



**EXHIBIT 10: TEST REPORT**

<b>Applicant:</b>	<b>Alcatel-Lucent USA, Inc.</b>
<b>Equipment:</b>	<b>UMTS-CDMA Transceiver System (1900)</b>
<b>FCC ID:</b>	<b>AS5ONEBTS-10</b>
<b>Rule Part:</b>	<b>Part 24, Subpart E – Broadband PCS</b>
<b>Frequency Range:</b>	<b>1930 - 1990 MHz</b>
<b>Power:</b>	<b>40 Watts for a Single Power Amplifier (PA) 80 Watts for 2 Parallel Power Amplifiers (PA)</b>
<b>Frequency Tolerance:</b>	<b>± 0.05 ppm</b>
<b>Emission Designator:</b>	<b>4M10F9W</b>

**Michael P. Farina  
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67 Whippany Road  
Whippany, NJ 07981**

**March 23, 2010**



Subject: **Application for Class II Permissive Change,  
under FCC ID: AS5ONEBTS-10, Covering the  
UMTS-CDMA Transceiver System (1900)  
Operating in the Broadband PCS Spectrum.**

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**March 23, 2010**

## **TEST REPORT**

### **INTRODUCTION:**

The exhibits presented in this Test Report demonstrate that the Alcatel-Lucent **UMTS-CDMA Transceiver System (1900)** remains 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 24, Subpart E – Broadband PCS; Section 24.238 - Emission Limitations for Broadband PCS Equipment; effective October 1, 2009. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2009. Compliance is also demonstrated with the spurious emissions limitations specified in ETSI TS 125 141 V7.4.0 (2006-06): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 7.4.0, Release 7). The initial Grant authorized a single carrier at 40 W for a single P2PAM power amplifier (PA) in the RF path. The objective of this application is to obtain FCC Class II Permissive Change authorization, under FCC ID: AS5ONEBTS-10, for operation with two (2) 40W power amplifiers in parallel to combine for a single carrier at 80W.

In accordance with Sec. 2.1043 *Changes In Certificated Equipment*, only the characteristics affected by the change need to be reported. As such, the applicable measurements affected are contained in the Test Report Exhibit, and all other Exhibits submitted with the initial filing that remain unchanged will not be repeated for brevity. All initial exhibits that were granted permanent confidentiality are unchanged and continue to remain confidential, and will not be repeated with this submission for brevity.

Alcatel-Lucent's wireless **UMTS-CDMA Transceiver System (1900)** is designed to operate in the North America Region (NAR) Broadband PCS Frequency Spectrum 1930-1990 MHz, with bandwidth of 60 MHz. The RF power rating is based the 3-second average, employing the Aggregate Overload Control (AOC) algorithm. Enhanced Digital Pre-Distortion (EDPD) and Closed Loop Gain Control (CLGC) are features that are enabled for each carrier. The carrier power level and frequency are remotely controlled by software. The single UMTS carrier has a 5 MHz bandwidth, with an emission designator at 4M10F9W, based on measurement of the Necessary Bandwidth. UMTS modulation capability demonstrated includes 1) TM1-64 with up to 68 active channels, consisting of 64 voice + 4 control, and 2) TM5-44 with up to 44 active channels, which include 8 High Speed Downlink Packet Access (HSDPA) channels.

The **UMTS-CDMA Transceiver System (1900)** consists of the principle RF components: (1) Crystal Reference Oscillator Module (OMA) 15 MHz, (2) UMTS-CDMA Multi-Carrier CDMA Radio MCR1900, Model BNJ64, (3) P2PAM power amplifier, and (4) 60 MHz Dual Duplex (DDpx), low loss, transmit filter covering the PCS spectrum 1930-1990 MHz. These components are considered as a system due to (1) the DDpx filters providing RF feedback to the transceiver in the form of Closed Loop Gain Control (CLGC) to provide constant power over temperature, and (2) Alcatel-Lucent's proprietary Enhanced Digital Pre-Distortion (EDPD-UL) technology which enables software to communicate between the transceiver, power amplifier and the transmit filter to achieve this goal. The Wideband CDMA (W-CDMA) transceiver, MCR1900, can be converted from CDMA functionality to UMTS functionality, or

from UMTS to CDMA, by software alone, which can be performed at the installation site. There are no physical, hardware or circuit changes to the transceiver. This system complies both with the Federal Communication Commission (FCC) Rules and Regulations (47 CFR Part 24), and with the European Telecommunications Standards Institute (ETSI) 3<sup>rd</sup> Generation Partnership Project (3GPP) Technical Specifications TS 25.104 and TS 25.141.

As a Transceiver System, all conducted RF characteristics and emissions measurements were performed at the transmit antenna terminal, using a production equipment frame. All testing was performed in the Alcatel-Lucent, Whippany, NJ, compliance laboratory by F. E. Chetwynd and M. P. Farina during the period March 11 - 18, 2010; in adherence to a test plan generated by M. P. Farina, in accordance with Alcatel-Lucent’s ISO/TL9000 Registration. All measurement instrumentation utilized were also calibrated in compliance with Alcatel-Lucent’s ISO/TL9000 Registration. The Whippany 3 & 10 Meter Open Area Test Site (OATS) is authorized by the Federal Communications Commission (FCC) under Registration Number: 90770, in compliance with the requirements of Section 2.948 of the Rules of the Commission. Frequency stability measurements were not repeated, since there were no changes made to the frequency determining and stabilization circuitry.

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 Alcatel-Lucent’s Broadband PCS Frequency **UMTS-CDMA Transceiver System (1900)** continues to be 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 24, Subpart E – Broadband PCS; Section 24.238 - Emission Limitations for Broadband PCS Equipment; effective October 1, 2009. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2009. It also demonstrates compliance with the spurious emission limitations specified in TSI TS 125 141 V7.4.0 (2006-06): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 7.4.0, Release 7).

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

The specific test procedures that are both required for and are applicable to the UMTS Distributed Base Station Transceiver System are:

<b>Part 2.1046</b>	RF Power Output	<b>Pages 4 – 5</b>
<b>Part 2.1047</b>	Modulation Characteristics	<b>Pages 6 – 9</b>
<b>Part 2.1049</b>	Occupied Bandwidth - Single Carrier	<b>Pages 10 – 20</b>
<b>Part 2.1051</b>	Spurious Emissions at the Antenna Terminals.	<b>Pages 21– 28</b>
<b>Part 2.1053</b>	Field Strength of Spurious Radiation	<b>Pages 29</b>
<i>Part 2.1055</i>	<i>Frequency Stability - Not Repeated</i>	<i>Pages 30</i>
<b>Part 2.1057</b>	Frequency Spectrum to be Investigated	
<b>Part 24</b>	Personal Communications Services; Subpart E – Broadband PCS	
<b>Part 24.238</b>	Emission Limitations for Broadband PCS Equipment	

**ETSI** TS 125 141 V7.4.0 (2006-06): Universal Mobile Telecommunications System (UMTS); Base Station (BS) Conformance Testing (FDD), (3GPP TS 25.141, Version 7.4.0, Release 7).

**ETSI** TS 125 104 V7.4.0 (2006-06): Universal Mobile Telecommunications System (UMTS); Base Station (BS) Radio Transmission and Reception (FDD), (3GPP TS 25.104, Version 7.4.0, Release 7).

**TEST REPORT**

**ANSI C63.4-2003**

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; January 30, 2004

**PART 2.1046 MEASUREMENTS REQUIRED: RF POWER OUTPUT**

The **UMTS-CDMA Transceiver System (1900)**, subject of this application for Class II Permissive Change authorization, is designed to provide a maximum RF power level, per single 5 MHz carrier emission bandwidth, of 40 Watts (+46.0 dBm) at the Equipment Antenna Terminal (EAC) for a single carrier and single P2PAM power amplifier (PA); and 80 Watts (+49.0 dBm) for a single carrier and 2 parallel P2PAM power amplifiers (PA). The RF power rating is based the 3-second average, employing the Aggregate Overload Control (AOC) algorithm. Enhanced Digital Pre-Distortion (EDPD) and Closed Loop Gain Control (CLGC) are features that are enabled for each carrier. This System is designed to operate in a 60 MHz bandwidth, over the Broadband PCS frequency spectrum: 1930-1990 MHz.

All testing was performed with 2 parallel P2PAM power amplifiers (PA) combined for 80W for a single carrier. All conducted emission measurements are performed at the EAC, with measurements being made at the lowest and the highest settable carrier frequencies in Broadband PCS Blocks A, B and C and at the center frequency of Blocks D, E and F. These 9 carrier channels were used throughout this test procedure, as tabulated below. Each time the carrier is set to each of the channels, and to each of 2 ETSI Test Modulation schemes, the power level is adjusted, by software control, to +49.0 dBm (80 Watts at 3-second average) before performing each emission measurement.

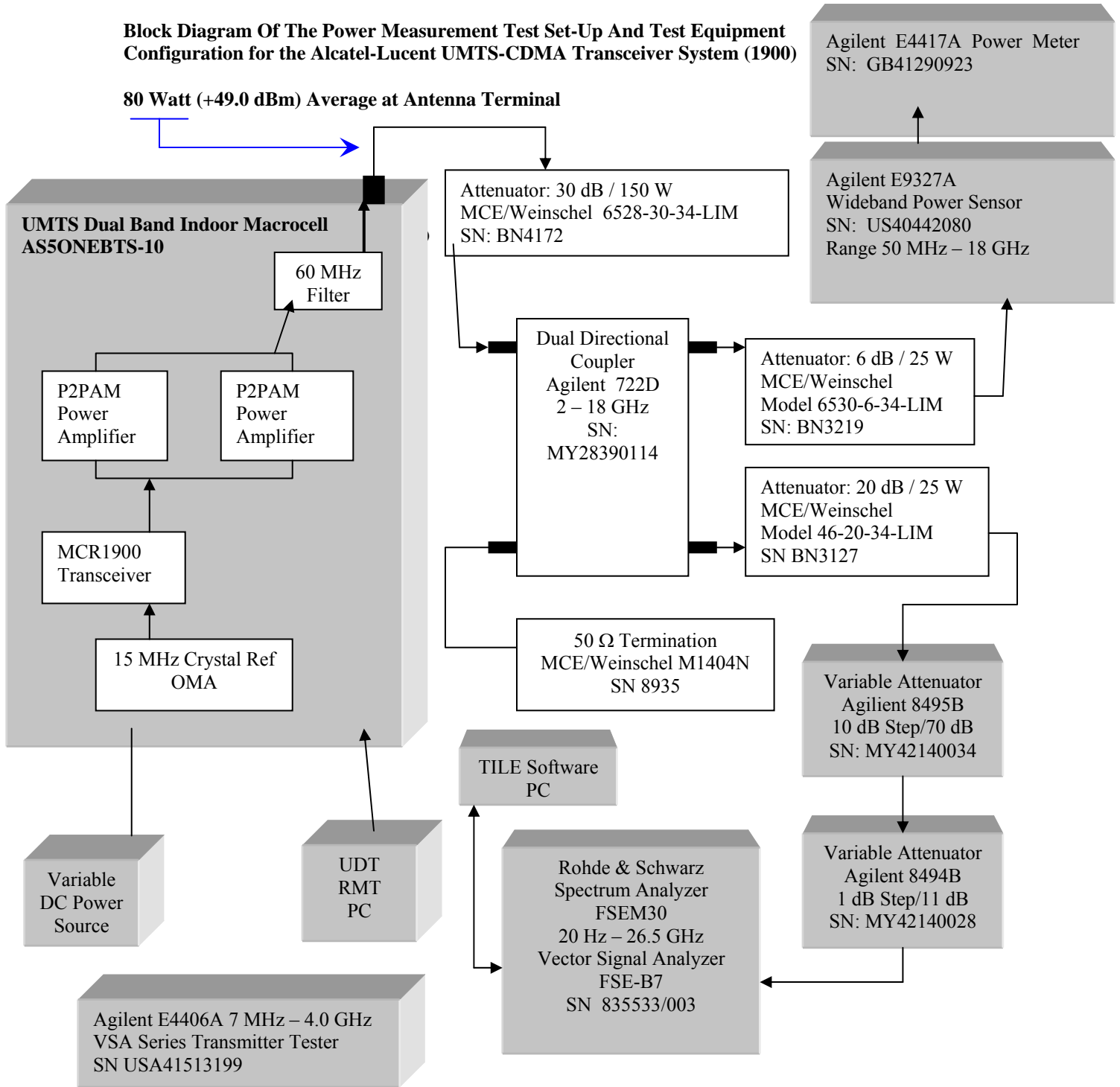
PCS Frequency	PCS Frequency Block	UARFCN Channel Number	Carrier Center Frequency	Measured Power Level
A1	Lowest Settable Channel	12	1932.5 MHz	+49.0 dBm
A3	Highest Settable Channel	62	1942.5 MHz	+49.0 dBm
D	Block Center	87	1947.5 MHz	+49.0 dBm
B1	Lowest Settable Channel	112	1952.5 MHz	+49.0 dBm
B3	Highest Settable Channel	162	1962.5 MHz	+49.0 dBm
E	Block Center	187	1967.5 MHz	+49.0 dBm
F	Block Center	212	1972.5 MHz	+49.0 dBm
C3	Lowest Settable Channel	237	1977.5 MHz	+49.0 dBm
C5	Highest Settable Channel	287	1987.5 MHz	+49.0 dBm

Note: UARFCN = UTRA Absolute Radio Frequency Channel Number

**Results:** The 5 MHz **UMTS-CDMA Transceiver System (1900)** is compliant with the manufacturer’s rated power level at the transmit antenna terminal for the above listed carrier frequencies.

TEST REPORT

Block Diagram Of The Power Measurement Test Set-Up And Test Equipment Configuration for the Alcatel-Lucent UMTS-CDMA Transceiver System (1900)



**TEST REPORT**

**PART 2.1047 MEASUREMENTS REQUIRED: MODULATION CHARACTERISTICS**

The modulation accuracy was measured at the Equipment Antenna Terminal (EAC) for the 9 carriers cited above. However, for brevity, the lowest settable, the mid-band and the highest settable carriers over the spectrum 1930-1990 MHz are tabulated below. In accordance with ETSI TS 25.141, the Error Vector Magnitude (EVM) was measured for a single modulation scheme:

**Test Model 5-44** modulation with 44 active channels that include 8 HSDPA channels. TM5-44 with 44 active channels (16QAM) and the power level set to Pmax (+47.8 dBm). The Error Vector Magnitude limit is  $EVM < 12.5\%$  for 16QAM.

**TM5-44: with 44 Active Channels, Including 8 HSDPA (High Speed Downlink Packet Access)  
ETSI TS 25.141 Rel 7, Table 6.6A : Test Model 5 Active Channels**

Type	Number of Channels	Fraction of Power (%)
P-CCPCH+SCH	1	7.9
Primary CPICH	1	7.9
PICH	1	1.3
S-CCPCH containing PCH (SF=256)	1	1.3
DPCH (SF=128)	30	14
HS-SCCH	2	4
HS-PDSCH (16 QAM)	8	63.6

**Minimum Standard Requirement:** The minimum standard requirement is that the RMS Error Vector Magnitude (EVM) average shall be less than 12.5% for TM5-44.

**Test Set-up and Configuration:** Same as previously used for Part 2.1046 RF Power Measurement, with exception that the FSEM30 Spectrum Analyzer is replaced by:

- 1) Agilent E4406A VSA Series Transmitter Tester, 7 MHz – 4.0 GHz, SN US41513199
- 2) The VSA measurement set up was for Composite Modulation Accuracy with 10 sweeps for test.

**TEST RESULTS:**

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

UMTS PCS Frequency Block	Broadband PCS Frequency Block	Power Level at Antenna Terminal	UMTS1900 Channel No.	UMTS 1900 Carrier Center Frequency MHz	RMS EVM TM5-44 <12.5 % Average	RMS EVM TM5-44 <12.5 % Peak Hold
A1	Lowest Settable	47.8 dBm	12	1932.5	6.04 %	7.28 %
B3	Mid Band	47.8 dBm	162	1962.5	5.75 %	7.03 %
C5	Highest Settable	47.8 dBm	287	1987.5	5.72 %	7.07 %

**RESULTS:** The UMTS-CDMA Transceiver System (1900) demonstrated full compliance with the modulation accuracy requirements specified in ETSI TS 25.141. All EVM measurements were less than the 12.5% RMS limitation, respectively, as tabulated above.

TEST REPORT

Lowest Settable Carrier - TM5-44 Modulation

TM5-44 Modulation Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz

Tx Antenna Terminal at +49.0 dBm per single 5 MHz carrier

* Agilent 12/10/77 14:17:58		W-CDMA w/ HSDPA		R	L	T	S	View/Trace
BTS	Ch Freq 1.93250 GHz	Completed		Src:Input		I/Q Measured Polar Graph		
Mod Accuracy		Averages: 10	PASS					
								I/Q Error
								Code Domain Power
								Peak/Avg Metrics
		<b>Peak/Average Metrics</b>						
		<b>Average</b>	<b>Peak Hold</b>					
Rho:		0.99633	0.99473					
RMS EVM:		6.04 %	7.28 %					
Peak EVM:		78.75 %	116.65 %					
Pk CDE:		-44.87 dB	-43.01 dB		at C8(9)			
Pk Active CDE:		-35.76 dB	-34.21 dB		at C4(7)			
RMS Mag Error:		5.52 %	6.81 %					
RMS Phase Error:		3.86 °	5.47 °					
Freq Error:		-2.27 Hz	-10.47 Hz					
I/Q Origin Offset:		-61.73 dB	-53.89 dB					
Time Offset:		5736.35 chip	16447.49 chip					
CPICH Power :		-10.08 dB	-9.89 dB					
Total Power:		49.31 dBm	49.43 dBm					
								Capture Time Summary
								Slot CDE/EVM

TEST REPORT

Mid-Band Carrier - TM5-44 Modulation

TM5-44 Modulation Characteristics: UARFCN Channel Number 162 @ 1962.5 MHz

Tx Antenna Terminal at +49.0 dBm per single 5 MHz carrier

Agilent 12/10/77 14:39:07		W-CDMA w/ HSDPA		RLTS		Measure
BTS Ch Freq 1.96250 GHz		Completed Src:Input		Averages: 10		Code Domain
Mod Accuracy				PASS		Mod Accuracy (Composite EVM)
<b>Peak/Average Metrics</b>						
	<b>Average</b>	<b>Peak Hold</b>				
Rho:	0.99668	0.99509				
RMS EVM:	5.75 %	7.03 %				
Peak EVM:	79.83 %	115.23 %				
Pk CDE:	-45.31 dB	-43.07 dB	at C8(17)		Power Stat CCDF	
Pk Active CDE:	-36.16 dB	-34.42 dB	at C4(6)		Spectrum (Freq Domain)	
RMS Mag Error:	5.38 %	6.71 %				
RMS Phase Error:	2.91 °	4.92 °				
Freq Error:	-2.78 Hz	-8.67 Hz				
I/Q Origin Offset:	-63.42 dB	-53.91 dB				
Time Offset:	64.97 chip	16704.53 chip				
CPICH Power :	-10.07 dB	-9.90 dB				
Total Power:	49.24 dBm	49.35 dBm				
						Waveform (Time Domain)
						More (2 of 3)



Highest Settable Carrier - TM5-44 Modulation

TM5-44 Modulation Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz  
Tx Antenna Terminal at +49.0 dBm per single 5 MHz carrier

Agilent 12/10/77 15:17:27		W-CDMA w/ HSDPA		R	L	T	S	Measure																																										
BTS	Ch Freq 1.98750 GHz	Completed		Src:Input				Code Domain																																										
Mod Accuracy	Averages: 10		PASS																																															
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<table border="1"> <thead> <tr> <th colspan="3">Peak/Average Metrics</th> </tr> <tr> <th></th> <th>Average</th> <th>Peak Hold</th> </tr> </thead> <tbody> <tr> <td>Rho:</td> <td>0.99671</td> <td>0.99503</td> </tr> <tr> <td>RMS EVM:</td> <td>5.72 %</td> <td>7.07 %</td> </tr> <tr> <td>Peak EVM:</td> <td>79.49 %</td> <td>114.53 %</td> </tr> <tr> <td>Pk CDE:</td> <td>-45.38 dB</td> <td>-43.37 dB at C8(0)</td> </tr> <tr> <td>Pk Active CDE:</td> <td>-36.19 dB</td> <td>-34.38 dB at C4(7)</td> </tr> <tr> <td>RMS Mag Error:</td> <td>5.33 %</td> <td>6.70 %</td> </tr> <tr> <td>RMS Phase Error:</td> <td>2.95 °</td> <td>4.73 °</td> </tr> <tr> <td>Freq Error:</td> <td>-2.71 Hz</td> <td>-11.07 Hz</td> </tr> <tr> <td>I/Q Origin Offset:</td> <td>-63.25 dB</td> <td>-54.36 dB</td> </tr> <tr> <td>Time Offset:</td> <td>-246.26 chip</td> <td>17889.70 chip</td> </tr> <tr> <td>CPICH Power :</td> <td>-10.07 dB</td> <td>-9.89 dB</td> </tr> <tr> <td>Total Power:</td> <td>49.07 dBm</td> <td>49.19 dBm</td> </tr> </tbody> </table>									Peak/Average Metrics				Average	Peak Hold	Rho:	0.99671	0.99503	RMS EVM:	5.72 %	7.07 %	Peak EVM:	79.49 %	114.53 %	Pk CDE:	-45.38 dB	-43.37 dB at C8(0)	Pk Active CDE:	-36.19 dB	-34.38 dB at C4(7)	RMS Mag Error:	5.33 %	6.70 %	RMS Phase Error:	2.95 °	4.73 °	Freq Error:	-2.71 Hz	-11.07 Hz	I/Q Origin Offset:	-63.25 dB	-54.36 dB	Time Offset:	-246.26 chip	17889.70 chip	CPICH Power :	-10.07 dB	-9.89 dB	Total Power:	49.07 dBm	49.19 dBm
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TEST REPORT

**PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH - SINGLE CARRIER**

The occupied bandwidth was measured at the Equipment Antenna Terminal (EAC) for each of the nine, UMTS 1900 MHz, 5 MHz carriers. The power level was set to 80 Watts (+49.0 dBm). Two ETSI Test Modulation schemes were utilized:

- 1) TM1-64 with up to 68 active channels, consisting of 64 Voice + 4 Control channels, for 9 carriers measured as previously cited, and
- 2) TM5-44 with up to 44 active channels, consisting of 30 Voice + 8 HSDPA + 6 control channels, where HSDPA = High Speed Downlink Packet Access. Since the test results were consistent from carrier to carrier between the two test modulations (TM), three carriers were sufficient for this modulation: the lowest settable, the mid-band and the highest settable.

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 (SN US41513199).
2. Emission mask limitation using a Rohde & Schwarz: Spectrum Analyzer FSEM30 (SN 835533/003), to demonstrate compliance with the ETSI TS 25.141 emission mask requirements and with Part 24.238.

**Method 1:** The carrier 99% power bandwidth was measured at the Equipment Antenna Terminal (EAC) with the carrier set to +49.0 dBm. Measurements were made for 9 carriers both at TM1-64 modulation and at TM5-44 modulation. However, for brevity, only the 3 carriers for each are tabulated below. The necessary bandwidth measurement results displayed below confirm that the 4M10F9W emission designator remains valid.

**99% POWER BANDWIDTH at 80W (+49.0 dBm)**

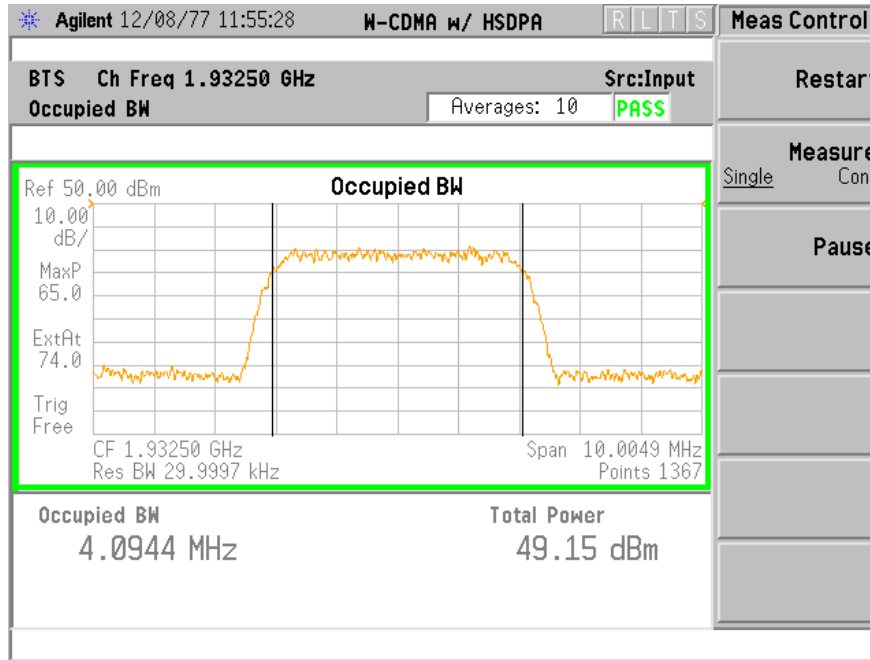
UMTS PCS Carrier	Broadband PCS Frequency Block	Power Level at Antenna Terminal	UMTS1900 Channel No.	UMTS 1900 Carrier Center Frequency MHz	99% Bandwidth TM1-64	99% Bandwidth TM5-44
A1	Lowest Settable	+49.0 dBm	12	1932.5	4.0944 MHz	4.0849 MHz
B3	Mid-Band	+49.0 dBm	162	1962.5	4.1034 MHz	4.0970 MHz
C5	Highest Settable	+49.0 dBm	287	1987.5	4.0960 MHz	4.0905 MHz

**Results:** For each of the above UMTS 1900 MHz channels, the carrier does not exceed 5.0 MHz. The necessary bandwidth and emission designator is consistently **4M10F9W**. The data plots for the above tabulated carriers A1, B3 and C5 are attached for both the TM1-64 and TM5-44 modulation schemes.

TEST REPORT

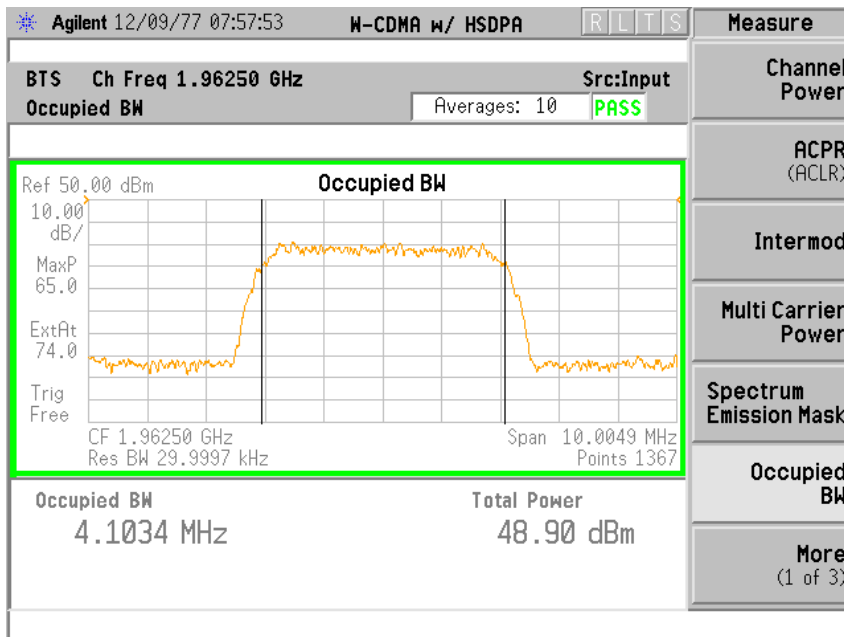
LOWEST SETTABLE CARRIER - TM1-64

TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



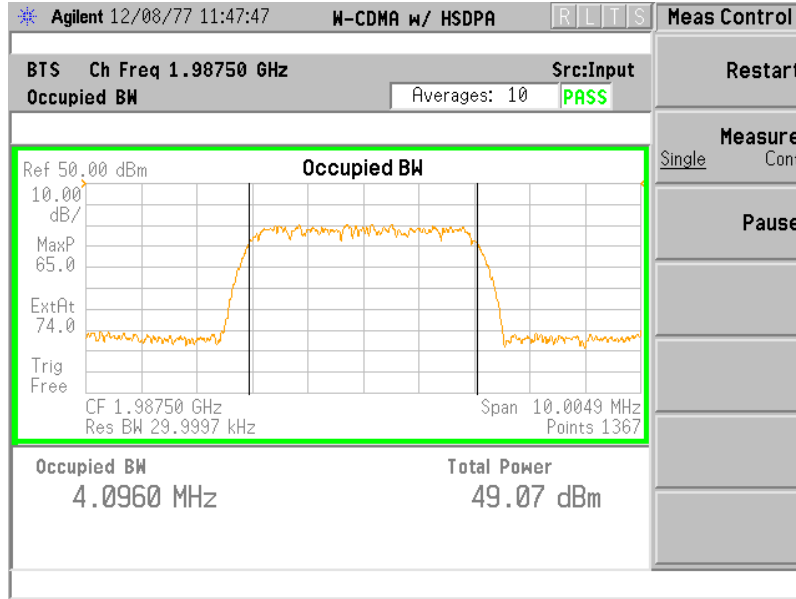
MID-BAND CARRIER - TM1-64

TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 162 @ 1962.5 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



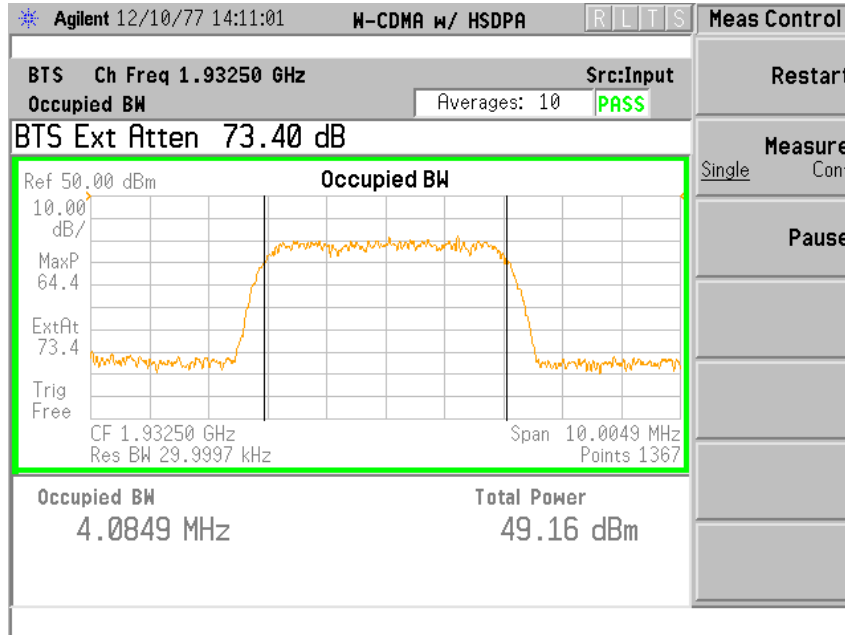
**HIGHEST SETTABLE CARRIER - TM1-64**

**TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz**  
**Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier**



**LOWEST SETTABLE CARRIER - TM5-44**

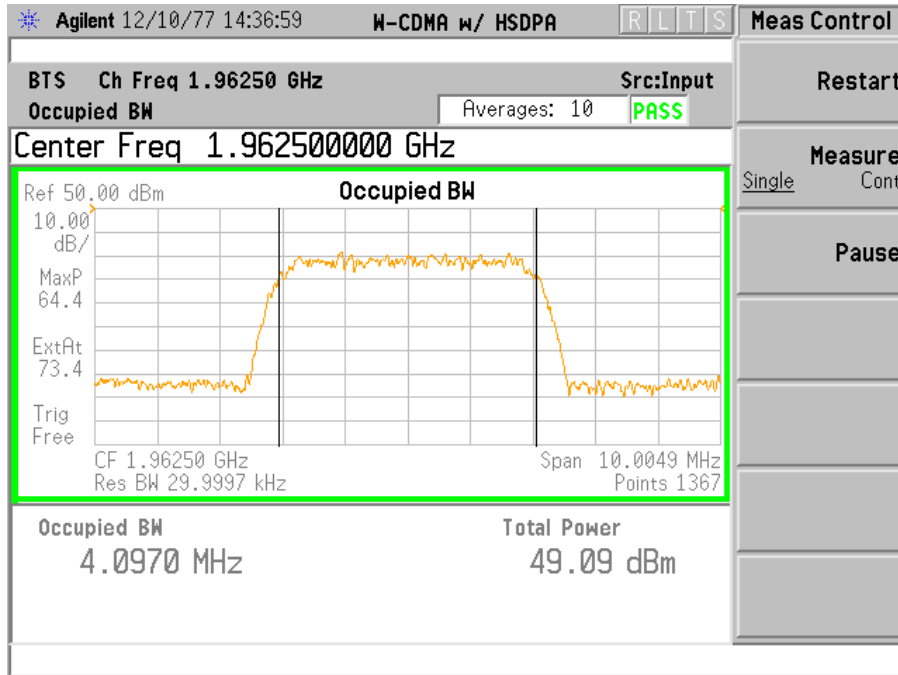
**TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz**  
**Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier**



TEST REPORT

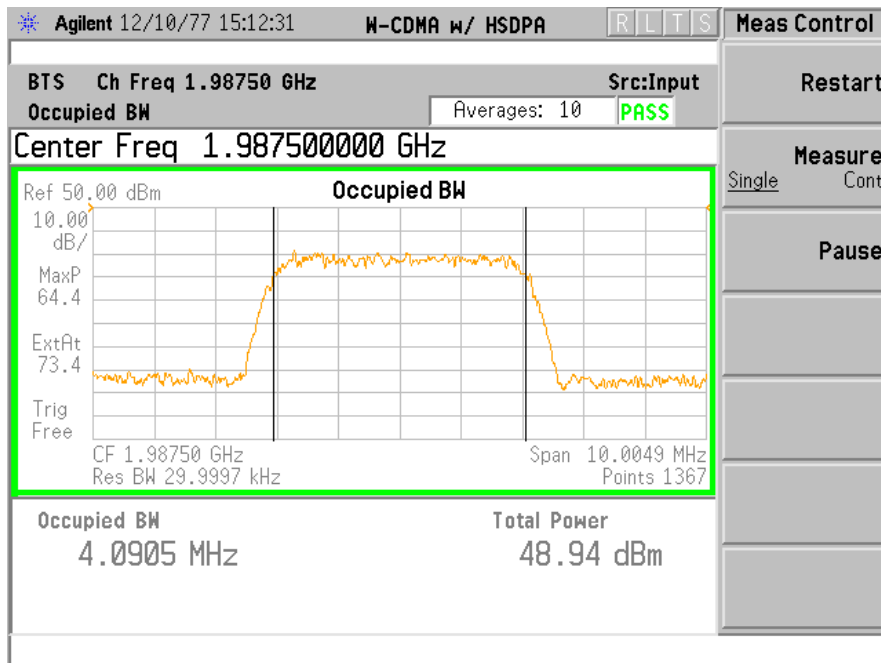
MID-BAND CARRIER - TM5-44

TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 162 @ 1962.5 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



HIGHEST SETTABLE CARRIER - TM5-44

TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



**PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH - SINGLE CARRIER****- CONTINUED -**

**Method 2.** Emission mask limitation using a Rohde & Schwarz: Spectrum Analyzer FSEM30 (SN 835533/003) with Total Integrated Laboratory Environment (TILE) test software.

Measurement of the occupied bandwidth emission characteristics was performed at the Equipment Antenna Terminal (EAC) with the 5 MHz carrier set to 80W (+49.0 dBm) for each of the 9 carriers previously cited, and for both the TM1-64 and the TM5-44 modulation schemes. However, for brevity, the lowest settable, mid-band and the highest settable data plots will be displayed in this report. 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 +49.0 dBm by  $-22.218$  dB, in accordance with the equation:

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

This series of measurements were performed using the EMC software:

Total Integrated Laboratory Environment (TILE),  
by ETS-Lindgren

For both TM1-64 and TM5-44, measurements were made at the lowest settable and highest settable carriers for Blocks A, B and C; and at band center for Blocks D, E and F. However, for brevity, attached are the data plots for the lowest settable, mid-band and highest settable carriers for both TM1-64 and TM5-44 modulations.

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

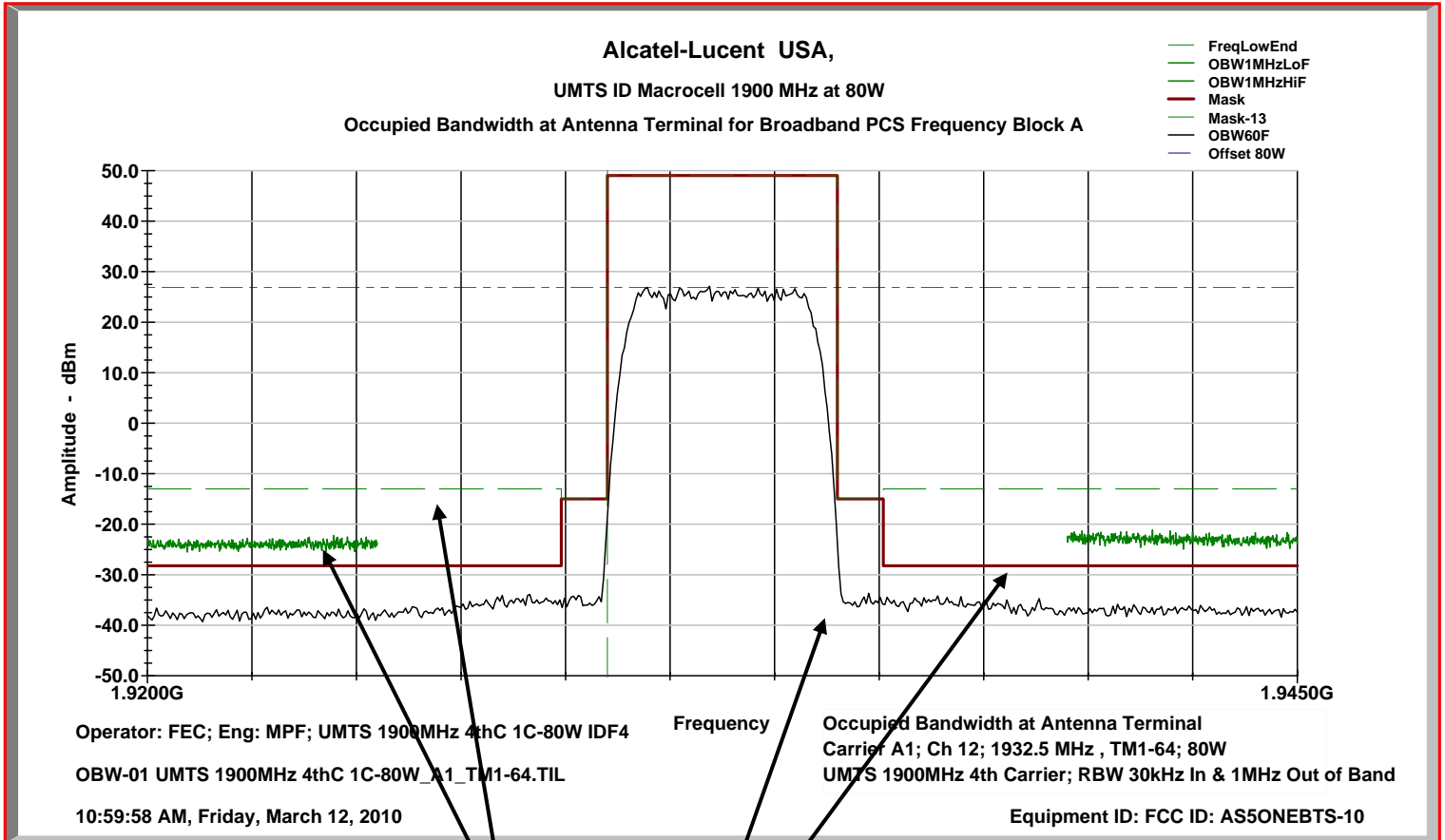
**RESULTS:** The UARFCN 12 (lowest settable), 112 (mid-band), and 287 (highest settable) channels all demonstrate compliance with the emission mask specified by ETSI TS 25.141 for both TM1-64 and TM5-44 test modulations. In each test, the carriers do not exceed the mask limitation.

The data plots are attached below for both the TM1-64 test modulation scheme and the TM5-44 modulation. All nine carriers were evaluated, however, for brevity the lowest settable, mid-band and the highest settable are attached, for each of the two modulation schemes. The remaining tests are retained as a permanent record.

TEST REPORT

LOWEST SETTABLE CARRIER - TM1-64 TEST MODULATION

Occupied Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



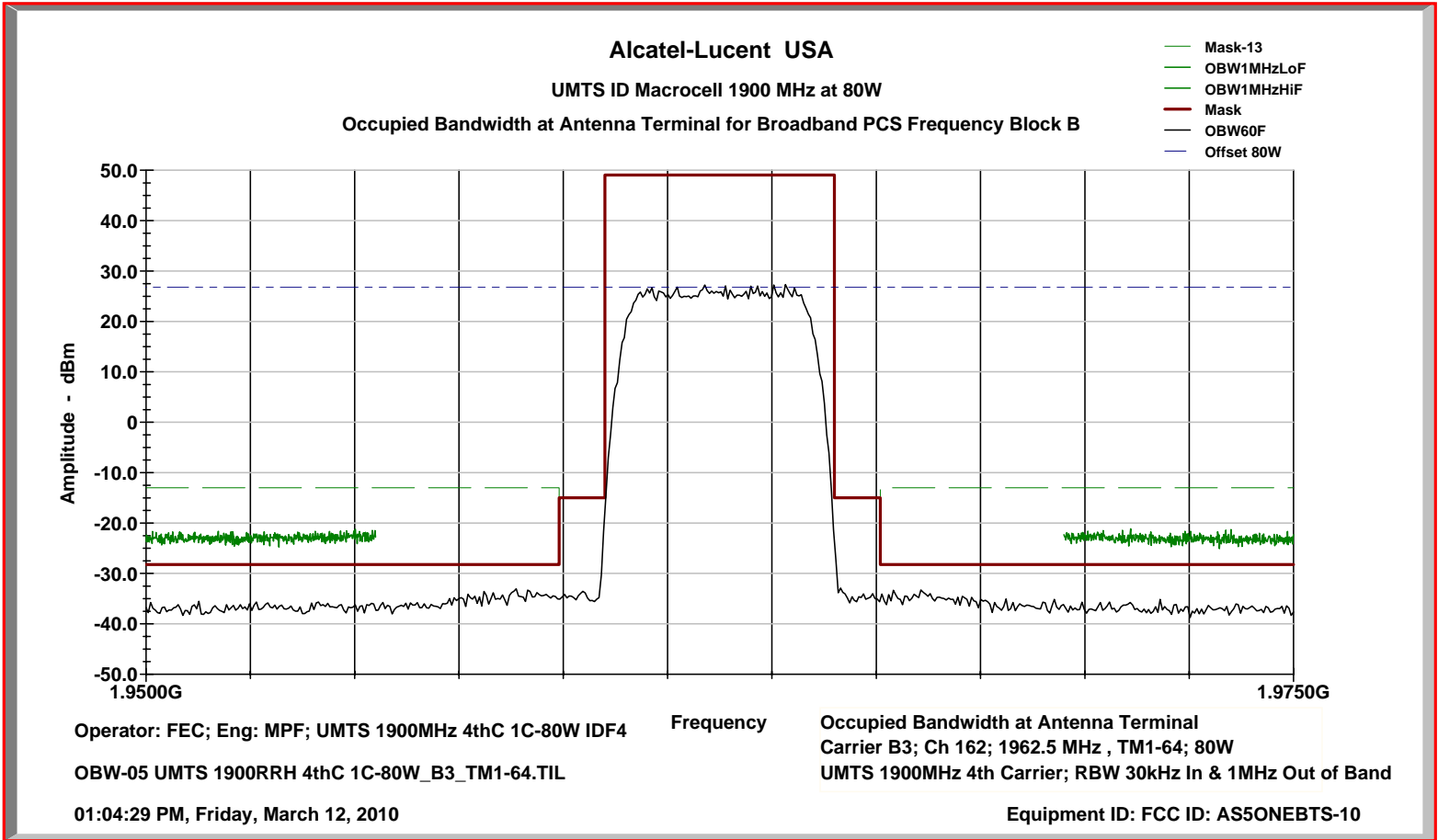
RBW = 1 MHz

RBW = 30 kHz

TEST REPORT

MID-BAND CARRIER - TM1-64 TEST MODULATION

Occupied Bandwidth Characteristics: UARFCN Channel Number 162 @ 1962.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier

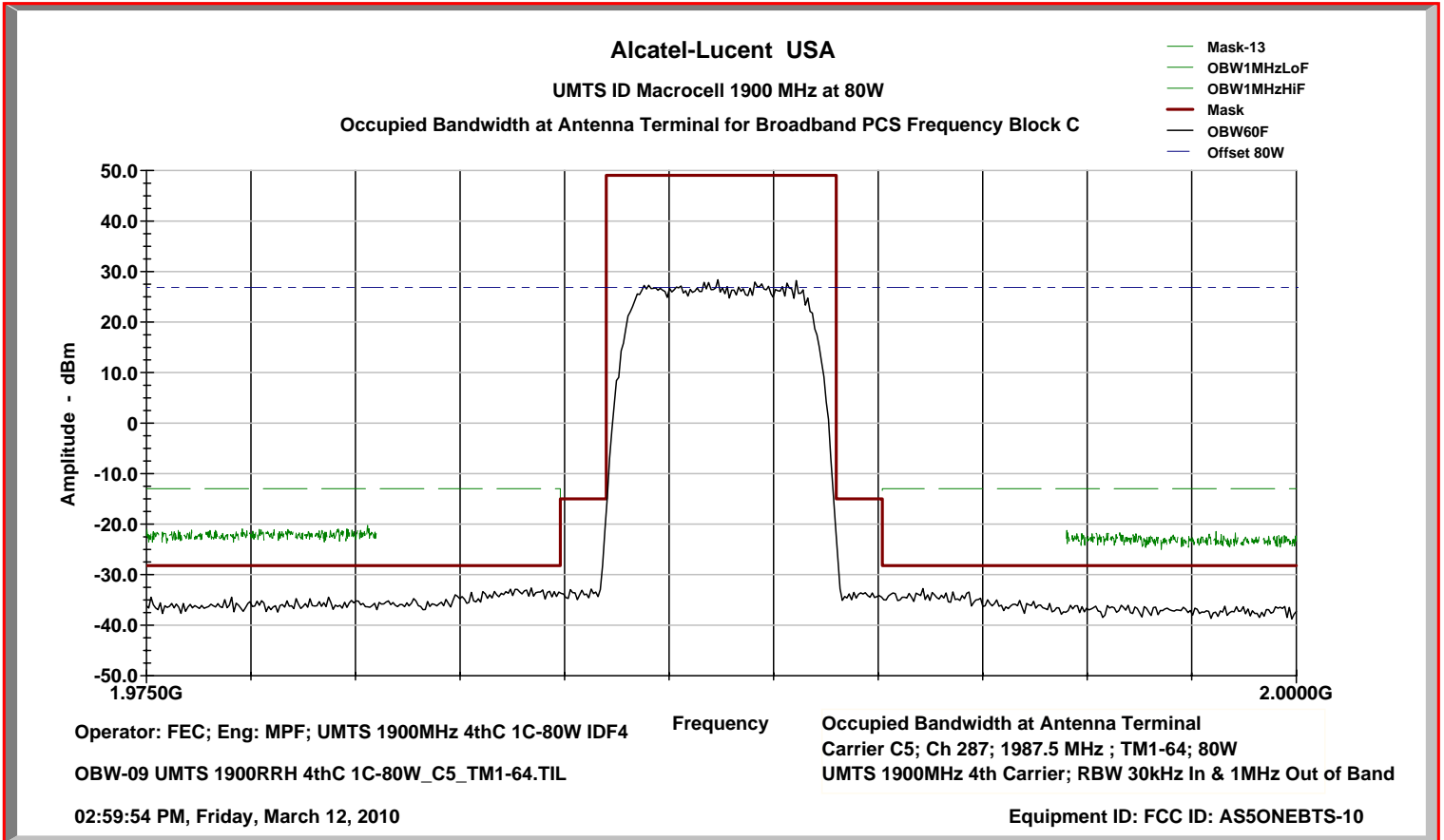




TEST REPORT

HIGHEST SETTABLE CARRIER - TM1-64 TEST MODULATION

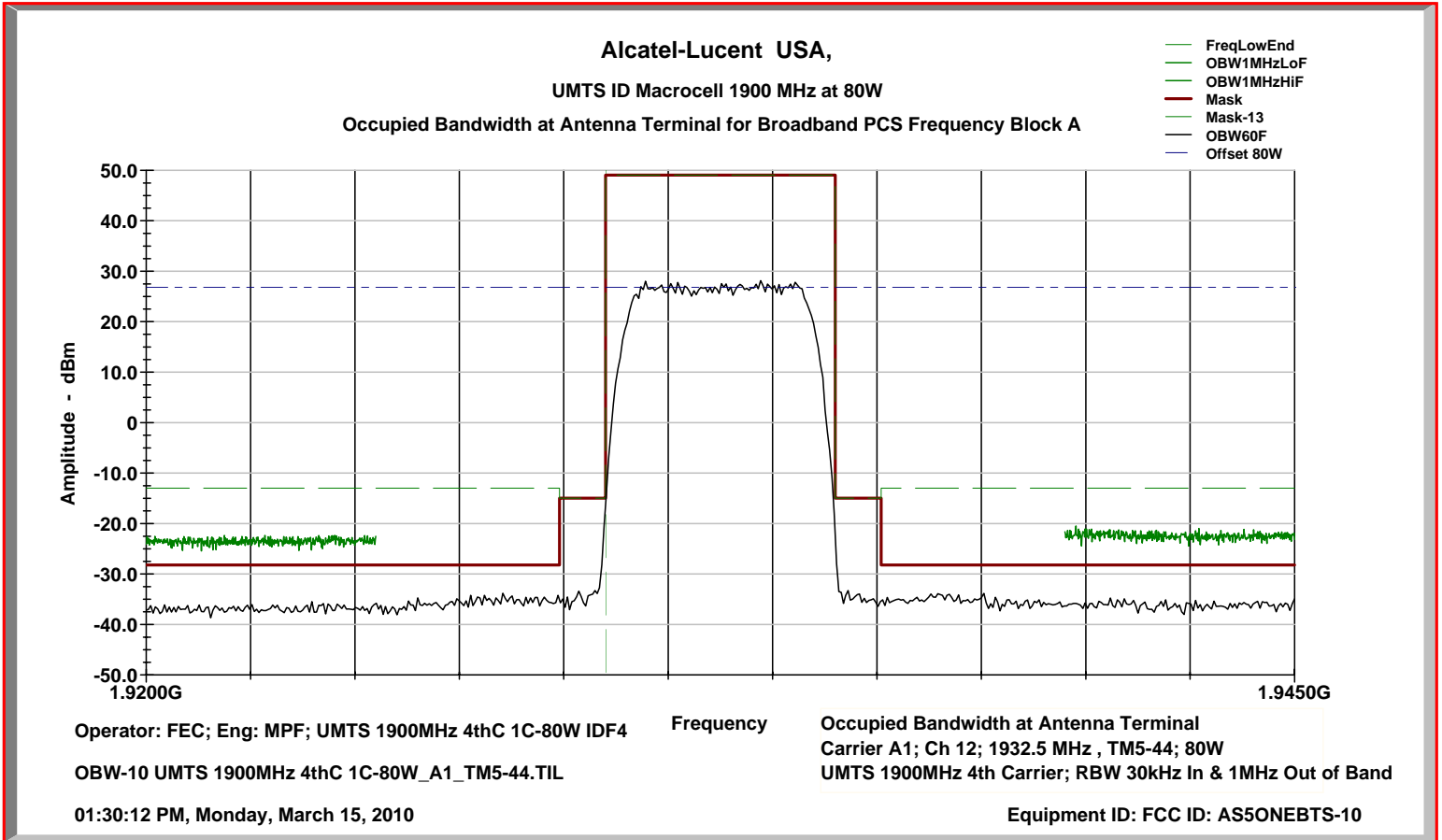
Occupied Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

LOWEST SETTABLE CARRIER - TM5-44 TEST MODULATION

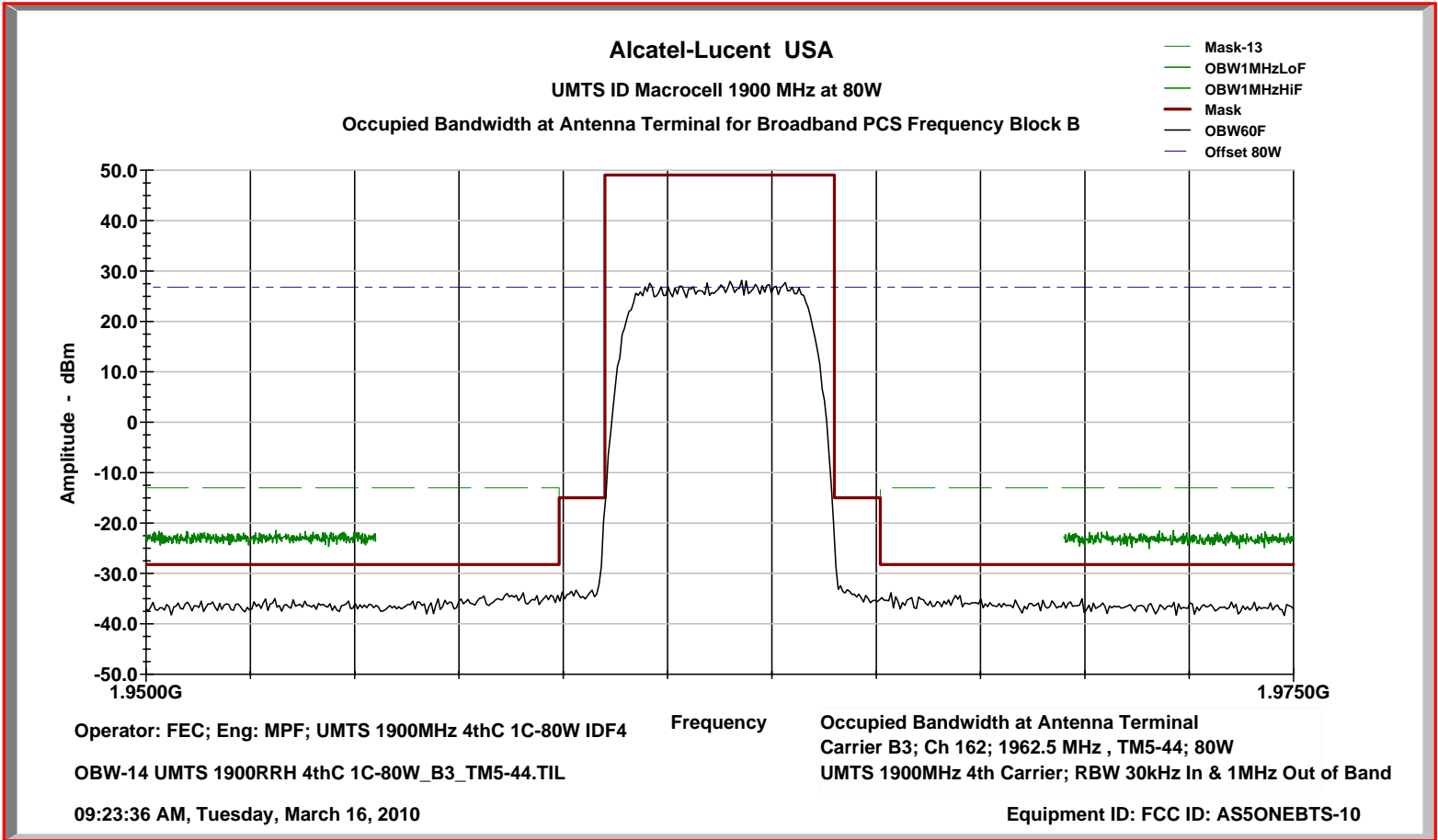
Occupied Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

MID-BAND CARRIER - TM5-44 TEST MODULATION

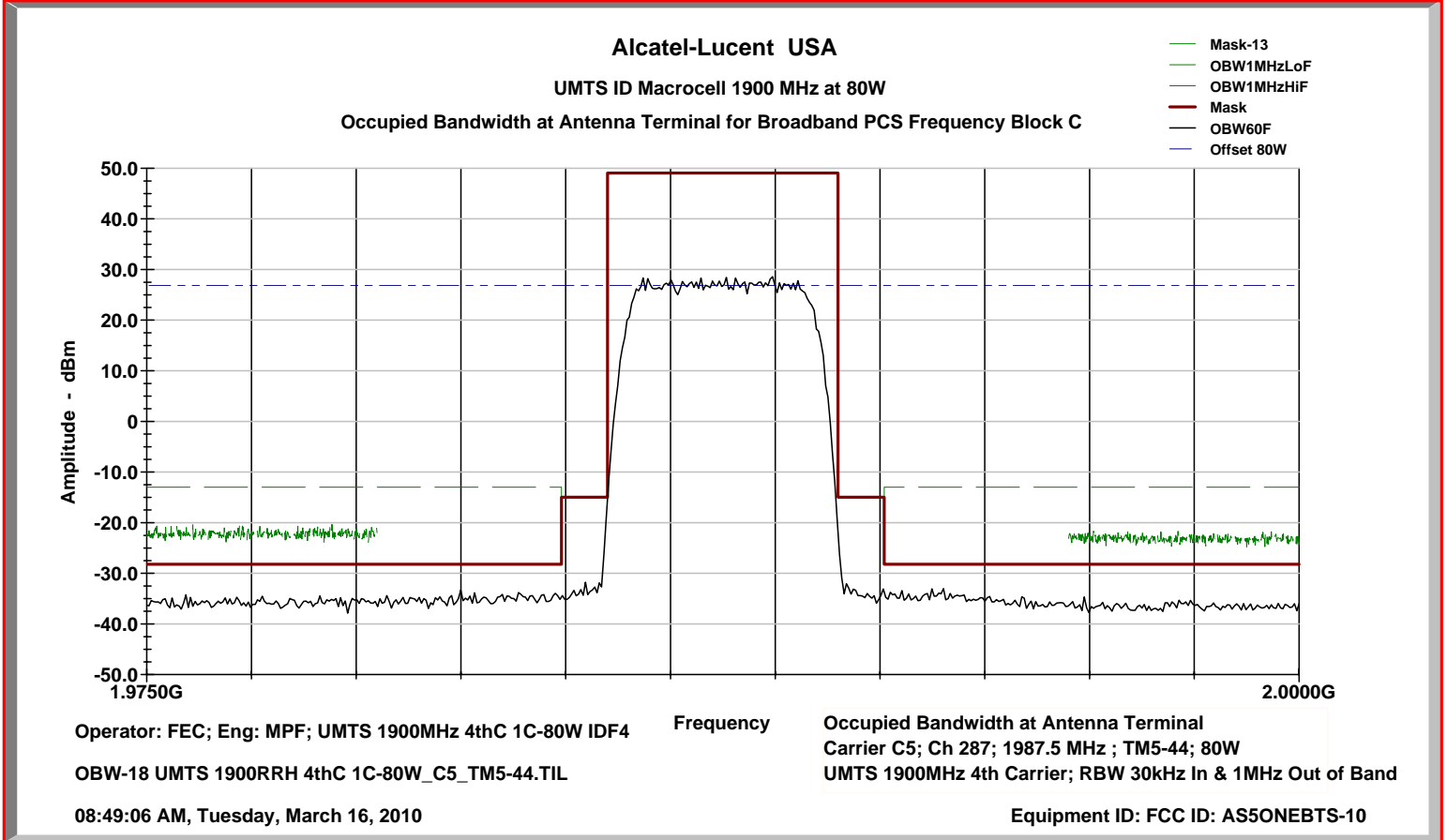
Occupied Bandwidth Characteristics: UARFCN Channel Number 162 @ 1962.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

HIGHEST SETTABLE CARRIER - TM5-44 TEST MODULATION

Occupied Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



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

This test procedure is an extension of the occupied bandwidth measurements at the Equipment Antenna Connector (EAC) terminal, using the same carrier frequencies, power level setting procedure and modulated carrier offset procedure. All test were performed with a single carrier at 80W (+49.0 dBm), combined by 2 parallel P2PAM power amplifiers (PA).

In accordance with Part 2.1057(a), the required frequency spectrum to be investigated extends from the lowest RF signal generated to the 10<sup>th</sup> harmonic of the carrier at the EAC terminal. The emission limits at the antenna terminal are specified in Part 24.238 (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 to 80 Watts average, produces an emission attenuation below the carrier of 62.0 dBc. Part 24.238 (b) specifies the required Resolution Bandwidth (RBW) to be 1 MHz or greater. In accordance with Part 2.1051, “the magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified”; i.e., these are not reportable. 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, which equates to 82.0 dBc. The pertinent test parameters are:

1. Frequency Spectrum: 10 MHz to 20 GHz
2. Resolution Bandwidth: 1 MHz or greater (Part 24.238)
3. Emission Limitation:  $43 + 10 \log (P)$  dBc =  $43 + 10 \log (80 \text{ Watts}) = 62.0$  dBc
4. Instrumentation Noise Floor: at least 20 dB greater than “ $43 + 10 \log (P)$  dBc” = 82.0 dBc

**Minimum Standard Requirement:**

The emission limits at the antenna terminal are specified in Part 24.238 (a) ... the power of any emission shall be attenuated below the transmitter power (*P*) by at least  $43 + 10 \log (P)$  dBc (i.e., attenuation below the unmodulated carrier). The power *P* is the average carrier power measured at the J4 antenna terminal in Watts. The measurement equipment must be adjusted and configured to provide an instrumentation noise floor that is 20 dB or more below the  $43 + 10 \log (P)$  dBc limit. In summary:

1. Carrier Power Level = 49.0 dBm
2. Emission Limitation = 49.0 dBm – 62.0 dBc = -13.0 dBm
3. Reportable Emission Limit = -13.0 dBm – 20 dBc = - 33.0 dBm
4. Emission power levels less than - 33.0 dBm are not reportable; i.e., at  $\geq 82.0$  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, or as low as  $-33.0$  dBm (i.e., 82.0 dBc), 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 (i.e., programming) 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, perform the mathematical corrections to each segment, and then sequentially compile all the segments into a continuous graphical display.

Part 24.238 requires that emissions over the required spectrum 10 MHz to 20 GHz be measured using an instrumentation resolution bandwidth of 1 MHz or greater. The TILE/IC software was able to sufficiently suppress the normally high noise floor by measuring the spectrum in a sequential series of short segments using a peak detector, in combination with an appropriate low-pass filter and then with an appropriate high-pass filter, installed at the input terminal of the spectrum analyzer, to prevent the carrier from over driving the spectrum analyzer. The spectrum portion 1930 MHz – 1990 MHz, in close proximity to the carrier, was measured without filters.

The specific EMC test filters used were manufactured by TRILITHIC, Inc., Indianapolis, IN:

1. Low Pass Filter: Model 10LC800-3-AA; Product No. 23042
2. High Pass Filter: Model 4HC1400/8000-1-KK; Product No. 23042

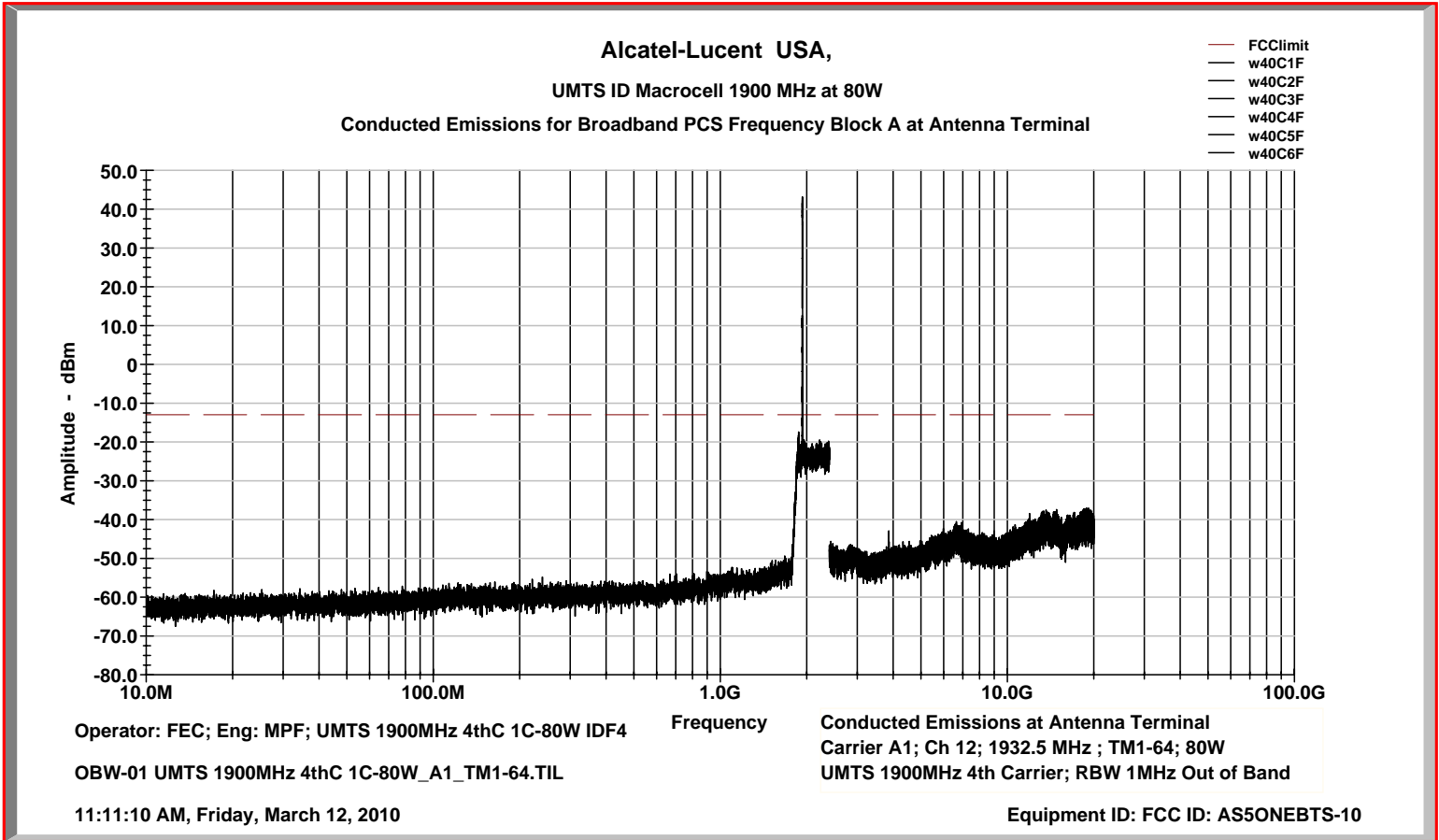
This test procedure was conducted in conjunction with the previously cited occupied bandwidth tests for single carrier at 80W for 2 parallel P2PAM power amplifiers (PA), for the same two test modulations: TM1-64 and TM5-44, as previously used for the occupied bandwidth tests.

**Results:** For each UMTS carrier combination previously cited, there were no reportable emissions. Data plots for the lowest settable, mid-band and the highest settable carrier combinations with each of the two test modulations: TM1-64 and TM5-44 are attached to this exhibit. The remaining carrier tests and data plots are retained as a permanent record.

TEST REPORT

Lowest Settable Carrier - TM1-64 Test Modulation

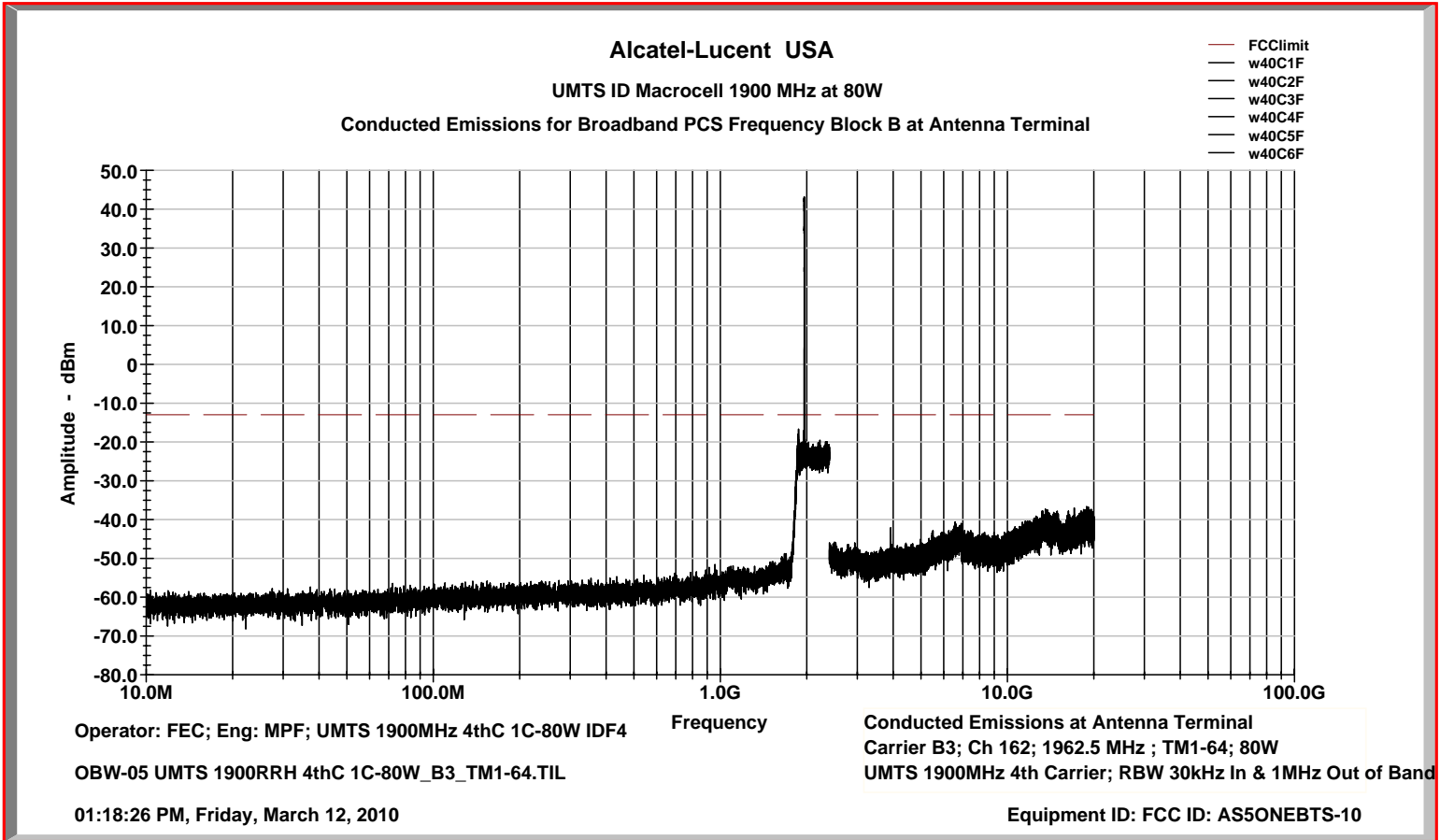
Conducted Emissions Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

Mid-Band Carrier - TM1-64 Test Modulation

Conducted Emissions Characteristics: UARFCN Channel Number 162 @ 1962.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier

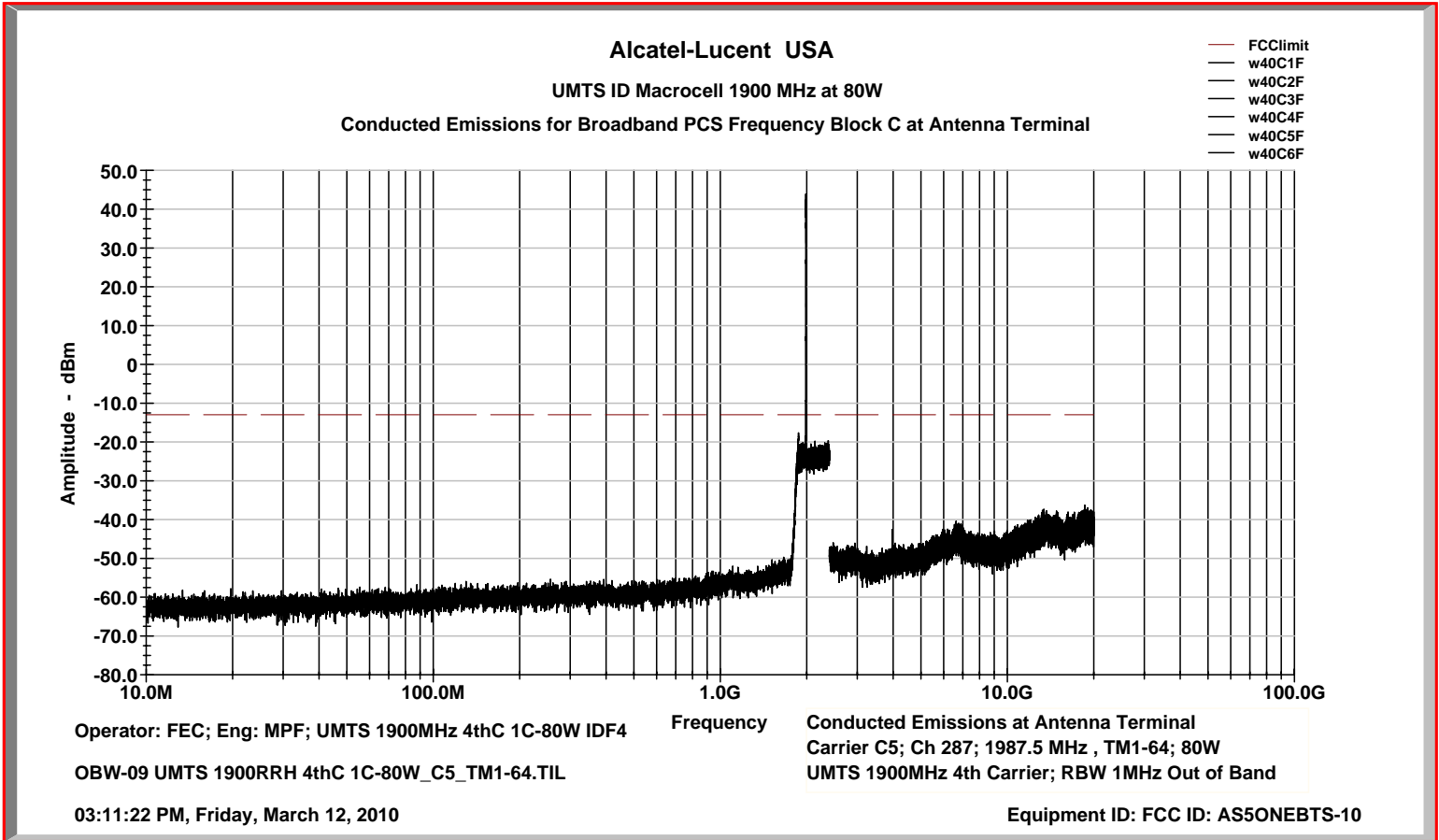




TEST REPORT

Highest Settable Carrier - TM1-64 Test Modulation

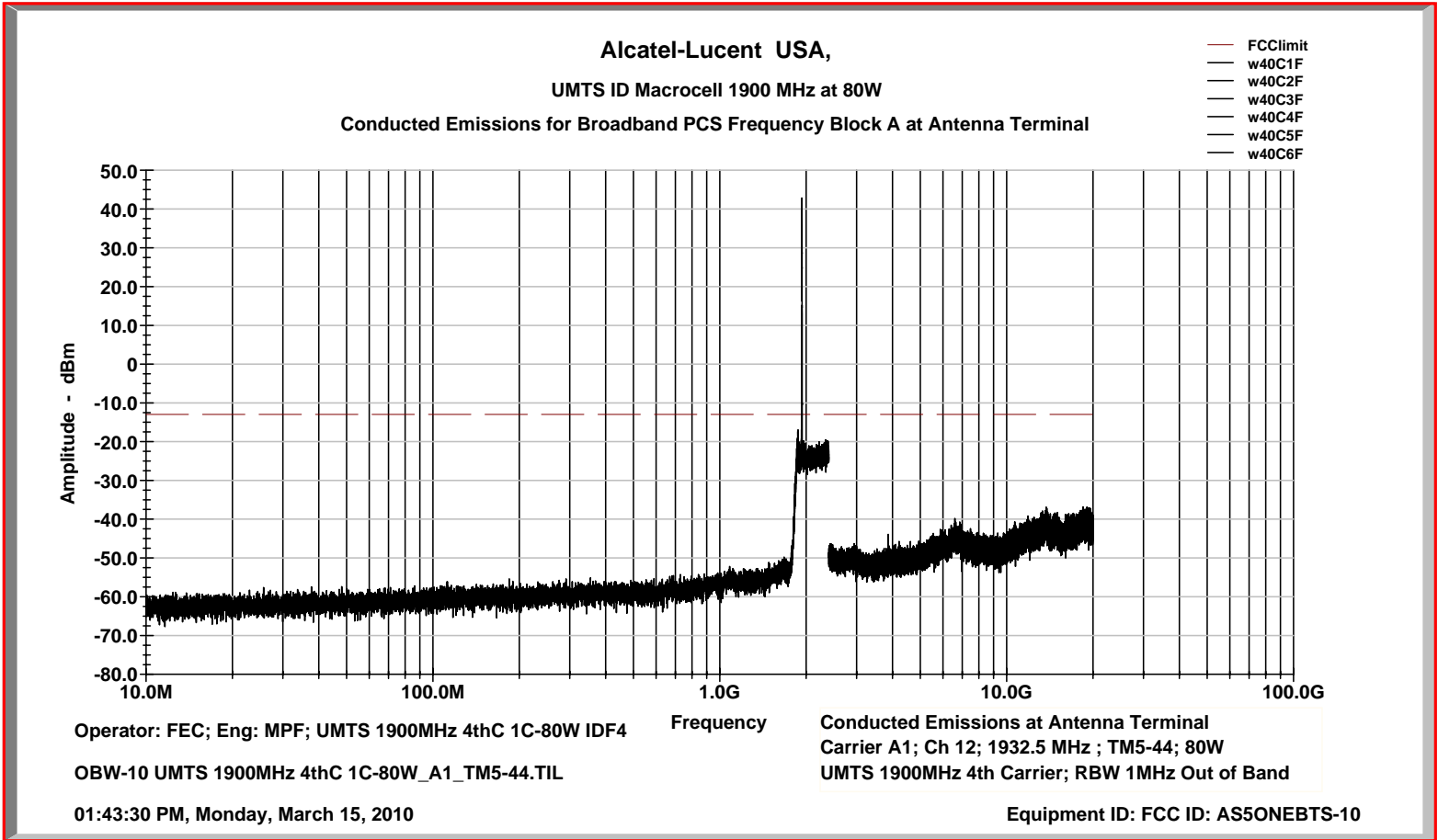
Conducted Emissions Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

Lowest Settable Carrier - TM5-44 Test Modulation

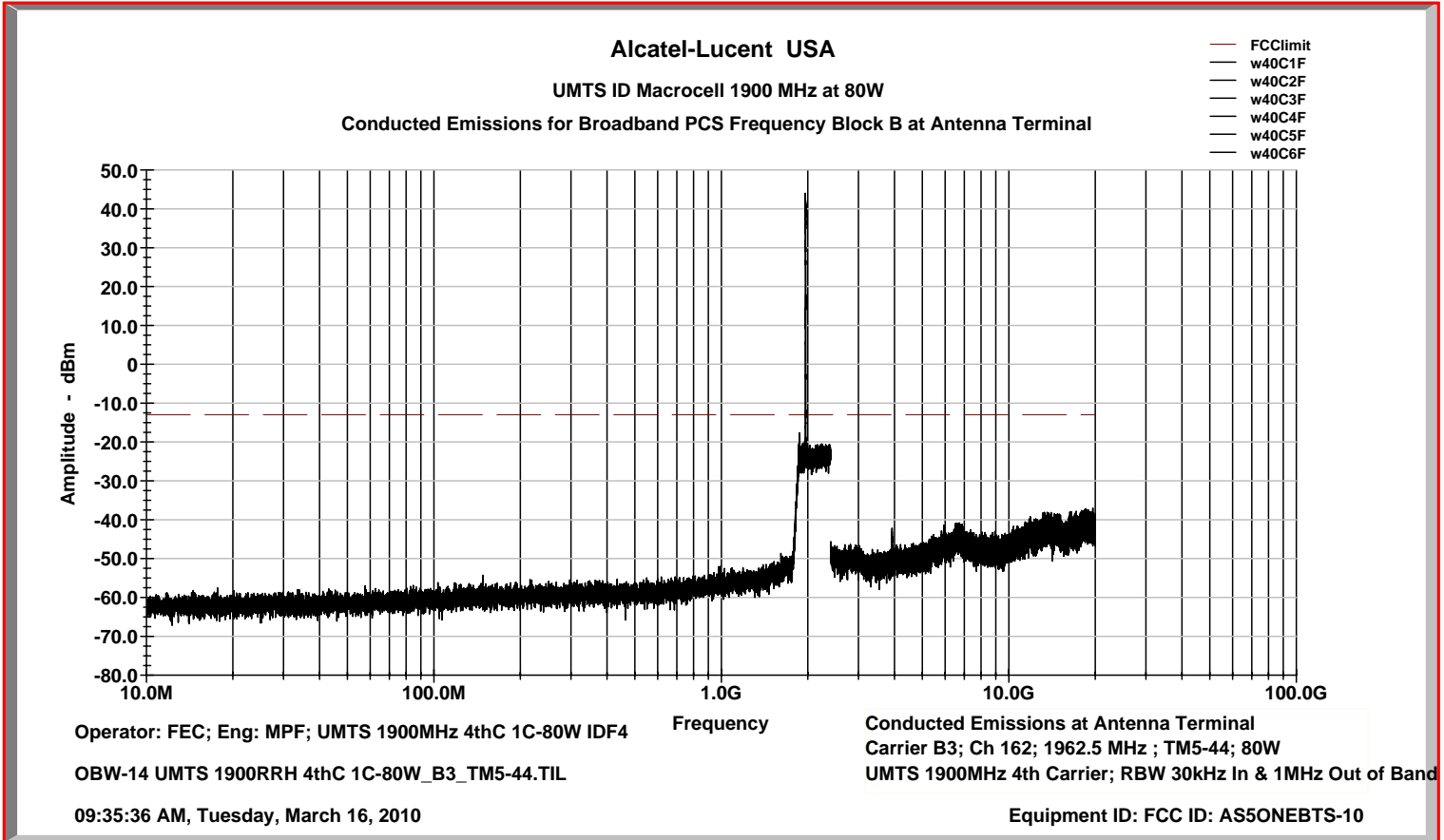
Conducted Emissions Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

Mid-Band Carrier - TM5-44 Test Modulation

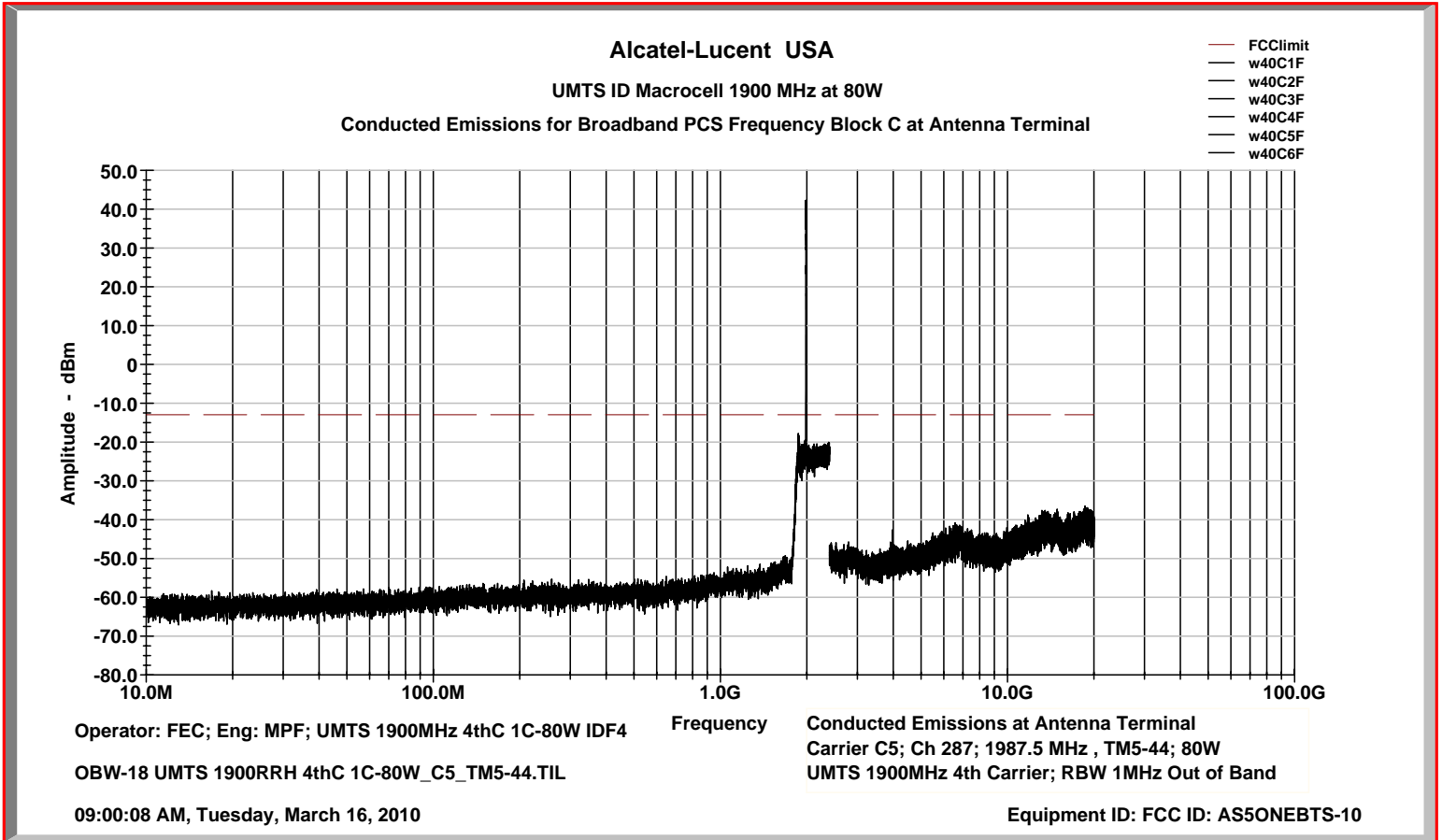
Conducted Emissions Characteristics: UARFCN Channel Number 162 @ 1962.5 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier



TEST REPORT

Highest Settable Carrier - TM5-44 Test Modulation

Conducted Emissions Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz  
Tx Antenna Terminal at 80W (+49.0 dBm) per single 5 MHz carrier





**PART 2.1055 MEASUREMENTS REQUIRED: FREQUENCY STABILITY**

**Since the frequency determining and stabilization circuitry were not changed and not affected by this Class II Permissive Change, the frequency stability measurements were not repeated.**