Subject: **Application for Class II Permissive Change under FCC ID: AS5ONEBTS-27 to Add the 15 MHz Emission Bandwidth Fundamental and Emission Designator to the Original Filing.**

Michael P. Farina
Alcatel-Lucent USA Inc.
600-700 Mountain Avenue, MH28-114M
Murray Hill, NJ 07974-0636
Desk: 908-582-3857
E-Mail: Michael.Farina@alcatel-lucent.com

April 16, 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.

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 application for a Class II Permissive Change, under FCC ID: AS5ONEBTS-27, is to add the 15 MHz emission bandwidth fundamental and emission designator to the RRH2x60-1900A filing, which is both LTE operational and 2x60 MIMO compliant. The spectrum covered is Rule Part 24E, 1930 – 1990 MHz. The current product, designated on the equipment label as RRH2x60-1900A, incorporates the same radio, 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 change is to the controlling software. As such, , it meets the LTE 2x60 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 60 W (47.8 dBm) and a total composite power combined in the air interface of 120 W (50.8 dBm).

The carrier/fundamental band width supported is 15 MHz. 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 FCC Part 24 — Personal Communications Services, § 24.238 Emission Limitations for Broadband PCS Equipment, 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.

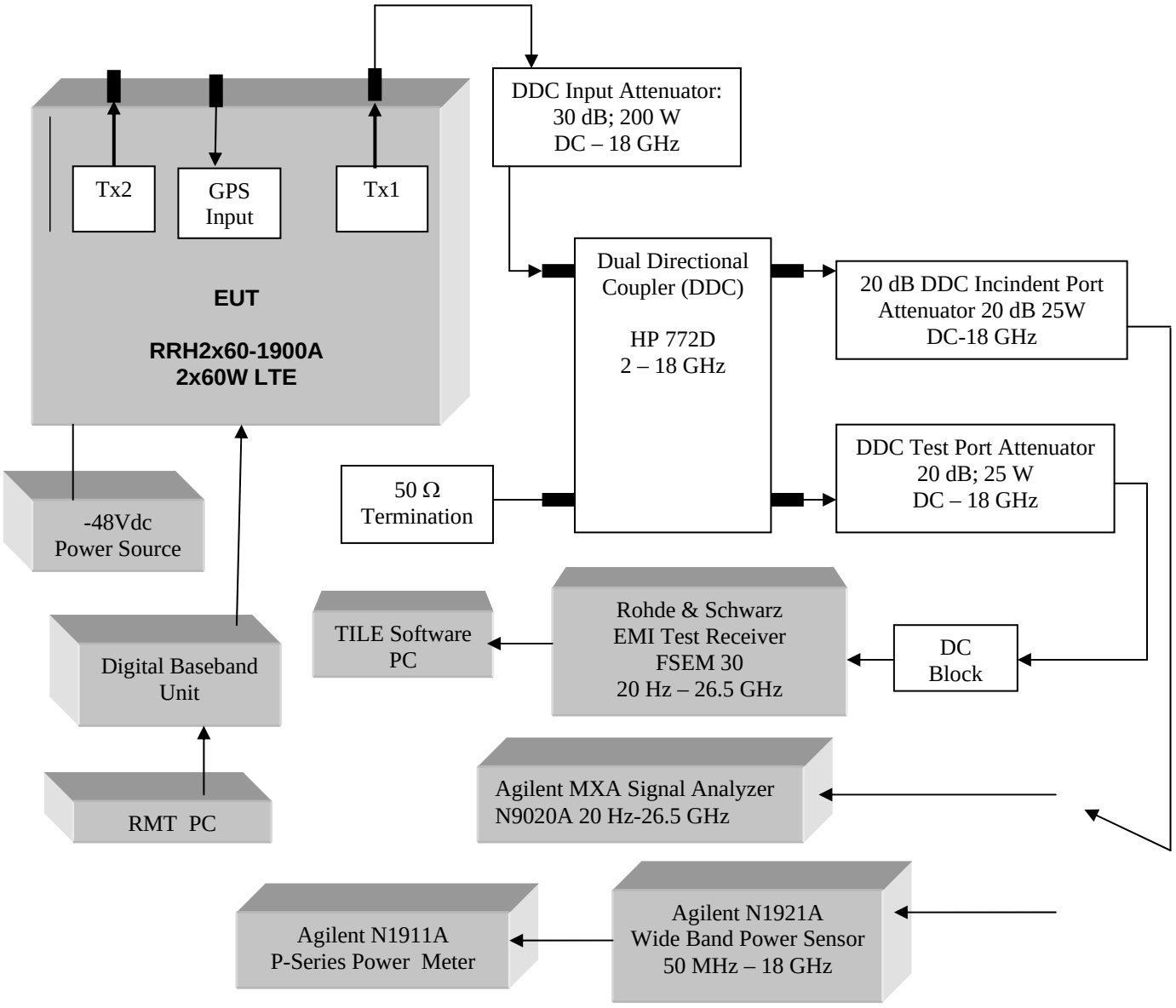
Part 2.1046	RF Power Output
Part 2.1047	Modulation Characteristics
Part 2.1049	Occupied Bandwidth
Part 2.1051	Spurious Emissions at the Antenna Terminals.
Part 2.1053	Field Strength of Spurious Radiation
Part 2.1057	Frequency Spectrum to be Investigated
Part 24	Personal Communications Services; Subpart E — Broadband PCS
Part 24.238	Emission Limitations for Broadband PCS Equipment
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 15 MHz BW carrier, tuned to 1937.5 MHz (Block A center frequency), 1957.5 MHz (Block B center frequency) and 1982.5 MHz (Block C center frequency), were measured at 60 W (47.8 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

60 Watt (+47.8 dBm) per Tx Antenna Terminal

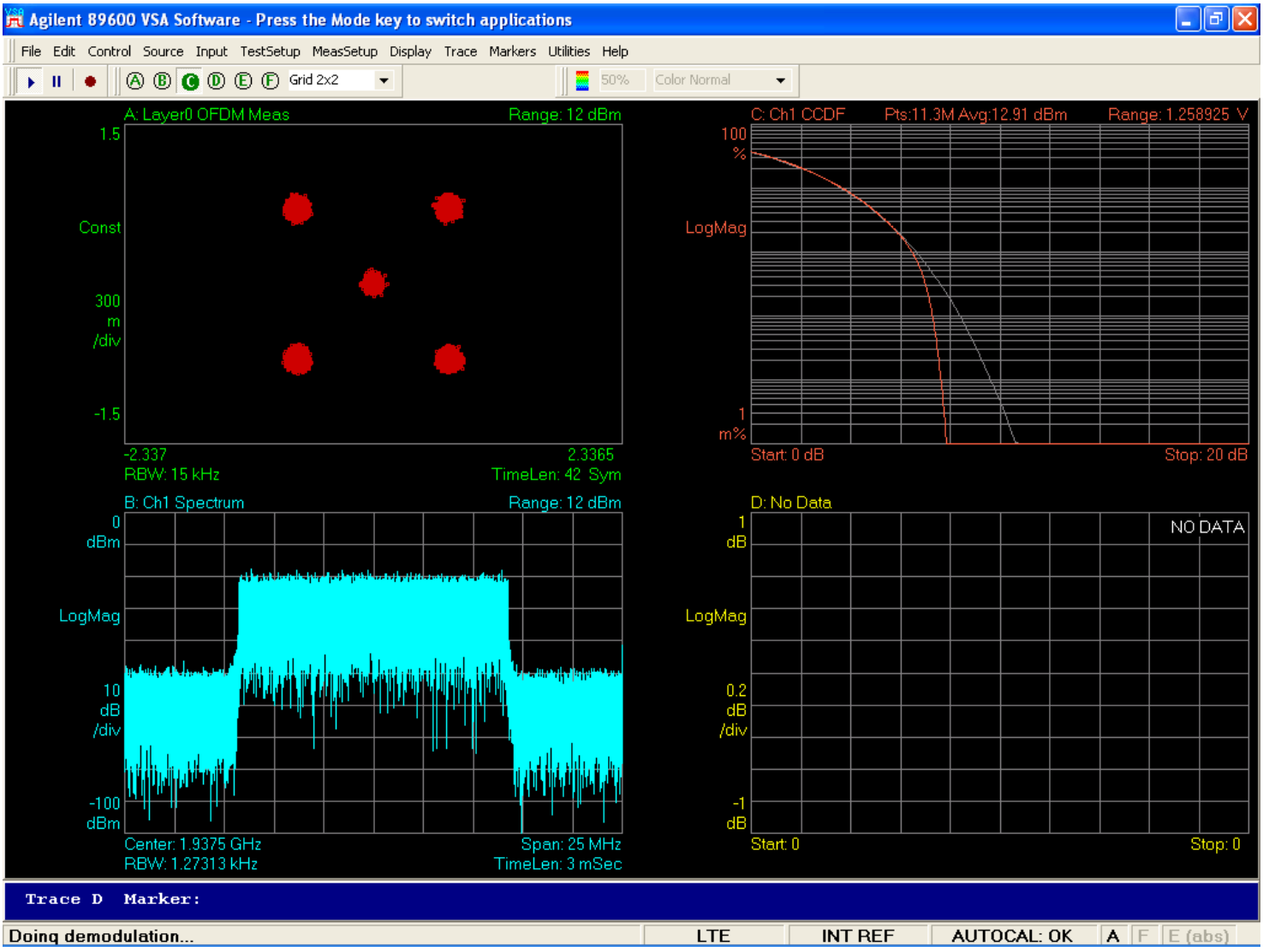


PART 2.1047 MEASUREMENTS REQUIRED: MODULATION CHARACTERISTICS

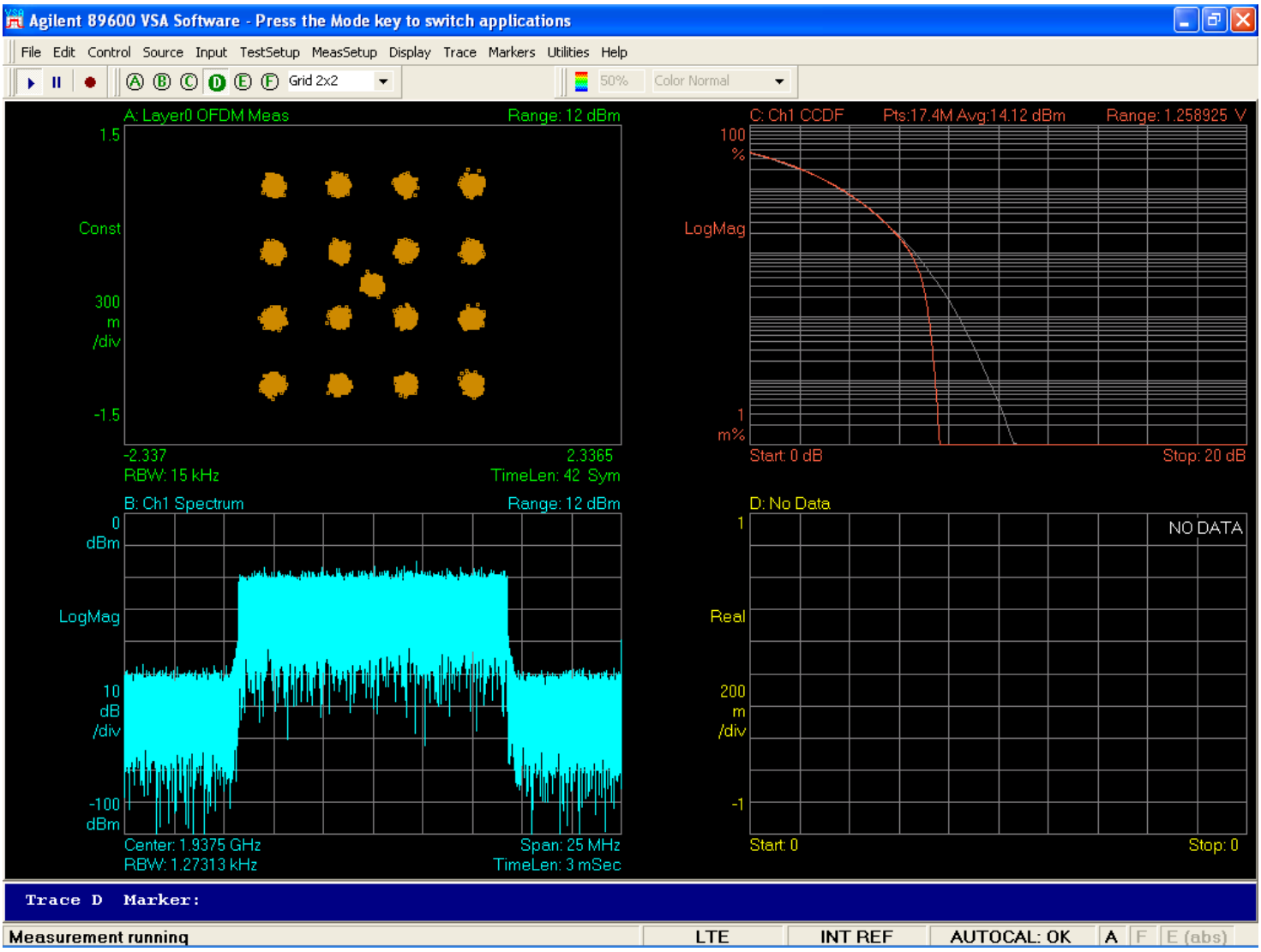
The LTE modulation characteristics were measured and recorded at Tx1 for each of the 3 LTE test modulation schemes: QPSK, 16 QAM and 64QAM, for the 3 carriers tabulated below.

Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power
A: 1930 – 1945 MHz	1937.5 MHz	15 MHz	60 W (47.8 dBm)
B: 1950 – 1965 MHz	1957.5 MHz	15 MHz	60 W (47.8 dBm)
C: 1975 – 1990 MHz	1982.5 MHz	15 MHz	60 W (47.8 dBm)

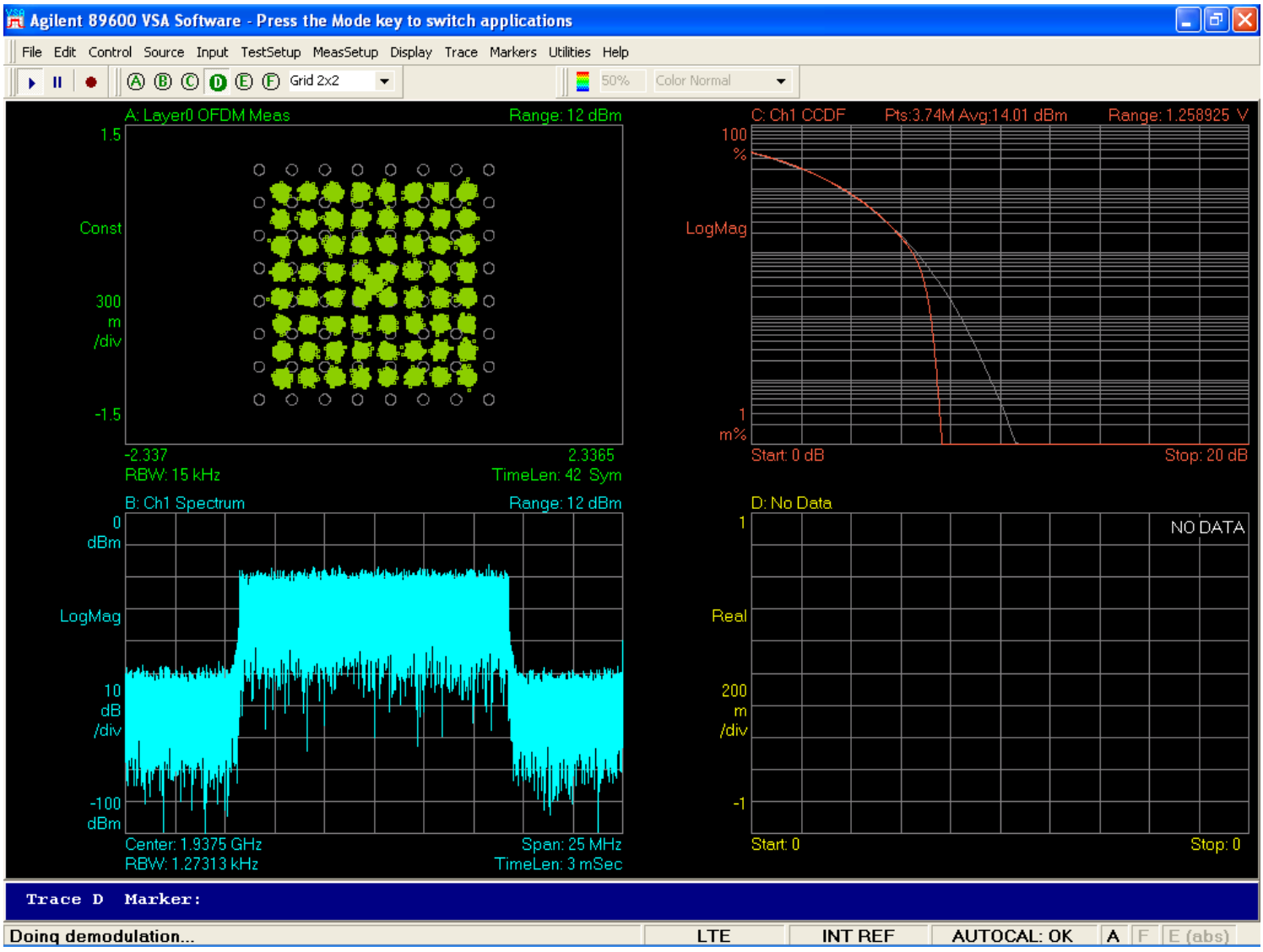
LTE QPSK
Tx1 1937.5 MHz, 60W (47.8 dBm), 15 MHz BW



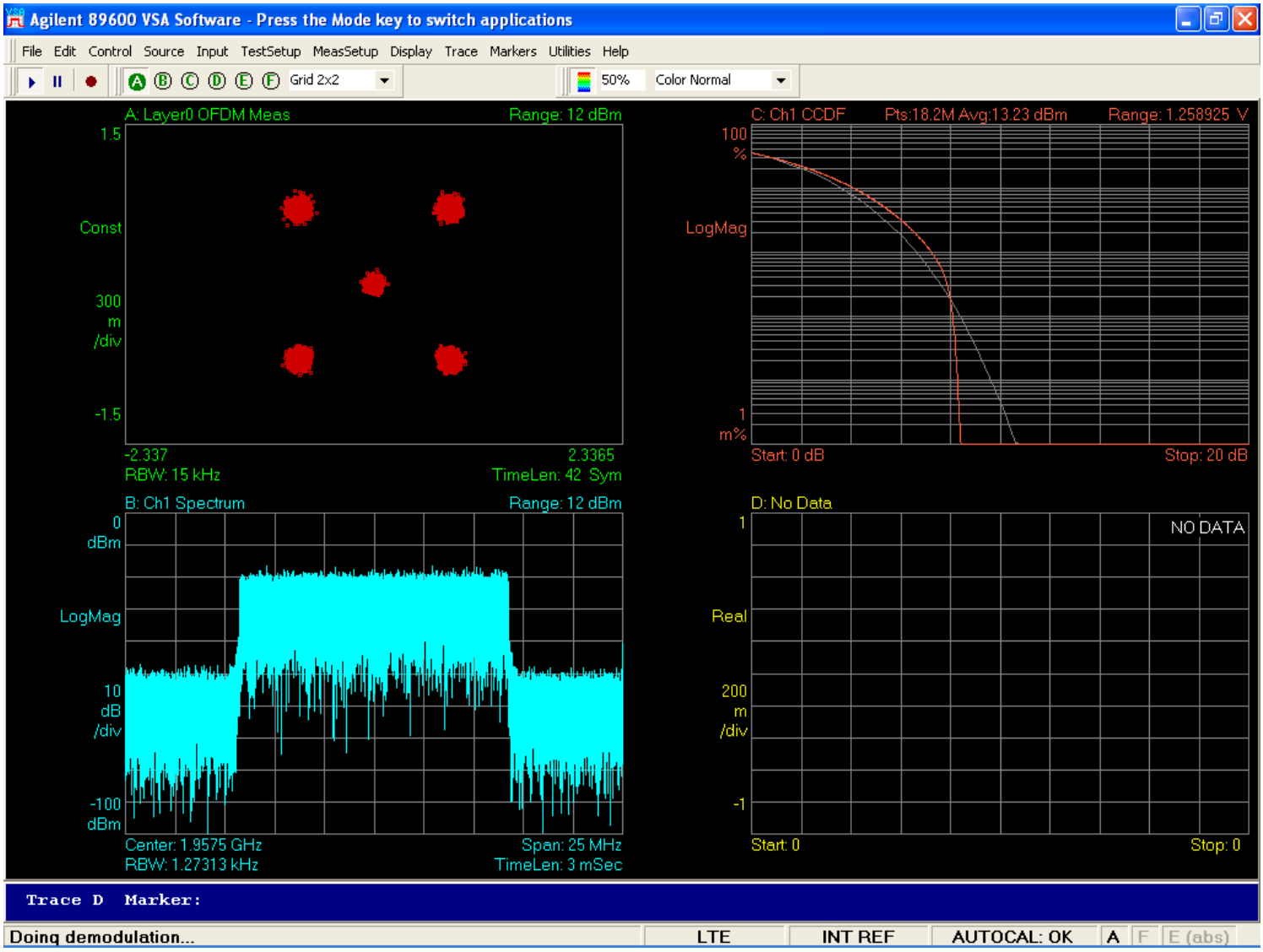
LTE 16QAM
Tx1 1937.5 MHz, 60W (47.8 dBm), 15 MHz BW



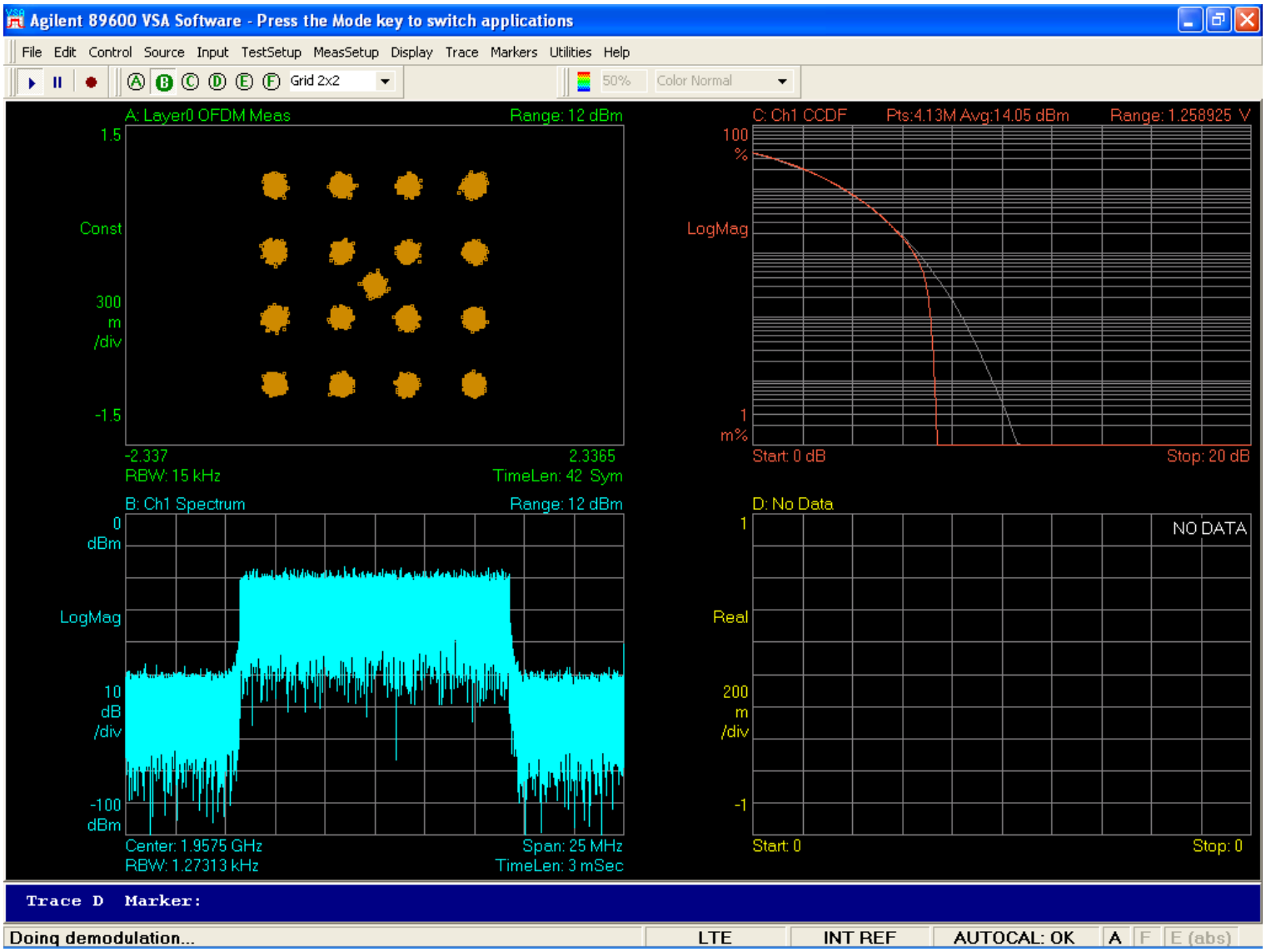
LTE 64QAM
Tx1 1937.5 MHz, 60W (47.8 dBm), 15 MHz BW



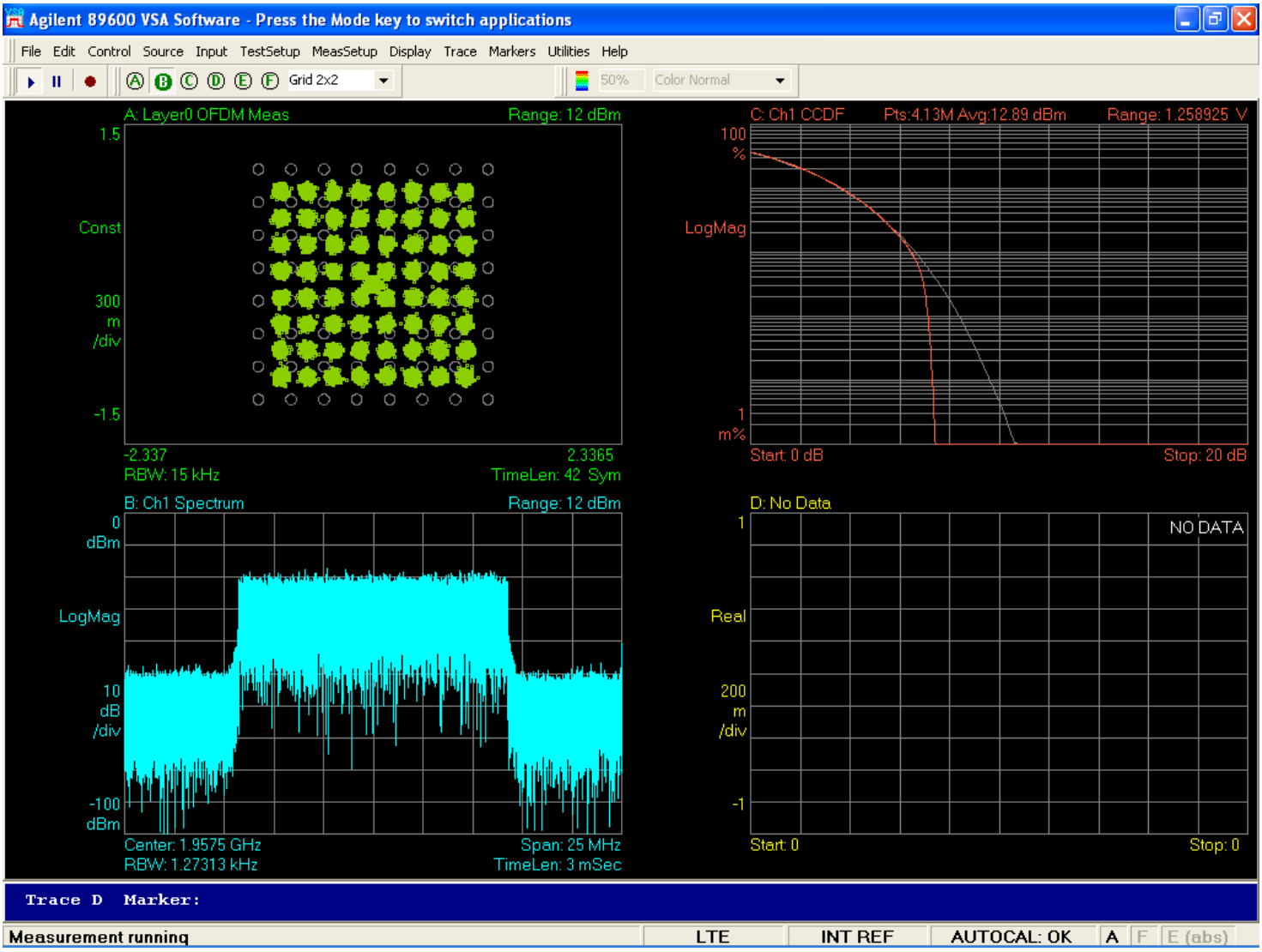
LTE QPSK
Tx1 1957.5 MHz, 60W (47.8 dBm), 15 MHz BW



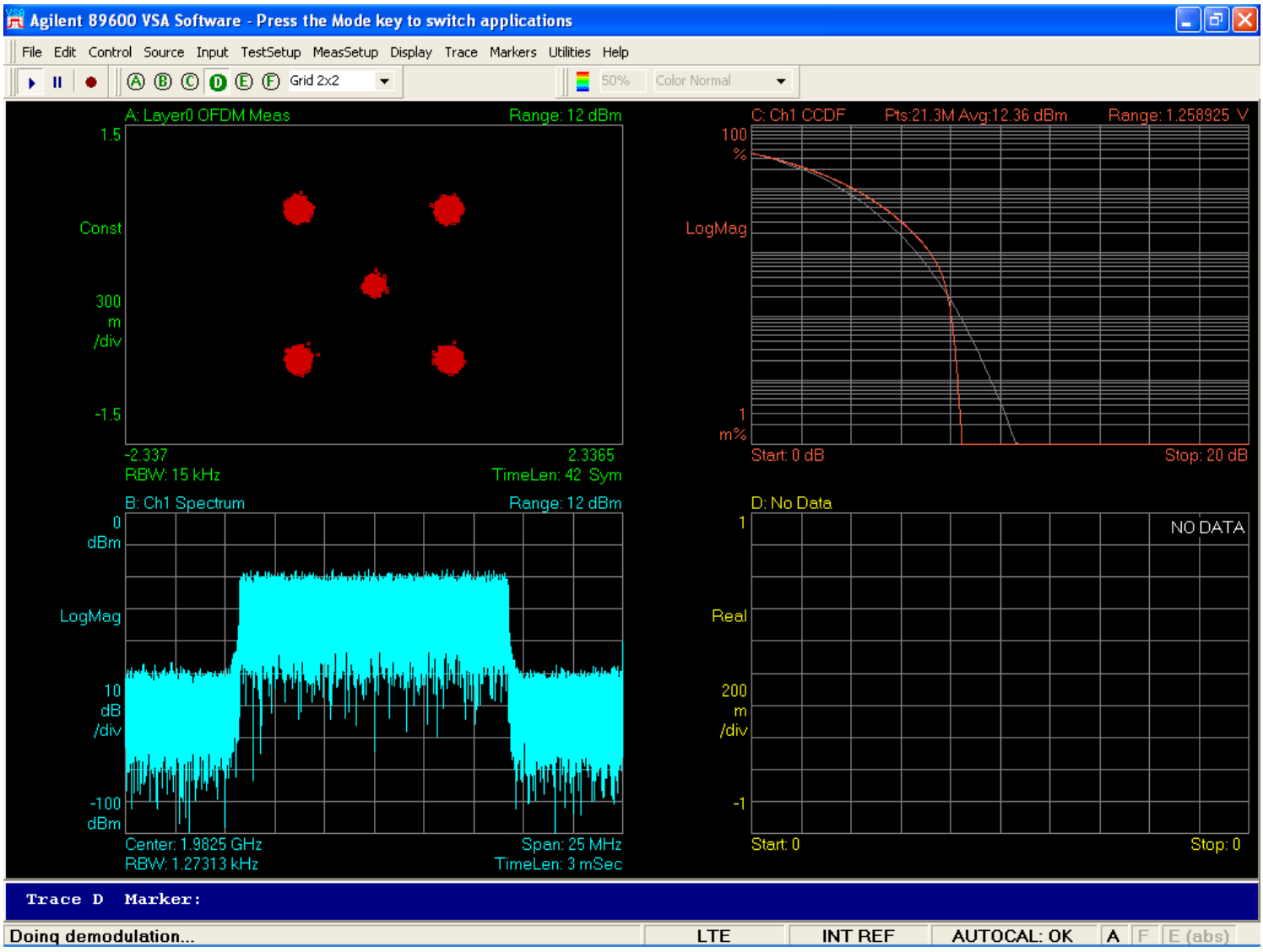
LTE 16QAM
Tx1 1957.5 MHz, 60W (47.8 dBm), 15 MHz BW



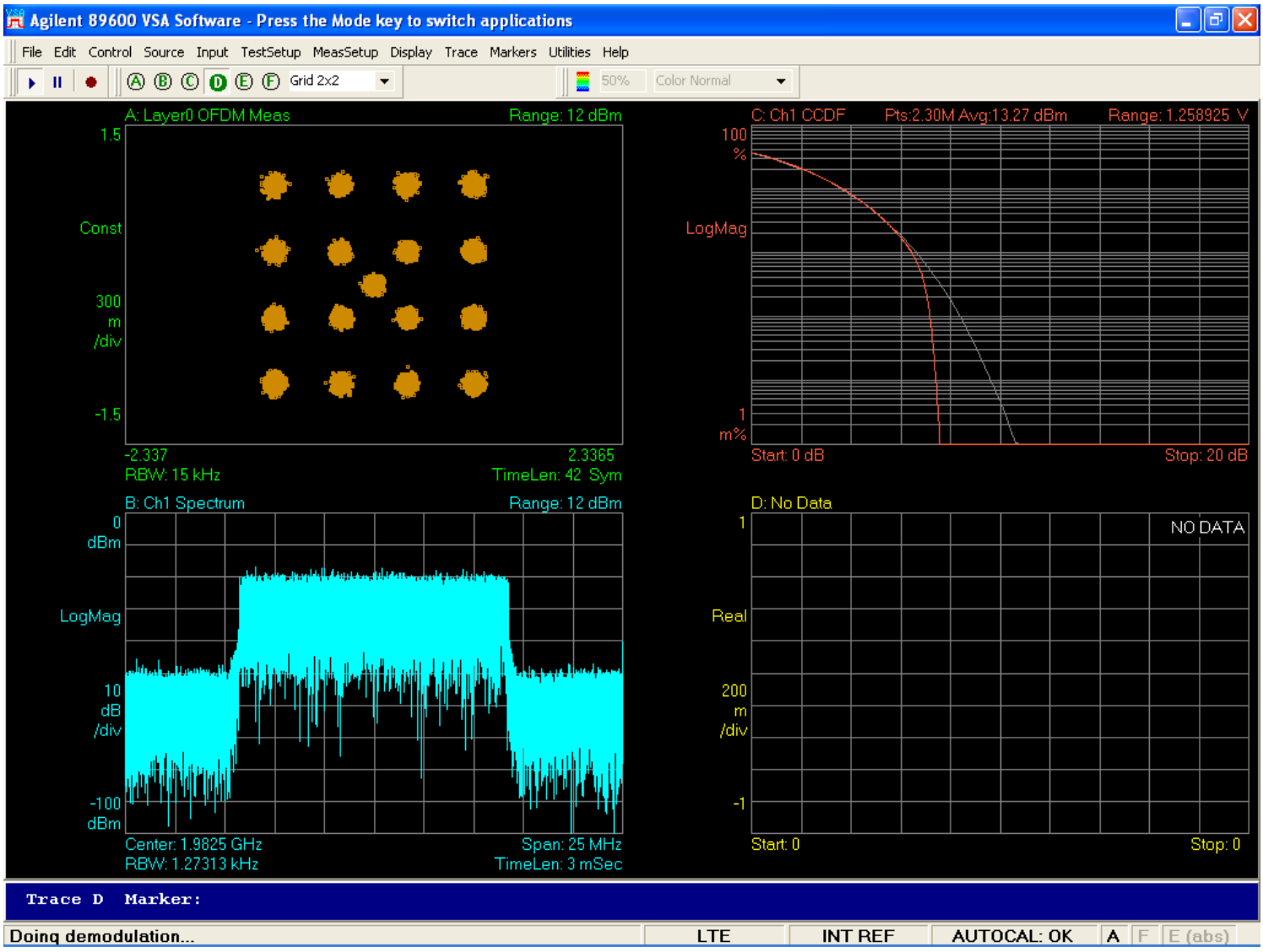
LTE 64QAM
Tx1 1957.5 MHz, 60W (47.8 dBm), 15 MHz BW



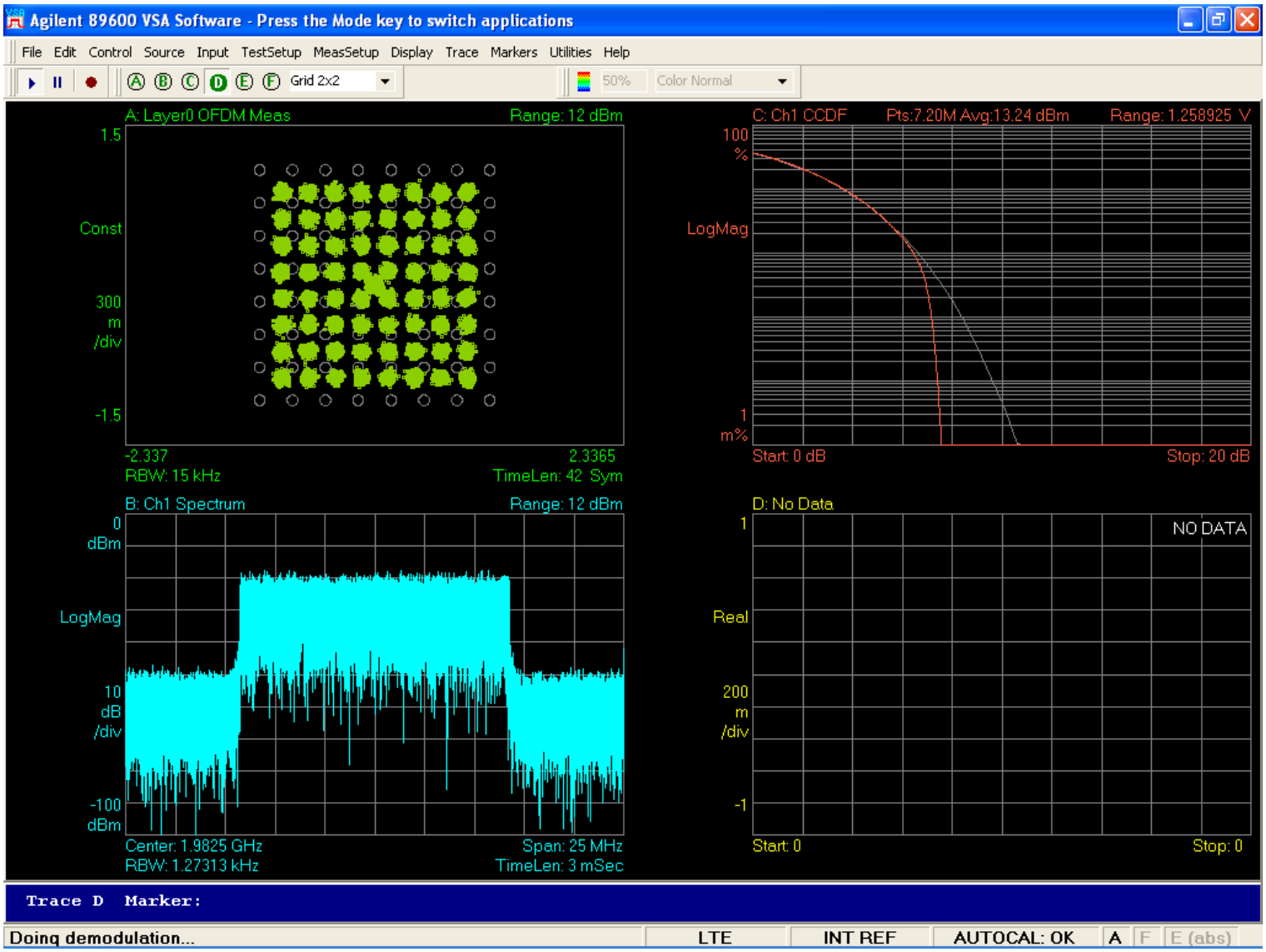
LTE QPSK
Tx1 1982.5 MHz, 60W (47.8 dBm), 15 MHz BW



LTE 16QAM
Tx1 1982.5 MHz, 60W (47.8 dBm), 15 MHz BW



LTE 64QAM
Tx1 1982.5 MHz, 60W (47.8 dBm), 15 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.

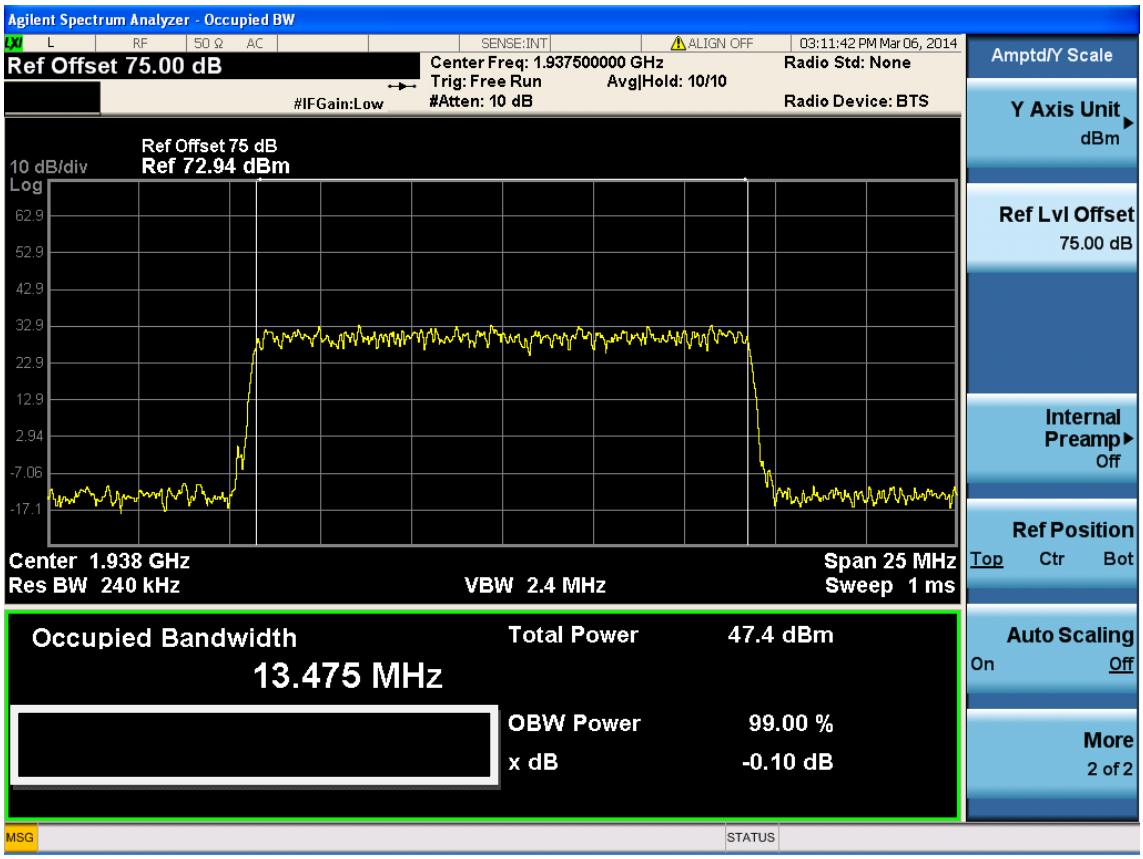
Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power
A: 1930 – 1945 MHz	1937.5 MHz	15 MHz	60 W (47.8 dBm)
B: 1950 – 1965 MHz	1957.5 MHz	15 MHz	60 W (47.8 dBm)
C: 1975 – 1990 MHz	1982.5 MHz	15 MHz	60 W (47.8 dBm)

Compliance was demonstrated by each of the two methods:

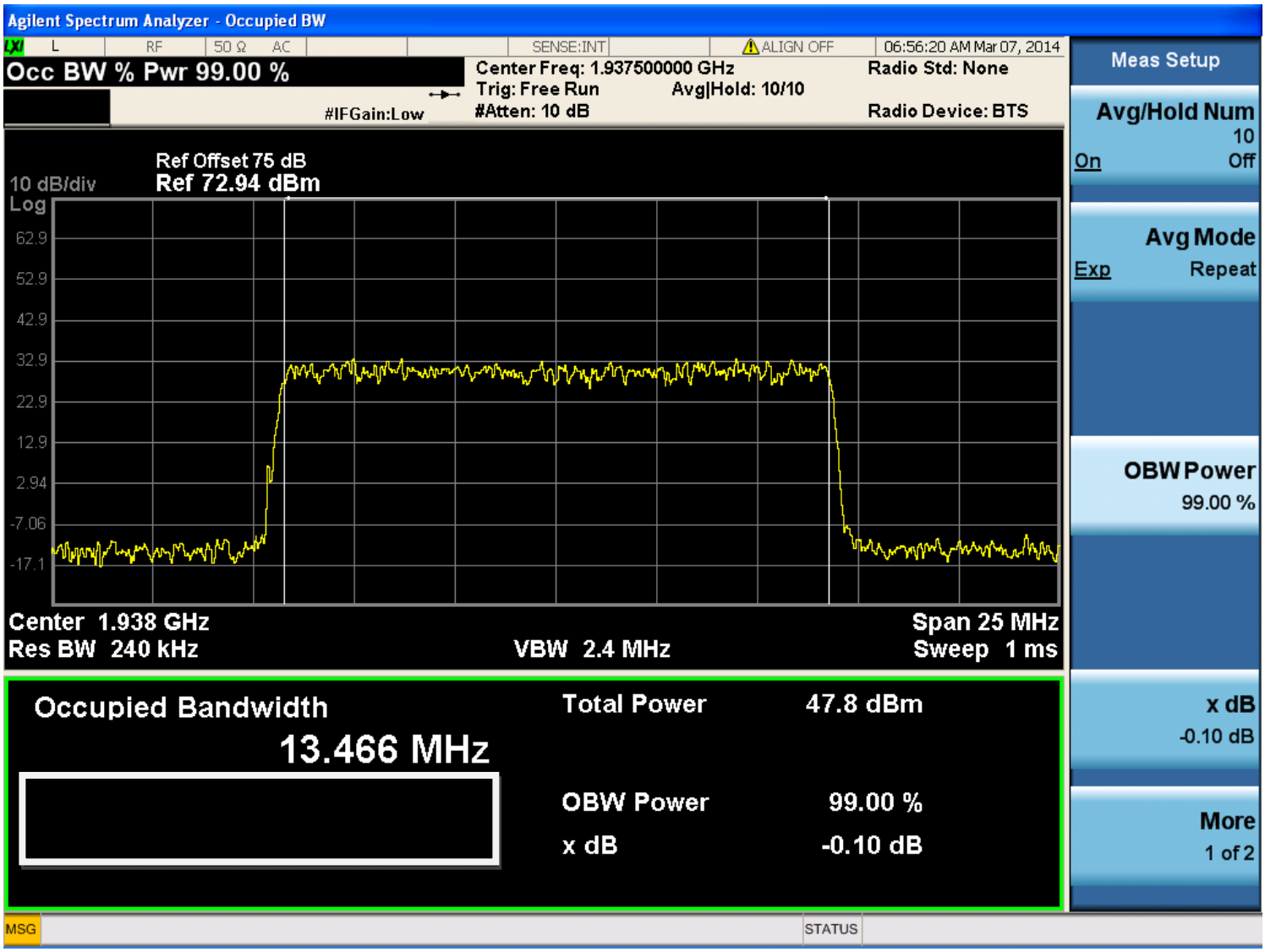
1. The carrier 99% Power Bandwidth, which defines the necessary bandwidth declared in the emission designator, using an Agilent MXA Signal Analyzer N9020A 20 Hz – 26.5 GHz.

2. 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 24.238.

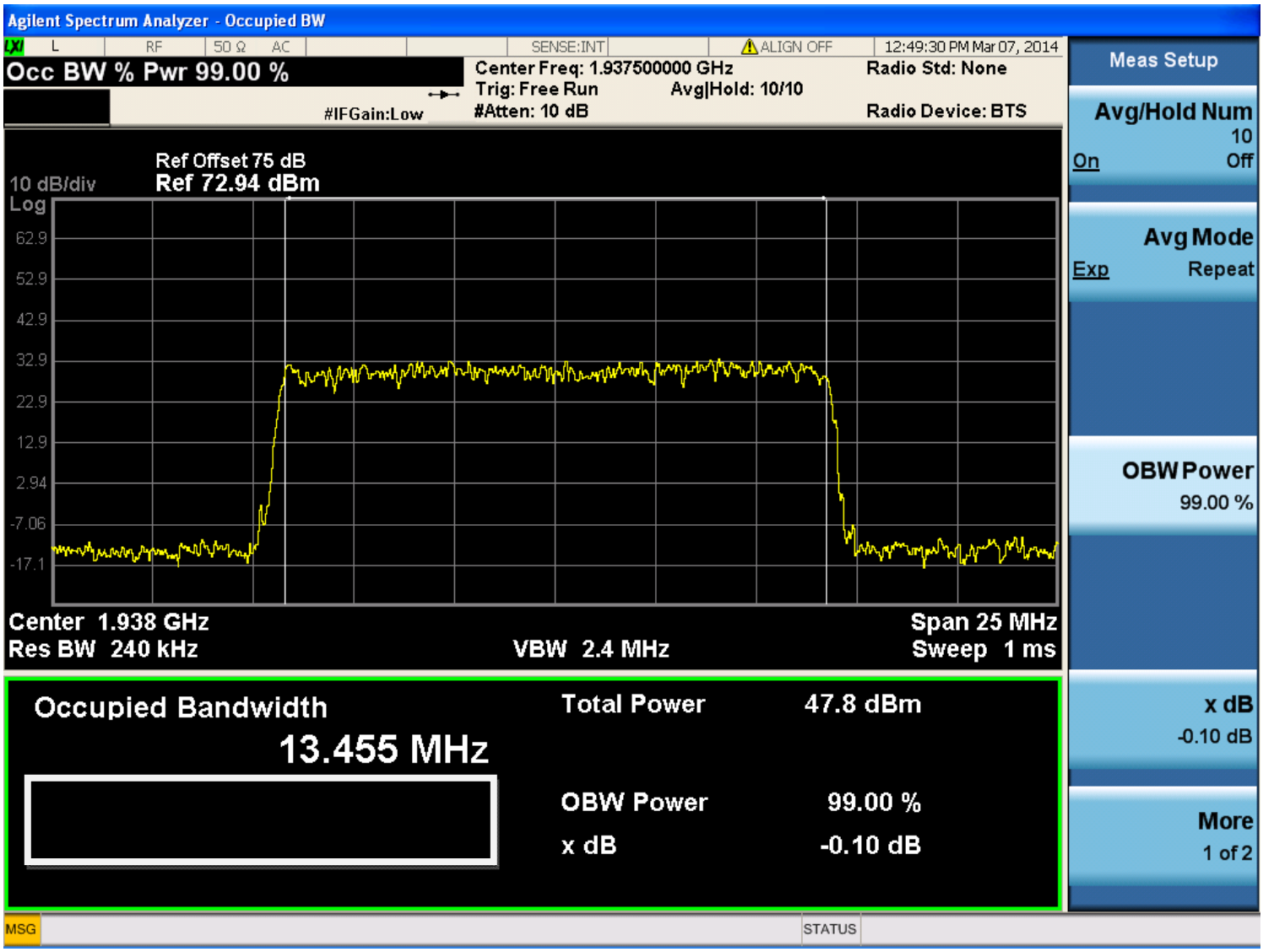
99% Power Bandwidth
LTE QPSK
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



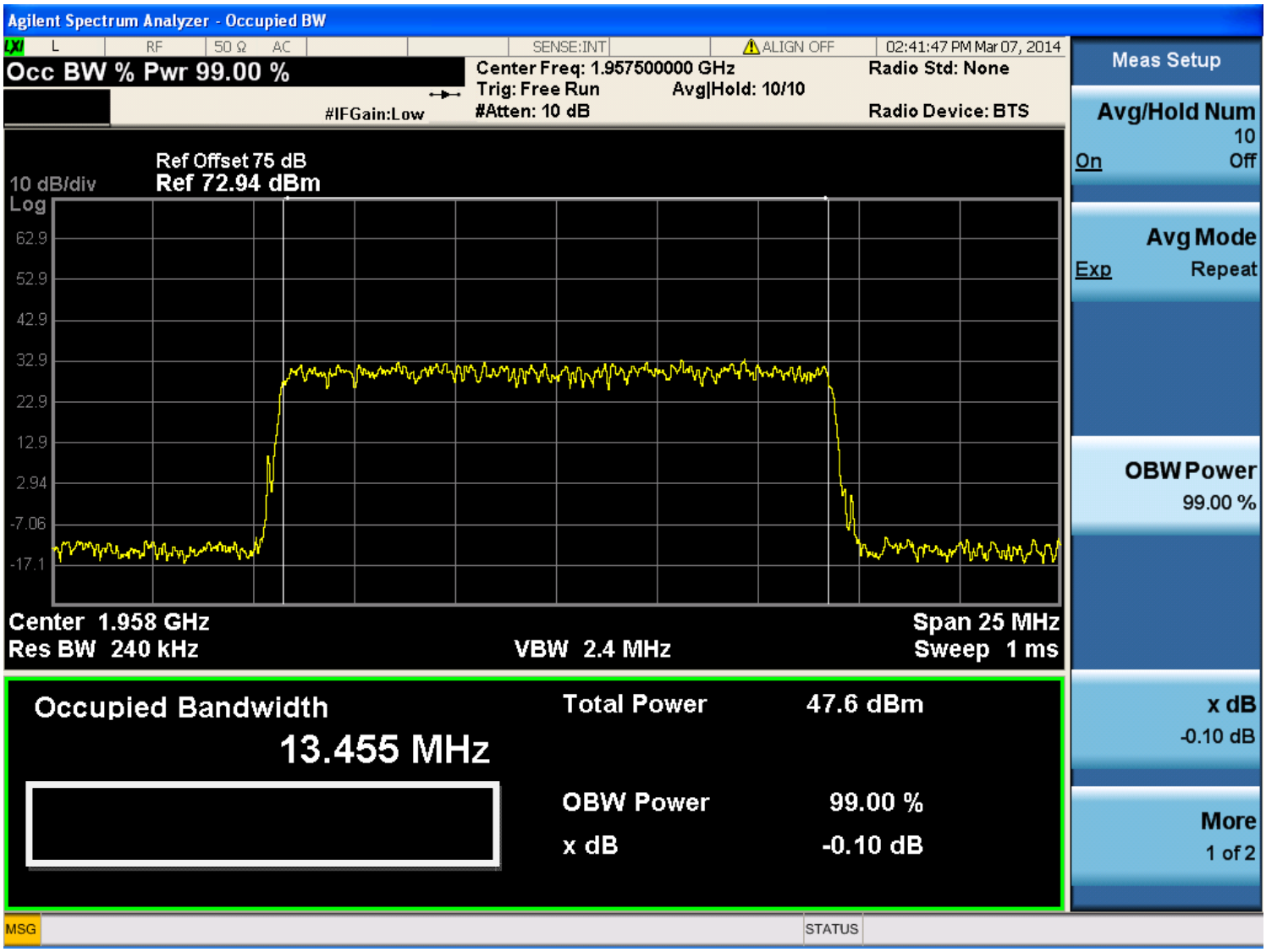
99% Power Bandwidth
LTE 16QAM
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



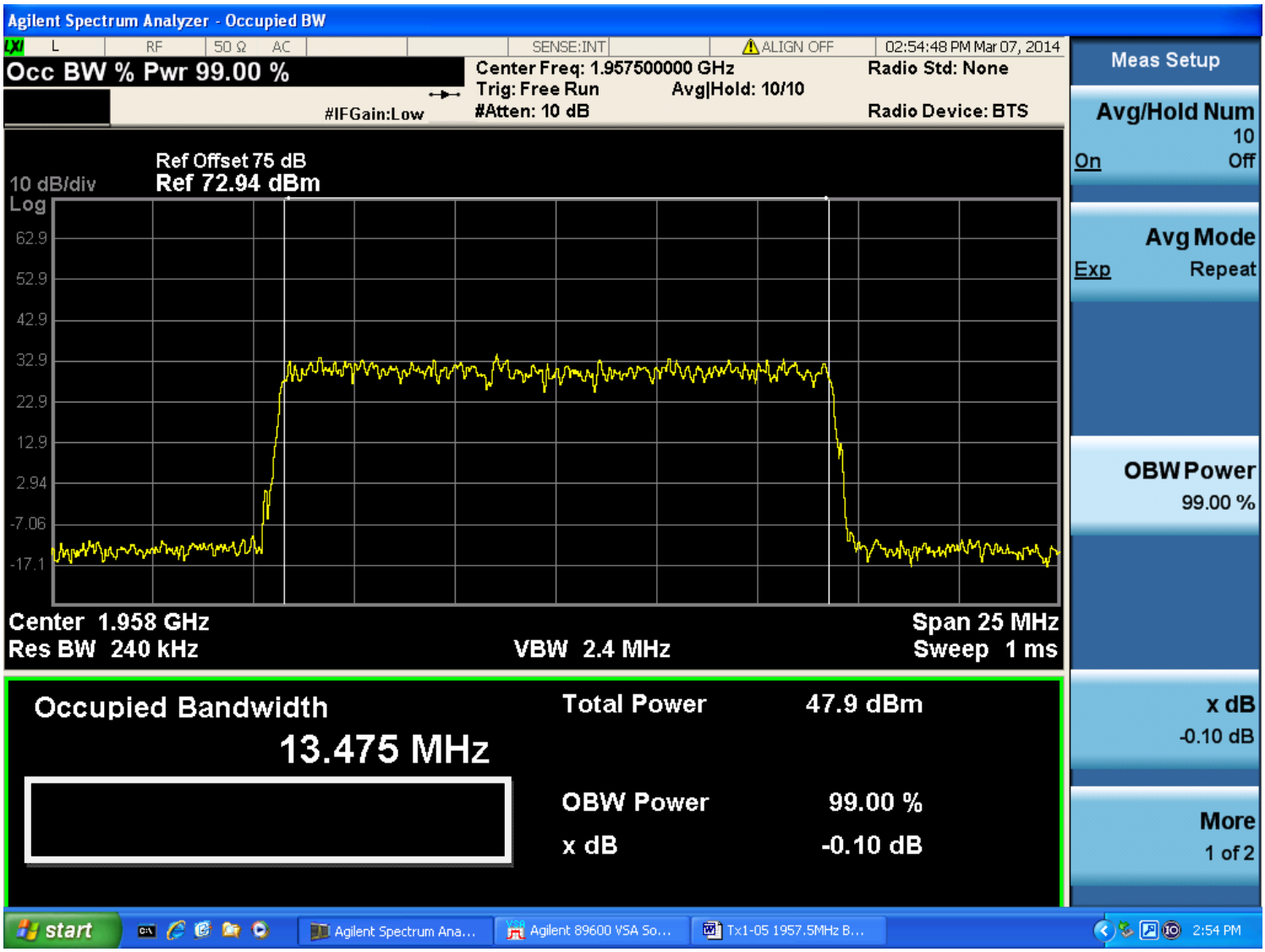
99% Power Bandwidth
LTE 64QAM
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



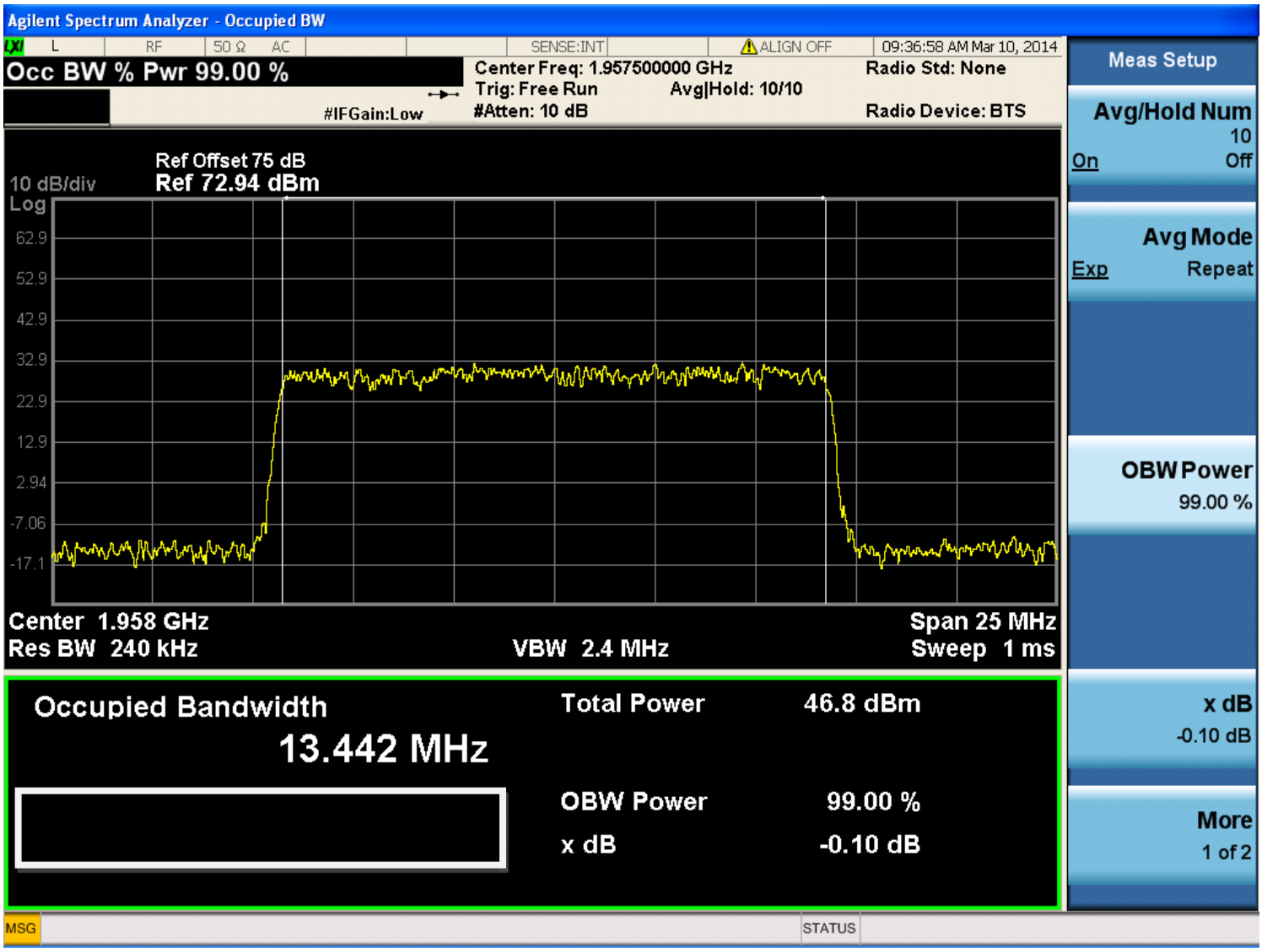
99% Power Bandwidth
LTE QPSK
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



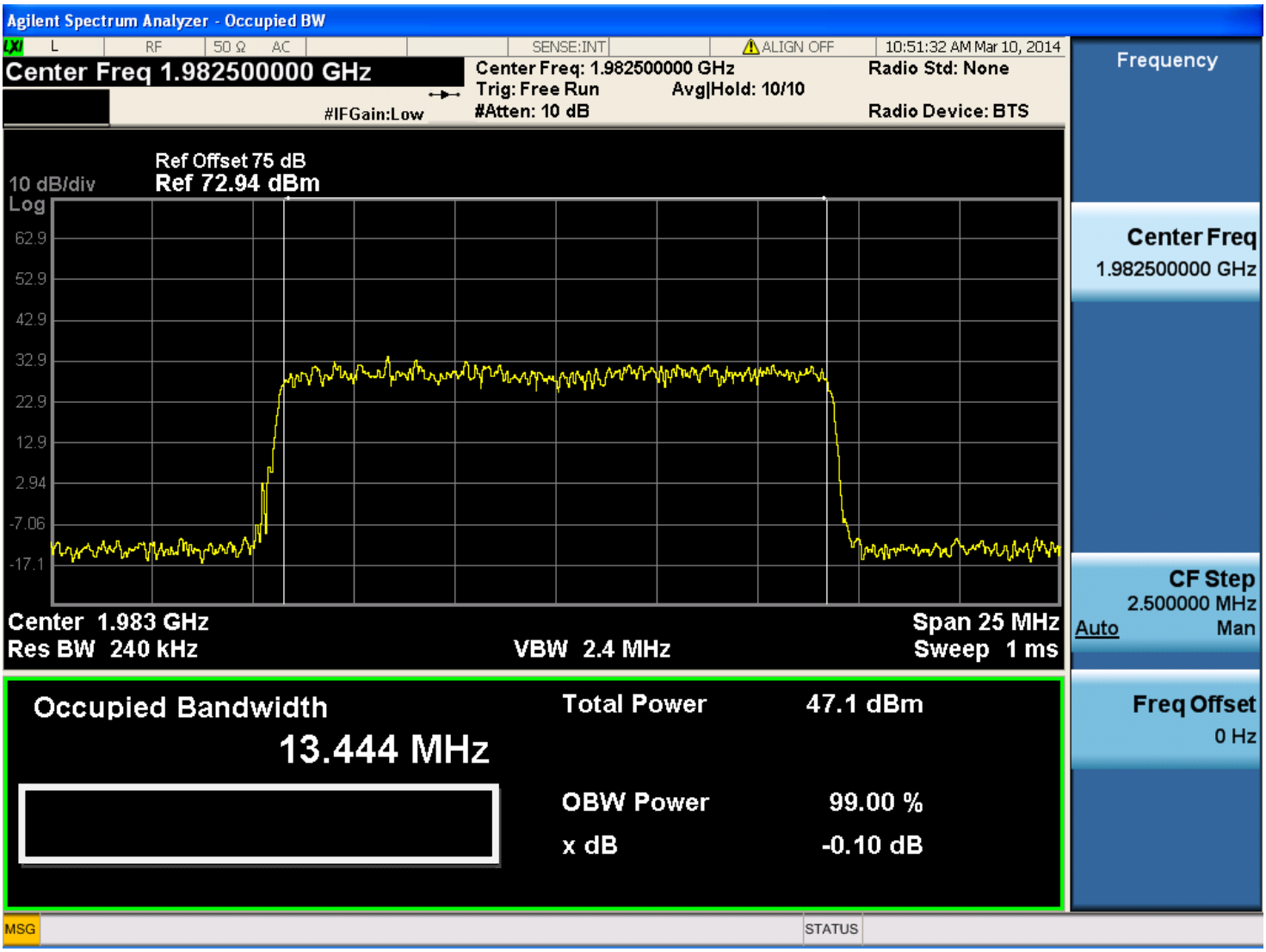
99% Power Bandwidth
LTE 16QAM
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



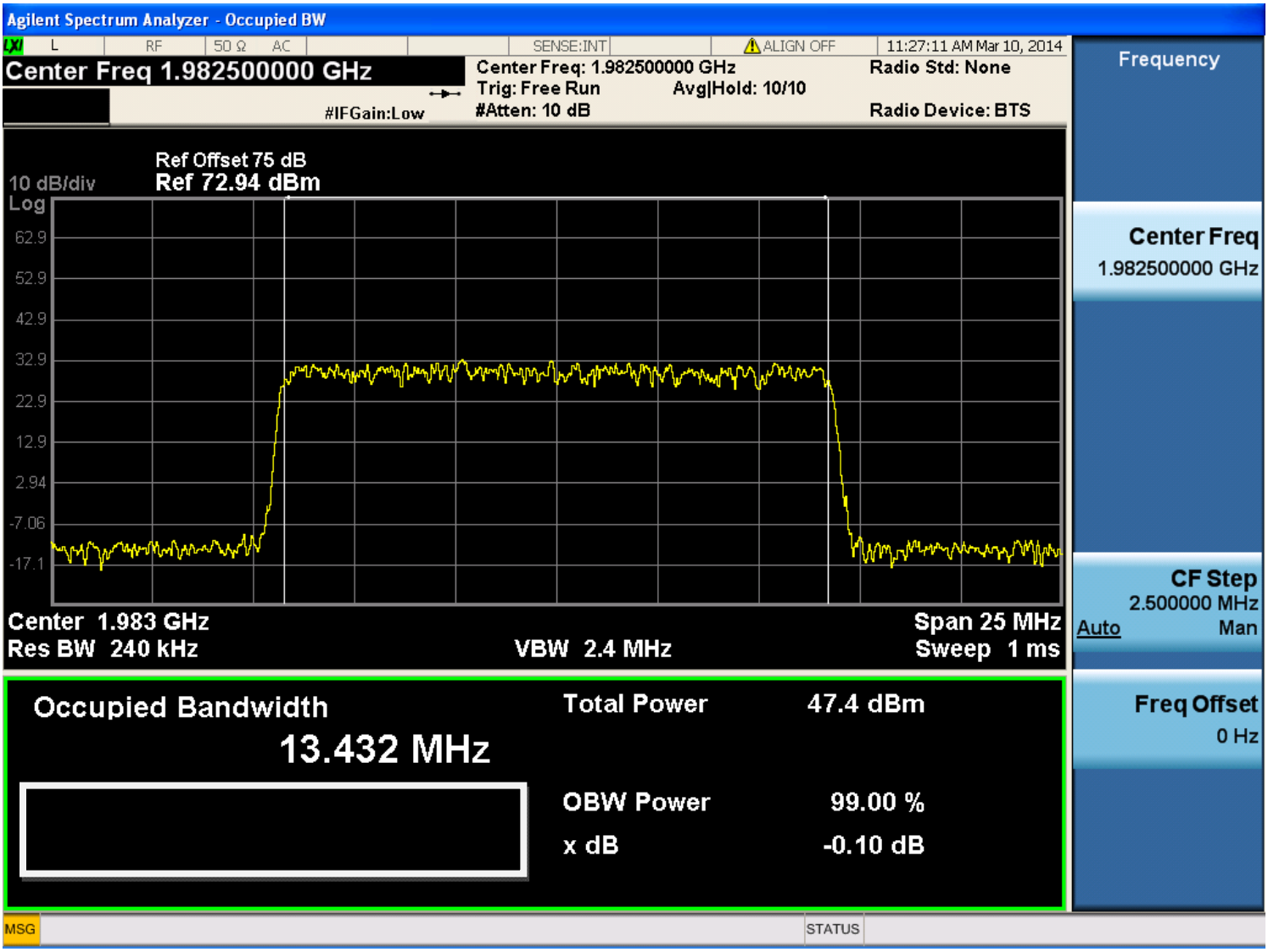
99% Power Bandwidth
LTE 64QAM
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



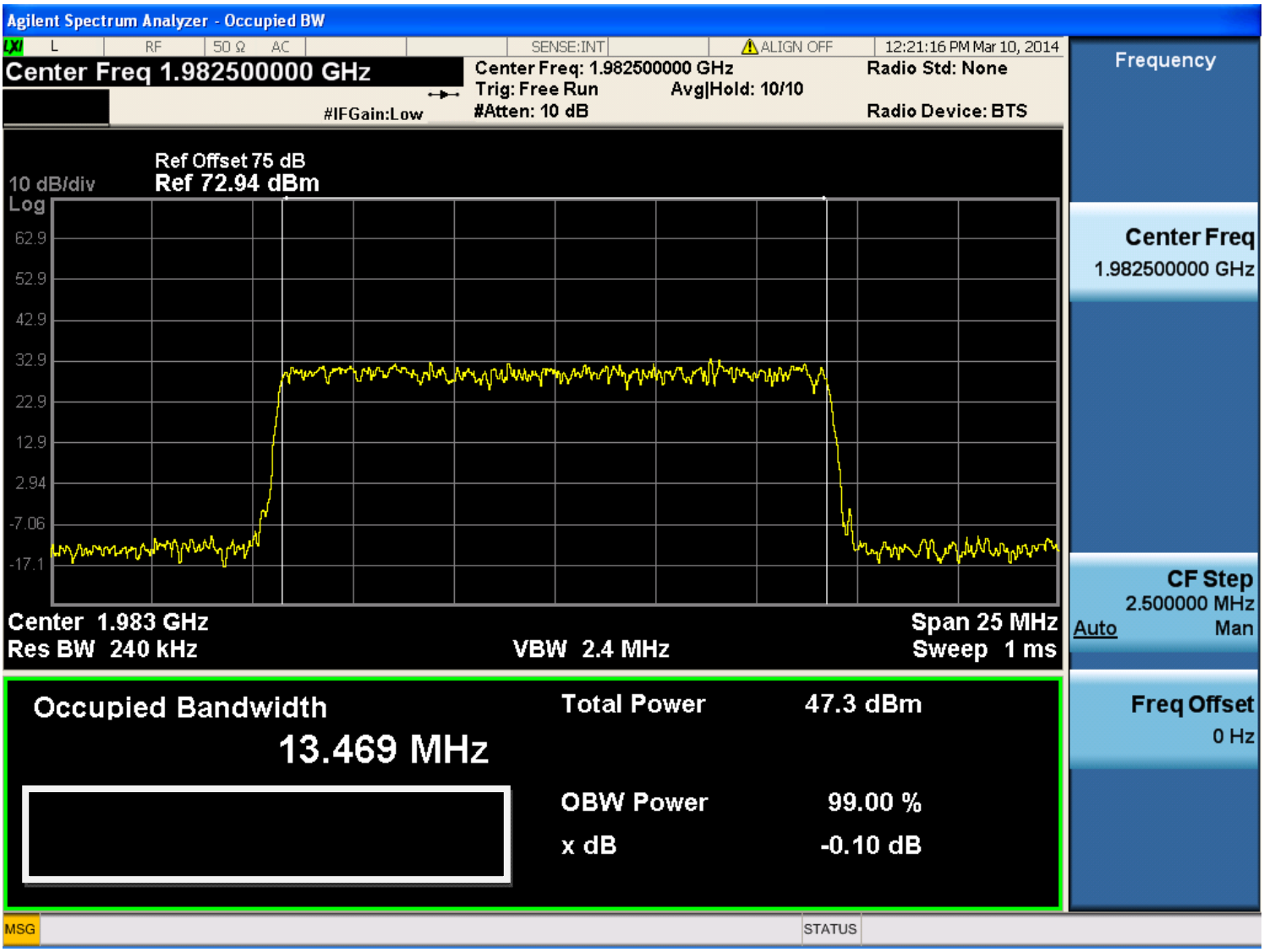
99% Power Bandwidth
LTE QPSK
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



99% Power Bandwidth
LTE 16QAM
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



99% Power Bandwidth
LTE 64QAM
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



99% Power Bandwidth Results Summary

Frequency Block	Fundamental Center Frequency	Emission Bandwidth	RF Power	LTE Modulation	Measured 99% Power Bandwidth (MHz)
A: 1930 – 1945 MHz	1937.5 MHz	15 MHz	60 W (47.8 dBm)	QPSK	13.475
	1937.5 MHz	15 MHz	60 W (47.8 dBm)	16QAM	13.466
	1937.5 MHz	15 MHz	60 W (47.8 dBm)	64QAM	13.455
B: 1950 – 1965 MHz	1957.5 MHz	15 MHz	60 W (47.8 dBm)	QPSK	13.455
	1957.5 MHz	15 MHz	60 W (47.8 dBm)	16QAM	13.475
	1957.5 MHz	15 MHz	60 W (47.8 dBm)	64QAM	13.442
C: 1975 – 1990 MHz	1982.5 MHz	15 MHz	60 W (47.8 dBm)	QPSK	13.444
	1982.5 MHz	15 MHz	60 W (47.8 dBm)	16QAM	13.432
	1982.5 MHz	15 MHz	60 W (47.8 dBm)	64QAM	13.469

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

15 MHz BW at 13M4F9W

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 24.238 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
A: 1930 – 1945 MHz	1937.5 MHz	15 MHz	60 W (47.8 dBm)
B: 1950 – 1965 MHz	1957.5 MHz	15 MHz	60 W (47.8 dBm)
C: 1975 – 1990 MHz	1982.5 MHz	15 MHz	60 W (47.8 dBm)

The data plots show full compliance with the carrier, for each modulation type, remaining within it's designated 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:

BW 15 MHz - Carrier Offset = 10 log (30 kHz/15 MHz) = -27.0 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) :

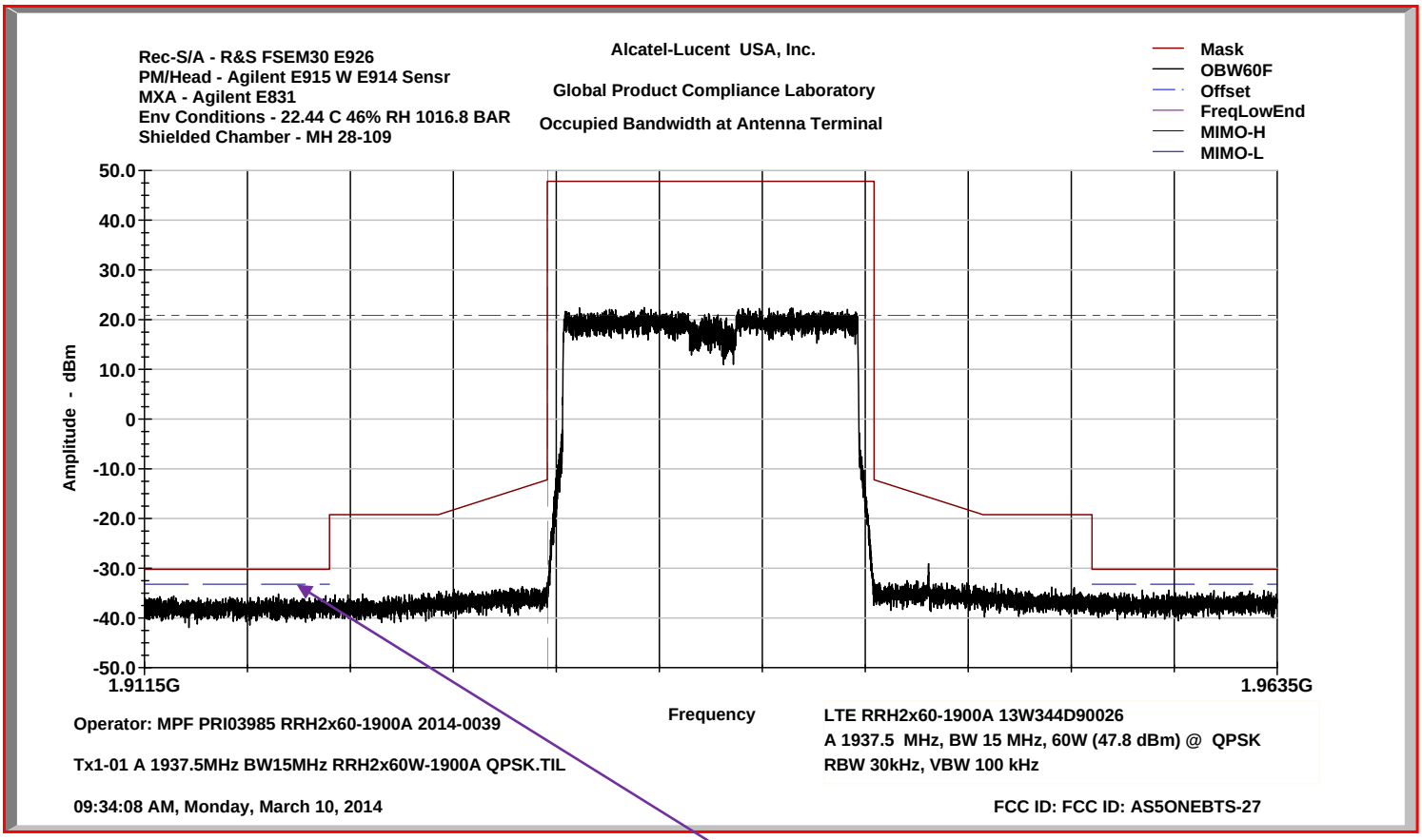
43 + 10 log 60W = 60.78 dBc, which equates to -13 dBm

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

43 + 10 log P + 10 log (Nant)
43 + 10 log 60W + 10 log 2 = 63.79 dBc = - 16 dBm

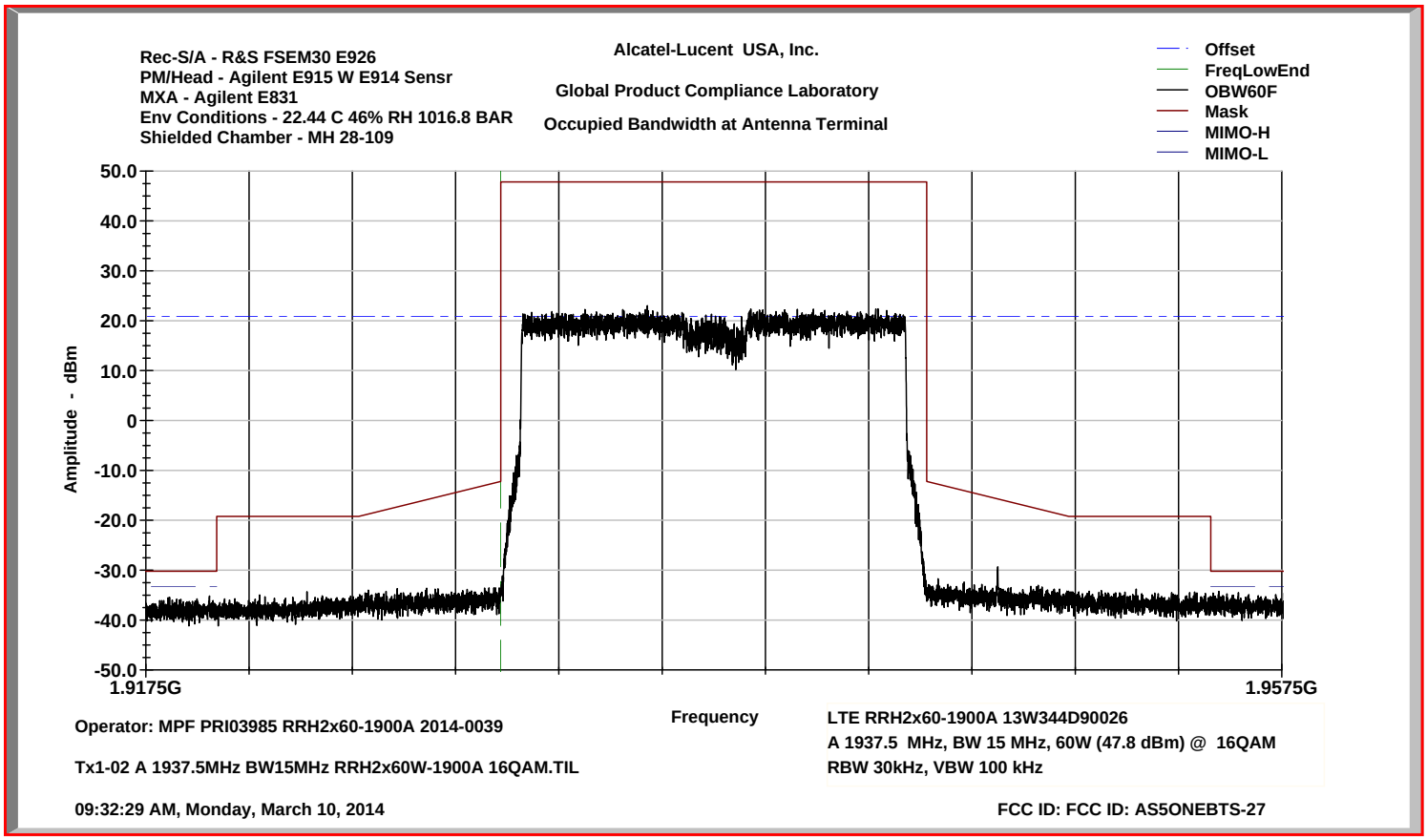
where, Nant is the number of outputs, i.e., transmit antenna terminals.

Occupied Bandwidth
LTE QPSK
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW

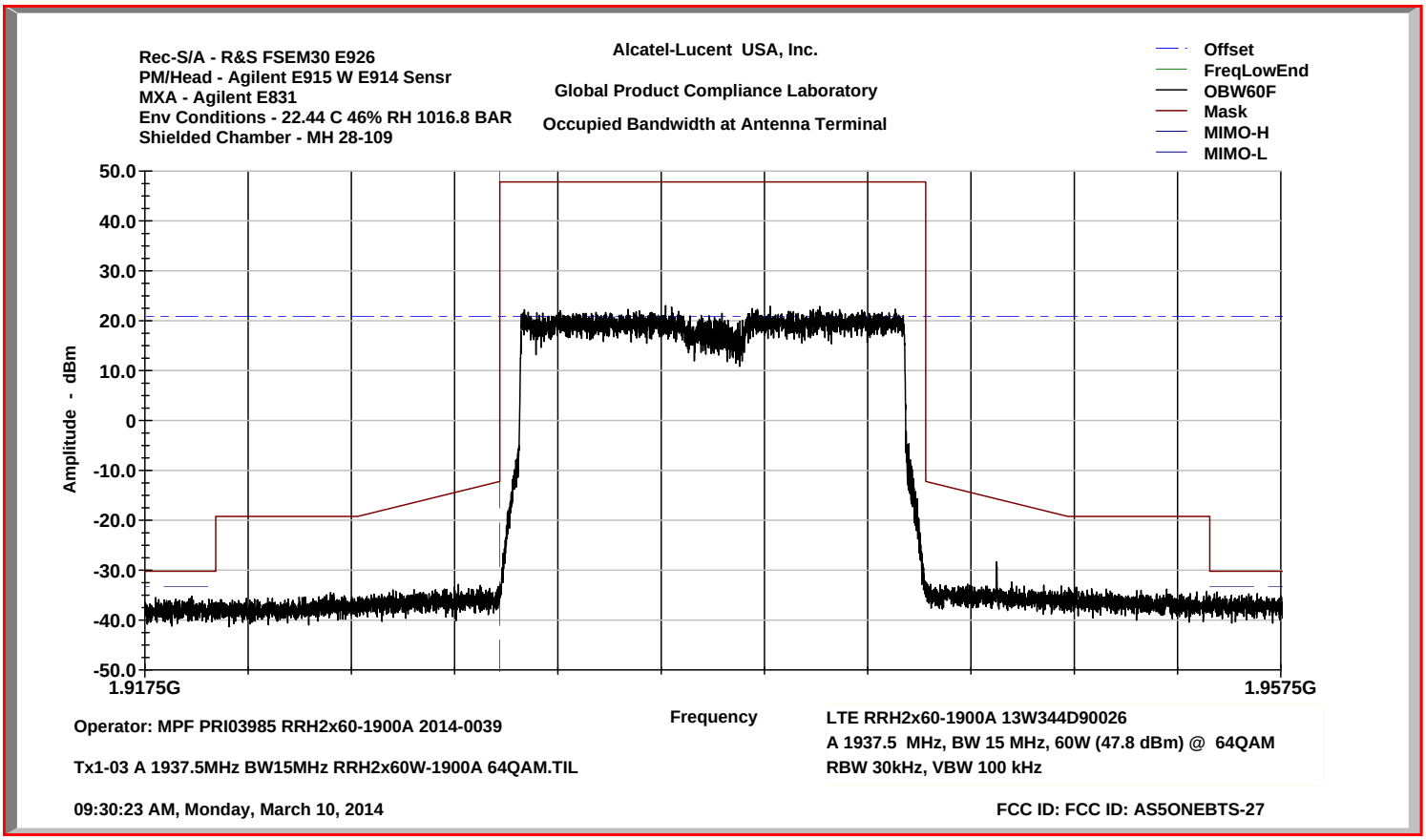


2xMIMO

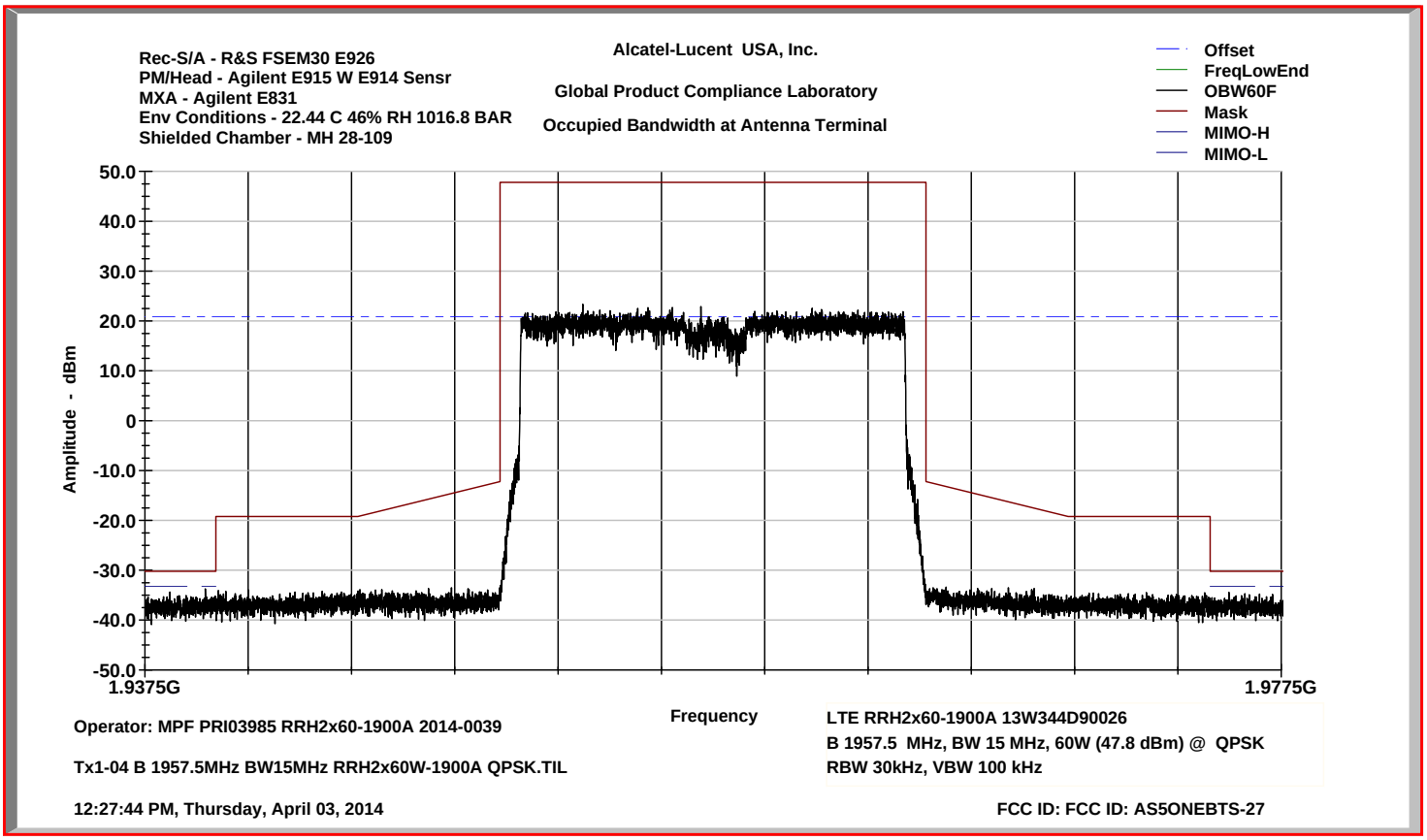
Occupied Bandwidth
LTE 16QAM
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



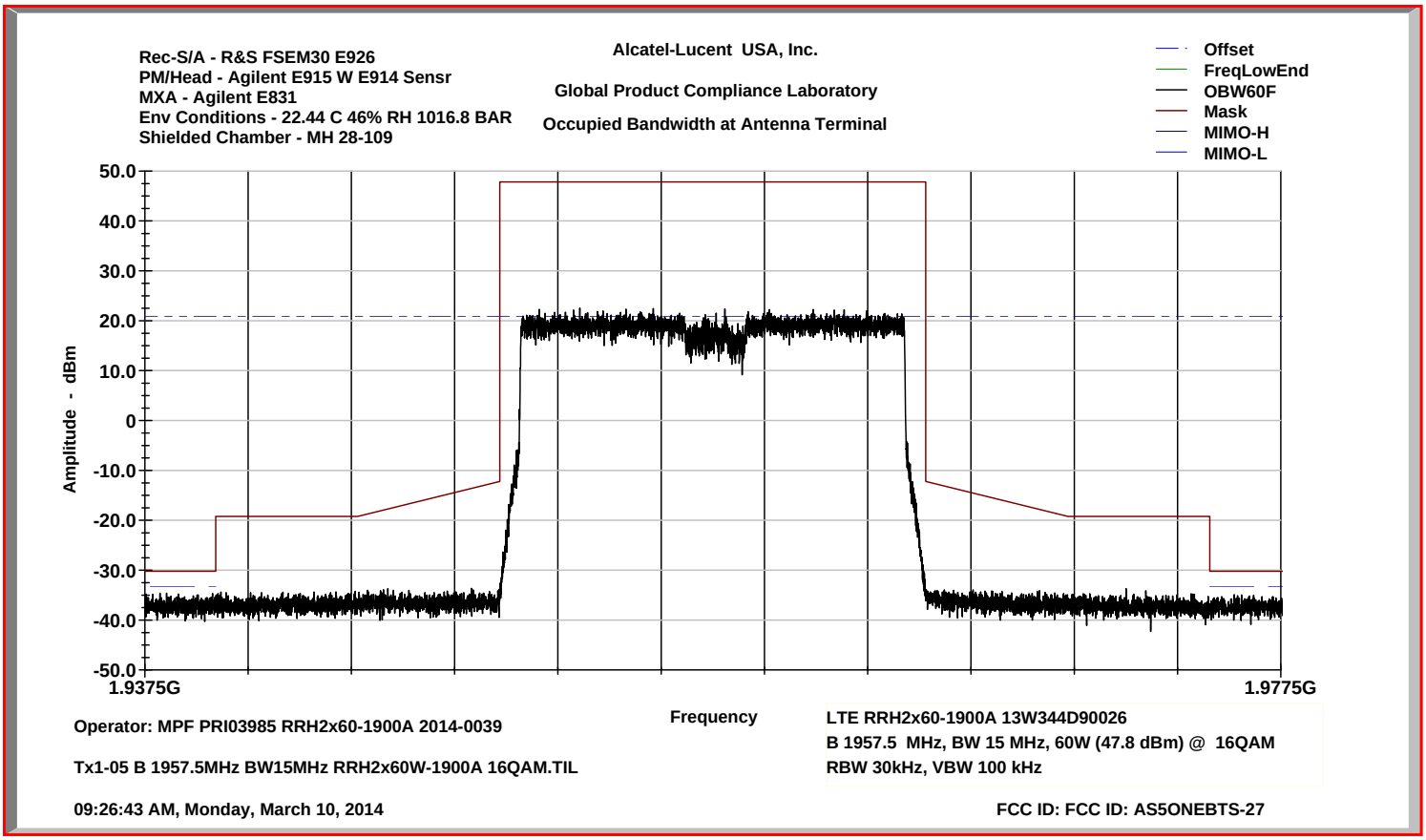
Occupied Bandwidth
LTE 64QAM
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



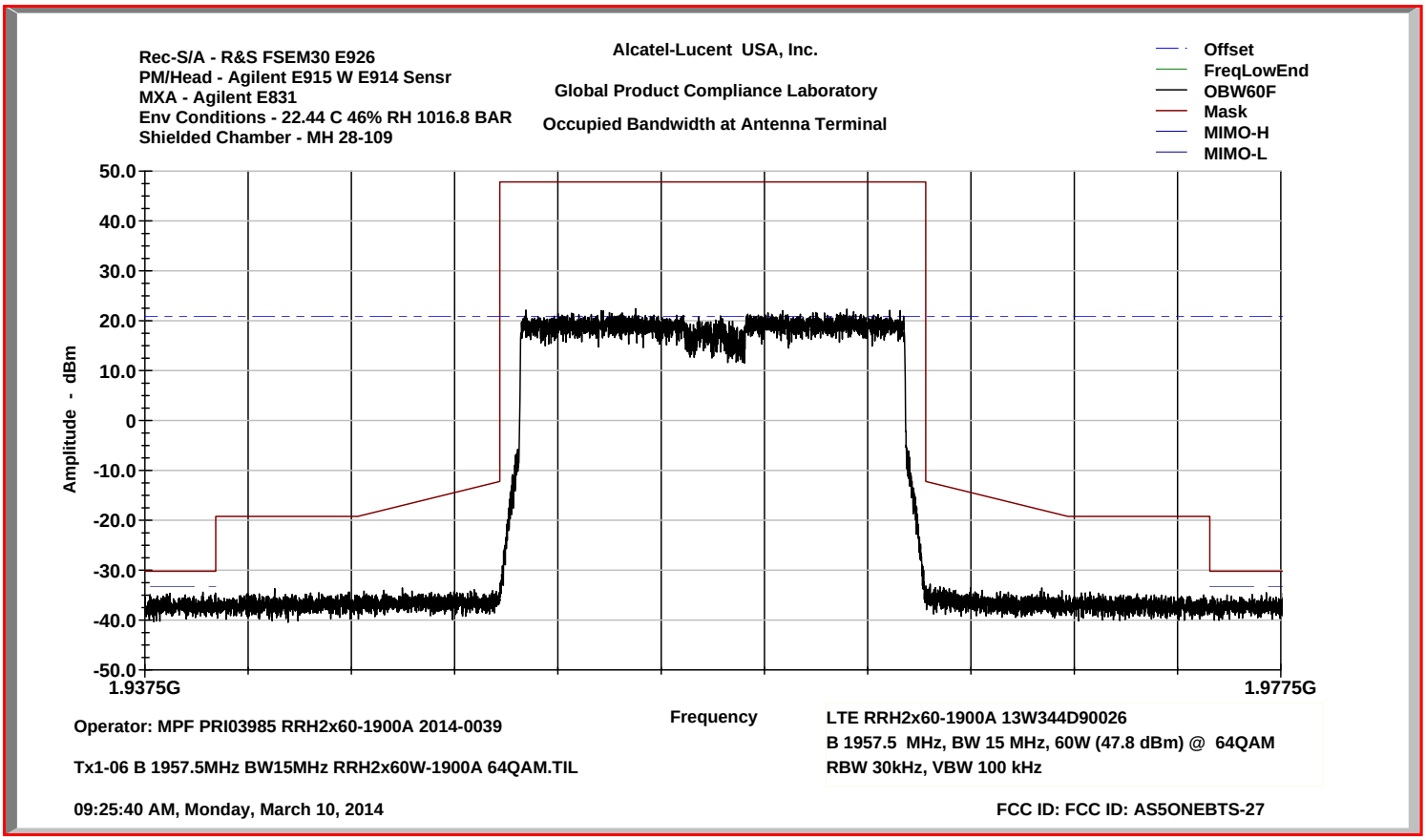
Occupied Bandwidth
LTE QPSK
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



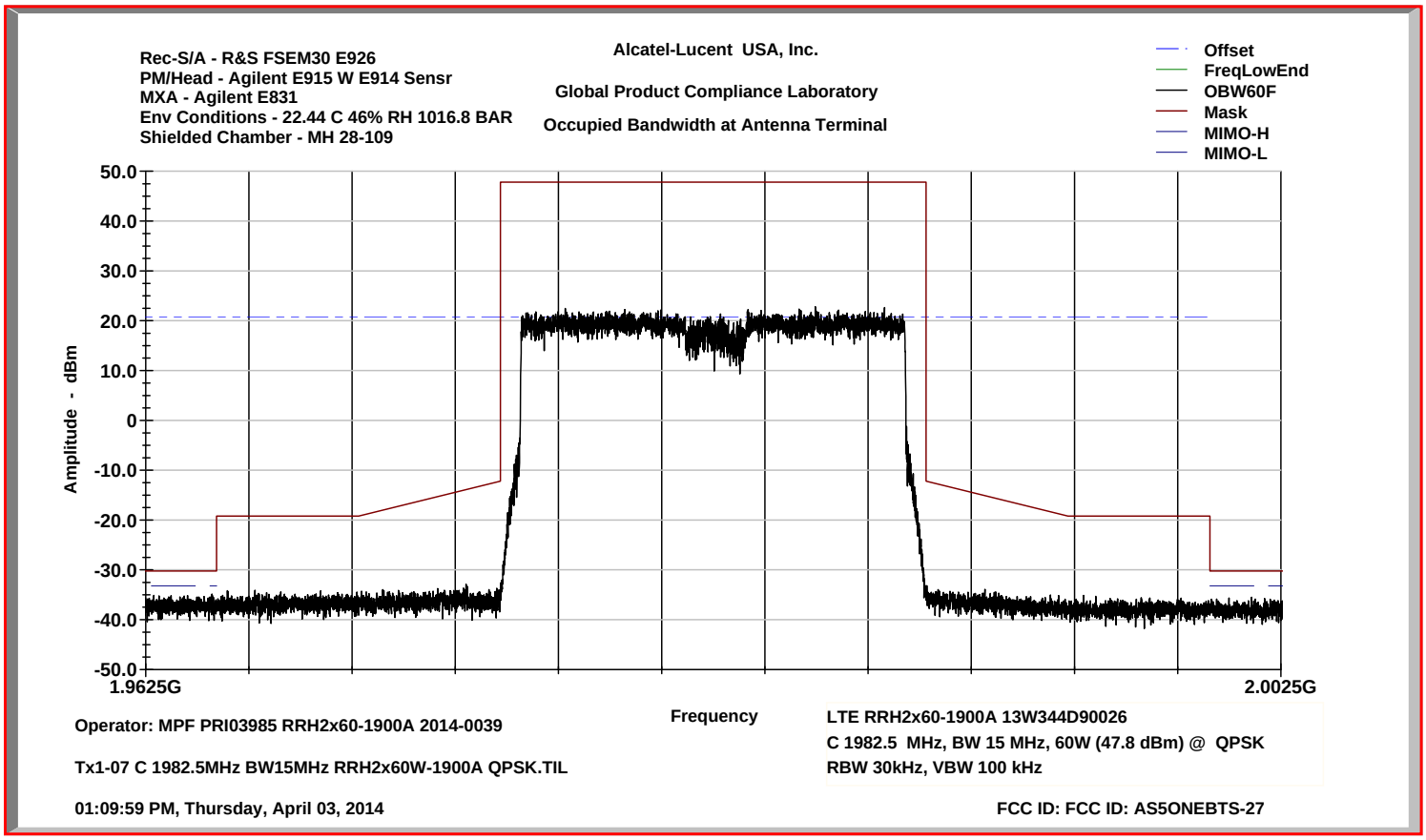
Occupied Bandwidth
LTE 16QAM
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



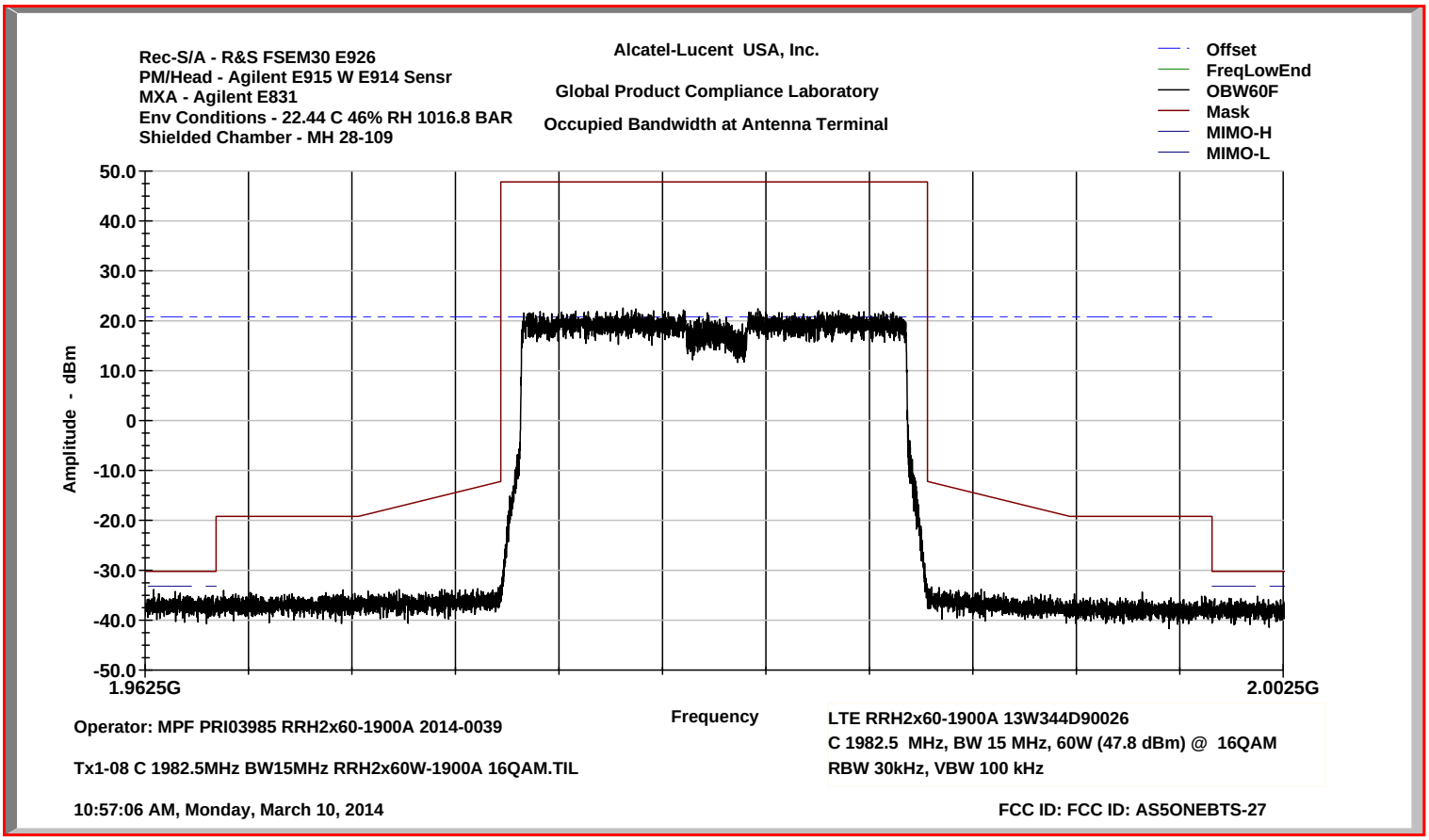
Occupied Bandwidth
LTE 64QAM
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



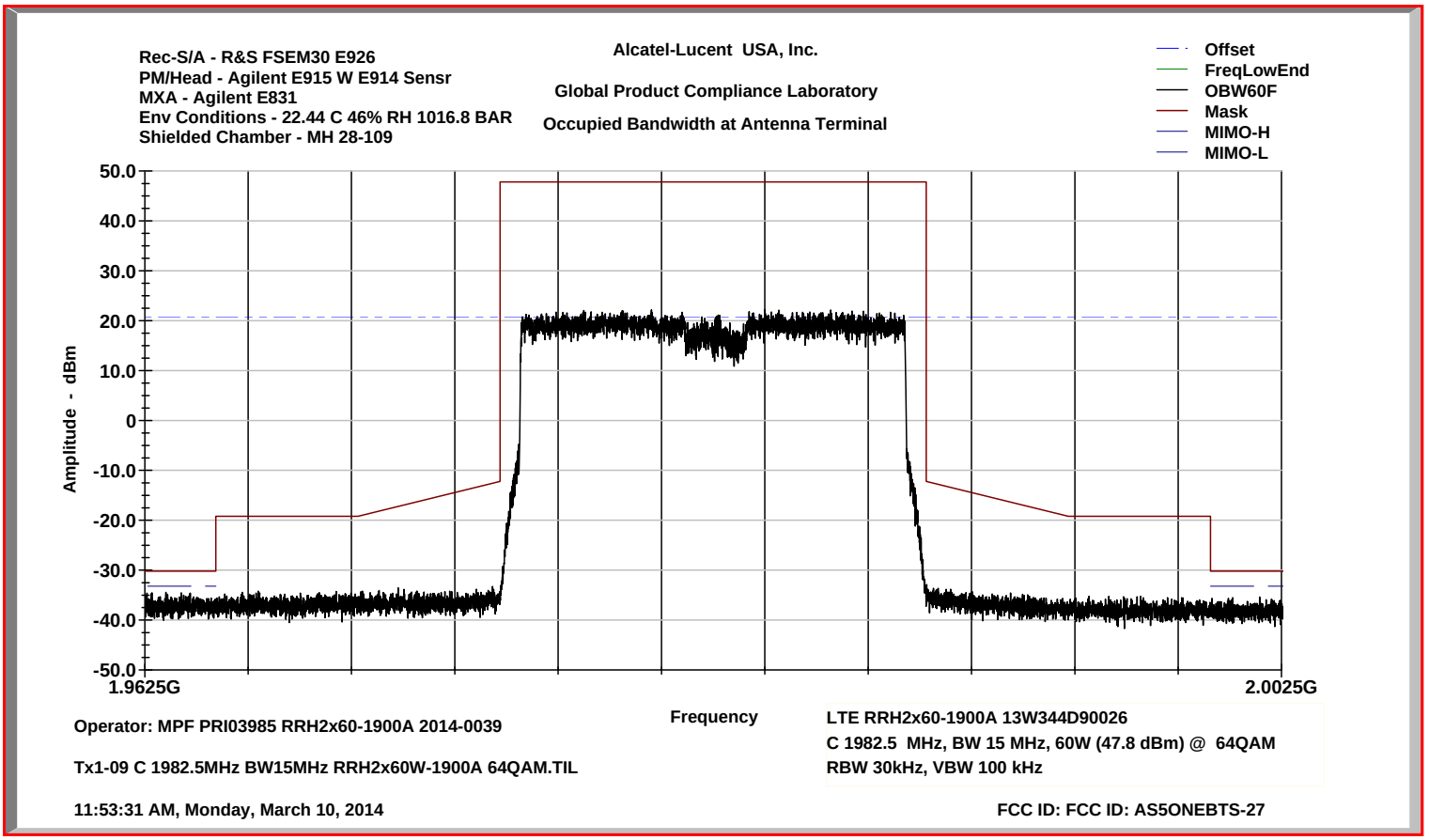
Occupied Bandwidth
LTE QPSK
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



Occupied Bandwidth
LTE 16QAM
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



Occupied Bandwidth
LTE 64QAM
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



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 10^{th} harmonic of the carrier at the EAC terminal. The emission limits at the antenna terminal are specified in §24.238(a)(b) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. 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 §24.238(a)(b), unwanted emissions must be suppressed by

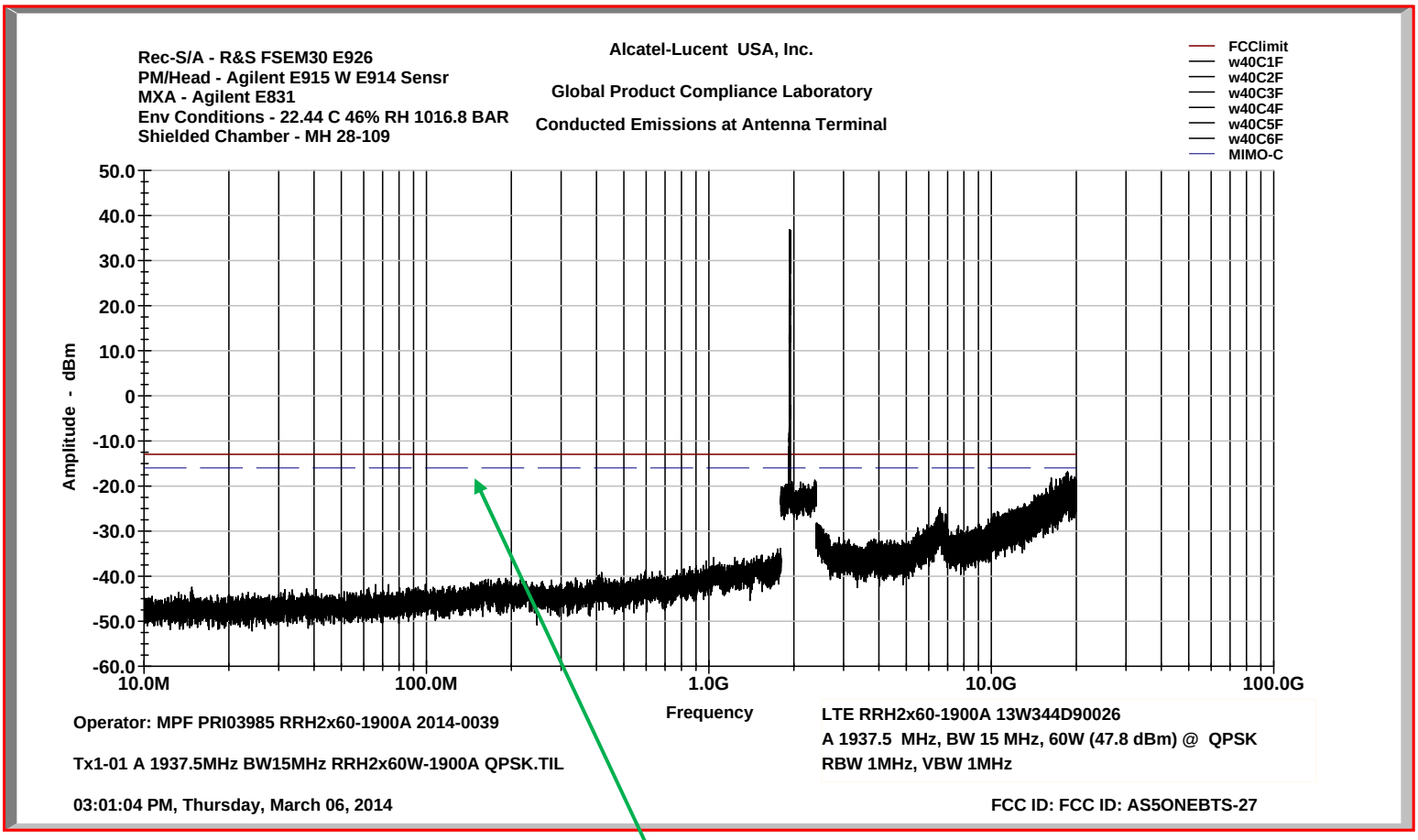
43 + 10 log 60W = 60.78 dBc, which equates to -13 dBm

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

43 + 10 log P + 10 log (Nant)
43 + 10 log 60W + 10 log 2 = 63.79 dBc, which equates to - 16 dBm

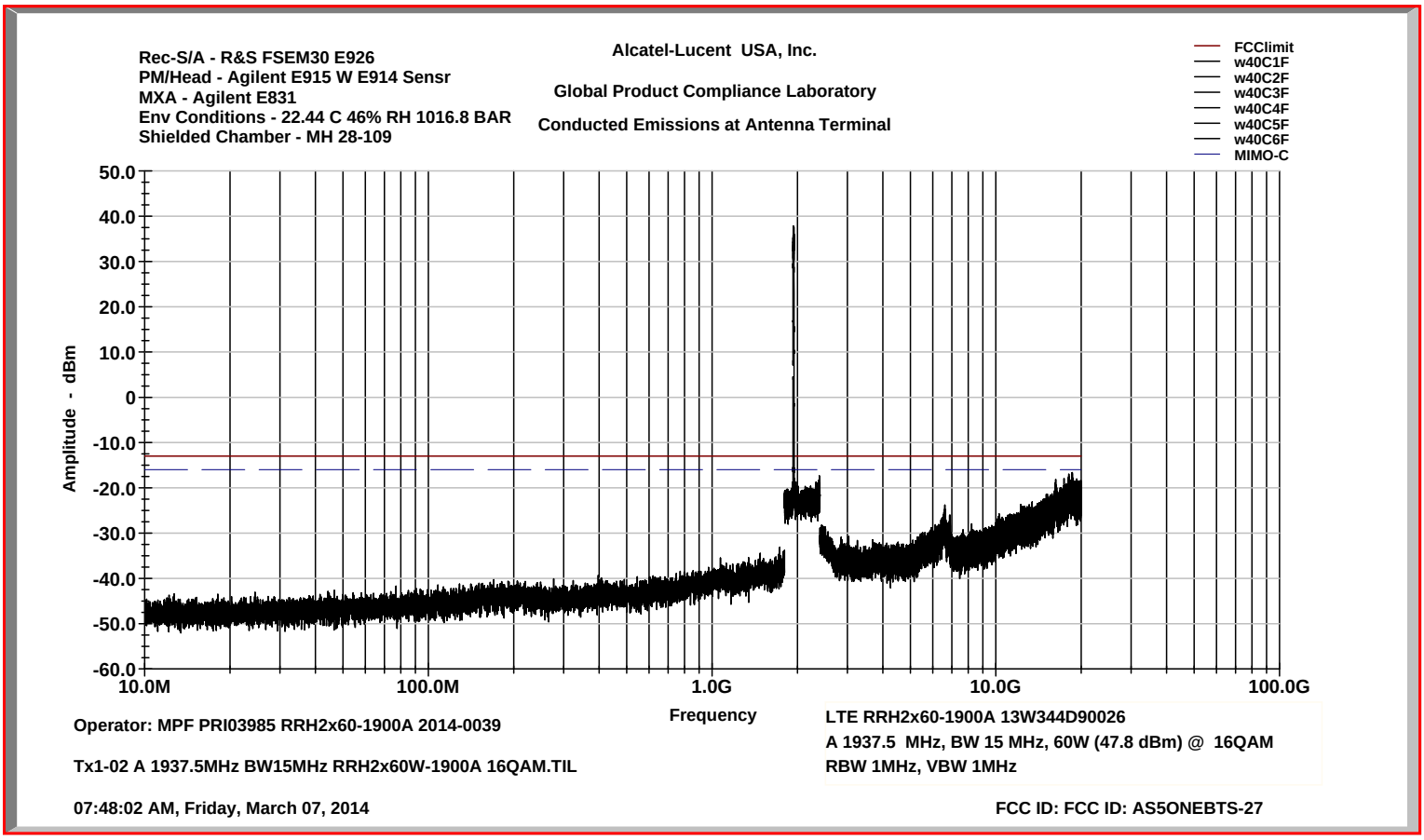
where, Nant is the number of outputs, i.e., transmit antenna terminals.

Conducted Emissions
LTE QPSK
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW

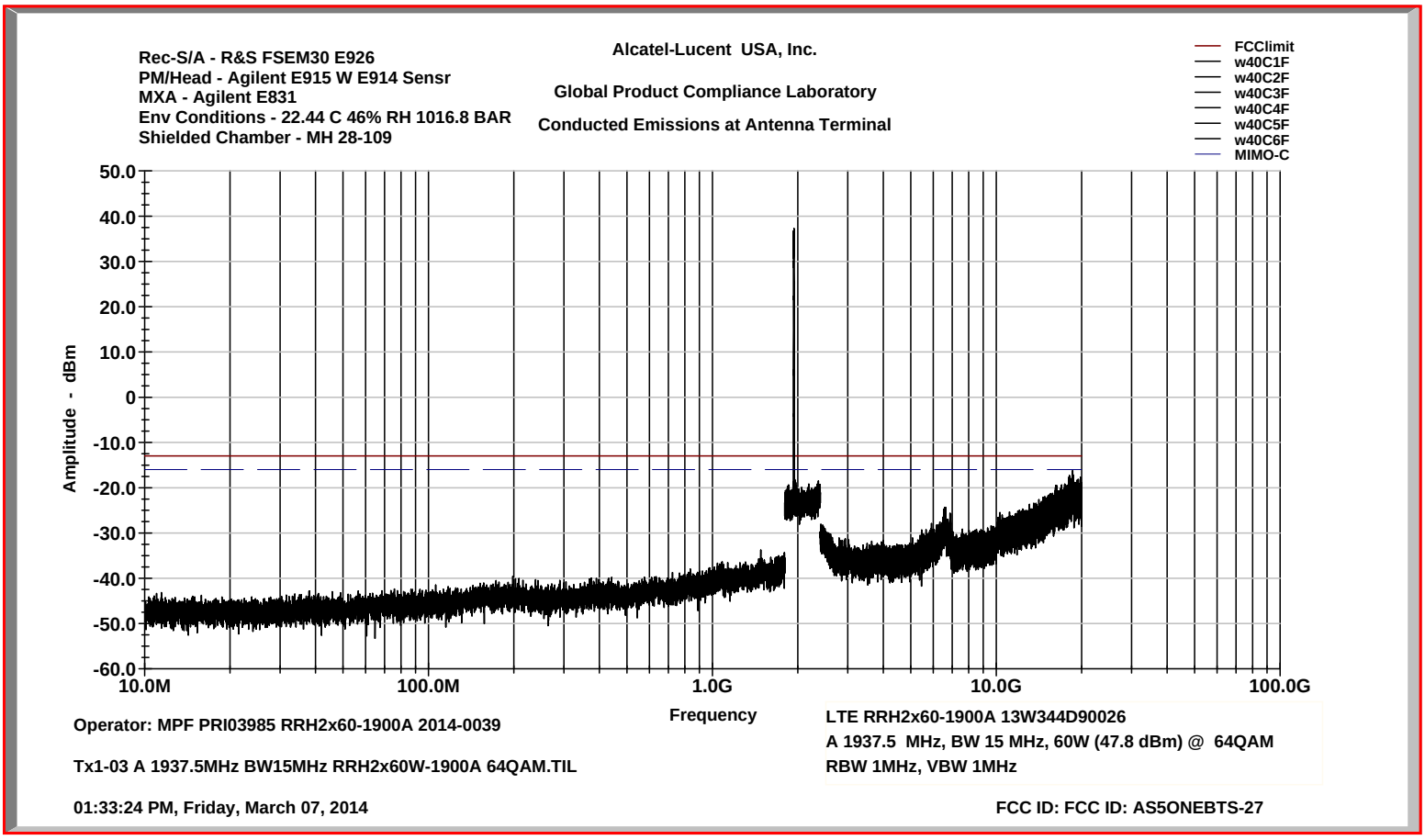


2xMIMO

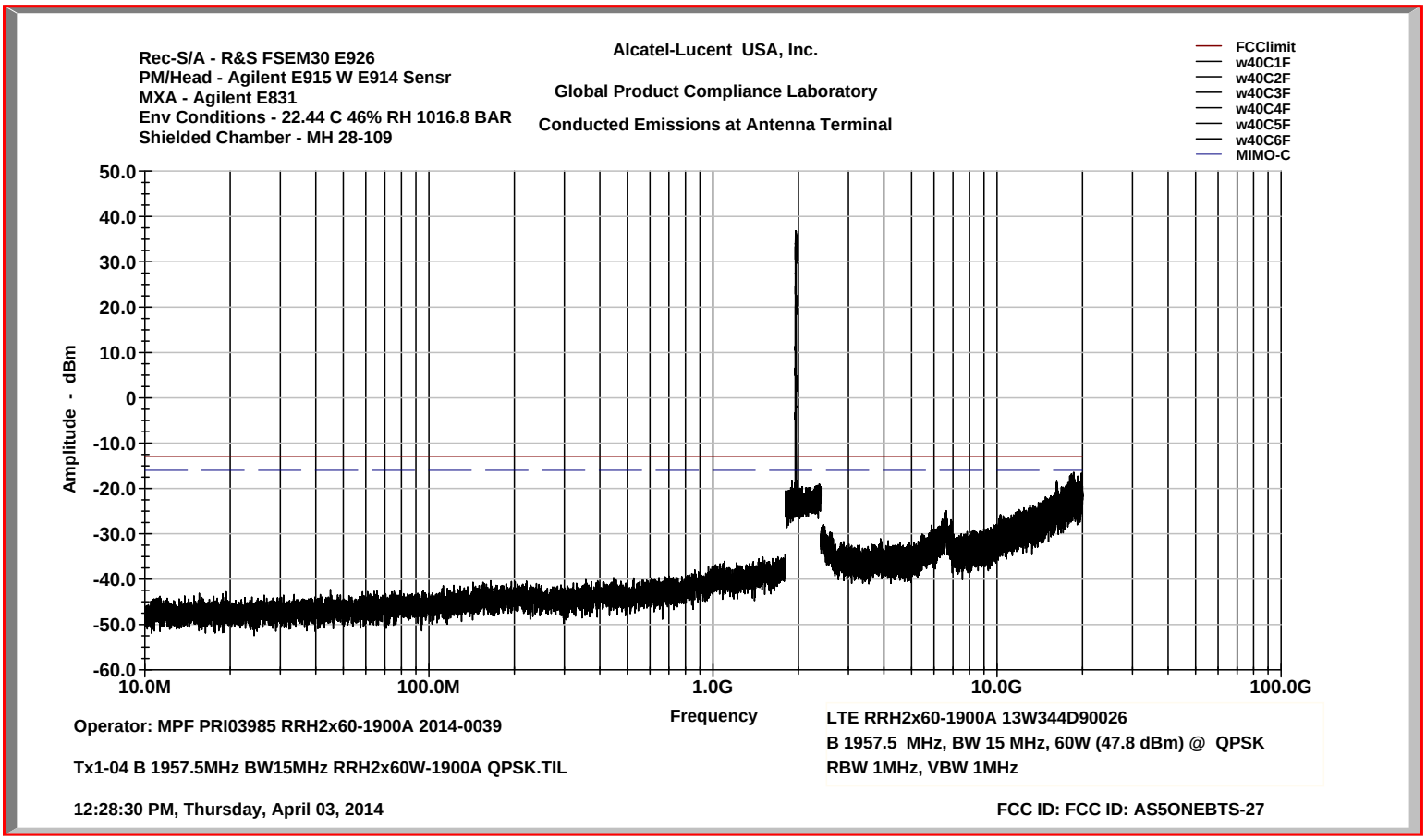
Conducted Emissions
LTE 16QAM
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



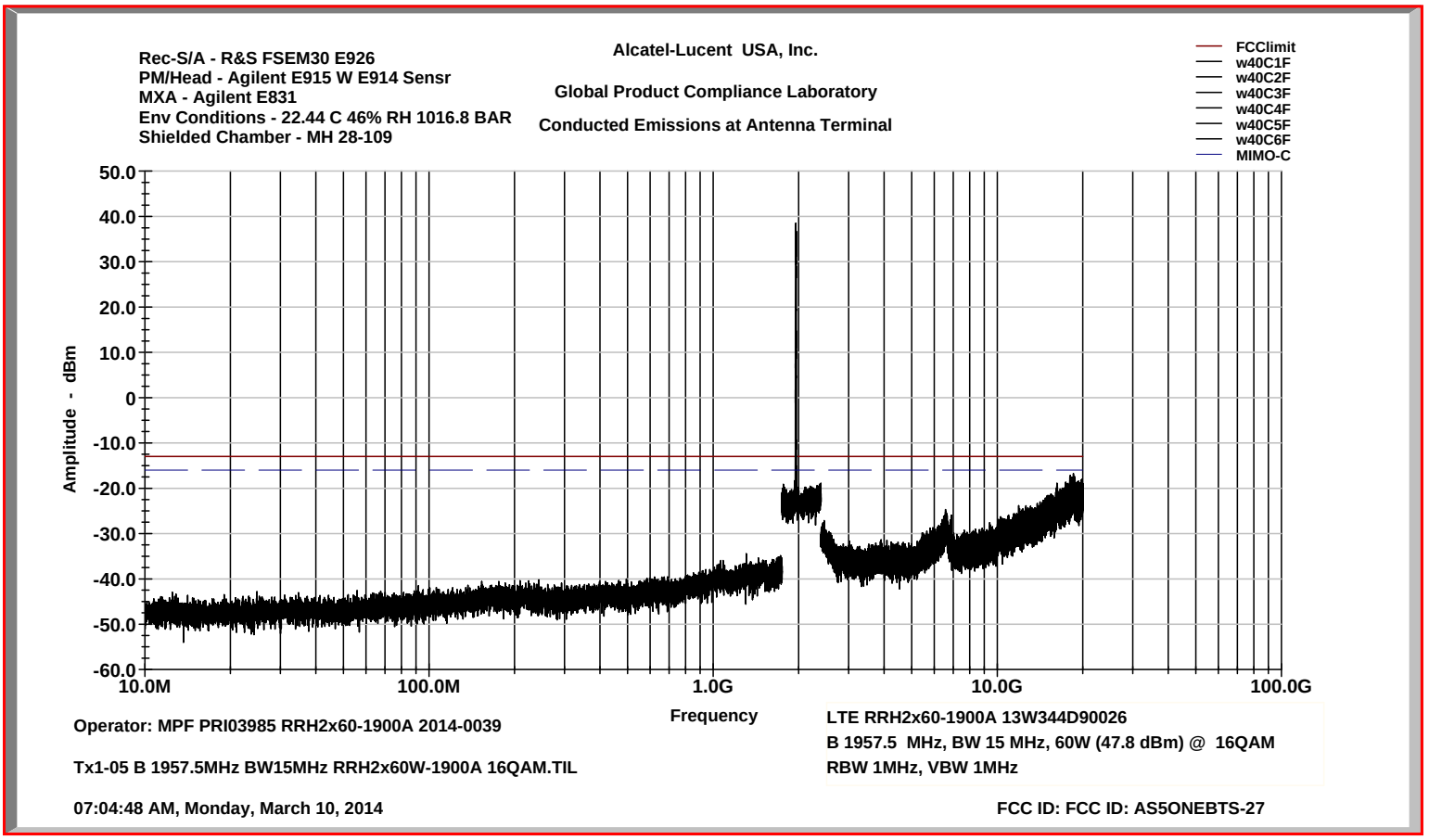
Conducted Emissions
LTE 64QAM
Tx1 1937.5 MHz, 60 W (47.8 dBm), 15 MHz BW



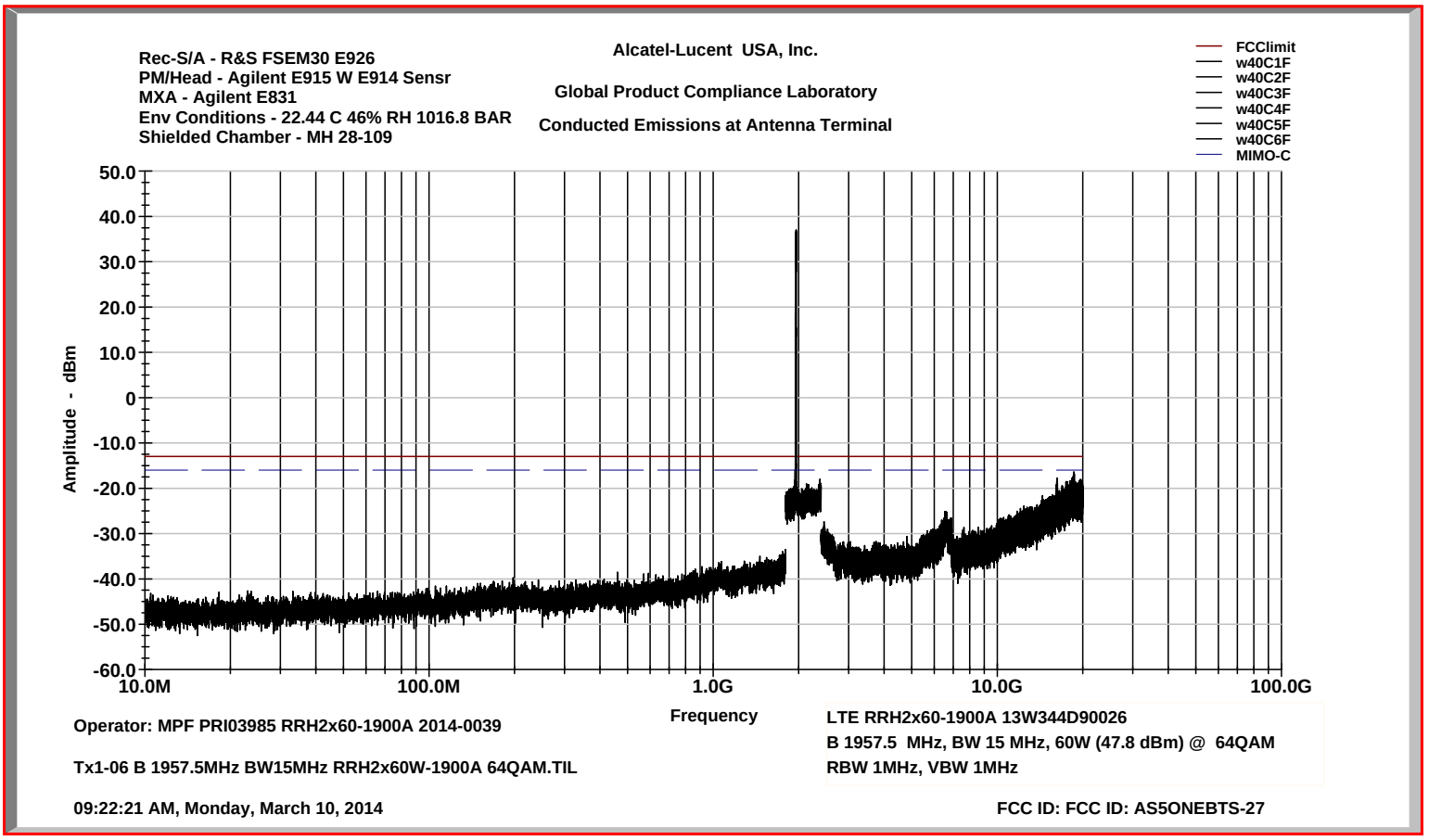
Conducted Emissions
LTE QPSK
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



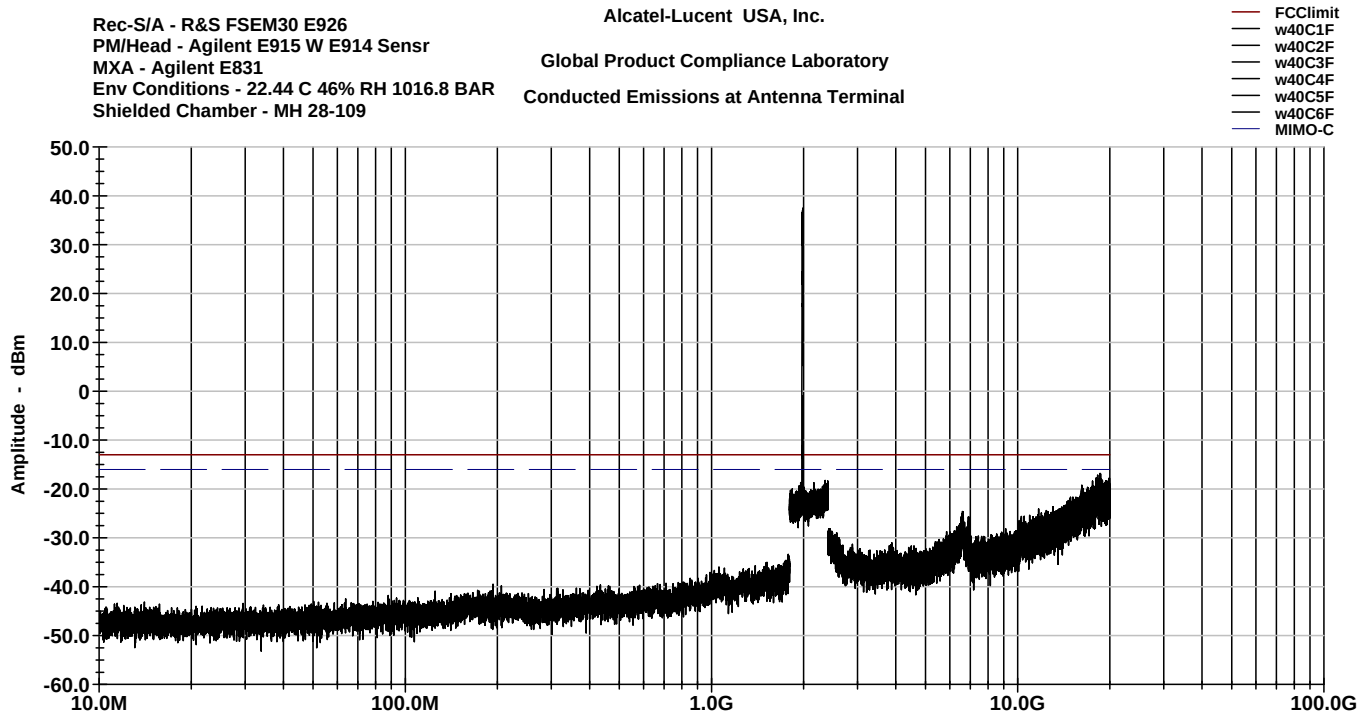
Conducted Emissions
LTE 16QAM
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



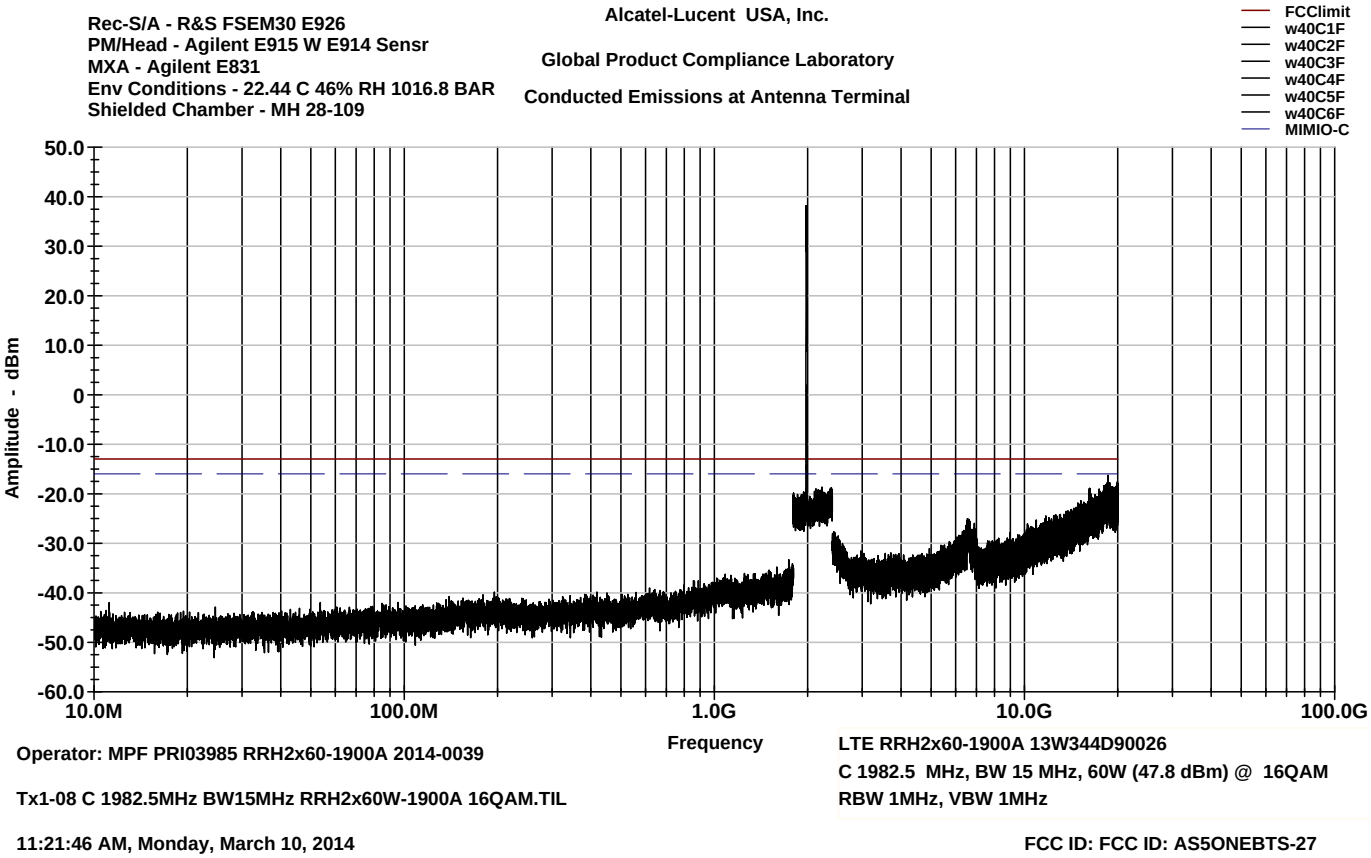
Conducted Emissions
LTE 64QAM
Tx1 1957.5 MHz, 60 W (47.8 dBm), 15 MHz BW



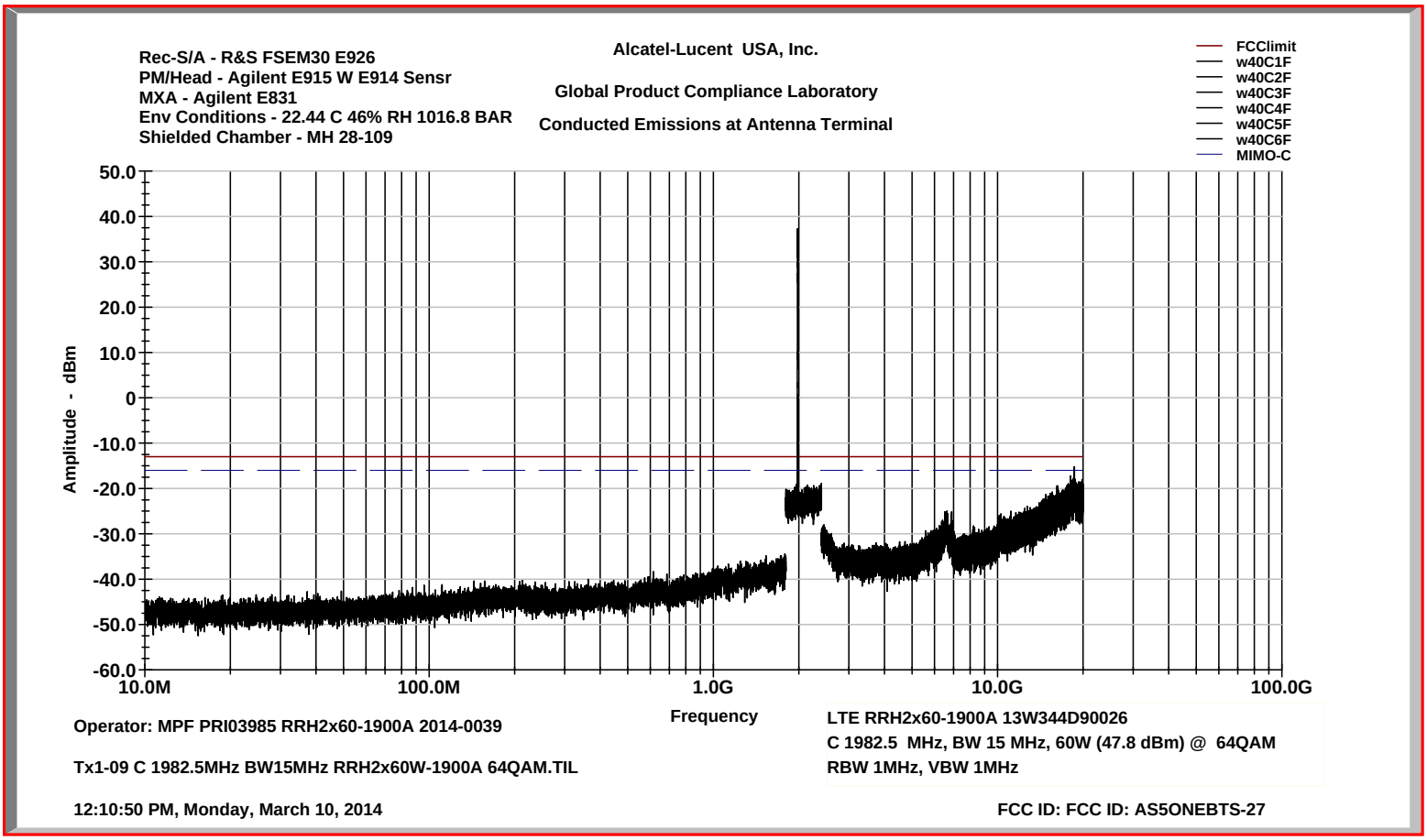
Conducted Emissions
LTE QPSK
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



Conducted Emissions
LTE 16QAM
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



Conducted Emissions
LTE 64QAM
Tx1 1982.5 MHz, 60 W (47.8 dBm), 15 MHz BW



PART 2.1053 MEASUREMENTS REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION

Radiated spurious emissions (RE) were investigated over the spectrum 30 MHz – 20 GHz for two (2) 2xMIMO carrier/fundamental configurations:

Carrier	Carrier Center Frequency	Emission Bandwidth	Test Modulation
Lowest Frequency	1937.5 MHz	15 MHz	QPSK
Highest Frequency	1982.5 MHz	15 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:

Pmeas (dBm) + Cable Loss(dB) + Antenna Factor(dB) + 107 (dBμV/dBm) -Amplifier Gain (dB)
= Field Strength (dBμV/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 = 60W

Results: Complies - Over the out-of-band spectrum investigated from 30 MHz to the tenth harmonic of the carrier (20GHz), the power levels of all emissions observed were >> 20 dB below the 82.23 dB μV/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
Spectyrum 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	N1911A P-Series Power Meter	MY451019834	2/12/14	2/1`2/16	E950
Power Meter Sensor	Agilent	N1921A 50 MHz – 18 GHz	MY45200339	3/13/14	3/13/15	---
Dual Directional Coupler	Hewlett-Packard	HP 772D 2 – 18 GHz	2839A01045	NR	NR	E1136
Attenuator/Fan Assembly (Input)	Aeroflex/Weinschel	6791	004	NR	NR	E1136
Attenuator (Input)	Aeroflex/Weinschel	66A-30-33-LIM 30 dB, 200 W	BV2470	NR	NR	
Attenuator (Incident)	Weinschel	46-20-34 DC – 18 GHz 20 dB, 25 W	BJ2719	NR	NR	
Attenuator (Test Port)	MCE/Weinschel	46-20-34-LIM DC – 18 GHz 20 dB, 25 W	BN3125	NR	NR	
Termination (Reflected)	MCE/Weinschel	M1404N	8936	NR	NR	
Regulated Power Supply	Kikusui Electronics Corp.	PAD-55-120L	DJ000237	NR	NR	E484
Ferrite Box Decoupling Network	Fisher Custom Communications, Inc.	F-2031-DCN-32mm Bandwidth 100 kHz – 1000 MHz	256	NR	NR	E488

Radiated Emissions Test Equipment List
AR9/2014-0039

Manufacturer	Model	Serial Number	Type	Description	GPCL ID	Last Cal	Interval	Status
Hewlett Packard	8593E	3911A04009	Spectrum Analyzer	9 KHz-22 GHz	E375	2/18/2013	24	Active
Sonoma Instrument Co.	310N	186744	Amplifier	9 kHz-1GHz	E812	8/21/2013	12	Active
EMC Test Systems	2090	0004-1507	Multi-Device Controller		E489		0	Active
A.H. Systems Inc.	SAS-521-2	457	Bilogical Antenna	25 - 2000 MHz	E766	12/26/2012	24	Active
Weinschel	2-6	BW2239	Attenuator	6 dB DC-18GHz 5 Watt	E890	6/5/2013	24	Active
Hewlett Packard	3116	2537	Horn Antenna	Double Ridged Horn 18-40 GHz	E520	12/26/2012	24	Active
Hewlett Packard	8449B	3008A01270	Pre-Amplifier	Preamplifier 1-26.5 GHz	E376	12/22/2013	24	Active
EMCO	3115	9903-5769	Horn Antenna	Double Ridged Horn 1-18 GHz	E393	1/30/2013	24	Active
Rohde & Schwarz	ESIB40	100100	Test Receiver	EMI (20Hz to 40 GHz)-150 +30dBM	E908	6/12/2013	24	Active
Trilithic	5HC2850/18 050-1.8-KK	PCS-HPF-5	High Pass Filter	PCS	E986		12	Active