

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-11**, 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.

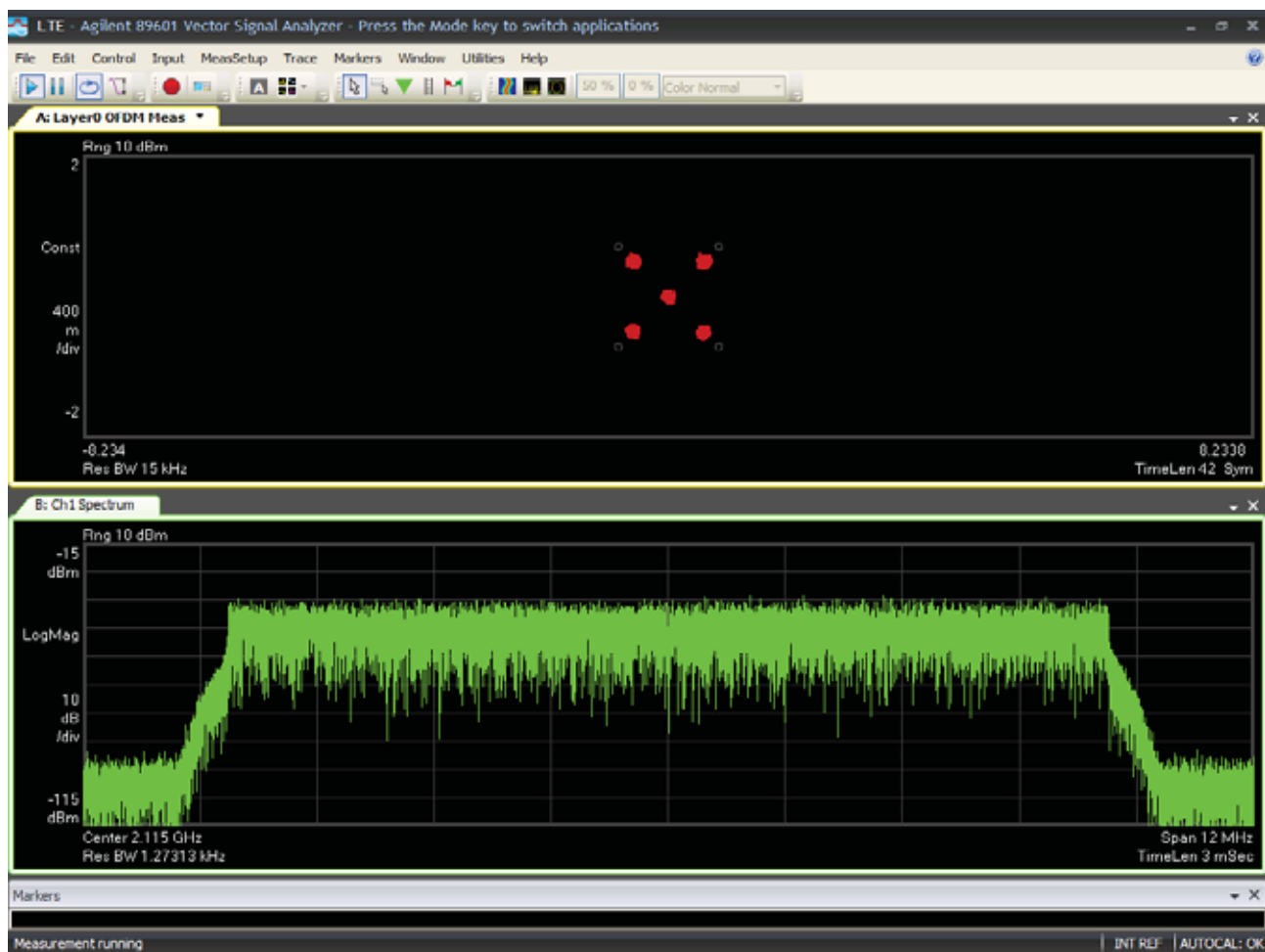
- (1) Quadrature Phase Shift Keying (QPSK) modulation scheme uses 2 bits are transmitted simultaneously (one per channel) and a symbol can be represented by 2 bits. Therefore there are $2^2 = 4$ states (Binary 00 to 11). The theoretical bandwidth is 2bits/second/Hz.
- (2) 16 Quadrature amplitude modulation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

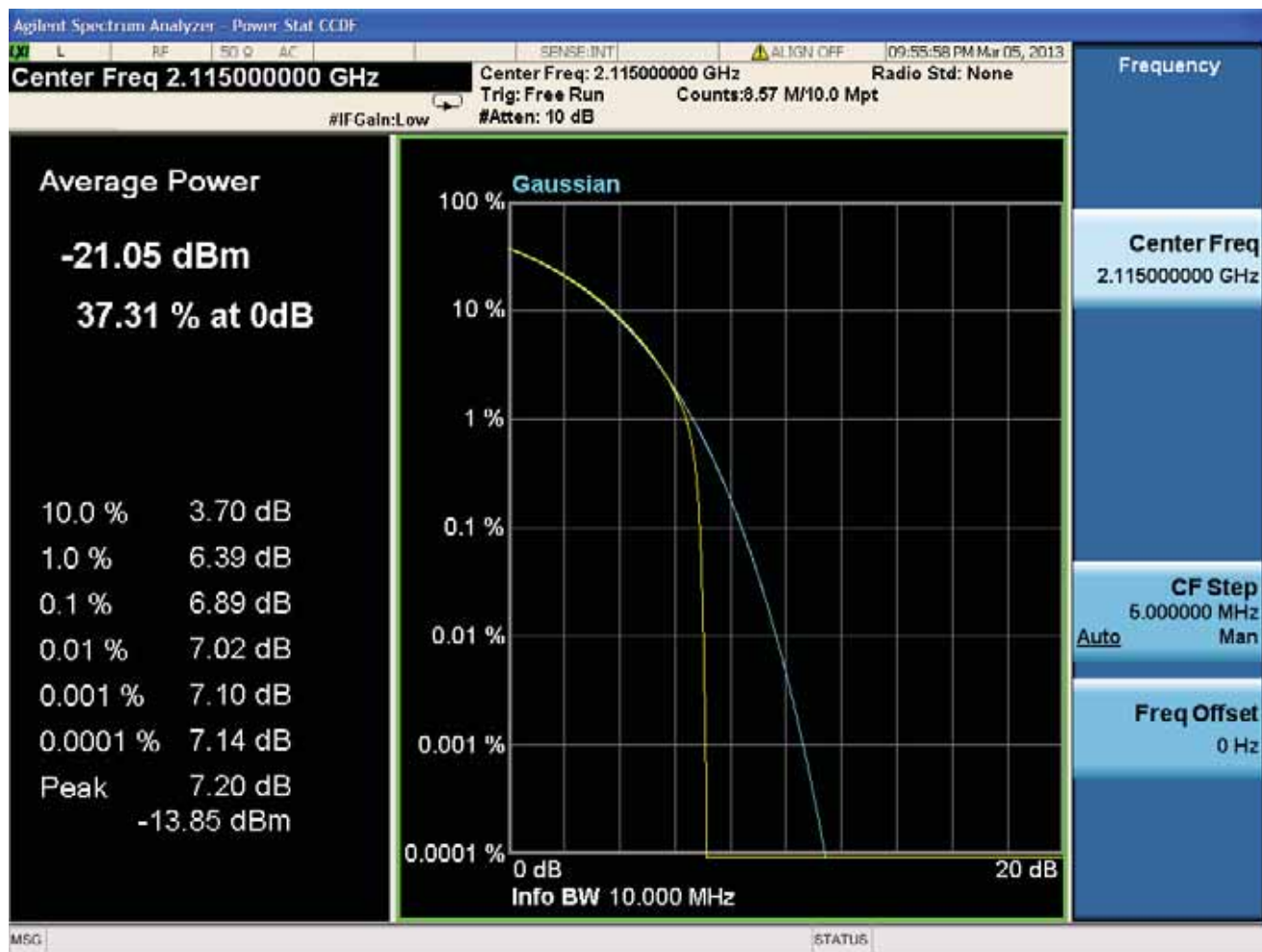
The peak-to-average (PAR) is plotted along with demodulated constellation plots. The plots show that average and peak values in dBm. The difference of peak-to-averages ratio does not exceed 13 dB as required in section 27.50(d) (5).

QPSK
2115MHz (10 MHz BW)

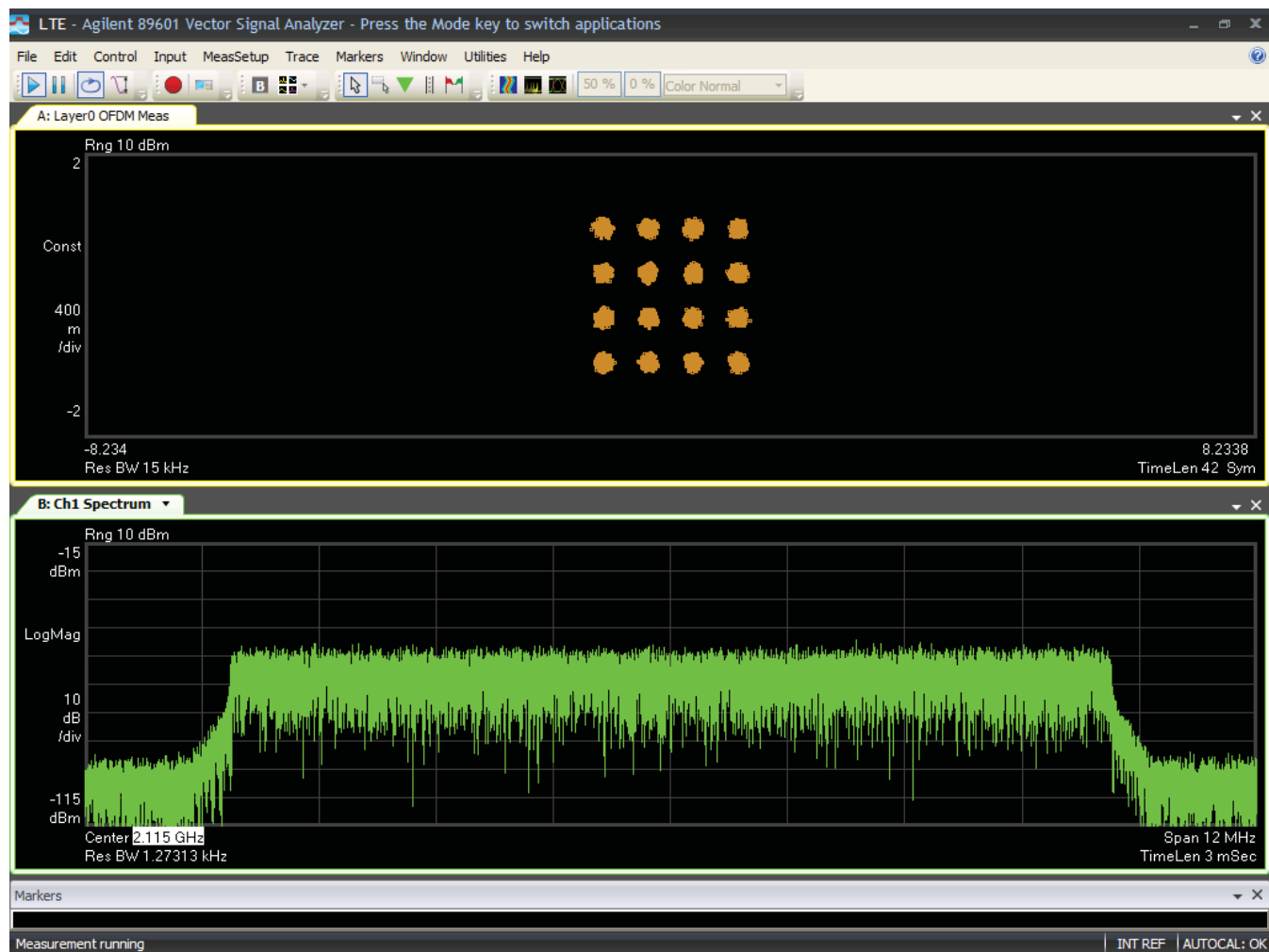


LTE AWS TRDU (M1) 2X60W in Light Radio Cabinet
FCC Part 27.53 Block A; PWR: 60 (2x60W MIMO)
FCCID: AS5BBTRX-11
TEST ENGINEER: JY

Peak to Average
QPSK
2115MHz (10 MHz BW)

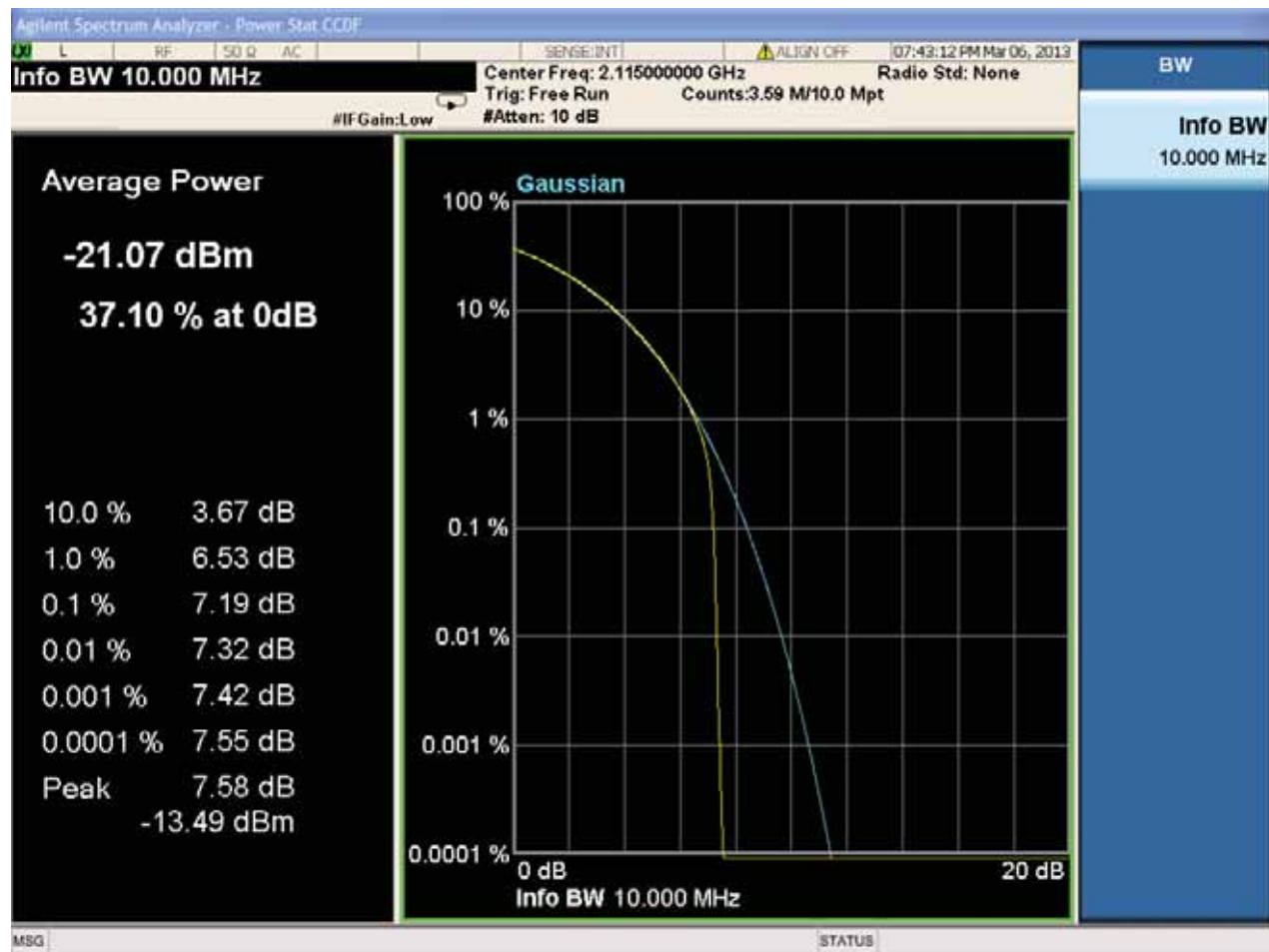


16QAM
2115MHz (10 MHz BW)

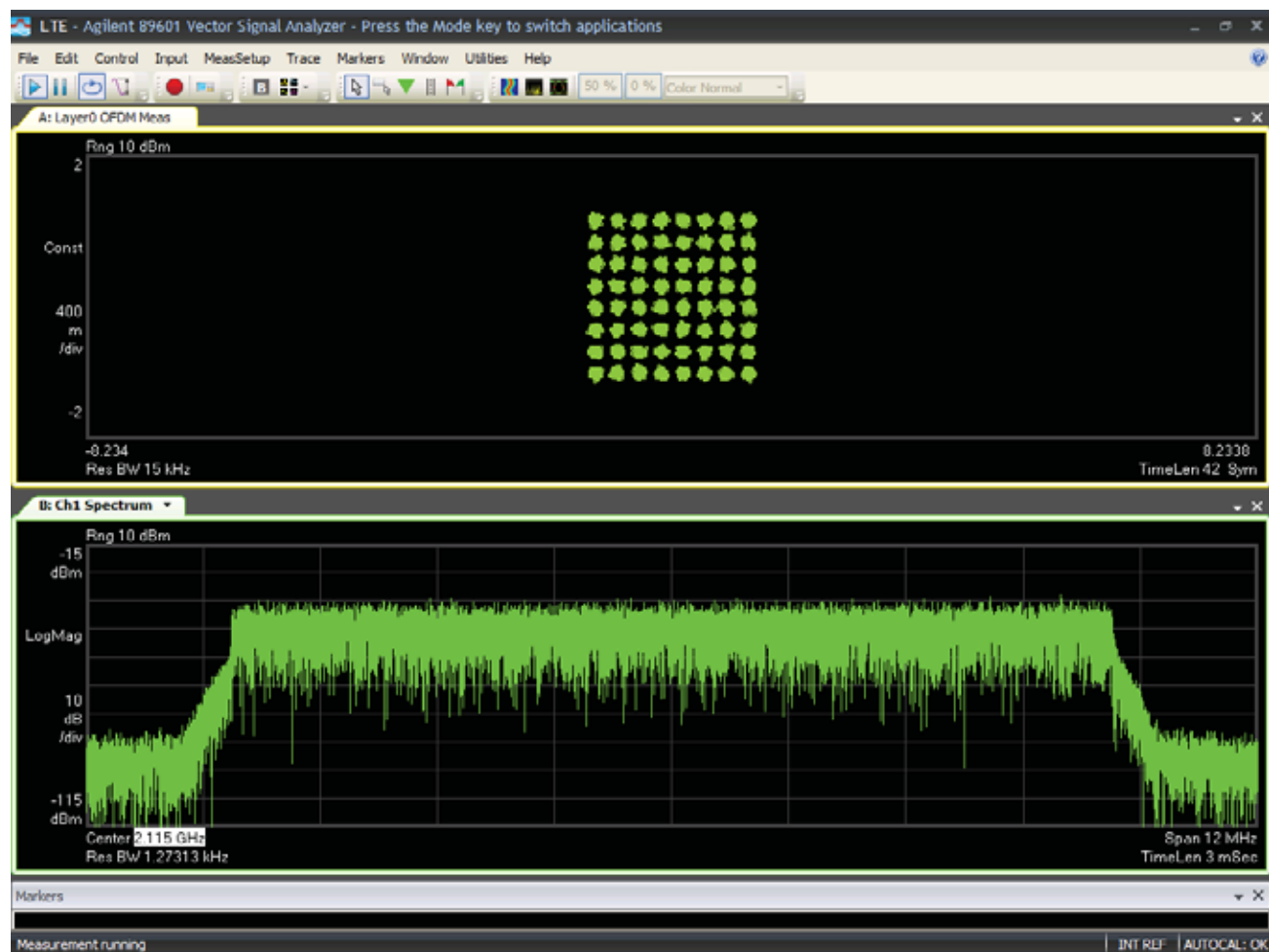


LTE AWS TRDU (M1) 2X60W in Light Radio Cabinet
FCC Part 27.53 Block A; PWR: 60 (2x60W MIMO)
FCCID: AS5BBTRX-11
TEST ENGINEER: JY

Peak to Average
16QAM
2115MHz (10 MHz BW)

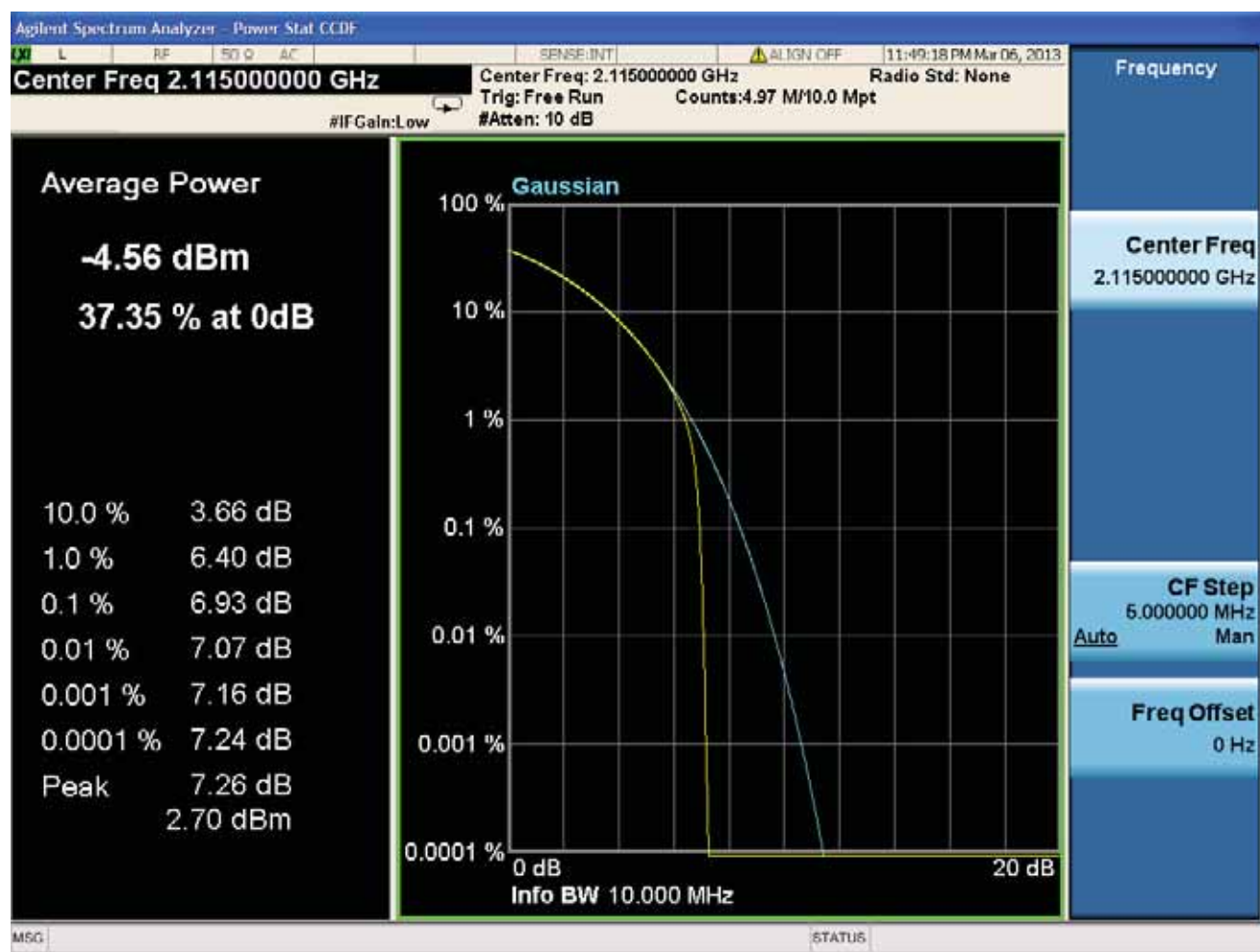


64QAM
2115MHz (10 MHz BW)

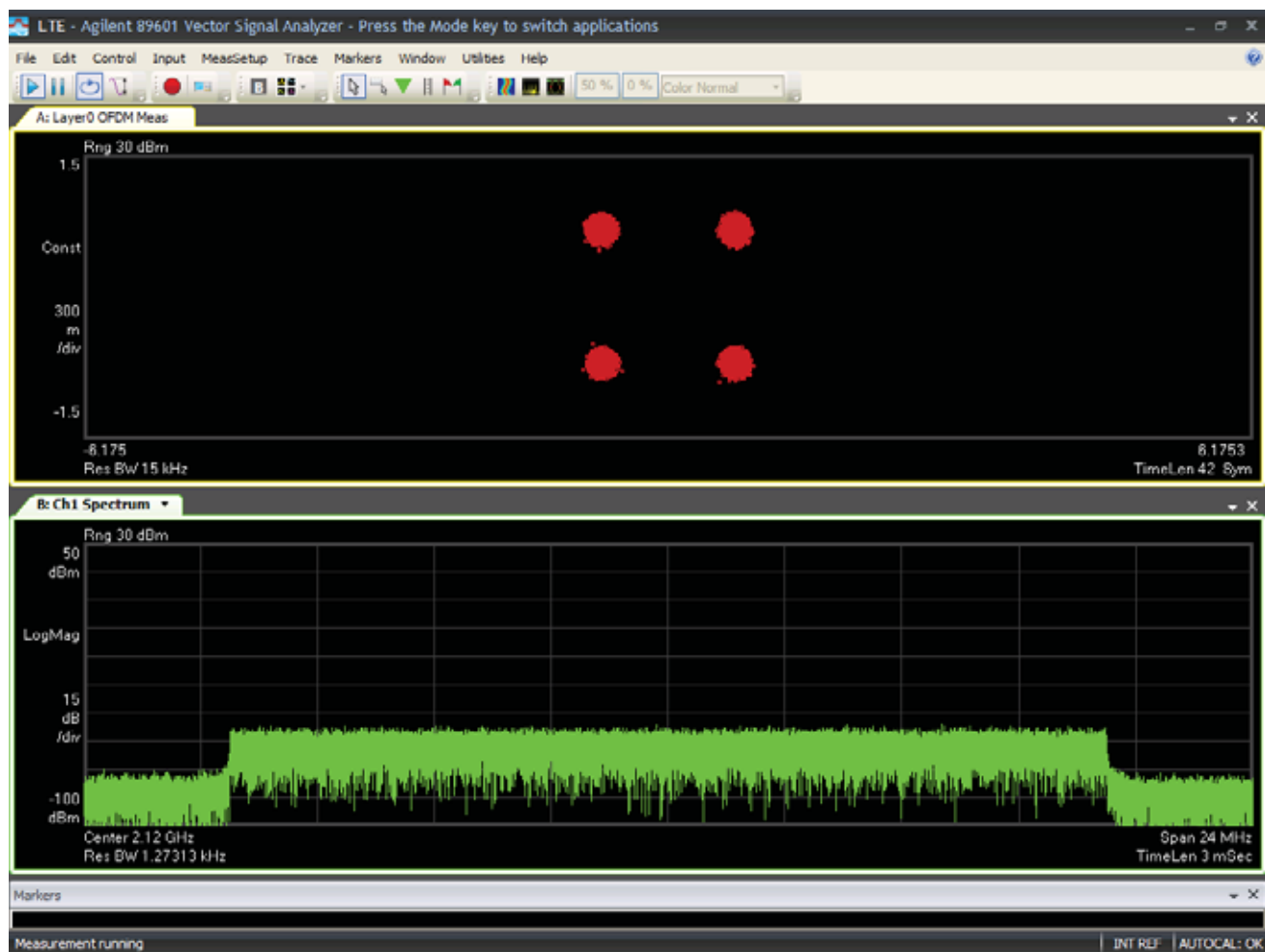


LTE AWS TRDU (M1) 2X60W in Light Radio Cabinet
FCC Part 27.53 Block A; PWR: 60 (2x60W MIMO)
FCCID: AS5BBTRX-11
TEST ENGINEER: JY

Peak to Average
64QAM
2115MHz (10 MHz BW)

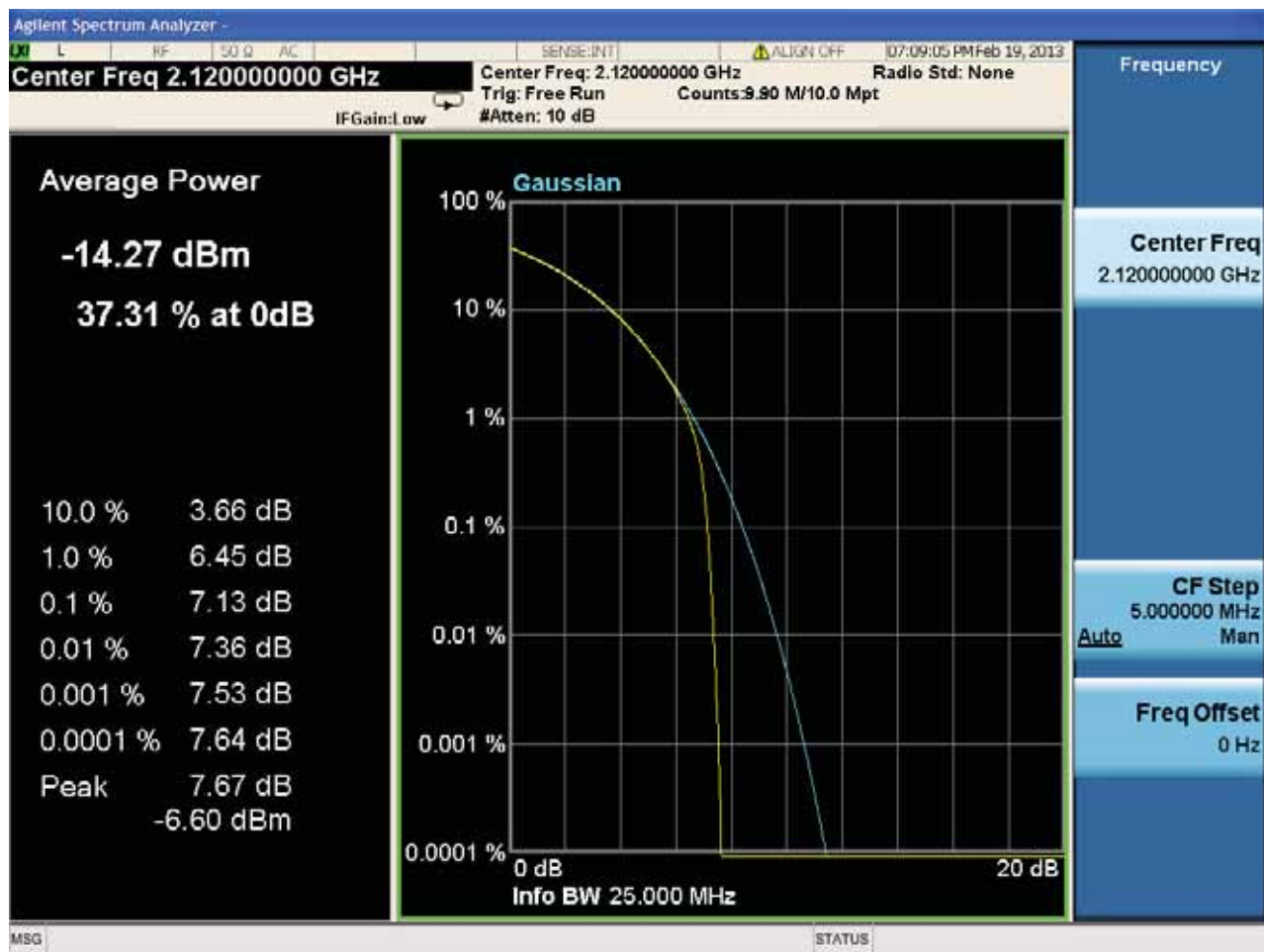


QPSK
2120MHz (20 MHz BW)

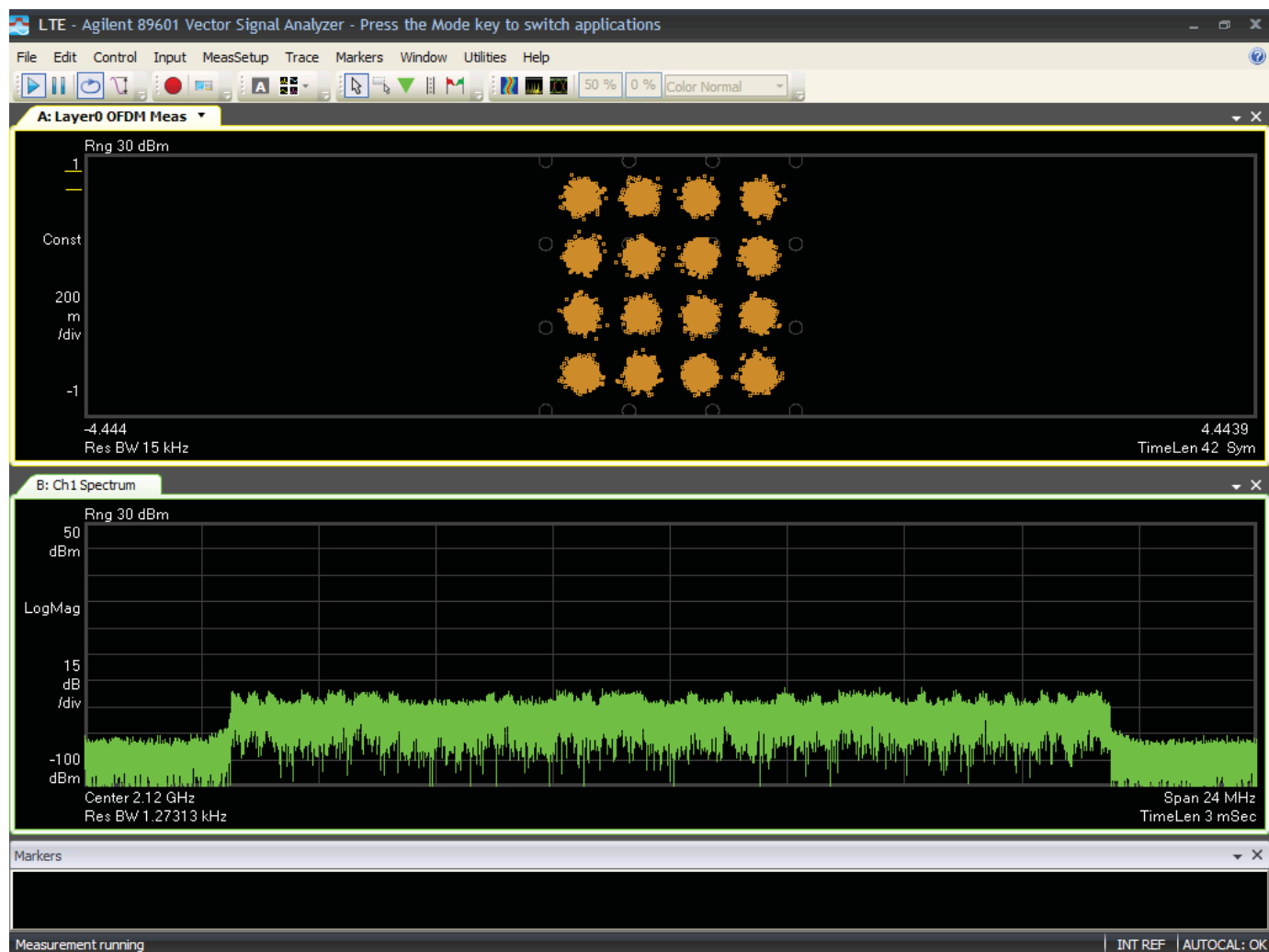


LTE AWS TRDU (M1) 2X60W in Light Radio Cabinet
FCC Part 27.53 Block A+B; PWR: 60 (2x60W MIMO)
FCCID: AS5BBTRX-11
TEST ENGINEER: JY

Peak to Average
QPSK
2120MHz (20 MHz BW)

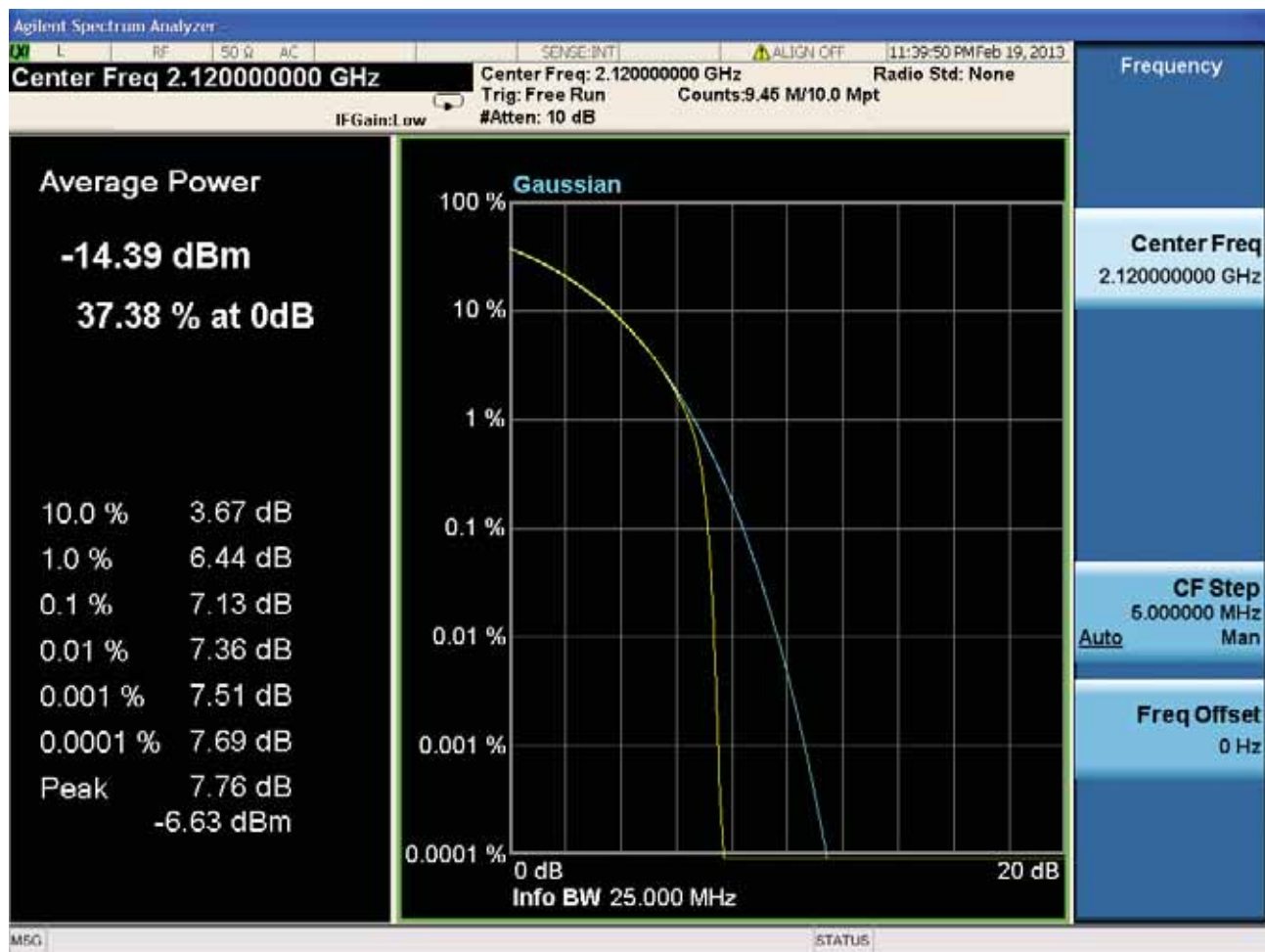


16 QAM
2120MHz (20 MHz BW)

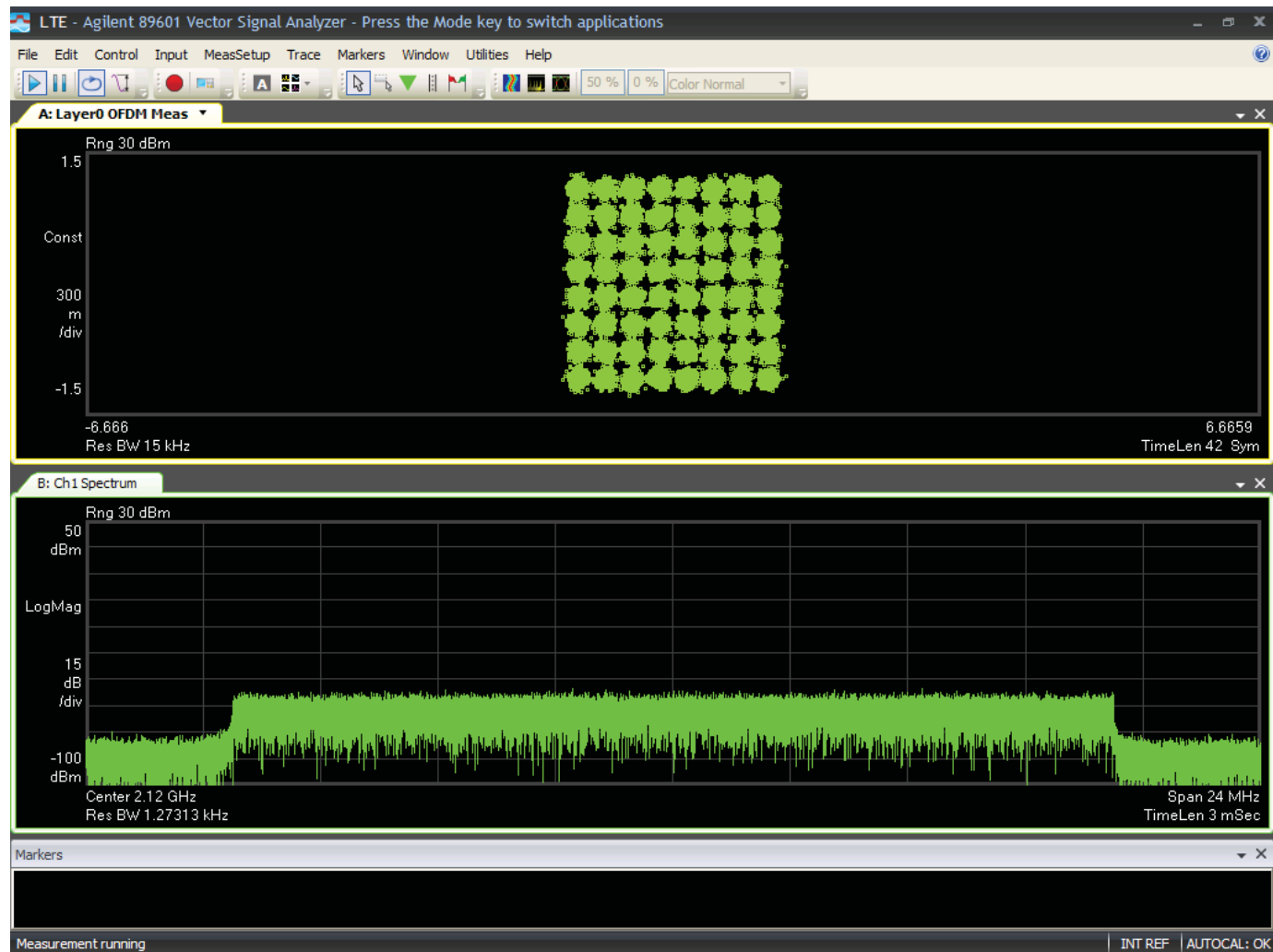


LTE AWS TRDU (M1) 2X60W in Light Radio Cabinet
FCC Part 27.53 Block A+B; PWR: 60 (2x60W MIMO)
FCCID: AS5BBTRX-11
TEST ENGINEER: JY

Peak to Average
16 QAM
2120MHz (20 MHz BW)

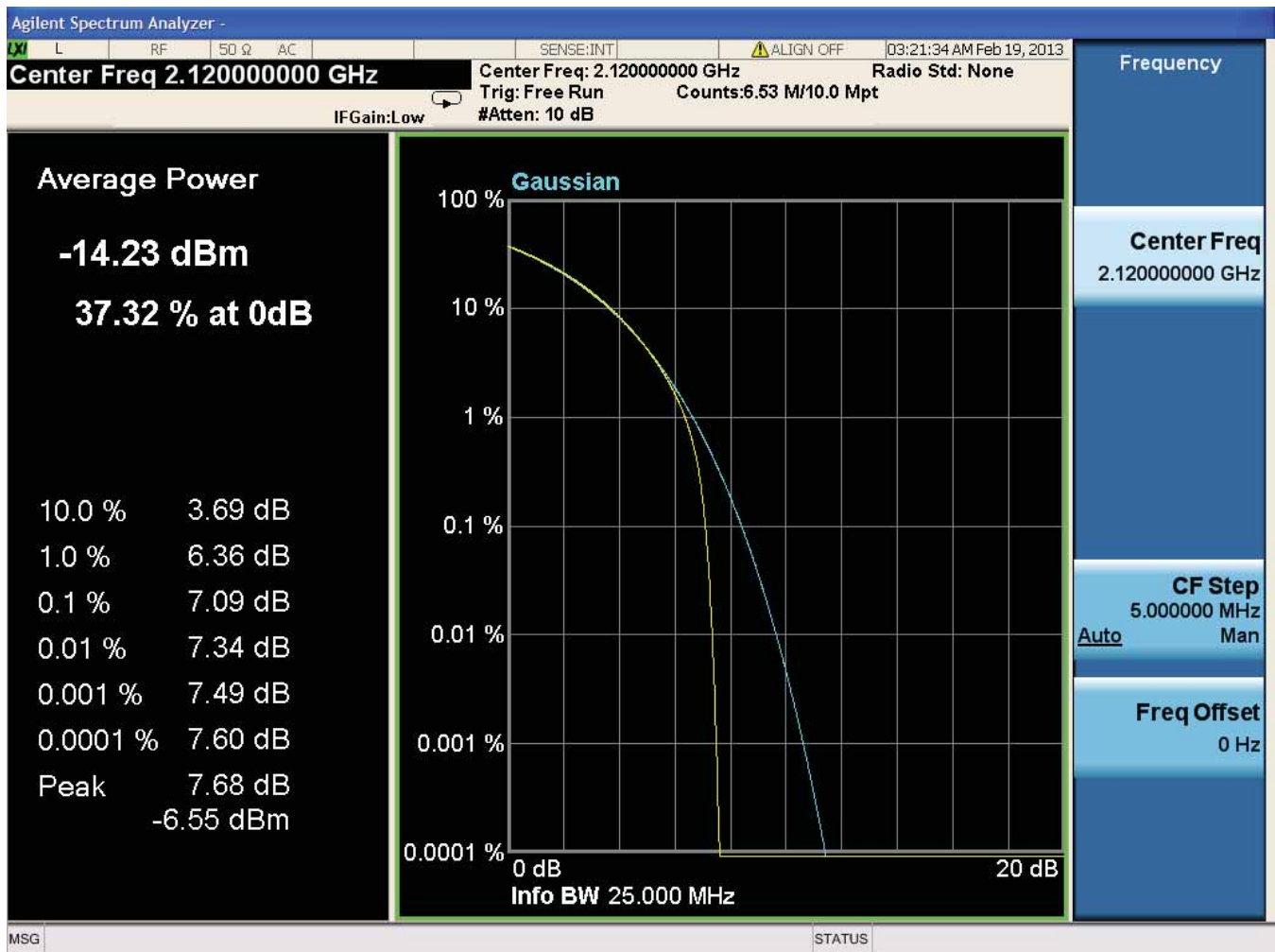


64 QAM
2120MHz (20 MHz BW)



LTE AWS TRDU (M1) 2X60W in Light Radio Cabinet
FCC Part 27.53 Block A+B; PWR: 60 (2x60W MIMO)
FCCID: AS5BBTRX-11
TEST ENGINEER: JY

Peak to Average
64 QAM
2120MHz (20 MHz BW)



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: 9.48 MHz for 10 MHz Bandwidth, and 18.85MHz for 20 MHz Bandwidth.

Therefore:

Measured Emission type: **9M48F9W** for 10 MHz Bandwidth.

Measured Emission type: **18M85F9W** for 20 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 (h) (3) 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 AWS TRDU (M1) 2X60W in 9712 Cabinet” in the following configurations:

1. QPSK
2. 16 QAM
3. 64 QAM

Results:

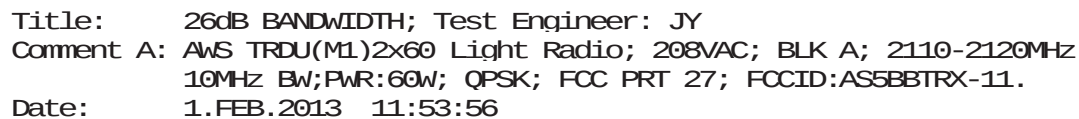
The plots are provided for QPSK, 16QAM and 64QAM modulations for 10 MHz band and 20MHz bandwidth. The Measured 26dB emissions bandwidth is 9.48 MHz for 10 MHz band, and 18.85 MHz for 20 MHz bandwidth.

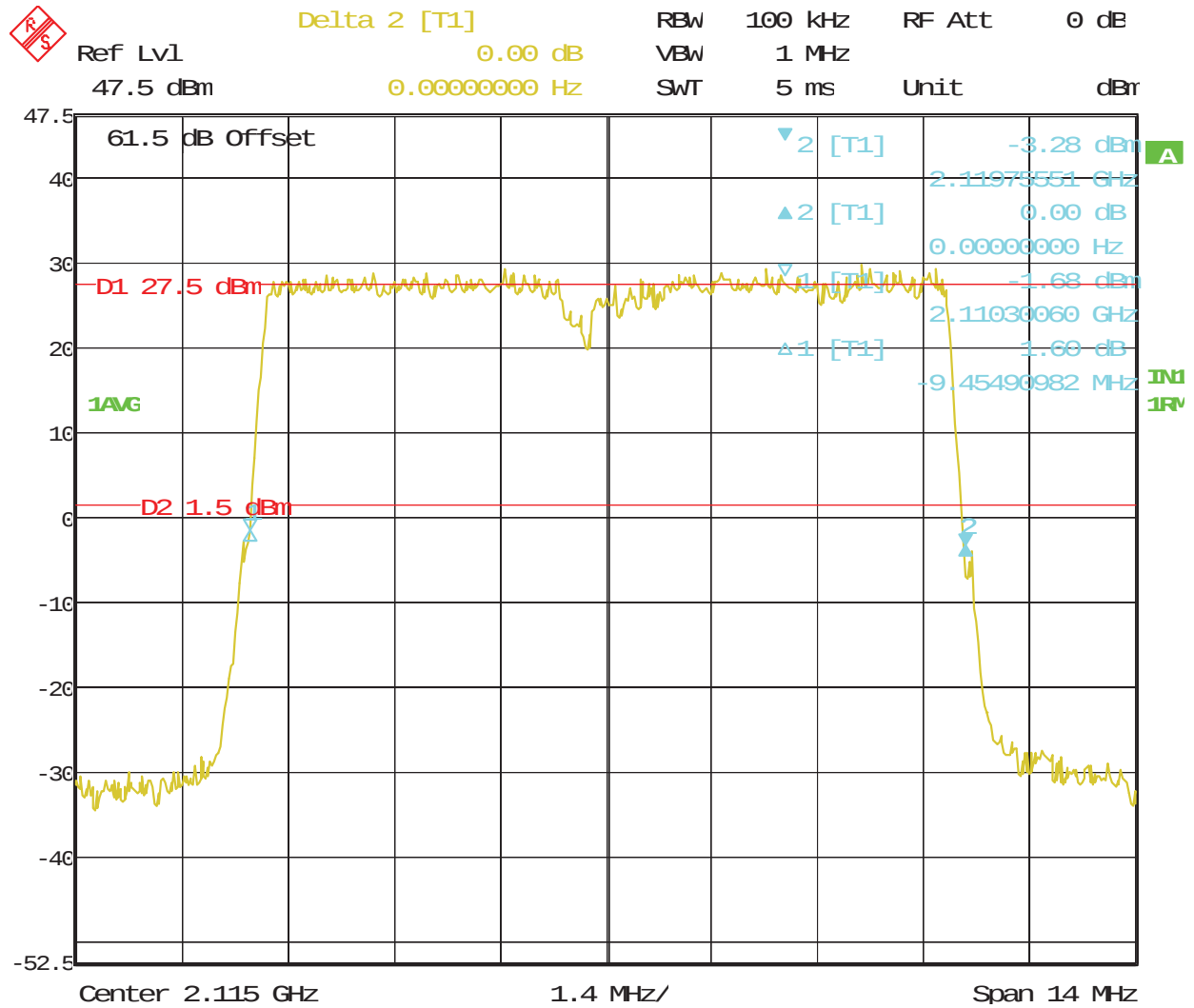
Block: A

10 MHz Bandwidth 2110 – 2120 MHz

2x60 watts (MIMO)

(26dB Bandwidth)

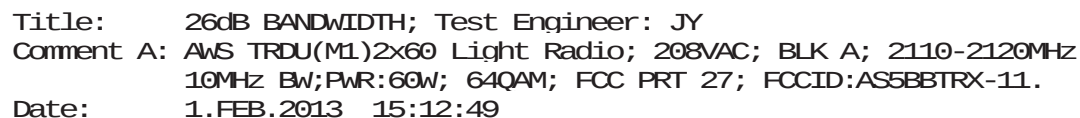




Title: 26dB BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK A; 2110-2120MHz
10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

Date: 1.FEB.2013 14:17:36

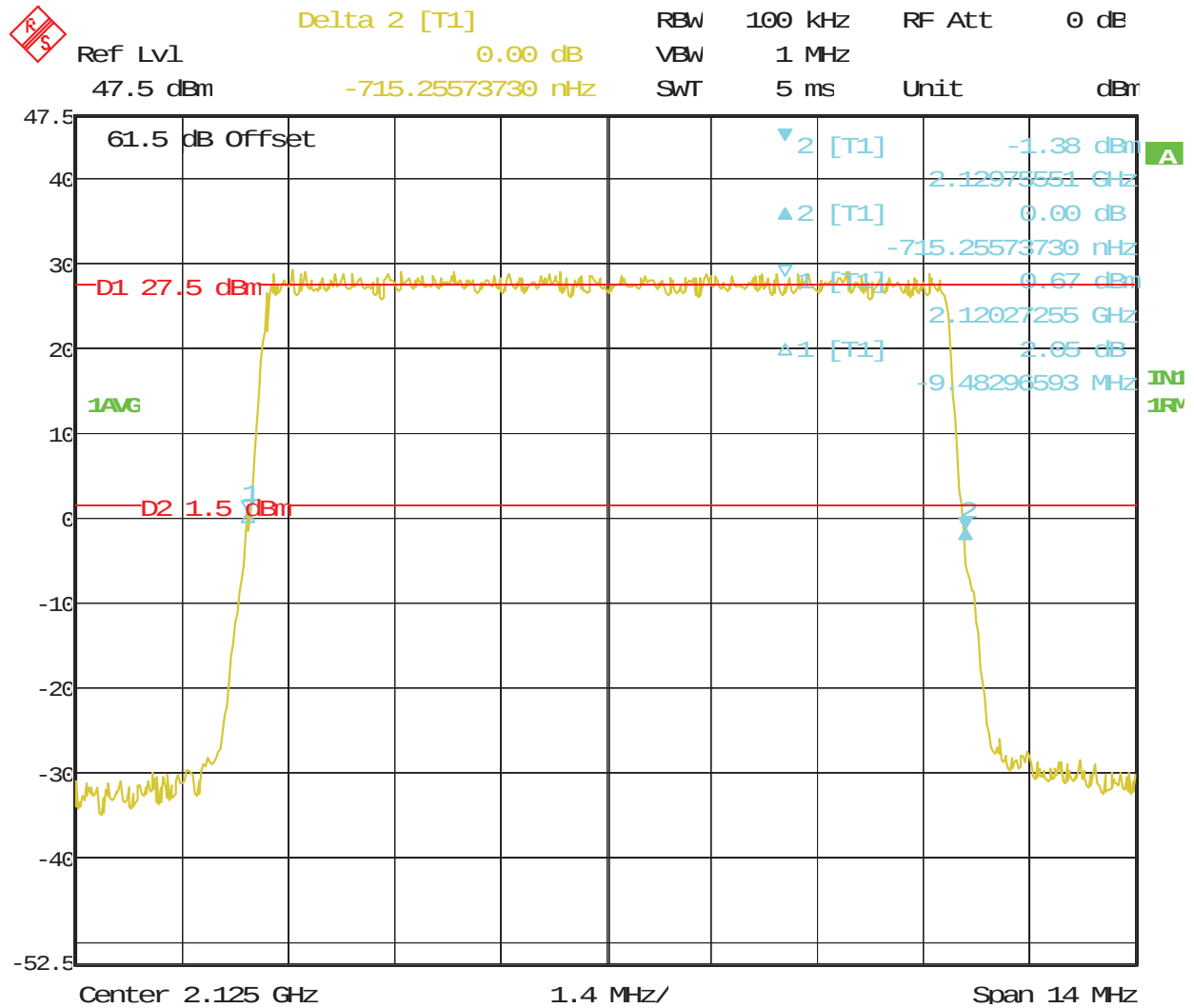


Block: B

10 MHz Bandwidth 2120 – 2130 MHz

2x60 watts (MIMO)

(26dB Bandwidth)

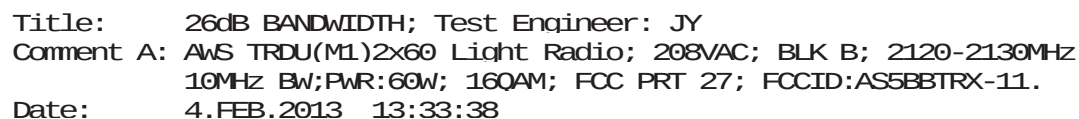


Title: 26dB BANDWIDTH; Test Engineer: JY

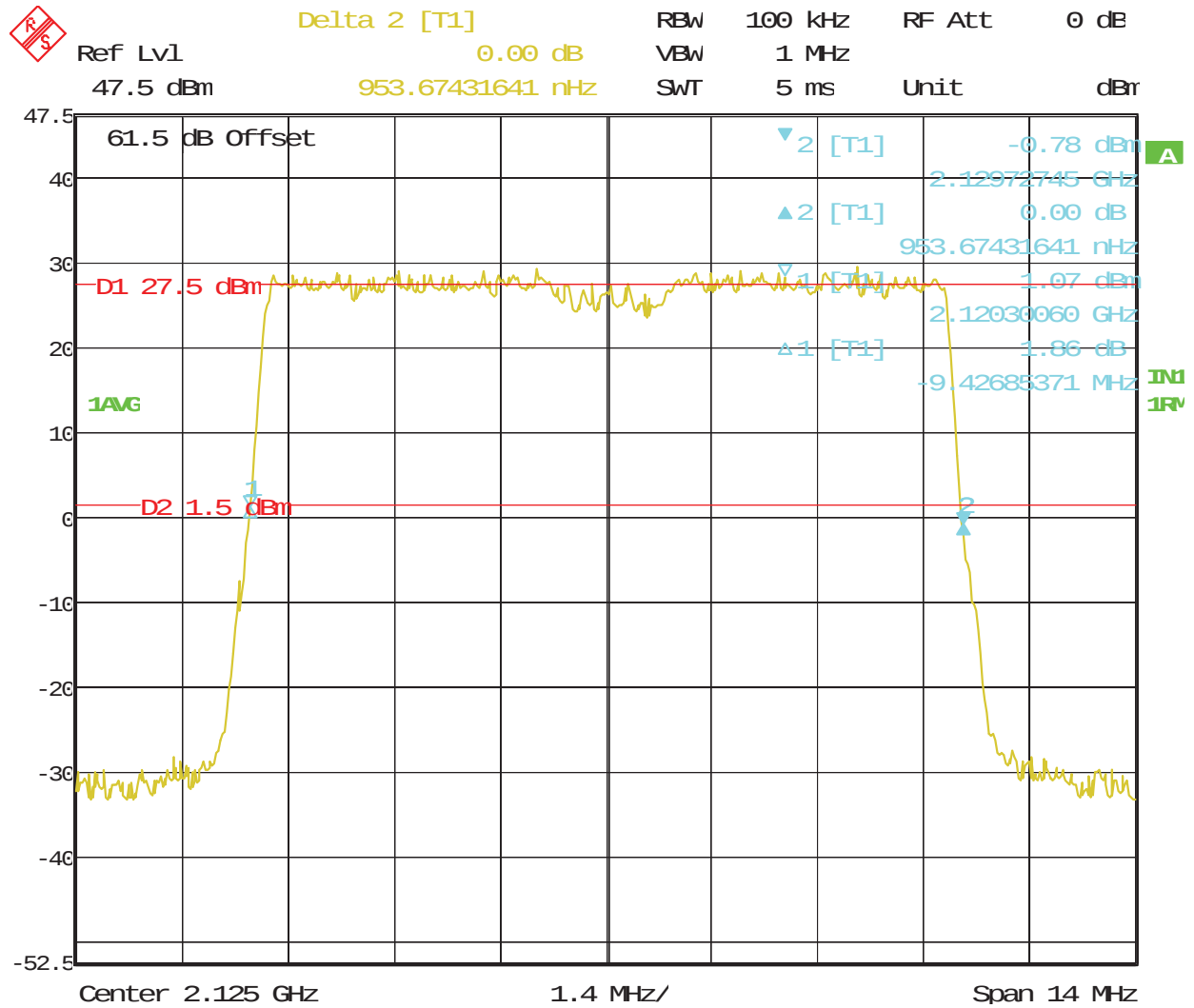
Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK B; 2120-2130MHz

10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.

Date: 1.FEB.2013 11:12:17



Title: 26dB BANDWIDTH; Test Engineer: JY
Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK B; 2120-2130MHz
10MHz BW; PWR:60W; 160AM; FCC PRT 27; FCCID:AS5BBTRX-11.
Date: 4.FEB.2013 13:33:38



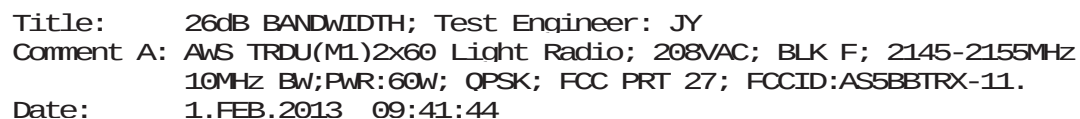
Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK B; 2120-2130MHz
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 12:14:11

Block: F

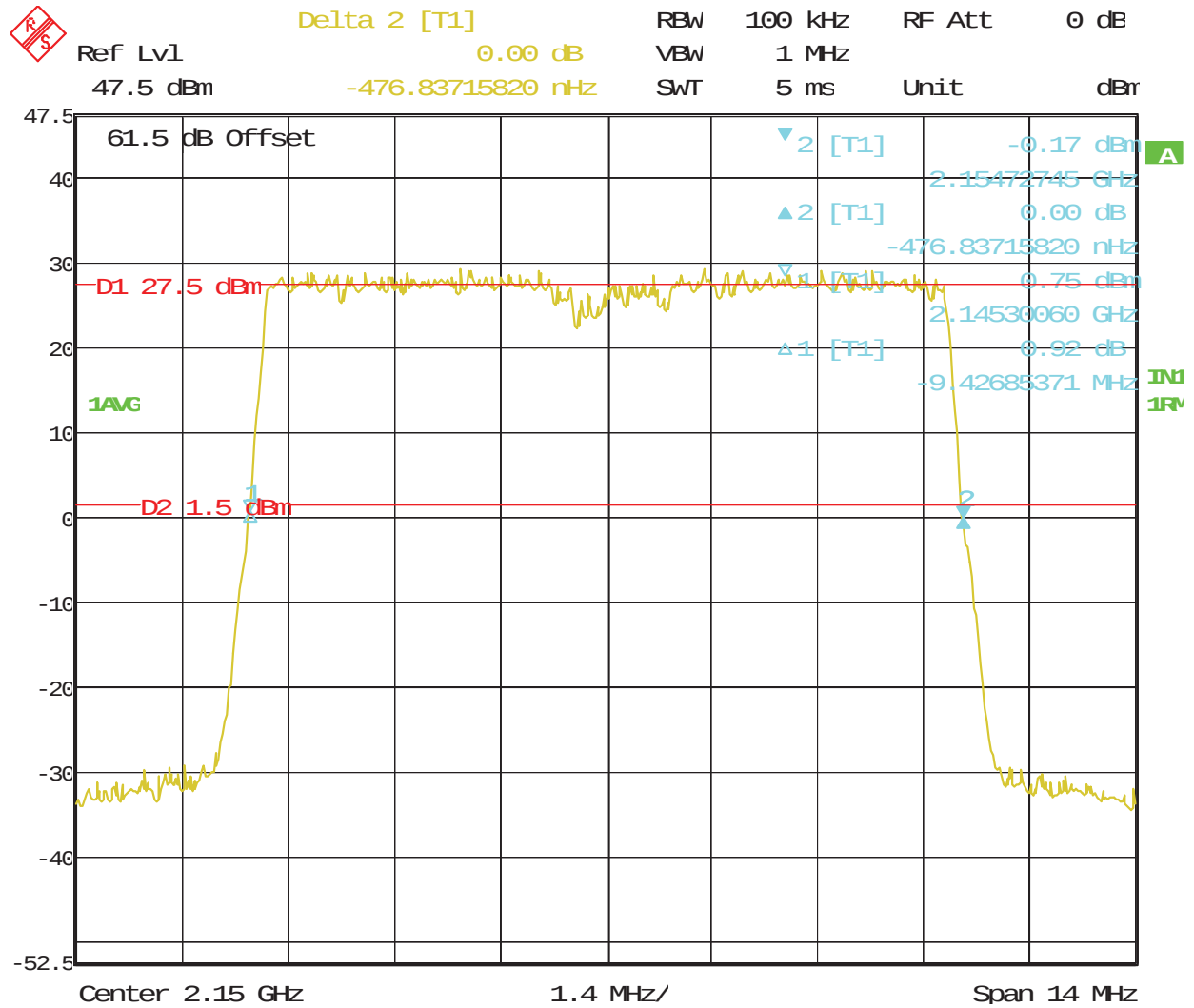
10 MHz Bandwidth 2145 – 2155 MHz

2x60 watts (MIMO)

(26dB Bandwidth)



Title: 26dB BANDWIDTH; Test Engineer: JY
Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK F; 2145-2155MHz
10MHz BW; PWR:60W; OPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
Date: 1.FEB.2013 09:41:44

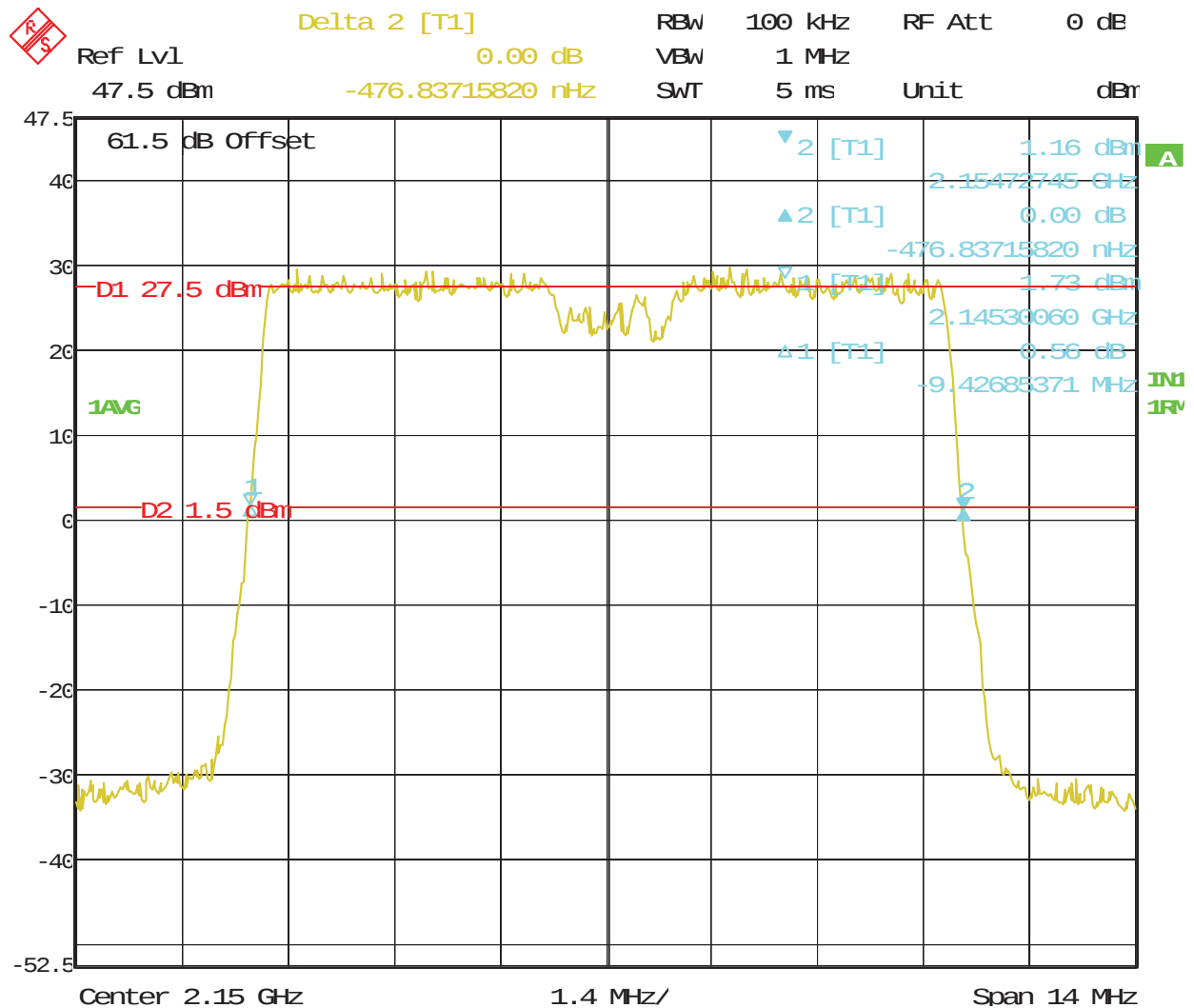


Title: 26dB BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK F; 2145-2155MHz

10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

Date: 7.FEB.2013 10:12:43



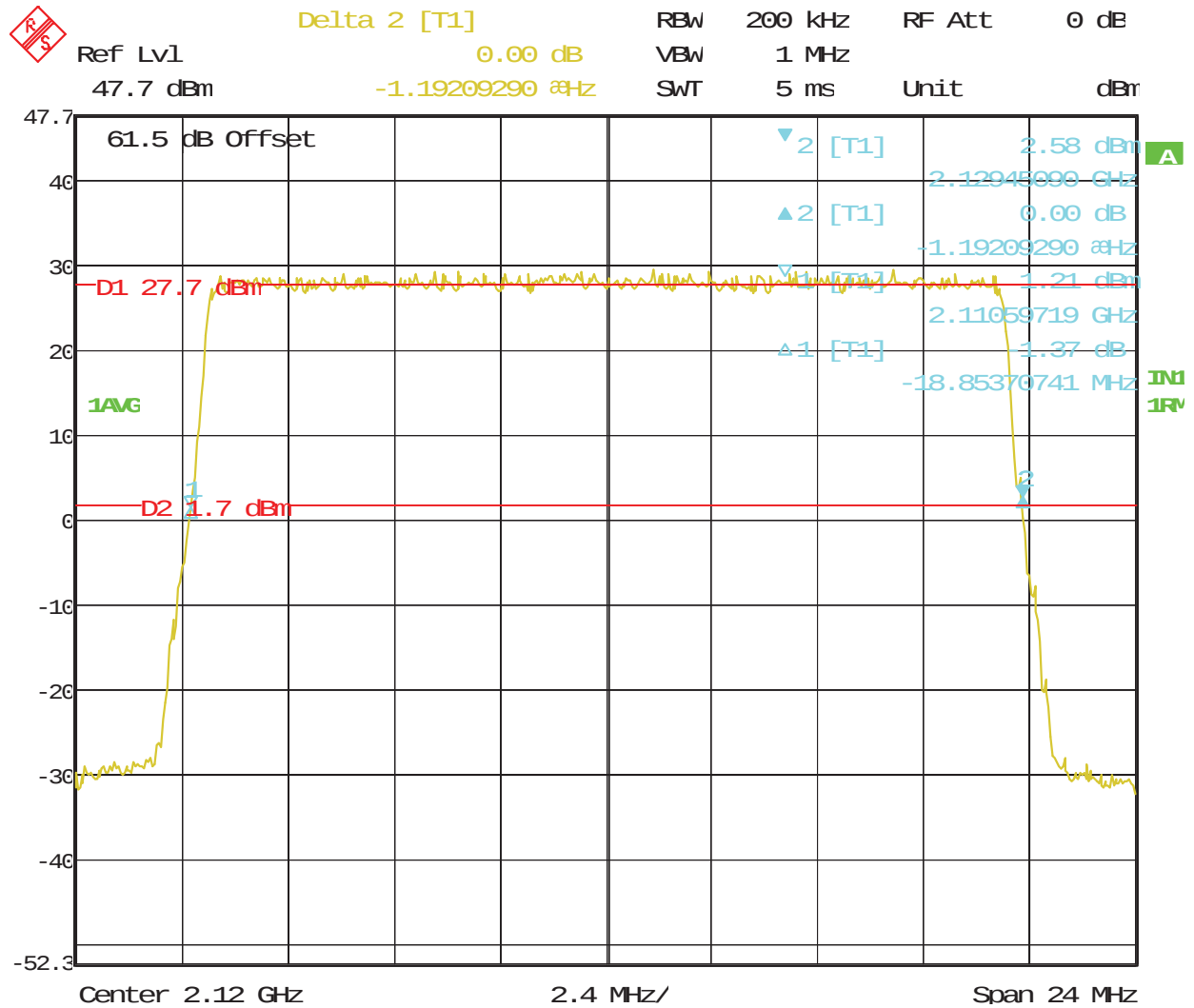
Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK F; 2145-2155MHz
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 07:56:04

Block: A+B

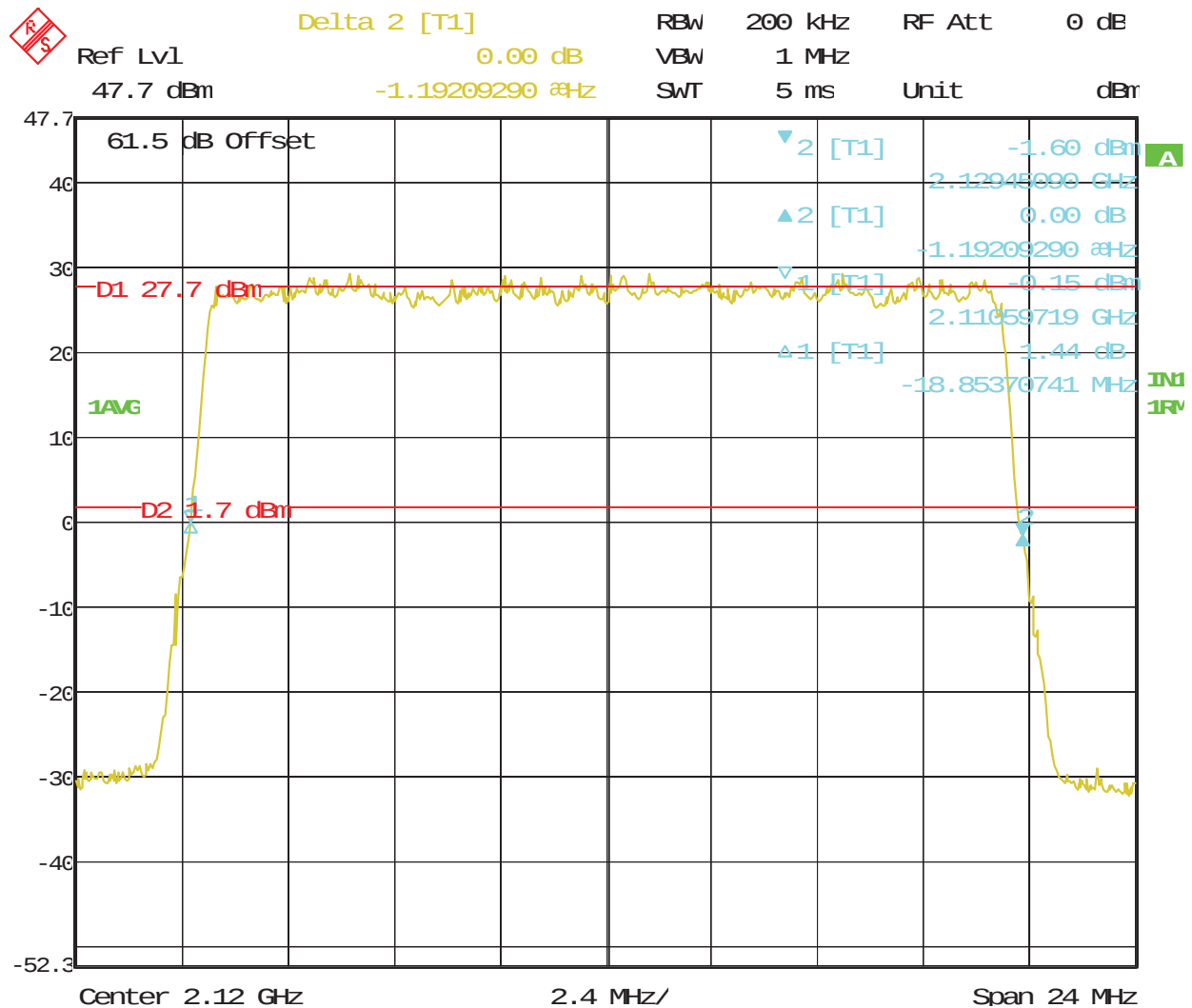
20 MHz Bandwidth 2110 – 2130 MHz

2x60 watts (MIMO)

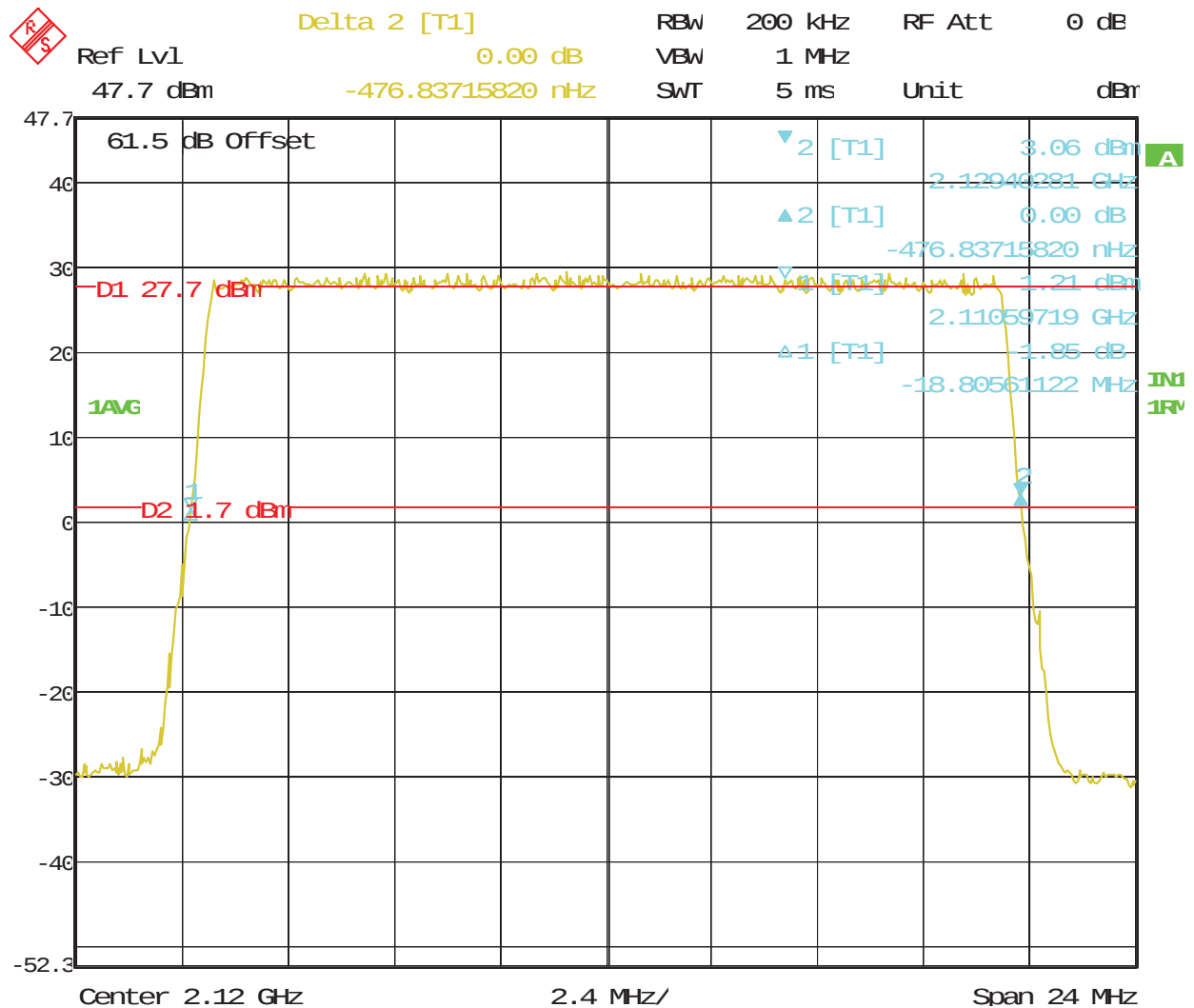
(26dB Bandwidth)



Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 07:18:22



Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:59:12



Title: 26dB BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; 2110-2130MHz(BLK A+B)

20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.

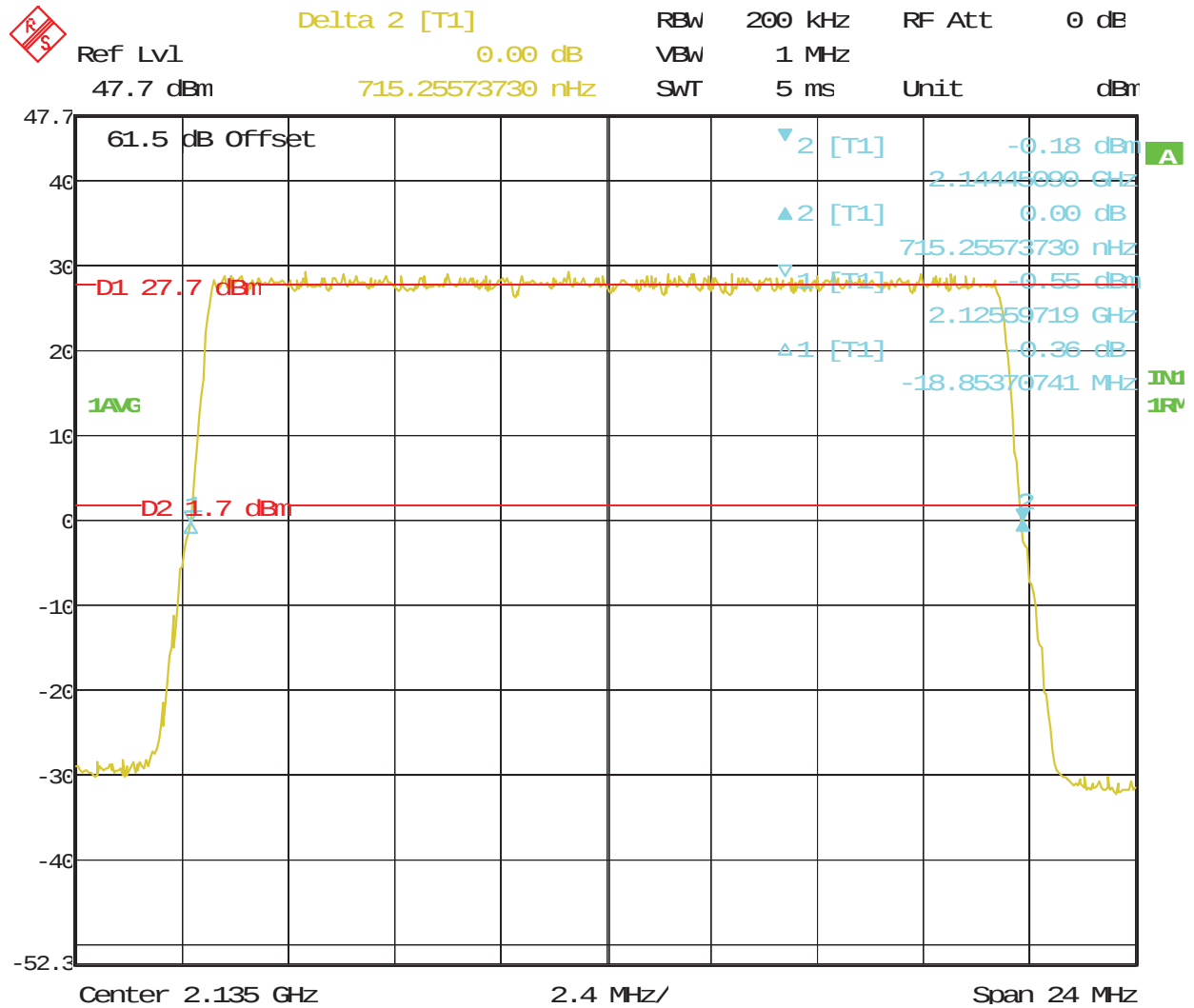
Date: 18.FEB.2013 09:12:09

Block: B2+C+D+E

20 MHz Bandwidth 2125 – 2145 MHz

2x60 watts (MIMO)

(26dB Bandwidth)

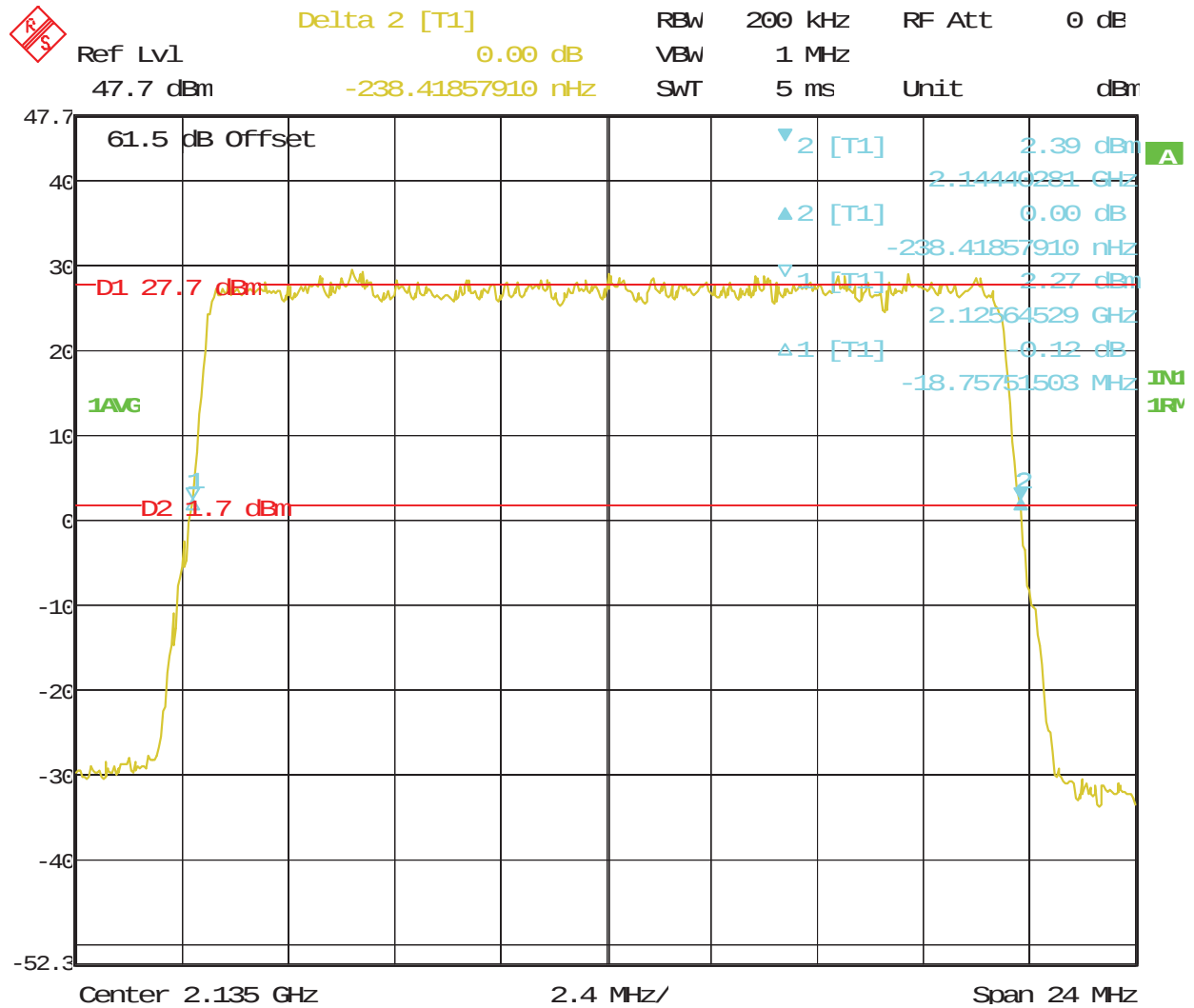


Title: 26dB BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2125-2145MHz(B2+C+D+E)

20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.

Date: 19.FEB.2013 08:23:24

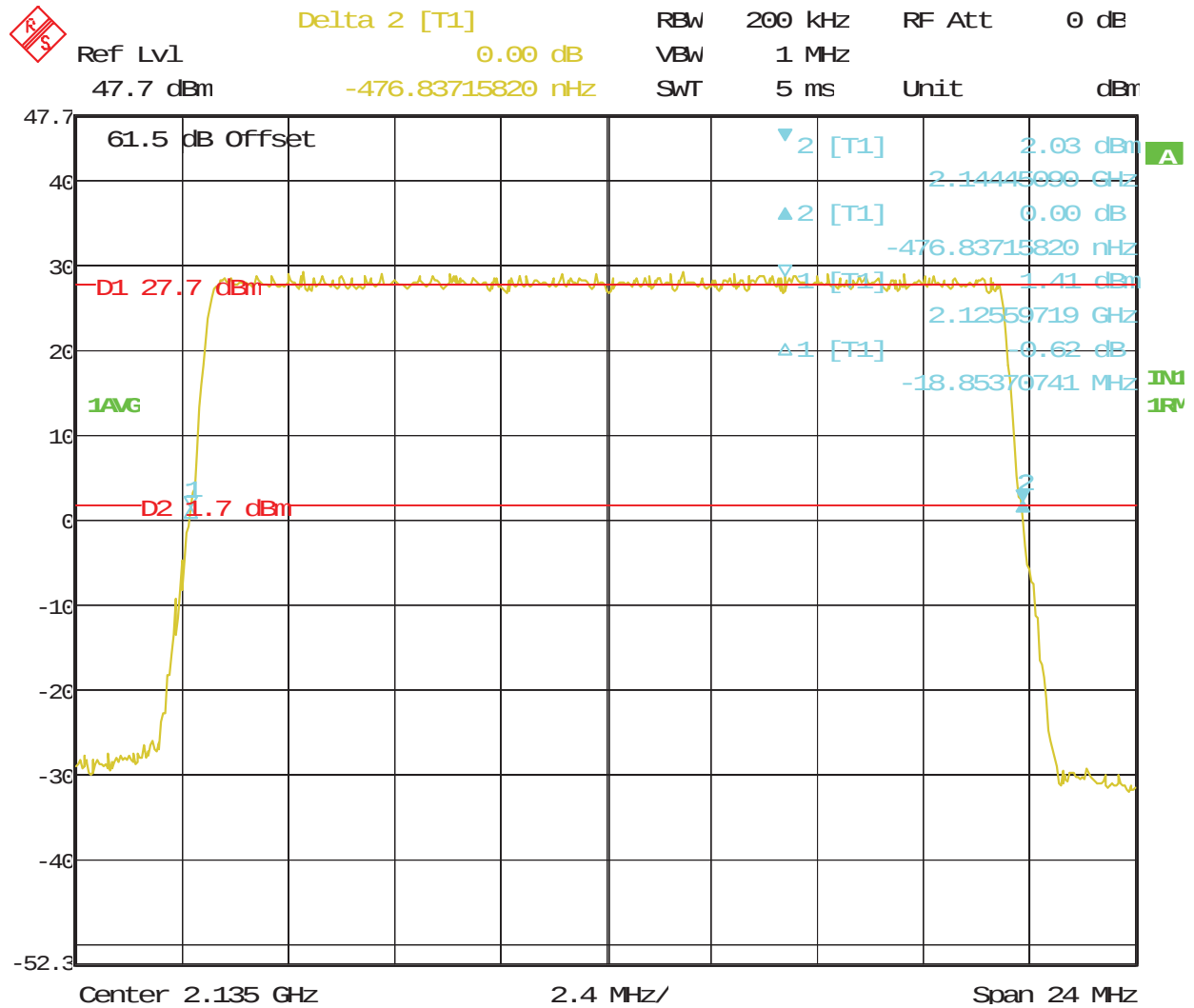


Title: 26dB BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2125-2145MHz(B2+C+D+E)

20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.

Date: 19.FEB.2013 11:20:02



Title: 26dB BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2125-2145MHz(B2+C+D+E)

20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.

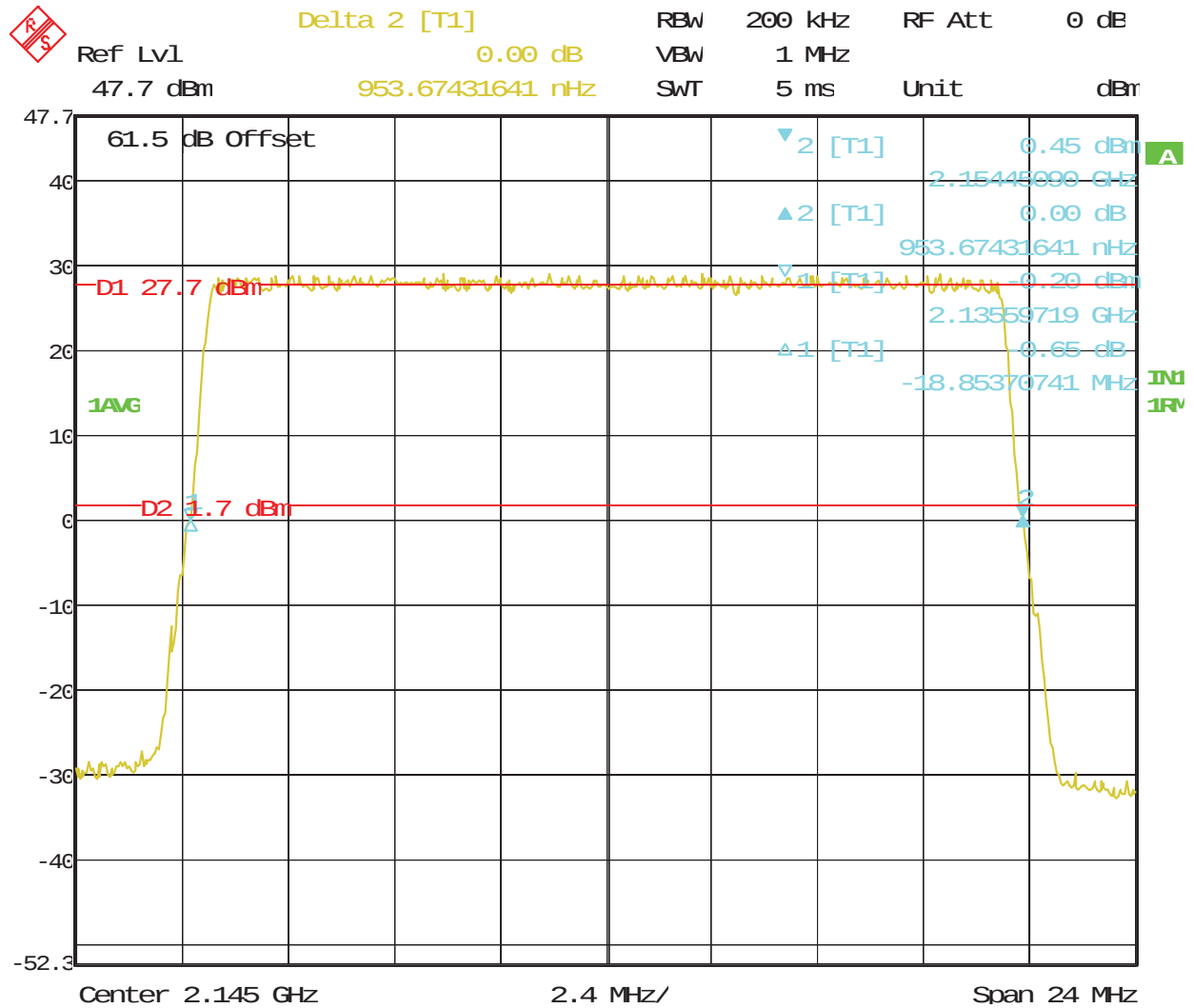
Date: 18.FEB.2013 10:16:25

Block: D+E+F

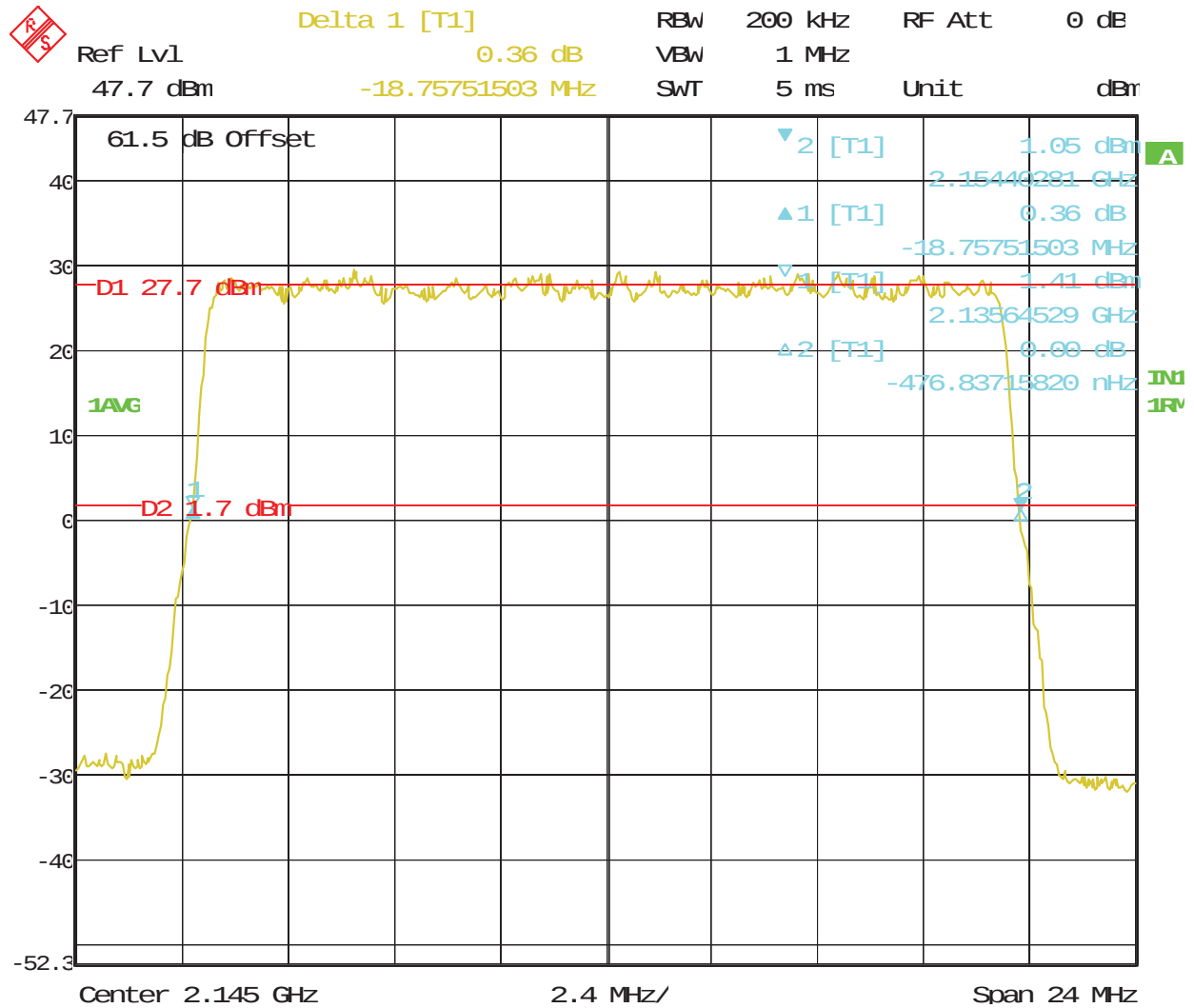
20 MHz Bandwidth 2135 – 2155 MHz

2x60 watts (MIMO)

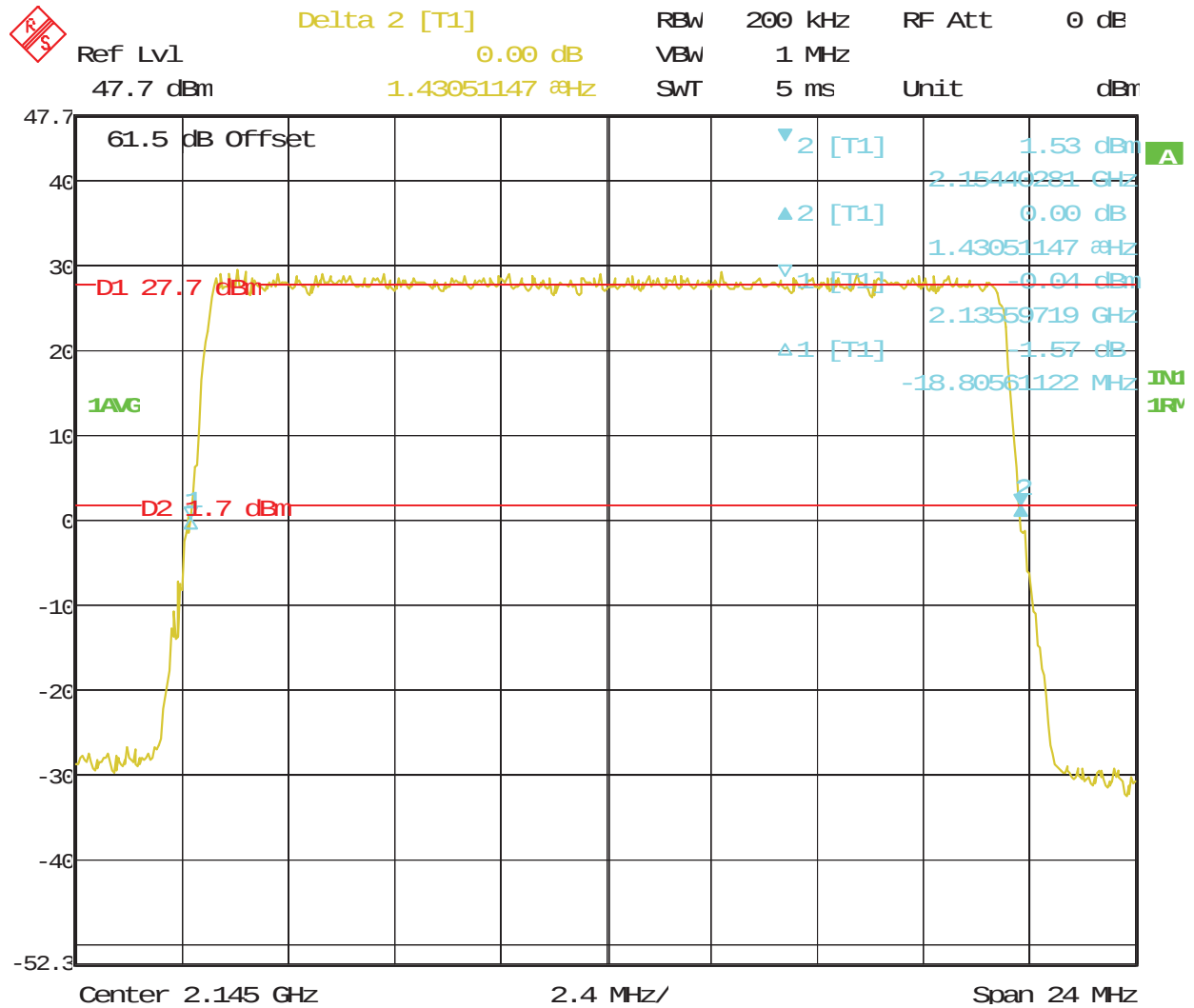
(26dB Bandwidth)



Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 08:54:40



Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 10:26:38



Title: 26dB BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 13:25:27

**MEASUREMENT OF
SPECTRUM MASK/OCCUPIED BANDWIDTH
(1MHz ADJACENT TO CHANNEL EDGE)**
Section 27.53 (H)

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) were measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The RF power level was measured using RF power meter as shown in the test setup in Figure A. The RF output from the LTE EAC port to spectrum analyzer was reduced (to an amplitude usable by the spectrum analyzer) by using a calibrated attenuator. This attenuation was offset on the display and the signal for single carrier was adjusted to the corrected RF power level for a 100 kHz resolution bandwidth for 10MHz wide transmit signal, and 200 kHz resolution bandwidth for 20 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 AWS TRDU (M1) 2X60W in 9712 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 60 Watts (47.8 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 and 20 MHz blocks. 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(h)(1): 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 list of Blocks tested, Bands and Power measured at External Antenna Connector (EAC)

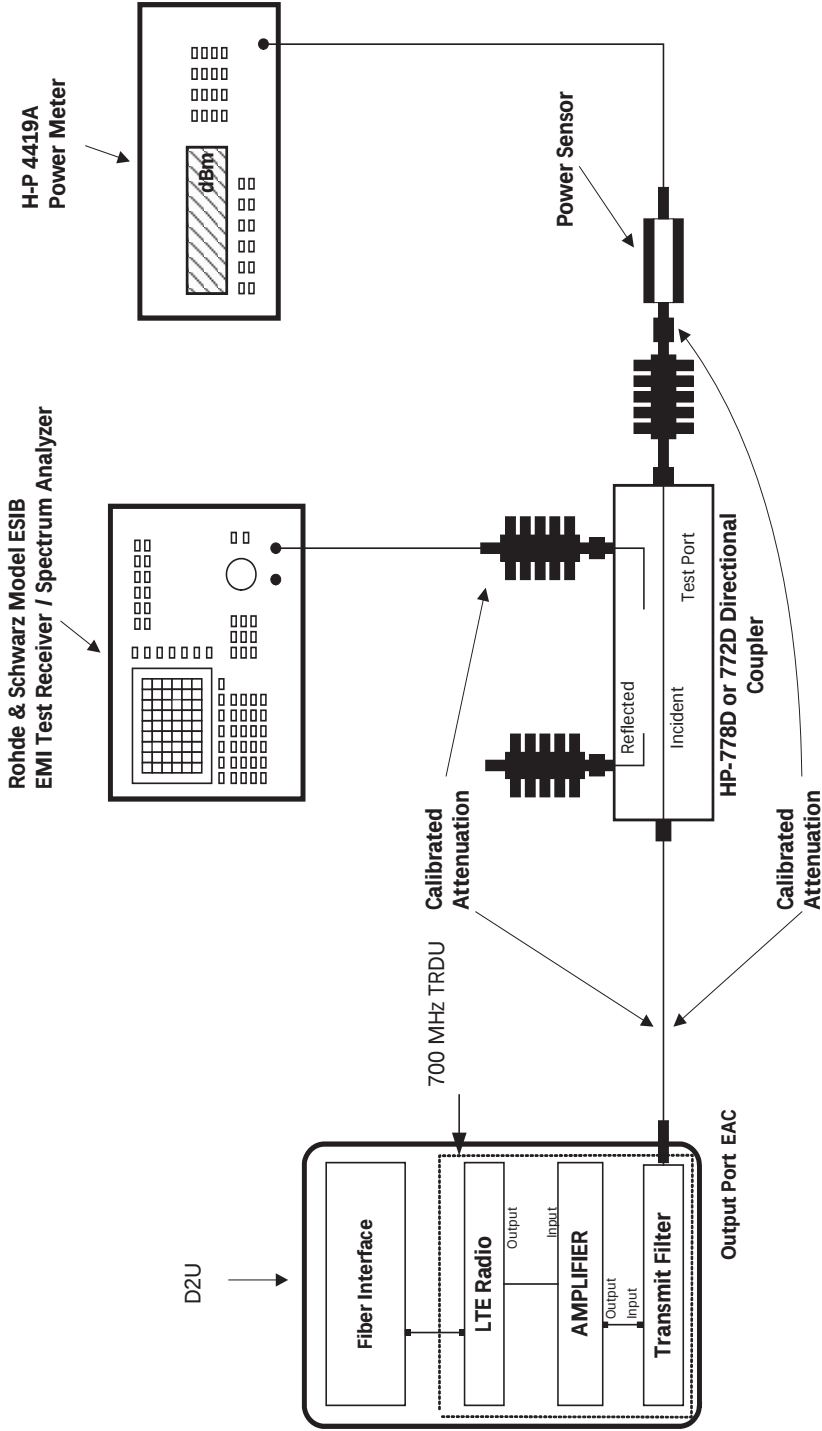
Blocks	Bandwidth	Frequency (MHz)	Power (Watts)
A	10	2115	60
B	10	2125	60
F	10	2150	60
			60
A+B	20	2120	60
B2+C+D+E	20	2135	60
D+E+F	20	2145	60

Measurement uncertainty:

Frequency: 100 Hz

Amplitude: 0.5 dB

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



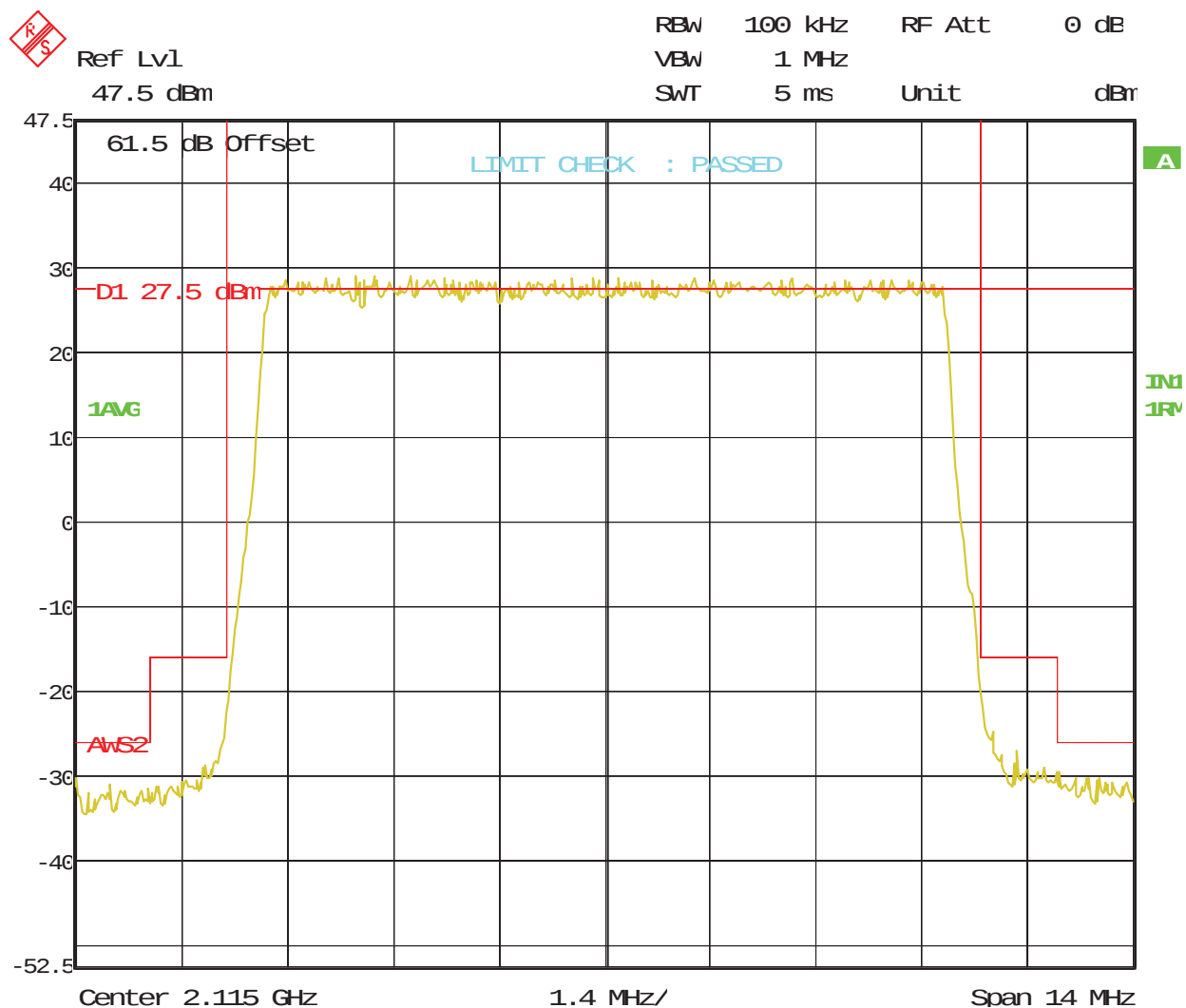
All components are calibrated over the frequency range of interest

Block: A

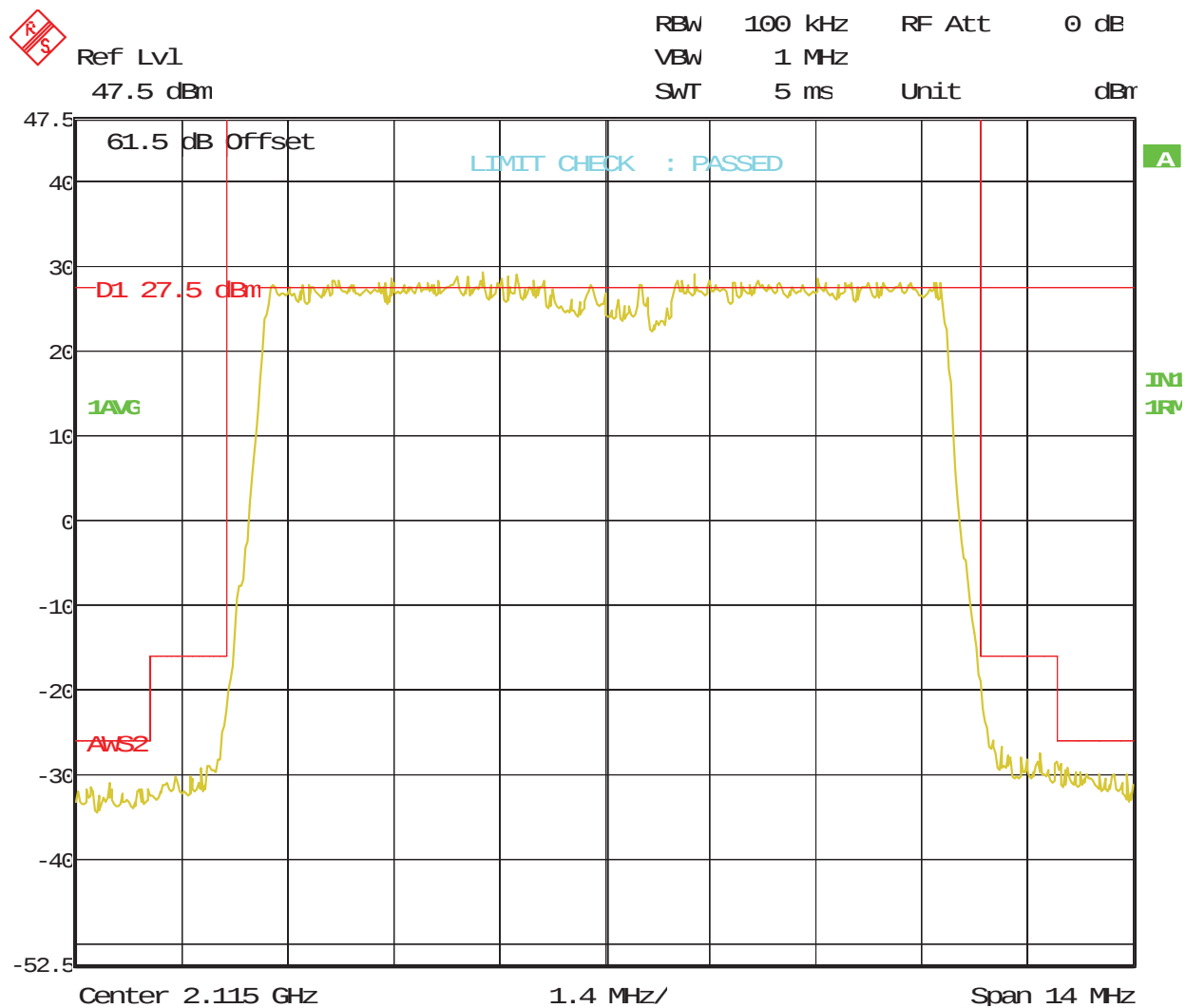
10 MHz Bandwidth 2110 – 2120 MHz

2x60watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH



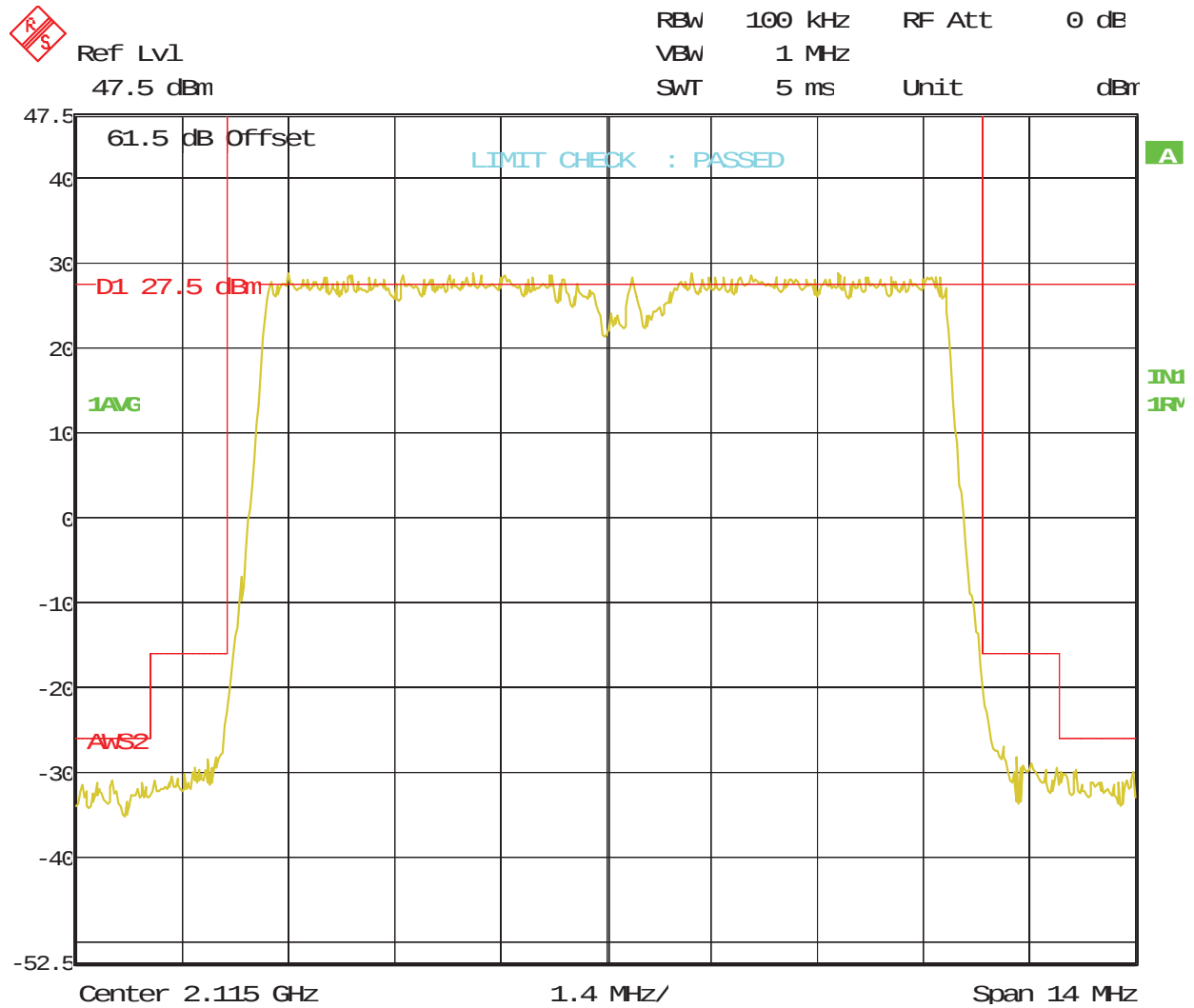
Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK A; 2110-2120MHz
 10MHz BW;PWR:60W; OPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 11:51:15



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK A; 2110-2120MHz
10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

Date: 1.FEB.2013 14:14:00



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK A; 2110-2120MHz
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

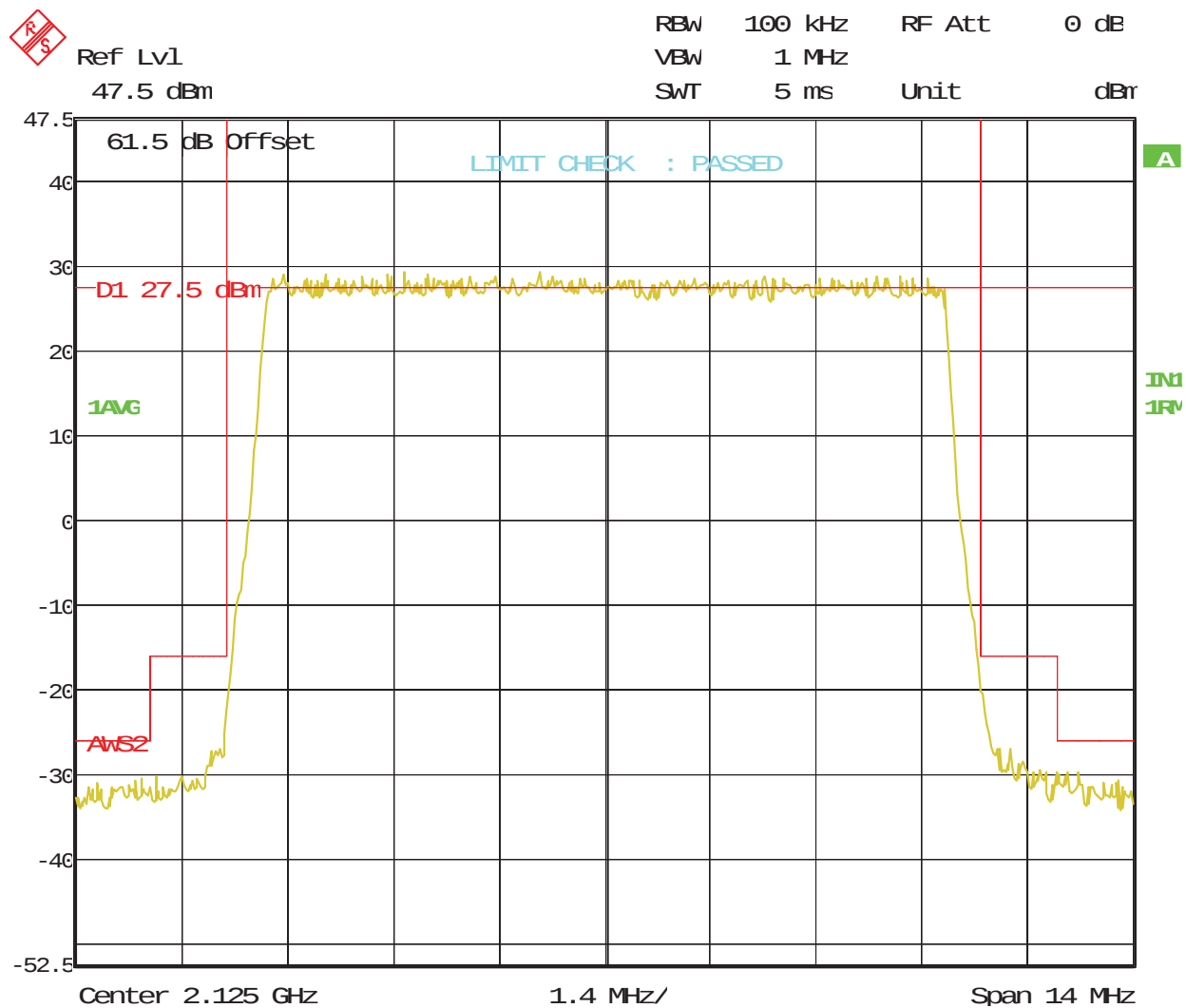
Date: 1.FEB.2013 15:10:37

Block: B

10 MHz Bandwidth 2120 – 2130 MHz

2x60 watts (MIMO)

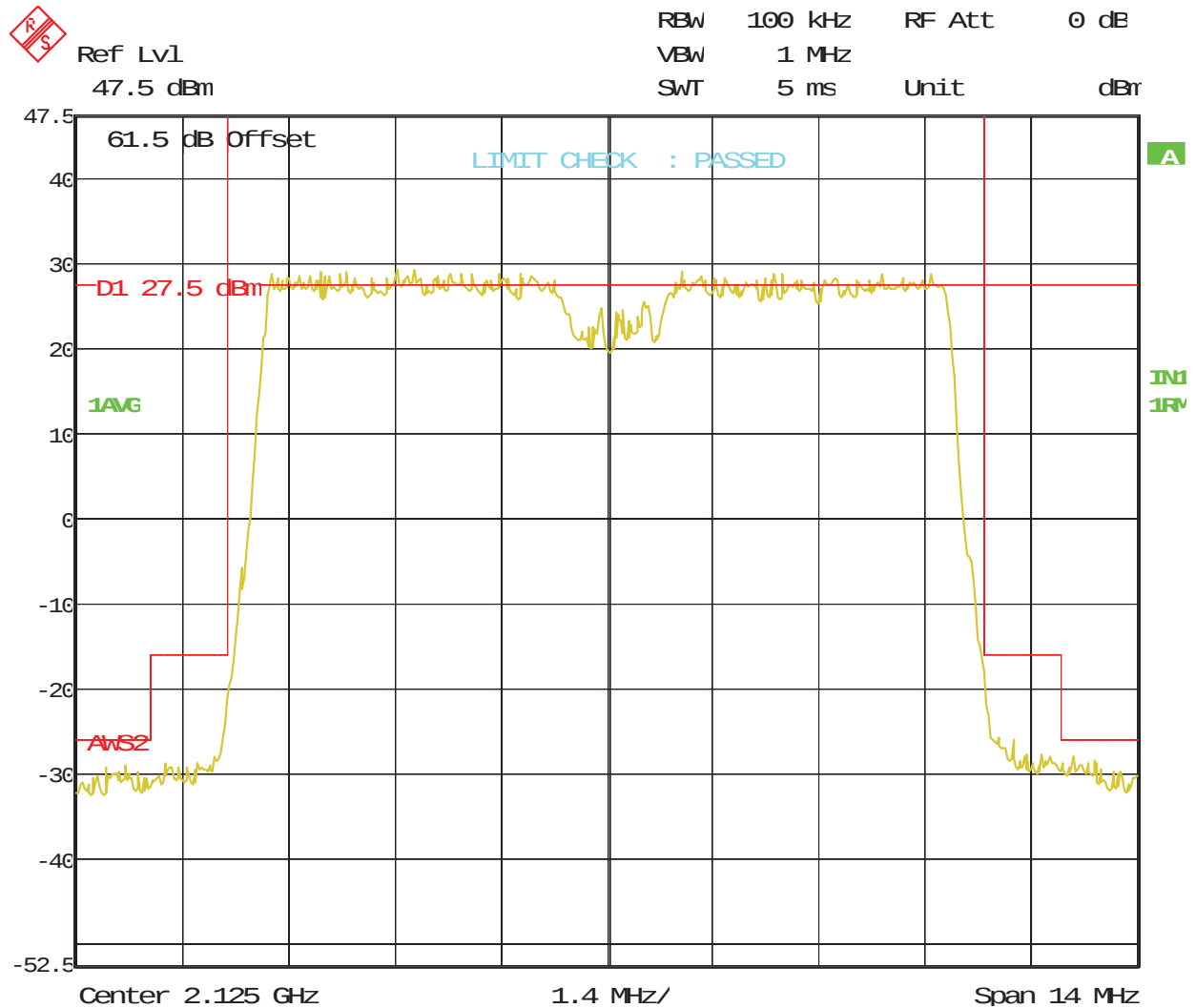
SPECTRUM MASK/OCCUPIED BANDWIDTH



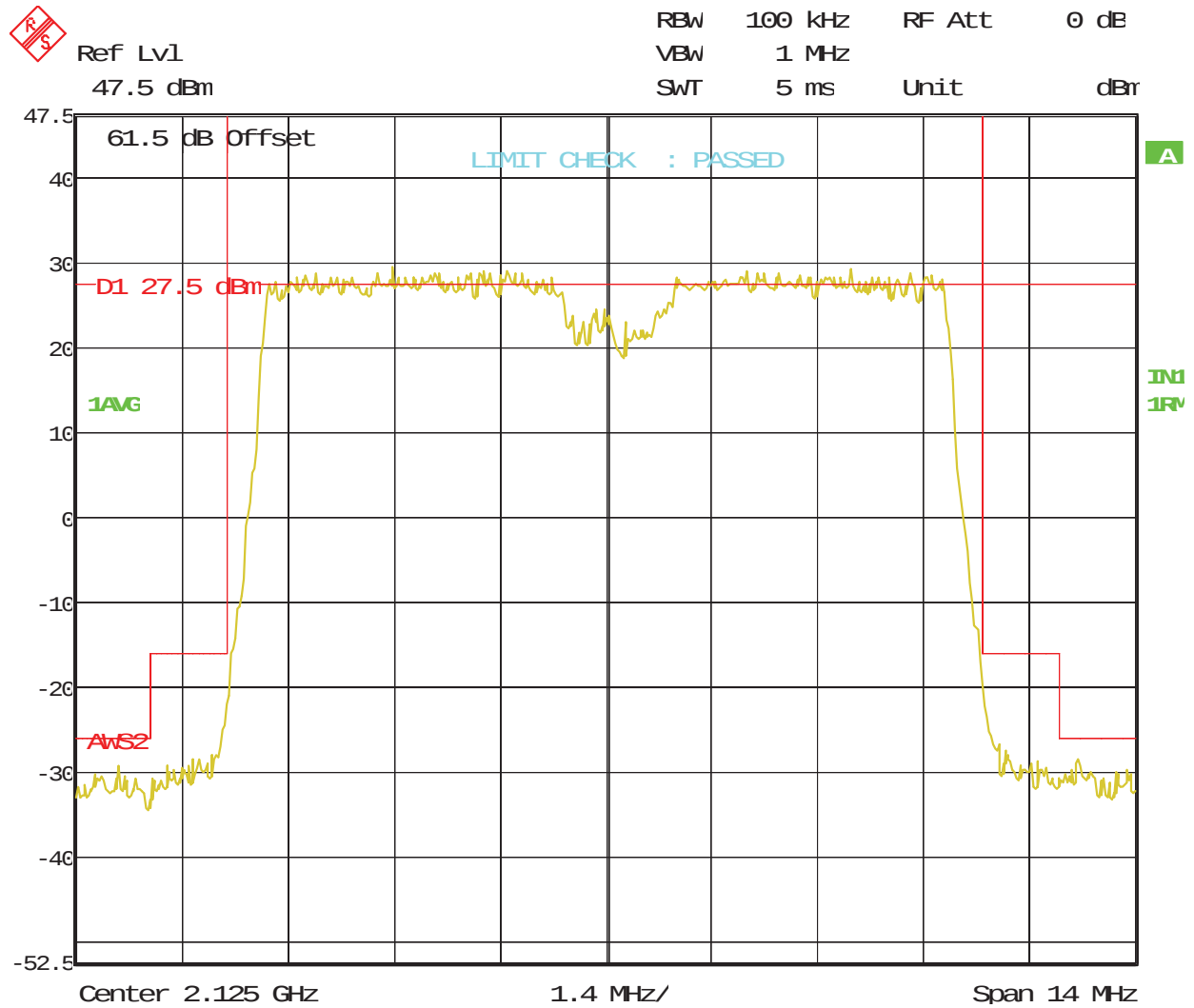
Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK B; 2120-2130MHz
10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.

Date: 1.FEB.2013 11:08:12



Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK B; 2120-2130MHz
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 13:30:40



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK B; 2120-2130MHz
10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

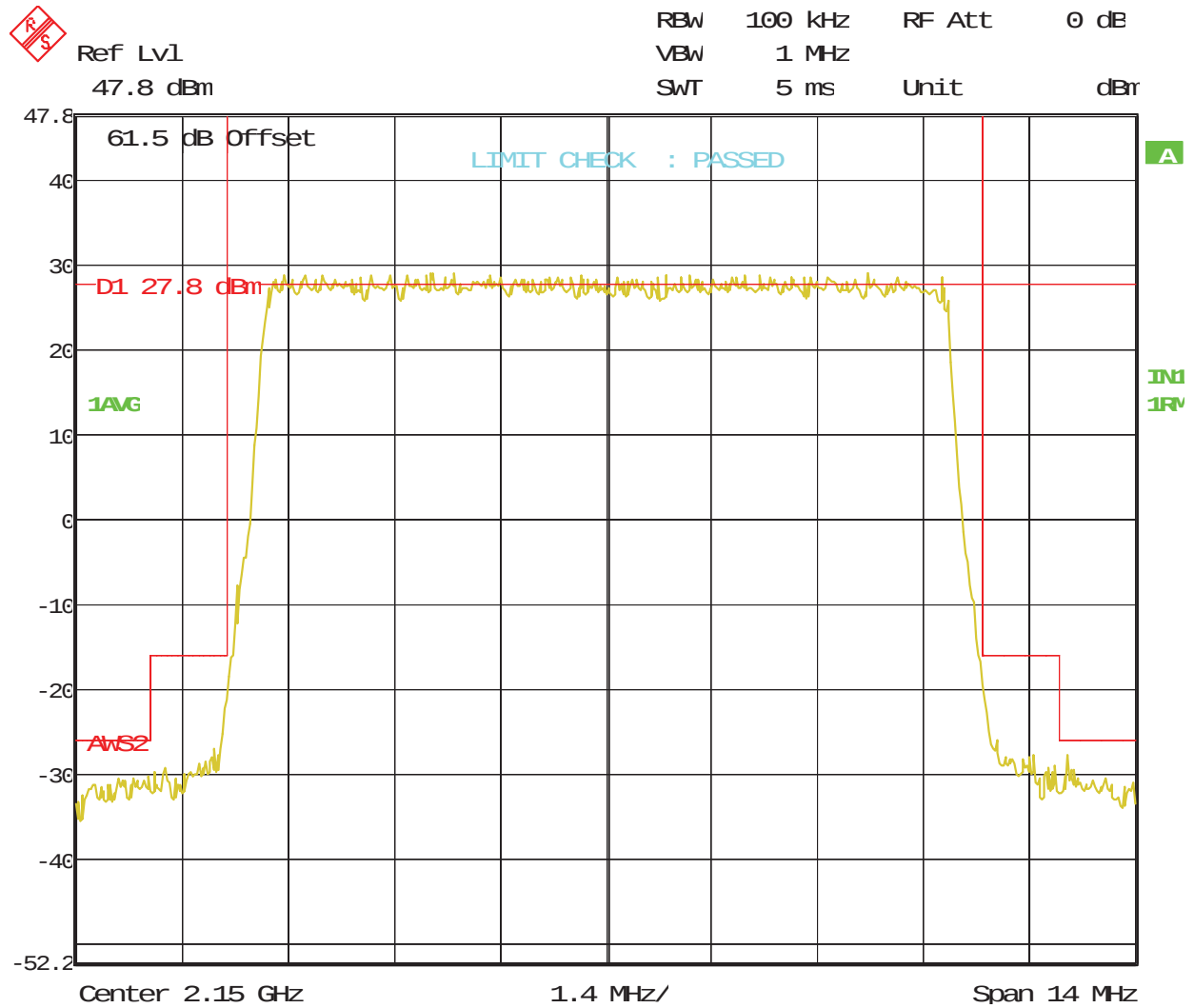
Date: 4.FEB.2013 12:08:05

Block: F

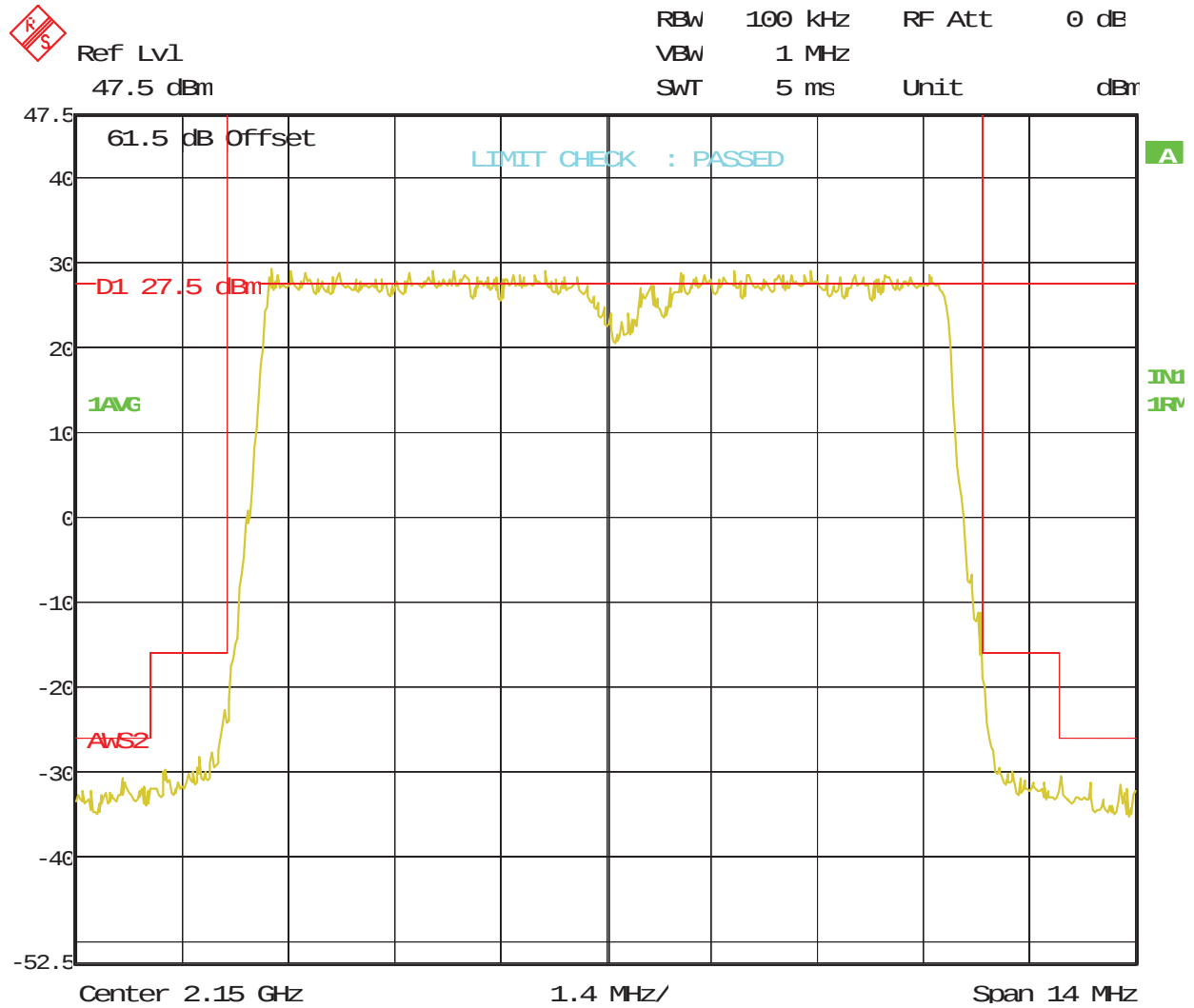
10 MHz Bandwidth 2145 – 2155 MHz

2x60 watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH



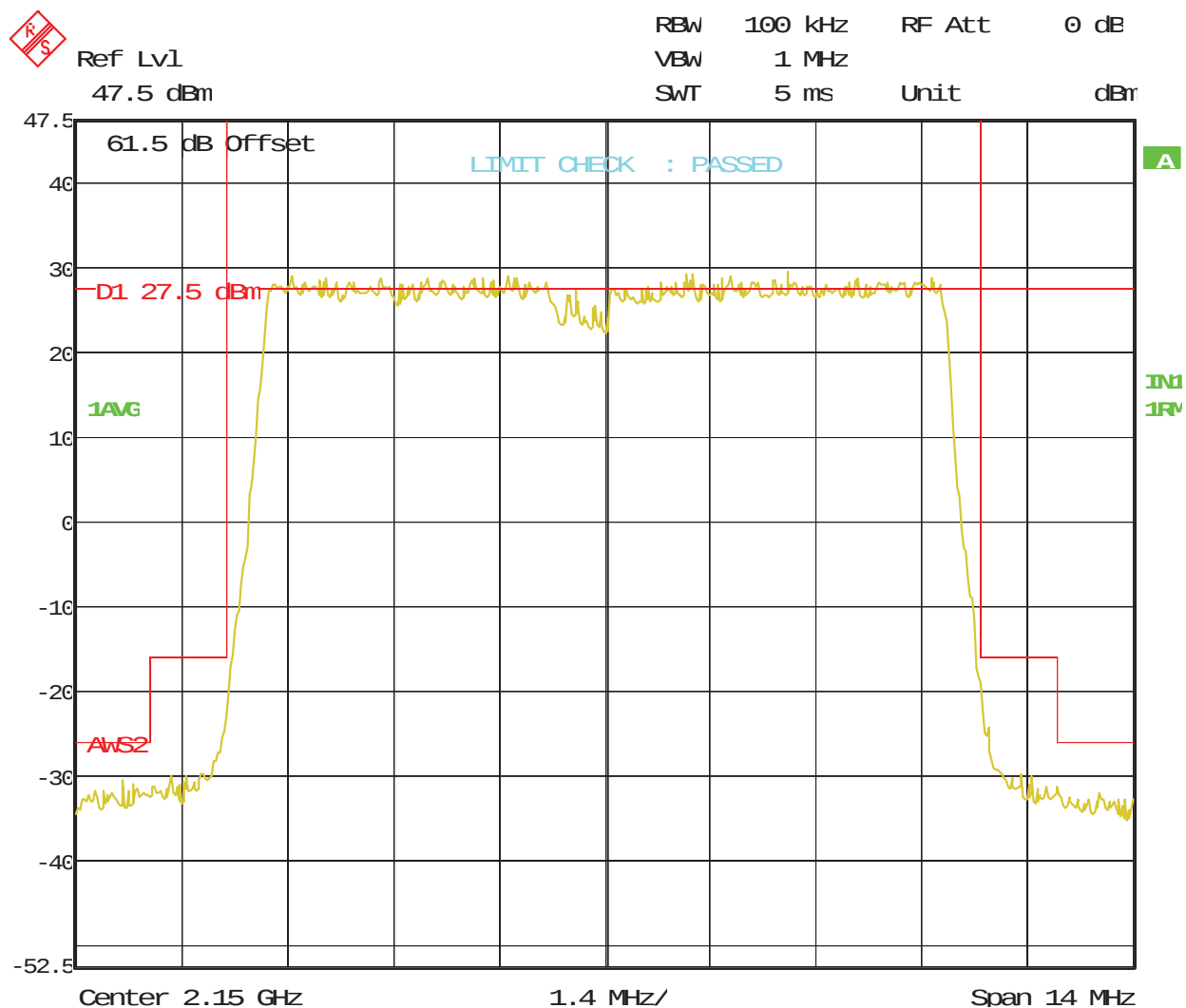
Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK F; 2145-2155MHz
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 09:49:39



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK F; 2145-2155MHz
10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

Date: 7.FEB.2013 10:11:42



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; BLK F; 2145-2155MHz
10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.

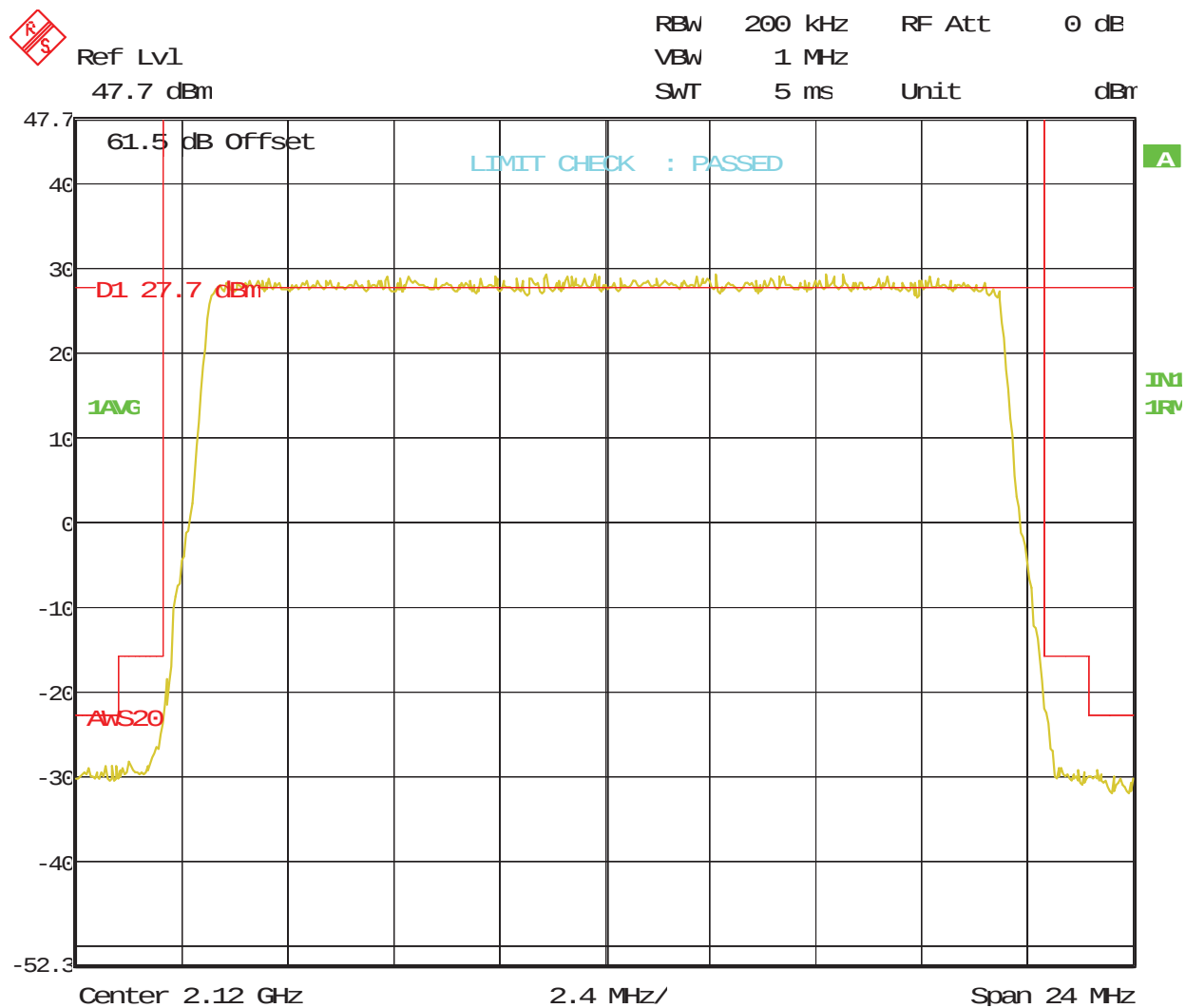
Date: 7.FEB.2013 07:54:41

Block: A+B

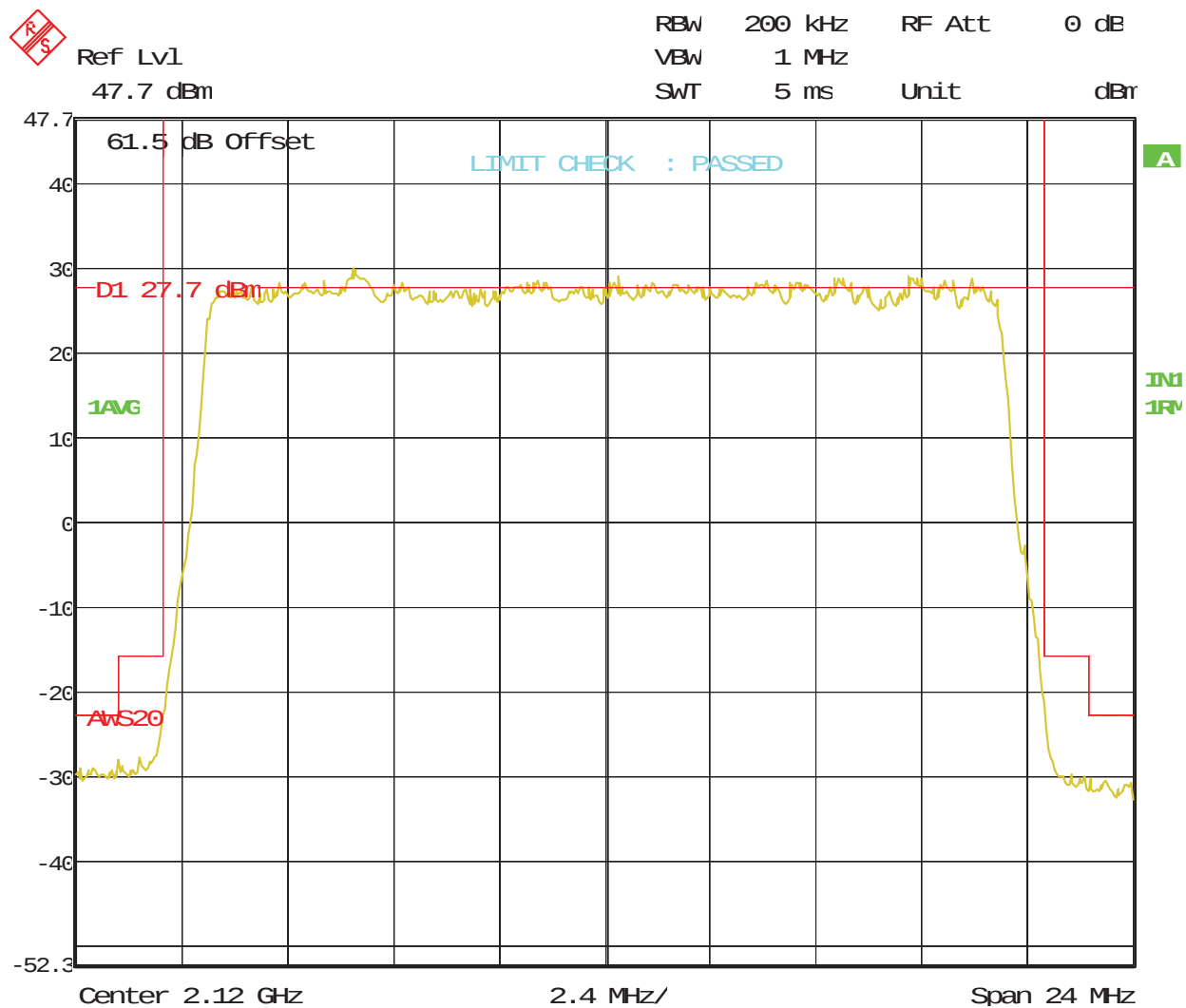
20 MHz Bandwidth 2110 – 2130 MHz

2x60 watts (MIMO)

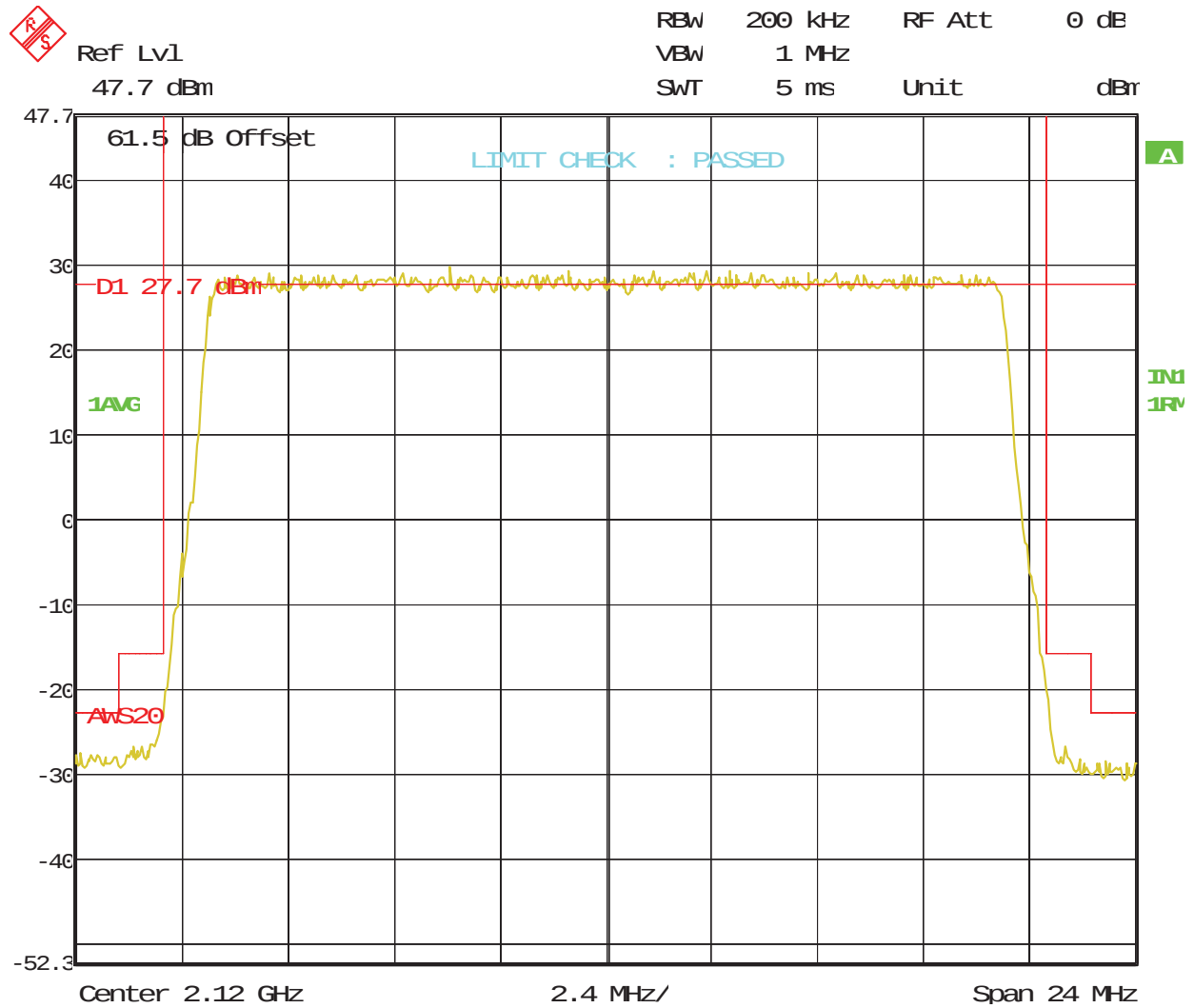
SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 07:14:59



Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:56:39



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio; 208VAC; 2110-2130MHz(BLK A+B)
20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.

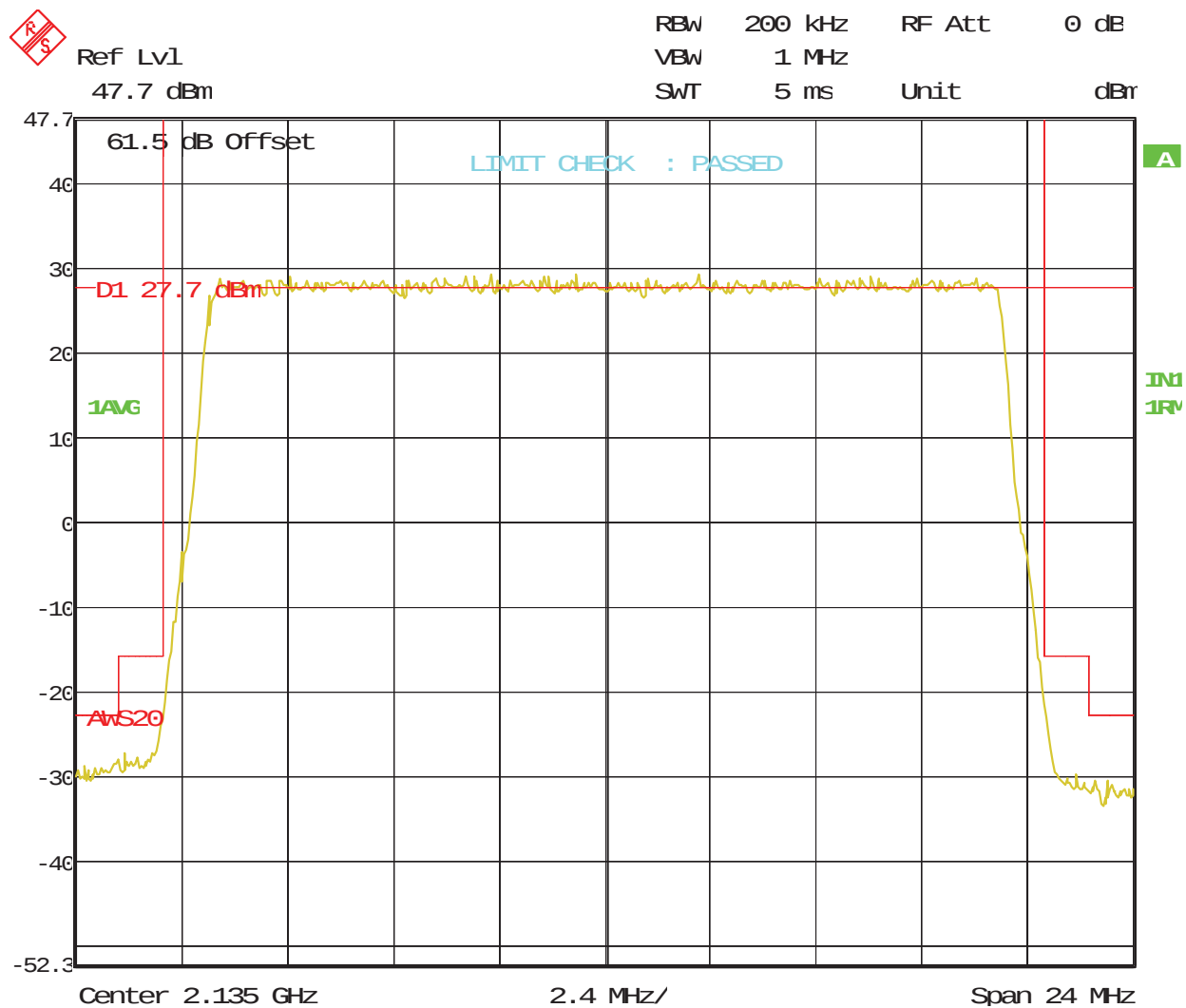
Date: 18.FEB.2013 09:27:55

Block: B2+C+D+E

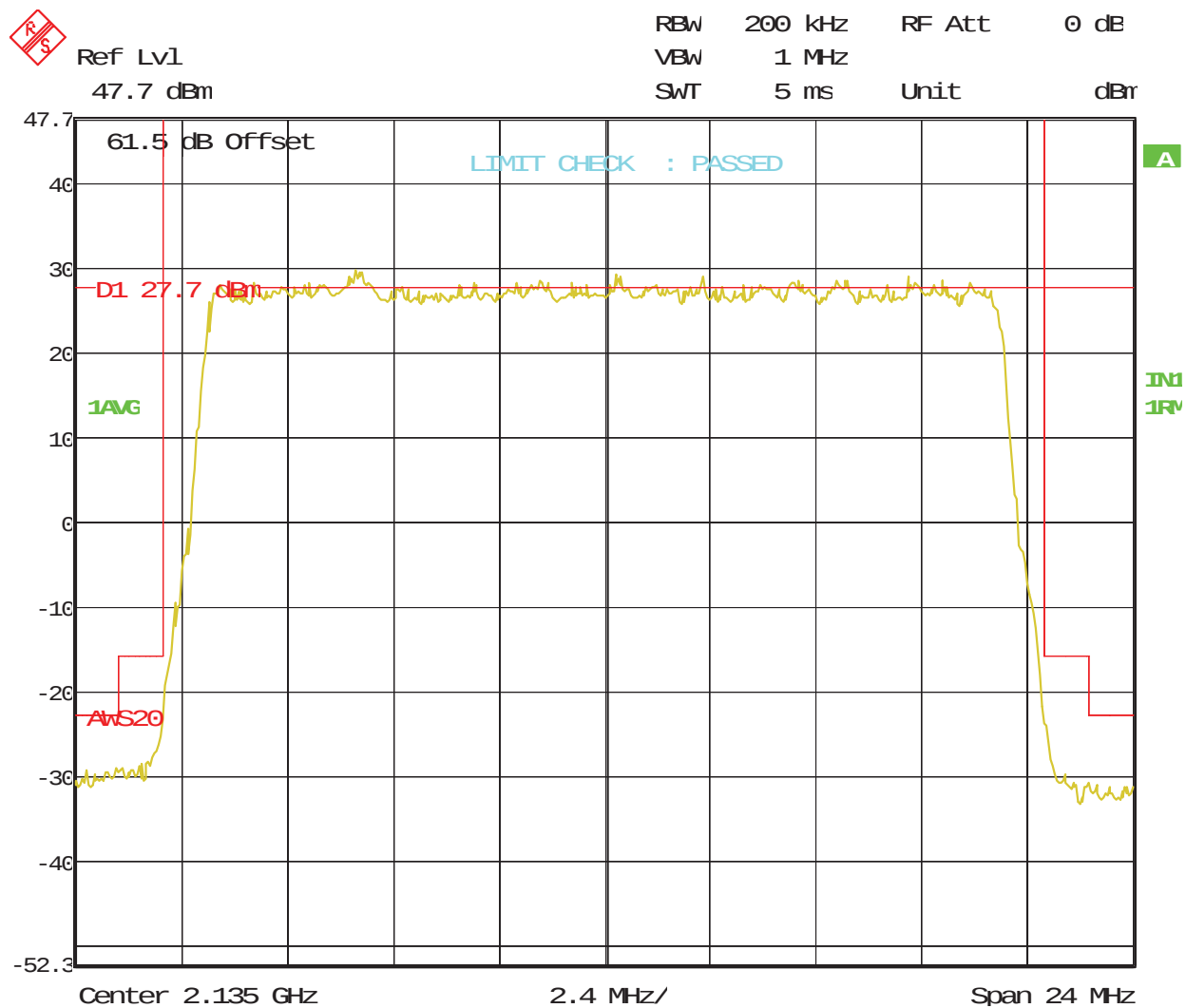
20 MHz Bandwidth 2125 – 2145 MHz

2x60 watts (MIMO)

SPECTRUM MASK/OCCUPIED BANDWIDTH



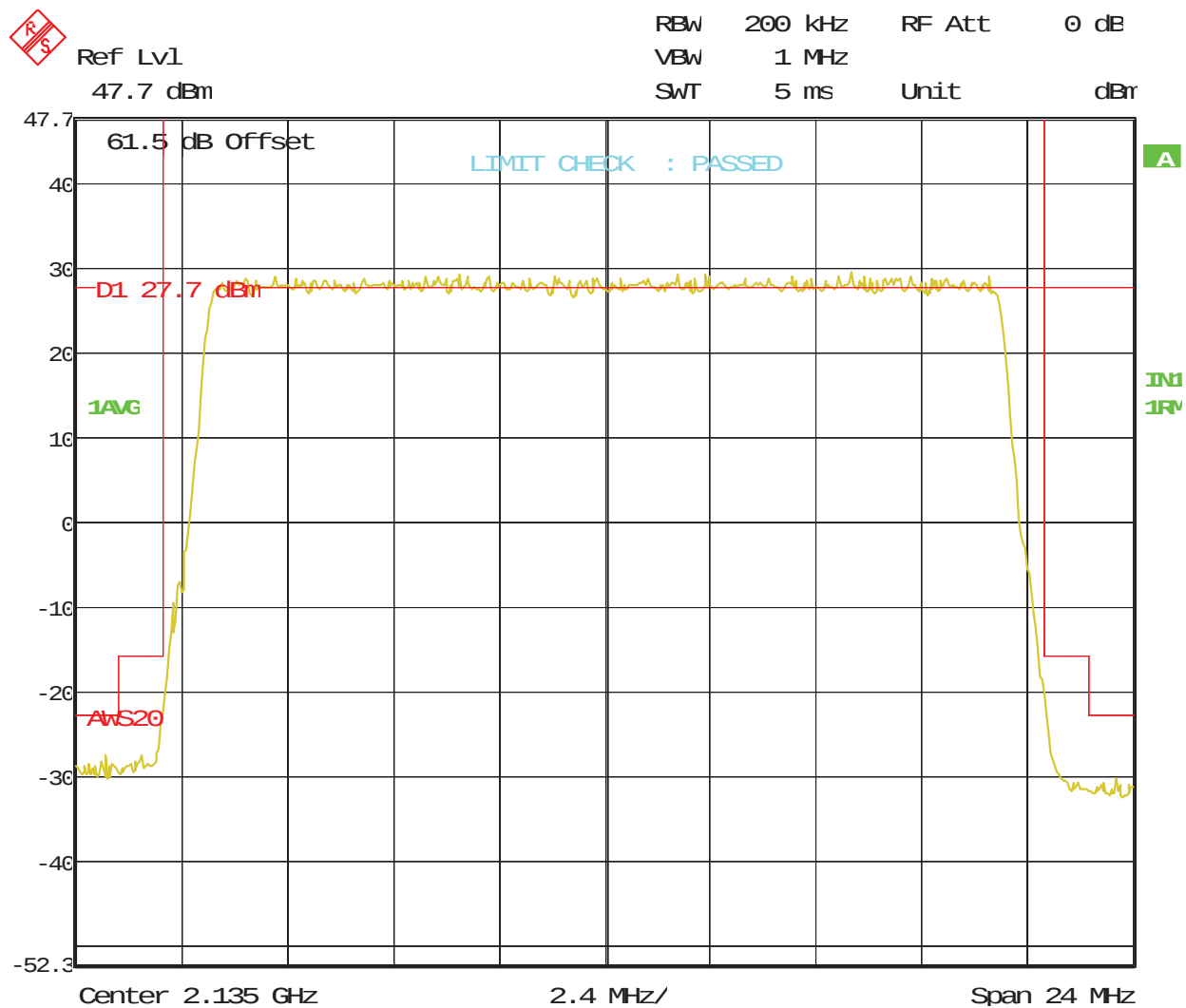
Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 08:19:08



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.

Date: 19.FEB.2013 11:15:07



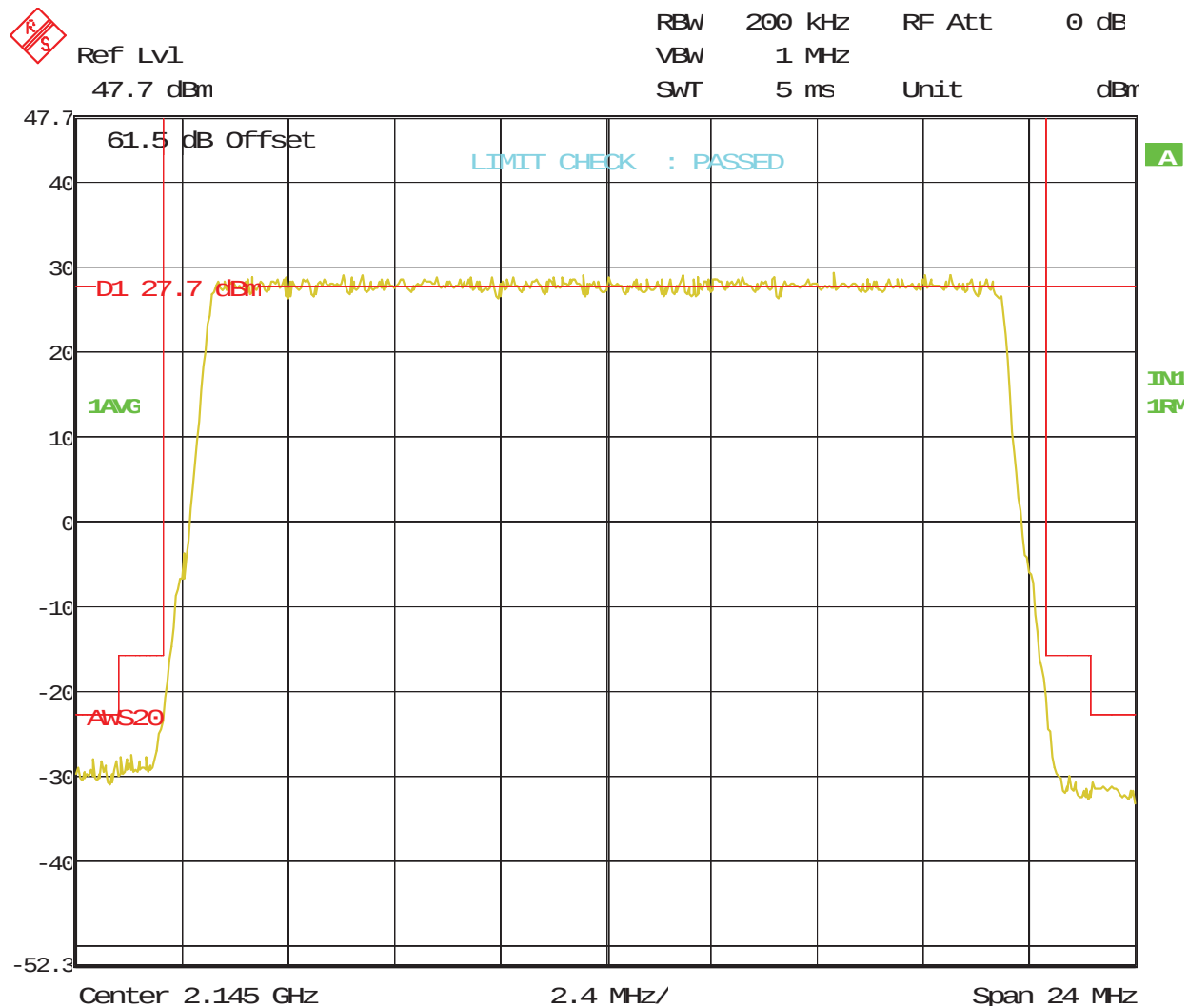
Title: OCCUPIED BANDWIDTH; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 10:16:57

Block: D+E+F

20 MHz Bandwidth 2135 – 2155 MHz

2x60 watts (MIMO)

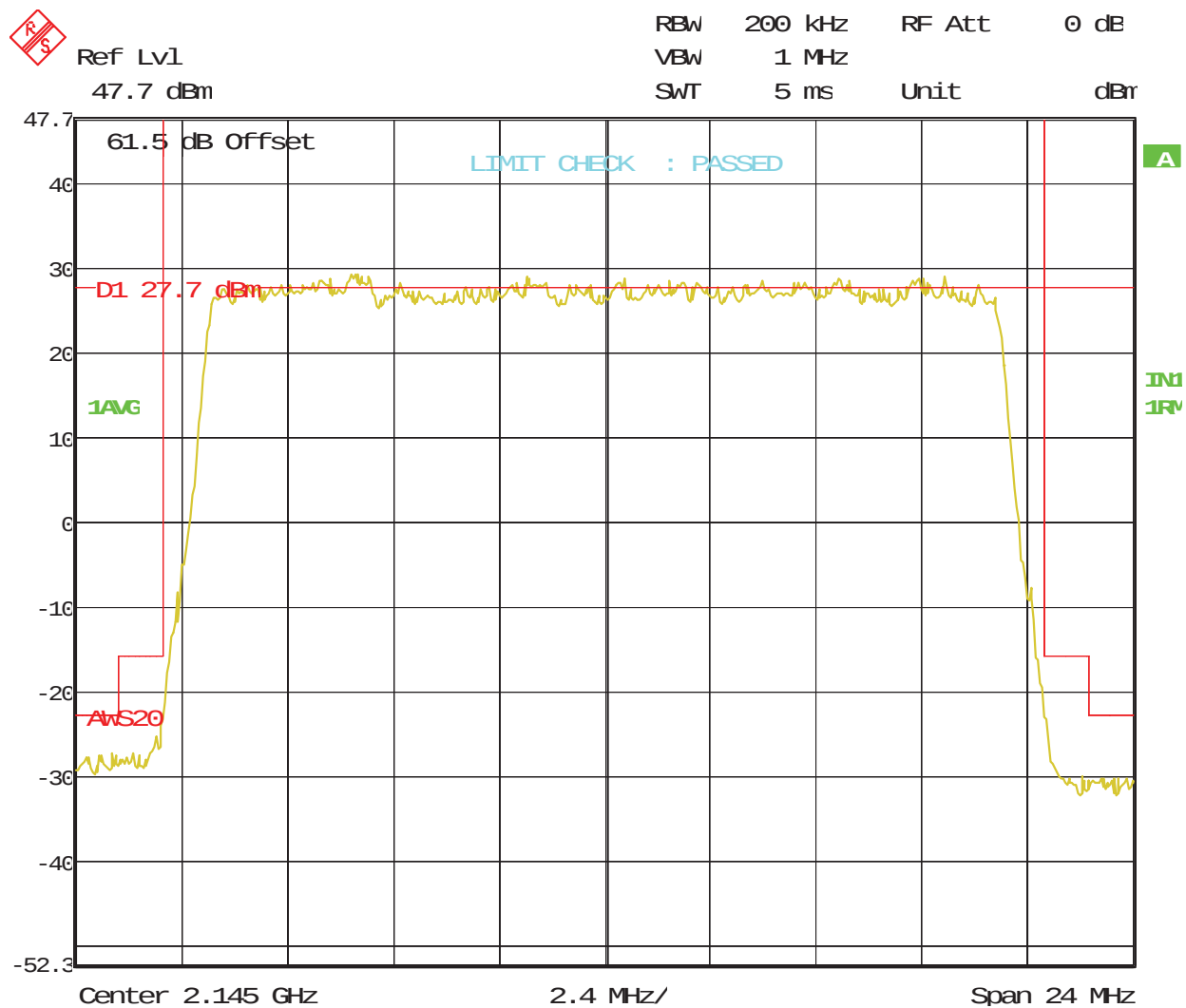
SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2135-2155MHz(D+E+F)
20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.

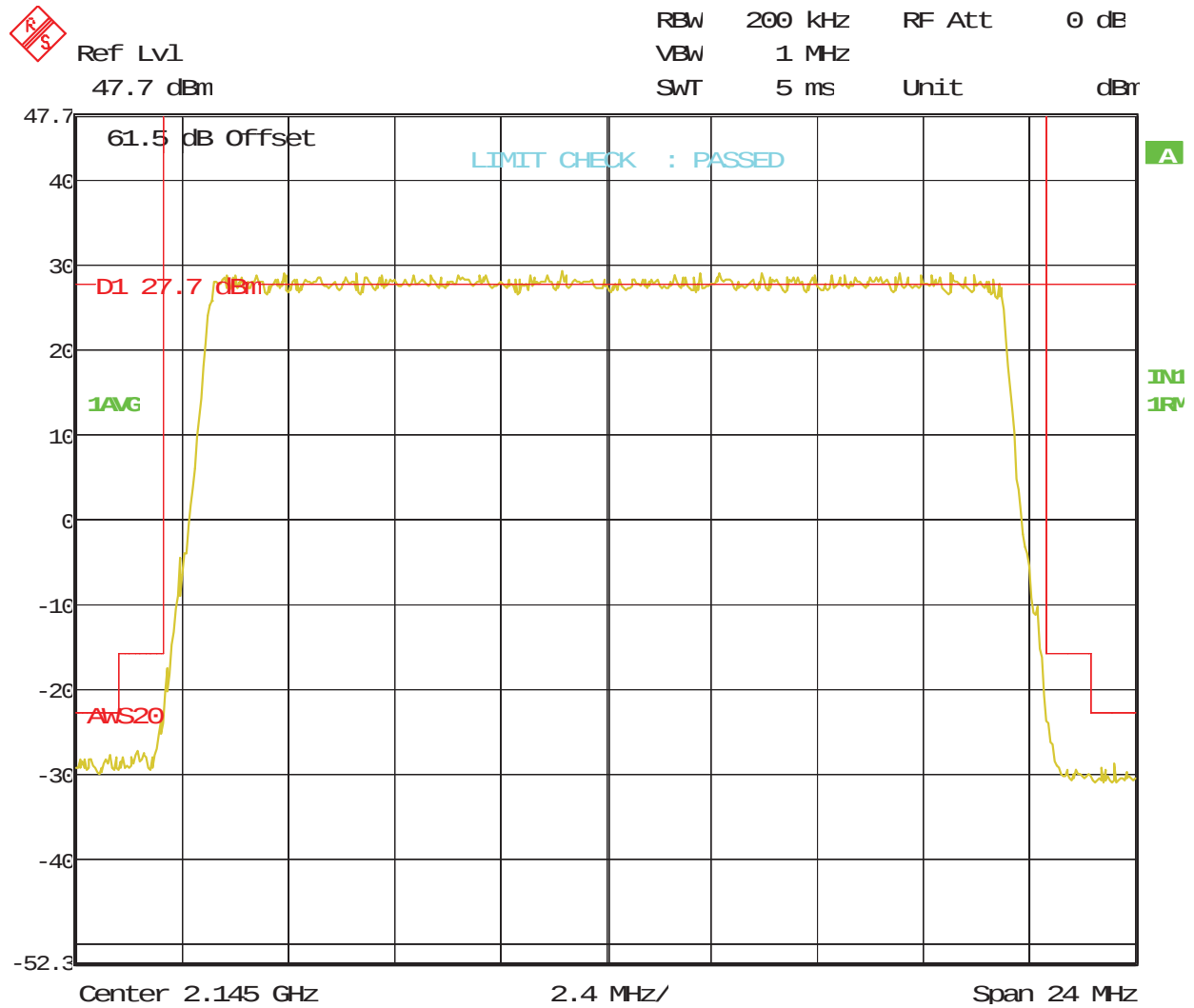
Date: 19.FEB.2013 08:52:39



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2135-2155MHz(D+E+F)
20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.

Date: 19.FEB.2013 10:24:14



Title: OCCUPIED BANDWIDTH; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60 Light Radio;208VAC;2135-2155MHz(D+E+F)
20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.

Date: 18.FEB.2013 10:57:54

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 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 (h) and FCC Part 24 Subpart E section 24.238. Measurements were made at 60W per carrier for 10 MHz Bandwidth, and 60W per carrier for 20MHz 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:

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

Blocks	Bandwidth	Frequency (MHz)	Power (Watts)
A	10	2115	60
B	10	2125	60
F	10	2150	60
			60
A+B	20	2120	60
B2+C+D+E	20	2135	60
D+E+F	20	2145	60

FCC Section 27.53(h)(1) 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).

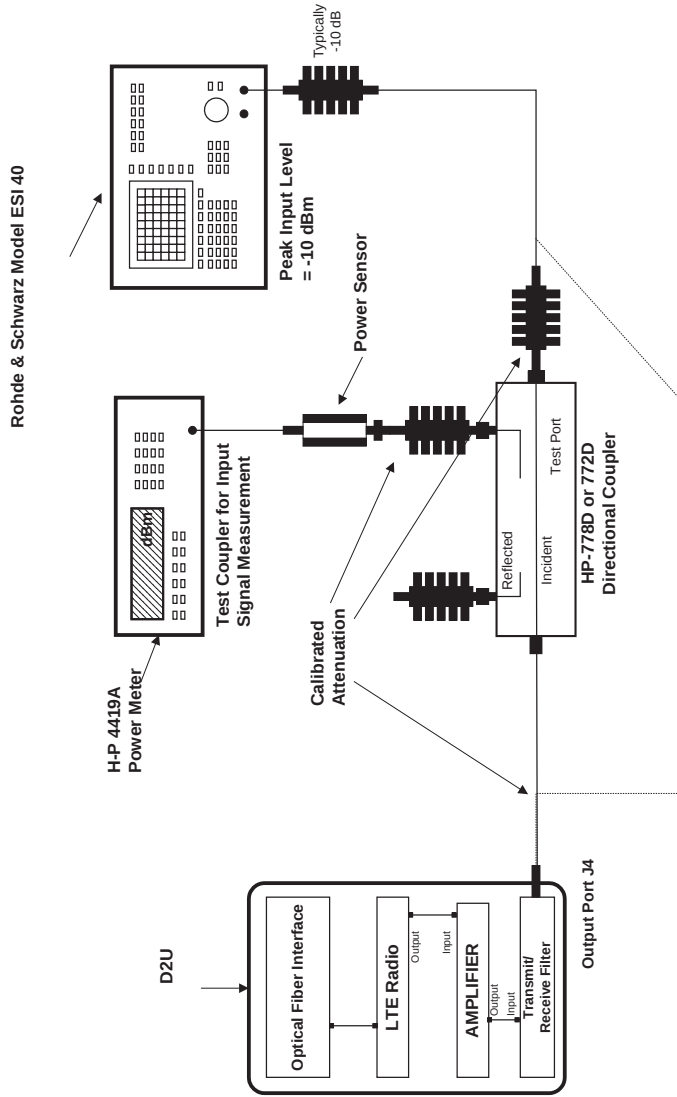
Measurement uncertainty:

9 kHz to 20 MHz: Frequency = 10 Hz, Amplitude = 0.5 dB

20 MHz to 1 GHz: Frequency = 100Hz, Amplitude = 0.5 dB

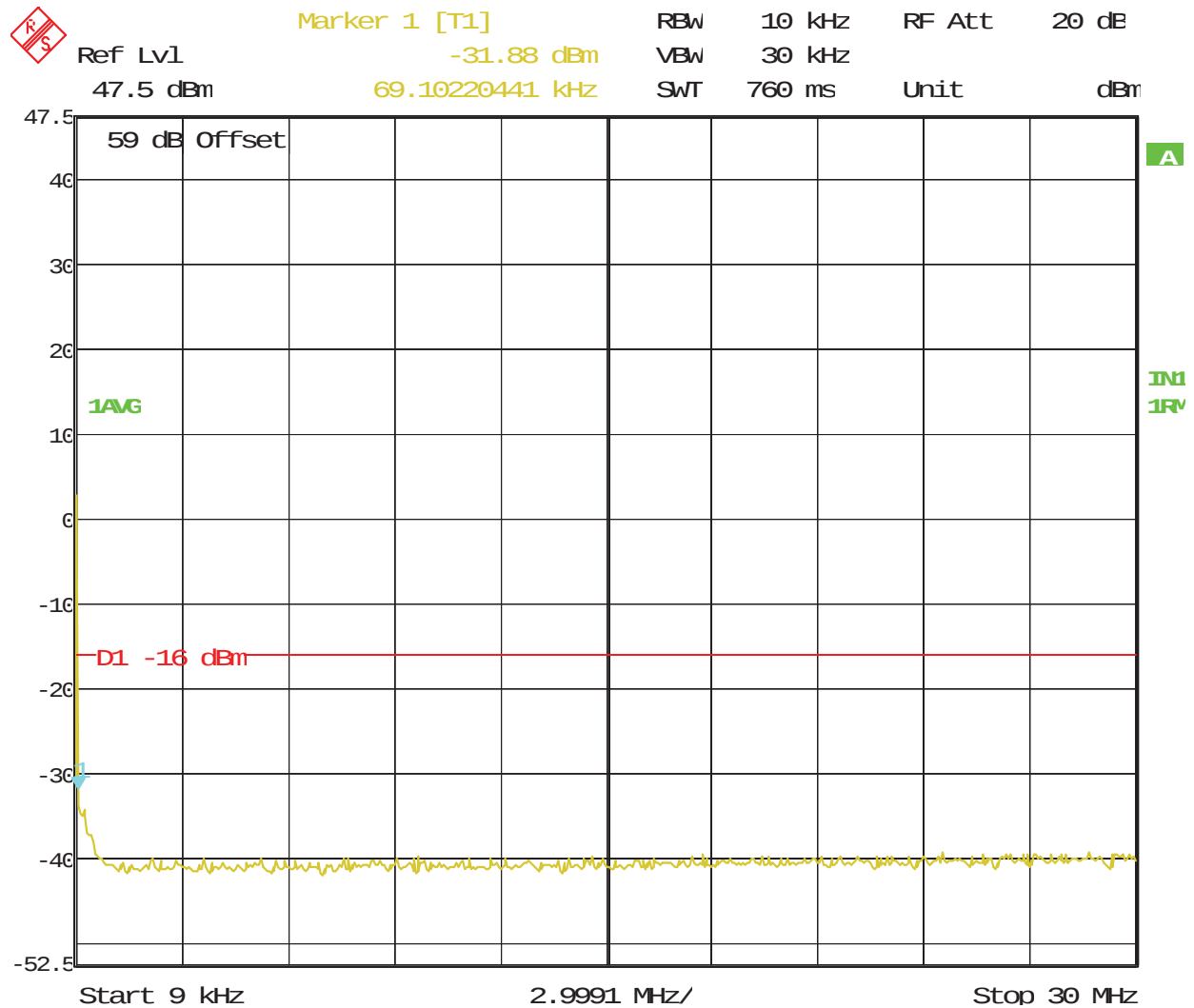
1 GHz to 10 GHz: Frequency = 10 kHz, Amplitude = 0.5 dB

Figure A. TEST CONFIGURATION FOR CONDUCTED SPURIOUS

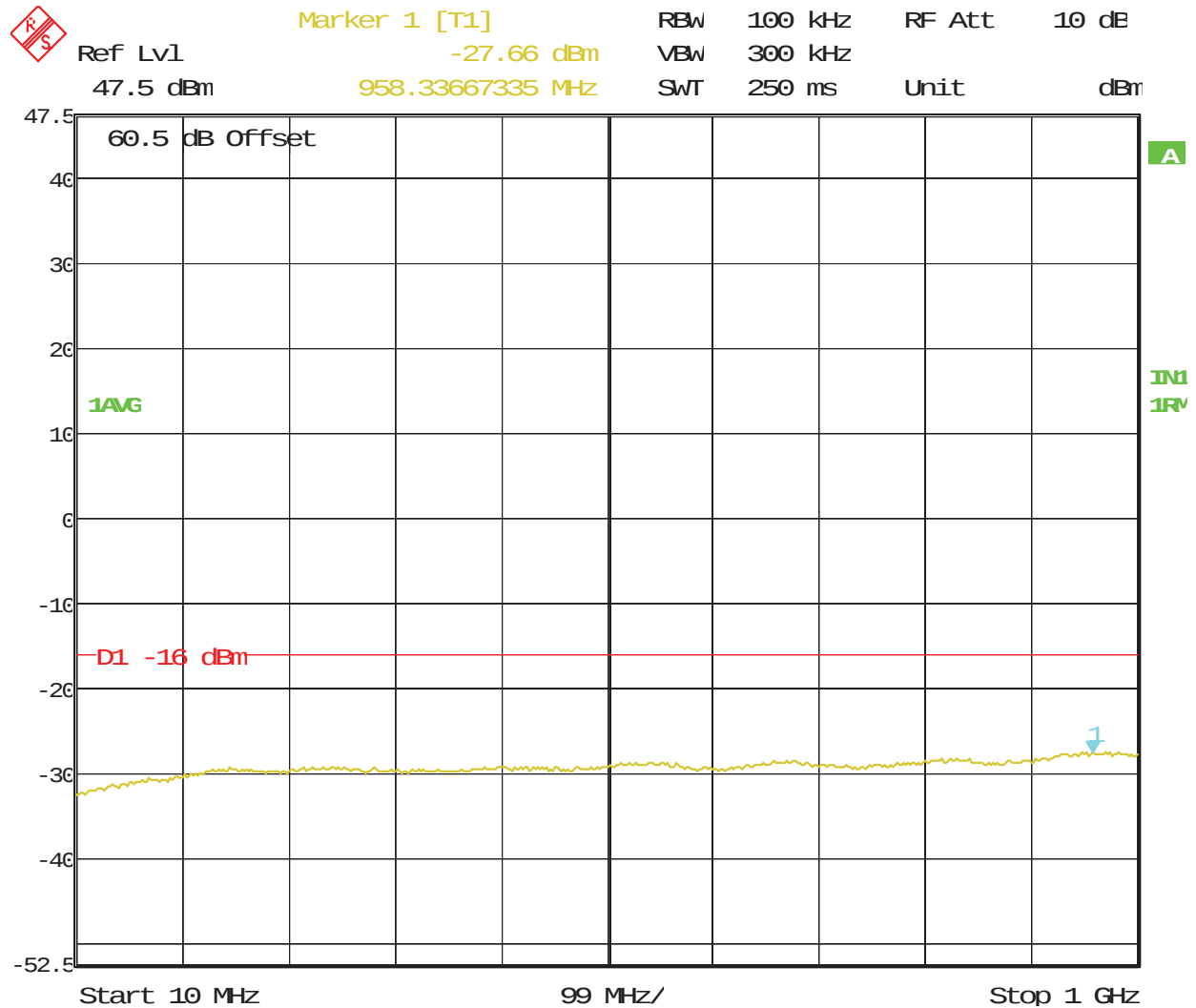


Transmit Port
Antenna Conducted Spurious Emissions

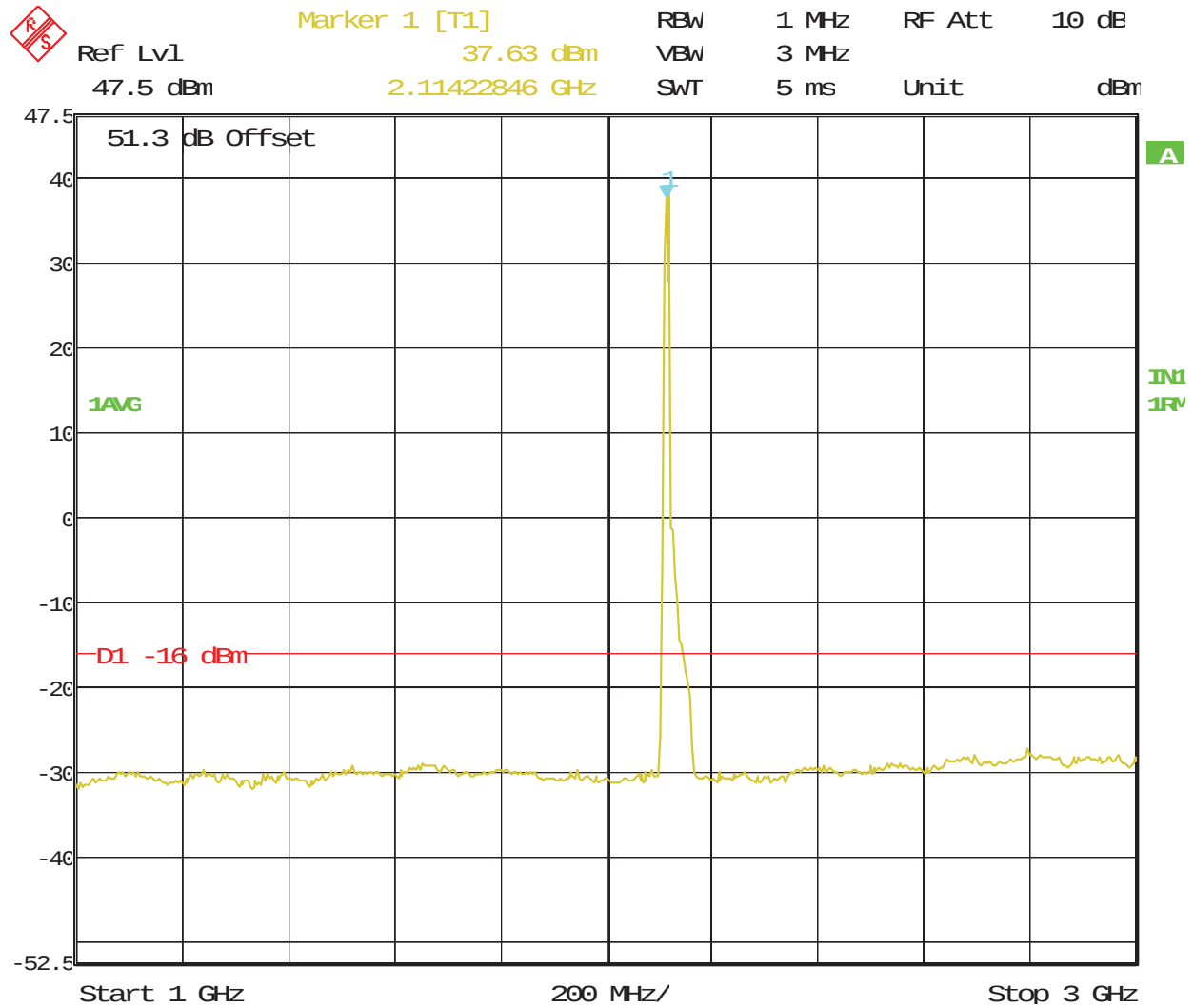
Block: A (10 MHz BW)
QPSK Modulation
Bandwidth 2110 – 2120 MHz
2x60 watts (MIMO)



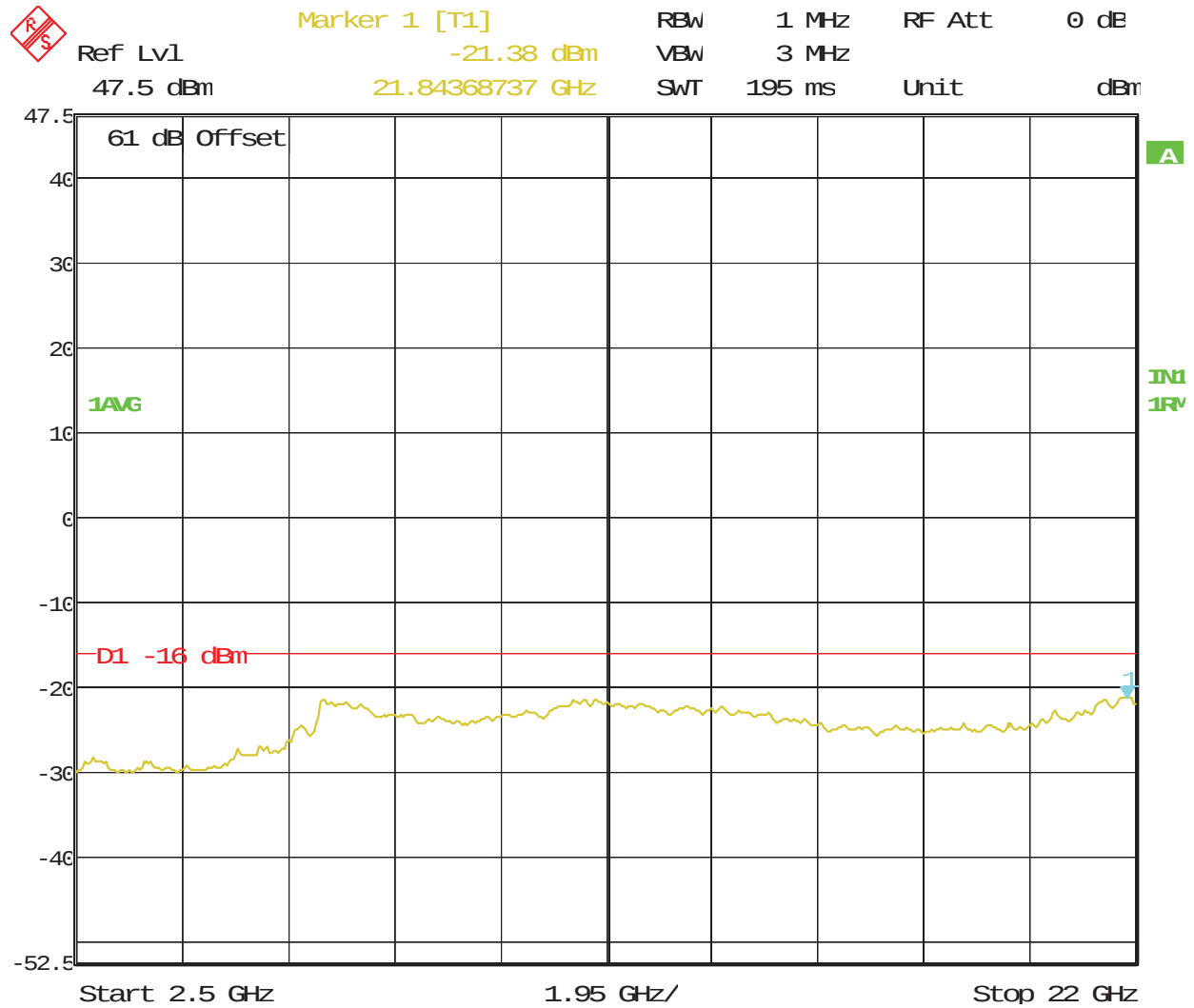
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 11:55:47



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 11:56:24



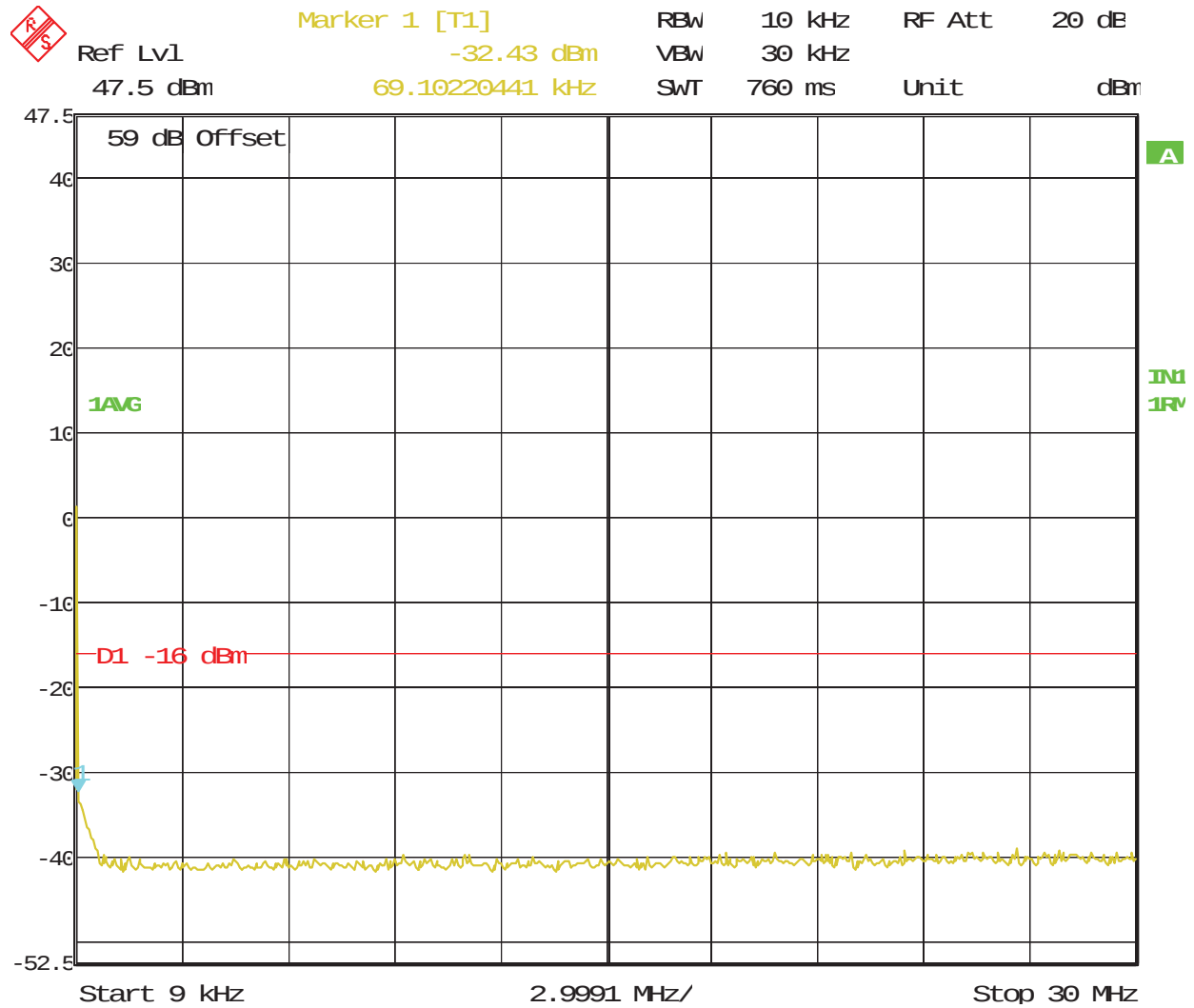
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 12:01:35



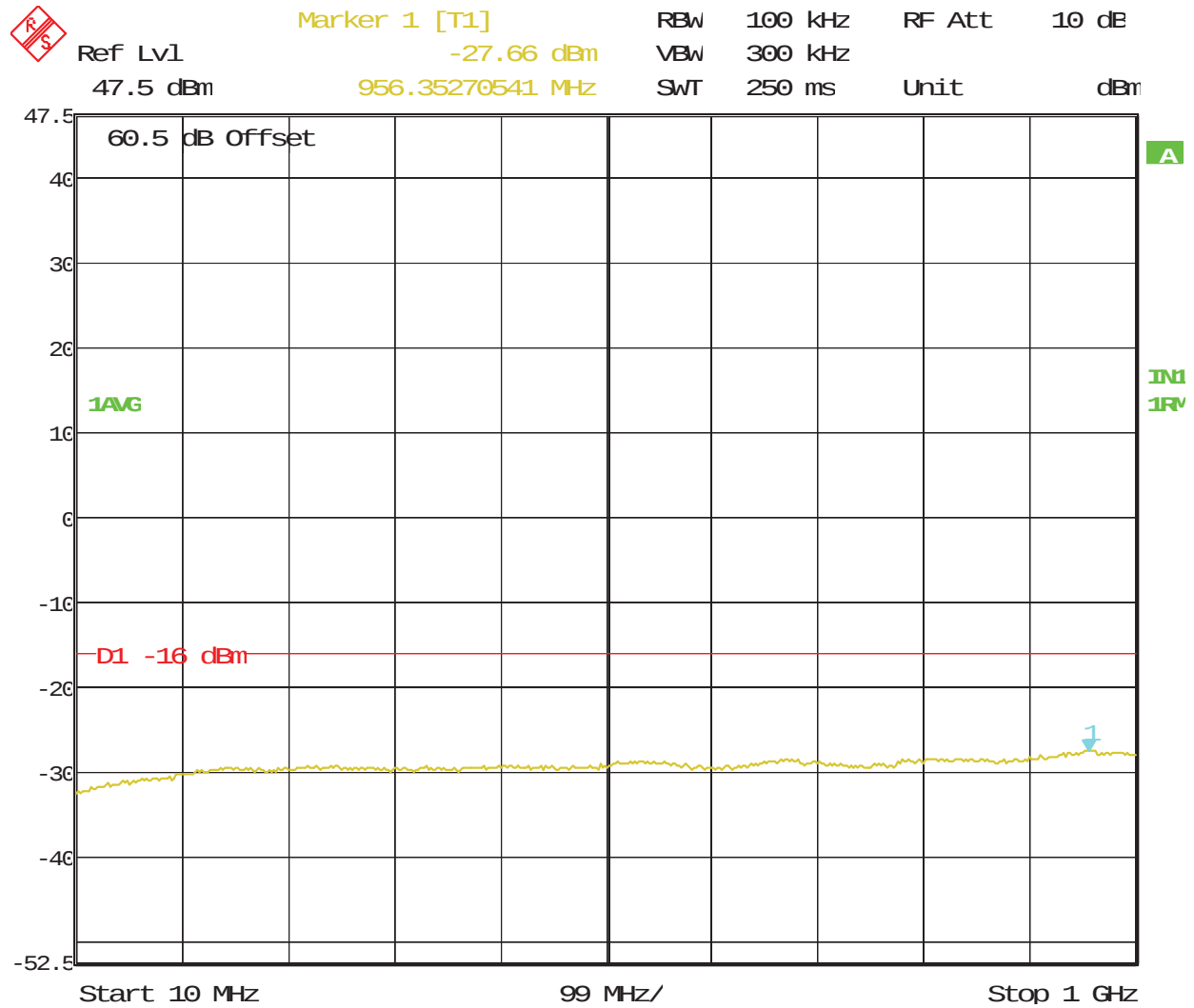
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; QPSK; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 6.FEB.2013 14:50:14

**Transmit Port
Antenna Conducted Spurious Emissions**

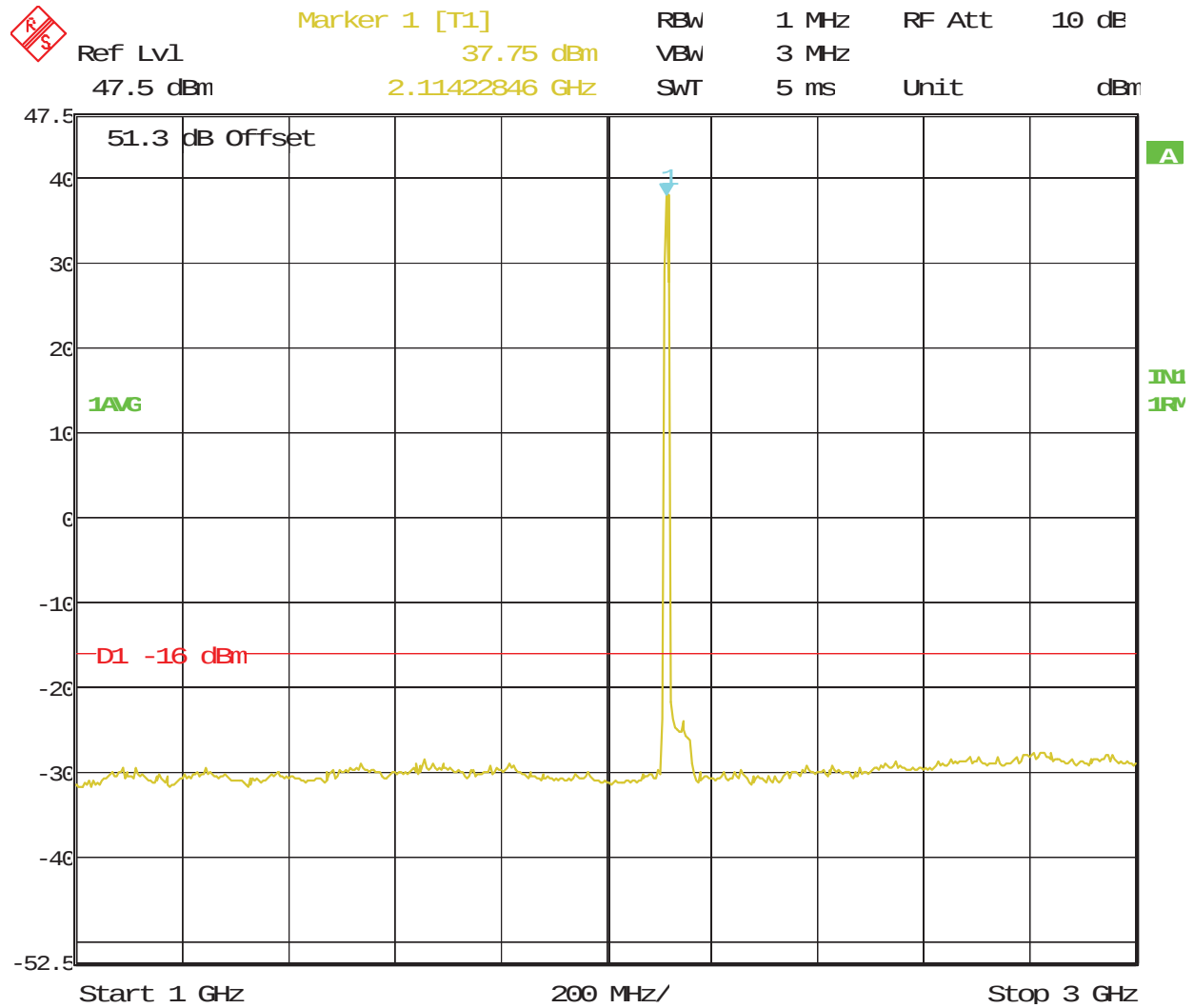
**Block: A (10 MHz BW)
16QAM Modulation
2x60 watts (MIMO)
Bandwidth 2110 – 2120 MHz**



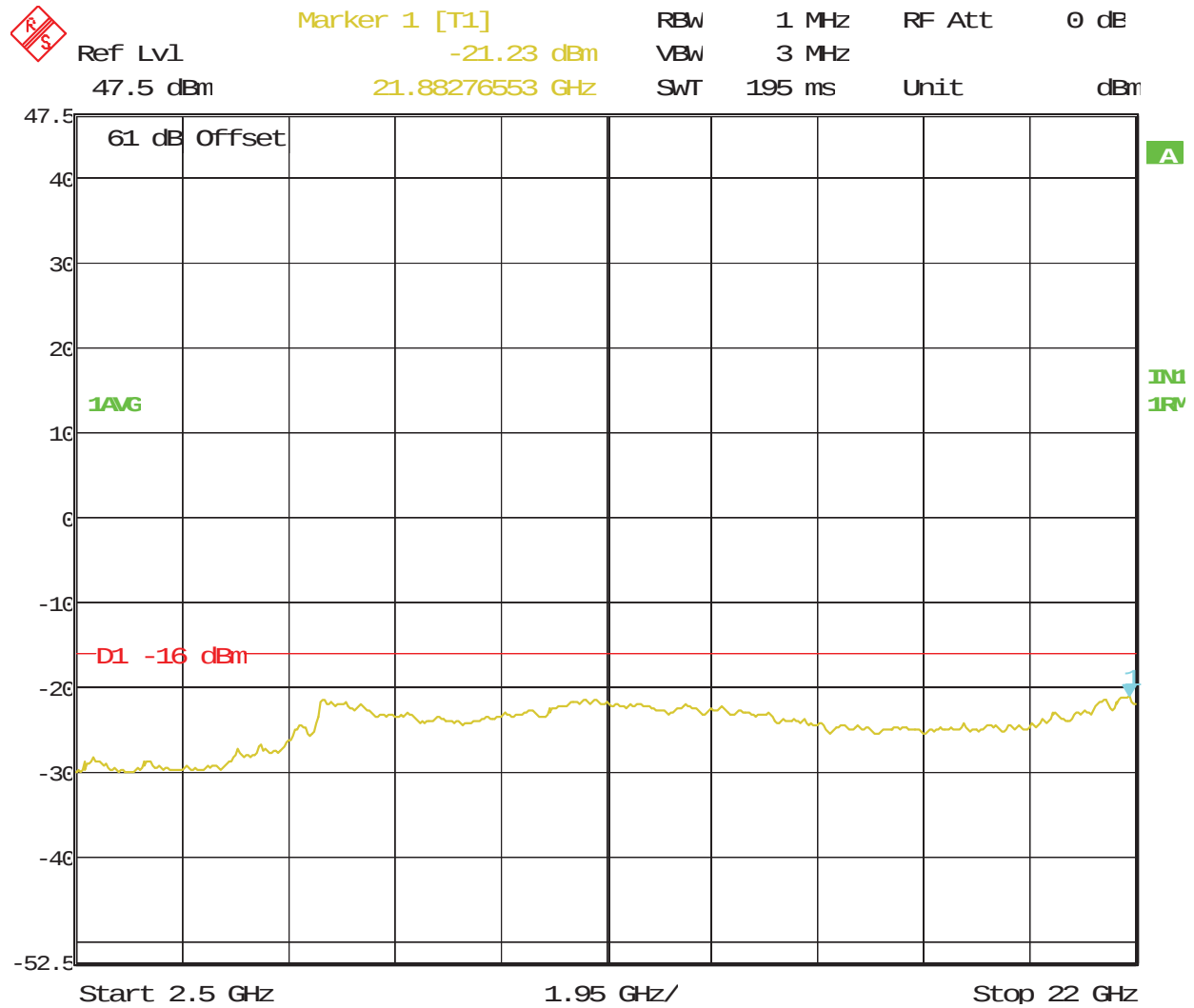
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 14:36:18



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 14:21:40



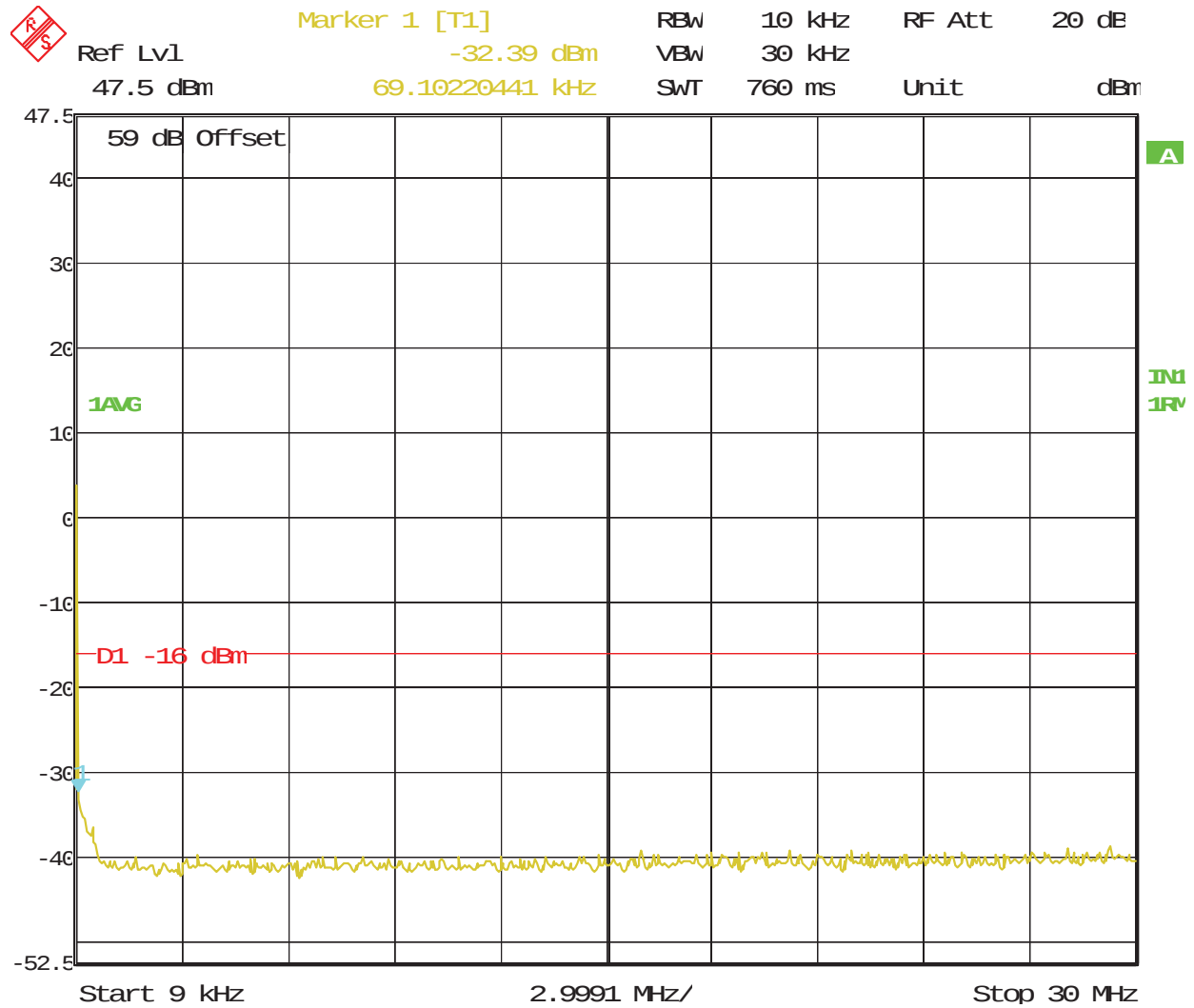
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 14:28:22



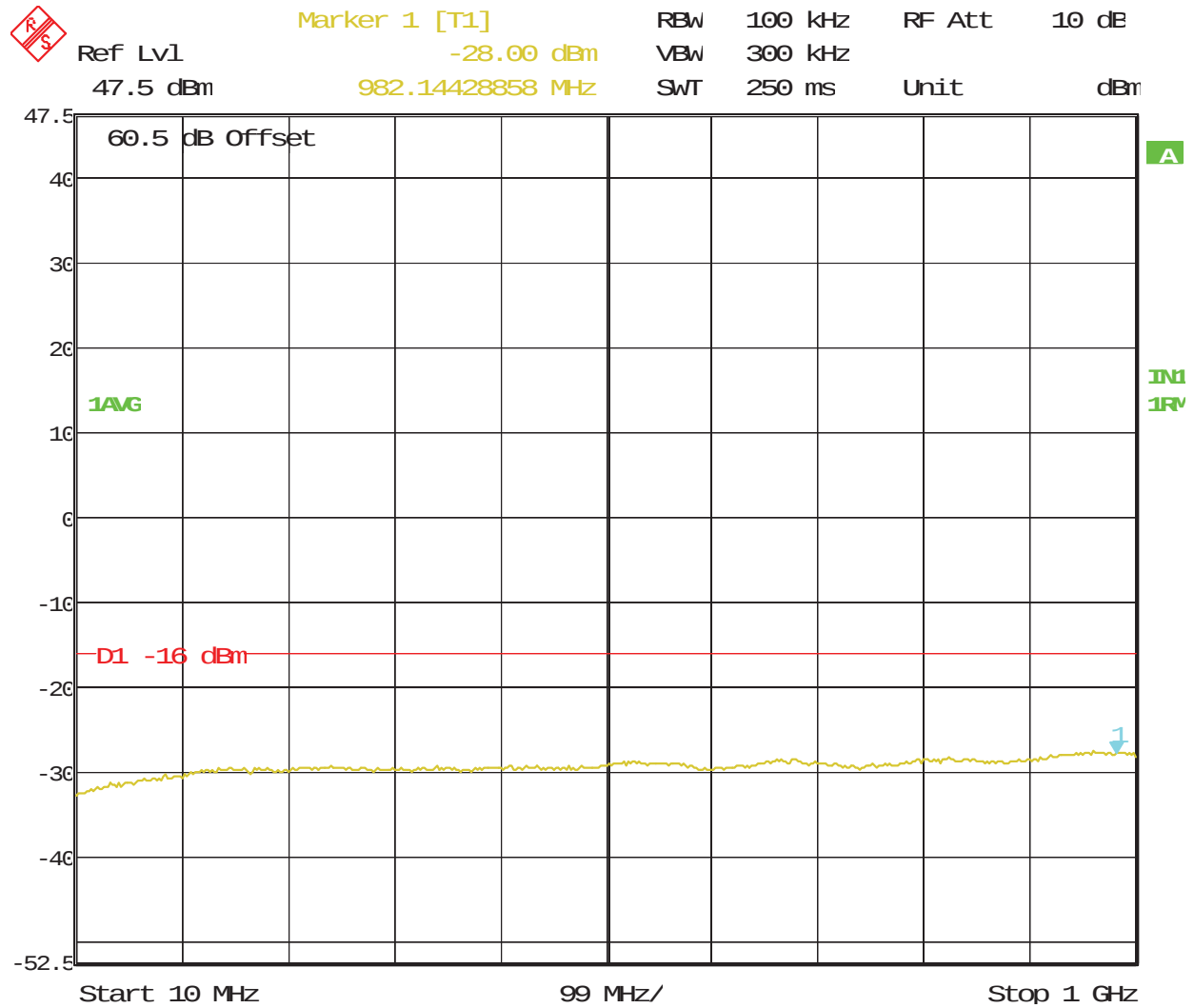
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 16QAM; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 6.FEB.2013 14:20:49

**Transmit Port
Antenna Conducted Spurious Emissions**

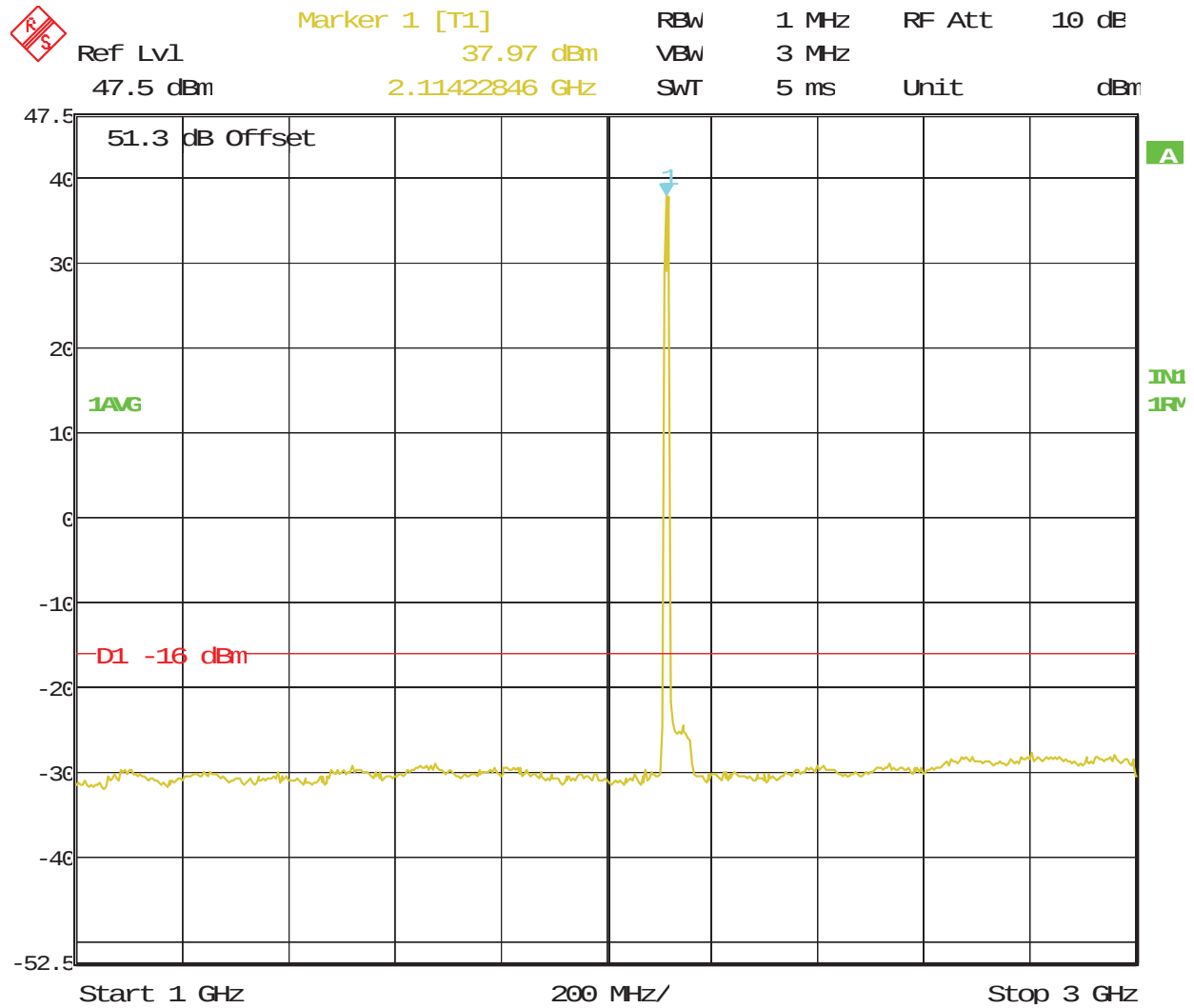
**Block: A (10 MHz BW)
64QAM Modulation
2x60 watts (MIMO)
Bandwidth 2110 – 2120 MHz**



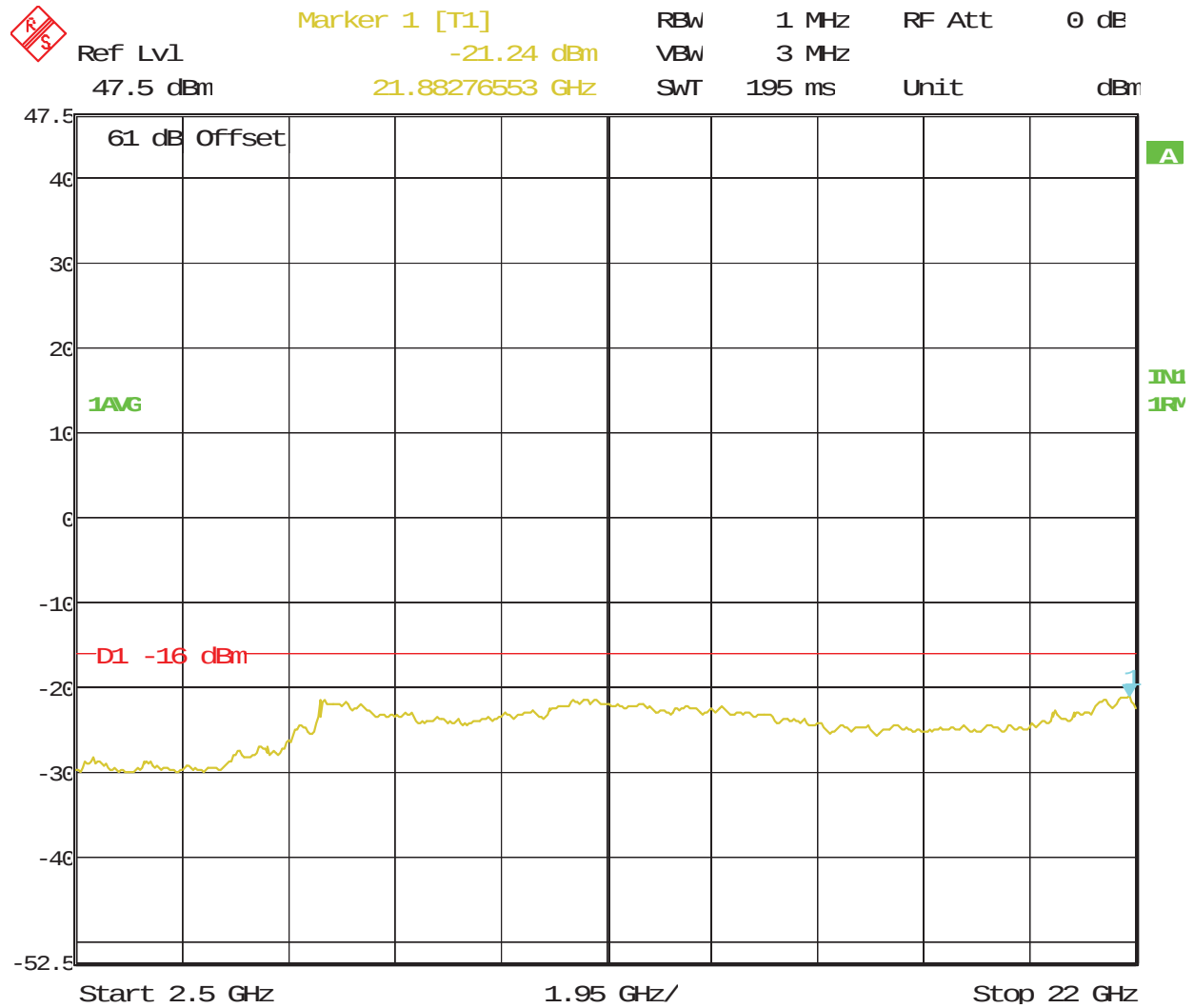
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 14:58:51



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 14:58:05



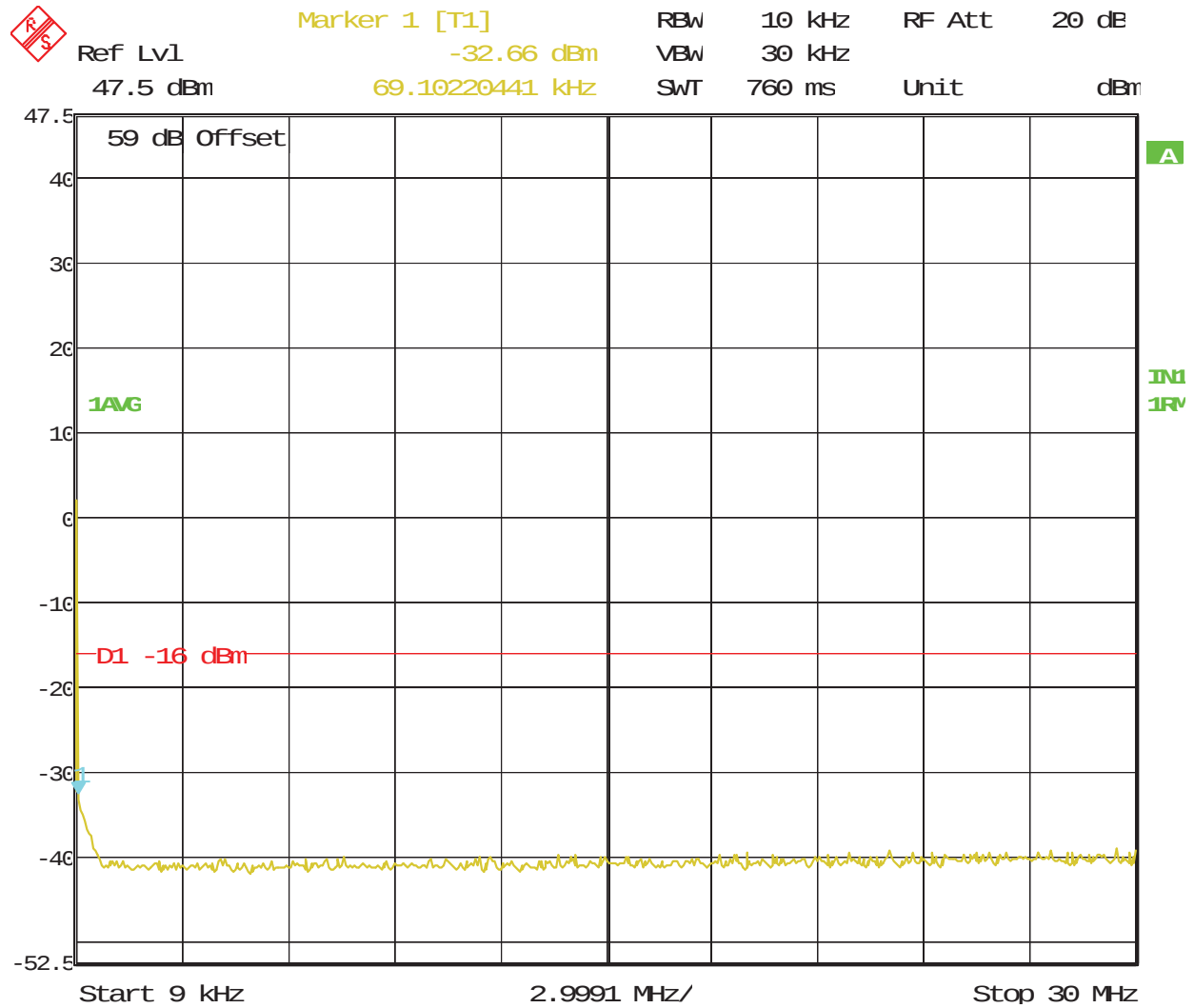
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 14:59:54



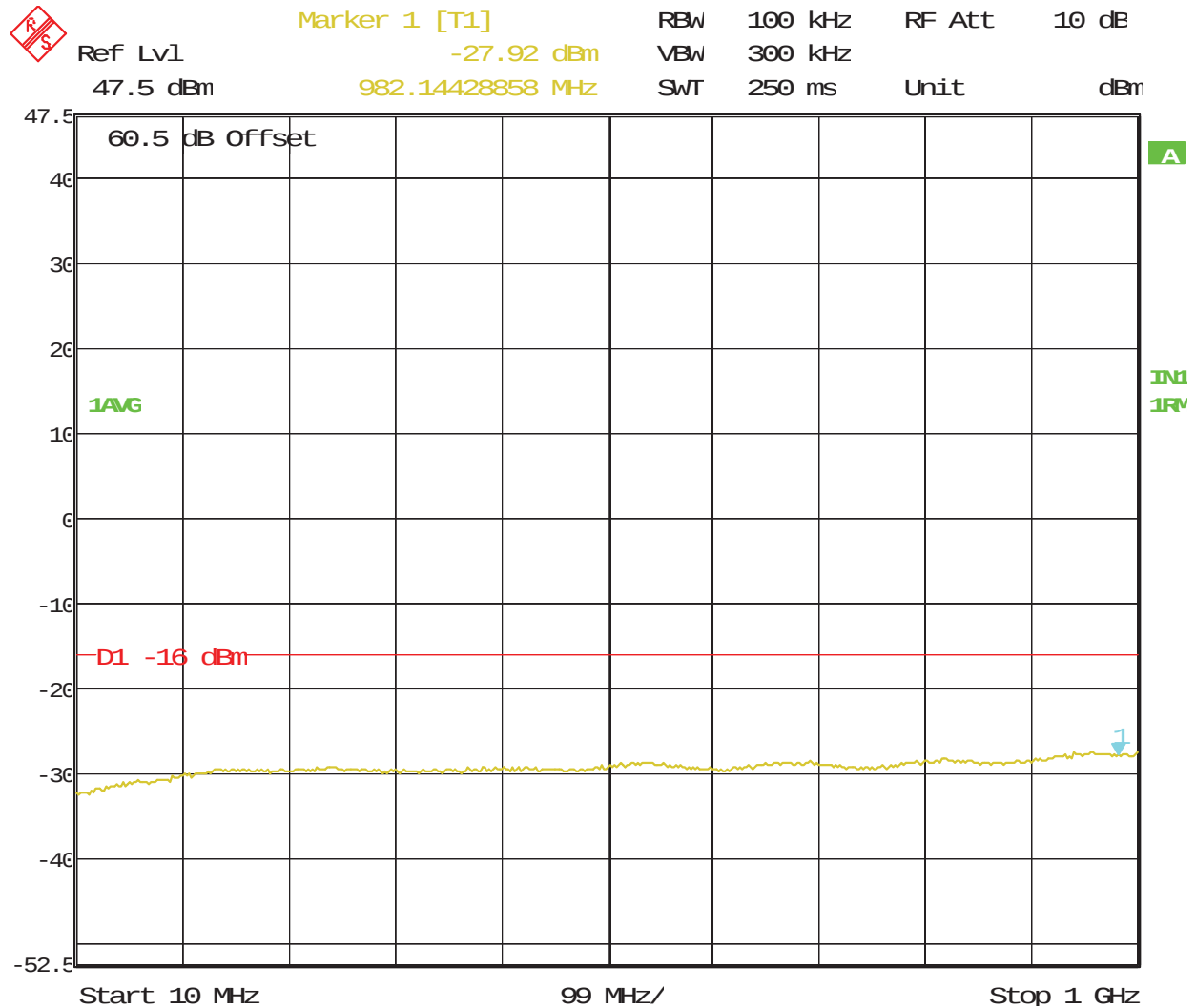
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK A; 2110-2120MHz;
 10MHz BW;PWR:60W; 64QAM; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 6.FEB.2013 14:13:42

Transmit Port
Antenna Conducted Spurious Emissions

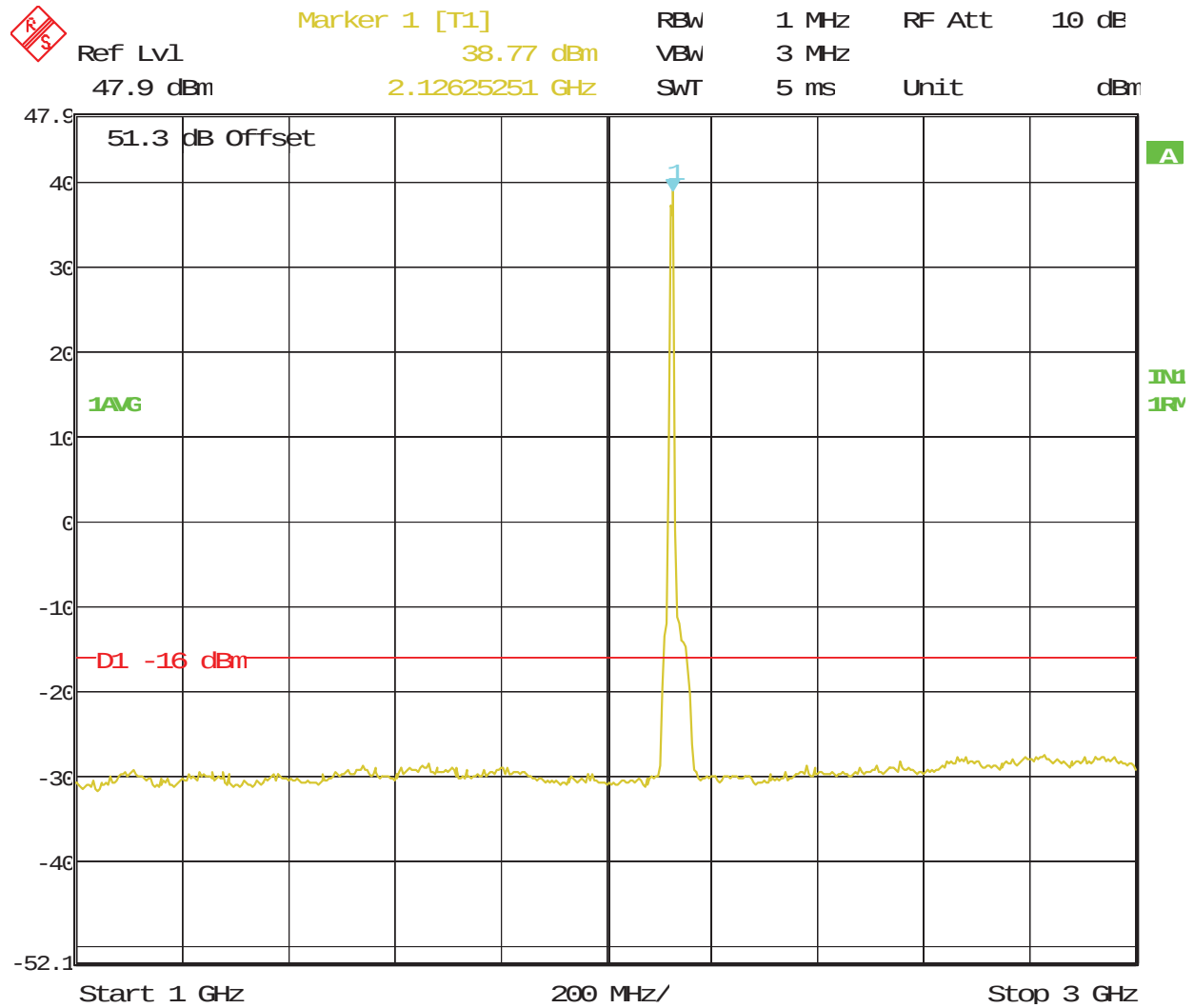
Block: B (10 MHz BW)
QPSK Modulation
2x60 watts (MIMO)
Bandwidth 2120 – 2130 MHz



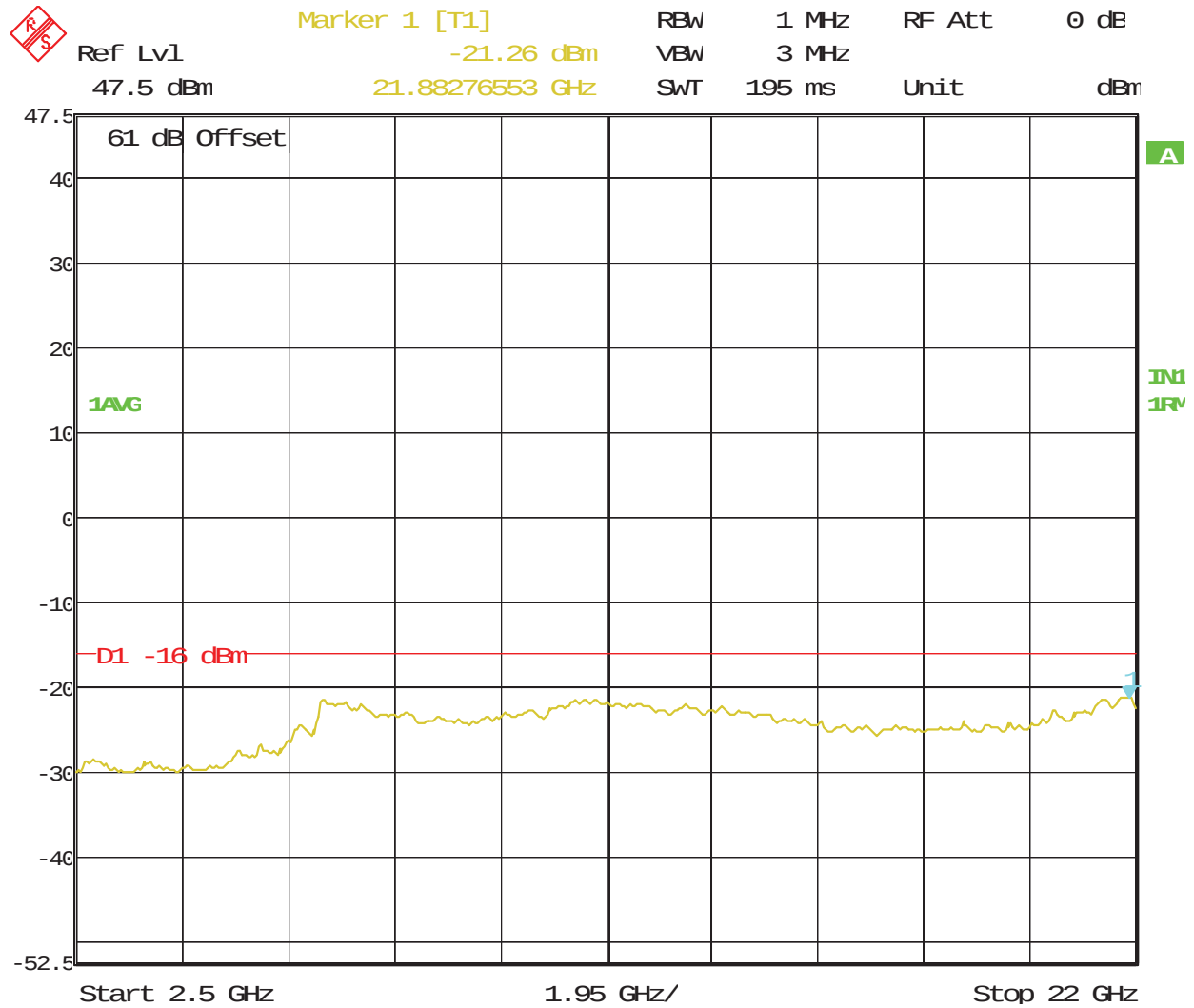
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 10:04:51



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 10:08:18



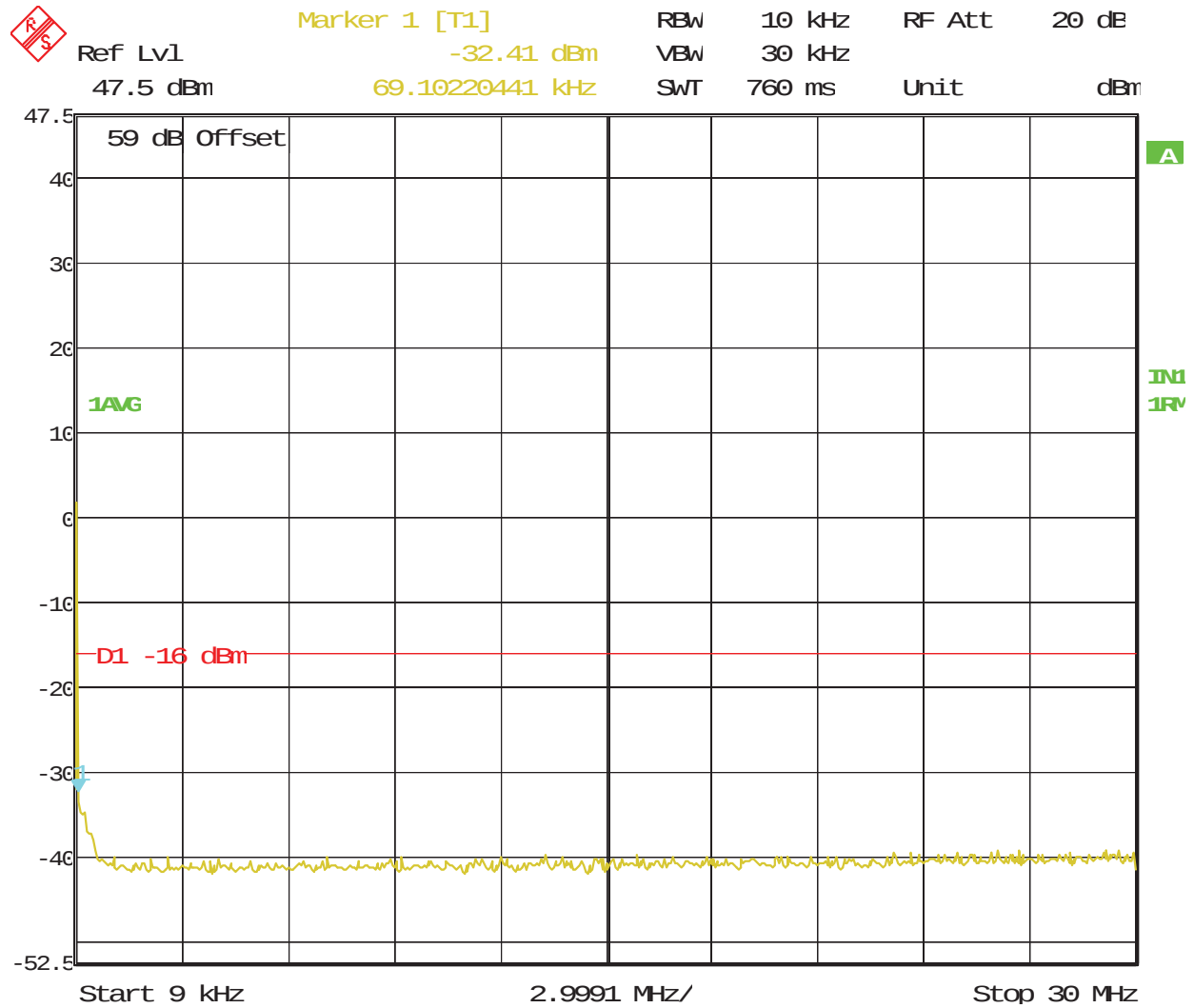
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
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 Date: 1.FEB.2013 10:11:15



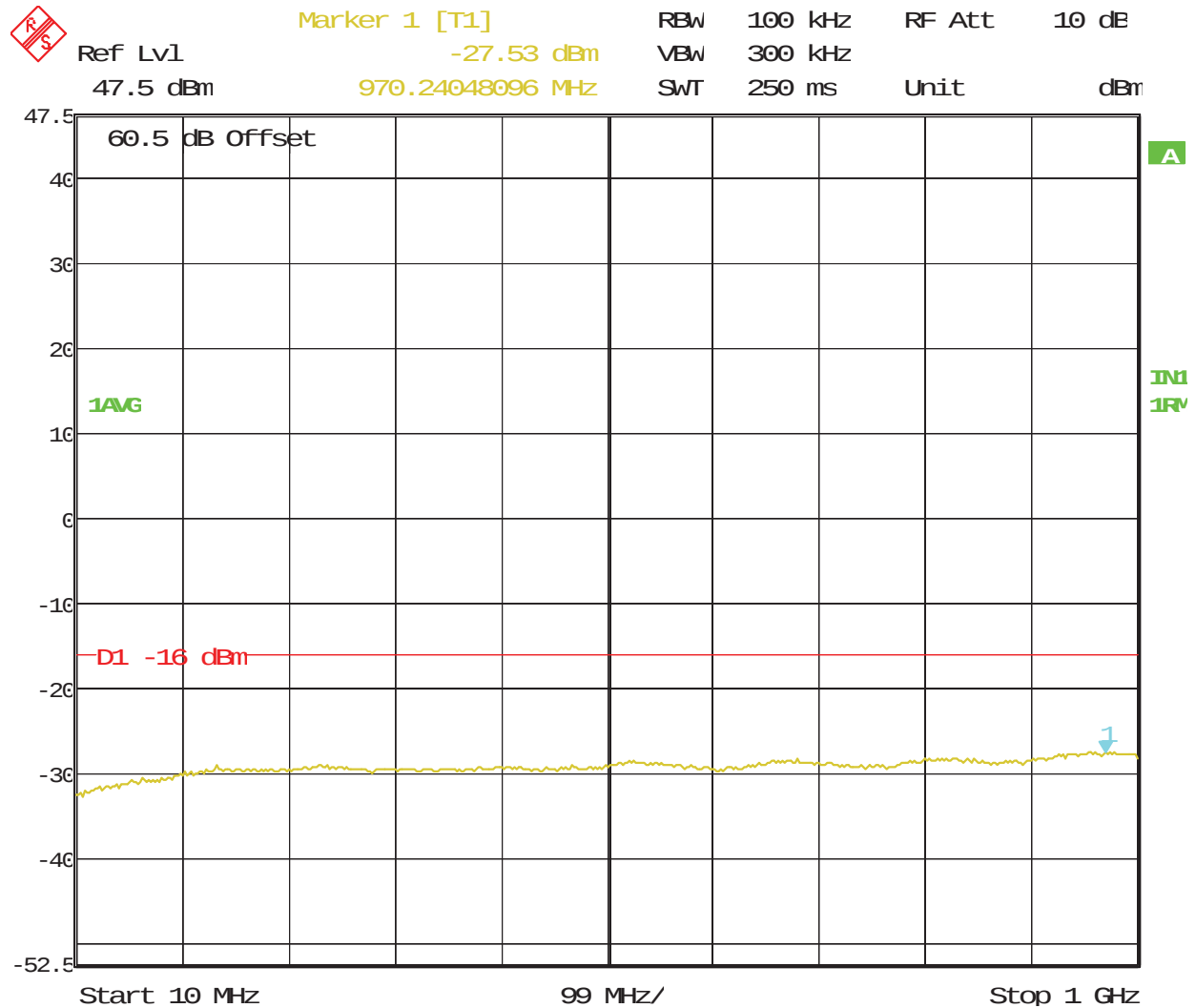
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
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 Date: 6.FEB.2013 14:54:30

**Transmit Port
Antenna Conducted Spurious Emissions**

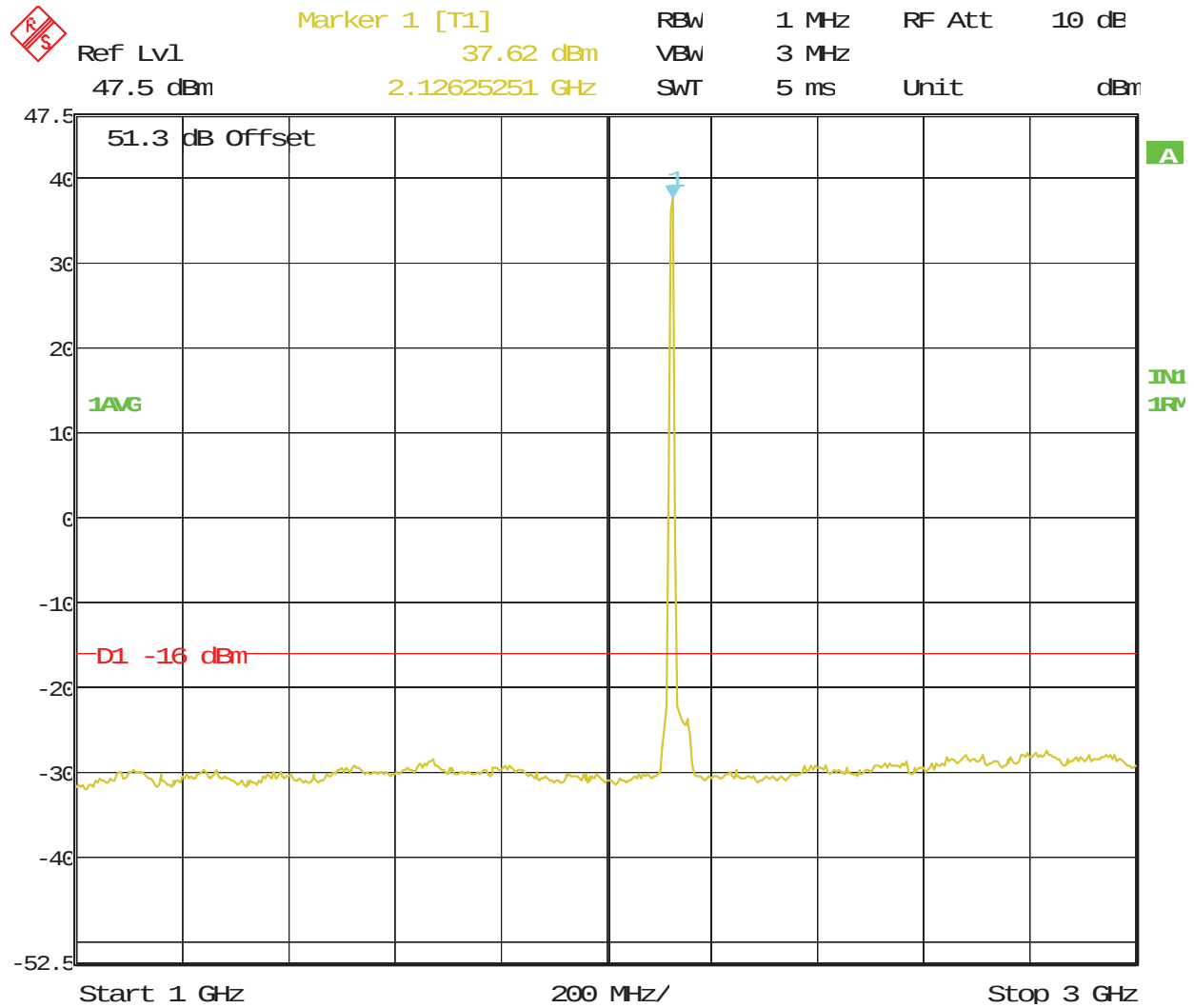
**Block: B (10 MHz BW)
2x60 (MIMO)
16QAM Modulation
Bandwidth 2120 – 2130 MHz**



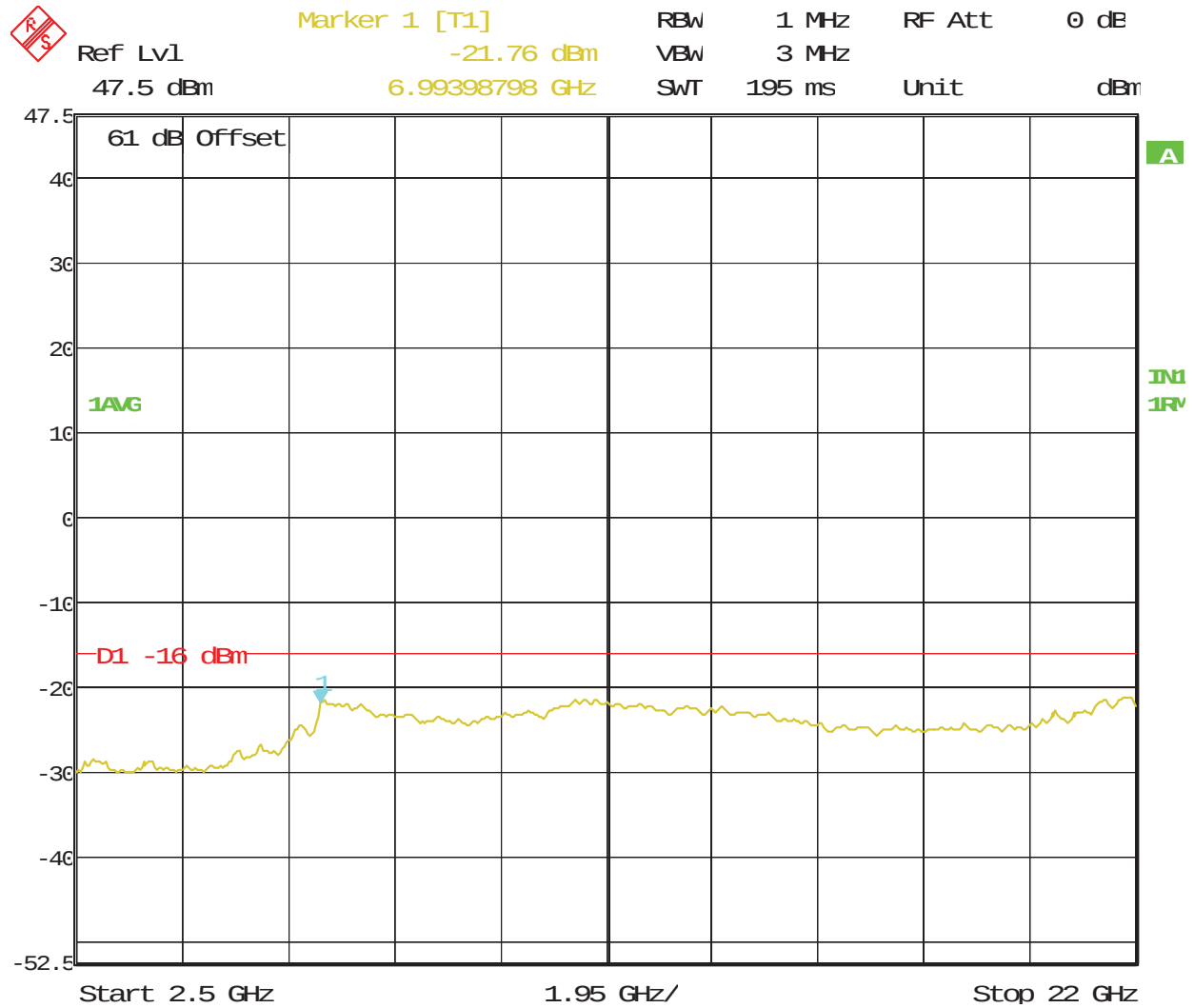
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 13:36:51



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 13:38:07



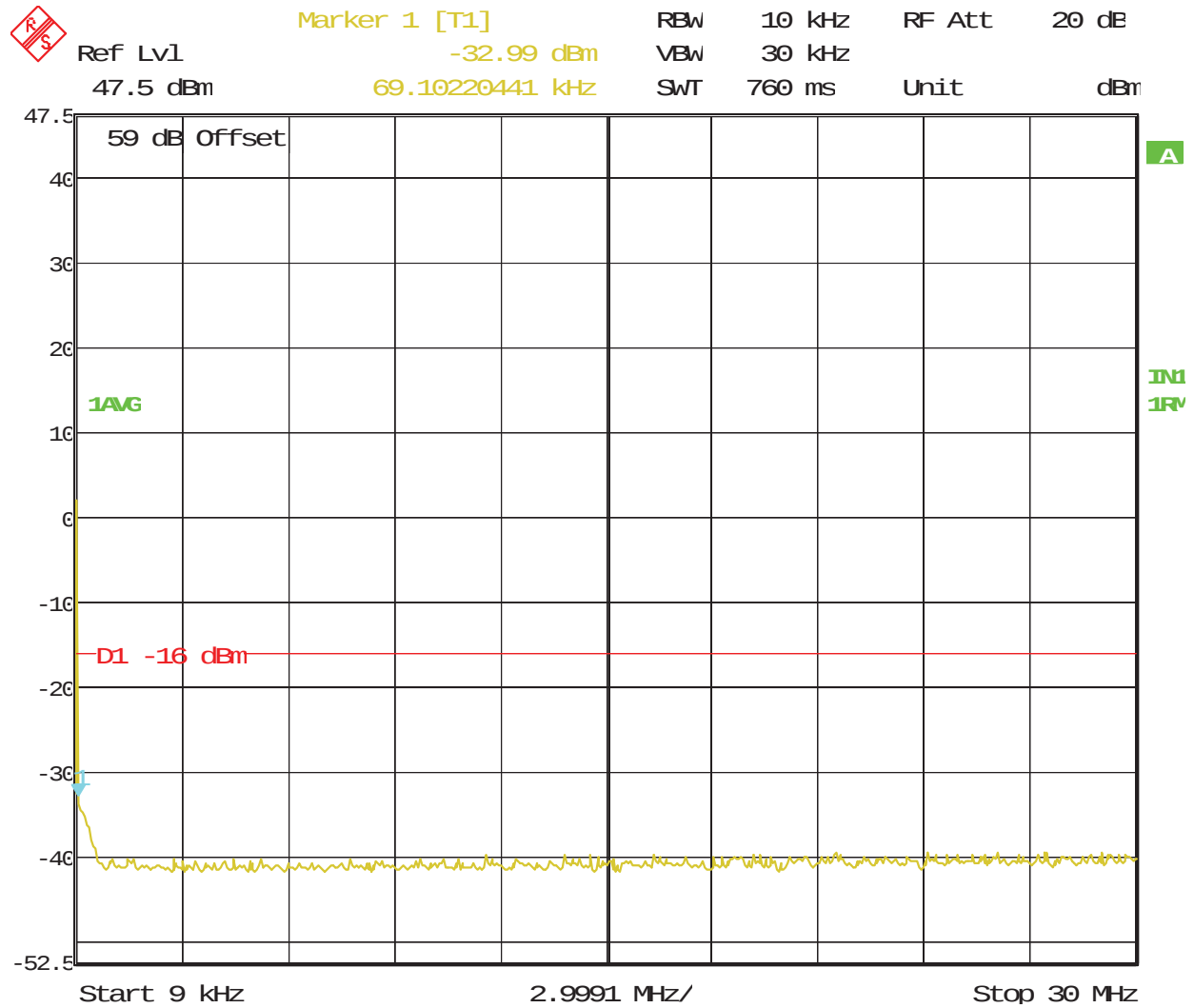
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
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 Date: 4.FEB.2013 13:41:25



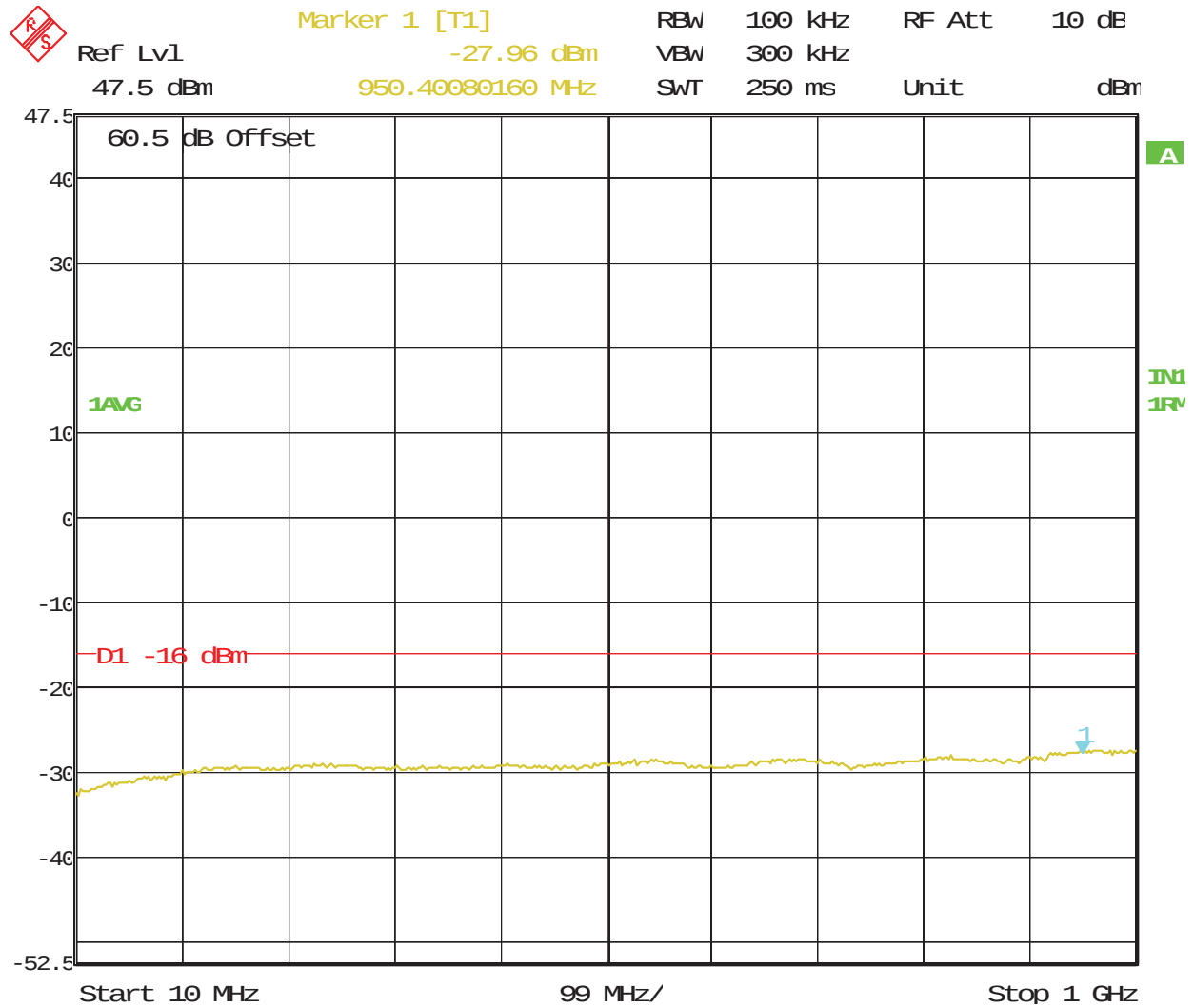
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 16QAM; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 6.FEB.2013 15:00:01

**Transmit Port
Antenna Conducted Spurious Emissions**

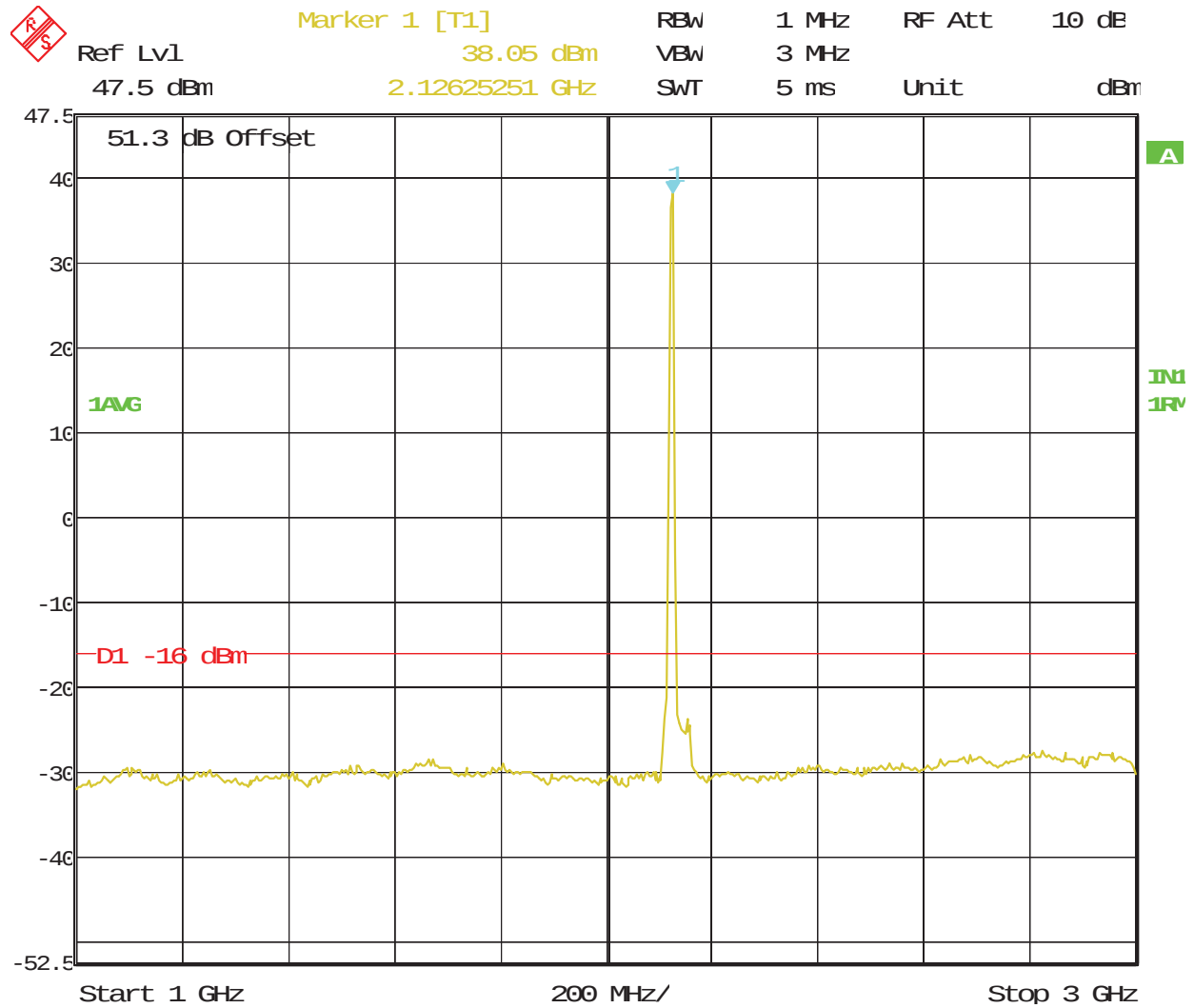
**Block: B (10 MHz BW)
64QAM Modulation
2x60 watts (MIMO)
Bandwidth 2120 – 2130 MHz**



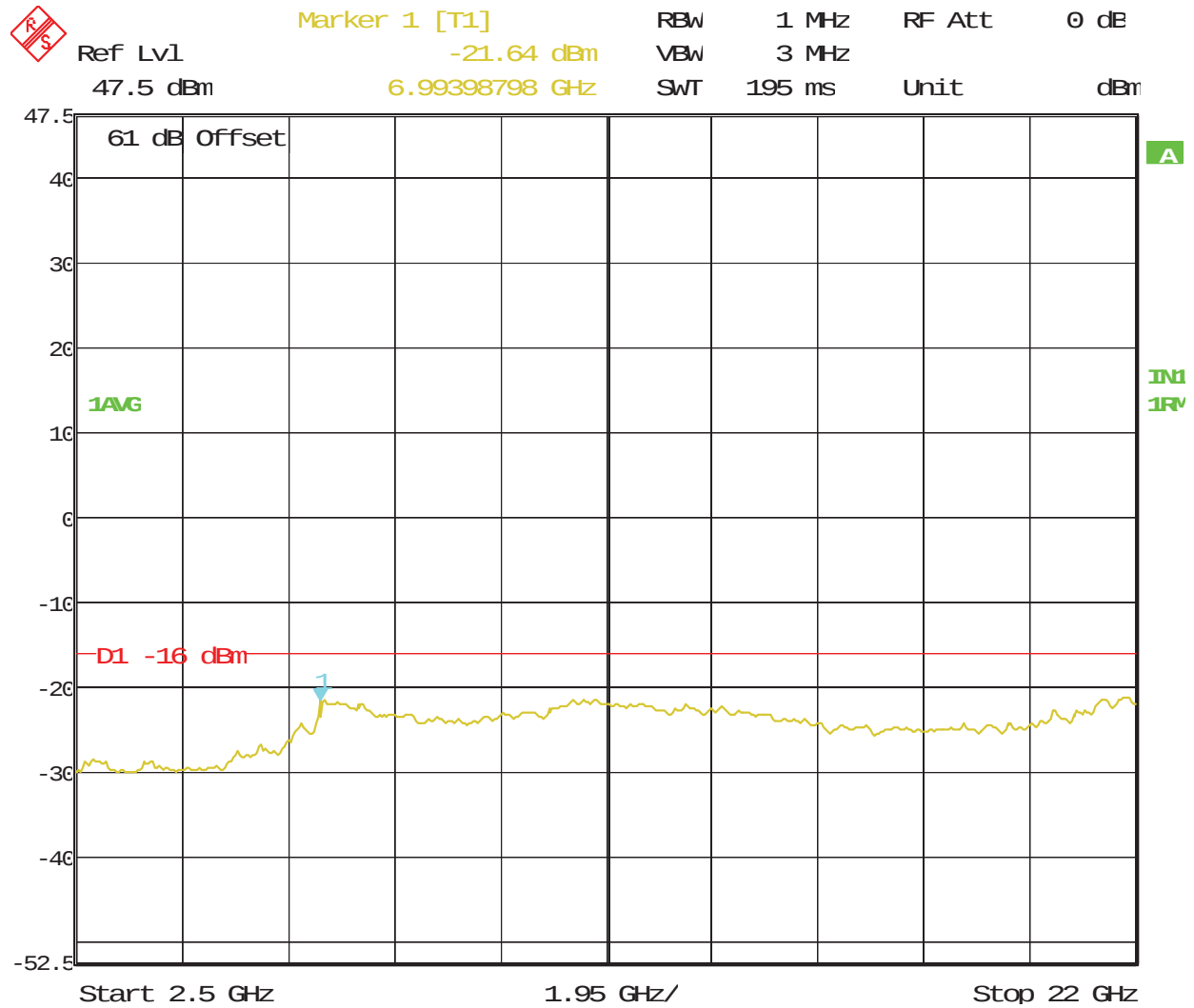
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 12:17:56



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 12:19:13



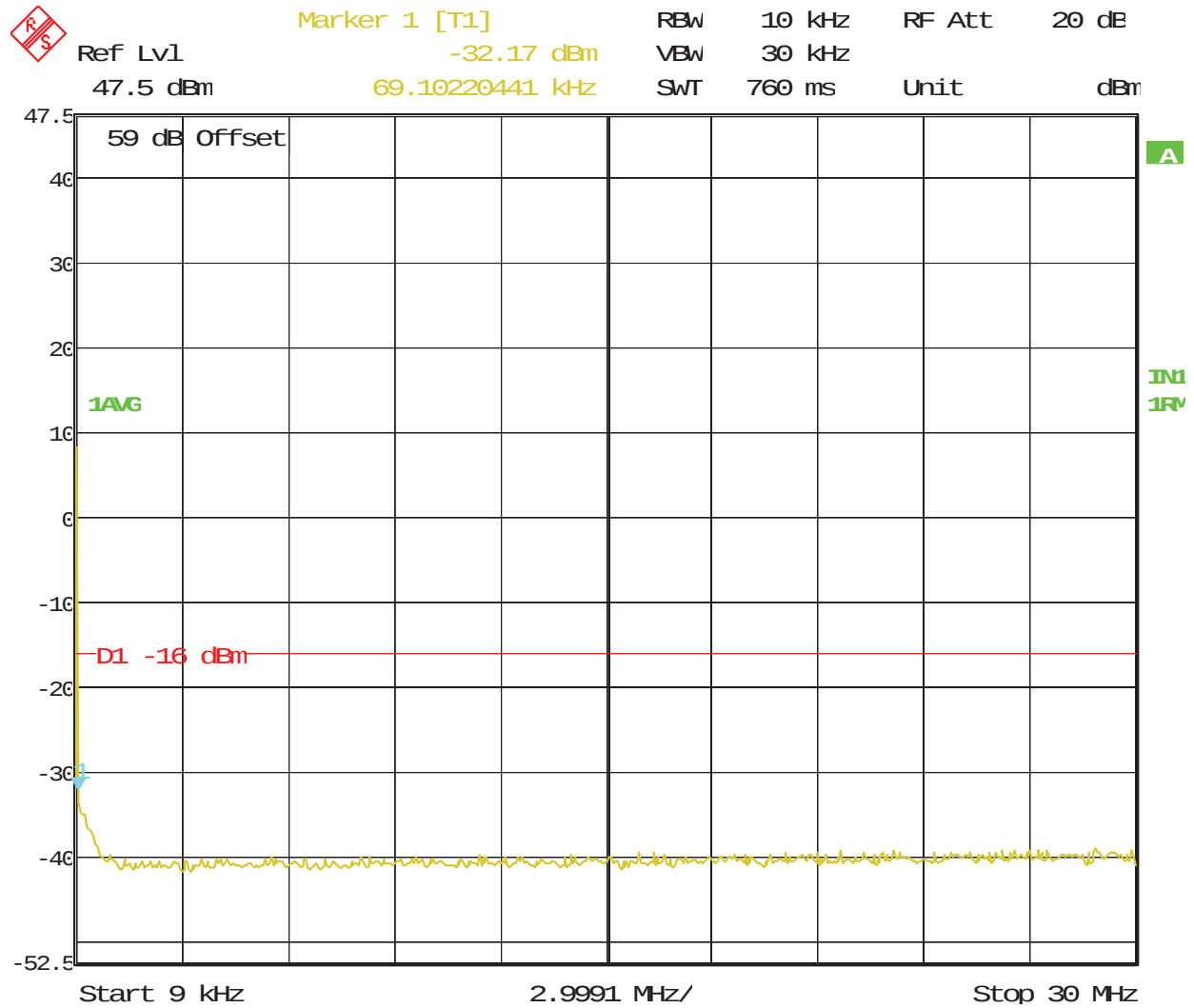
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 4.FEB.2013 12:23:14



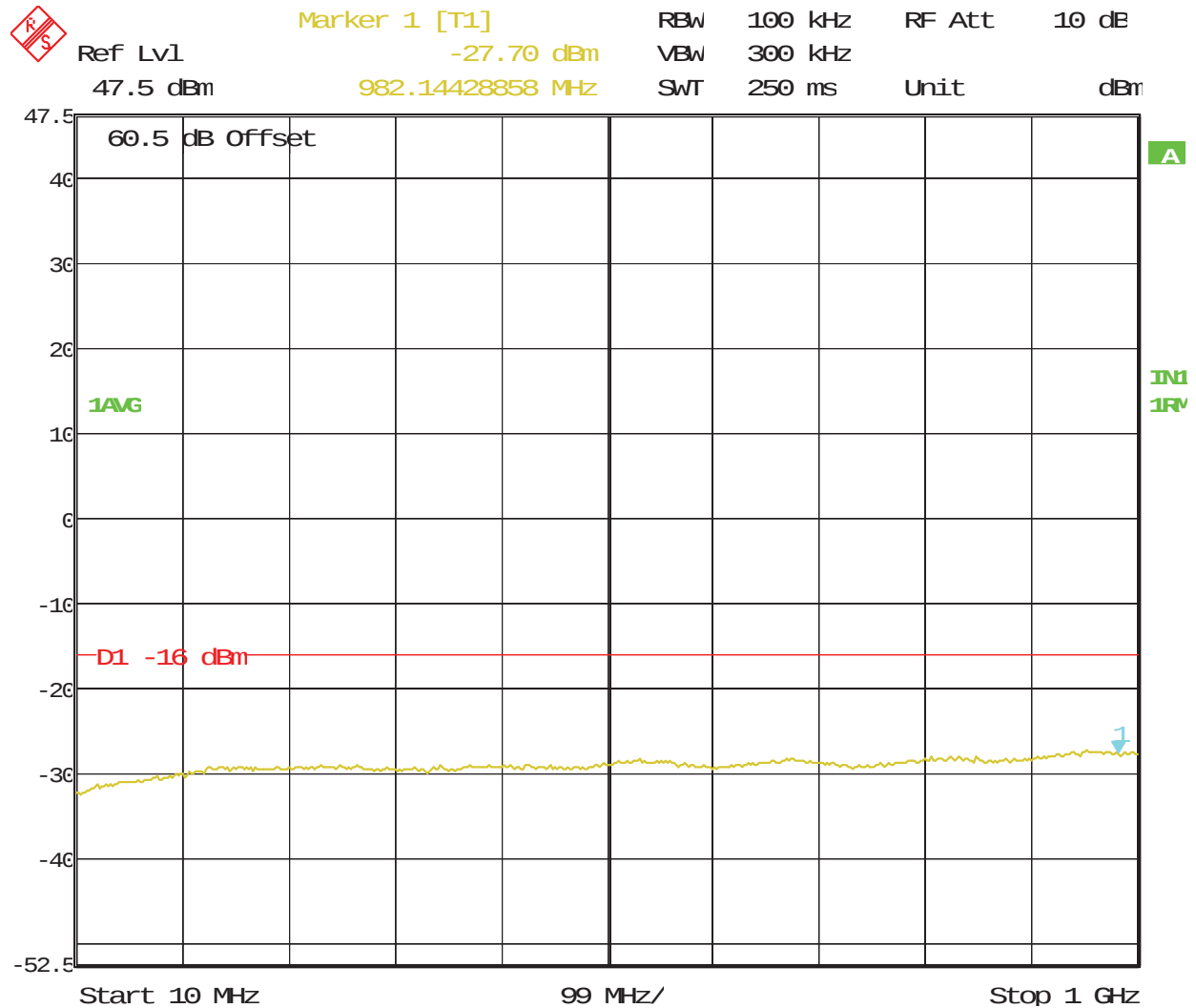
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK B; 2120-2130MHz;
 10MHz BW;PWR:60W; 64QAM; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 6.FEB.2013 15:02:14

**Transmit Port
Antenna Conducted Spurious Emissions**

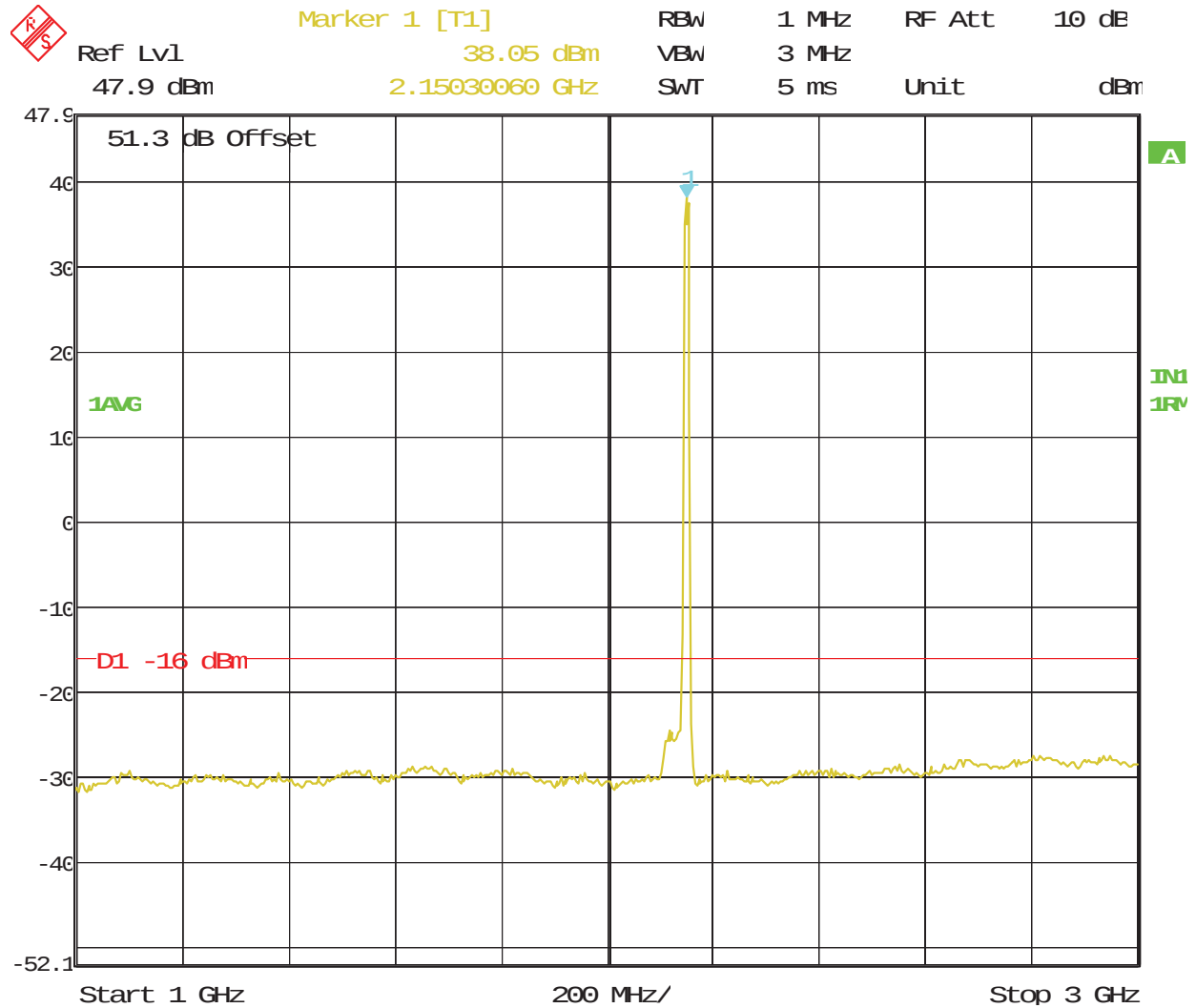
**Block: F (10 MHz BW)
QPSK Modulation
2x60 (MIMO)
Bandwidth 2145 – 2155 MHz**



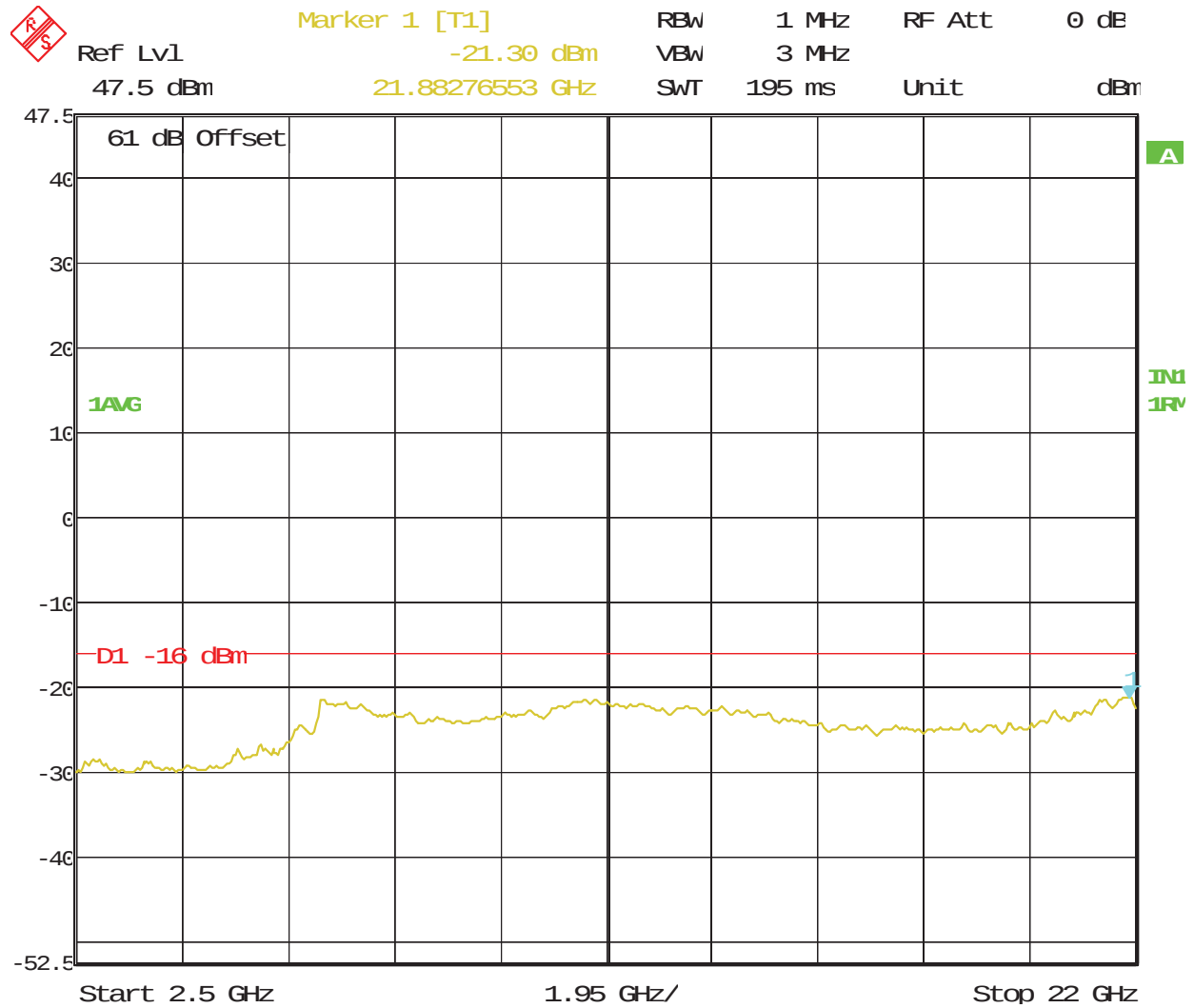
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 07:30:31



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 07:29:09



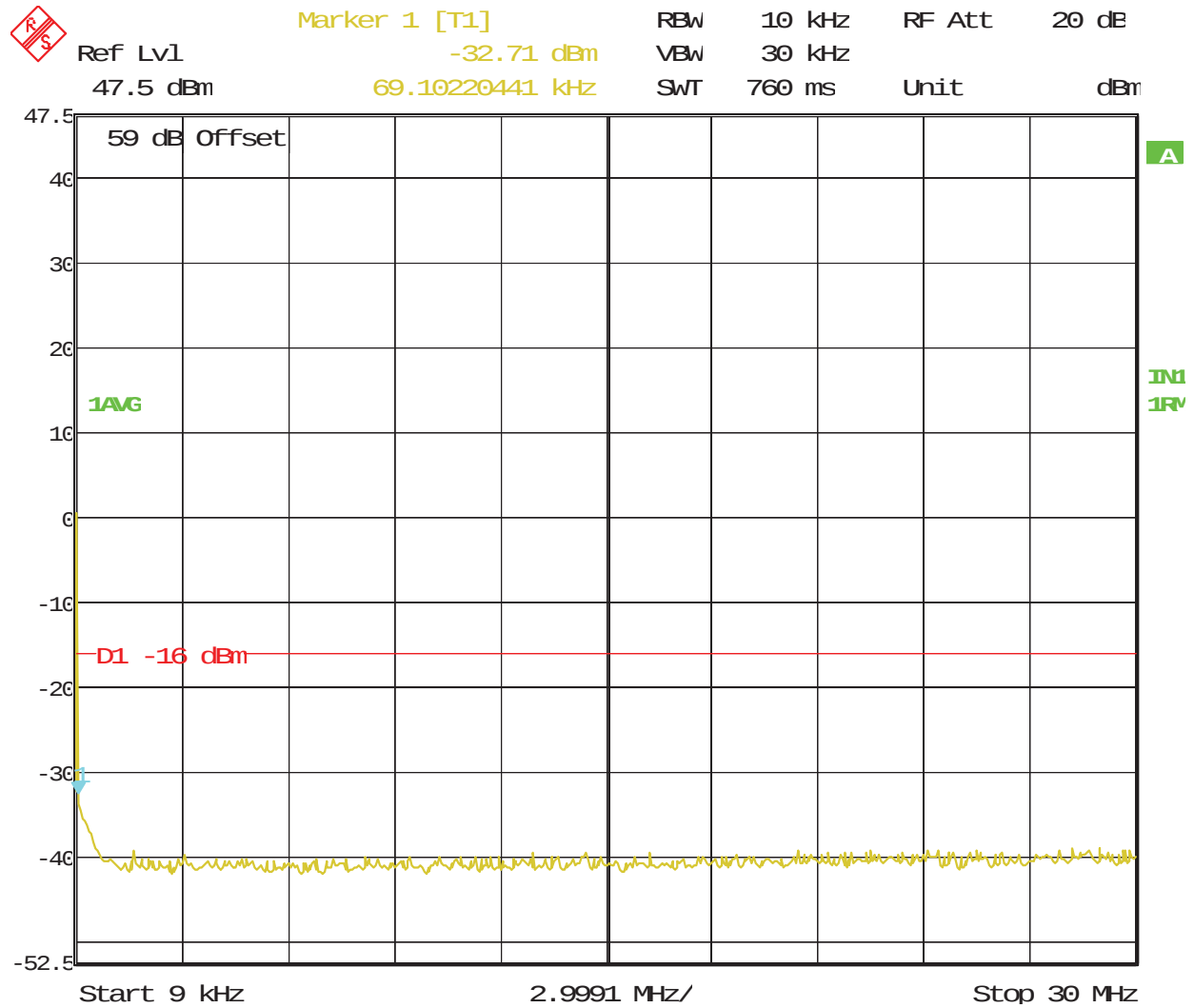
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; QPSK; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 1.FEB.2013 09:28:16



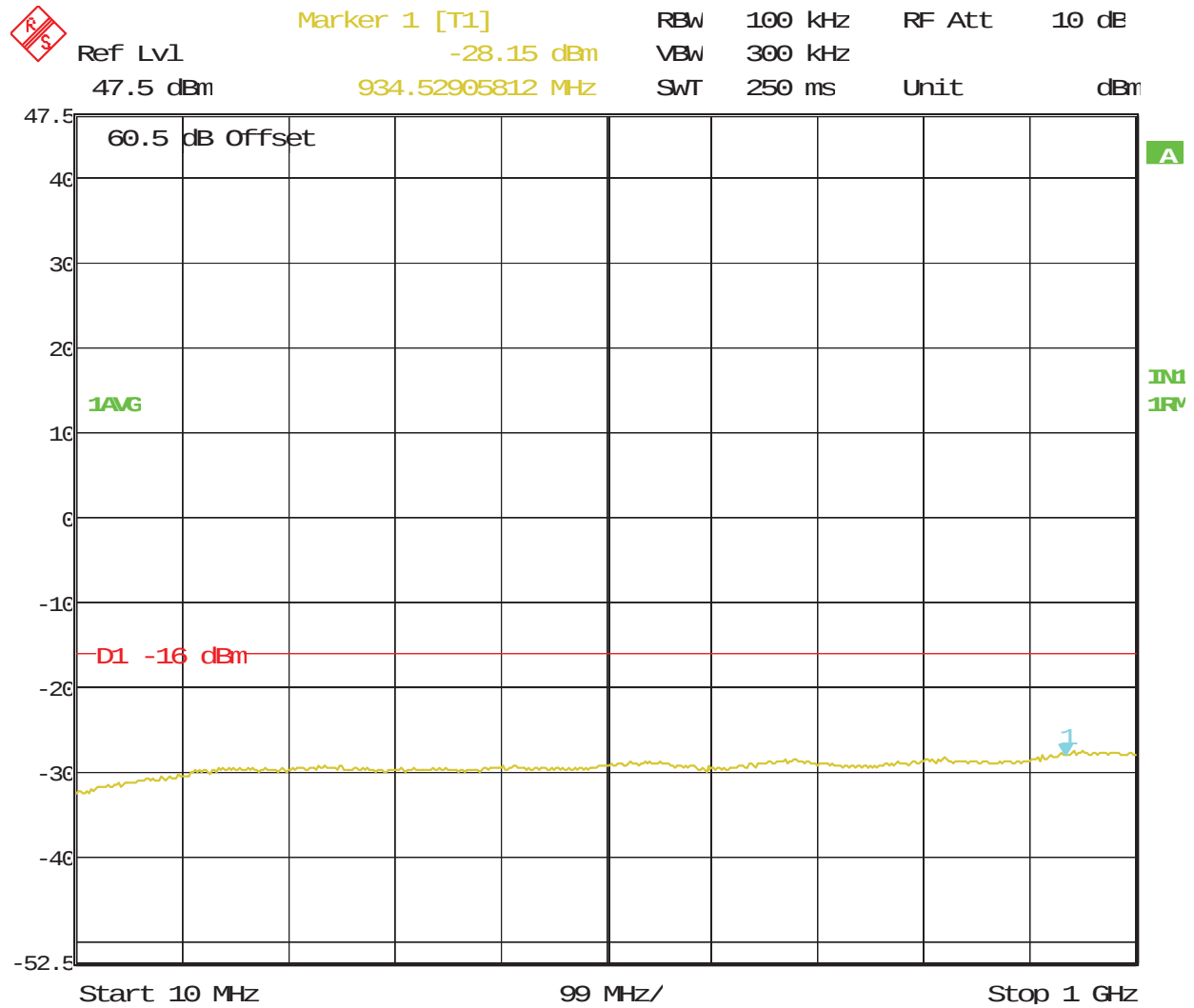
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; QPSK; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 11:02:11

**Transmit Port
Antenna Conducted Spurious Emissions**

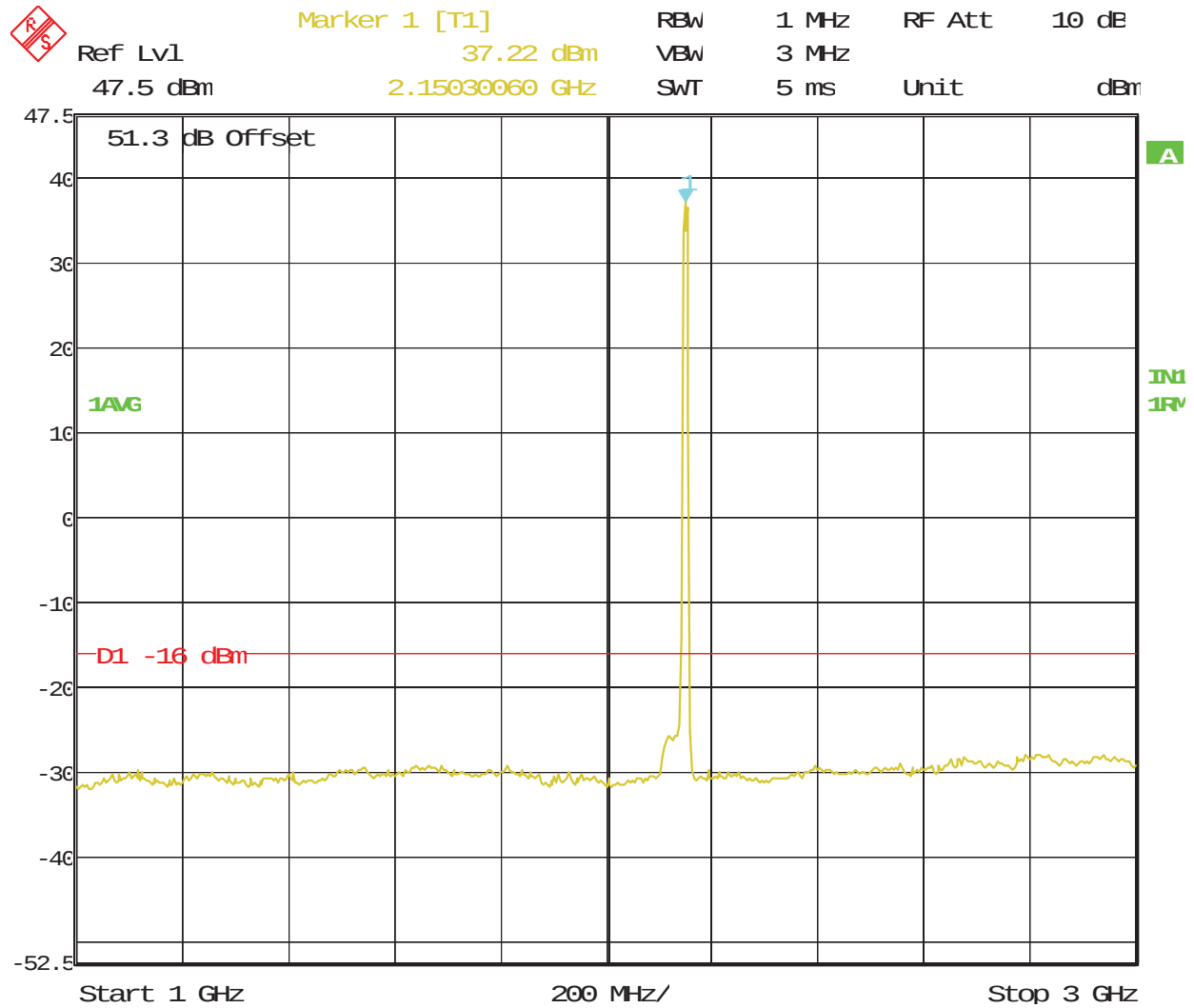
**Block: F (10 MHz BW)
16QAM Modulation
2x60 (MIMO)
Bandwidth 2145 – 2155 MHz**



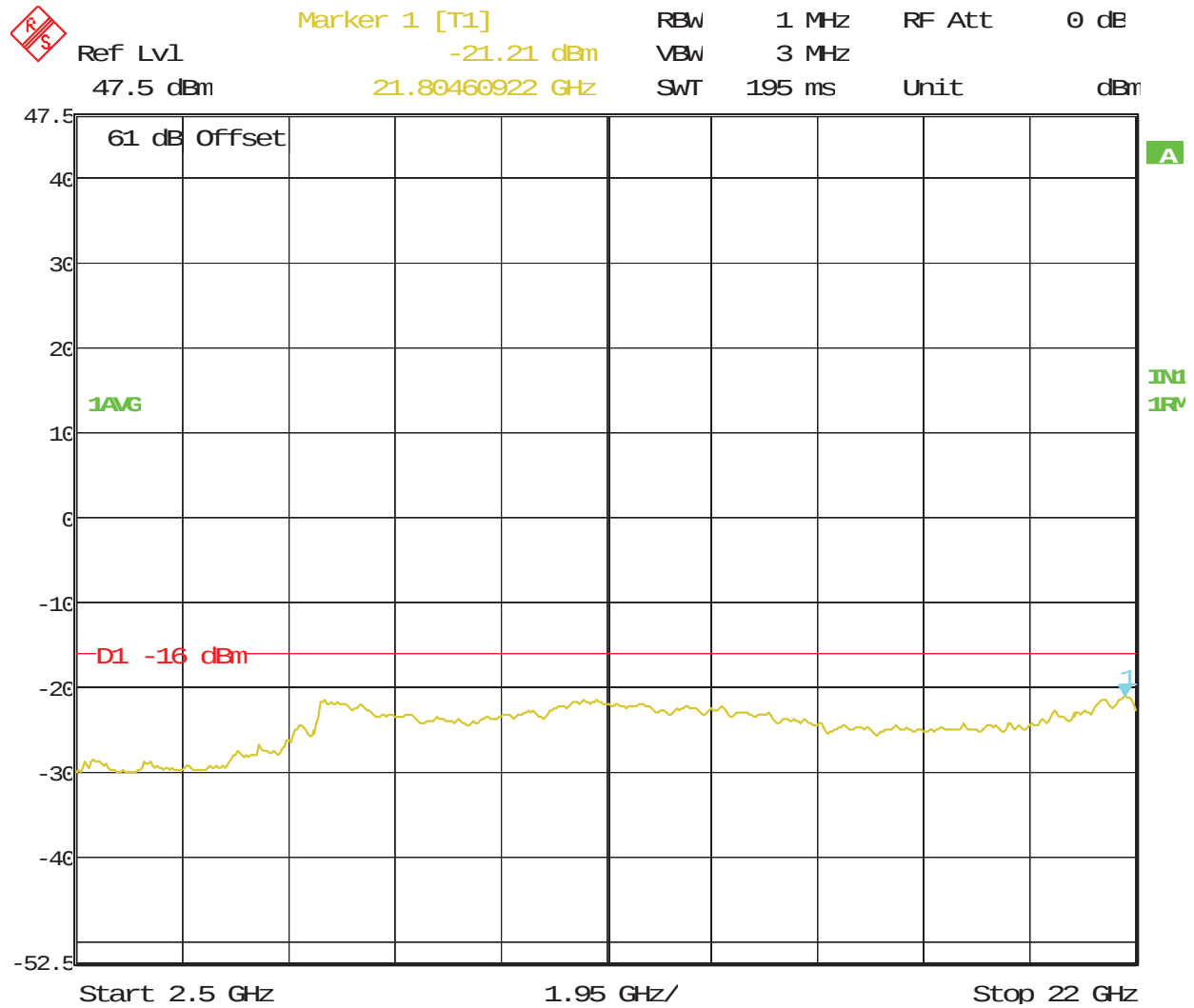
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 10:16:43



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 10:17:33



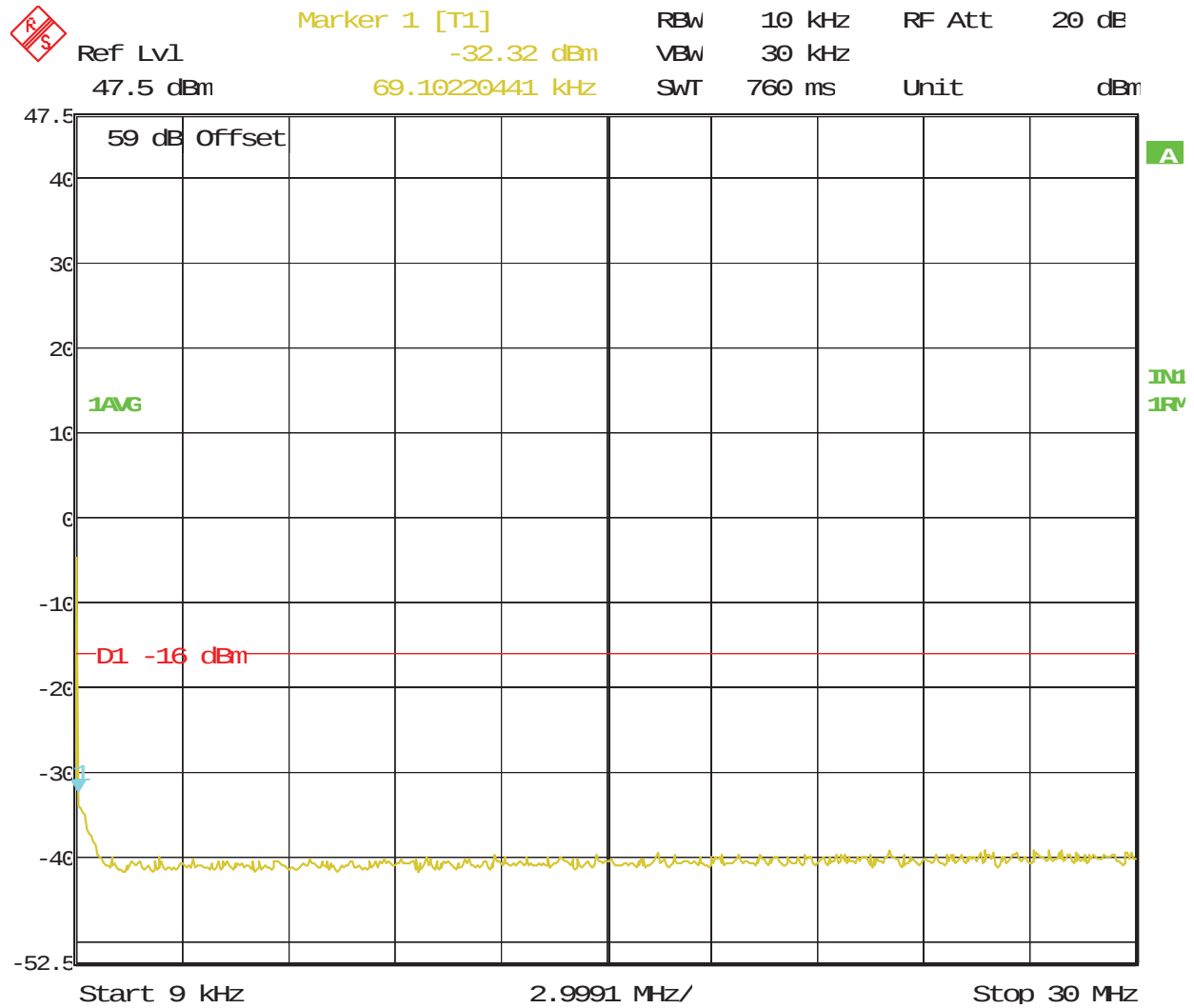
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 16QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 10:18:37



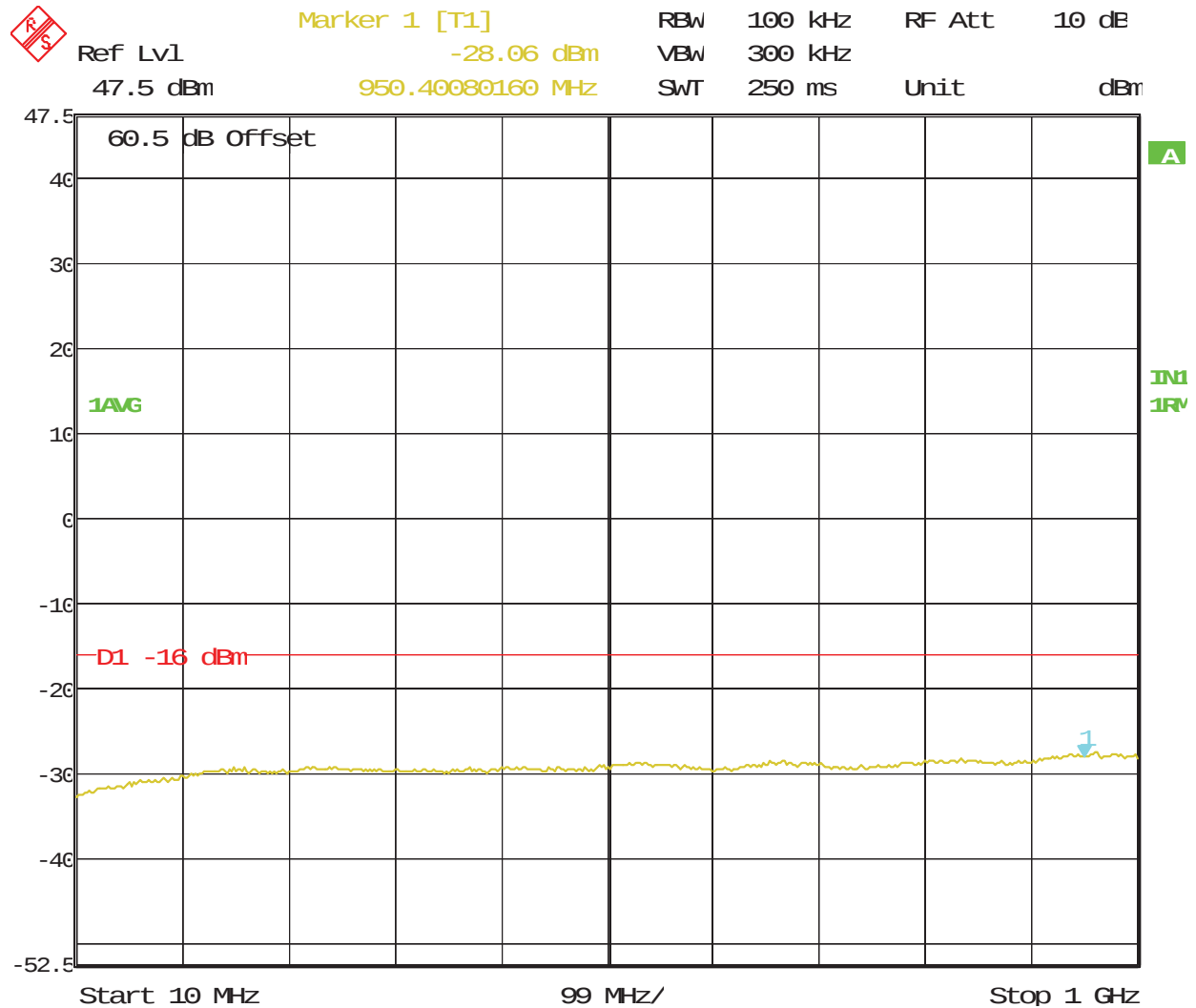
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 16QAM; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 10:20:12

**Transmit Port
Antenna Conducted Spurious Emissions**

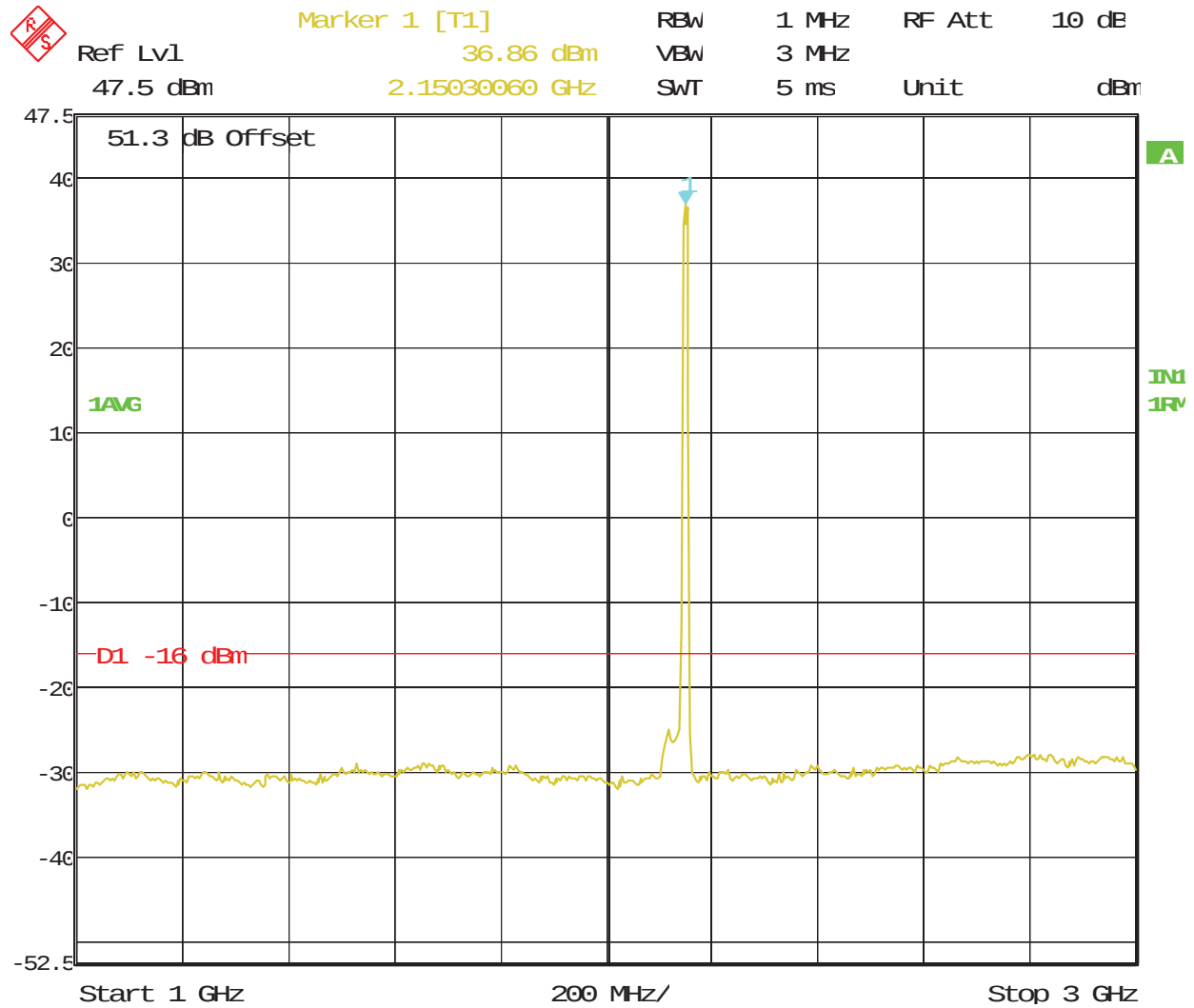
**Block: F (10MHz BW)
64QAM Modulation
2x60 (MIMO)
Bandwidth 2145 – 2155 MHz**



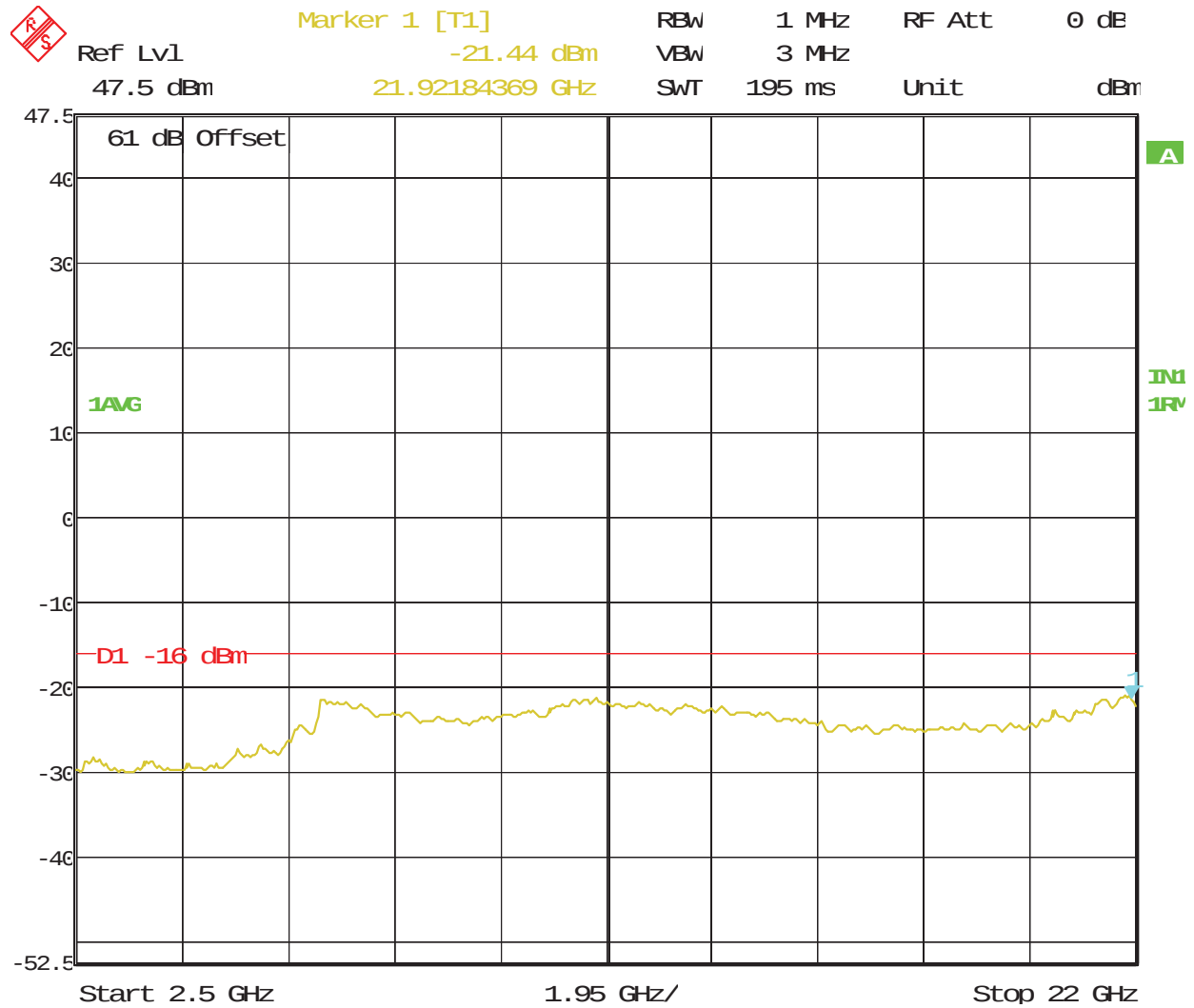
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 08:01:47



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W;64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 07:52:53



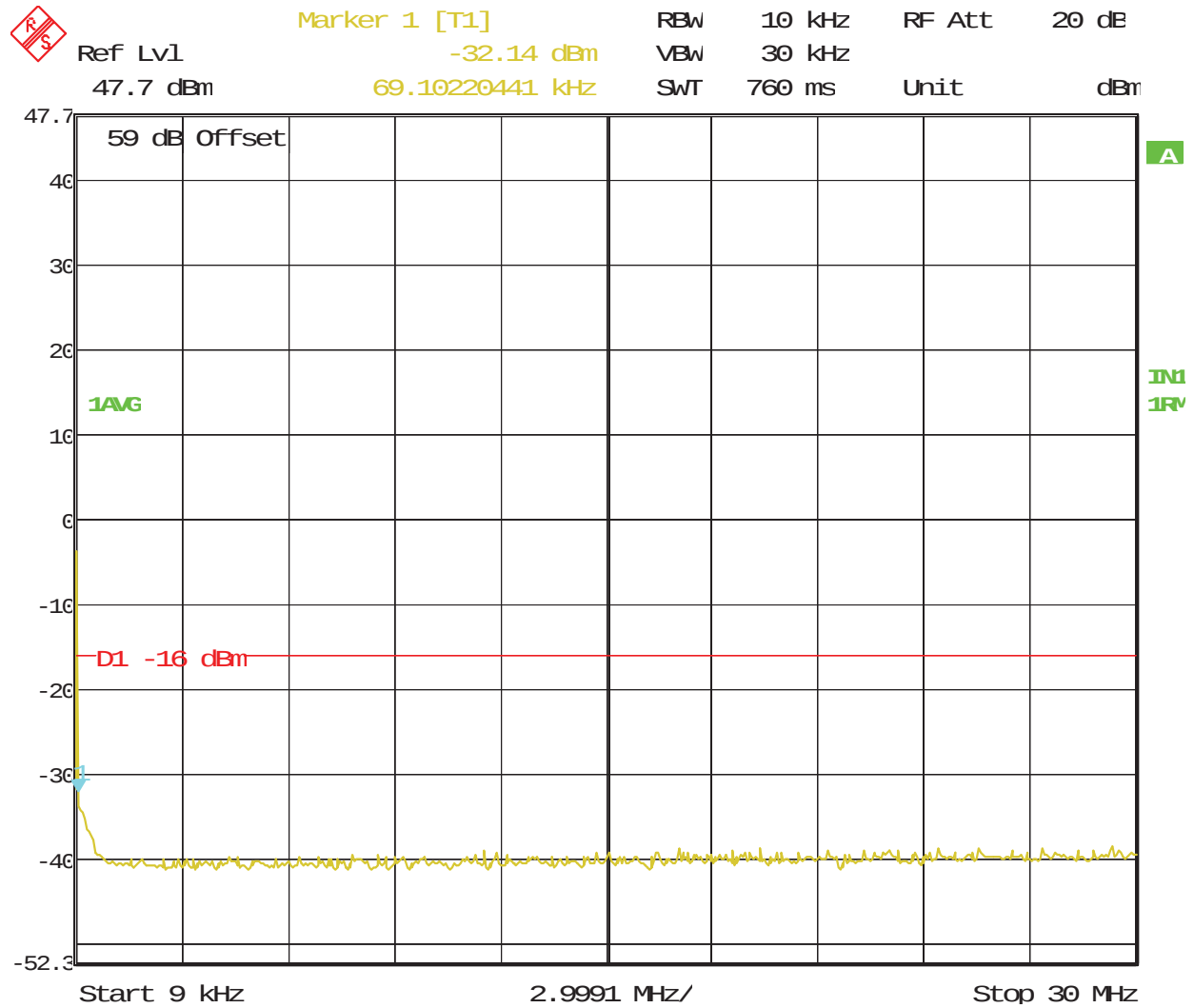
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 64QAM; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 07:51:29



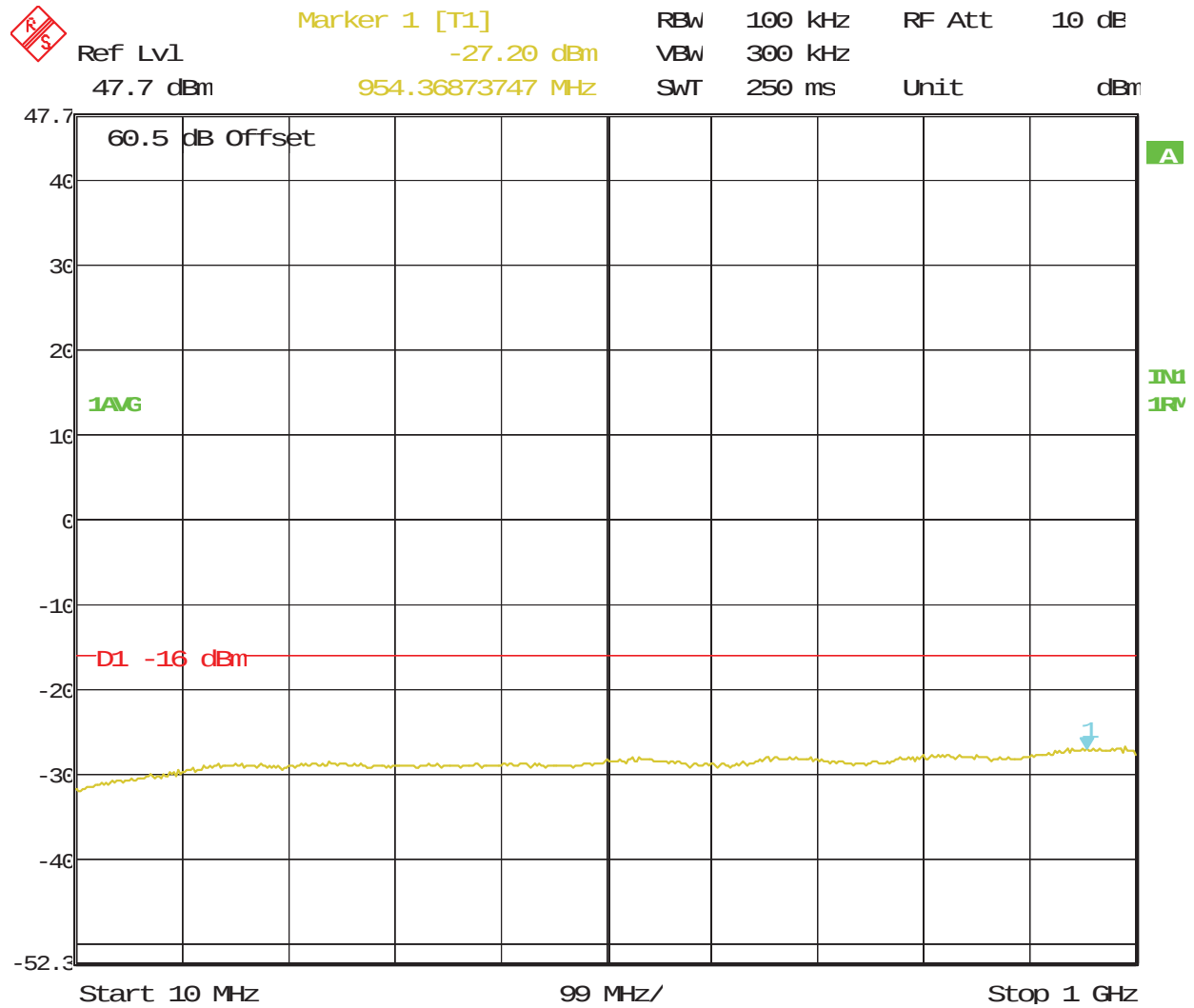
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; BLK F; 2145-2155MHz;
 10MHz BW;PWR:60W; 64QAM; HPF; FCC PRT 27; FCCID:AS5BBTRX-11.
 Date: 7.FEB.2013 07:50:01

Transmit Port
Antenna Conducted Spurious Emissions

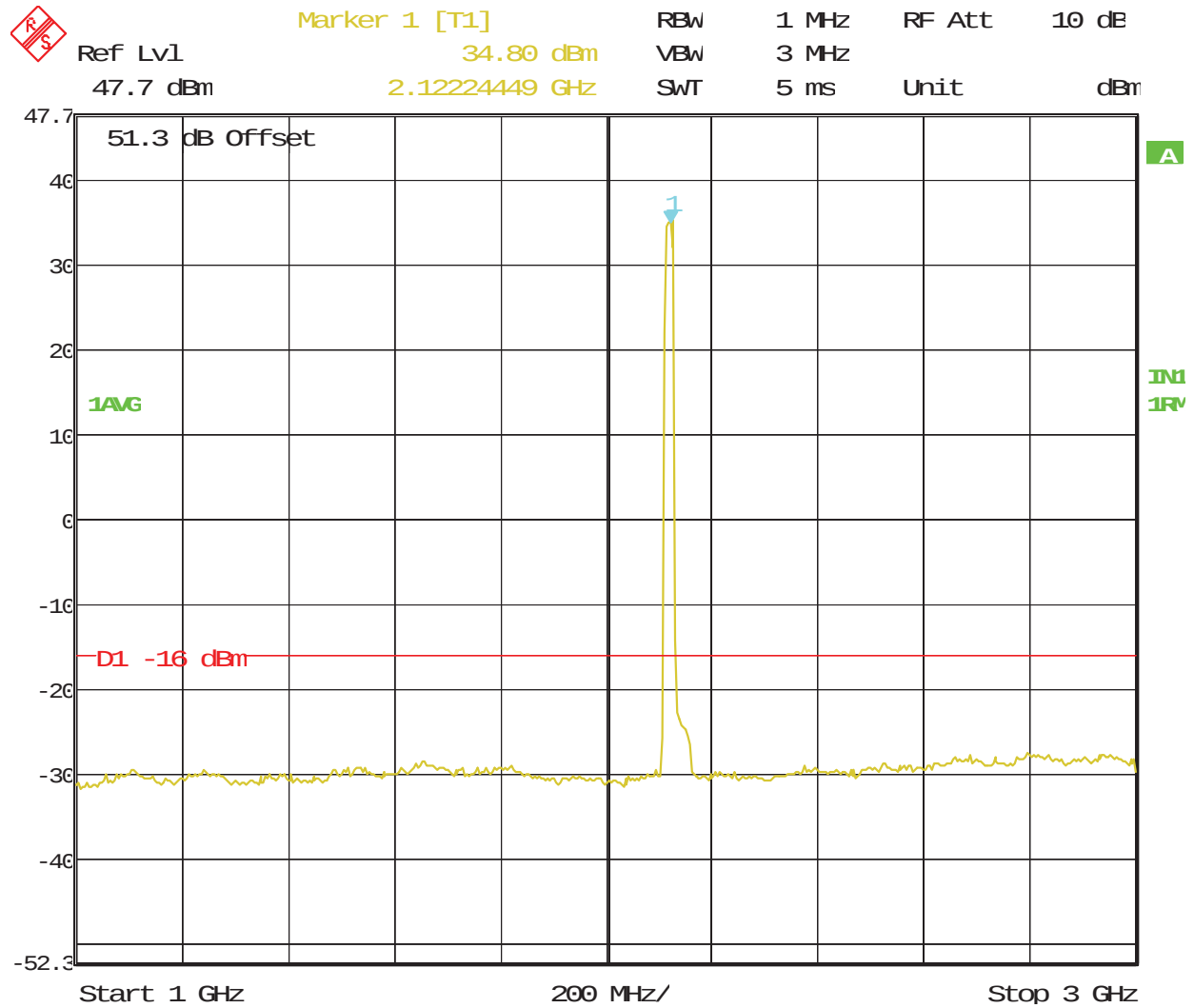
Block: A+B (20MHz BW)
QPSK Modulation
2x60 (MIMO)
Bandwidth 2110 – 2130 MHz



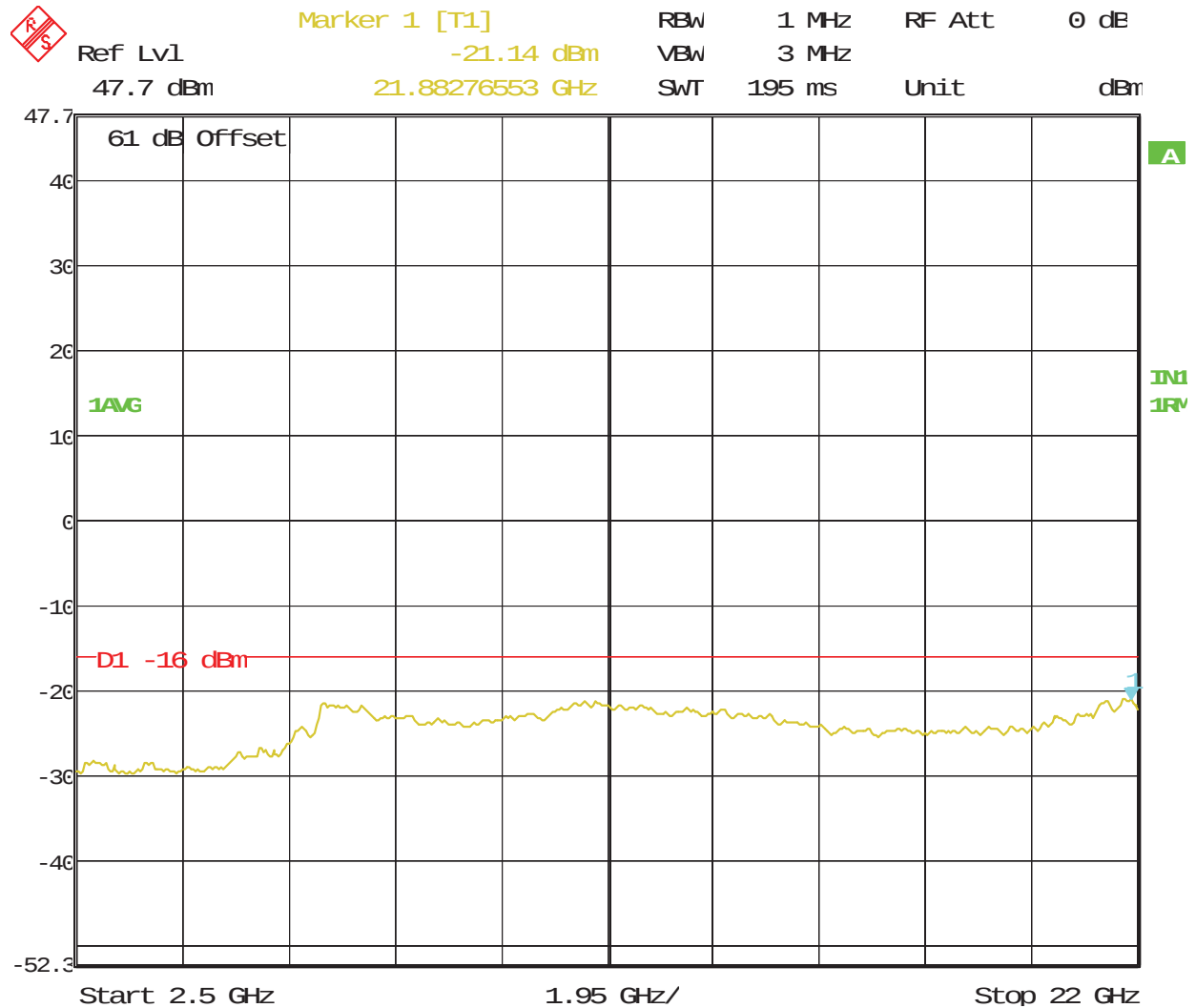
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 07:20:19



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 07:21:53



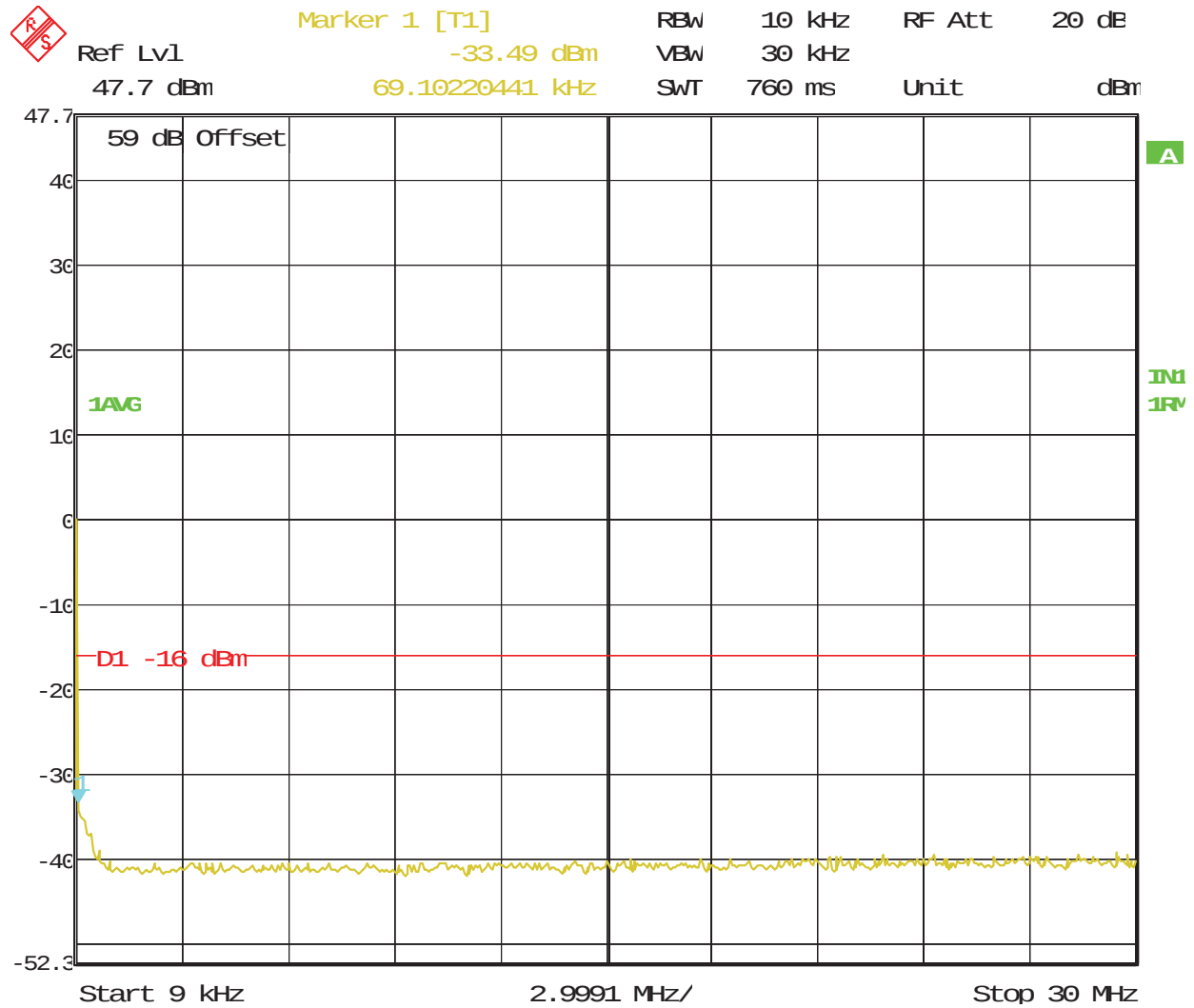
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 07:24:00



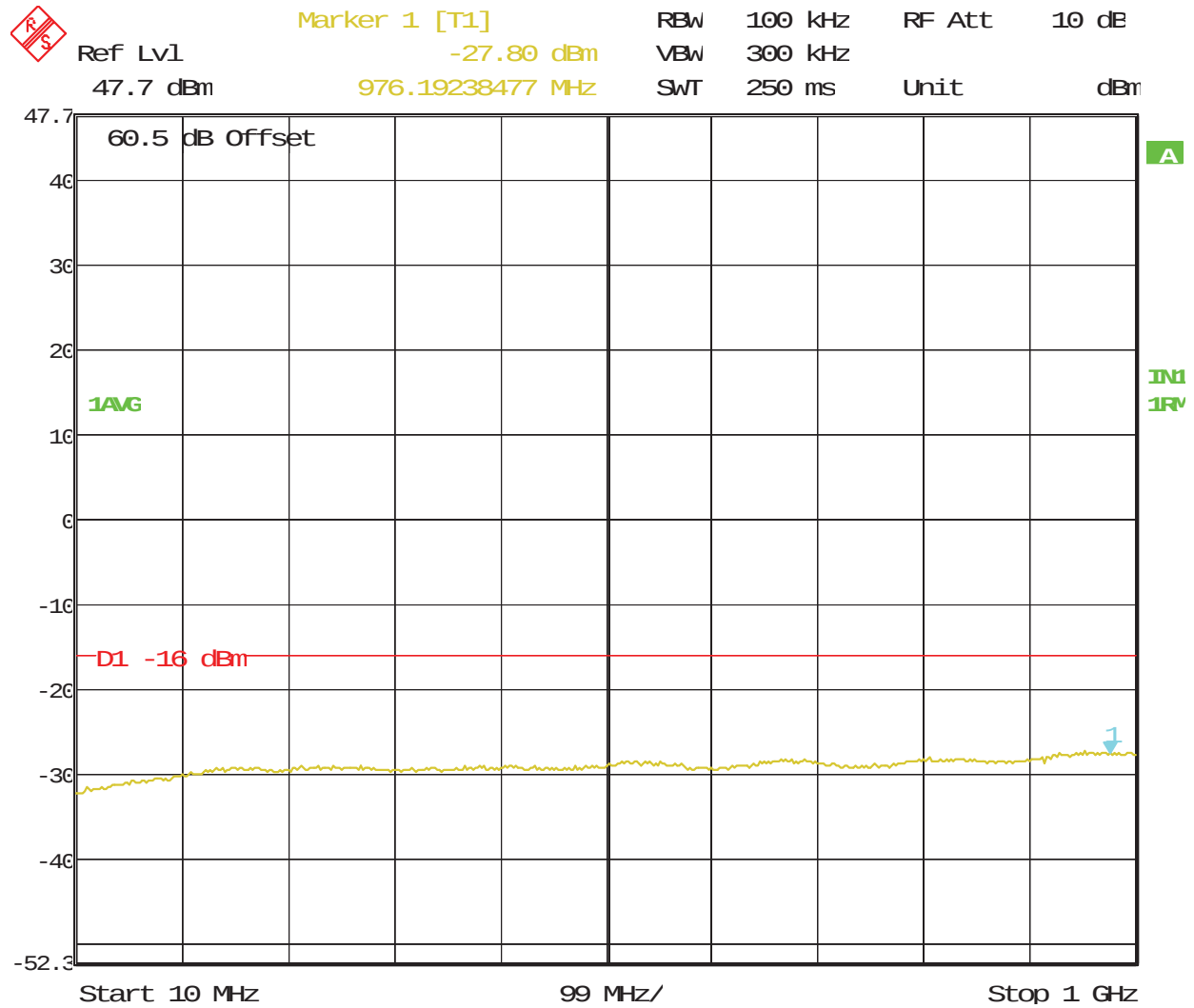
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;QPSK;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 12:25:36

**Transmit Port
Antenna Conducted Spurious Emissions**

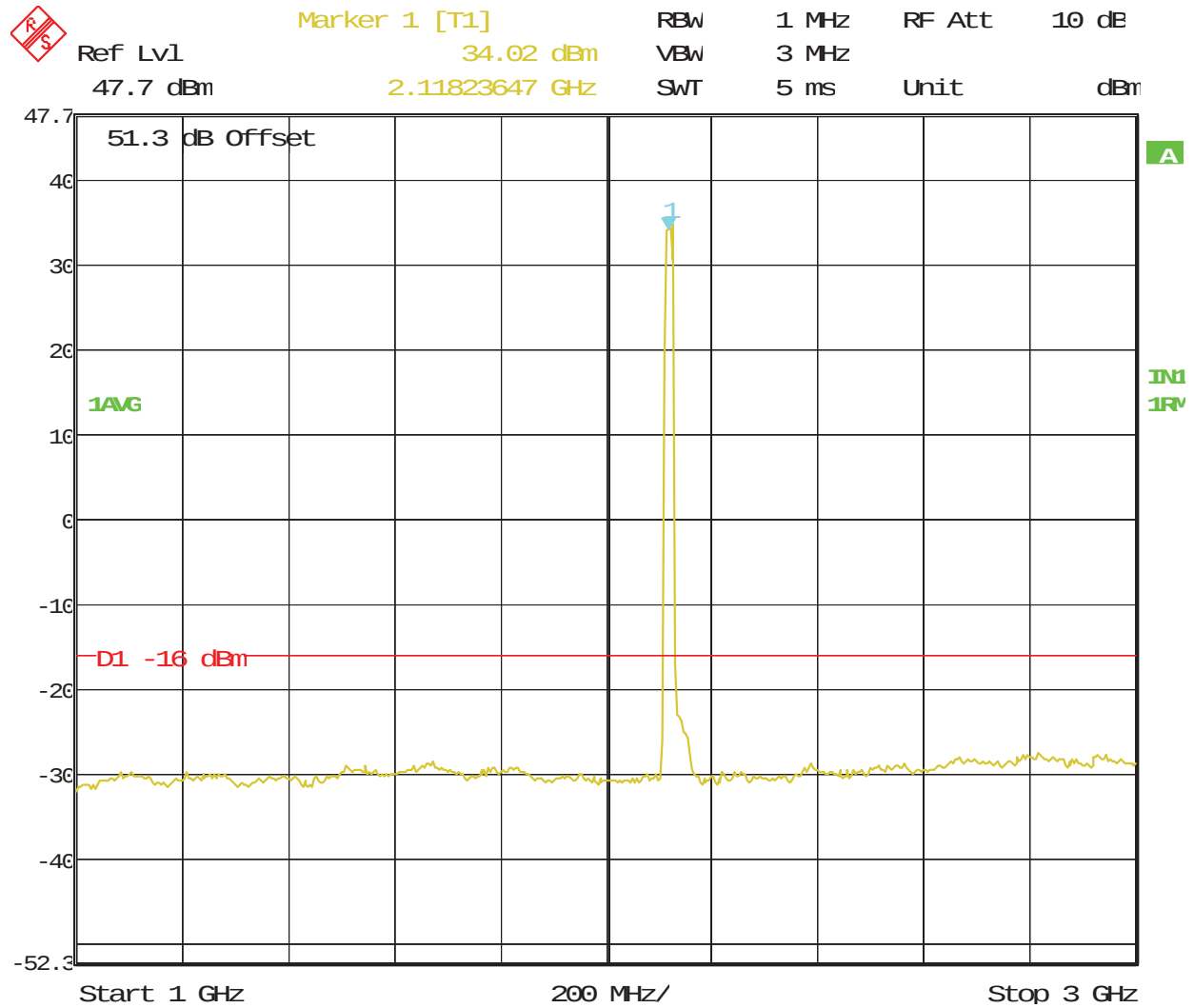
**Block: A+B (20MHz BW)
16QAM Modulation
2x60 (MIMO)
Bandwidth 2110 – 2130 MHz**



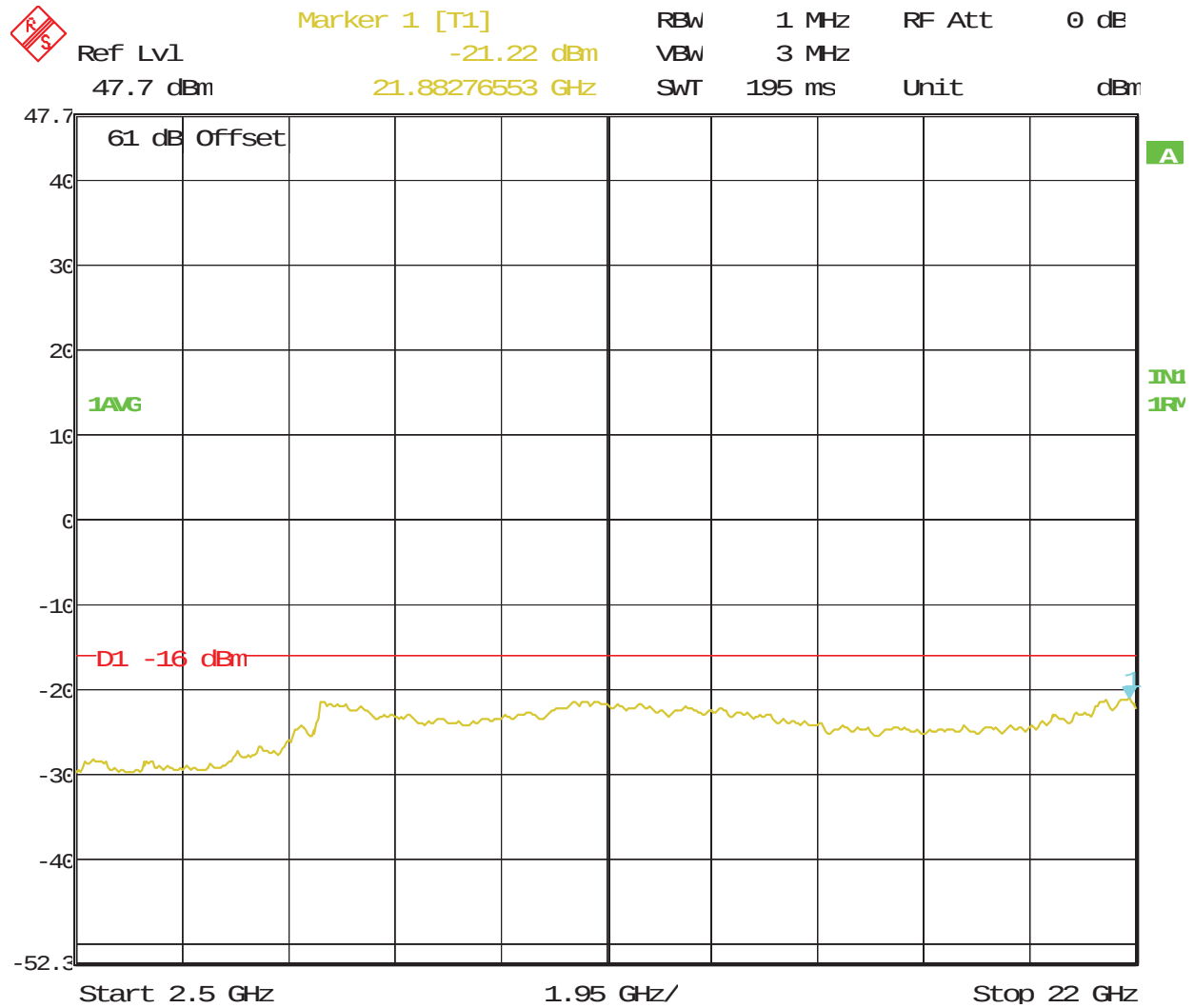
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:50:52



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:51:45



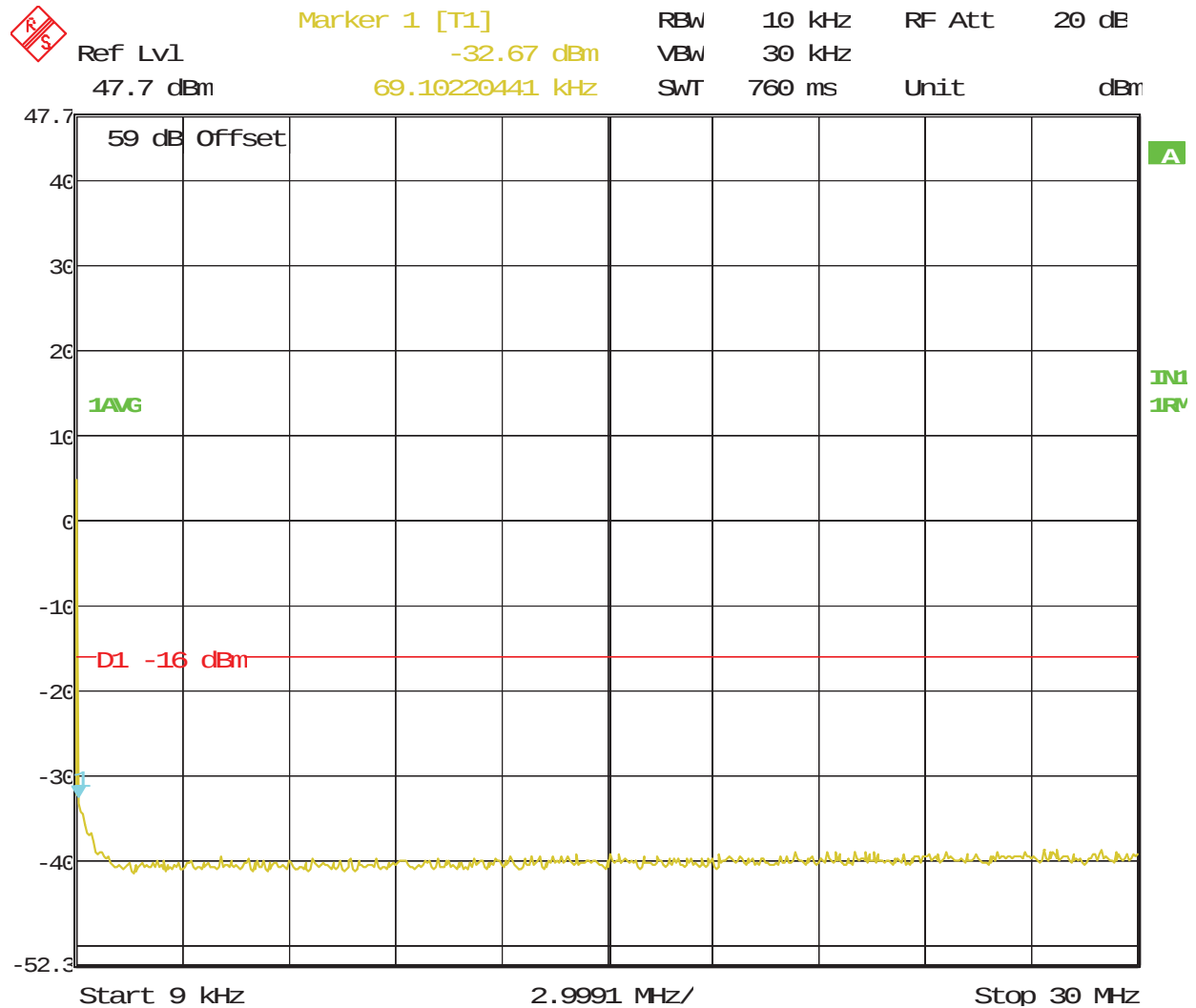
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:53:34



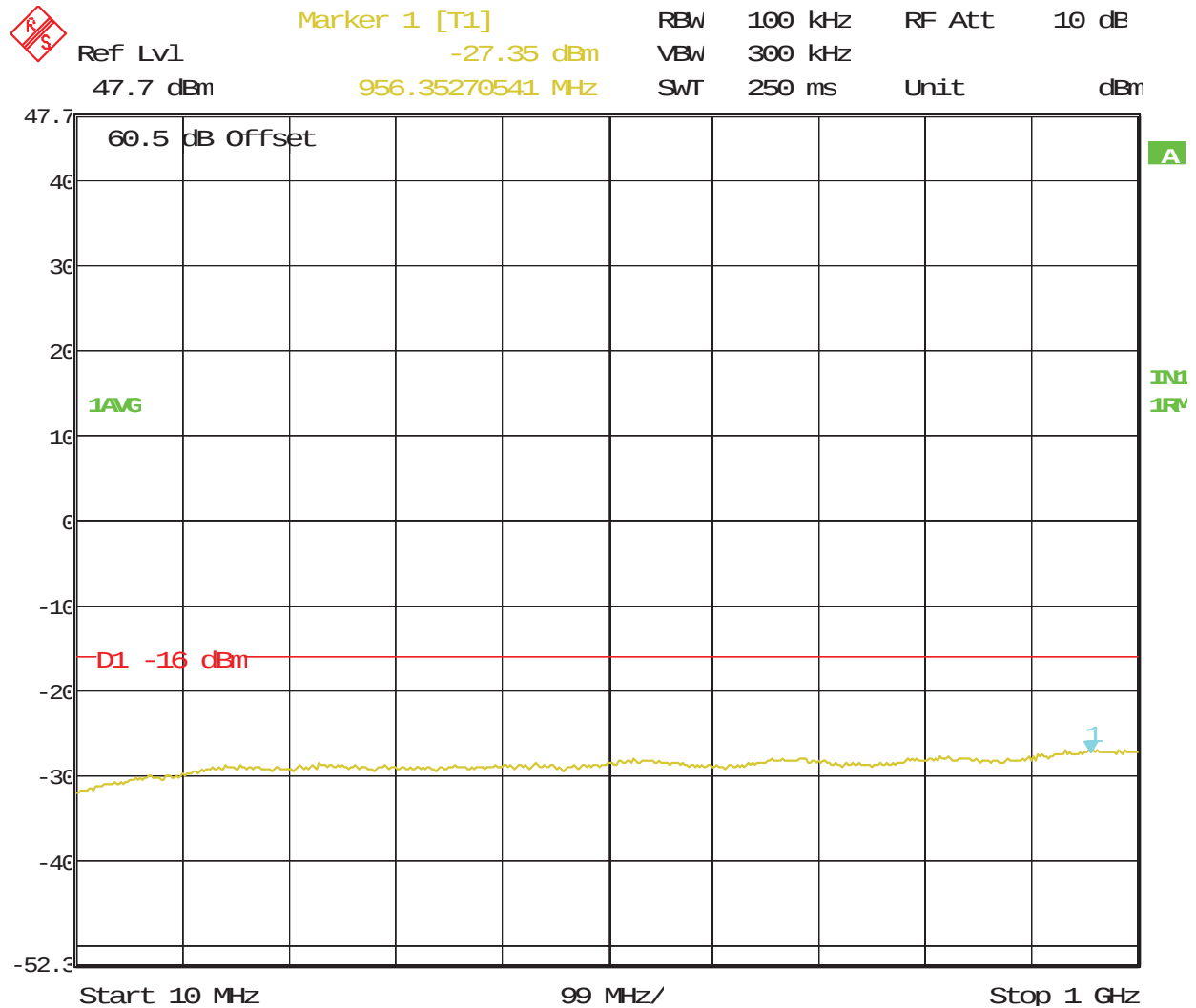
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;16QAM;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 11:54:52

**Transmit Port
Antenna Conducted Spurious Emissions**

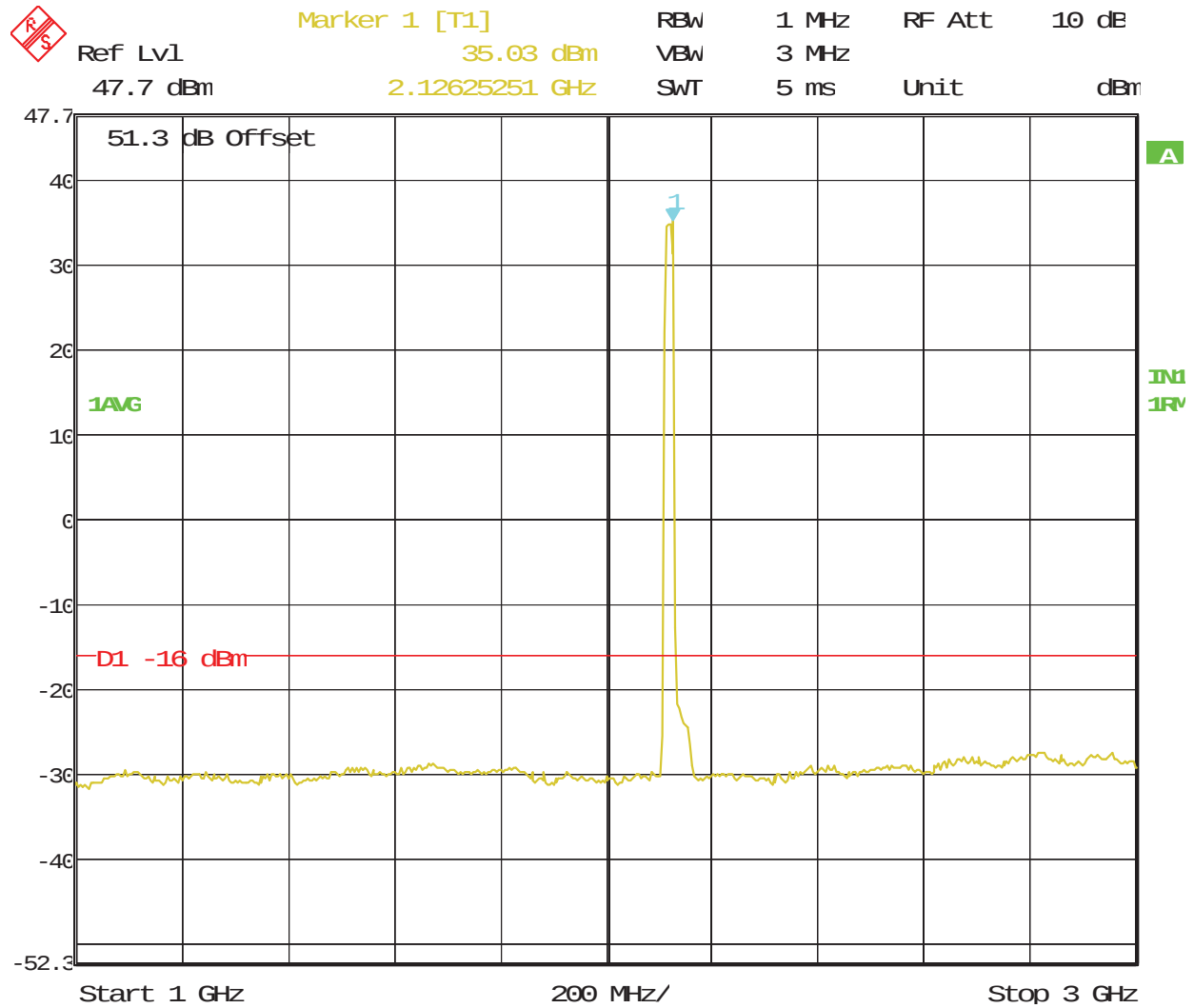
**Block: A+B (20MHz BW)
64QAM Modulation
2x60 (MIMO)
Bandwidth 2110 – 2130 MHz**



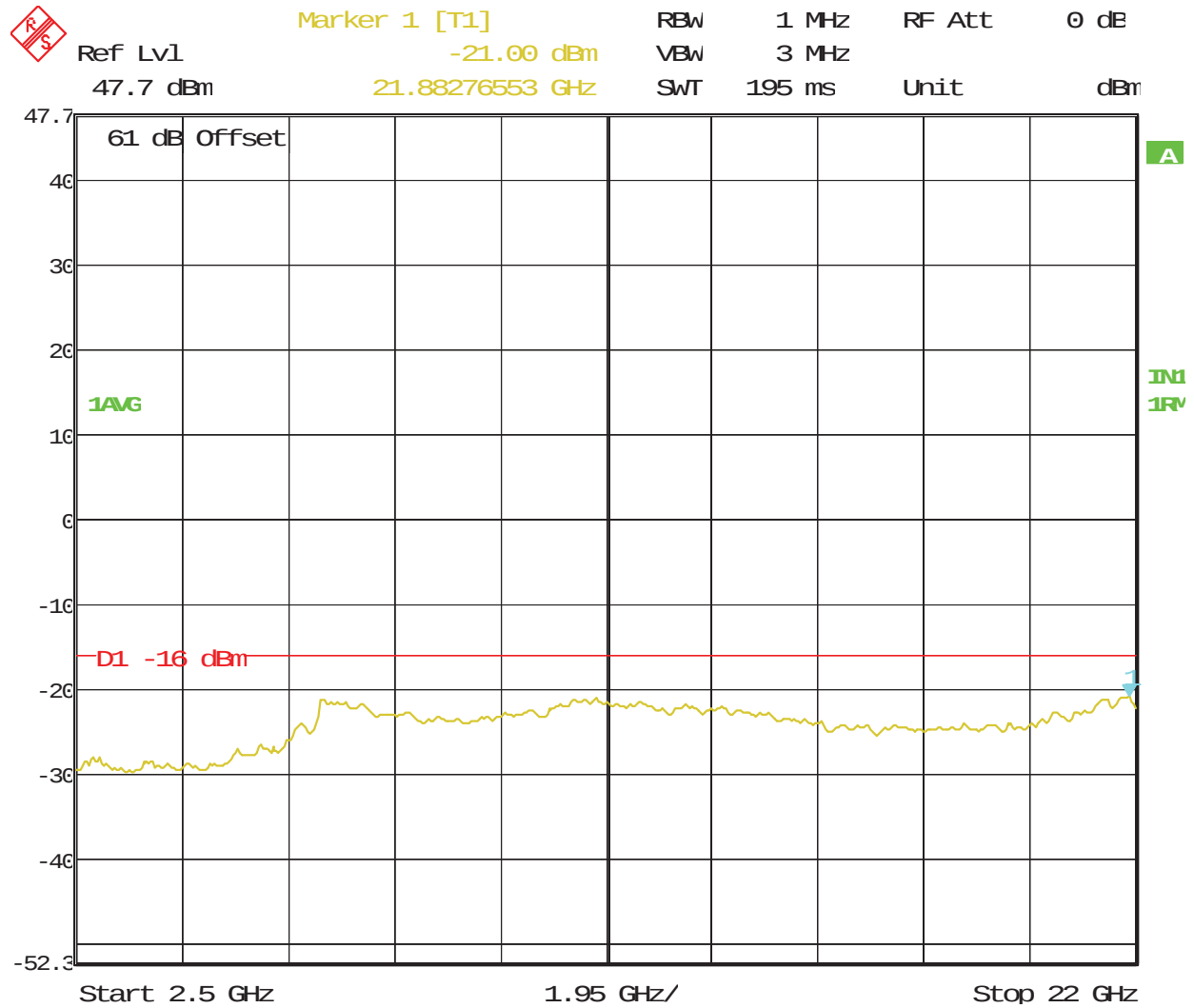
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; 2110-2130MHz(BLK A+B)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 09:14:41



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; 2110-2130MHz(BLK A+B)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 09:15:35



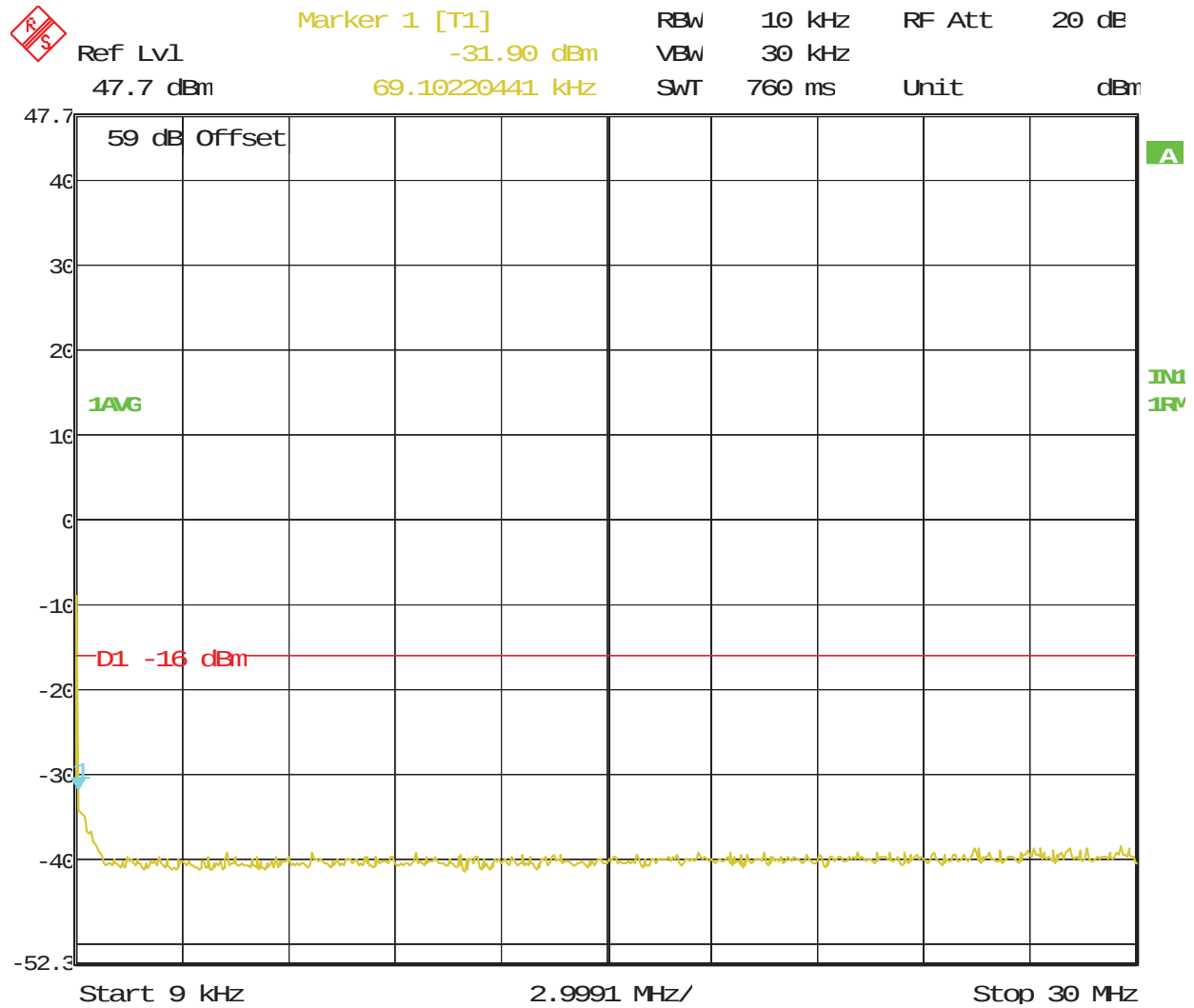
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; 2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 10:34:34



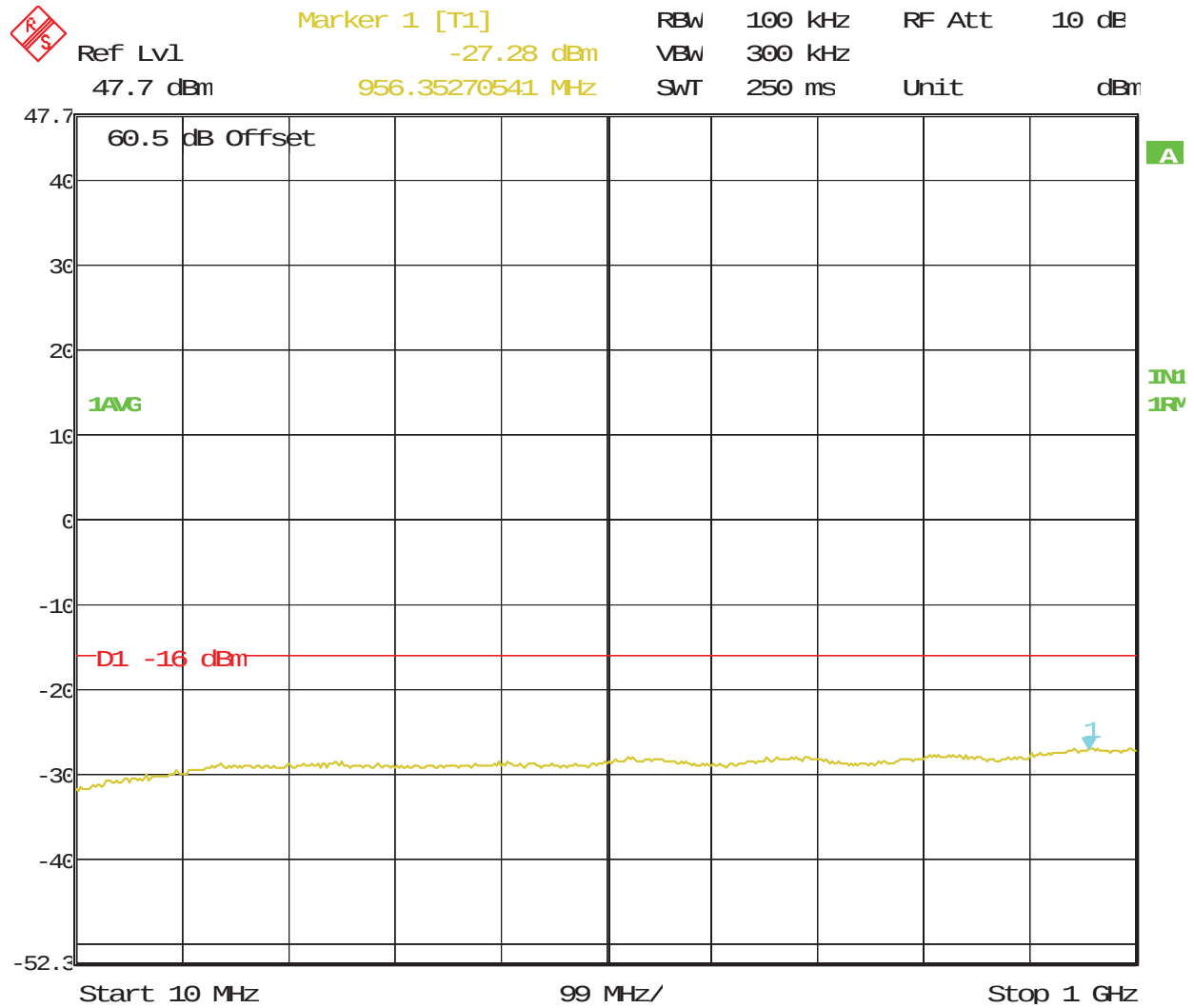
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio; 208VAC; 2110-2130MHz(A+B)
 20MHz BW;PWR:60W;MIMO;64QAM;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 18.FEB.2013 09:19:23

**Transmit Port
Antenna Conducted Spurious Emissions**

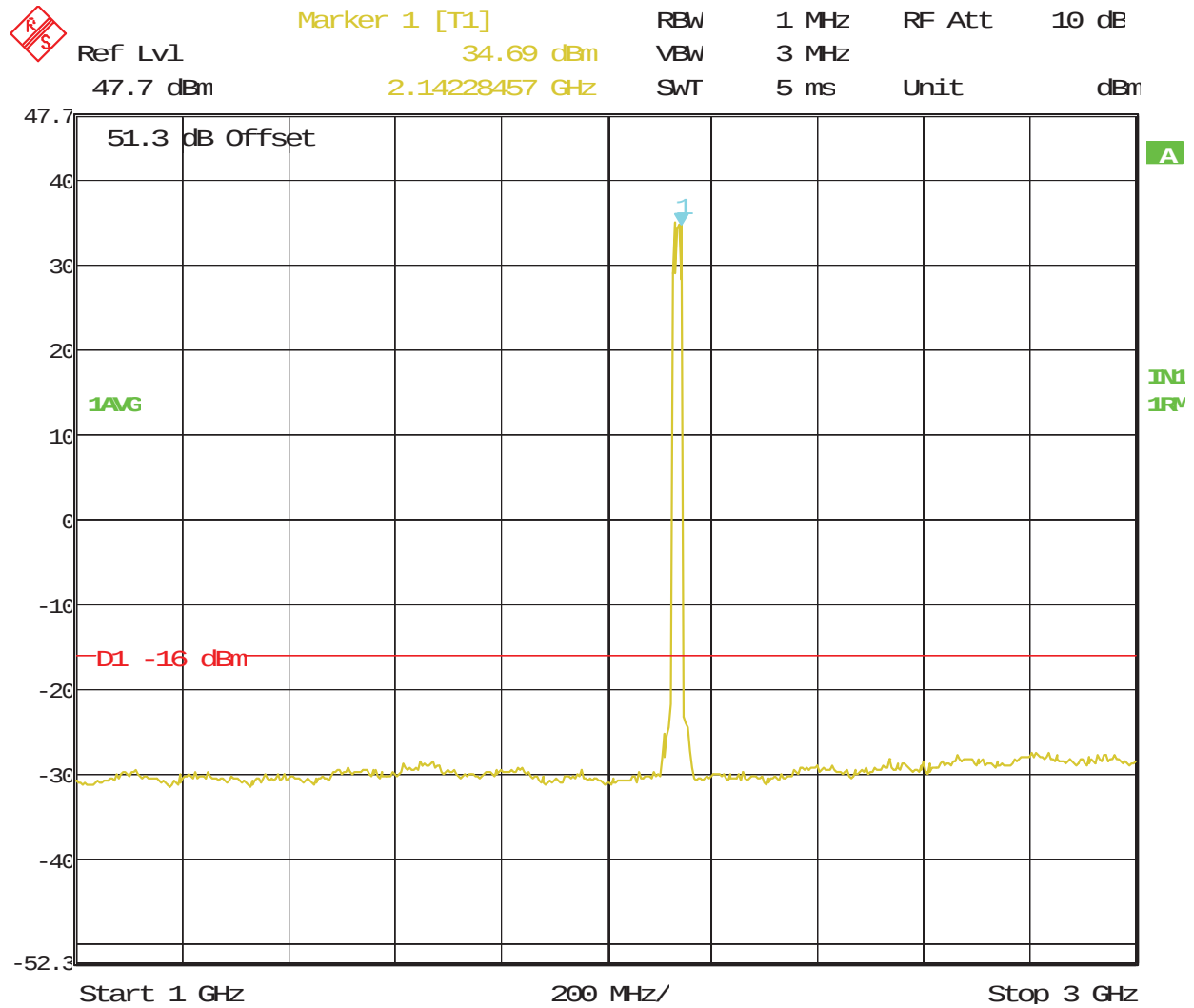
**Block: B2+C+D+E (20MHz BW)
QPSK Modulation
2x60 (MIMO)
Bandwidth 2125 – 2145 MHz**



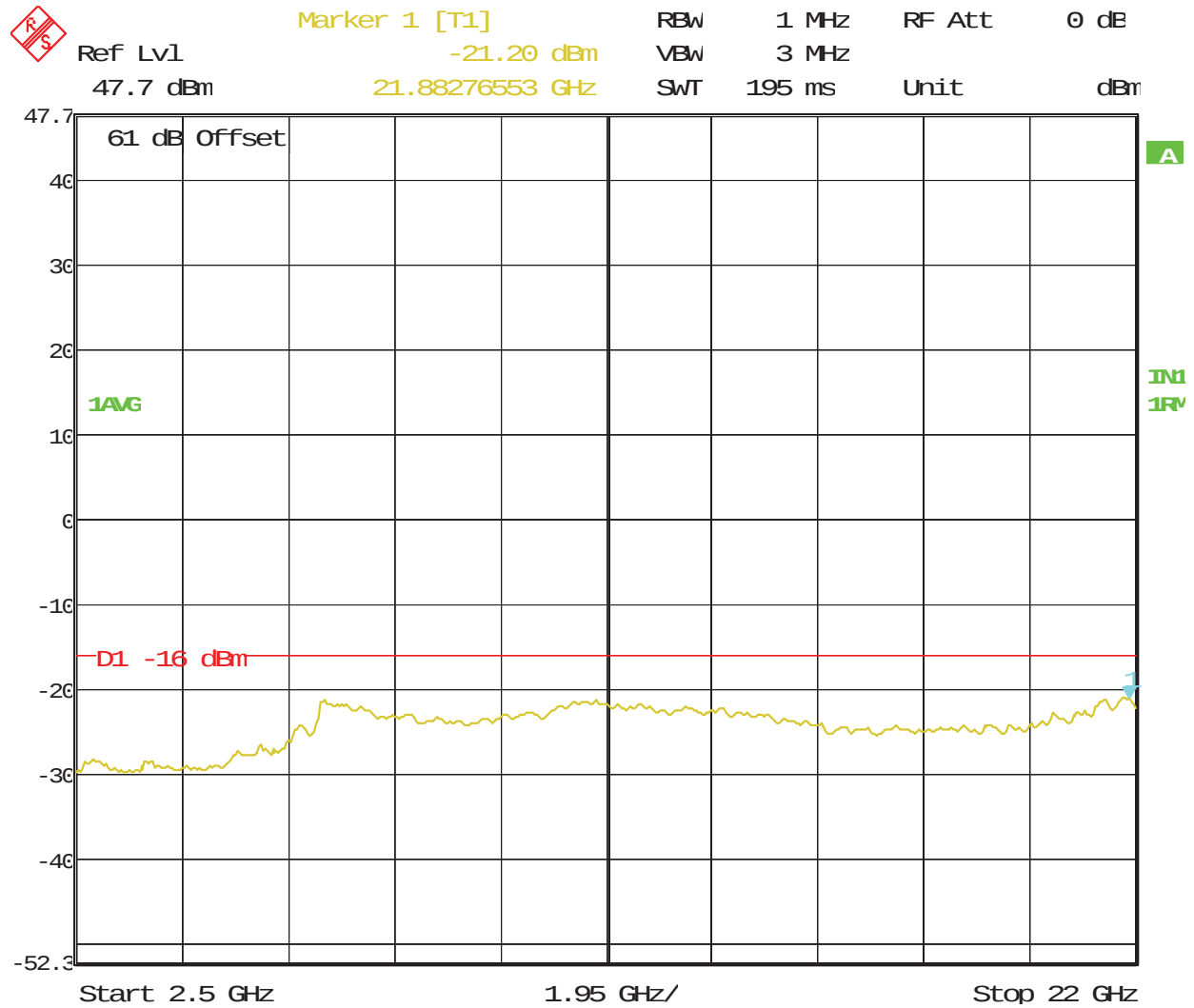
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 08:46:42



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 08:25:29



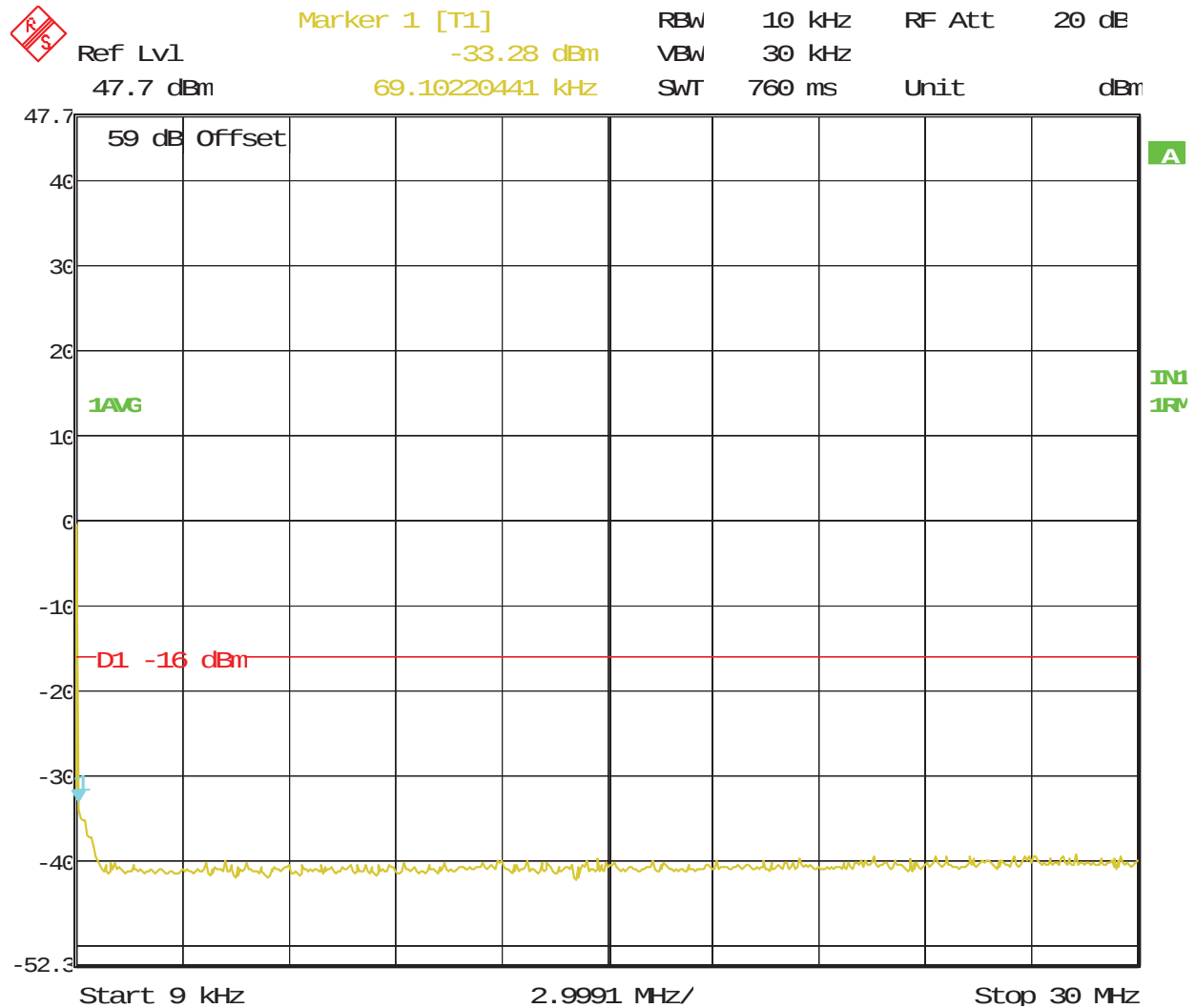
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 08:27:07



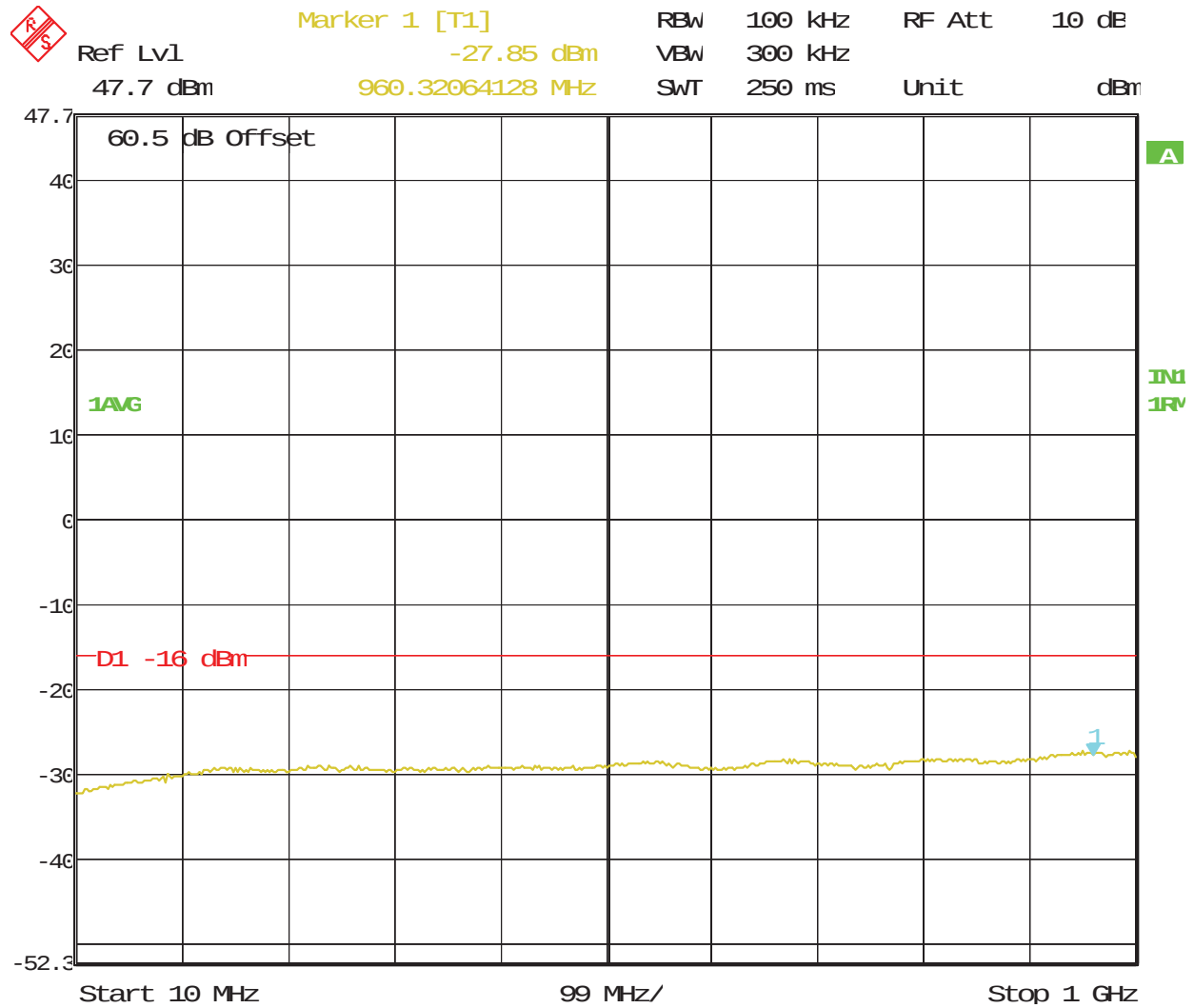
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;QPSK;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 12:17:27

**Transmit Port
Antenna Conducted Spurious Emissions**

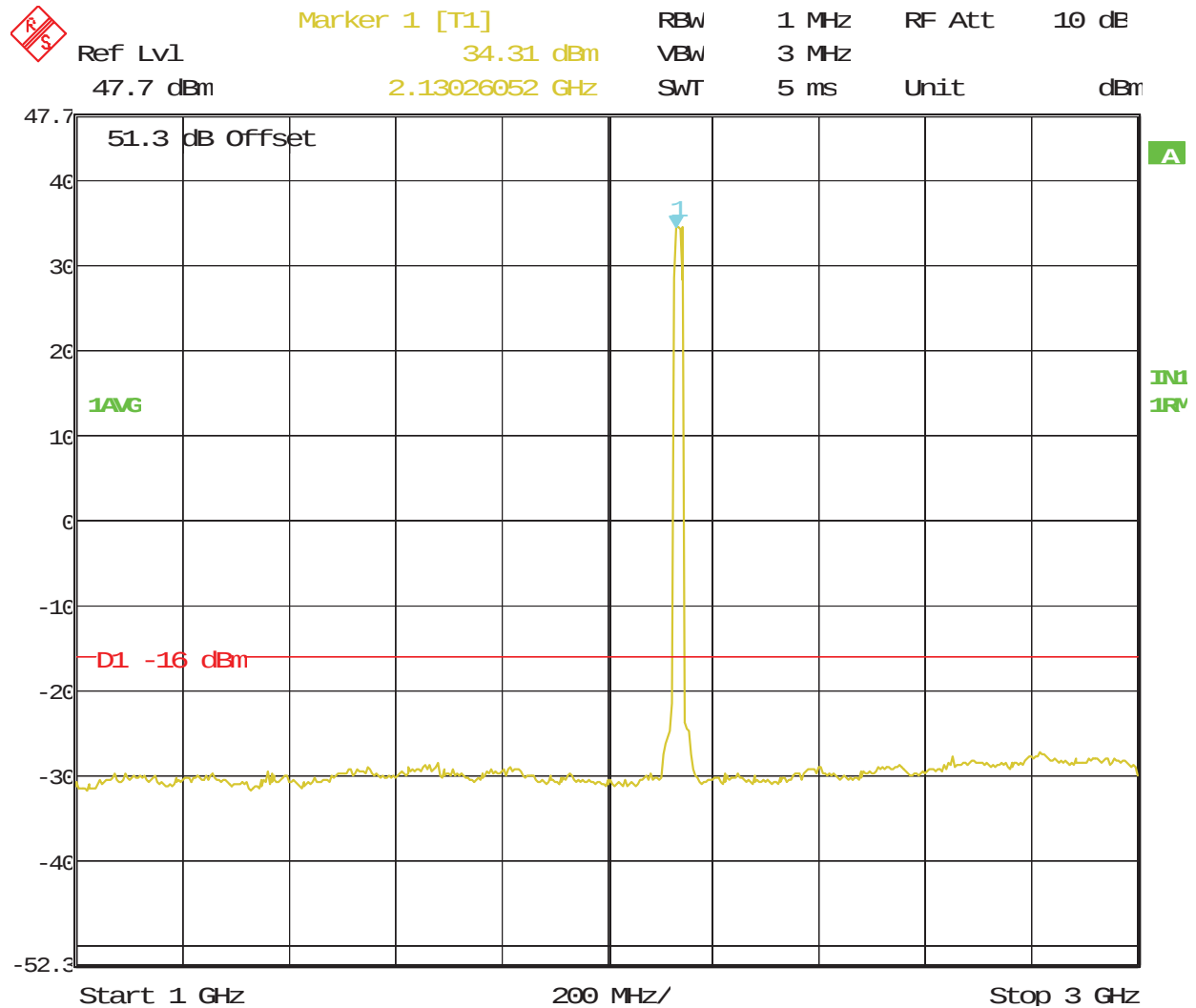
**Block: B2+C+D+E (20MHz BW)
16QAM Modulation
2x60 (MIMO)
Bandwidth 2125 – 2145 MHz**



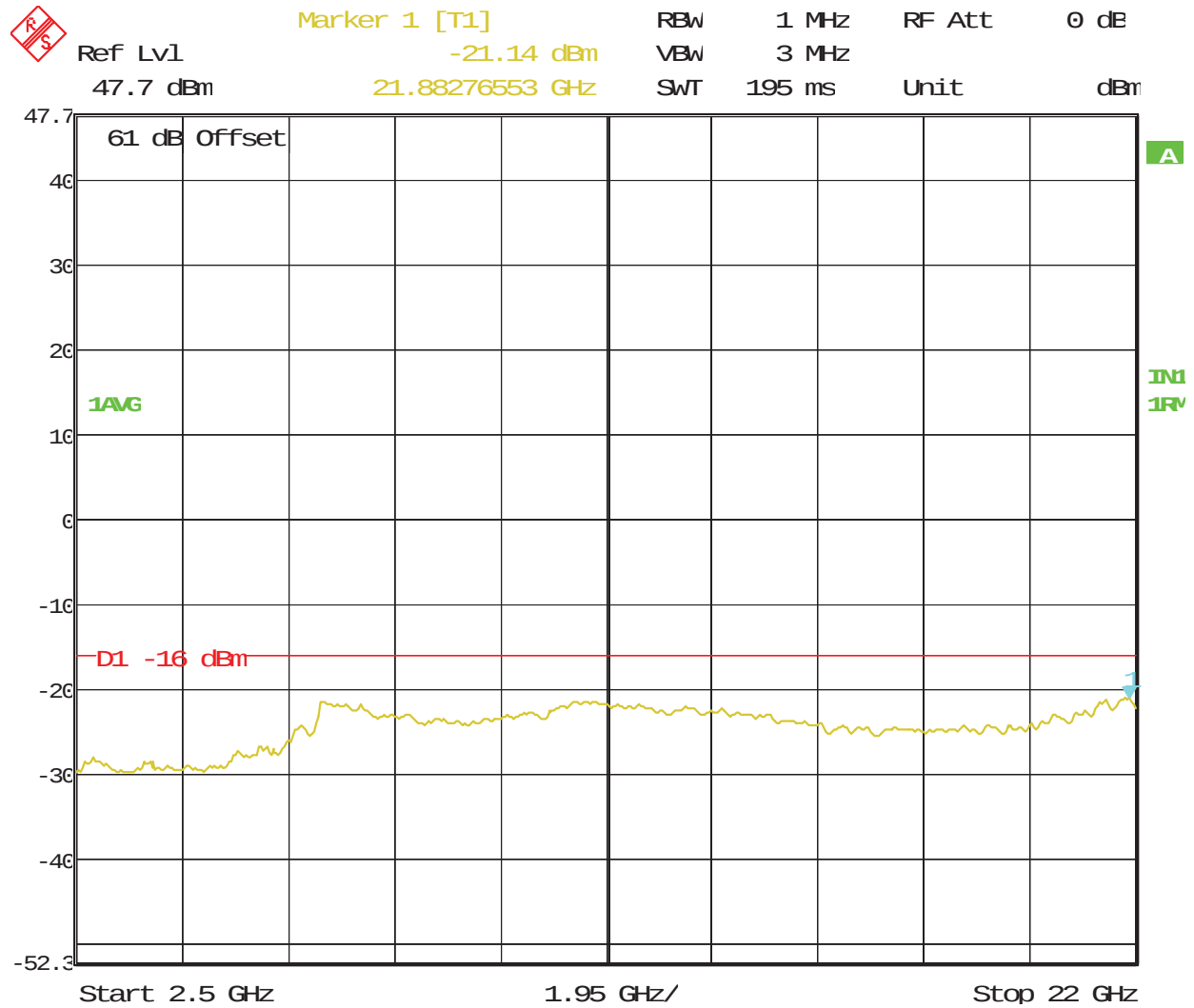
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:21:24



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:22:08



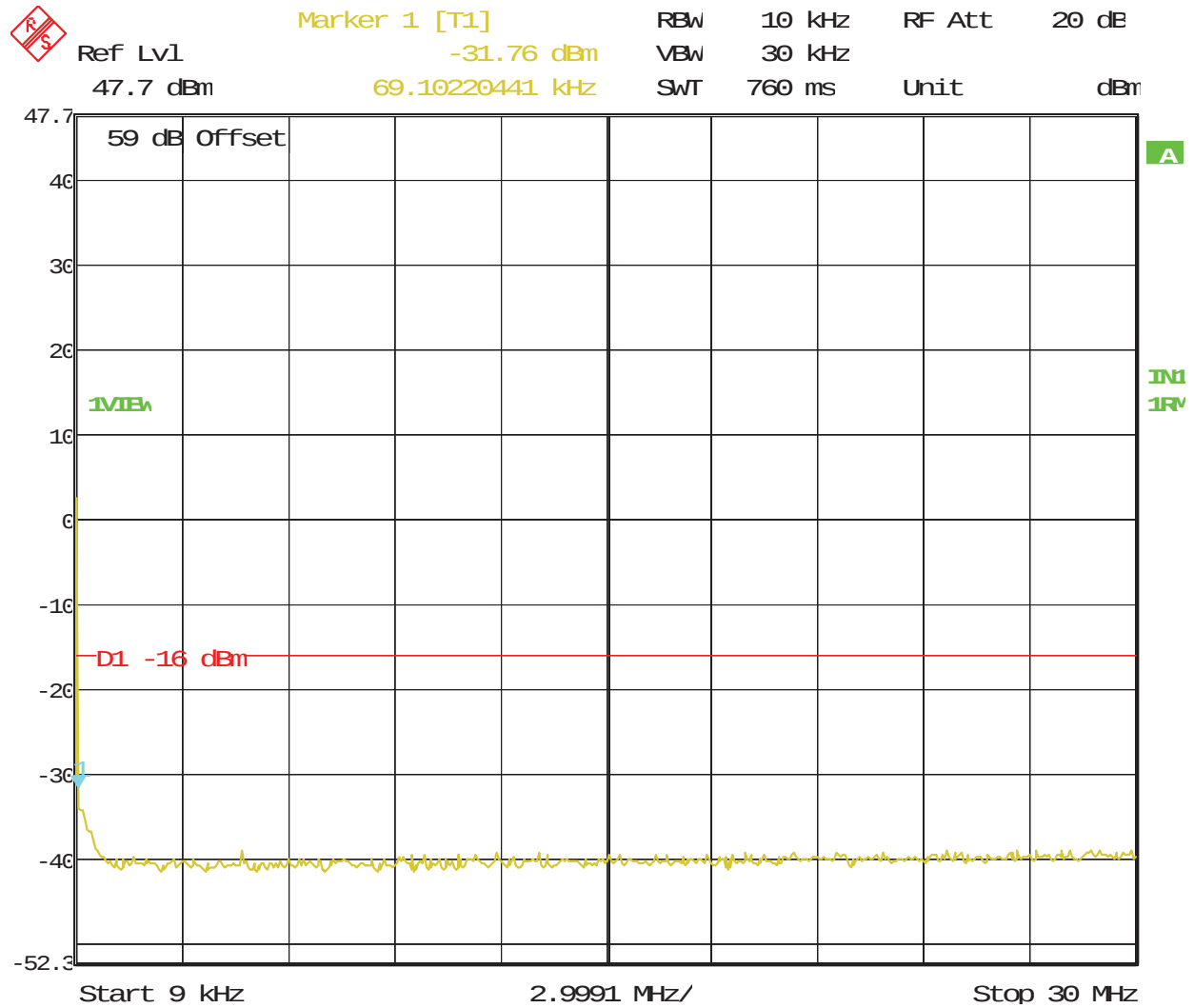
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 11:23:35



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;16QAM;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 11:25:24

**Transmit Port
Antenna Conducted Spurious Emissions**

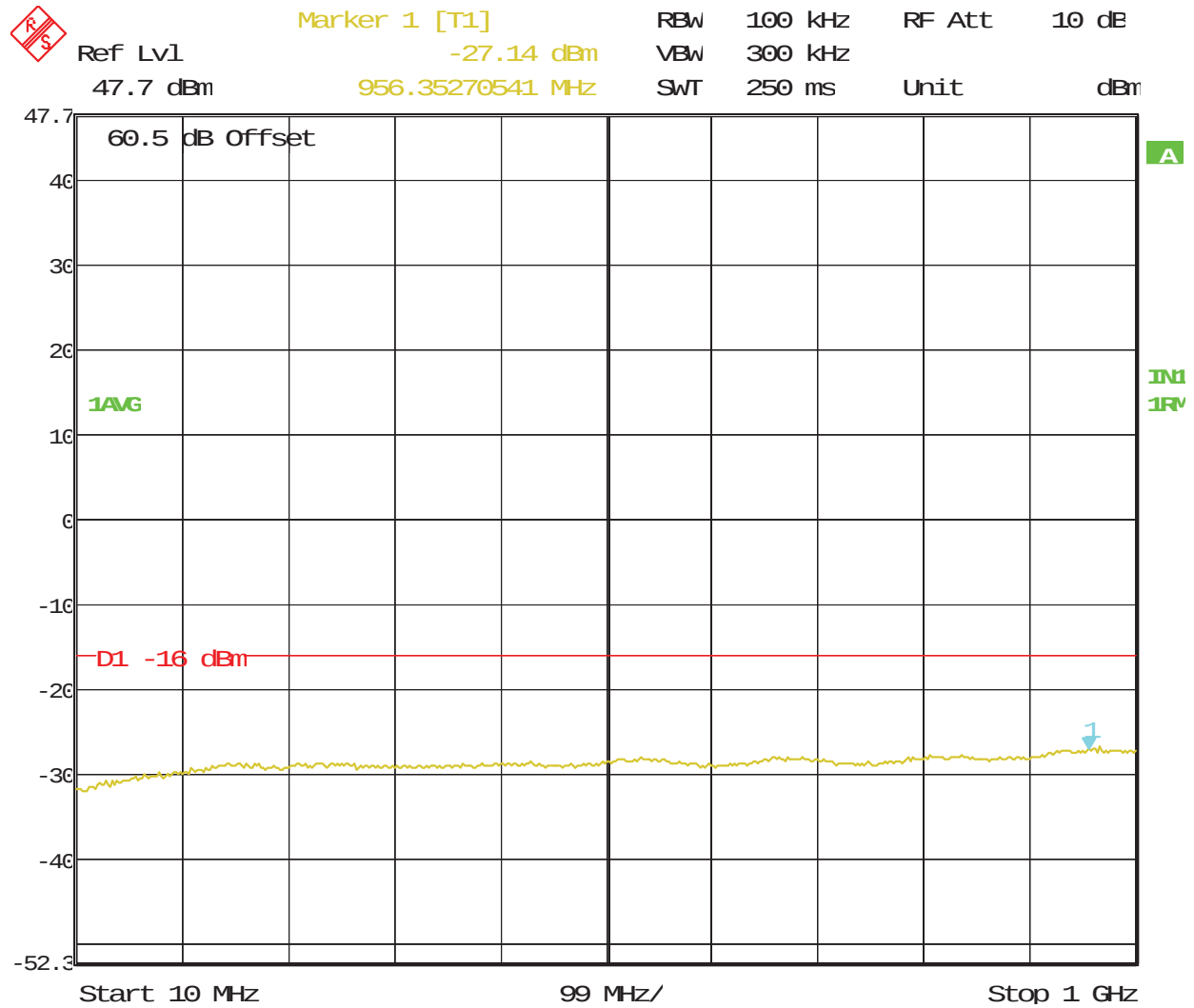
**Block: B2+C+D+E (20MHz BW)
64 QAM Modulation
2x60 (MIMO)
Bandwidth 2125 – 2145 MHz**



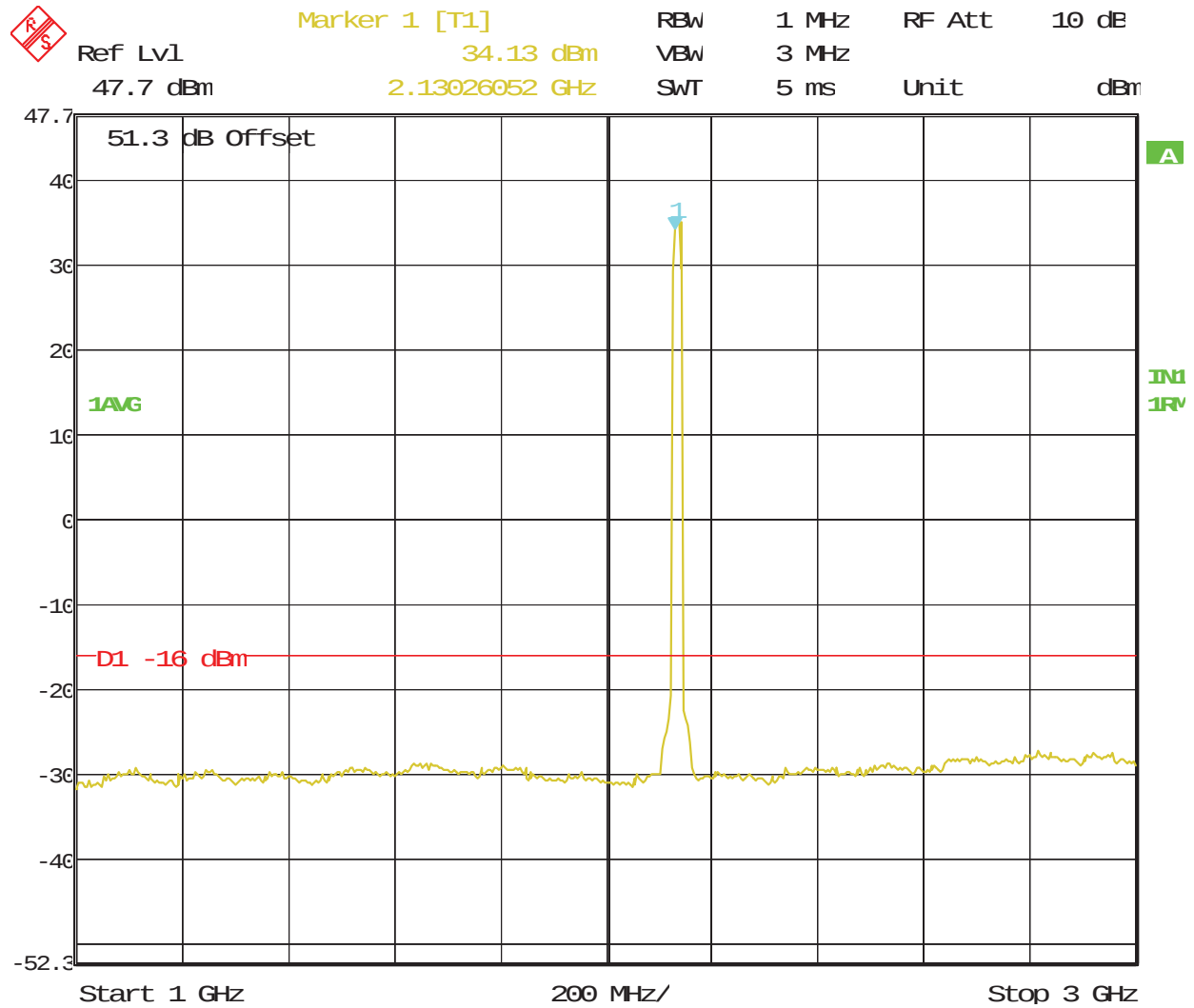
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY

Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.

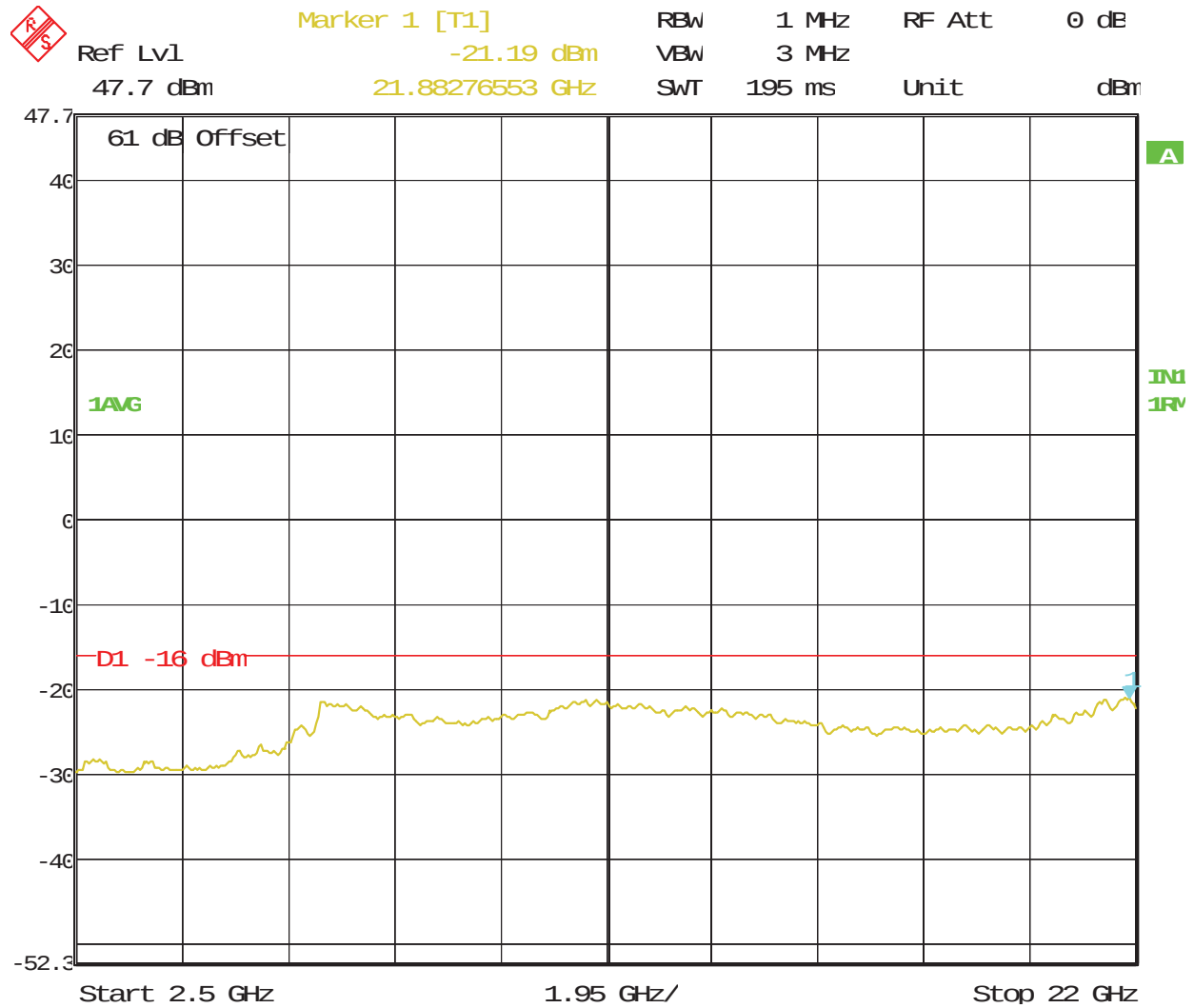
Date: 18.FEB.2013 10:02:19



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 10:03:34



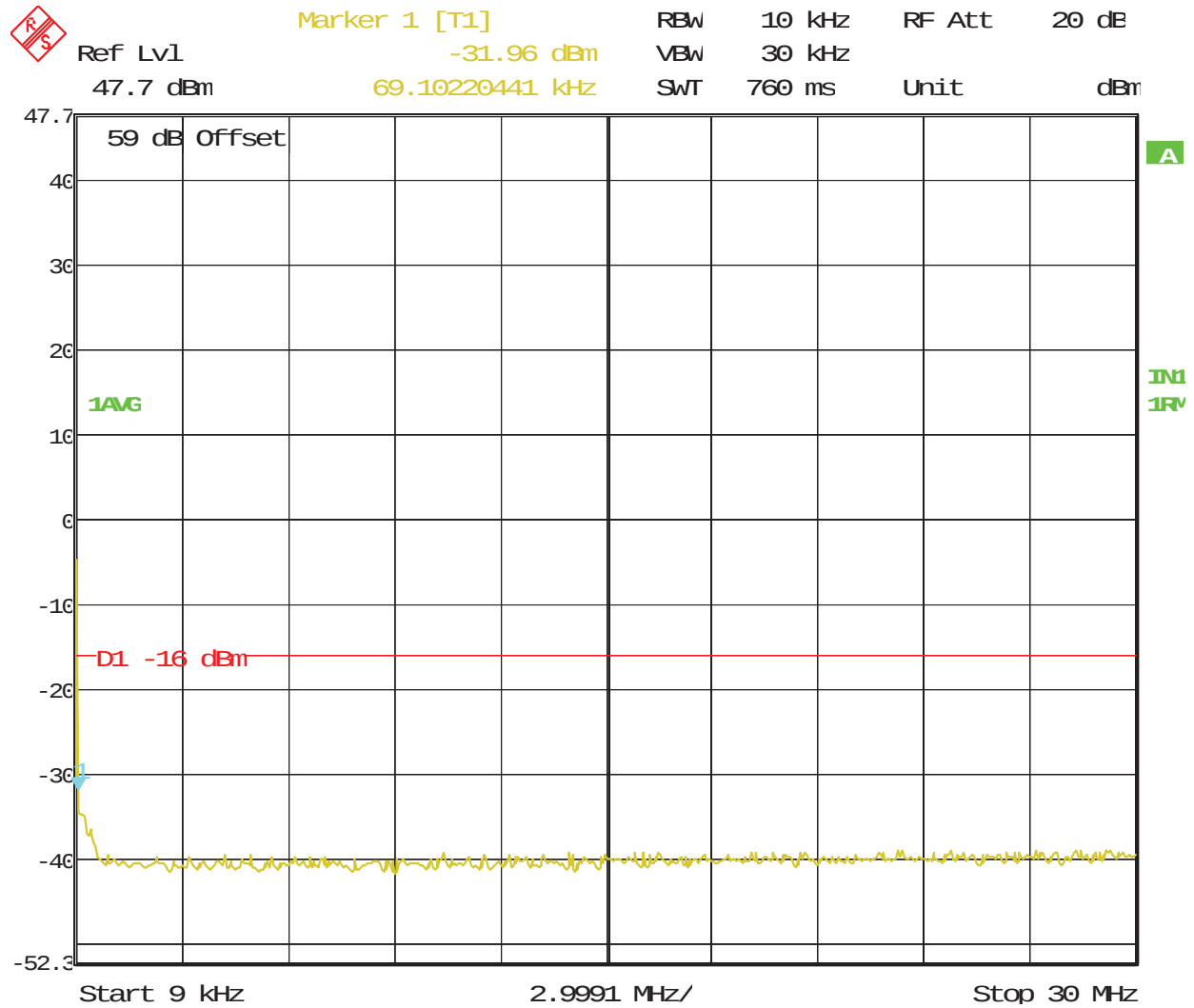
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 10:05:49



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2125-2145MHz(B2+C+D+E)
 20MHz BW;PWR:60W;MIMO;64QAM;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 12:19:32

**Transmit Port
Antenna Conducted Spurious Emissions**

**Block: D+E+F (20MHz BW)
QPSK Modulation
2x60 (MIMO)
Bandwidth 2135 – 2155 MHz**

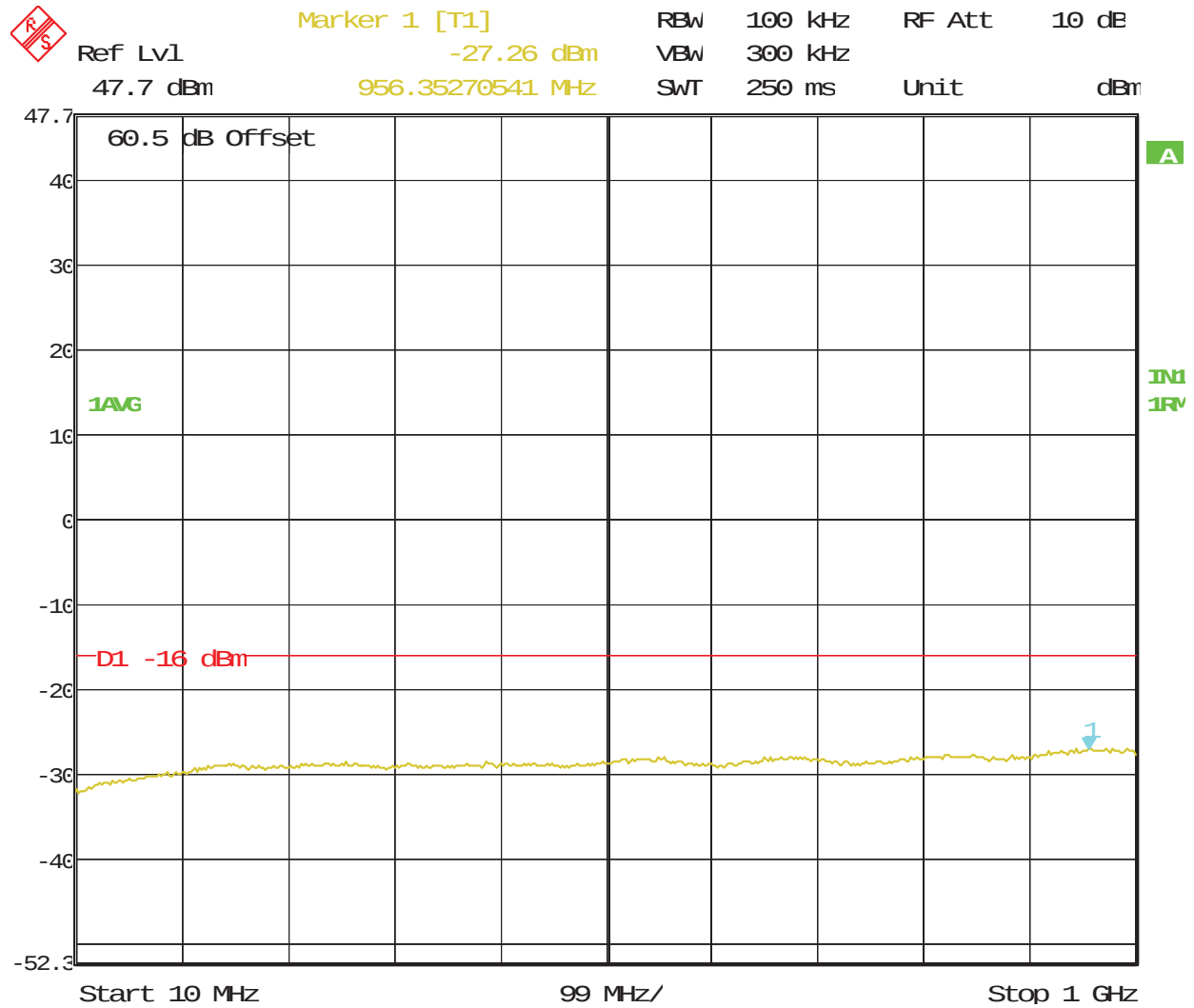


Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY

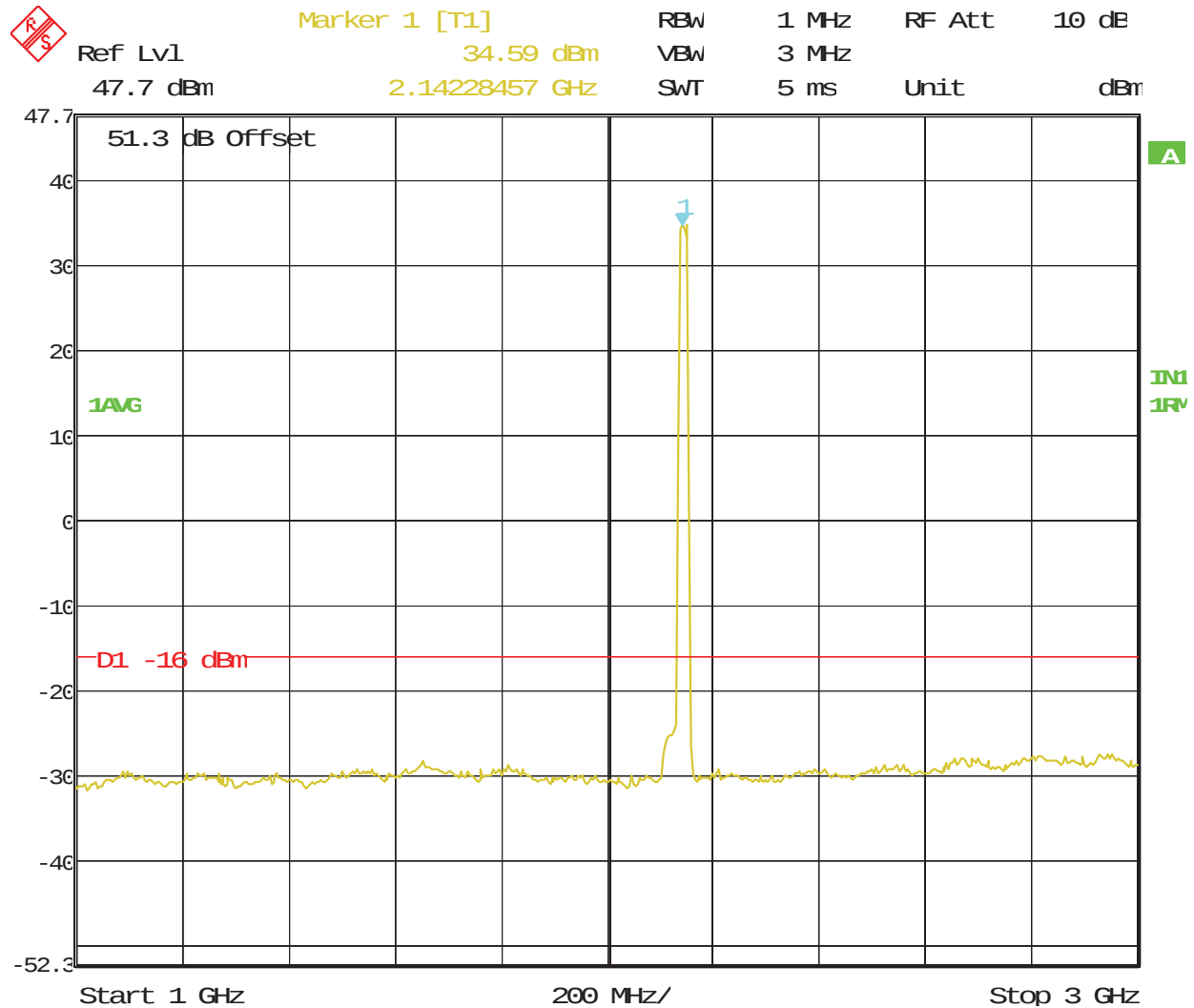
Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)

20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.

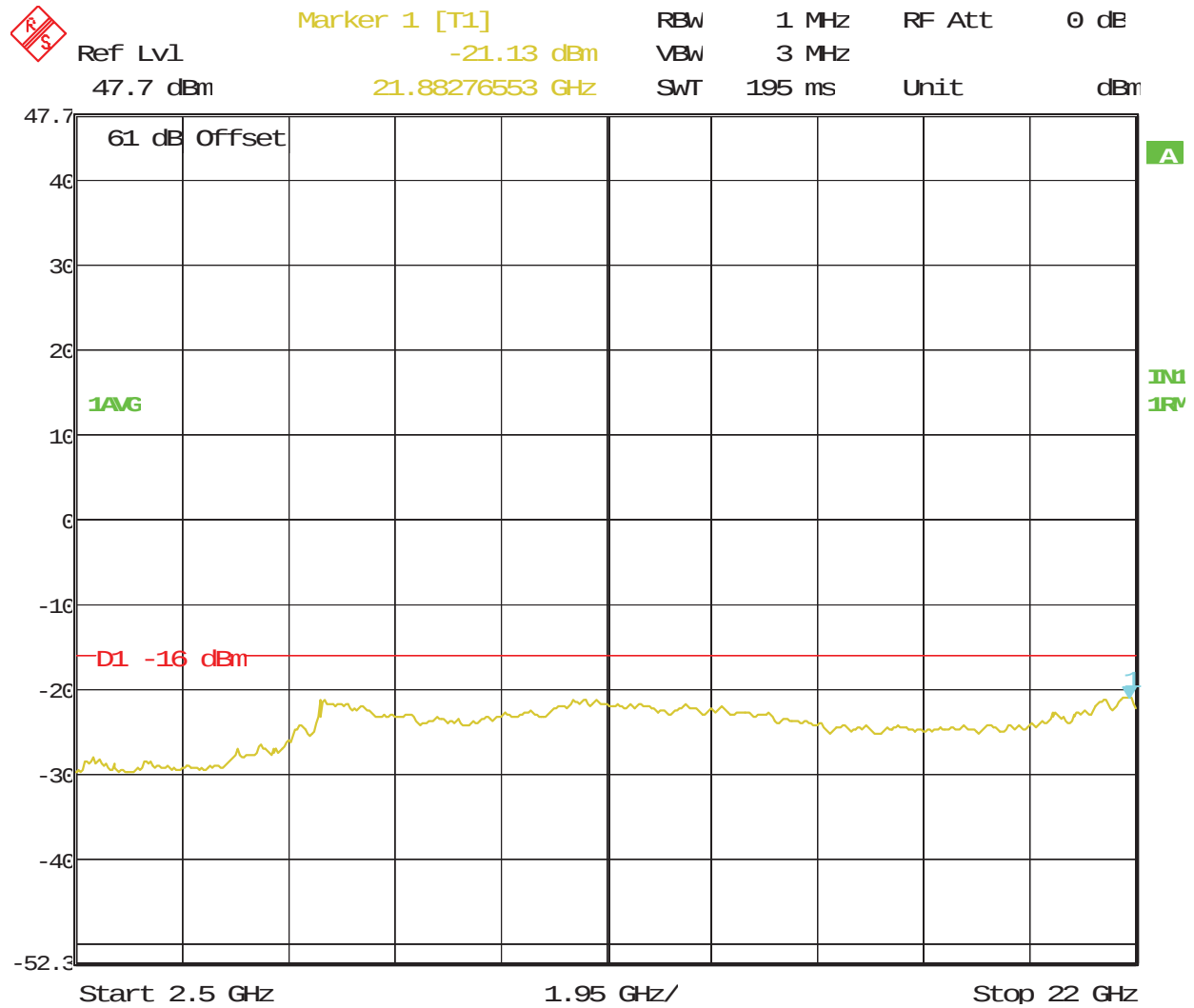
Date: 19.FEB.2013 08:56:05



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 08:59:24



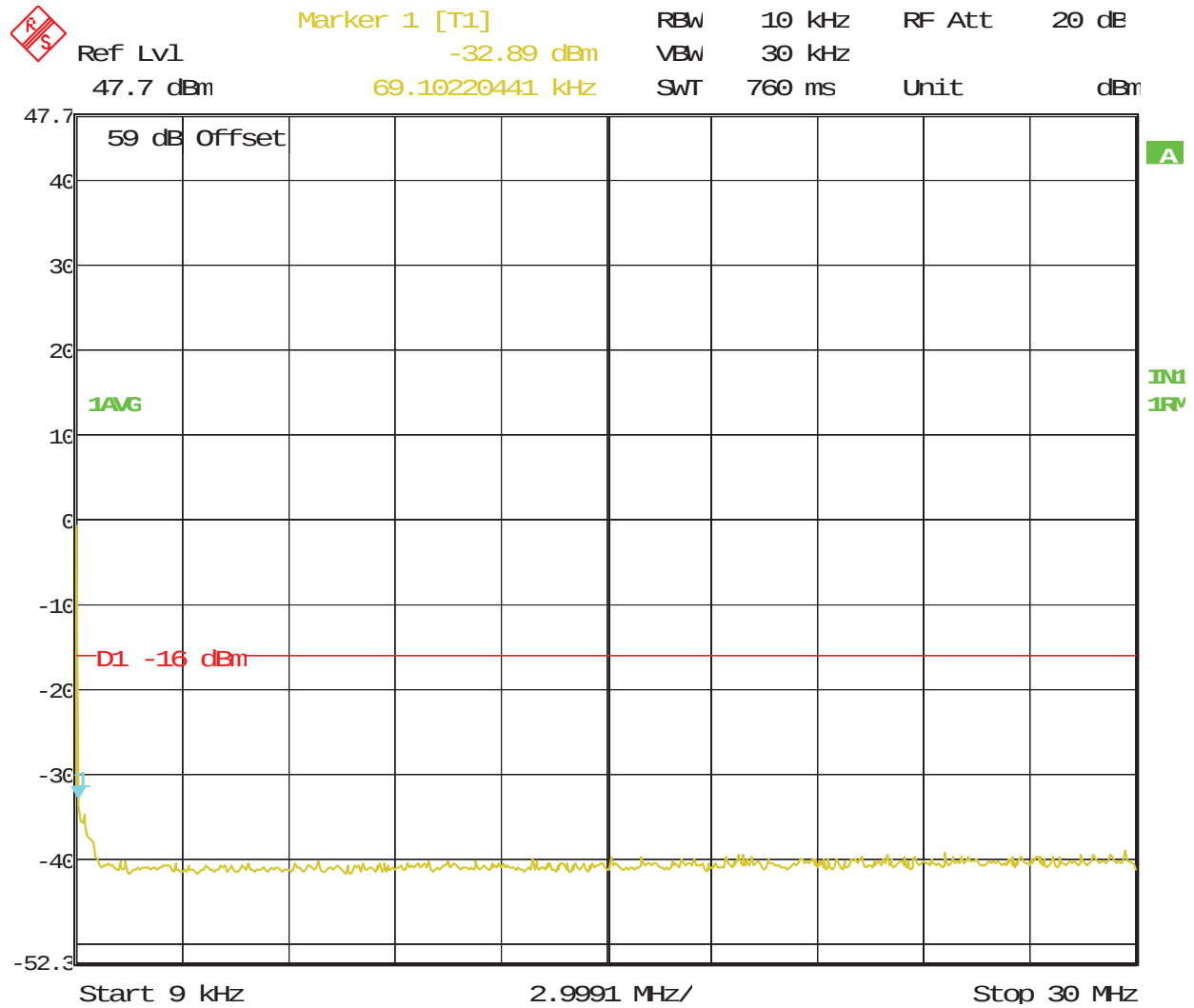
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;QPSK; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 09:00:57



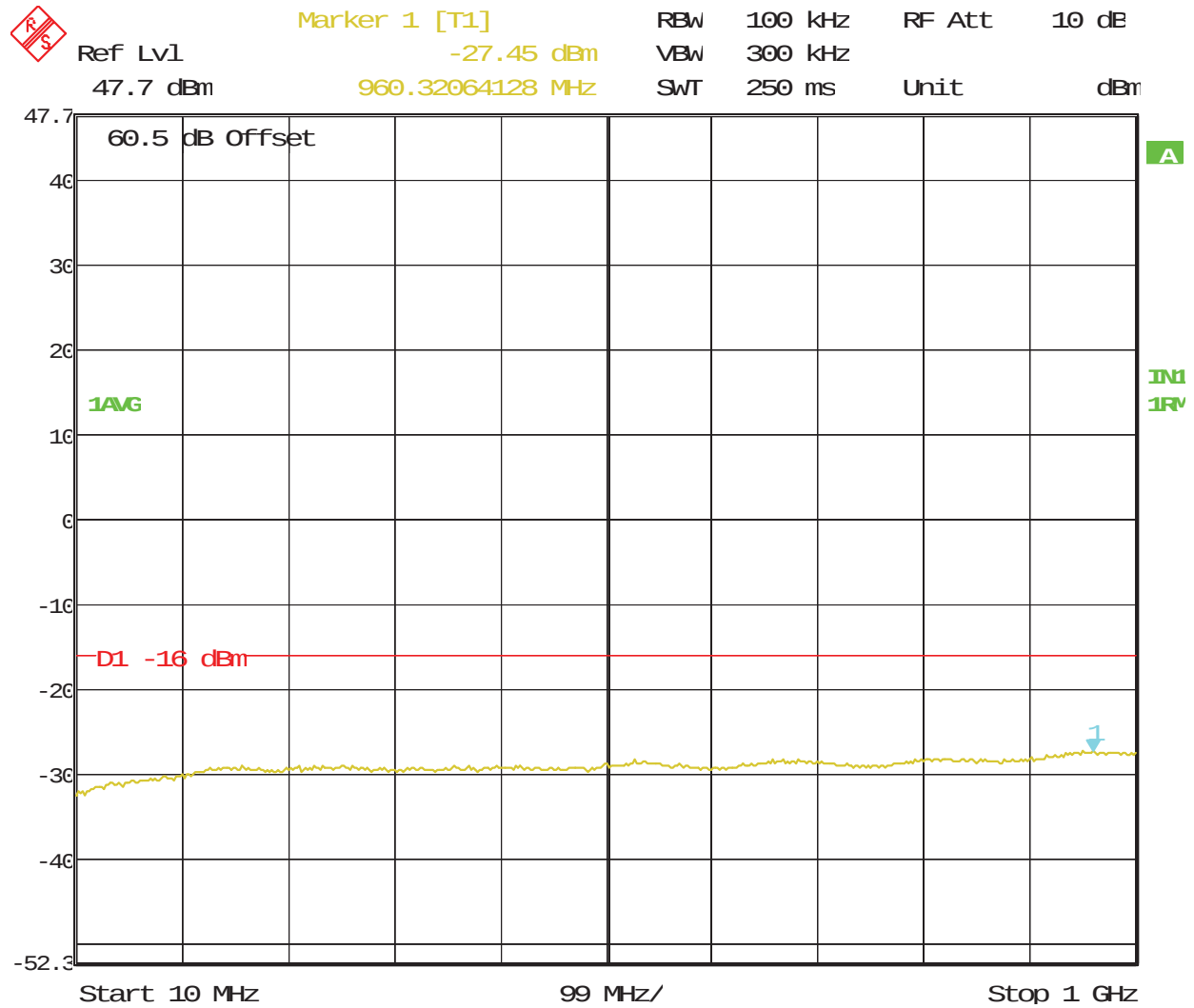
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;QPSK;HPF;FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 09:20:08

**Transmit Port
Antenna Conducted Spurious Emissions**

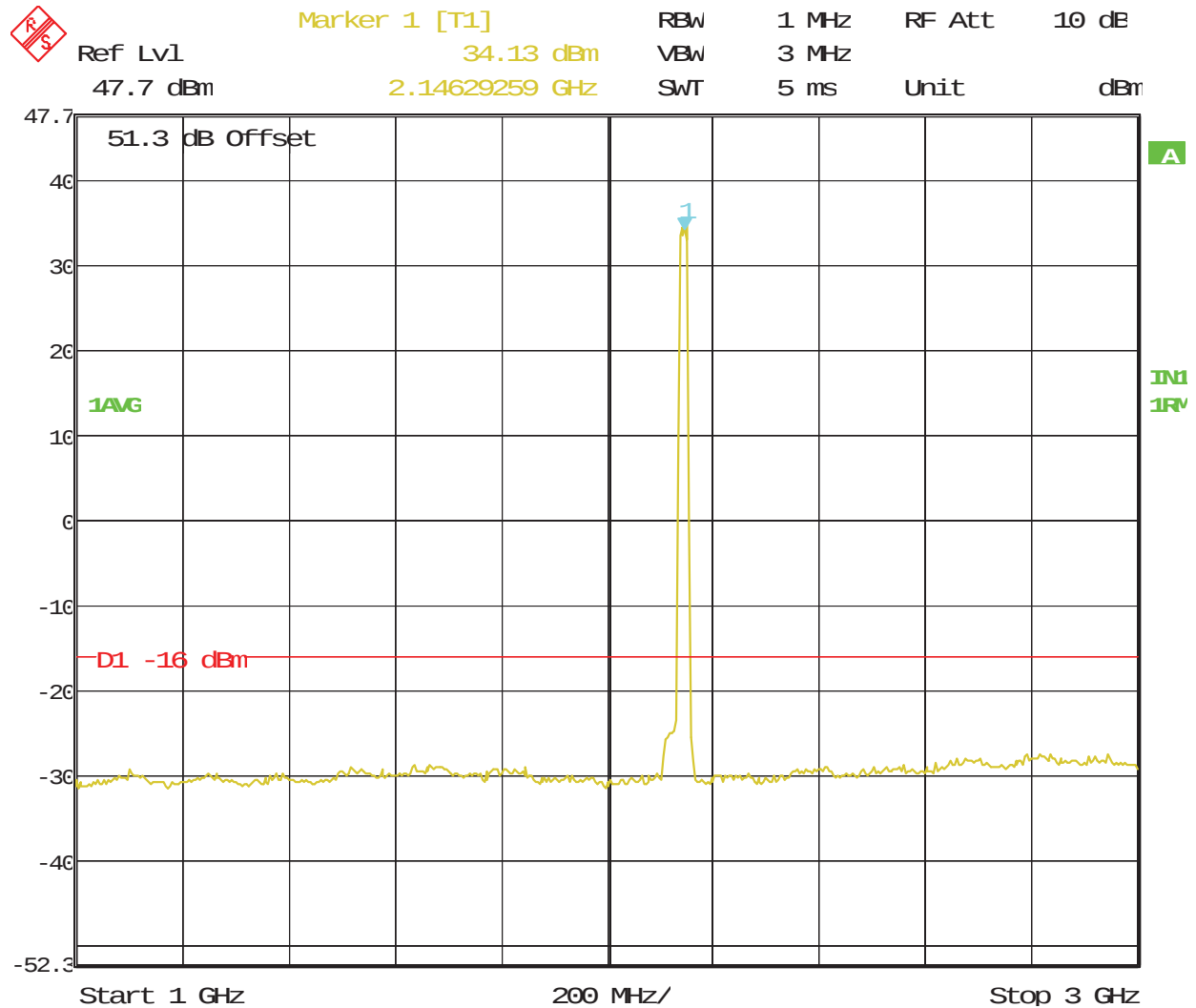
**Block: D+E+F (20MHz BW)
16QAM Modulation
2x60 (MIMO)
Bandwidth 2135 – 2155 MHz**



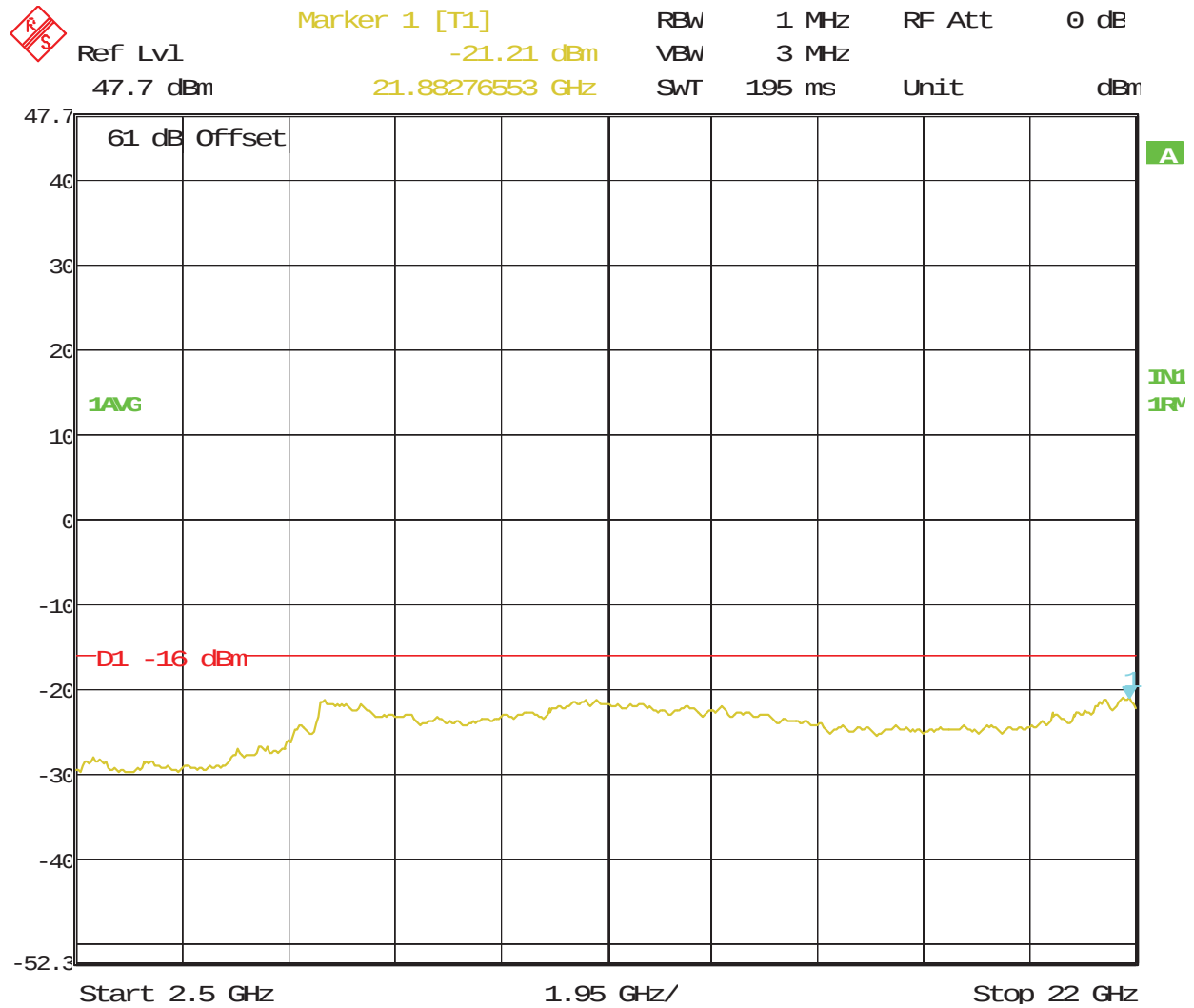
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 10:30:52



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 10:29:31



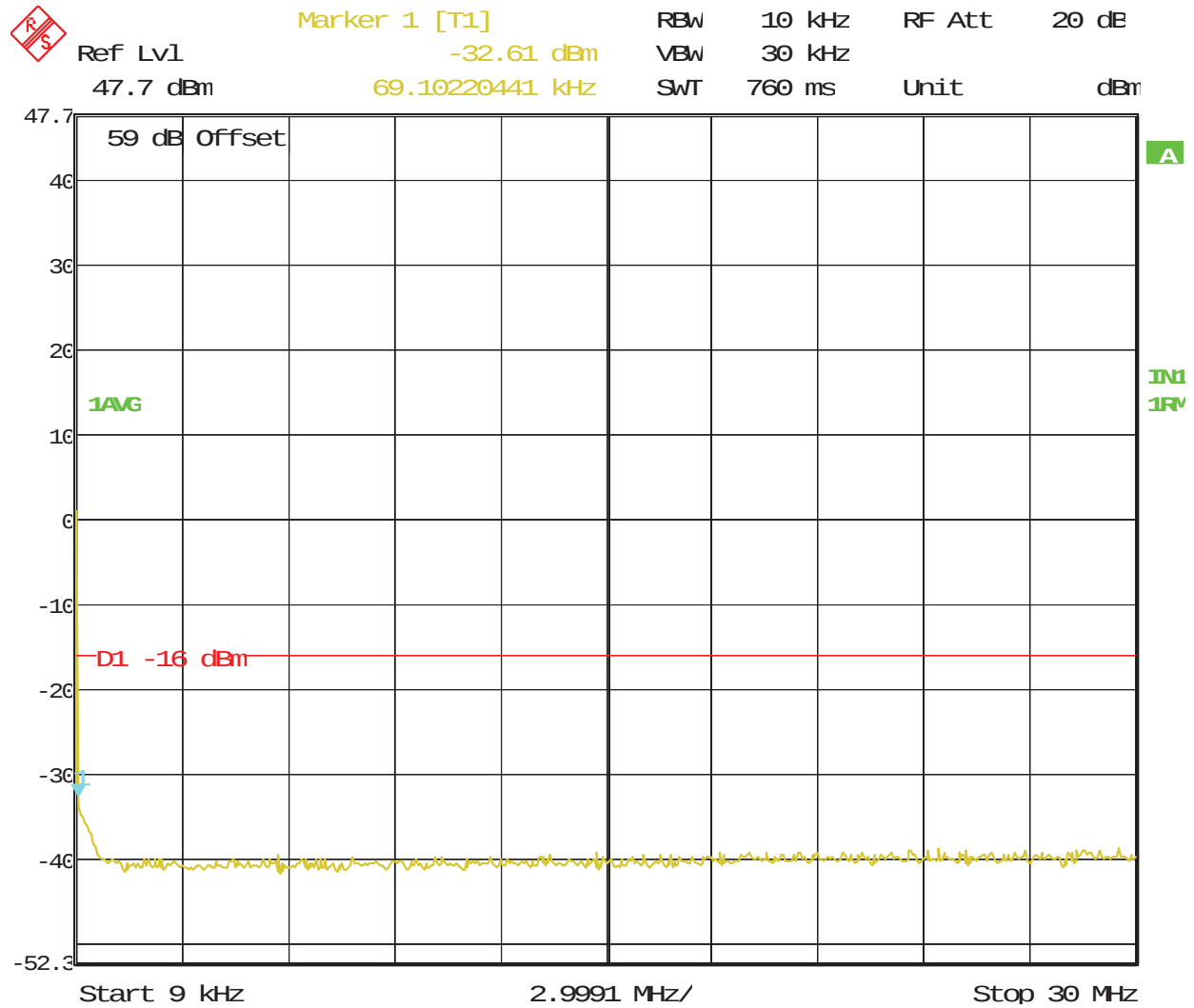
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;16QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 19.FEB.2013 10:32:55



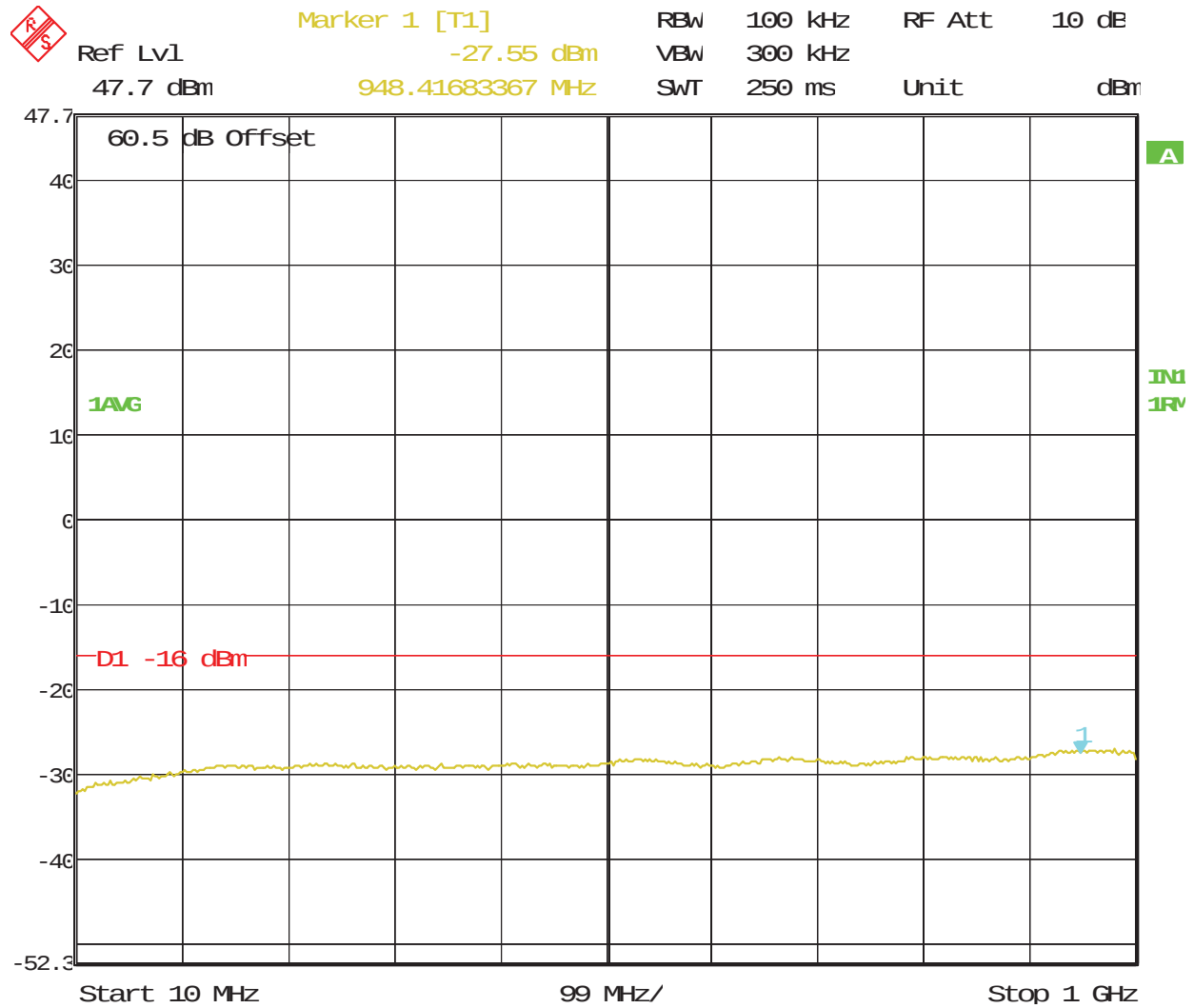
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;16QAM;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 10:38:23

**Transmit Port
Antenna Conducted Spurious Emissions**

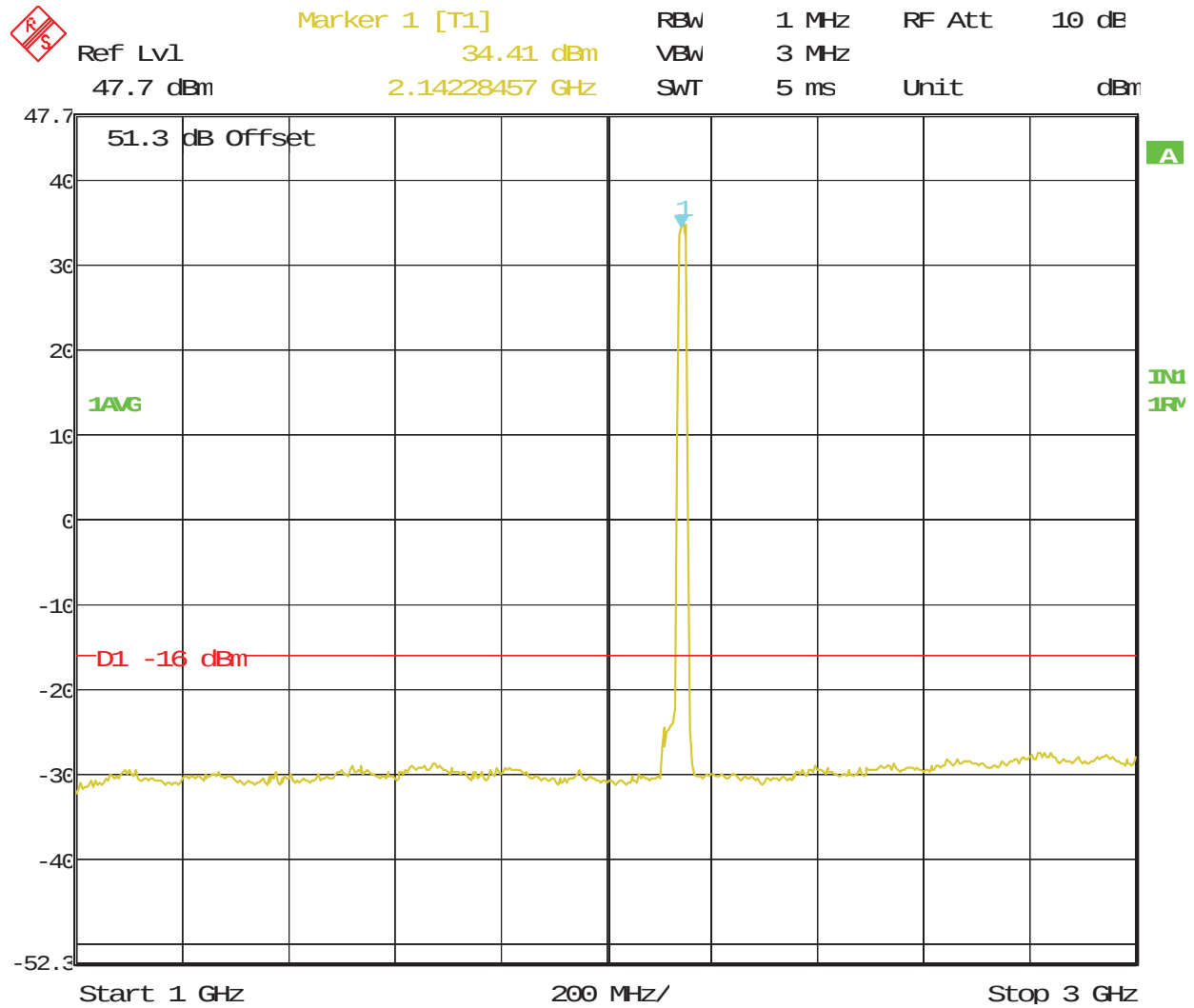
**Block: D+E+F (20MHz BW)
64QAM Modulation
2x60 (MIMO)
Bandwidth 2135 – 2155 MHz**



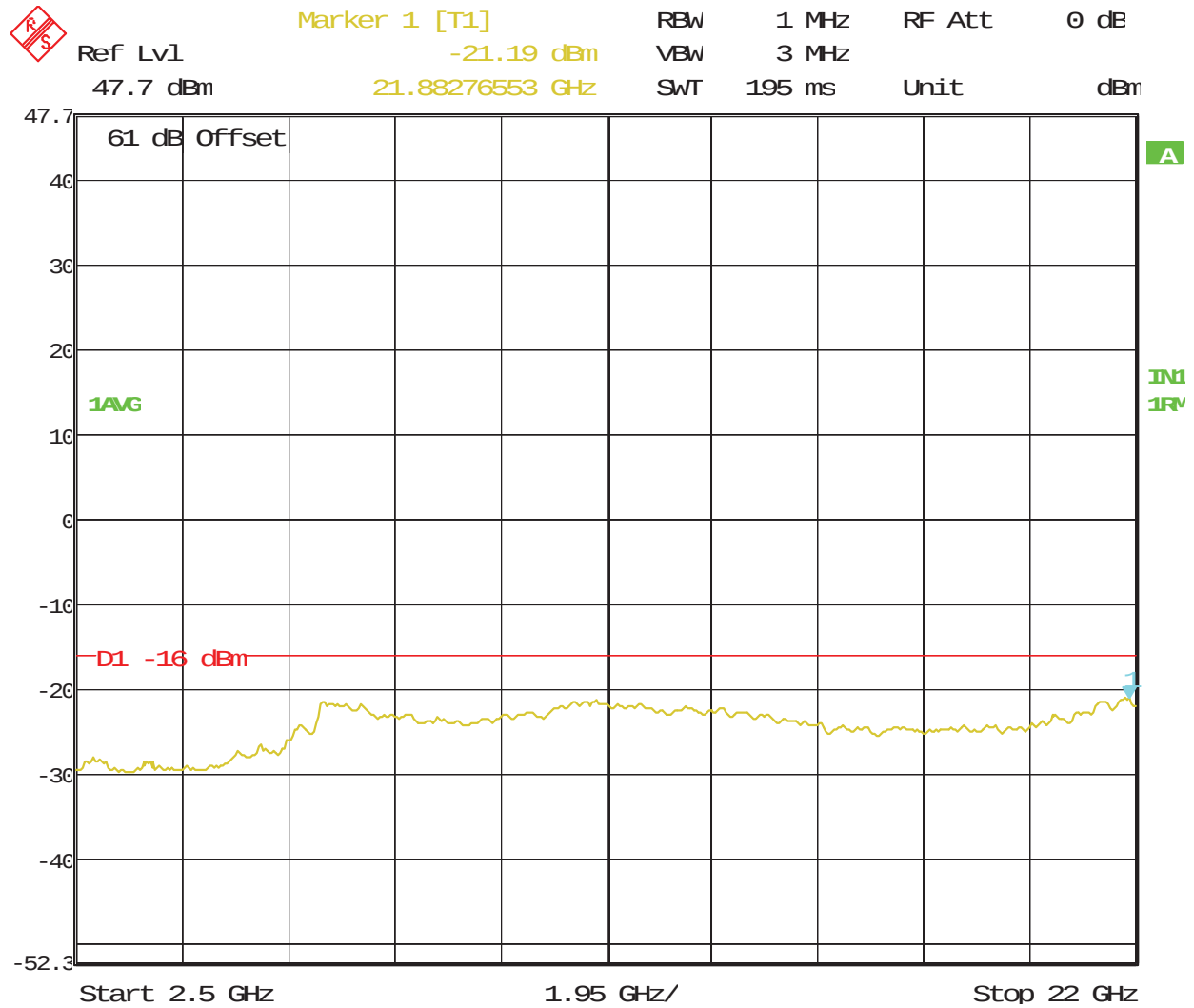
Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 13:26:59



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 13:27:56



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;64QAM; FCC PRT27; FCCID:AS5BBTRX-11.
 Date: 18.FEB.2013 13:29:22



Title: Spurious Emissions AT TX Antenna Port; Test Engineer: JY
 Comment A: AWS TRDU(M1)2x60W Light Radio;208VAC;2135-2155MHz(D+E+F)
 20MHz BW;PWR:60W;MIMO;64QAM;HPF;FCC PRT27; FCCID:AS5BBTRX-11
 Date: 19.FEB.2013 12:22:18

TEST INSTRUMENTATION

Table 3
Test Equipment List

Manufacturer	Model	Serial #	Description	Manual #	Last Cal Date	Cal Cycle Month
Rohde & Schwarz	ESIB40	100119	EMI Test Receiver (20Hz to 40 GHz)-150 +30dBm	E936	5/15/2012	12
Hewlett Packard	437B	3737U26396	RF Power Meter	E754	7/23/2012	12
Agilent	8481A	MY41096522	Power Sensor 10 MHz-18 GHz	E732	2/15/2012	13
Hewlett Packard	772D	2839A01006	Dual Directional Coupler 2-18 GHz	E371	N/A	N/A
Weinschel	66-20-34	BW7320	Attenuator 20dB 150W DC-18 GHz	E815	8/31/2011	18
Weinschel	48-30-33	AY8323	Attenuator DC - 18GHz 100 Watt	E961	N/A	N/A
Weinschel	46-10-34	BL7552	Attenuator 10dB 25W DC-18 GHz	E583	10/23/2012	12

Measurement -5

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

LTE TRDU2X60-AWS**SECTION 2.1053****FIELD STRENGTH OF SPURIOUS RADIATION**

Field strength measurements of radiated spurious emissions were made at 5 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 439234).

The “**LTE TRDU2X60-AWS** with FCCID: AS5BBTRX-11” was tested at a RF output of **60 W at Antenna Interface Connector (AIC)**. These tests were performed in LTE 9712 cabinet with (6) **LTE TRDU2X60-AWS** and Six D2UV5 Base band units (BBU). Each TRDU is designed to provide (2) 60 Watts LTE Carriers. The interconnection between the TRDU and D2U was through optical fiber. The radiated emissions tests were performed serially with the TRDUs were operating with 10 MHz and 20 MHz bandwidths in the frequency blocks combinations listed for Antenna Conducted spurious emissions. For 10MHz A, B and F blocks; for 20MHz Block combinations A+B, B2+C+D+E and D+E+F. All tests were performed with the TRDU operating in QPSK, 16QAM 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 Reference Data for Radio Engineers, Page 27-7 6th edition, IT&T Corp

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

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

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 79.2 dB μ V/meter. Reportable measurements are equal to or greater than 59.2 dB μ V/meter. Over the spectrum investigated, 10 MHz to 10th of the carrier (8 GHz), no reportable spurious emissions were detected. This demonstrates that the “**LTE TRDU2X60-AWS**” the subject of this application, complies with Sections 2.1053, 27.53 (h) and 2.1057 of the Rules.

TEST INSTRUMENTATION

Manufacturer	Model#	Description	Serial#	Last Cal	Next Cal
A.H. Systems	SAS-521-2	Bi-log Antenna 25 - 2000 MHz	410/E602	10/1/2012	10/1/2014
Weinschel	2-6	6 dB Attenuator DC-18GHz 5 Watt	BX3438	1/23/2012	1/23/2013
Hewlett Packard	8593E	Spectrum Analyzer 9 KHz-22 GHz	3911A04009	9/22/2012	12/22/2013
Hewlett Packard	8447D	RF Amplifier 0.1-1300 MHz	2944A09820	9/10/2012	9/10/2013
EMCO	3115	Double Ridged Horn 1-18 GHz	9903-5769	1/17/2012	1/17/2013
EMC Test Systems	3116	Double Ridged Horn 18-40 GHz	2537	12/26/2012	12/26/2014
Hewlett Packard	8449B	Preamplifier 1-26.5 GHz	3008A01270	9/10/2012	9/10/2013
Rohde & Schwarz	ESIB40	EMI Test Receiver (20Hz to 40 GHz) -150 +30dBm	100100	3/28/2012	3/28/2013

Measurement -6

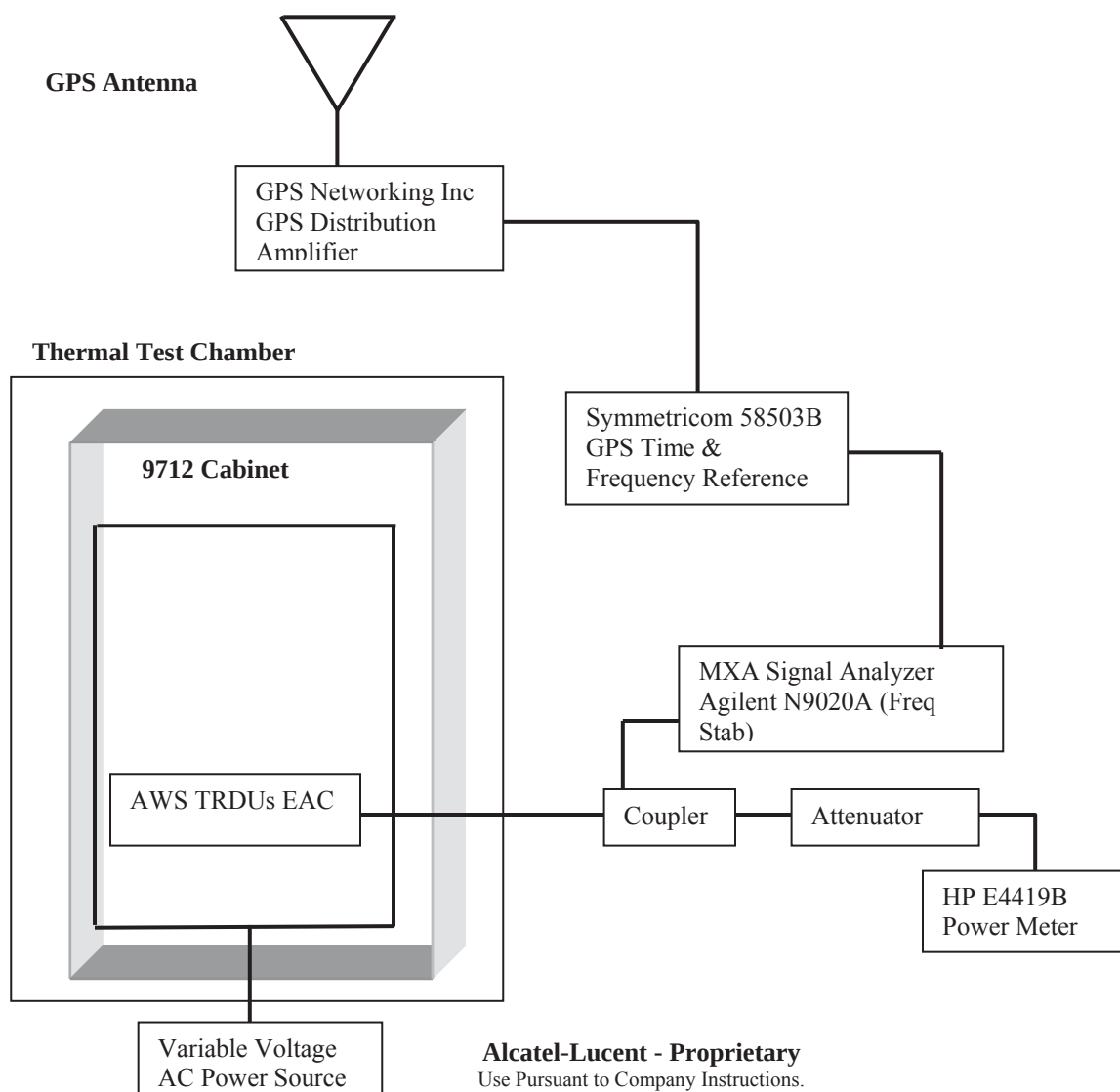
MEASUREMENT OF FREQUENCY STABILITY

MEASUREMENT OF FREQUENCY STABILITY

The frequency stabilization and accuracy of the LTE signals modulated and amplified by the **LTE TRDU 2x60-AWS** 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 9712 Cabinet was subjected to the FCC specified environments while operating at full rated power of 2x60W at External Antenna Connector (EAC) port. The carrier Frequency deviations were measured. The nominal Voltage input to this device is 208V. The 9712 Cabinet is designed to operate in the Voltage range of 208V in the temperature range of -30C to 50C. The carrier frequency is designed to be within an accuracy of 106.6Hz (.05ppm) in the temperature range -30C to 50C. The frequency stability tests were for the voltage 176.5 to 240V 60Hz range and for the temperature -30C to 50C range. The measurement setup is depicted in Block diagram A.

FIGURE A: TEST SET-UP



Frequency Stability performance was verified by measuring Frequency Tolerance at EAC using an MXA Signal Analyzer. Frequency Tolerance is a measurement of the difference between the actual transmit frequency and the assigned frequency (2132.50MHz).

Frequency Block Tested: 208VAC LightRadio Config3 (9712) OD with AWS TRDU (CF = 2132.50MHz)

Baseline Measurement at +25°C

Transmit Frequency Deviation at +25°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.123
0.5	0.116
1.0	0.124
1.5	-0.111
2.0	0.167
2.5	0.139
3.0	0.109
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +50°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.103
0.5	-0.147
1.0	0.154
1.5	0.123
2.0	0.163
2.5	0.183
3.0	0.103
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +40°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.136
0.5	0.117
1.0	0.119
1.5	-0.176
2.0	0.187
2.5	0.159
3.0	0.122
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +30°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.131
0.5	0.151
1.0	0.156
1.5	-0.069
2.0	-0.146
2.5	-0.153
3.0	-0.171
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +20°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.163
0.5	0.136
1.0	0.175
1.5	0.122
2.0	0.189
2.5	0.187
3.0	0.113
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +10°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.127
0.5	0.173
1.0	0.163
1.5	0.105
2.0	-0.118
2.5	0.126
3.0	-0.082
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at 0°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.176
0.5	0.124
1.0	0.141
1.5	-0.160
2.0	0.158
2.5	0.121
3.0	0.101
FCC SPECIFICATION	± 2132.50 MHz (± 0.05 ppm) ± 0.05 ppm = ± 106.6 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at -10°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.133
0.5	0.107
1.0	0.153
1.5	0.117
2.0	0.114
2.5	0.167
3.0	0.196
FCC SPECIFICATION	± 2132.50 MHz (± 0.05 ppm) ± 0.05 ppm = ± 106.6 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at -20°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.186
0.5	-0.149
1.0	-0.128
1.5	0.138
2.0	-0.150
2.5	0.116
3.0	0.119
FCC SPECIFICATION	± 2132.50 MHz (± 0.05 ppm) ± 0.05 ppm = ± 106.6 Hz
FCC RESULT	PASS

Transmit Frequency Deviation at -30°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.144
0.5	0.188
1.0	0.138
1.5	0.125
2.0	0.161
2.5	0.120
3.0	0.127
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Upon return to +25°C.

Transmit Frequency Deviation at +25°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.109
0.5	0.164
1.0	0.143
1.5	0.141
2.0	0.196
2.5	0.106
3.0	0.180
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at +3% of Nominal Voltage, 214.29VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.134
0.5	0.112
1.0	0.141
1.5	0.104
2.0	0.191
2.5	0.104
3.0	0.126
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at +6% of Nominal Voltage, 220.50VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.139
0.5	0.169
1.0	0.196
1.5	0.138
2.0	0.118
2.5	-0.149
3.0	-0.112
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at +9% of Nominal Voltage, 227.72VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.111
0.5	0.121
1.0	0.184
1.5	0.169
2.0	-0.192
2.5	-0.162
3.0	0.171
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at +12% of Nominal Voltage, 233.0VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.166
0.5	0.158
1.0	0.108
1.5	0.157
2.0	-0.130
2.5	0.156
3.0	0.141
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at +15% of Nominal Voltage, 239.0VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.191
0.5	0.184
1.0	0.115
1.5	-0.121
2.0	0.128
2.5	0.136
3.0	0.157
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at 100% of Nominal Voltage, 208VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.141
0.5	-0.141
1.0	0.175
1.5	0.193
2.0	-0.165
2.5	0.146
3.0	-0.123
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -3% of Nominal Voltage, 201.76VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.171
0.5	0.165
1.0	-0.192
1.5	-0.166
2.0	0.189
2.5	0.194
3.0	-0.155
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -6% of Nominal Voltage, 195.5VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.109
0.5	0.149
1.0	0.114
1.5	-0.123
2.0	-0.126
2.5	0.128
3.0	0.169
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -9% of Nominal Voltage, 189.0VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	0.188
0.5	-0.155
1.0	-0.180
1.5	0.174
2.0	-0.110
2.5	0.162
3.0	0.139
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -12% of Nominal Voltage, 183VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.172
0.5	0.152
1.0	-0.158
1.5	0.108
2.0	-0.112
2.5	0.123
3.0	-0.108
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Transmit Frequency Deviation at +25°C at -15% of Nominal Voltage, 176.5VAC	
Time (minutes)	Transmit Carrier Deviation (Hz)
0	-0.161
0.5	0.147
1.0	0.181
1.5	-0.119
2.0	-0.109
2.5	0.183
3.0	-0.149
FCC SPECIFICATION	±2132.50 MHz (±0.05ppm) ±0.05ppm = ±106.6Hz
FCC RESULT	PASS

Instrument Used for Measurement

Instrument Type	Serial Number	Vendor	Expiration Date
MXA Signal Analyzer	MY49060086	Agilent N9020A	10/10/2014
Power Meter	MY40511034	HP E4419B	10/18/2013
Power Sensor	MY52280005	AGILENT	11/3/2013
Multimeter	JP35001820	HP 971A	2/28/2014
Power supply	N/A	STACO ENERGY PRODUCTS: MODEL NO 6020EY	N/A

**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