

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-13**, 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 Section 27.50(d)(5)	Modulation Characteristics Peak-to-Average ratio (PAR)
Measurement: 3	Section 2.1049	(a) Emissions Bandwidth (b) Occupied Bandwidth/Band Edge spurious Emissions
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 &

Section 27.50(d)(5) Measurement of Peak-to-Average ratio (PAR)

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 plots of graphs show the modulation components: In phase (I) and Quadrature (Q) components.

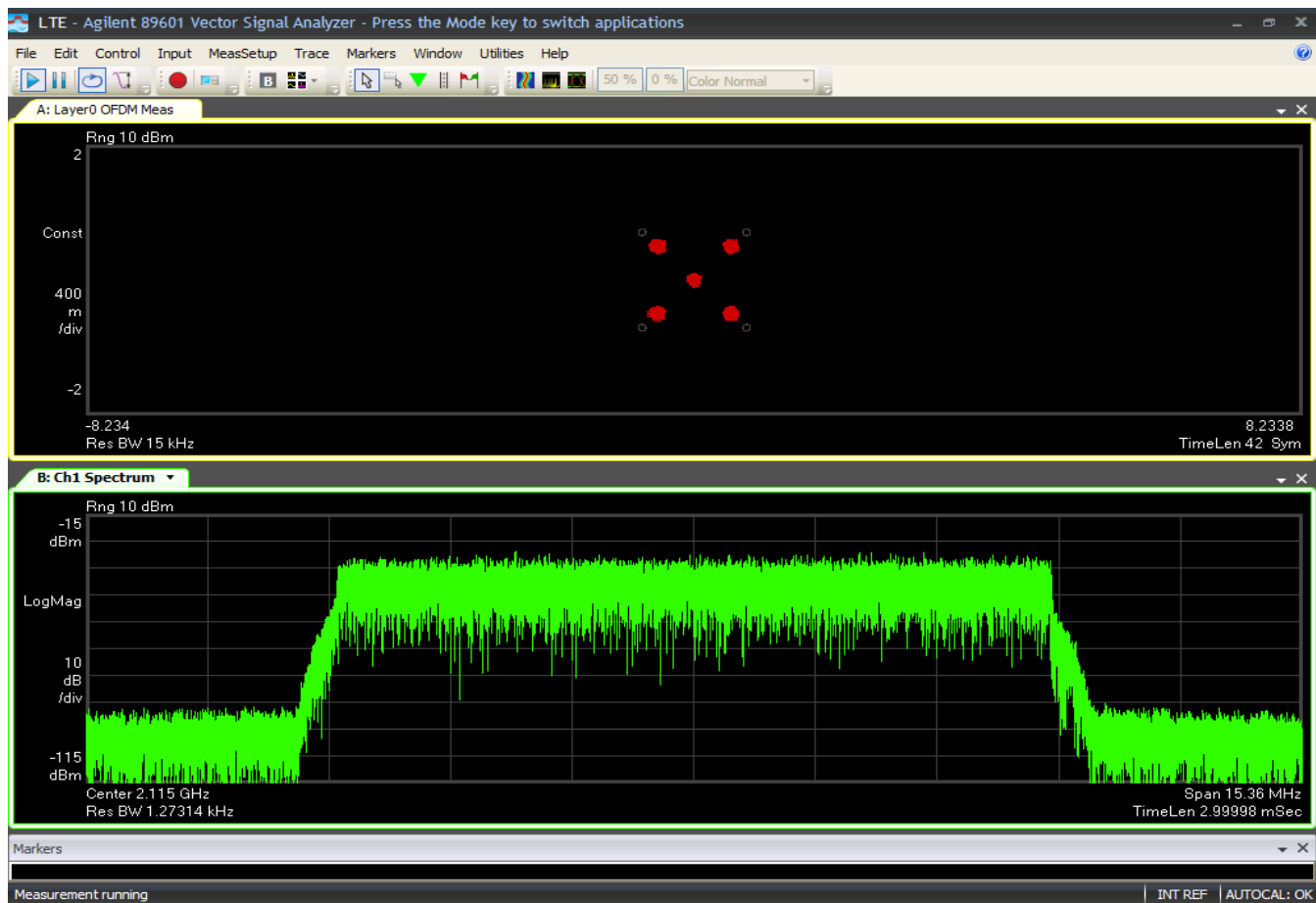
- (1) Quadrature Phase Shift Keying (QPSK) modulation scheme uses 2 bits are transmitted simultaneously (one per channel) and a symbol can be represented by 2 bits. Therefore there are $2^2 = 4$ states (Binary 00 to 11). The theoretical bandwidth is 2bits/second/Hz.
- (2) 16 Quadrature amplitude modulation (QAM): In 16QAM, there 16-states. There are four I values and four Q values, therefore 4 bits are available for 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.

Section 27.50(d)(5)

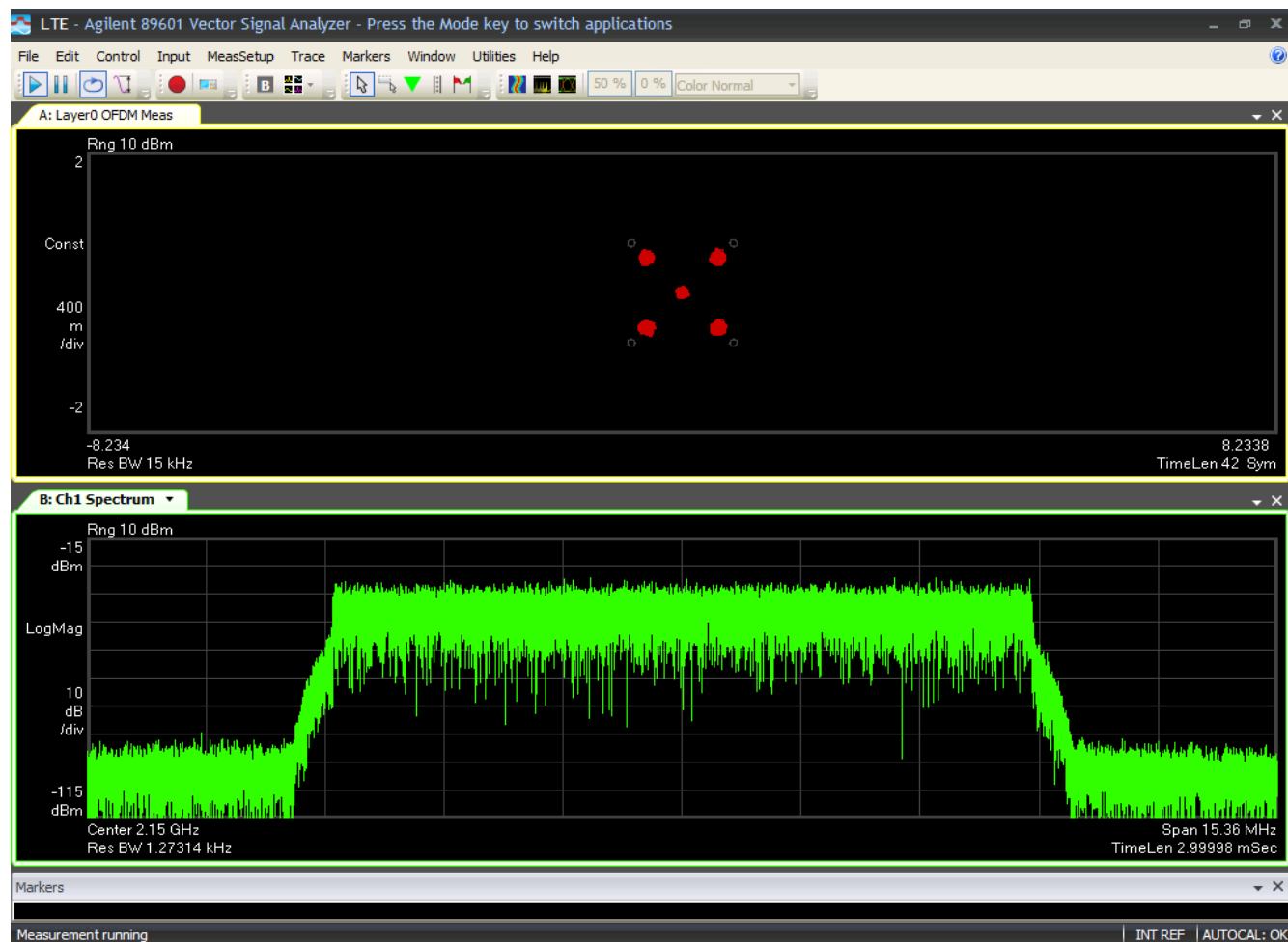
Measurement of Peak-to-Average ratio (PAR)

The peak-to-average (PAR) is plotted along with demodulated constellation plots. The plots show that average and peak values in dBm. The difference of peak-to-averages ratio does not exceed 13 dB as required in section 27.50(d) (5).

QPSK 120 watts
2115MHz & 2150 MHz (10 MHz BW)

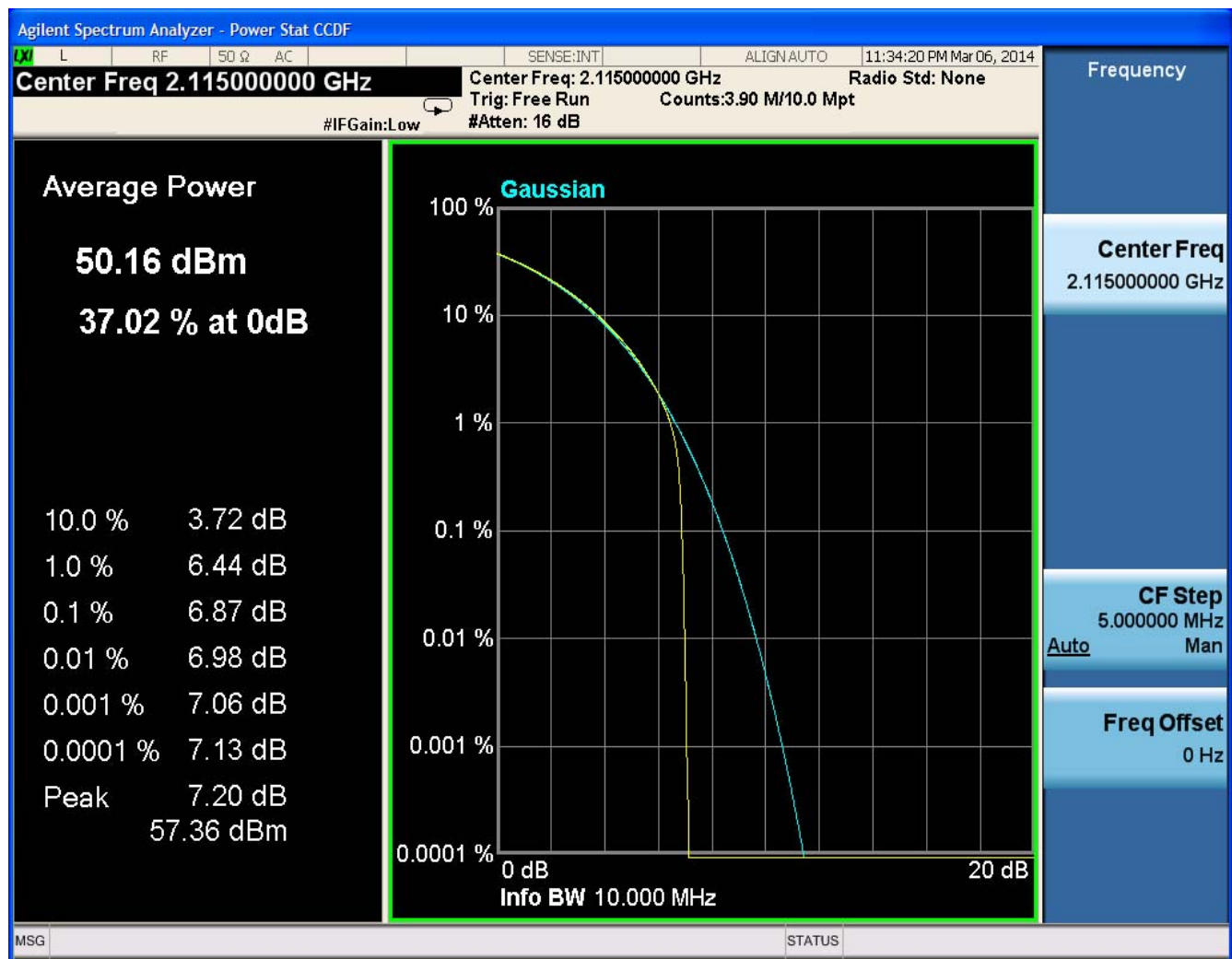


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block A (2110-2120 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

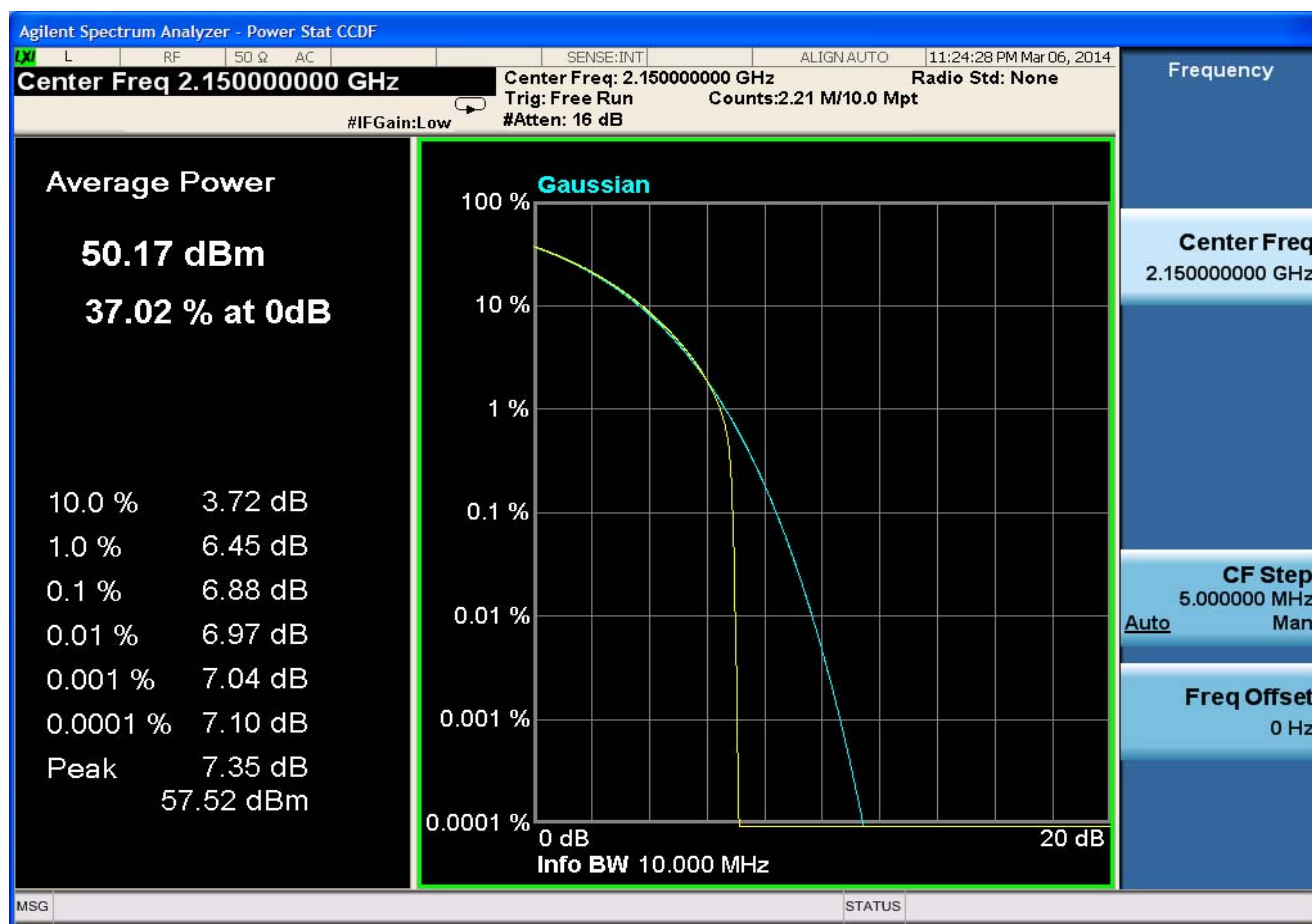


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block F (2145-2155 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

Peak to Average
QPSK 120 watts
2115MHz & 2150MHz (10 MHz BW)

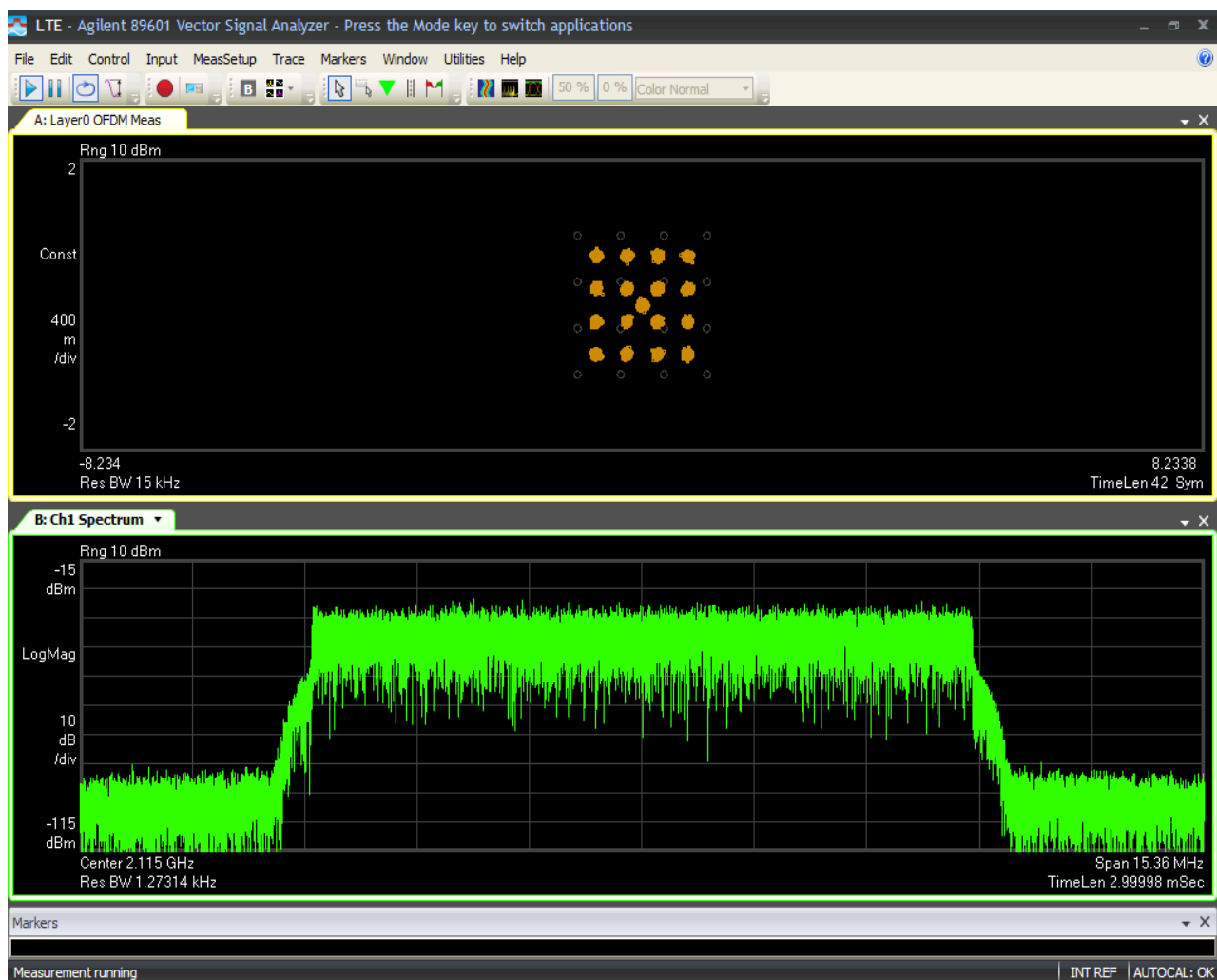


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block A (2110-2120 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

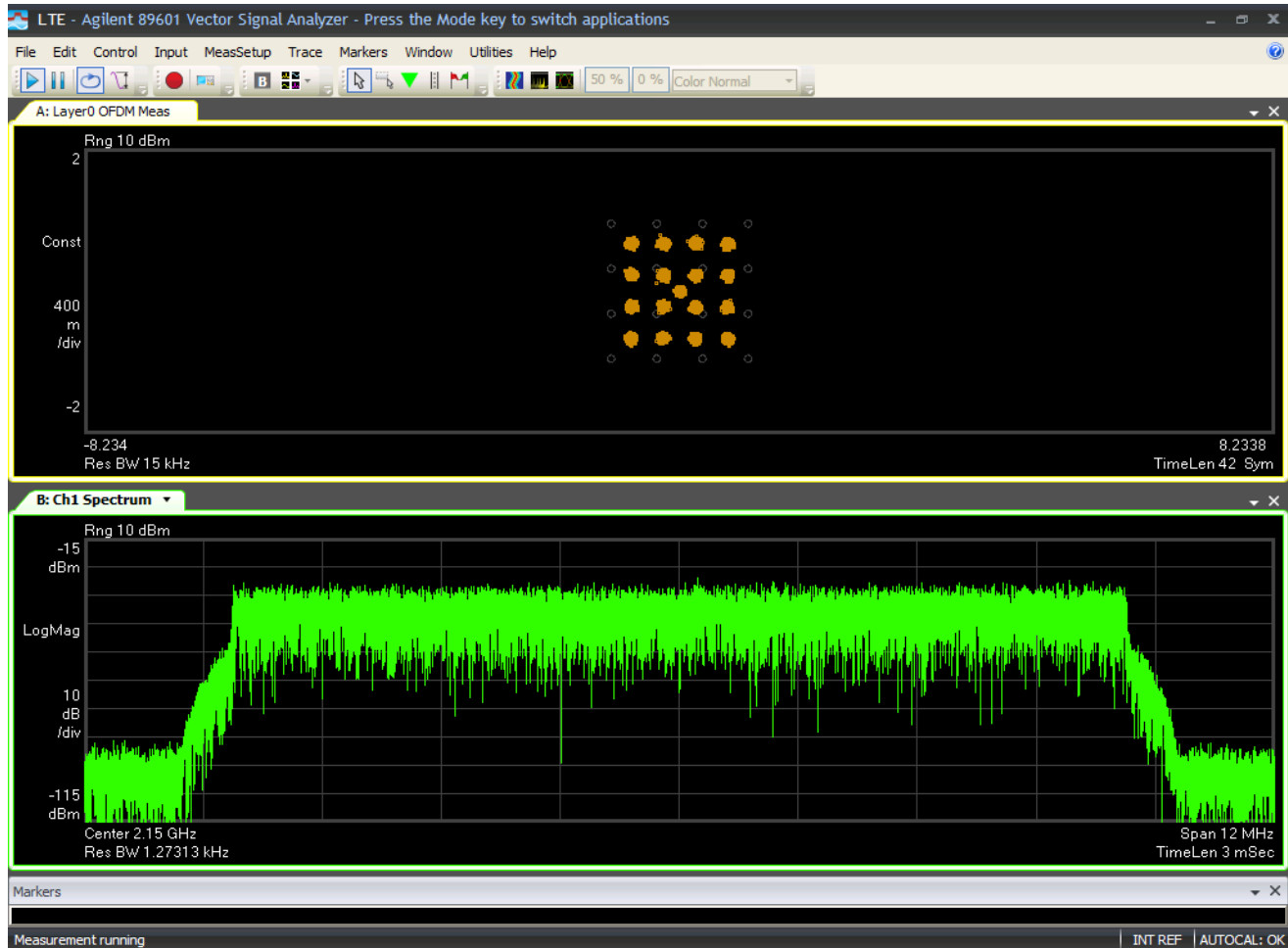


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block F (2145-2155 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

16QAM 120 watts
2115MHz & 2150 (10 MHz BW)

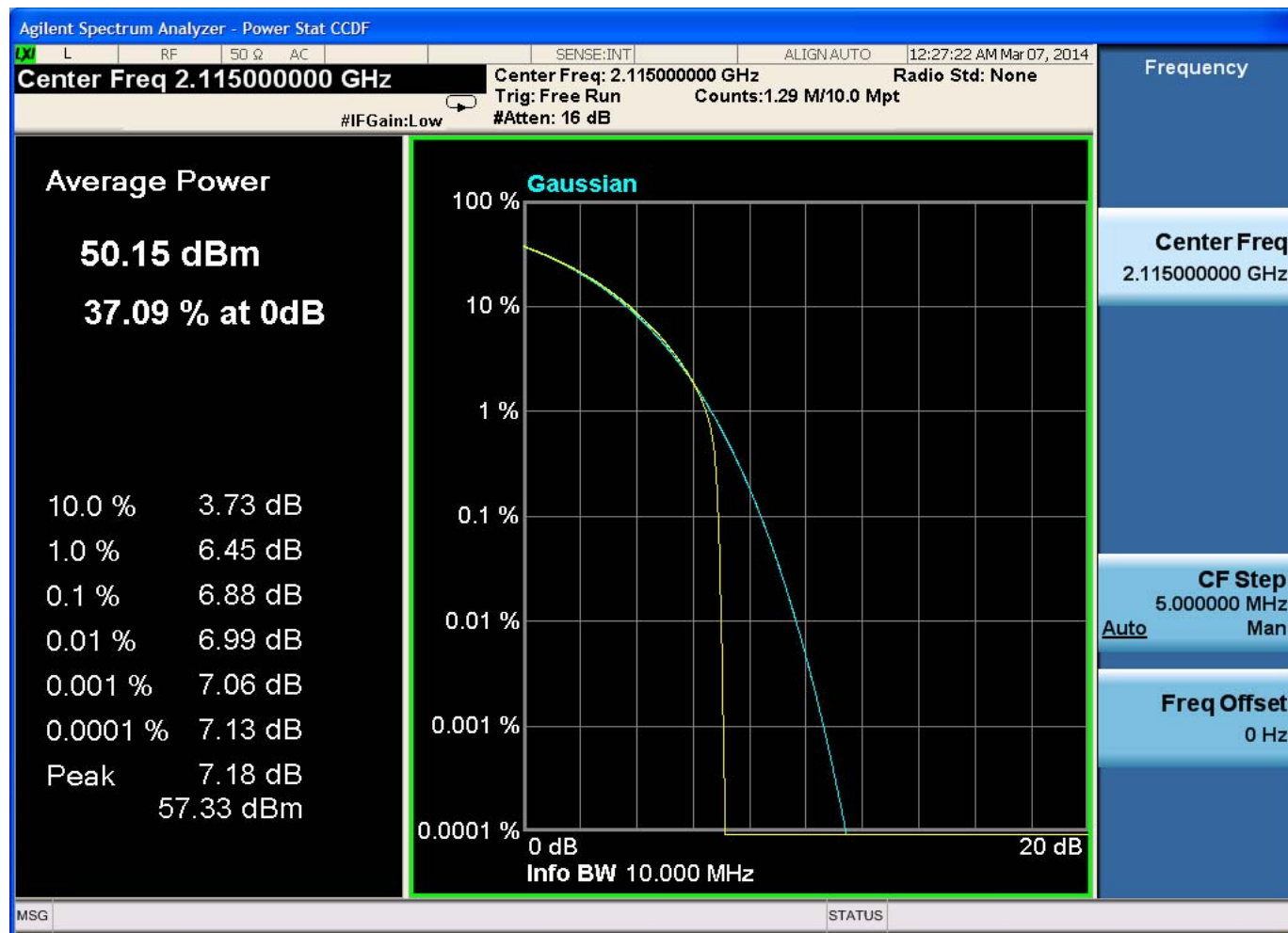


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block A (2110-2120 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

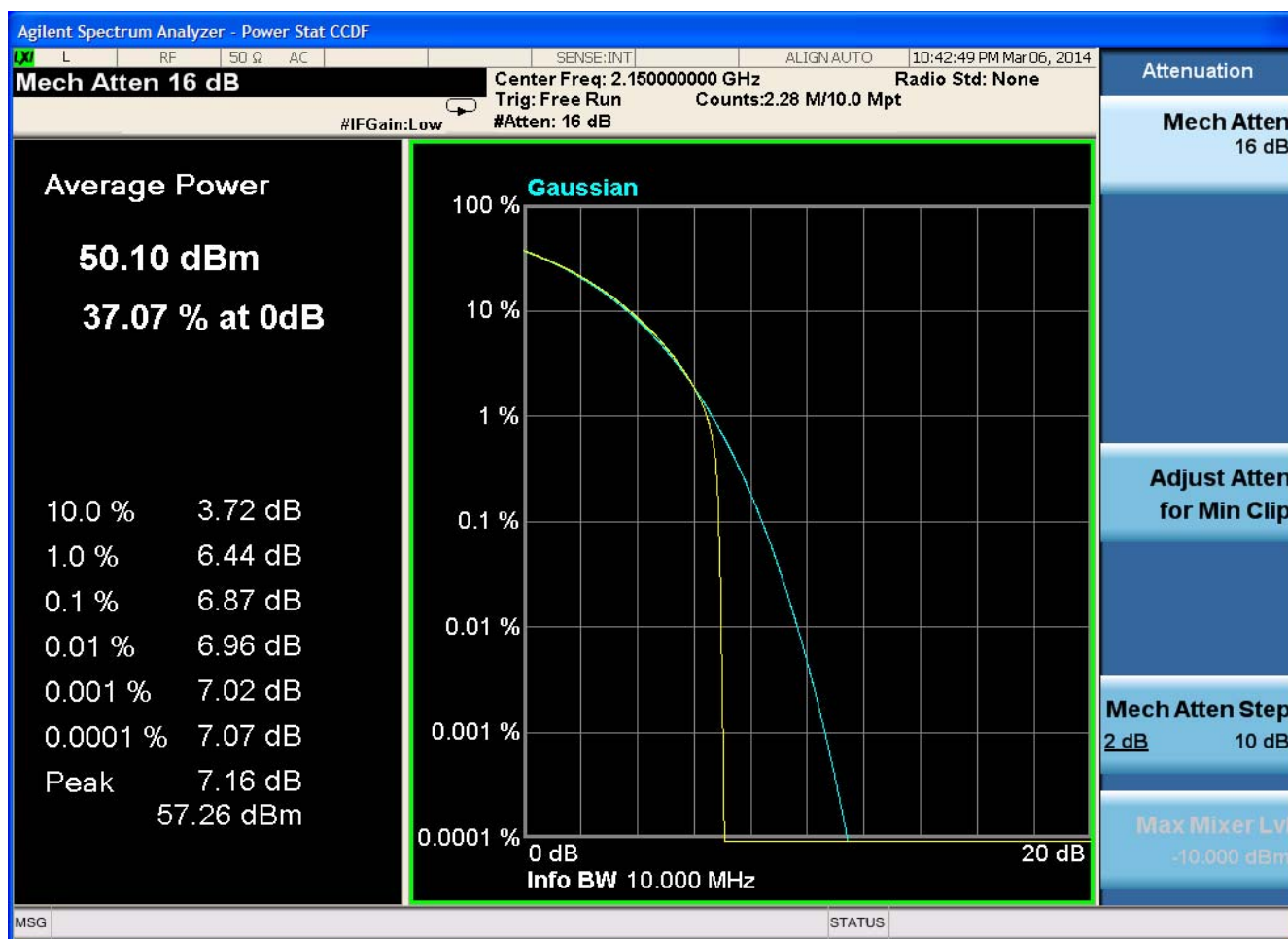


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block F (2145-2155 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

Peak to Average
16QAM 120 watts
2115MHz & 2150MHz (10 MHz BW)

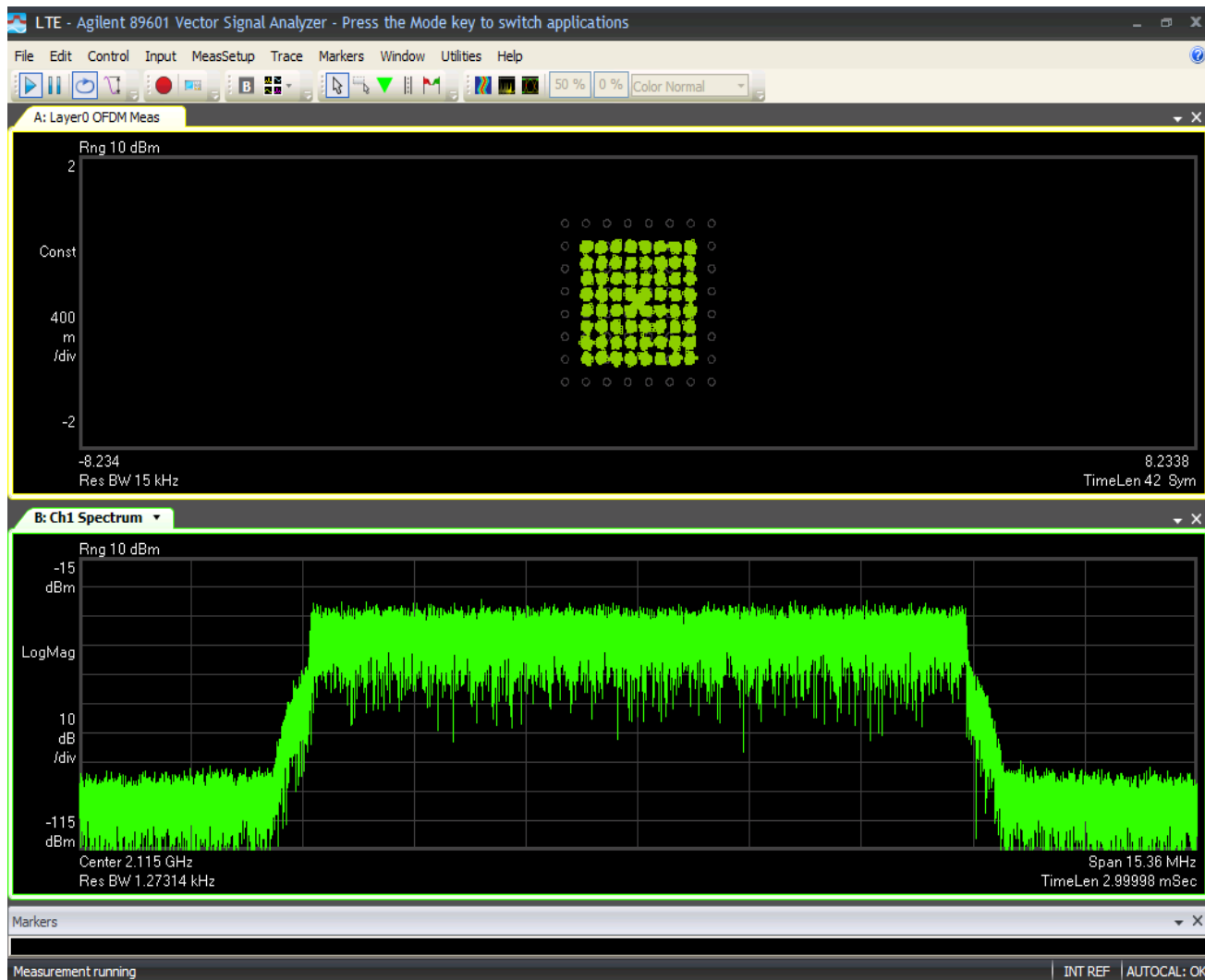


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block A (2110-2120 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

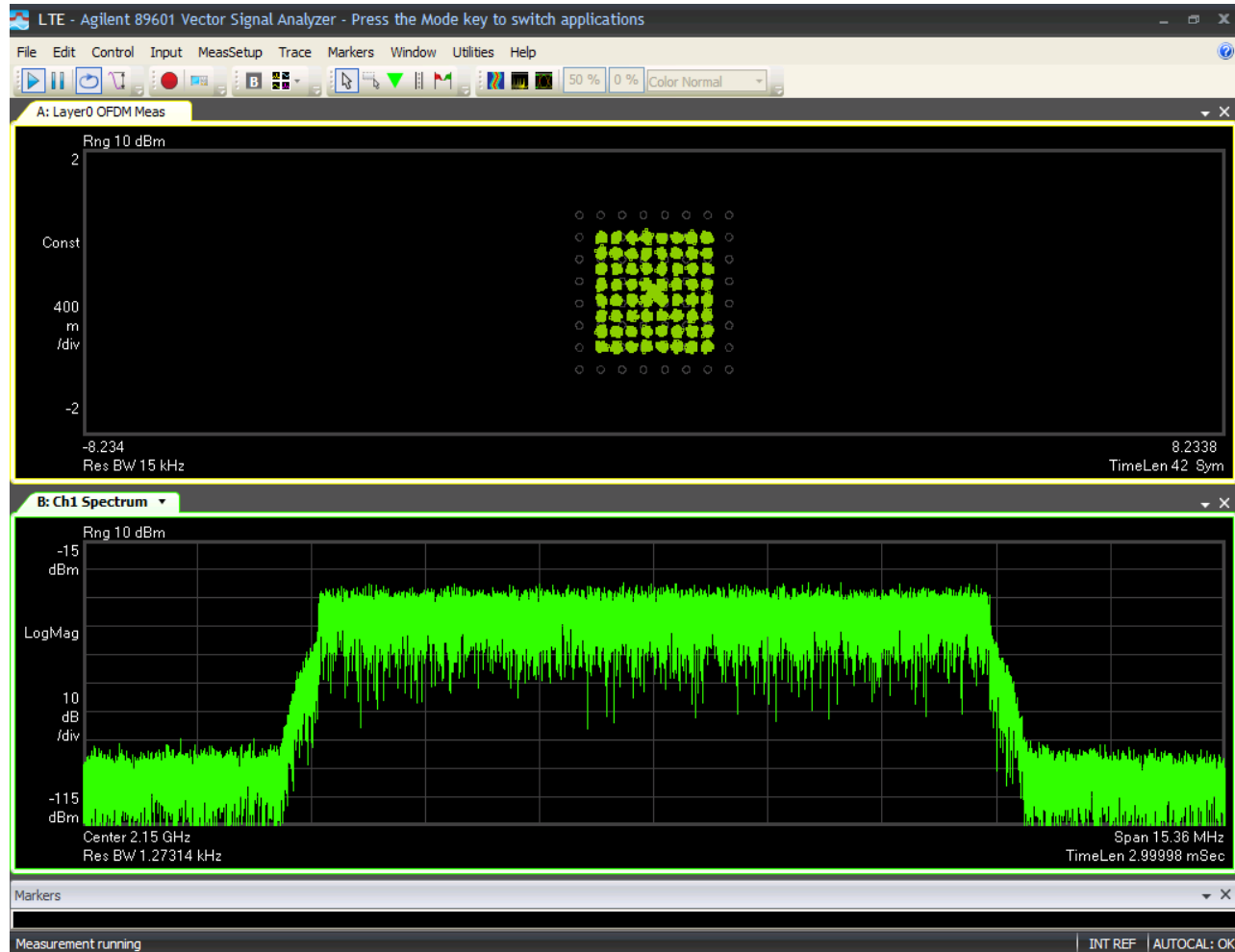


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block F (2145-2155 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

**64QAM 120 Watts
2115MHz & 2150MHz (10 MHz BW)**

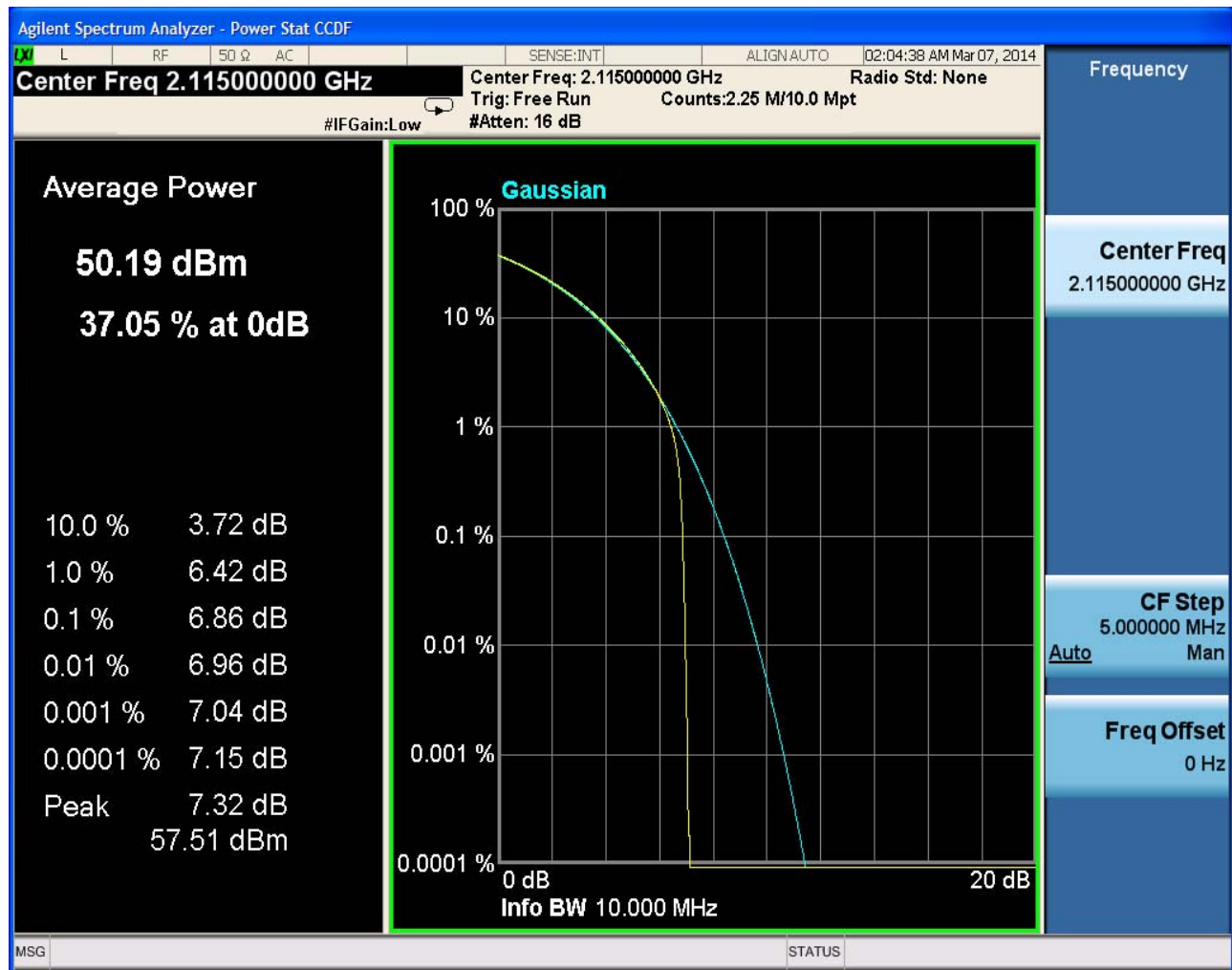


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block A (2110-2120 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

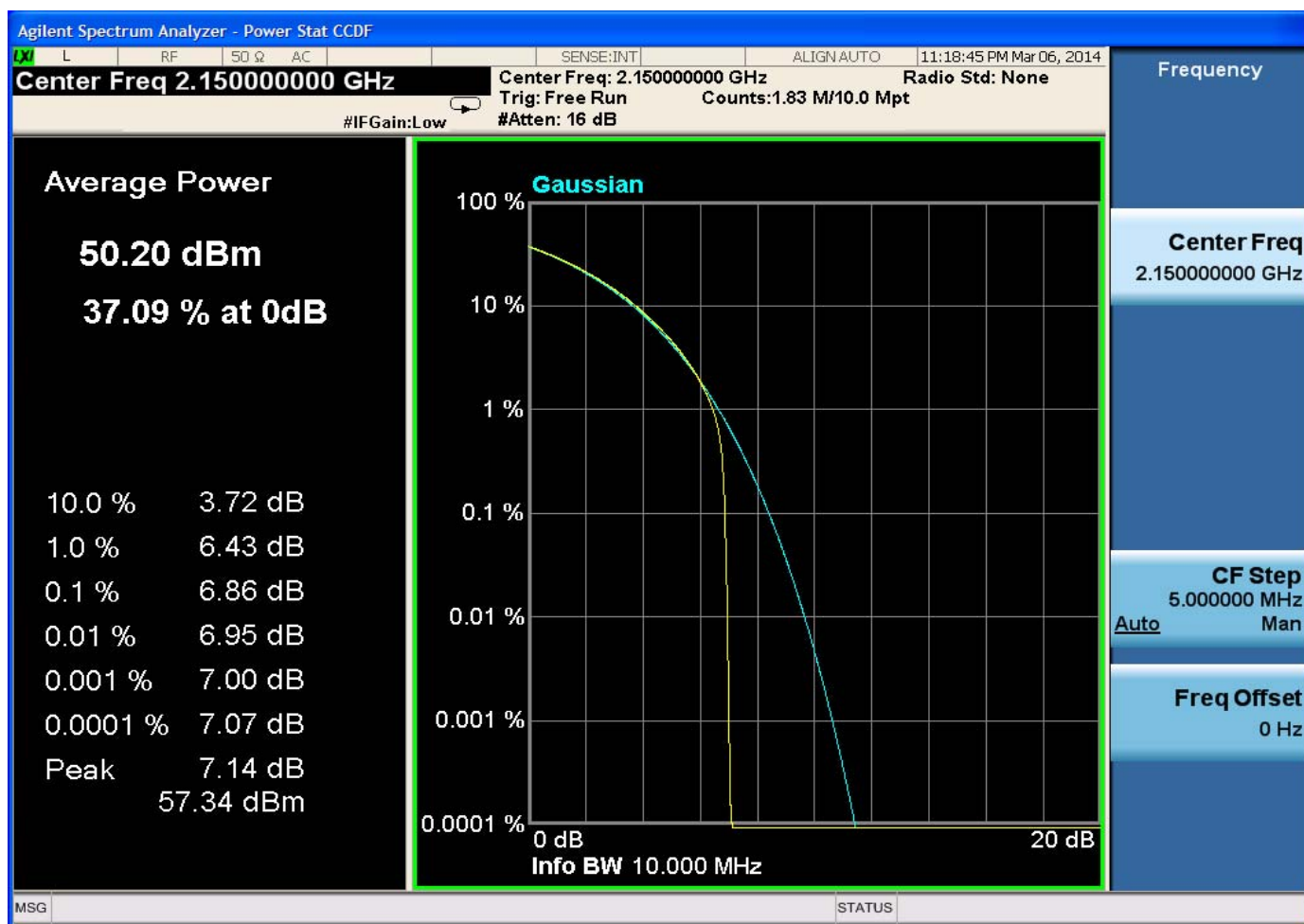


TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block F (2145-2155 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG

**Peak to Average
64QAM 120 watts
2115MHz & 2150MHz (10 MHz BW)**



TRDU 2x120 Band 4 AWS (LTRE-RF)
FCC Part 27.53 Block A (2110-2120 MHz); PWR: 120 (2x120W MIMO)
FCCID: AS5BBTRX-13
TEST ENGINEER: SEG



TRDU 2x120 Band 4 AWS (LTRE-RF)

FCC Part 27.53 Block F (2145-2155 MHz); PWR: 120 (2x120W MIMO)

FCCID: AS5BBTRX-13

TEST ENGINEER: SEG

Measurement 3

FCC Section 2.1049

- (a) Emissions Bandwidth Measurement
- (b) Occupied Bandwidth Measurement showing spurious Emissions **1MHz close to Block edges.**

Spectrum Bandwidth Measurement For Emissions Type

FCC approved measurement method for Spectrum Bandwidth.

(A) 26 dB Band width.

This method was 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: 9.45 MHz for 10 MHz Bandwidth.
Therefore, Measured Emission type: **9M45F9W** for 10 MHz Bandwidth.

MEASUREMENT OF EMISSIONS 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 described in section 27.53 (g) (3). 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 “TRDU 2x120 Band 4 AWS (LTRE-RF)” in the following configurations:

1. QPSK
2. 16 QAM
3. 64 QAM

Results:

The plots are provided for following modulations: QPSK, 16QAM and 64QAM.

Table for 10MHz for 120W all Contiguous Bands

Frequency Range (MHz) & Block	Bandwidth (MHz)	Center Frequency (MHz)	Power (Watts)
2110-2120 (A)	10	2115	120
2120-2130 (B)	10	2125	120
2130-2140 (C+D)	10	2135	120
2135-2145 (D+E)	10	2140	120
2145-2155 (F)	10	2150	120

The Measured 26dB emissions bandwidth is:

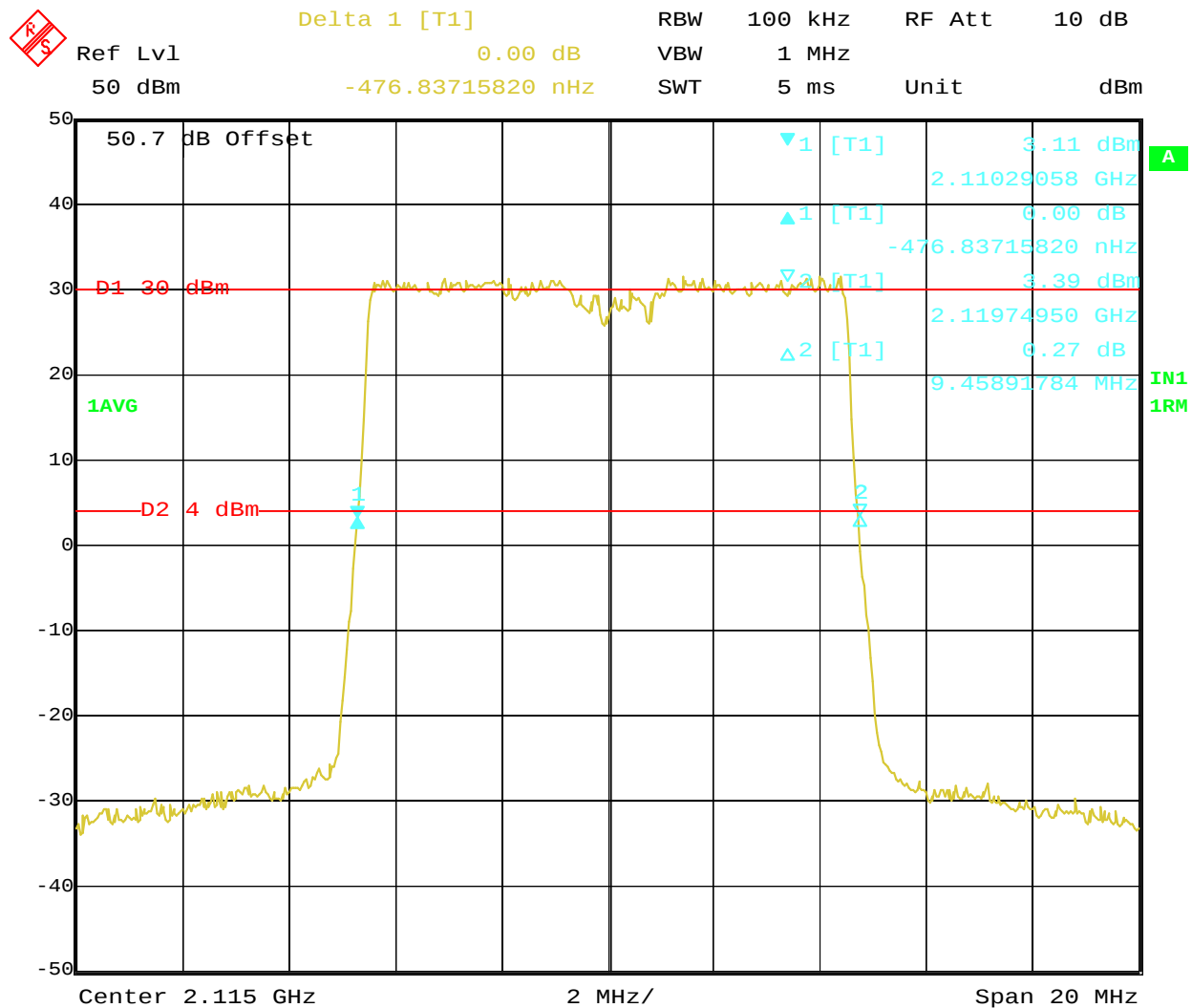
BW	Tested BW (MHz)
10 MHz 120 Watts	9.45

Block: A

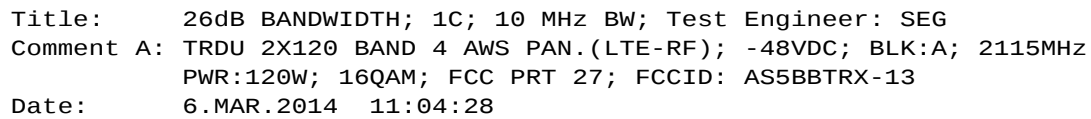
10 MHz Bandwidth (2110-2120 MHz)

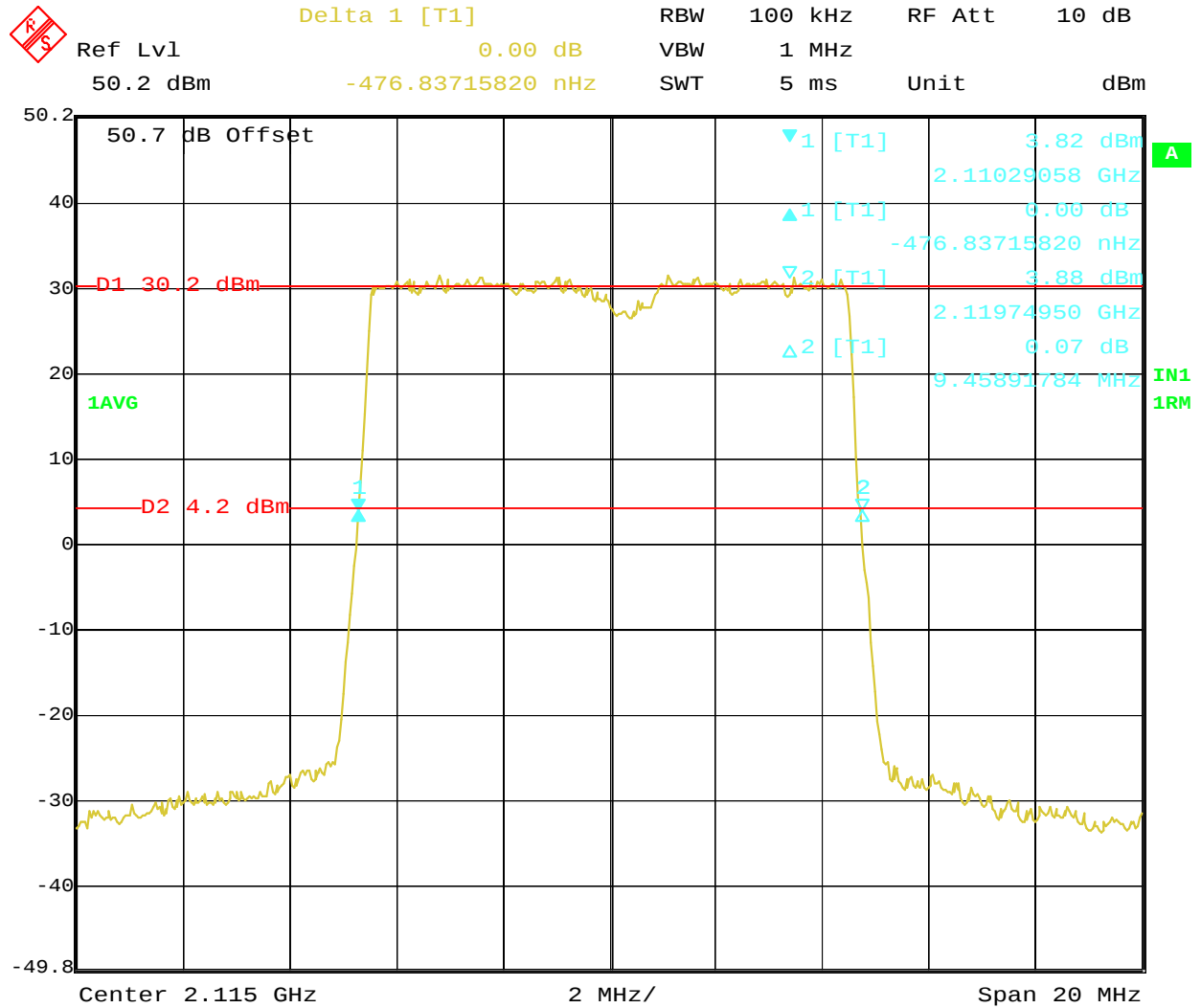
2x120 watts (MIMO)

(26dB Bandwidth)



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
 PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
 Date: 6.MAR.2014 10:27:19





Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHZ

PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13

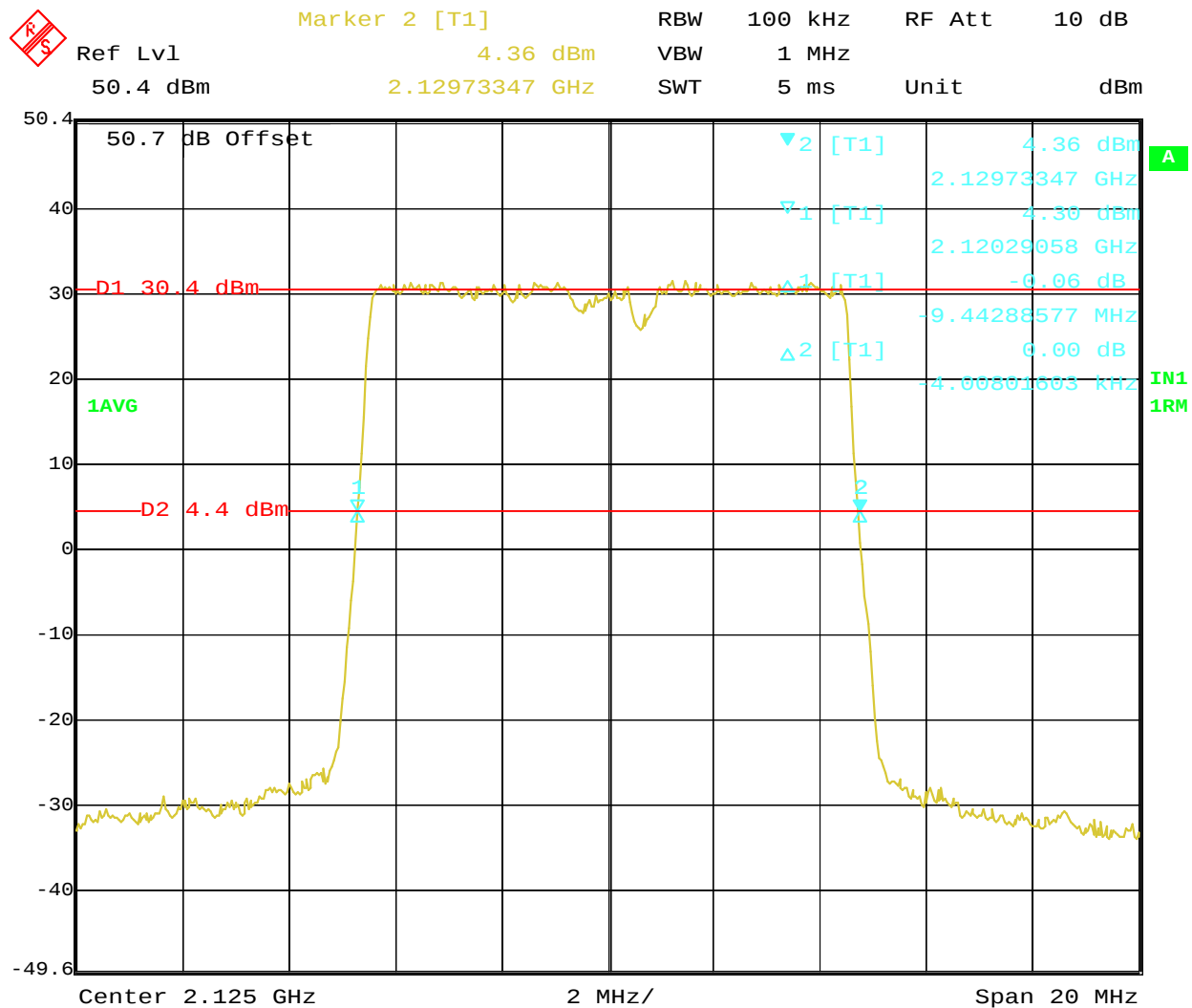
Date: 6.MAR.2014 13:22:55

Block: B

10 MHz Bandwidth (2120-2130 MHz)

2x120 watts (MIMO)

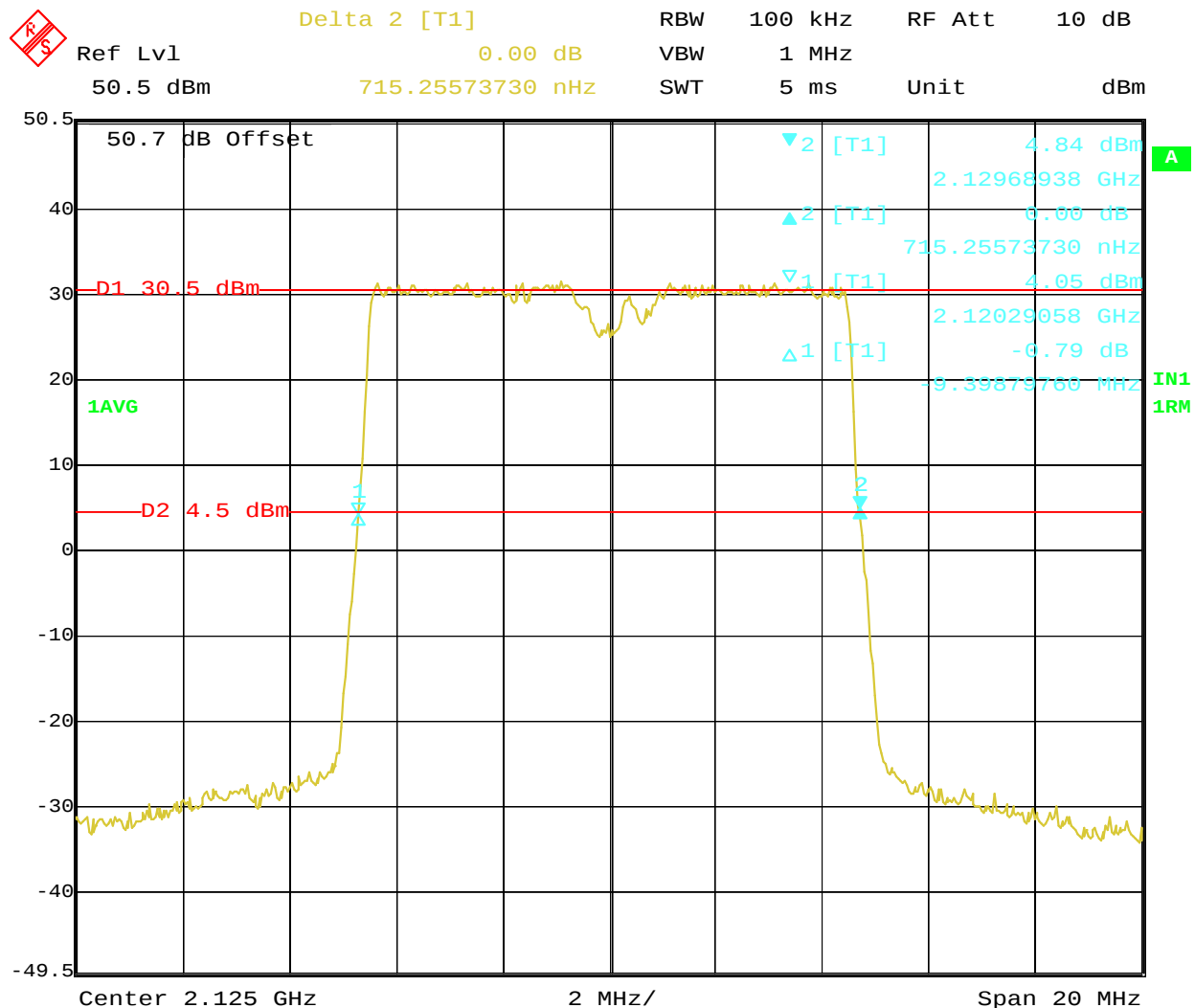
(26dB Bandwidth)



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHZ
 PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

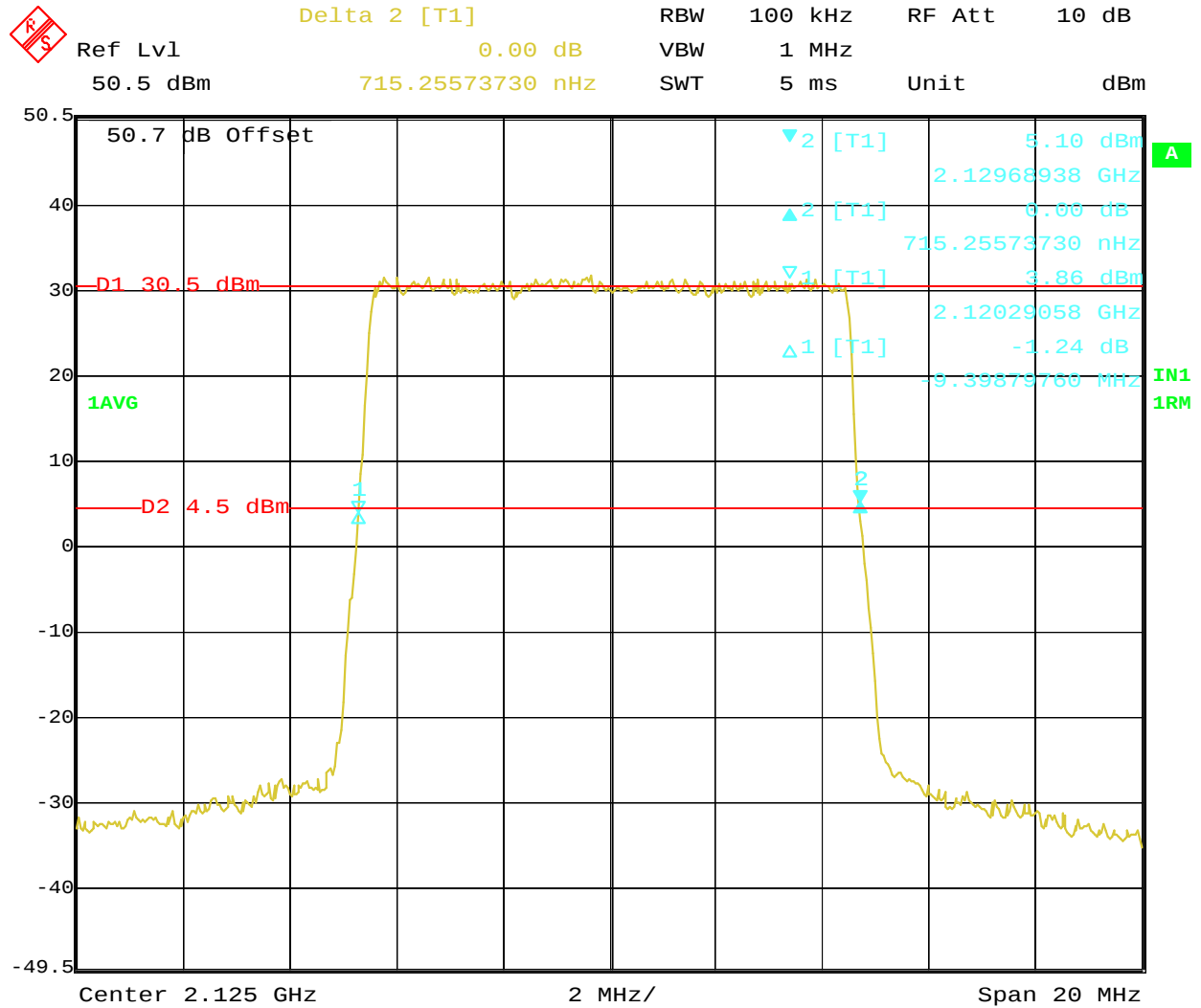
Date: 7.MAR.2014 13:09:13



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHZ
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 7.MAR.2014 08:23:18



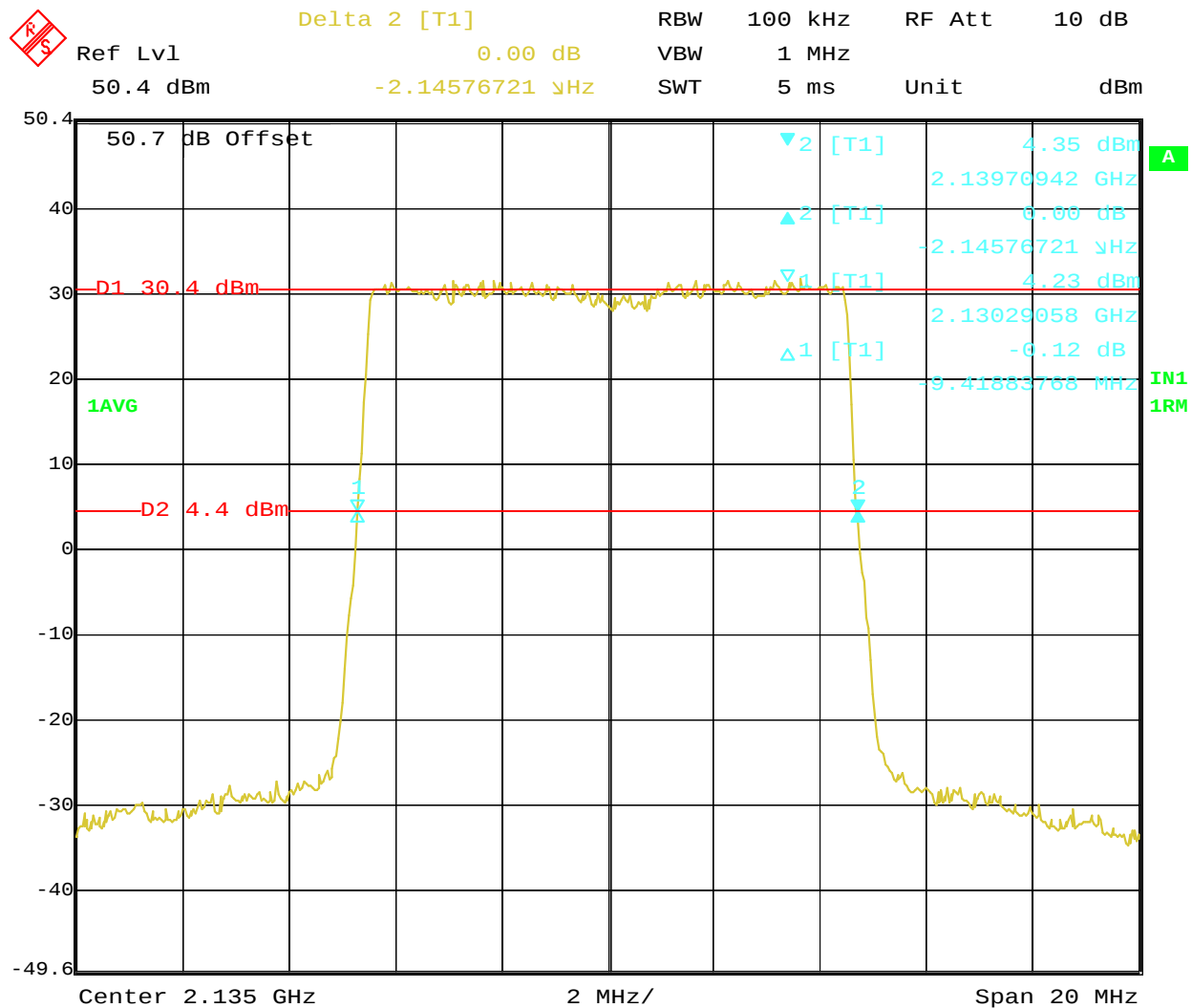
Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
 PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 6.MAR.2014 14:37:52

Block: C+D

10 MHz Bandwidth (2130-2140 MHz)

2x120 watts (MIMO)

(26dB Bandwidth)

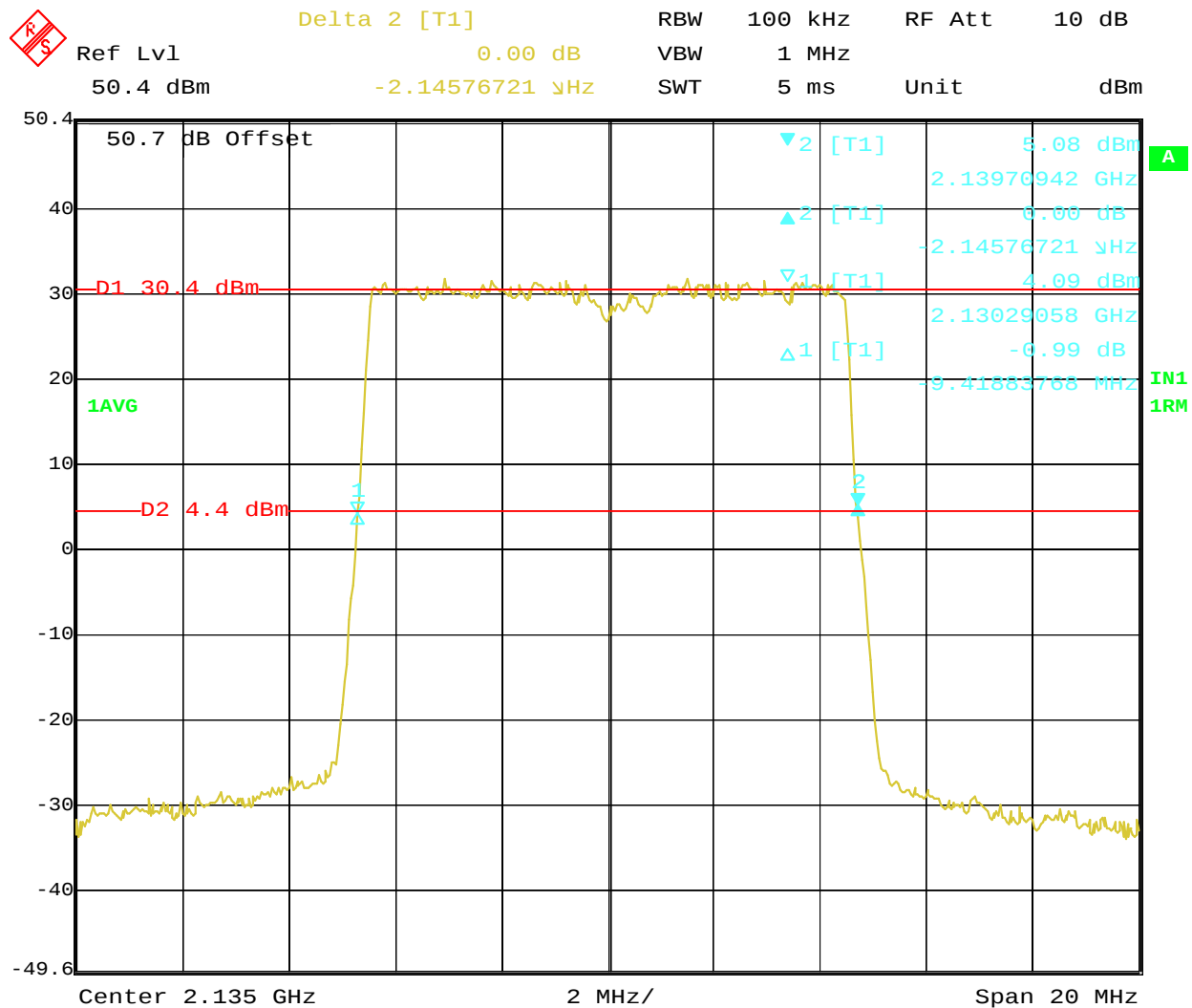


Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

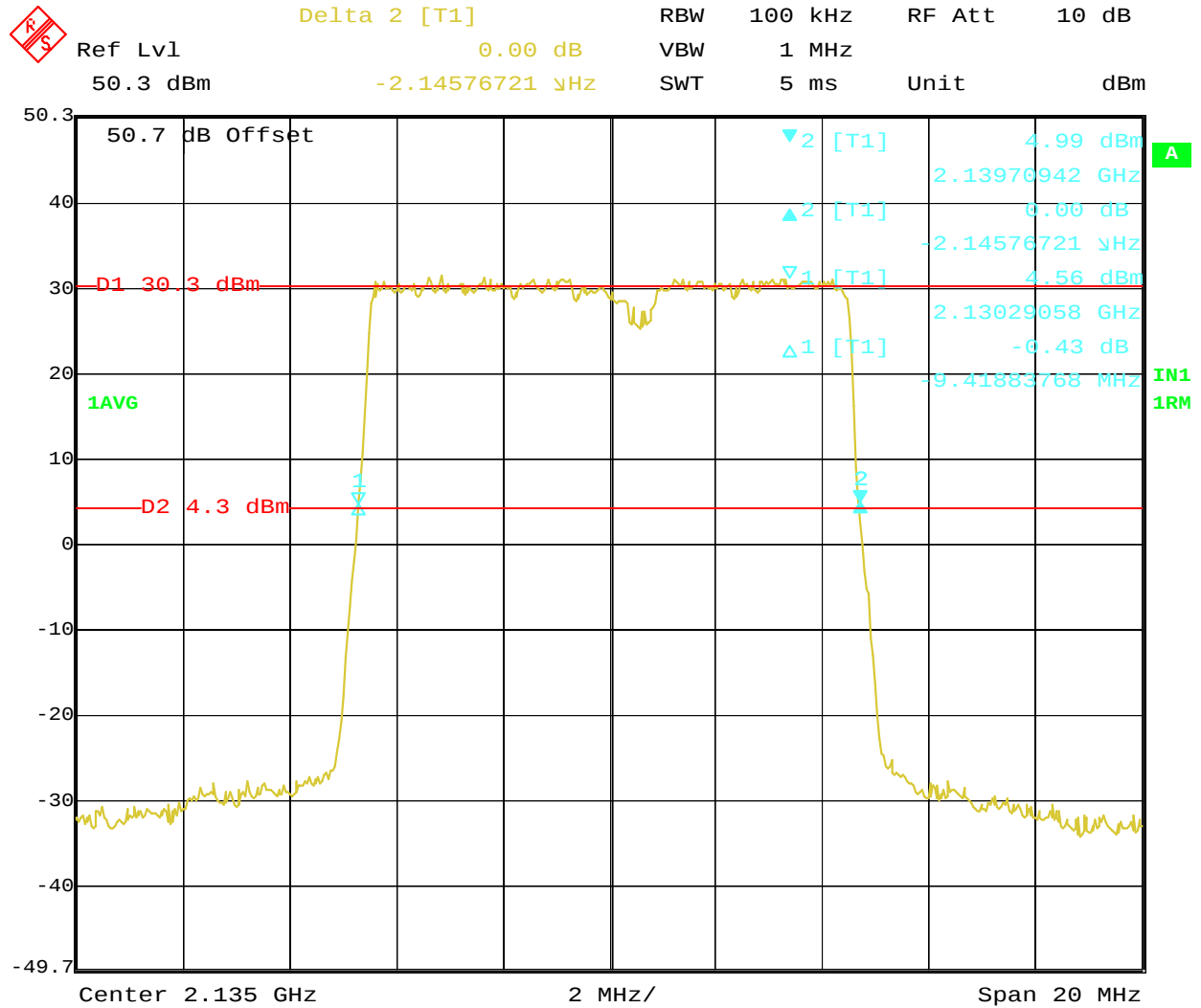
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 7.MAR.2014 14:03:58



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
 PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 10.MAR.2014 08:05:07



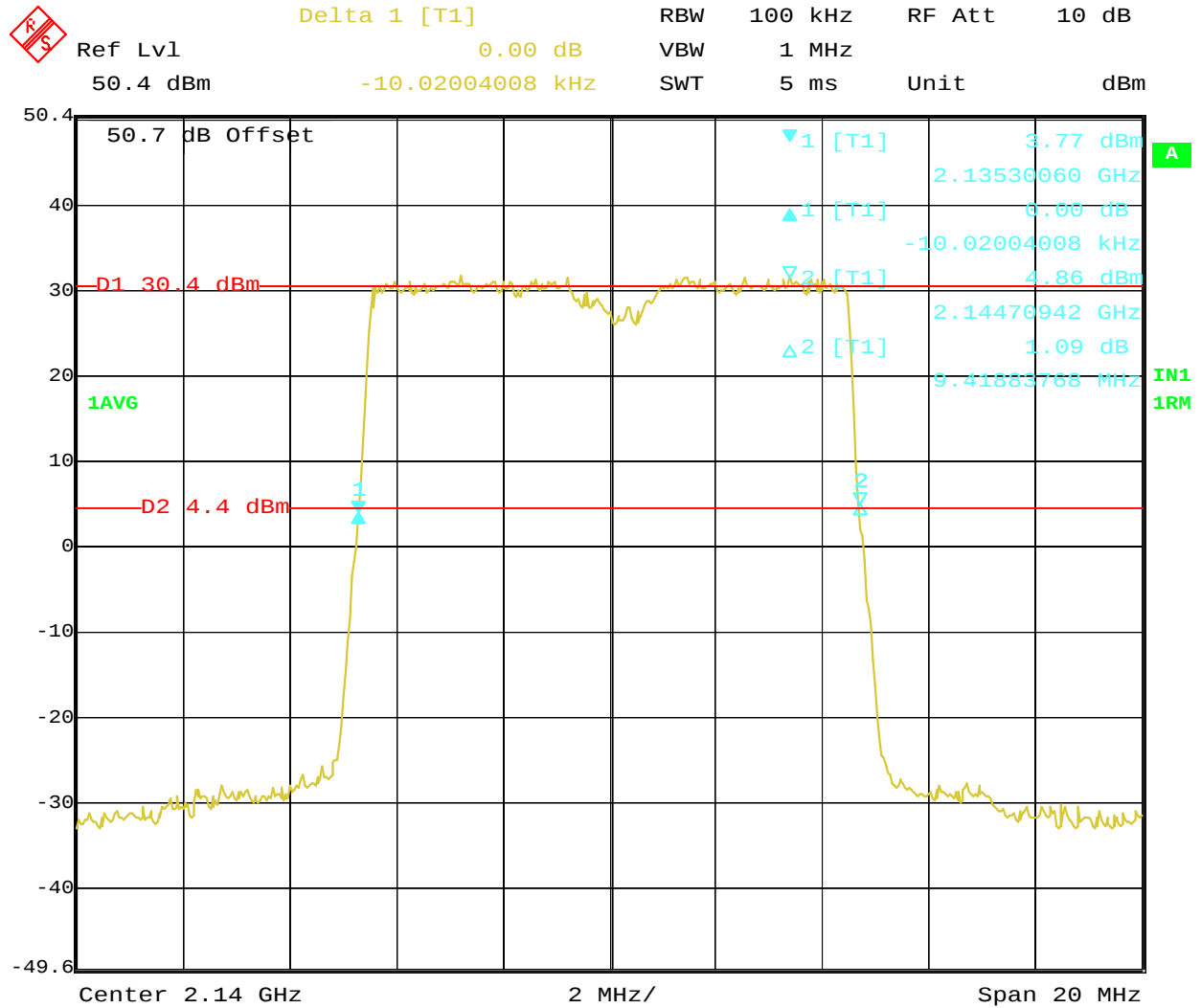
Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
 PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 10.MAR.2014 08:46:36

Block: D+E

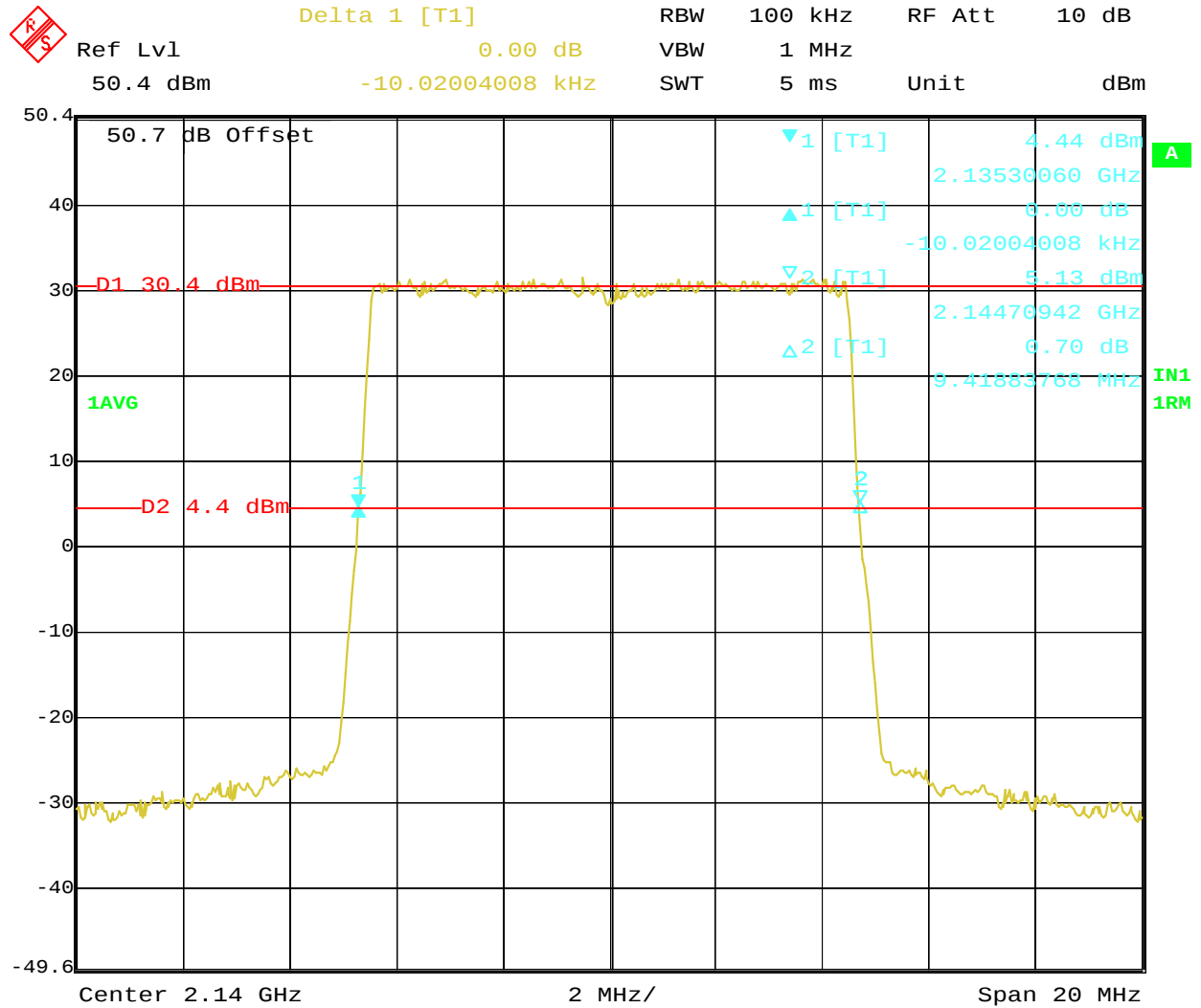
10 MHz Bandwidth (2135-2145 MHz)

2x120 watts (MIMO)

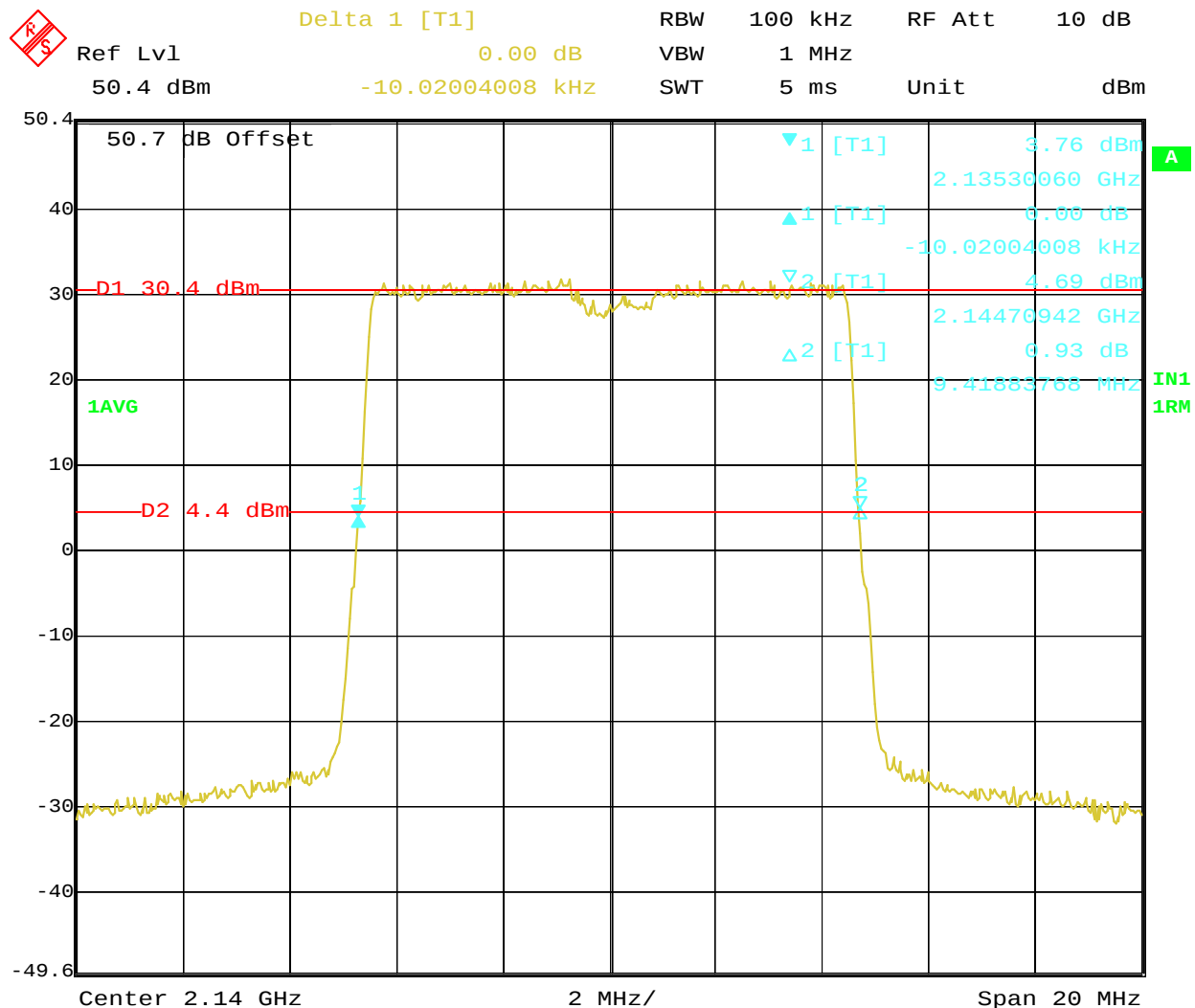
(26dB Bandwidth)



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
 PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 10.MAR.2014 11:43:30



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
 PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 10.MAR.2014 10:26:05



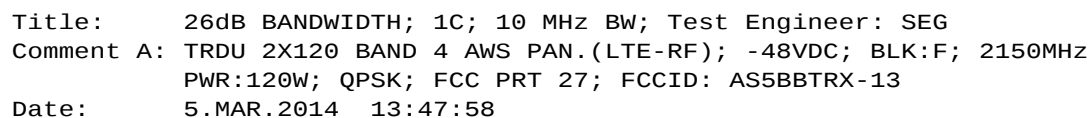
Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
 PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 10.MAR.2014 09:46:17

Block: F

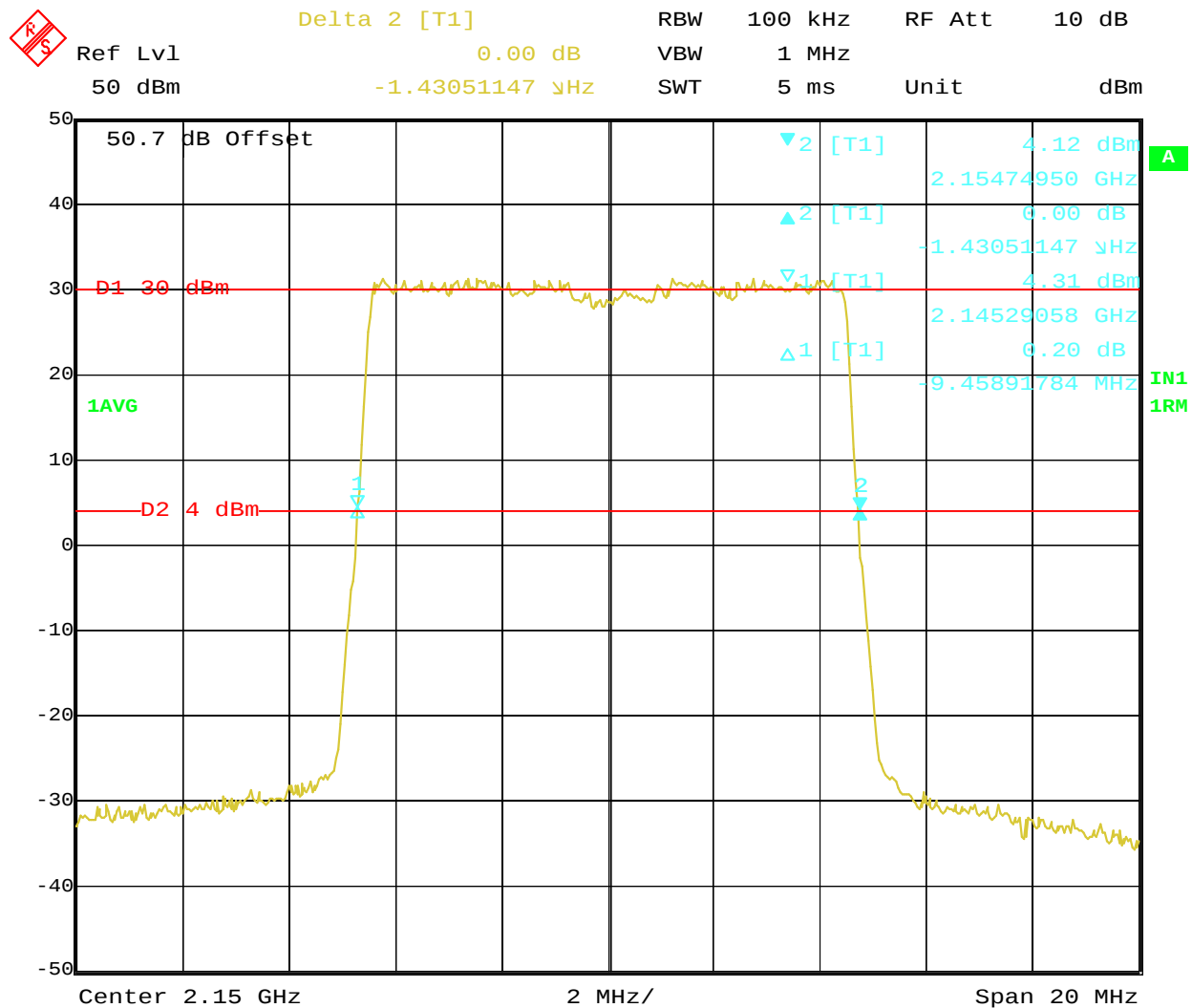
10 MHz Bandwidth (2145-2155 MHz)

2x120 watts (MIMO)

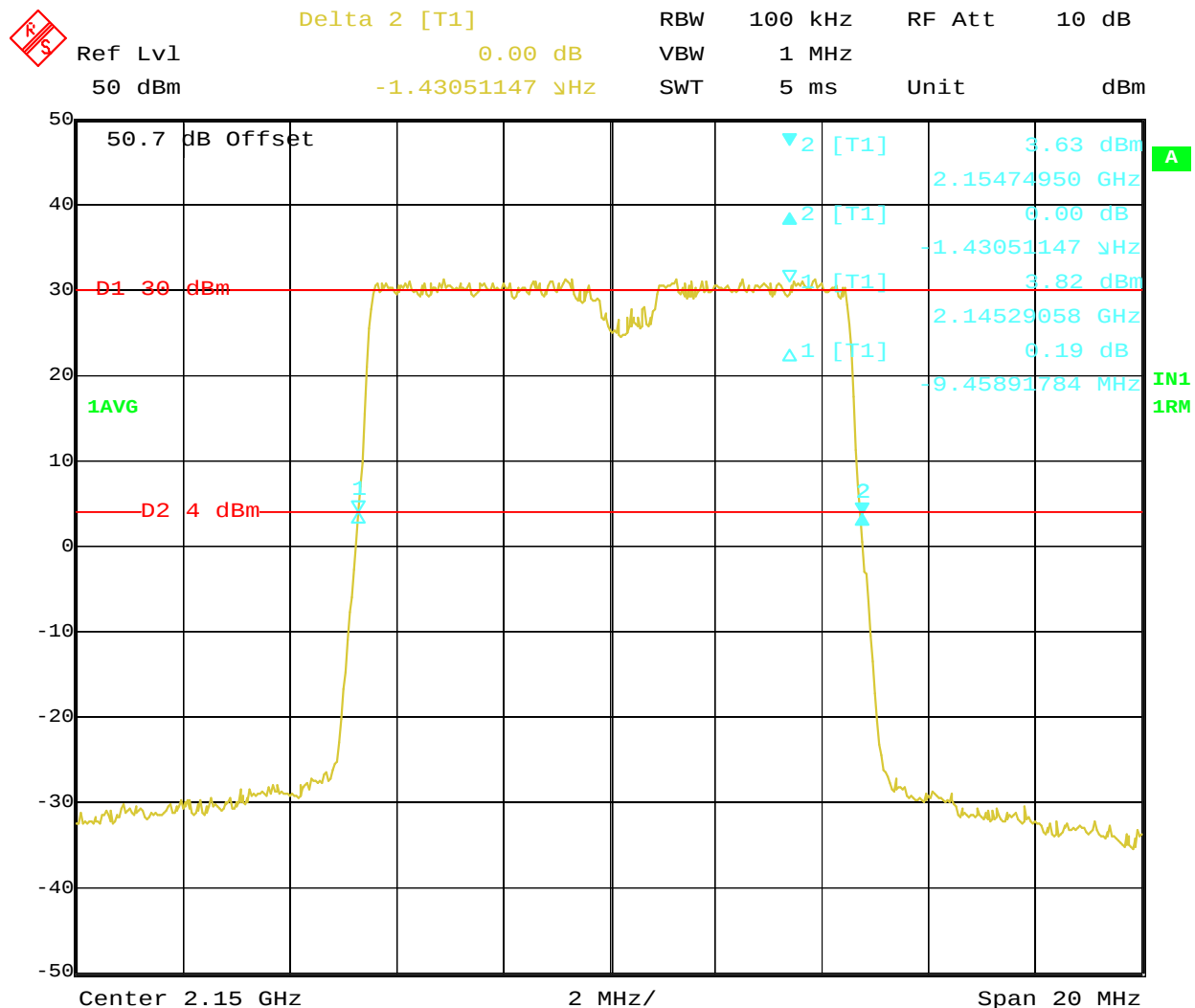
(26dB Bandwidth)



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
 PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
 Date: 5.MAR.2014 13:47:58



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
 PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
 Date: 6.MAR.2014 08:58:39



Title: 26dB BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
 PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13
 Date: 6.MAR.2014 09:25:03

**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. 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 “TRDU 2x120 Band 4 AWS (LTRE-RF)”.

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 120 Watts (50.7 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 AWS TRDUs are capable of operating in the band of 2110 MHz to 2155 MHz (Block A,B,C,D,E and F). The Base station presently tested was configured to operate at 10 MHz Bands. Blocks and bands listed in Table below 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. All tests were performed for QPSK, 16QAM and 64QAM modulations.

Block edge requirements:

FCC Section 27.53(g)(3): Based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

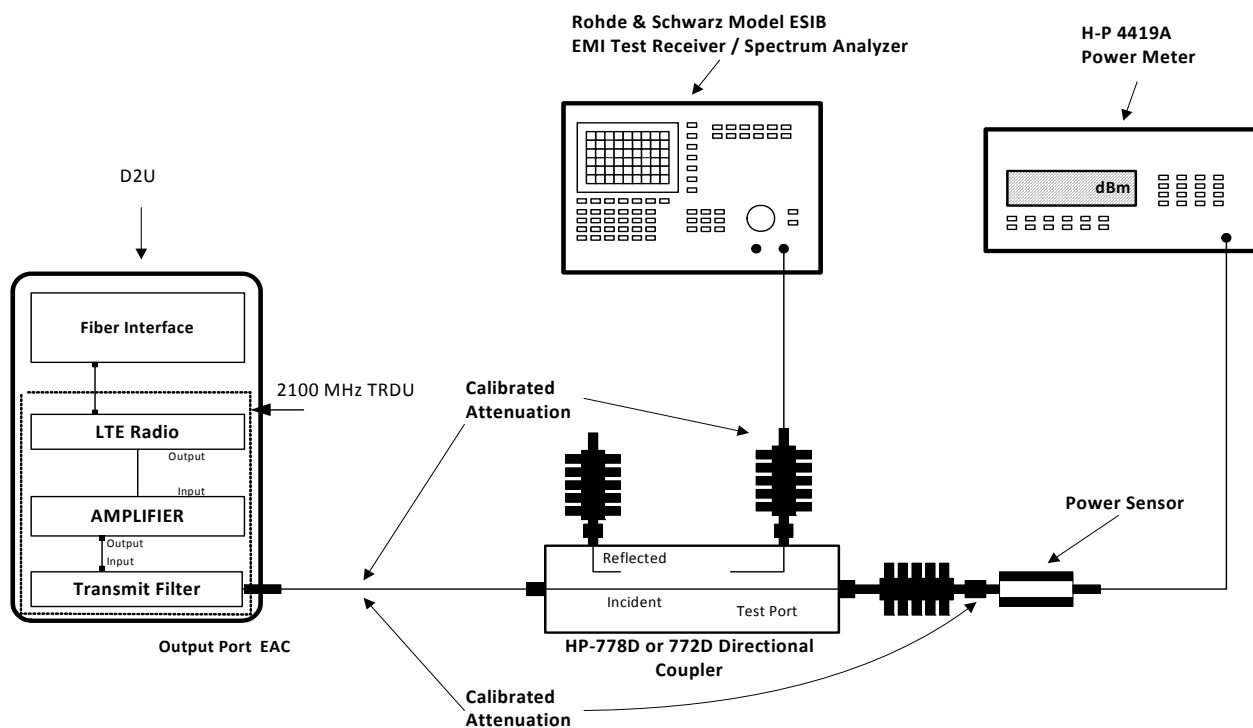
Pursuant to FCC OET RULES 662911 D01 and D02 for two antenna MIMO mode of operations, the FCC limit of -13dBm shall be 3dB more stringent, therefore all channel edge and out of band spurious emissions shall be -16dBm. For 10MHz BW, the one percent of emissions BW is 100 kHz.

The list of blocks and bands, tested are listed below:

Table for 10MHz for 120W all Contiguous Bands

Frequency Range (MHz) & Block	Bandwidth (MHz)	Center Frequency (MHz)	Power (Watts)
2110-2120 (A)	10	2115	120
2120-2130 (B)	10	2125	120
2130-2140 (C+D)	10	2135	120
2135-2145 (D+E)	10	2140	120
2145-2155 (F)	10	2150	120

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



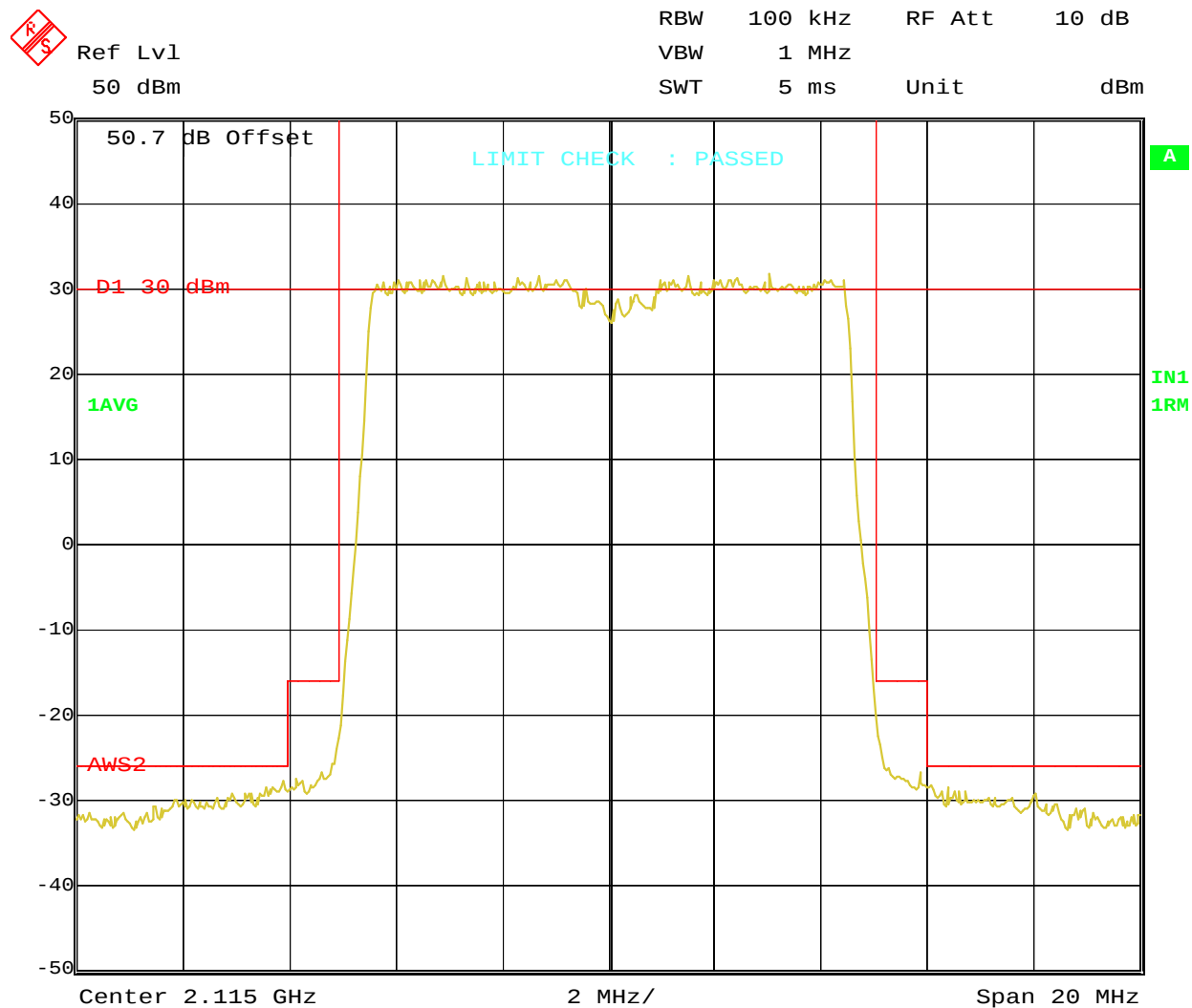
All components are calibrated over the frequency range of interest

Block: A

10 MHz Bandwidth (2110-2120 MHz)

2x120 watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH

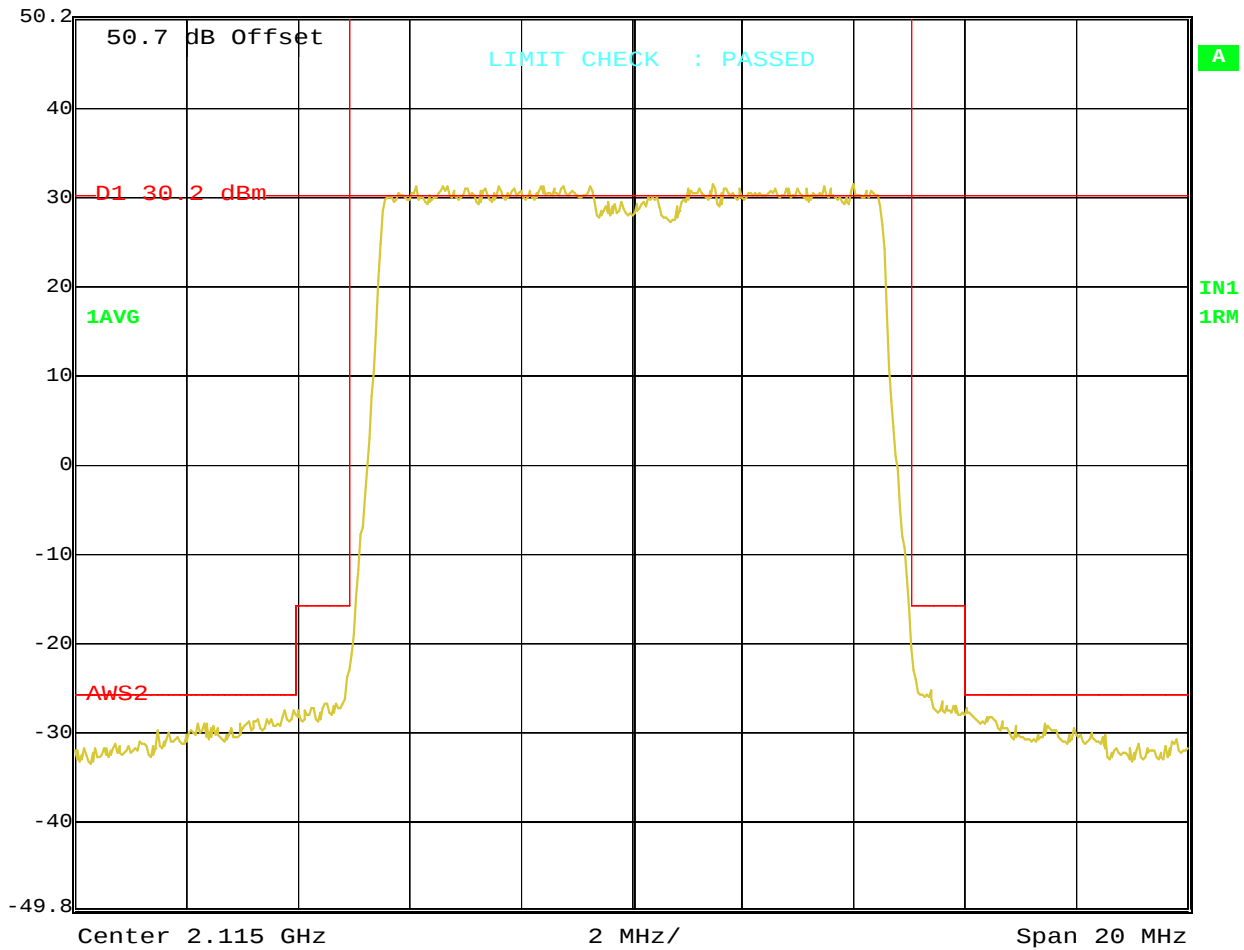


Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 10:23:41

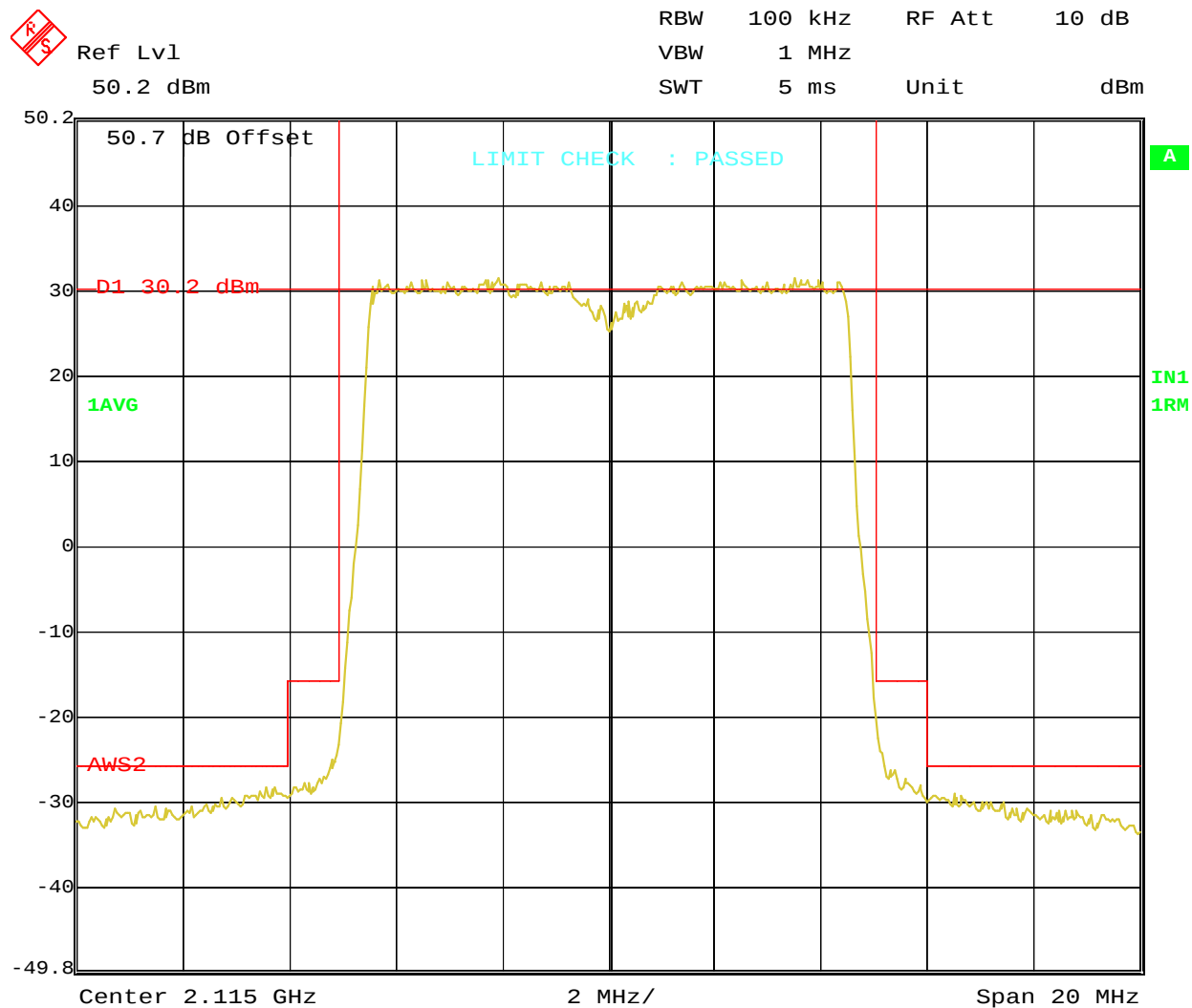


Ref Lvl
50.2 dBm

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



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 11:01:17



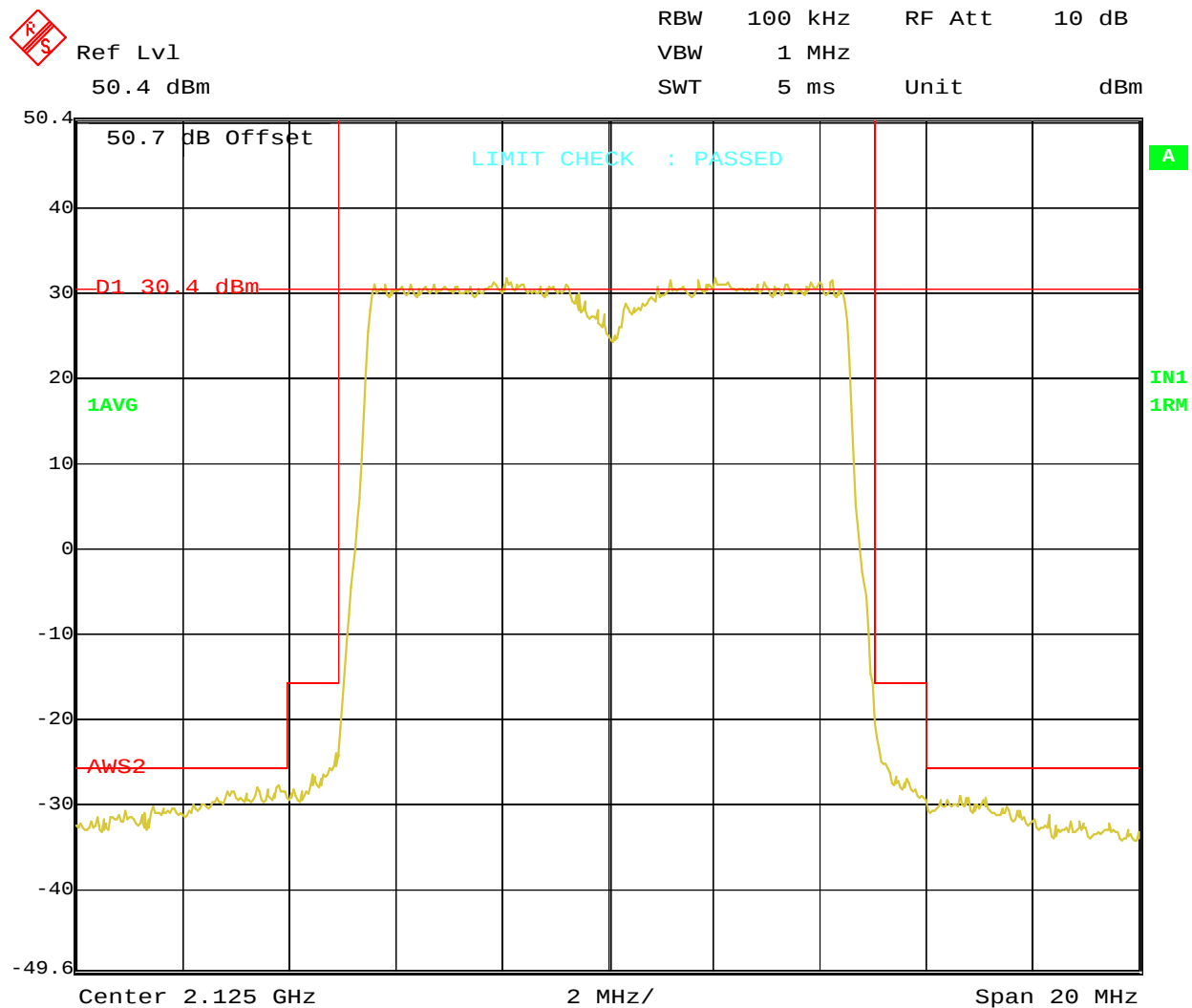
Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 12:54:58

Block: B

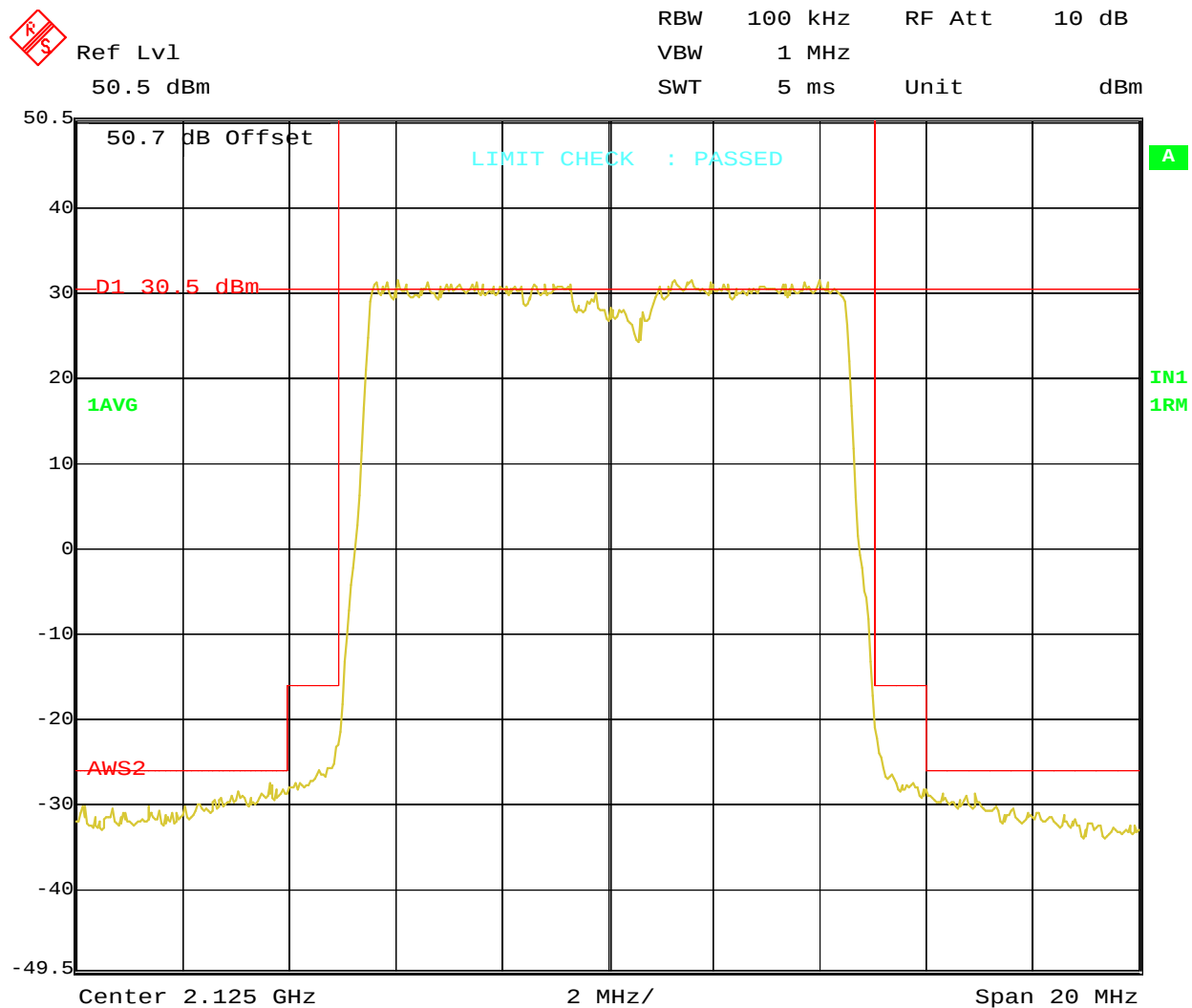
10 MHz Bandwidth (2120-2130 MHz)

2x120 watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH



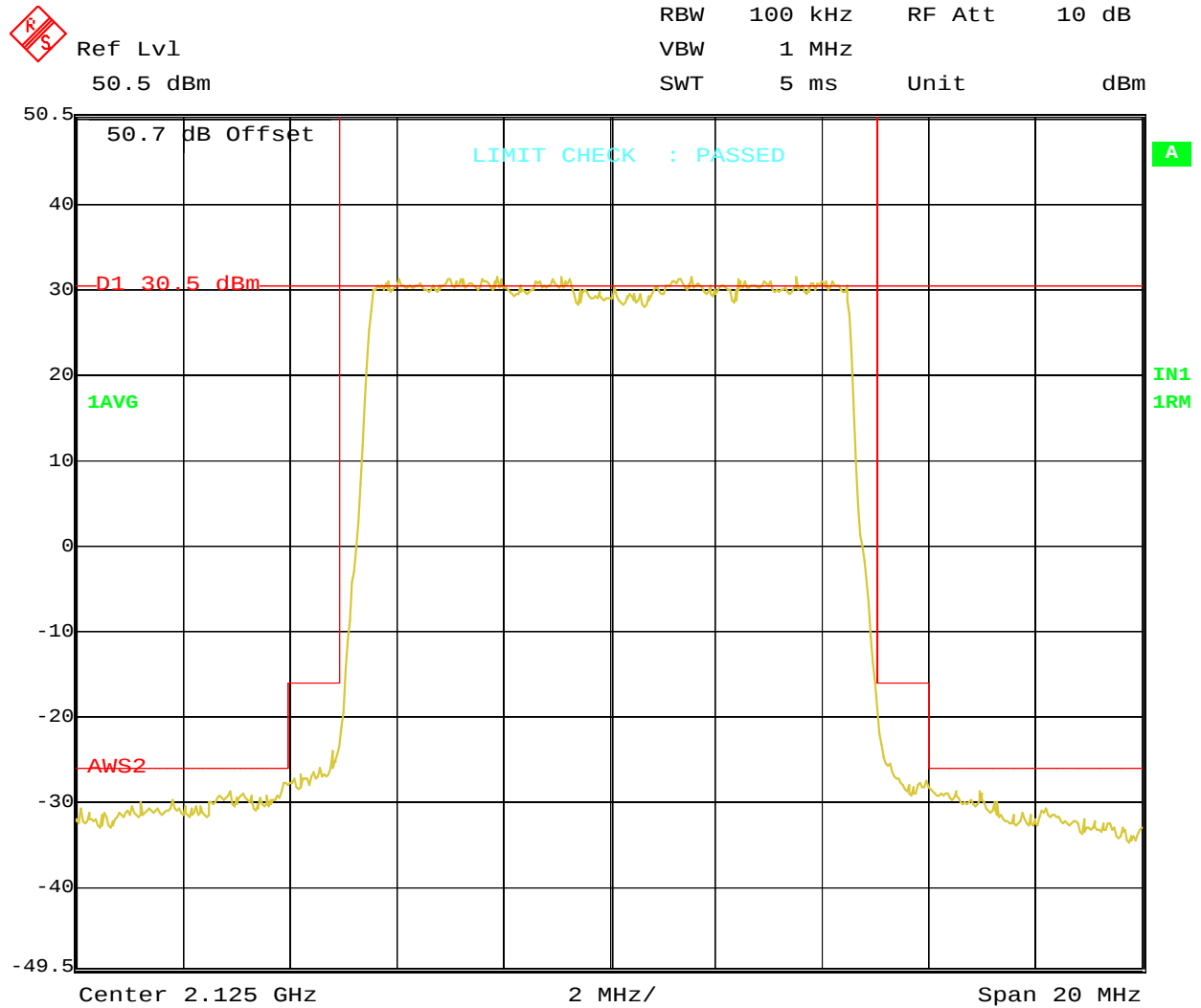
Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 13:04:57



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 7.MAR.2014 09:16:01



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

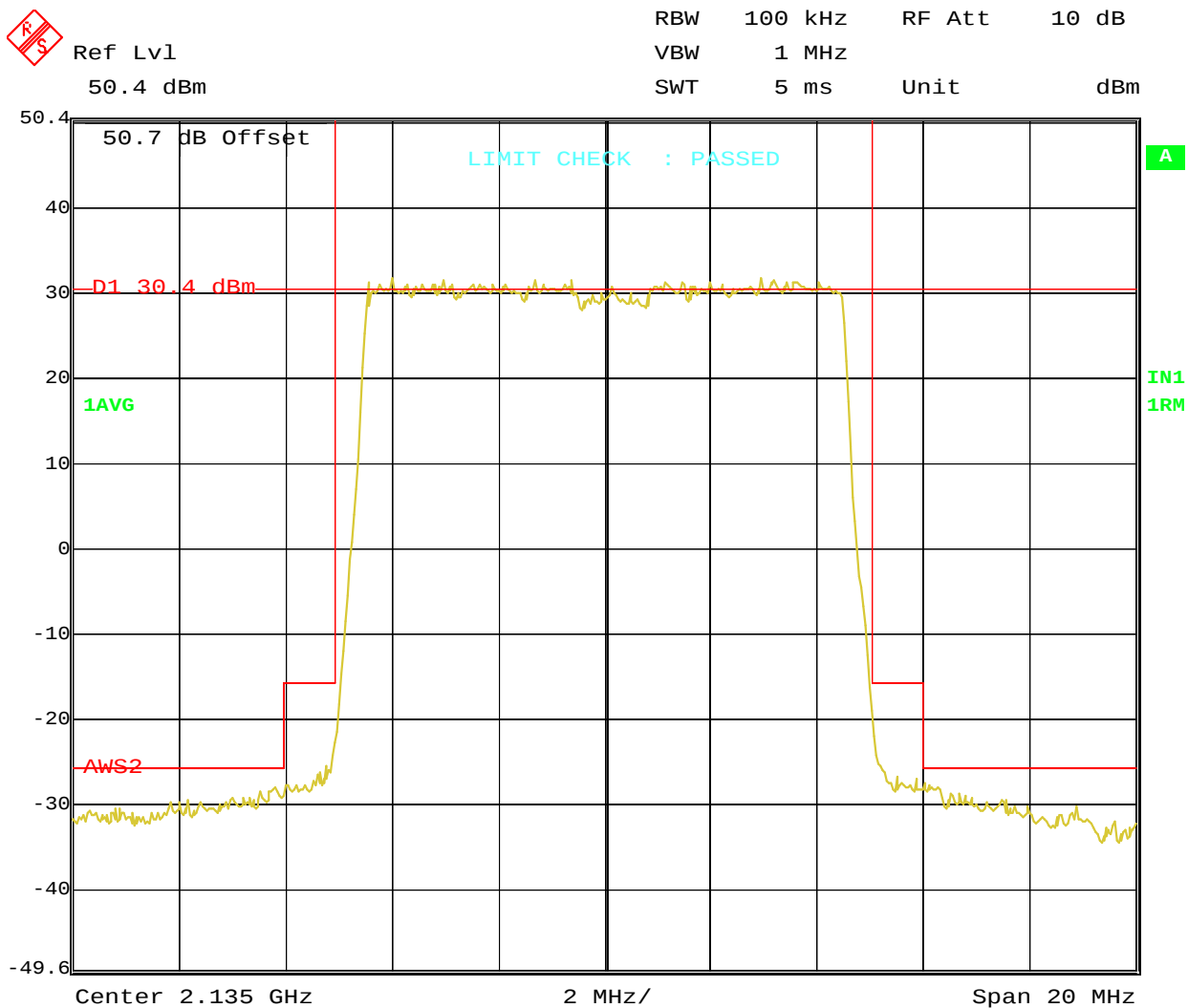
Date: 6.MAR.2014 14:34:05

Block: C+D

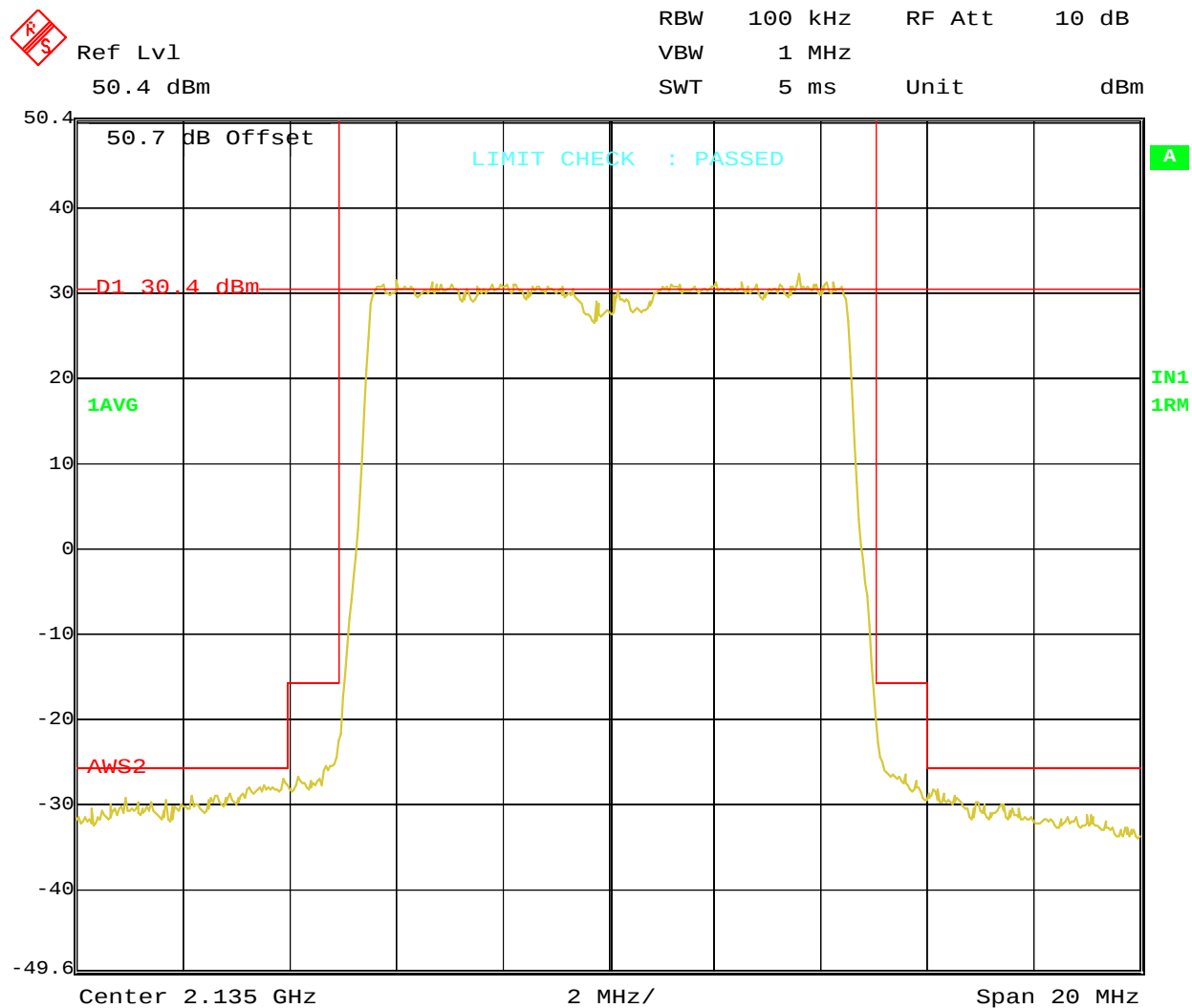
10 MHz Bandwidth (2130-2140 MHz)

2x120 watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 13:57:35

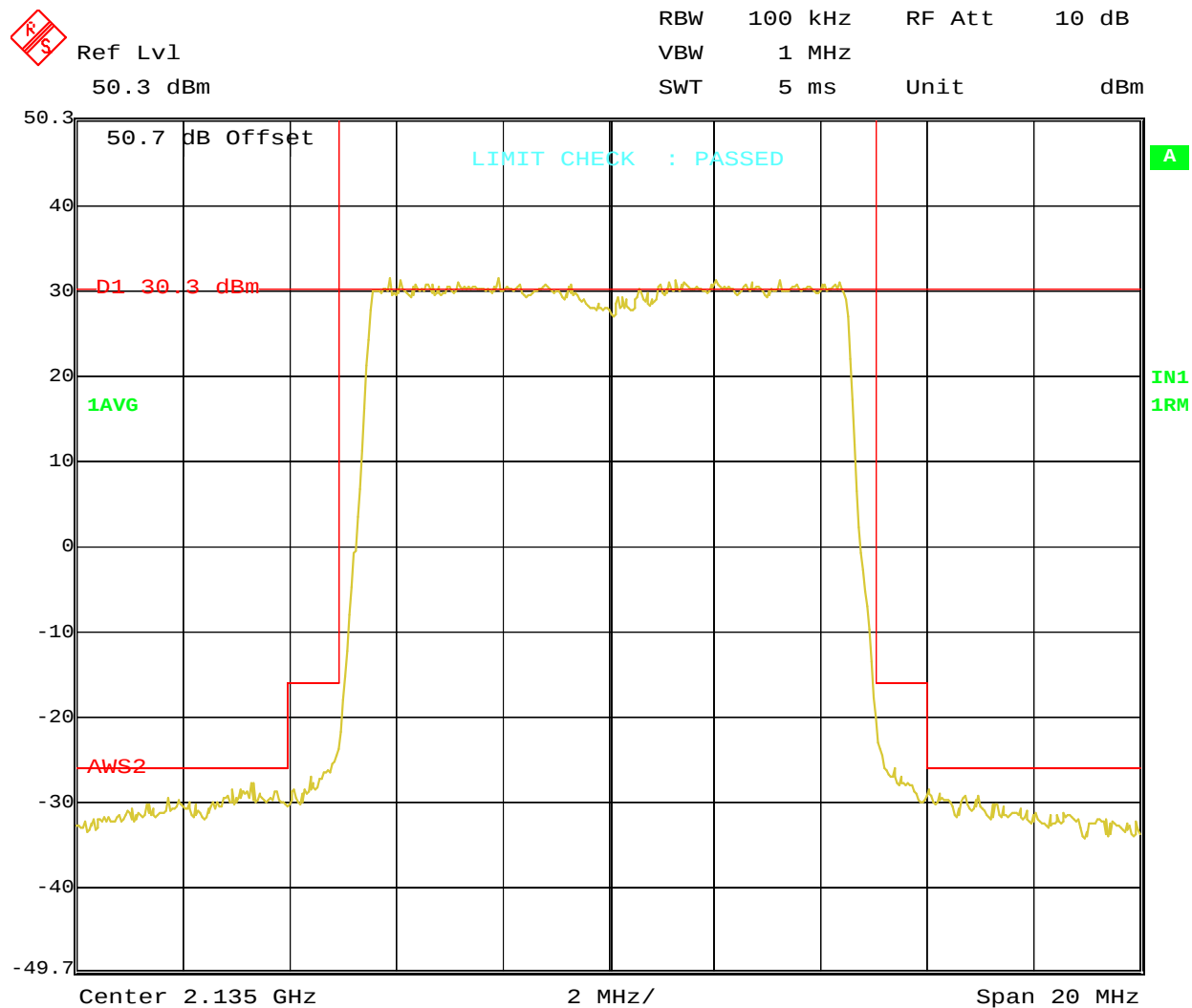


Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 10.MAR.2014 08:06:41



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

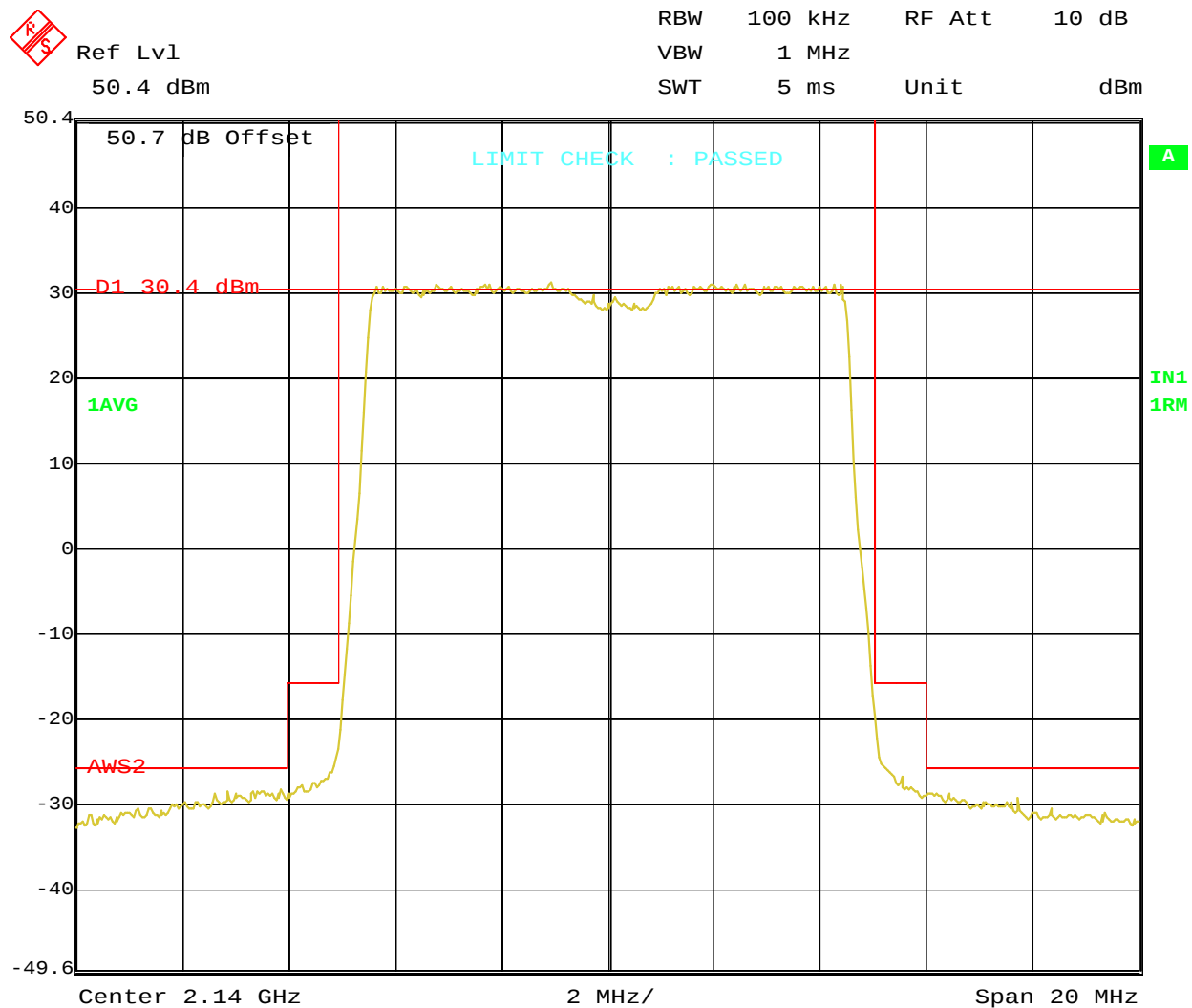
Date: 10.MAR.2014 08:44:31

Block: D+E

10 MHz Bandwidth (2135 - 2145 MHz)

2x120 watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH

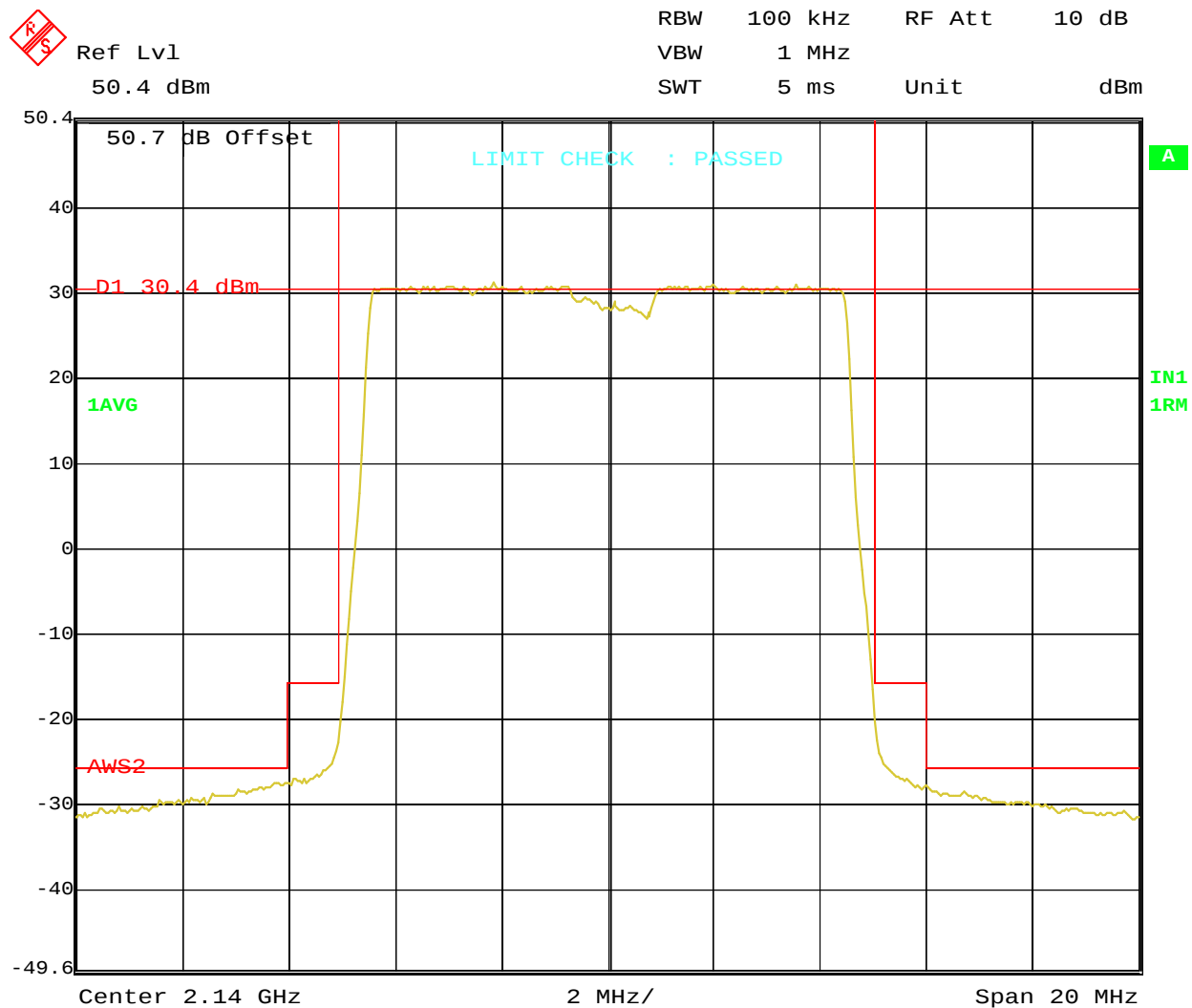


Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz

PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 10.MAR.2014 11:37:35

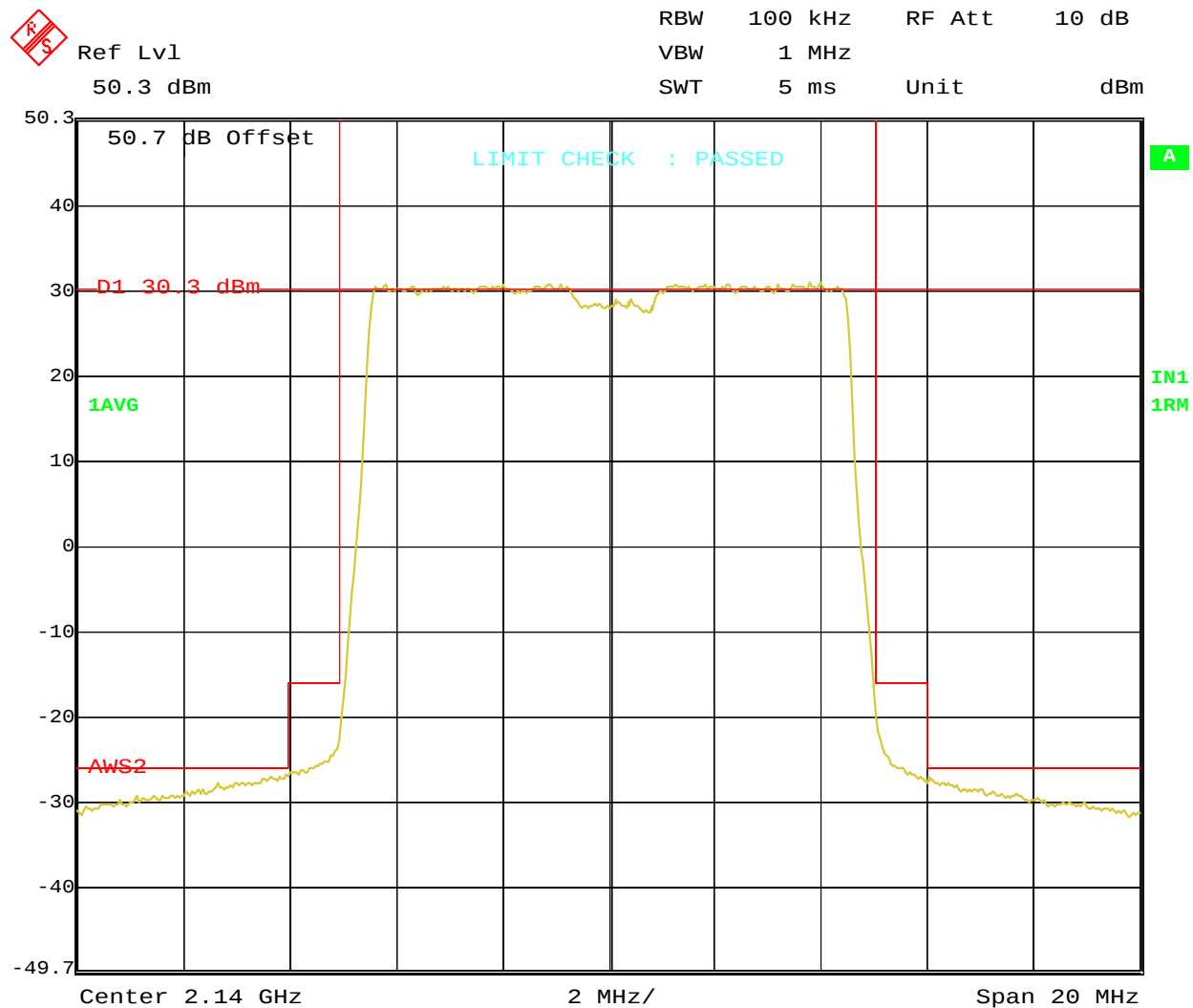


Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz

PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 10.MAR.2014 10:24:24



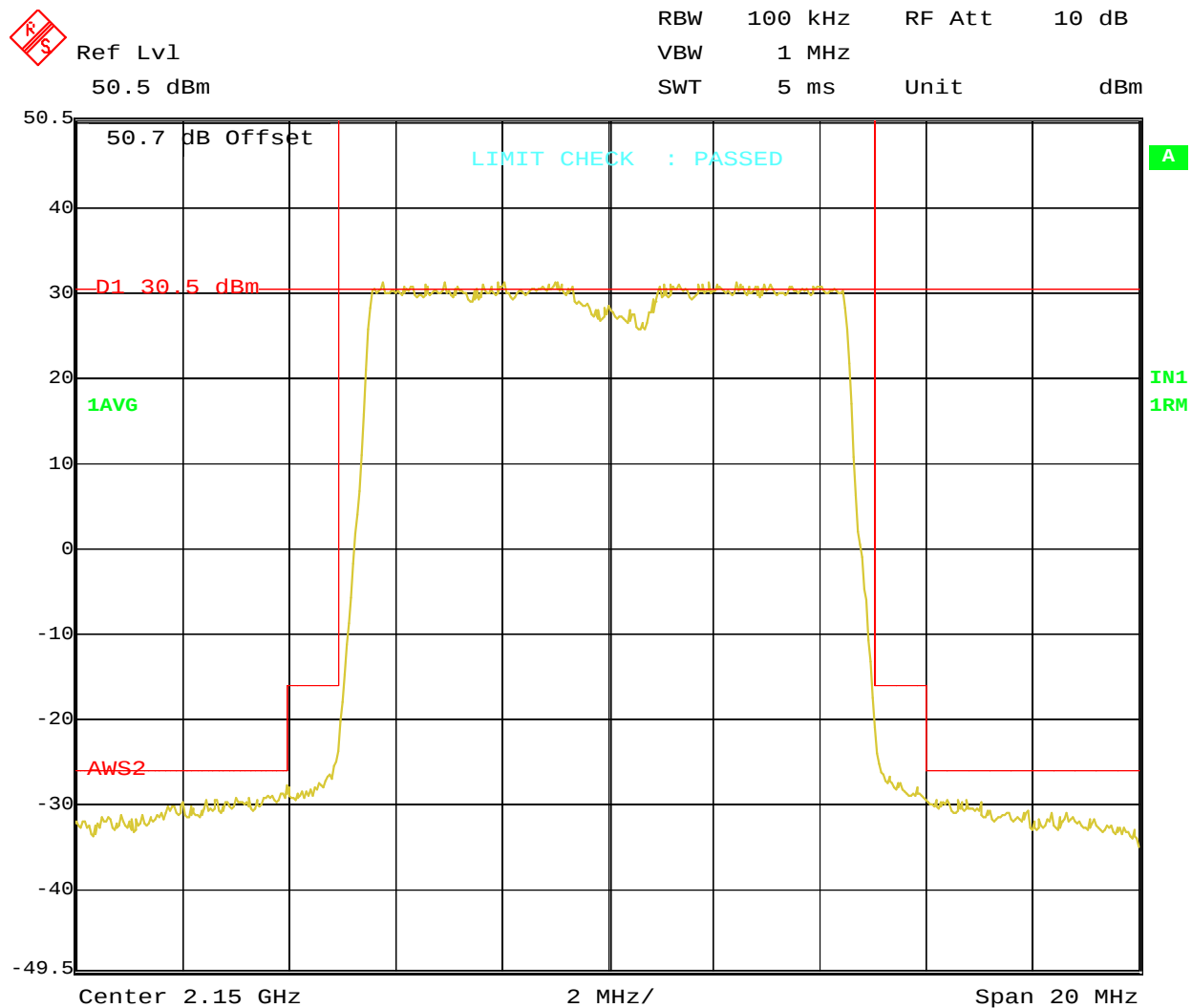
Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHZ
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 09:31:44

Block: F

10 MHz Bandwidth (2145 - 2155 MHz)

2x120 watts (MIMO)

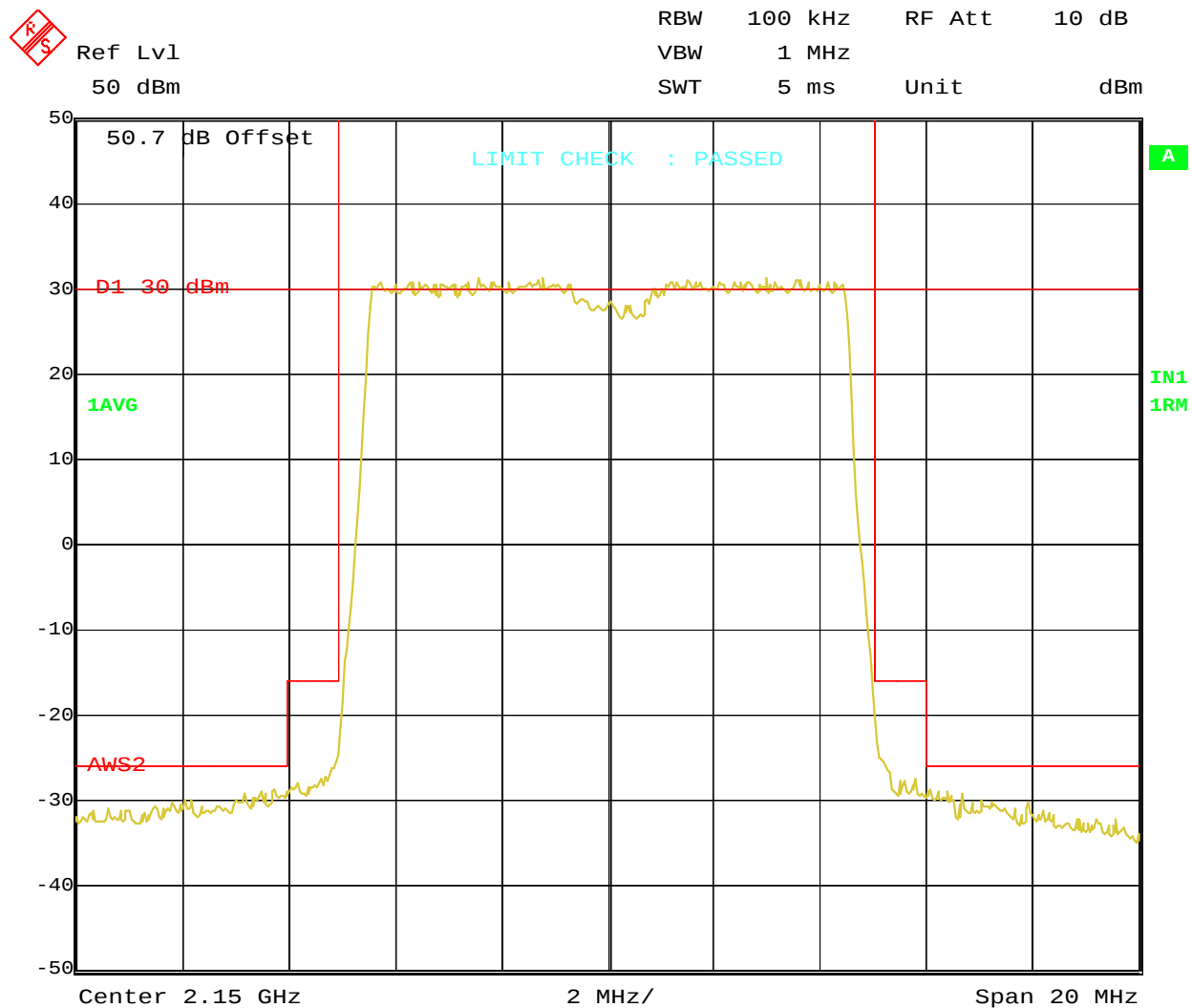
SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13

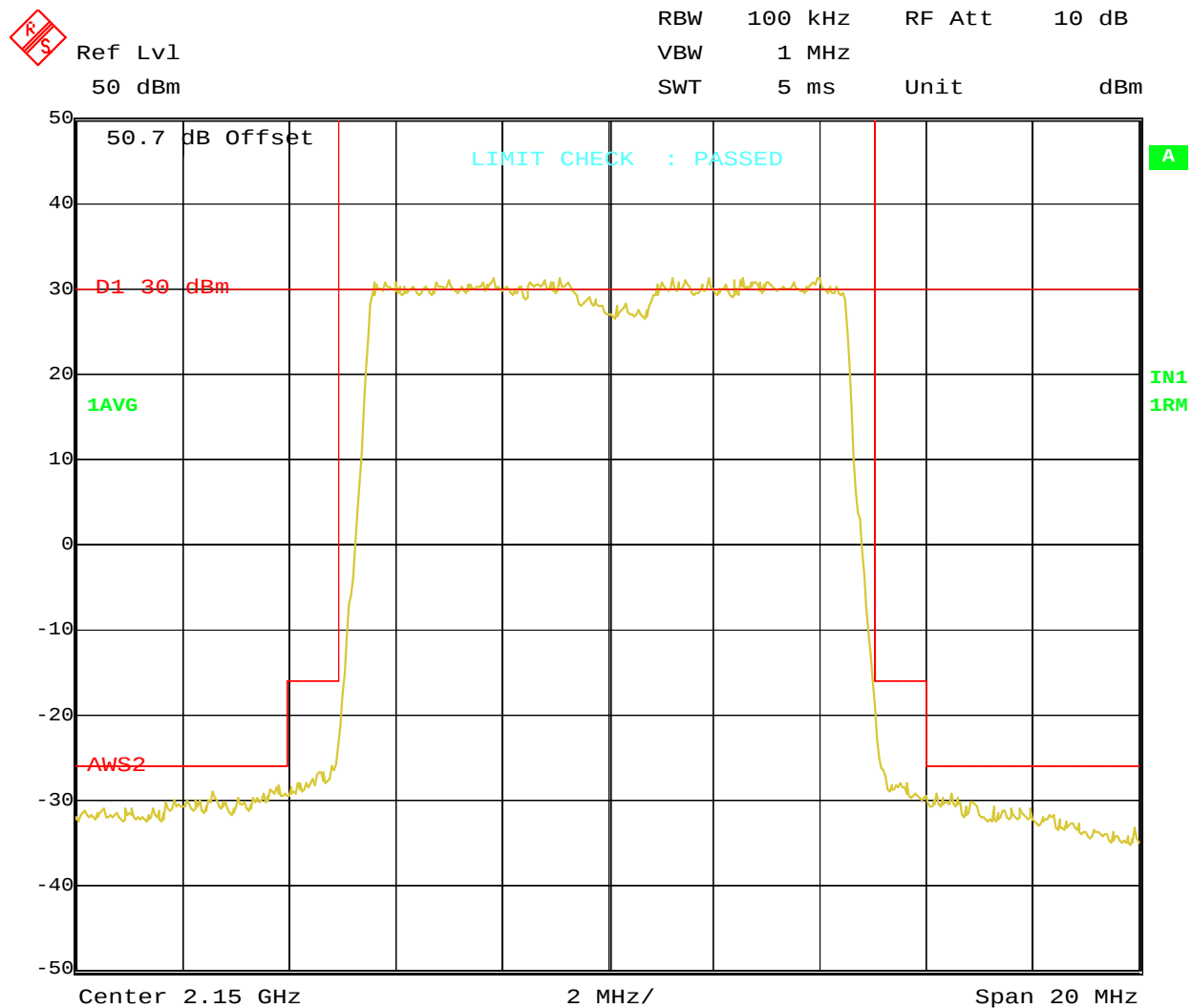
Date: 5.MAR.2014 13:38:06



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13

Date: 6.MAR.2014 08:56:09



Title: OCCUPIED BANDWIDTH; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13

Date: 6.MAR.2014 09:21:01

Measurement 4

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

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

Spurious Emissions at Transmit Antenna Terminals

Spurious Emissions at the transmit-antenna terminals were investigated over the frequency range of 9 kHz to the 22 GHz. The test setup is as described in Figure B. 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 B. The required emission limitation is specified in 27.53 (g) and FCC Part 24 Subpart E section 24.238. Measurements were made at 120W per carrier for 10 MHz Bandwidth at antenna terminals. The measured spurious emission levels were plotted for the frequency range 9 kHz to 22 GHz. The measurements were made using following receiver parameters:

Frequency Range	Resolution Bandwidth
9 kHz to 30 MHz	10 kHz
30 MHz to 1 GHz	100 kHz
1 GHz to 22 GHz	1 MHz

The list of blocks and bands, tested are listed below:

Table for 10MHz for 120W all Contiguous Bands

Frequency Range (MHz) & Block	Bandwidth (MHz)	Center Frequency (MHz)	Power (Watts)
2110-2120 (A)	10	2115	120
2120-2130 (B)	10	2125	120
2130-2140 (C+D)	10	2135	120
2135-2145 (D+E)	10	2140	120
2145-2155 (F)	10	2150	120

FCC Section 27.53(g)(3) Based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

Pursuant to FCC OET RULES 662911 D01 and D02 for two antenna MIMO mode of operations, the FCC limit of -13dBm shall be 3dB more stringent, therefore all channel edge and out of band spurious emissions shall be -16dBm.

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(h).

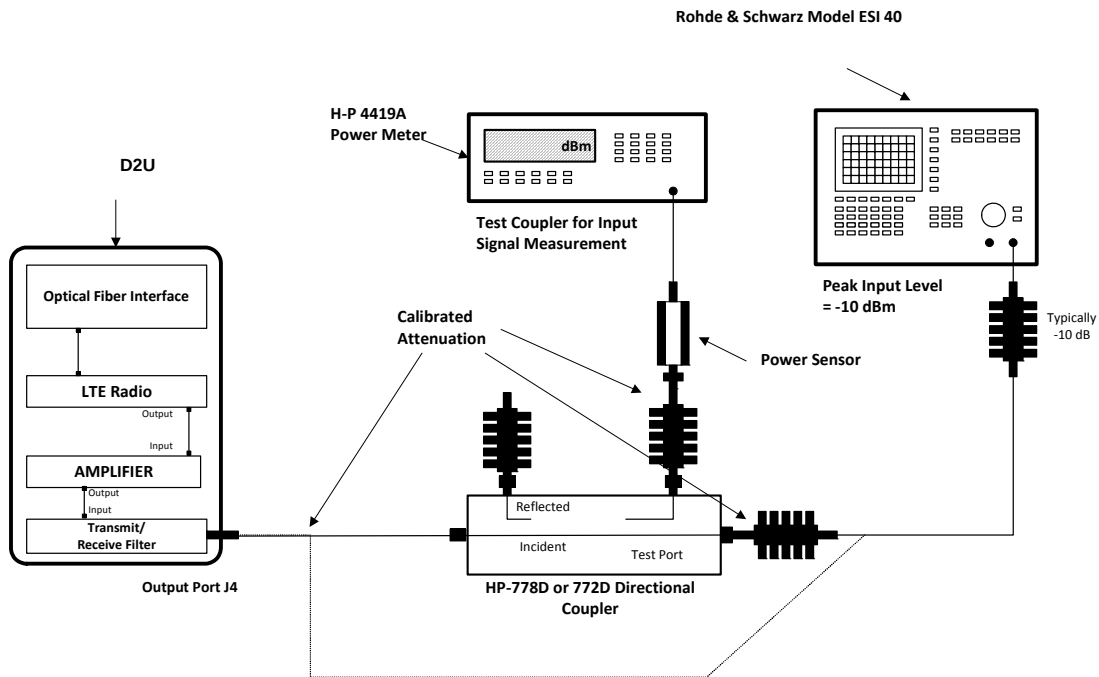
Measurement uncertainty:

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 B. TEST CONFIGURATION FOR CONDUCTED SPURIOUS

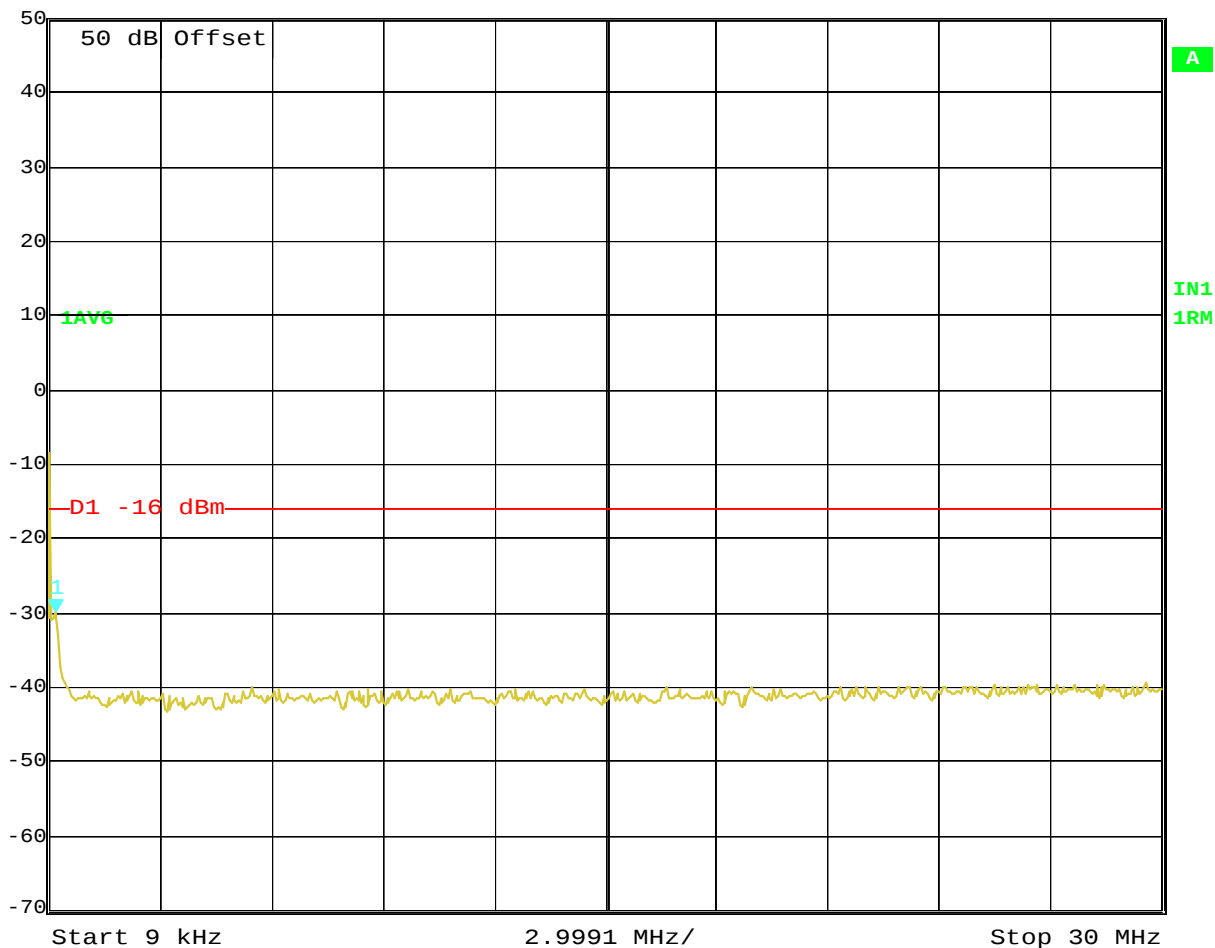


**Transmit Port
Antenna Conducted Spurious Emissions**

**Block: A
10 MHz Bandwidth (2110 - 2120 MHz)
2x120 watts (MIMO)
QPSK Modulation**



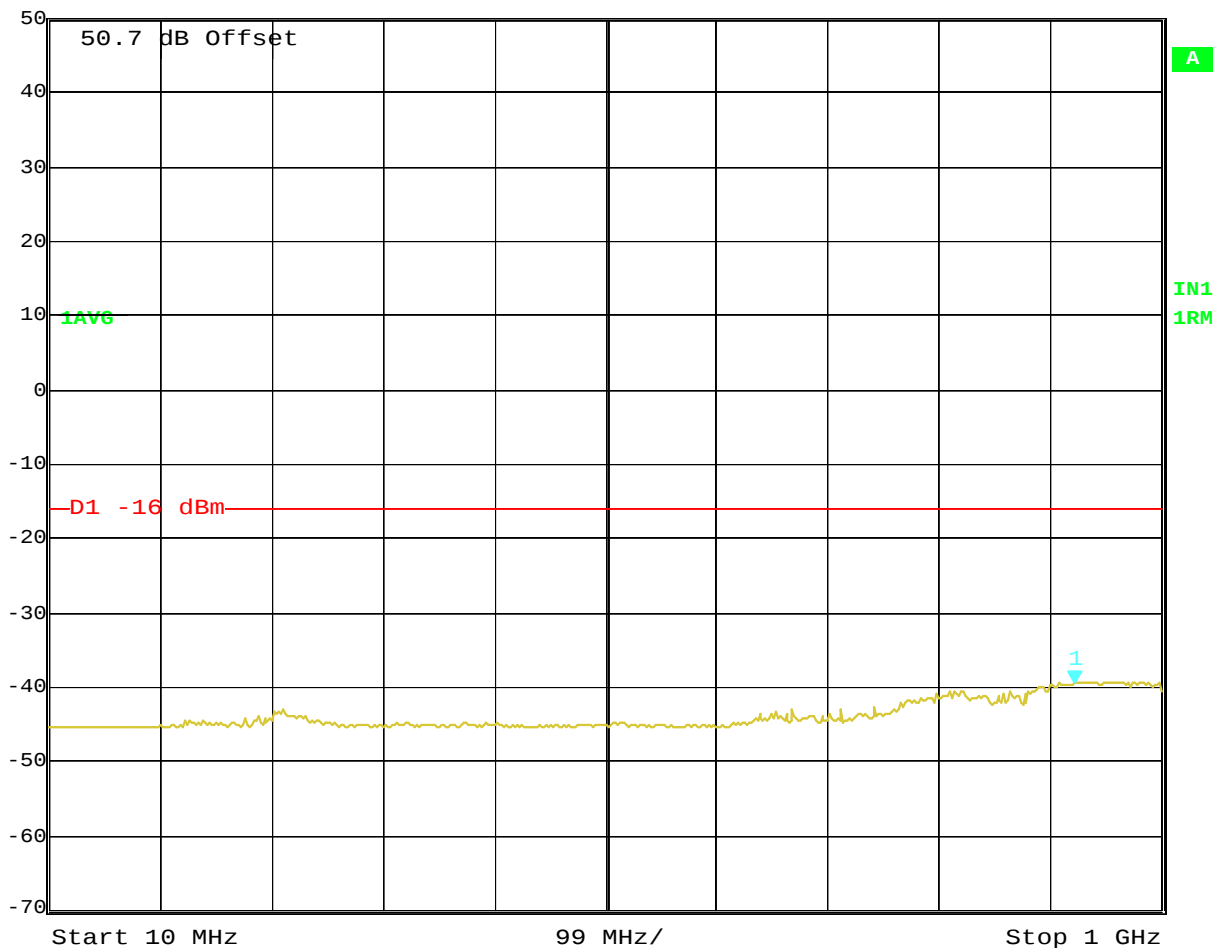
Ref Lvl 50 dBm
Marker 1 [T1] -29.96 dBm
189.30661323 kHz
RBW 10 kHz
VBW 30 kHz
RF Att 30 dB
SWT 760 ms
Unit dBm



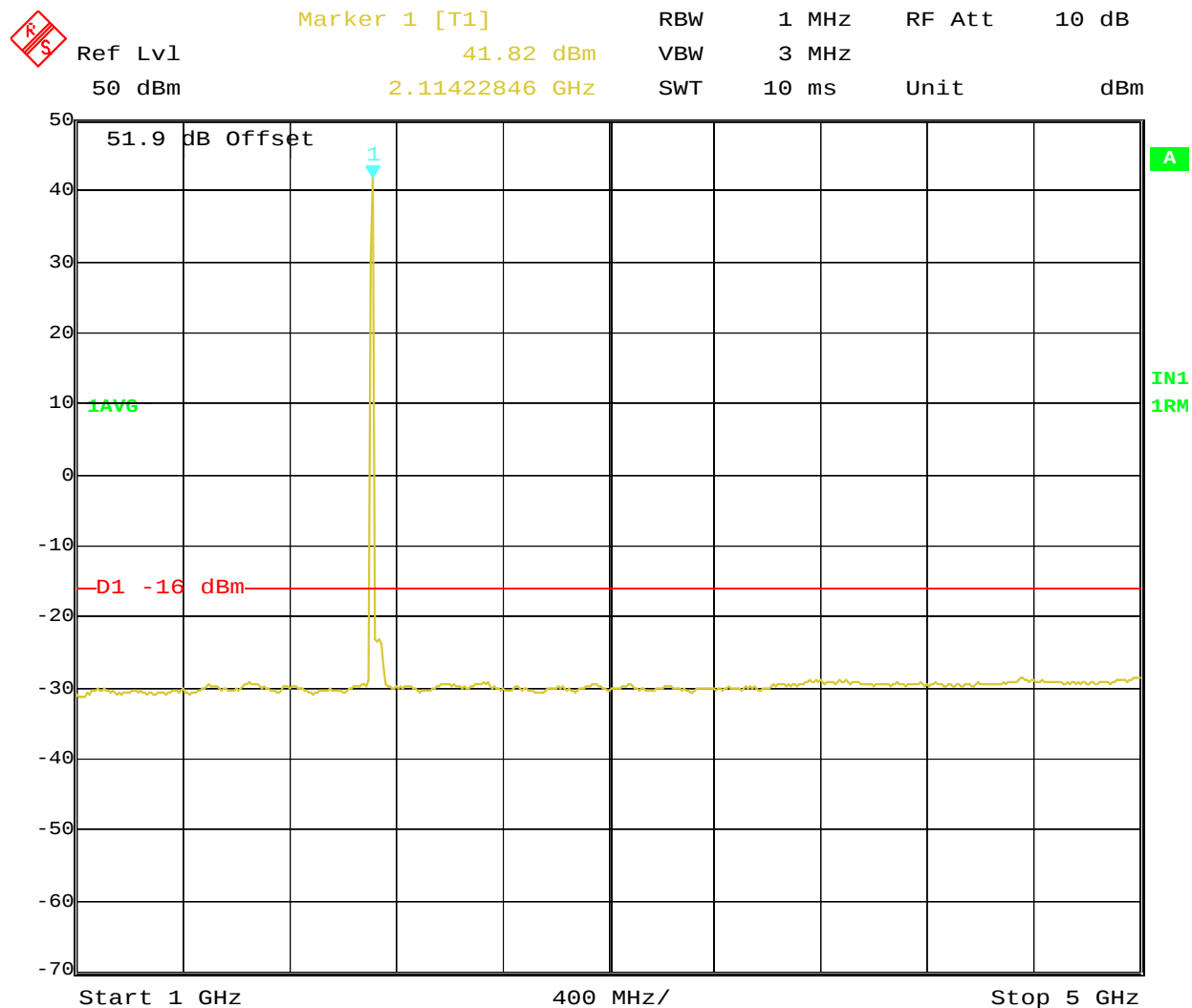
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 10:21:45



Ref Lvl 50 dBm
Marker 1 [T1] -39.54 dBm
922.62525050 MHz
RBW 100 kHz
RF Att 10 dB
VBW 300 kHz
SWT 250 ms
Unit dBm



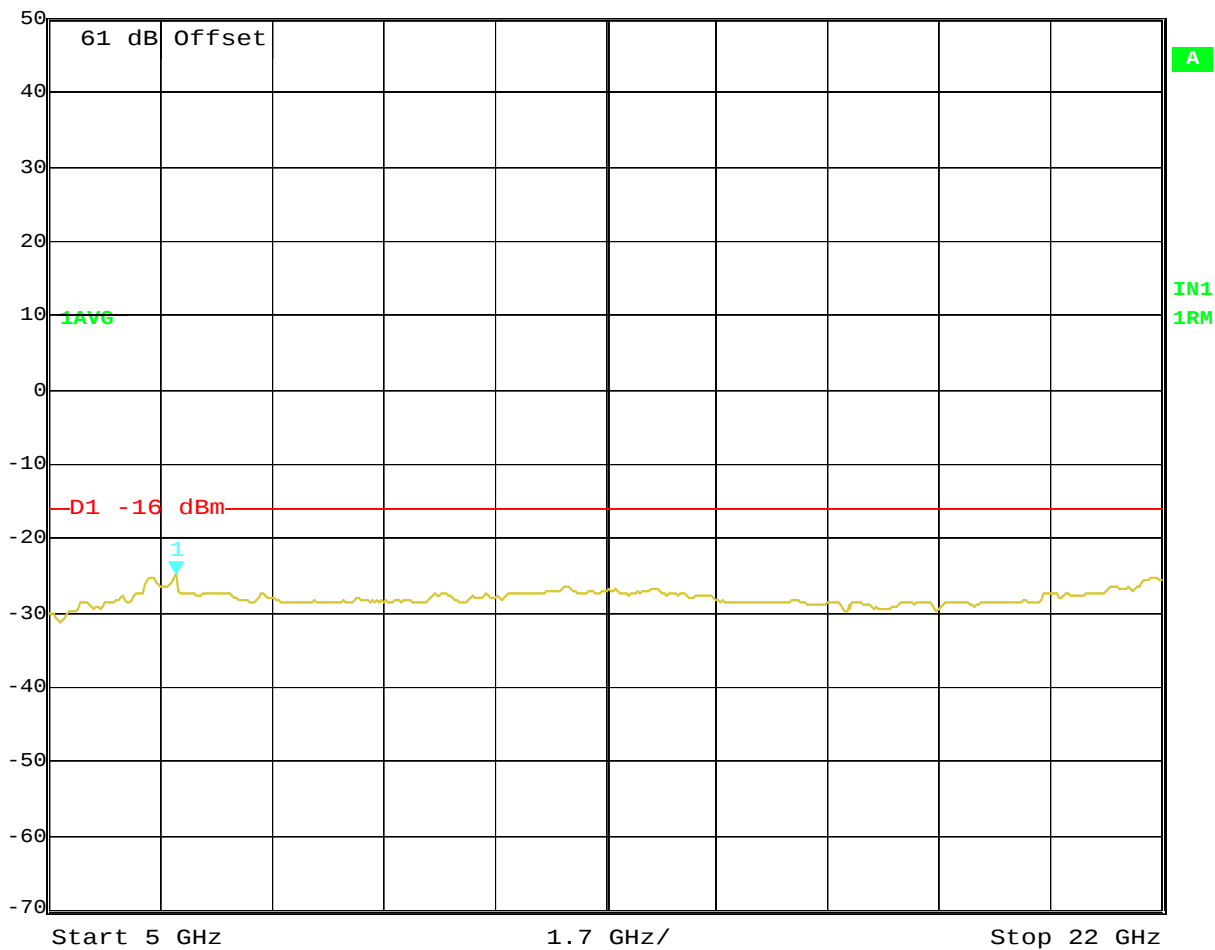
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 10:19:57



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 10:18:30



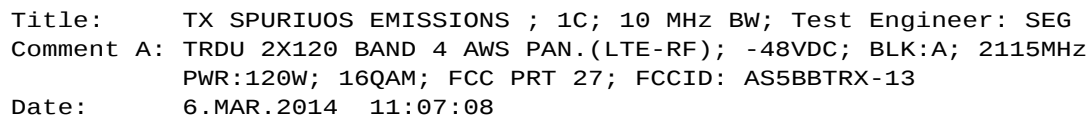
Ref Lvl 50 dBm
Marker 1 [T1] -24.75 dBm
6.94188377 GHz
RBW 1 MHz
VBW 3 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm



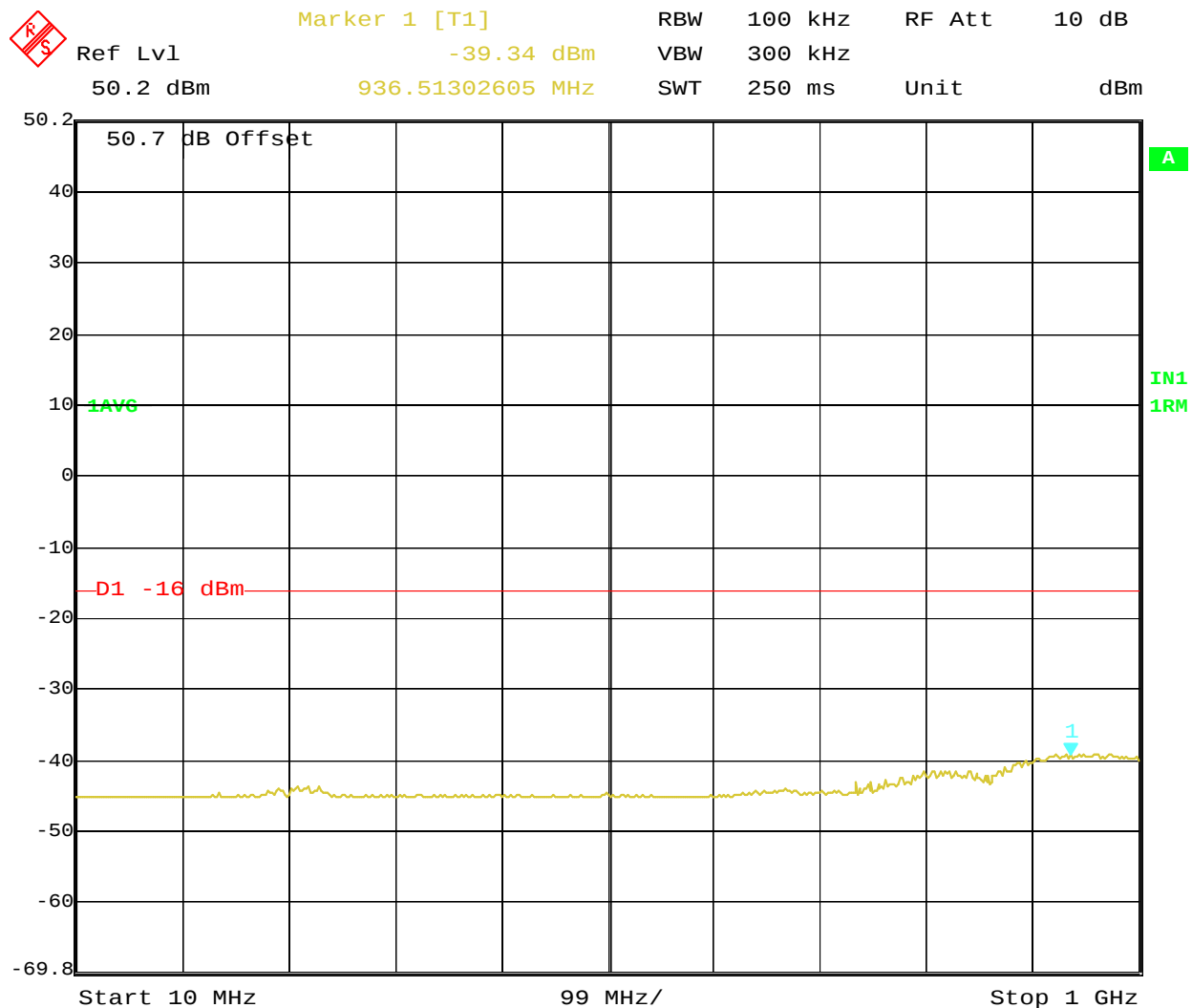
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 10:14:12

Transmit Port
Antenna Conducted Spurious Emissions

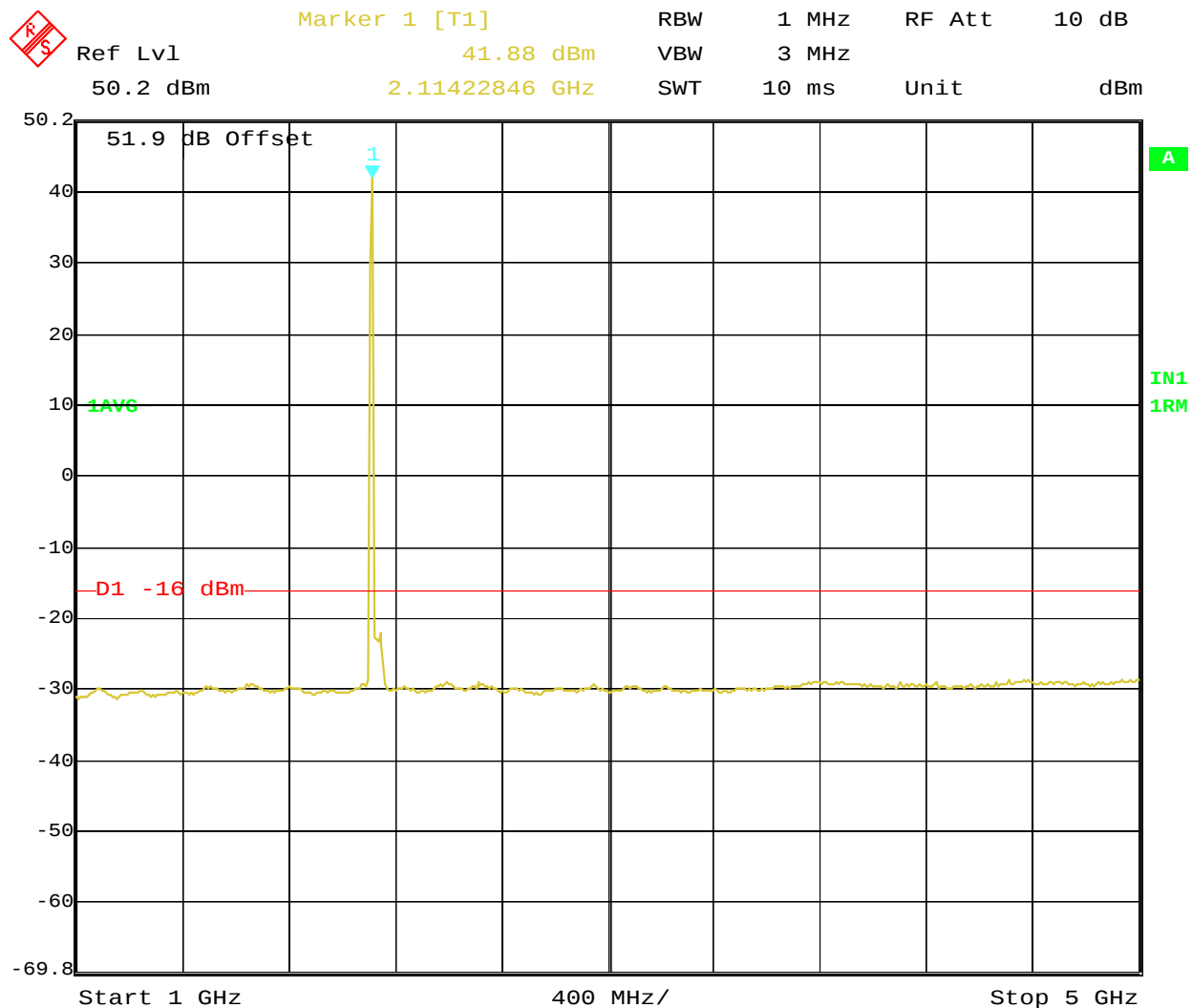
Block: A
10 MHz Bandwidth (2110 - 2120 MHz)
2x120 watts (MIMO)
16QAM Modulation



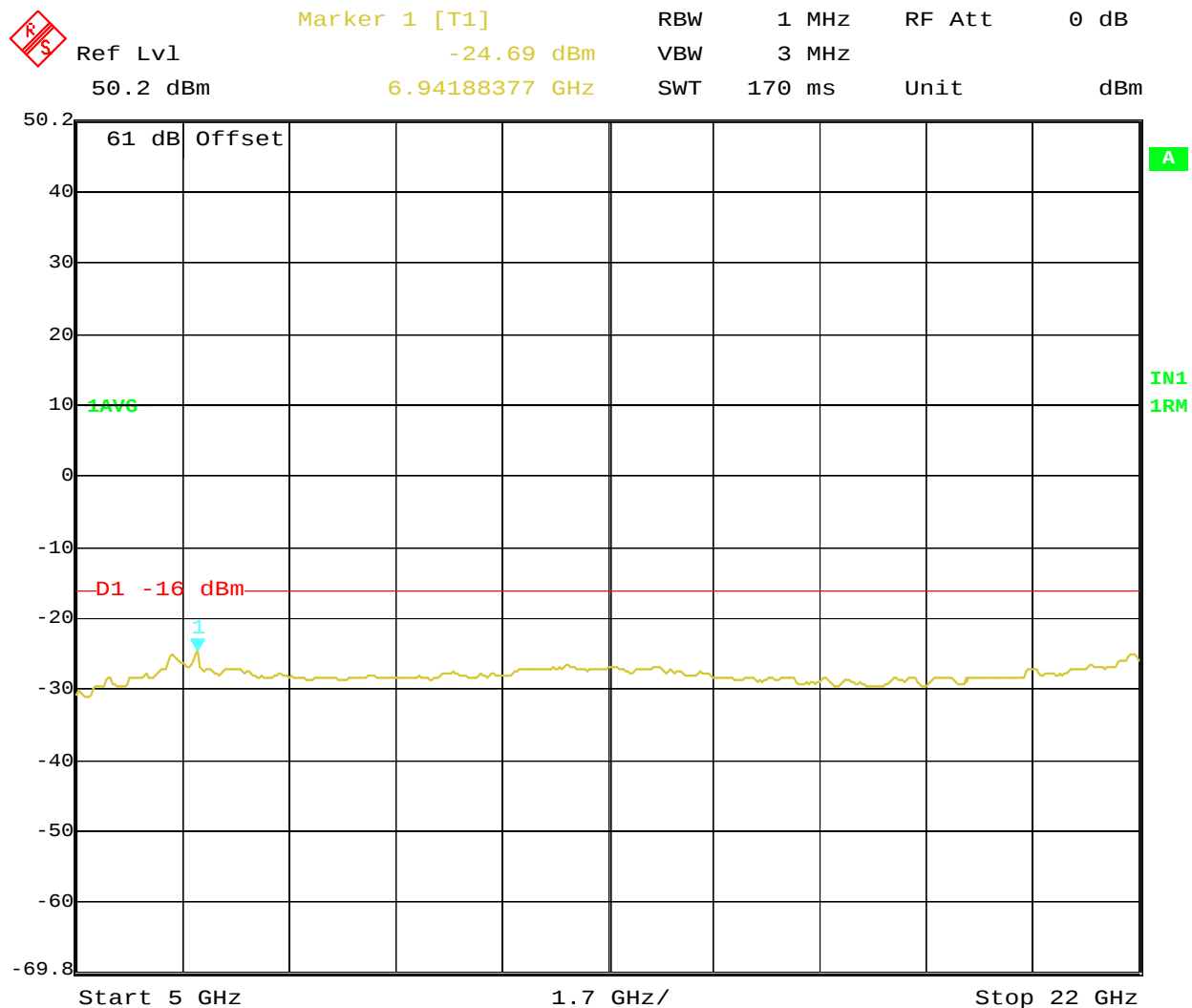
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 11:07:08



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 11:09:17



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 11:10:33



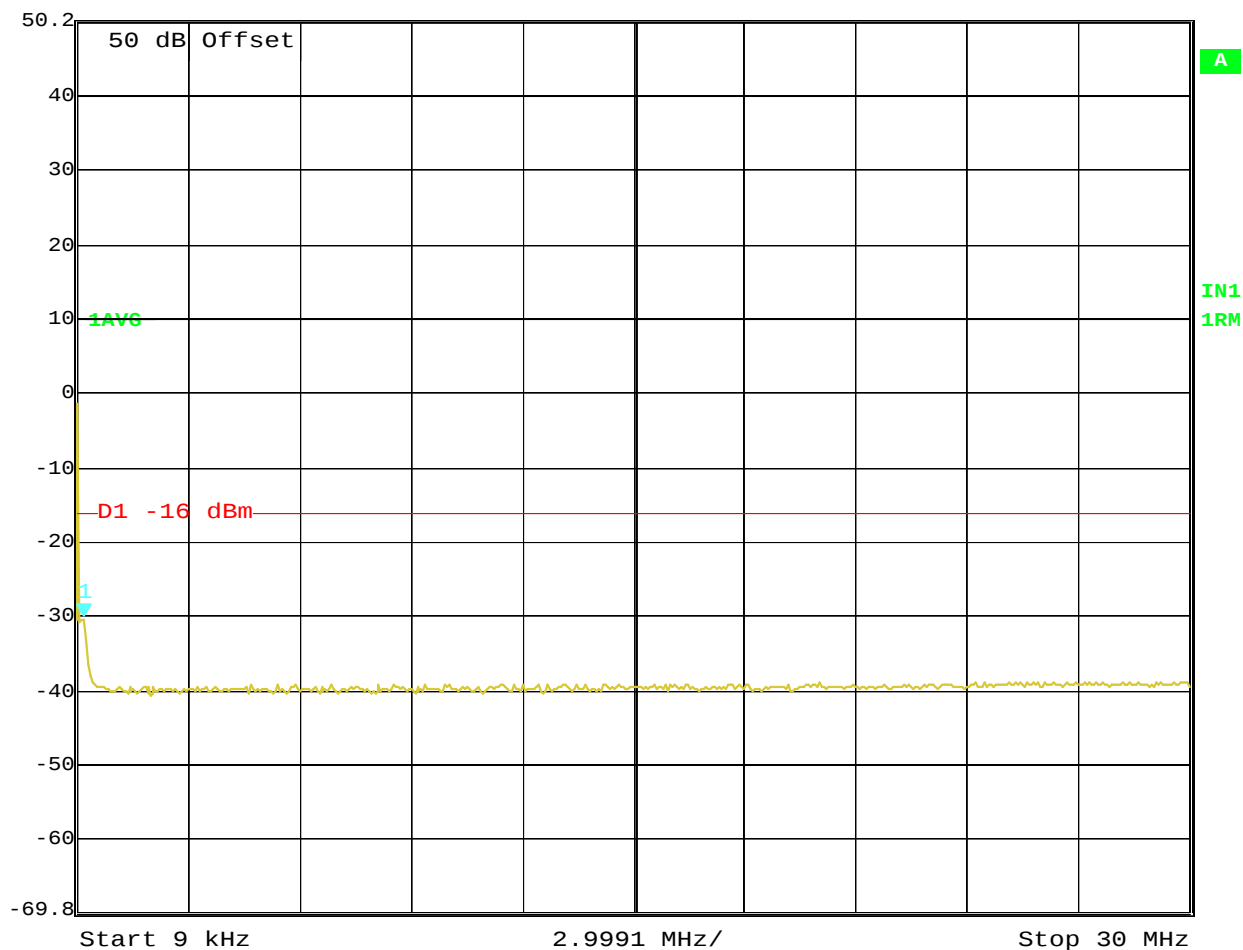
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
 PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
 Date: 6.MAR.2014 11:13:48

**Transmit Port
Antenna Conducted Spurious Emissions**

**Block: A
10 MHz Bandwidth (2110 - 2120 MHz)
2x120 watts (MIMO)
64QAM Modulation**



Marker 1 [T1] RBW 10 kHz RF Att 30 dB
Ref Lvl -30.10 dBm VBW 30 kHz
50.2 dBm 189.30661323 kHz SWT 760 ms Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 12:53:06



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.34 dBm

VBW 300 kHz

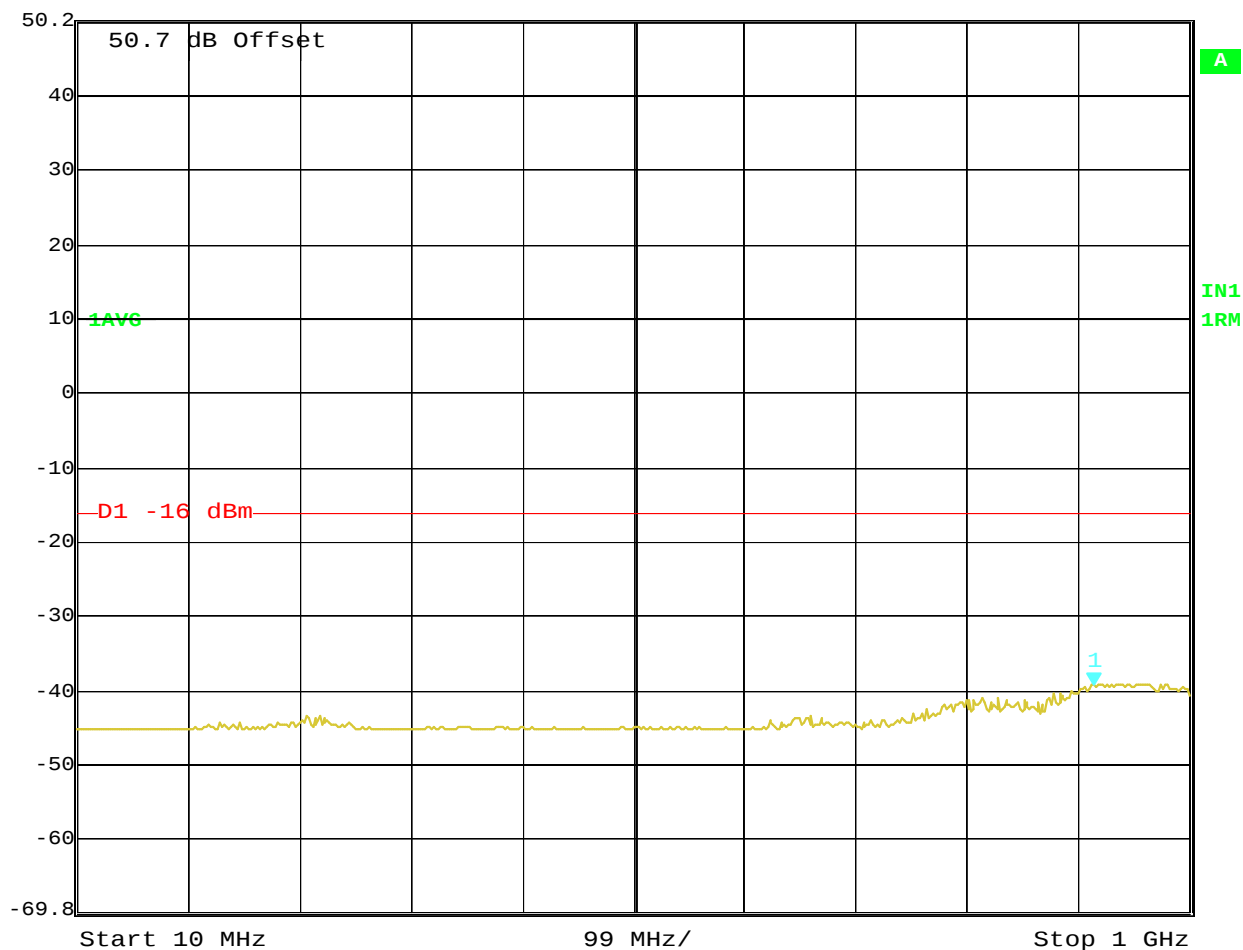
50.2 dBm

914.68937876 MHz

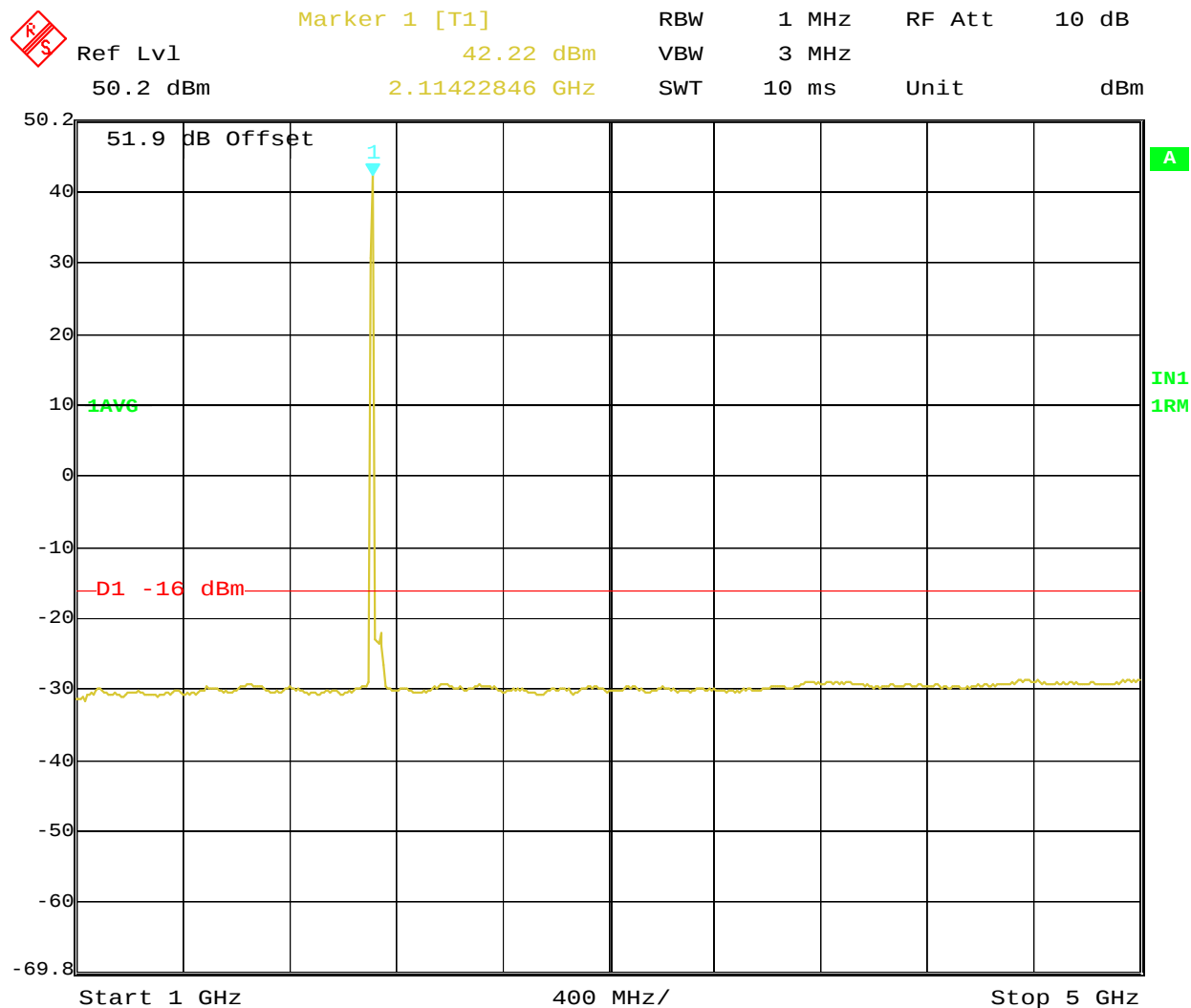
SWT 250 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 12:50:33



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 12:49:18



Marker 1 [T1]

RBW

1 MHz

RF Att

0 dB

Ref Lvl

-24.69 dBm

VBW

3 MHz

50.2 dBm

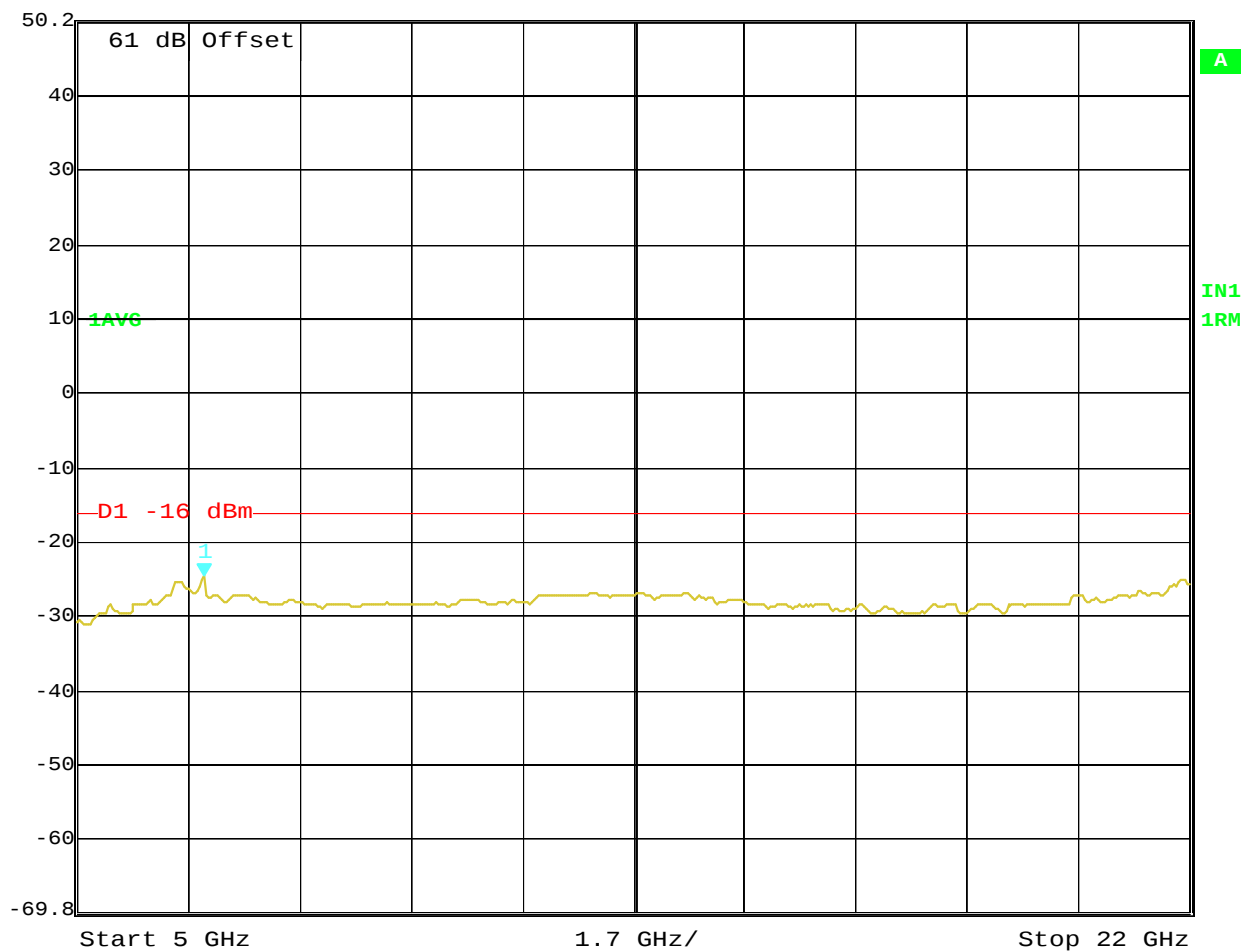
6.94188377 GHz

SWT

170 ms

Unit

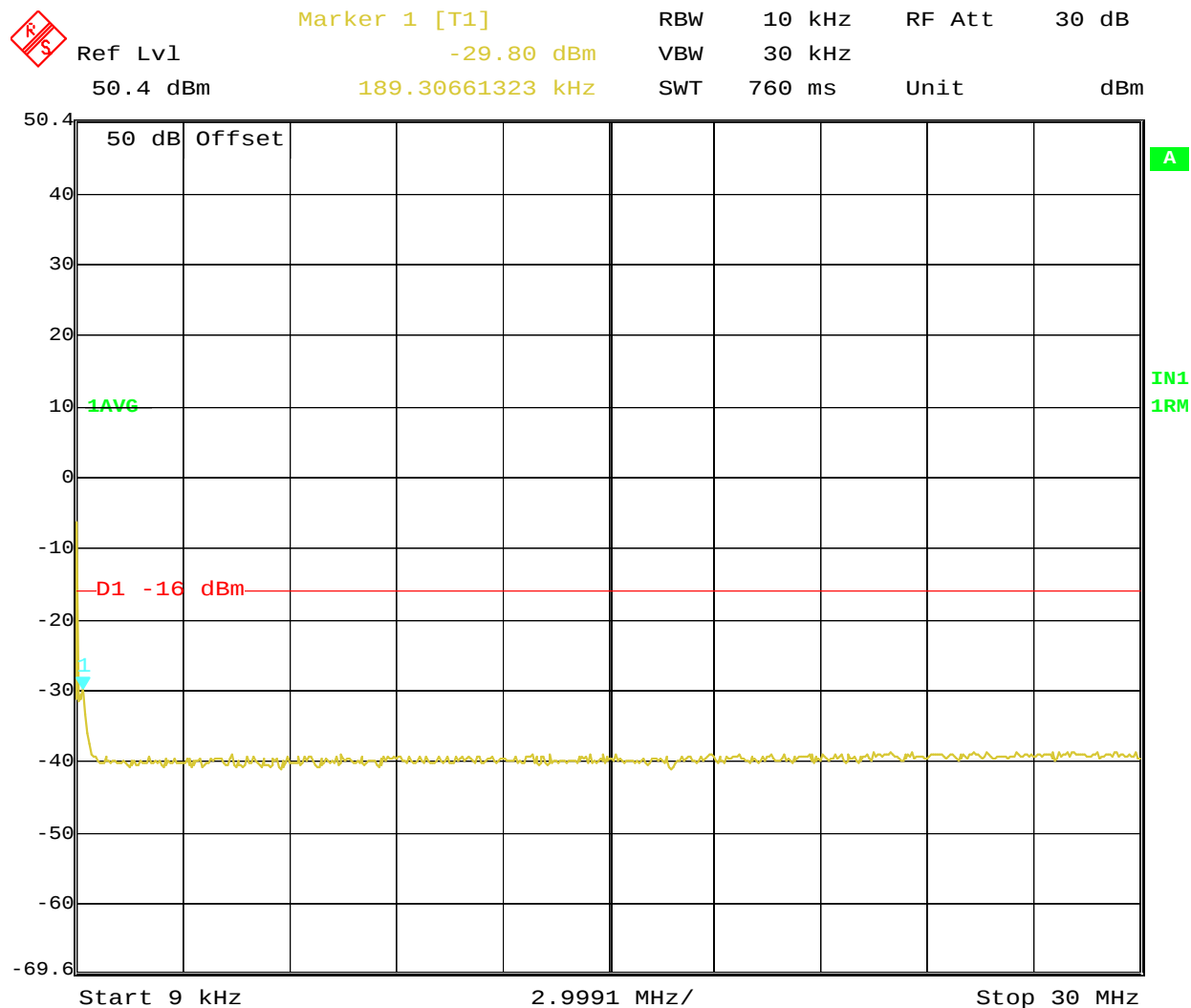
dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:A; 2115MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 12:45:15

Transmit Port
Antenna Conducted Spurious Emissions

Block: B
10 MHz Bandwidth (2120 - 2130 MHz)
2x120 watts (MIMO)
QPSK Modulation



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz

PWR:120W;QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

Date: 7.MAR.2014 13:12:30



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.49 dBm

VBW 300 kHz

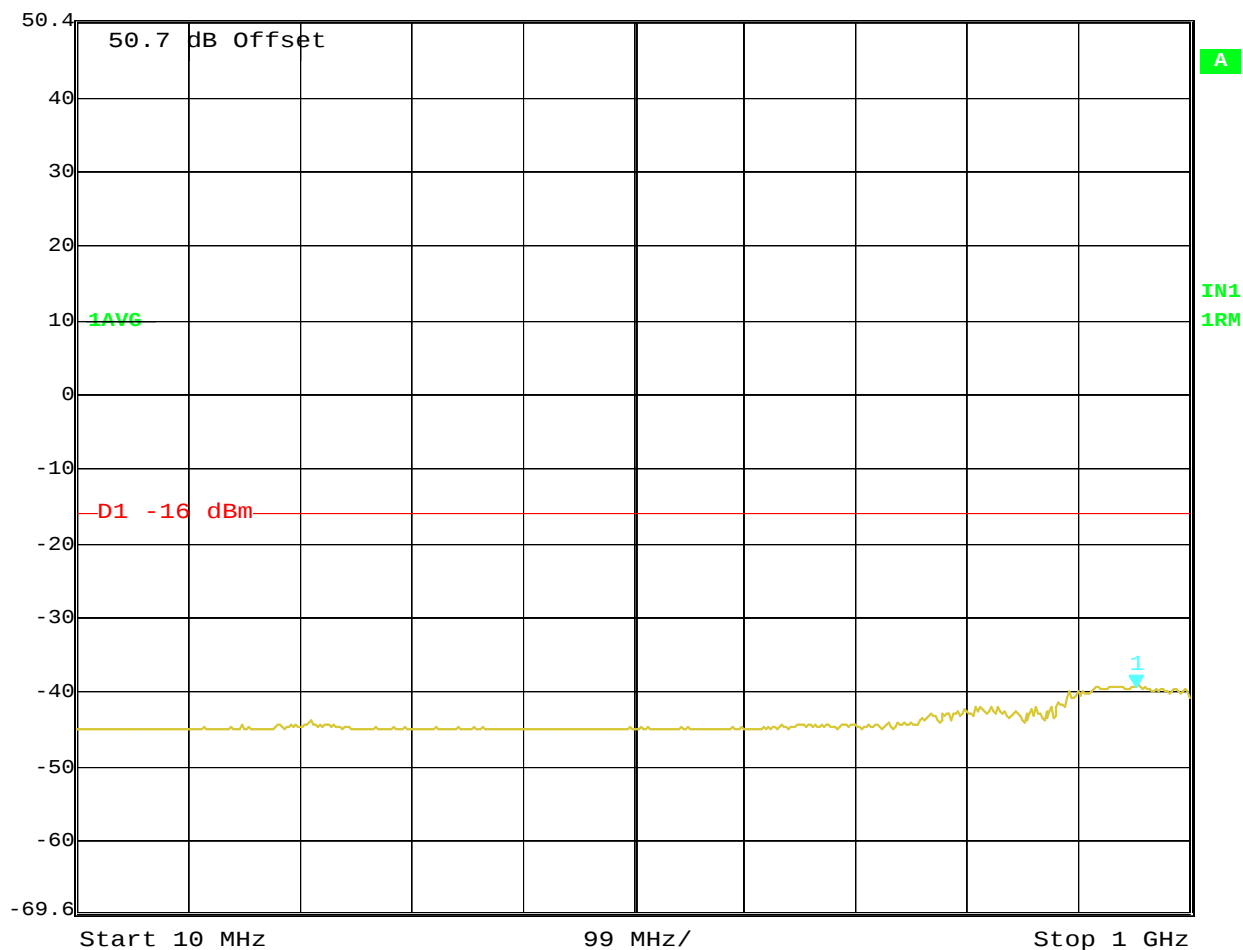
50.4 dBm

952.38476954 MHz

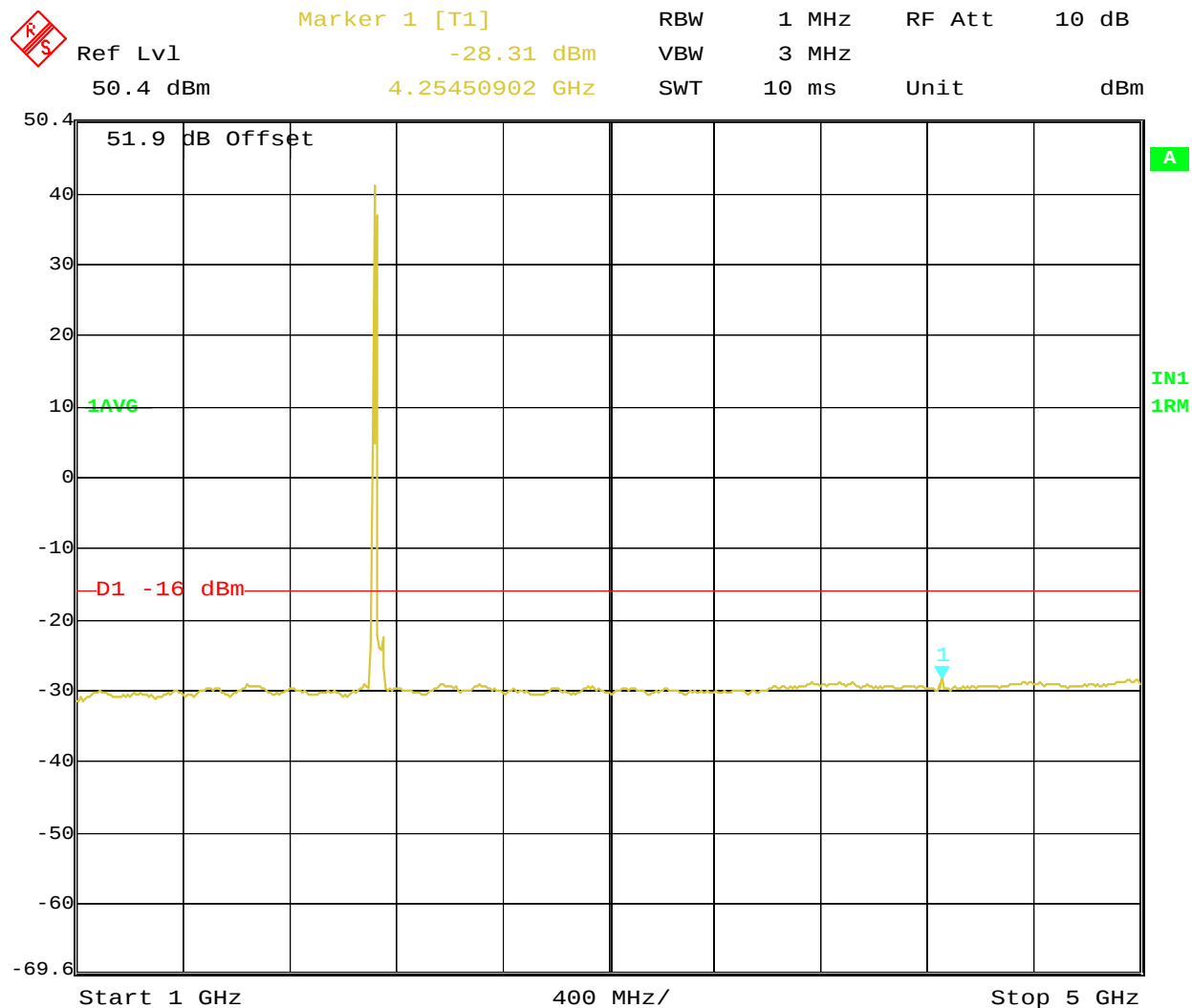
SWT 250 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 13:14:04



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 13:15:33



Marker 1 [T1]

RBW 1 MHz RF Att 0 dB

Ref Lvl -24.88 dBm

VBW 3 MHz

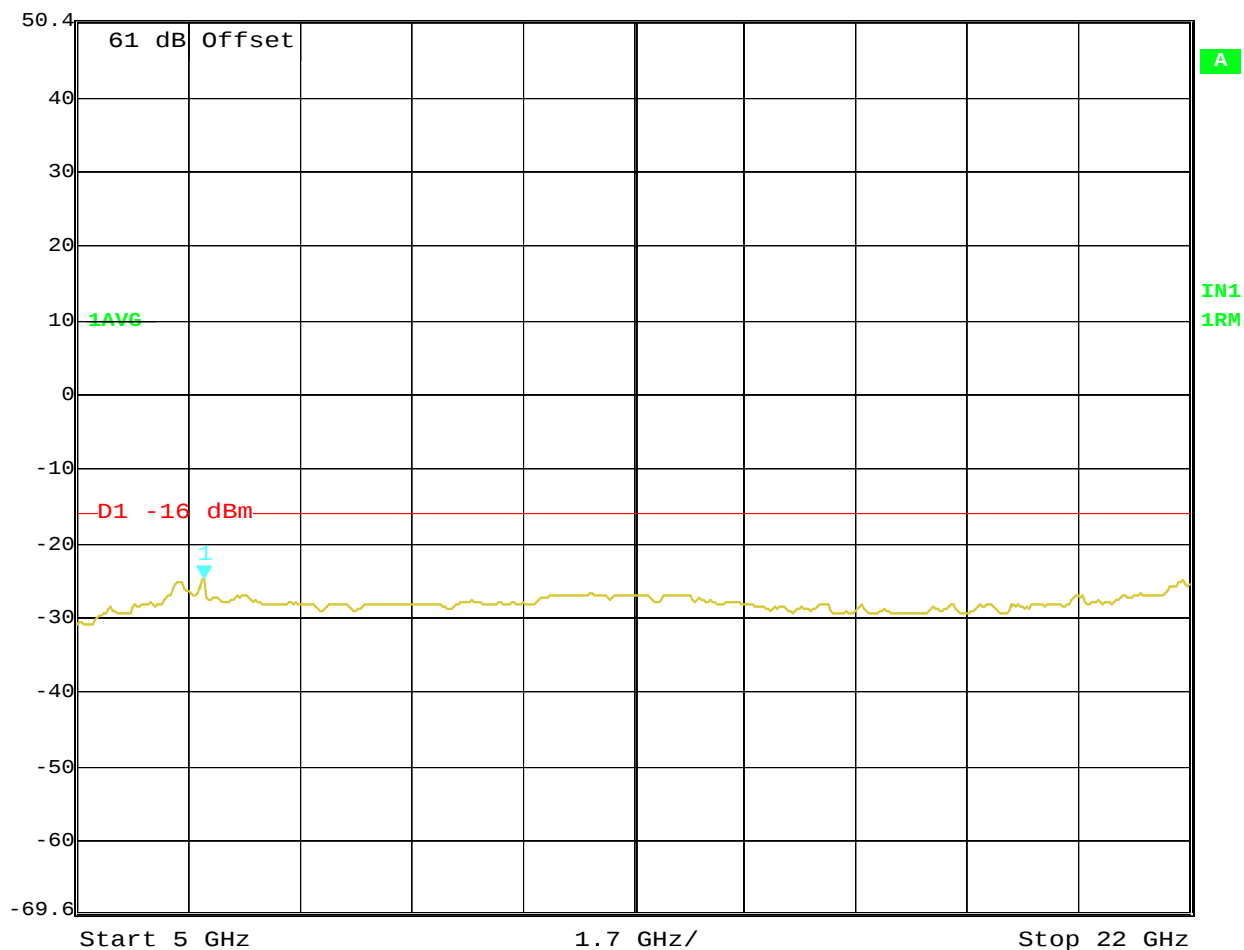
50.4 dBm

6.94188377 GHz

SWT 170 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;QPSK; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG;HPF
Date: 7.MAR.2014 13:18:27

Transmit Port
Antenna Conducted Spurious Emissions

Block: B
10 MHz Bandwidth (2120-2130 MHz)
2x120 watts (MIMO)
16QAM Modulation



Marker 1 [T1]

RBW 10 kHz RF Att 30 dB

Ref Lvl -30.33 dBm

VBW 30 kHz

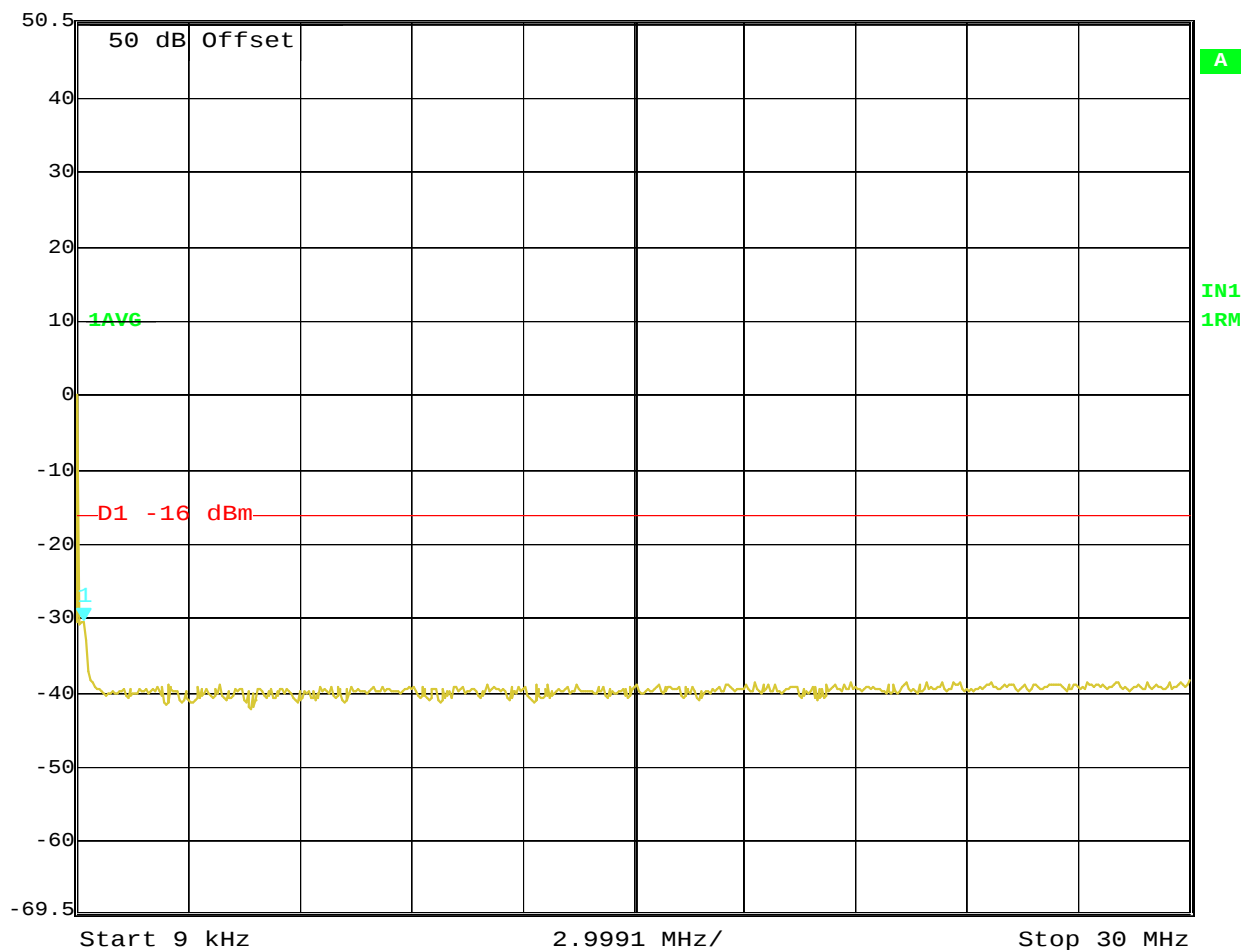
50.5 dBm

189.30661323 kHz

SWT 760 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 08:18:38



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.18 dBm

VBW 300 kHz

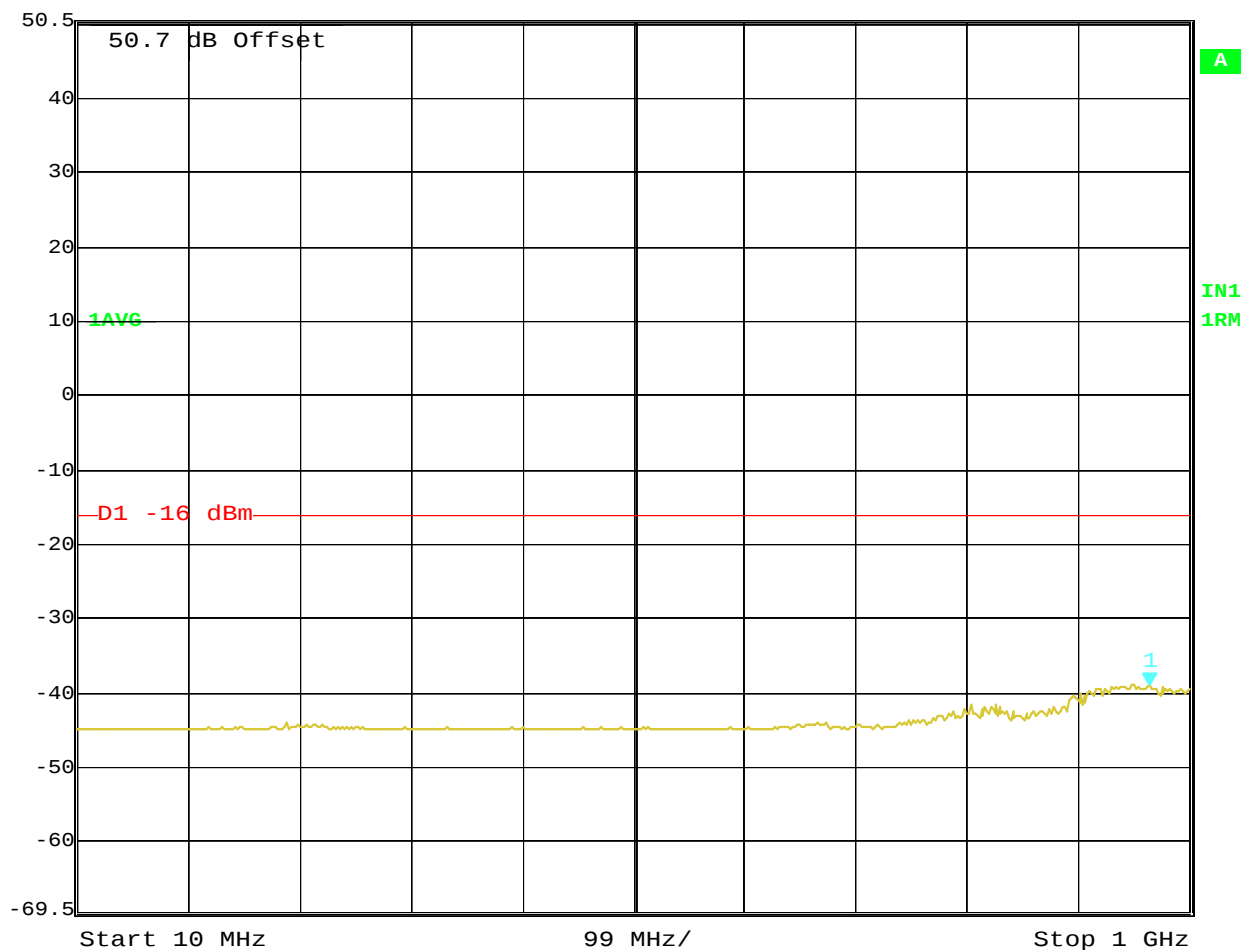
50.5 dBm

964.28857715 MHz

SWT 250 ms

Unit

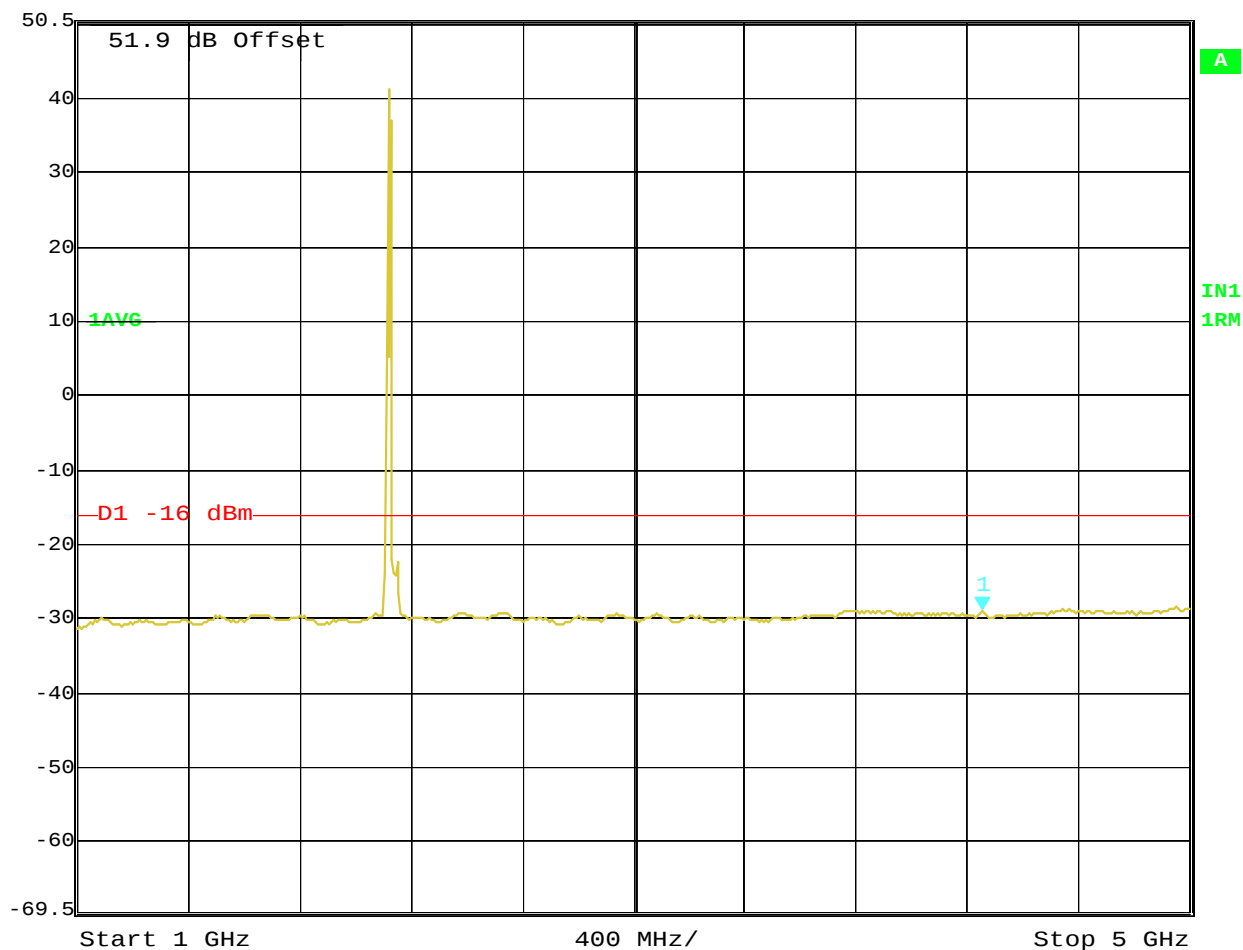
dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 08:17:15



Ref Lvl 50.5 dBm
Marker 1 [T1] -28.82 dBm
4.25450902 GHz
RBW 1 MHz
VBW 3 MHz
SWT 10 ms
RF Att 10 dB
Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 7.MAR.2014 08:13:49



Marker 1 [T1]

RBW 1 MHz RF Att 0 dB

Ref Lvl -24.72 dBm

VBW 3 MHz

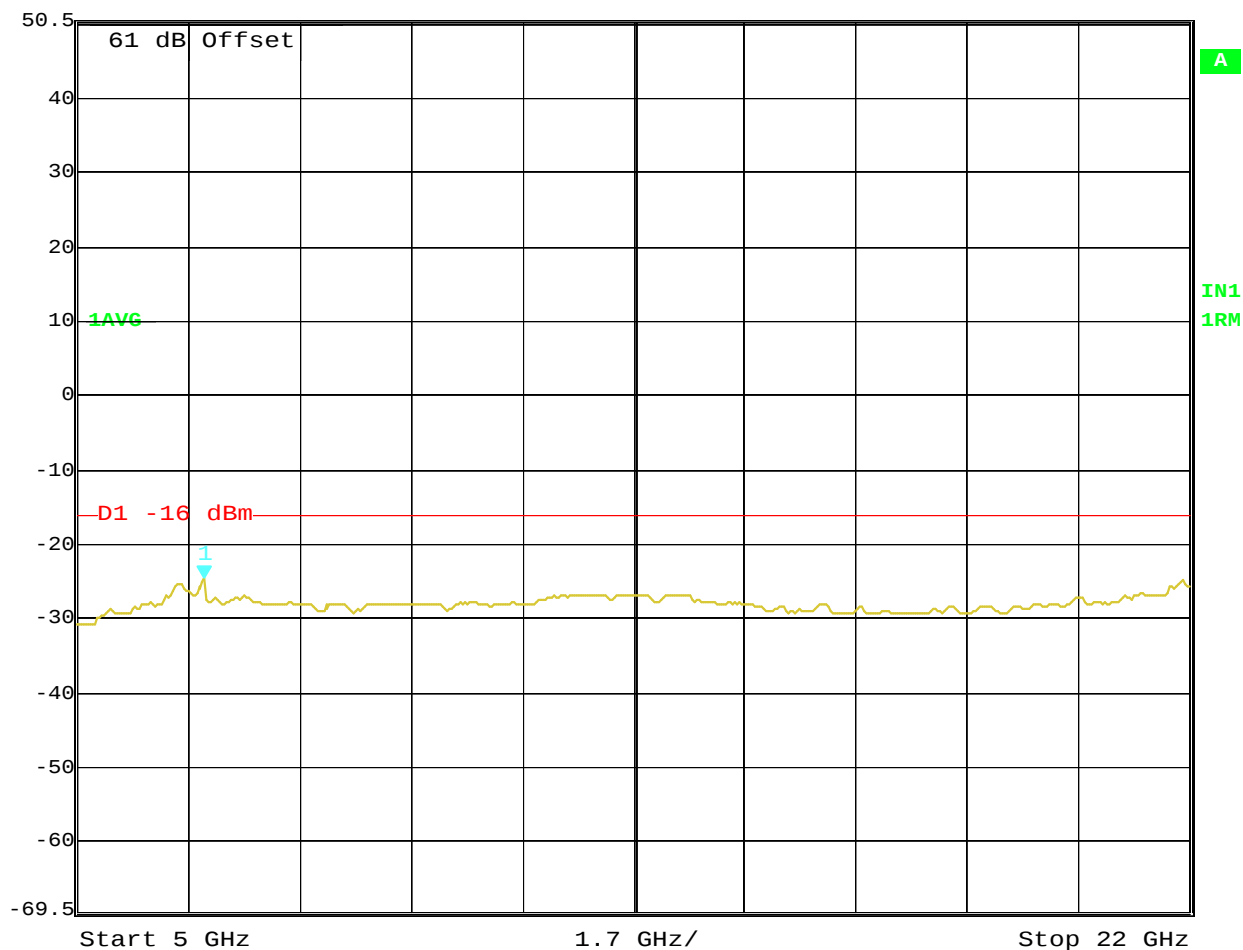
50.5 dBm

6.94188377 GHz

SWT 170 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;16QAM; FCC PRT 27;FCCID:AS5BBTRX-13;CLS II CHNG;HPF
Date: 7.MAR.2014 08:09:36

Transmit Port
Antenna Conducted Spurious Emissions

Block: B
10 MHz Bandwidth (2120-2130 MHz)
2x120 watts (MIMO)
64QAM Modulation



Marker 1 [T1]

RBW 10 kHz RF Att 30 dB

Ref Lvl -29.92 dBm

VBW 30 kHz

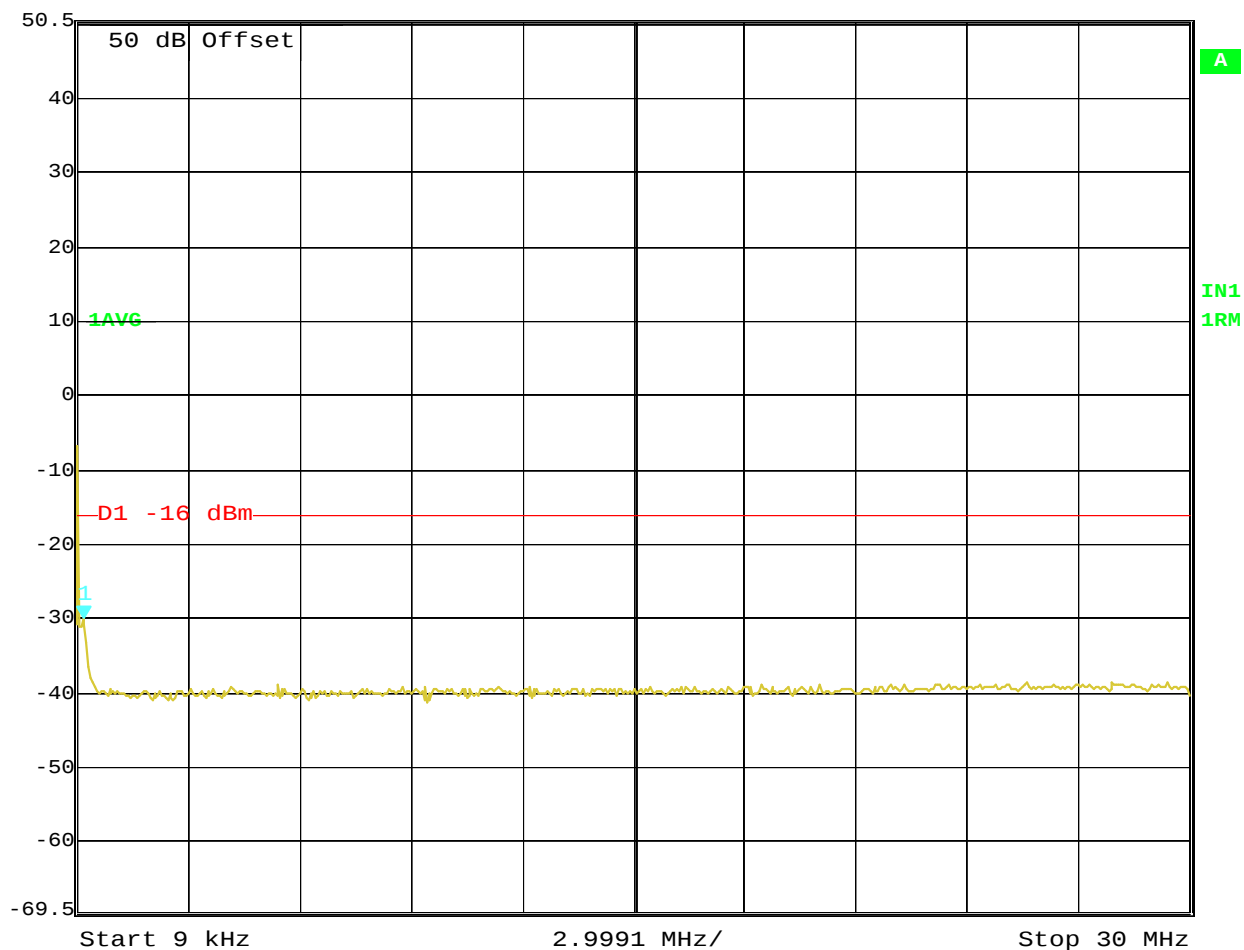
50.5 dBm

189.30661323 kHz

SWT 760 ms

Unit

dBm



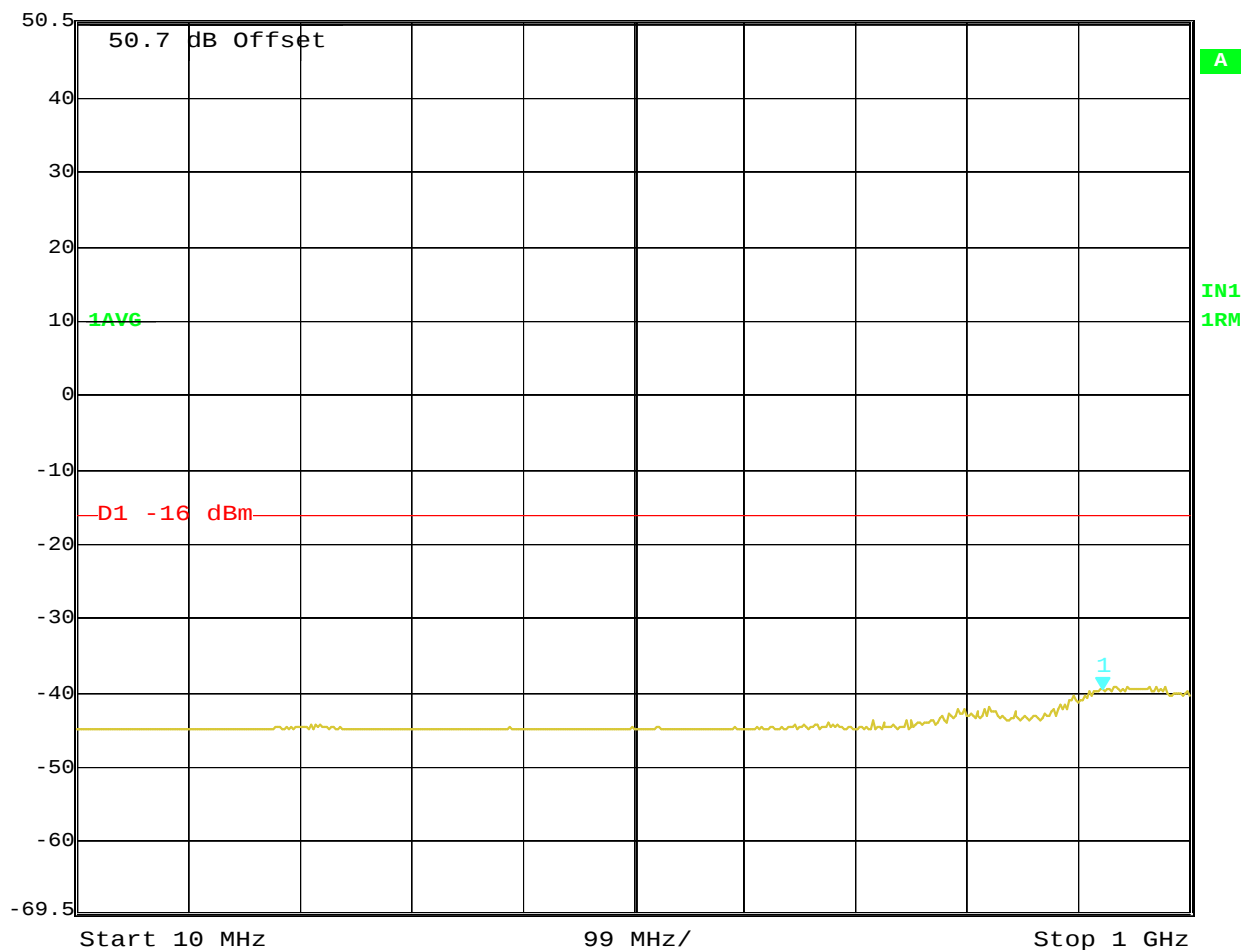
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 6.MAR.2014 14:44:28



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB
 VBW 300 kHz
 SWT 250 ms Unit dBm

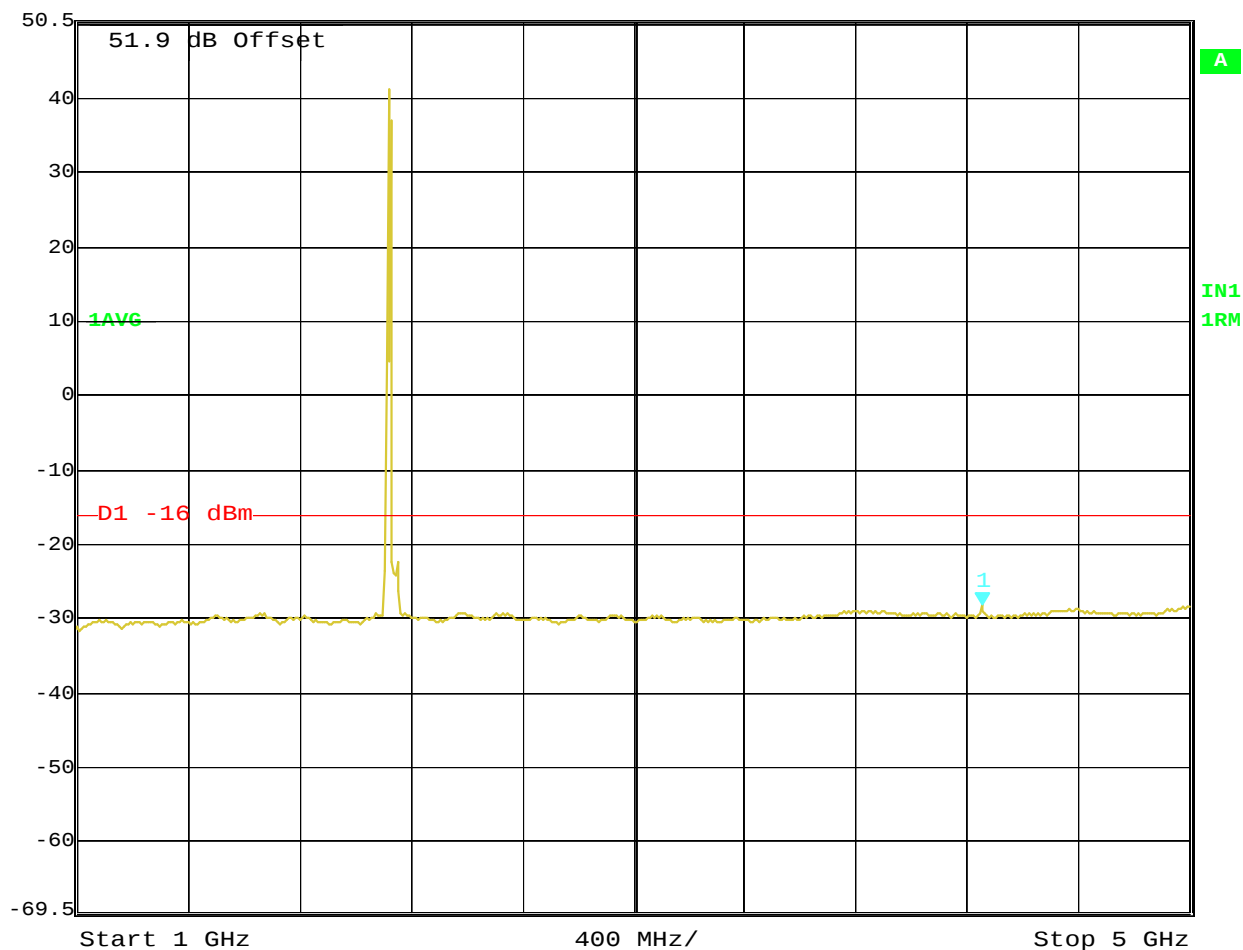
Ref Lvl -39.52 dBm
 50.5 dBm 922.62525050 MHz



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
 PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 6.MAR.2014 14:46:23



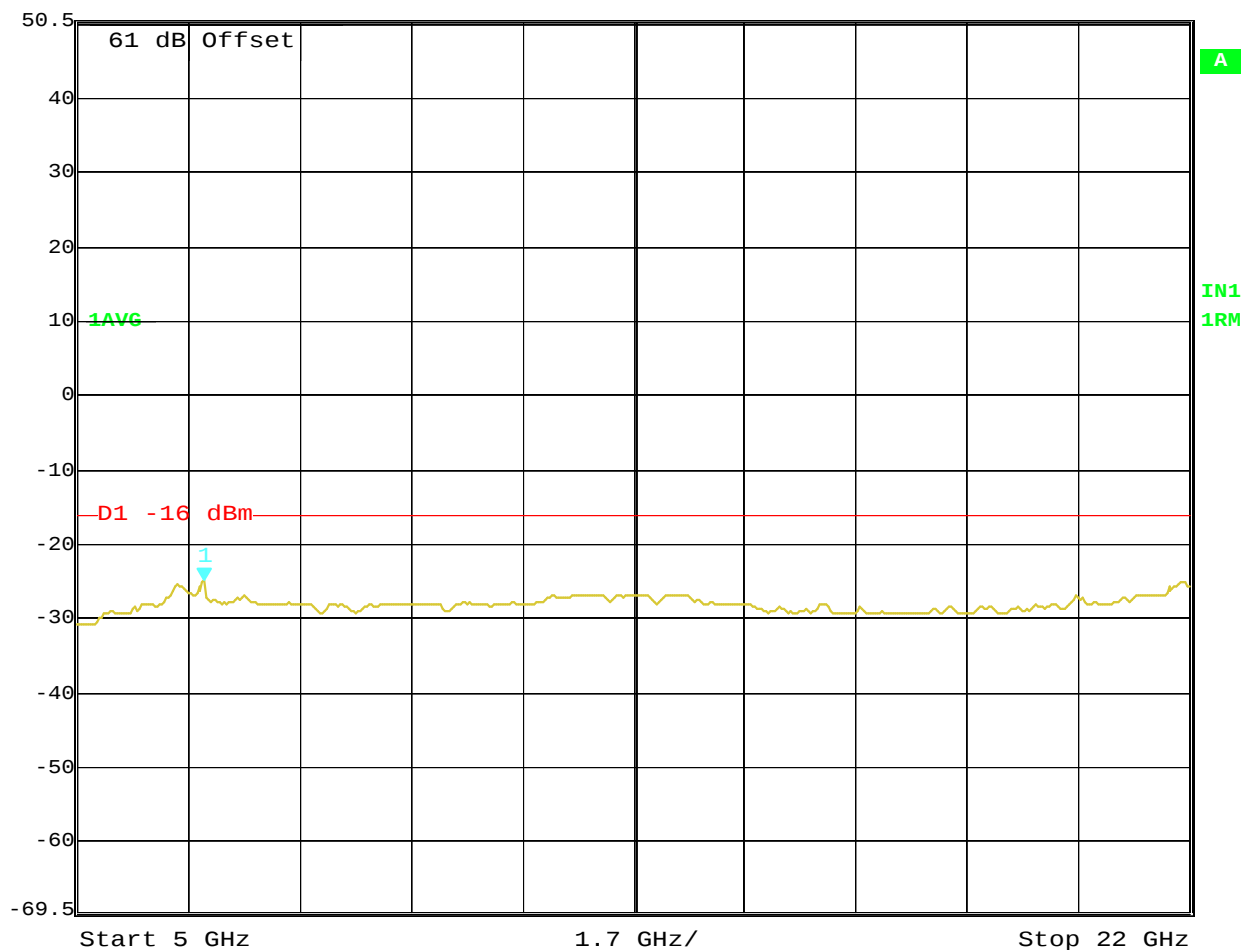
Marker 1 [T1] RBW 1 MHz RF Att 10 dB
Ref Lvl -28.33 dBm VBW 3 MHz
50.5 dBm 4.25450902 GHz SWT 10 ms Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 6.MAR.2014 14:47:40



Ref Lvl 50.5 dBm
Marker 1 [T1] -24.95 dBm
6.94188377 GHz
RBW 1 MHz
VBW 3 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:B; 2125MHz
PWR:120W;64QAM; FCC PRT 27;FCCID:AS5BBTRX-13;CLS II CHNG;HPF
Date: 6.MAR.2014 14:50:17

Transmit Port
Antenna Conducted Spurious Emissions

Block: C+D
10 MHz Bandwidth (2130 - 2140 MHz)
2x120 watts (MIMO)
QPSK Modulation



Marker 1 [T1]

RBW 10 kHz RF Att 30 dB

Ref Lvl -29.87 dBm

VBW 30 kHz

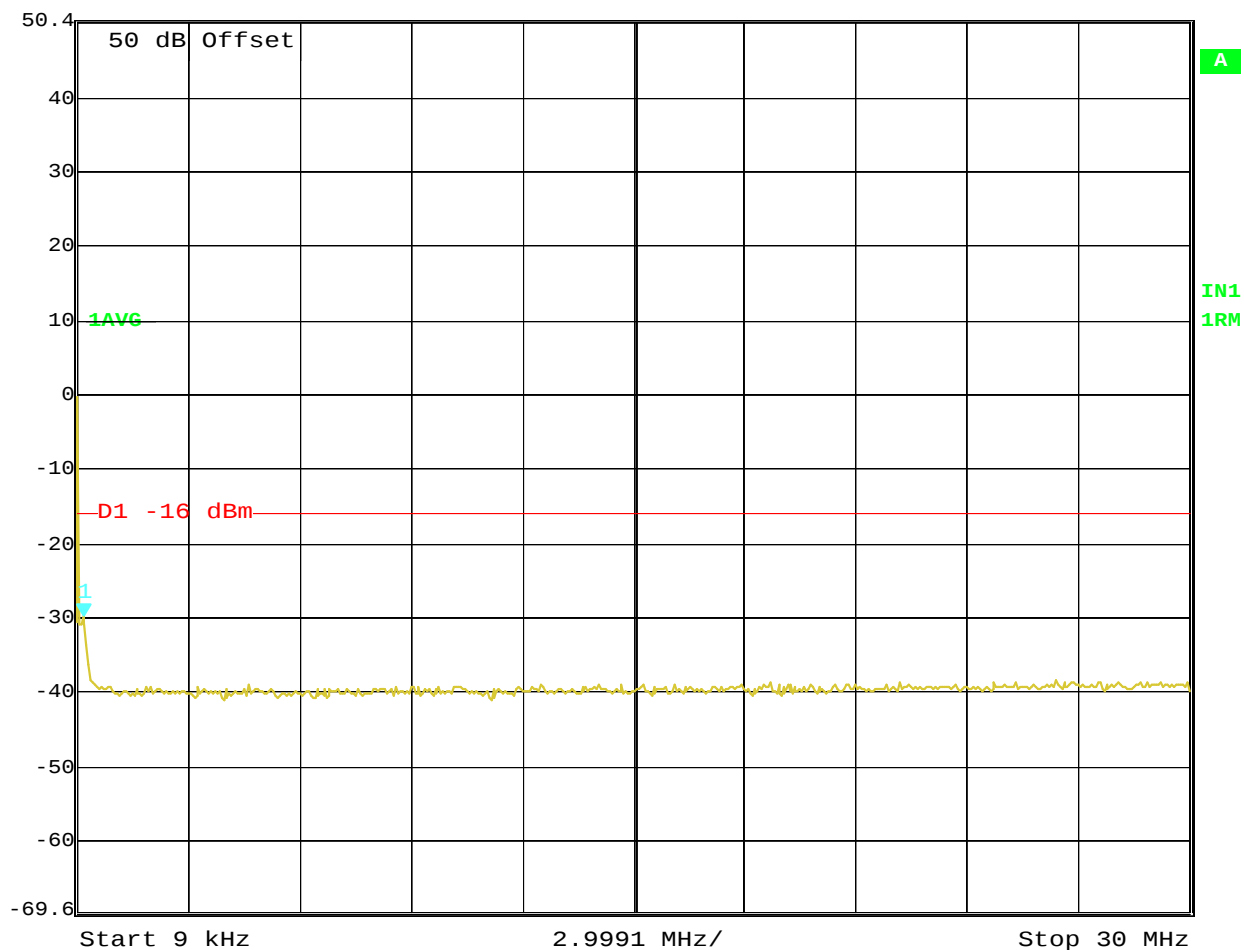
50.4 dBm

189.30661323 kHz

SWT 760 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W;QPSK; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG

Date: 7.MAR.2014 13:55:21



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.78 dBm

VBW 300 kHz

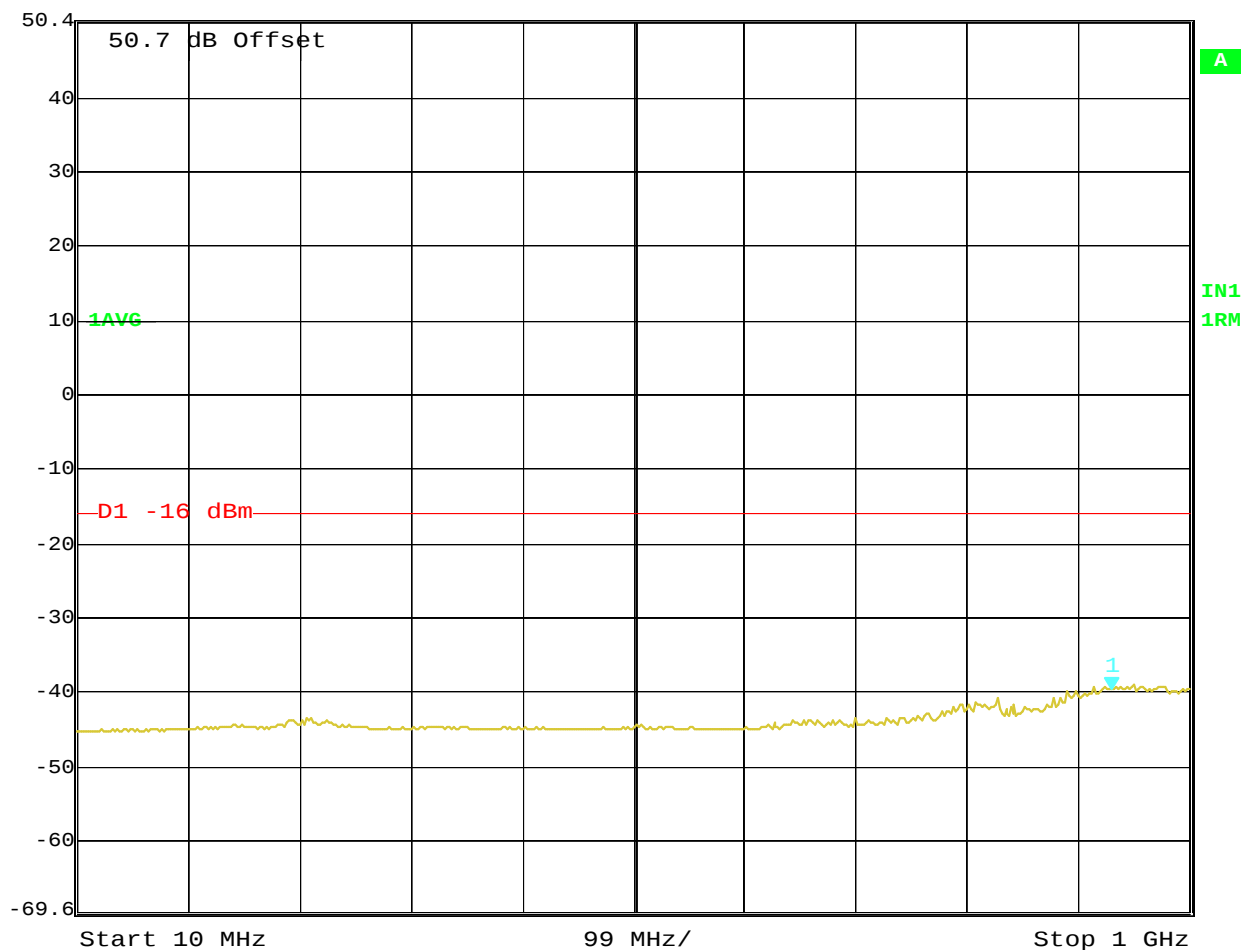
50.4 dBm

930.56112224 MHz

SWT 250 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG

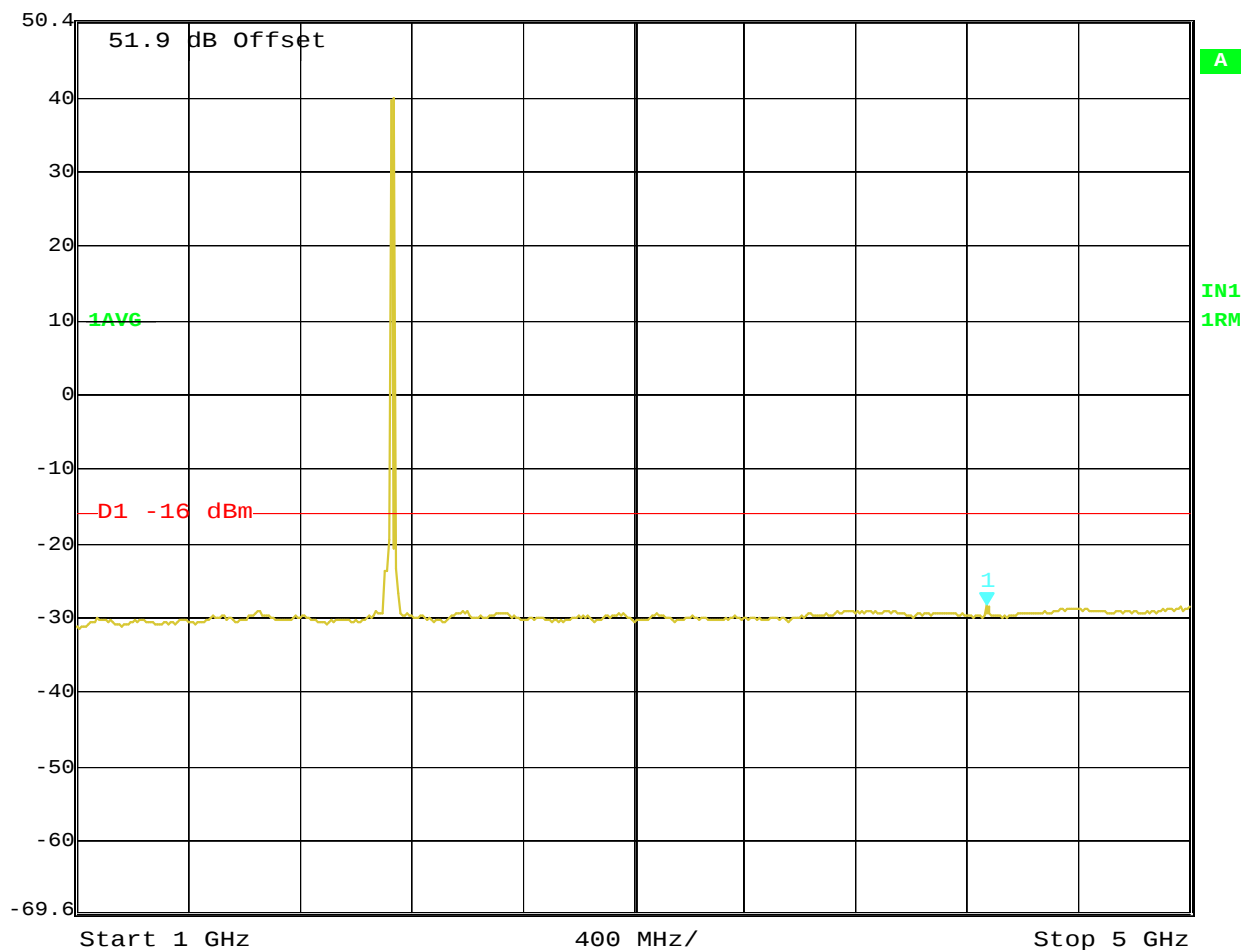
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W;QPSK; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG

Date: 7.MAR.2014 13:53:53



Marker 1 [T1] RBW 1 MHz RF Att 10 dB
Ref Lvl -28.40 dBm VBW 3 MHz
50.4 dBm 4.27054108 GHz SWT 10 ms Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W;QPSK; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG
Date: 7.MAR.2014 13:52:15



Marker 1 [T1]

RBW 1 MHz RF Att 0 dB

Ref Lvl -24.77 dBm

VBW 3 MHz

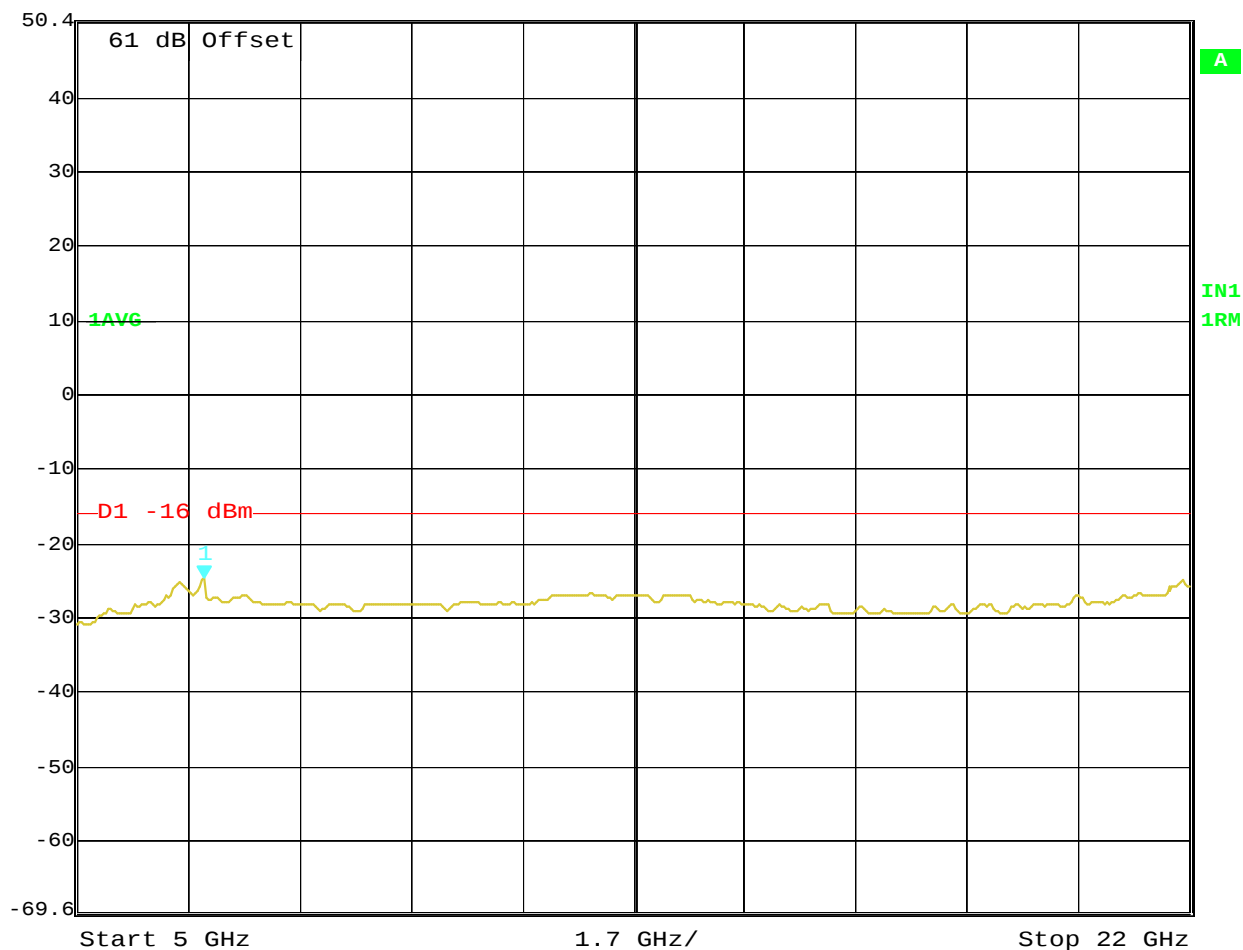
50.4 dBm

6.94188377 GHz

SWT 170 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W;QPSK; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG;HPF

Date: 7.MAR.2014 13:49:42

Transmit Port
Antenna Conducted Spurious Emissions

Block: C+D
10 MHz Bandwidth (2130 - 2140 MHz)
2x120 watts (MIMO)
16QAM Modulation



Marker 1 [T1]

RBW 10 kHz RF Att 30 dB

Ref Lvl -29.95 dBm

VBW 30 kHz

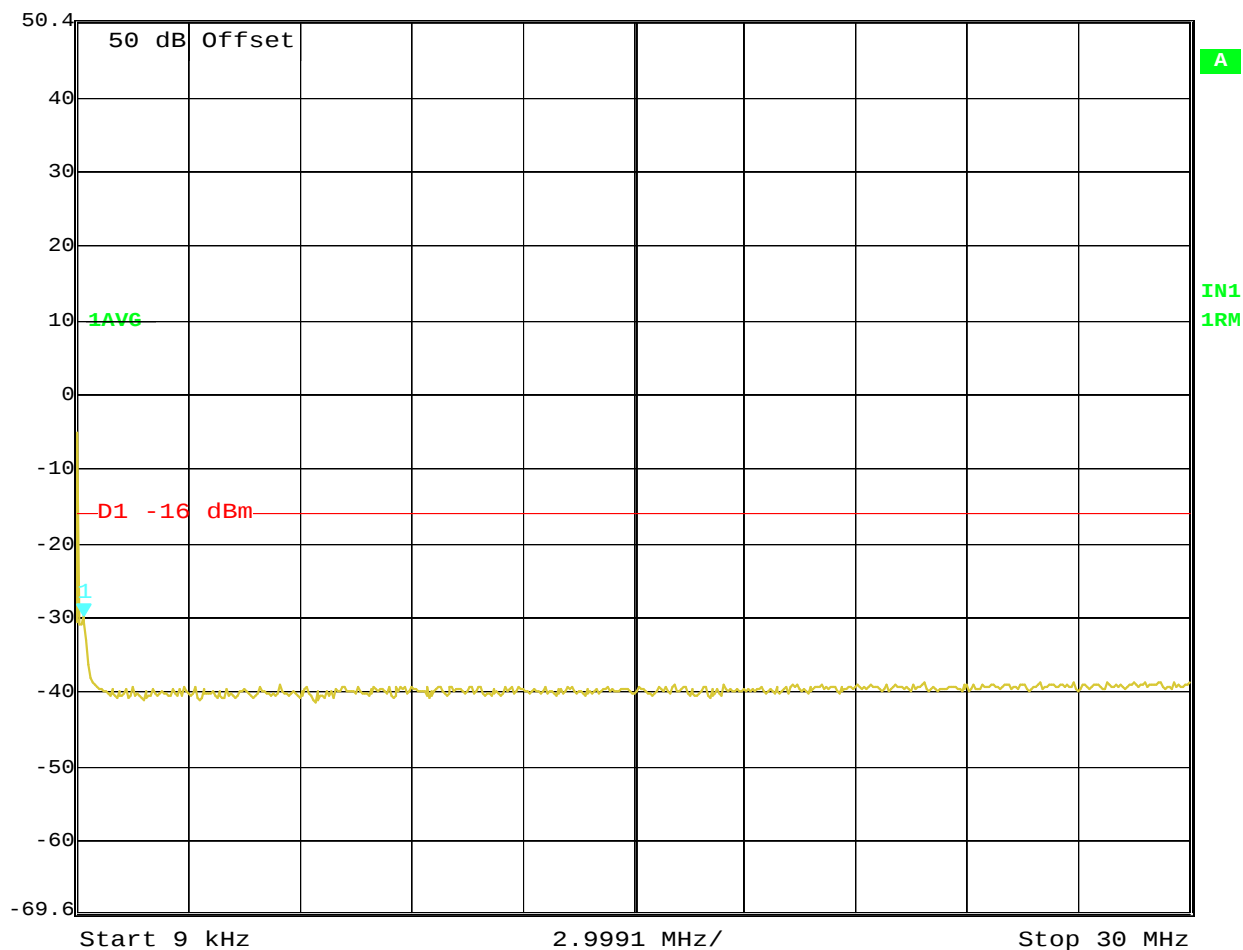
50.4 dBm

189.30661323 kHz

SWT 760 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W;16QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG
Date: 10.MAR.2014 08:08:31



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.58 dBm

VBW 300 kHz

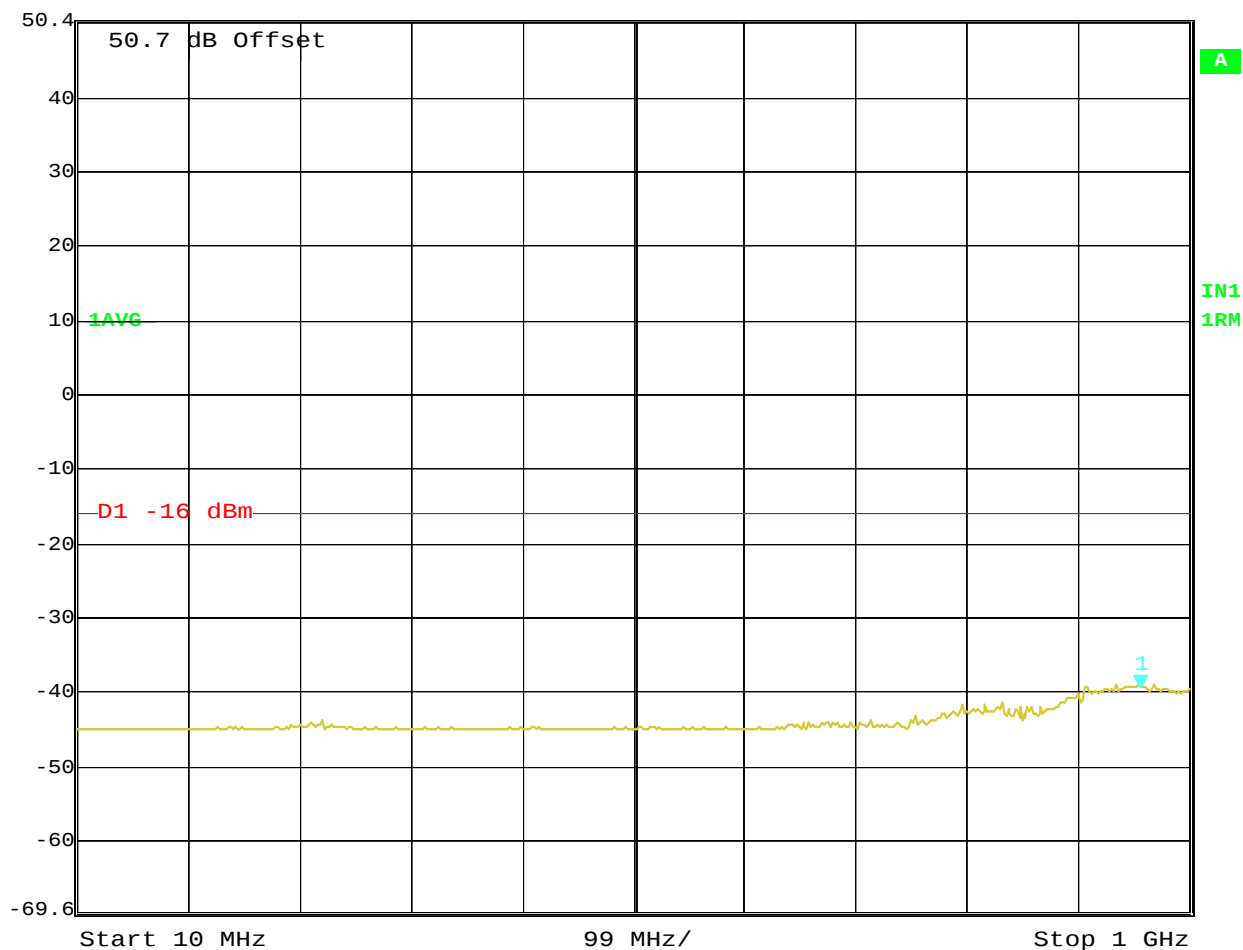
50.4 dBm

956.35270541 MHz

SWT 250 ms

Unit

dBm

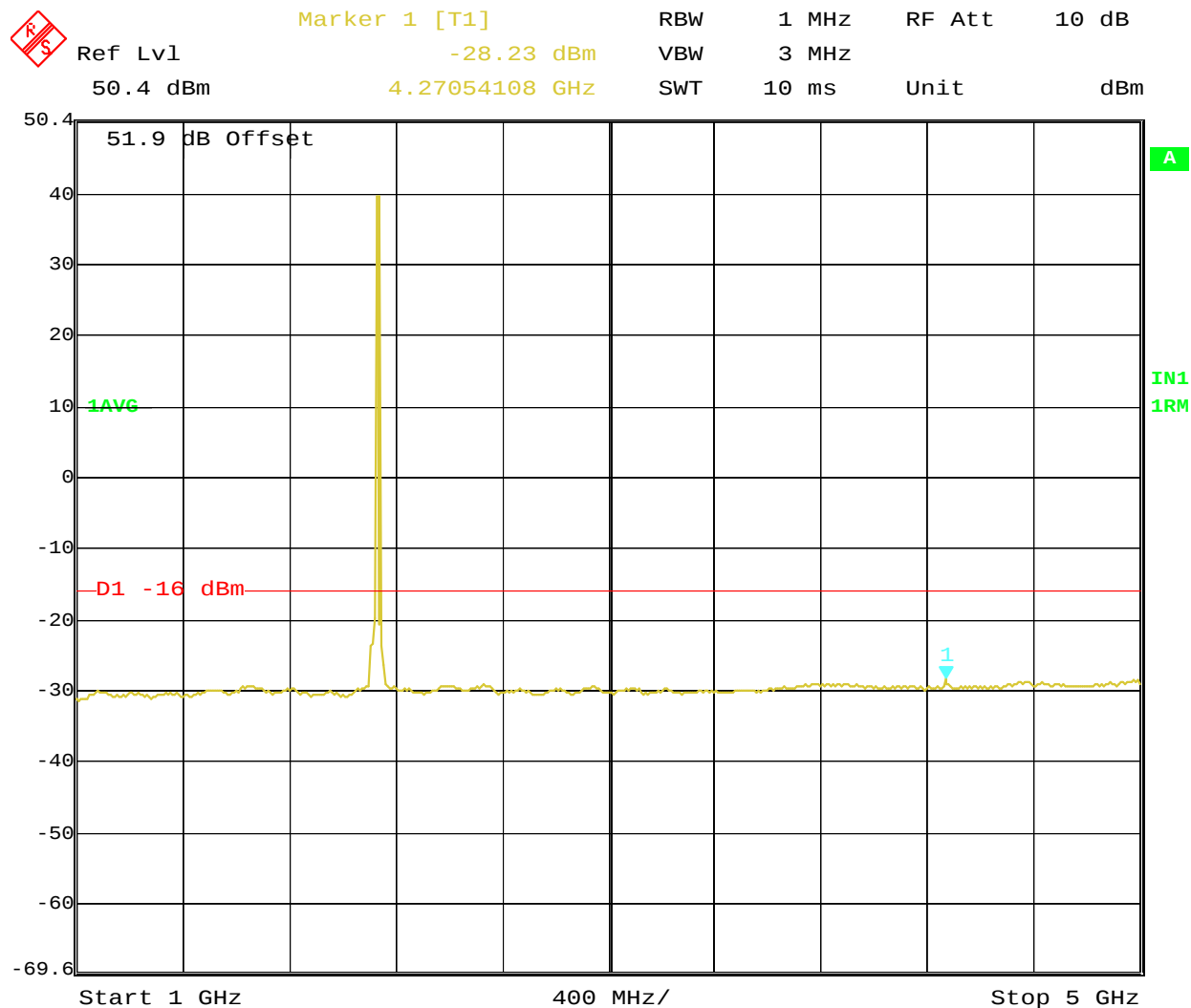


Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG

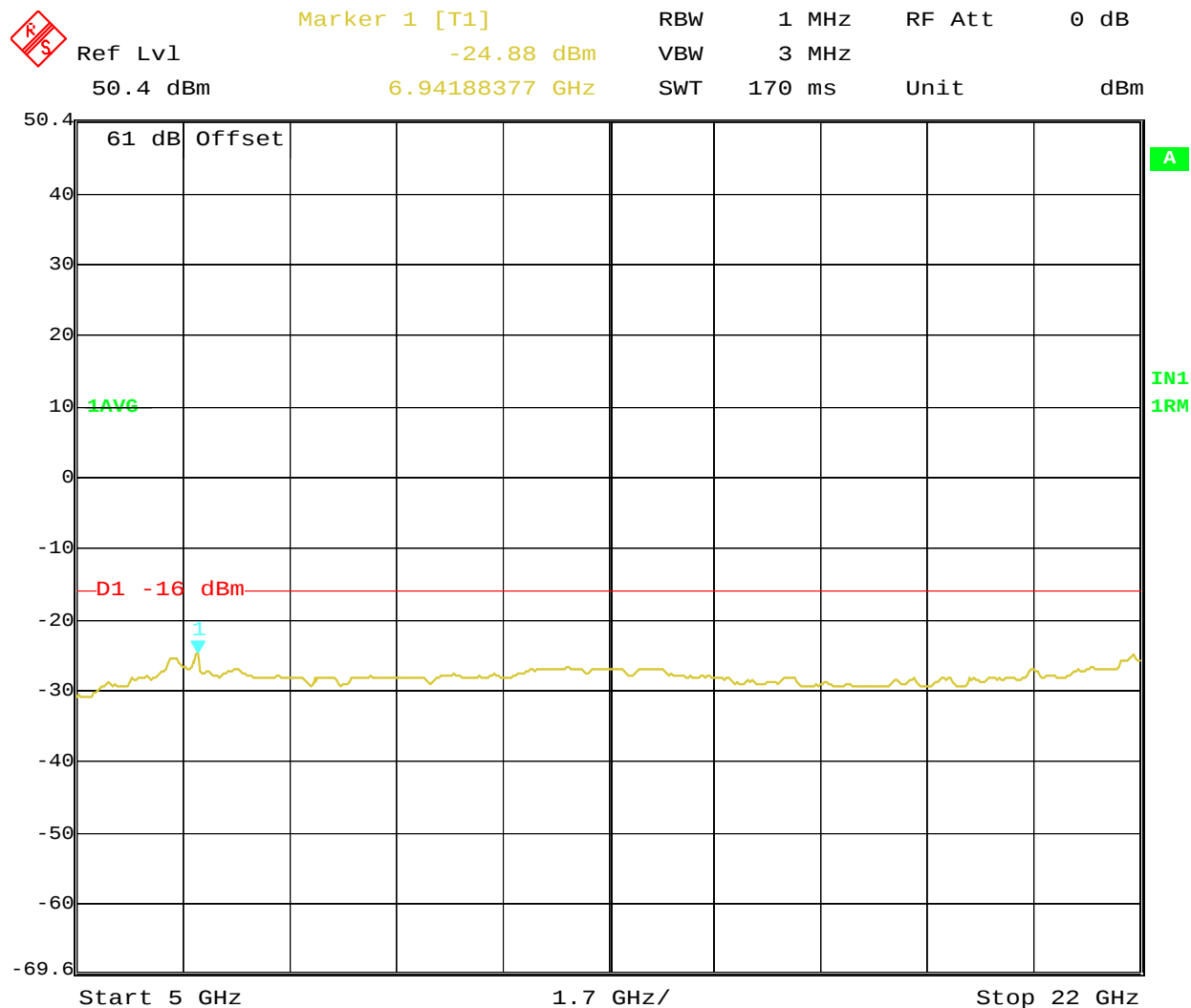
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz

PWR:120W;16QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG

Date: 10.MAR.2014 08:09:49



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W;16QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG
Date: 10.MAR.2014 08:11:05



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
 PWR:120W;16QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG;HP
 Date: 10.MAR.2014 08:13:35

Transmit Port
Antenna Conducted Spurious Emissions

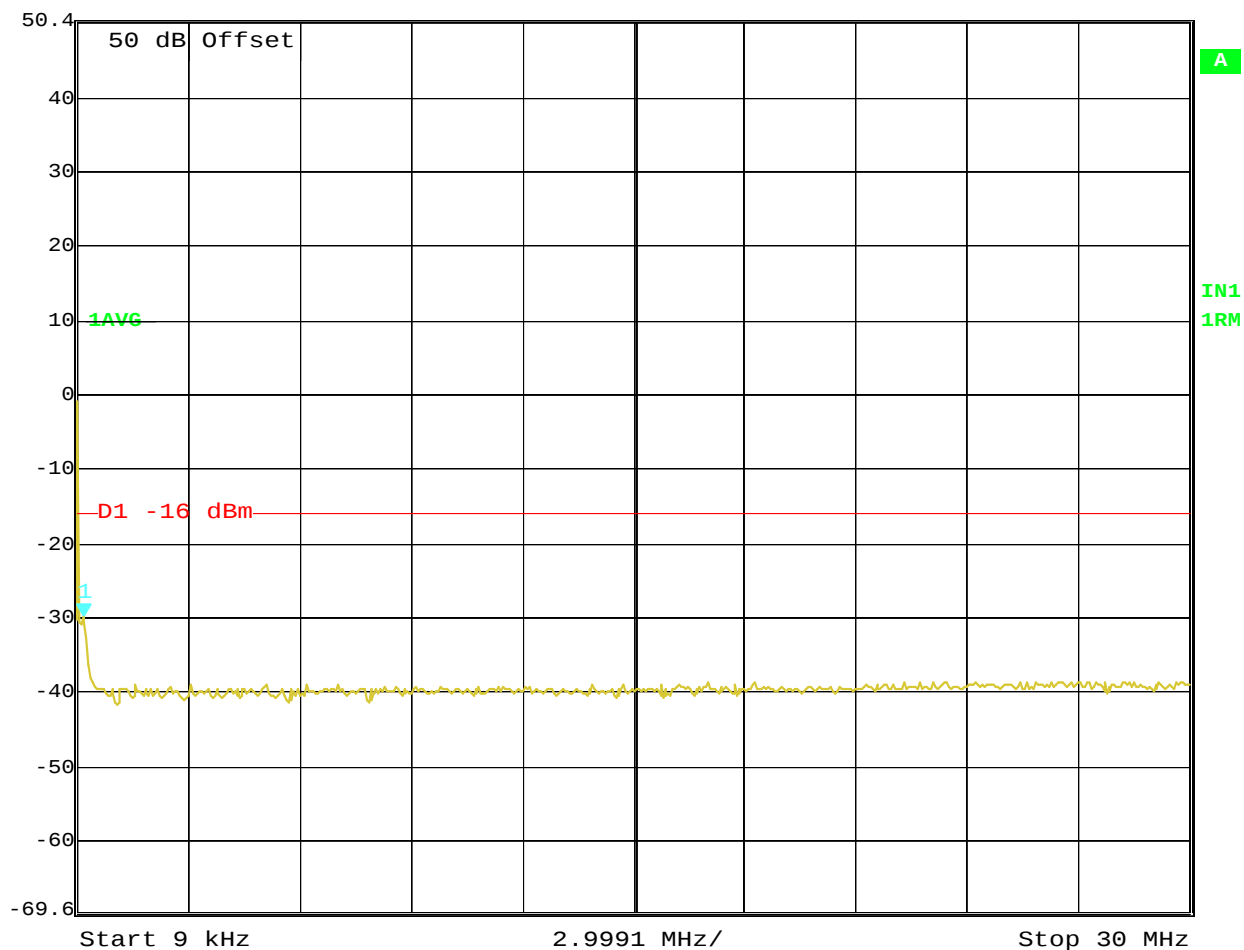
Block: C+D
10 MHz Bandwidth (2130 - 2140 MHz)
2x120 watts (MIMO)
64QAM Modulation



Marker 1 [T1]

RBW 10 kHz RF Att 30 dB
 VBW 30 kHz
 SWT 760 ms Unit dBm

Ref Lvl -29.79 dBm
 50.4 dBm 189.30661323 kHz



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
 PWR:120W;64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
 Date: 10.MAR.2014 08:41:57



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.70 dBm

VBW 300 kHz

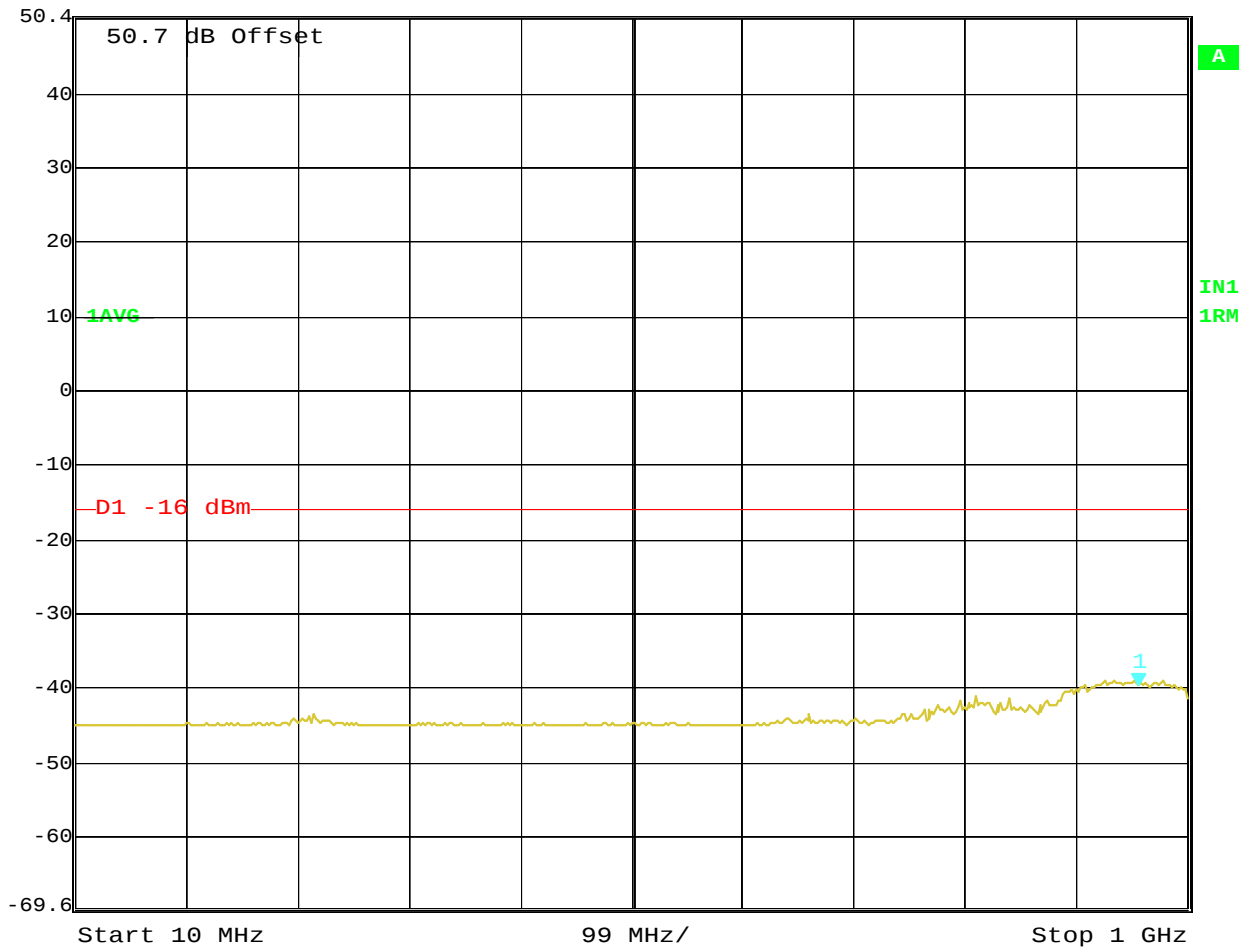
50.4 dBm

956.35270541 MHz

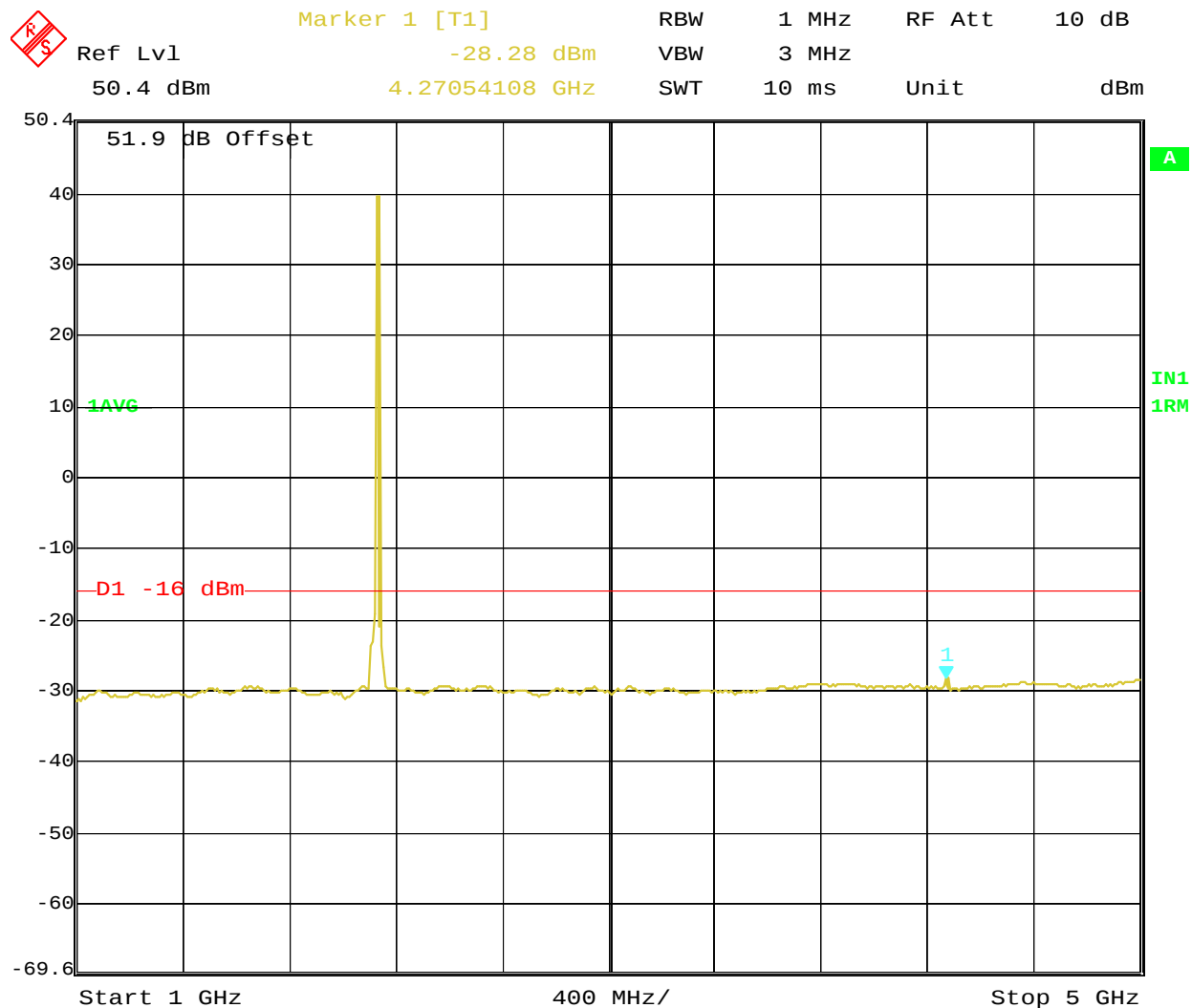
SWT 250 ms

Unit

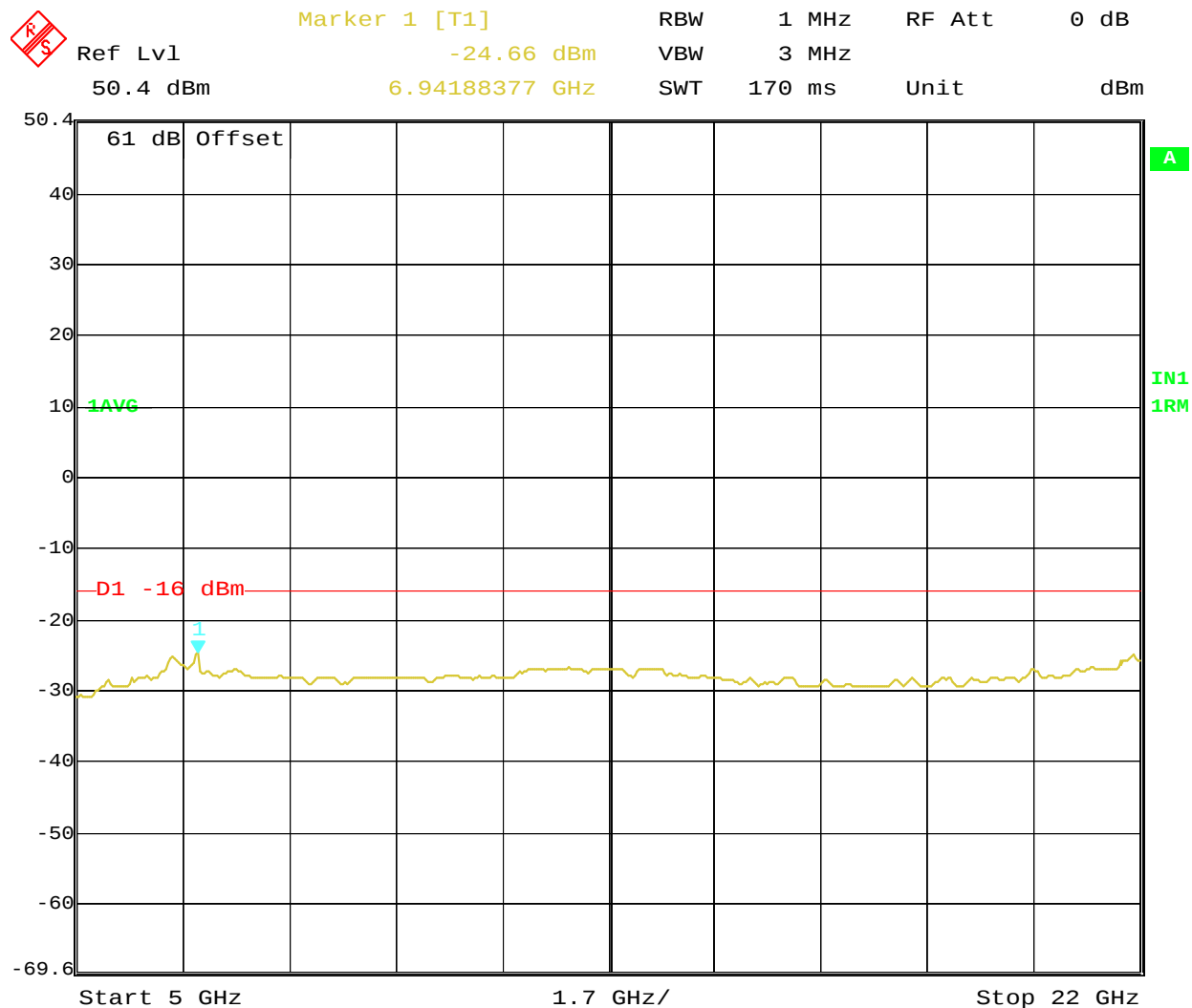
dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W;64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 08:40:39



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W;64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 08:39:22



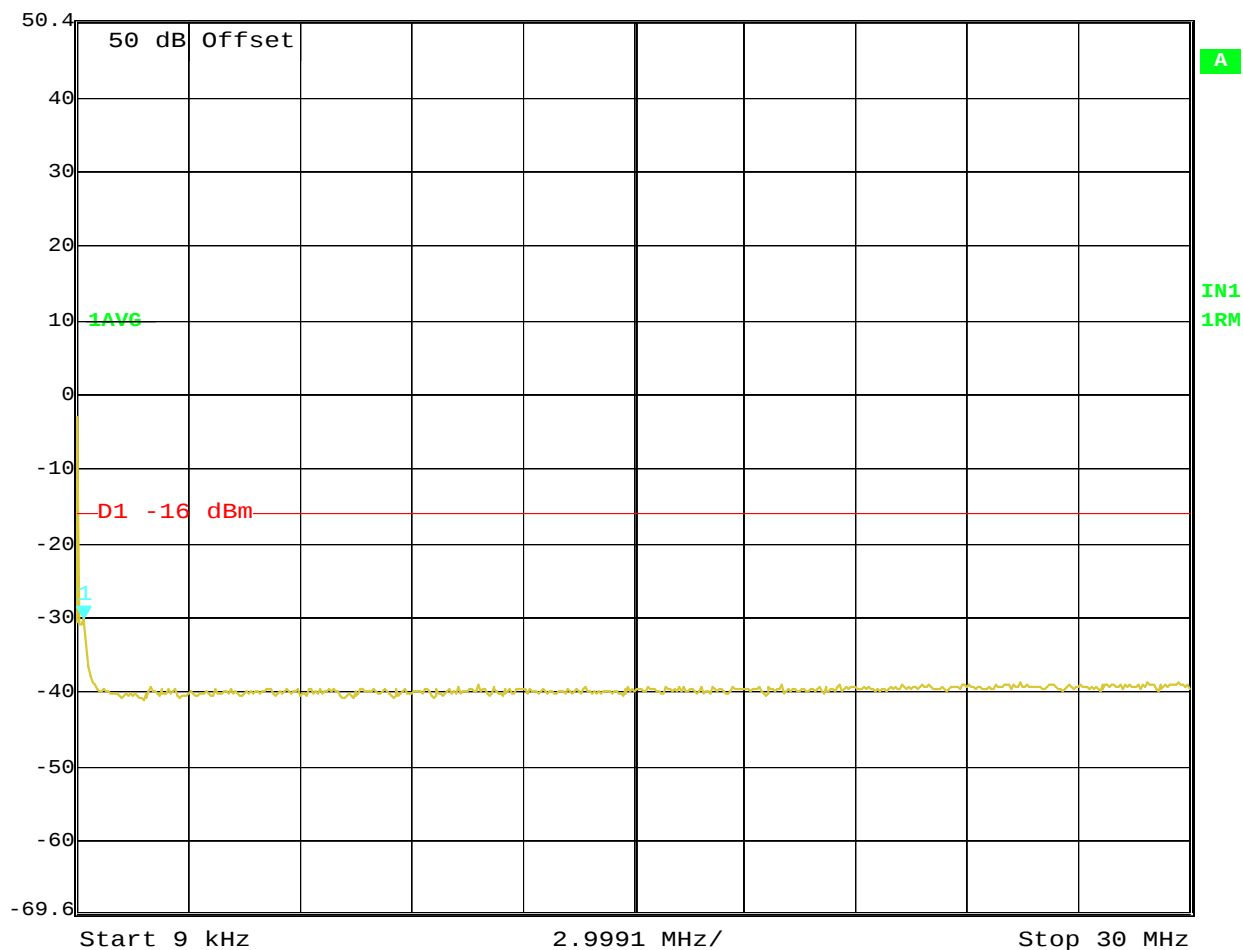
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:C+D; 2135MHz
PWR:120W;64QAM; FCC PRT 27;FCCID:AS5BBTRX-13;CLS II CHNG;HPF
Date: 10.MAR.2014 08:35:40

Transmit Port
Antenna Conducted Spurious Emissions

Block: D+E
10 MHz Bandwidth (2135 - 2145 MHz)
2x120watts (MIMO)
QPSK Modulation



Marker 1 [T1] RBW 10 kHz RF Att 30 dB
Ref Lvl -30.00 dBm VBW 30 kHz
50.4 dBm 189.30661323 kHz SWT 760 ms Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 11:56:55



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.14 dBm

VBW 300 kHz

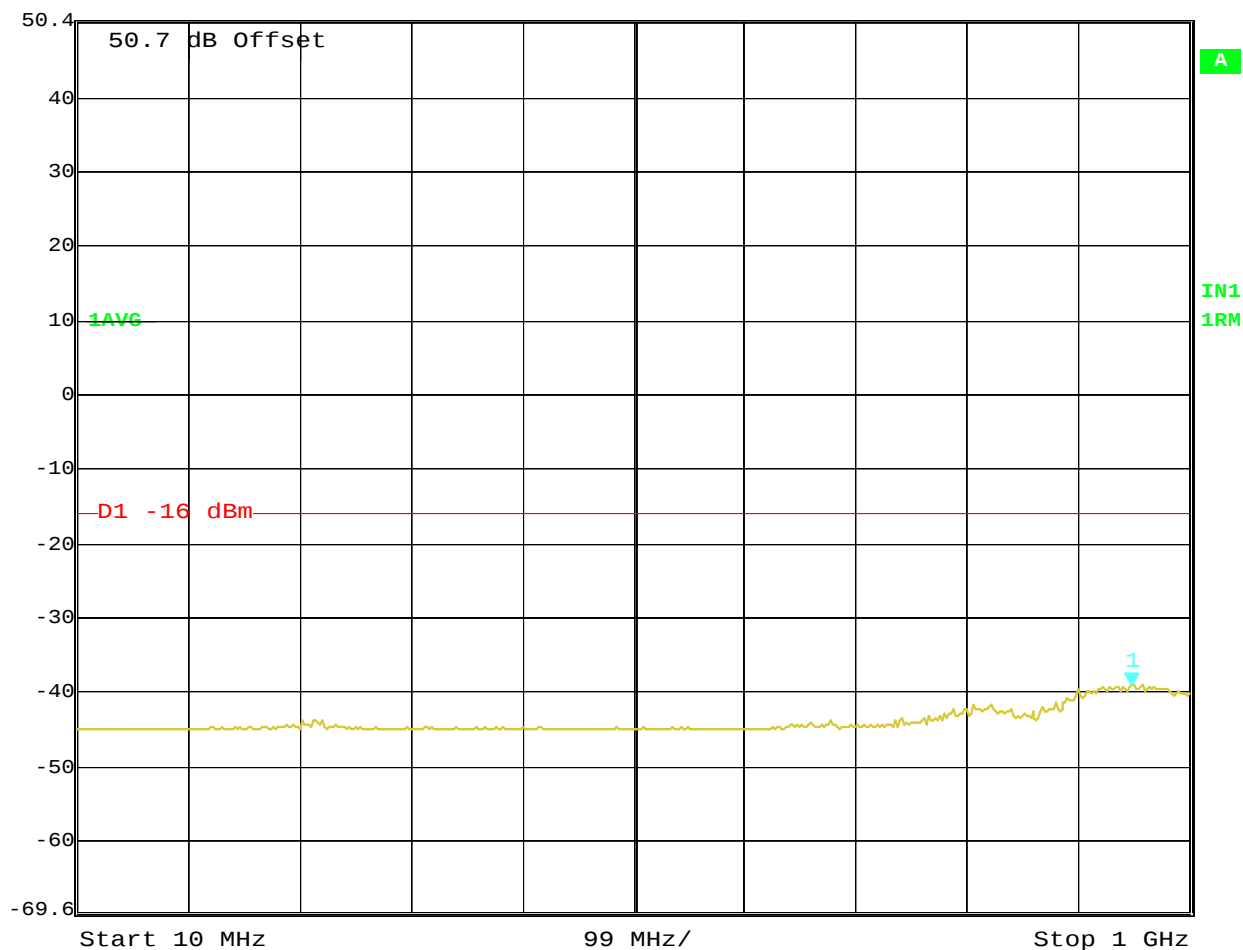
50.4 dBm

948.41683367 MHz

SWT 250 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 11:58:14



Marker 1 [T1]

RBW

1 MHz

RF Att

10 dB

Ref Lvl

-27.58 dBm

VBW

3 MHz

50.4 dBm

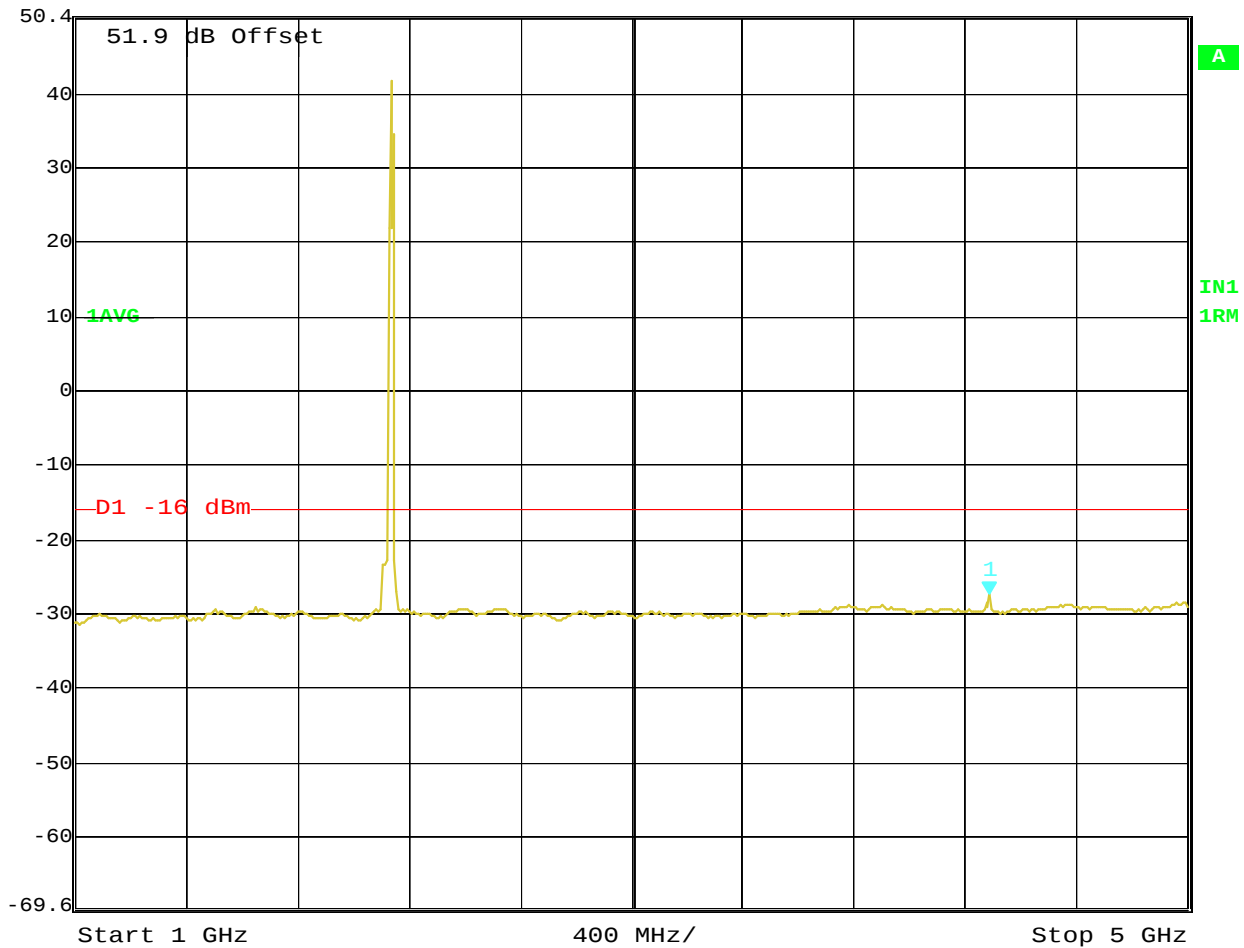
4.28657315 GHz

SWT

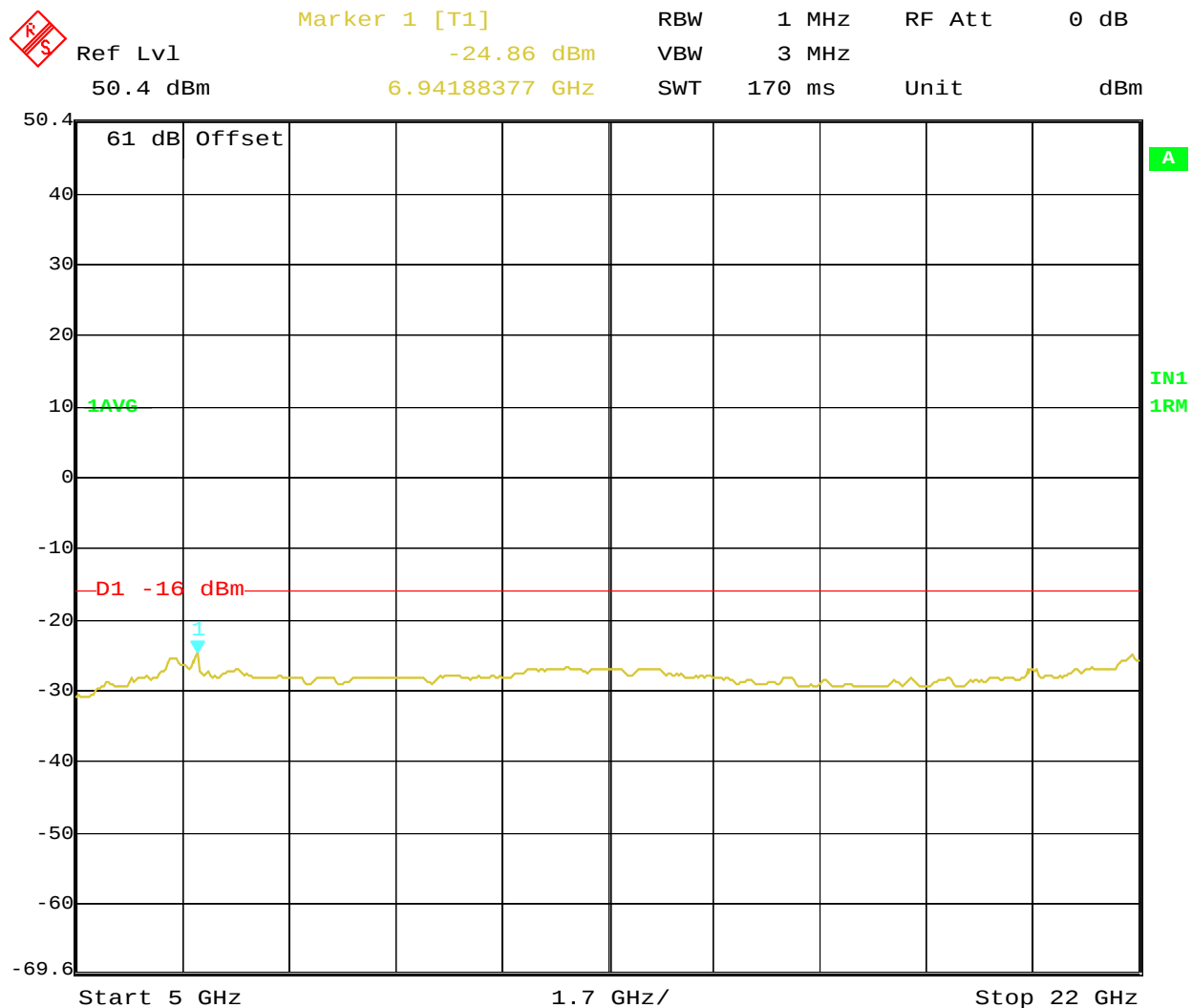
10 ms

Unit

dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 11:59:55



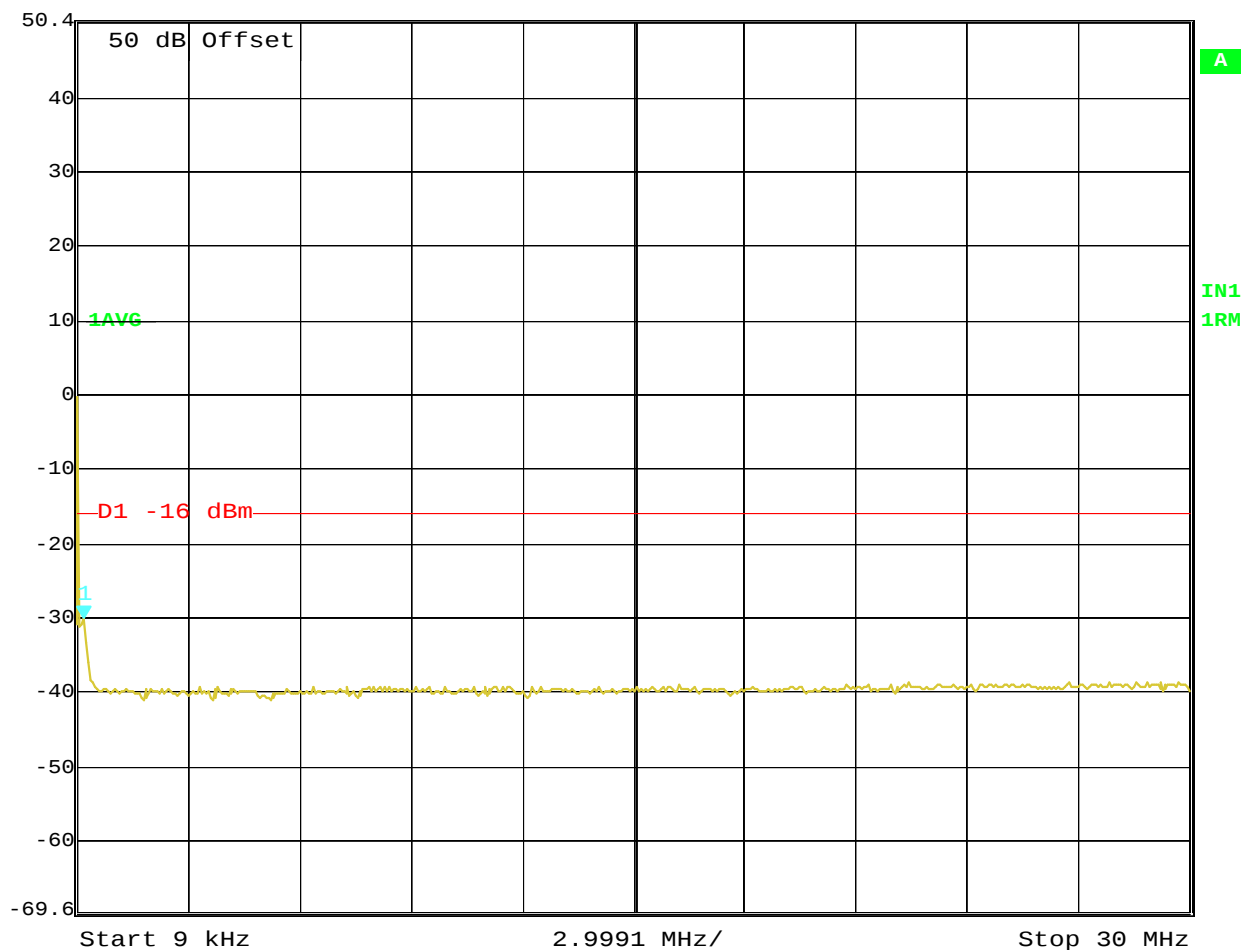
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;QPSK;FCC PRT 27;FCCID:AS5BBTRX-13; CLS II CHNG;HPF
Date: 10.MAR.2014 12:02:31

Transmit Port
Antenna Conducted Spurious Emissions

Block: D+E
10 MHz Bandwidth (2135 - 2145 MHz)
2x120watts (MIMO)
16QAM Modulation



Marker 1 [T1] RBW 10 kHz RF Att 30 dB
Ref Lvl -30.14 dBm VBW 30 kHz
50.4 dBm 189.30661323 kHz SWT 760 ms Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 10:22:37



Marker 1 [T1]

RBW 100 kHz RF Att 10 dB

Ref Lvl -39.14 dBm

VBW 300 kHz

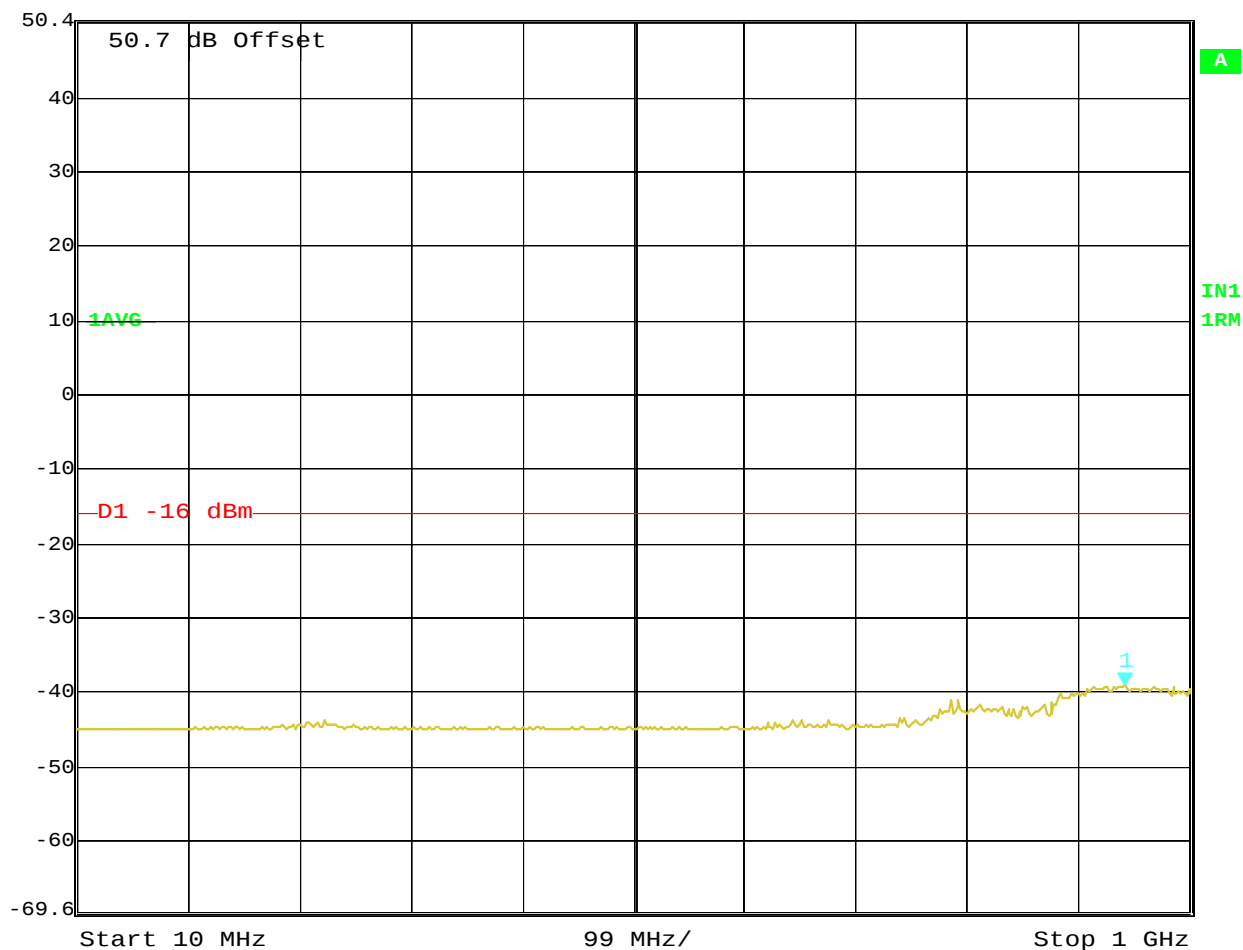
50.4 dBm

942.46492986 MHz

SWT 250 ms

Unit

dBm

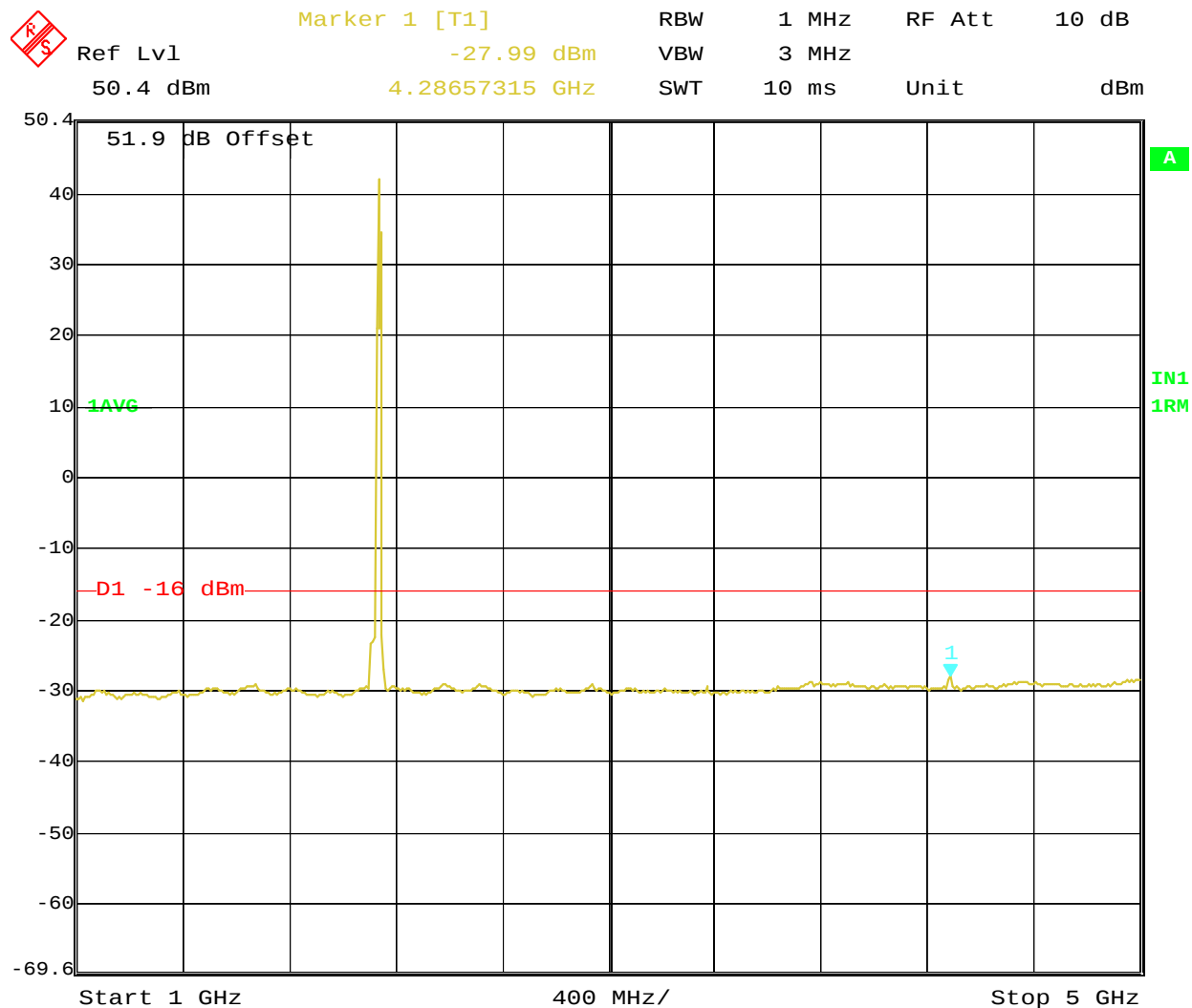


Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG

Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz

PWR:120W;16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG

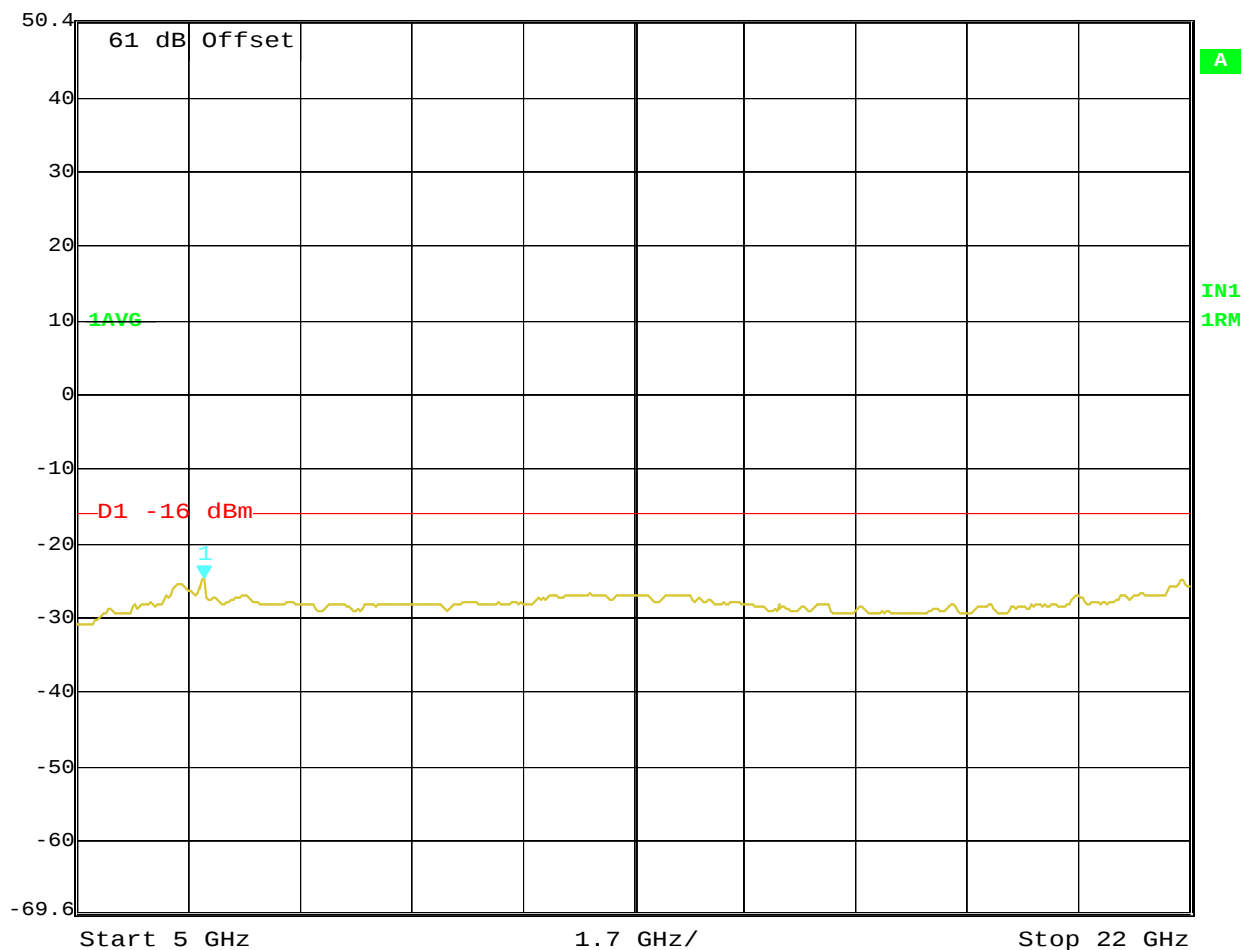
Date: 10.MAR.2014 10:20:53



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; CLS II CHNG
Date: 10.MAR.2014 10:19:48



Ref Lvl 50.4 dBm
Marker 1 [T1] -24.77 dBm
6.94188377 GHz
RBW 1 MHz
VBW 3 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm



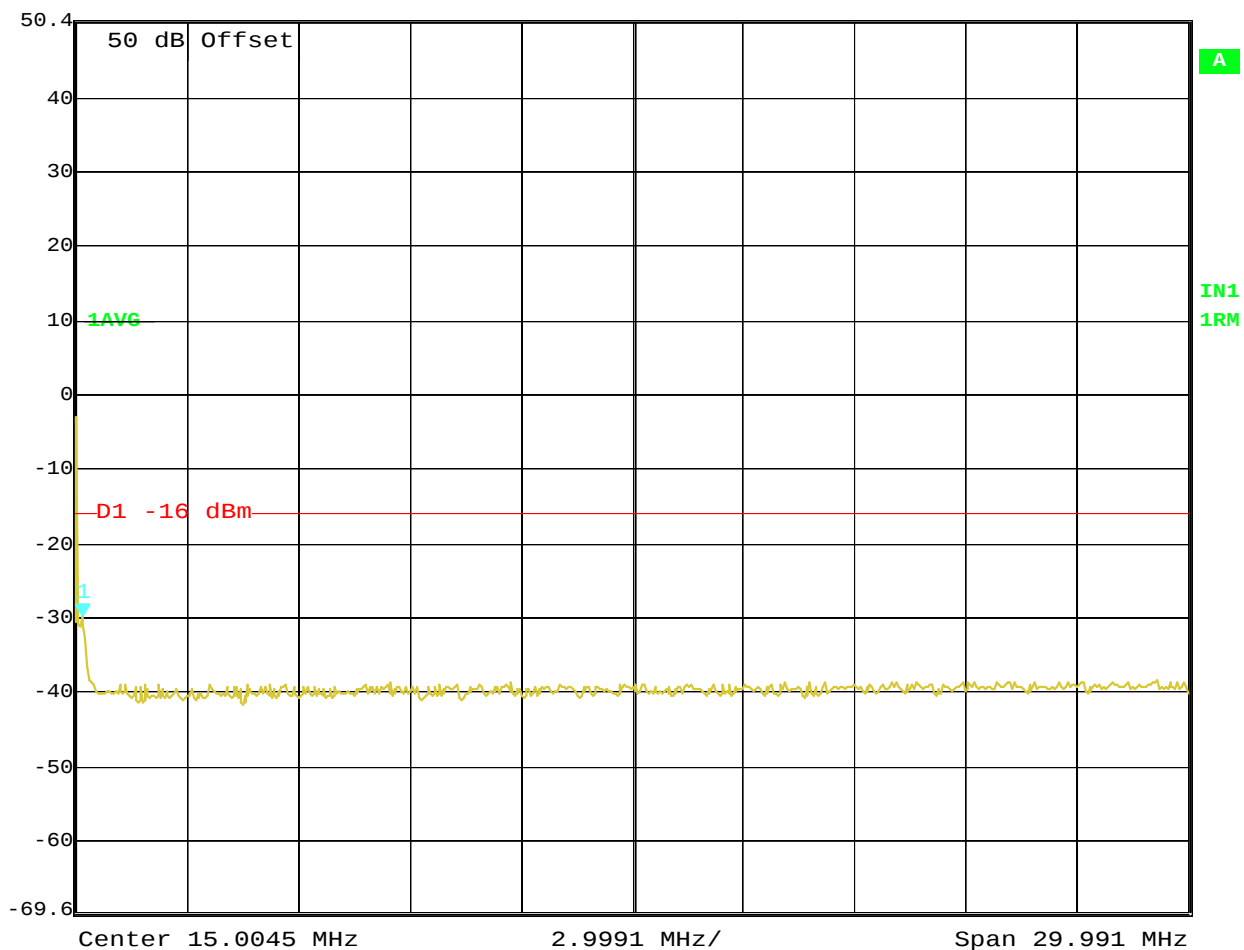
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;16QAM;FCC PRT 27;FCCID:AS5BBTRX-13;CLS II CHNG;HPF
Date: 10.MAR.2014 10:14:54

Transmit Port
Antenna Conducted Spurious Emissions

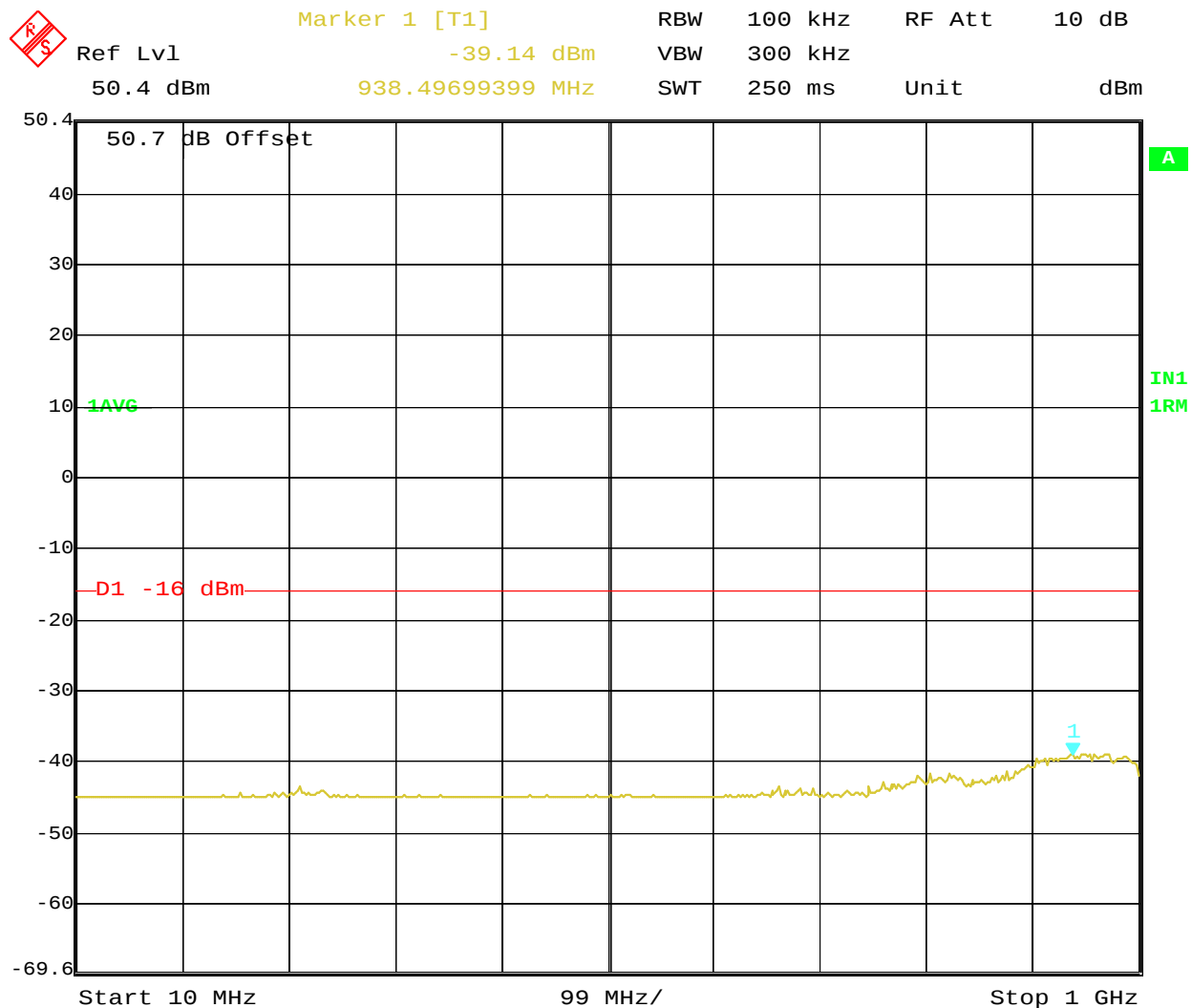
Block: D+E
10 MHz Bandwidth (2135 - 2145 MHz)
2x120watts (MIMO)
64QAM Modulation



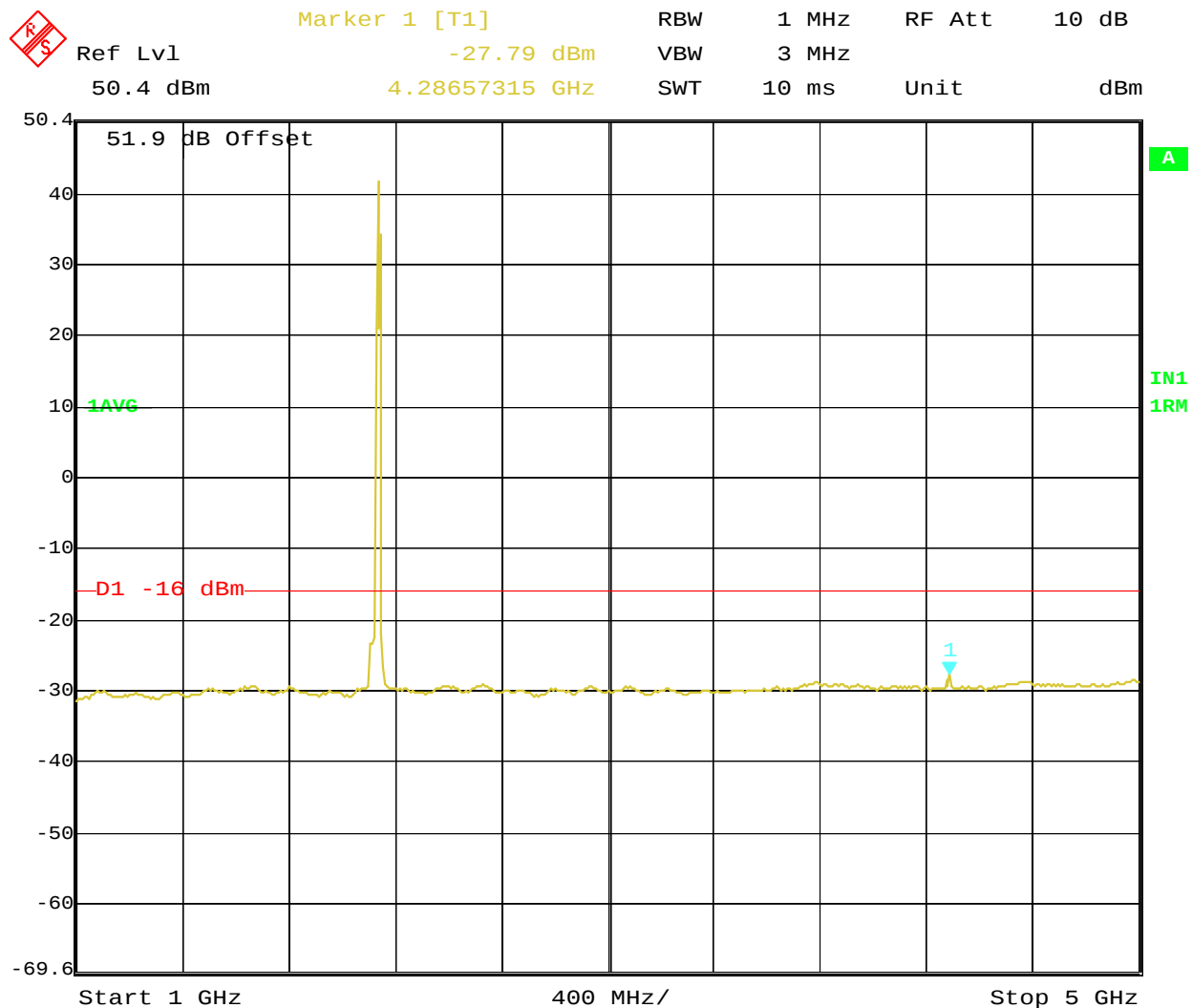
Ref Lvl 50.4 dBm Marker 1 [T1] -29.92 dBm RBW 10 kHz RF Att 30 dB
189.30661323 kHz VBW 30 kHz Unit dBm
SWT 760 ms



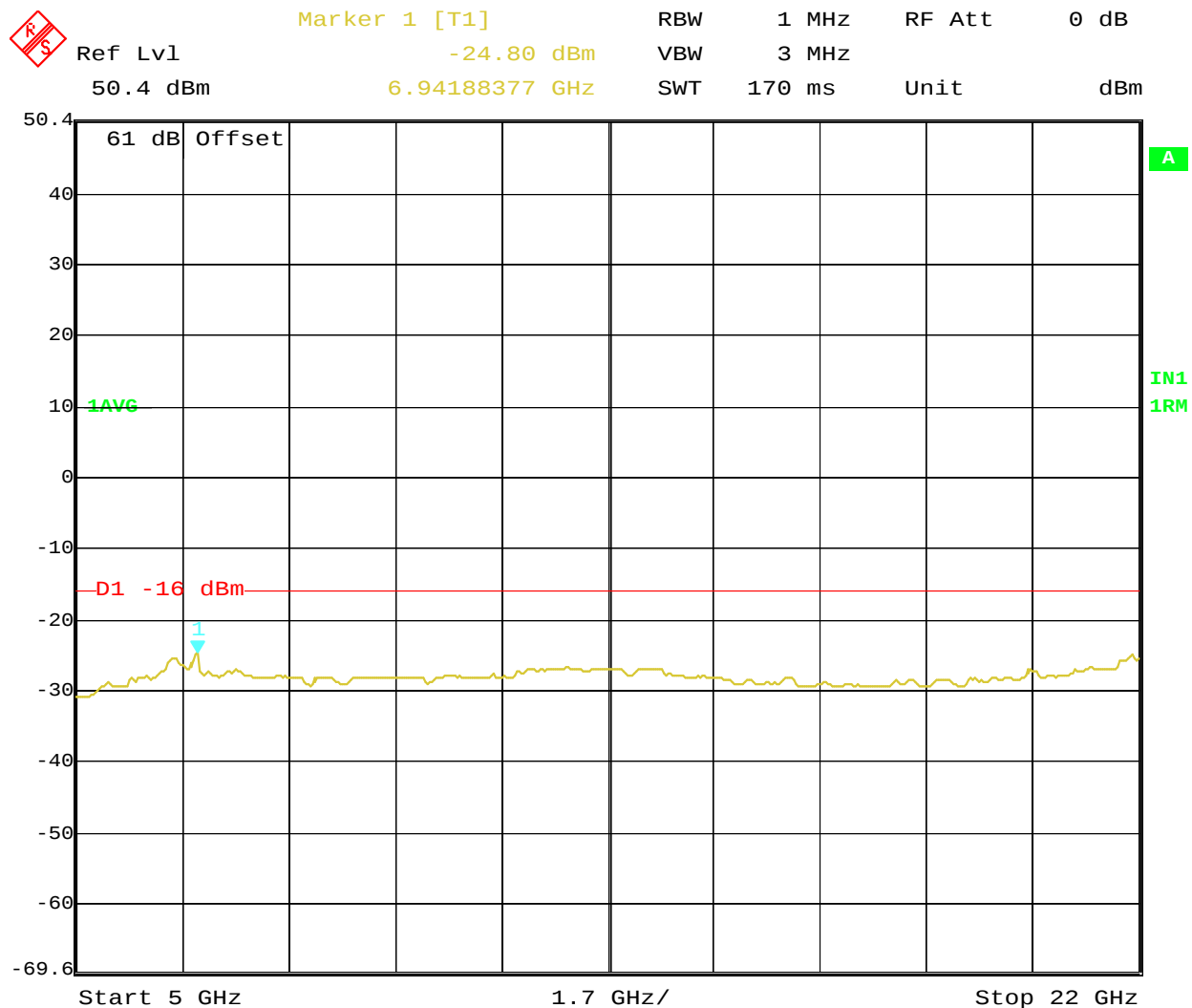
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;64QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG
Date: 10.MAR.2014 09:59:25



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;64QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG
Date: 10.MAR.2014 10:00:52



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;64QAM; FCC PRT 27; FCCID:AS5BBTRX-13;CLS II CHNG
Date: 10.MAR.2014 10:02:01



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS (LTE-RF); -48VDC; BLK:D+E; 2140MHz
PWR:120W;64QAM;FCC PRT 27;FCCID:AS5BBTRX-13;CLS II CHNG;HPF
Date: 10.MAR.2014 10:04:10

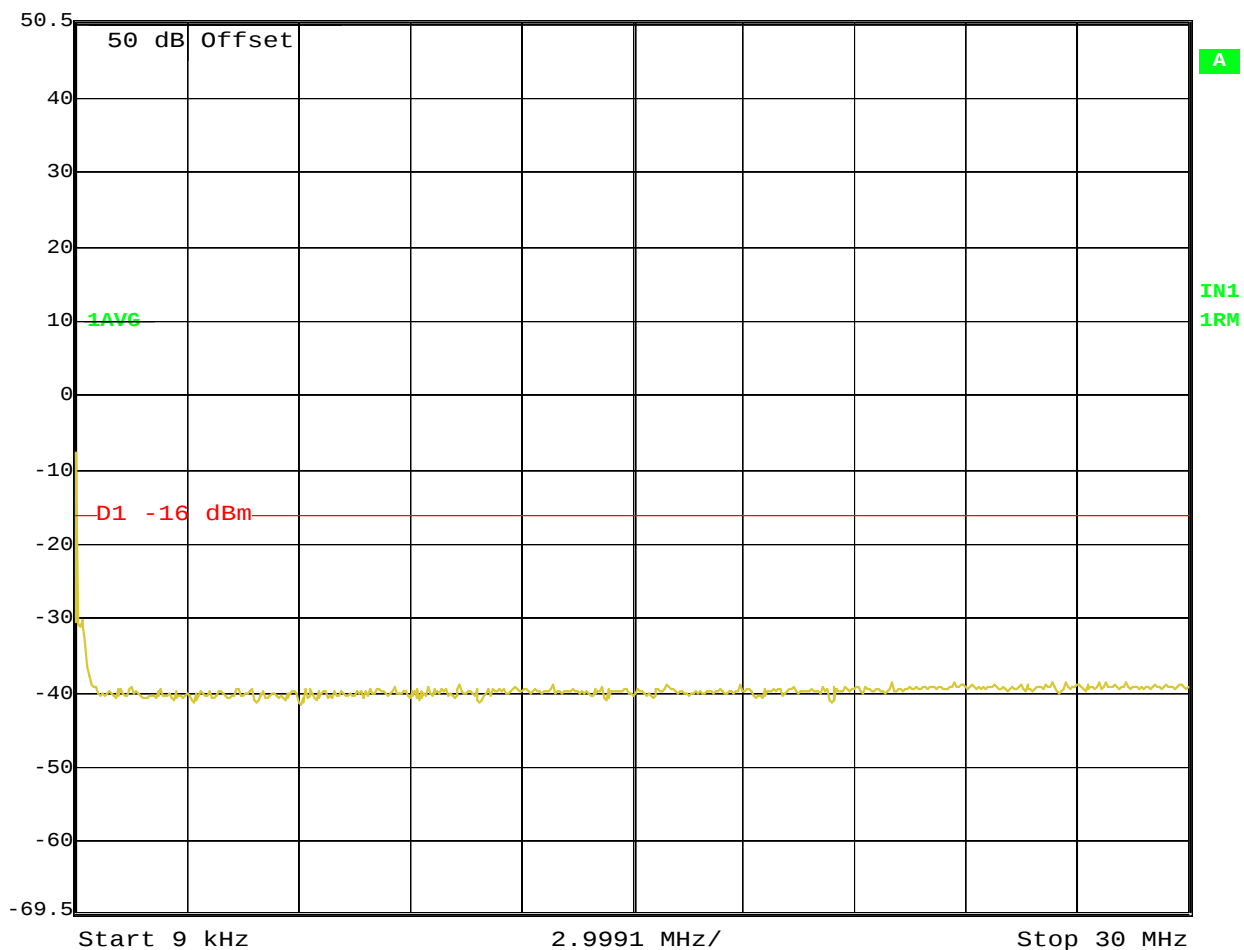
**Transmit Port
Antenna Conducted Spurious Emissions**

**Block: F
10 MHz Bandwidth (2145 - 2155 MHz)
2x120watts (MIMO)
QPSK Modulation**

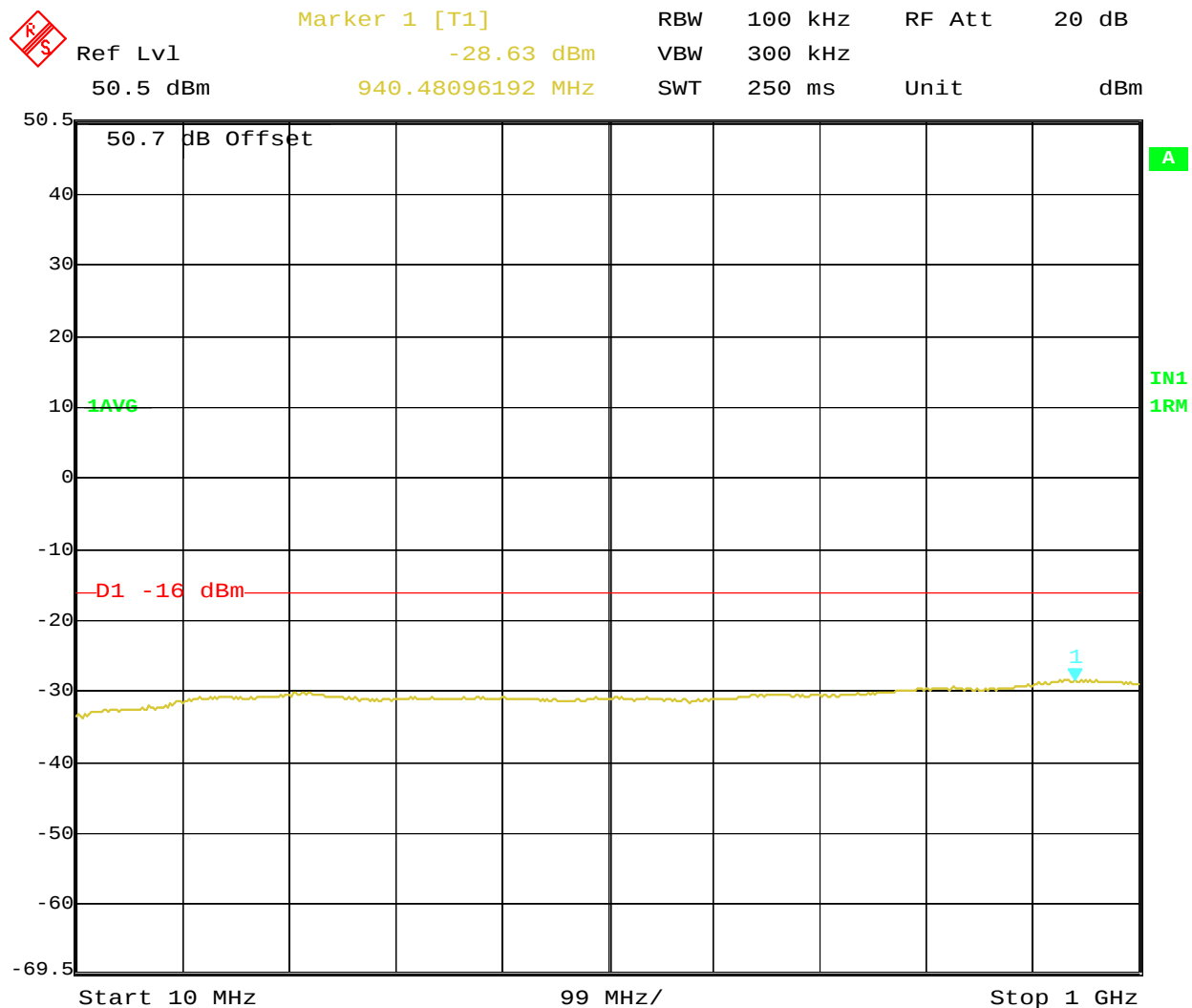


Ref Lvl
50.5 dBm

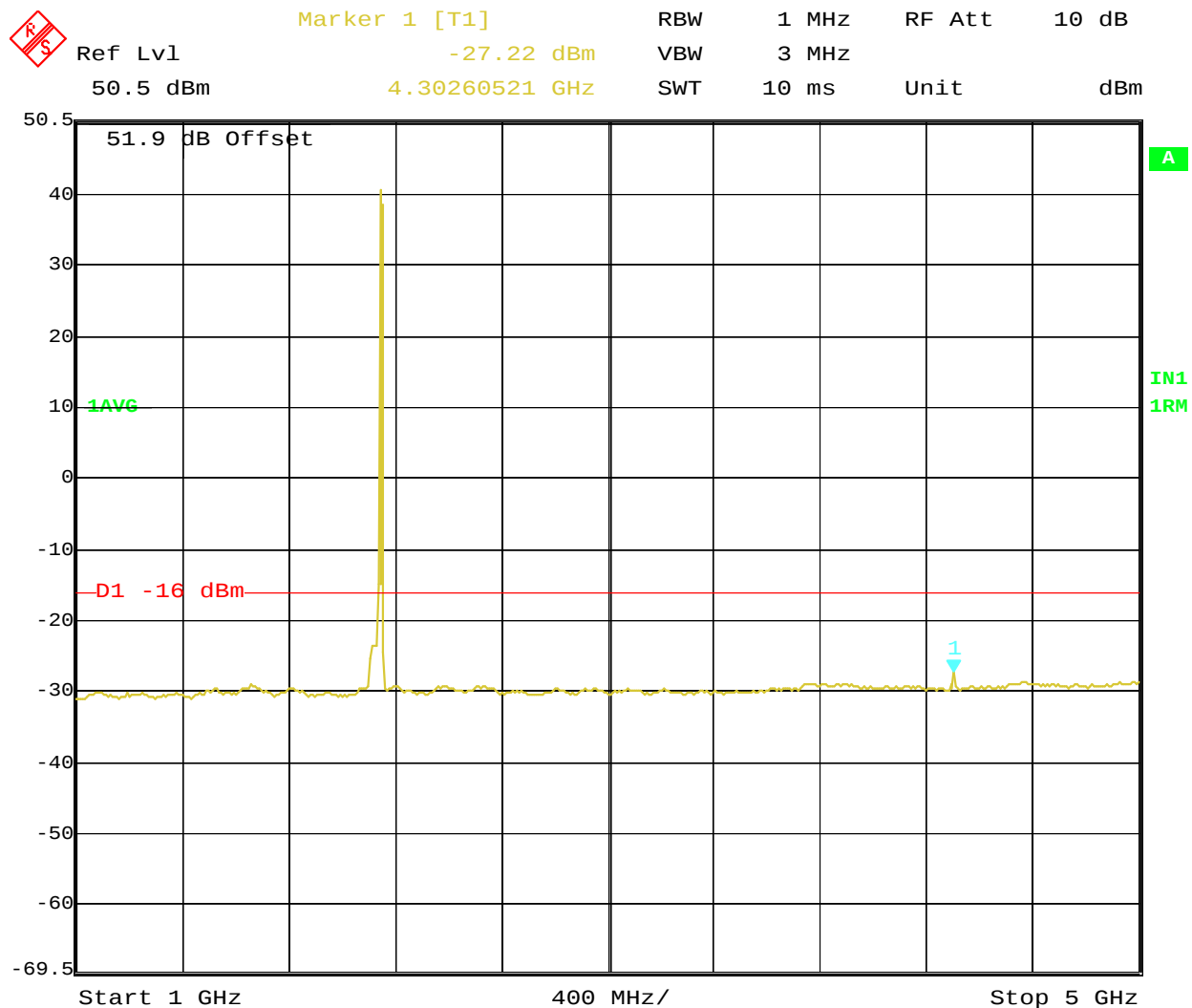
RBW 10 kHz RF Att 30 dB
VBW 30 kHz
SWT 760 ms Unit dBm



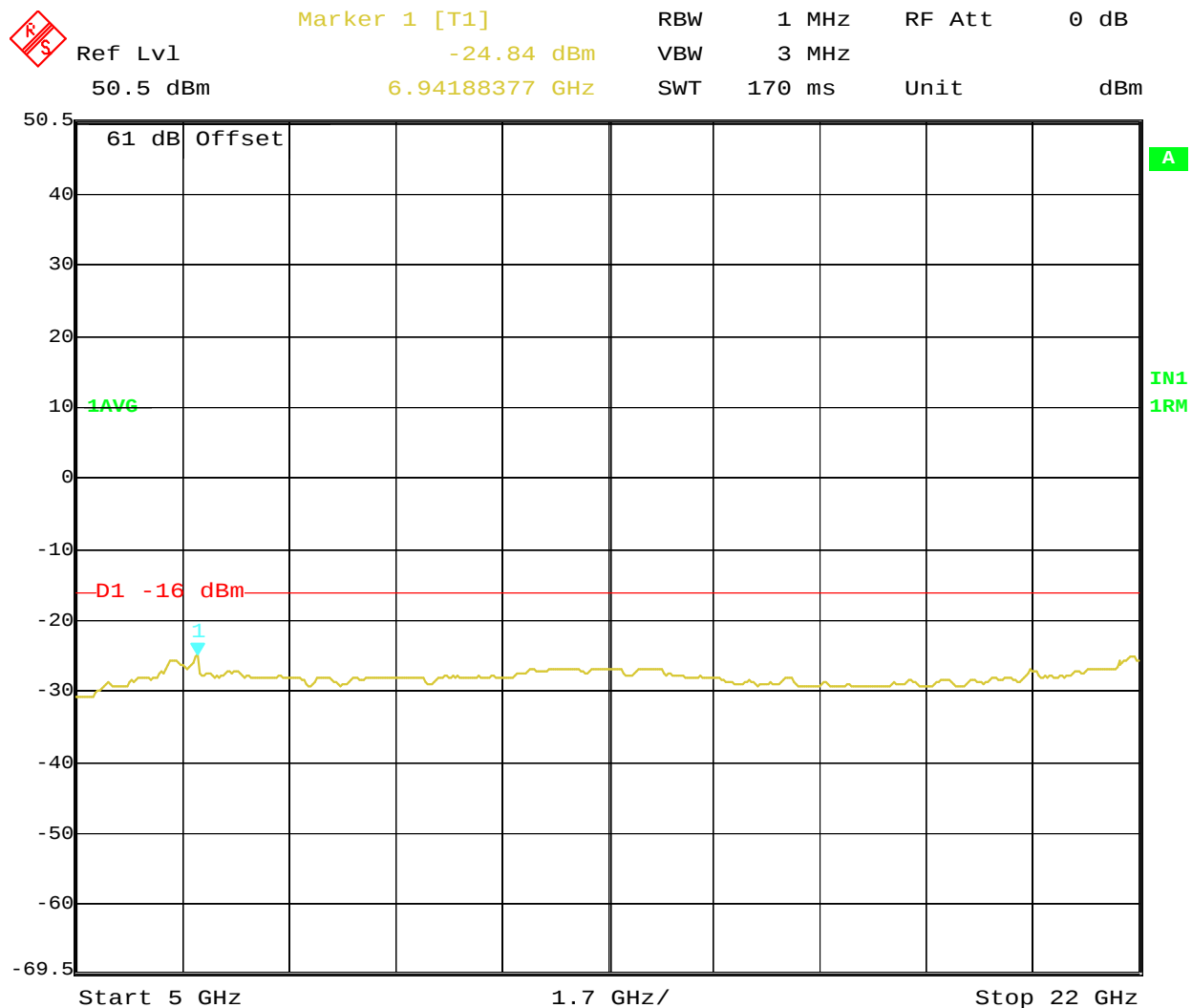
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 5.MAR.2014 14:14:03



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 5.MAR.2014 14:16:00



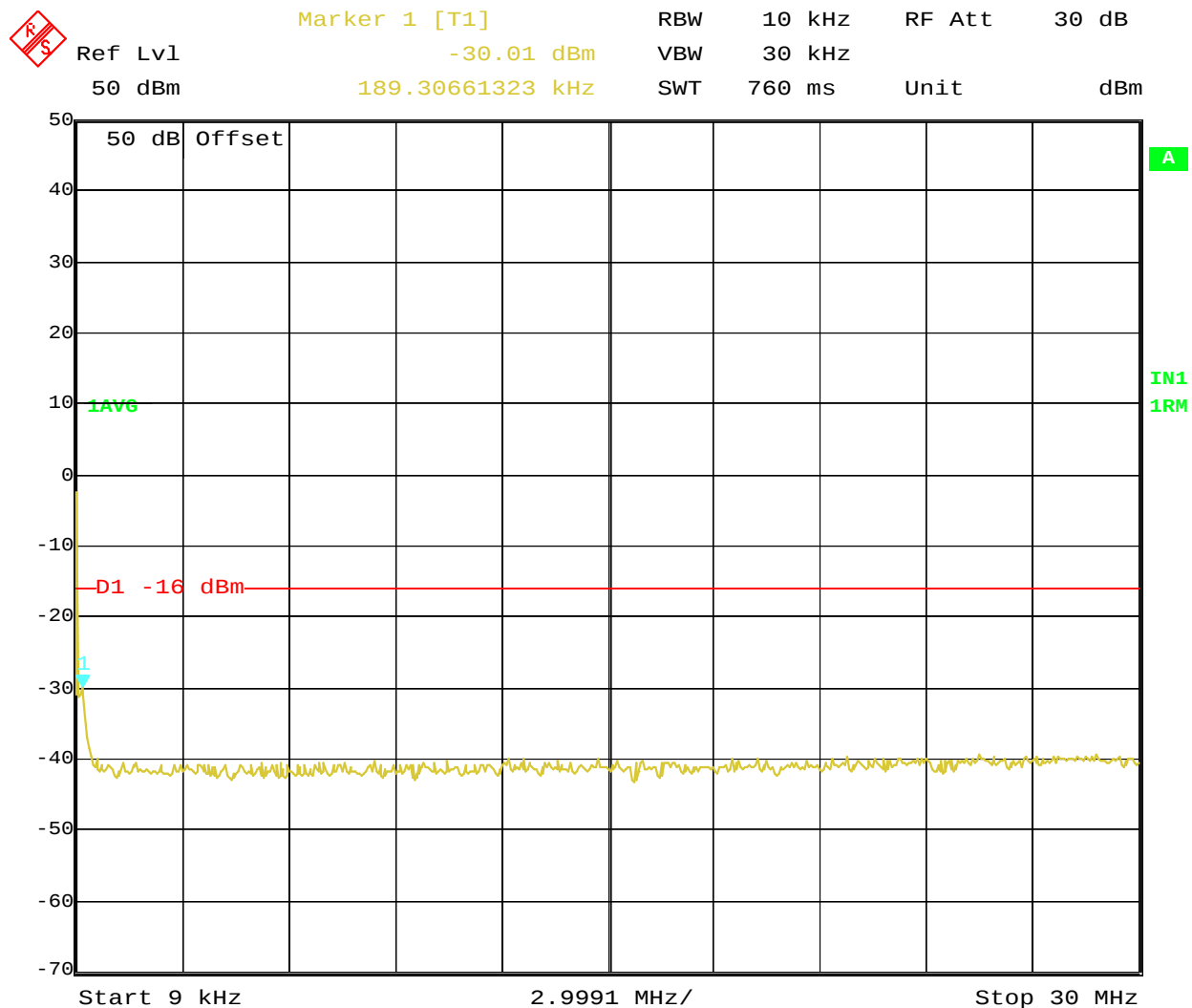
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 5.MAR.2014 14:20:34



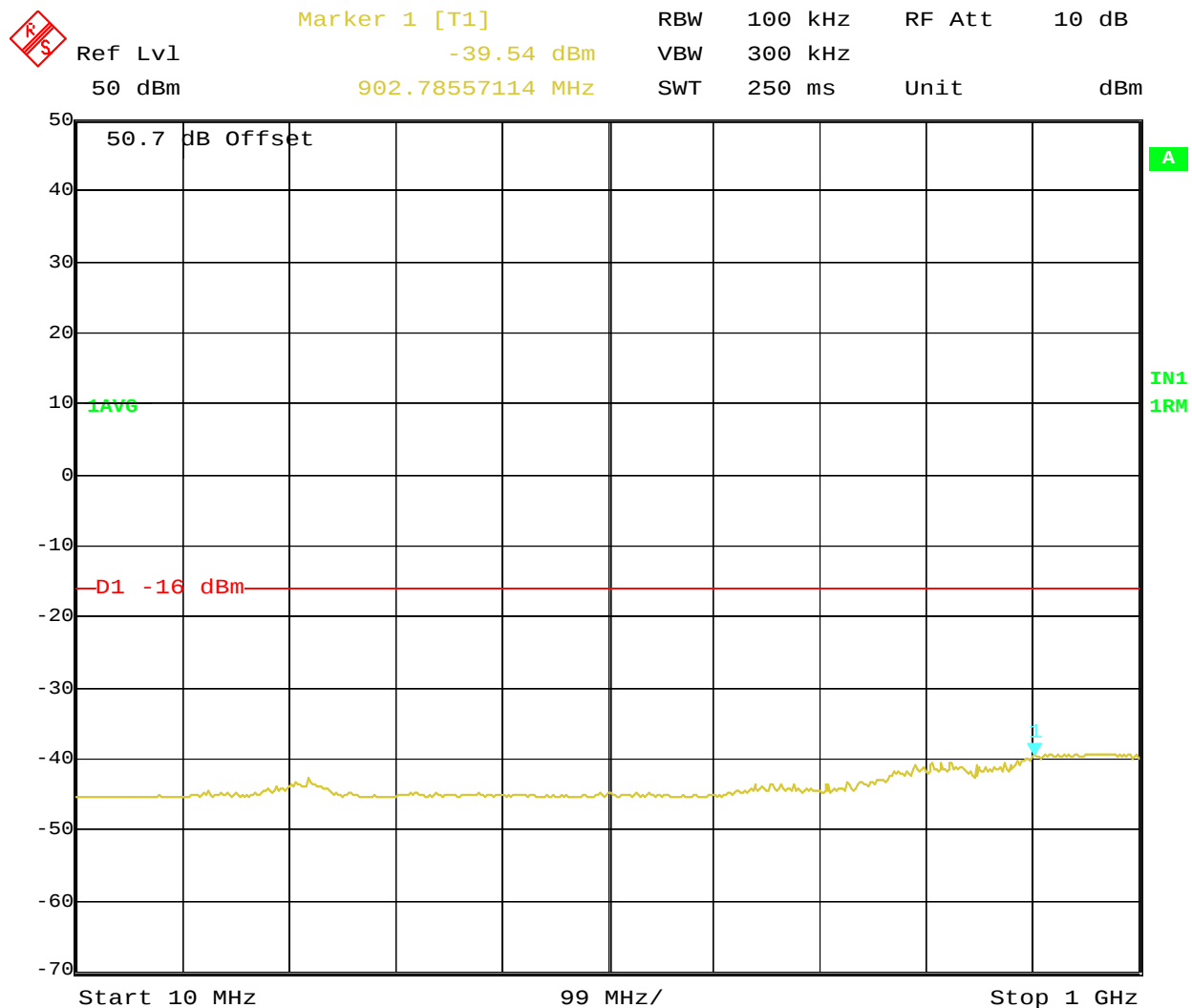
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 5.MAR.2014 14:32:34

Transmit Port
Antenna Conducted Spurious Emissions

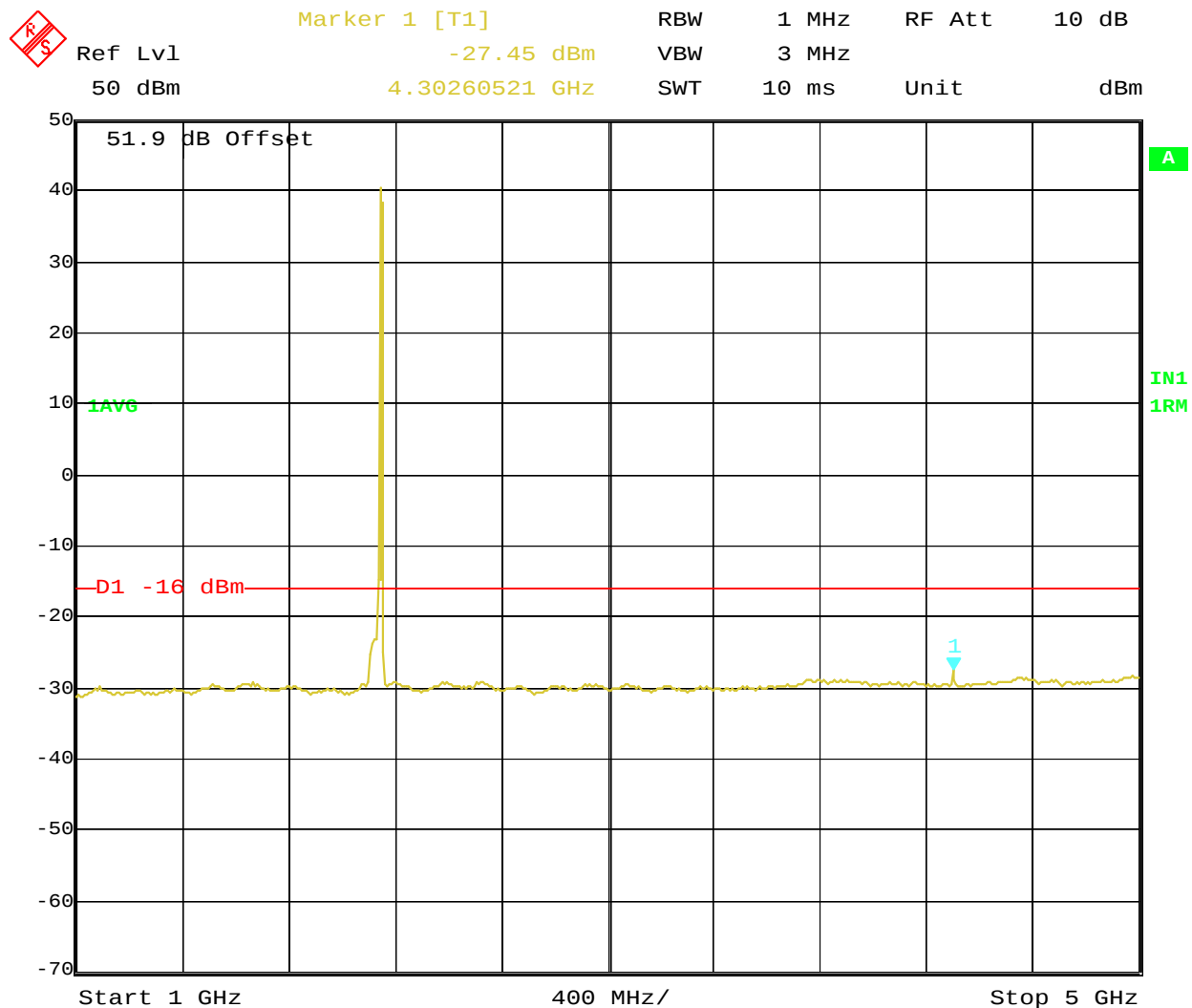
Block: F
10 MHz Bandwidth (2145 - 2155 MHz)
2x120watts (MIMO)
16QAM Modulation



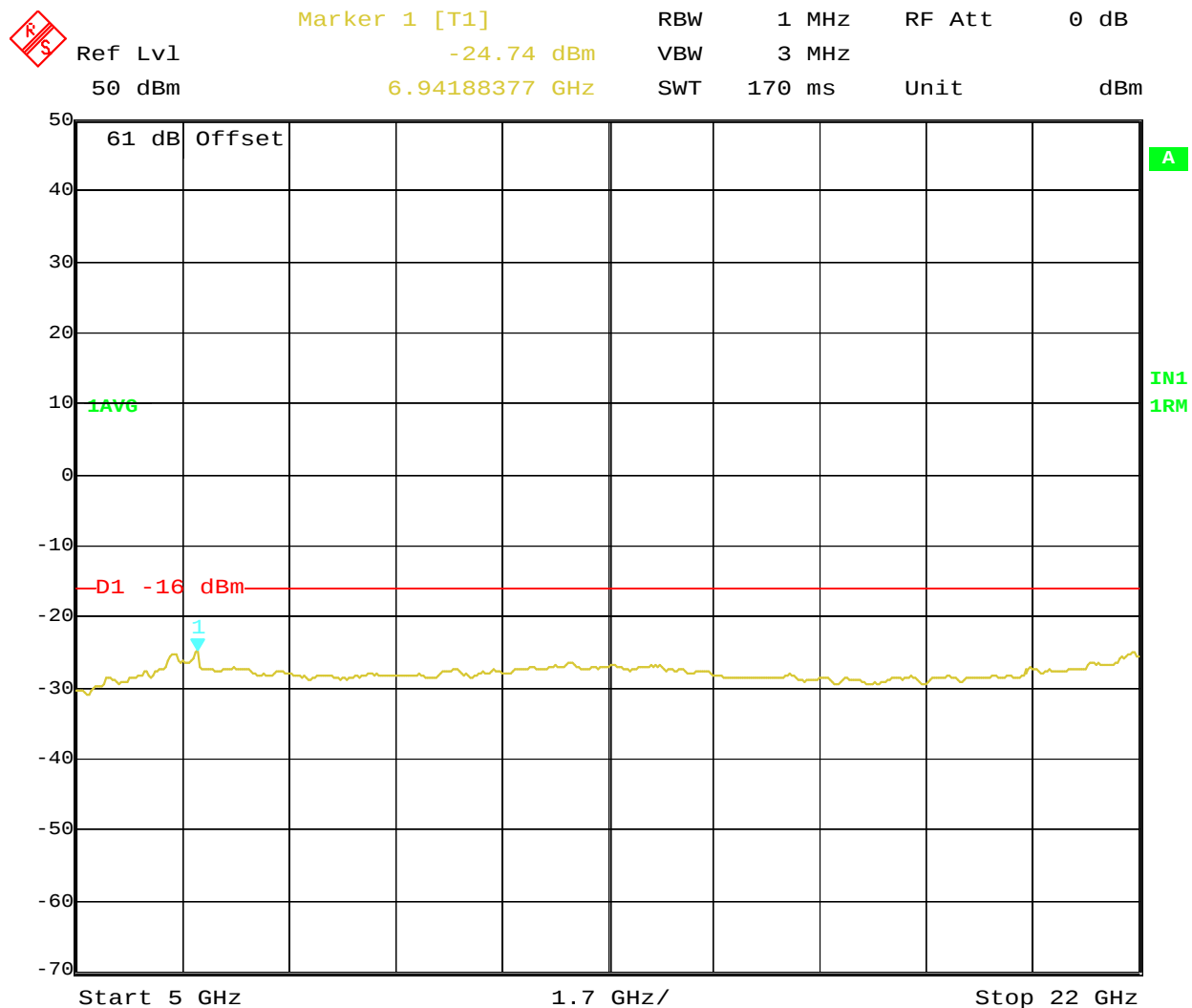
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 08:51:13



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 08:48:37



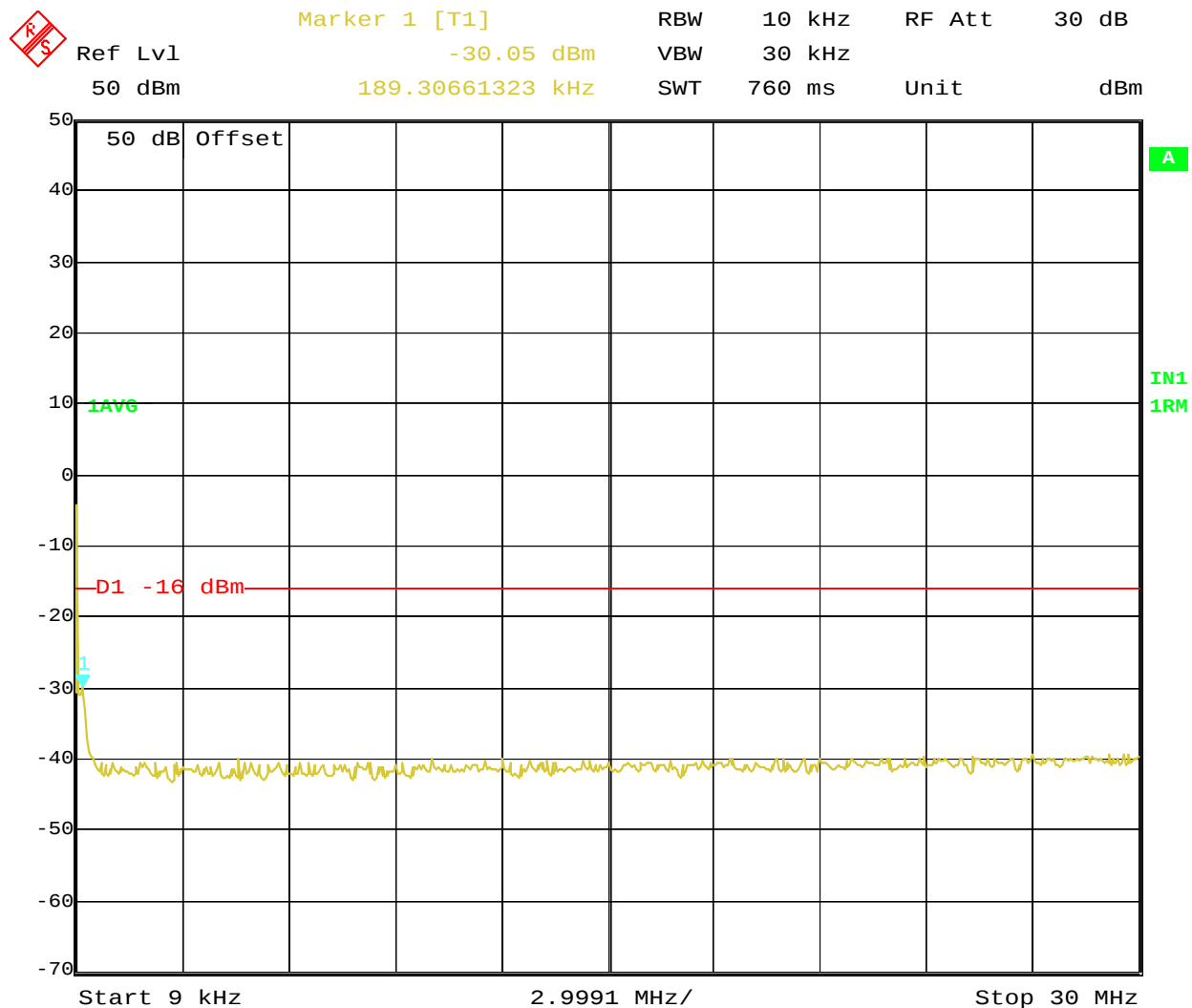
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 08:46:55



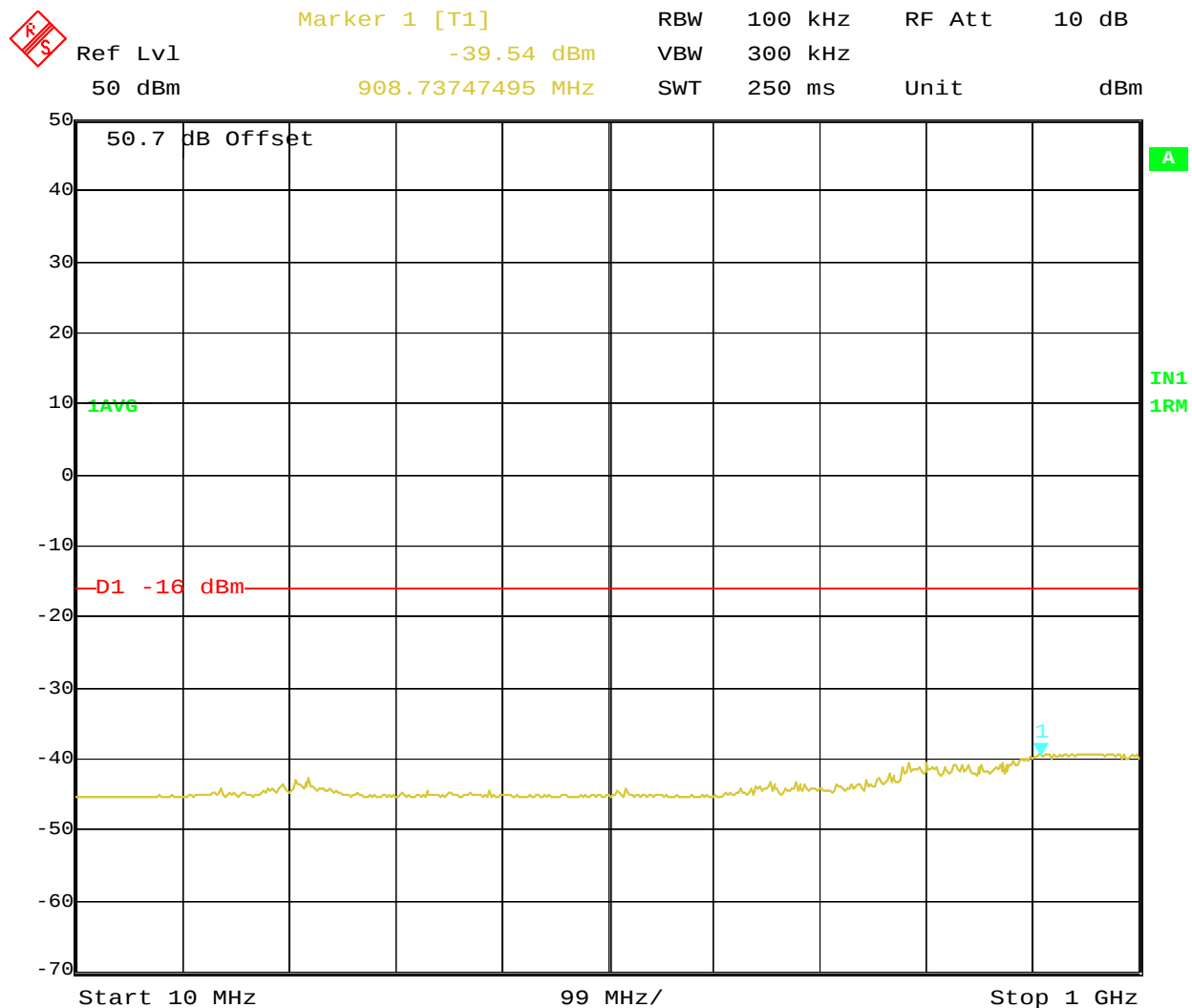
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 08:43:30

Transmit Port
Antenna Conducted Spurious Emissions

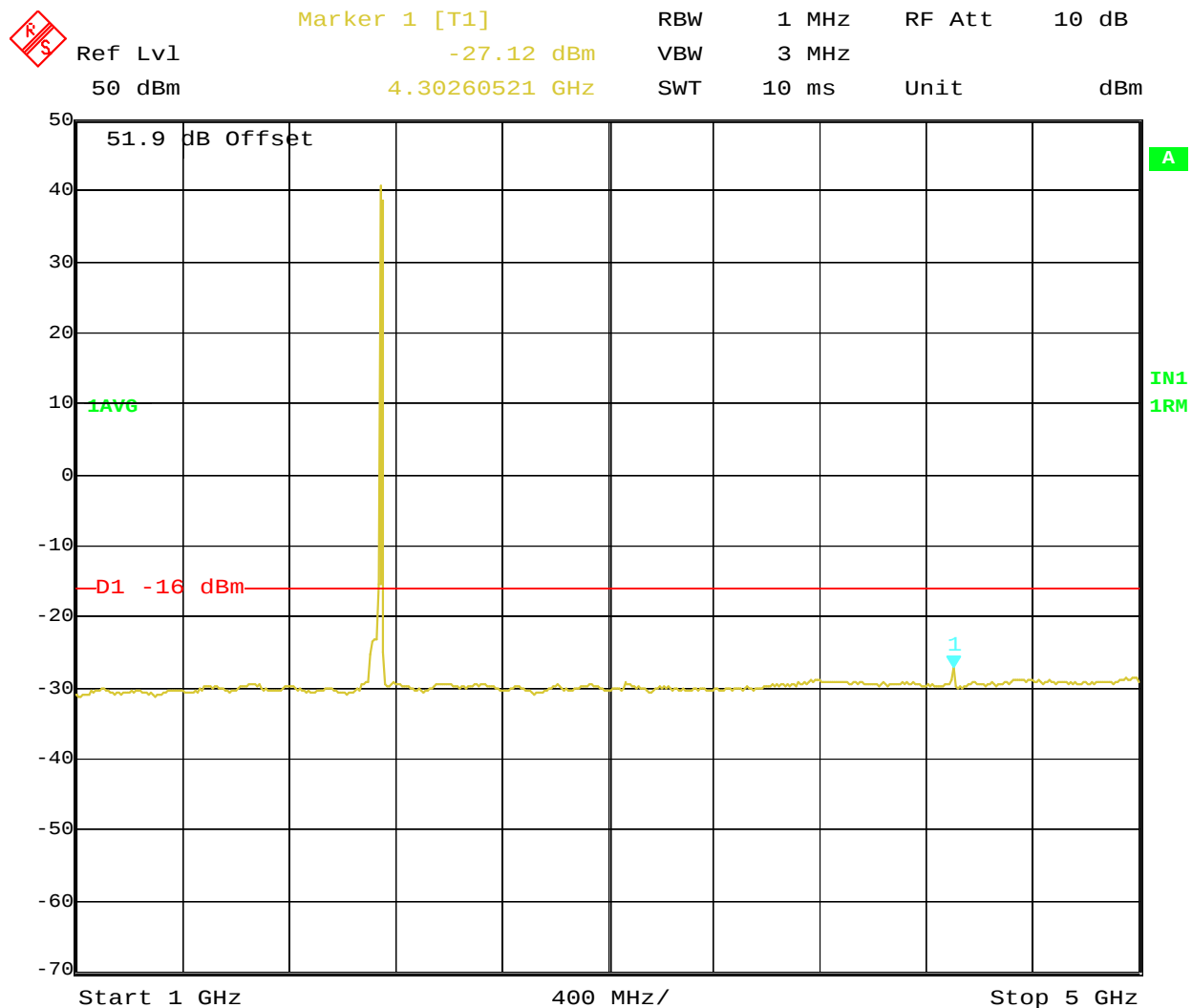
Block: F
10 MHz Bandwidth (2145 - 2155 MHz)
2x120watts (MIMO)
64QAM Modulation



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 09:38:30



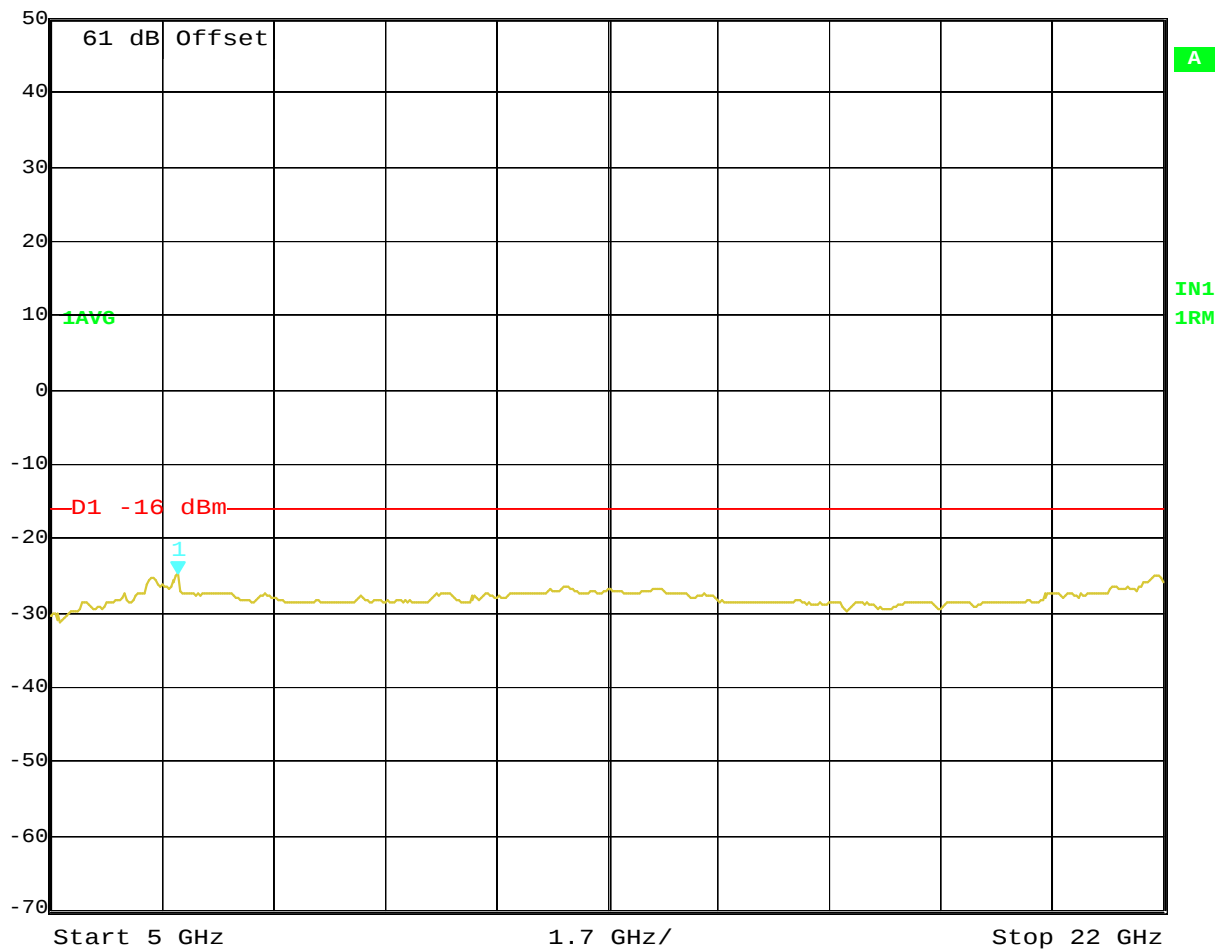
Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
 Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
 PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13
 Date: 6.MAR.2014 09:28:22



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13
Date: 6.MAR.2014 09:29:53



Ref Lvl 50 dBm
Marker 1 [T1] -24.72 dBm
6.94188377 GHz
RBW 1 MHz
VBW 3 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm



Title: TX SPURIOUS EMISSIONS ; 1C; 10 MHz BW; Test Engineer: SEG
Comment A: TRDU 2X120 BAND 4 AWS PAN.(LTE-RF); -48VDC; BLK:F; 2150MHz
PWR:120W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-13; HPF
Date: 6.MAR.2014 09:32:01

Test Instrumentation List

Manufacturer	Model	Serial #	Description	Manual #	Last Cal Date	Cal Cycle Month
Hewlett Packard	437B	3125U21137	RF Power Meter	E760	10/16/2013	12
Agilent	N9020A	MY52090740	MXA Analyzer 10 Hz – 3.6 GHz	N/A	7/13/2012	24
Rohde & Schwarz	ESIB40	100044	EMI Test Receiver (20Hz to 40 GHz)-150 +30dBm	E567	7/2/2013	24
Hewlett Packard	8481A	US37294629	Power Sensor 10 MHz-18 GHz	E839	9/16/2013	12
Weinschel	66-20-34	BW7319	Attenuator 20dB 150W DC-18 GHz	E816	9/27/2013	15
Weinschel	48-30-33	AY8323	Attenuator DC - 18GHz 100 Watt	E961	N/A	N/A
Hewlett Packard	773D	2839A01399	Directional coupler 2 – 18 GHz	E1176	N/A	N/A

Measurement -5

FIELD STRENGTH OF SPURIOUS RADIATION **SECTION 2.1053 and 27.53 (g)**

TRDU 2x120 Band 4 AWS (LTRE-RF)**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 353147).

The “TRDU 2x120 Band 4 AWS (LTRE-RF) with FCCID: AS5BBTRX-13” was tested at a RF output of **120 W at Antenna Interface Connector (AIC)**. These tests were performed in LTE 9412 cabinet with (6) TRDU 2x120 Band 4 AWS (LTRE-RF) and one D2UV5 Base band unit (BBU). Each TRDU is designed to provide (1) 120 Watts LTE Carriers. The interconnection between the TRDU and D2U was through optical fiber. The radiated emissions tests were performed with the TRDUs were operating with 10 MHz bandwidth in the frequency blocks combinations listed for Antenna Conducted spurious emissions. All tests were performed with the TRDU operating in QPSK and 64QAM modulations simultaneously. During testing, the TRDU AIC were terminated with 50 ohm load. The spectrum from 10 MHz to the 10th harmonic (22 GHz) 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:

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

Section 27.53 and 2.1053 contains the requirements for the levels of spurious radiation as a function of frequency.

FCC Section 27.53(h): the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB or -13dBm. Pursuant to FCC OET RULES 662911 D01 and D02 for two antenna MIMO mode of operations, the FCC limit of -13dBm shall be 3dB more stringent, therefore all channel edge and out of band spurious emissions shall be -16dBm.

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 Recommendation ITU-R, SM.329-11, “*Unwanted emissions in the spurious domain*” January 2011.

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

$$20 \log(E \cdot 106) - (46 + 10 \log P) = 79.2 \text{ dB } \mu\text{V/meter}$$

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 79.2dB μ V/meter. Reportable measurements are equal to or greater than 59.2dB μ V/meter. Over the spectrum investigated, 10 MHz to 10th of the carrier (22 GHz), no reportable spurious emissions were detected. This demonstrates that the “TRDU 2x120 Band 4 AWS (LTRE-RF)” 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

(There is no change in circuitry or product construction including frequency stabilizing circuits. For this class II filing new data is not considered required)

**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