

Nemko Test Report: 5L0053RUS1

Applicant: Enfora, Inc.

Equipment Under Test: LBH0107 Tri-Band Phone
(E.U.T.)

In Accordance With: **FCC Part 24, Subpart E**
Broadband PCS Subscriber Station

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

Authorized By:



Tom Tidwell, Frontline Manager

Date: 7 March 2005

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Section 1. Summary of Test Results

Manufacturer: Enfora, Inc.

Model No.: LBH0107

Serial No.: None

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 24, Subpart E.



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	24.232	Complies
Occupied Bandwidth	24.238	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	NA
Field Strength of Spurious Emissions	24.238(a)	Complies
Frequency Stability	24.235	Complies

Footnotes:

The phone has an integral antenna.

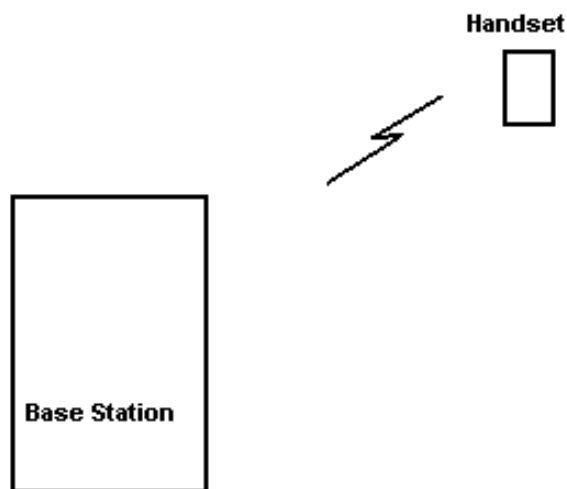
Section 2. General Equipment Specification

Supply Voltage Input:	3.6 Vdc Battery		
Frequency Bands:	☒ Block A : 1850 – 1865 MHz ☒ Block B : 1865 – 1870 MHz ☒ Block C : 1870 – 1885 MHz ☒ Block D : 1885 – 1890 MHz ☒ Block E : 1890 – 1895 MHz ☒ Block F : 1895 – 1910 MHz		
Type of Modulation and Designator:	CDMA (F9W) ☐	GSM (GXW) ☒	NADC (DXW) ☐
Emission Designator:	300KGXW		
Necessary Bandwidth:	300 kHz		
Output Impedance:	50 ohms		
RF Output (Rated):	0.5 W eirp		

System Description

The phone is a tri-band GSM phone operating in the 900 MHz GSM band, 1800 DCS band and 1900 PCS band.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 3-3-05

Test Results: Complies.**Measurement Data:**

Frequency (MHz)	Output Power EIRP (Watts)	Output Power EIRP (dBm)
1850.2	0.275	24.4
1880.2	0.363	25.6
1909.8	0.490	26.9

Note: Measurements were done radiated using the signal substitution method of measurement.

Equipment Used: 1304-1036-1484-1485**Measurement Uncertainty:** +/- 1.7 dB**Temperature:** 22 °C**Relative Humidity:** 45 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1047
TESTED BY: David Light	DATE: 11/10/2004

Test Results: Complies.

Test Data: See attached plots.

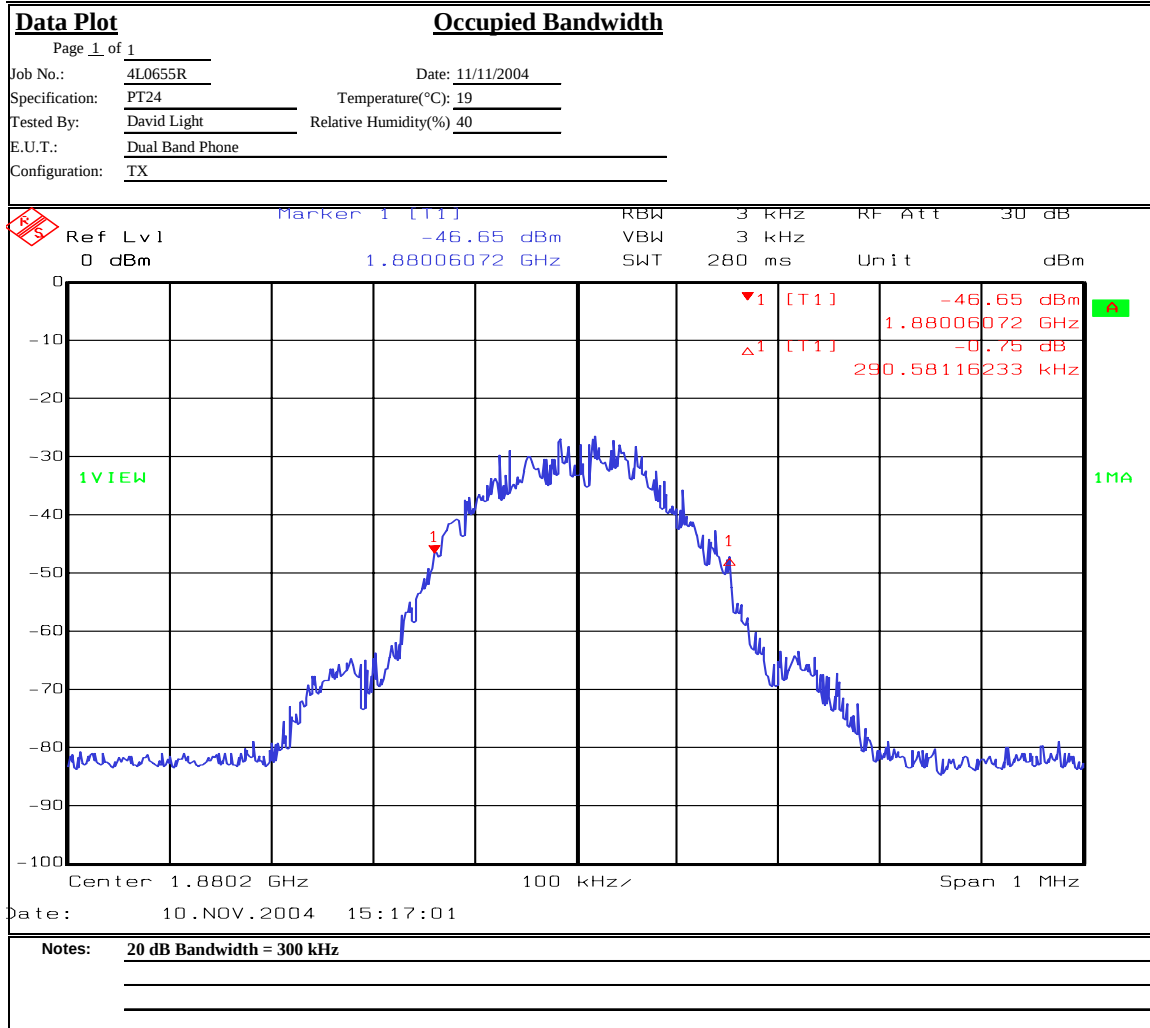
Test Data – Occupied Bandwidth



Dallas Headquarters:

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Tel: (972) 436-9600
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Nemko Dallas, Inc.



Section 5. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1053
TESTED BY: David Light	DATE: 3/3/05

Test Results: Complies.

Test Data: See attached table.

Test Data - Radiated Emissions



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<u>EIRP</u>										
Page <u>1</u> of <u>1</u>		Job No.: <u>5L0053</u>		Date: <u>3/3/05</u>		Complete <u>X</u>				
Specification: <u>PT24</u>		Temperature(°C): <u>22</u>		Relative Humidity(%) <u>45</u>		Preliminary <u> </u>				
Tested By: <u>David Light</u>										
E.U.T.: <u>Tri-band phone</u>										
Configuration: <u>TX</u>										
Sample No: <u>1</u>										
Location: <u>AC 3</u>		RBW: <u>1 MHz</u>		Measurement						
Detector Type: <u>Peak</u>		VBW: <u>1 MHz</u>		Distance: <u>3 m</u>						
Test Equipment Used										
Antenna: <u>1304</u>		Directional Coupler: <u> </u>								
Pre-Amp: <u>1016</u>		Cable #1: <u>1484</u>								
Filter: <u>1482</u>		Cable #2: <u>1485</u>								
Receiver: <u>1036</u>		Cable #3: <u> </u>								
Attenuator #1: <u> </u>		Cable #4: <u> </u>								
Attenuator #2: <u> </u>		Mixer: <u> </u>								
Additional equipment used: <u> </u>										
Measurement Uncertainty: <u>+/-1.7 dB</u>										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
3760.4	-80.0	34.3		0	10.1		-35.5	0.0003	H	
5640.6	-61.0	36.0		32	11.2		-45.8	0.0000	H	
7520.8	-55.0	39.8		32	11.6		-35.6	0.0003	H	
9401	-60.0	41.4		34	12.2		-40.4	0.0001	H	
11281.2	-59.0	44.4		34.6	13.2		-36.0	0.0003	H	
13161.4	-59.0	47.5		34	13.3		-32.2	0.0006	H	
15041.6	-67.0	47.1		32	13.5		-38.4	0.0001	H	
16921.8	-67.0	46.1		33	15.2		-38.7	0.0001	H	
3760.4	-76.0	40.4		0	10.1		-25.5	0.0028	V	
5640.6	-63.0	38.5		32	11.2		-45.3	0.0000	V	
7520.8	-56.0	40.4		32	11.6		-36.0	0.0003	V	
9401	-61.0	39.3		34	12.2		-43.5	0.0000	V	
11281.2	-60.0	42.0		34.6	13.2		-39.4	0.0001	V	
13161.4	-57.0	44.8		34	13.3		-32.9	0.0005	V	
15041.6	-66.0	46.5		32	13.5		-38.0	0.0002	V	
16921.8	-67.0	44.3		33	15.2		-40.5	0.0001	V	
Notes: <u> </u>										

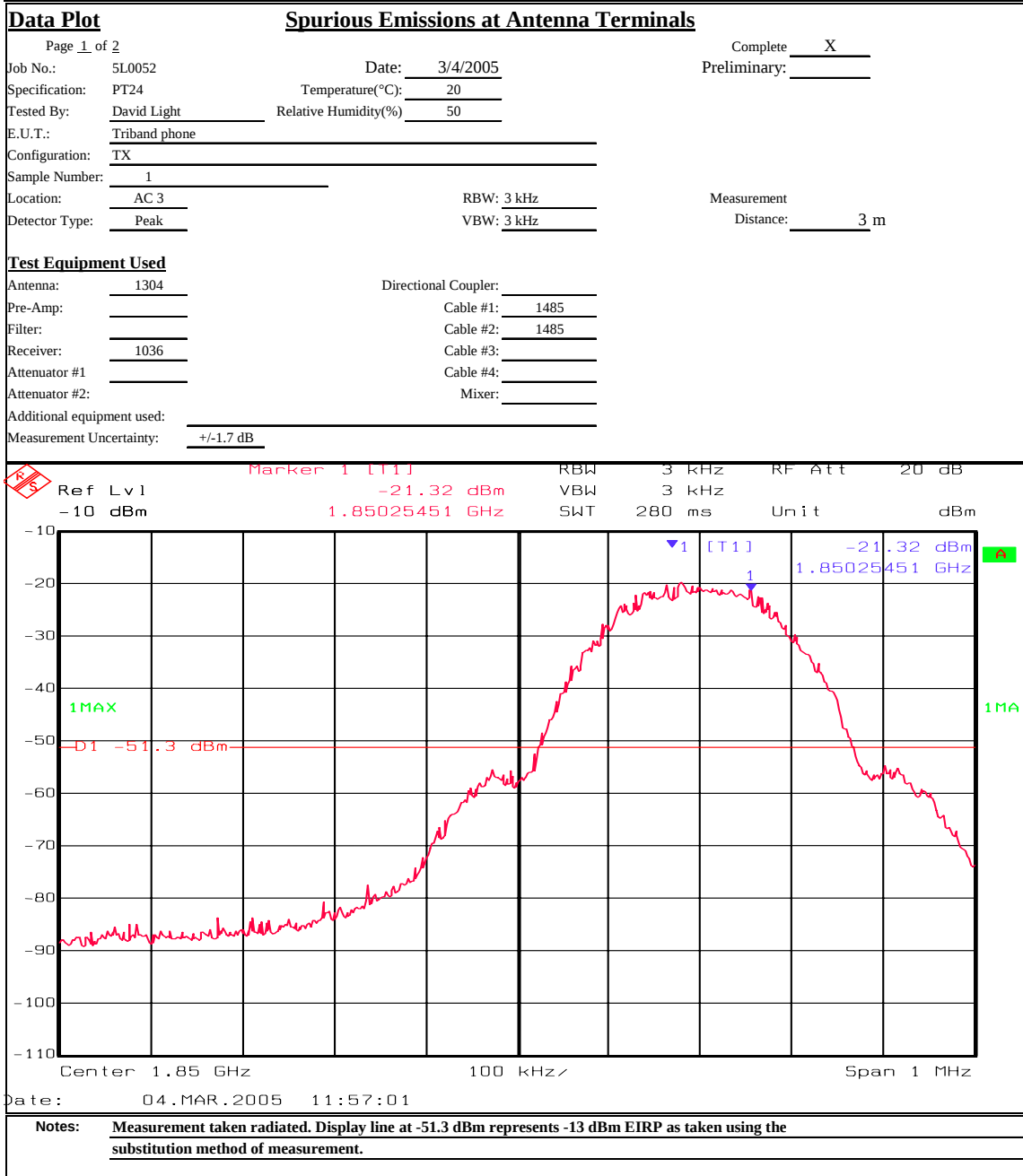
The device was tested on three orthogonal axis' Worse case data is presented.
The device was tested from 30 MHz to the 10th harmonic of the carrier.

Bandedge Plots



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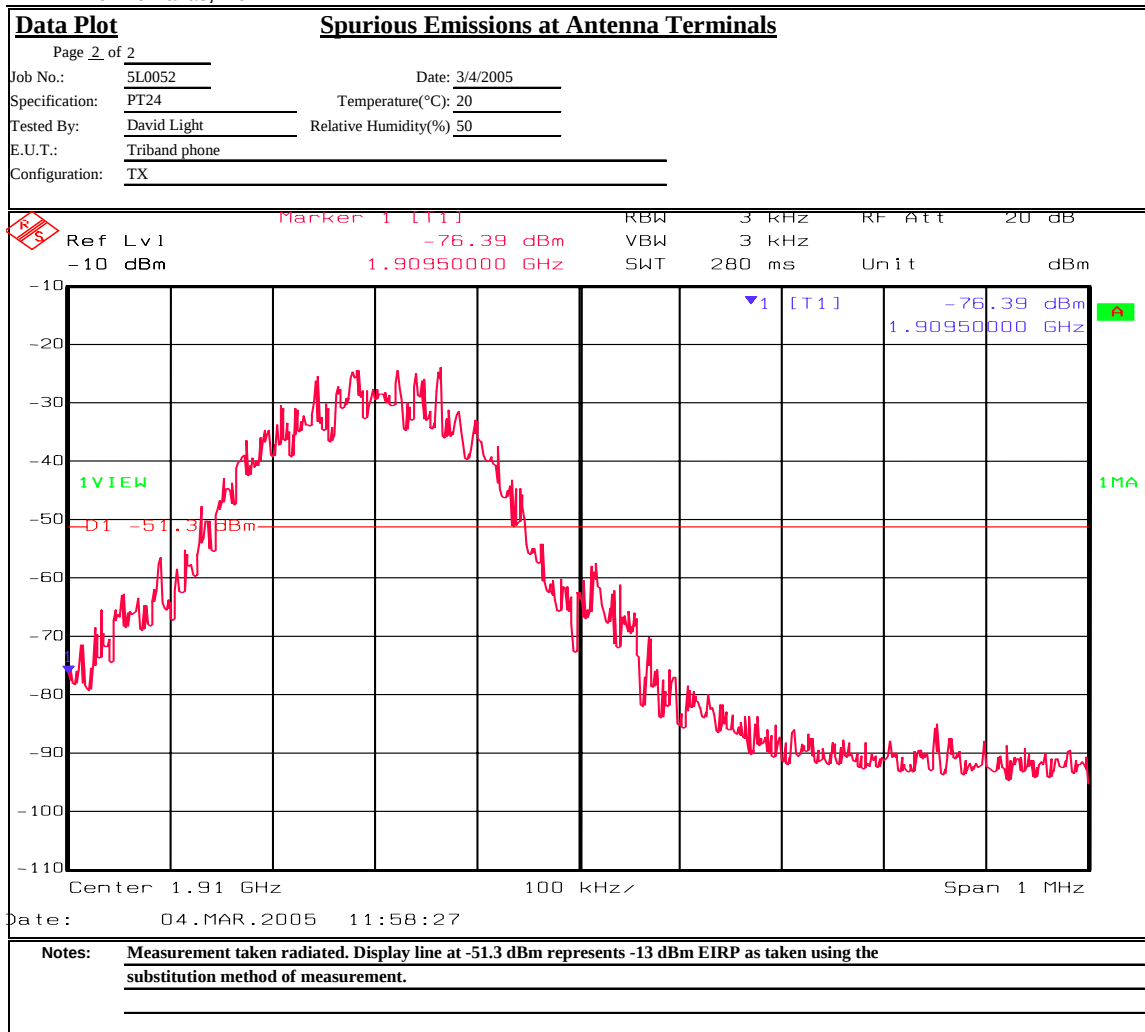
Bandedge Plots



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Photographs of Test Setup



Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY: David Light	DATE: 11/12/04

Test Results: Complies.

Test Data – Frequency Stability



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Frequency StabilityPage 1 of 1

Job No.: 4L0655R Date: 11/12/2004
Specification: PT24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DUAL BAND PHONE
Configuration: TX
Sample Number: 1

Test Equipment Used

Antenna: 1304 Directional Coupler: _____
Pre-Amp: _____ Cable #1: 1629
Filter: _____ Cable #2: _____
Receiver: 1026 Thermometer: 619
Attenuator #1: _____
Attenuator #2: _____

Measurement
Uncertainty: 1x10⁻¹⁷ ppm Standard Test Frequency 1880.267300 MHz

Temp (°C)	Measured Frequency (MHz)	Rho	Test Voltage	Frequency Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	1880.267300	NA	3.6	0	4700.7	0	Fully charged battery
20	1880.268120	NA	4.2	820	4700.7	0.4	Connected to charger
20	1880.267750	NA	3.0	450	4700.7	0.2	Battery cutoff
50	1880.266894	NA		-406	4700.7	-0.2	
40	1880.266894	NA		-406	4700.7	-0.2	
30	1880.268419	NA		1119	4700.7	0.6	
10	1880.270808	NA		3508	4700.7	1.9	
0	1880.270500	NA		3200	4700.7	1.7	
-10	1880.269165	NA		1865	4700.7	1.0	
-20	1880.270700	NA		3400	4700.7	1.8	
-30	1880.267600	NA		300	4700.7	0.2	
Notes:							

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1629	CABLE, 6 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A
1026	FREQUENCY COUNTER	HEWLETT PACKARD 5350B	8232A01493	01/23/04	01/22/05
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	04/22/04	04/21/05
619	THERMOMETER	FLUKE 51	4520028	09/16/04	09/16/05
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	08/26/04	08/26/05
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	08/02/04	08/02/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/04	11/12/05
1481	Microwave Highpass Filter	K & L 3DH1-2000/T8000-0/0	4	Cal B4 Use	N/A
1482	Band Pass Filter	K & L 11SH10-4000/T12000-0/0	2	Cal B4 Use	N/A
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	07/23/04	07/23/05
791	PREAMP, 25dB	ICC LNA25	398	11/12/04	11/12/05
1983	CABLE	KTL Site A OATS	N/A	03/11/04	03/11/05
760	Antenna biconical	Electro Metrics MFC-25	477	06/22/04	06/22/05

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output**PARA. NO.: 2.1046**

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement: CDMA Per ANSI/J-STD-008
TDMA Per ANSI/J-STD-010
PCS 1900 Per ANSI/J-STD-007

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer.

Integral Antenna:

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.

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 2.1049

Minimum Standard: Para. No. 24.238(b). 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.

Method Of Measurement:

CDMA Per ANSI/J-STD-008

Spectrum analyzer settings:

RBW: 30 kHz

VBW: $\geq$ RBW

Span: 5 MHz

Sweep: Auto

GSM Per ANSI/J-STD-007

RBW: 3 kHz

VBW: $\geq$ RBW

Span: 2 MHz

Sweep: Auto

NADC Per IS-136

RBW: 1 kHz

VBW: $\geq$ RBW

Span: 1 MHz

Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals	PARA. NO.: 2.1051
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Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA Per ANSI/J-STD-008

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 20 kHz (< 1MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM Per ANSI/J-STD-007

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: Disabled

NADC Per IS-136

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 1 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053
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Minimum Standard:

Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by 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.

NAME OF TEST: Frequency Stability**PARA. NO.: 2.1055**

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement: CDMA Per ANSI/J-STD-008
TDMA Per ANSI/J-STD-007
NADC Per IS-136

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

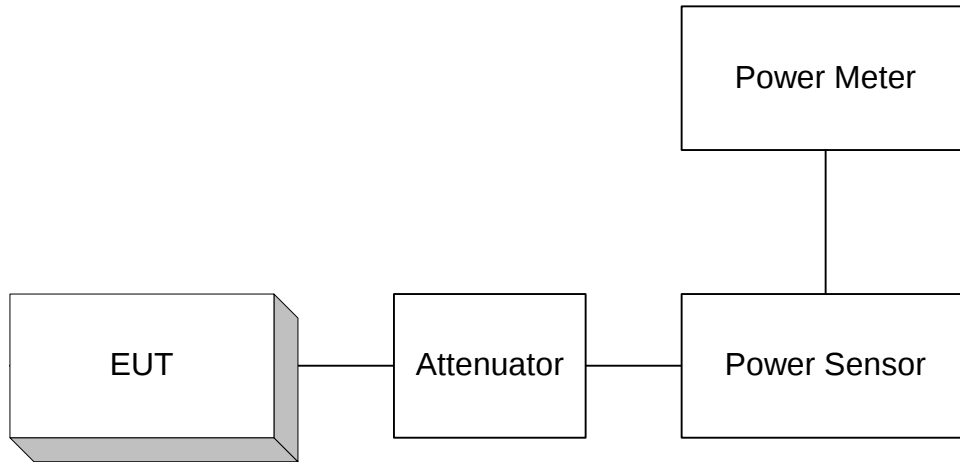
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Digitally Modulated Signals

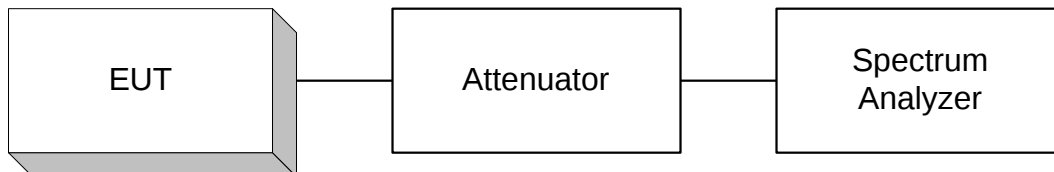
Equipment that produces a digitally modulated carrier is tested using a vector modulation analyzer. Frequency accuracy and rho are measured over the specified environmental extremes.

ANNEX B - TEST DIAGRAMS

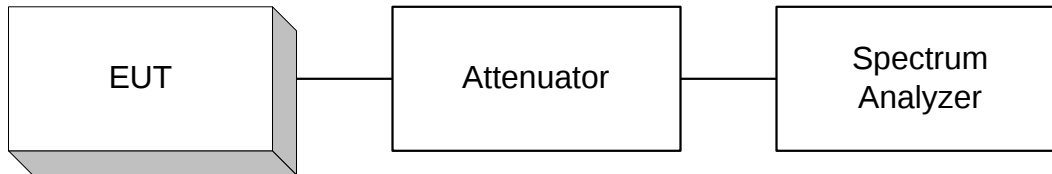
Para. No. 2.985 - R.F. Power Output



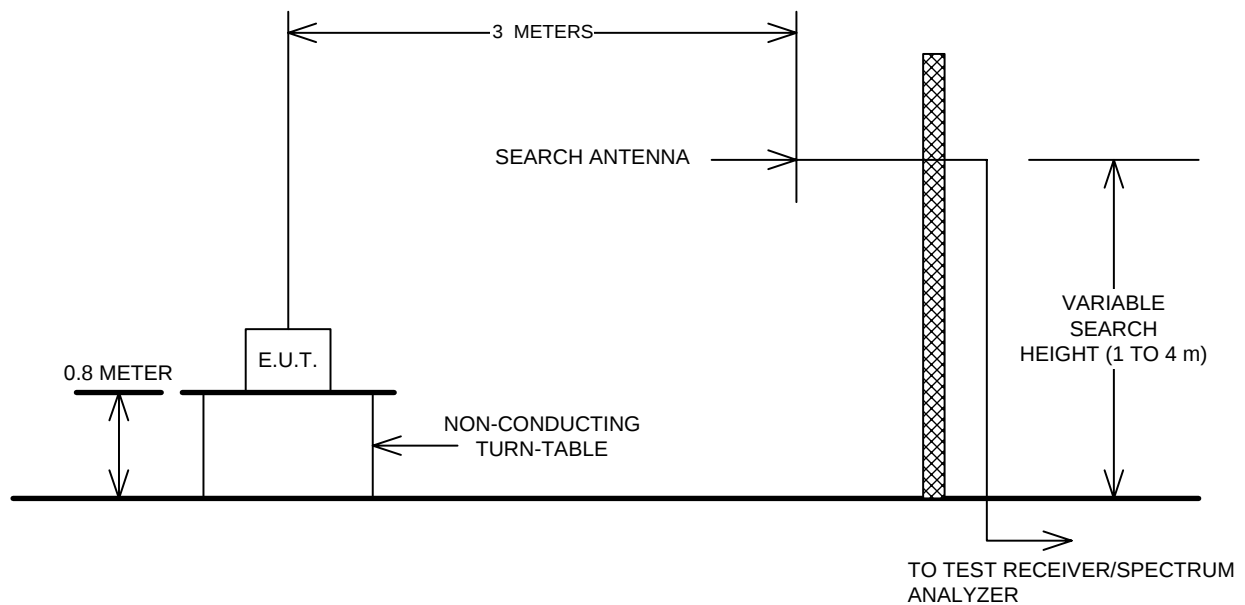
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

