

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-02**, measured in accordance with the procedures set out in Section 2. 1033 (c) (14) of the Rules.

Each required measurement and its corresponding exhibit number are:

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

Measurement 1

FCC Section 2.1046 RF Power output

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

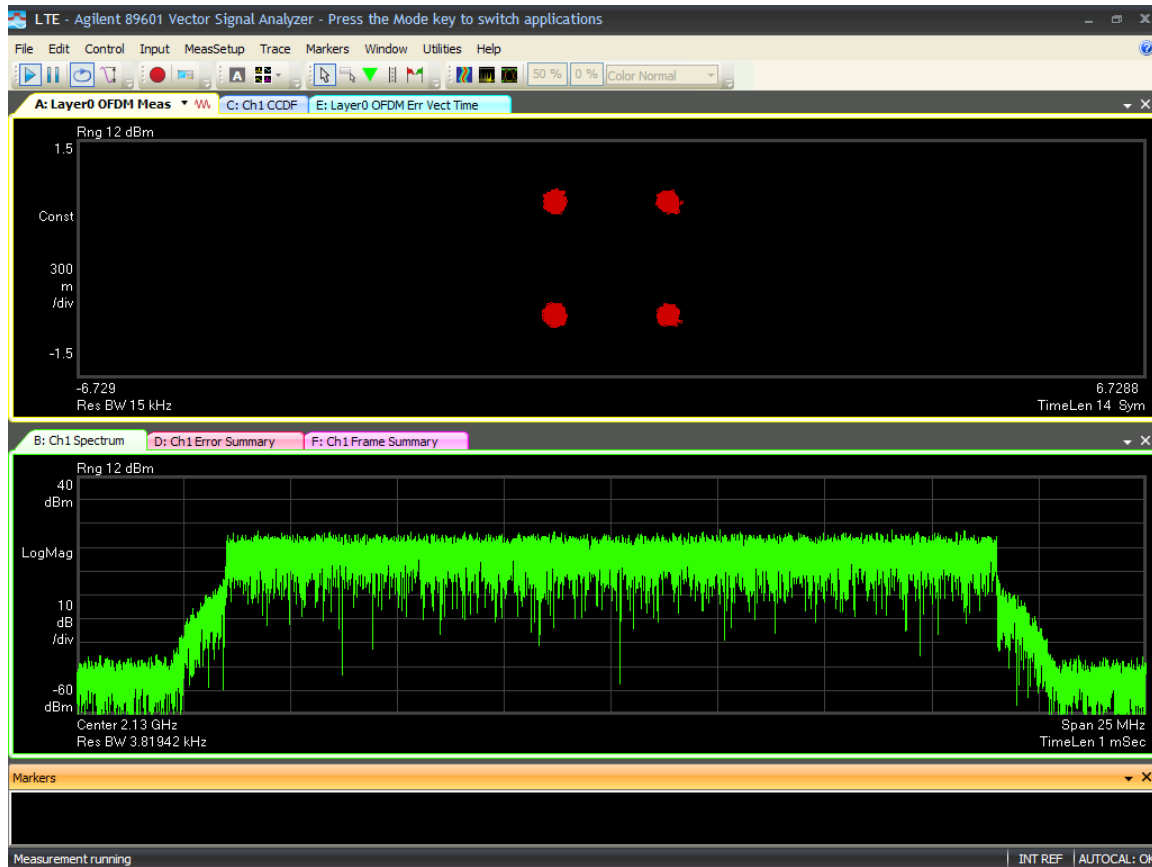
Measurement 2

FCC Section 2.1047 Modulation Characteristics

The modulation techniques used are explained in the submission as part section 2.1033 (c) (13). The RF signal at the antenna port was demodulated and verified for correctness of modulation signal used before each test was performed. The attached 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.

QPSK MODULATION



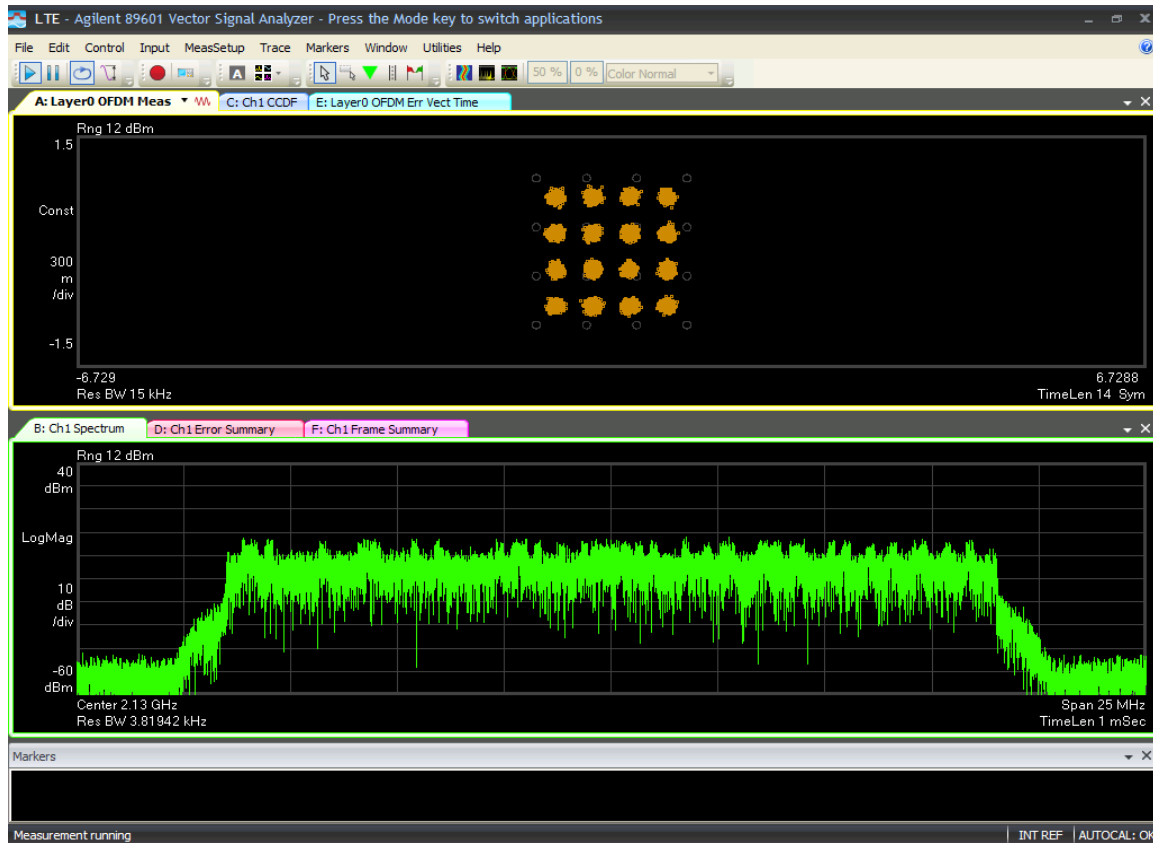
LTE 9442 RRH2X40-AWS

FCC Part 27.53 Blocks B+C+D; QPSK Modulation; Model: R4X; PWR: 40 (2x40W MIMO)

FCCID: AS5BBTRX-02

TEST ENGINEER: SEG

16QAM MODULATION



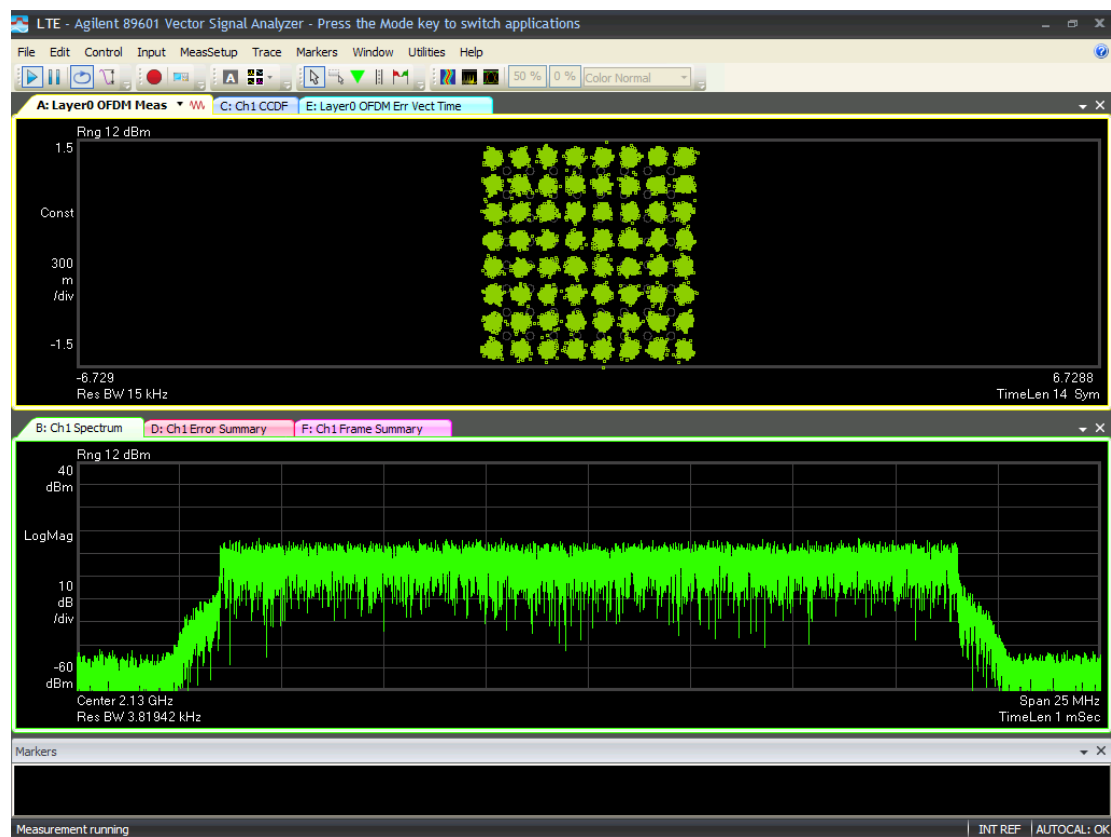
LTE 9442 RRH2X40-AWS

FCC Part 27.53 Blocks B+C+D; 16QAM Modulation; Model: R4X; PWR: 40 (2x40W MIMO)

FCCID: AS5BBTRX-02

TEST ENGINEER: SEG

64QAM MODULATION



LTE 9442 RRH2X40-AWS

FCC Part 27.53 Blocks B+C+D; QPSK Modulation; Model: R4X; PWR: 40 (2x40W MIMO)

FCCID: AS5BBTRX-02

TEST ENGINEER: SEG

Measurement 3

FCC Section 2.1049

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

Spectrum Bandwidth Measurement For Emissions Type

FCC approves 26 dB measurement methods for Spectrum Bandwidth.

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

1. QPSK
2. 16 QAM
3. 64 QAM

Highest Bandwidth that was measured is used for Emissions type designation: 18.93 MHz for 20 MHz

Therefore, Measured Emission type: **18M93F9W** for 20 MHz Bandwidth

MEASUREMENT OF SPECTRUM BANDWIDTH

26 dB POWER BANDWIDTH

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

The occupied bandwidth of the Long Term Evolution (LTE) is measured using a Rohde & Schwarz ESI Spectrum Analyzer/Receiver and an HP Model 520 DeskJet Printer. The emissions bandwidth is provided in section 27.53 (h) (1) is used. Accordingly “The emissions bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.”

The measurements were made on a “**LTE 9442 RRH2X40-AWS**” with **20 MHz Carrier** in the following configurations:

1. QPSK
2. 16 QAM
3. 64 QAM

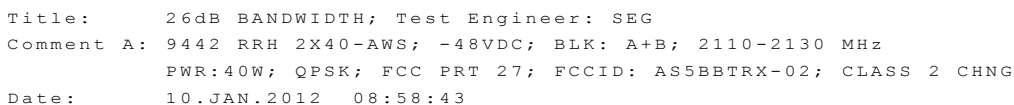
Results:

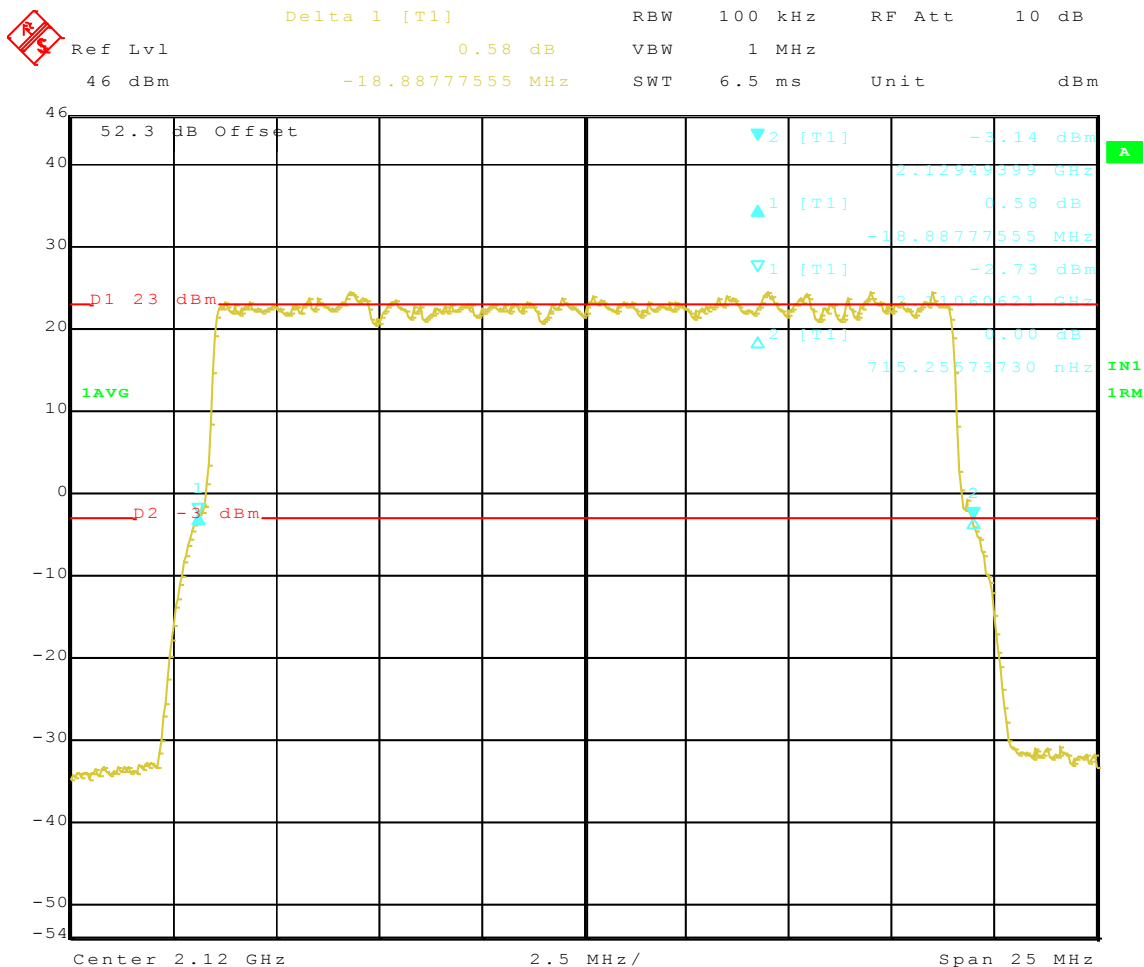
The plots are provided for QPSK, 16QAM and 64QAM modulations for 20 MHz band.
The Measured 26dB emissions bandwidth is 18.93 MHz for 20 MHz band.

Blocks: A+B

20 MHz Bandwidth, 2110 – 2130 MHz

(26dB Bandwidth)



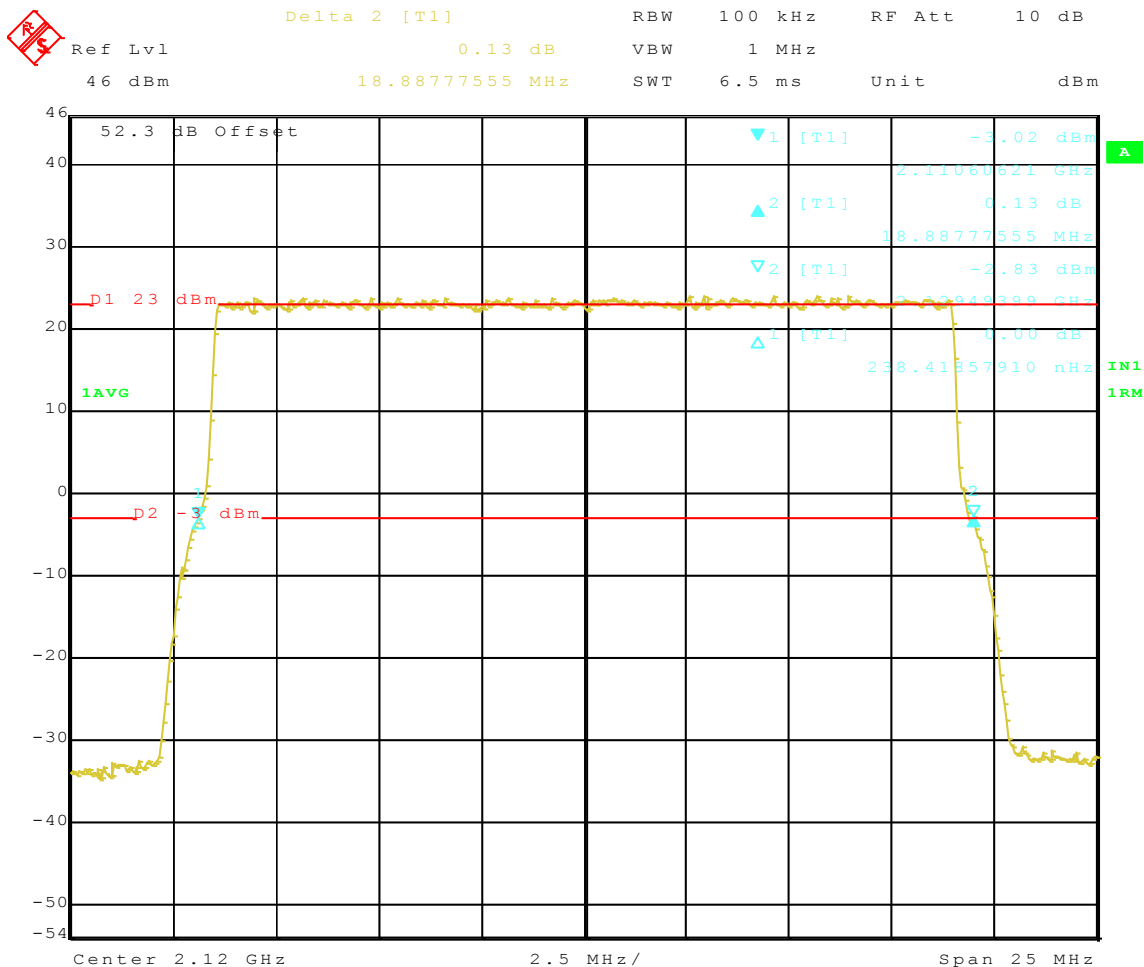


Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 08:28:15



Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

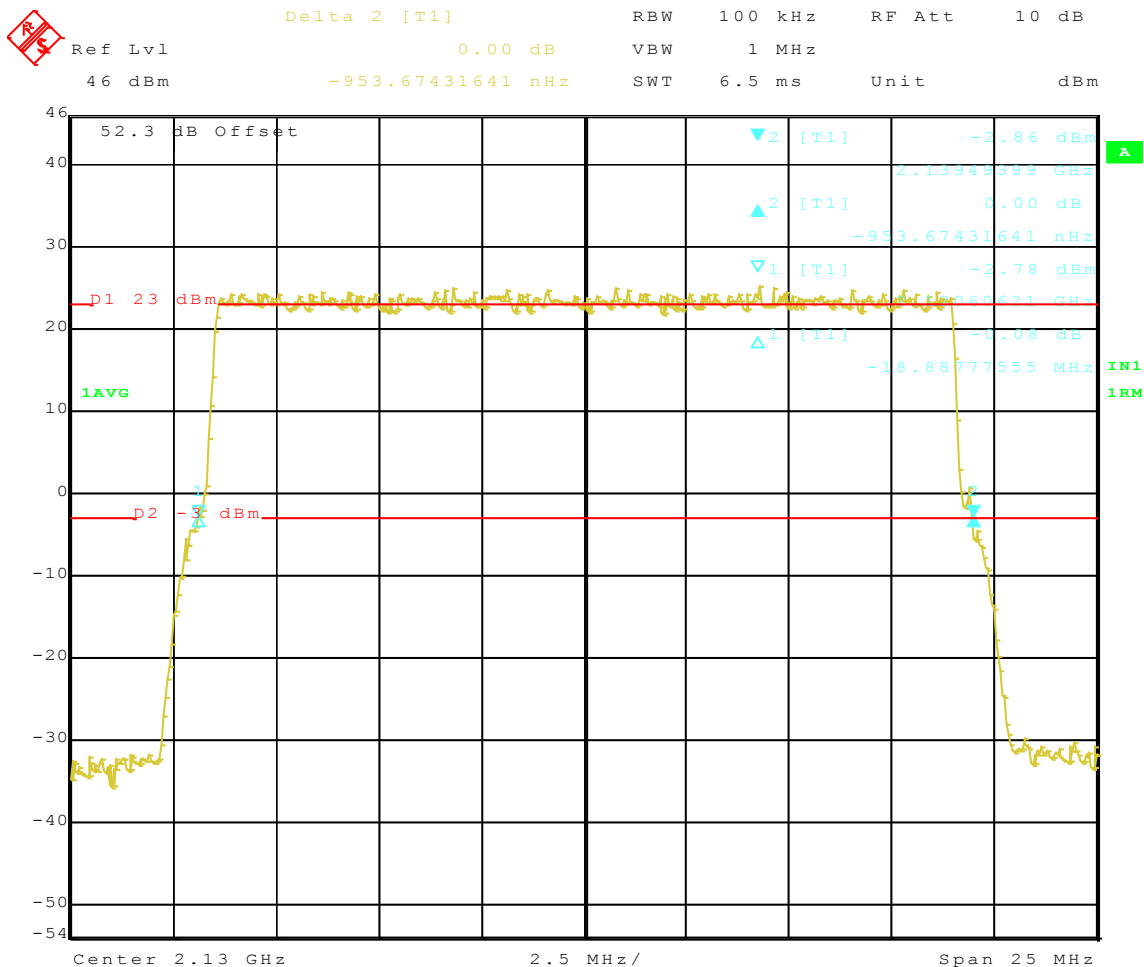
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 09:56:11

Blocks: B+C+D

20 MHz Bandwidth, 2120 – 2140 MHz

(26 dB Bandwidth)

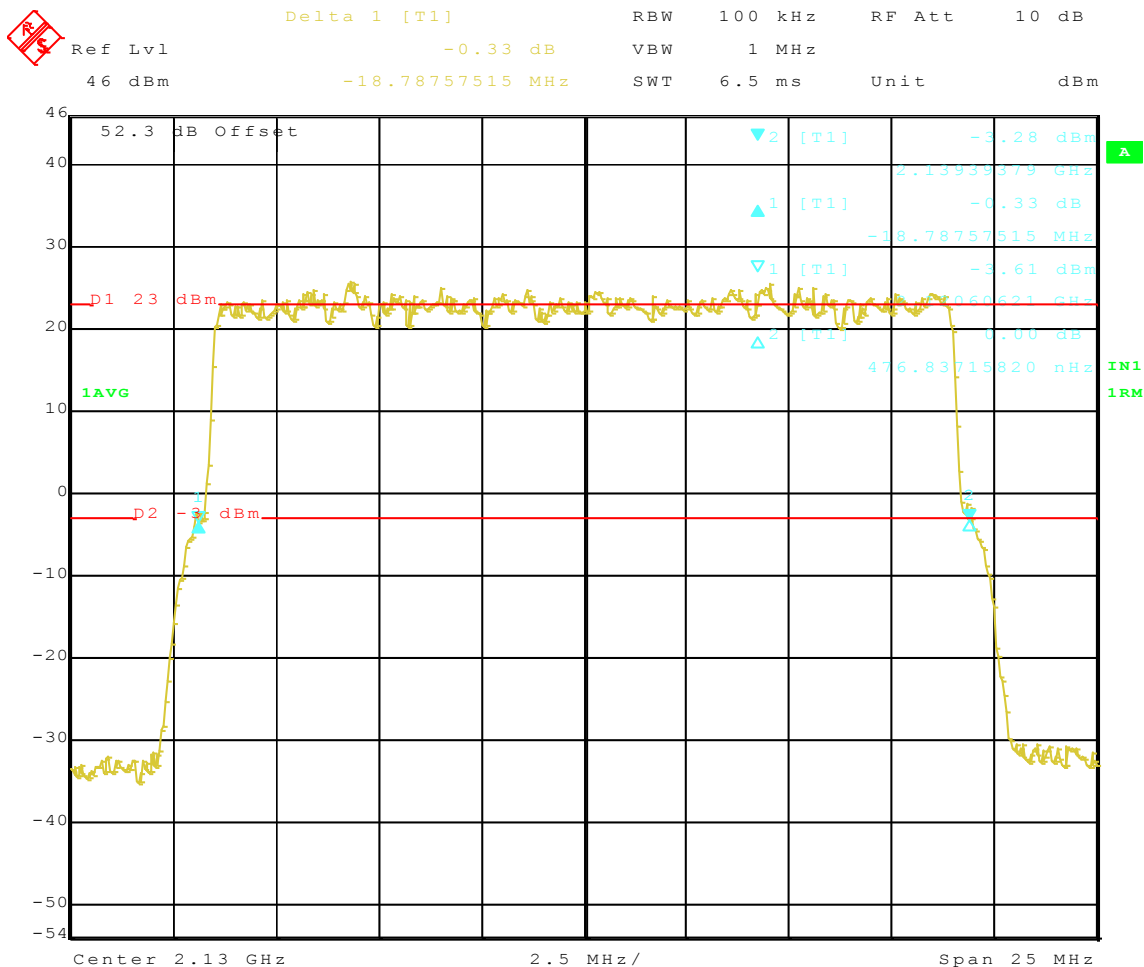


Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 8.JAN.2012 08:52:56

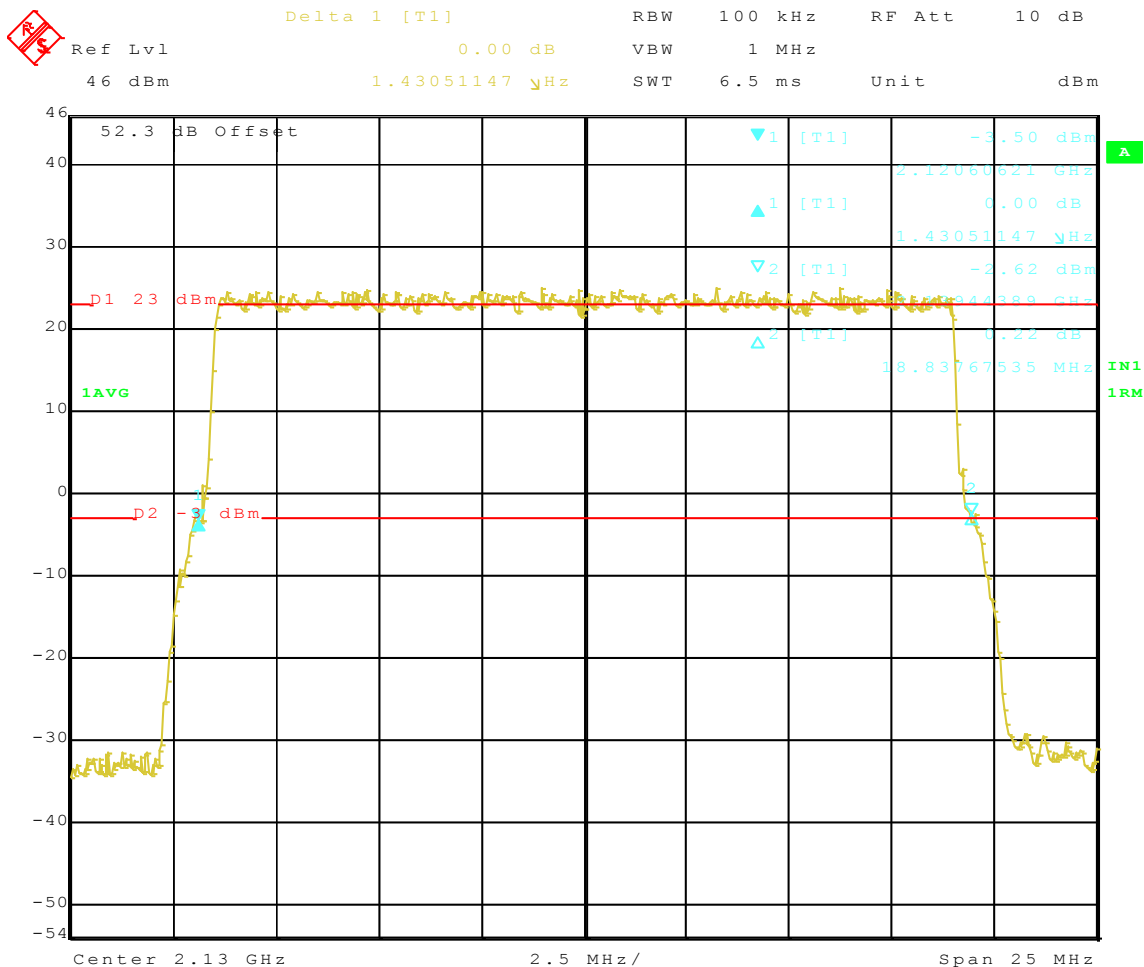


Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 9.JAN.2012 10:08:29



Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

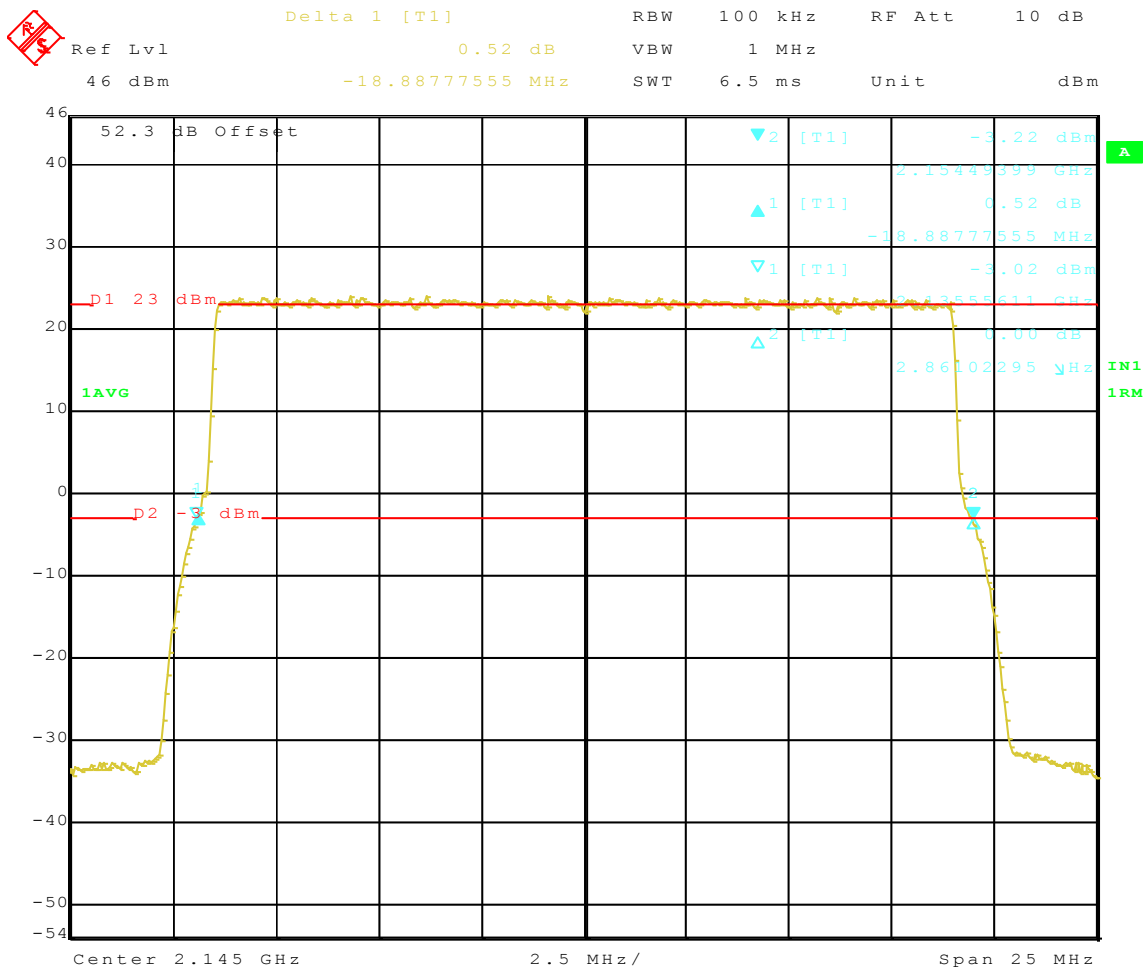
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 8.JAN.2012 13:44:27

Blocks: D+E+F

20 MHz Bandwidth 2135 – 2155 MHz

(26 dB Bandwidth)

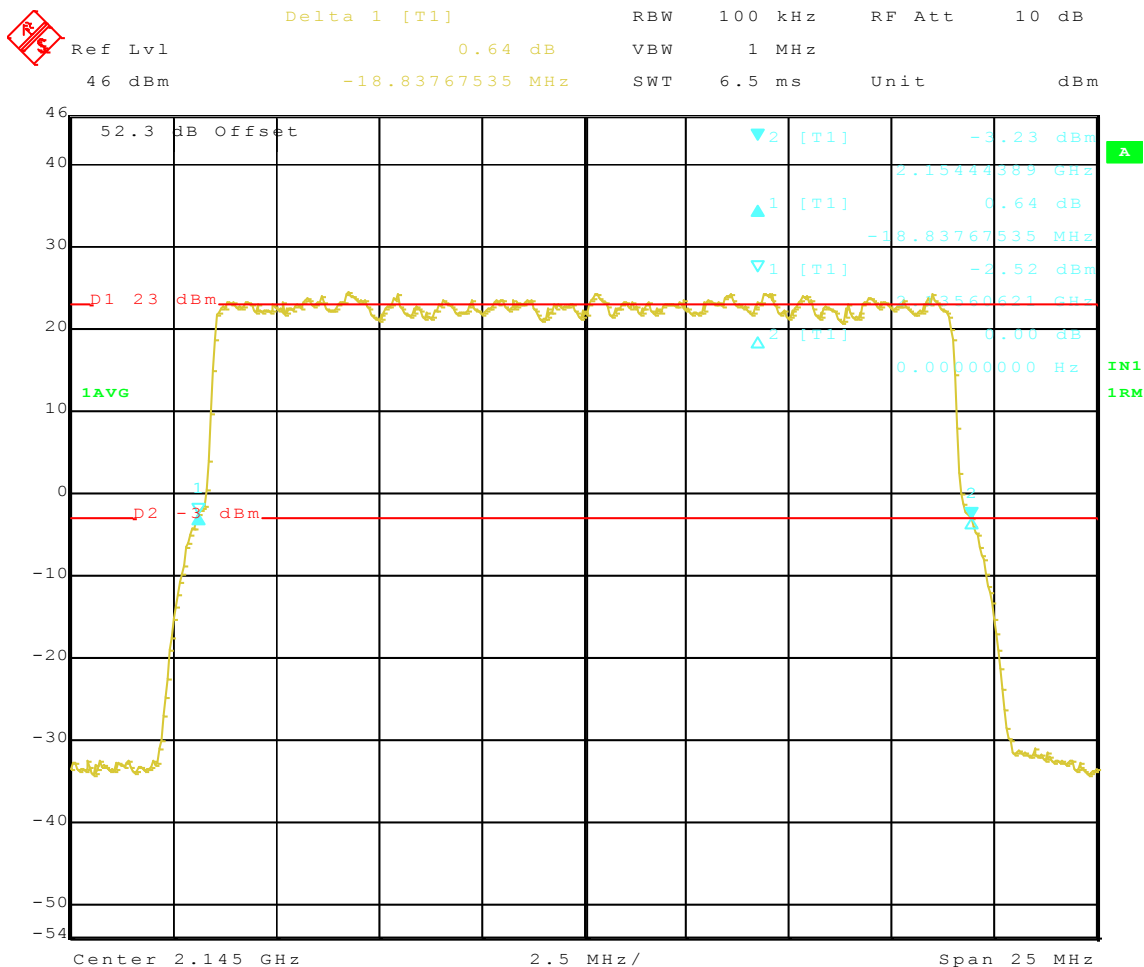


Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz

PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 13:06:55

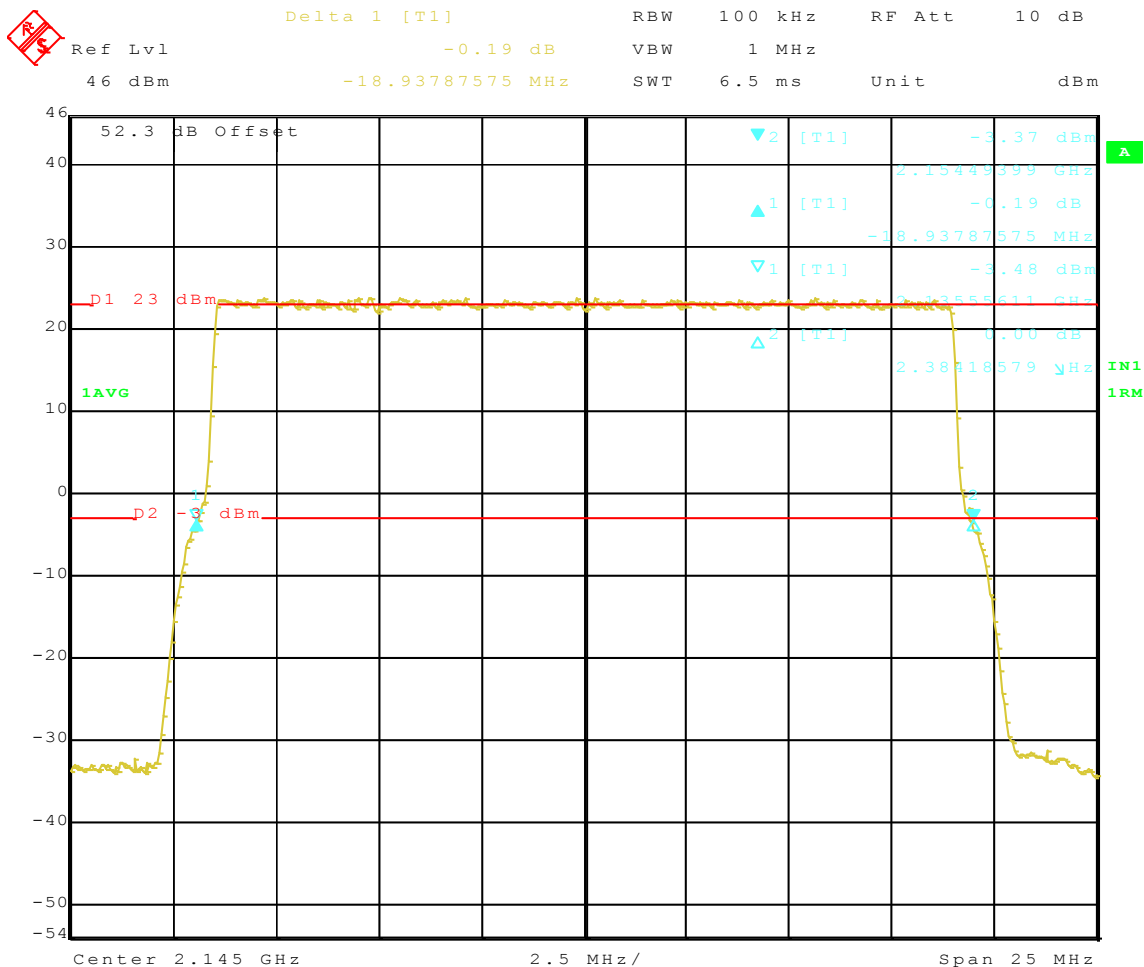


Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz

PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 14:18:32



Title: 26dB BANDWIDTH; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz

PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 14:38:16

**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) Trials 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 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 9442 RRH2X40-AWS with 20 MHz carrier**”.

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

The frequencies and blocks used were tabulated on the bottom of each plot. The output signals at RF filter were plotted at each frequency/block. The LTE RRHs 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 all 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): Based on measurement instrument employing resolution bandwidth of 1MHz bands or greater out band emissions shall be attenuated at least $43 + 10\log(P)$ dB or -13dBm. However in 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 200 kHz (1% of 20 MHz) may be employed.

The list of Blocks, Bands and Power measured at External Antenna Connector (EAC)

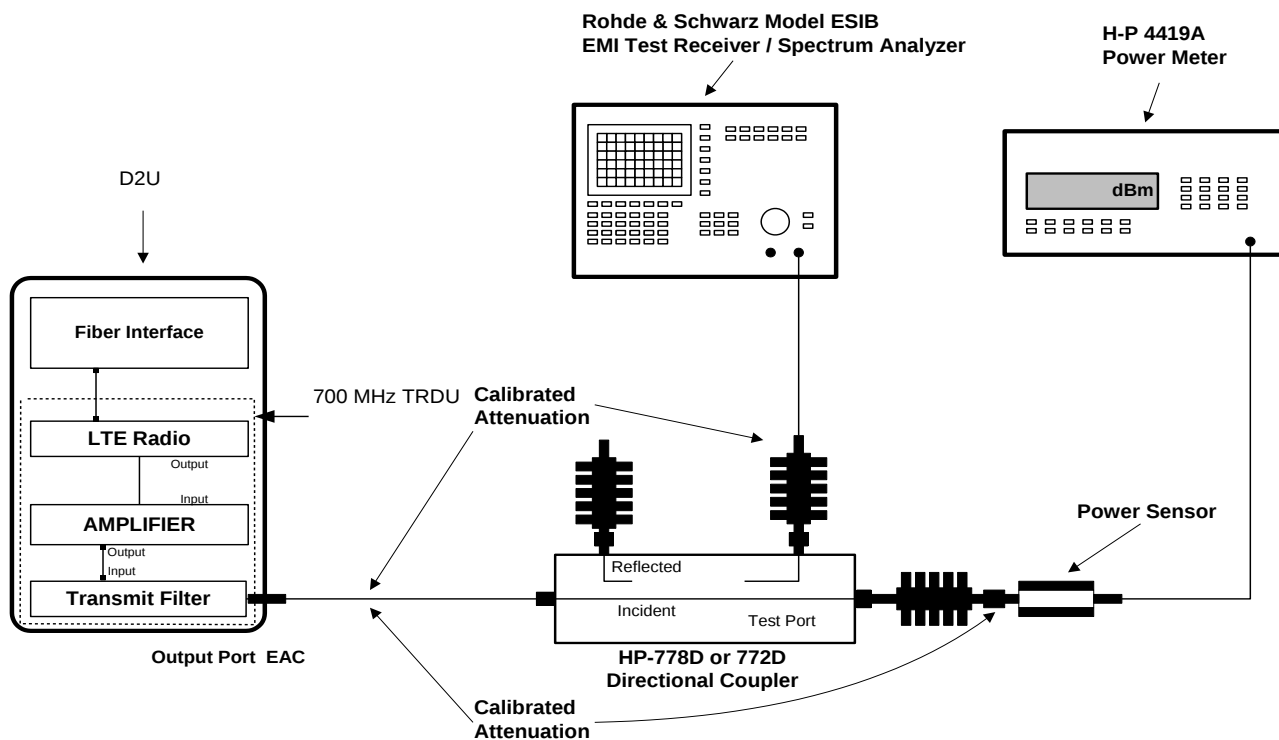
Band	Block	Frequency (MHz)	Power (Watts)
	A+B	2110 – 2130	40
	B+C+D	2120 – 2140	40
	D+E+F	2135 - 2155	40

Measurement uncertainty:

Frequency: 100 Hz

Amplitude: 0.5 dB

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

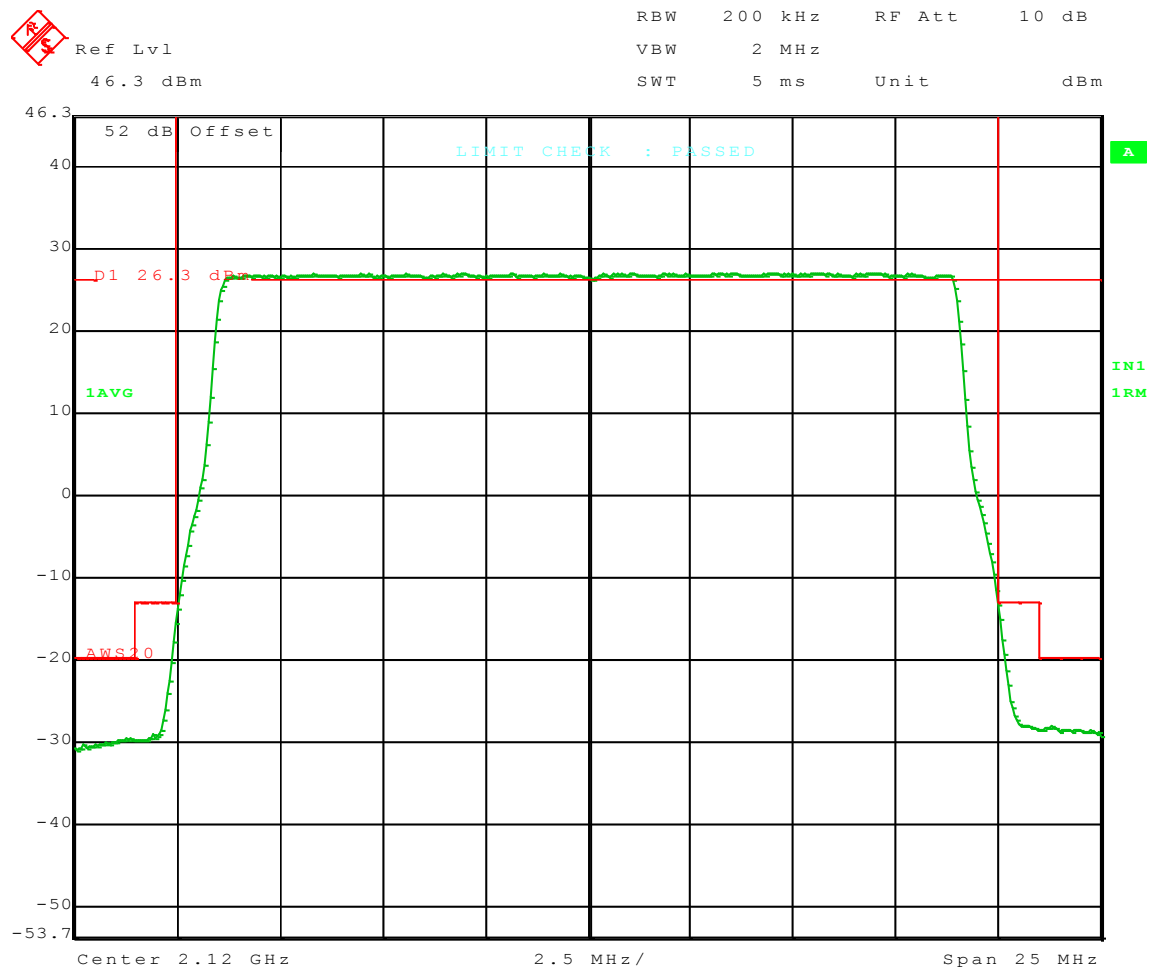


All components are calibrated over the frequency range of interest

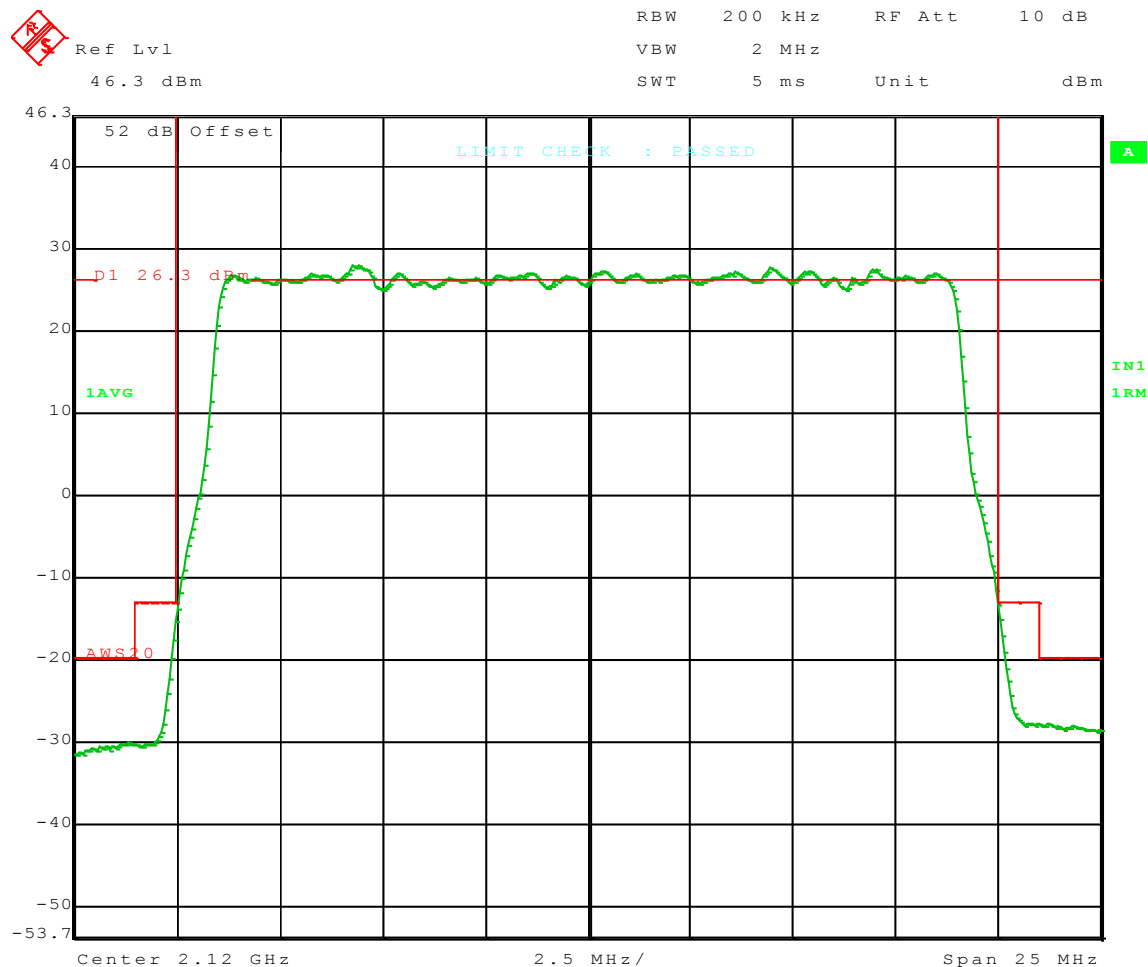
Block: A+B

20 MHz Bandwidth 2110 – 2130 MHz

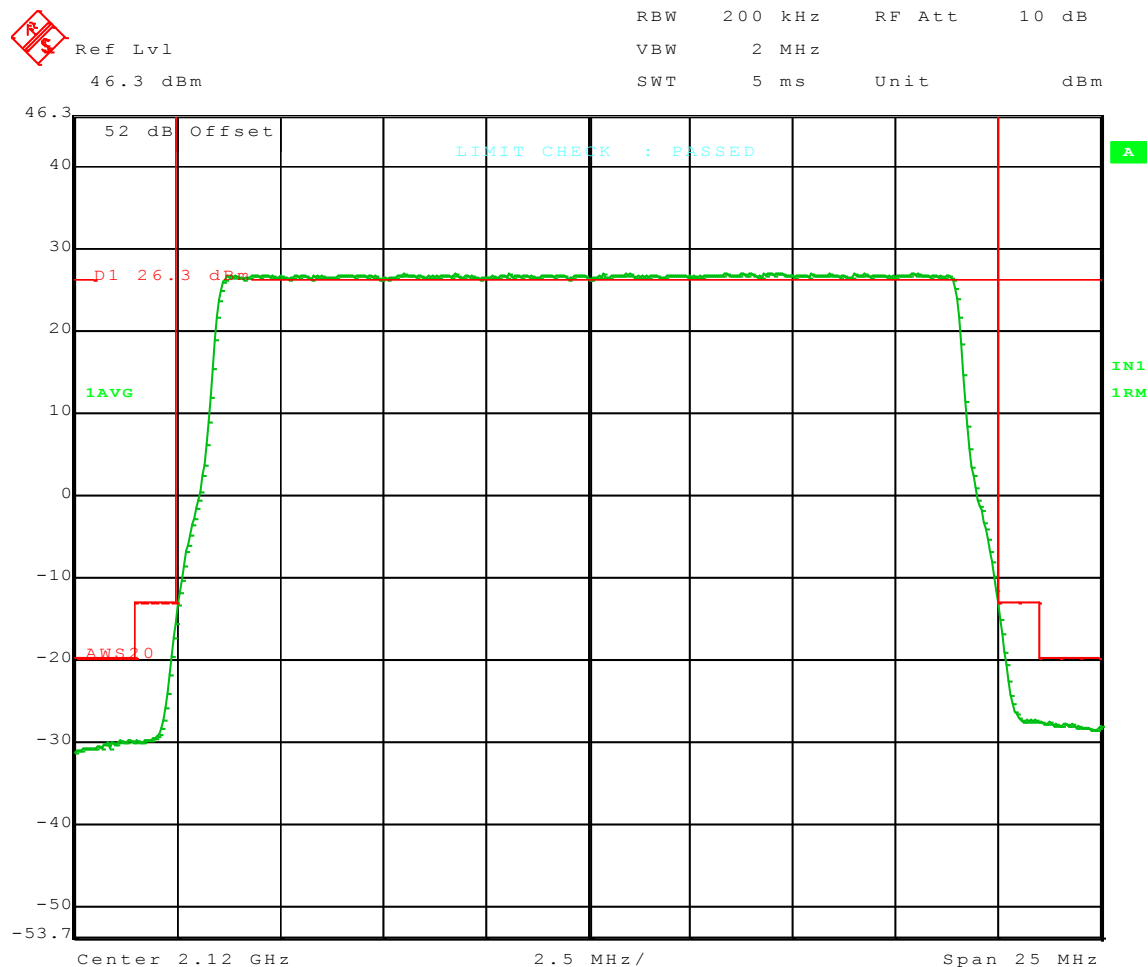
SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
 Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz
 PWR:40W; QPSK; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
 Date: 13.FEB.2012 12:59:25



Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
 Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz
 PWR:40W; 16QAM; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
 Date: 13.FEB.2012 12:51:49

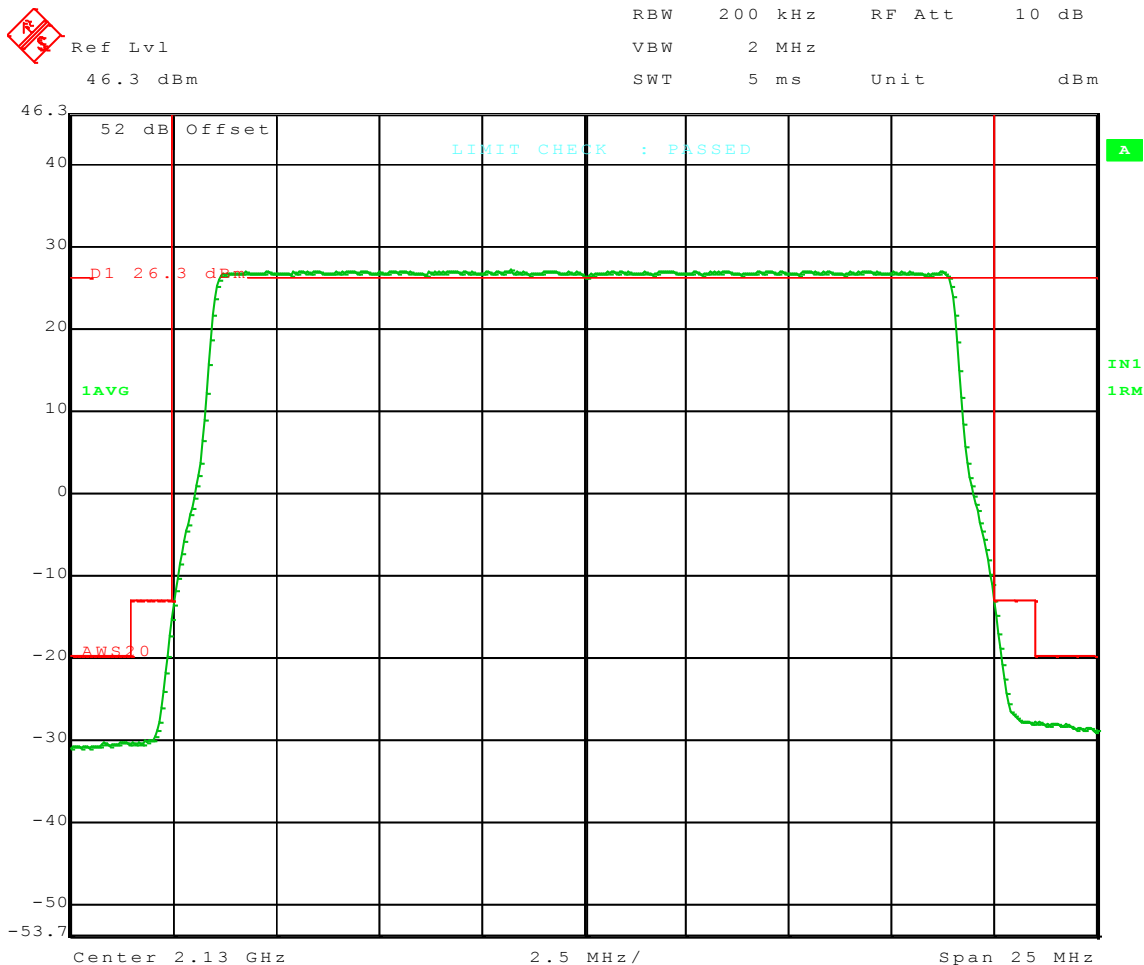


Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
 Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz
 PWR:40W; 64QAM; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
 Date: 13.FEB.2012 13:12:04

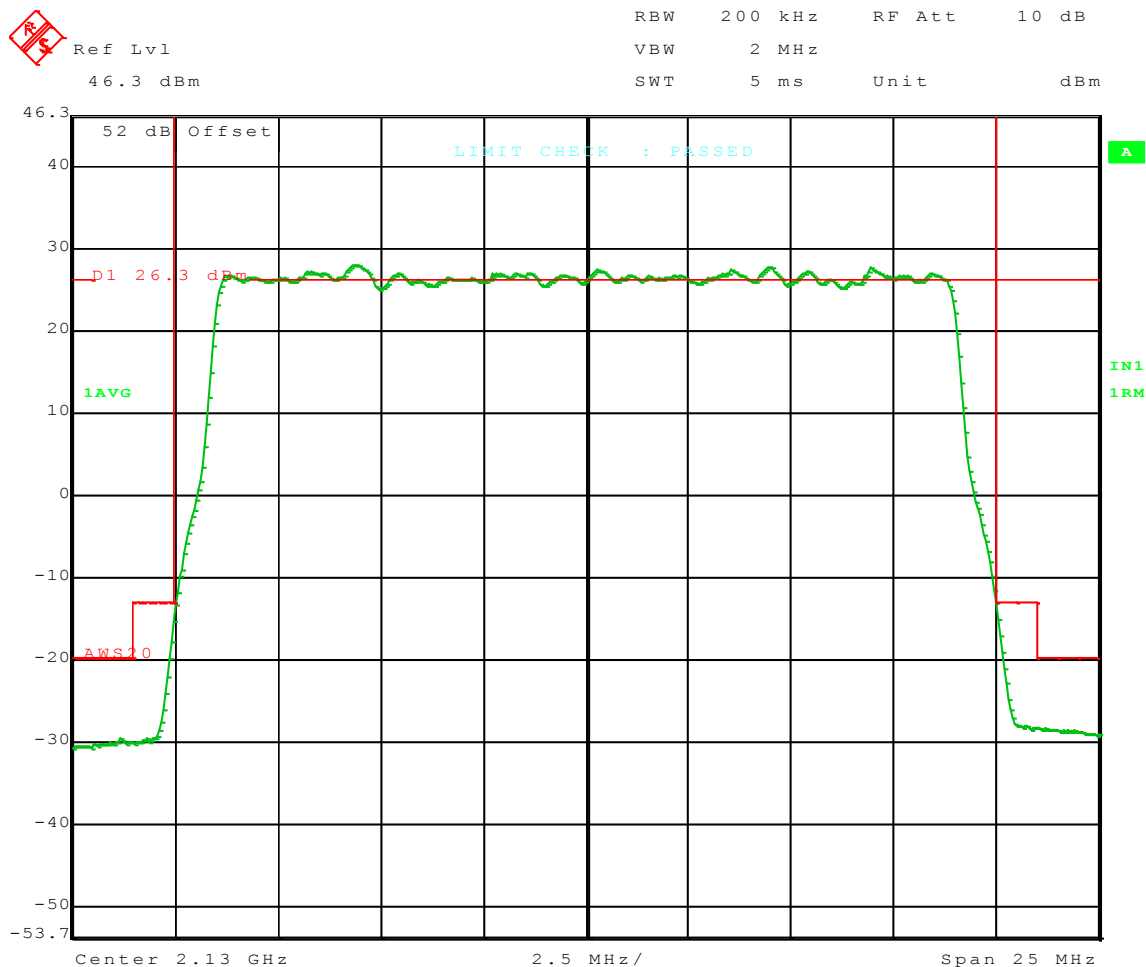
Block: B+C+D

20 MHz Bandwidth 2120 – 2140 MHz

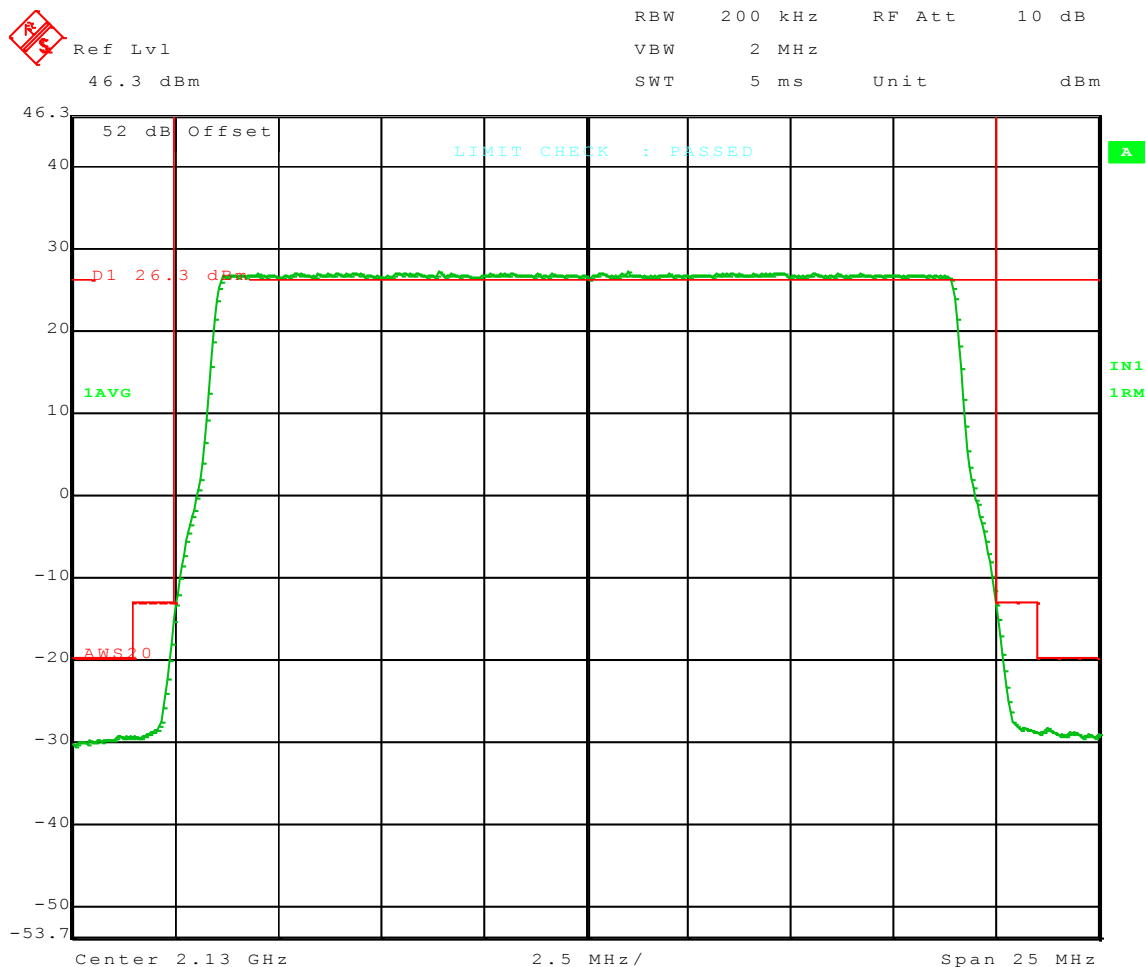
SPECTRUM MASK/OCCUPIED BANDWIDTH



Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
PWR:40W; QPSK; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
Date: 13.FEB.2012 13:58:55



Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
 Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
 PWR:40W; 16QAM; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
 Date: 13.FEB.2012 13:46:40

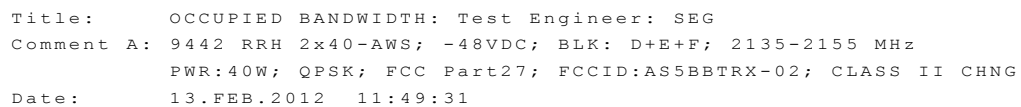


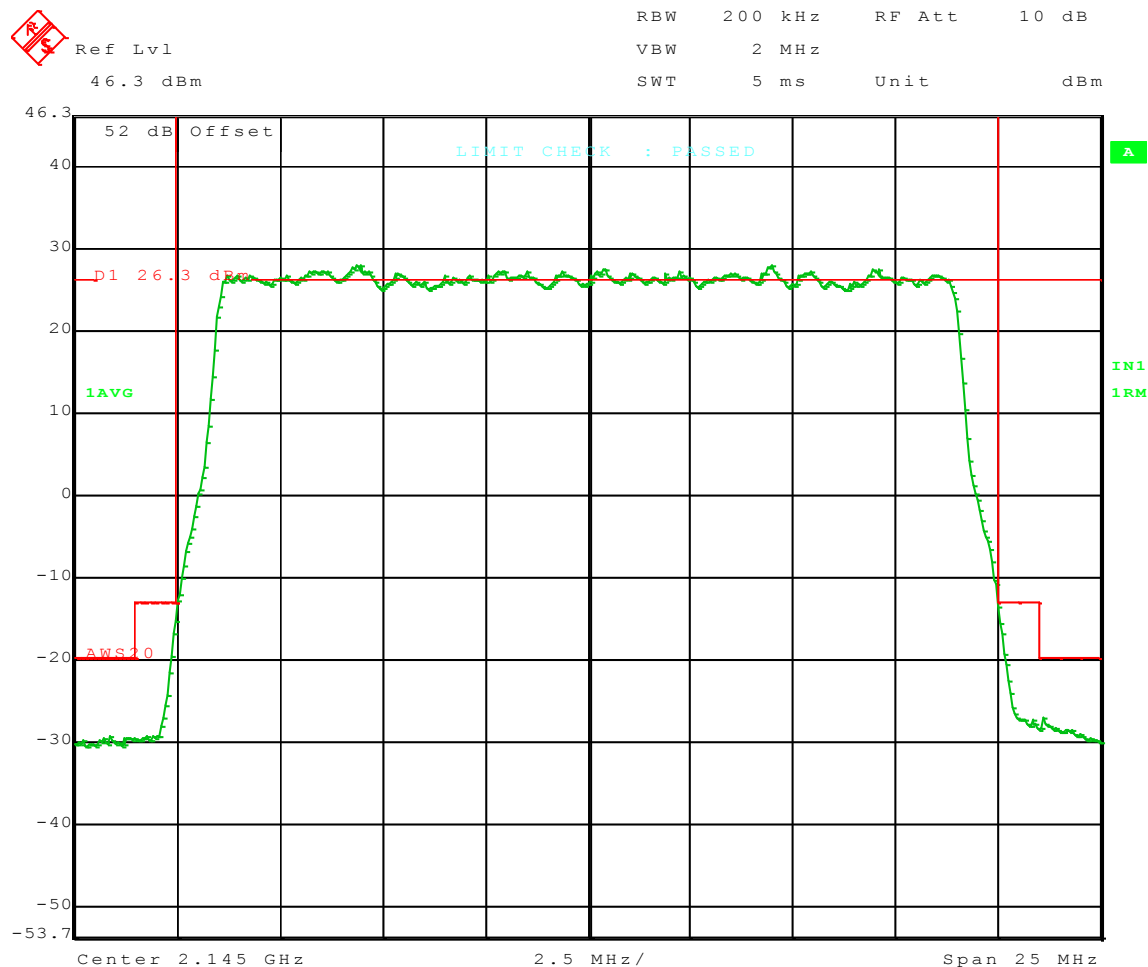
Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
 Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
 PWR:40W; 64QAM; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
 Date: 13.FEB.2012 13:27:15

Block: D+E+F

20 MHz Bandwidth 2135 – 2155 MHz

SPECTRUM MASK/OCCUPIED BANDWIDTH



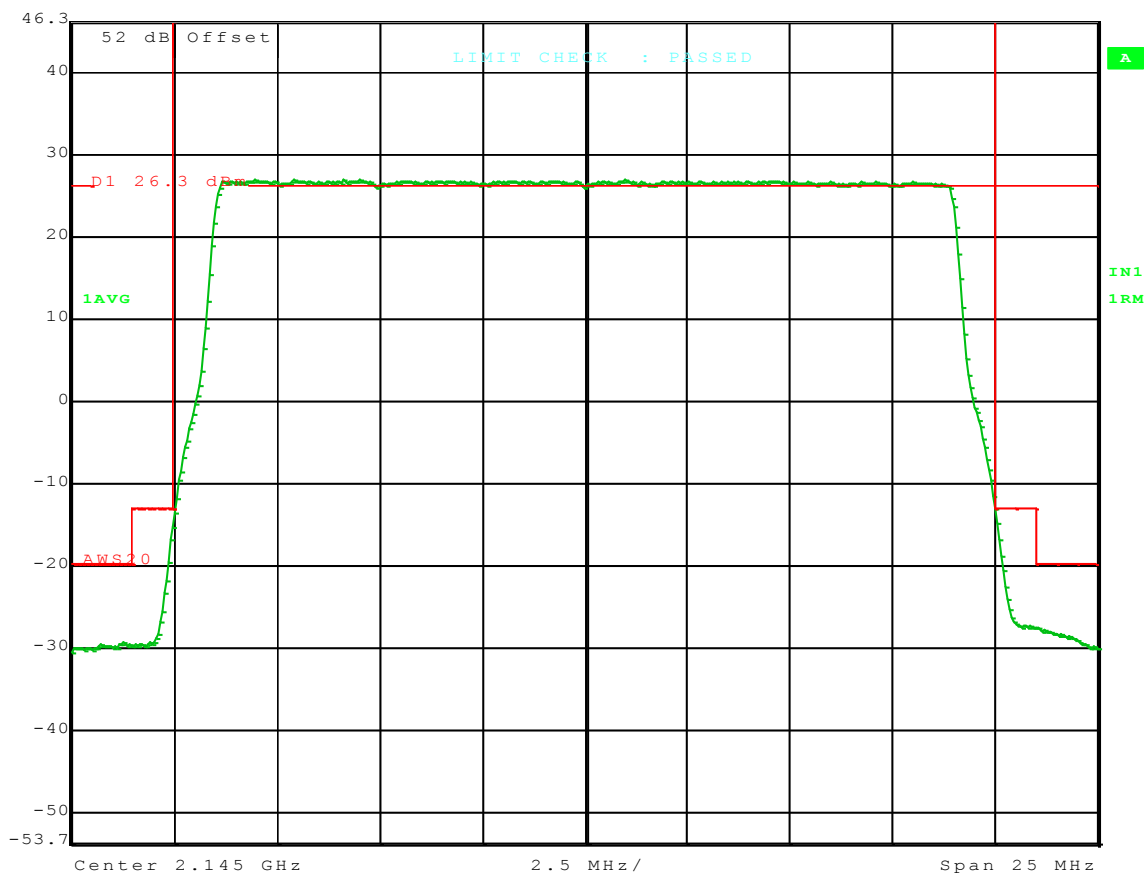


Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
 Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
 PWR:40W; 16QAM; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
 Date: 13.FEB.2012 12:35:15



Ref Lvl
46.3 dBm

RBW 200 kHz RF Att 10 dB
VBW 2 MHz
SWT 5 ms Unit dBm



Title: OCCUPIED BANDWIDTH: Test Engineer: SEG
Comment A: 9442 RRH 2x40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; 64QAM; FCC Part27; FCCID:AS5BBTRX-02; CLASS II CHNG
Date: 13.FEB.2012 11:32:38

Measurement 4

FCC Section 2.1051 and 27.53 (C)

Spurious Emissions at Antenna Transmit Terminals

Measurement -4

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

Spurious Emissions at Transmit Antenna Terminals

Spurious Emissions at the transmit-antenna terminals were investigated over the frequency range of 9 kHz to the 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 40W per carrier for 20 MHz Bandwidth (10 MHz and 5MHz Bandwidth s already FCC approved) 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:

Band	Block	Frequency (MHz)	Power (Watts)
	A+B	2110 – 2130	40
	B+C+D	2120 – 2140	40
	D+E+F	2135 - 2155	40

FCC Section 27.53(h): Based on measurement instrument employing resolution bandwidth of 1MHz bands or greater out band emissions shall be attenuated at least $43 + 10\log(P)$ dB or -13dBm. However in 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 200 kHz (1% of 20 MHz) may be employed.

The tests were performed in following modulation configurations:

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

RESULTS:

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

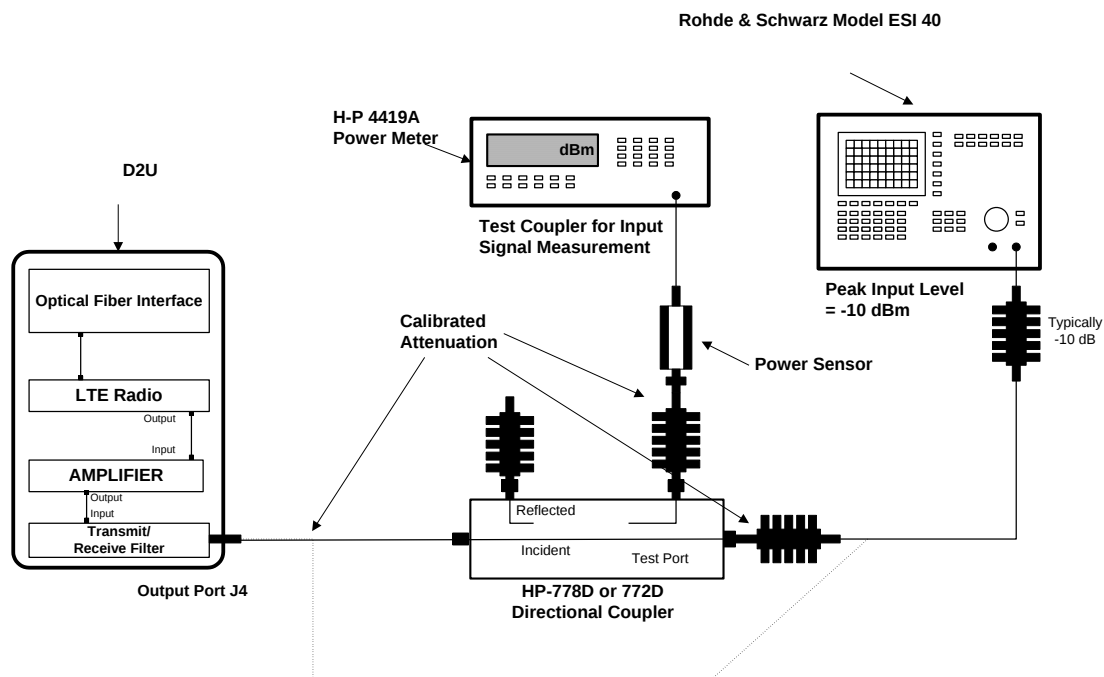
Measurement uncertainty:

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

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

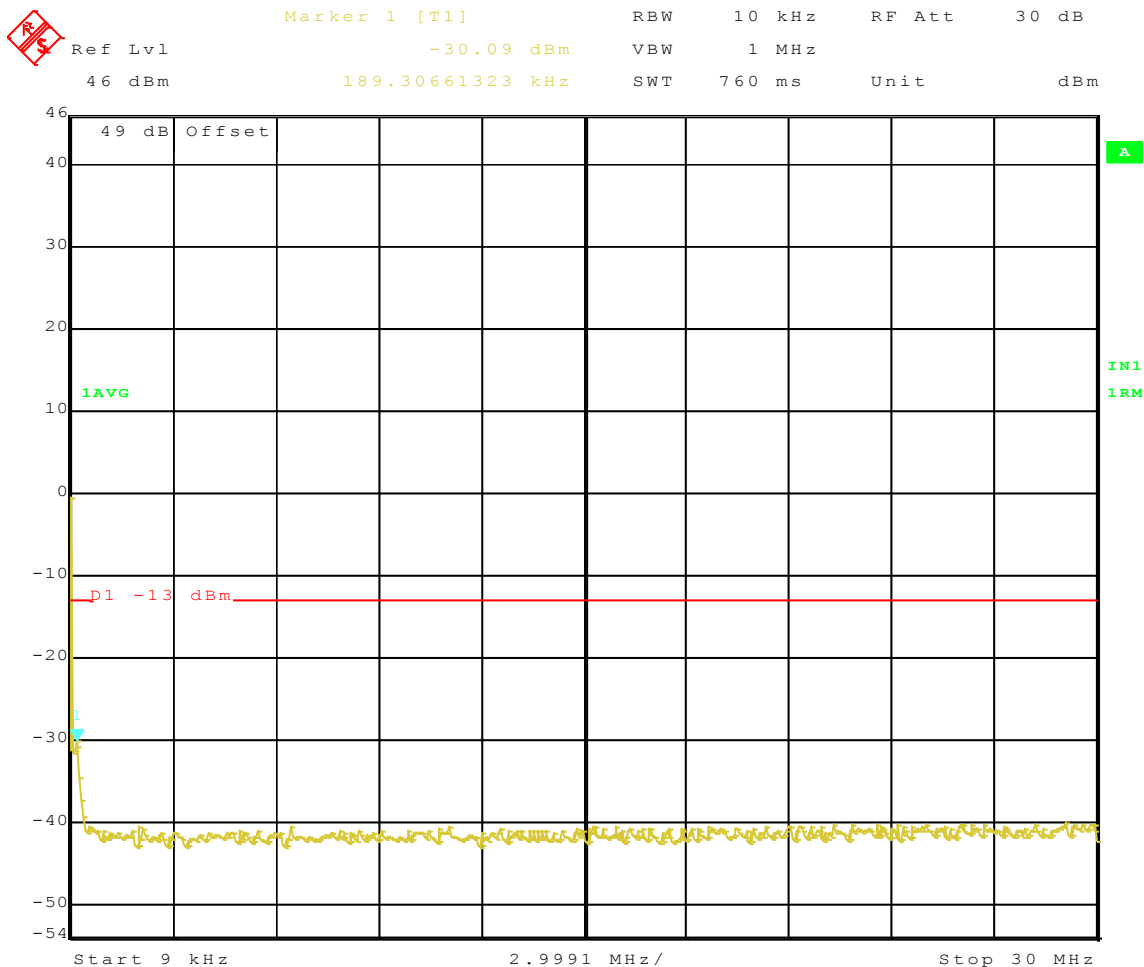
1 GHz to 10 GHz: Frequency = 10 kHz, Amplitude = 0.5 dB

Figure A. TEST CONFIGURATION FOR CONDUCTED SPURIOUS



Transmit Port
Antenna Conducted Spurious Emissions

Block: A+B
QPSK Modulation
Bandwidth 2110 – 2130 MHz

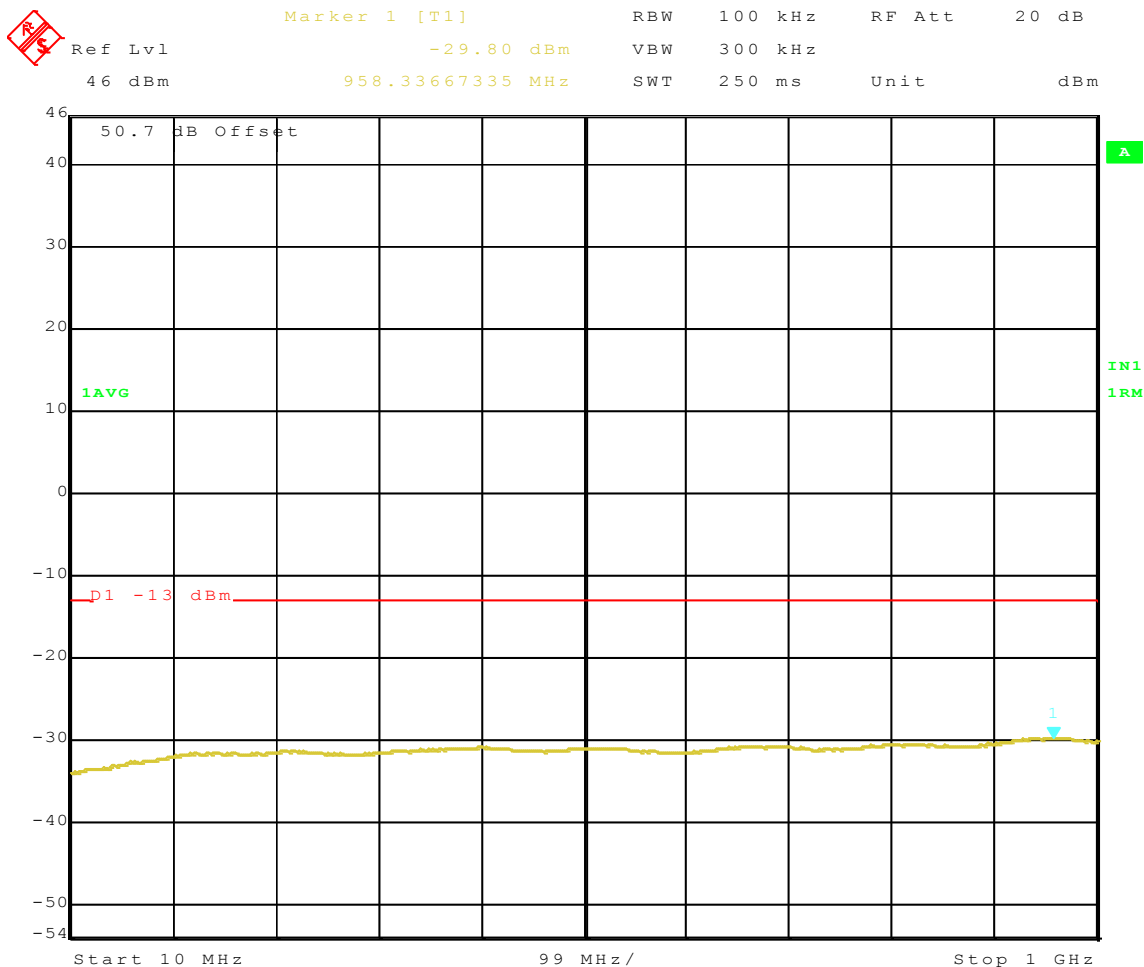


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 09:07:53

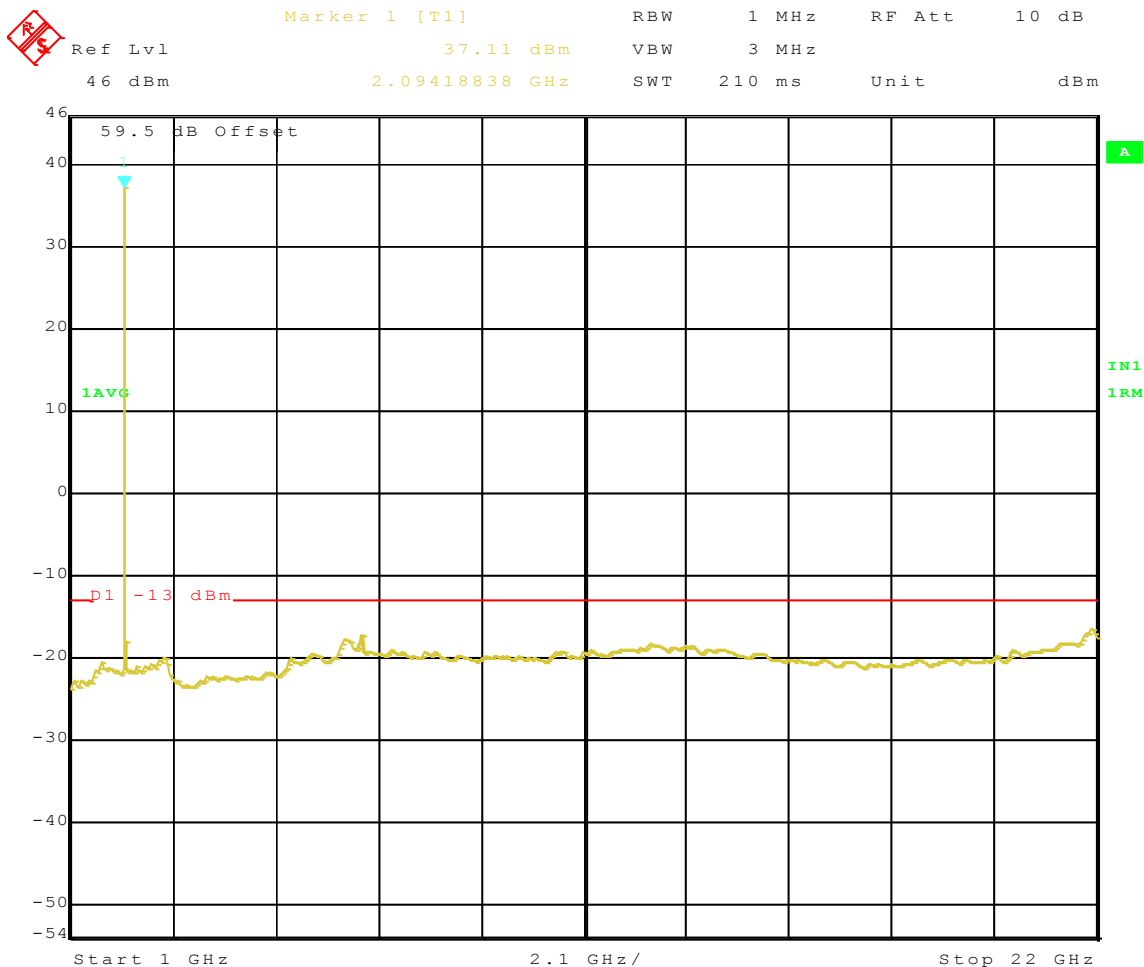


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 09:09:43



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

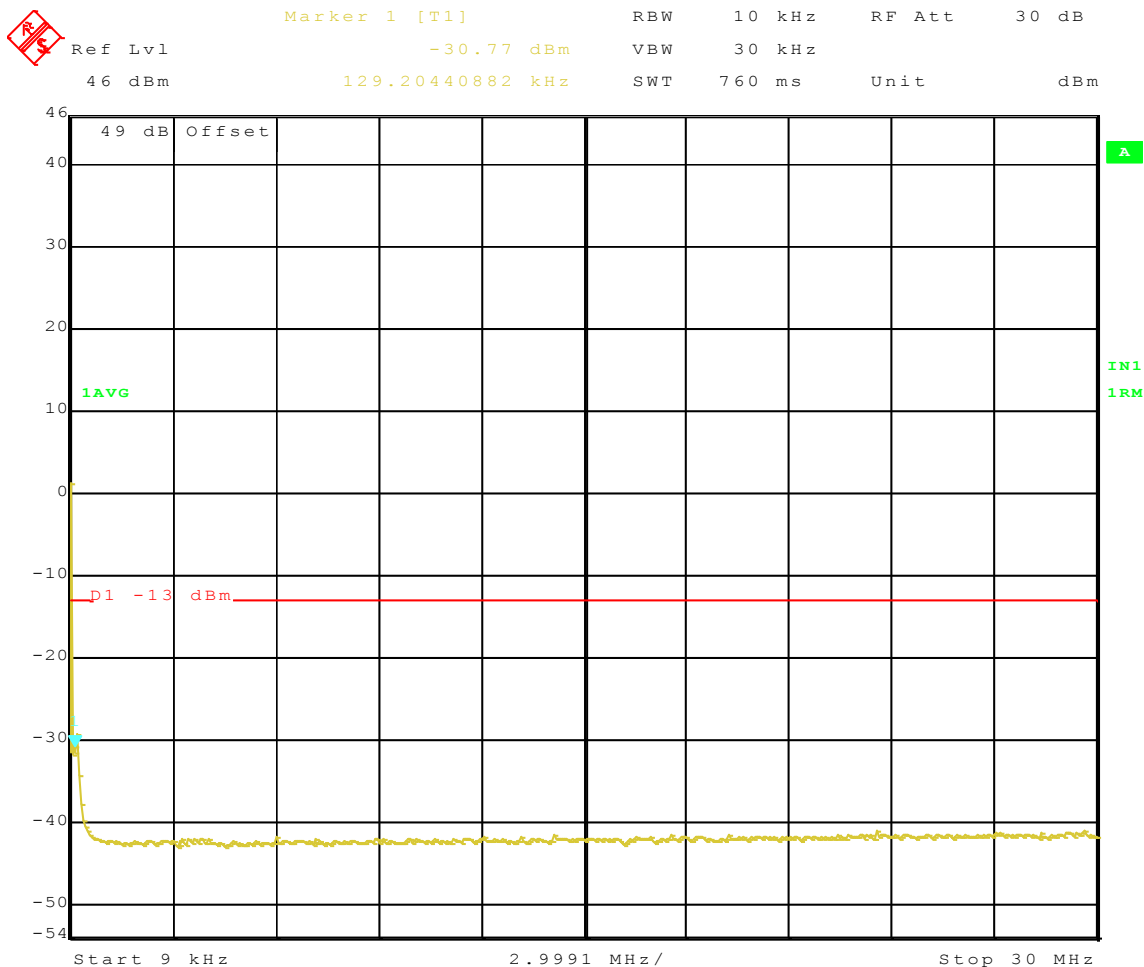
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

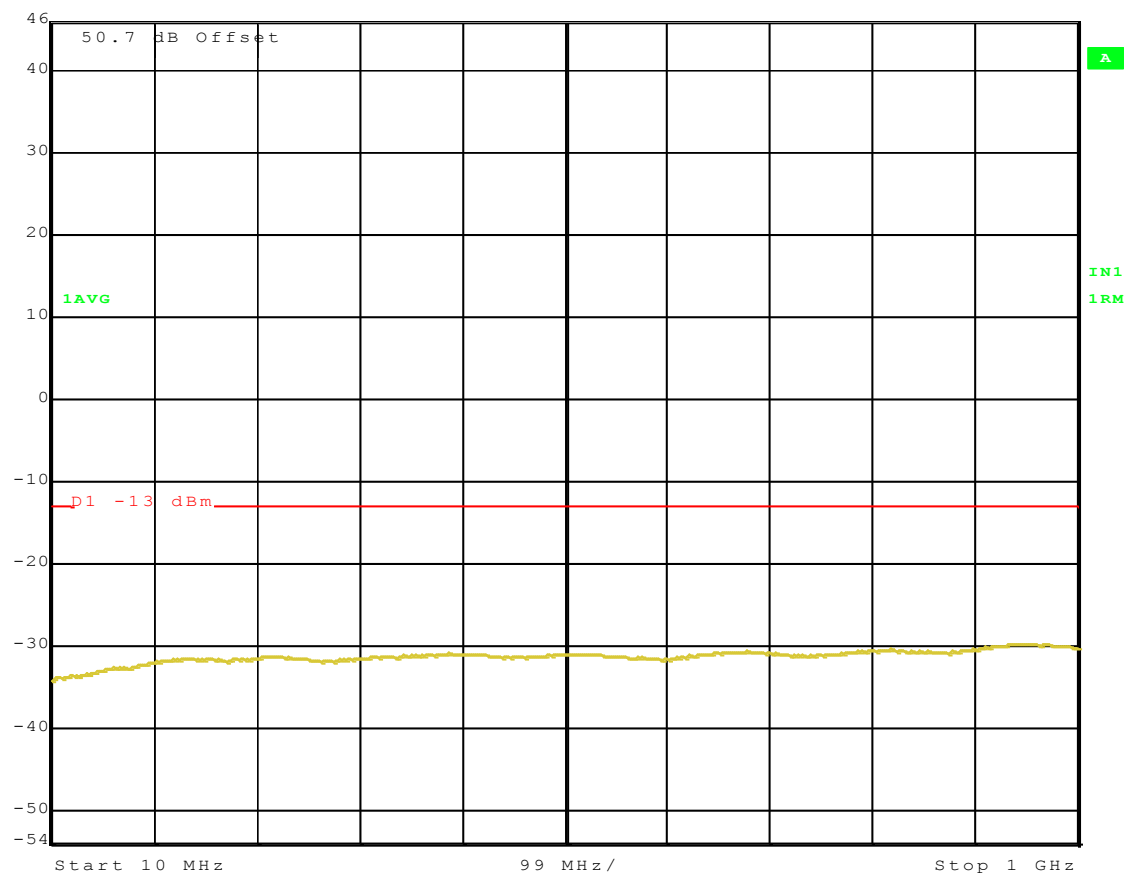
Date: 10.JAN.2012 09:10:58

Transmit Port
Antenna Conducted Spurious Emissions

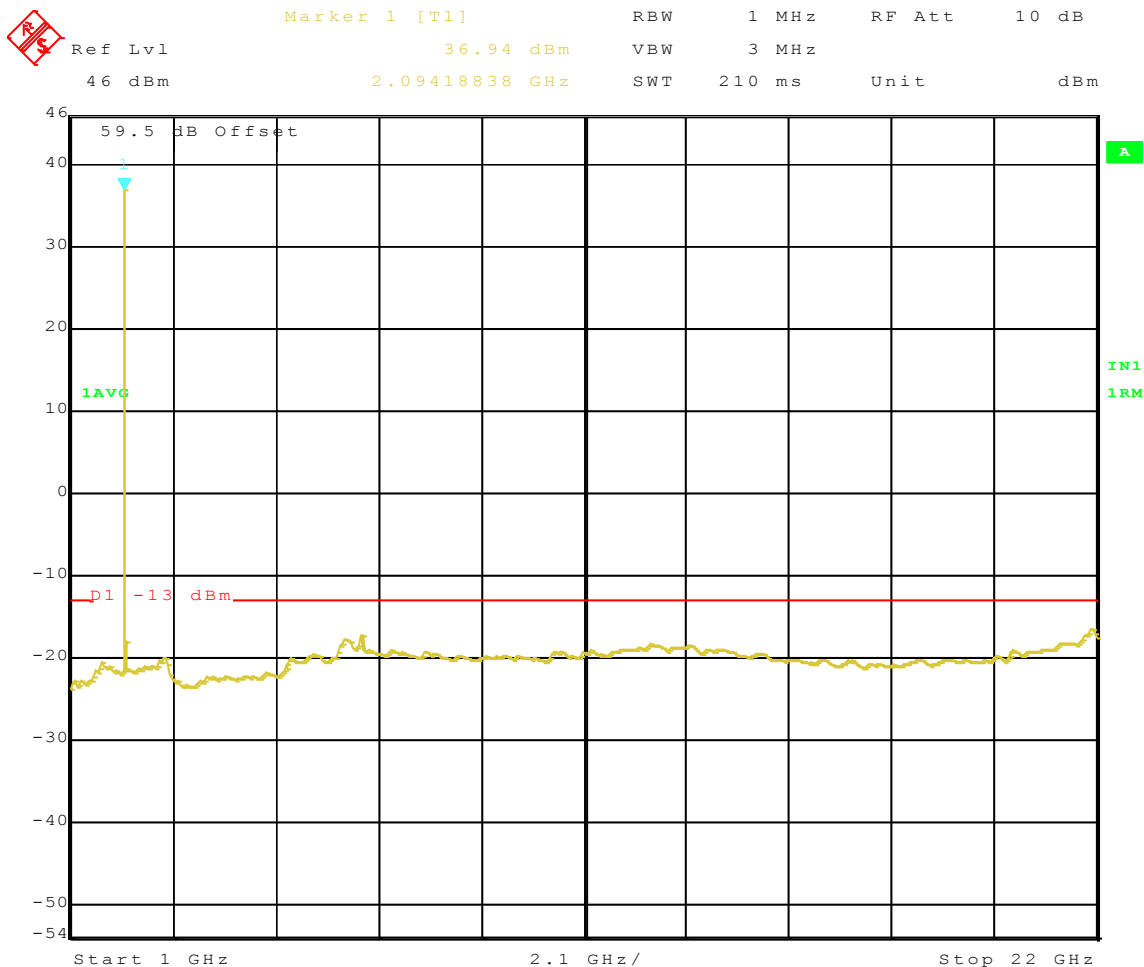
Block: A+B
16QAM Modulation
Bandwidth 2110 – 2130 MHz



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
 Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz
 PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
 Date: 10.JAN.2012 08:11:40

Ref Lvl
46 dBmRBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz
PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 08:14:42



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

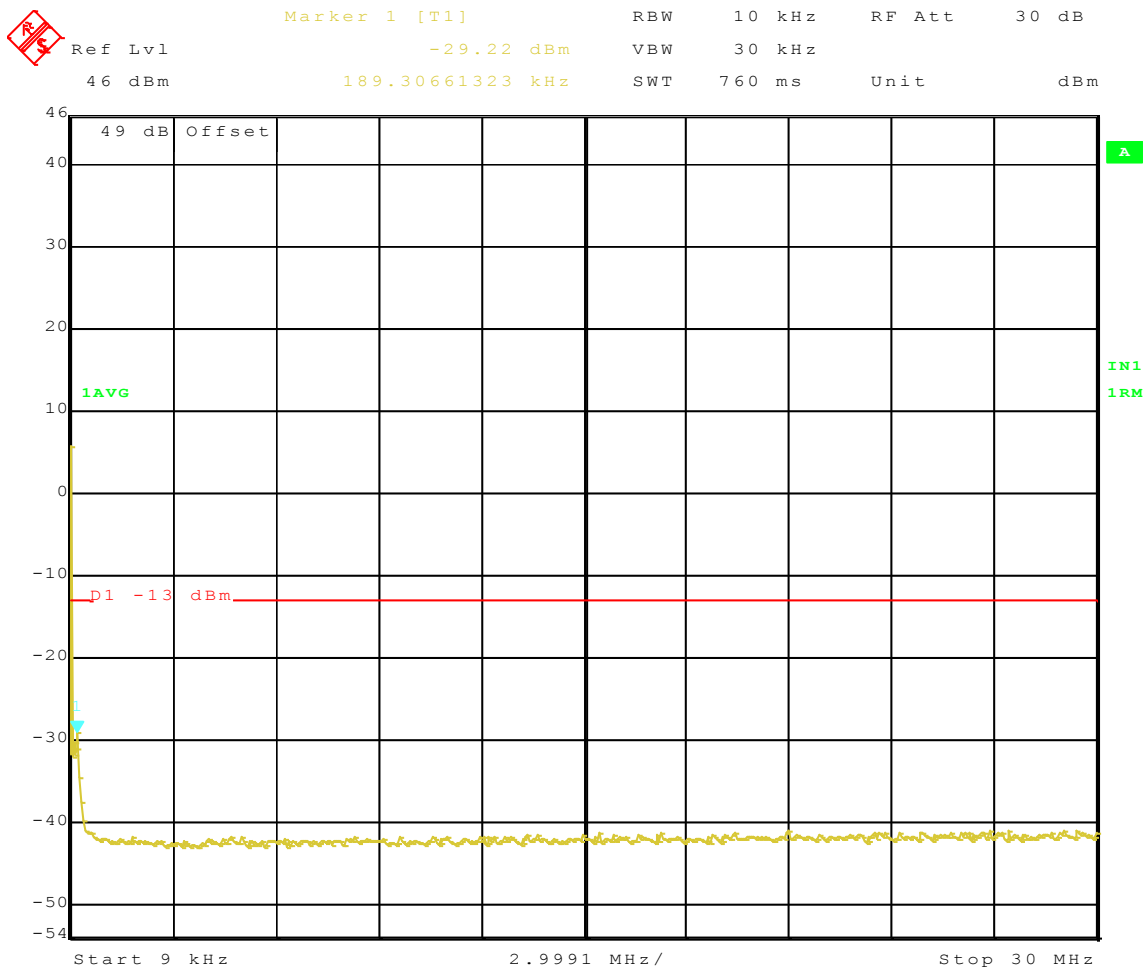
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 08:17:25

Transmit Port
Antenna Conducted Spurious Emissions

Block: A+B
64QAM Modulation
Bandwidth 2110 – 2130 MHz



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

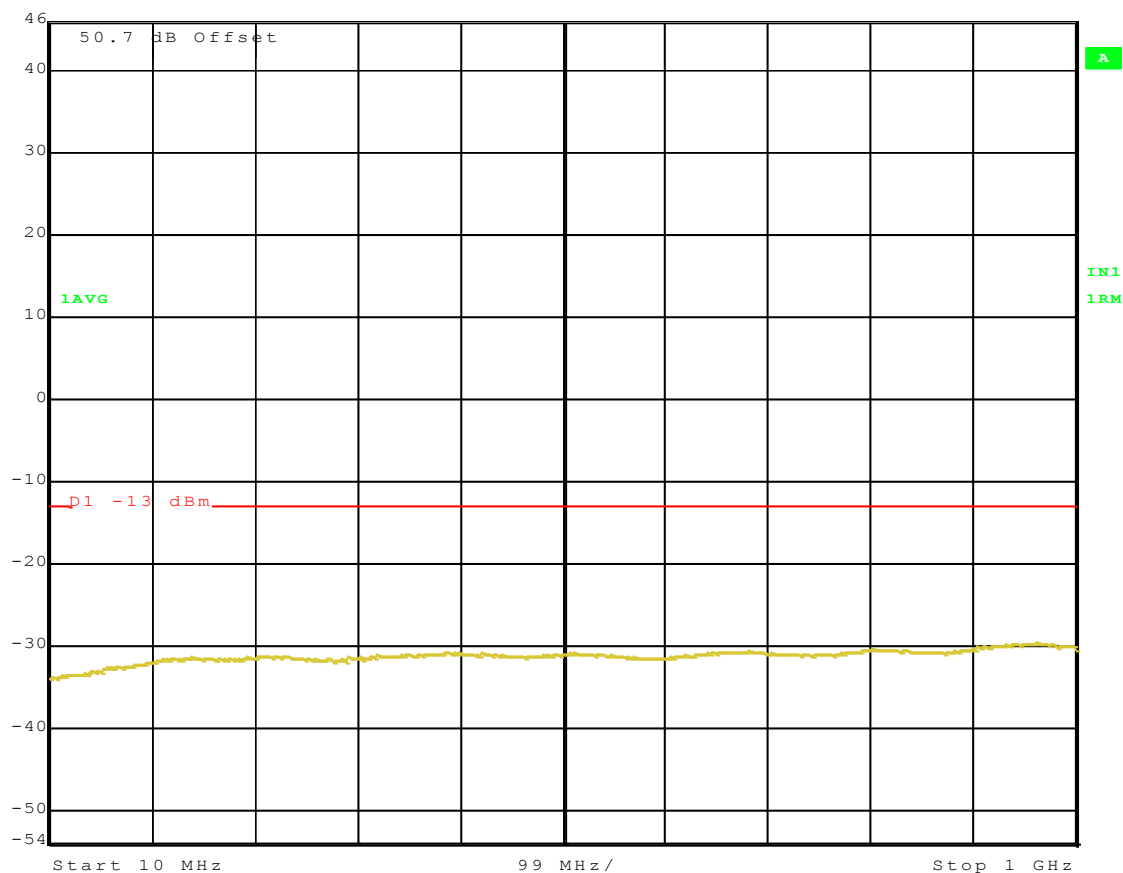
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 09:45:21

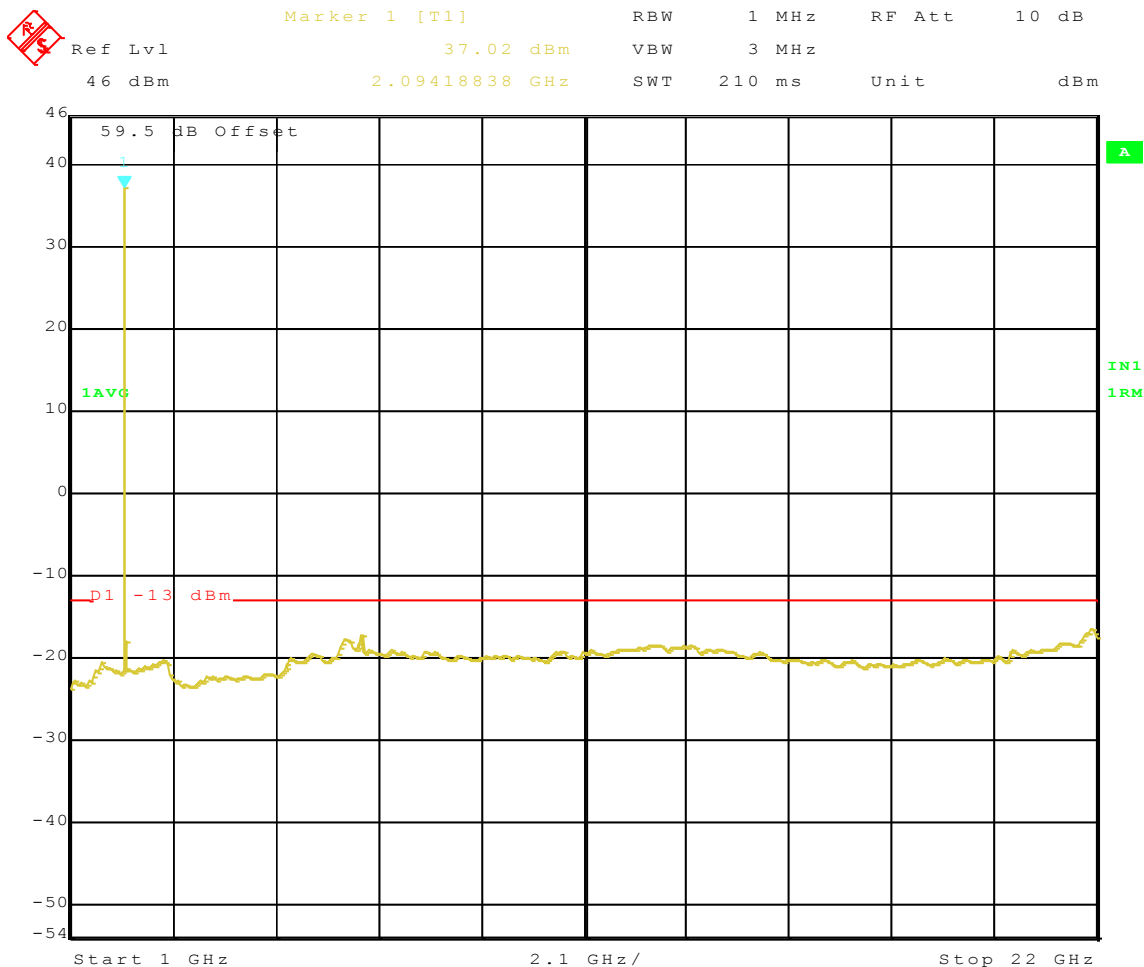


Ref Lvl
46 dBm

RBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
 Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz
 PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
 Date: 10.JAN.2012 09:44:00



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: A+B; 2110-2130 MHz

PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

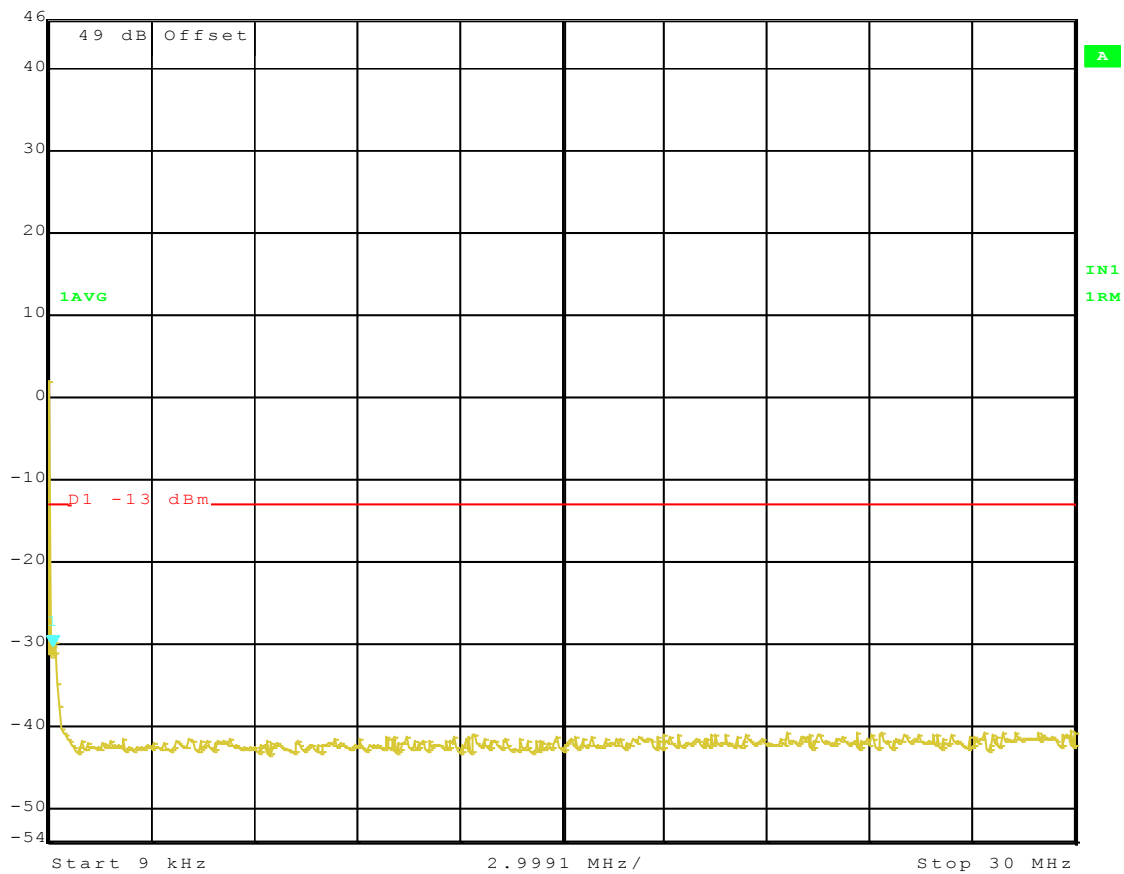
Date: 10.JAN.2012 09:42:40

Transmit Port
Antenna Conducted Spurious Emissions

Block: B+C+D
QPSK Modulation
Bandwidth 2120 – 2140 MHz



Marker 1 [T1] RBW 10 kHz RF Att 30 dB
Ref Lvl -30.48 dBm VBW 30 kHz
46 dBm 129.20440882 kHz SWT 760 ms Unit dBm

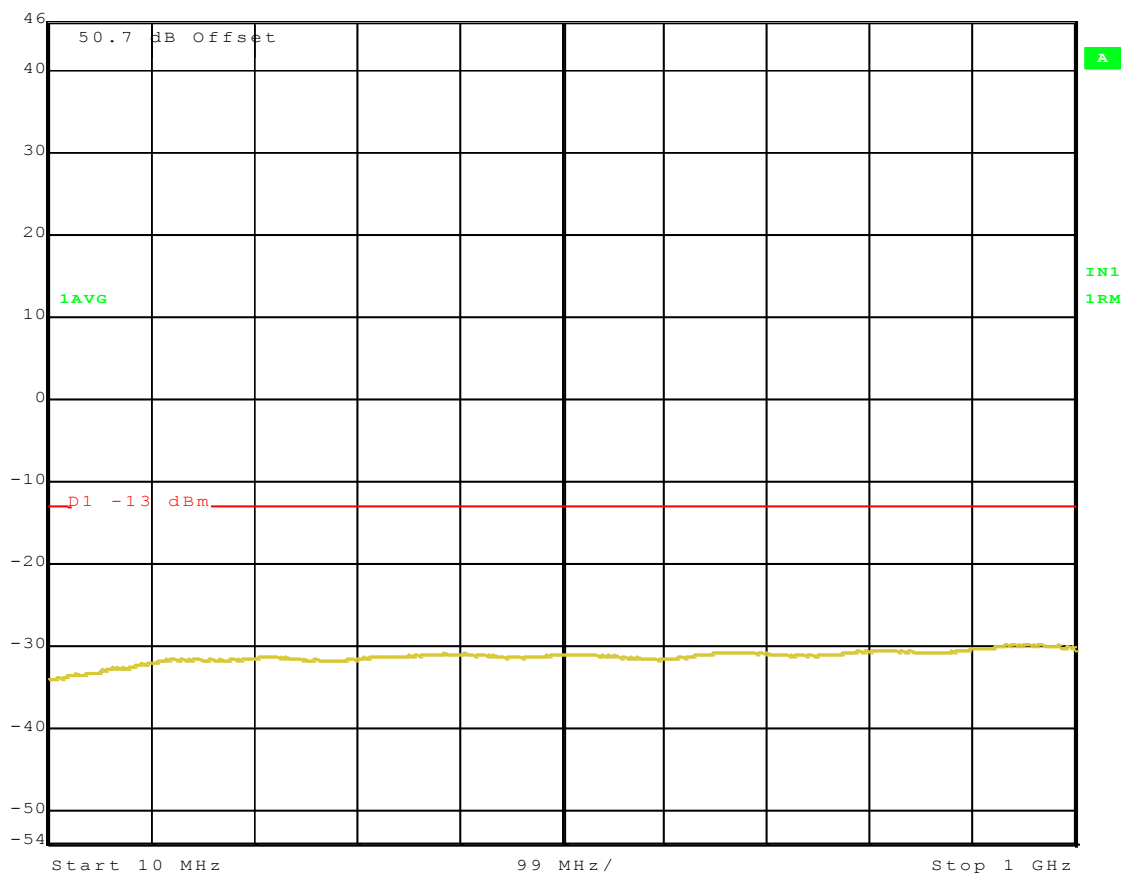


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 8.JAN.2012 09:23:12

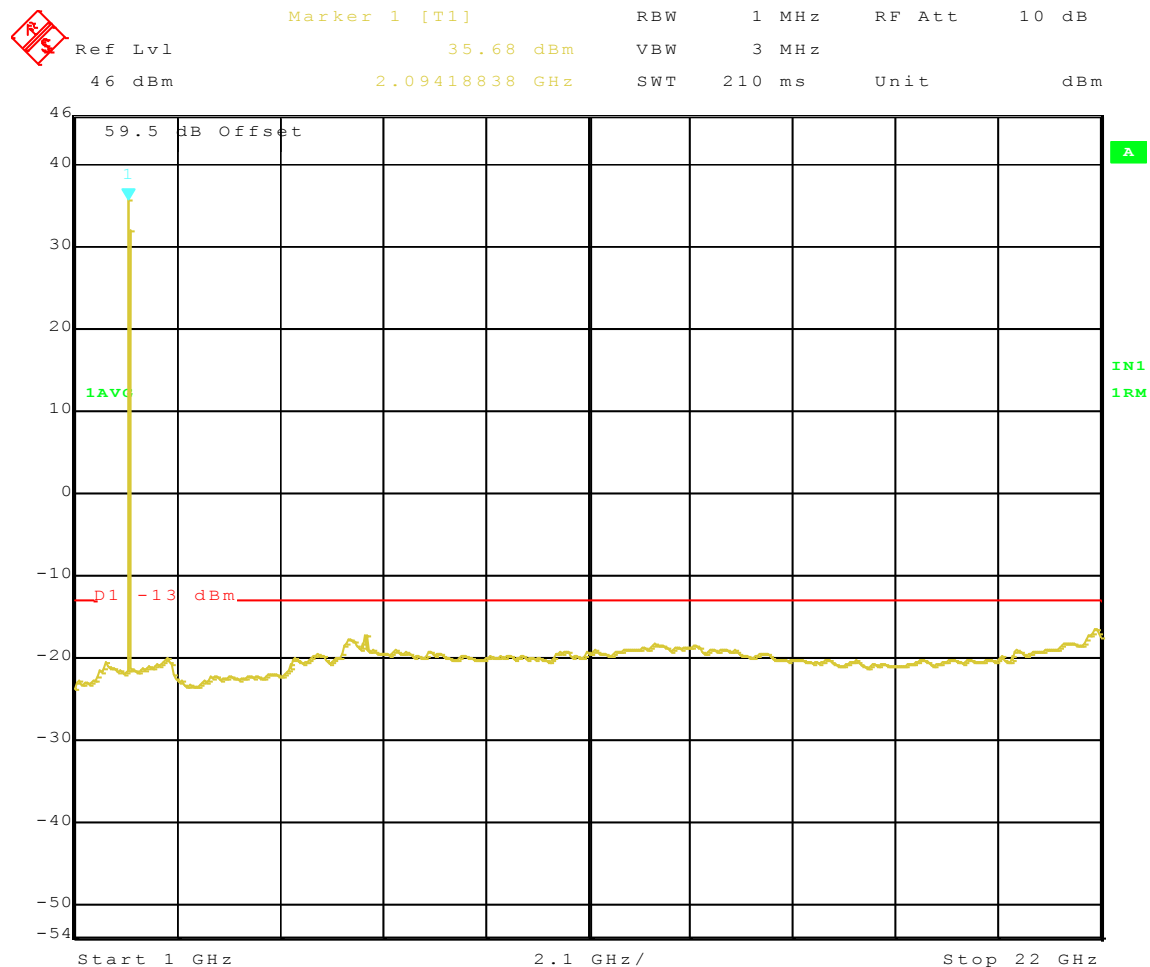


Ref Lvl
46 dBm

RBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 8.JAN.2012 09:30:53



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

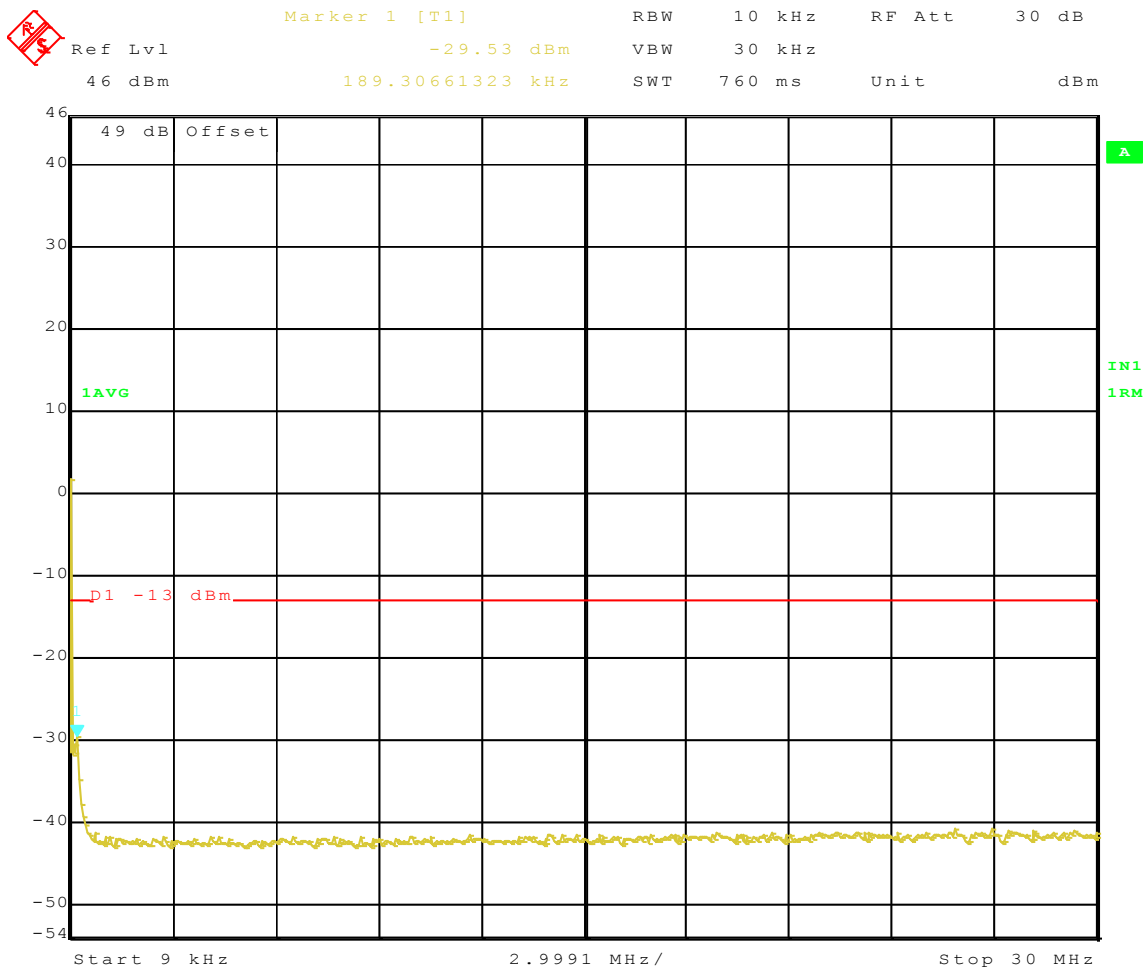
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 8.JAN.2012 09:28:37

Transmit Port
Antenna Conducted Spurious Emissions

Block: B+C+D
16QAM Modulation
Bandwidth 2120 – 2140 MHz



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

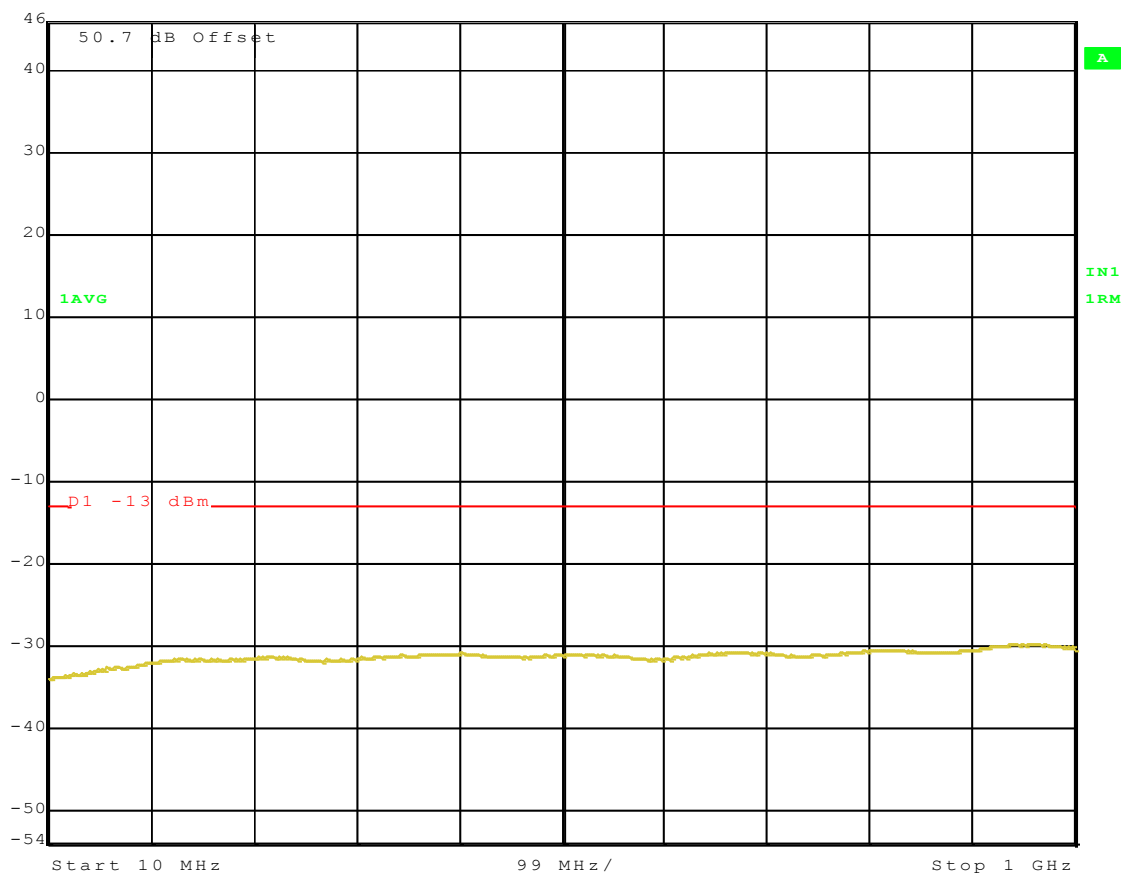
PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 9.JAN.2012 10:19:01

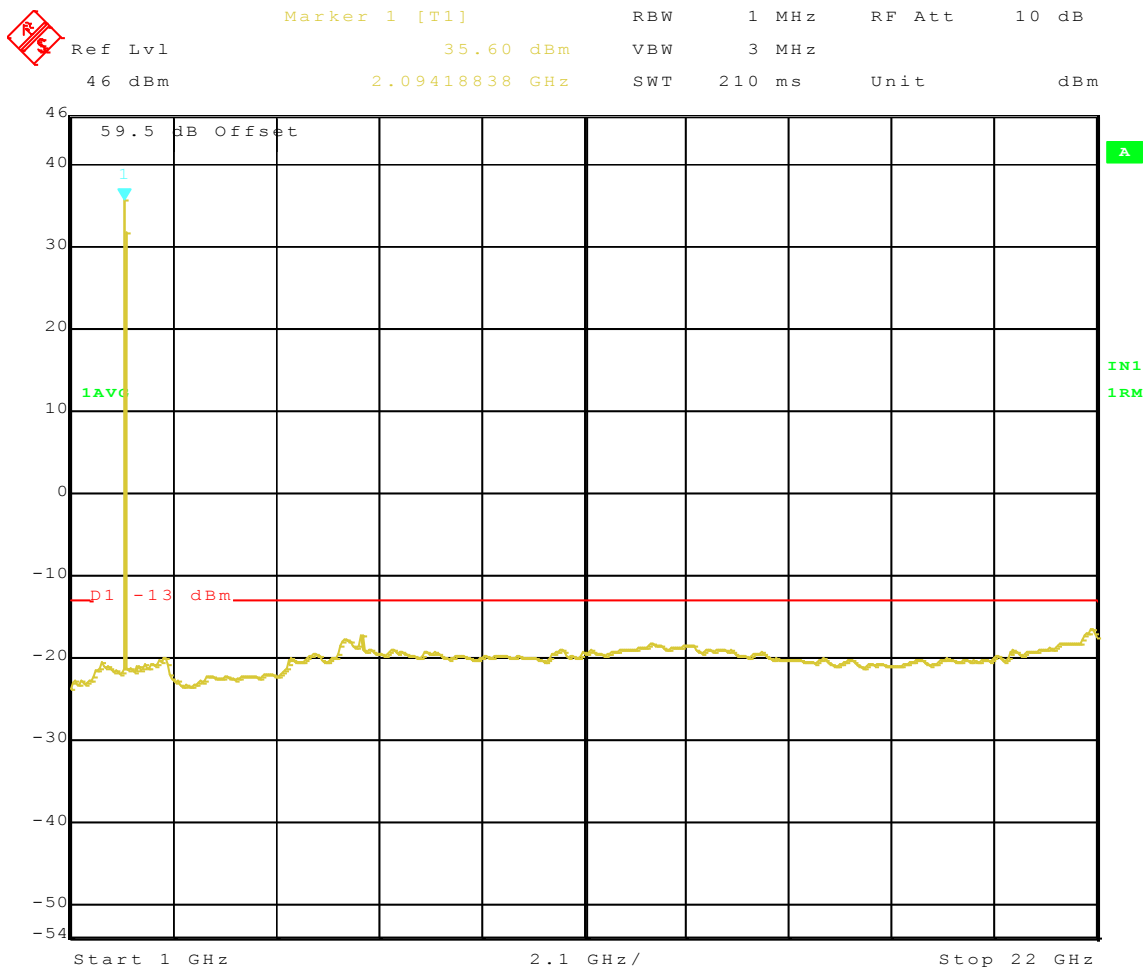


Ref Lvl
46 dBm

RBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm



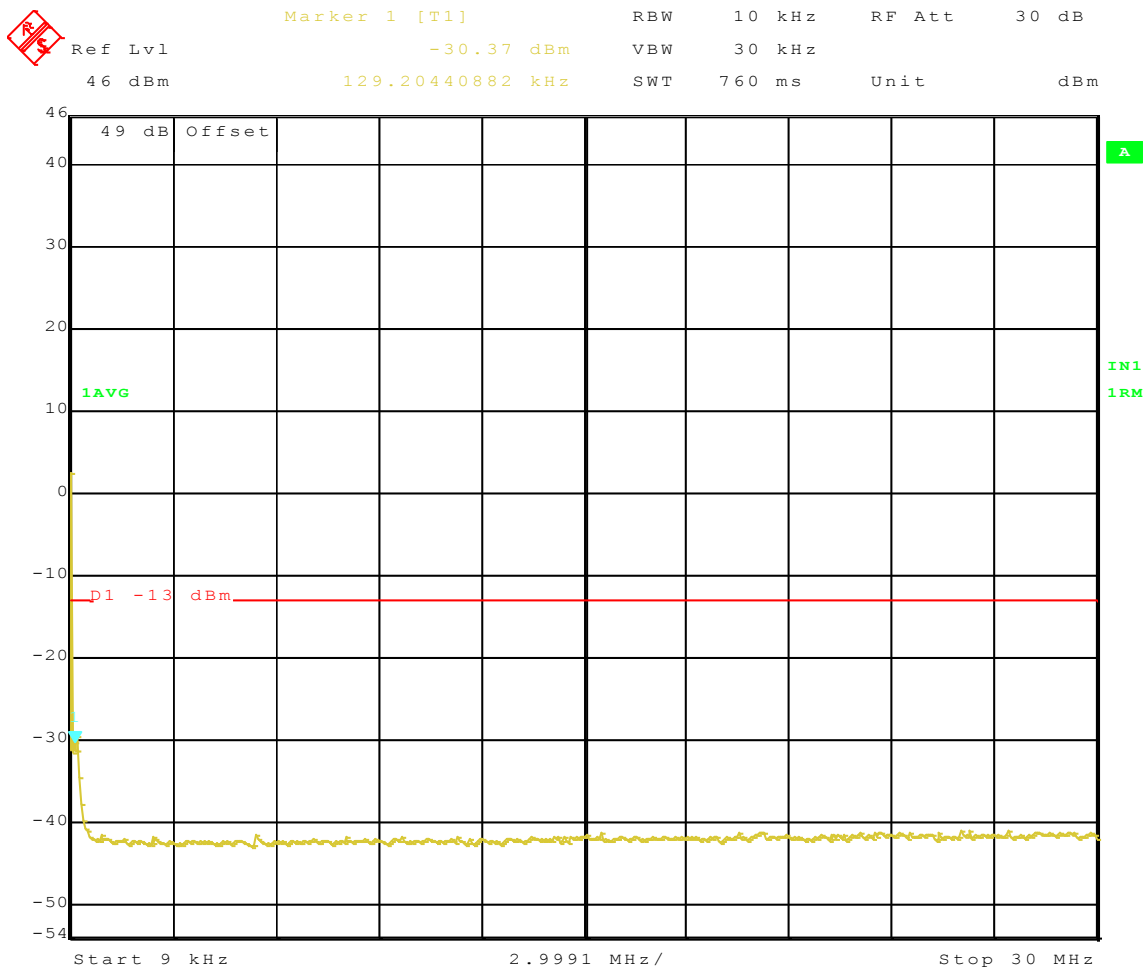
Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
 Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
 PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
 Date: 9.JAN.2012 10:21:40



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
 Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
 PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
 Date: 9.JAN.2012 10:28:55

Transmit Port
Antenna Conducted Spurious Emissions

Block: B+C+D
64QAM Modulation
Bandwidth 2120 – 2140 MHz



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

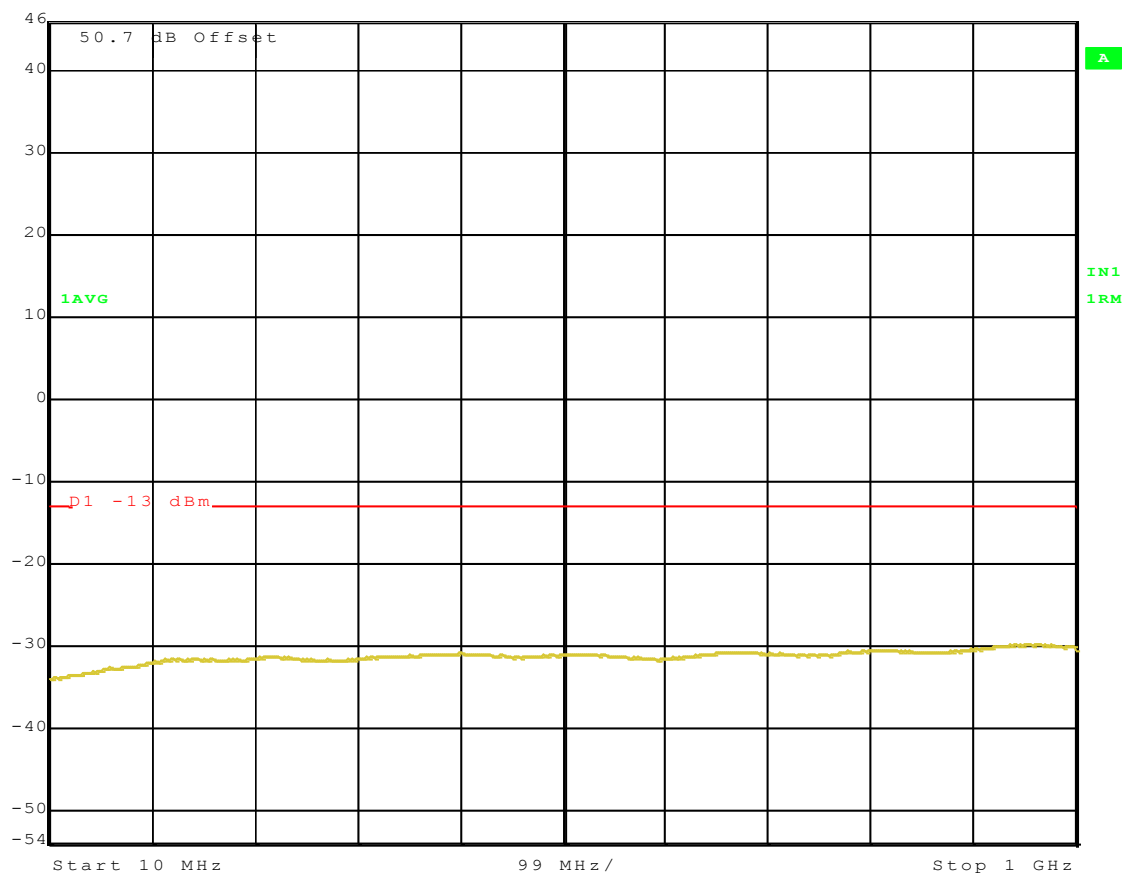
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 8.JAN.2012 13:29:18

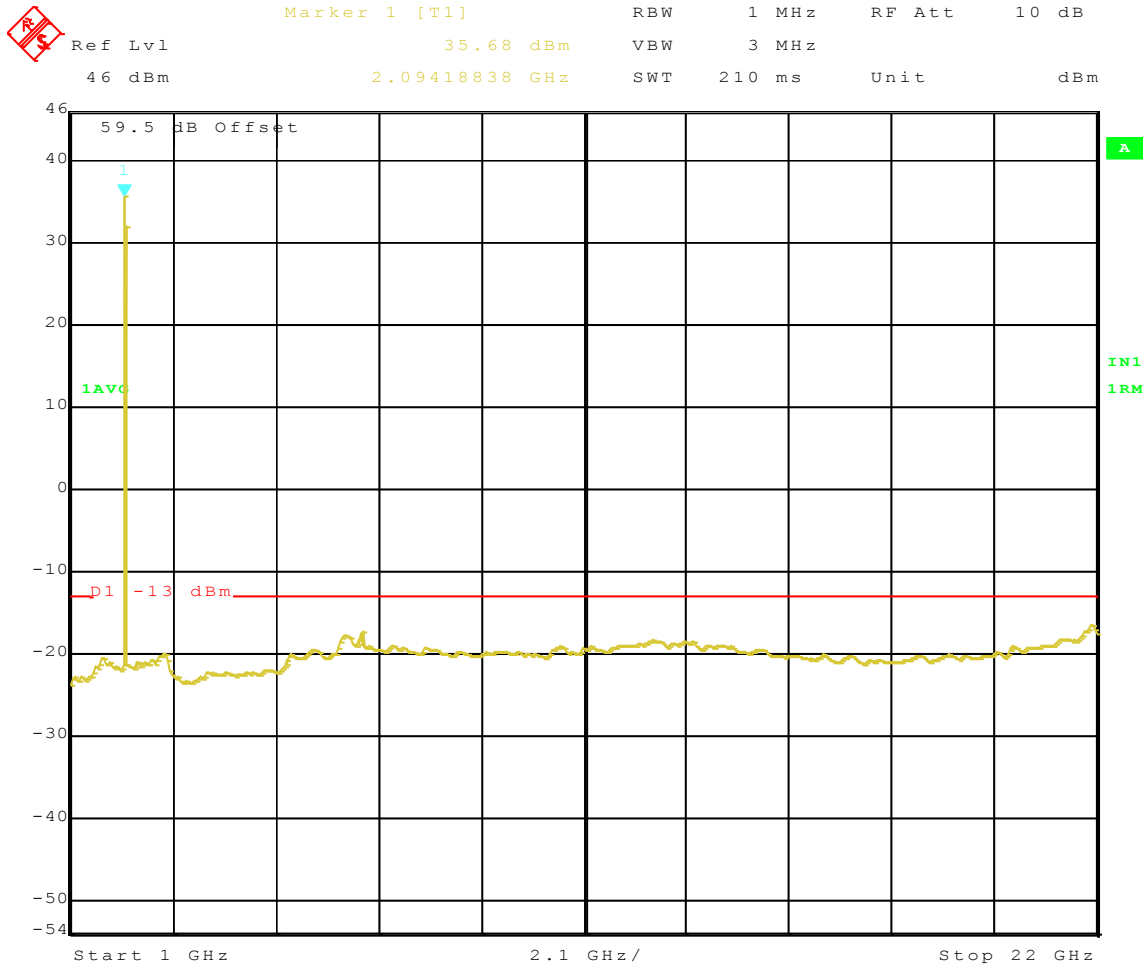


Ref Lvl
46 dBm

RBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 8.JAN.2012 13:24:12



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: B+C+D; 2120-2140 MHz

PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 8.JAN.2012 13:26:12

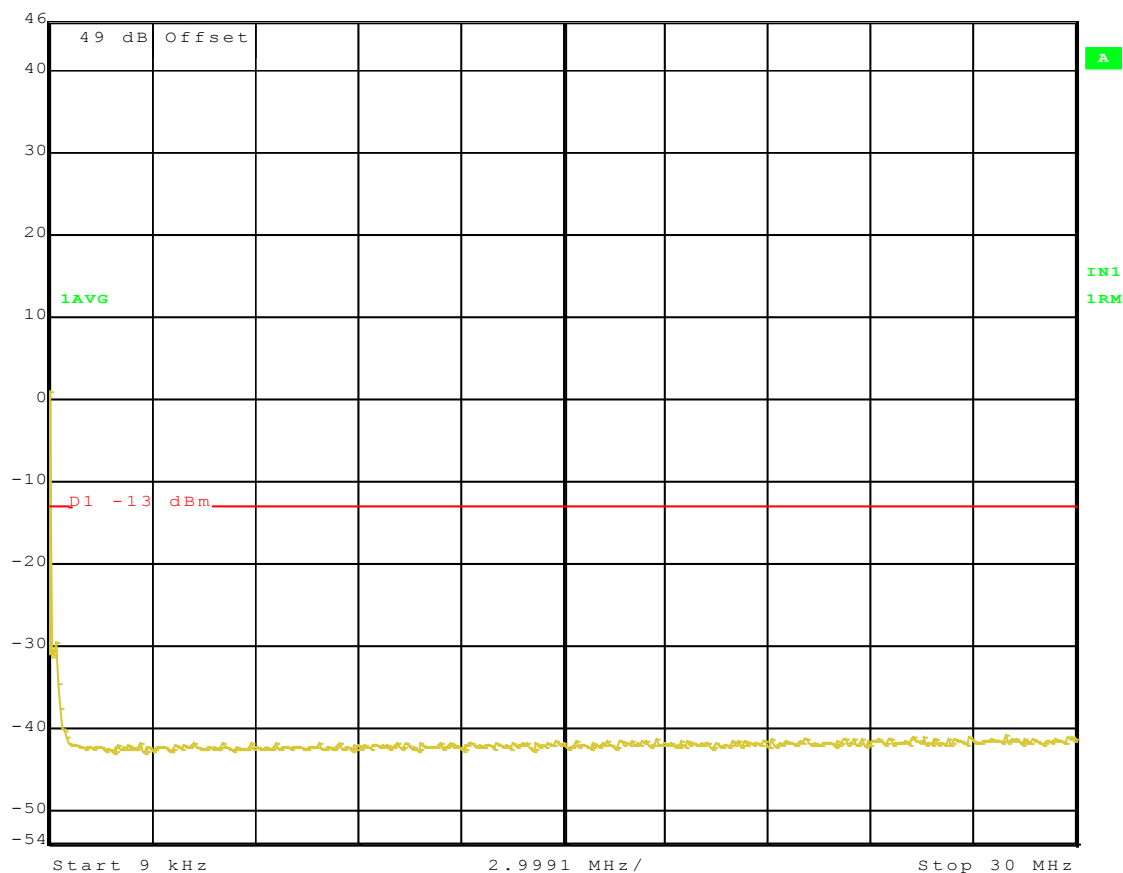
Transmit Port
Antenna Conducted Spurious Emissions

Block: D+E+F
QPSK Modulation
Bandwidth 2135 – 2155 MHz



Ref Lvl
46 dBm

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

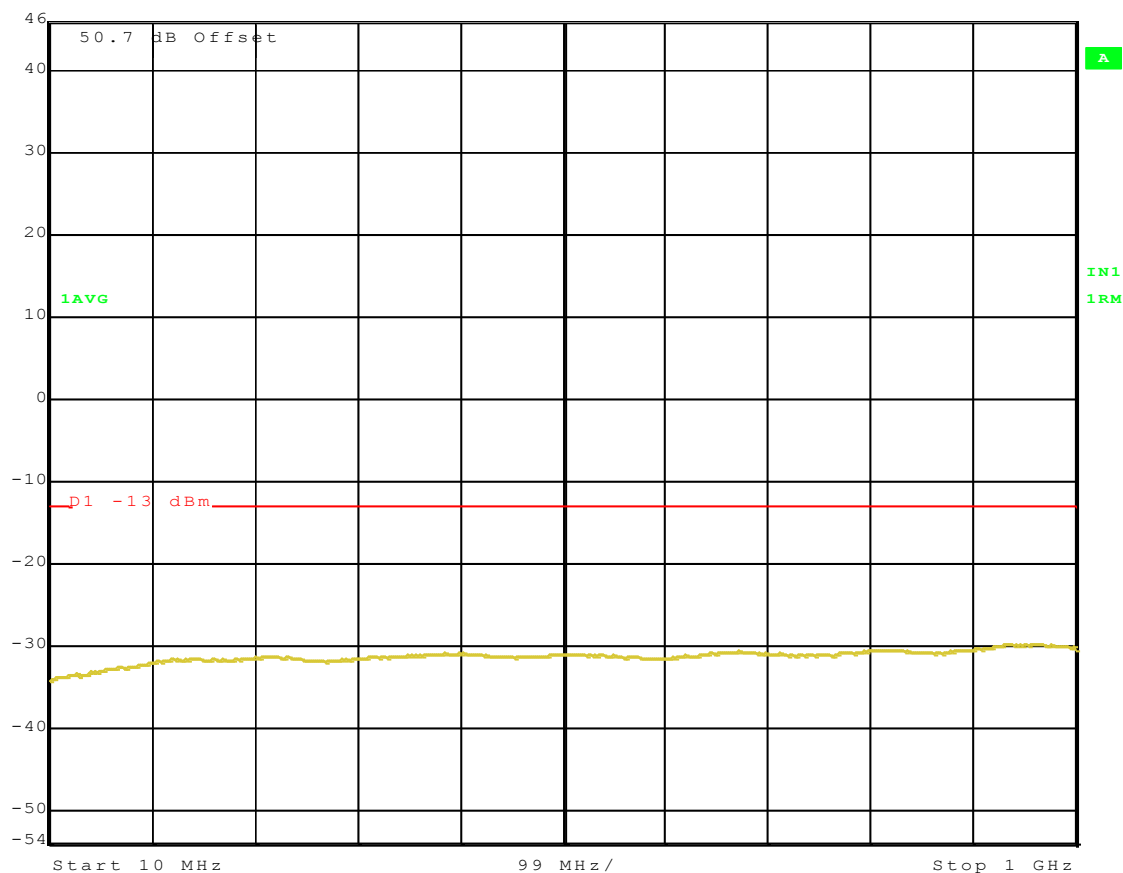


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
 Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
 PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
 Date: 10.JAN.2012 13:19:11

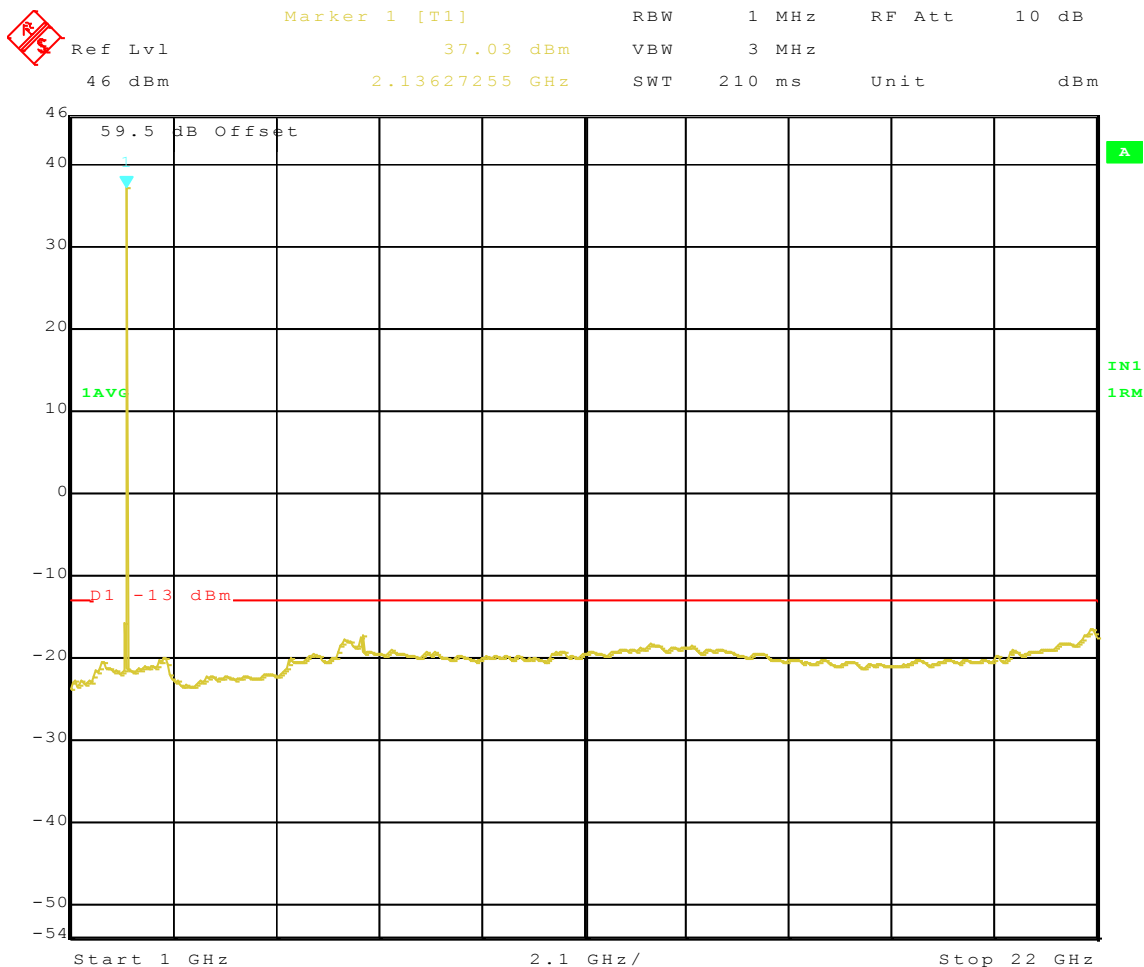


Ref Lvl
46 dBm

RBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm



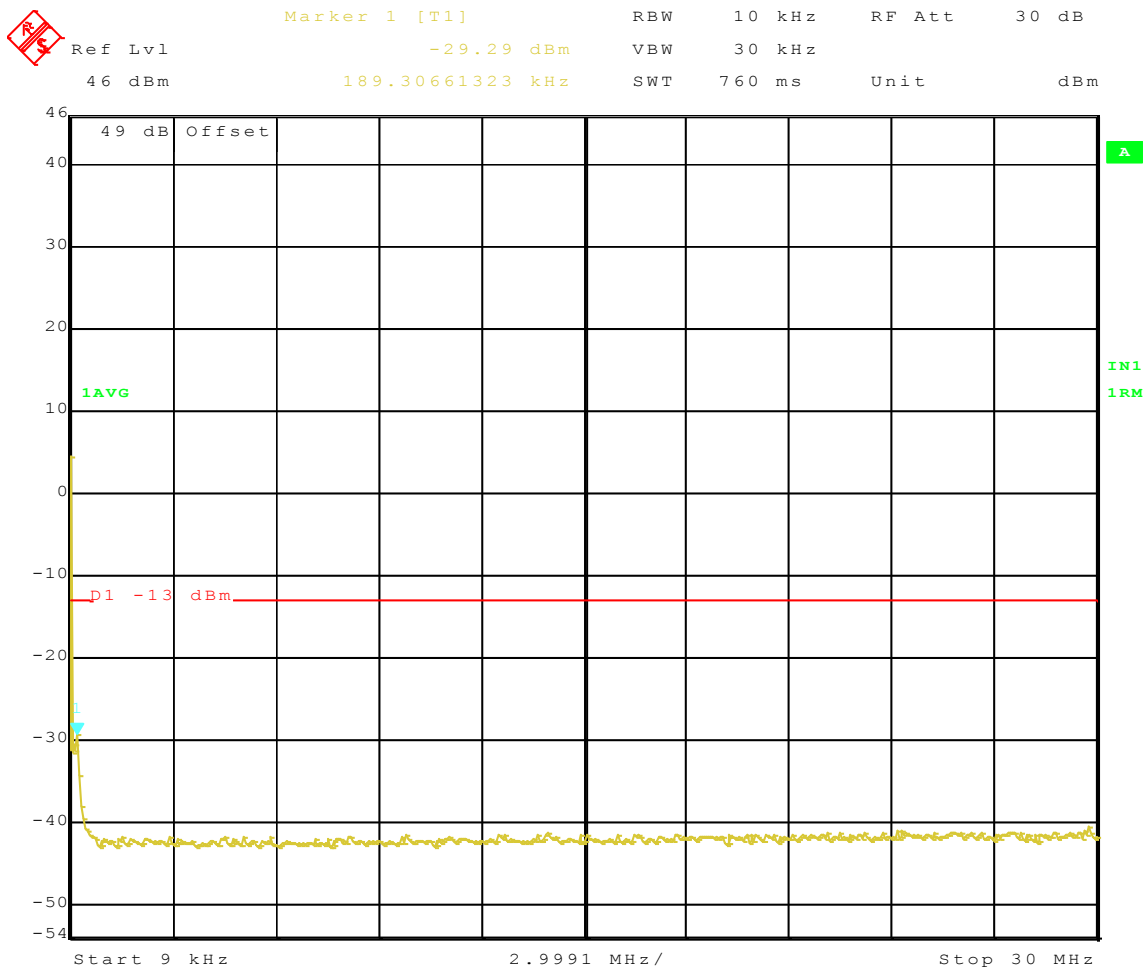
Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 13:21:23



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; QPSK; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 13:22:48

Transmit Port
Antenna Conducted Spurious Emissions

Block: D+E+F
16QAM Modulation
Bandwidth 2135 – 2155 MHz

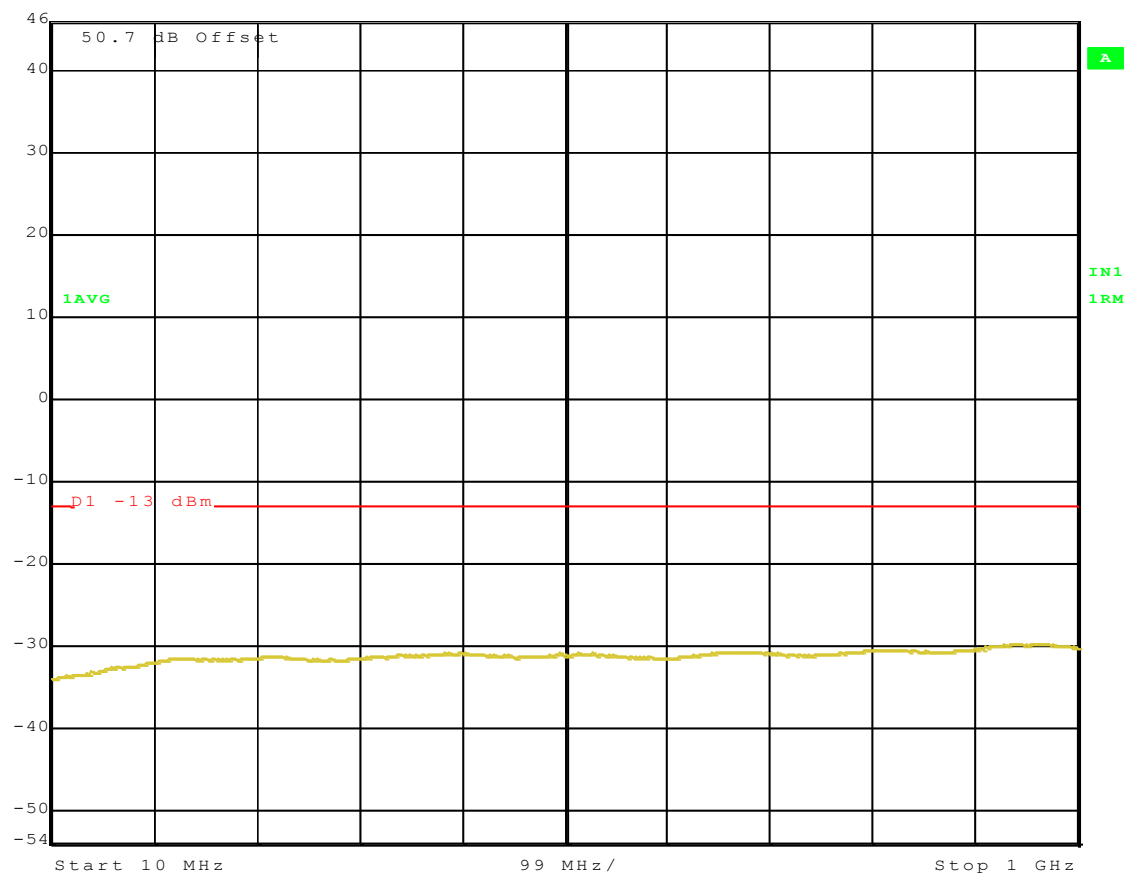


Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

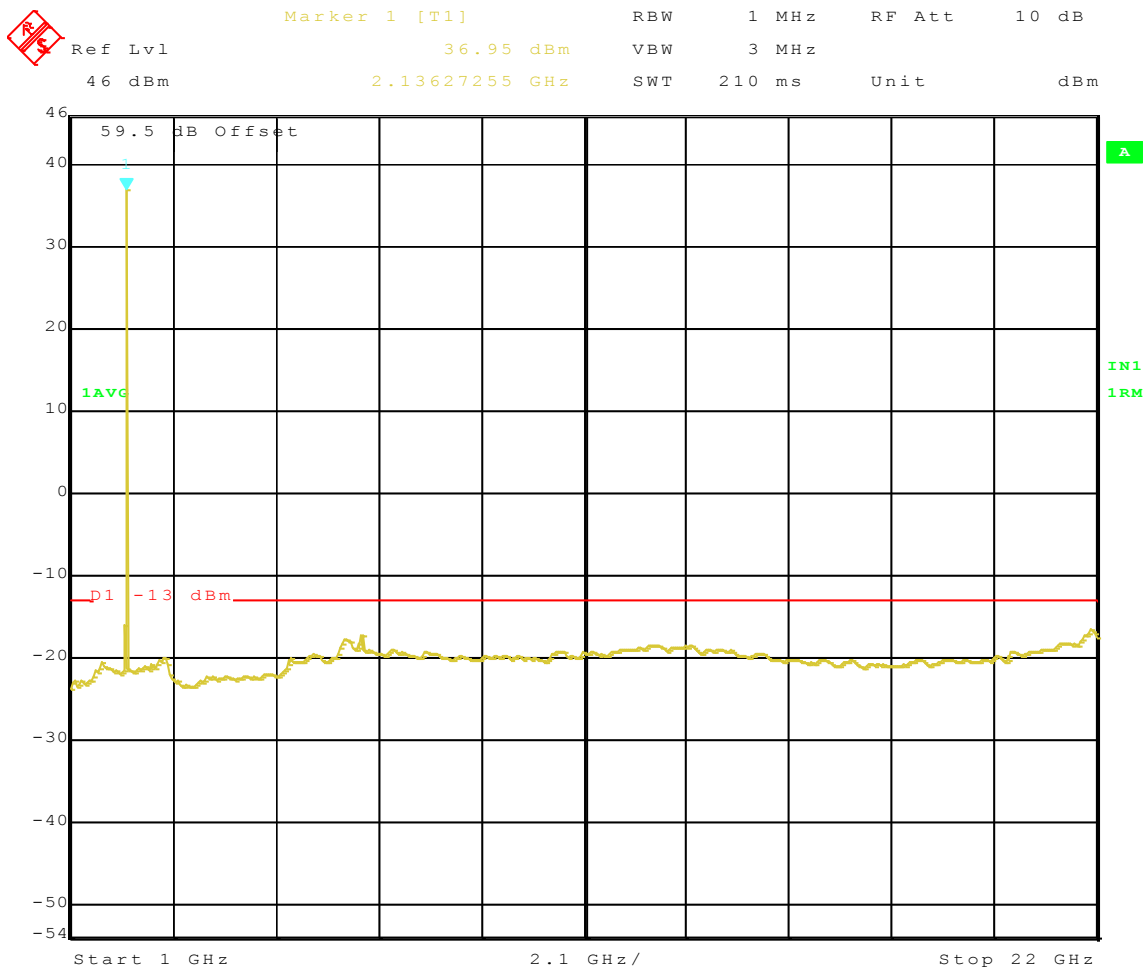
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz

PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

Date: 10.JAN.2012 14:09:45

Ref Lvl
46 dBmRBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 14:07:37



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG

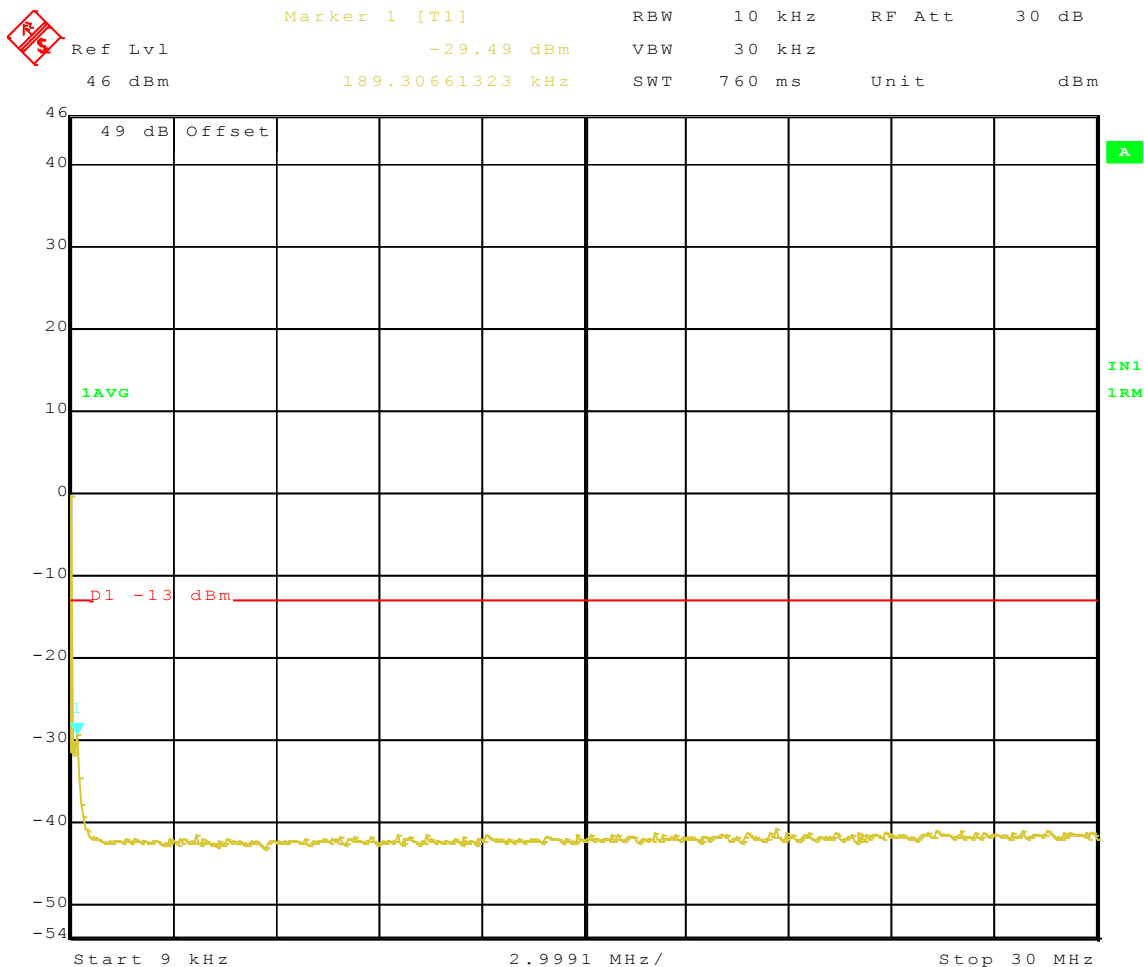
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz

PWR:40W; 16QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG

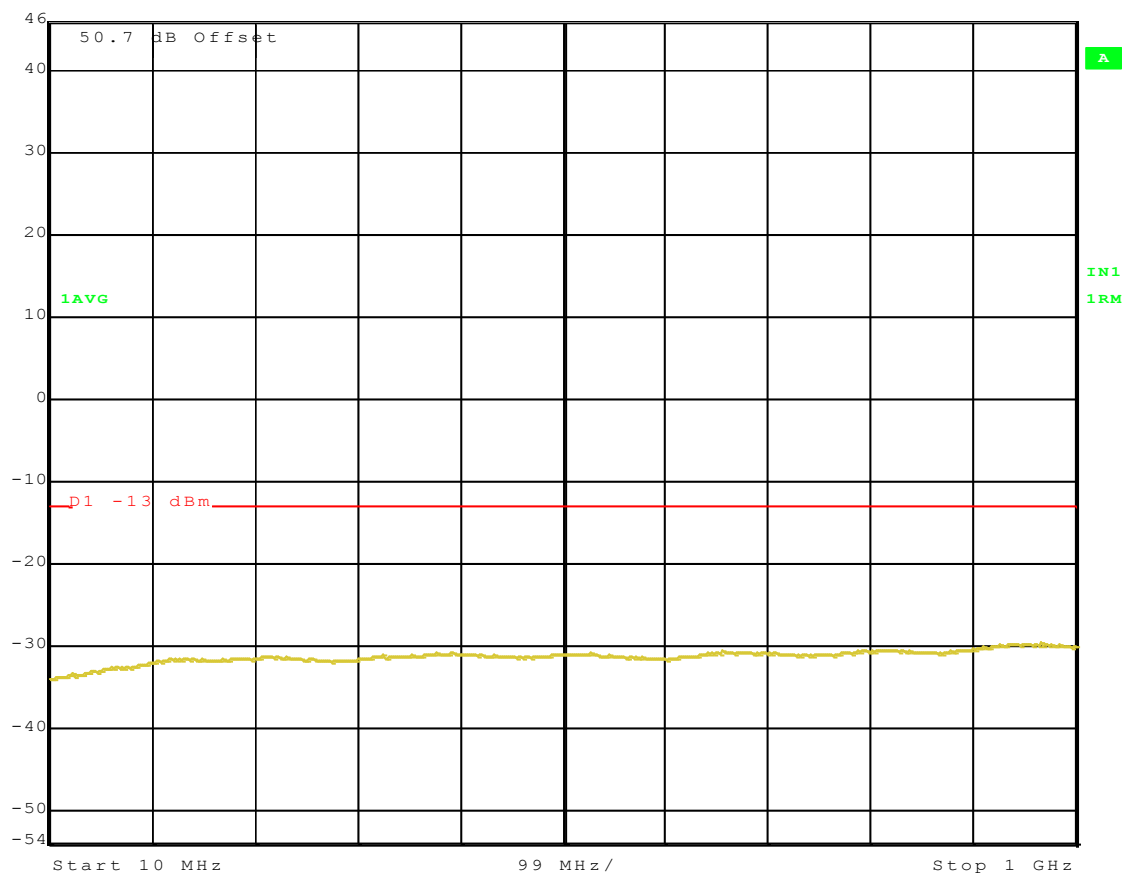
Date: 10.JAN.2012 14:04:56

Transmit Port
Antenna Conducted Spurious Emissions

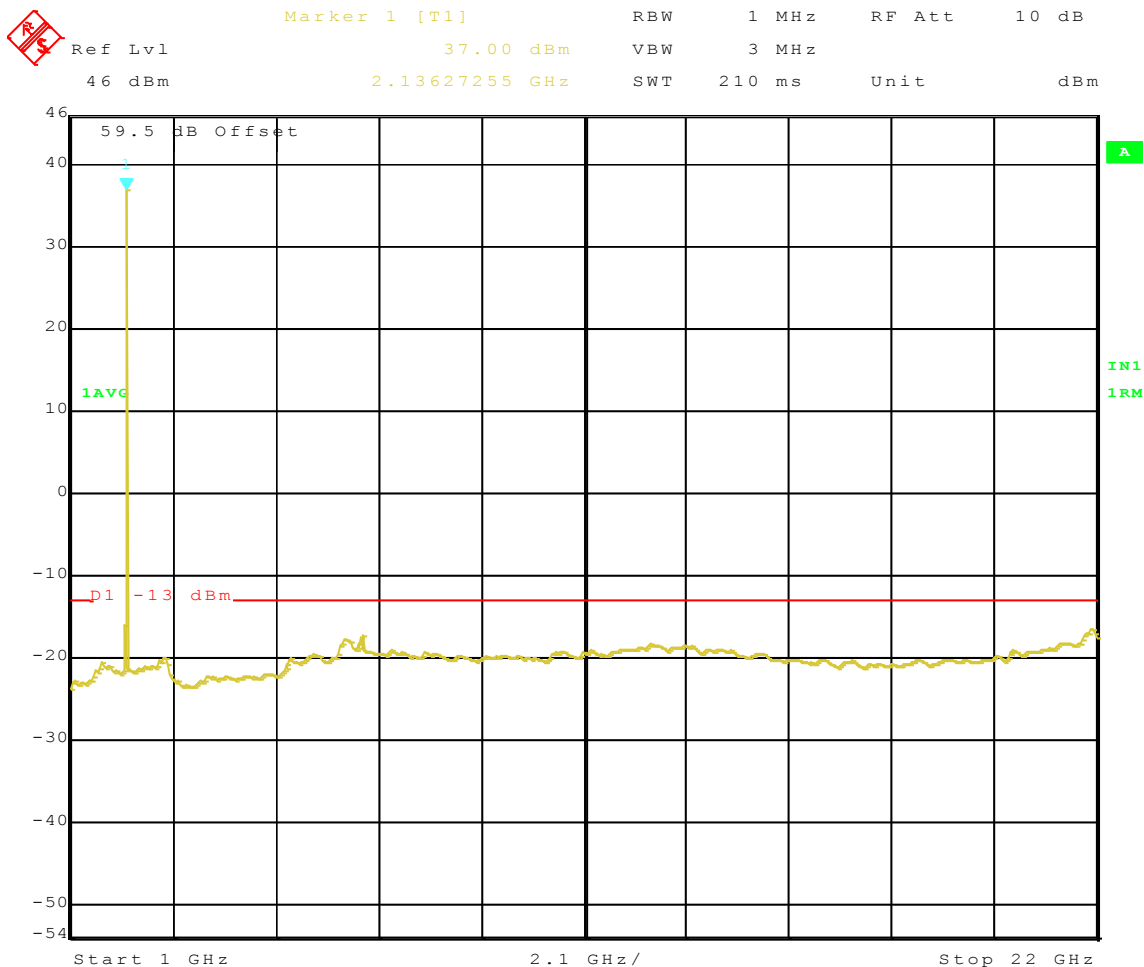
Block: D+E+F
64QAM Modulation
Bandwidth 2135 – 2155 MHz



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 14:45:32

Ref Lvl
46 dBmRBW 100 kHz RF Att 20 dB
VBW 300 kHz
SWT 250 ms Unit dBm

Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 14:47:02



Title: SPURIOUS EMISSIONS AT TX ANTENNA PORT; Test Engineer: SEG
Comment A: 9442 RRH 2X40-AWS; -48VDC; BLK: D+E+F; 2135-2155 MHz
PWR:40W; 64QAM; FCC PRT 27; FCCID: AS5BBTRX-02; CLASS 2 CHNG
Date: 10.JAN.2012 14:49:21

Measurement -5

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

MEASUREMENT: 5**SECTION 2.1053****FIELD STRENGTH OF SPURIOUS RADIATION**

Field strength measurements of radiated spurious emissions were made at 3m semi anechoic room of Global Product Compliance Laboratories of Alcatel-Lucent Murray Hill, NJ. A complete description and full measurement data for the site is on file with the Commission Chamber 5 (AR5) is 515091.

The “LTE 9442 RRH2X40-AWS” with 20 MHz carrier was tested with a amplifiers operating with a RF output of 40W at Antenna Interface Connector (AIC). The operation of RRH was simulated using Base Band Unit (BBU)/(D2U placed outside the chamber. The interconnection between RRH and D2U was through optical fiber. The radiated emissions tests were performed with amplifiers operating with 10 MHz band width. During the tests RRH AIC were terminated with 50 ohm load. The spectrum from 10 MHz to the 10th harmonic 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 the level of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an ideal dipole excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, page 676, 4th edition, IT&T Corp.

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

$$20 \log (E * 10^6) - (43 + 10 \log P) = 82.2 \text{ dB}\mu\text{V/meter}$$

E = Field Intensity in Volts/meter

P = Transmitted Power in Watts = 40 W

R = Distance in meters = 3 m

RESULTS:

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

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 were 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