



# Test Report Summary

## FCC CFR 47, Part 27

### Wireless Communications Service

**Manufacturer:** ADC Telecommunications, Inc.

**Name of Equipment:** Spectrum 700Path 1/700Path 2 MIMO SRAU

**Model Number(s):** SPT-S1-7070-1-MIMO

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

**Test Report Number:** MN120724 700P1 700P2 MIMO SRAU

**Test Date(s):** 16 & 20 July, 2012 (Intertek)  
25, 26, 27, & 28 June, 2011 (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: 24 July, 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 55379  
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:** MN120724 700P1 700P2 MIMO SRAU

**Date of Issue:** 24 July, 2012

**Model Number(s):** SPT-S1-7070-1-MIMO

**Product Name:** Spectrum 700Path 1/700Path 2 MIMO SRAU

**Product Type:** Repeater/Booster

**Applicant:** ADC Telecommunications

**Manufacturer:** ADC Telecommunications

**License Holder:** ADC Telecommunications

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

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

**Test Project Number:** **100789990MIN-001**  
**Reference(s)**

**Total pages including Appendices:** 154



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## 2.0 REVISION DESCRIPTION

Rev	Total Pages	Date	Description
A	154	24 July, 2012	Original Release

## 3.0 DOCUMENTATION

### 3.1 Test Regulations

- 27.50 Power limits
- 27.53 Emission limits
- 27.54 Frequency stability

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: 25° C  
Relative Humidity: 29%  
Atmospheric Pressure: 98.0 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))

### 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 repeater/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-S1-7070-1-MIMO	None	

### 3.12 Support Equipment

Description	Manufacturer	Model #	FCC ID #
Power Meter	HP	437B	
Signal Generator	Aeroflex	IFR 3413	

### 3.13 Deviations from Standard:

Modifications required to pass:

As indicated on the data sheet(s)

■ **None**

Test Specification Deviations; Additions to or Exclusions from:

As indicated in the Test Plan

■ **None**

### 3.14 General Remarks:

None.

### 3.15 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 Radiated Emissions Report **100789990MIN-001**

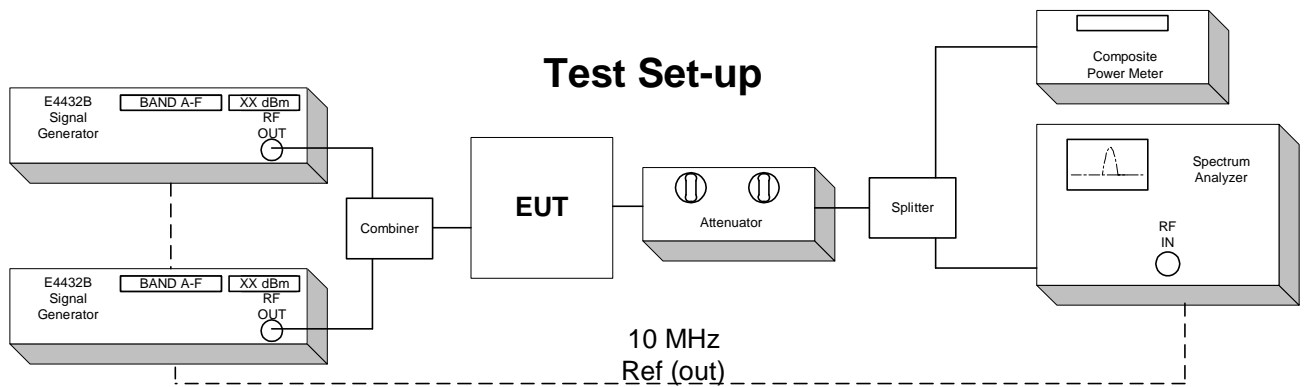
## 4.2 Test Set-up Drawings

### Conducted and Radiated Emission Limits Test

#### Conducted Output Power Test

#### Inter-Modulation Test

#### Occupied Bandwidth Modulation Test

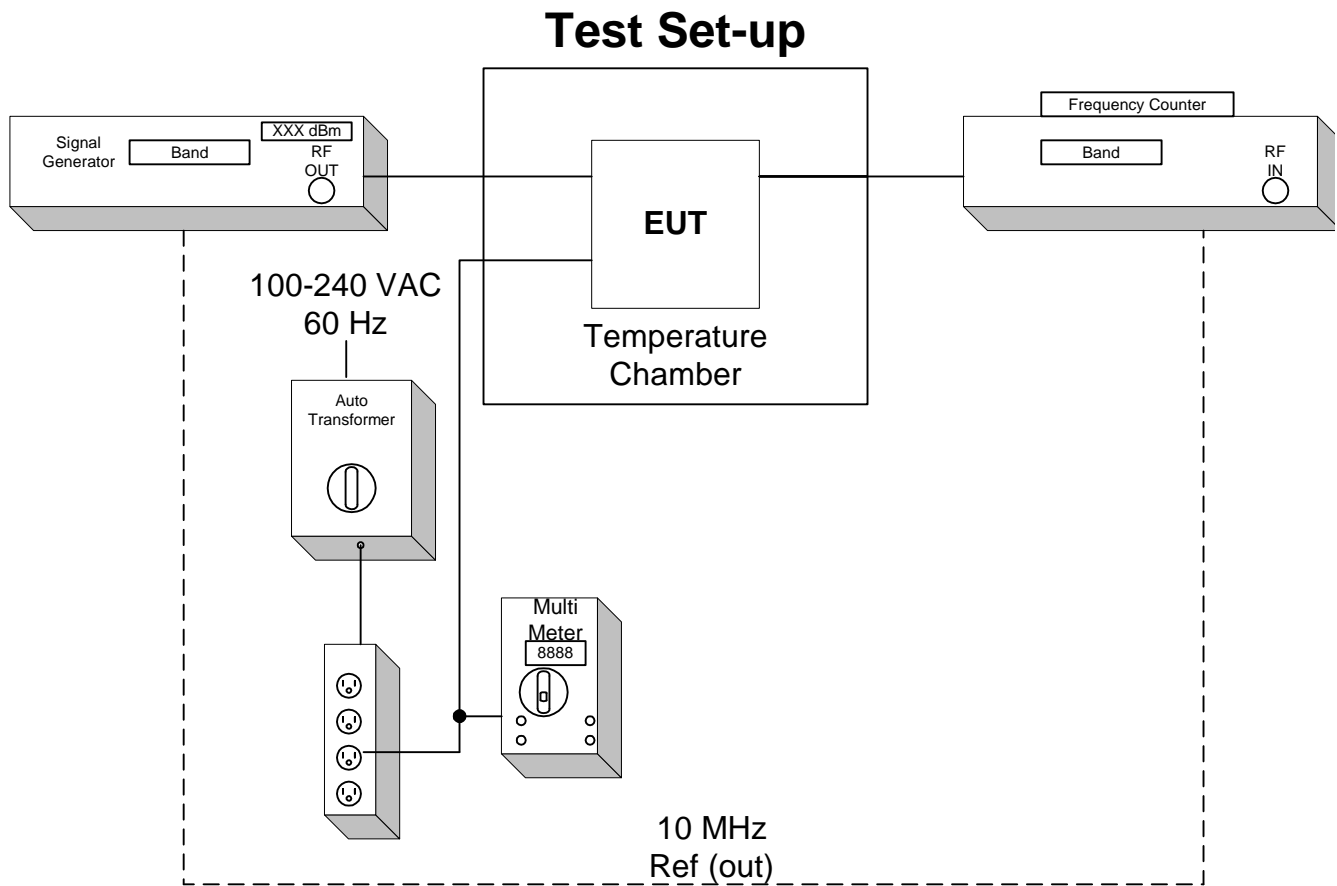




# Frequency Tolerance Test

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 -25° to +50° C, and was tested with its range.



## 5.0 TEST RESULTS

### 5.1.1 27.50 RF Power Limits

#### Test Summary:

- The requirements are:                     **MET**                     NOT MET
- Minimum margin of compliance is 20.22 dB at 737.0 MHz(LTE 1.4 MHz)(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 20.15 dB at 737.0 MHz(LTE 1.4 MHz)(LowerABC)(Path2)
- Minimum margin of compliance is 21.02 dB at 737.0 MHz(LTE 3 MHz)(LowerABC)(Path2)
- Minimum margin of compliance is 20.37 dB at 737.0 MHz(LTE 5 MHz)(LowerABC)(Path2)
- Minimum margin of compliance is 20.37 dB at 737.0 MHz(LTE 10 MHz)(LowerABC)(Path2)
- Minimum margin of compliance is 20.59 dB at 751.5 MHz(LTE 1.4 MHz)(UpperC)(Path2)
- Minimum margin of compliance is 21.11 dB at 751.5 MHz(LTE 3 MHz)(UpperC)(Path2)
- Minimum margin of compliance is 20.26 dB at 751.5 MHz(LTE 5 MHz)(UpperC)(Path2)
- Minimum margin of compliance is 19.96 dB at 751.5 MHz(LTE 10 MHz)(UpperC)(Path2)

#### Test Location:

INTERTEK (Oakdale, MN)

**ADC facility (Shakopee, MN)**

#### Test Distance:

3 Meters

10 Meters

**Conducted measurement**

#### Test Equipment (ADC):

1, 2, 6, 7, 12

#### Test Limit:

100 Watts or 50 dBm Limit

#### Test Data:

[Conducted Output Power; Section 7.2](#)

[Table of Contents; Section 1.0](#)

**Test Engineer:** Joshua J. Wittman

**Date:** 25 June, 2012

## 5.1.2 27.54 Frequency Stability

### Test Summary:

- The requirements are:             **MET**                             NOT MET
- The fundamental emission stays within the limit.
- Frequency measured over a temperature range of -25 to 50° C and an input voltage range of 100 to 240 VAC.

### Test Location:

INTERTEK (Oakdale, MN)

**ADC facility (Shakopee, MN)**

### Test Equipment (ADC):

3, 4, 5, 6, 9,11,12

### Test Limit:

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

### Test Data:

[Frequency Stability; Section 7.3](#)

[Table of Contents; Section 1.0](#)

**Test Engineer:** Joshua J. Wittman

**Date:** 26 June, 2012

### 5.1.3 27.53 Emission Limitations

#### Test Summary:

- The requirements are:                     **MET**                     NOT MET
- Out of band emissions were less than -13 dBm.
- Outside the emission bandwidth of the carrier, all emissions are attenuated at least 26 dB below the transmitter power.

#### Test Location:

INTERTEK (Oakdale, MN)

**ADC facility (Shakopee, MN)**

#### Test Equipment (ADC):

1, 2, 6, 7, 12, 13

#### 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.

Outside of the carrier emissions bandwidth:

26 dB below the transmitter power

#### Test Data:

[Conducted Emissions; Section 7.1](#)

[Intermodulation; Section 7.4](#)

[Occupied Bandwidth; Section 7.5](#)

Radiated Emissions; ([Appendix B](#))

**Test Engineer:** Joshua J. Wittman

**Date:** 25 June, 2012

**Date:** 27, 28 June, 2012

**Date:** 27 June, 2012

[Table of Contents; Section 1.0](#)

## 6.0 TEST EQUIPMENT

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

Number	Description	Manufacturer	Model	ADC TELECOMMUNICATIONS Serial Number	Cal Due	Used
1	Spectrum Analyzer	HP	8563E	MC27690	6-30-13	<input checked="" type="checkbox"/>
2	Power Meter	HP	437B	MC27754	6-30-13	<input checked="" type="checkbox"/>
3	Multimeter	Fluke	79	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	6-30-12	<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.

7.0

## APPENDIX A

Conducted Emissions Test Data

[Table of Contents; Section 1.0](#)

**Test Engineer:** Joshua J. Wittman

## 7.1 Conducted Emission Limits Test

[Table of Contents; Section 1.0](#)

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

The out of band emissions were measured directly from the EUT antenna output in the TX path using a spectrum analyzer from 30 MHz to the 10<sup>th</sup> harmonic of the highest carrier frequency. Test signals used are LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz Channel Bandwidths. The different signals were input one at a time to the EUT. In all cases, the out of band emissions were less than -13 dBm from the equation

$$(19\text{dBm} - [43 + 10\log(0.08\text{W})])$$

Band edge compliance is also demonstrated using a LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz Channel Bandwidths signal at the upper and lower limits of the band.

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  $\approx$  -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.

27.53(c)(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

27.53(c)(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

27.53(c)(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

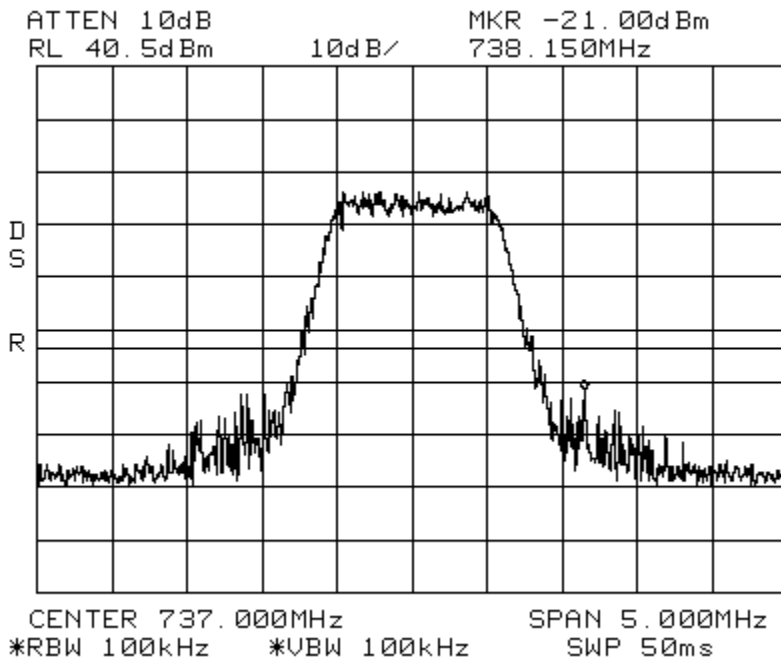
27.53(f) For operations in the 746-763 MHz, 775-793 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Results:

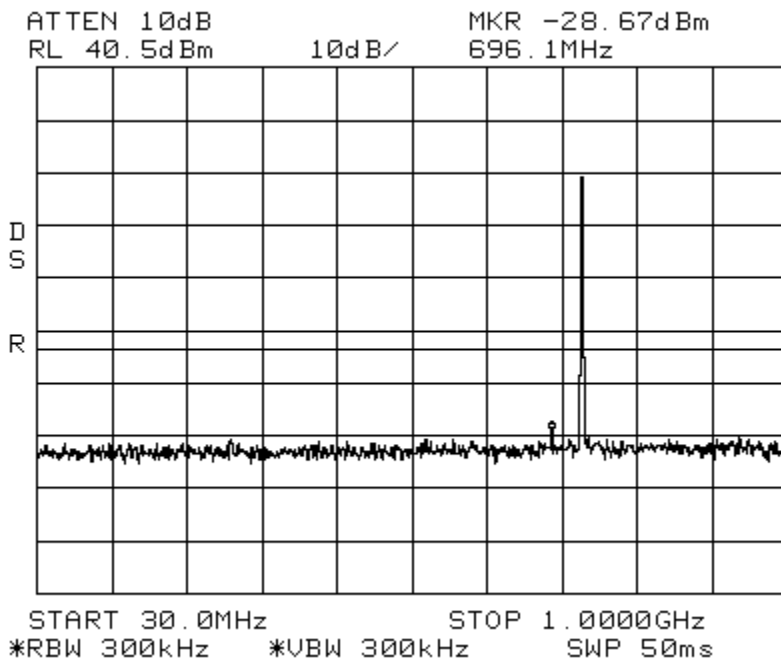
Pass (See plots)



Conducted Emissions      LTE 1.4 MHz Channel Bandwidth      Spectrum 700 MHz Lower ABC  
Path 1  
Center: 737 MHz      Span: 5 MHz      RBW/VBW: 100 kHz



Conducted Emissions      LTE 1.4 MHz Channel Bandwidth      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



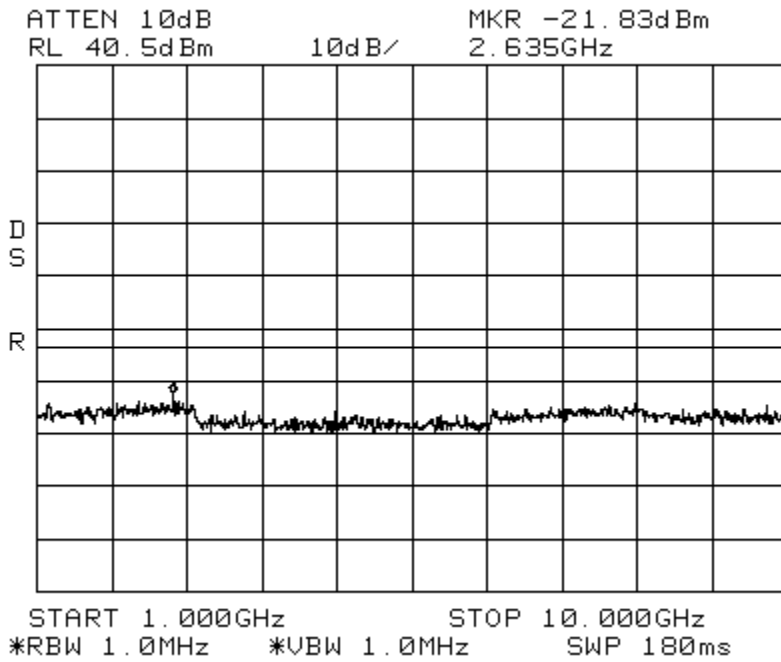
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 1

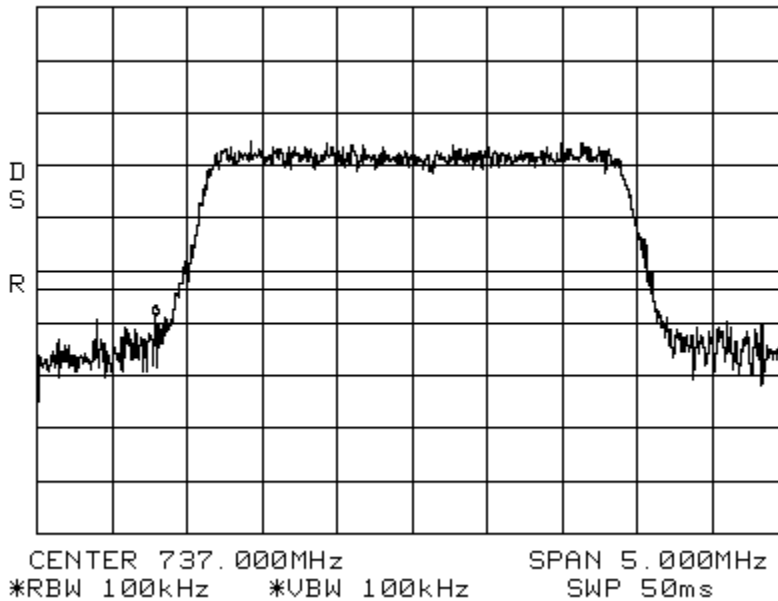
Spectrum 700 MHz Lower ABC

Center: 737 MHz

Span: 5 MHz

RBW/VBW: 100 kHz

ATTEN 10dB  
RL 40.5dBm 10dB/ MKR -18.17dBm  
735.292MHz



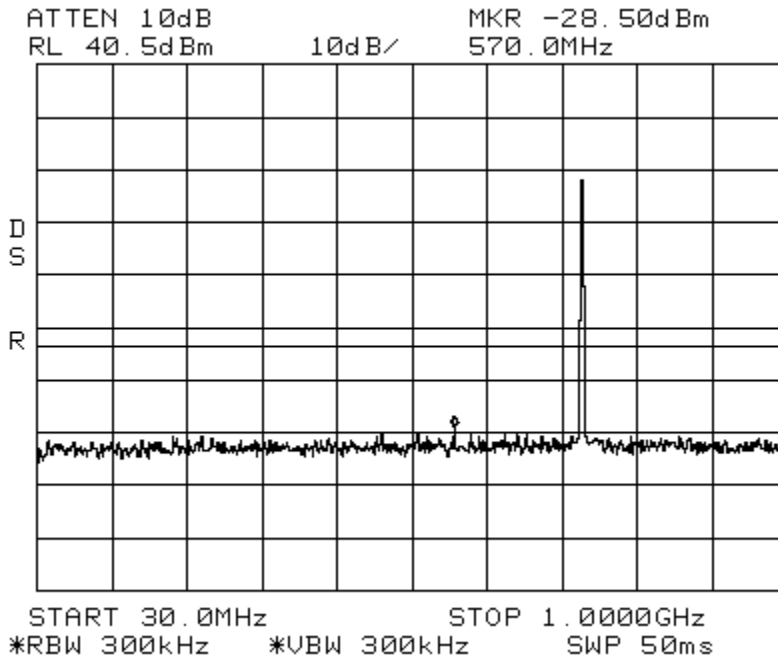
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



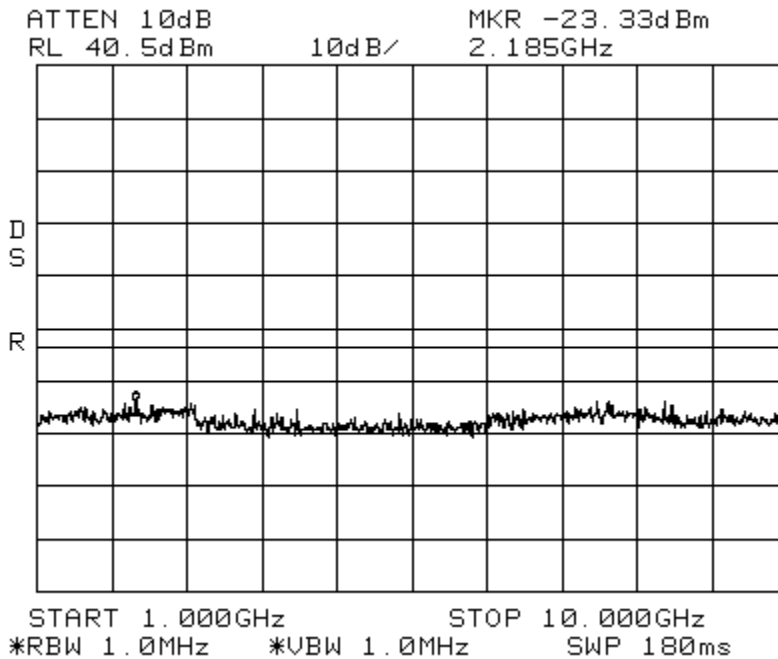
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Lower ABC

Span: 1 GHz to 10 GHz

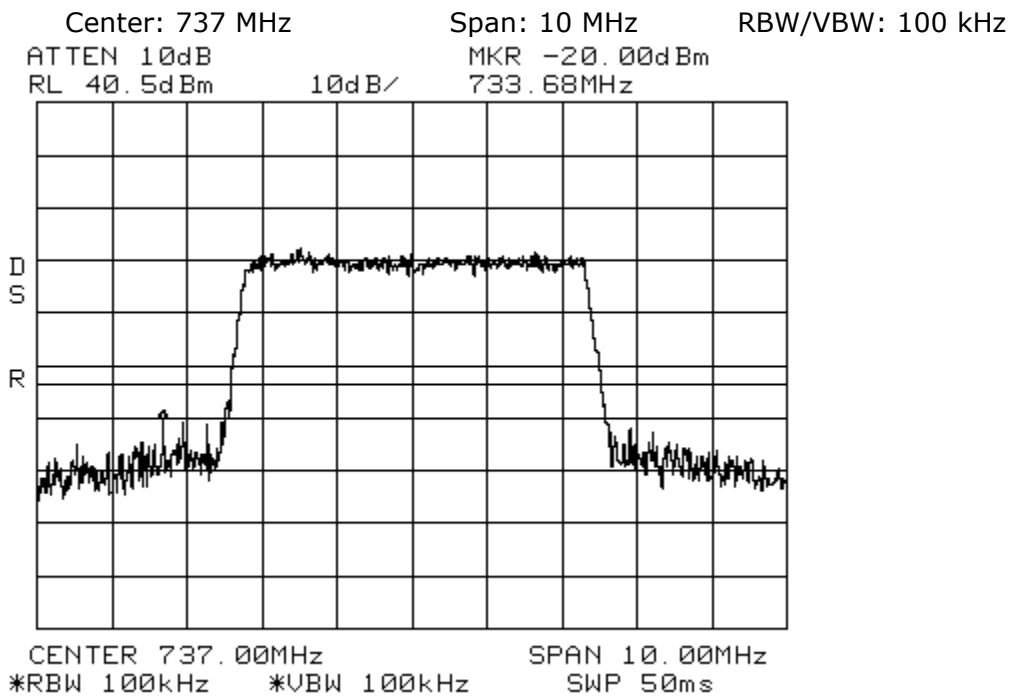
RBW/VBW: 1 MHz



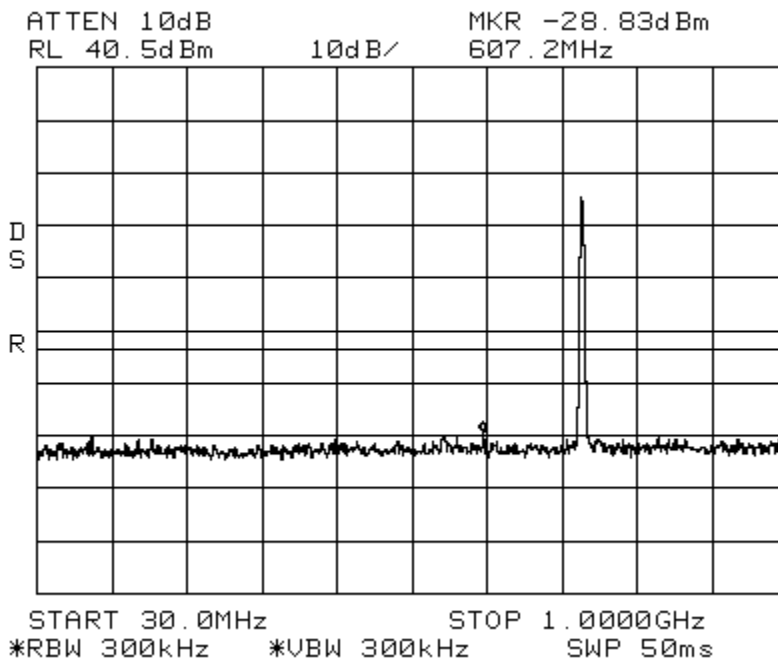
Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Lower ABC



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



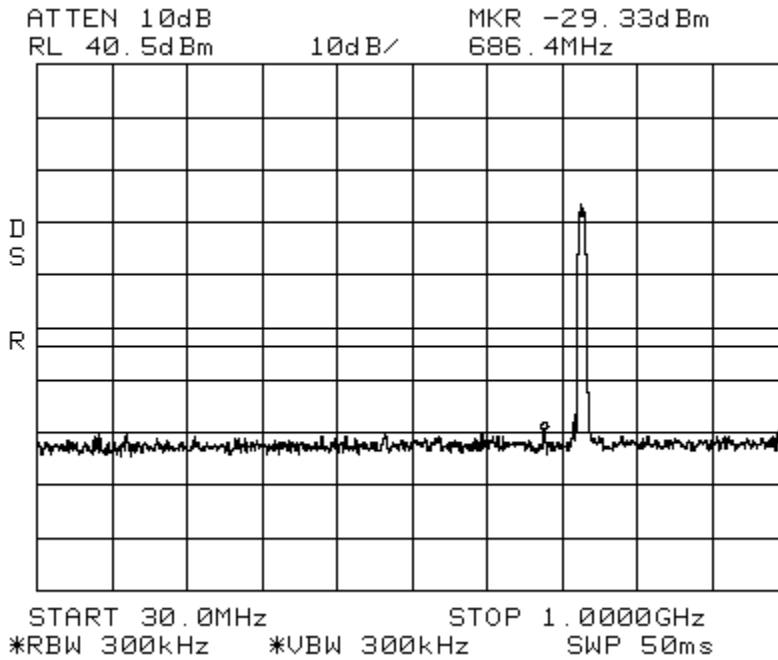
Conducted Emissions

LTE 10 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



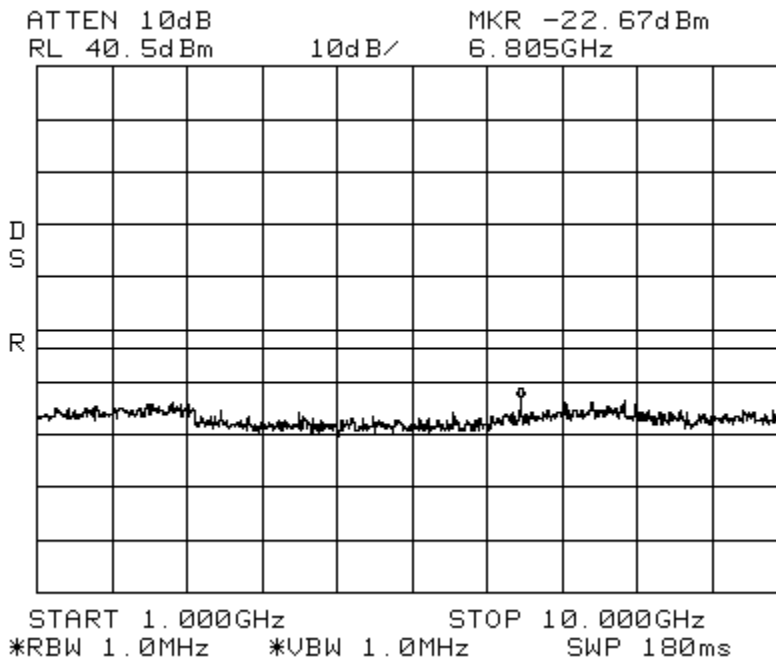
Conducted Emissions

LTE 10 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

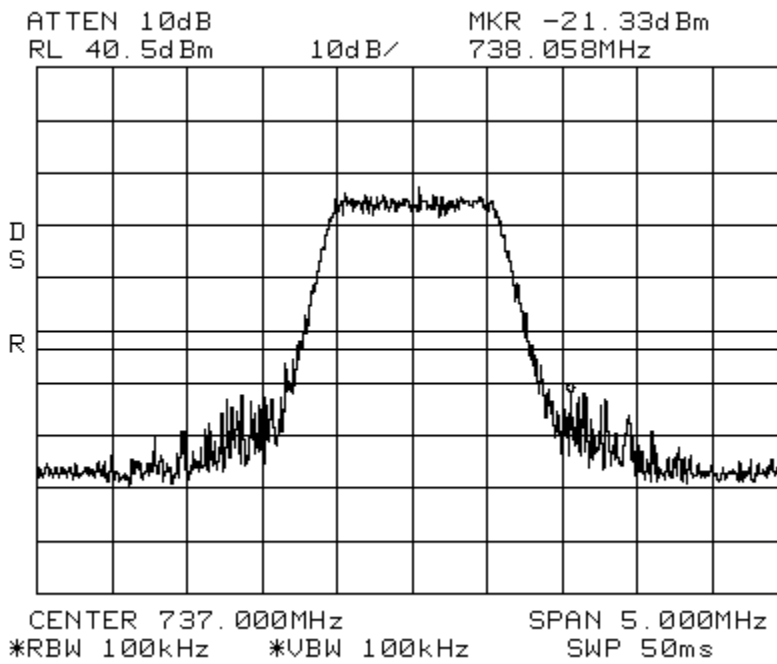
LTE 1.4 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Center: 737 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



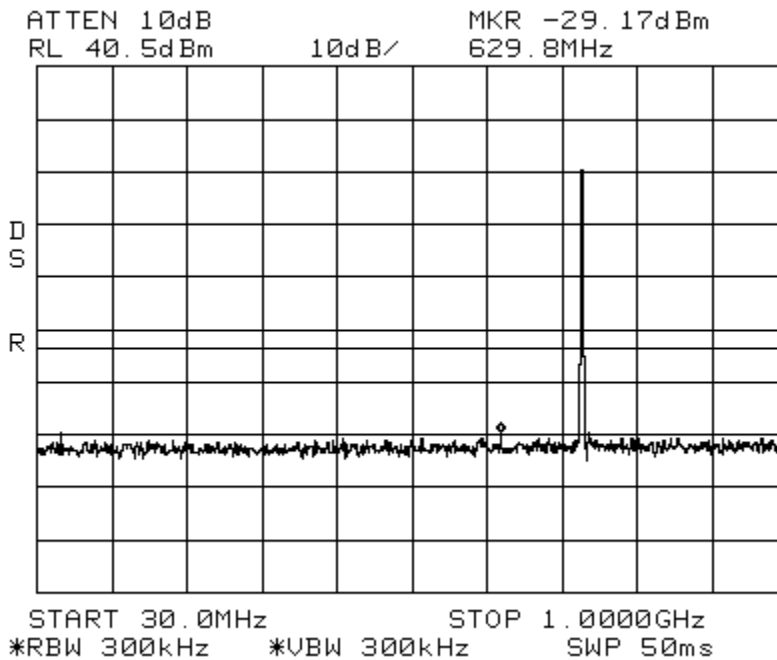
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



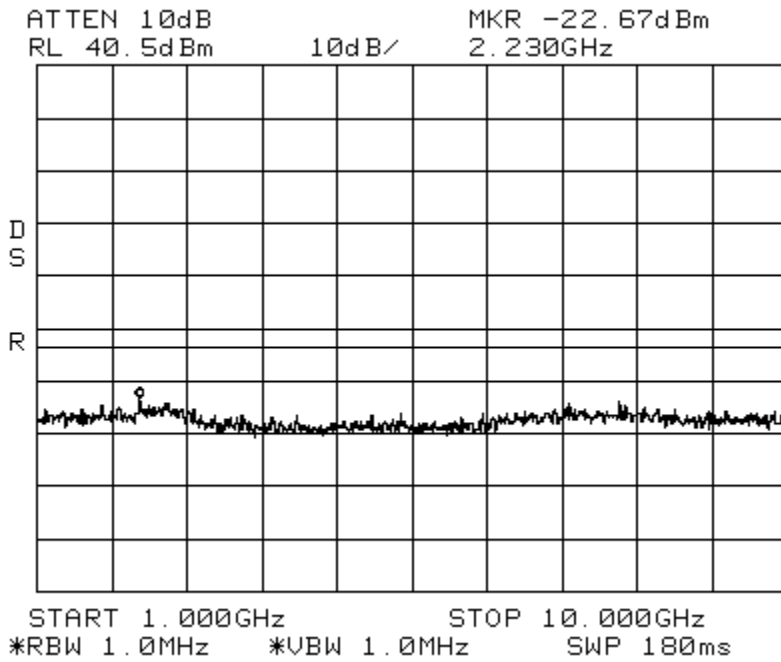
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 2

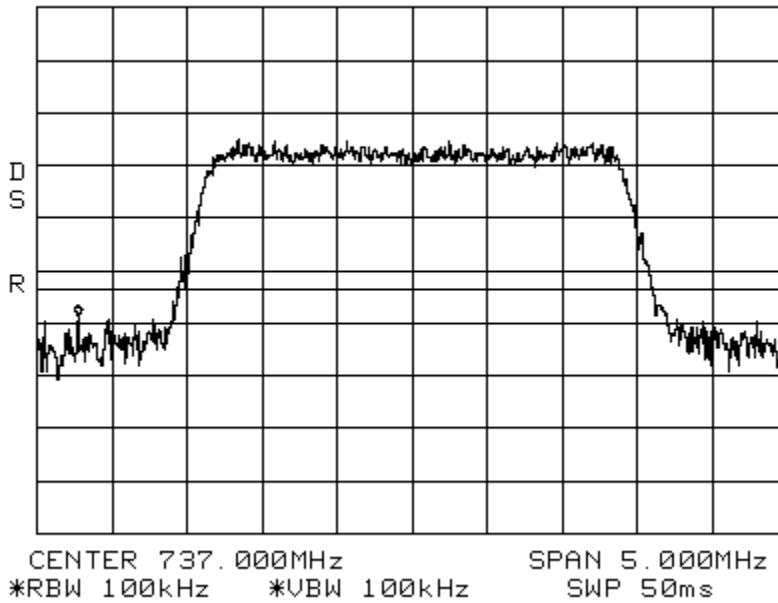
Spectrum 700 MHz Lower ABC

Center: 737 MHz

Span: 5 MHz

RBW/VBW: 100 kHz

ATTEN 10dB  
RL 40.5dBm  
10dB/  
MKR -18.00dBm  
734.775MHz





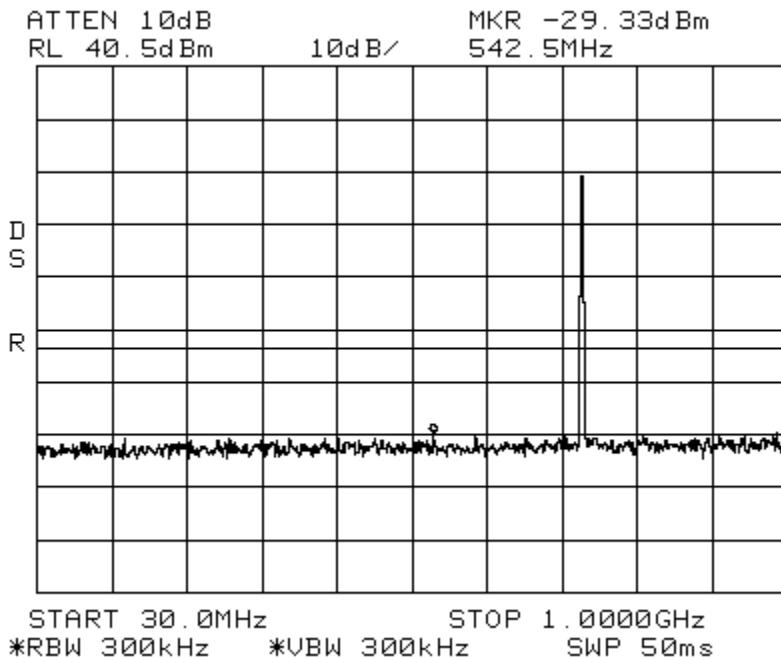
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



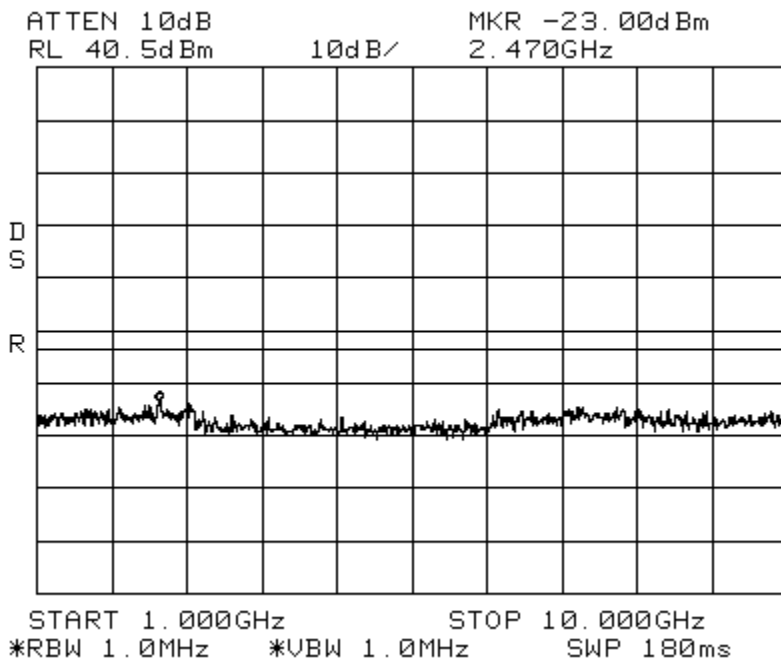
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

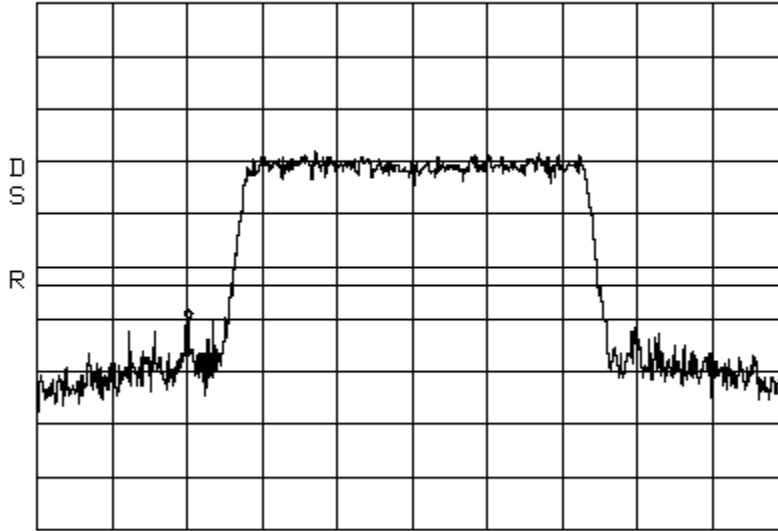


Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Center: 737 MHz      Span: 10 MHz      RBW/VBW: 100 kHz  
ATTEN 10dB      MKR -19.50dBm  
RL 40.5dBm      10dB/      734.02MHz



CENTER 737.00MHz      SPAN 10.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

Conducted Emissions

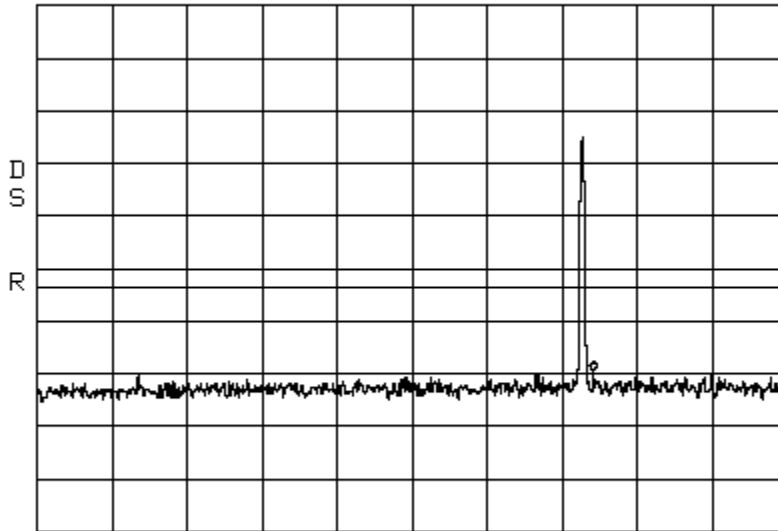
LTE 5 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

ATTEN 10dB      MKR -29.00dBm  
RL 40.5dBm      10dB/      749.4MHz



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

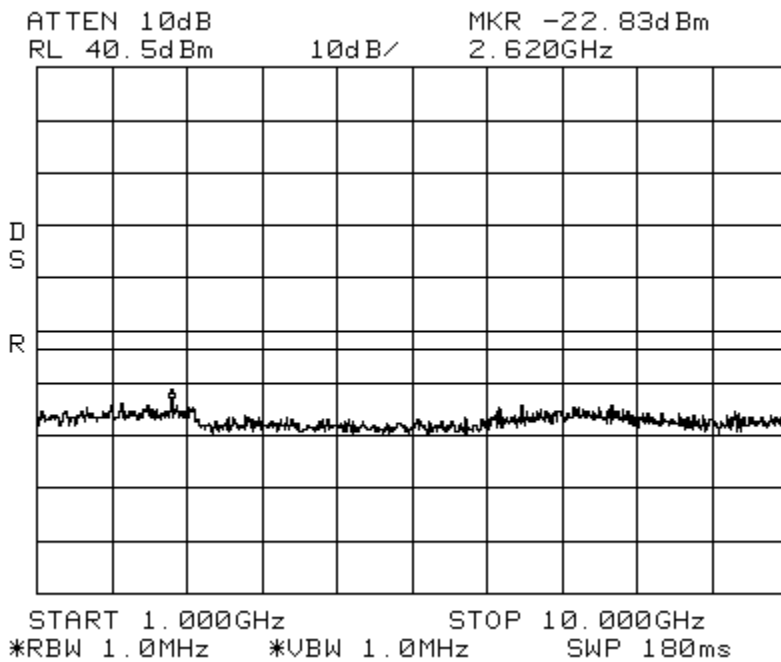
Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

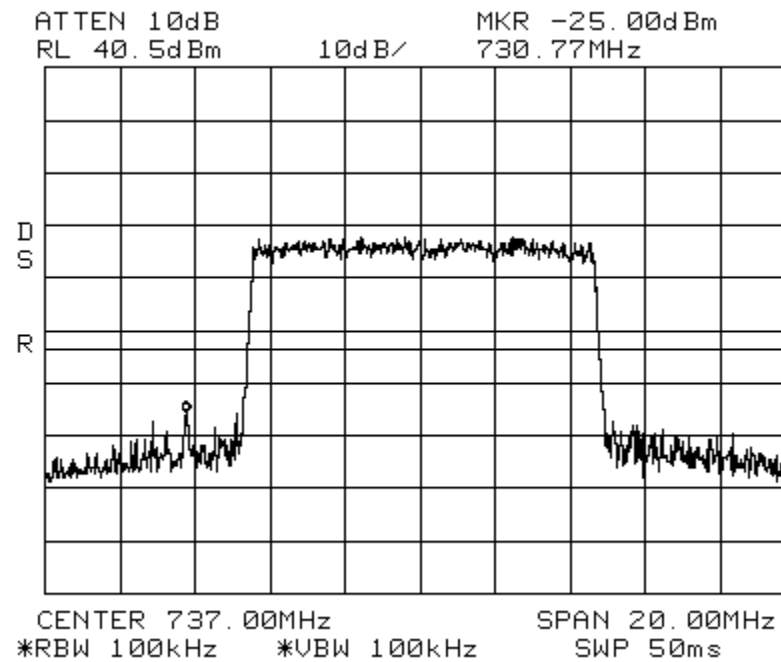
LTE 10 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

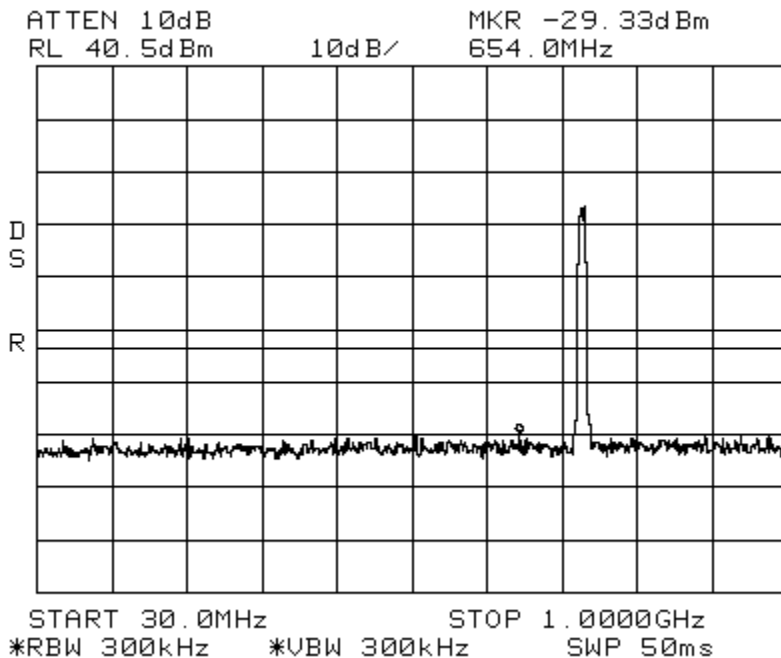
Center: 737 MHz

Span: 20MHz

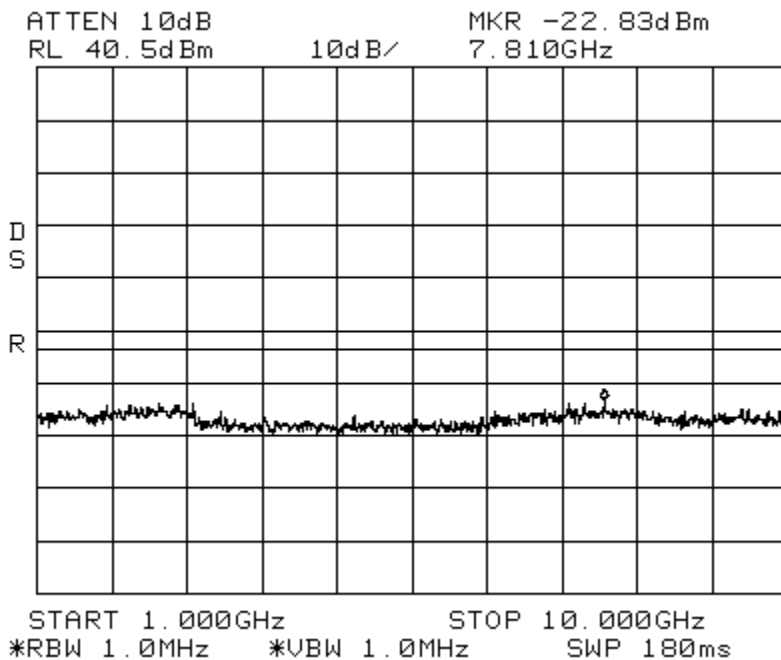
RBW/VBW: 100 kHz



Conducted Emissions      LTE 10 MHz Channel Bandwidth      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Conducted Emissions      LTE 10 MHz Channel Bandwidth      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



Conducted Emissions

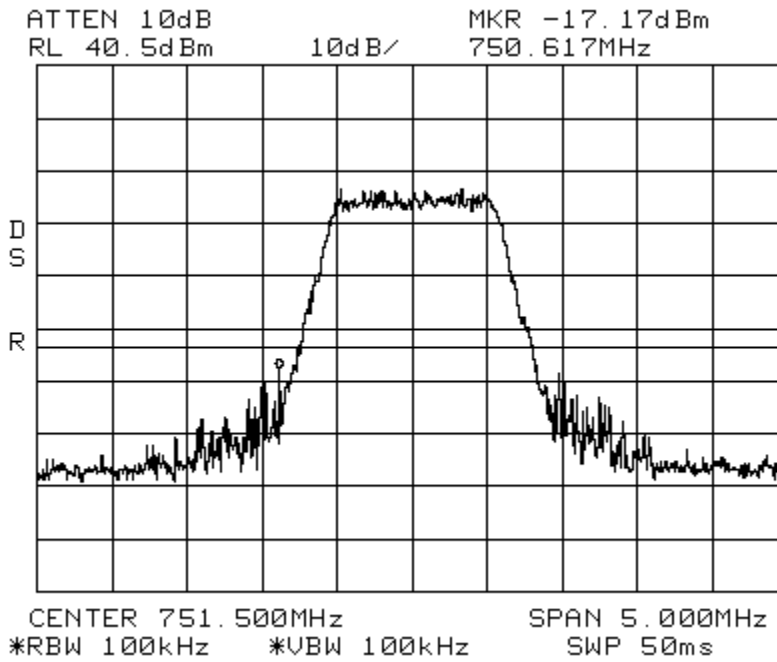
LTE 1.4 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Center: 751.5 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



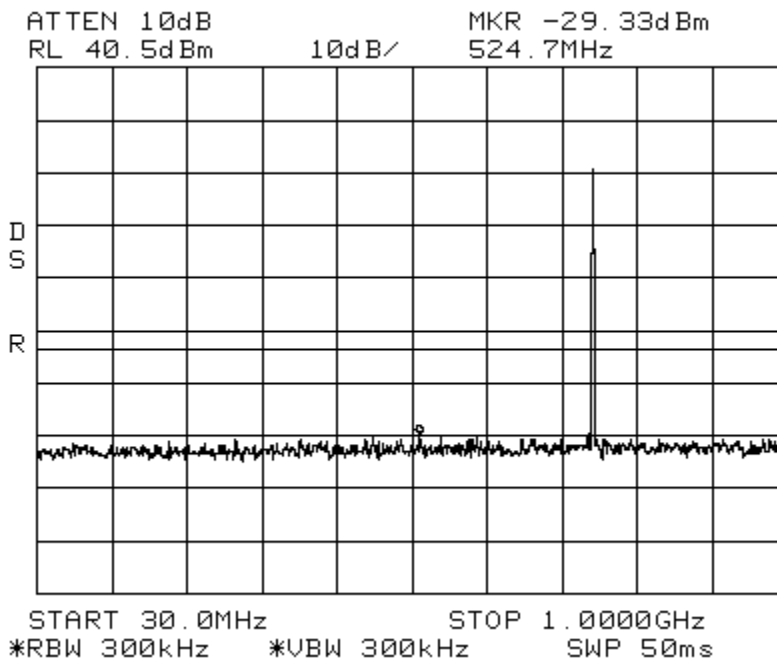
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth  
Path 1

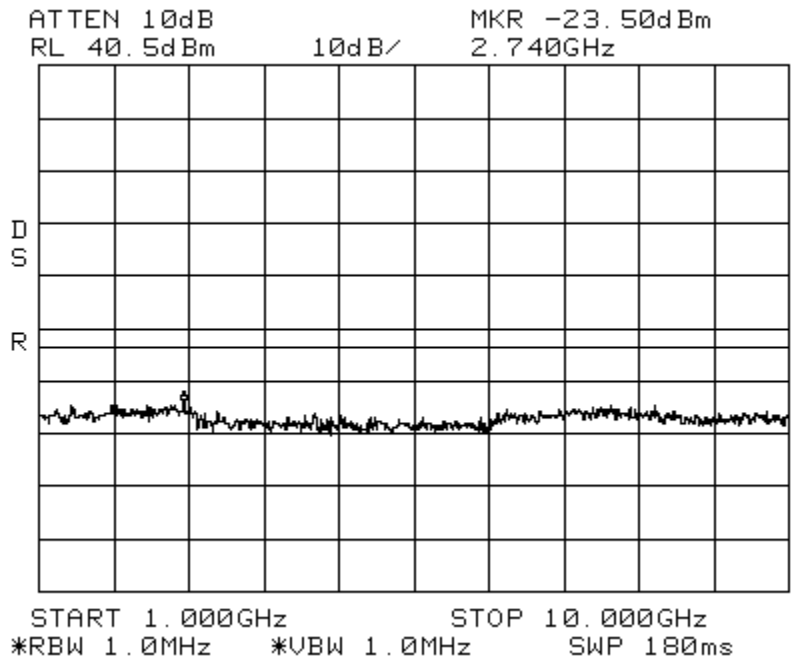
Spectrum 700 MHz Upper C

Span: 30 MHz to 1 GHz

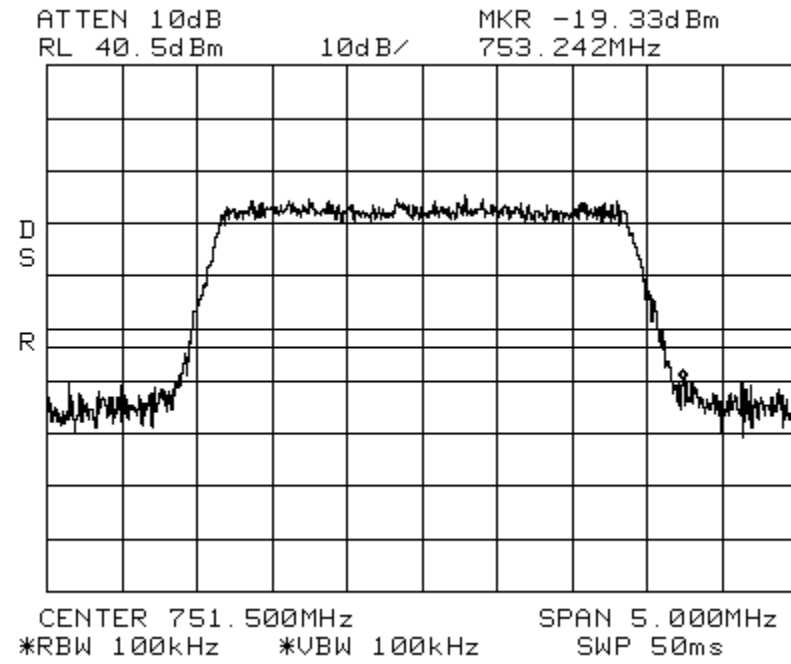
RBW/VBW: 300 kHz



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



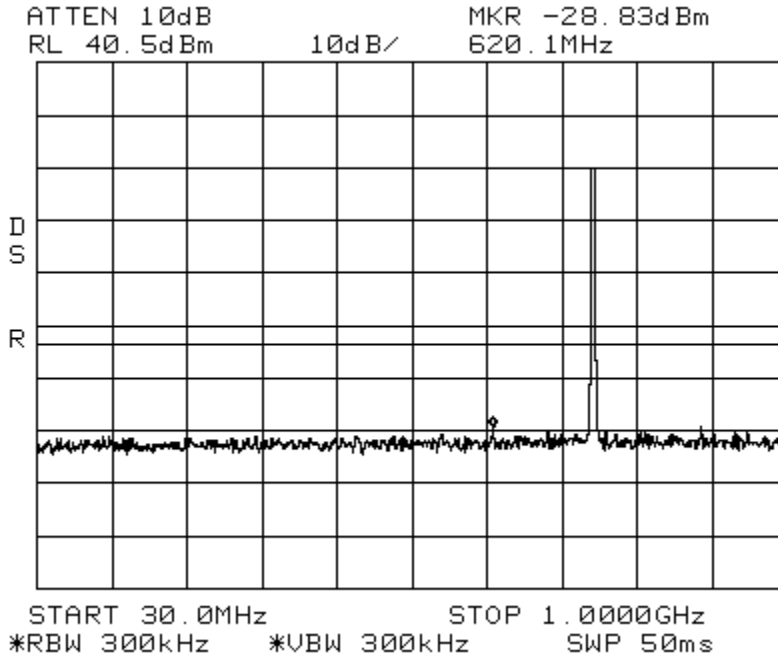
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



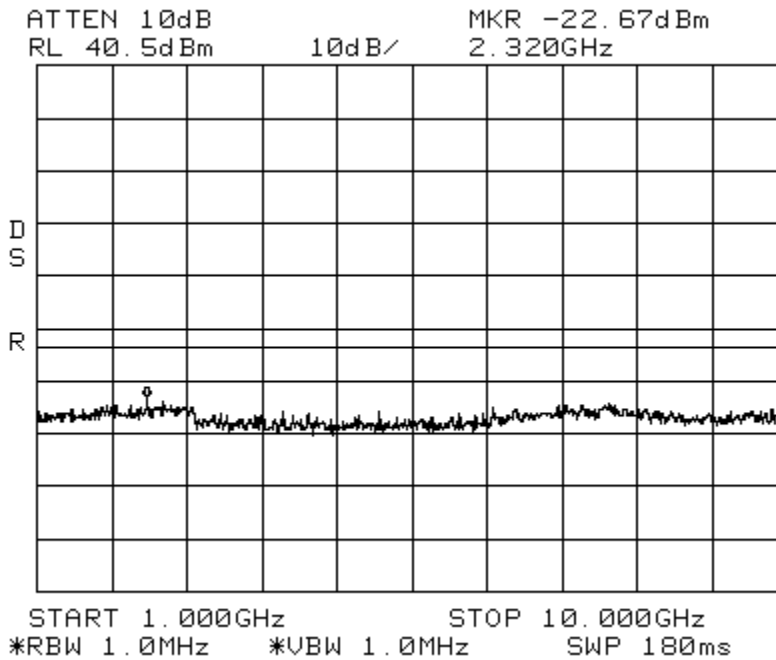
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

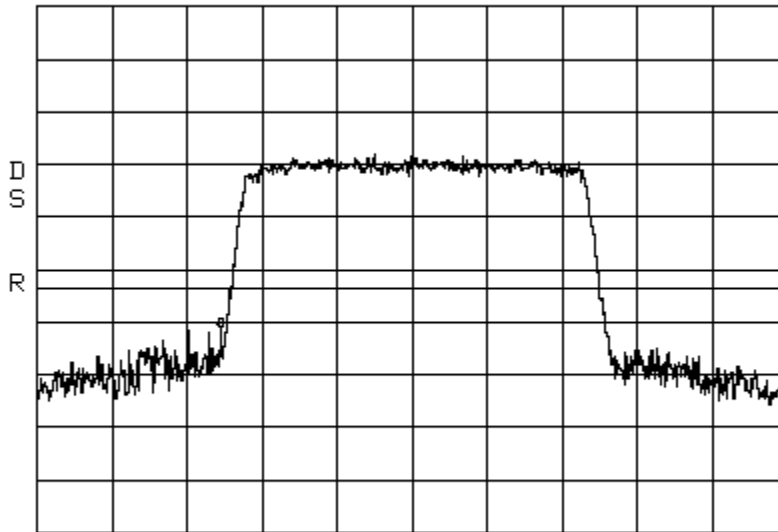


Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Center: 751.5 MHz      Span: 10 MHz      RBW/VBW: 100 kHz  
ATTEN 10dB      MKR -20.67dBm  
RL 40.5dBm      10dB/      748.95MHz



CENTER 751.50MHz      SPAN 10.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

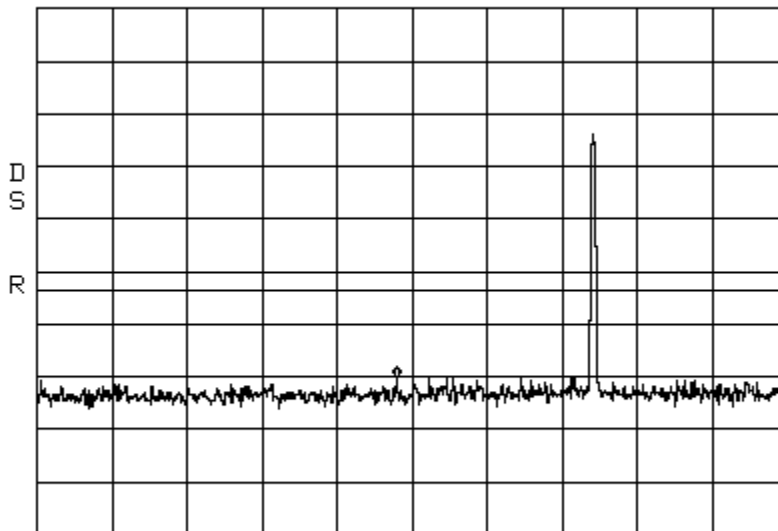
Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

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

ATTEN 10dB      MKR -29.67dBm  
RL 40.5dBm      10dB/      495.6MHz



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



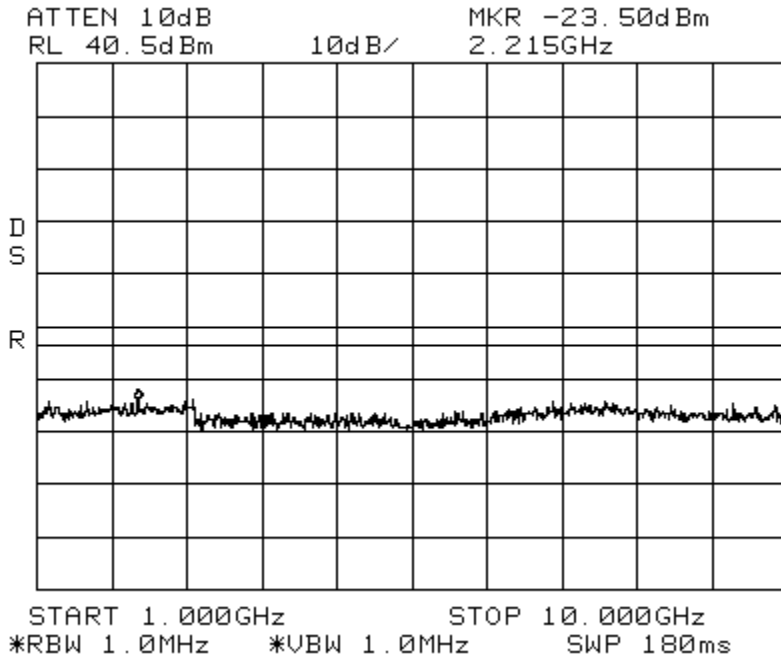
Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

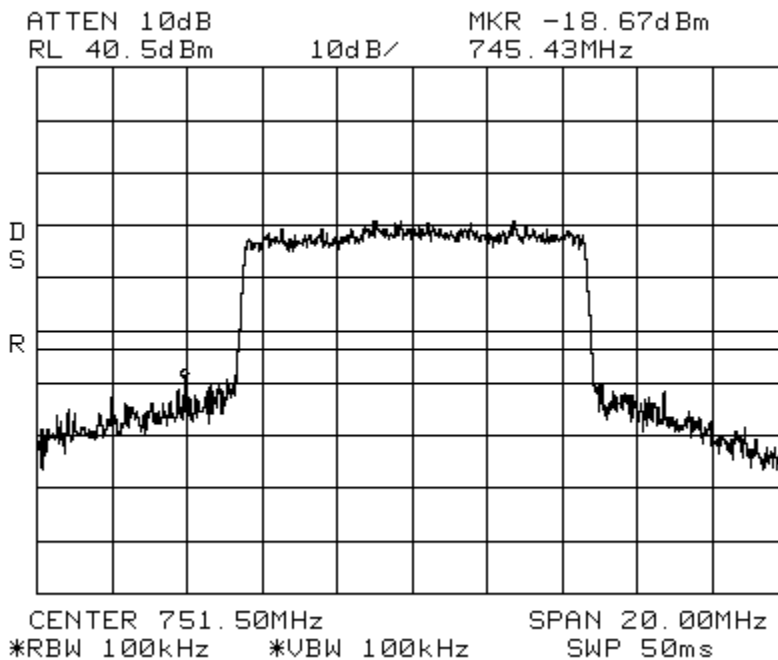
LTE 10 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

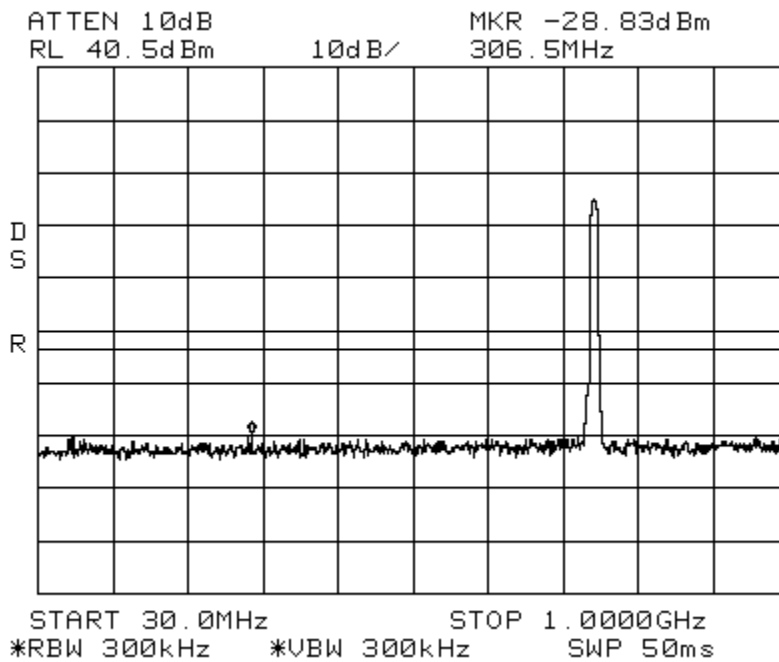
Center: 751.5 MHz

Span: 20MHz

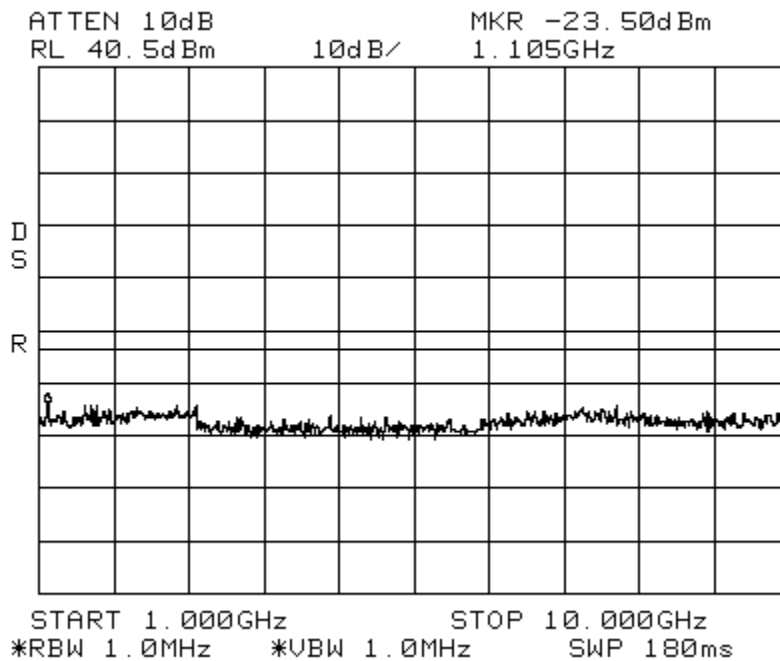
RBW/VBW: 100 kHz



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

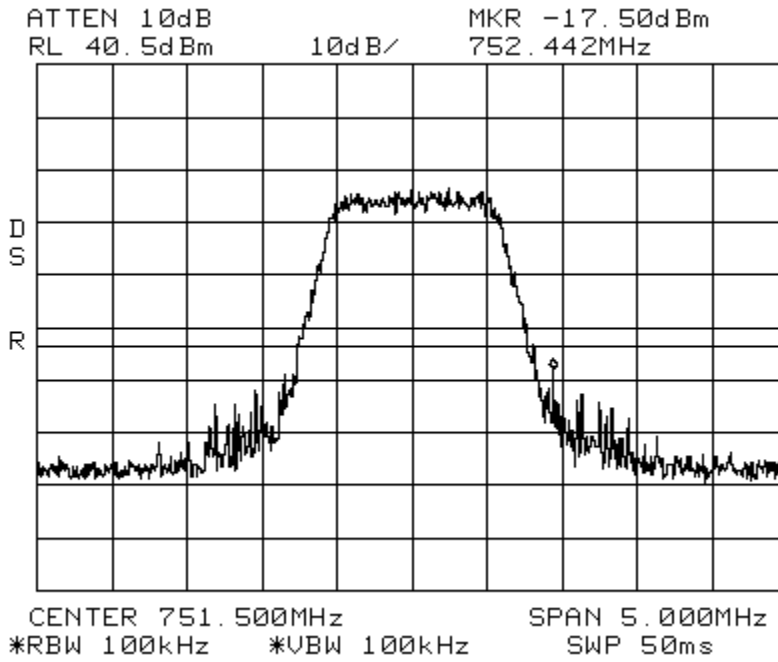
LTE 1.4 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Center: 751.5 MHz

Span: 5 MHz

RBW/VBW: 100 kHz



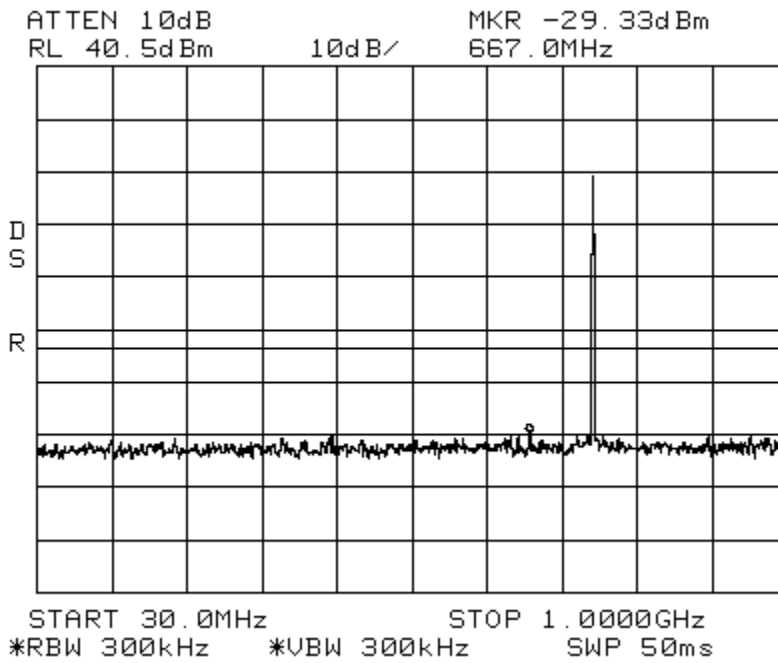
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



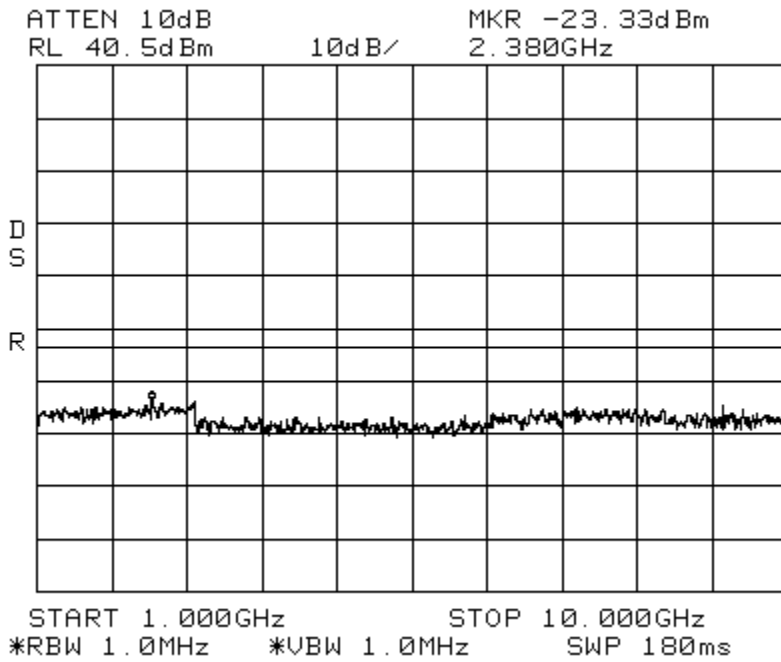
Conducted Emissions

LTE 1.4 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 2

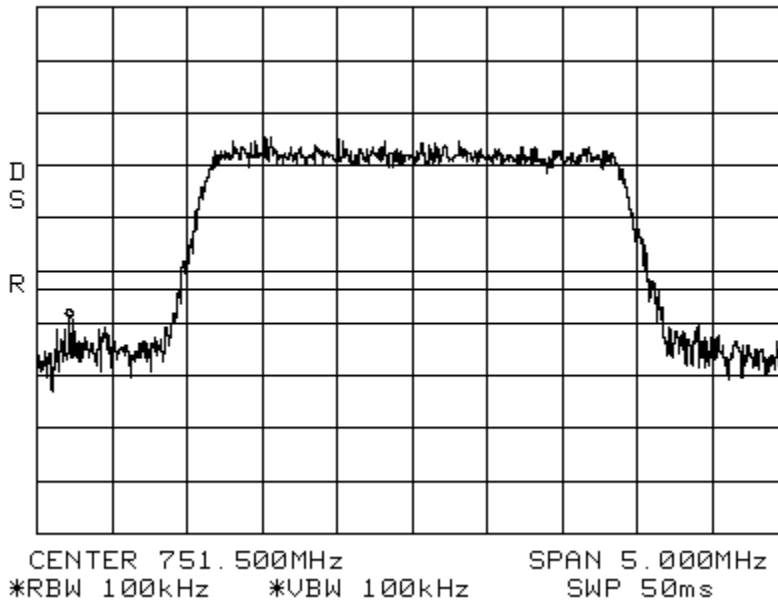
Spectrum 700 MHz Upper C

Center: 751.5 MHz

Span: 5 MHz

RBW/VBW: 100 kHz

ATTEN 10dB  
RL 40.5dBm  
10dB/  
MKR -18.67dBm  
749.217MHz



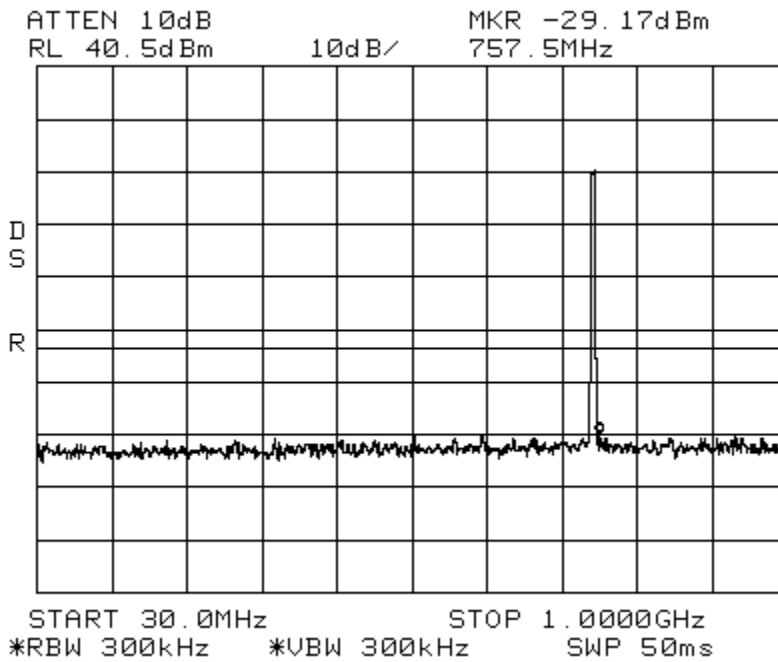
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



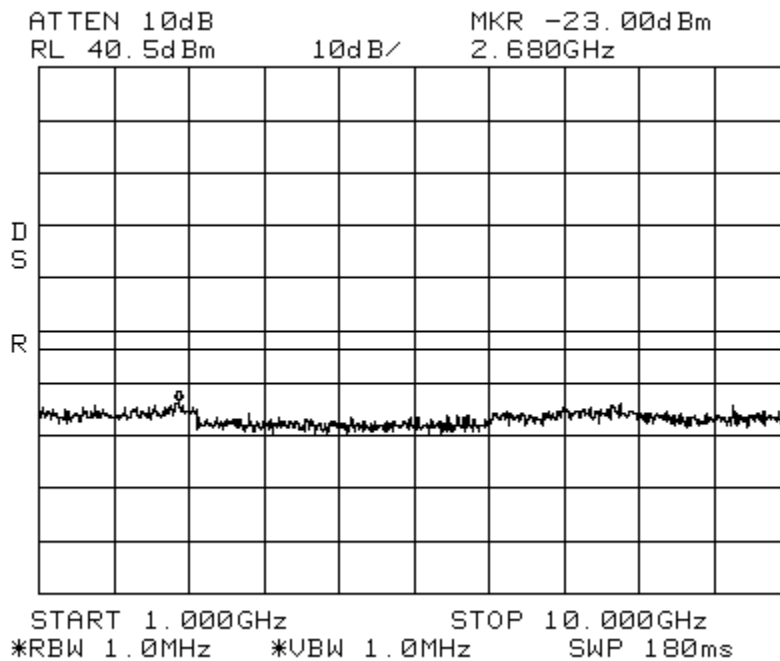
Conducted Emissions

LTE 3 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz

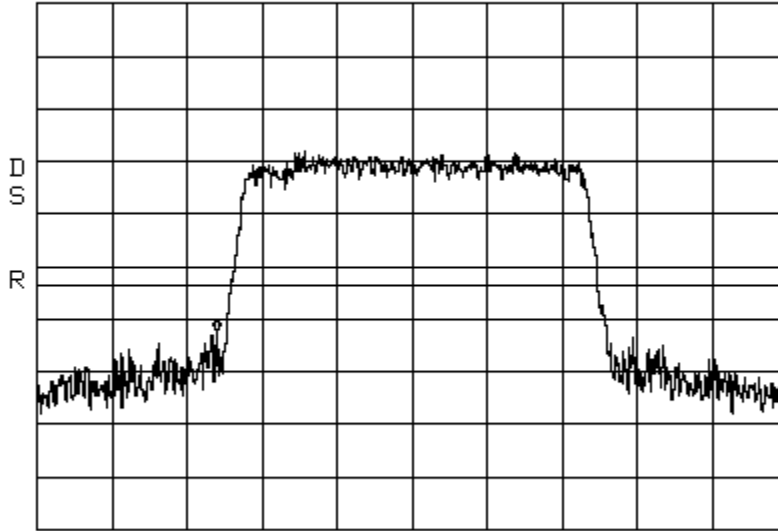


Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Center: 751.5 MHz      Span: 10 MHz      RBW/VBW: 100 kHz  
ATTEN 10dB      MKR -21.67dBm  
RL 40.5dBm      10dB/      748.90MHz



CENTER 751.50MHz      SPAN 10.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

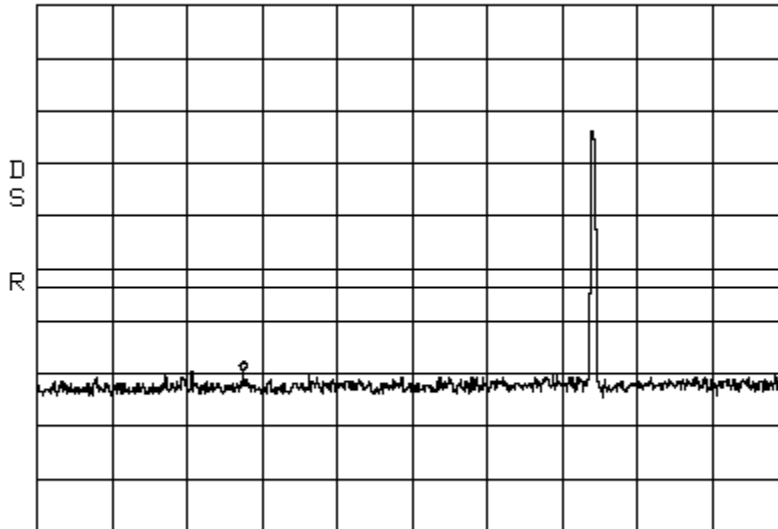
Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

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

ATTEN 10dB      MKR -29.00dBm  
RL 40.5dBm      10dB/      296.8MHz



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

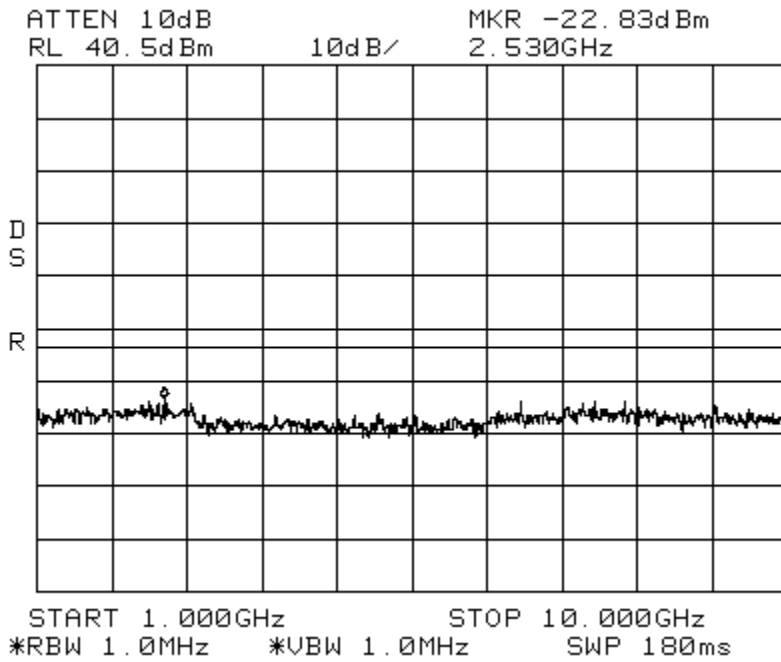
Conducted Emissions

LTE 5 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Conducted Emissions

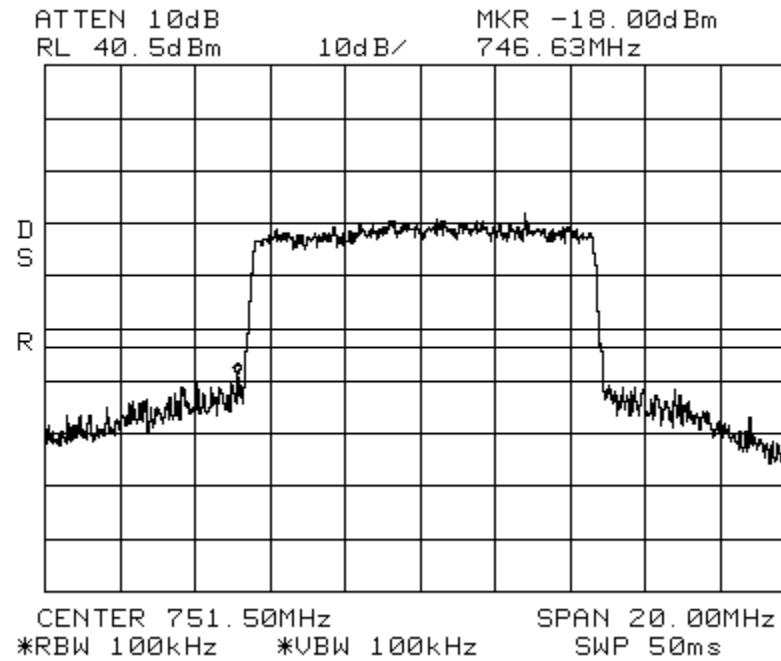
LTE 10 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Upper C

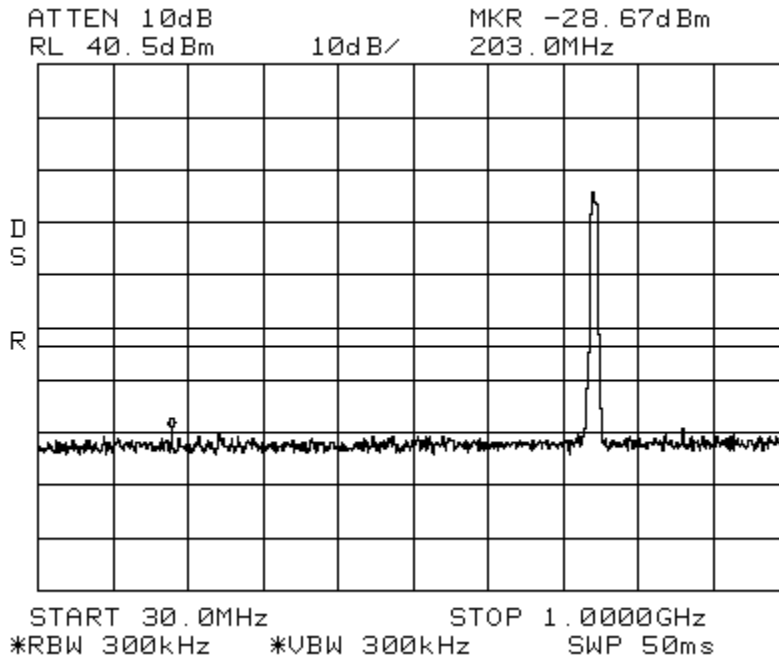
Center: 751 MHz

Span: 20MHz

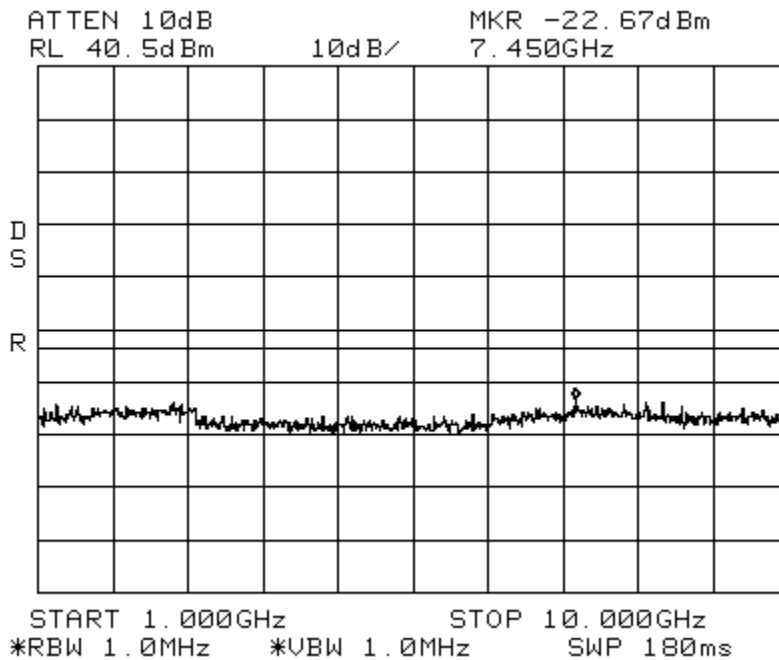
RBW/VBW: 100 kHz



Conducted Emissions      LTE 10 MHz Channel Bandwidth      Spectrum 700 MHz Upper C  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Conducted Emissions      LTE 10 MHz Channel Bandwidth      Spectrum 700 MHz Upper C  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



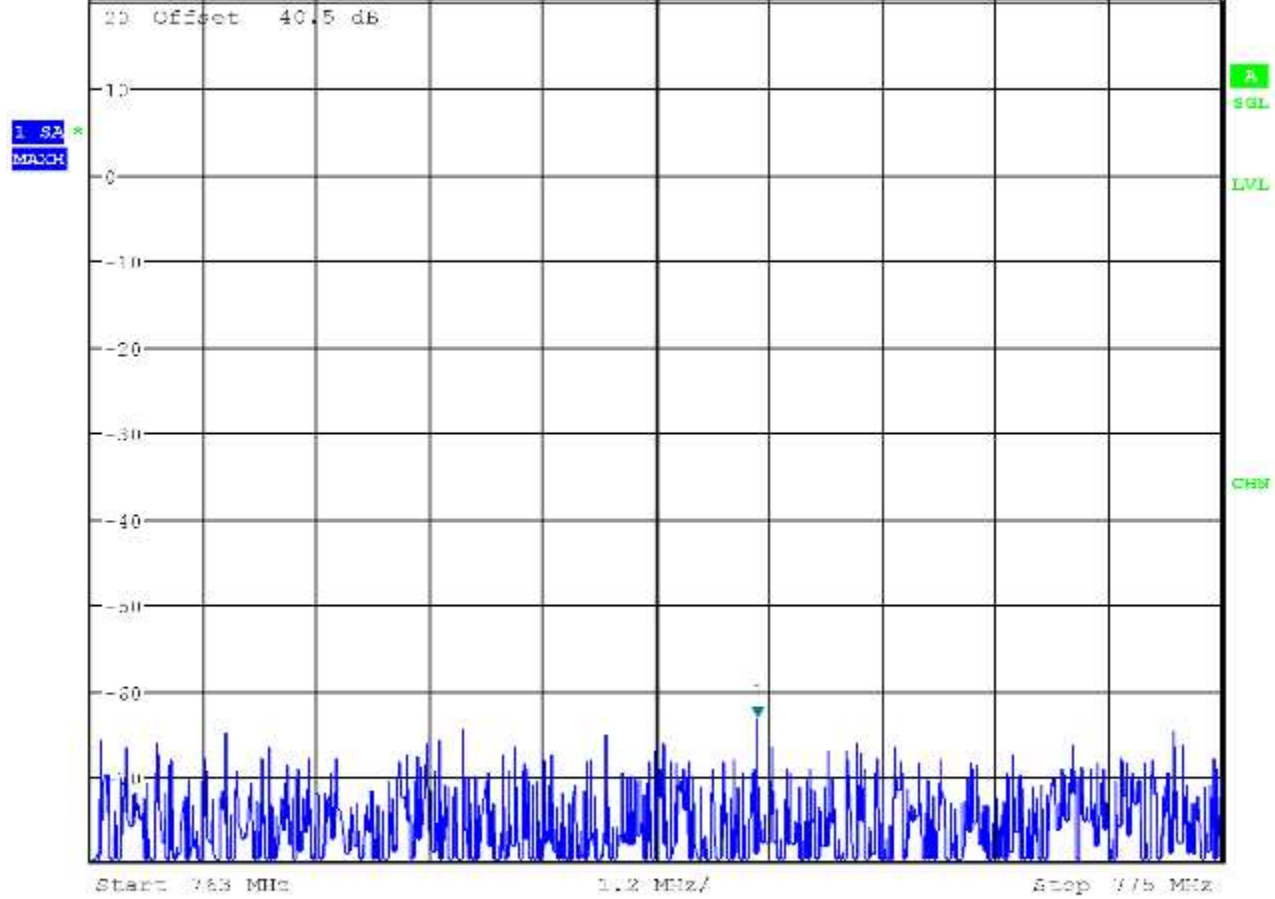


Conducted Emissions      LTE 1.4 MHz Channel Bandwidth      Spectrum 700 MHz Path 1  
Start 763 MHz Stop 775 MHz      RBW 6.0kHz VBW 20 kHz



\* RBW 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20.0 kHz      -63.03 dBm

Ref 20.0 dBm      Att 9 dB      SWT 88 s      770.076923077 MHz



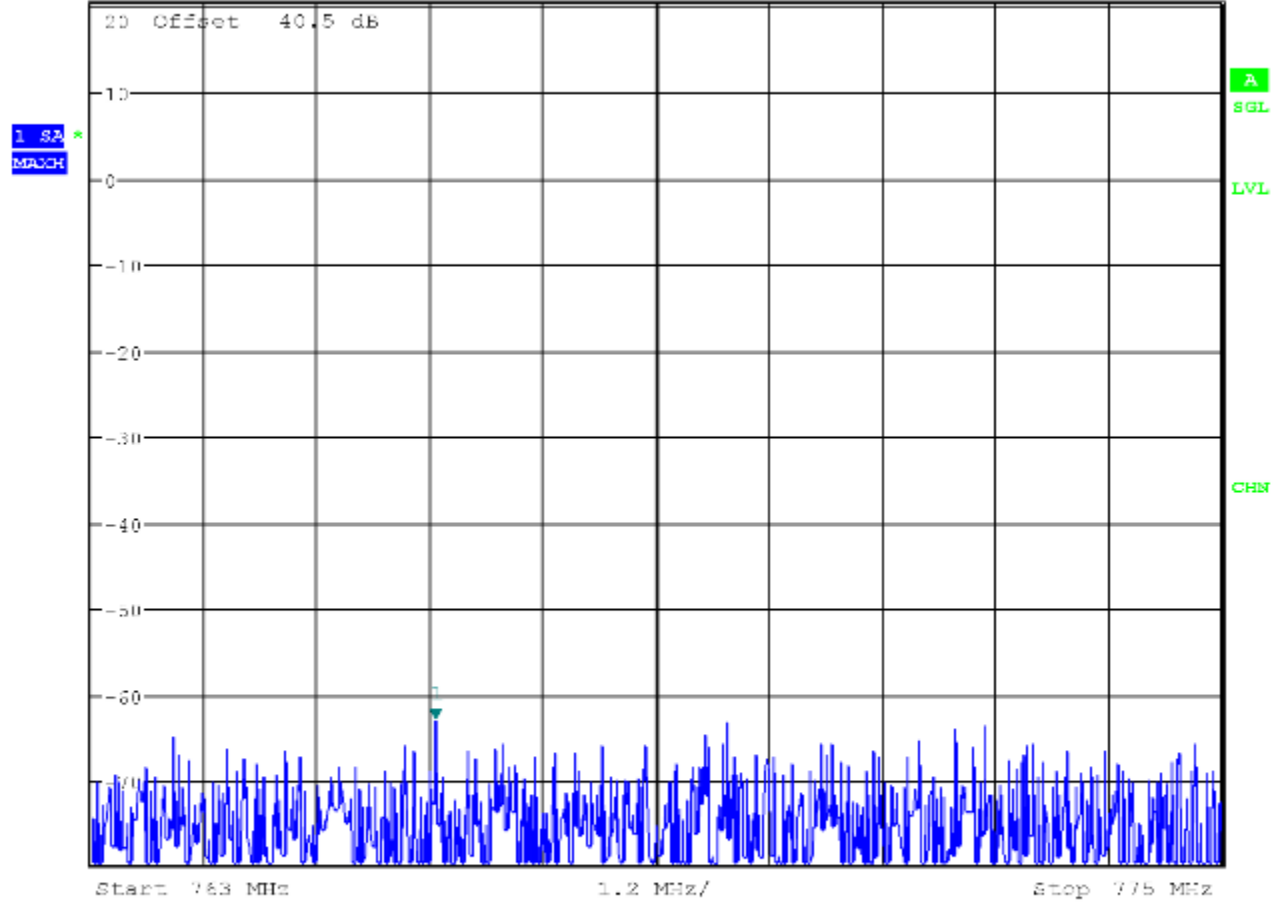
Date: 28.JUN.2012 14:26:28

Conducted Emissions      LTE 1.4 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 763 MHz Stop 775 MHz      RBW 6.0kHz VBW 20 kHz



\*RBW 6 kHz      Marker 1 [T1 ]  
\*VBW 20 kHz      -62.84 dBm  
766.653846154 MHz

Ref 20.0 dBm      Att 9 dB      SWT 88 s



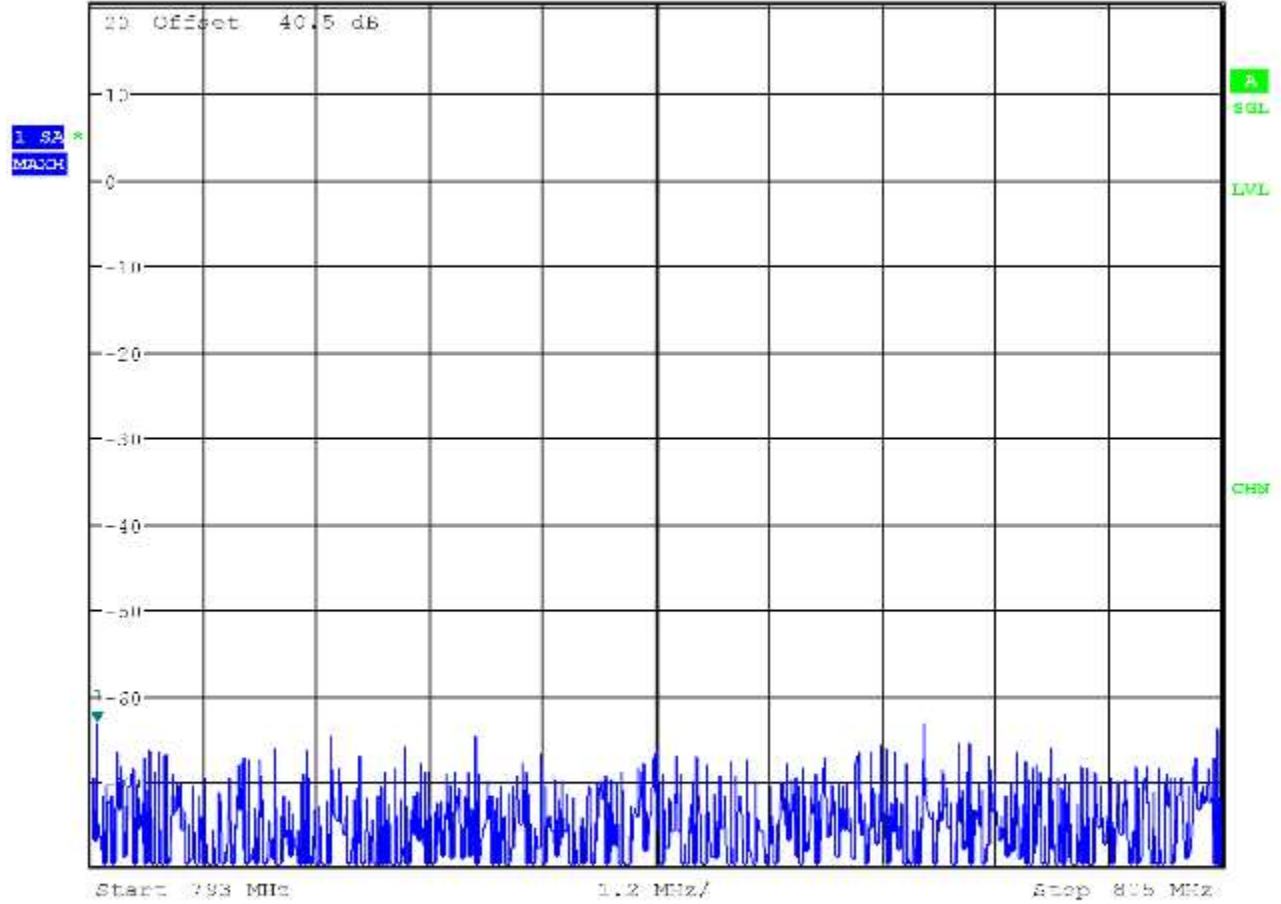
Date: 28.JUN.2012 14:36:00

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 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20 kHz      -63.03 dBm

Ref 20.0 dBm      Att 9 dB      SWT 28 s      793.057692308 MHz

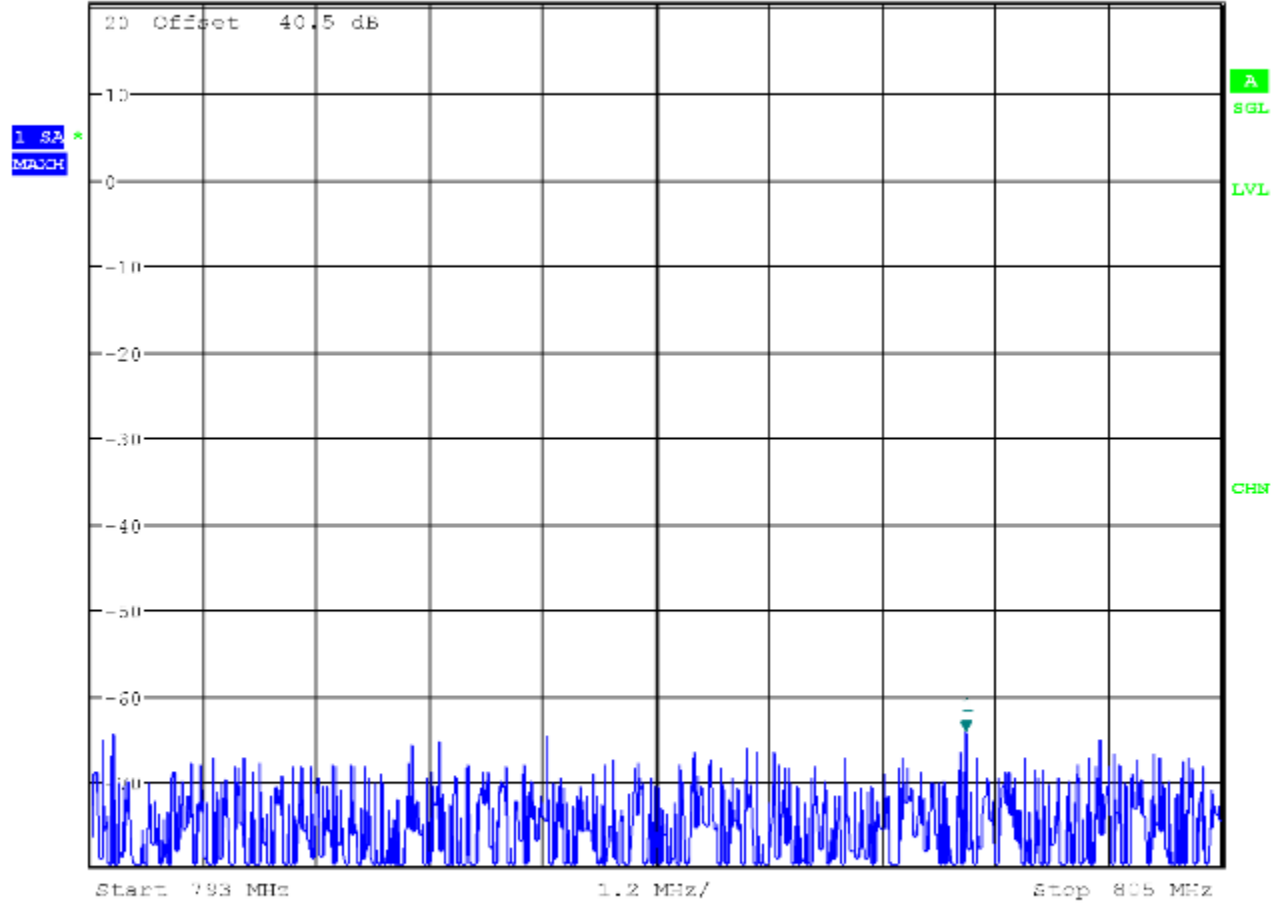


Date: 28.JUN.2012 14:57:13

Conducted Emissions      LTE 1.4 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 793 MHz Stop 805 MHz      RBW 6.0kHz VBW 20 kHz



\*RBW 6 kHz      Marker 1 [T1 ]  
\*VBW 20 kHz      -64.12 dBm  
Ref 20.0 dBm      Att 9 dB      SWT 88 s      802.288461538 MHz

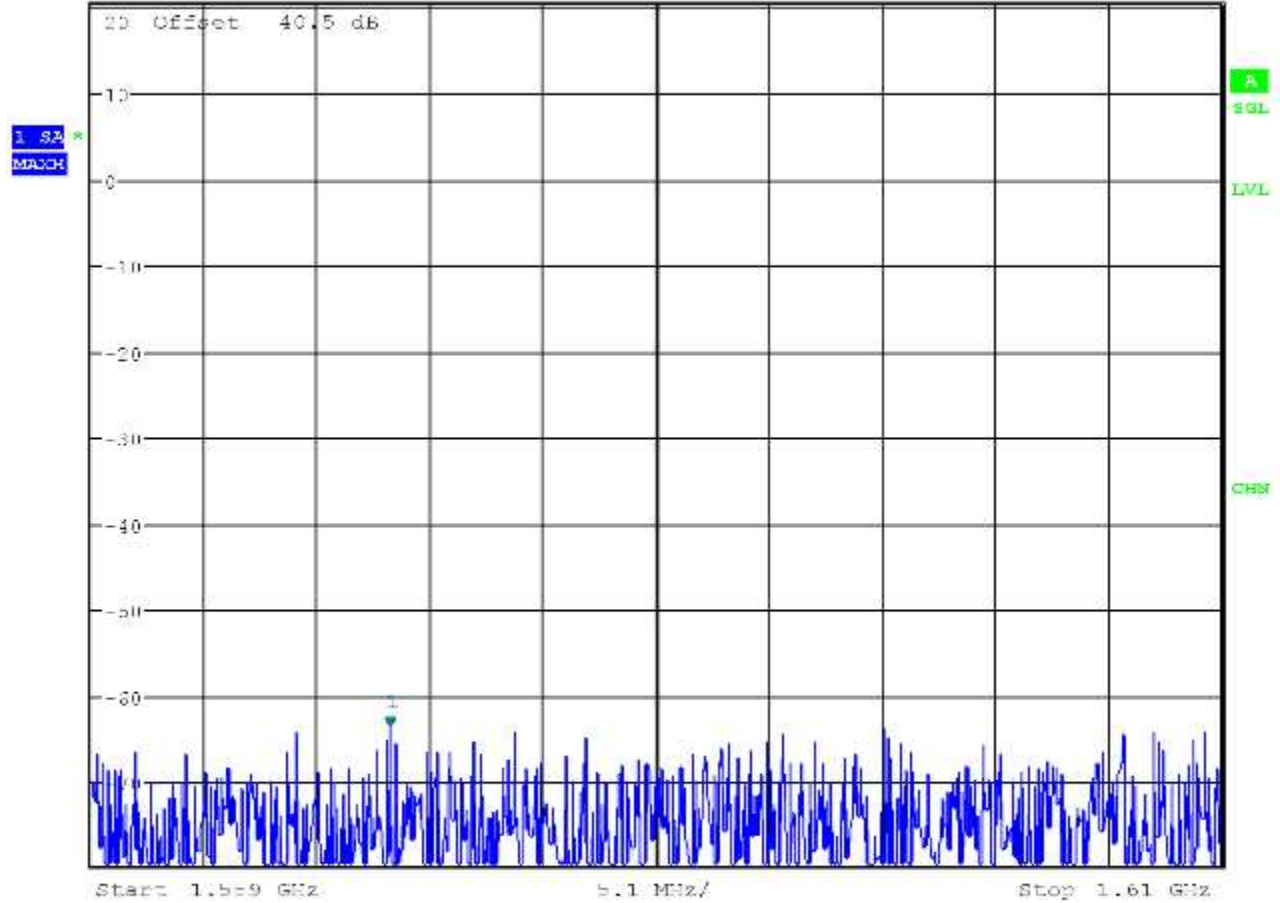


Date: 28.JUN.2012 14:59:05

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



\*RBW: 6.0kHz      \*Marker 1 [T1]  
\*VBW: 20.0kHz      -63.66 dBm  
Ref: 20.0 dBm      Att: 9 dB      SWT: 290.0 s      1.572485577 GHz



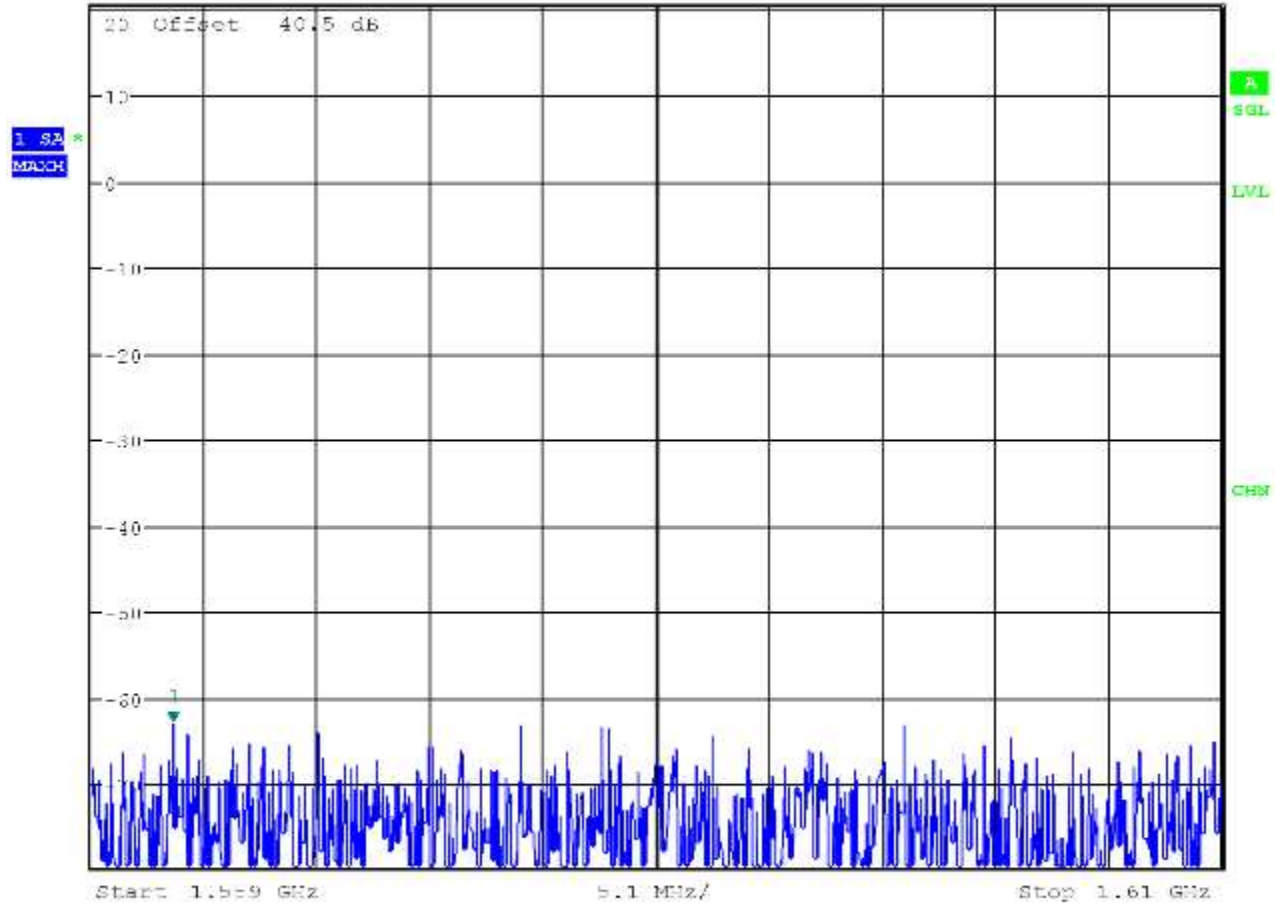
Date: 28.JUN.2012 15:31:43

Conducted Emissions      LTE 1.4 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 1559 MHz Stop 1610 MHz      RBW 6.0kHz VBW 20 kHz



\* RBW 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20.0 kHz      -62.76 dBm

Ref 20.0 dBm      Att 9 dB      SWT 290.0 s      1.562677885 GHz

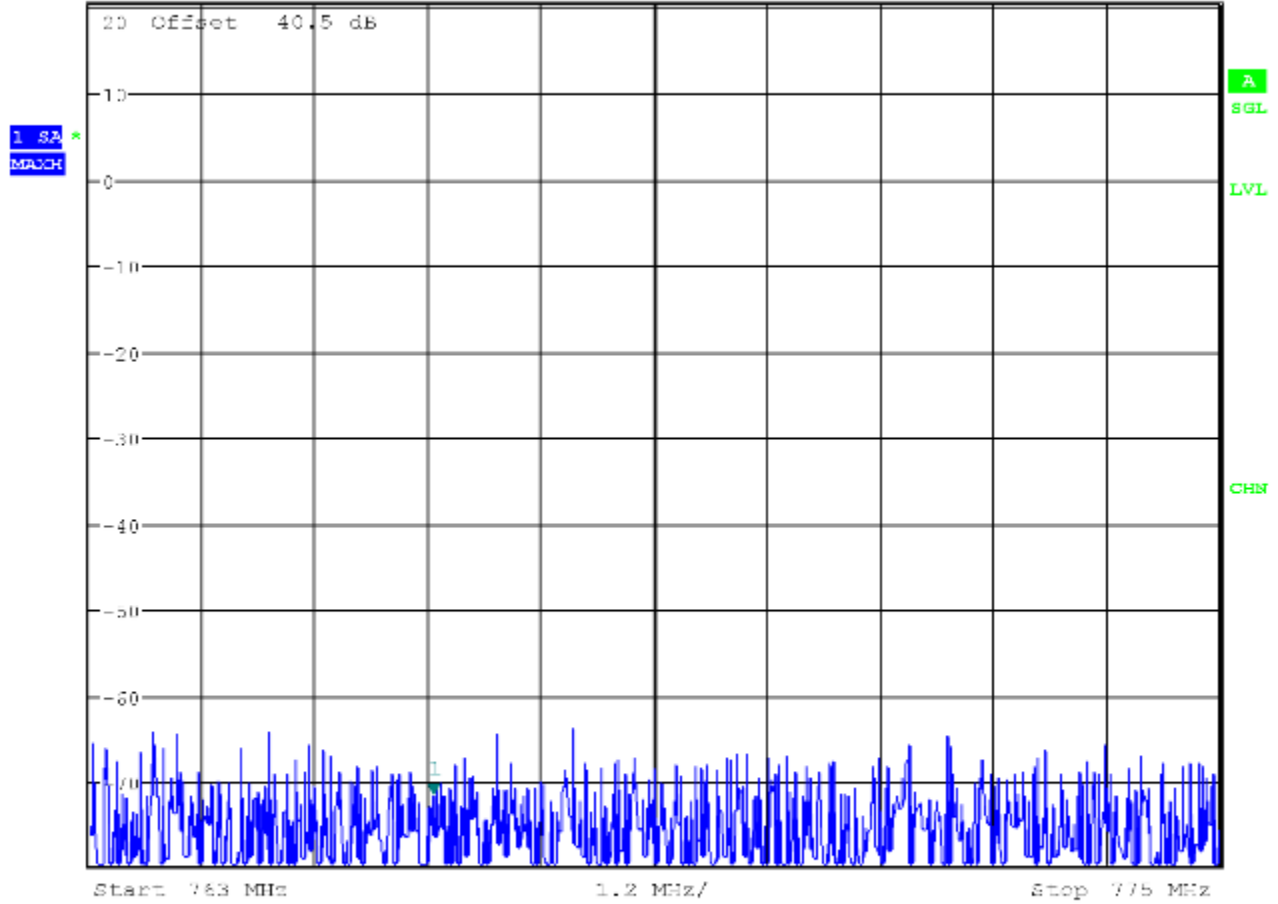


Date: 28.JUN.2012 15:26:05

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 20.0 dBm      Att 9 dB      SWT 88 s      766.653846154 MHz

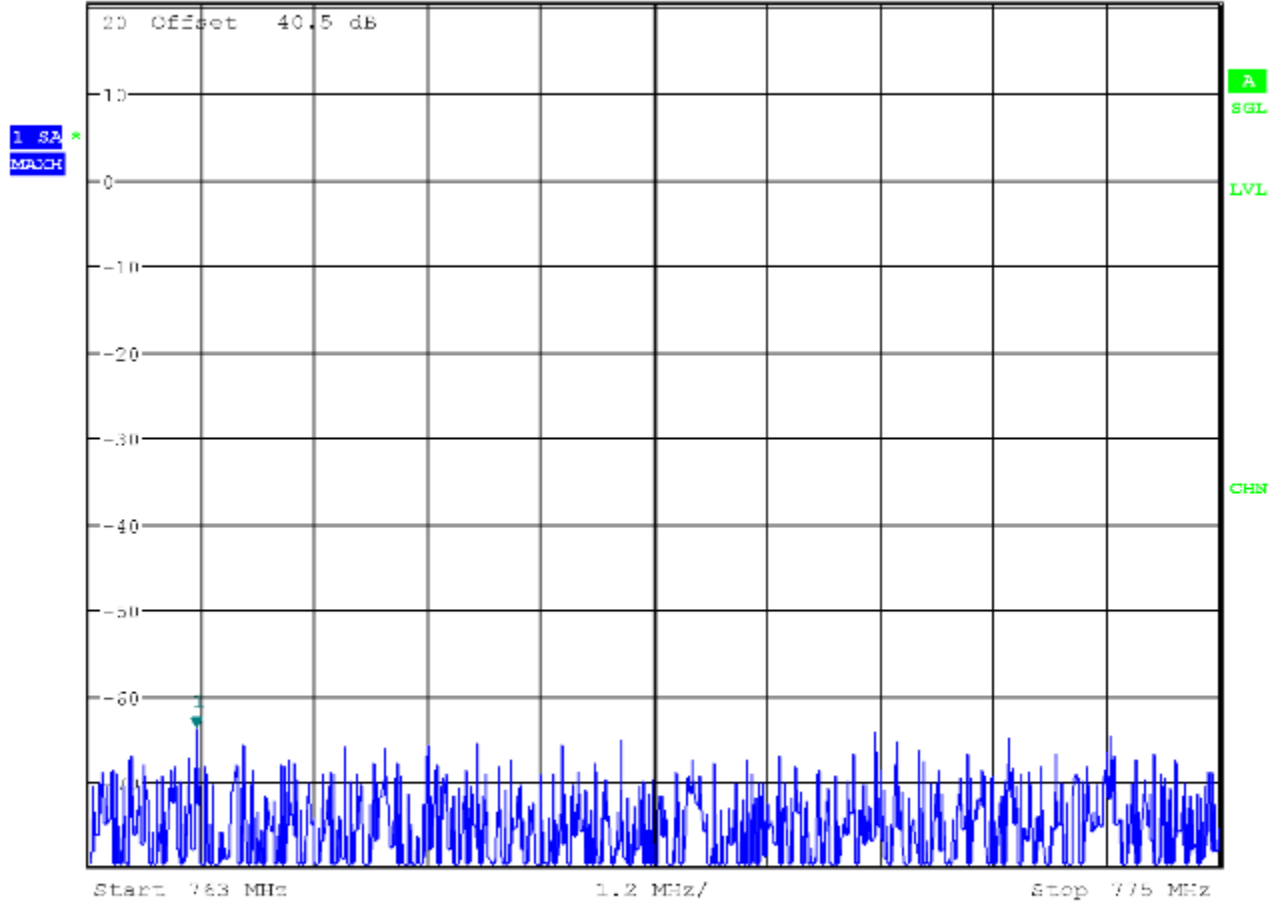


Date: 28.JUN.2012 14:38:02

Conducted Emissions      LTE 3.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 763 MHz Stop 775 MHz      RBW 6.0kHz VBW 20 kHz



\* RBW 6 kHz      Marker 1 [T1 ]  
\* VBW 20 kHz      -63.72 dBm  
Ref 20.0 dBm      Att 9 dB      SWT 88 s      764.134615385 MHz



Date: 28.JUN.2012 14:39:35

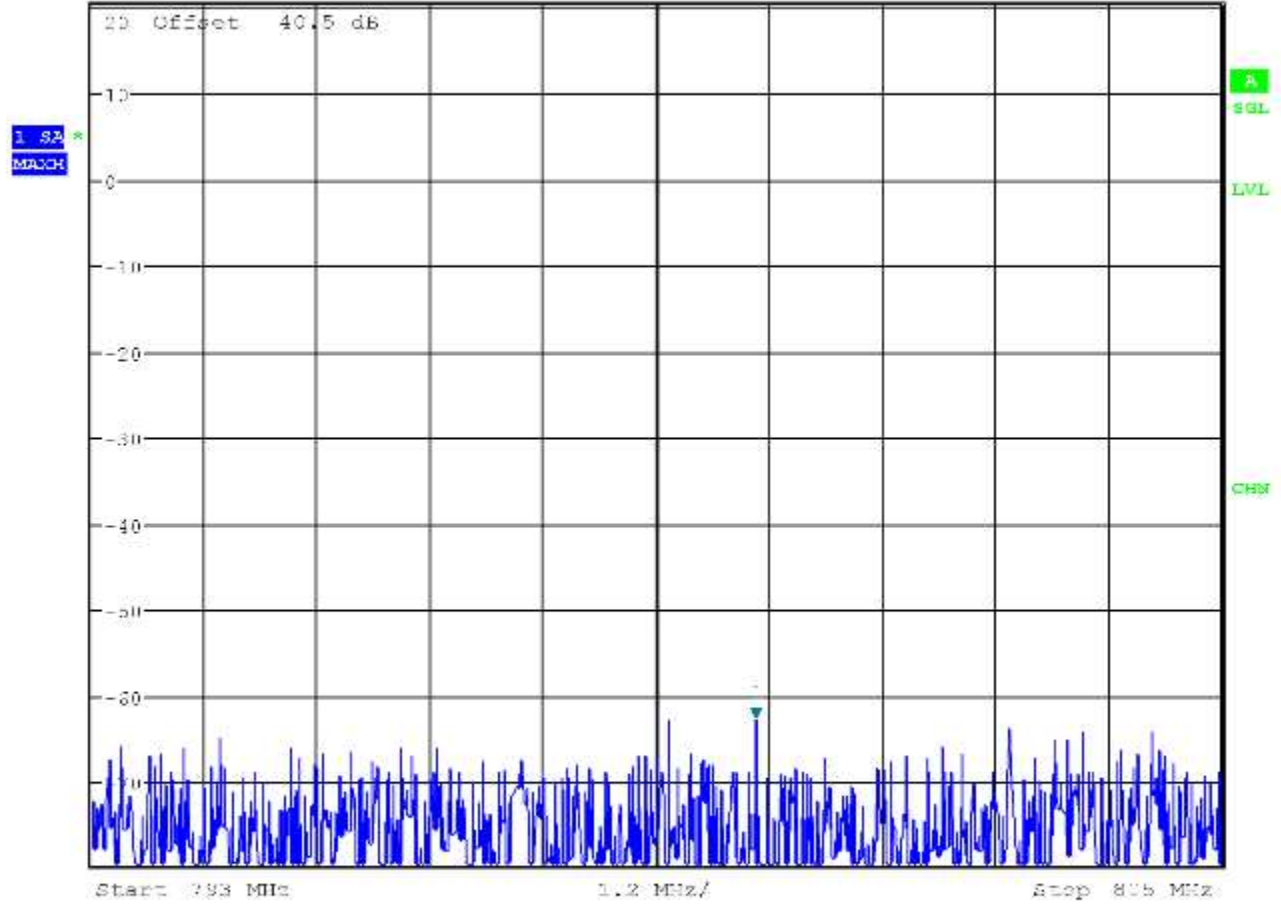


Conducted Emissions      LTE 3.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 1  
Start 793 MHz Stop 805 MHz      RBW 6.0kHz VBW 20 kHz



\*RBW 6.0kHz      Marker 1 [T1]  
\*VBW 20 kHz      -62.57 dBm

Ref 20.0 dBm      Att 9 dB      SWT 28 s      800.057692308 MHz



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

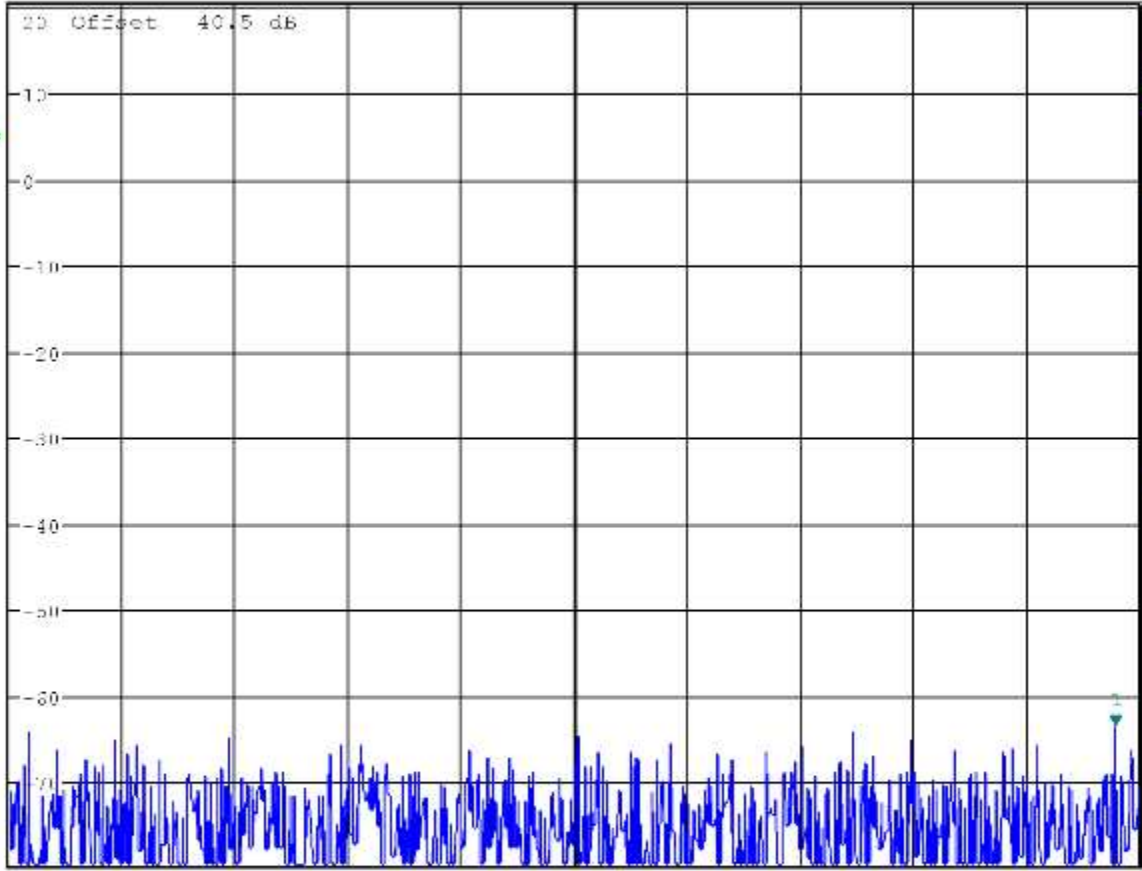
Conducted Emissions      LTE 3.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 793 MHz Stop 805 MHz      RBW 6.0kHz VBW 20 kHz



\*RBW 6.0kHz      Marker 1 [T1]  
\*VBW 20.0kHz      -63.46 dBm

Ref 20.0 dBm      Att 9 dB      SWT 88 s      804.75000000 MHz

1 SA\*  
MACH



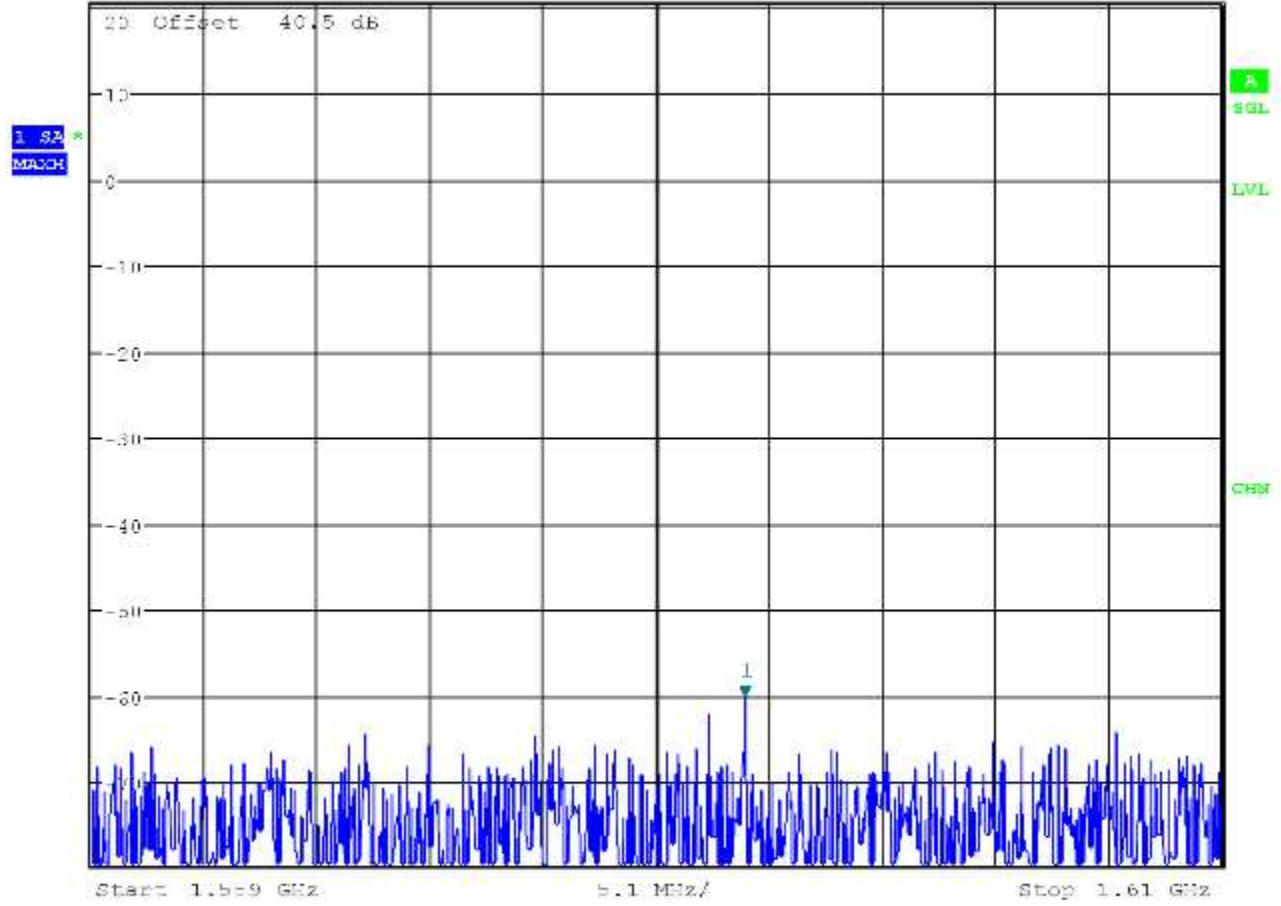
Start 793 MHz      1.2 MHz/      Stop 805 MHz

Date: 28.JUN.2012 15:02:33

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



\*RBW 6.0kHz      \*Marker 1 [T1]  
\*VBW 20 kHz      -60.14 dBm  
Ref 20.0 dBm      Att 9 dB      SWT 290.0 s      1.588504808 GHz

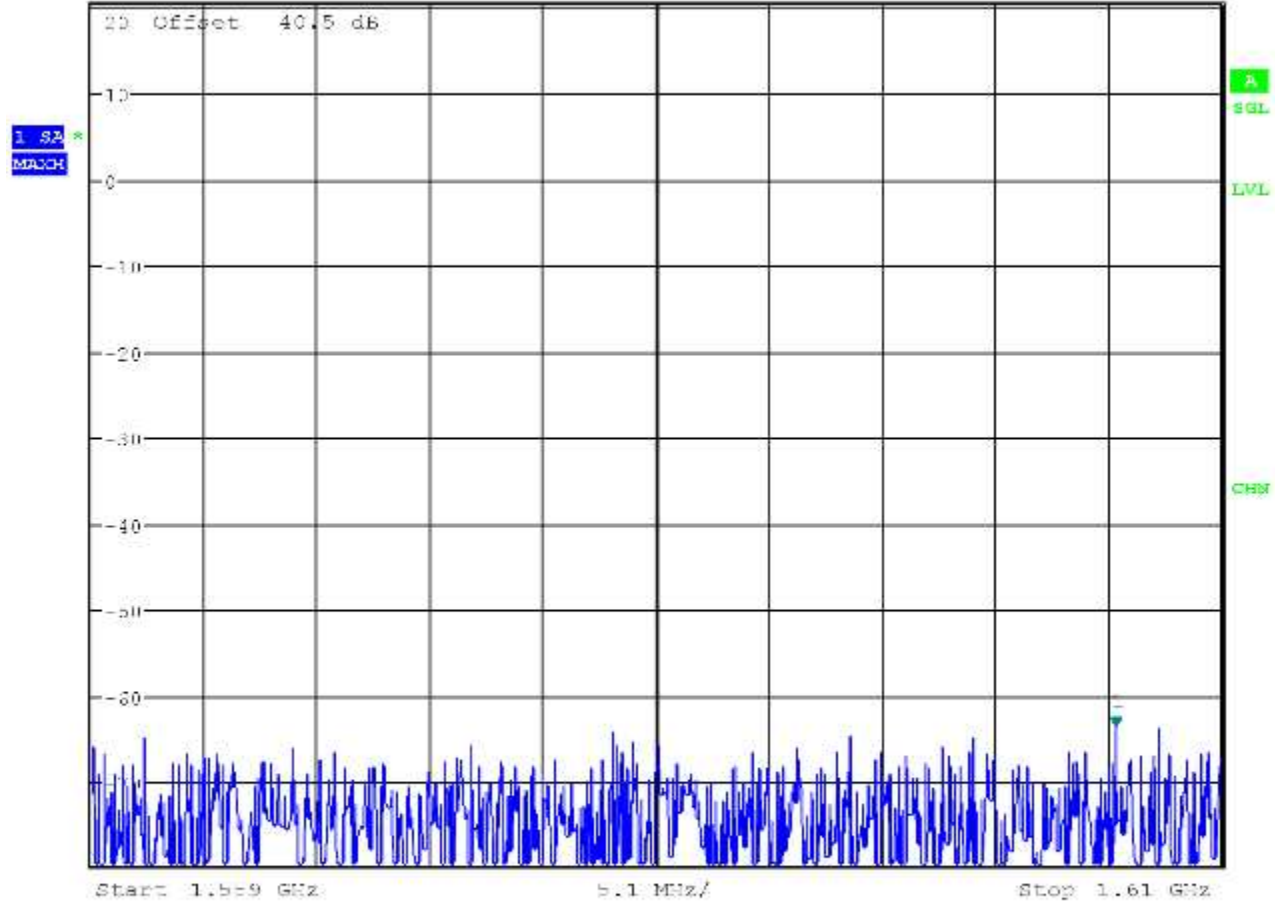


Date: 28.JUN.2012 15:40:13

Conducted Emissions      LTE 3.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 1559 MHz Stop 1610 MHz      RBW 6.0kHz VBW 20 kHz



Ref 20.0 dBm      Att 9 dB      SWT 290 s      Marker 1 [T1]      -63.60 dBm  
2.605258815 GHz

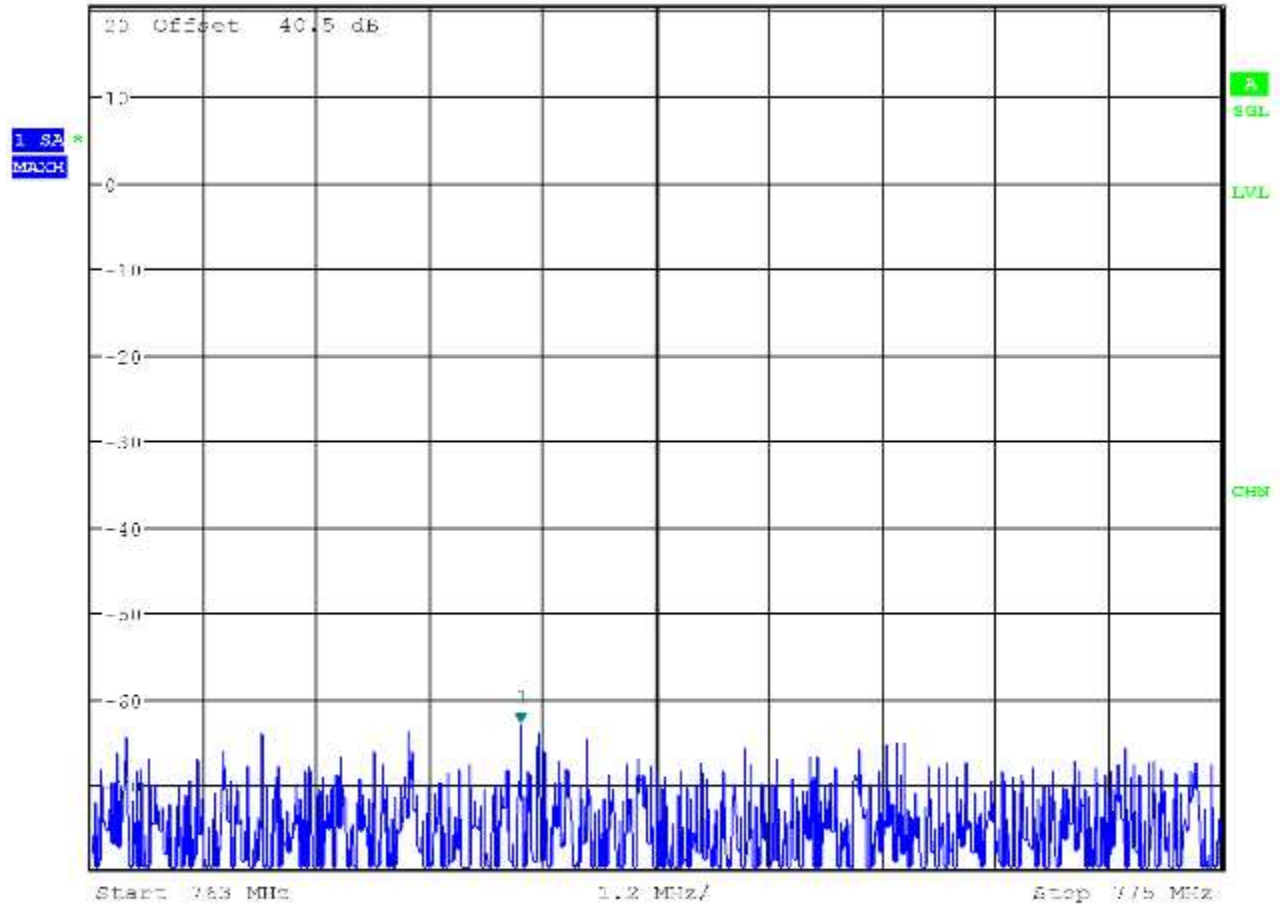


Date: 28.JUN.2012 15:45:12

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



\* RBW 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20 kHz      -62.84 dBm  
Ref 20.0 dBm      Att 9 dB      SWT 28 s      767.557692308 MHz



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

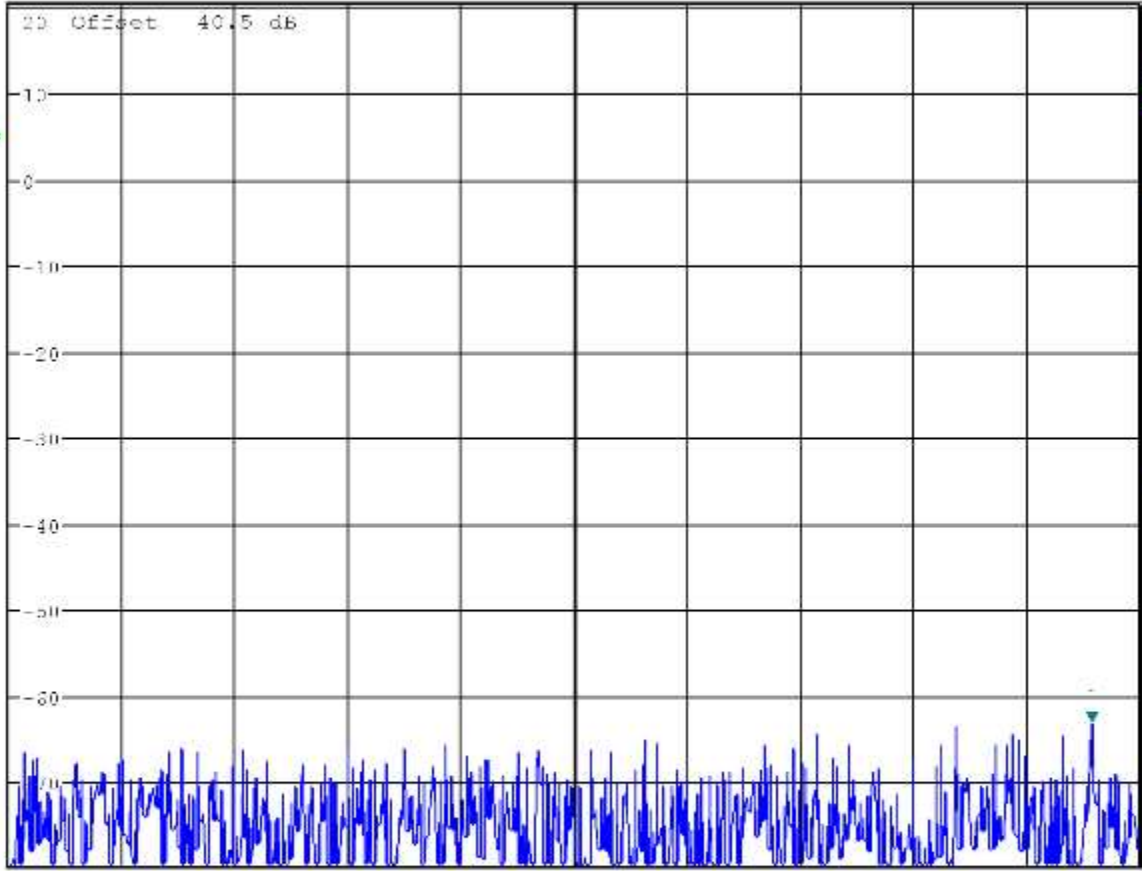
Conducted Emissions      LTE 5.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 763 MHz Stop 775 MHz      RBW 6.0kHz VBW 20 kHz



\*RBW 6.0kHz      Marker 1 [T1]  
\*VBW 20.0kHz      -63.03 dBm

Ref 20.0 dBm      Att 9 dB      SWT 88 s      774.50000000 MHz

1 SA\*  
MACH



Start 763 MHz      1.2 MHz/      Stop 775 MHz

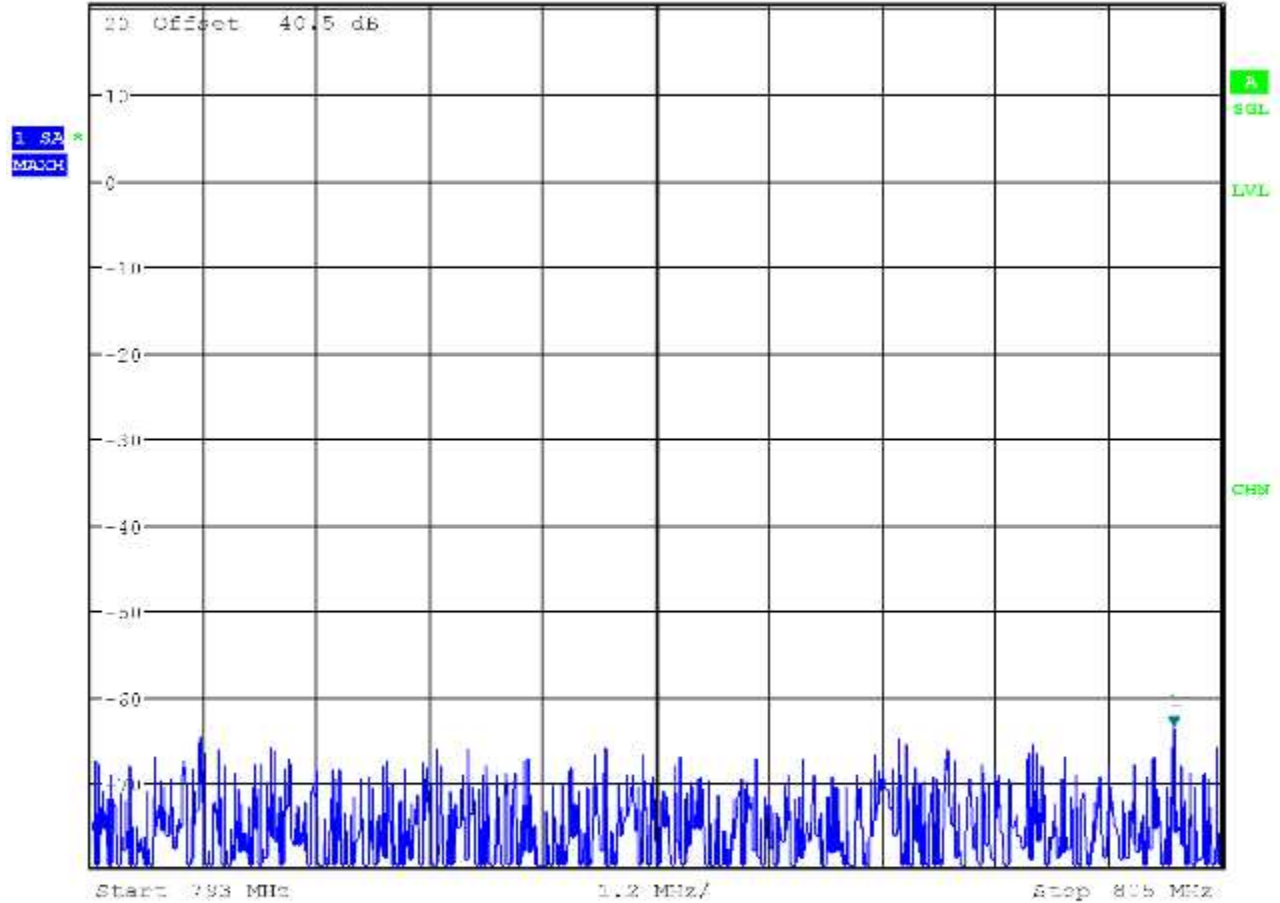
Date: 28.JUN.2012 14:43:36

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



\* RBW 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20.0 kHz      -63.46 dBm

Ref 20.0 dBm      Att 9 dB      SWT 28 s      804.50000000 MHz



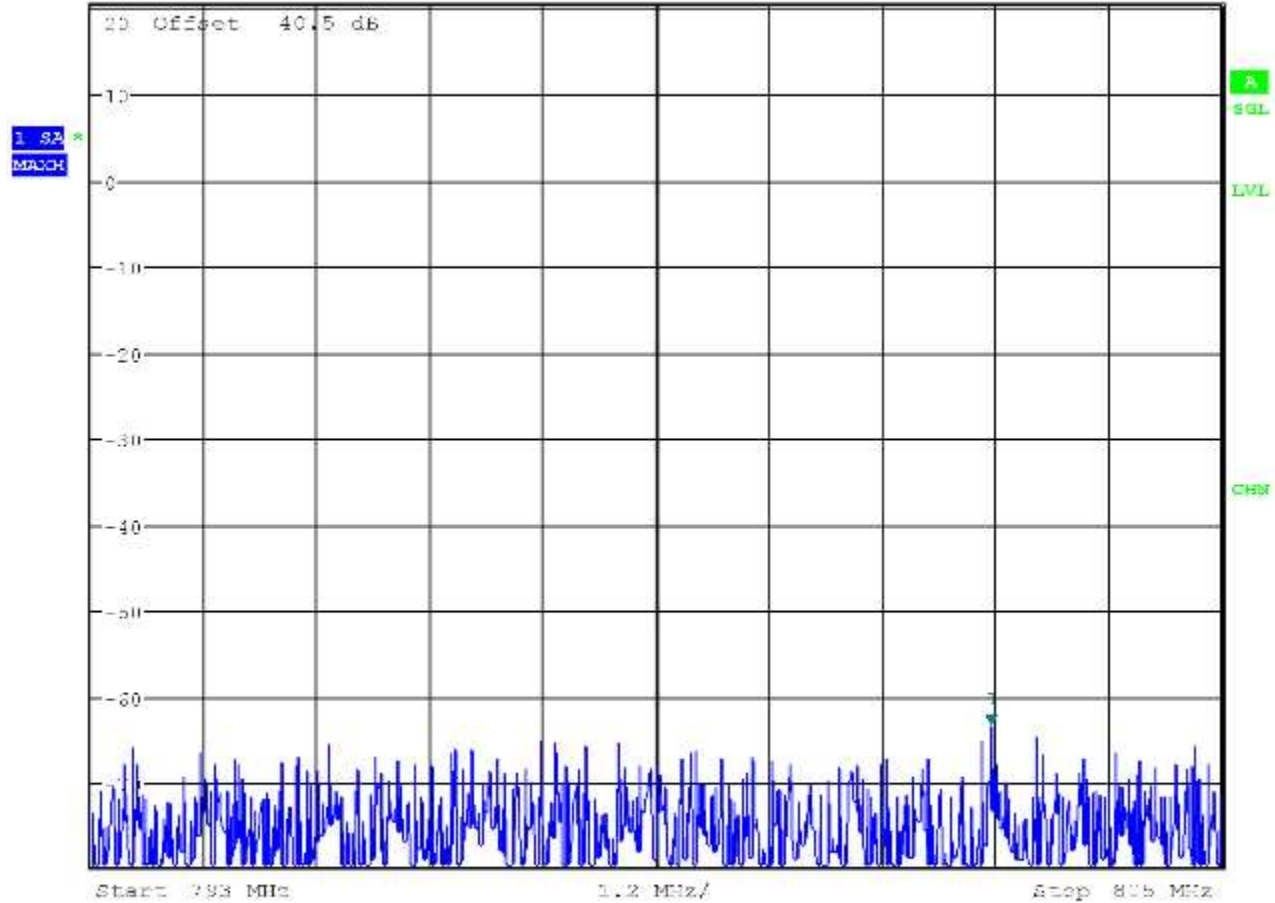
Date: 28.JUN.2012 15:07:46

Conducted Emissions      LTE 5.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 793 MHz Stop 805 MHz      RBW 6.0kHz VBW 20 kHz



\* RBW 6.0 kHz      Marker 1 [T1]      -63.31 dBm  
\* VBW 20 kHz

Ref 20.0 dBm      Att 9 dB      SWT 28 s      802.557692308 MHz



Date: 28.JUN.2012 15:04:45

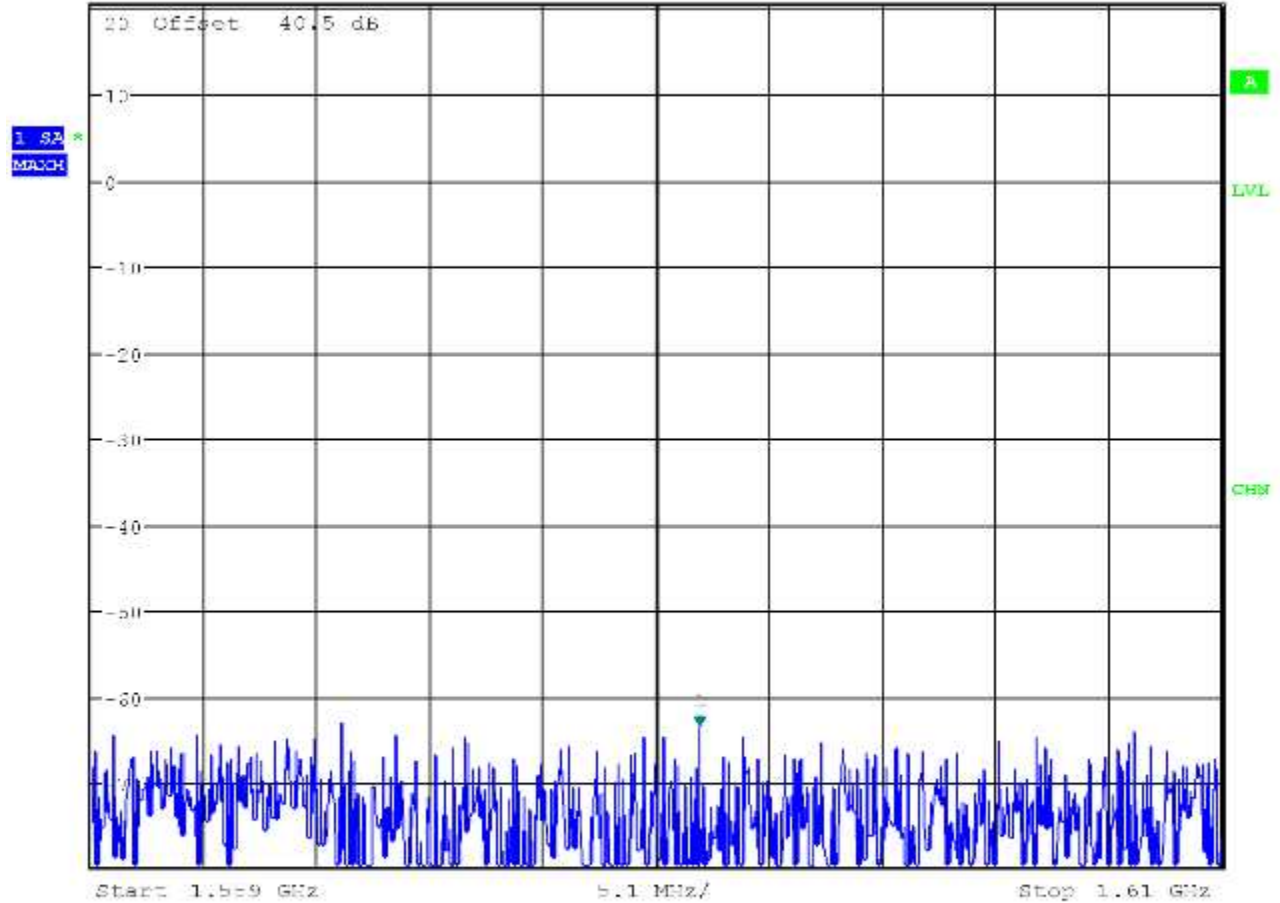


Conducted Emissions      LTE 5.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 1  
Start 1559 MHz Stop 1610 MHz      RBW 6.0kHz VBW 20 kHz



RBW 6.0kHz      Marker 1 [T1]  
VBW 20.0kHz      -63.31 dBm

Ref 20.0 dBm      Att 9 dB      SWT 290.0 s      1.586661538 GHz

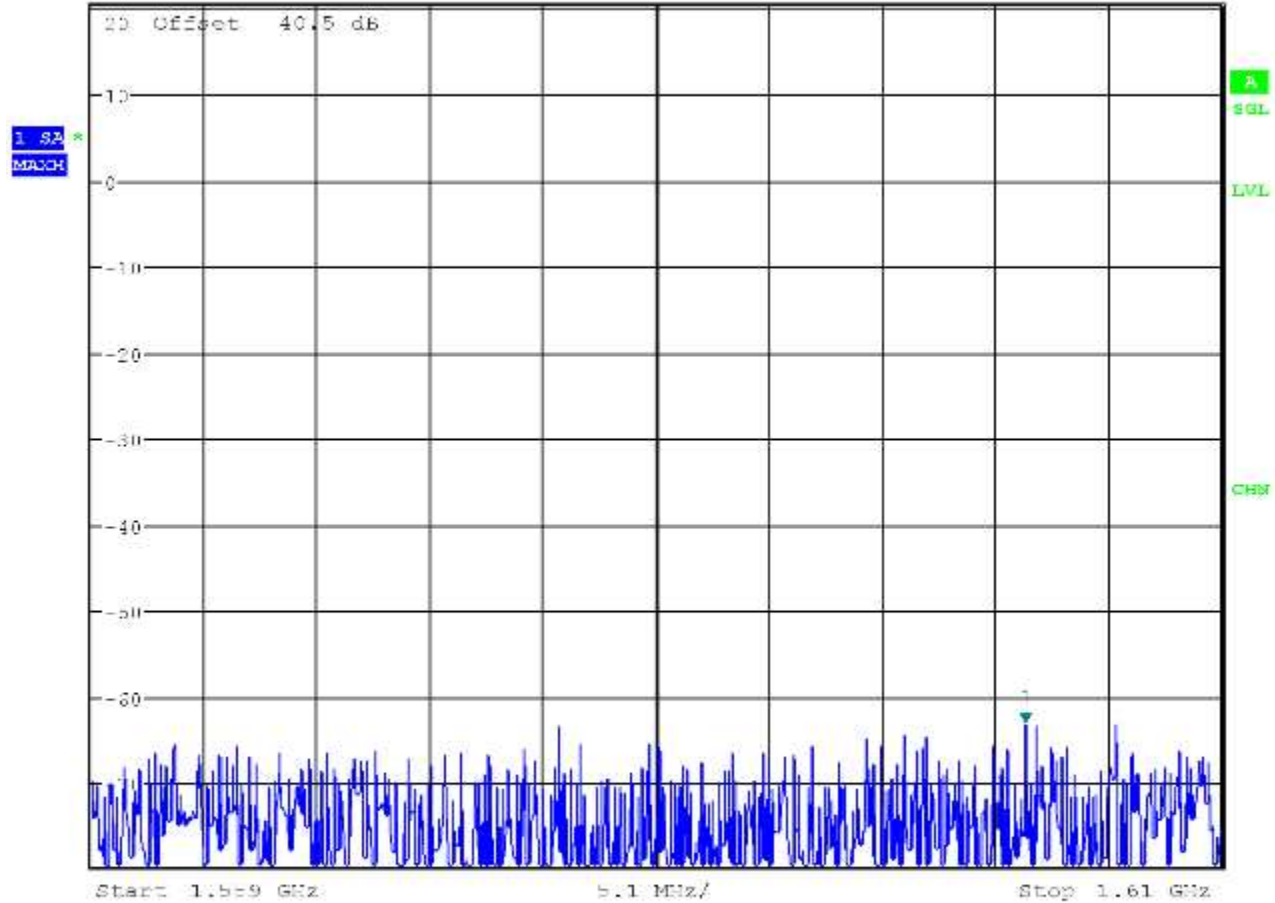


Date: 28.JUN.2012 15:15:12

Conducted Emissions      LTE 5.0 MHz Channel Bandwidth      Spectrum 700 MHz Path 2  
Start 1559 MHz Stop 1610 MHz      RBW 6.0kHz VBW 20 kHz



\* RBW 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20.0 kHz      -62.97 dBm  
Ref 20.0 dBm      Att 9 dB      SWT 290.0 s      1.601173077 GHz

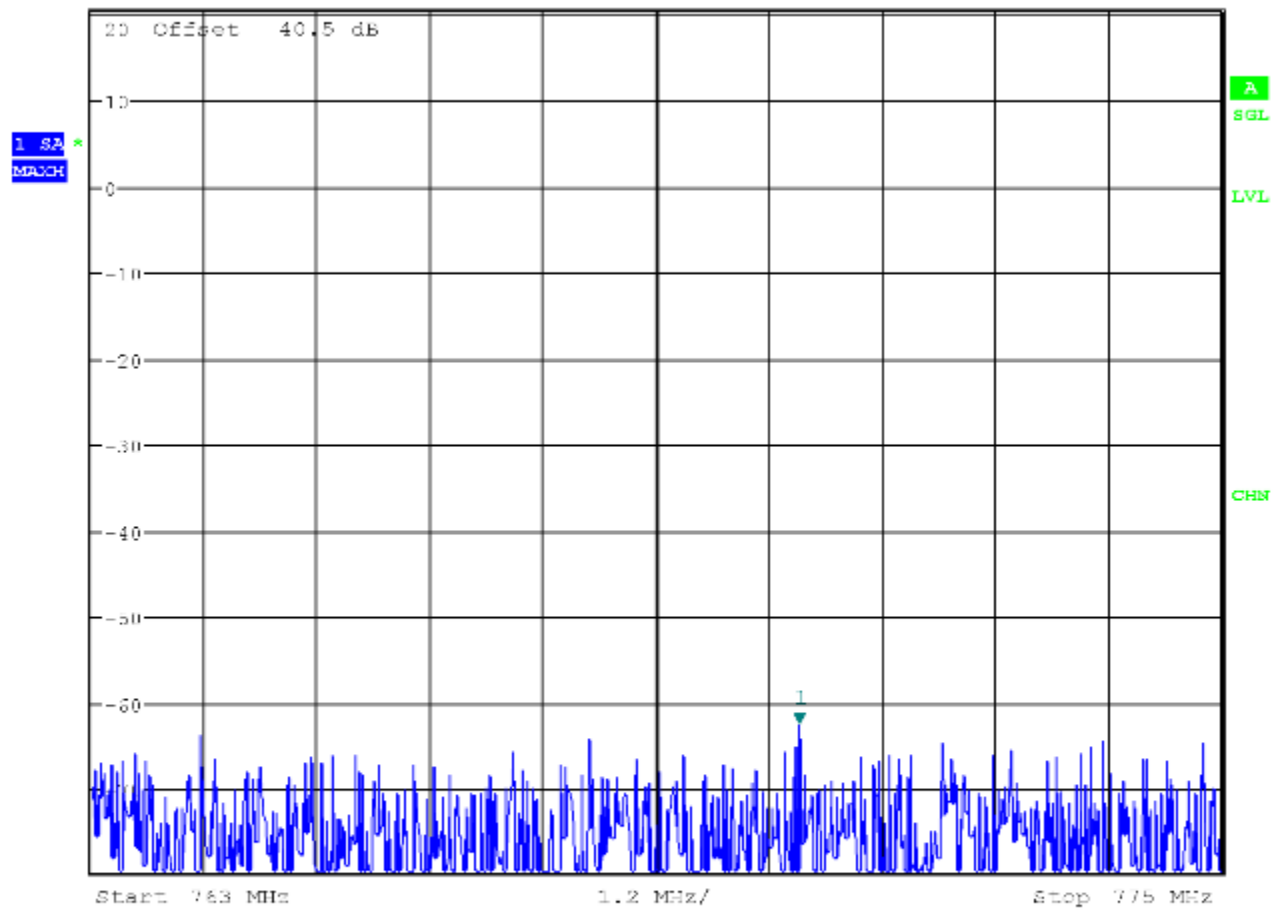


Date: 28.JUN.2012 15:20:37

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

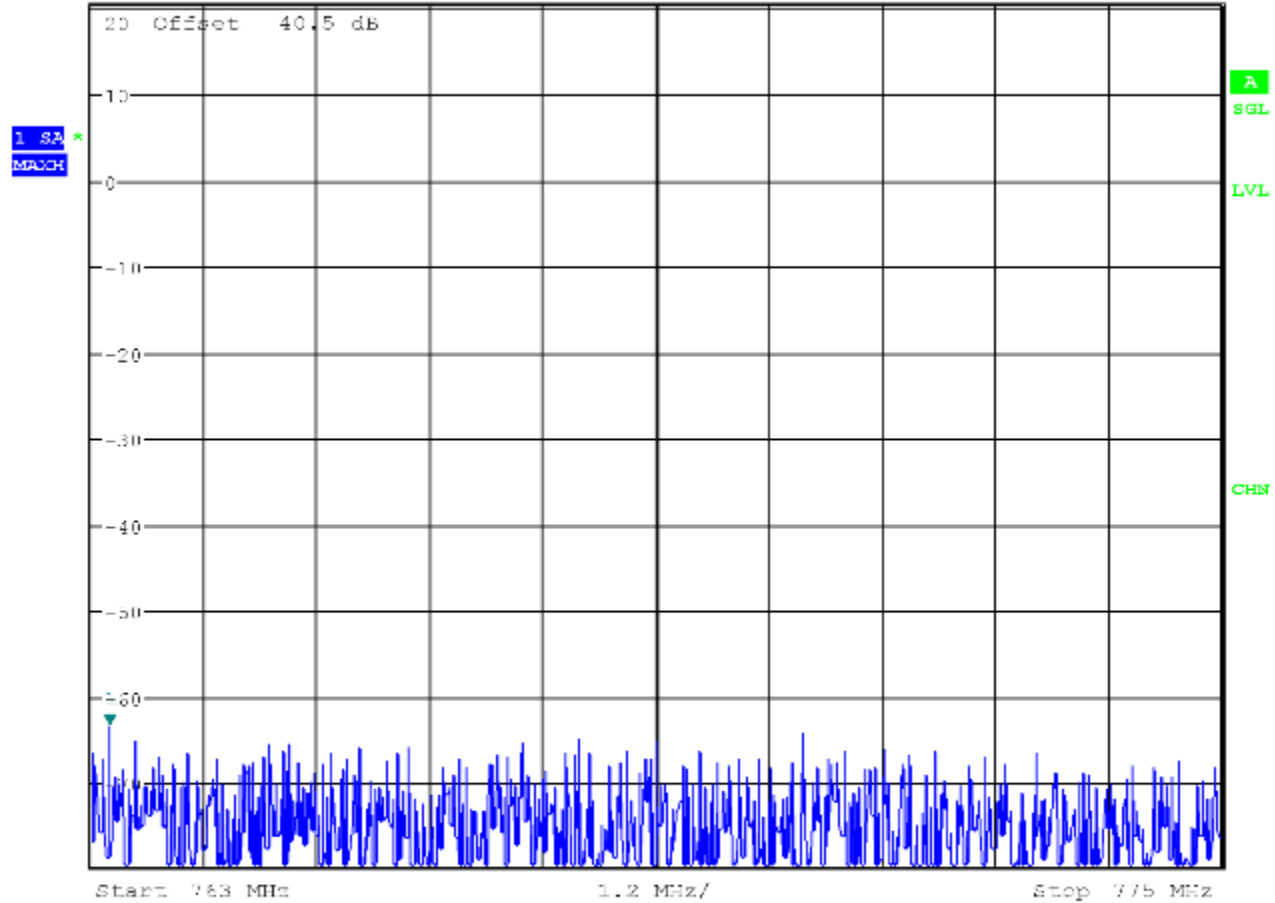


Date: 28.JUN.2012 14:45:41

Conducted Emissions      LTE 10.0 MHz Channel Bandwidth    Spectrum 700 MHz Path 2  
 Start 763 MHz Stop 775 MHz                                      RBW 6.0kHz VBW 20 kHz



\*RBW 6 kHz                      Marker 1 [T1 ]  
 \*VBW 20 kHz                      -63.23 dBm  
 Ref 20.0 dBm                      Att 9 dB                      SWT 88 s                      763.192307692 MHz



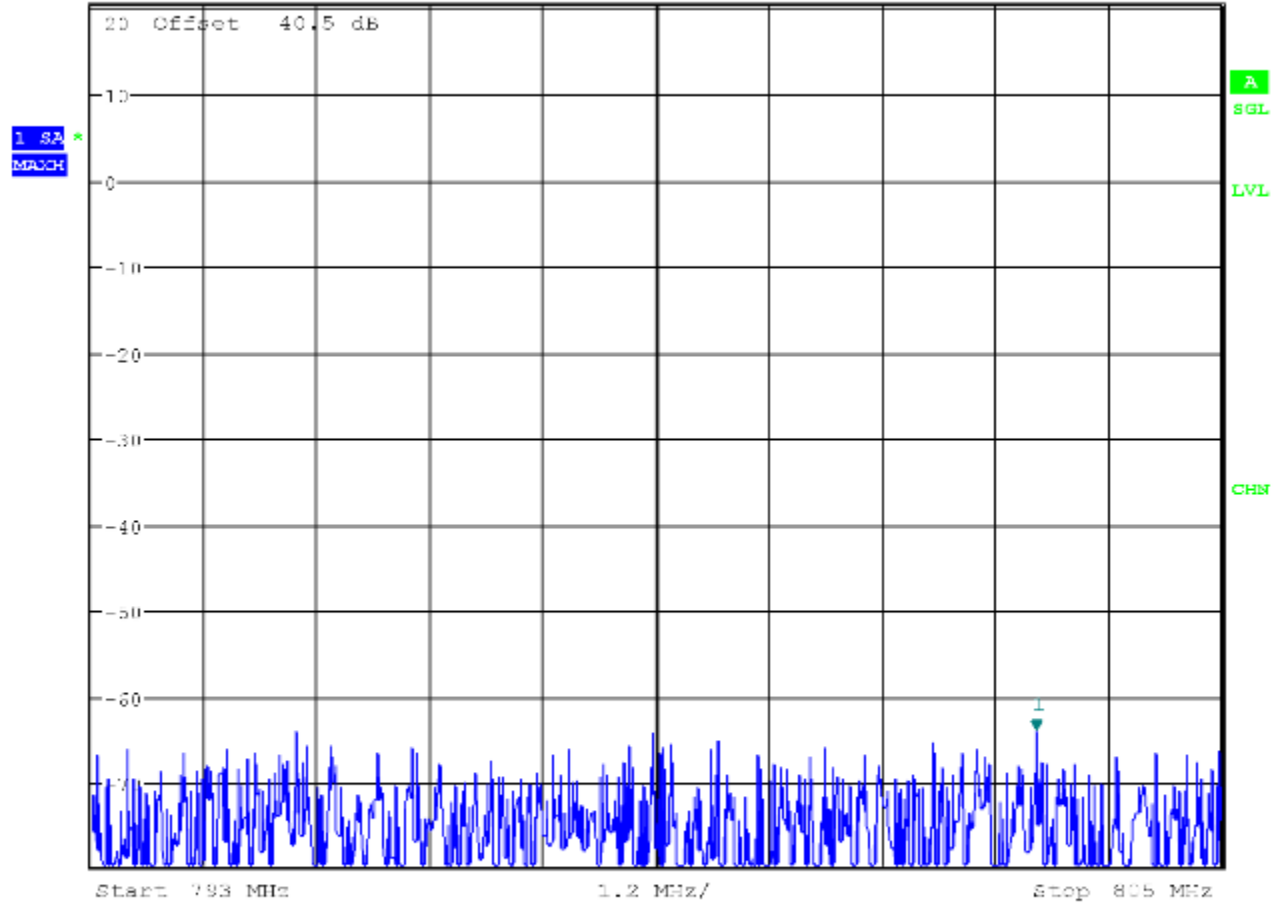
Date: 28.JUN.2012 14:48:05

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 20.0 dBm      Att 9 dB      SWT 88 s      803.038461538 MHz



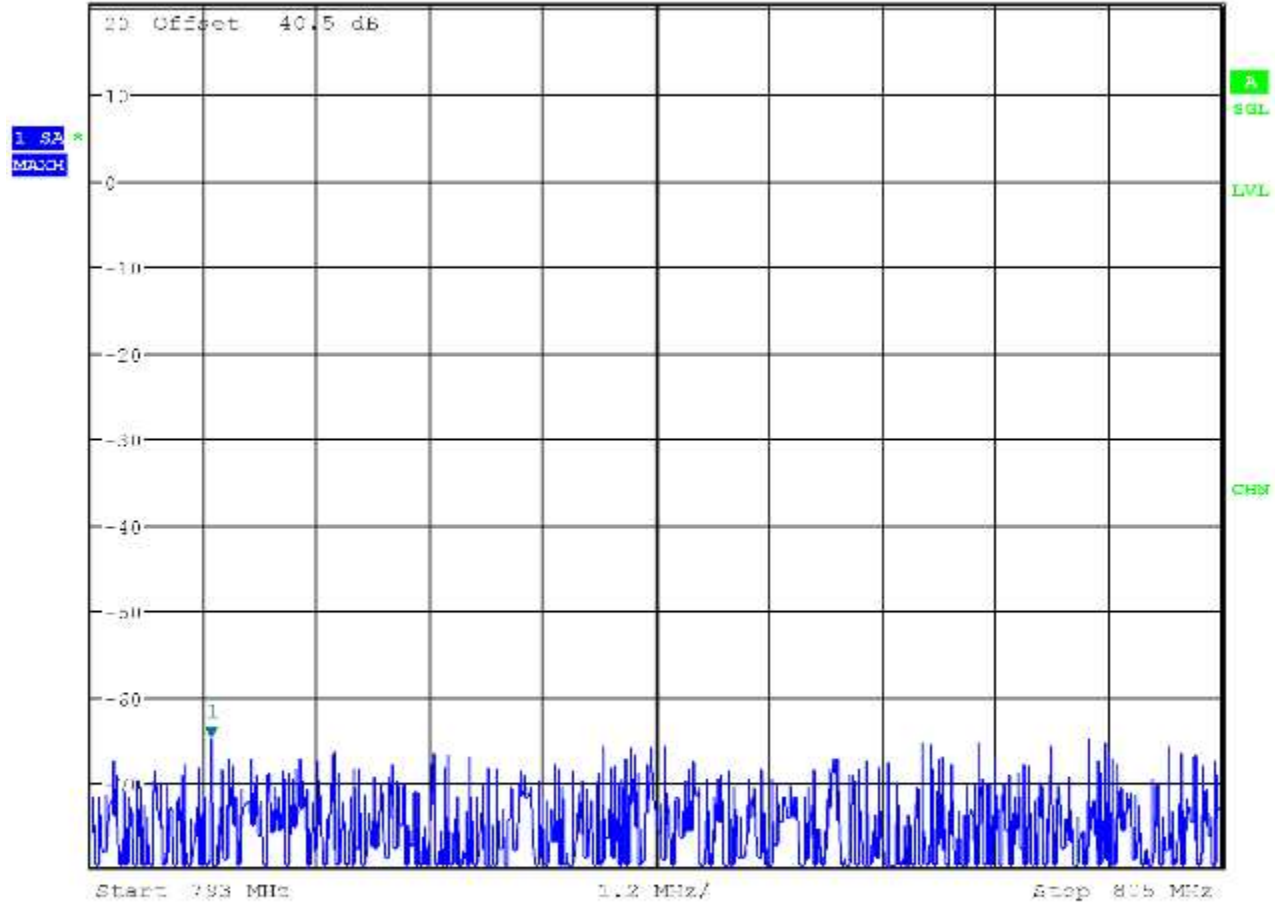
Date: 28.JUN.2012 14:50:54

Conducted Emissions      LTE 10.0 MHz Channel Bandwidth    Spectrum 700 MHz Path 2  
Start 793 MHz Stop 805 MHz      RBW 6.0kHz VBW 20 kHz



\* RBW 6.0 kHz      Marker 1 [T1 ]  
\* VBW 20 kHz      -64.67 dBm

Ref 20.0 dBm      Att 9 dB      SWT 88 s      794.269230769 MHz

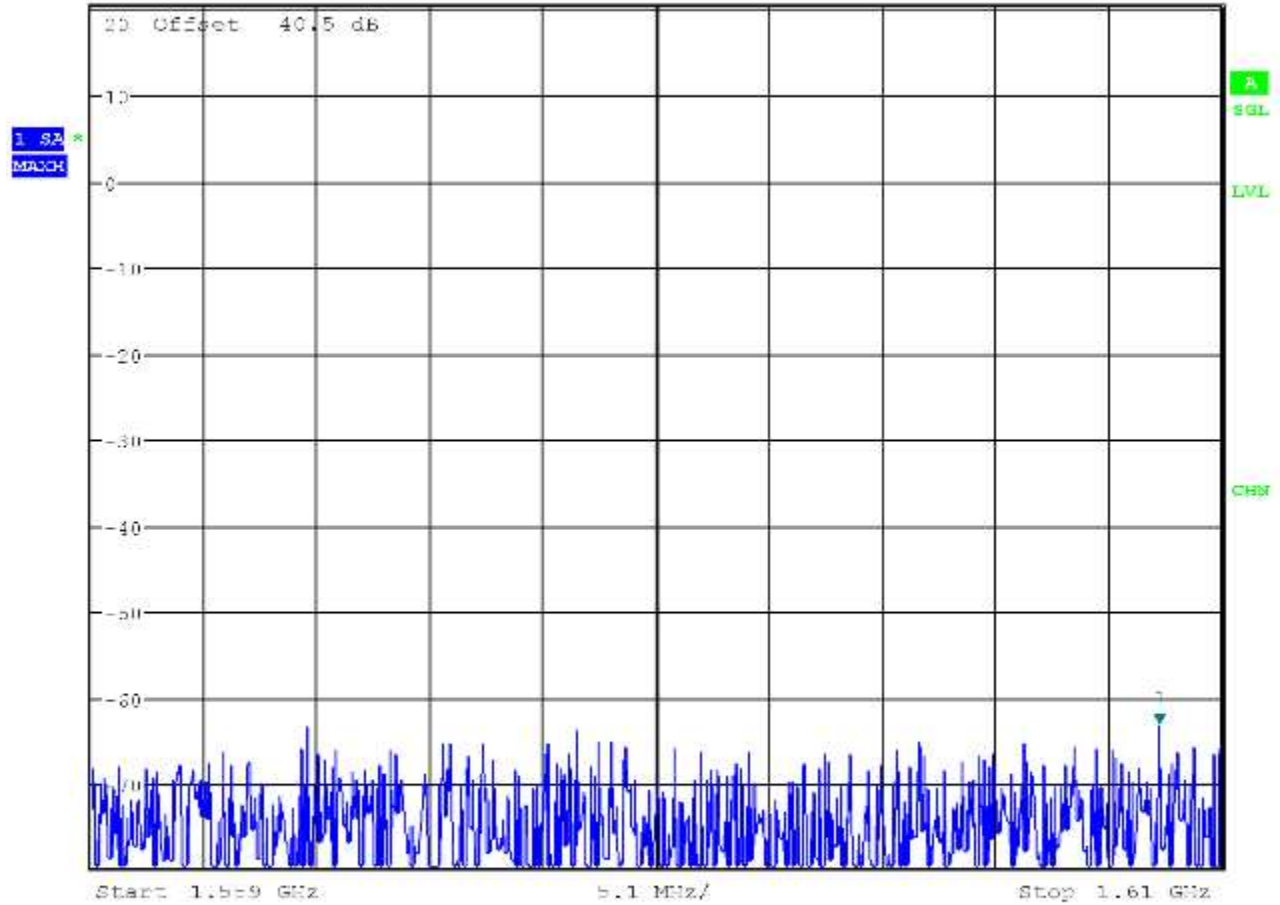


Date: 28.JUN.2012 14:52:35

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



\* RBW 6.0 kHz    \* Marker 1 [T1]    -63.03 dBm  
\* VBW 20 kHz  
Ref 20.0 dBm    Att 9 dB    SWT 290.0 s    1.607221164 GHz



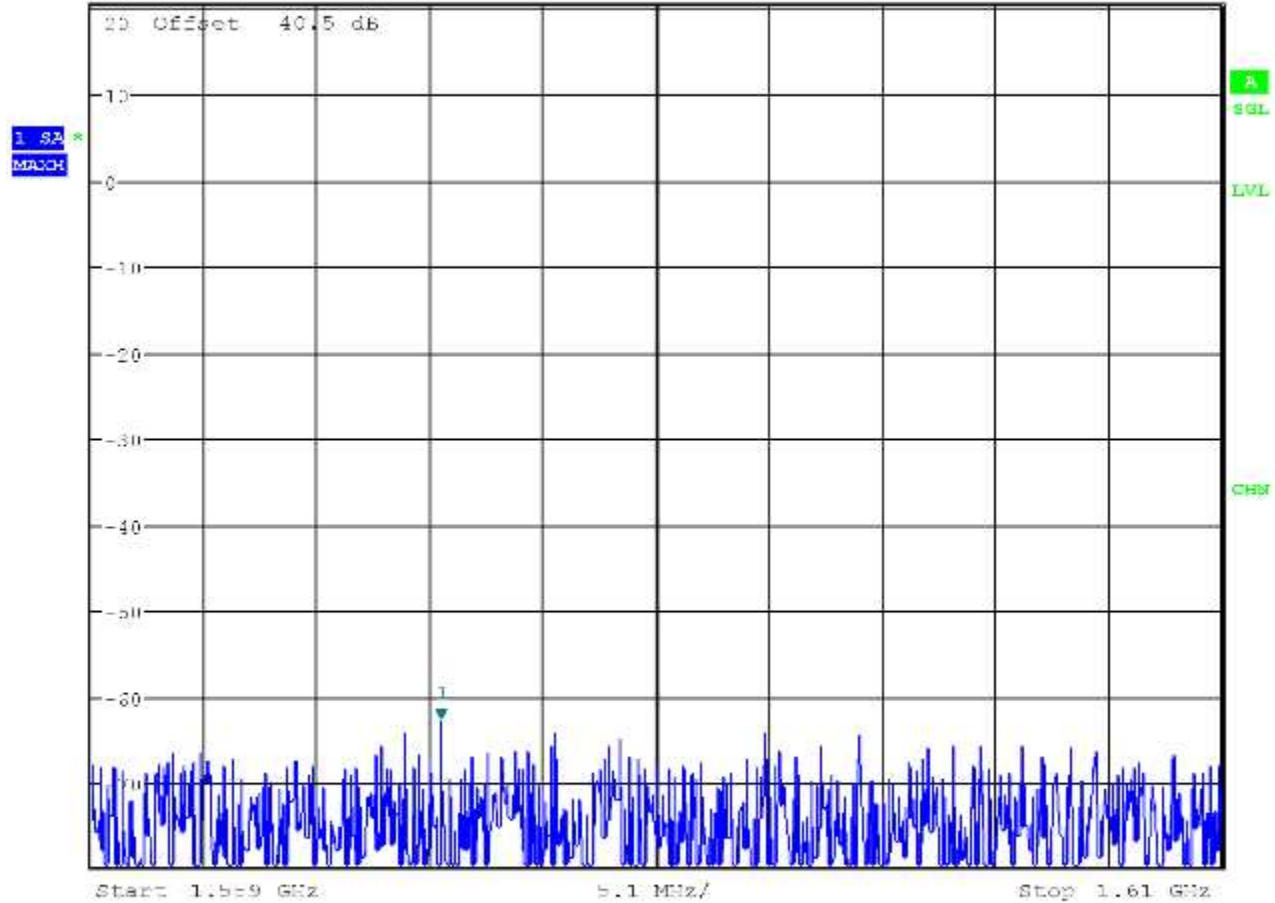
Date: 28.JUN.2012 15:56:54

Conducted Emissions      LTE 10.0 MHz Channel Bandwidth    Spectrum 700 MHz Path 2  
Start 1559 MHz   Stop 1610 MHz      RBW 6.0kHz   VBW 20 kHz



\* RBW 6.0 kHz    Marker 1 [T1]     
\* VBW 20.0 kHz    -62.52 dBm

Ref 20.0 dBm    Att 9 dB    SWT 290.0 s    1.574774038 GHz



Date: 28.JUN.2012 15:50:21



Band\_Edge

LTE 1.4 MHz Channel Bandwidth  
ABC MHz Path 1

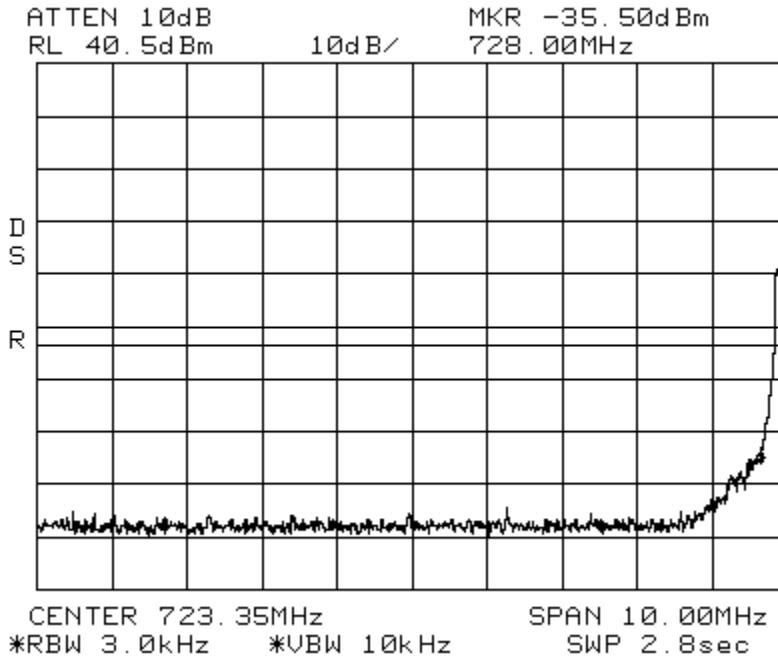
Spectrum 700 Lower

Center: 728.7MHz

Span: 10 MHz

RBW: 3 kHz

VBW: 10 kHz



Band\_Edge

LTE 1.4 MHz Channel Bandwidth  
ABC MHz Path 1

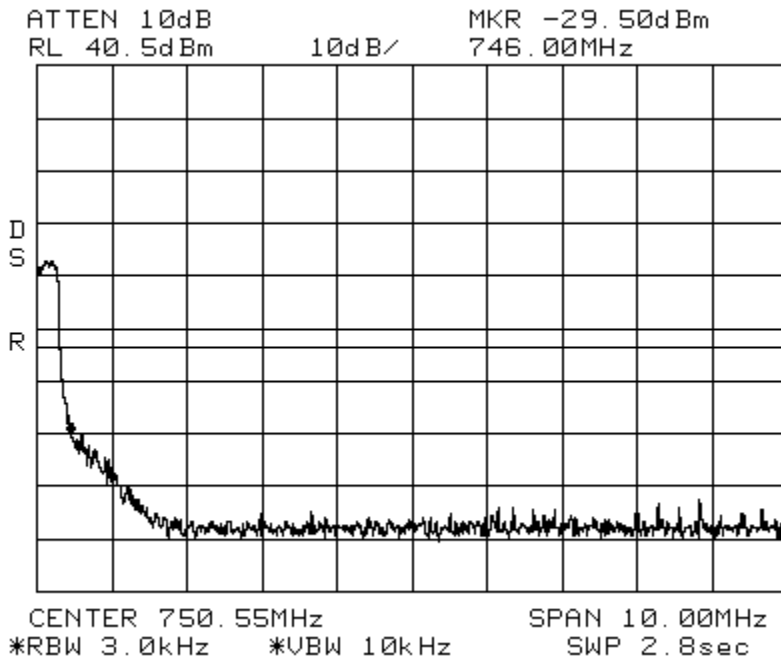
Spectrum 700 Lower

Center: 745.3 MHz

Span: 10 MHz

RBW: 3 kHz

VBW: 10 kHz



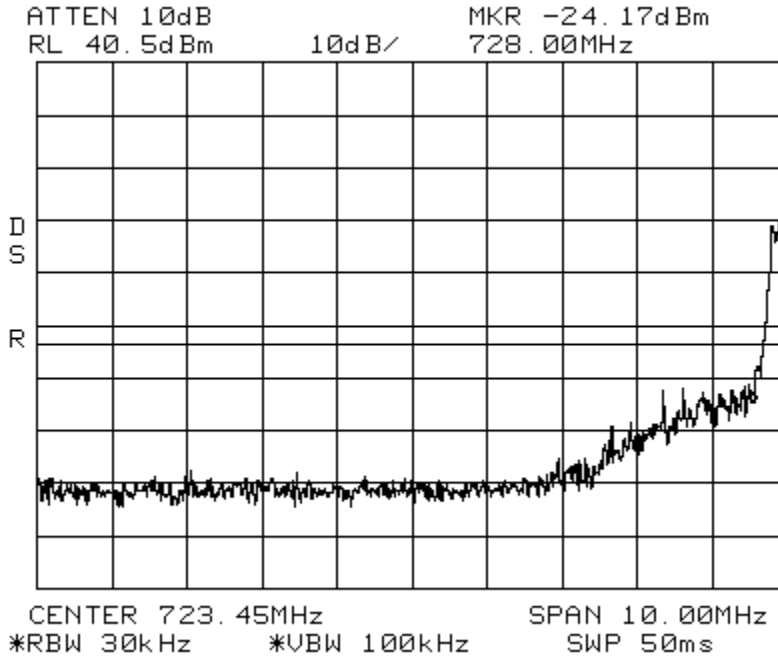
Band\_Edge

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



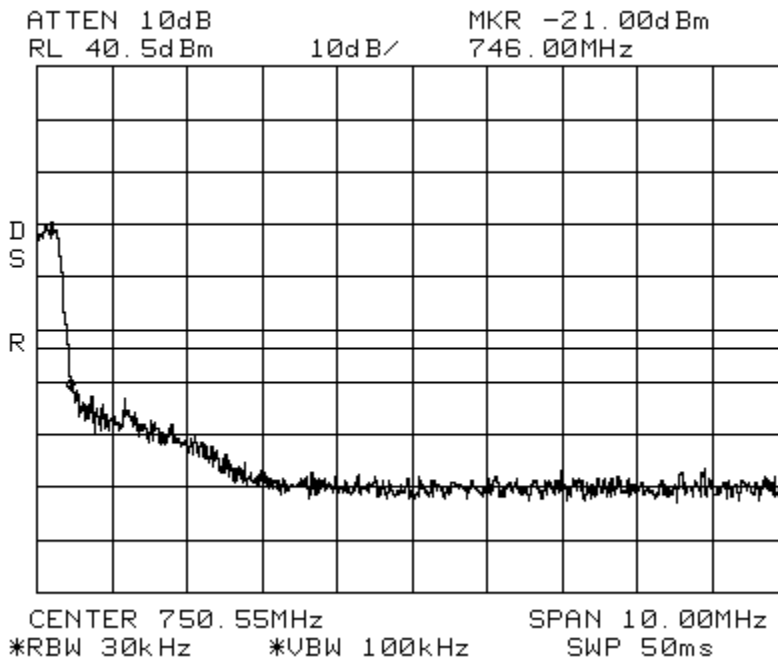
Band\_Edge

LTE 3MHz Channel Bandwidth

Spectrum 700 MHz

Lower ABC Path 1

Center: 744.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz



Band\_Edge

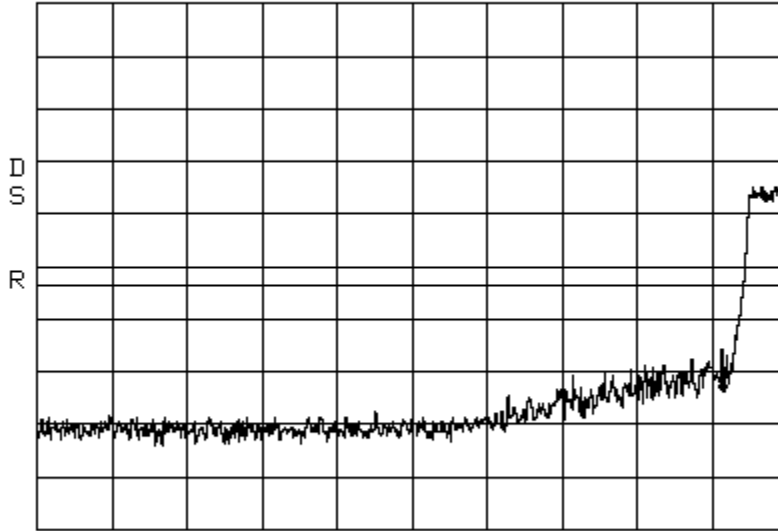
LTE 5 MHz Channel Bandwidth

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



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

Band\_Edge

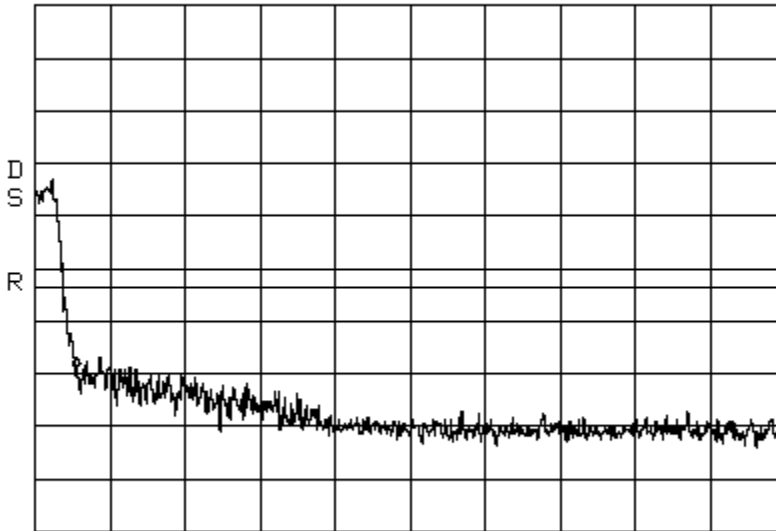
LTE 5 MHz Channel Bandwidth

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



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

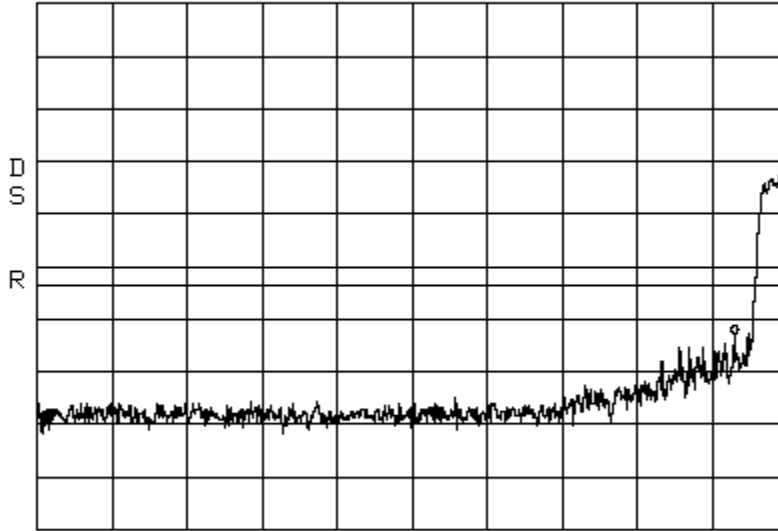
ATTEN 10dB

MKR -22.50dBm

RL 40.5dBm

10dB/

728.00MHz



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

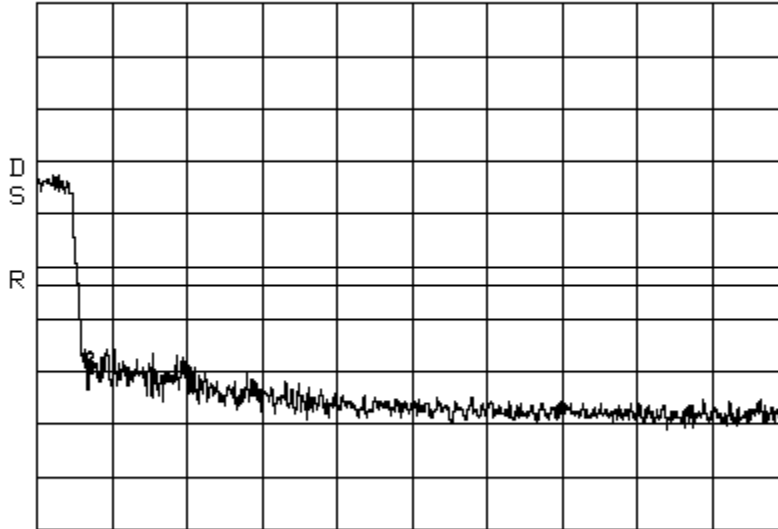
ATTEN 10dB

MKR -27.50dBm

RL 40.5dBm

10dB/

746.00MHz



CENTER 754.60MHz SPAN 20.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

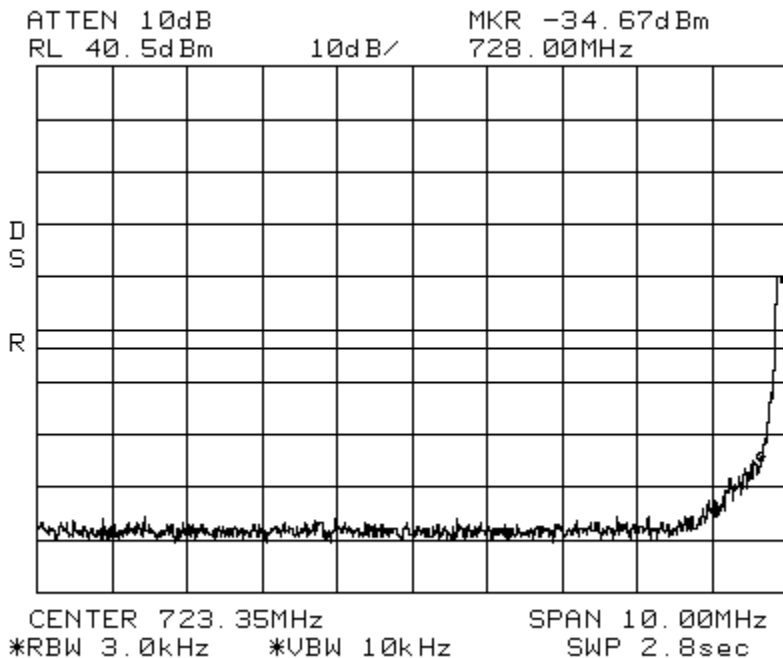
Band\_Edge

LTE 1.4 MHz Channel Bandwidth

Spectrum 700 Lower ABC MHz

Center: 728.7MHz Path 2

Span: 10 MHz RBW: 3 kHz VBW: 10 kHz



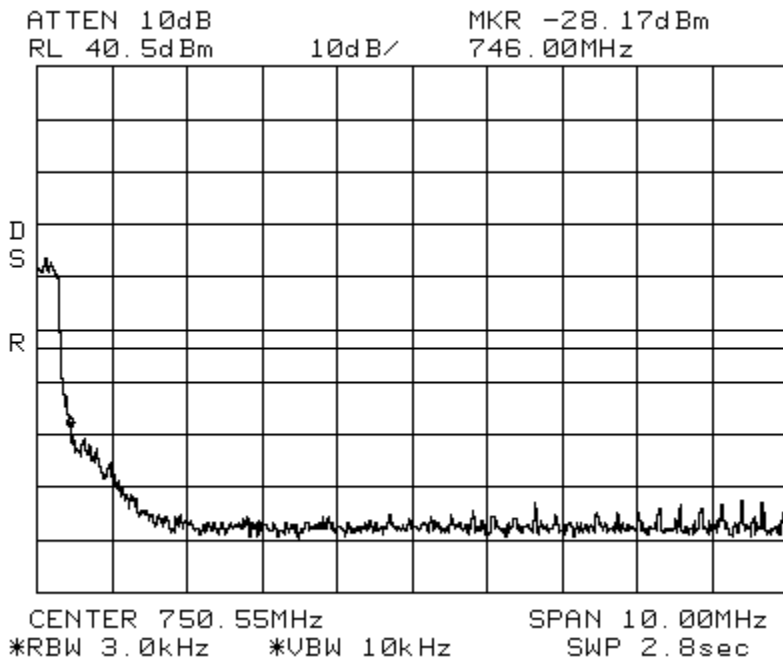
Band\_Edge

LTE 1.4 MHz Channel Bandwidth

Spectrum 700 Lower

Center: 745.3 MHz ABC MHz Path 2

Span: 10 MHz RBW: 3 kHz VBW: 10 kHz

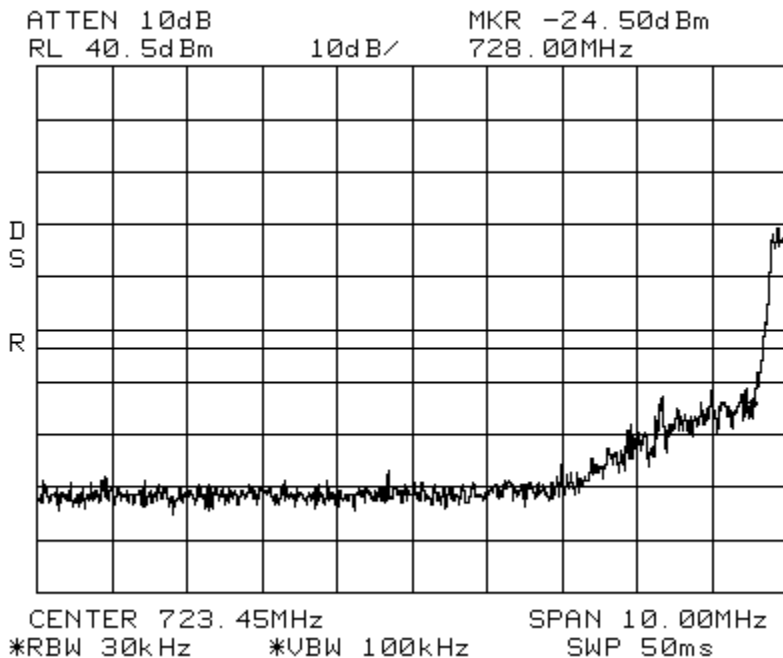


Band\_Edge

LTE 3 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Center: 729.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

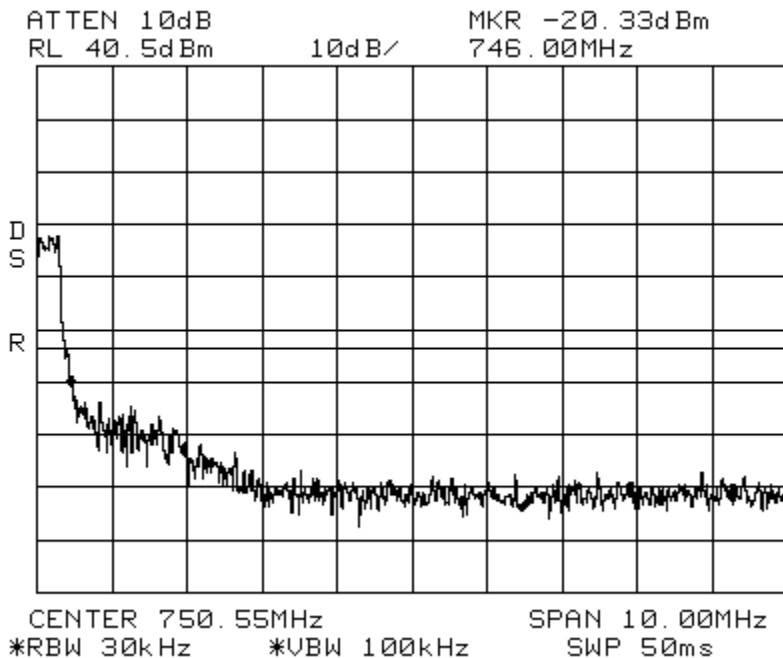


Band\_Edge

LTE 3MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Center: 744.5 MHz Span: 10 MHz RBW: 30 kHz VBW: 100 kHz



Band\_Edge

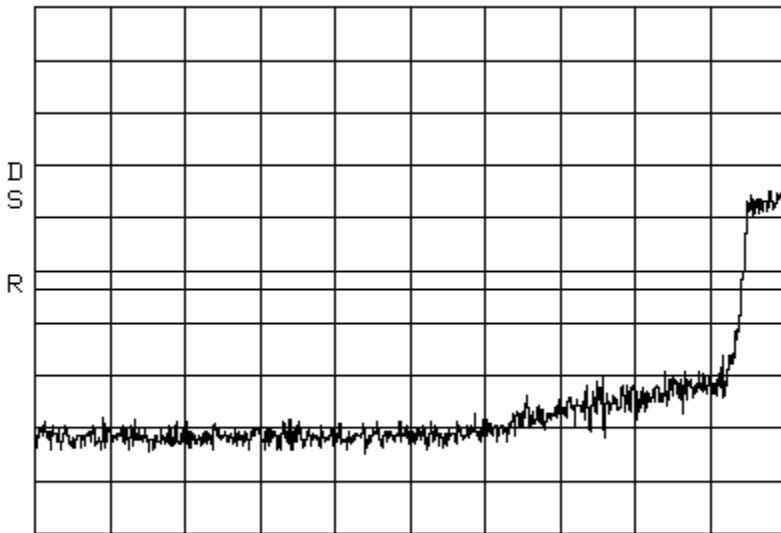
LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz Lower ABC

Path 2

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

ATTEN 10dB MKR -31.83dBm  
RL 40.5dBm 10dB/ 728.00MHz



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

Band\_Edge

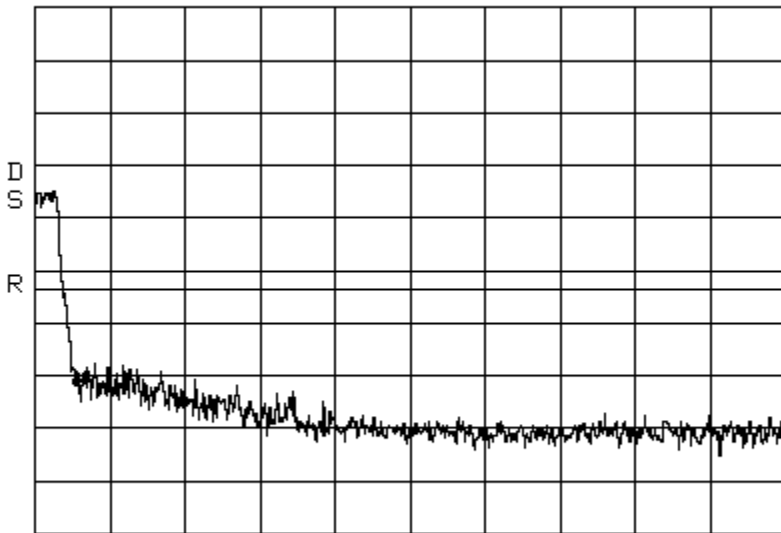
LTE 5 MHz Channel Bandwidth

Spectrum 700 MHz Lower ABC

Path 2

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

ATTEN 10dB MKR -31.50dBm  
RL 40.5dBm 10dB/ 746.00MHz



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

Band\_Edge

LTE 10 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Center: 733 MHz

Span: 20 MHz

RBW: 100 kHz

VBW: 100 kHz

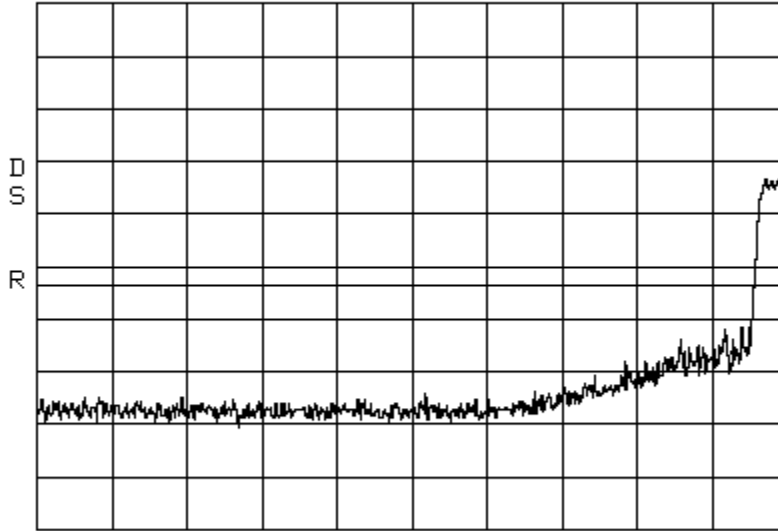
ATTEN 10dB

MKR -27.00dBm

RL 40.5dBm

10dB/

729.00MHz



CENTER 720.40MHz

SPAN 20.00MHz

\*RBW 100kHz

\*VBW 100kHz

SWP 50ms

Band\_Edge

LTE 10 MHz Channel Bandwidth  
Path 2

Spectrum 700 MHz Lower ABC

Center: 741 MHz

Span: 20 MHz

RBW: 100 kHz

VBW: 100 kHz

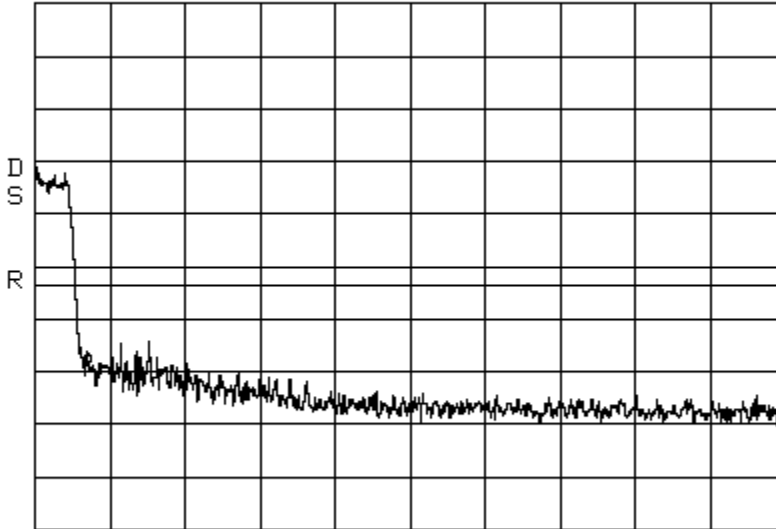
ATTEN 10dB

MKR -28.00dBm

RL 40.5dBm

10dB/

746.00MHz



CENTER 754.60MHz

SPAN 20.00MHz

\*RBW 100kHz

\*VBW 100kHz

SWP 50ms



Band\_Edge

LTE 1.4 MHz Channel Bandwidth  
Upper C Path 1

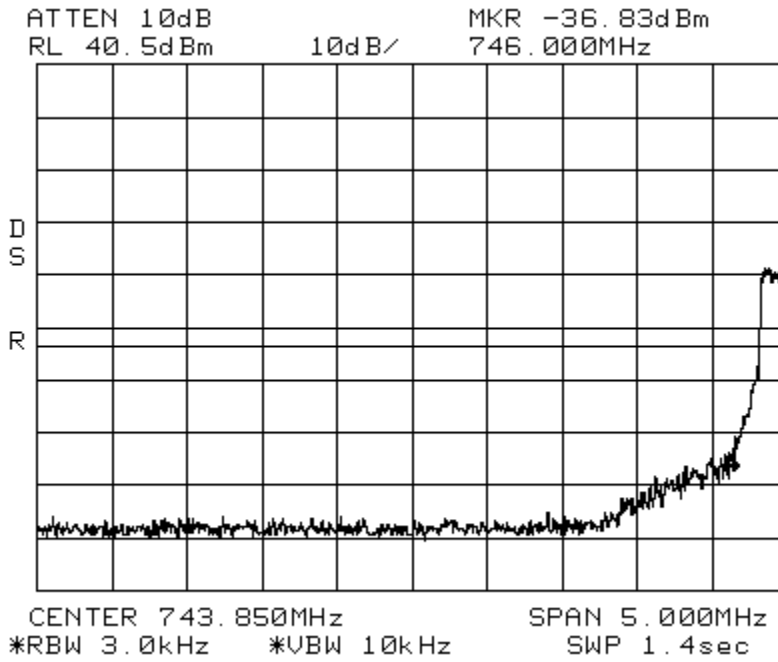
Spectrum 700 MHz

Center: 746.7MHz

Span: 5 MHz

RBW: 3 kHz

VBW: 10 kHz



Band\_Edge

LTE 1.4 MHz Channel Bandwidth  
Upper C Path 1

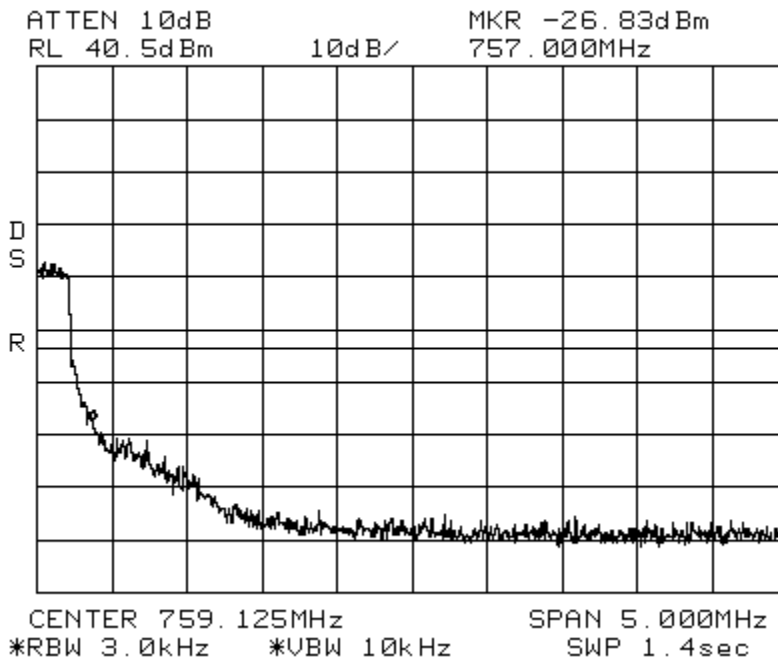
Spectrum 700 MHz

Center: 756.3 MHz

Span: 5 MHz

RBW: 3 kHz

VBW: 10 kHz



Band\_Edge

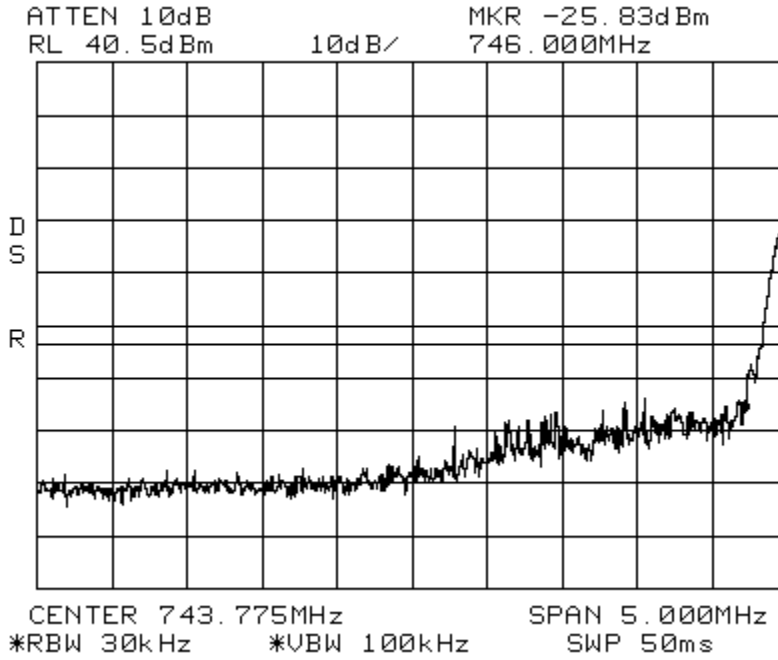
LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 747.5 MHz Span: 5 MHz

RBW: 30 kHz VBW: 100 kHz



Band\_Edge

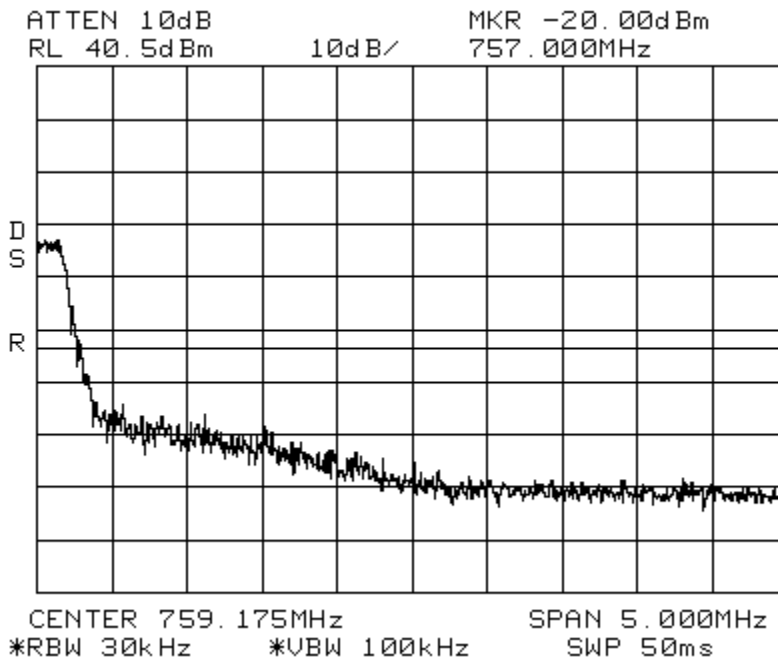
LTE 3MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 1

Center: 755.5 MHz Span: 5 MHz

RBW: 30 kHz VBW: 100 kHz



Band\_Edge

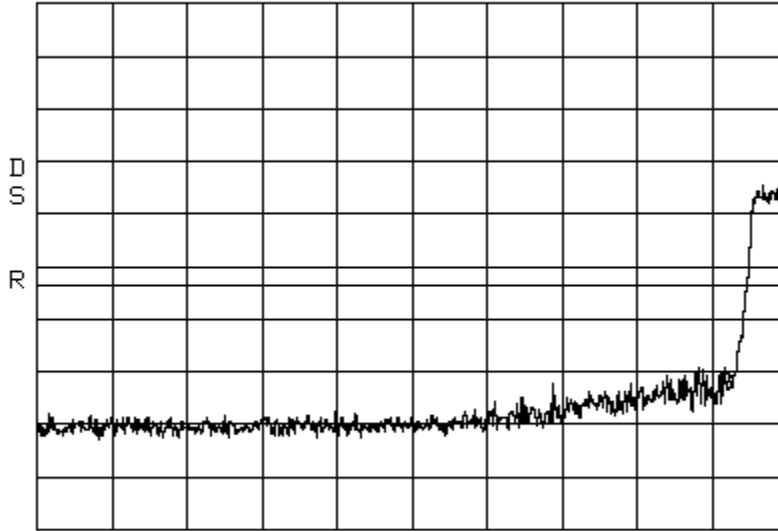
LTE 5 MHz Channel Bandwidth

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



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

Band\_Edge

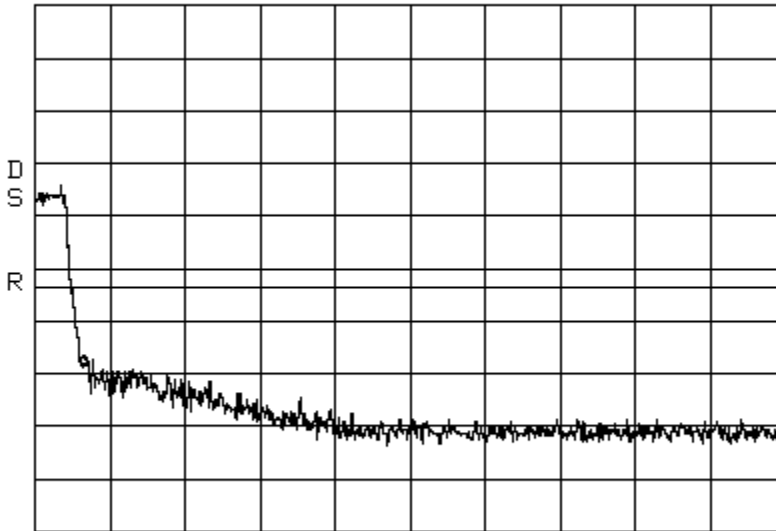
LTE 5 MHz Channel Bandwidth

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



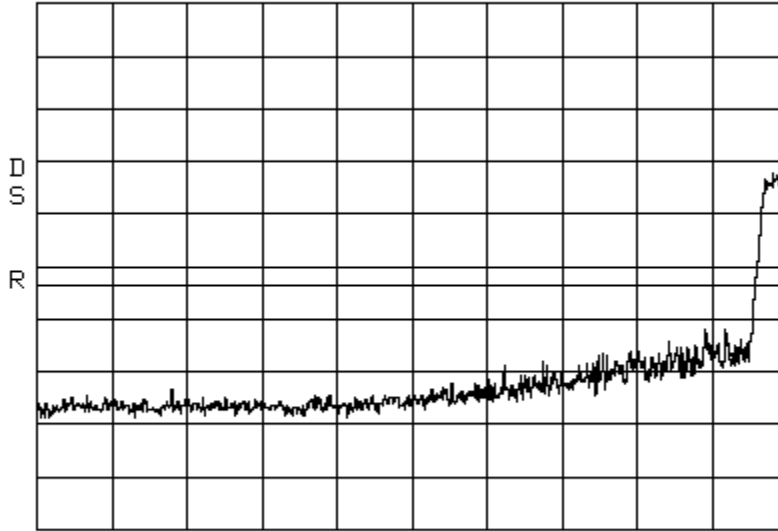
CENTER 761.35MHz SPAN 10.00MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

Band\_Edge

LTE 10 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Center: 751 MHz      Span: 15 MHz      RBW: 100 kHz      VBW: 100 kHz  
ATTEN 10dB      MKR -27.83dBm  
RL 40.5dBm      10dB/      746.00MHz



CENTER 739.60MHz      SPAN 15.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

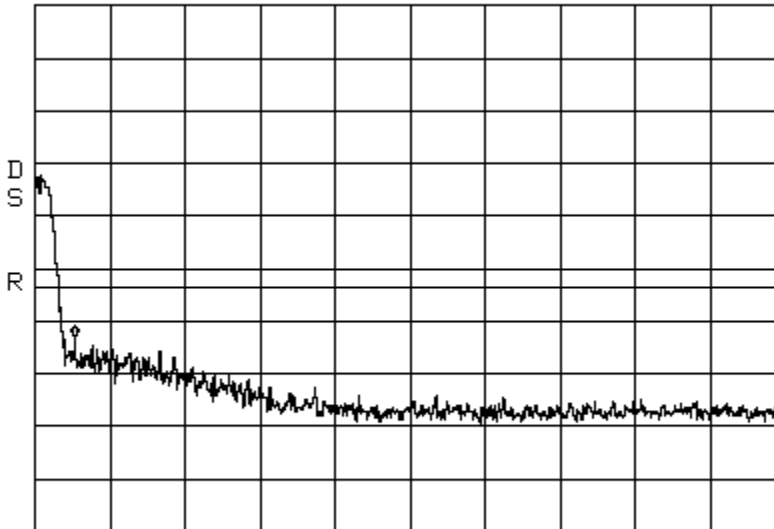
Band\_Edge

LTE 10 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Center: 752 MHz      Span: 15 MHz      RBW: 100 kHz      VBW: 100 kHz

ATTEN 10dB      MKR -22.33dBm  
RL 40.5dBm      10dB/      757.00MHz



CENTER 763.70MHz      SPAN 15.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

Band\_Edge

LTE 1.4 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 2

Center: 746.7MHz

Span: 5 MHz

RBW: 3 kHz

VBW: 10 kHz

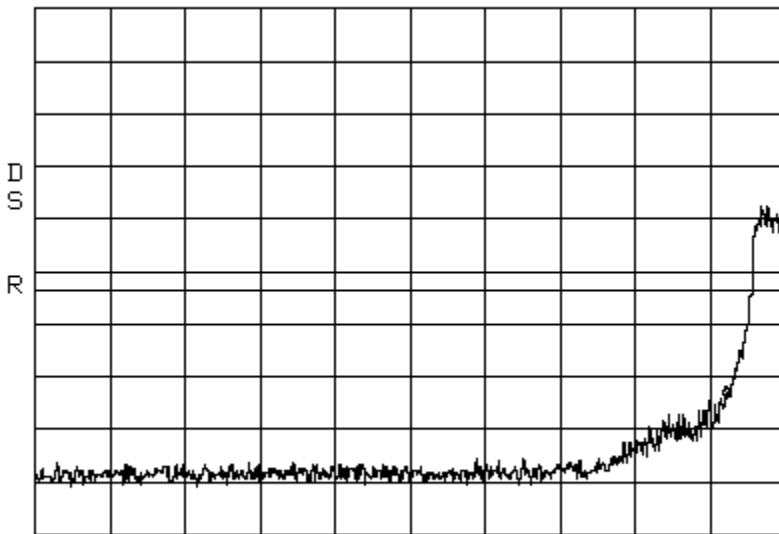
ATTEN 10dB

MKR -33.50dBm

RL 40.5dBm

10dB/

745.998MHz



CENTER 743.890MHz SPAN 5.000MHz  
\*RBW 3.0kHz \*VBW 10kHz SWP 1.4sec

Band\_Edge

LTE 1.4 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 2

Center: 756.3 MHz

Span: 5 MHz

RBW: 3 kHz

VBW: 10 kHz

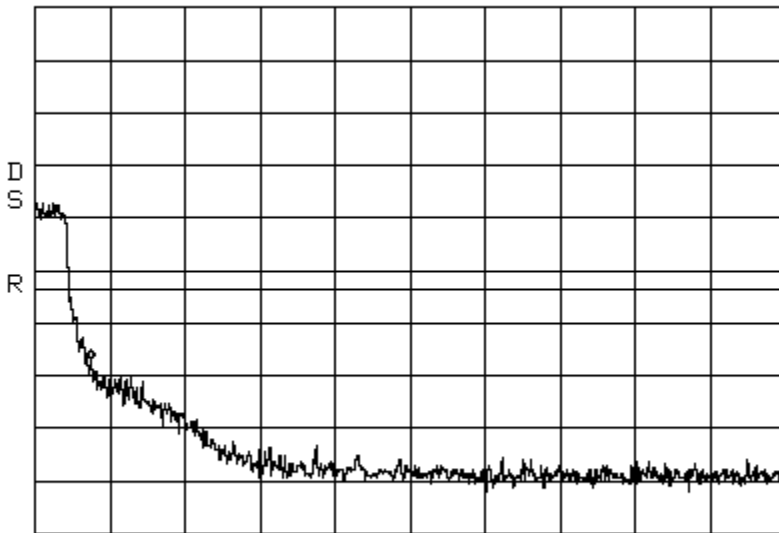
ATTEN 10dB

MKR -26.50dBm

RL 40.5dBm

10dB/

757.000MHz



CENTER 759.125MHz SPAN 5.000MHz  
\*RBW 3.0kHz \*VBW 10kHz SWP 1.4sec

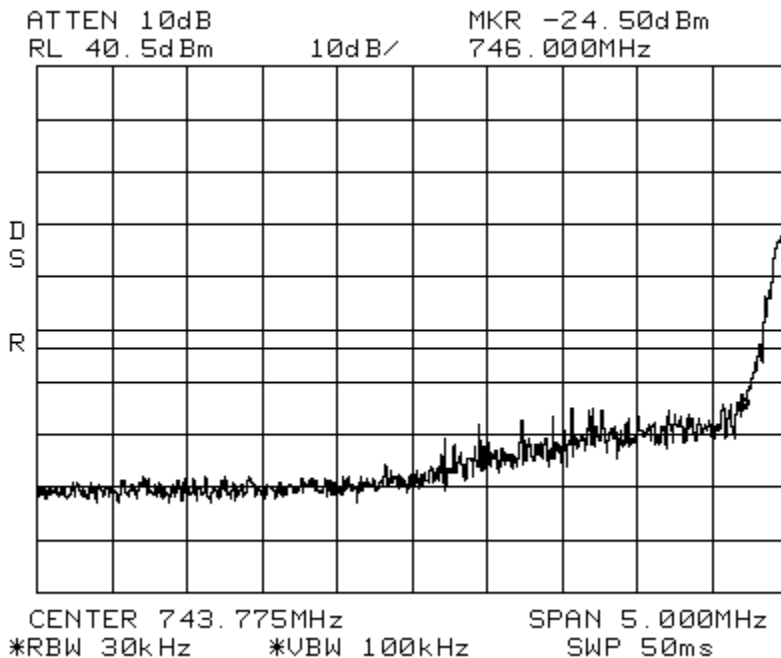
Band\_Edge

LTE 3 MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 2

Center: 747.5 MHz Span: 5 MHz RBW: 30 kHz VBW: 100 kHz



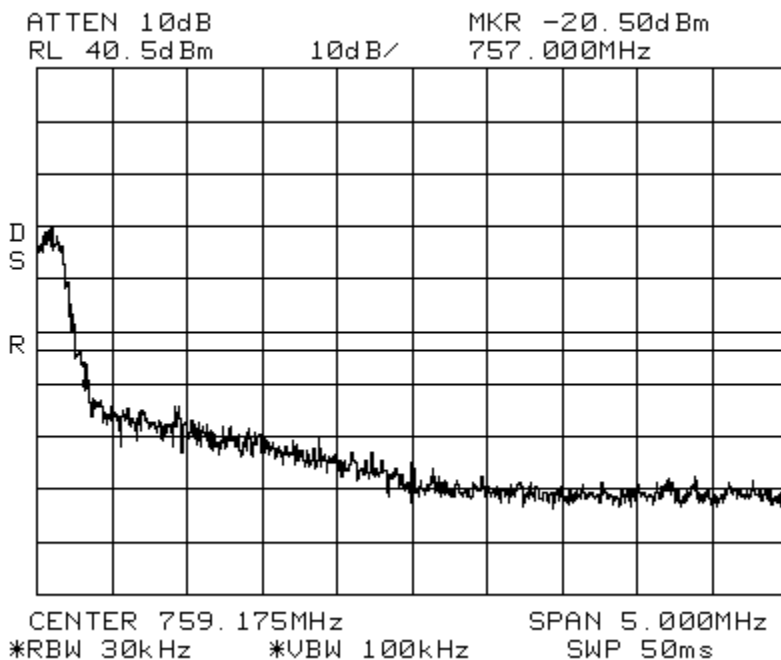
Band\_Edge

LTE 3MHz Channel Bandwidth

Spectrum 700 MHz

Upper C Path 2

Center: 755.5 MHz Span: 5 MHz RBW: 30 kHz VBW: 100 kHz



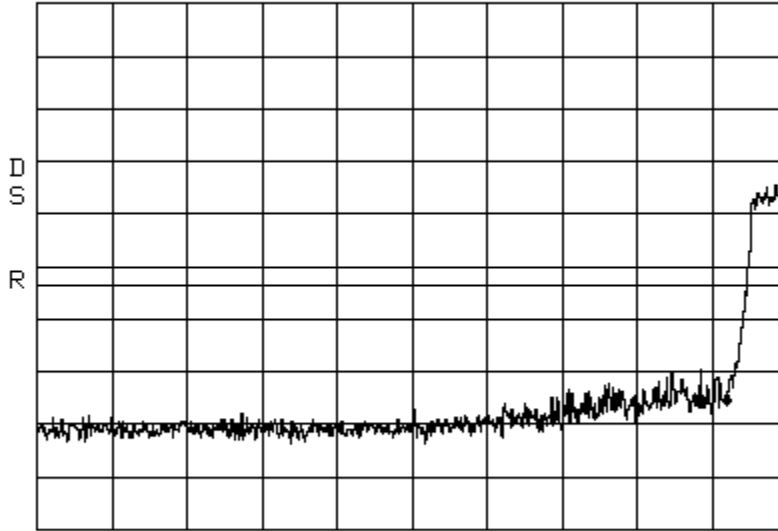
Band\_Edge

LTE 5 MHz Channel Bandwidth  
Upper C Path 2

Spectrum 700 MHz

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

ATTEN 10dB MKR -36.00dBm  
RL 40.5dBm 10dB/ 746.00MHz



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

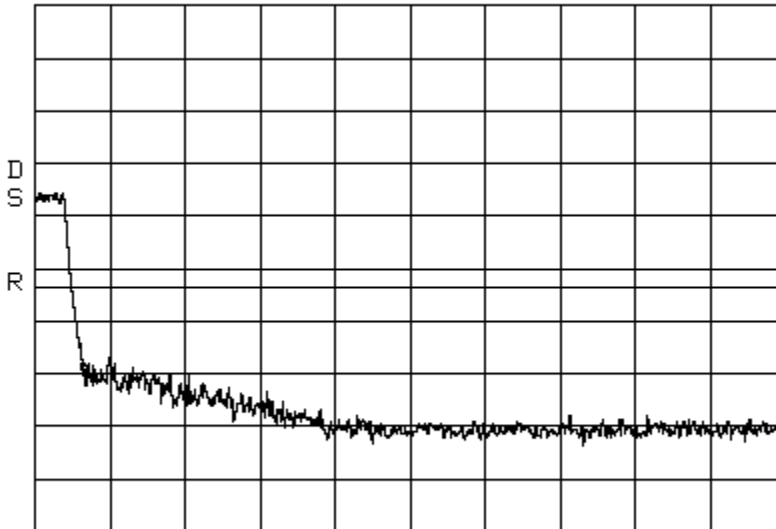
Band\_Edge

LTE 5 MHz Channel Bandwidth  
Upper C Path 2

Spectrum 700 MHz

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

ATTEN 10dB MKR -29.33dBm  
RL 40.5dBm 10dB/ 757.00MHz



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

Band\_Edge

LTE 10 MHz Channel Bandwidth  
Upper C Path 2

Spectrum 700 MHz

Center: 751 MHz

Span: 15 MHz

RBW: 100 kHz

VBW: 100 kHz

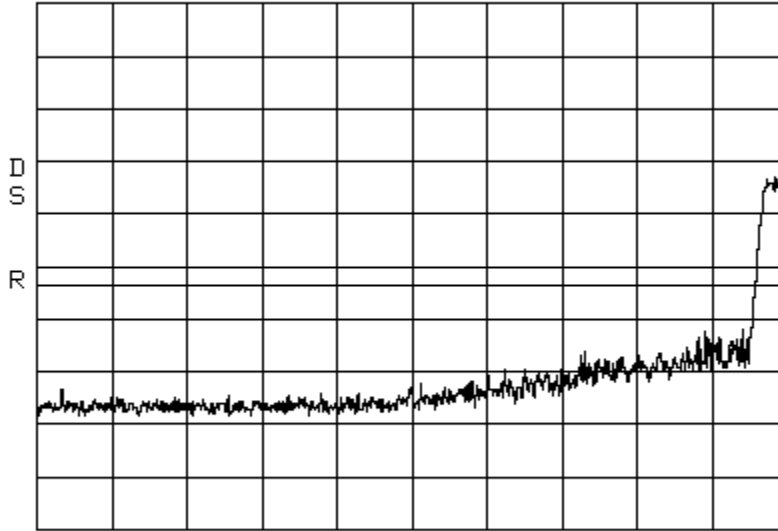
ATTEN 10dB

MKR -25.83dBm

RL 40.5dBm

10dB/

746.00MHz



CENTER 739.60MHz SPAN 15.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

Band\_Edge

LTE 10 MHz Channel Bandwidth  
Upper C Path 2

Spectrum 700 MHz

Center: 752 MHz

Span: 15 MHz

RBW: 100 kHz

VBW: 100 kHz

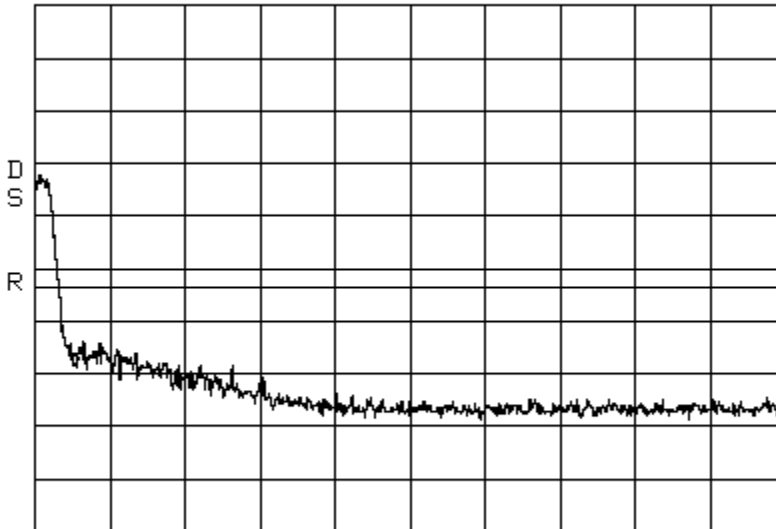
ATTEN 10dB

MKR -27.67dBm

RL 40.5dBm

10dB/

757.00MHz



CENTER 763.70MHz SPAN 15.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms



## 7.2 Conducted Output Power Test

[Table of Contents; Section 1.0](#)

[Back to Conducted Output Power; Section 5.1.1](#)

\*Note: The EUT is a fixed repeater and not a base station.

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 Channel Bandwidths signal generator. The power meter level was offset to compensate for attenuators and cable loss between the EUT and the power meter.

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

### 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

**700 Lower ABC Path 2**

**LTE 1.4 MHz Ch. BW      0.1035 Watts**

Carrier Frequency	Carrier Output
728.70 MHz	18.52 dBm
737.00 MHz	20.15 dBm
745.30 MHz	19.22 dBm

**700 Lower ABC Path 2**

**LTE 3.0 MHz Ch. BW      0.1264 Watts**

Carrier Frequency	Carrier Output
729.50 MHz	19.48 dBm
737.00 MHz	21.02 dBm
744.50 MHz	20.12 Bm

**700 Lower ABC Path 2**

**LTE 5.0 MHz Ch. BW      0.1088 Watts**

Carrier Frequency	Carrier Output
730.50 MHz	19.24 dBm
737.00 MHz	20.37 dBm
743.50 MHz	19.32 dBm

**700 Lower ABC Path 2**

**LTE 10.0 MHz Ch. BW      0.1088 Watts**

Carrier Frequency	Carrier Output
733.00 MHz	20.04 dBm
737.00 MHz	20.37 dBm
741.00 MHz	19.91 dBm

**700 Upper C Path 2**

**LTE 1.4 MHz Ch. BW      0.1145 Watts**

Carrier Frequency	Carrier Output
746.70 MHz	18.38 dBm
751.50 MHz	20.59 dBm
756.30 MHz	18.84 dBm

**700 Upper C Path 2**

**LTE 3.0 MHz Ch. BW      0.1291 Watts**

Carrier Frequency	Carrier Output
747.50 MHz	19.28 dBm
751.50 MHz	21.11 dBm
755.50 MHz	20.08 dBm

**700 Upper C Path 2**

**LTE 5.0 MHz Ch. BW      0.1061 Watts**

Carrier Frequency	Carrier Output
748.50 MHz	19.25 dBm
751.50 MHz	20.26 dBm
754.50 MHz	19.75 dBm

**700 Upper C Path 2**

**LTE 10.0 MHz Ch. BW      0.0990 Watts**

Carrier Frequency	Carrier Output
751.50 MHz	19.96 dBm

### 7.3 Frequency Stability Test

[Table of Contents; Section 1.0](#)

[Back to Frequency Stability; Section 5.1.1](#)

#### Path 1

Host/DRU	IFEU	RAU	Carrier Frequency	Measured Frequency	Meets Requirements?
<b>Input Voltage</b>	<b>Input Voltage</b>	<b>Input Voltage</b>			
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	755.800 MHz	755.800 MHz	Yes
170 VAC	54VDC	54 VDC	755.800 MHz	755.800 MHz	Yes
240 VAC	54VDC	54 VDC	755.800 MHz	755.800 MHz	Yes
<b>Temperature</b>			<b>Carrier Frequency</b>	<b>Measured Frequency</b>	<b>Meets Requirements?</b>
-25 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
-25 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
-25 Deg. C			755.800 MHz	755.800 MHz	Yes
-20 Deg. C			755.800 MHz	755.800 MHz	Yes
-10 Deg. C			755.800 MHz	755.800 MHz	Yes
0 Deg. C			755.800 MHz	755.800 MHz	Yes
10 Deg. C			755.800 MHz	755.800 MHz	Yes
20 Deg. C			755.800 MHz	755.800 MHz	Yes
30 Deg. C			755.800 MHz	755.800 MHz	Yes
40 Deg. C			755.800 MHz	755.800 MHz	Yes
45 Deg. C			755.800 MHz	755.800 MHz	Yes
50 Deg. C			755.800 MHz	755.800 MHz	Yes

## Path 2

Host/DRU	IFEU	RAU			
<b>Input Voltage</b>	<b>Input Voltage</b>	<b>Input Voltage</b>	<b>Carrier Frequency</b>	<b>Measured Frequency</b>	<b>Meets Requirements?</b>
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	755.800 MHz	755.800 MHz	Yes
170 VAC	54VDC	54 VDC	755.800 MHz	755.800 MHz	Yes
240 VAC	54VDC	54 VDC	755.800 MHz	755.800 MHz	Yes
<b>Temperature</b>			<b>Carrier Frequency</b>	<b>Measured Frequency</b>	<b>Meets Requirements?</b>
-25 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
-25 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
-25 Deg. C			755.800 MHz	755.800 MHz	Yes
-20 Deg. C			755.800 MHz	755.800 MHz	Yes
-10 Deg. C			755.800 MHz	755.800 MHz	Yes
0 Deg. C			755.800 MHz	755.800 MHz	Yes
10 Deg. C			755.800 MHz	755.800 MHz	Yes
20 Deg. C			755.800 MHz	755.800 MHz	Yes
30 Deg. C			755.800 MHz	755.800 MHz	Yes
40 Deg. C			755.800 MHz	755.800 MHz	Yes
45 Deg. C			755.800 MHz	755.800 MHz	Yes
50 Deg. C			755.800 MHz	755.800 MHz	Yes

## 7.4 Intermodulation Test

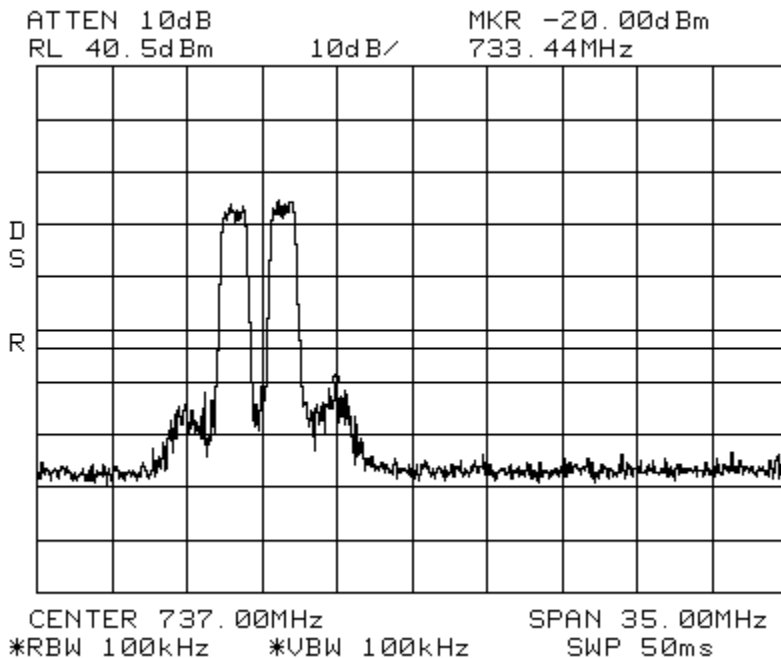
[Table of Contents; Section 1.0](#)

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

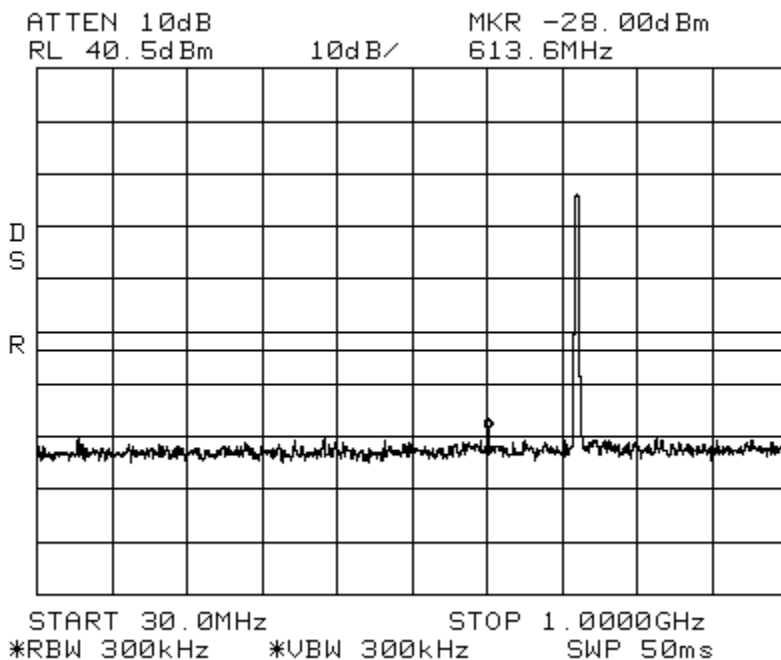
The inter-modulation products test was performed for the EUT. Three tests were performed with the modulation type. Test 1 was with 2 signals input to the EUT at lower end channels. Test 2 was with 2 signals input to the EUT at upper end channels. Test 3 was with 2 signals input to the EUT at upper and lower end channels. The modulation types tested were LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz Channel Bandwidths. An investigation was made from 30 MHz to the 10<sup>th</sup> Harmonic of the highest fundamental frequency (~20 GHz). The following plots show the results.

Results:  
(See Plots)

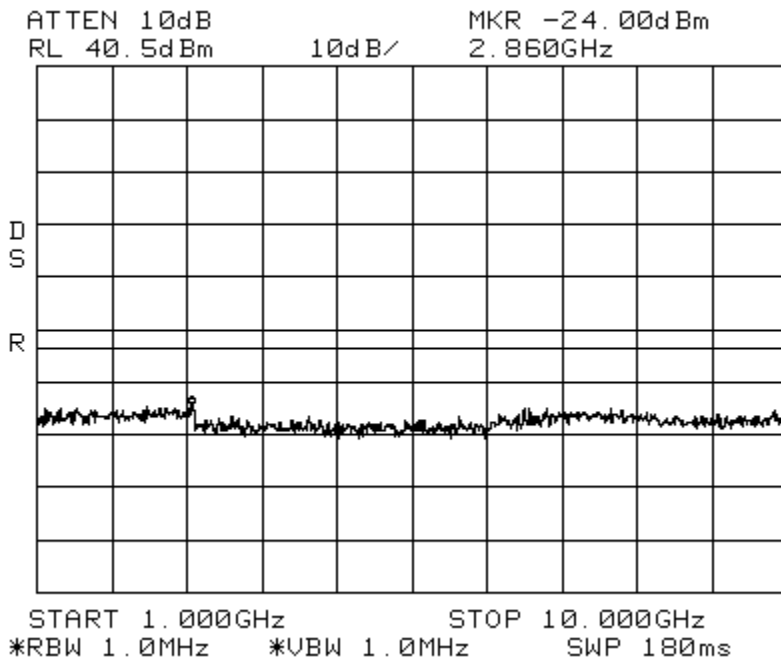
Intermodulation      LTE 1.4 MHz Channel Bandwidth\_Low      Spectrum 700 MHz Lower ABC  
Path 1  
Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz



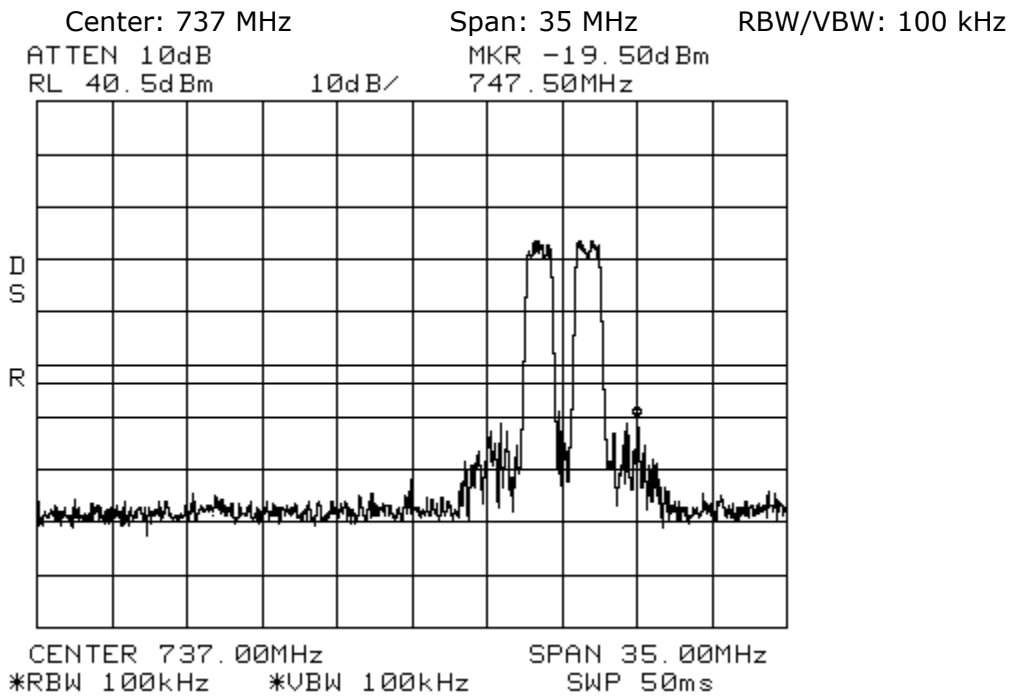
Intermodulation      LTE 1.4 MHz Channel Bandwidth\_Low      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



Intermodulation      LTE 1.4 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 1

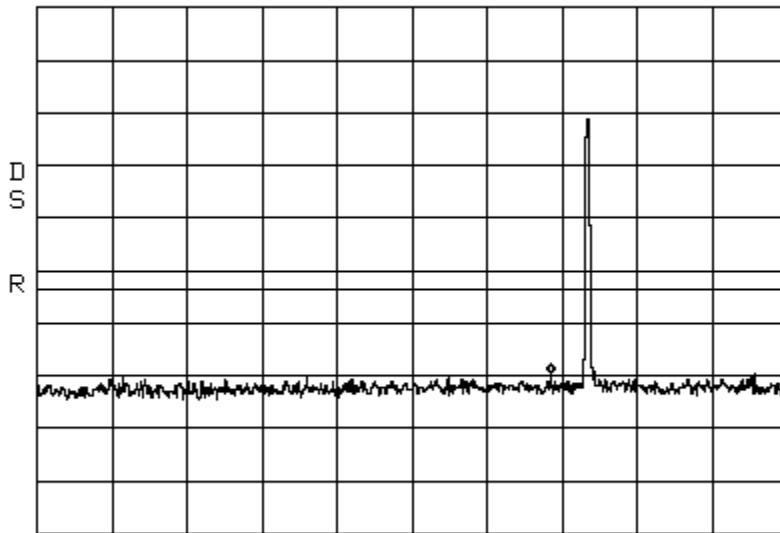




Intermodulation      LTE 1.4 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 1

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

ATTEN 10dB      MKR -29.17dBm  
RL 40.5dBm      10dB/      694.5MHz

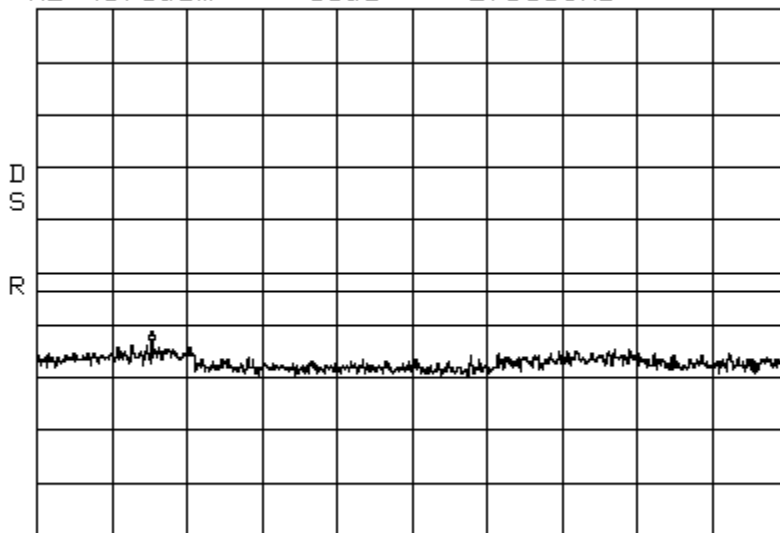


START 30.0MHz      STOP 1.0000GHz  
\*RBW 300kHz      \*VBW 300kHz      SWP 50ms

Intermodulation      LTE 1.4 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 1

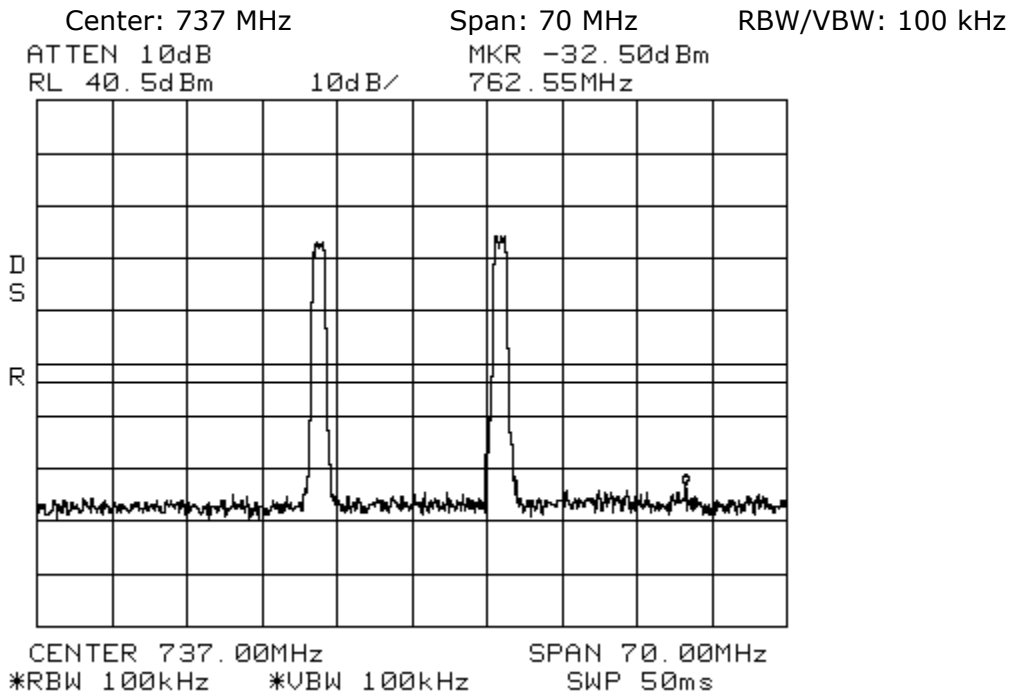
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz

ATTEN 10dB      MKR -22.83dBm  
RL 40.5dBm      10dB/      2.380GHz

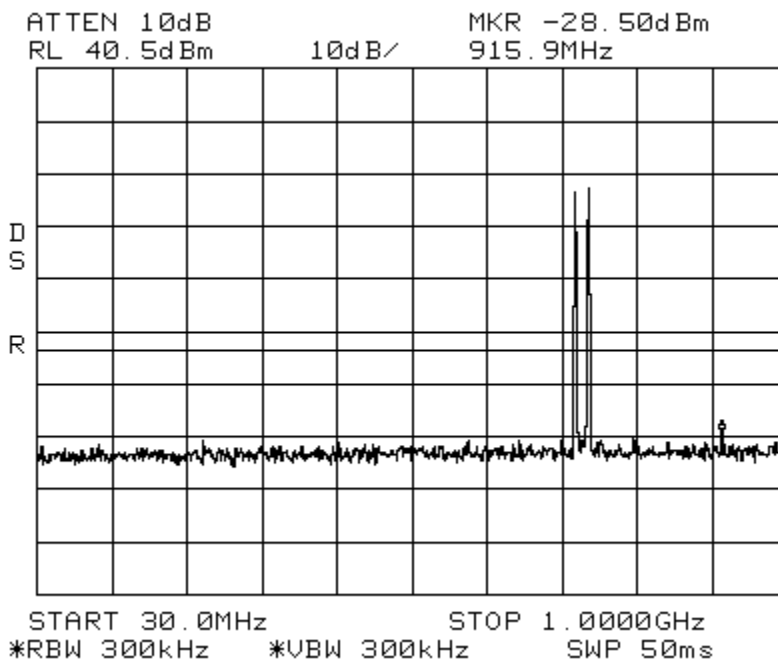


START 1.000GHz      STOP 10.000GHz  
\*RBW 1.0MHz      \*VBW 1.0MHz      SWP 180ms

Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 1



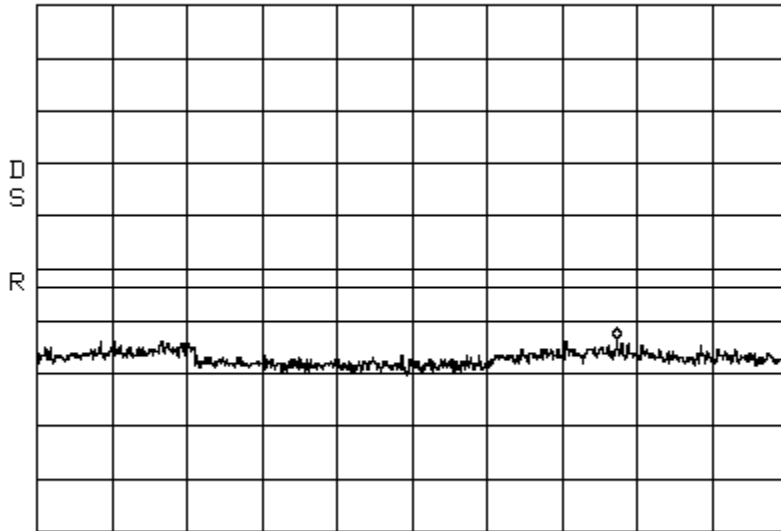
Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 1

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

ATTEN 10dB      MKR -22.83dBm  
RL 40.5dBm      10dB/      7.960GHz

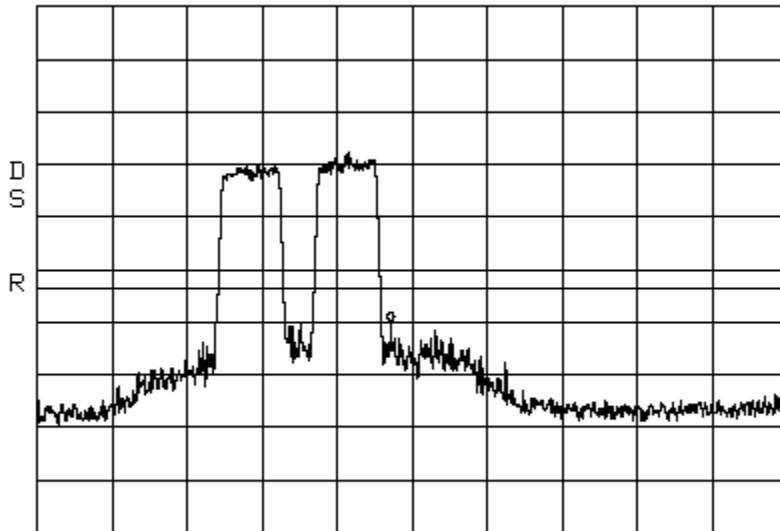


START 1.000GHz      STOP 10.000GHz  
\*RBW 1.0MHz      \*VBW 1.0MHz      SWP 180ms

Intermodulation      LTE 3 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 1

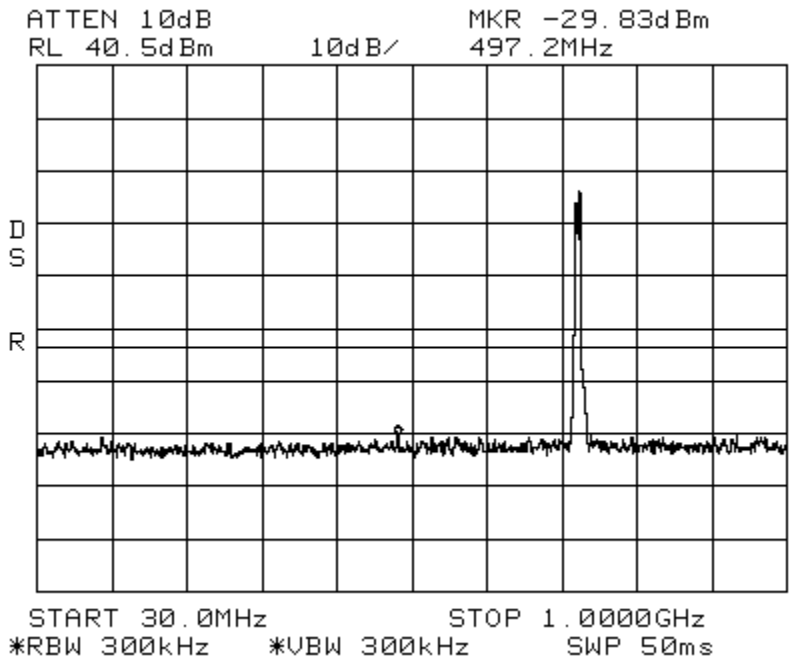
Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz

ATTEN 10dB      MKR -19.50dBm  
RL 40.5dBm      10dB/      736.01MHz



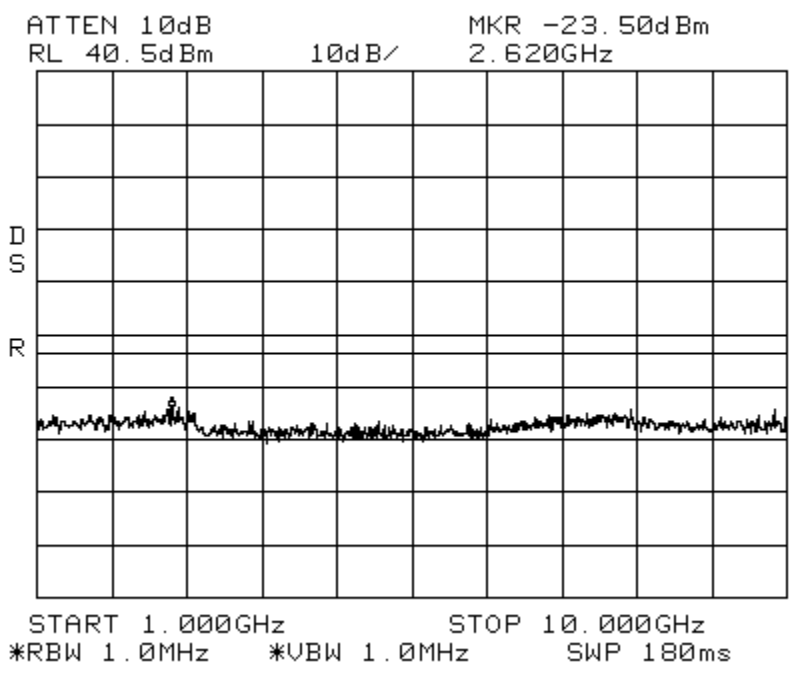
CENTER 737.00MHz      SPAN 35.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

Intermodulation LTE 3MHz Channel Bandwidth \_Low Spectrum 700 MHz Lower ABC Path 1  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation LTE 3 MHz Channel Bandwidth\_Low Spectrum 700 MHz Lower ABC  
Path 1

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

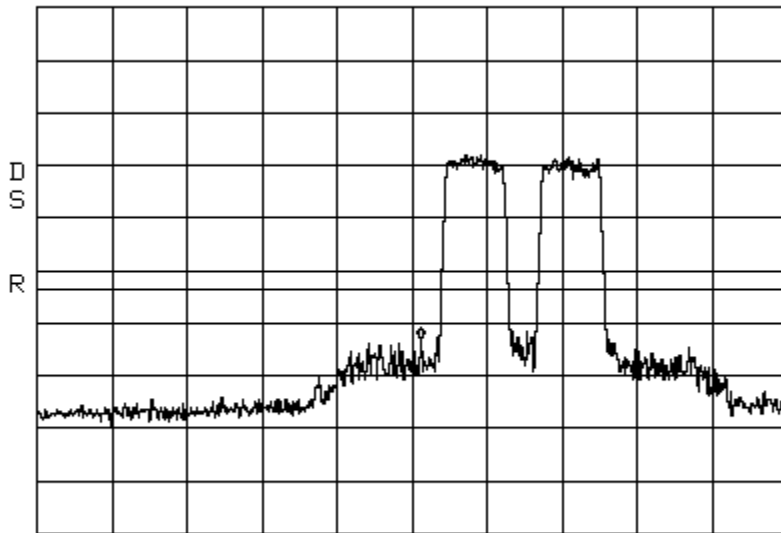
ATTEN 10dB

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

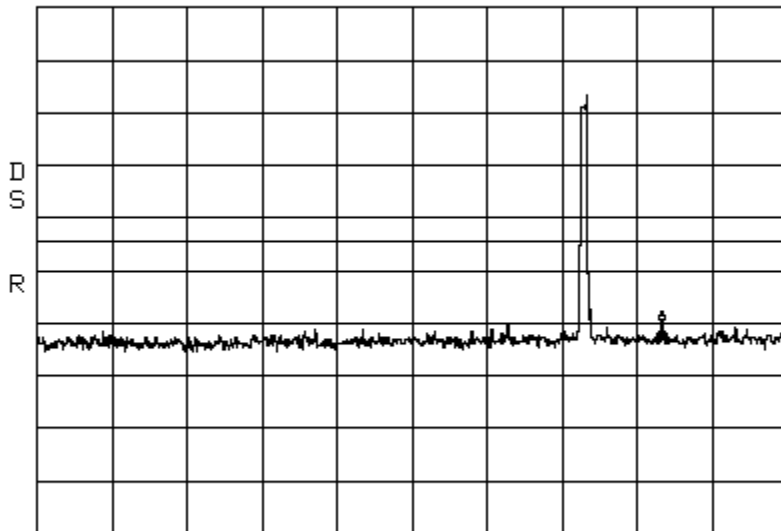
\*ATTEN 10dB

MKR -28.33dBm

RL 31.5dBm

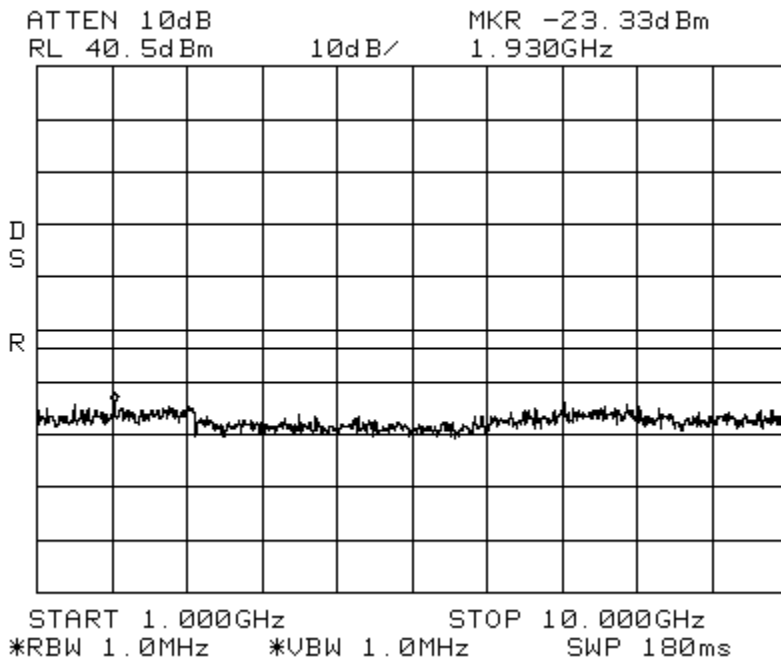
10dB/

838.3MHz

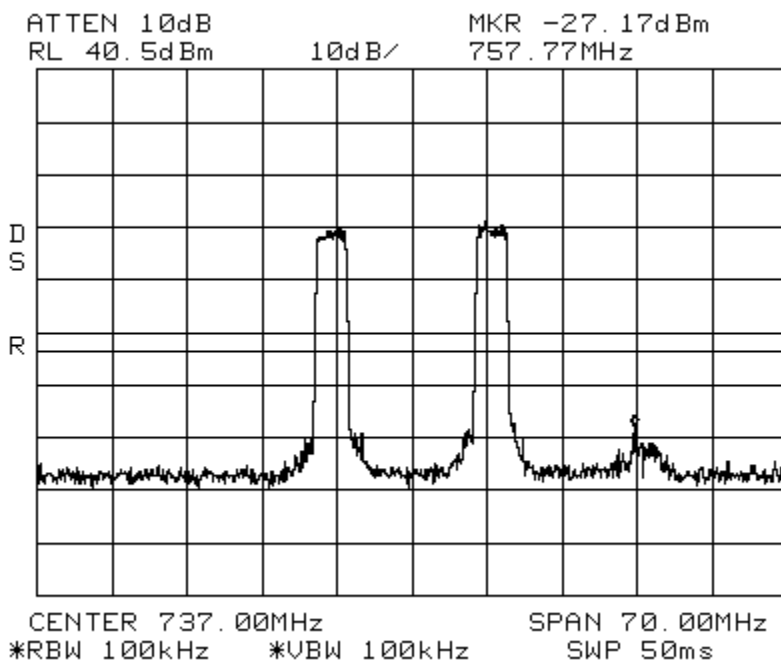


START 30.0MHz      STOP 1.0000GHz  
\*RBW 300kHz      \*VBW 300kHz      SWP 50ms

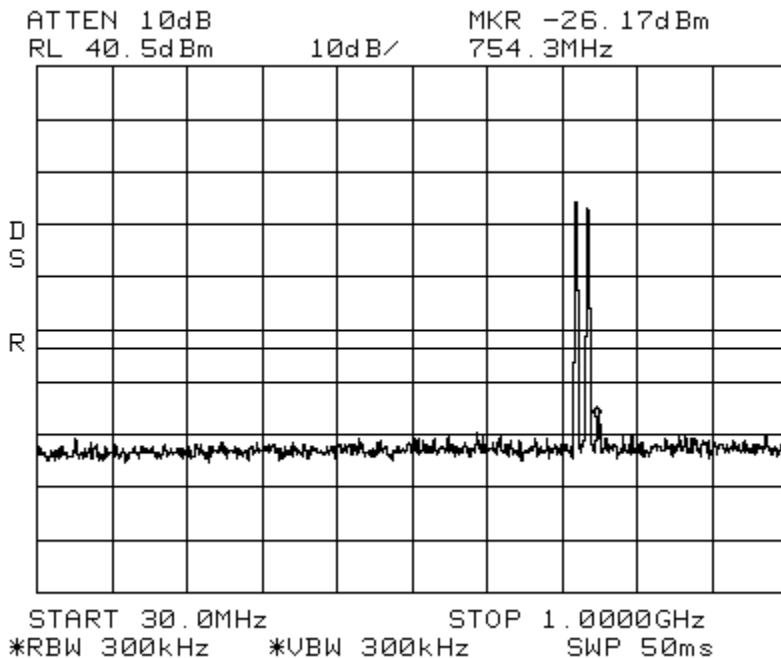
Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
 Path 1  
 Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



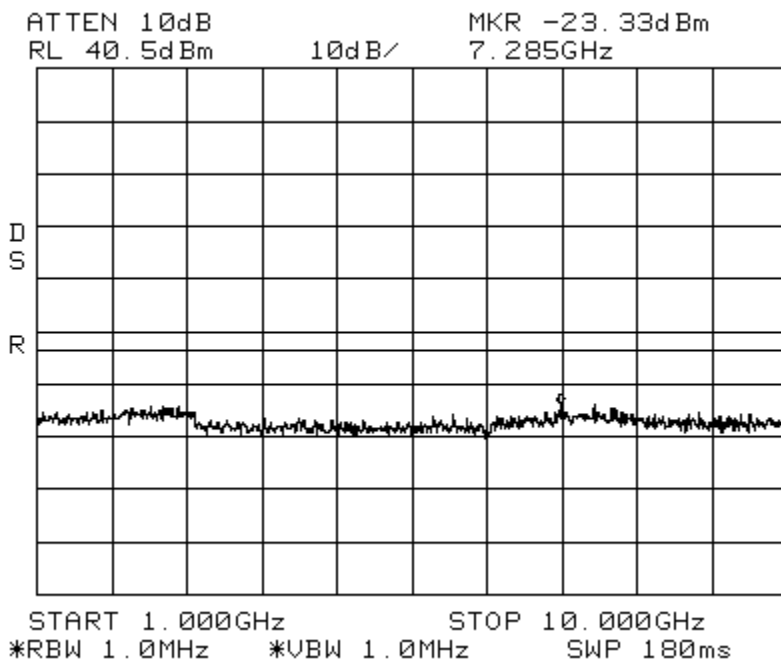
Intermodulation      LTE 3 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
 Path 1  
 Center: 737 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



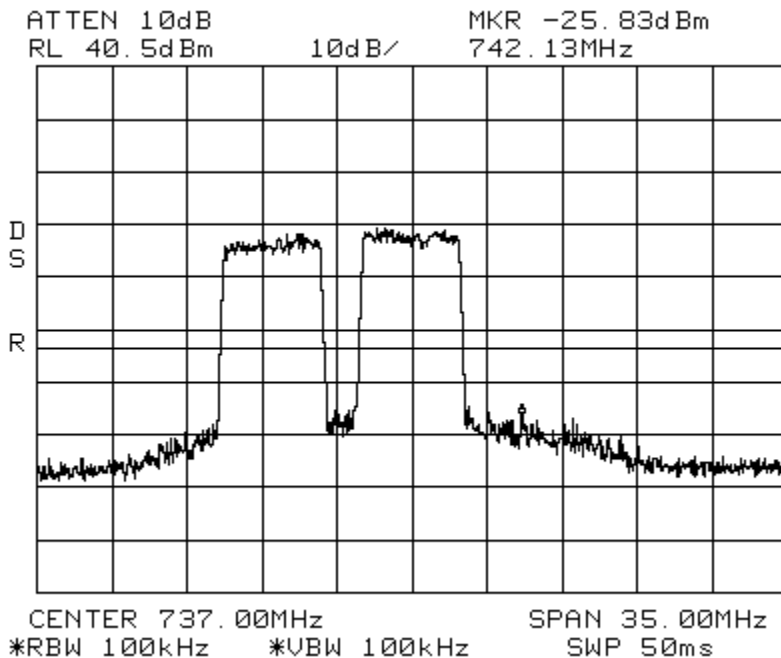
Intermodulation      LTE 3 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



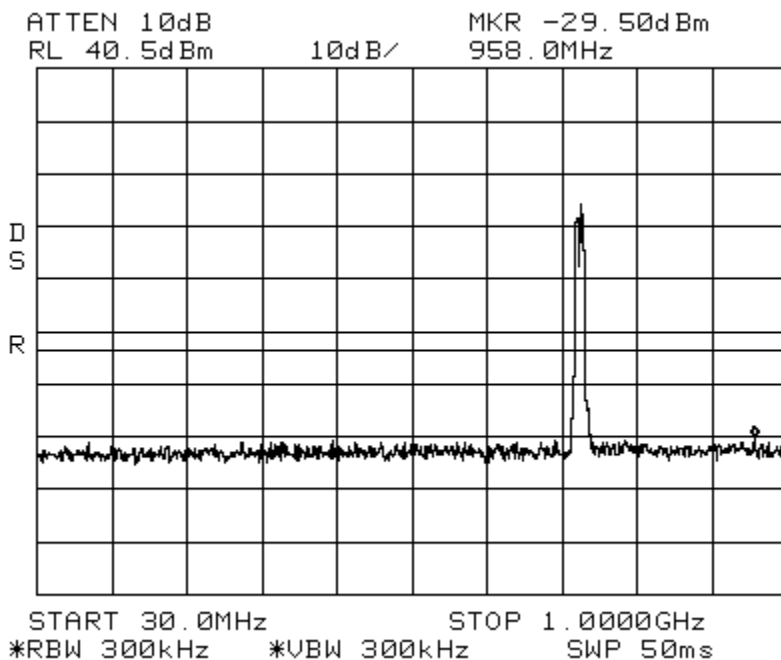
Intermodulation      LTE 3 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



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

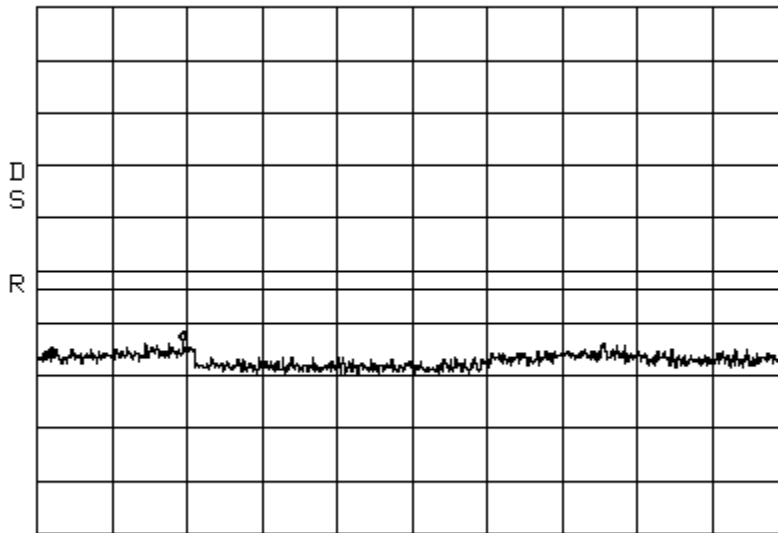




Intermodulation      LTE 5 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 1

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

ATTEN 10dB      MKR -23.00dBm  
RL 40.5dBm      10dB/      2.755GHz

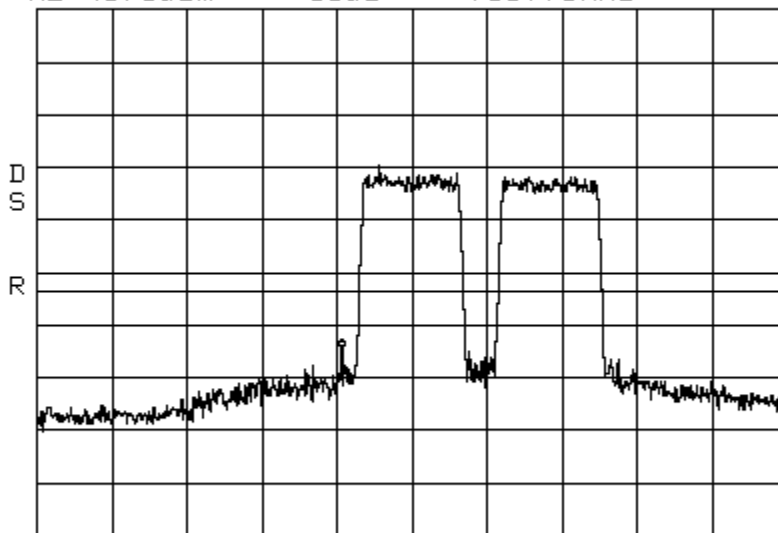


START 1.000GHz      STOP 10.000GHz  
\*RBW 1.0MHz      \*VBW 1.0MHz      SWP 180ms

Intermodulation      LTE 5 MHz Channel Bandwidth\_High      Spectrum 700 MHz Lower ABC  
Path 1

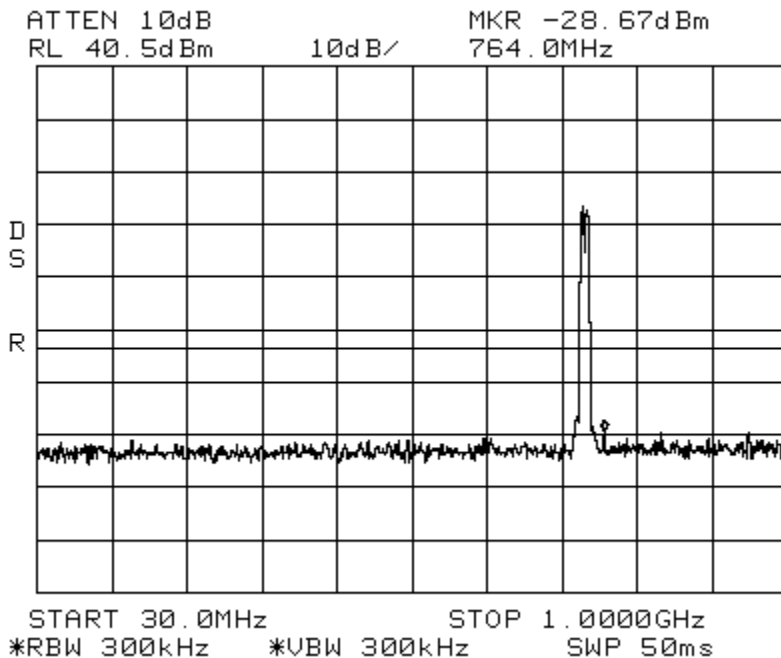
Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz

ATTEN 10dB      MKR -24.00dBm  
RL 40.5dBm      10dB/      733.73MHz

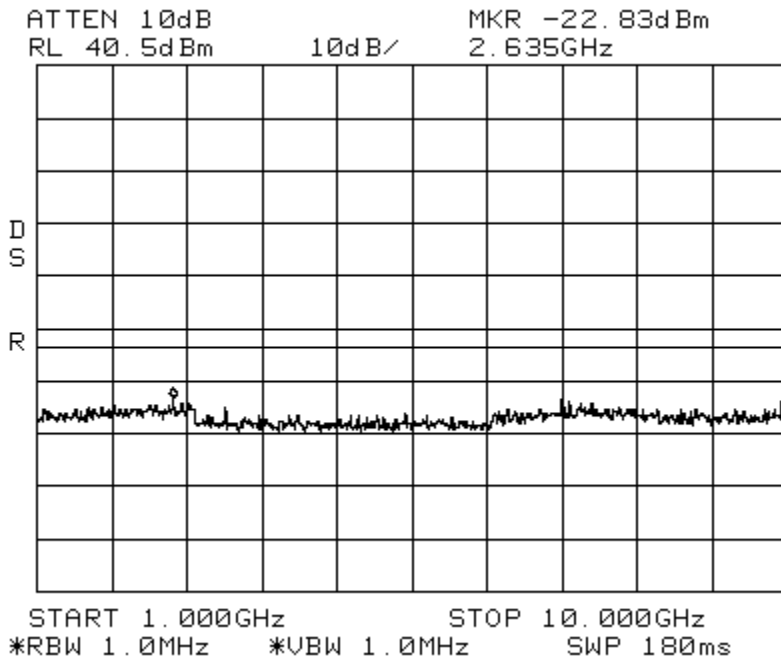


CENTER 737.00MHz      SPAN 35.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

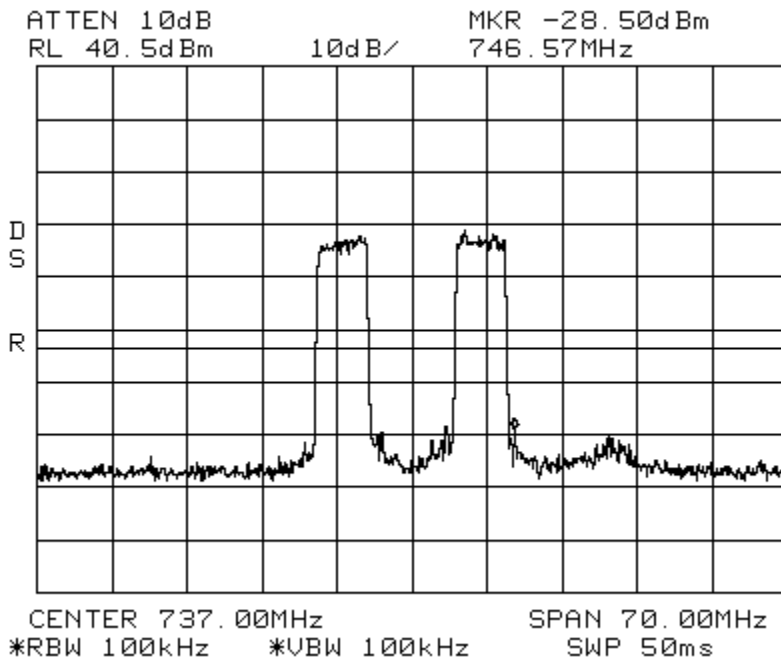
Intermodulation      LTE 5 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



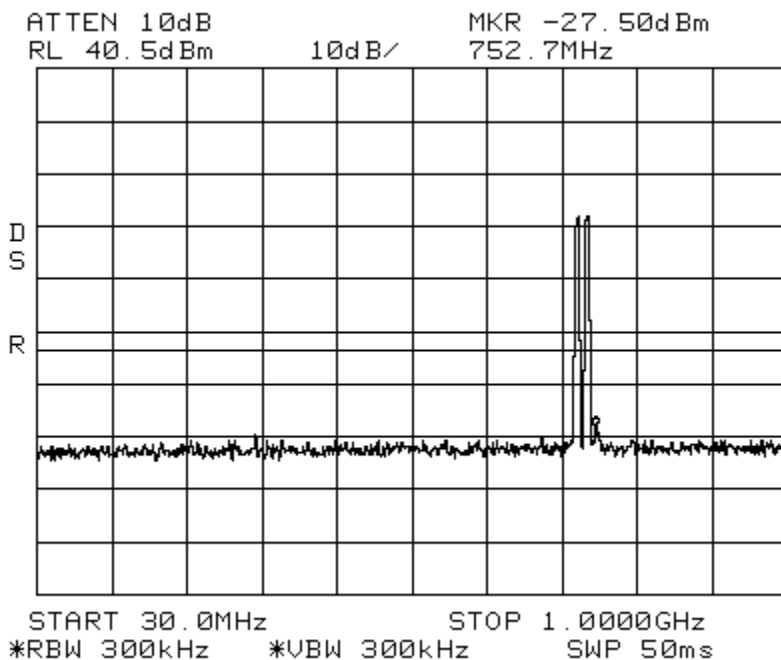
Intermodulation      LTE 5 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



Intermodulation      LTE 5 MHz Channel Bandwidth\_Apart      Spectrum 700 MHz Lower ABC  
Path 1  
Center: 737 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



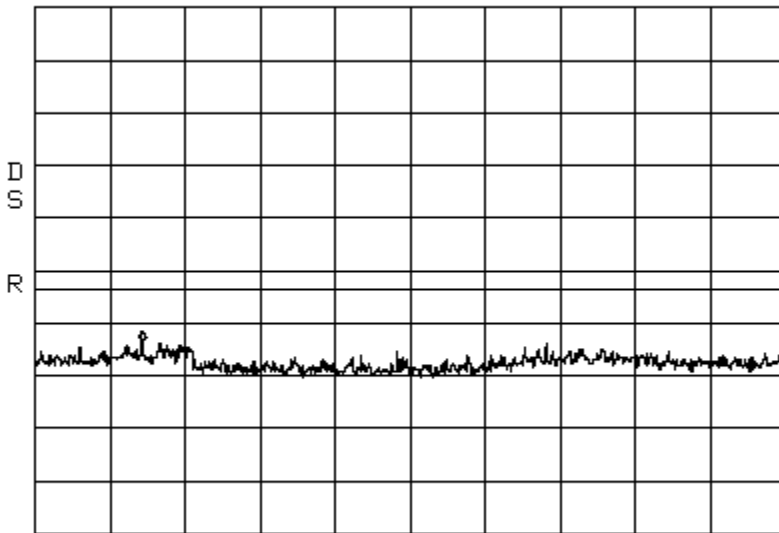
Intermodulation      LTE 5 MHz Channel Bandwidth\_Apart      Spectrum 700 MHz Lower ABC  
Path 1  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



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

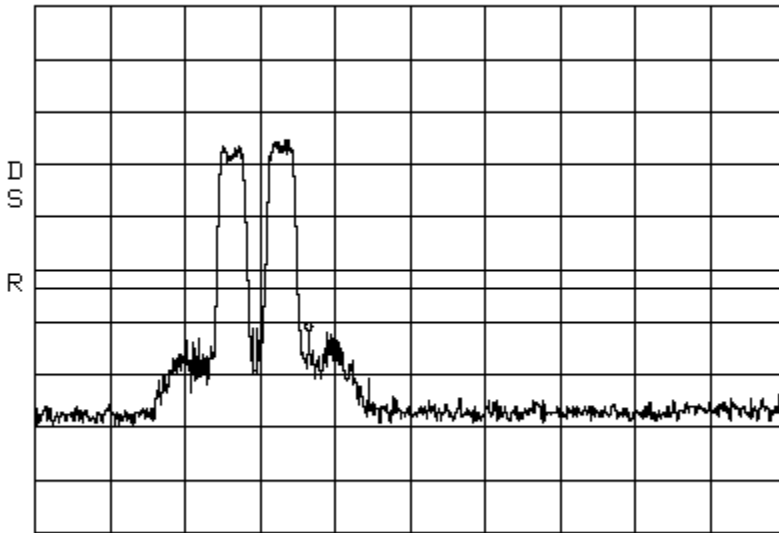


START 1.000GHz      STOP 10.000GHz  
\*RBW 1.0MHz      \*VBW 1.0MHz      SWP 180ms

Intermodulation      LTE 1.4 MHz Channel Bandwidth\_Low      Spectrum 700 MHz Lower ABC  
Path 2

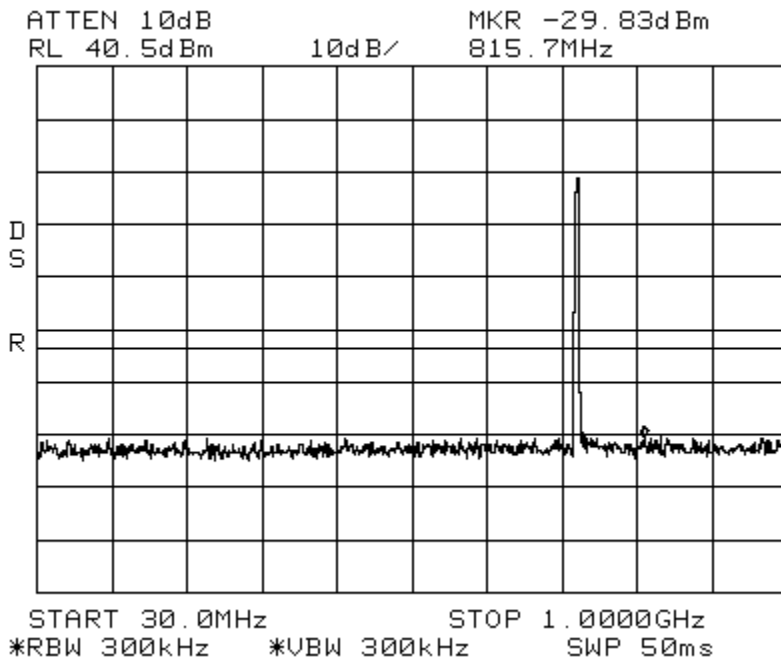
Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz

ATTEN 10dB      MKR -21.33dBm  
RL 40.5dBm      10dB/      732.28MHz

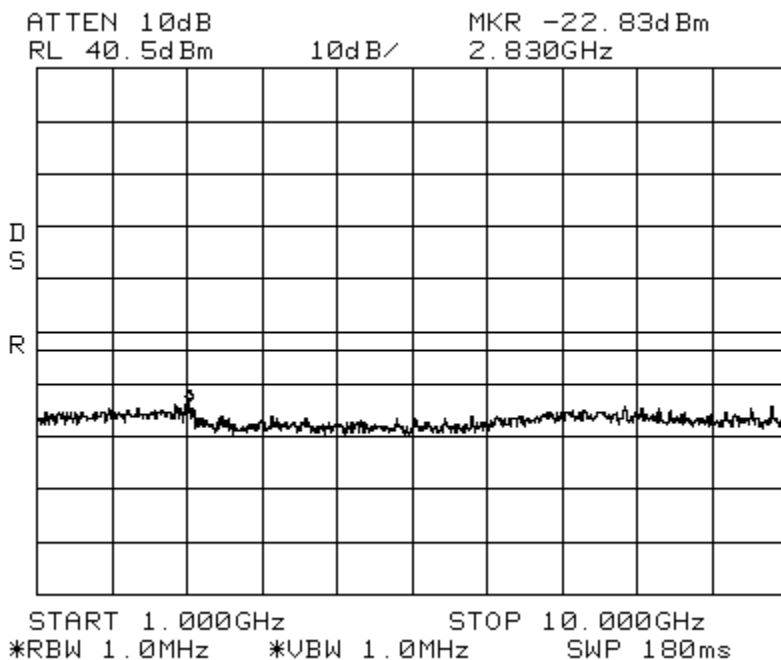


CENTER 737.00MHz      SPAN 35.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms

Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth \_High

Spectrum 700 MHz

Lower ABC Path 2

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

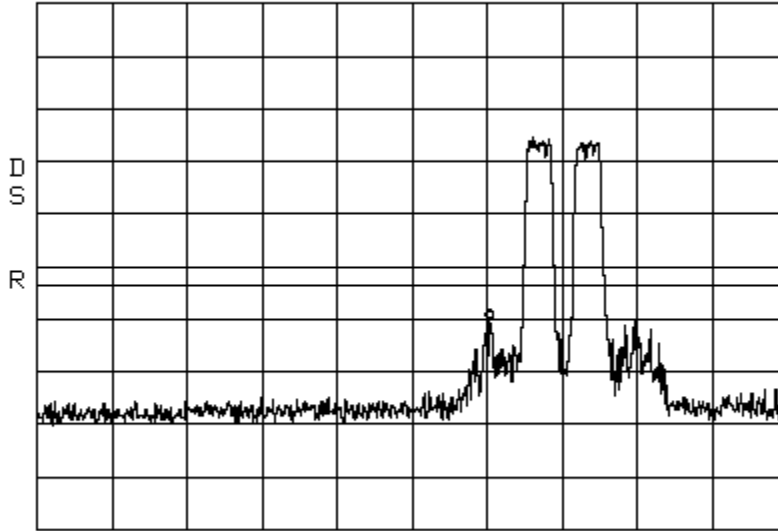
ATTEN 10dB

MKR -19.67dBm

RL 40.5dBm

10dB/

740.62MHz



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

Intermodulation

LTE 1.4 MHz Channel Bandwidth \_High

Spectrum 700 MHz Lower ABC

Path 2

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

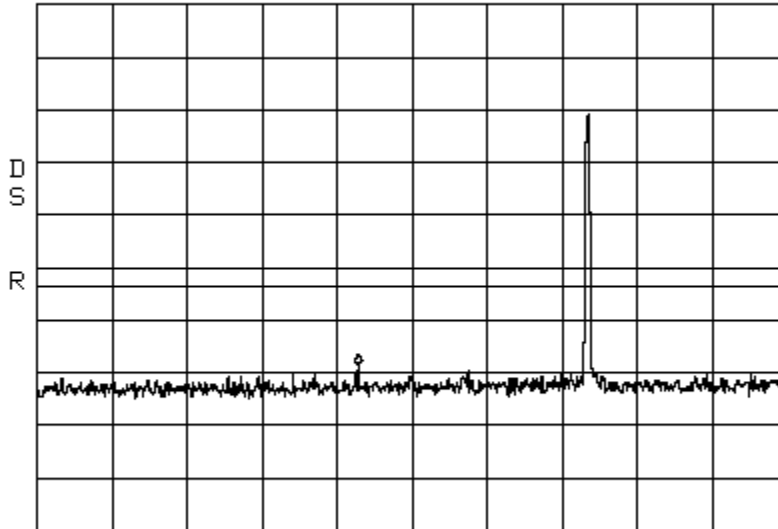
ATTEN 10dB

MKR -28.17dBm

RL 40.5dBm

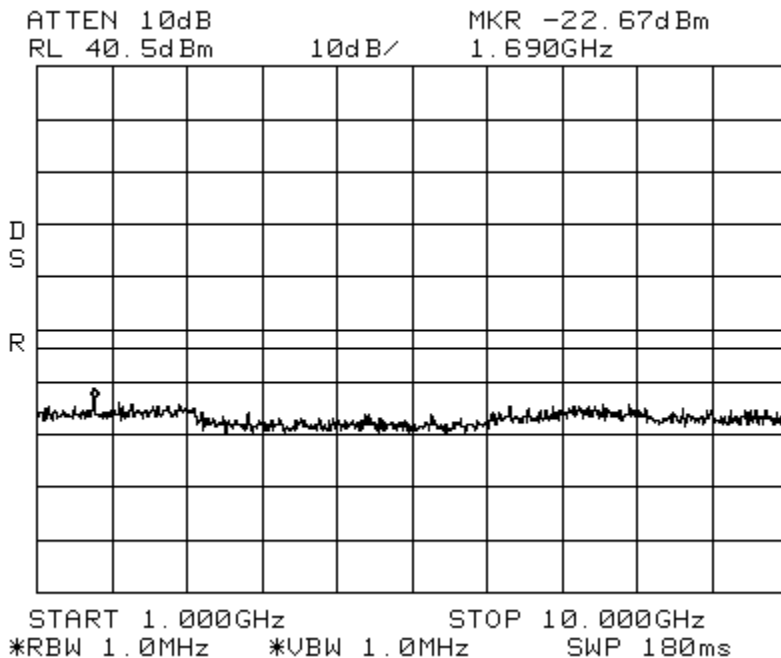
10dB/

445.5MHz

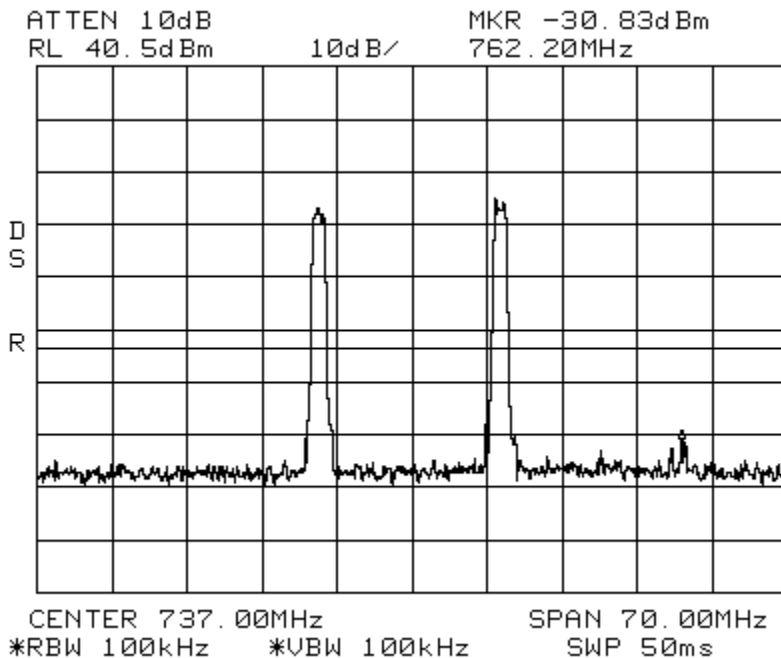


START 30.0MHz STOP 1.0000GHz  
\*RBW 300kHz \*VBW 300kHz SWP 50ms

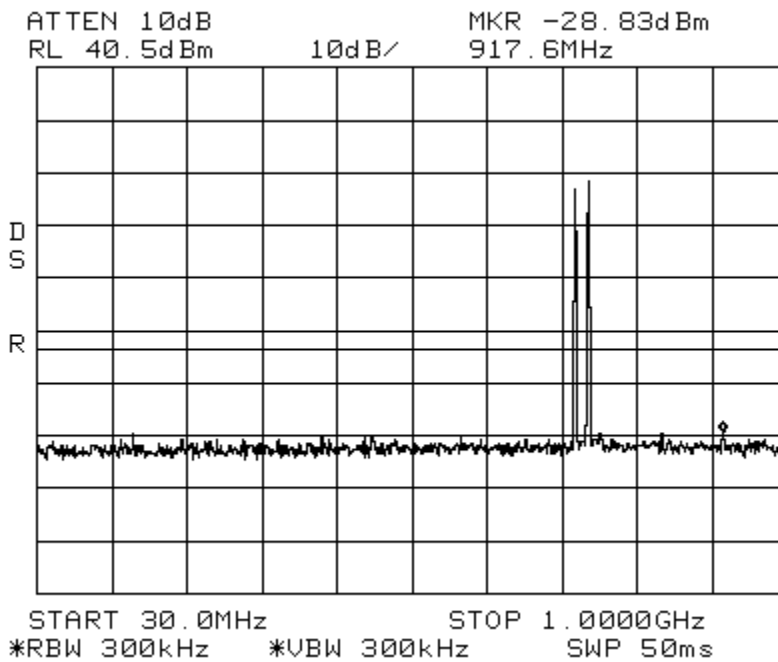
Intermodulation      LTE 1.4 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



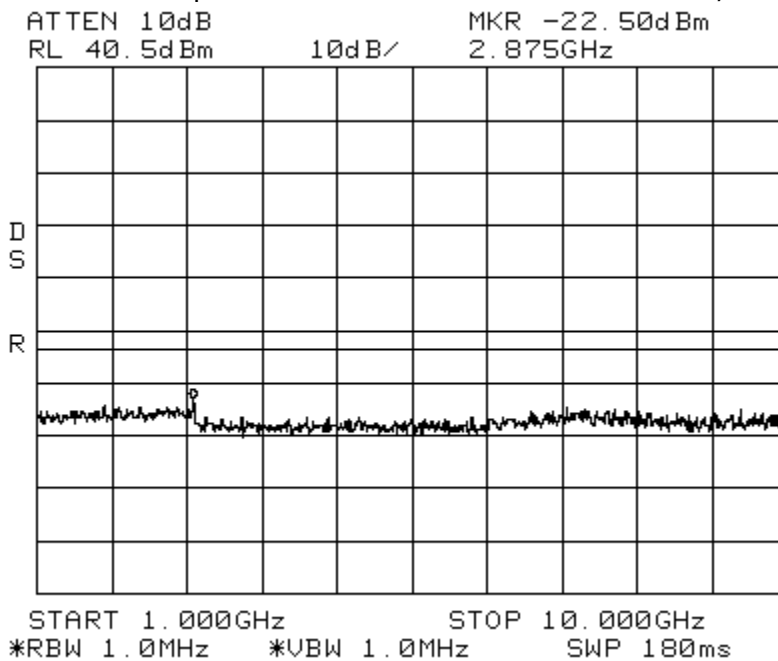
Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 2  
Center: 737 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz





Path 2

Center: 737 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

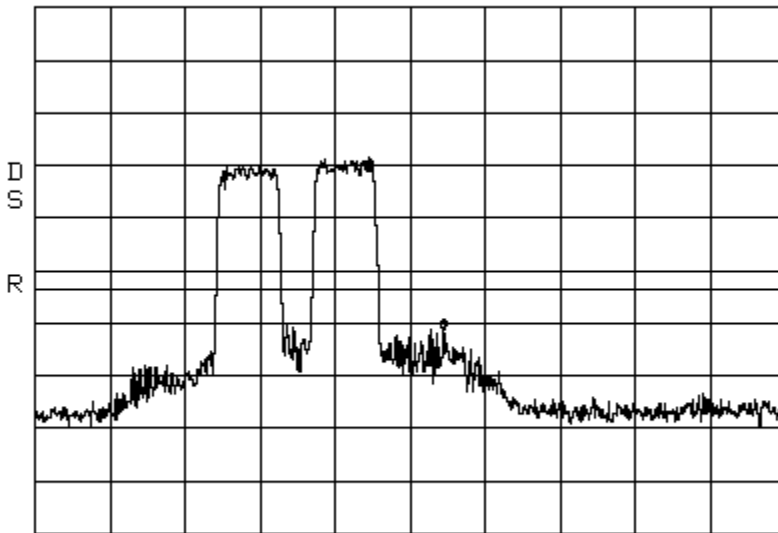
ATTEN 10dB

MKR -20.67dBm

RL 40.5dBm

10dB/

738.58MHz



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

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

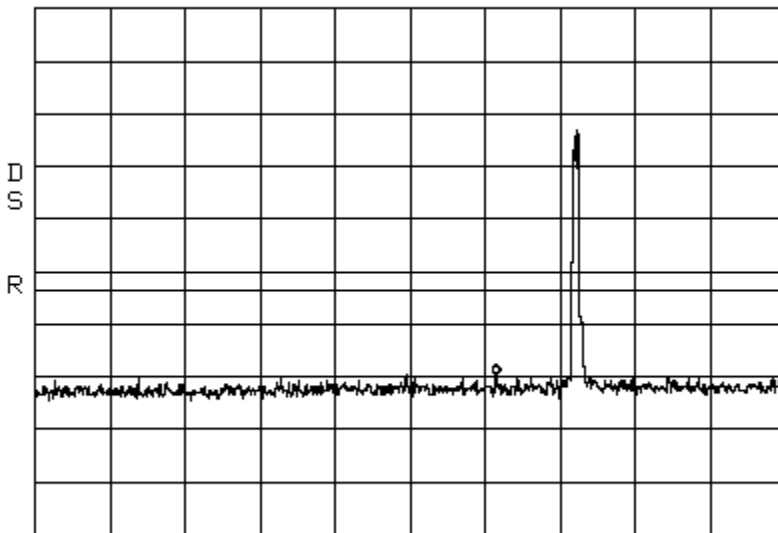
ATTEN 10dB

MKR -29.17dBm

RL 40.5dBm

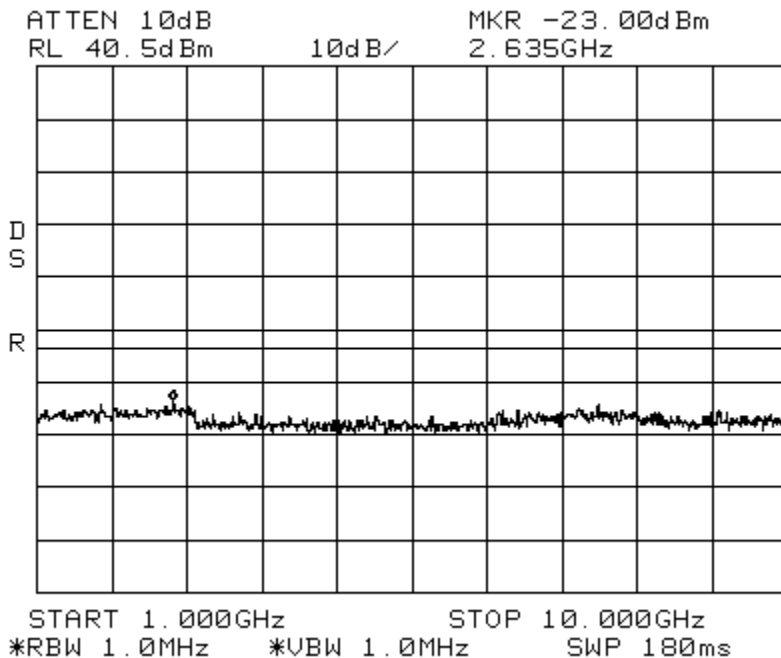
10dB/

626.6MHz

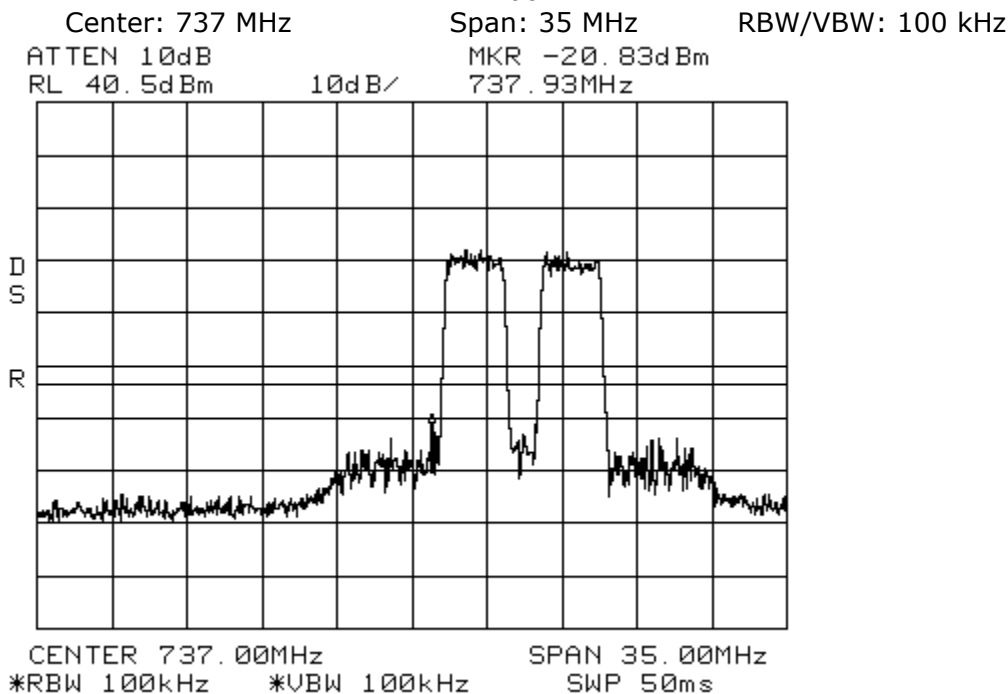


START 30.0MHz      STOP 1.0000GHz  
\*RBW 300kHz      \*VBW 300kHz      SWP 50ms

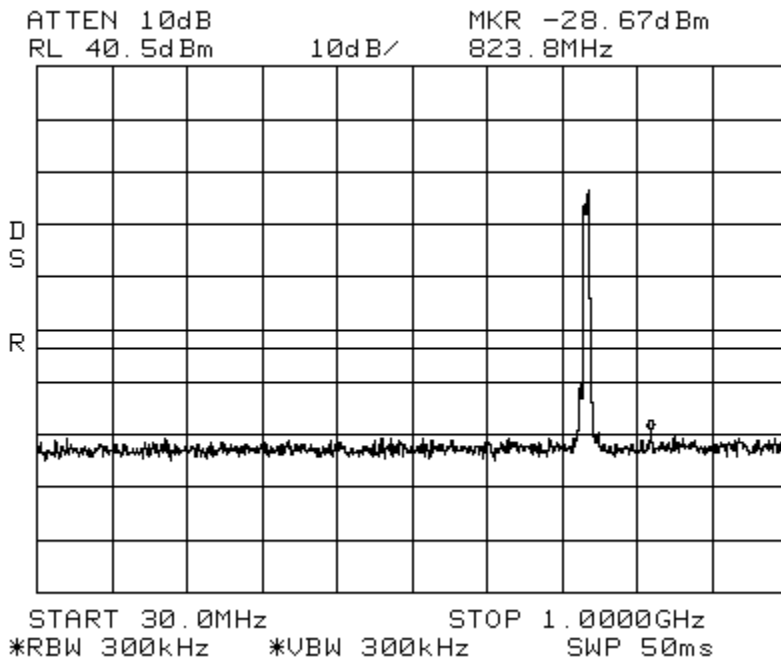
Intermodulation      LTE 3 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
 Path 2  
 Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



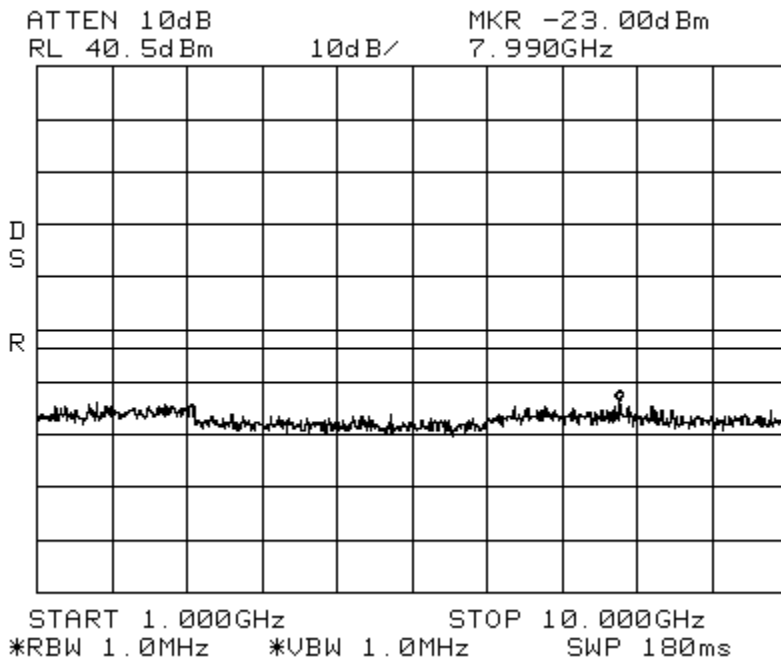
Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
 Path 2



Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz

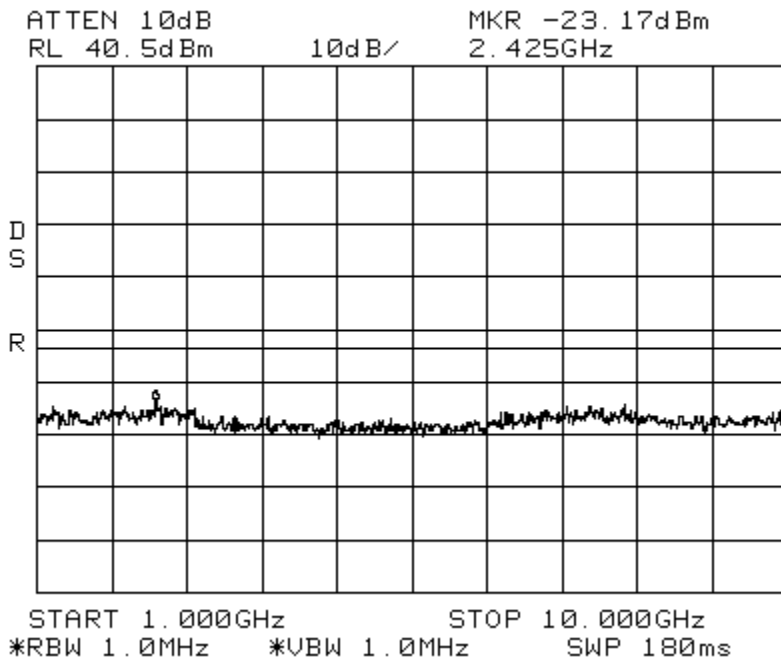


Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz

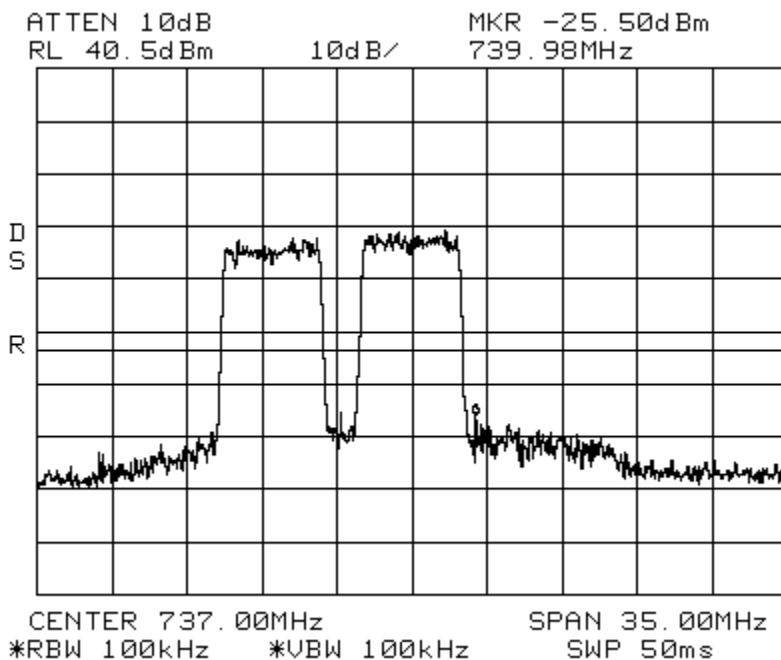




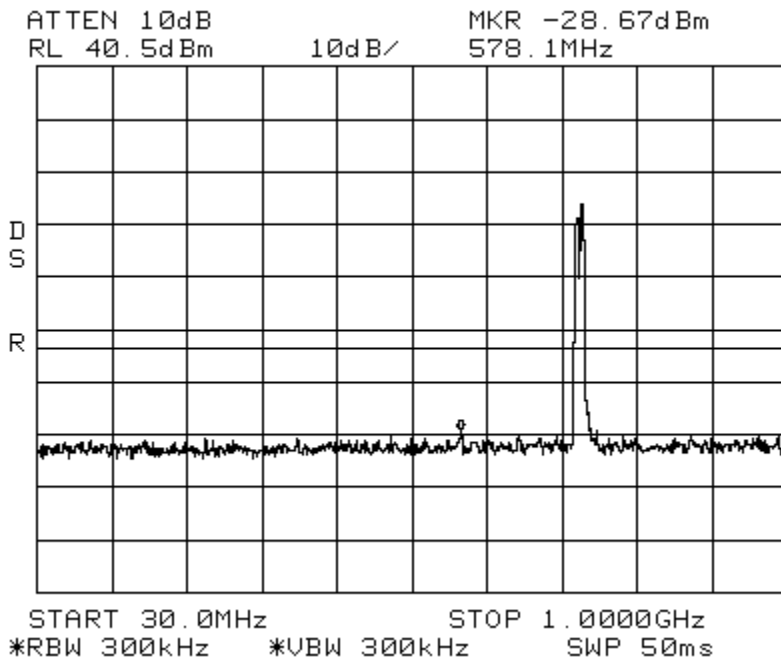
Intermodulation      LTE 3 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
 Path 2  
 Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



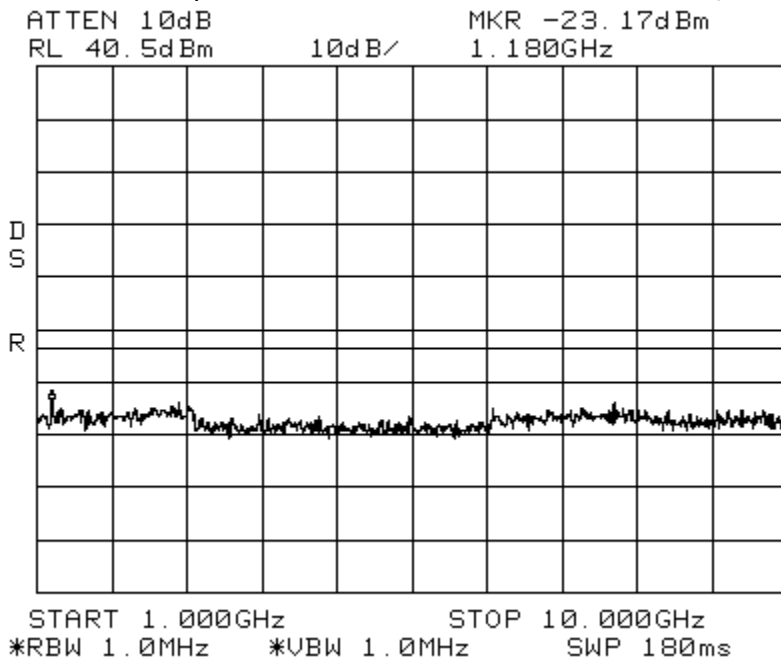
Intermodulation      LTE 5 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
 Path 2  
 Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz



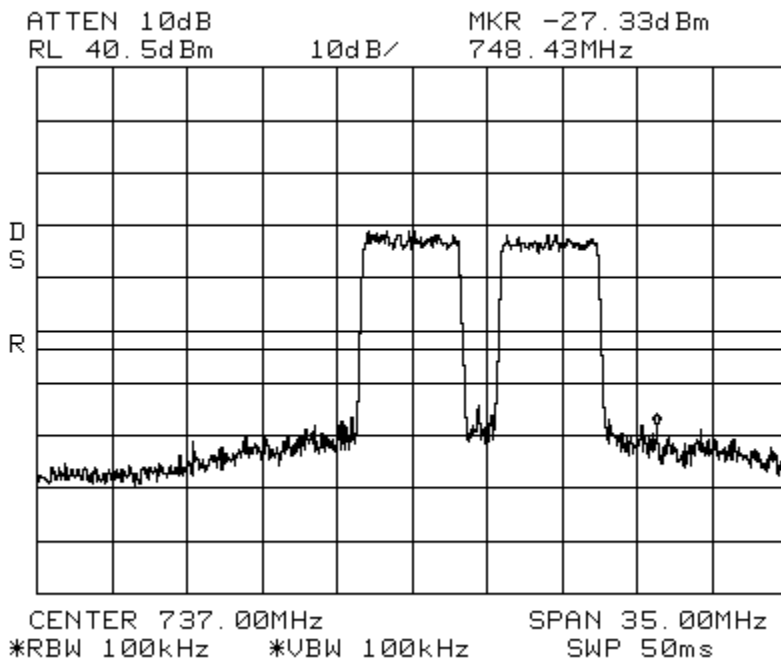
Intermodulation      LTE 5 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



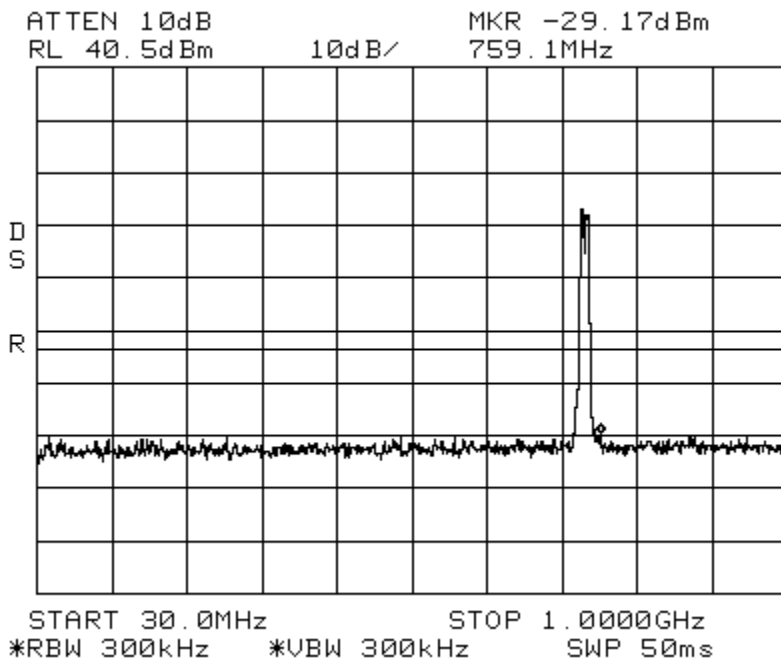
Intermodulation      LTE 5 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



Intermodulation      LTE 5 MHz Channel Bandwidth\_High      Spectrum 700 MHz Lower ABC  
 Path 2  
 Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz



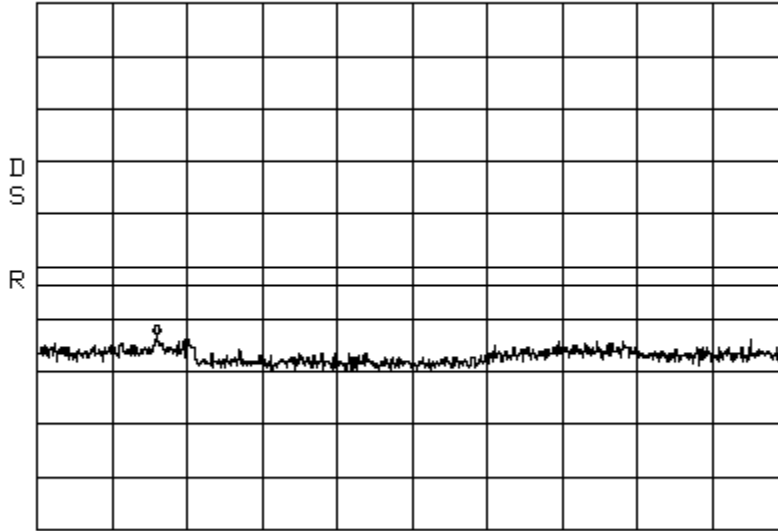
Intermodulation      LTE 5 MHz Channel Bandwidth\_High      Spectrum 700 MHz Lower ABC  
 Path 2  
 Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Intermodulation      LTE 5 MHz Channel Bandwidth \_High      Spectrum 700 MHz Lower ABC  
Path 2

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

ATTEN 10dB      MKR -22.67dBm  
RL 40.5dBm      10dB/      2.440GHz

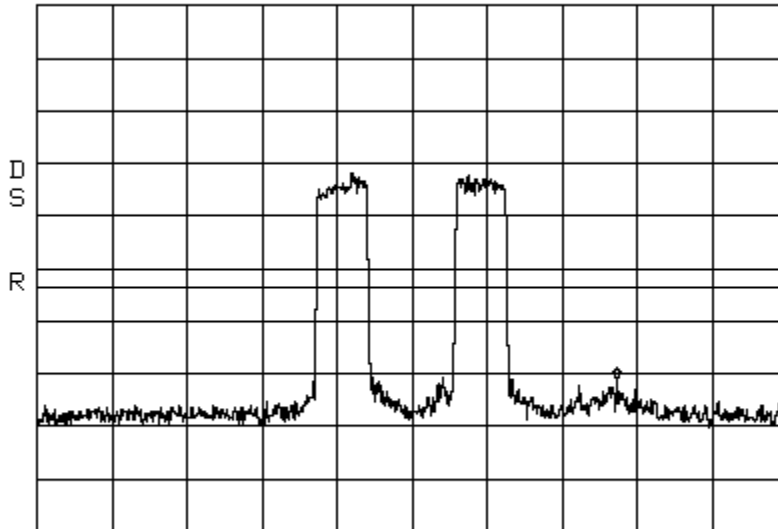


START 1.000GHz      STOP 10.000GHz  
\*RBW 1.0MHz      \*VBW 1.0MHz      SWP 180ms

Intermodulation      LTE 5 MHz Channel Bandwidth\_ **Apart**      Spectrum 700 MHz Lower ABC  
Path 2

Center: 737 MHz      Span: 35 MHz      RBW/VBW: 100 kHz

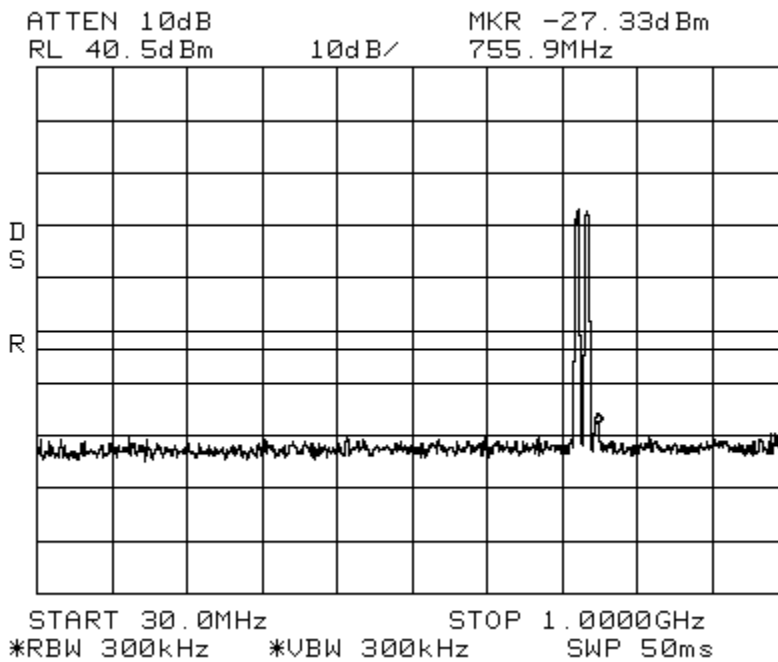
ATTEN 10dB      MKR -30.33dBm  
RL 40.5dBm      10dB/      756.13MHz



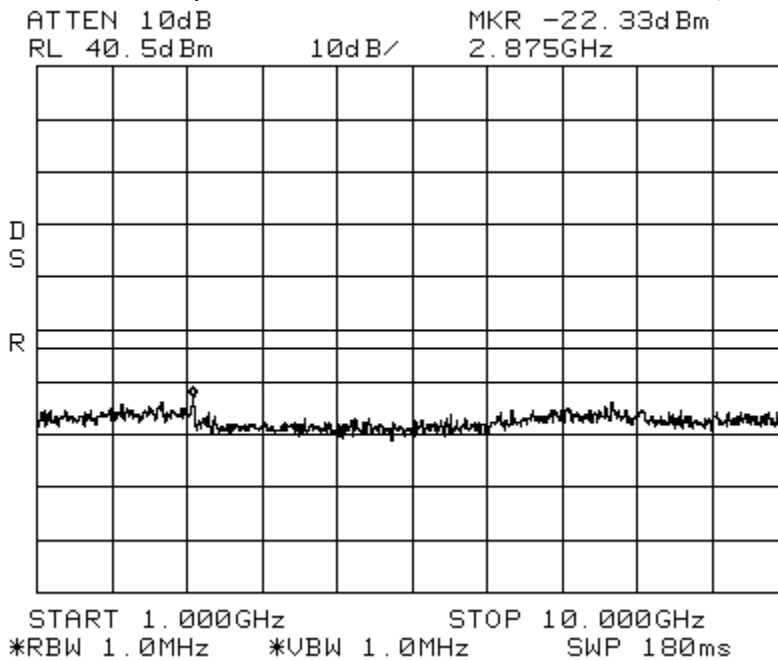
CENTER 737.00MHz      SPAN 70.00MHz  
\*RBW 100kHz      \*VBW 100kHz      SWP 50ms



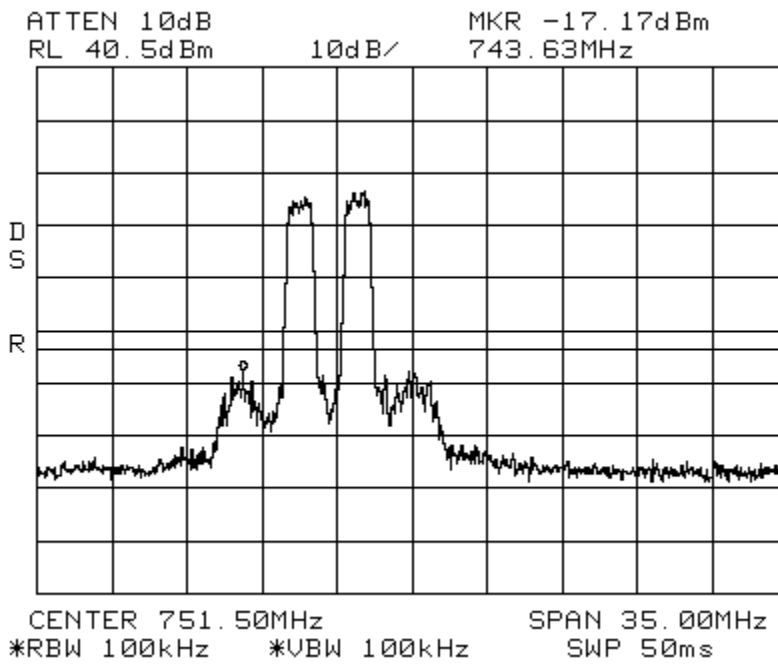
Intermodulation      LTE 5 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



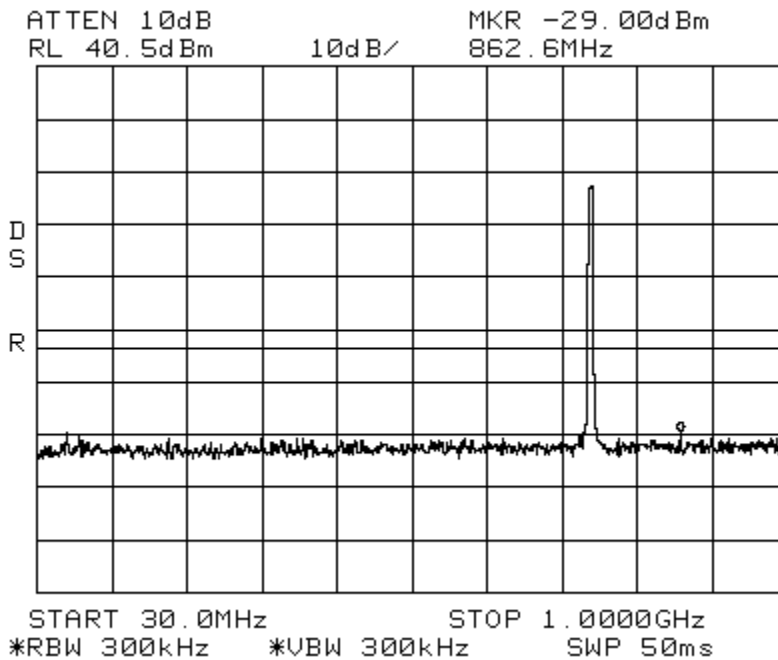
Intermodulation      LTE 5 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Lower ABC  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



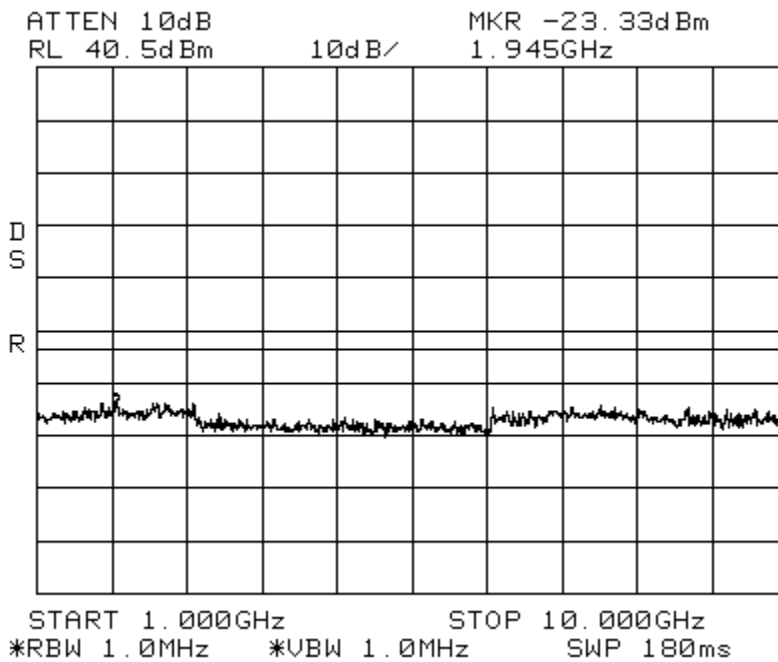
Intermodulation LTE 1.4 MHz Channel Bandwidth\_Low Path 1 Spectrum 700 MHz Upper C  
Center: 751.5 MHz Span: 35 MHz RBW/VBW: 100 kHz



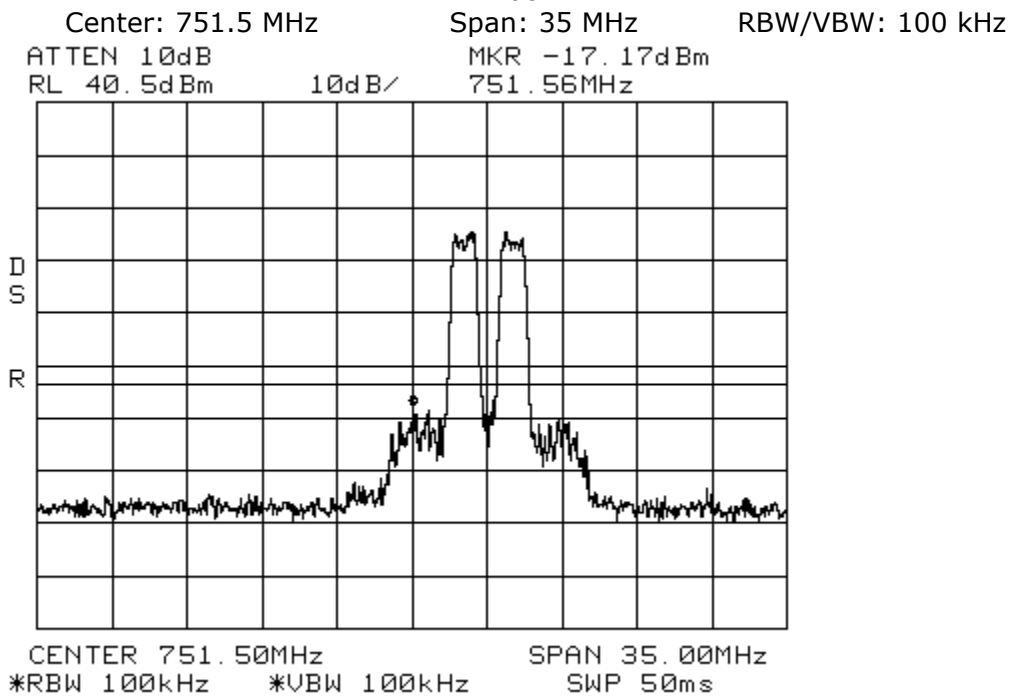
Intermodulation LTE 1.4 MHz Channel Bandwidth\_Low Path 1 Spectrum 700 MHz Upper C  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



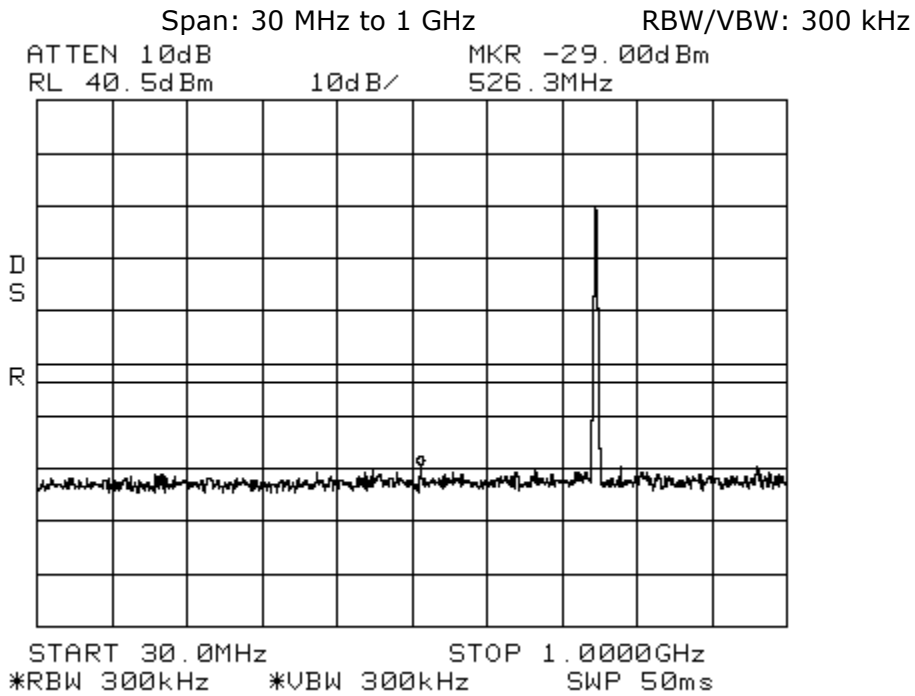
Intermodulation      LTE 1.4 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Upper C  
 Path 1  
 Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



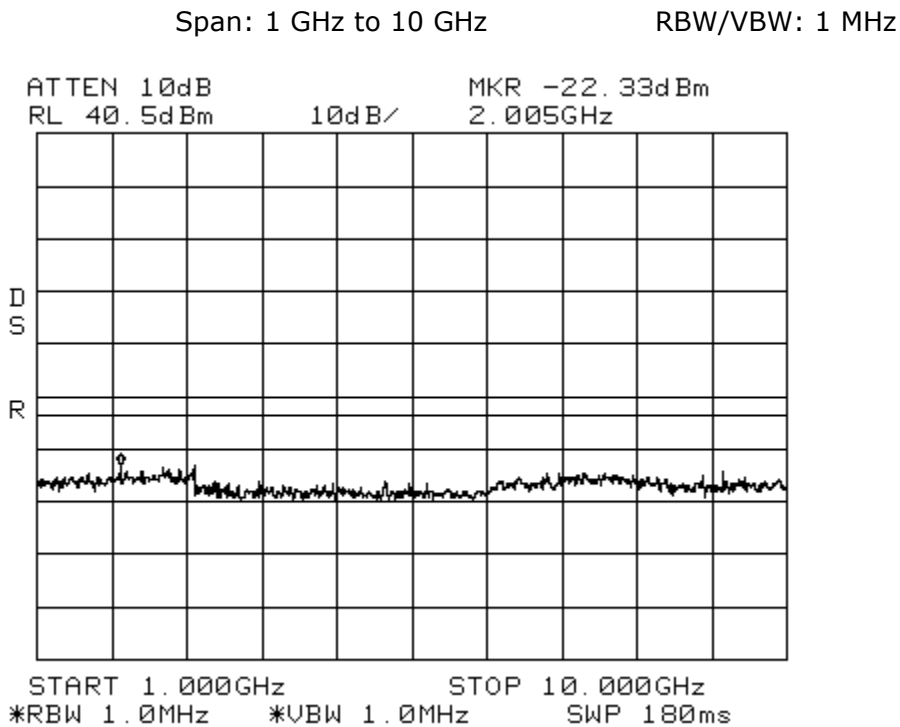
Intermodulation      LTE 1.4 MHz Channel Bandwidth \_High      Spectrum 700 MHz Upper C  
 Path 1



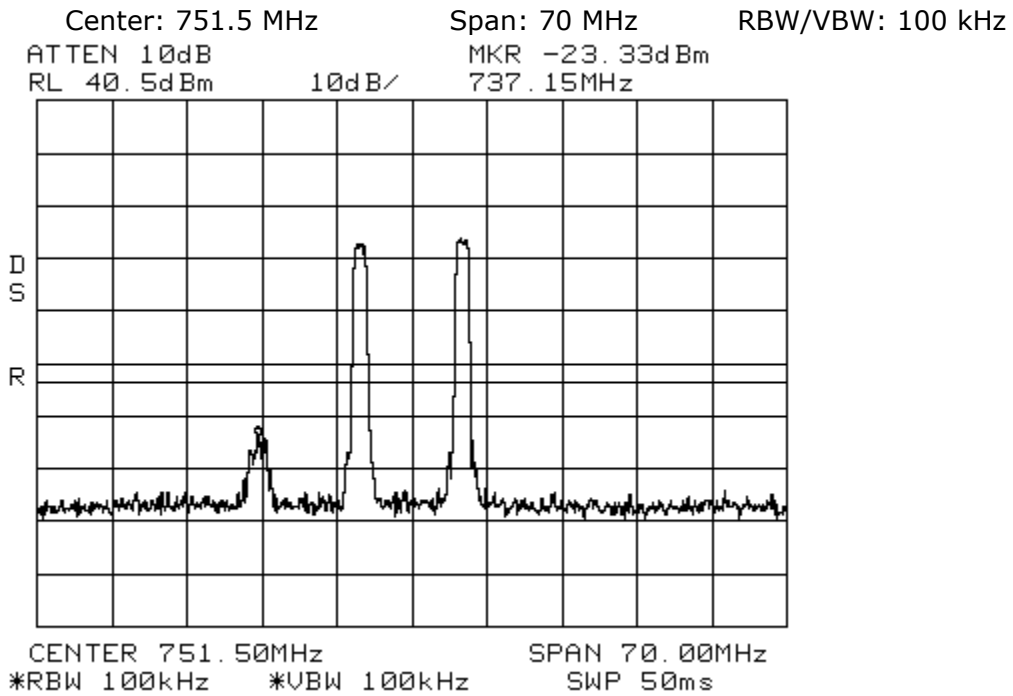
Intermodulation LTE 1.4 MHz Channel Bandwidth \_High Spectrum 700 MHz Upper C  
Path 1



Intermodulation LTE 1.4 MHz Channel Bandwidth \_High Spectrum 700 MHz Upper C  
Path 1

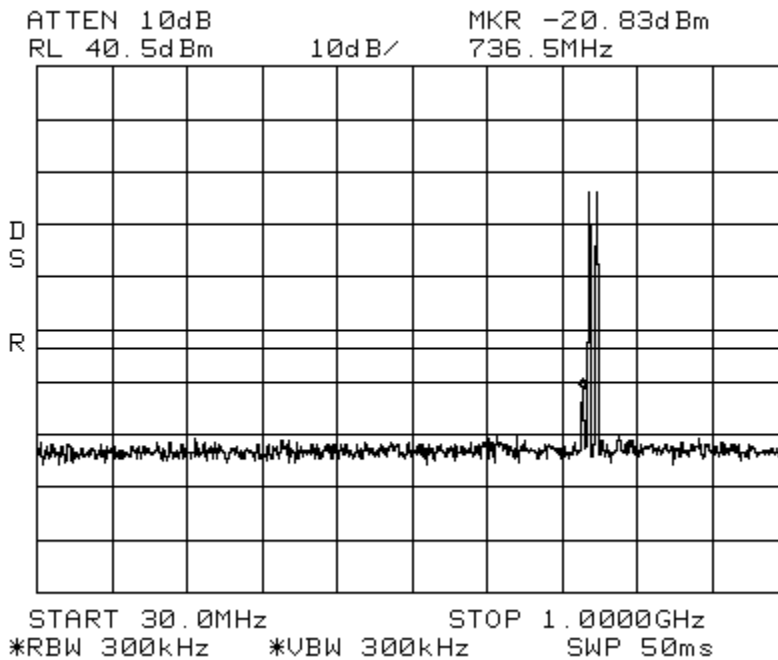


Intermodulation LTE 1.4 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 1

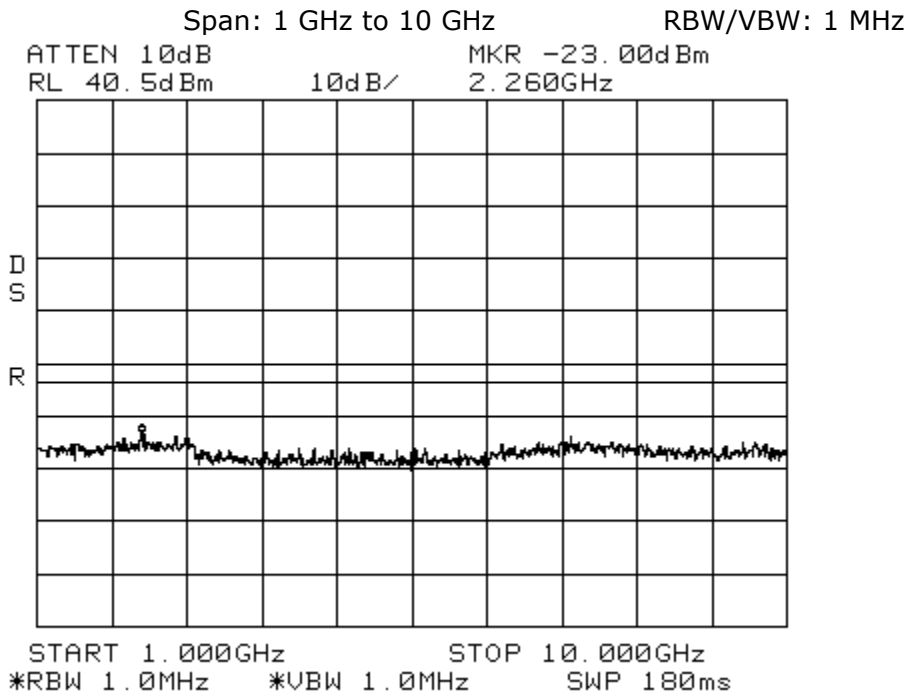


Intermodulation LTE 1.4 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 1

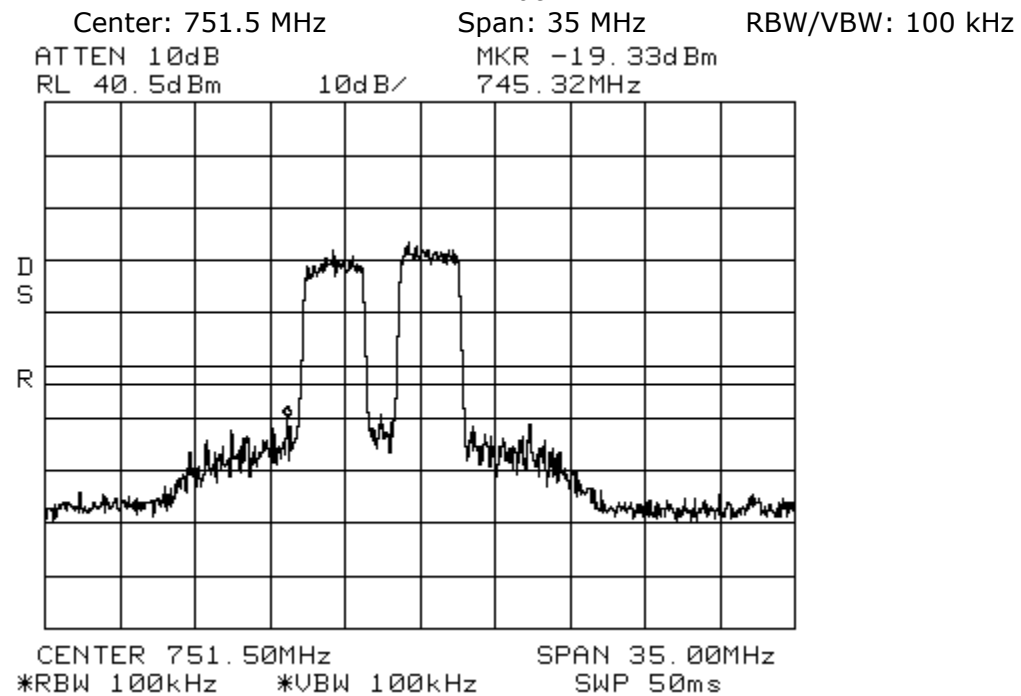
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation LTE 1.4 MHz Channel Bandwidth\_Apart Spectrum 700 MHz Upper C Path 1



Intermodulation LTE 3 MHz Channel Bandwidth\_Low Spectrum 700 MHz Upper C Path 1

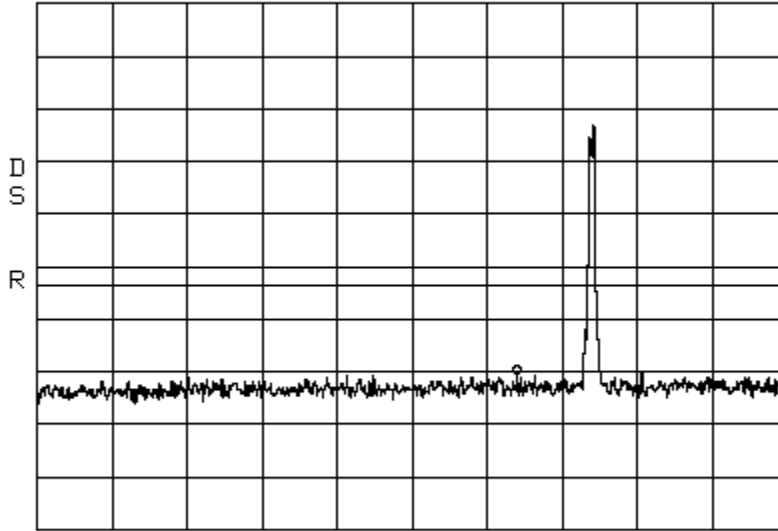


Intermodulation LTE 3MHz Channel Bandwidth \_LowSpectrum 700 MHz Upper C Path 1

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

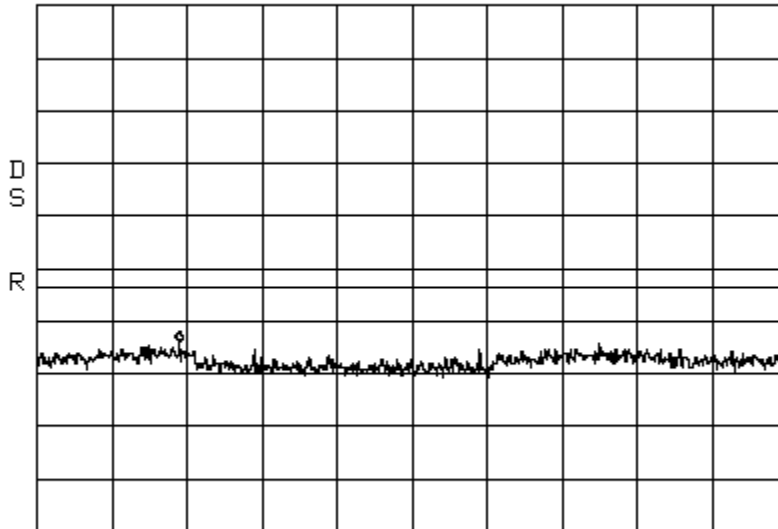
Intermodulation LTE 3 MHz Channel Bandwidth \_Low Spectrum 700 MHz Upper C

Path 1

Span: 1 GHz to 10 GHz

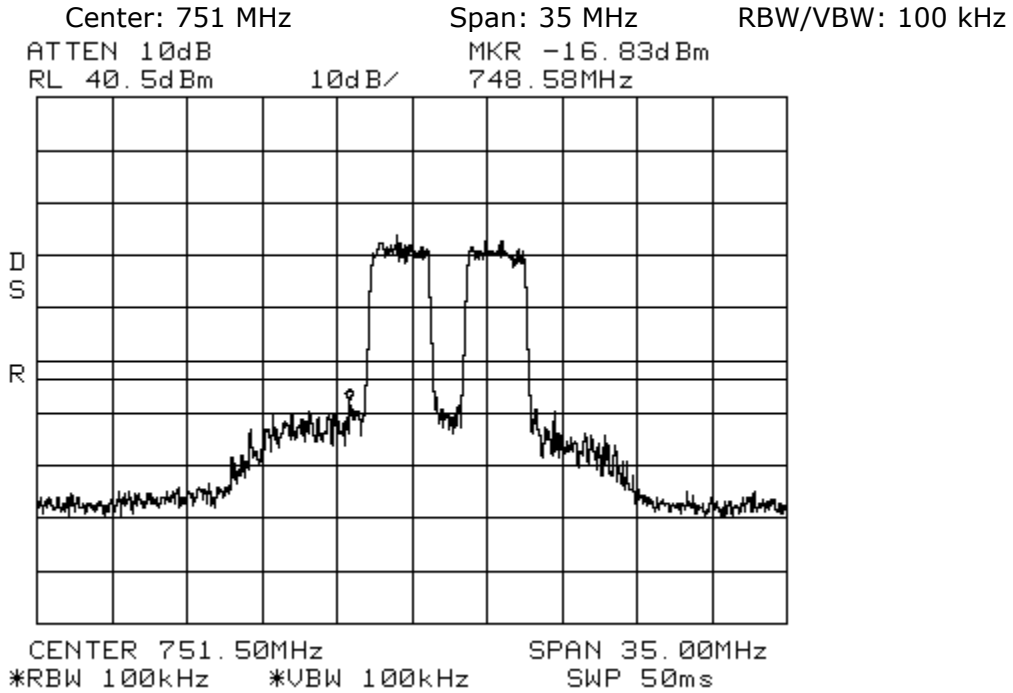
RBW/VBW: 1 MHz

ATTEN 10dB MKR -23.50dBm  
RL 40.5dBm 10dB/ 2.710GHz

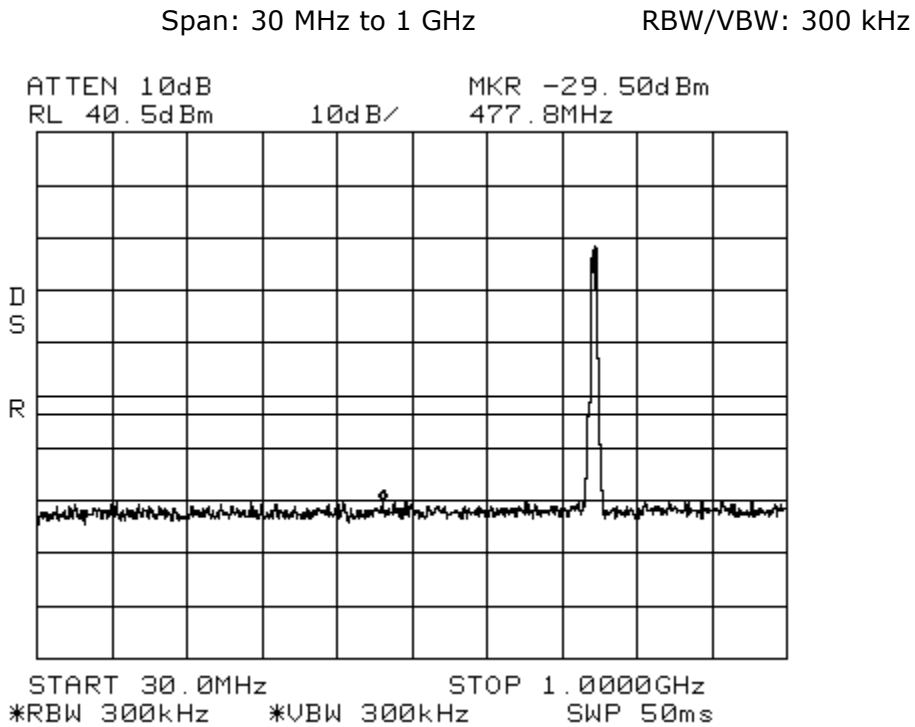


START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Upper C  
Path 1

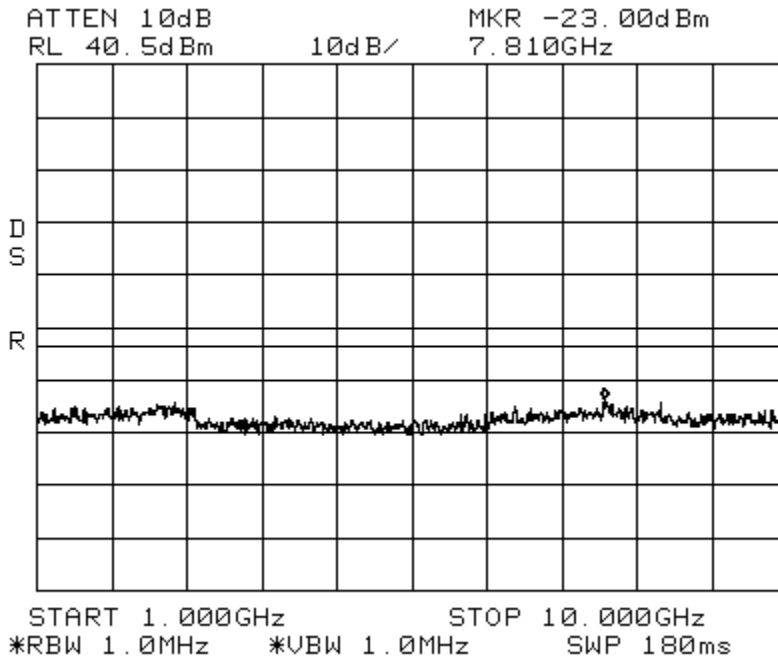


Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Upper C  
Path 1

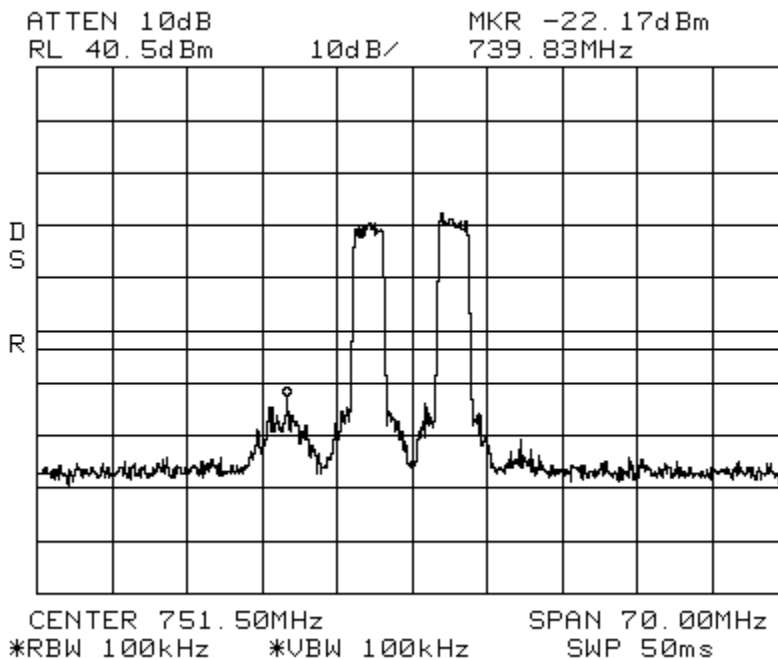




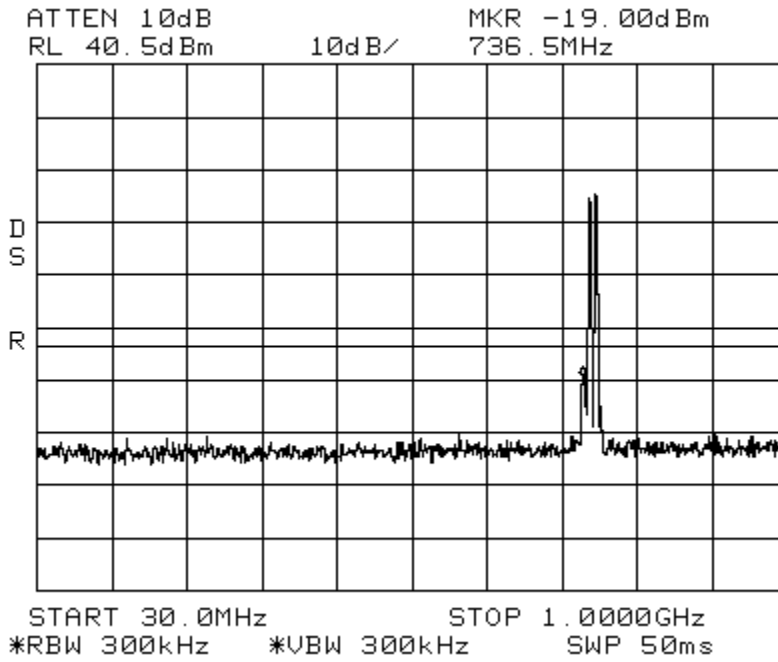
Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Upper C  
 Path 1  
 Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



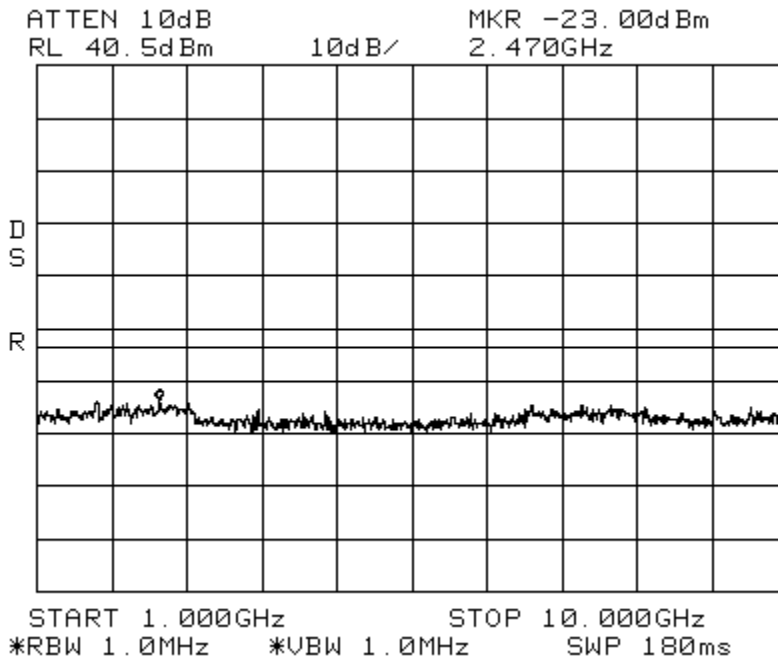
Intermodulation      LTE 3 MHz Channel Bandwidth \_Apart      Spectrum 700 MHz Upper C  
 Path 1  
 Center: 751.5 MHz      Span: 70 MHz      RBW/VBW: 100 kHz



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

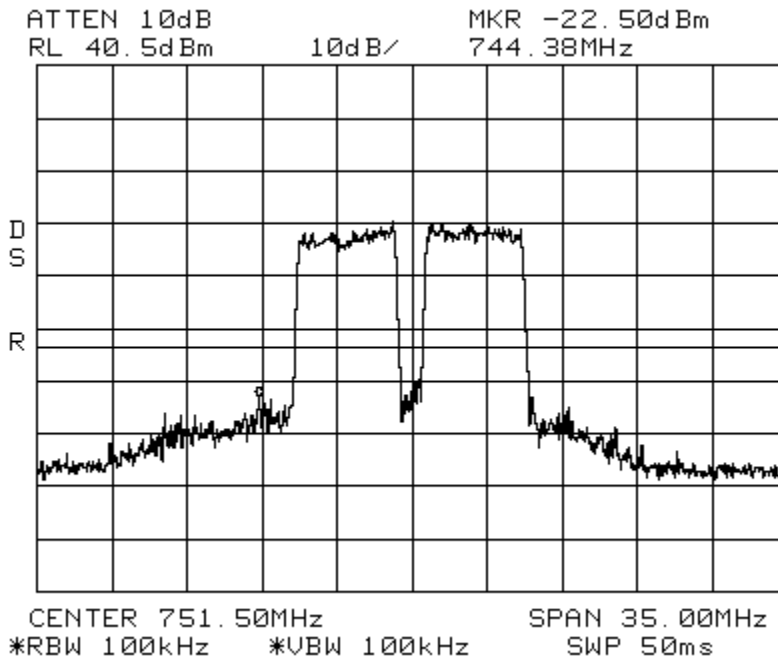
LTE 5 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

Center: 751.5 MHz

Span: 35 MHz

RBW/VBW: 100 kHz



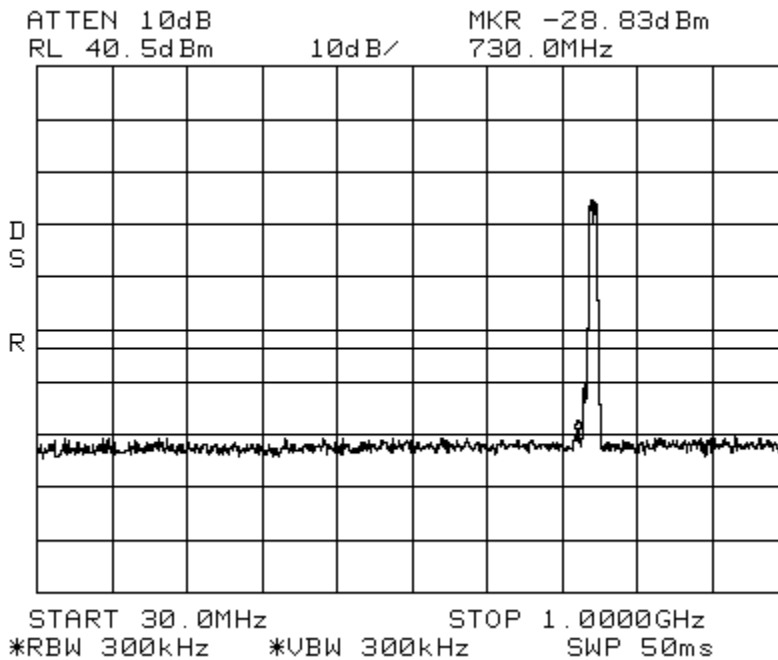
Intermodulation

LTE 5 MHz Channel Bandwidth  
Path 1

Spectrum 700 MHz Upper C

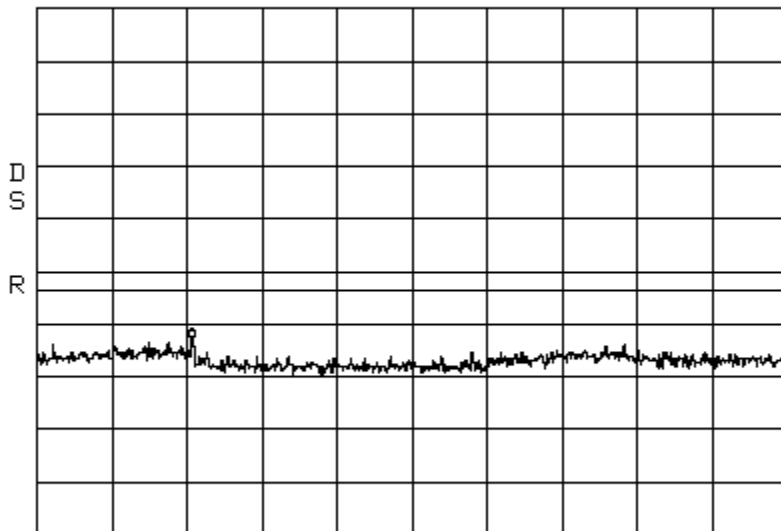
Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz



Intermodulation LTE 5 MHz Channel Bandwidth Spectrum 700 MHz Upper C Path 1  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

ATTEN 10dB MKR -22.33dBm  
RL 40.5dBm 10dB/ 2.860GHz

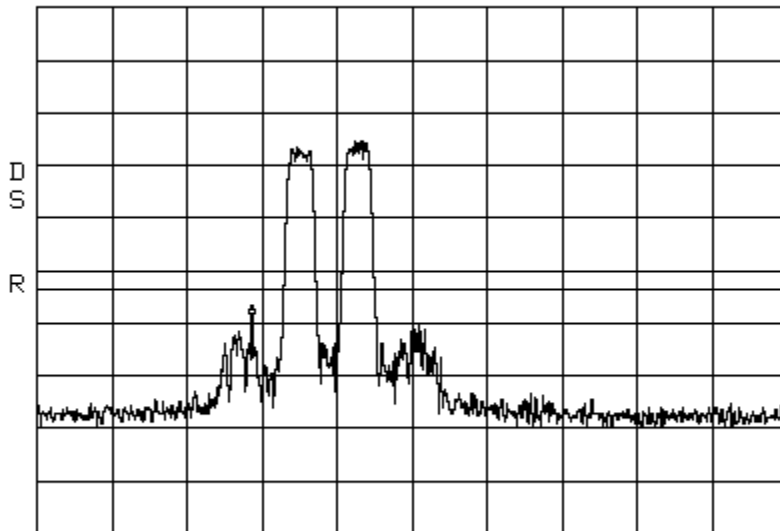


START 1.000GHz STOP 10.000GHz  
\*RBW 1.0MHz \*VBW 1.0MHz SWP 180ms

Intermodulation LTE 1.4 MHz Channel Bandwidth\_Low Path 2 Spectrum 700 MHz Upper C

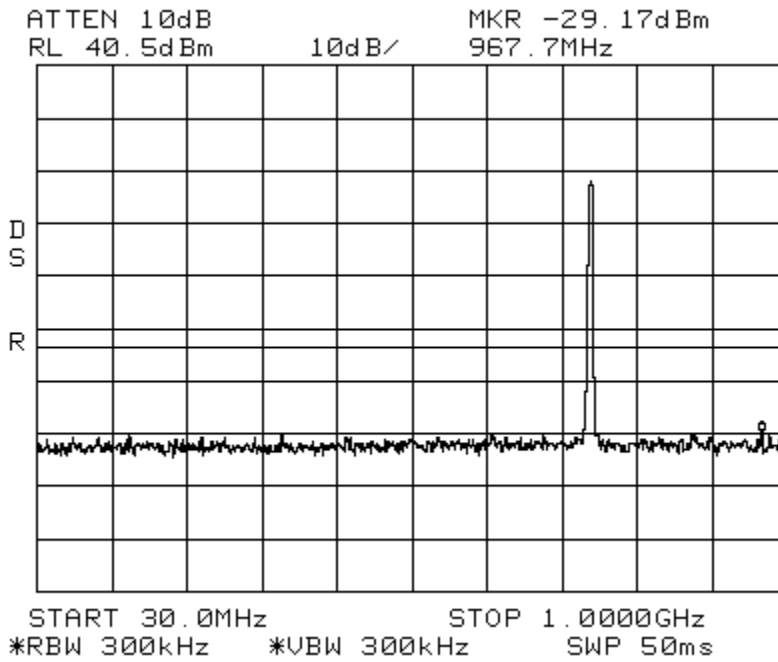
Center: 751.5 MHz Span: 35 MHz RBW/VBW: 100 kHz

ATTEN 10dB MKR -18.17dBm  
RL 40.5dBm 10dB/ 744.03MHz

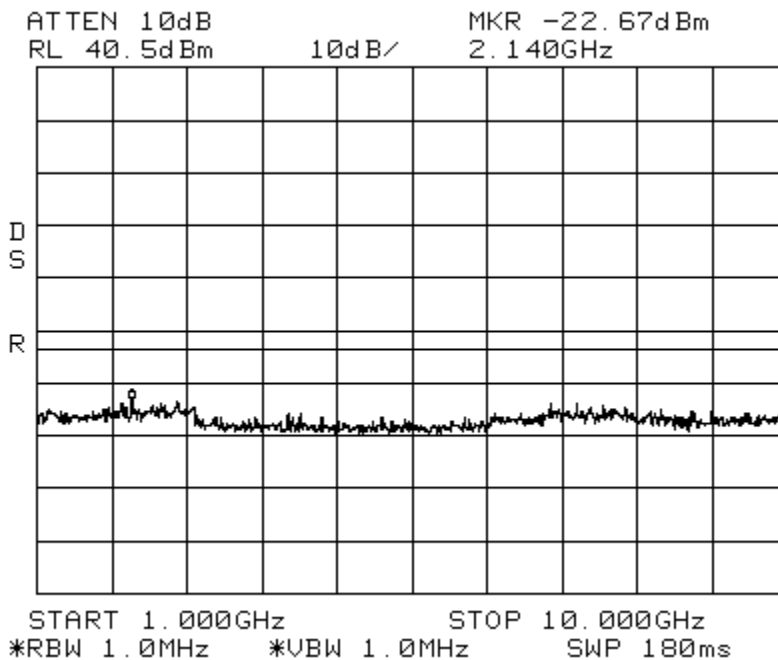


CENTER 751.50MHz SPAN 35.00MHz  
\*RBW 100kHz \*VBW 100kHz SWP 50ms

Intermodulation LTE 1.4 MHz Channel Bandwidth \_Low Spectrum 700 MHz Upper C  
Path 2  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



Intermodulation LTE 1.4 MHz Channel Bandwidth \_Low Spectrum 700 MHz Upper C  
Path 2  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



Intermodulation

LTE 1.4 MHz Channel Bandwidth \_High

Spectrum 700 MHz

Upper C Path 2

Center: 751 MHz

Span: 35 MHz

RBW/VBW: 100 kHz

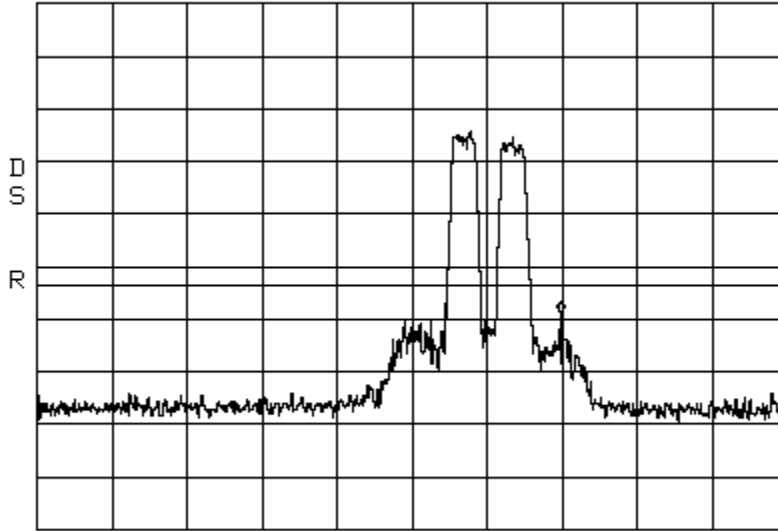
ATTEN 10dB

MKR -18.17dBm

RL 40.5dBm

10dB/

758.44MHz



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

Intermodulation

LTE 1.4 MHz Channel Bandwidth \_High

Spectrum 700 MHz Upper C

Path 2

Span: 30 MHz to 1 GHz

RBW/VBW: 300 kHz

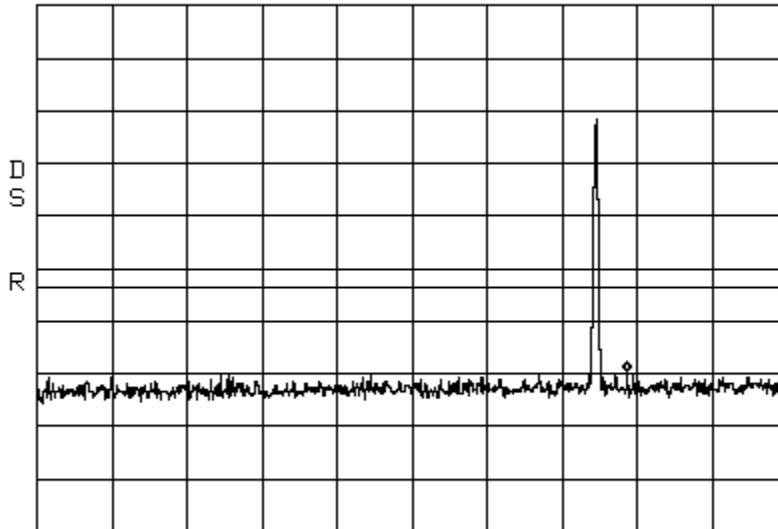
ATTEN 10dB

MKR -29.17dBm

RL 40.5dBm

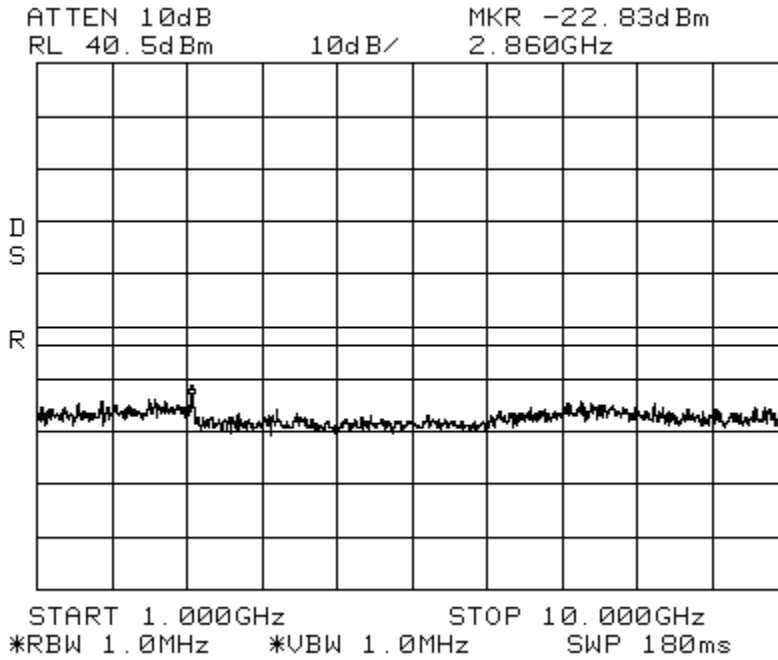
10dB/

793.1MHz

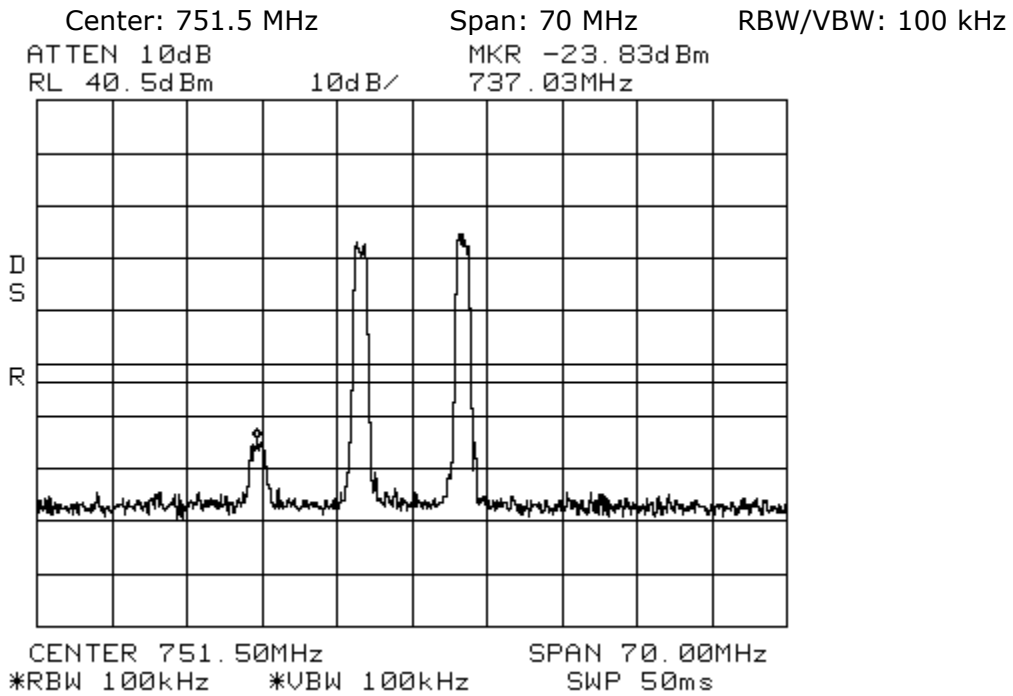


START 30.0MHz STOP 1.0000GHz  
\*RBW 300kHz \*VBW 300kHz SWP 50ms

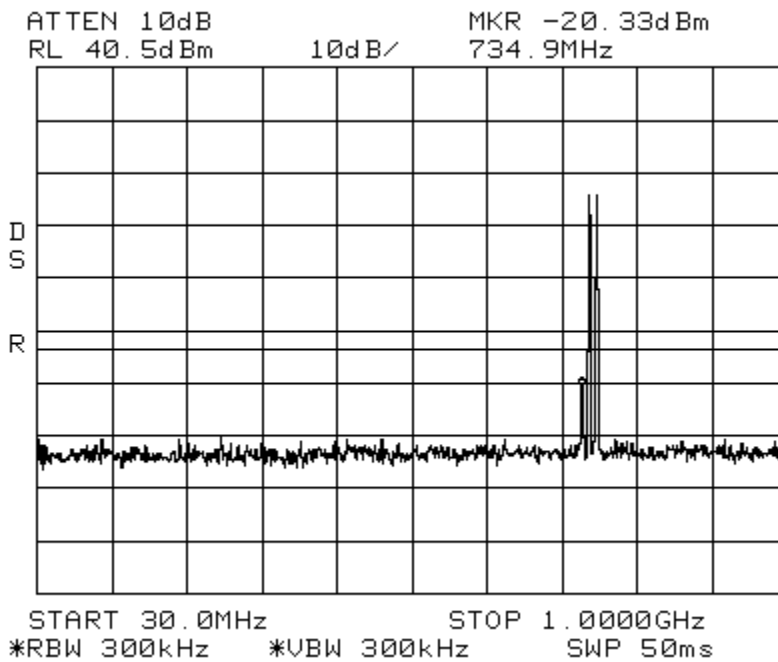
Intermodulation LTE 1.4 MHz Channel Bandwidth \_High Spectrum 700 MHz Upper C  
Path 2  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz



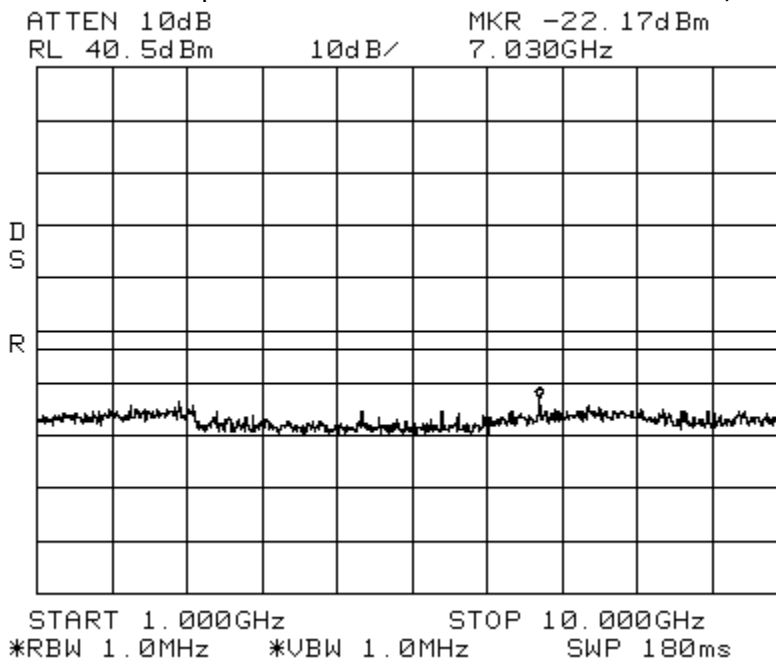
Intermodulation LTE 1.4 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 2



Intermodulation LTE 1.4 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 2  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz

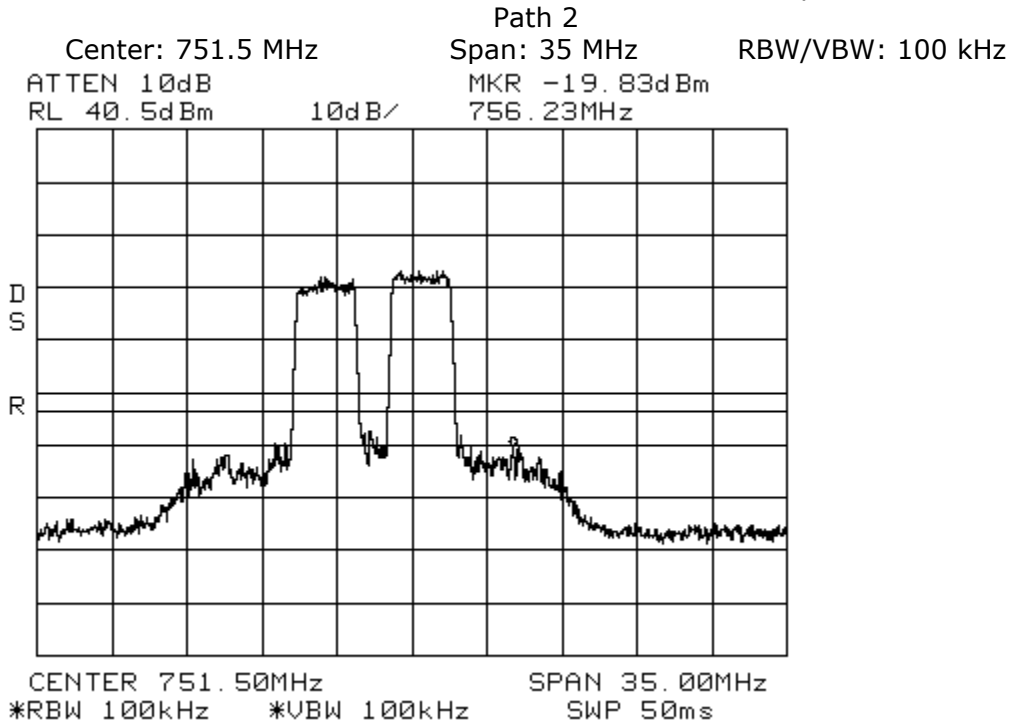


Intermodulation LTE 1.4 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 2  
Span: 1 GHz to 10 GHz RBW/VBW: 1 MHz

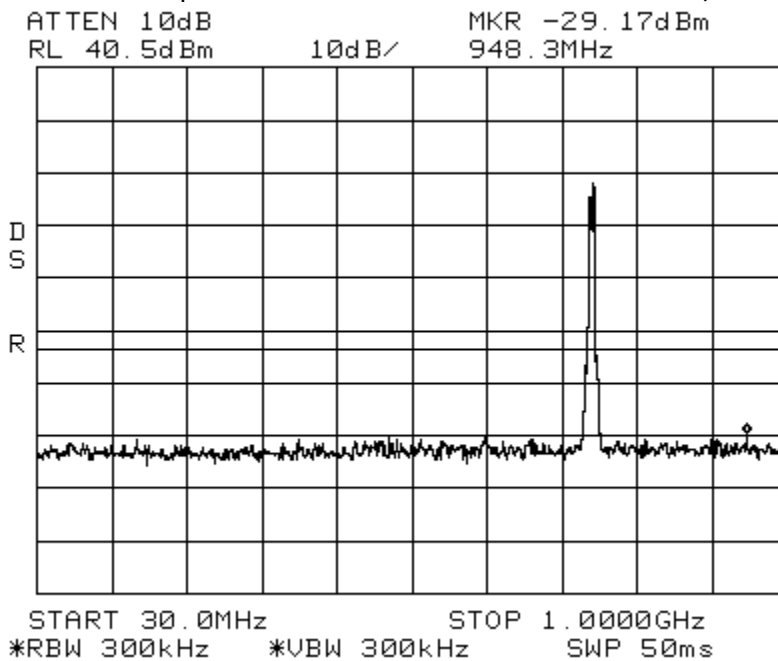




Intermodulation LTE 3 MHz Channel Bandwidth\_Low Path 2 Spectrum 700 MHz Upper C



Intermodulation LTE 3MHz Channel Bandwidth\_Low Spectrum 700 MHz Upper C Path 2  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



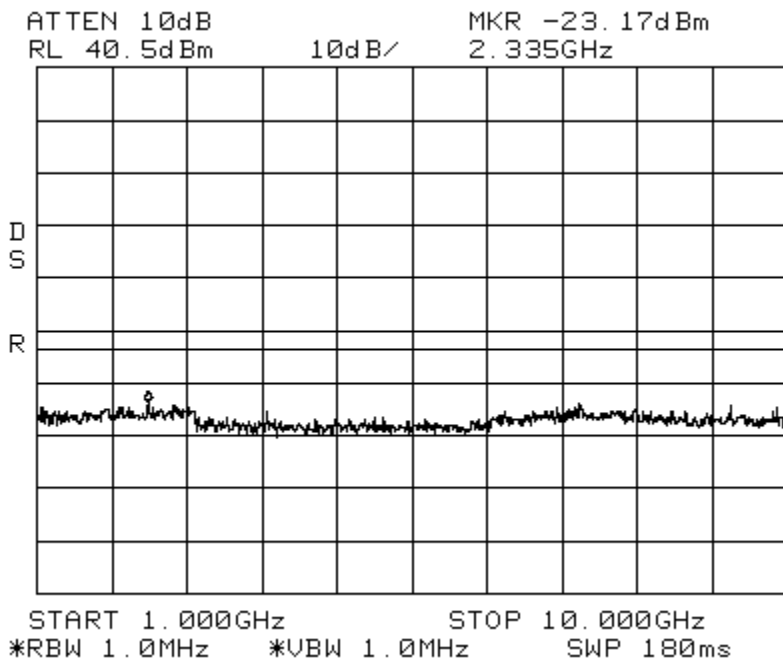
Intermodulation

LTE 3 MHz Channel Bandwidth \_Low  
Path 2

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

RBW/VBW: 1 MHz



Intermodulation

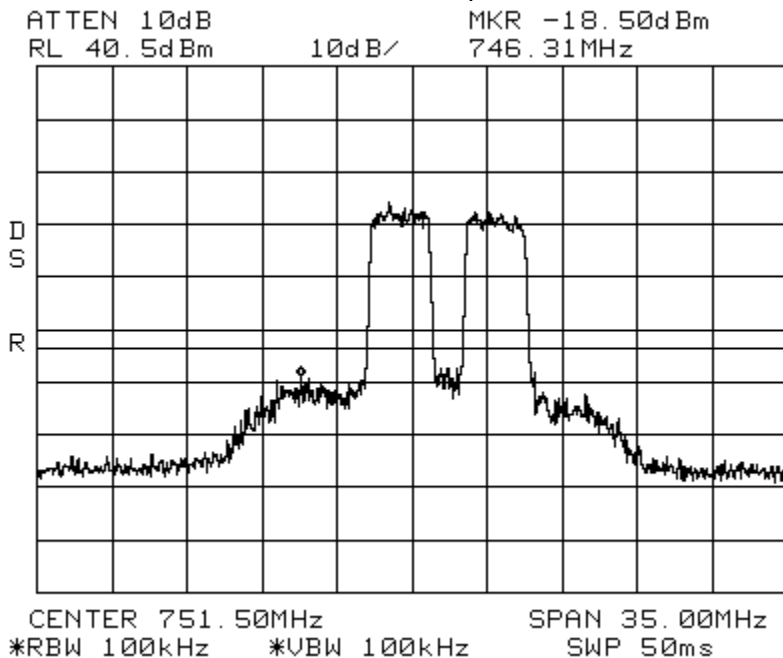
LTE 3 MHz Channel Bandwidth \_High  
Path 2

Spectrum 700 MHz Upper C

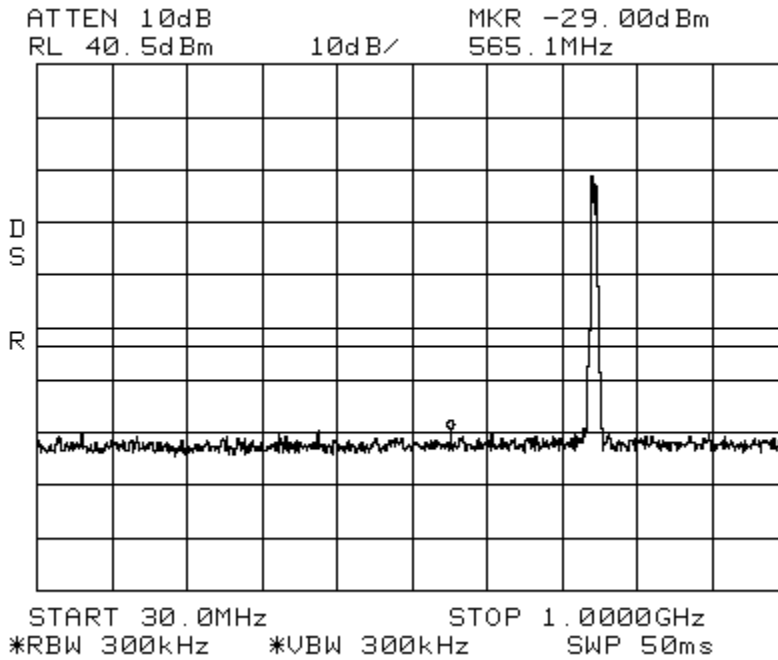
Center: 751.5 MHz

Span: 35 MHz

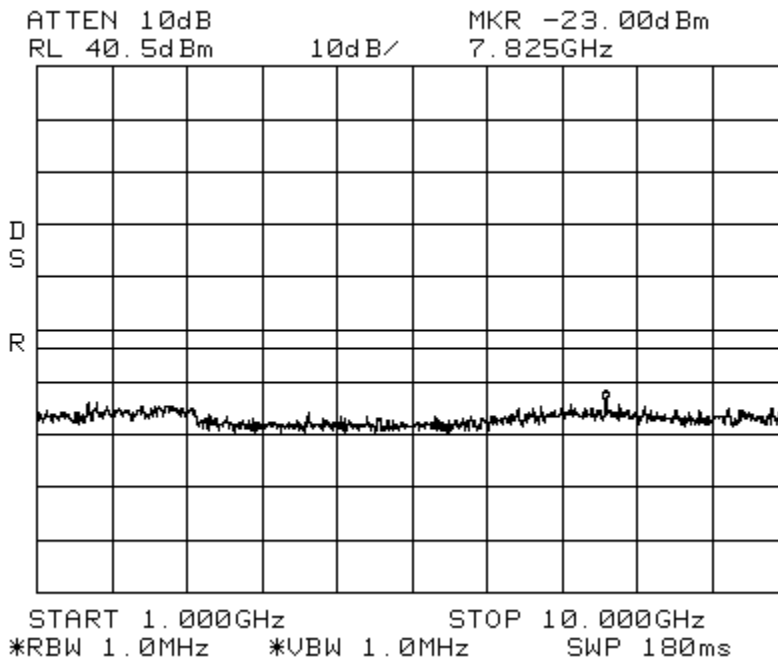
RBW/VBW: 100 kHz



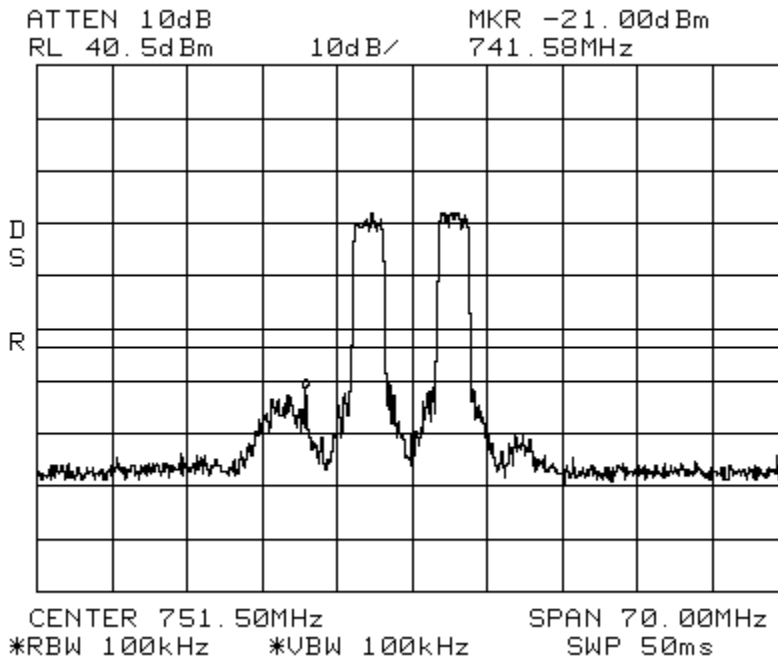
Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Upper C  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



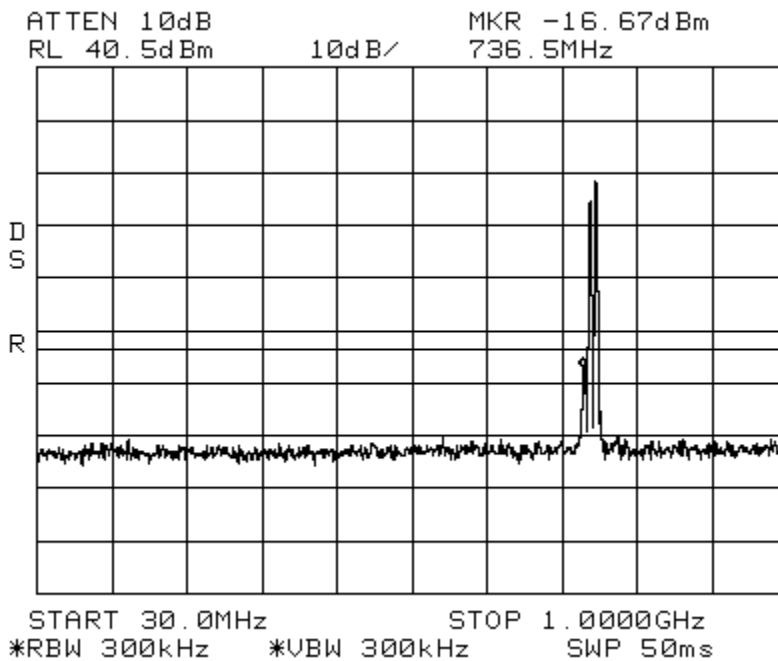
Intermodulation      LTE 3 MHz Channel Bandwidth \_High      Spectrum 700 MHz Upper C  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



Intermodulation LTE 3 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 2  
Center: 751.5 MHz Span: 70 MHz RBW/VBW: 100 kHz



Intermodulation LTE 3 MHz Channel Bandwidth \_Apart Spectrum 700 MHz Upper C  
Path 2  
Span: 30 MHz to 1 GHz RBW/VBW: 300 kHz



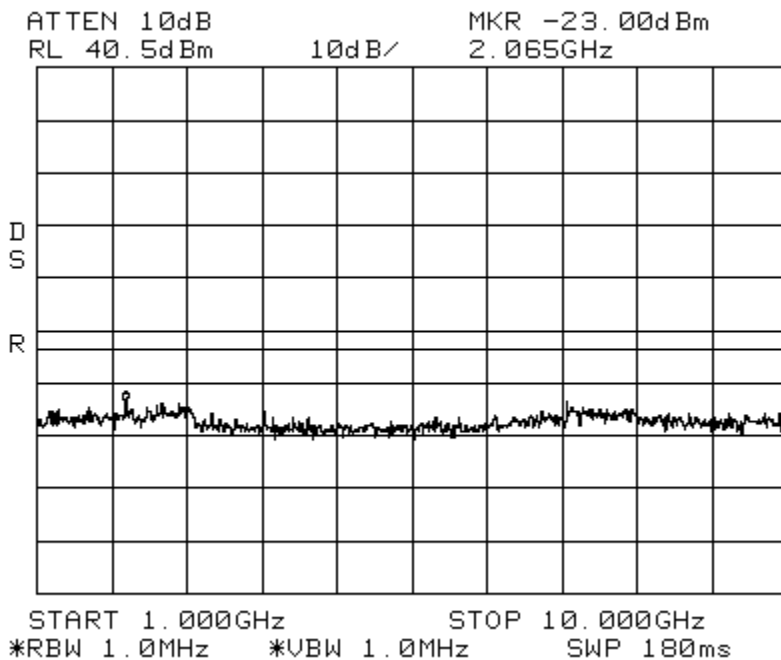
Intermodulation

LTE 3 MHz Channel Bandwidth \_Apart  
Path 2

Spectrum 700 MHz Upper C

Span: 1 GHz to 10 GHz

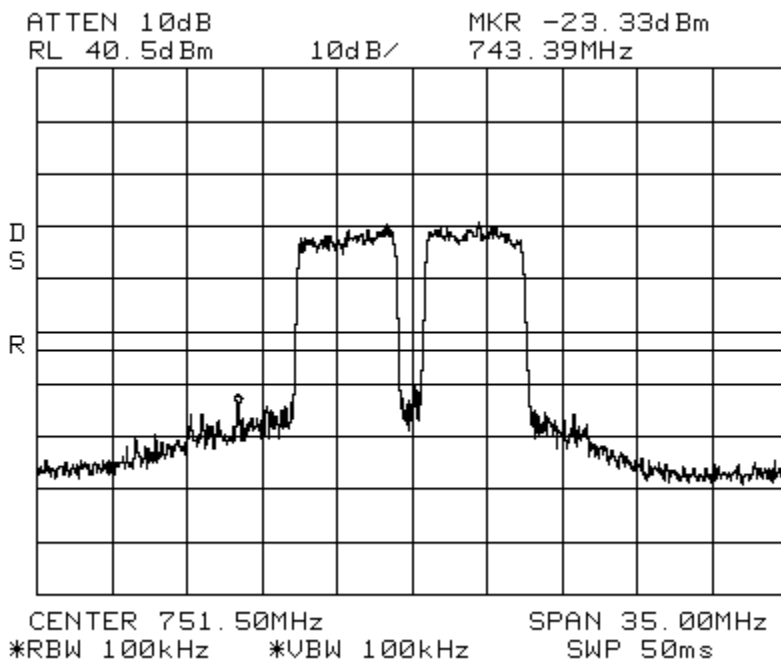
RBW/VBW: 1 MHz



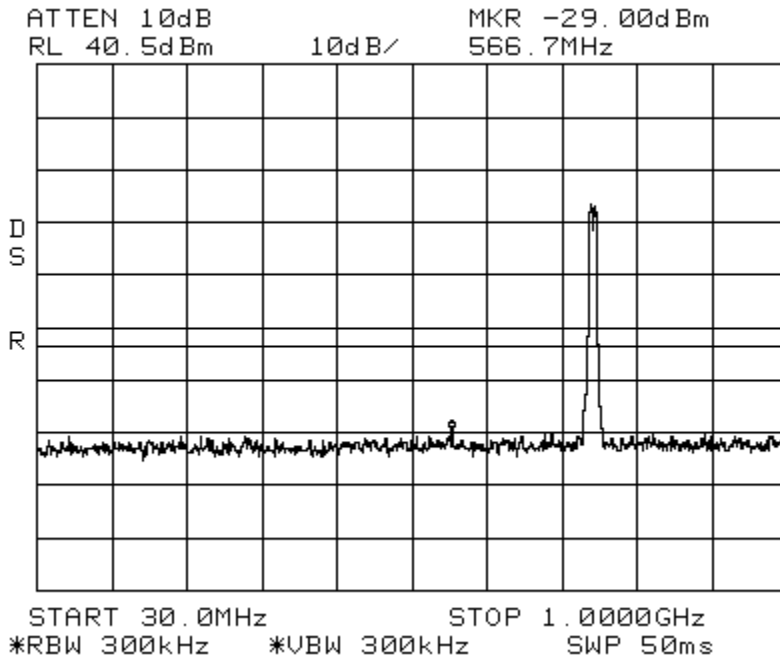
Intermodulation

LTE 5 MHz Channel Bandwidth  
Center: 751.5 MHz  
Span: 35 MHz

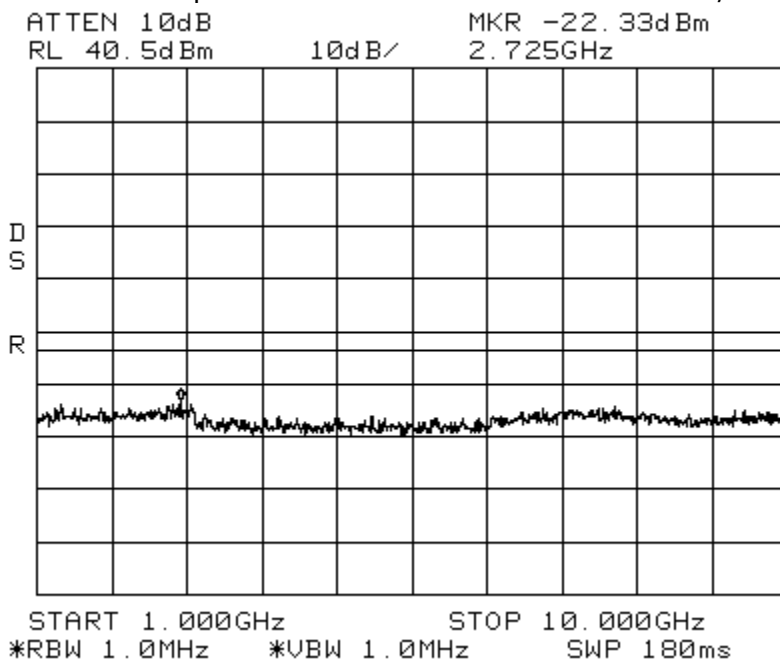
Spectrum 700 MHz Upper C Path 2  
RBW/VBW: 100 kHz



Intermodulation      LTE 5 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Upper C  
Path 2  
Span: 30 MHz to 1 GHz      RBW/VBW: 300 kHz



Intermodulation      LTE 5 MHz Channel Bandwidth \_Low      Spectrum 700 MHz Upper C  
Path 2  
Span: 1 GHz to 10 GHz      RBW/VBW: 1 MHz



## 7.5 Occupied Bandwidth Modulation Test

[Table of Contents; Section 1.0](#)

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

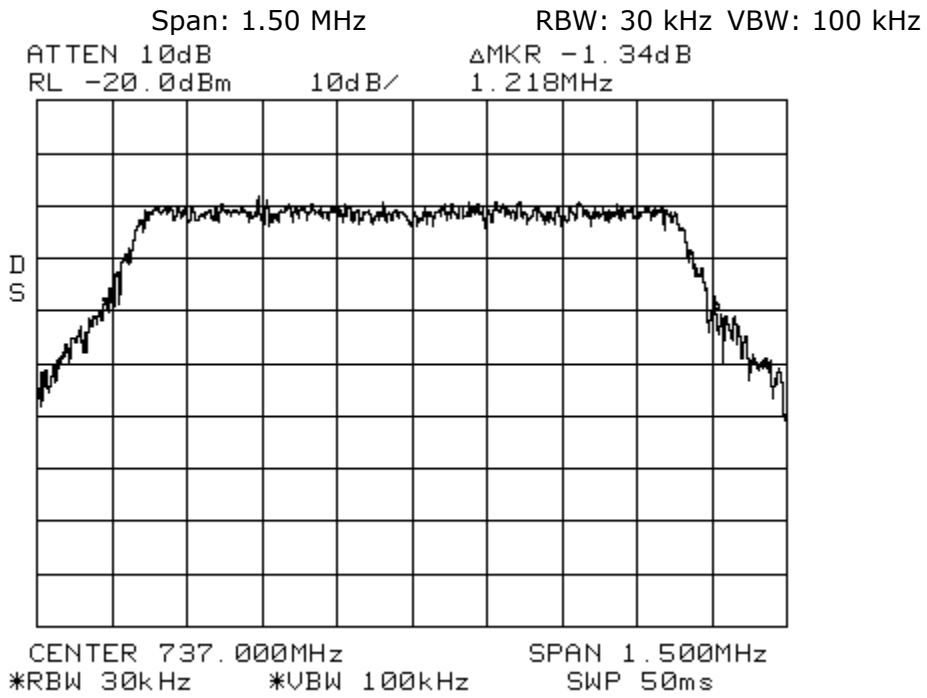
An input/output Occupied Bandwidth test was done with modulation types: LTE 1.4 MHz, 3 MHz, 5MHz, 10MHz Channel Bandwidths. The purpose was to determine the amount of distortion added to different types of modulation schemes by the EUT. The following plots show input signals vs. output signals.

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.

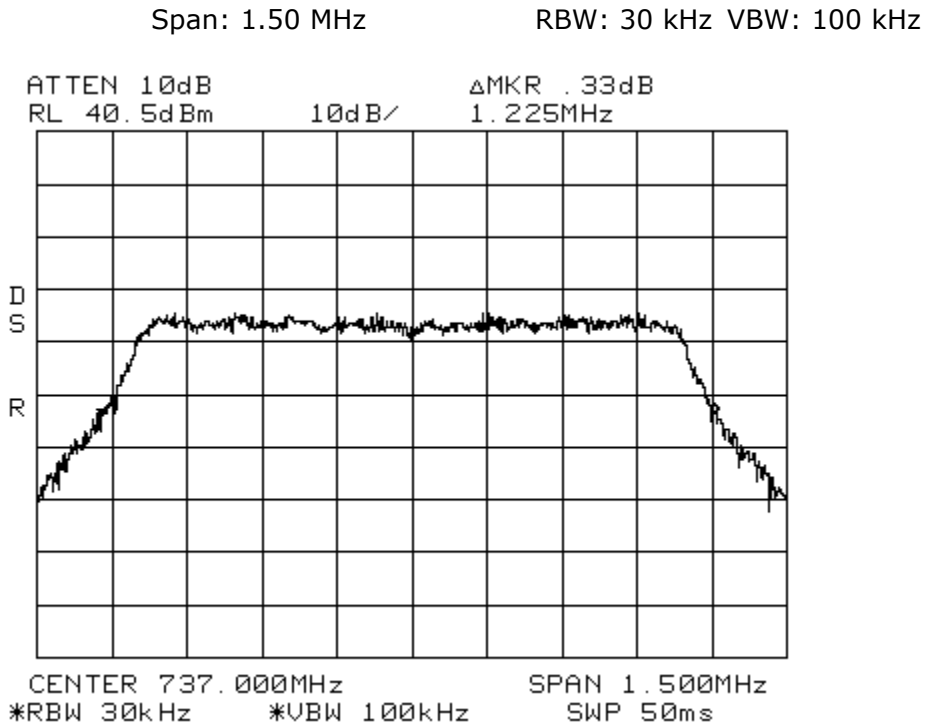
### **Results:**

Pass (see plots)

Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC  
Path 1

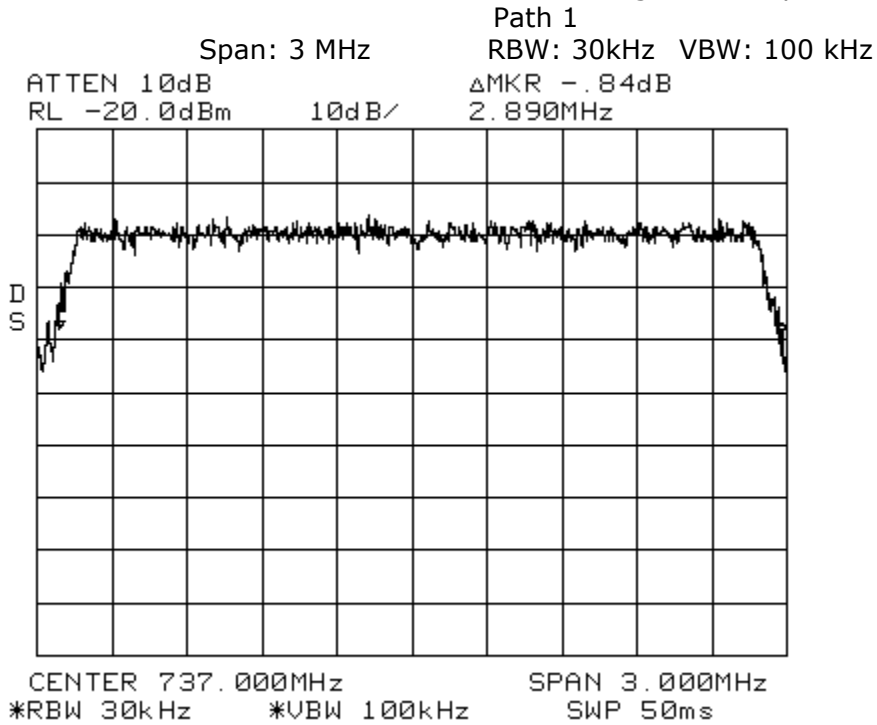


Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower  
ABC Path 1

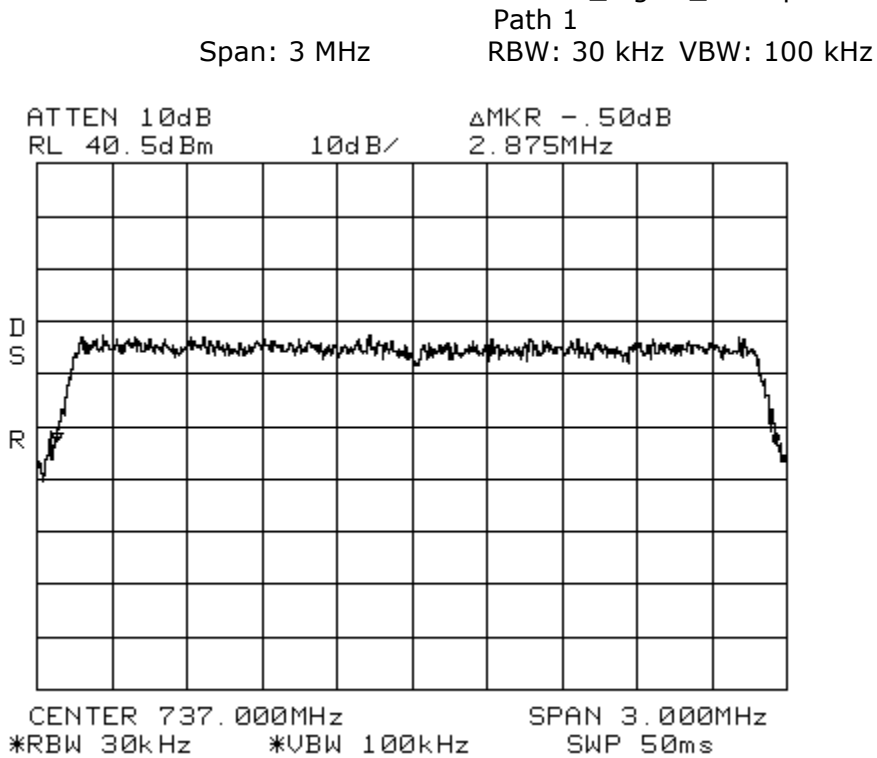




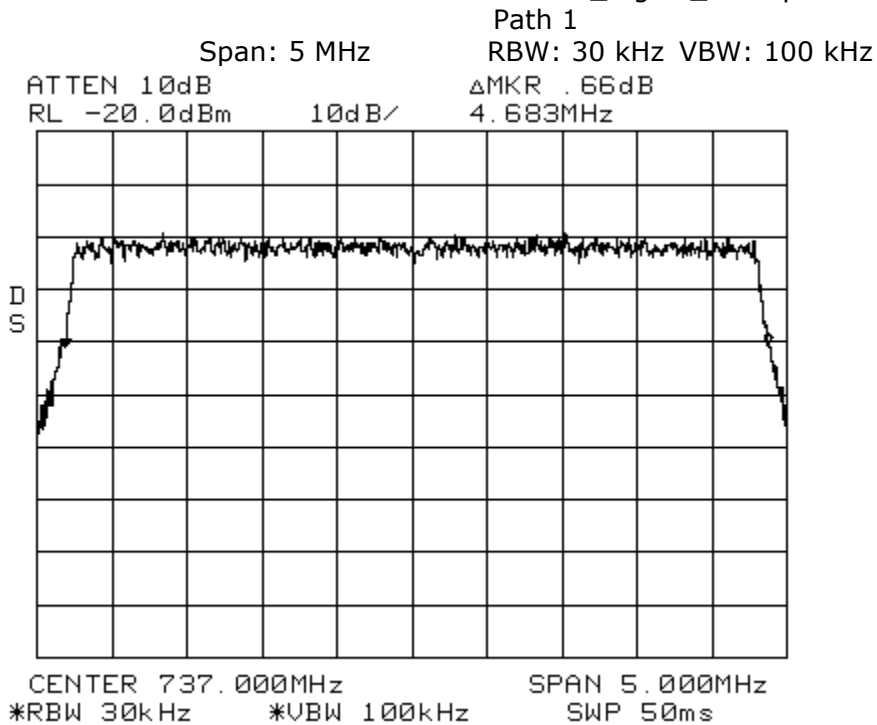
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC



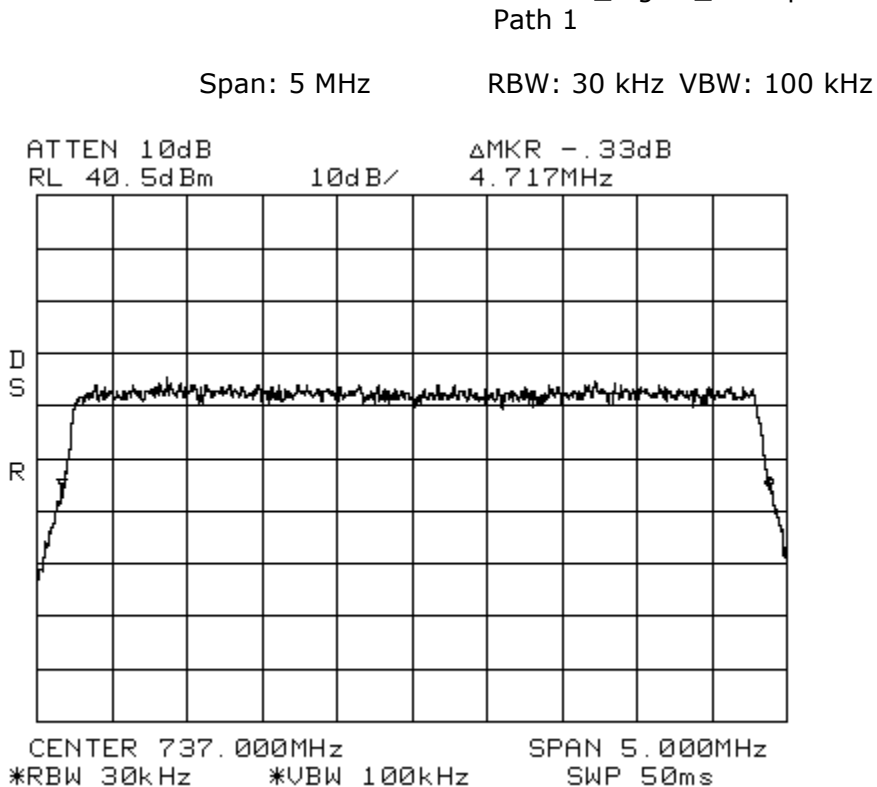
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower ABC



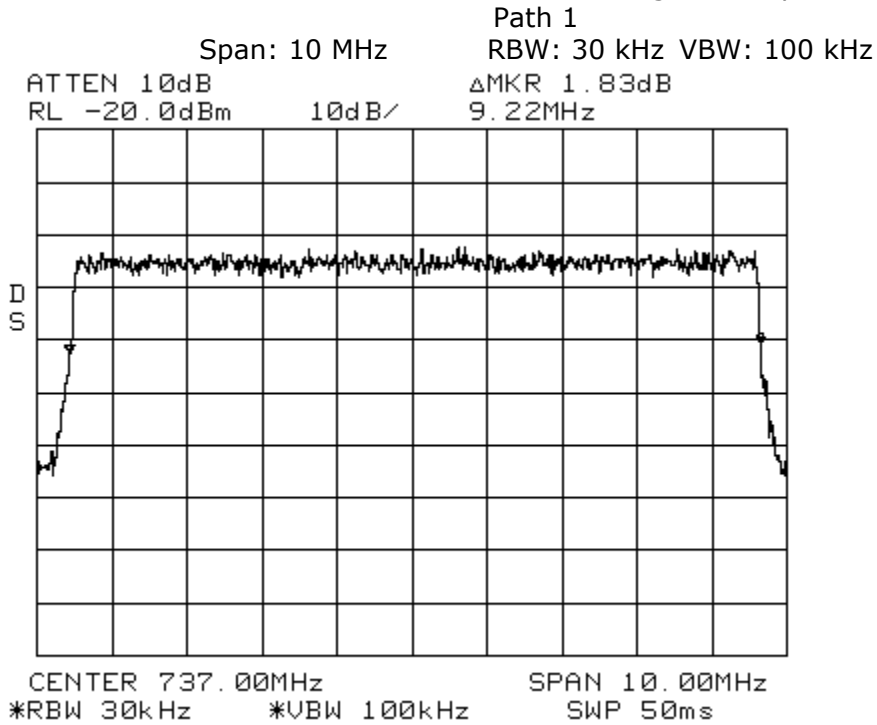
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC



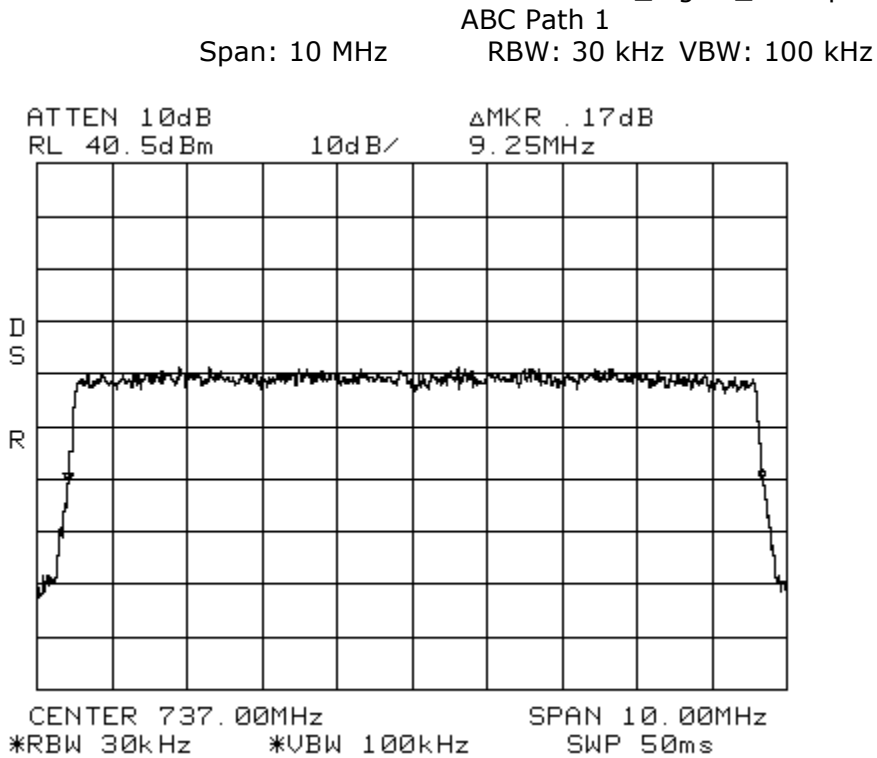
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower ABC



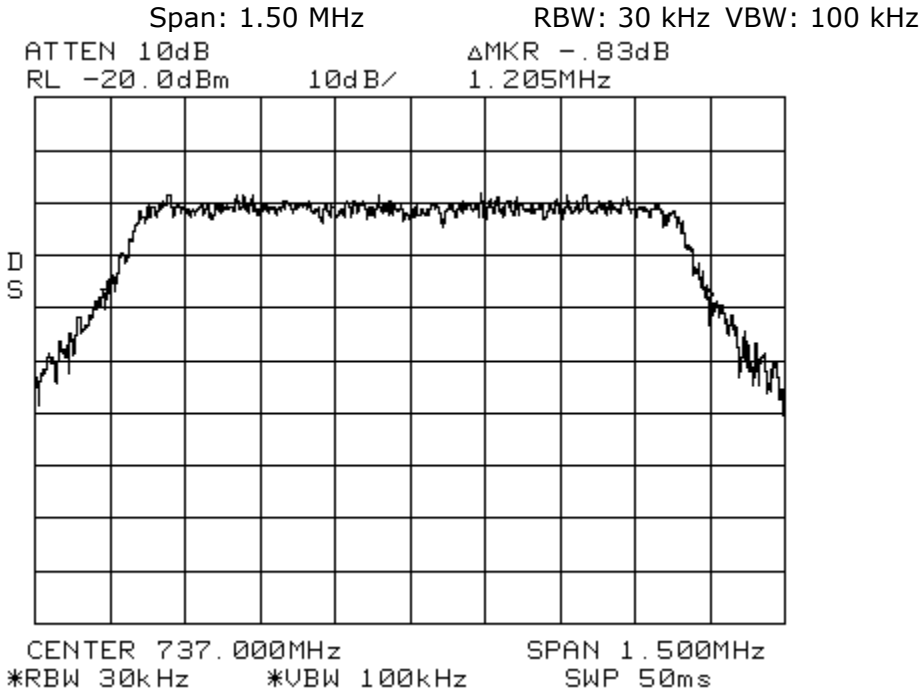
Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC



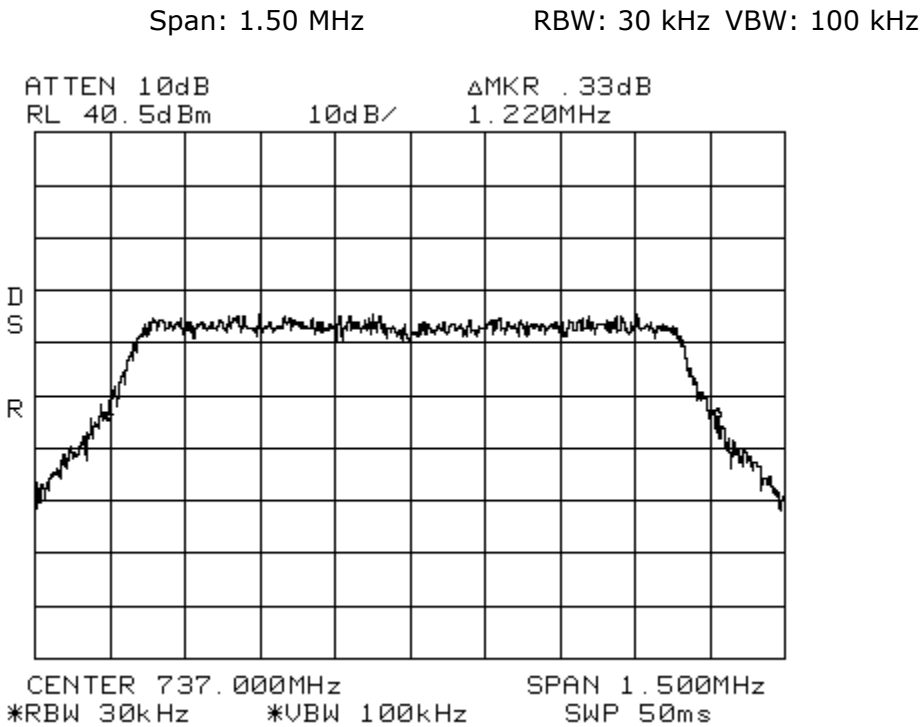
Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower



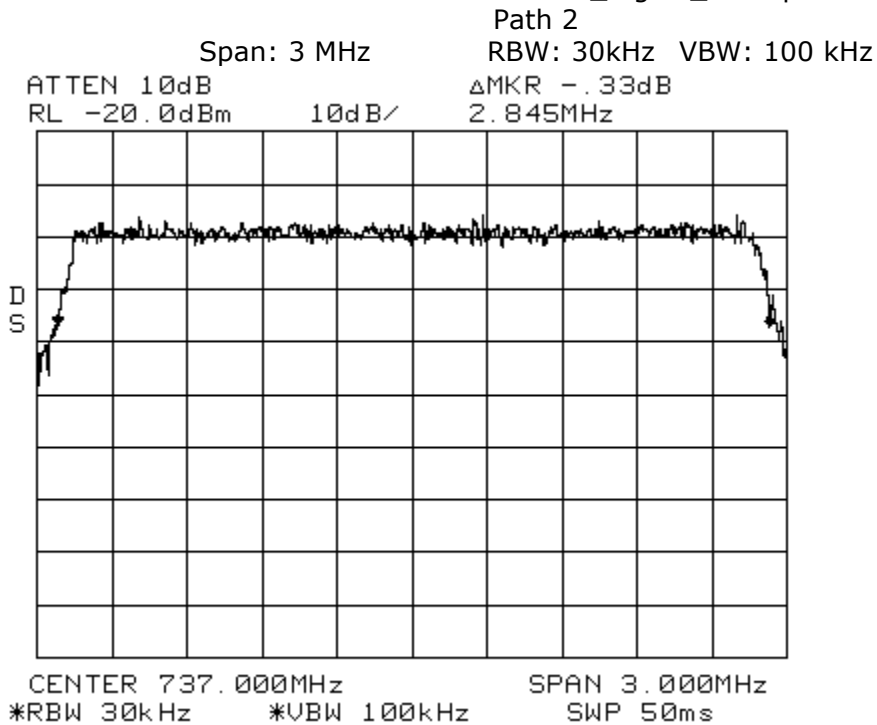
Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC Path 2



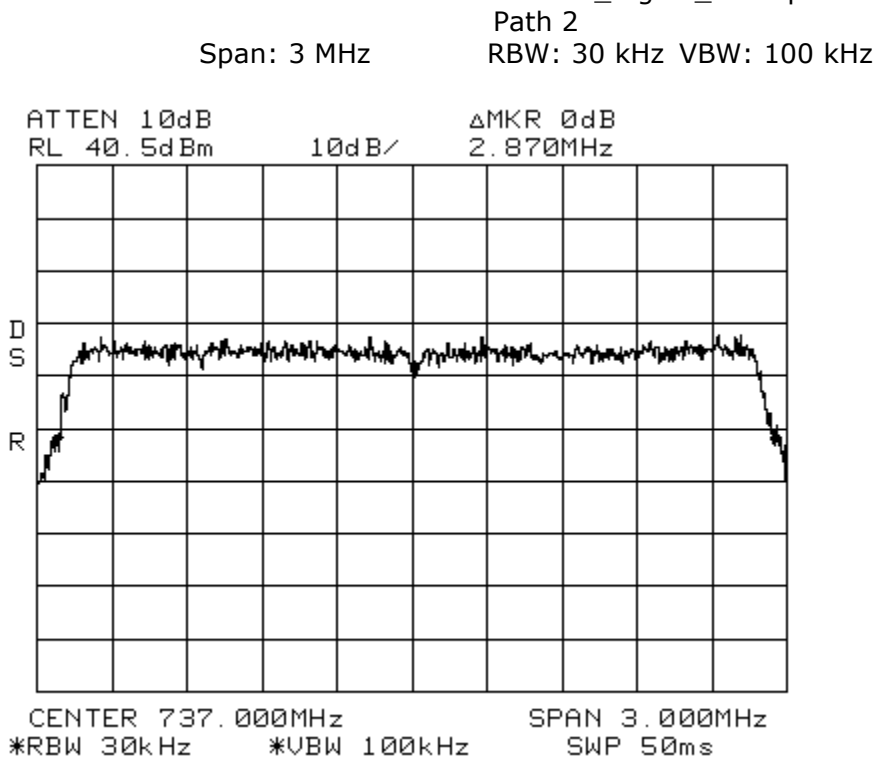
Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower ABC Path 2



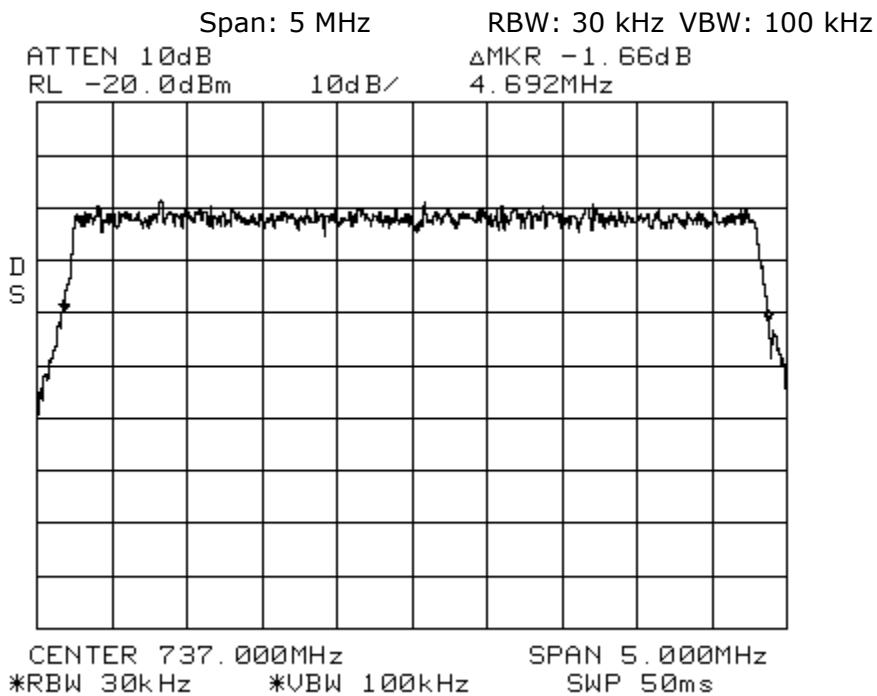
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC



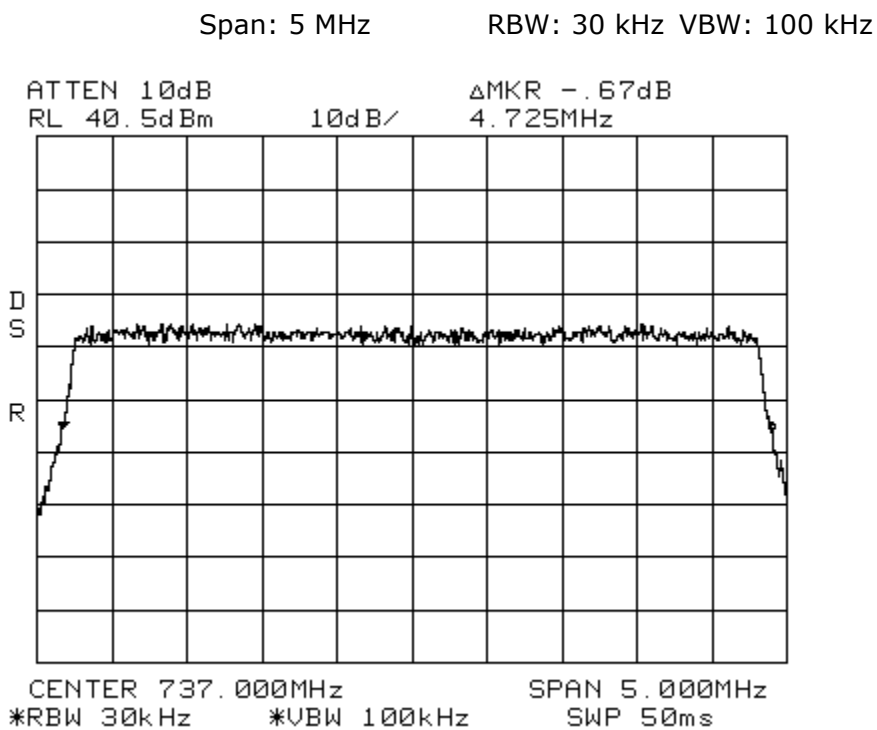
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower ABC



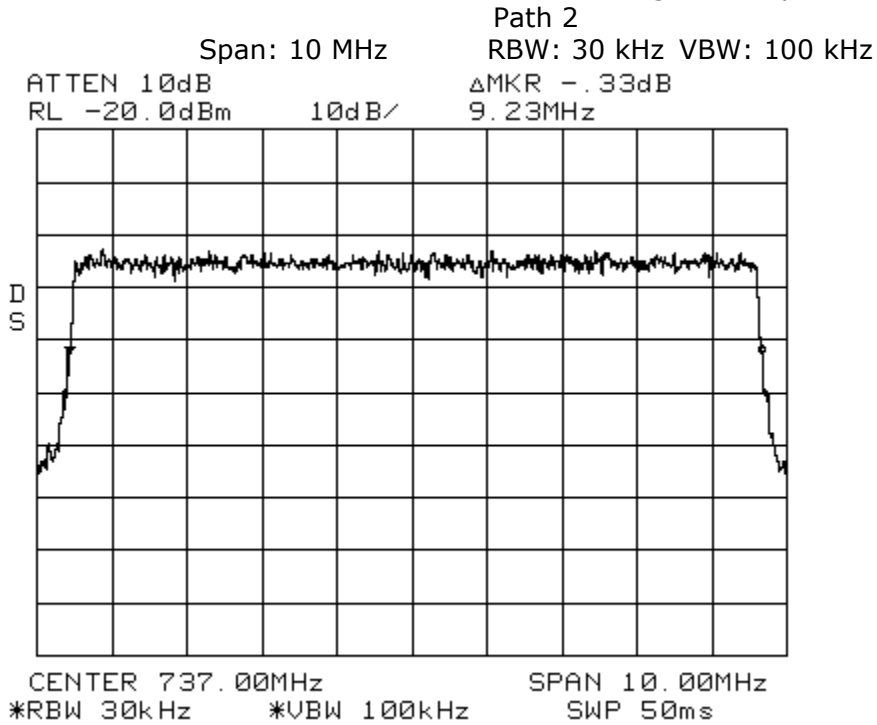
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC Path 2



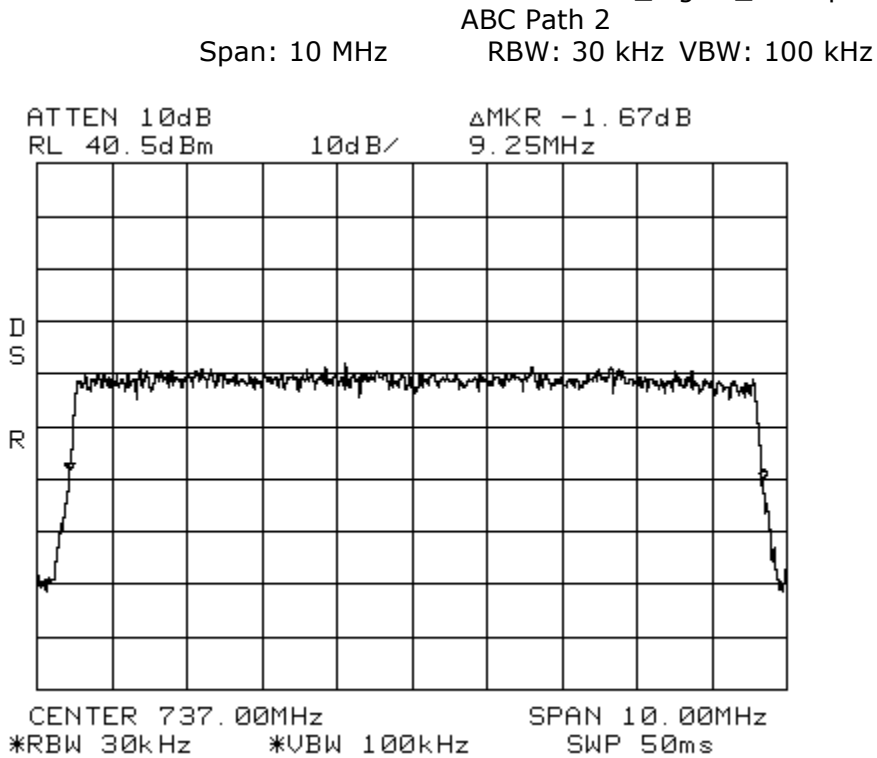
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower ABC Path 2



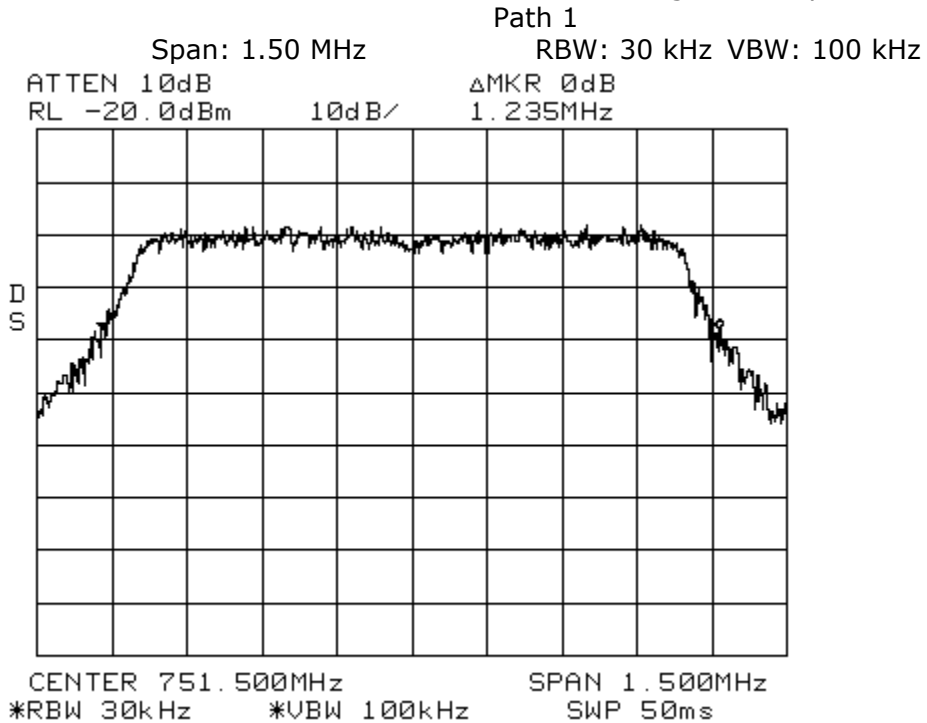
Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Lower ABC



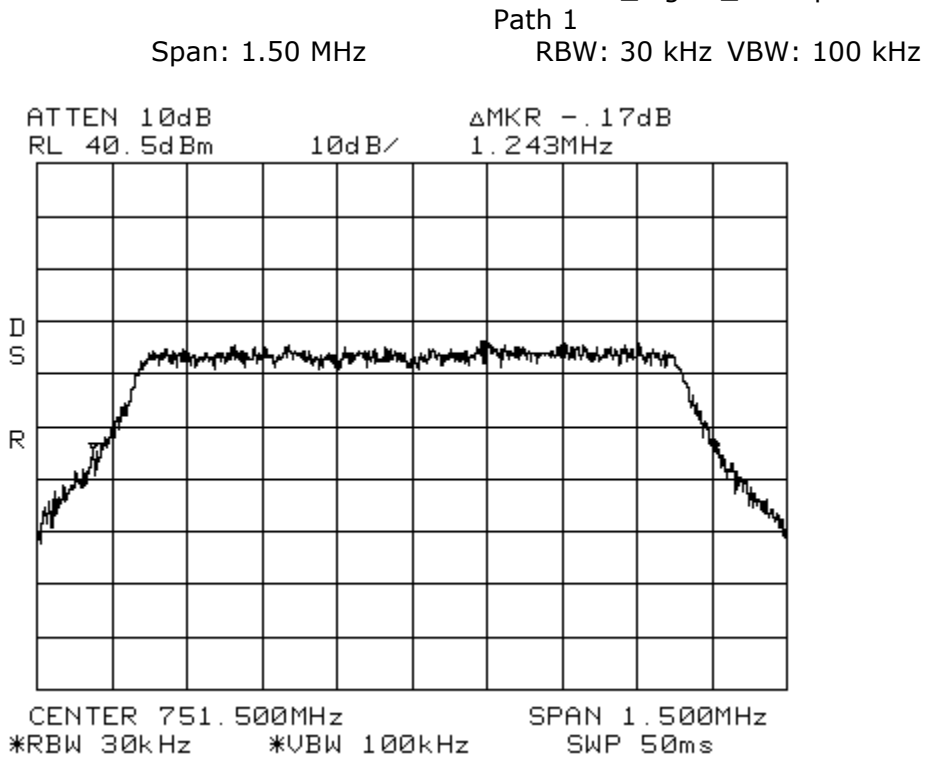
Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Lower



Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C

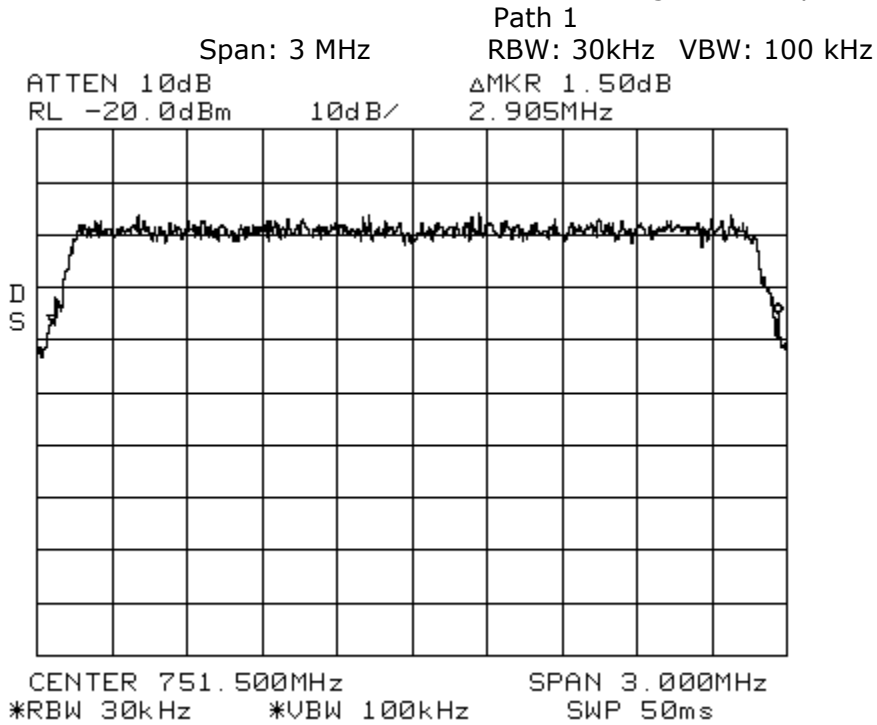


Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Upper C

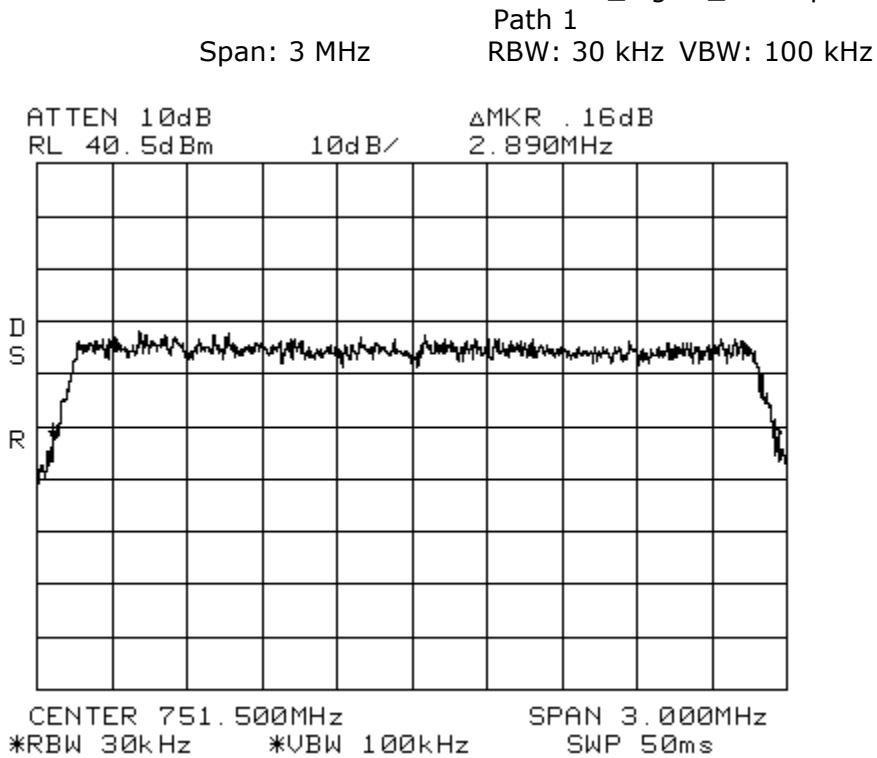




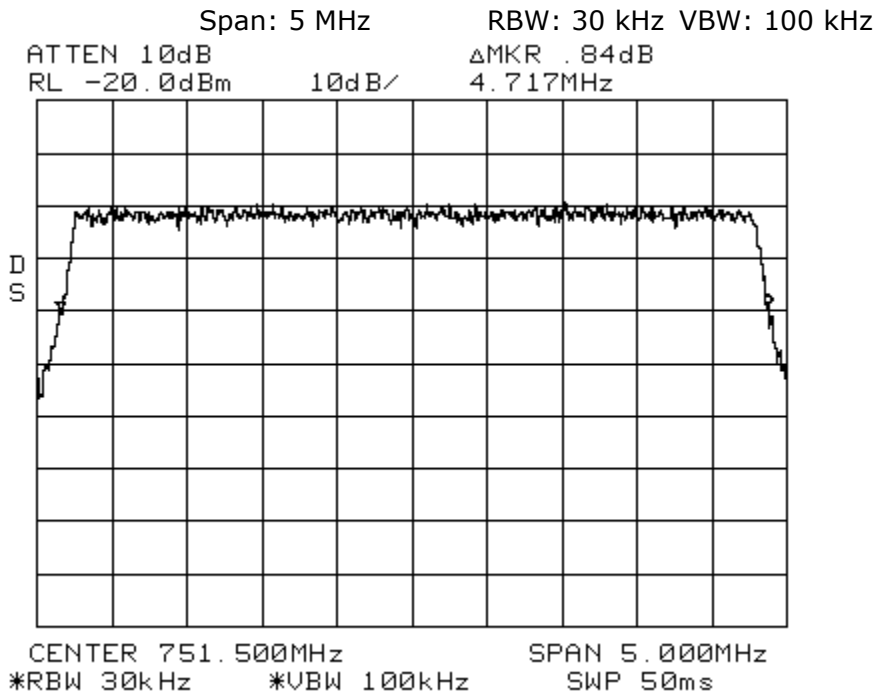
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C



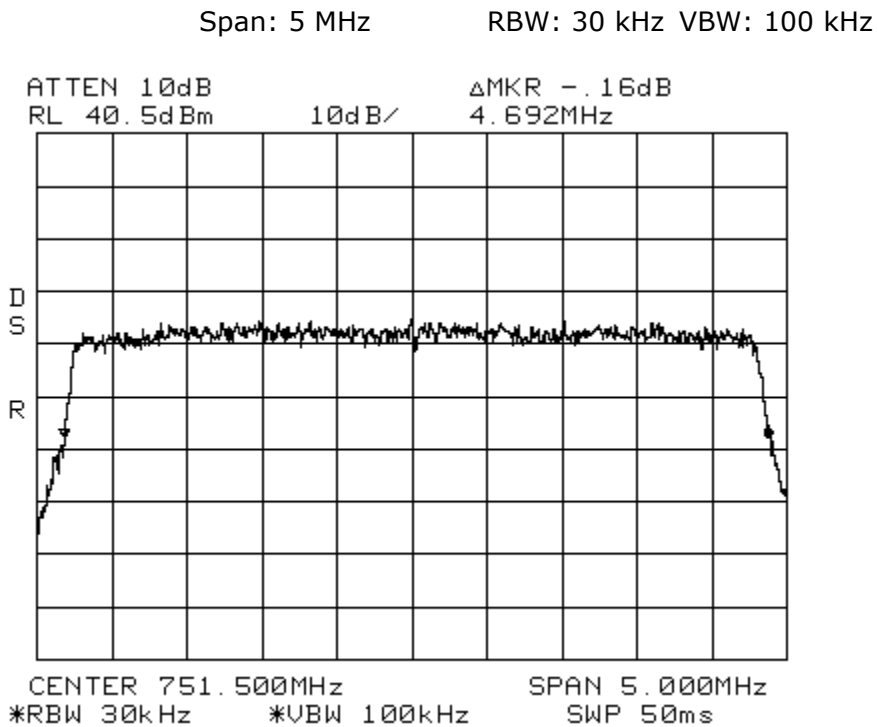
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Upper C



Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C  
Path 1

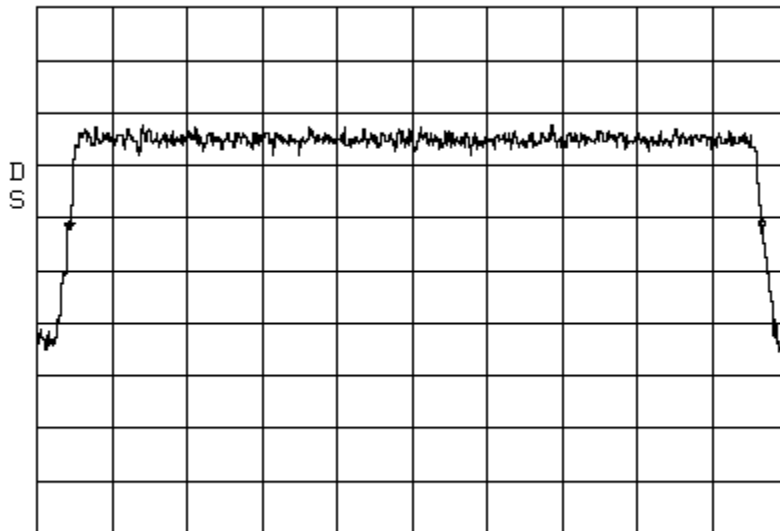


Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Upper C  
Path 1



Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Path 1

Span: 10 MHz RBW: 30 kHz VBW: 100 kHz  
ATTEN 10dB ΔMKR 0dB  
RL -20.0dBm 10dB/ 9.23MHz

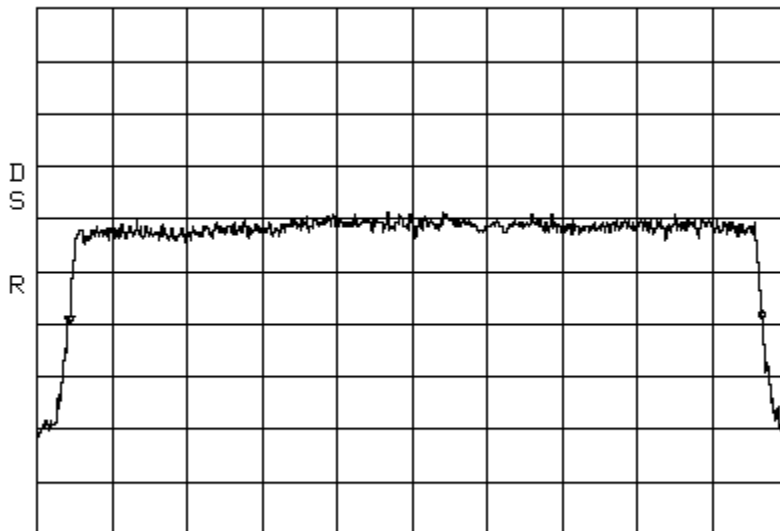


CENTER 751.50MHz SPAN 10.00MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Path 1

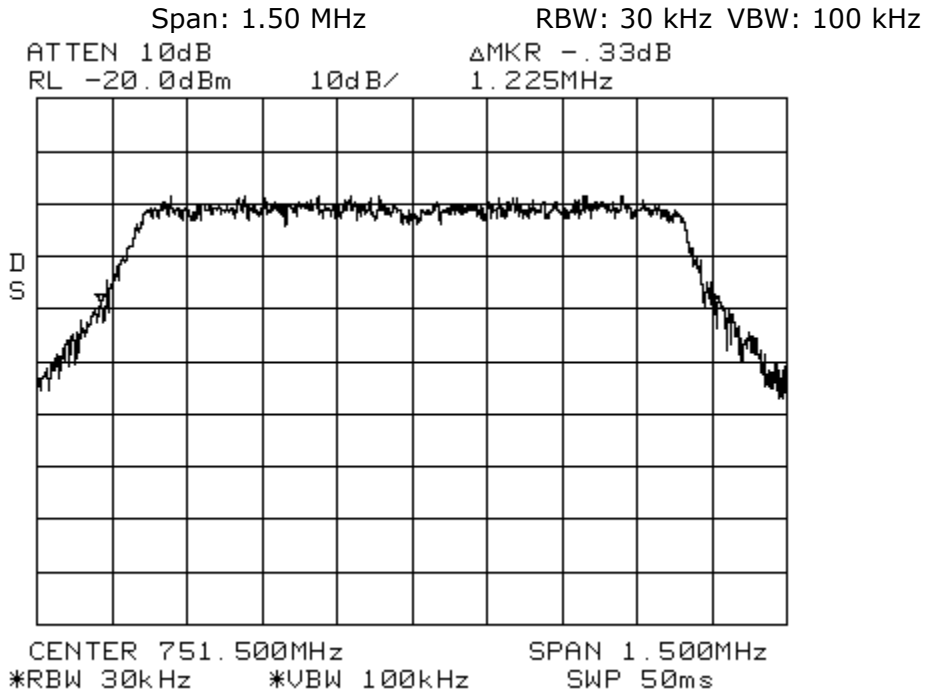
Span: 10 MHz RBW: 30 kHz VBW: 100 kHz

ATTEN 10dB ΔMKR .83dB  
RL 40.5dBm 10dB/ 9.23MHz

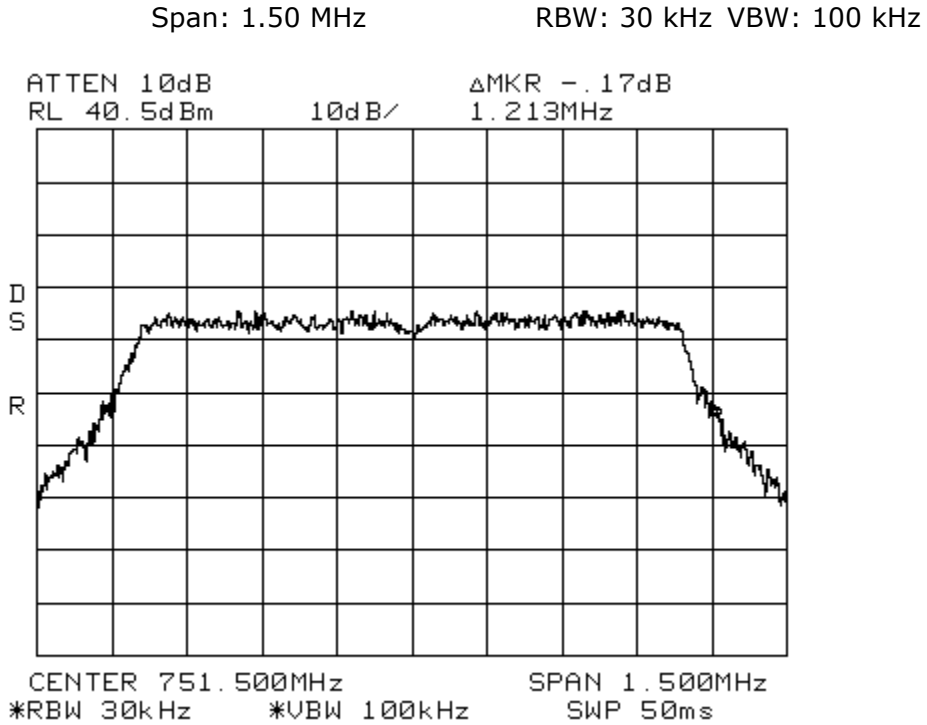


CENTER 751.50MHz SPAN 10.00MHz  
\*RBW 30kHz \*VBW 100kHz SWP 50ms

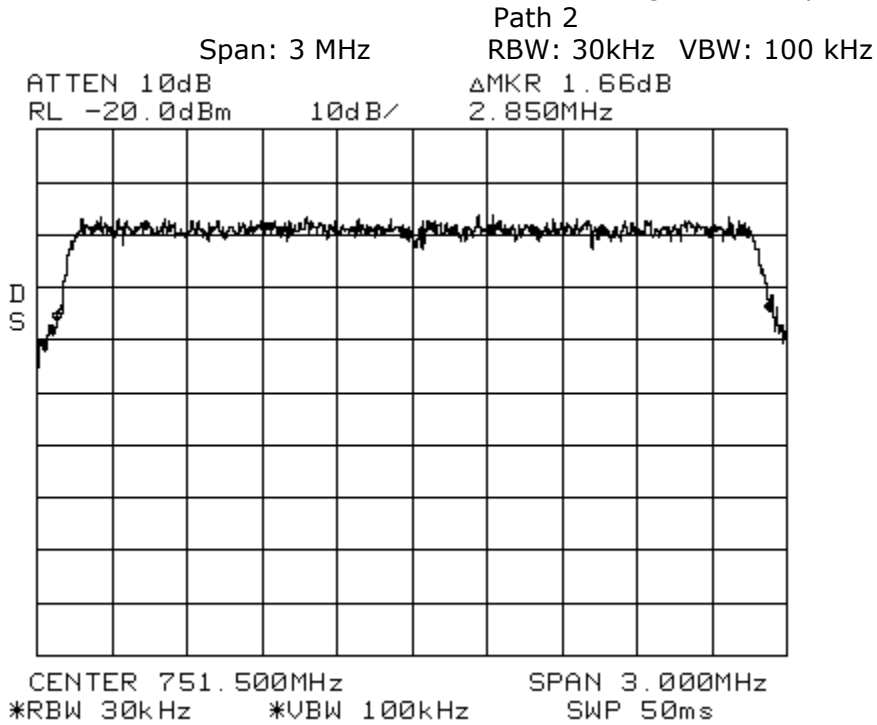
Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C  
Path 2



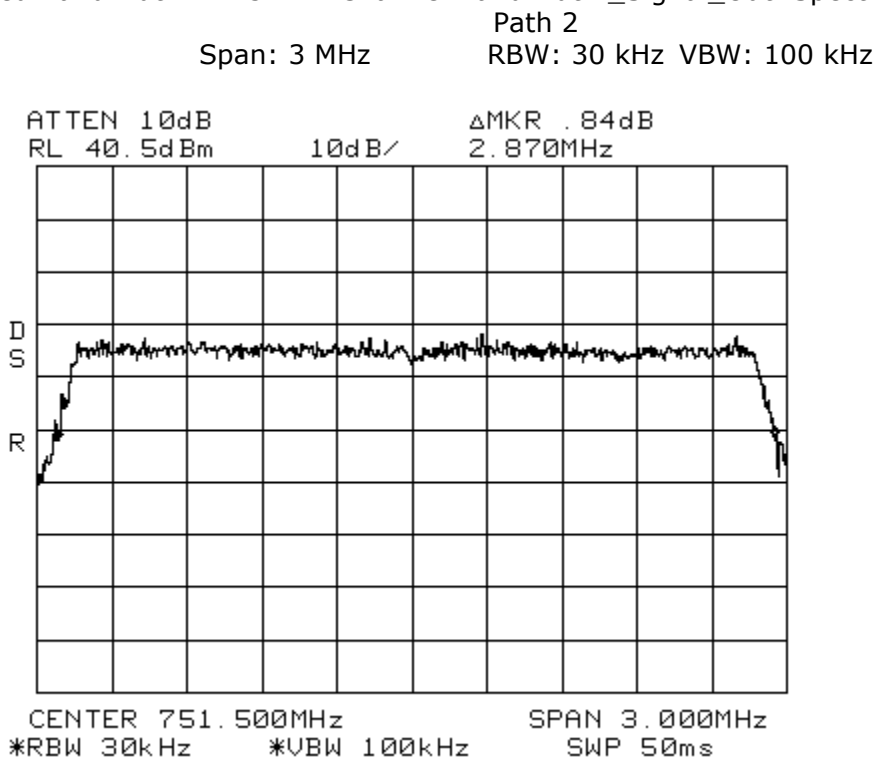
Occupied Bandwidth LTE 1.4 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Upper C  
Path 2



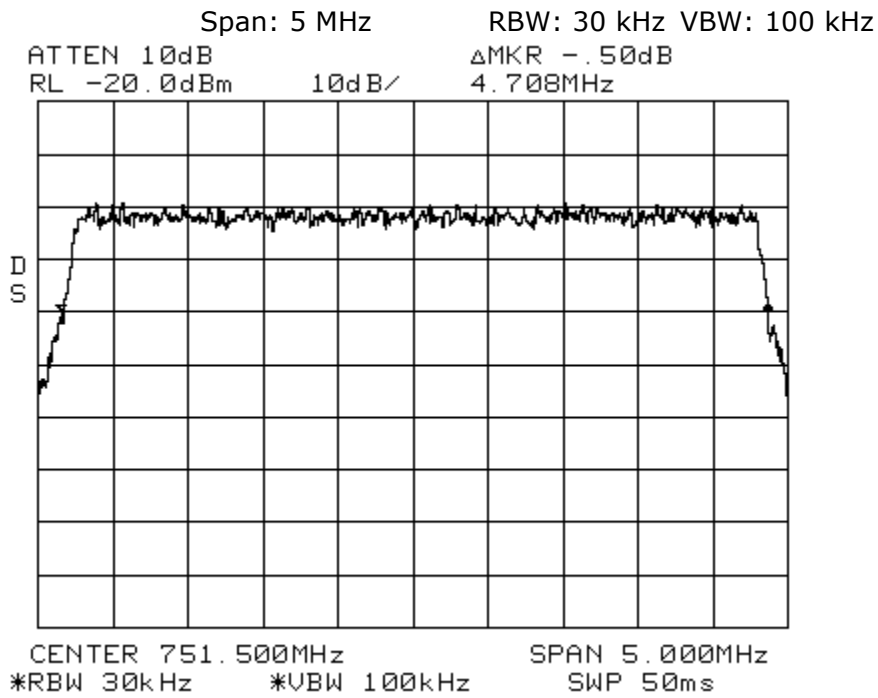
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C



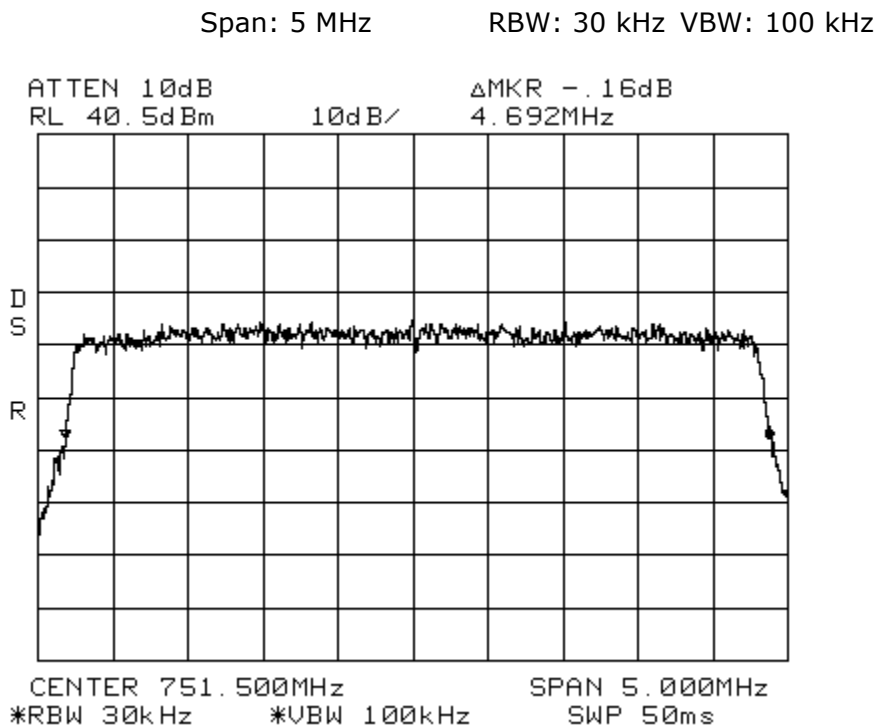
Occupied Bandwidth LTE 3 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Upper C



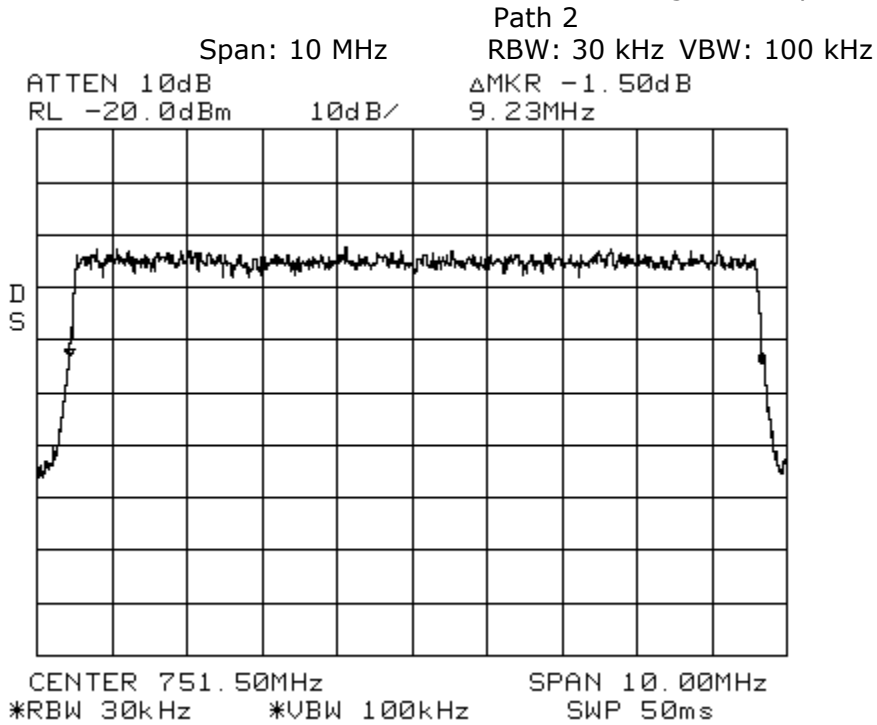
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C Path 2



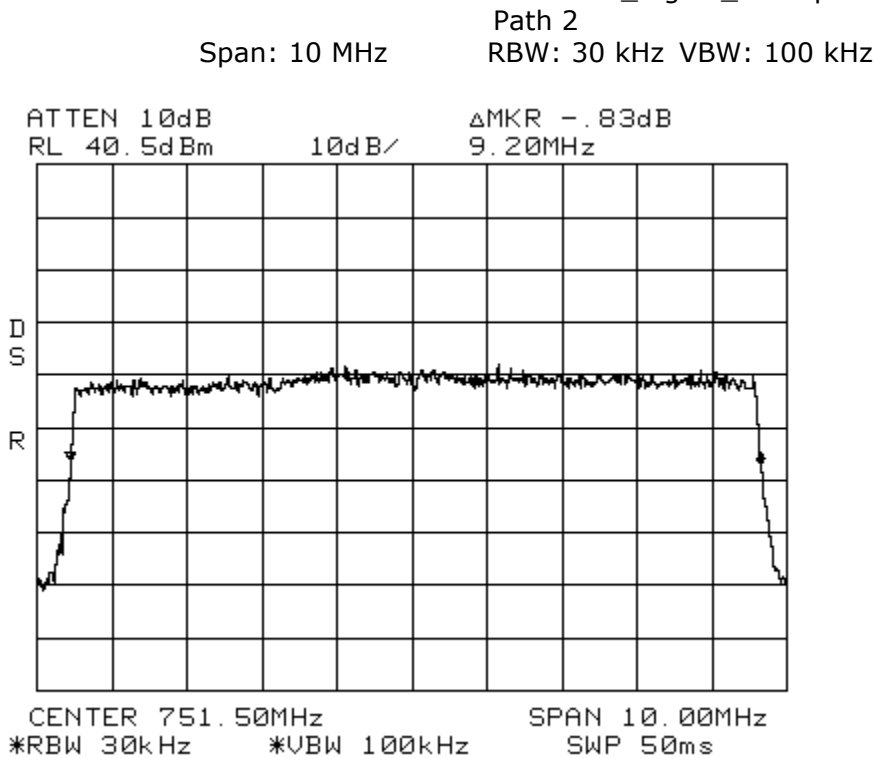
Occupied Bandwidth LTE 5 MHz Channel Bandwidth\_Signal\_Out Spectrum 700 MHz Upper C Path 2



Occupied Bandwidth LTE 10 MHz Channel Bandwidth\_Signal\_In Spectrum 700 MHz Upper C



Occupied Bandwidth LTE 10 MHz Channel Bandwidth \_Signal\_Out Spectrum 700 MHz Upper C



8.0

## **APPENDIX B**

Measurement Protocol

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



# Measurement Protocol

## Environmental conditions of the lab, (ADC)

Temperature: 25° C

Relative Humidity: 29 %

Atmospheric Pressure: 98.0 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)	FINAL (dB/m)	POL/HGT/AZ (m) (deg)	DELTA1
60.80	42.5Qp +	1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

## **Substitution Method**

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

## **Test Equipment**

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

## Radiated Emissions Test Data

[Table of Contents; Section 1.0](#)

Document Name: 100789990MIN-001

**Test Engineer:** Richard Blonigen

**Date:** July 20, 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