Subject: **Application for Class II Permissive Change under FCC ID: AS5BBTRX-08 to Add the Lower 700 MHz Frequency Band BC-17.**

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EXHIBIT 9: TEST REPORT

INTRODUCTION:

The exhibits presented in this test report demonstrate that the Alcatel-Lucent **9764 MetroCell Outdoor 2x5W 4G/LTE** is in full compliance with all requirements of the Rules of the Commission as specified in the Code of Federal Regulations (CFR), Title 47 – Telecommunication; Part 27, Subpart C —Technical Standards; Section § 27.53 Emission Limits.; effective August 5, 2013. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective May 24, 2013. It also demonstrates compliance with the spurious emissions limitations specified 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).*

The **9764 MetroCell Outdoor 2x5W 4G/LTE** is designed for 2xMIMO operation with a long term average power at each of the 2 transmit terminals of 5 W (37 dBm), with a 10 MHz emission band width (BW). Total composite power at the air interface is then 10 W (40 dBm). This product supports 3 LTE (Long Term Evolution) modulation schemes**:** QPSK, 16QAM and 64QAM. The spectrum of operation is AWS 700L in Band Class 17 (BC 17) 734 – 746 MHz. 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, will not be repeated for brevity.

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 27.53	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)*

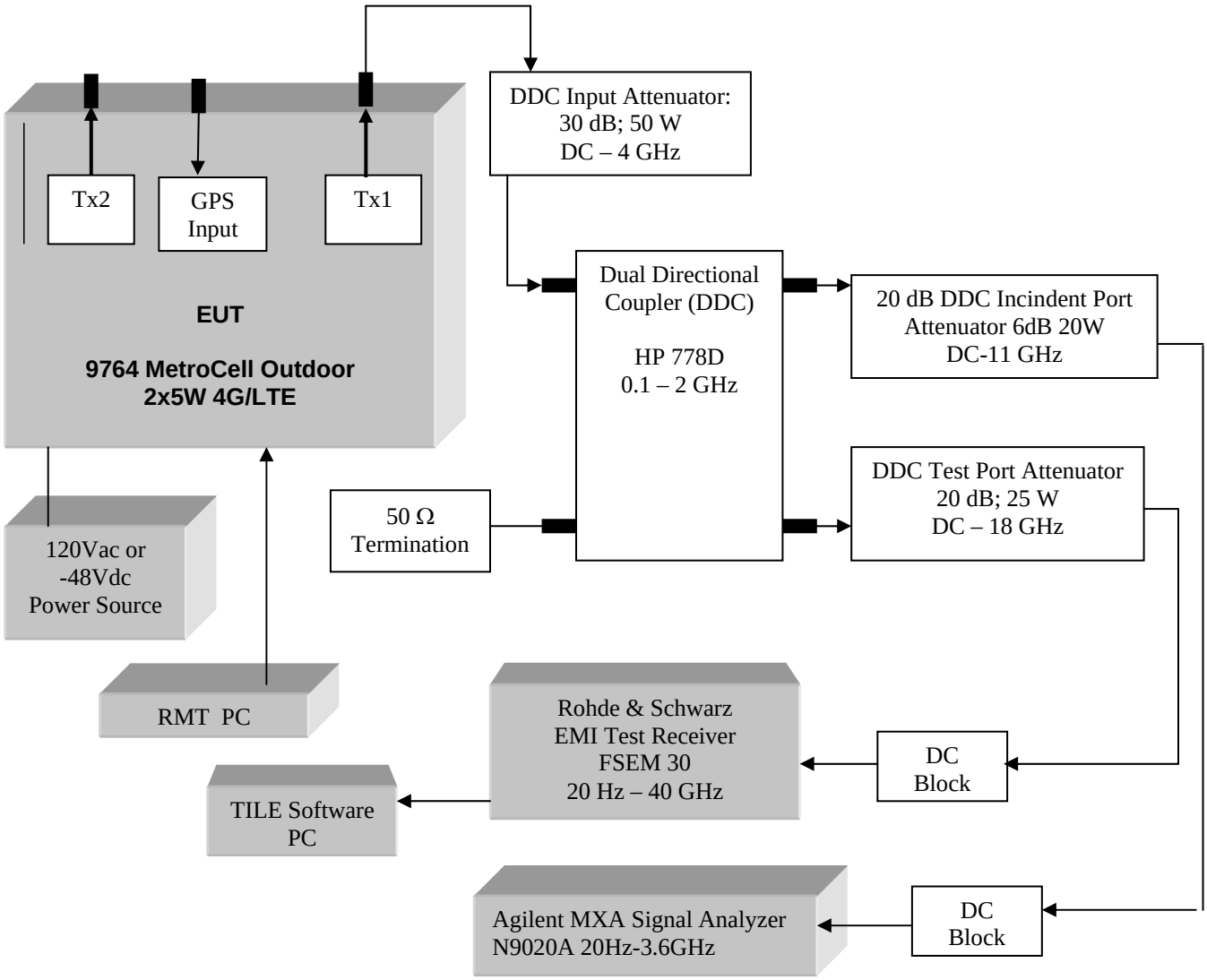
ANSI C63.4-2009 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic in the Range of 9 kHz to 40 GHz; September 15, 2009.

PART 2.1046 MEASUREMENTS REQUIRED: RF POWER OUTPUT

The RF power of the single 10 MHz BW carrier, tuned to 740 MHz center frequency, was measured at 5 W (37 dBm) long term average power at each transmit terminal (Tx1 and Tx2) and for each of the 3 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

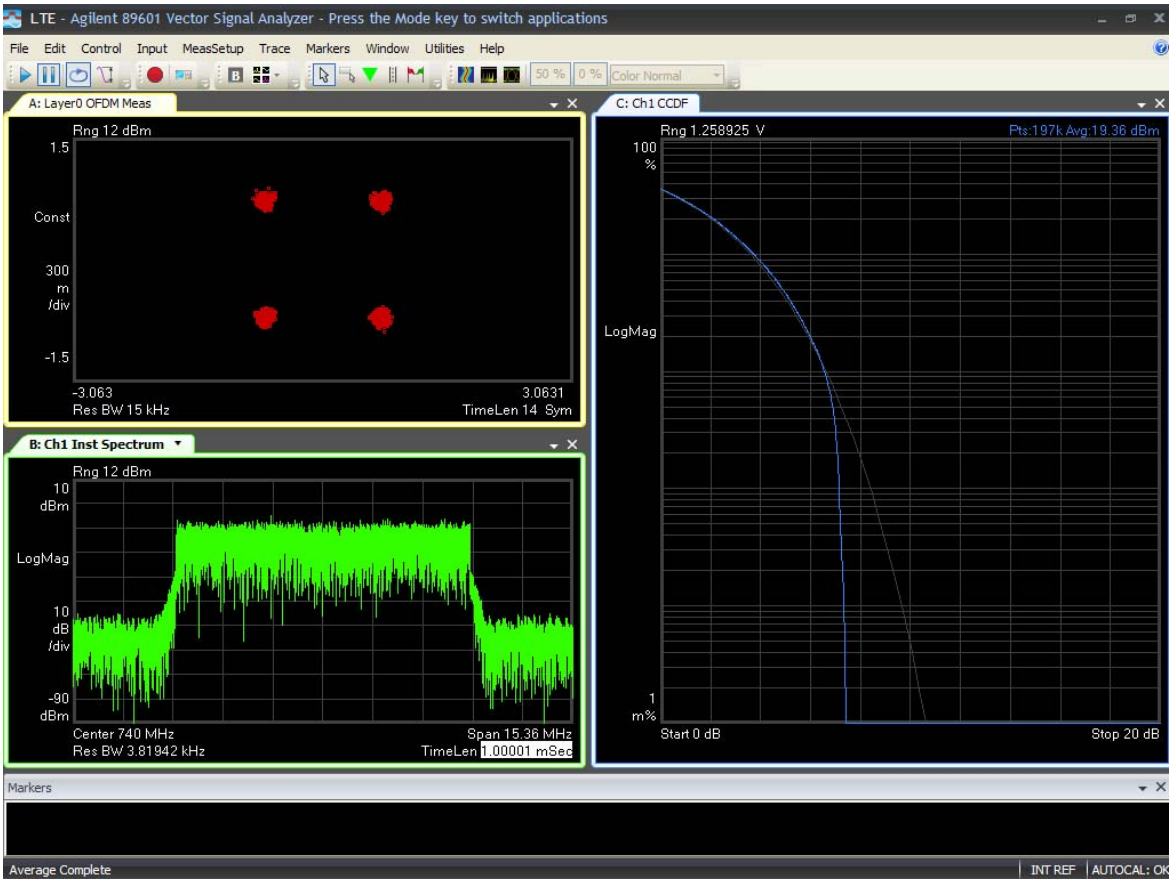
5 Watt (+37 dBm) per Tx Antenna Terminal



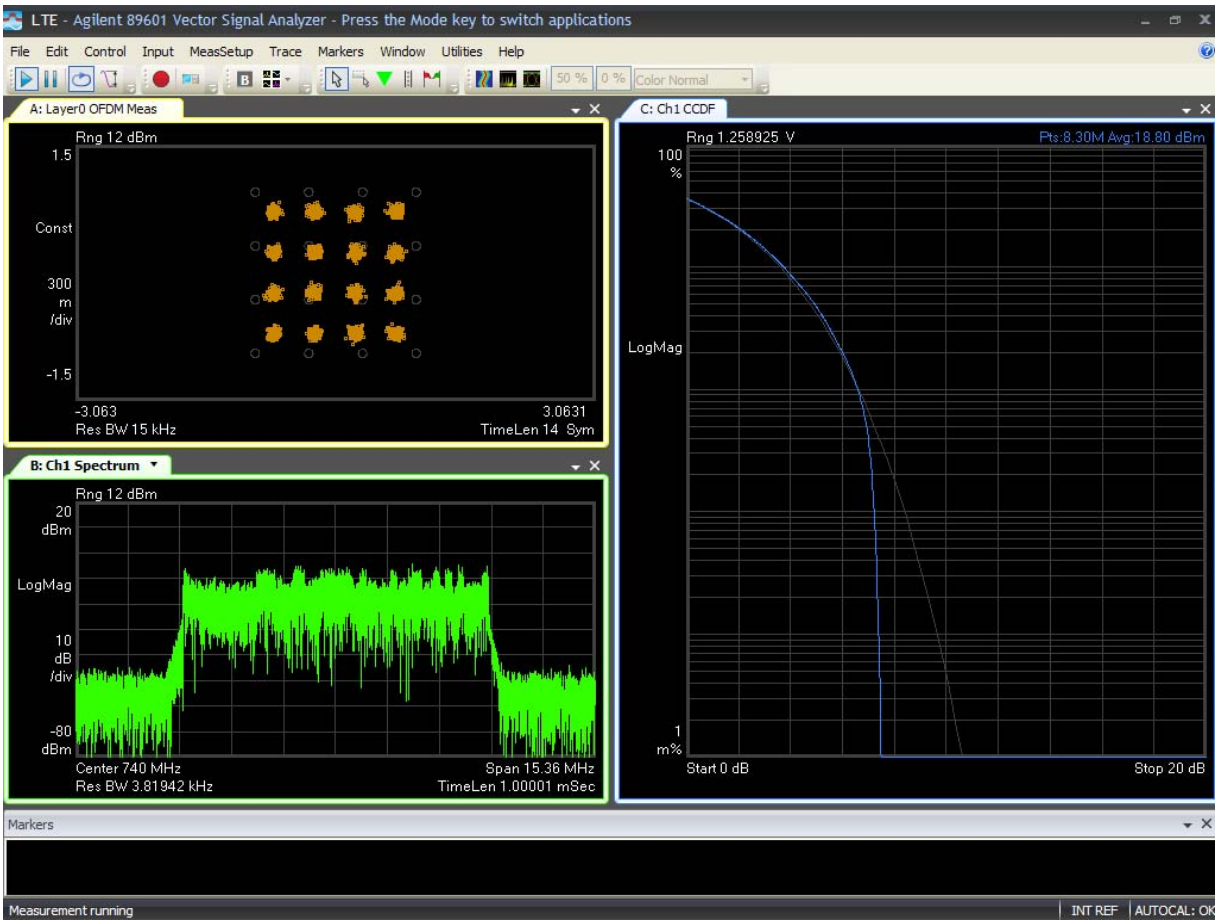
PART 2.1047 MEASUREMENTS REQUIRED: MODULATION CHARACTERISTICS

The LTE modulation characteristics were measured and recoded for both Tx1 and Tx2 with the 10 MHz BW carrier set to 740 MHz and 3 consecutive test modulations: QPSK, 16QAM and 64 QAM. For brevity, only the test results measured at Tx1 will be displayed in the following data plots.

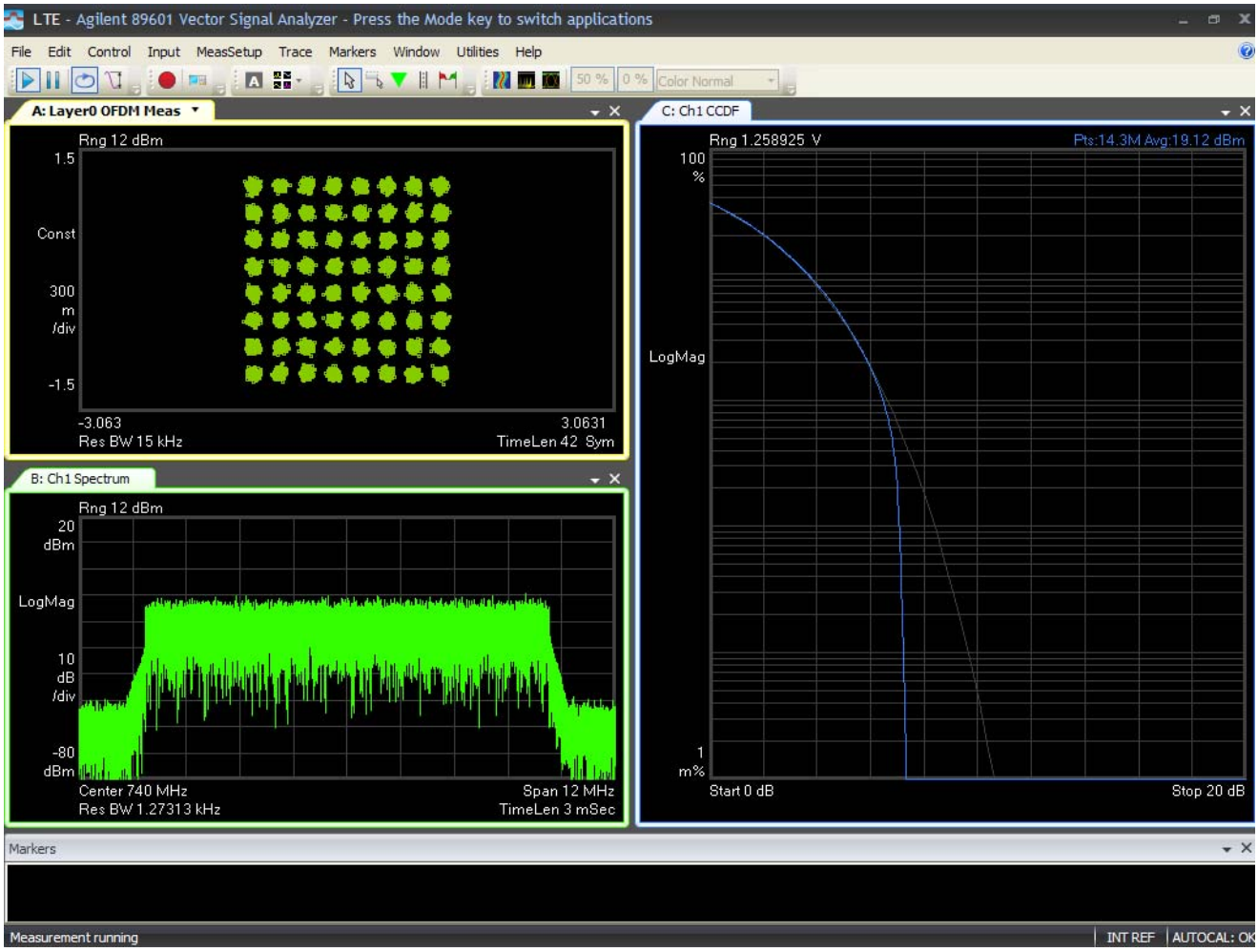
LTE QPSK
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW



LTE 16QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW



LTE 64QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW



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

The occupied bandwidth was measured at each Equipment Antenna Terminal (EAC): Tx1 and Tx2, for each of the 3 test modulation schemes: QPSK, 16QAM and 64QAM. As previously done, the carrier was set to 740 MHz and 5W (37 dBm) for each antenna terminal.

Compliance was demonstrated by two methods for each test modulation:

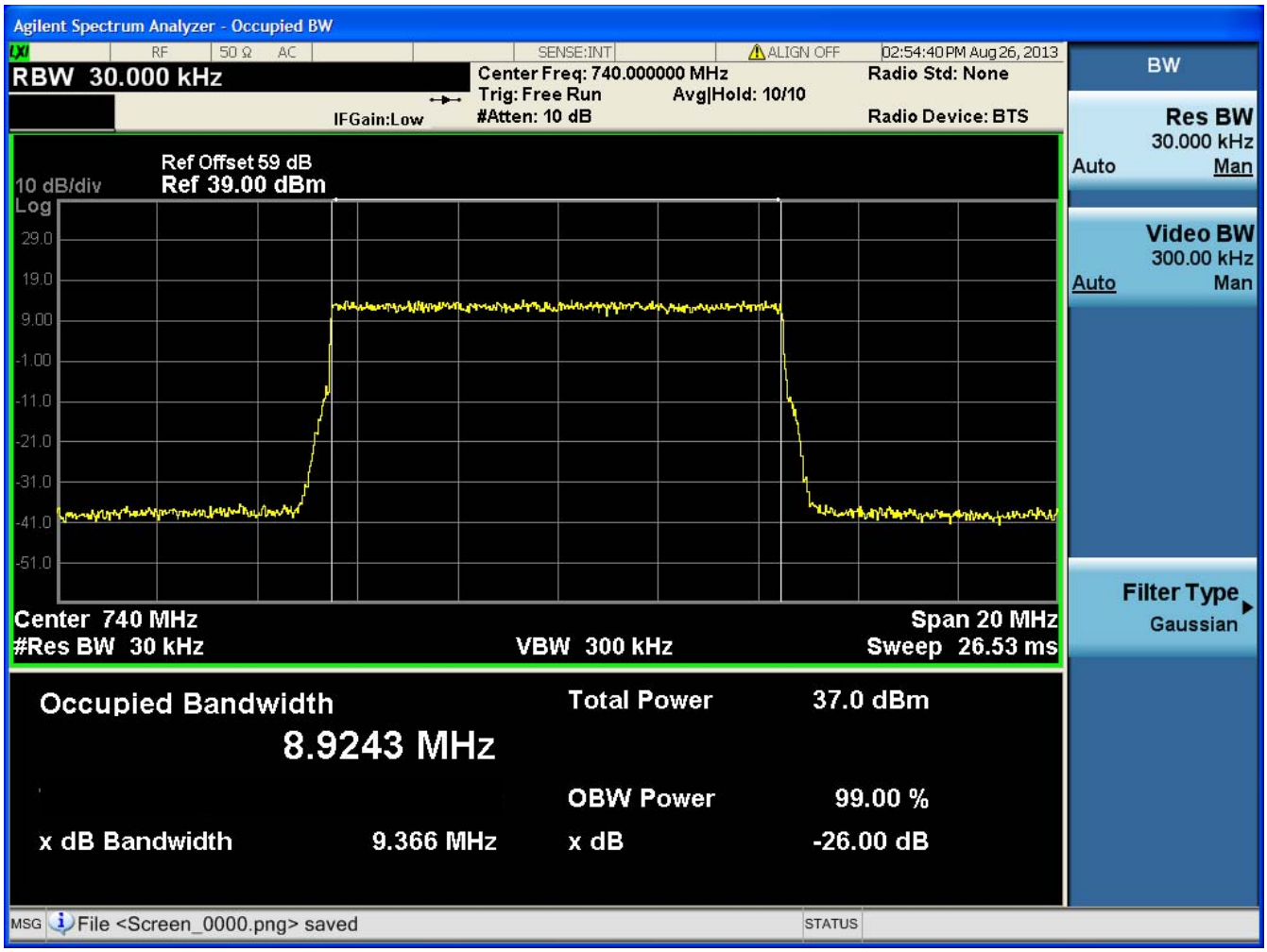
1. The carrier 99% Power Bandwidth, which defines the necessary bandwidth declared in the emission designator, using an Agilent MXA Signal Analyzer N9020A 20 Hz – 3.6 GHz.

2. ETSI TS 36.104 emission mask limitation, using a Rohde & Schwarz FSEM30 EMI Test Receiver, to demonstrate compliance with both the emission mask requirements and with Part 27.53.

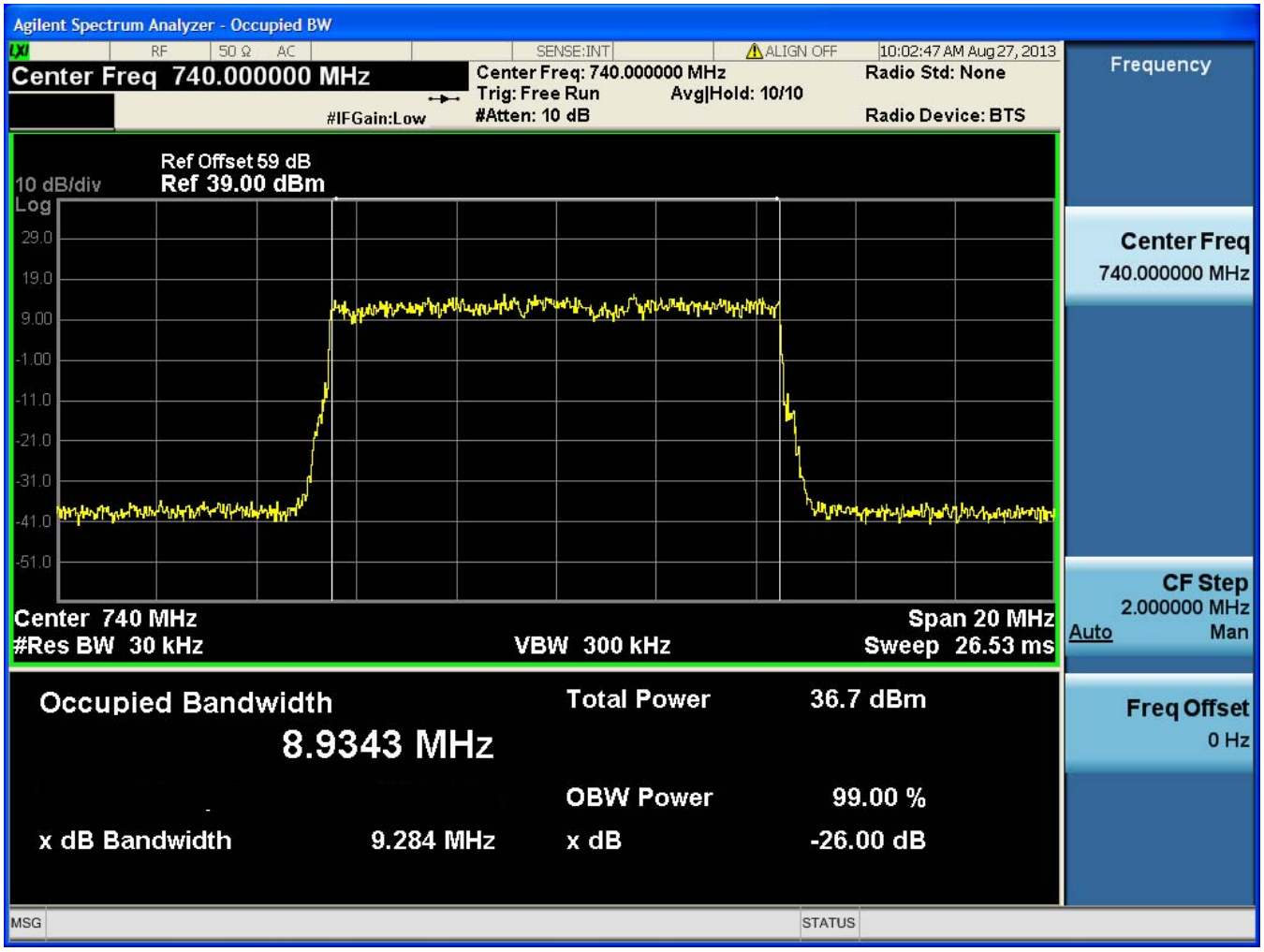
99% Power Bandwidth

The LTE 99% Power Bandwidth was measured and recoded for both Tx1 and Tx2 with the 10 MHz BW carrier set to 740 MHz and 3 consecutive test modulations: QPSK, 16QAM and 64 QAM. For brevity, only the test results measured at Tx1 will be displayed in the following data plots.

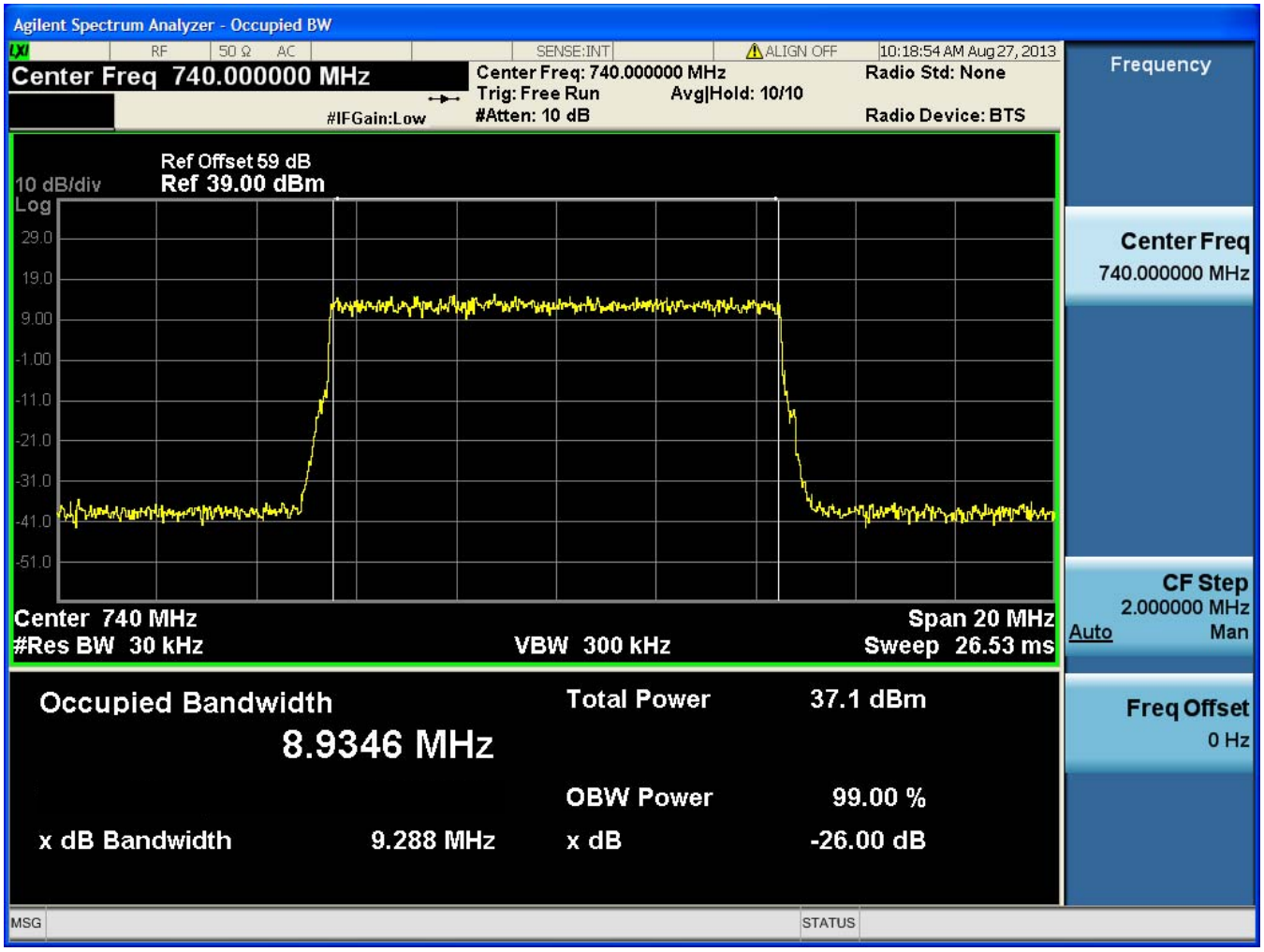
99% Power Bandwidth
LTE QPSK
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW



99% Power Bandwidth
LTE 16QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW



99% Power Bandwidth
LTE 64QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW



99% Power Bandwidth Results Summary

Modulation	Tx1	Tx2
QPSK	8.9243 MHz	8.9467 MHz
16QAM	8.9343 MHz	8.9420 MHz
64QAM	8.9346 MHz	8.9405 MHz

The average 99% Power Bandwidth, i.e. the Necessary Bandwidth, for all tests is 8.94 MHz. Therefore, this is rounded up to 9.0 MHz, making the emission designator to be 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 was demonstrated using an EMI Test Receiver, in combination with the Total Integrated Laboratory Environment (TILE) EMI test software, by ETS-Lindgren. The occupied bandwidth emission mask compliance measurements demonstrate and confirm compliance of 10 MHz LTE carrier, at 740 MHz center frequency and set to 5 W (37 dBm), transmitting from Tx1 and from Tx2 for each of the 3 test modulations: QPSK, 16QQAM and 64QAM. For brevity, only the test results measured at Tx1 will be displayed in the following data plots.

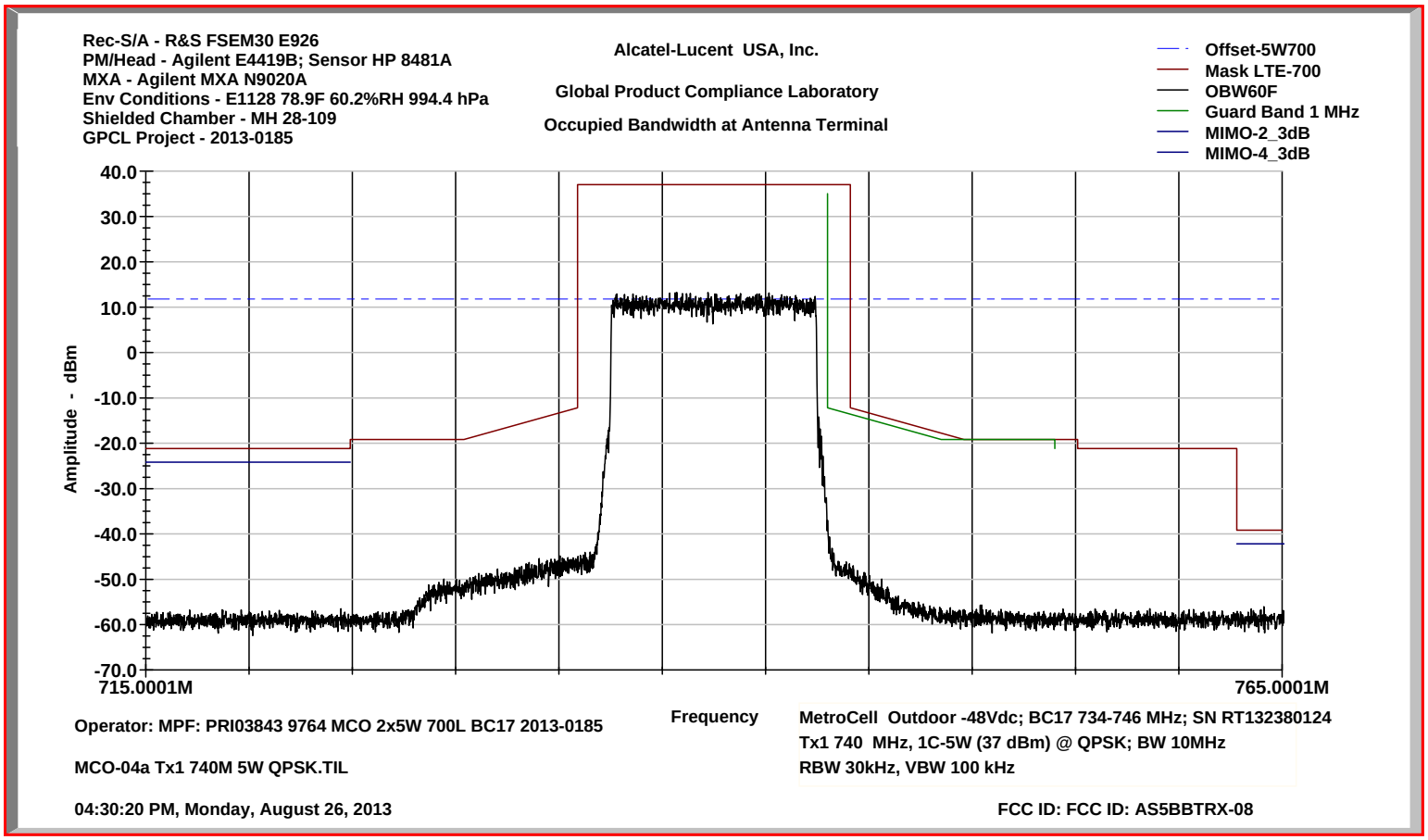
The data plots show compliance both with the BC-17 spectrum 734-746 MHz and with the 1 MHz guard band at each spectrum edge. Compliance is also demonstrated with the § 27.53 (c)(3) restricted AWS frequency bands:

> *(c) …. the power of any emission outside the 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, in accordance with the following*
>
> ***(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations (Note: These are restricted frequency bands)***

Outside of these two frequency bands, the attenuation below the carrier (dBc) is required to be 43 + 10 log (P) in a 100 kHz band segment. The LTE AWS emission mask 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 made the modulated 10 MHz carrier to be offset by –25.23 dB, in accordance with

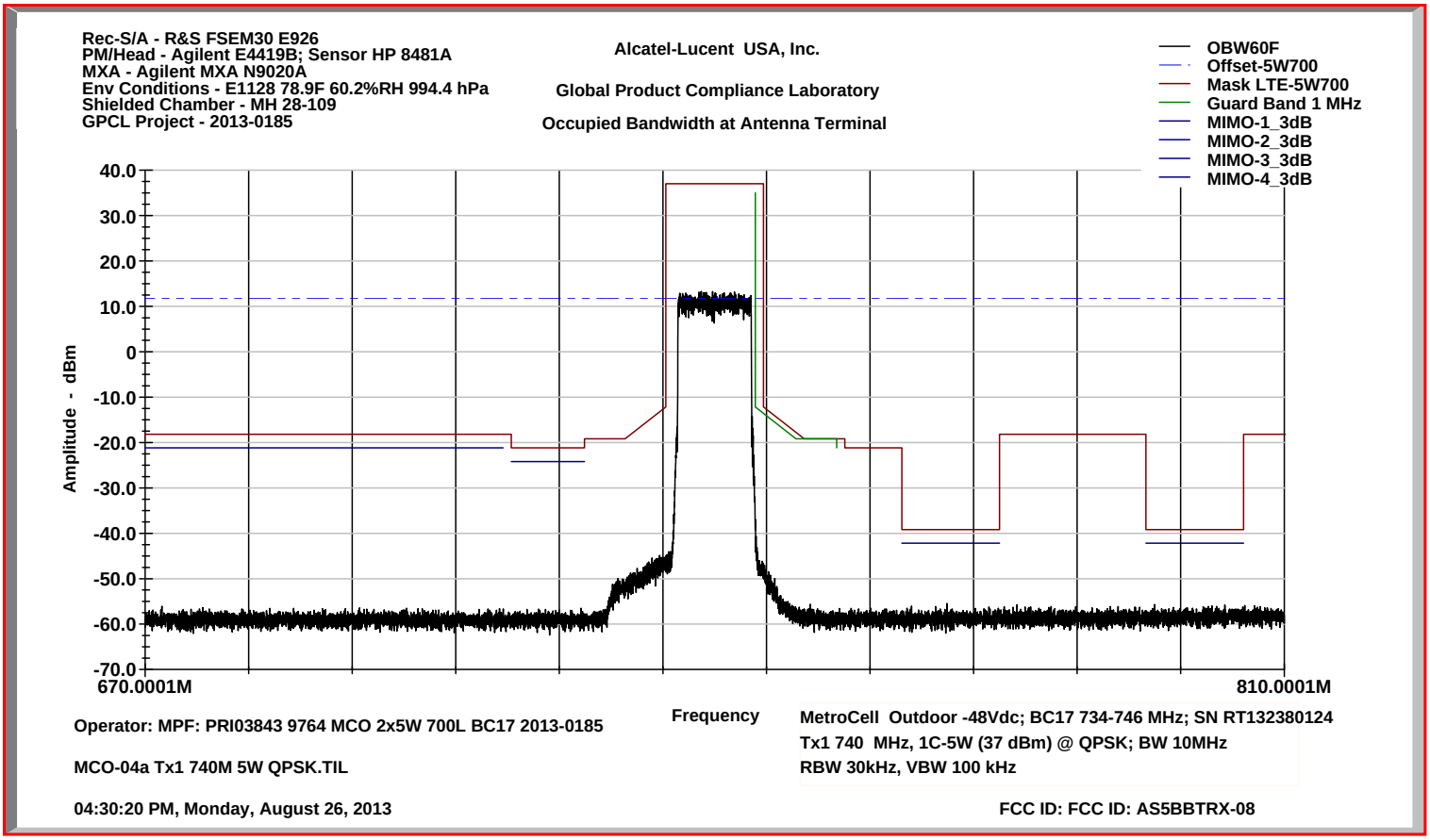
Carrier Offset = 10 log (30 kHz/10 MHz) = -25.23 dB

Occupied Bandwidth
LTE QPSK
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
Showing 1 MHz Guard Band
MCO-04a Tx1 740M 5W QPSK

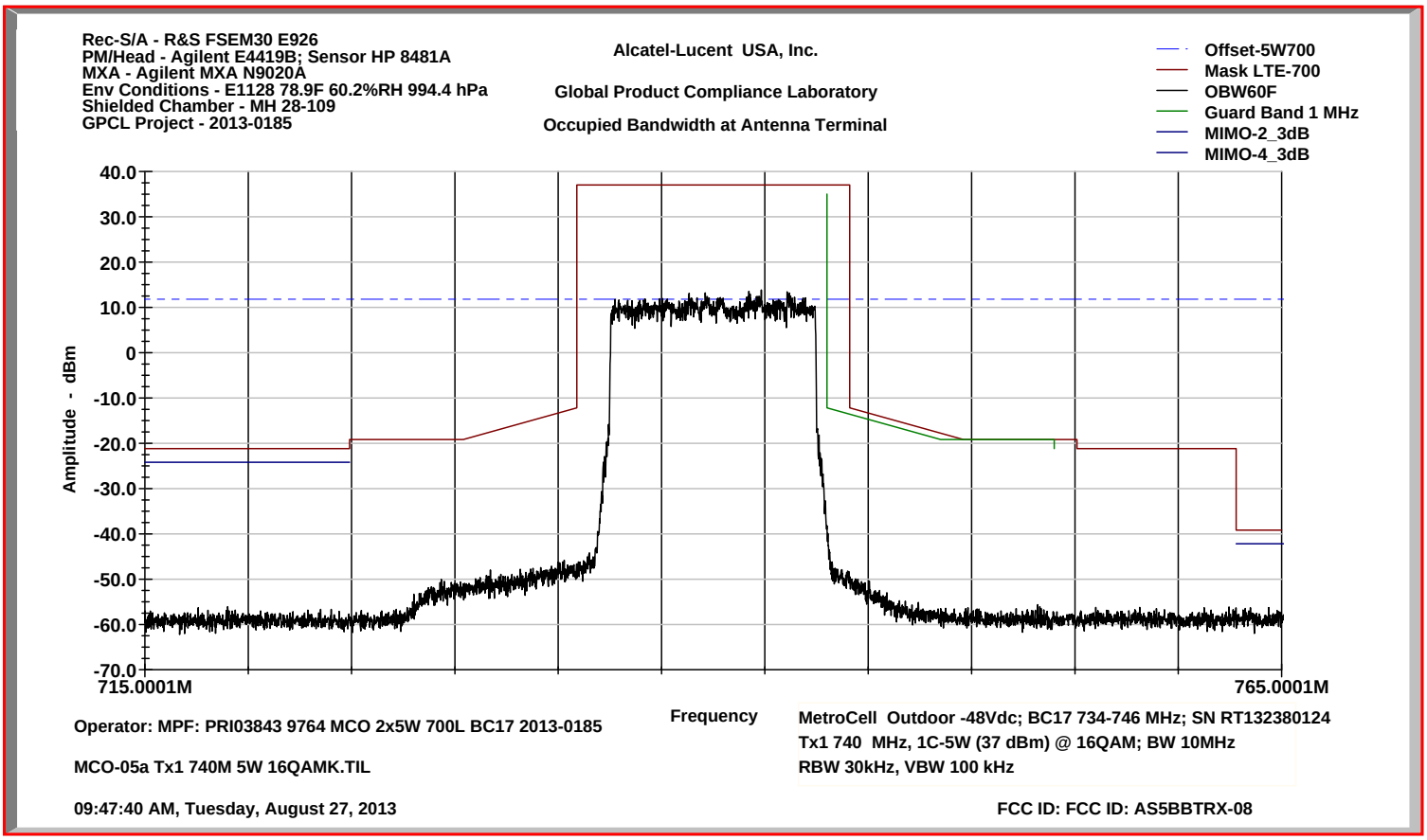


Restricted Spectrum Compliance 763-775 MHz and 793-805 MHz
LTE QPSK
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW

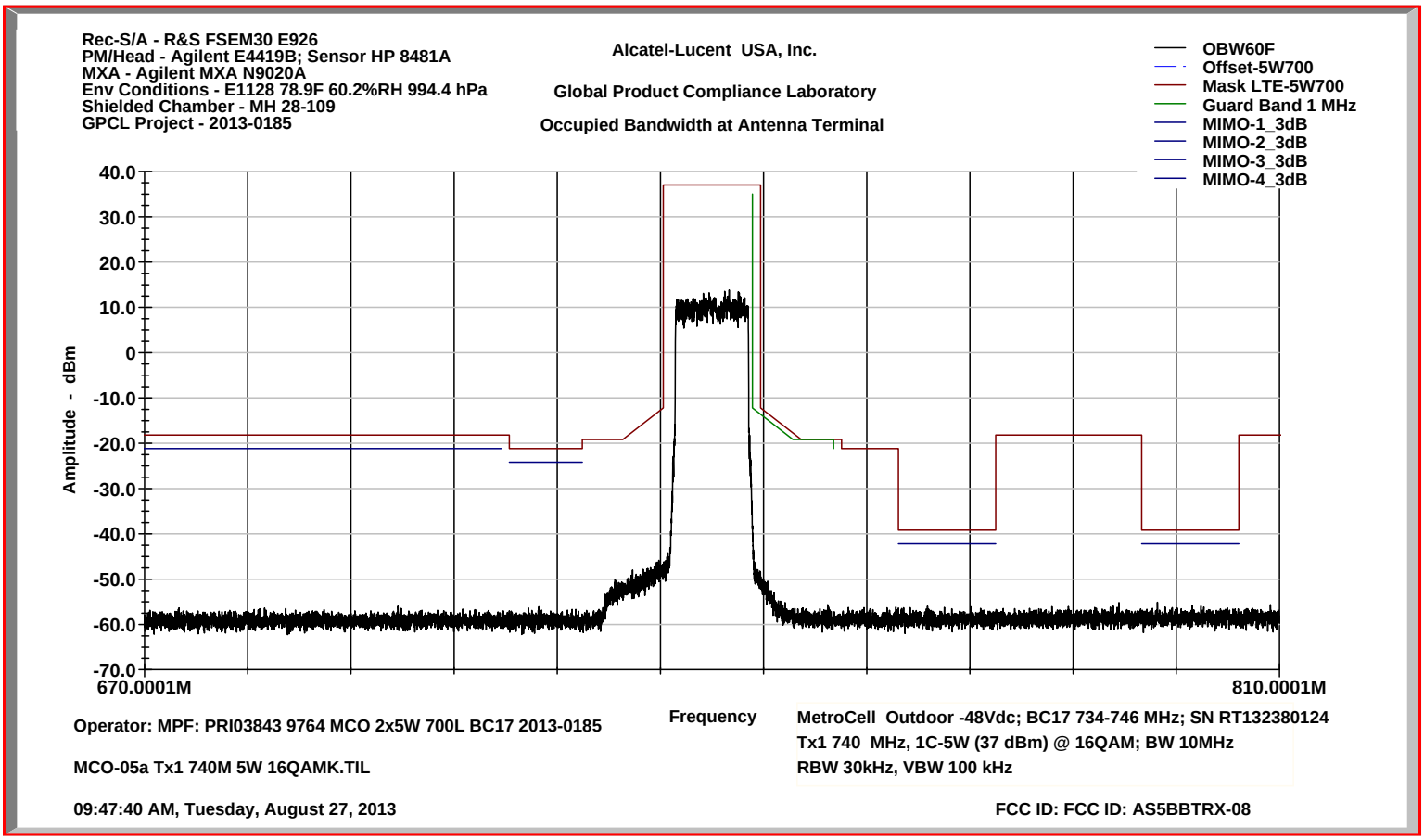
MCO-04a Tx1 740M 5W QPSK



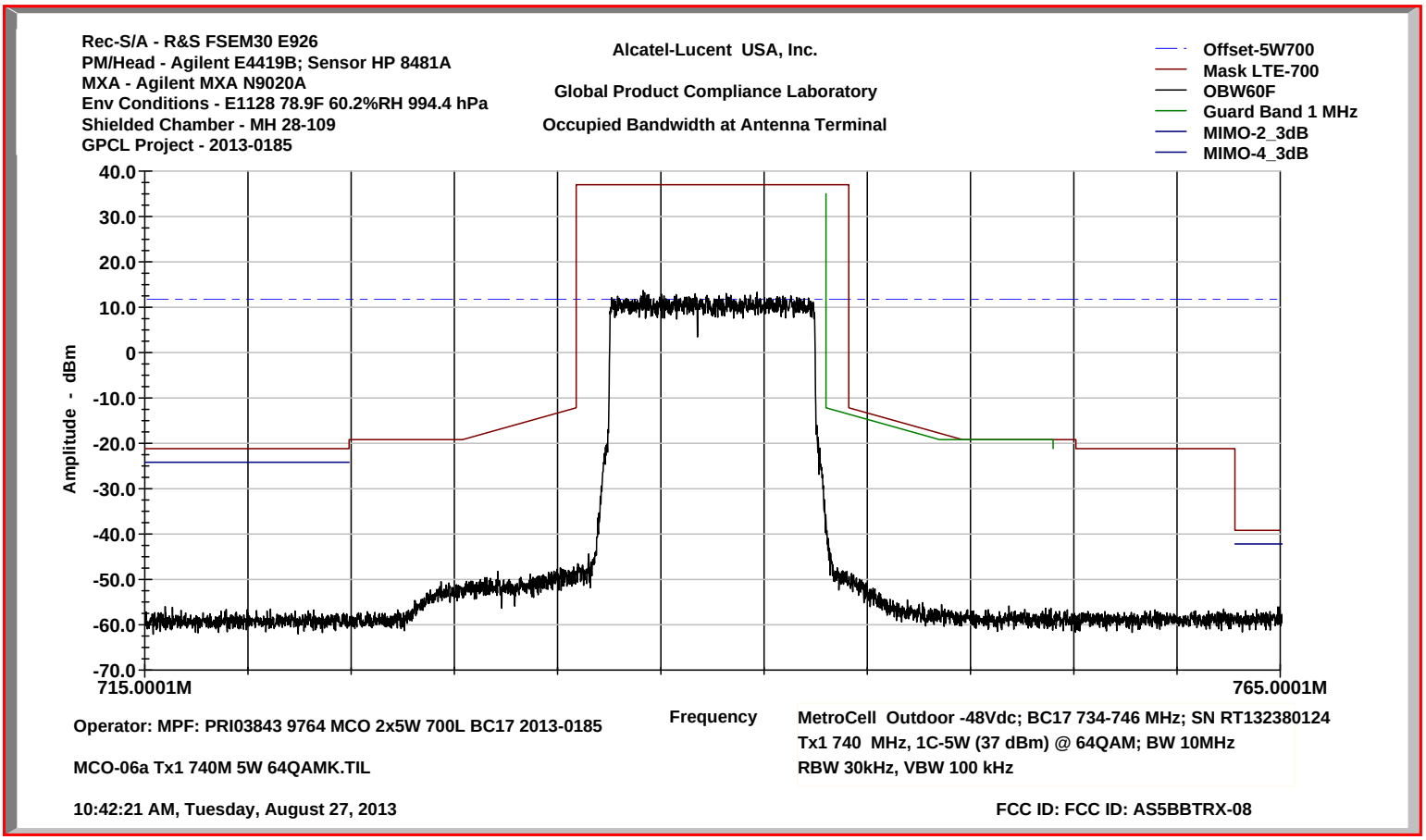
Occupied Bandwidth
LTE 16QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
Showing 1 MHz Guard Band
MCO-05a Tx1 740M 5W 16QAMK



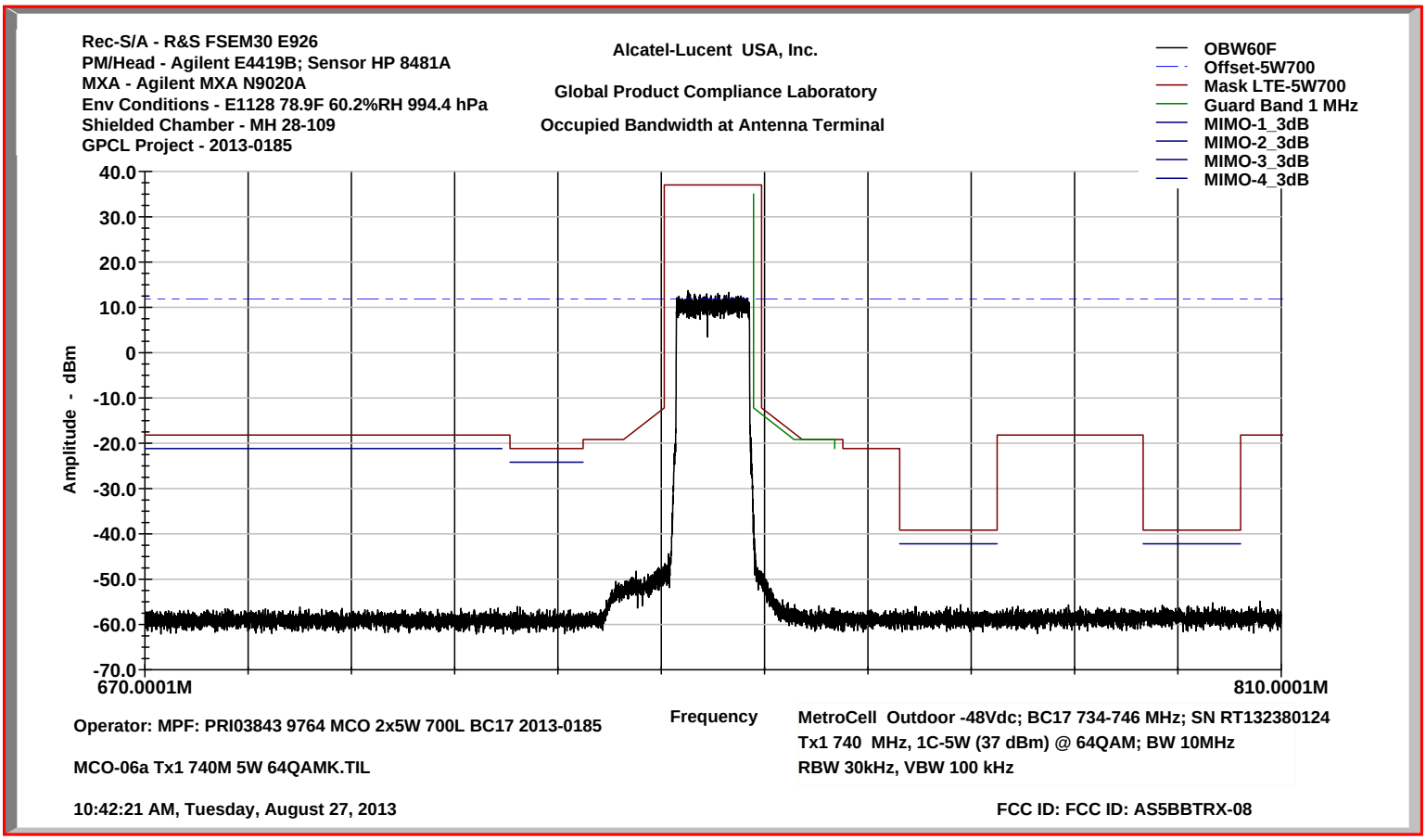
Restricted Spectrum Compliance 763-775 MHz and 793-805 MHz
LTE 16QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
MCO-05a Tx1 740M 5W 16QAMK



Occupied Bandwidth
LTE 64QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
Showing 1 MHz Guard Band
MCO-06a Tx1 740M 5W 64QAMK



Restricted Spectrum Compliance 763-775 MHz and 793-805 MHz
LTE 64QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
MCO-06a Tx1 740M 5W 64QAMK



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

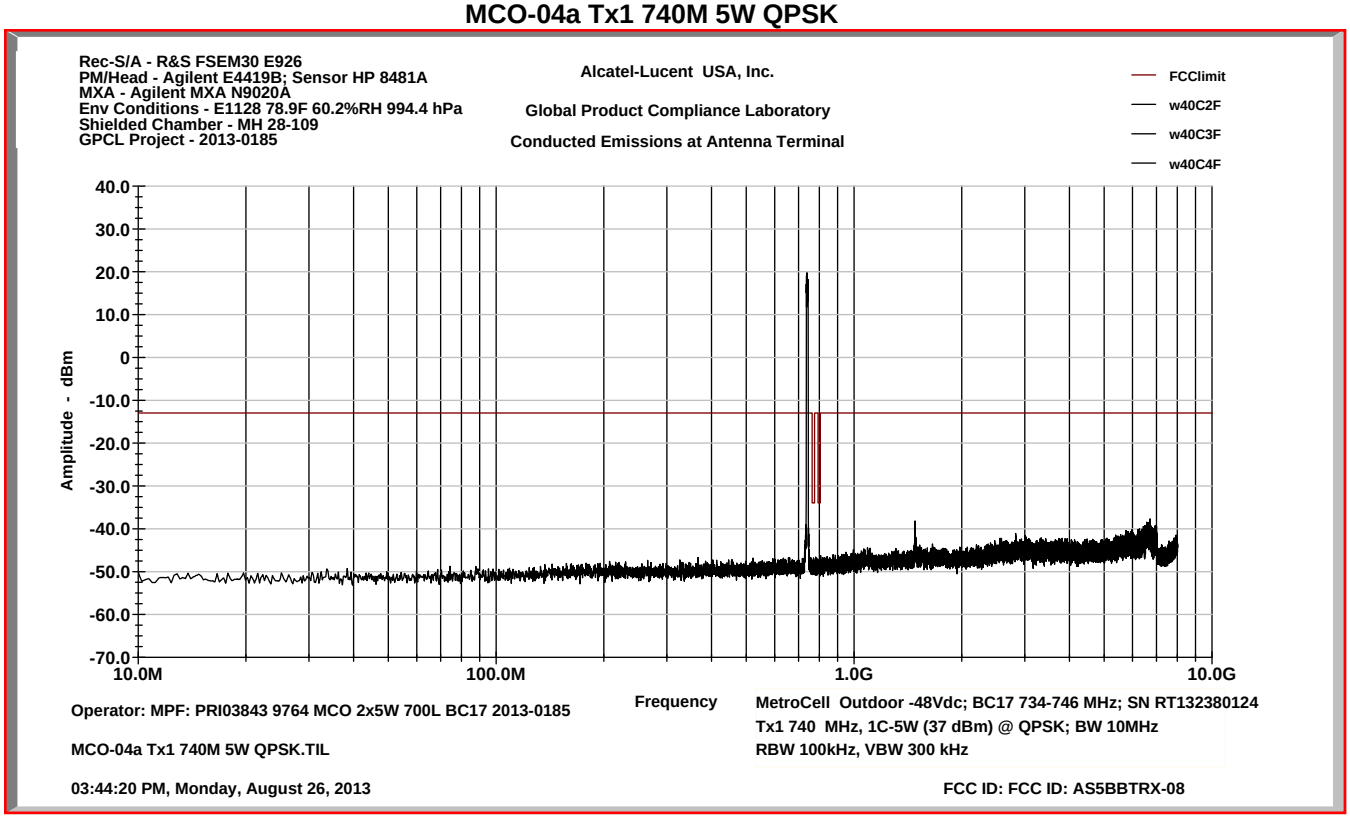
This test procedure is an extension of the occupied bandwidth measurement at the Equipment Antenna Connector (EAC) terminal, i.e., the downlink transmit antenna, using the same carrier frequencies, configurations, power level settings and test modulations, as in the preceding *PART 2.1049 MEASUREMENTS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

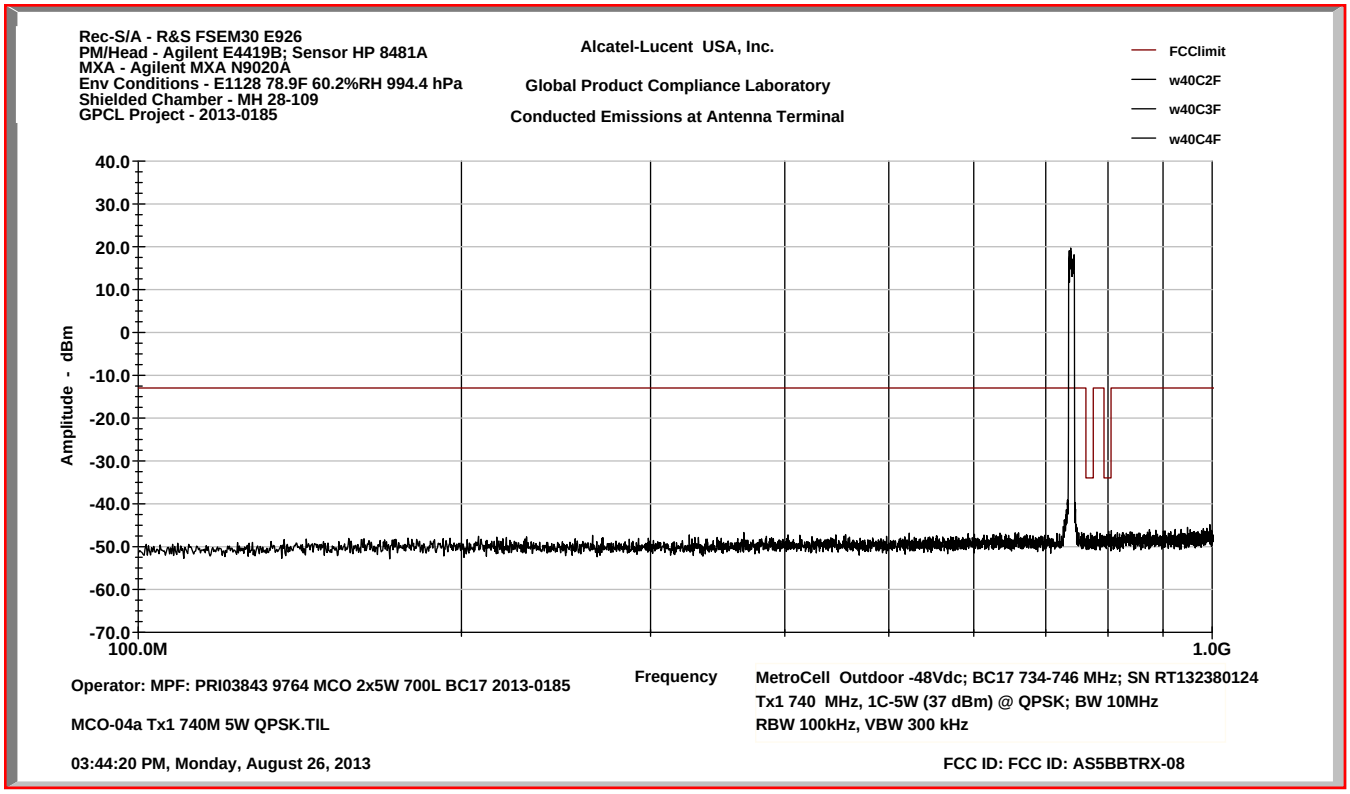
In accordance with Part 2.1057(a), the required frequency spectrum to be investigated extends from the lowest RF signal generated to the 10^{th} harmonic of the carrier at the EAC terminal. The emission limits at the antenna terminal are specified in Part 27.53 *On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations. Outside of these two frequency bands, the attenuation below the carrier (dBc) is required to be 43 + 10 log (P) in a 100 kHz band segment.* 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.

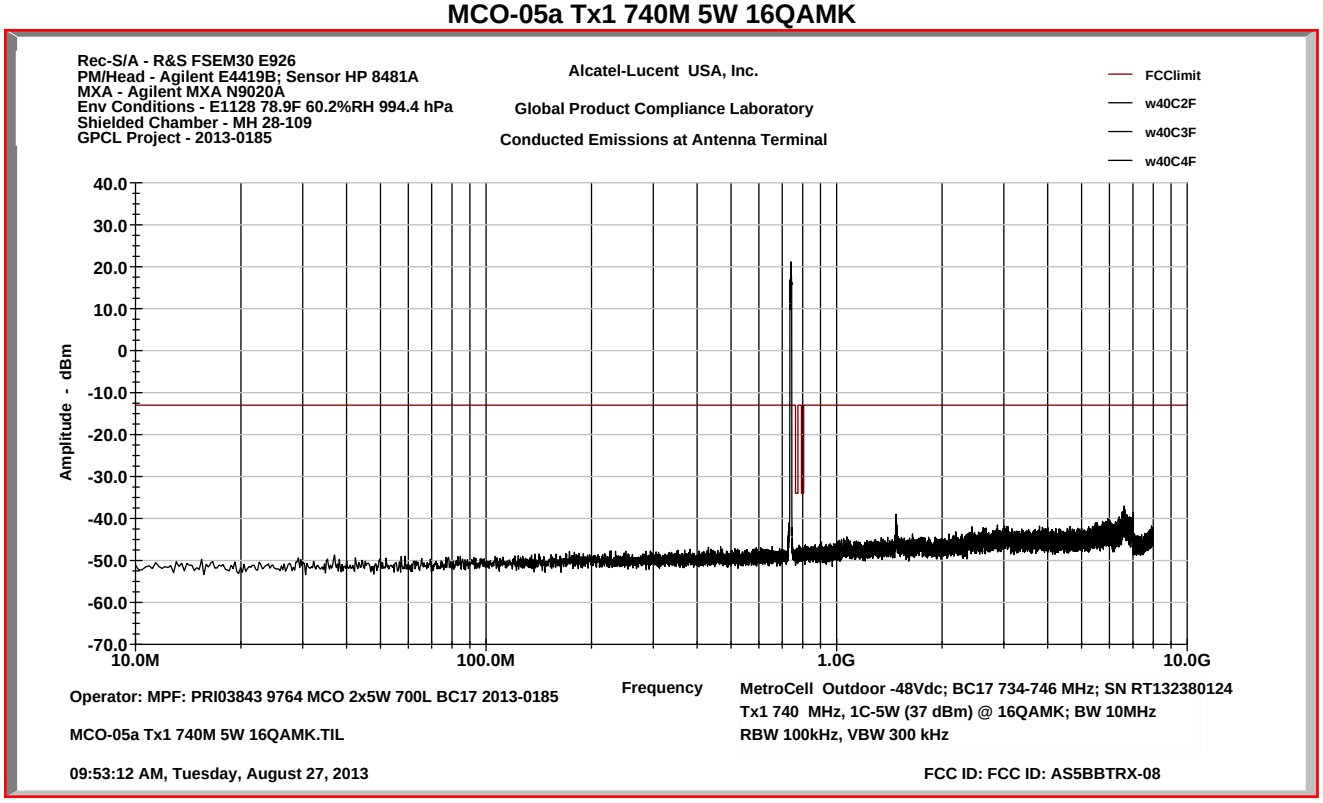
The conducted spurious emission measurements demonstrate and confirm compliance of the 10 MHz LTE carrier, at 740 MHz center frequency and set to 5 W (37 dBm), transmitting from Tx1 and from Tx2 for each of the 3 test modulations: QPSK, 16QQAM and 64QAM. For brevity, only the test results measured at Tx1 will be displayed in the following data plots.

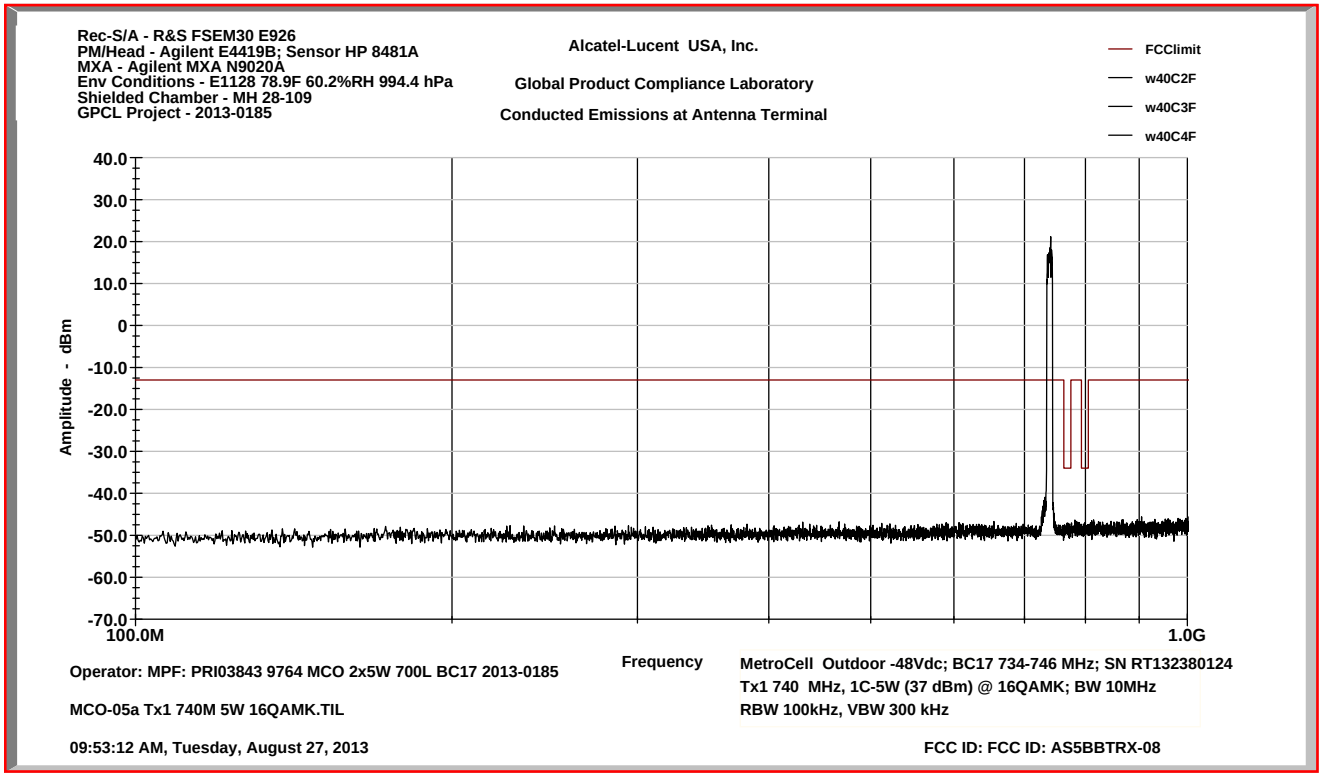
LTE QPSK
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
MCO-04a Tx1 740M 5W QPSK



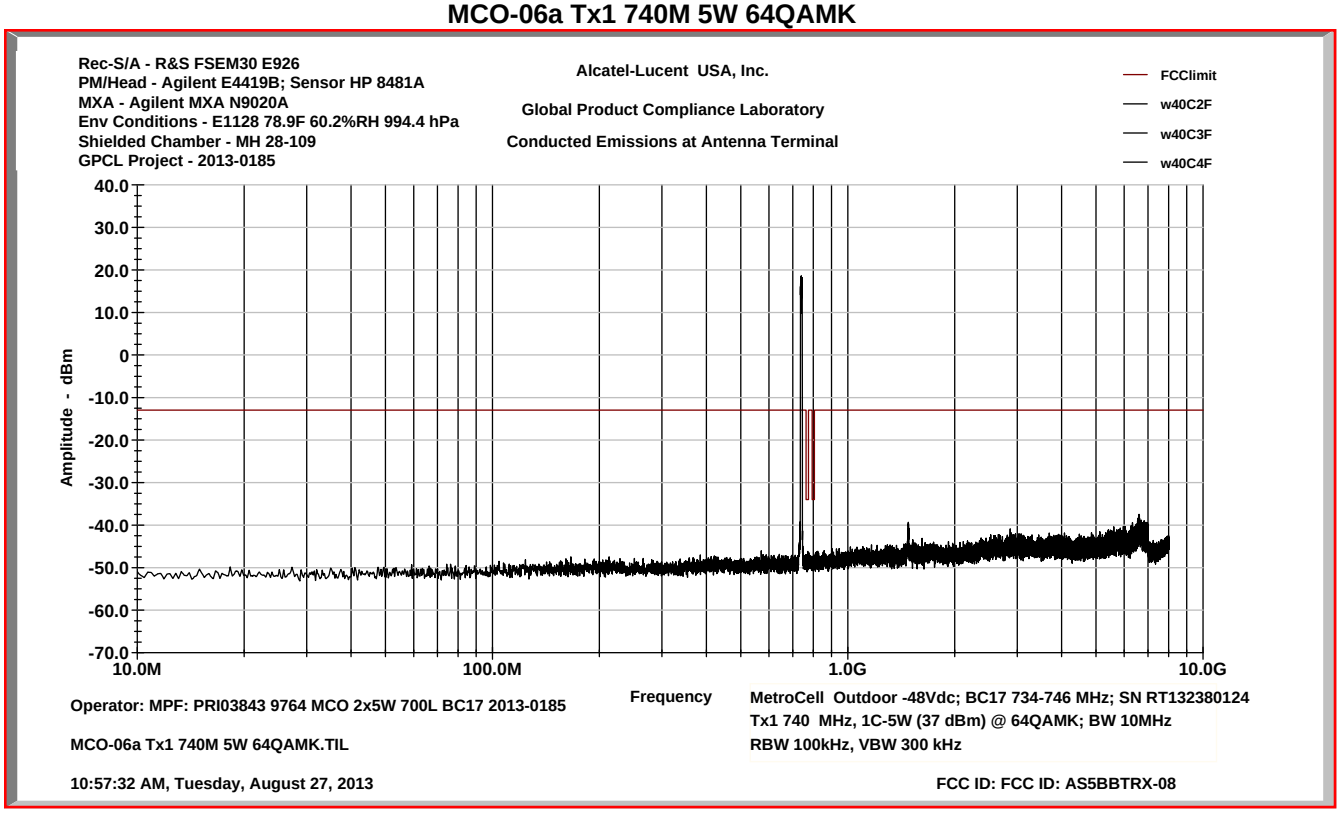


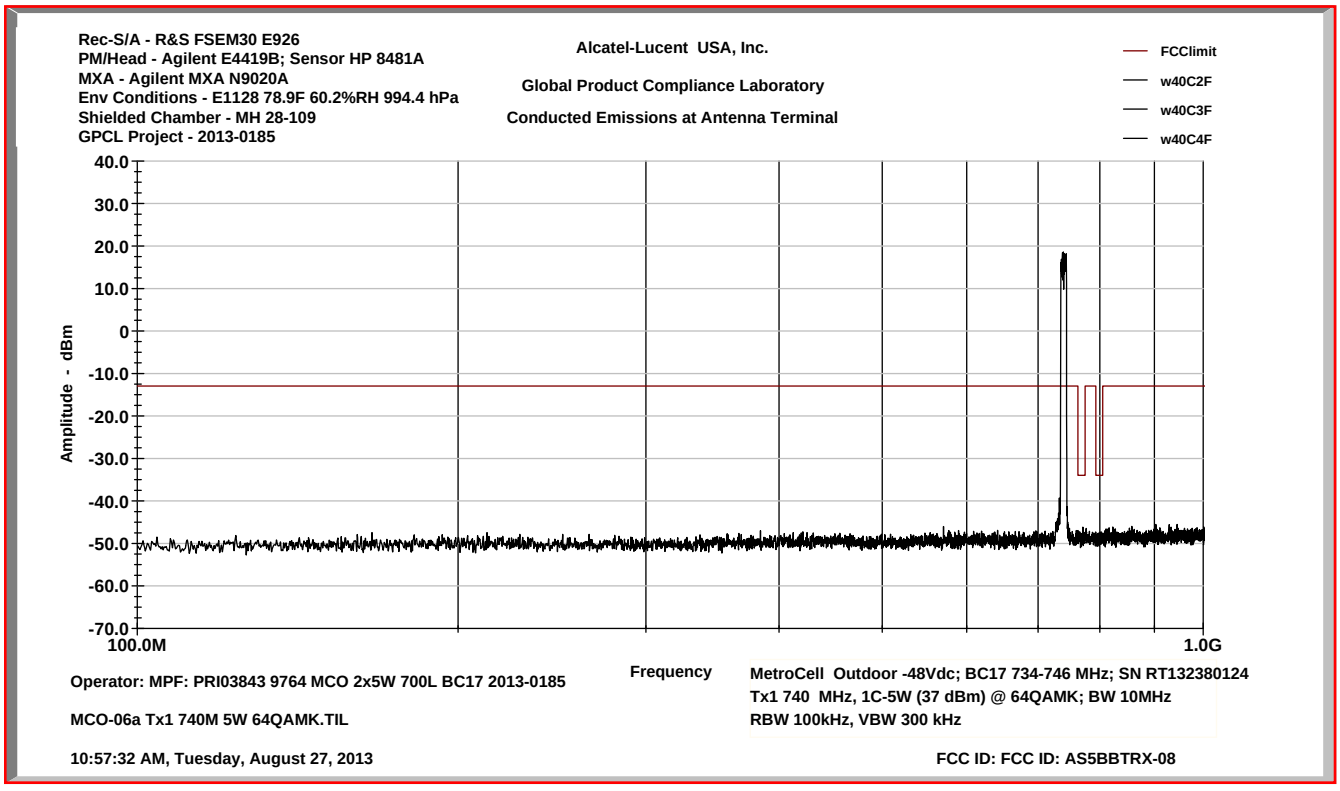
LTE 16QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
MCO-05a Tx1 740M 5W 16QAMK





LTE 64QAM
Tx1 740 MHz, 5W (37 dBm), 10 MHz BW
MCO-06a Tx1 740M 5W 64QAMK





PART 2.1053 MEASUREMENTS REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION

The **9764 MetroCell Outdoor 2x5W 4G/LTE** is designed for 2xMIMO operation with a long term average power at each of the 2 transmit terminals of 5 W (37 dBm), with a 10 MHz emission bandwidth (BW). Total composite power at the air interface is then 10 W (40 dBm). This product supports 3 LTE (Long Term Evolution) modulation schemes**:** QPSK, 16QAM and 64QAM. However, a single modulation, 64QAM, was sufficient for this radiated emissions testing. The spectrum of operation is AWS 700L in Band Class 17 (BC 17) 734 – 746 MHz. Therefore, radiated measurements were made to 8 GHz, which is the 10th harmonic of the fundamental.

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 896745), 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 = 5W

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 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