Nemko Test Report:	4L0194RUS4REV1
Applicant:	Enfora, Inc. 661 E. 18th Street Plano, TX 75074
Equipment Under Test: (E.U.T.)	GSM0110
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:	 Dustin Oaks, Engineer
Date:	4/08/2005

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Section 1. Summary of Test Results

Manufacturer: Enfora, Inc.

Model No.: GSM0110

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. NONE
See " Summary of Test Data".

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	24.232	Complies
Occupied Bandwidth (GSM)	24.238	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	*Complies
Field Strength of Spurious Emissions	24.238(a)	*Complies
Frequency Stability	24.235	Complies

Footnotes:

The conducted data presented in this test report was originally taken in April 2004. Radiated measurements were repeated as the only change was antenna redeisign.

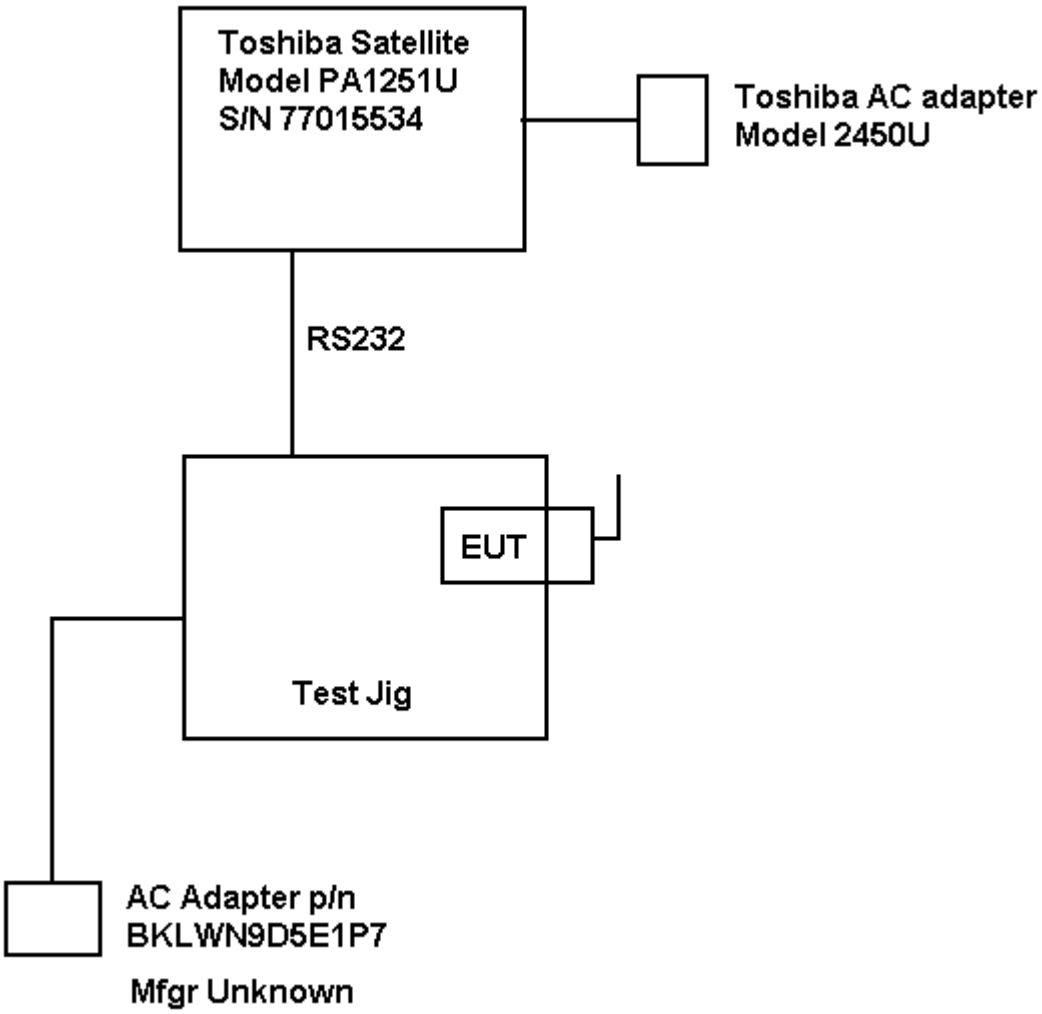
Section 2. General Equipment Specification

Supply Voltage Input:	3.6 Vdc
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:	300KG7W
Necessary Bandwidth:	300 kHz
Output Impedance:	50 ohms
RF Output (Rated):	2 W (e.i.r.p.)

System Description

This device is a wireless PCMCIA GSM/GPRS wireless modem that operates in the PCS band and in the 800 MHz Cellular band.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 3/11/05

Test Results: Complies.

Measurement Data:

Antenna Conducted:

Modulation Type	Power Level	Output Power (dBm)	Output Power (W)
GSM	PL0	28	0.63

Unit has no provisions for conducted measurements, values based on manufacturers settings. PL0 is the setting to produce the maximum output power.

Test Data – EIRP (Radiated)

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

EIRP Substitution Method

Page 1 of 2 — Complete X

Job No.: 4L0194 — Date: 3/11/05 — Preliminary

Specification: PT 24 — Temperature(°C): 24

Tested By: David Light — Relative Humidity(%) 35

E.U.T.: Orion

Configuration: Tx full power at 1880.2 MHz

Sample No: 1

Location: AC 3 — RBW: 300 kHz — Measurement

Detector Type: Peak — VBW: 300 kHz — Distance: 3 m

Test Equipment Used

Antenna: 1304 — Directional Coupler:

Pre-Amp: 1016 — Cable #1: 1484

Filter: 1482 — Cable #2: 1485

Receiver: 1464 — Cable #3:

Attenuator #1 — Cable #4:

Attenuator #2: — Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
1880.2	-11.7	31.0		0	9.4		28.7	741.3	V	
1880.2	-11.8	33.0		0	9.4		30.6	1148.2	H	
1909.8	-12.3	31.0		0	9.4		28.1	645.7	V	
1909.8	-13.0	33.0		0	9.4		29.4	871.0	H	
1880.2	-14.0	31.0		0	9.4		26.4	436.5	V	
1880.2	-11.0	33.0		0	9.4		31.4	1380.4	H	

Notes:

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (GSM)	PARA. NO.: 2.1047
TESTED BY: David Light	DATE: 4/14/04

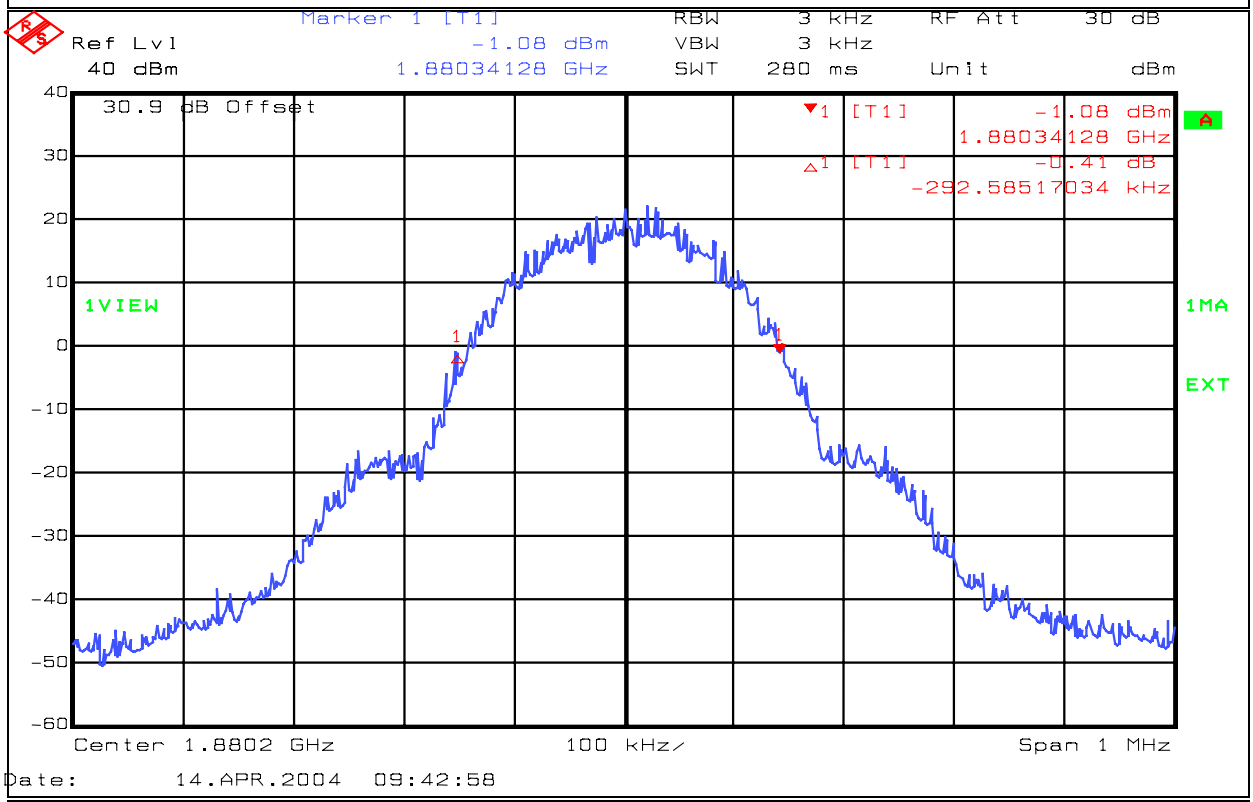
Test Results: Complies.

Test Data: See attached plots.

Test Plot: **Occupied Bandwidth**

Page 4 of 4

Job No.:	4L0194	Date:	4/14/2004
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	ORION		
Configuration:	TX FULL POWER		



Notes:
Occupied 26 dB Bandwidth
Center channel
Tx 29.2 dBm

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 4/14/04

Test Results: Complies.

Test Data:

NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-23
Lower Band Edge	-18
Upper Band Edge	-18

Test Data – Spurious Emissions at Antenna Terminals

Data Plot **Spurious Emissions at Antenna Terminals**

Page 1 of 4

Complete X

Job No.: 4L0194 Date: 4/14/2004 Preliminary:

Specification: PT 24 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: ORION

Configuration: TX FULL POWER

Sample Number: 1

Location: Lab 1 RBW: Refer to plots Measurement

Detector Type: Peak VBW: Refer to plots Distance: NA m

Test Equipment Used

Antenna: Directional Coupler:

Pre-Amp: Cable #1: 1626

Filter: Cable #2:

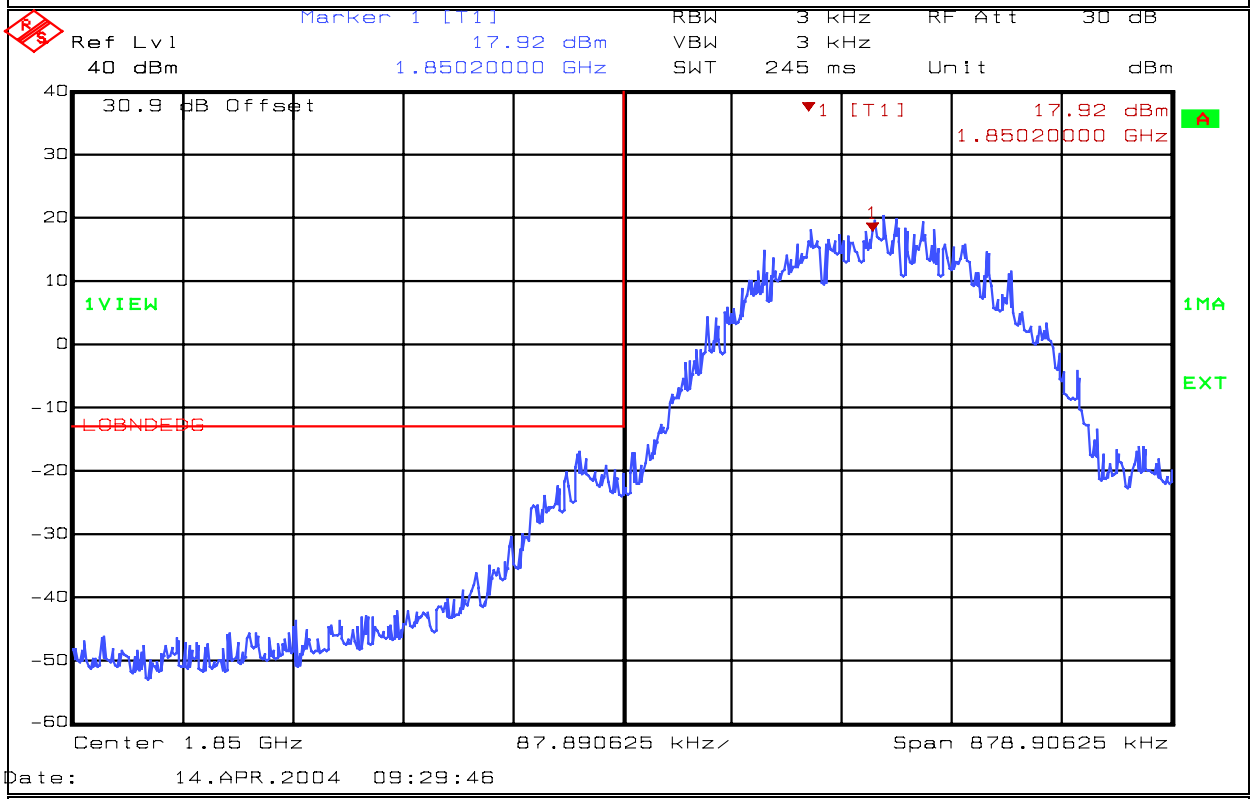
Receiver: 1036 Cable #3:

Attenuator #1 1467 Cable #4:

Attenuator #2: 1478 Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **Lower band edge - Tx 1850.2 MHz - Lowest channel**

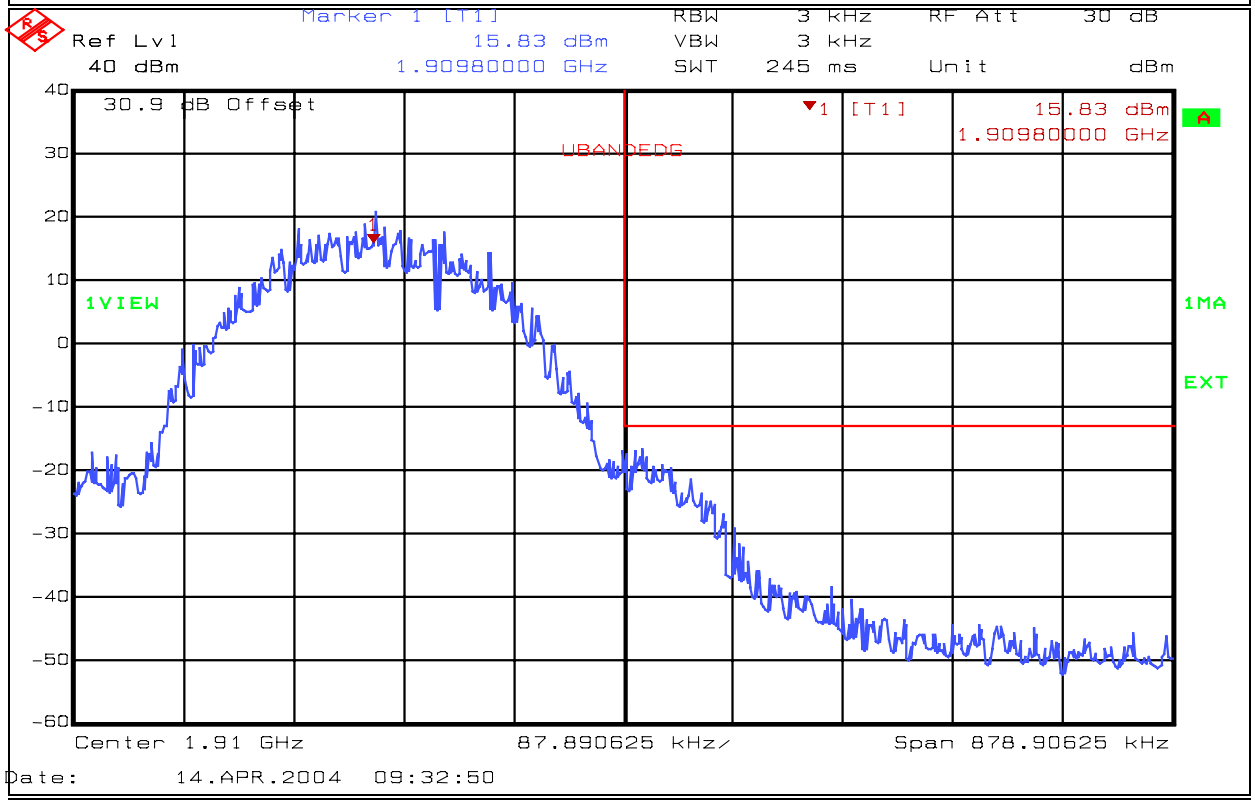
Tx at 28.9 dBm

Test Data – Spurious Emissions at Antenna Terminals

Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 4

Job No.:	4L0194	Date:	4/14/2004
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	ORION		
Configuration:	TX FULL POWER		



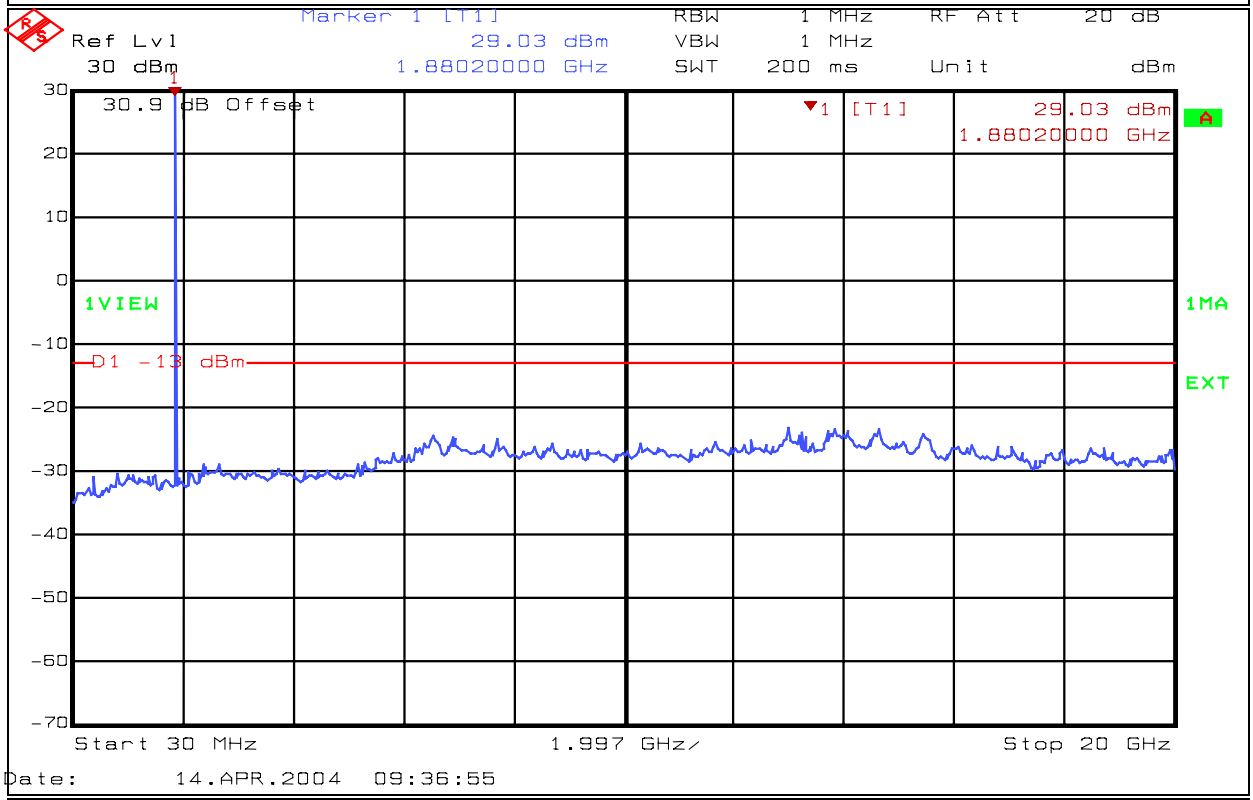
Notes: **Upper band edge - Tx 1909.8 MHz - Highest Channel**
Tx 29.1 dBm

Test Data – Spurious Emissions at Antenna Terminals

Data Plot **Spurious Emissions at Antenna Terminals**

Page 3 of 4

Job No.:	4L0194	Date:	4/14/2004
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	ORION		
Configuration:	TX FULL POWER		



Notes: **Marker indicates carrier at 1880.2 MHz**
Tx 29.2 dBm

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1053
TESTED BY: David Light	DATE: 3/11/05

Test Results: Complies.

Test Data: See attached table.

Test Data - Radiated Emissions

Field Strength of Spurious Emissions

Page 1 of 2 — Complete X

Job No.: 4L0194 — Date: 3/11/05 — Preliminary

Specification: PT 24 — Temperature(°C): 24

Tested By: David Light — Relative Humidity(%) 35

E.U.T.: Orion

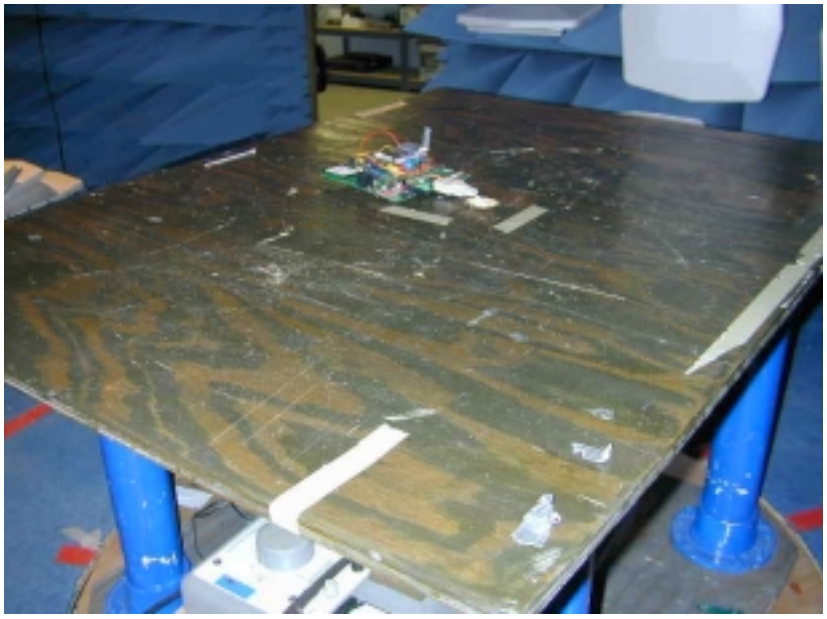
Configuration: Tx full power at 1880.2 MHz

Sample No: 1

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3760.4	-71.0	35.5		0	10.7	-13	-24.8	0.0033	H	Noise Floor
5640.6	-68.0	37.8		33	11.4	-13	-51.8	0.0000	H	
7520.8	-57.0	41.5		32.5	11.3	-13	-36.7	0.0002	H	
9401	-71.0	42.3		34.5	11.7	-13	-51.5	0.0000	H	Noise Floor
11281.2	-67.0	47.0		34.6	12.5	-13	-42.1	0.0001	H	
13161.4	-72.0	47.8		35.3	11.9	-13	-47.6	0.0000	H	Noise Floor
15041.6	-72.0	47.7		32.7	12.8	-13	-44.2	0.0000	H	Noise Floor
16921.8	-71.0	49.3		33.3	14.5	-13	-40.5	0.0001	H	Noise Floor
3760.4	-75.0	43.3		0	10.7	-13	-21.0	0.0080	V	
5640.6	-60.0	39.8		33	11.4	-13	-41.8	0.0001	V	
7520.8	-62.0	41.8		32.5	11.3	-13	-41.4	0.0001	V	
9401	-71.0	41.3		34.5	11.7	-13	-52.5	0.0000	V	Noise Floor
11281.2	-62.0	43.7		34.6	12.5	-13	-40.4	0.0001	V	
13161.4	-71.0	45.8		35.3	11.9	-13	-48.6	0.0000	V	Noise Floor
15041.6	-72.0	45.2		32.7	12.8	-13	-46.7	0.0000	V	Noise Floor
16921.8	-71.0	46.0		33.3	14.5	-13	-43.8	0.0000	V	Noise Floor

Notes:

Photographs of Test Setup



Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY: David Light	DATE: 4/15/04

Test Results: Complies.

Measurement Data: Standard Test Frequency: 1880.252740 MHz
Standard Test Voltage: 3.6 Vdc

Test Data – Frequency Stability

Frequency Stability

Page 1 of 1

Job No.: 4L0194 Date: 4/15/2004

Specification: PT 24 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: Orion

Configuration: Tx at center band

Sample Number: 1

Test Equipment Used

Antenna: #N/A Directional Coupler:

Pre-Amp: #N/A Cable #1: 1626

Filter: #N/A Cable #2:

Receiver: 1026

Attenuator #1 1478

Attenuator #2: #N/A

Measurement Uncertainty: $1x10^{-17}$ppm **Standard Test Frequency 1880.252740 MHz**

Temp (°C)	Measured Frequency (MHz)		Test Voltage	Freqeuncy Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	1880.252740		3.6	0	4700.6	0.0	
20	1880.252700		3.06	-40	4700.6	0.0	
20	1880.252715		4.14	-25	4700.6	0.0	
50	1880.252090		3.6	-650	4700.6	-0.3	
40	1880.251250		3.6	-1490	4700.6	-0.8	
30	1880.252960		3.6	220	4700.6	0.1	
10	1880.248990		3.6	-3750	4700.6	-2.0	
0	1880.250300		3.6	-2440	4700.6	-1.3	
-10	1880.249873		3.6	-2867	4700.6	-1.5	
-20	1880.255500		3.6	2760	4700.6	1.5	
-30	1880.251746		3.6	-994	4700.6	-0.5	

Notes:

Section 8. Test Equipment List

April 2004

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1467	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1478	20db Attenuator DC 18 Ghz	MCL Inc. BW-S20W6	NONE	CBU	N/A
1626	CABLE, 5 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/29/04	03/29/06
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/24/03	07/23/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/23/04
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	02/11/03	02/11/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	04/22/03	04/21/04
1026	FREQUENCY COUNTER	HEWLETT PACKARD 5350B	8232A01493	01/23/04	01/22/05

March 2005

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
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
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/04	11/12/05
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
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
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	07/23/04	07/23/05
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: ≥ RBW
Span: 5 MHz
Sweep: Auto

GSM Per ANSI/J-STD-007

RBW: 3 kHz
VBW: ≥ RBW
Span: 2 MHz
Sweep: Auto

NADC Per IS-136

RBW: 1 kHz
VBW: ≥ RBW
Span: 1 MHz
Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

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: ≥ 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: ≥ 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: ≥ 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

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

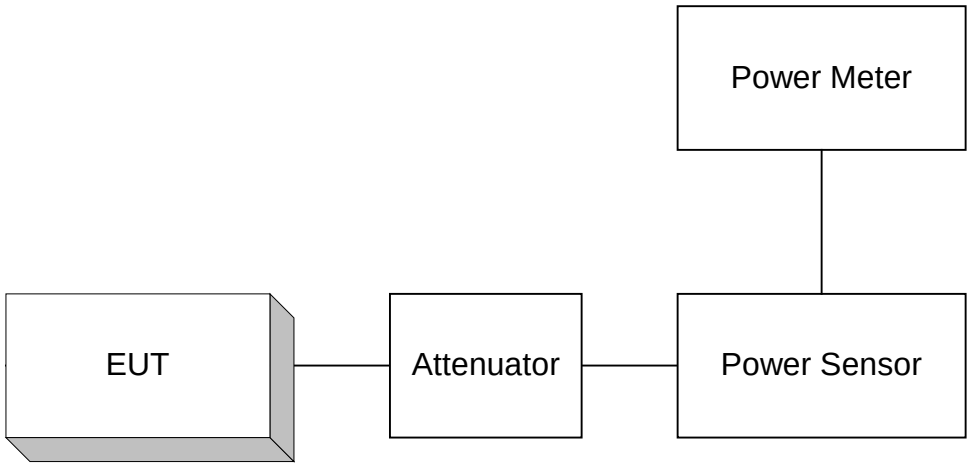
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Digitally Modulated Signals

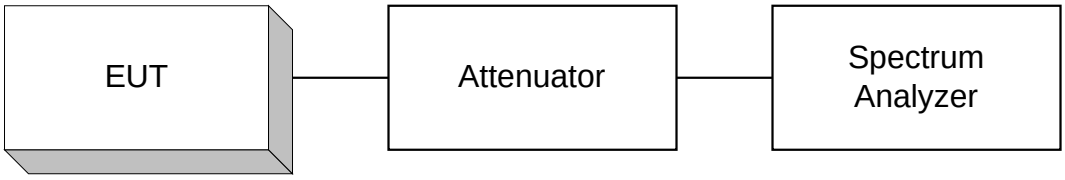
Equipment that produces a digitally modulated carrier is tested using a vector modulation analyzer. Frequency accuracy and rho are measured over the specified environmental extremes.

ANNEX B - TEST DIAGRAMS

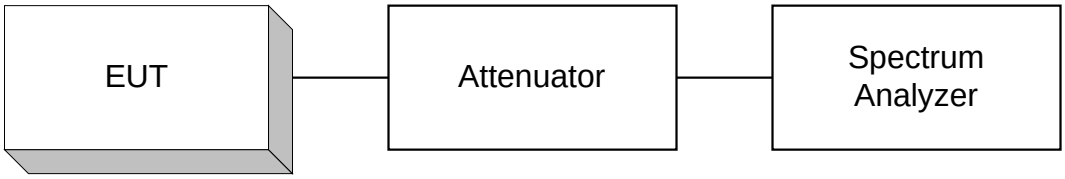
Para. No. 2.985 - R.F. Power Output



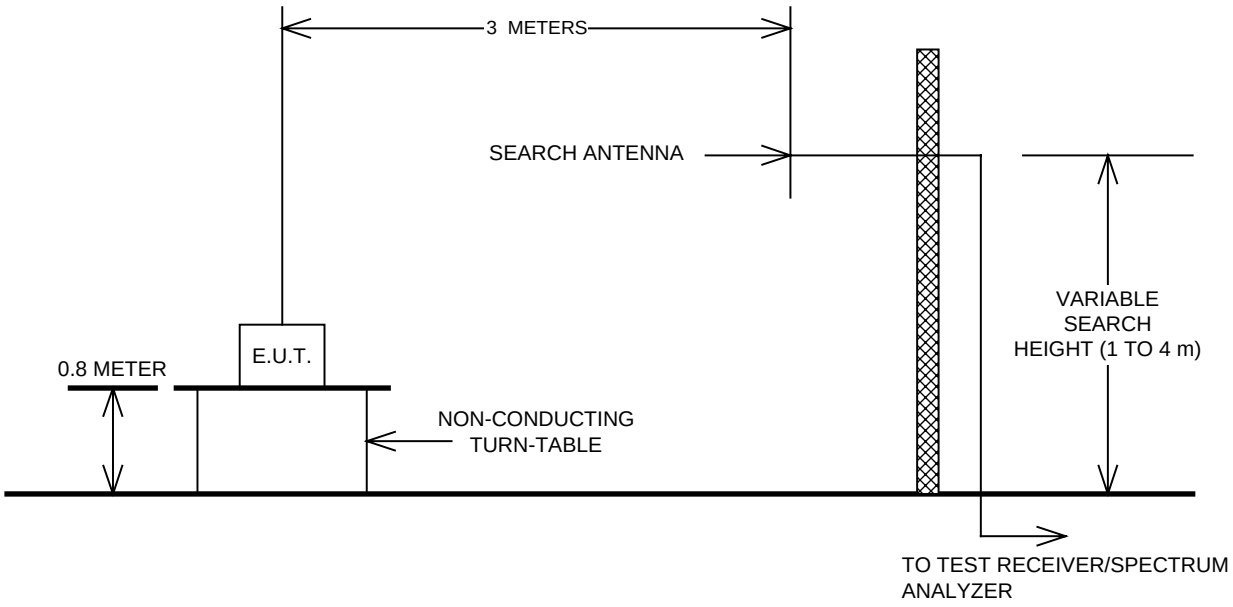
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability