



Subject: **Application for Class II Permissive Change
Authorization under FCC ID: AS5ONEBTS-24,
to Add the UMTS Emission Designator 4M10F9W
to the Initial Filing.**

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EXHIBIT 9: TEST REPORT

INTRODUCTION:

The exhibits presented in this test report demonstrate that the Alcatel-Lucent Cellular Frequency UMTS/WCDMA **850MHz High Efficiency RF Power Amplifier (HE PAM)**, deployed in the **9391 OneBTS Macrocells**, 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 22, Subpart H – Cellular Radiotelephone Service; Section 22.917 - Emission Limitations for Cellular Equipment; effective October 1, 2010. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2010. It also demonstrates compliance with the spurious emissions limitations specified in ETSI TS 125 141 V7.15.0 (2010-02): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 7.15.0, Release 7). This standard was the guideline used in the design of the MCR850 transceiver.

The initial FCC Grant of Equipment Authorization, under FCC ID: AS5ONEBTS-24, was issued August 10, 2009 for a CDMA product. The objective of this Class II Permissive Change request is to obtain authorization to add the UMTS/WCDMA emission designator, 4M10F9W, to the filing for the same product.

The UMTS850 UMTS-CDMA Transceiver System, subject of this Class II Permissive Change request consists of the principle RF components: (1) Crystal Reference Oscillator Module (OMA) at 15 MHz, (2) UMTS-CDMA Multi-Carrier Radio (MCR850), Model BNJ65, which was previously authorized by the Federal Communications Commission under FCC ID: AS5ONEBTS-08, (3) High Efficiency RF Power Amplifier (HE PAM), and (4) 25 MHz bandwidth Dual Duplex (DDpx), low loss, transmit filters covering the cellular frequency spectrum: 869-894 MHz.

As a Transceiver System, all conducted RF characteristics and emissions measurements were performed at the transmit antenna terminal (downlink), using a production equipment frame. All testing was performed by Global Product Compliance Laboratory (GPCL), Murray Hill, NJ.

Since the Reference Frequency Oscillator and the frequency determining and stabilization circuitry incorporated in the MCR850 transceiver are unchanged from the initial Grant, frequency stability measurements were not repeated.

As a Class II Permissive Change, only the characteristics that could be affected by the Change need be evaluated. This report fully documents all required tests and the test results, sufficient to show full compliance with the Rules of the Commission.

APPLICABLE FCC RULES AND INDUSTRY STANDARDS:

The exhibits presented in this test report demonstrate that the Alcatel-Lucent, Cellular Frequency, UMTS/WCDMA **850MHz High Efficiency RF Power Amplifier (HE PAM)** 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 22, Subpart H – Cellular Radiotelephone Service; Section 22.917 - Emission Limitations for Cellular Equipment; effective October 1, 2010. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2010. It also demonstrates compliance with the spurious emissions limitations specified in ETSI TS 125 141 V7.15.0 (2010-02): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 7.15.0, Release 7). 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	Pages 3 – 4
Part 2.1047	Modulation Characteristics	Pages 5 – 10
Part 2.1049	Occupied Bandwidth	Pages 11 – 28
Part 2.1051	Spurious Emissions at the Antenna Terminals.	Pages 29 – 41
Part 2.1053	Field Strength of Spurious Radiation	Pages 42 – 43
Part 2.1057	Frequency Spectrum to be Investigated	
Part 22	Public Mobile Services; Subpart H – Cellular Radiotelephone Service	
Part 22.917	Emission Limitations for Cellular Equipment	

ETSI TS 125 141 V7.15.0 (2010-02): Universal Mobile Telecommunications System (UMTS); Base Station (BS) Conformance Testing (FDD), (3GPP TS 25.141, Version 7.15.0, Release 7).

ETSI TS 125 104 V8.3.0 (2008-06): Universal Mobile Telecommunications System (UMTS); Base Station (BS) Radio Transmission and Reception (FDD), (3GPP TS 25.104, Version 8.3.0, Release 8).

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 **single UMTS/WCDMA 850MHz High Efficiency RF Power Amplifier (HE PAM)** is designed to provide a single carrier with the rated power level of 60W, measured at the transmit (downlink) antenna terminal. The single HE PAM can also accommodate 2 adjacent carriers at 30W/C for a total composite power of 60W.

The 850 MHz HE PAM can also be configured with 2 in Parallel to provide either a single carrier at 80W or 2 adjacent carriers at 50W/C, measured at the antenna terminal. The RF power measured at the antenna terminal for each configuration, across the 25 MHz 869-894 MHz frequency band is tabulated below.

Single High Efficiency RF Power Amplifier (HE PAM)

Number of Carriers	Rated RF Power per Carrier	Measured RF Power	HE PAM 850MHz PA Configuration
1	60W	47.8 dBm (60W)	1 Single
2	30W/C	44.8 dBm/C (30W/C)	1 Single

Two Parallel High Efficiency RF Power Amplifier (HE PAM)

Number of Carriers	Rated RF Power per Carrier	Measured RF Power	HE PAM 850MHz PA Configuration
1	80W	49.0 dBm (80W)	2 in Parallel
2	50W/C	46.0 dBm/C (50W/C)	2 in Parallel

The carrier channel frequencies used represent the lowest settable, mid band and the highest settable frequencies for both single carriers at 60W and 80W, and for 2 adjacent carriers at 30W/C and 50W/C operation. These are tabulated below.

The 850 MHz Single Carrier Test Frequencies at 60W (+47.8 dBm) and 80W (+49.0 dBm) are:

Cellular Freq Band	UMTS 850 Carrier	UARFCN Channel Number	Carrier Center Frequency
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz
A	Highest Settable in A-Band	1037	877.5 MHz
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz

The 850MHz Two Carrier Test Frequencies at 30W/C (+44.8 dBm/C) and 50W/C (+47.0 dBm/C) are:

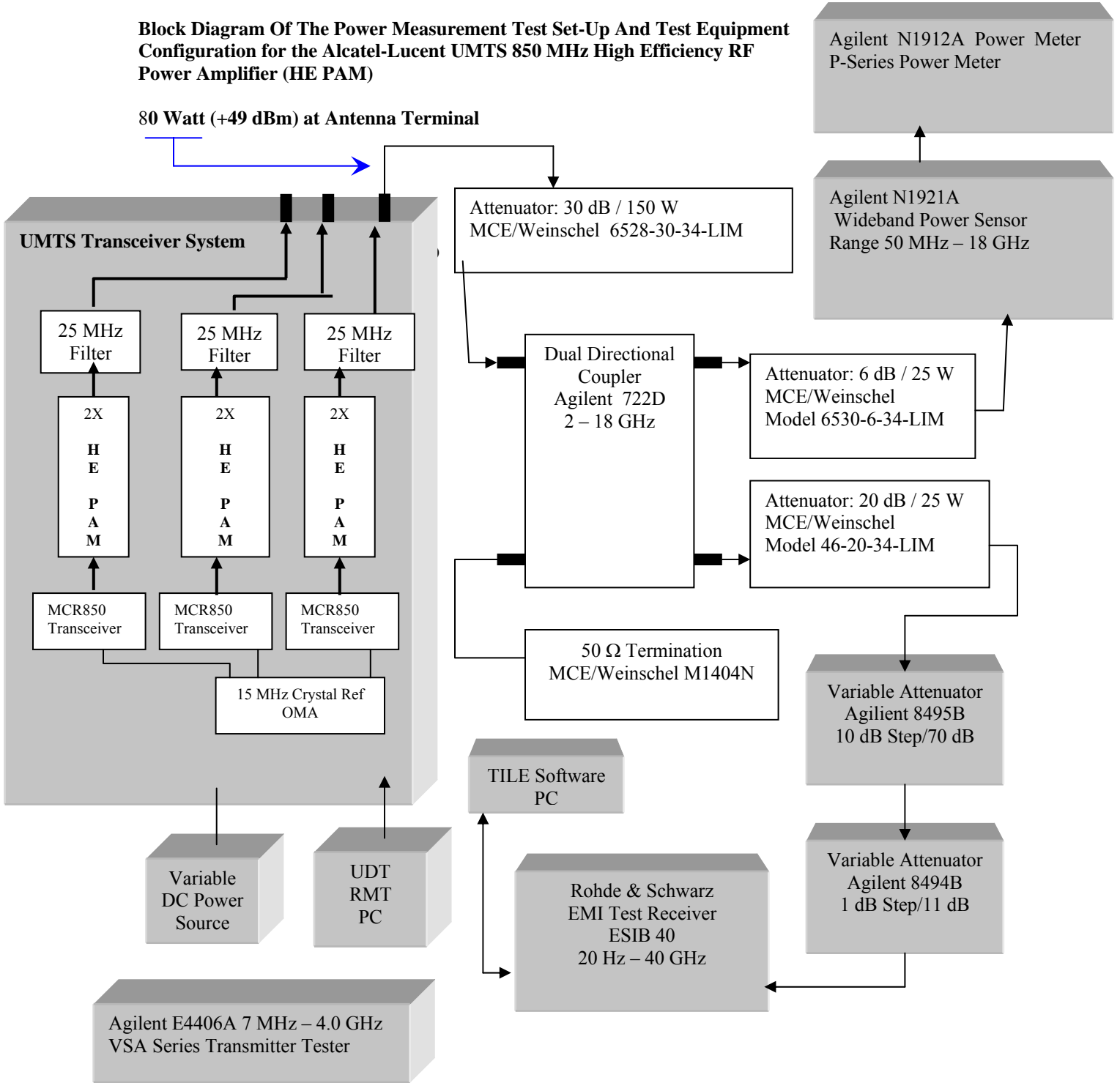
Frequency Block	UMTS 850 Carrier	UARFCN DL Channel No.	Carrier Center Frequency
A + A	Lowest Settable to the 869 MHz Band Edge	1007 + 1032	871.5 + 876.5 MHz
A + B	Mid Band	1037 + 1062	877.5 + 882.5 MHz
B + B'	Highest Settable to the 894 MHz Band Edge	1082 + 1107	886.5 + 891.5 MHz

Note: UARFCN = UTRA Absolute Radio Frequency Channel Number

Results: The UMTS 850 MHz HE PAM is compliant with the manufacturer's rated power level at the transmit antenna terminal for the above listed carrier frequencies.

Block Diagram Of The Power Measurement Test Set-Up And Test Equipment Configuration for the Alcatel-Lucent UMTS 850 MHz High Efficiency RF Power Amplifier (HE PAM)

80 Watt (+49 dBm) at Antenna Terminal



PART 2.1047 MEASUREMENTS REQUIRED: MODULATION CHARACTERISTICS

The modulation accuracy was measured at the Equipment Antenna Terminal (EAC) for each of the *single carrier* test frequencies and power levels previously cited, i.e., the lowest and highest settable carrier frequencies for the A-Block and the B-Block. The data is tabulated below. However, for brevity, only the highest carrier frequencies will be displayed, since they show the highest EVM RMS value.

In accordance with ETSI TS 25.141, the Error Vector Magnitude (EVM) was measured for two test modulation (TM) schemes:

- 1) **TM1-64** with 68 active channels: 64 voice + 4 control (QPSK). Limit: EVM RMS < 17.5 %
- 2) **TM 5-44** with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM). Limit: EVM RMS < 12.5 %.

In each test, the power level was set to Pmax: 60W (47.8 dBm) and 80W (49.0 dBm), respectively. The test equipment used was an Agilent E4406A VSA Series Transmitter Tester. Modulation accuracy measurement mode was Composite EVM, using the Peak/Average Metrics.

RMS Error Vector Magnitude (EVM) Measurement Summary at the Antenna Terminal:

TM1-64 (QPSK) - Single Carrier at 60W (47.8 dBm)

Cellular Freq Band	UMTS 850 Carrier 60W (47.8 dBm) TM1-64 (QPSK)	UARFCN Channel Number	Carrier Center Frequency	Modulation Accuracy Average < 17.5 %	Modulation Accuracy Peak Hold < 17.5 %
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz	7.23 %	8.18 %
A	Highest Settable in A-Band	1037	877.5 MHz	6.52 %	7.56 %
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz	6.42 %	7.40 %
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz	8.89 %	9.67 %

TM1-64 (QPSK) - Single Carrier at 80W (49.0 dBm)

Cellular Freq Band	UMTS 850 Carrier 80W (49.0 dBm) TM1-64 (QPSK)	UARFCN Channel Number	Carrier Center Frequency	Modulation Accuracy Average < 17.5 %	Modulation Accuracy Peak Hold < 17.5 %
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz	7.18 %	8.12 %
A	Highest Settable in A-Band	1037	877.5 MHz	6.50 %	7.40 %
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz	6.43 %	7.40 %
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz	8.93 %	9.66 %

TM5-44 (16QAM) - Single Carrier at 60W (47.8 dBm)

Cellular Freq Band	UMTS 850 Carrier 60W (47.8 dBm) TM5-44 (16QAM)	UARFCN Channel Number	Carrier Center Frequency	Modulation Accuracy Average < 12.5 %	Modulation Accuracy Peak Hold < 12.5 %
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz	6.38 %	7.06 %
A	Highest Settable in A-Band	1037	877.5 MHz	5.55 %	6.36 %
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz	5.42 %	6.19 %
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz	8.11 %	8.62 %

TM5-44 (16QAM) - Single Carrier at 80W (49.0 dBm)

Cellular Freq Band	UMTS 850 MHz Carrier 80W (49.0 dBm) TM5-44 (16QAM)	UARFCN Channel Number	Carrier Center Frequency	Modulation Accuracy Average < 12.5 %	Modulation Accuracy Peak Hold < 12.5 %
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz	6.32 %	7.02 %
A	Highest Settable in A-Band	1037	877.5 MHz	5.48 %	6.28 %
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz	5.39 %	6.17 %
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz	8.23 %	8.74 %

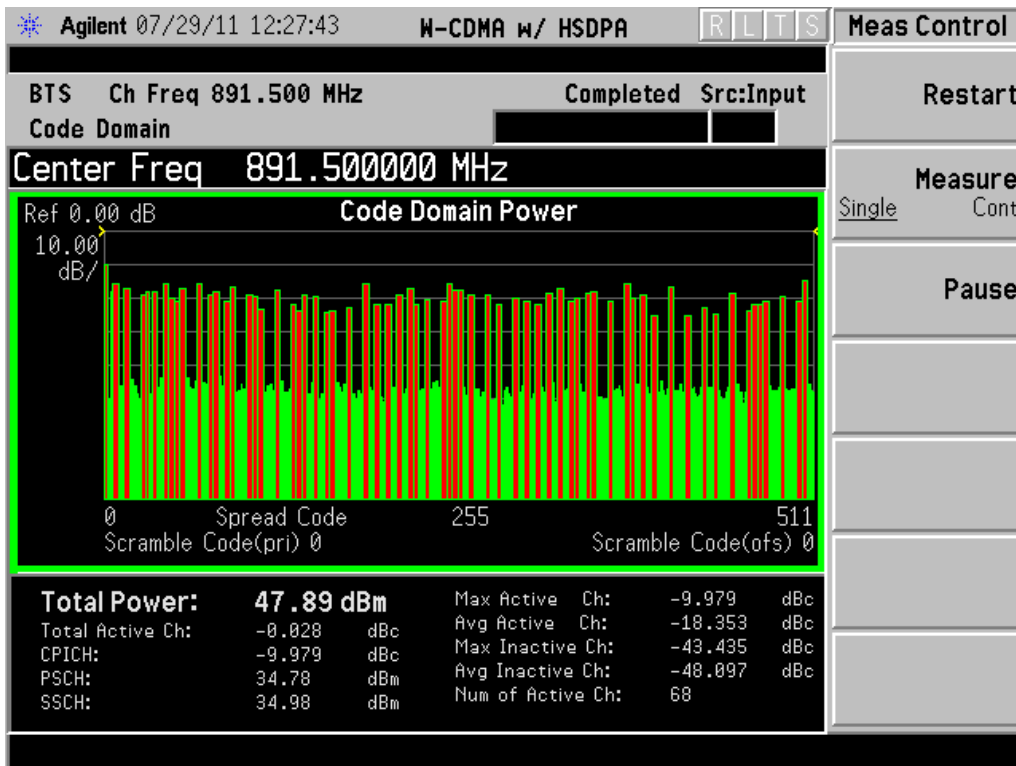
Minimum Standard Requirement: The minimum standard requirement is that the RMS Error Vector Magnitude (EVM) shall be less than 17.5% for TM1-64 (QPSK) and less than 12.5% for TM5-44 (16QAM).

Test Set-up and Configuration: Same as previously used for Part 2.1046 RF Power Measurement, with exception that the ESIB-40 EMI Test Receiver is replaced by Agilent E4406A VSA Series Transmitter Tester, 7 MHz – 4.0 GHz

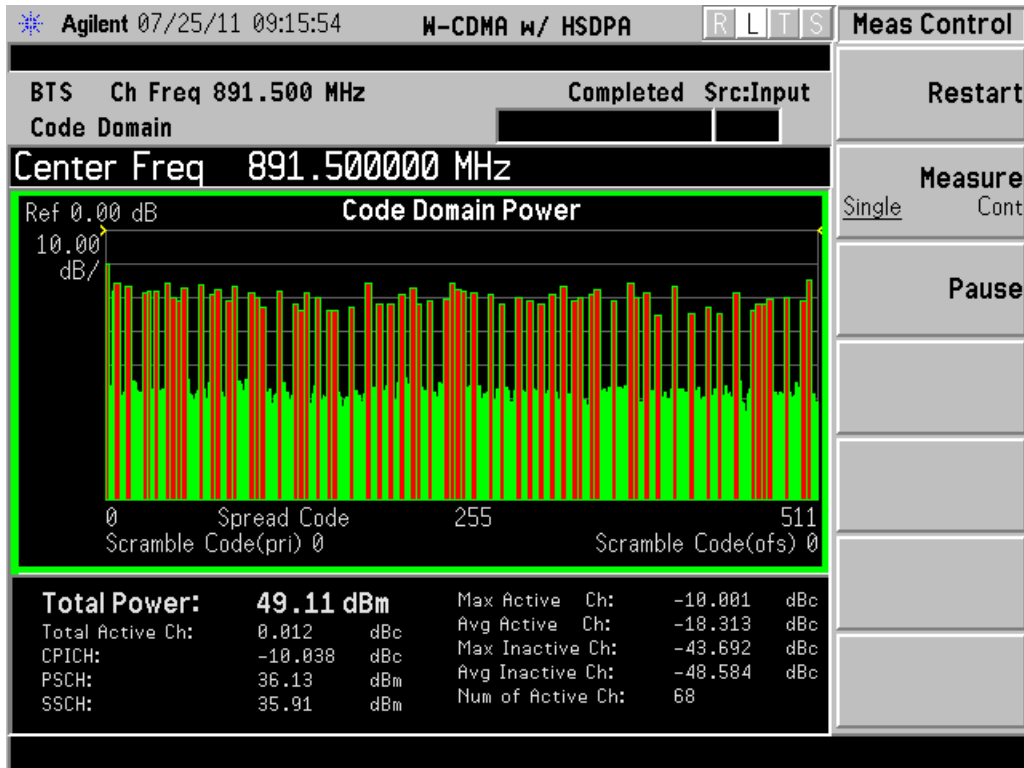
RESULTS: The UMTS/WCDMA 850MHz High Efficiency RF Power Amplifier (HE PAM) demonstrated full compliance with the modulation accuracy requirements specified in ETSI TS 25.141. All channels measured were less than the 12.5% RMS limitation. The plots for each channel are recorded and stored on file. For brevity, only the highest carrier frequencies will be displayed in this exhibit, since they show the highest EVM RMS value.

Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK). Limit: EVM RMS < 17.5 %

TM1-64 (QPSK) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz

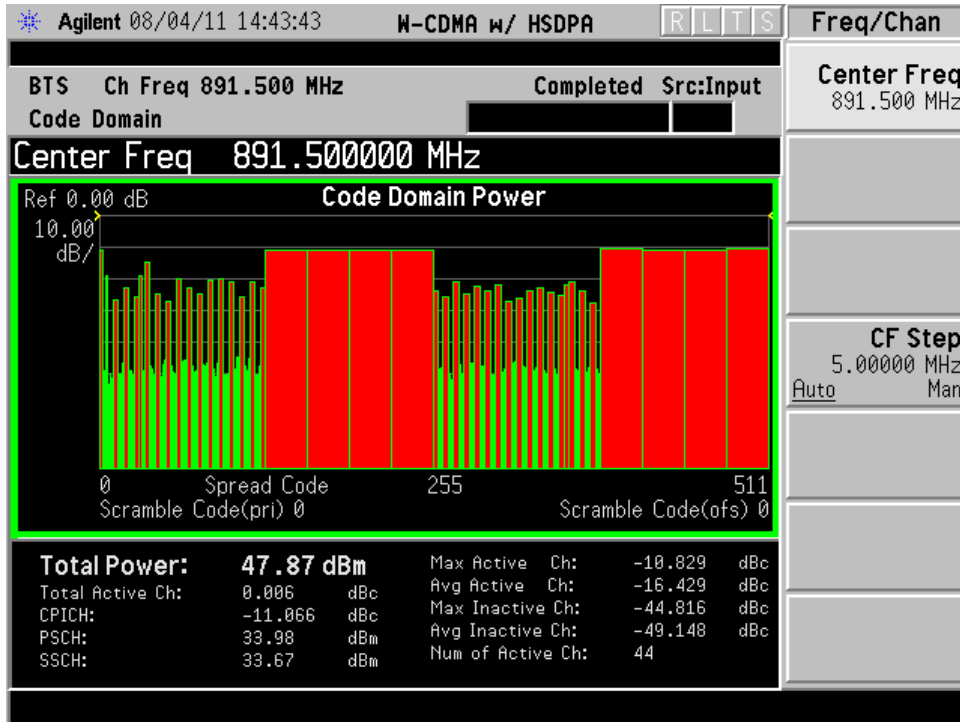


TM1-64 (QPSK) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM). Limit: EVM RMS < 12.5 %.

TM5-44 (16QAM) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz



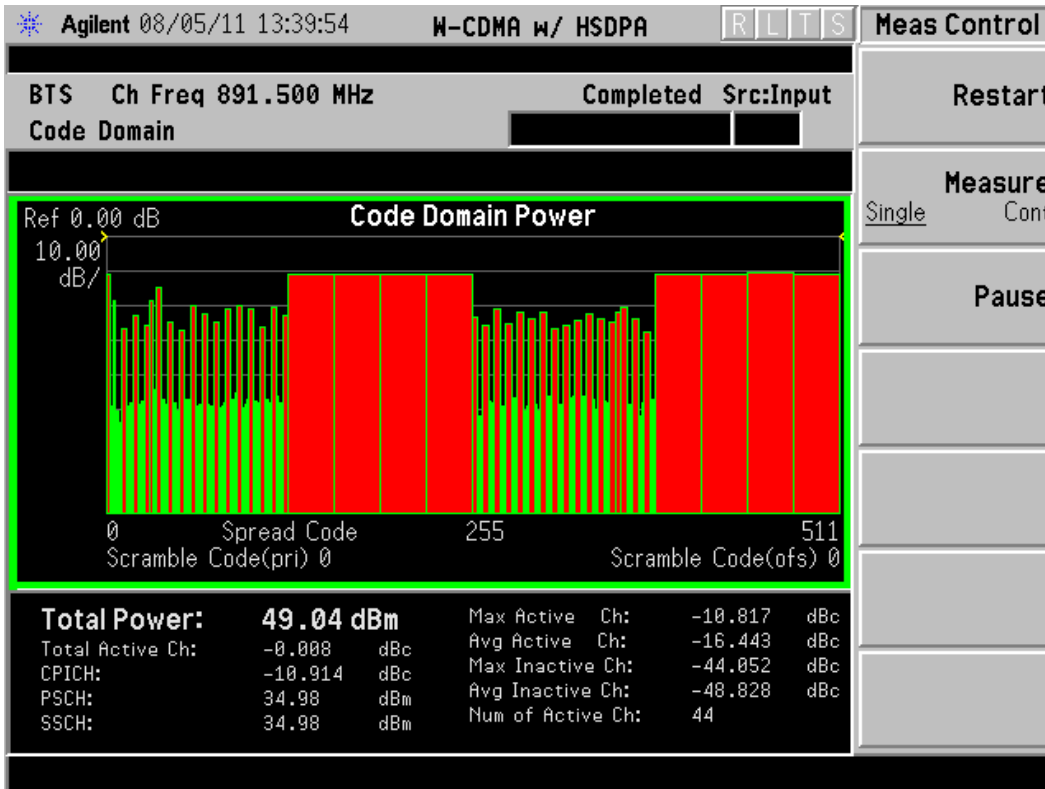
Agilent 08/04/11 14:47:05 W-CDMA W/ HSDPA R L T S

BTS Ch Freq 891.500 MHz Completed Src:Input
Mod Accuracy Averages: 10 **PASS**

Peak/Average Metrics		
	Average	Peak Hold
Rho:	0.99346	0.99263
RMS EVM:	8.11 %	8.62 %
Peak EVM:	83.74 %	119.11 %
Pk CDE:	-42.55 dB	-41.37 dB at C8(45)
Pk Active CDE:	-33.37 dB	-32.58 dB at C4(6)
RMS Mag Error:	6.67 %	7.22 %
RMS Phase Error:	7.68 °	10.11 °
Freq Error:	-31.03 Hz	-38.69 Hz
I/Q Origin Offset:	-57.36 dB	-49.29 dB
Time Offset:	-679.93 chip	-17211.34 chip
CPICH Power :	-11.02 dB	-10.90 dB
Total Power:	47.82 dBm	47.93 dBm

Measure
Code Domain
Mod Accuracy (Composite EVM)
QPSK EVM
Power Stat CCDF
Spectrum (Freq Domain)
Waveform (Time Domain)
More (2 of 3)

TMS-44 (16QAM) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



Agilent 08/05/11 13:55:50 W-CDMA w/ HSDPA R L T S Measure

BTS Ch Freq 891.500 MHz Completed Src:Input
Mod Accuracy Averages: 10 **PASS**

Peak/Average Metrics		
	Average	Peak Hold
Rho:	0.99326	0.99242
RMS EVM:	8.23 %	8.74 %
Peak EVM:	82.82 %	117.46 %
Pk CDE:	-42.36 dB	-41.13 dB at C8(51)
Pk Active CDE:	-33.24 dB	-32.59 dB at C4(6)
RMS Mag Error:	6.75 %	7.26 %
RMS Phase Error:	7.82 °	9.33 °
Freq Error:	-30.66 Hz	-37.62 Hz
I/Q Origin Offset:	-57.33 dB	-49.38 dB
Time Offset:	4137.83 chip	-19035.34 chip
CPICH Power :	-11.02 dB	-10.91 dB
Total Power:	49.10 dBm	49.21 dBm

Code Domain

Mod Accuracy (Composite EVM)

QPSK EVM

Power Stat CCDF

Spectrum (Freq Domain)

Waveform (Time Domain)

More (2 of 3)

PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH

The occupied bandwidth was measured at the Equipment Antenna Terminal (EAC) for the previously cited Single-Carrier and Two-Carrier frequencies. The configurations and power levels evaluated were:

- 1) 3S1C - 60W: single carrier and single HE PAM
- 2) 3S1C - 80W: single carrier and 2 parallel HE PAM
- 3) 3S2C - 30W/C: two adjacent carriers and single HE PAM
- 4) 3S2C - 50W/C: two adjacent carriers and 2 parallel HE PAM

Compliance was demonstrated for the ETSI TS 25.141 emission masks, using both the TM1-64 and TM5-44 test modulations, for each of the above configurations and power levels.

The occupied bandwidth was measured by two methods:

1. The carrier 99% power bandwidth, which is also the necessary bandwidth, using an Agilent E4406A VSA Series Transmitter Tester 7MHz-4.0 GHz. This measurement was for a single carrier only.
2. Emission mask limitation using a Rohde & Schwarz ESIB-40 EMI Test Receiver, to demonstrate compliance with the ETSI TS 25.141 emission mask requirements and with Part 22.917. This measurement was performed for both a single-carrier and for two-carrier operation.

Method 1: The carrier 99% power bandwidth was measured at the Equipment Antenna Terminal (EAC) for each of the single carrier configurations above at 60W (47.8 dBm) and at 80W (49.0 dBm) for both TM1-64 (QPSK) and TM5-44 (16QAM) test modulations.

60W (47.8 dBm)

Cellular Freq Band	UMTS 850 MHz Carrier 60W (47.8 dBm)	UARFCN Channel Number	Carrier Center Frequency	Measured Carrier 99% Power Bandwidth TM1-64	Measured Carrier 99% Power Bandwidth TM5-44
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz	4.1016 MHz	4.0918 MHz
A	Highest Settable in A-Band	1037	877.5 MHz	4.0917 MHz	4.0947 MHz
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz	4.1026 MHz	4.0948 MHz
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz	4.1025 MHz	4.0893 MHz

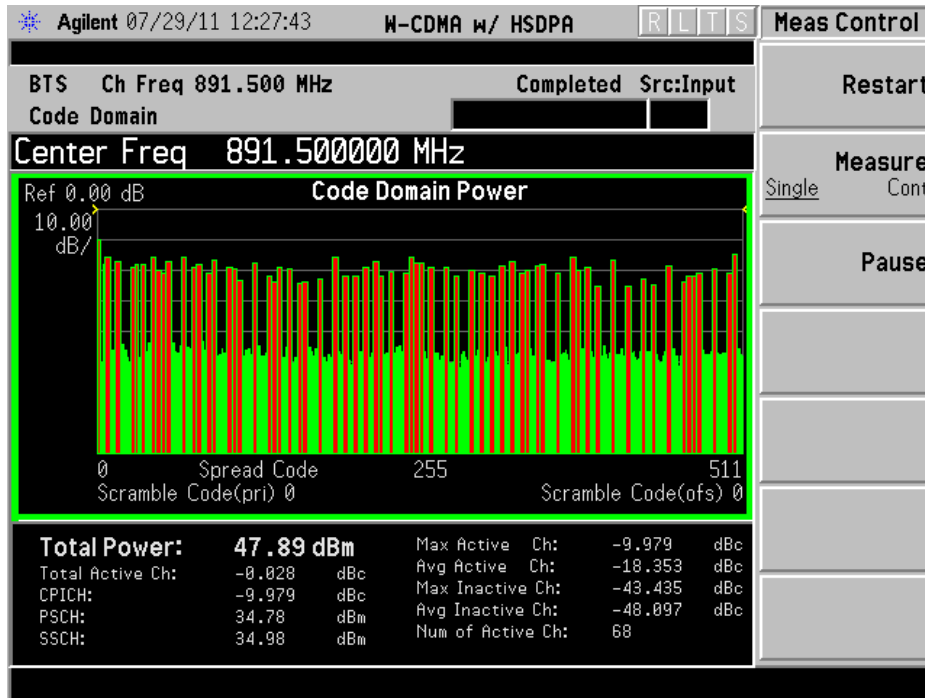
80W (49.0 dBm)

Cellular Freq Band	UMTS 850 MHz Carrier 80W (49.0 dBm)	UARFCN Channel Number	Carrier Center Frequency	Measured Carrier 99% Power Bandwidth TM1-64	Measured Carrier 99% Power Bandwidth TM5-44
A'' - A	Lowest Settable to the 869 MHz Band Edge	1007	871.5 MHz	4.0935 MHz	4.0941 MHz
A	Highest Settable in A-Band	1037	877.5 MHz	4.1170 MHz	4.0948 MHz
B - B'	Lowest Settable in B-Band & Spectrum Mid-Band	1062	882.5 MHz	4.0942 MHz	4.0929 MHz
B'	Highest Settable to the 894 MHz Band Edge	1107	891.5 MHz	4.1010 MHz	4.1056 MHz

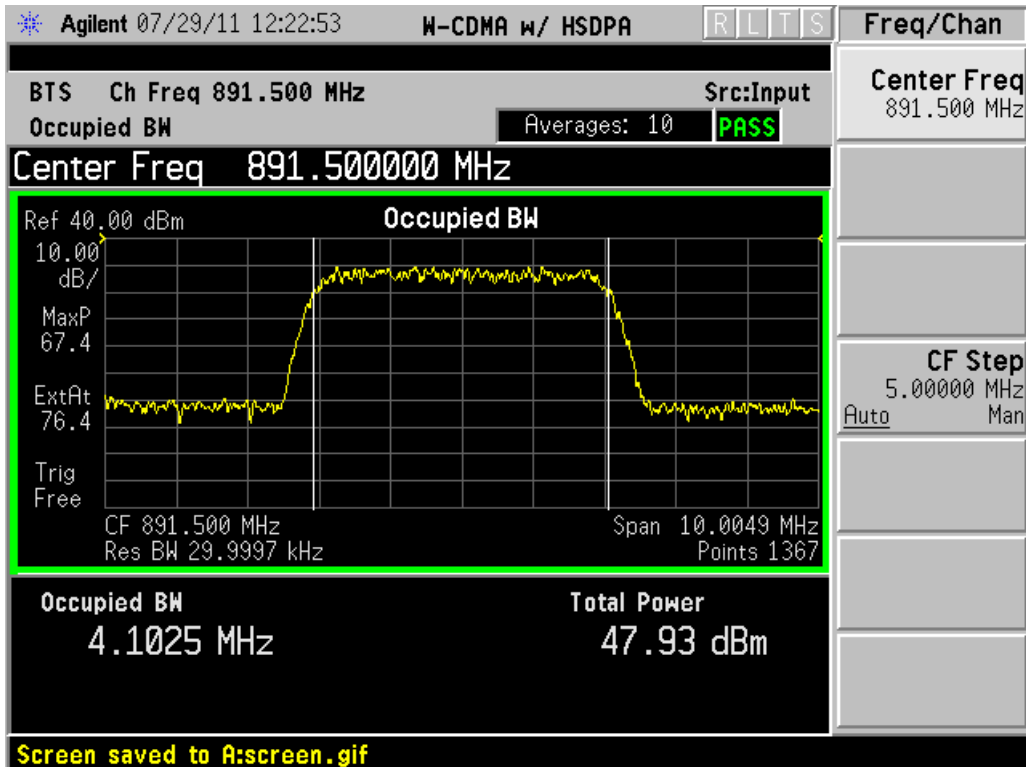
Results: The 99% occupied bandwidth measurement confirms that the carrier's emission designator remains at 4M10F9W. The plots for each channel are recorded and stored on file. For brevity, only the highest carrier frequency will be displayed in this exhibit, since they show the highest EVM RMS value.

Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK). 99% Occupied Bandwidth

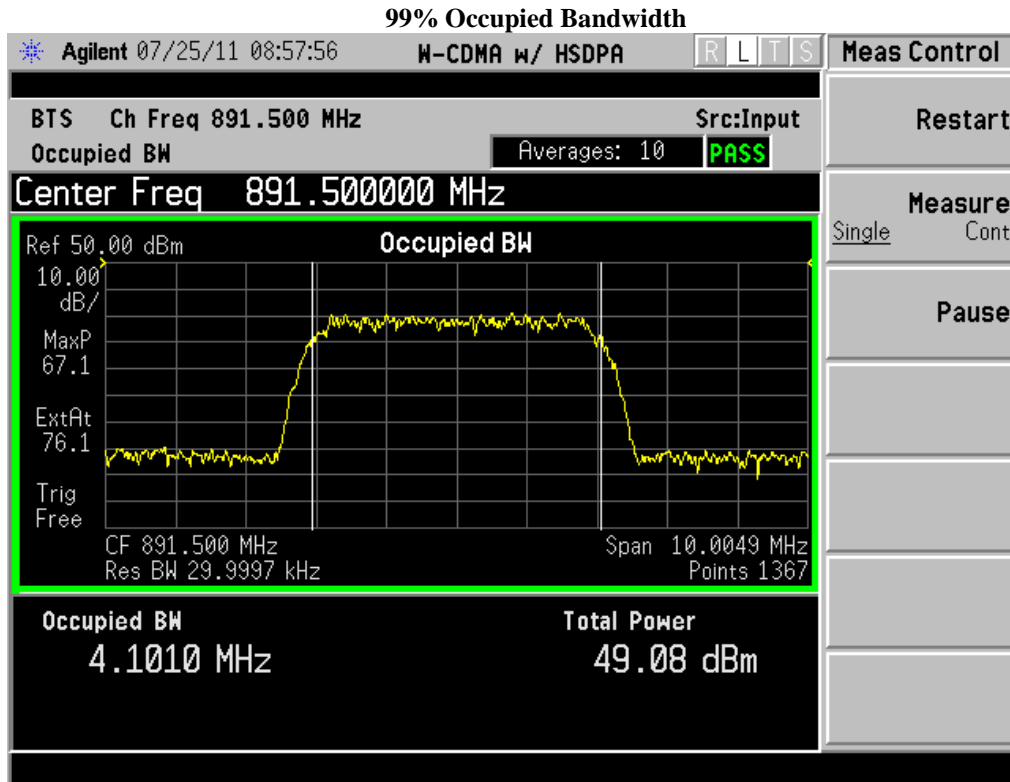
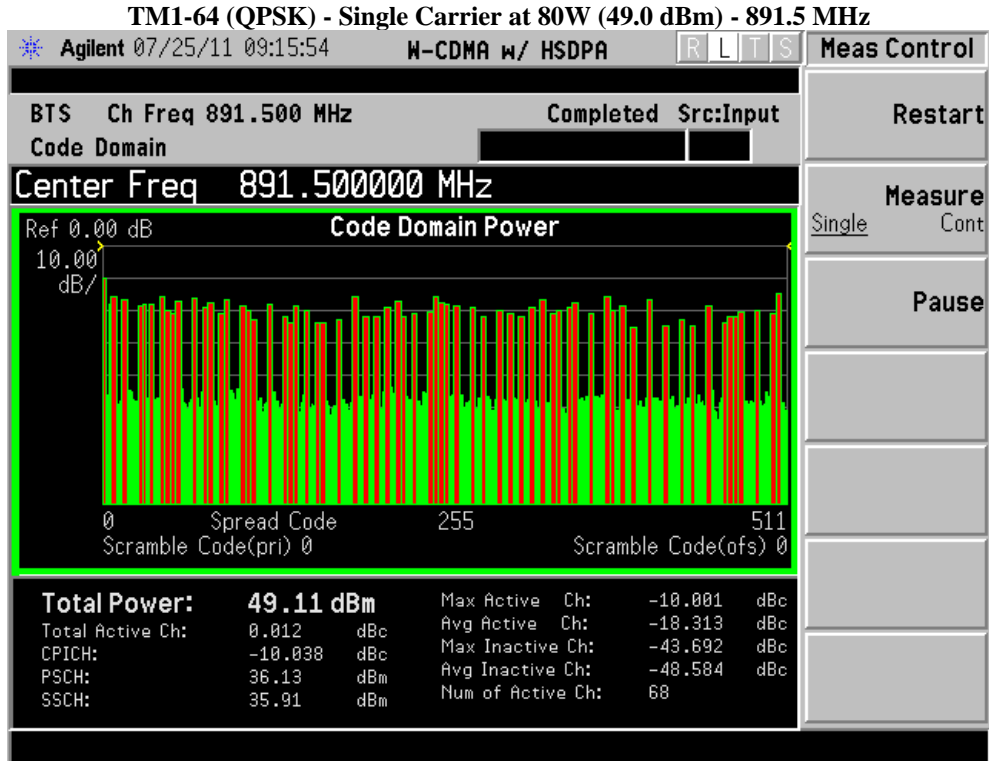
TM1-64 (QPSK) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz



99% Occupied Bandwidth

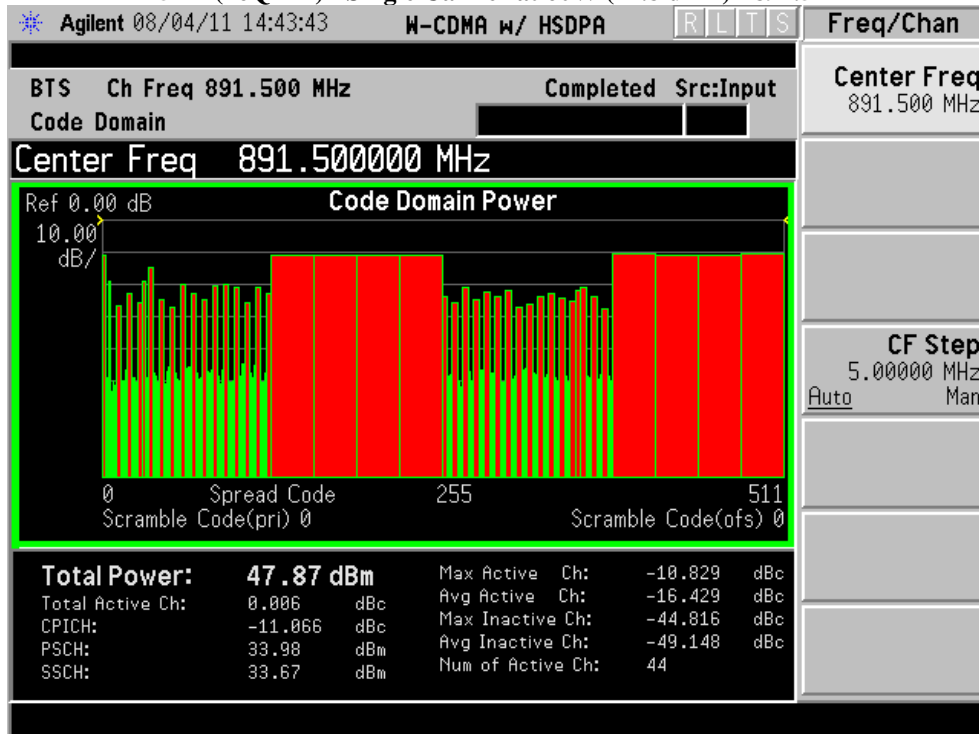


Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK). 99% Occupied Bandwidth

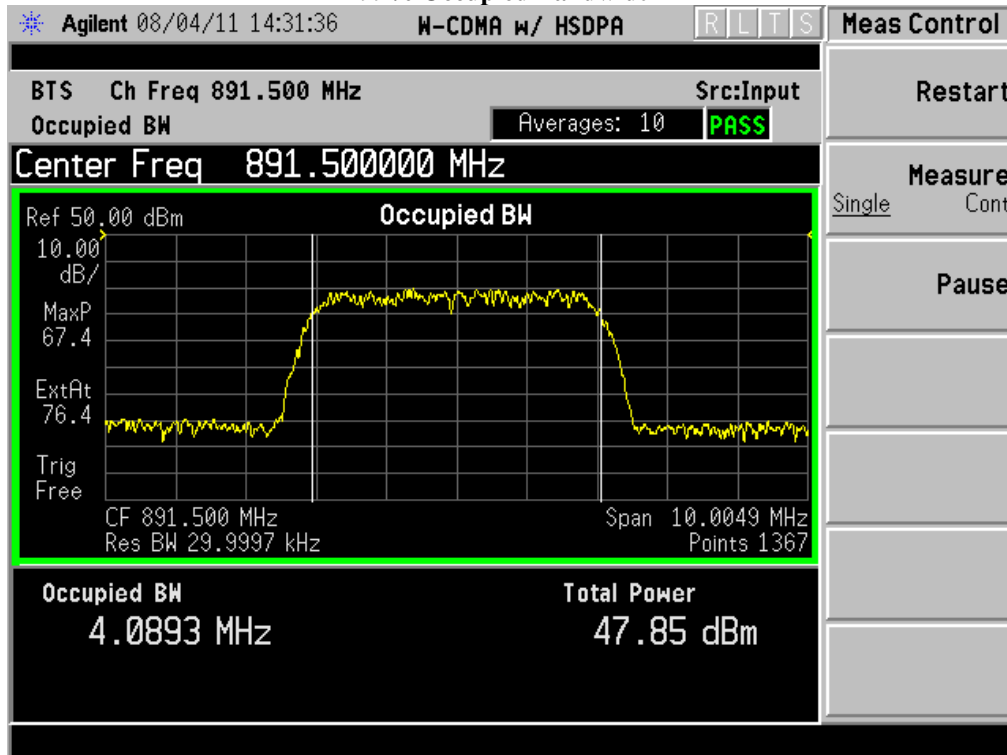


Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM). 99% Occupied Bandwidth

TM5-44 (16QAM) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz

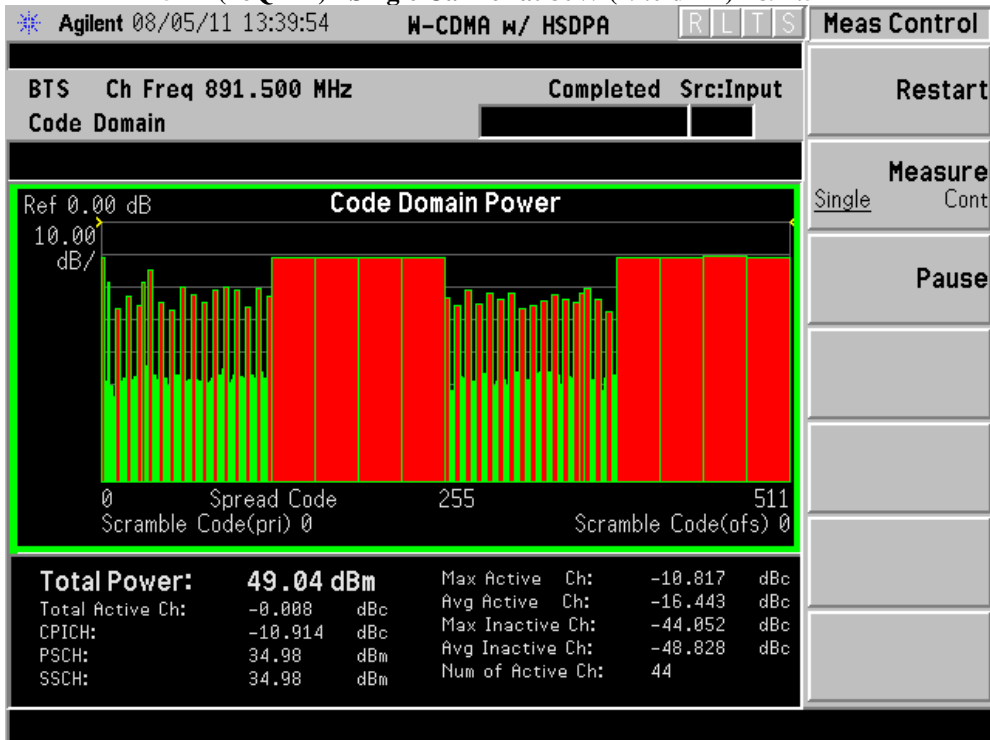


99% Occupied Bandwidth

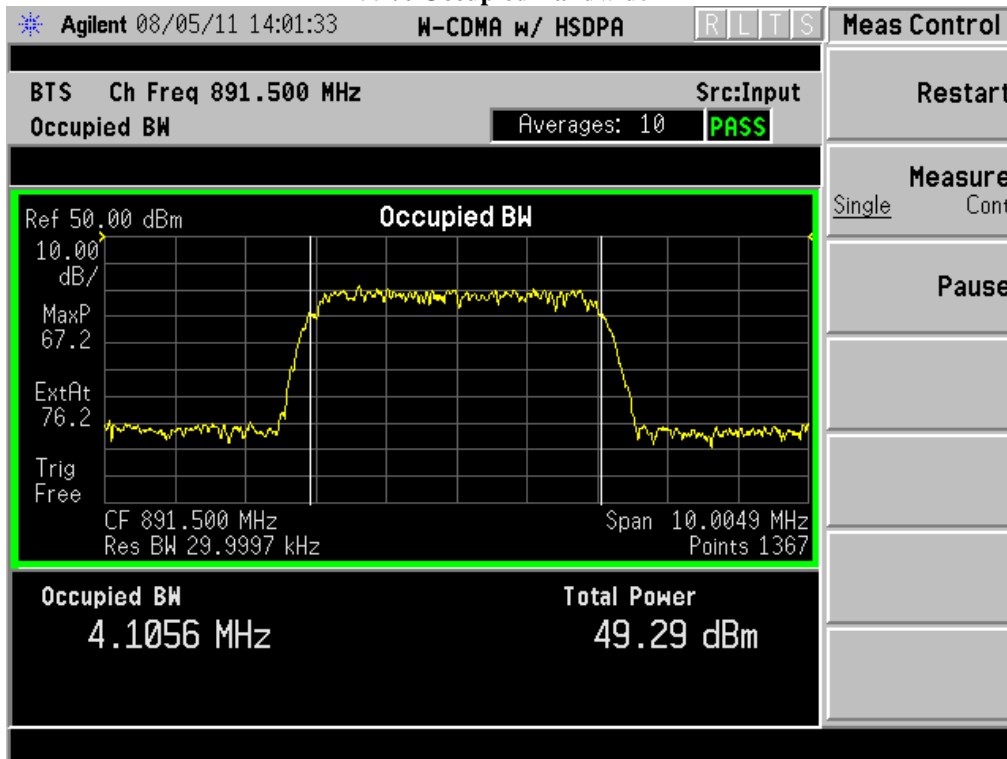


Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM). 99% Occupied Bandwidth

TM5-44 (16QAM) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



99% Occupied Bandwidth



PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH

Method 2. Emission mask limitation using a Rohde & Schwarz ESIB-40 EMI Test Receiver with Total Integrated Laboratory Environment (TILE) test software.

Compliance with the ETSI TS 25.141 occupied bandwidth emission mask requirements and with Part 22.917 was demonstrated using a Rohde & Schwarz ESIB-40 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 were performed for both a single-carrier and for two-carrier operation, with both TM1-64 and TM5-44 ETSI test modulations.

Measurements were performed at the Equipment Antenna Terminal (EAC) for the following configurations:

- 1) 3S1C - 60W: single carrier and single HE PAM
- 2) 3S1C - 80W: single carrier and 2 parallel HE PAM
- 3) 3S2C - 30W/C: two adjacent carriers and single HE PAM
- 4) 3S2C - 50W/C: two adjacent carriers and 2 parallel HE PAM

The same UARFCN channels as previously cited were repeated. The emission mask used to demonstrate compliance was as specified in ETSI TS 25.141 for $P \geq +43$ dBm. The mask attenuation values were based on a 30 kHz resolution bandwidth, which made the modulated 5 MHz carrier to be offset from +46 dBm by -22.218 dB, in accordance with the equation:

$$\text{Carrier Offset} = 10 \log (30 \text{ kHz}/5 \text{ MHz}) = -22.218 \text{ dB}$$

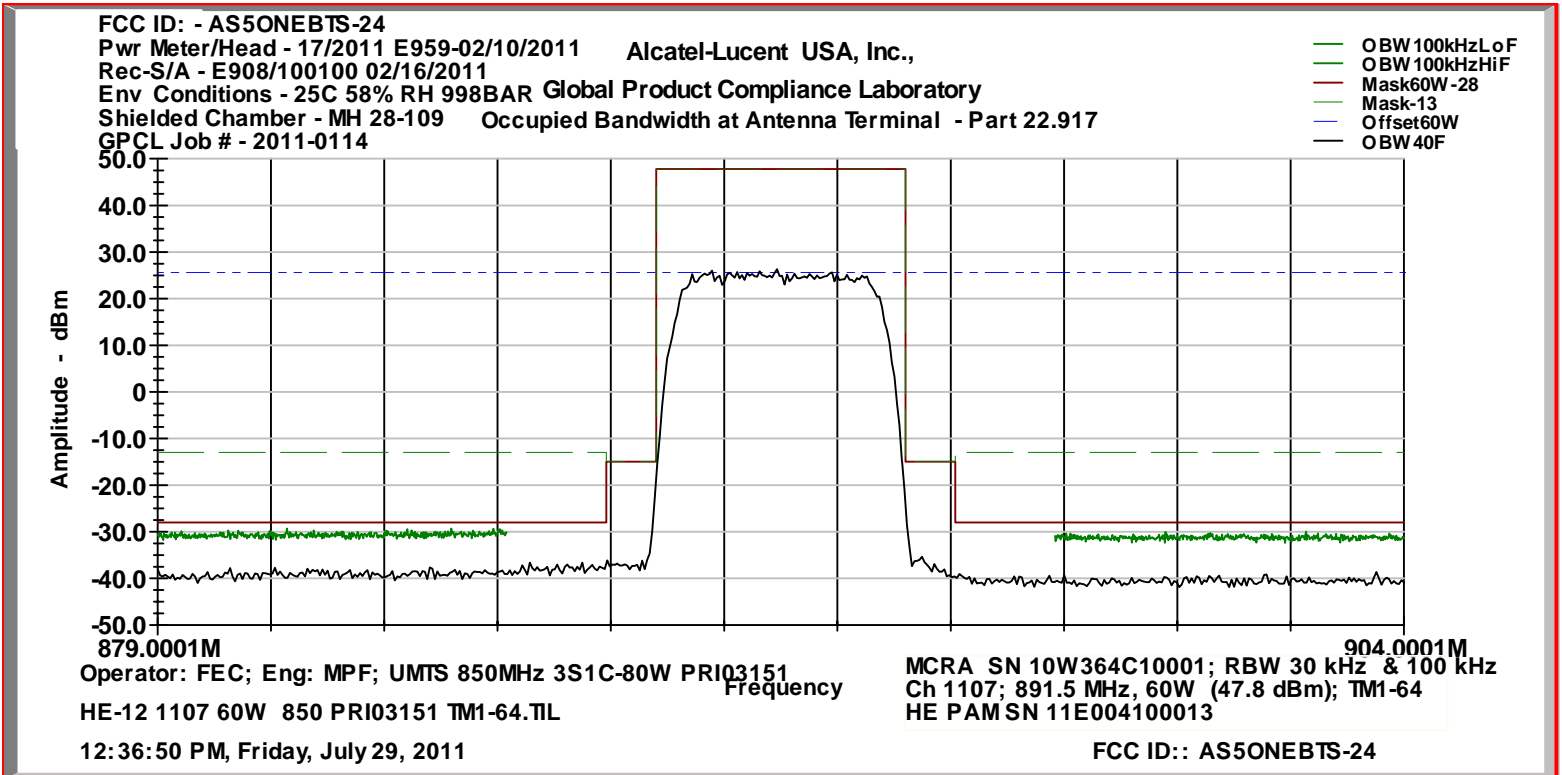
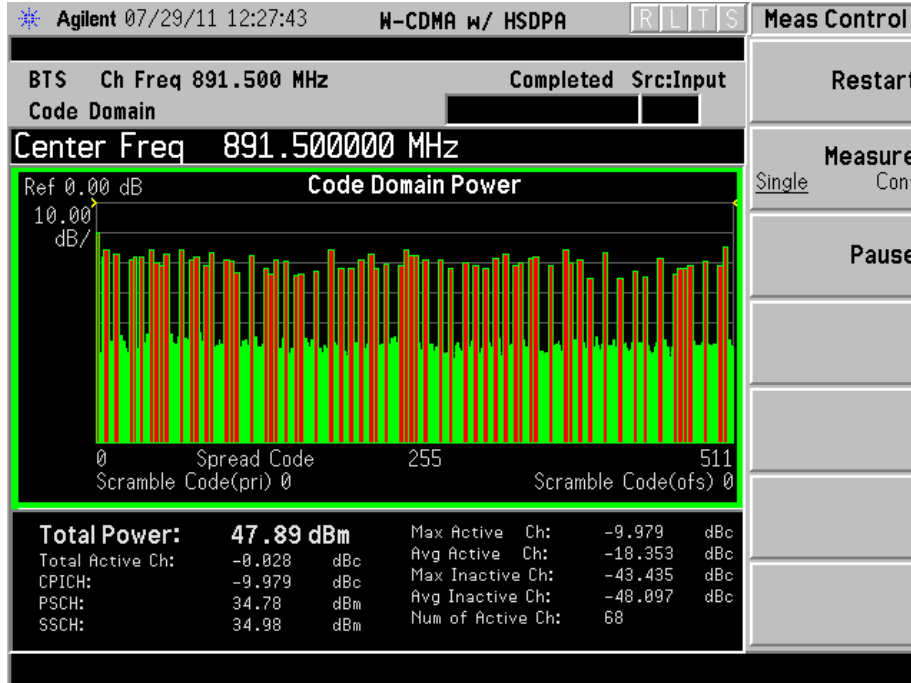
The plots for each channel measured are recorded and stored on file. For brevity, only the highest single-carrier and two-carrier frequencies will be displayed in this exhibit, as done previously.

Test Set-up and Configuration: Same as previously used for Part 2.1046 RF Power Measurement.

RESULTS: All UARFCN channels measured demonstrate compliance with the emission mask specified by ETSI TS 25.141; the carriers do not exceed the mask limitation. The data plots attached below show characteristics consistent with all measurements. **For brevity, only the highest single-carrier and two-carrier frequencies will be displayed in this exhibit, as done previously.**

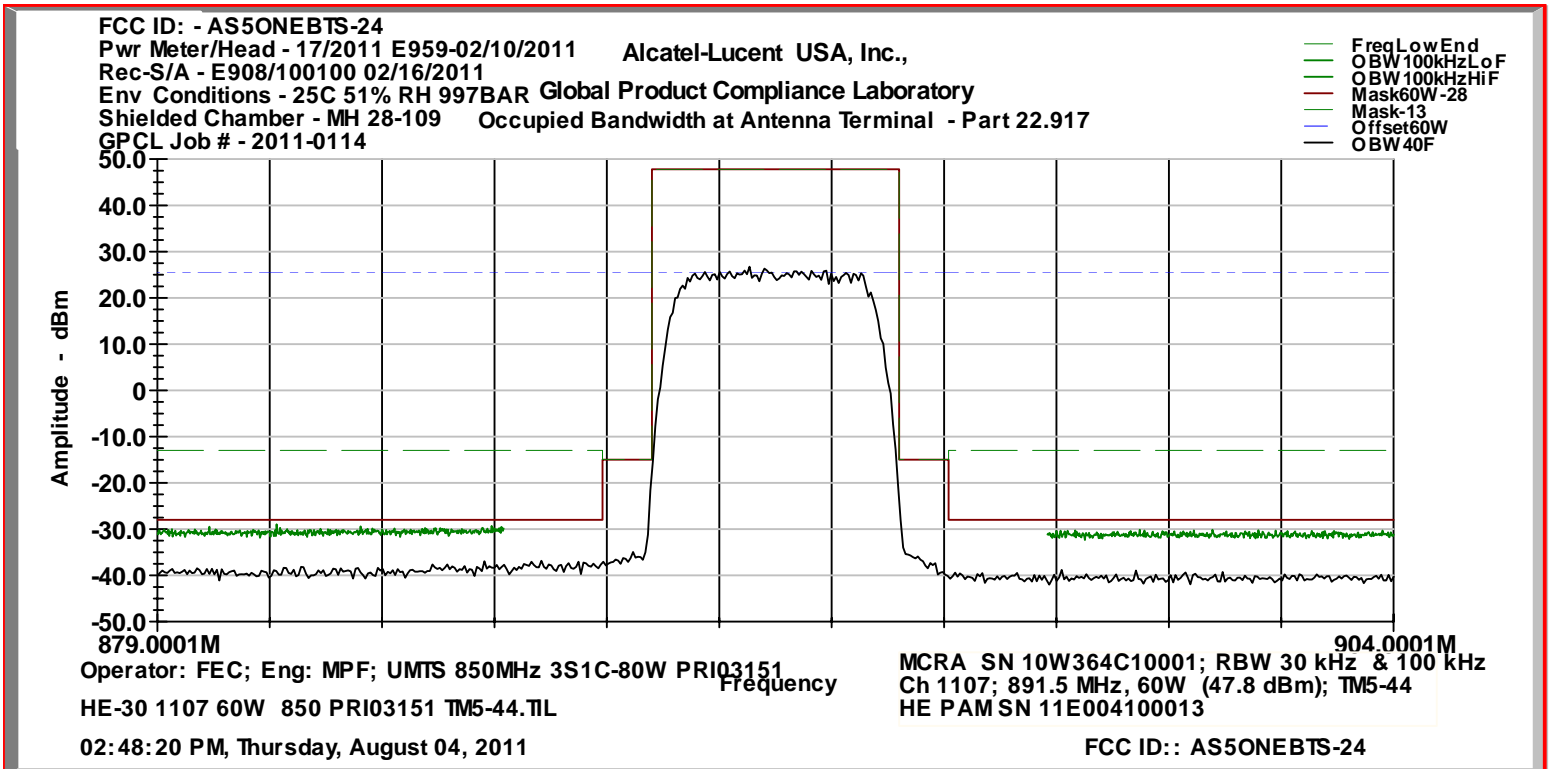
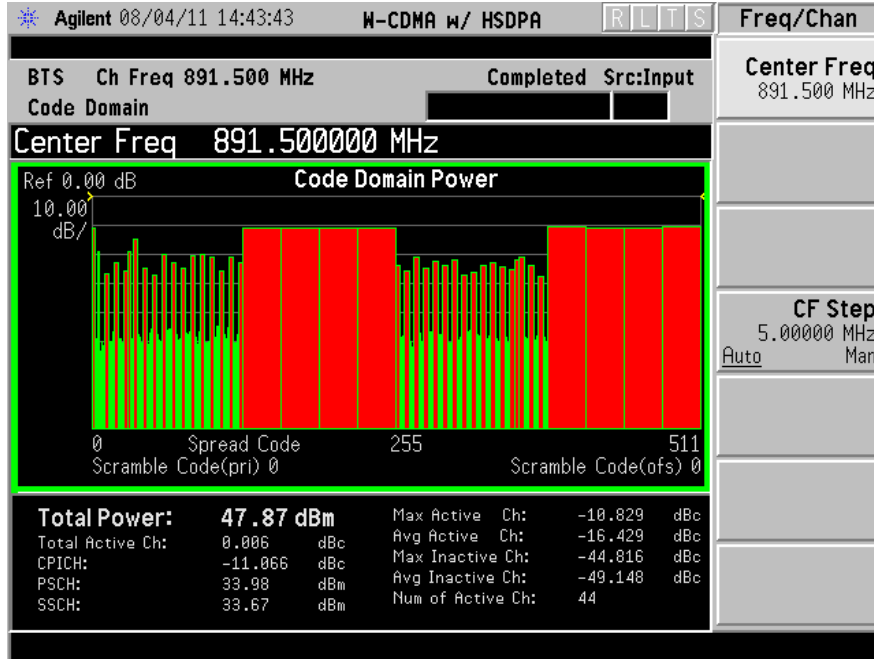
1a) 3S1C - 60W: SINGLE CARRIER AND SINGLE HE PAM AT 891.5 MHZ

Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK) - 60W
 TM1-64 (QPSK) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz



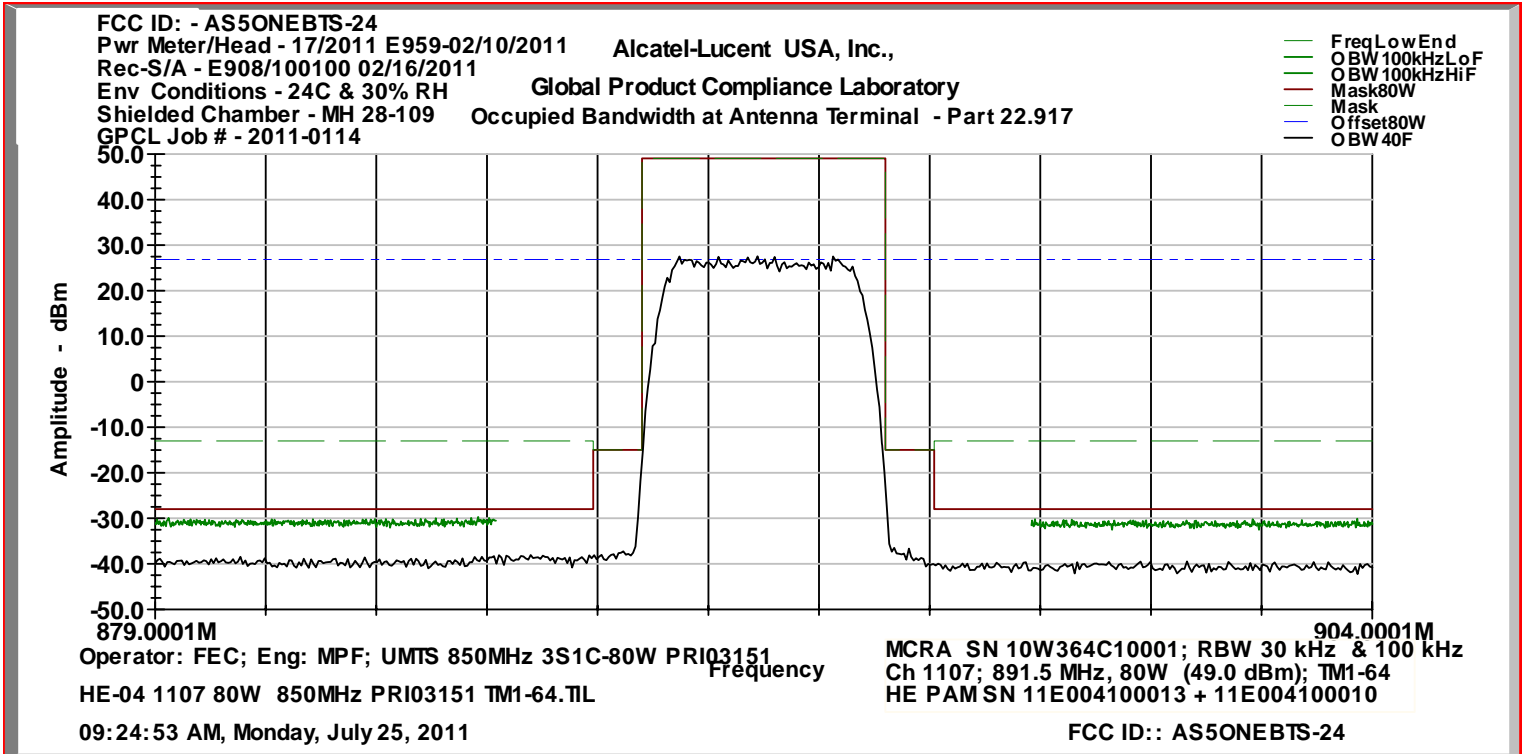
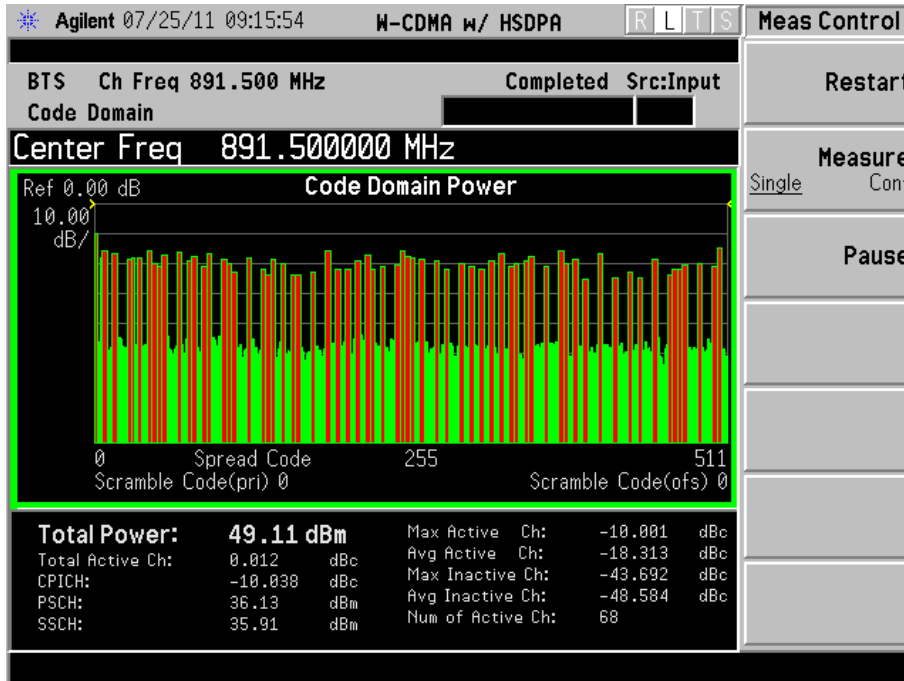
1b) 3S1C - 60W: SINGLE CARRIER AND SINGLE HE PAM AT 891.5 MHZ

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 60W
TM5-44 (16QAM) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz



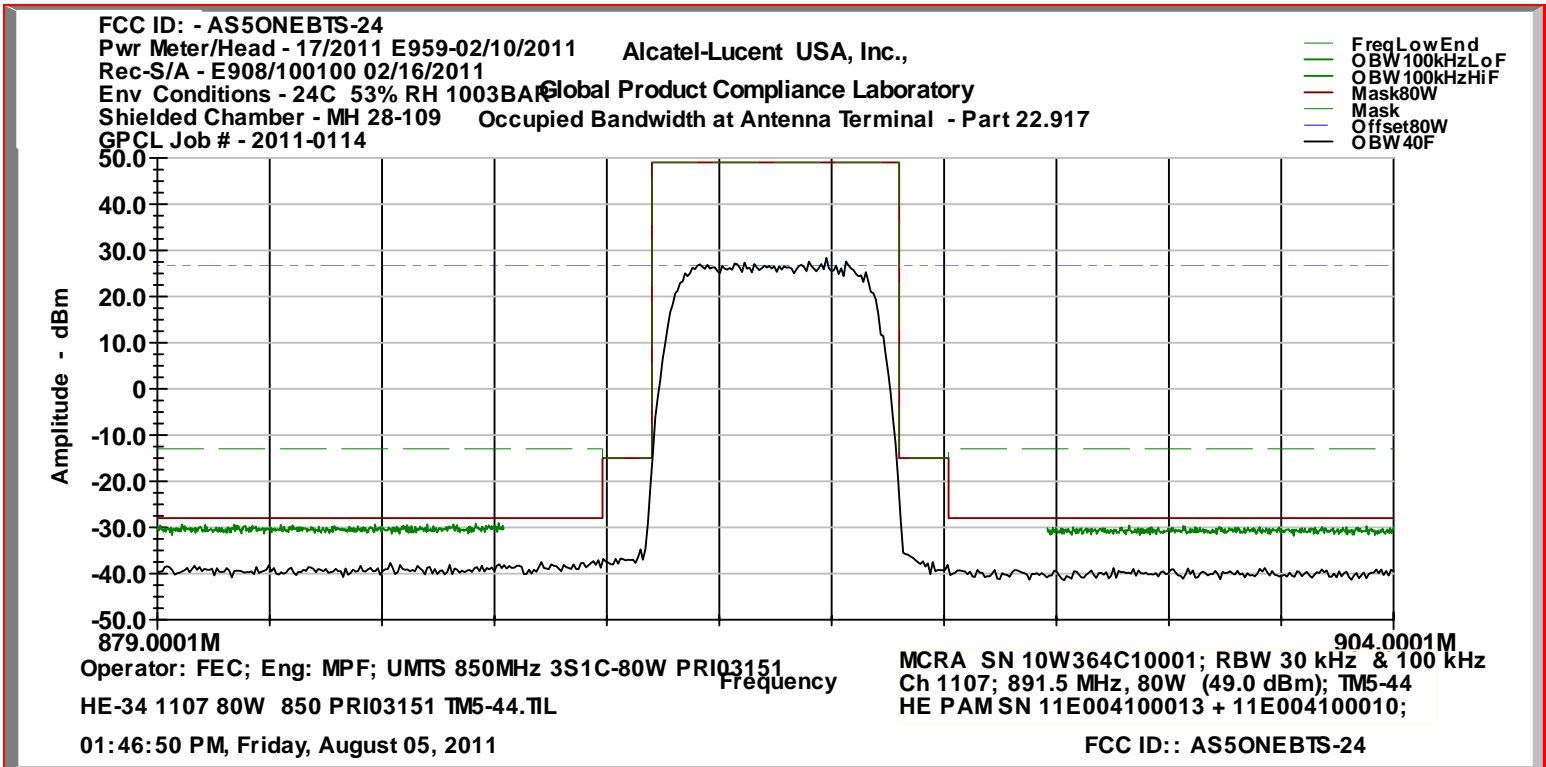
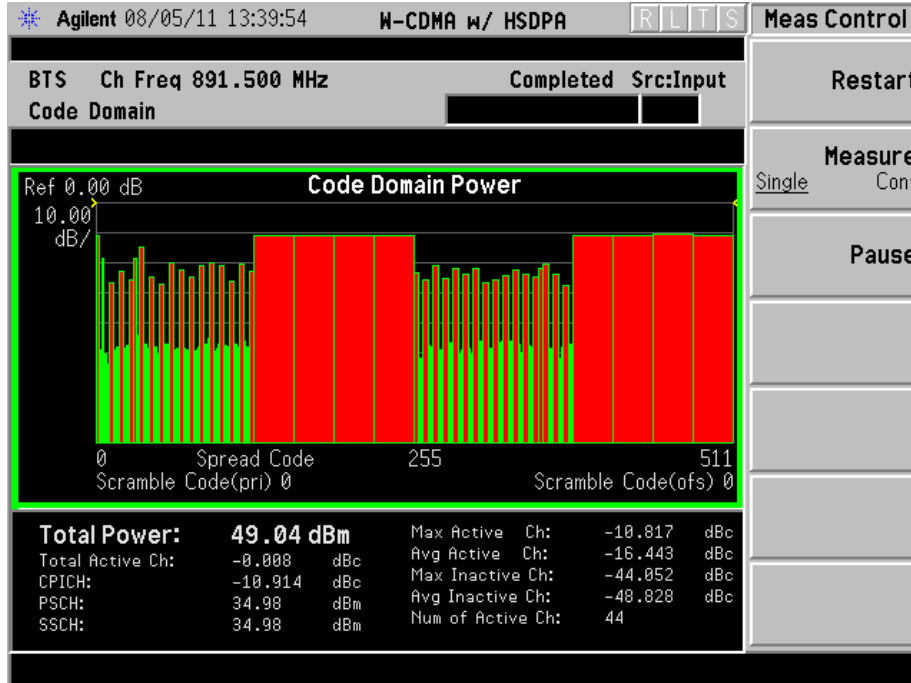
2a) 3S1C - 80W: SINGLE CARRIER AND 2 PARALLEL HE PAM

Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK) - 80W
TM1-64 (QPSK) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



2b) 3S1C - 80W: SINGLE CARRIER AND 2 PARALLEL HE PAM

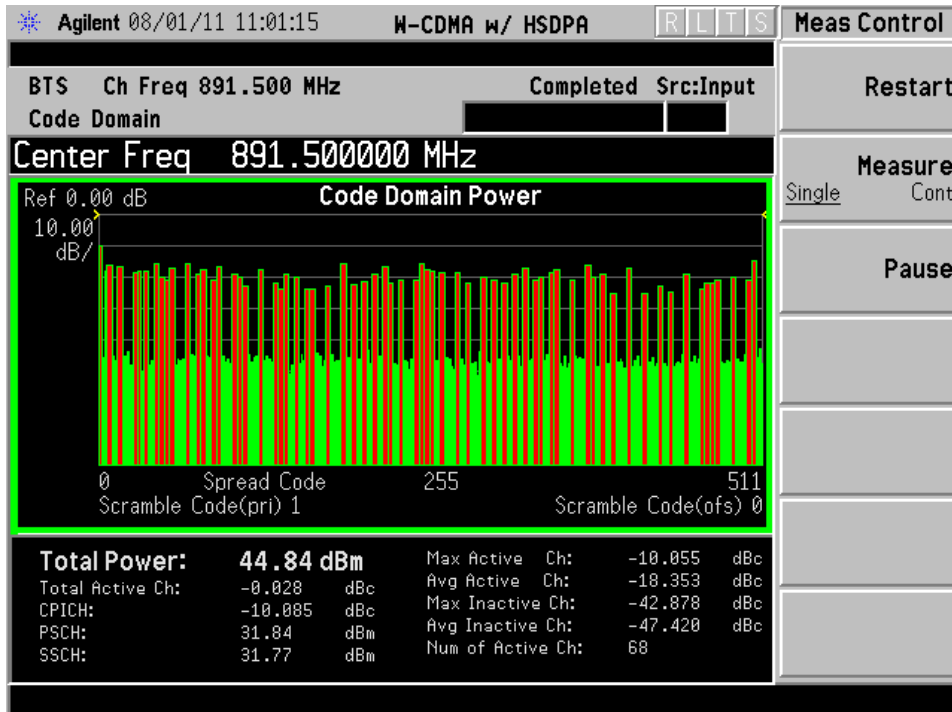
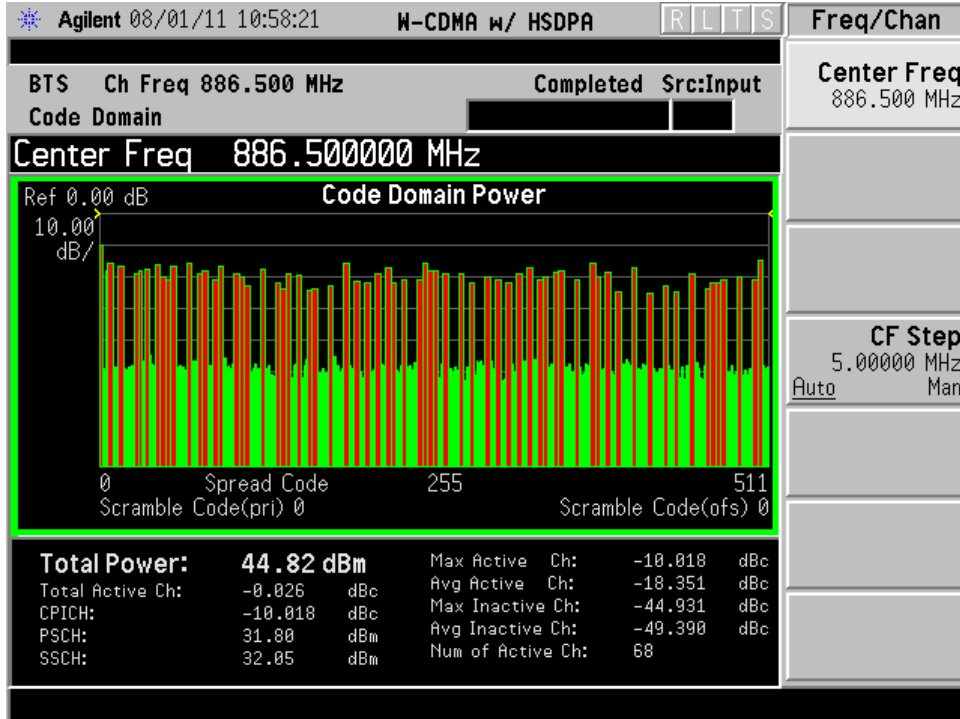
Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 80W
TM5-44 (16QAM) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



3a) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 30W/C with Total Composite Power 60W

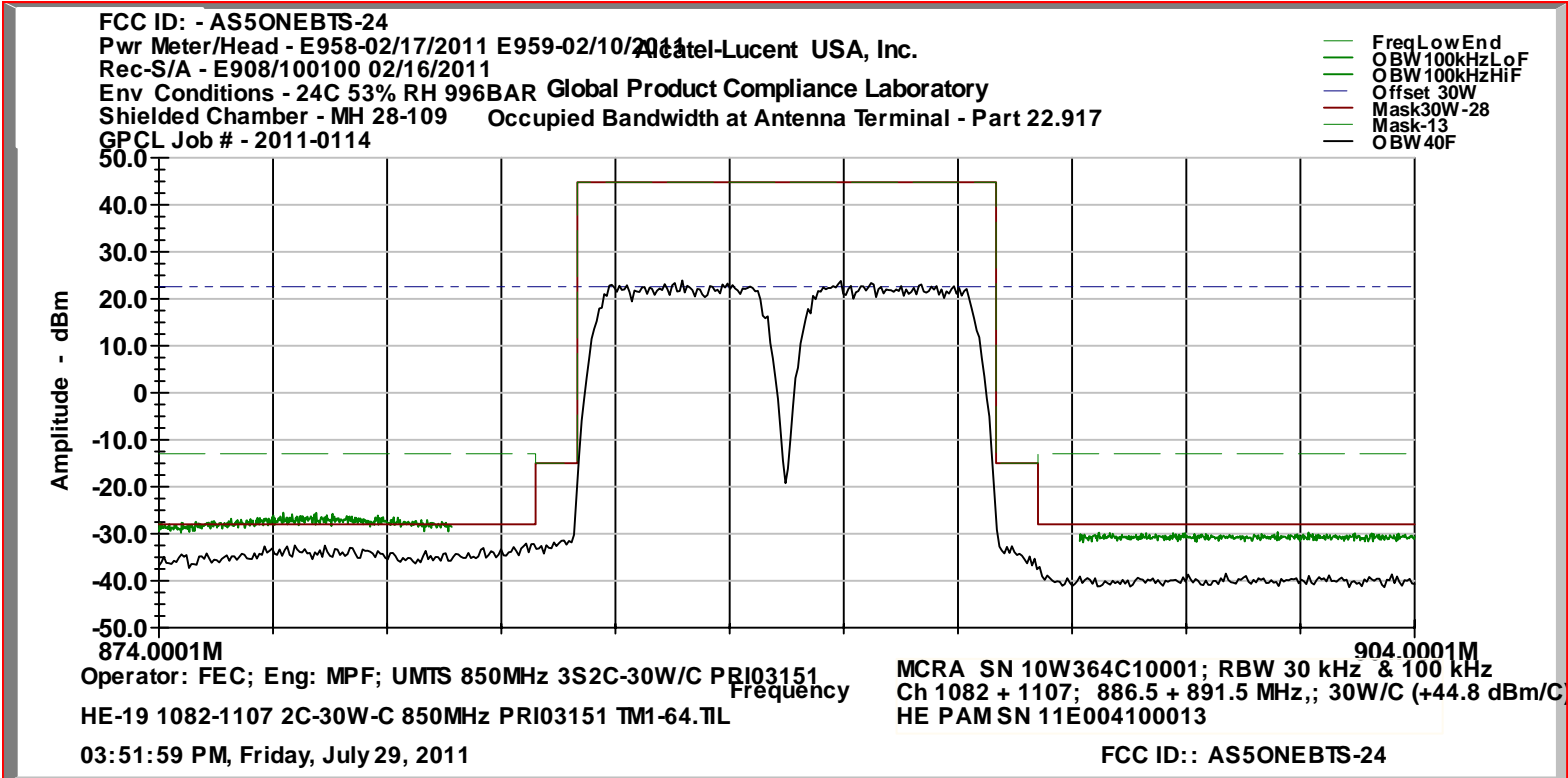
TM1-64 (QPSK) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



3a) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

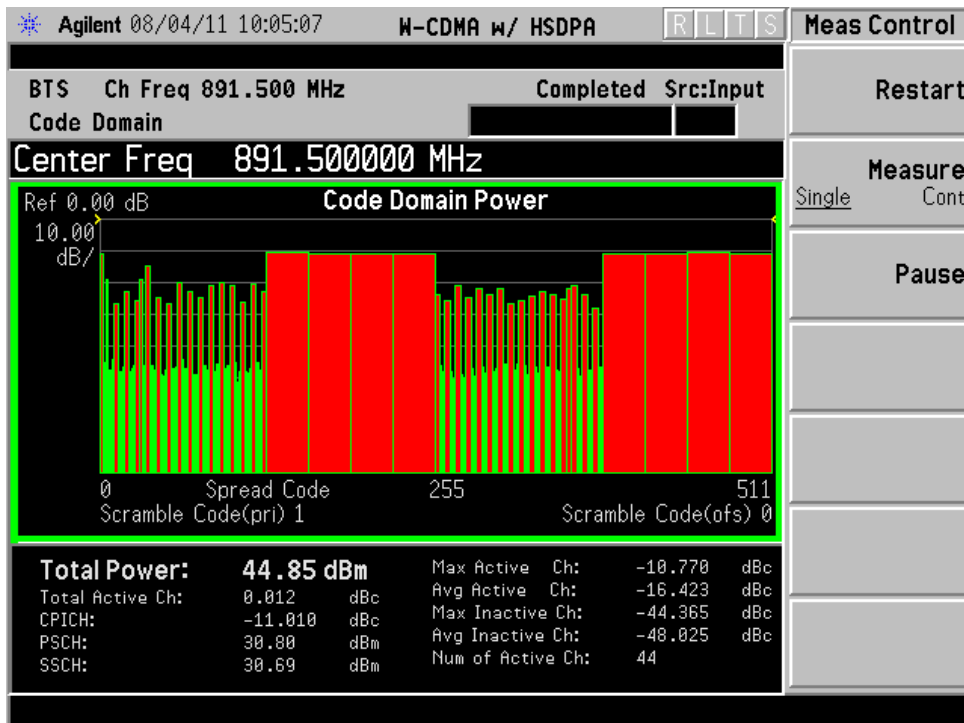
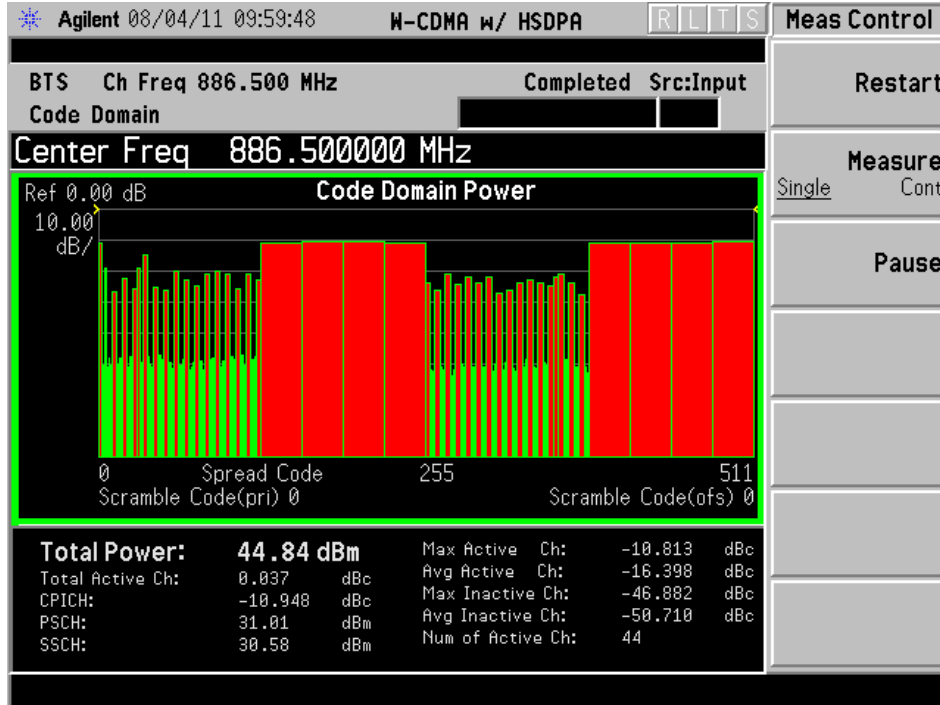
Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 30W/C with Total Composite Power 60W

TM1-64 (QPSK) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



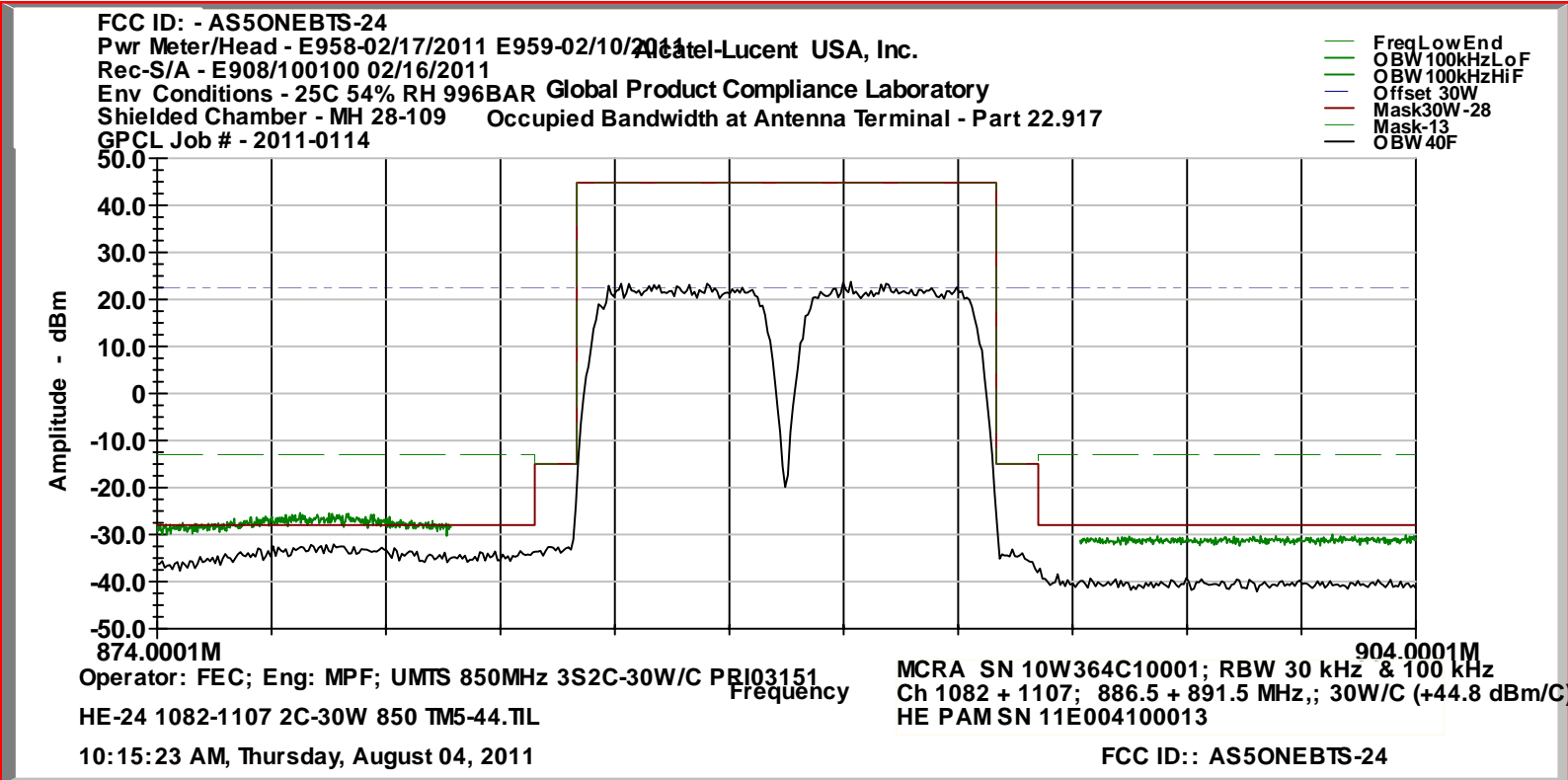
3b) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 30W/C with Total Composite Power 60W
TM5-44 (16QAM) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



3b) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

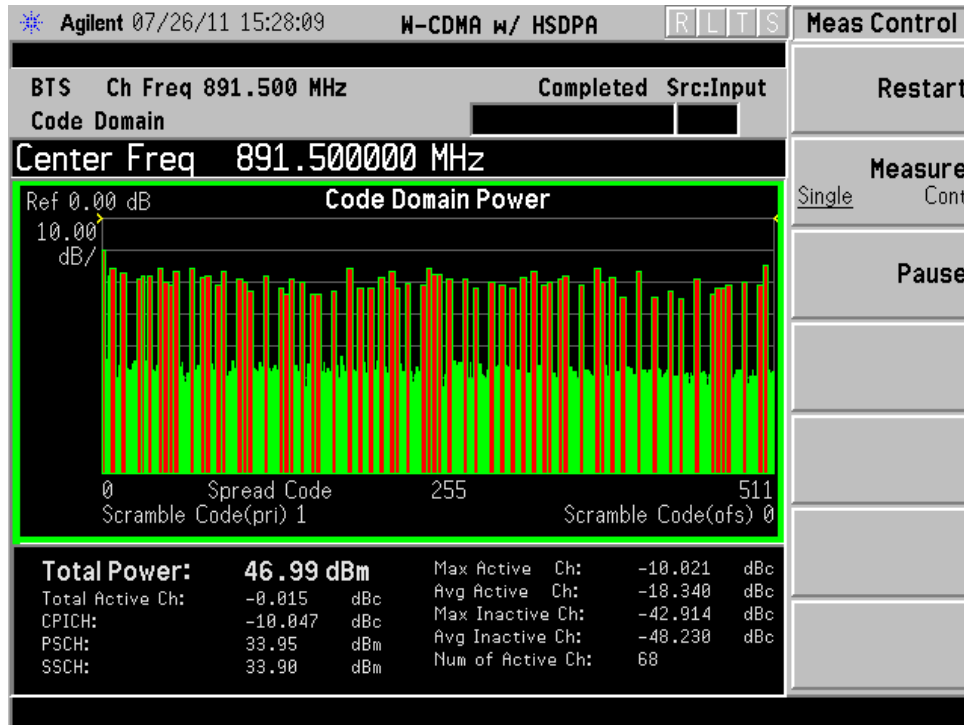
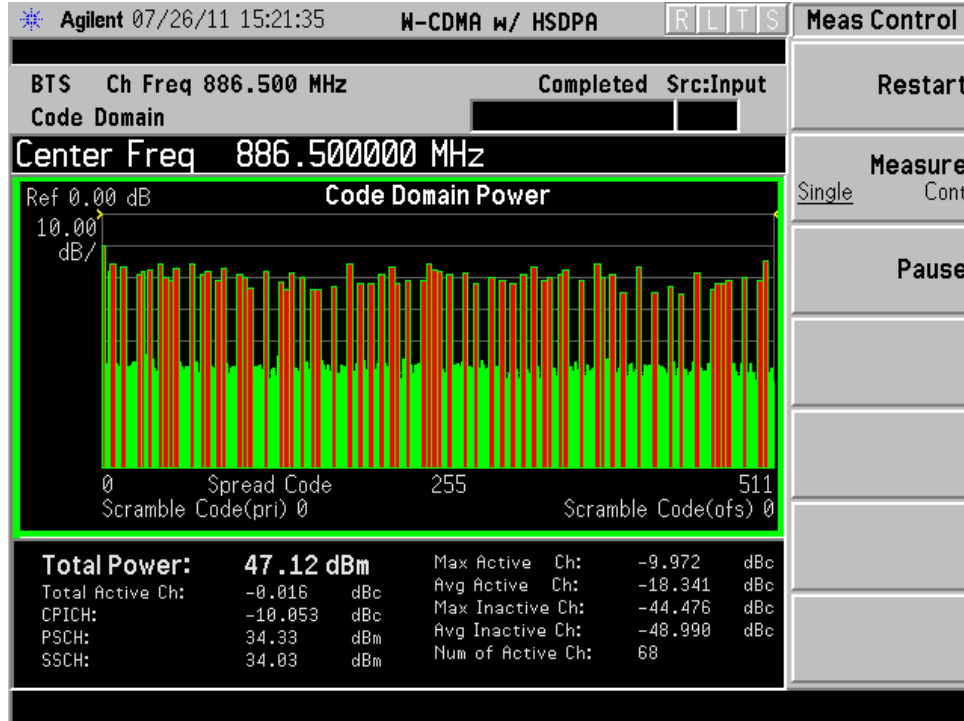
Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 30W/C with Total Composite Power 60W
TM5-44 (16QAM) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



4a) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 50W/C with Total Composite Power 100W

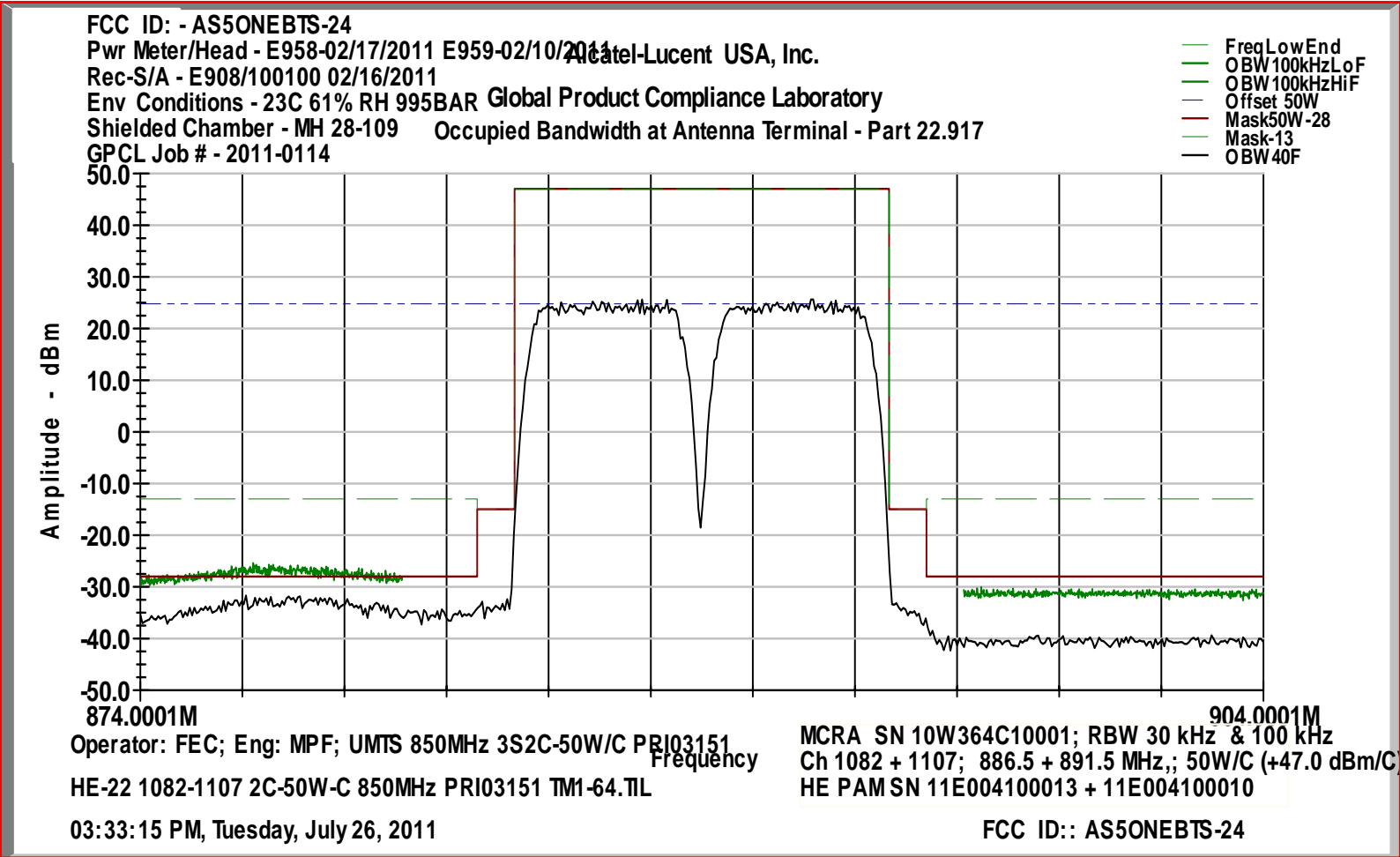
TM1-64 (QPSK) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



4a) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

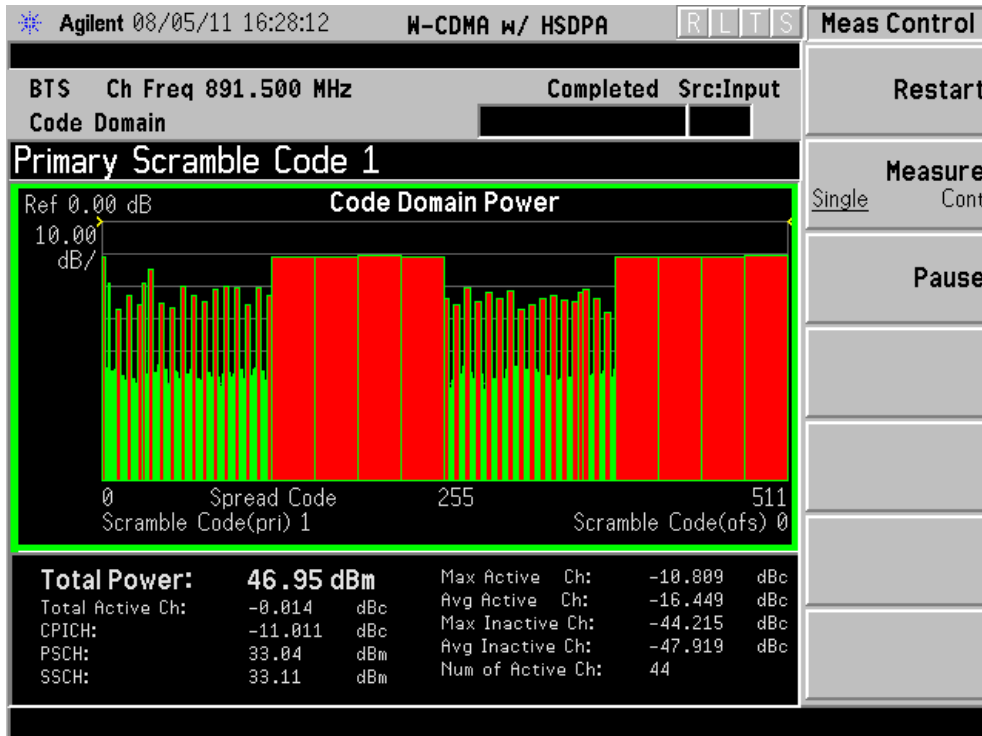
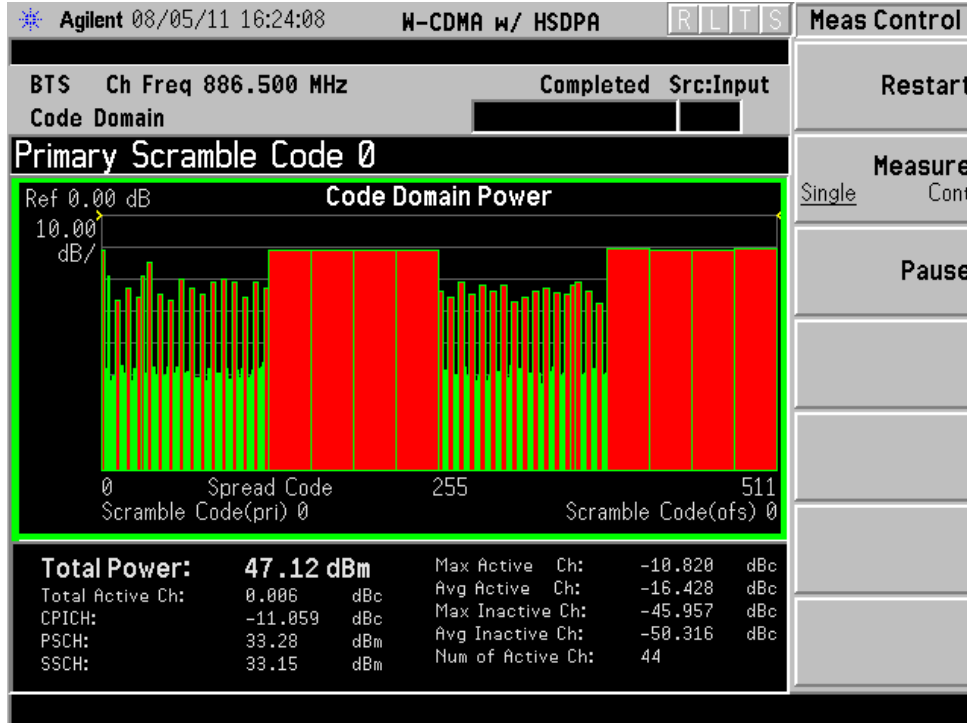
Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 50W/C with Total Composite Power 100W

TM1-64 (QPSK) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



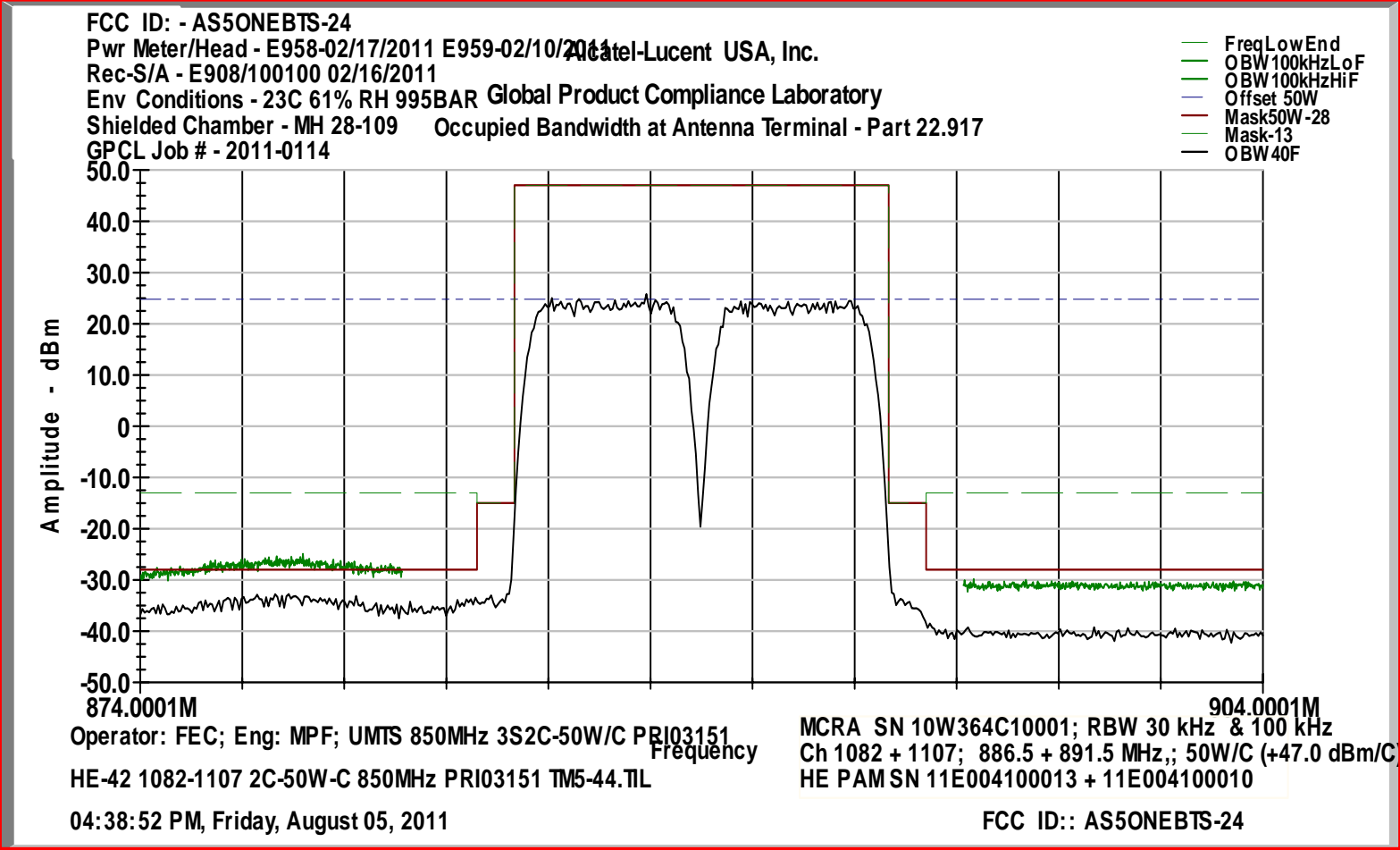
4b) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 50W/C with Total Composite Power 100W
 TM5-44 (16QAM) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



4b) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 50W/C with Total Composite Power 100W
TM5-44 (16QAM) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



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.

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 22.917 (a) ... the power of any emission shall be attenuated below the transmitter power (*P*) by at least $43 + 10 \log (P)$ dBc. The power *P* is the average carrier power measured at the EAC (antenna) terminal in Watts. Setting the power level at EAC as shown below, produces the corresponding emission attenuation below the carrier in dBc, which all equate to -13 dBm.

- 1) 3S1C at P = 60W; Required Spurious Emission Attenuation = 60.78 dBc (-13.0 dBm)
- 2) 3S1C at P = 80W; Required Spurious Emission Attenuation = 62.03 dBc (-13.0 dBm)
- 3) 3S2C at P = 30W/C; Required Spurious Emission Attenuation = 57.77 dBc (-13.0 dBm)
- 4) 3S2C at P = 50 W/C; Required Spurious Emission Attenuation = 59.99 dBc (-13.0 dBm)

Part 22.917 (b) specifies the required Resolution Bandwidth (RBW) to be 100 kHz 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. Hence, the measurement equipment must be adjusted and configured to provide an instrumentation noise floor that is at least 20 dB or more below the $43 + 10 \log (P)$ dBc limit. The pertinent test parameters are:

- 1. Frequency Spectrum: 10 MHz to 10 GHz
- 2. Resolution Bandwidth: 100 kHz or greater (Part 22.917)
- 3. Emission Limitation: $43 + 10 \log (P)$ dBc
- 4. Instrumentation Noise Floor: at least 20 dB greater than “ $43 + 10 \log (P)$ dBc”

Test Set-up and Configuration: Same as previously used for Part 2.1046 RF Power Measurement.

Method of Measurement:

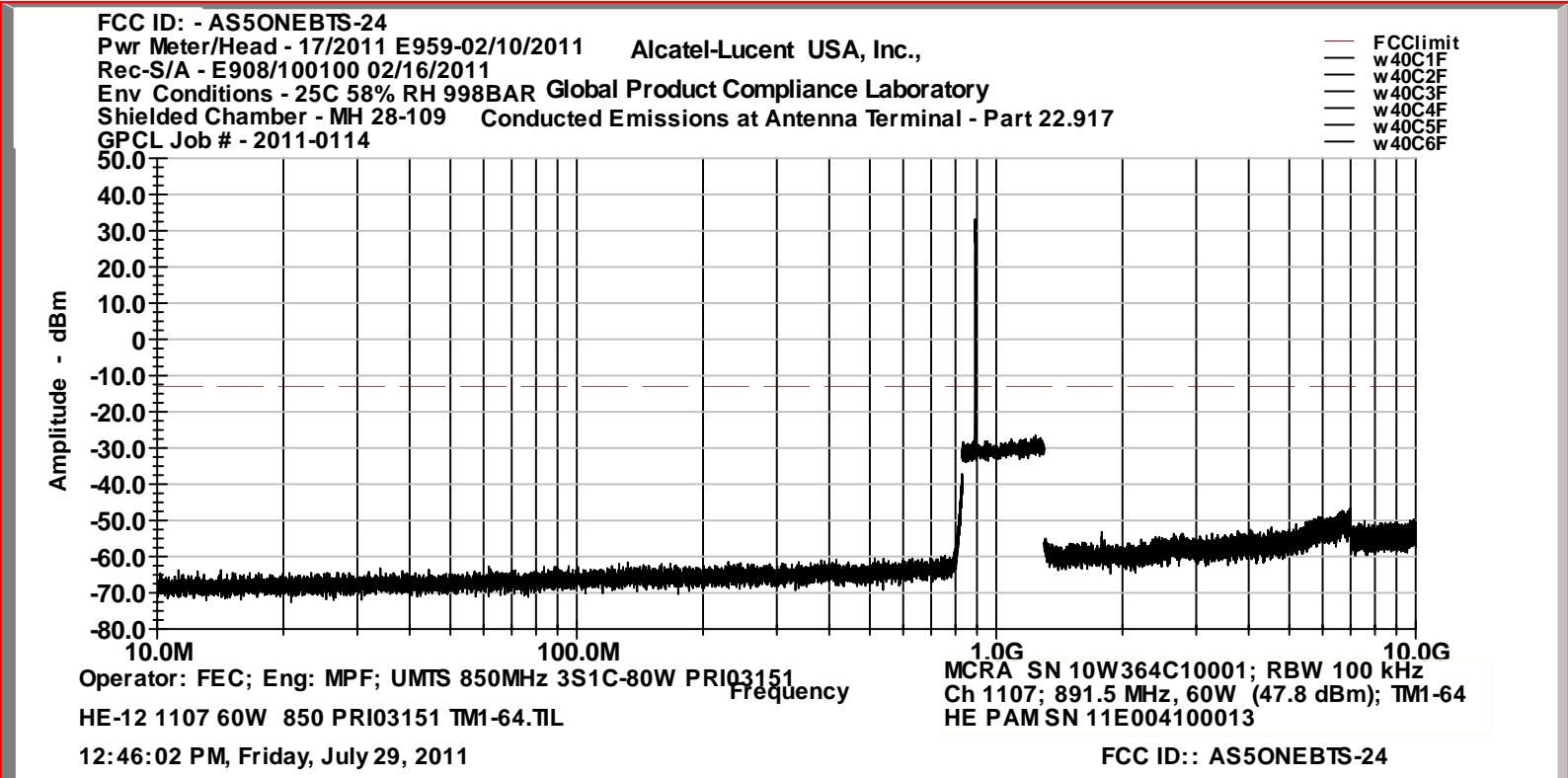
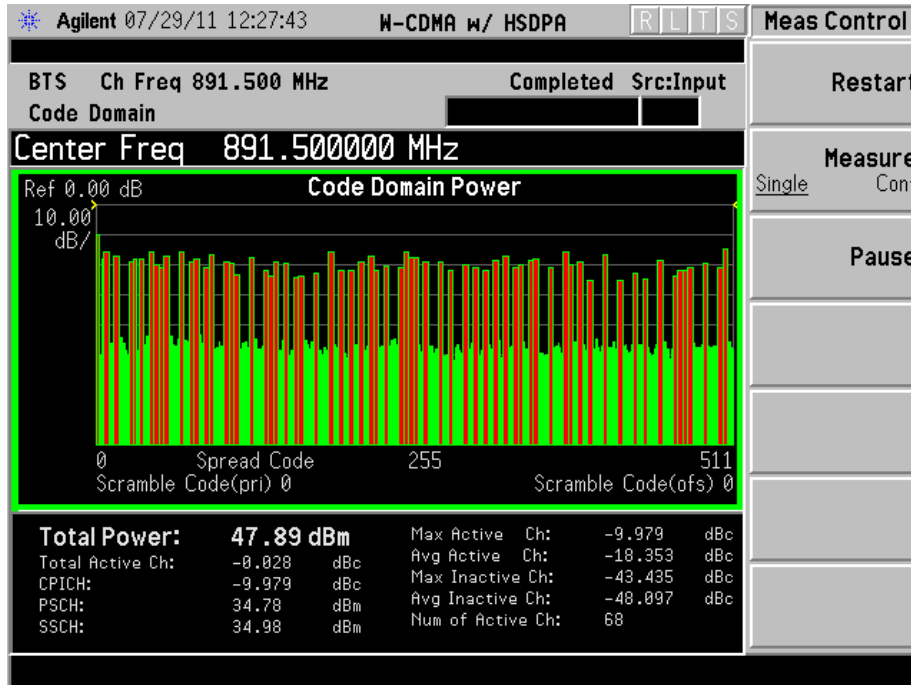
In order to suppress the instrumentation noise floor sufficient to detect and measure spurious signals that have power levels as low as 20 dB below the required limit, an EMC software package was employed to drive the spectrum analyzer, collect and compile the acquired data, perform mathematical corrections to the data by incorporating pre-measured path losses into the software, and then generate a graphical display as shown in this exhibit. 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,

Part 22.917 requires that emissions over the required spectrum 10 MHz to 10 GHz be measured using an instrumentation resolution bandwidth of 100 kHz or greater. The TILE/IC software was able to sufficiently suppress the noise floor by measuring the spectrum in a sequential series of short segments using a peak detector, perform mathematical corrections to each segment, and then sequentially compile all the segments into a continuous graphical display. These measurements were performed in combination with an appropriate instrumentation low-pass filter and high-pass filter, installed at the input terminal of the spectrum analyzer.

Results: For each UMTS carrier, there were no reportable emissions. Data plots for each carrier, previously displayed under 2.1049, are attached to this exhibit.

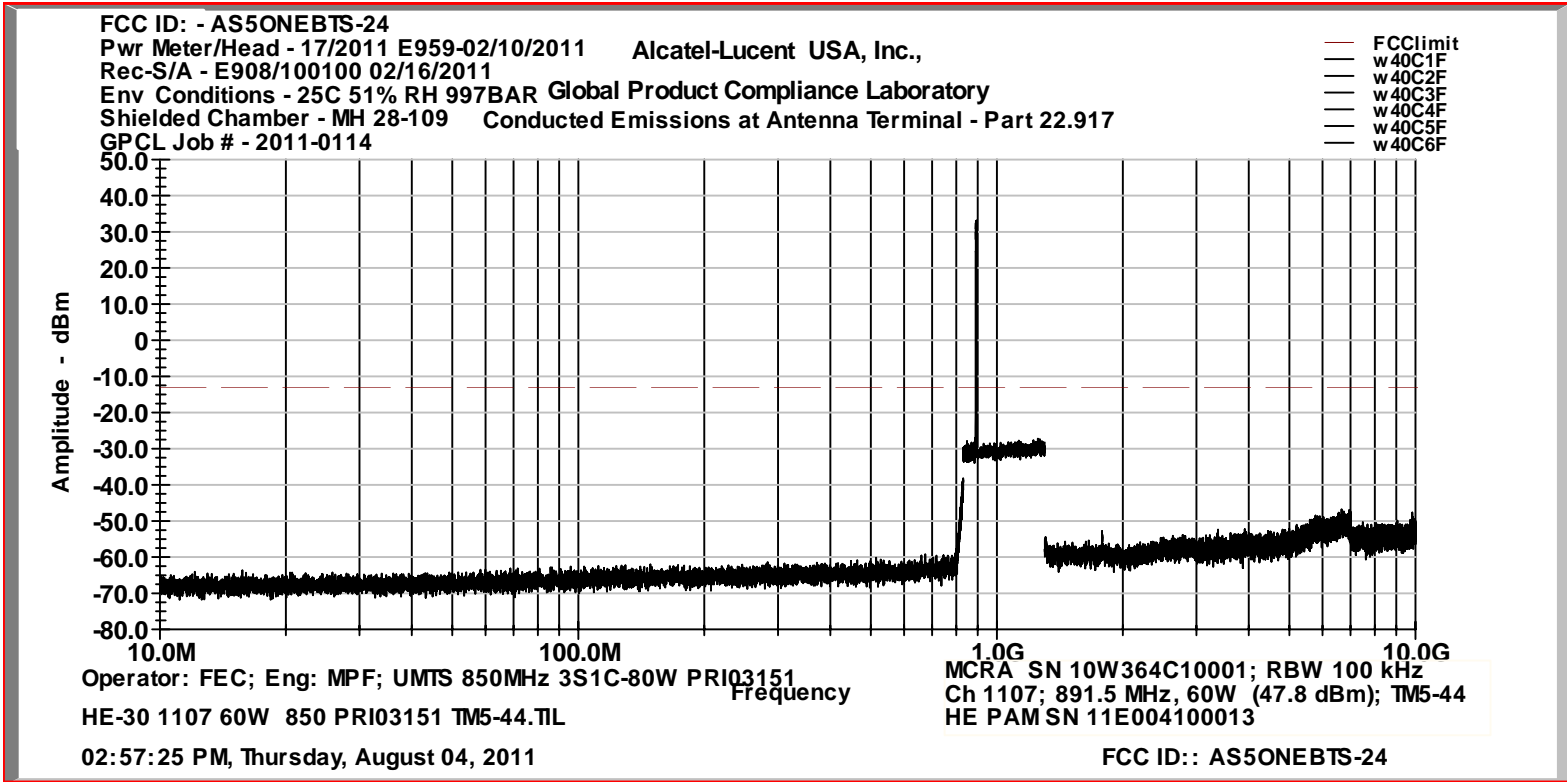
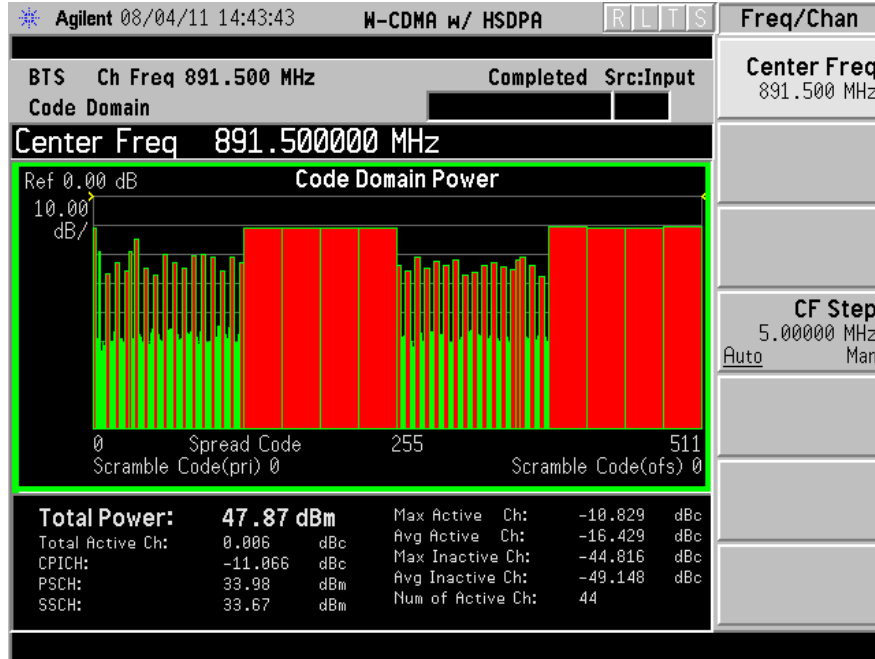
1a) 3S1C - 60W: SINGLE CARRIER AND SINGLE HE PAM AT 891.5 MHZ

Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK) - 60W
TM1-64 (QPSK) - Single Carrier at 60W (47.8 dBm) - 891.5 MHz



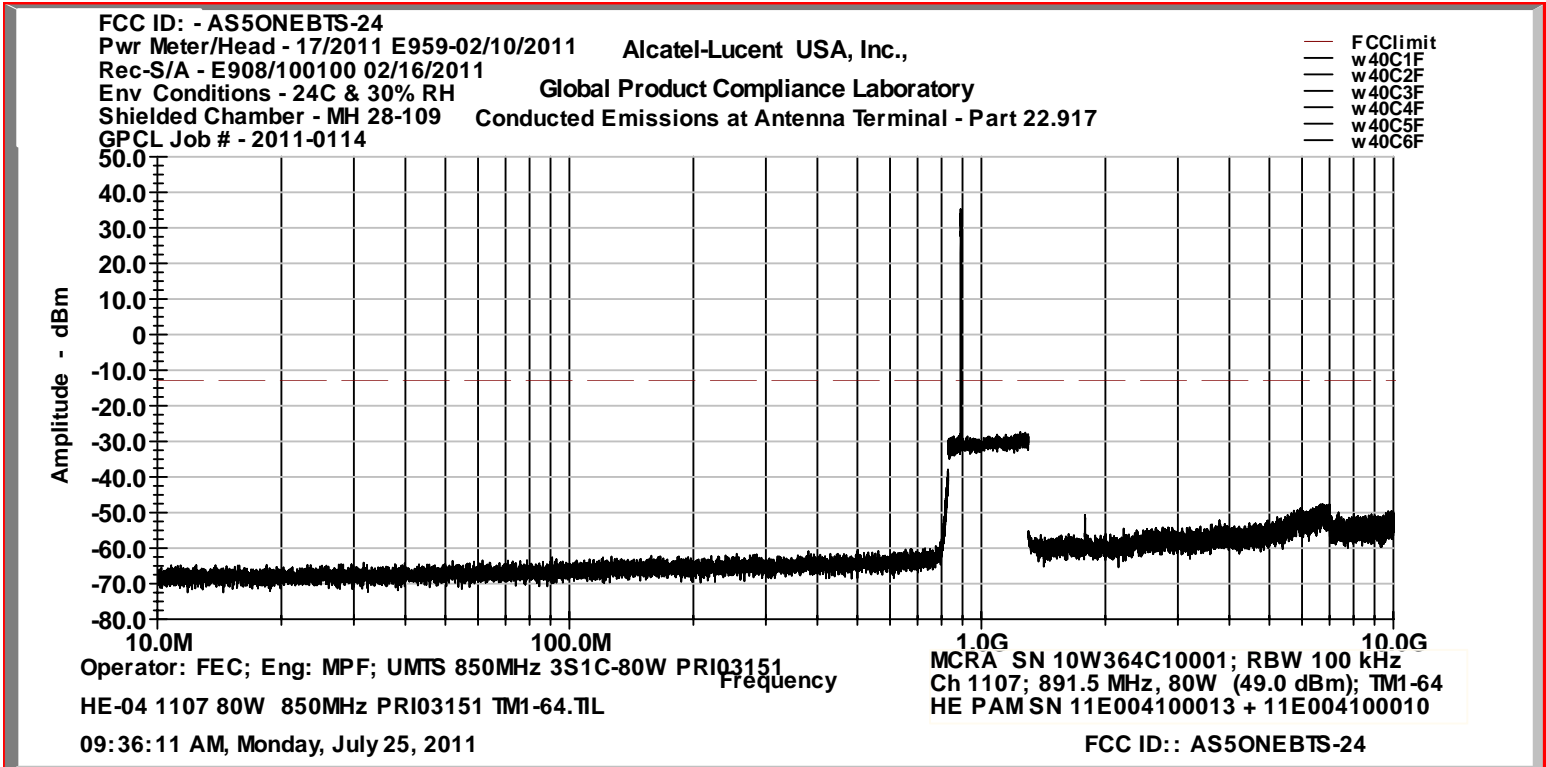
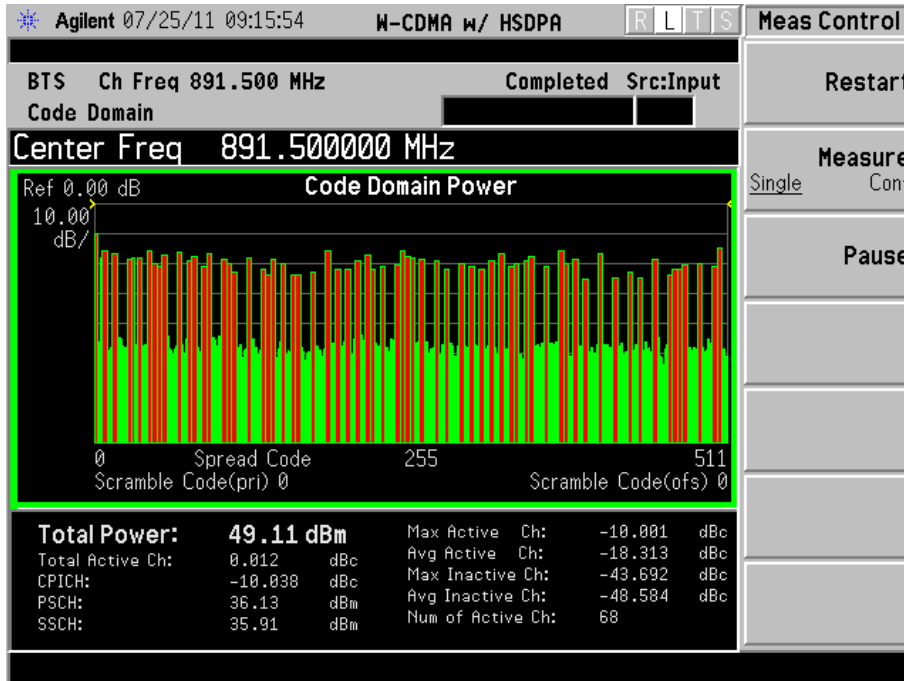
1b) 3S1C - 60W: SINGLE CARRIER AND SINGLE HE PAM AT 891.5 MHZ

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 60W
TM5-44 (16QAM) - Single Carrier at 60W (47.8 dBm) - 891.5 MHZ



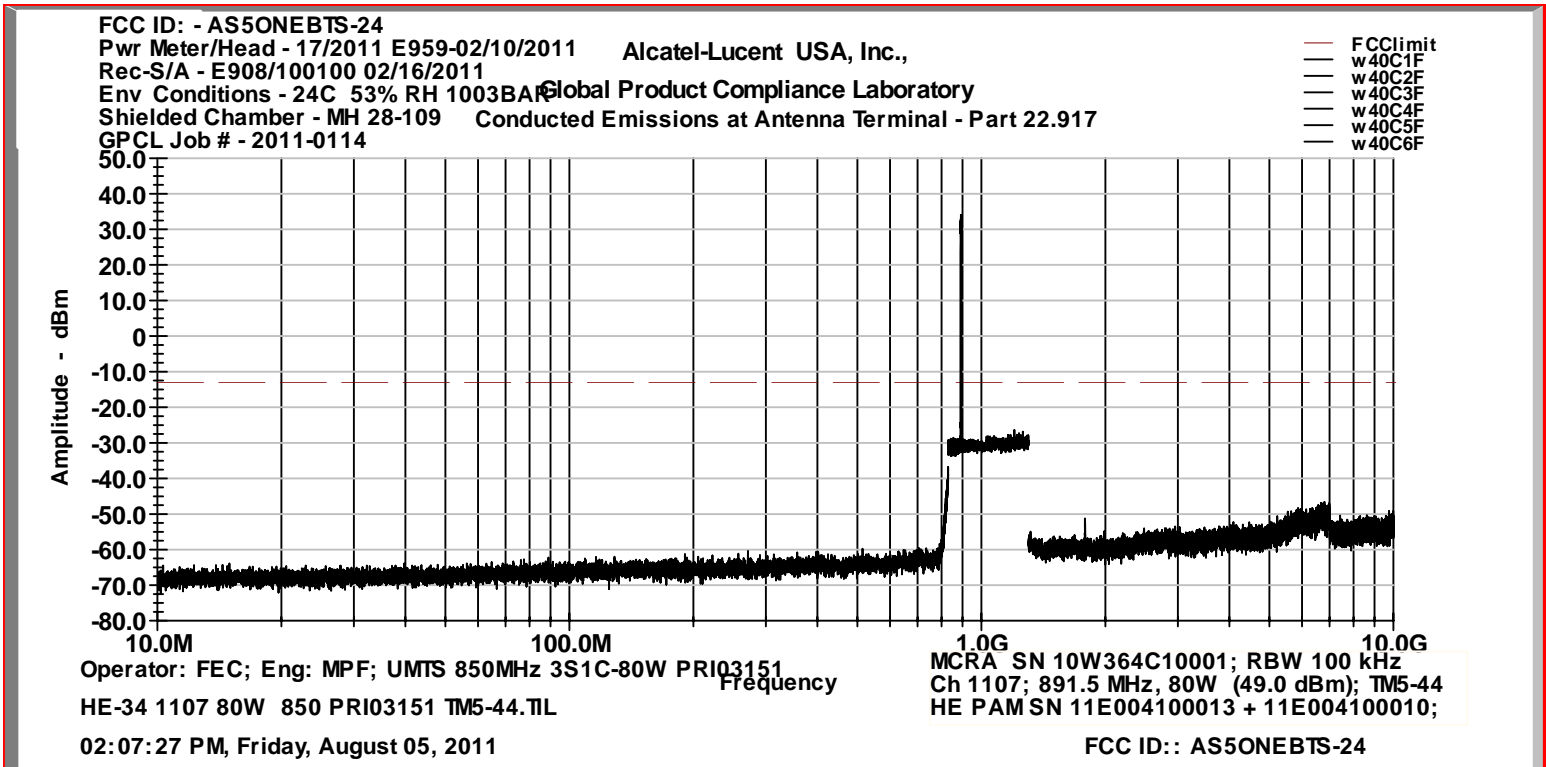
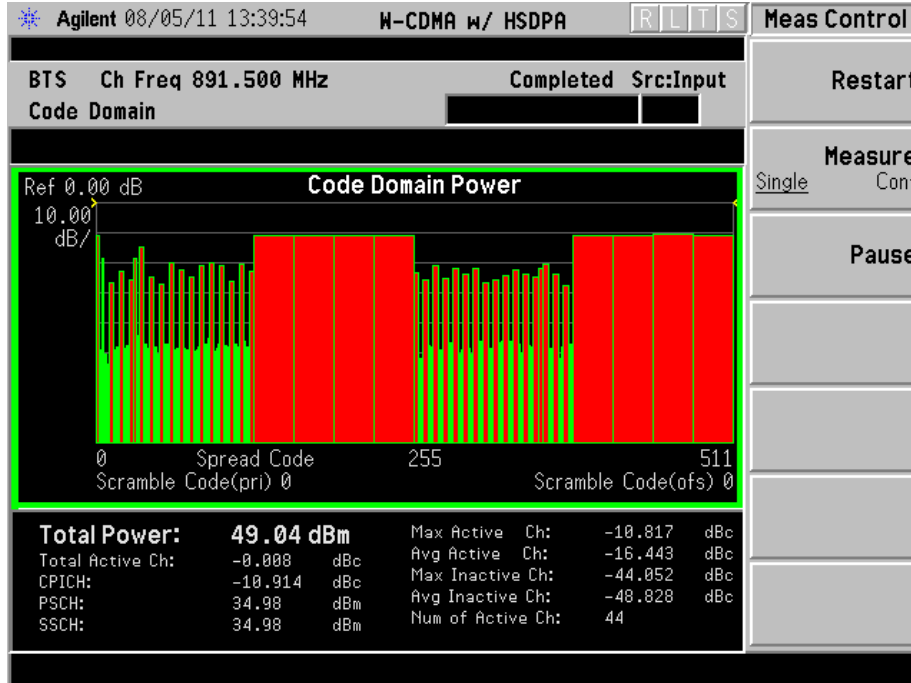
2a) 3S1C - 80W: SINGLE CARRIER AND 2 PARALLEL HE PAM

Test Modulation: TM1-64 with 68 active channels: 64 voice + 4 control (QPSK) - 80W
TM1-64 (QPSK) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



2b) 3S1C - 80W: SINGLE CARRIER AND 2 PARALLEL HE PAM

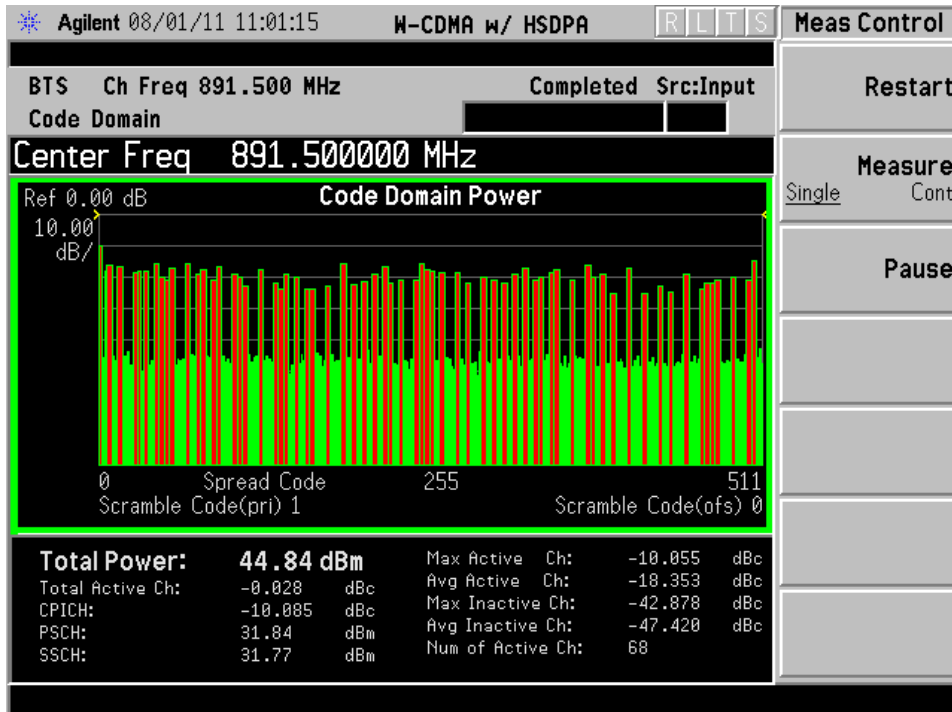
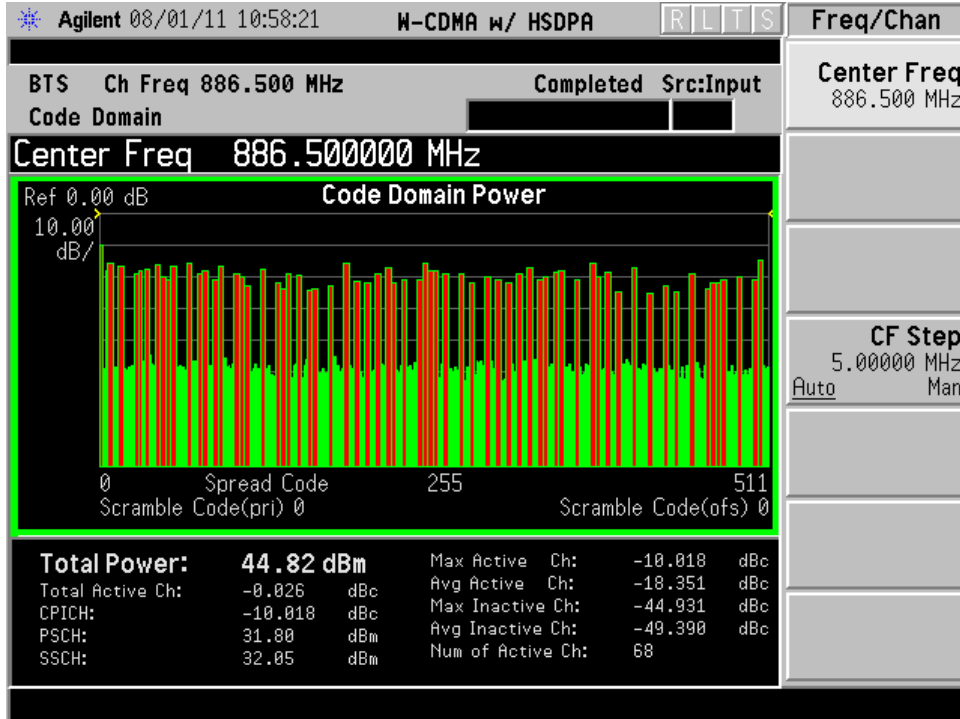
Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 80W
TM5-44 (16QAM) - Single Carrier at 80W (49.0 dBm) - 891.5 MHz



3a) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 30W/C with Total Composite Power 60W

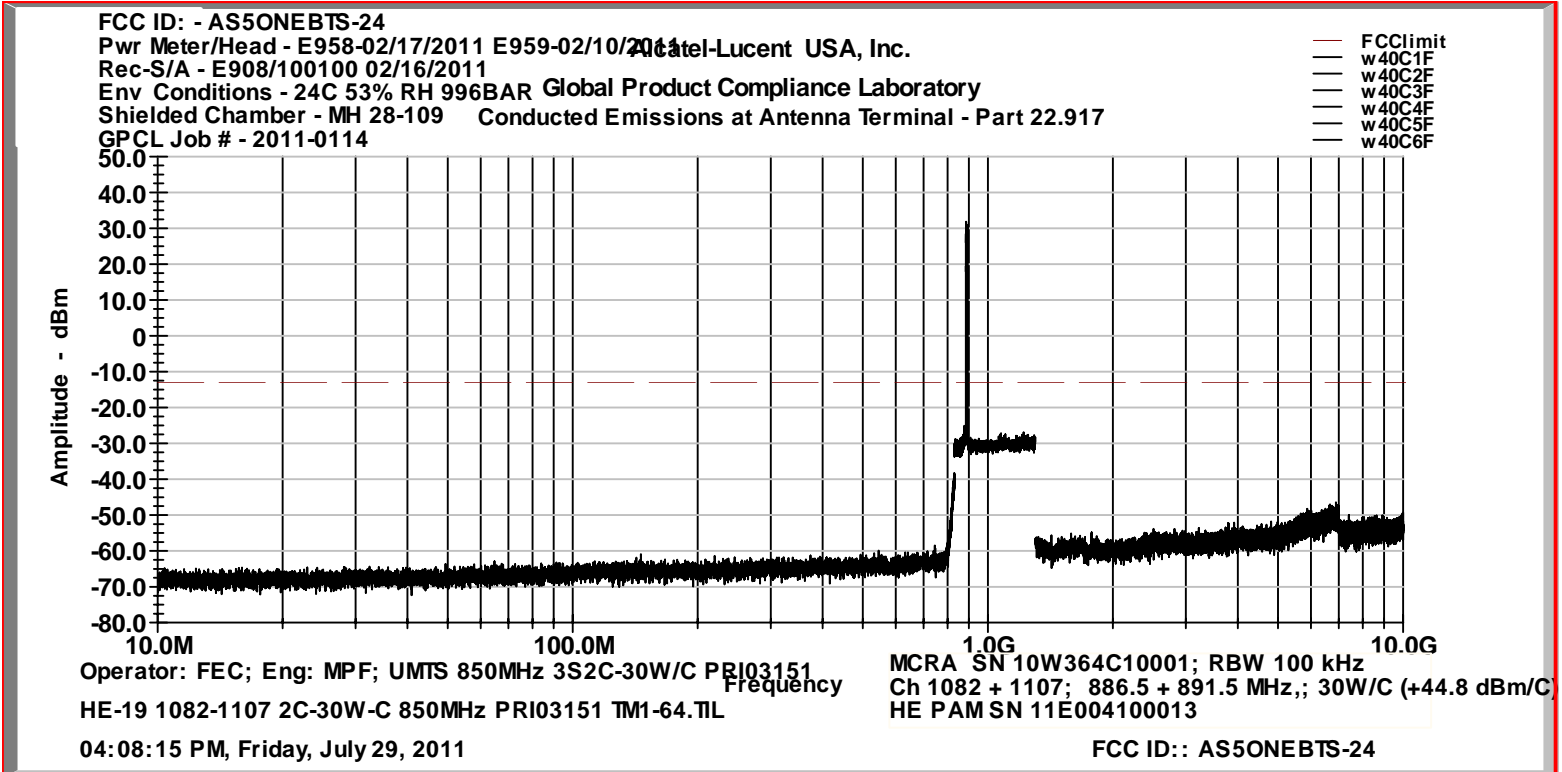
TM1-64 (QPSK) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



3a) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

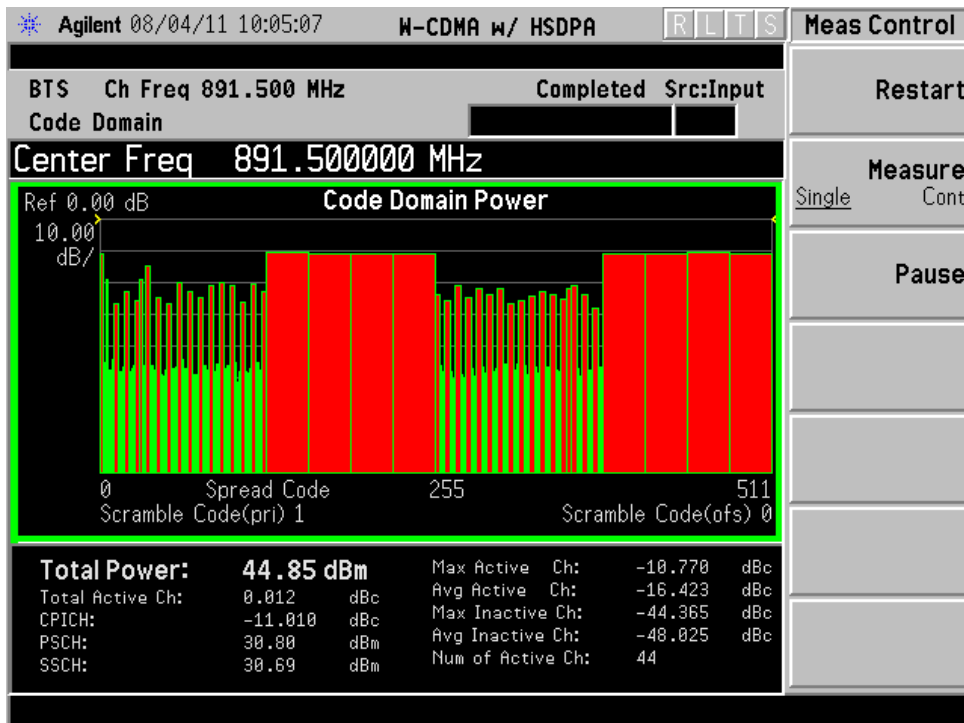
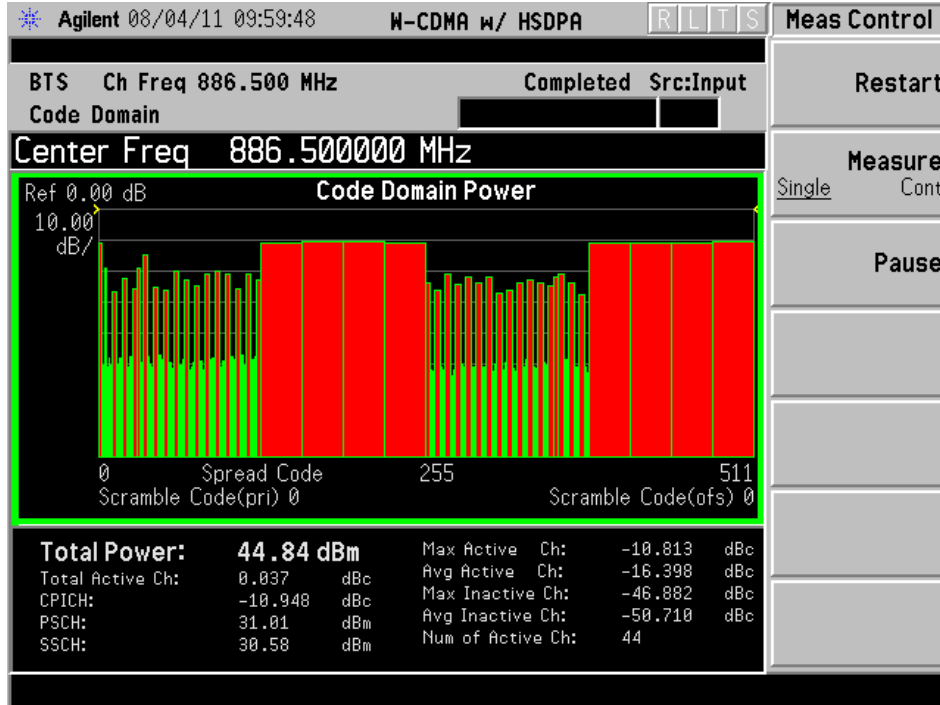
Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 30W/C with Total Composite Power 60W

TM1-64 (QPSK) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



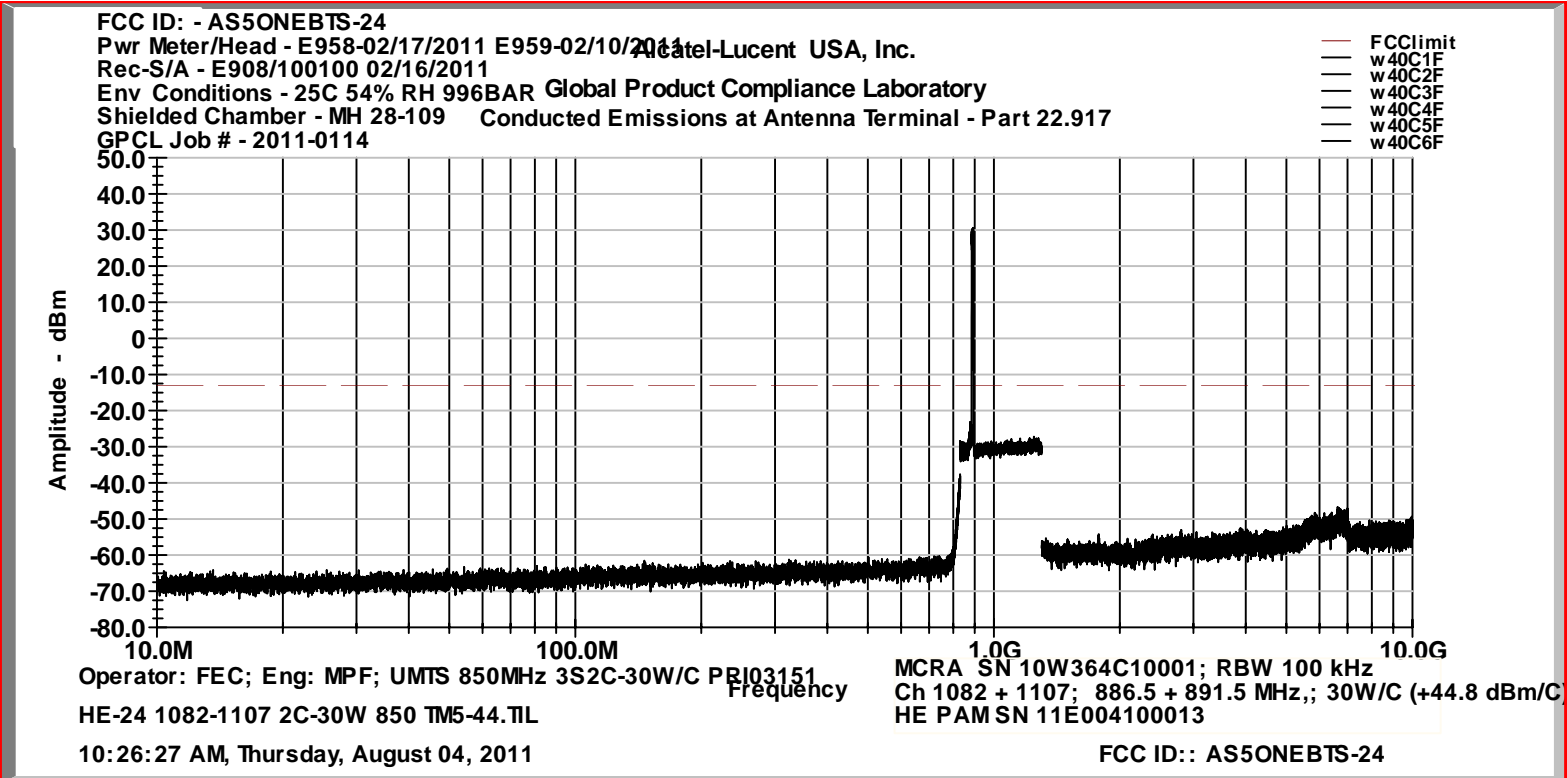
3b) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 30W/C with Total Composite Power 60W
TM5-44 (16QAM) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



3b) 3S2C - 30W/C: TWO ADJACENT CARRIERS AND SINGLE HE PAM

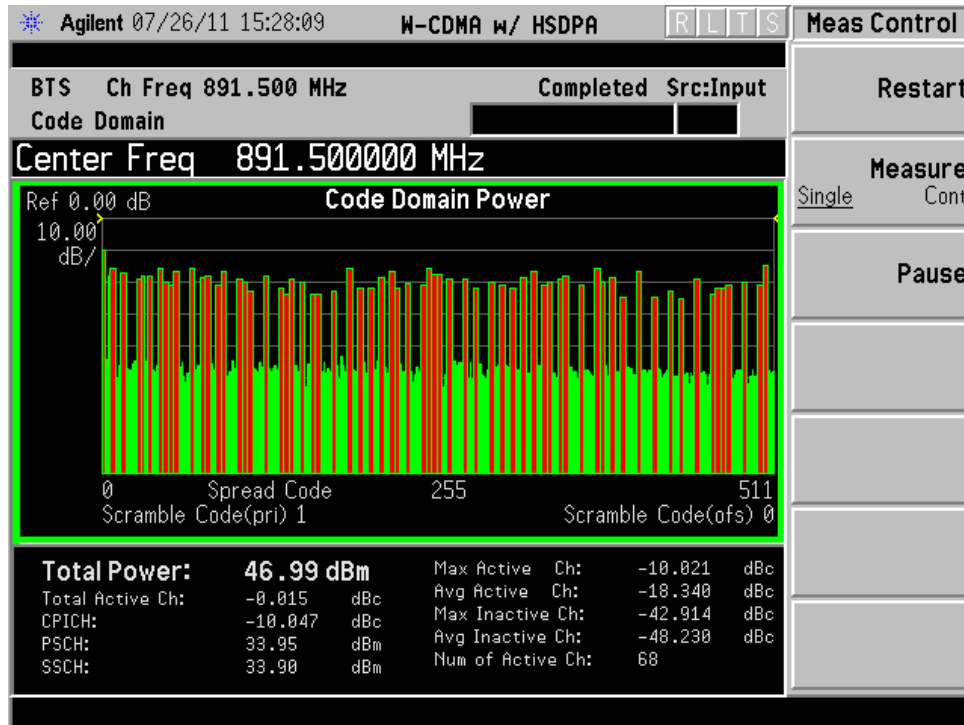
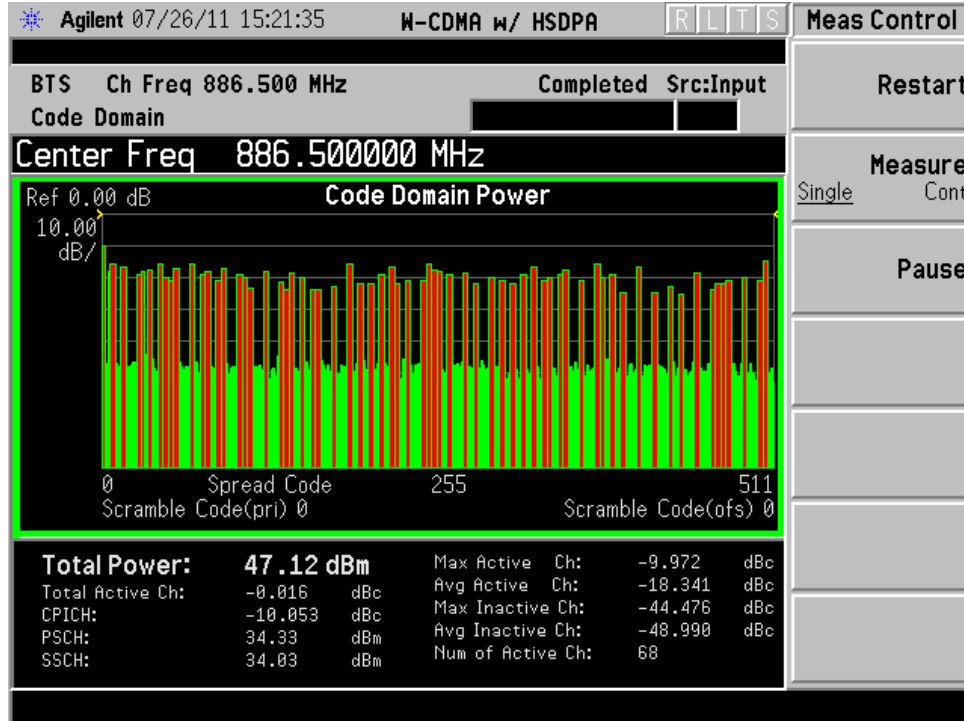
Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 30W/C with Total Composite Power 60W
TM5-44 (16QAM) - Two Adjacent Carriers at 30W/C (44.8 dBm/C) - 886.5 + 891.5 MHz



4a) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 50W/C with Total Composite Power 100W

TM1-64 (QPSK) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz

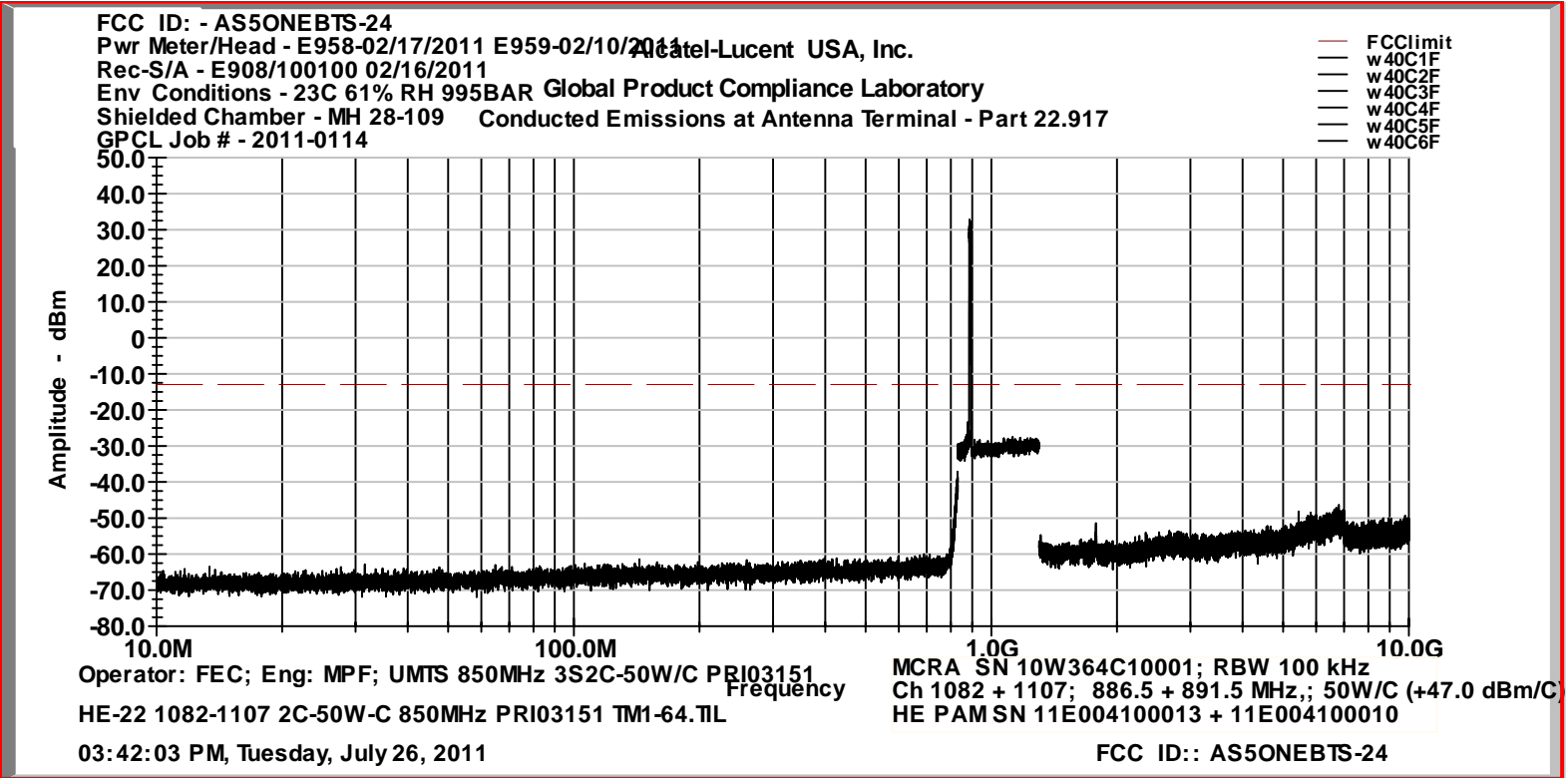


TEST REPORT

4a) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

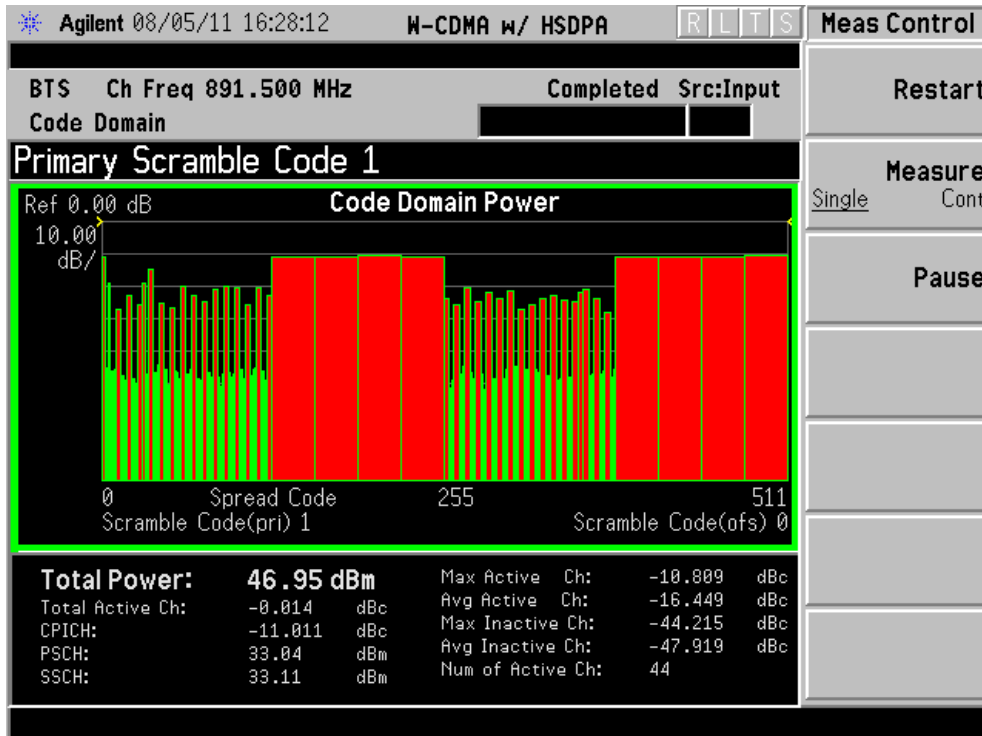
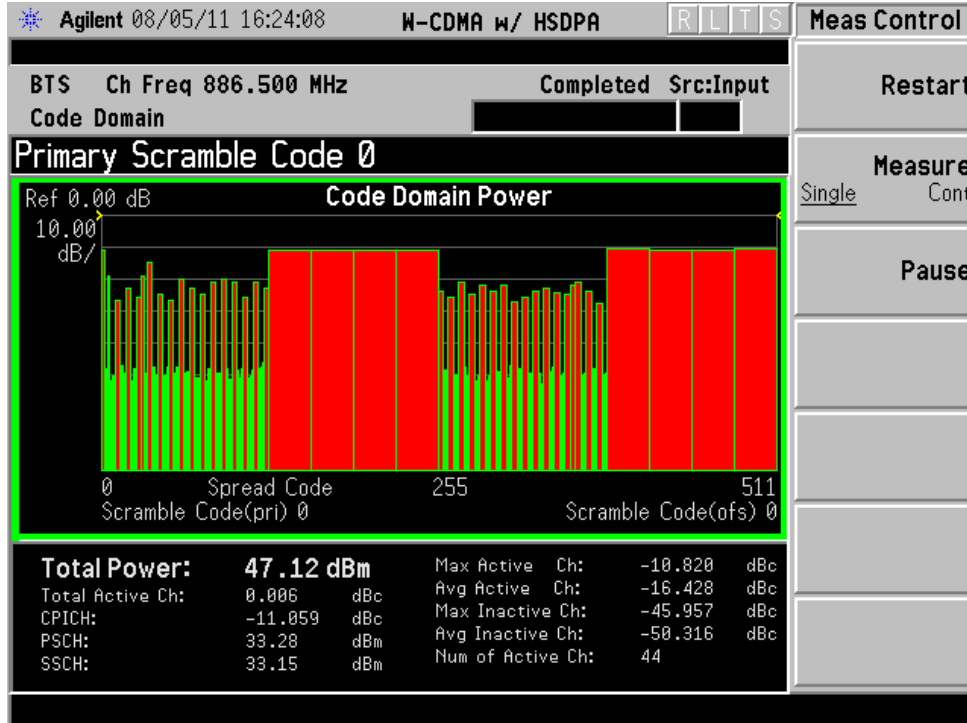
Test Modulation: TM1-64 with 68 Active Channels: 64 voice + 4 control (QPSK) - 50W/C with Total Composite Power 100W

TM1-64 (QPSK) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



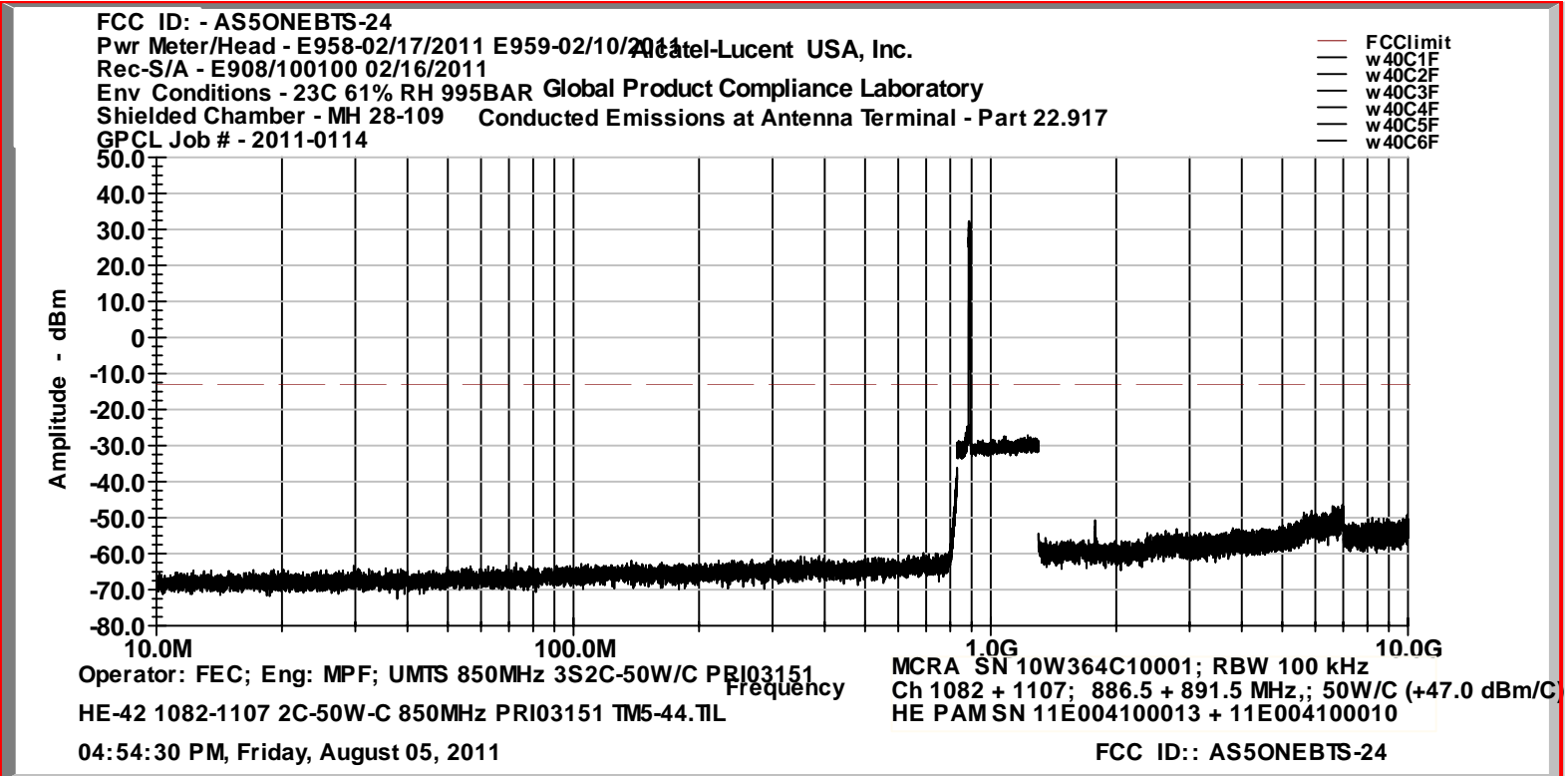
4b) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 50W/C with Total Composite Power 100W
 TM5-44 (16QAM) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



4b) 3S2C - 50W/C: TWO ADJACENT CARRIERS AND 2 PARALLEL HE PAM

Test Modulation: TM 5-44 with 44 active channels: 30 voice + 8 HSDPA (High Speed Downlink Packet Access) channels + 6 control (16QAM) - 50W/C with Total Composite Power 100W
TM5-44 (16QAM) - Two Adjacent Carriers at 50W/C (47.0 dBm/C) - 886.5 + 891.5 MHz



PART 2.1053 MEASUREMENTS REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION

This test was performed for 3 hardware and 850 MHz carrier configurations 1) 3S1C at 60W, 2) 3S1C at 80W and 3) 3S2C at 50W/C. All were previously described and evaluated for spurious emissions at the antenna terminal. As required, the frequency range investigated was from 30 MHz to 10 GHz (10th harmonic of the carrier) as in the previous conducted spurious emissions test procedure. The carrier frequencies utilized were the same as in the previous Occupied Bandwidth tests. The 3 configurations evaluated are:

RE Config #1 - 3S1C at 60W with TM1-64 (QPSK)

	60W (47.8 dBm) 850 MHz
Transceiver	3x 850
HE PAM	3x HE PAM
Dual Duplex Filter	3x 850 MHz
Sector 1	871.5 MHz
Sector 2	882.5 MHz
Sector 3	891.5 MHz

RE Config #2 - 3S1C at 80W with TM1-64 (QPSK)

	80W (49.0 dBm) 850 MHz
Transceiver	3x 850
HE PAM	6x HE PAM
Dual Duplex Filter	3x 850 MHz
Sector 1	871.5 MHz
Sector 2	882.5 MHz
Sector 3	891.5 MHz

RE Config #3 - 3S2C at 50W/C with TM1-64 (QPSK)

	50W/C (47.0 dBm) 850 MHz
Transceiver	3x 850
HE PAM	6x HE PAM
Dual Duplex Filter	3x 850 MHz
Sector 1	871.5 + 876.5 MHz
Sector 2	877.5 + 882.5 MHz
Sector 3	886.5 + 891.5 MHz

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* with external alarm and T1 cables connected to the EUT and routed as prescribed in ANSI C63.4-2009. Field strength measurements of radiated spurious emissions were evaluated in a 10m semi-anechoic chamber (FCC Site RN 263912), using an EUT-to-Antenna separation of 3-meters. Test software was Vasona by EMiSoft.

