# TEST REPORT

## RF FILTER- Manufacturer-2

(ORIGINALLY FILED WITH FCC)

## MEASUREMENT PER SECTION 2.1033 (C) (14) OF THE RULES

**SECTION 2.1033 (c) (14)**

The data required by Section 2.1046 through 2.1057, inclusive, measured in accordance with the procedures set out in Section 2.1041.

**RESPONSE**:

The following pages include the data required for the **AS5BBTRX-03**, measured in accordance with the procedures set out in Section 2. 1033 (c) (14) of the Rules.

Each required measurement and its corresponding exhibit number are:

| | | |
|---|---|---|
| Measurement: 1 | Section 2.1046 | RF Power Output - See Measurement 3 |
| Measurement: 2 | Section 2.1047 | Modulation Characteristics |
| Measurement: 3 | Section 2.1049 | (a) Emissions Bandwidth<br>(b) Occupied Bandwidth |
| Measurement: 4 | Section 2.1051 | Spurious Emissions at Antenna Terminals |
| Measurement: 5 | Section 2.1053 | Field Strength of Spurious Radiation |
| Measurement: 6 | Section 2.1055 | Measurement of Frequency Stability |
| | Section 2.1057 | Frequency Spectrum to be Investigated |

# Measurement 1

## FCC Section 2.1046
## RF Power output

Refer to Measurement 3 Occupied Bandwidth Measurement during that measurement RF Output was continuously monitored.

# Measurement 2

# FCC Section 2.1047
# Modulation Characteristics

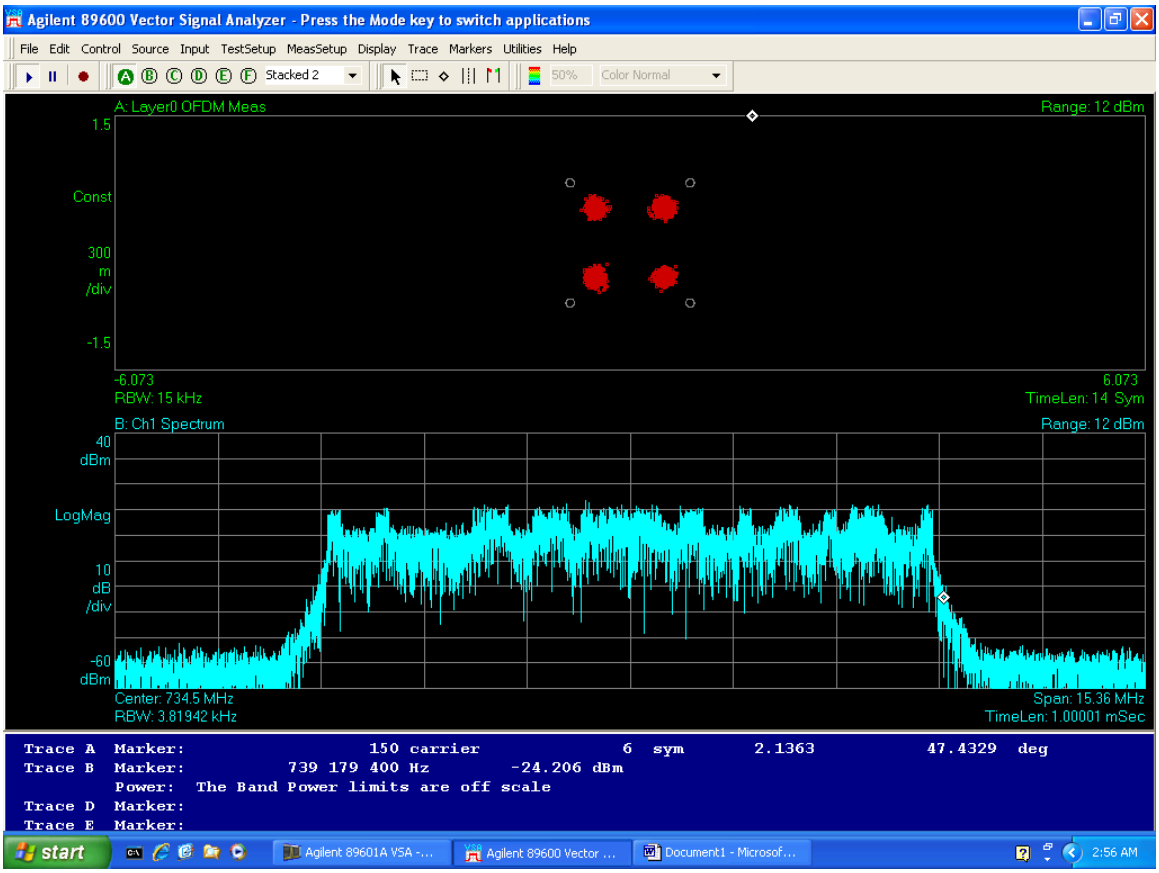
The modulation techniques used are explained in the submission as part section 2.1033 (c) (13). The RF signal at the antenna port was demodulated and verified for correctness of modulation signal used before each test was performed. The attached plot of graphs shows the modulation components: In phase (I) and Quadrature (Q) components.

(1) Quadrature Phase Shift Keying (QPSK) modulation scheme uses 2 bits transmitted simultaneously (one per channel) and a symbol can be represented by 2 bits. Therefore there are $2^2 = 4$ states (Binary 00 to 11). The theoretical bandwidth is 2bits/second/Hz.

(2) 16 Quadrature amplitude modulation (QAM): In 16QAM, there are 16-states. There are four I values and four Q values. Therefore, 4 bits are available to represent a symbol. Therefore there are $2^4 = 16$ states (Binary 0000 to 1111). The theoretical bandwidth is 4bits/second/Hz.

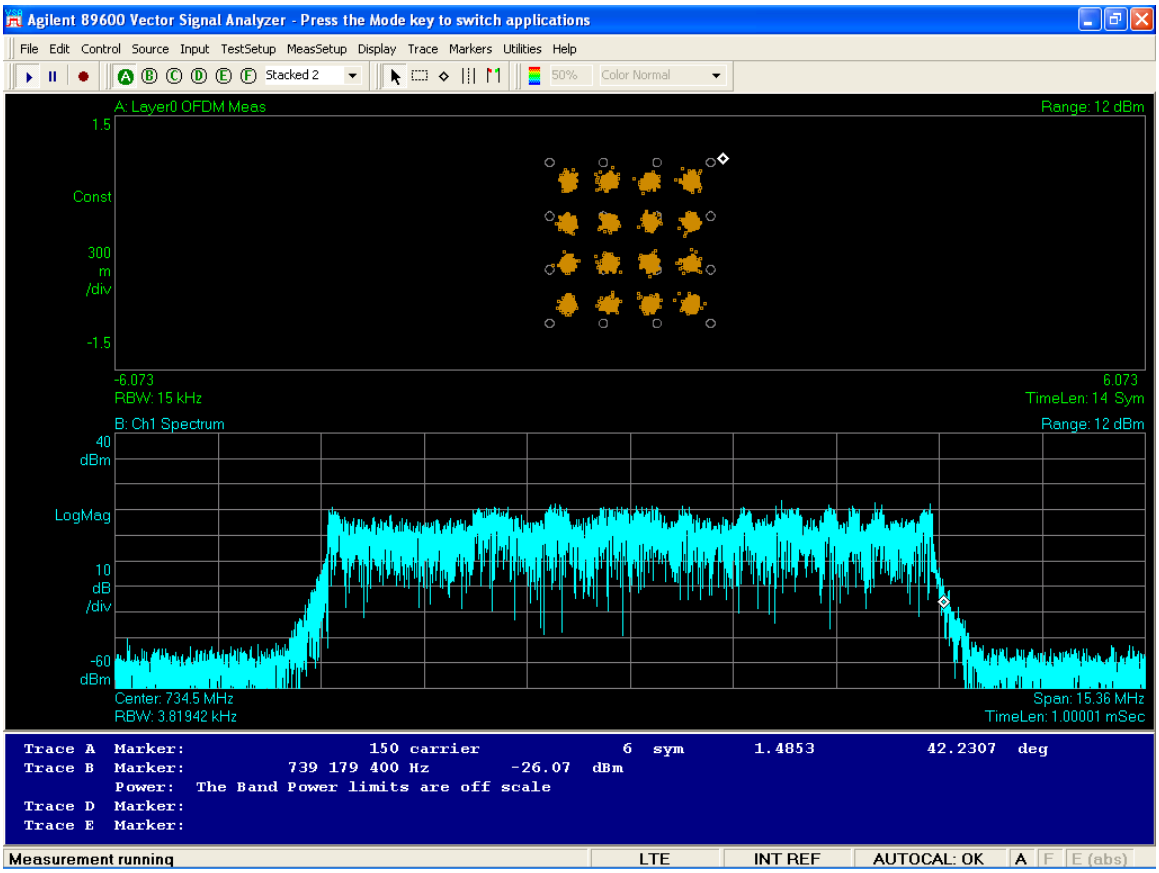
(3) 64 Quadrature amplitude modulation (QAM): In 64QAM: The 64QAM is similar to 16QAM and there will be 64 states and 6 bits are available to represent a symbol.

# QPSK MODULATION



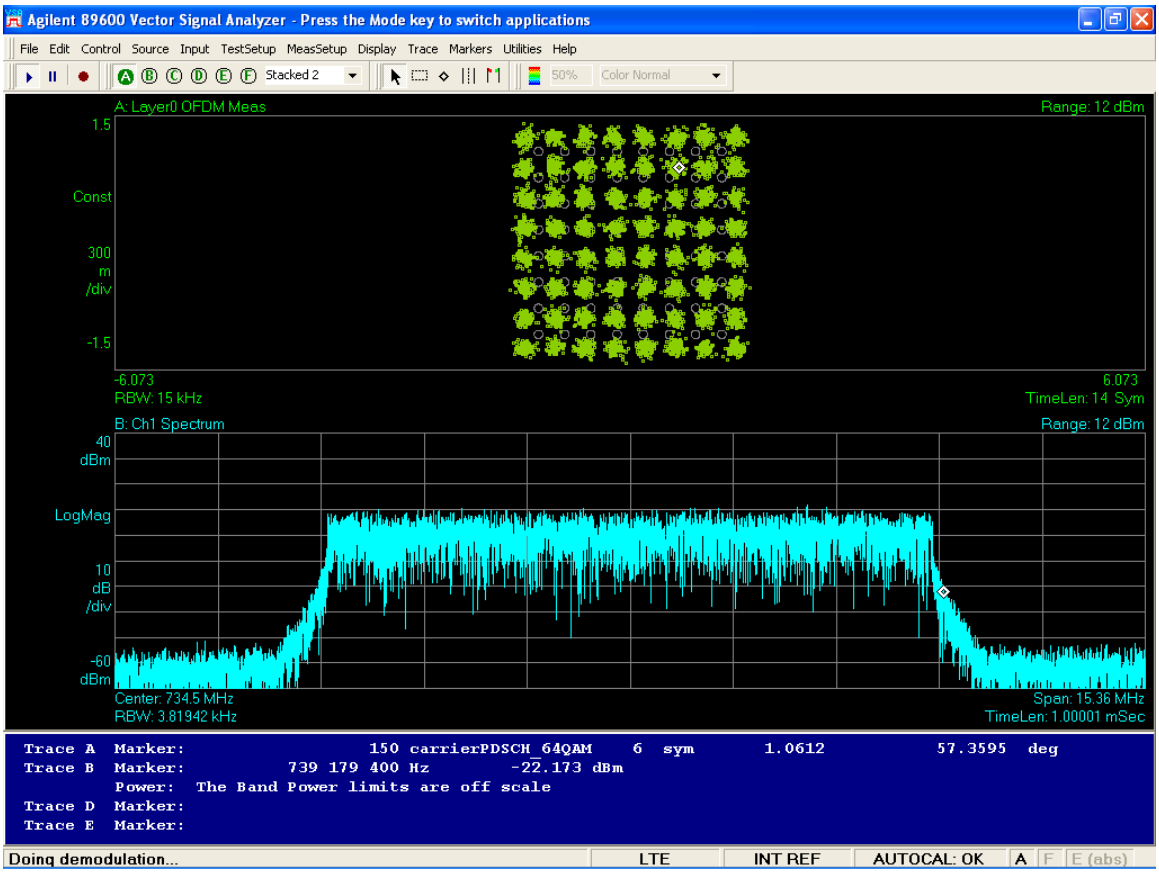

LTE 9442 RRH2x40-P2
FCC Part 27.53 Block A+B; QPSK Modulation; PWR: 40 (2x40W MIMO)
FCCID: AS5BBTRX-03
TEST ENGINEER: SEG

# 16QAM MODULATION




LTE 9442 RRH2x40-P2
FCC Part 27.53 Block A+B; 16QAM Modulation; PWR: 40 (2x40W MIMO)
FCCID: AS5BBTRX-03
TEST ENGINEER: SEG

# 64QAM MODULATION




LTE 9442 RRH2x40-P2
FCC Part 27.53 Block A+B; 64QAM Modulation; PWR: 40 (2x40W MIMO)
FCCID: AS5BBTRX-03
TEST ENGINEER: SEG

# Measurement 3

# FCC Section 2.1049

(a) Emissions Bandwidth Measurement
(b) Occupied Bandwidth Measurement showing spurious Emissions 100 kHz close to Block edges.

# Spectrum Bandwidth Measurement For Emissions Type

**FCC approves two measurement methods for Spectrum Bandwidth.**

(A) 99% Bandwidth
(B) 26 dB Band width.

**Both methods were used to measure the bandwidth at modulations and highest is recorded. The modulations used are:**

1. QPSK
2. 16 QAM
3. 64 QAM

Highest Bandwidth is used for Emissions type designation: 8.95 MHz for 10 MHz Bandwidth, and 4.488 MHz for 5 MHz Bandwidth.
Therefore:
Measured Emission type: **8M95F9W** for 10 MHz Bandwidth.
Measured Emission type: **4M49F9W** for 5 MHz Bandwidth.

# MEASUREMENT OF OCCUPIED BANDWIDTH
# (A) 99% POWER BANDWIDTH

Reviewed By: DDM Date: 8/23/2010

**MEASUREMENT OF**
**OCCUPIED BANDWIDTH**
**For Emissions Type**

The emissions bandwidth is not defined in the section 27.53 for 700 MHz bands. The occupied bandwidth of the Long Term Evolution (LTE) **9442 RRH2x40-P2** was measured using the Rohde & Schwarz ESI Spectrum Analyzer/Receiver designed to measure 99% power bandwidth. The measurements were made on blocks A, A+B, B, B+C, and C of the **LTE 9442 RRH2x40-P2** with 5 MHz and 10 MHz bandwidths.

The measurements were made on a "**LTE 9442 RRH2x40-P2"** cabinet in the following modulation configurations:

1. QPSK
2. 16 QAM
3. 64 QAM

This measurement also determines emission type.

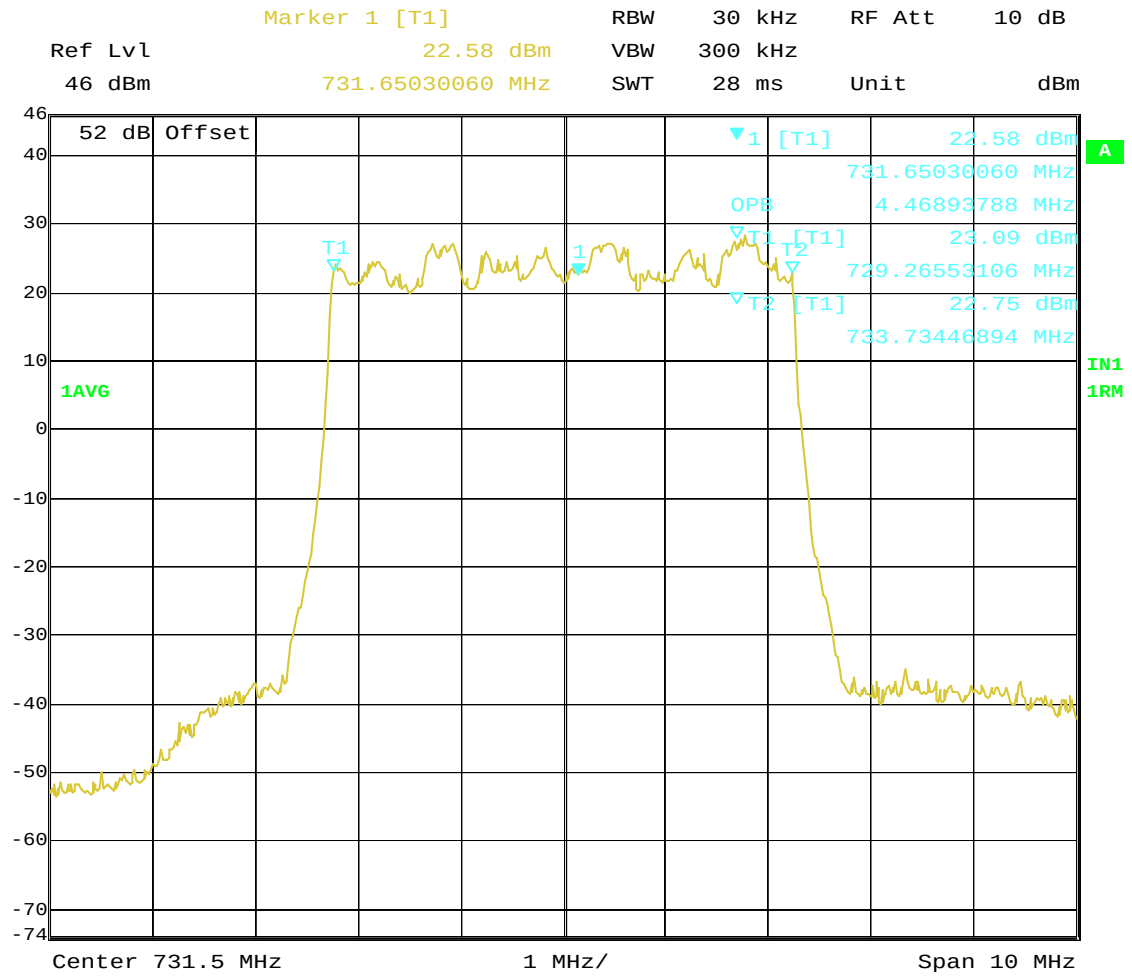
**Results:**
The plots are provided for QPSK, 16QAM and 64QAM modulations of 5 MHz and 10 MHz band of the **LTE 9442 RRH2x40-P2.**
The Measured 99% power bandwidth is 8.95 MHz for 10 MHz band and 4.49 MHz for 5 MHz band.

# Block: A

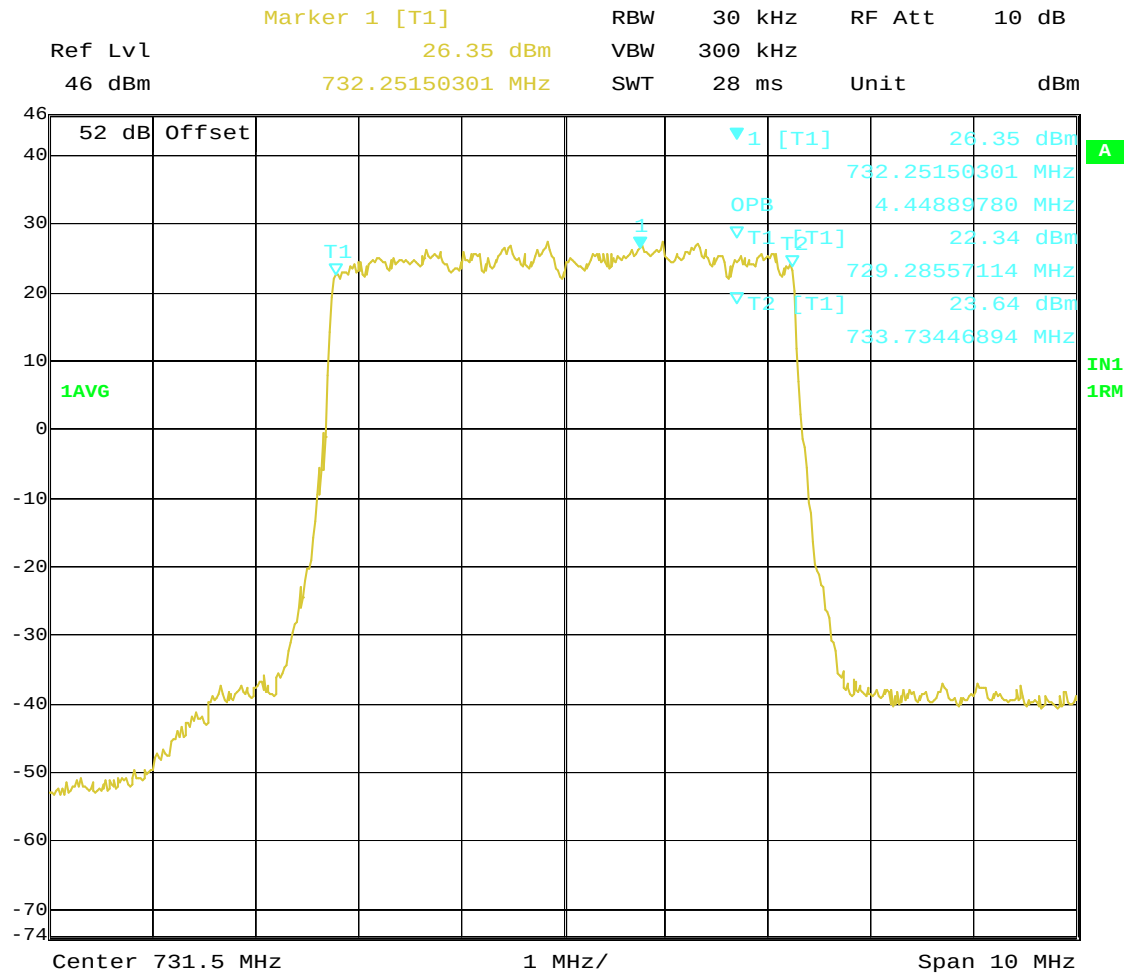
# Channel: 5035

# 5 MHz Bandwidth 729 – 734 MHz

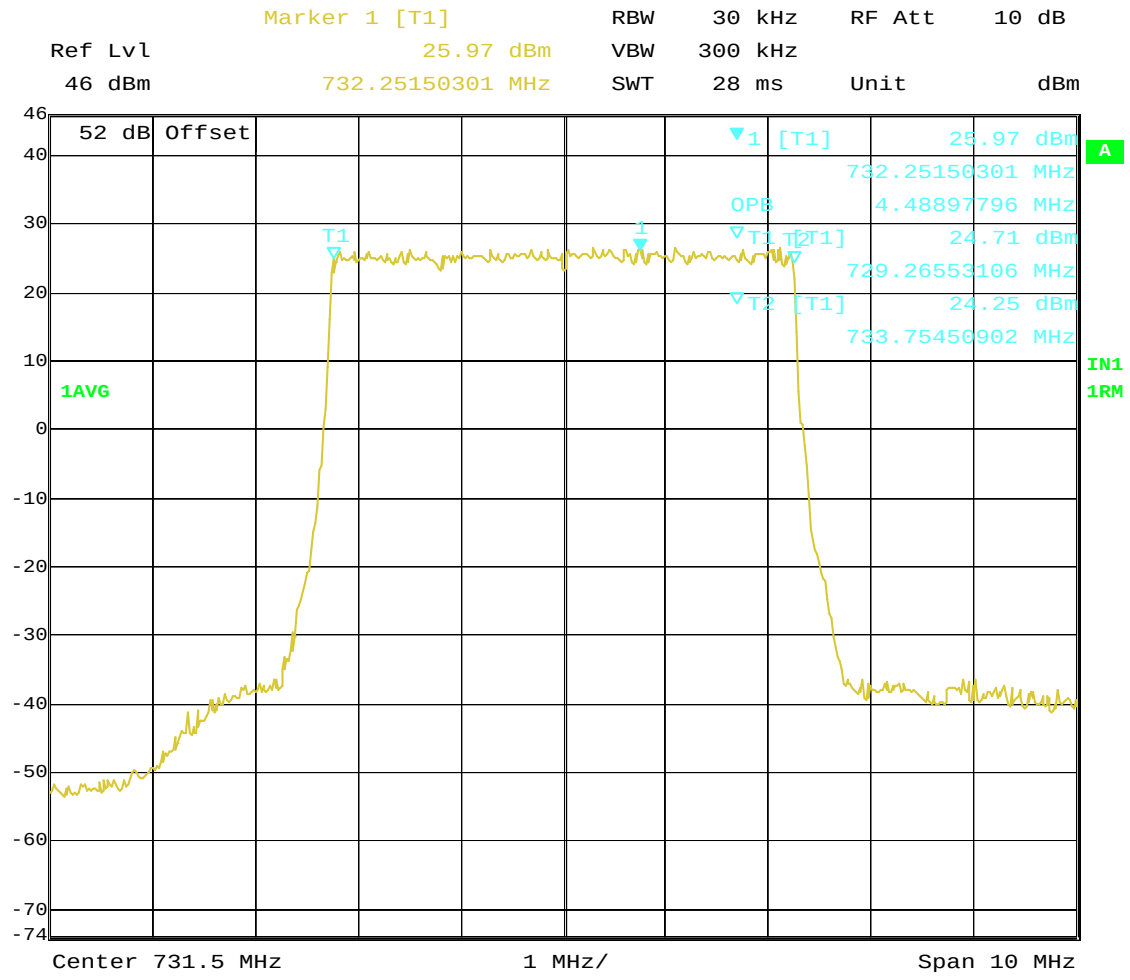
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:35:09




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:10:13



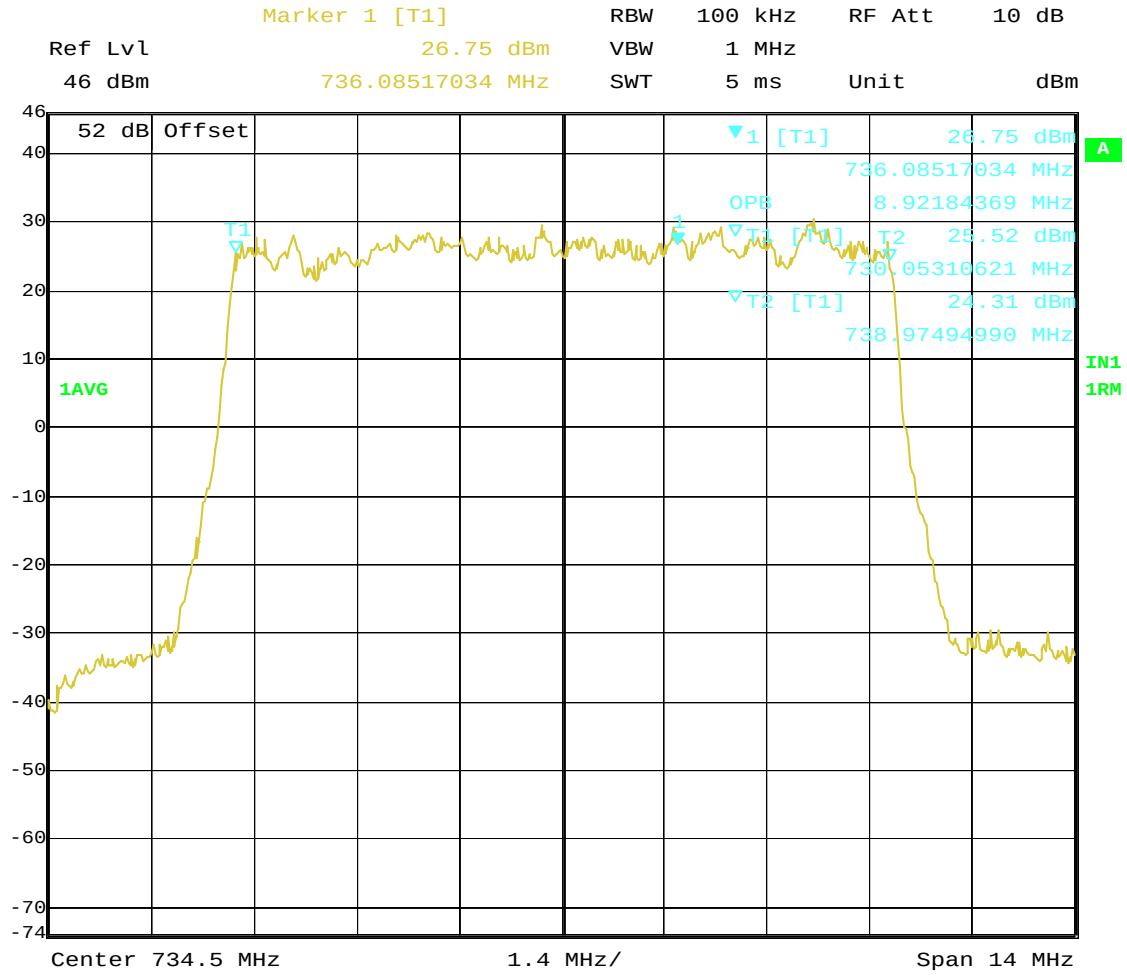

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:24:04

# Block: A+B

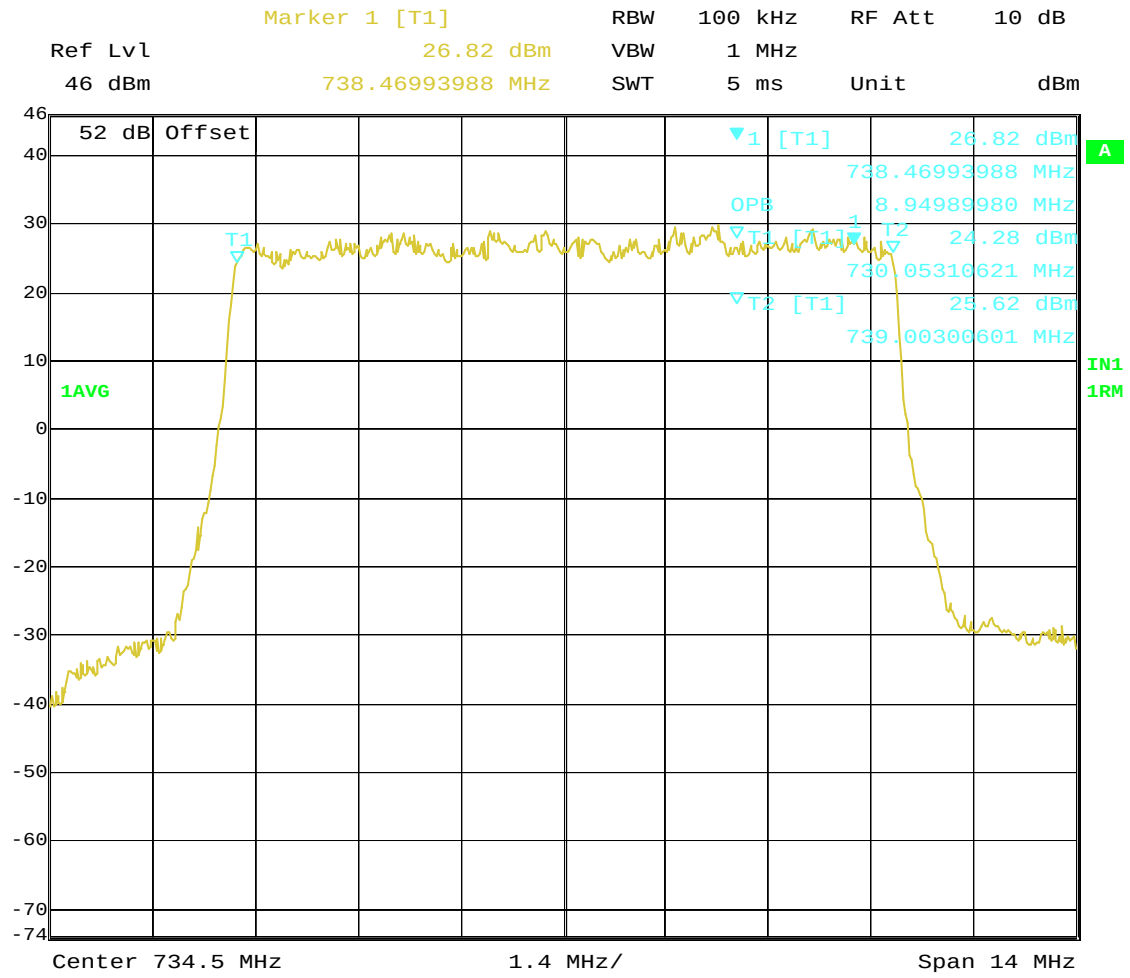
# Channel: 5065

# 10 MHz Bandwidth 729.5 – 739.5 MHz

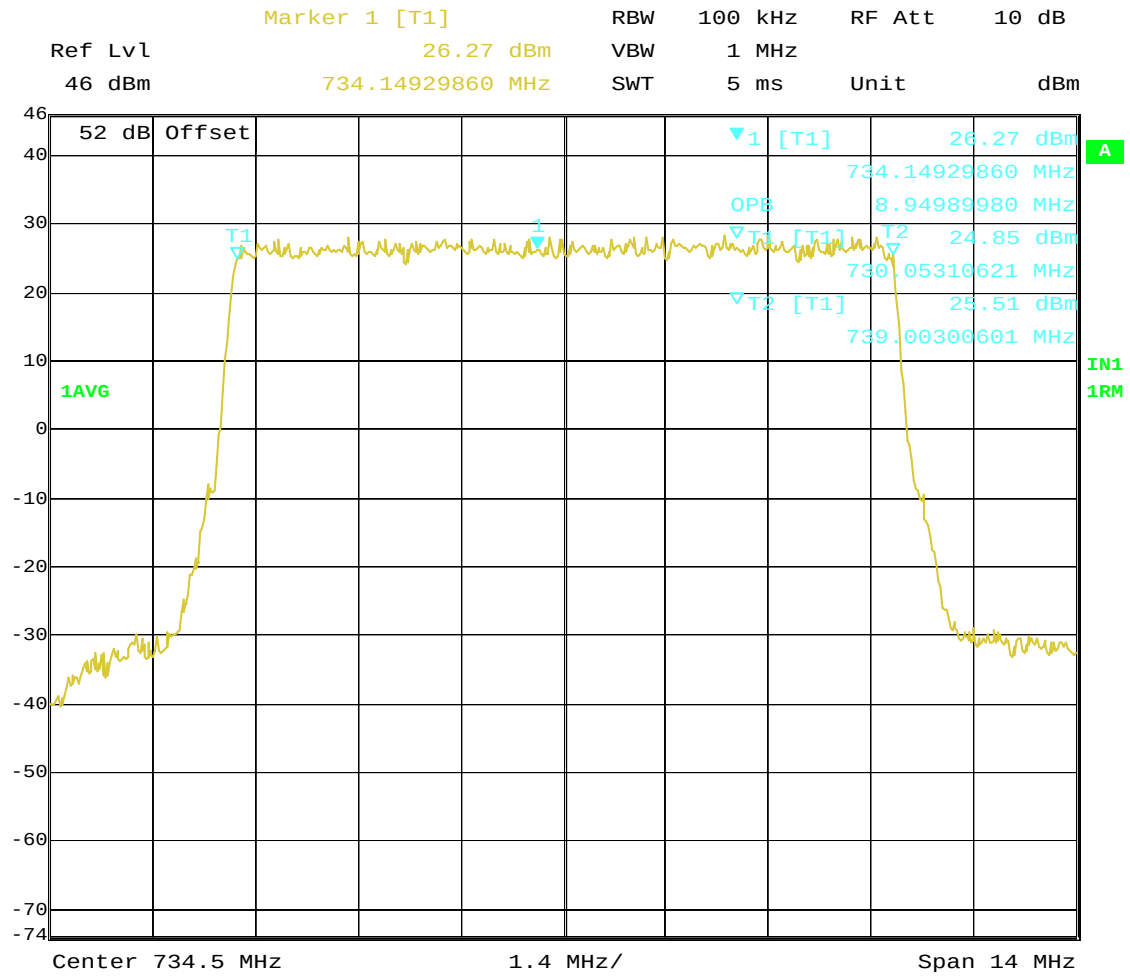
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:06:43




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 09:46:53



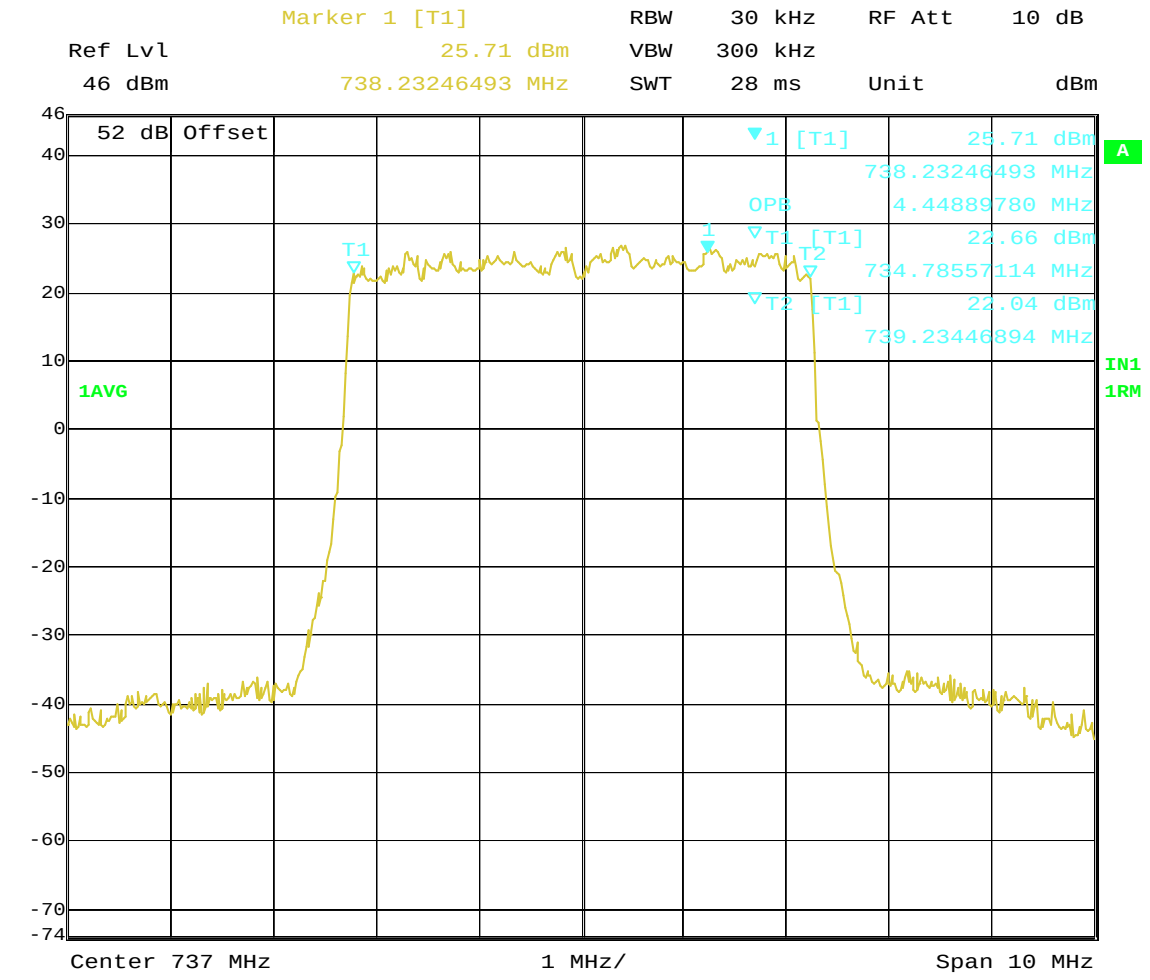

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:18:30

# Block: B

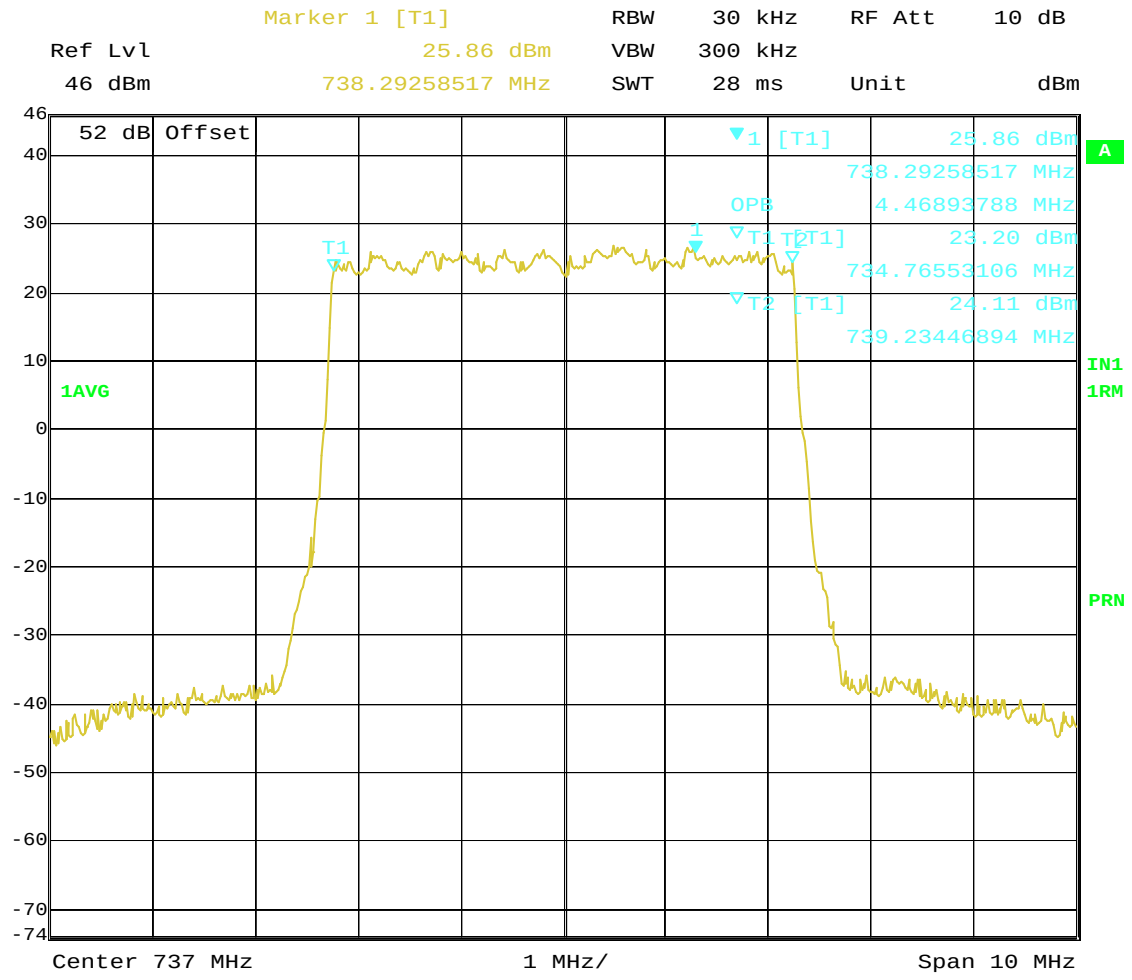
# Channel: 5090

# 5 MHz Bandwidth 734.5 – 739.5 MHz

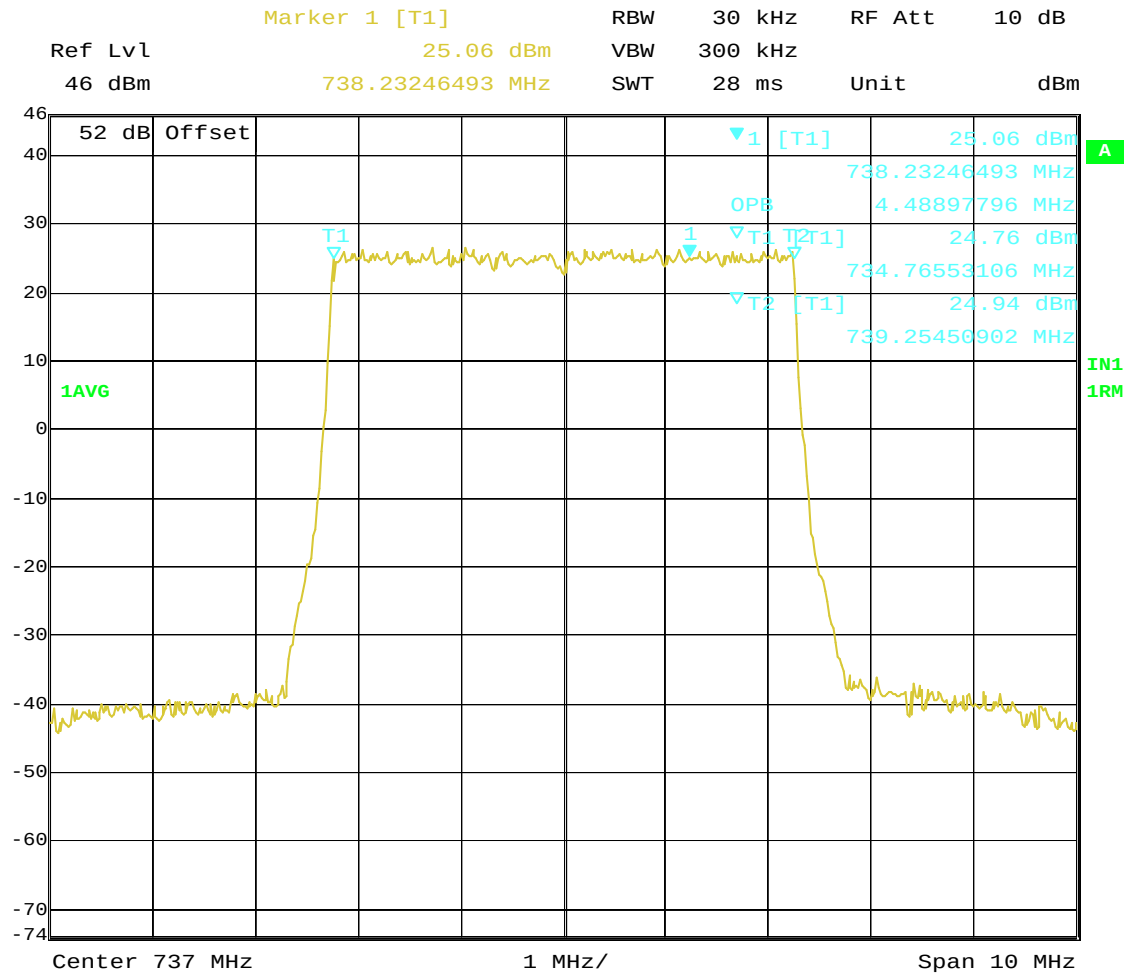
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:01:41




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:23:47



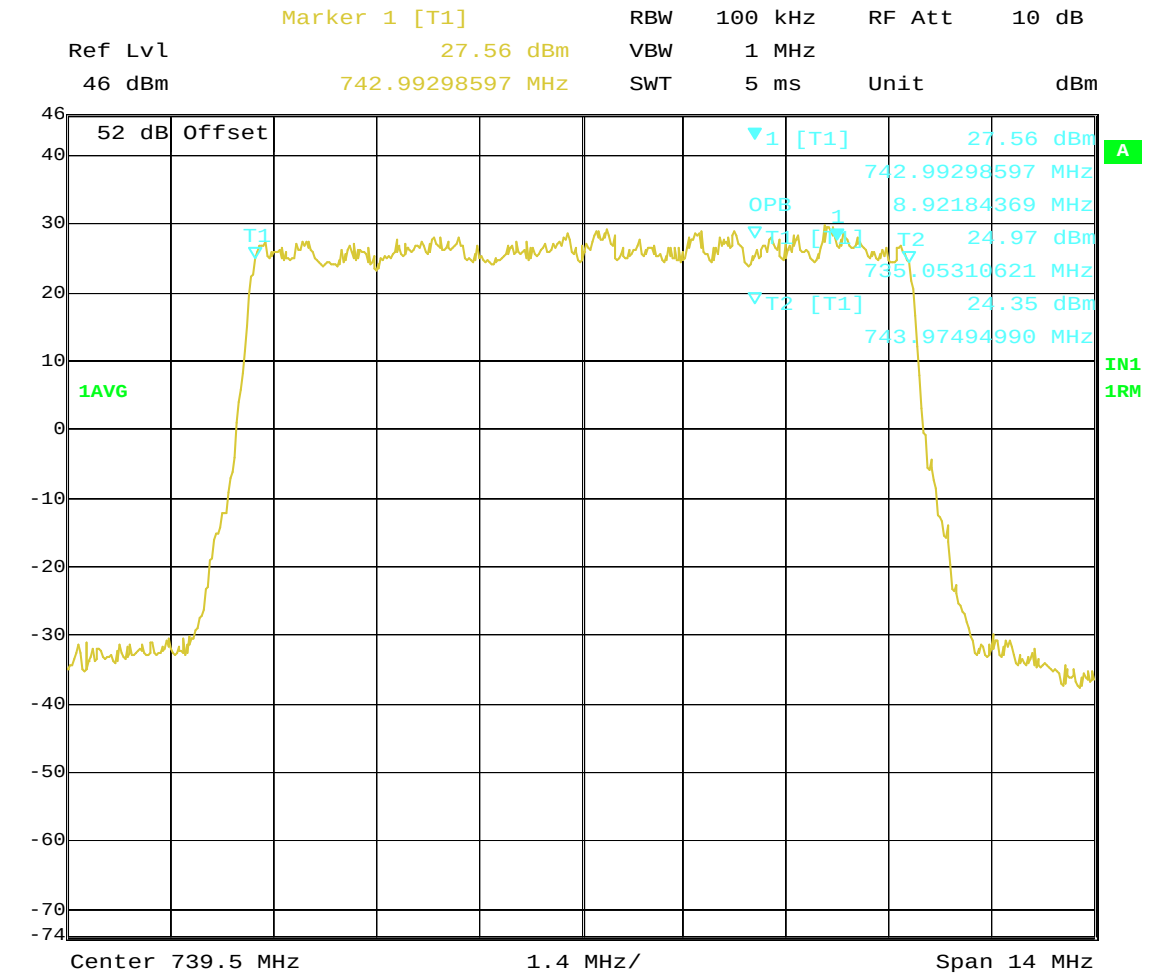

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:16:56

# Block: B+C

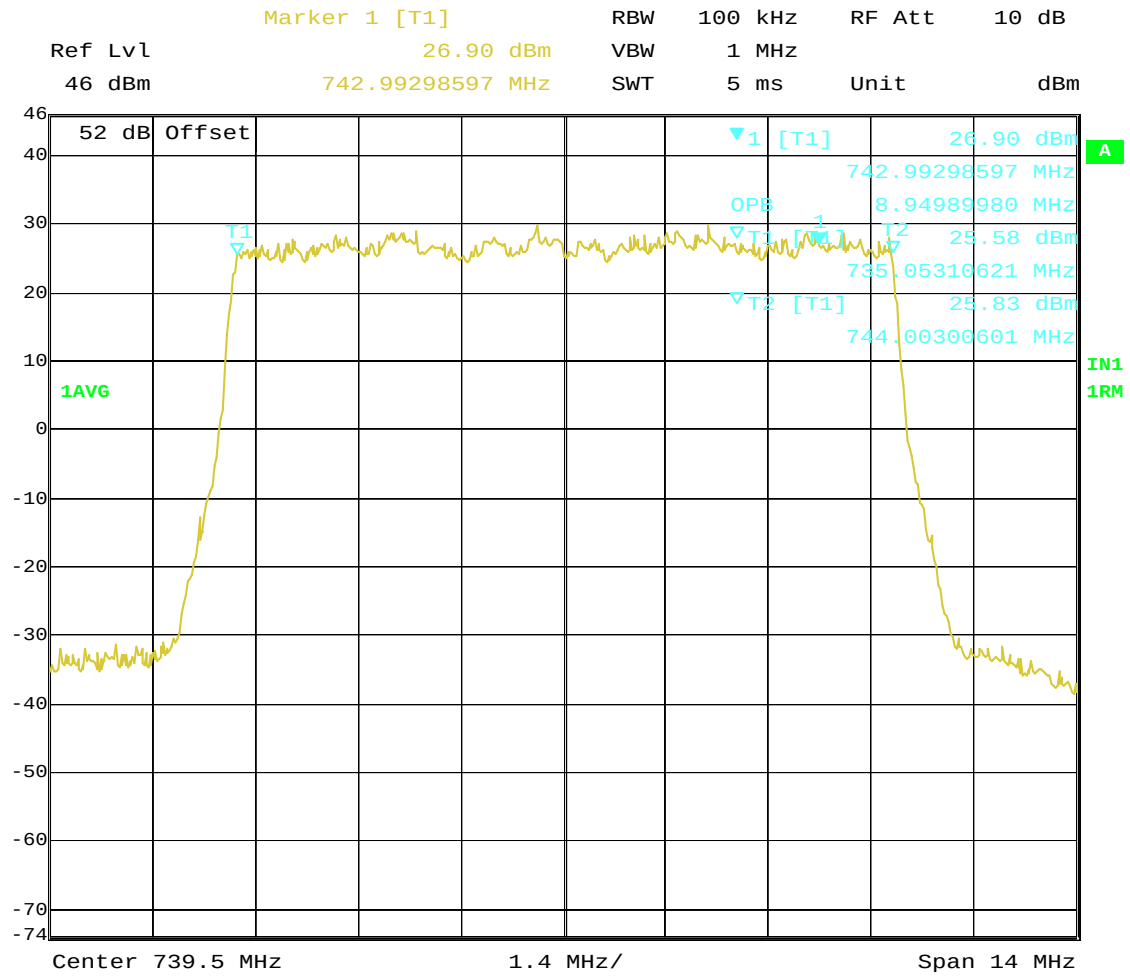
# Channel: 5115

# 10 MHz Bandwidth 734.5 – 744.5 MHz

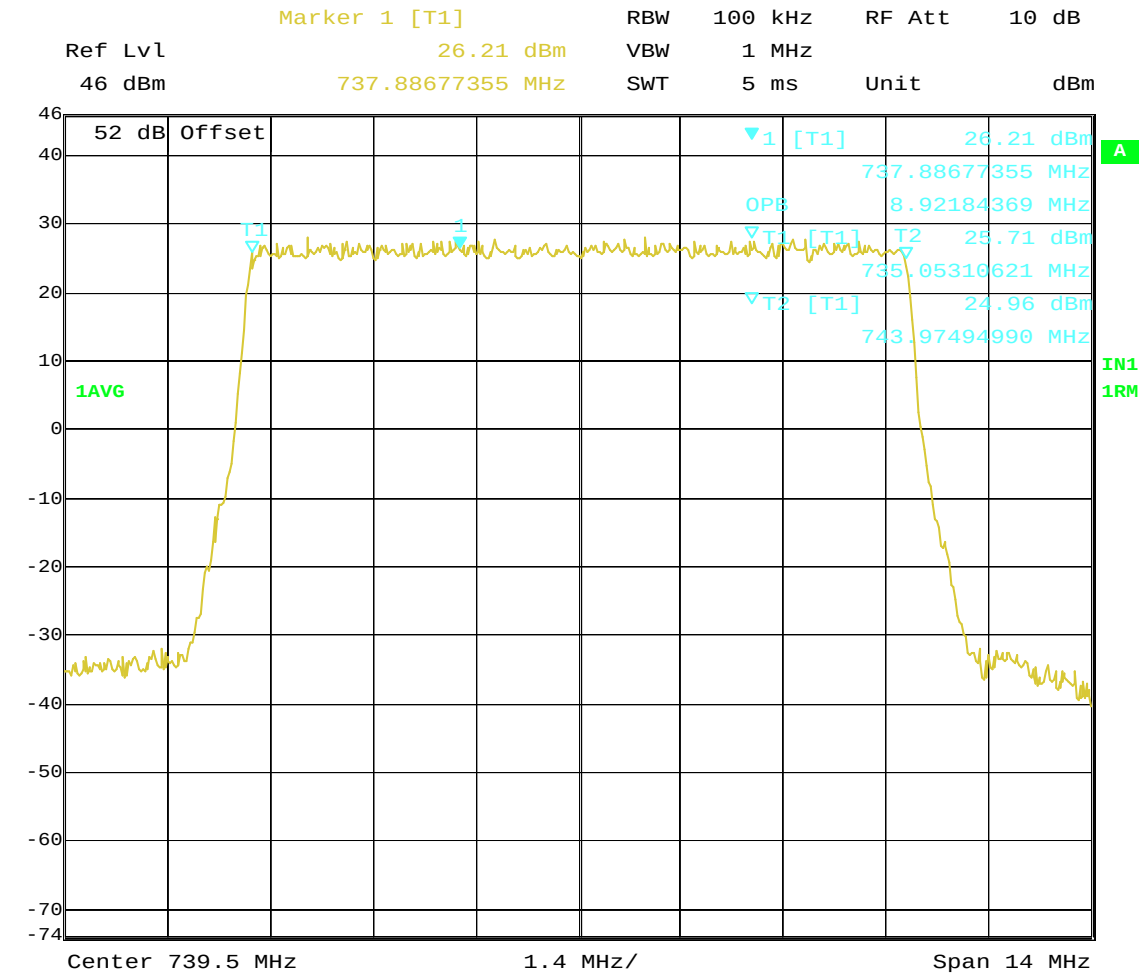
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:18:43




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:27:12



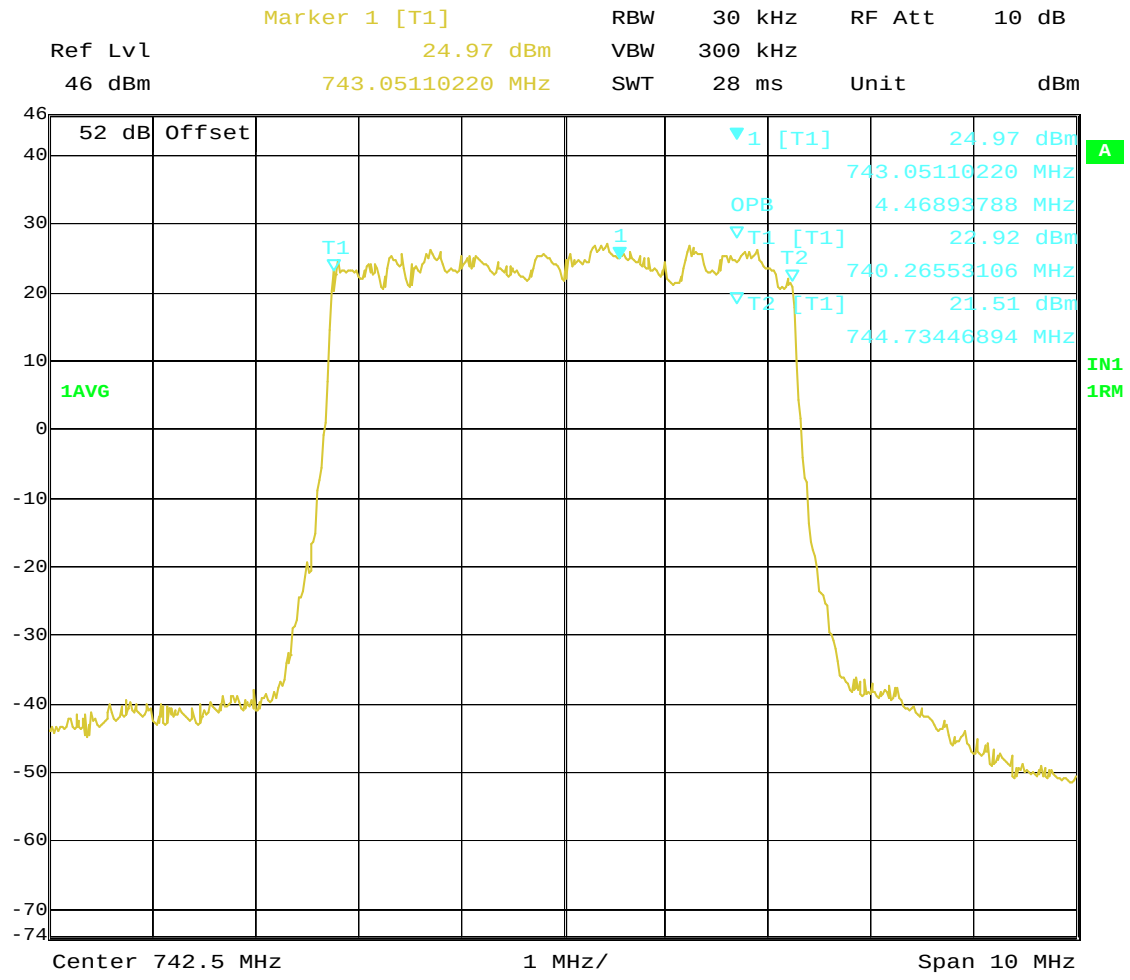

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:03:26

# Block: C

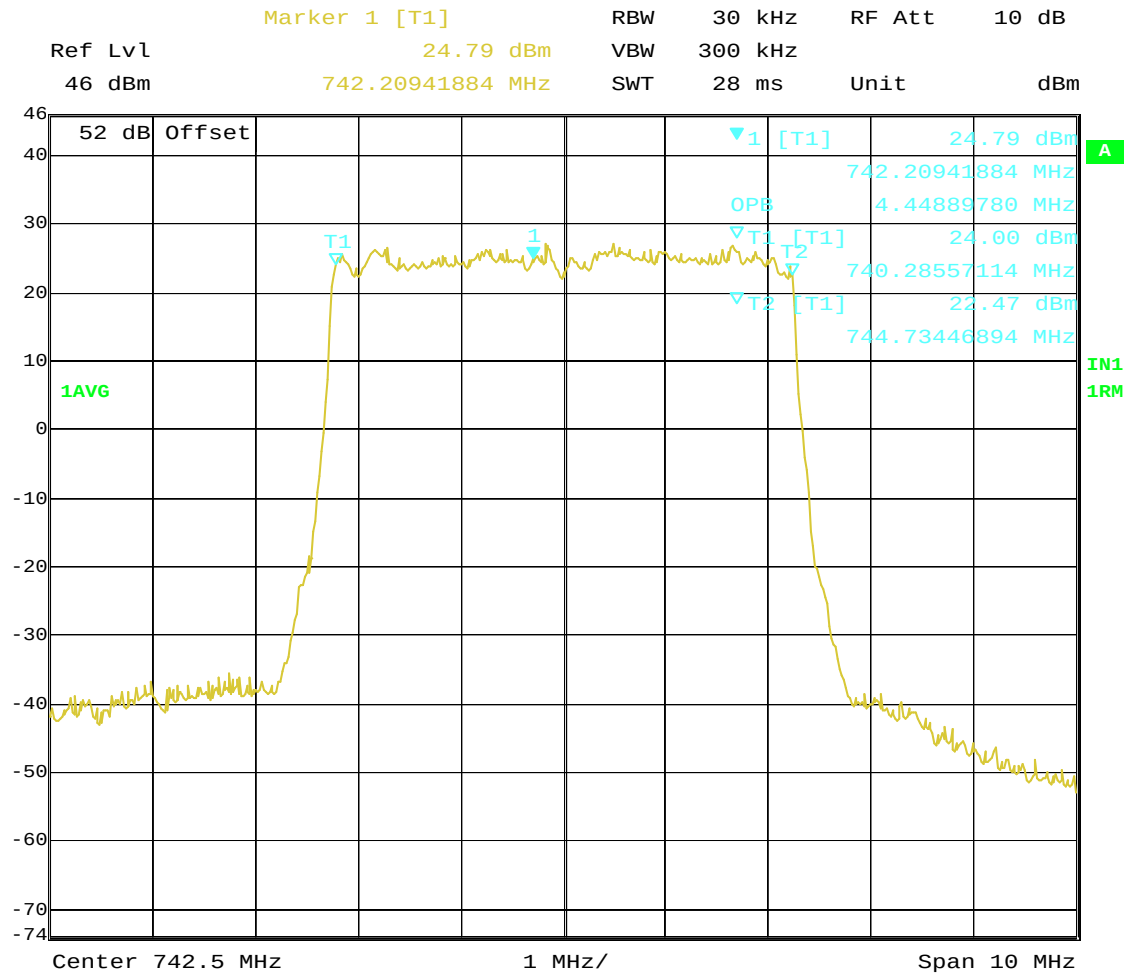
# Channel: 5145

# 5 MHz Bandwidth 740 – 745 MHz

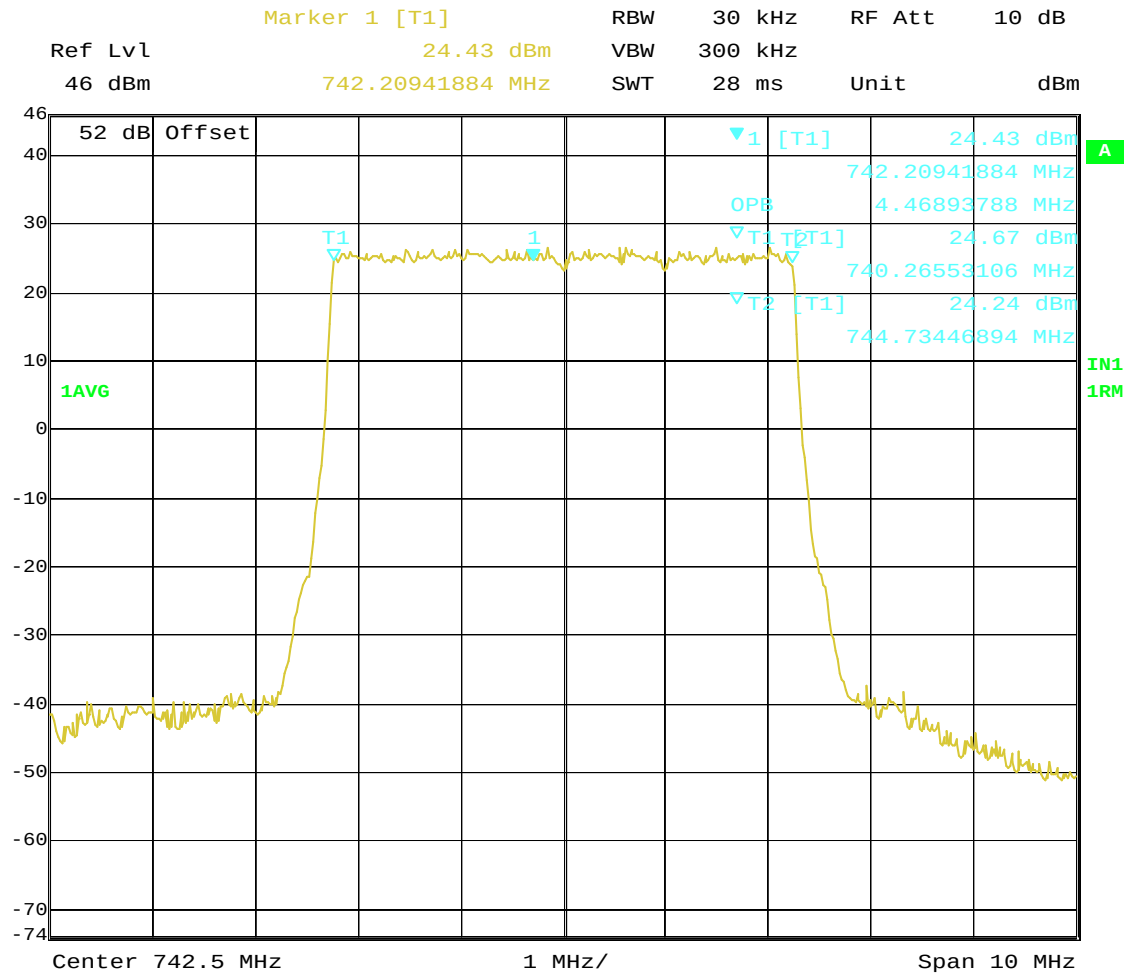
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:59:25




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:32:47




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:41:01

# MEASUREMENT OF SPECTRUM BANDWIDTH
# (B) 26 dB POWER BANDWIDTH

## (b) **MEASUREMENT OF SPECTRUM BANDWIDTH For Emissions Type**

The occupied bandwidth of the Long Term Evolution (LTE) is measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The emissions bandwidth is not provided in the section 27.53 for 700 MHz bands. Therefore emissions band width definition provided in section 27.53 (h) (1) is used. Accordingly "The emissions bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power."

The measurements were made on a "**LTE 9442 RRH2x40-P2"** in the following configurations:
1. QPSK
2. 16 QAM
3. 64 QAM

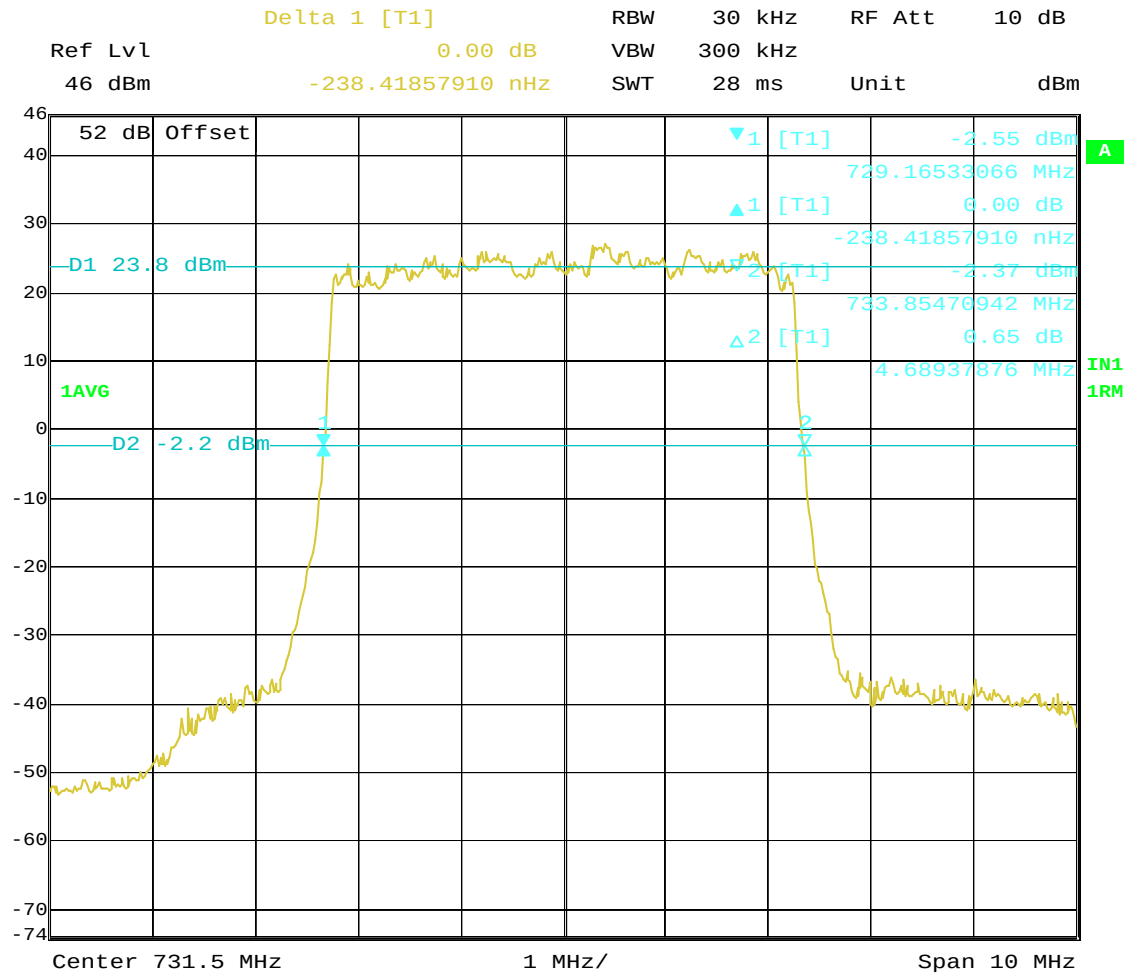
**Results:**
The plots are provided for QPSK, 16QAM and 64QAM modulations for 10 MHz band and 5MHz band.
The Measured 26dB emissions bandwidth is 9.42 MHz for 10 MHz band, and 4.70 MHz for 5 MHz band.

# Block: A

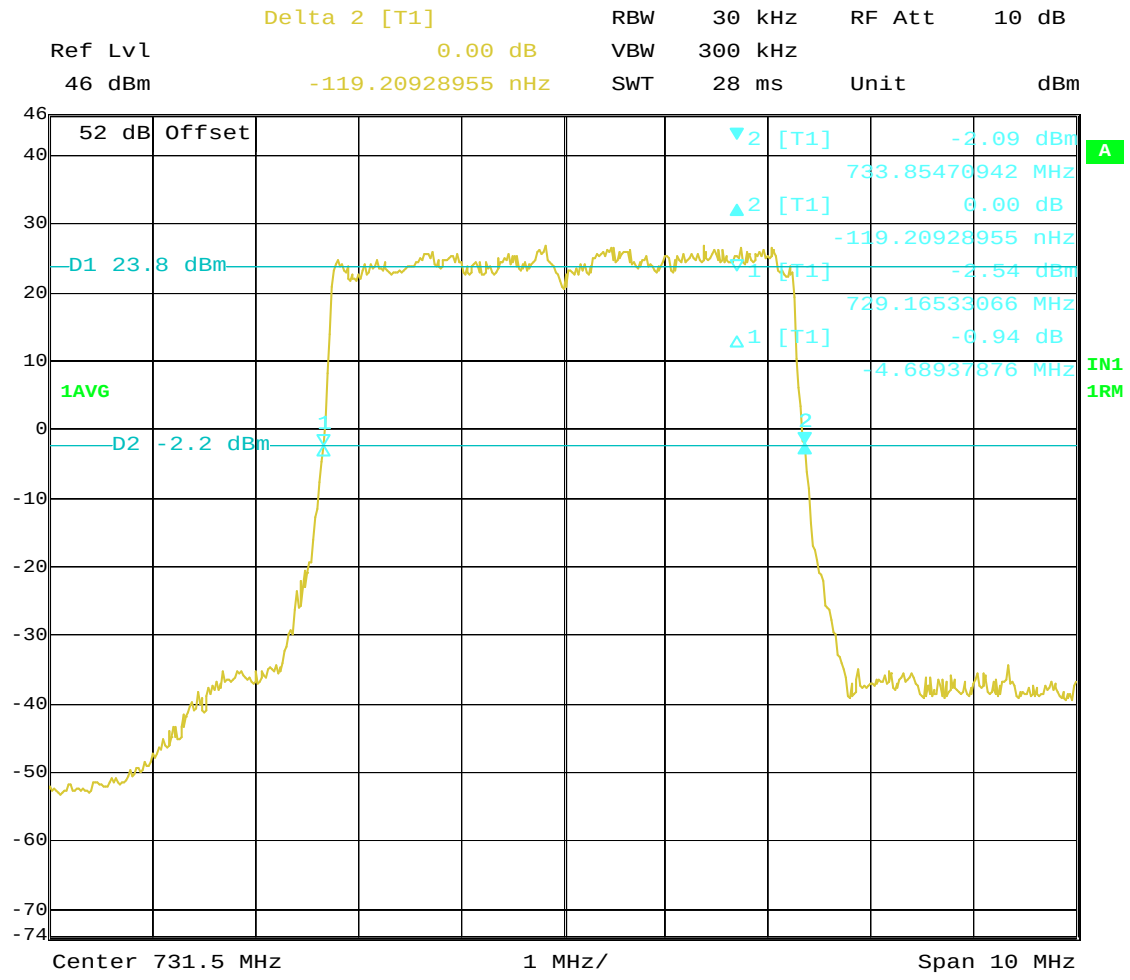
# Channel: 5035

# 5 MHz Bandwidth 729 – 734 MHz

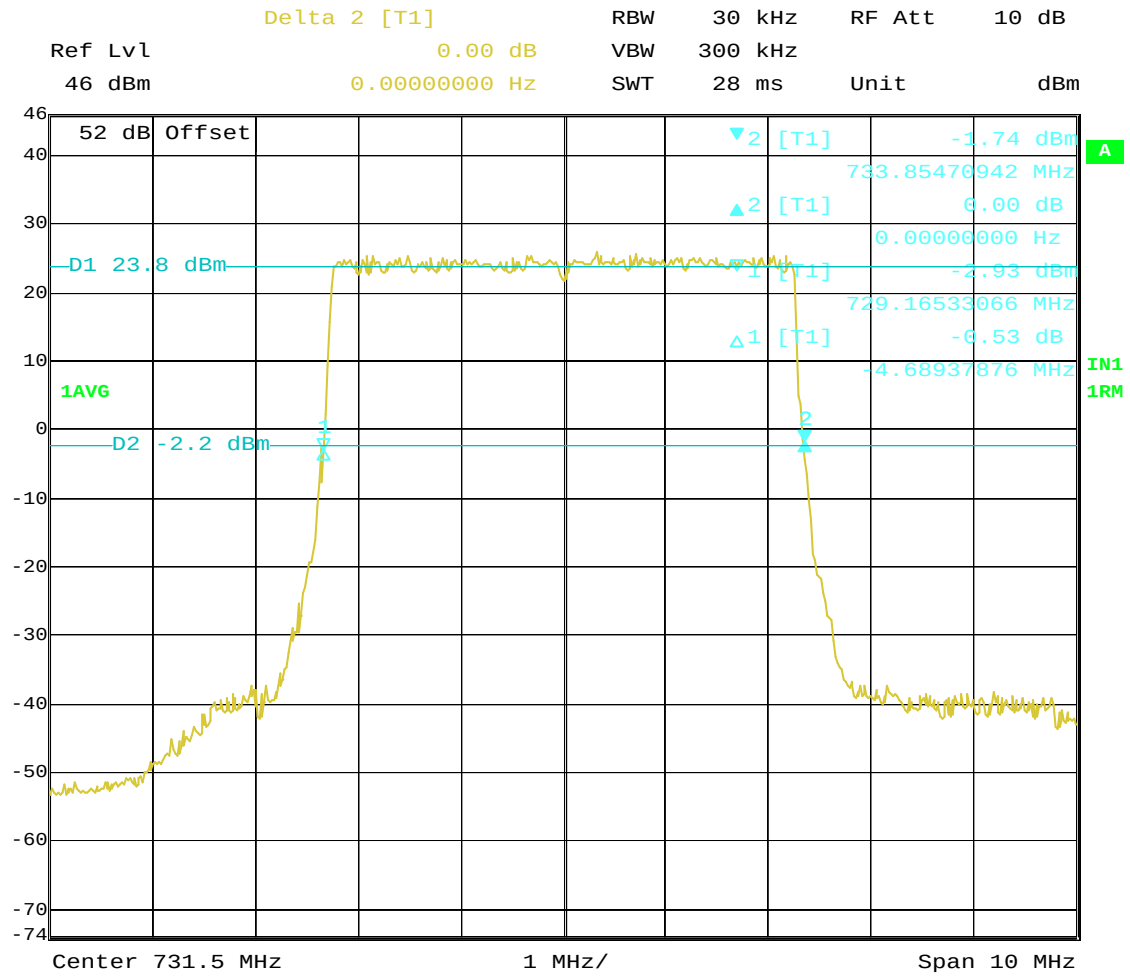
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:39:54




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:08:52



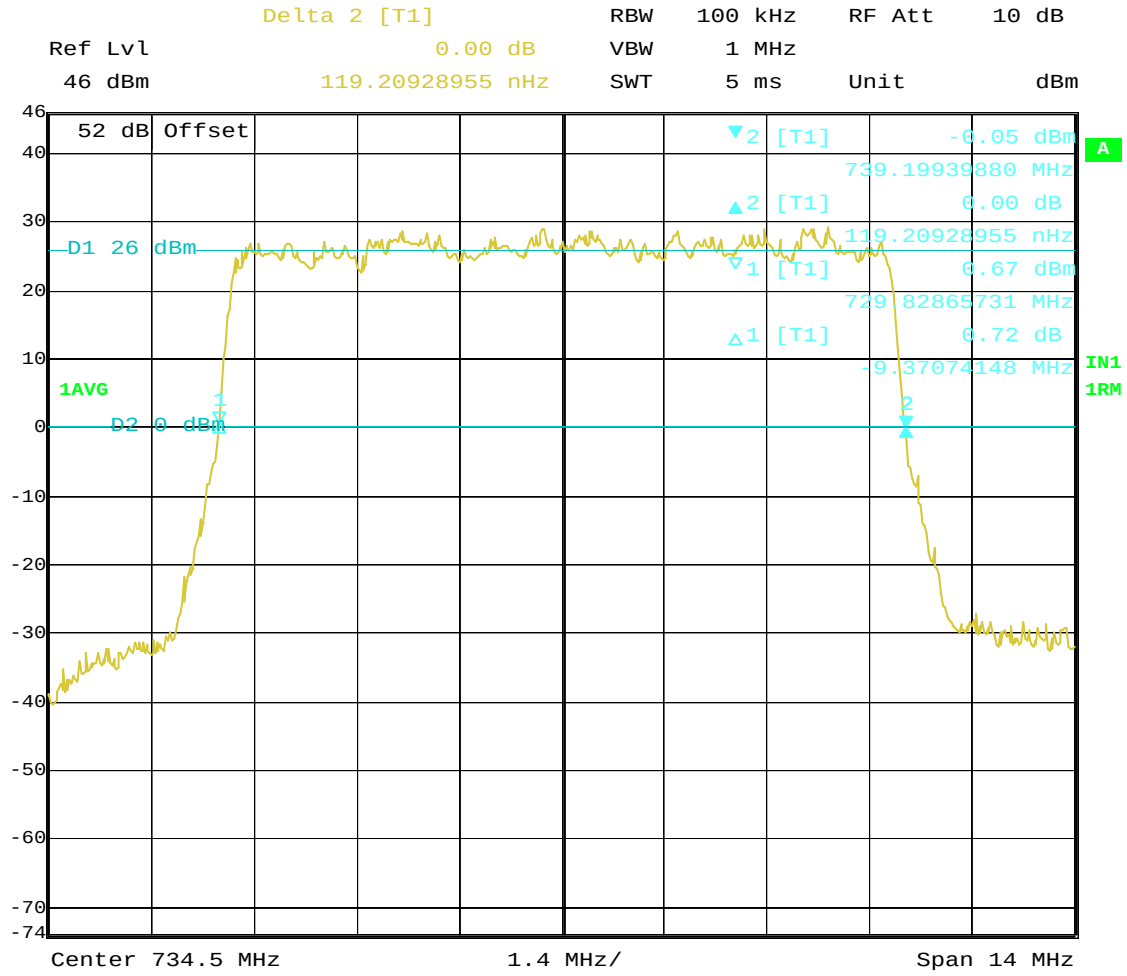

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:32:00

# Block: A+B

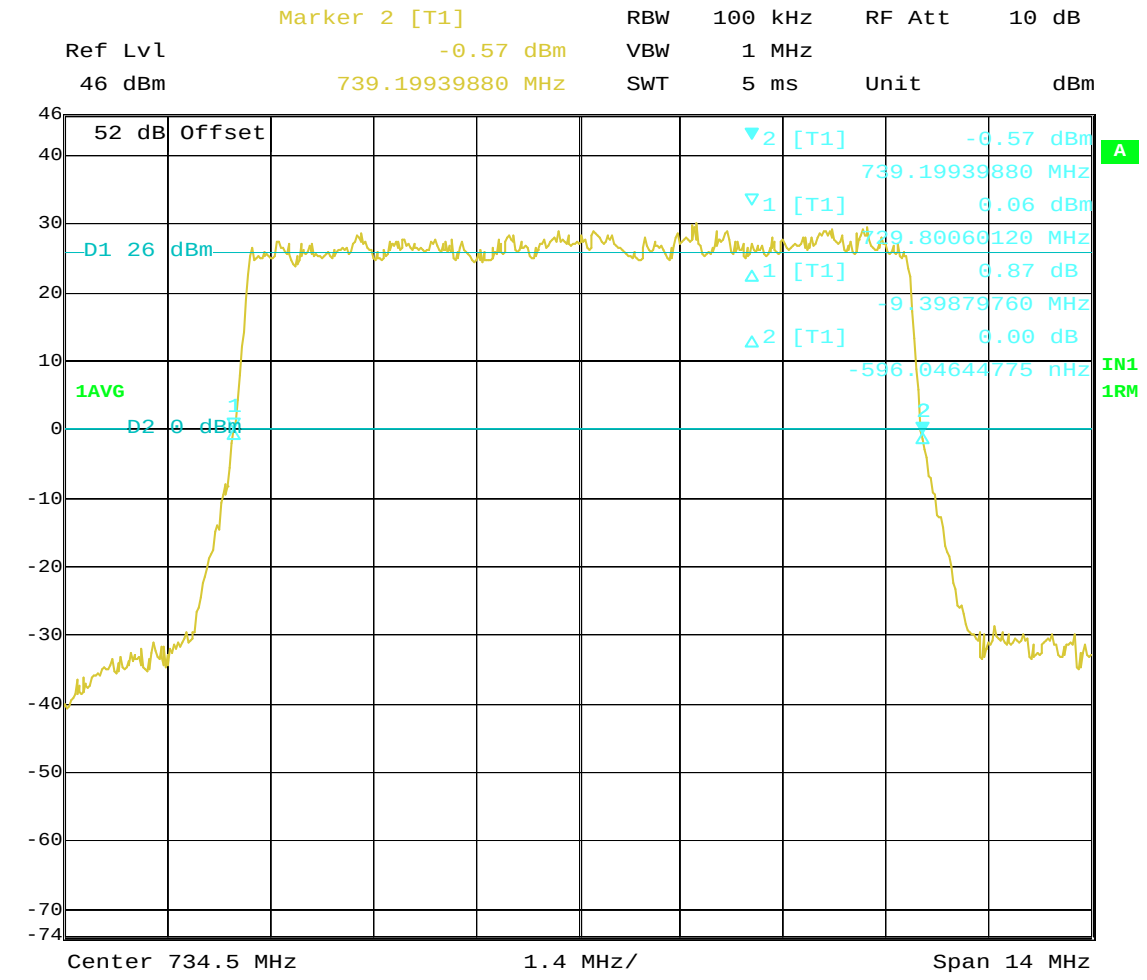
# Channel: 5065

# 10 MHz Bandwidth 729.5 – 739.5 MHz

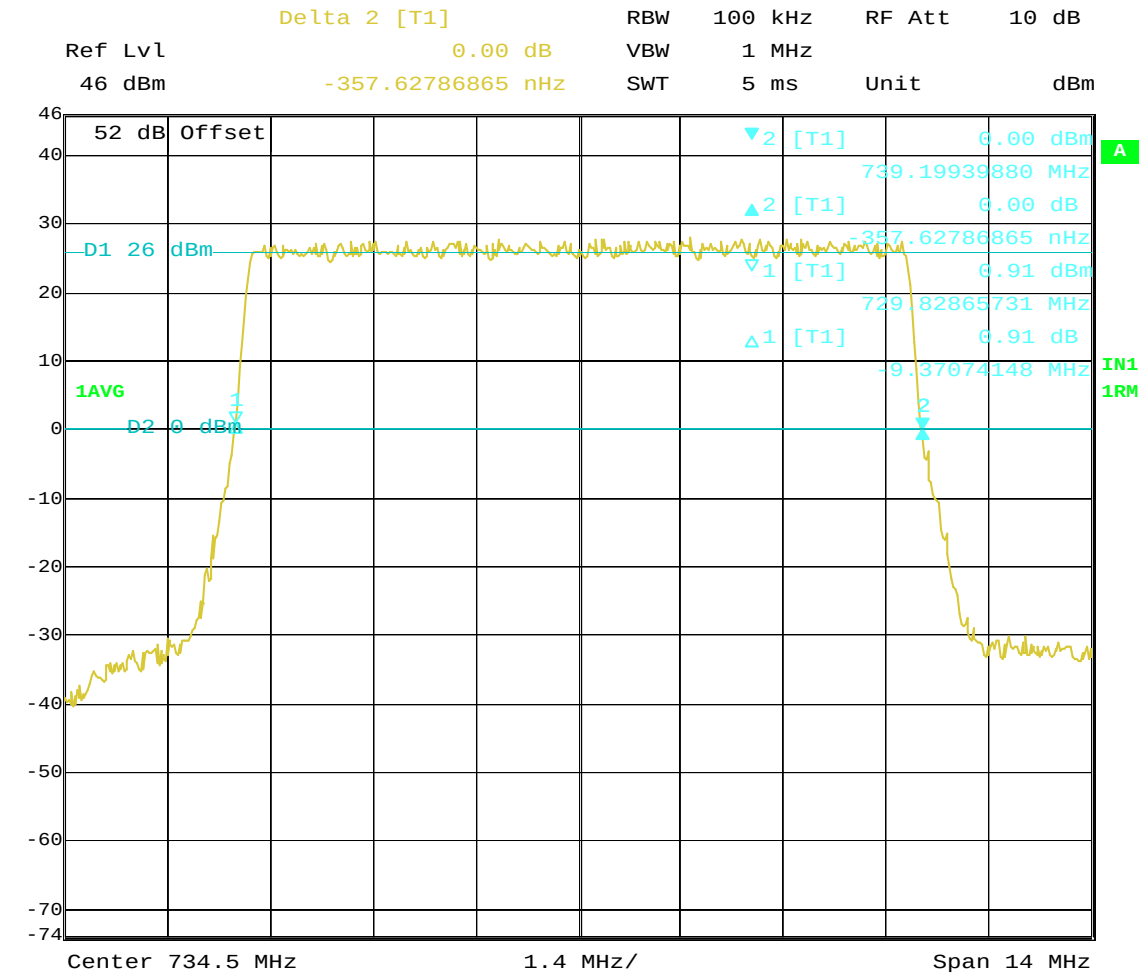
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:09:54




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 09:44:54



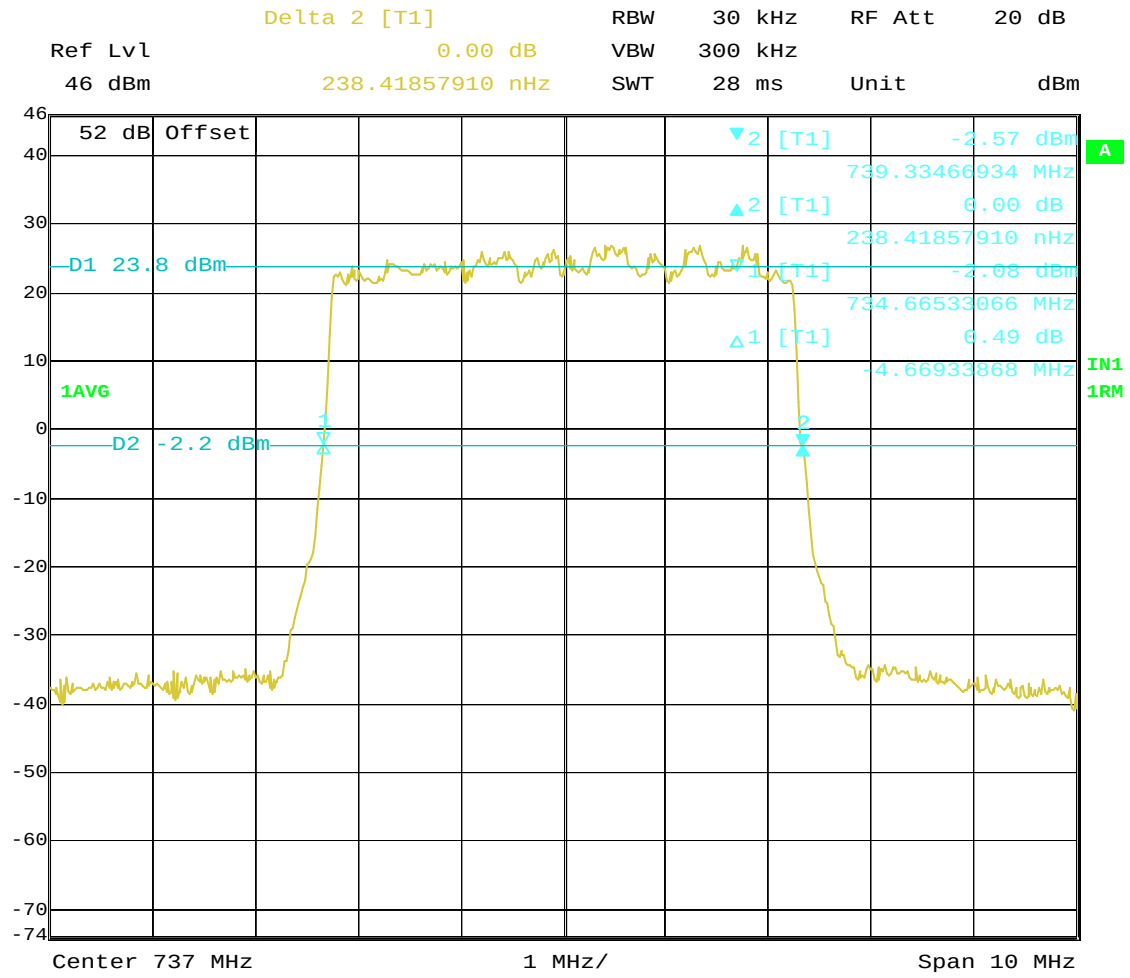

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:21:29

# Block: B

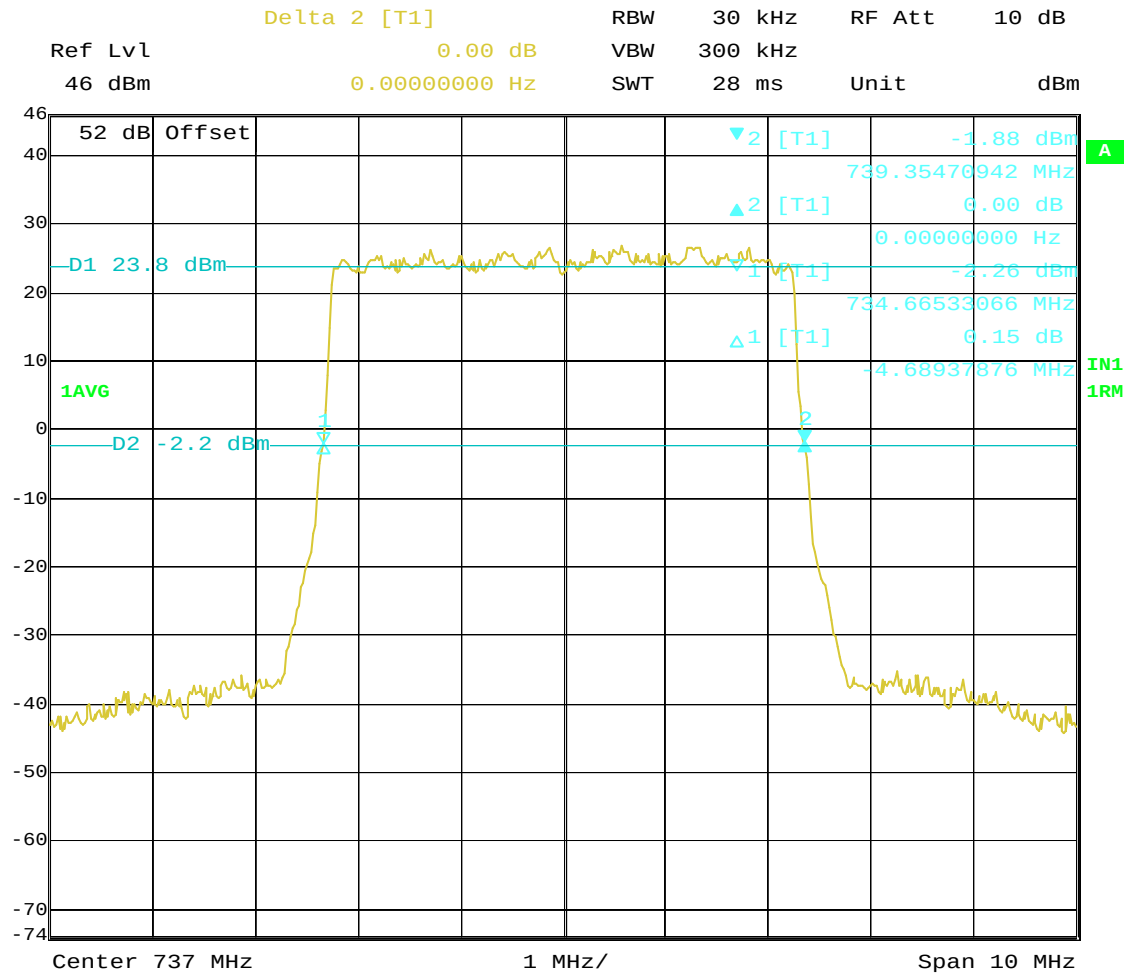
# Channel: 5090

# 5 MHz Bandwidth 734.5 – 739.5 MHz

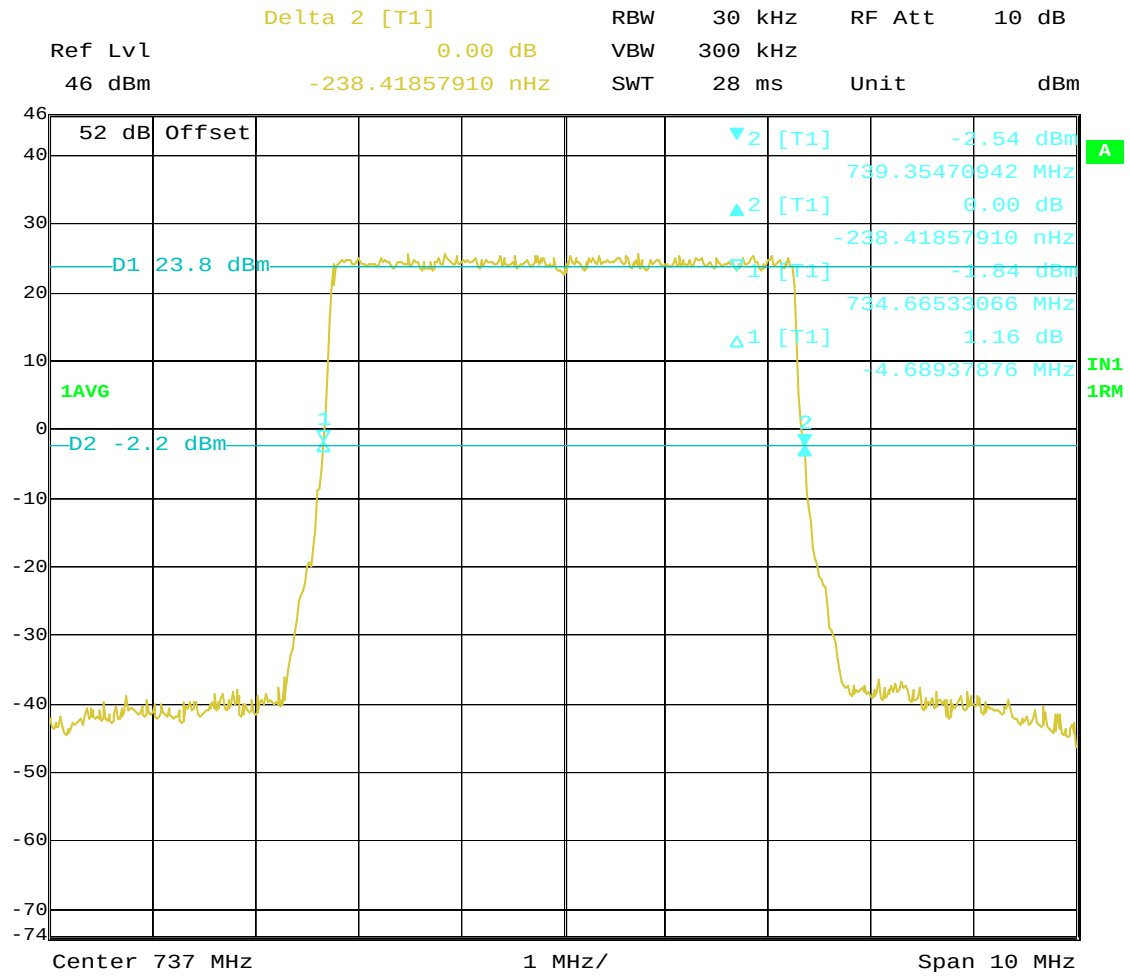
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:03:30




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:27:35



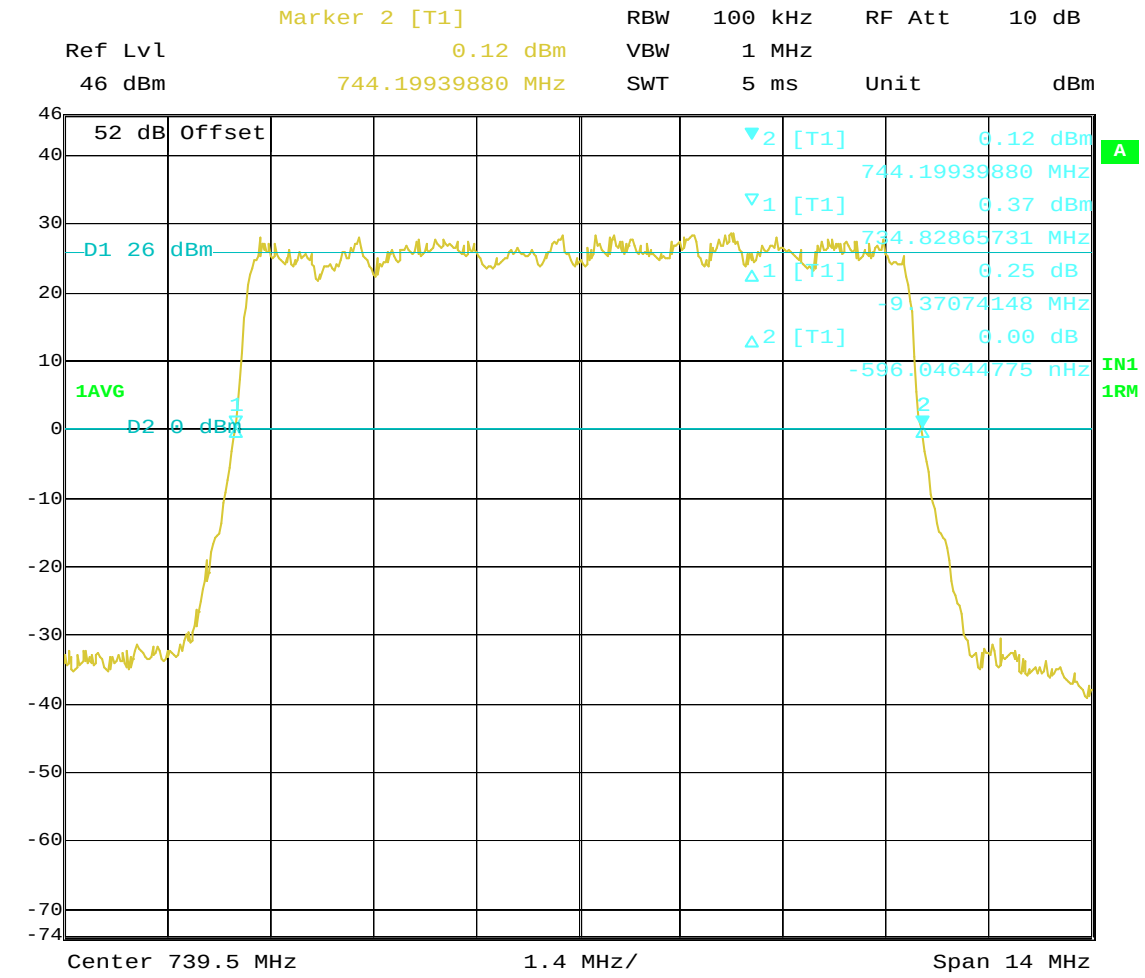

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:24:50

# Block: B+C

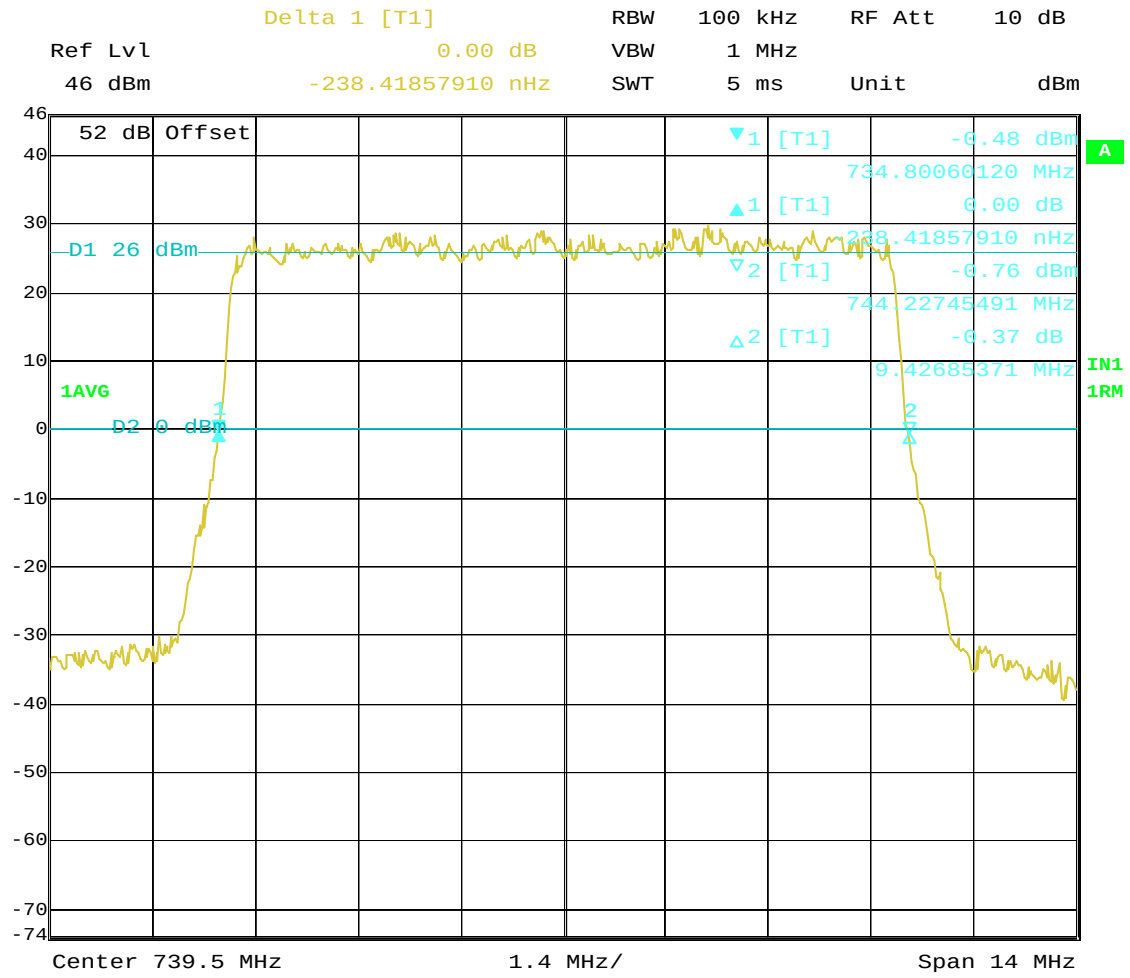
# Channel: 5115

# 10 MHz Bandwidth 734.5 – 744.5 MHz

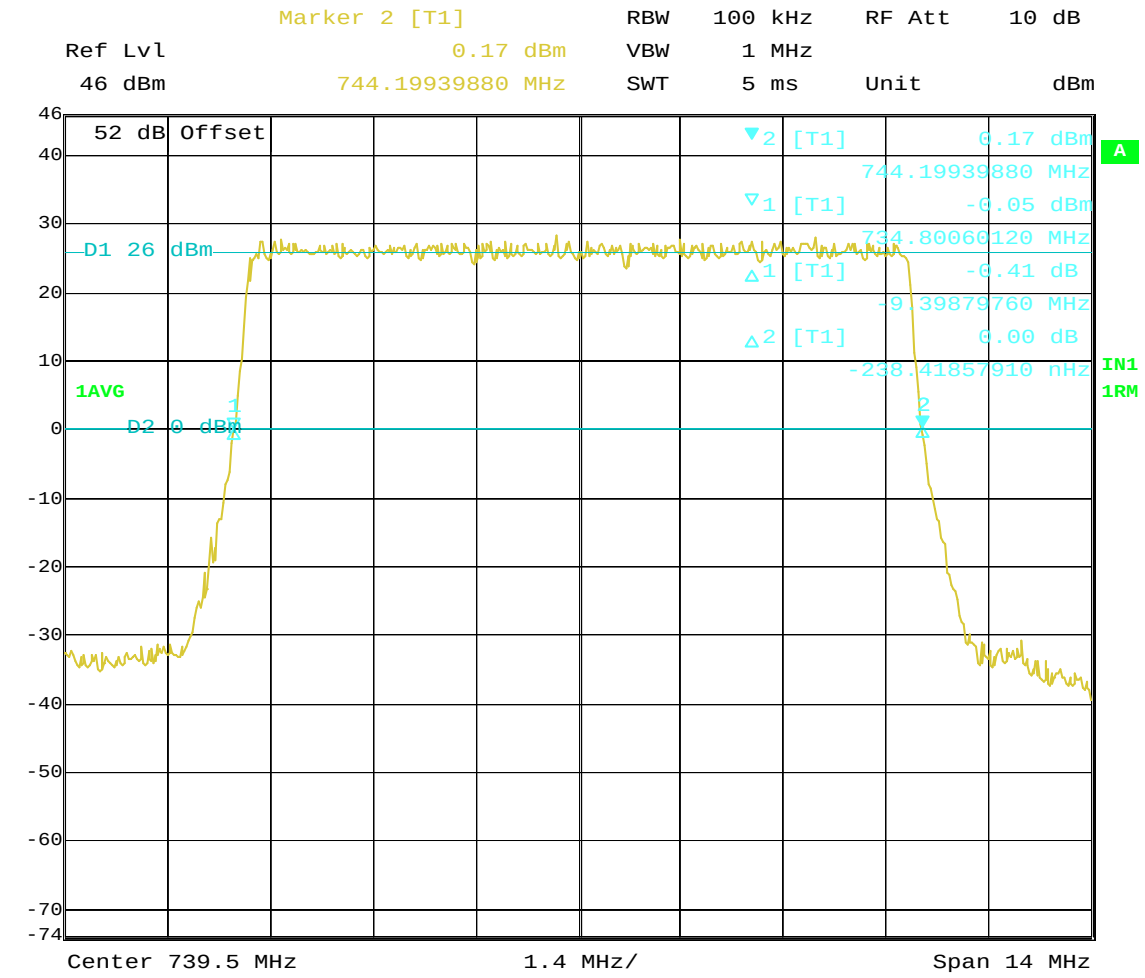
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:09:29




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:30:06



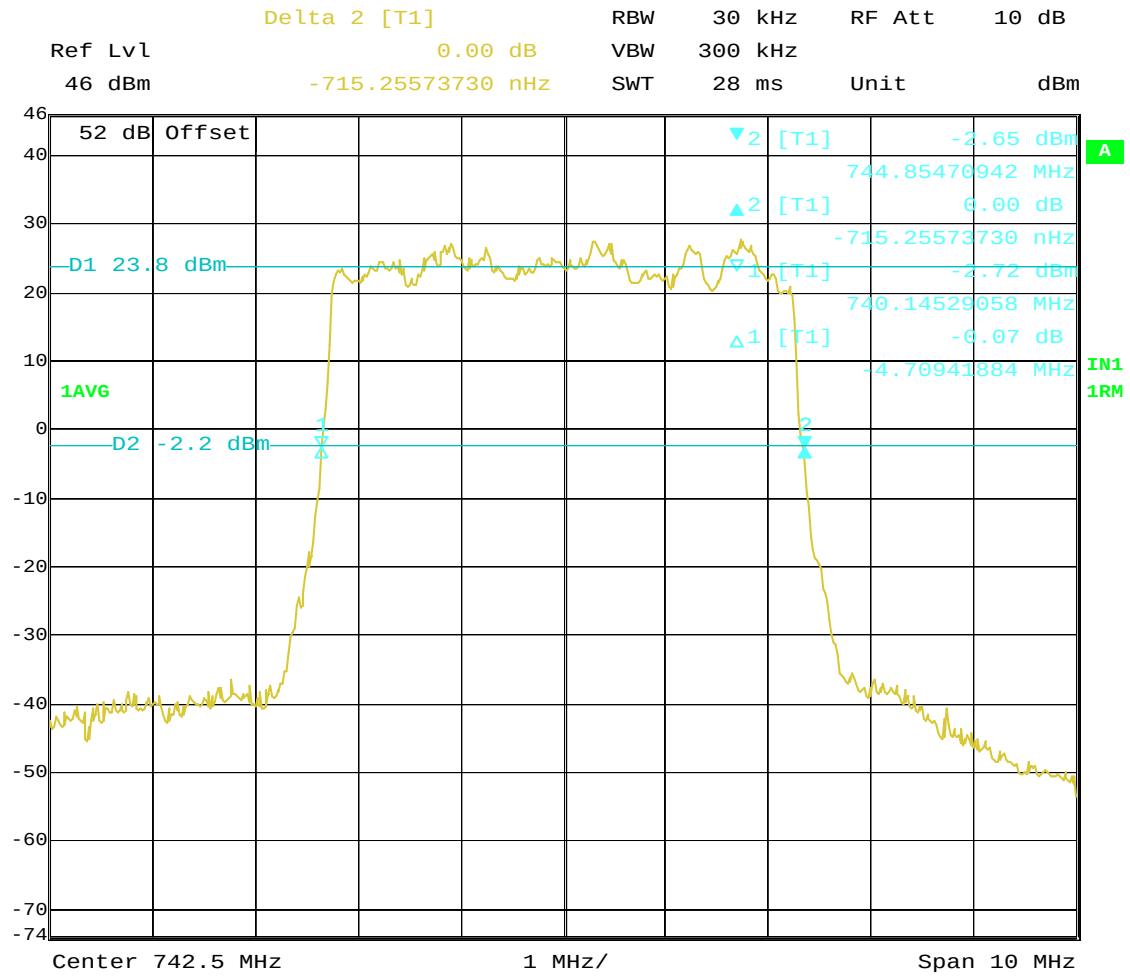

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:02:16

# Block: C

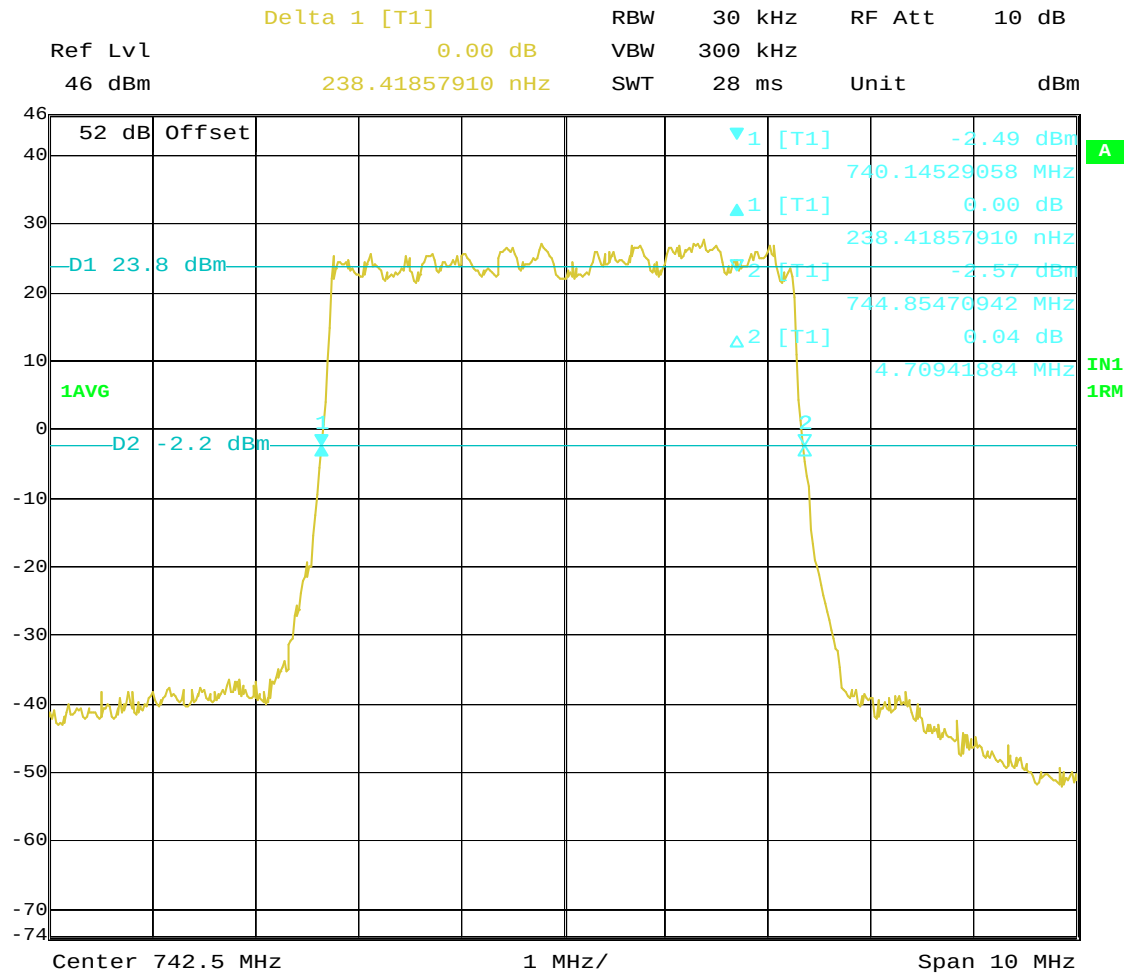
# Channel: 5145

# 5 MHz Bandwidth 740 – 745 MHz

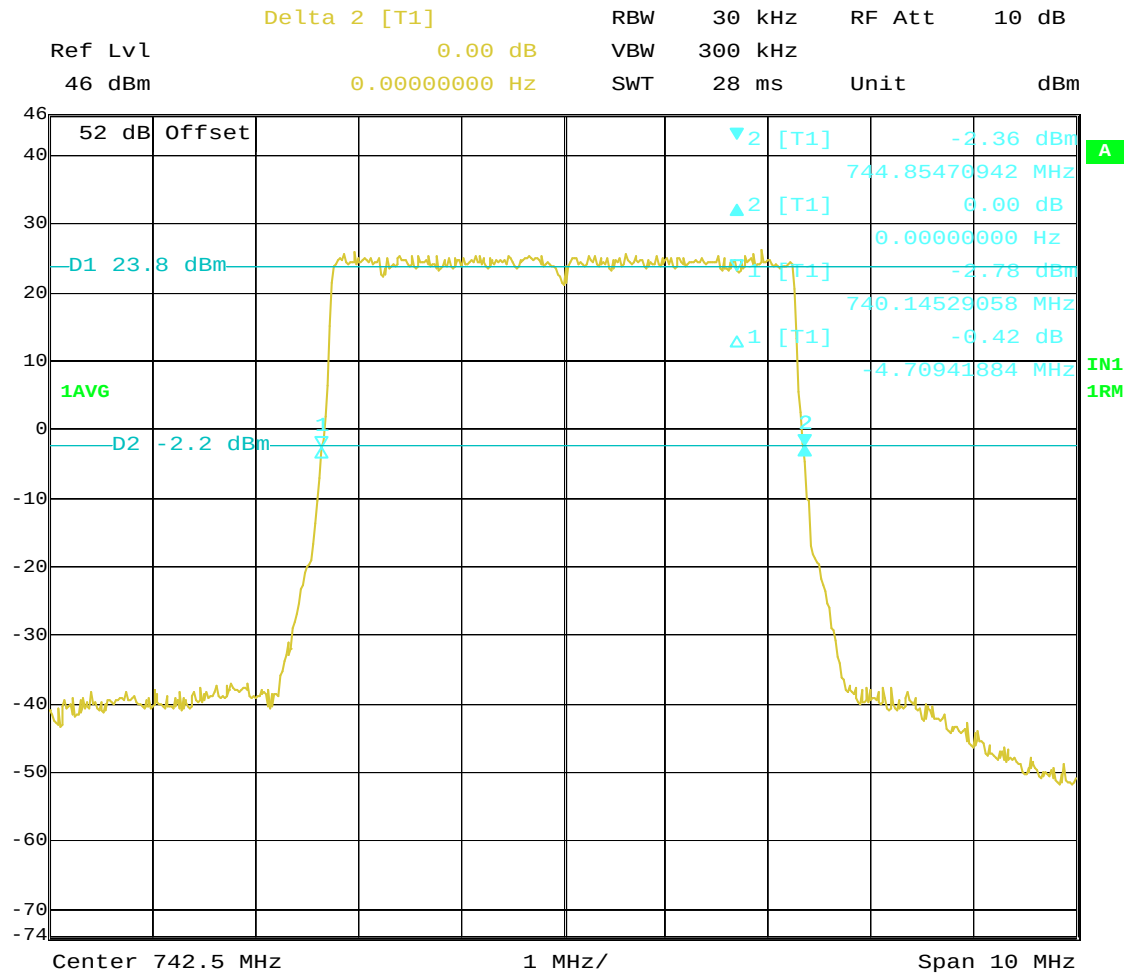
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:58:13




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 12:44:49




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:44:34

# MEASUREMENT OF
# SPECTRUM MASK/OCCUPIED BANDWIDTH
# (1MHz ADJACENT TO CHANNEL EDGE)

**Section 27.53 (G)**

## MEASUREMENT OF SPECTRUM MASK
## OCCUPIED BANDWIDTH

The Spectrum mask close to the center of the carrier frequency (Occupied bandwidth) of the Long Term Evolution (LTE) was measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The RF power level was measured using RF power meter as shown in the test setup in Figure A. The RF output from the LTE EAC port to spectrum analyzer was reduced (to an amplitude usable by the spectrum analyzer) by using a calibrated attenuator. This attenuation was offset on the display and the signal for single carrier was adjusted to the corrected RF power level for a 100 kHz resolution bandwidth for 10MHz wide transmit signal, and 30 kHz resolution bandwidth for 5 MHz wide transmit signal. While adjusting the corrected RF power level in the spectrum analyzer, the attenuator and resolution BW of the spectrum analyzer were considered.

The measurements were made on a "**LTE 9442 RRH2x40-P2**.

The reference line on the spectrum analyzer display corresponds to level measured by the RF power meter. Occupied Bandwidth plots were made at antenna terminals for an output of 40 Watts (46.0 dBm)/carrier.

***The frequencies and blocks used were tabulated on the bottom of each plot. The output signals at RF filter were plotted at each frequency/block. The* LTE 9442 RRH2x40-P2 *is capable of operating in the band of 729 MHz to 745 MHz. The Base station presently tested was configured to operate in Blocks A, A+B, B, B+C, and C only. Plots were provided for a single carrier. These frequencies were chosen to show the occupied bandwidth in the blocks in the frequency band in which this radio can be operated.***

***Block edge requirements:***
***FCC Section 27.53(g): Based on measurement instrument employing resolution bandwidth of 100 kHz bands or greater out band shall be attenuated at least 43+10log (P) dB or -13dBm. However in 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.***

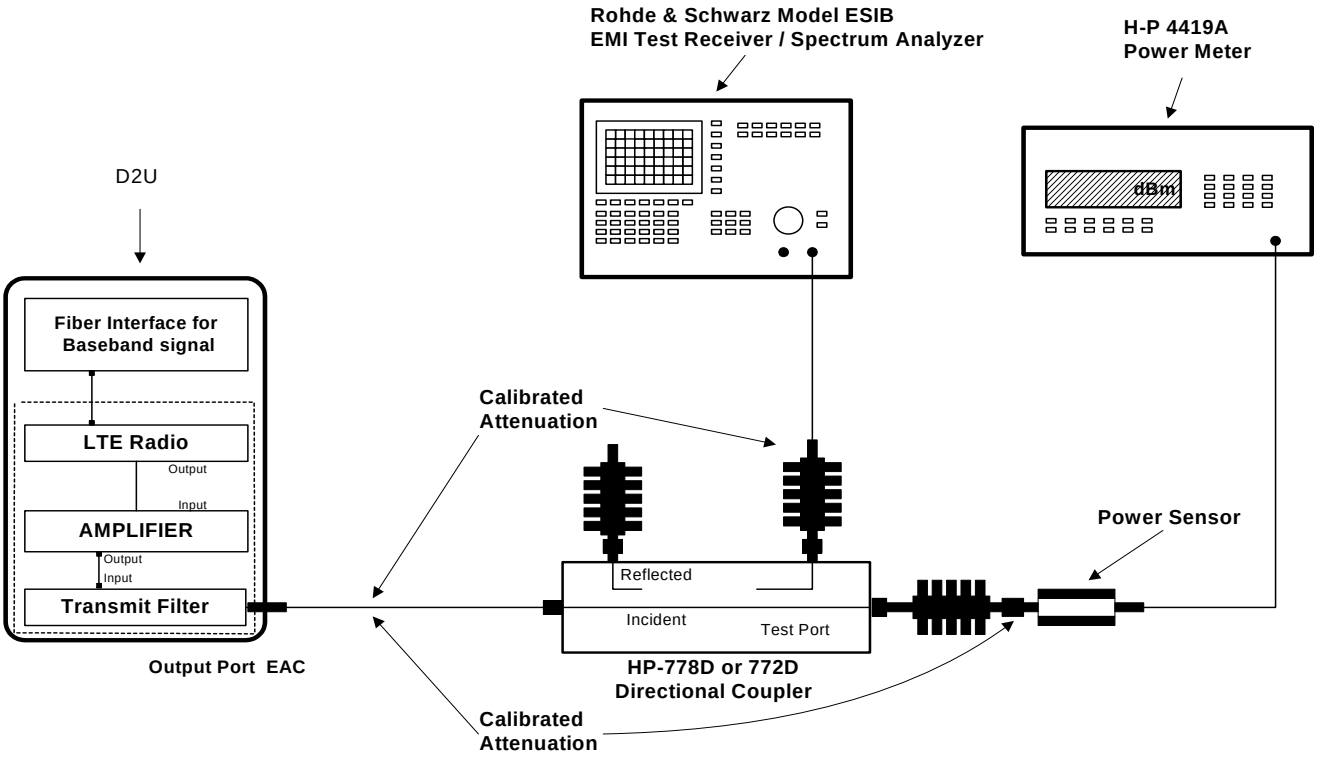
***Note: For all tests 100 kHz resolution bandwidth was used for the 10 MHz Carrier Bandwidth, while 30 kHz resolution bandwidth was used for the 5 MHz Carrier Bandwidth.***

The list of band, channels, RF filters (EAC) and Amplifiers tested are listed below:

| Band | Block | Center Frequency (MHz) | Carrier Bandwidth (MHz) | Channel | RF Filter | Power (Watts) |
|---|---|---|---|---|---|---|
| | A | 731.5 | 5 | 5035 | M2 | 40 |
| | A+B | 734.5 | 10 | 5065 | M2 | 40 |
| | B | 737 | 5 | 5090 | M2 | 40 |
| | B+C | 739.5 | 10 | 5115 | M2 | 40 |
| | C | 742.5 | 5 | 5145 | M2 | 40 |

**Measurement uncertainty:**
Frequency: 100 Hz
Amplitude: 0.5 dB

# Figure A. TEST CONFIGURATION FOR SPECTRUM MASK (OCCUPIED BANDWIDTH)



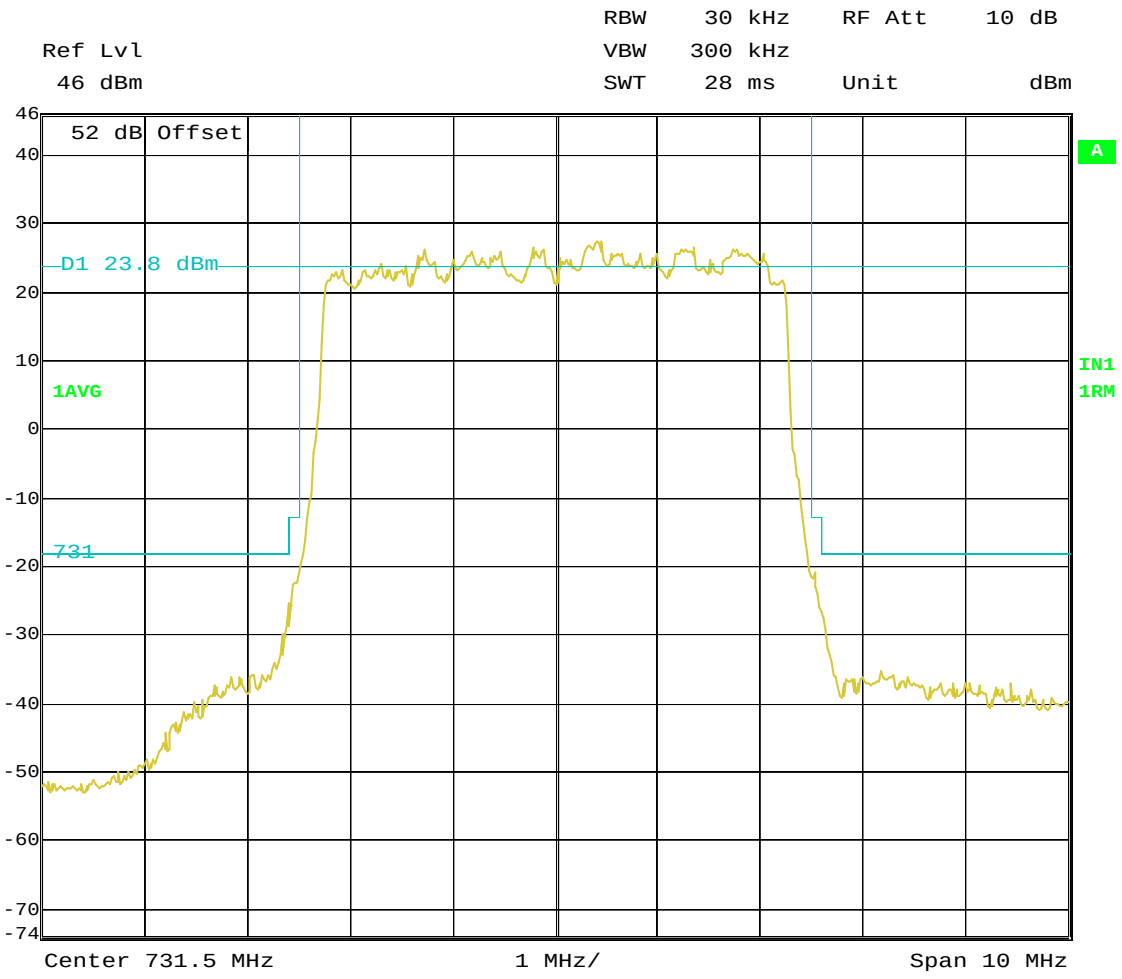

All components are calibrated over the frequency range of interest

# Block: A

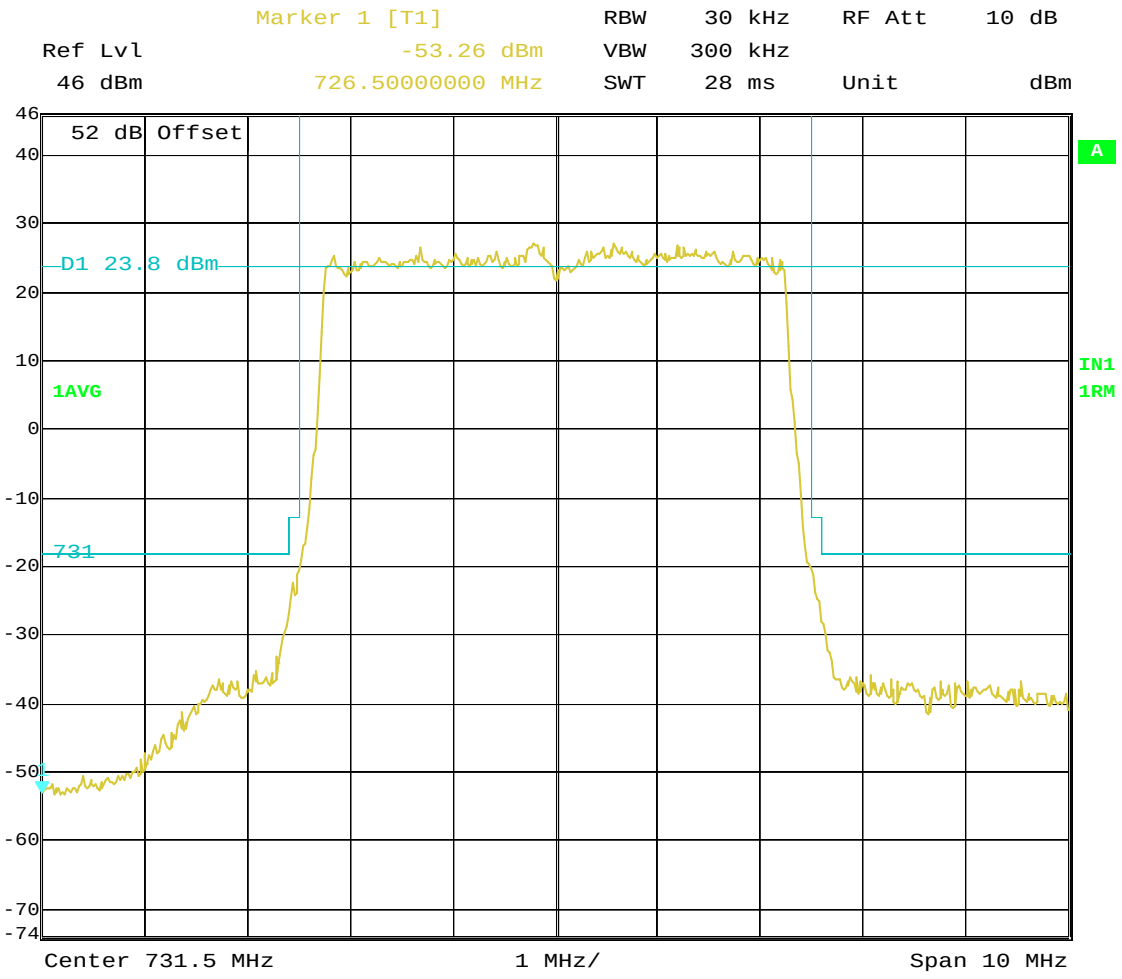
# Channel: 5035

# 5 MHz Bandwidth 729 – 734 MHz
# (Left Edge)

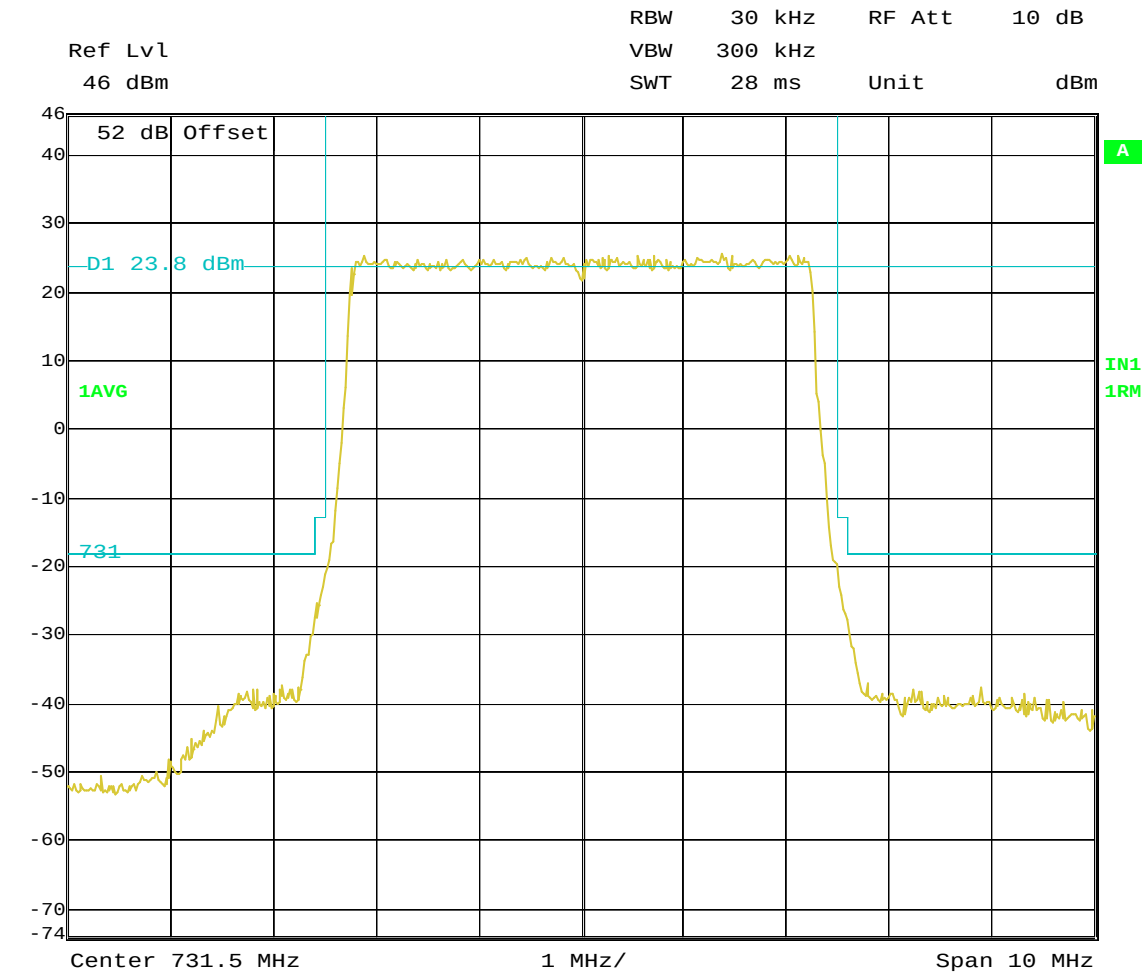
## SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:41:53




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:06:39



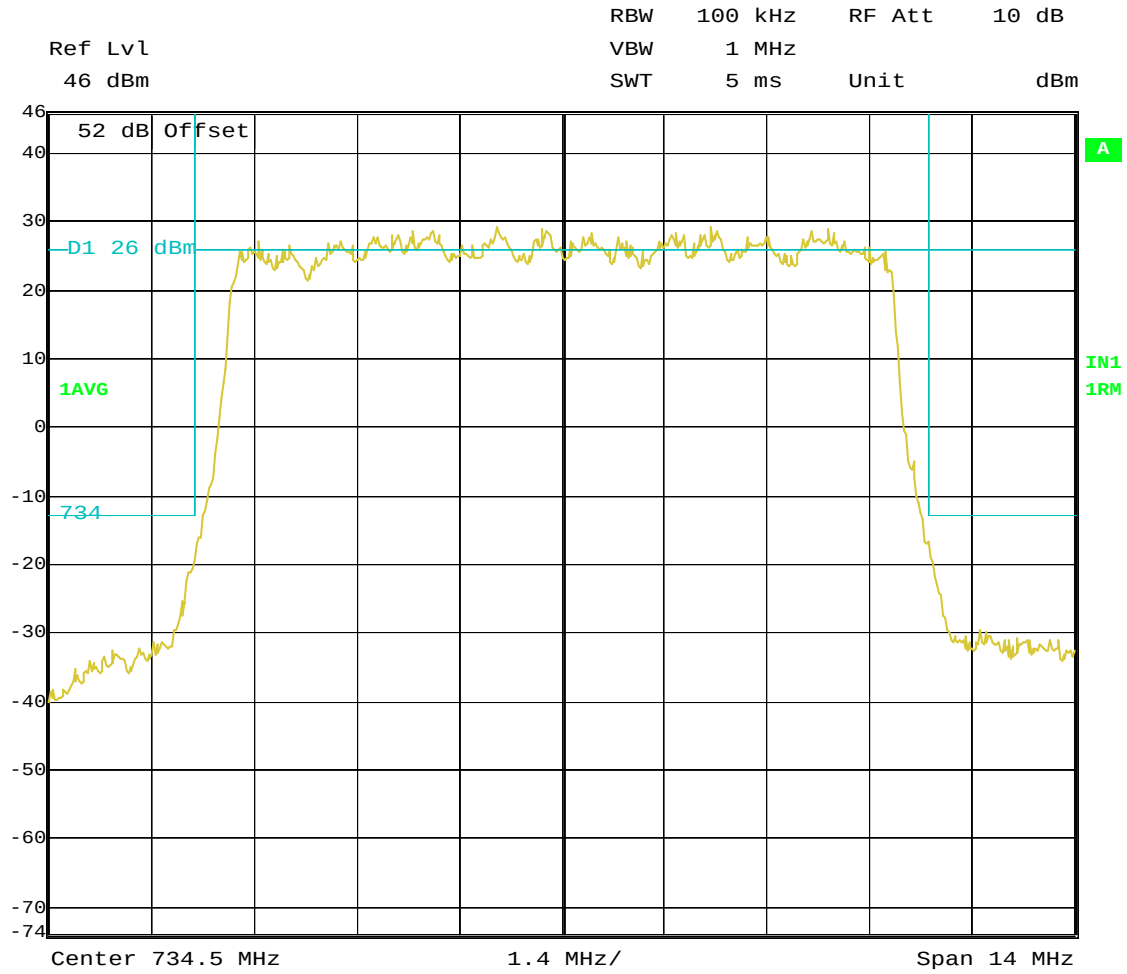

Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:33:11

# Block: A+B

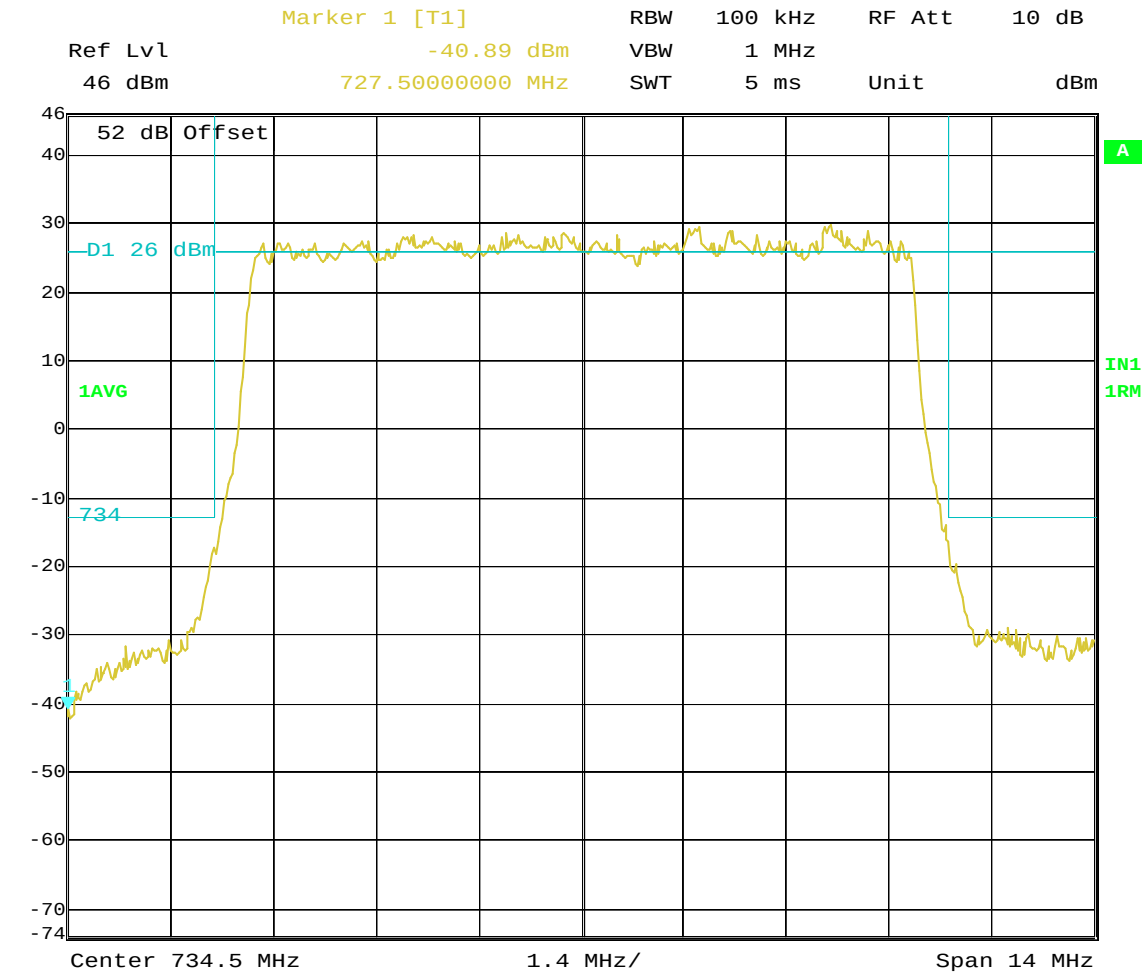
# Channel: 5065

# 10 MHz Bandwidth 729.5 – 739.5 MHz

## SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:12:42




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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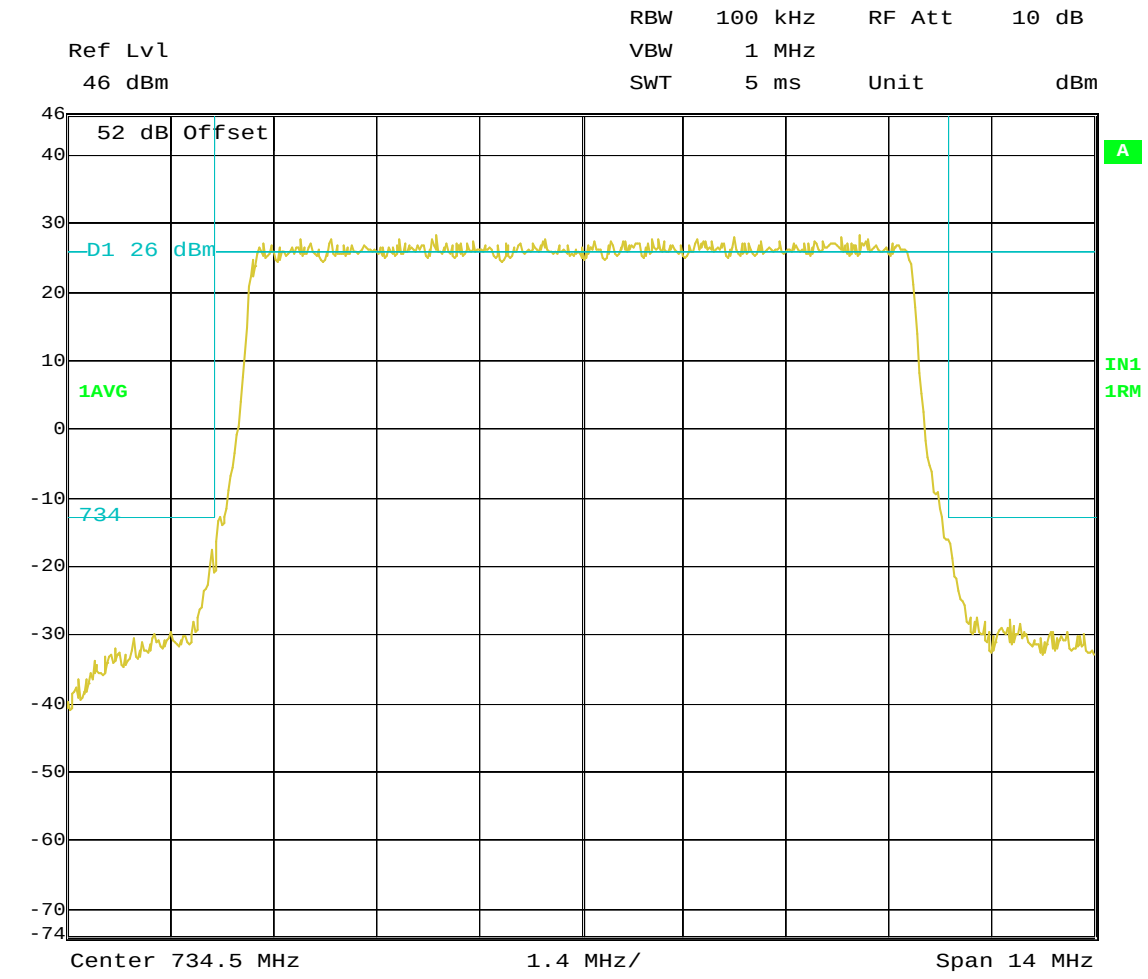


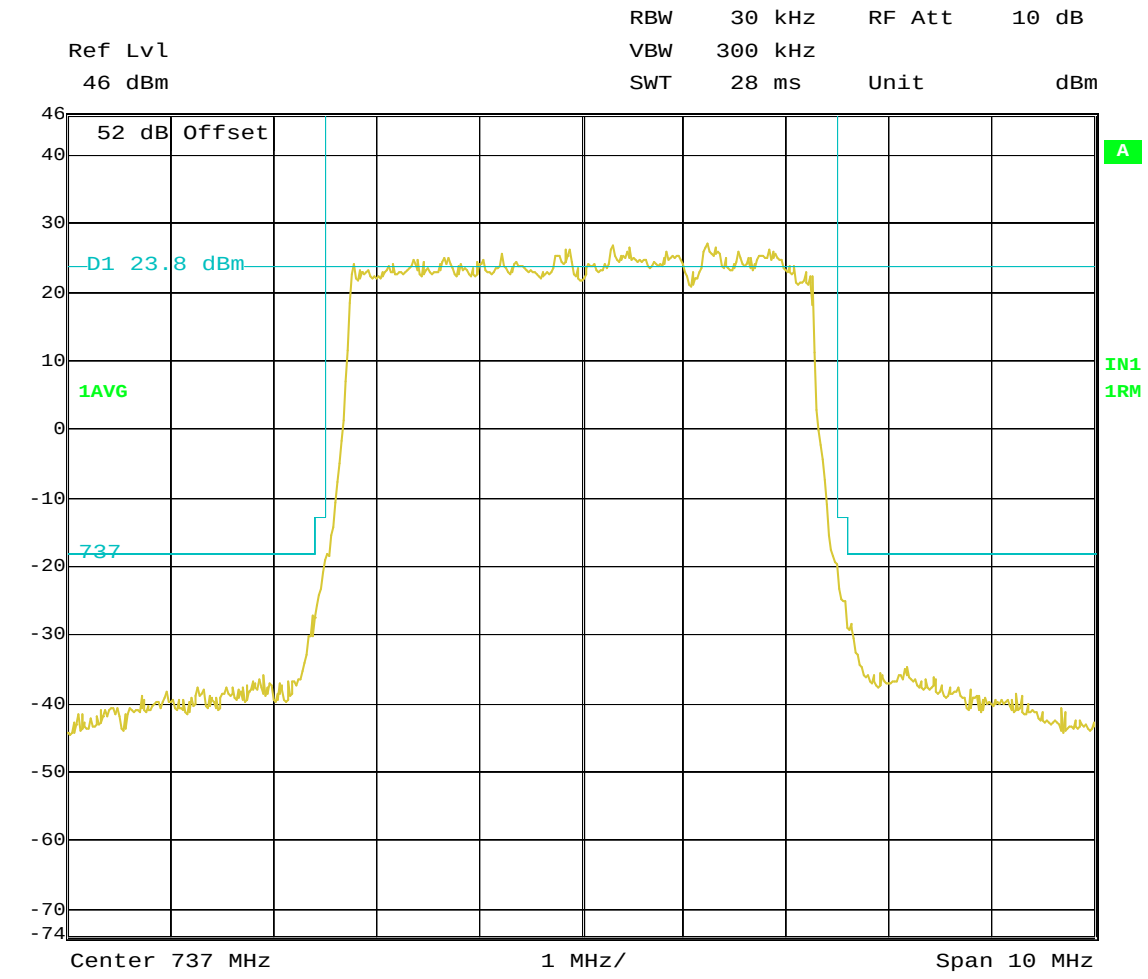

Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:23:32

# Block: B

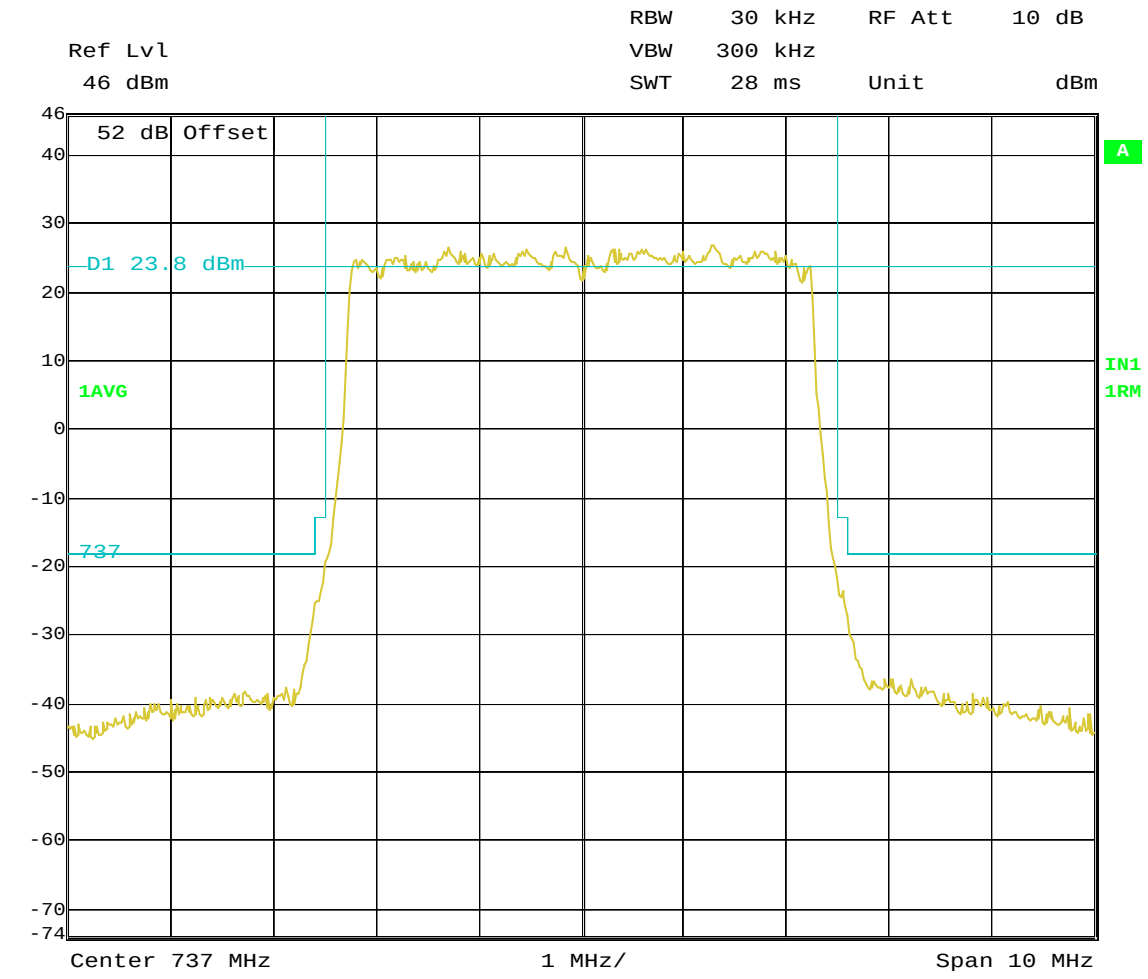
# Channel: 5090

# 5 MHz Bandwidth 734.5 – 739.5 MHz

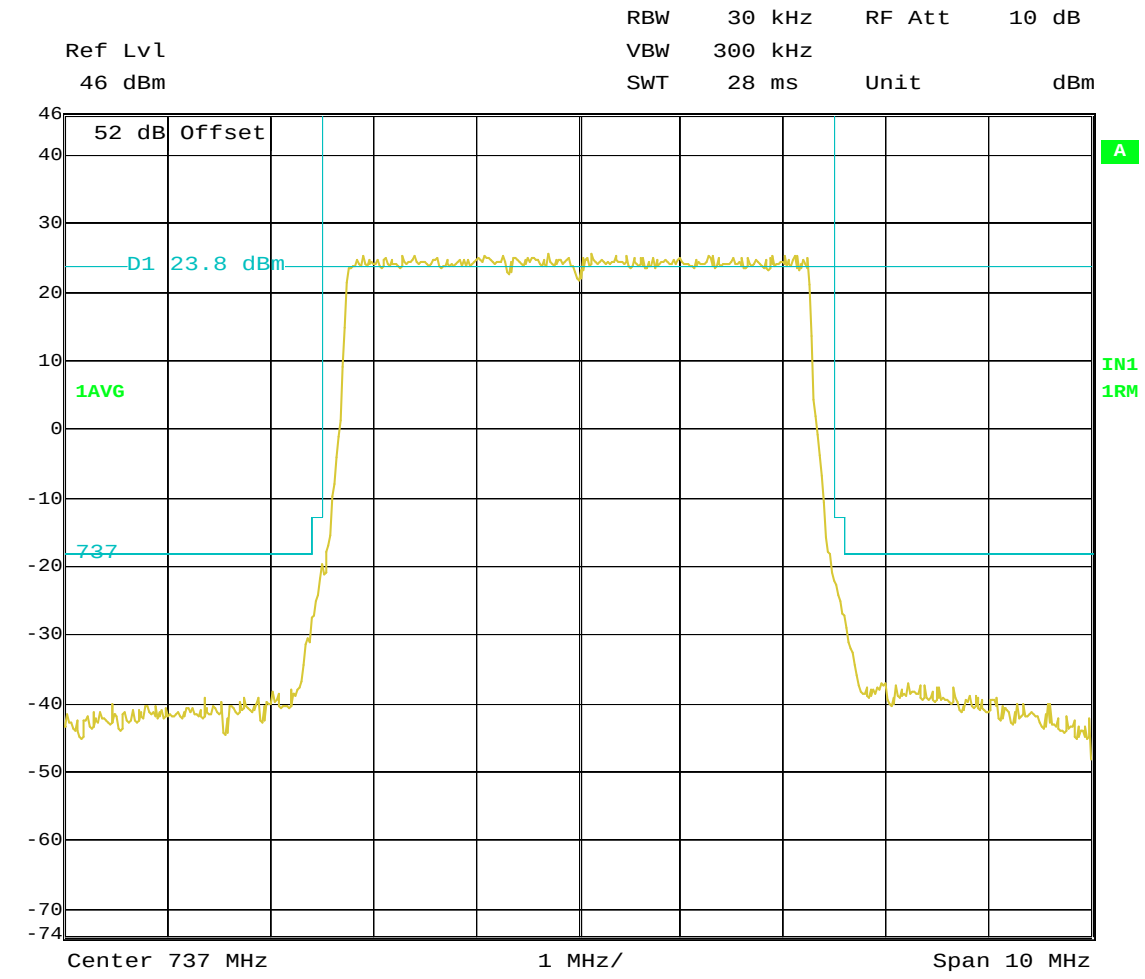
## SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:06:41




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:28:38



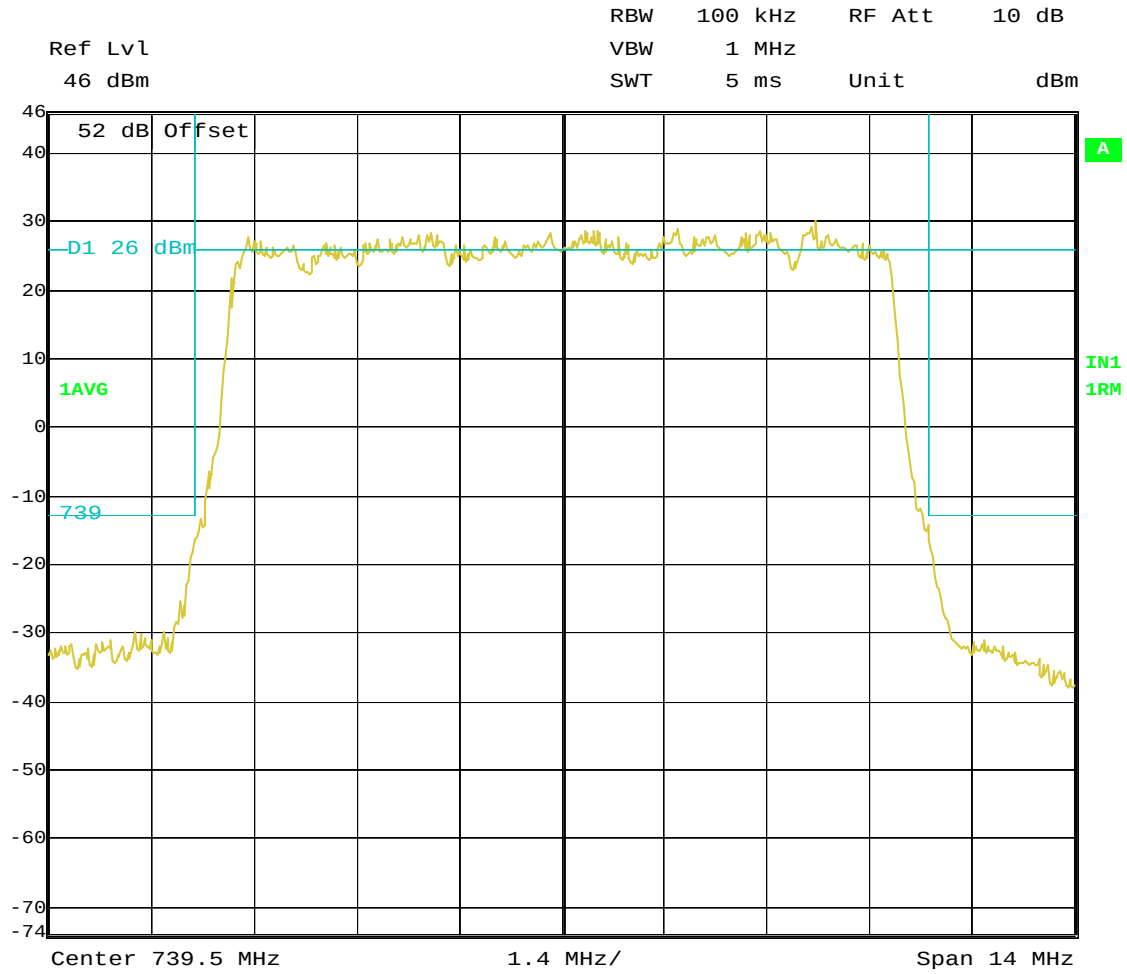

Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:22:46

# Block: B+C

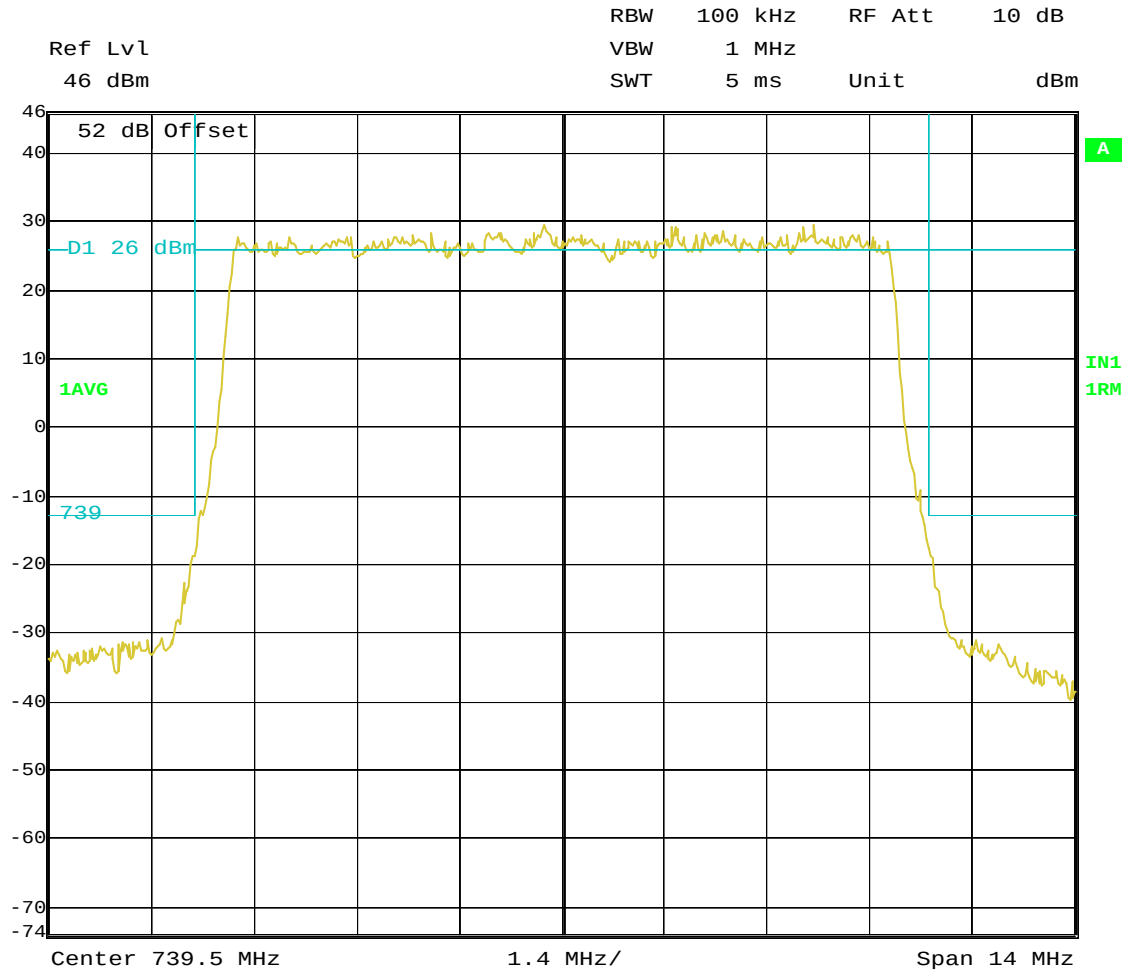
# Channel: 5115

# 10 MHz Bandwidth 734.5 – 744.5 MHz

# SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:03:42




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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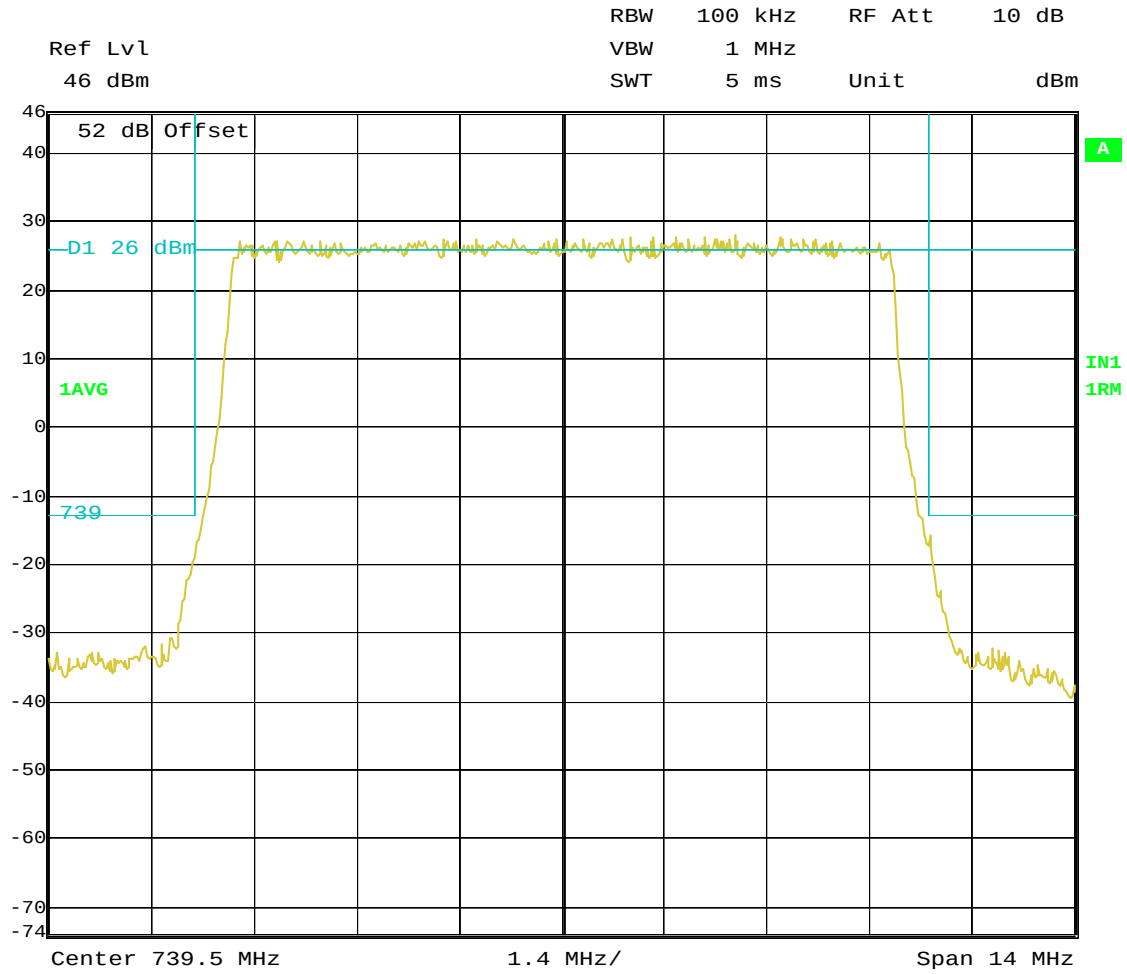
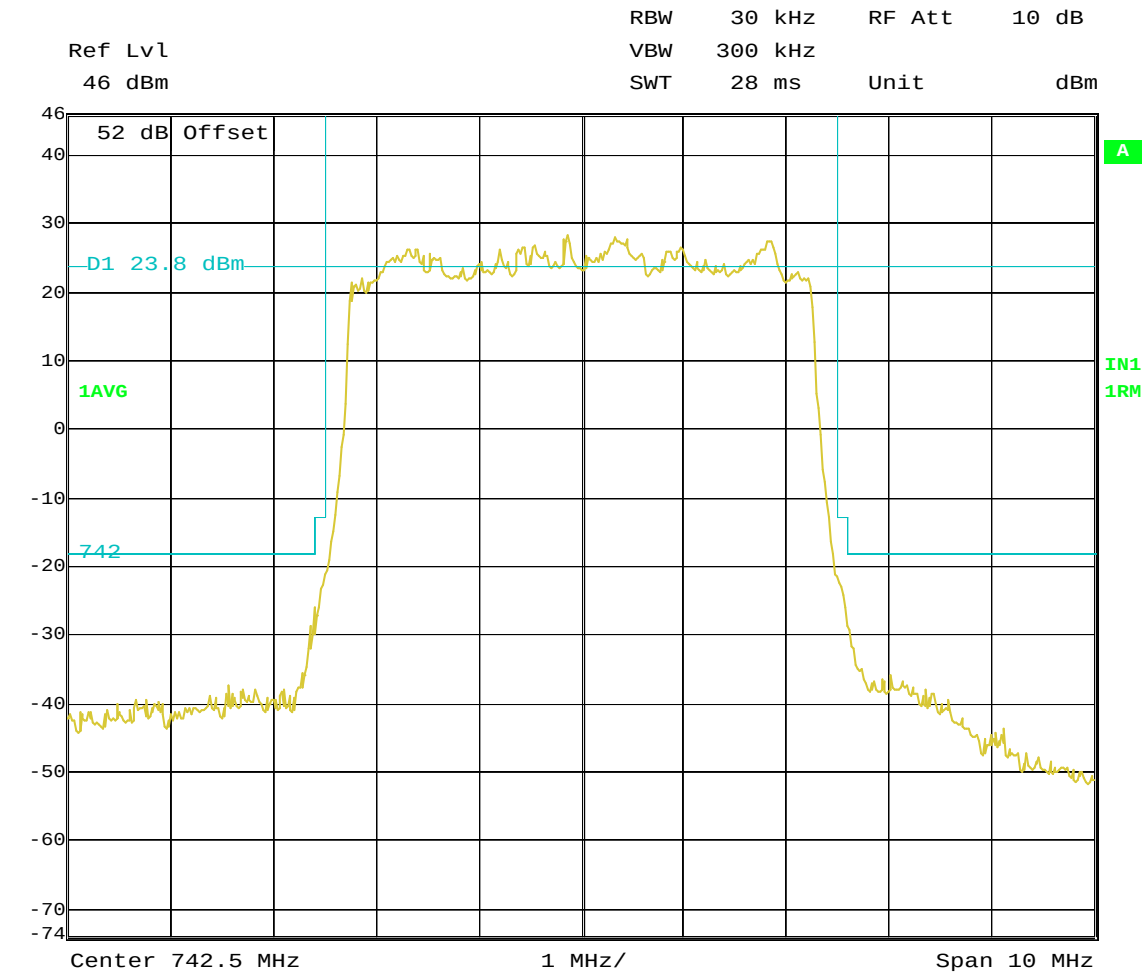



Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 12:57:17

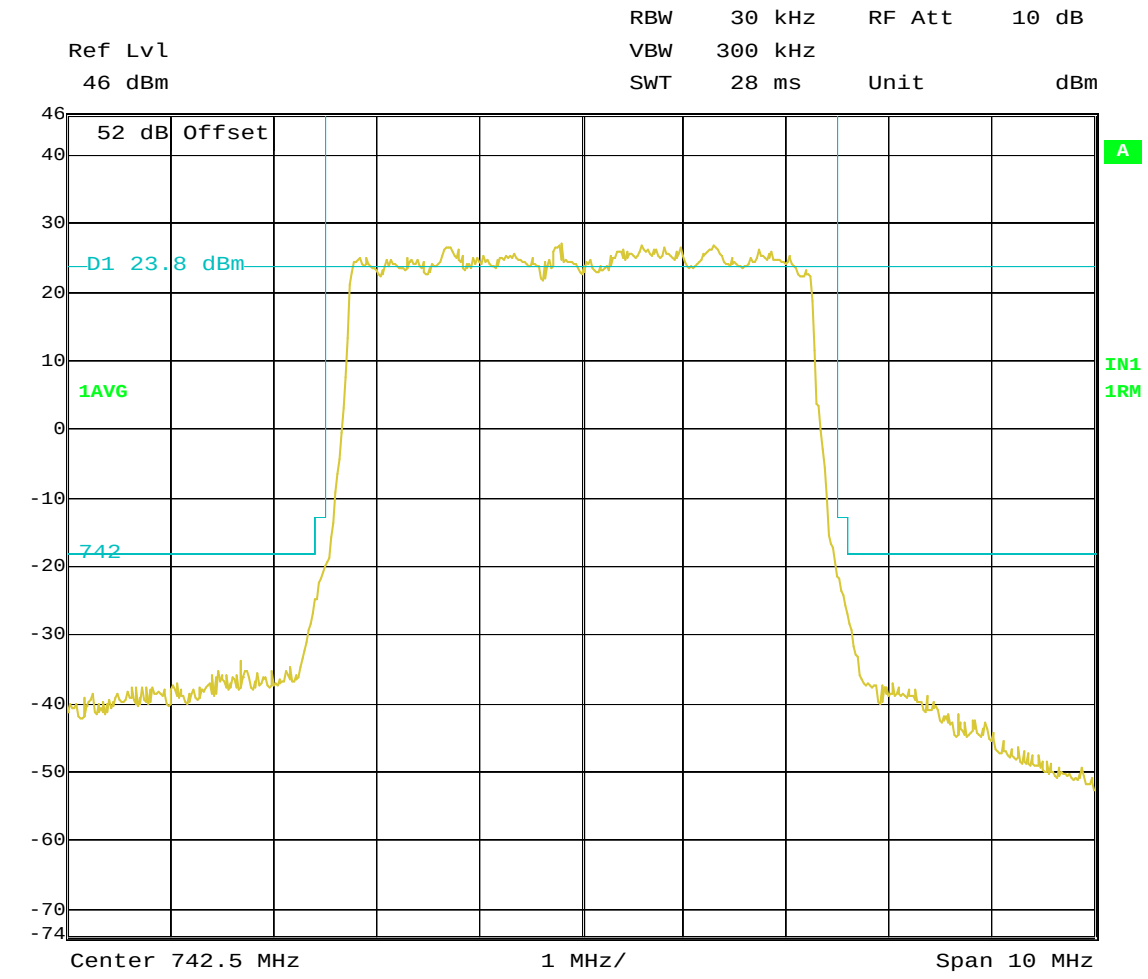
# Block: C

# Channel: 5145

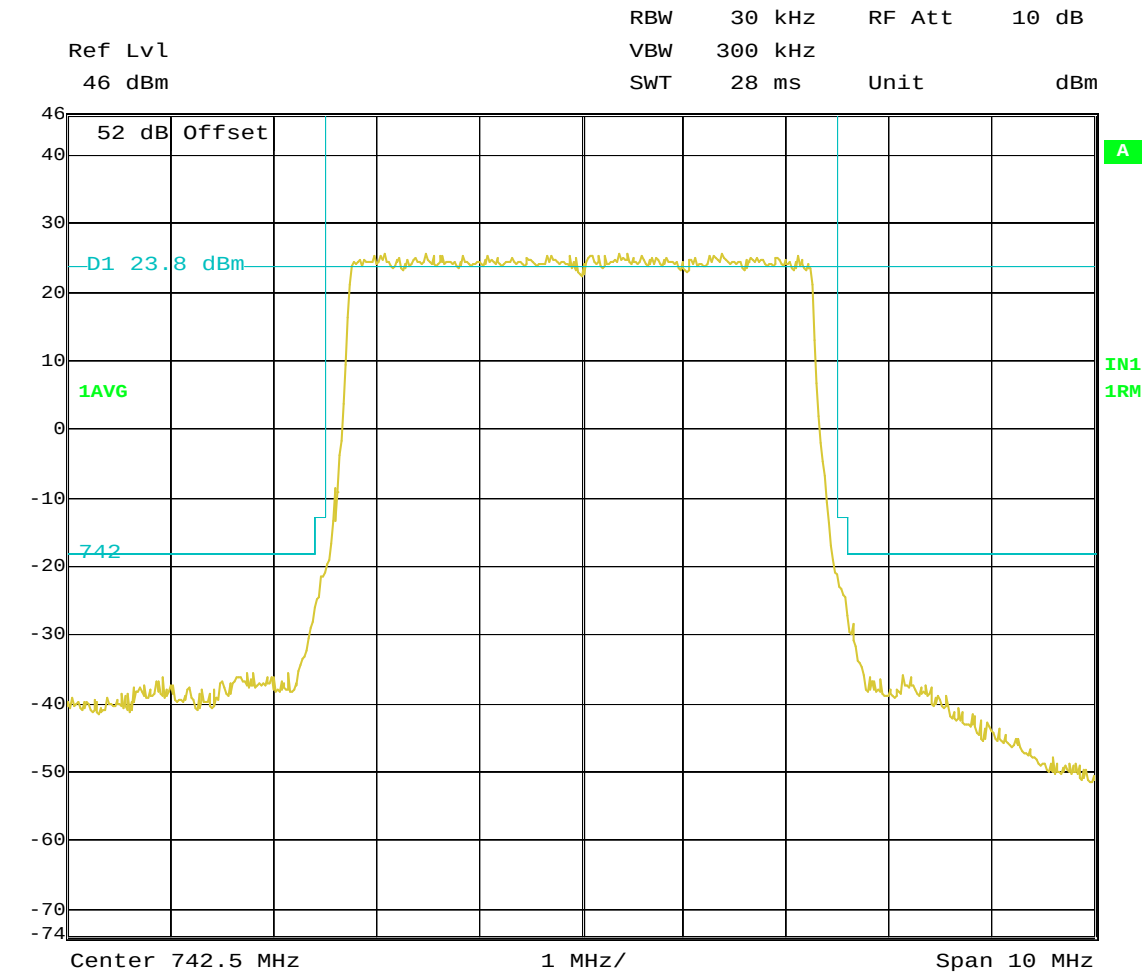
# 5 MHz Bandwidth 740 – 745 MHz
# (Right Edge)
# SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:55:27




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:15:35




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:46:43

# Measurement 4

# FCC Section 2.1051 and 27.53 (g)
# Spurious Emissions at Antenna Transmit Terminals

# Measurement -4

## MEASUREMENT OF
## SPURIOUS EMISSIONS
## AT TRANSMIT ANTENNA PORT
## FCC 27.53 (g)

## Spurious Emissions at Transmit Antenna Terminals

Spurious Emissions at the transmit-antenna terminals were investigated over the frequency range of 9 kHz to 8 GHz. The test setup is as described in Figure A. Measurements were made using a Rohde & Schwarz ESI 40 (9 kHz to 40 GHz) EMI Test receiver and a HP Model 520 DeskJet Printer. The RF output from the transmitter was reduced (to an amplitude usable by the receivers) using calibrated attenuators. The RF power level was continuously monitored via RF Power Meter as shown in the test setup in Figure A. The required emission limitation is specified in 27.53 (g). Measurements were made at 40W per carrier for 10 MHz Bandwidth, and 40W per carrier for 5MHz Bandwidth at antenna terminals. The measured spurious emission levels were plotted for the frequency range 9 kHz to 8 GHz. The measurements were made using following receiver parameters:

| Frequency Range | Resolution Bandwidth |
|---|---|
| 9 kHz to 150 kHz | 1 kHz |
| 150 kHz to 40 MHz | 10 kHz |
| 30 MHz to 1 GHz | 100 kHz |
| 1 GHz to 8 GHz | 1 MHz |

The list of band, channels, RF filters (J4) and Amplifiers tested are listed below:

| Band | Block | Center Frequency (MHz) | Carrier Bandwidth (MHz) | Channel | RF Filter | Power (Watts) |
|---|---|---|---|---|---|---|
| | A | 731.5 | 5 | 5035 | M2 | 40 |
| | A+B | 734.5 | 10 | 5065 | M2 | 40 |
| | B | 737 | 5 | 5090 | M2 | 40 |
| | B+C | 739.5 | 10 | 5115 | M2 | 40 |
| | C | 742.5 | 5 | 5145 | M2 | 40 |

***FCC Section 27.53(g): Based on measurement instrument employing resolution bandwidth of 100 kHz bands or greater out band emissions shall be attenuated at least 43 + 10log (P) dB or -13dBm. However in 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.***

The tests were performed in following modulation configurations:

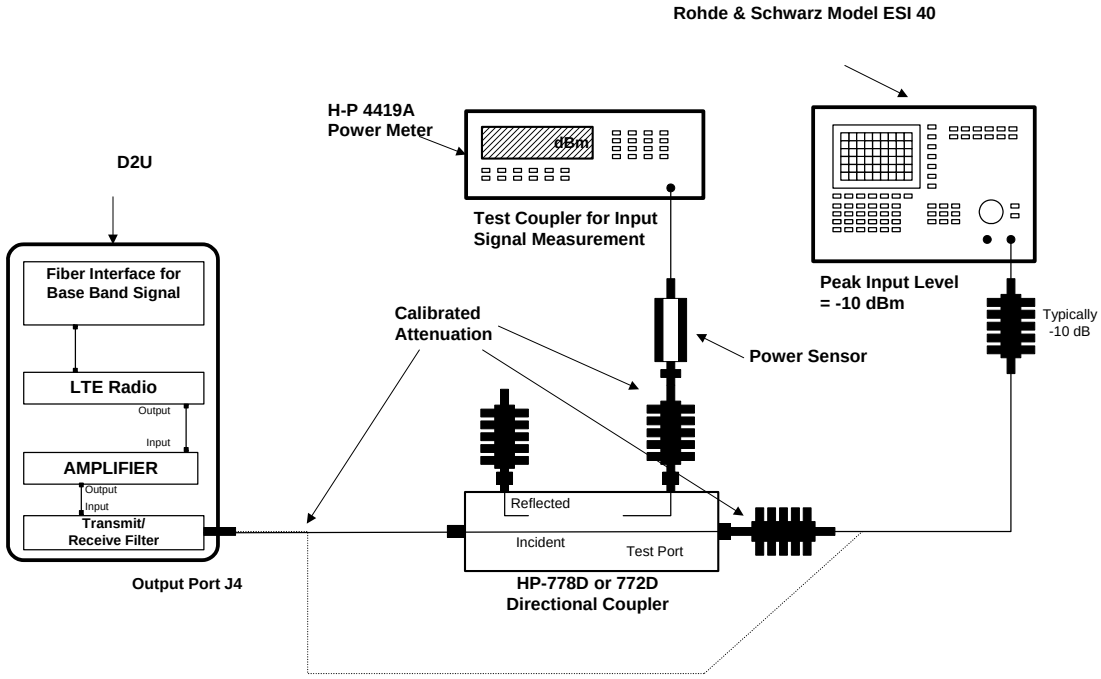
A. QPSK
B. 16QAM
C. 64QAM

**RESULTS**:

The magnitude of spurious emissions is within the specification limits of FCC Part 27.53(g).

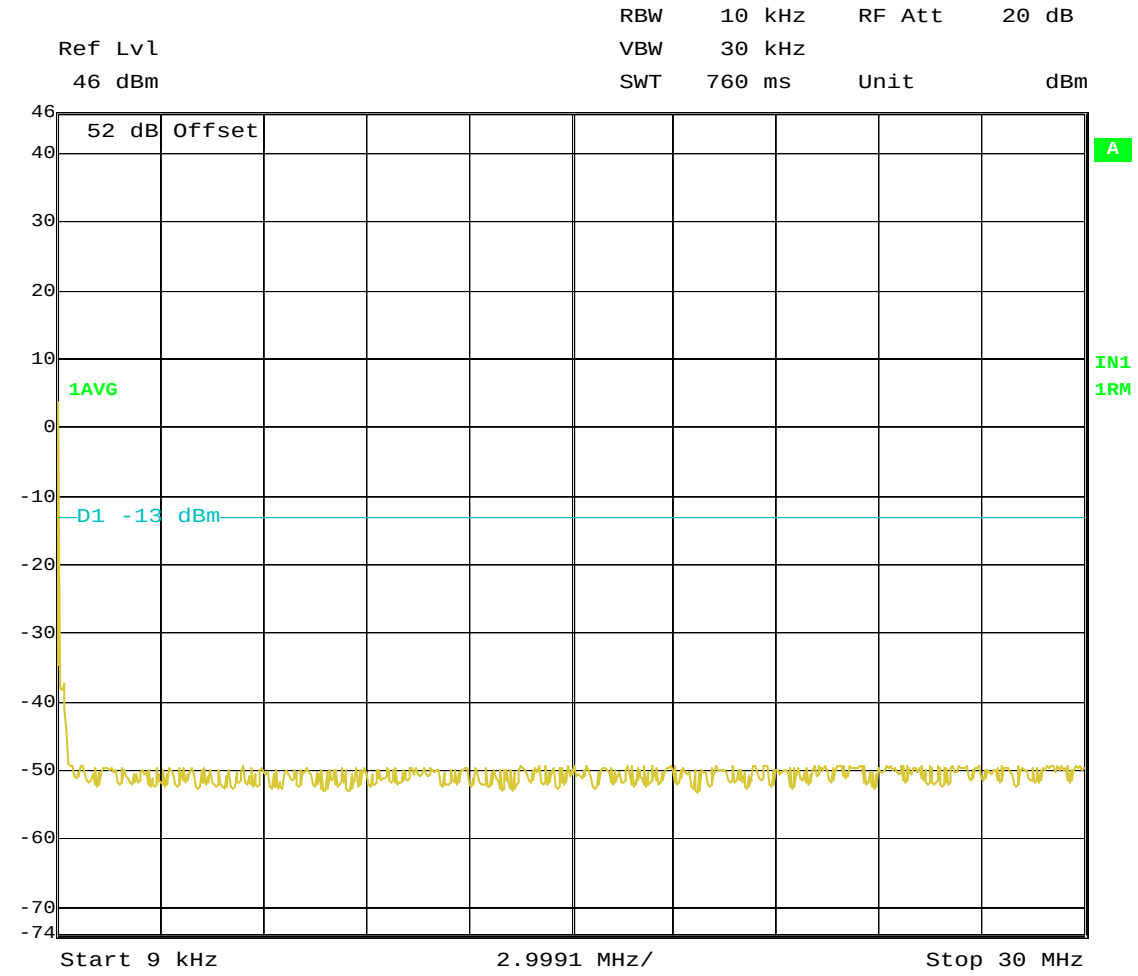
Measurement uncertainty:
9 kHz to 20 MHz: Frequency = 10 Hz, Amplitude = 0.5 dB
20 MHz to 1 GHz: Frequency = 100Hz, Amplitude = 0.5 dB
1 GHz to 10 GHz: Frequency = 10 kHz, Amplitude = 0.5 dB

## Figure A. TEST CONFIGURATION FOR CONDUCTED SPURIOUS

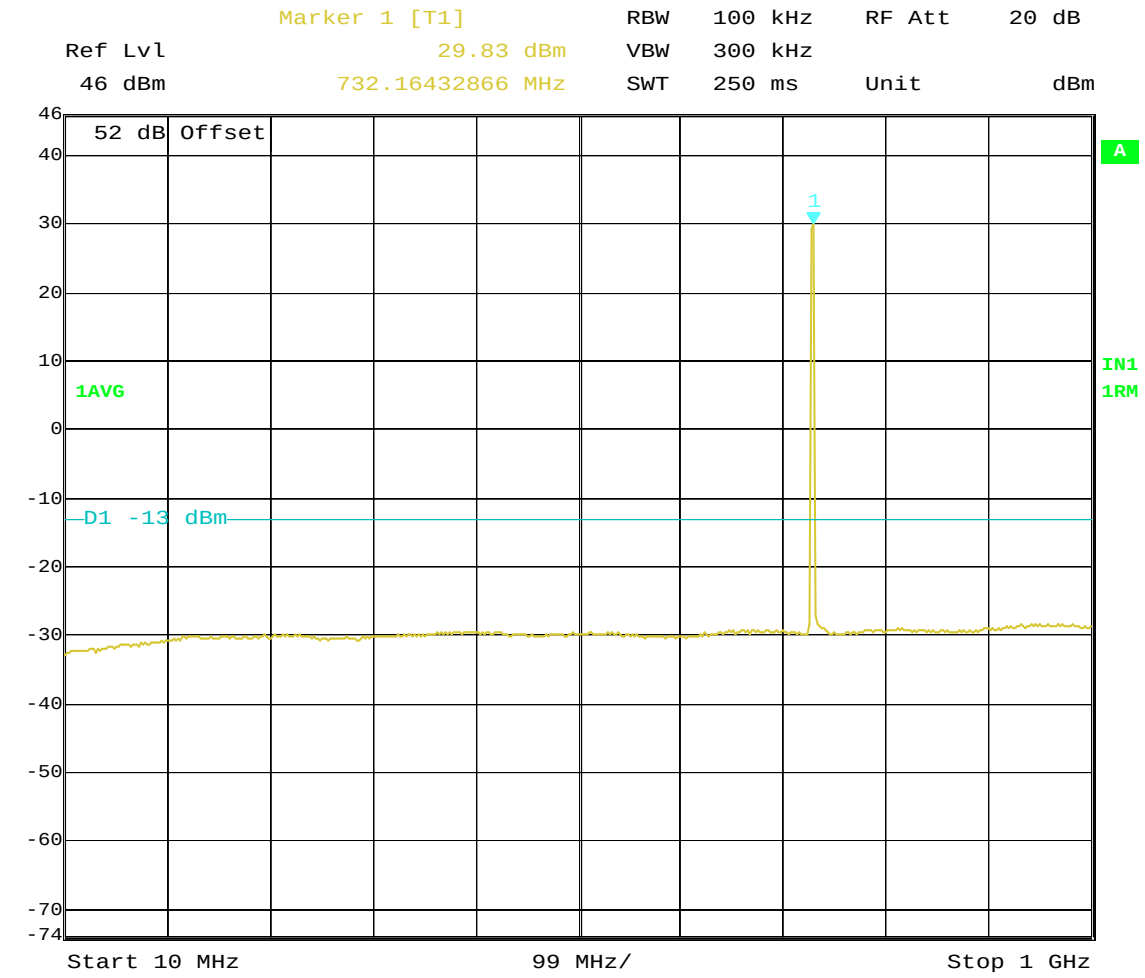


# Transmit Port
# Antenna Conducted Spurious Emissions

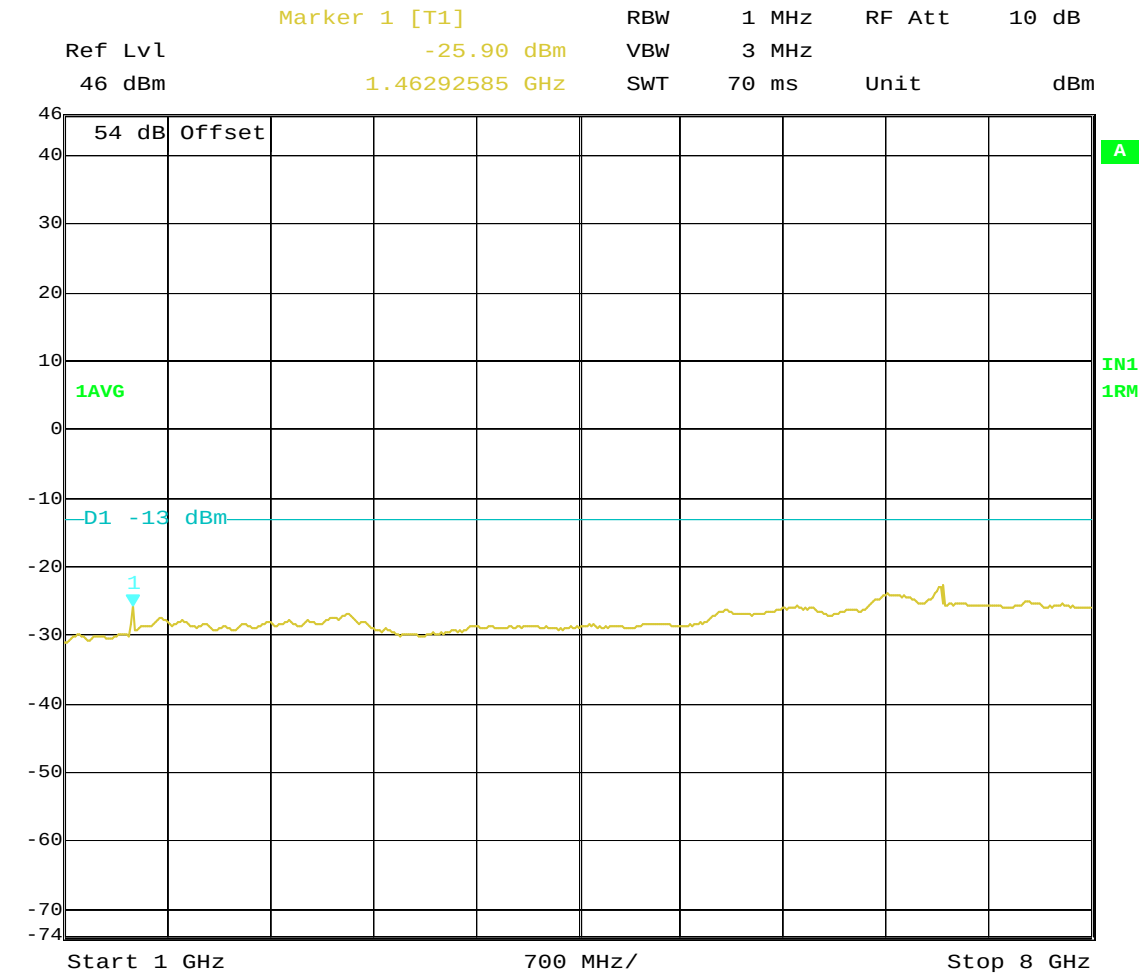
# Block: A
# QPSK Modulation
# Bandwidth 729 – 734 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:44:02



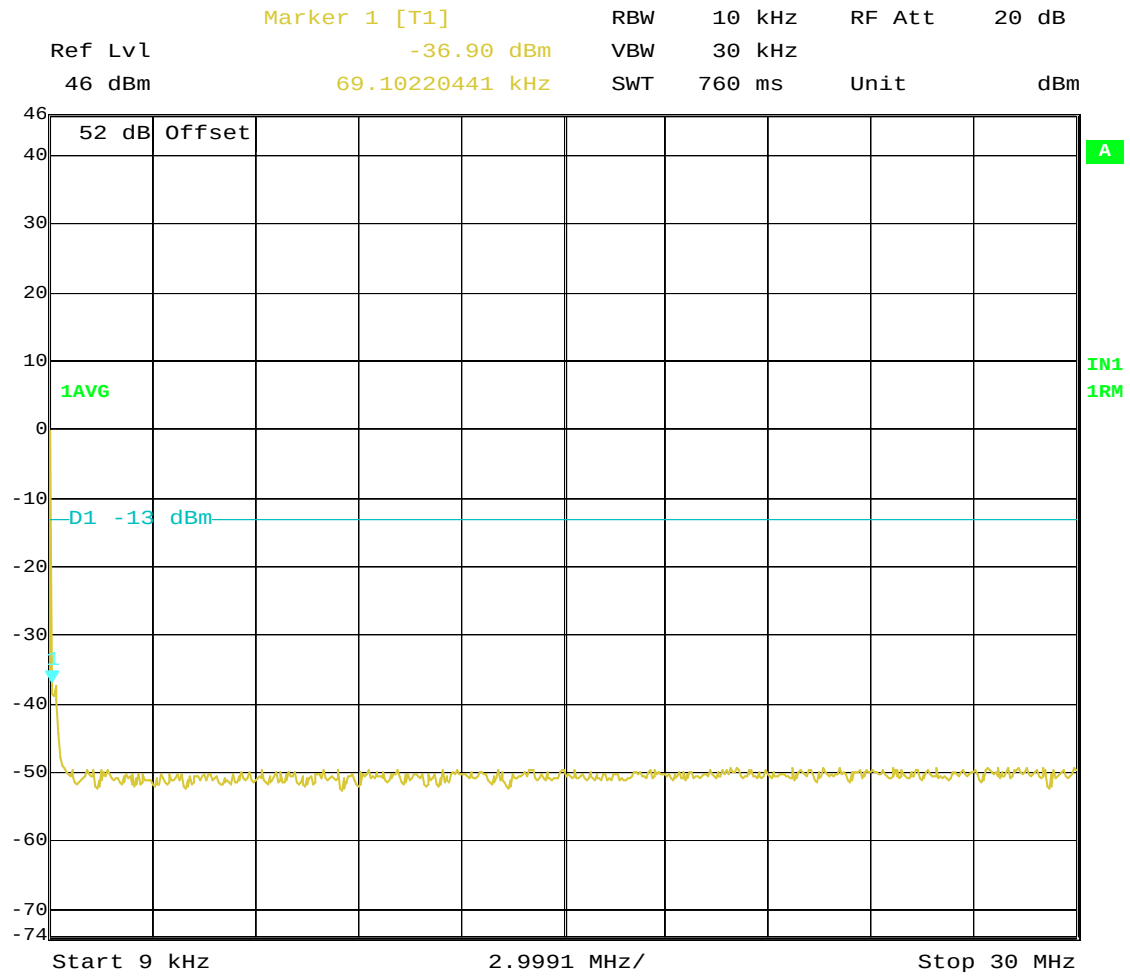

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:46:06



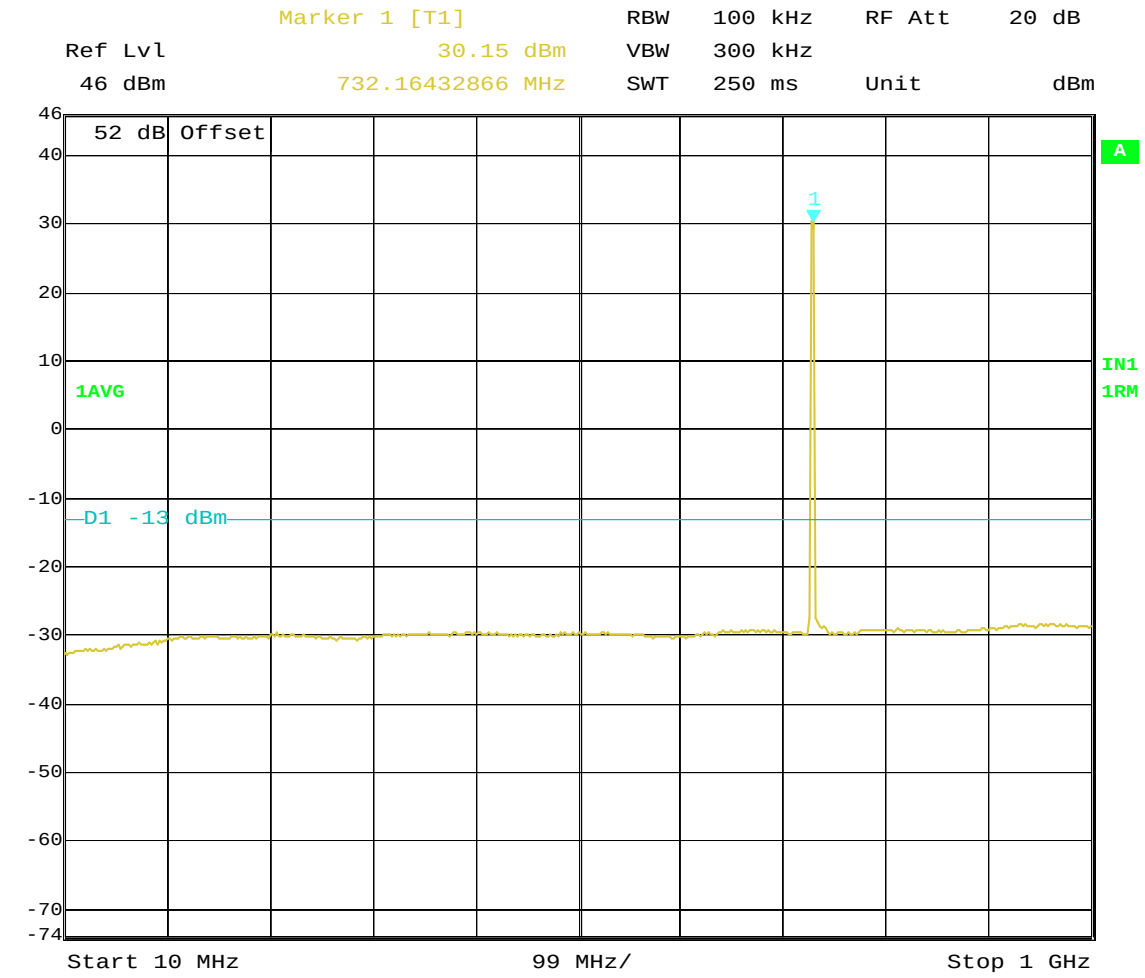

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 13:47:22

# Transmit Port
# Antenna Conducted Spurious Emissions

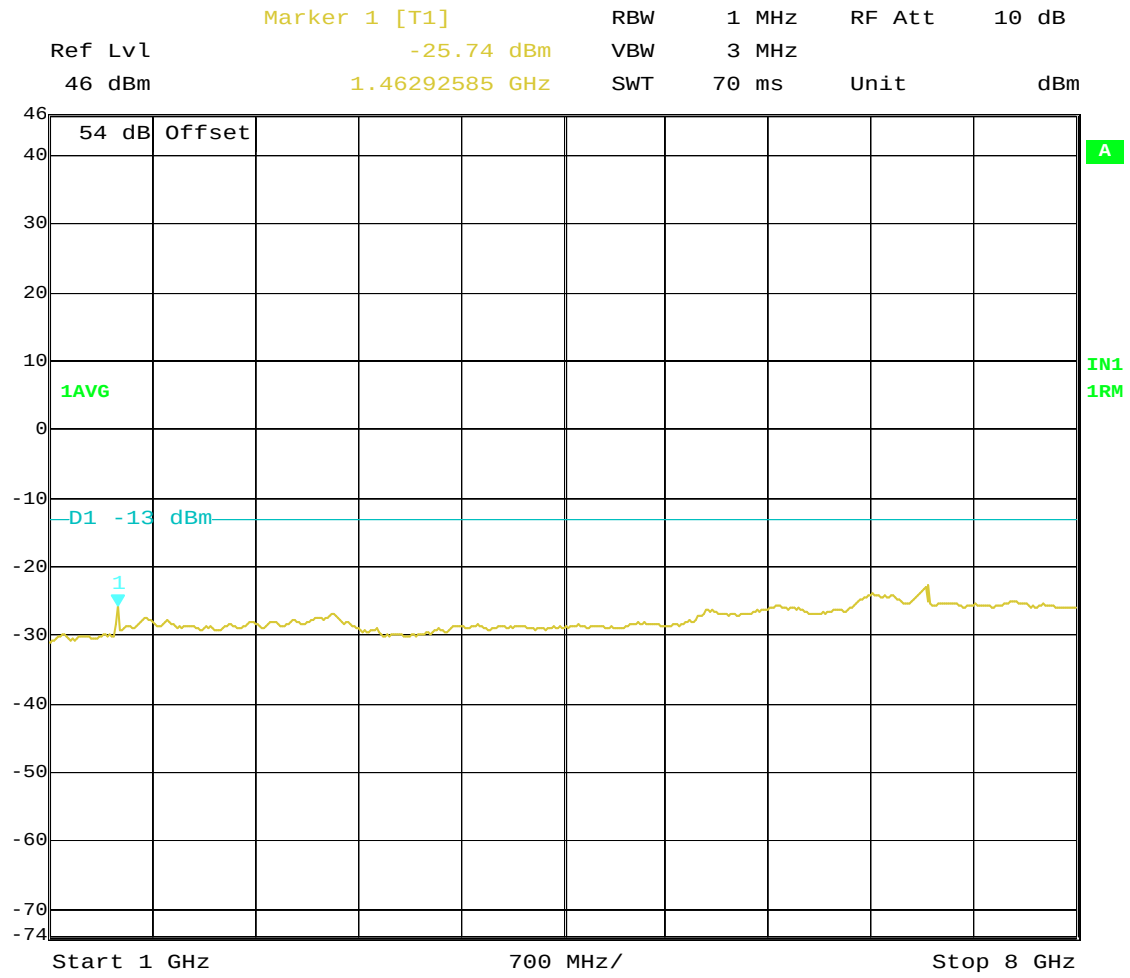
# Block: A
# 16QAM Modulation
# Bandwidth 729 – 734 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:04:40



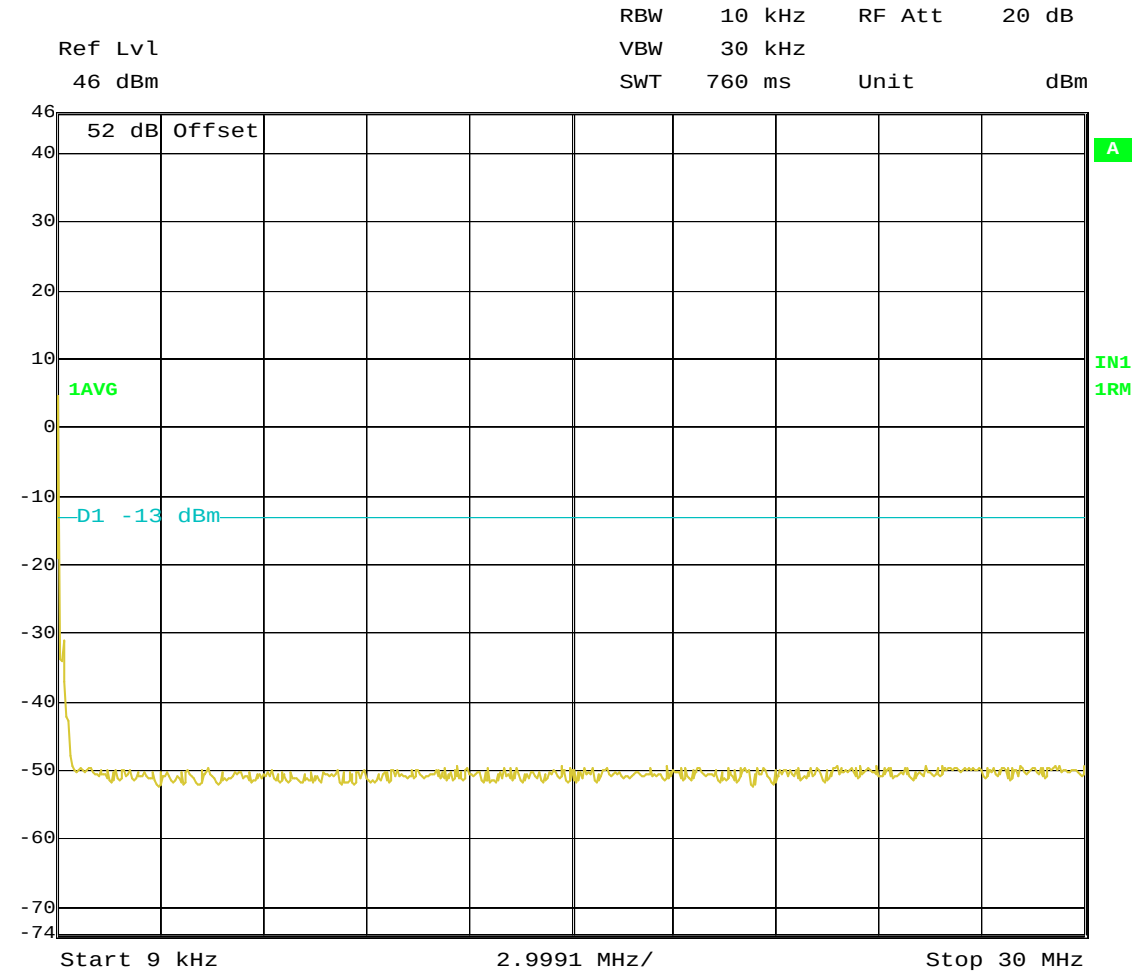

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:03:25



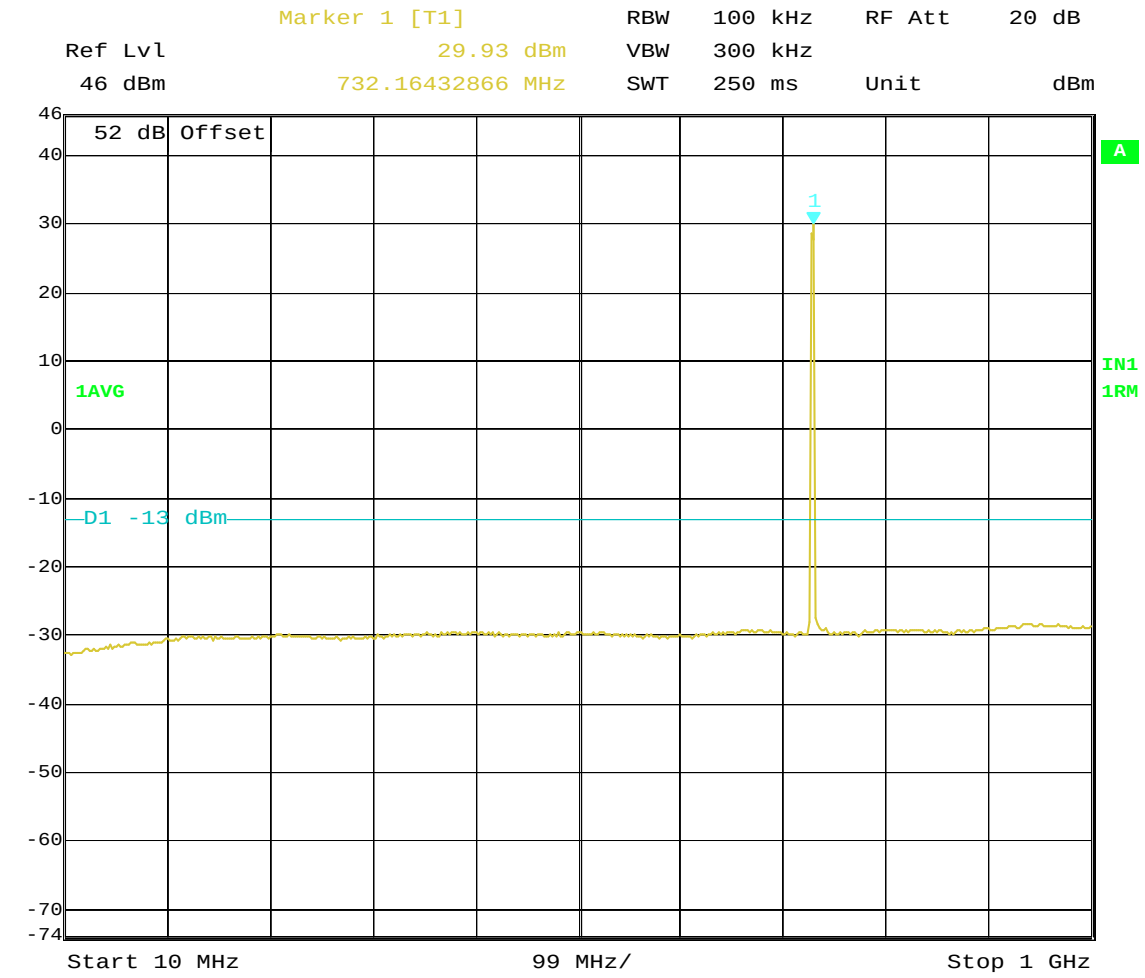

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:02:13

# Transmit Port
# Antenna Conducted Spurious Emissions

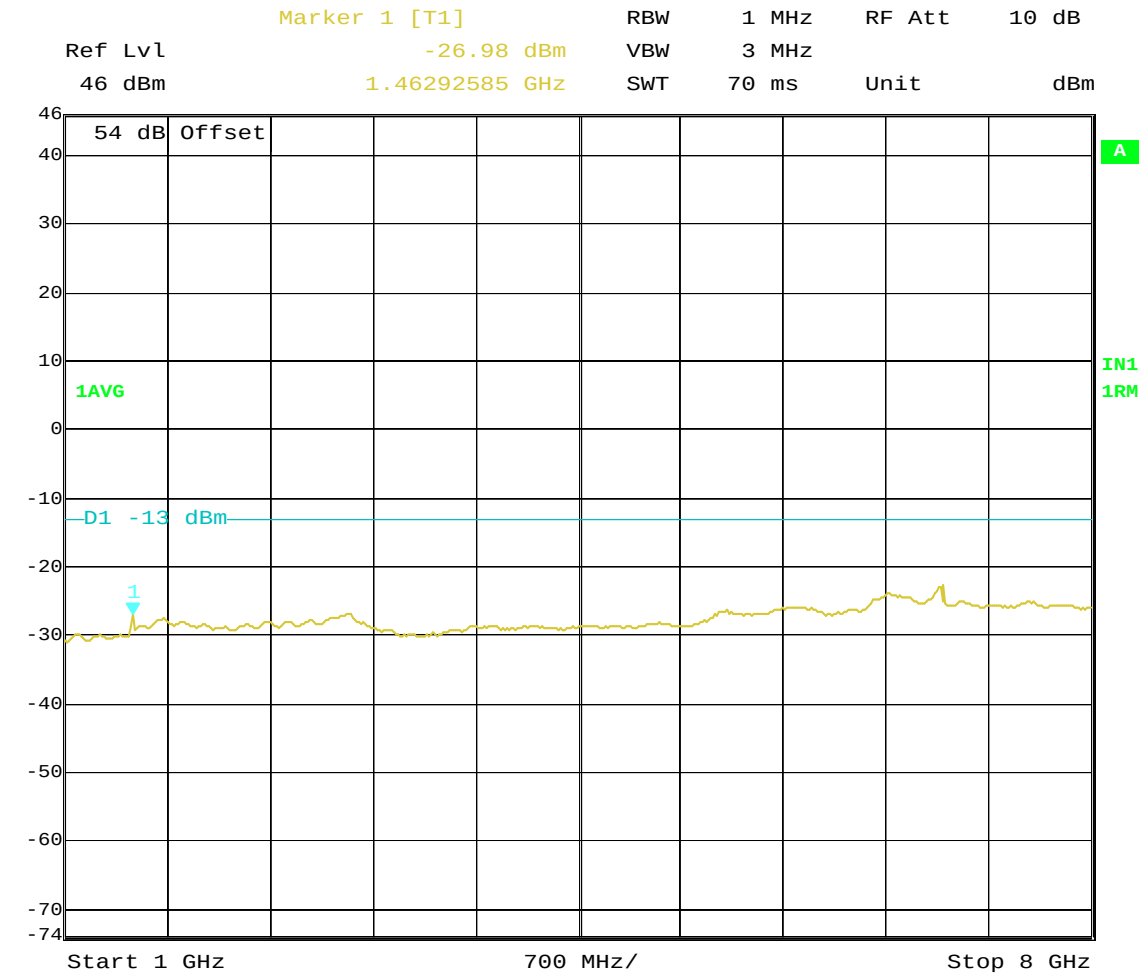
# Block: A
# 64QAM Modulation
# Bandwidth 729 – 734 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:46:25



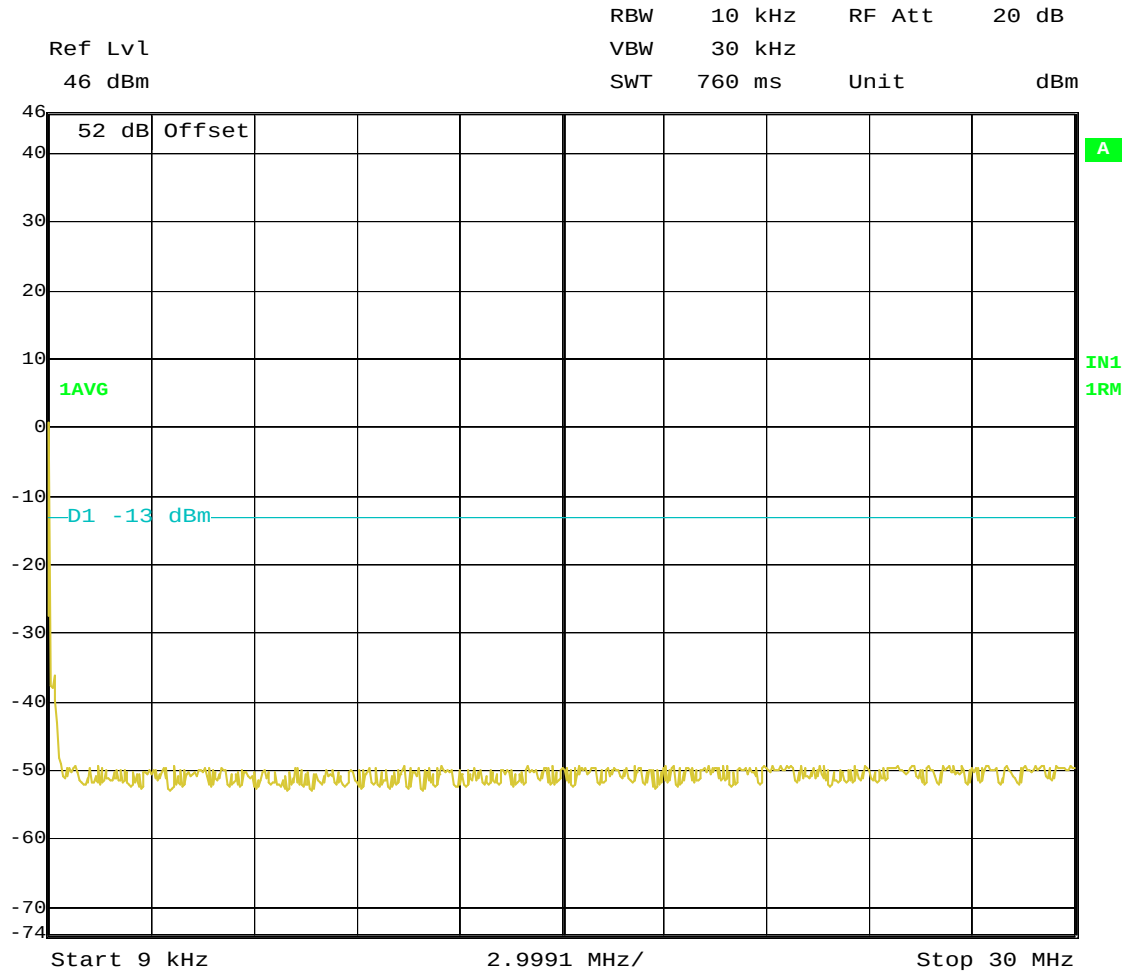

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:44:46



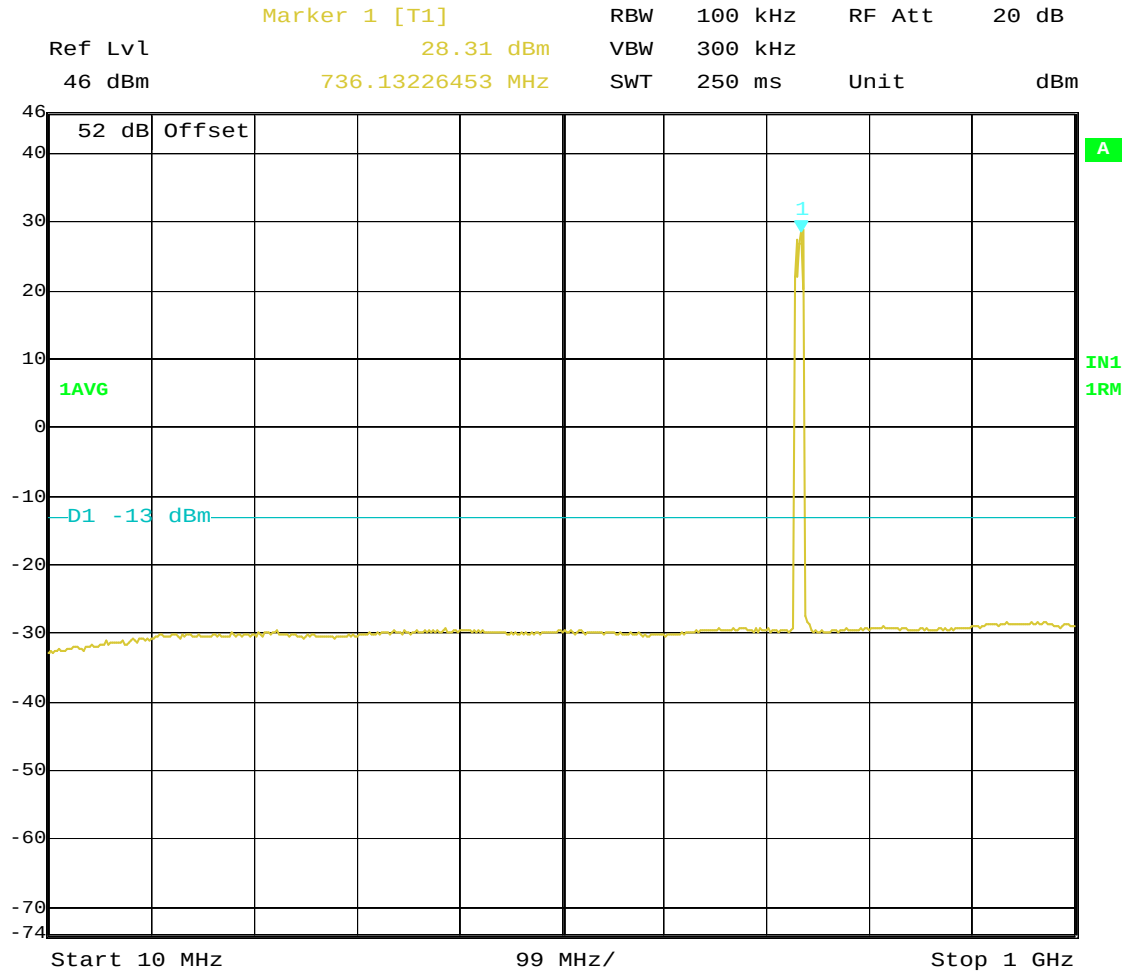

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter: M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 14:47:56

# Transmit Port
# Antenna Conducted Spurious Emissions

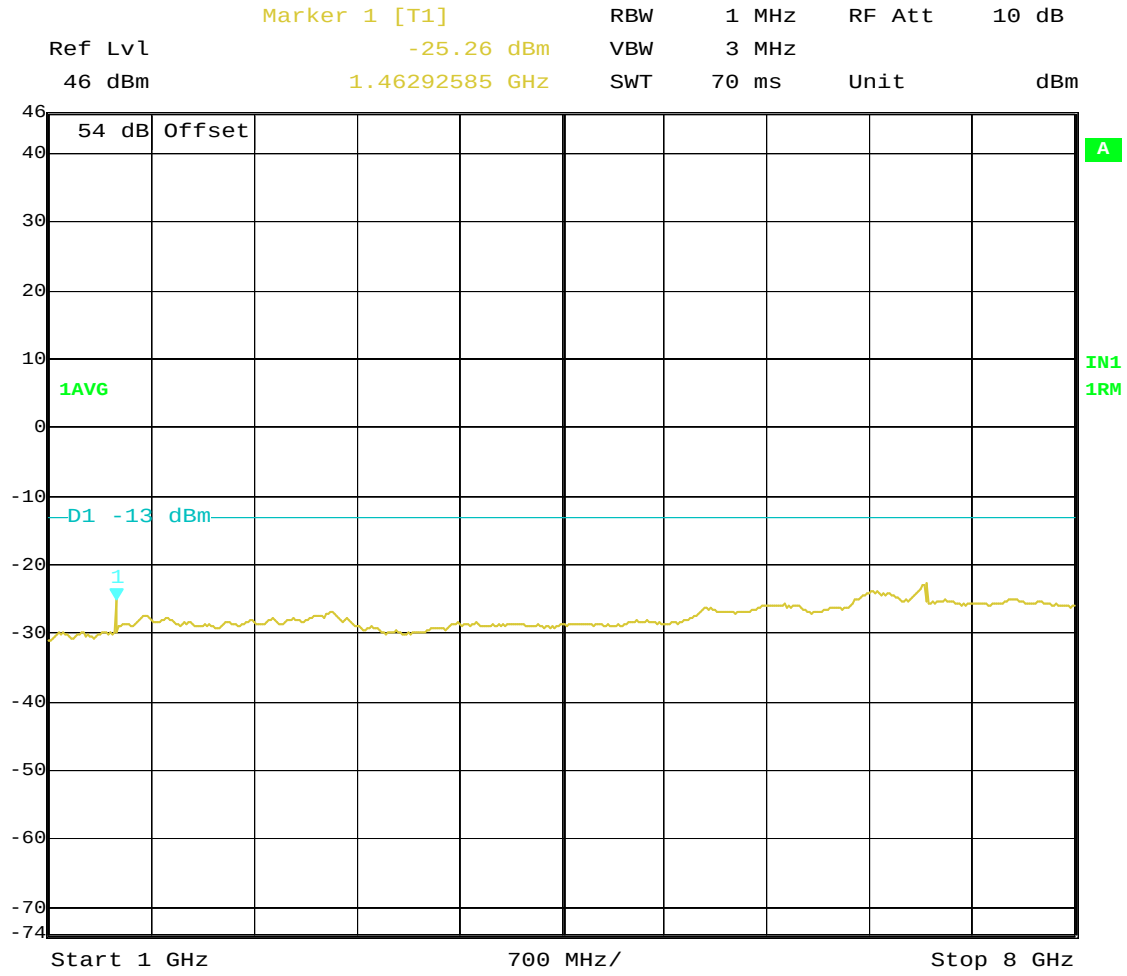
# Block: A+B
# QPSK Modulation
# Bandwidth 729.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:14:54



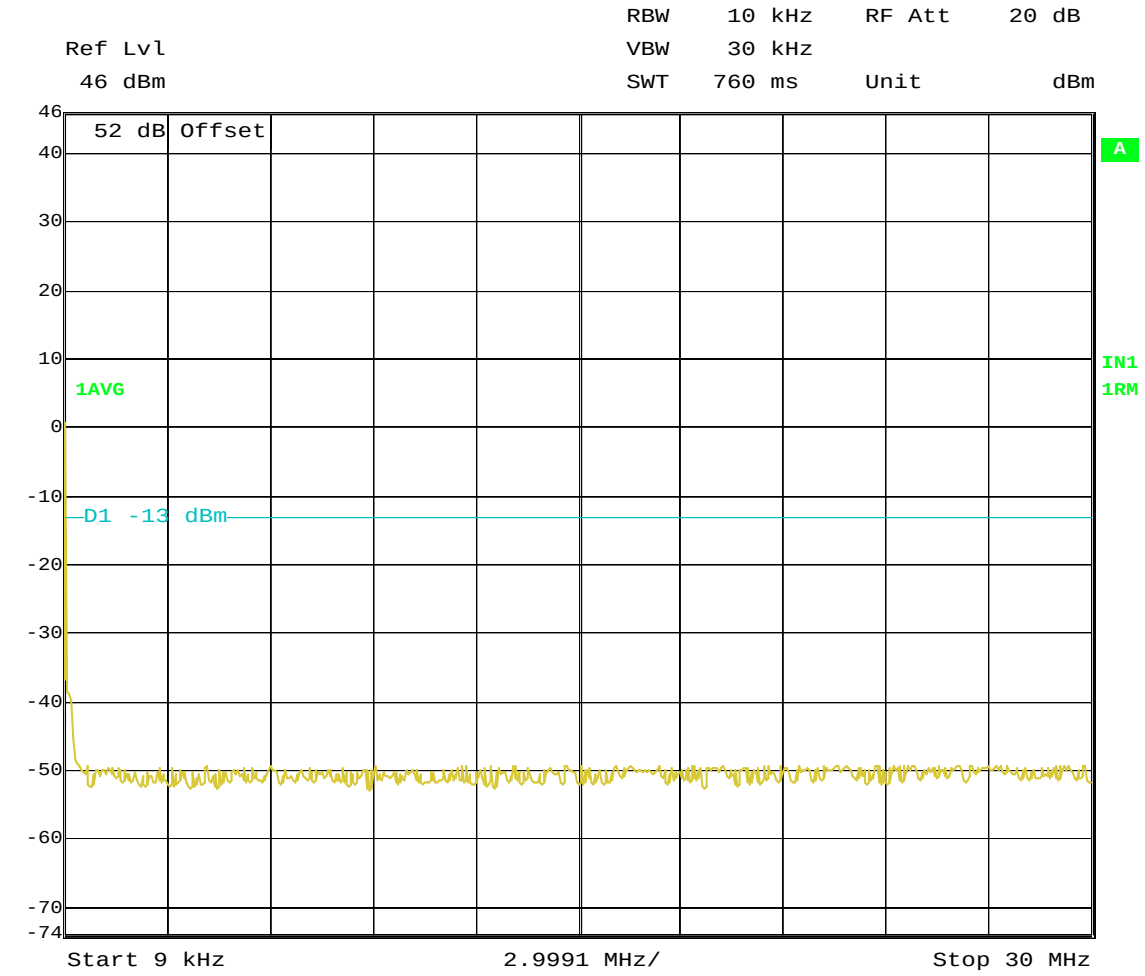

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:17:01



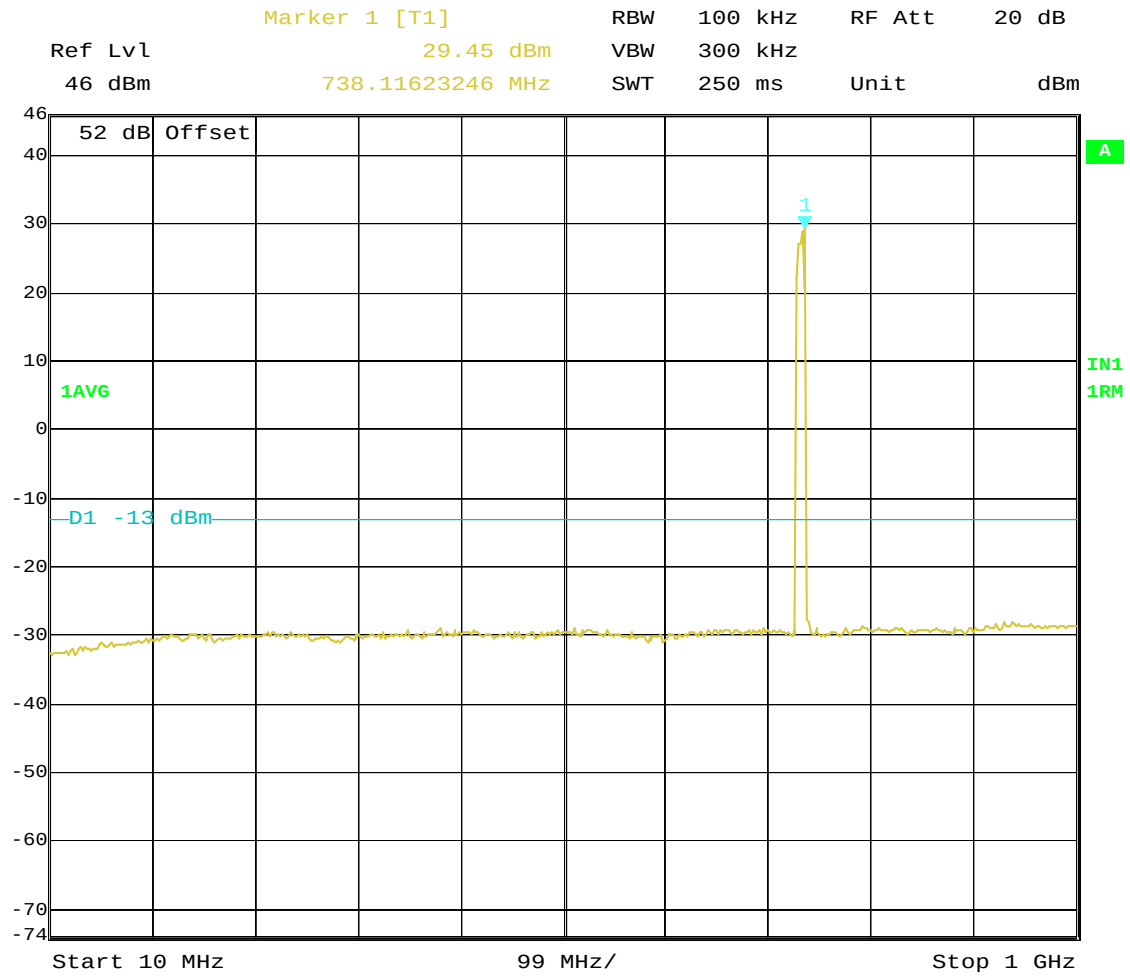

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:18:09

# Transmit Port
# Antenna Conducted Spurious Emissions

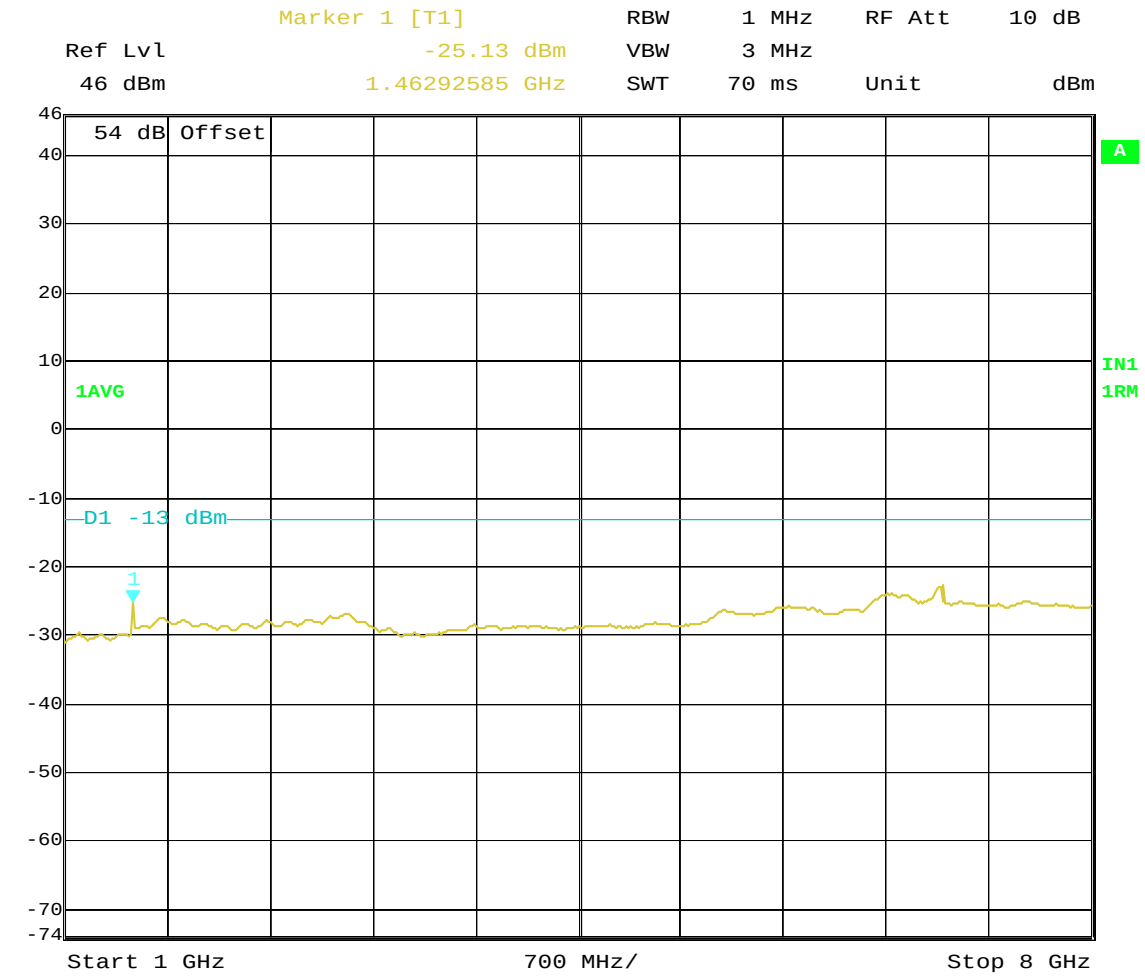
# Block: A+B
# 16QAM Modulation
# Bandwidth 729.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 09:38:18



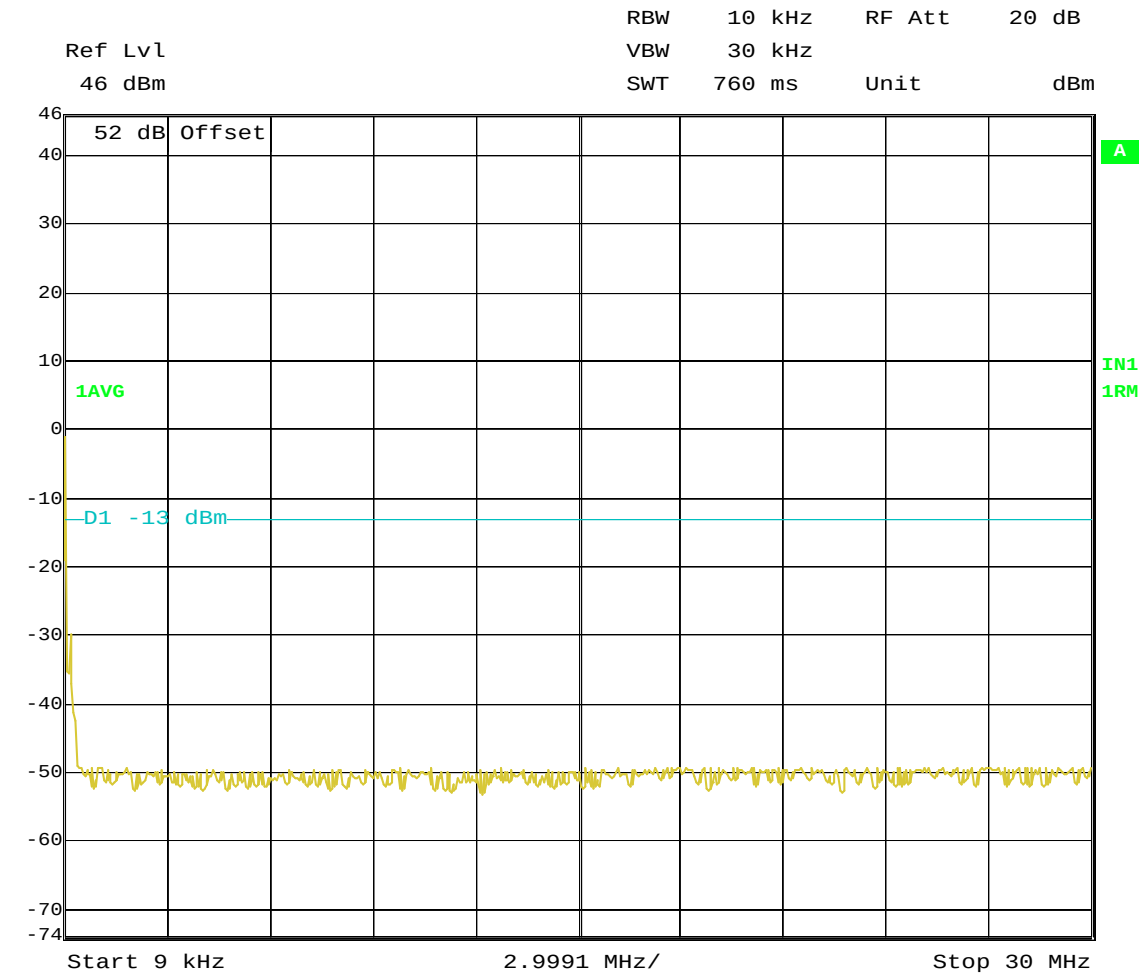

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:59:01



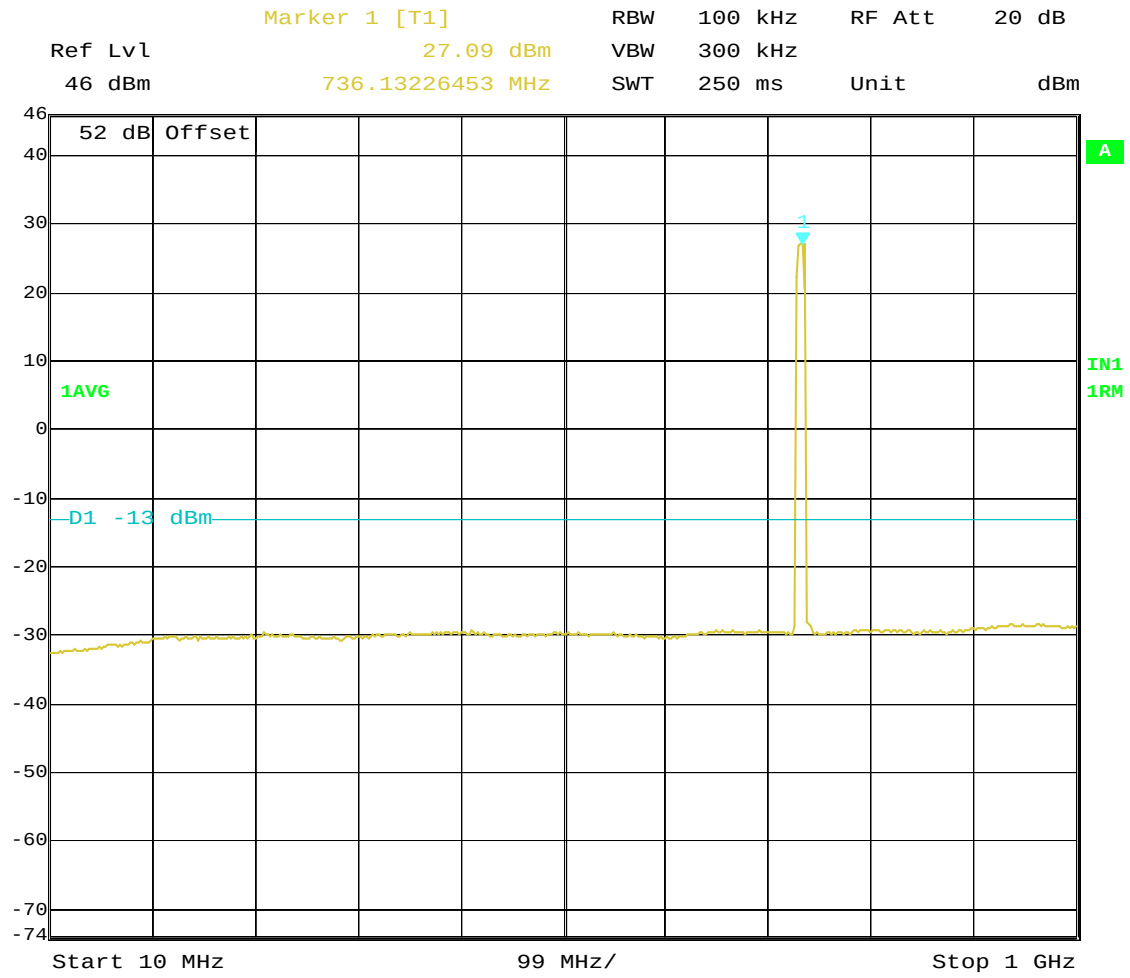

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:57:50

# Transmit Port
# Antenna Conducted Spurious Emissions

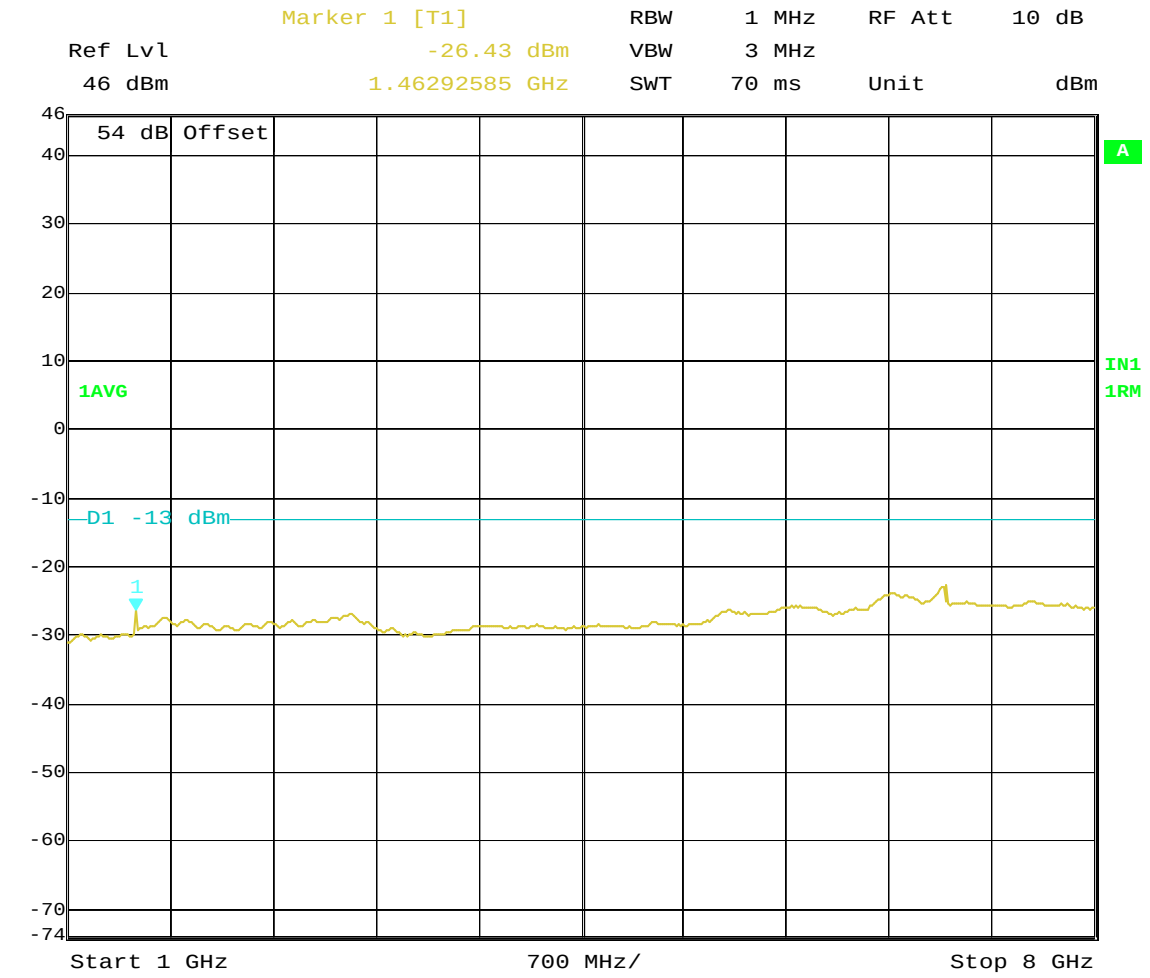
# Block: A+B
# 64QAM Modulation
# Bandwidth 729.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:26:01



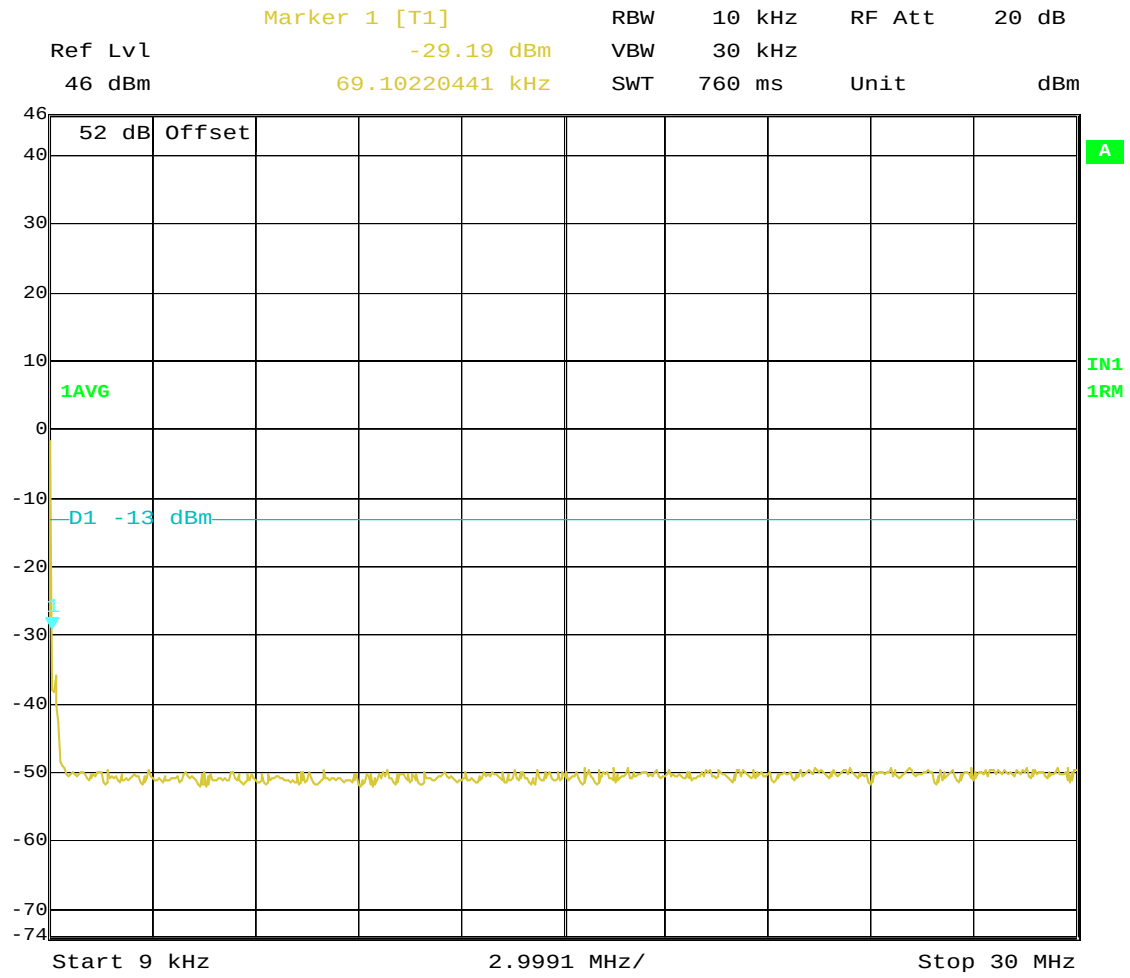

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:27:39



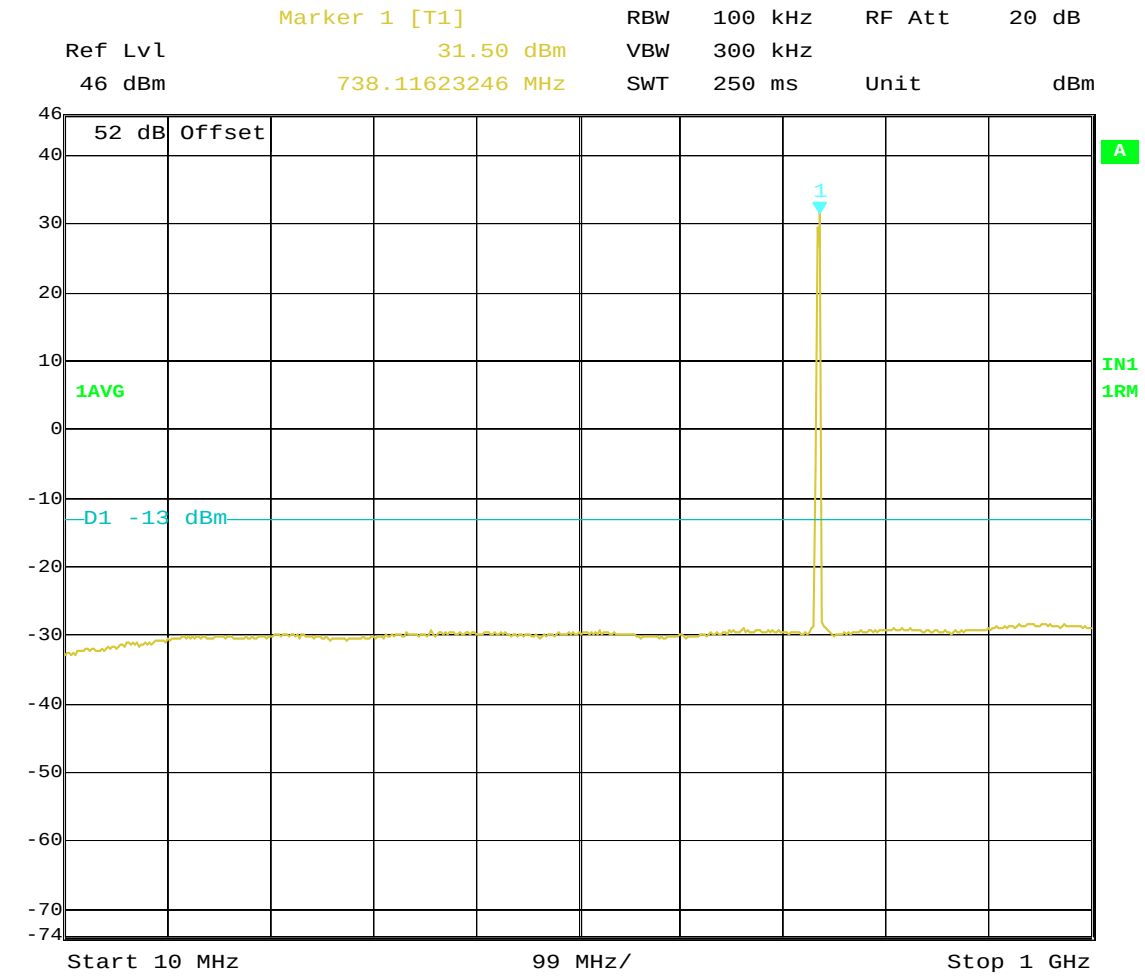

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 08:29:05

# Transmit Port
# Antenna Conducted Spurious Emissions

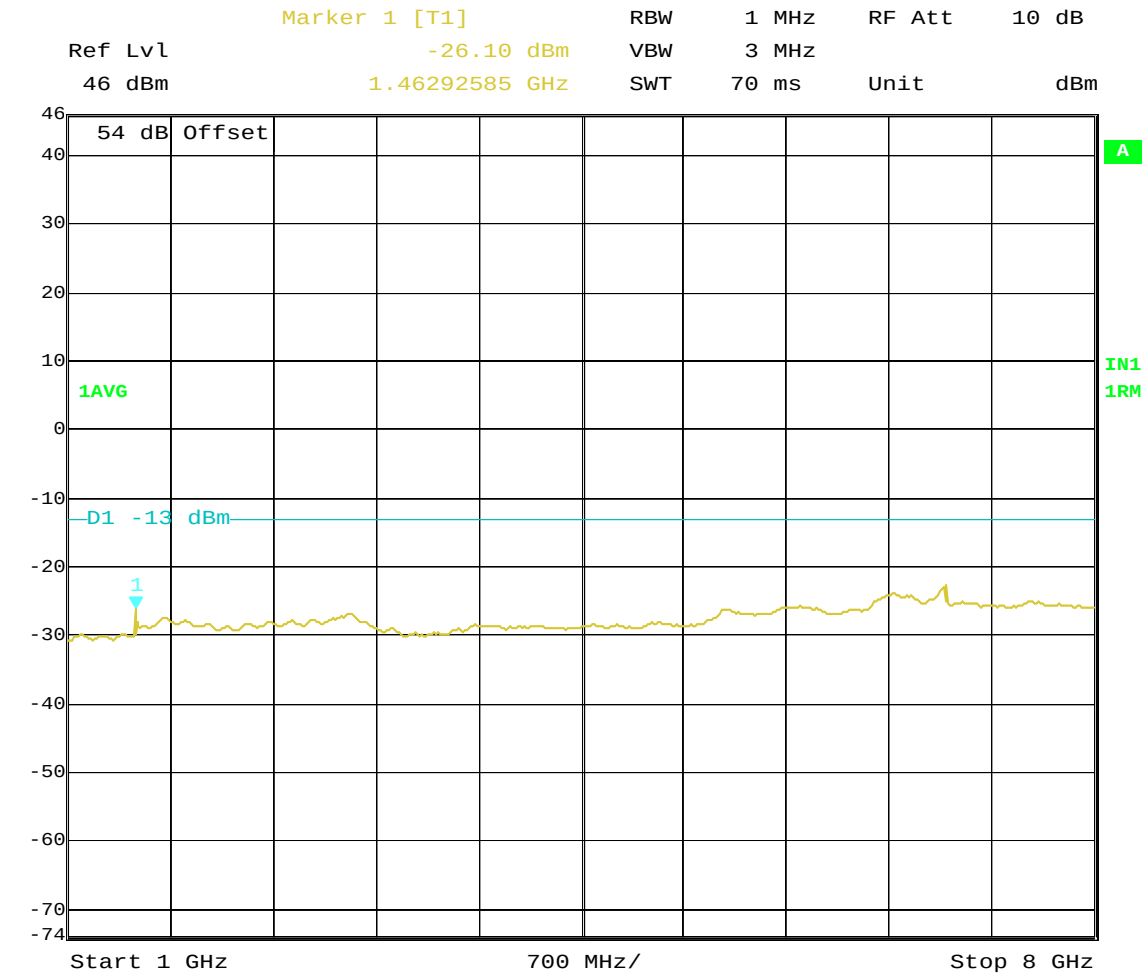
# Block: B
# QPSK Modulation
# Bandwidth 734.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter: M
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 07:49:10



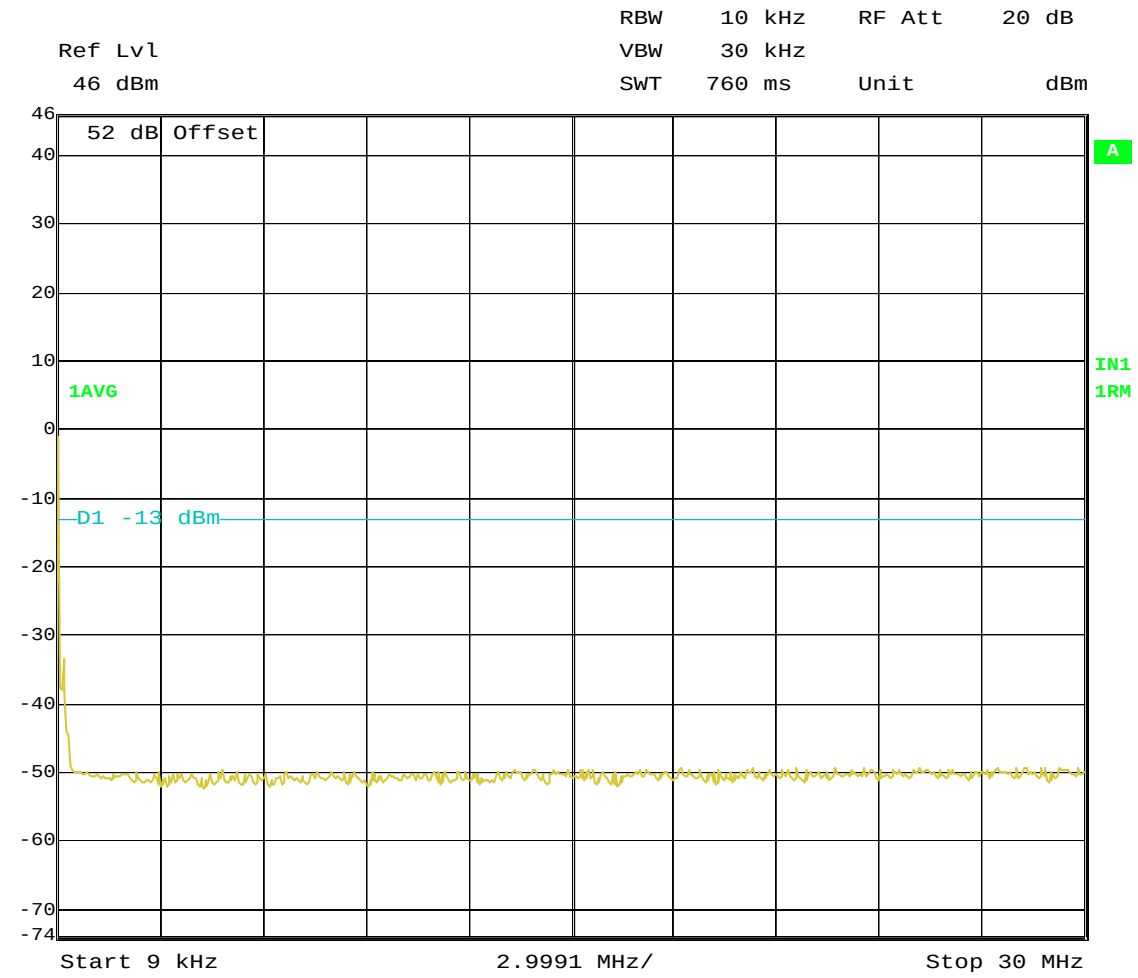

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter: M
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 07:47:29



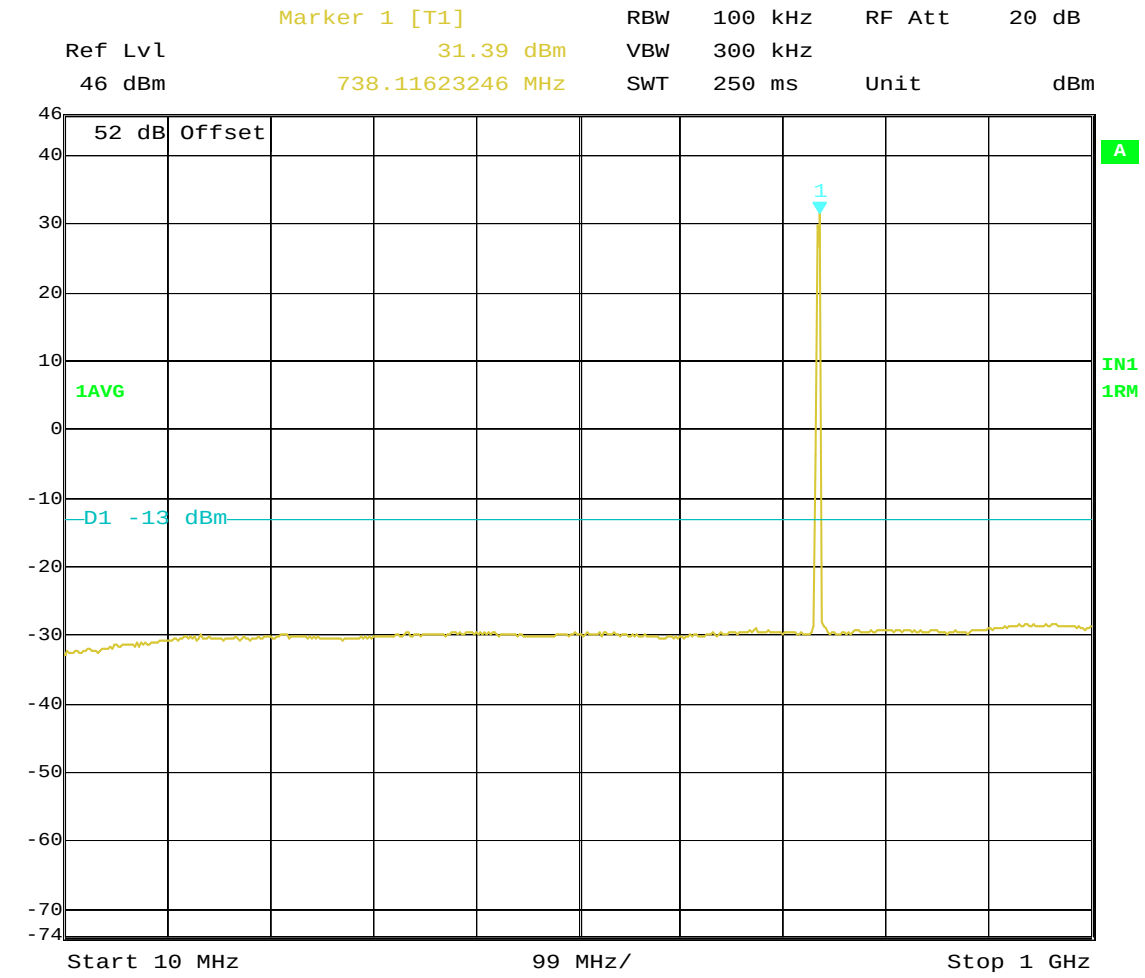

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter: M
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 07:36:01

# Transmit Port
# Antenna Conducted Spurious Emissions

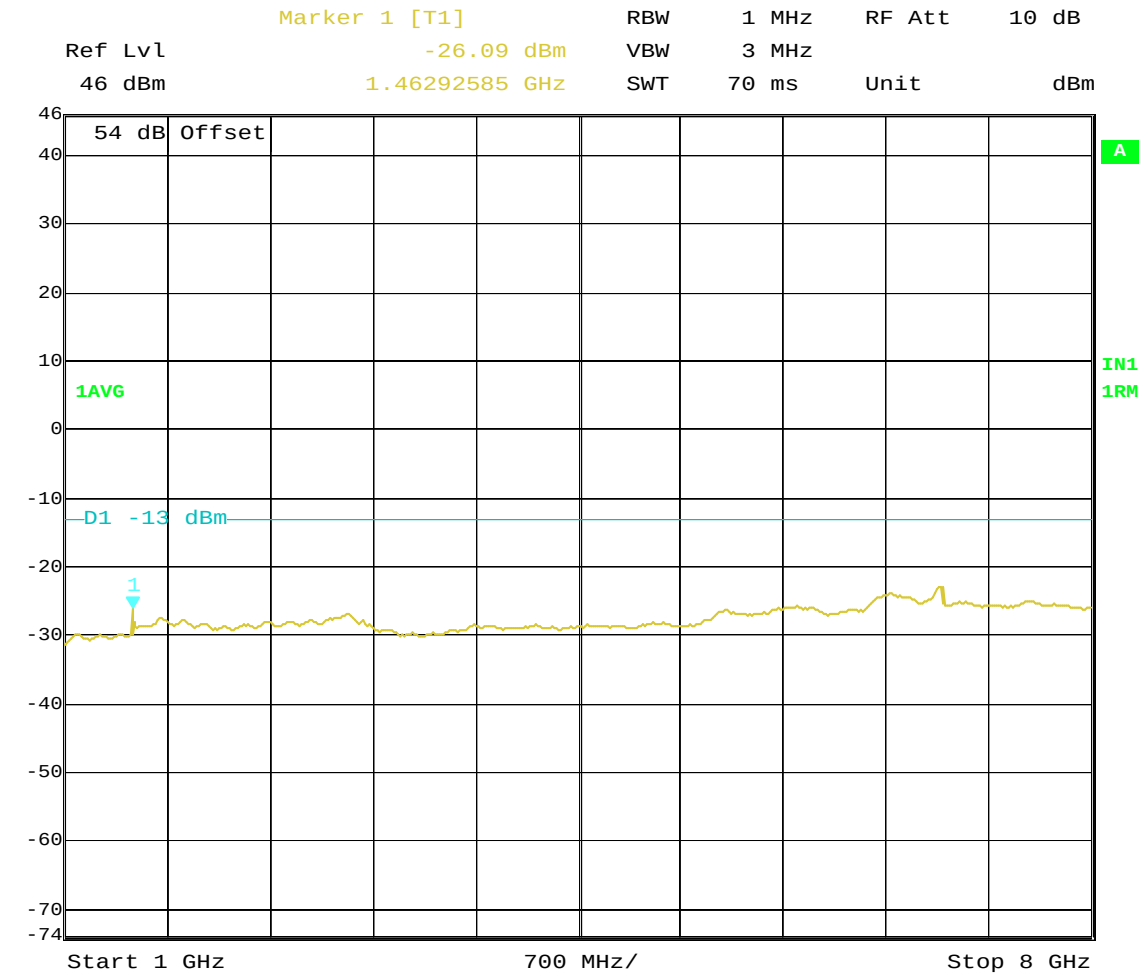
# Block: B
# 16QAM Modulation
# Bandwidth 734.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:30:40



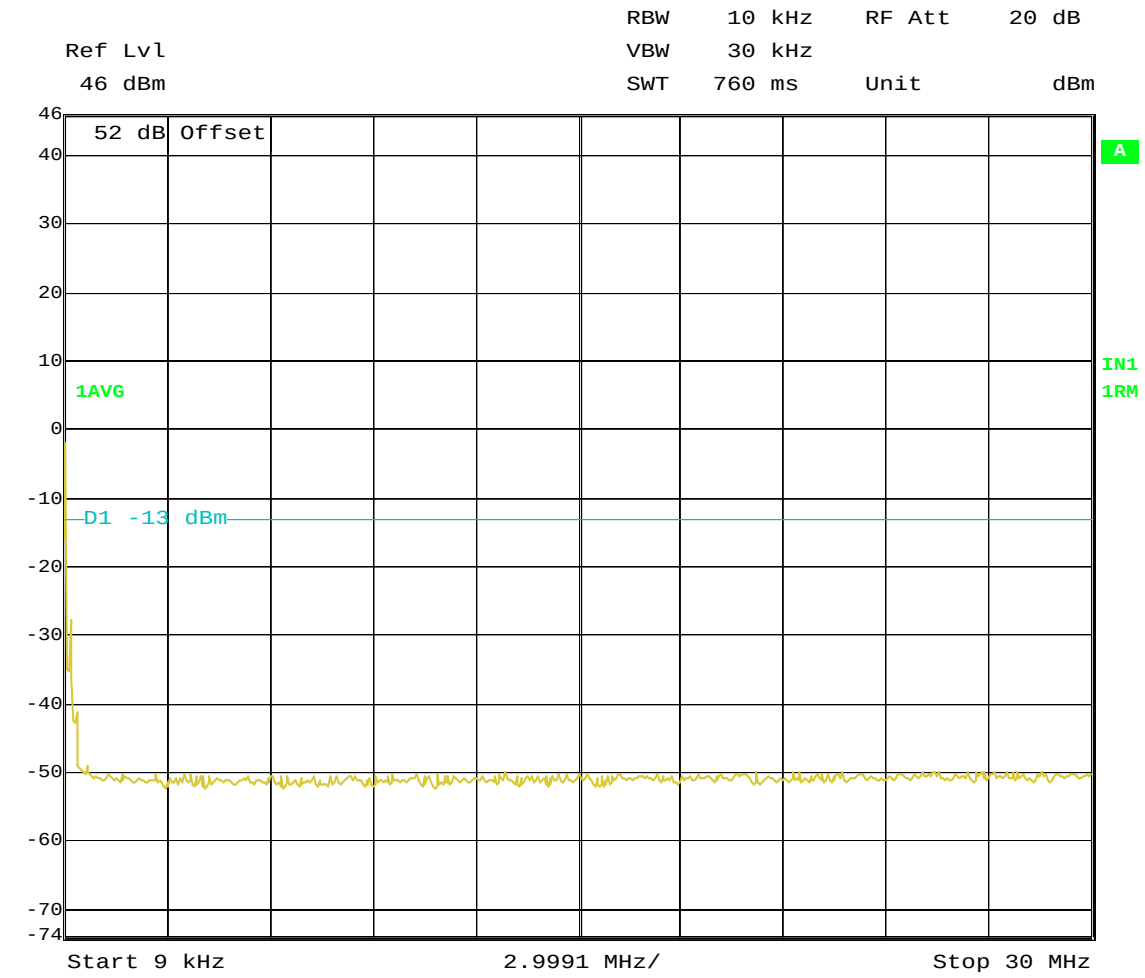

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:31:36



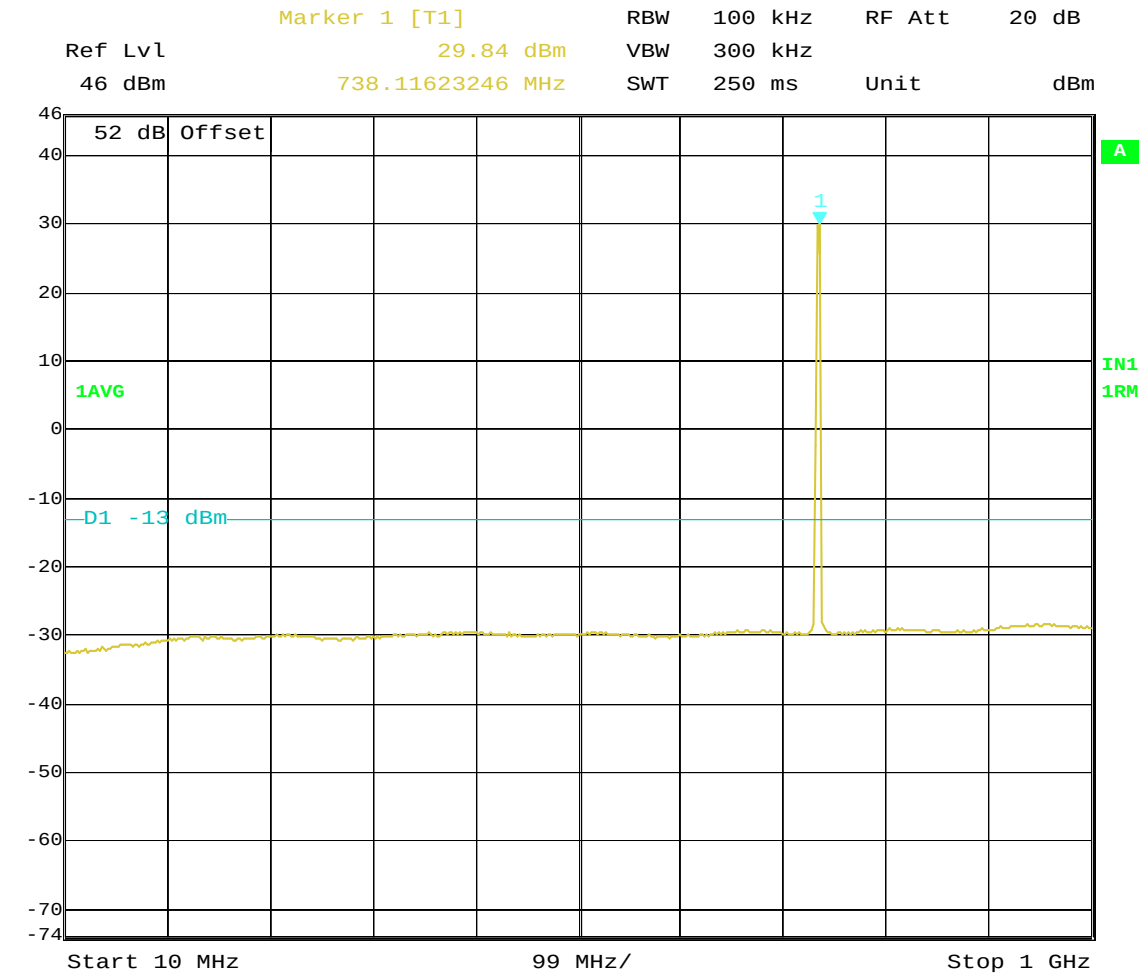

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 08:33:06

# Transmit Port
# Antenna Conducted Spurious Emissions

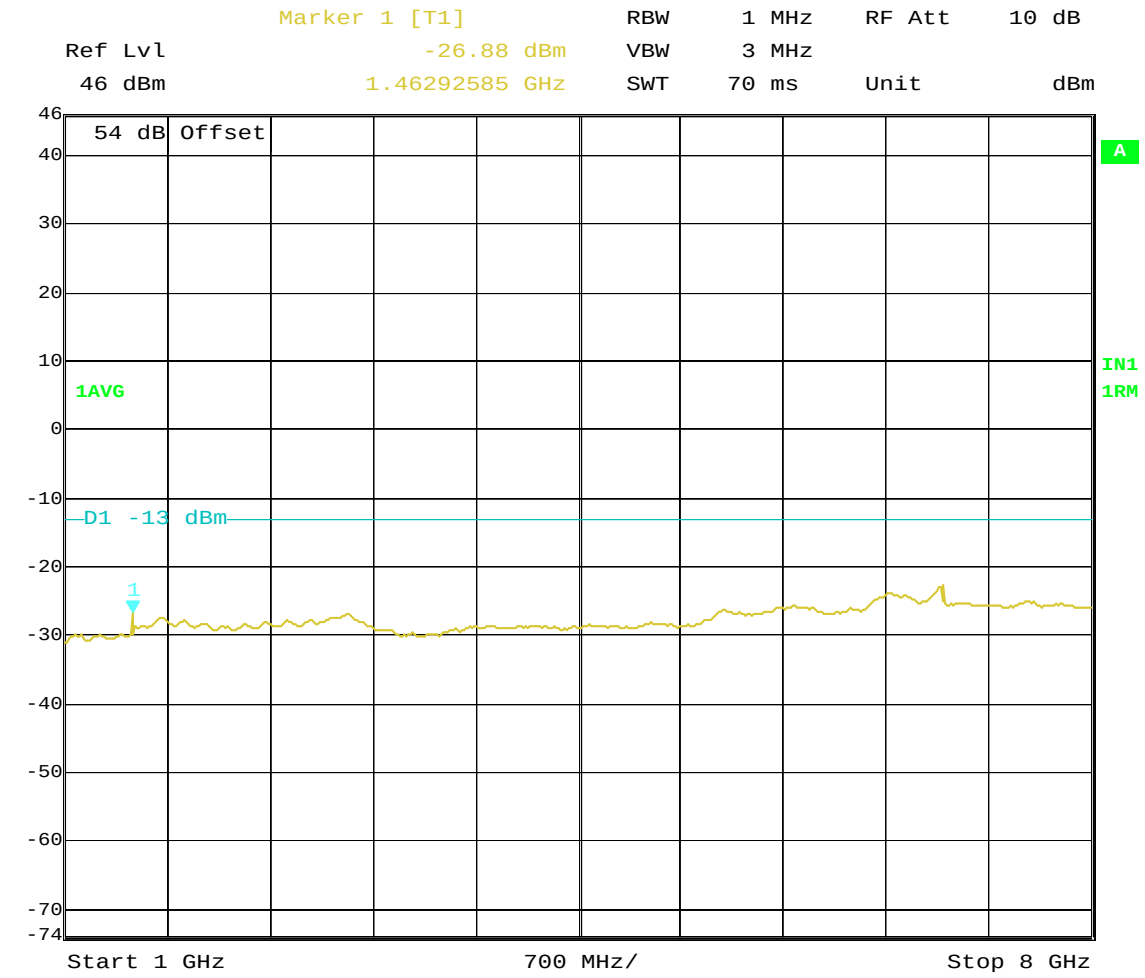
# Block: B
# 64QAM Modulation
# Bandwidth 734.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:27:21



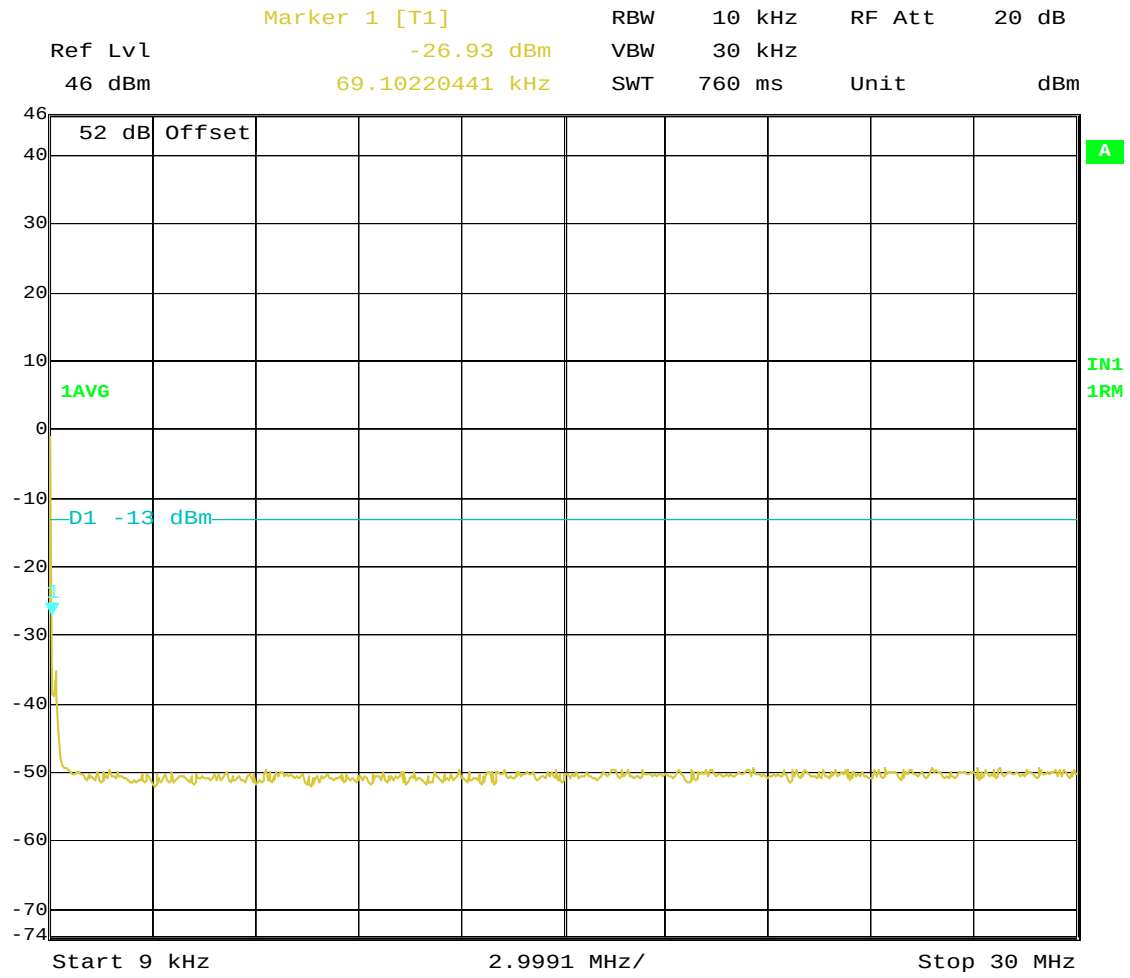

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:28:33



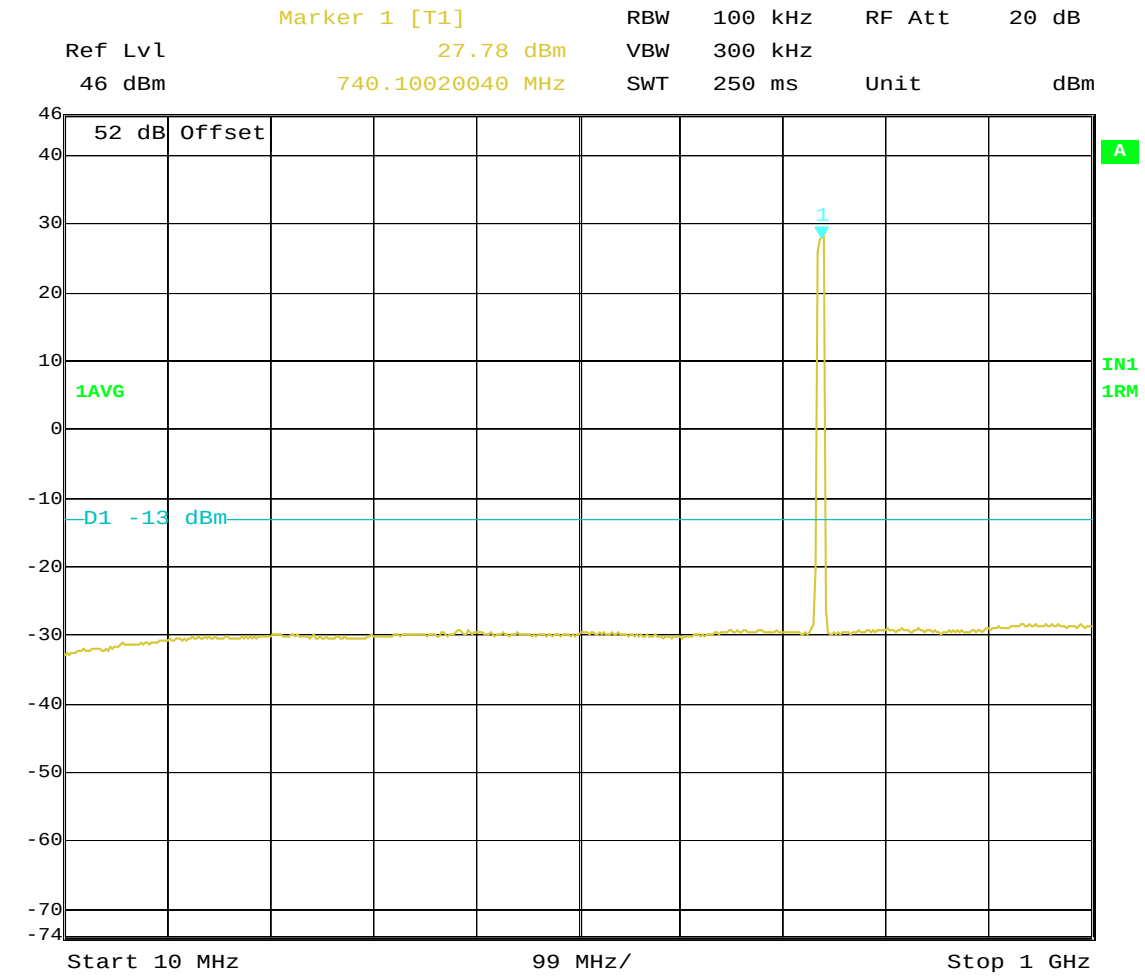

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk B; 734.5-739.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:29:44

# Transmit Port
# Antenna Conducted Spurious Emissions

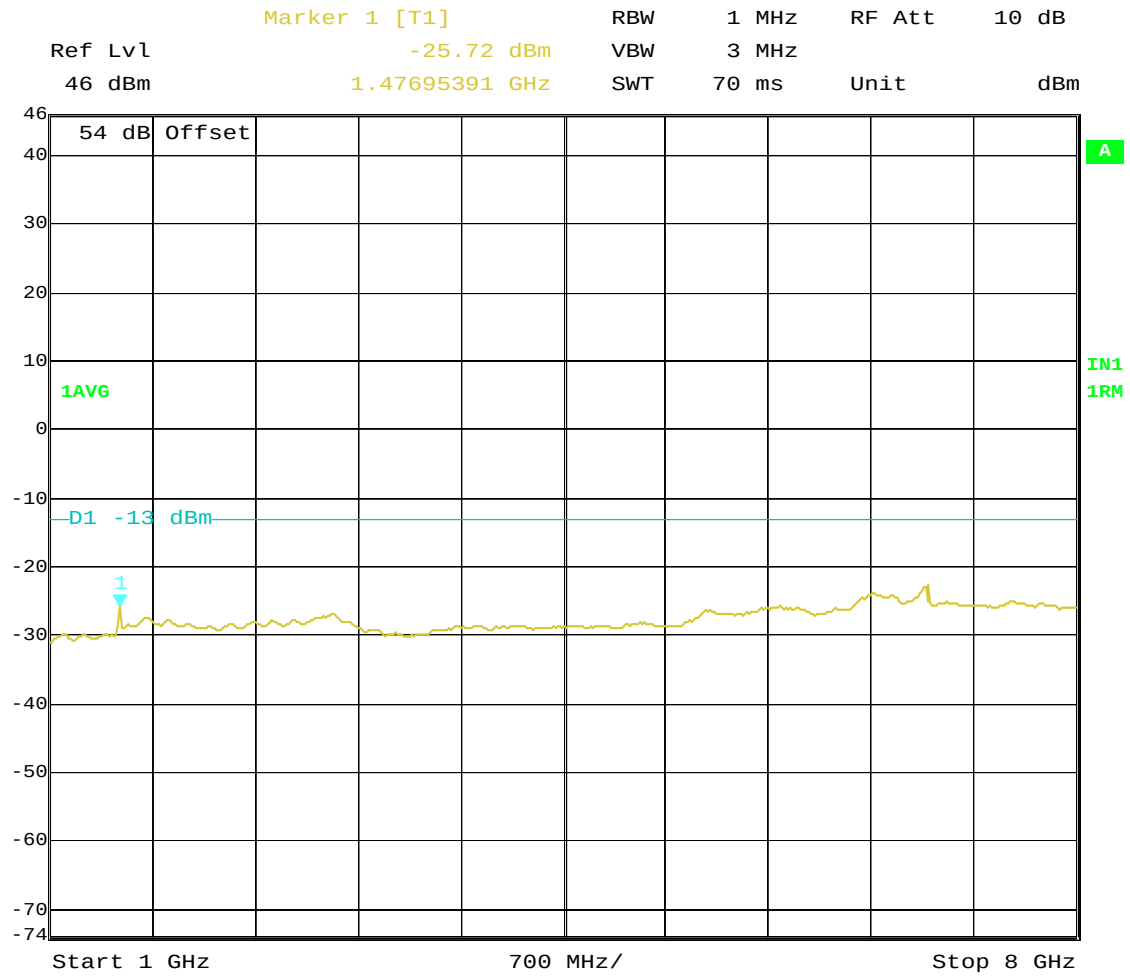
# Block: B+C
# QPSK Modulation
# Bandwidth 734.5 – 744.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:01:17



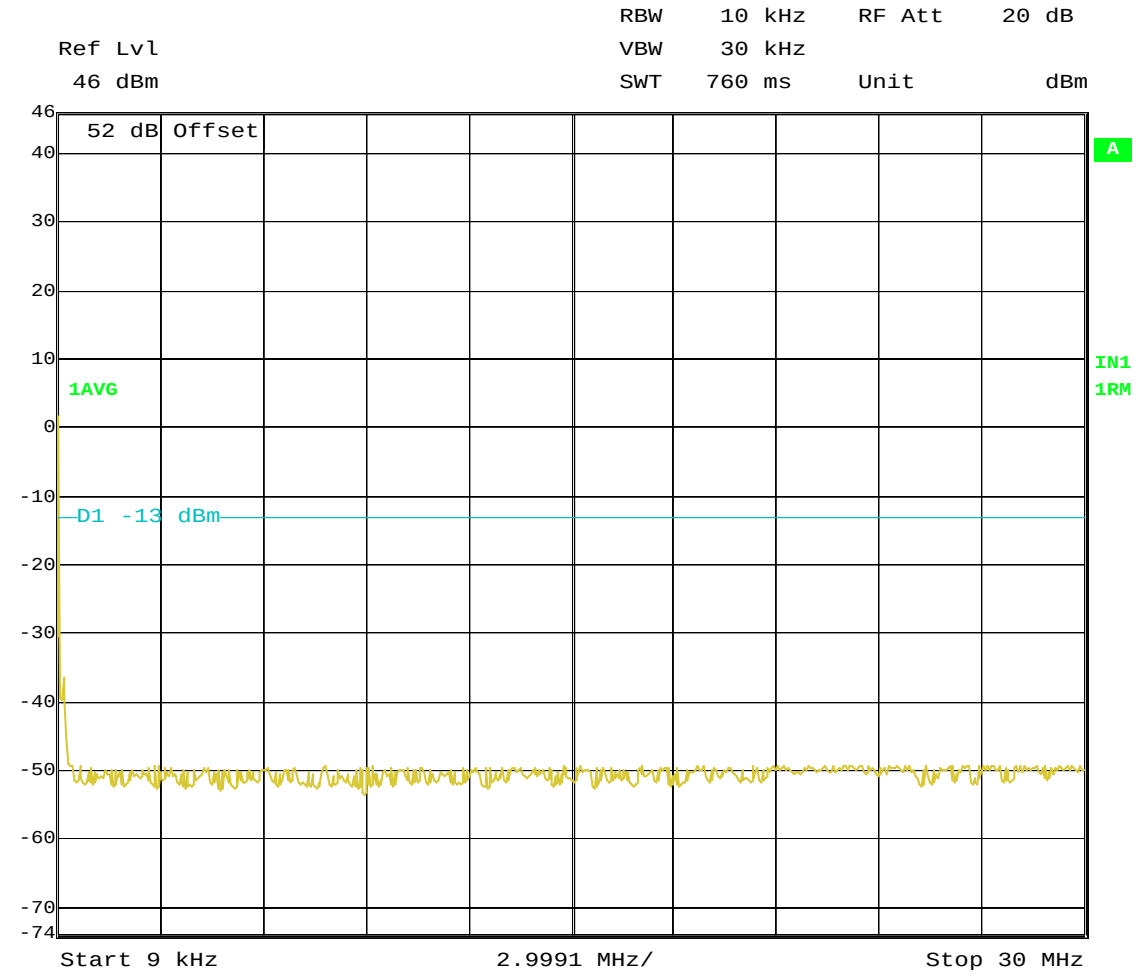

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:59:40



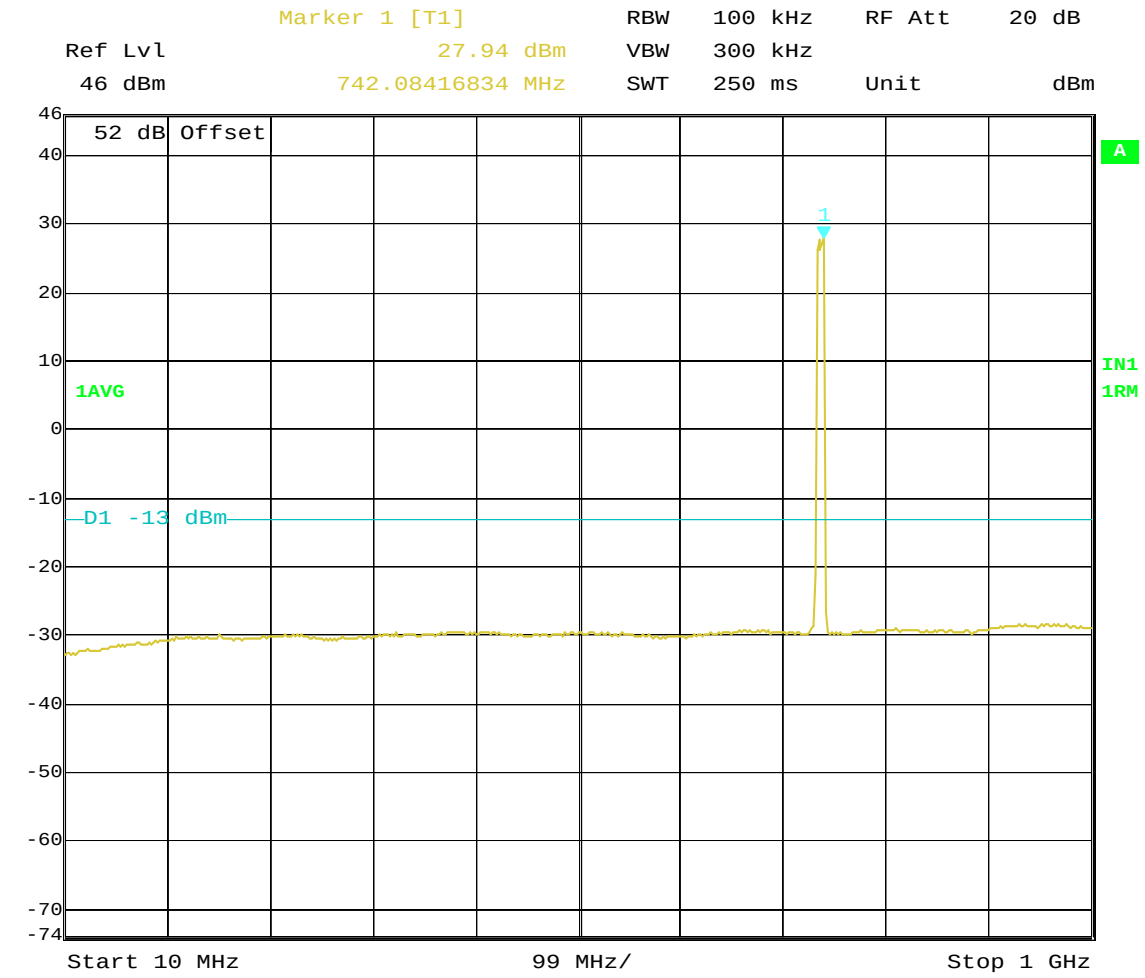

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 10:57:50

# Transmit Port
# Antenna Conducted Spurious Emissions

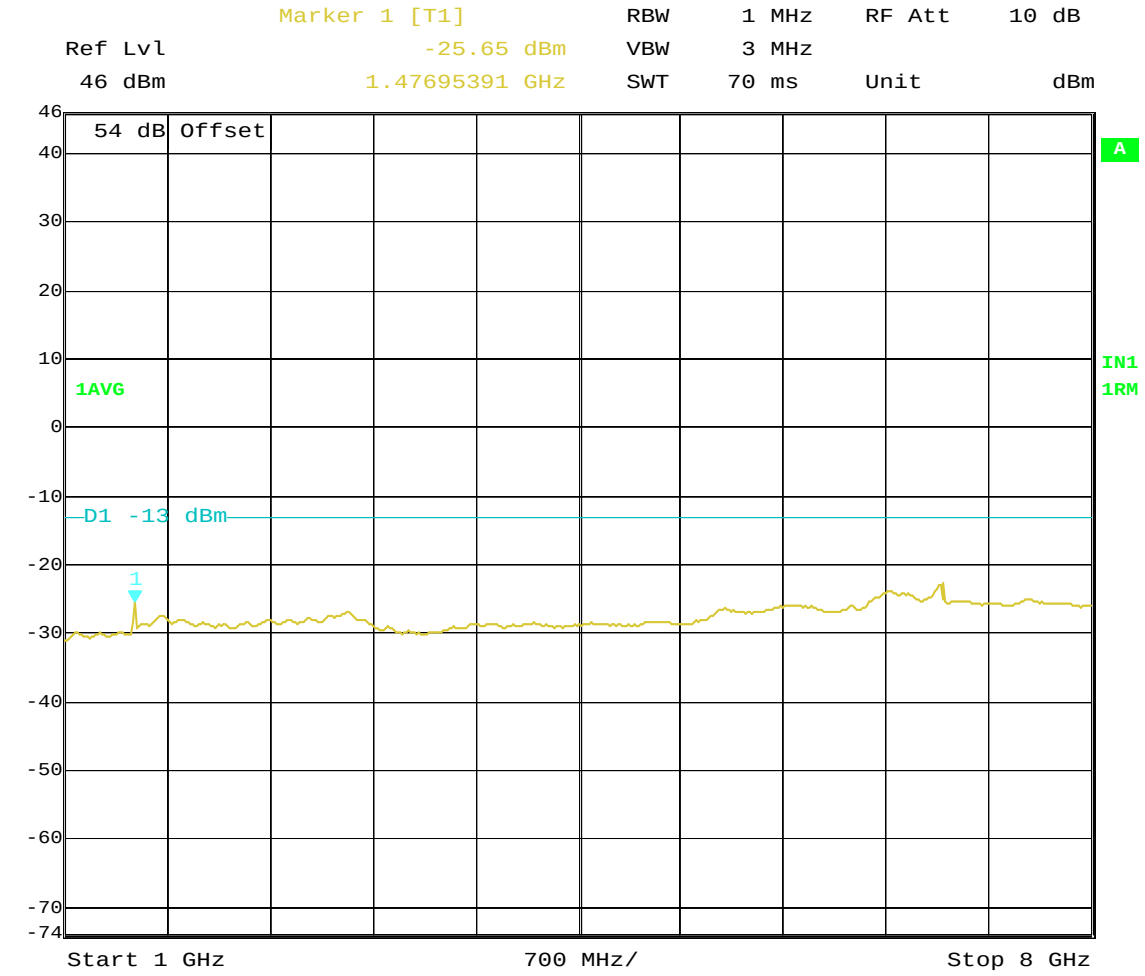
# Block: B+C
# 16QAM Modulation
# Bandwidth 734.5 – 744.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:34:10



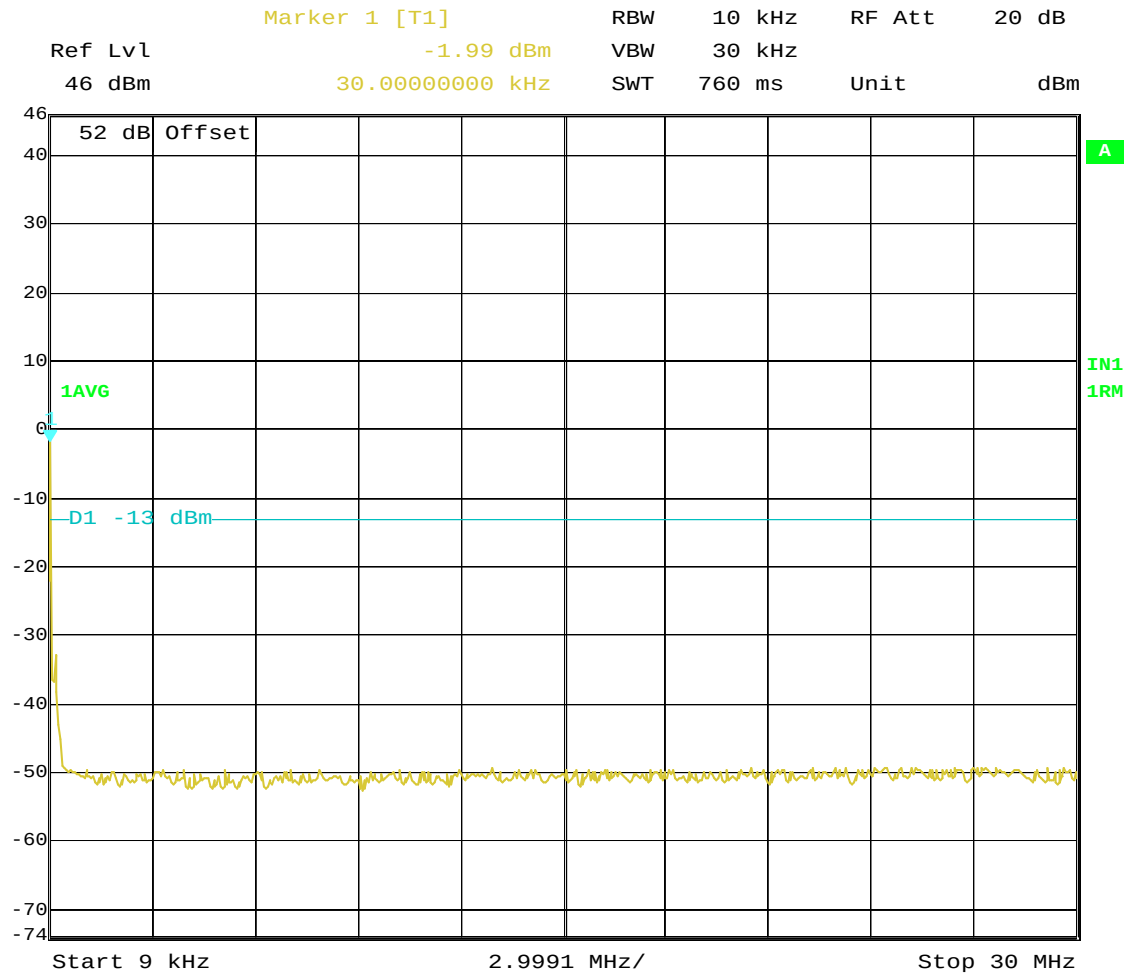

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:35:19



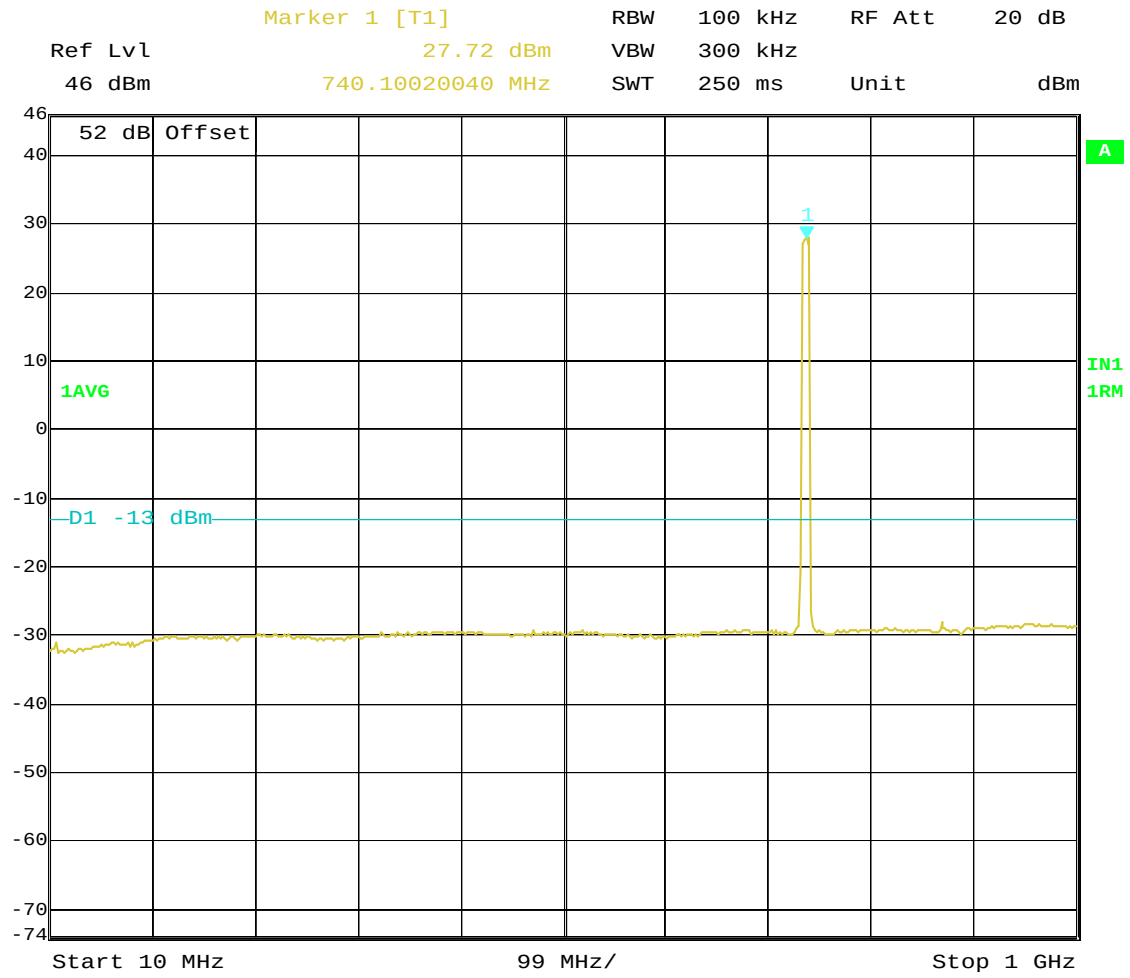

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 11:36:25

# Transmit Port
# Antenna Conducted Spurious Emissions

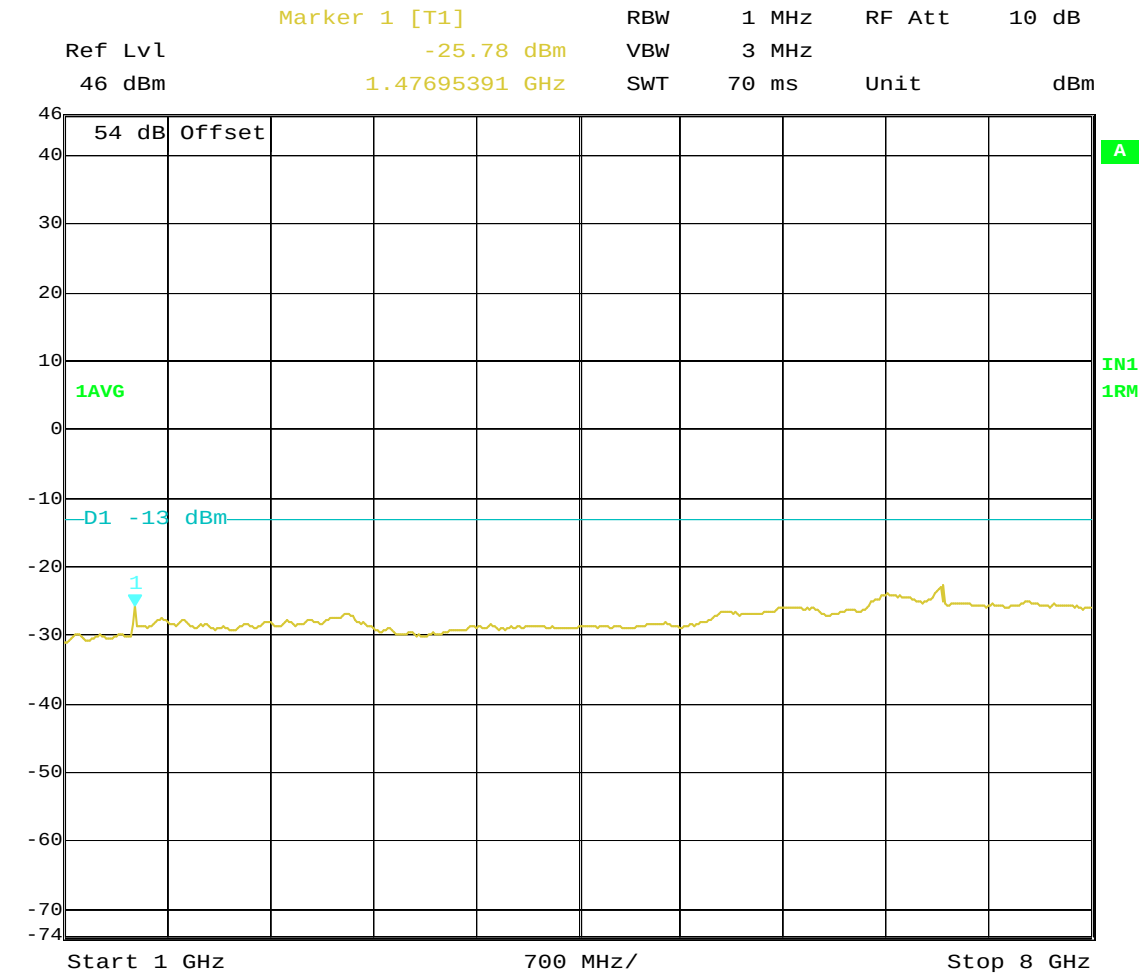
# Block: B+C
# 64QAM Modulation
# Bandwidth 734.5 – 744.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 12:53:19



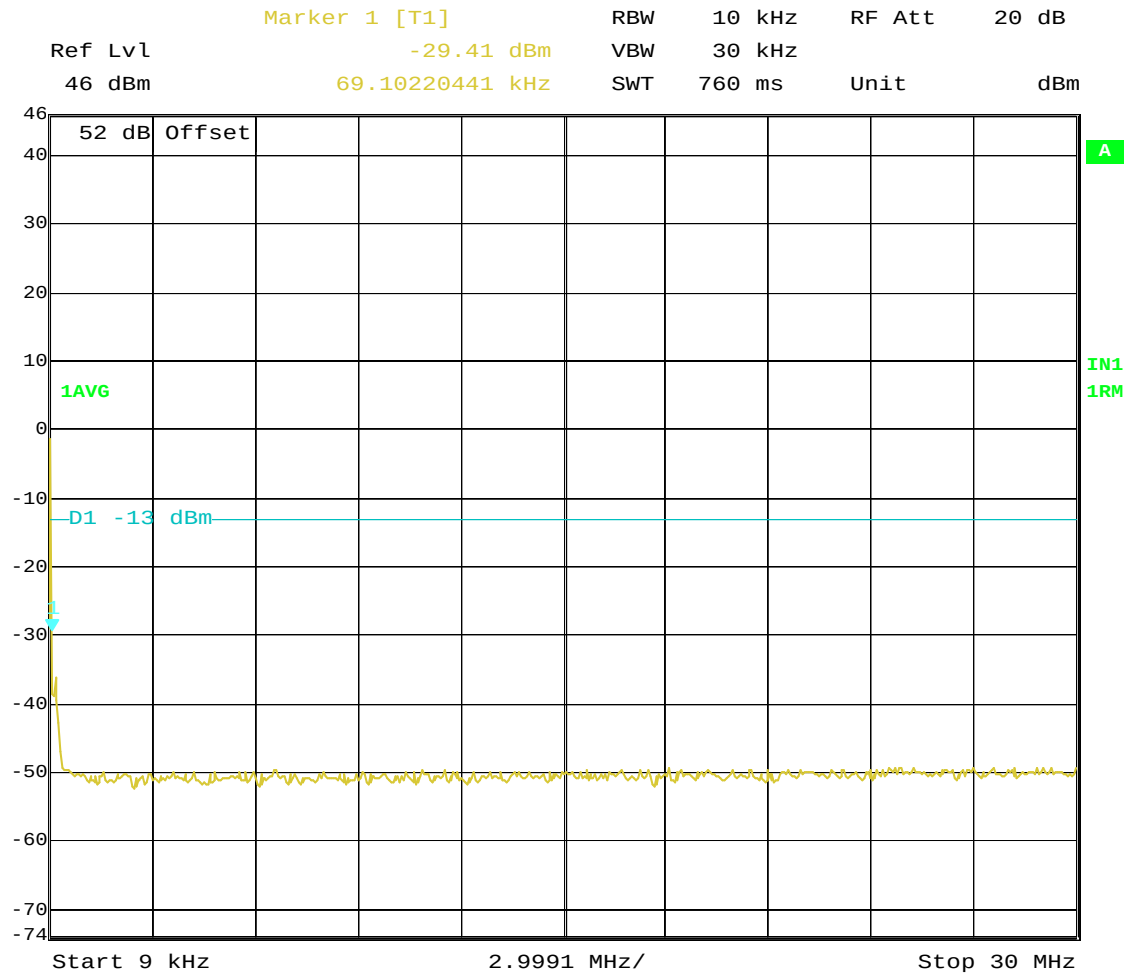

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 12:49:02



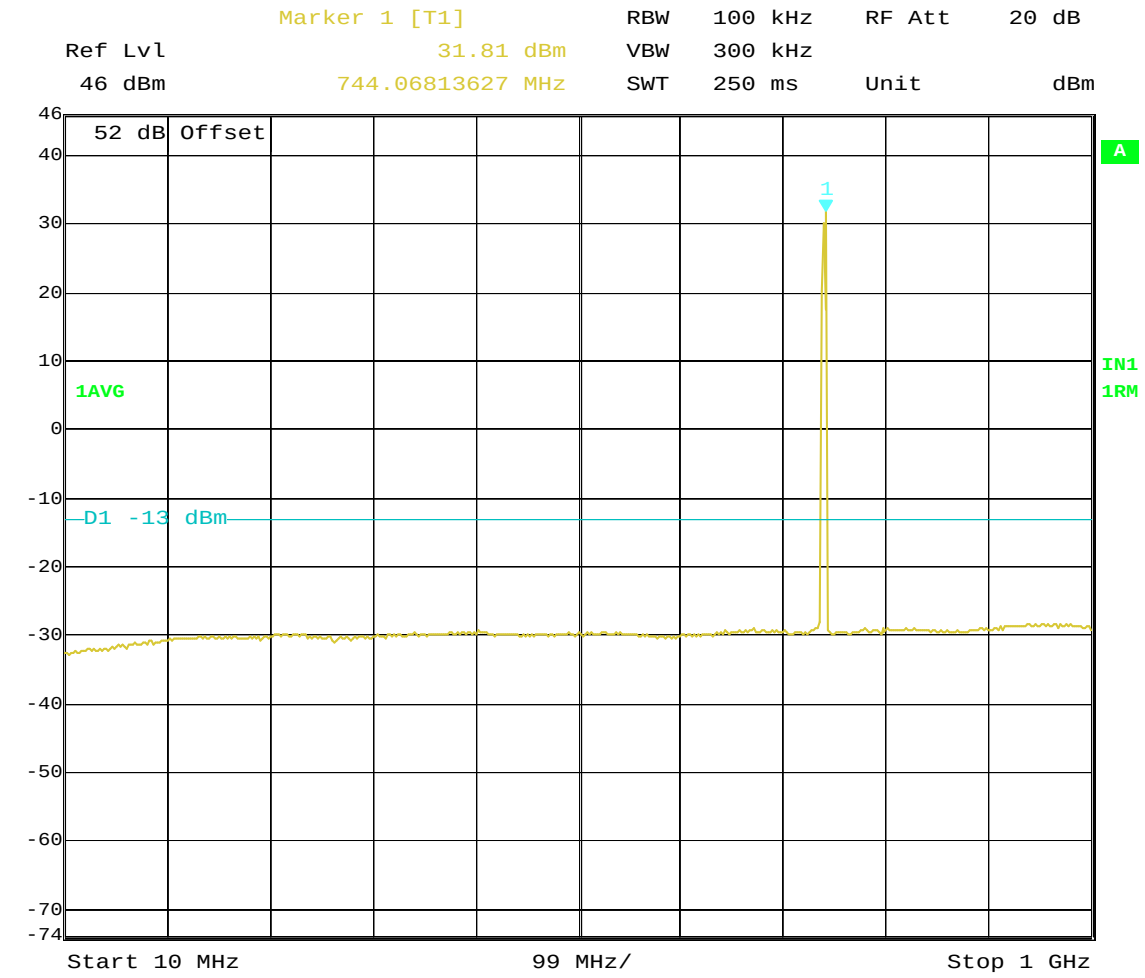

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 19.AUG.2010 12:47:24

# Transmit Port
# Antenna Conducted Spurious Emissions

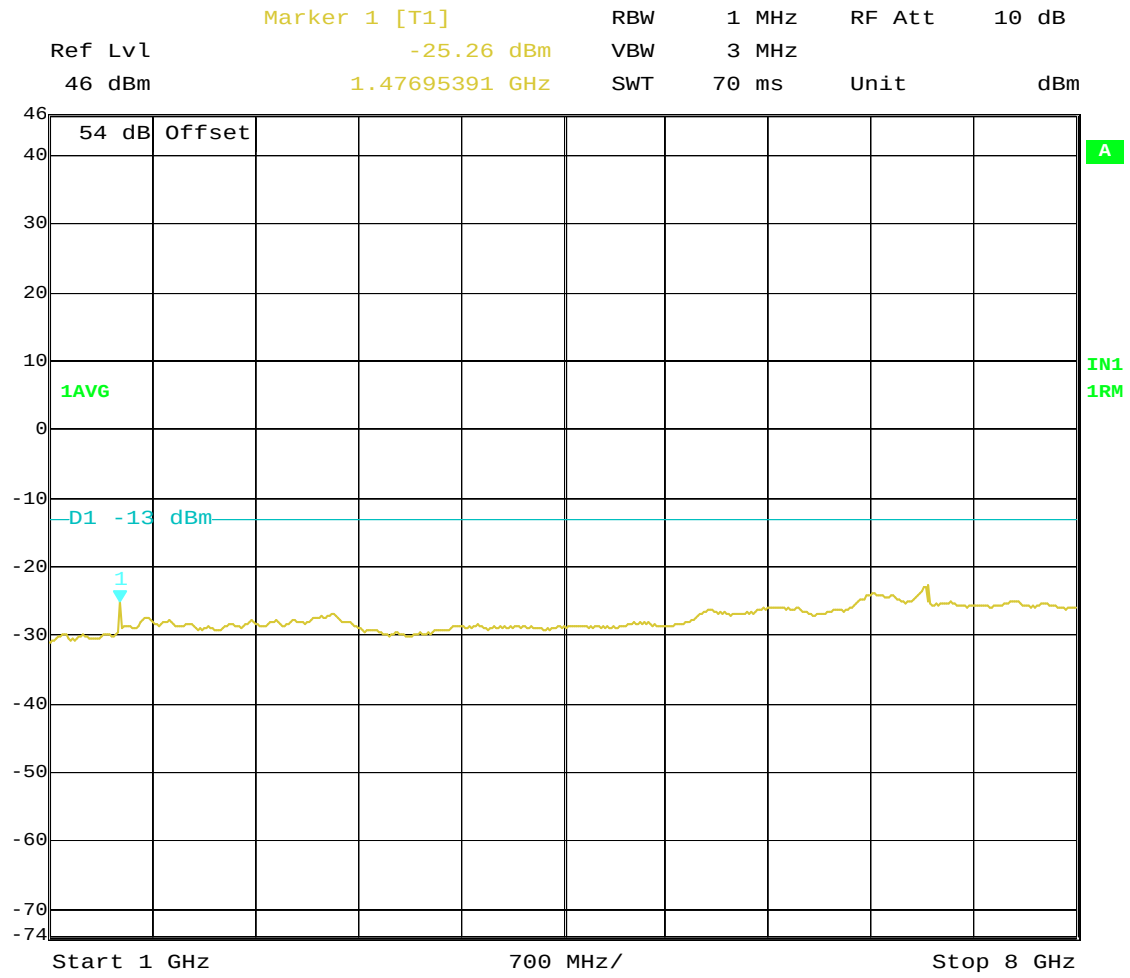
# Block: C
# QPSK Modulation
# Bandwidth 740 – 745 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:51:16



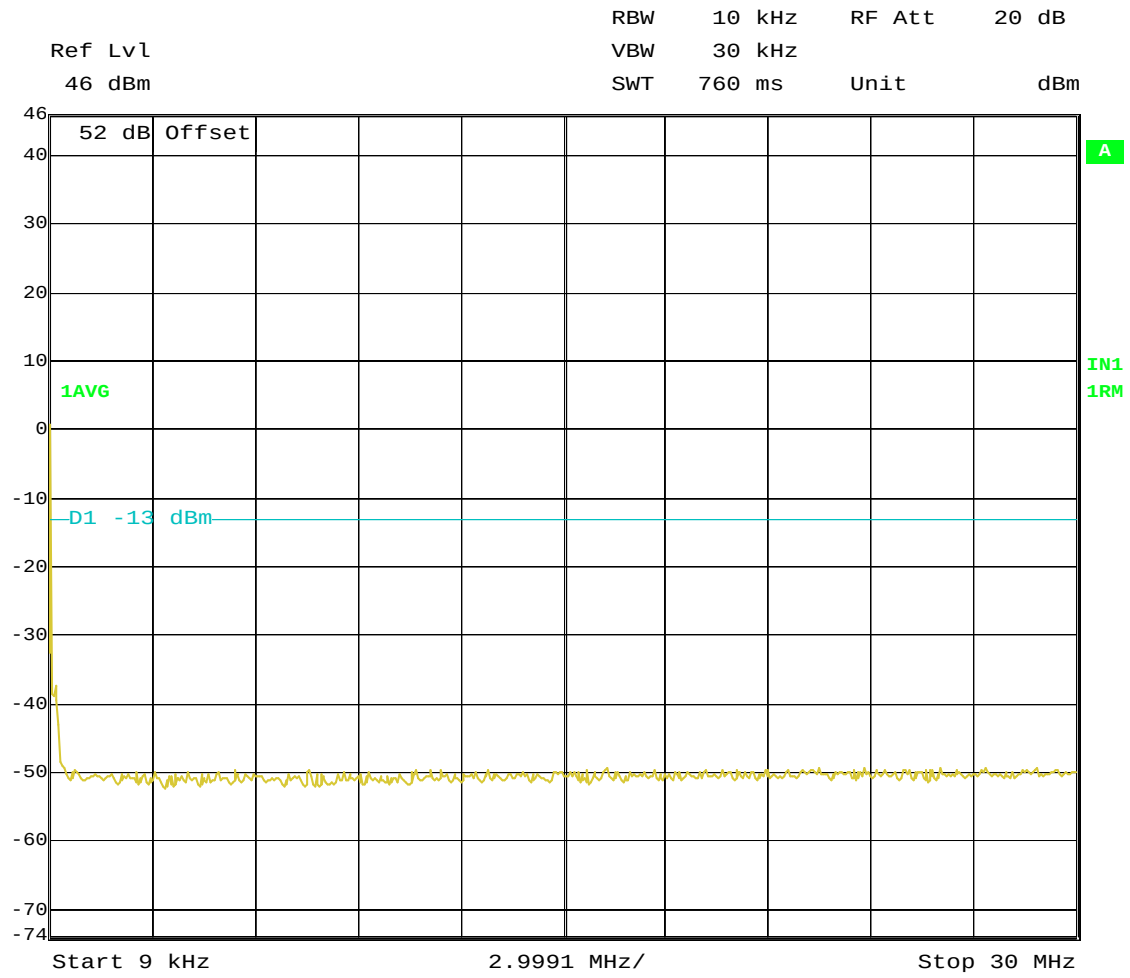

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:49:25



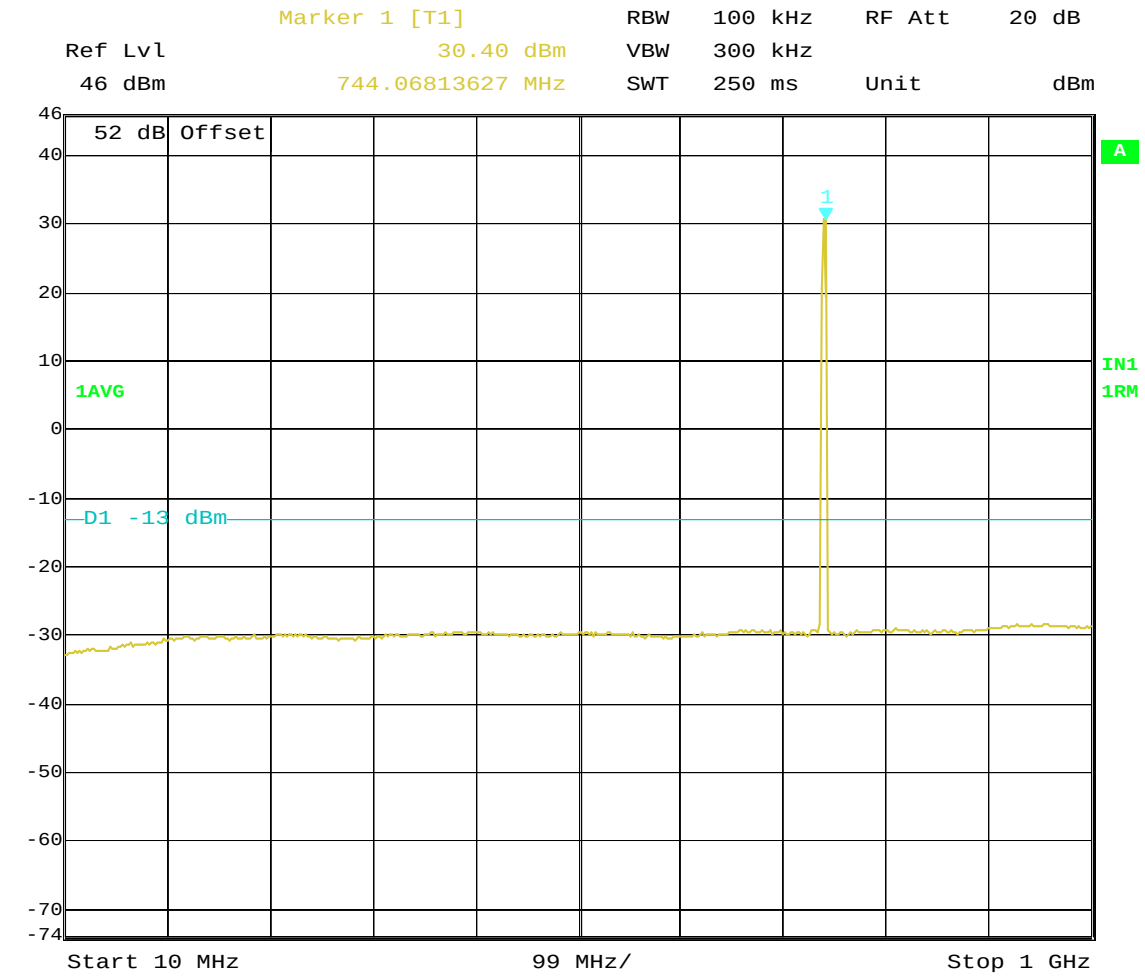

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, QPSK;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 10:48:06

# Transmit Port
# Antenna Conducted Spurious Emissions

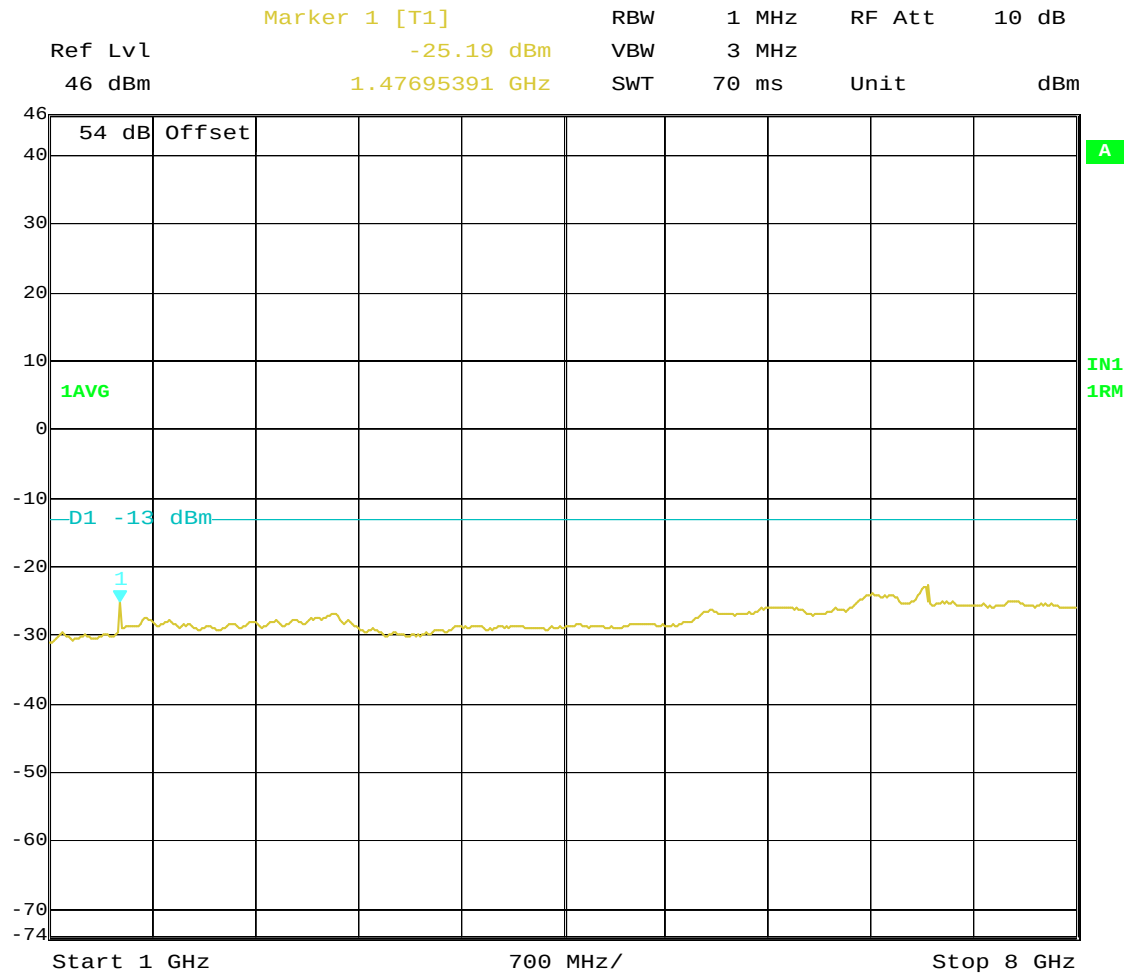
# Block: C
# 16QAM Modulation
# Bandwidth 740 – 745 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:18:14



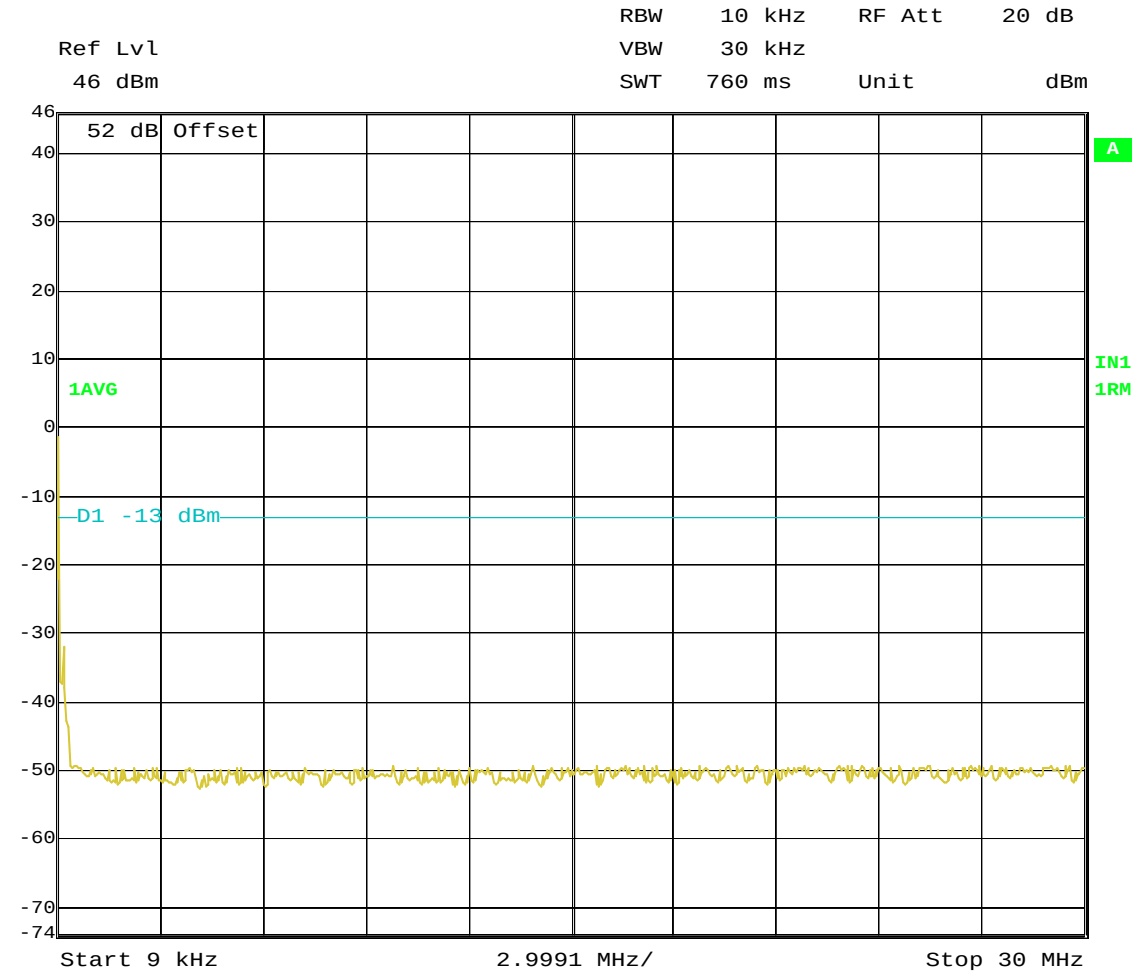

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:19:22



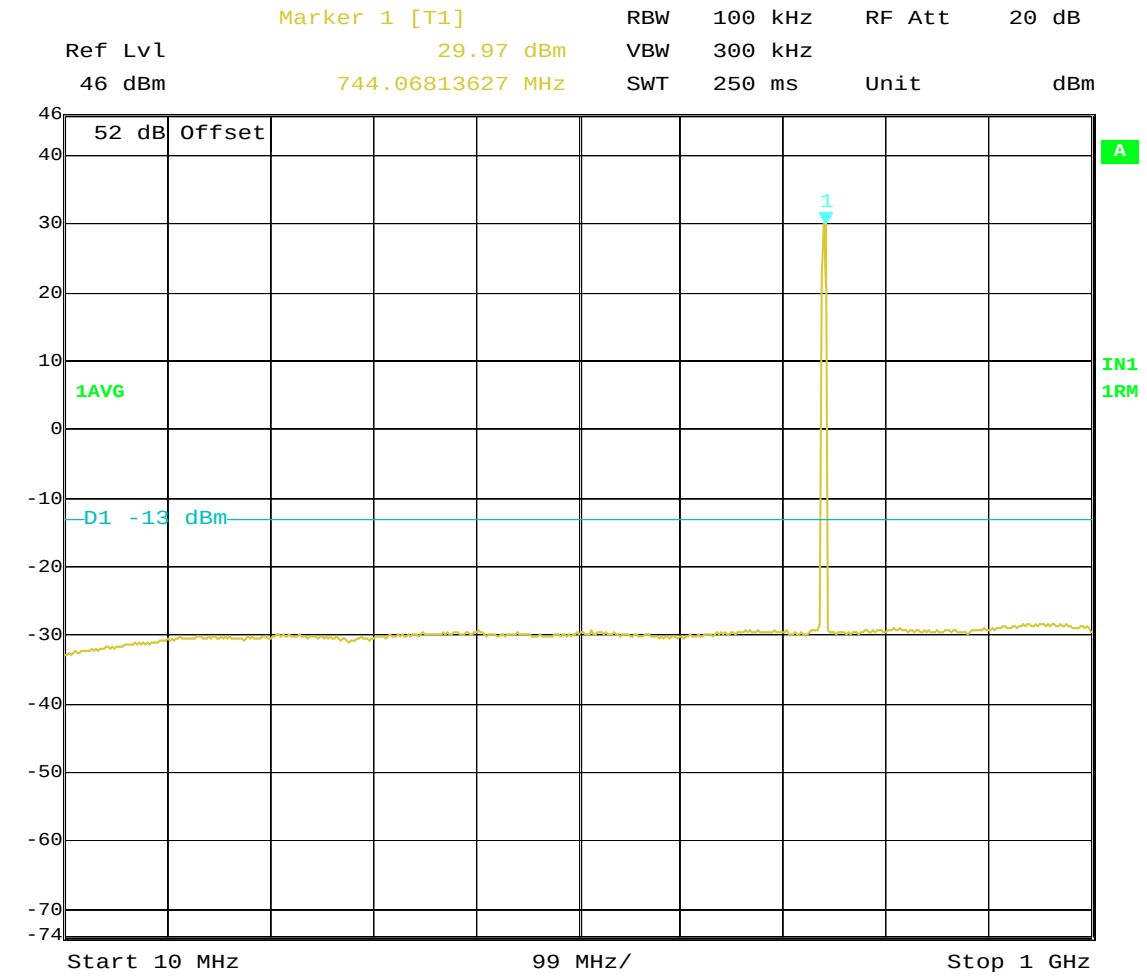

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:20:55

# Transmit Port
# Antenna Conducted Spurious Emissions

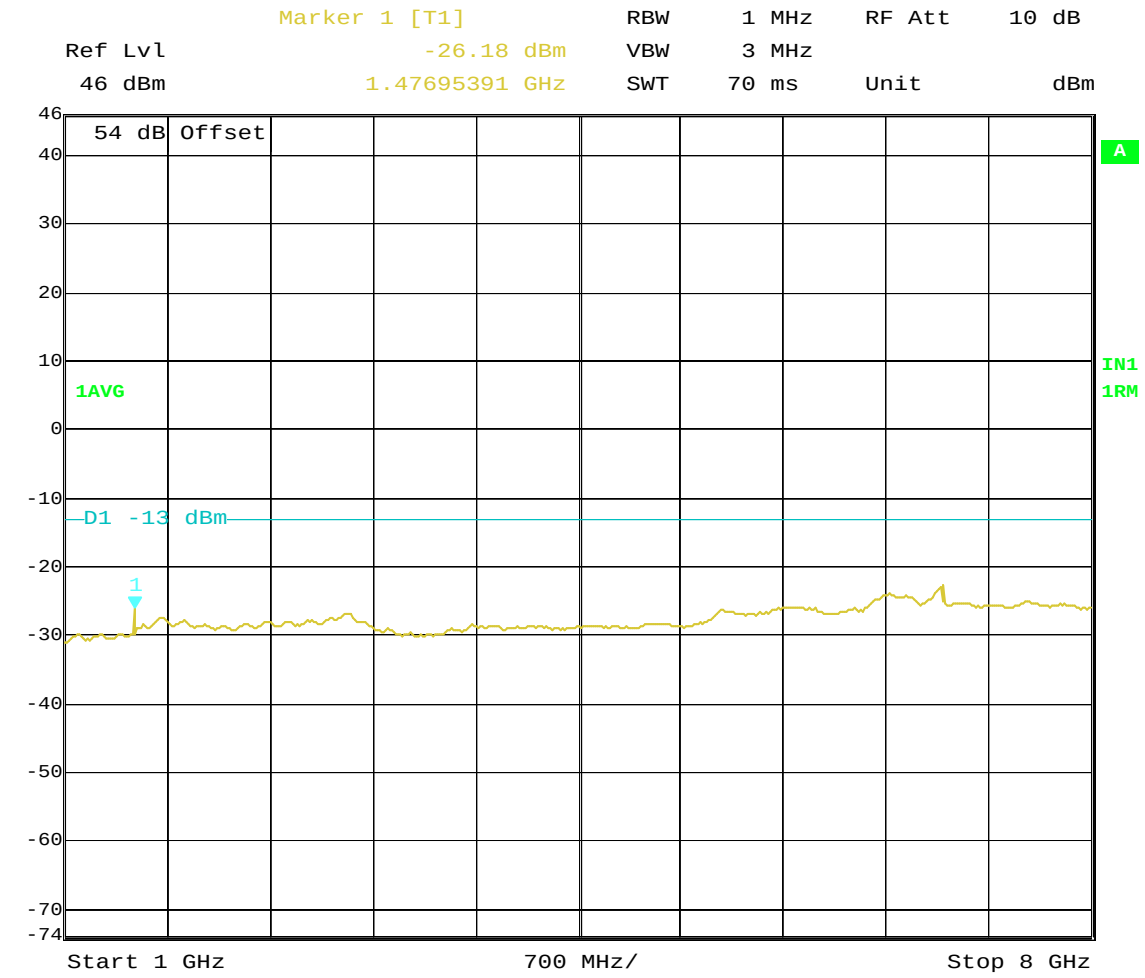
# Block: C
# 64QAM Modulation
# Bandwidth 740 – 745 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:48:38




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:49:33




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Blk C; 740-745 MHz; Filter:M2
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 20.AUG.2010 13:50:37

# FILTER- MI

(NEW MANUFACTURER)

## MEASUREMENT PER SECTION 2.1033 (C) (14) OF THE RULES

**SECTION 2.1033 (c) (14)**

The data required by Section 2.1046 through 2.1057, inclusive, measured in accordance with the procedures set out in Section 2.1041.

**RESPONSE**:

The following pages include the data required for the **AS5BBTRX-03**, measured in accordance with the procedures set out in Section 2. 1033 (c) (14) of the Rules.

Each required measurement and its corresponding exhibit number are:

| | | |
|---|---|---|
| Measurement: 1 | Section 2.1046 | RF Power Output - See Measurement 3 |
| Measurement: 2 | Section 2.1047 | Modulation Characteristics |
| Measurement: 3 | Section 2.1049 | (a) Emissions Bandwidth<br>(b) Occupied Bandwidth |
| Measurement: 4 | Section 2.1051 | Spurious Emissions at Antenna Terminals |
| Measurement: 5 | Section 2.1053 | Field Strength of Spurious Radiation |
| Measurement: 6 | Section 2.1055 | Measurement of Frequency Stability |
| | Section 2.1057 | Frequency Spectrum to be Investigated |

# Measurement 1

## FCC Section 2.1046
## RF Power output

Refer to Measurement 3 Occupied Bandwidth Measurement during that measurement RF Output was continuously monitored.

# Measurement 2

# FCC Section 2.1047
# Modulation Characteristics

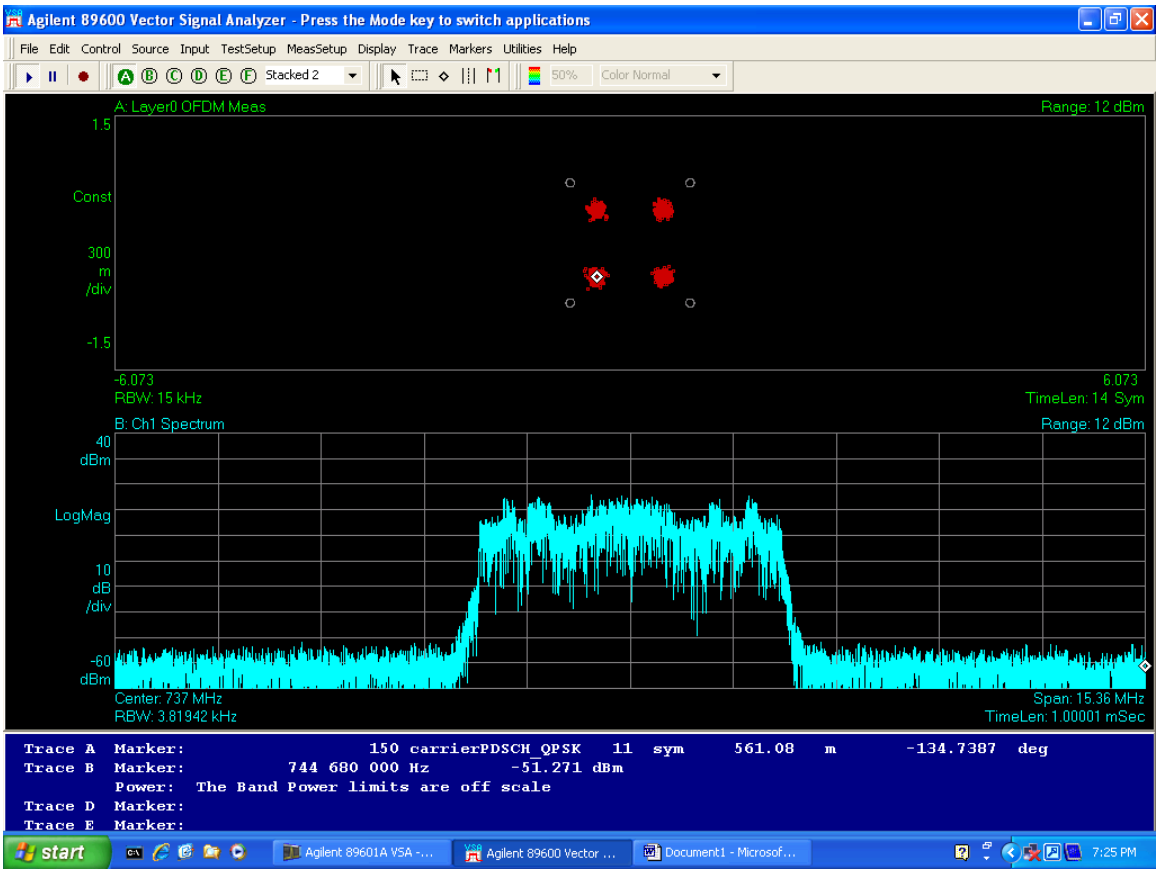
The modulation techniques used are explained in the submission as part section 2.1033 (c) (13). The RF signal at the antenna port was demodulated and verified for correctness of modulation signal used before each test was performed. The attached plot of graphs shows the modulation components: In phase (I) and Quadrature (Q) components.

(4) Quadrature Phase Shift Keying (QPSK) modulation scheme uses 2 bits transmitted simultaneously (one per channel) and a symbol can be represented by 2 bits. Therefore there are $2^2 = 4$ states (Binary 00 to 11). The theoretical bandwidth is 2bits/second/Hz.

(5) 16 Quadrature amplitude modulation (QAM): In 16QAM, there are 16-states. There are four I values and four Q values. Therefore, 4 bits are available to represent a symbol. Therefore there are $2^4 = 16$ states (Binary 0000 to 1111). The theoretical bandwidth is 4bits/second/Hz.

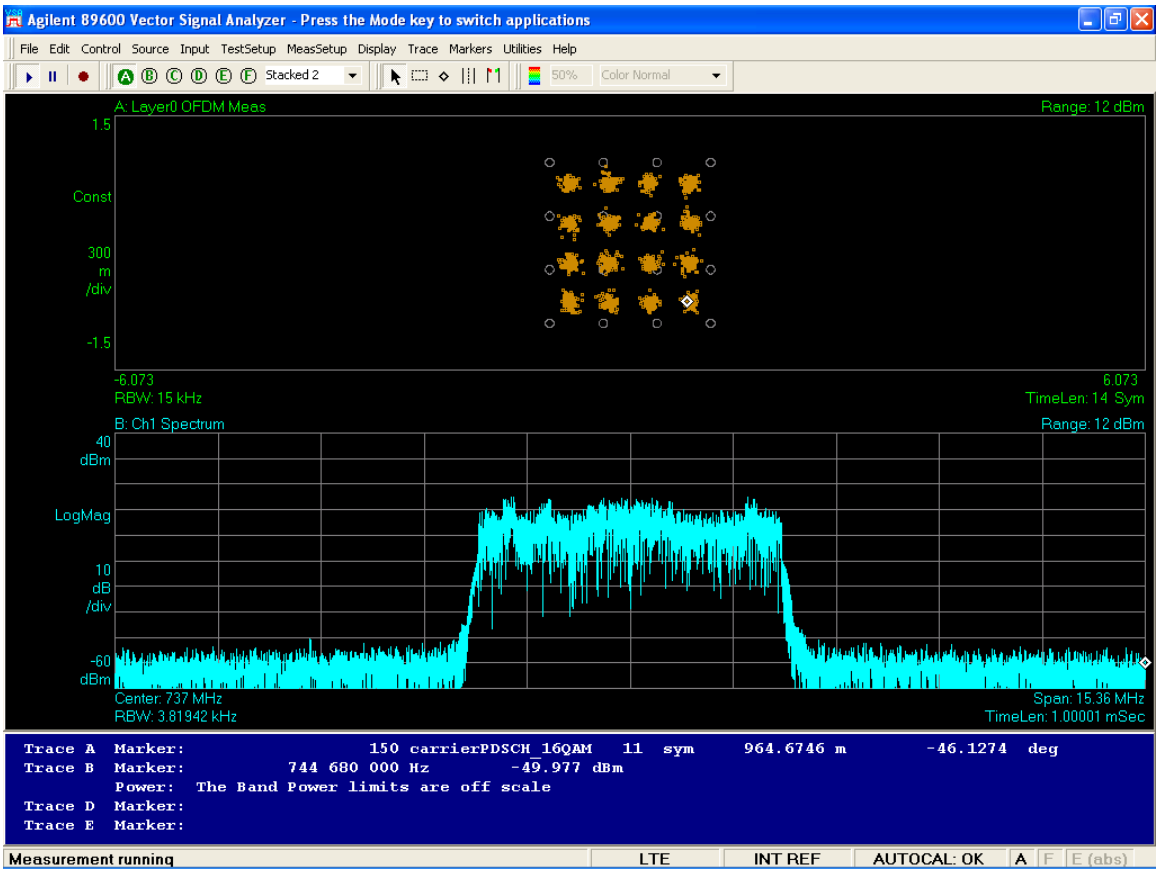
(6) 64 Quadrature amplitude modulation (QAM): In 64QAM: The 64QAM is similar to 16QAM and there will be 64 states and 6 bits are available to represent a symbol.

# QPSK MODULATION



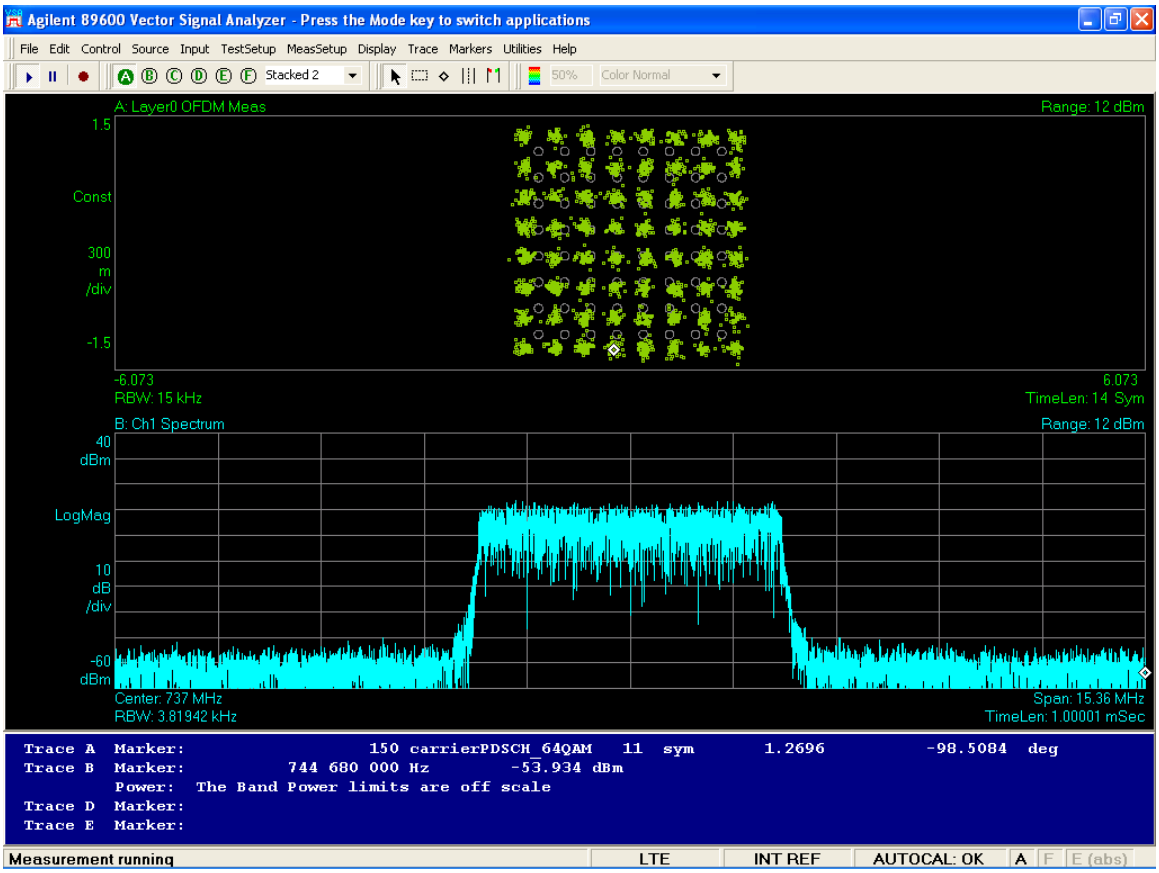

LTE 9442 RRH2x40-P2
FCC Part 27.53 Block B; QPSK Modulation; PWR: 40 (2x40W MIMO)
FCCID: AS5BBTRX-03
TEST ENGINEER: SEG

# 16QAM MODULATION




LTE 9442 RRH2x40-P2
FCC Part 27.53 Block B; 16QAM Modulation; PWR: 40 (2x40W MIMO)
FCCID: AS5BBTRX-03
TEST ENGINEER: SEG

# 64QAM MODULATION




LTE 9442 RRH2x40-P2
FCC Part 27.53 Block B; 64QAM Modulation; PWR: 40 (2x40W MIMO)
FCCID: AS5BBTRX-03
TEST ENGINEER: SEG

# Measurement 3

# FCC Section 2.1049

(a) Emissions Bandwidth Measurement
(b) Occupied Bandwidth Measurement showing spurious Emissions 100 kHz close to Block edges.

# Spectrum Bandwidth Measurement For Emissions Type

**FCC approves two measurement methods for Spectrum Bandwidth.**

(C) 99% Bandwidth
(D) 26 dB Band width.

**Both methods were used to measure the bandwidth at modulations and highest is recorded. The modulations used are:**

4. QPSK
5. 16 QAM
6. 64 QAM

Highest Bandwidth is used for Emissions type designation: 8.95 MHz for 10 MHz Bandwidth, and 4.488 MHz for 5 MHz Bandwidth.
Therefore:
Measured Emission type: **8M95F9W** for 10 MHz Bandwidth.
Measured Emission type: **4M49F9W** for 5 MHz Bandwidth.

# MEASUREMENT OF OCCUPIED BANDWIDTH
# (A) 99% POWER BANDWIDTH

Reviewed By: DDM Date: 8/23/2010

**MEASUREMENT OF**
**OCCUPIED BANDWIDTH**
**For Emissions Type**

The emissions bandwidth is not provided in the section 27.53 for 700 MHz bands. The occupied bandwidth of the Long Term Evolution (LTE) **9442 RRH2x40-P2** was measured using the Rohde & Schwarz ESI Spectrum Analyzer/Receiver designed to measure 99% power bandwidth. The measurements were made on blocks A, A+B, B, B+C, and C of the **LTE 9442 RRH2x40-P2** with 5 MHz and 10 MHz bandwidths.

The measurements were made on a "**LTE 9442 RRH2x40-P2"** cabinet in the following modulation configurations:

4. QPSK
5. 16 QAM
6. 64 QAM

This measurement also determines emission type.

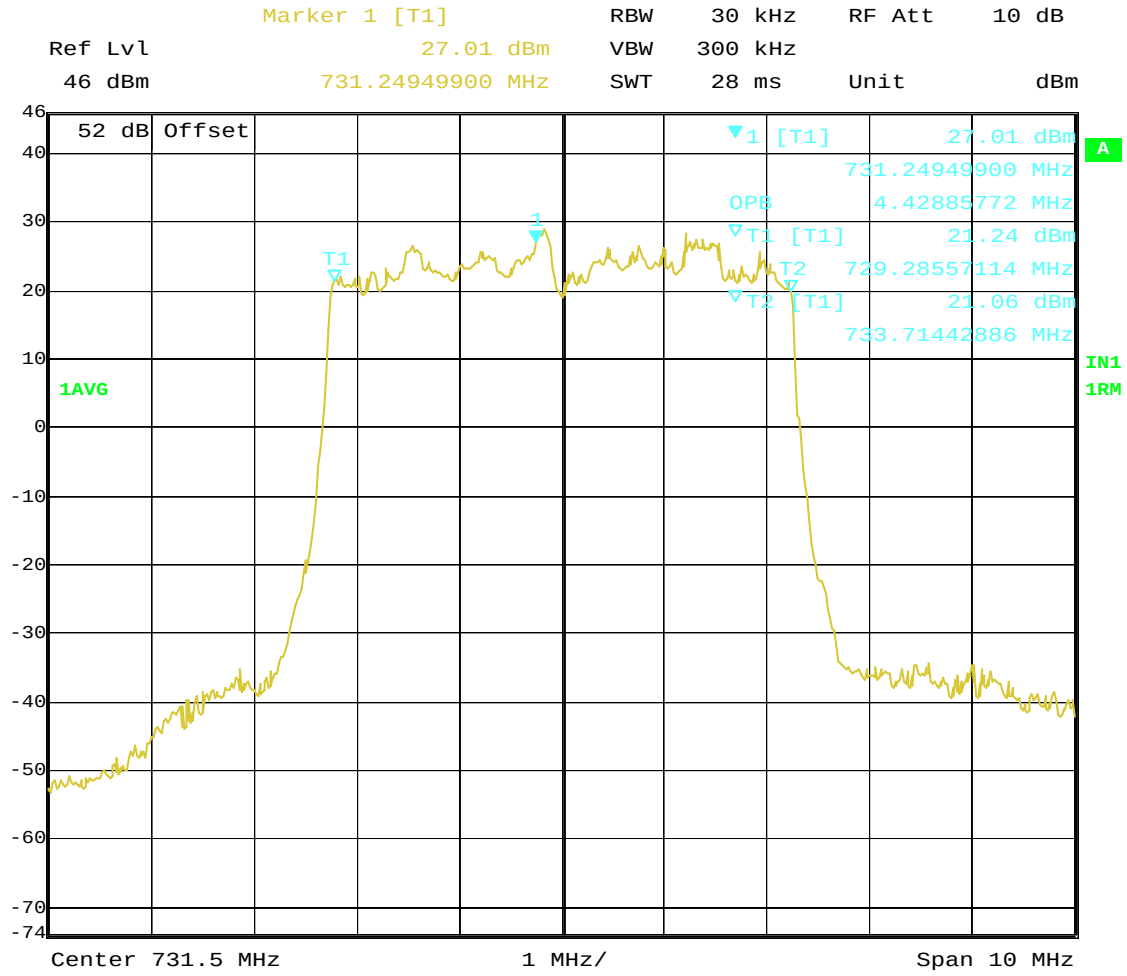
**Results:**
The plots are provided for QPSK, 16QAM and 64QAM modulations of 5 MHz and 10 MHz band of the **LTE 9442 RRH2x40-P2.**
The Measured 99% power bandwidth is 8.95 MHz for 10 MHz band and 4.49 MHz for 5 MHz band.

# Block: A

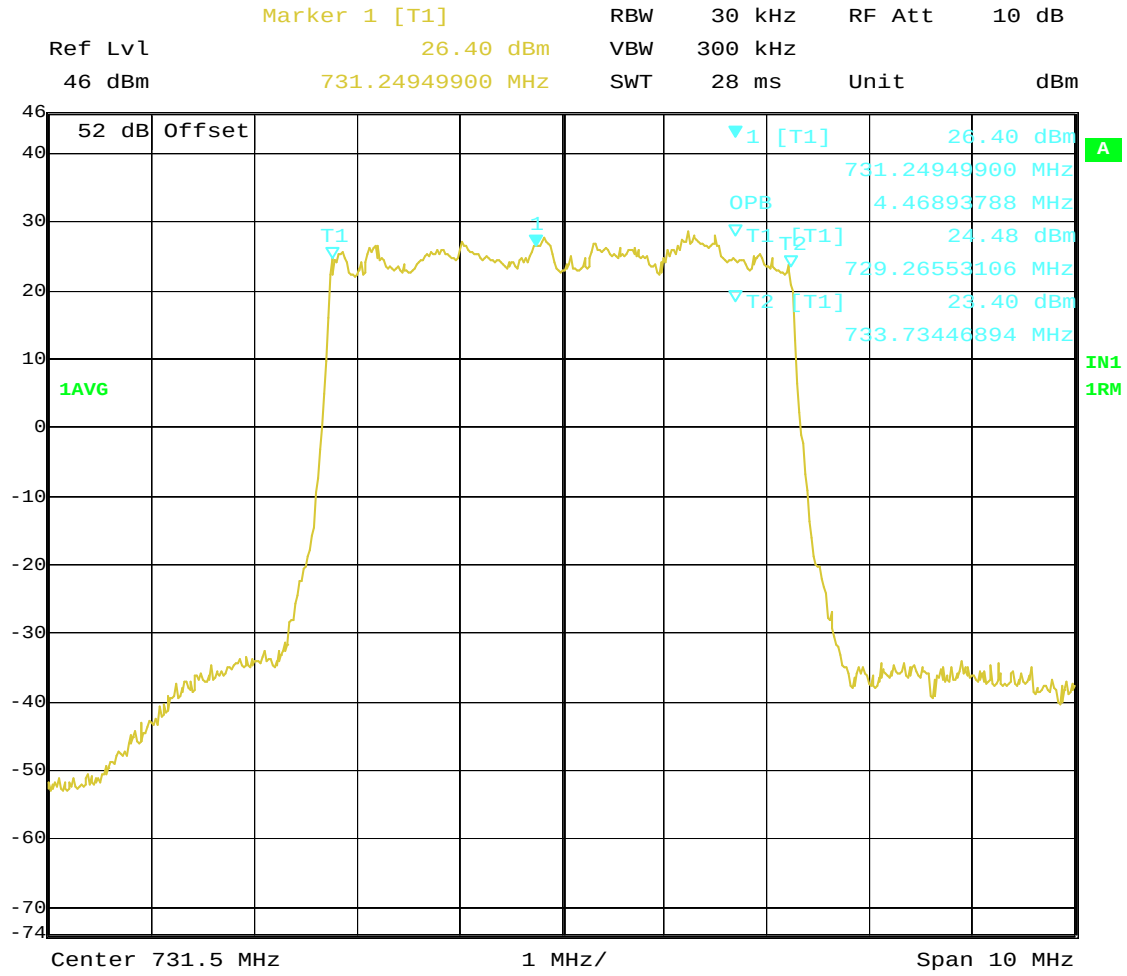
# Channel: 5035

# 5 MHz Bandwidth 729 – 734 MHz

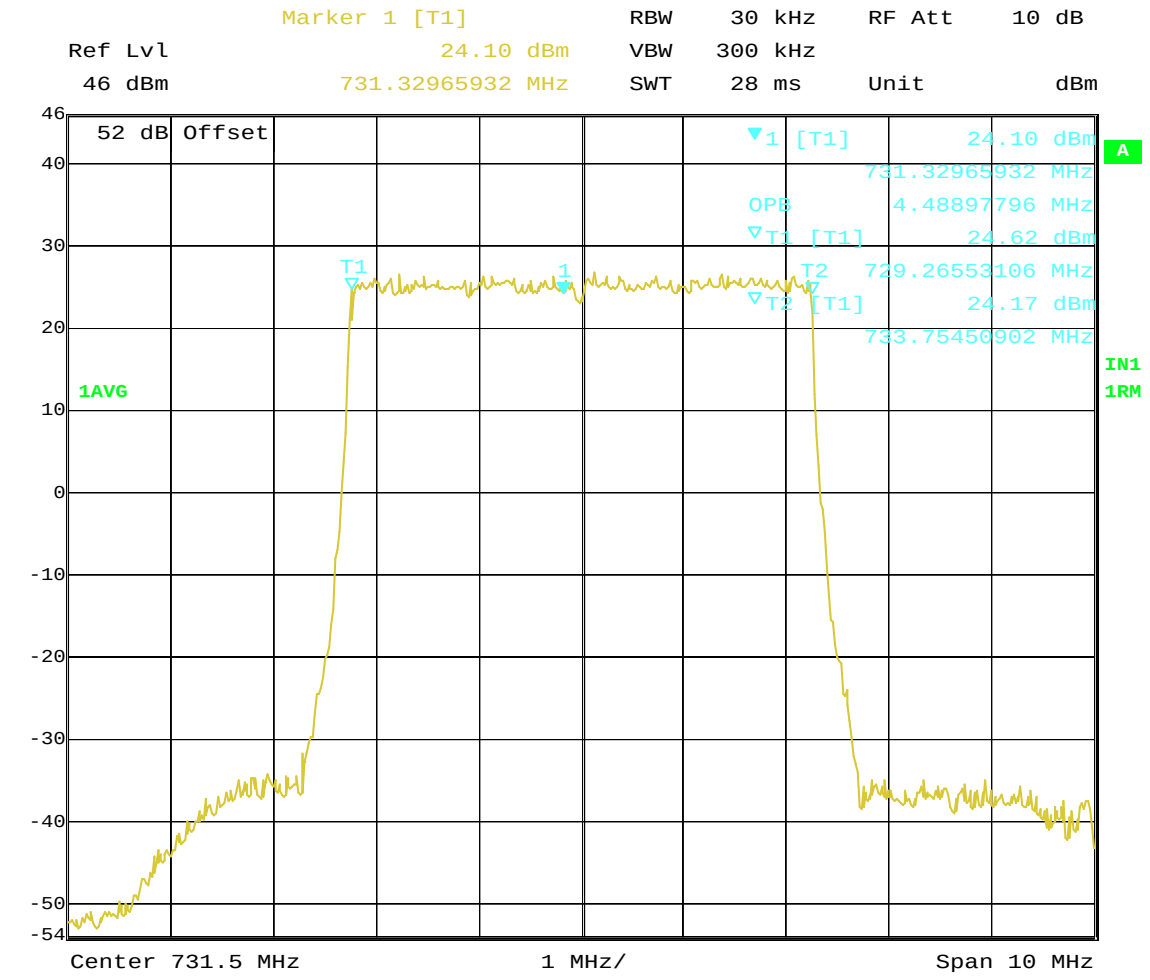
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:28:52




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:13:57



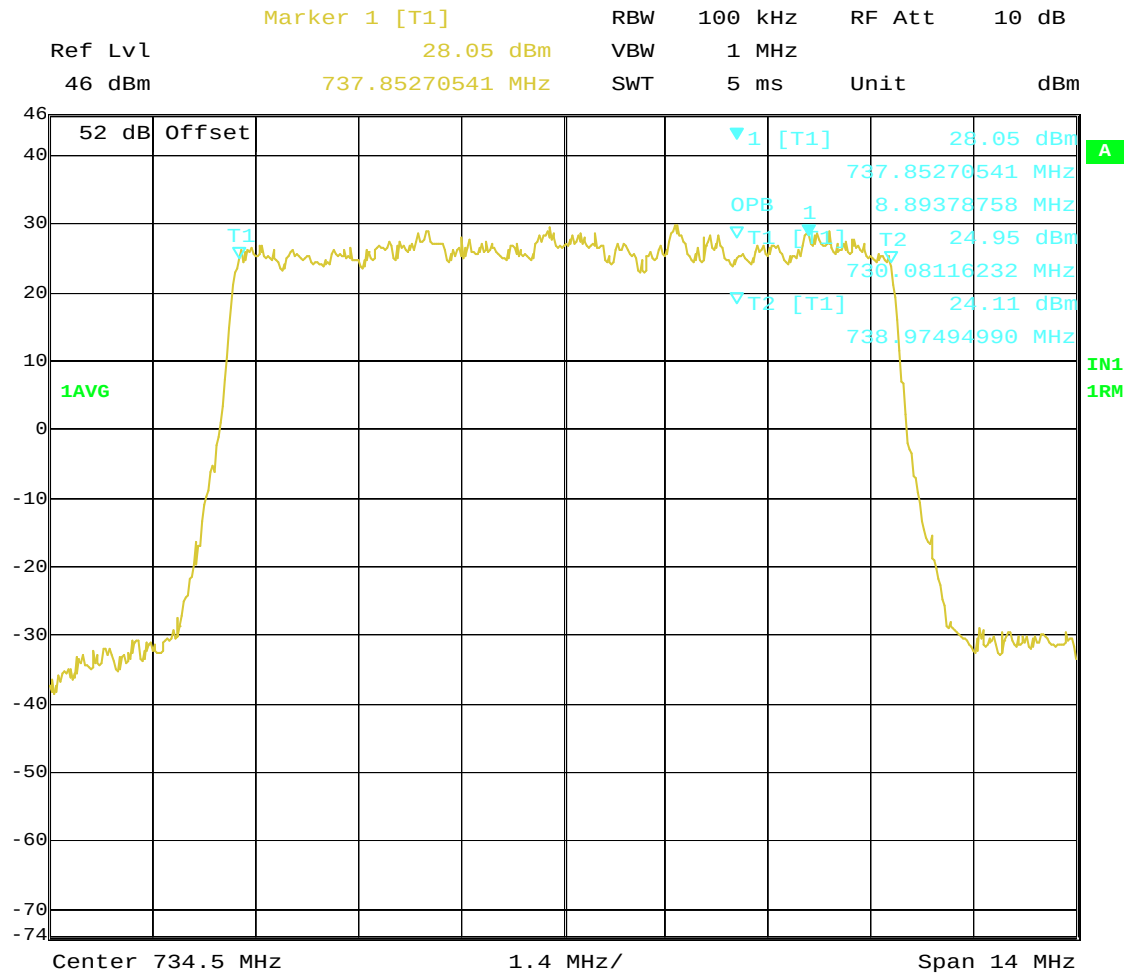

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 11.AUG.2010 14:10:39

# Block: A+B

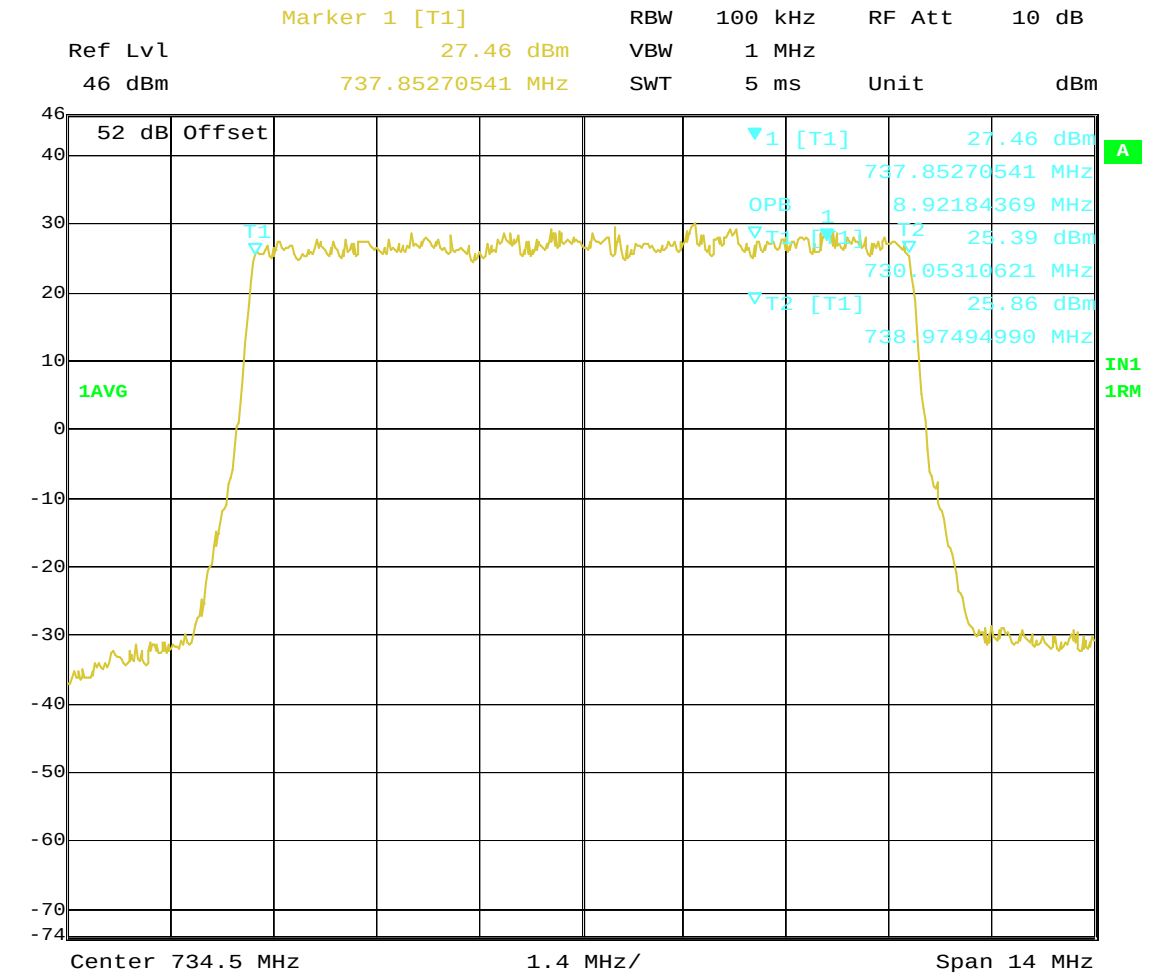
# Channel: 5065

# 10 MHz Bandwidth 729.5 – 739.5 MHz

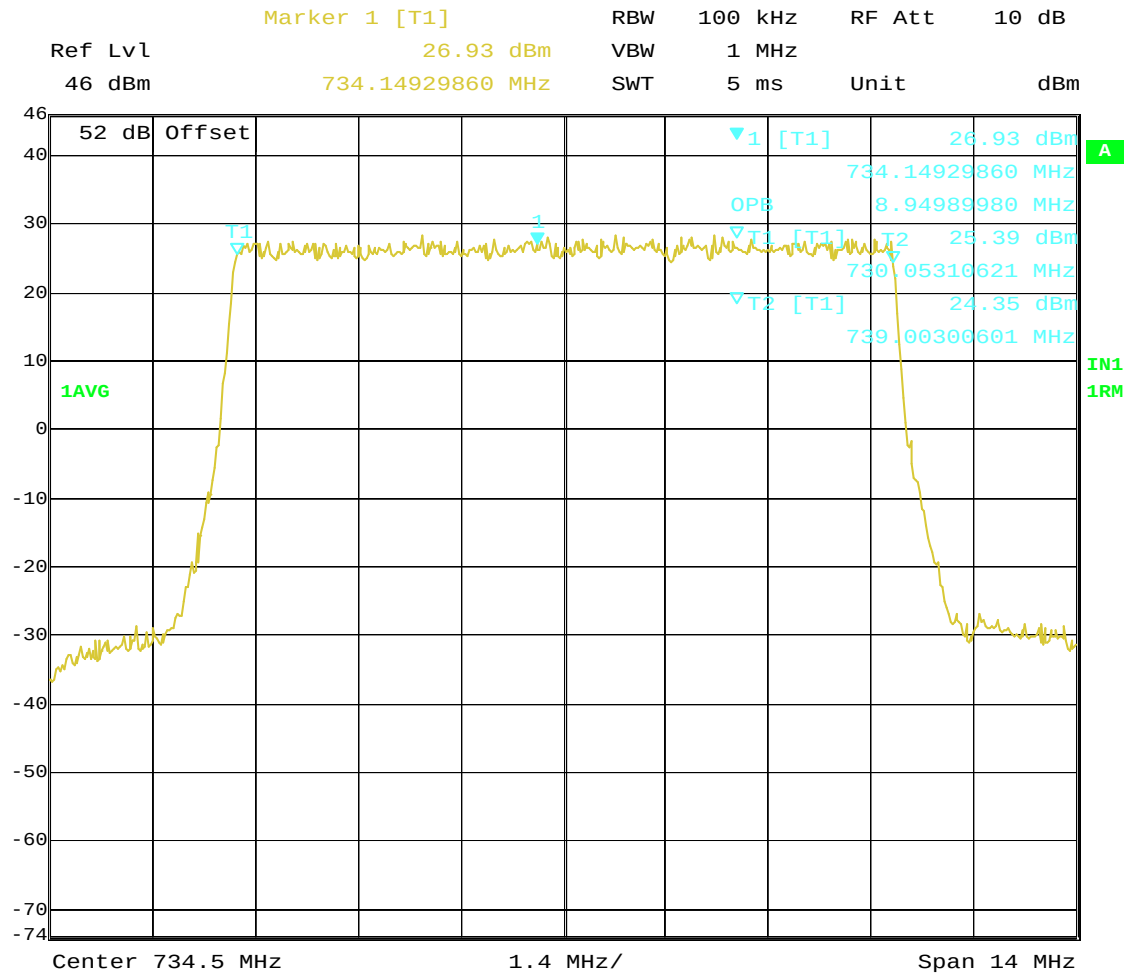
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 08:56:59




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 09:25:27



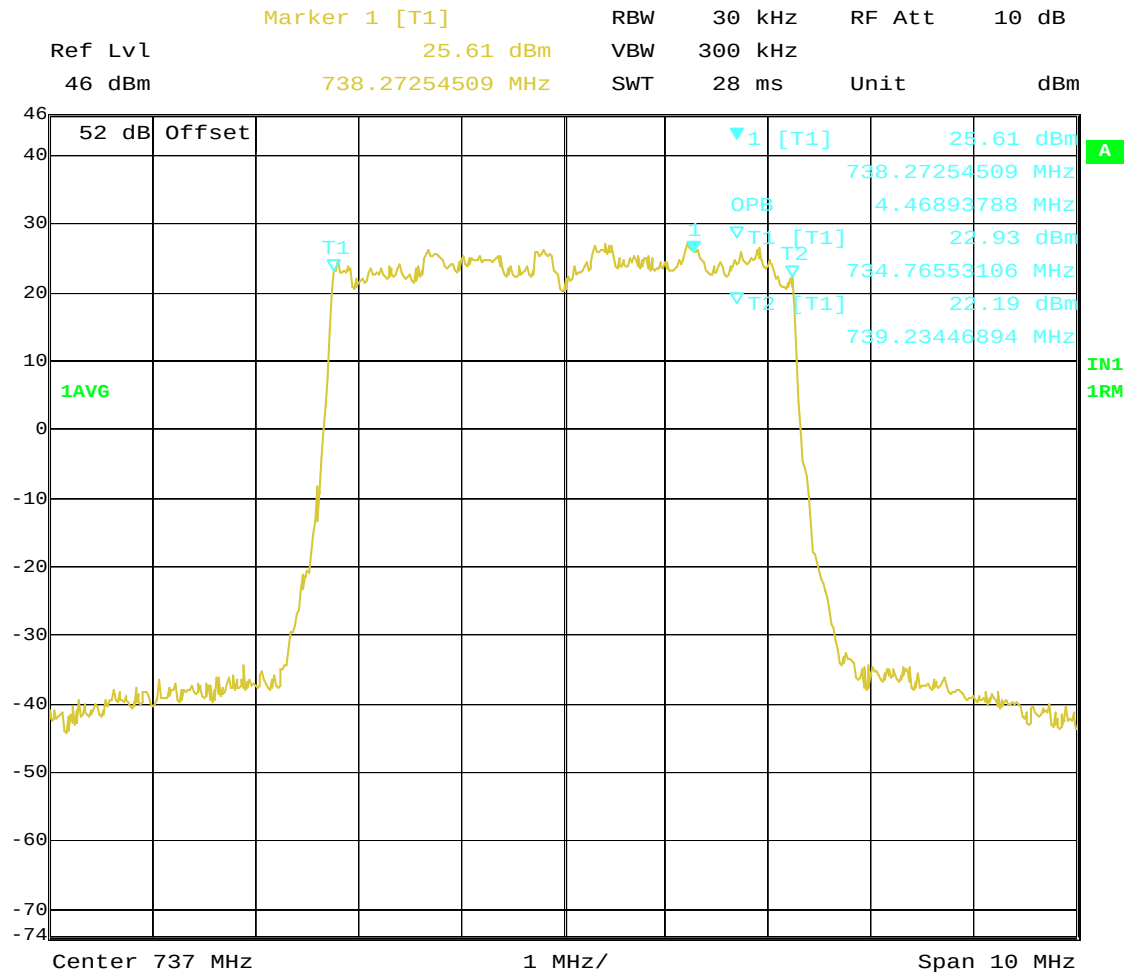

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 10:08:59

# Block: B

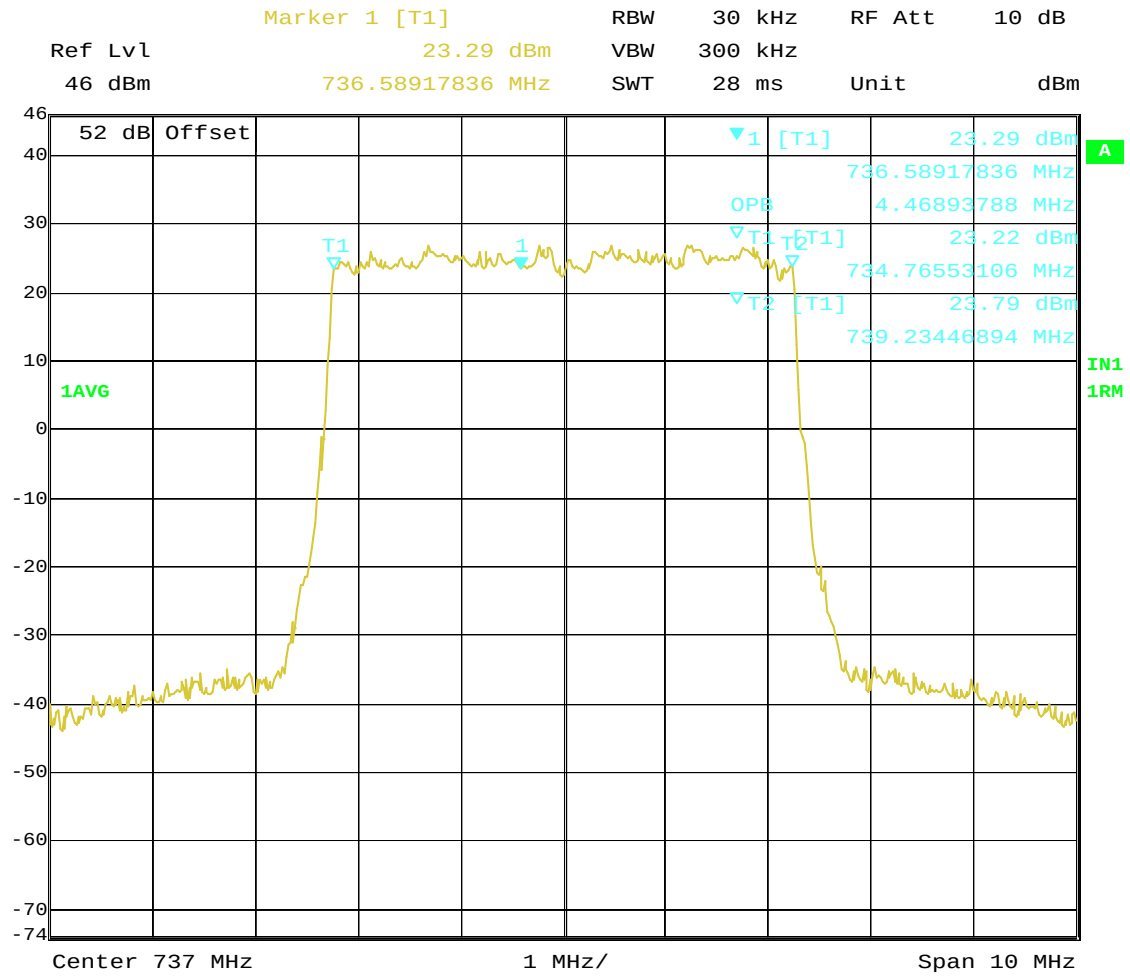
# Channel: 5090

# 5 MHz Bandwidth 734.5 – 739.5 MHz

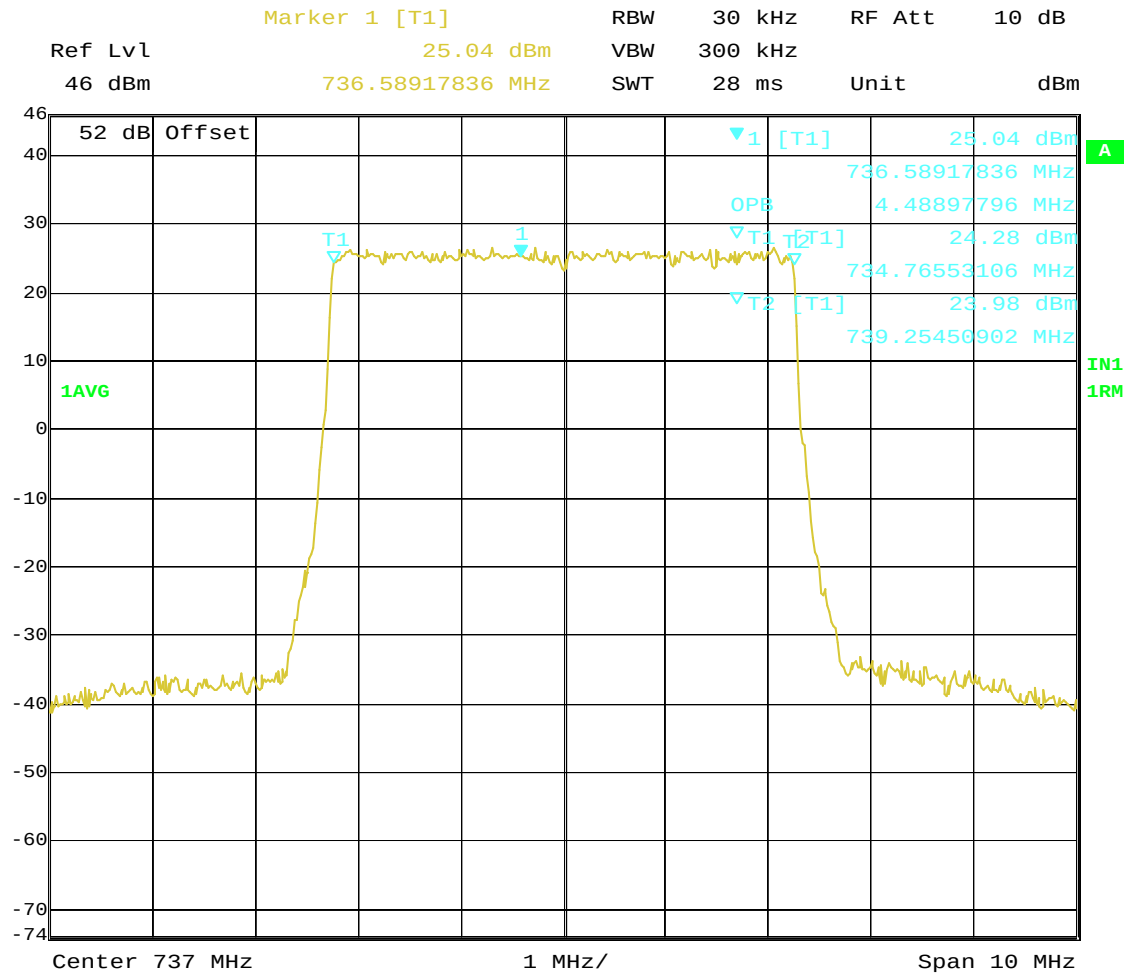
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 14:45:22




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:02:46



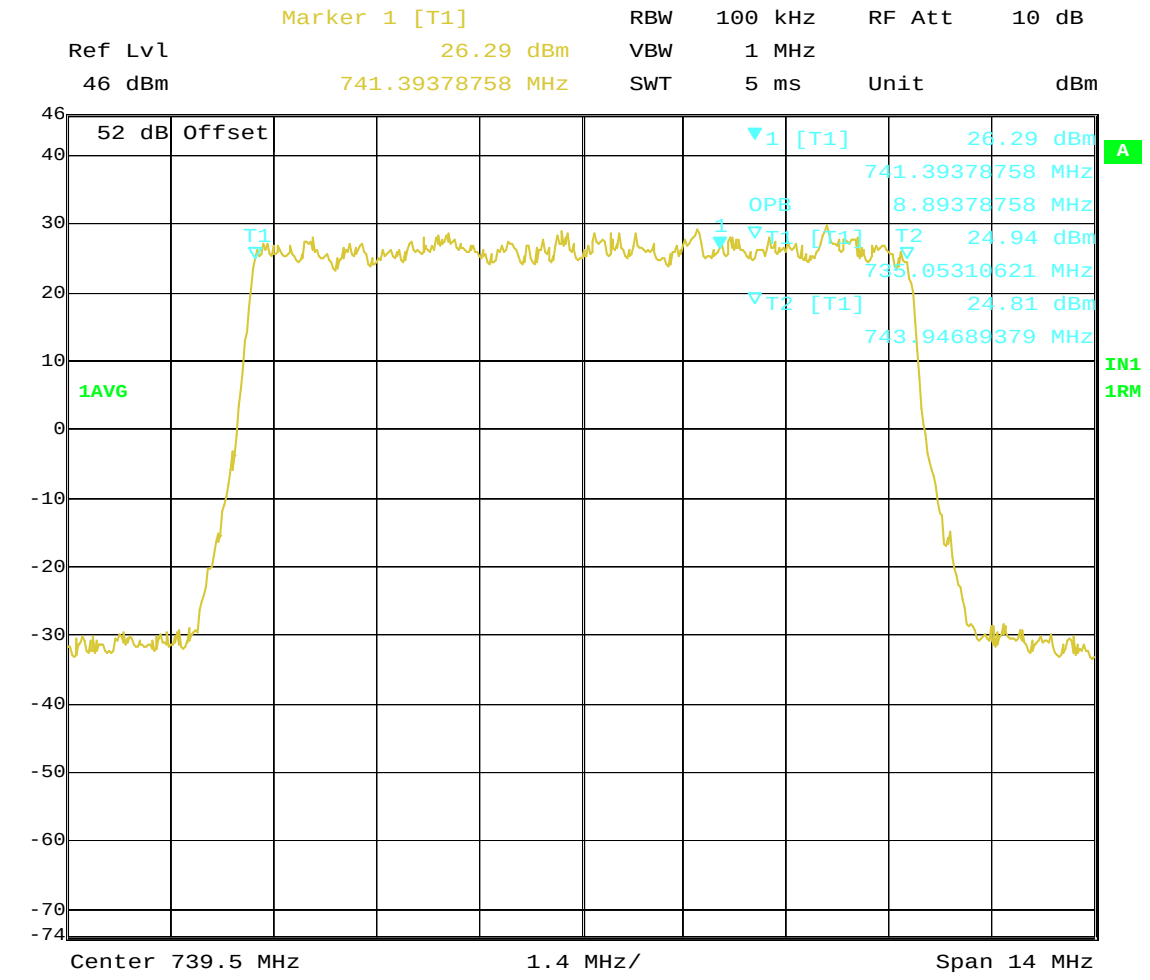

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:12:36

# Block: B+C

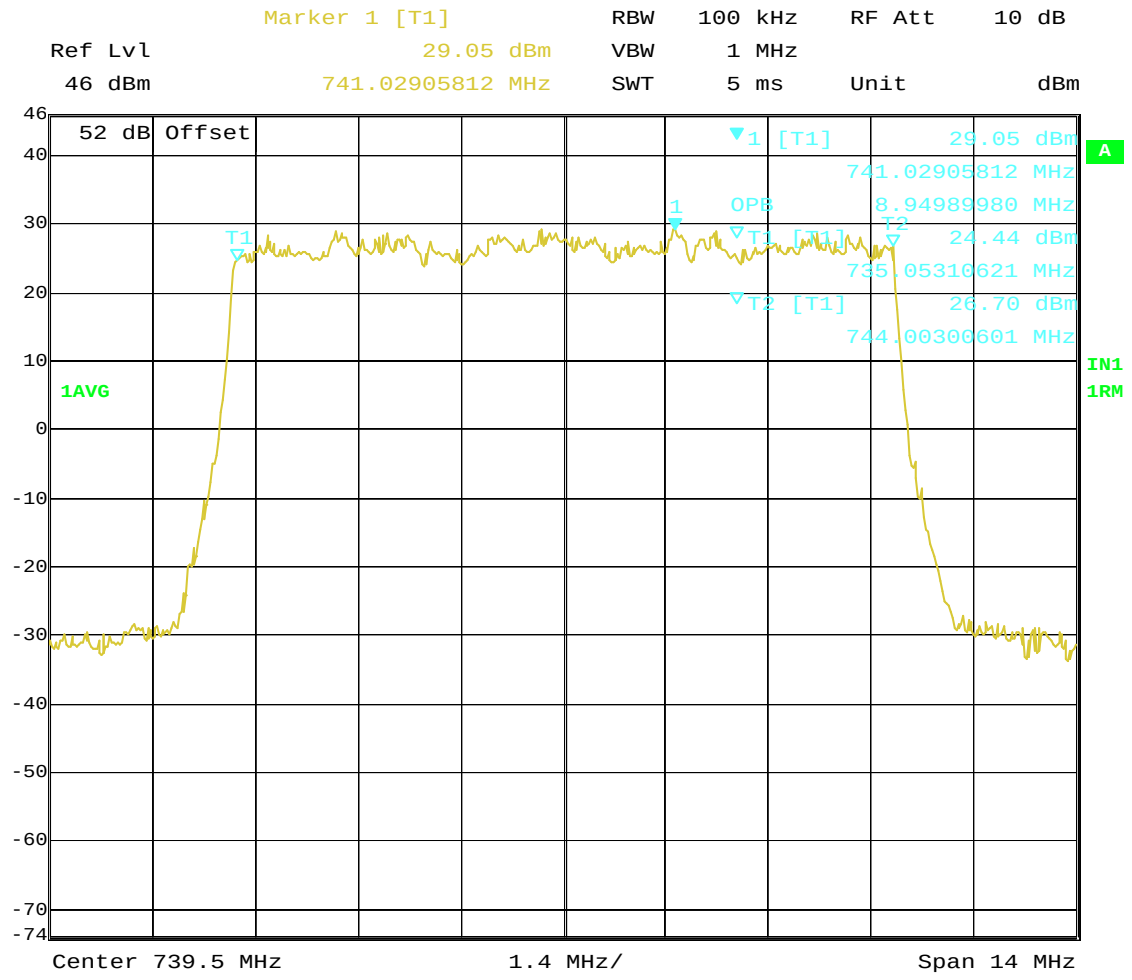
# Channel: 5115

# 10 MHz Bandwidth 734.5 – 744.5 MHz

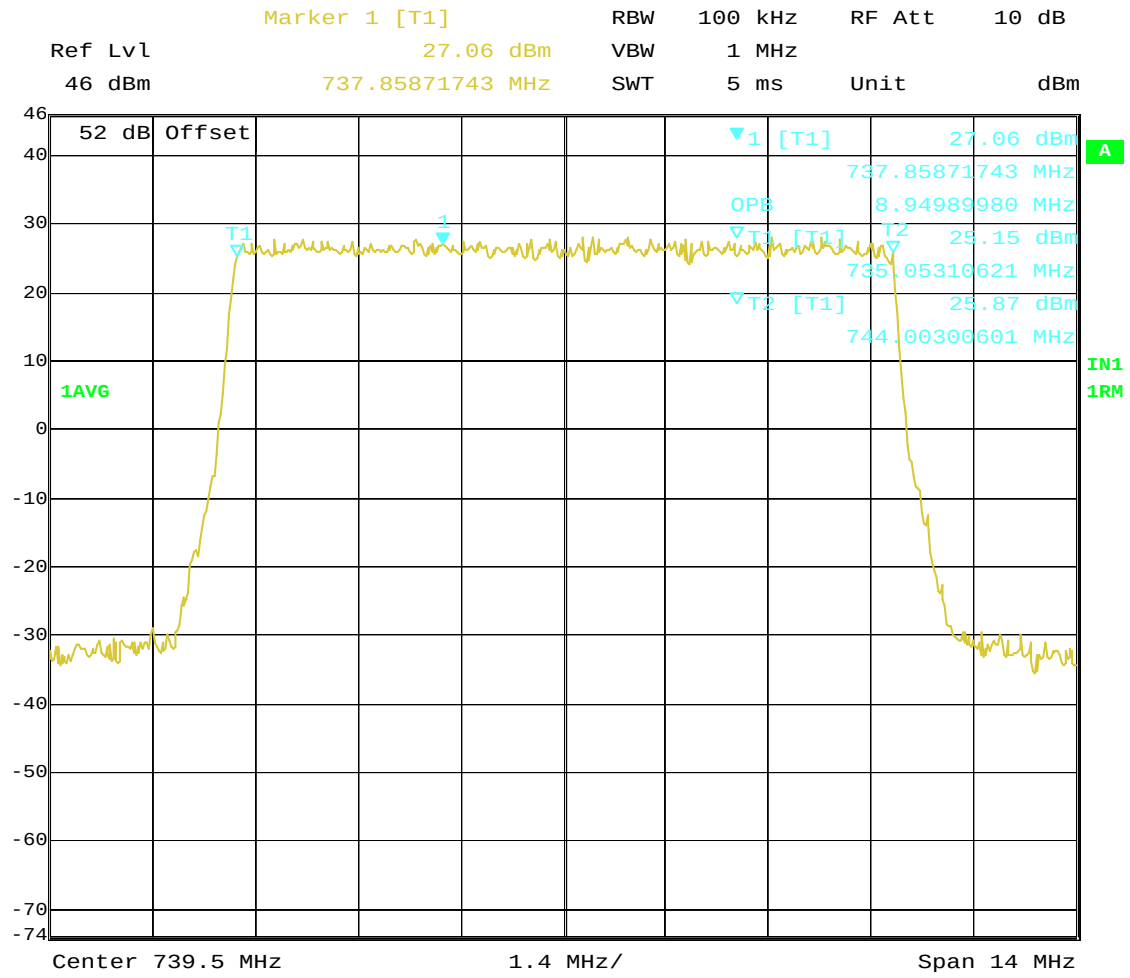
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:55:20




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 16.AUG.2010 08:21:30



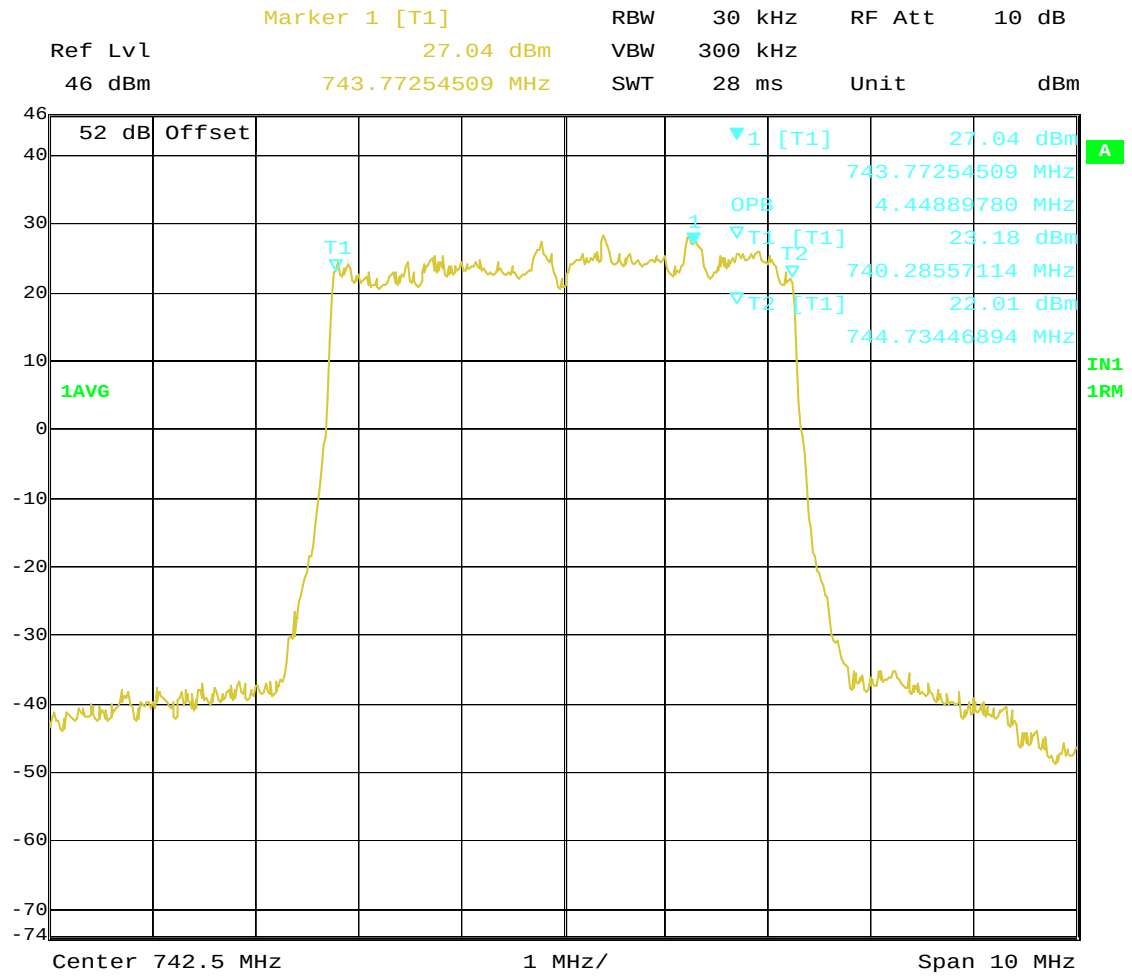

Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 08:06:54

# Block: C

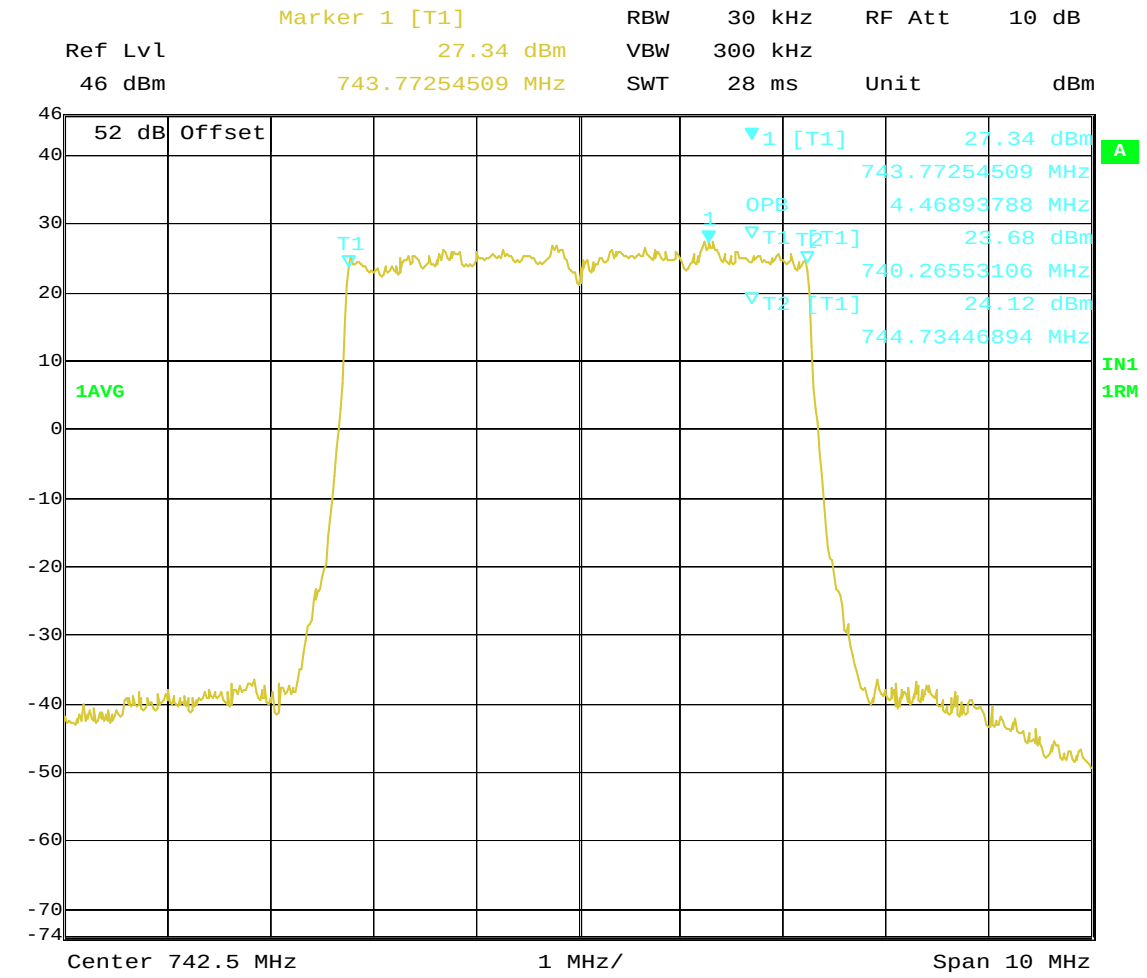
# Channel: 5145

# 5 MHz Bandwidth 740 – 745 MHz

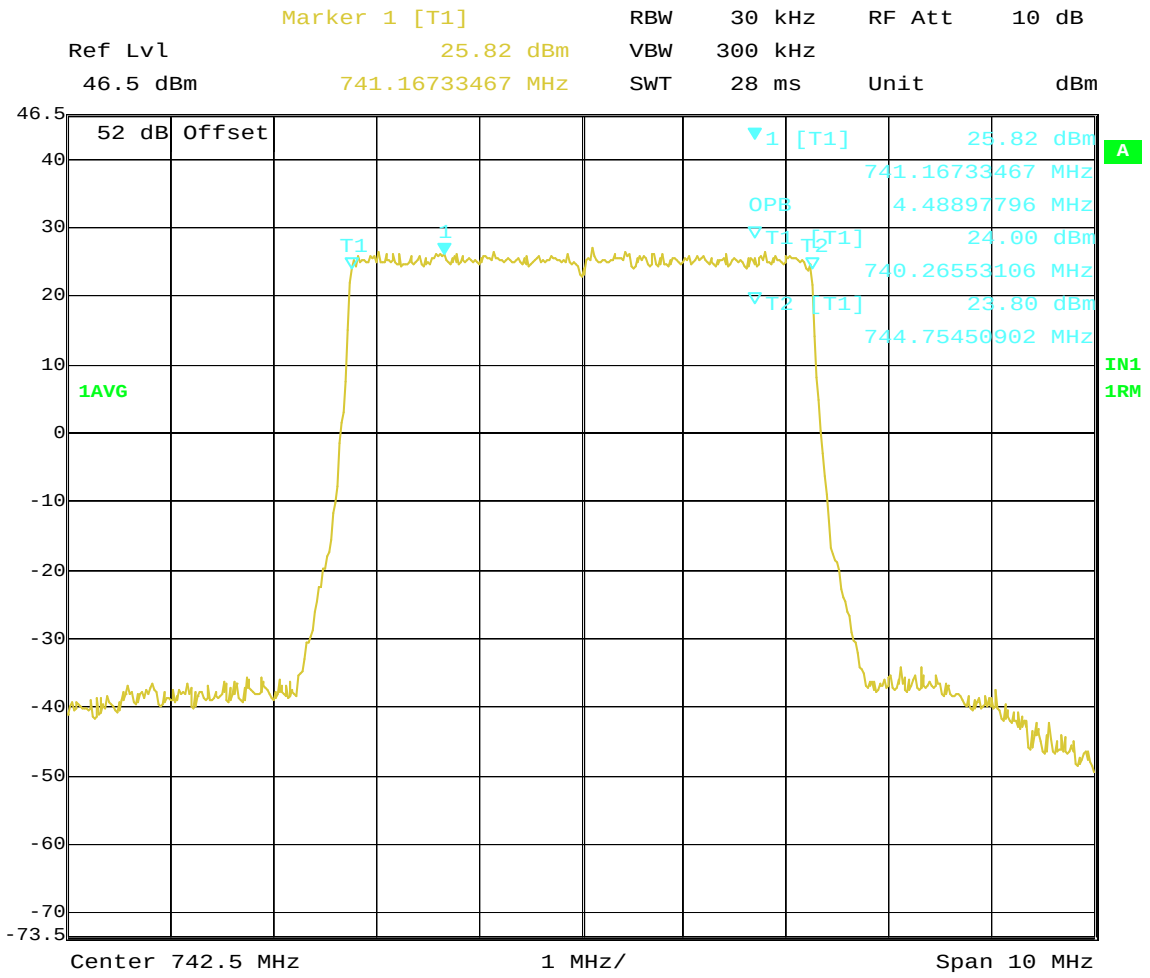
# (99% Power Bandwidth)




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:18:31




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:34:59




Title: 99% POWER BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 12:43:35

# MEASUREMENT OF SPECTRUM BANDWIDTH
# (B)26 dB POWER BANDWIDTH

## (b) **MEASUREMENT OF SPECTRUM BANDWIDTH For Emissions Type**

The occupied bandwidth of the Long Term Evolution (LTE) is measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The emissions bandwidth is not provided in the section 27.53 for 700 MHz bands. Therefore emissions band width definition provided in section 27.53 (h) (1) is used. Accordingly "The emissions bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power."

The measurements were made on a "**LTE 9442 RRH2x40-P2"** in the following configurations:
1. QPSK
2. 16 QAM
3. 64 QAM

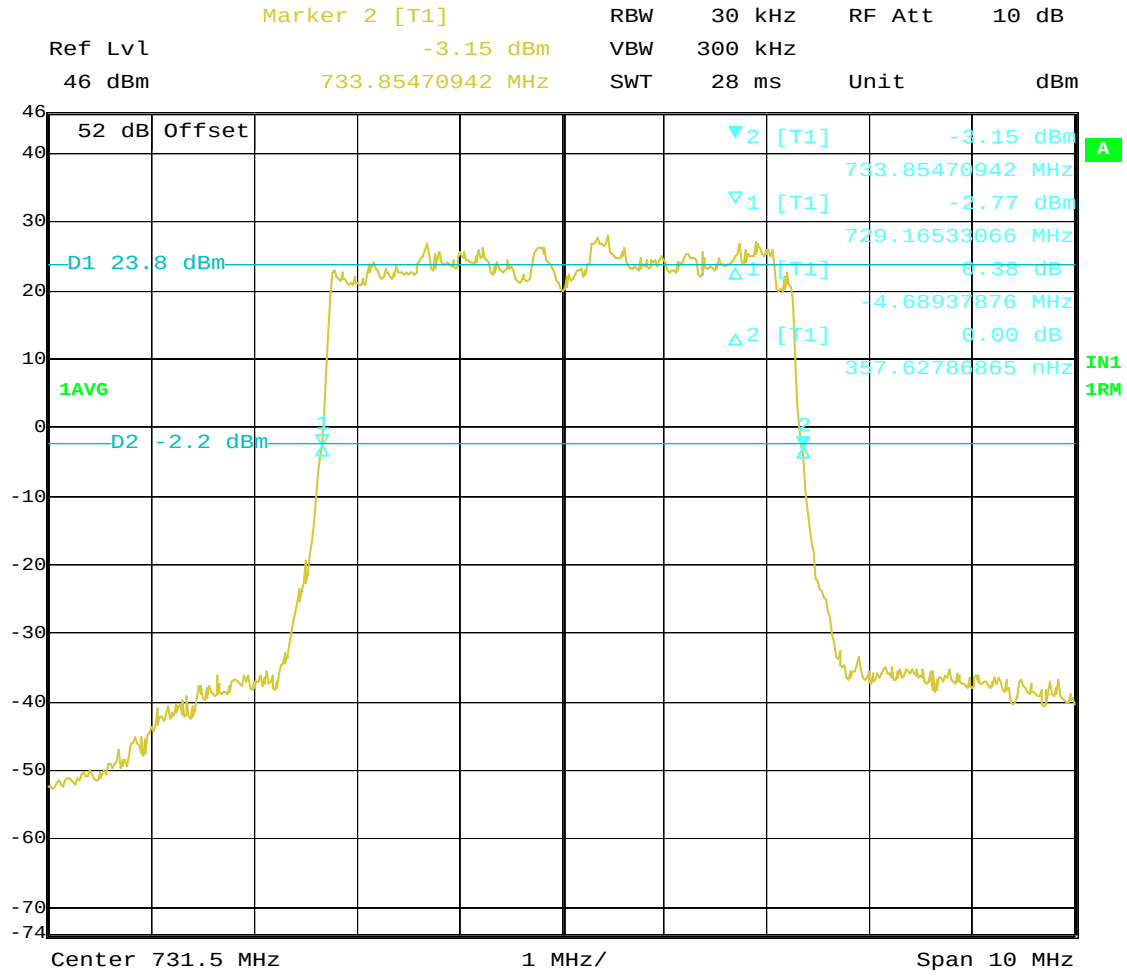
**Results:**
The plots are provided for QPSK, 16QAM and 64QAM modulations for 10 MHz band and 5MHz band.
The Measured 26dB emissions bandwidth is 9.42 MHz for 10 MHz band, and 4.70 MHz for 5 MHz band.

# Block: A

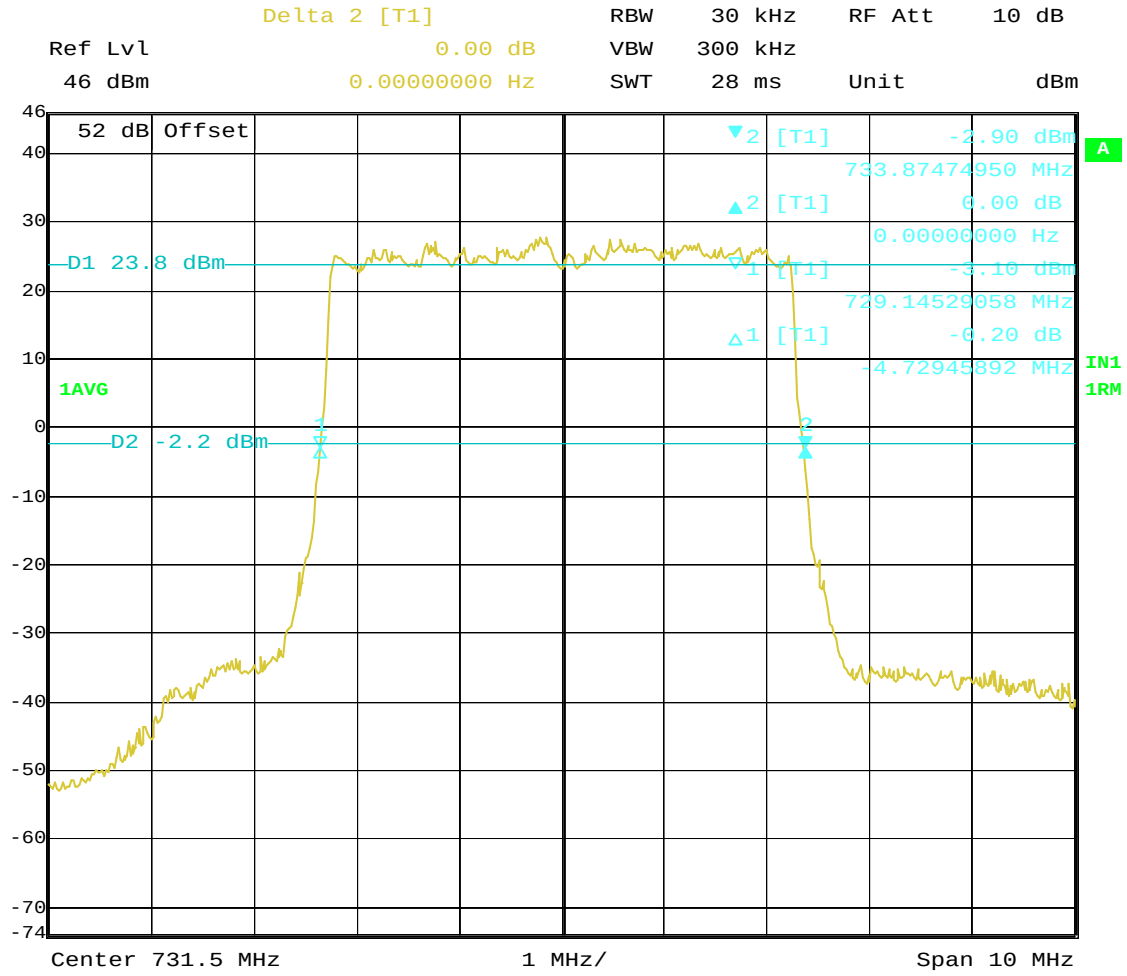
# Channel: 5035

# 5 MHz Bandwidth 729 – 734 MHz

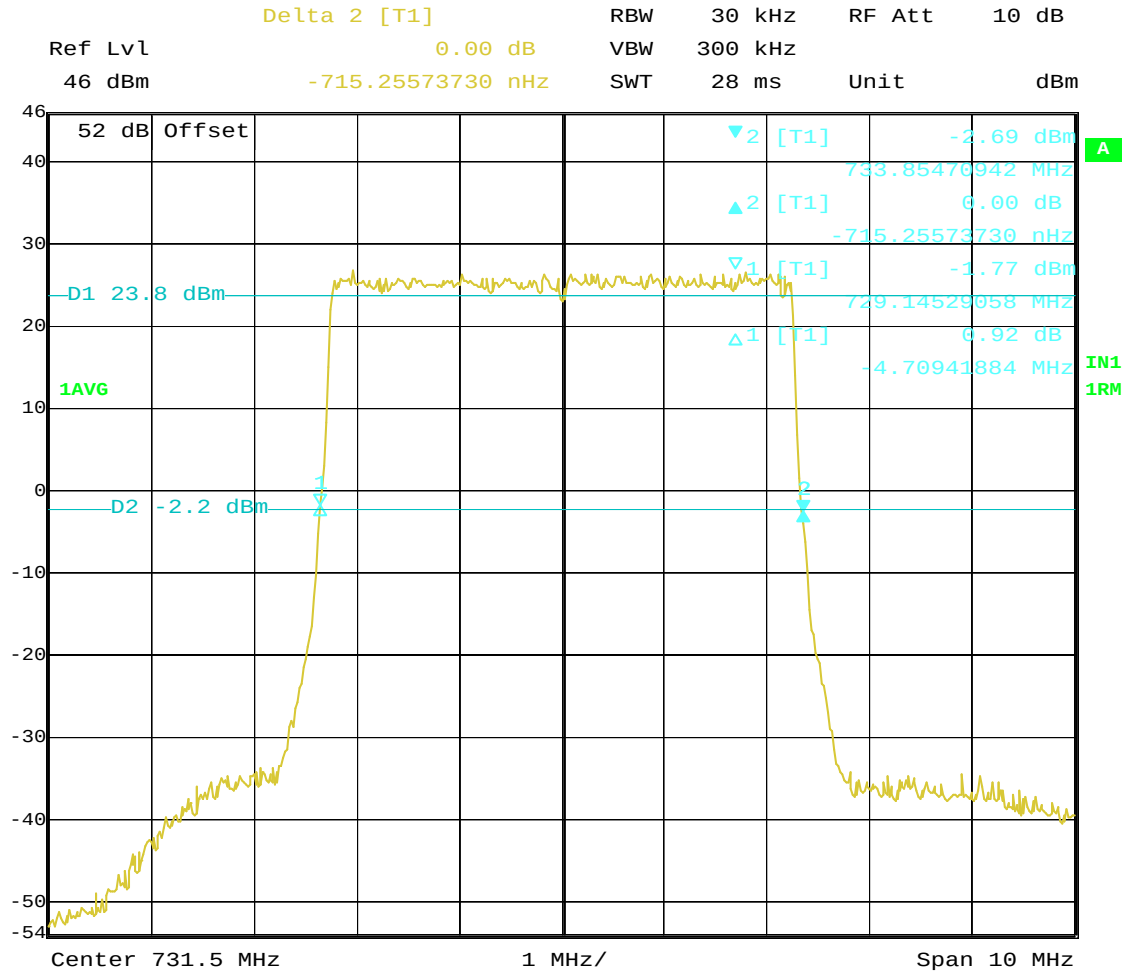
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:32:29




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:11:50



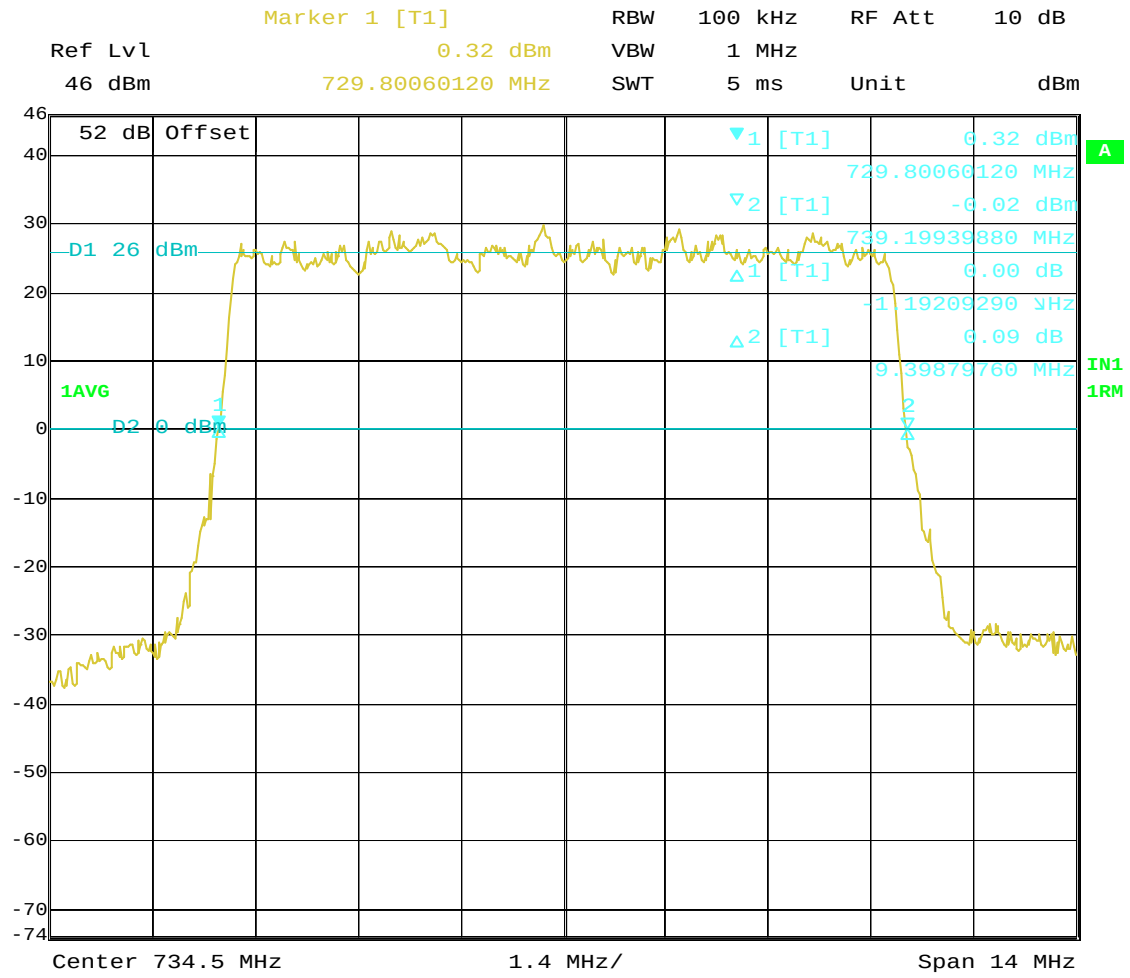

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 11.AUG.2010 14:03:21

# Block: A+B

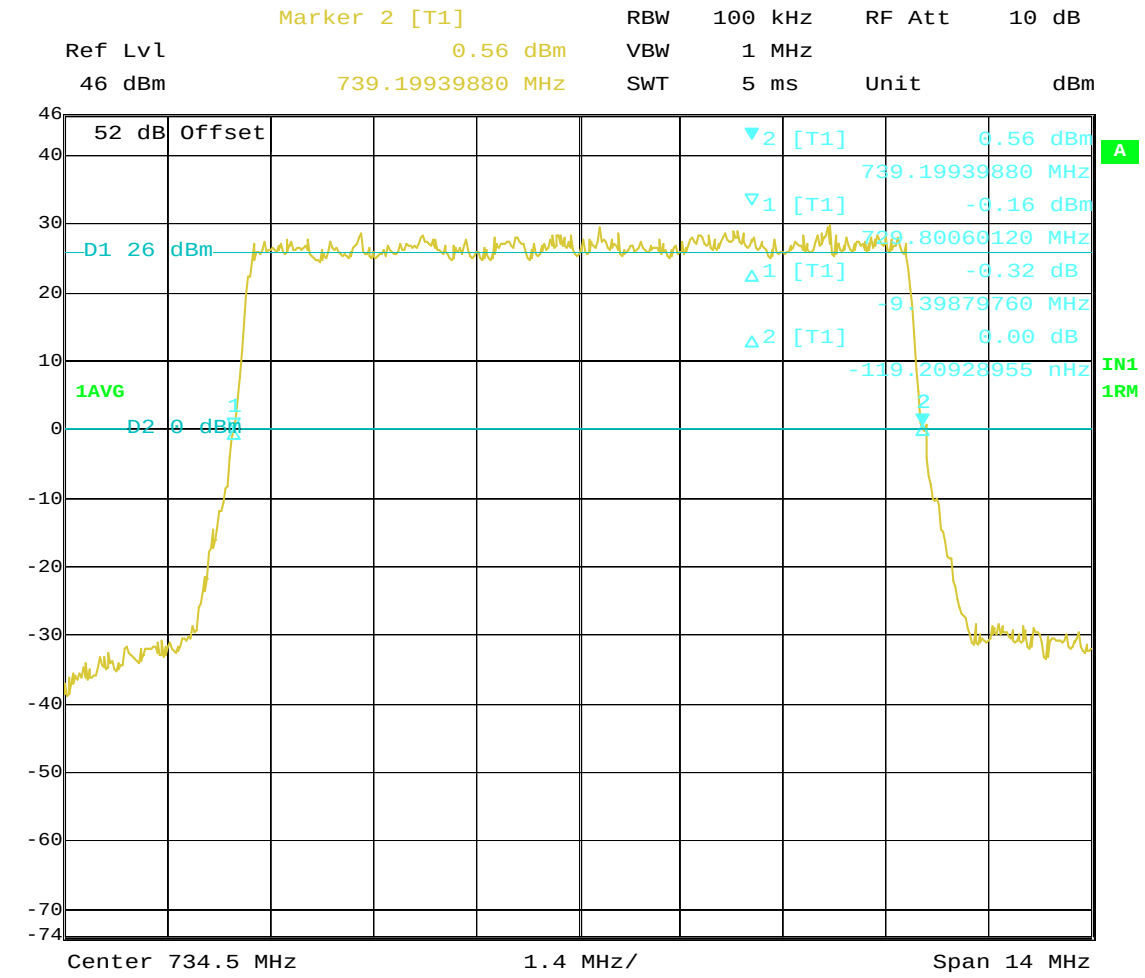
# Channel: 5065

# 10 MHz Bandwidth 729.5 – 739.5 MHz

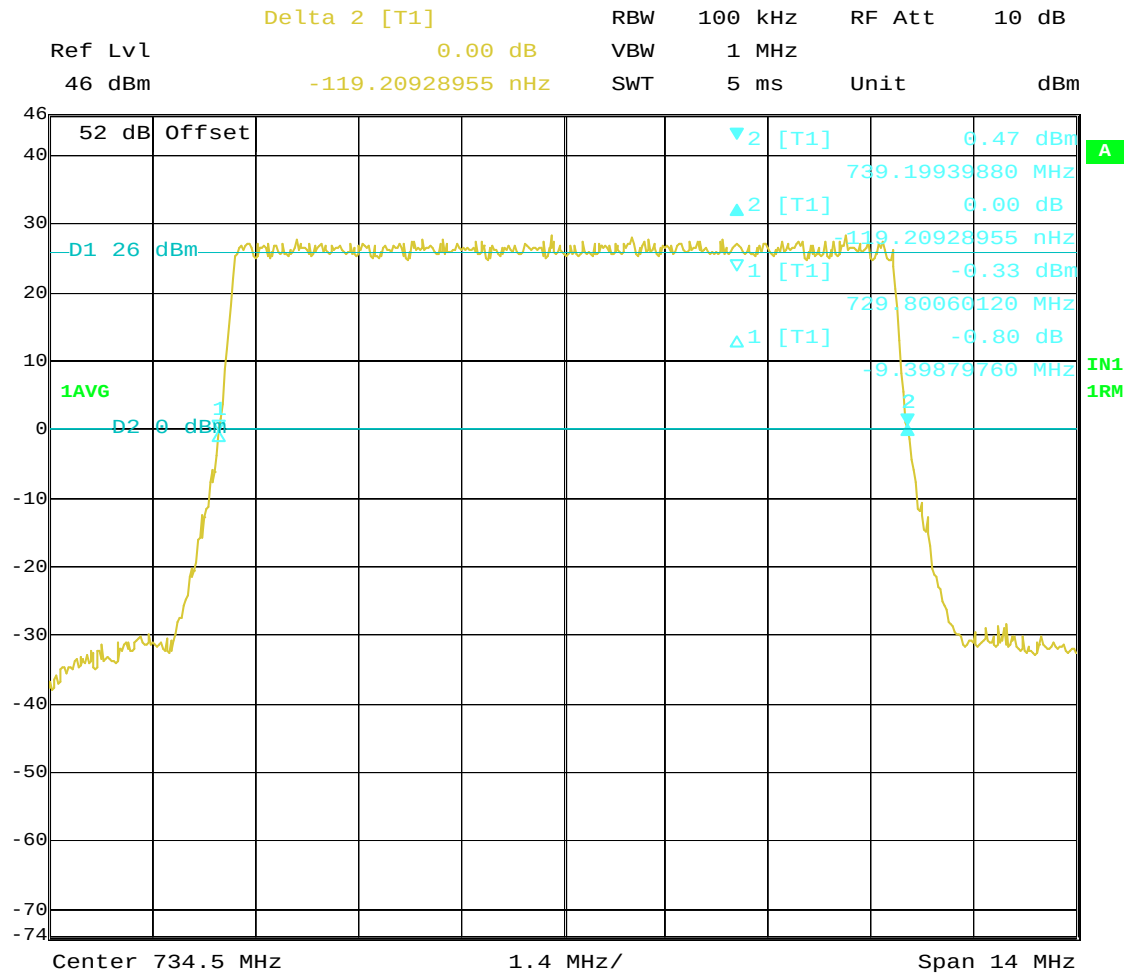
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 08:53:58




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 09:29:34



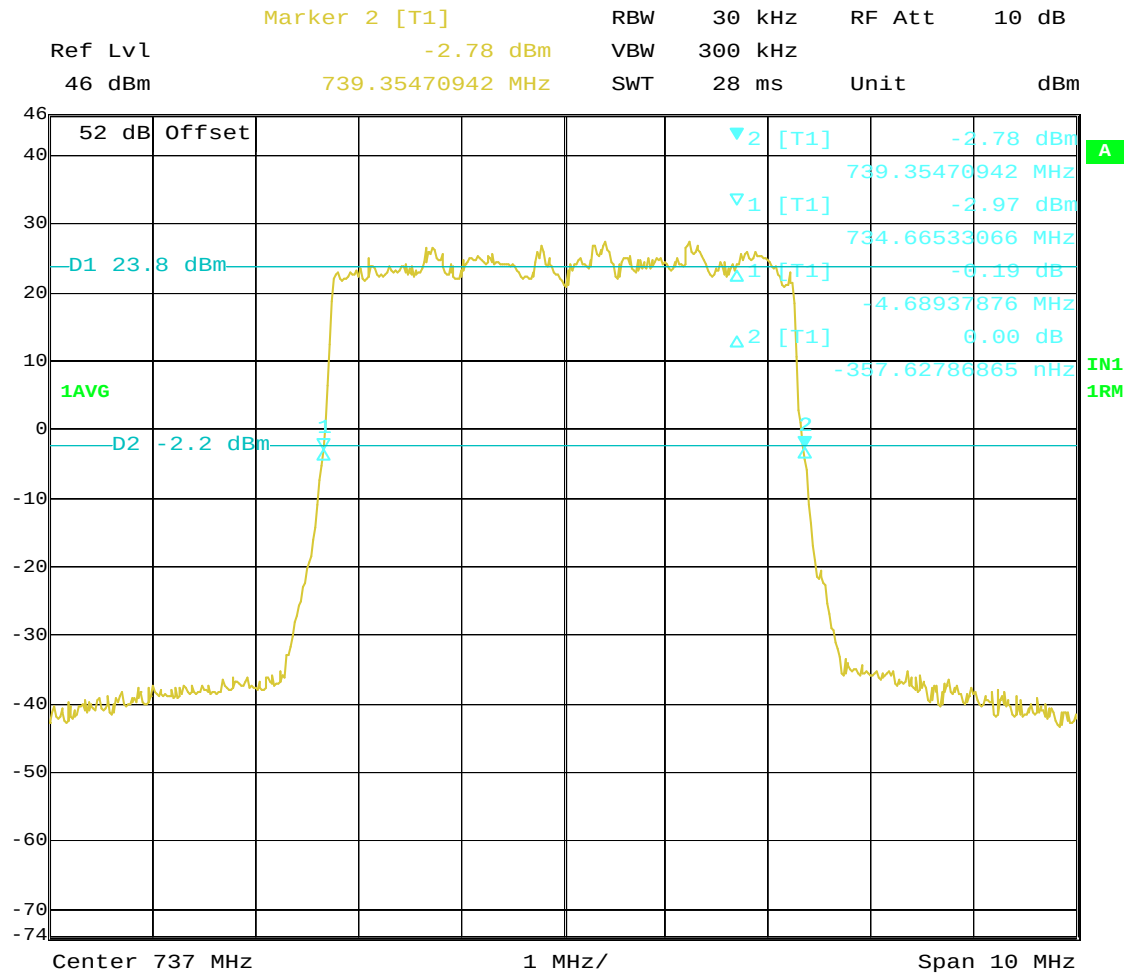

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 10:07:17

# Block: B

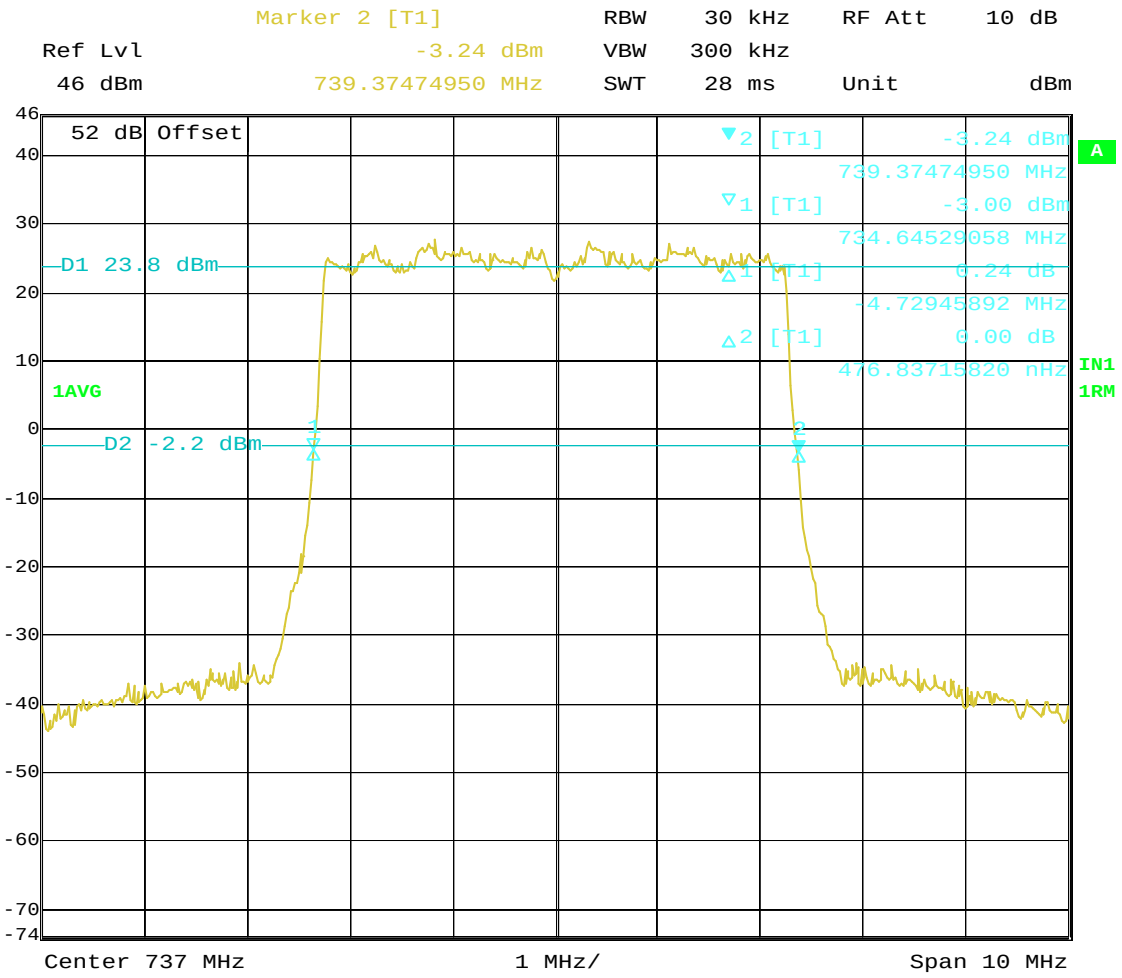
# Channel: 5090

# 5 MHz Bandwidth 734.5 – 739.5 MHz

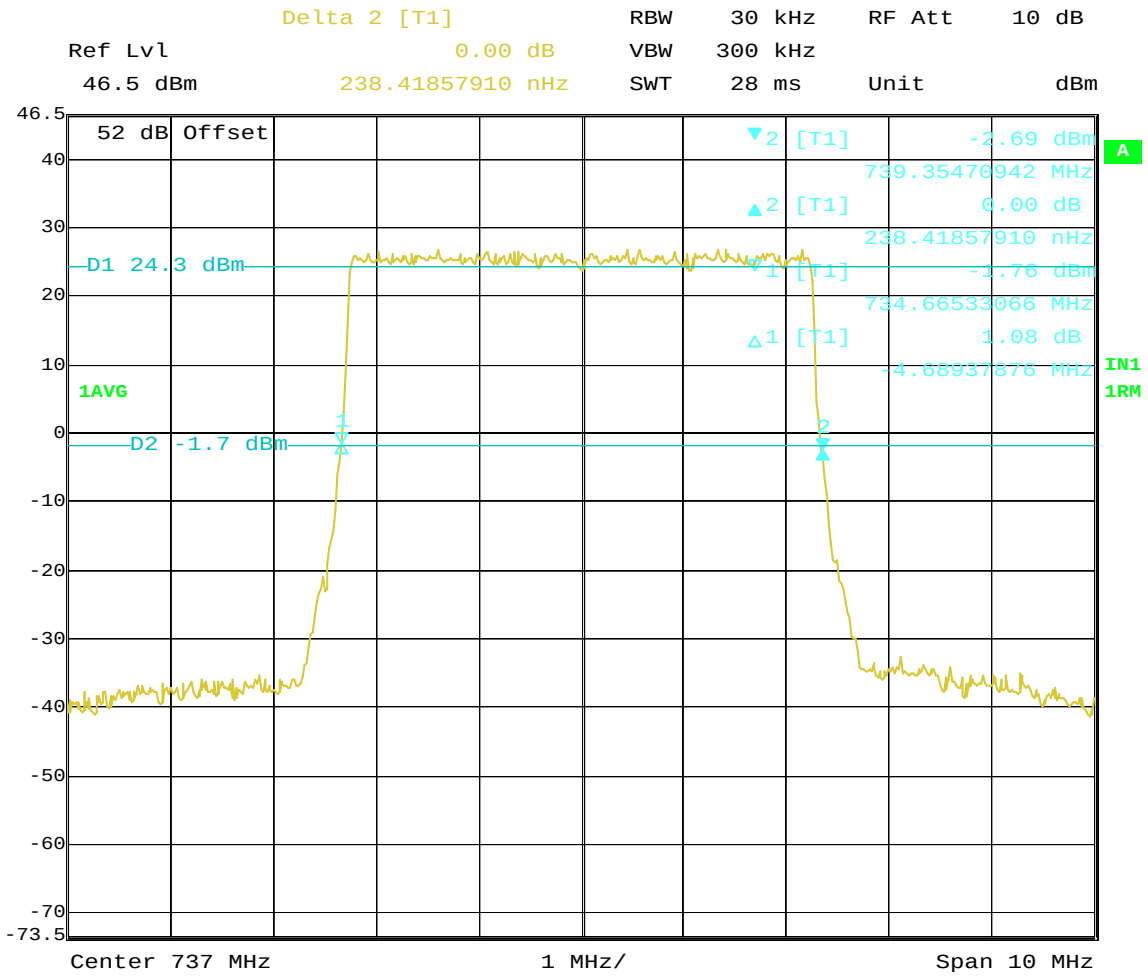
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 14:31:31




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:00:48



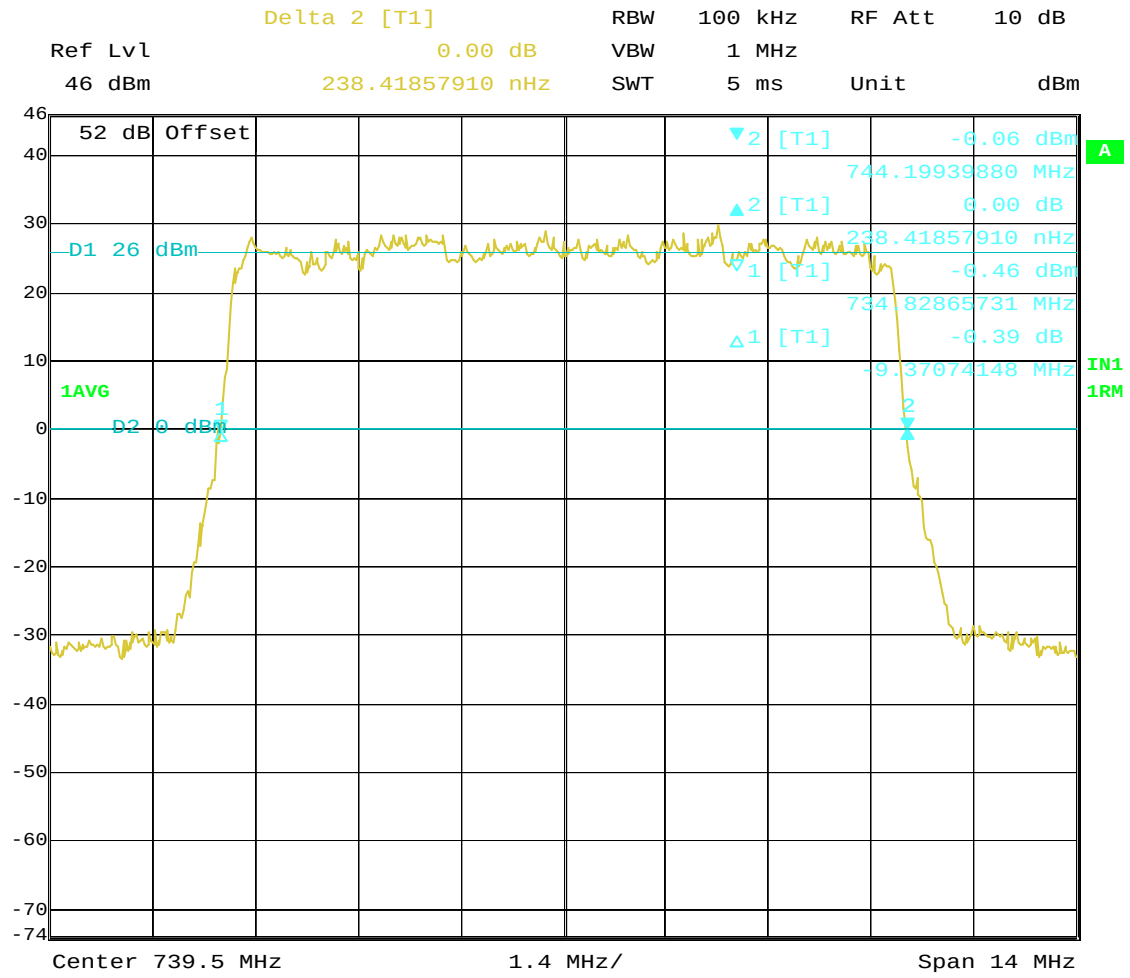

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:26:15

# Block: B+C

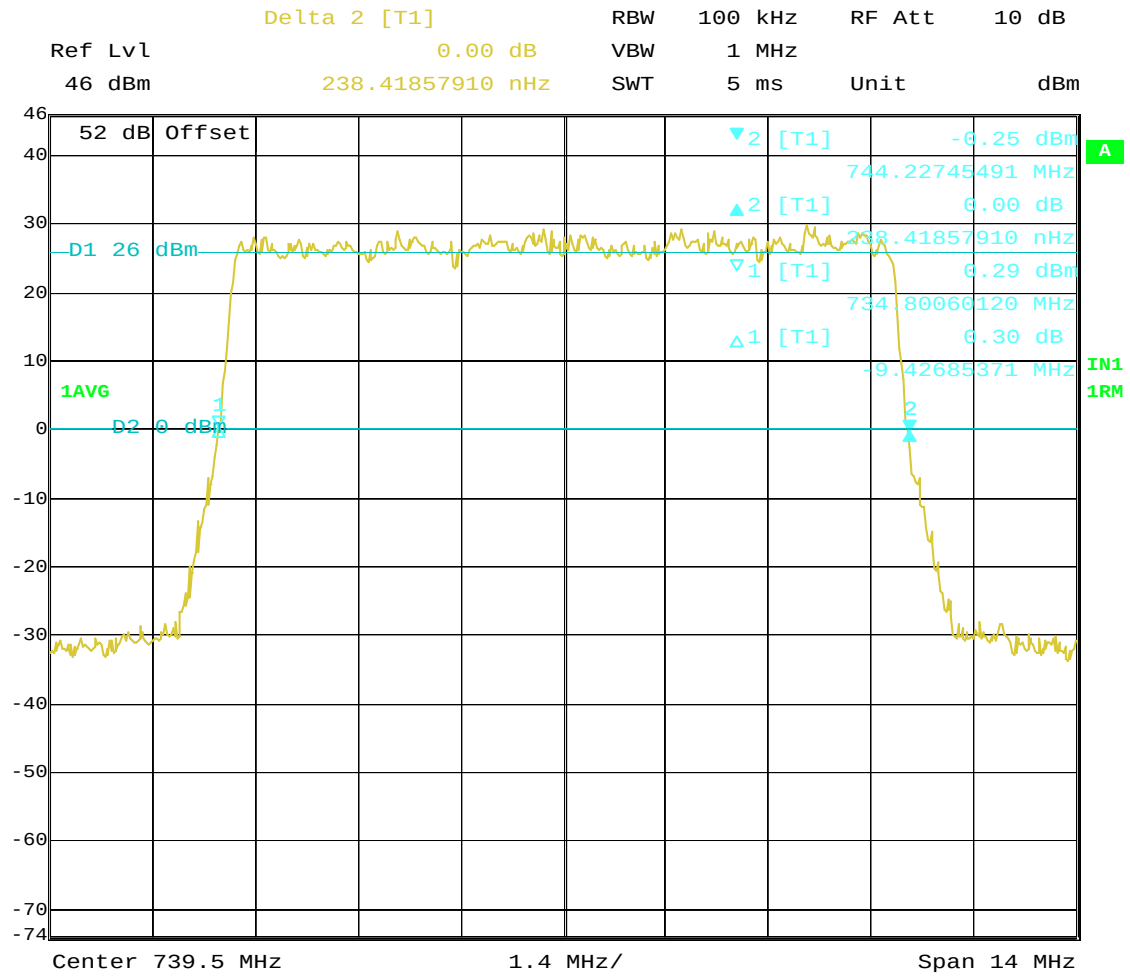
# Channel: 5115

# 10 MHz Bandwidth 734.5 – 744.5 MHz

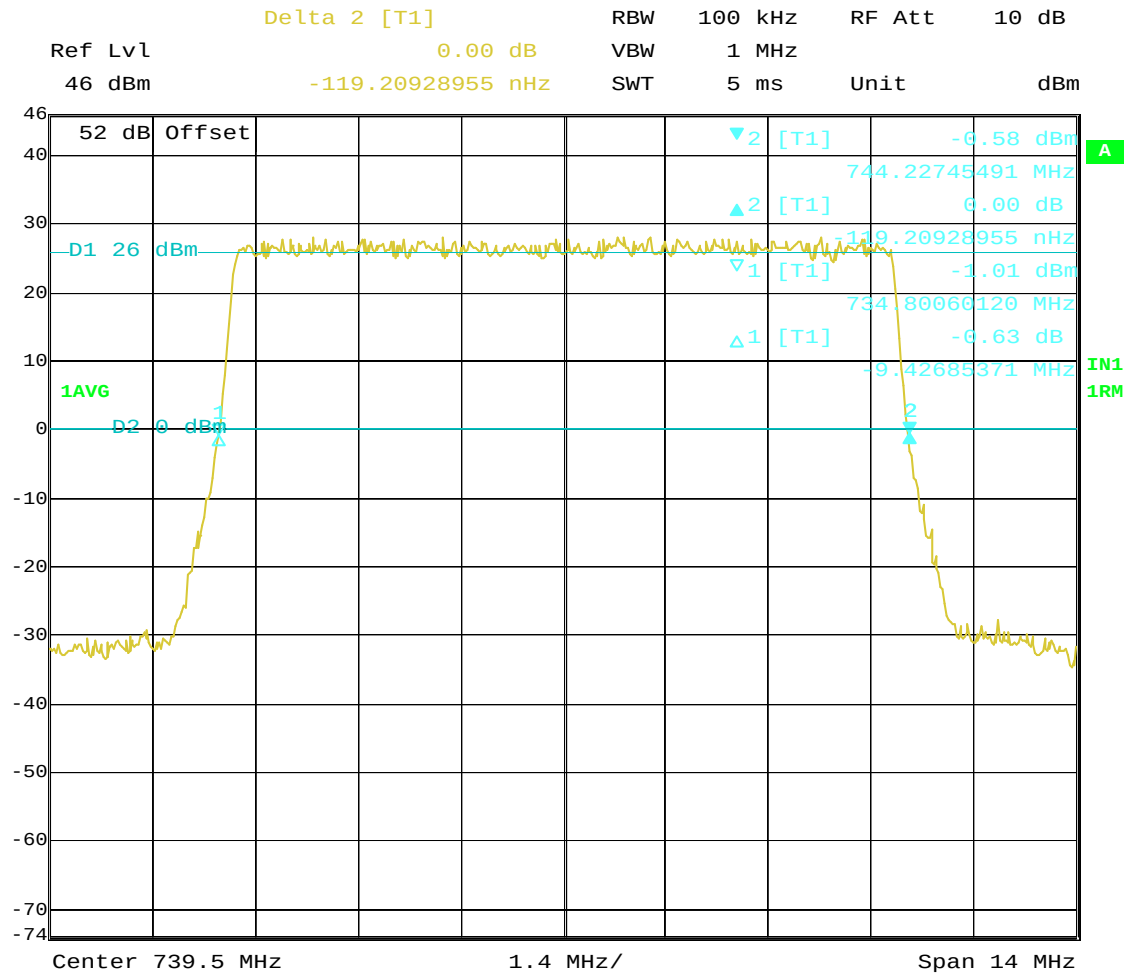
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:53:30




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 16.AUG.2010 08:29:05



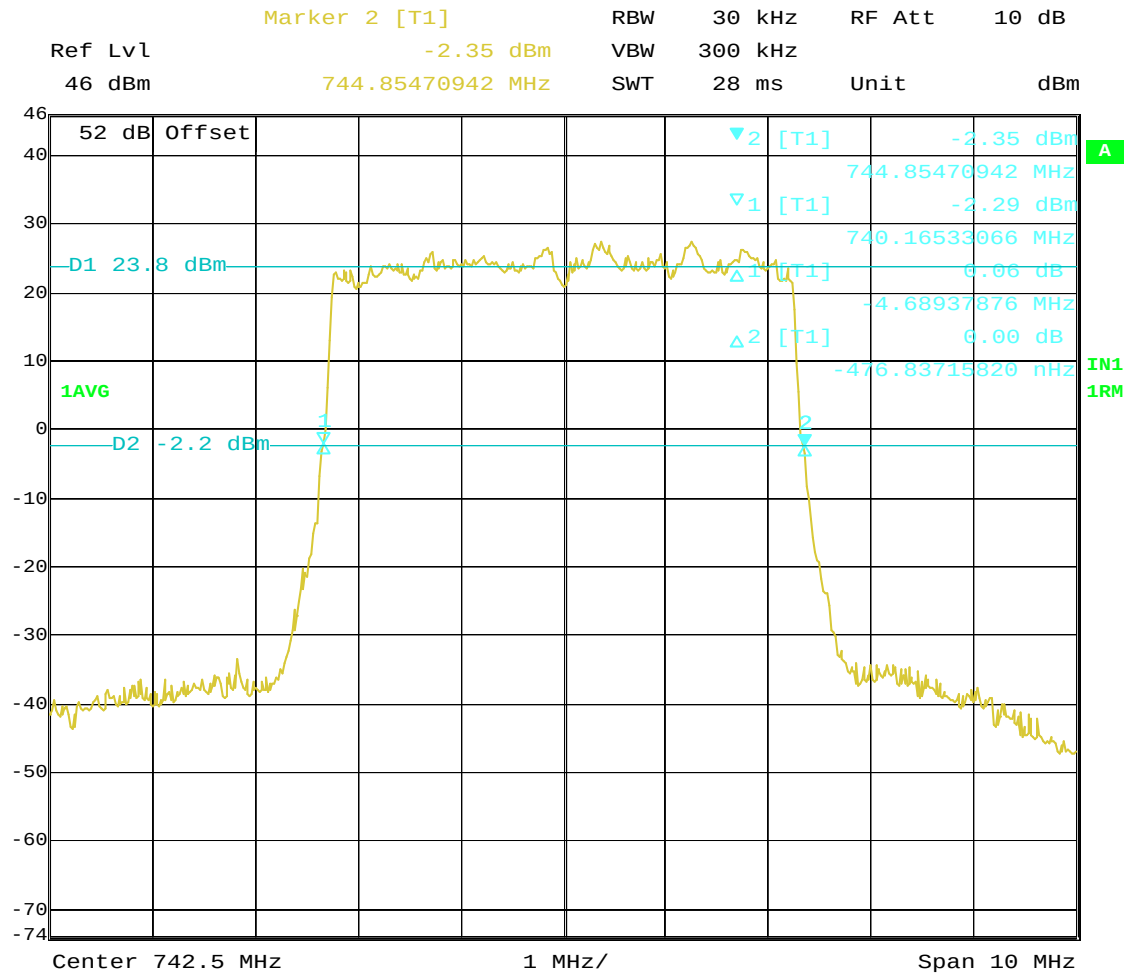

Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 08:03:05

# Block: C

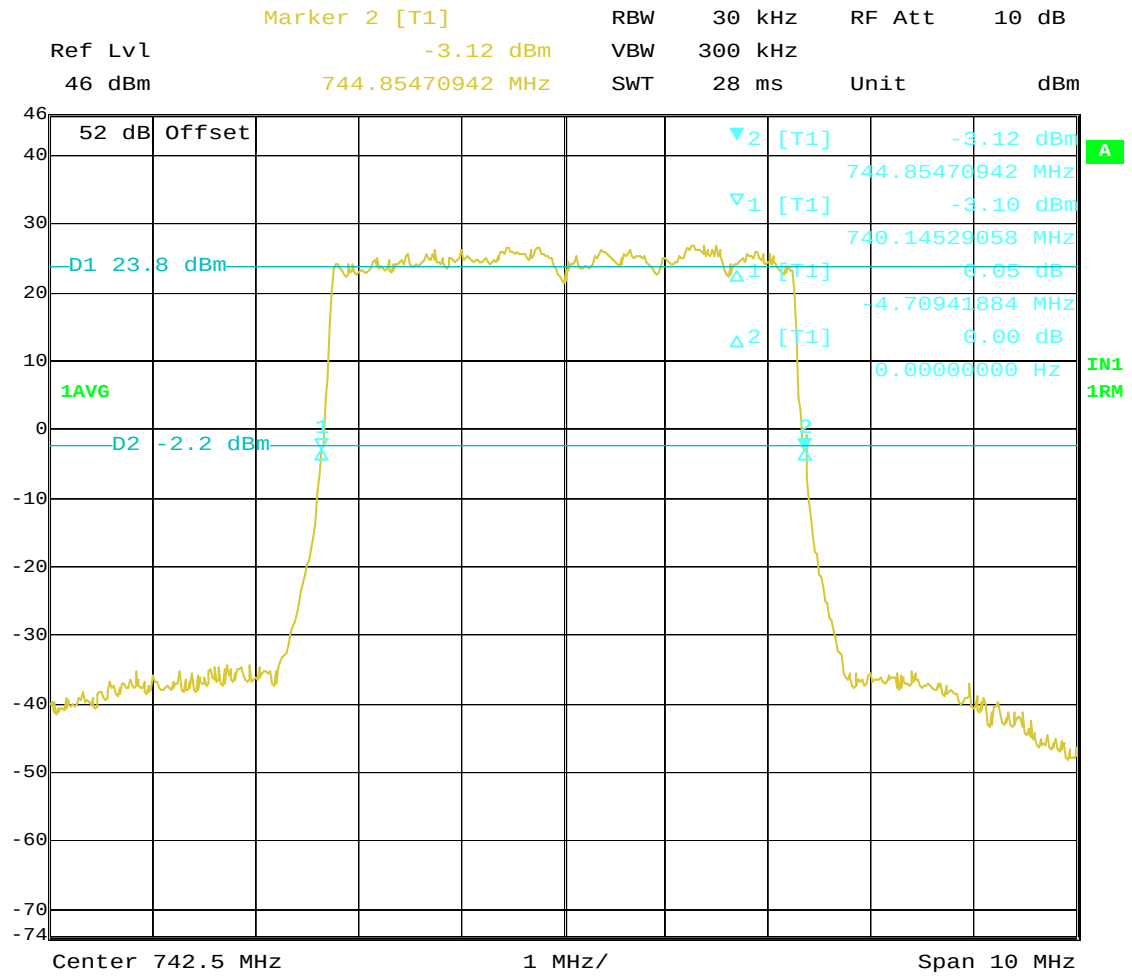
# Channel: 5145

# 5 MHz Bandwidth 740 – 745 MHz

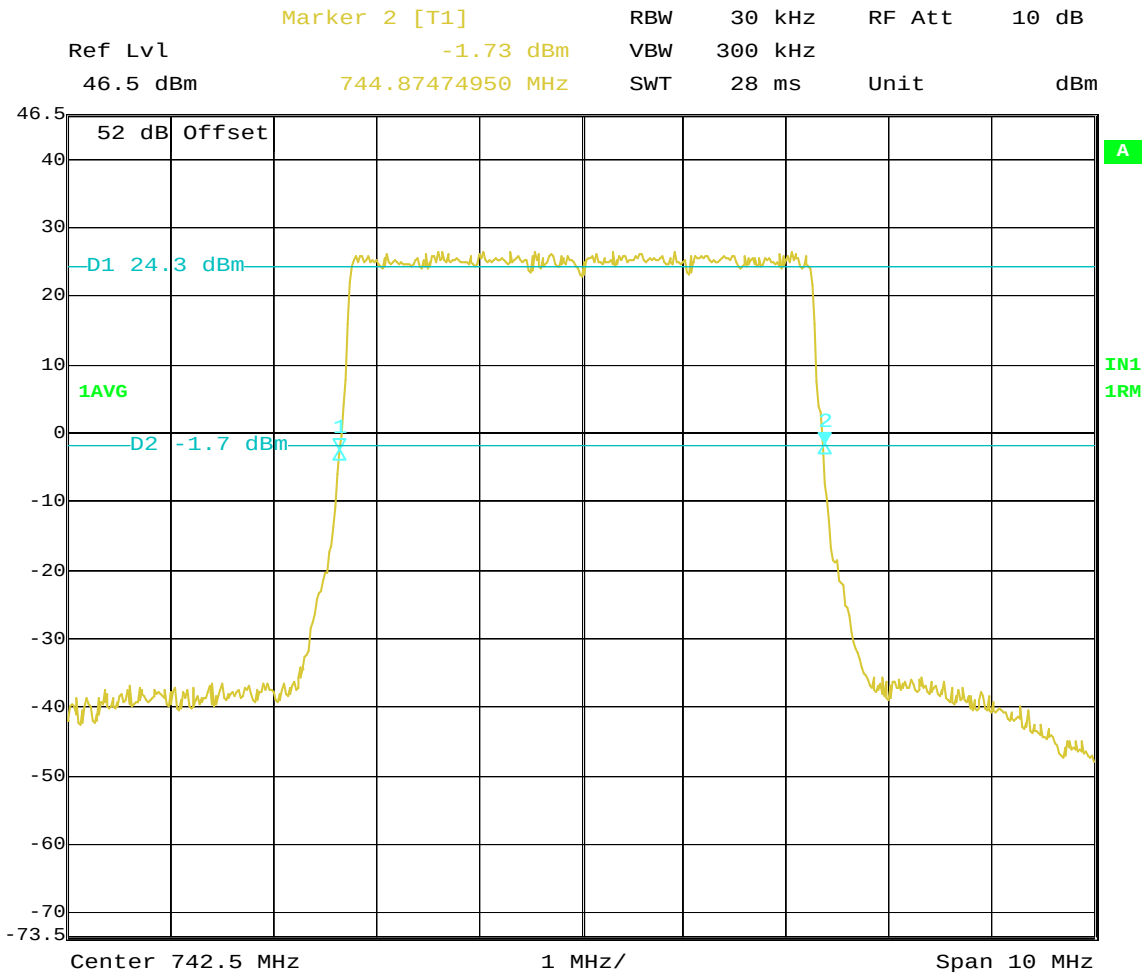
# (26dB Bandwidth)




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:16:30




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:39:16




Title: 26dB BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:09:25

# MEASUREMENT OF SPECTRUM MASK/OCCUPIED BANDWIDTH (1MHz ADJACENT TO CHANNEL EDGE)

**Section 27.53 (G)**

## MEASUREMENT OF SPECTRUM MASK
## OCCUPIED BANDWIDTH

The Spectrum mask close to the center of the carrier frequency (Occupied bandwidth) of the Long Term Evolution (LTE) was measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The RF power level was measured using RF power meter as shown in the test setup in Figure A. The RF output from the LTE EAC port to spectrum analyzer was reduced (to an amplitude usable by the spectrum analyzer) by using a calibrated attenuator. This attenuation was offset on the display and the signal for single carrier was adjusted to the corrected RF power level for a 100 kHz resolution bandwidth for 10MHz wide transmit signal, and 30 kHz resolution bandwidth for 5 MHz wide transmit signal. While adjusting the corrected RF power level in the spectrum analyzer, the attenuator and resolution BW of the spectrum analyzer were considered.

The measurements were made on a "**LTE 9442 RRH2x40-P2**.

The reference line on the spectrum analyzer display corresponds to level measured by the RF power meter. Occupied Bandwidth plots were made at antenna terminals for an output of 40 Watts (46.0 dBm)/carrier.

***The frequencies and blocks used were tabulated on the bottom of each plot. The output signals at RF filter were plotted at each frequency/block. The* LTE 9442 RRH2x40-P2 *is capable of operating in the band of 729 MHz to 745 MHz. The Base station presently tested was configured to operate in Blocks A, A+B, B, B+C, and C only. Plots were provided for a single carrier. These frequencies were chosen to show the occupied bandwidth in the blocks in the frequency band in which this radio can be operated.***

***Block edge requirements:***
***FCC Section 27.53(g): Based on measurement instrument employing resolution bandwidth of 100 kHz bands or greater out band shall be attenuated at least 43+10log (P) dB or -13dBm. However in 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.***

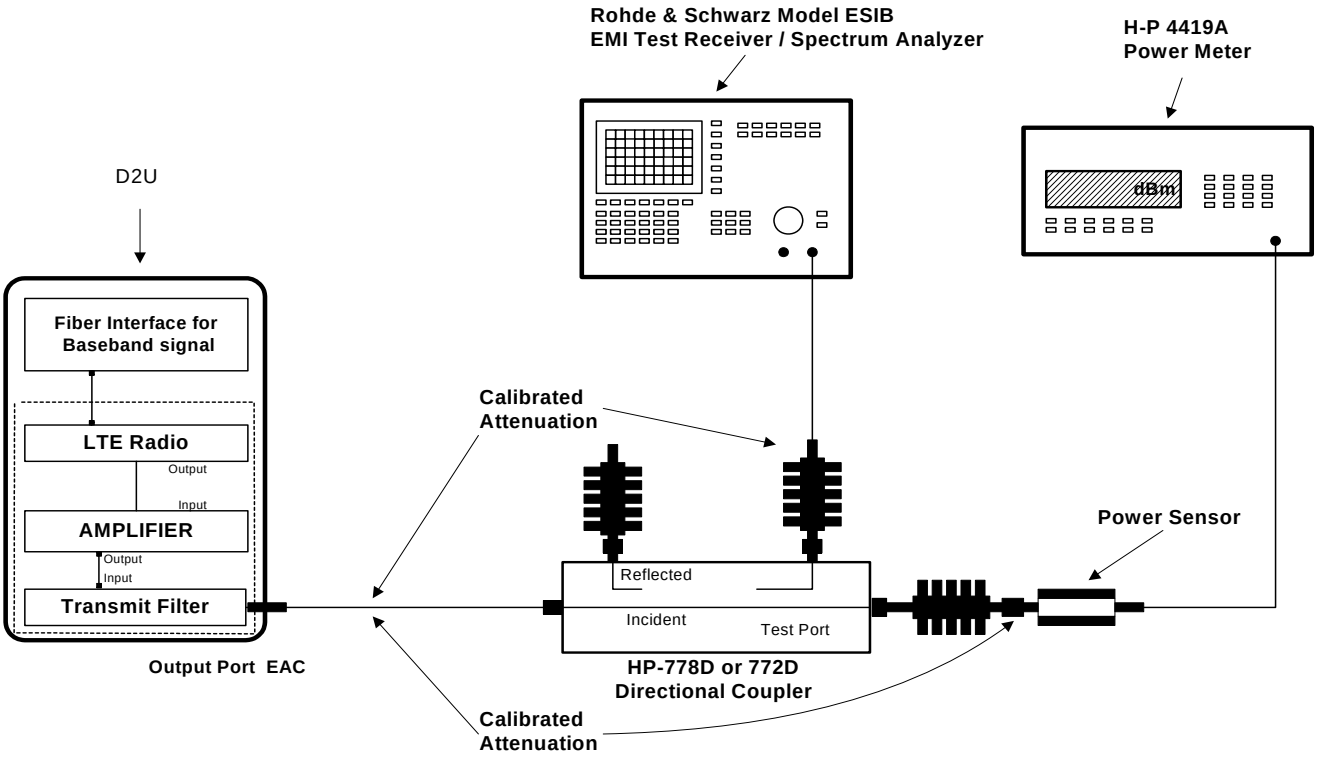
***Note: For all tests 100 kHz resolution bandwidth was used for the 10 MHz Carrier Bandwidth, while 30 kHz resolution bandwidth was used for the 5 MHz Carrier Bandwidth.***

The list of band, channels, RF filters (EAC) and Amplifiers tested are listed below:

| Band | Block | Center Frequency (MHz) | Carrier Bandwidth (MHz) | Channel | RF Filter | Power (Watts) |
|---|---|---|---|---|---|---|
| | A | 731.5 | 5 | 5035 | M1 | 40 |
| | A+B | 734.5 | 10 | 5065 | M1 | 40 |
| | B | 737 | 5 | 5090 | M1 | 40 |
| | B+C | 739.5 | 10 | 5115 | M1 | 40 |
| | C | 742.5 | 5 | 5145 | M1 | 40 |

**Measurement uncertainty:**
Frequency: 100 Hz
Amplitude: 0.5 dB

# Figure A. TEST CONFIGURATION FOR SPECTRUM MASK (OCCUPIED BANDWIDTH)



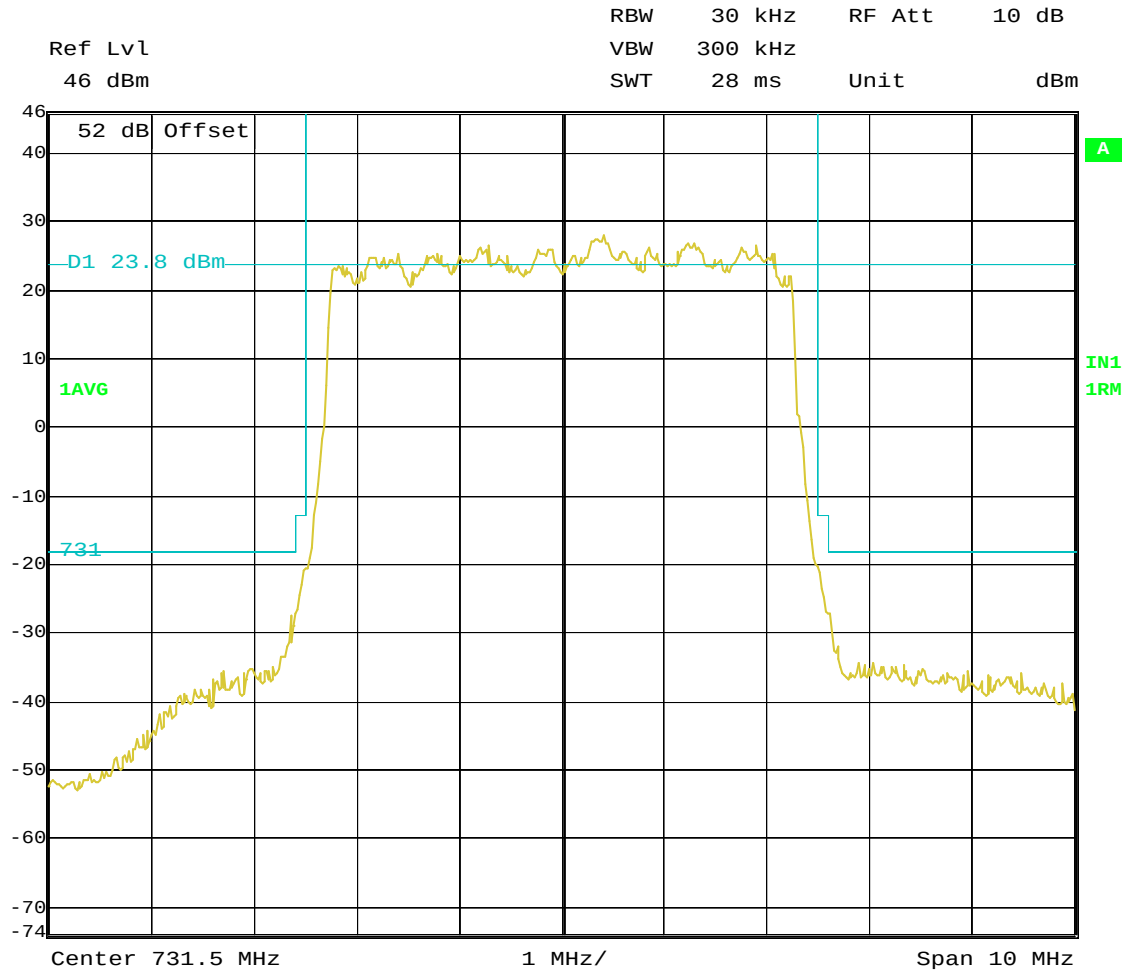

All components are calibrated over the frequency range of interest

# Block: A

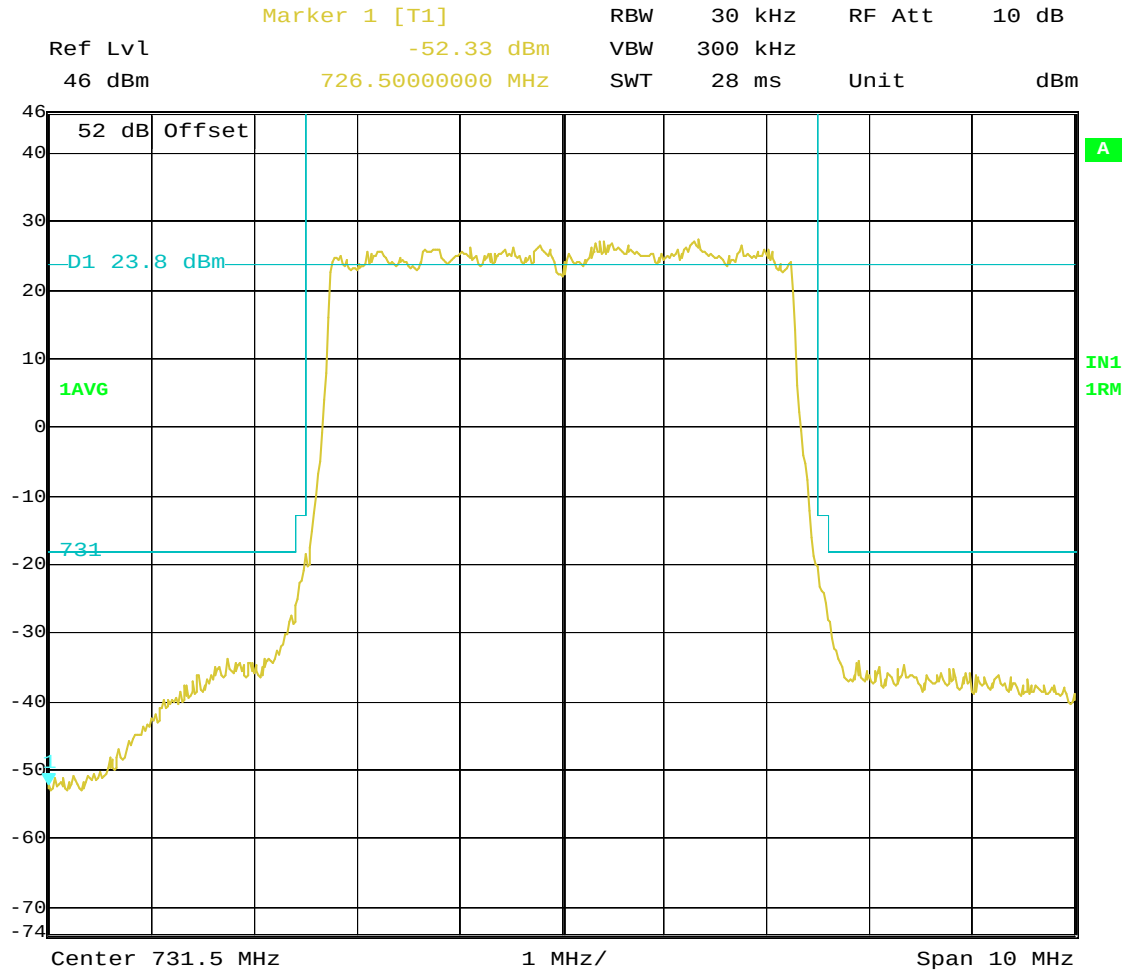
# Channel: 5035

# 5 MHz Bandwidth 729 – 734 MHz
# (Left Edge)

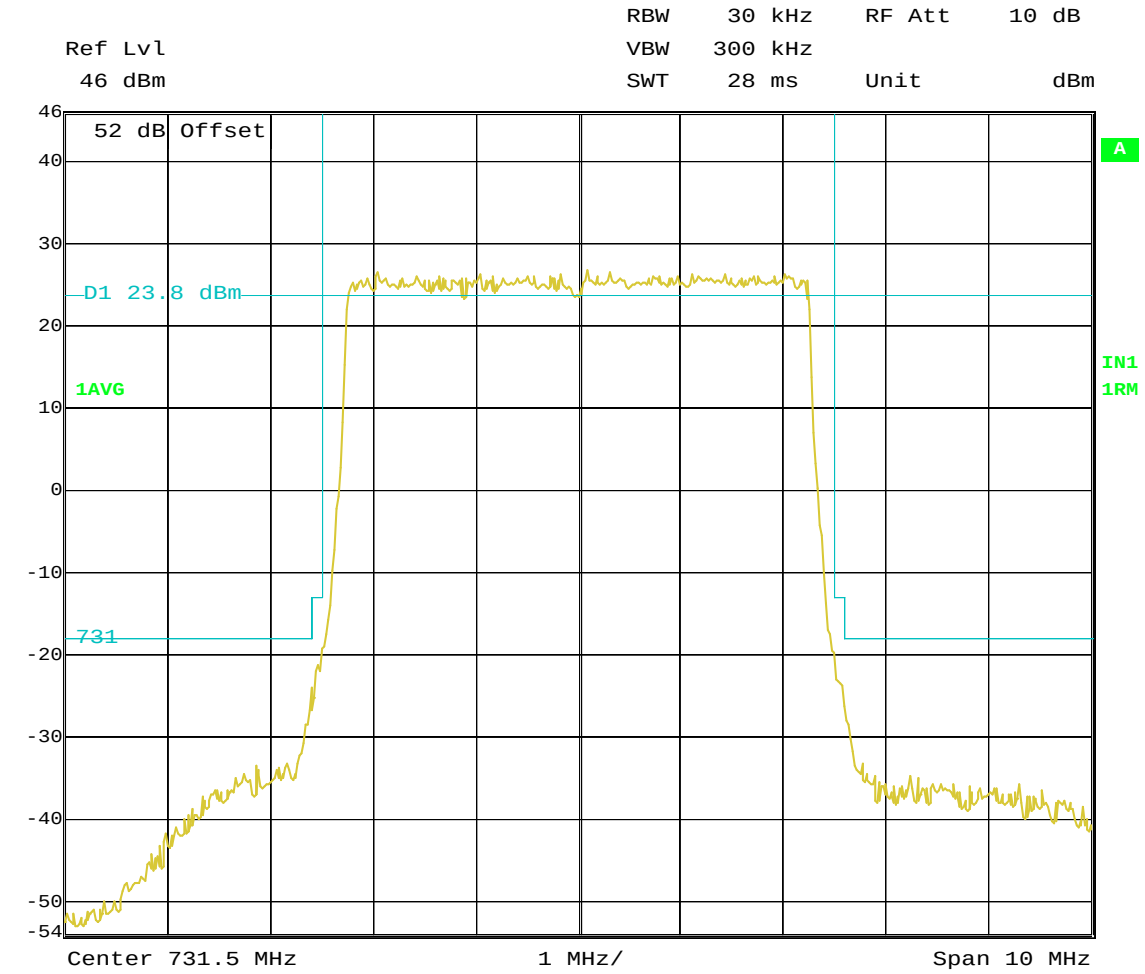
## SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:35:04




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:08:32



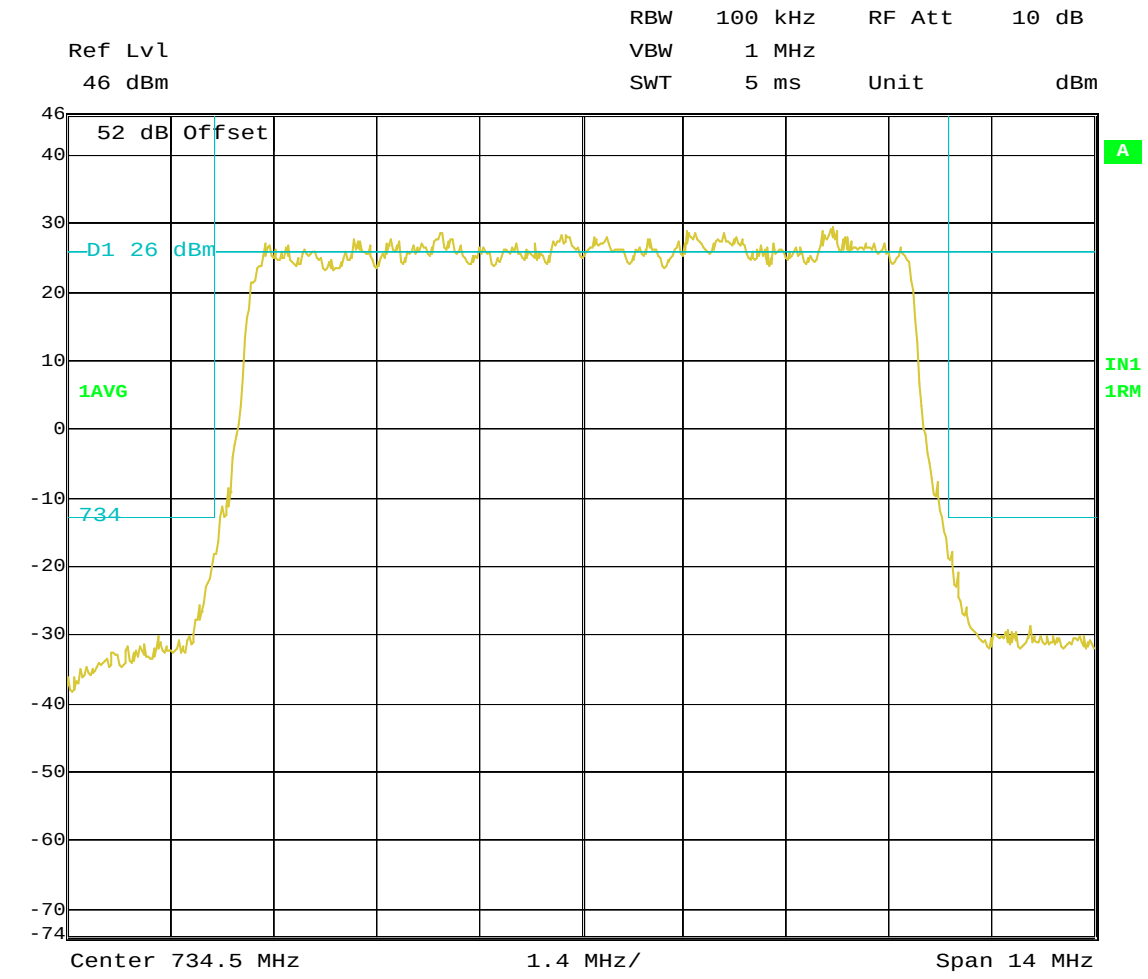

Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Flt:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 11.AUG.2010 13:12:42

# Block: A+B

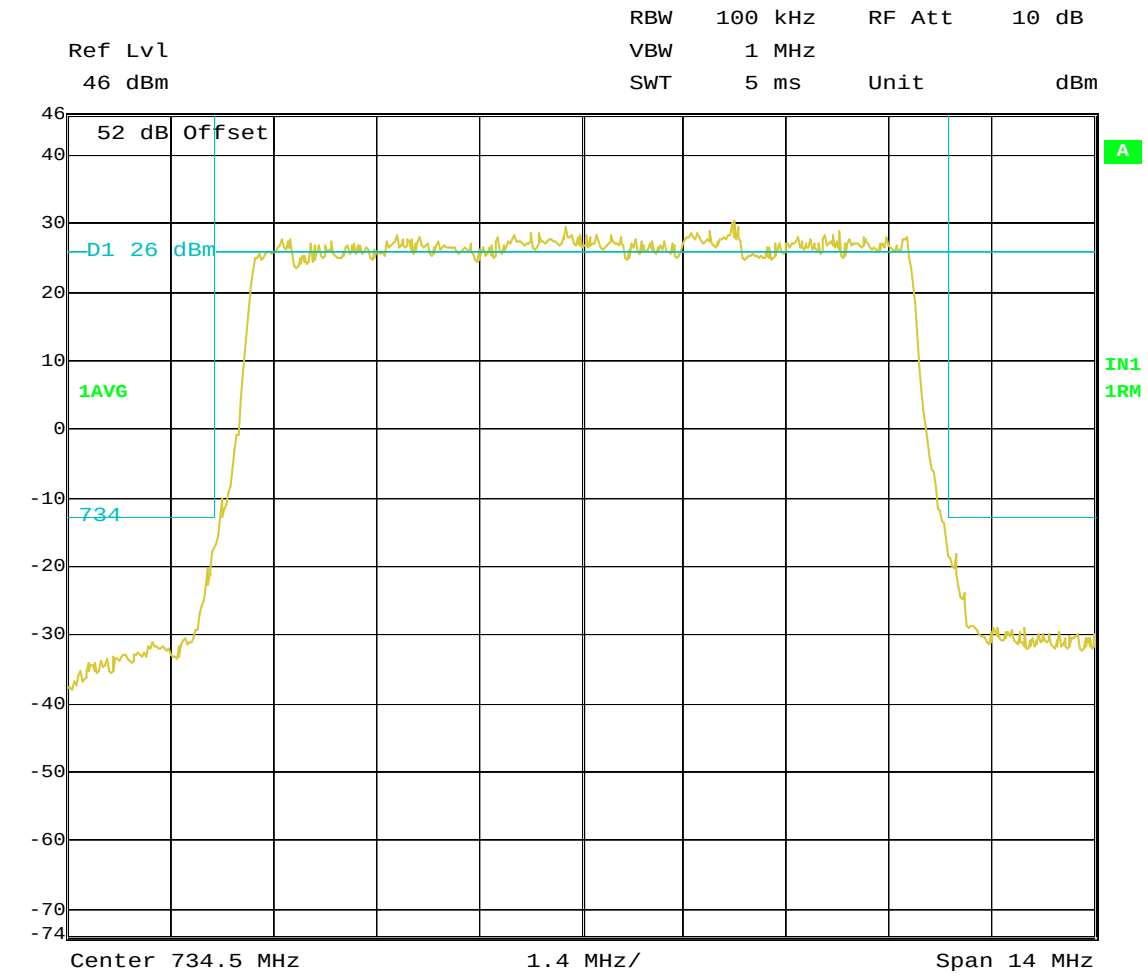
# Channel: 5065

# 10 MHz Bandwidth 729.5 – 739.5 MHz

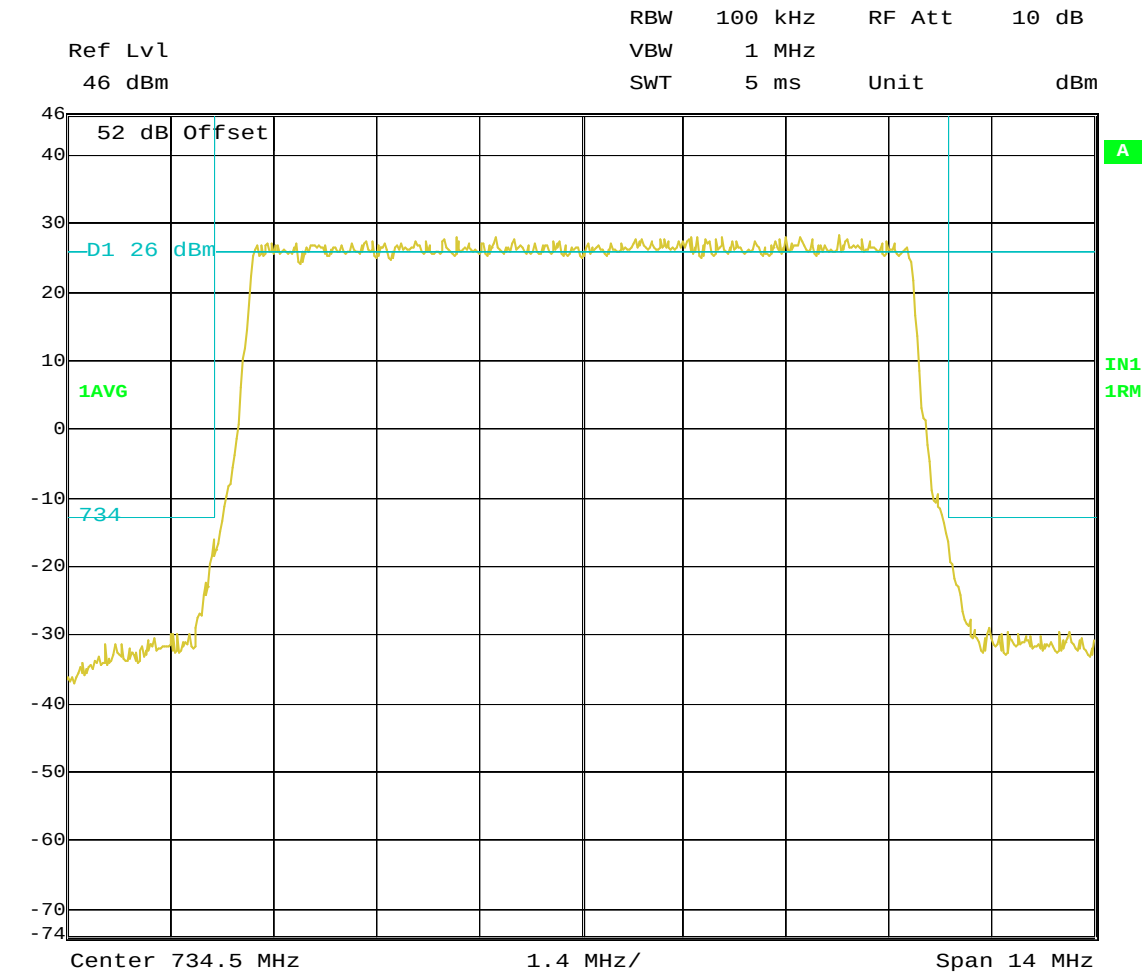
## SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 08:49:31




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 09:31:28



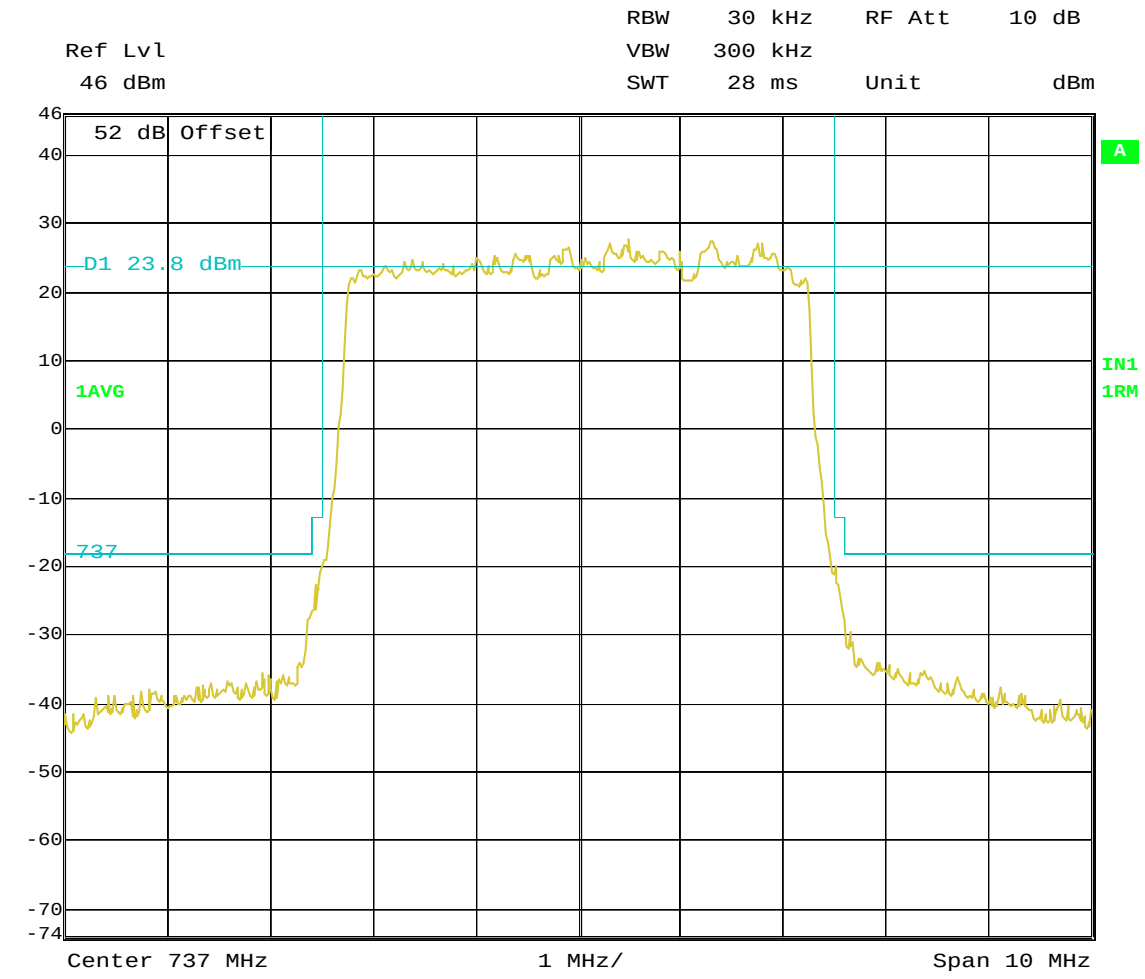

Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 10:03:40

# Block: B

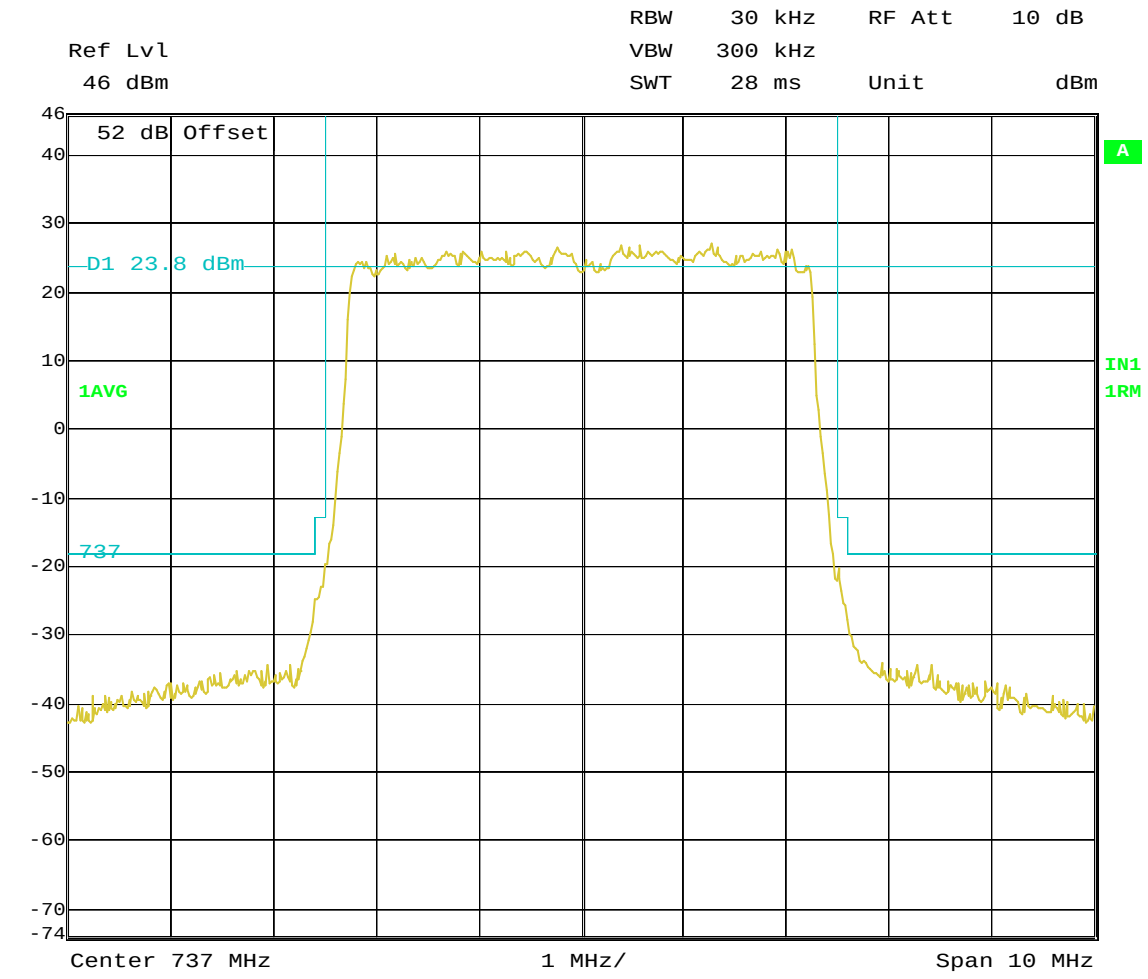
# Channel: 5090

# 5 MHz Bandwidth 734.5 – 739.5 MHz

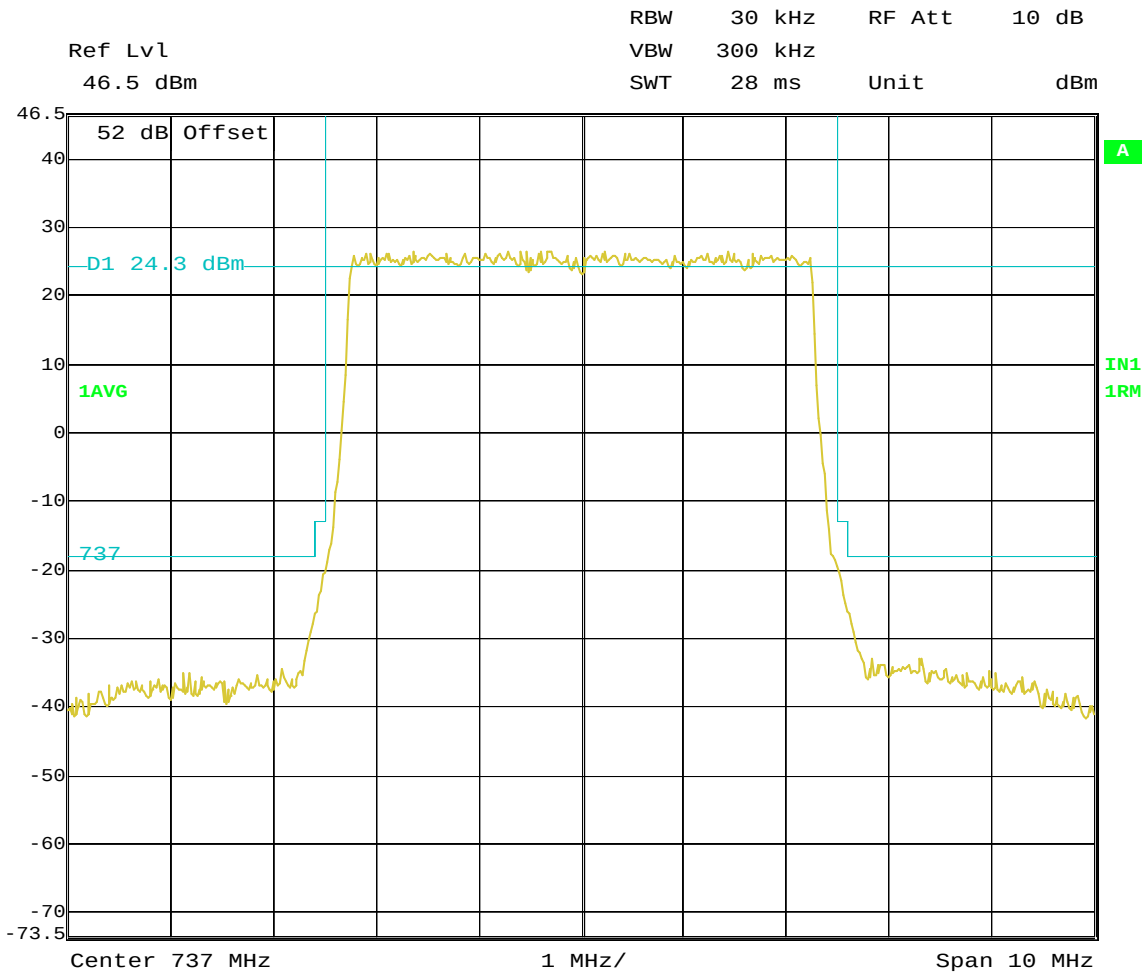
## SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 14:27:47




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 07:57:57



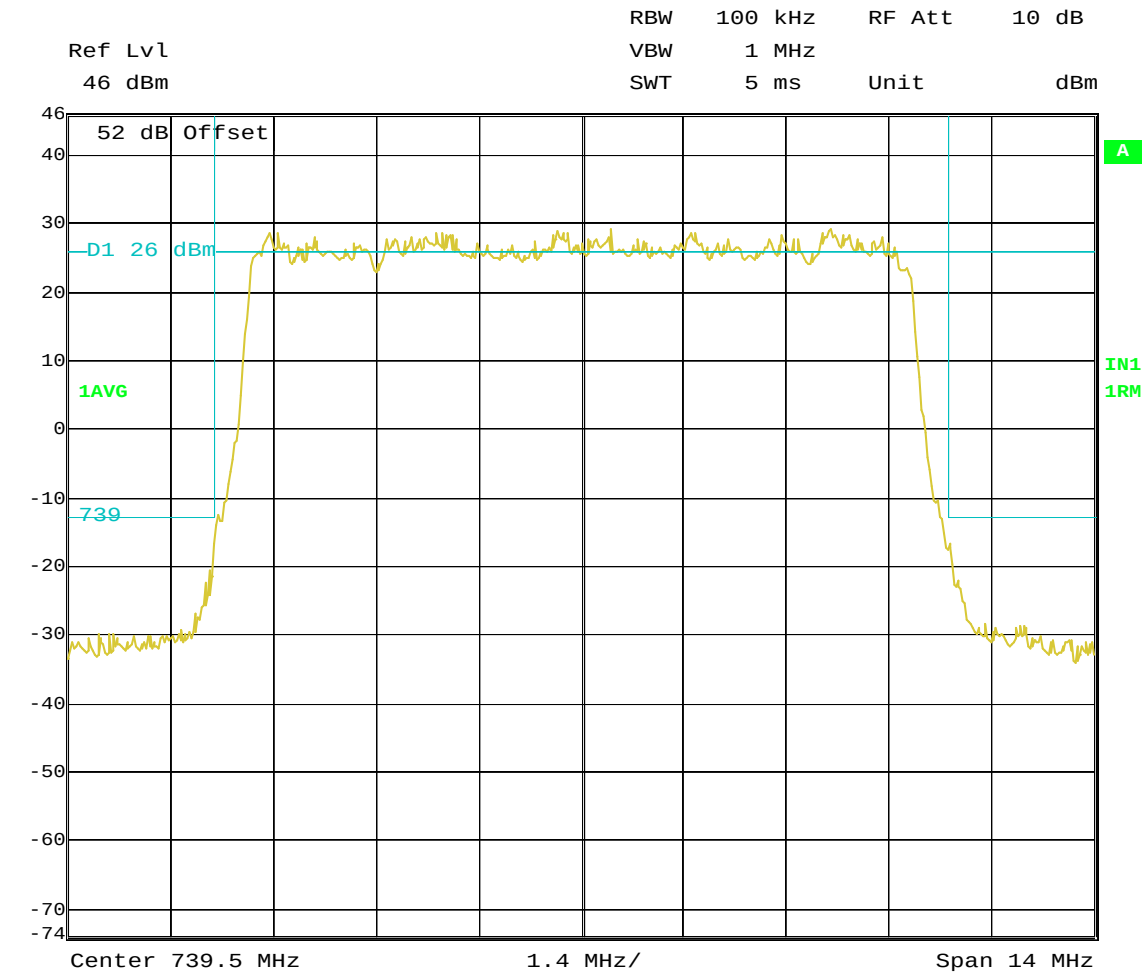

Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:29:28

# Block: B+C

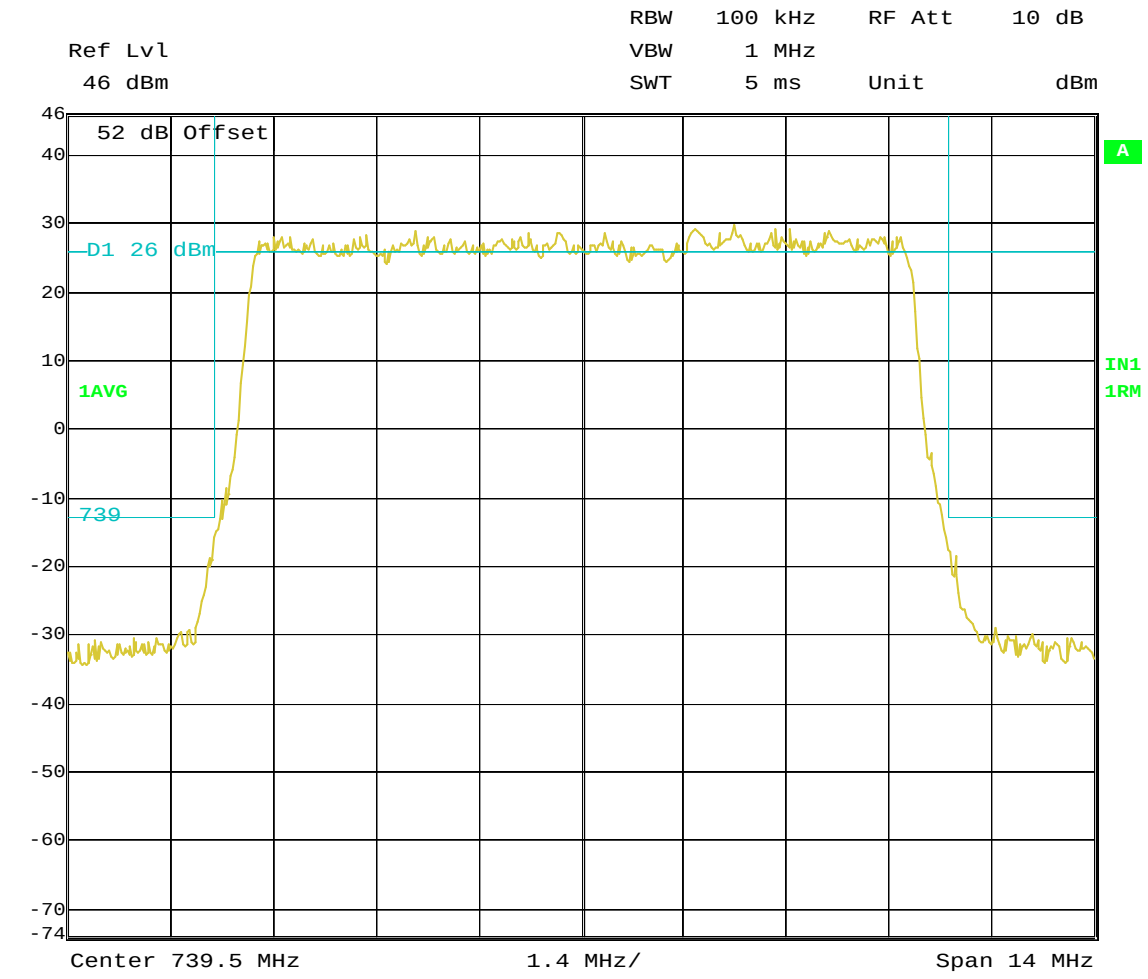
# Channel: 5115

# 10 MHz Bandwidth 734.5 – 744.5 MHz

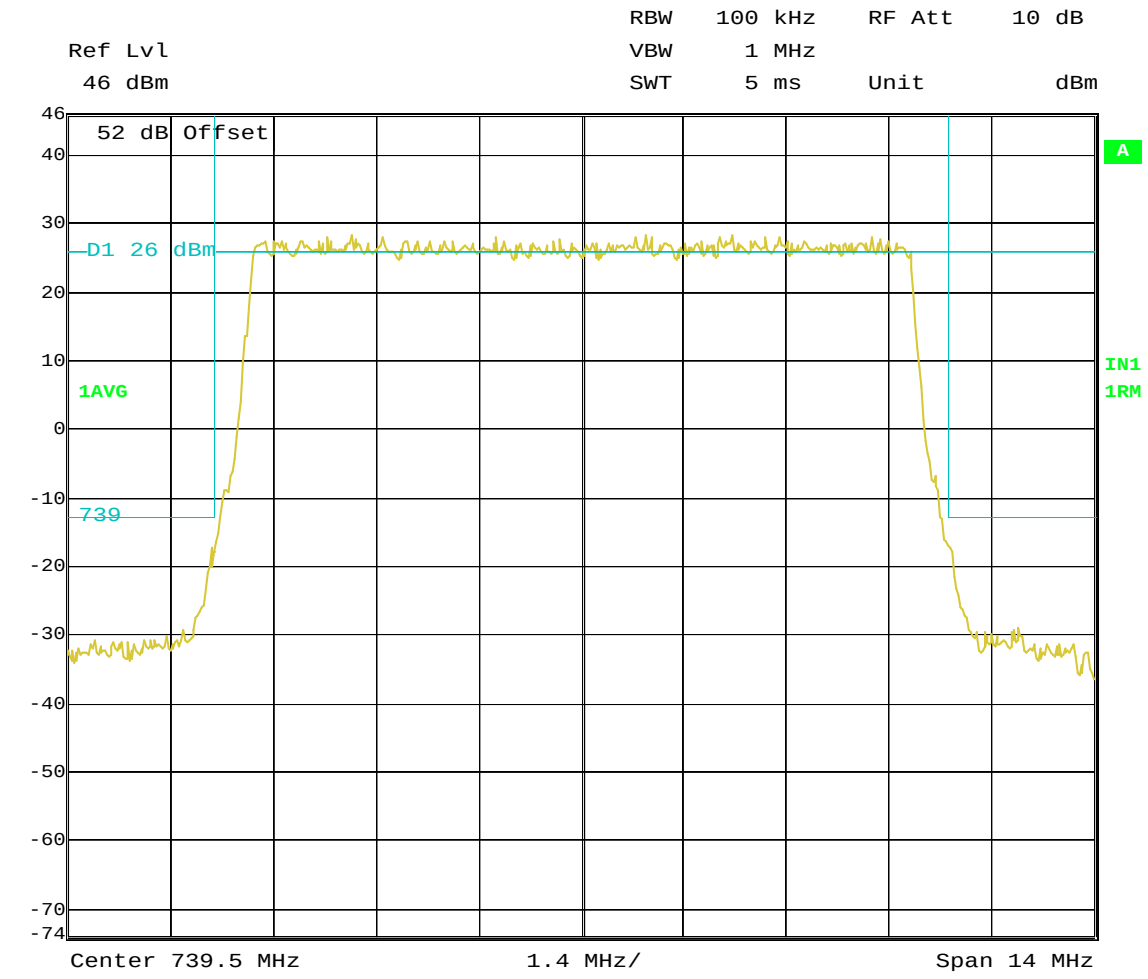
# SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:50:47




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 16.AUG.2010 07:48:37

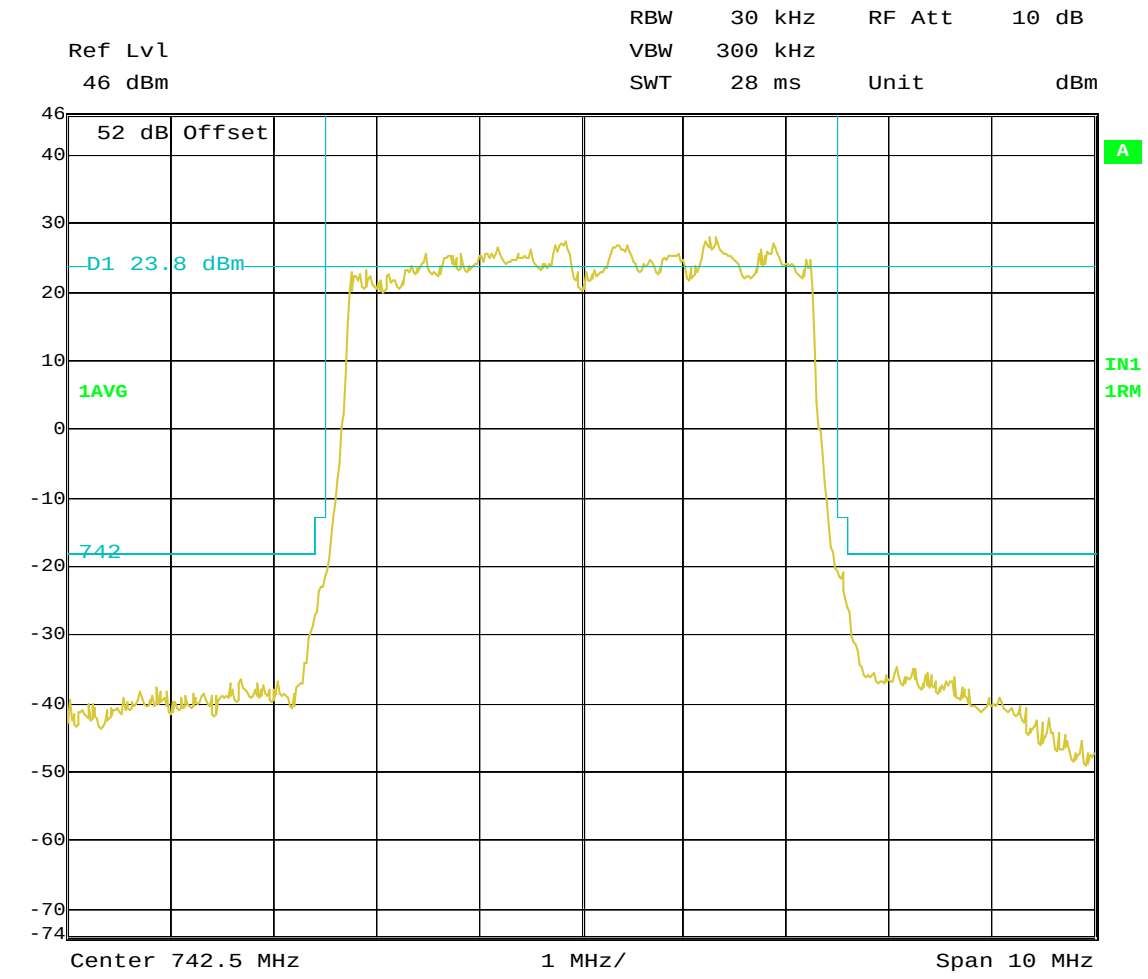



Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 08:05:15

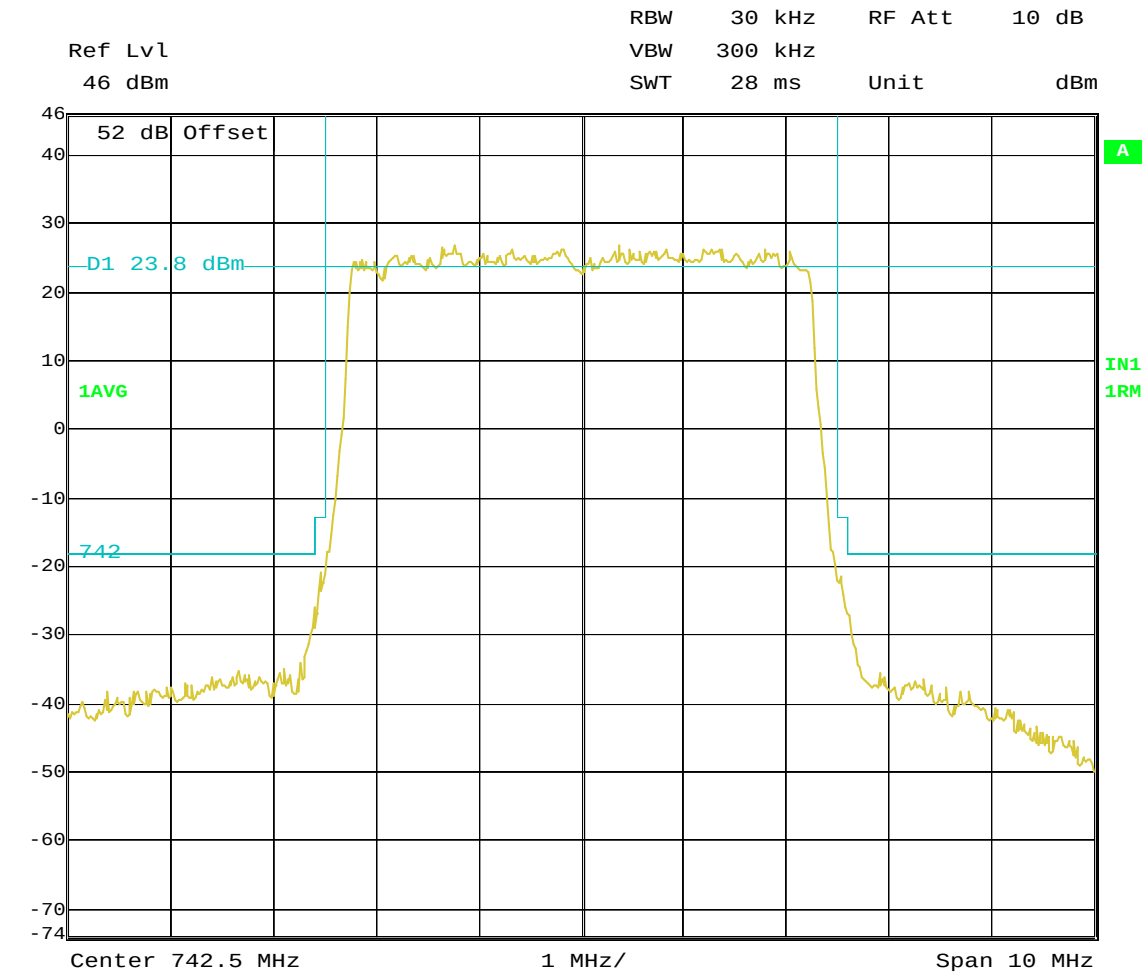
# Block: C

# Channel: 5145

# 5 MHz Bandwidth 740 – 745 MHz
# (Right Edge)
# SPECTRUM MASK/OCCUPIED BANDWIDTH




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:12:46




Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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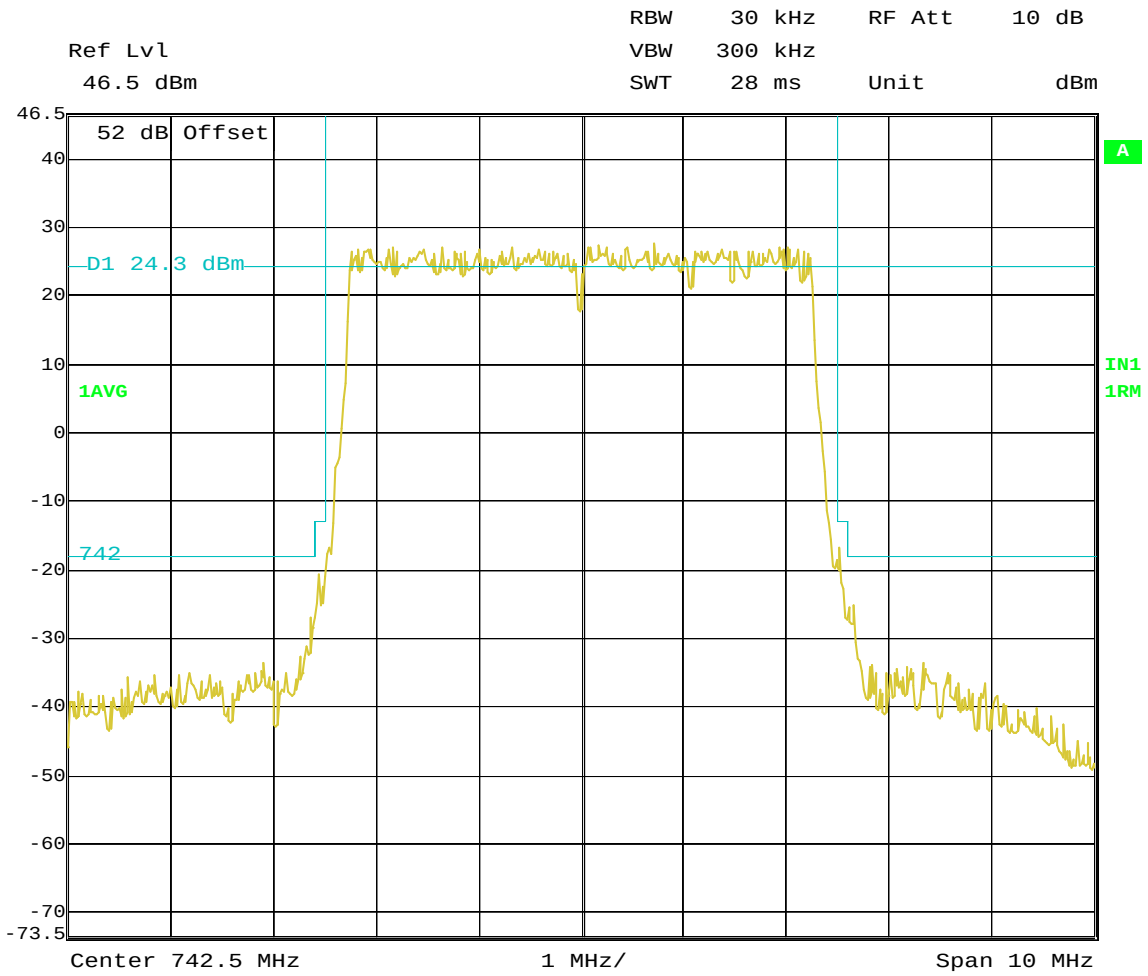



Title: OCCUPIED BANDWIDTH; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:11:49

# Measurement 4

# FCC Section 2.1051 and 27.53 (g)
# Spurious Emissions at Antenna Transmit Terminals

# Measurement -4

## MEASUREMENT OF
## SPURIOUS EMISSIONS
## AT TRANSMIT ANTENNA PORT
## FCC 27.53 (g)

Reviewed By: DDM Date: 8/23/2010

## Spurious Emissions at Transmit Antenna Terminals

Spurious Emissions at the transmit-antenna terminals were investigated over the frequency range of 9 kHz to 8 GHz. The test setup is as described in Figure A. Measurements were made using a Rohde & Schwarz ESI 40 (9 kHz to 40 GHz) EMI Test receiver and a HP Model 520 DeskJet Printer. The RF output from the transmitter was reduced (to an amplitude usable by the receivers) using calibrated attenuators. The RF power level was continuously monitored via RF Power Meter as shown in the test setup in Figure A. The required emission limitation is specified in 27.53 (g). Measurements were made at 40W per carrier for 10 MHz Bandwidth, and 40W per carrier for 5MHz Bandwidth at antenna terminals. The measured spurious emission levels were plotted for the frequency range 9 kHz to 8 GHz. The measurements were made using following receiver parameters:

| Frequency Range | Resolution Bandwidth |
|---|---|
| 9 kHz to 150 kHz | 1 kHz |
| 150 kHz to 40 MHz | 10 kHz |
| 30 MHz to 1 GHz | 100 kHz |
| 1 GHz to 8 GHz | 1 MHz |

The list of band, channels, RF filters (J4) and Amplifiers tested are listed below:

| Band | Block | Center Frequency (MHz) | Carrier Bandwidth (MHz) | Channel | RF Filter | Power (Watts) |
|---|---|---|---|---|---|---|
| | A | 731.5 | 5 | 5035 | M1 | 40 |
| | A+B | 734.5 | 10 | 5065 | M1 | 40 |
| | B | 737 | 5 | 5090 | M1 | 40 |
| | B+C | 739.5 | 10 | 5115 | M1 | 40 |
| | C | 742.5 | 5 | 5145 | M1 | 40 |

***FCC Section 27.53(g): Based on measurement instrument employing resolution bandwidth of 100 kHz bands or greater out band emissions shall be attenuated at least 43 + 10log (P) dB or -13dBm. However in 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.***

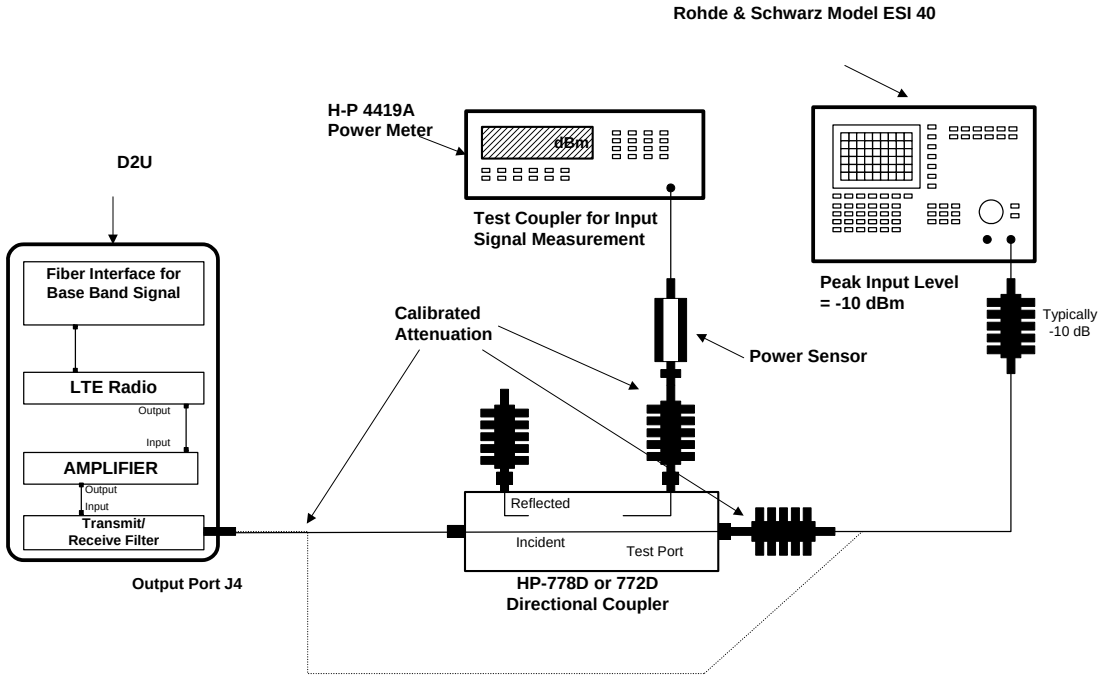
The tests were performed in following modulation configurations:
A. QPSK
B. 16QAM
C. 64QAM

**RESULTS**:

The magnitude of spurious emissions is within the specification limits of FCC Part 27.53(g).

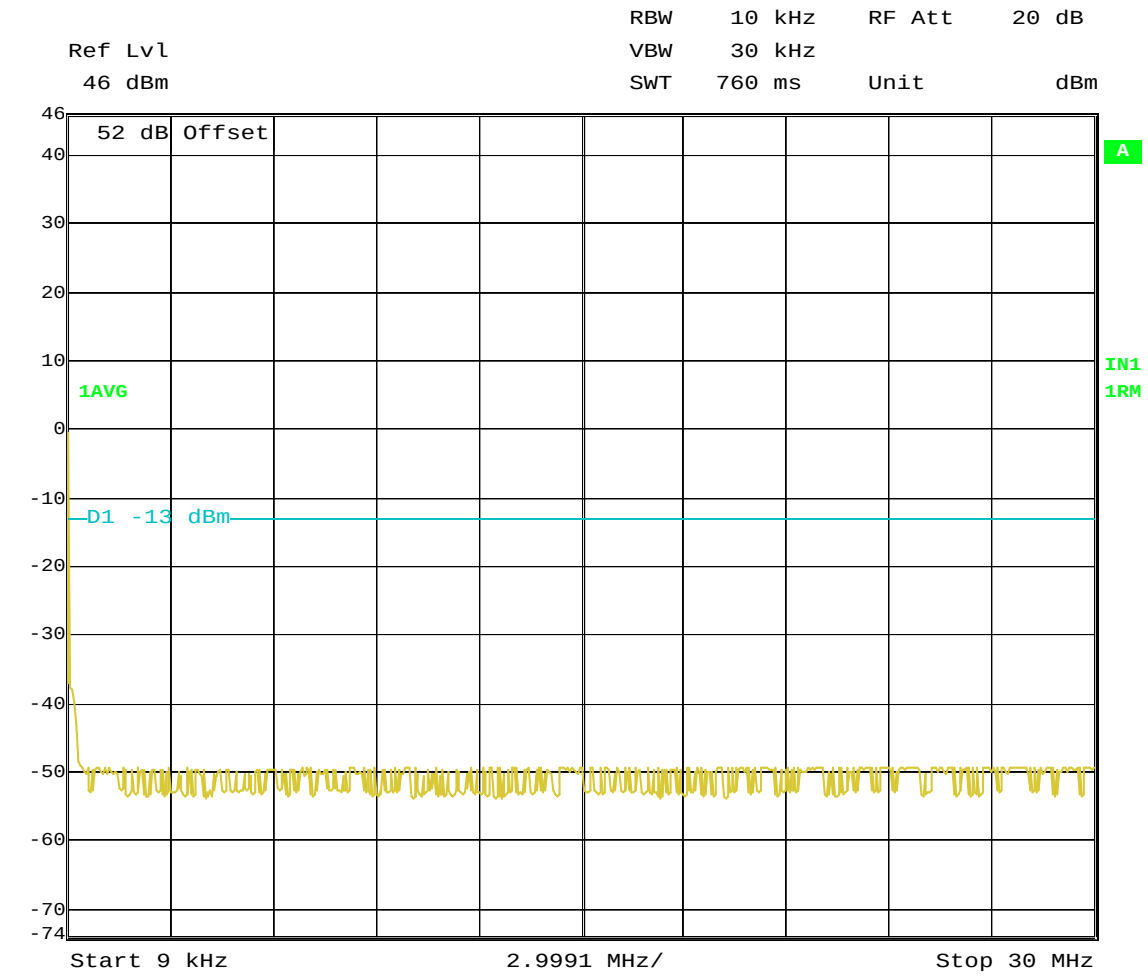
Measurement uncertainty:
9 kHz to 20 MHz: Frequency = 10 Hz, Amplitude = 0.5 dB
20 MHz to 1 GHz: Frequency = 100Hz, Amplitude = 0.5 dB
1 GHz to 10 GHz: Frequency = 10 kHz, Amplitude = 0.5 dB

## Figure A. TEST CONFIGURATION FOR CONDUCTED SPURIOUS



# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: A
# QPSK Modulation
# Bandwidth 729 – 734 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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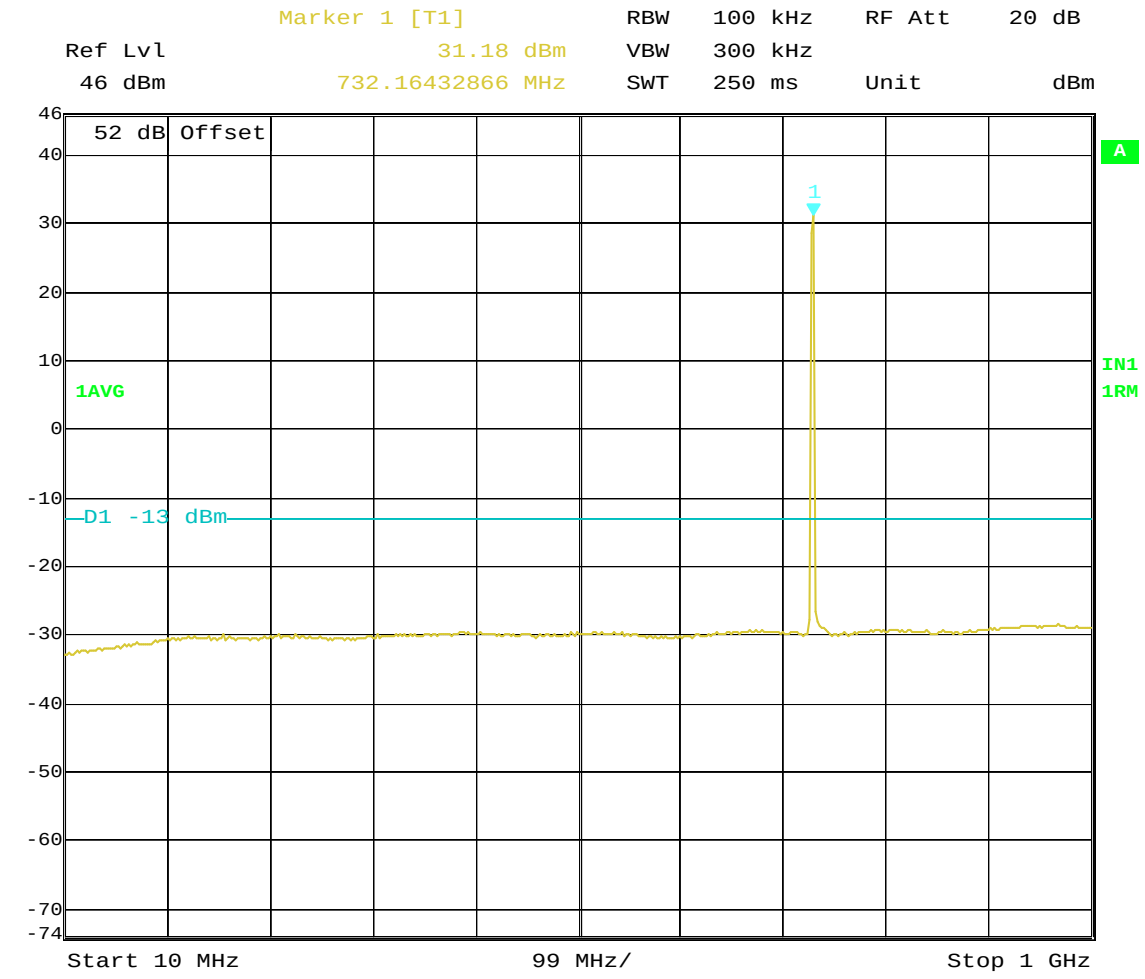


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
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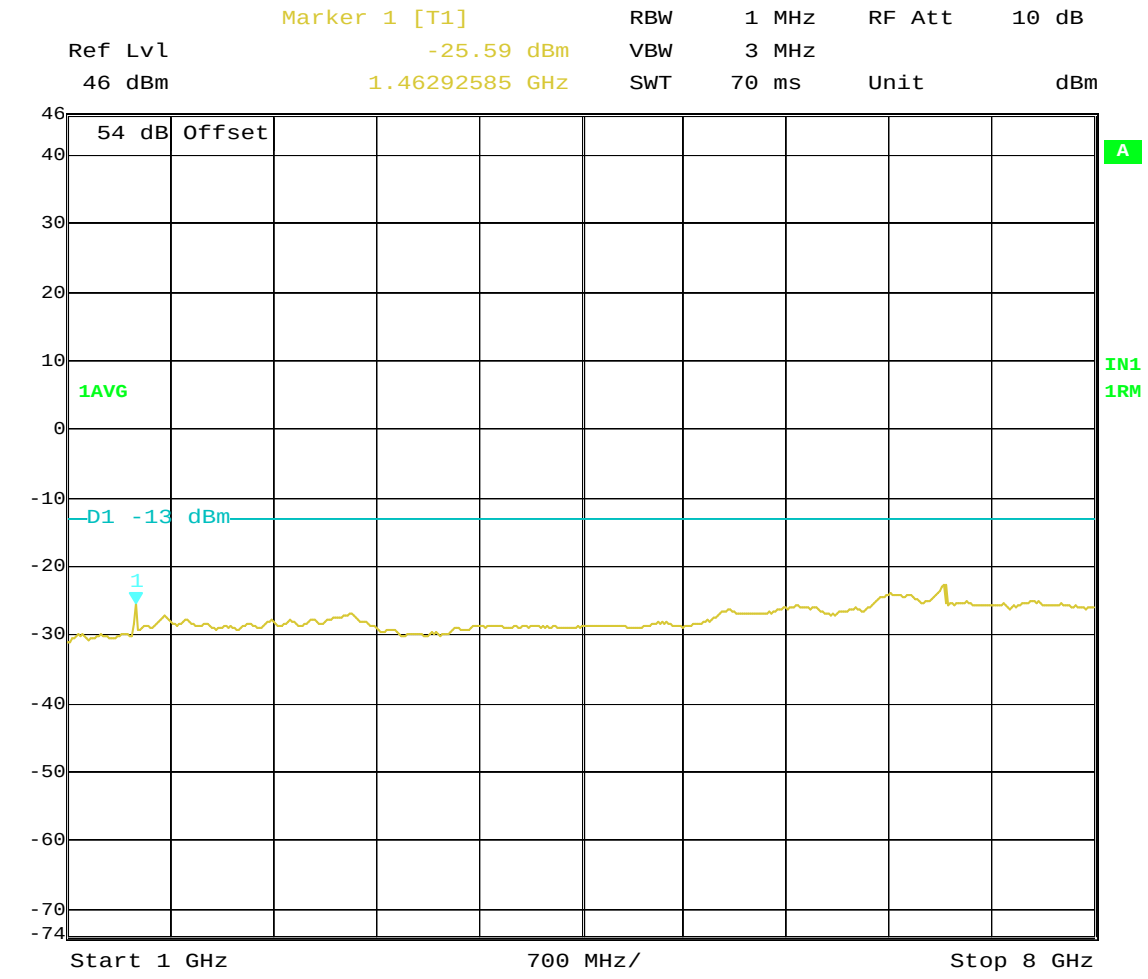
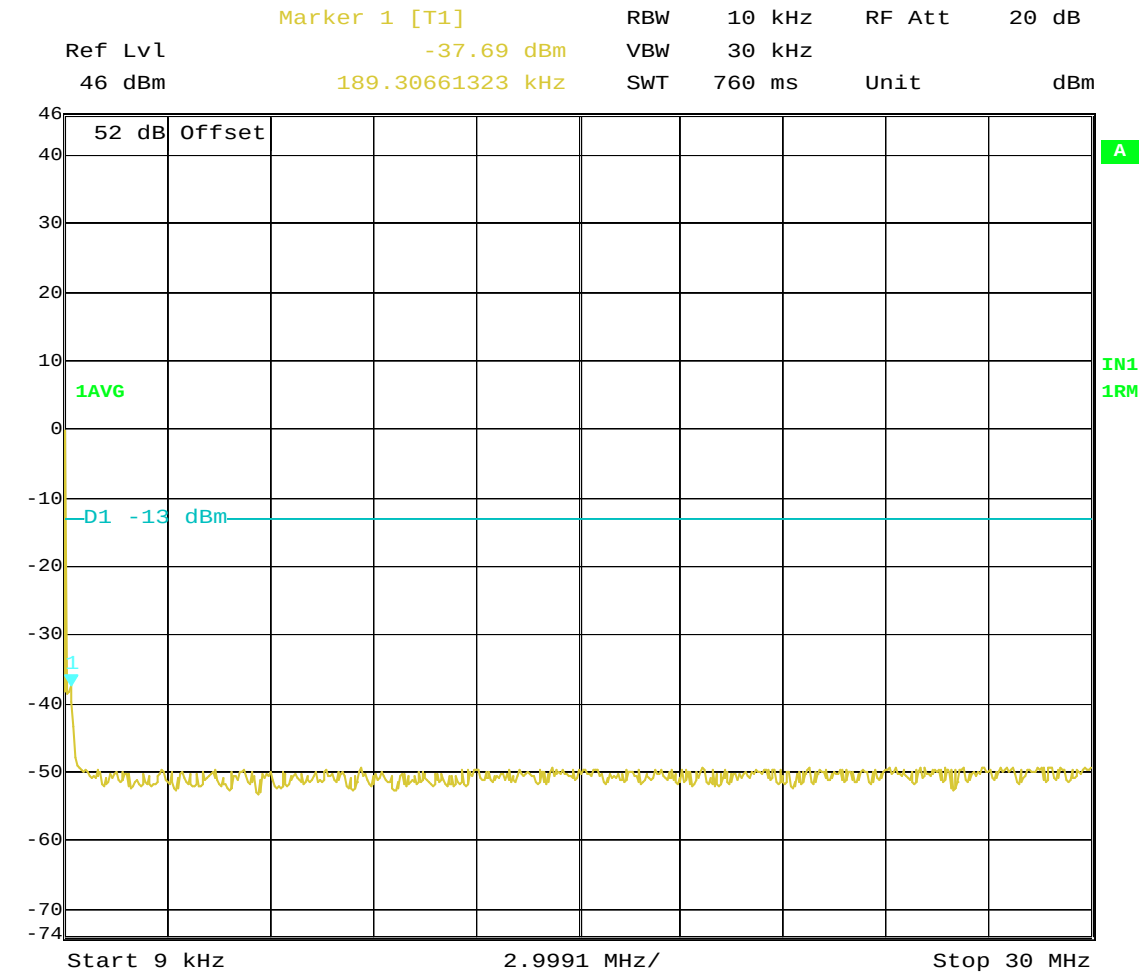



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 07:42:11

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: A
# 16QAM Modulation
# Bandwidth 729 – 734 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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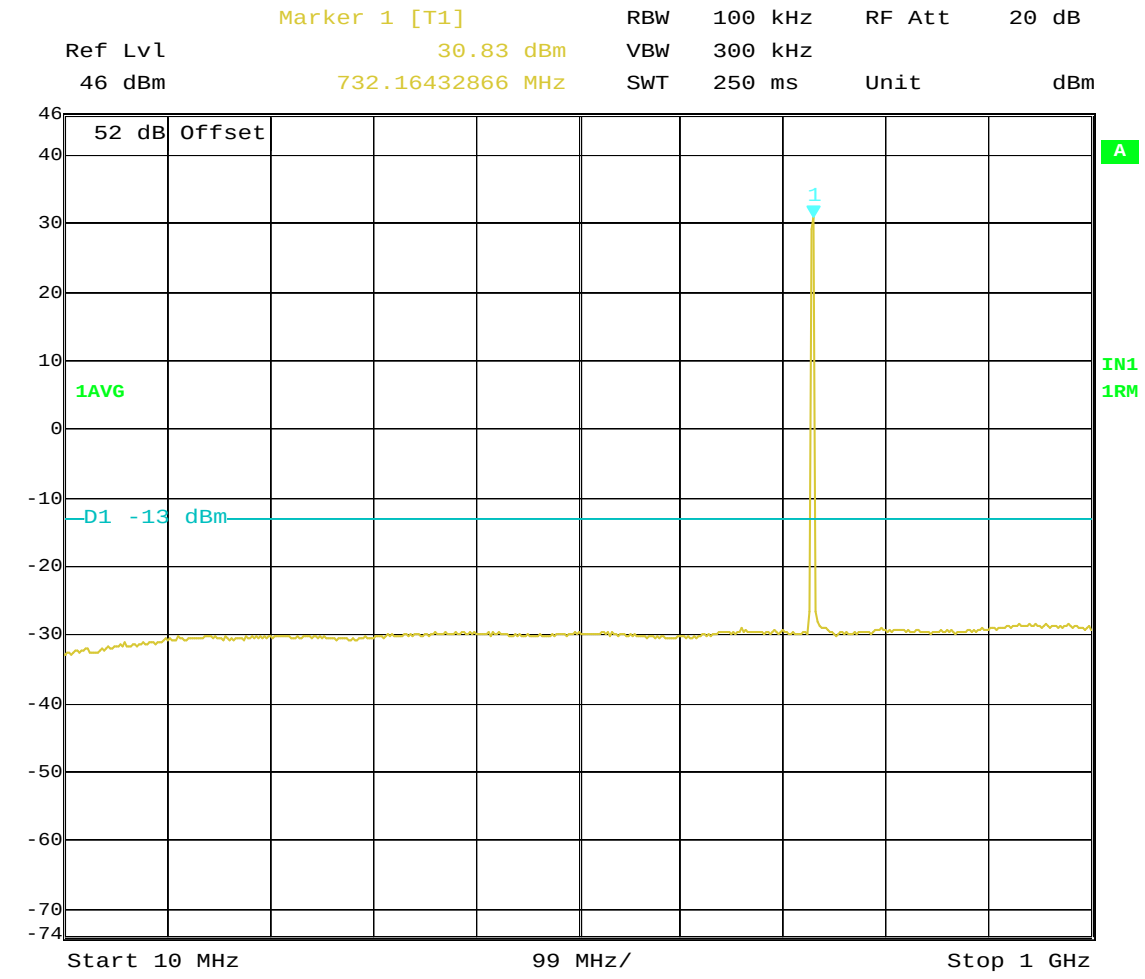


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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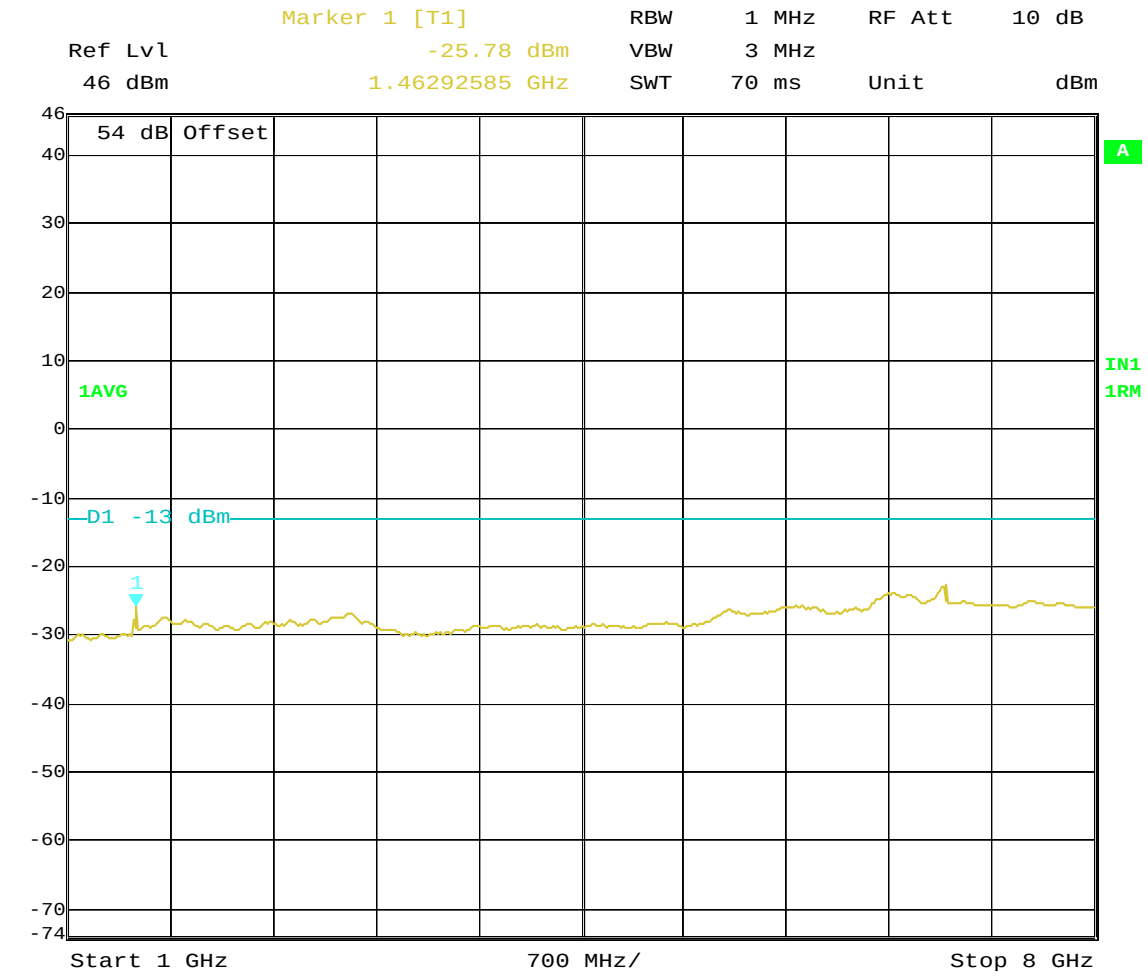


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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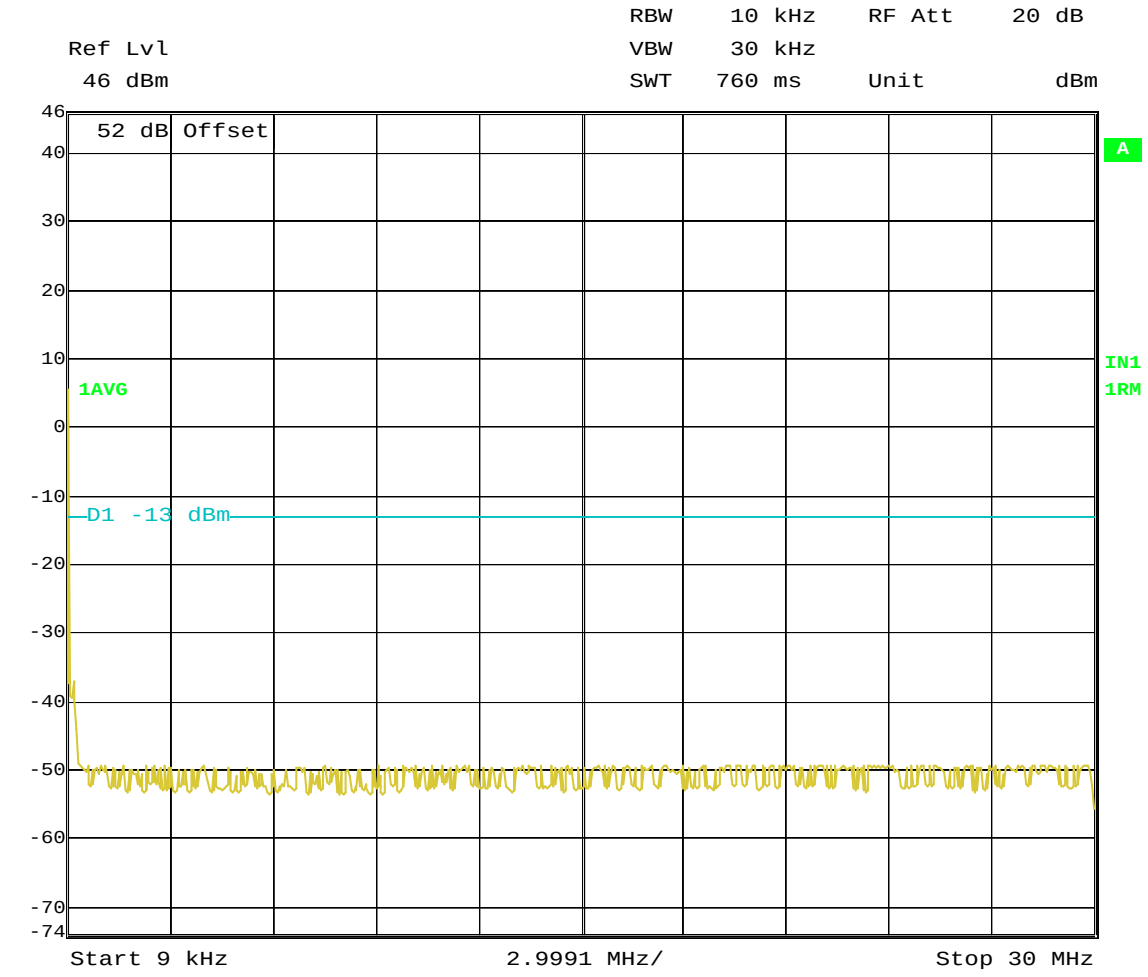
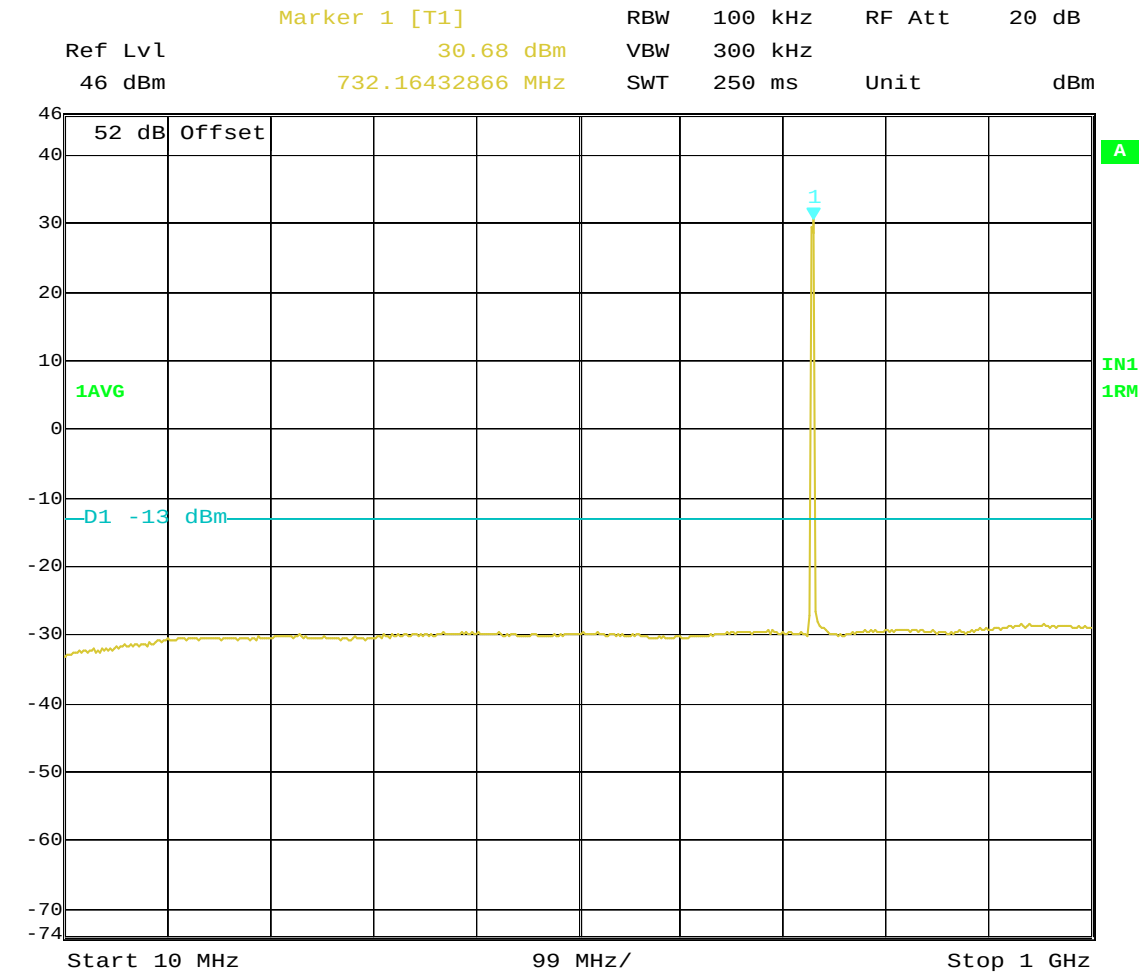
# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: A
# 64QAM Modulation
# Bandwidth 729 – 734 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 11.AUG.2010 14:29:08




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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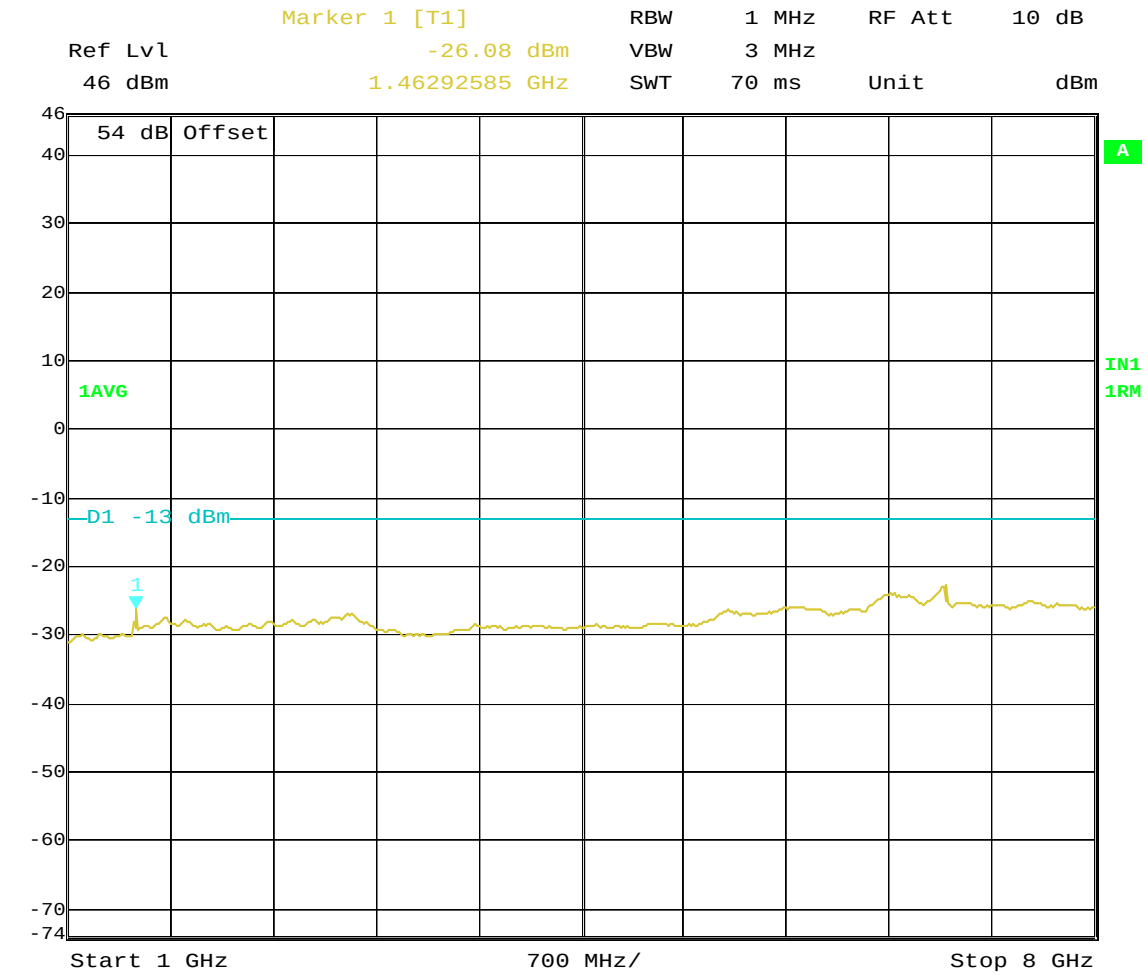
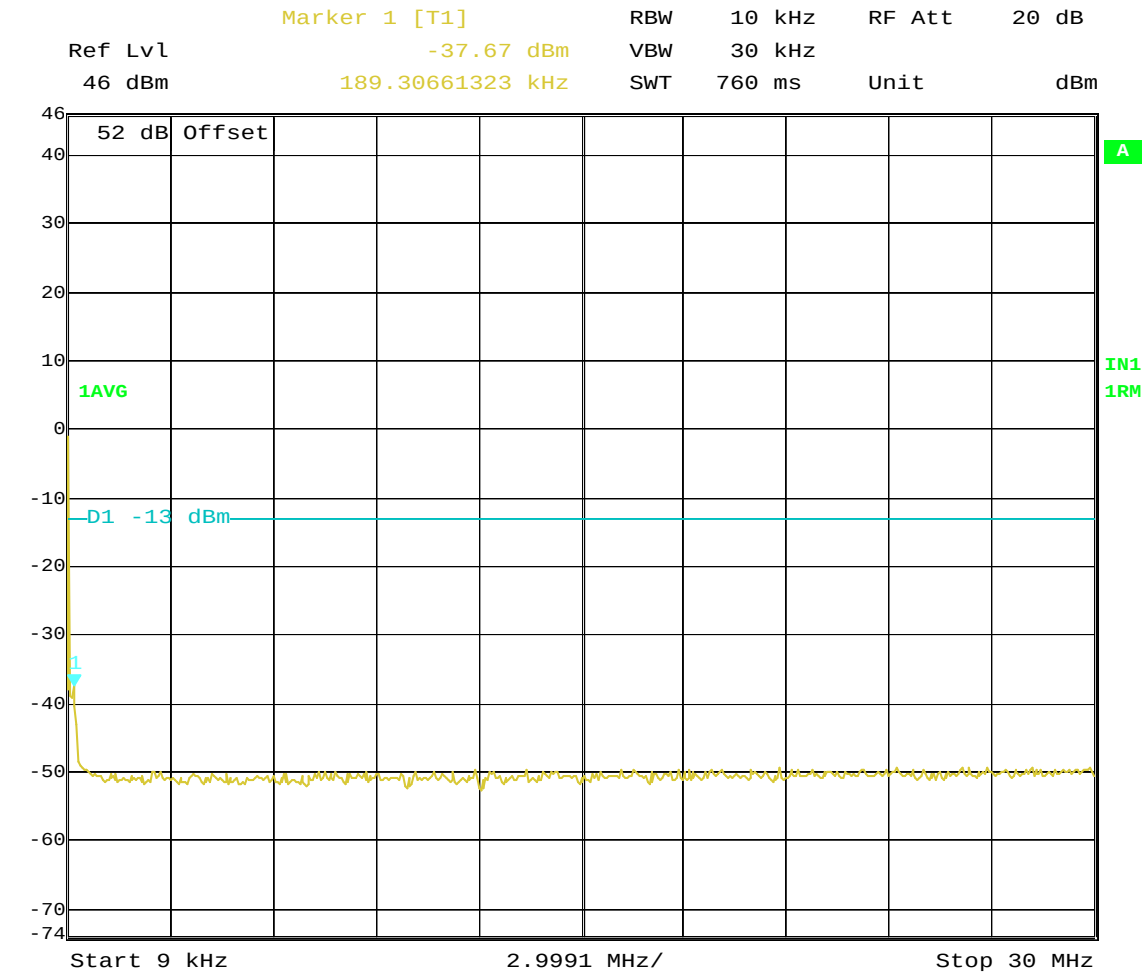



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC; Block A; 729-734 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 11.AUG.2010 14:32:57

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: A+B
# QPSK Modulation
# Bandwidth 729.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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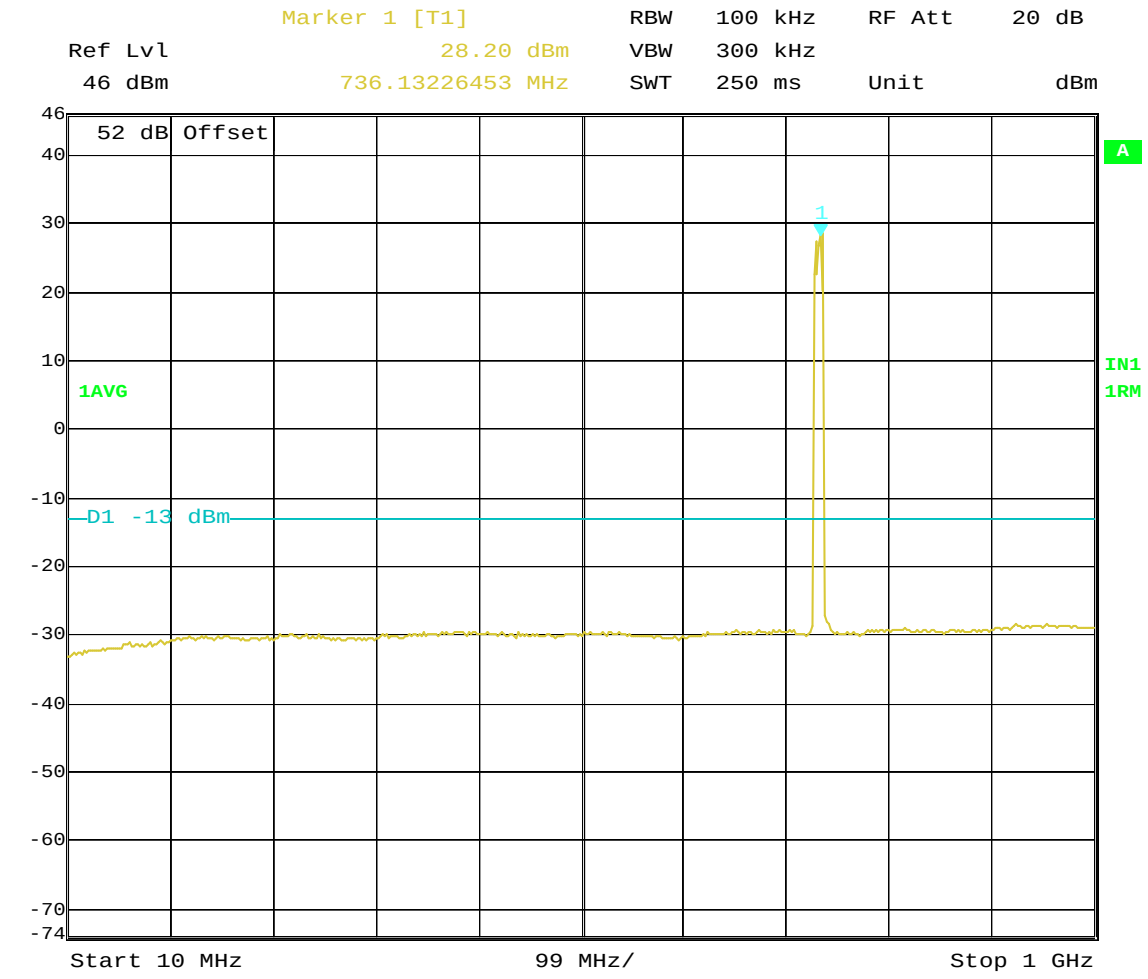


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
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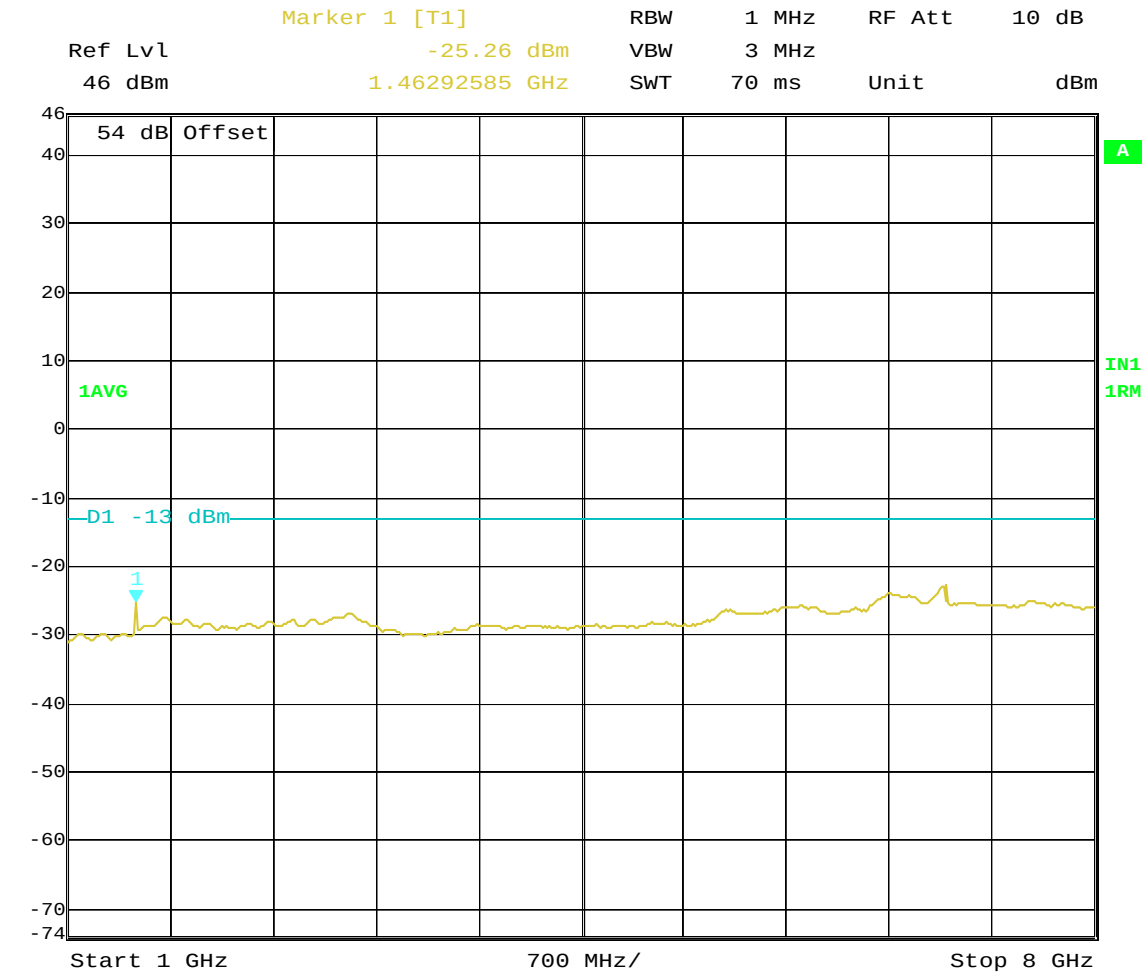
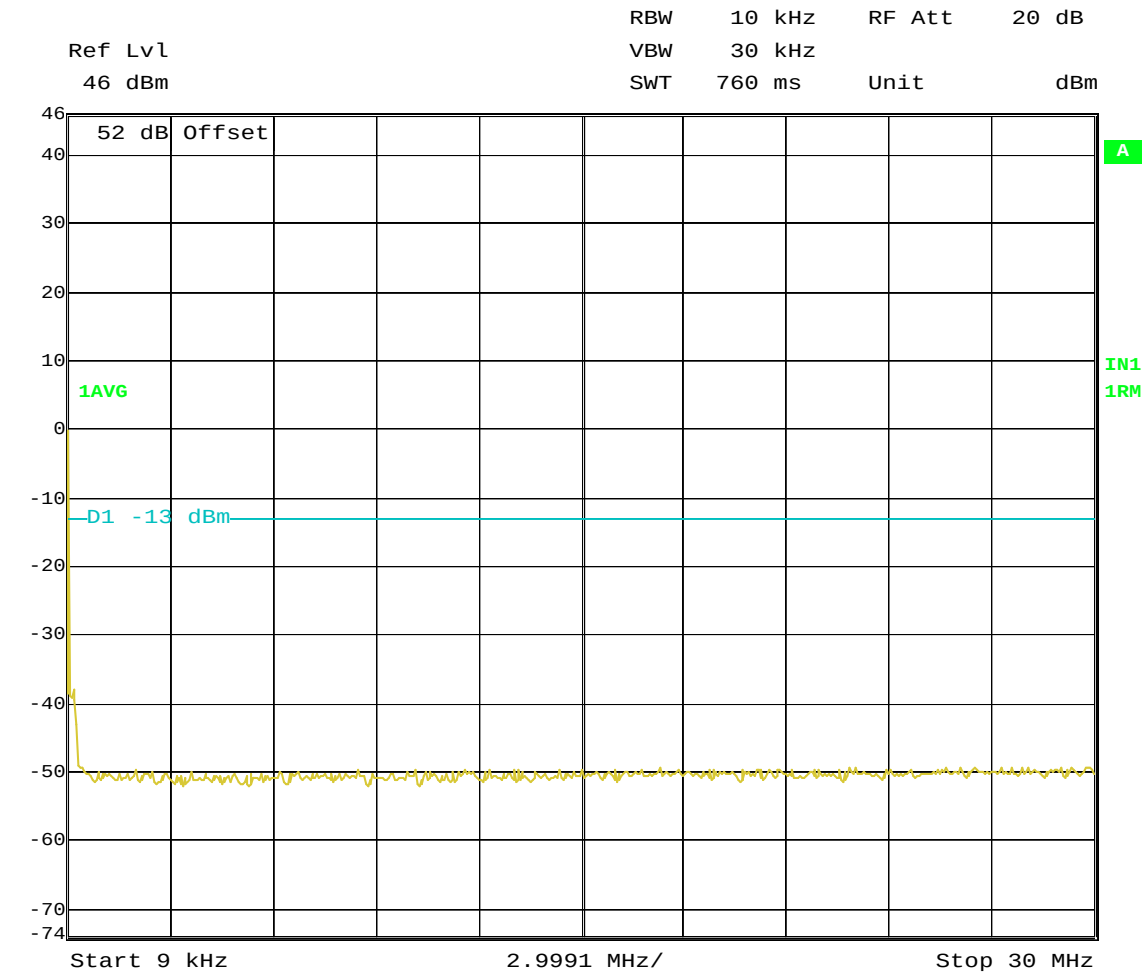



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 08:44:13

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: A+B
# 16QAM Modulation
# Bandwidth 729.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
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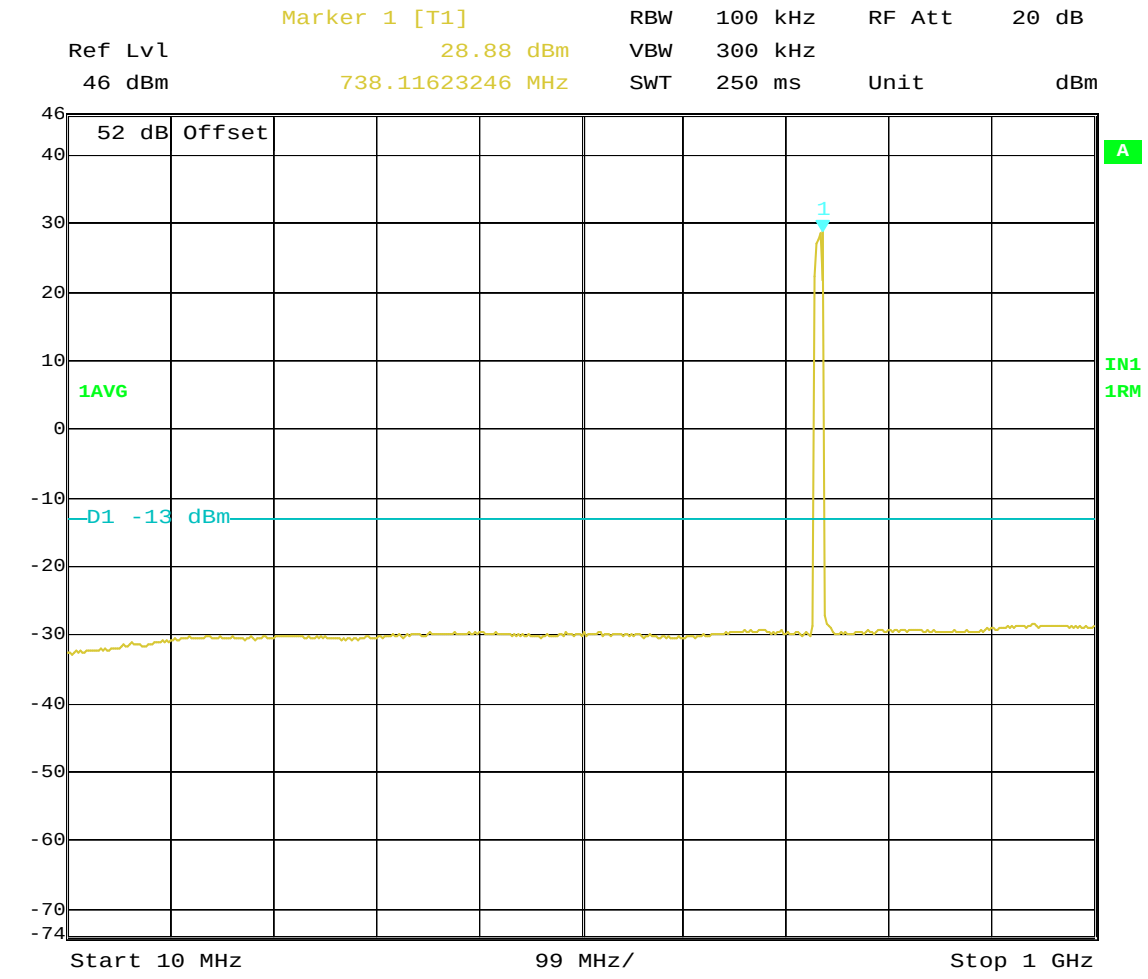


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
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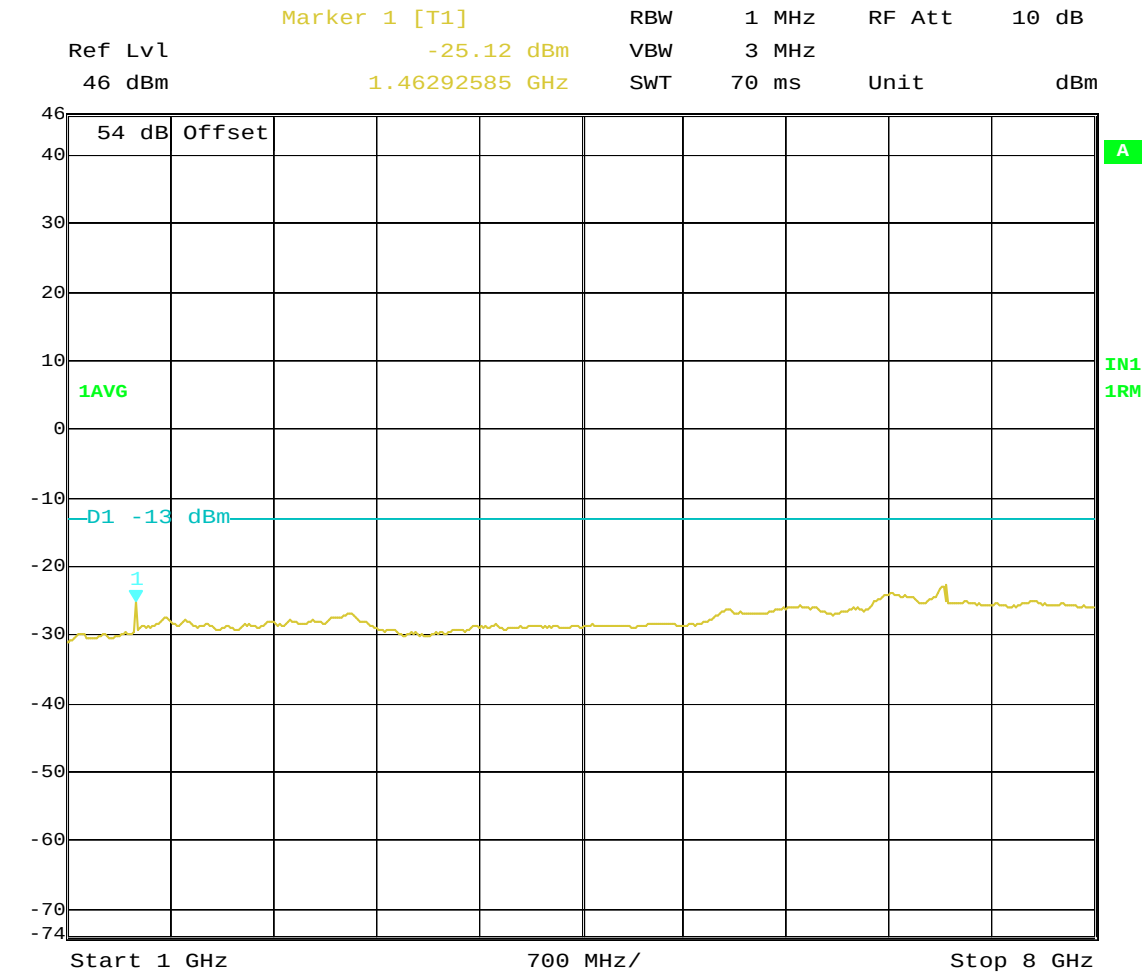
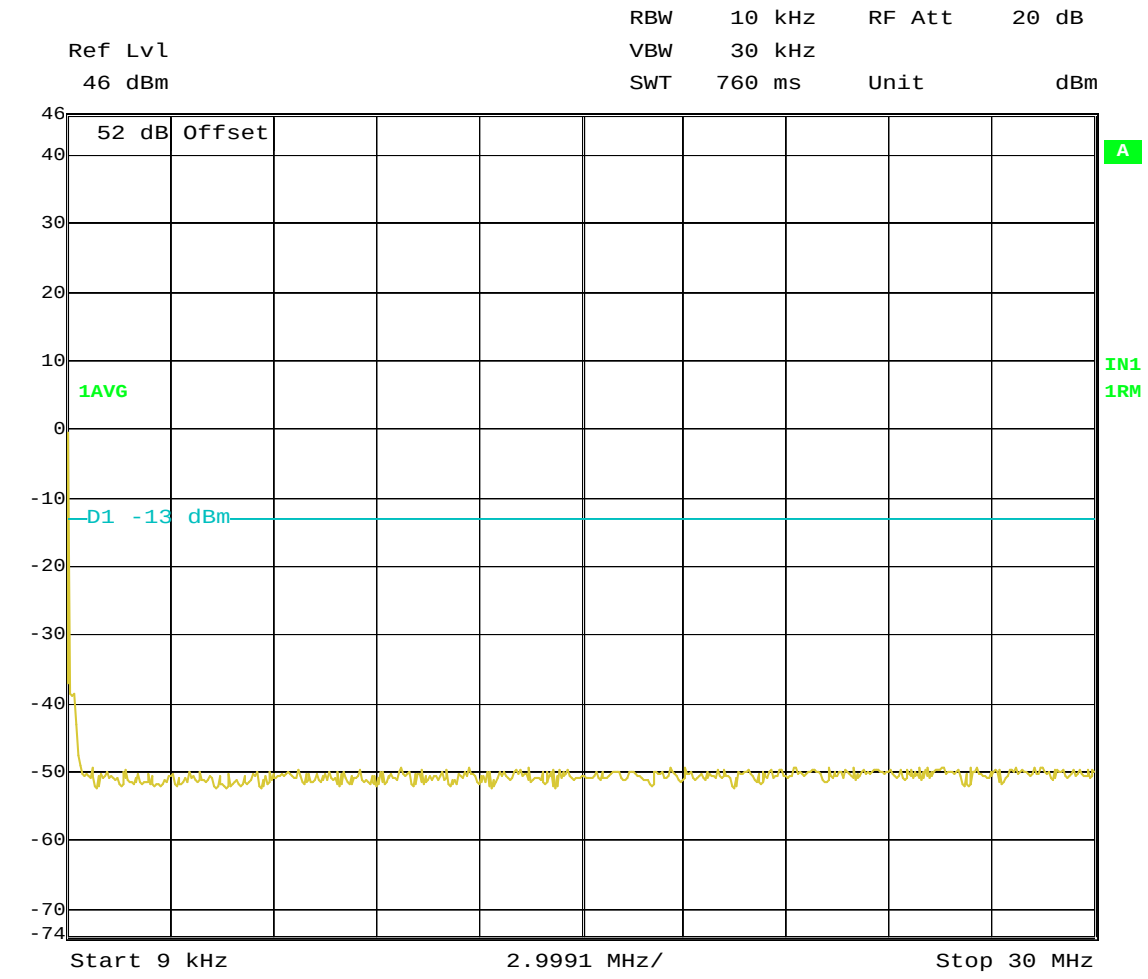



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 09:37:35

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: A+B
# 64QAM Modulation
# Bandwidth 729.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
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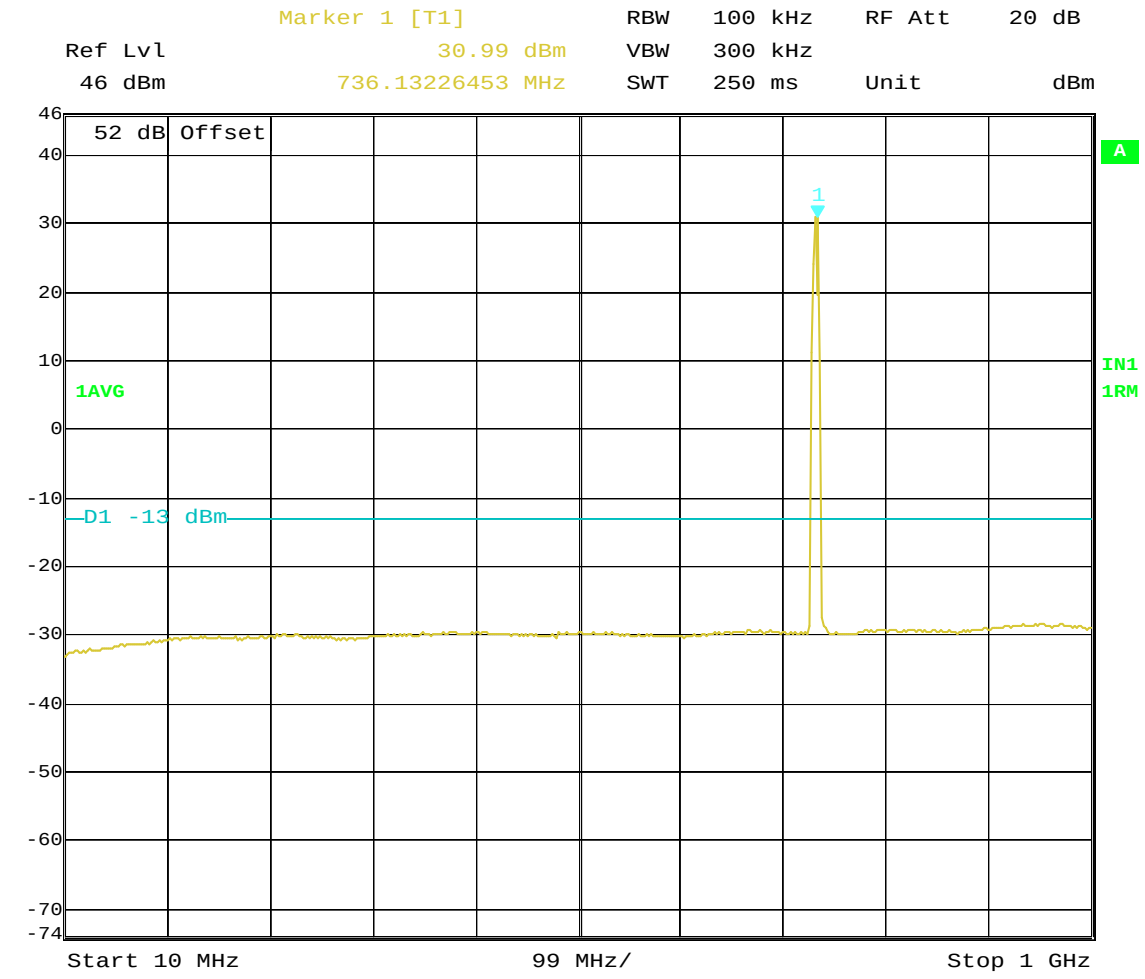
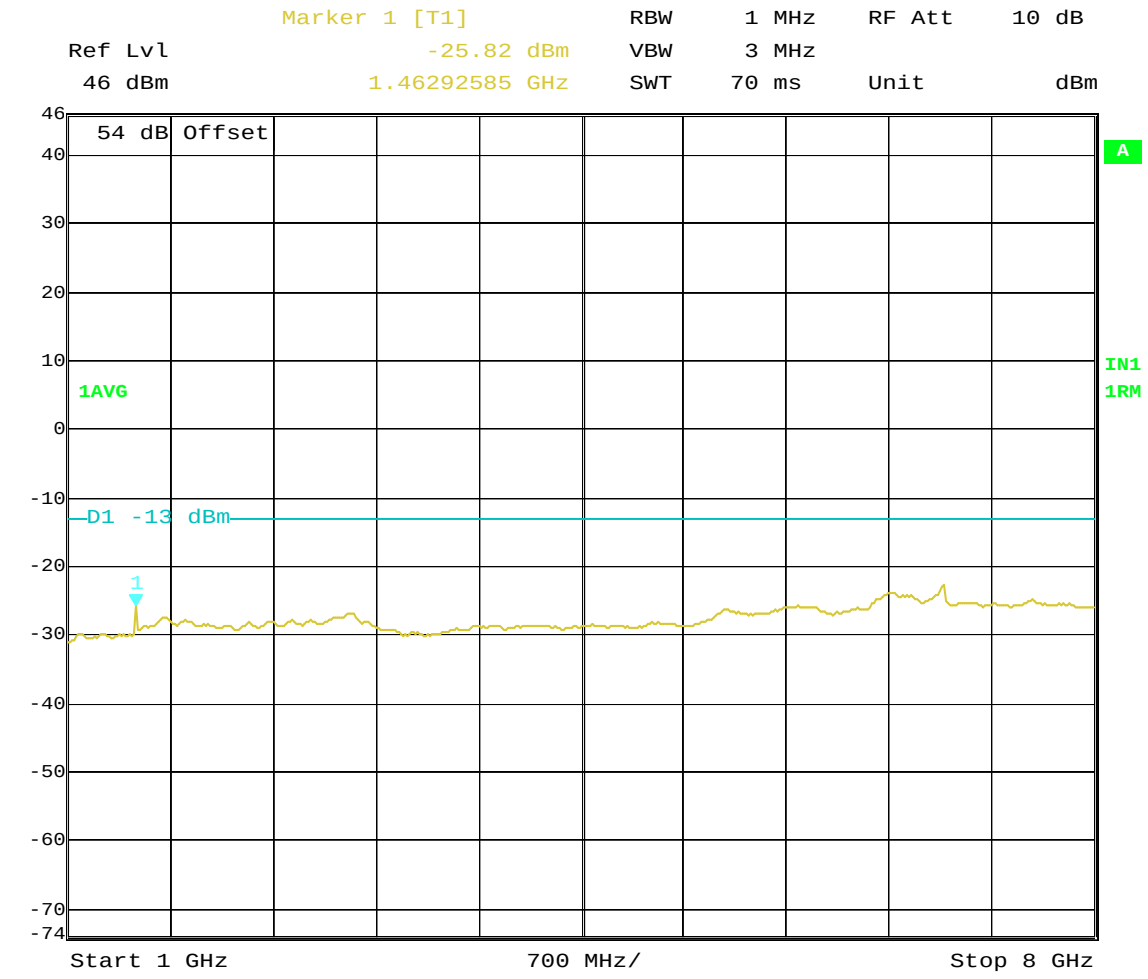


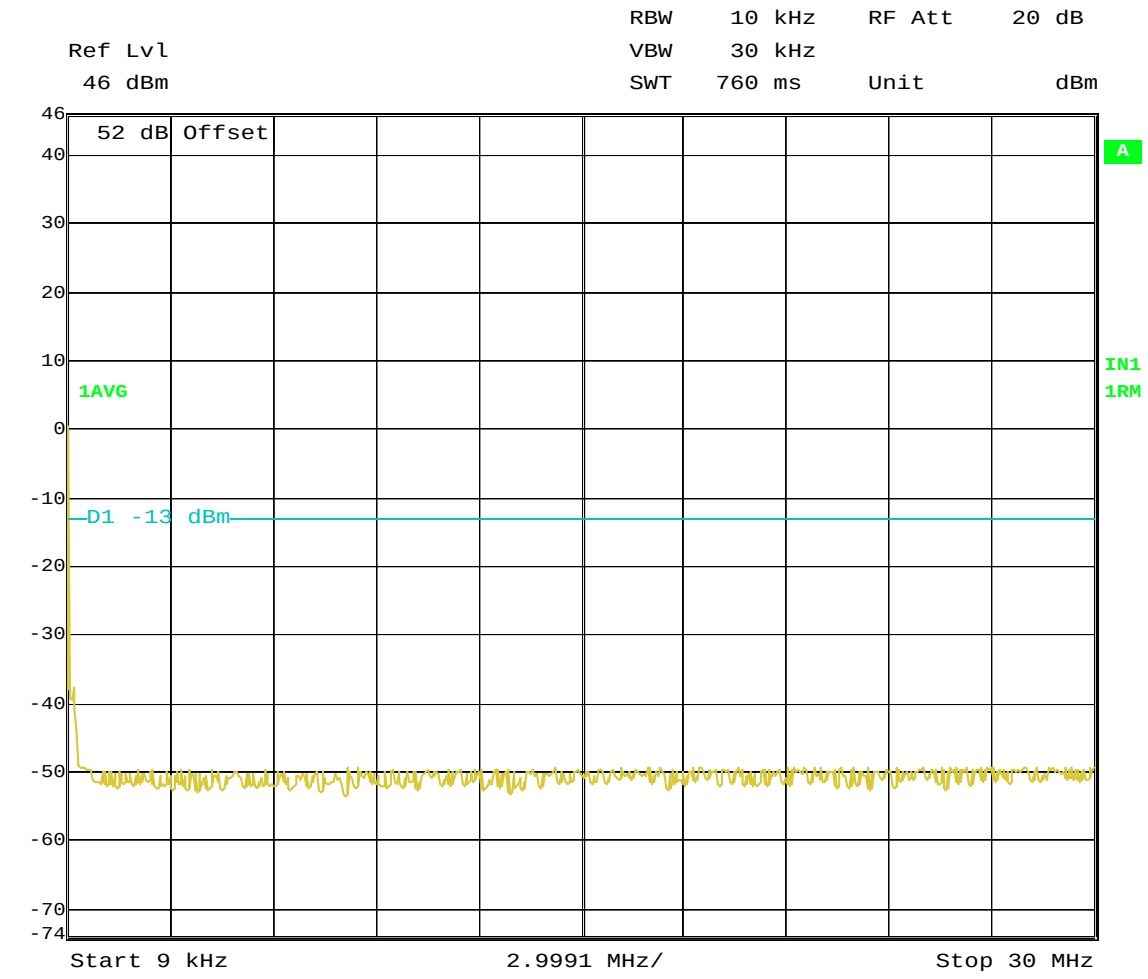

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 10:49:06




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk A+B;729.5-739.5MHz;Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 12.AUG.2010 10:45:08

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: B
# QPSK Modulation
# Bandwidth 734.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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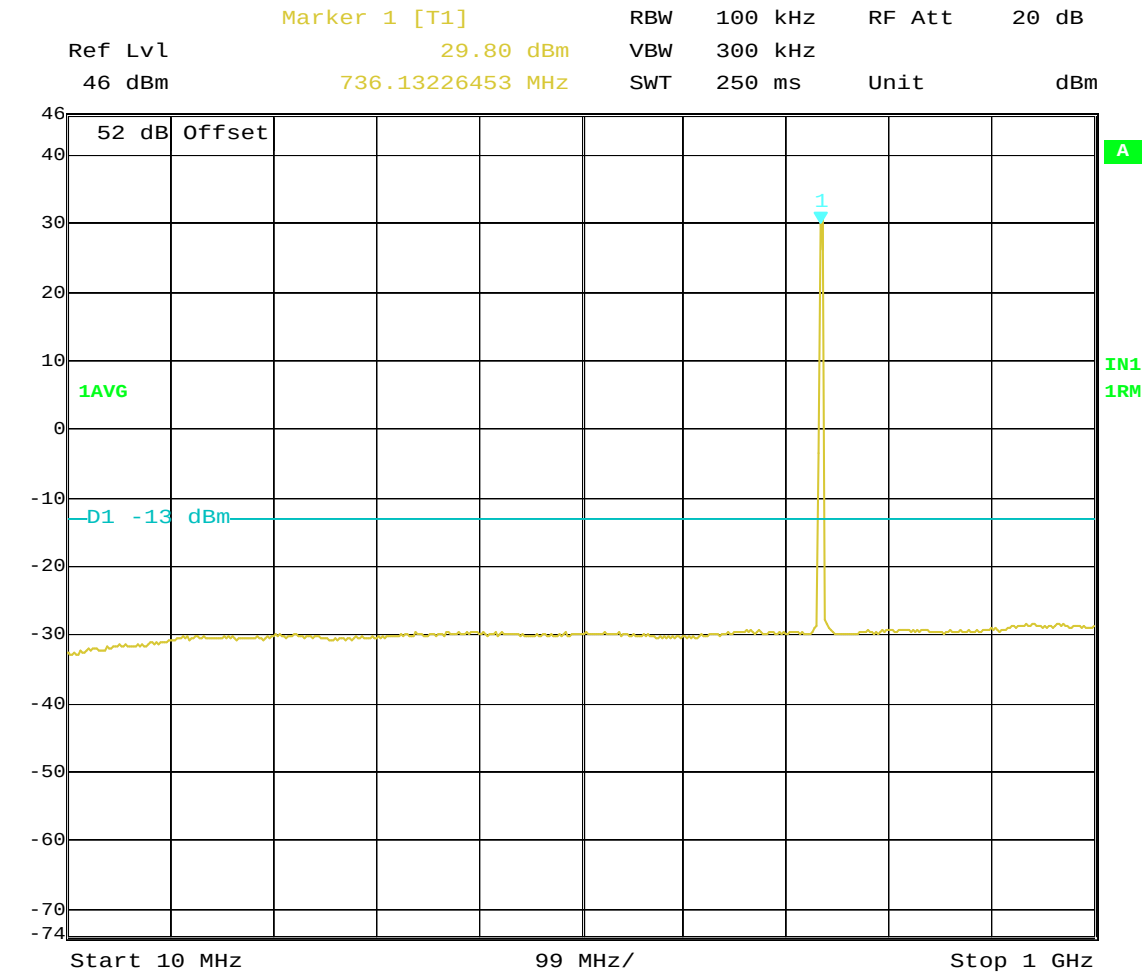


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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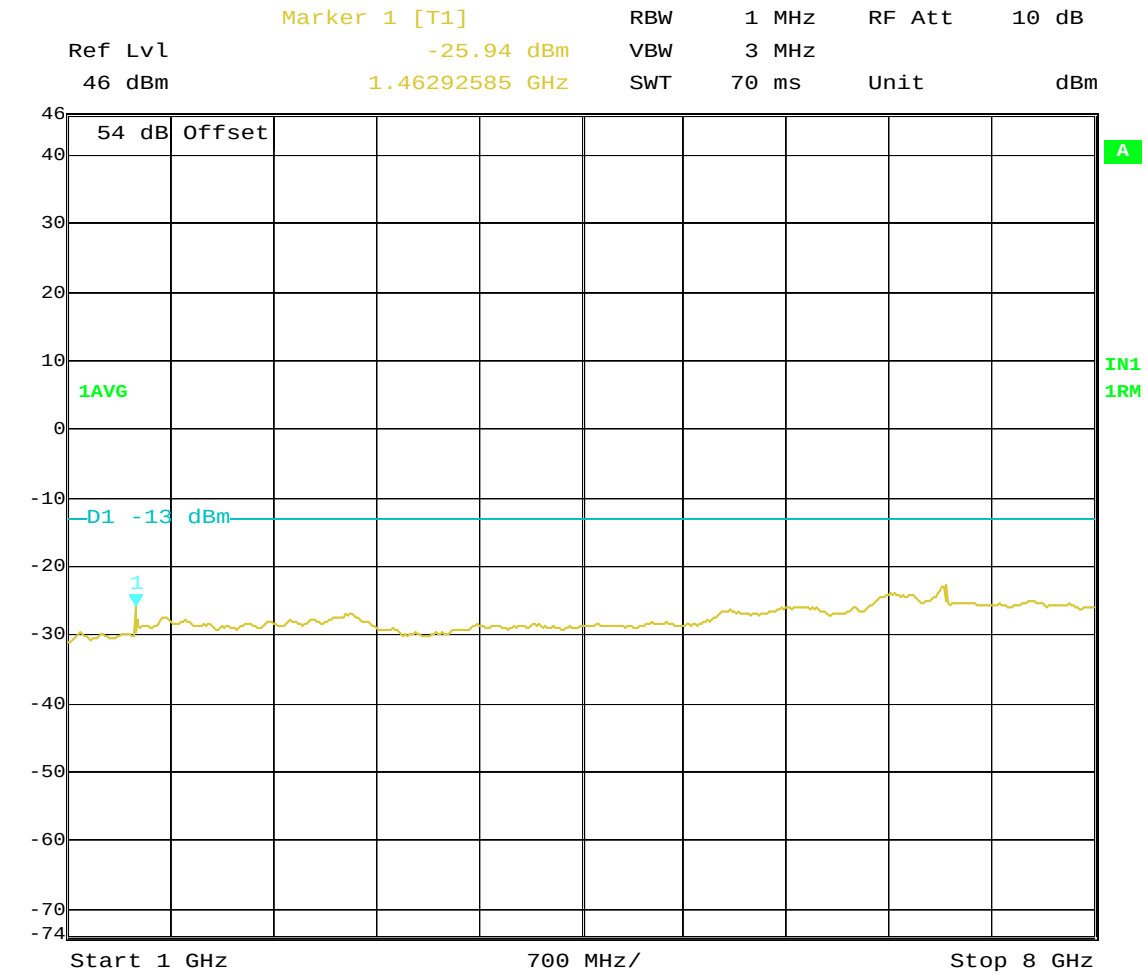
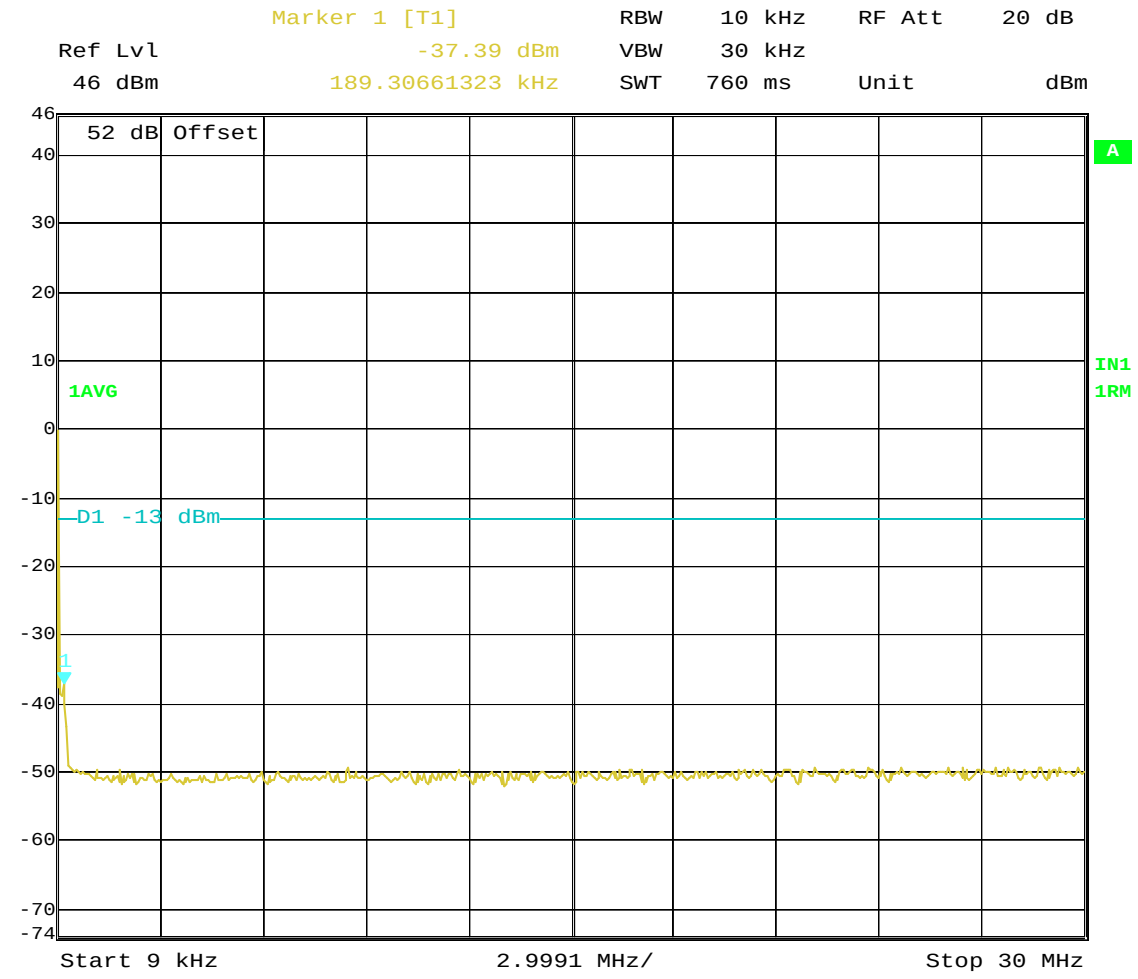


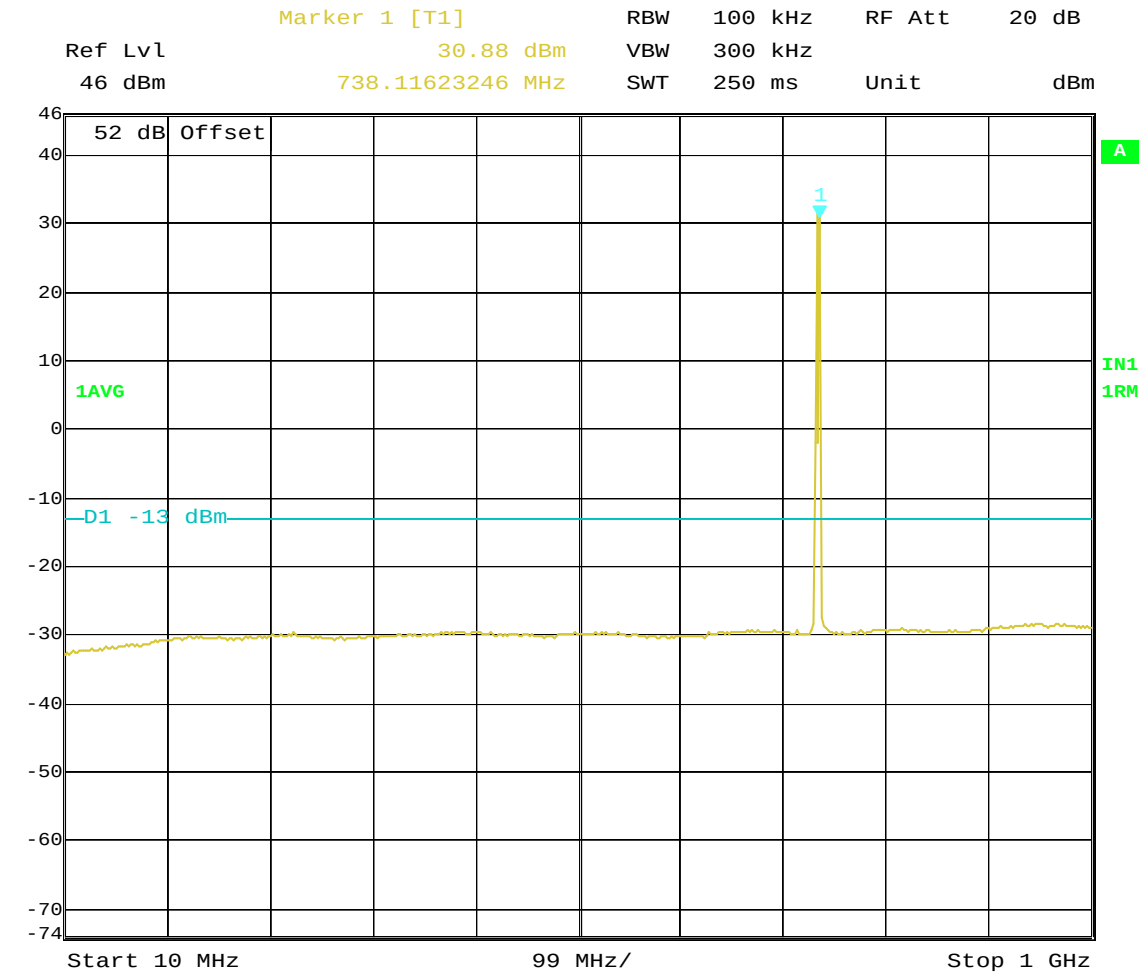

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 07:19:34

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: B
# 16QAM Modulation
# Bandwidth 734.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 07:42:01




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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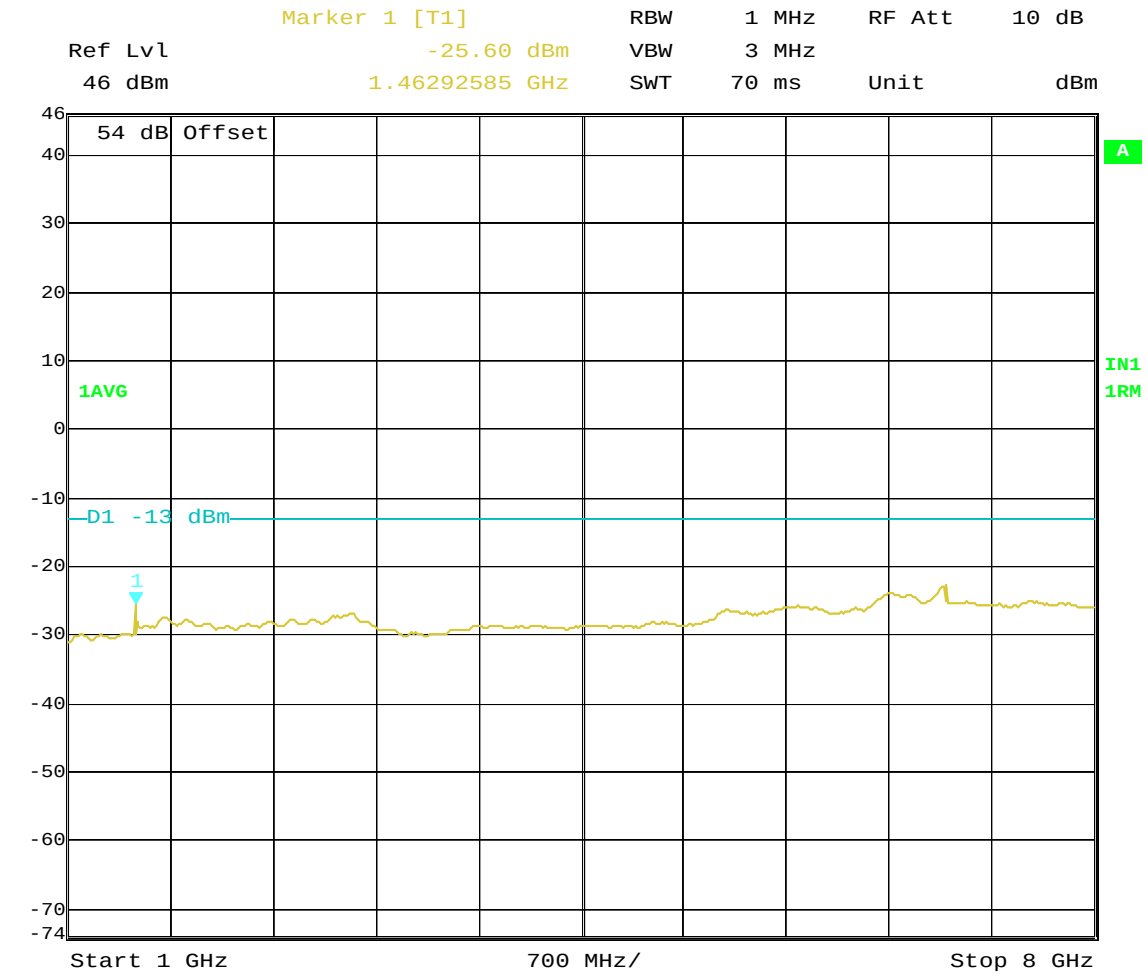
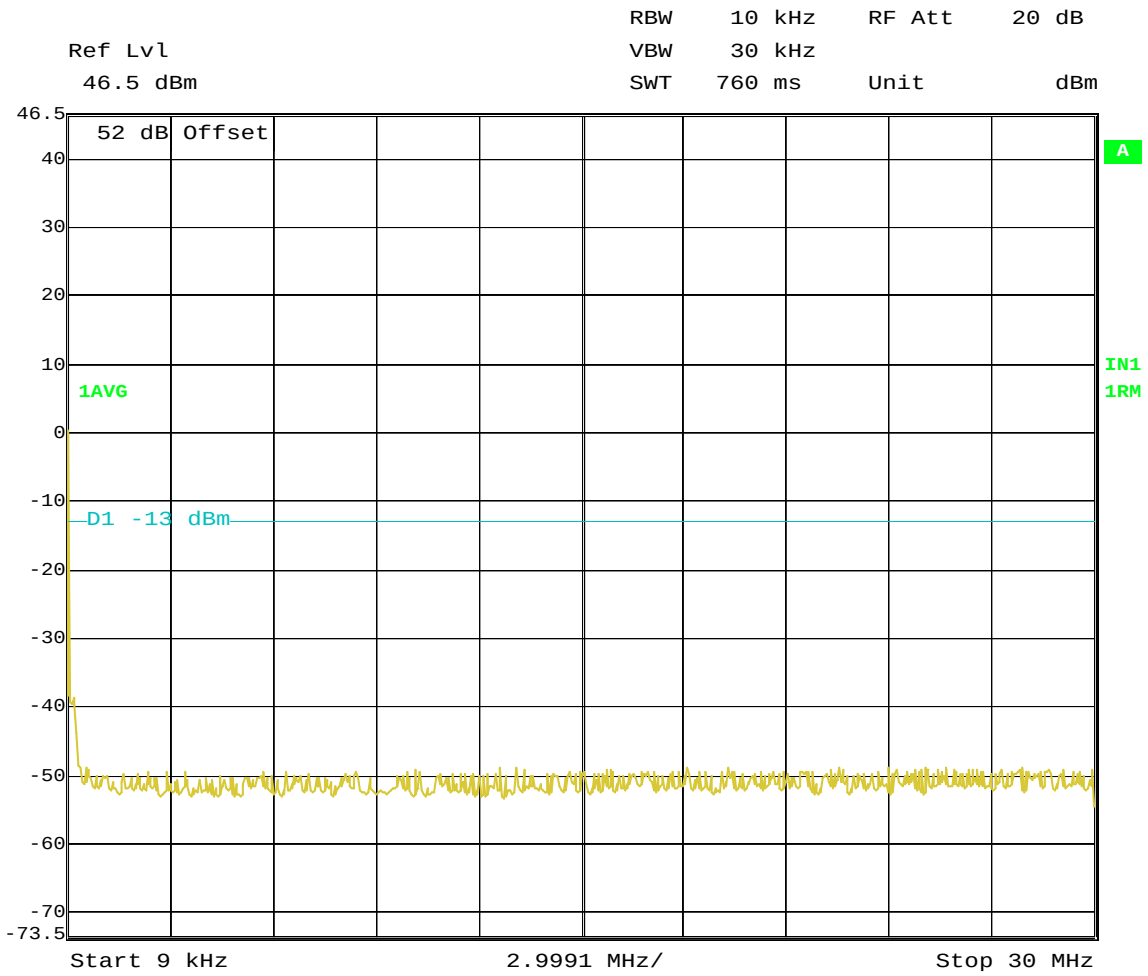



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 07:39:03

# Transmit Port
# Antenna Conducted Spurious Emissions

# Block: B
# 64QAM Modulation
# Bandwidth 734.5 – 739.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
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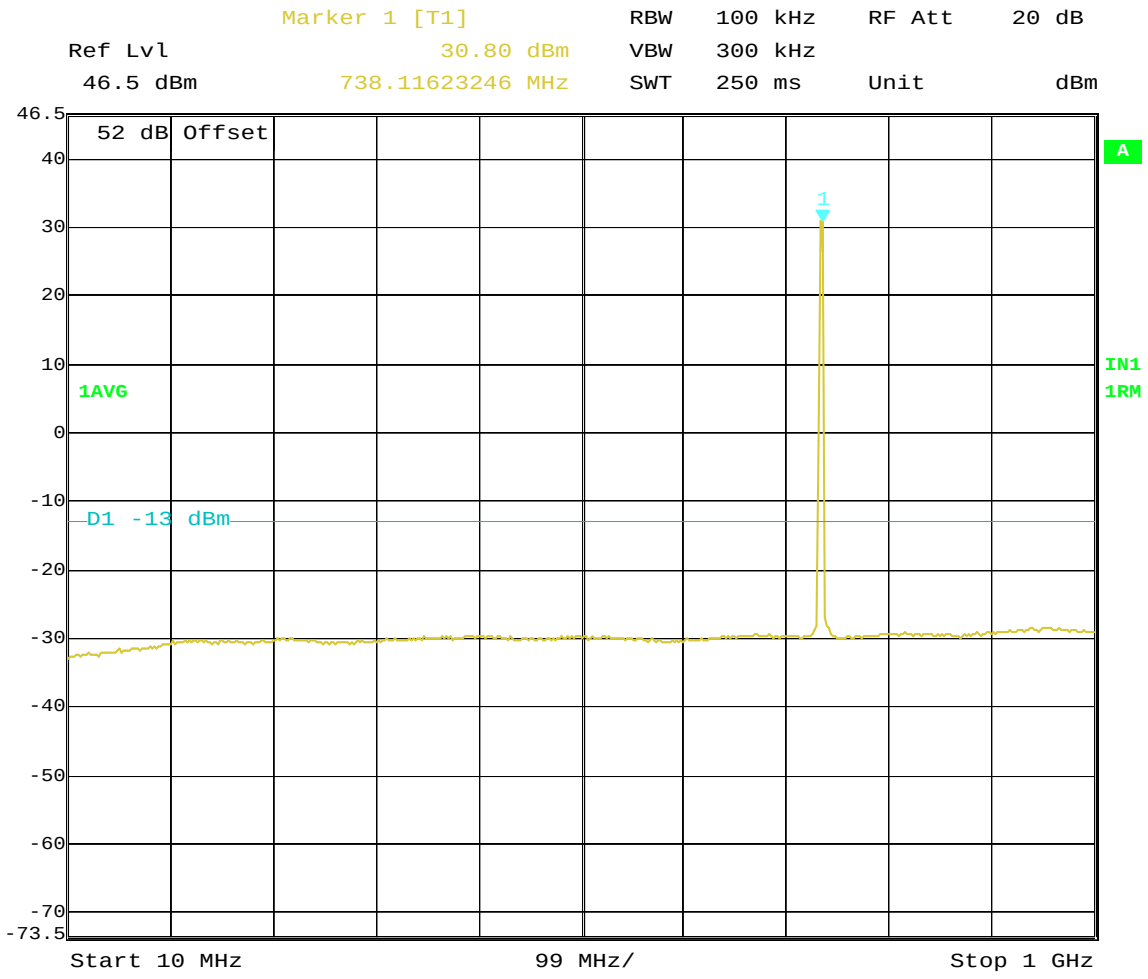
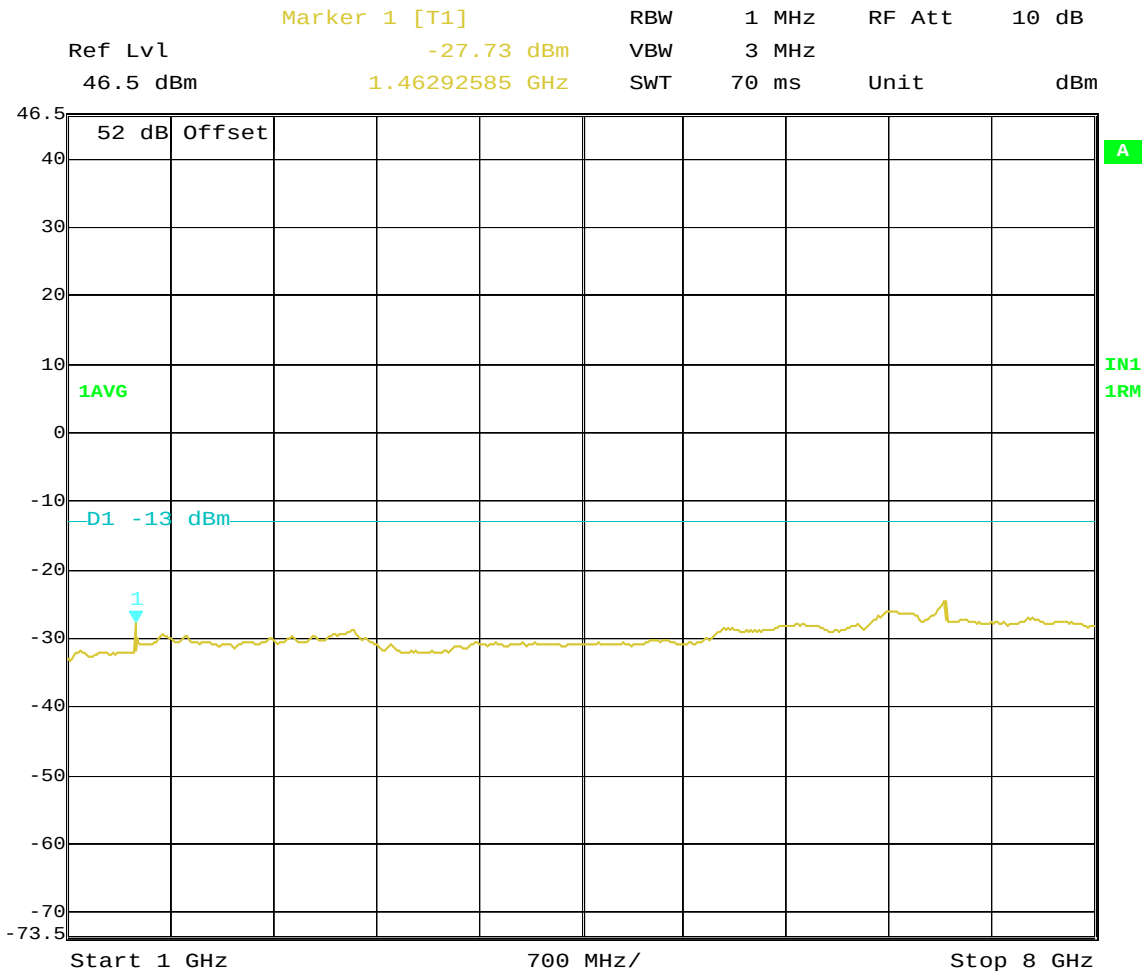


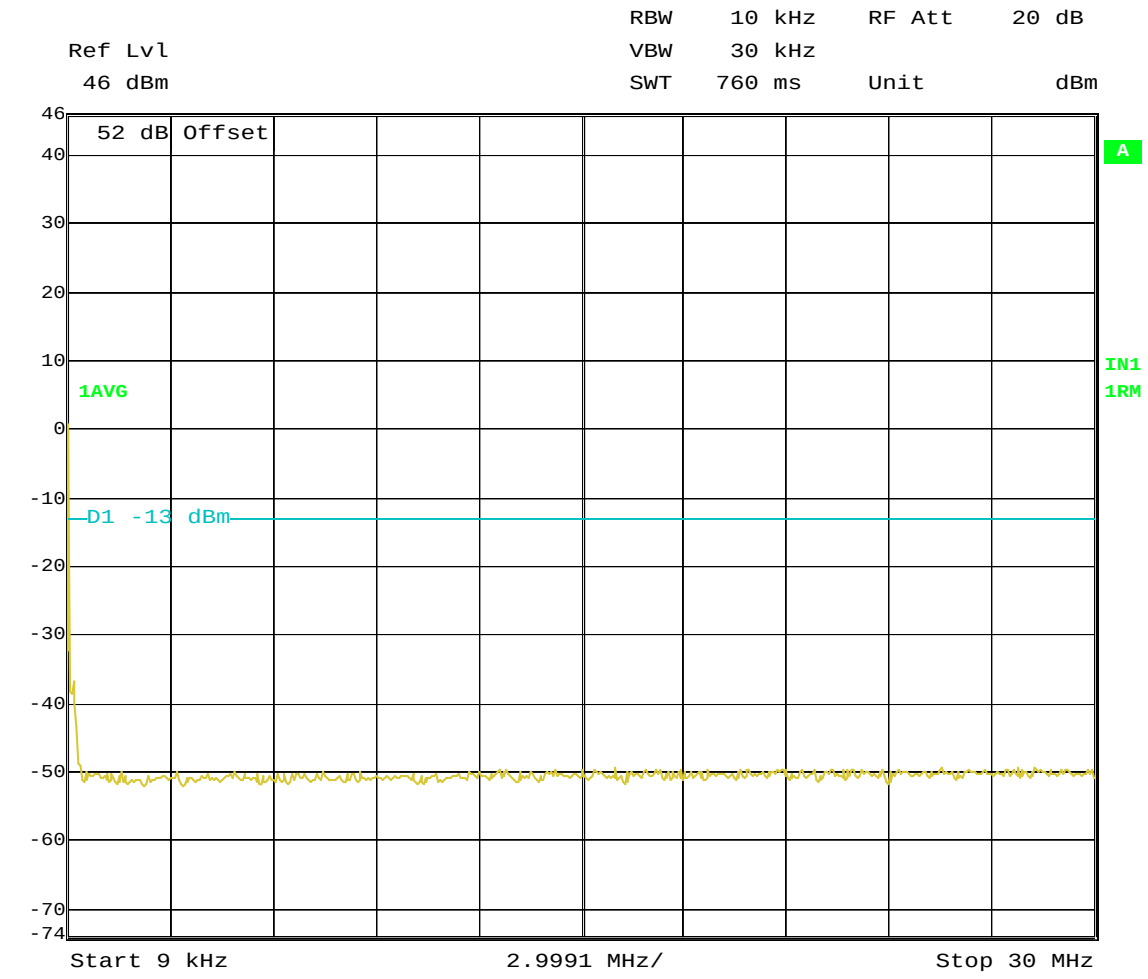

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:33:17



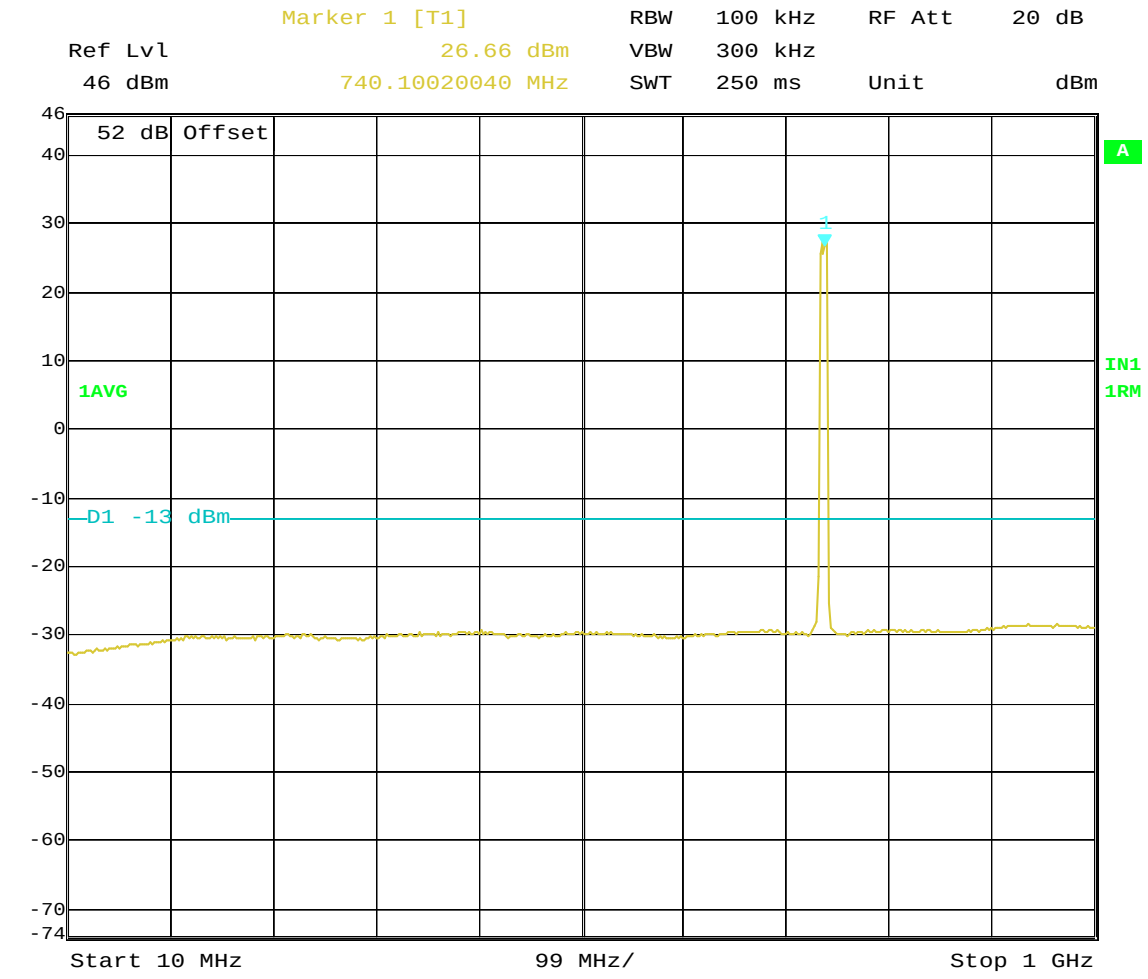

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B;734.5-739.5MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 08:45:13

# Transmit Port
# Antenna Conducted Spurious Emissions

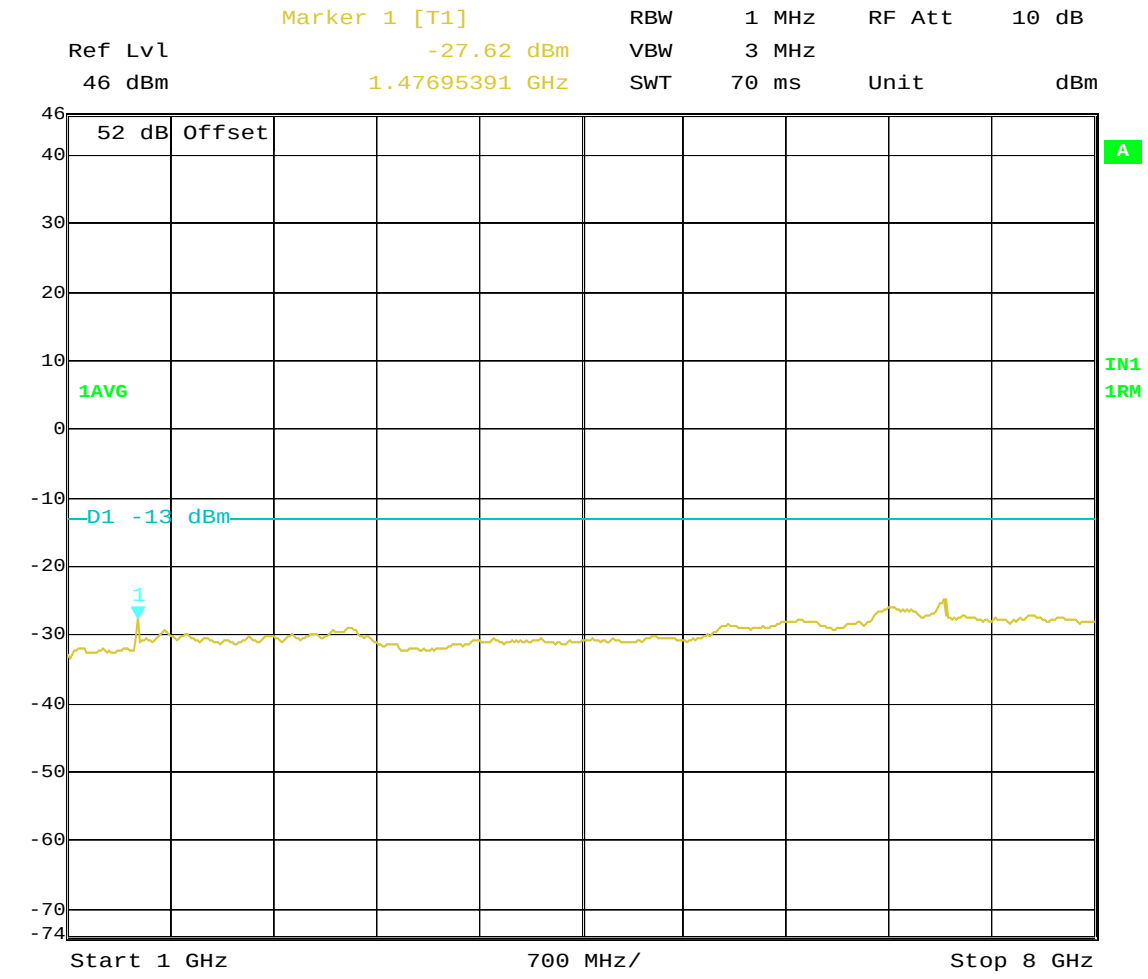
# Block: B+C
# QPSK Modulation
# Bandwidth 734.5 – 744.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:57:41



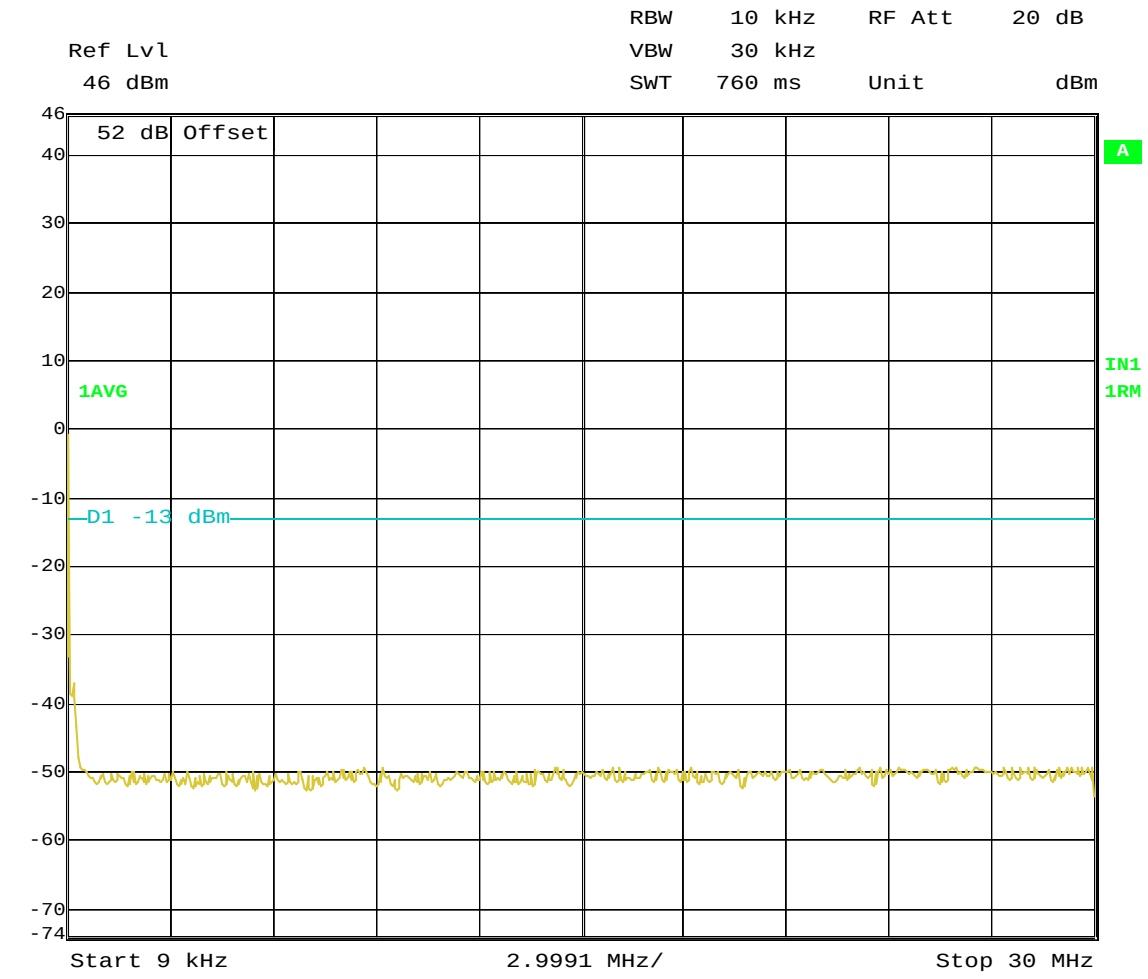

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 13:59:18



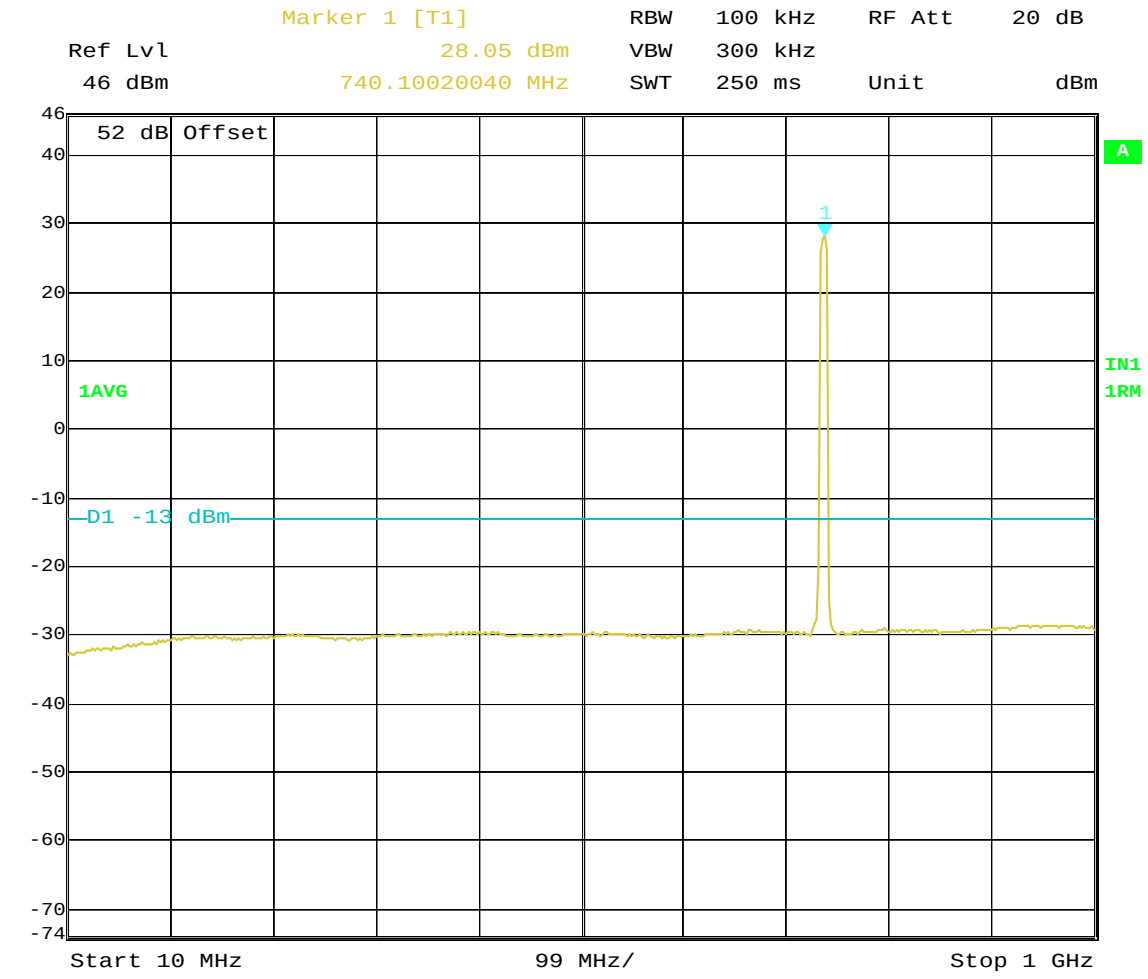

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 14:00:24

# Transmit Port
# Antenna Conducted Spurious Emissions

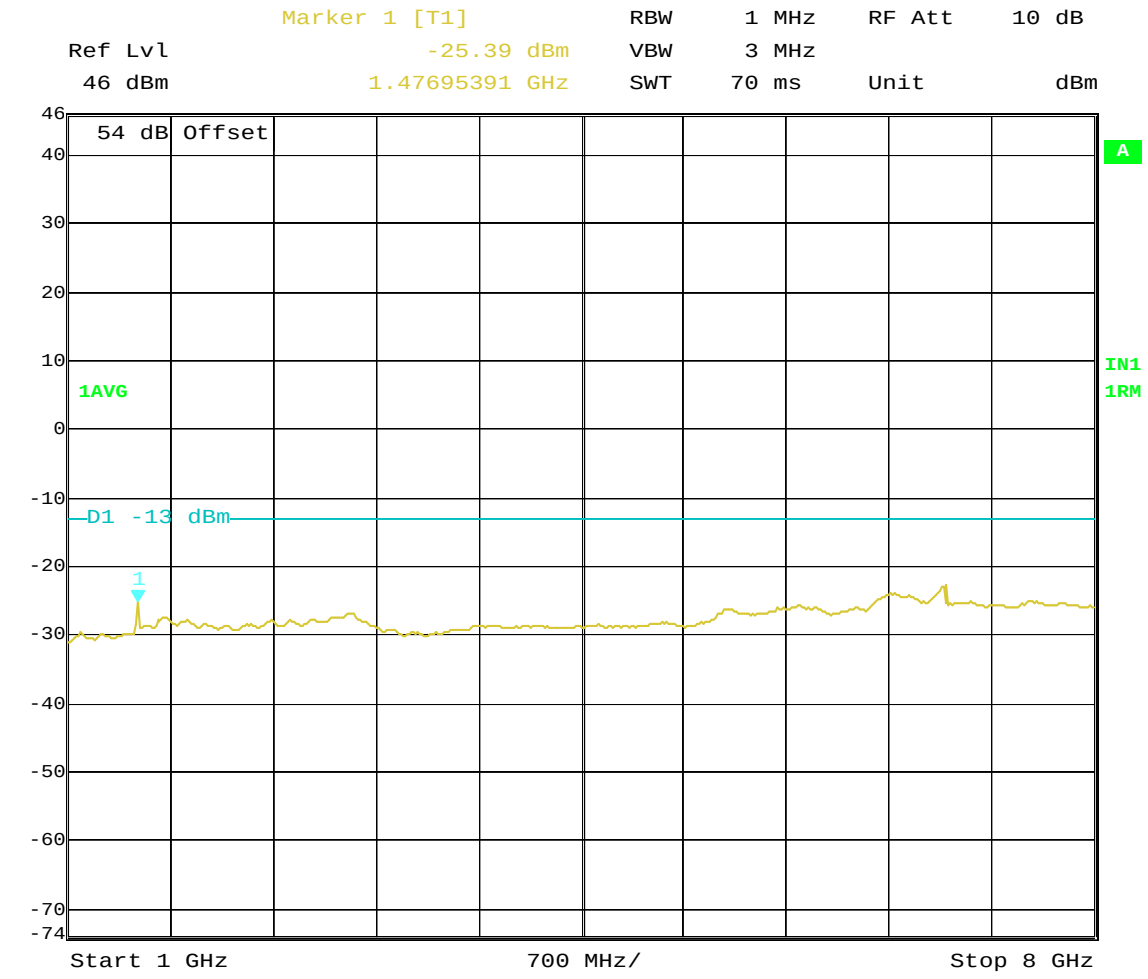
# Block: B+C
# 16QAM Modulation
# Bandwidth 734.5 – 744.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 14:15:38



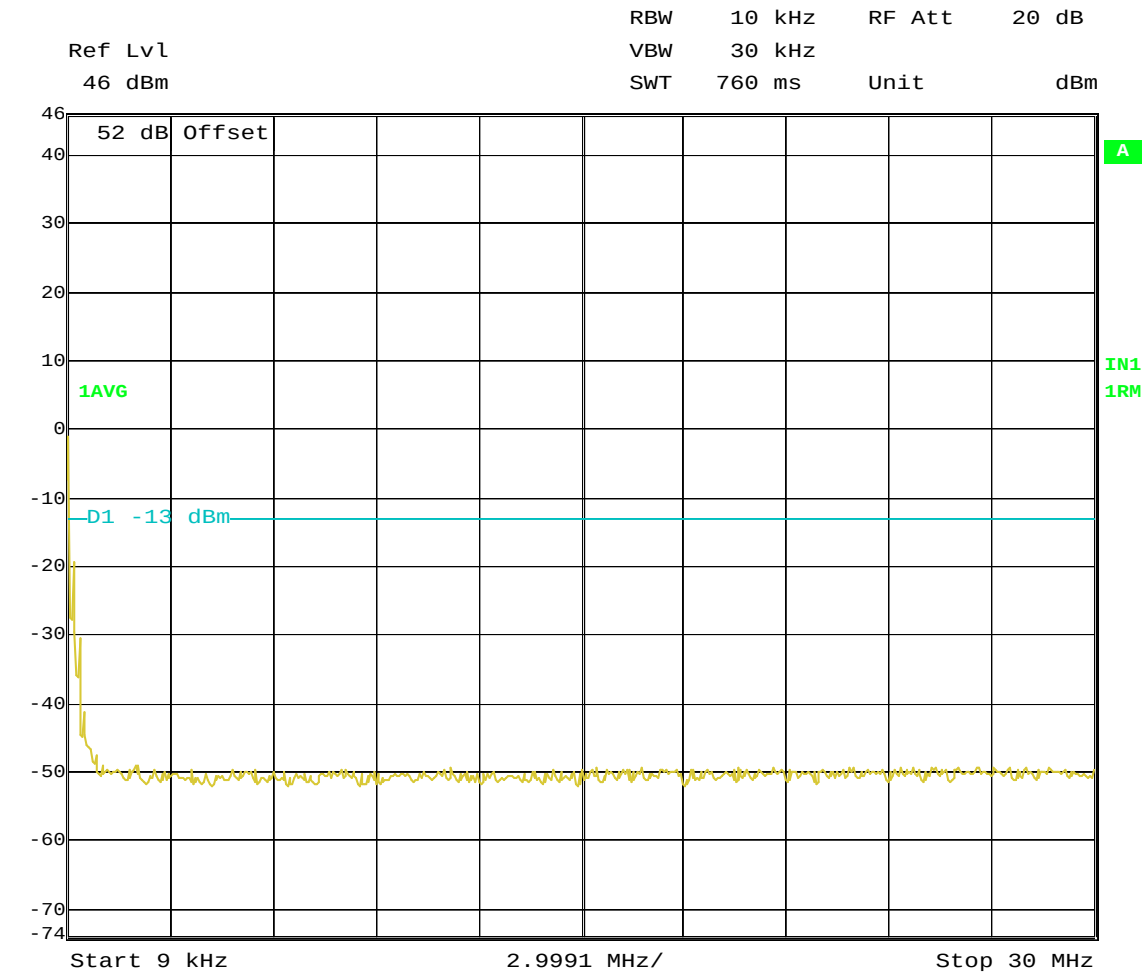

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 14:16:59



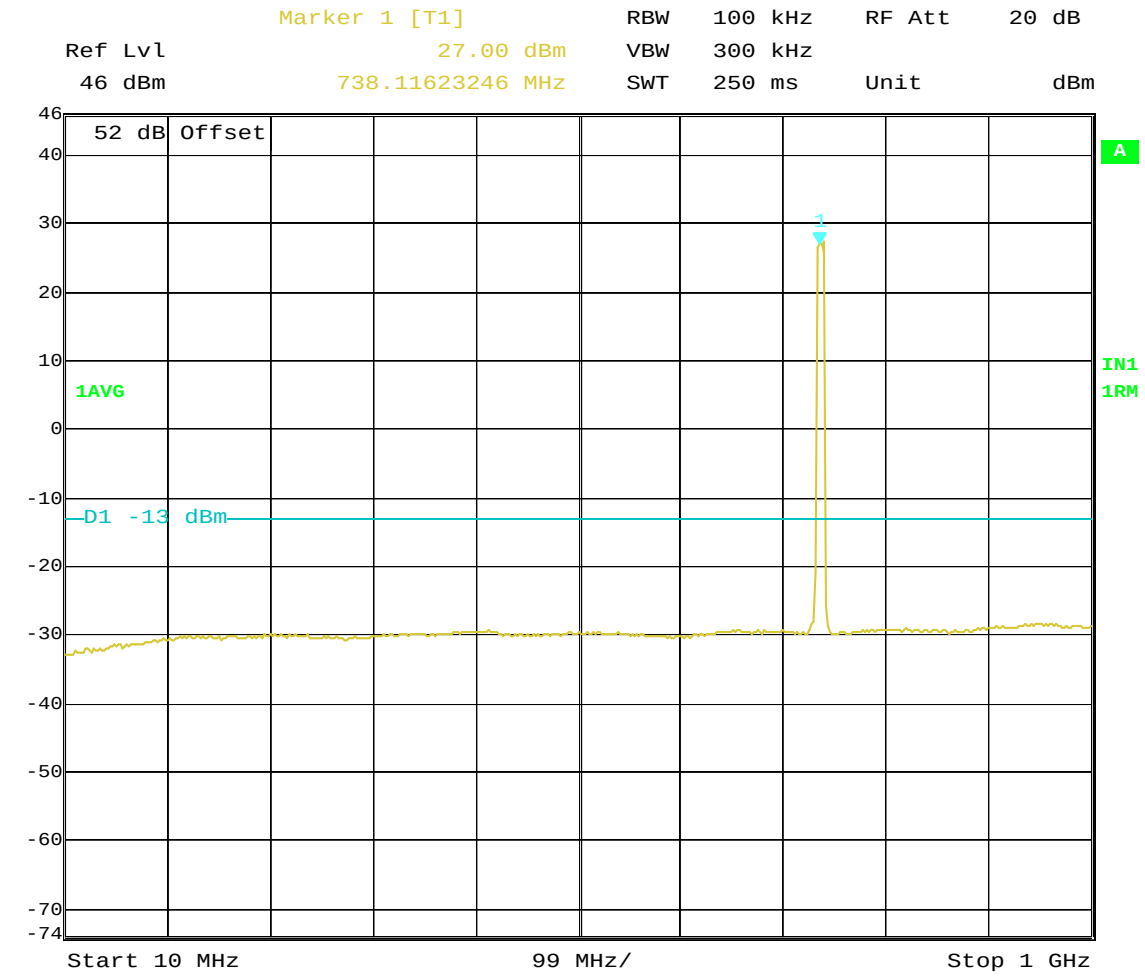

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 16QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 14:18:41

# Transmit Port
# Antenna Conducted Spurious Emissions

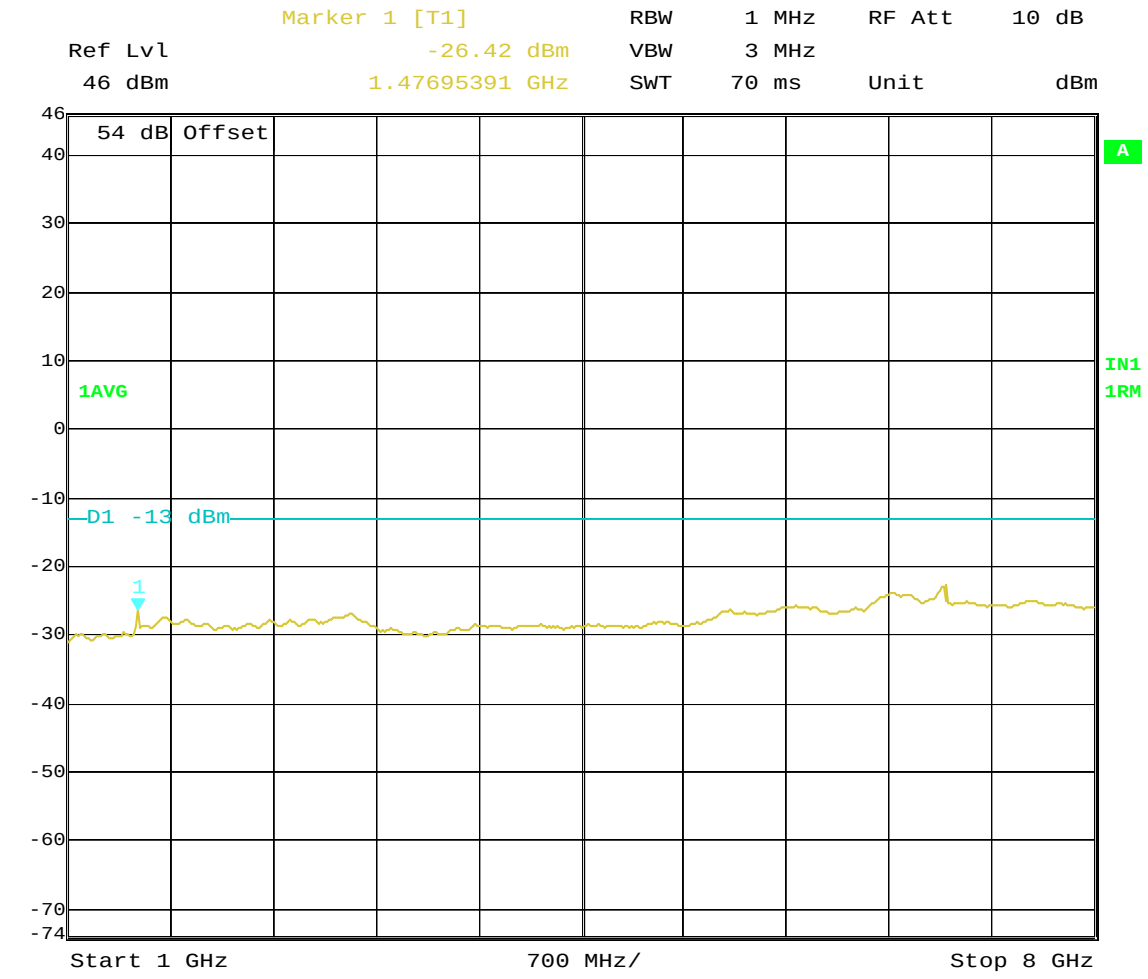
# Block: B+C
# 64QAM Modulation
# Bandwidth 734.5 – 744.5 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 08:09:45



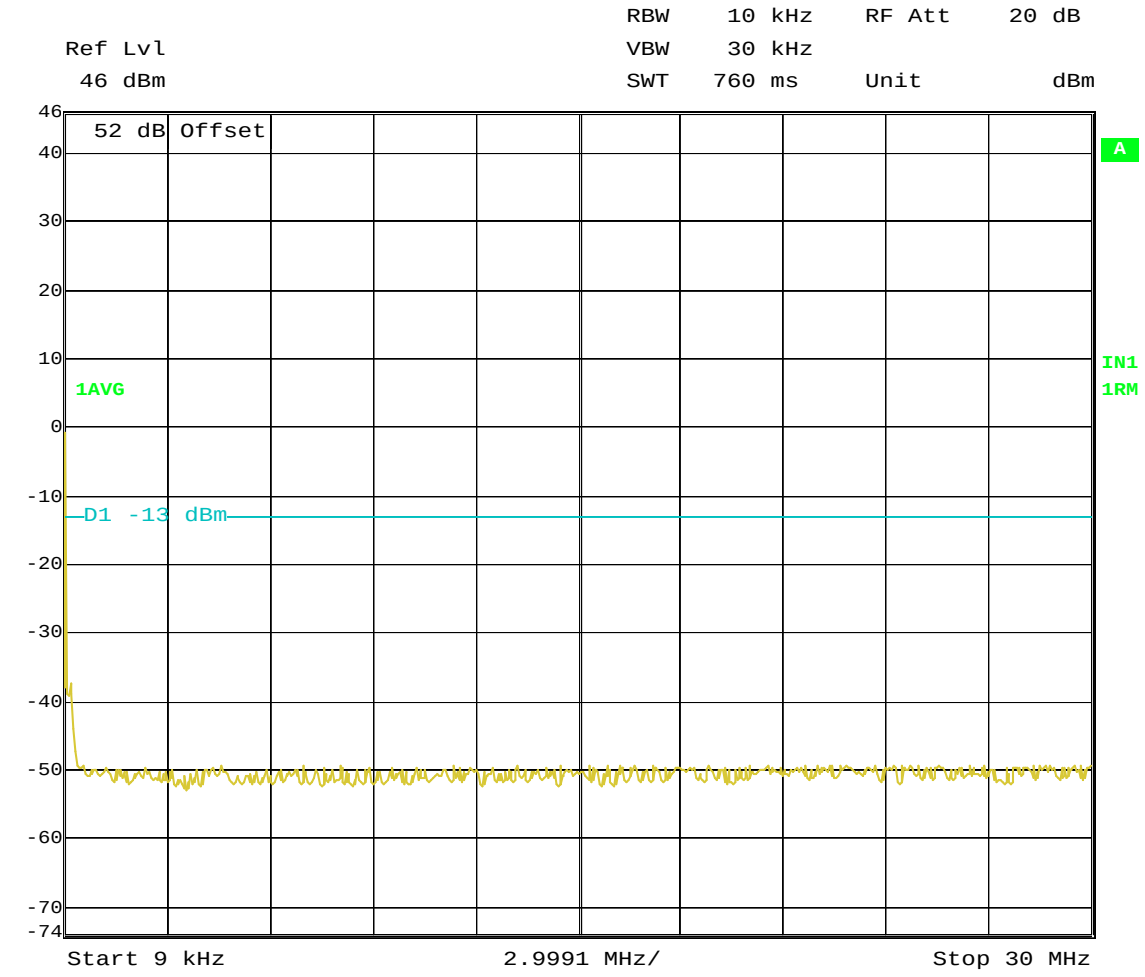

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 08:10:38



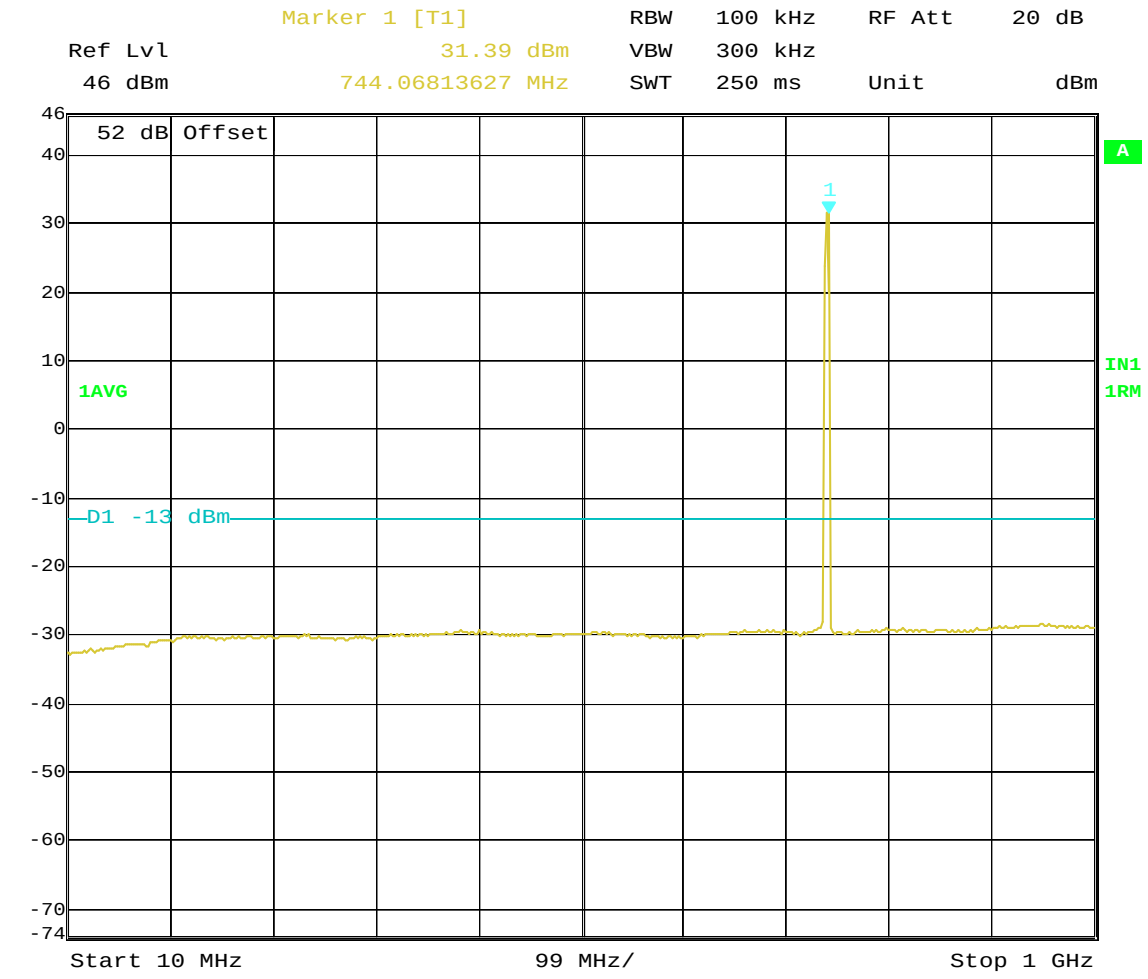

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk B+C;734.5-744.5MHz; Filter:M1
PWR:40W, 64QAM;FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 18.AUG.2010 08:12:20

# Transmit Port
# Antenna Conducted Spurious Emissions

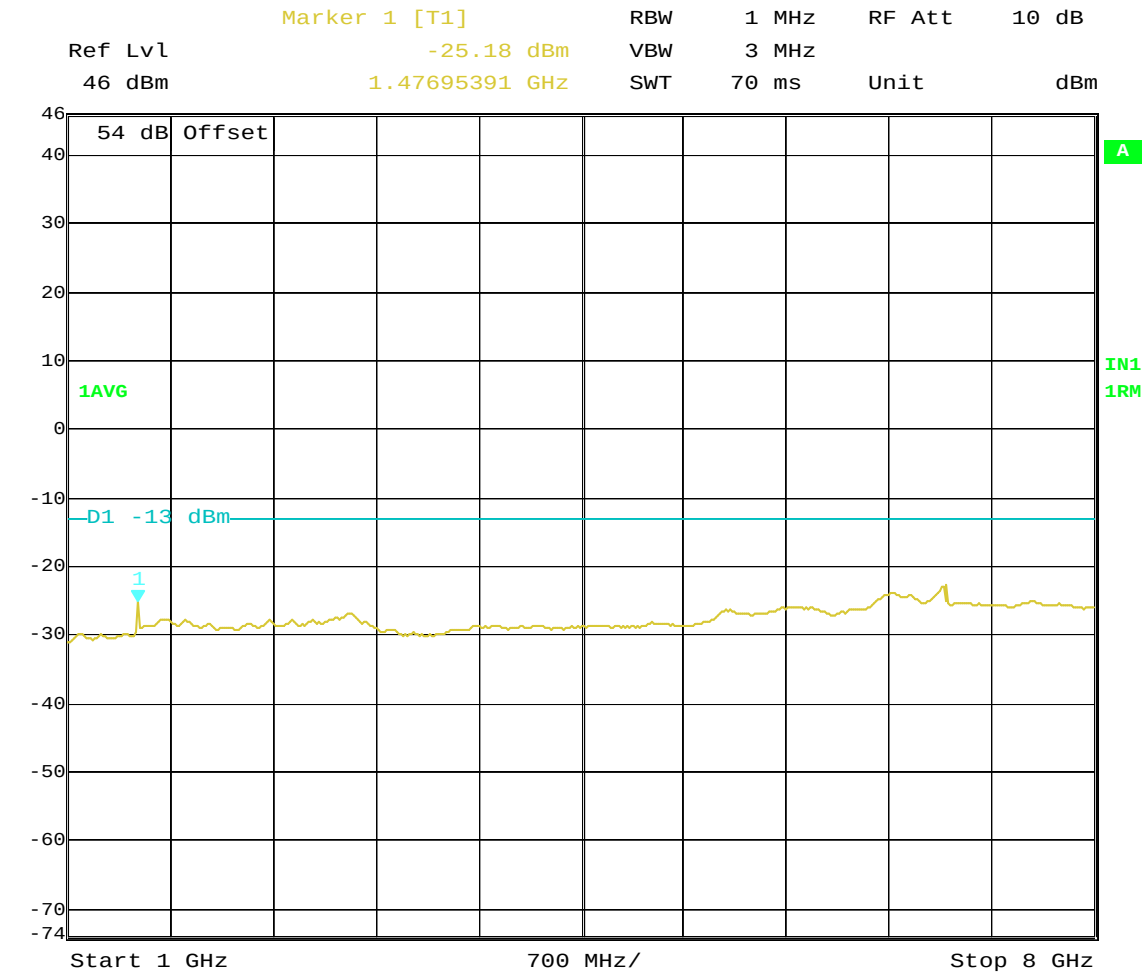
# Block: C
# QPSK Modulation
# Bandwidth 740 – 745 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:07:14



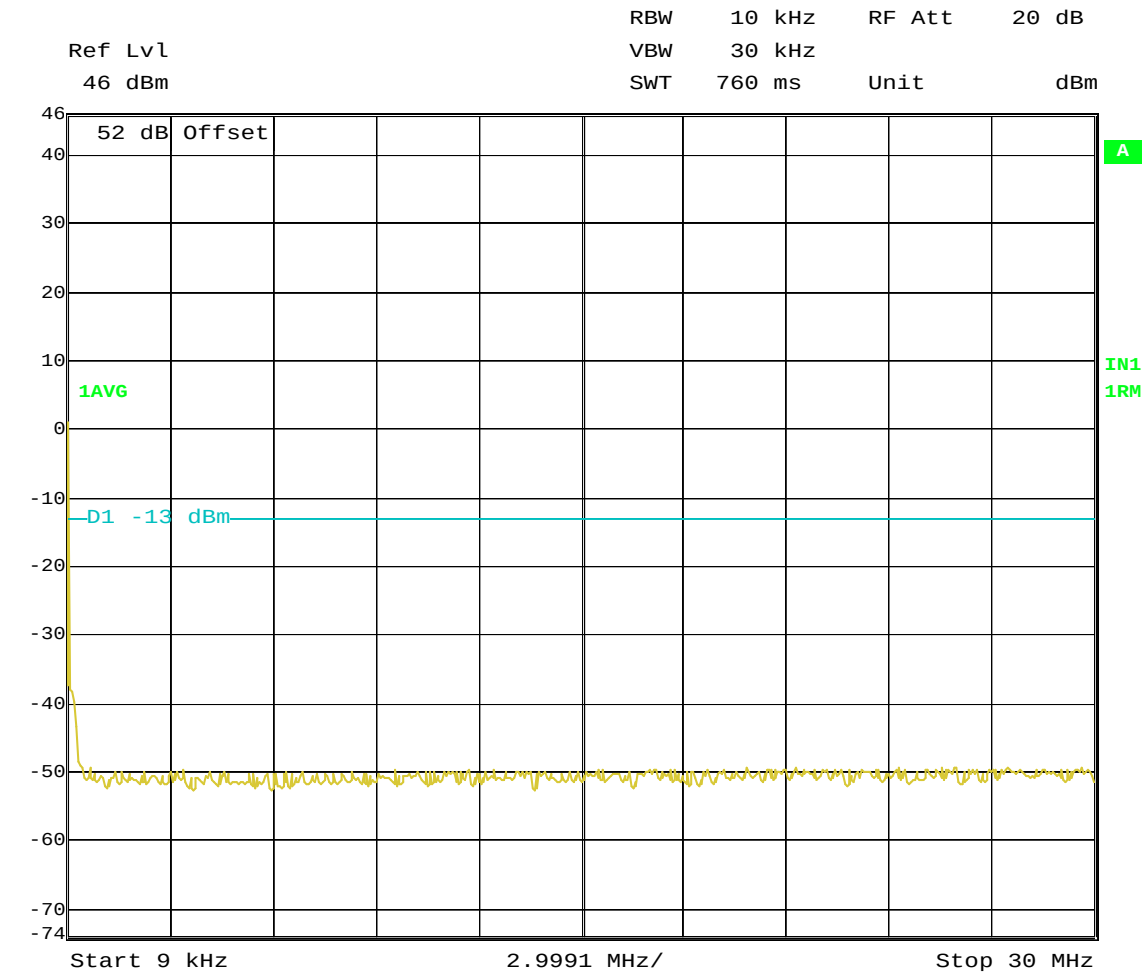

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:04:51



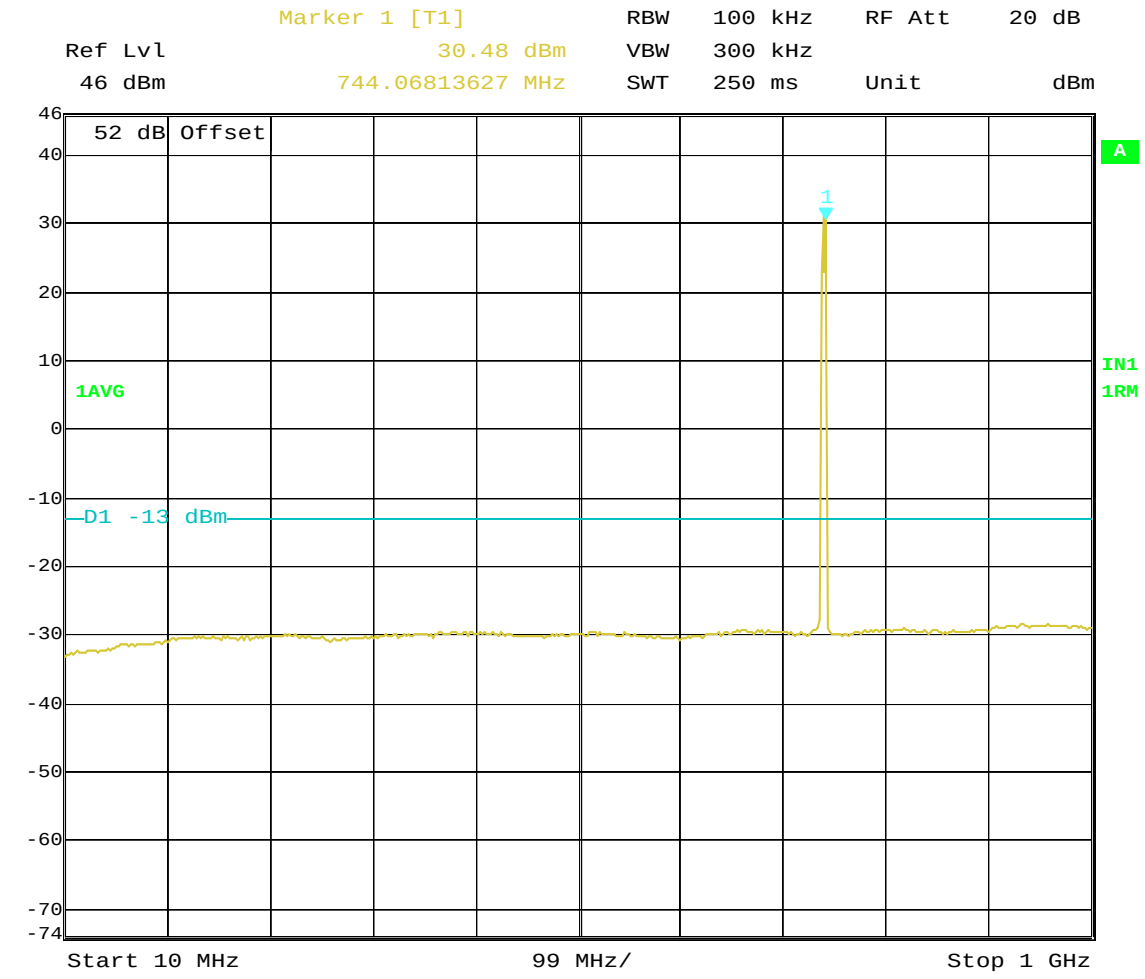

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, QPSK; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:09:27

# Transmit Port
# Antenna Conducted Spurious Emissions

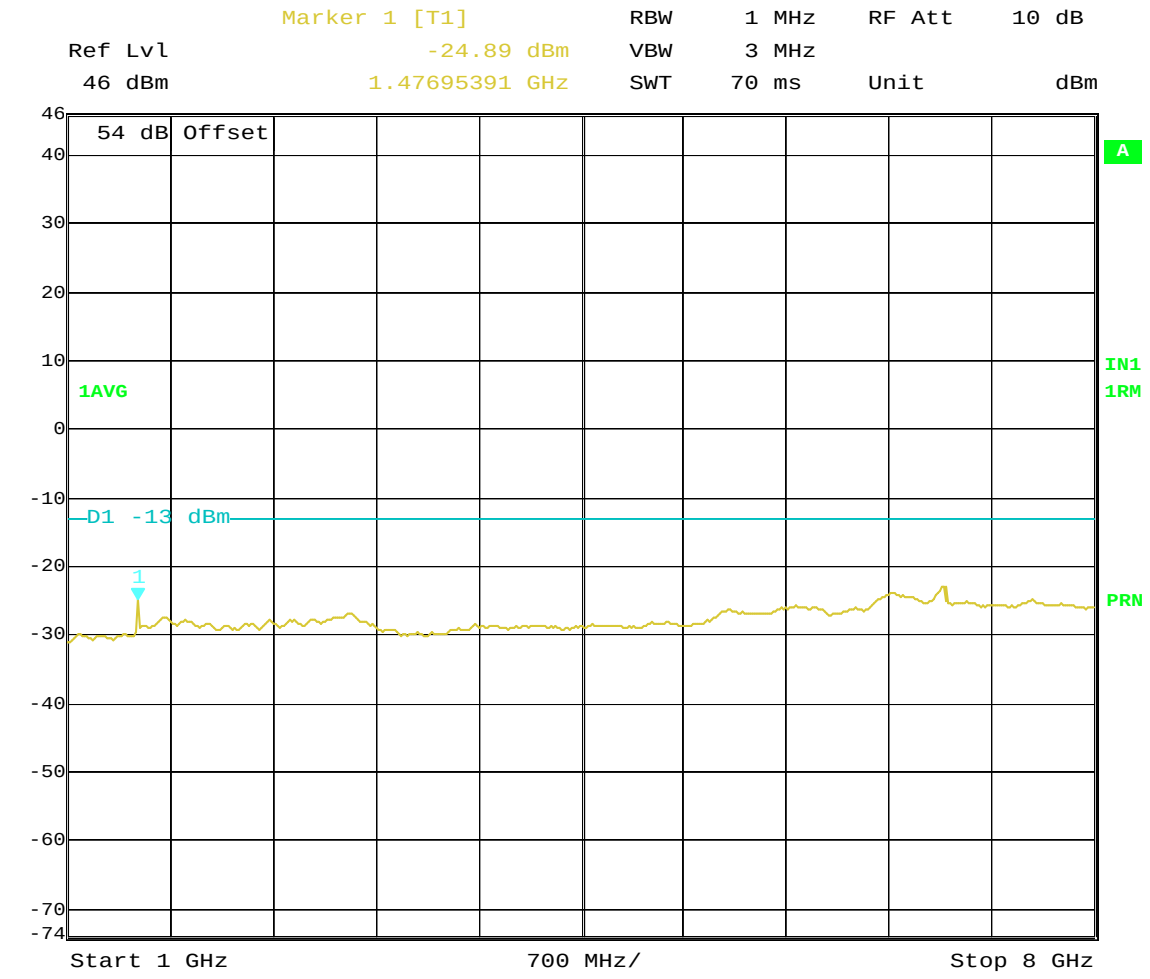
# Block: C
# 16QAM Modulation
# Bandwidth 740 – 745 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:43:17



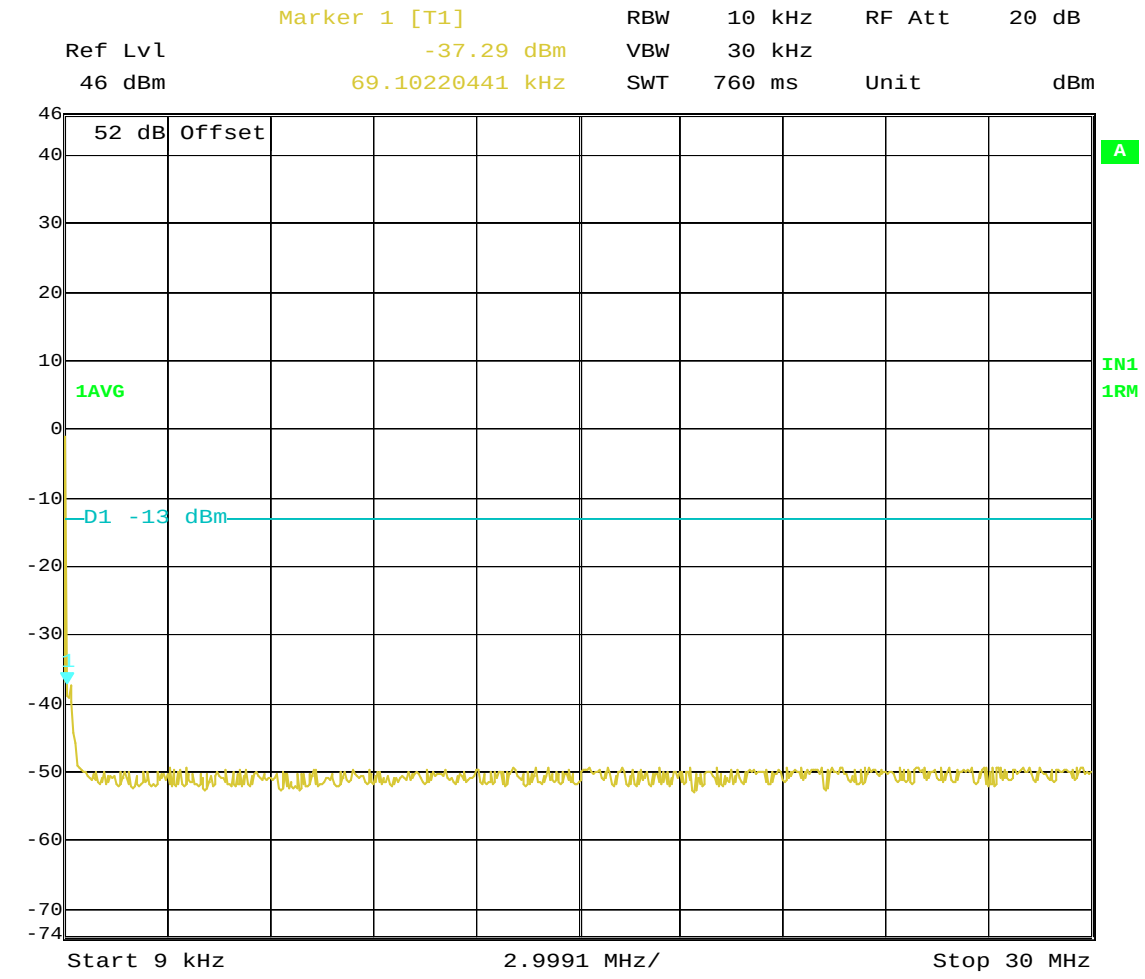

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:43:57



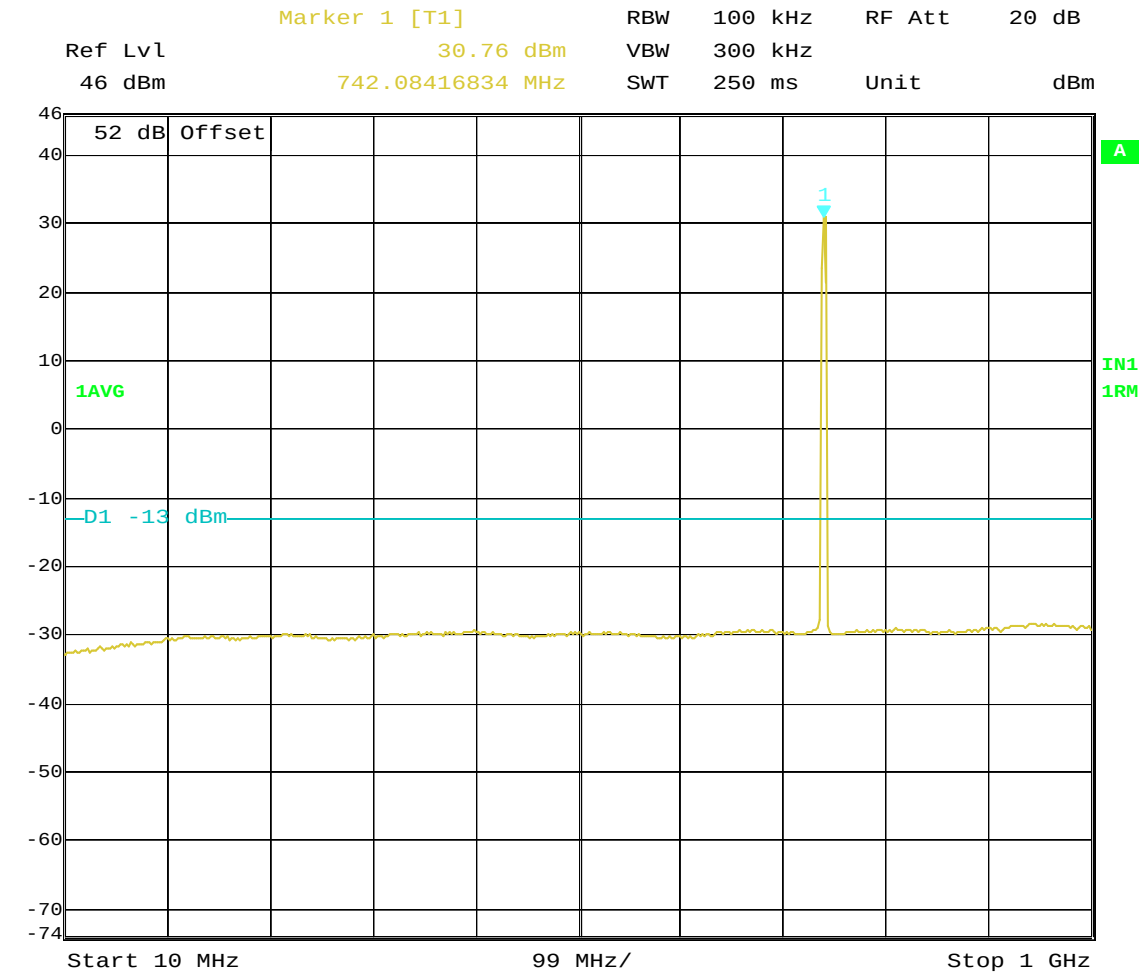

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 16QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 10:45:54

# Transmit Port
# Antenna Conducted Spurious Emissions

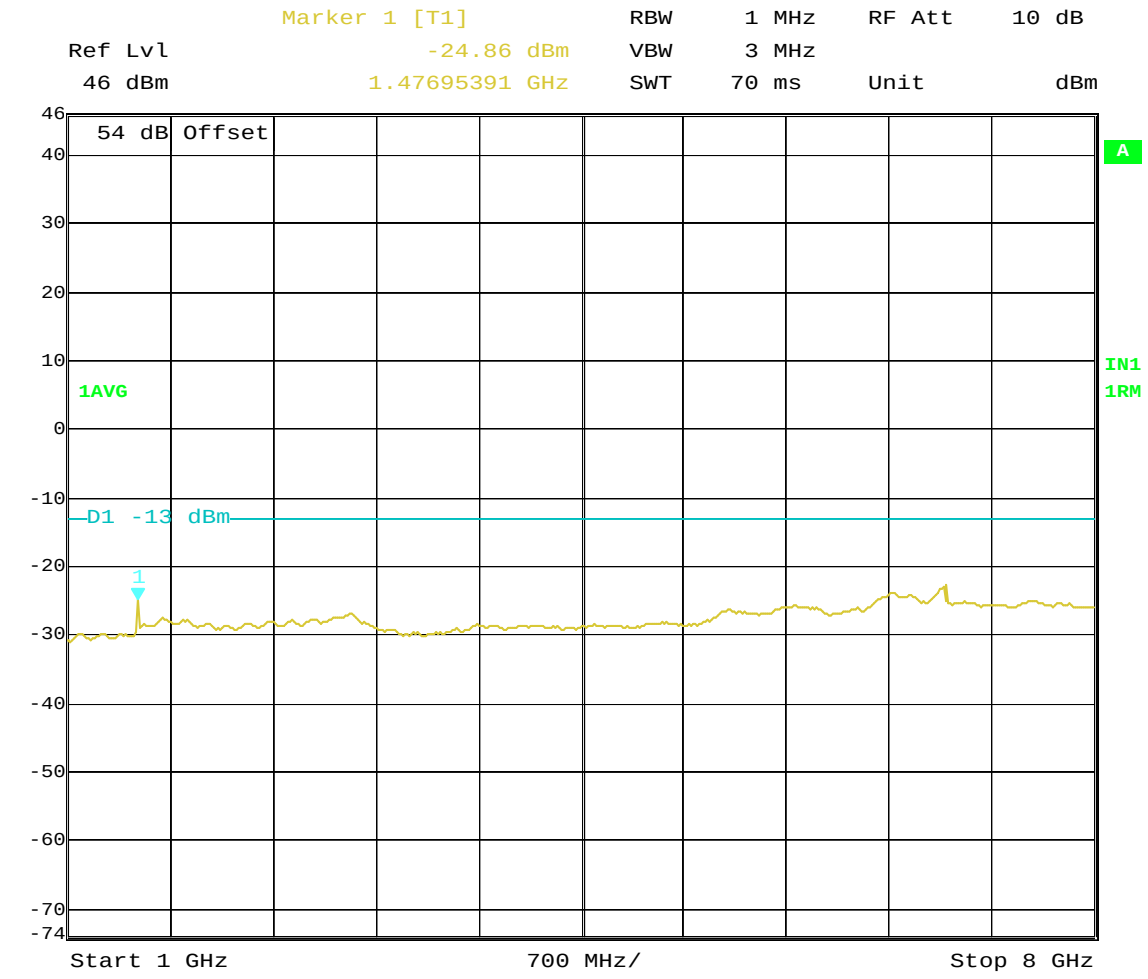
# Block: C
# 64QAM Modulation
# Bandwidth 740 – 745 MHz




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 11:06:44




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 11:05:23




Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: LTE 9442 RRH2X40-P2;-48VDC;Blk C;740 - 745 MHz; Filter:M1
PWR:40W, 64QAM; FCC Prt 27.53; FCCID:AS5BBTRX-03; Cls 2 Chng
Date: 13.AUG.2010 11:03:54

# Measurement -5

# FIELD STRENGTH OF SPURIOUS RADIATION

**SECTION 2.1053 and 27.53 (g)**

**FILTER- M 2**
**(ORIGINALLY FILED WITH FCC)**

**SECTION 2.1053**

**FIELD STRENGTH OF SPURIOUS RADIATION**

Field strength measurements of radiated spurious emissions were made at 3 m semi anechoic room of Global Product Compliance Laboratory of Alcatel-Lucent Murray Hill. A complete description and full measurement data for the site is on file with the Commission (FCC File 515091).

The **"**LTE 9442 Remote Radio Head (RRH) FCCID: AS5BBTRX-03" was tested at a RF output of 40W at Antenna Interface Connector (AIC). The operation of RRH was simulated using Base Band Unit (BBU)/(D2U placed outside the chamber. The interconnection between RRH and D2U was through optical fiber. The radiated emissions tests were performed serially with RRH operating with 5 MHz and 10 bandwidths in the frequency blocks A, B, C, A+B and B+C. All tests were performed with the RRH operating in QPSK and 64QAM modulations. For some frequency blocks tests were performed in 16QAM modulations. During the tests RRH AIC were terminated with 50 ohm load. The spectrum from 10 MHz to the 10th harmonic (8GHz) of the carrier was searched for spurious radiation. Measurements were made according to ANSI C63.4. All emissions more than 20 dB below the specification limit were considered not reportable (Section 2.1057(c)).

All emissions more than 20 dB below the specification limit were considered not reportable (Section 2.1057(c)).

The calculated emission levels were found by:

Measured level (dBμV) + Cable Loss(dB)+Antenna Factor(dB) = Field Strength (dBμV/m)

Section 27.53 and 2.1053 contains the requirements for the levels of spurious radiation as a function of the level of the un-modulated carrier.

The reference level for the un-modulated carriers is calculated as the field produced by an ideal isotropic antenna excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, Page 27-7 6th edition, IT&T Corp

$E= [(30*P)^{1/2}]/R$

$20 \log (E*10^6) – (43 + 10 \log P) = 82.2$ dB μV/meter
E = Field Intensity in Volts/meter
P = Transmitted Power in Watts
R = Distance from the ideal isotropic antenna in meters = 3 m

**RESULTS:**
For this particular test, the field strength of any spurious radiation is required to be less than 82.2 dBμV/meter. Reportable measurements are equal to or greater than 62.2 dBμV/meter. Over the spectrum investigated, 10 MHz to 10th of the carrier (8 GHz), no reportable spurious emissions were detected. This demonstrates that the **"**LTE 9442 Remote Radio Head (RRH)" the subject of this application, complies with Sections 2.1053, 27.53 (g) and 2.1057 of the Rules.

**FILTER- M 1**
**(NEW MANUFACTURER)**

**SECTION 2.1053**

## FIELD STRENGTH OF SPURIOUS RADIATION

Field strength measurements of radiated spurious emissions were made at 3 m semi anechoic room of Global Product Compliance Laboratory of Alcatel-Lucent Murray Hill. A complete description and full measurement data for the site is on file with the Commission (FCC File 515091).

The **"**LTE 9442 Remote Radio Head (RRH) FCCID: AS5BBTRX-03" was tested at a RF output of 40W at Antenna Interface Connector (AIC). The operation of RRH was simulated using Base Band Unit (BBU)/(D2U placed outside the chamber. The interconnection between RRH and D2U was through optical fiber. The radiated emissions tests were performed serially with RRH operating with 5 MHz and 10 bandwidths in the frequency blocks A, B, C, A+B and B+C. All tests were performed with the RRH operating in QPSK and 64QAM modulations. For some frequency blocks tests were performed in 16QAM modulations. During the tests RRH AIC were terminated with 50 ohm load. The spectrum from 10 MHz to the 10th harmonic (8GHz) of the carrier was searched for spurious radiation. Measurements were made according to ANSI C63.4. All emissions more than 20 dB below the specification limit were considered not reportable (Section 2.1057(c)).

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The calculated emission levels were found by:

Measured level (dBμV) + Cable Loss(dB)+Antenna Factor(dB) = Field Strength (dBμV/m)

Section 27.53 and 2.1053 contains the requirements for the levels of spurious radiation as a function of the level of the un-modulated carrier.

The reference level for the un-modulated carriers is calculated as the field produced by an ideal isotropic antenna excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, Page 27-7 6th edition, IT&T Corp

$E= [(30*P)^{1/2}]/R$

$20 \log (E*10^6) – (43 + 10 \log P) = 82.2$ dB μV/meter
E = Field Intensity in Volts/meter
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R = Distance from the ideal isotropic antenna in meters = 3 m

**RESULTS:**
For this particular test, the field strength of any spurious radiation is required to be less than 82.2 dBμV/meter. Reportable measurements are equal to or greater than 62.2 dBμV/meter. Over the spectrum investigated, 10 MHz to 10th of the carrier (8 GHz), no reportable spurious emissions were detected. This demonstrates that the **"**LTE 9442 Remote Radio Head (RRH)" the subject of this application, complies with Sections 2.1053, 27.53 (g) and 2.1057 of the Rules.

# Measurement -6

# MEASUREMENT OF FREQUENCY STABILITY

# These changes made in schematics will not affect the Frequency stability data and therefore not provided.

# FREQUENCY SPECTRUM TO BE INVESTIGATED
# SECTION 2.1057

## SECTION 2.1057

## FREQUENCY SPECTRUM TO BE INVESTIGATED

**Frequency Spectrum to be investigated, Measurement Bandwidth and detector functions used meet or exceed the Specification contained in Section 2.1057, 27, and 3GGP TS36.104 V8.4.0 (2008-12)**

# Measurement Instrumentation and Antennas

All instrumentations, antennas and test Chamber used for the purpose of tests contained in the report were in calibration and calibrations are traceable to NIST