Exhibit 11 Listing of Required Measurements

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 lowest clock frequency in the **AWS Base Station System** is the 10 MHz rubidium reference oscillator. Conducted spurious measurements were performed over the range of 10 MHz to 21.75 GHz which is above the tenth harmonic of the transmit frequency range.

The following pages include the data required for the Product Certification authorization of the **AWS Base Station System / FCC ID: AS5ONEBTS-16**, measured in accordance with the procedures set out in Section 2.1041 of the Rules.

Each required measurement and its corresponding exhibit number are:

Exhibit 12	Section 2.1046	Measurement of Radio Frequency Power Output
Exhibit 13	Section 2.1047	Measurement of Modulation Characteristics
Exhibit 14	Section 2.1049	Measurement of Occupied Bandwidth
Exhibit 15	Section 2.1051	Measurement of Spurious Emissions at Antenna
Exhibit 16	Section 2.1053	Field Strength of Spurious Radiation
Exhibit 17	Section 2.1055	Measurement of Frequency Stability

Exhibit 12 Measurement Of Radio Frequency Power Output

SECTION 2.1046 Measurements required: RF power output.

The test arrangements used to measure the radio frequency power output of the **AWS Base Station System/ AS5ONEBTS-16** is on the following page. Measurements were made respectively at each frequency where Occupied Bandwidth measurements were performed. This Class II Change is for use of the **AWS Base Station System** with singular or multiple 60W IPAM amplifier modules supporting single or multiple 1M40F9W LTE carriers at 24 Watts per amplifier. Demonstration of compliance with the operation using the 24 Watts per carrier (when using one amplifier) was demonstrated for AWS Blocks C, as identified in this application. There is no retuning or change in hardware necessary for operation in any AWS Block. This testing requires that the J4 power level be calibrated for the specific channel of use. The test configuration, Figure 12a, allowed the measurement of output power for each channel investigated for Occupied Bandwidth. These included the upper and lower Block edges for each Block.

In this application the **AWS Base Station System** providing 1M40F9W LTE carriers has a maximum power output of 24 Watts per carrier (when using one amplifier) at the antenna terminals (43.8 dBm/carrier +2/-4 dB for each carriers). It also has a minimum power output at the antenna terminals of 0.024 Watts/carrier (13.8 dBm +2 / -4 dB), across the AWS C Block (2130 - 2135 MHz). The signal supplied by the **AWS Base Station System** is defined in **3GPP TS 36.211 V9.1.0 (2010-03) titled:** 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation (Release 9).

The power was set to the specified 24 W/carrier maximum at each measurement frequency to verify the spectral performance at that power level at each specific frequency of interest. Power was also verified for the QPSK, 16QAM and 64QAM modulation configurations. The Peak to Average Ratio, PAR was also measured to be less than 13 dB and is documented in Exhibit 13 Modulation. There was no measurable change in power settings or output power during modulation changes.

The attenuation range was also verified. The specific Frequencies and channels and set power level was documented on each "Occupied Bandwidth" sheet.

The applied signal, from an **AWS Base Station System/ AS5ONEBTS-16**, met the recommended characteristics per **3GPP TS 36.211 V9.1.0 (2010-03)** 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation (Release 9).

Exhibit 12 RF Power Test Configuration

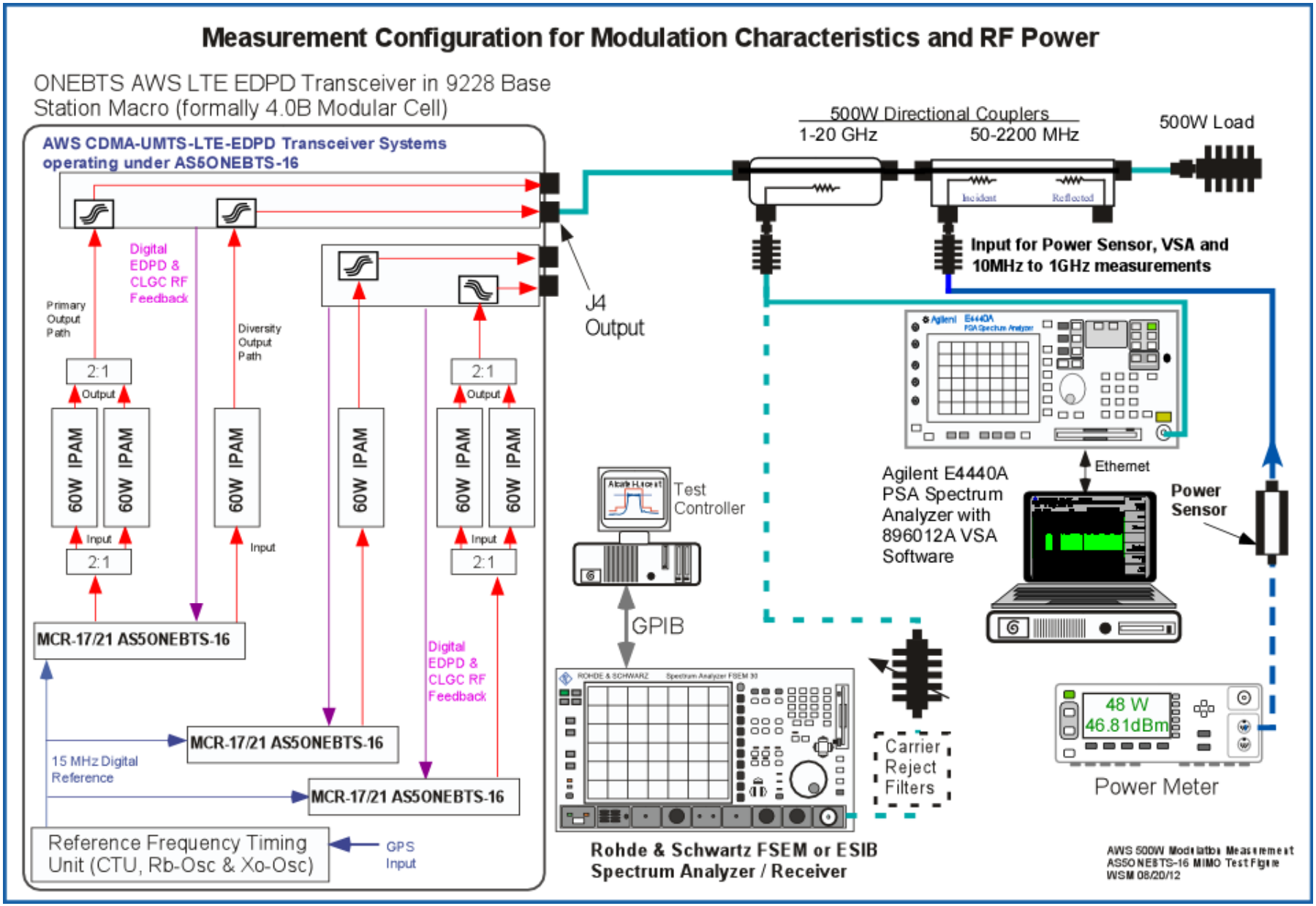


Exhibit 12 *continued* Table 12.1 Test Equipment

The following Equipment used for RF Power, Modulation, Occupied bandwidth and Conducted Spurious Measurements

Equipment	Description	Reference Number	Calibration Date
Power Meter:	Agilent N1912A P Series Power Meter	E949	02/01/2012,
Power Head	Agilent N1921A 0.05-18 GHz Wideband Power Sensor	E950	12/19/2011
EMC Receiver / SA	Rohde & Schwarz ESIB-40	E907 / 100101	02/24/2012
EMC Spectrum Analyzer	Rohde & Schwarz FSEM-30	E926 / 167438	05/21/2012
Code Domain Analyzer	Agilent E4440A PSA with 89600B` VSA Software.	E1055	05/09/2012
Computer Controller:	EG Technology, Intel Pentium PC w/WIN 2000 OS	POR-2	N/A
Low Pass Filter:	10 MHz-1.93 GHz, Custom manufactured	PCS LPF-10	02/03/12
High Pass Filters:	1.99-20 GHz, Custom manufactured |	PCS HPF-10	02/03/12
GPS Receiver	Symmetricom 58503B (former Agilent)	KR93200849	N/A

Multi Use Laboratory Equipment (MULE)

RF Test coupler	The equipment below is maintained and verified as a unit as:	Purple 500W-Mule-Lim	19 July 2012
Directional Coupler:	Narda 500W 1-20 GHz	ks/n 0430	
Directional Coupler:	Narda 500W 0.05-1 GHz	s/n 42790	
Attenuator, Variable	HP 8494B DC-18 GHz digital attenuator	MY42140028	
Attenuator, Variable	HP 8495B DC-18 GHz digital attenuator	MY42140034	
Attenuator, Fixed	Narda 500W 1-18 GHz,	s/n 0823	
Attenuator, Fixed	Weinschel 46-10-34 LIM and 46-20-34LIM	BH9326	
Attenuator, Fixed	Weinschel 46-20-34 LIM and 46-20-34LIM	BH3132	
Attenuator, Fixed	Weinschel 46-10-34	BH3118	
Test Cables:	Low loss test cables custom mfg.		

The following equipment was used for Radiated Spurious Measurements

Description	Manufacturer-Model	Serial #	Last Cal Date
Spectrum Analyzer 9kHz-22GHz	Hewlett Packard 8593E	82-2001835	3/20/2012
Amplifier 9kHz-1GHz	Sonoma Instrument Co. 310N	E812	8/18/2012
6 dB Attenuator DC-18GHz 2 Watt	Weinschel 2-6	E891	1/23/2012
EMI Test Receiver (20Hz to 40GHz)	Rohde & Schwarz ESIB40	E908	3/28/2012
Preamplifier 1-26.5GHz 30dB	Agilent 8449B	E377	7/23/2012
High Pass Filter 2850-18050MHz	Trilithic Inc. 5HC2850/18050-1.8-KK	E988 / PCS-HPF-11	Verified 03/20/2012
Bilogical Antenna 25-2000MHz	A.H. Systems, SAS-521-2	E758	12/27/2011
Double Ridged Horn 1-18GHz	EMCO 3117	E1024	10/20/12 Due
Double Ridged Horn 18-40GHz	EMC Test Systems 3116	E520	9/27/2011
Active Rod & Field Antenna 30Hz-50MHz	EMC Test Systems 3301B	E067	4/16/2012

Exhibit 12 *continued* Measurements required: RF power output.

AWS - Block	AWS Channel #	Number of carriers	Sub-Carrier Modulation	# of amplifiers in MCA	Power per Carrier, W/c	Total Power Watts	Results RF Power
C	414	1	QPSK	1	24	24	Compliant
C	414	1	16QAM	1	24	24	Compliant
C	414	1	64QAM	1	24	24	Compliant
C	486	1	QPSK	1	24	24	Compliant

RESULTS:

The **AWS Base Station System/ AS5ONEBTS-16** was configured in the test setup shown in Figure 12A. For the channel configuration identified above the **AWS Base Station System/ AS5ONEBTS-16** delivered a minimum of 24.0 Watts/carrier 43.8 dBm +2/-0 dB when measured at the J4 output connection. This data is recorded on the Occupied Bandwidth Data Sheets for "Left edge" and "Right Edge" of each frequency Block.

Note: The **AWS Base Station System/ AS5ONEBTS-16** is a multi channel linear amplifier and its maximum power level is verified at each cell site during setup of the Alcatel-Lucent 9228 Macro (Formally Modular Cell 4.0B)

Exhibit 13 Measurement Of Modulation And Signal Characteristics

SECTION 2.1047 Measurement Of Modulation Characteristics

The modulation characteristics and accuracy of the **AWS Base Station System/ AS5ONEBTS-16** output signal is a function of the input signal which is provided by the AWS Multi Carrier Radio (**MCR-1721**) which was authorized by the Federal Communications Commission under **FCC ID: AS5ONEBTS-16** and granted 14 September 2007 for all AWS Blocks.

13.1 - Modulation Description

The LTE spectrum while appearing similar to CDMA differs greatly in complexity . The modulation used in evaluating the **AWS Transceiver's** Multi Carrier Radio **MCR-1721 / AS5ONEBTS-16** are described in the pertinent standards documents which include **3GPP TS 36.211 V9.1.0 (2010-03) titled:** 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation (Release 9). The modulation is Orthogonal Frequency Division Multiple Access (OFDMA) which is processed into an uplink IF signal. The input data stream is divided into several parallel sub-streams of reduced data rate and each sub-stream is transmitted on a separate orthogonal sub-carrier. The sub-carriers are modulated using either QPSK, 16QAM or 64QAM. There is no single measure of the modulation quality other than to verify that the subcarrier modulation constellations visual orientation match the symbol and amplitude criteria is consistent with QPSK, 16QAM and 64QAM.

13.2 Results

The **AWS Base Station System** was configured in the test setup shown in Figure 13A. The antenna connection J4 output was evaluated with an Agilent Transmitter Analyzer consisting of an Agilent E4440A PSA Spectrum Analyzer with 896012A VSA Software. Measurements were performed at the AWS Channels shown in table 13.2.

13.2.1 Results Summary

For each of the AWS channels tested, the **AWS Base Station System's** modulated sub-carriers constellations were consistent for the modulation type. All of the modulation plots include the CCDF plot which indicates the Peak to Average Ratio (PAR) of the transmitted signal. For all measurements the PAR was between 8 and 11 dB which is compliant with the CFR which specifies that the PAR be less than 13 dB. The **AWS Base Station System's** transmit signal modulation parameters and constellation for AWS channel 414 are shown in Figures 13B and 13C below for QPSK and 16QAM followed by the AWS channel 486 in figure 13D for 64QAM.

Exhibit 13 ***continued***

AWS - Block	AWS - Channels	Sub-Carrier Modulation	Results Modulation
C	414	QPSK	Compliant
C	414	16QAM	Compliant
C	414	64QAM	Compliant
C	486	QPSK	Compliant

TABLE 13.2 Channels and Modulation Characteristics Measurement

Figure 13A; Test Setup for Antenna Port Measurement of Modulation Characteristics and Code Domain

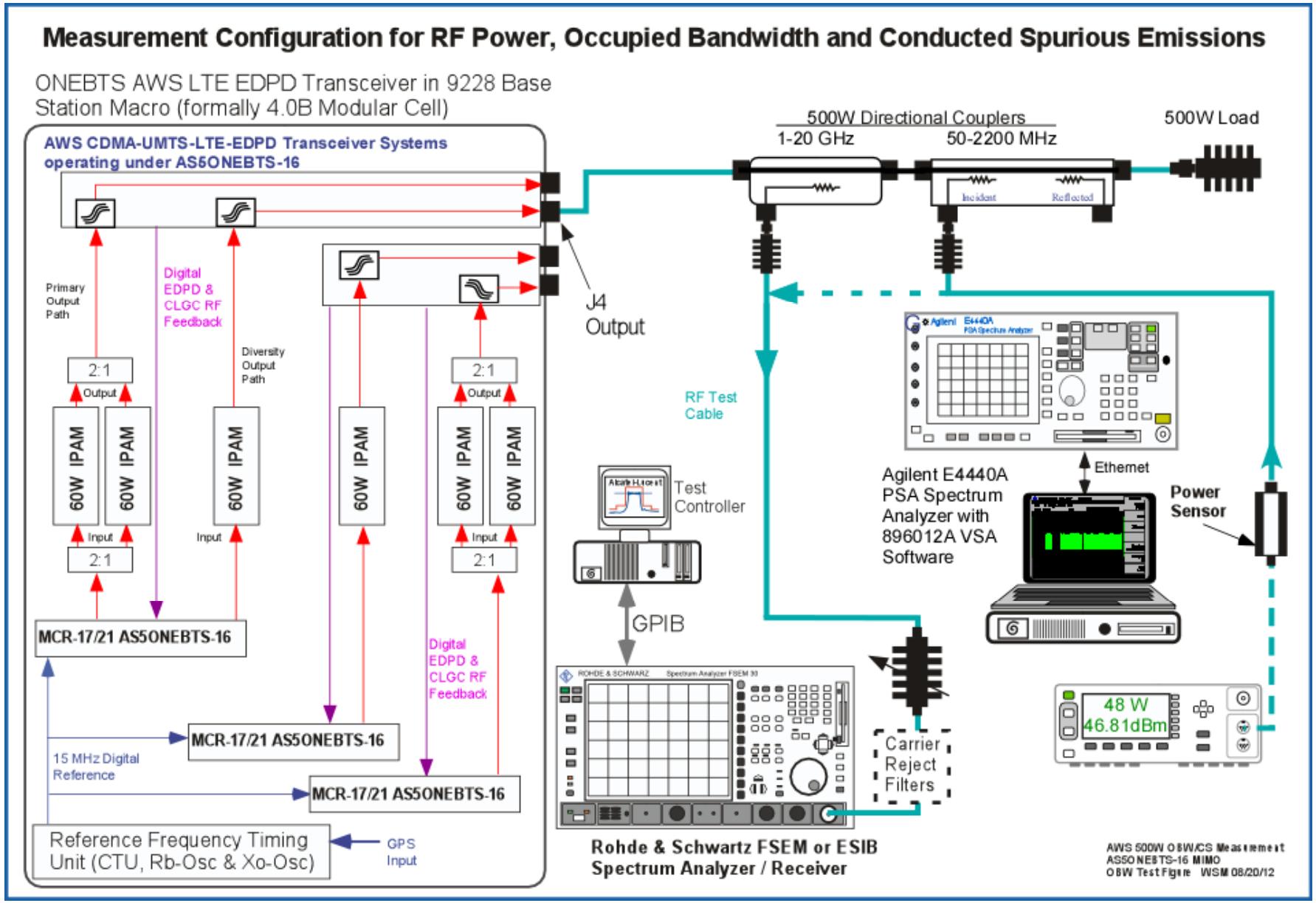


Figure 13B QPSK Modulation, Channel 414 Tx Output 2 Amplifier

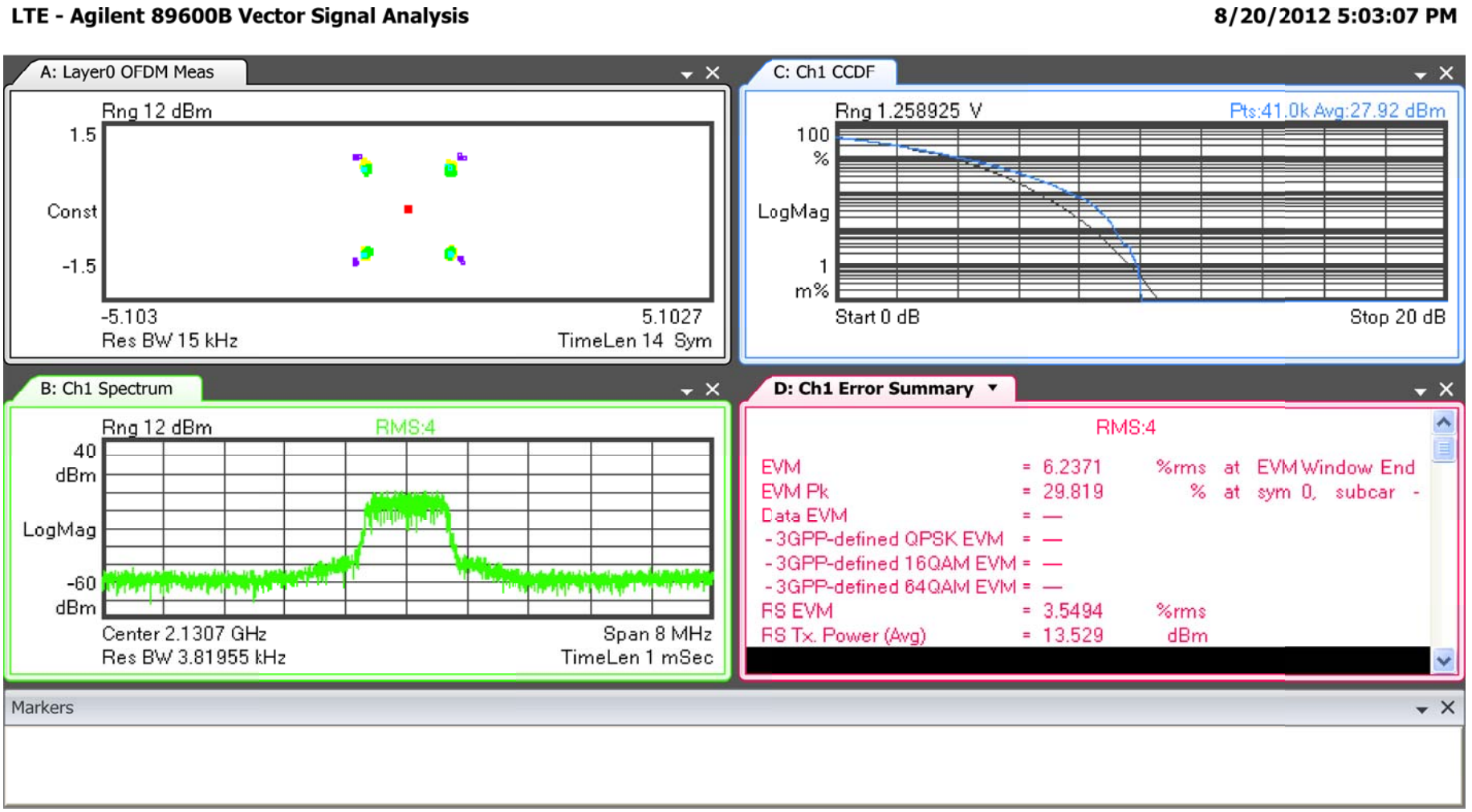


Figure 13C 16QAM Modulation, Channel 414 Tx Output 2 Amplifier

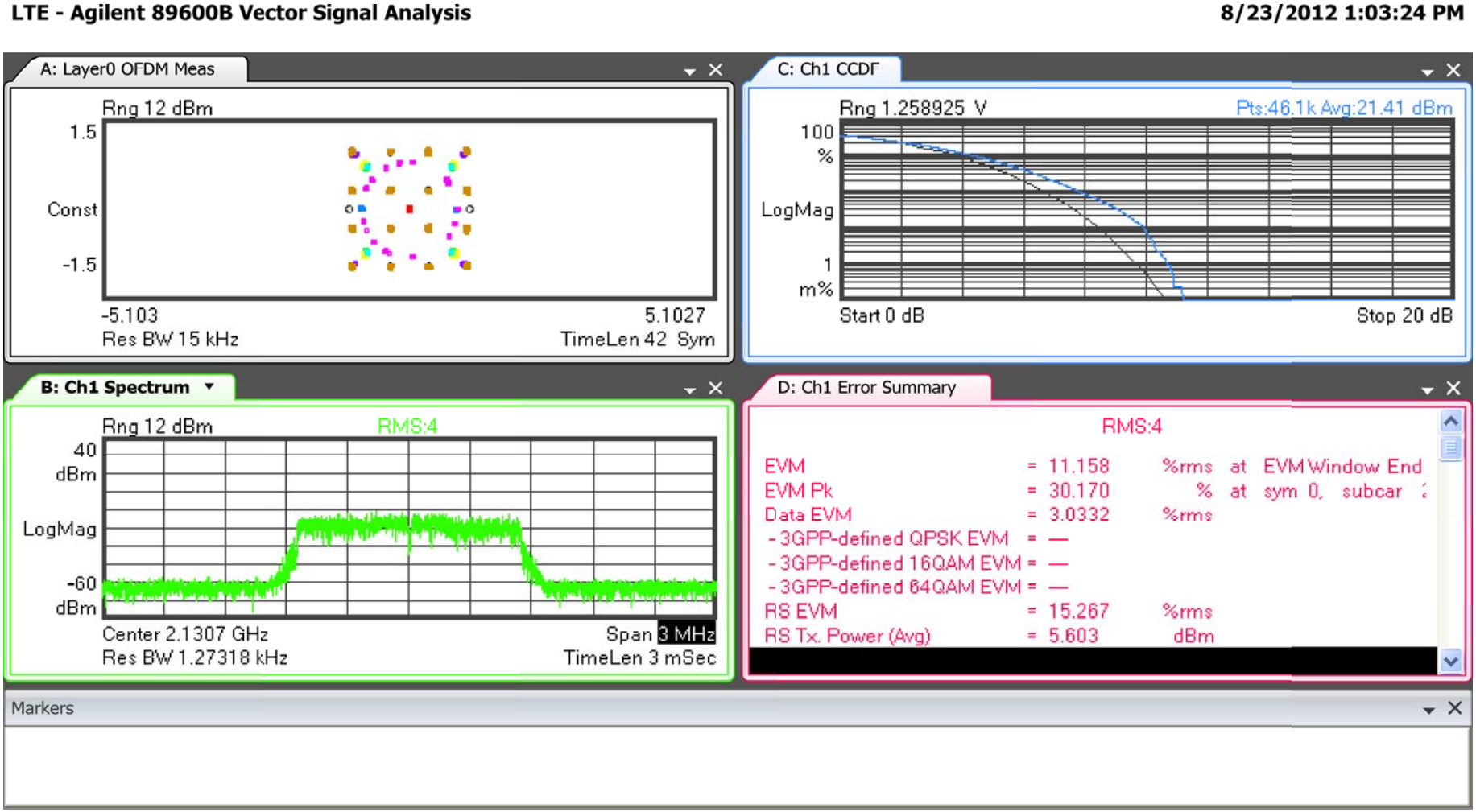


Figure 13D 64QAM Modulation, Channel 486 Tx Output 2 Amplifier

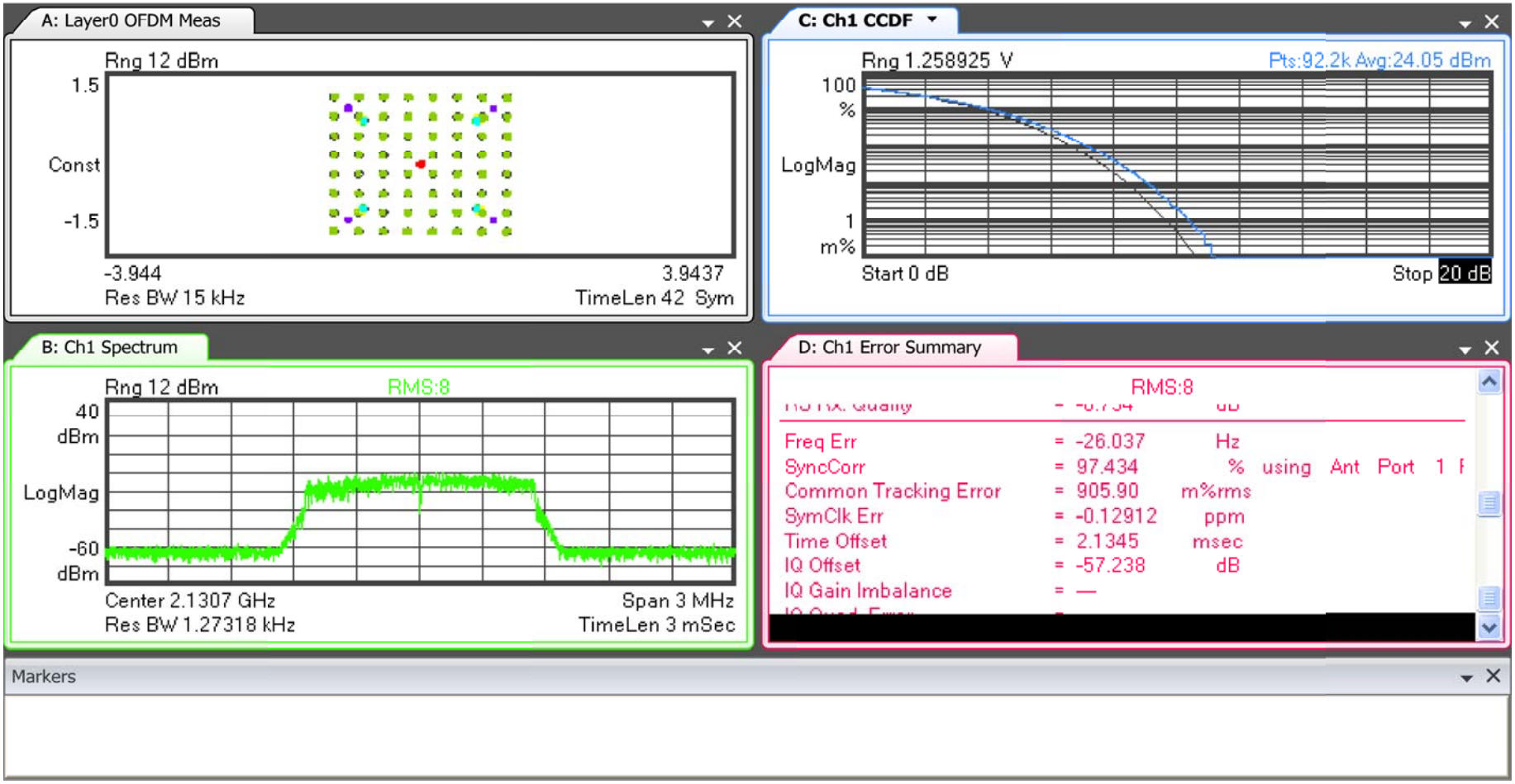


Exhibit 14 Measurement Of Occupied Bandwidth

SECTION 2.1049 Measurement of Occupied Bandwidth

Occupied bandwidth measurements of the **AWS Base Station System** were performed while configured in all three of the defined subcarrier modulations defined in Exhibit 13. These measurements were performed with the **AWS Base Station System** operating in all AWS Blocks. This documents the typical performance of the **AWS Base Station System** while operating with the 1M40F9W LTE emissions designator at 24W per carrier. All power adjustments were performed via the **MCR-1721 / AS5ONEBTS-16** and as described below.

The occupied bandwidth of the **AWS Base Station System/ FCC ID: AS5ONEBTS-16** was measured using a Rohde & Schwarz FSEM-30 Spectrum Analyzer, a PC based instrumentation controller using TILE™ software and a calibrated RF attenuation and coupled signal path. The RF power level was measured and adjusted via the test setup in Figure 14A. The set RF output from the transmitter was reduced by calibrated broadband RF Couplers and attenuators to amplitudes usable by the spectrum analyzer and power meter. The attenuation factors are reflected in the displayed values of the charts which are documented in absolute dBm. The typical occupied bandwidth measurement, Figure 14B, displays the signal adjusted to the -16.69 dBc level corresponding to the corrected RF power level for a 30 kHz resolution bandwidth (RBW) measurement of a 1.4 MHz signal (-16.69dB=10LOG(30kHz/1.4MHz). This set-point was performed as follows:

For each test the power calibration was individually verified at the transmitter antenna connection (J4) with a power meter by using the test setup depicted in Figure 14A. The power calibration was performed to calibrate the setting to the power meter measurement as a reference for both the measured 30 kHz Occupied Bandwidth signal at the -16.69 dBc (27.3 dBm) line and a 3 MHz RBW measurement against the "Top of Mask" limit as depicted in Figure 14B. The "Top of Mask" limit corresponds to a single carrier signal at the specified power level of 24 W/c as measured with an RBW of 3 MHz. Since the transmitter J4 output has a bandwidth of 1.4 MHz and the maximum analyzer resolution bandwidth is 3 MHz the power calibration reference line is the top of mask. The Top of Mask is +43.8 dBm and the power calibration line is thus 43.8 dBm. For power verification, the measurement made with an RBW setting of 3 MHz should align the spectrum analyzer measurement with the measurement performed using a power meter. The power meter has greater power accuracy and is thus used as the standard. The power level verifications using a power meter were first performed as part of each Occupied Bandwidth measurement. The signals, measured by the analyzer at RBW's of 3 MHz and 30 kHz, were corrected for path loss and were plotted against the mask limit. As part of the correlation between the power meter measurement and the test analyzer, software was used to place the 3 MHz RBW signal at the carrier power calibration line for the LTE 1.4 MHz bandwidth signals. The carrier as measured with 3 MHz and 30 kHz RBW were corrected with the same attenuation factors and the two measurements were co-plotted on the same graph. A typical single carrier example is shown in Figure 14B which depicts a single carrier (650 E Block) inside the mask appropriate for a single 3 MHz carrier in E Block.

The test procedure described above, references the carrier power and accurately places the 30 kHz RBW measured carrier at the –16.69 dBc reference line. All of the plots are presented with a sufficiently wide frequency span for the specific signals or Block of interest and again for the entire AWS Band. This allows for ease of comparison of the broadband carriers performance. This data was recorded for all AWS blocks using the TILE™ software and placed in the Occupied Bandwidth Data Sheets.

Block Organization and Tests Performed

The **AWS Base Station System** product line allows the use of transmit filters with bandwidths of 20 MHz to as wide as 45 MHz. The use of Enhanced Digital Pre Distortion provides the spurious control which allows the use of wide bandwidth AWS Band filters. These wideband filters provide for the least spurious reduction at "edge of block" and "edge of band" and thus represent the most difficult compliance configuration. The filters do not provide for any spurious reduction at the internal block edges inside the band. The testing of the product documented herein was performed with 45 MHz AWS band filters. These test configurations are the most difficult for compliance demonstration.

The demonstration of compliance for the **LTE AWS Base Station System** transmit configurations were performed for operation in AWS Block C. The presented data for this Class II change demonstrates the **LTE AWS Base Station System** products conformance.

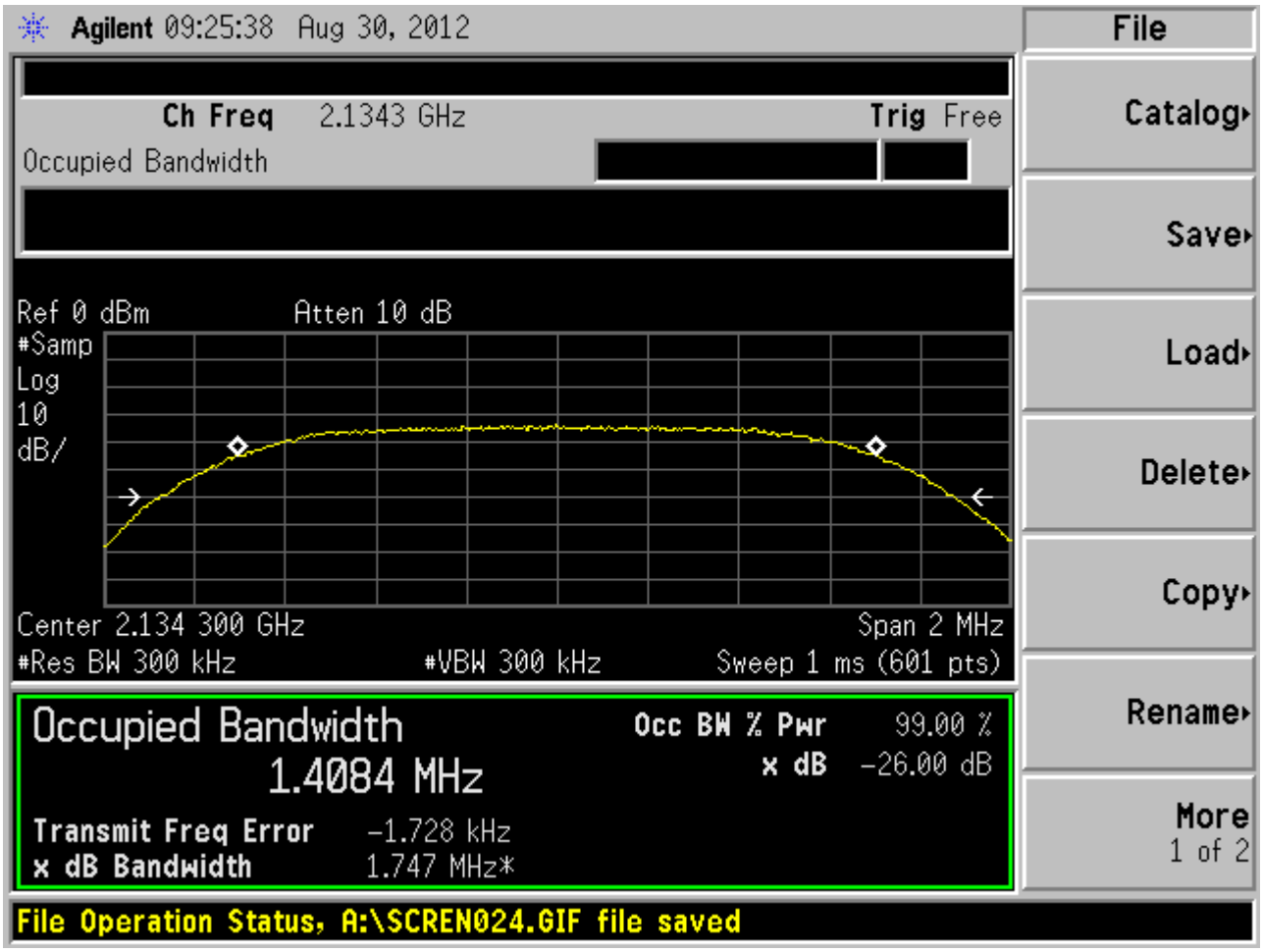
Exhibit 14 *continued*

Applied Signal Characteristics
In order to adequately evaluate performance the occupied bandwidth was measured with each of the sub-carrier modulation factors and co-plotted. The applied signal from an **AWS Base Station System/ FCC ID: AS5ONEBTS-16**, met the recommended characteristics as defined in **3GPP TS 36.211 V9.1.0 (2010-03) titled:** 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation (Release 9).

The power was set to the specified 24 W/carrier maximum at each measurement frequency to verify the spectral performance at that power level at each specific frequency of interest. Power was also verified for the QPSK, 16QAM and 64QAM modulation configurations. The 99%/-26dB signal bandwidth was measured using the setup of Figure 14A for channels 486. The attenuation range was also verified. The specific Frequencies and channels and set power level was documented on each "Occupied Bandwidth" sheet.

The FCC limits contained in **47CFR 27.53 1-Oct-2010** were followed.

99% -26 dB Signal Bandwidth Channel 486



Measurement Offset

The spectrum analysis output plots shows the peak of the 1.4 MHz LTE channel signal -16.69 dB below the Mask reference / "zero dBc line" of the spectrum analyzer for the following reason: For the OFDM system there is no carrier without modulation. Since the LTE signal is broadband and 1.4 MHz wide, all measurements performed at narrower resolution bandwidths need be adjusted for the reduction in signal energy. The following relationship was used to provide the correct level for an unmodulated carrier vs. the modulated signal.

10*log (Resolution Bandwidth/ Transmit Bandwidth) = Signal Offset (1)

For the peak of the 1.4 MHz LTE signal measured with a RBW of 30 kHz the signal offset is:

Signal Offset = 10*log (30 kHz /1.4 MHz) = -16.69 dB

Limits which are specified as appropriate at a given RBW can be measured and evaluated at other RBW's if the limit is adjusted per equation (1). To account for a worst case summation of multiple transmit signals, per KDB 662911 D01 Multiple Transmitter Output v01r0, the level needs be adjusted by 10LOG(N) where N= number of outputs. The adjustment is

Additional offset dB = 10* log(N) (2)

Limits adjusted per equation (1) need to account for multiple identical transmit outputs per equation (2).

Required Levels

Unlike CDMA there is no requirement in 3GPP TS 36.211 V9.1.0(2010-03) for Suppression inside the Licensee's Frequency Block(s). Masks are therefore defined only by 47 CFR 27.53(h)(1)(2)(3)

The Limit in 47 CFR 27.53 (h)(1)(2)(3) for emissions in the 1 MHz band immediately outside and adjacent to a licensees frequency block is:

Emissions $\leq$1 MHz outside the Block *when measured with a RBW of 1%* of the emissions Bandwidth shall be attenuated by :

-{43+10log (mean power output in watts)} = -13 dBm

The Limit in 47 CFR 24.53(h) for emissions outside a licensees frequency block is:

Emissions >1 MHz outside the Block, *when measured with a RBW of 1 MHz*, shall be attenuated by :

-{43+10log (mean power output in watts)} = -13 dBm.

Measurement at a Resolution Bandwidth of 30 kHz is based on our experience with 47CFR 27.53(h) and lacking other guidance.

Adjusted Levels

The following levels apply when measurement of the above limits are performed with an RBW of 30 kHz. Measurement at a Resolution Bandwidth of 30 kHz is based on our experience with 47 CFR 27.53(h) and lacking other guidance.

1. On any frequency from the block edge to 1MHz above or below the Block edge the level shall not exceed -12.70 dBm when measured with a 30 kHz resolution bandwidth (Note 2 below).
   For 24 Watts the required level is **-12.7 dBm/ –56.5 dBc**.

2. On any frequency greater than 1MHz above or below the Block edge the level shall not exceed -31.24 dBm when measured in a 30 kHz resolution bandwidth (Note 3 below).
   For 24 Watts the required level is **-31.24 dBm/ – 75.04 dBc** as measured with a 30 kHz resolution bandwidth (see Note 3). This is equal to -13 dBm measured with a 1 MHz resolution bandwidth. and

3. From the edge of the Block to the 10th harmonic of the carrier at least
   -{43+10log (mean power output in watts)} = -16.01 dBm.
   When measured with a 1 MHz resolution bandwidth (Note 4 below).

Exhibit 14 *continued*

++

Note 2: The -12.7 dBm/ –56.5 dBc level was computed as follows: The limit is specified as

-{43+10log (mean power output in watts) } dB = -13 dBm

When measured in a resolution bandwidth not less than 1% of the signal bandwidth.
Since the carrier is a 1.4 MHz bandwidth signal, the limit is adjusted to

-13 + 10LOG(30kHz/14 kHz) dBm = -9.69 dBm

When accounting for a 2x MIMO signal, (per KDB 662911 D01 Multiple Transmitter Output v01r01), the level needs be adjusted by 10LOG(n) where n= number of outputs. The adjustment for n=2 is:
3.01 dB = 10LOG(2)

The resultant limit for MIMO operation is -9.69 dBm – 3.01 dB = -12.7 dBm **;**
which given a 43.8 dBm carrier (24W) equals – 56.5 dBc

Note 3: The -31.24 dBm / -75.04 dBc level is computed from -13 dBm measured with a 1 MHz resolution bandwidth adjusted by :

-13 + 10LOG(30kHz/1.0 MHz) dBm = -28.23 dBm

When accounting for a 2x MIMO signal, (per KDB 662911 D01 Multiple Transmitter Output v01r01), the level needs be adjusted by 10LOG(n) where n= number of transmitter outputs. The adjustment for n=2 is:
3.01 dB = 10LOG(2)

The resultant limit for MIMO operation is -28.23 dBm – 3.01 dB = -31.24 dBm **;**
which given a 43.8 dBm carrier (24W) equals – 75.04 dBc

Note 4: The -16.01 dBm level is computed from -13 dBm measured with a 1 MHz resolution bandwidth and adjusted for a 2x MIMO transmission (per KDB 662911 D01 Multiple Transmitter Output v01r01). For a 2x MIMO signal the level needs be adjusted by 10LOG(n) where n= number of transmitter outputs. The adjustment for n=2 is:dB = 10LOG(2)

The resultant limit for MIMO operation is: -13 dBm - 3.01 dB = -16.01 dBm ;

Exhibit 14 *continued*

Mask Description for a Single Carrier in a 24 Watts per carrier multi-carrier application.

The Mask limits are identical for the left and right side of the AWS Blocks and are as follows:

Figure 14B shows the 1.4 MHz LTE Mask limit for AWS Block C (2130-2135 MHz) for AWS channel 414. The horizontal line from a to aa (a-aa) is the 43.8 dBm/ 0 dBc reference level. The Power Calibration reference line g-gg is the top of mask reference line as the 3 MHz power calibration resolution bandwidth exceeds the 1.4 MHz signal bandwidth.

The top of a typical 43.8 dBm single 1.4 MHz LTE QPSK carrier signal viewed at a resolution bandwidth of 30 kHz is shown at the 27.11 dBm/ -16.69 dBc line t-tt. This line is based on equations 1 and 2, and the ratio of the 1.4 MHz signal bandwidth and the 30 kHz resolution bandwidth of the spectrum analyzer.

The vertical line from a to b (i.e. a-b) and aa-bb are at the block edge for C Block. The horizontal lines c-b and bb-cc represent the limit for the 1st MHz outside the block. The placement of lines c-b and bb-cc is derived from evaluation of 1% of the signal bandwidth, the 30 kHz resolution bandwidth and adjustments for MIMO using the suggested value in of the rules.
Per Note 2 above, the limit for the 1st MHz outside the band with MIMO operation is **-12.7 dBm / – 56.5 dBc**
The vertical line, c-d and cc-dd are the transitions at 1MHz outside the specified Block.

The horizontal line d-e and dd-ee are placed at the **-31.24 dBm / -75.04 dBc** below the 0 dBc / 43.8 dBm reference per Note 3 above. The rules require a 1 MHz resolution bandwidth for measurements 1 MHz or greater outside the AWS band. Again, equation (1) and the ratio of 1 MHz to 1.4 MHz provides this value. The same logic was used in determining the other block and band edge tolerances.

Trace Description and Power Calibration

Figure 14B shows the 1.4 MHz carrier, Block C channel 414 LTE signal, measured with two different resolution bandwidths. The upper magenta trace displays the signal as measured with a resolution bandwidth of 3 MHz. The lower black trace is the same signal as measured with a 30 kHz resolution bandwidth and this is the appropriate trace for the mask evaluation. The wider resolution bandwidth allows for a true power calibration of the measured signal against the top of mask. The top of the mask is appropriate for a single carrier power calibration as it represents the true power level of a single carrier as measured with a power meter. For a LTE 1.4 MHz carrier signal the total power is the same as the trace as the analyzers maximum resolution bandwidth is 3 MHz and captures all of the signal. There is therefore no bandwidth correction factor for the 3 MHz carrier signal measured with a 3 MHz resolution bandwidth. Specifically:

For a 24W / 43.8 dBm signal the Power calibration reference line is: 43.8 dBm

The power calibration value for the 1.4 MHz carrier configurations at 24 W/c is 43.8 dBm which is the top of mask. These values are depicted on the occupied bandwidth charts as the dashed magenta Power Calibration Line gh-gg on each chart and as shown on example Chart 14B.

Exhibit 14 *continued*

Measurement of the 1.4 MHz Carrier Configuration

All of the tolerance lines for the output are referenced to the top of the Occupied Bandwidth mask, which is defined as 43.8 dBm/ zero dBc. For all measurements of the **AWS Base Station System/ FCC ID: AS5ONEBTS-16** Occupied Bandwidth, the output power was measured / adjusted individually to the 24 W level for each carrier and this is the 43.8 dBm value at the 0 dBc reference line.

In order to depict the tolerance lines that are required by Sec 27.53 of the FCC Rules all measurements were made with a resolution bandwidth of 30 kHz and the limits were adjusted using equation (1). A sample detector was employed using minimum of 25 sweeps averaging per trace.

AWS - Block	AWS - Channels	Number of carriers	Sub-Carrier Modulation	Total Power Watts	Results Occupied Bandwidth
C	414	1	QPSK	24	Compliant
C	414	1	16QAM	24	Compliant
C	414	1	64QAM	24	Compliant
C	486	1	QPSK	24	Compliant
C	486	1	16QAM	24	Compliant
C	486	1	64QAM	24	Compliant

TABLE 14.2 AWS Occupied Bandwidth Compliance Tabulation

Exhibit 14 *Results*

*The Block designation, AWS channels, frequencies and Measured RF Power are tabulated on each plot. The transmitter output signals are plotted for each frequency, modulation and channel of interest. Plots are provided for the AWS Block evaluated and two plots showing the three different modulations co-plotted together. This shows that the occupied bandwidth in the AWS Blocks in which this product can be operated, is in compliance with Section 27.53(h)(1)(2)(3) of the Commission code. The signal used to show the occupied bandwidth is as defined and recommended in **3GPP TS 36.211 V9.1.0 (2010-03)**. The power output level was adjusted to provide the documented value on each chart.*

RESULTS: The following exhibits illustrate the spectrums investigated and document compliance.

W. Steve Majkowski NCE

Figure 14A Test Setup for Antenna Port Measurement of Transmit Power, Occupied Bandwidth and Conducted Spurious Emissions

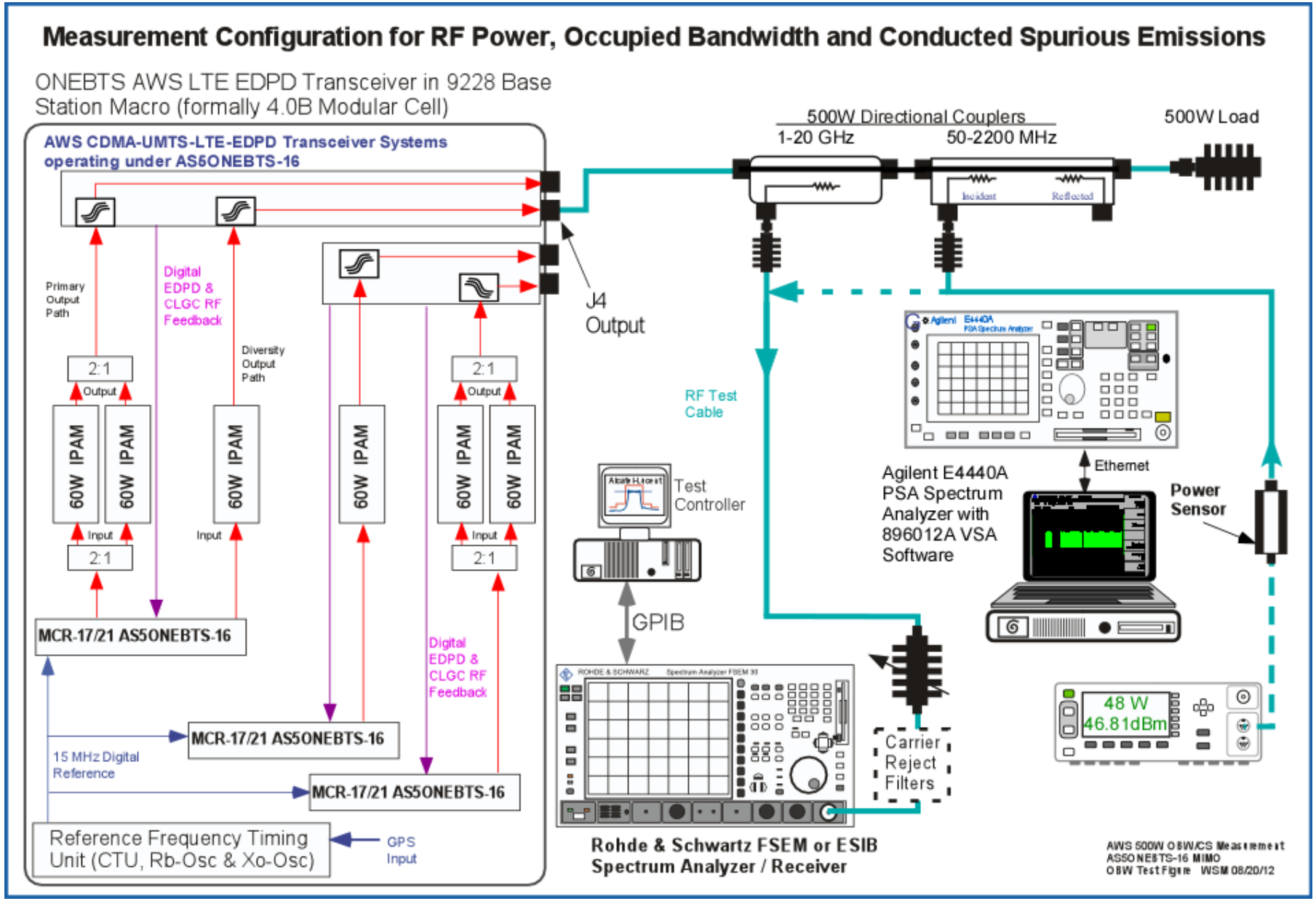
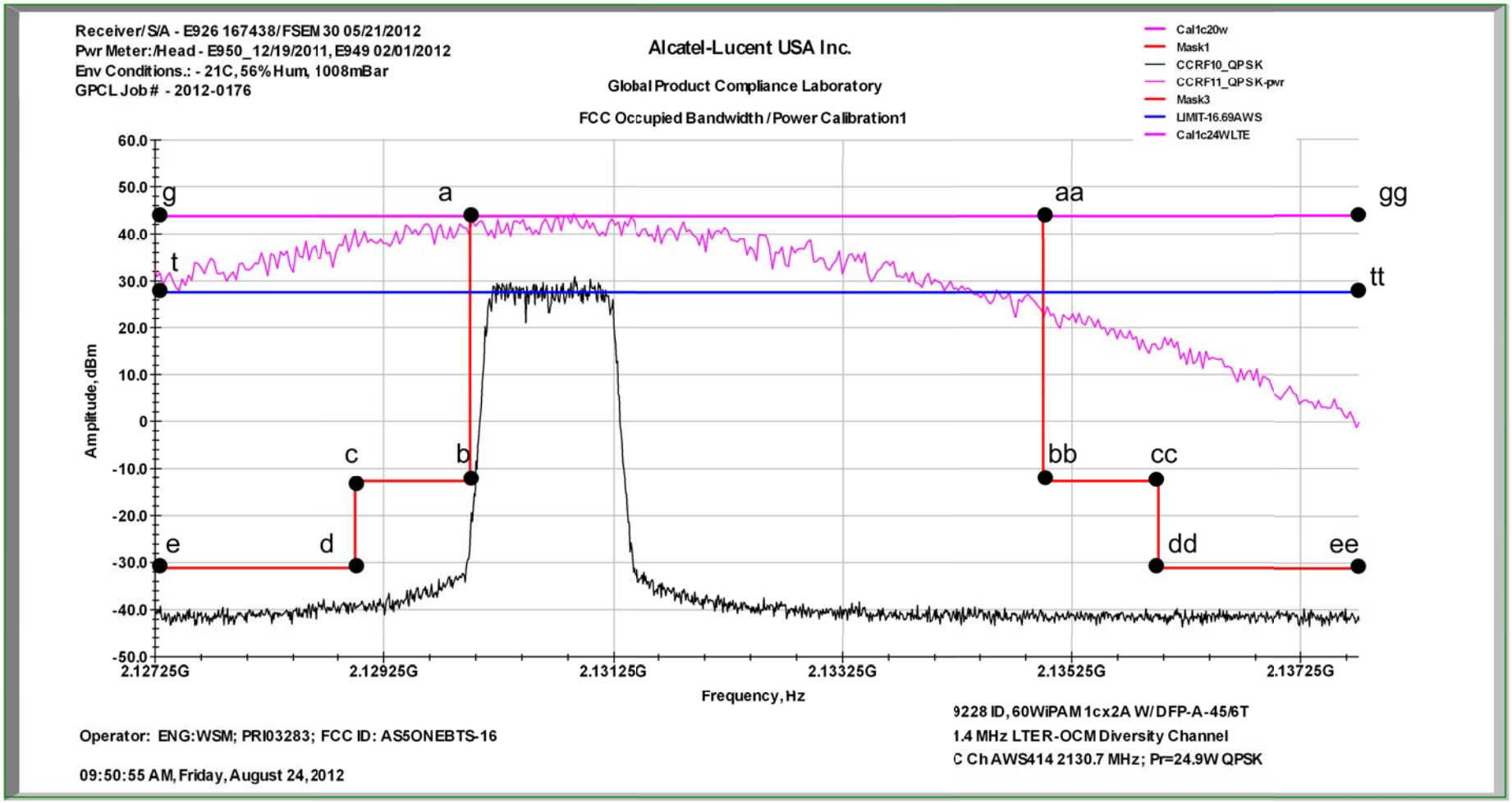


Figure 14B Occupied Bandwidth Mask for AWS Block Operation at 24 W with Power Calibration
(AWS C Block is depicted with a single 1.4 MHz LTE carrier signal showing use of the Power Calibration Trace)



Transmitter Measurements of FCC Occupied Bandwidth for Alcatel-Lucent USA Inc. AWS Base Station System FCC ID: AS5ONEBTS-16 Installed in LTE AWS 9228 Base Station Macro Operational Configuration with 60W IPAMs at 24W/carrier

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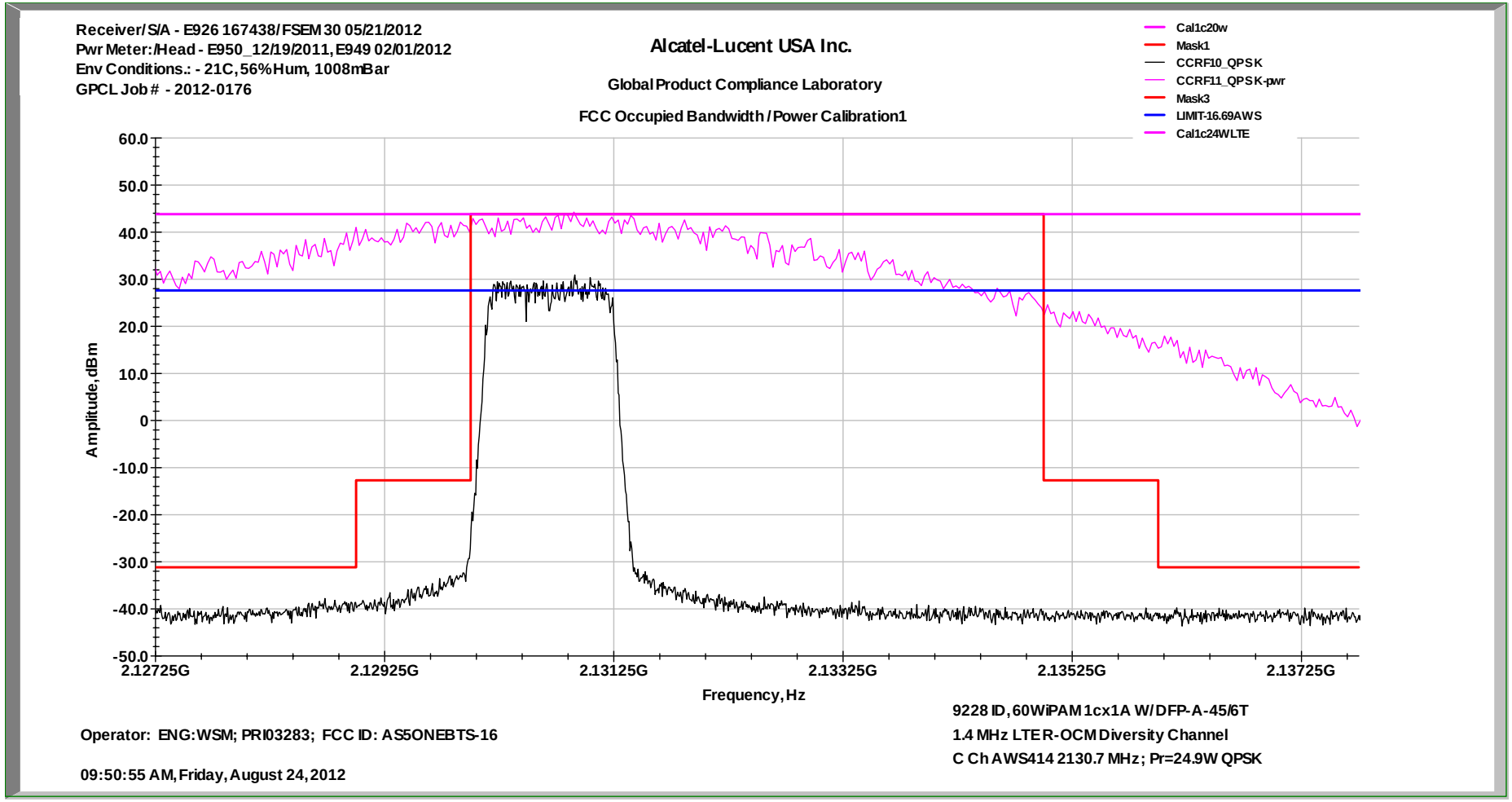
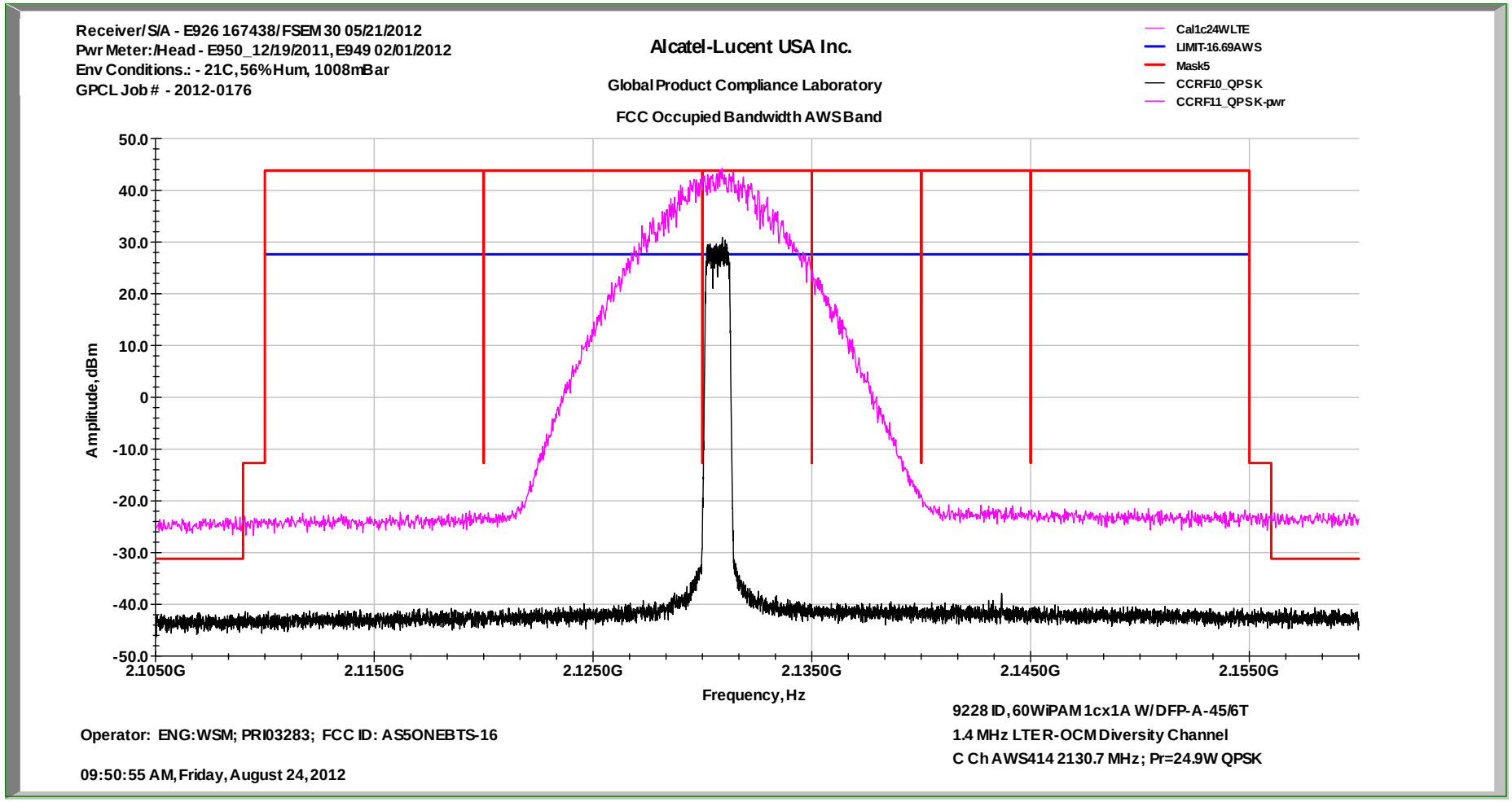
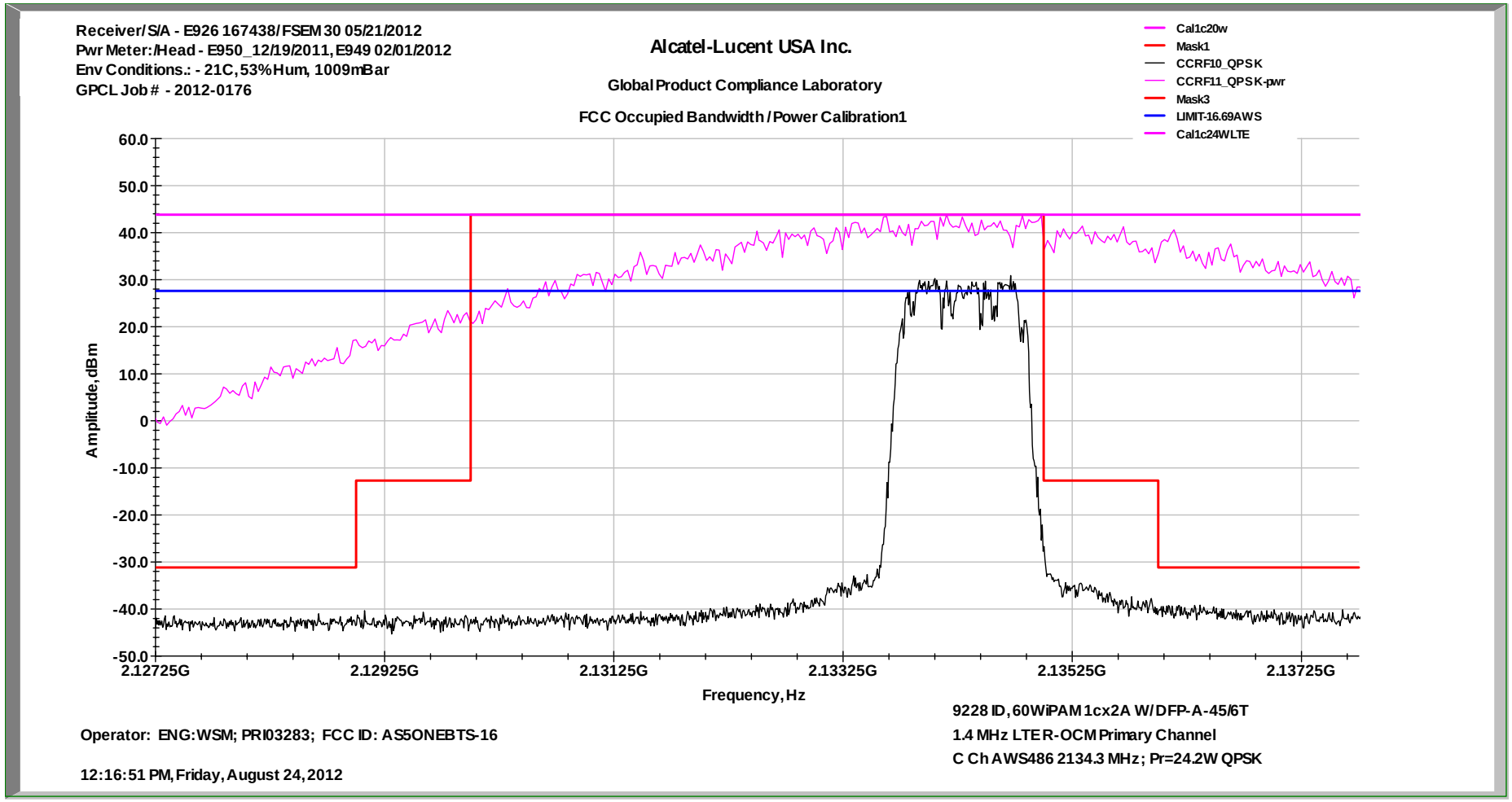
FCC Occupied Bandwidth Emissions AWS 1.4 MHz Ch A1-414 1cx1A 24 W/c QPSK



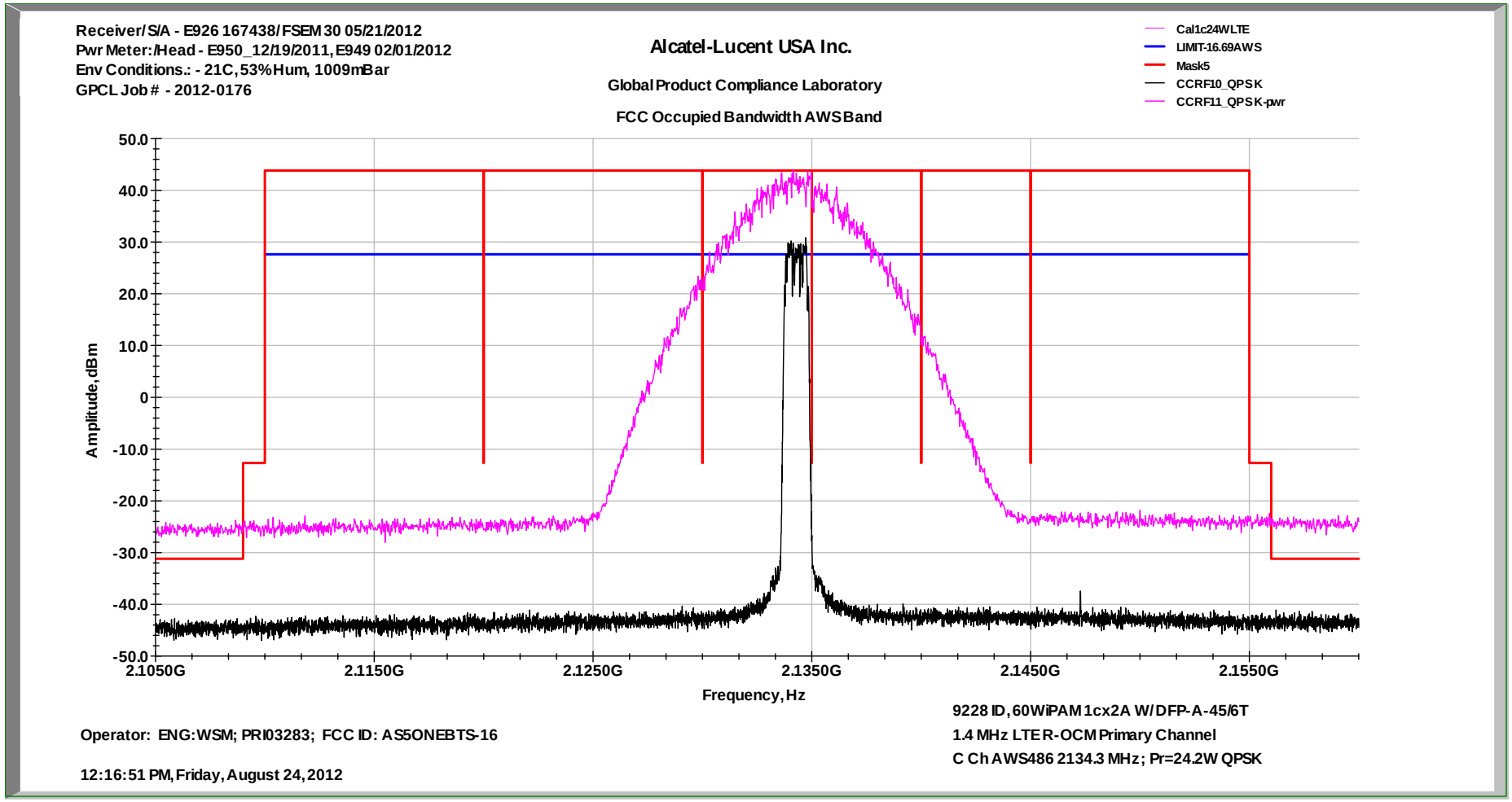
In-Band Intermodulation AWS 1.4 MHz Ch A1-414 1cx1A 24 W/c QPSK



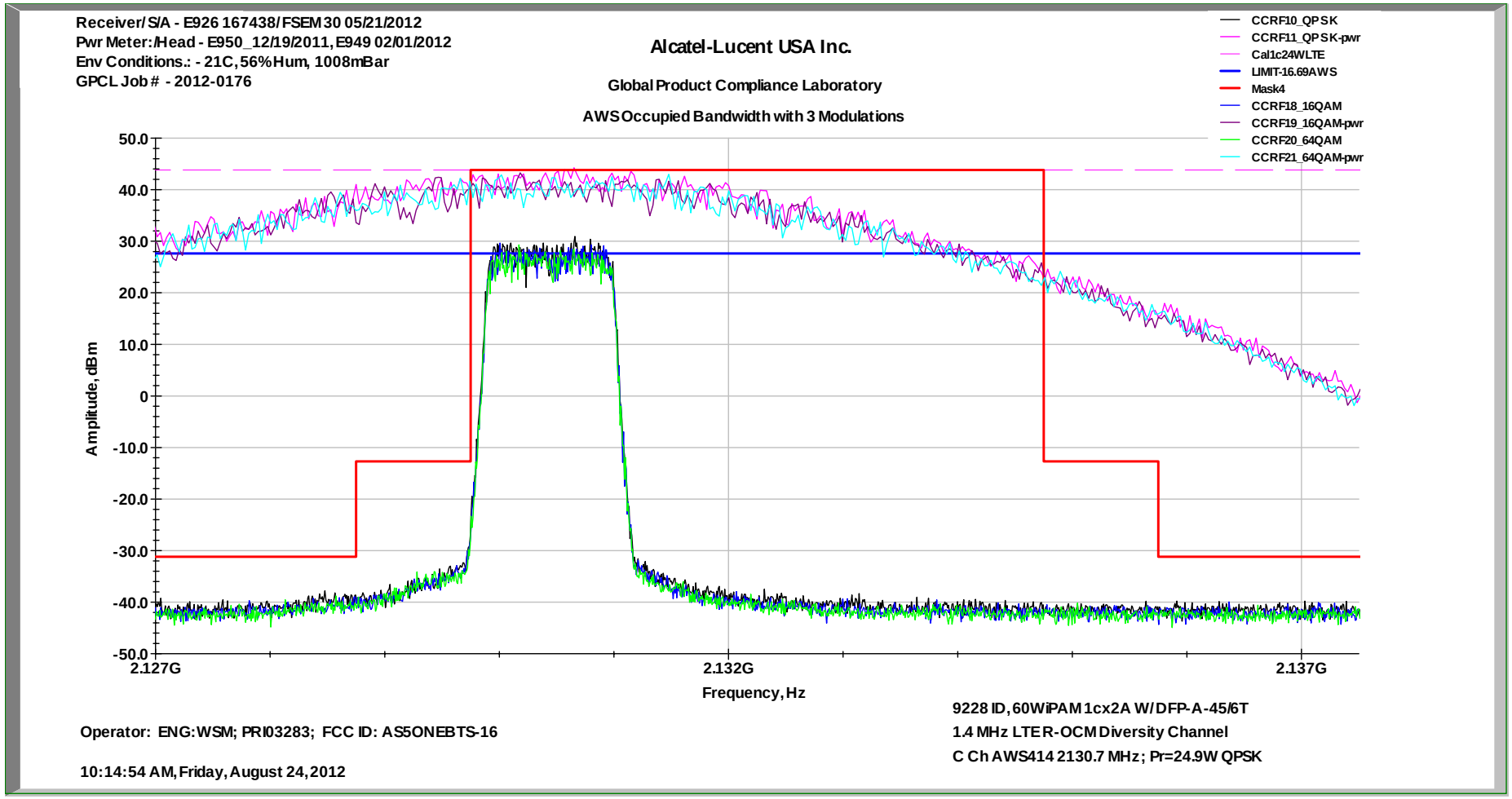
FCC Occupied Bandwidth Emissions AWS 1.4 MHz Ch A1-486 1cx2A 24 W/c



In-Band Intermods AWS 1.4 MHz Ch A1-30 1cx1A 24 W/c 16 QAM



FCC Occupied Bandwidth Emissions AWS 1.4 MHz Ch A1-30 1cx1A 24 W/c Co-Plot of QPSK, 16 QAM and 64 QAM



FCC Occupied Bandwidth Emissions AWS 1.4 MHz Ch F7-868 1cx1A 24 W/c Co-Plot of QPSK, 16 QAM and 64 QAM

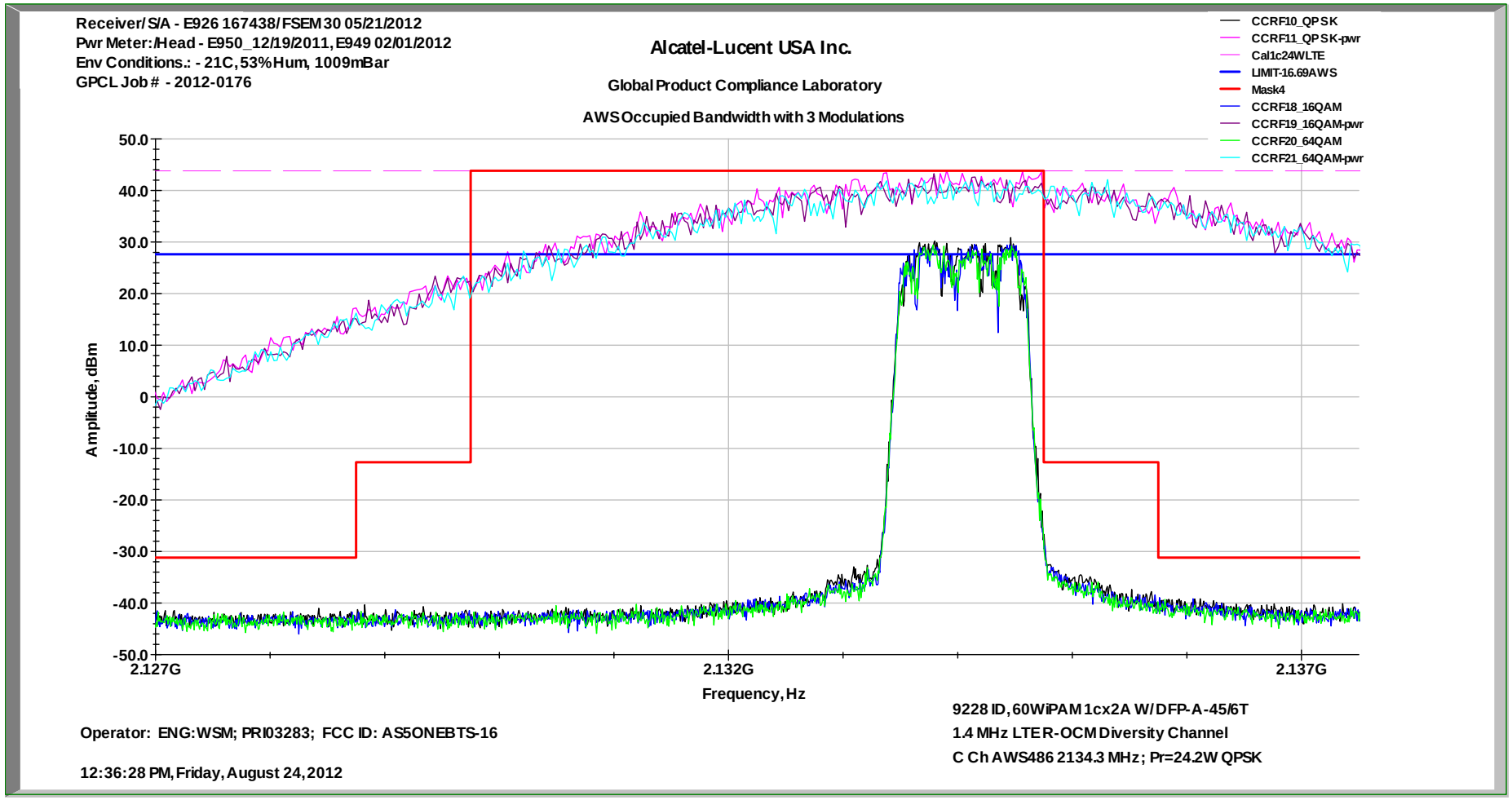


Exhibit 15: Conducted Spurious Emissions at Antenna Terminals

Section 2.1051 Spurious Emissions at Antenna Terminals

Spurious Emissions at the antenna terminals were investigated over the frequency range of 10 MHz to 21.75 GHz which is beyond the 10th harmonic of the carrier frequency. The RF output from the transmitter was reduced, to an amplitude usable by the spectrum analyzer, by use of a broadband attenuator. The complete RF test path was calibrated over the 10 MHz - 22 GHz range. The RF power level was measured and monitored prior to and during the test via the test setup in Figure 15A. The spurious measurements were made using an automated test system. The test system consists of a Rohde & Schwarz FSEM30 Spectrum Analyzer (or ESIB Test Receiver), a PC based computer test controller, calibrated test hardware and a TILE ™ software program to acquire the test data. This system allows measurement and presentation of the data in an accurate and compact form for FCC review. The volume of collected data is greater than 2×10^6 data points over the frequency range of 10 MHz to 21.75 GHz.

The required emission limitation specified in Section 27.53(h) of Title 47 CFR was applied to these tests. Based upon the criterion given in Section 27.53(h)(1)(2)(3) of Title 47 CFR (1-Oct-2010) and as developed in Exhibit 14 (see Note4), the required emission limit for MIMO operation is -16.01 dBm when measured with a resolution bandwidth of 1 MHz. The measurements of the spurious signals were therefore made using a resolution bandwidth of 1 MHz. All spurious and harmonics of the LTE Carrier was also shown to be lower than the -16.01 dBm limit.

The carrier signal shown on these plots was measured at a resolution Bandwidths of 3 MHz. This was done so that the carrier plot correctly and accurately depicts the carrier output power in relation to the spurious signals and the defined limit. In this application the **AWS Base Station System** has a maximum power output of 24 Watts at the antenna terminals (43.8 dBm/carrier +2/-4 dB) for each 1.4 MHz LTE carrier. The signal applied to the **AWS Base Station System** is as defined in **3GPP TS 36.211 V9.1.0 (2010-03).** The power was set to the specified 24 W/carrier maximum at each measurement frequency to verify the spectral performance at that power level at each specific frequency of interest. Power was also verified for the QPSK, 16QAM and 64QAM modulation configurations.

Test Results Summary:

Conducted Spurious measurements were performed for the **AWS Base Station System** configurations supporting 1.4 MHz LTE carrier operation at 24 Watts/c. Conducted Transmit Spurious measurements were performed as part of the test profile for Occupied bandwidth. Every AWS Block Edge measurements configuration therefore included a Conducted Transmit Spurious measurements as documented in Table 15.1.

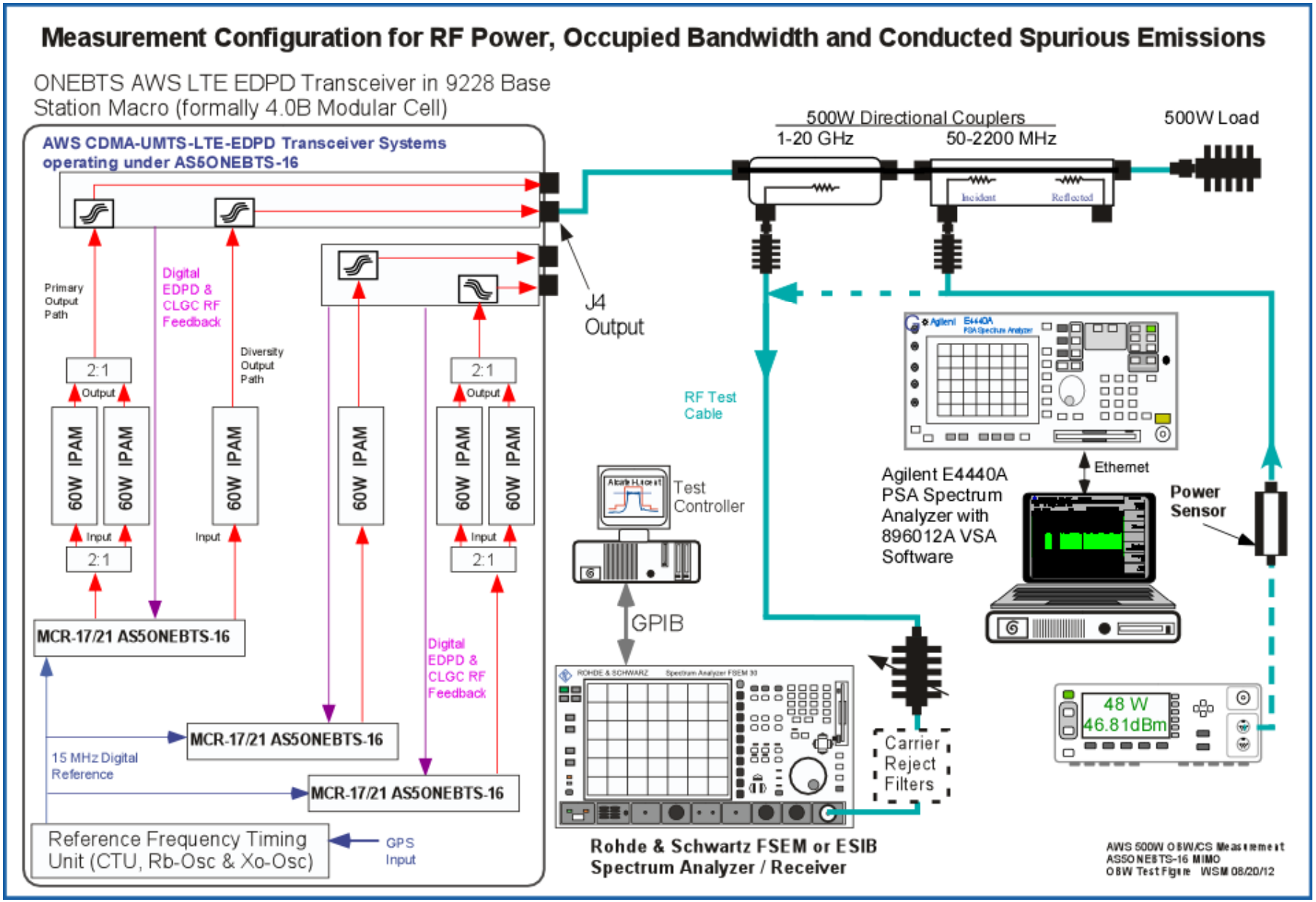
The attached spectral plots are representative of the Conducted Spurious compliance performance of the **AWS Base Station System.** The compliance for all of the representative transmit configurations are documented in Table 15.1. This Table lists AWS Blocks/ Channels tested the amplifier configuration and the status of the performance. The performance data, charts and tables all show that there are no “Out of Block” harmonics or spurious emissions above the applicable limit of -16.01 dBm. The attached table and sample data plots document the results. The results are compliant with FCC requirements.

Exhibit 15 *continued*

AWS - Block	AWS - Channels	Number of carriers	Sub-Carrier Modulation	Total Power Watts	Results Conducted Spurious
C	414	1	QPSK	24	Compliant
C	414	1	16QAM	24	Compliant
C	414	1	64QAM	24	Compliant
C	486	1	QPSK	24	Compliant

TABLE 15.1 AWS Conducted Spurious Compliance Tabulation

Figure 15A Test Setup for Antenna Port Measurement of Conducted Spurious Emissions



Transmitter Measurements of Conducted Spurious Emissions for Alcatel-Lucent USA Inc. AWS Base Station System FCC ID: AS5ONEBTS-16 Installed in LTE AWS 9228 Base Station Macro Operational Configuration with 60W IPAMs at 24 W/carrier

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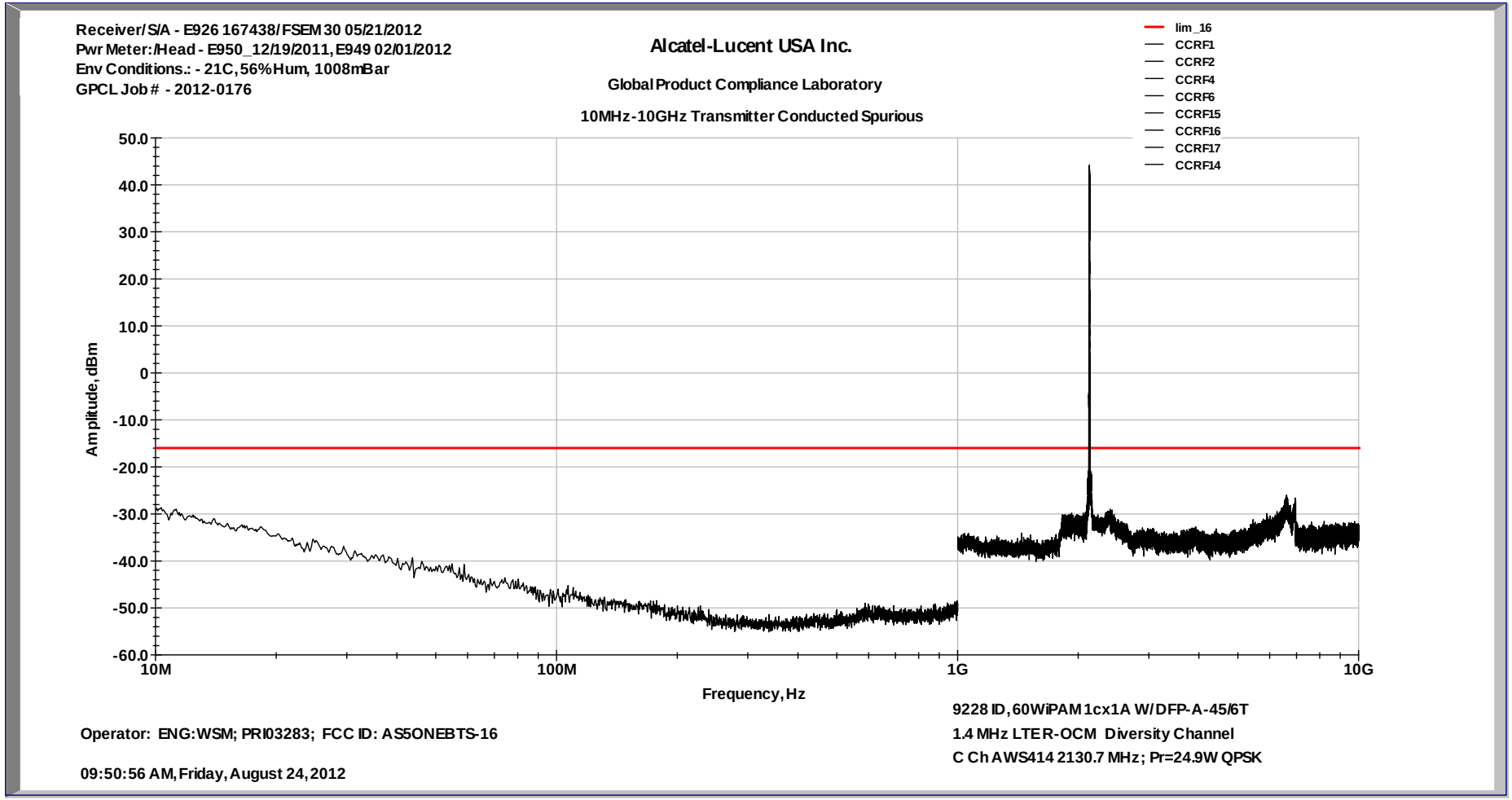
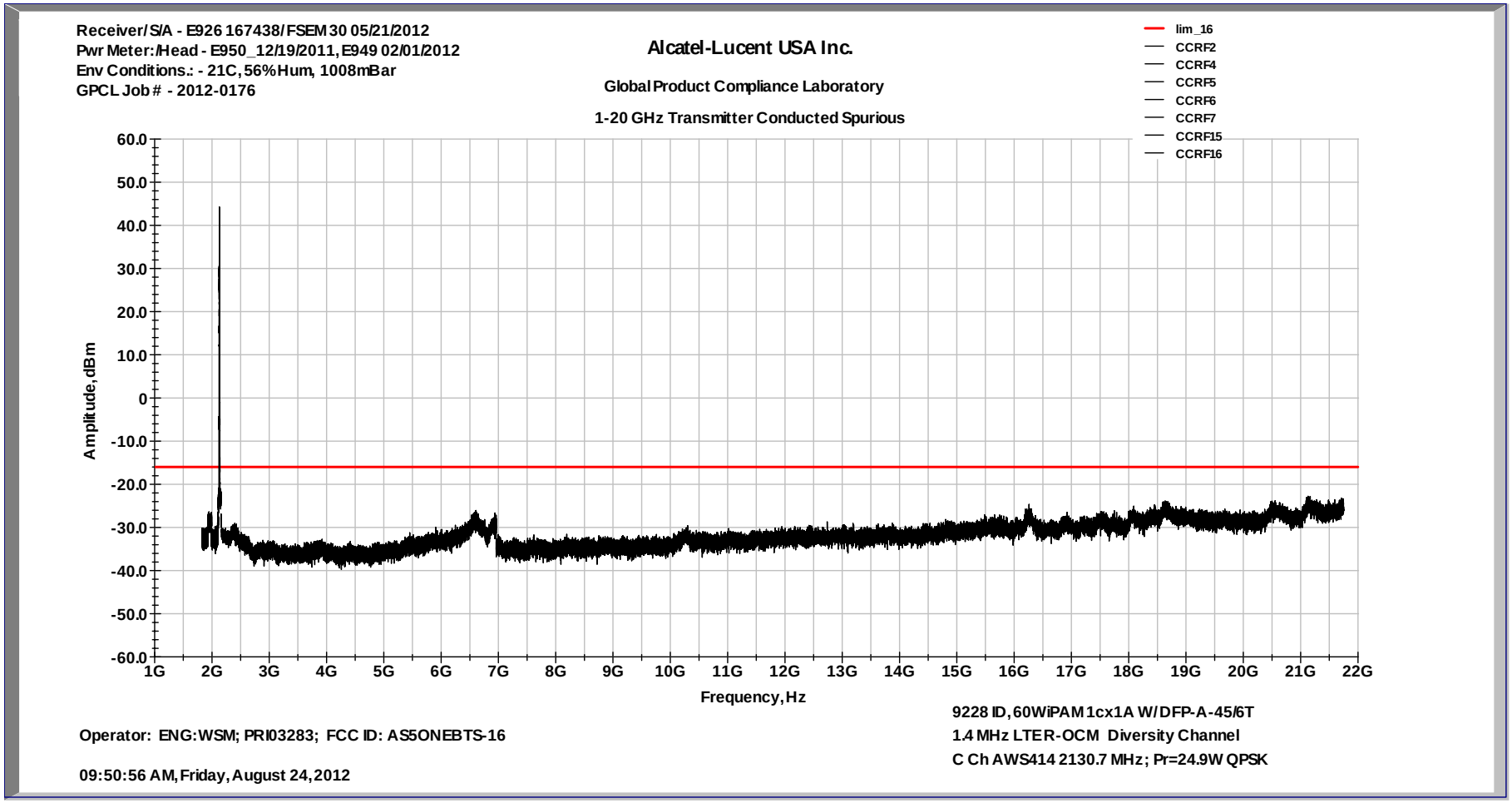
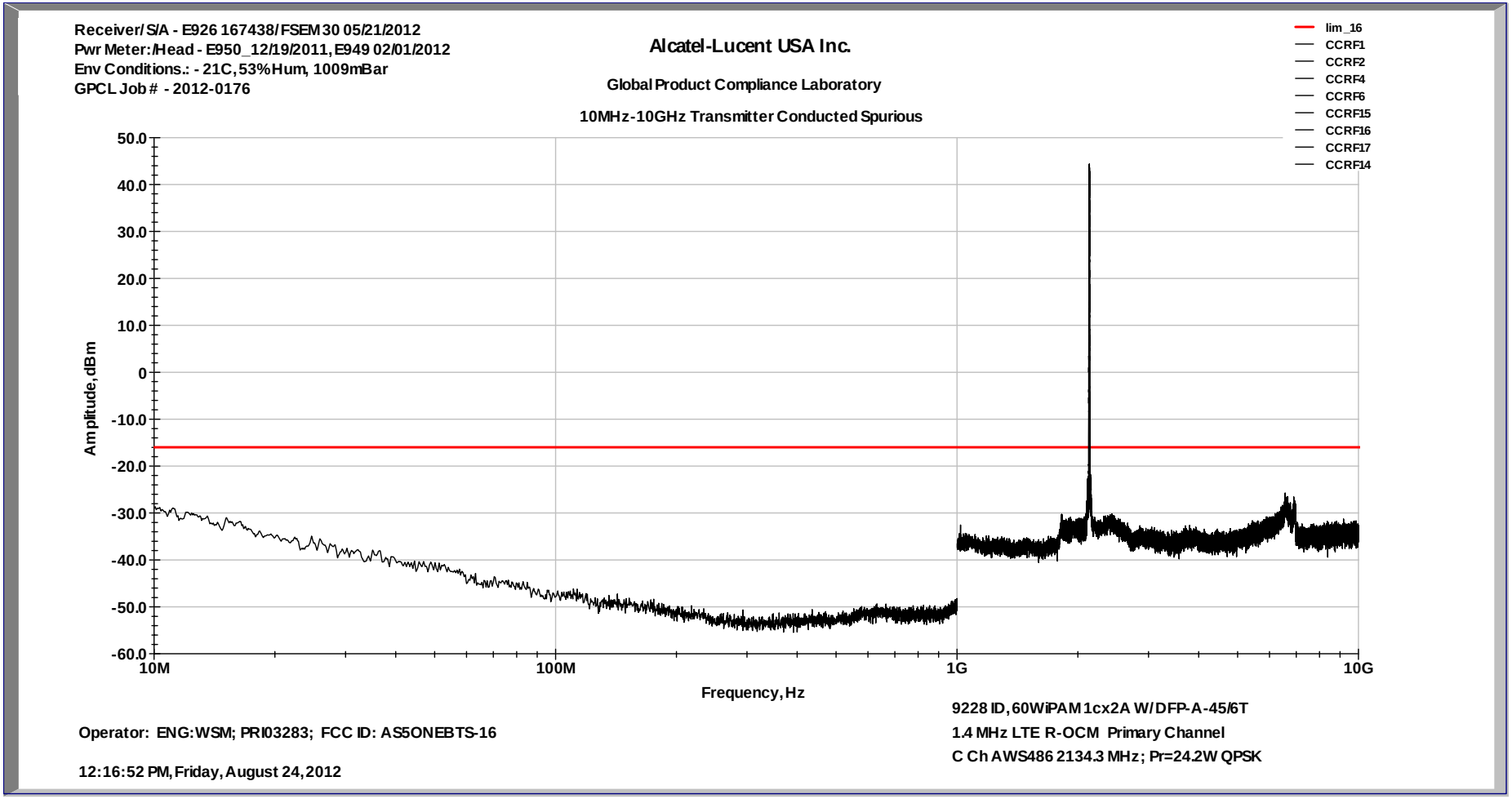
Conducted Spurious Emissions 10 MHz – 10 GHz AWS 1.4 MHz Ch A1-414 1cx1A 24 W/c QPSK



Conducted Spurious Emissions 1 – 20 GHz AWS 1.4 MHz Ch A1-30 1cx1A 24 W/c QPSK



Conducted Spurious Emissions 10 MHz – 10 GHz AWS 1.4 MHz Ch F7-868 1cx1A 24 W/c QPSK



Conducted Spurious Emissions 1 – 20 GHz AWS 1.4 MHz Ch F7-868 1cx1A 24 W/c QPSK

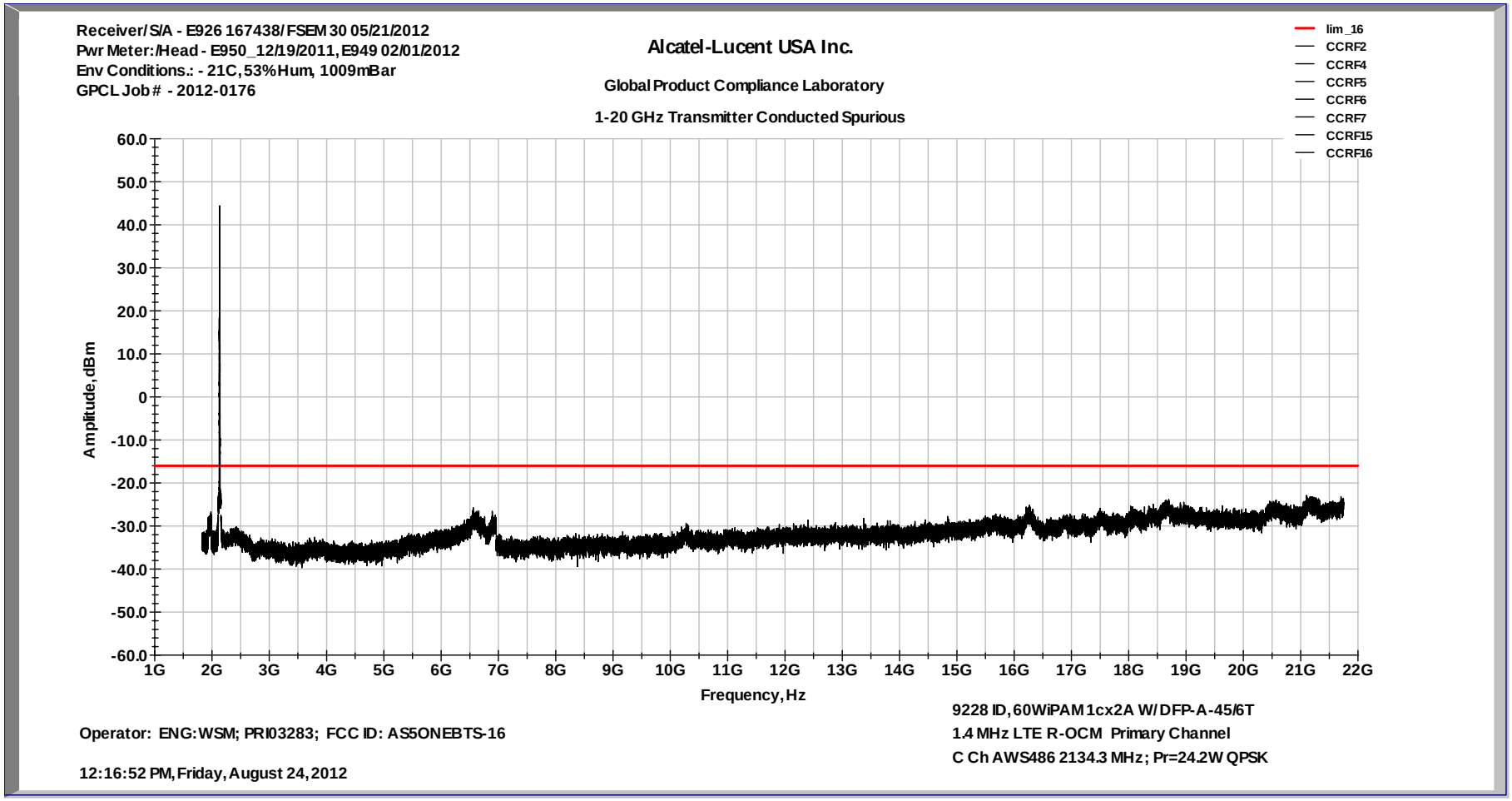


Exhibit 16: Field Strength Of Spurious Radiation

SECTION 2.1053 Field Strength of Spurious Radiation

Field strength measurements of radiated spurious emissions were evaluated in a 5m semi anechoic compliance chamber maintained by Alcatel-Lucent USA Inc Bell Laboratories Global Product Compliance Laboratory in Murray Hill, New Jersey. A complete description and full measurement data for the site have been placed on file with the Commission.

The three **MCR1721s** were configured with nine **60W IPAMs** and all other associated equipment in a **AWS Indoor LTE AWS 9228 Base Station Macro** frames operating in AWS Block C. This formed a three transmit sector **AWS Base Station Systems/ FCC ID: AS5ONEBTS-16** configured with the 1.4 MHz LTE carrier. Each sector was configured to provide 24 Watts of LTE carrier performance. The spectrum from 10 MHz to beyond the tenth harmonic of the 2.155 GHz carrier (22 GHz) was searched for spurious radiation. 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 2.1053 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.

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

$$20 \log (E * 10^6) - (43 + 10 \log P) = 71.77 \text{ dB } \mu V/\text{meter}$$

Where: E = Field Intensity in Volts/ meter
P_t = Transmitted Power in watts = 24 W/ Carrier
R = Distance in meters = 10 m
$P = P_t/4\pi R^2$ Power density in W/m^2

RESULTS:

For this particular test, the field strength of any spurious radiation, measured at 10m, is required to be less than 71.7 dBμV/meter. Emissions equal to or less than 51.7 dBμV/meter are not reportable and may be verified using field strength measurements and broadband antennas. Over the out of band spectrum investigated from 10 MHz to beyond the tenth harmonic of the carrier (21.6 GHz), no reportable spurious emissions were detected. This demonstrates that the **AWS Base Station System/ FCC ID: AS5ONEBTS-16**, the subject of this application, complies with Sections 2.1053, 27.53(h) and 2.1057 of the Rules.

Exhibit 17 Measurement Of Frequency Stability

SECTION 2.1055 Measurement of Frequency Stability

The design and performance of the Frequency generating and stabilizing circuitry of the **AWS Base Station System** specifically the AWS MCR-1721 has not changed. The frequency stability performance remains within the parameters as previously filed.

Previous results:

The previously filed data documented that the maximum frequency drift at the antenna terminal of the Modular Cell 4.0B AWS system due to temperature and supply voltage is 0.00151 ppm which is below 3GPP2 ±0.05ppm requirement. The Alcatel-Lucent **AWS Base Station System** demonstrated full compliance with the Rules of the Commission.