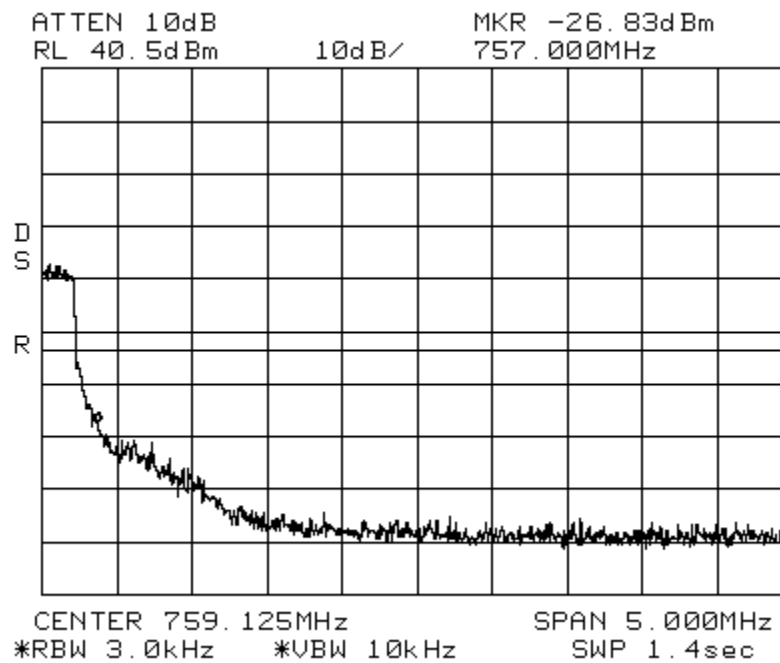
Upper C Path 1

Center: 756.3 MHz

Span: 5 MHz

RBW: 3 kHz

VBW: 10 kHz



Band_Edge

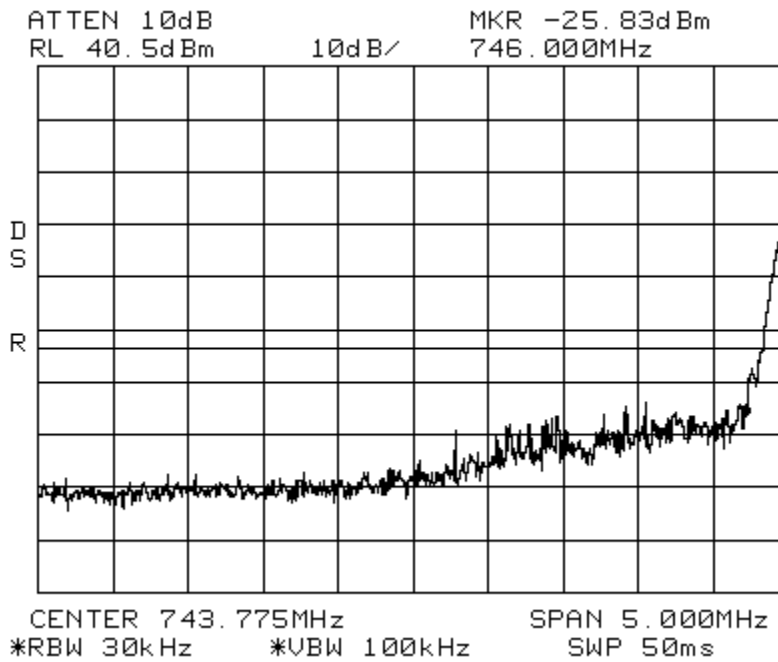
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 747.5 MHz Span: 5 MHz

RBW: 30 kHz VBW: 100 kHz



Band_Edge

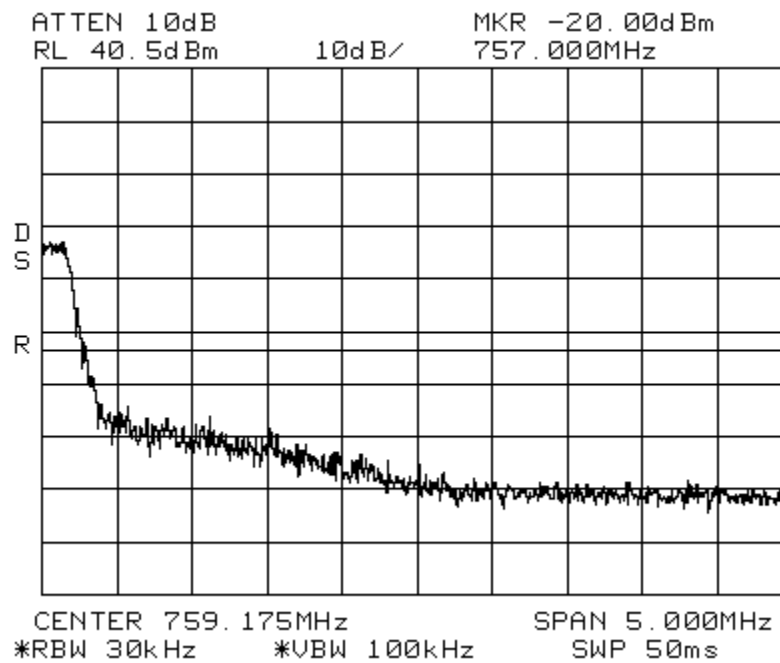
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 755.5 MHz Span: 5 MHz

RBW: 30 kHz VBW: 100 kHz



Band_Edge

LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 748.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB

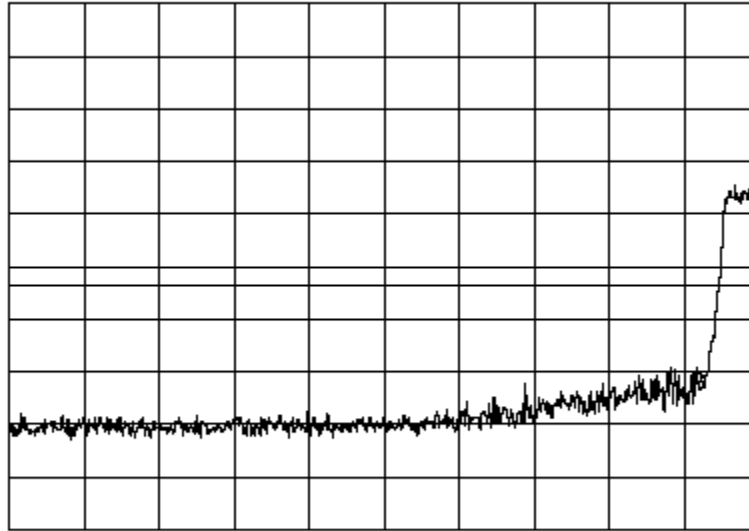
MKR -31.50dBm

RL 40.5dBm

10dB/

746.00MHz

D
S
R



CENTER 741.80MHz SPAN 10.00MHz
*RBW 30kHz *VBW 100kHz SWP 50ms

Band_Edge

LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 754.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB

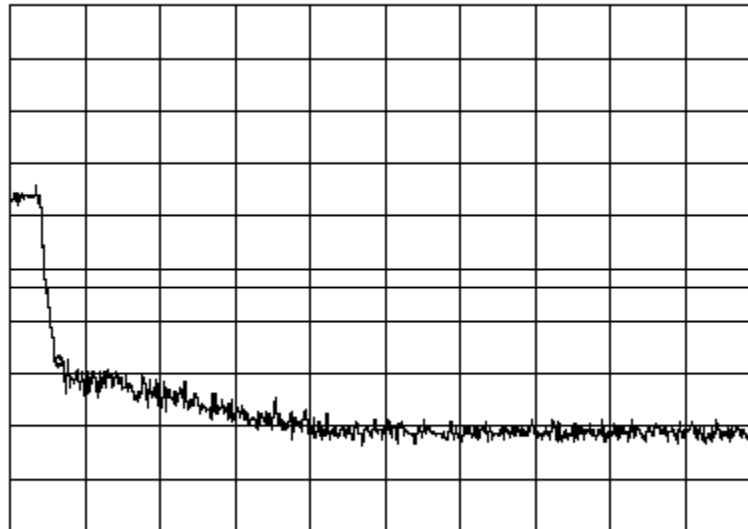
MKR -28.17dBm

RL 40.5dBm

10dB/

757.00MHz

D
S
R



CENTER 761.35MHz SPAN 10.00MHz
*RBW 30kHz *VBW 100kHz SWP 50ms

Band_Edge

LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 751 MHz

Span: 15 MHz

RBW: 100 kHz

VBW: 100 kHz

ATTEN 10dB

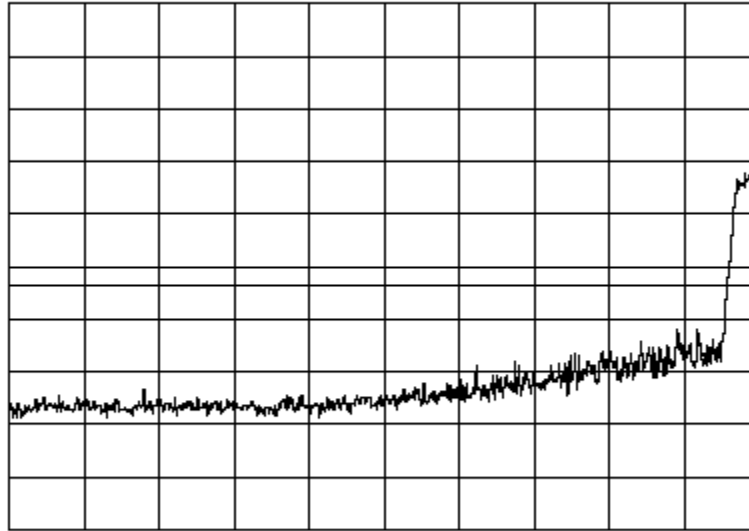
MKR -27.83dBm

RL 40.5dBm

10dB/

746.00MHz

D
S
R



CENTER 739.60MHz

SPAN 15.00MHz

*RBW 100kHz

*VBW 100kHz

SWP 50ms

Band_Edge

LTE 10 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 752 MHz

Span: 15 MHz

RBW: 100 kHz

VBW: 100 kHz

ATTEN 10dB

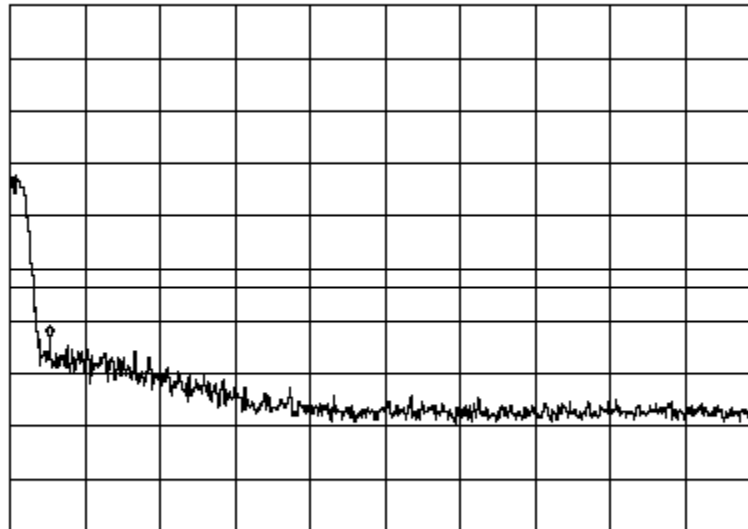
MKR -22.33dBm

RL 40.5dBm

10dB/

757.00MHz

D
S
R



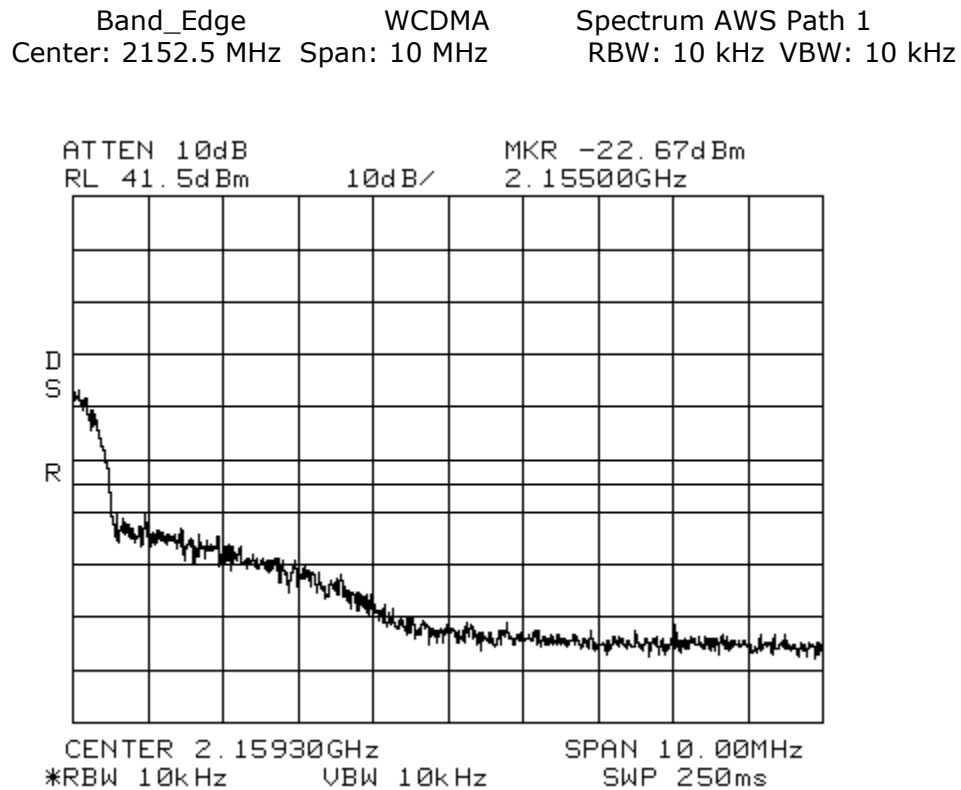
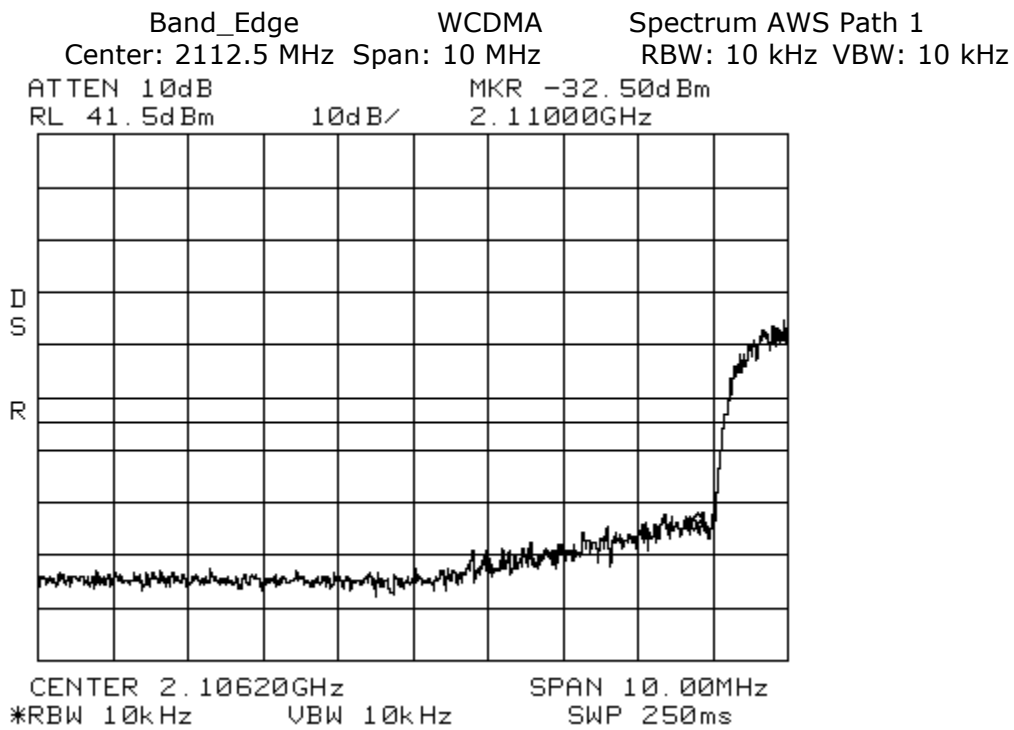
CENTER 763.70MHz

SPAN 15.00MHz

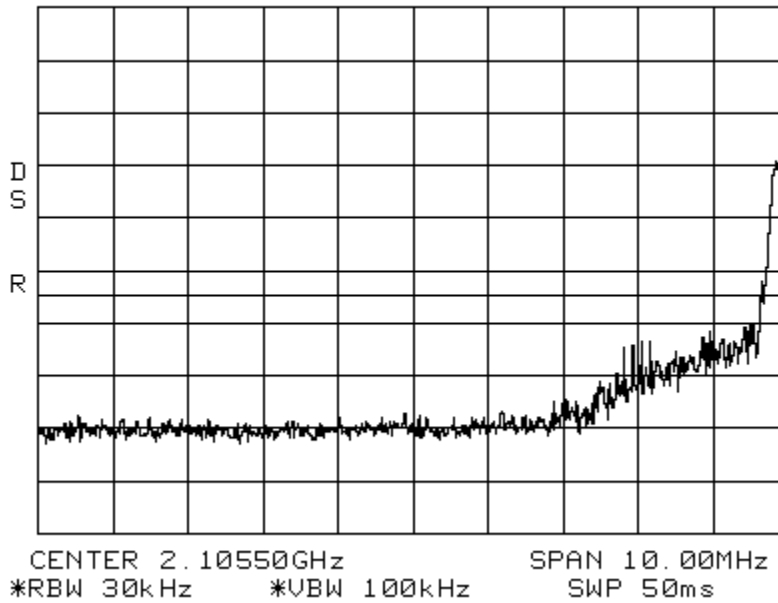
*RBW 100kHz

*VBW 100kHz

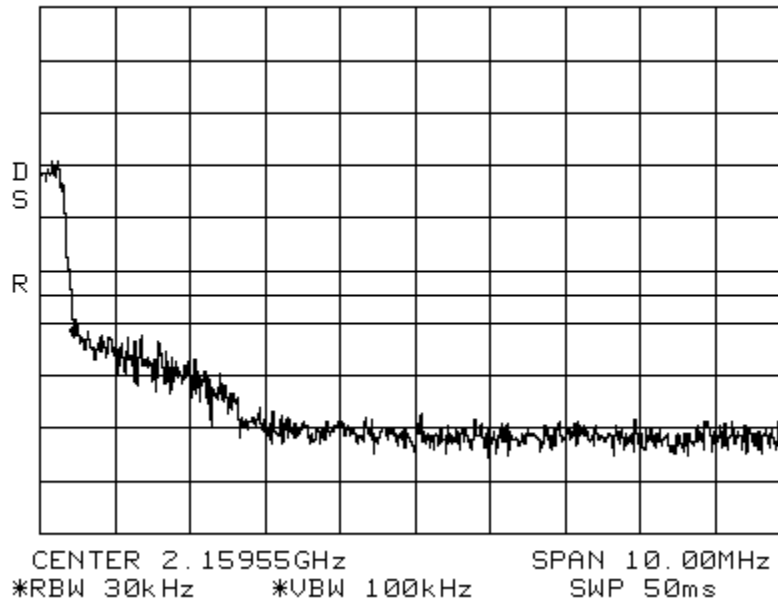
SWP 50ms



Band_Edge LTE 3 MHz Channel Bandwidth AWS Path 1
Center: 2111.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz
ATTEN 10dB MKR -22.67dBm
RL 41.5dBm 10dB/ 2.11000GHz



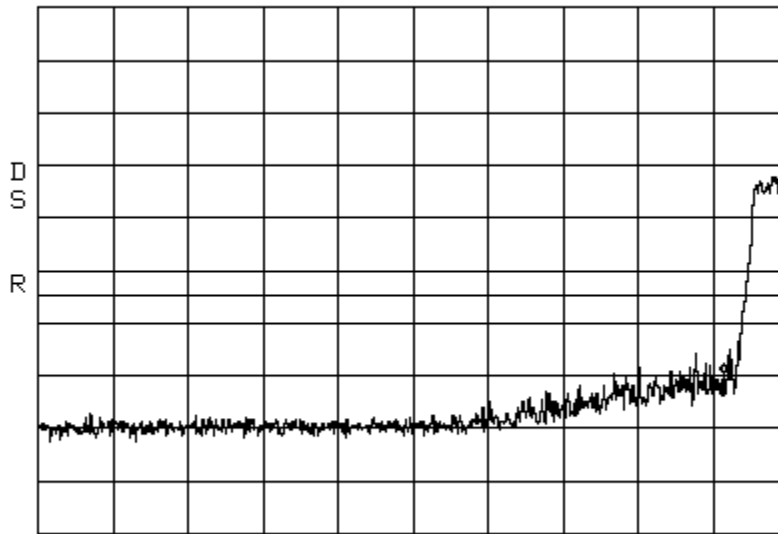
Band_Edge LTE 3 MHz Channel Bandwidth AWS Path 1
Center: 2153.5MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz
ATTEN 10dB MKR -21.00dBm
RL 41.5dBm 10dB/ 2.15000GHz



Band_Edge LTE 5 MHz Channel Bandwidth AWS Path 1

Center: 2112.5MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB MKR -28.17dBm
RL 41.5dBm 10dB/ 2.11000GHz

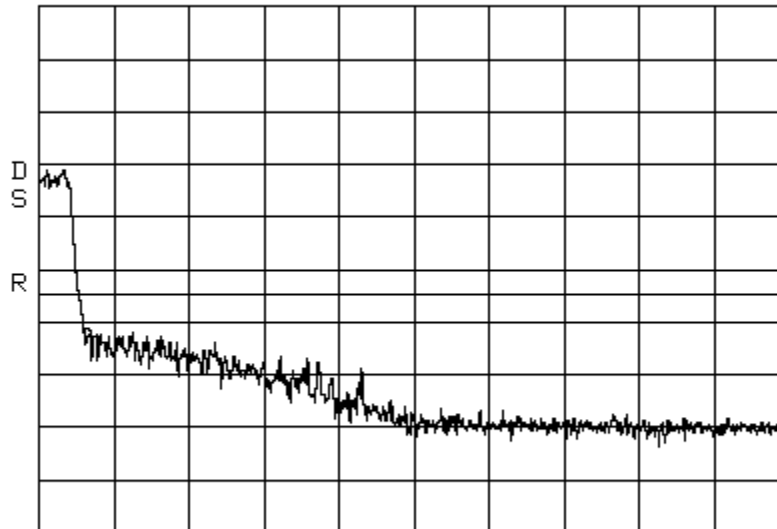


CENTER 2.10585GHz SPAN 10.00MHz
*RBW 30kHz *VBW 100kHz SWP 50ms

Band_Edge LTE 5 MHz Channel Bandwidth AWS Path 1

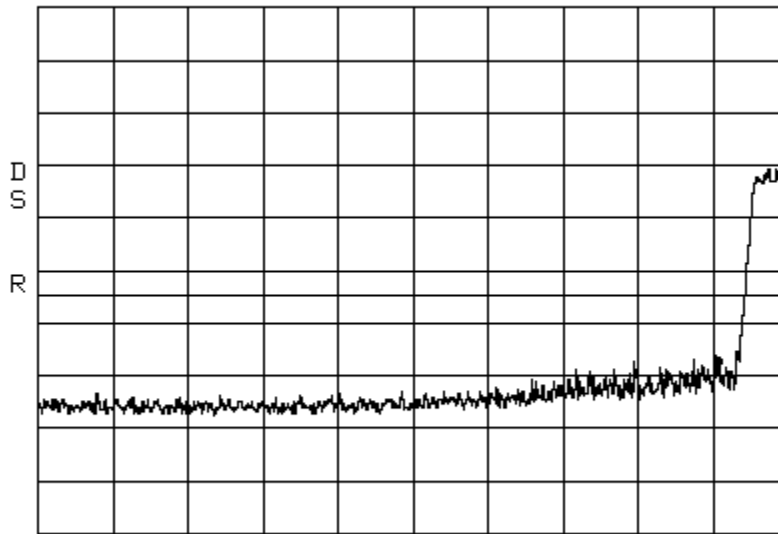
Center: 2152.5MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB MKR -21.50dBm
RL 41.5dBm 10dB/ 2.15500GHz



CENTER 2.15935GHz SPAN 10.00MHz
*RBW 30kHz *VBW 100kHz SWP 50ms

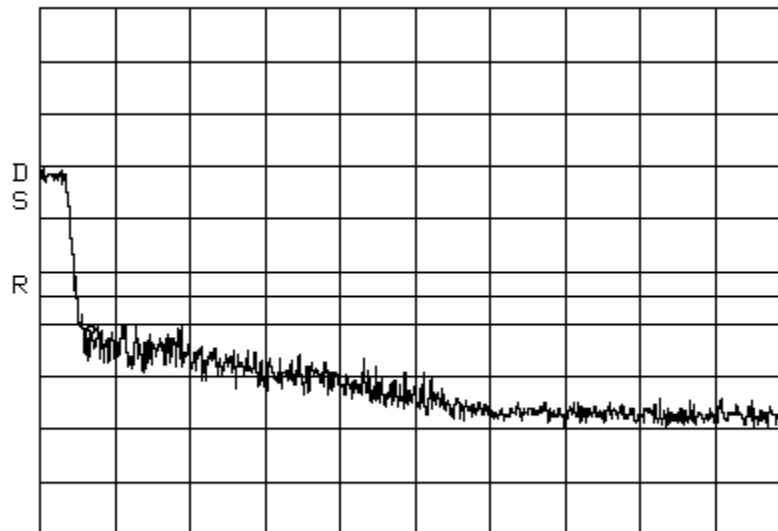
Band_Edge LTE 10 MHz Channel Bandwidth AWS Path 1
 Center: 2115.0MHz Span: 15 MHz RBW: 100 kHz VBW: 100 kHz
 ATTEN 10dB MKR -26.83dBm
 RL 41.5dBm 10dB/ 2.11000GHz



CENTER 2.10390GHz SPAN 15.00MHz
 *RBW 100kHz *VBW 100kHz *SWP 50ms

Band_Edge LTE 10 MHz Channel Bandwidth AWS Path 1
 Center: 2150.0MHz Span: 15 MHz RBW: 100 kHz VBW: 100 kHz

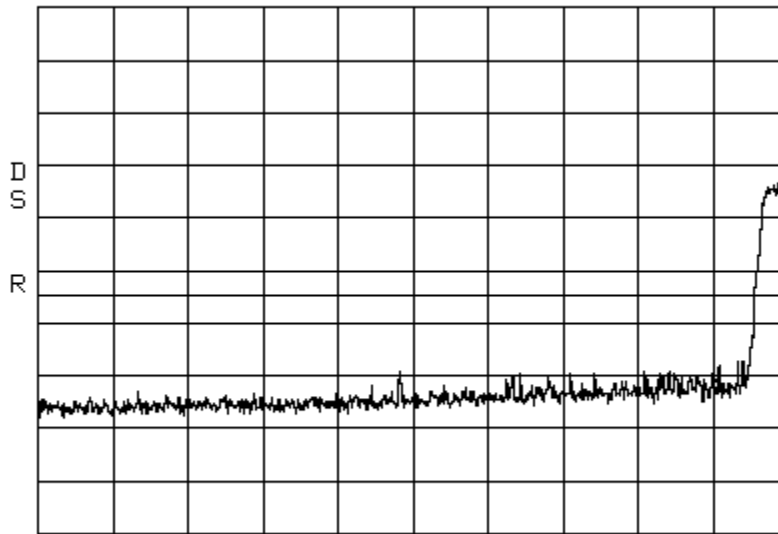
ATTEN 10dB MKR -20.50dBm
 RL 41.5dBm 10dB/ 2.15500GHz



CENTER 2.16148GHz SPAN 15.00MHz
 *RBW 100kHz *VBW 100kHz *SWP 50ms

Band_Edge LTE 15 MHz Channel Bandwidth
 Center: 2117.5 MHz Span: 15 MHz RBW: 100 kHz
 ATTEN 10dB MKR -31.33dBm
 RL 41.5dBm 10dB/ 2.11000GHz

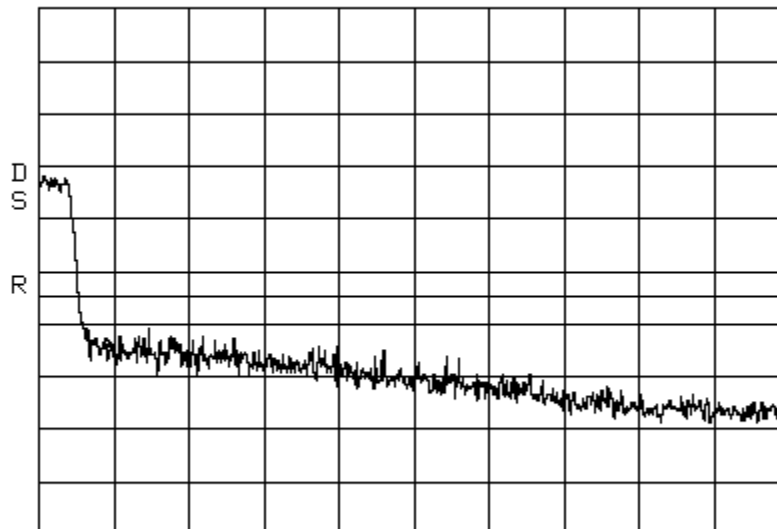
AWS Path 1
 VBW: 100 kHz



CENTER 2.10395GHz SPAN 15.00MHz
 *RBW 100kHz *VBW 100kHz *SWP 50ms

Band_Edge LTE 15 MHz Channel Bandwidth AWS Path 1
 Center: 2147.5MHz Span: 15 MHz RBW: 100kHz VBW: 100 kHz

ATTEN 10dB MKR -23.17dBm
 RL 41.5dBm 10dB/ 2.15500GHz



CENTER 2.16115GHz SPAN 15.00MHz
 *RBW 100kHz *VBW 100kHz *SWP 50ms

Band_Edge
Center: 2120.0MHz

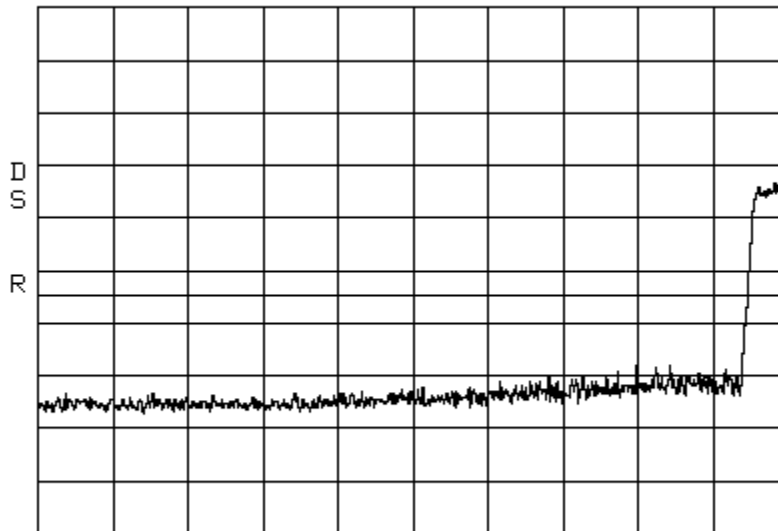
LTE 20 MHz Channel Bandwidth
Span: 20 MHz RBW: 100 kHz

AWS Path 1
VBW: 100 kHz

ATTEN 10dB
RL 41.5dBm

10dB/

MKR -30.33dBm
2.11000GHz



CENTER 2.10220GHz SPAN 20.00MHz
*RBW 100kHz *VBW 100kHz *SWP 50ms

Band_Edge
Center: 2145.0MHz

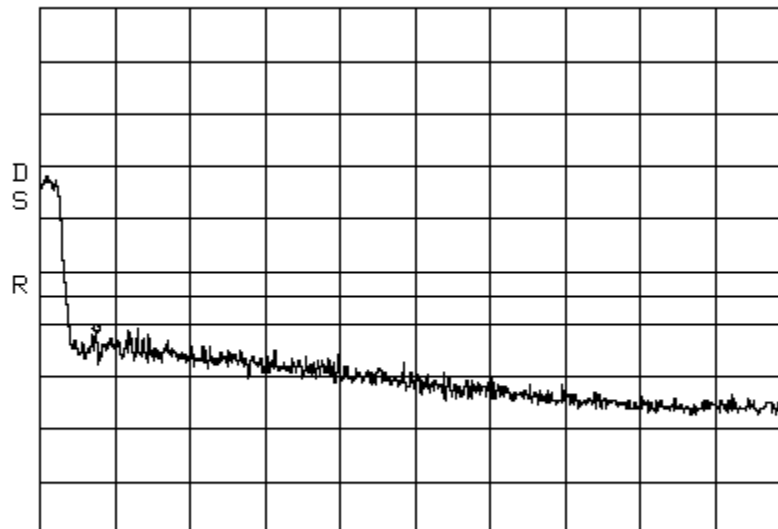
LTE 20 MHz Channel Bandwidth
Span: 20 MHz RBW: 100 kHz

AWS Path 1
VBW: 100 kHz

ATTEN 10dB
RL 41.5dBm

10dB/

MKR -20.33dBm
2.15500GHz



CENTER 2.16350GHz SPAN 20.00MHz
*RBW 100kHz *VBW 100kHz *SWP 50ms

6.4 FCC 2.1049 & 27.53 – Occupied Bandwidth

Test Summary:

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

Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.0149 & 27.53

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: LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz, 15MHz, 20MHz Channel Bandwidths & WCDMA. 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: 6/27/12 & 8/29/12

Tests Conducted By: Joshua J. Wittman

Test Equipment: 1, 2, 6, 7, 12

| Number | Description | Manufacturer | Model | ADC TELECOMMUNICAT IONS 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 | 11-9-12 | <input checked="" type="checkbox"/> |
| 7 | Signal Generator | Aeroflex | 3414 | 341001/259 | 6-13-13 | <input checked="" type="checkbox"/> |
| 12 | RF Power Sensor | Agilent | 8481A | MC27649 | 6-30-13 | <input checked="" type="checkbox"/> |

Environmental Conditions in the lab:

Temperature: 24° C

Relative Humidity: 31%

Atmospheric Pressure: 97.7 kPa

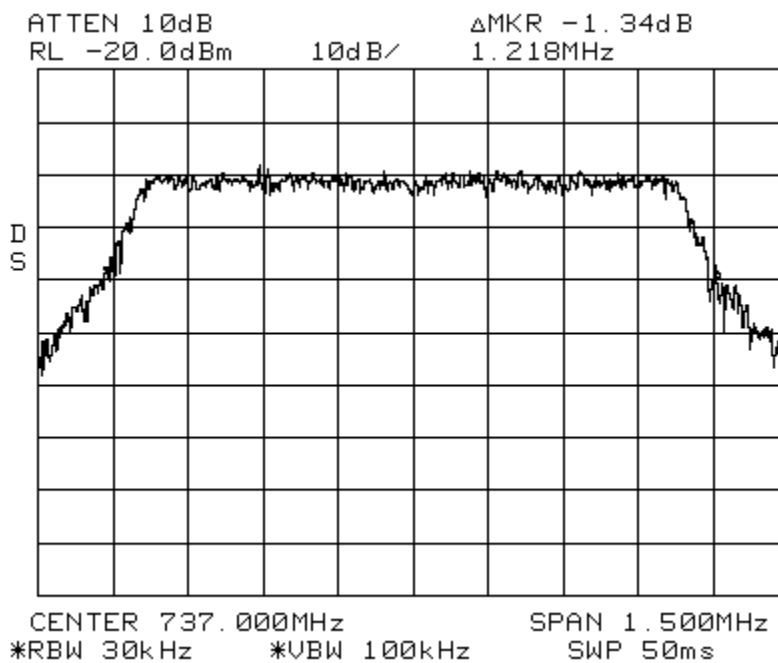
Test Results:

Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth_Signal_In
Lower ABC Path 1

Spectrum 700 MHz

Span: 1.50 MHz

RBW: 30 kHz VBW: 100 kHz

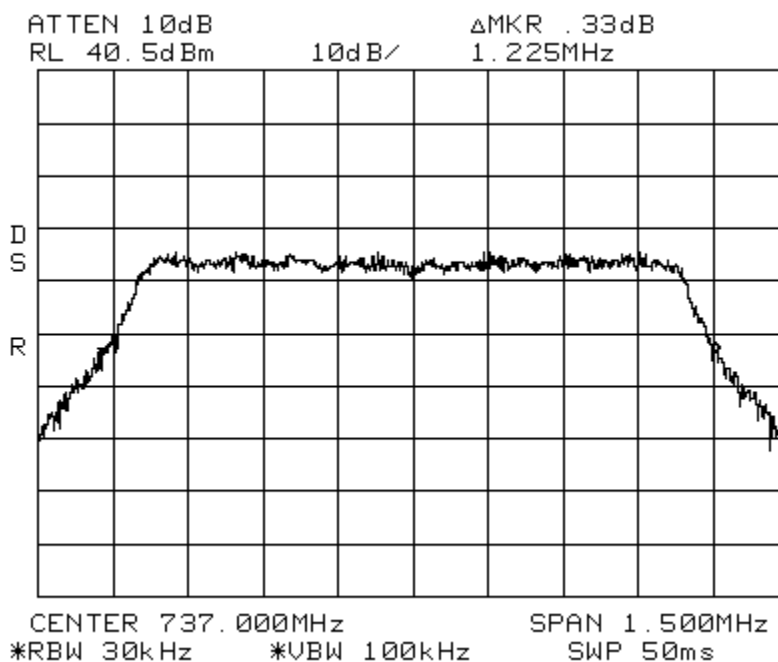


Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth_Signal_Out
Lower ABC Path 1

Spectrum 700 MHz

Span: 1.50 MHz

RBW: 30 kHz VBW: 100 kHz



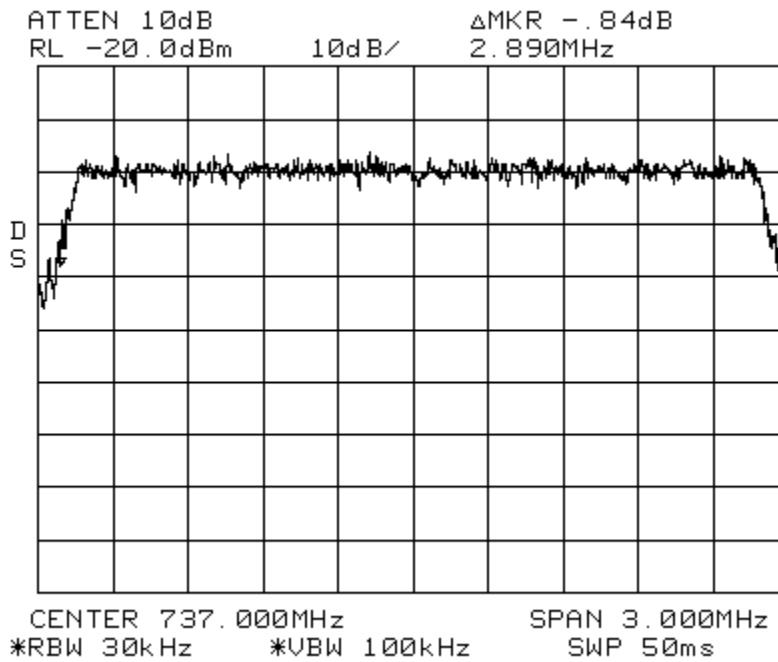
Occupied Bandwidth LTE 3 MHz Channel Bandwidth_Signal_In

Spectrum 700 MHz

Lower ABC Path 1

Span: 3 MHz

RBW: 30kHz VBW: 100 kHz



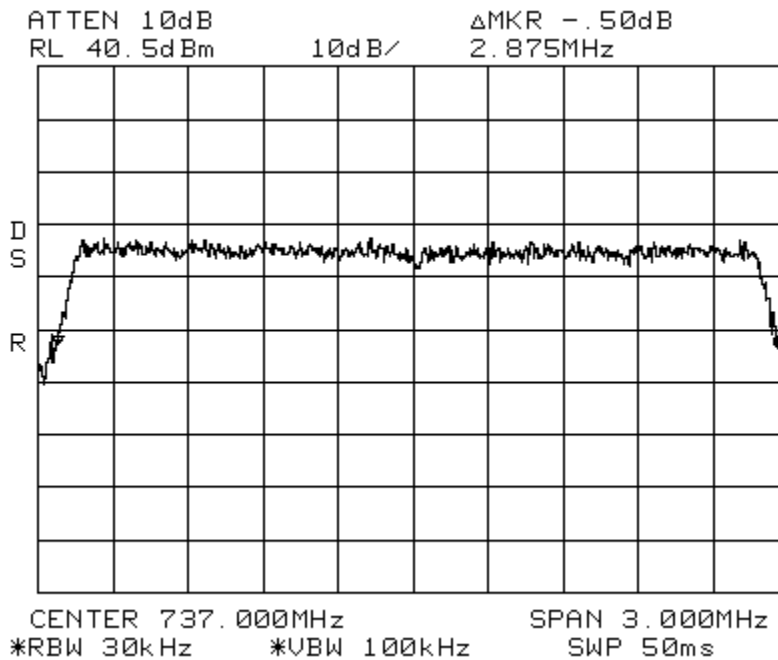
Occupied Bandwidth LTE 3 MHz Channel Bandwidth_Signal_Out

Spectrum 700 MHz

Lower ABC Path 1

Span: 3 MHz

RBW: 30 kHz VBW: 100 kHz



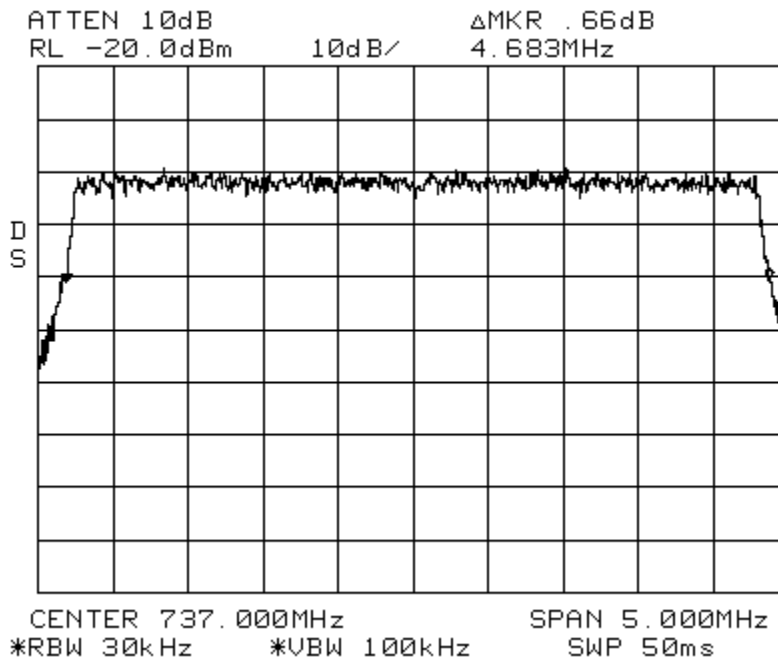
Occupied Bandwidth LTE 5 MHz Channel Bandwidth_Signal_In

Spectrum 700 MHz

Lower ABC Path 1

Span: 5 MHz

RBW: 30 kHz VBW: 100 kHz



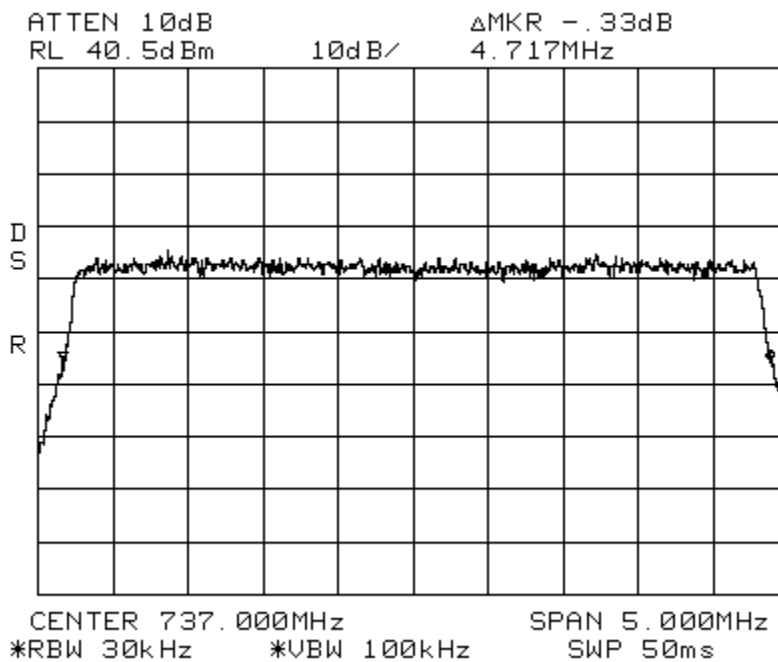
Occupied Bandwidth LTE 5 MHz Channel Bandwidth_Signal_Out

Spectrum 700 MHz

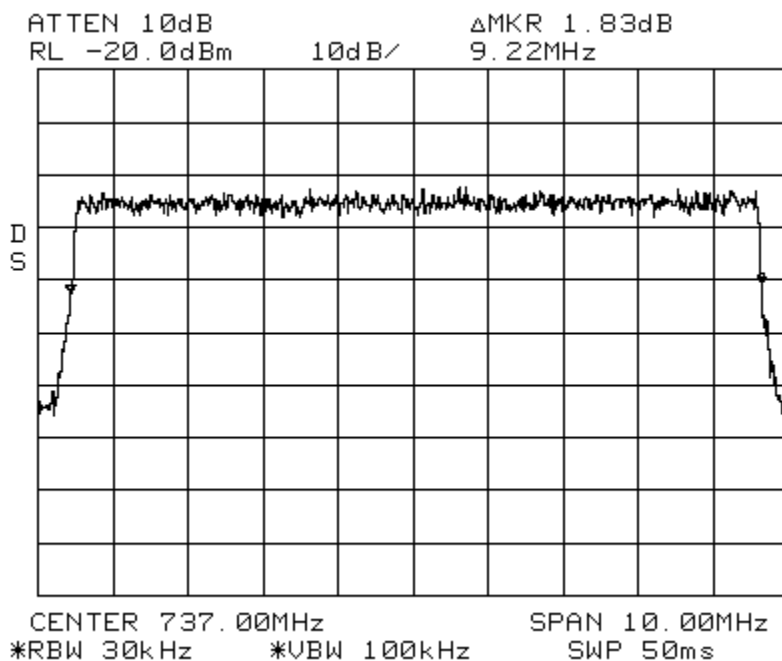
Lower ABC Path 1

Span: 5 MHz

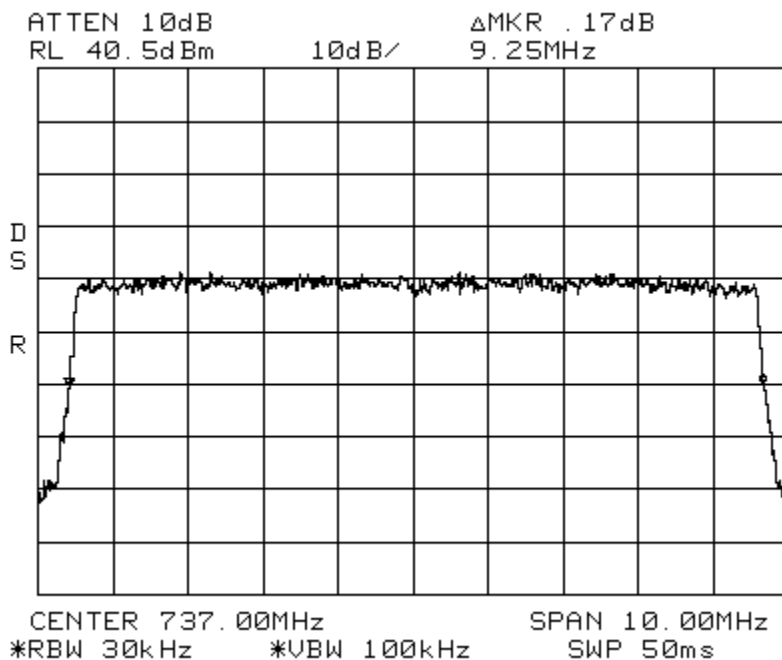
RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth LTE 10 MHz Channel Bandwidth_Signal_In Spectrum 700 MHz Lower ABC
 Path 1
 Span: 10 MHz RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth LTE 10 MHz Channel Bandwidth_Signal_Out Spectrum 700 MHz
 Lower ABC Path 1
 Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

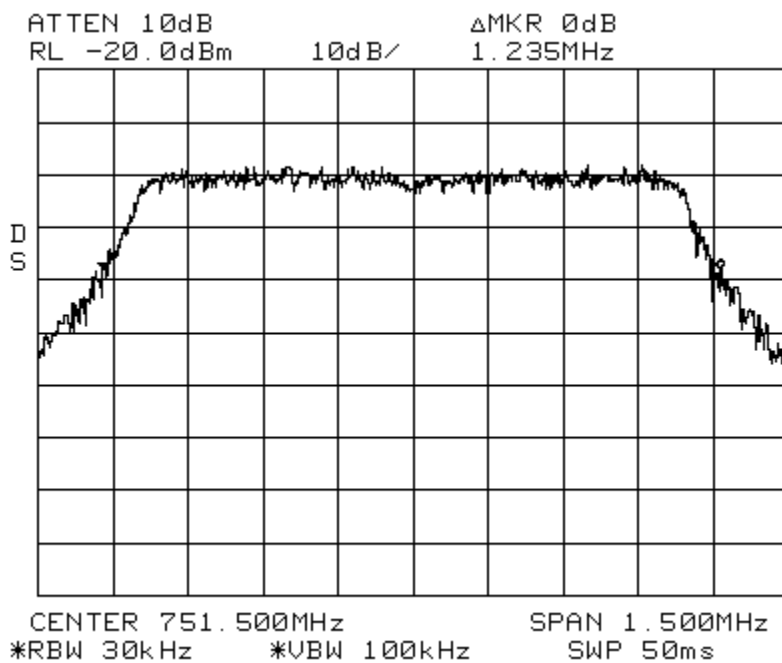


Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth_Signal_In
Upper C Path 1

Spectrum 700 MHz

Span: 1.50 MHz

RBW: 30 kHz VBW: 100 kHz

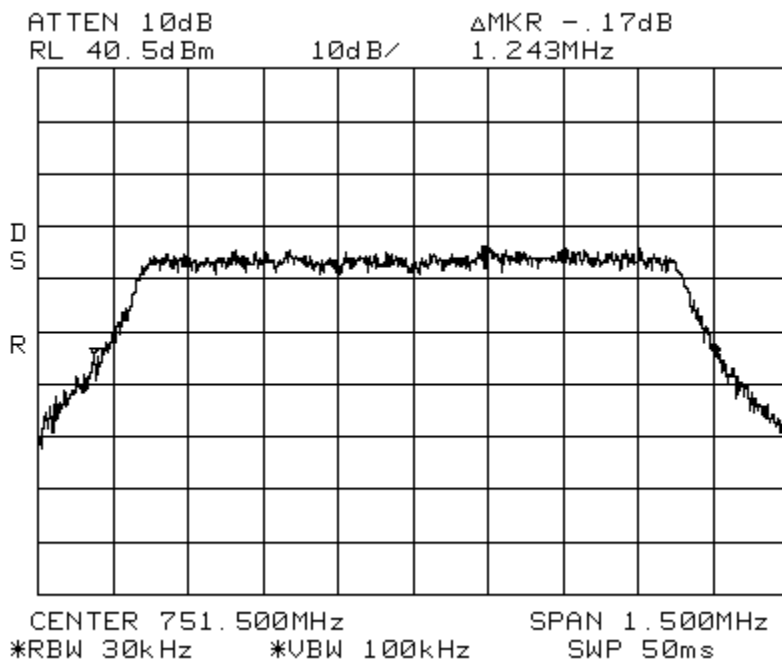


Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth_Signal_Out
Upper C Path 1

Spectrum 700 MHz

Span: 1.50 MHz

RBW: 30 kHz VBW: 100 kHz

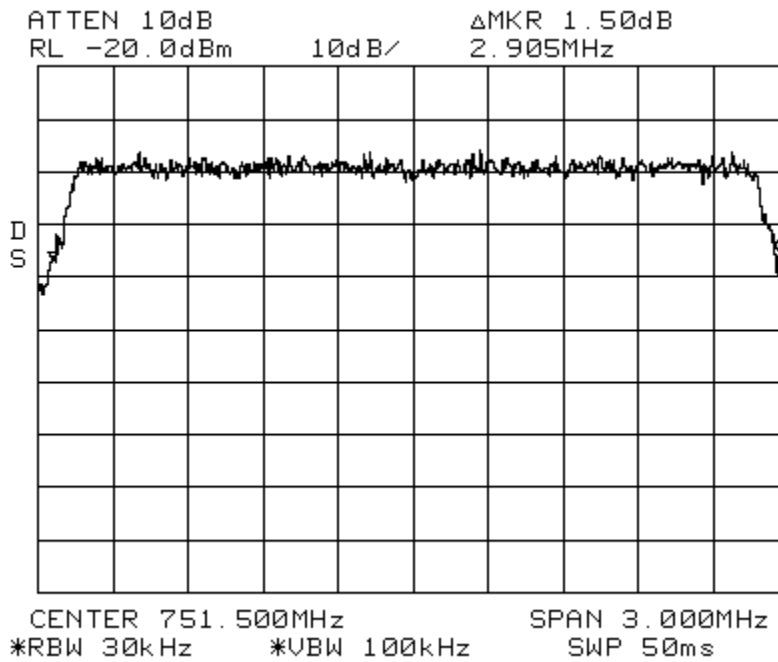


Occupied Bandwidth LTE 3 MHz Channel Bandwidth_Signal_In
Upper C Path 1

Spectrum 700 MHz

Span: 3 MHz

RBW: 30kHz VBW: 100 kHz

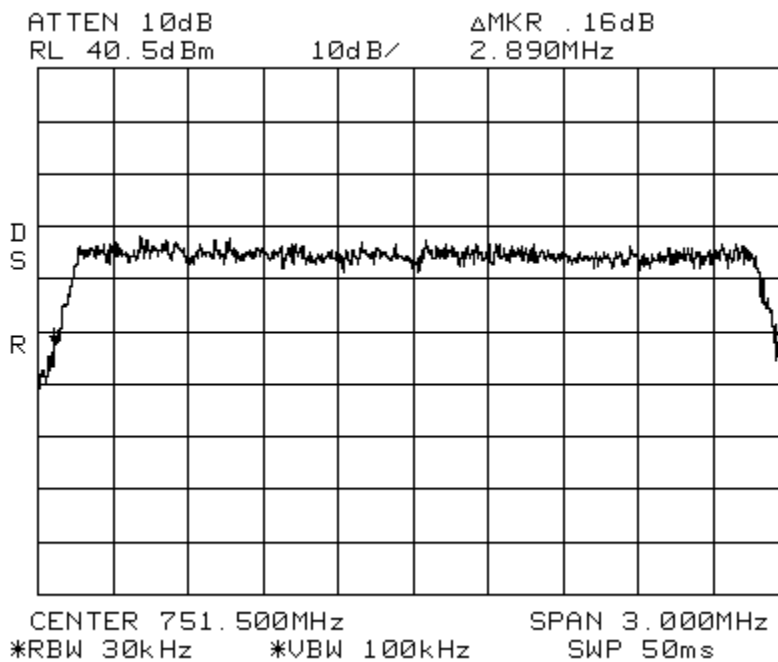


Occupied Bandwidth LTE 3 MHz Channel Bandwidth_Signal_Out
Upper C Path 1

Spectrum 700 MHz

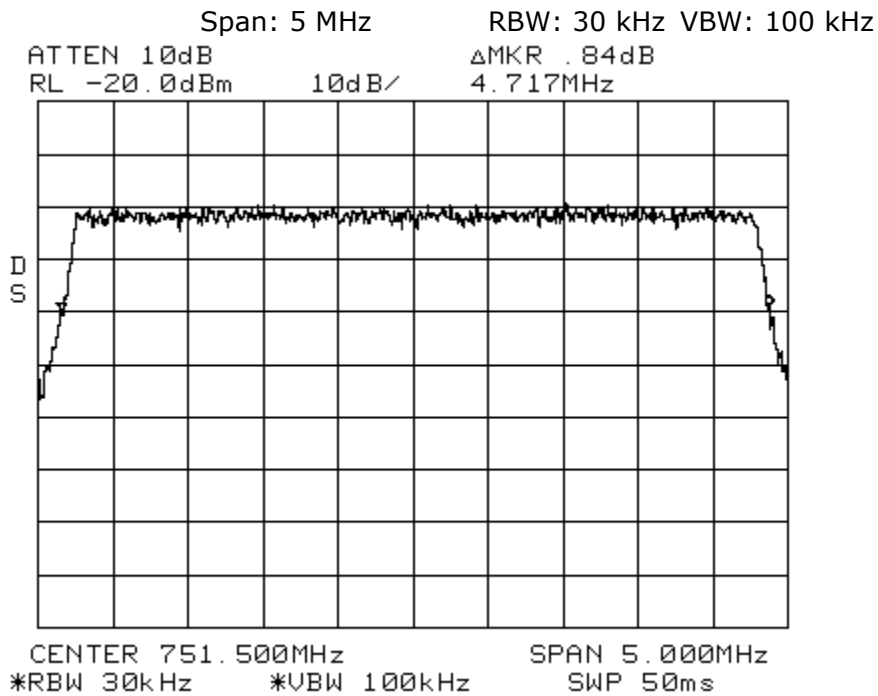
Span: 3 MHz

RBW: 30 kHz VBW: 100 kHz



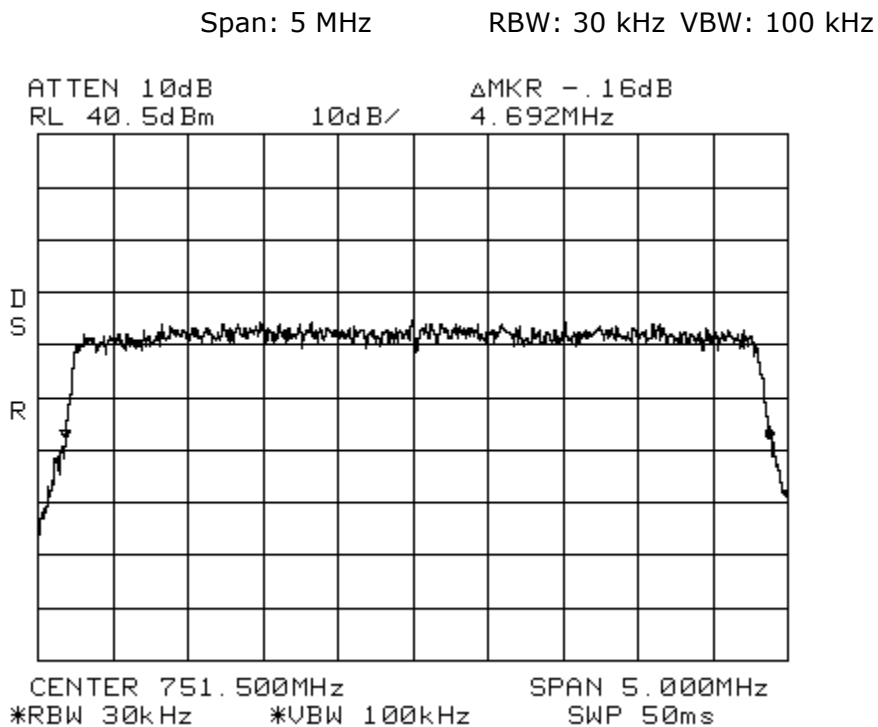
Occupied Bandwidth LTE 5 MHz Channel Bandwidth_Signal_In
Upper C Path 1

Spectrum 700 MHz



Occupied Bandwidth LTE 5 MHz Channel Bandwidth_Signal_Out
Upper C Path 1

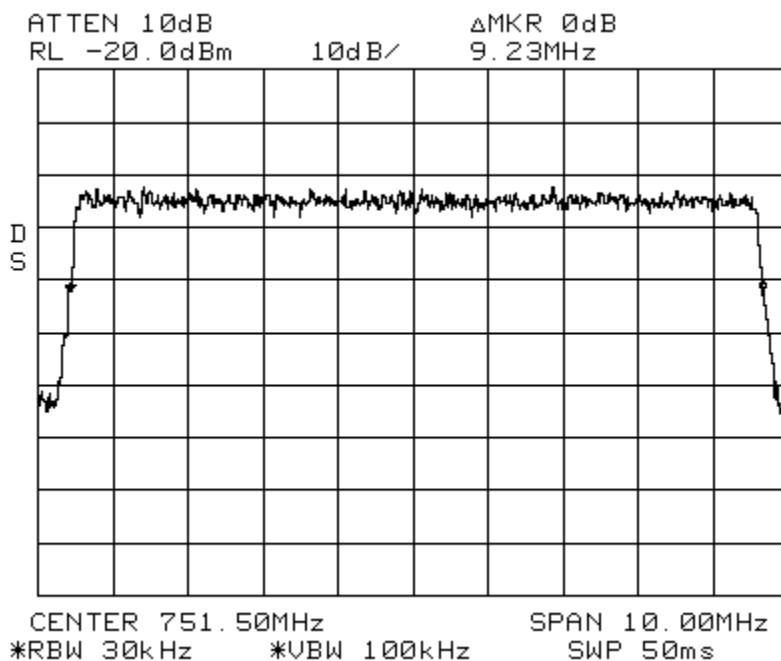
Spectrum 700 MHz



Occupied Bandwidth

LTE 10 MHz Channel Bandwidth_Signal_In
MHz Upper C Path 1
Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

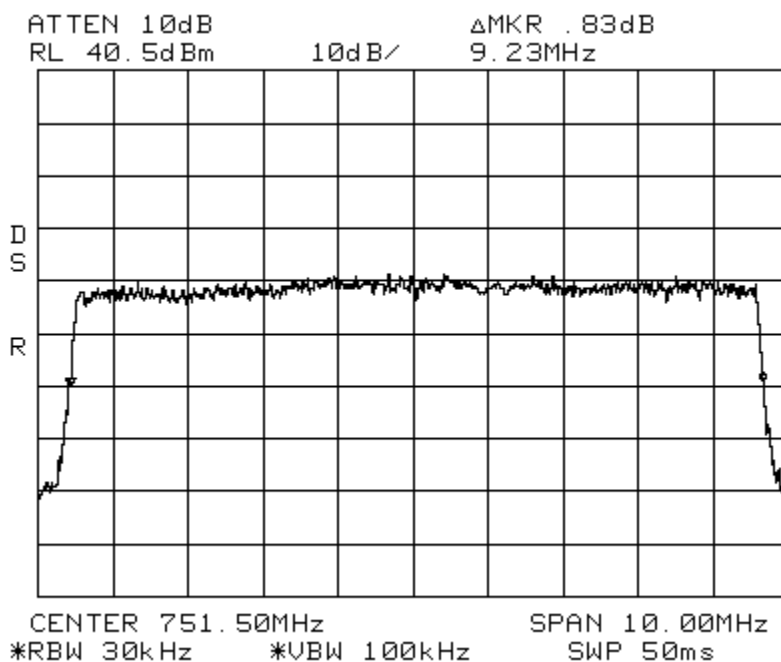
Spectrum 700



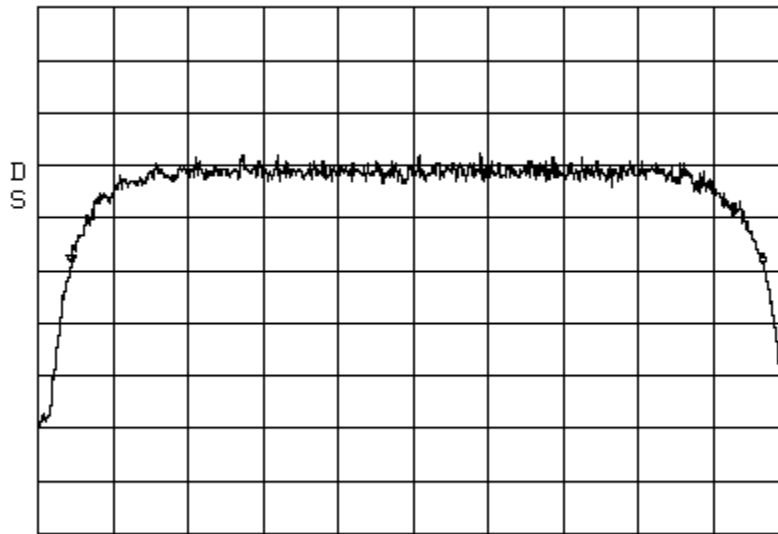
Occupied Bandwidth

LTE 10 MHz Channel Bandwidth _Signal_Out
MHz Upper C Path 1
Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

Spectrum 700

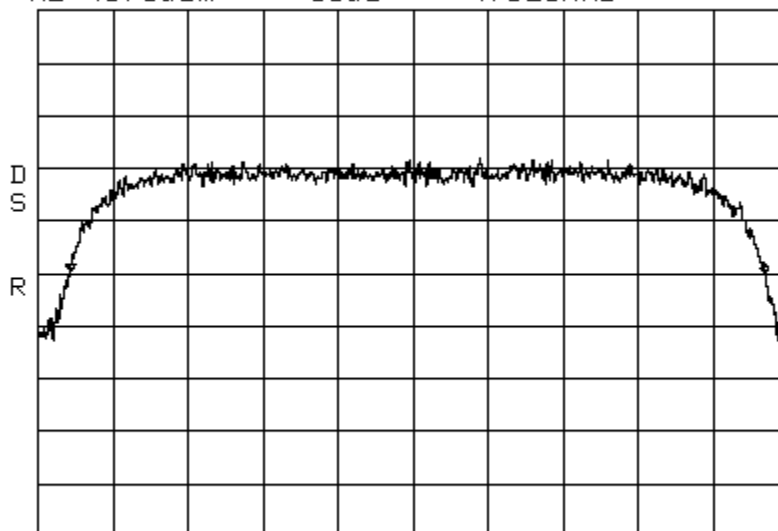


Occupied Bandwidth WCDMA_Signal_In Spectrum AWS Path 1
 Span: 5.0 MHz RBW: 30 kHz VBW: 100 kHz
 ATTN 10dB Δ MKR -.33dB
 RL 0dBm 10dB/ 4.608MHz



CENTER 2.132500GHz SPAN 5.000MHz
 *RBW 30kHz *VBW 100kHz *SWP 420ms

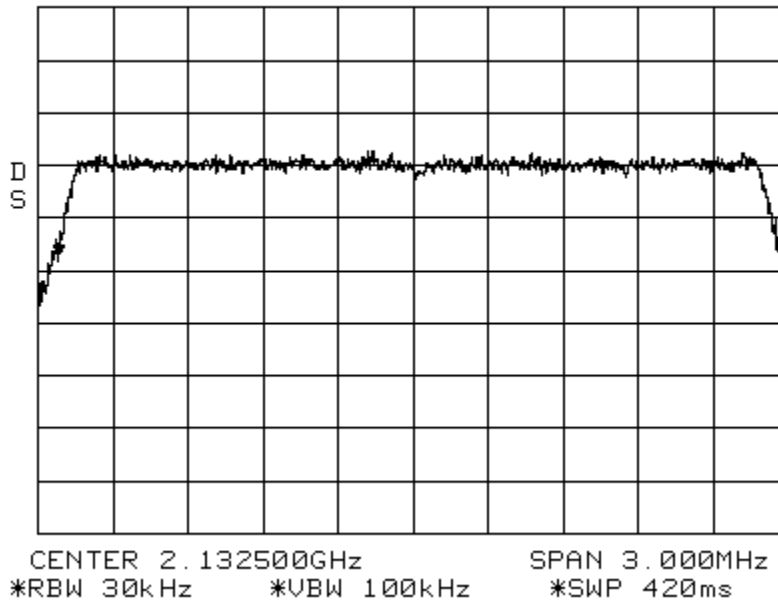
Occupied Bandwidth WCDMA_Signal_Out Spectrum AWS Path 1
 Span: 5.0 MHz RBW: 30 kHz VBW: 100 kHz
 ATTN 10dB Δ MKR -.50dB
 RL 41.5dBm 10dB/ 4.625MHz



CENTER 2.132500GHz SPAN 5.000MHz
 *RBW 30kHz *VBW 100kHz *SWP 420ms

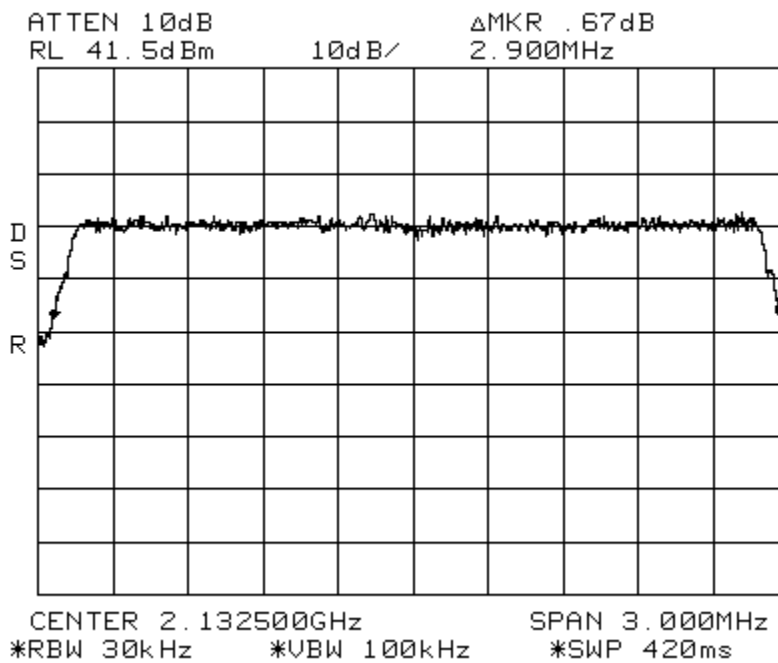
Occupied Bandwidth LTE 3 MHz Channel Bandwidth_Signal_In
Span: 3 MHz RBW: 30kHz VBW: 100 kHz
ATTEN 10dB RL 0dBm 10dB/ ΔMKR -.16dB
2.885MHz

AWS Path 1



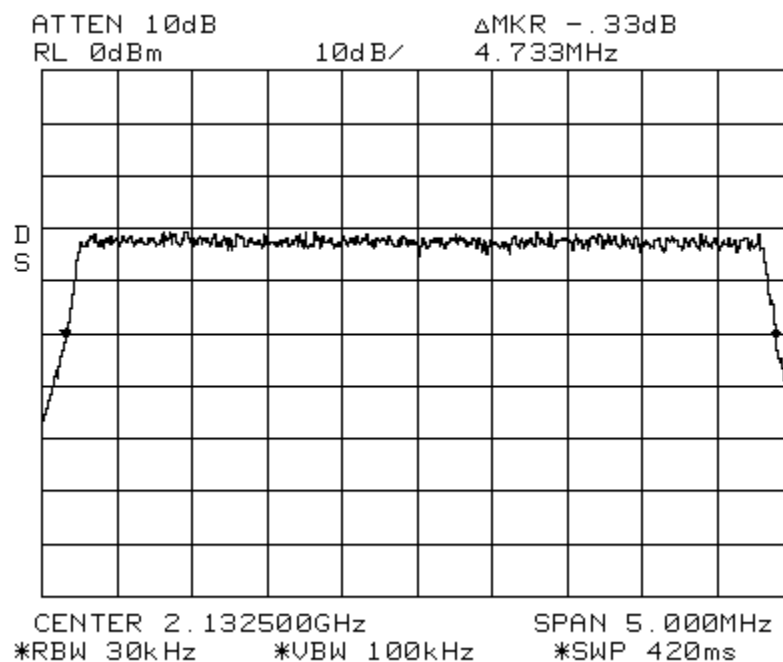
Occupied Bandwidth LTE 3 MHz Channel Bandwidth_Signal_Out
Span: 3 MHz RBW: 30 kHz VBW: 100 kHz

AWS Path 1



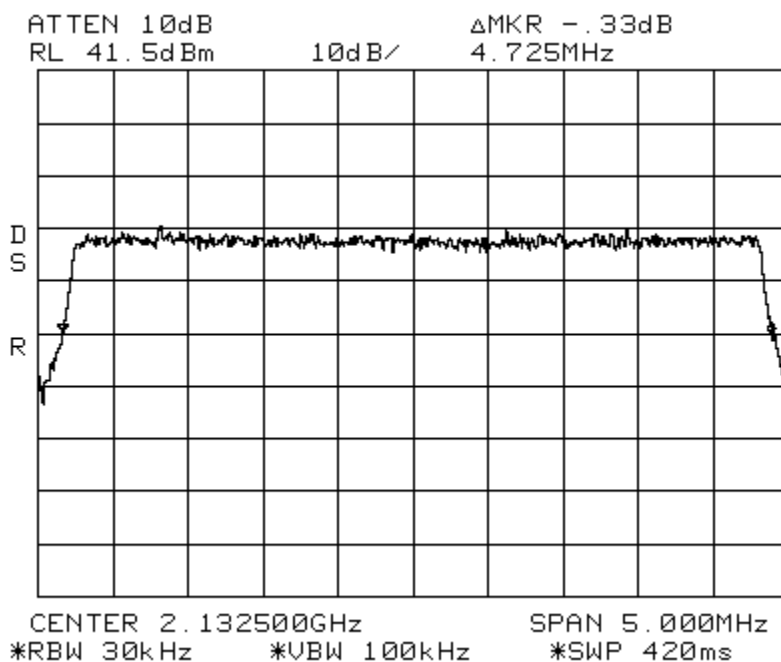
Occupied Bandwidth LTE 5 MHz Channel Bandwidth_Signal_In
Span: 5 MHz RBW: 30 kHz VBW: 100 kHz

AWS Path 1

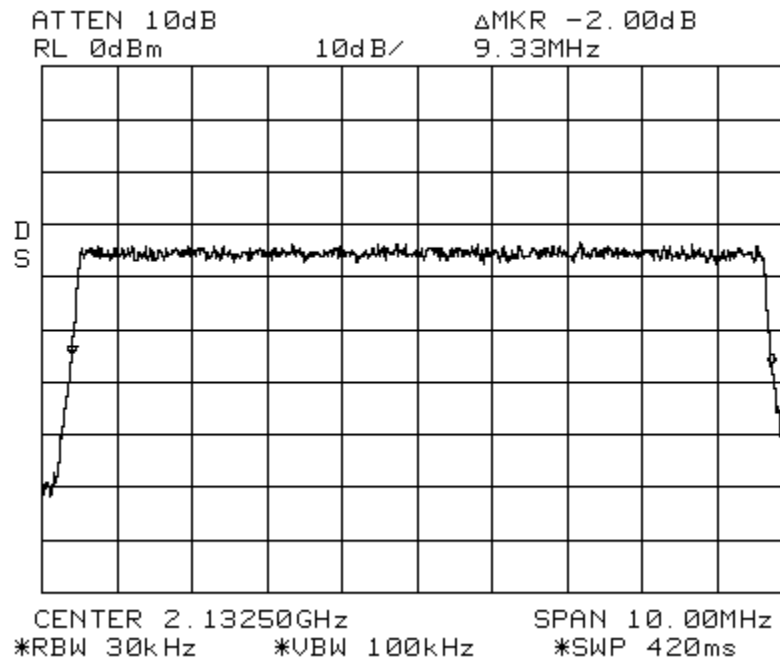


Occupied Bandwidth LTE 5 MHz Channel Bandwidth_Signal_Out
Span: 5 MHz RBW: 30 kHz VBW: 100 kHz

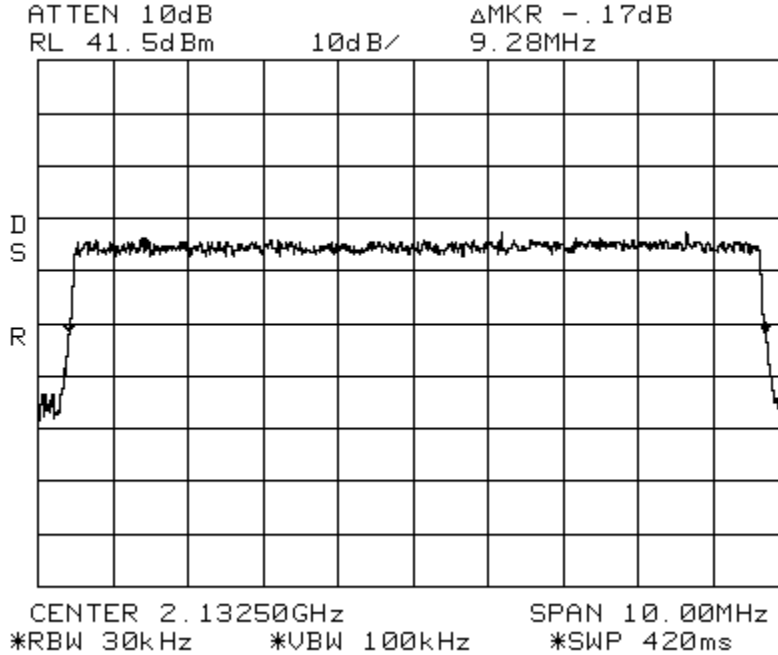
AWS Path 1



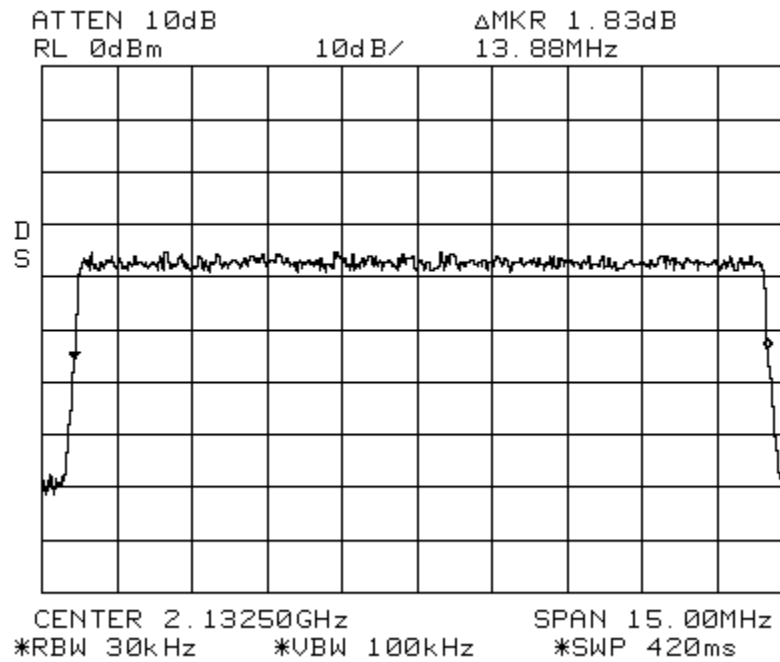
Occupied Bandwidth LTE 10 MHz Channel Bandwidth_Signal_In AWS Path 1
 Span: 10 MHz RBW: 30 kHz VBW: 100 kHz



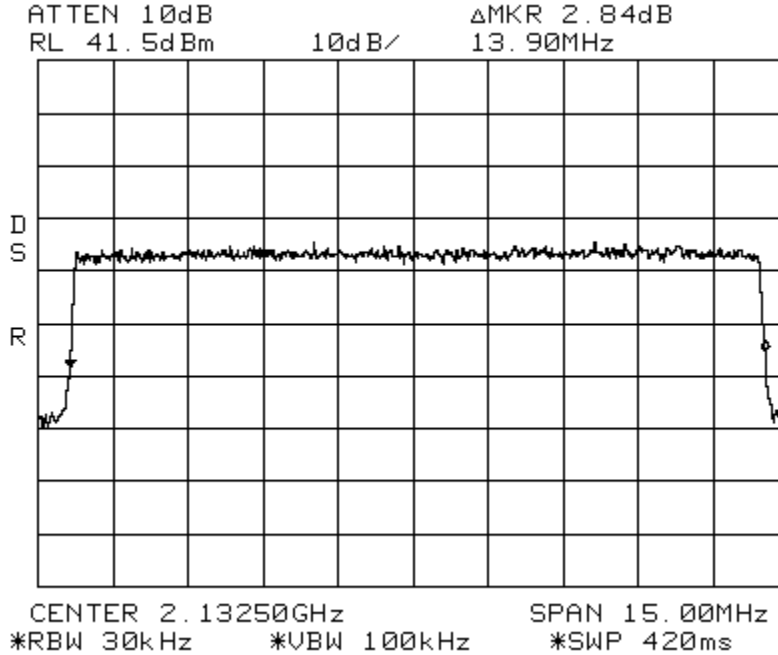
Occupied Bandwidth LTE 10 MHz Channel Bandwidth_Signal_Out AWS Path 1
 Span: 10 MHz RBW: 30 kHz VBW: 100 kHz



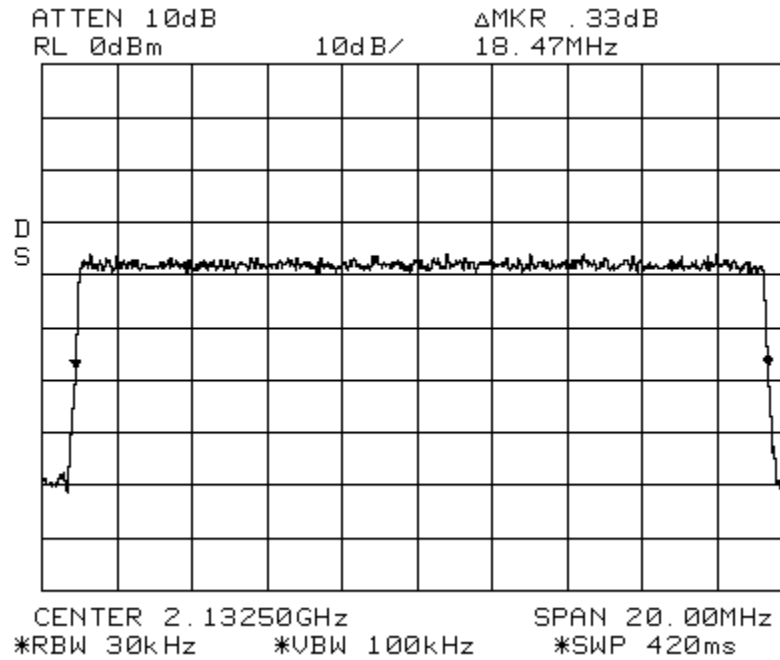
Occupied Bandwidth LTE 15 MHz Channel Bandwidth_Signal_In AWS Path 1
 Span: 15 MHz RBW: 30 kHz VBW: 100 kHz



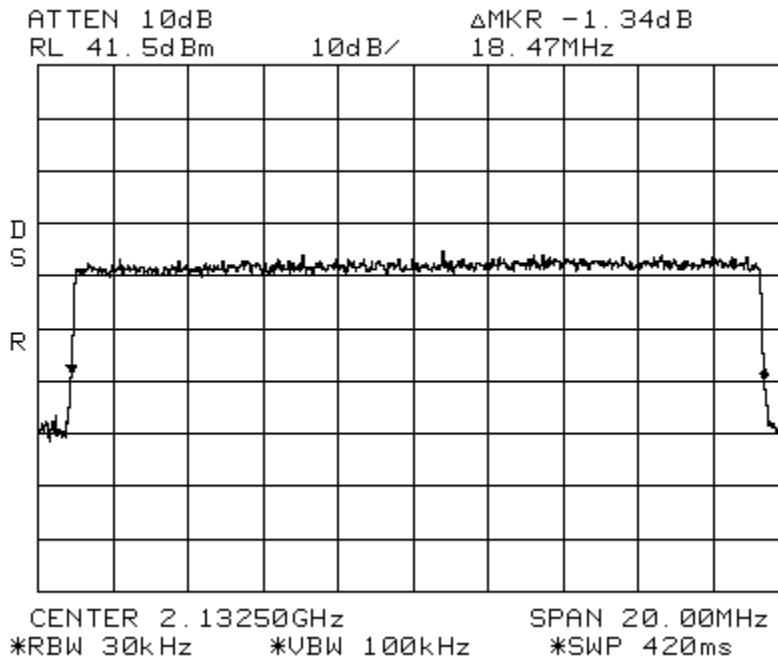
Occupied Bandwidth LTE 15 MHz Channel Bandwidth_Signal_Out AWS Path 1
 Span: 15 MHz RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth LTE 20 MHz Channel Bandwidth_Signal_In AWS Path 1
 Span: 20 MHz RBW: 30 kHz VBW: 100 kHz



Occupied Bandwidth LTE 20 MHz Channel Bandwidth_Signal_Out AWS Path 1
 Span: 20 MHz RBW: 30 kHz VBW: 100 kHz



6.5 FCC 2.1055 & 27.54 – Frequency Stability

Test Summary:

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

Test Methods Used:

TIA-603-C 2004, ANSI C63.4-2003, FCC 2.1055 & 27.54

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: 6/26/12 & 8/28/12

Tests Conducted By: Joshua J. Wittman

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

| Number | Description | Manufacturer | Model | ADC TELECOMMUNICAT IONS 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 | 9-8-12 | <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"/> |
| 11 | Attenuator | Aeroflex | 86-30-12 | N/A | CNR | <input checked="" type="checkbox"/> |
| 12 | RF Power Sensor | Agilent | 8481A | MC27649 | 6-30-13 | <input checked="" type="checkbox"/> |

Environmental Conditions in the lab:

Temperature: 24° C

Relative Humidity: 31%

Atmospheric Pressure: 97.7 kPa

Test Results:

| Host/DRU | IFEU | RAU | | | |
|---------------|---------------|---------------|-------------------|--------------------|---------------------|
| Input Voltage | Input Voltage | Input Voltage | Carrier Frequency | Measured Frequency | Meets Requirements? |
| 100 VAC | 54VDC | 54 VDC | 2110.200 MHz | 2110.200 MHz | Yes |
| 170 VAC | 54VDC | 54 VDC | 2110.200 MHz | 2110.200 MHz | Yes |
| 240 VAC | 54VDC | 54 VDC | 2110.200 MHz | 2110.200 MHz | Yes |
| 100 VAC | 54VDC | 54 VDC | 2132.500 MHz | 2132.500 MHz | Yes |
| 170 VAC | 54VDC | 54 VDC | 2132.500 MHz | 2132.500 MHz | Yes |
| 240 VAC | 54VDC | 54 VDC | 2132.500 MHz | 2132.500 MHz | Yes |
| 100 VAC | 54VDC | 54 VDC | 2154.800 MHz | 2154.800 MHz | Yes |
| 170 VAC | 54VDC | 54 VDC | 2154.800 MHz | 2154.800 MHz | Yes |
| 240 VAC | 54VDC | 54 VDC | 2154.800 MHz | 2154.800 MHz | Yes |
| Temperature | | | Carrier Frequency | Measured Frequency | Meets Requirements? |
| | | | | | |
| -30 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| -20 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| -10 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 0 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 10 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 20 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 30 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 40 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 45 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| 50 Deg. C | | | 2110.200 MHz | 2110.200 MHz | Yes |
| | | | | | |
| -30 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| -20 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| -10 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 0 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 10 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 20 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 30 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 40 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 45 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| 50 Deg. C | | | 2132.500 MHz | 2132.500 MHz | Yes |
| | | | | | |
| -30 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| -20 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| -10 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 0 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 10 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 20 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 30 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 40 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 45 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |
| 50 Deg. C | | | 2154.800 MHz | 2154.800 MHz | Yes |

| Host/DRU | IFEU | RAU | | | |
|---------------|---------------|---------------|-------------------|--------------------|---------------------|
| Input Voltage | Input Voltage | Input Voltage | Carrier Frequency | Measured Frequency | Meets Requirements? |
| 100 VAC | 54VDC | 54 VDC | 728.200 MHz | 728.200 MHz | Yes |
| 170 VAC | 54VDC | 54 VDC | 728.200 MHz | 728.200 MHz | Yes |
| 240 VAC | 54VDC | 54 VDC | 728.200 MHz | 728.200 MHz | Yes |
| 100 VAC | 54VDC | 54 VDC | 742.000 MHz | 742.000 MHz | Yes |
| 170 VAC | 54VDC | 54 VDC | 742.000 MHz | 742.000 MHz | Yes |
| 240 VAC | 54VDC | 54 VDC | 742.000 MHz | 742.000 MHz | Yes |
| 100 VAC | 54VDC | 54 VDC | 756.800 MHz | 756.800 MHz | Yes |
| 170 VAC | 54VDC | 54 VDC | 756.800 MHz | 756.800 MHz | Yes |
| 240 VAC | 54VDC | 54 VDC | 756.800 MHz | 756.800 MHz | Yes |
| Temperature | | | Carrier Frequency | Measured Frequency | Meets Requirements? |
| | | | | | |
| -30 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| -20 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| -10 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 0 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 10 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 20 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 30 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 40 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 45 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| 50 Deg. C | | | 728.200 MHz | 728.200 MHz | Yes |
| | | | | | |
| -30 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| -20 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| -10 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 0 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 10 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 20 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 30 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 40 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 45 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| 50 Deg. C | | | 742.000 MHz | 742.000 MHz | Yes |
| | | | | | |
| -30 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| -20 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| -10 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 0 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 10 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 20 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 30 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 40 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 45 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |
| 50 Deg. C | | | 756.800 MHz | 756.800 MHz | Yes |

Measurement Protocol

[Table of Contents; Section 1.0](#)

[Back to Emission Limits; Section 5.1.3](#)

Measurement Protocol

Environmental conditions of the lab, (ADC)

Temperature: 24° C

Relative Humidity: 31 %

Atmospheric Pressure: 97.7 kPa

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 is 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

[Table of Contents; Section 1.0](#)Document Name: **100856639MIN-001****Test Engineer:** Simon Khazon**Date:** August 28, 2012**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