

TEST REPORT

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-01**, 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 – Not Provided- Same as Original Filing
Measurement: 3	Section 2.1049	(a) Emissions Bandwidth (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**

-

Same as Original Filing

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: 9.38 MHz
Therefore Emissions Type: **9M38F9W**

**(a) MEASUREMENT OF SPECTRUM BANDWIDTH
(99% POWER BANDWIDTH)**

**(a) MEASUREMENT OF
SPECTRUM BANDWIDTH
For Emissions Type**

The emissions bandwidth is not provided in the section 27.53 for 700 MHz bands. The spectrum bandwidth of the Long Term Evolution (LTE) was measured using an ESI40 Spectrum Analyzer/Receiver designed to measure 99% power bandwidth. The measurements were made for the channel center frequency of 751 MHz with 10 MHz bandwidth.

The measurements were made on a “**LTE TRDU 700 MHz (M2)**” indoor cabinet in 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 for 10 MHz band.

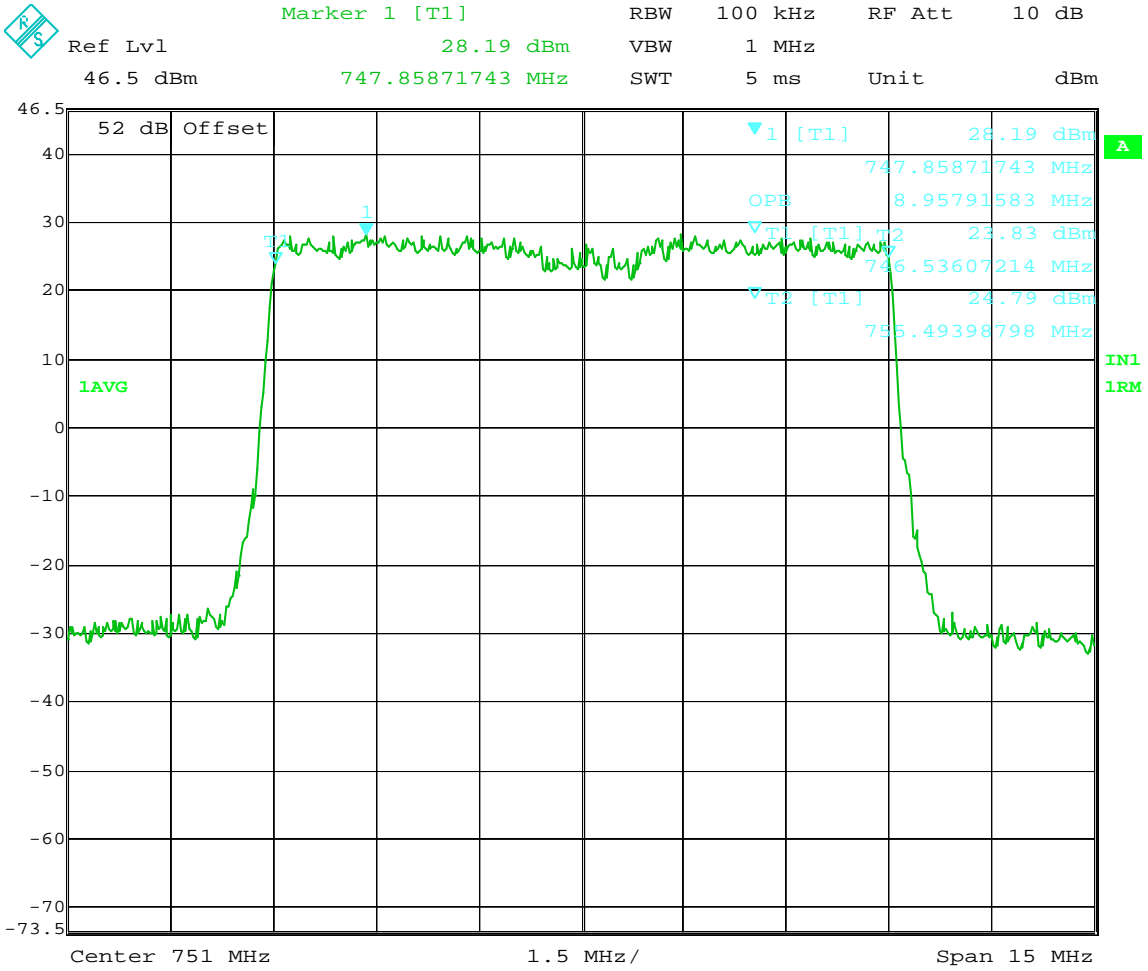
The Measured 99% power bandwidth is 9.37 MHz for Block C 10 MHz band.

Block: C

10 MHz Bandwidth

QPSK Modulation

(99% Power Bandwidth)



Title: 99% POWER BANDWIDTH; Test Engineer: SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 06:09:09

Block: C

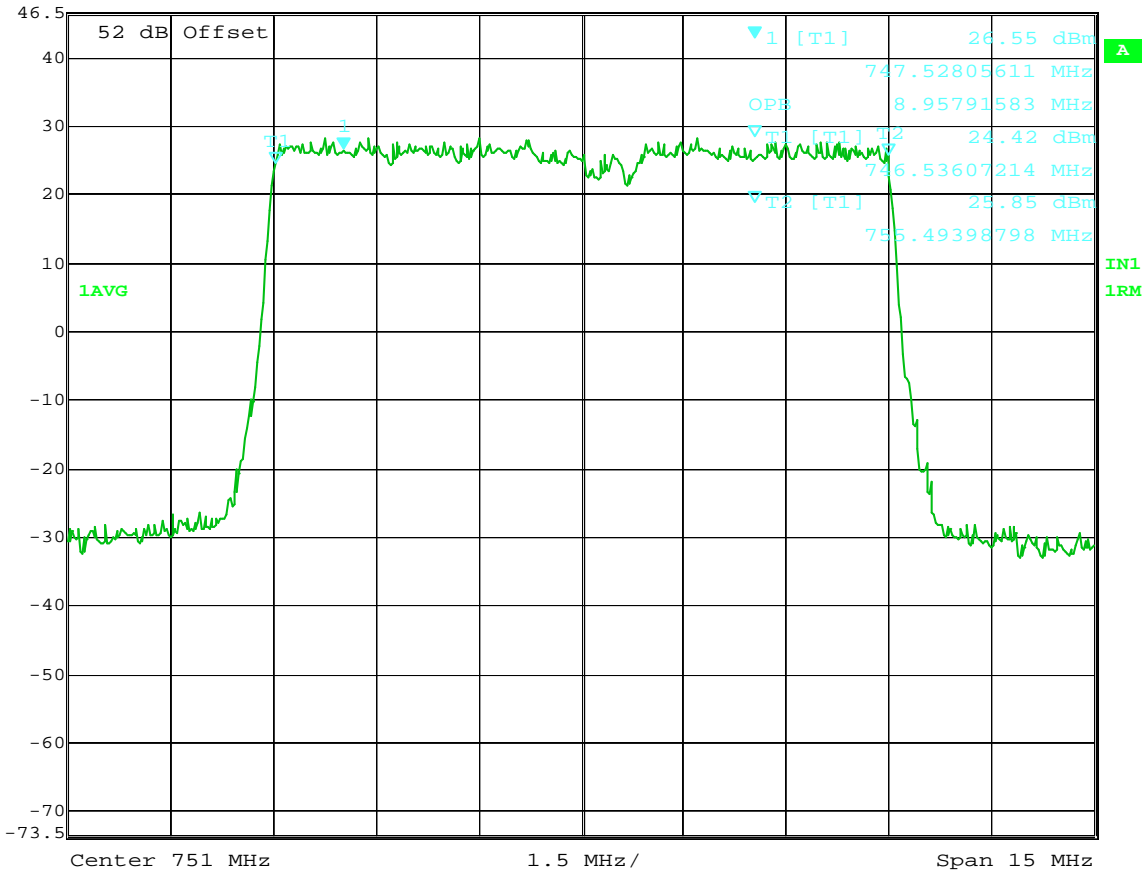
10 MHz Bandwidth

16 QAM Modulation

(99% Power Bandwidth)



Marker 1 [T1] RBW 100 kHz RF Att 10 dB
 Ref Lvl 26.55 dBm VBW 1 MHz
 46.5 dBm 747.52805611 MHz SWT 5 ms Unit dBm



Title: 99% POWER BANDWIDTH; Test Engineer:SEG/KJH
 Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
 PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
 Date: 11.FEB.2011 10:39:30

Block: C

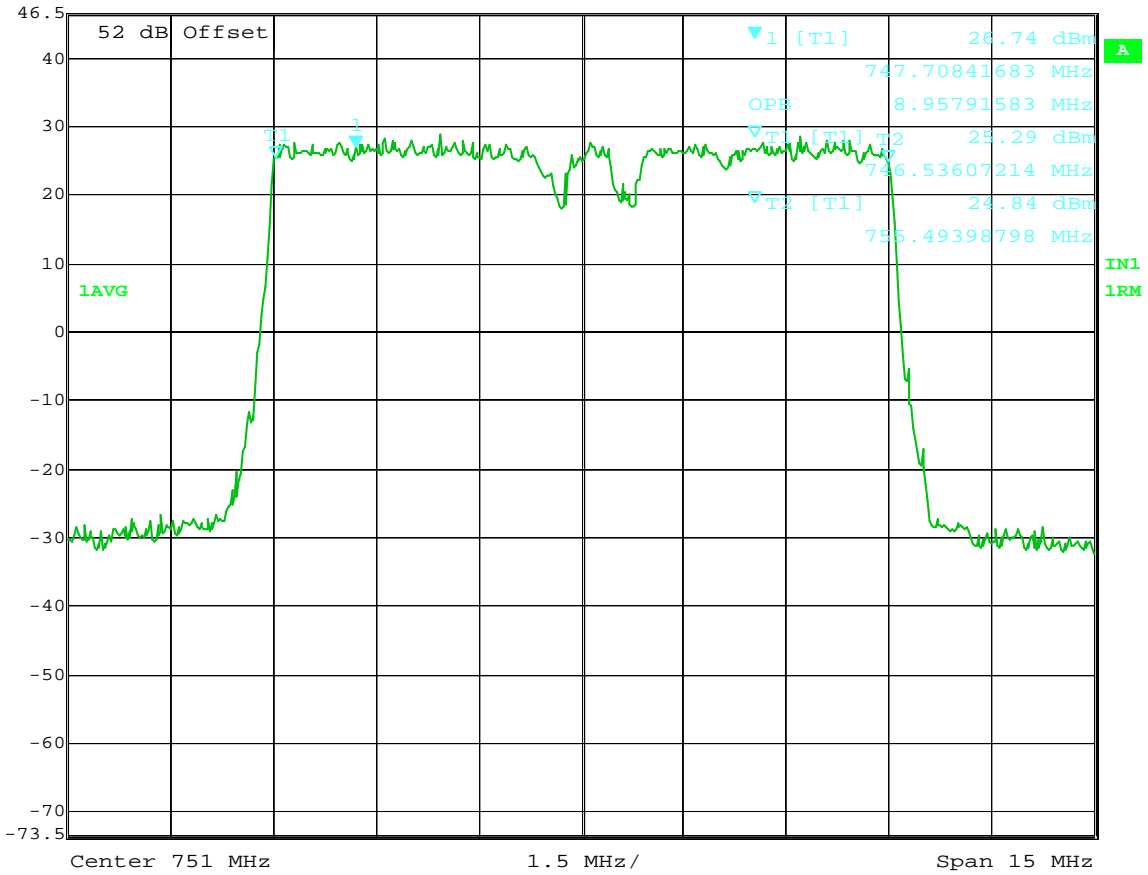
10 MHz Bandwidth

64 QAM Modulation

(99% Power Bandwidth)



Marker 1 [T1] RBW 100 kHz RF Att 10 dB
Ref Lvl 26.74 dBm VBW 1 MHz
46.5 dBm 747.70841683 MHz SWT 5 ms Unit dBm



Title: 99% POWER BANDWIDTH; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 09:07:21

**MEASUREMENT OF SPECTRUM BANDWIDTH
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 provided in section 27.53 (g) (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 TRDU 700 MHz (M2)**” indoor cabinet in following configurations:

1. QPSK
2. 16 QAM
3. 64 QAM

Results:

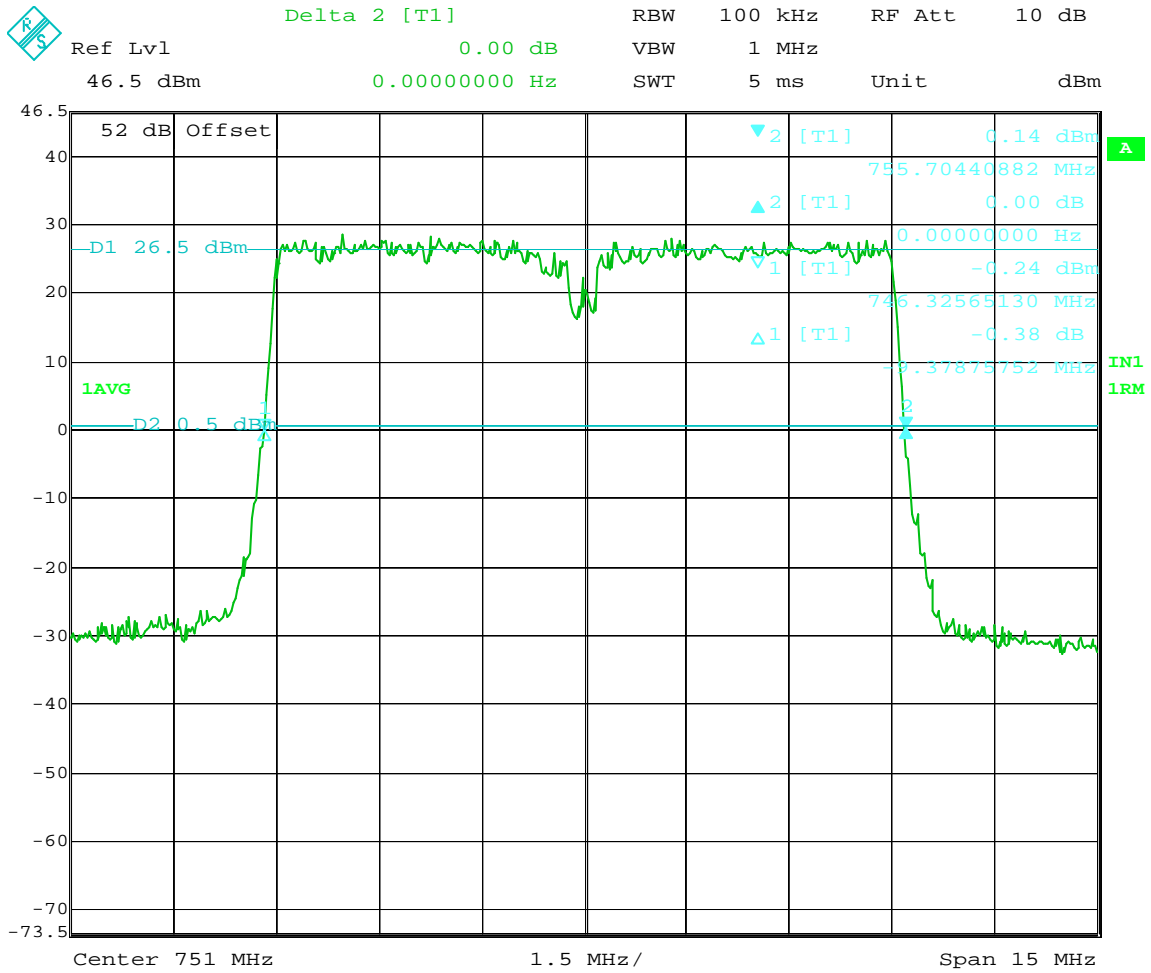
The plots are provided for QPSK, 16QAM and 64QAM modulations for 10 MHz band.
The Measured 26dB emissions bandwidth is 9.38 MHz for Block C 10 MHz band.

Block: C

10 MHz Bandwidth

QPSK Modulation

(26dB Bandwidth)



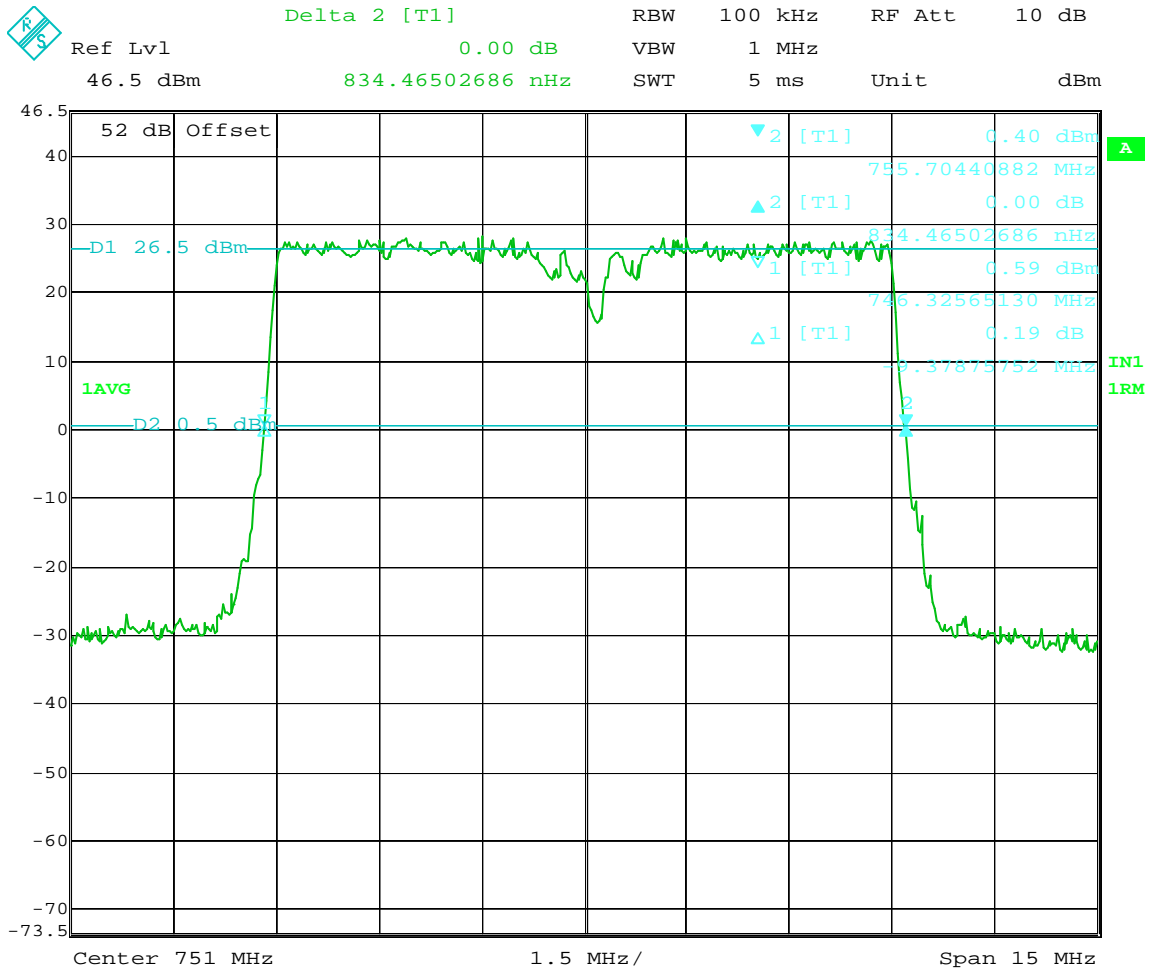
Title: 26dB BANDWIDTH; Test Engineer: SEG/KJH
 Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
 PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
 Date: 11.FEB.2011 06:23:12

Block: C

10 MHz Bandwidth

16 QAM Modulation

(26dB Bandwidth)



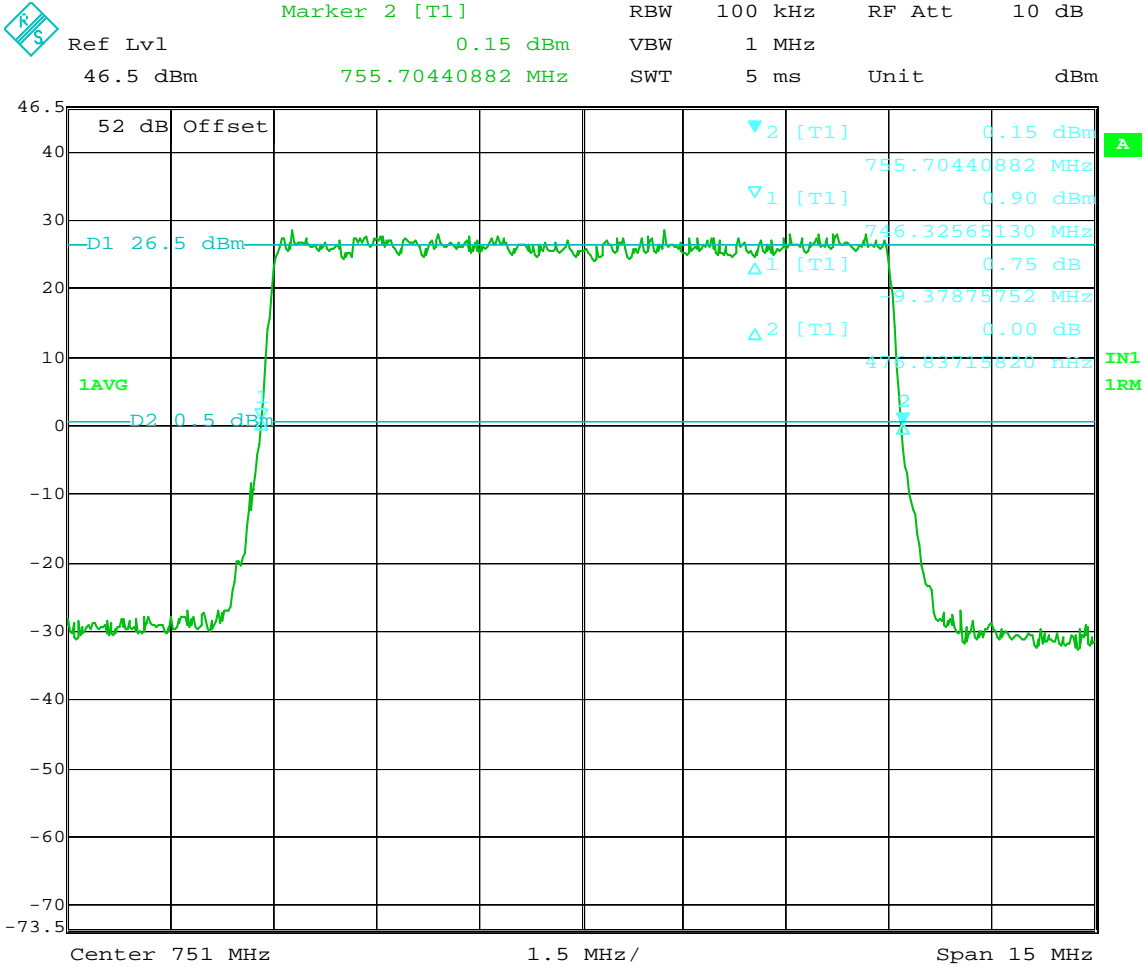
Title: 26dB BANDWIDTH; Test Engineer:SEG/KJH
 Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
 PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
 Date: 11.FEB.2011 10:55:05

Block: C

10 MHz Bandwidth

64 QAM Modulation

(26dB Bandwidth)



Title: 26dB BANDWIDTH; Test Engineer:SEG/KJH
 Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
 PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
 Date: 11.FEB.2011 09:00:42

**MEASUREMENT OF
SPECTRUM MASK/OCCUPIED BANDWIDTH
(100 kHz ADJACENT TO CHANNEL EDGE)**
Section 27.53 (C) (5)

**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) 700 MHz TRDU was measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The RF power level was continuously measured using RF power meter as shown in the test setup in Figure A. The RF output from the 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 10 MHz wide transmit signal. While adjusting the corrected RF power level in the spectrum analyzer, the attenuator and resolution BW of spectrum analyzer were considered.

The measurements were made on a “**LTE TRDU 700 MHz (M2)**” indoor cabinet.

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 (EAC) were plotted at each frequency/block. The LTE TRDU 700 MHz (M2) is capable of operating in the band of 746 to 756 MHz (Block C). The TRDU presently tested was configured to operate in Block C only. Plots were provided for a single carrier. These frequencies were chosen to show the occupied bandwidth in the block in the frequency band in which this radio can be operated.

Block edge requirements:

FCC Section 27.53(c)(5): 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: Since the LTE frame passes with 100 kHz resolution bandwidth 30 kHz resolution bandwidth was not used.

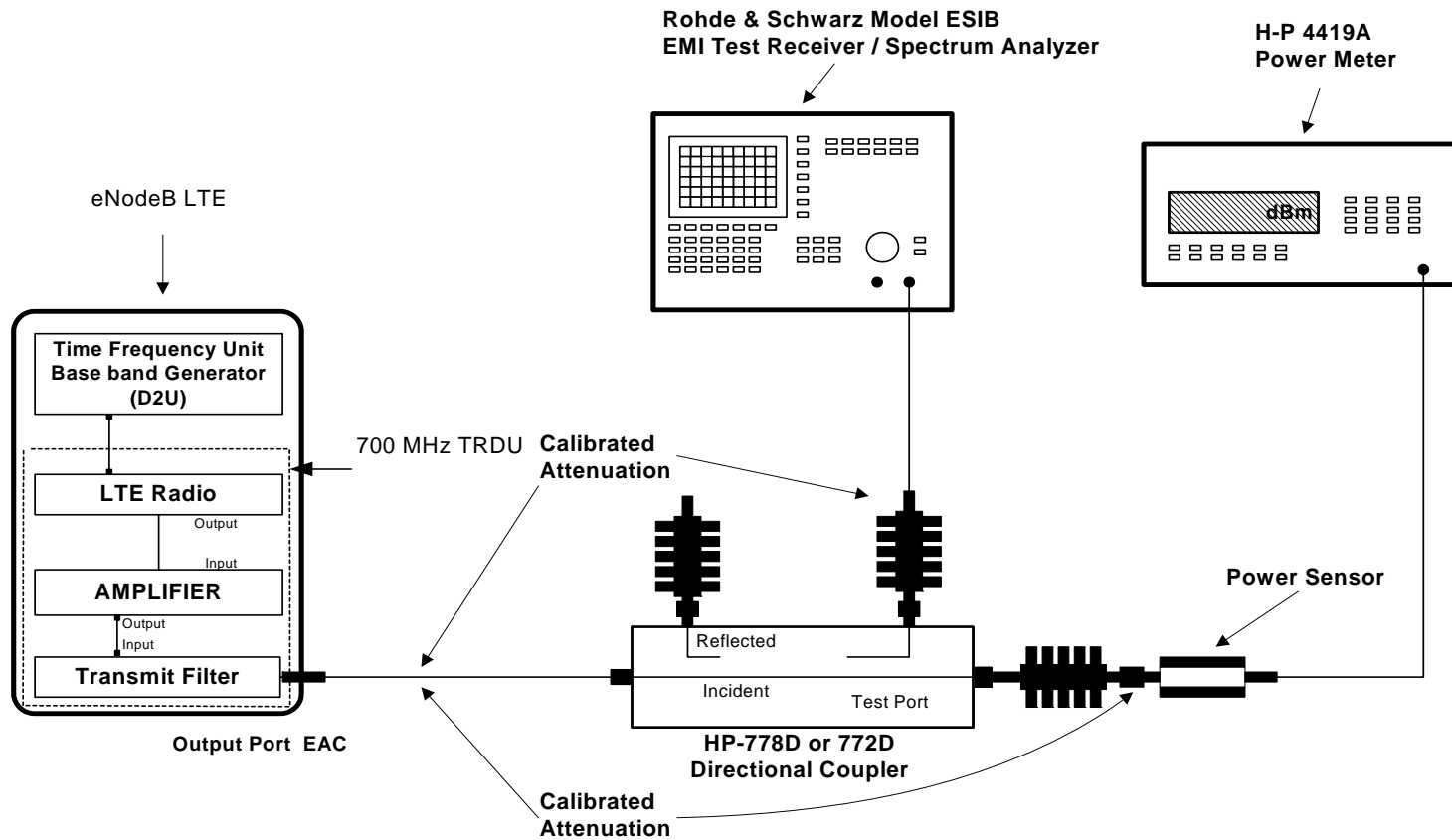
The list of band, channels, RF filters (EAC) and Amplifiers tested are listed below:

Band	Block	Frequency (MHz)	Mode	RF TRDU Manufacturer	Power (Watts)
	FCC Block C	746-756	eNodeB	M2	40

Measurement uncertainty:

Frequency: 100 Hz
Amplitude: 0.5 dB

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

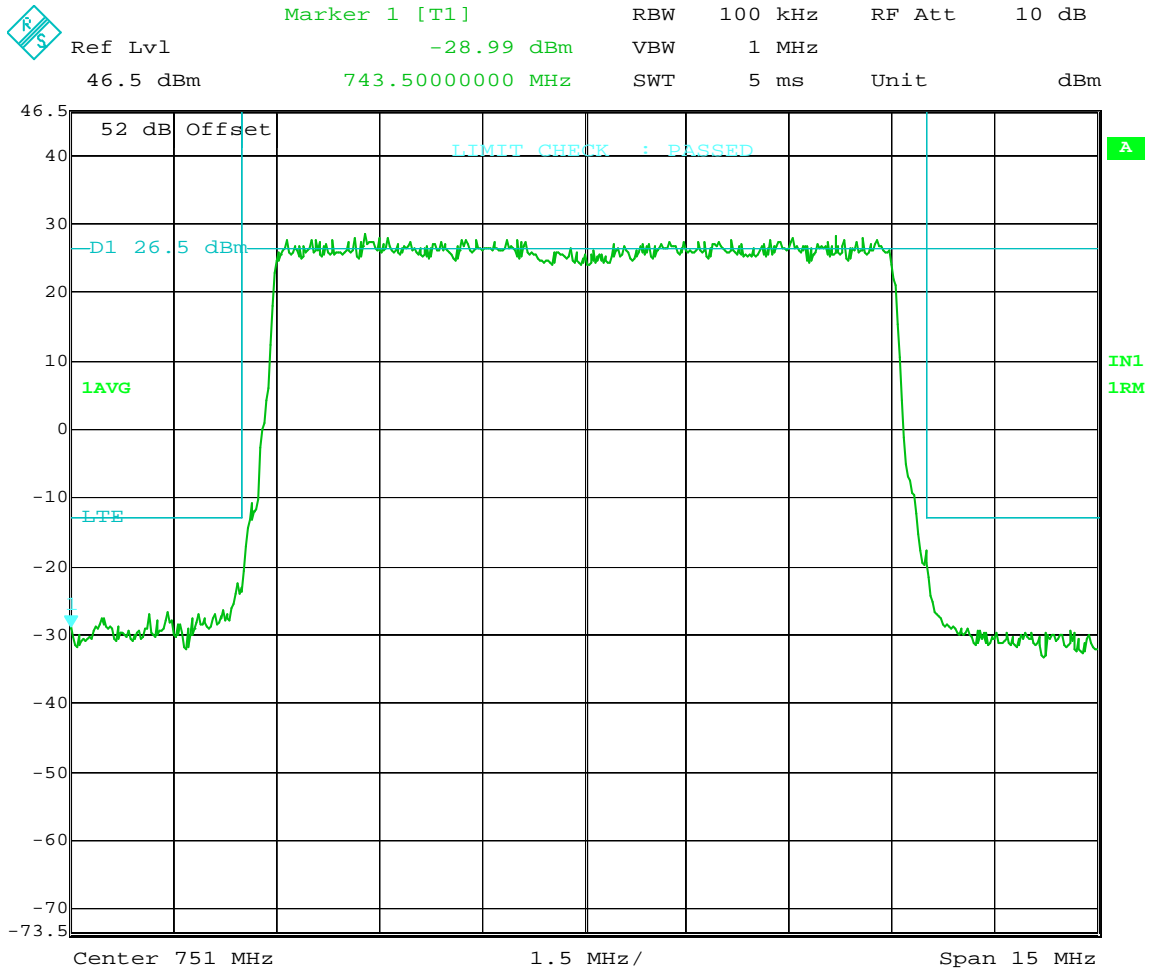


All components are calibrated over the frequency range of interest

Block: C

QPSK Modulation

SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH; Test Engineer: SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 05:50:57

Block: C

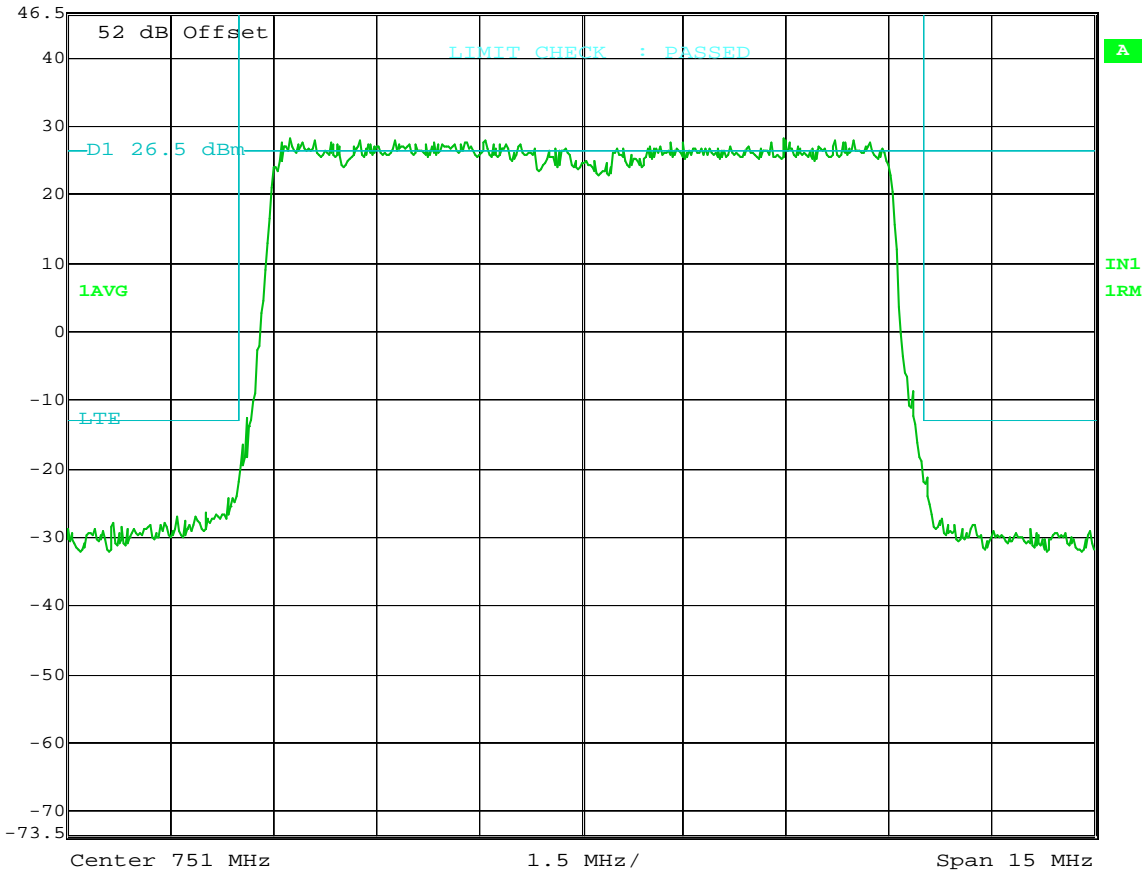
16 QAM Modulation

SPECTRUM MASK/OCCUPIED BANDWIDTH



Ref Lvl
46.5 dBm

RBW 100 kHz RF Att 10 dB
VBW 1 MHz
SWT 5 ms Unit dBm

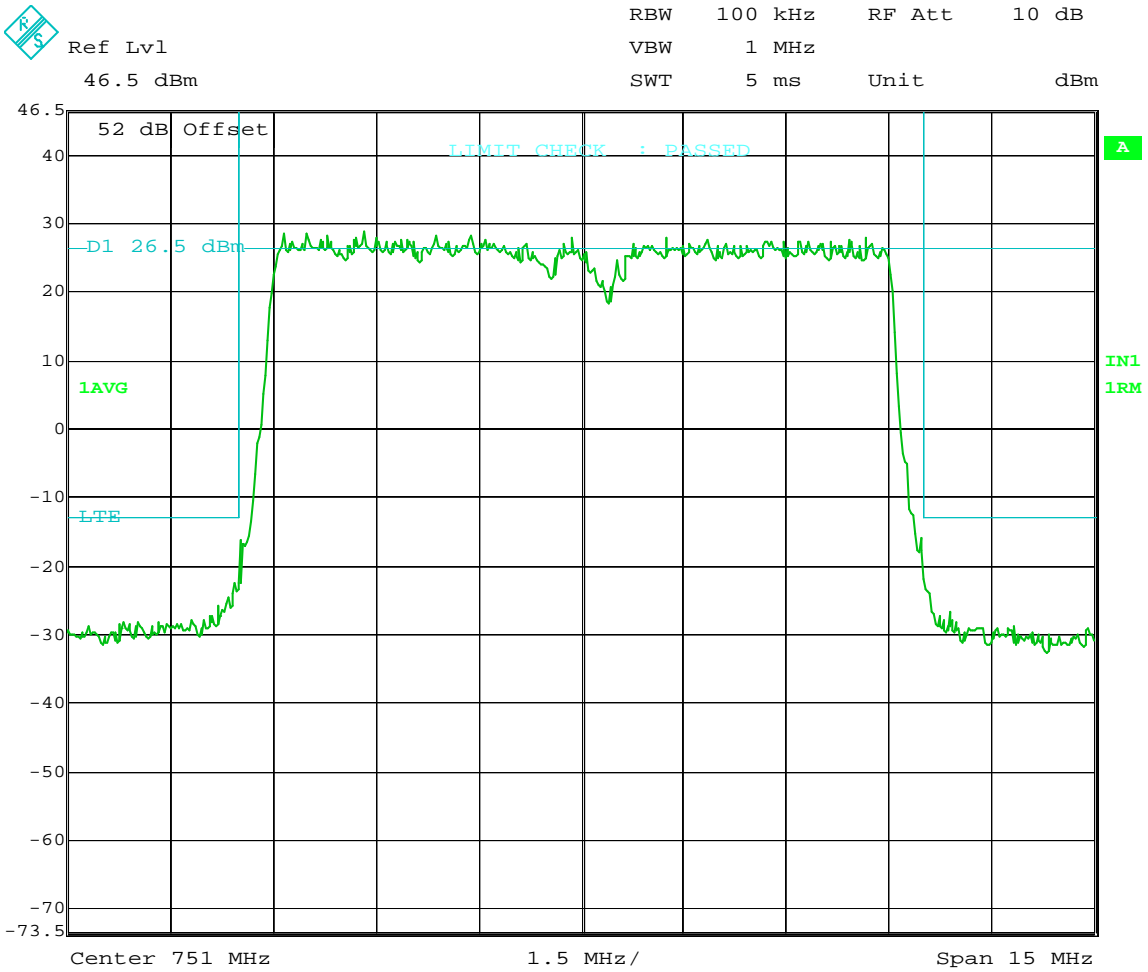


Title: OCCUPIED BANDWIDTH; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:00:24

Block: C

64 QAM Modulation

SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:51:39

Measurement 4

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

Measurement -4

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

Spurious Emissions at Transmit Antenna Terminals

Spurious Emissions at the transmit-antenna terminals were investigated over the frequency range of 9 kHz to the 12.5 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(c). All measurements were made for 40W per carrier, at external antenna connector (EAC) terminals. The measured spurious emission levels were plotted for the frequency range 9 kHz to 12.5 GHz. The measurements were made using following receiver parameters:

Frequency Range	Resolution Bandwidth	Detector Function
9 kHz to 150 kHz	1 kHz	Peak
150 kHz to 30 MHz	10 kHz	Peak
30 MHz to 1 GHz	100 kHz	Peak
1 GHz to 12.5 GHz	1 MHz	Peak

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

Band	Block	Frequency (MHz)	Mode	RF TRDU Manufacturer	Power (Watts)
	C	746-756	eNodeB	M2	40

FCC Section 27.53(c)(1) and (5): 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.

47 e-CFR March 10, 2011: FCC Section 27.53(c)(3): Based on measurement instrument employing resolution bandwidth of 6.25 kHz bands or greater on all frequencies 763 to 775 MHz and 793 to 805 MHz shall be attenuated at least 76 + 10log (P) dB or -46 dBm/6.25 kHz or -44dBm/10kHz.

The tests were performed in following modulation configurations:

- A. QPSK
- B. 16 QAM
- C. 64 QAM

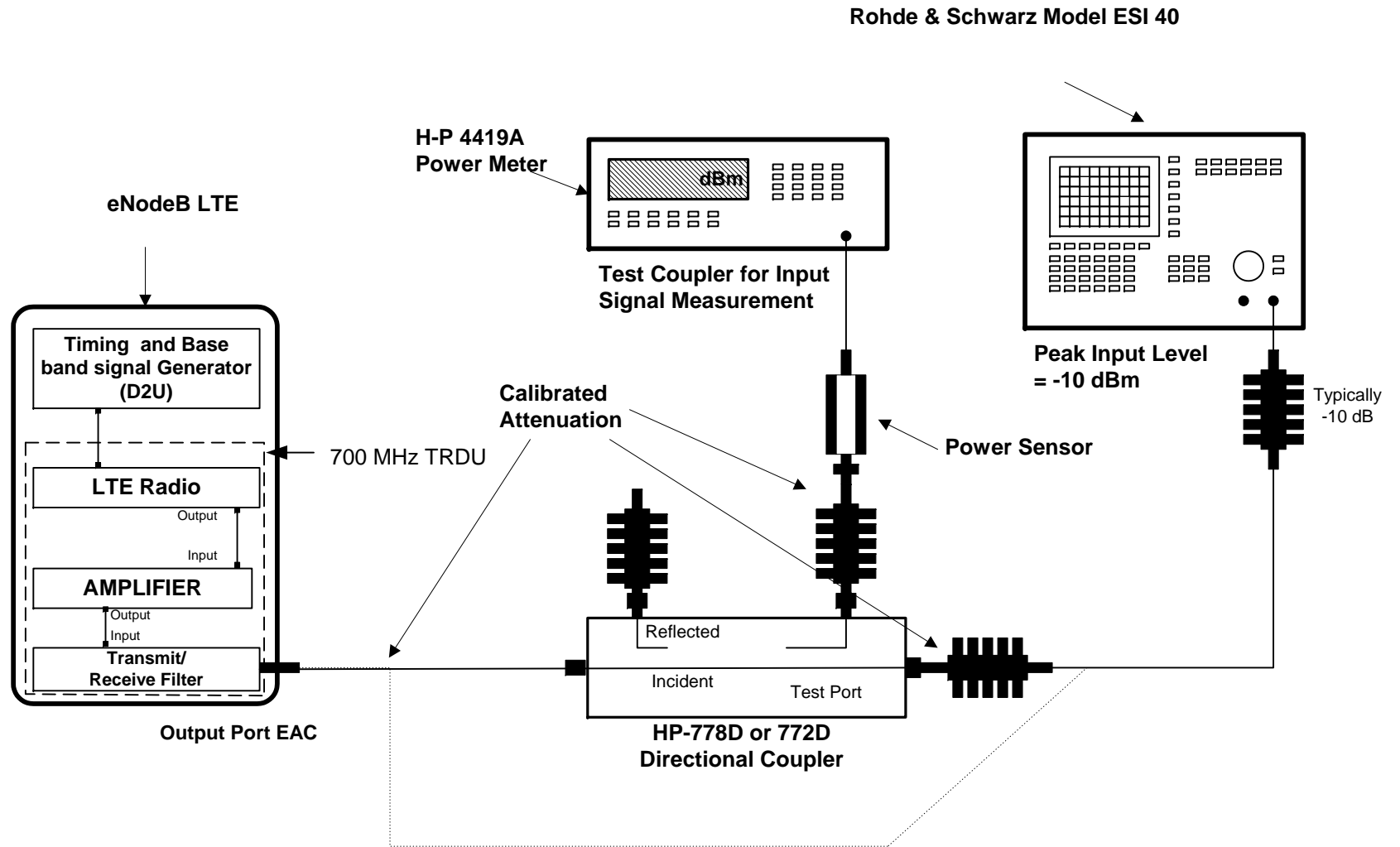
RESULTS:

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

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



APPLICANT: **Alcatel-Lucent**

FCC ID: **AS5BBTRX-01**

**Transmit Port
Antenna Conducted Spurious Emissions**

Block: C

QPSK



Marker 1 [T1]

RBW 1 kHz RF Att 20 dB

Ref Lvl -44.55 dBm

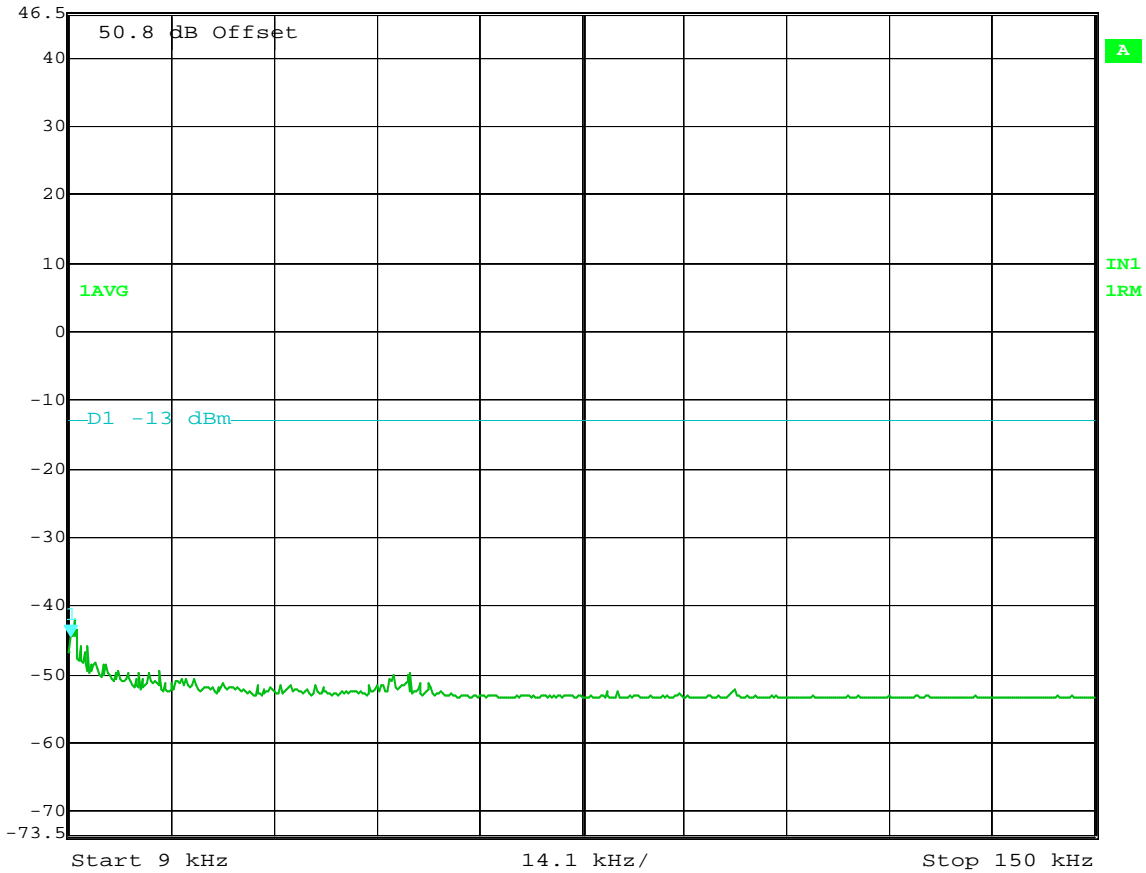
VBW 3 kHz

46.5 dBm

9.28256513 kHz

SWT 360 ms

Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 07:17:11



Marker 1 [T1]

RBW 10 kHz RF Att 20 dB

Ref Lvl -44.68 dBm

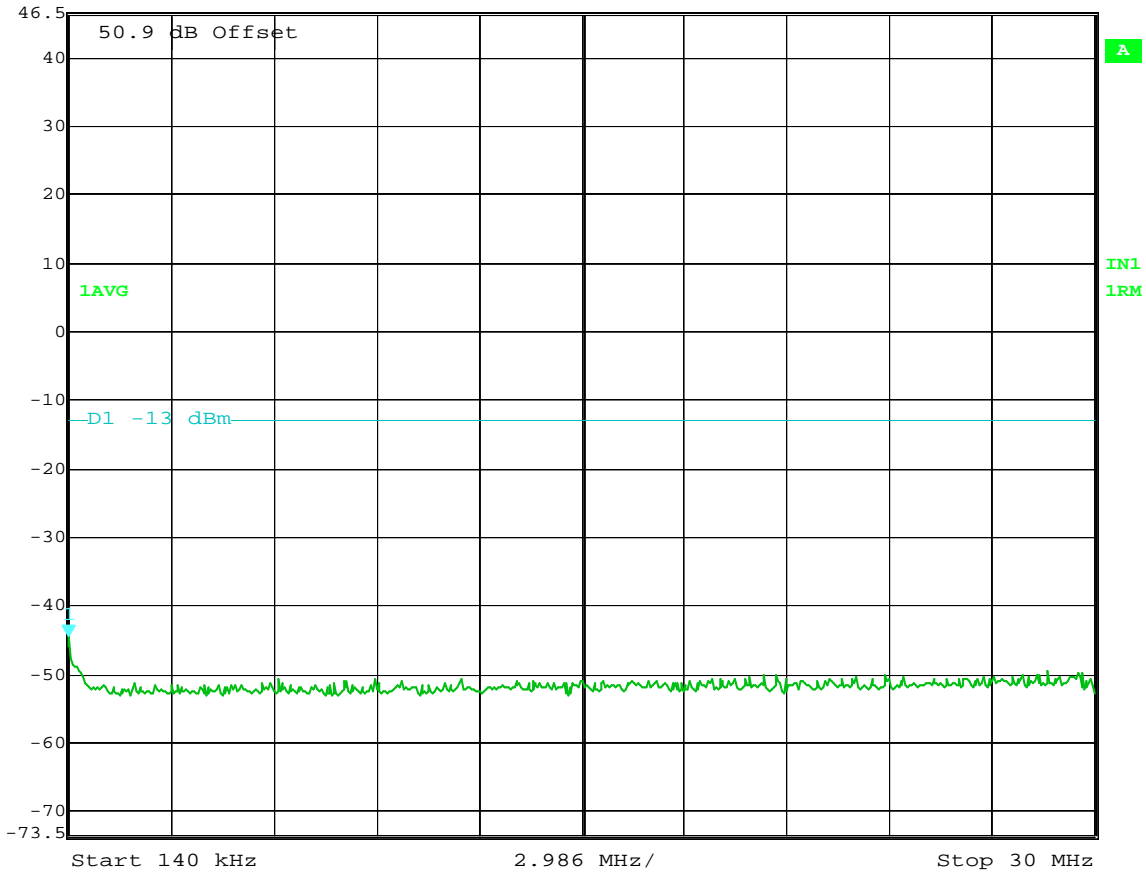
VBW 30 kHz

46.5 dBm

140.0000000 kHz

SWT 760 ms

Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 07:19:35



Marker 1 [T1]

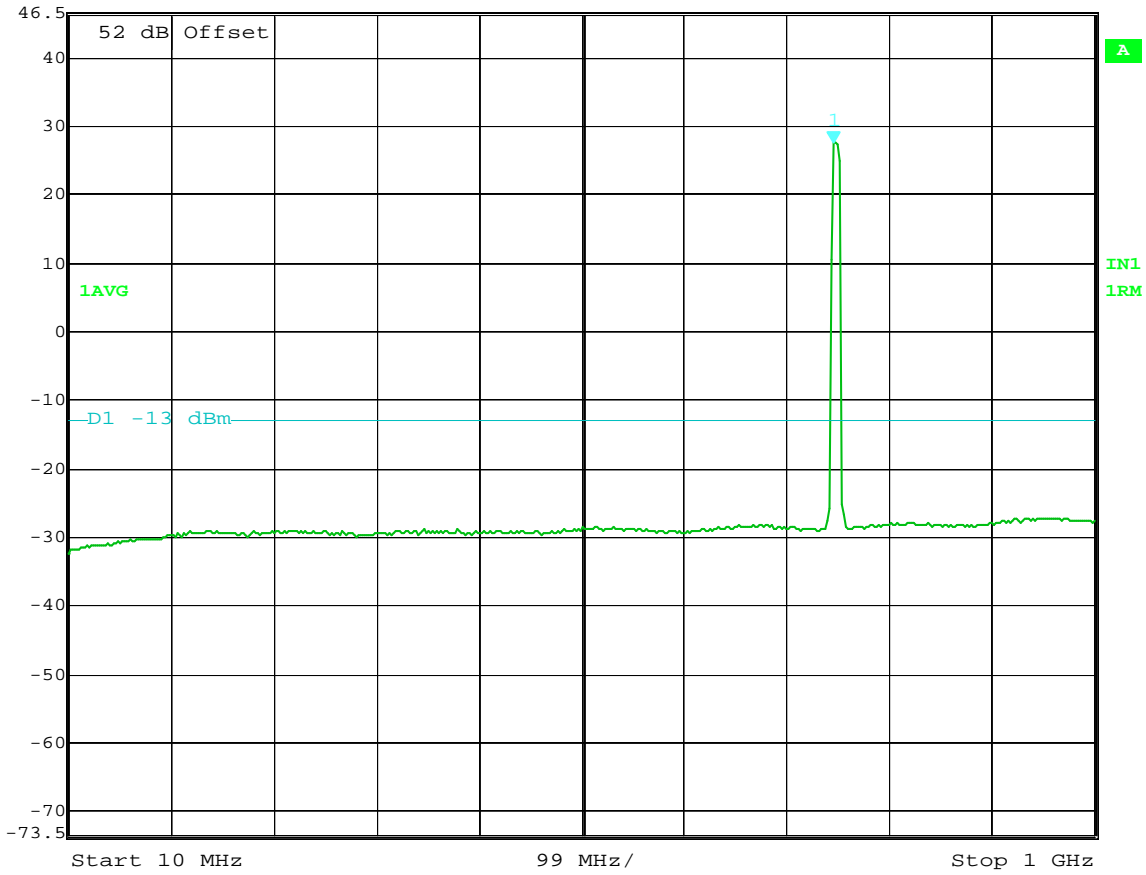
RBW 100 kHz RF Att 20 dB

Ref Lvl 27.43 dBm

VBW 300 kHz

46.5 dBm 748.03607214 MHz

SWT 250 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 07:30:35



Marker 1 [T1]

RBW 1 MHz RF Att 10 dB

Ref Lvl -17.98 dBm

VBW 3 MHz

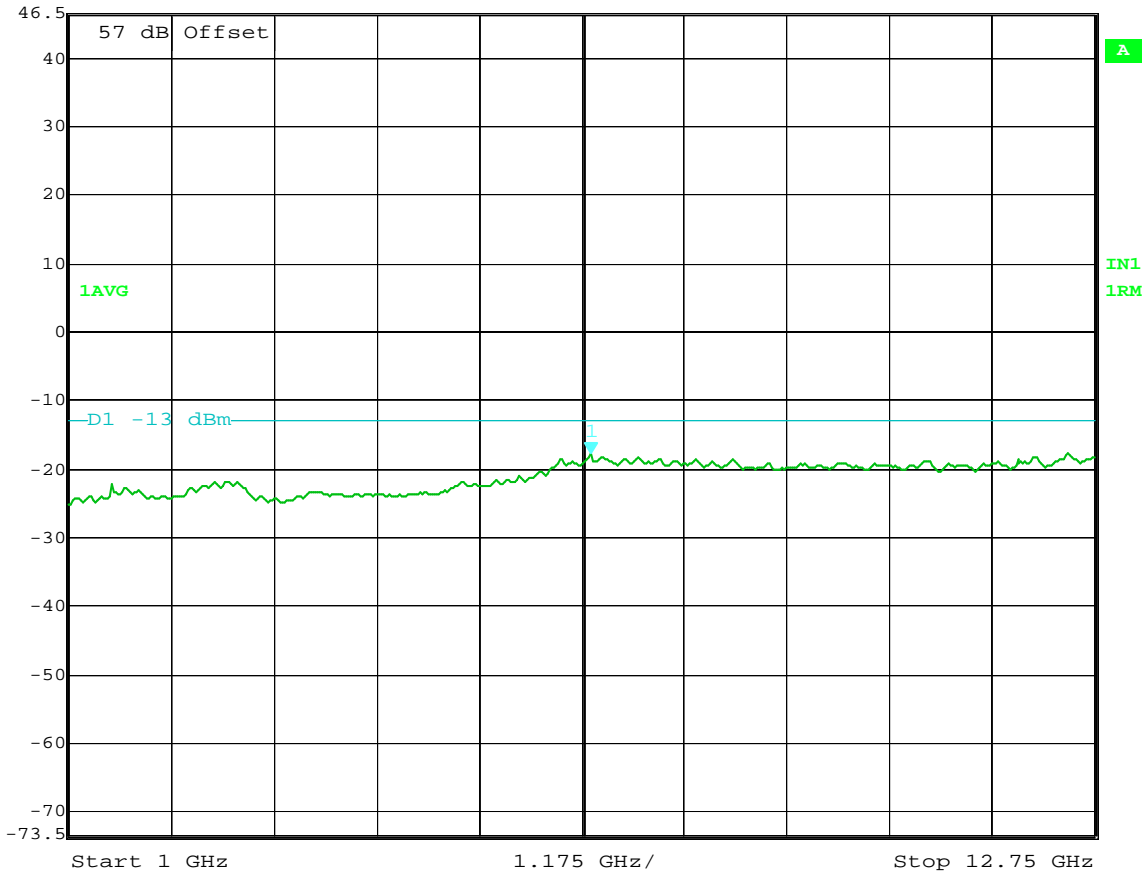
46.5 dBm

6.98096192 GHz

SWT 120 ms

Unit

dBm

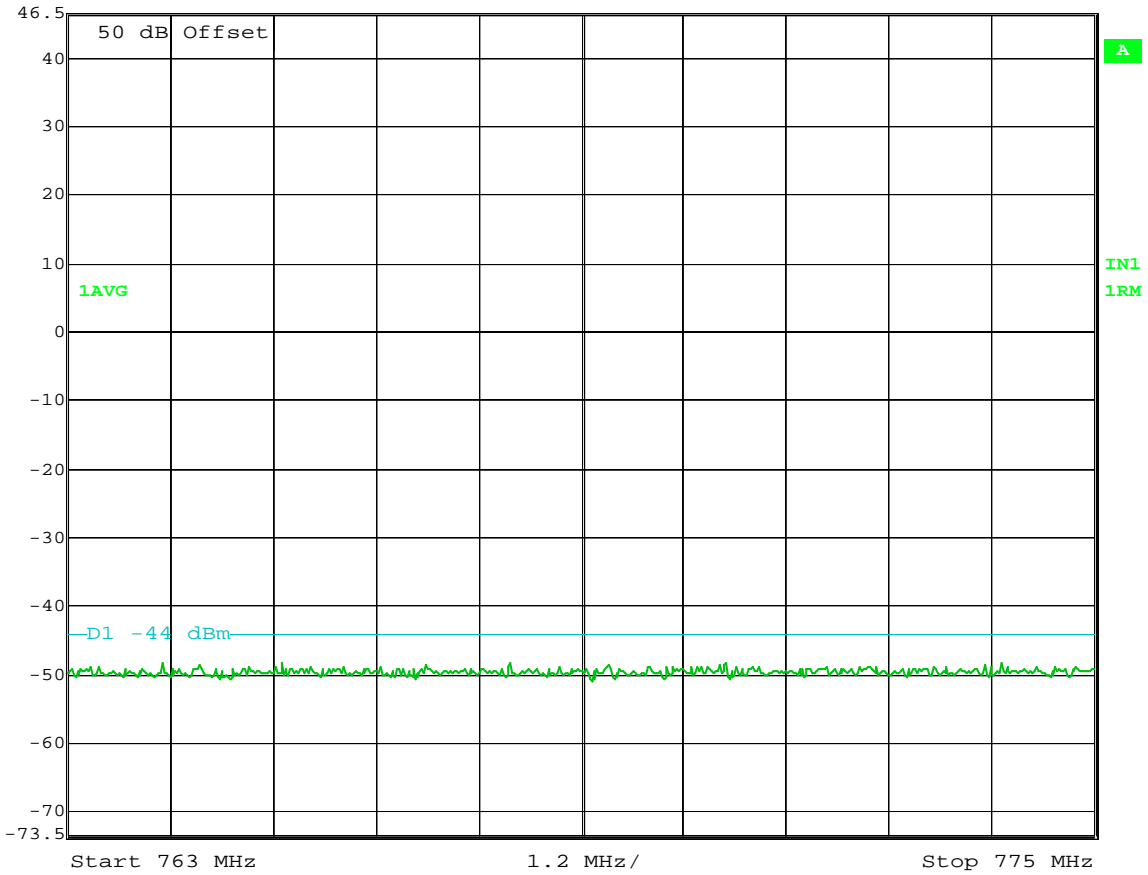


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 07:33:46



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm

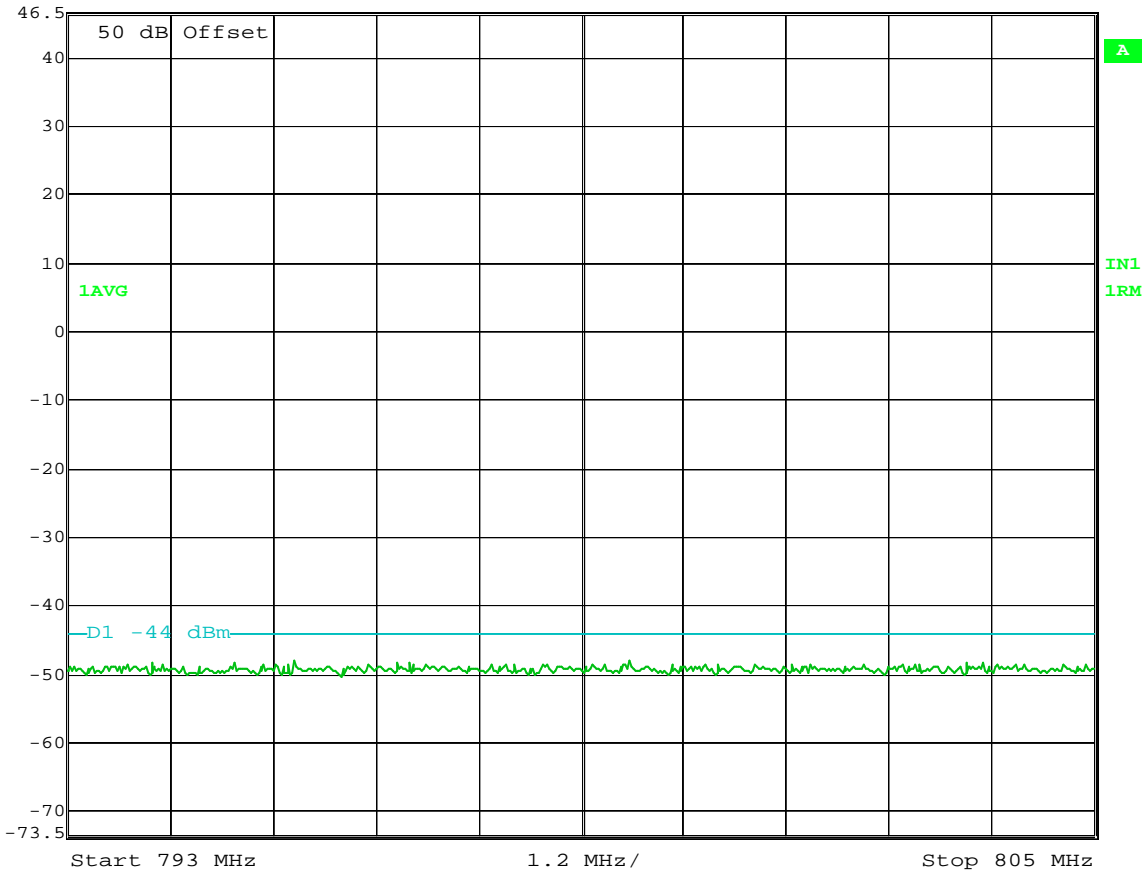


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 07:42:16



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm

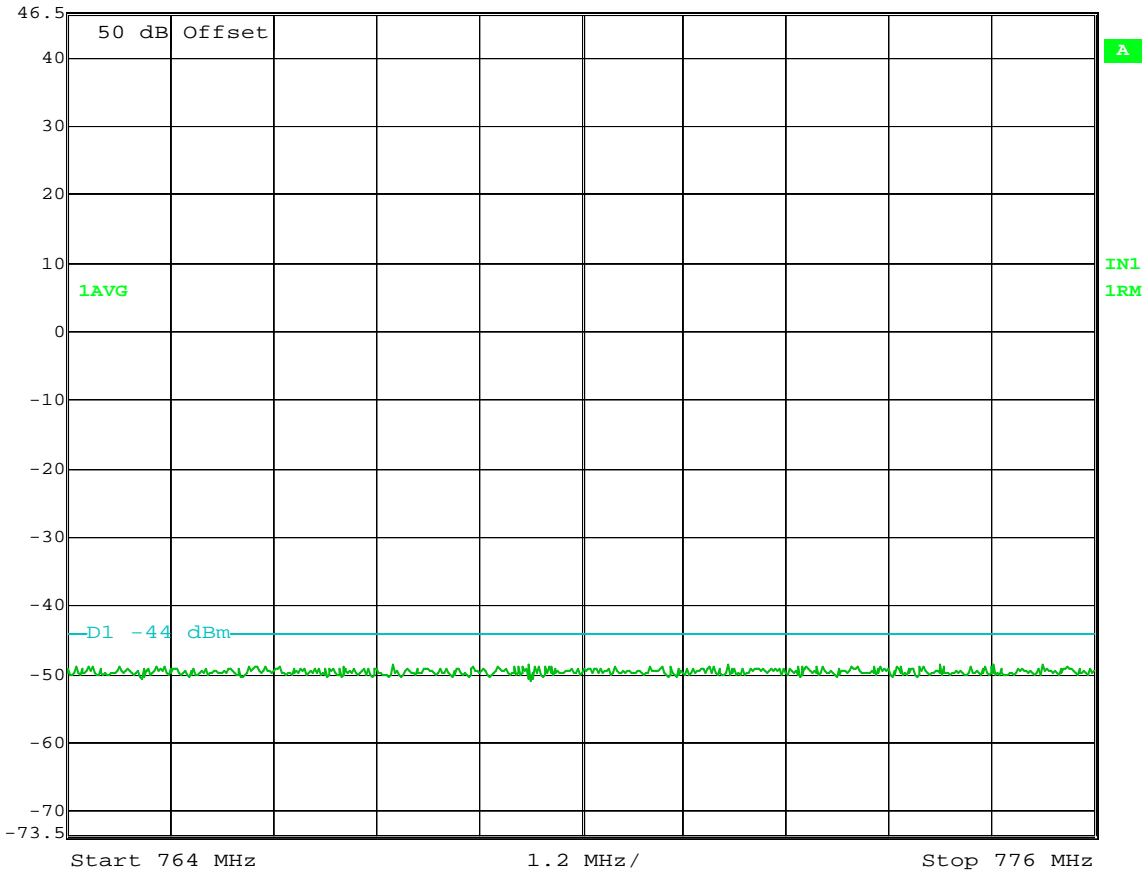


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 07:58:18



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; QPSK Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:00:15

**Transmit Port
Antenna Conducted Spurious Emissions**

Block: C

16 QAM



Marker 1 [T1]

RBW 1 kHz RF Att 20 dB

Ref Lvl -44.38 dBm

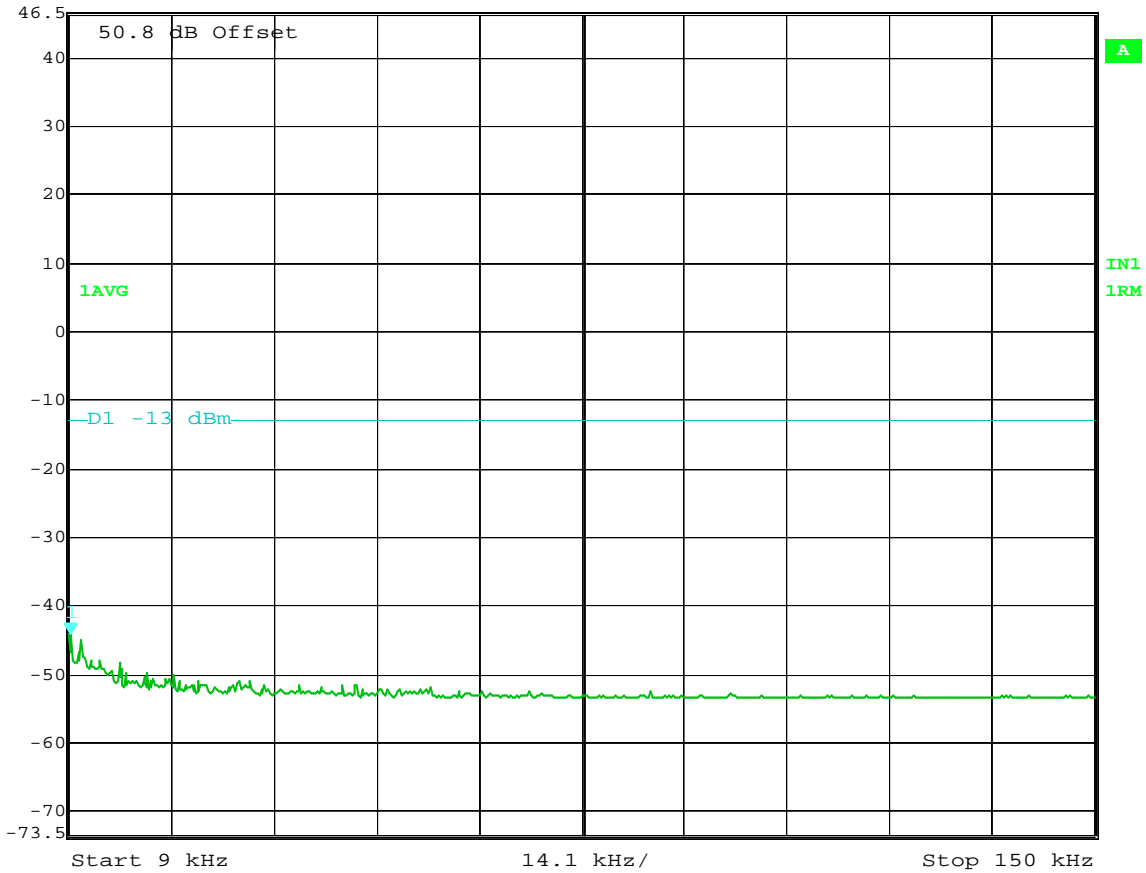
VBW 3 kHz

46.5 dBm

9.28256513 kHz

SWT 360 ms

Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:10:42



Marker 1 [T1]

RBW 10 kHz RF Att 20 dB

Ref Lvl -44.49 dBm

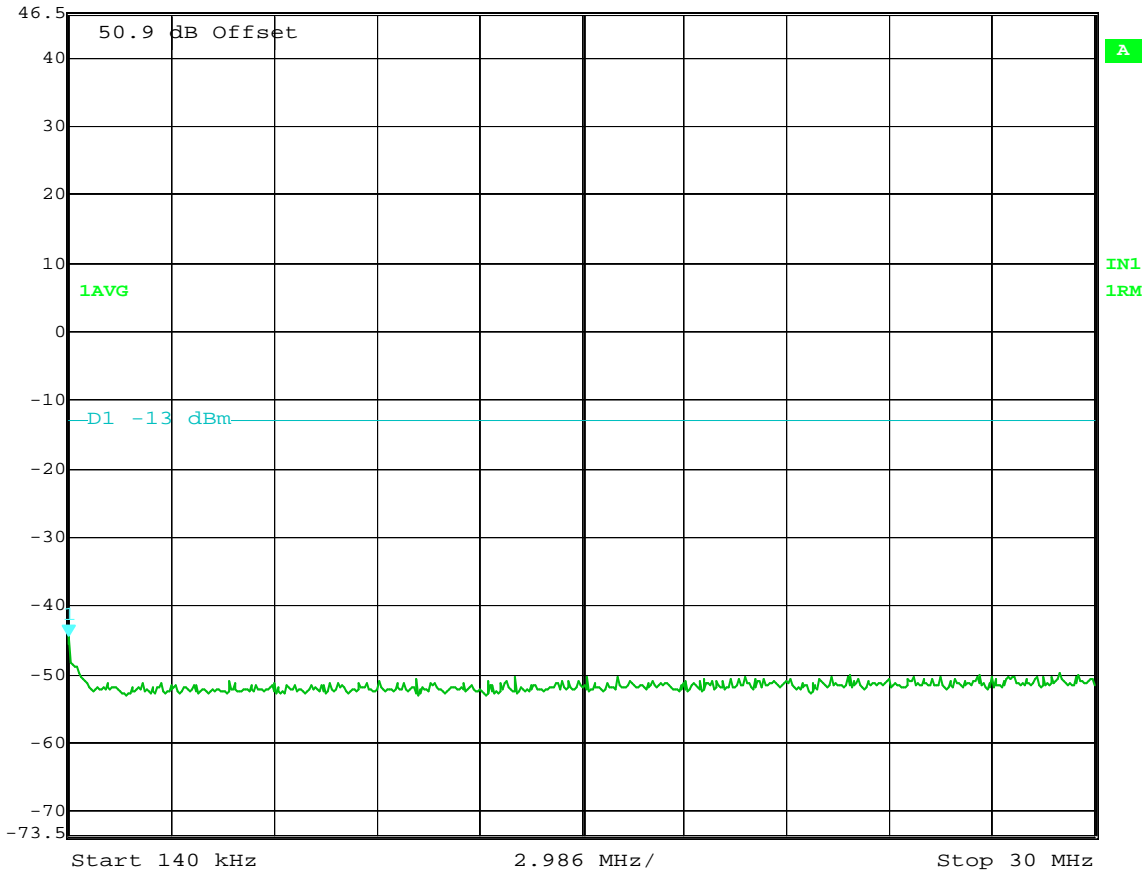
VBW 30 kHz

46.5 dBm

140.00000000 kHz

SWT 760 ms

Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:14:05



Marker 1 [T1]

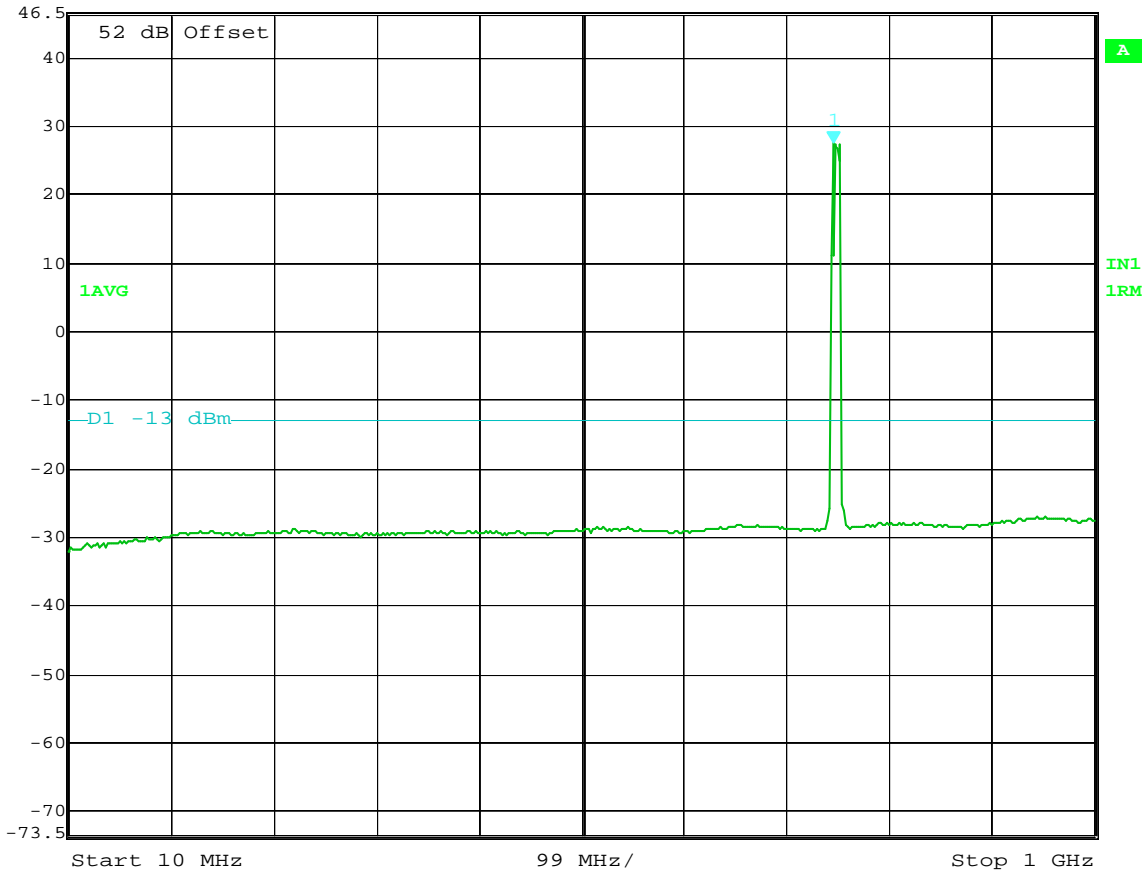
RBW 100 kHz RF Att 20 dB

Ref Lvl 27.52 dBm

VBW 300 kHz

46.5 dBm 748.03607214 MHz

SWT 250 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:19:56



Marker 1 [T1]

RBW 1 MHz RF Att 10 dB

Ref Lvl -17.96 dBm

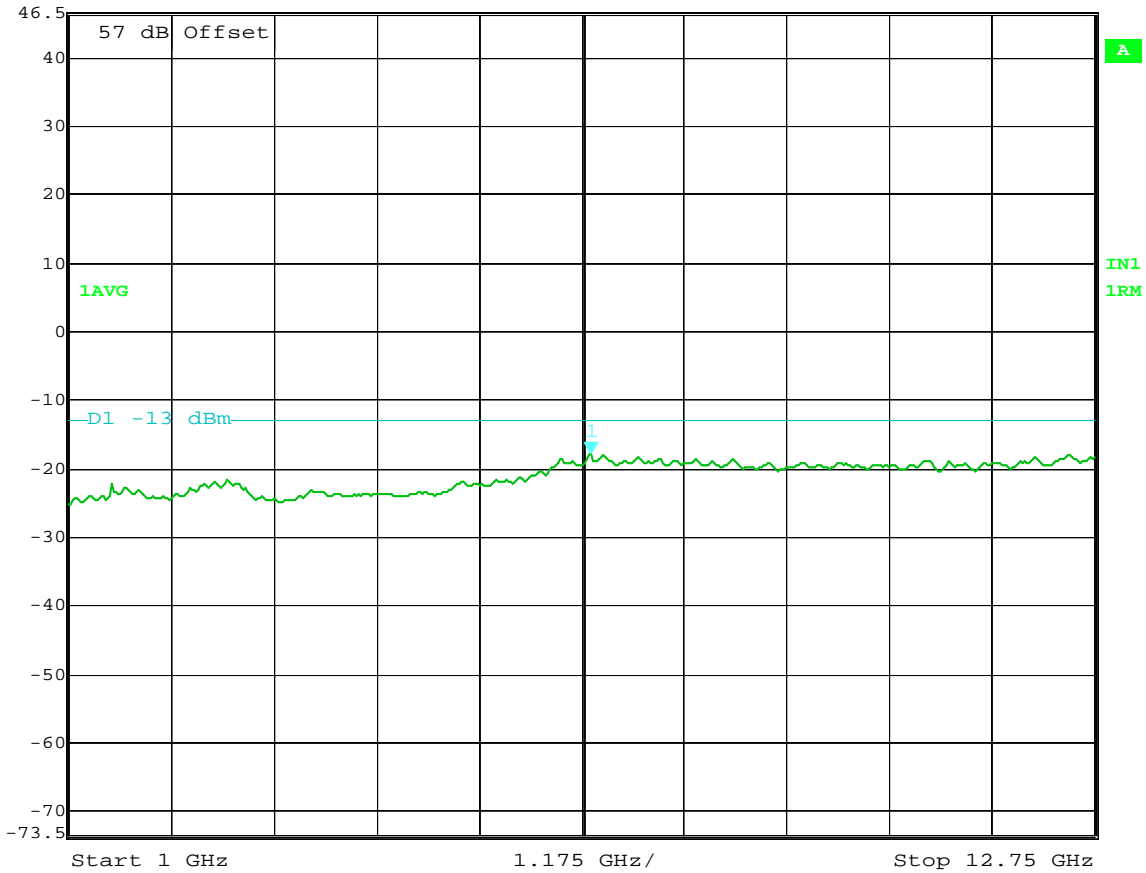
VBW 3 MHz

46.5 dBm

6.98096192 GHz

SWT 120 ms

Unit dBm

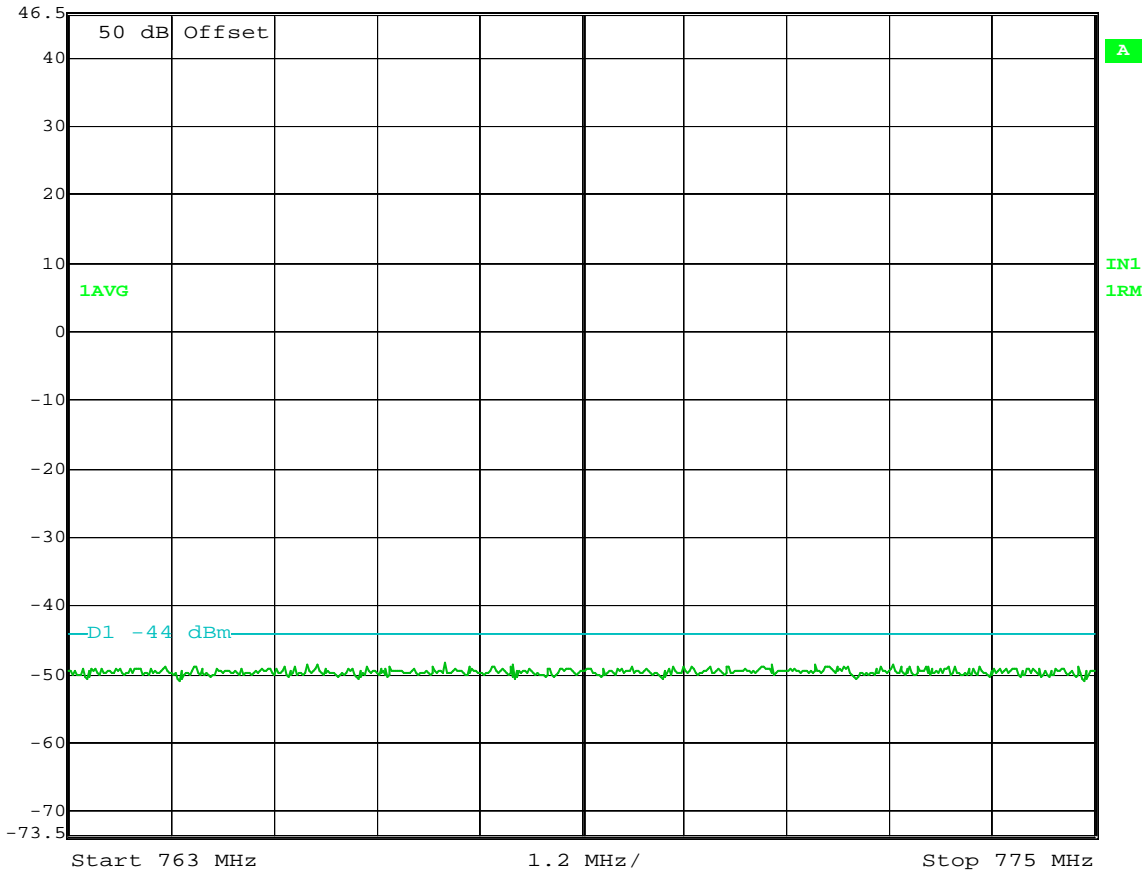


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:24:05



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm

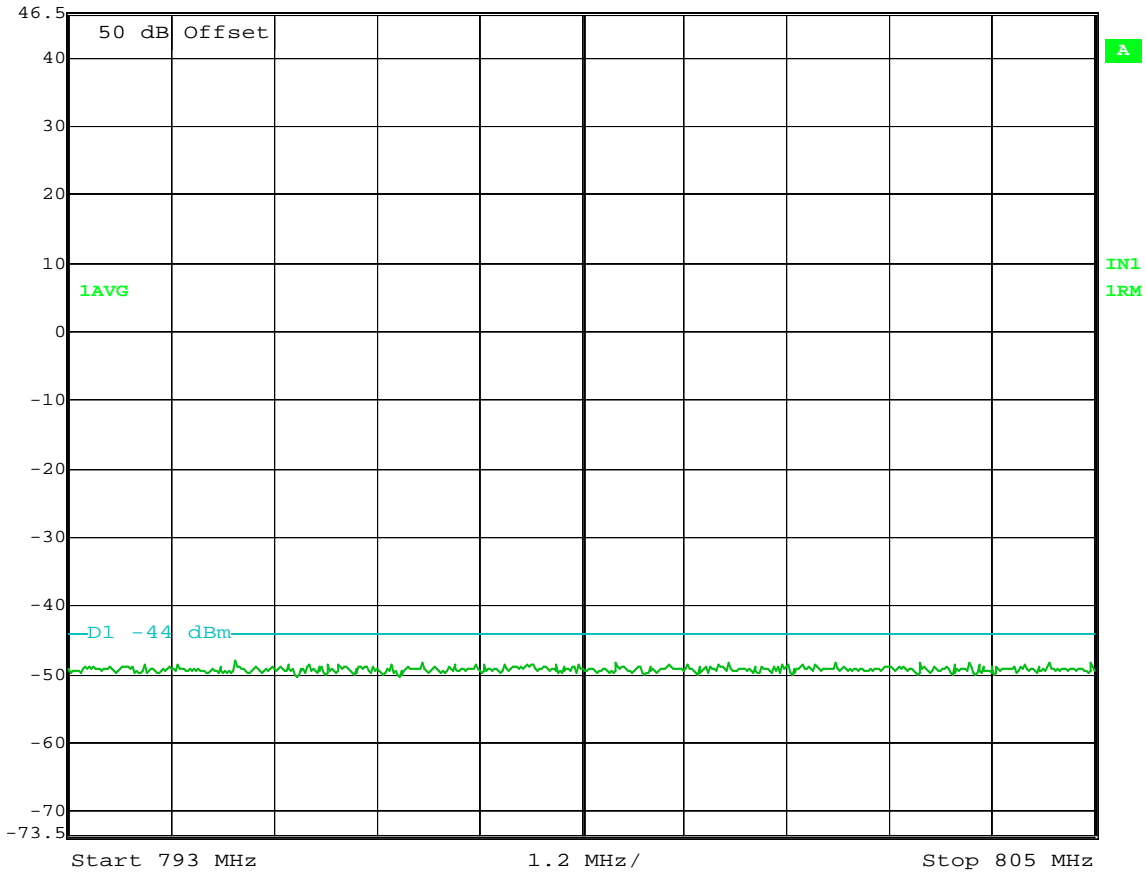


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:28:24



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm

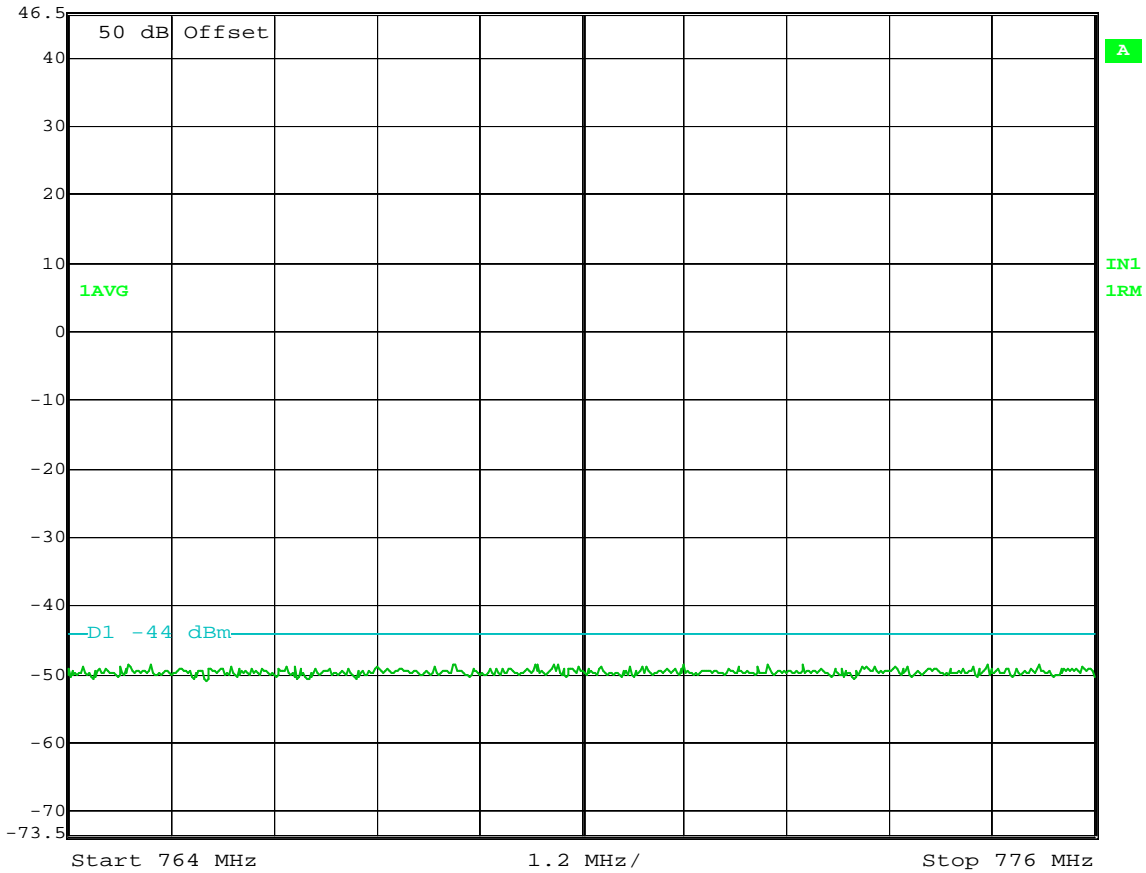


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:43:52



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 16QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 11:45:19

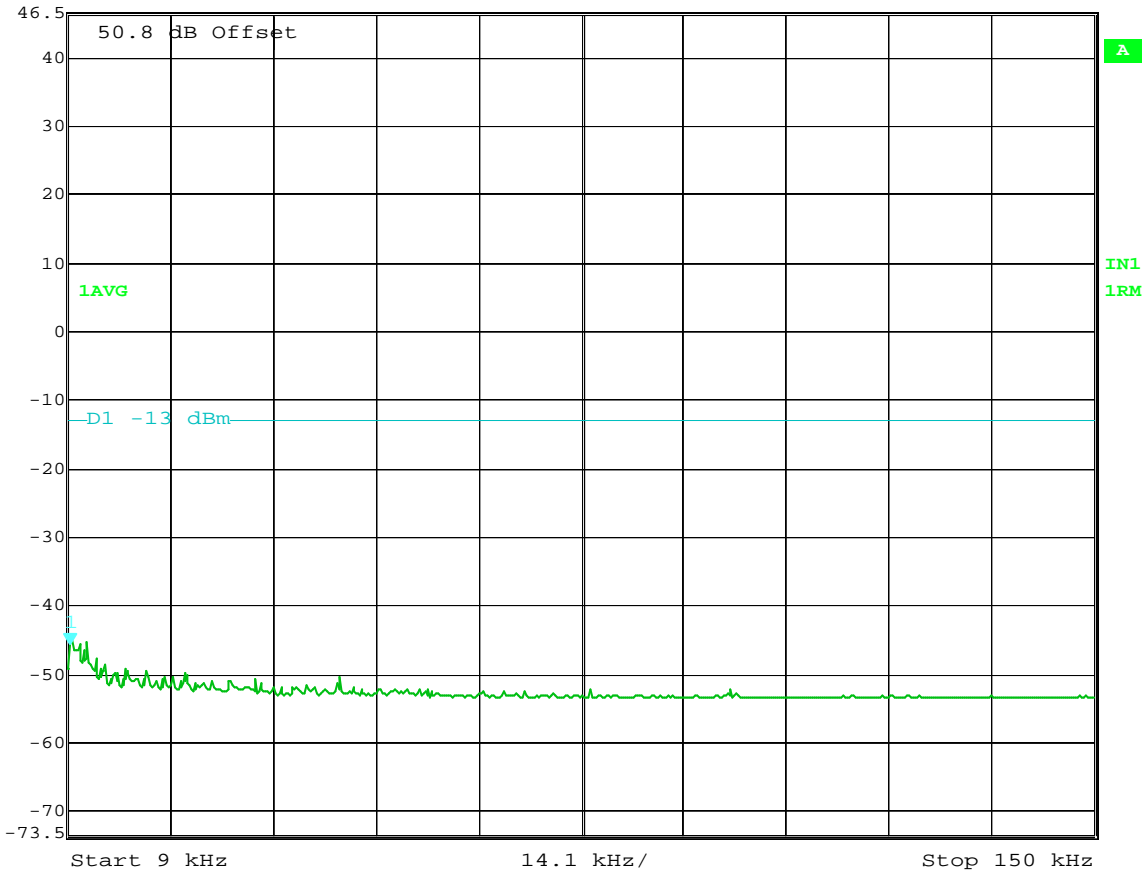
**Transmit Port
Antenna Conducted Spurious Emissions**

Block: C

64 QAM



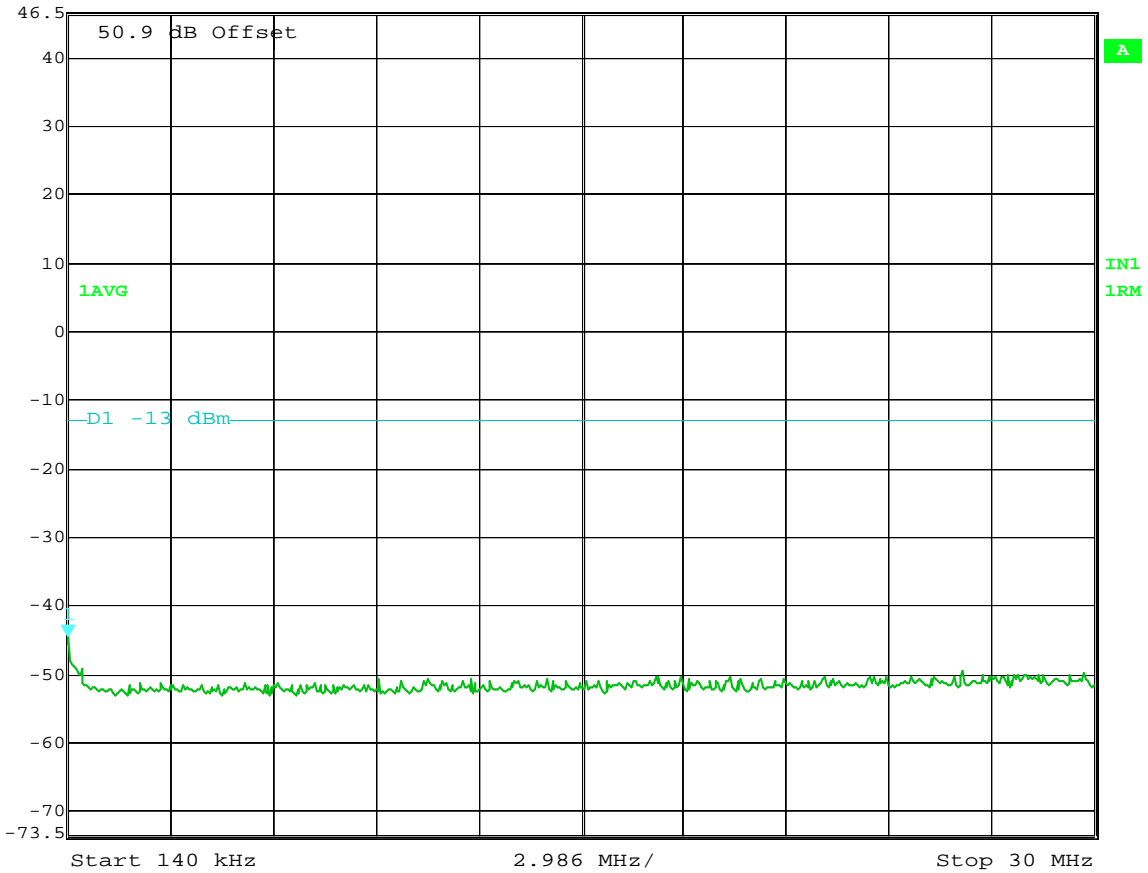
Marker 1 [T1] RBW 1 kHz RF Att 20 dB
Ref Lvl -45.77 dBm VBW 3 kHz
46.5 dBm 9.28256513 kHz SWT 360 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:37:18



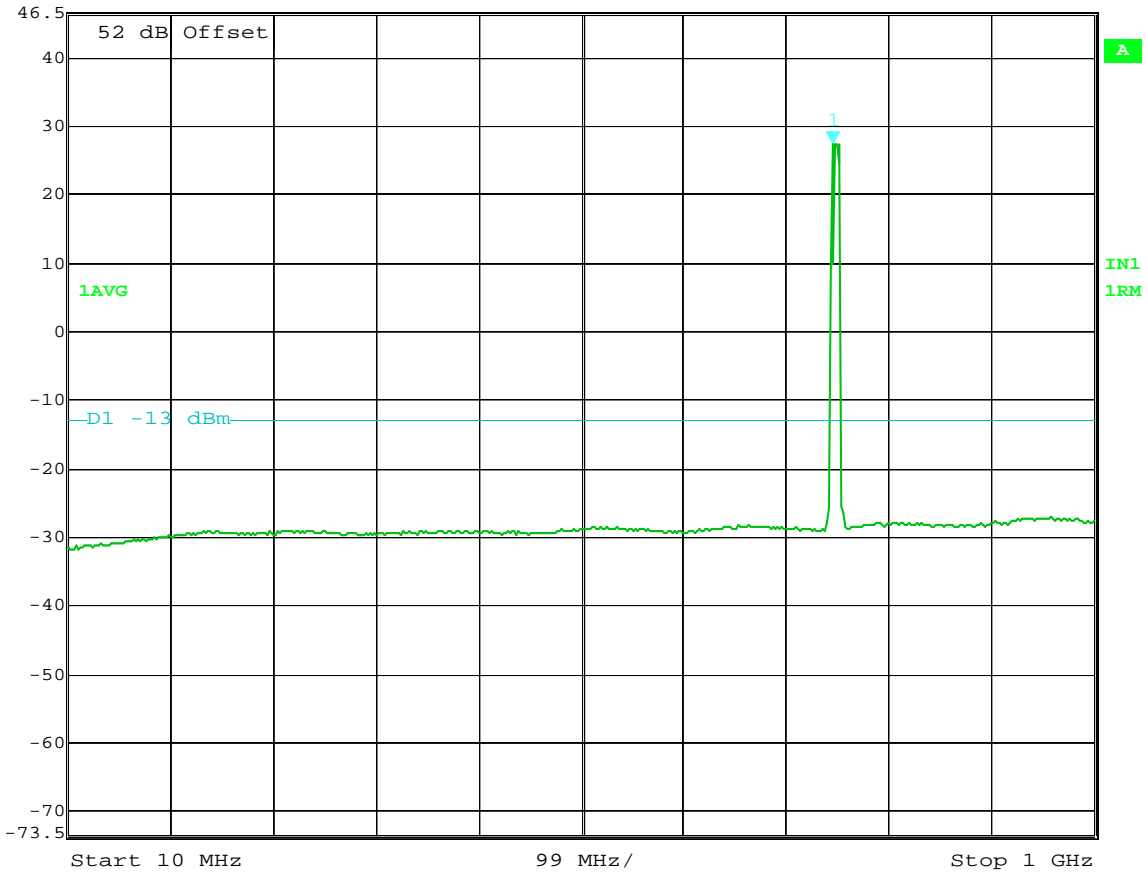
Marker 1 [T1] RBW 10 kHz RF Att 20 dB
Ref Lvl -44.68 dBm VBW 30 kHz
46.5 dBm 140.0000000 kHz SWT 760 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:34:09



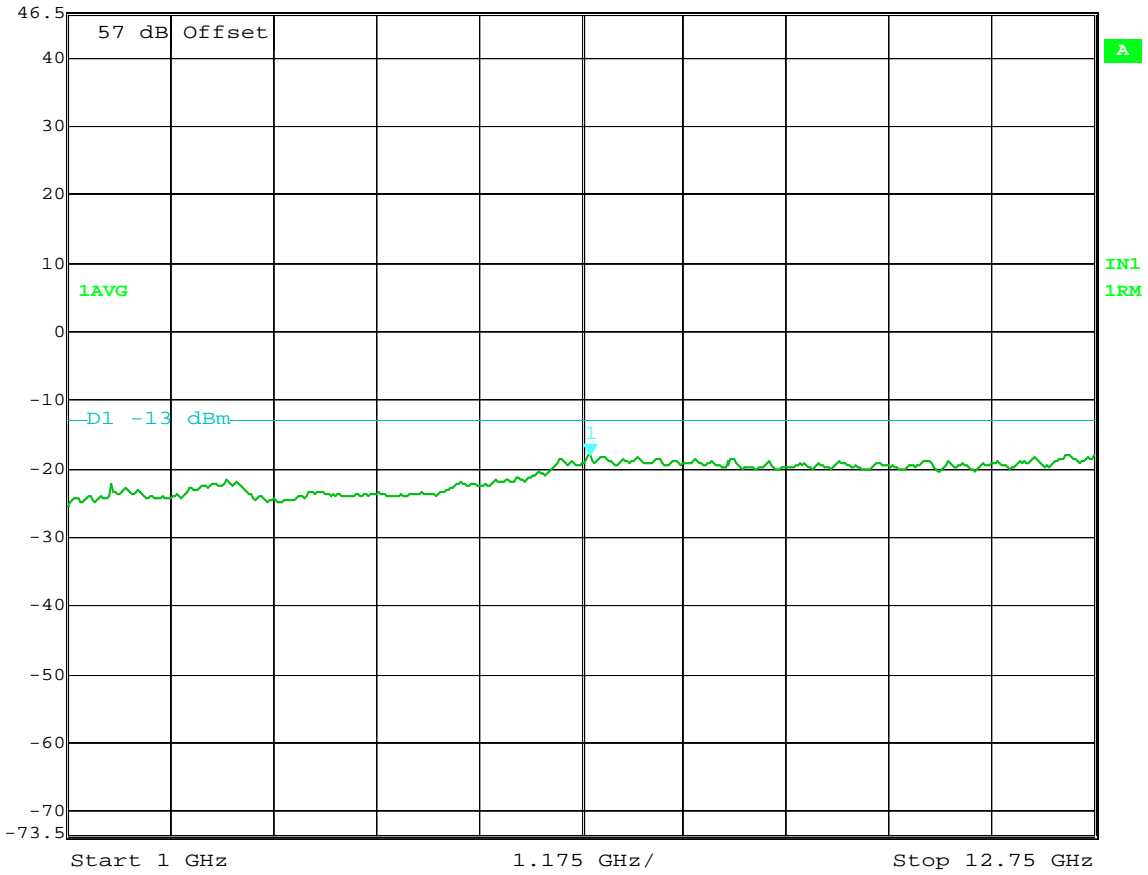
Marker 1 [T1] RBW 100 kHz RF Att 20 dB
Ref Lvl 27.44 dBm VBW 300 kHz
46.5 dBm 748.03607214 MHz SWT 250 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:31:39



Marker 1 [T1] RBW 1 MHz RF Att 10 dB
Ref Lvl -18.03 dBm VBW 3 MHz
46.5 dBm 6.98096192 GHz SWT 120 ms Unit dBm

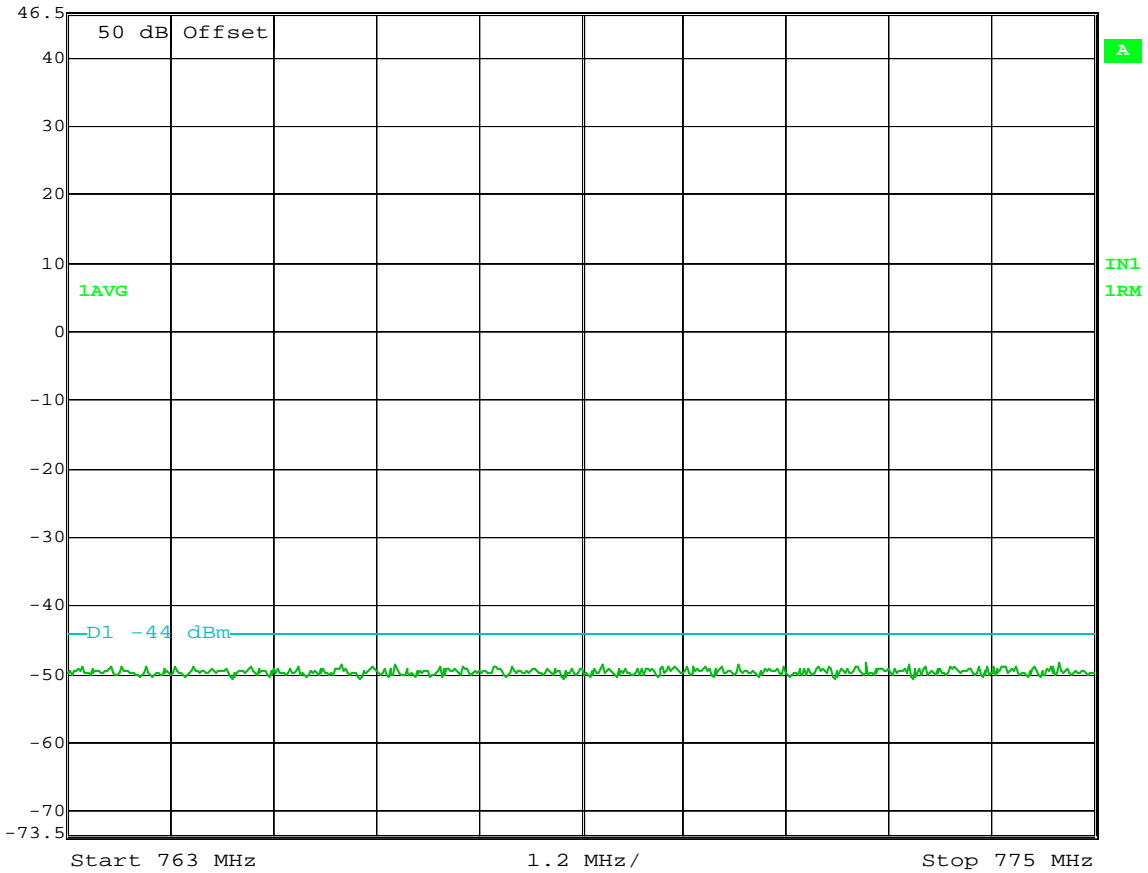


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:25:24



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm

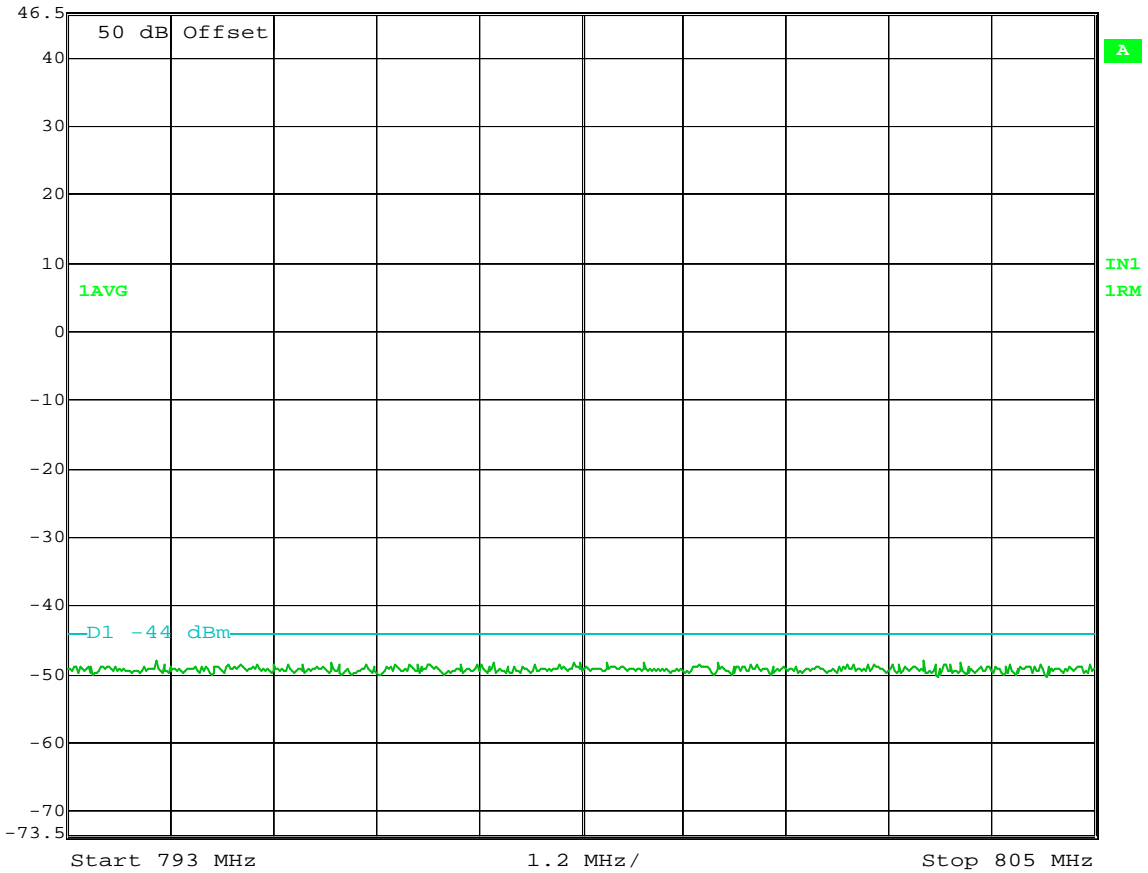


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:22:06



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm

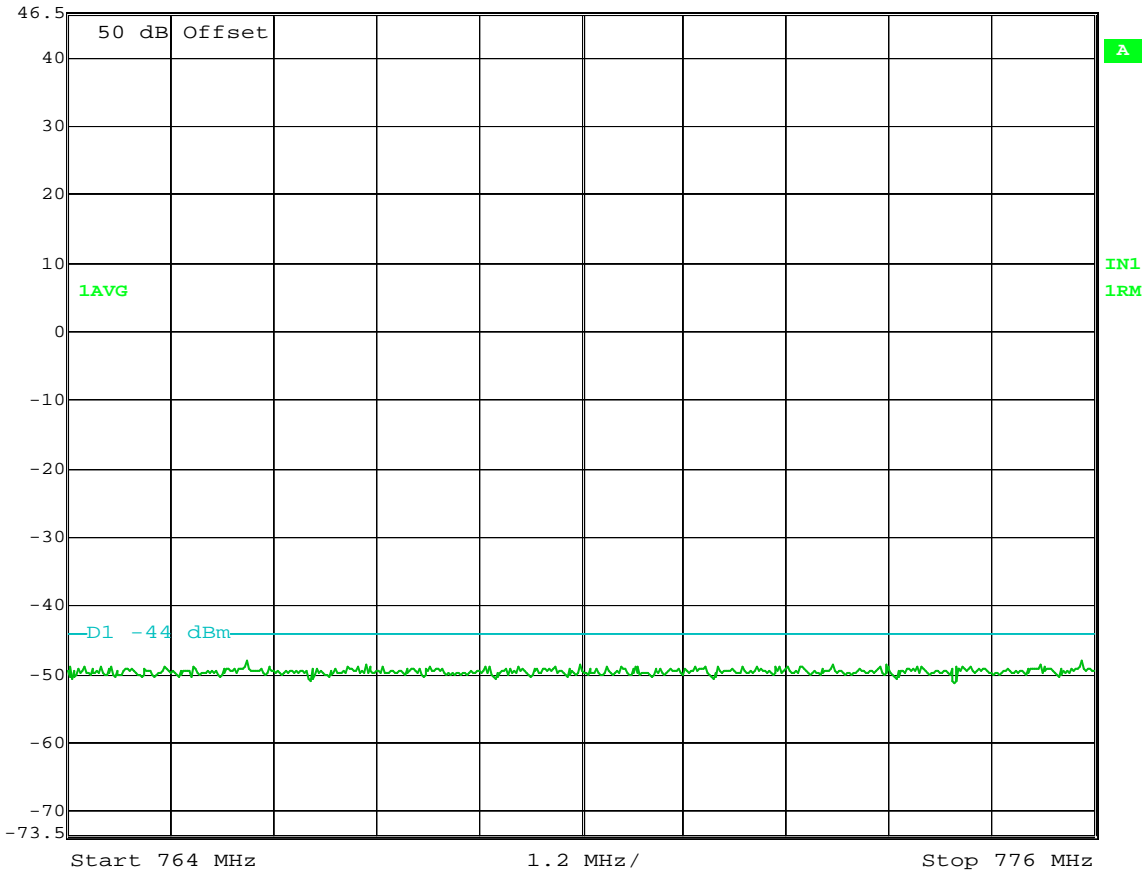


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:20:18



Ref Lvl
46.5 dBm

RBW 10 kHz RF Att 20 dB
VBW 30 kHz
SWT 300 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer:SEG/KJH
Comment A: LTE; FCC Part 27.5(3) Block C; 64QAM Modulation; TRDU-M2
PWR: 40W (2X40W MIMO); FCCID: AS5BBTRX-01; Class II Change
Date: 11.FEB.2011 08:18:44

Measurement -5

FIELD STRENGTH OF SPURIOUS RADIATION
SECTION 2.1053 and 27.53

MEASUREMENT: 5

SECTION 2.1053

FIELD STRENGTH OF SPURIOUS RADIATION

Field strength measurements of radiated spurious emissions were made at 10 m semi anechoic room of Global Product Compliance Laboratories of Alcatel-Lucent, Murray Hill, NJ. A complete description and full measurement data for the site is on file with the Commission (FCC Registration File: 328881).

The “9412 eNodeB Compact” was tested with LTE TRDU 700 MHz (M2)s operating with a RF output of 40Wx2 in MIMO mode at EAC. The operation of “9412 eNodeB Compact” was simulated using Base Band Unit called D2U which is part of the cabinet circuit packs. The test cabinet was equipped with three LTE TRDU 700 MHz (M2)s and one D2U. The tests were performed on a “9412 eNodeB Compact” which is an indoor cabinet. The radiated emissions tests were performed with amplifiers operating with 10 MHz band width. The External Antenna Connector (EAC) of RF filters that were connected to amplifiers were terminated with 50 ohm loads. The spectrum from 10 MHz to the 12.75 GHz (more than 10th harmonic of the carrier) was searched for spurious radiation. Measurements were made according to ANSI C63.4. Special attention was taken for measurements in the frequency range 763 to 775 MHz and 793 to 805 MHz. In these bands no measurable radiated emissions were observed.

Measurements were made in following modulations.

1. Three LTE TRDU 700 MHz (M2)s operating QPSK mode
2. Three LTE TRDU 700 MHz (M2)s operating in 16 QAM mode
3. Three LTE TRDU 700 MHz (M2)s operating in 64 QAM mode
4. Each of the LTE TRDU 700 MHz (M2)s operating in QPSK, 16 QAM and 64 QAM modes respectively.

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:

$$\text{Measured level (dB}\mu\text{V)} + \text{Cable Loss(dB)} + \text{Antenna Factor(dB)} = \text{Field Strength (dB}\mu\text{V/m)}$$

Section 27.53 and 2.1053 contains the requirements for the levels of spurious radiation as a function of the level of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an ideal dipole excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, page 676, 4th edition, IT&T Corp.

$$E = [(49.2 * P)^{1/2}] / R$$

$$20 \log (E * 10^6) - (43 + 10 \log P) = 84.4 \text{ dB}\mu\text{V/meter}$$

E = Field Intensity in Volts/meter

P = Transmitted Power in Watts = 40 W

R = Distance in meters = 10 m

RESULTS:

For this particular test, the field strength of any spurious radiation is required to be less than 84.4 dBμV/meter. Reportable measurements are equal to or greater than 64.4 dBμV/meter. Over the spectrum investigated, 10 MHz to 10th of the carrier, no reportable spurious emissions were detected. This demonstrates that the “9412 eNodeB Compact with LTE TRDU 700 MHz (M2)s ” the subject of this application, complies with Sections 2.1053, 27.53 and 2.1057 of the Rules.

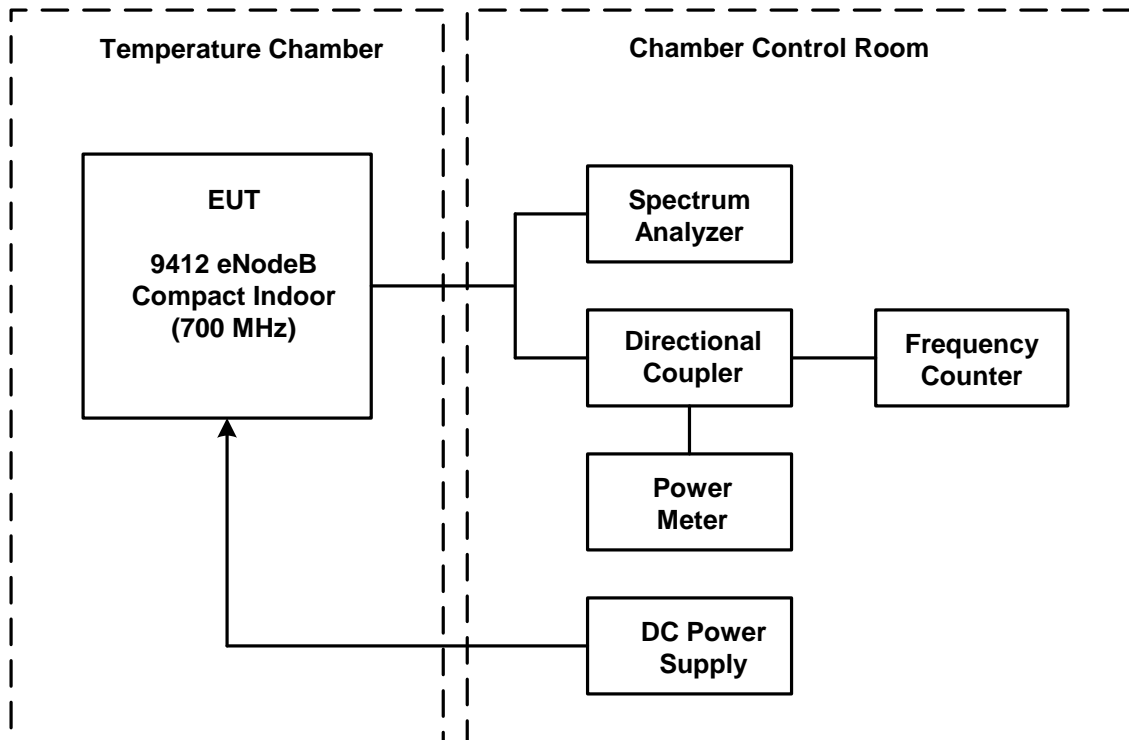
Measurement -6

MEASUREMENT OF FREQUENCY STABILITY

MEASUREMENT OF FREQUENCY STABILITY

The frequency stabilization and accuracy of the LTE signals modulated and amplified by the 700 MHz Transmit and Receive Duplexer Unit (LTE TRDU 700 MHz (M2)) is a function of the input signal which is derived from GPS signals. The system provide for automatic timing synchronization upon reacquisition of GPS lock.

The 9412 eNodeB Compact indoor cube was subjected to the FCC specified environments while operating at full rated power of 2x40W at External Antenna Connector (EAC) port. The carrier Frequency deviations were measured. The nominal Voltage input to this device is 24V DC. The 9412 eNodeB Compact indoor cube is designed to operate in the Voltage range of 20.4V to 27.6V and in the temperature range of -5C to 50C. However, the carrier frequency is designed to be within an accuracy of 750 mHz in the temperature range -30C to 50C. The frequency stability tests were for the voltage 20.4 to 28.8VDC range and for the temperature -30C to 50C range. The measurement setup is depicted in Block diagram A.



Frquency Stability Test Set-up Block Diagram
9412 eNodeB Compact Indoor (700 MHz)

Block Diagram A

TEST RESULTS:

Measurement Center Frequency : 751 MHz

Transmit Frequency Deviation at 24VDC Over Temperature Range

Temperature in C	TX Frequency Deviation in (Hz)
25	-0.13
30	-0.13
40	-0.12
50	-0.12
40	-0.12
30	-0.12
20	-0.13
10	-0.13
0	-0.13
-10	-0.13
-20	-0.13
-30	-0.13
-40	-0.12
-30	-0.12
-20	-0.12
-10	-0.13
0	-0.13
10	-0.13
20	-0.13
25	-0.13

Transmit Frequency Deviation at 25C Over Voltage Range

Voltage in DC	TX Frequency Deviation in (Hz)
24	-0.11
23	-0.11
22	-0.11
21	-0.12
20.4	-0.11
21	-0.11
22	-0.11
23	-0.12
24	-0.12
25	-0.11
26	-0.12
27	-0.12
27.6	-0.12
28	-0.11
28.8	-0.11

Conclusions

The 9412 eNodeB Compact indoor cube met the Frequency Stability requirement of “ 750 mHz” over the temperature range -30 to 50C and voltage range 20.4 to 28.8VDC.

Instrument Used for Measurement

Instrument Type	Serial Number	Vendor	Expiration Date
Frequency Counter	3418A00309	HP	March 23, 2011
MXA Signal Analyzer	MY49060086	Agilent Technology	April 4, 2012
Power Meter	GB37170388	HP	NOV 11, 2012

Measurement Uncertainty: **1%**

**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 function used meet or exceed the Specification contained in Section 2.1057, 27, and 3GPP 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