EXHIBIT 9: TEST REPORT

SYNOPSIS

The test report attached to this exhibit demonstrates that the Alcatel-Lucent Broadband Personal Communications Service (PCS) Frequency UMTS Distributed Base Station Transceiver System, *UMTS 9341 RRH 40W 1900 MHz System*, 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 24 Subpart E – Broadband PCS; Section 24.238 - Emission Limitations for Broadband PCS Equipment; effective October 1, 2007. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2007. It also demonstrates compliance 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), which is the standard used as a guideline in the design of the Distributed Base Station transceiver system. The objective of this application is to obtain FCC initial authorization, under FCC ID: AS5ONEBTS-18, for operation in the Universal Mobile Telecommunications System (UMTS) both with a single 5 MHz emission bandwidth carrier (4M10F9W) set to a maximum power level at the antenna terminal of 40 Watts (3-second average), and with 2 carriers at 20 Watts per carrier for a total composite power of 40 Watts (3-second average), over 60 MHz of the Broadband PCS Frequency Spectrum 1930-1990 MHz.

Alcatel-Lucent's wireless UMTS Distributed Base Station Transceiver System, *UMTS 9341 RRH 40W 1900 MHz System*, is the subject of this application for authorization by the Federal Communications Commission under the new FCC ID: AS5ONEBTS-18. Alcatel-Lucent's Universal Mobile Telecommunications System (UMTS) Distributed Base Station System, *UMTS 9341 RRH 40W 1900 MHz System*, is designed to operate in the North America Region (NAR) Broadband PCS Frequency Spectrum 1930-1990 MHz, with bandwidth of 60 MHz. The Distributed Base Station (DBS) can be configured for both single carrier (1S1C) operation at 40 Watts (+46 dBm) and for two carrier (1S2C) operation at 20 Watts (+43 dBm) per carrier with a total composite power of 40 Watts. 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) up to 68 active channels, consisting of 64 voice + 4 control, 2) up to 44 active channels, which include 8 High Speed Downlink Packet Access (HSDPA) channels, and 3) a single active channel *Synchronization Channel* (SCH).

The *UMTS 9341 RRH 40W 1900 MHz System*, subject of this certification, is comprised of two separate modules interconnected by fiber optic cable: 1) the digital Base Band Unit (BBU), and 2) the Remote Radio Head (RRH). They have the flexibility of being installed either in close proximity to or remotely located from each other. The BBU has the capability of controlling up to 3 remotely located RRH units, via fiber optic cable, and incorporates the digital channel cards, reference oscillator module, T1/E1 and alarm interface, and the RF-to-Optical and Optical-to-RF conversion circuitry. The 1900 MHz RRH incorporates the Future Technology Radio (FTR1900), power amplifier (PA) and passive filter with single transmit (Tx) and diversity receive functionality (Rx0, Rx1). 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) 3rd 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 February 27 – March 14, 2008; 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 ALU'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 performed by N.Hussain, Alcatel-Lucent , Swindon, United Kingdom, under the direction of M. P. Farina, and in adherence to the previously cited ISO/TL9000 test plan. A full report is attached to this exhibit.

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Subject: **Application for Certification under FCC ID: AS5ONEBTS-18, Covering the *UMTS 9341 RRH 40W 1900 MHz System*, Operating in the Broadband Personal Communications Service, 1930-1990 MHz.**

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March 19, 2008

TEST REPORT

INTRODUCTION:

The exhibits presented in this test report demonstrate that the Alcatel-Lucent Broadband PCS Frequency *UMTS 9341 RRH 40W 1900 MHz System*, UMTS Distributed Base Station Transceiver System, 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 24, Subpart E – Broadband PCS; Section 24.2387 - Emission Limitations for Broadband PCS Equipment; effective October 1, 2007. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2007. It also demonstrates compliance 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). This standard was the guideline used in the design of the Distributed Base Station transceiver system. The objective of this application is to obtain initial FCC authorization, under FCC ID: AS5ONEBTS-18, for operation in the Universal Mobile Telecommunications System (UMTS) with both a single 5 MHz emission bandwidth carrier (4M10F9W) set to a maximum power level at the antenna terminal of 40 Watts (3-second average) and with two 5 MHz carriers set to 20 Watts per carrier, with the total composite power at 40 Watts (3-second average).

Alcatel-Lucent's wireless *UMTS 9341 RRH 40W 1900 MHz System* is the subject of this application for authorization by the Federal Communications Commission under the new FCC ID: AS5ONEBTS-18. Alcatel-Lucent's Universal Mobile Telecommunications System (UMTS) Distributed Base Station System, *UMTS 9341 RRH 40W 1900 MHz System,* is designed to operate in the North America Region (NAR) Broadband PCS Frequency Spectrum 1930-1990 MHz, with bandwidth of 60 MHz. The Distributed Base Station (DBS) can be configured both for single carrier (1S1C) operation at 40 Watts (+46 dBm) and for two carrier (1S2C) operation at 20 Watts (+43 dBm) per carrier with a total composite power of 40 Watts. 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) up to 68 active channels, consisting of 64 voice + 4 control, 2) up to 44 active channels, which include 8 High Speed Downlink Packet Access (HSDPA) channels, and 3) a single active channel *Synchronization Channel* (SCH).

The *UMTS 9341 RRH 40W 1900 MHz System*, subject of this certification, is comprised of two separate modules interconnected by fiber optic cable: 1) the digital Base Band Unit (BBU), and 2) the RF Remote Radio Head (RRH). They have the flexibility of being installed either in close proximity to or remotely located from each other. The BBU has the capability of controlling up to 3 remotely located RRH units, via fiber optic cable, and incorporates the digital channel cards, reference oscillator module, T1/E1 and alarm interface, and the RF-to-Optical and Optical-to-RF conversion circuitry. The 1900 MHz RRH incorporates the Future Technology Radio (FTR1900), power amplifier (PA) and passive filter with single transmit (Tx) and diversity receive functionality (Rx0, Rx1). 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) 3rd 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 February 27 – March 14, 2008; 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 performed by N.Hussain, Alcatel-Lucent, Swindon, United Kingdom, under the direction of M. P. Farina, and in adherence to the previously cited ISO/TL9000 test plan. A full report is attached to this exhibit.

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 9341 RRH 40W 1900 MHz System* 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 24, Subpart E – Broadband PCS; Section 24.238 - Emission Limitations for Broadband PCS Equipment; effective October 1, 2007. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2007. It also demonstrates compliance with the spurious emission 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 specific test procedures that are both required for and are applicable to the UMTS Distributed Base Station Transceiver System are:

Part 2.1046	RF Power Output	**Pages 4 – 5**
Part 2.1047	Modulation Characteristics	**Pages 6-11**
Part 2.1049	Occupied Bandwidth	**Pages 12-26**
Part 2.1051	Spurious Emissions at the Antenna Terminals.	**Pages 27-38**
Part 2.1053	Field Strength of Spurious Radiation	**Pages 39**
Part 2.1055	Frequency Stability	**Pages 40-64**
Part 2.1057	Frequency Spectrum to be Investigated	
Part 24	Personal Communications Services; Subpart E – Broadband PCS	
Part 24.238	Emission Limitations for Broadband PCS Equipment	

ETSI TS 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).

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 9341 RRH 40W 1900 MHz System*, Distributed Base Station Transceiver System, subject of this application for certification, is designed to provide a maximum RF power level, per single 5 MHz carrier emission bandwidth, of 40 Watts (+46 dBm) at the Equipment Antenna Terminal (EAC). 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. This system is also designed to transmit 2 carriers at 20 Watts (+43 dBm) per carrier for a total composite power at 40 Watts.

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 +46 dBm (40 Watts at 3-second average) before performing each emission measurement.

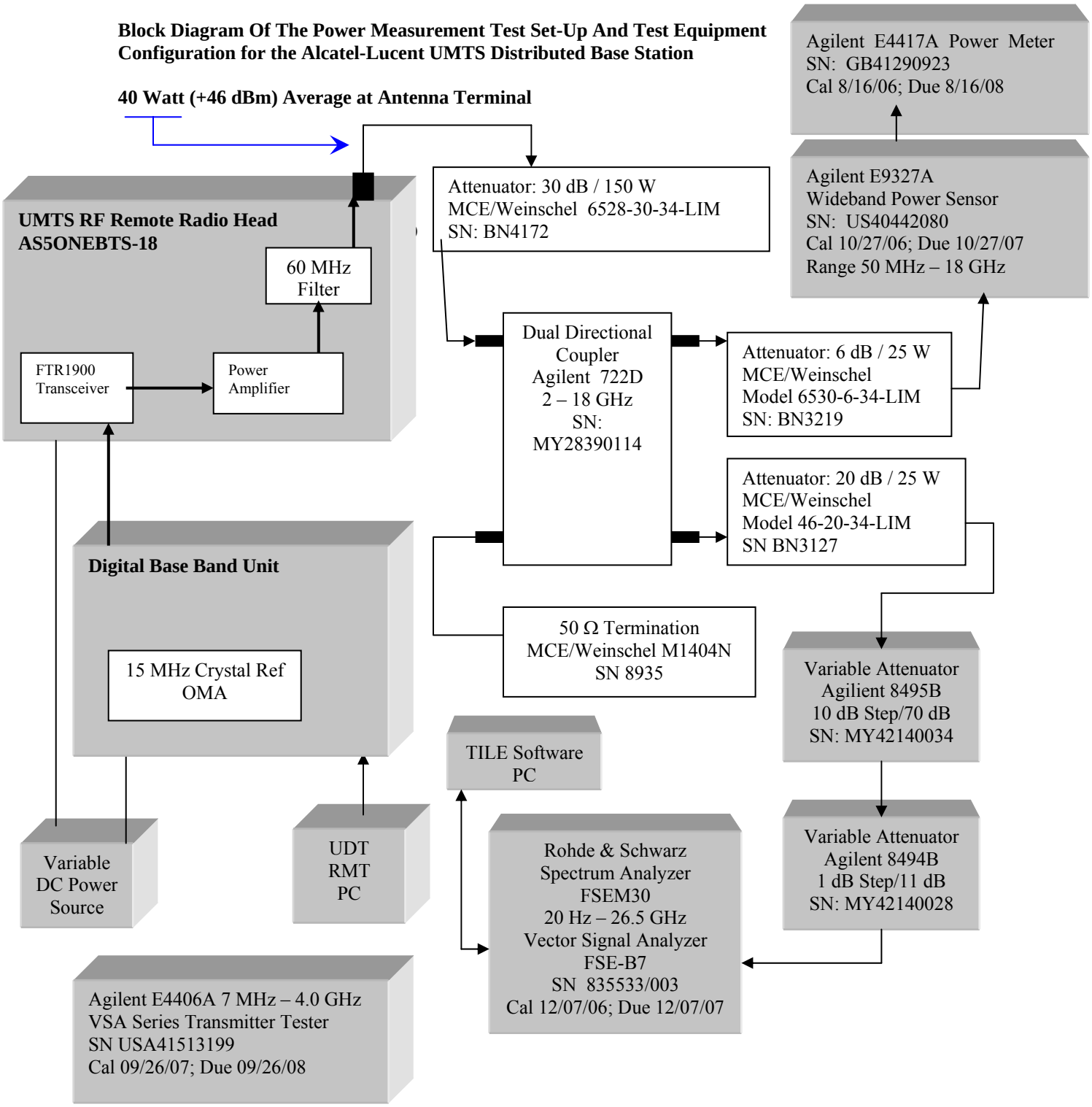
PCS Frequency	PCS Frequency Block	UARFCN Channel Number	Carrier Center Frequency	Measured Power Level
A1	Lowest Settable Channel	12	1932.5 MHz	+46 dBm
A3	Highest Settable Channel	62	1942.5 MHz	+46 dBm
D	Block Center	87	1947.5 MHz	+46 dBm
B1	Lowest Settable Channel	112	1952.5 MHz	+46 dBm
B3	Highest Settable Channel	162	1962.5 MHz	+46 dBm
E	Block Center	187	1967.5 MHz	+46 dBm
F	Block Center	212	1972.5 MHz	+46 dBm
C3	Lowest Settable Channel	237	1977.5 MHz	+46 dBm
C5	Highest Settable Channel	287	1987.5 MHz	+46 dBm

Note: UARFCN = UTRA Absolute Radio Frequency Channel Number

Results: The 5 MHz *UMTS 9341 RRH 40W 1900 MHz System*, Transceiver System, 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 Distributed Base Station

40 Watt (+46 dBm) Average 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 nine UMTS 1900 carriers, previously cited. In accordance with ETSI TS 25.141, the Error Vector Magnitude (EVM) was measured for each of two modulation schemes:

1. Test Model 4 (TM4) modulation with a single active channel (SCH) and the power level set to Pmax – 18 dB (+46 dBm- 18 dB = +28 dBm). The Error Vector Magnitude limit is EVM < 17.5% for QPSK.

TM4: with 1 Active Channel
ETSI TS 25.141 Rel 7, Table 6.6 : Test Model 4 Active Channels

Type	Number of Channels
P-CCPCH+SCH when Primary CPICH is disabled.	1

2. 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 (+46 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) shall be less than 17.5% for TM4 and less than 12.5% for TM5-44.

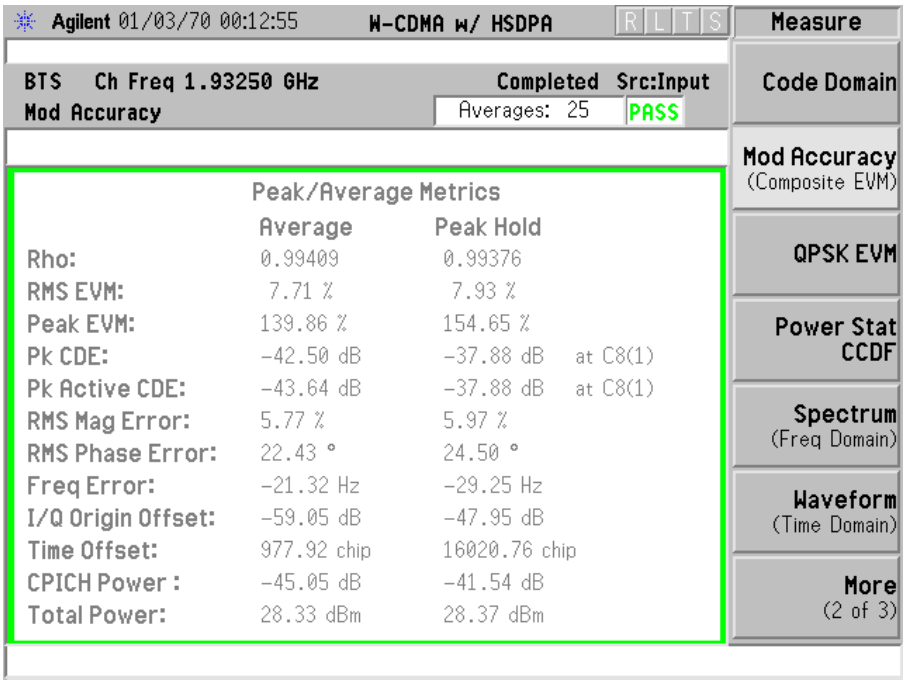
Test Set-up and Configuration: Same as previously used for Part 2.1046 RF Power Measurement, with exception that the FSEM30 Spectrum Analyzer is replaced by:
1) Agilent E4406A VSA Series Transmitter Tester, 7 MHz – 4.0 GHz, SN US41513199
2) The VSA measurement set up was for Composite Modulation Accuracy with 25 sweeps for test.

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

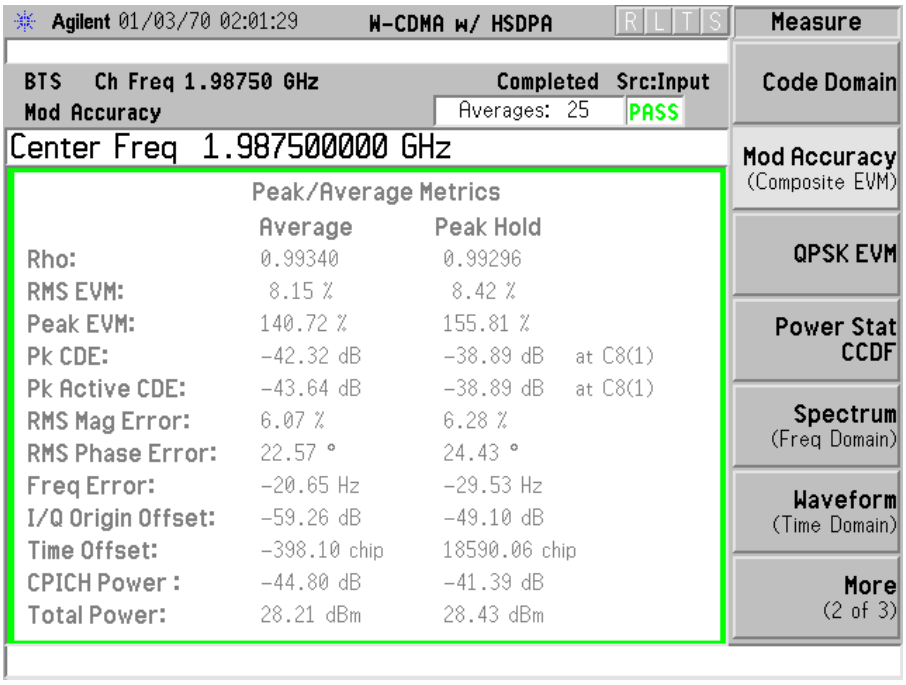
UMTS PCS Frequency Block	Broadband PCS Frequency Block	Power Level at Antenna Terminal	UMTS1900 Channel No.	UMTS 1900 Carrier Center Frequency MHz	EVM TM4 < 17.5 % Average	EVM TM5-44 <12.5 % Average
A1	Lowest Settable	46 dBm	12	1932.5	7.71 %	6.69 %
A3	Highest Settable	46 dBm	62	1942.5	7.47 %	6.51 %
D	Center	46 dBm	87	1947.5	7.46 %	6.50 %
B1	Lowest Settable	46 dBm	112	1952.5	7.45 %	6.49 %
B3	Highest Settable	46 dBm	162	1962.5	7.64 %	6.50 %
E	Center	46 dBm	187	1967.5	7.64 %	6.47 %
F	Center	46 dBm	212	1972.5	7.65 %	
C3	Lowest Settable	46 dBm	237	1977.5	7.73 %	6.44 %
C5	Highest Settable	46 dBm	287	1987.5	8.15 %	6.55 %

RESULTS: The *UMTS 9341 RRH 40W 1900 MHz System*, Transceiver System, demonstrated full compliance with the modulation accuracy requirements specified in ETSI TS 25.141. All channels were less than the 17.5% rms and the 12.5% rms limitations, respectively, as tabulated above. For brevity, the data plots for A1 and C5 carriers, for each modulation , are included in this exhibit as shown below. The remaining data plots are retained on file.

TM4 Modulation Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz
Tx Antenna Terminal at +28 dBm per single 5 MHz carrier

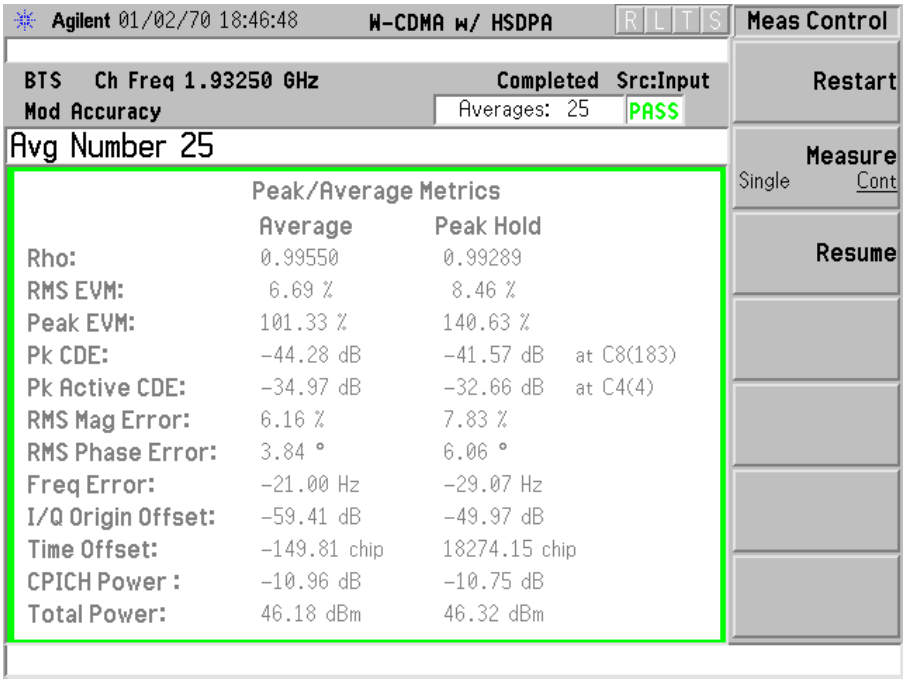


TM4 Modulation Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz
Tx Antenna Terminal at +28 dBm per single 5 MHz carrier

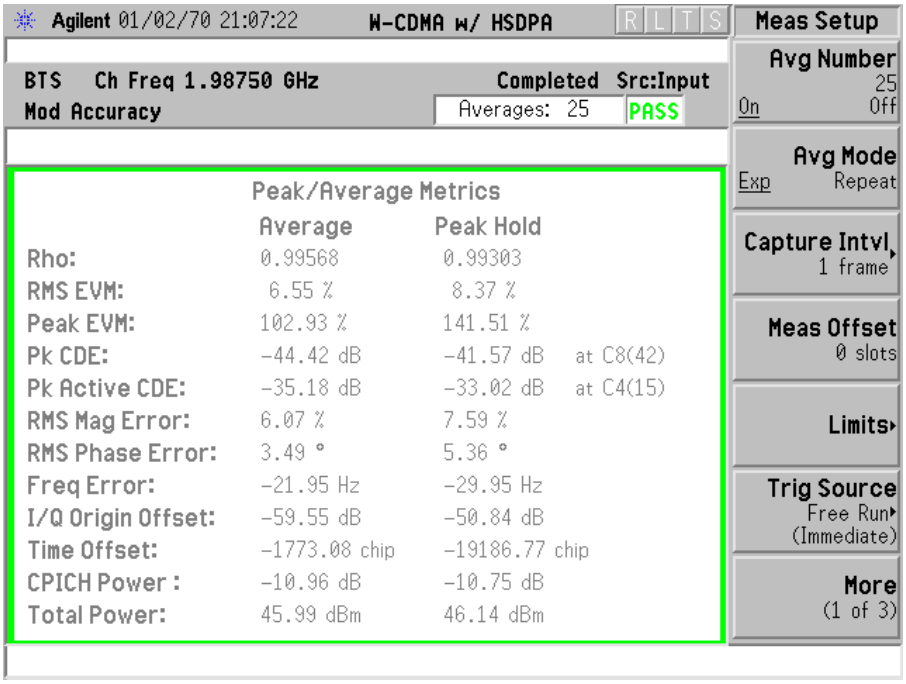


TM5-44 Modulation Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz

Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



TM5-44 Modulation Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz
Tx Antenna Terminal at +28 dBm per single 5 MHz carrier



PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH

The occupied bandwidth was measured at the Equipment Antenna Terminal (EAC) for each of the nine, UMTS 1900, 5 MHz carriers. The power level was set to 40 Watts (+46 dBm). Two ETSI Test Modulation schemes were utilized:

1) TM1-64 with up to 68 active channels, consisting of 64 Voice + 4 Control active channels, and
2) TM5-44 with up to 44 active channels, consisting of 30 Voice + 8 HSDPA + 6 Control active channels, where HSDPA = High Speed Downlink Packet Access.

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 5 MHz carrier set to +46 dBm and modulated first with TM1-64 and then with TM5-44. The necessary bandwidth measurement results show that the carrier is within the manufacturer's rated 5 MHz bandwidth for all nine carriers measured, and for both modulation schemes, as tabulated below. For brevity, the data plots that are attached show the TM1-64 measurements. The TM5-44 plots are nearly identical, and tabulating the measured values below is sufficient.

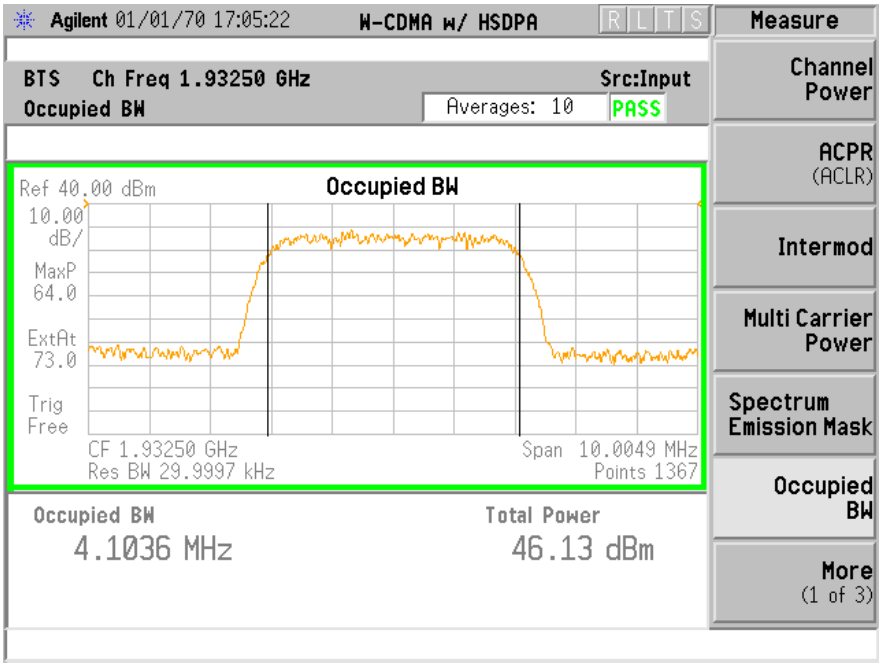
UMTS PCS Carrier	Broadband PCS Frequency Block	Power Level at Antenna Terminal	UMTS1900 Channel No.	UMTS 1900 Carrier Center Frequency MHz	99% Bandwidth TM1-64	99% Bandwidth TM5-44
A1	Lowest Settable	46 dBm	12	1932.5	4.1036 MHz	4.1217 MHz
A3	Highest Settable	46 dBm	62	1942.5	4.1032 MHz	4.1234 MHz
D	Center	46 dBm	87	1947.5	4.1016 MHz	4.1215 MHz
B1	Lowest Settable	46 dBm	112	1952.5	4.1004 MHz	4.1346 MHz
B3	Highest Settable	46 dBm	162	1962.5	4.1072 MHz	4.1326 MHz
E	Center	46 dBm	187	1967.5	4.1045 MHz	4.1142 MHz
F	Center	46 dBm	212	1972.5	4.1000 MHz	4.1140 MHz
C3	Lowest Settable	46 dBm	237	1977.5	4.1075 MHz	4.1125 MHz
C5	Highest Settable	46 dBm	287	1987.5	4.1034 MHz	4.1276 MHz

Results: For each UMTS 1900 MHz channel, and for each test modulation scheme, the carrier does not exceed 5.0 MHz. The necessary bandwidth and emission designator is **4M10F9W**. The data plots for the above tabulated carriers A1 and C5 are attached for each of the two modulation schemes. The data for the remaining carriers and modulation schemes are retained as permanent records.

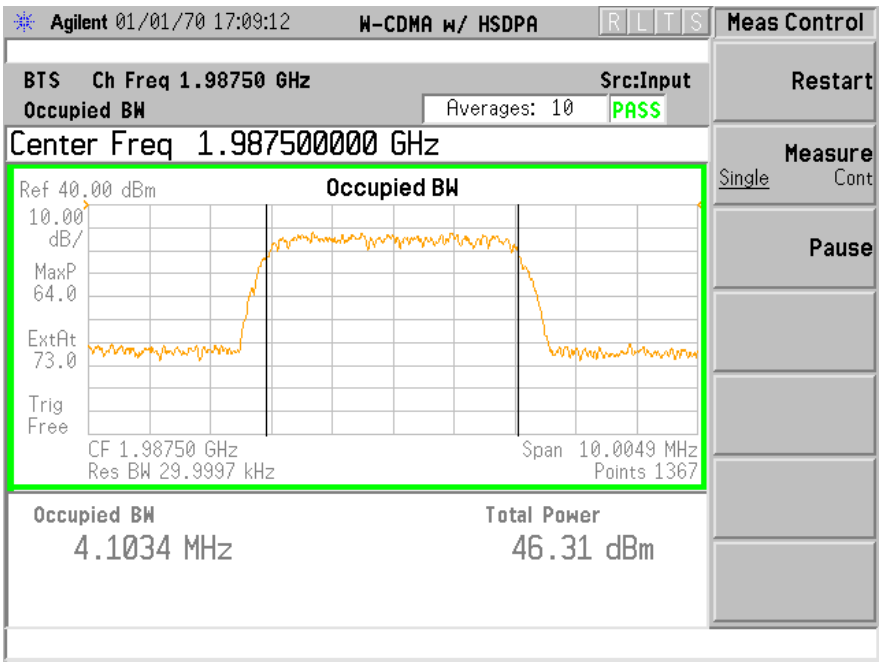
The average and range of the 99% power bandwidth/necessary bandwidth measurements are:

Average	4.1130
Max	4.1346
Min	4.1000

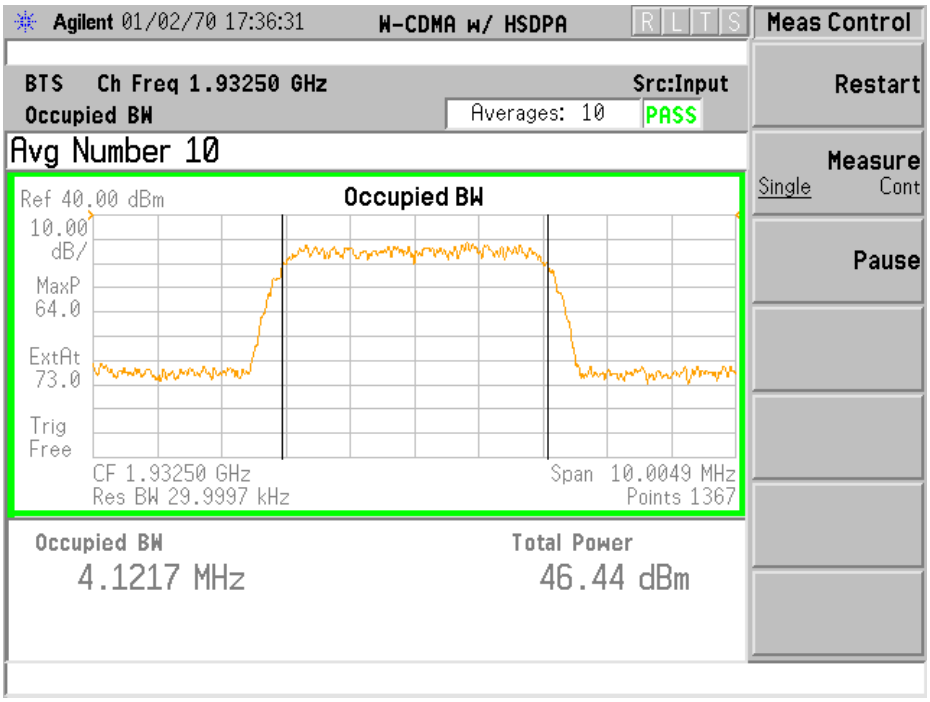
TM1-64 99% Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



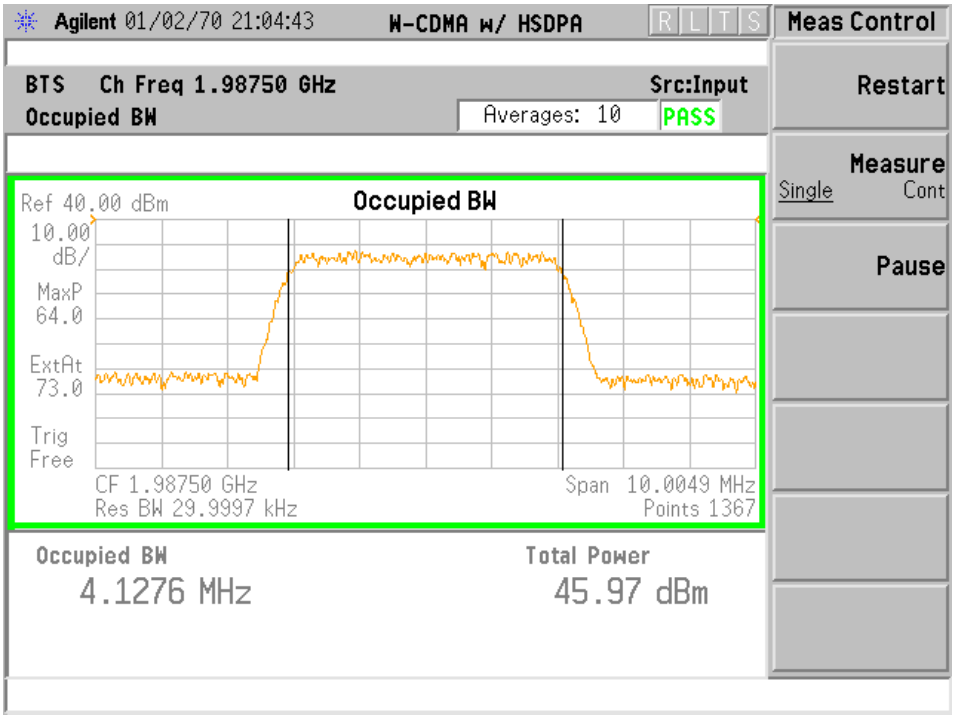
TM1-64 99% Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.5 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



TM5-44 99% Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.5 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



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 +46 dBm for each of the 9 carriers, and for both the TM1-64 and TM5-44 modulation schemes. The same 9 UARFCN channels as used previously, were repeated. The emission mask used to demonstrate compliance was as specified in ETSI TS 25.141 for P ≥ +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 –22.2 dB, in accordance with the equation:

Carrier Offset = 10 log (30 kHz/5 MHz) = -22.2 dB

This series of measurements were performed using the EMC software:

Total Integrated Laboratory Environment (TILE)
By Quantum Change/EMC Systems, Inc.

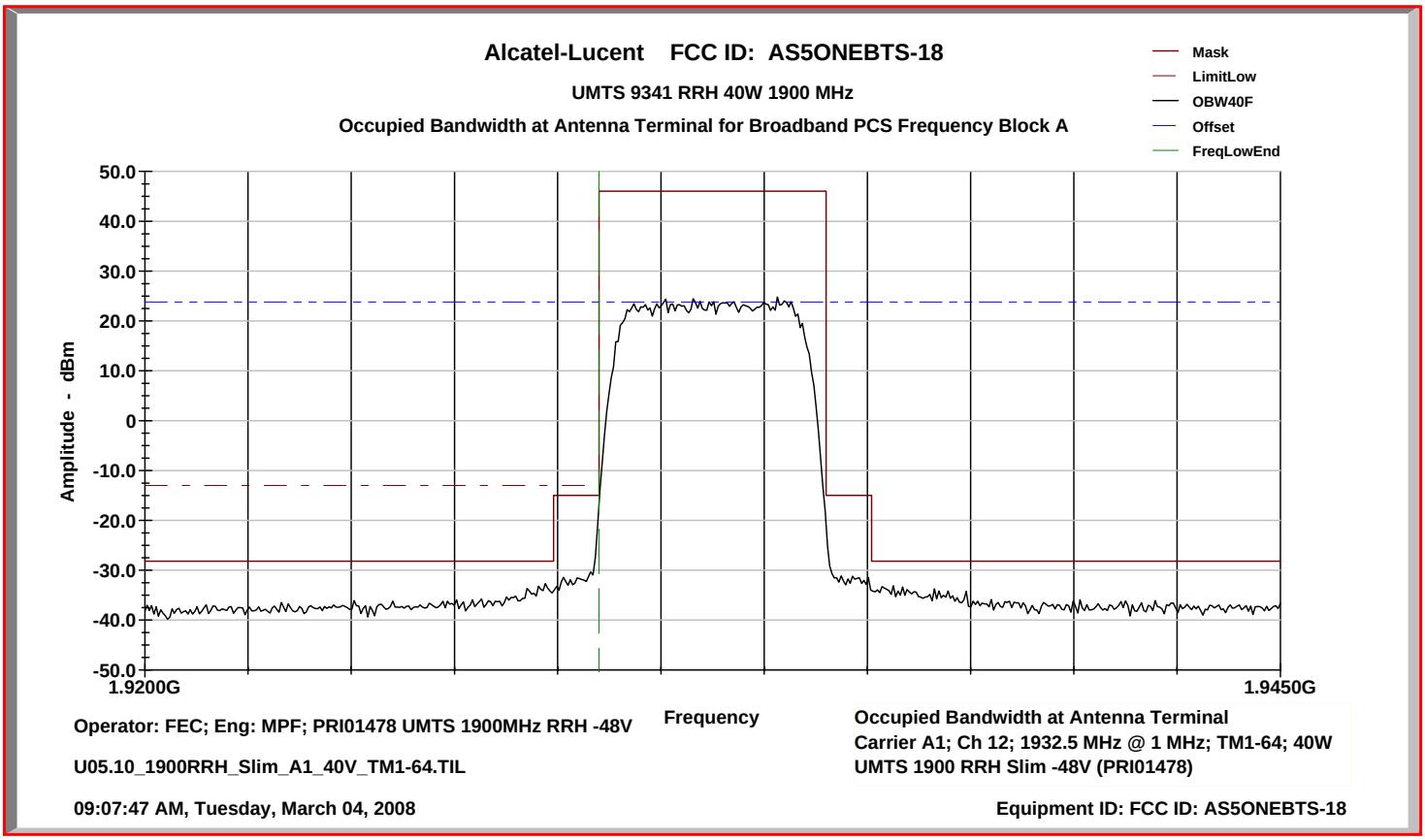
The data/measurement plots for the 4 channels with TM1-64 modulation are attached below. The same test results were demonstrated for the TM5-44 test modulation; and are not attached to avoid repetition.

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

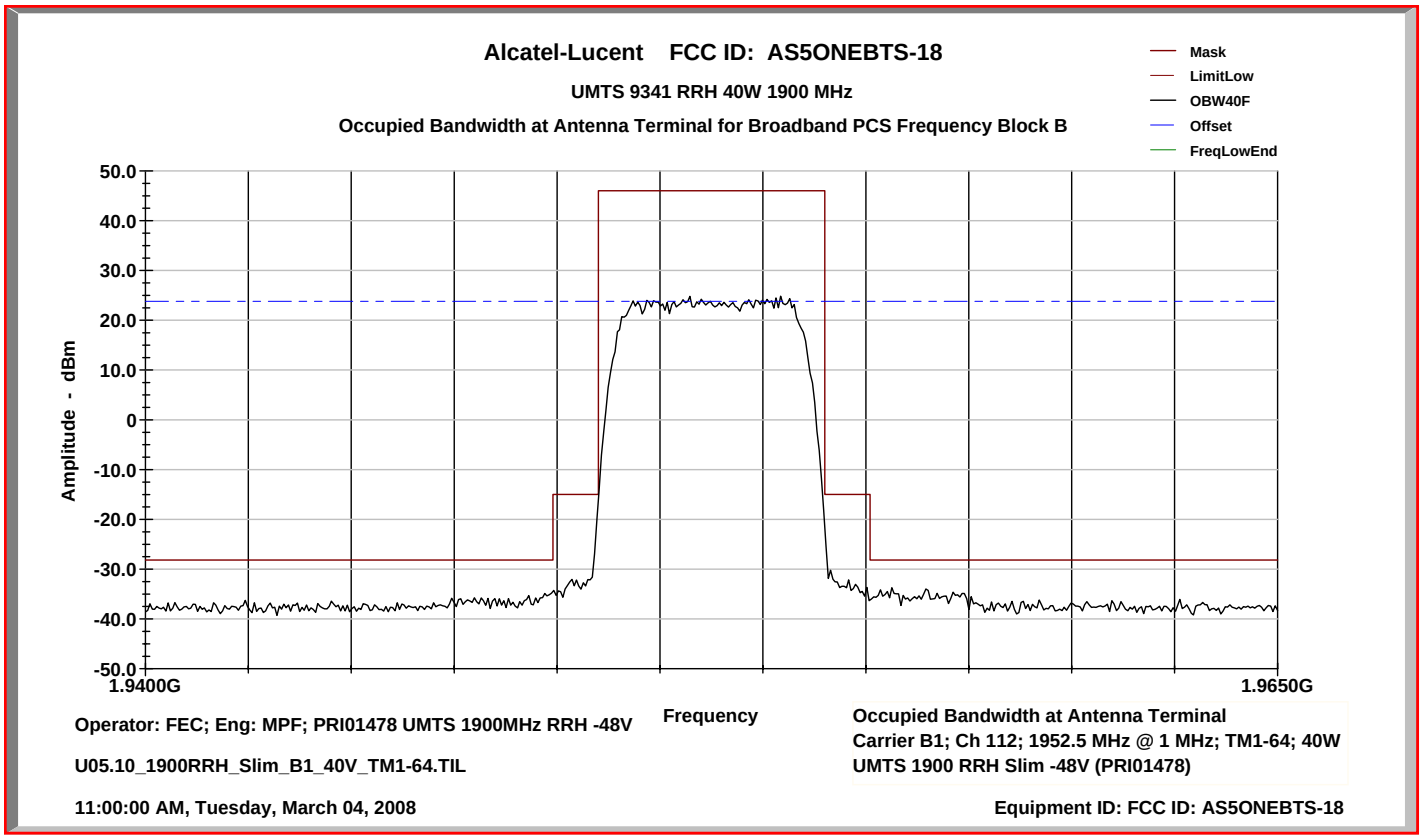
RESULTS: The UARFCN 12, 112, and 287 channels all demonstrate compliance with the emission mask specified by ETSI TS 25.141 for both TM1-64 and TM5-44 test modulations. In each test, the carriers do not exceed the mask limitation.

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.

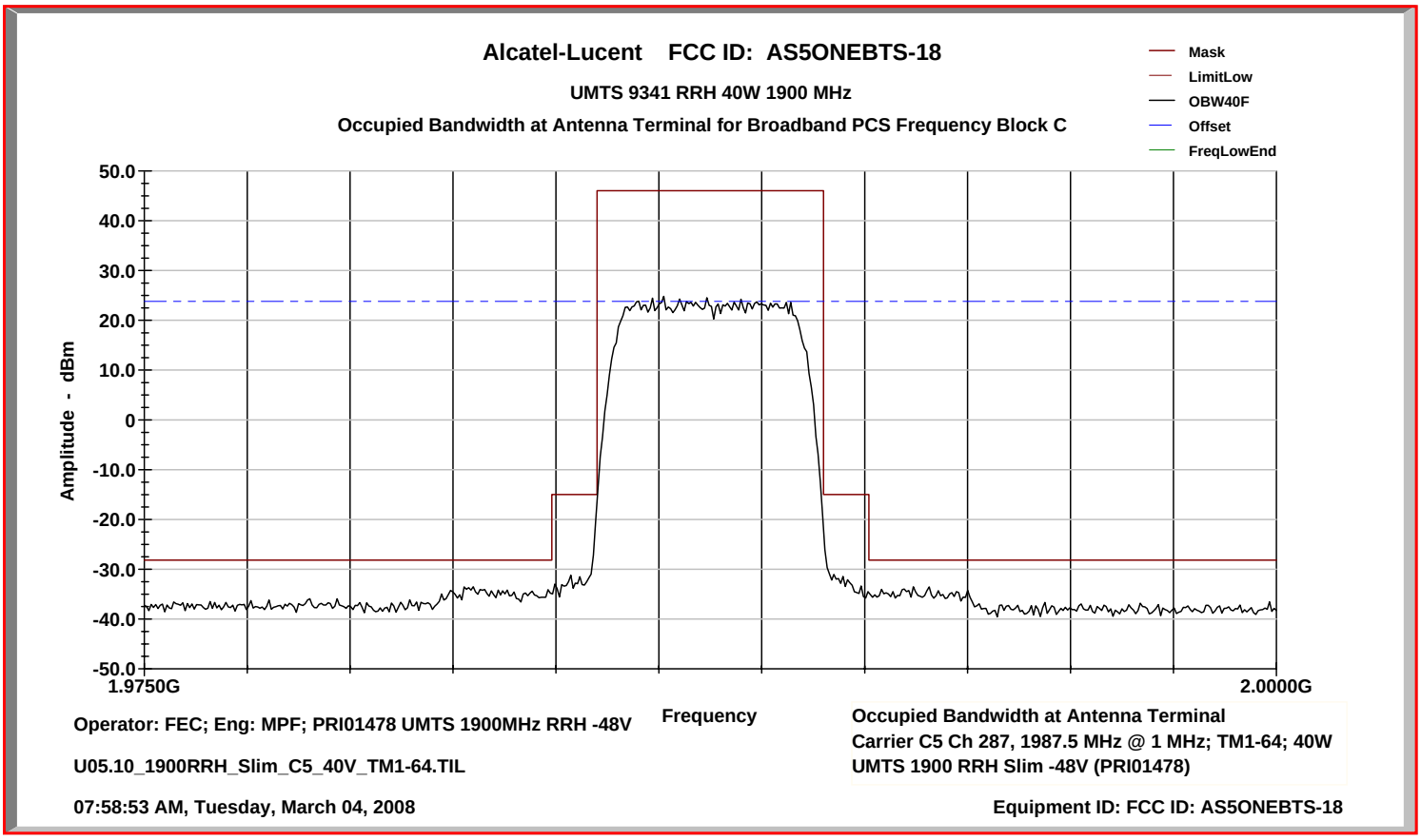
Occupied Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM1-64 Test Modulation



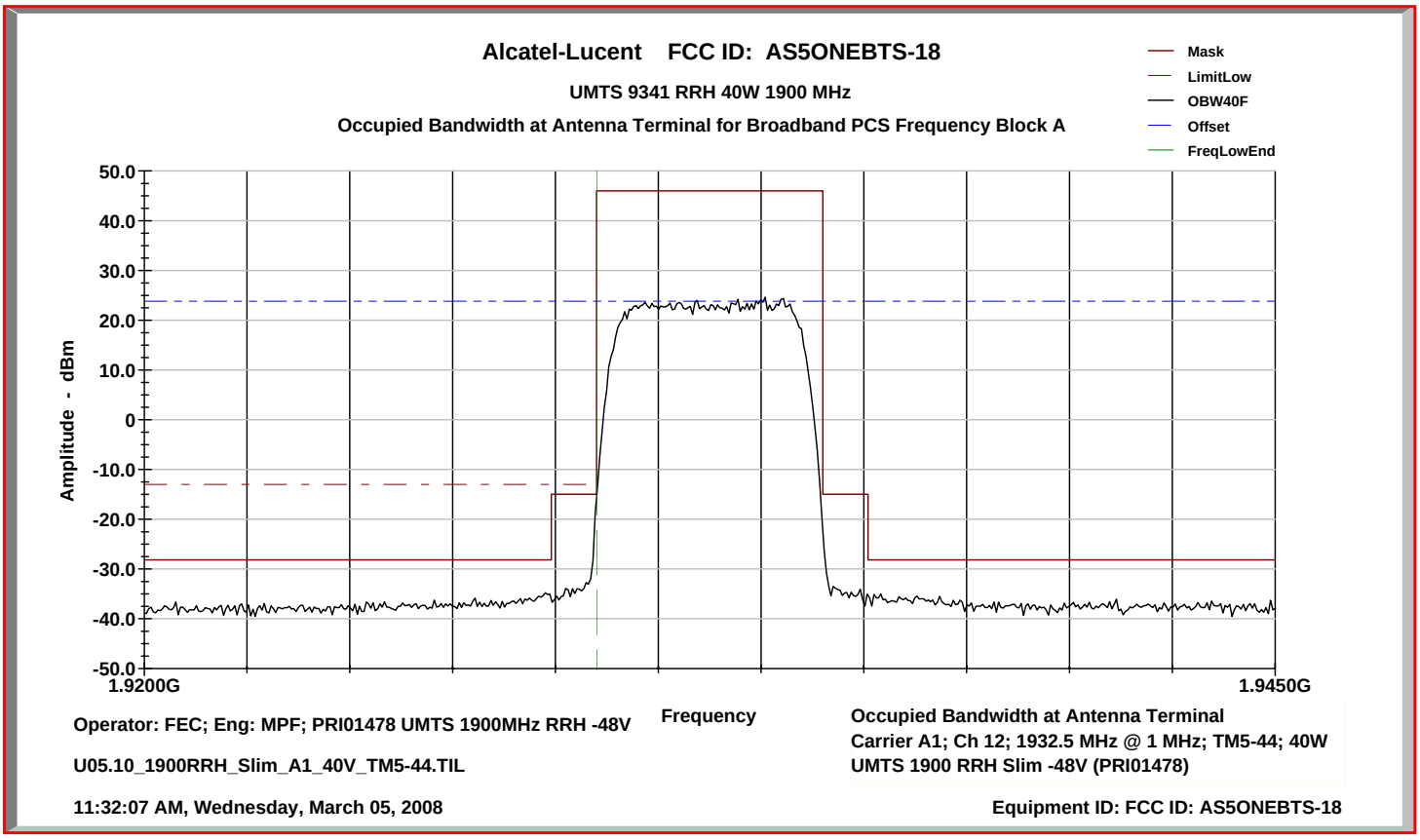
Occupied Bandwidth Characteristics: UARFCN Channel Number 112 @ 1952.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM1-64 Test Modulation



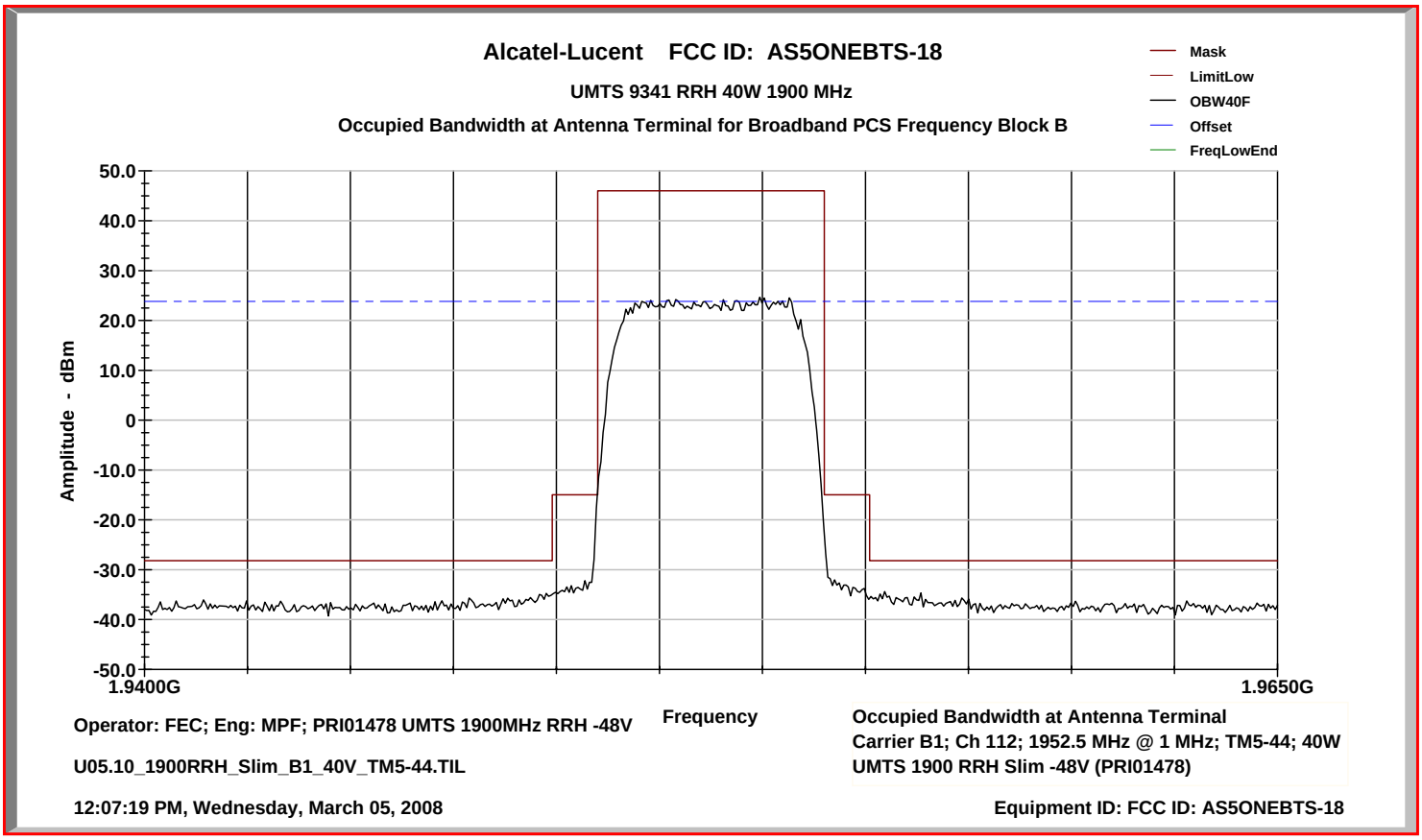
Occupied Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM1-64 Test Modulation



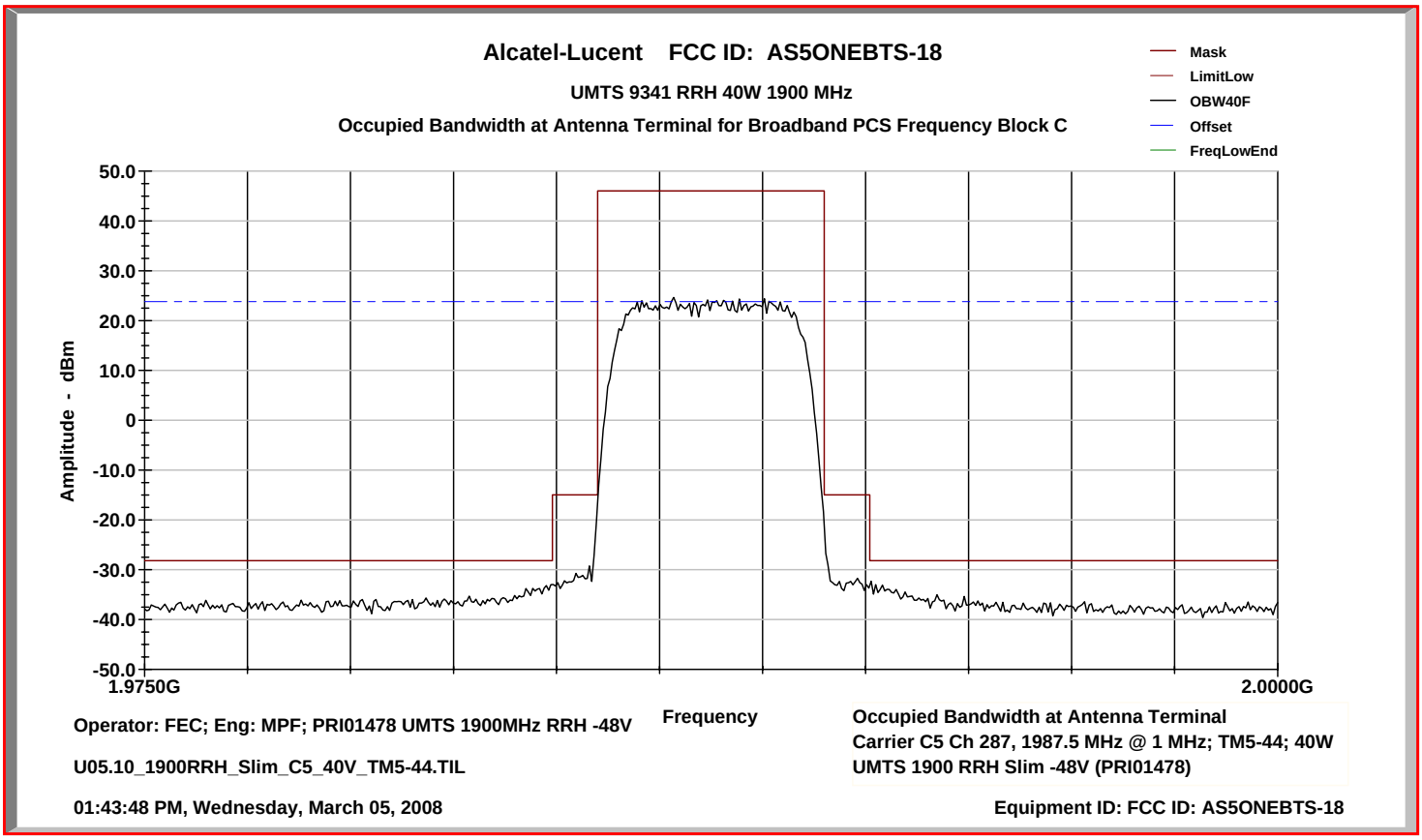
Occupied Bandwidth Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM5-44 Test Modulation



Occupied Bandwidth Characteristics: UARFCN Channel Number 112 @ 1952.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM5-44 Test Modulation



Occupied Bandwidth Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM5-44 Test Modulation



SPECIAL TEST FOR INTERMODULATION PRODUCTS AT THE ANTENNA TERMINAL:

This is a special test submitted to the FCC when a multi-carrier amplifier is included in the FCC filing. ETSI TS 25.141 Rel 7, Section 6.6 *Transmit Intermodulation* also specifies this requirement for W-CDMA. This test is a measure of the linearity of the RF path components and of their ability to suppress the generation of unwanted intermodulation products, when 2 carrier signals are transmitted. Focus is on the third and fifth order intermodulation products that fall either within or immediately adjacent to the authorized passband.

All tests were performed with 2 adjacent carriers at 20 W each, consistent with the system design for a total bandwidth of 10 MHz capability, and modulated by TM1-16, with 20 active channels. The total composite power remains at 40W (+46 dBm). The measurement spectrum will be sufficient to include the 3rd and 5th order IMD products. The FCC limitation is -13 dBm when measured at 30 kHz RBW. Three channel/carrier pairs are sufficient to demonstrate compliance at the lowest settable, mid-band and at the highest settable pairs:

Pair #1, A-Block: A1Ch 12, 1932.5 MHz + A2 Ch 37, 1937.5 MHz
Pair #2, B-Block: B1 Ch 112, 1952.5 MHz + B2 Ch 137, 1957.5 MHz
Pair #3, C-Block: C4 Ch 262, 1982.5 MHz + C5 Ch 287, 1987.5 MHz

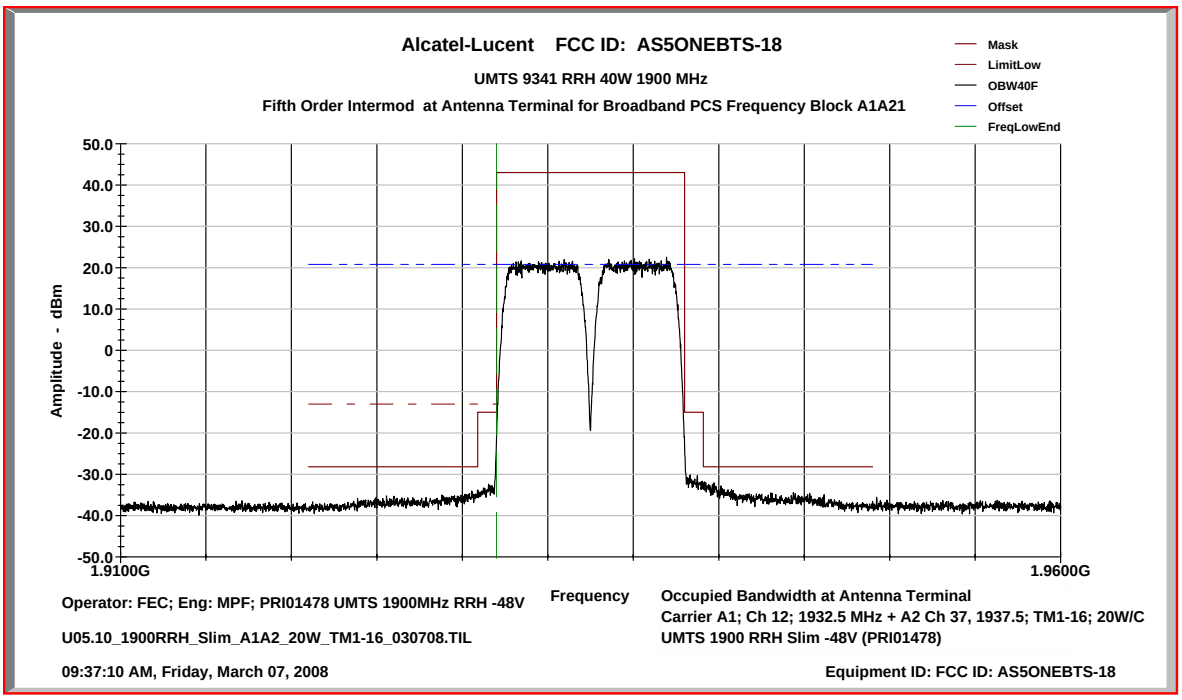
The following test parameters apply:

1. Focus is on the 3rd and 5th order intermodulation products that are generated within and adjacent to the FCC authorized passband spectrum.
2. The 3rd order IMD products of interest are: $2F_1 - F_2$ and $2F_2 - F_1$, where F_1 is the lower frequency and F_2 the higher frequency.
3. The 5th order IMD products of interest are: $3F_1 - 2F_2$ and $3F_2 - 2F_1$
4. The FCC limit = -13 dBm
5. The measurement instrumentation Resolution Bandwidth (RBW) = 30 kHz
6. The frequency span is sufficient to cover the 5th order IMD products.
7. The complete conducted emissions spectrum 10 MHz – 10 GHz is included
8. Measurements were performed using the Total Integrated Laboratory Environment (TILE) EMC automated test software, by Quantum Change/EMC Systems, Inc.

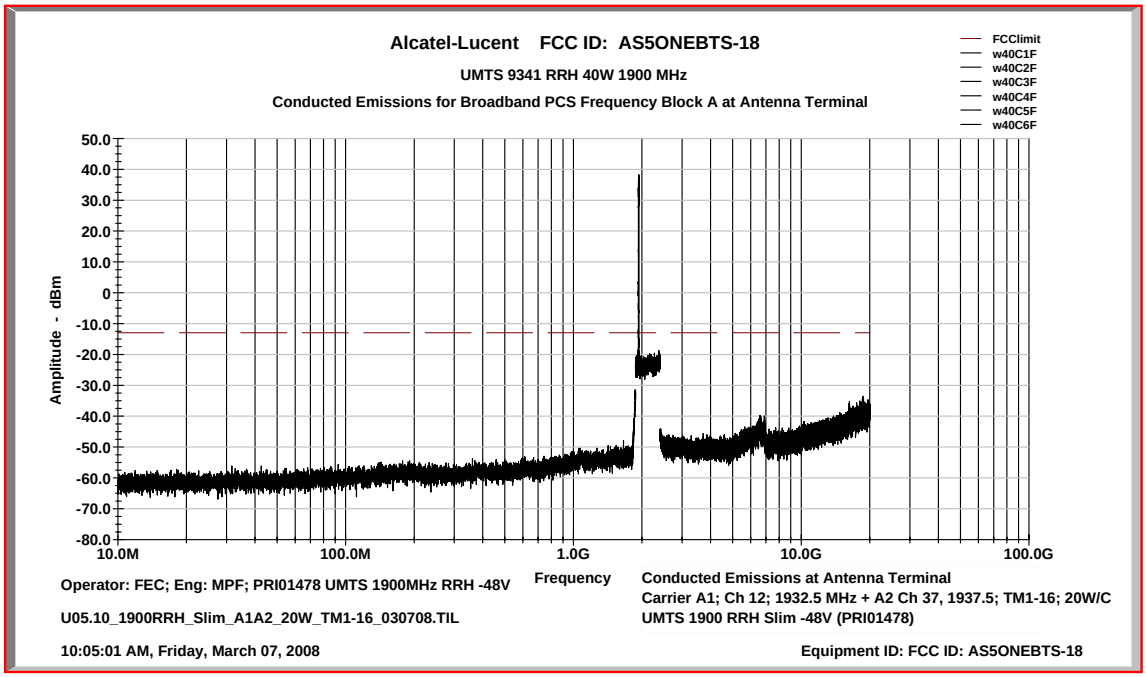
Results:

The data plots are attached, and show both 5th order intermodulation product occupied bandwidth and conducted spurious emissions over the spectrum 10 MHz - 20 GHz . No intermodulation products were observed.

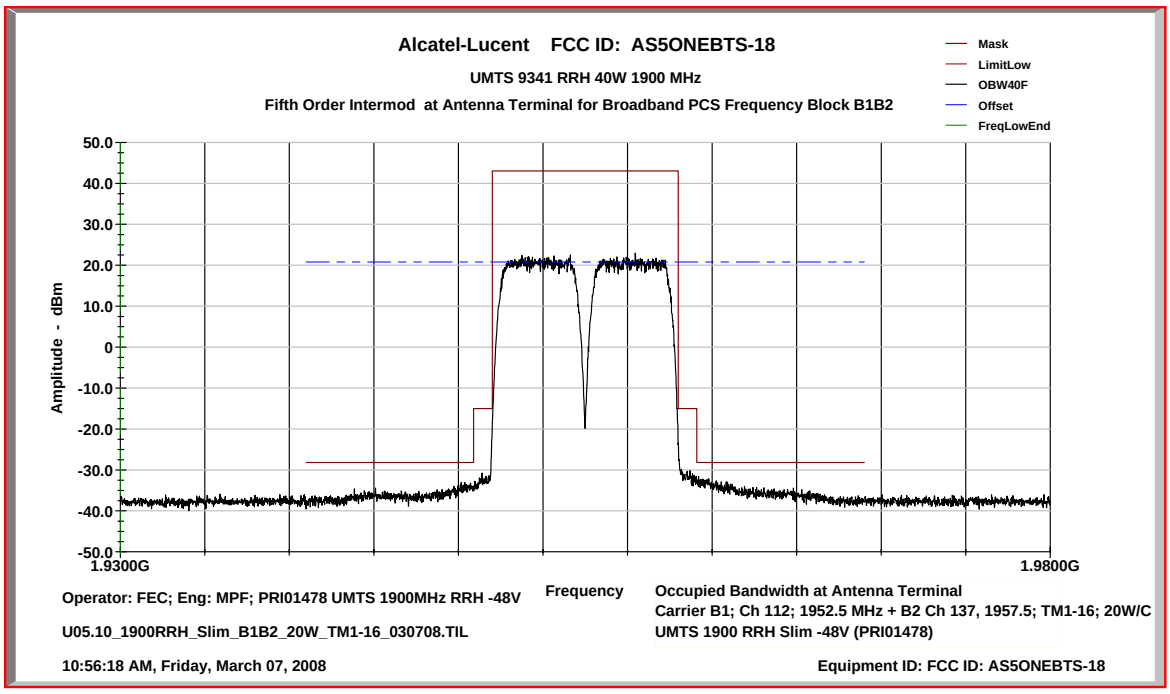
Pair #1, A-Block: A1Ch 12, 1932.5 MHz + A2 Ch 37, 1937.5 MHz
TM1-16 test modulation with 20 active channels per carrier.



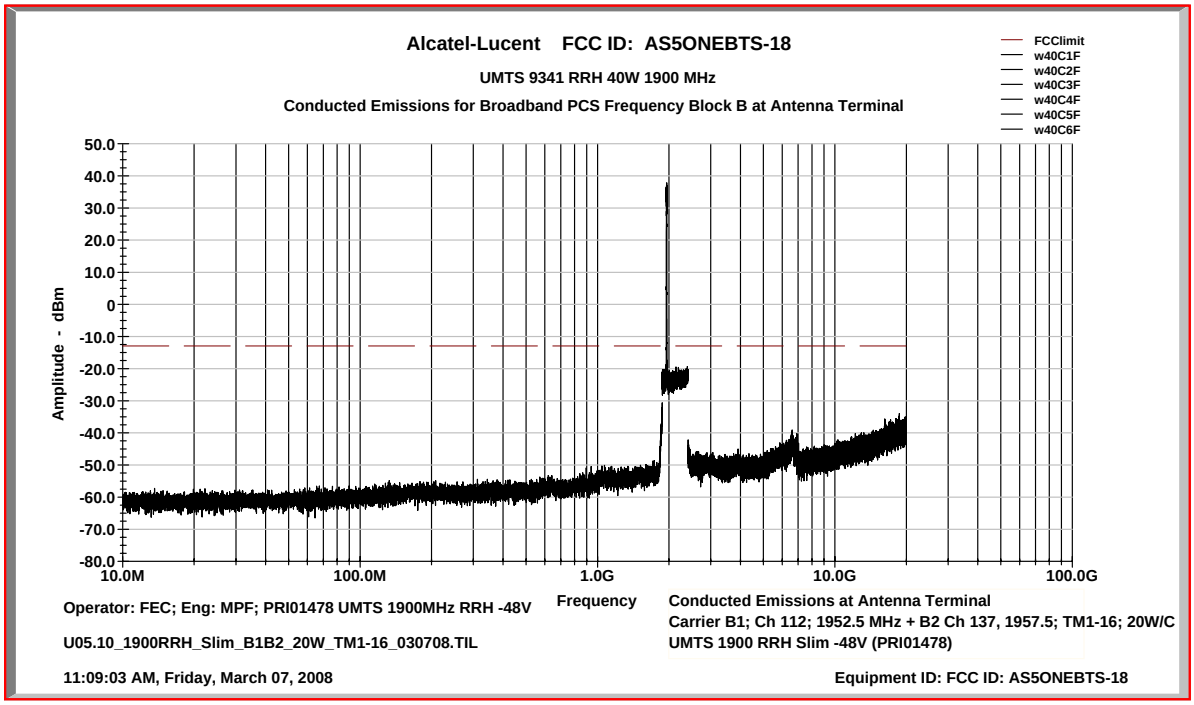
Pair #1, A-Block: A1Ch 12, 1932.5 MHz + A2 Ch 37, 1937.5 MHz
TM1-16 test modulation with 20 active channels per carrier.
Measurement Spectrum 10 MHz – 20 GHz



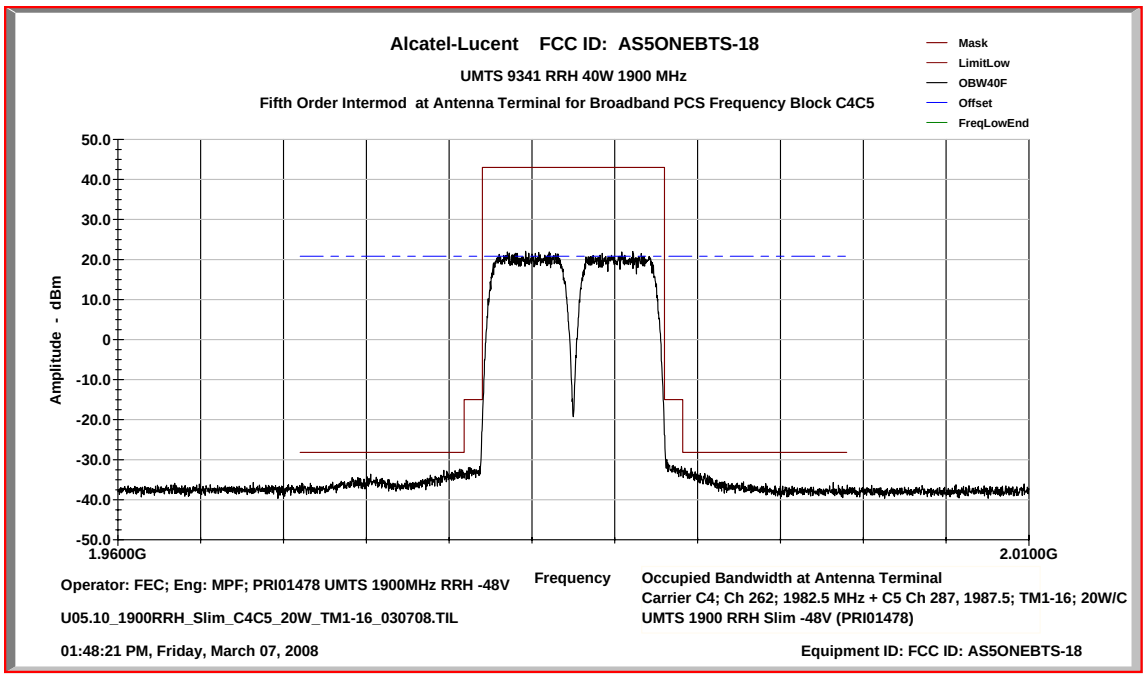
Pair #2, B-Band: B-Block: B1 Ch 112, 1952.5 MHz + B2 Ch 137, 1957.5 MHz
TM1-16 test modulation with 20 active channels per carrier.



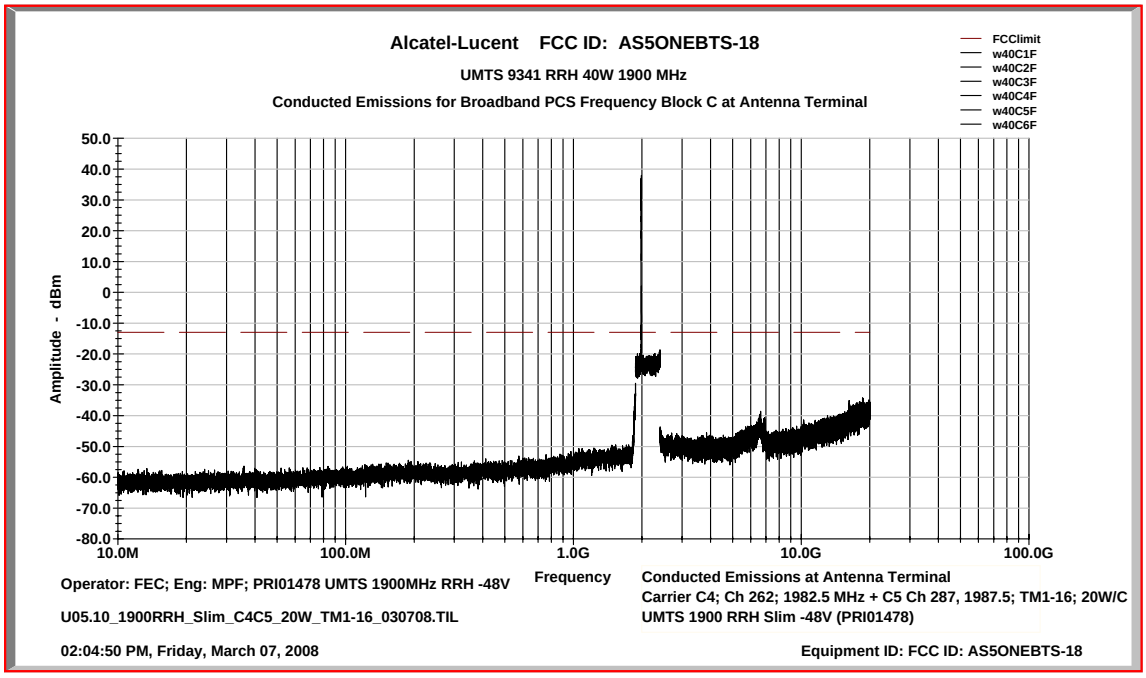
Pair #2, B-Band: B-Block: B1 Ch 112, 1952.5 MHz + B2 Ch 137, 1957.5 MHz
TM1-16 test modulation with 20 active channels per carrier.
Measurement Spectrum 10 MHz – 20 GHz



Pair #3, C-Block: C4 Ch 262, 1982.5 MHz + C5 Ch 287, 1987.5 MHz
TM1-16 test modulation with 20 active channels per carrier.



Pair #3, C-Block: C4 Ch 262, 1982.5 MHz + C5 Ch 287, 1987.5 MHz
TM1-16 test modulation with 20 active channels per carrier.
Measurement Spectrum 10 MHz – 20 GHz



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, using the same carrier frequencies, power level setting procedure and modulated carrier offset procedure. In accordance with Part 2.1057(a), the required frequency spectrum to be investigated extends from the lowest RF signal generated to the 10^{th} harmonic of the carrier at the EAC terminal. The emission limits at the antenna terminal are specified in Part 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 40 Watts average, produces an emission attenuation below the carrier of 59.0 dBc. 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, which equates to 79.0 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 (40 Watts) = 59.0 dBc
4.	Instrumentation Noise Floor:	at least 20 dB greater than "43 + 10 log (*P*) dBc" = 79.0 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 = 46.0 dBm
2. Emission Limitation = 46.0 dBm – 59.0 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 $\geq$ 79.0 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., 79 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 Quantum Change/EMC Systems, Inc. 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.

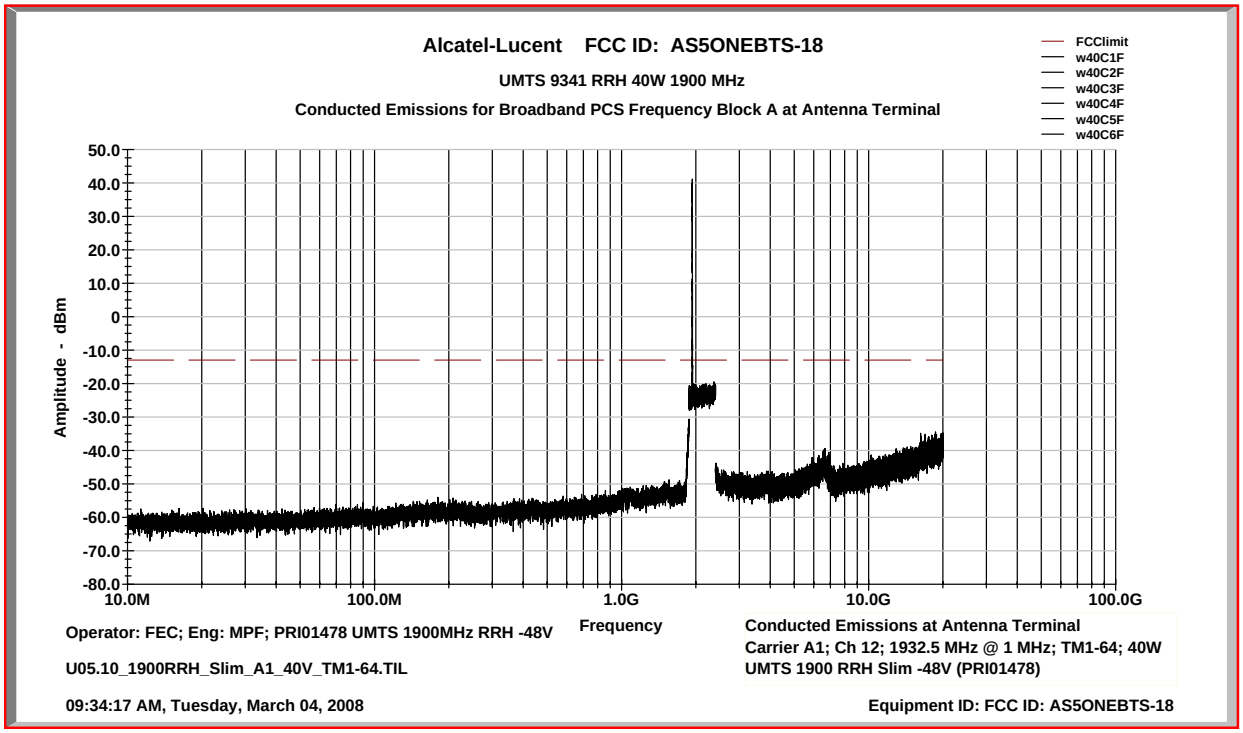
The specific EMC test filters used were manufactured by TRILITHIC, Inc., Indianapolis, IN:

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

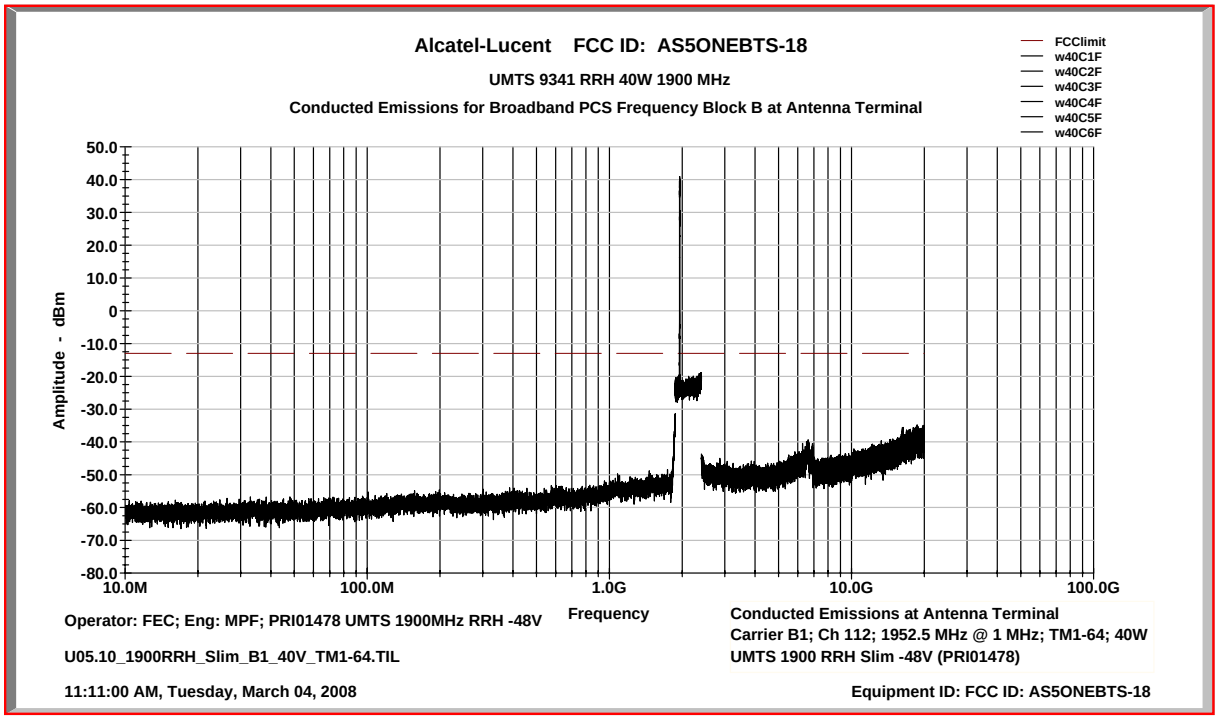
This test procedure was conducted in conjunction with the previously cited occupied bandwidth tests, and utilized all nine Broadband PCS carriers previously cited, plus the same two test modulations: TM1-64 and TM5-44. For brevity, the carrier tabulation will not be repeated..

Results: For each UMTS carrier, there were no reportable emissions. Data plots for the lowest settable, mid-band and the highest settable carriers 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.

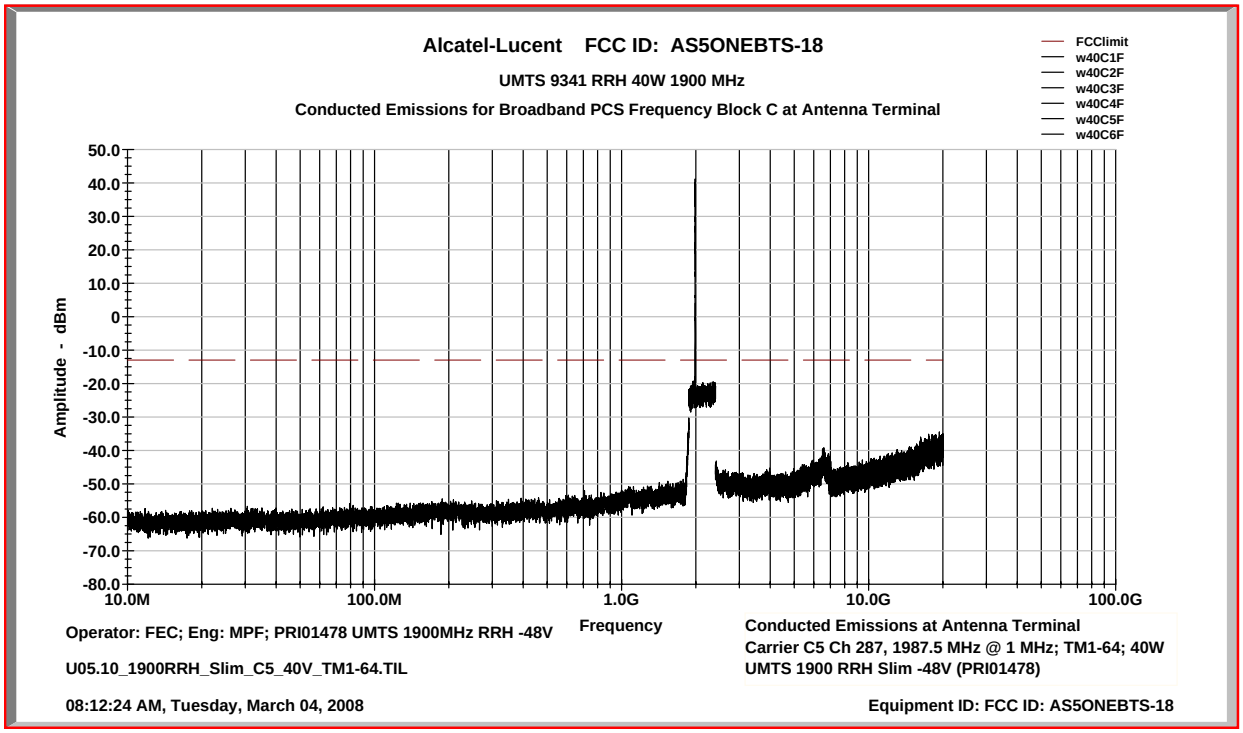
Conducted Emissions Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM1-64 Test Modulation



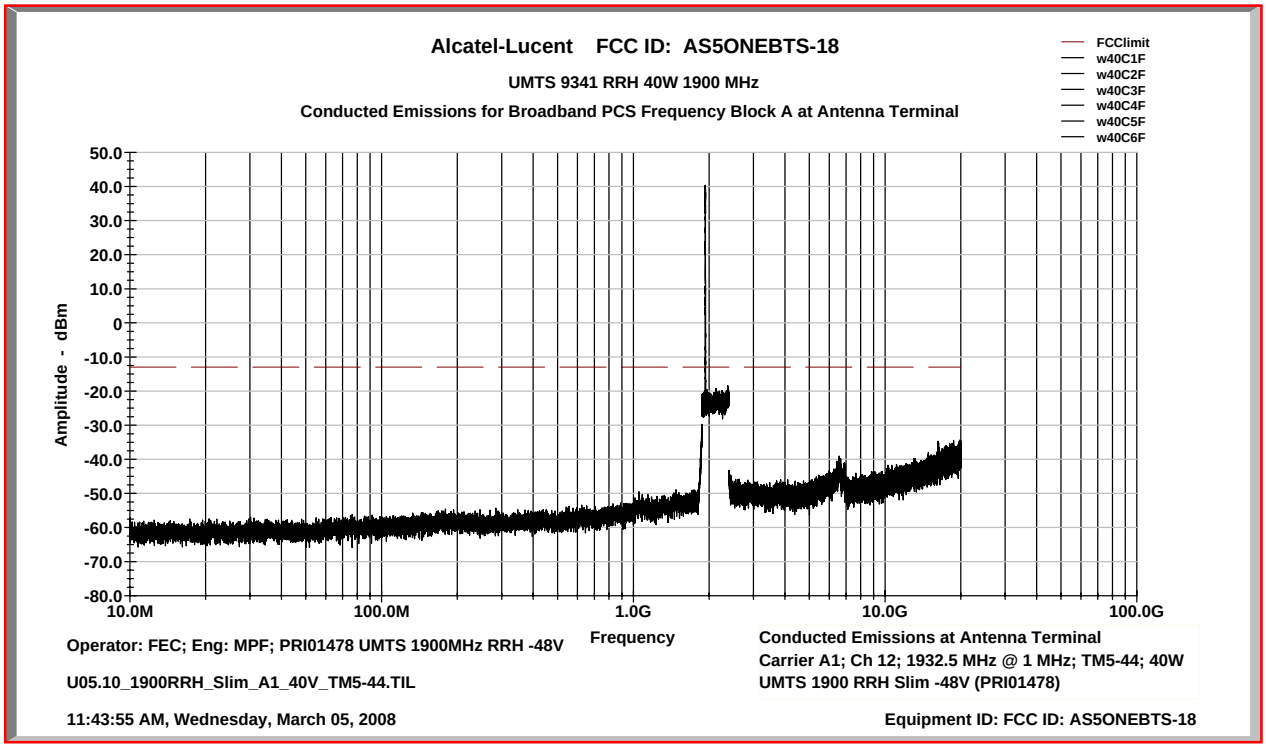
Conducted Emissions Characteristics: UARFCN Channel Number 112 @ 1952.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM1-64 Test Modulation



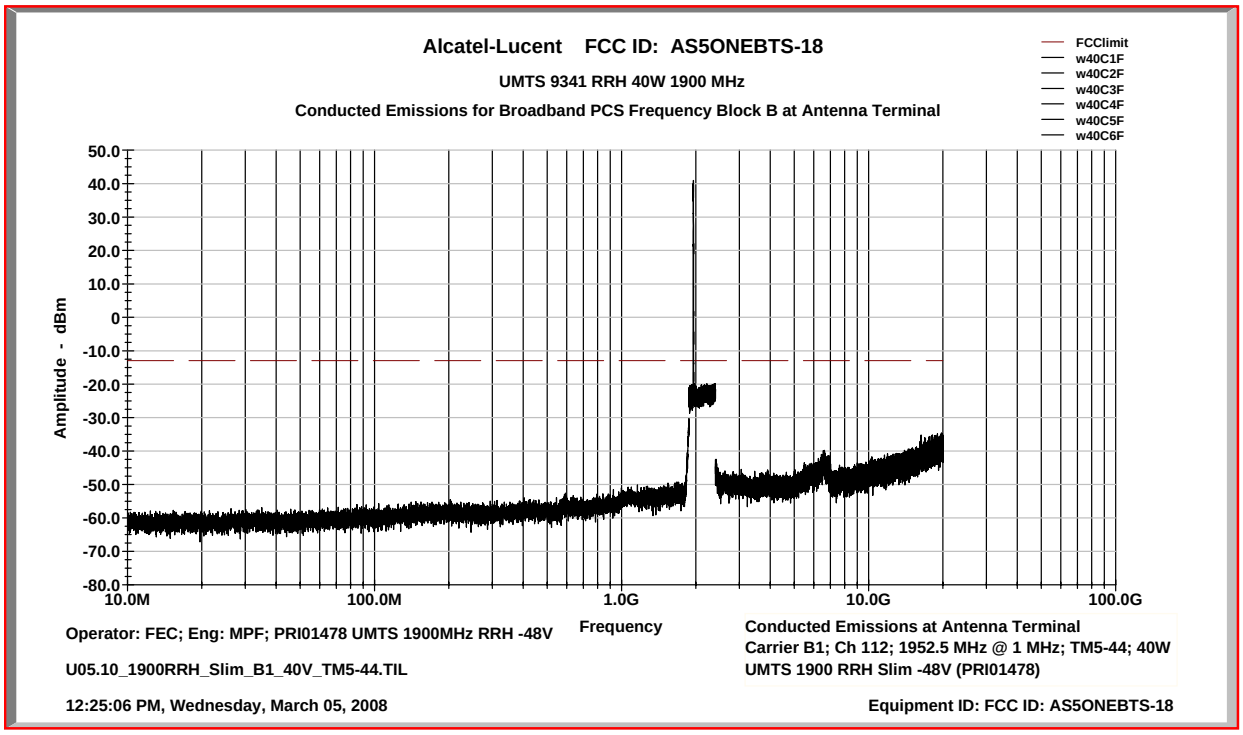
Conducted Emissions Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM1-64 Test Modulation



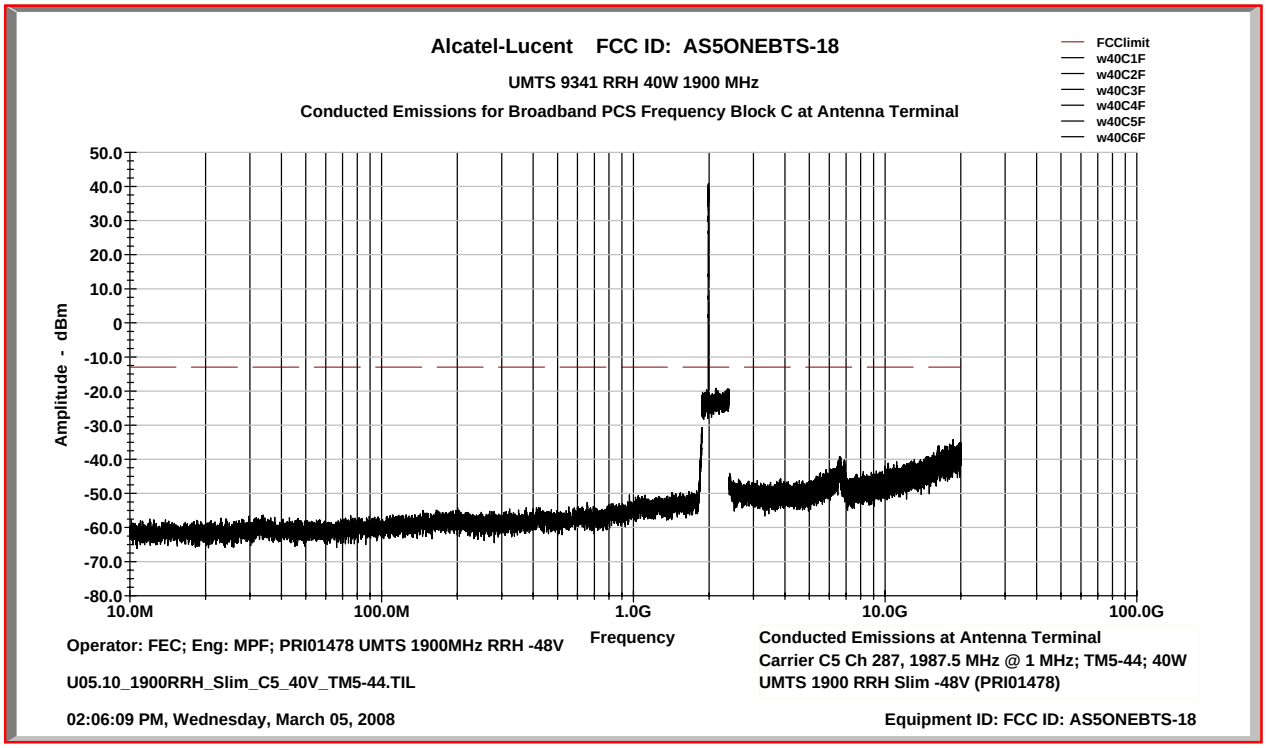
Conducted Emissions Characteristics: UARFCN Channel Number 12 @ 1932.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM5-44 Test Modulation



Conducted Emissions Characteristics: UARFCN Channel Number 112 @ 1952.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM5-44 Test Modulation



Conducted Emissions Characteristics: UARFCN Channel Number 287 @ 1987.50 MHz
Tx Antenna Terminal at +46 dBm per single 5 MHz carrier
TM5-44 Test Modulation



PART 2.1053 MEASUREMENTS REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION

This test requires a single carrier at maximum rated power (40 Watts), transmitting into a non-radiating dummy load. The equipment under test (EUT) is configured for 1 sector at 1 carrier per sector (1S1C). As required, the frequency range investigated was from 10 MHz to 20 GHz (10^{th} harmonic of the carrier) as in the previous conducted spurious emissions test procedure. Three tests were performed with the lowest settable, mid-band and the highest settable carriers from the previously cited carrier frequency tabulations and set to the TM1-64 test modulation, with each carrier adjusted to provide 40 Watts (46.0 dBm) at the Equipment Antenna Connector (EAC) transmit antenna terminal. This test was then repeated with two carriers set to 20Watts per carrier, corresponding to the lowest settable, mid-band and the highest settable.

In compliance with the guidelines of ANSI C63.4-2003, the equipment under test (EUT) was configured as recommended for *floor standing equipment*. 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 C63.4-2003. Field strength measurements of radiated spurious emissions were evaluated in a 3m semi-anechoic pre-compliance chamber and verified as required at the ten meter Open Area Test Site (OATS) maintained by Alcatel-Lucent FCC Compliance Laboratory in Whippany, New Jersey. A complete description and full measurement data for the site have been placed on file with the Commission.

The spectrum from 10 MHz to the tenth harmonic of the carrier 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 24.238 and 2.1053 contains the requirements for the levels of spurious radiation as a function of the EIRP of the unmodulated carrier. The reference level for the unmodulated carrier is calculated as the field produced by an isotropic radiator excited by the transmitter output power according to the following relation taken from Reference Data for Radio Engineers, page 27-7, 6th edition, IT&T Corp.

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

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

Where: E = Field Intensity in Volts/ meter R = Distance in meters = 10 m
P = Transmitted Power in watts = 40 W/ Carrier

Results:

For this particular test, the field strength of any spurious radiation is required to be less than 71.8 dBμV/meter. Emissions equal to or less than 51.8 dBμV/meter are not reportable and may be verified using field strength measurements. Over the out of band spectrum investigated from 30 MHz to tenth harmonic of the carrier, no reportable spurious emissions were detected. This demonstrates that the *UMTS 9341 RRH 40W 1900 MHz System*, the subject of this application, complies with Sections 2.1053, 24.238 and 2.1057 of the Rules.

PART 2.1055 MEASUREMENTS REQUIRED: FREQUENCY STABILITY

The frequency stability was measured both at the Equipment Antenna Terminal (EAC) of the RF Remote Radio Head (RRH) and at the reference frequency output terminal of the digital Base Band Unit (BBU) for a single carrier set to 1960.0 MHz, which corresponds to mid Broadband PCS frequency band. Frequency stability measurements were performed by N. Hussain, Alcatel-Lucent, Swindon, United Kingdom, under the direction of M. P. Farina, and in adherence to the previously cited ISO/TL9000 test plan. The complete test report is attached, which shows the test results, test equipment configuration and photographs of the test set-up.

The procedure required by the FCC is specified in CFR 47, Part 2, Subpart J – Equipment Authorization Procedures, Section 2.1055 – Measurements Required: Frequency Stability, Effective: October 01, 2007. The requirements for base station/land station equipment, are summarized as:

Section 2.1055(a)(1): The frequency stability shall be measured with variation of ambient temperature from –30 °C to +50 °C

Section 2.1055(b): Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10 °C through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. (*Note: The term "keying" does not apply to base station/land station equipment. "Heating element" applies to "heat cartridges" if used* .) Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

Section 2.1055(d)(1): The frequency stability shall be measured with variation of primary supply voltage from 85% to 115% of the nominal value.

Frequency Stability Limitation:

The frequency stability is the measurement of the carrier center frequency deviation from its assigned value as a function of (1) temperature variation from – 30°C to + 50°C, in +10°C increments, and (2) variation of supply voltage, at the equipment frame power input terminals, from 85% to 115% of the nominal value. This is a lengthy procedure and is performed one time with a single UMTS 850 carrier set to 881.5 MHz. The required tolerance limit for UMTS 850 base station/land station equipment is specified in ETSI TS 25.141 as ± 0.05 ppm.

Exception:

The FCC requires testing over the temperature range -30C to +50C, in 10C increments. This would apply to equipment installed and operated in an outdoor, non-controlled environment. Equipment installed in an indoor, controlled environment should be compliant with Telcordia, GR-63-CORE, Issue 3, March 2006 - *NEBS™ Requirements: Physical Protection*. Equipment installed and operated in an indoor, controlled environment are required to demonstrate frequency stability compliance over the temperature range -5C to +50C. This would apply to the Indoor BBU, which is the subject of this certification.

Results:

The UMTS Distributed Base Station Transceiver System (850 MHz), subject of this application for certification under FCC ID: AS5ONEBTS-17, demonstrated full compliance with the requirements of FCC Rule Part 2.1055. The frequency stability for all measurements were well within the required ± 0.05 ppm, as shown in detail in the attached Test Report. The measurement results are summarized below.

Frequency stability testing for 1900 RRH with BBU.

TEST FREQUENCY: 1960.0 MHz (Middle channel)
P_out max: 40W(46dBm)

Note:
Test Model 4 used to check RF Output frequency, Trace on Max hold and part per million calculated.
On 15 MHz reading deviation from 15MHz noted and PPM calculated.

RF Remote Radio Head (RRH)

Stabilized temperature (°C)		TEST: TRANSMIT FREQUENCY ERROR Spec: F_tx ± 50ppb = 1960.0MHz ± 98.0MHz					
		Supply voltage: @85% of nominal (–48V–15%= –40.8V)		Supply voltage: @100% of nominal (i.e. –48. 0V)		Supply voltage: @115% of nominal (–48V+15%= –55.2V)	
Outdoor BBU	Outdoor RRH	Measured Tx Freq Error (Hz)	Deviation [Note 1] (ppb)	Measured Tx Freq Error (Hz)	Deviation [Note 1] (ppb)	Measured Tx Freq Error (Hz)	Deviation [Note 1] (ppb)
–30 C	–30 C	7.77	4.0	7.69	3.9	9.60	4.9
–20 C	–20 C	9.21	4.7	9.44	4.8	9.70	4.9
–10 C	–10 C	7.32	3.7	6.26	3.2	7.18	3.7
0 C	0 C	7.77	4.0	4.86	2.5	8.61	4.4
+10 C	+10 C	7.48	3.8	7.07	3.6	6.66	3.4
+20C	+20 C	13.4	6.8	4.70	2.4	6.75	3.4
+30 C	+30 C	7.22	3.7	6.95	3.5	8.25	4.2
+40 C	+40 C	4.27	2.2	5.07	2.6	5.42	2.8
+50 C	+50 C	3.23	1.6	5.9	3.0	3.81	1.9

Digital Base Band Unit (BBU)

Stabilized temperature (°C)		TEST: STABILITY OF 15MHz REFERENCE FREQUENCY Spec: 15MHz ± 0.05ppm = 15MHz ± 0.75Hz					
		Supply voltage: @85% of nominal (–48V–15%= –40.8V)		Supply voltage: @100% of nominal (i.e. –48. 0V)		Supply voltage: @115% of nominal (–48V+15%= –55.2V)	
Outdoor BBU	Outdoor RRH	Measured Ref freq stability (Hz)	Deviation [Note 2] (ppm)	Measured Ref freq stability (Hz)	Deviation [Note 2] (ppm)	Measured Ref freq stability (Hz)	Deviation [Note 2] (ppm)
–30 C	–30 C	0.04	0.00267	0.04	0.00267	0.04	0.00267
–20 C	–20 C	0.04	0.00267	0.04	0.00267	0.04	0.00267
–10 C	–10 C	0.03	0.00200	0.03	0.00200	0.03	0.00200
0 C	0 C	0.04	0.00267	0.04	0.00267	0.04	0.00267
+10 C	+10 C	0.03	0.00200	0.03	0.00200	0.03	0.00200
+20C	+20 C	0.03	0.00200	0.03	0.00200	0.03	0.00200
+30 C	+30 C	0.03	0.00200	0.03	0.00200	0.03	0.00200
+40 C	+40 C	0.02	0.00133	0.02	0.00133	0.02	0.00133
+50 C	+50 C	0.02	0.00133	0.02	0.00133	0.02	0.00133

UMTS

Node B Compliance

BBU -48V (d2U v2.0) with RRH 1900 Outdoor Unit

Release 5.0b

FCC 47 CFR 2.1055

Frequency Stability

Test Report

Number: **13546516**
Issue: **0.1**
Status: **Draft**

Author: **Nayyar Hussain**
Date: **11 March 2008**

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Use Pursuant to Company Instructions

1. Summary

This report describes the FCC 47 CFR 2.1055 tests completed on a –48Vdc BBU [Indoor, Outdoor] and 1900RRH [Outdoor] UMTS system to verify compliance to Release 5.0b (Feature 5.11).
Functional tests were scheduled during the thermal test conditioning.

The test results showed that when the equipment was powered up all functional tests passed. These were:

1) Transmit Frequency Error
2) Stability of Reference Frequency (OMA Stability)

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2. Object

This test was carried out to determine the frequency stability of a V2 d2u BBU (Baseband Unit) with Outdoor 1900 RRH (40Watt) over the temperature range –30°C to +50°C and at voltage extremes of +/– 15% from nominal (–48Vdc).

3. Introduction

This document contains the results of the FCC 47 CFR 2.1055 tests carried out on the UMTS BBU & 1900 RRH, Release 5.0b, FCC Test Plan for UMTS.
Also included are lists showing the test instruments used, equipment under test and functional tests conducted.

3.1 Glossary

A/C	Alternating Current
D/C	Direct Current
°C	Degree Celsius
ETSI	European Telecommunications Standards Institution
FCC	Federal Communications Commission
FTR	Future Technologies Radio (the RF module)
HIOU	Hybrid Input Output Unit
Node B	UMTS Base Station
OMA	Oscillator Module
RH	Relative Humidity
RX	Receive
SRD	System Requirement Definition
TX	Transmit
TM	Test model
UCU	Universal Channel Unit
UDT	UMTS / Universal Diagnostic Tools (Lucent internal tool used for sending scripts to run tests)
UMTS	Universal Mobile Telecommunication System
RRH	Remote Radio Head
BBU	Base Band Unit

3.2 Scope

This test was applied to the BBU (d2U, V2) and RRH1900 40W outdoor unit as per product specification Release 5.0b.

3.3 Specifications

[R5.0b] FCC Test Plan for UMTS Indoor and Outdoor Baseband Unit (BBU) and RRH1900 Outdoor Unit by M.P.Farina.

3.4 Standards

[3.4.1] 3GPP 25.141 (Release 7)
[3.4.2] Title 47--Telecommunication 47 Part 2 -- Frequency Allocations and Radio Treaty Matters; General Rules and Regulation, 2.1055. Measurements required: Frequency stability.

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4. Equipment

4.1 Under Test

The UMTS 1900RRH 40 watts was equipped with hardware as listed in Annex A, Table 7.1, which contains the full list of equipment under test, together with their serial numbers.

4.2 Test Equipment

The test equipment used to perform the investigation has been documented in Annex B, Table 8.1.
Annex D, Figure 10.1 shows a photograph of the test equipment layout.

5. Test Procedure

5.1 Test Setup

Prior to testing, the hardware was installed into the cabinet as per specification and configured to Release 5.0b.
Note: The cabinet was installed onto its test platform as shown in the photograph of Annex D, Figure 10.2.

5.2 Test Parameters

a) Points of Measurement: The oscillator frequency is measured at its 15MHz output terminal.

b) Carrier Modulation: Test Model 4.

c) Test Frequencies: The FCC accepts a single test frequency, 1960.0MHz for 1900MHz basestation.

d) Carrier Power Level: Pmax –18dB = 46dBm–18dB = 28.0dBm at EAC, using TM4.

e) Temperature Range: Variation of ambient temperature from –30°C to +50°C. Stabilized at increments of 10°C.

f) Supply Voltage Variation:

Input Supply Voltage	DC Voltage
Low voltage: 85% of nominal voltage	–55.2 Vdc
Nominal voltage	–48.0 Vdc
High voltage: 115% of nominal voltage	–40.8 Vdc

Table 5.1.1 Supply Voltage Variation

5.3 Functional Tests

Functional tests were carried out during thermal conditioning at stabilized temperatures. These are
a) Measurement of Transmit Frequency Error,
b) Reference Frequency stability (i.e. OMA Frequency Stability).

The universal diagnostic tool (UDT) and (TCI) were used to perform the tests.
The BBU and RRH were connected through the fibre optic cable.

Results table on next sheet.

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5.3.1 RESULTS

Table 5.3.1.1 below shows the test results for RRH1900 with BBU d2U V2.

Test frequency: 1960.0 MHz (Middle channel)

P_out max: 40W (46dBm)

Note: 1)Transmit Frequency Error test: Test Model 4 is used to check RF transmit frequency (place trace on 'max hold' and calculate parts per million).
2) Stability of reference frequency test: On 15MHz reading, the deviation from 15MHz is noted and PPM calculated.

Stabilized temperature (°C)		TEST: TRANSMIT FREQUENCY ERROR Spec: F_tx ± 50ppb = 1960.0MHz ± 98.0MHz						TEST: STABILITY OF 15MHz REFERENCE FREQUENCY Spec: 15MHz ± 0.05ppm = 15MHz ± 0.75Hz					
		Supply voltage: @85% of nominal (–48V–15%= –40.8V)		Supply voltage: @100% of nominal (i.e. –48. 0V)		Supply voltage: @115% of nominal (–48V+15%= –55.2V)		Supply voltage: @85% of nominal (–48V–15%= – 40.8V)		Supply voltage: @100% of nominal (i.e. –48. 0V)		Supply voltage: @115% of nominal (–48V+15%= –55.2V)	
Outdoor BBU	Outdoor RRH	Measured Tx Freq Error (Hz)	Deviation [Note 1] (ppb)	Measured Tx Freq Error (Hz)	Deviation [Note 1] (ppb)	Measured Tx Freq Error (Hz)	Deviation [Note 1] (ppb)	Measured Ref freq stability (Hz)	Deviation [Note 2] (ppm)	Measured Ref freq stability (Hz)	Deviation [Note 2] (ppm)	Measured Ref freq stability (Hz)	Deviation [Note 2] (ppm)
–30 C	–30 C	7.77	4.0	7.69	3.9	9.60	4.9	0.04	0.00267	0.04	0.00267	0.04	0.00267
–20 C	–20 C	9.21	4.7	9.44	4.8	9.70	4.9	0.04	0.00267	0.04	0.00267	0.04	0.00267
–10 C	–10 C	7.32	3.7	6.26	3.2	7.18	3.7	0.03	0.00200	0.03	0.00200	0.03	0.00200
0 C	0 C	7.77	4.0	4.86	2.5	8.61	4.4	0.04	0.00267	0.04	0.00267	0.04	0.00267
+10 C	+10 C	7.48	3.8	7.07	3.6	6.66	3.4	0.03	0.00200	0.03	0.00200	0.03	0.00200
+20C	+20 C	13.4	6.8	4.70	2.4	6.75	3.4	0.03	0.00200	0.03	0.00200	0.03	0.00200
+30 C	+30 C	7.22	3.7	6.95	3.5	8.25	4.2	0.03	0.00200	0.03	0.00200	0.03	0.00200
+40 C	+40 C	4.27	2.2	5.07	2.6	5.42	2.8	0.02	0.00133	0.02	0.00133	0.02	0.00133
+50 C	+50 C	3.23	1.6	5.9	3.0	3.81	1.9	0.02	0.00133	0.02	0.00133	0.02	0.00133

Table 5.3.1.1 FCC 47 CFR 2.1055 Frequency Error Measurement: results of Transmit Frequency Error and Stability of Reference Frequency tests for RRH1900 with BBU d2U V2.

Note 1. Deviation(ppb)= 50 x (measured freq error in Hz) / 98; e.g. Deviation = 50 x 7.77 / 98 = 3.96=4.0ppb

Note 2. Deviation(ppm)= 0.05 x (measured freq error in Hz) / 0.75; e.g. Deviation = 0.05 x 0.04 / 0.75 = 0.00267ppm

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6. Conclusions

The 1900RRH (40 Watts) Release 5.0b meets the FCC Title 47 Part 2.1055 Frequency Stability requirements.

7. Annex A. Equipment Under Test

Table 7.1 lists the comcodes and serial numbers of the relevant elements in the BTS, while Table 7.2 lists the BTS software and firmware loads.

BTS Element	Comcode	Serial number	Model no	Comment
1900RRH	---	08W327P100026	9341 40W 1900MHz RRH P2 S0:4	
Contains:				
Amplifier	109637454	07W322L70089	44WA82, Rev B08, Series SP2	
Interface board	201302312	07W367N40062	BNJ 210, Rev B06, Series S0:2	
FTR	201302304	07W365N50034	BNJ 86, Rev A22, Series S0:7	
PSU	409047529	DB0805A0323	V2.7+	
Filter	409053477	087D02000897	Vx.02	
Fibre Optic board	702046020	7X5004e00526	OPTO	
Baseband Unit (ex-Lucent) BBU P2 d2u (–48Vdc)	300966017	07WH44142029		
Contains: UCU III	109579805	06W340G60014	E, BNJ76, S0:3, P3 :0	CPLD-A,B,V6.0

Table 7.1 Traceability of hardware elements in the BTS

BTS Element	Software image contained in the GDF
Generic Download File (GDF)	C050000915.c3
Radio image	90_3
UDT	3.3.0
RMT	29.9.1.0X

Table 7.2 BTS software and firmware loads

8. Annex B. Test Equipment

Item	Manufac-turer	Model	Serial number	Calibration data Next due data
Environmental Chamber	Votsch, Weiss Technik Ltd	VSKZ, D6/180/S	563354 (Asset No: CR1852)	Nov 2008
Radio Tester	Rohde $ Schwarz	FSIG3	100028 (Asset No: CR0177)	Feb 2009
Universal Frequency Counter	Fluke	PM6685R	SM668747 (Asset No: CR1107)	Mar 2009

Table 8.1 Test Equipment

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9. Annex C. Functional Tests

The following functional tests were carried out during thermal conditioning. These functional tests and the system configurations were extracted from the requirements

Test	Configuration	Functional Test	Notes
FCC 47 Part 2.1022	TM4	TX: Measure freq Error at Pmax –18dB at EAC, using TM4.	Middle of the band
		TX: Measure OMA Frequency	OMA

Table 9.1 Functional Tests

Functional Test	Pass / Fail Criteria
TX: Frequency Error	(50 Parts Per Billion = 0.05 Parts Per Million) on TX Frequency. 1960.0MHz x 0.05PPM = (+/- 98.0Hz) Spec: 1960.0MHz ± 98.0Hz
OMA Frequency Accuracy	(50 Parts Per Billion = 0.05 Parts Per Million) on 15MHz reference oscillator. 15.0MHz x 0.05PPM = (+/- 0.75Hz) Spec: 15.0MHz ± 0.75Hz

Table 9.2 Functional Tests Pass / Fail Criteria

All functional test Pass / Fail Criteria was extracted from Standards [3.4.1].

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10. Annex D. Photographs of Basestation Testing

Figure 10.1 Test Equipment layout.

Figure 10.2 1900RRH and BBU mounted on test stands.

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