




Nemko Test Report: 8665RUS1

Applicant: AirWalk Communications
1830 N. Greenville Avenue
Richardson, TX 75081
USA

**Equipment Under Test:
(E.U.T.)** XCVB 800 MHz

In Accordance With: **CFR 47 Part 22, Subpart H**
800 MHz Cellular Base Stations

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, TX
75057-3136

TESTED BY: 

David Light, Senior Wireless Engineer

DATE: 25 February, 2008

APPROVED BY: 

DATE: 26 February, 2008

Total Number of Pages: 28

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Section 1. Summary of Test Results

Manufacturer: AirWalk Communications

Model No.: XCVB 800 MHz

Serial No.: VB0339C

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22, Subpart H.

New Submission

Production Unit

Class II Permissive Change

Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



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This report applies only to the items tested.

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	22.913	Complies
Occupied Bandwidth	Not specified	Complies
Spurious Emissions at Antenna Terminals	22.917	Complies
Field Strength of Spurious Emissions	22.917	Complies
Frequency Stability	22.355	Complies

Footnotes:

Section 2. General Equipment Specification

Frequency Range:	869 - 894 MHz
Necessary Bandwidth:	1.23 MHz
Emission Designator:	1M23F9W
Output Impedance:	50 ohms
RF Power Output (rated):	0.050 mW
Operator Selection of Frequency:	Software Controlled
Power Output Adjustment Capability:	Software Controlled

System Description

XCVB 800 MHz is a CDMA2000 single channel base transceiver station.

System Diagram

Refer to separate exhibit.

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 22.913
TESTED BY: David Light	DATE: 21 February 2008

Test Results: Complies.

Measurement Data:

Frequency (MHz)	Output Power (dBm)	Output Power (W)
869.70	17.7	0.059
885.81	17.8	0.060
893.31	17.7	0.059

Spectrum analyzer settings:

Span: 5 MHz
RBW: 3 MHz
VBW: 5 MHz

Equipment Used: 1036-1082-1469

Measurement Uncertainty: 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1047
TESTED BY: David Light	DATE: 21 February 2008

Test Results: Complies.

Test Data: See attached plots.

Equipment Used: 1082-1036-1469

Measurement Uncertainty: 1x10⁻⁷ ppm

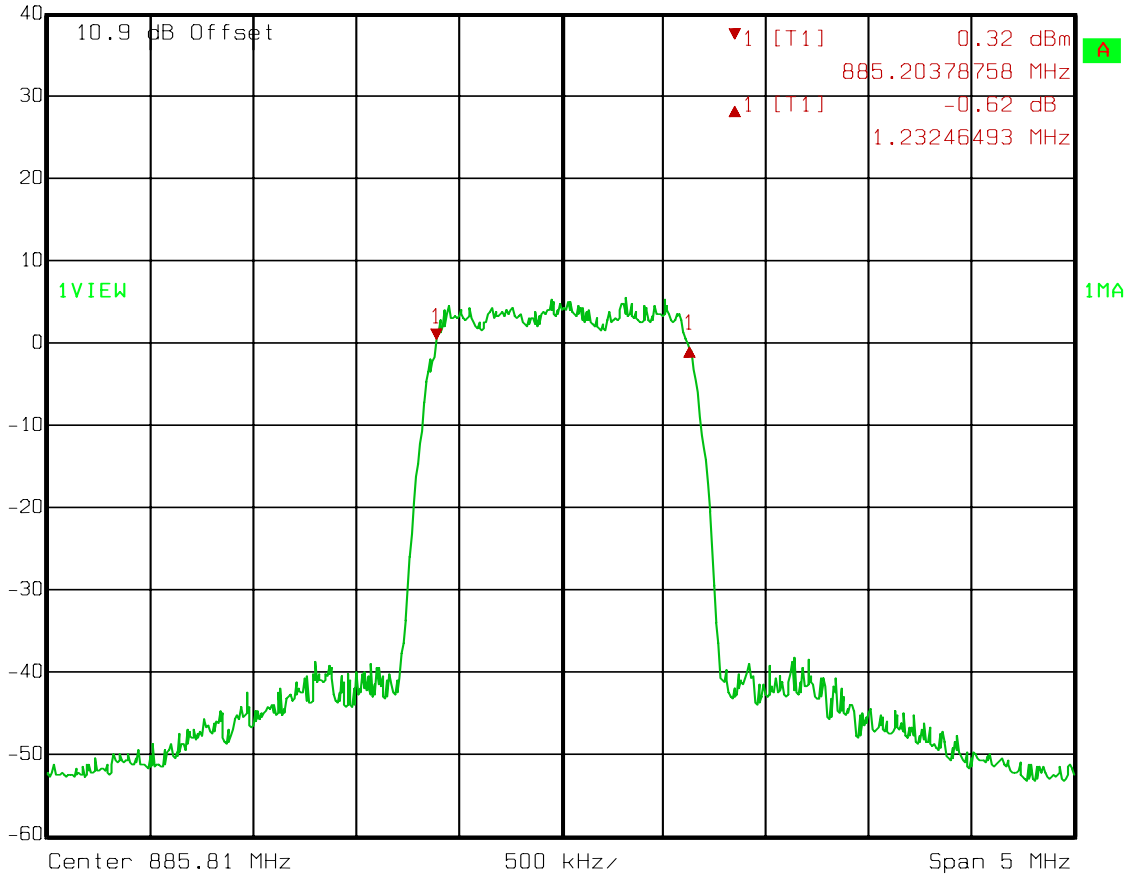
Temperature: 22 °C

Relative Humidity: 35 %

Test Data – Occupied Bandwidth

6 dB Bandwidth

RS	Delta 1 [T1]	RBW	30 kHz	RF Att	40 dB	
	Ref Lvl	-0.62 dB	VBW	30 kHz	Mixer	-10 dBm
	40 dBm	1.23246493 MHz	SWT	14 ms	Unit	dBm

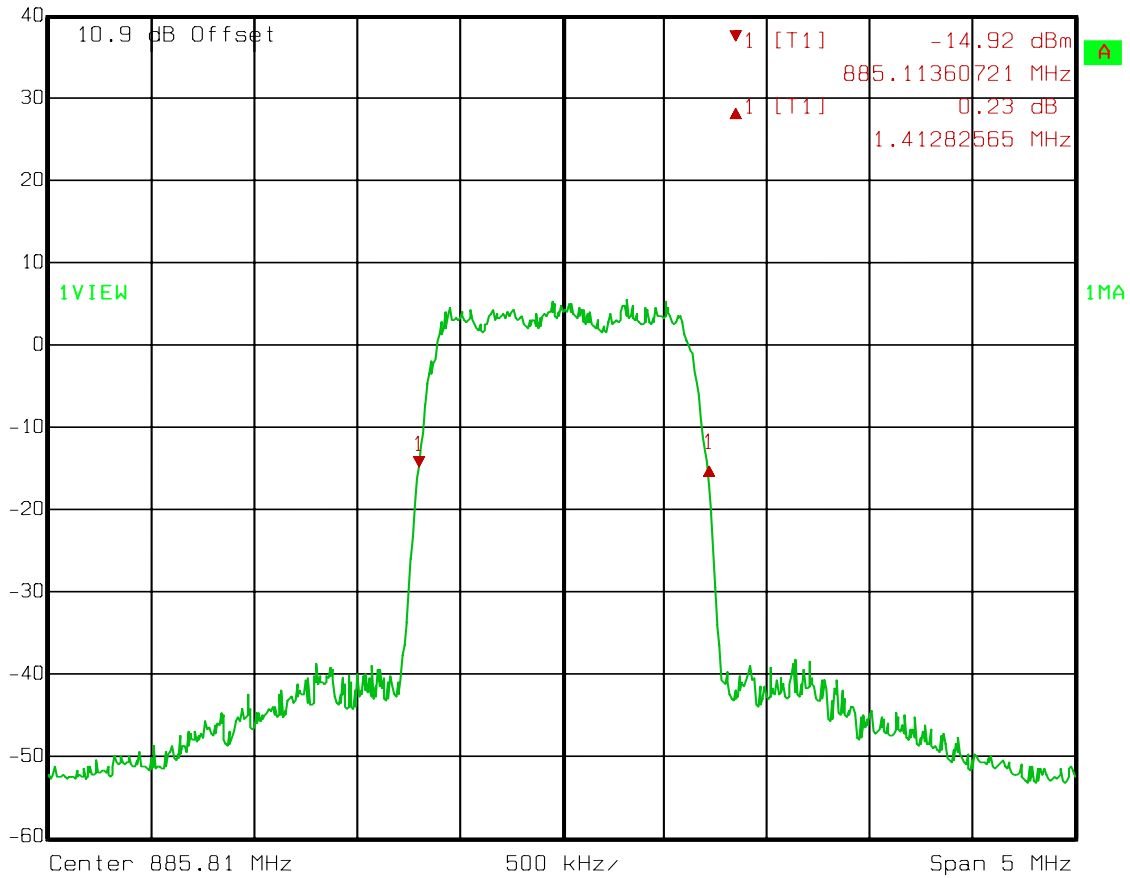


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Test Data – Occupied Bandwidth

20 dB Bandwidth

RS	Delta 1 [T1]	RBW	30 kHz	RF Att	40 dB	
	Ref Lvl	0.23 dB	VBW	30 kHz	Mixer	-10 dBm
	40 dBm	1.41282565 MHz	SWT	14 ms	Unit	dBm



Date: 21.FEB.2008 10:18:24

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 21 Feb. 2008

Test Results: Complies.

Test Data: Refer to plots on following pages

Equipment Used: 1036-1082-1469

Measurement Uncertainty: 1.7 dB

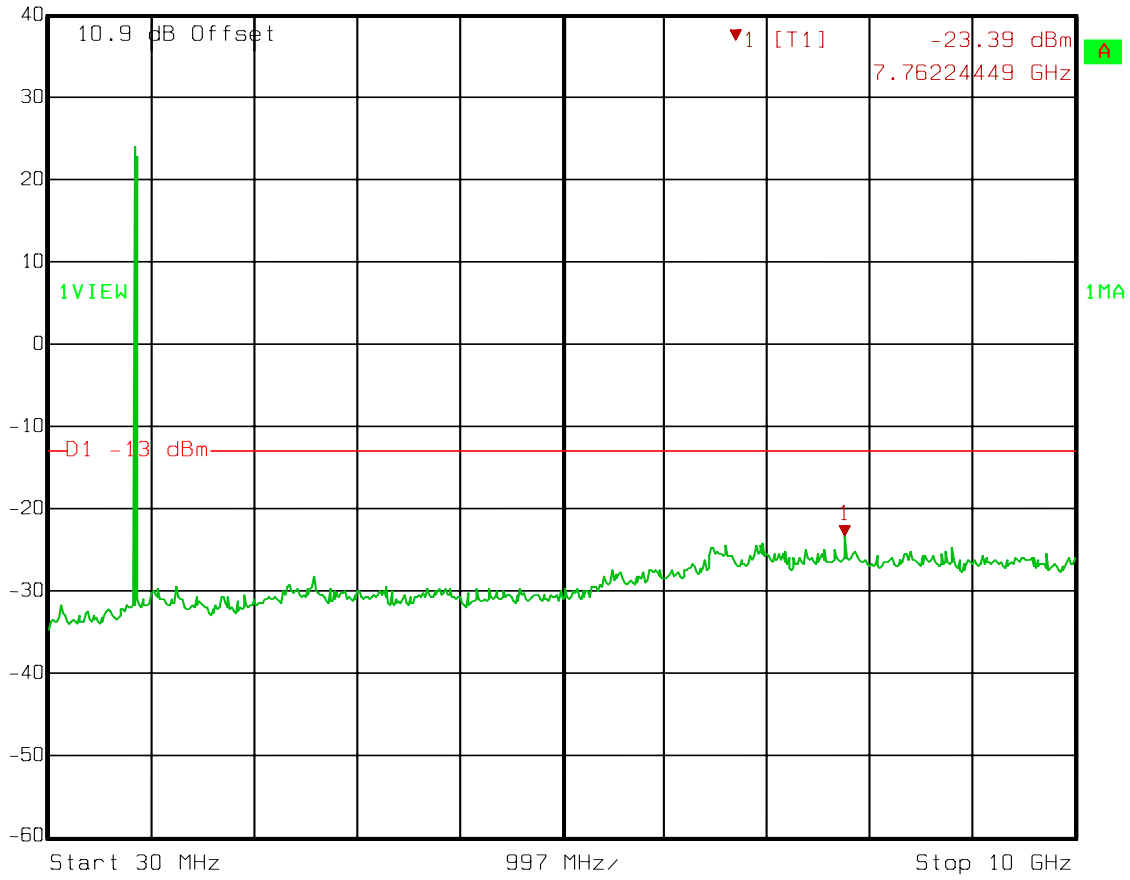
Temperature: 22 °C

Relative Humidity: 35 %

Test Data – Spurious Emissions at Antenna Terminals



Ref Lvl 40 dBm
Marker 1 [T1] -23.39 dBm
7.76224449 GHz
RBW 1 MHz
VBW 1 MHz
SWT 100 ms
RF Att 40 dB
Mixer -10 dBm
Unit dBm



Date: 21.FEB.2008 10:15:17

The noise floor data presented is representative of all channels.

Test Data – Spurious Emissions at Antenna Terminals



Ref Lvl 40 dBm
Marker 1 [T1] 869.00000000 MHz
RBW 30 kHz
VBW 300 kHz
SWT 7 ms
RF Att 40 dB
Mixer -10 dBm
Unit dBm



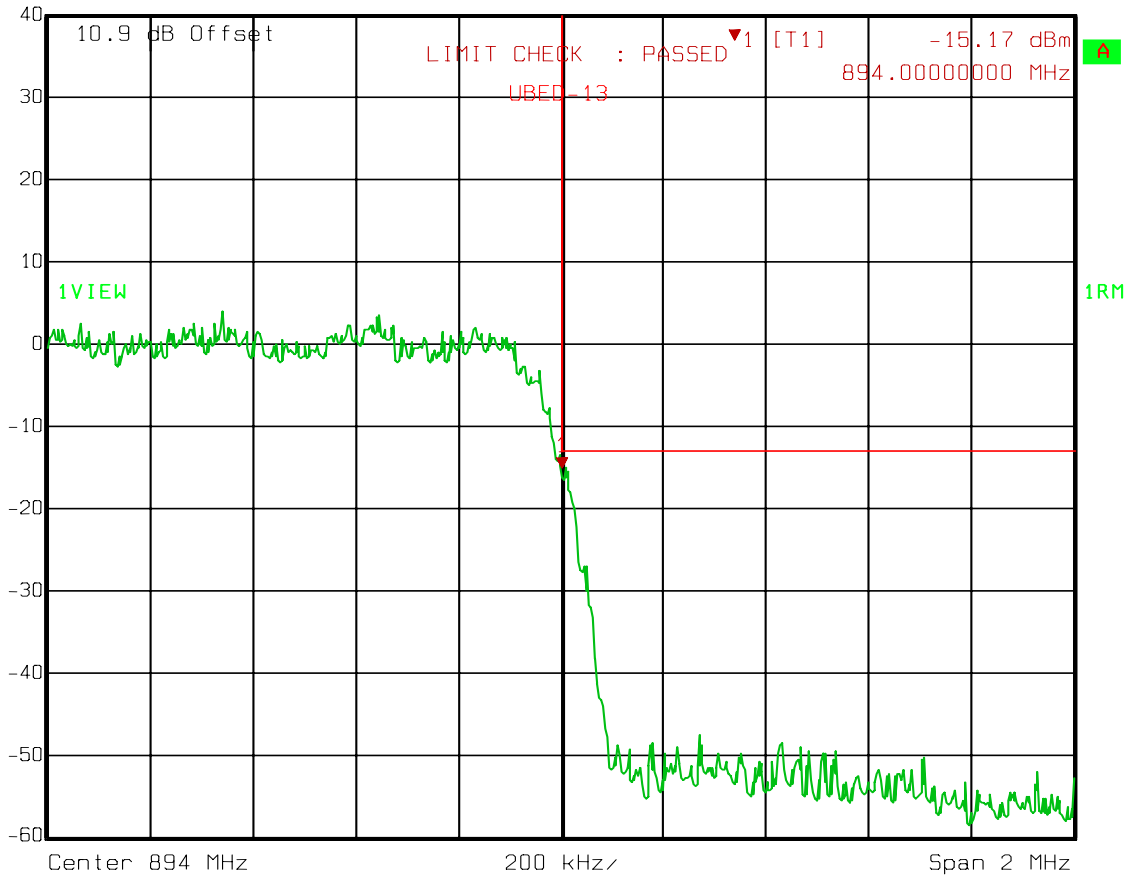
Date: 21.FEB.2008 10:33:17

Channel 1013

Test Data – Spurious Emissions at Antenna Terminals



Ref Lvl 40 dBm
Marker 1 [T1] 894.00000000 MHz
RBW 30 kHz
VBW 300 kHz
SWT 6 ms
RF Att 40 dB
Mixer -10 dBm
Unit dBm



Date: 21.FEB.2008 10:25:26

Channel 777

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 22 February 2008

Test Results: Complies.

Test Data: There were no emissions detected above the noise floor which was at least 20 dB below the specification limit of -13 dBm.

Equipment Used: 1469-1484-1485-1016-993-759-760-791

Measurement Uncertainty: 1.7 dB

Temperature: 21 °C

Relative Humidity: 30 %

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: David Light	DATE: 25 February 2008

Test Results: Complies.

Measurement Data: Standard Test Frequency: 885.81 MHz
Standard Test Voltage: 120 Vac

Equipment Used: 1036-1082-1469-283-619

Measurement Uncertainty: 1x10⁻⁷ ppm

Temperature: 20 °C

Relative Humidity: 29 %

Test Data – Frequency Stability

Temp (°C)	Measured Frequency (MHz)		Test Voltage	Frequency Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	885.809952		120	-48	1328.7	-0.1	
20	885.809952		108.0	-48	1328.7	-0.1	
20	885.809952		132.0	-48	1328.7	-0.1	
50	885.810051		120	51	1328.7	0.1	
40	885.809953		120	-47	1328.7	-0.1	
30	885.809951		120	-49	1328.7	-0.1	
10	885.809939		120.0	-61	1328.7	-0.1	
0	885.809930		120.0	-70	1328.7	-0.1	
-10	885.809915		120.0	-85	1328.7	-0.1	
-20	885.810071		120	71	1328.7	0.1	
-30	885.809928		120	-72	1328.7	-0.1	
Notes:							

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1469	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	05/26/06	05/26/08
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	05/02/07	05/01/08
1485	Cable	Storm PR90-010-216	N/A	05/02/07	05/01/08
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/08
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/01/07	04/30/08
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	03/30/07	03/29/08
760	Antenna biconical	Electro Metrics MFC-25	477	01/19/07	01/19/08
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	NA	NA
619	THERMOMETER	FLUKE 51	4520028	03/01/07	02/29/08

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output

PARA. NO.: 2.1046

Minimum Standard: §22.913 Effective radiated power limits. The effective radiated power (ERP) of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Method Of Measurement:

Detachable Antenna:

The power at antenna terminals is measured using a spectrum analyzer.

Integral Antenna:

Test Method: TIA/EIA-603-1992,

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 2.1049

Minimum Standard: 22.917 Emission limitations for cellular equipment. -
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

NAME OF TEST: Spurious Emission at Antenna Terminals	PARA. NO.: 22.917
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Minimum Standard: 22.917 Emission limitations for cellular equipment. -
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 22.917
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Minimum Standard: 22.917 Emission limitations for cellular equipment. -
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Method: TIA/EIA-603-1992, Section 2.2.12

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

The spectrum is searched to 10 GHz.

NAME OF TEST: Frequency Stability	PARA. NO.: 22.355
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Minimum Standard: Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

Freq. Range (MHz)	Base, fixed	Mobile > 3 W	Mobile ≤ 3 W
821 to 896	1.5 ppm	2.5 ppm	2.5 ppm

Table C-1

Method Of Measurement:

Frequency Stability With Voltage Variation:

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation:

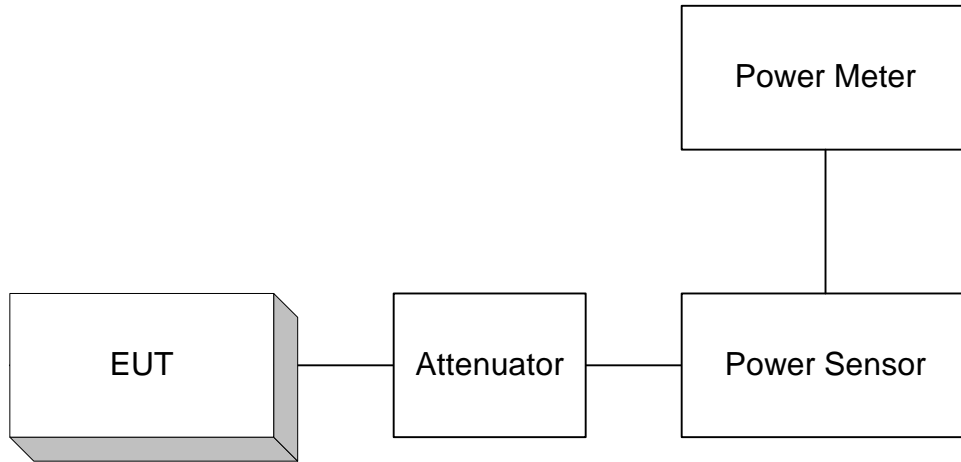
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Devices that operate within a network and use dynamic power and frequency adjustment, the device is placed in call mode using a test set during this testing.

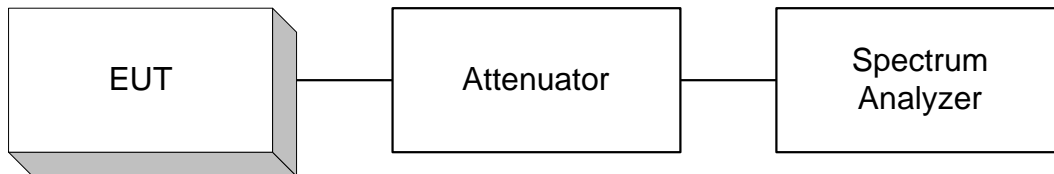
For devices that use complex digital modulation and cannot produce an unmodulated rf signal, the device is placed into call mode with a test set and the frequency error and rho parameters are recorded at each temperature and voltage variation.

ANNEX B - TEST DIAGRAMS

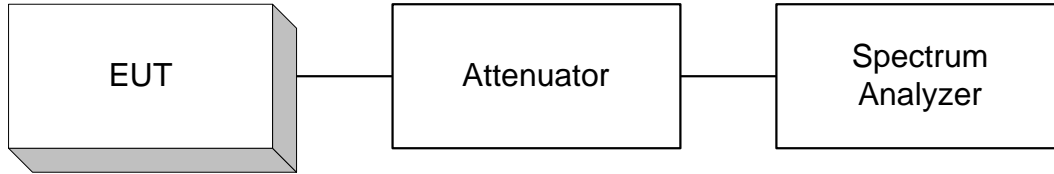
Para. No. 2.985 - R.F. Power Output



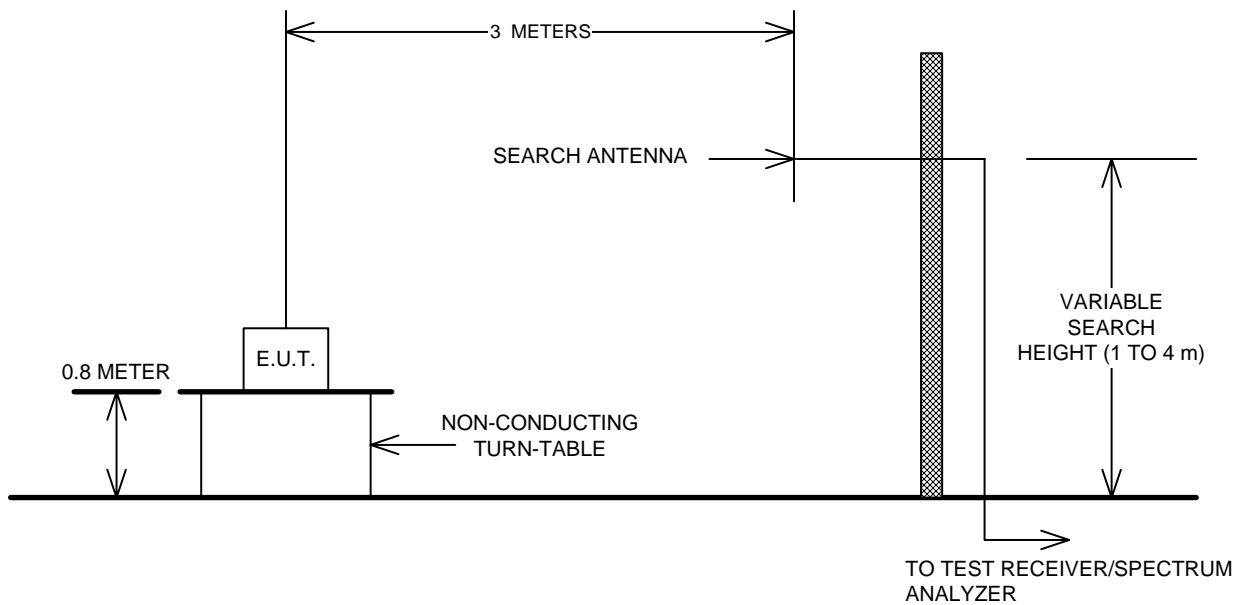
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

