



Subject: Application for Class II Permissive Change
under FCC ID: AS5BBTRX-06 to Add Band
Class 29 to the Original Filing.

Michael P. Farina
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March 21, 2014

EXHIBIT 9: TEST REPORT

ATTESTATION:

All tests were performed by qualified staff members of:

Global Product Compliance Laboratory (GPCL)
Alcatel-Lucent USA, Inc.
600-700 Mountain Avenue
Murray Hill, New Jersey 07974-0636

All tests of emissions and emission characteristics conducted to the transmit port (antenna terminal) were performed directly by me and radiated emissions testing was directed by me. As Project Lead Engineer, I was responsible for the definition and execution of all EMC/EMI testing.

A handwritten signature in black ink that reads "Michael P. Farina".

Michael P. Farina
Member of Technical Staff
Global Product Compliance Laboratory (GPCL)
Alcatel-Lucent USA, Inc.
600-700 Mountain Avenue
Murray Hill, New Jersey 07974-0636
Desk: 908-582-3857

INTRODUCTION:

The purpose and objective of this Class II Permissive Change request is to add the additional § 27.5 (c) spectrum Band Class 29: 716 – 728 MHz, covering two unpaired channel blocks of 6 megahertz each: Block D: 716-722 MHz, and Block E: 722-728. The current product, designated on the equipment label as RRH2x40-07L-D/E, incorporates the same radio (but with Rx disabled), the same power amplifier, and the same digital (D/A) circuitry. There is no change to the radio frequency determining and stabilization circuitry. The only changes are to the controlling software and to the passive transmit filter.

The RRH2x40-07L-D/E, in this frequency band, provides transmit (down link) only. However, it meets the LTE 2x40 MIMO requirements of *OET Bulletin 662911 D011 Multiple Transmitter Output v02r01*. The long term average power rating at each of the two transmit antenna terminals is 40 W (46 dBm) and a total composite power combined in the air interface of 80 W (49 dBm).

The carrier/fundamental band widths supported are 5 MHz in Block D, 5 MHz in Block E, and 10 MHz in Blocks D and E combined. Three LTE (Long Term Evolution) modulation schemes are also supported: QPSK, 16QAM and 64QAM. Design and operation employs the guidelines set forth in ETSI TS 36.104 *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 10.9.0 Release 10)*. Full compliance has been demonstrated with FCC Part 27 — Miscellaneous Wireless Communications Services, Subpart C — Technical Standards, § 27.53 Emission Limits, (g) *For operations in the 698-746 MHz band*, following the procedural requirements specified in Part 2 — Frequency Allocations And Radio Treaty Matters; General Rules And Regulations Subpart J — Equipment Authorization Procedures.

In accordance with Sec. 2.1043 *Changes In Certificated Equipment*, only the characteristics affected by this Class II Change need to be reported. As such, the applicable measurements affected are contained in these Test Report Exhibits, and all other Exhibits submitted with the initial filing, that remain unchanged, need not be repeated.

APPLICABLE FCC RULES AND INDUSTRY STANDARDS:

The specific test procedures that are both required for and are applicable to this Class II certification are listed below. Note that Frequency Stability measurements need not be repeated.

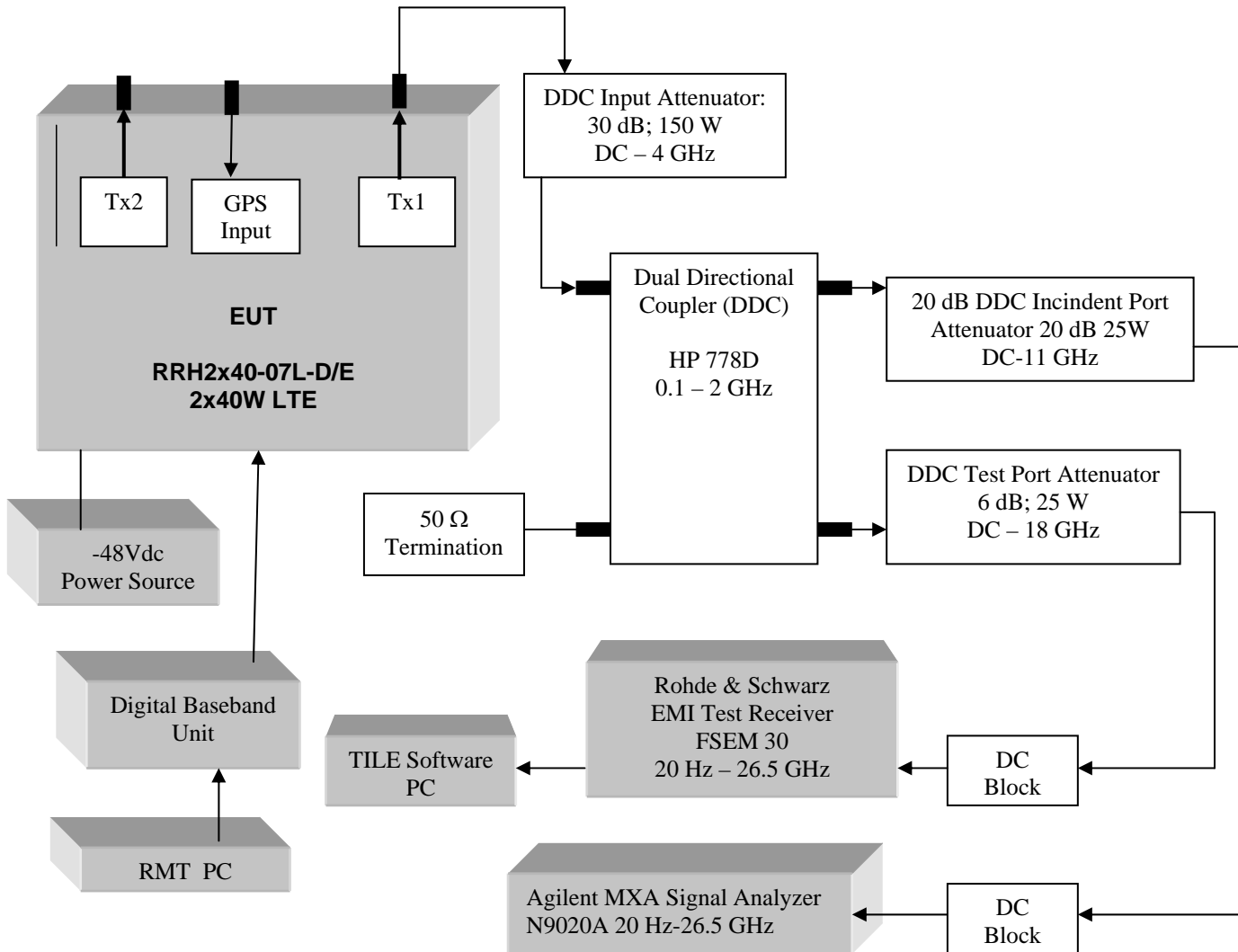
Part 2.1046	RF Power Output
Part 2.1047	Modulation Characteristics
Part 2.1049	Occupied Bandwidth
Part 2.1051	Spurious Emissions at the Antenna Terminals.
Part 2.1053	Field Strength of Spurious Radiation
Part 2.1057	Frequency Spectrum to be Investigated
Part 27	Miscellaneous Wireless Communications Services; Subpart C — Technical Standards
Part 27 (c)	Frequency
Part 27.53	Emission Limits.

ETSI TS 36.104 *LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception (3GPP TS 36.104 version 10.9.0 Release 10)*

ANSI C63.4-2009 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic in the Range of 9 kHz to 40 GHz; September 15, 2009.

PART 2.1046 MEASUREMENTS REQUIRED: RF POWER OUTPUT

The RF power of the single 5 MHz and 10 MHz BW carriers, tuned to 719, 725 and 722 MHz respective center frequencies, were measured at 40 W (46 dBm) long term average power at a single transmit terminal (Tx1) and for each of the 3 LTE test modulation schemes: QPSK, 16QAM and 64QAM. The RF power was measured and confirmed prior to each test.

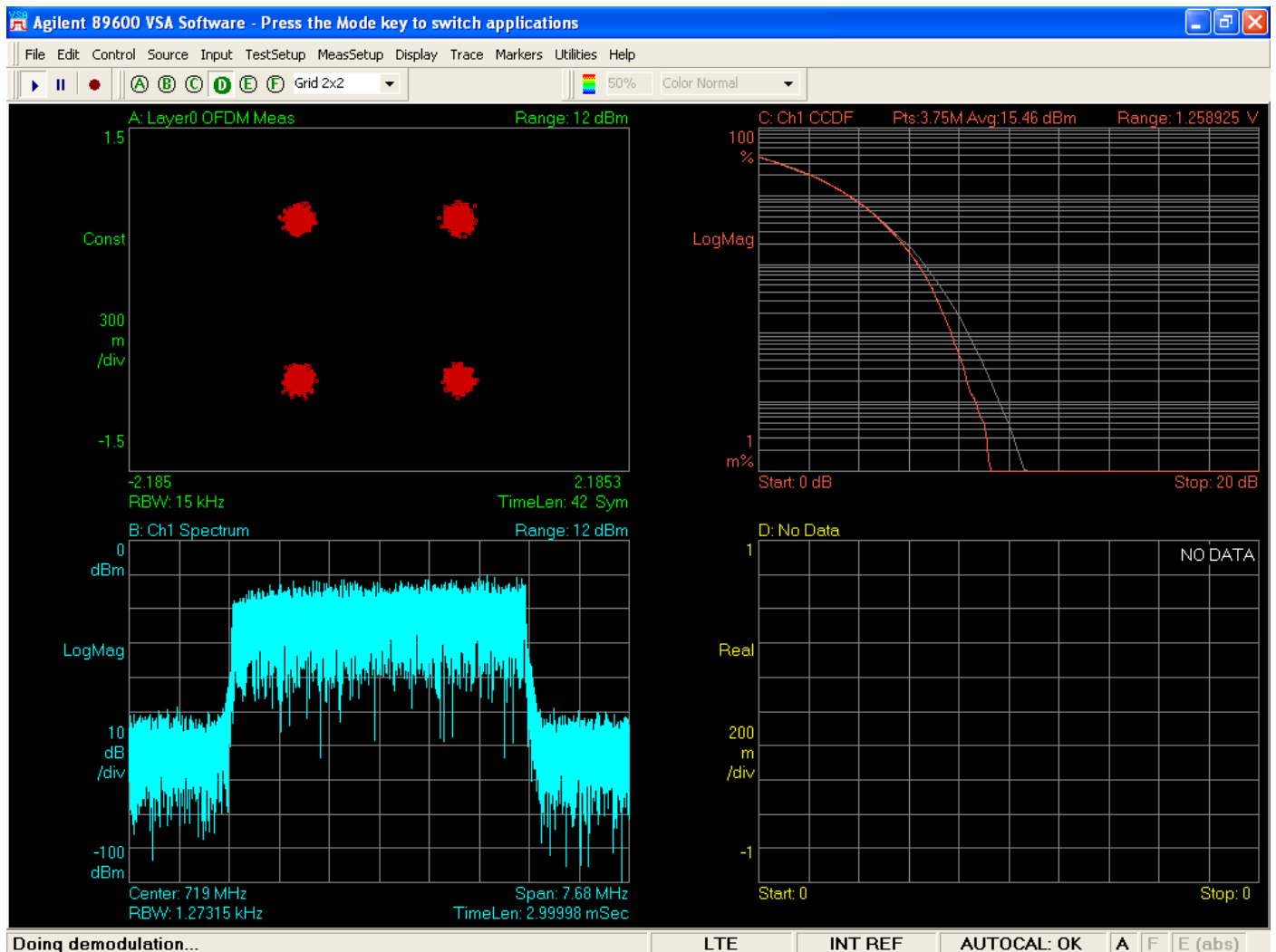
Block Diagram Of The Equipment Test Set-Up for Measurements at the Antenna Terminal**40 Watt (+46 dBm) per Tx Antenna Terminal**

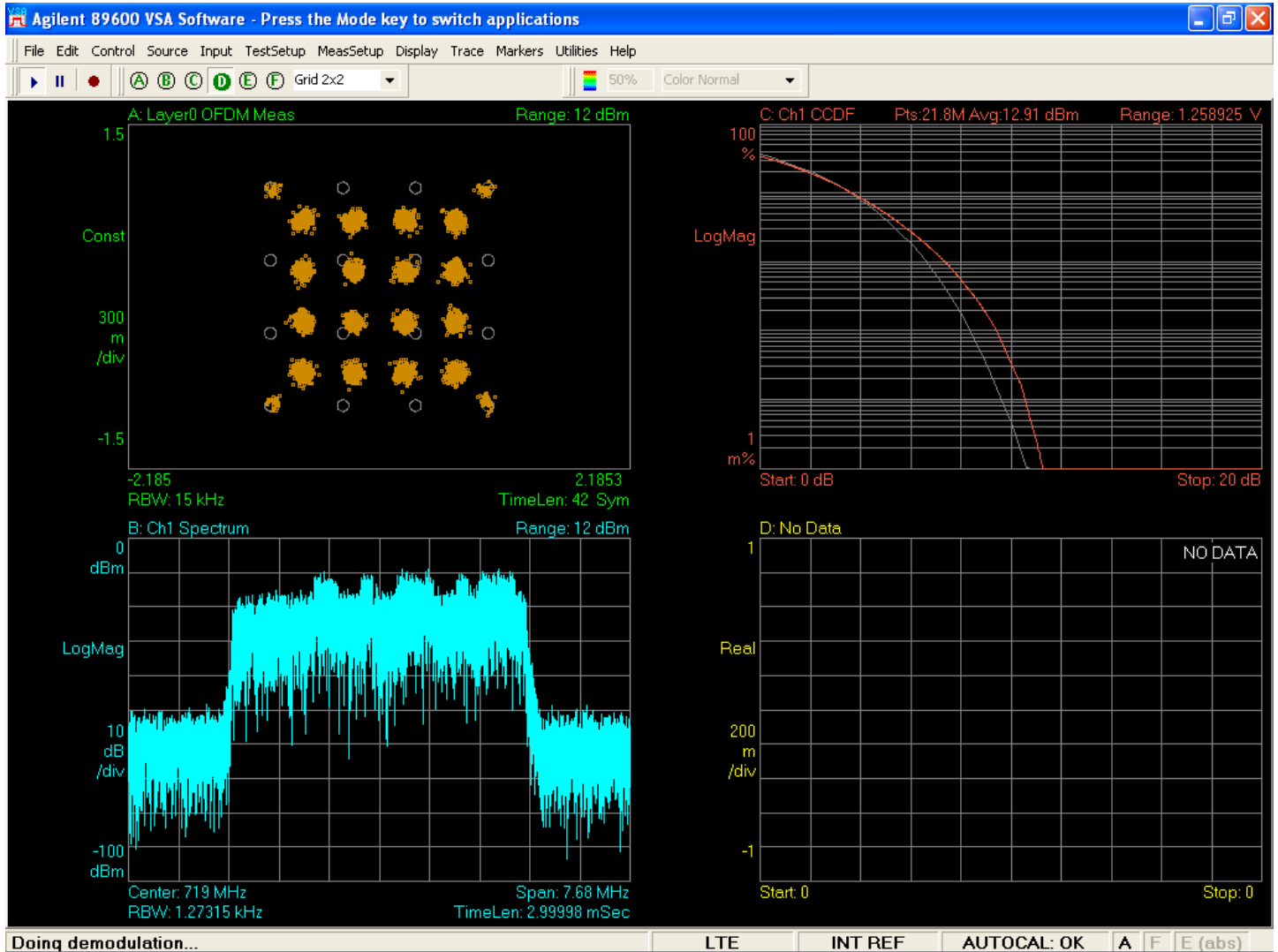
PART 2.1047 MEASUREMENTS REQUIRED: MODULATION CHARACTERISTICS

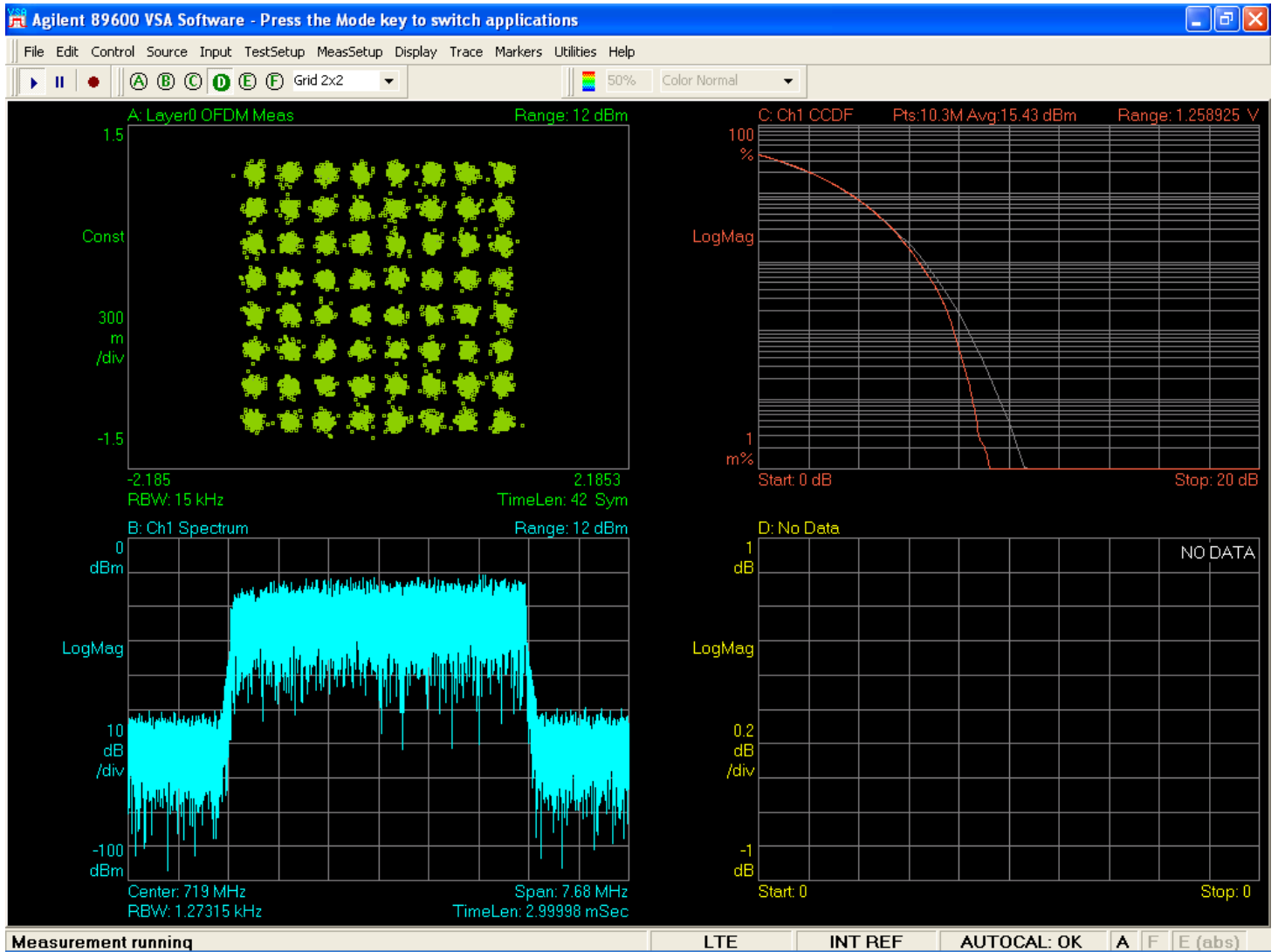
The LTE modulation characteristics were measured and recorded at Tx1 for each of the 3 LTE test modulation schemes: QPSK, 16 QAM and 64QAM, for the 3 carriers tabulated below.

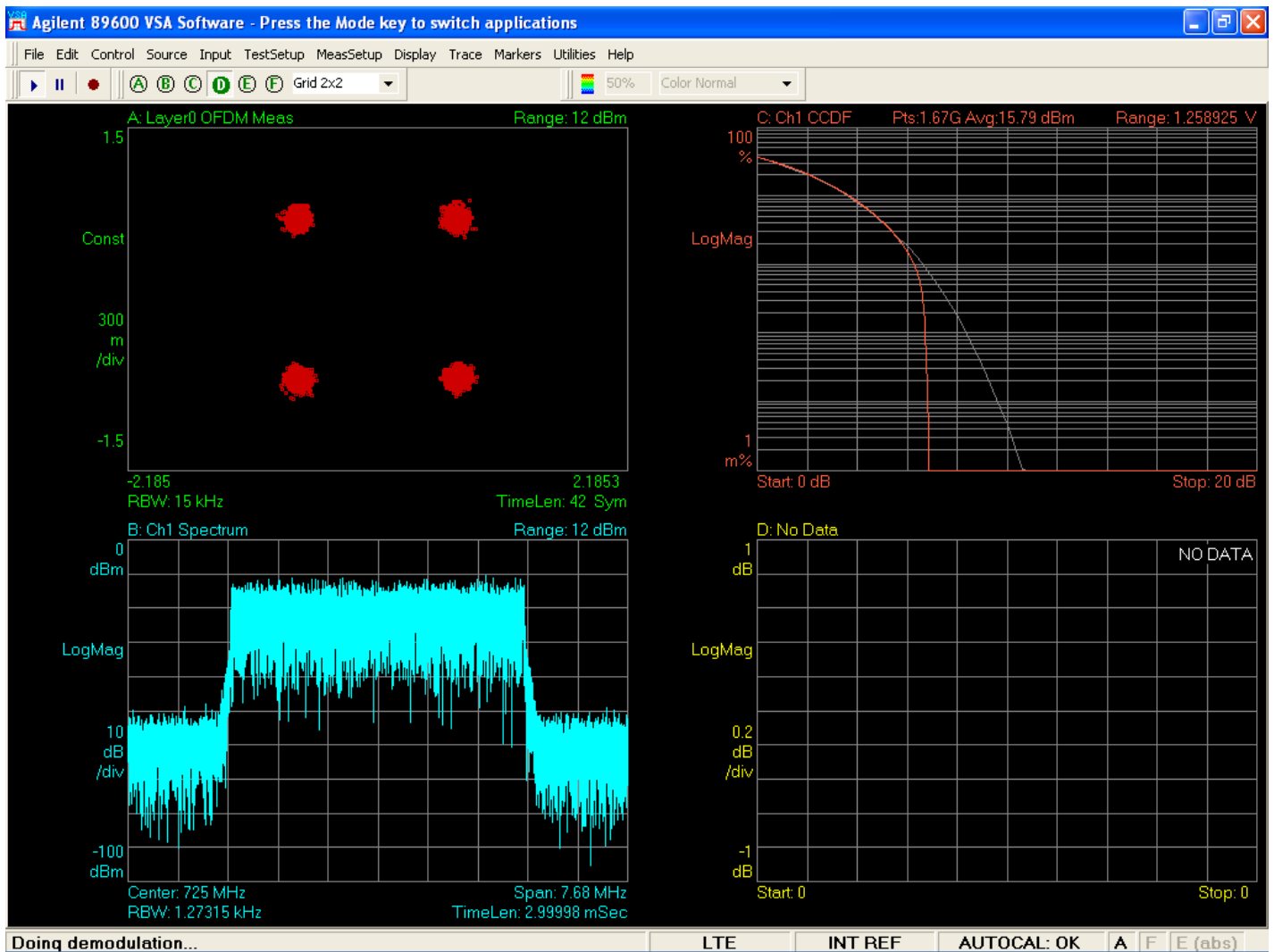
Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power
D: 716 – 722 MHz	719 MHz	5 MHz	40 W (46 dBm)
E: 722 – 728 MHz	725 MHz	5 MHz	40 W (46 dBm)
D+E: 716 – 728 MHz	722 MHz	10 MHz	40 W (46 dBm)

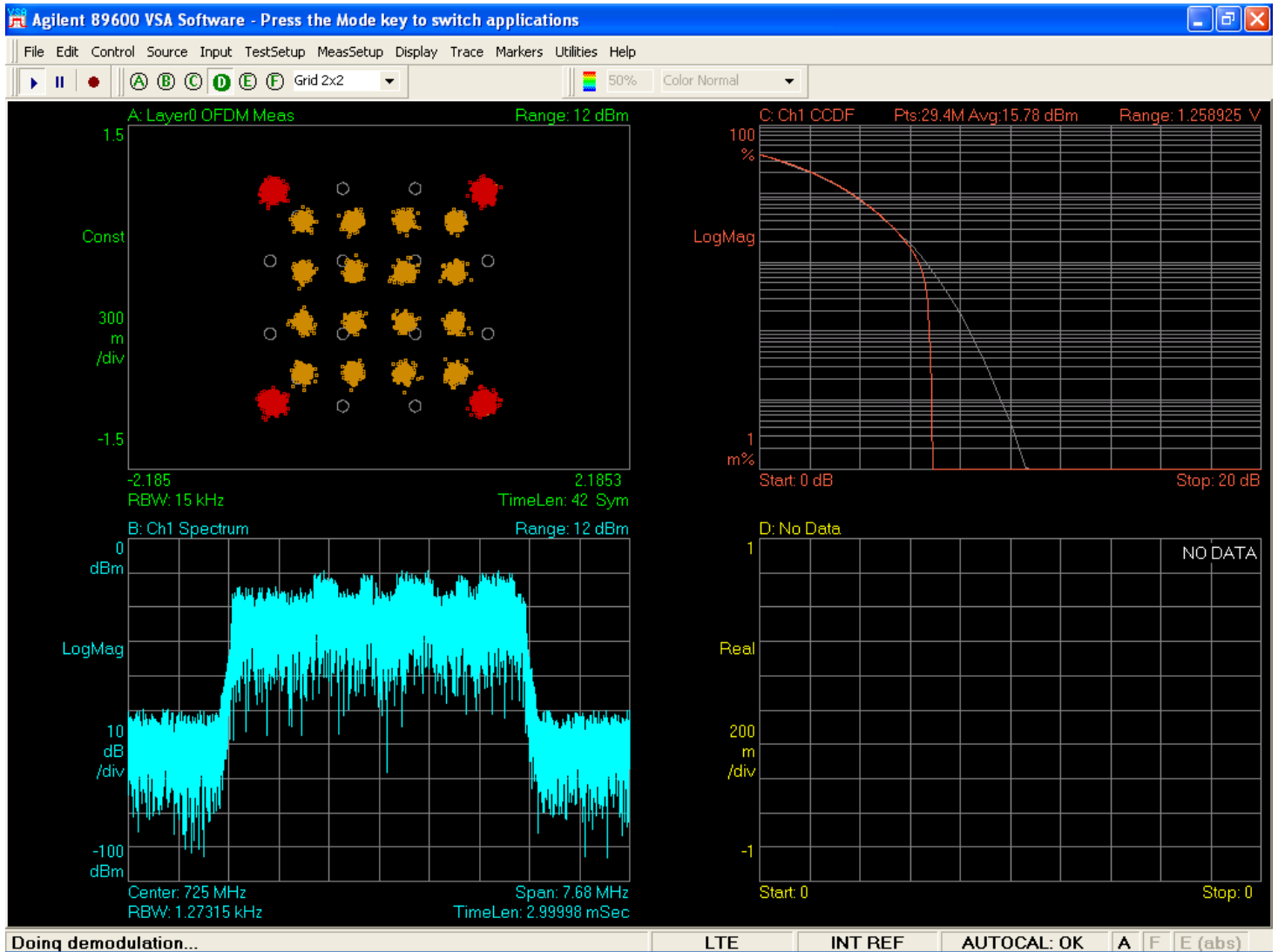
LTE QPSK
Tx1 719 MHz, 40W (46 dBm), 5 MHz BW



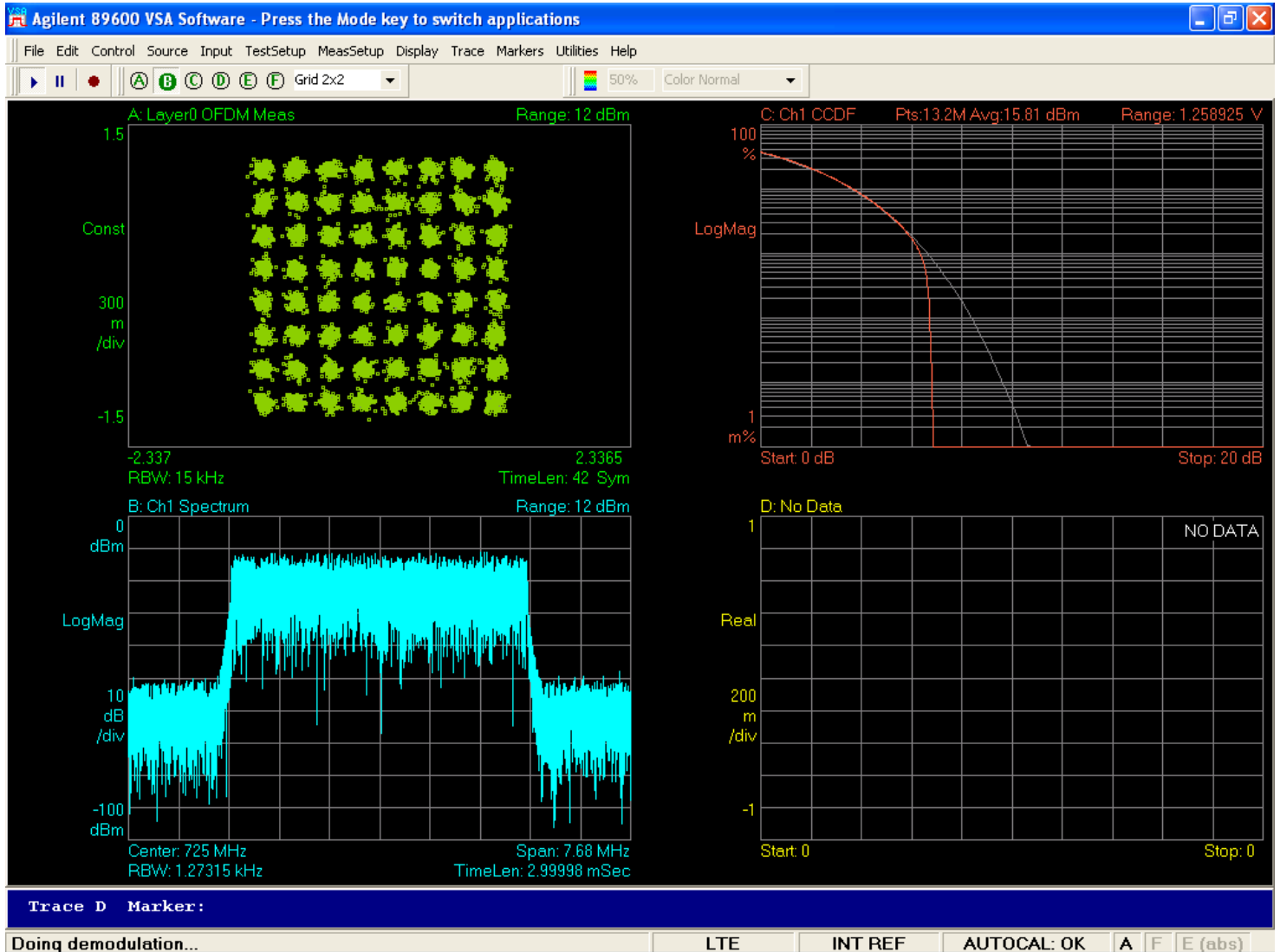
LTE 16QAM
Tx1 719 MHz, 40W (46 dBm), 5 MHz BW

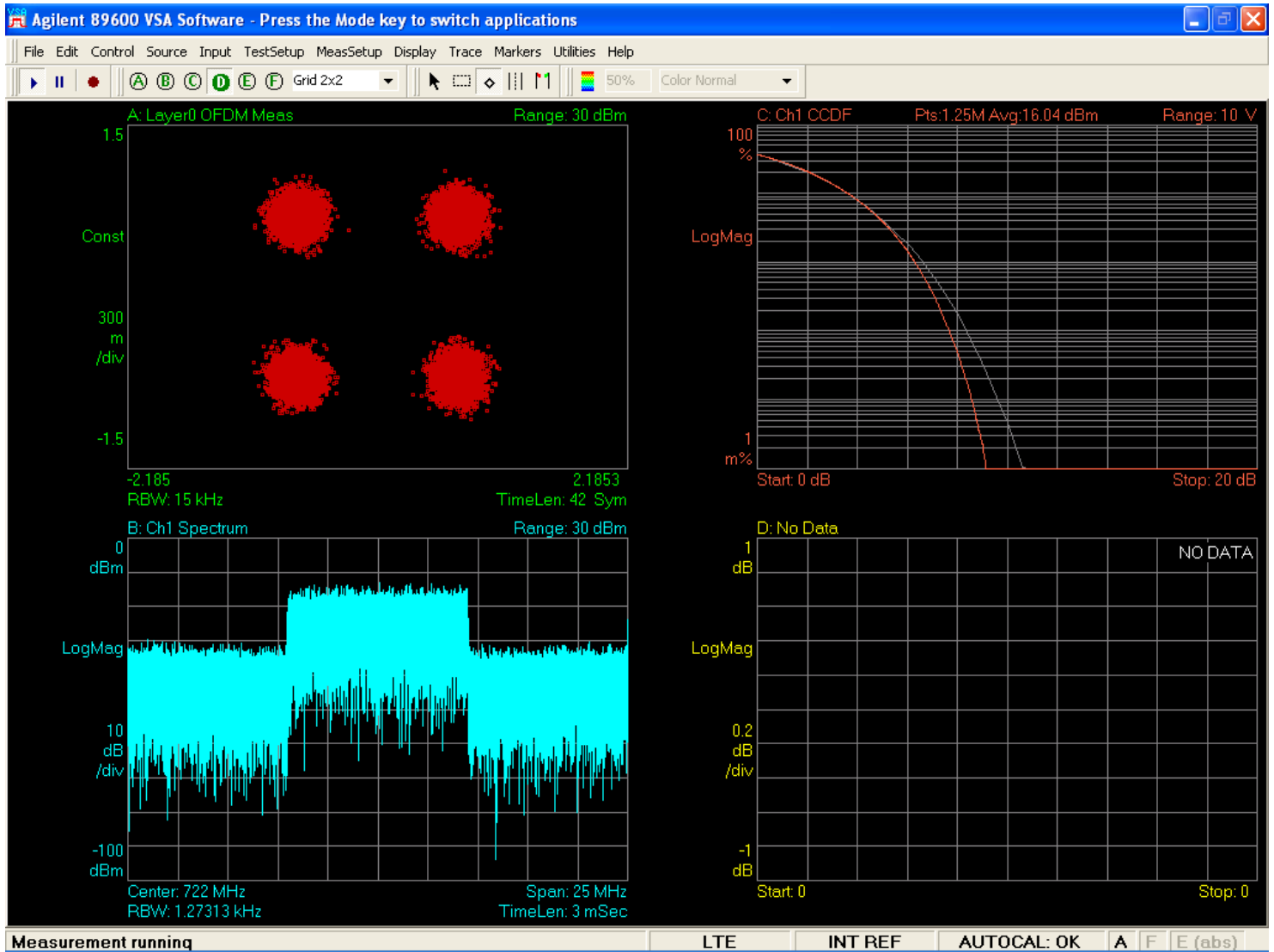
LTE 64QAM
Tx1 719 MHz, 40W (46 dBm), 5 MHz BW

LTE QPSK
Tx1 725 MHz, 40W (46 dBm), 5 MHz BW

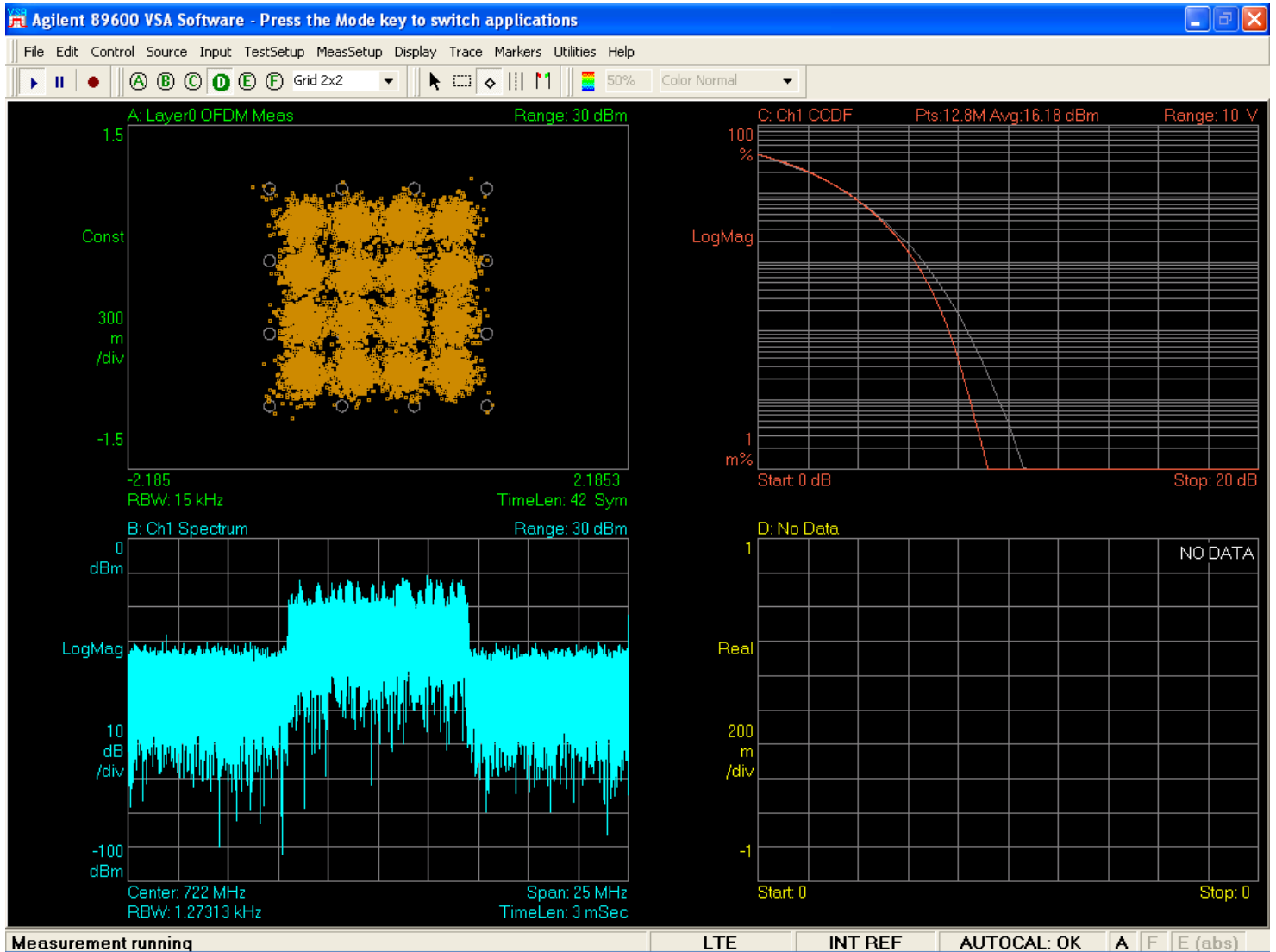
LTE 16QAM
Tx1 725 MHz, 40W (46 dBm), 5 MHz BW

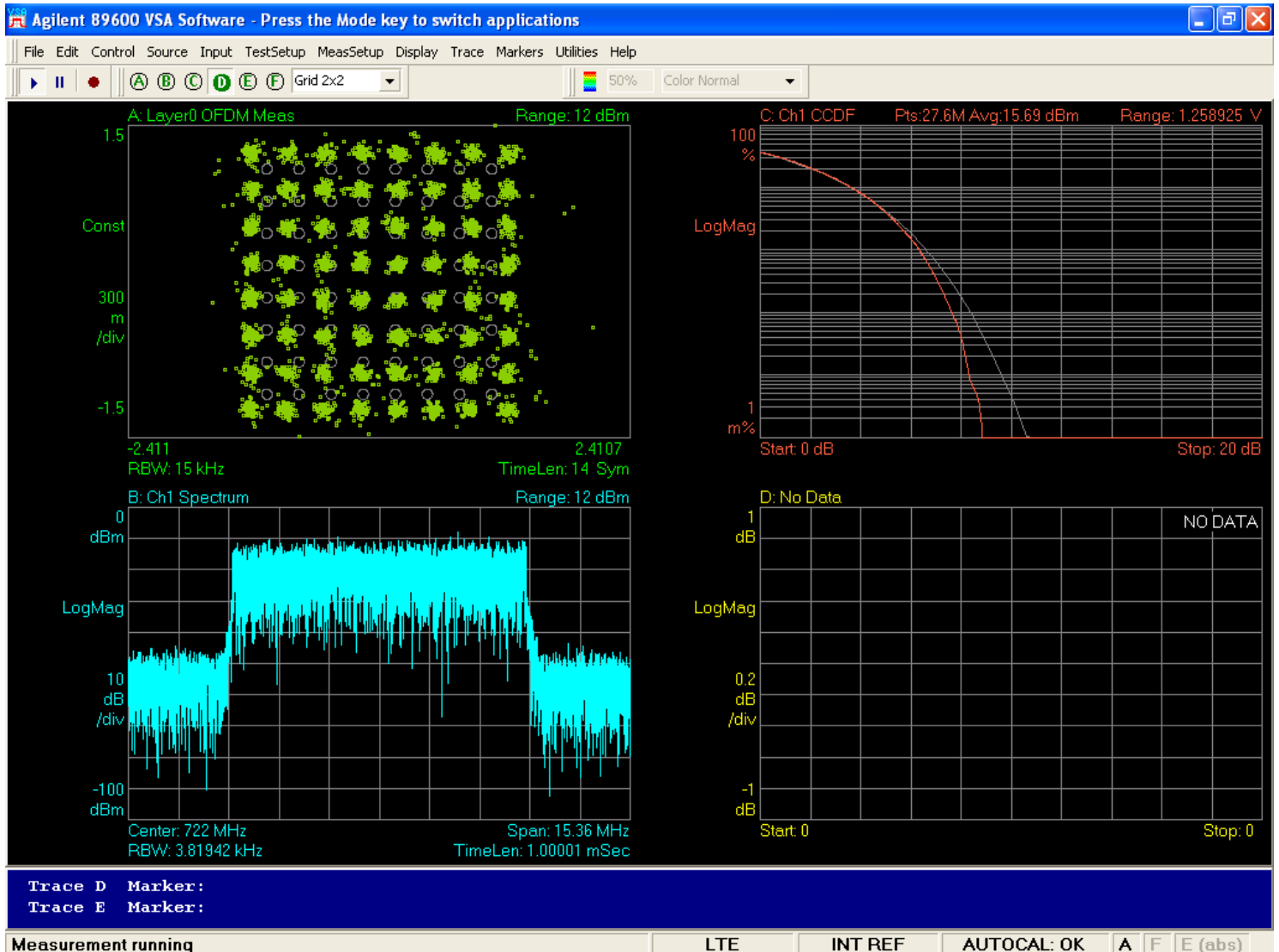
LTE 64QAM
Tx1 725 MHz, 40W (46 dBm), 5 MHz BW



LTE QPSK
Tx1 722 MHz, 40W (46 dBm), 10 MHz BW

LTE 16QAM
Tx1 722 MHz, 40W (46 dBm), 10 MHz BW



LTE 64QAM
Tx1 722 MHz, 40W (46 dBm), 10 MHz BW

PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH – 99% POWER BANDWIDTH

Both the 99% Power Bandwidth (In-Band), which defines the emission designator, and the Emission Mask Compliance (Out-Of-Band) were measured and recorded at Tx1 for each of the 3 LTE test modulation schemes: QPSK, 16 QAM and 64QAM, for the 3 carriers tabulated below.

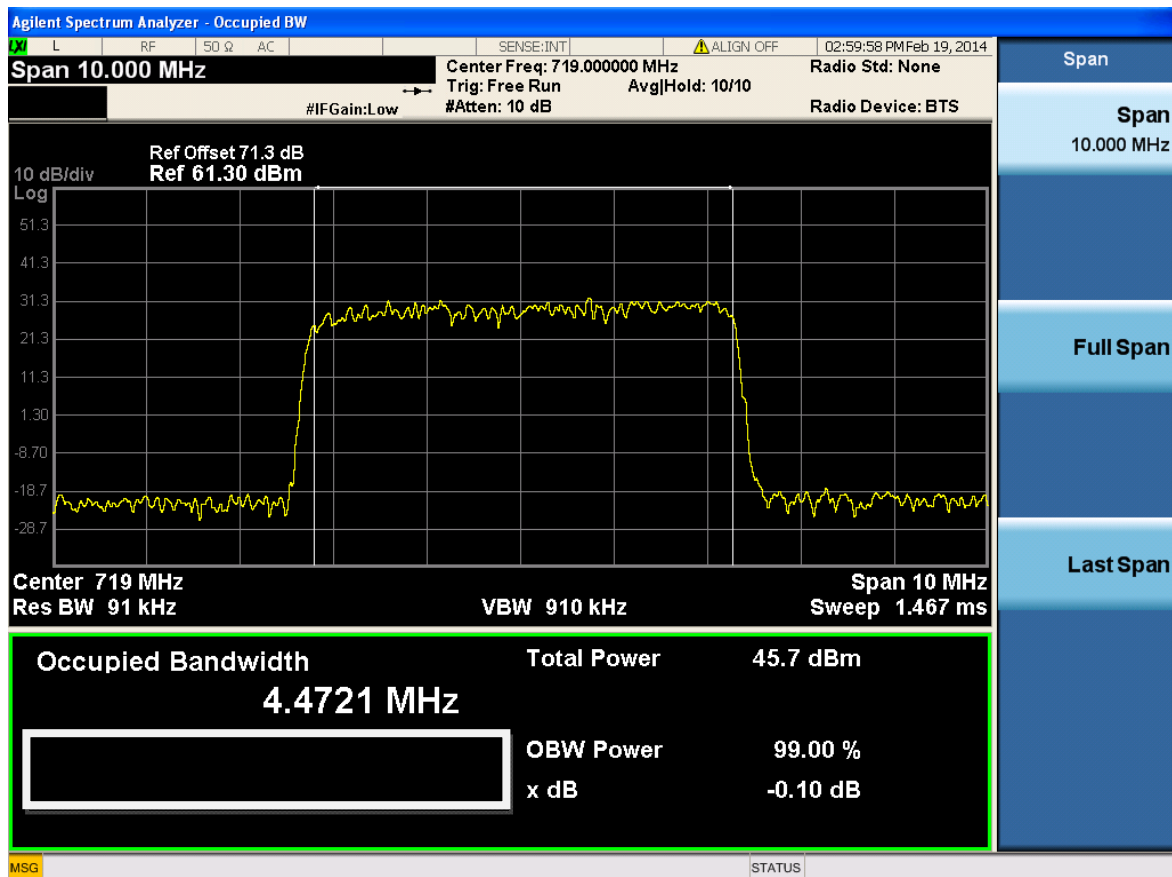
Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power
D: 716 – 722 MHz	719 MHz	5 MHz	40 W (46 dBm)
E: 722 – 728 MHz	725 MHz	5 MHz	40 W (46 dBm)
D+E: 716 – 728 MHz	722 MHz	10 MHz	40 W (46 dBm)

Compliance was demonstrated by each of the two methods:

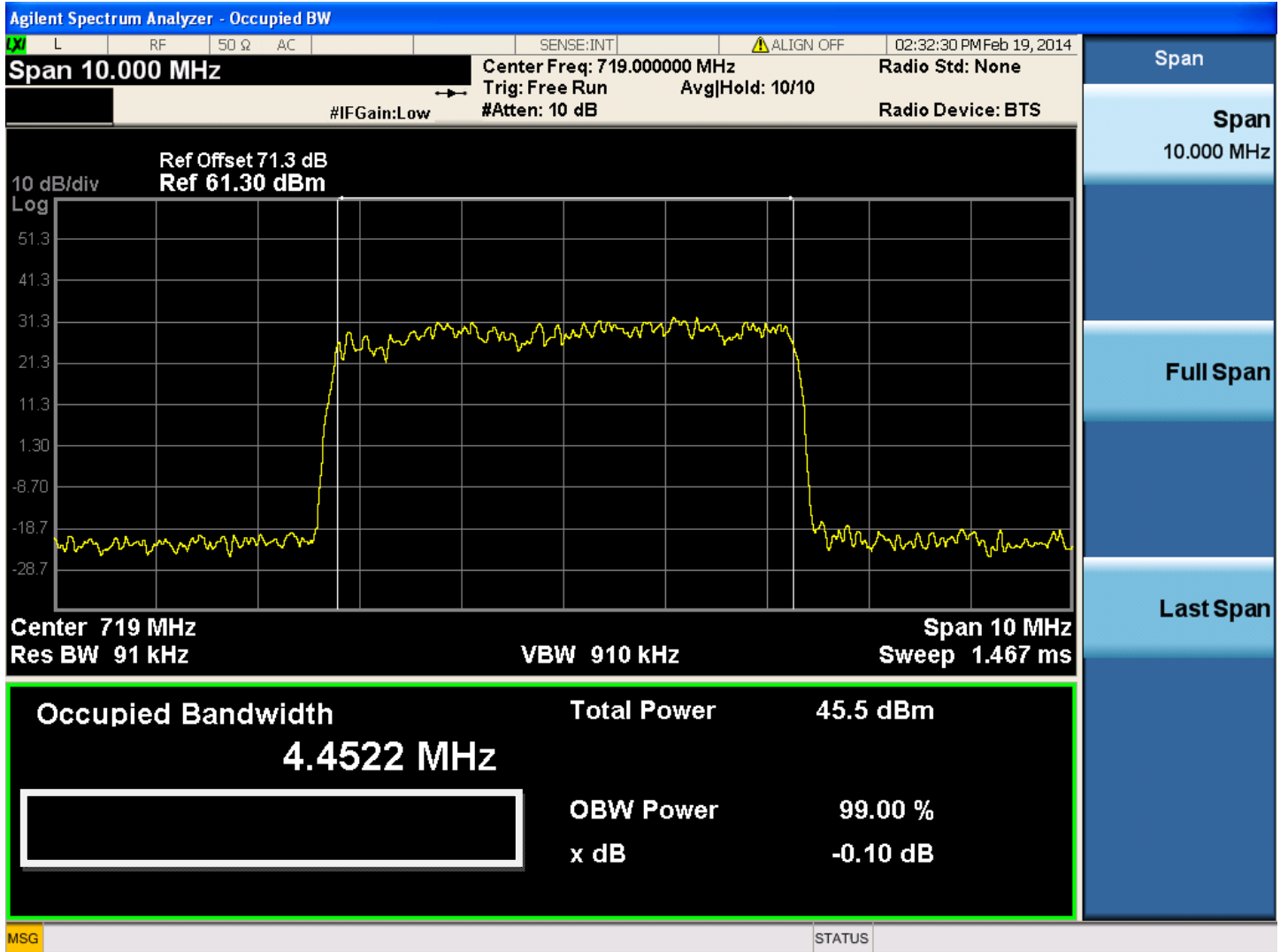
The carrier 99% Power Bandwidth, which defines the necessary bandwidth declared in the emission designator, using an Agilent MXA Signal Analyzer N9020A 20 Hz – 26.5 GHz.

1. The ETSI TS 36.104 emission mask limitation, using a Rohde & Schwarz FSEM 30 EMI Test Receiver, to demonstrate compliance with both the emission mask requirements and with Part 27.53(g).

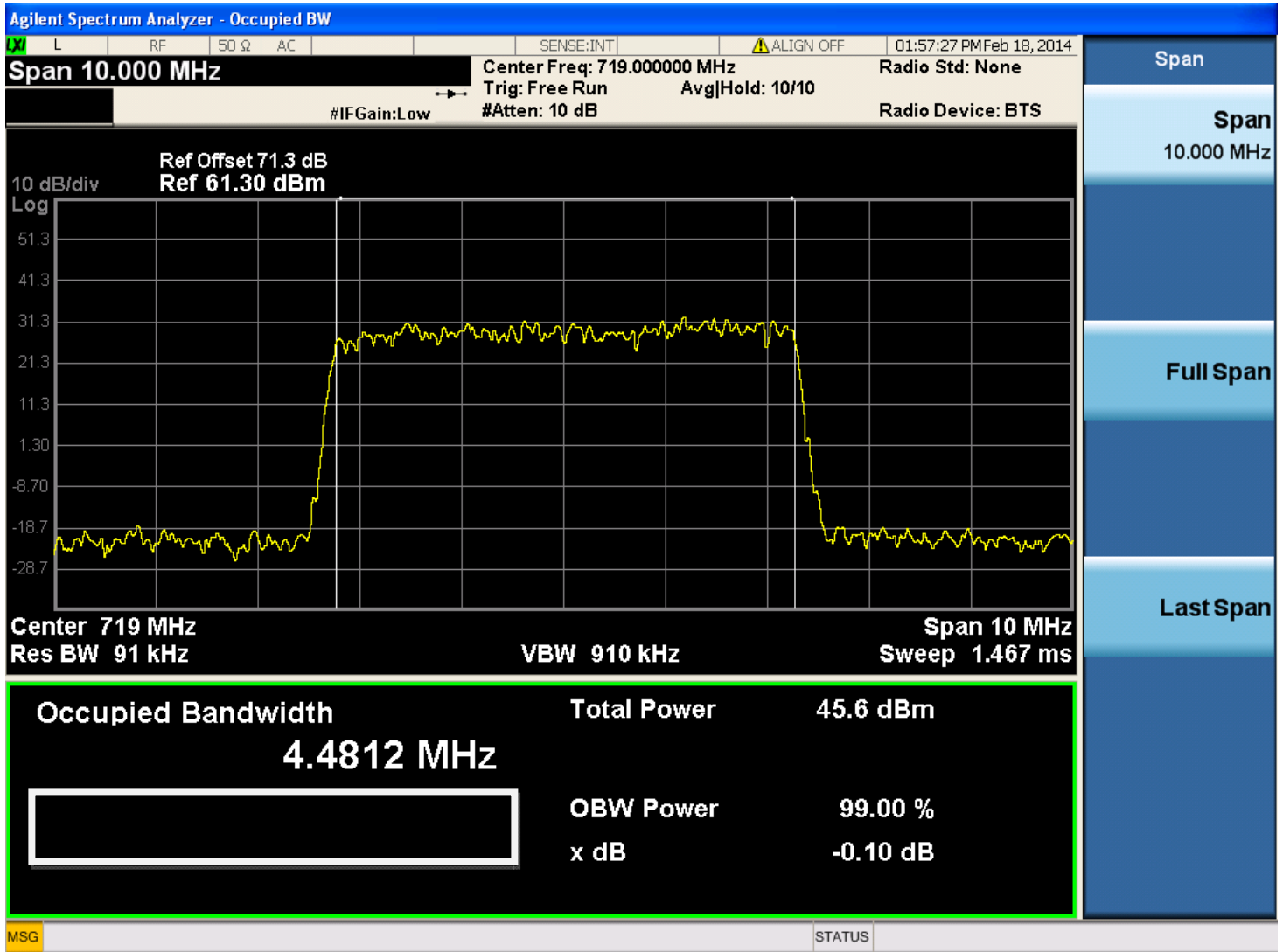
**99% Power Bandwidth
LTE QPSK
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW**



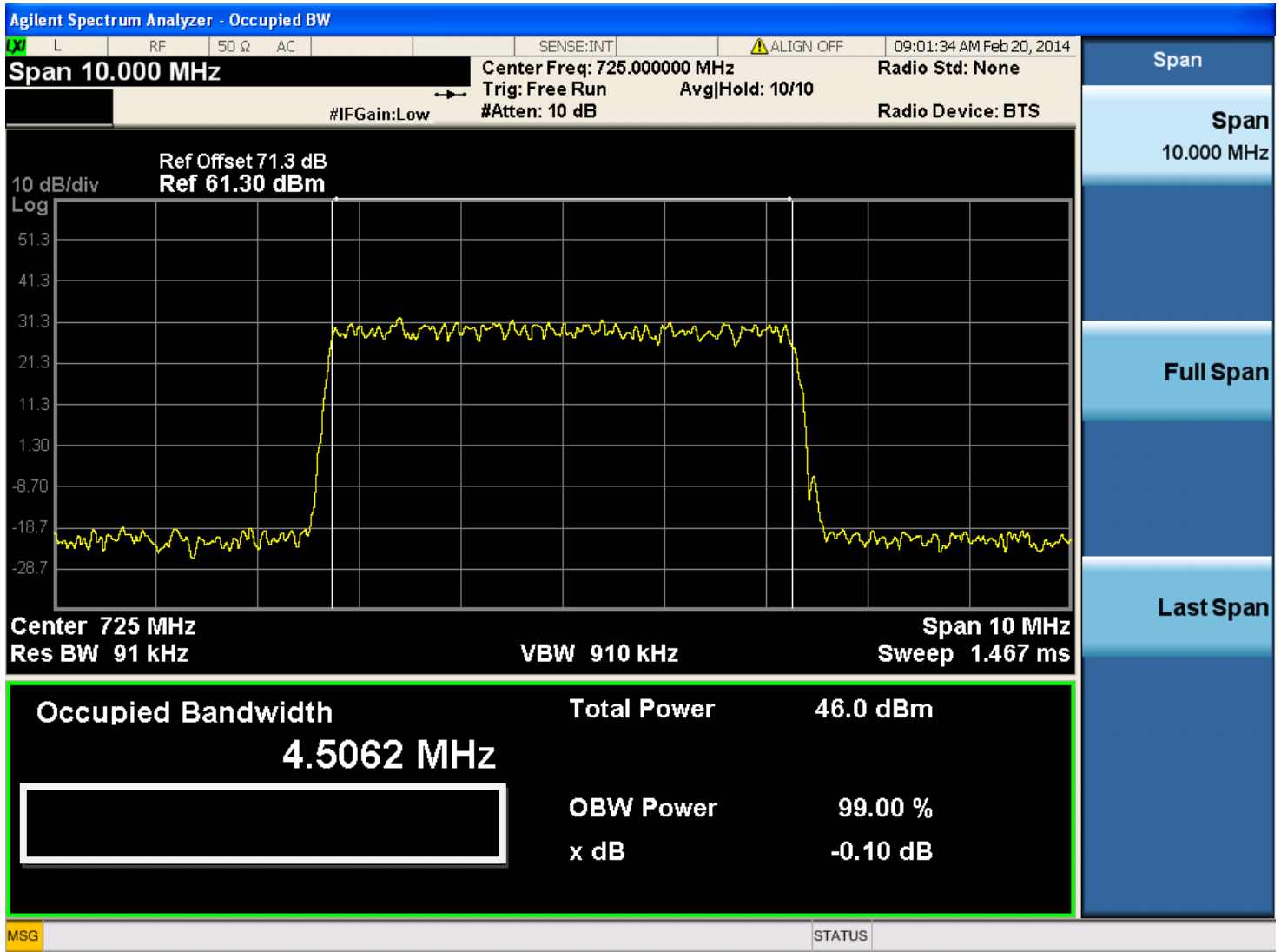
99% Power Bandwidth
LTE 16QAM
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW



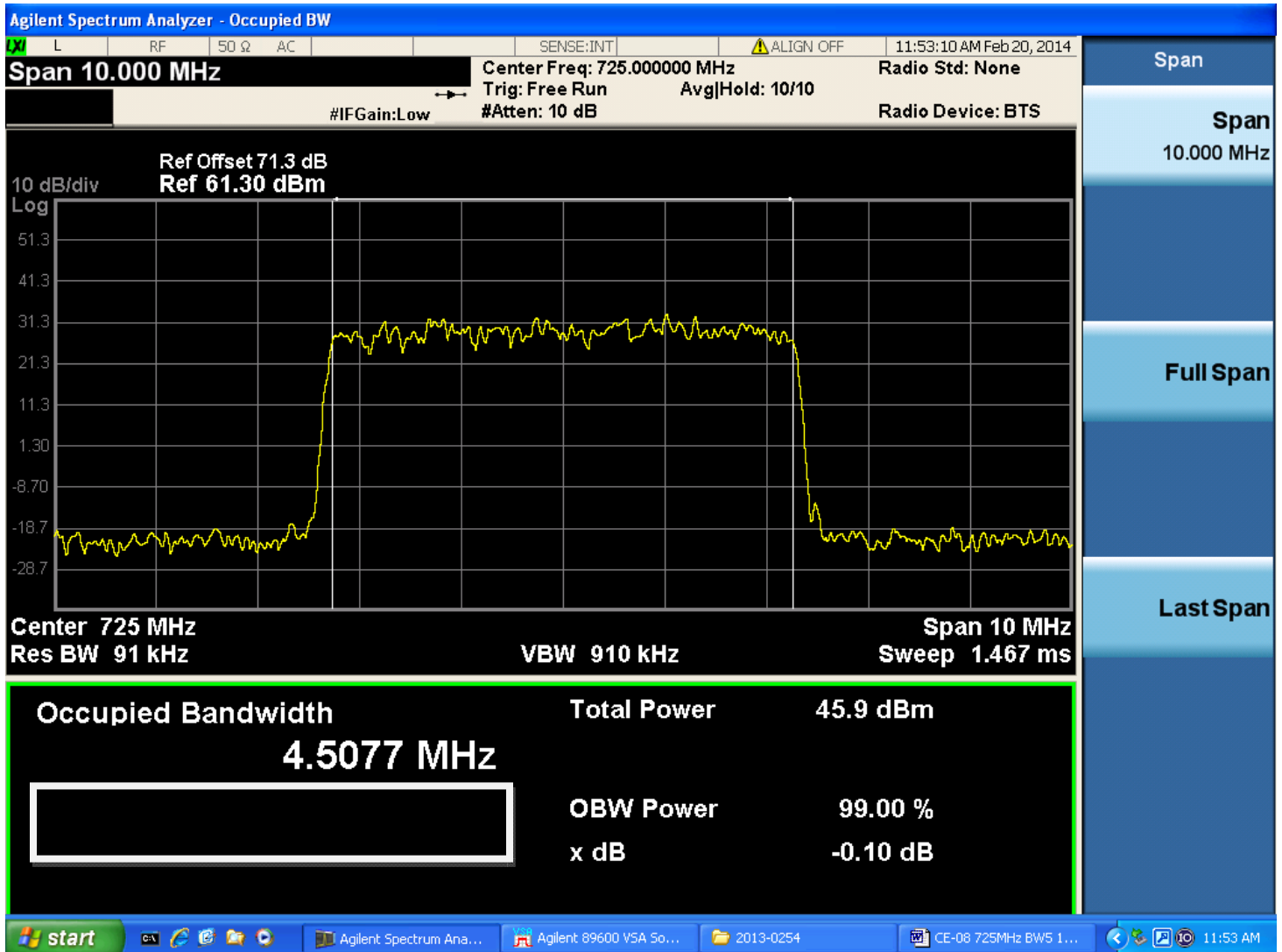
99% Power Bandwidth
LTE 64QAM
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW



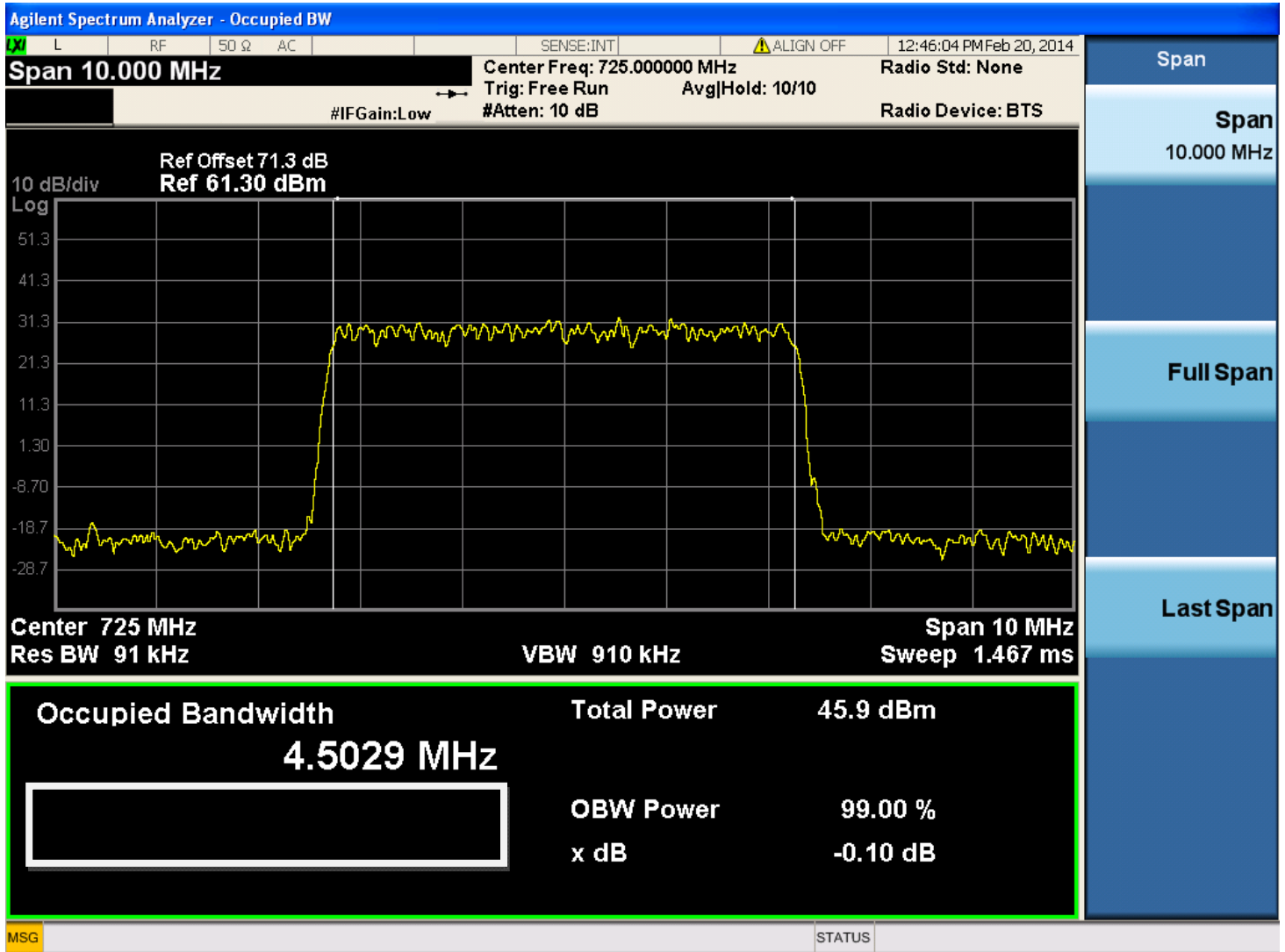
99% Power Bandwidth
LTE QPSK
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW



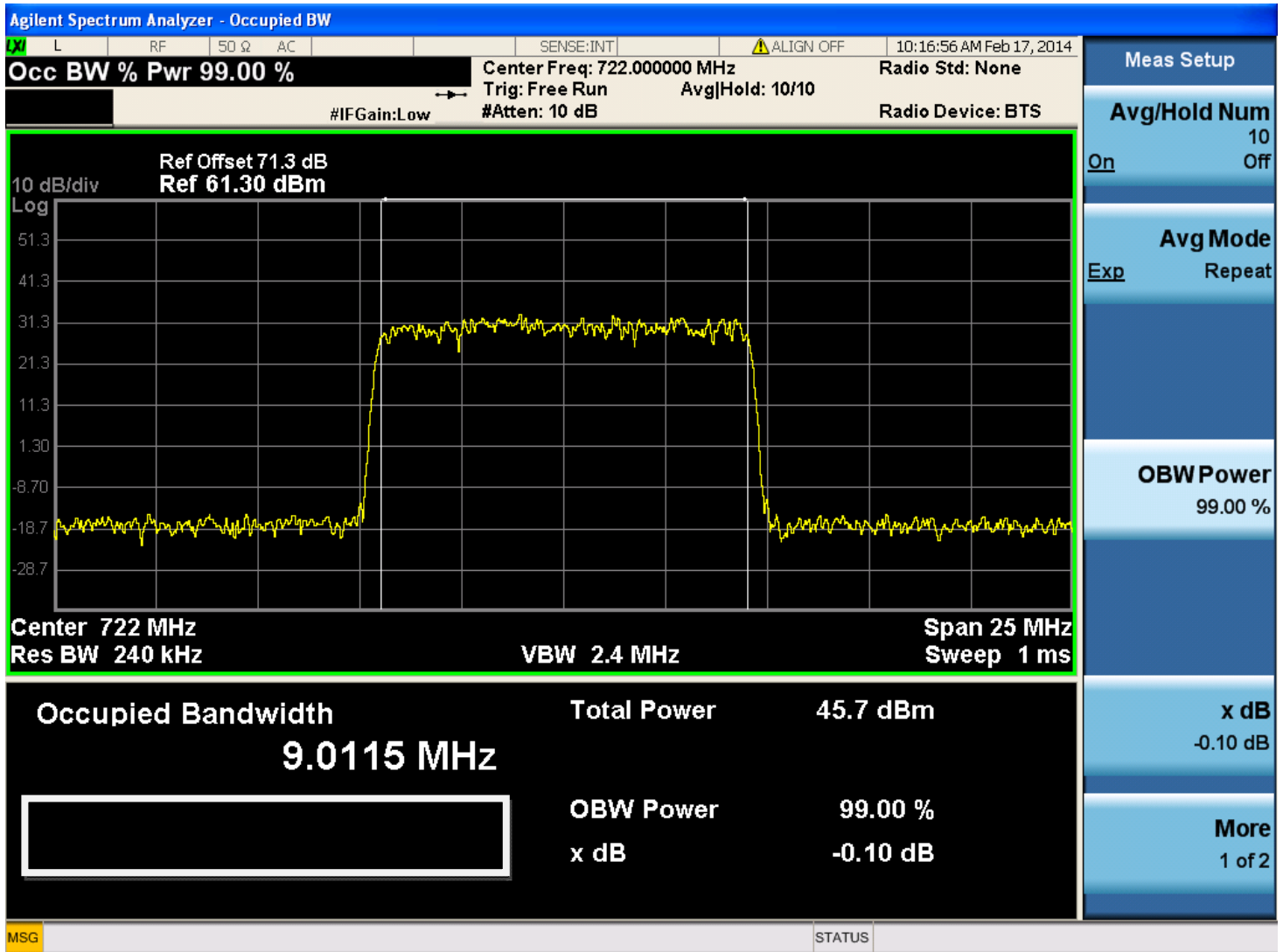
99% Power Bandwidth
LTE 16QAM
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW



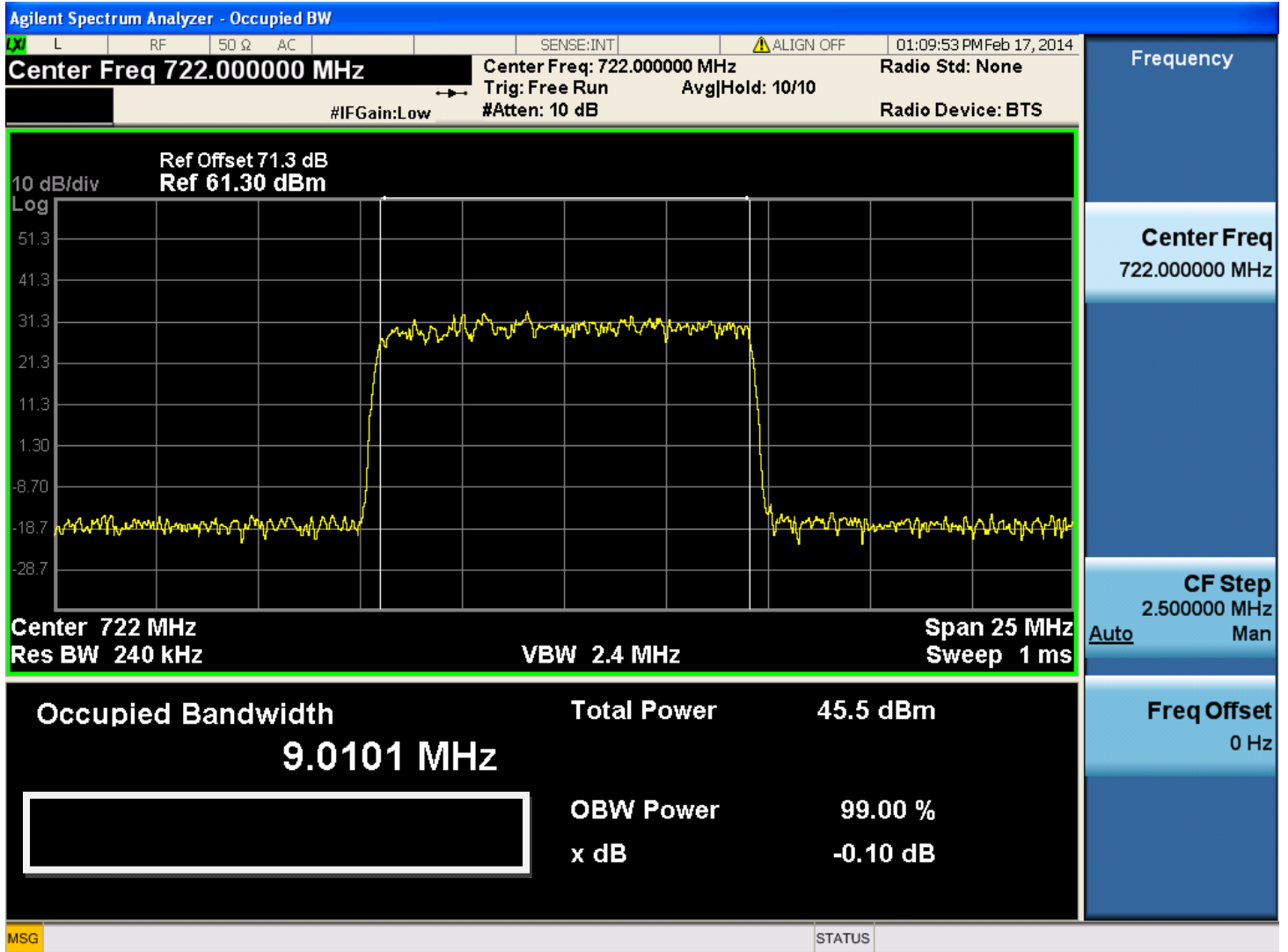
99% Power Bandwidth
LTE 64QAM
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW



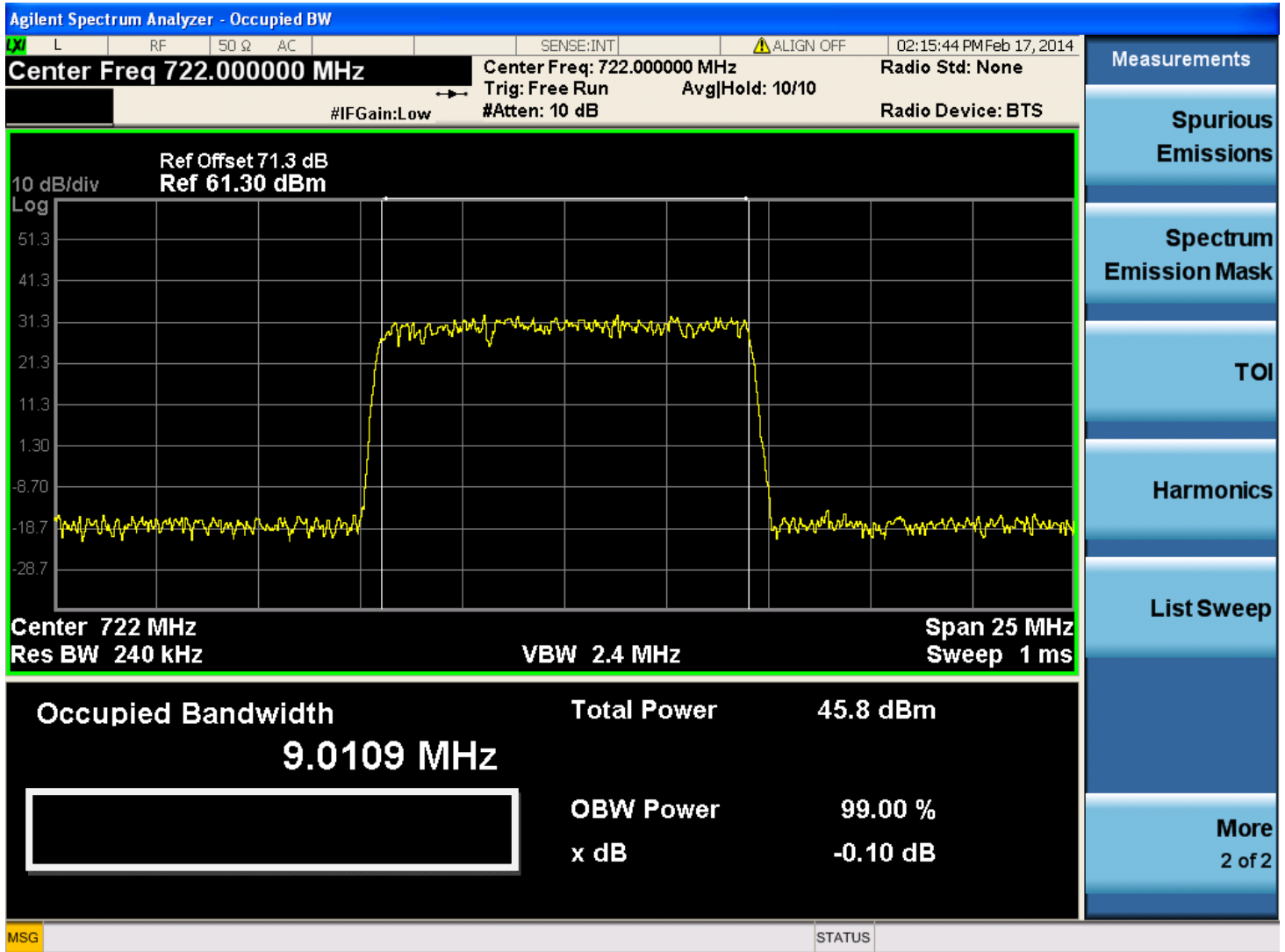
99% Power Bandwidth
LTE QPSK
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW



99% Power Bandwidth
LTE 16QAM
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW



99% Power Bandwidth
LTE 64QAM
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW



99% Power Bandwidth Results Summary

Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power	LTE Modulation	Measured % Power Bandwidth (MHz)
D: 716 – 722 MHz	719 MHz	5 MHz	40 W (46 dBm)	QPSK	4.4721
	719 MHz	5 MHz	40 W (46 dBm)	16QAM	4.4522
	719 MHz	5 MHz	40 W (46 dBm)	64QAM	4.4812
E: 722 – 728 MHz	725 MHz	5 MHz	40 W (46 dBm)	QPSK	4.5062
	725 MHz	5 MHz	40 W (46 dBm)	16QAM	4.5077
	725 MHz	5 MHz	40 W (46 dBm)	64QAM	4.5029
D+E: 716 – 728 MHz	722 MHz	10 MHz	40 W (46 dBm)	QPSK	9.0115
	722 MHz	10 MHz	40 W (46 dBm)	16QAM	9.0101
	722 MHz	10 MHz	40 W (46 dBm)	64QAM	9.0109

The average 99% Power Bandwidth, i.e. the Necessary Bandwidth, rounded off to 1 decimal point determines the emission designator to be:

5 MHz BW at 4M5F9W
10 MHz BW at 9M0F9W

PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH – EMISSION MASK

Method 2. Emission mask limitation using an EMI Test Receiver with Total Integrated Laboratory Environment (TILE) EMI test software.

Compliance with the ETSI TS 36.104 occupied bandwidth emission mask requirements and with Part 27.53(g) was demonstrated using an EMI Test Receiver, in combination with the Total Integrated Laboratory Environment (TILE) EMI test software, by ETS-Lindgren. The Emission Mask Compliance (Out-Of-Band) were measured and recorded at Tx1 for each of the 3 LTE test modulation schemes: QPSK, 16 QAM and 64QAM, for the 3 carriers tabulated below.

Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power
D: 716 – 722 MHz	719 MHz	5 MHz	40 W (46 dBm)
E: 722 – 728 MHz	725 MHz	5 MHz	40 W (46 dBm)
D+E: 716 – 728 MHz	722 MHz	10 MHz	40 W (46 dBm)

The data plots show compliance both with the Block D (716 – 722 MHz), Block E (722 MHz – 728 MHz) and BC-29 (716 - &28 MHz) spectrum, with the carrier for each modulation type remaining within it's emission mask, which is defined in *ETSI TS 136 104 V10.9.0 (2013-02) Table 6.6.3.2.1-3: General operating band unwanted emission limits for 5, 10, 15 and 20 MHz channel bandwidth (E-UTRA bands <1GHz) for Category B*. The mask attenuation values are based on a 30 kHz resolution bandwidth (RBW), which required the carrier to be offset by:

$$\text{BW 5 MHz - Carrier Offset} = 10 \log (30 \text{ kHz}/5 \text{ MHz}) = -22.22 \text{ dB}$$

$$\text{BW 10 MHz - Carrier Offset} = 10 \log (30 \text{ kHz}/10 \text{ MHz}) = -25.23 \text{ dB}$$

Unless the emission mask is more stringent, attenuation outside the mask is specified as the attenuation below the carrier (dBc) is required to be $43 + 10 \log (P)$ in a 100 kHz band segment, in accordance with § 27.53 *Emission limit, (g) For operations in the 698-746 MHz band*.

$$43 + 10 \log 40\text{W} = 59 \text{ dBc}, \text{ which equates to } -13 \text{ dBm}$$

Consistent with 2xMIMO requirements, an additional 3 dB attenuation is required, in accordance with:

$$43 + 10 \log P + 10 \log (N_{\text{ant}})$$

$$43 + 10 \log 40\text{W} + 10 \log 2 = 62.0 \text{ dBc} = -16 \text{ dBm}$$

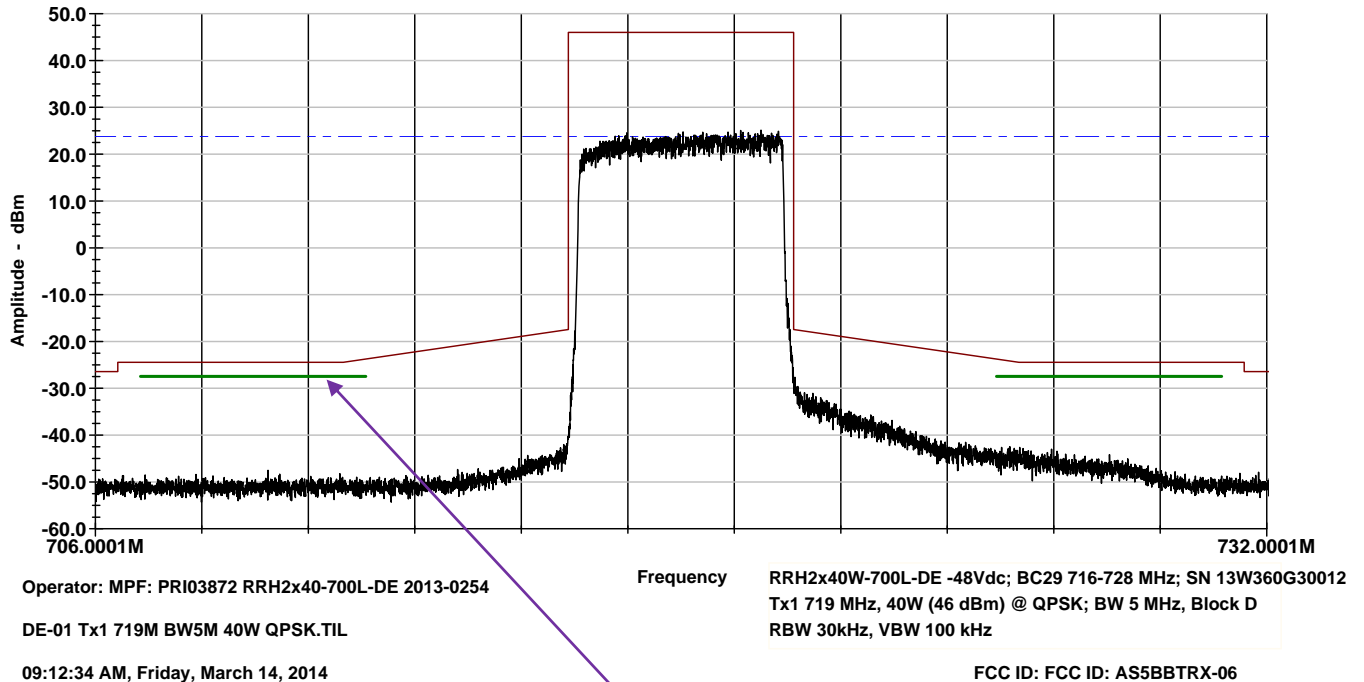
where, N_{ant} is the number of outputs, i.e., transmit antenna terminals.

Occupied Bandwidth
LTE QPSK
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Occupied Bandwidth at Antenna Terminal

Offset-40W700L
OBW60F
Mask 700L_D 719MHz
MIMO-H
MIMO-L



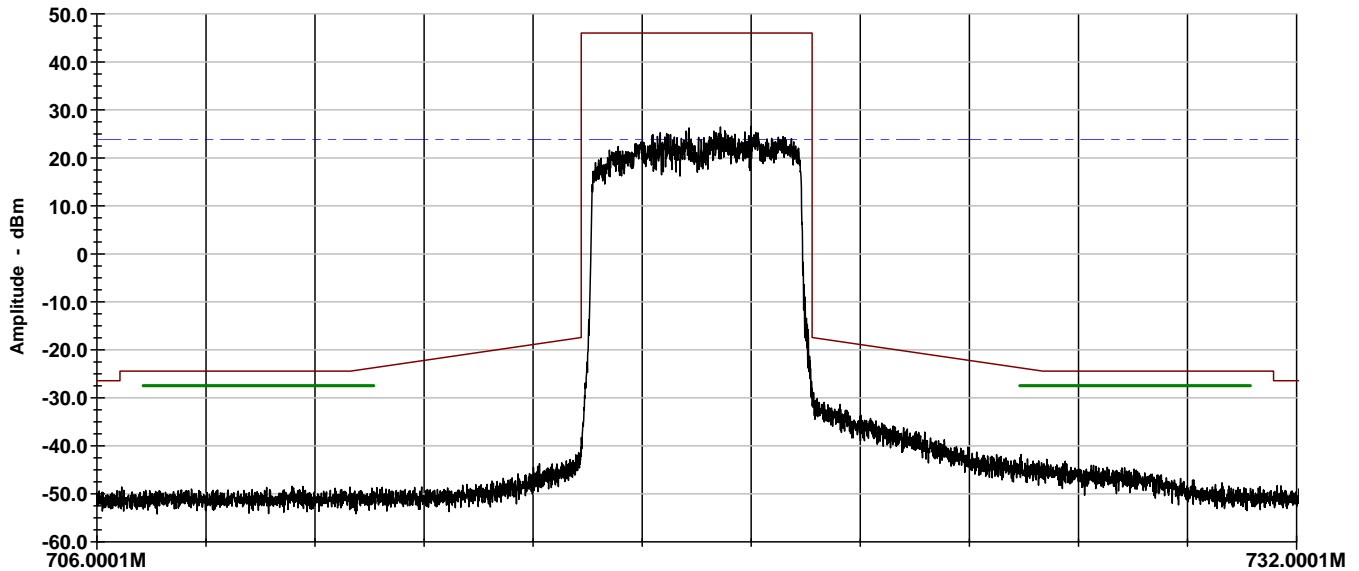
2xMIMO

Occupied Bandwidth
LTE 16QAM
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Occupied Bandwidth at Antenna Terminal

Offset-40W700L
OBW60F
Mask 700L_D 719MHz
MIMO-H
MIMO-L



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

Frequency

RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 719 MHz, 40W (46 dBm) @ 16QAM; BW 5 MHz, Block D
RBW 30kHz, VBW 100 kHz

DE-02 Tx1 719M BW5M 40W 16QAM.TIL

03:11:58 PM, Wednesday, February 19, 2014

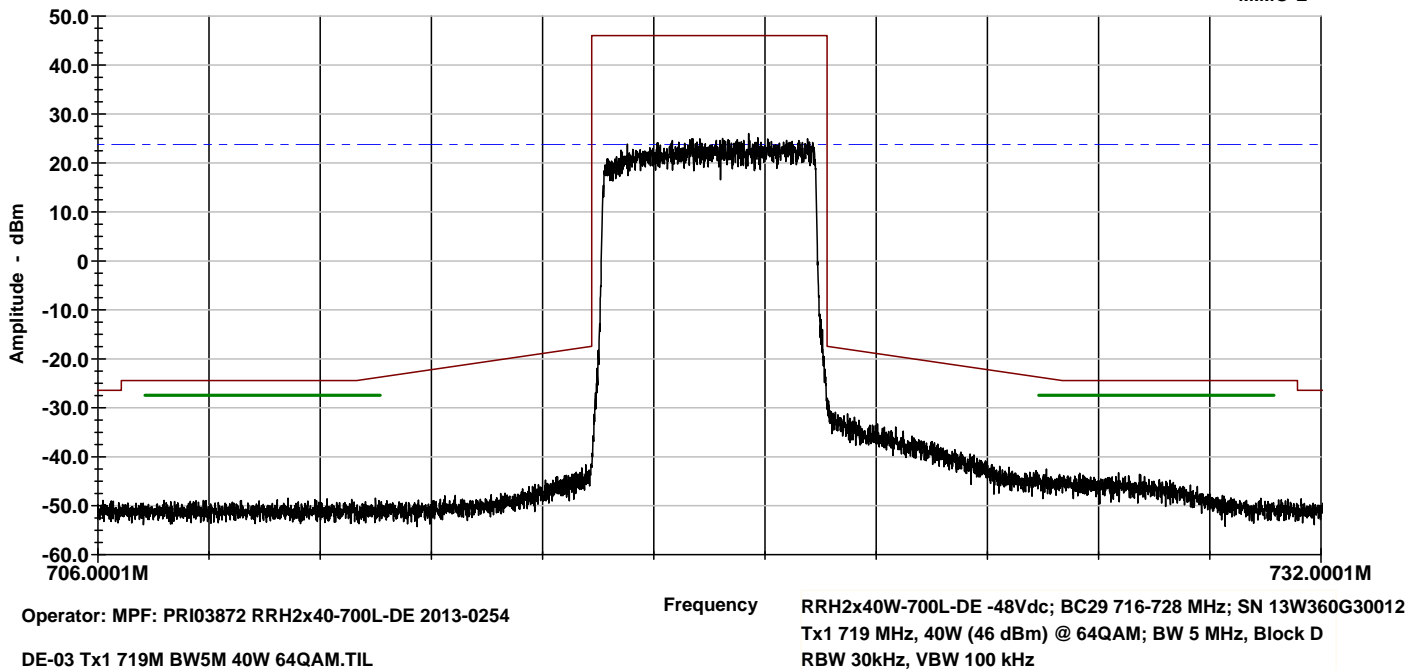
FCC ID: FCC ID: AS5BBTRX-06

Occupied Bandwidth
LTE 64QAM
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Occupied Bandwidth at Antenna Terminal

Offset-40W700L
OBW60F
Mask 700L_D 719MHz
MIMO-H
MIMO-L

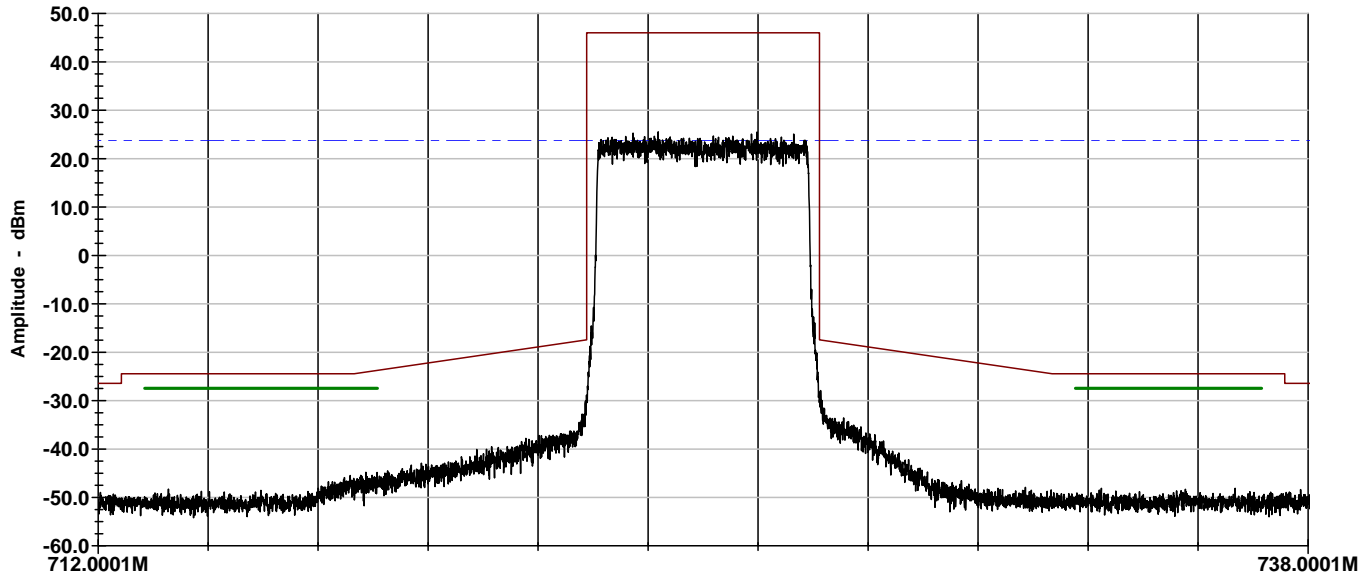


Occupied Bandwidth
LTE QPSK
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Occupied Bandwidth at Antenna Terminal

Offset-40W700L
OBW60F
Mask 700L_E 725MHz
MIMO-H
MIMO-L



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-07 Tx1 725M BW5M 40W QPSK.TIL

09:38:37 AM, Thursday, February 20, 2014

RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 725 MHz, 40W (46 dBm) @ QPSK; BW 5 MHz, Block E
RBW 30kHz, VBW 100 kHz

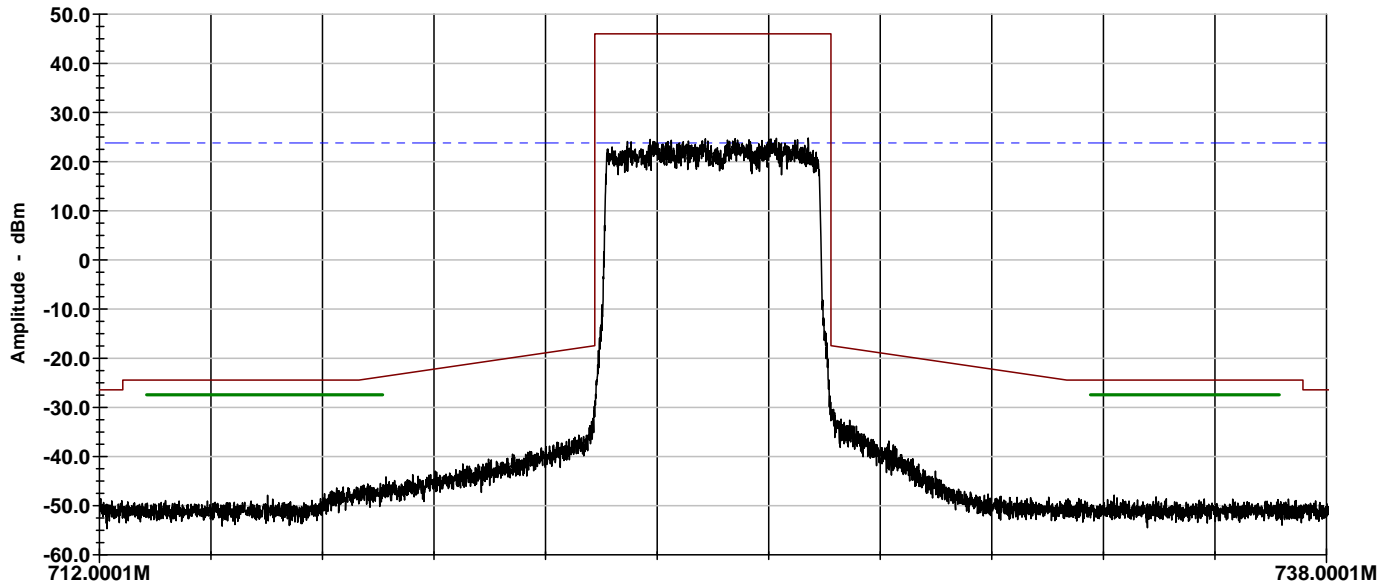
FCC ID: FCC ID: AS5BBTRX-06

Occupied Bandwidth
LTE 16QAM
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Occupied Bandwidth at Antenna Terminal

Offset-40W700L
OBW60F
Mask 700L_E 725MHz
MIMO-H
MIMO-L



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-08 Tx1 725M BW5M 40W 16QAM.TIL

12:25:24 PM, Thursday, February 20, 2014

Frequency

RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 725 MHz, 40W (46 dBm) @ 16QAM; BW 5 MHz, Block E
RBW 30kHz, VBW 100 kHz

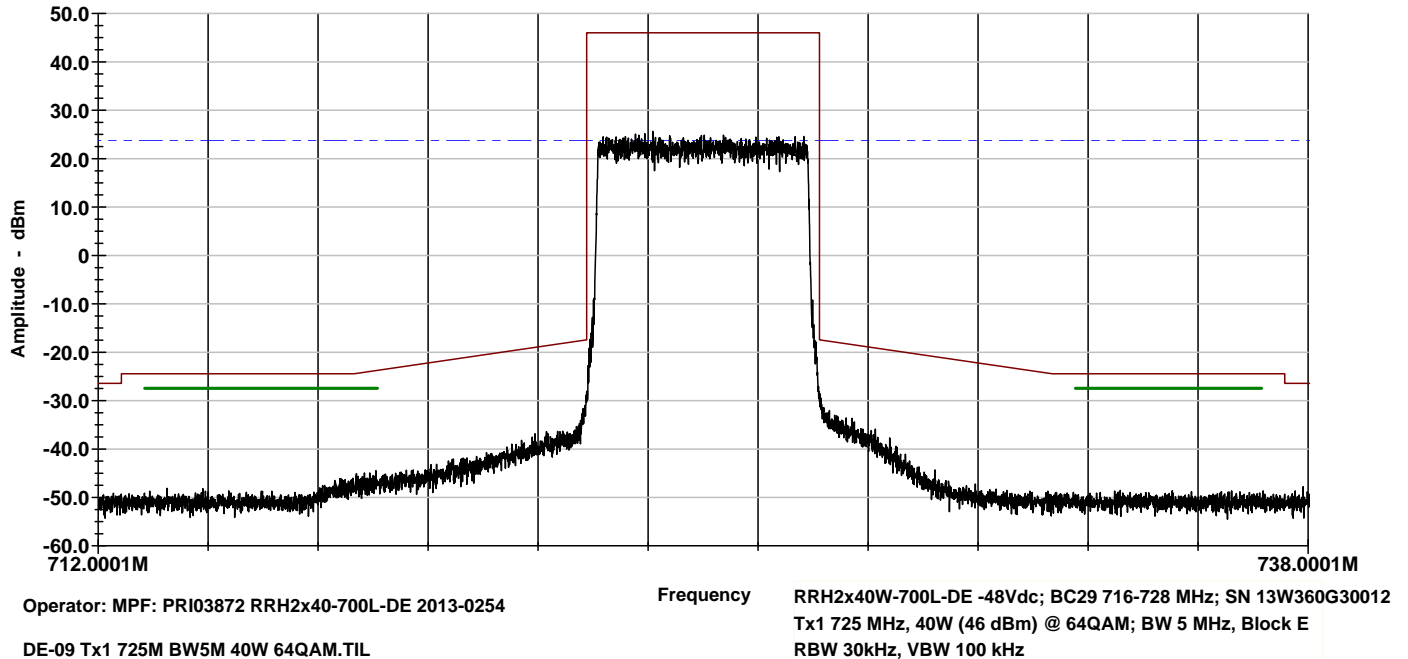
FCC ID: FCC ID: AS5BBTRX-06

Occupied Bandwidth
LTE 64QAM
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Occupied Bandwidth at Antenna Terminal

Offset-40W700L
OBW60F
Mask 700L_E 725MHz
MIMO-H
MIMO-L



FCC ID: FCC ID: AS5BBTRX-06

Occupied Bandwidth
LTE QPSK
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW

Rec-S/A - R&S FSEM30 E926

PM/Head - Agilent N1912A E915; Sensor Agilent N1921A E914

MXA - Agilent MXA N9020A E831

Env Conditions - E1128 24.9C 4.6%RH 1007.9 hPa

Shielded Chamber - MH 28-109

GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.

Global Product Compliance Laboratory

Occupied Bandwidth at Antenna Terminal

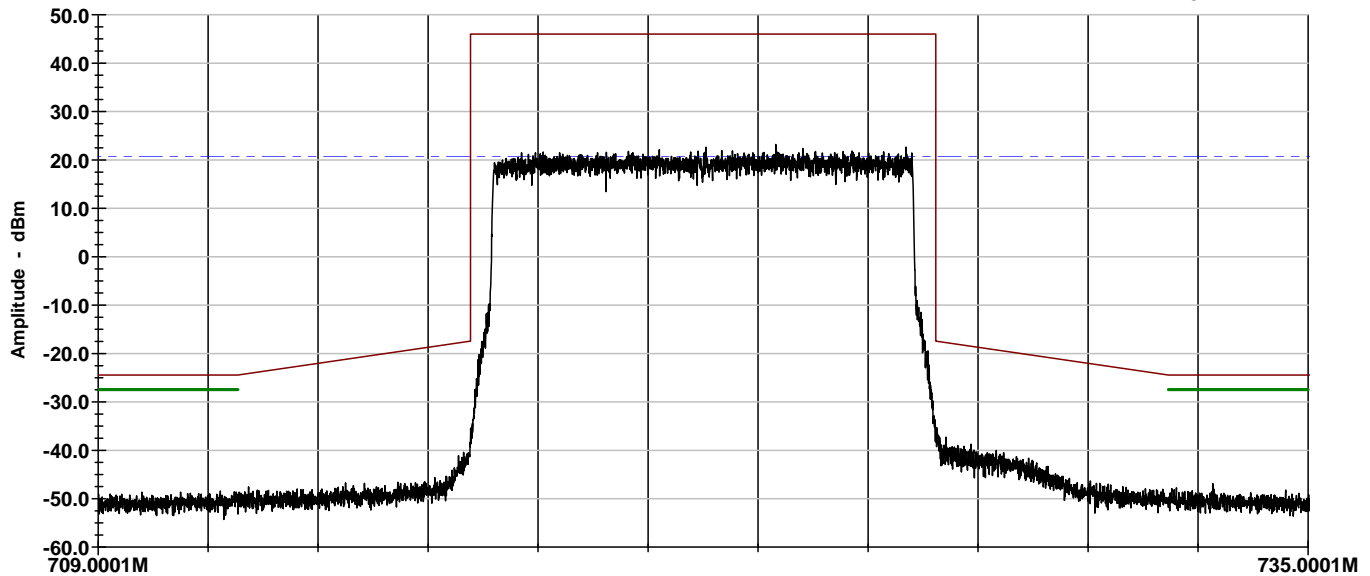
Offset-40W700L

OBW60F

Mask 700L_BC29 722MHz

MIMO-L

MIMO-H



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-13b Tx1 722M BW10M 40W QPSK.TIL

12:28:53 PM, Monday, February 17, 2014

Frequency

RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012

Tx1 722 MHz, 40W (46 dBm) @ QPSK; BW 10 MHz, BC 29

RBW 30kHz, VBW 100 kHz

FCC ID: FCC ID: AS5BBTRX-06

Occupied Bandwidth
LTE 16QAM
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW

Rec-S/A - R&S FSEM30 E926

PM/Head - Agilent N1912A E915; Sensor Agilent N1921A E914

MXA - Agilent MXA N9020A E831

Env Conditions - E1128 24.9C 4.6%RH 1007.9 hPa

Shielded Chamber - MH 28-109

GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.

Global Product Compliance Laboratory

Occupied Bandwidth at Antenna Terminal

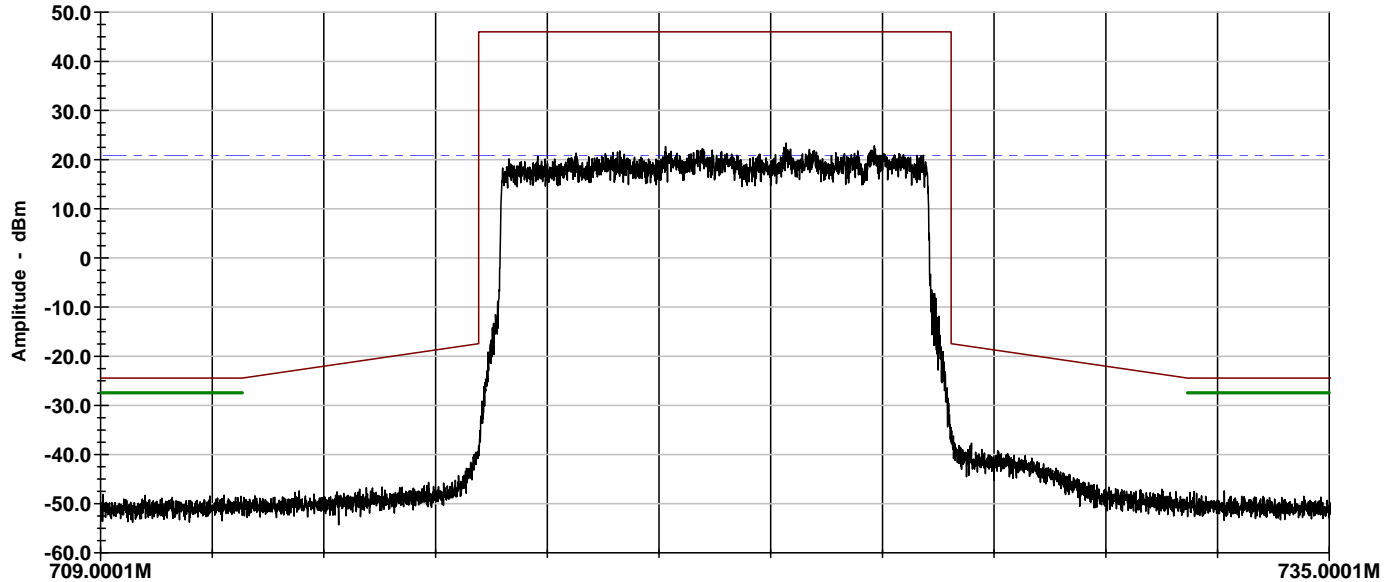
Offset-40W700L

OBW60F

Mask 700L_BC29 722MHz

MIMO-H

MIMO-L



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-14 Tx1 722M BW10M 40W 16QAM.TIL

02:53:10 PM, Friday, March 14, 2014

Frequency

RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 722 MHz, 40W (46 dBm) @ 16QAM; BW 10 MHz, BC 29
RBW 30kHz, VBW 100 kHz

FCC ID: FCC ID: AS5BBTRX-06

Occupied Bandwidth
LTE 64QAM
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW

Rec-S/A - R&S FSEM30 E926

PM/Head - Agilent N1912A E915; Sensor Agilent N1921A E914

MXA - Agilent MXA N9020A E831

Env Conditions - E1128 24.9C 4.6%RH 1007.9 hPa

Shielded Chamber - MH 28-109

GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.

Global Product Compliance Laboratory

Occupied Bandwidth at Antenna Terminal

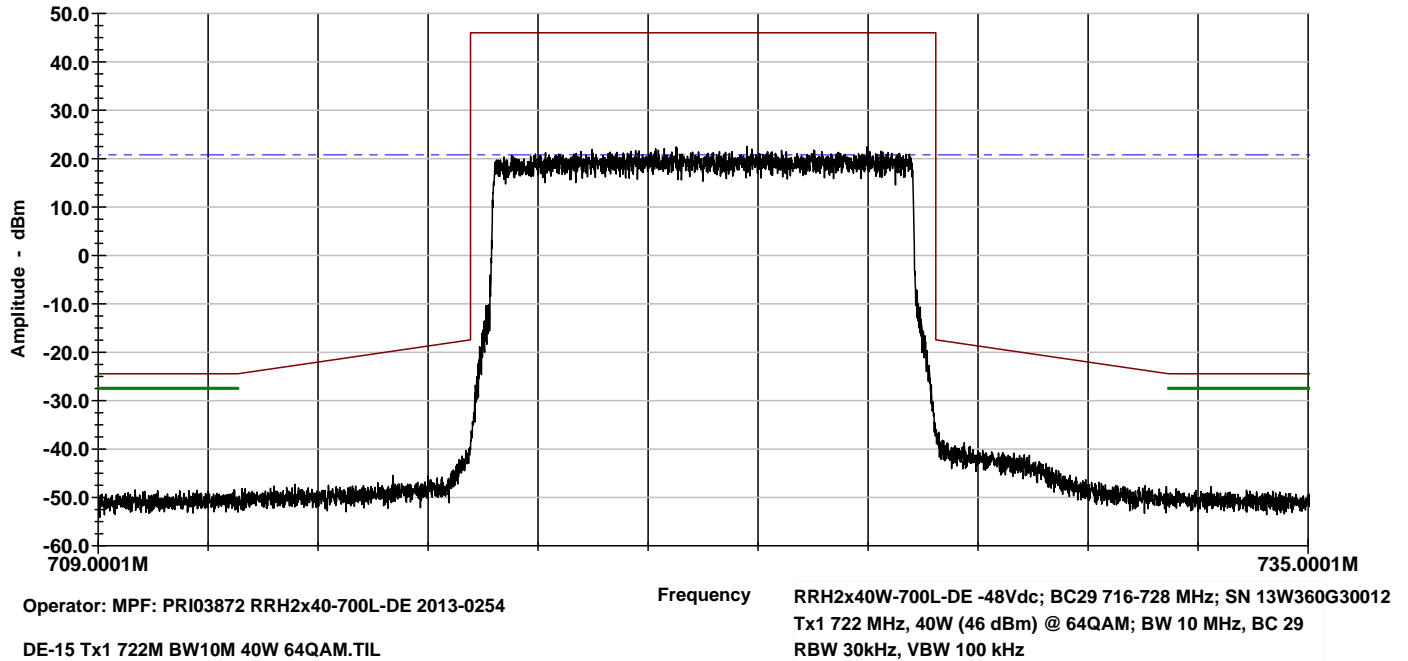
Offset-40W700L

OBW60F

Mask 700L_BC29 722MHz

MIMO-H

MIMO-L



FCC ID: FCC ID: AS5BBTRX-06

PART 2.1051 MEASUREMENTS REQUIRED: SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS.

This test procedure is an extension of the occupied bandwidth measurement at the Equipment Antenna Connector (EAC) terminal, i.e., the downlink transmit antenna, using the same carrier frequencies, configurations, power level settings and test modulations, as in the preceding *PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH – EMISSION MASK*.

In accordance with Part 2.1057(a), the required frequency spectrum to be investigated extends from the lowest RF signal generated to the 10th harmonic of the carrier at the EAC terminal. The emission limits at the antenna terminal are specified in Part 27.53(g) *For operations in the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.* In accordance with Part 2.1051, "the magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified"; i.e., these are not reportable.

In order to suppress the instrumentation noise floor sufficient to detect and measure spurious signals that have power levels as low as 20 dB below the required limit, an EMC software package was employed to drive the spectrum analyzer, collect and compile the acquired data, perform mathematical corrections to the data by incorporating pre-measured path losses into the software, and then generate a graphical display as shown in the following exhibits. The software package is: *TILE/IC (Total Integrated Laboratory Environment/Instrument Control System)*; purchased and licensed from ETS-Lindgren. The instrumentation noise floor is suppressed by the software's ability to split the spectrum being measured into many small segments/ranges and then sequentially compile them for the continuous graphical display.

In accordance with § 27.53 Emission limit, (g) For operations in the 698-746 MHz band, unwanted emissions must be suppressed by

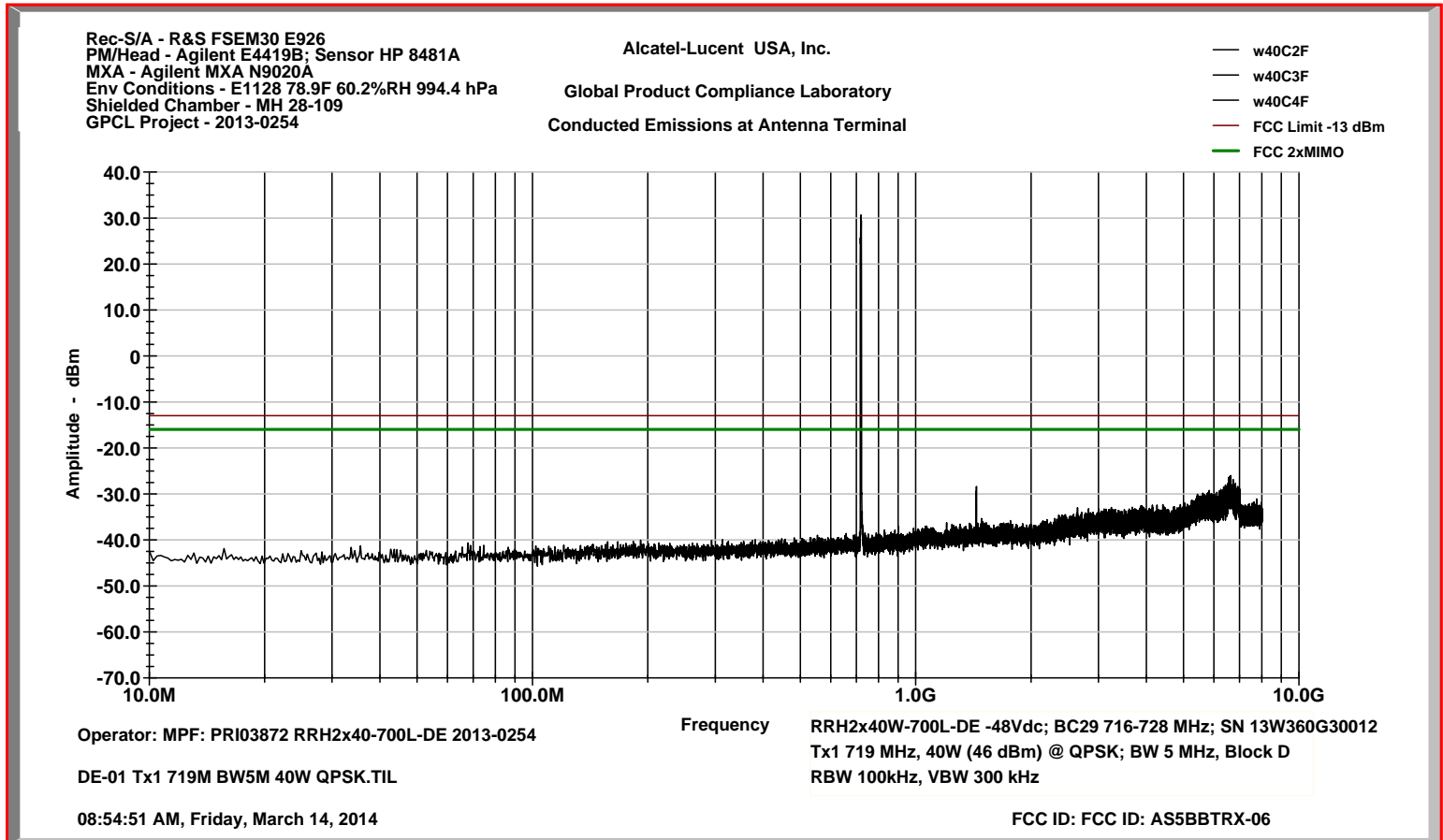
$$43 + 10 \log 40W = 59 \text{ dBc, which equates to } -13 \text{ dBm}$$

Consistent with 2xMIMO requirements, an additional 3 dB attenuation is required, in accordance with:

$$\begin{aligned} 43 + 10 \log P + 10 \log (N_{\text{ant}}) \\ 43 + 10 \log 40W + 10 \log 2 = 62.0 \text{ dBc} = -16 \text{ dBm} \end{aligned}$$

where, N_{ant} is the number of outputs, i.e., transmit antenna terminals.

Conducted Emissions
LTE QPSK
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW



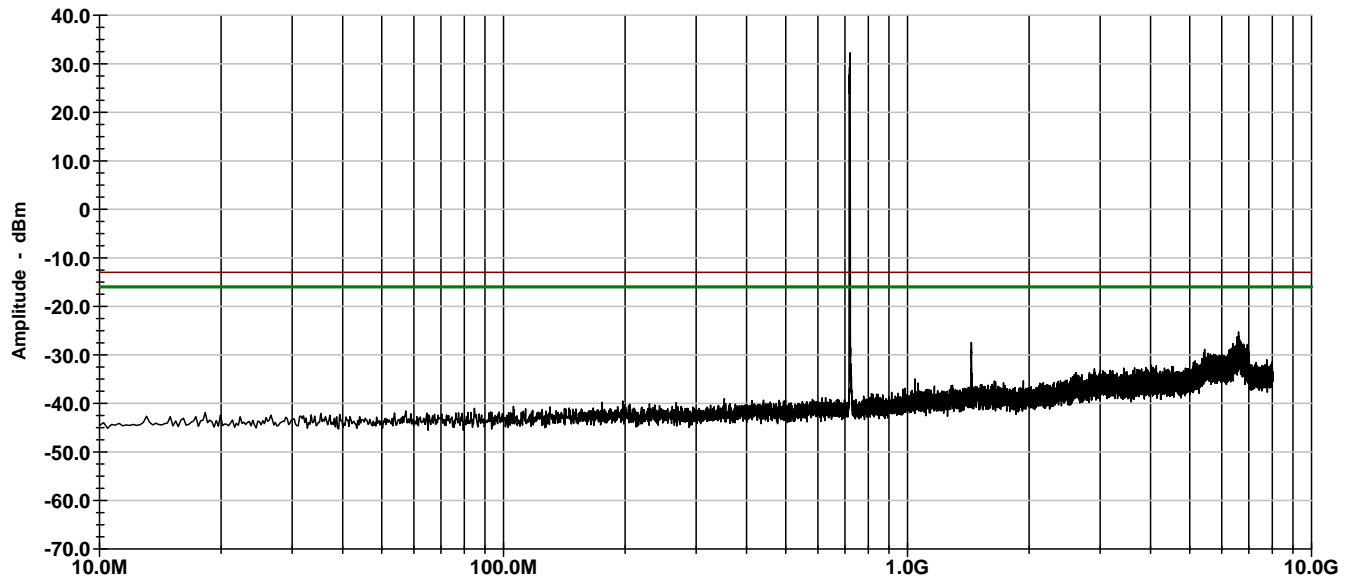
Harmonic: 1.4391 GHz at -28.39 dBm

Conducted Emissions
LTE 16QAM
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-02 Tx1 719M BW5M 40W 16QAM.TIL

03:12:13 PM, Wednesday, February 19, 2014

RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 719 MHz, 40W (46 dBm) @ 16QAM; BW 5 MHz, Block D
RBW 100kHz, VBW 300 kHz

FCC ID: FCC ID: AS5BBTRX-06

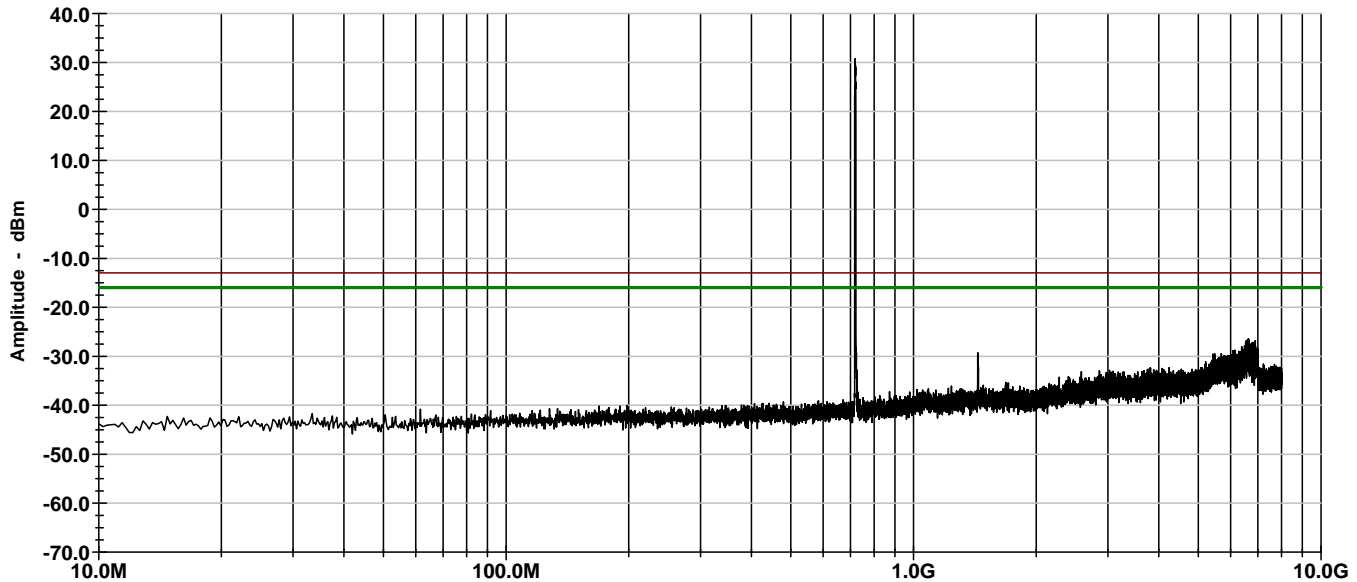
Harmonic: 1.4386 GHz at -27.43 dBm

Conducted Emissions
LTE 64QAM
Tx1 719 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-03 Tx1 719M BW5M 40W 64QAM.TIL

03:07:41 PM, Tuesday, February 18, 2014

Frequency RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 719 MHz, 40W (46 dBm) @ 64QAM; BW 5 MHz, Block D
RBW 100kHz, VBW 300 kHz

FCC ID: FCC ID: AS5BBTRX-06

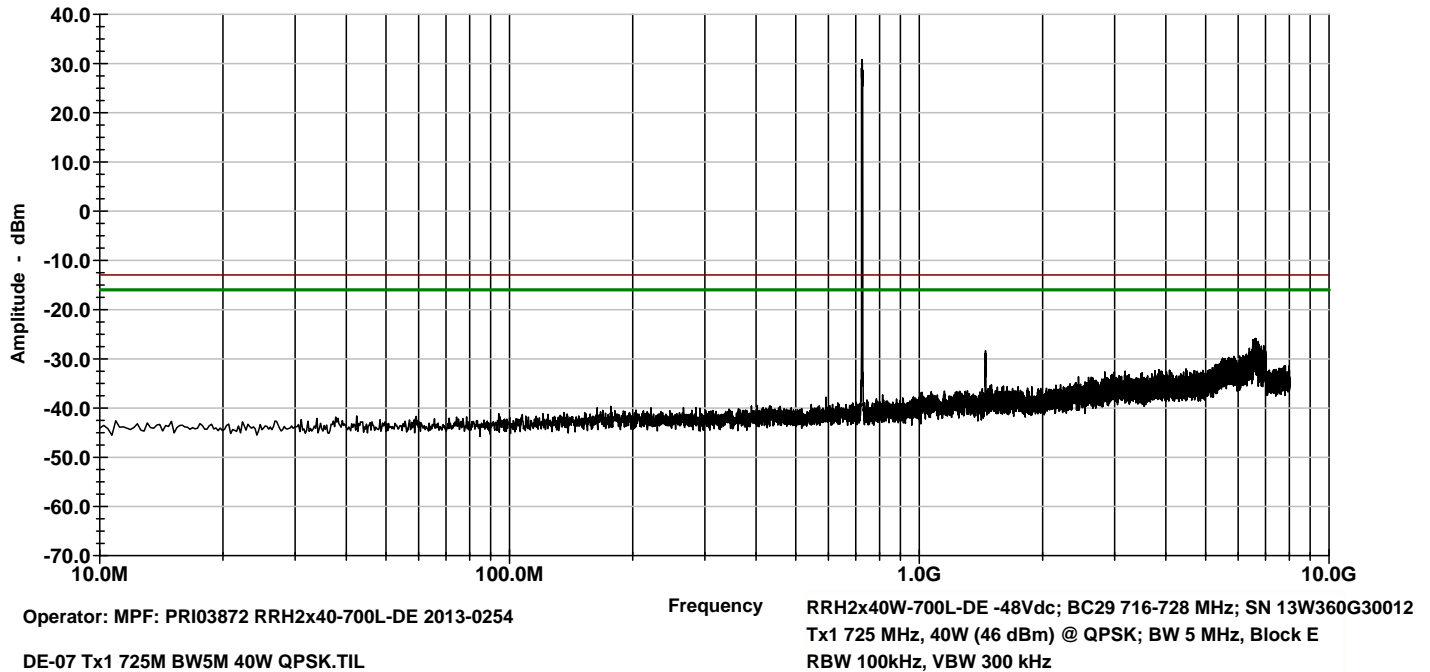
Harmonic: 1.4377 GHz at -29.48 dBm

Conducted Emissions
LTE QPSK
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



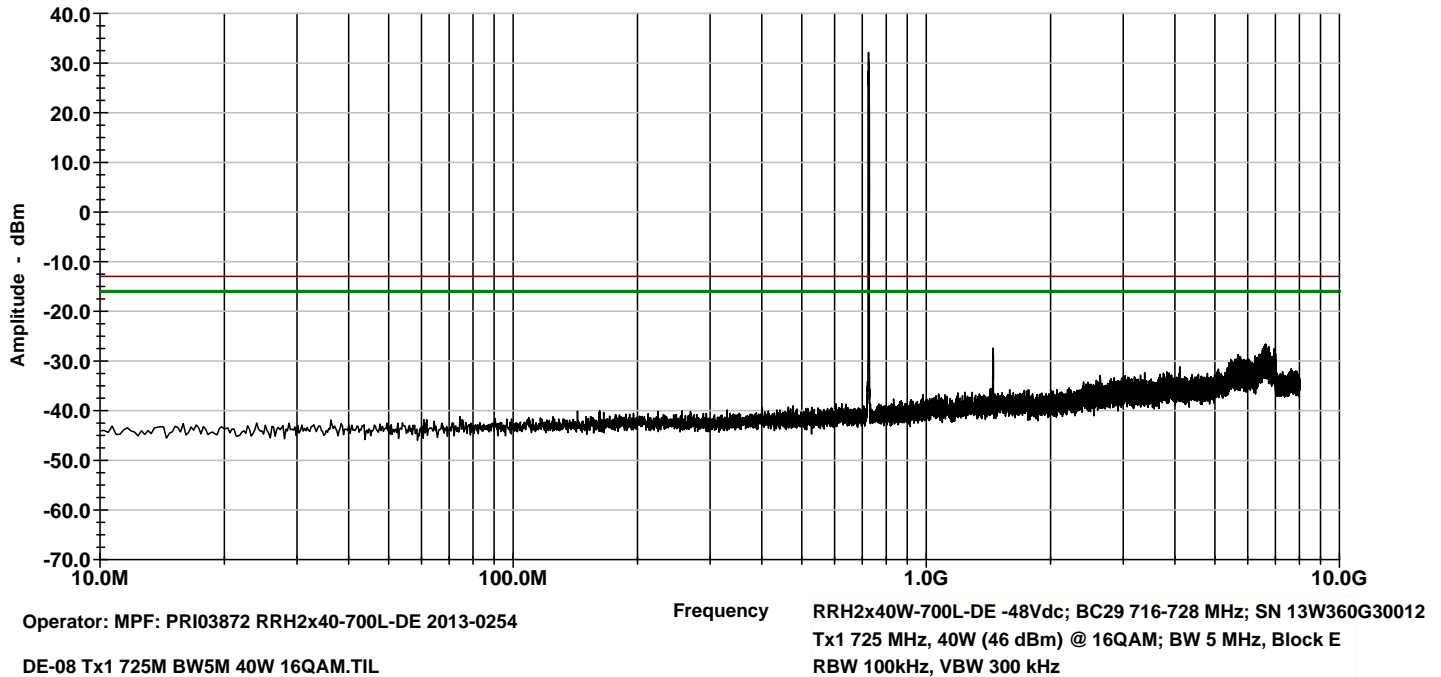
Harmonic: 1.4494 GHz at -28.34 dBm

Conducted Emissions
LTE 16QAM
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



FCC ID: FCC ID: AS5BBTRX-06

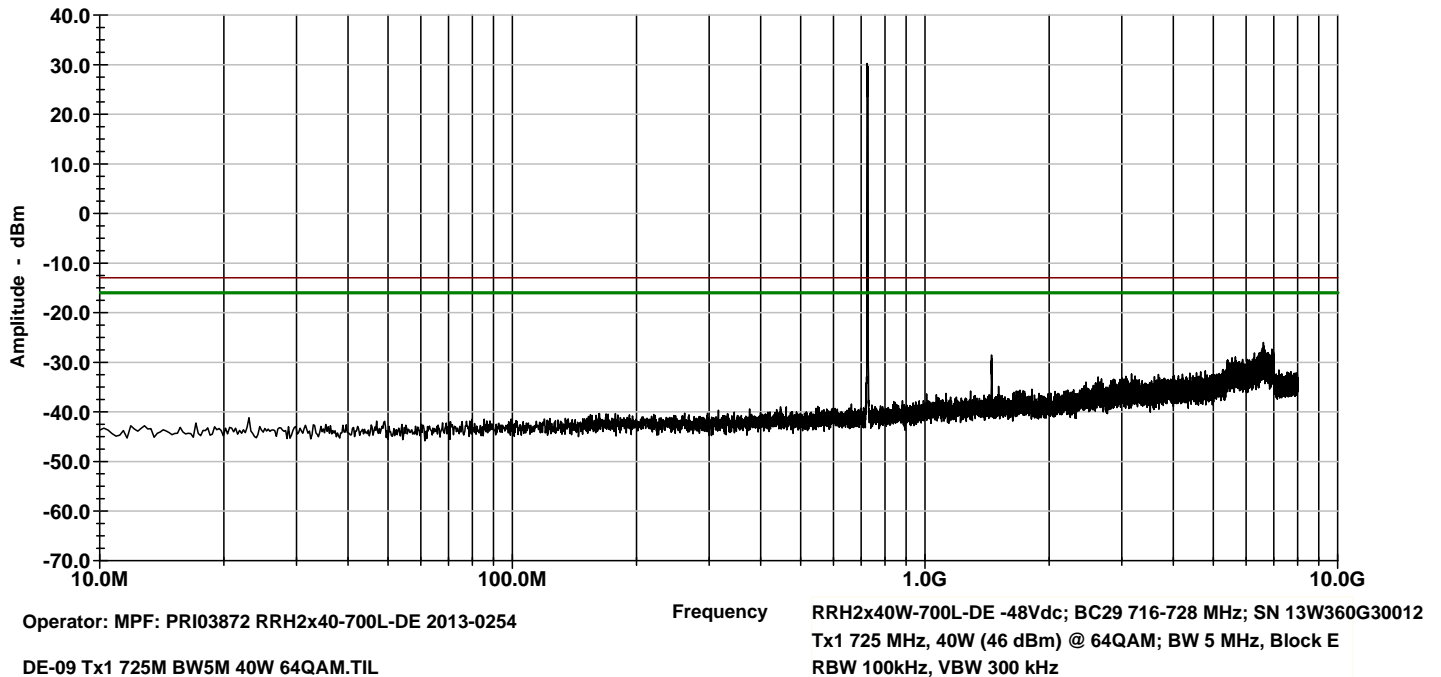
Harmonic: 1.4498 GHz at -27.43 dBm

Conducted Emissions
LTE 64QAM
Tx1 725 MHz, 40 W (46 dBm), 5 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent E4419B; Sensor HP 8481A
MXA - Agilent MXA N9020A
Env Conditions - E1128 78.9F 60.2%RH 994.4 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Alcatel-Lucent USA, Inc.
Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



FCC ID: FCC ID: AS5BBTRX-06

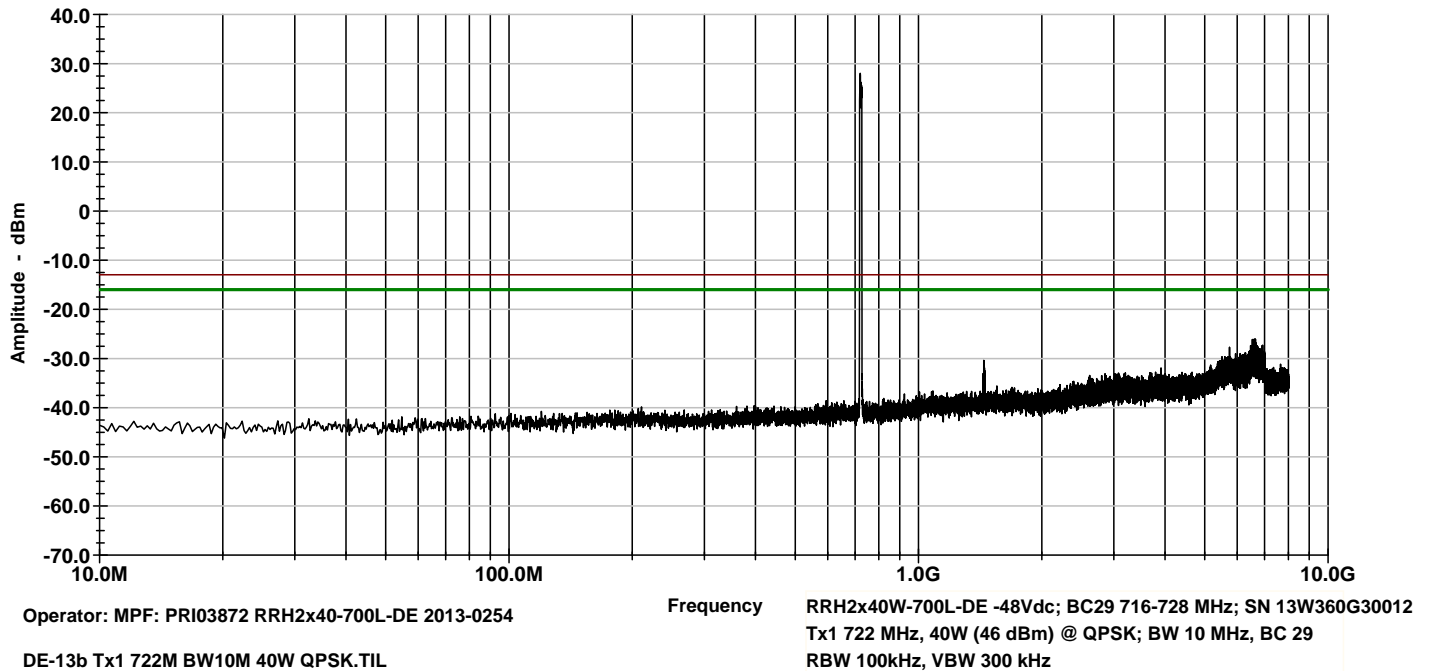
Harmonic: 1.4489 GHz at -28.56 dBm

Conducted Emissions
LTE QPSK
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent N1912A E915; Sensor Agilent N1921A E914 Alcatel-Lucent USA, Inc.
MXA - Agilent MXA N9020A E831
Env Conditions - E1128 24.9C 4.6%RH 1007.9 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



FCC ID: FCC ID: AS5BBTRX-06

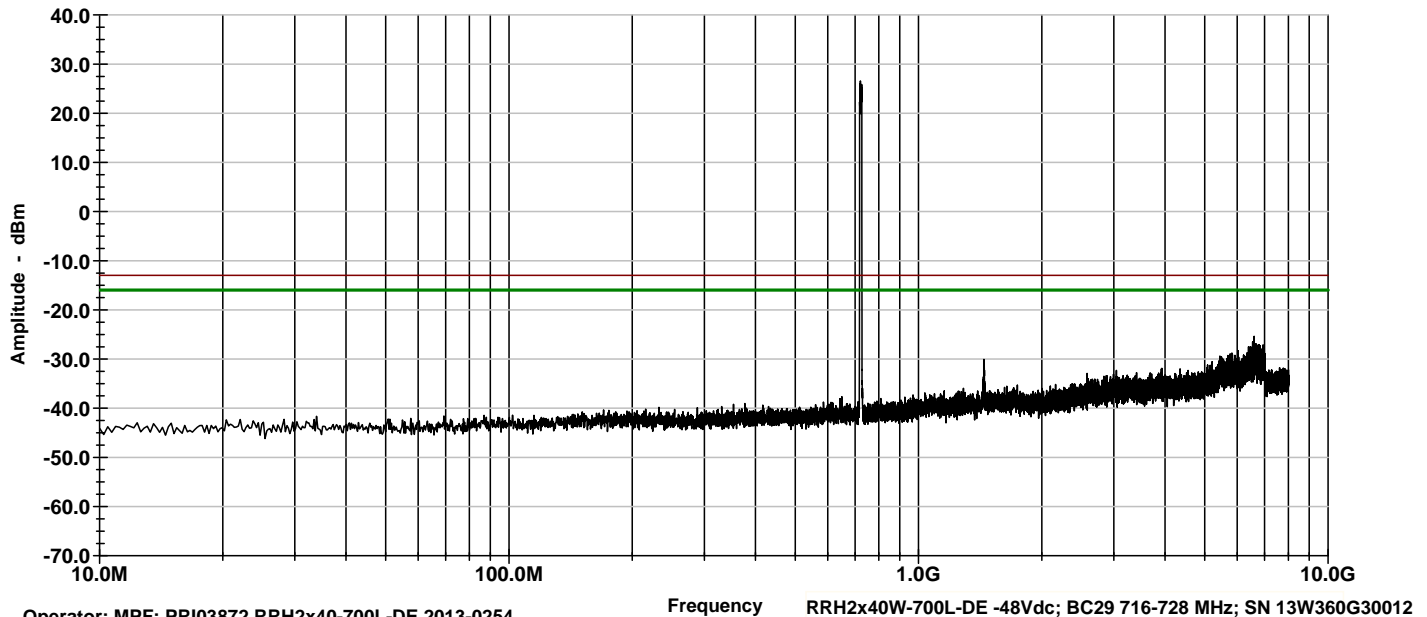
Harmonic: 1.4424 GHz at -30.39 dBm

Conducted Emissions
LTE 16QAM
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent N1912A E915; Sensor Agilent N1921A E914 Alcatel-Lucent USA, Inc.
MXA - Agilent MXA N9020A E831
Env Conditions - E1128 24.9C 4.6%RH 1007.9 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



Operator: MPF: PRI03872 RRH2x40-700L-DE 2013-0254

DE-14 Tx1 722M BW10M 40W 16QAM.TIL

01:40:16 PM, Monday, February 17, 2014

Frequency RRH2x40W-700L-DE -48Vdc; BC29 716-728 MHz; SN 13W360G30012
Tx1 722 MHz, 40W (46 dBm) @ 16QAM; BW 10 MHz, BC 29
RBW 100kHz, VBW 300 kHz

FCC ID: FCC ID: AS5BBTRX-06

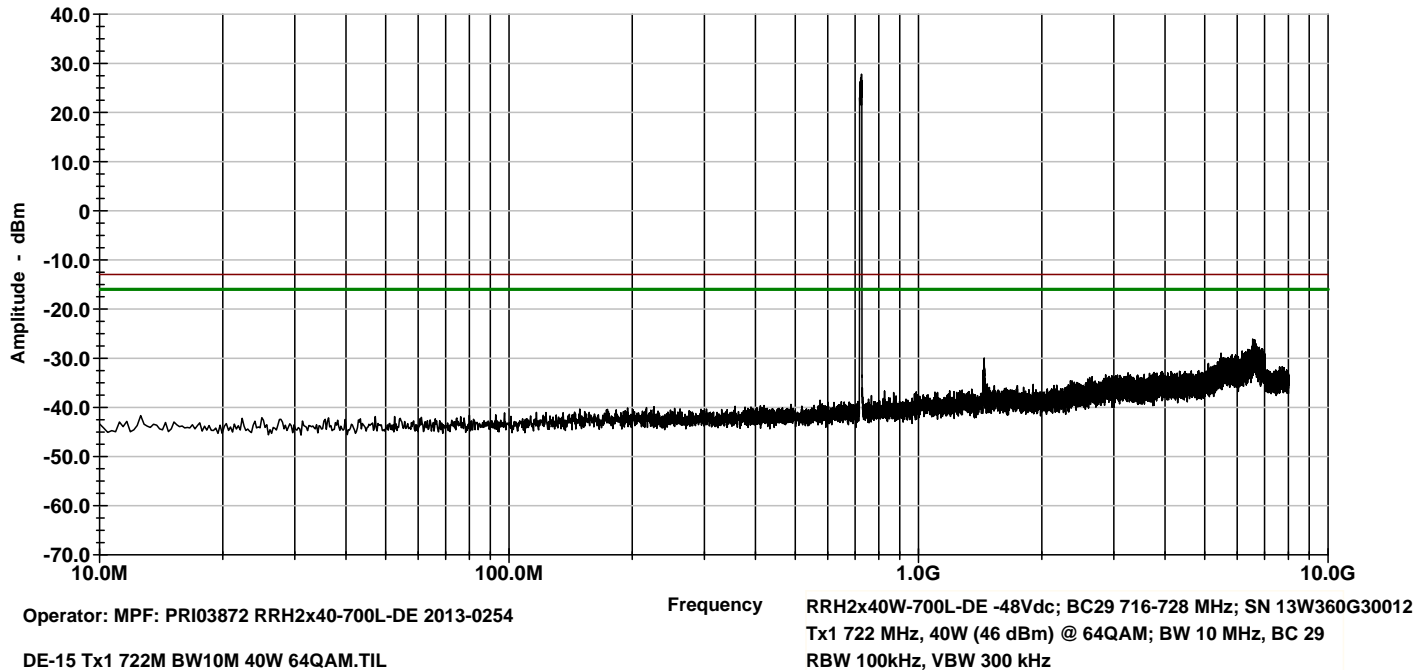
Harmonic: 1.4438 GHz at -30.10 dBm

Conducted Emissions
LTE 64QAM
Tx1 722 MHz, 40 W (46 dBm), 10 MHz BW

Rec-S/A - R&S FSEM30 E926
PM/Head - Agilent N1912A E915; Sensor Agilent N1921A E914 Alcatel-Lucent USA, Inc.
MXA - Agilent MXA N9020A E831
Env Conditions - E1128 24.9C 4.6%RH 1007.9 hPa
Shielded Chamber - MH 28-109
GPCL Project - 2013-0254

Global Product Compliance Laboratory
Conducted Emissions at Antenna Terminal

— w40C2F
— w40C3F
— w40C4F
— FCC Limit -13 dBm
— FCC 2xMIMO



FCC ID: FCC ID: AS5BBTRX-06

Harmonic: 1.4456 GHz at -29.99 dBm

PART 2.1053 MEASUREMENTS REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION

Radiated spurious emissions (RE) were investigated over the spectrum 30 MHz – 10 GHz for three (3) 2xMIMO carrier/fundamental configurations:

Carrier	Carrier Center Frequency	Emission Bandwidth	Test Modulation
Lowest Frequency	719 MHz	5 MHz	64QAM
Highest Frequency	725 MHz	5 MHz	QPSK
Widest Bandwidth	722 MHz	10 MHz	64QAM

The equipment under test (EUT) was configured as recommended for *floor standing equipment*, following the guidelines of ANSI C63.4-2009. The EUT was installed and operated as in the *normal mode of operation*. Field strength measurements of radiated spurious emissions were evaluated in a 3m semi-anechoic chamber (FCC Site RN 328881), using an EUT-to-Antenna separation of 3-meters. Test software was Vasona by EMIsoft.

Measurements were made using both horizontally and vertically polarized broadband antennas. Per FCC regulations, the comparison of out of band spurious emissions directly to the limit is appropriately made using the substitution method. However, *when the emissions are more than 20 dB below the specification limit*, the use of field strength measurements for compliance determination is acceptable and those emissions are considered *not reportable* (Section 2.1057 and the FCC Interpretive database for 2.1053).

For this case the evaluation of acceptable radiated field strength is as follows. The calculated emission levels were found by:

$$P_{meas} \text{ (dBm)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB)} + 107 \text{ (dB}\mu\text{V/dBm)} - \text{Amplifier Gain (dB)} \\ = \text{Field Strength (dB}\mu\text{V/m)}$$

Section 27.53 and 2.1053 contains the requirements for the levels of spurious radiation as a function of the EIRP of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an isotropic radiator 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.

$$E = (120\pi P)^{1/2} = [(30 * P)^{1/2}] / R$$

$$20 \log (E * 10^6) - (43 + 10 \log P) = 82.23 \text{ dB } \mu\text{V/meter}$$

Where: E = Field Intensity in Volts/ meter

R = Distance in meters = 3 m

P = Transmitted Power in watts = 40W

Results: Complies - Over the out-of-band spectrum investigated from 30 MHz to the tenth harmonic of the carrier (8 GHz), the power levels of all emissions observed were >> 20 dB below the 82.23 dB $\mu\text{V/meter}$ limit. **Therefore, there were no reportable radiated spurious emissions.**

PART 2.1055 MEASUREMENTS REQUIRED: FREQUENCY STABILITY

ALREADY PROVIDED IN THE ORIGINAL FILING
NO ADDITIONAL INFORMATION ADDED

LIST OF TEST EQUIPMENT

Measurement of Emissions Conducted to the Transmit Port/Antenna Terminal

Equipment Function	Manufacturer	Model	Serial Number	Calibration Date	Next Due Date	GPCL
Spectrum Analyzer	Rohde & Schwarz	FSEM 30 20 Hz – 26.5 GHz	DE35292	9/25/13	9/25/15	E926
MXA Signal Analyzer	Agilent	N9020A 20 Hz – 26.5 GHz	MY48011791	1/10/14	1/10/16	E831
Power Meter	Agilent	N1912A P-Series Power Meter	GB44440226	6/12/13	6/12/14	E915
Power Meter Sensor	Agilent	N1921A 50 MHz – 18 GHz	US44510270	6/19/13	6/19/14	E914
Attenuator	Aeroflex/Weinschel	49-30-43 30 dB, 150 W	RK468	NR	NR	
Dual Directional Coupler	Hewlett-Packard	HP 778D 0.1 – 2.0 GHz	14427	NR	NR	
Attenuator (Input)	MCE/Weinschel	6528-30-34-LIM 30 dB, 150 W	BN4181	NR	NR	
Attenuator (Incident)	Weinschel	46-20-34 DC – 18 GHz 20 dB, 25 W	BJ2488	NR	NR	
Attenuator (Test Port)	MCE/Weinschel	6530-6-34-LIM DC – 18 GHz 6 dB, 25 W	BN3225	NR	NR	
Termination (Reflected)	Weinschel	M1404N	7836	NR	NR	
Regulated Power Supply	Kikusui Electronics Corp.	PAD-55-120L	DM000112	NR	NR	E483

Test Equipment List
Radiated Emissions 2013-0254 / AR8

Manufacturer	Model	Serial Number	Type	Description	GPCL ID	Last Cal	Interval	Status
A.H. Systems Inc.	SAS-521-2	457	Biological Antenna	25 - 2000 MHz	E766	12/26/2012	24	Active
Sonoma Instrument Co.	310	185794	Amplifier	9KHz-1GHz	E507	6/5/2013	12	Active
Agilent	E7405A	MY45110440	Spectrum Analyzer	EMC 100Hz - 26.5GHz	E736	6/21/2013	24	Active
Hewlett Packard	37204	3212U31137	HP-IB Extender		E479		0	Active
Weinschel	2-6	BX3432	Attenuator	6 dB DC-18GHz 5 Watt	E891	3/27/2013	12	Active
Rohde & Schwarz	ESIB40	100100	Test Receiver	EMI (20Hz to 40 GHz)-150 +30dBm	E908	6/12/2013	24	Active
Hewlett Packard	37204A	3212U27554	HP-IB Extender		E258		0	Active
Hewlett Packard	8449B	3008A01267	Pre-Amplifier	Preamplifier 1-26.5 GHz	E377	7/26/2013	12	Active
EMCO	3115	9909-5914	Horn Antenna	Double Ridged Horn 1-18 Ghz	E433	9/12/2012	24	Active
Trilithic	5HC2850/1 8050-1.8-KK	PCS-HPF-5	High Pass Filter	PCS	E986		12	Out of Service