

APPLICANT: LUCENT TECHNOLOGIES

FCC ID: AS5ONEBTS-05

EXHIBIT 10: TEST REPORT

The test report attached to this exhibit demonstrates that the Lucent Technologies' Broadband PCS UMTS-CDMA Transceiver System, which is designed to operate in the Lucent UMTS Flexent® OneBTS™ W1900M (SD-2R521-01) Wireless Base Station, 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 Limits; effective October 1, 2002. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2002. It also demonstrates compliance with the spurious emissions limitations specified in ETSI TS 125 141 V4.1.0 (2001-06): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 4.1.0, Release 4), which is the standard used as a guideline in the design of the UCR1900 transceiver. The objective of this application is to obtain FCC authorization as a new filing, under FCC ID: AS5ONEBTS-05, for operation in the Universal Mobile Telecommunications System (UMTS) with a single 5 MHz carrier (5M0F9W) set to a maximum power level at the antenna terminal of 40 Watts (3-second), over the frequency spectrum 1930-1950 MHz.

The UMTS1900 Transceiver System consists of the principle RF components: (1) Rubidium Reference Oscillator Module (OMR) 15 MHz, (2) UMTS-CDMA Radio (UCR1900), Model BNJ27B, which was previously authorized by the Federal Communications Commission under FCC ID: AS5ONEBTS-04, (3) P2PAM power amplifier, (4) 20 MHz wide Dual Duplex (DDpx), low loss, transmit filter covering the PCS A & D-Block spectrum 1930-1950 MHz, and (5) the Test and Diagnostic Unit (TDU) used to monitor the output of the P2PAMs and feed it back to the UCR for processing and distortion cancellation. 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) Lucent's proprietary Digital Pre Distortion (DPD) technology which enables software to communicate between the transceiver, power amplifier and the transmit filter to achieve this goal.

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 Lucent Technologies, Whippany, NJ, compliance laboratory by F. E. Chetwynd and M. P. Farina during the period July 18 to August 4, 2003; in adherence to a test plan generated by M. P. Farina, in accordance with Lucent's ISO/TL9000 Registration. All measurement instrumentation utilized were also calibrated in compliance with 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 V. Van and S. Stephens, at Lucent Technologies, Swindon, United Kingdom, under the direction of M. P. Farina, and in adherence to the previously cited ISO/TL9000 test plan. This test program was conducted during the interval February 19 to March 10, 2003.

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FCC ID: AS5ONEBTS-05

Lucent Technologies
Bell Labs Innovations



67 Whippany Road
Whippany, NJ 07981

**Subject: Application for Certification under FCC ID:
AS5ONEBTS-05, Covering a Broadband PC S
Transceiver System for Operation with a
5 MHz UMTS/W-CDMA Carrier.**

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August 4, 2003

TEST REPORT

SYNOPSIS:

The exhibits presented in this test report demonstrate that the Lucent Technologies' Broadband PCS UMTS-CDMA Transceiver System, which is designed to operate in the Lucent UMTS Flexent® OneBTS™ W1900M (SD-2R521-01) Wireless Base Station, 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 Limits; effective October 1, 2002. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2002. It also demonstrates compliance with the spurious emissions limitations specified in ETSI TS 125 141 V4.1.0 (2001-06): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 4.1.0, Release 4). This standard was the guideline used in the design of the UCR1900 transceiver. The objective of this application is to obtain FCC authorization as a new filing, under FCC ID: AS5ONEBTS-05, for operation in the Universal Mobile Telecommunications System (UMTS) with a single 5 MHz carrier (5M0F9W) set to a maximum power level at the antenna terminal of 40 Watts (3-second), over the frequency spectrum 1930-1950 MHz.

The UMTS1900 Transceiver System consists of the principle RF components: (1) Rubidium Reference Oscillator Module (OMR) 15 MHz, (2) UMTS-CDMA Radio (UCR1900), Model BNJ27B, which was previously authorized by the Federal Communications Commission under FCC ID: AS5ONEBTS-04, (3) P2PAM power amplifier, (4) 20 MHz wide Dual Duplex (DDpx), low loss, transmit filter covering the PCS A & D-Block spectrum 1930-1950 MHz, and (5) the Test and Diagnostic Unit (TDU) used to monitor the output of the P2PAMs and feed it back to the UCR for processing and distortion cancellation. 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) Lucent's proprietary Digital Pre Distortion (DPD) technology which enables software to communicate between the transceiver, power amplifier and the transmit filter to achieve this goal.

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 Lucent Technologies, Whippany, NJ, compliance laboratory by F. E. Chetwynd and M. P. Farina during the period June 27 to July 16, 2003; in adherence to a test plan generated by M. P. Farina, in accordance with Lucent's ISO/TL9000 Registration. All measurement instrumentation utilized were also calibrated in compliance with 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.

APPLICANT: LUCENT TECHNOLOGIES**FCC ID: ASSONEBTS-05**

Frequency stability measurements were performed by V. Van and S. Stephens, at Lucent Technologies, Swindon, United Kingdom, under the direction of M. P. Farina, and in adherence to the previously cited ISO/TL9000 test plan. This test program was conducted during the interval February 19 to March 10, 2003.

This report fully documents all required tests and the test results, sufficient to show full compliance with the Rules of the Commission.

APPLICABLE FCC RULES AND INDUSTRY STANDARDS:

The exhibits presented in this test report demonstrate that the Lucent Technologies' Broadband PCS UMTS-CDMA Transceiver System, which is designed to operate in the Lucent UMTS Flexent® OneBST™ W1900M (SD-2R521-01) Wireless Base Station, 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 Limits; effective October 1, 2002. All testing was performed in accordance with CFR 47, Part 2, Subpart J – Equipment Authorization Procedures; effective October 1, 2002. It also demonstrates compliance with the spurious emissions limitations specified in ETSI TS 125 141 V4.1.0 (2001-06): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 4.1.0, Release 4). The specific test procedures that are both required for and are applicable to the UMTS1900 Transceiver System are:

Part 2.1046	RF Power Output	Pages 4 – 5
Part 2.1047	Modulation Characteristics	Pages 6-9
Part 2.1049	Occupied Bandwidth	Pages 10-17
Part 2.1051	Spurious Emissions at the Antenna Terminals.	Pages 18-22
Part 2.1053	Field Strength of Spurious Radiation	Pages 23-24
Part 2.1055	Frequency Stability	Pages 25-35
Part 2.1057	Frequency Spectrum to be Investigated	
Part 24	Personal Communications Services; Subpart E – Broadband PCS	
Part 24.238	Emission Limits	
ETSI	TS 125 141 V4.1.0 (2001-06): Universal Mobile Telecommunications System (UMTS); Base Station Conformance Testing (FDD), (3GPP TS 25.141, Version 4.1.0, Release 4).	
ANSI C63.4-1992	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; July 17, 1992.	

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PART 2.1046 MEASUREMENTS REQUIRED: RF POWER OUTPUT

The Broadband PCS UMTS Transceiver System, subject of this application for certification, is designed to provide a maximum RF power level, per single 5 MHz carrier, of 40 Watts (+46 dBm) at the Equipment Antenna Terminal (EAC). This System is designed to operate in the PCS A and D frequency blocks. A 20 MHz wideband, Low Loss A/D Dual Duplex (DDpx), transmit filter is incorporated into this System. All conducted emission measurements are performed at the EAC. Three 5 MHz UMTS carrier channels were used throughout this test procedure, as tabulated below, to represent the lowest and the highest settable channels in the PCS A-Block, and the center frequency of PCS D-Block. Each time the carrier is set to each of the three channels, the power level is adjusted, by software control, to +46 dBm (40 Watts at 3-second average) before performing emission measurements. The carrier modulation is set to the full 20 Codes, as required by ETSI Test Model 1.

UMTS Frequency	PCS Frequency Block	Single Carrier Bandwidth	UMTS Channel Number	UMTS Carrier Center Frequency	Measured Power Level
A1	Lowest Settable Channel	5 MHz	12	1932.5 MHz	+46 dBm
A3	Highest Settable Channel	5 MHz	62	1942.5 MHz	+46 dBm
D1	Block Center	5 MHz	87	1947.5 MHz	+46 dBm

These three frequencies are used for all of the conducted emission tests that follow.

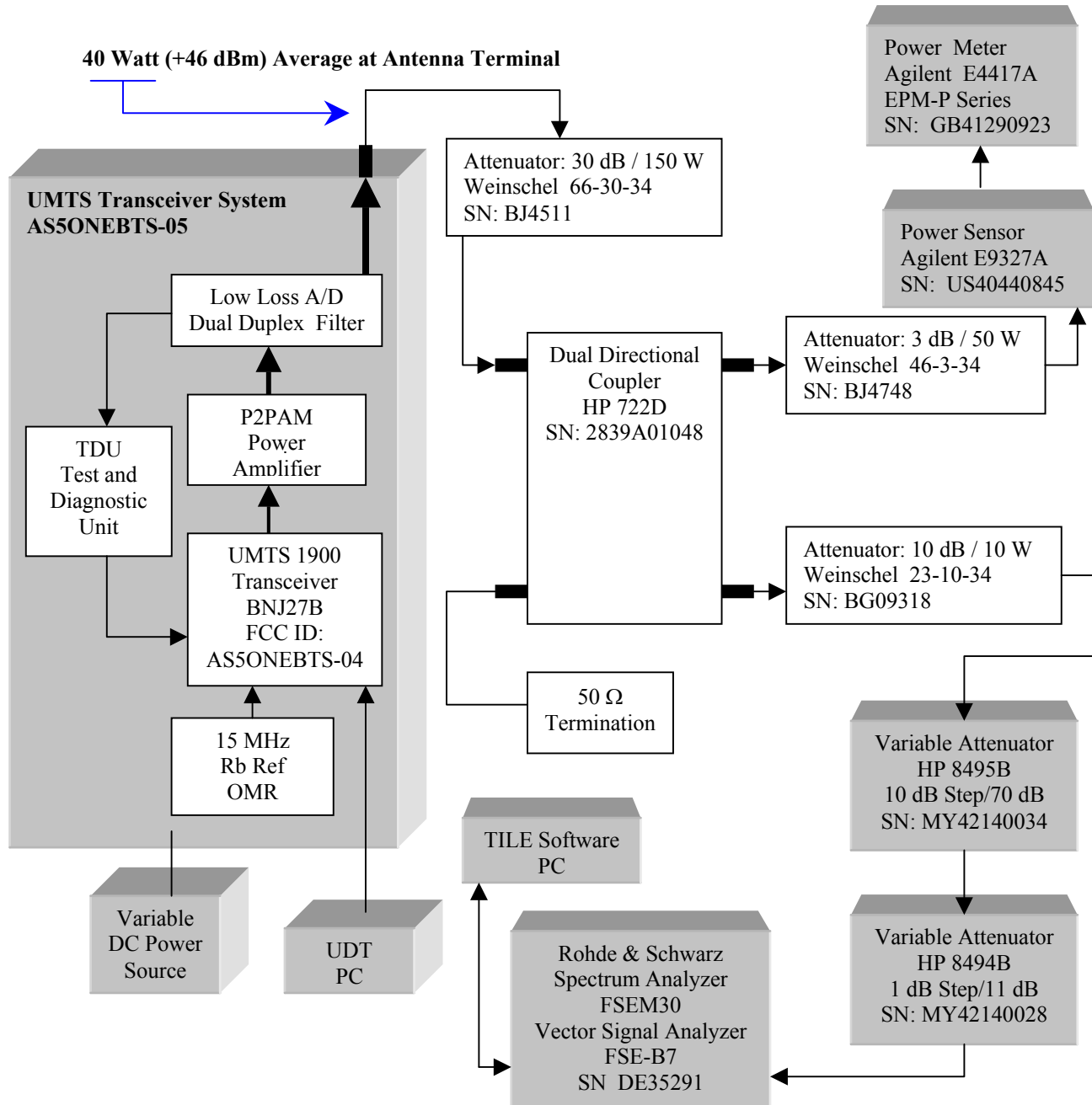
Results: The 5 MHz UMTS 1900 Transceiver System is compliant with the manufacturer's rated power level at the transmit antenna terminal for the above listed carrier frequencies.

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Block Diagram Of The Power Measurement Test Set-Up And Test Equipment Configuration for the Lucent UMTS Flexent® OneBTS™ W1900M (SD-2R521-01) Wireless Base Station



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EXHIBIT 10: TEST REPORT

PART 2.1047 MEASUREMENTS REQUIRED: MODULATION CHARACTERISTICS

The modulation accuracy was measured at the Equipment Antenna Terminal (EAC) for each of the three UMTS 1900 carriers A1, A3 and D1. The power level was set 40 Watts (+46 dBm) and the modulation set to a single active channel/code (PCCPCH + SCH), as required for ETSI TS 25.141 Test Model 4 modulation. The requirement is that the Error Vector Magnitude (EVM) be less than 17.5%. The test equipment used was an Agilent E4406A VSA Series Transmitter Tester (SN US41513200).

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	Modulation Accuracy at Antenna Terminal: Error Vector Magnitude (EVM)
A1	Lowest Settable	46 dBm	12	1932.5	1.87 % rms
A3	Highest Settable	46 dBm	62	1942.5	2.56 % rms
D	Center	46 dBm	87	1947.5	2.92 % rms

Minimum Standard Requirement: The minimum standard requirement is that the RMS error vector magnitude (EVM) shall be less than 17.5%.

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

RESULTS: The UMTS1900 Transceiver System demonstrated full compliance with modulation accuracy requirements specified in ETSI TS 25.141. All 3 channels were less than the 17.5% limitation. The plots for each channel (A1, A3 and D1) are included in this exhibit as shown below.

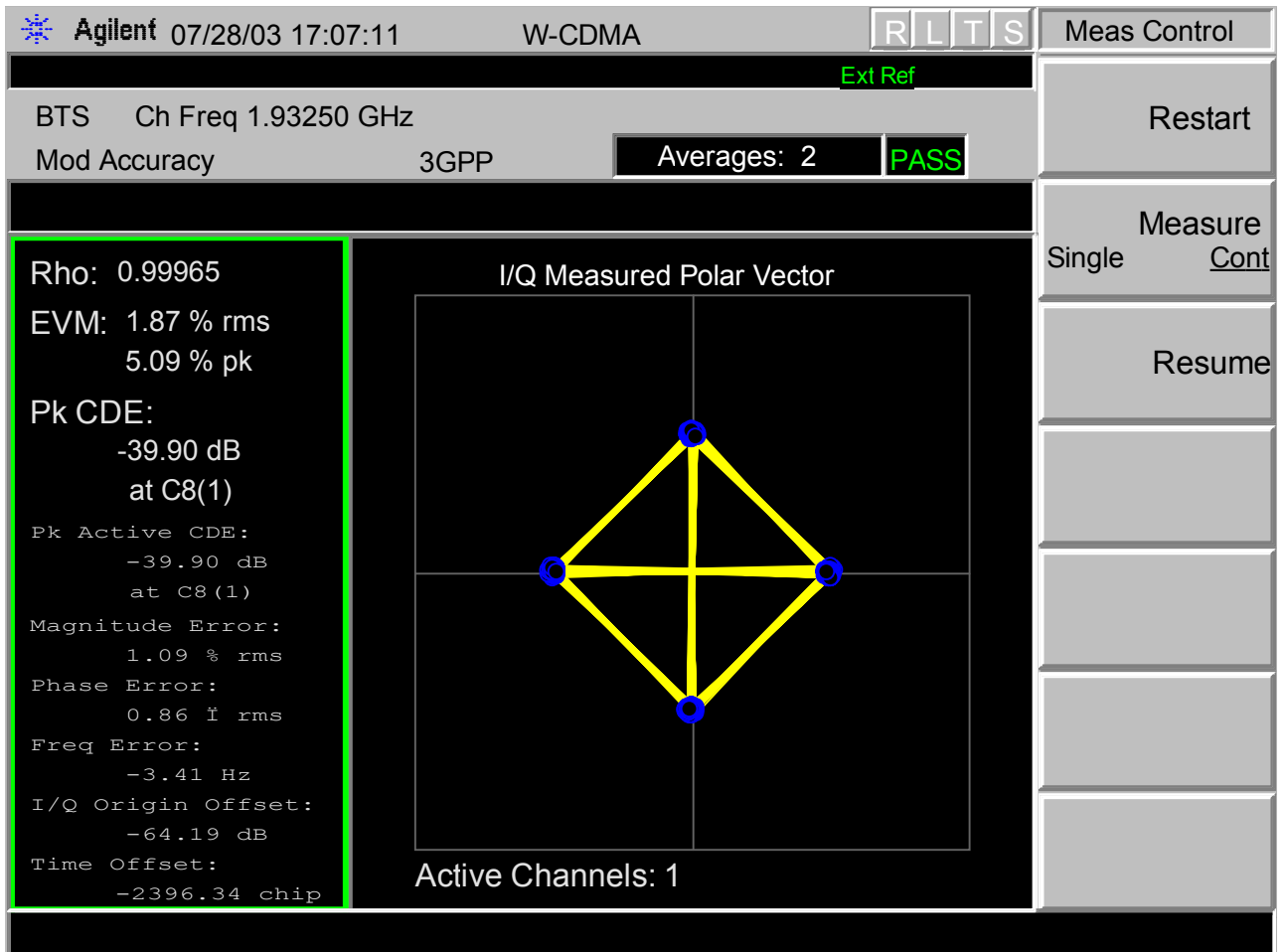
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EXHIBIT 10: TEST REPORT

Modulation Characteristics Block A1

UMTS1900 Ch 12; 1932.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



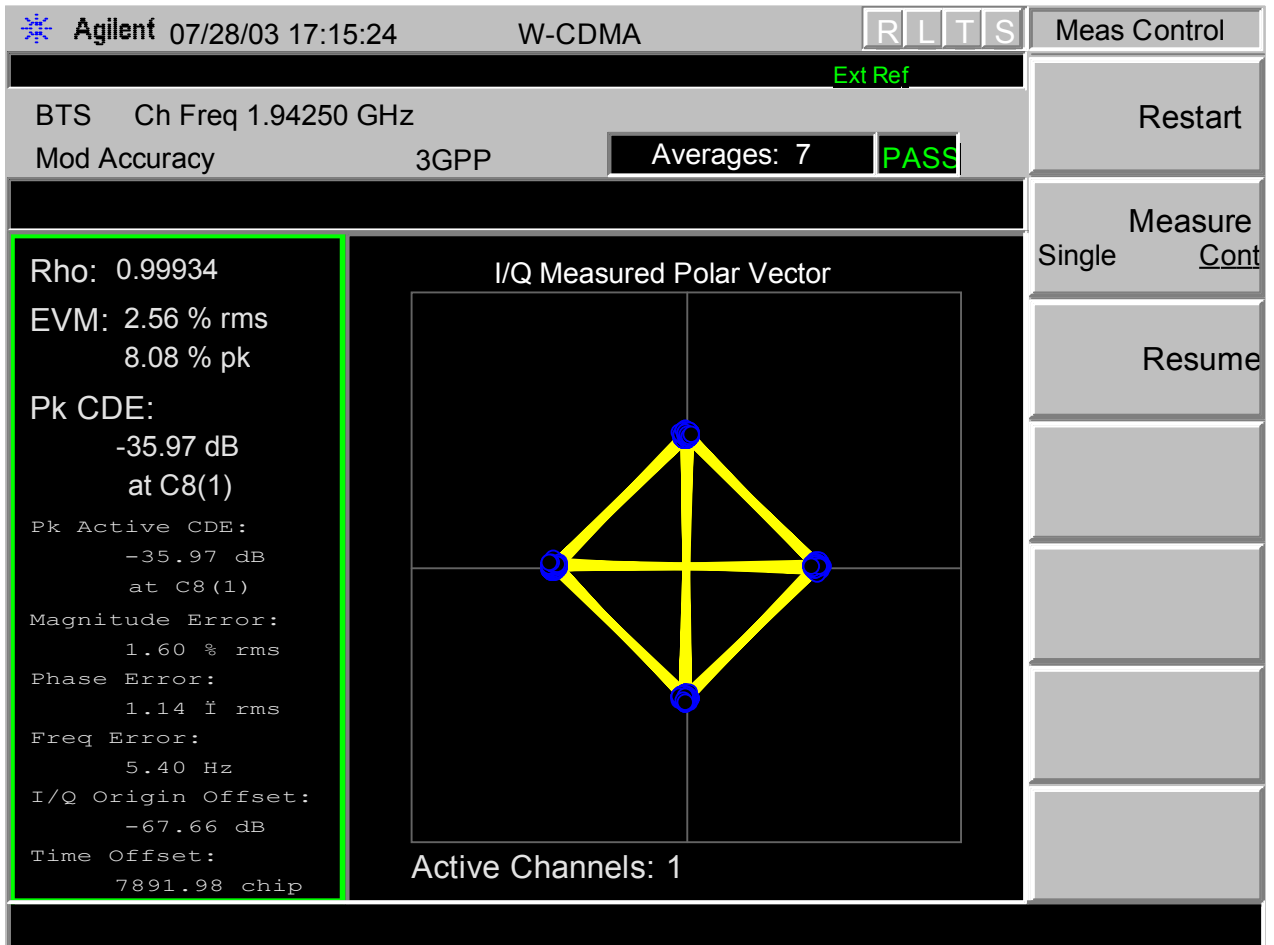
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EXHIBIT 10: TEST REPORT

Modulation Characteristics Block A3

UMTS1900 Ch 62; 1942.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



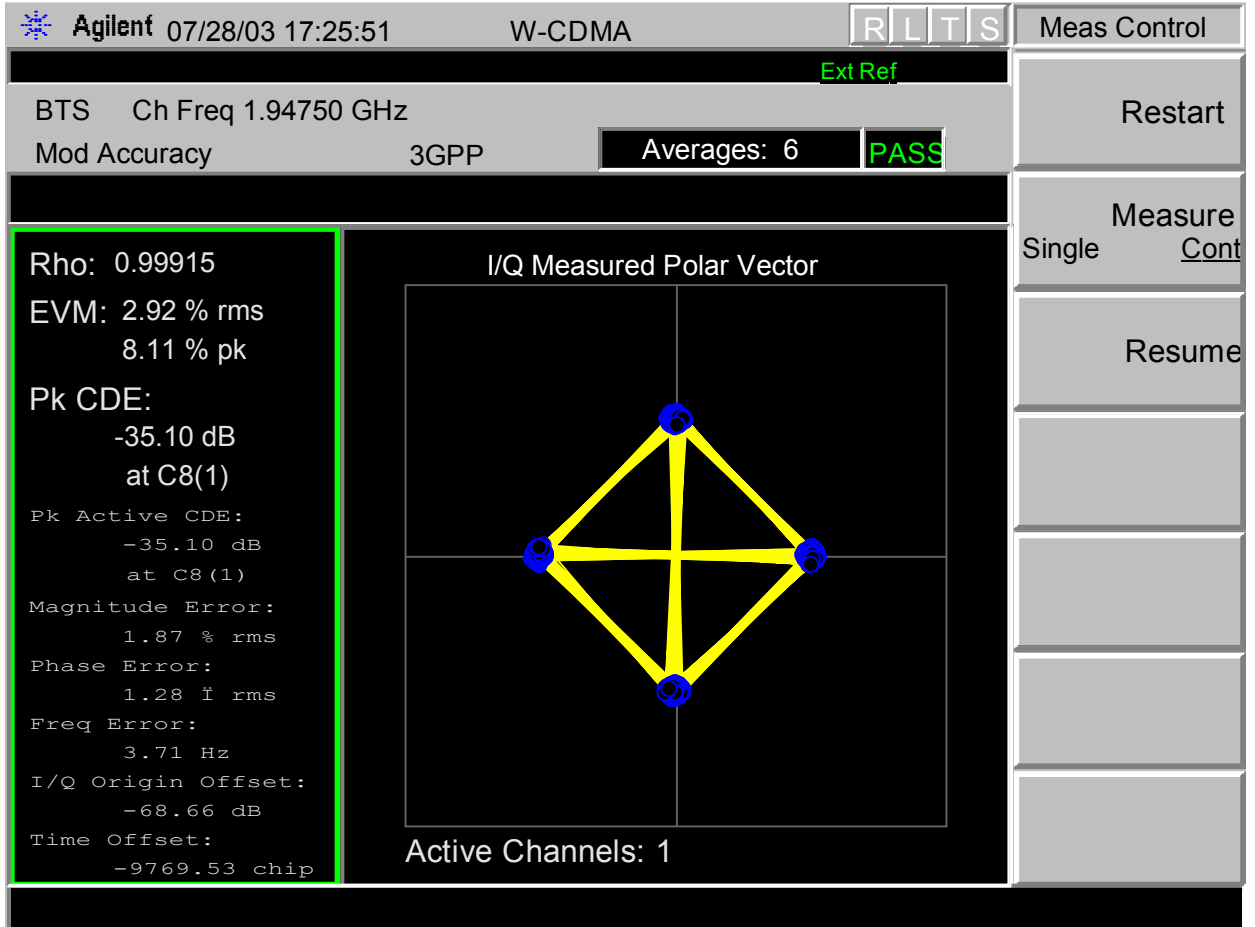
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EXHIBIT 10: TEST REPORT

Modulation Characteristics Block D1

UMTS1900 Ch 87; 1947.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



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EXHIBIT 10: TEST REPORT**PART 2.1049 MEASUREMENTS REQUIRED: OCCUPIED BANDWIDTH**

The occupied bandwidth was measured at the Equipment Antenna Terminal (EAC) for each of the three UMTS 1900 5 MHz carriers A1, A3 and D1. The power level was set to 40 Watts (+46 dBm) and the modulation set to the full 20 active channels/codes, as required for ETSI TS 25.141 Test Model 1 modulation.

The occupied bandwidth was measured by two methods:

1. The carrier bandwidth using an Agilent E4406A VSA Series Transmitter Tester (SN US41513200).
2. Emission mask limitation using a Rohde & Schwarz: Spectrum Analyzer FSEM30 (SN DE35291)

Method 1: The carrier bandwidth was measured at the Equipment Antenna Terminal (EAC) with the 5 MHz carrier set to +46 dBm and modulated with the full 20 channels/codes. The results show that the carrier is within the manufacturer's rated bandwidth for A1, A3 and D1. Tabulated measurement results and actual data plots are shown below.

UMTS PCS Frequency Block	Broadband PCS Frequency Block	Power Level at Antenna Terminal	UMTS1900 Channel No.	UMTS 1900 Carrier Center Frequency MHz	Measured Carrier Bandwidth MHz
A1	Lowest Settable	46 dBm	12	1932.5	4.0934
A3	Highest Settable	46 dBm	62	1942.5	4.0962
D	Center	46 dBm	87	1947.5	4.0950

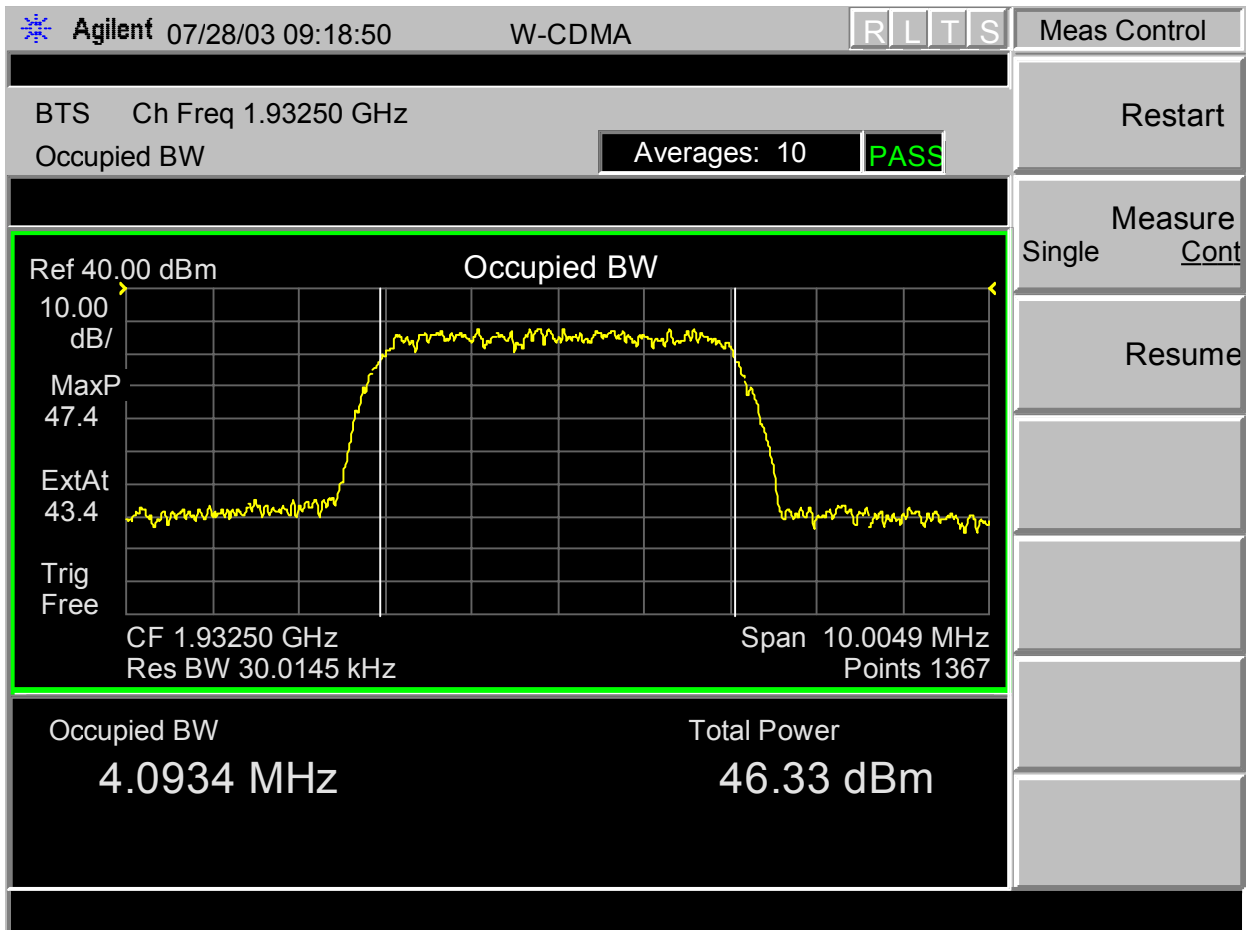
Results: For each UMTS1900 channel, the carrier does not exceed 5.0 MHz.

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Carrier Bandwidth Characteristics Block A1

UMTS1900 Ch 12; 1932.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier

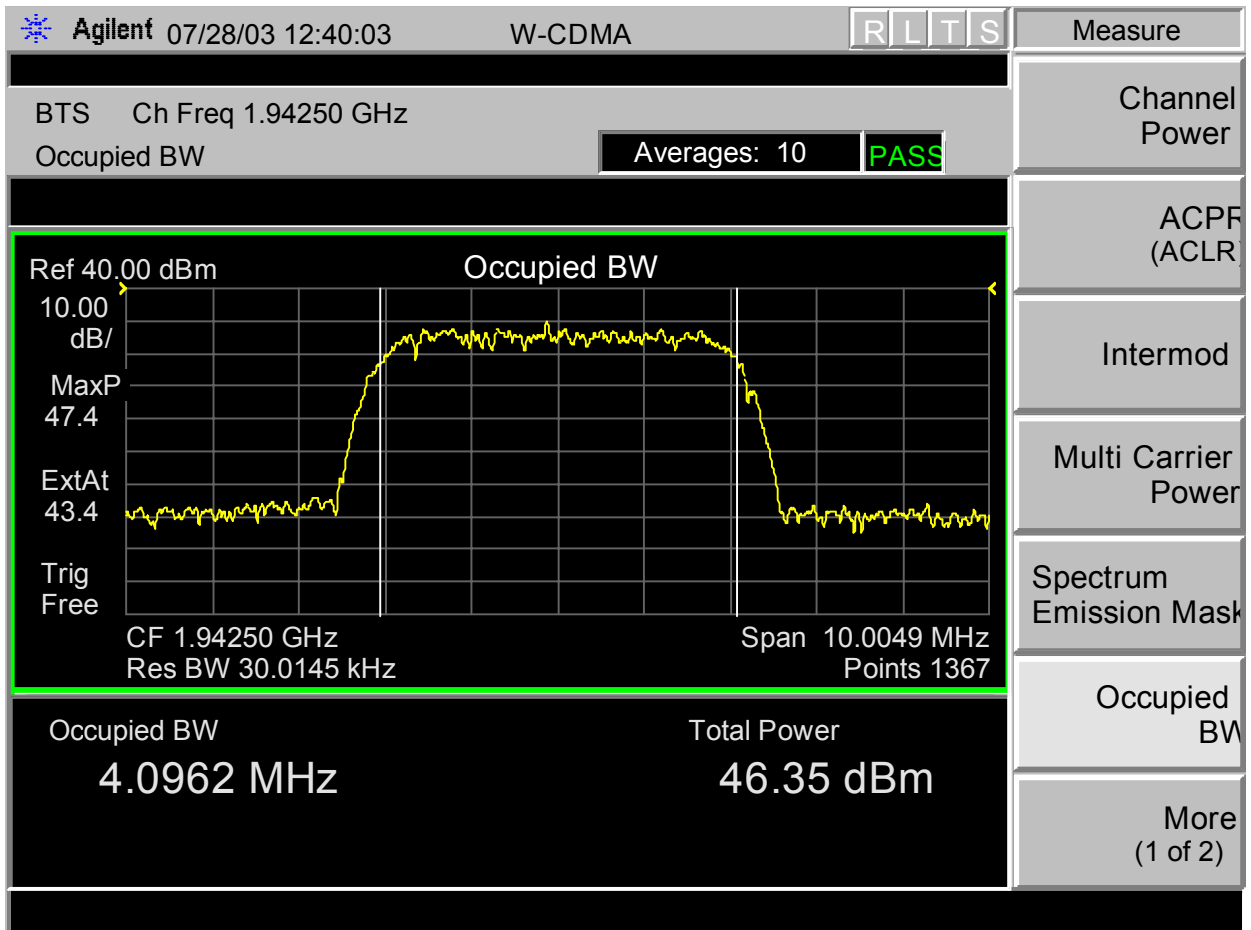


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Carrier Bandwidth Characteristics Block A3

UMTS1900 Ch 62; 1942.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier

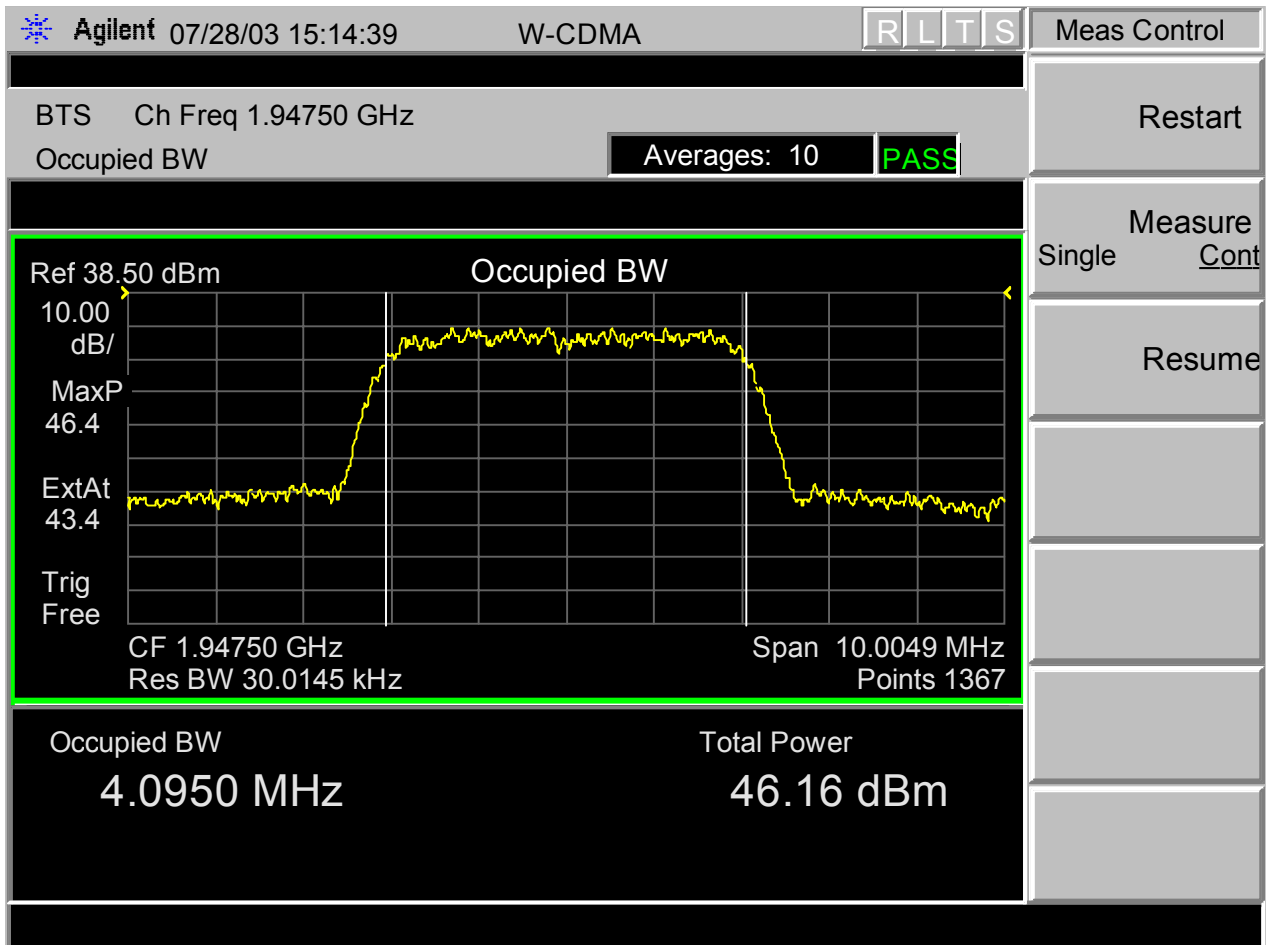


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Carrier Bandwidth Characteristics Block D1

UMTS1900 Ch 87; 1947.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



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Method 2. Emission mask limitation using a Rohde & Schwarz: Spectrum Analyzer FSEM30 (SN DE35291) with Total Integrated Laboratory Environment (TILE) test software.

Measurement of the occupied bandwidth emission characteristics were performed at the Equipment Antenna Terminal (EAC) with the 5 MHz carrier set to +46 dBm, and the modulation set to the full 20 channels/codes as required by ETSI TS 25.141, Test Model 1, for blocks A1, A3 and D1. In compliance with Part 24.238, A1 and A3 represented the lowest and the highest settable channels in PCS Block A, respectively. Since Block D is 5 MHz wide, a single channel (D1) was set to the block center frequency. The emission mask used to demonstrate compliance was as specified in ETSI TS 25.141 for $P \geq 43$ dBm. The mask attenuation values were based on a 30 kHz resolution bandwidth, which made the modulated 5 MHz carrier to be offset from +46 dBm by -22.2 dB, in accordance with the equation:

$$\text{Carrier Offset} = 10 \log (30 \text{ kHz}/5 \text{ MHz}) = -22.2 \text{ dB}$$

This series of measurements were performed using EMC software:

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

The data/measurement plots for A1, A3 and D1 are attached below.

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

RESULTS: The A1, A3 and D1 channels demonstrate compliance with the emission mask specified by ETSI TS 25.141; the carriers do not exceed the mask limitation. Compliance is also demonstrated for each PCS frequency block edge requirement specified in Part 24.238.

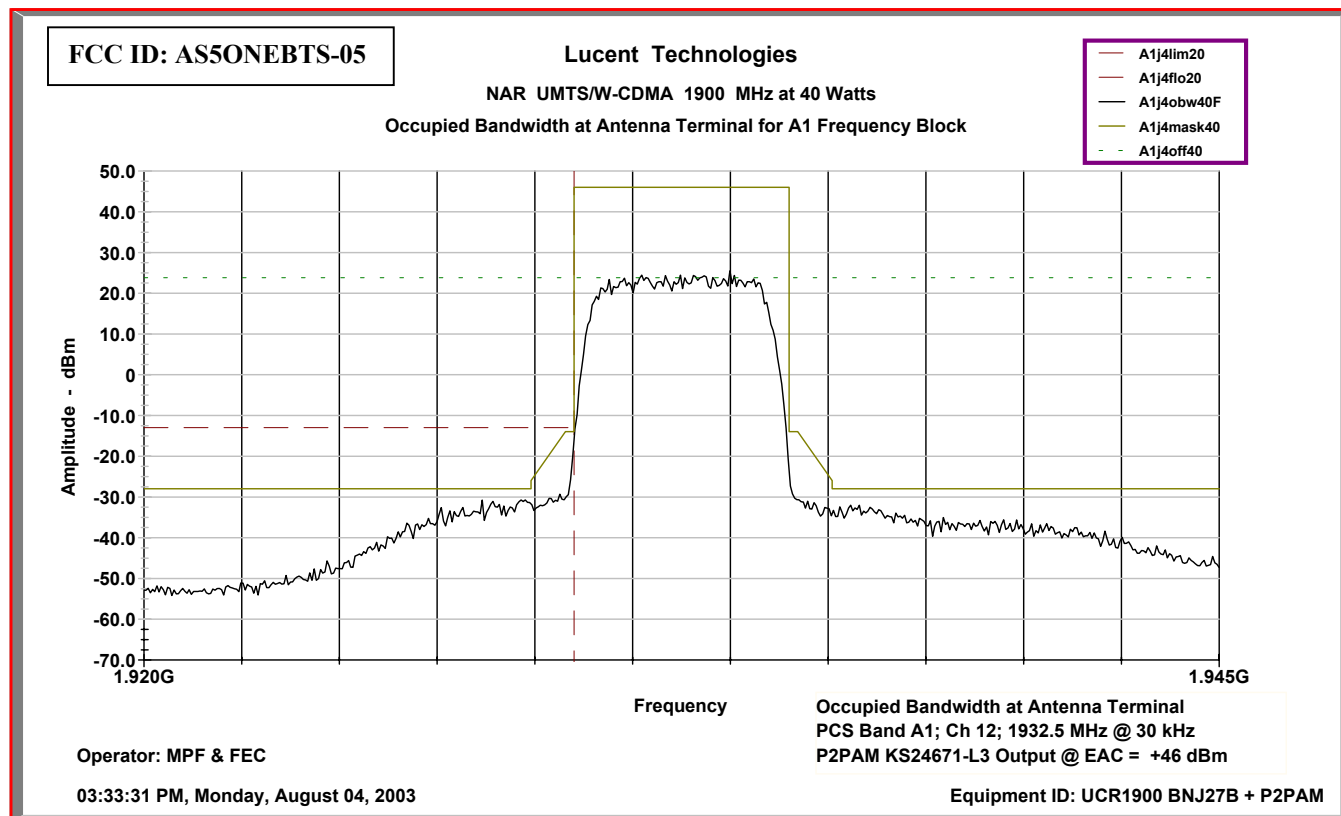
The data plots are attached below.

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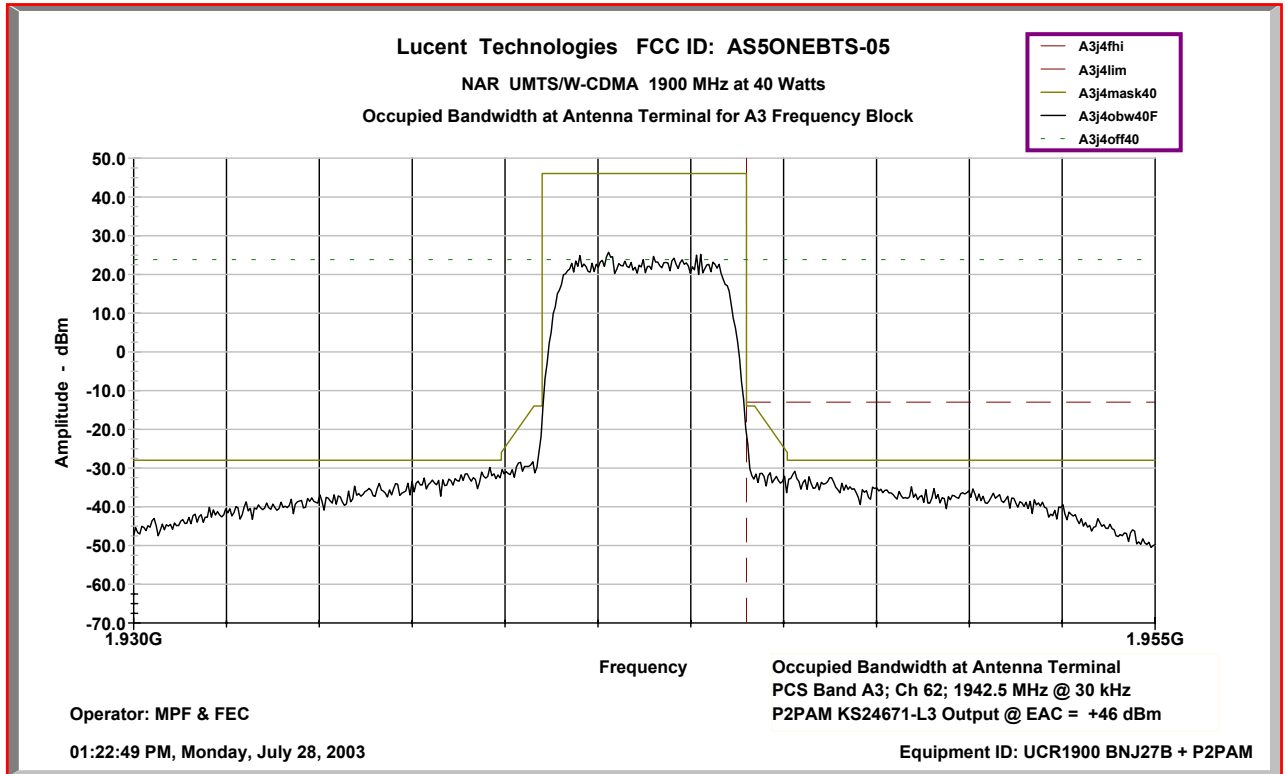
Occupied Bandwidth Characteristics Block A1

UMTS1900 Ch 12; 1932.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier



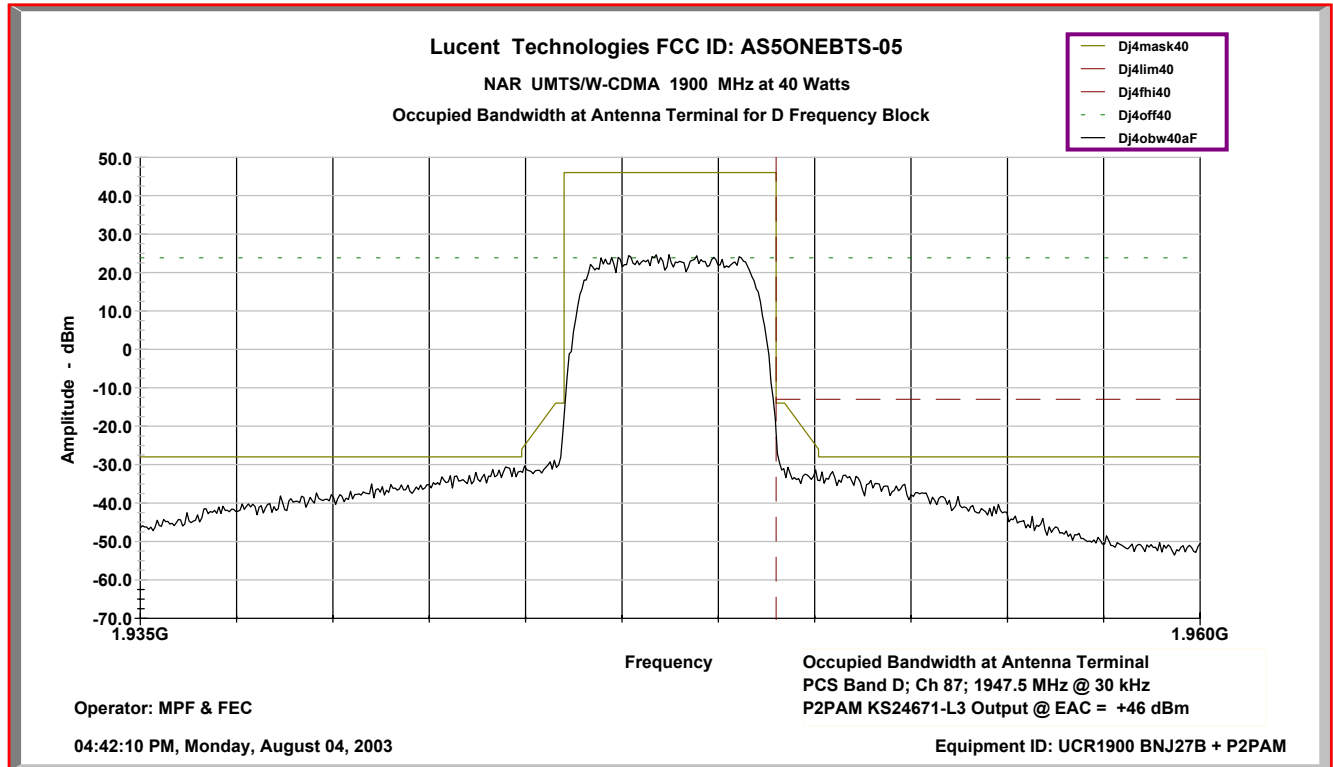
APPLICANT: LUCENT TECHNOLOGIES

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Occupied Bandwidth Characteristics Block A3**UMTS1900 Ch 62; 1942.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier**

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Occupied Bandwidth Characteristics Block D1**UMTS1900 Ch 87; 1947.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier**

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EXHIBIT 10: TEST REPORT**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 10th 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 24.238 (b) specifies the required Resolution Bandwidth (RBW) to be 1 MHz. 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 (Part 24.238) |
| 3. Emission Limitation: | $43 + 10 \log (P)$ dBc = $43 + 10 \log (40 \text{ Watts}) = 59.0$ 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 ≥ 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.

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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. The TILE/IC software was able to sufficiently suppress the normally high noise floor associated with 1 MHz RBW 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 1.8 – 2.5 GHz, 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 10LC1790-3-AA; SN 200033011; Product No. 23042
2. High Pass Filter: Model 5HC2850/18050-1-.8-KK; SN 9926050; Product No. 23042

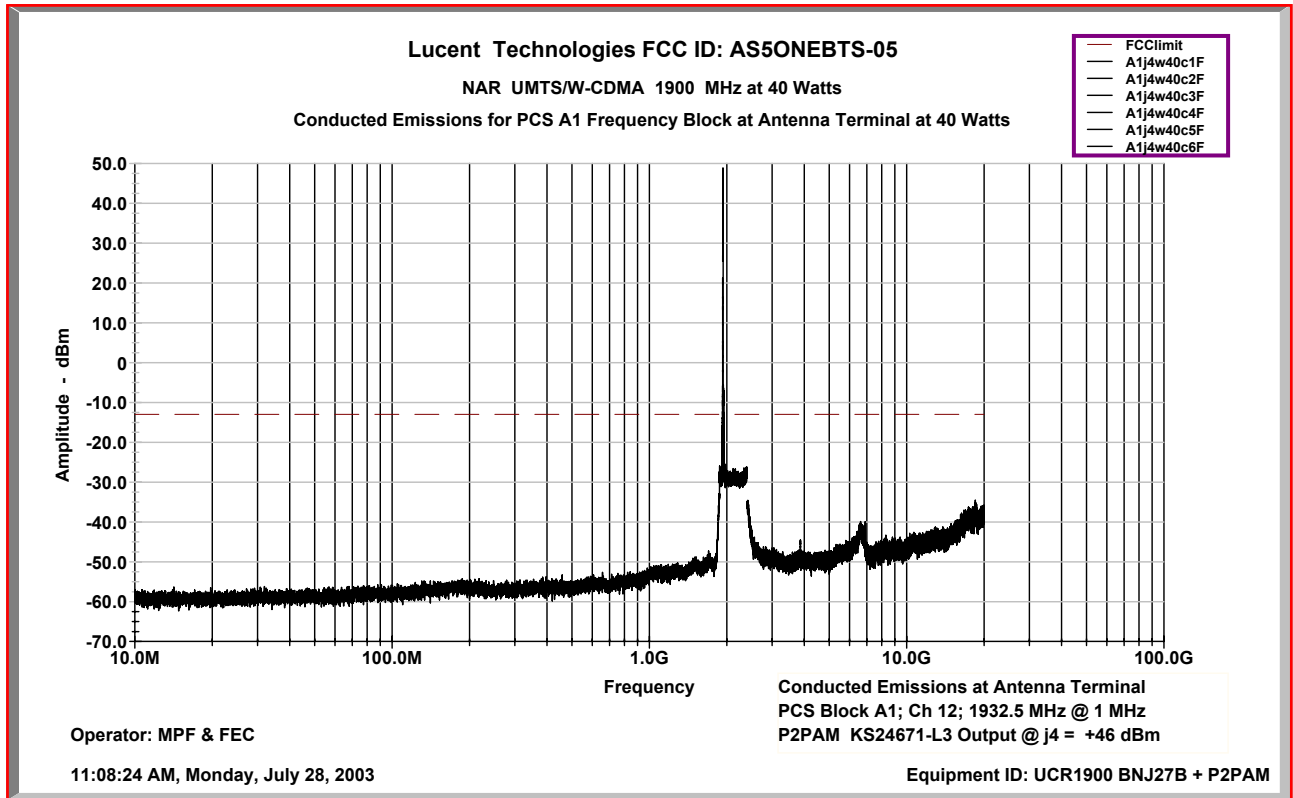
Part 24.238 requires that this test be performed for the lowest settable and for the highest settable carrier frequencies in each PCS frequency block, which are summarized in the following table.

UMTS PCS Frequency Block	Broadband PCS Frequency Block	Power Level at Antenna Terminal	UMTS1900 Channel No.	UMTS 1900 Carrier Center Frequency MHz	Measured Carrier Bandwidth MHz
A1	Lowest Settable	46 dBm	12	1932.5	4.0934
A3	Highest Settable	46 dBm	62	1942.5	4.0962
D	Center	46 dBm	87	1947.5	4.0950

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

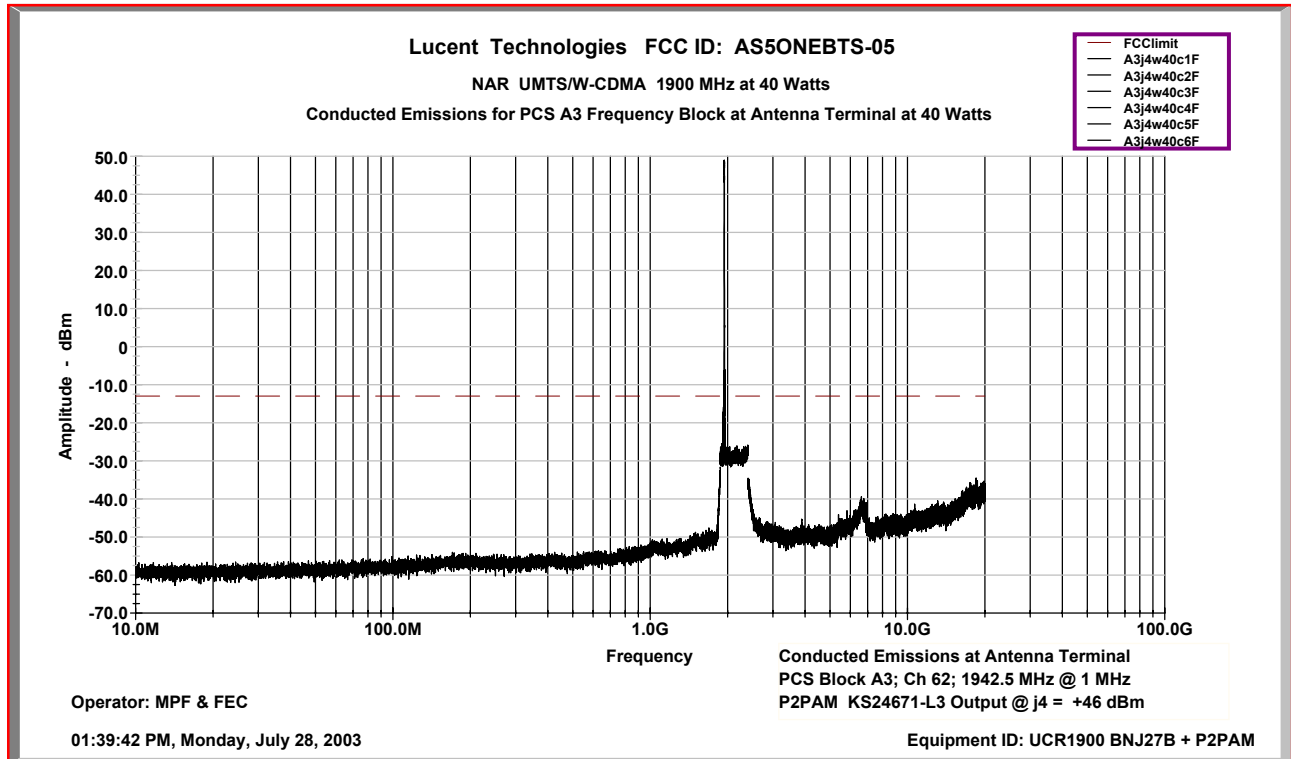
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Conducted Emissions Characteristics Block A1**UMTS1900 Ch 12; 1932.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier**

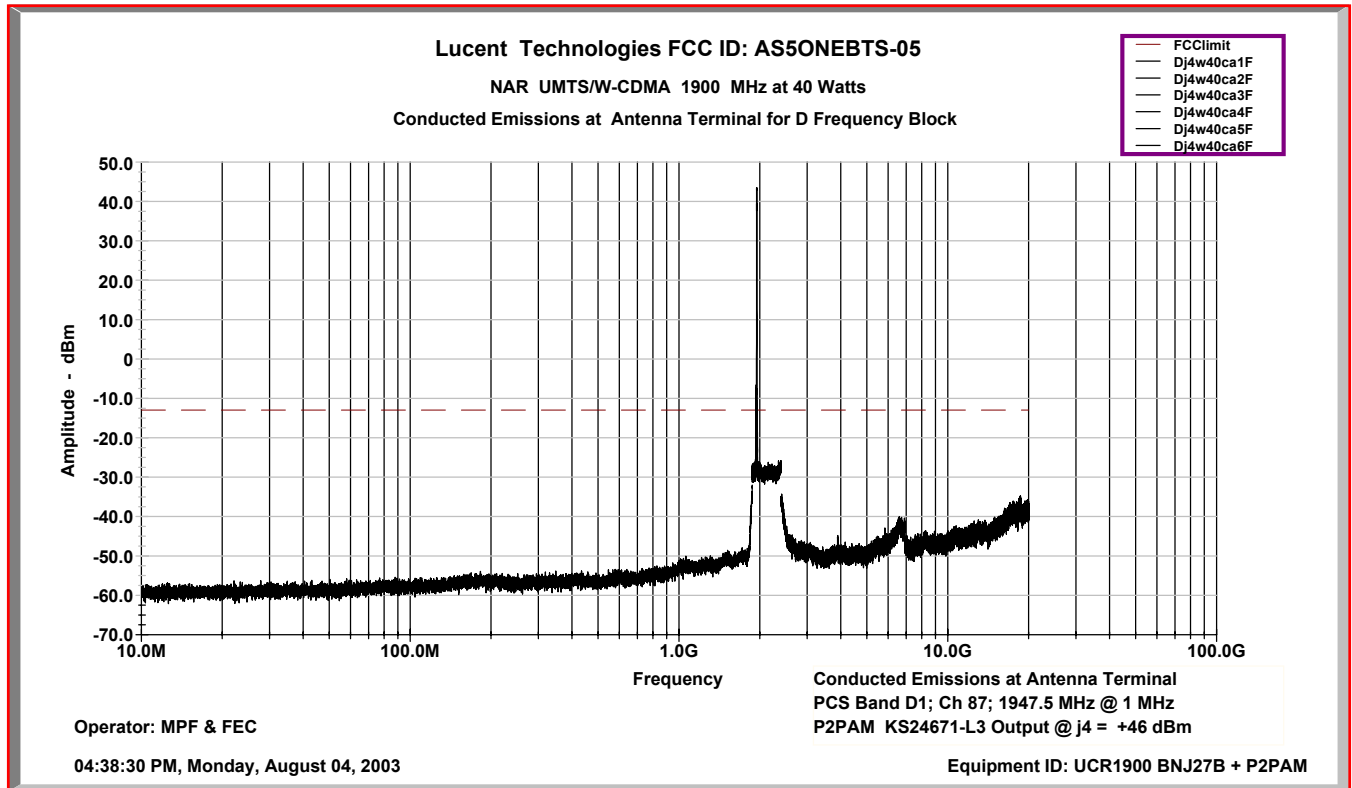
APPLICANT: LUCENT TECHNOLOGIES

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Conducted Emissions Characteristics Block A3**UMTS1900 Ch 62; 1942.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier**

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Conducted Emissions Characteristics Block D1**UMTS1900 Ch 87; 1947.5 MHz at Tx Antenna Terminal at +46 dBm per single 5 MHz carrier**

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EXHIBIT 10: TEST REPORT**PART 2.1053 MEASUREMENTS REQUIRED: FIELD STRENGTH OF SPURIOUS RADIATION**

This test requires a single carrier per sector, each at maximum rated power (40 Watts), transmitting into a non-radiating dummy load. As required, the frequency range investigated was from 10 MHz to 20 GHz as in the previous conducted spurious emissions test procedure. This test was performed for the PCS A-Block and D-Block, using the UMTS PCS frequencies A1, A3 and D1 channels, as cited in the previous occupied bandwidth tests, and adjusted to provide 40 Watts (46.0 dBm) at the Equipment Antenna Connector (EAC) transmit antenna terminal. Three separate tests were run with all 3 sectors transmitting on the same channel. In compliance with the guidelines of ANSI C63.4-1992, 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 C63.4-1992. The typical procedure is that the 10 highest field strength signals, between 10 MHz and 20 GHz, would be identified in the initial scans conducted in the Whippany semi-anechoic 3-meter RF chamber and then accurately remeasured on the Whippany Open Area Test Site (OATS), which is FCC listed and approved under Registration Number 90770. This procedure would be followed only if any signals were of sufficient field strength to be detectable and measurable on the OATS, in consideration of the RF ambient on that test site.

Any emissions radiating from the cabinet are treated as radiating from a halfwave dipole antenna, as specified in Part 2, Section 2.1053(a). Limitations are based on attenuation below the carrier (dBc) using the formula $43 + 10 \log (P \text{ Watts}) = \text{dBc}$, where P is the signal power level at the transmit antenna terminal (EAC). In accordance with Part 24.238, the required resolution bandwidth was 1 MHz.; the detector function was set to peak. As stated in Part 2.1051, the magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

For a dipole antenna in free space:

$$E = [(49.2)(P)\exp(1/2)]/R$$

Where: E = field intensity in Volts/Meter
 P = transmitted power in Watts
 R = distance in meters

The required attenuation is:

$$\text{Att} = 43 + 10\log (P \text{ in Watts}) \text{ dBc}$$

The required limitation is then:

$$E(\text{lim}) = E - \text{Att} \text{ (in dBuV/m)}$$

APPLICANT: LUCENT TECHNOLOGIES**FCC ID: AS5ONEBTS-05****Method of Measurement:**

In order to suppress the instrumentation noise floor sufficient to detect and measure spurious signals that have power levels as low as 20 dB below the required limit, an EMC software package was employed to drive the spectrum analyzer, collect and compile the acquired data, perform mathematical corrections to the data by incorporating (i.e., programming) pre-measured path losses and antenna factors 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, which also showed the required compliance limitations.

RESULTS:

The UMTS1900 Transceiver System, subject of this application for certification under FCC ID: AS5ONEBTS-05, demonstrated full compliance with the requirements of FCC Rule Part 2.1053 and with the requirements of Part 24.238. All radiated emissions that were detected and measured in the Whippany semi-anechoic 3-meter RF chamber had field strengths that were substantially greater than 20 dB below the FCC limitation. Therefore, there are no reportable radiated spurious emissions.

APPLICANT: LUCENT TECHNOLOGIES

FCC ID: AS5ONEBTS-05

EXHIBIT 10: TEST REPORT**PART 2.1055 MEASUREMENTS REQUIRED: FREQUENCY STABILITY**

The frequency stability was measured at the Equipment Antenna Terminal (EAC) and at the UCR1900 transceiver output terminal for a single carrier set A1 (1932.5 MHz). The power level used was 20 Watts (+43 dBm) at the EAC and the modulation set to a single active channel/code (PCCPCH + SCH), as required for ETSI TS 25.141 Test Model 4 modulation for the EAC measurement. For the UCR1900 (previously authorized under FCC ID: AS5ONEBTS-04) measurement, the power was set to +10 dBm. A third measurement was made at the 15 MHz Rb reference (OMR) output terminal. All frequency stability measurements were performed by V. Van and S. Stephens, at Lucent Technologies, Swindon, United Kingdom, under the direction of M. P. Farina, and in adherence to the previously cited ISO/TL9000 test plan. This test program was conducted during the interval February 19 to March 10, 2003. The complete data, test setup diagram and test setup photographs are attached to this exhibit.

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, 2002. 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 $+50^{\circ}\text{C}$

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 $+50^{\circ}\text{C}$, in $+10^{\circ}\text{C}$ 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 carrier set to the A1 channel (1932.5 MHz). The required tolerance limit for UMTS 1900 base station/land station equipment is specified in ETSI TS 25.141 as ± 0.05 ppm.

RESULTS: The PCS UMTS Transceiver System, subject of this application for certification under FCC ID: AS5ONEBTS-05, demonstrated full compliance with the requirements of FCC Rule Part 2.1055. The frequency stability was well within the required ± 0.05 ppm, as shown in the measurement data attached.

The worst case frequency deviations measured were:

OMR @ 15.0 MHz =	+0.0027 ppm
UCR1900 @ 1932.5 MHz =	+0.0127 ppm
Transceiver System at EAC @ 1932.5 MHz =	+0.0112 ppm

Liberty 1900 O/D Temperature Test Results

Results Tables with RF Frequency error measured at Antenna Port

Chamber Temp +50 C								
Voltage supply minimum			Voltage supply normal			Voltage supply maximum		
VDC 22.1V VAC 195.5V (heat exchanger)			VDC 26V VAC 230V (heat exchanger)			VDC 29.9V VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)	Measured OMR frequency error (Hz)		Measured RF Frequency Error (Hz)	Measured 15 MHz OMR frequency error (Hz)		Measured RF Frequency Error (Hz)	Measured OMR frequency error (Hz)	
+15.6 (+0.008 ppm)	-0.03 (- 0.002 ppm)		+15.5 (+0.008 ppm)	+0.02 (+ 0.0013 ppm)		-14.2 (-0.0073 ppm)	-0.03 (- 0.002 ppm)	
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.90	4.96	3.28	14.91	4.96	3.29	14.91	4.96	3.28

Chamber Temp +40 C								
Voltage supply minimum			Voltage supply normal			Voltage supply maximum		
VDC 22.1V			VDC 26V			VDC 29.9V		
VAC 195.5V (heat exchanger)			VAC 230V (heat exchanger)			VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
+21.6 (+0.0112 ppm)		-0.03 (- 0.002 ppm)	+15.2 (+0.0079 ppm)		-0.03 (- 0.002 ppm)	+17.6 (+0.0091 ppm)		-0.03 (- 0.002 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.91	4.96	3.28	14.91	4.96	3.28	14.91	4.96	3.28

Chamber Temp +30 C								
Voltage supply minimum			Voltage supply nominal			Voltage supply maximum		
VDC 22.1V VAC 195.5V (heat exchanger)			VDC 26V VAC 230V (heat exchanger)			VDC 29.9V VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
+16.1 (+ 0.0083 ppm)		+0.02 (+ 0.0013 ppm)	-20.3 (- 0.0105 ppm)		+0.03 (+ 0.002 ppm)	+16.9 (+ 0.0087 ppm)		+0.02 (+ 0.0013 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.91	4.96	3.28	14.91	4.96	3.28	14.91	4.96	3.28

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Chamber Temp +20 C								
Voltage supply minimum			Voltage supply normal			Voltage supply maximum		
VDC 22.1V VAC 195.5V (heat exchanger)			VDC 26V VAC 230V (heat exchanger)			VDC 29.9V VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
+14.6 (+0.0076 ppm)		+0.03 (+ 0.002 ppm)	+17.7 (+0.0092 ppm)		+0.03 (+ 0.002 ppm)	+17.4 (+0.0090 ppm)		+0.02 (+ 0.0013 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.91	4.96	3.28	14.91	4.96	3.28	14.91	4.96	3.28

Chamber Temp +10 C								
Voltage supply minimum			Voltage supply nominal			Voltage supply maximum		
VDC 22.1V VAC 195.5V (heat exchanger)			VDC 26V VAC 230V (heat exchanger)			VDC 29.9V VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
+12.8 (+0.0066 ppm)		+0.04 (+ 0.0027 ppm)	+15.5 (+ 0.0080 ppm)		+0.02 (+ 0.0013 ppm)	+16.5 (+ 0.0085 ppm)		+0.04 (+ 0.0027 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.92	4.96	3.29	14.92	4.96	3.29	14.92	4.96	3.29

Chamber Temp 0 C								
Voltage supply minimum			Voltage supply normal			Voltage supply maximum		
VDC 22.1V VAC 195.5V (heat exchanger)			VDC 26V VAC 230V (heat exchanger)			VDC 29.9V VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
14.9 (+0.0077 ppm)		-0.02 (- 0.0013 ppm)	-13.5 (-0.0070 ppm)		+0.03 (+ 0.002 ppm)	16.6 (+ 0.0086 ppm)		+0.02 (+ 0.0013 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.92	4.96	3.28	14.92	4.96	3.29	14.92	4.96	3.29

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Chamber Temp -10 C								
Voltage supply minimum			Voltage supply normal			Voltage supply maximum		
VDC 22.1V			VDC 26V			VDC 29.9V		
VAC 195.5V (heat exchanger)			VAC 230V (heat exchanger)			VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
+18.9 (+0.0098 ppm)		+0.02 (+ 0.0013 ppm)	13.2 (+0.0068 ppm)		-0.03 (- 0.002 ppm)	-14.0 (-0.0072 ppm)		+0.03 (+ 0.002 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.92	4.96	3.29	14.92	4.97	3.29	14.92	4.97	3.29

Chamber Temp -20 C								
Voltage supply minimum			Voltage supply nominal			Voltage supply maximum		
VDC 22.1V			VDC 26V			VDC 29.9V		
VAC 195.5V (heat exchanger)			VAC 230V (heat exchanger)			VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
14.2 (+0.0073 ppm)		+0.03 (+ 0.0020 ppm)	13.9 (+0.0072 ppm)		+0.04 (+ 0.0027 ppm)	15.4 (+0.0080 ppm)		+0.03 (+ 0.0020 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.91	4.96	3.28	14.91	4.96	3.28	14.91	4.96	3.28

Chamber Temp -30 C								
Voltage supply minimum			Voltage supply nominal			Voltage supply maximum		
VDC 22.1V VAC 195.5V (heat exchanger)			VDC 26V VAC 230V (heat exchanger)			VDC 29.9V VAC 265V (heat exchanger)		
Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)	Measured RF Frequency Error (Hz)		Measured OMR frequency error (Hz)
-17.6 (-0.0091 ppm)		+0.03 (+ 0.0020 ppm)	+15.5 (+0.0080 ppm)		+0.03 (+ 0.0020 ppm)	+12.4 (+0.0064 ppm)		-0.03 (- 0.0020 ppm)
DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)			DC Voltage supply to OMR (V)		
15	5	3.3	15	5	3.3	15	5	3.3
14.91	4.96	3.28	14.91	4.96	3.28	14.91	4.96	3.28

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Results Tables with RF Frequency error measured at UCR Tx port transmit at 10 dBm

Chamber Temp +50 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
18.1 (+0.0094 ppm)	14.5 (+0.0075 ppm)	14.0 (+0.0072 ppm)

Chamber Temp +40 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
16.4 (+0.0085 ppm)	17.9 (+0.0093 ppm)	-13.4 (-0.0069 ppm)

Chamber Temp +30 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
+19.6 (+0.0101 ppm)	18.3 (+0.0095 ppm)	15.2 (+0.0079 ppm)

Chamber Temp +20 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
15.1 (+0.0078 ppm)	-18.6 (-0.0096 ppm)	-11.4 (-0.0059 ppm)

Chamber Temp +10 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
17.6 (+0.0091 ppm)	17.6 (+0.0091 ppm)	-15.2 (-0.0079 ppm)

Chamber Temp 0 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
12.8 (+0.0066 ppm)	24.5 (+0.0127 ppm)	16.0 (+0.0083 ppm)

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Chamber Temp -10 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
14.6 (+0.0076 ppm)	12.5 (+0.0065 ppm)	-15.7 (-0.0081 ppm)

Chamber Temp -20 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
15.6 (+0.0081 ppm)	-14.7 (-0.0076 ppm)	-12.8 (-0.0066 ppm)

Chamber Temp -30 C		
Voltage supply minimum	Voltage supply nominal	Voltage supply maximum
VDC 22.1V	VDC 26V	VDC 29.9V
VAC 195.5V (heat exchanger)	VAC 230V (heat exchanger)	VAC 265V (heat exchanger)
Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)	Measured RF Frequency Error (Hz)
12.5 (+0.0065 ppm)	-13.8 (-0.0071 ppm)	-12.8 (-0.0066 ppm)

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BTS Hardware Configurations

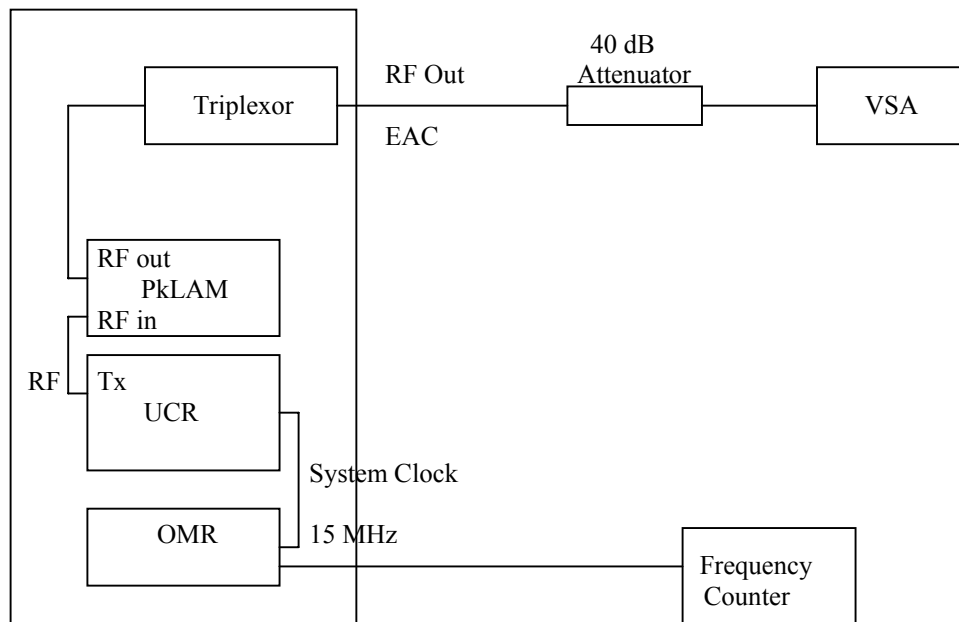
Unit	Phase	Model	Comcode	S/N
URC	P2	44WA50X	848542668	01CE09107502
UCU16 +24V	S1:5 AM1	BNJ25	848633970	01NG09109080
UCU64 +24V	S0:9 P1:5	BNJ53	848633970	03J601880025
UCU64 +24V	S0:9 P1:5	BNJ53	848633970	03J601880014
Dummy Card	UCU Slot 4			
Dummy Card	UCU Slot 5			
Dummy Card	UCU Slot 6			
Dummy Card	UCU Slot 7			
Dummy Card	UCU Slot 8			
Dummy Card	UCU Slot 9			
Dummy Card	UCU Slot 10			
Dummy Card	UCU Slot 11			
Dummy Card	UCU Slot 12			
UCR1900	S1:3 AM1	BNJ27	848633962	03J601640142
UCR1900	S0:14C P3:1	BNJ27	848633962	02J607640146
UCR1900	S1:16 P1 A11	BNJ27	848633962	01NG10106738
Dummy Card	UCR Slot 4			
Dummy Card	UCR Slot 5			
Dummy Card	UCR Slot 6			
CTU	P2	44WW27	848783684	02CE02133575
IOU4	S1 1:1	44WWIOU4		02G012306570
PDP I ² C +24V			C848832622	0633121
PkLAM +24V	P2 1:1	+24V	CC 408663698	02M505000104
Dummy Load	LAM slot 3			
Dummy Load	LAM slot 5			
Dummy Load	LAM slot 7			
Dummy Load	LAM slot 9			
Dummy Load	LAM slot 11			
PTDU	S1:4	44WW33		03G001325730
PTDU	S1:4	44WW33		03G001323106
1900 Triplexor	T-P-A1/A3		CC408668614	029K11441568
FAC			CC848814638	01AC11000037
FAN (Digital Shelf)			CC848572087	01MR09578910
FAN (LAM shelf)				
CPC-A +24V			CC408646040	01T767002002
CPC-A +24V			CC408646040	01T767001989
CPC-B +24V			CC408646032	01T766001680
CPC-B +24V			CC408646032	01T766001685
OMU-RB	REV-H		106500-004	028F02500330
OMU-XO	REV-H		106500-003	018F10490313

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Test Equipment Listing

Unit Description	Manufacture	Model	S/N	Cal. due date
VSA Series Transmitter Tester	Agilent	E4406A	US40061456	Sep-04-2003
Universal Frequency Counter/Calibrator	Fluke	PM6685R	960565	Nov-01-2003
Multimeter	Fluke	73 Series II	65780386	Apr-09-2003
20 dB Attenuator	Weinschel	49-20-43	LK310	In house cal
20 dB Attenuator	Weinschel	46-20-34	LK310	In house cal

Block Diagram for the test setup

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Photos of the BTS



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