Nemko Test Report No.:	4L0194RUS3REV1
Applicant:	Enfora, Inc. 661 E. 18 th Street Plano, TX 75074
Equipment Under Test:	GSM0110
In Accordance With:	FCC Part 22, Subpart H 800 MHz Cellular Subscriber Units
Tested By:	Nemko Dallas Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	Dustin Oaks, Engineer

Date:

4/08/2005

Table of Contents

Section 1.	Summary of Test Results	3
Section 2.	General Equipment Specification	5
Section 3.	RF Power Output	7
Section 4.	Occupied Bandwidth	9
Section 5.	Spurious Emissions at Antenna Terminals1	0
Section 6.	Field Strength of Spurious1	4
Section 7.	Frequency Stability 1	7
Section 8.	Test Equipment List 1	9
ANNEX A - T	EST DETAILS 2	20
ANNEX B - T	EST DIAGRAMS	0

Section 1.	Summary of Test Results
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 22, Subpart H.

\boxtimes	New Submission		Production Unit
	Class II Permissive Change	\square	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".

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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	2.1046	*Complies
Audio Frequency Response	2.1047	NA
Audio Low Pass Filter Response	2.1047	NA
Modulation Limiting	2.1047	NA
Occupied Bandwidth (GSM)	2.1049	Complies
Spurious Emissions at Antenna Terminals	2.1051	Complies
Field Strength of Spurious Emissions	2.1053	*Complies
Frequency Stability	2.1055	Complies

Footnotes:

The device is GSM/GPRS only.

Radiated Measurements redone due to a redesign of antenna. Conducted measurements were originally taken in April 2004

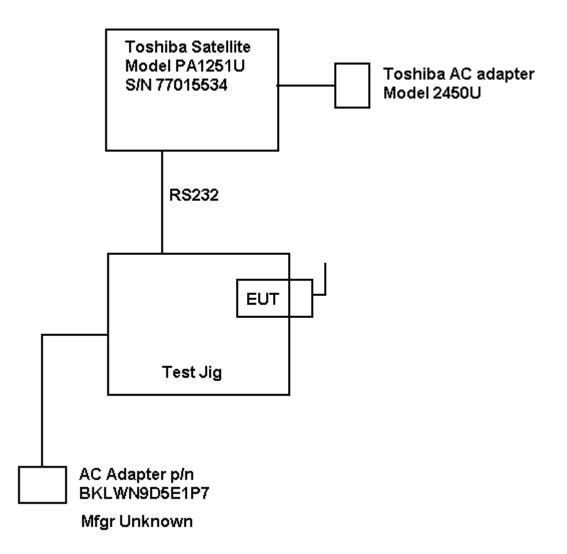
Section 2. General Equipment Specification

Frequency Range:	824.2 to 848.8 MHz
Tunable Bands:	824.2 to 848.8 MHz
Necessary Bandwidth:	300 kHz
Emission Designator:	300KG7W
Output Impedance:	50 ohms
Operator Selection of Frequency:	Software Controlled
Power Output Adjustment Capability:	Software Controlled

Operational 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	Power Level	Output Power	Output Power
Type		(dBm)	(W)
GSM	PL5	31	1.26

Unit has no provisions for conducted measurements, values based on manufacturers settings. PL5 is the setting to produce the maximum output power.

FCC PART 22, SUBPART H 800 MHz CELLULAR SUBSCRIBER UNITS TEST REPORT NO.: 4L0194RUS3

Test Data – RF Power Output (ERP)

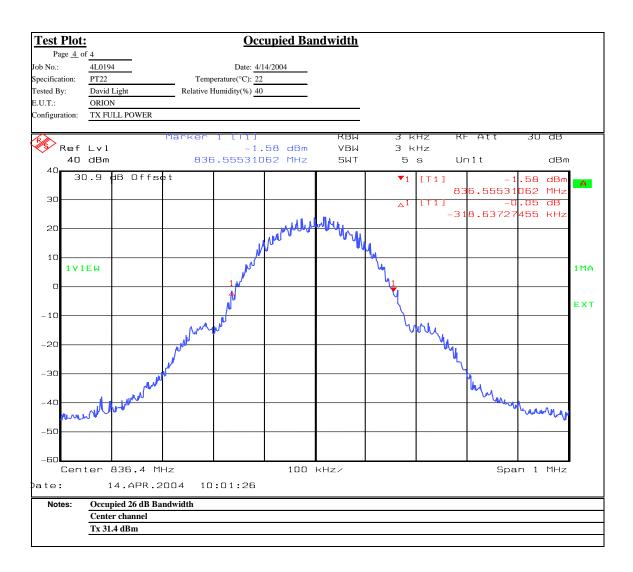
) R			0			Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667					
					E	RP						
Page <u>1</u> o	of <u>2</u>							Complete	Х			
Job No.:	4L0194			Date:	3/11/05			Preliminary				
Specification:	PT 22			erature(°C):								
Tested By:	David Light		Relative H	lumidity(%)	35							
E.U.T.:	ORION											
Configuration:	TX FULL P	OWER										
Sample No:	1											
Location:	AC 3				RBW:	1 MHz		Measurement				
Detector Type:	Peak				VBW:	1 MHz		Distance:	3	m		
Test Equipm	ent Used											
Antenna:	1304			D	irectional Coupler:							
Pre-Amp:	1016			D	Cable #1:	1484						
Filter:	1481				Cable #2:							
Receiver:	1464				-	1105						
Attenuator #1		•										
Attenuator #2:					Mixer:							
Additional equip	ment used:				-							
Measurement U		+/1.7 dB	_									
Frequency	Meter	Correction		Pre-Amp	Substitution		ERP	ERP	Polarity	Comments		
	Reading	Factor		Gain	Antenna Gain							
(MHz)	(dBm)	(dB)		(dB)	(dBd)		(dBm)	(mW)				
836.6	-12.7	32.3		0	0.5		20.1	103.28	V			
836.6	-6.8	32.3		0	0.5		26.0	399.02	Н			
824.2	-11.5	32.3		0	0.5		21.3	136.14	v			
824.2	-6.7	32.3		0	0.5		26.1	408.32	, H			
02112	0.7			v	0.0		20.1	100.02				
848.8	-11.8	32.3		0	0.5		21.0	127.06	V			
848.8	-5.2	32.3		0	0.5		27.6	576.77	Н			
2.010				0					-			
				-								
Notes	:	-	· · · ·					- -		-		

Section 4. Occupied Bandwidth

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1047
TESTED BY: David Light	DATE: 4/14/04

Test Results: Complies.

Measurement Data: See attached table.



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions at Antenna Terminals PARA. NO.: 2.1053

TESTED BY: David Light

DATE: 4/14/04

Test Results: Complies.

Measurement Data: See attached table.

FCC PART 22, SUBPART H 800 MHz CELLULAR SUBSCRIBER UNITS TEST REPORT NO.: 4L0194RUS3

EQUIPMENT: GSM0110

Test Data – Spurious Emissions at Antenna Terminals

		mk	0				Lew Tel:	as Headquarter 802 N. Kealy risville, TX 7505 (972) 436-960 : (972) 436-266	57 10	
Ne Data Plot	mko Dallas, Inc.	Snur	ious Emis	sions at /	ntenna '	Ferminals				
Page <u>1</u> Job No.: Specification: Tested By: E.U.T.:		Temp	Date:	4/14/2004 22			Complete Preliminary:	X		
Configuration: Sample Number Location: Detector Type:	TX FULL POWER 1 Lab 1 Average				efer to plots efer to plots		Measurement Distance:	<u>NA</u> m		
Test Equipn Antenna: Pre-Amp: Filter: Receiver: Attenuator #1 Attenuator #2: Additional equi Measurement U	<u>1036</u> <u>1478</u> 1467 pment used:	dB	Direction	onal Coupler: Cable #1: Cable #2: Cable #3: Cable #4: Mixer:	1626					
Ref	Lvl	Marker	1 [1]	71 dBm	КВШ УВШ		Hz RF Hz	Att	30 dB	
•	dBm	824	4.200000		БИТ	280 m		nit	dBm	
30 <u></u>	0.9 dB Offe	se t	LI	MIT CHE	СК : Р	ASSED ^{▼1}	[T1] 82	17 4.20000	.71 dBm 300 MHz	A
20 10						M My Mile	n www.			
	IEW							n _{ul}		1MA
- 10 - LOI	BNDEDG							4	٨.,	EXT
-20				Mart	<u> v</u>				MAG	
-40 -50 4,4	Mallamar	houldwind	MM							
-60	ter 824 MHz			100					- 1 MU-	
Date:	14.APR.		:52:24	100	kHz∕			эраі	ח 1 MHz	
Notes:	Lower band edge Tx at 31.6 dBm	- Tx 824.2 MH	z - Lowest cha	annel						
	1A at 51.0 ubill									

Test Data – Spurious Emissions at Antenna Terminals



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

Ner	nko D	allas, Inc.									
Data Plot	t		Spur	ious Emis	ssions at A	Antenna T	Ferminals				
Page <u>2</u> o	of <u>4</u>										
Job No.:	4L019	4		Date: 4/1							
Specification:	PT22			erature(°C): 22							
Tested By:	David		Relative H	[umidity(%) 40							
E.U.T.:	ORIO										
Configuration:	TX F	JLL POWER									
			Marker	1 [11]		RBM	З К	Hz RE	- Att	30 dB	
Ref	∟v l				22 dBm	VВW	зк				
40	dBm		848	.800000	IOO MHz	SWT	280 m	s Ur	nit	dBm	1
40 31	.9	dB Offse	• †				▼1	[T1]	20	.22 dBm	
				LI	MIT CHE	СК : Рі	ASSED		⊔∠ 8.80000		A
30					UBAN	DEDG		04	0.00000	000 1112	
20				N II							
				VY UIW.							
4.5		ام		N	1						
10 1 V I	EW				14						1 MA
					٩.						
0					1						
		A.			Ч.						EXT
-10											
-20		N			4	M.M.					
-20	V	1				M.					
-30						4					
							4.				
-40											
							••••W	Myrund H.	al the al	Junhann	
-50								1	Mander	1 million	
									Ť.	•	
-60											
	ter	849 MHz			100	kHz∕			Spa	n 1 MHz	-
⊅ate:		14.APR.2	004 09	:55:31							
Notes:		r band edge -			annel						
		.3 dBm		0 -							

FCC PART 22, SUBPART H 800 MHz CELLULAR SUBSCRIBER UNITS TEST REPORT NO.: 4L0194RUS3

EQUIPMENT: GSM0110

Test Data – Spurious Emissions at Antenna Terminals

Nemko Dallas, Inc				Lew Tel:	AS Headquarte 802 N. Kealy isville, TX 750 (972) 436-96 : (972) 436-26	57 00		
Data Plot	Spurious Emis	sions at Ante	nna T	erminals				
Page 3 of 4 Job No.: 4L0194 Specification: PT22 Tested By: David Light E.U.T.: ORION Configuration: TX FULL POWE	Date: 4/1 Temperature(°C): 22 Relative Humidity(%) 40	4/2004						
	Marker 1 [11]	0.5	кви		Hz RF	Att	20 dB	
Ref Lvl 30 dBm	-20. 836.400000	85 dBm 00 MHz	VBW SWT	1 M 90 m		nīt	dBm	
30 30.9 HB Of	fset			▼1	[T1] 83	26 6.40000	.85 dBm 000 MHz	A
10								
-10 -10								1MA EXT
-20	And Martin Martin	muchun	www	human	man	Moren Jen	man	
-40								
-60								
-70 Start 30 MHz ate: 14.APF	.2004 09:57:36	897 MHz	27			Sto	p 9 GHz	
	es carrier at 836.4 MHz							

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.

Measurement Data: See attached table.

FCC PART 22, SUBPART H 800 MHz CELLULAR SUBSCRIBER UNITS TEST REPORT NO.: 4L0194RUS3

Test Data - Radiated Emissions

Nerr	Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667								
				E	RP				
Page <u>1</u> o	f <u>2</u>						Complete	Х	
Job No.:	4L0194		Date:	3/11/05			Preliminary	X	-
Specification:	PT 22		Temperature(°C):						-
Tested By:	David Light		Relative Humidity(%)						
E.U.T.:	ORION		• • • •						
Configuration:	TX FULL P	OWER							
Sample No:	1								
Location:	AC 3			RBW:	1 MHz		Measurement		
Detector Type:	Peak			VBW:	1 MHz		Distance:	3	m
Test Equipm	ent Used								
Antenna:	1304		D	virectional Coupler:					
Pre-Amp:	1016		D	Cable #1:	1484				
Filter:	1481			Cable #2:					
Receiver:	1464			Cable #3:					
Attenuator #1	1101			-					
Attenuator #2:				Mixer:		•			
Additional equip	ment used:			-					
Measurement Ur	ncertainty:	+/1.7 dB							_
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)	Pre-Amp Gain (dB)	Substitution Antenna Gain (dBd)	Limit (dBm)	ERP (dBm)	ERP (mW)	Polarity	Comments
(MHZ)	(abm)	(ab)	(ав)	(ава)	(dBM)	(abm)	(mw)		
1672.2	66.0	20.0	0	6.1	12	20.8	0.0010	V	
1673.2	-66.0	29.9	0	6.4	-13	-29.8	0.0010	V	
2509.8	-44.0	35.6	33	8.0	-13	-33.5	0.0004	V	
2509.8 3346.4	-44.0 -60.0	35.6 37.1	33 32.6	8.0 8.1	-13 -13	-33.5 -47.4	0.0004 0.0000	V V	
2509.8 3346.4 4183	-44.0 -60.0 -56.0	35.6 37.1 42.8	33 32.6 33	8.0 8.1 7.9	-13 -13 -13	-33.5 -47.4 -38.3	0.0004 0.0000 0.0001	V V V	
2509.8 3346.4 4183 5019.6	-44.0 -60.0 -56.0 -60.0	35.6 37.1 42.8 40.6	33 32.6 33 32.7	8.0 8.1 7.9 9.1	-13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0	0.0004 0.0000 0.0001 0.0000	V V V V	
2509.8 3346.4 4183 5019.6 5856.2	-44.0 -60.0 -56.0 -60.0 -62.0	35.6 37.1 42.8 40.6 38.5	33 32.6 33 32.7 31.9	8.0 8.1 7.9 9.1 9.1	-13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3	0.0004 0.0000 0.0001 0.0000 0.0000	V V V V V	
2509.8 3346.4 4183 5019.6 5856.2 6692.8	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0	35.6 37.1 42.8 40.6 38.5 38.3	33 32.6 33 32.7 31.9 31.5	8.0 8.1 7.9 9.1 9.1 10.1	-13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000	V V V V V V	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4	33 32.6 33 32.7 31.9 31.5 32.5	8.0 8.1 7.9 9.1 9.1 10.1 9.4	-13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000	V V V V V V V	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0	35.6 37.1 42.8 40.6 38.5 38.3	33 32.6 33 32.7 31.9 31.5	8.0 8.1 7.9 9.1 9.1 10.1	-13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000	V V V V V V	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6	33 32.6 33 32.7 31.9 31.5 32.5 32.9	8.0 8.1 7.9 9.1 9.1 10.1 9.4 9.7	-13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V V	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -64.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0	8.0 8.1 7.9 9.1 9.1 10.1 9.4 9.7 6.4	-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -64.0 -47.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33	8.0 8.1 7.9 9.1 9.1 9.1 9.1 6.4 8.0	-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000 0.0032 0.0032	V V V V V V V H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -64.0 -47.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6	8.0 8.1 7.9 9.1 9.1 9.1 9.1 6.4 8.0 8.1	-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4 -53.7	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000 0.0032 0.0032 0.0002	V V V V V V V H H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -64.0 -47.0 -65.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33	8.0 8.1 7.9 9.1 9.1 9.1 9.1 6.4 8.0	-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000 0.0032 0.0002 0.0002 0.0000	V V V V V V V H H H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -64.0 -47.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6	8.0 8.1 7.9 9.1 9.1 9.1 9.1 6.4 8.0 8.1 7.9	-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4 -53.7 -54.9	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000 0.0032 0.0002 0.0002 0.0000 0.0000	V V V V V V V H H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183 5019.6 5856.2	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -64.0 -47.0 -65.0 -65.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2 36.3 36.0	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33 32.7 31.9 31.5 32.9 0 33 32.6 33 32.7 31.9	8.0 8.1 7.9 9.1 9.1 9.1 9.1 6.4 8.0 8.1 7.9 9.1	-13 -13 -13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4 -53.7 -54.9 -54.4 -51.8	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0000 0.0002 0.0002 0.0000 0.0000 0.0000 0.0000	V V V V V V V H H H H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183 5019.6 5856.2 6692.8	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2 36.3 36.0 37.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33 32.9 0 33 32.6 33 32.7 31.9 31.5	8.0 8.1 7.9 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 8.0 8.1 7.9 9.1 9.1 10.1	-13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -48.6 -25.0 -37.4 -53.7 -54.9 -54.4 -51.8 -51.5	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0002 0.0002 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V H H H H H H H H	
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -64.0 -47.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2 36.3 36.0 37.8 39.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33 32.6 33 32.6 33 32.6 33 32.7 31.9 31.5 32.7 31.9 31.5 32.5	8.0 8.1 7.9 9.1 9.1 10.1 9.4 9.7 6.4 8.0 8.1 7.9 9.1 10.1 9.4 9.7	-13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4 -53.7 -54.9 -54.4 -51.8 -51.5 -56.3	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0002 0.0002 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V V H H H H H H H H H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183 5019.6 5856.2 6692.8	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2 36.3 36.0 37.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33 32.9 0 33 32.6 33 32.7 31.9 31.5	8.0 8.1 7.9 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1 8.0 8.1 7.9 9.1 9.1 10.1	-13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -48.6 -25.0 -37.4 -53.7 -54.9 -54.4 -51.8 -51.5	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0002 0.0002 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V H H H H H H H H	
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -64.0 -47.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2 36.3 36.0 37.8 39.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33 32.6 33 32.6 33 32.6 33 32.7 31.9 31.5 32.7 31.9 31.5 32.5	8.0 8.1 7.9 9.1 9.1 10.1 9.4 9.7 6.4 8.0 8.1 7.9 9.1 10.1 9.4 9.7	-13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4 -53.7 -54.9 -54.4 -51.8 -51.5 -56.3	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0002 0.0002 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V V H H H H H H H H H H	Noise floor
2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4 8366 1673.2 2509.8 3346.4 4183 5019.6 5856.2 6692.8 7529.4	-44.0 -60.0 -56.0 -60.0 -62.0 -66.0 -73.0 -67.0 -67.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -65.0 -67.0 -73.0 -73.0	35.6 37.1 42.8 40.6 38.5 38.3 40.4 41.6 32.7 34.6 35.8 35.2 36.3 36.0 37.8 39.8	33 32.6 33 32.7 31.9 31.5 32.5 32.9 0 33 32.6 33 32.6 33 32.6 33 32.6 33 32.7 31.9 31.5 32.7 31.9 31.5 32.5	8.0 8.1 7.9 9.1 9.1 10.1 9.4 9.7 6.4 8.0 8.1 7.9 9.1 10.1 9.4 9.7	-13 -13 -13 -13 -13 -13 -13 -13	-33.5 -47.4 -38.3 -43.0 -46.3 -49.1 -55.6 -48.6 -25.0 -37.4 -53.7 -54.9 -54.4 -51.8 -51.5 -56.3	0.0004 0.0000 0.0001 0.0000 0.0000 0.0000 0.0000 0.0002 0.0002 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000	V V V V V V V V H H H H H H H H H H	Noise floor

Searched spectrum from 30 MHz to 9 GHz

Photographs of Test Setup



Section 7. Frequency Stability

NAME OF TEST: Freque	ency Stability	PARA. NO.: 2.1055
TESTED BY: David Ligh	t	DATE: 4/15/04
Test Results:	Complies.	
Test Nesuits.	Complies.	
Measurement Data:	Refer to attached data	
Measurement Data.		
Test Canditions	Standard Test Frequency 4 926	
Test Conditions :	Standard Test Frequency: 836	.459956 IVIHZ

Standard Test Voltage: 3.6 Vdc

Test Data	a – Frequency S	Stability				
) Ner	nko		Lev	as Headqua 802 N. Kealy wisville, TX 7 1: (972) 436-9	/ 5057
Ne	mko Dallas, Inc.			Fa	x: (972) 436-2	2667
		Freque	ency Stabili	ity		
Page 1 of	f <u>1</u>					
Job No.:	4L0194	Date:	4/15/2004			
Specification:	PT 22	Temperature(°C):	22			
Tested By:	David Light	Relative Humidity(%)	40			
E.U.T.:	ORION					
Configuration:	TX AT MID BAND					
Sample Number:	1					
		Test Equipment Used				
Antenna:	#N/A	Direc	ctional Coupler:			
Pre-Amp:	#N/A		Cable #1:	1629		
Filter:	1026		Cable #2:			
Receiver:	#N/A					
Attenuator #1	1478					
Attenuator #2:	#N/A					
Measurement Uncertainty:	<u>1x10⁻¹⁷ppm</u>	Standard Tes	t Frequency	836.4	59956	_MHz
Temp (^o C)	Measured	Test	Freqeuncy	Limit	Error	
	Frequency (MHZ)	Voltage	Error (Hz)	(+/-Hz)	(ppm)	Comment
20	836.459956	3.6	0	2091.1	0.0	
20	836.459950	3.06	-6	2091.1	0.0	
20	836.459940	4.14	-16	2091.1	0.0	
50	836.459844	3.6	-112	2091.1	-0.1	
40	836.460190	3.6	234	2091.1	0.3	
30	836.460787	3.6	831	2091.1	1.0	
10	836.458922	3.6	-1034	2091.1	-1.2	
0	836.459950	3.6	-6	2091.1	0.0	
-10	836.459893	3.6	-63	2091.1	-0.1	
-20	836.460755	3.6	799	2091.1	1.0	
-30	836.458270	3.6	-1686	2091.1	-2.0	
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	830844/005	03/29/04	03/29/06
1464	Spectrum analyzer	Hewlett Packard 8563E	3551AD4428	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	2749AD0159	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	8232AD1493	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	1485 Cable 2.0-18.0 Ghz Storm PR90-010-216		N/A	08/02/04	08/02/05
1464	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	1304 HORN ANTENNA ELECTRO MI RGA-6		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 DETAILS

Nemko USA

EQUIPMENT: GSM0110

NAME OF TEST: RF Power Output

PARA. NO.: 1.1046

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 power meter.

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: Audio Frequency Response PARA. NO.: 2.1047

Minimum Standard: No specific limit expressed in the FCC Rules.

From 300 to 3000 Hz the audio frequency response should not vary more than +1 to -3 dB from a true 6dB octave pre-emphasis characteristic as referred to 1000 Hz level (with the exception of a permissible 6dB per octave roll-off from 2500 to 3000 Hz).

Method Of Measurement:

Operate the transmitter with the compressor disabled, and monitor the output with a frequency deviation meter or standard test receiver without standard 750-microsecond de-emphasis, with expander disabled, and without C-message weighted filter (see 6.6.2). Apply a sine wave audio input to the transmitter external audio input port, vary the modulating frequency from 300 to 3000 Hz and observe the input levels necessary to maintain a constant ± 2.9 kHz system deviation.

NAME OF TEST: Audio Low Pass Filter Response PARA. NO.: 2.1047

Minimum Standard: No specific limit expressed in the FCC Rules.

For mobile stations, signals should be attenuated as a function of frequency as follows:

- i. In the frequency ranges 3.0 to 5.9 Hz and 6.1 to 15 kHz, 40 log (f/3) dB.
- ii. In the frequency range 5.9 to 6.1 kHz, 35 dB
- iii. In the frequency range above 15 kHz, 28 dB.

Method Of Measurement:

Adjust the audio input frequency to 1000 Hz and adjust the input level to 20 dB greater than that required to produce ± 8 kHz deviation. Note the output level on the frequency deviation meter or standard test receiver. Using the output level as reference (0dB), vary the modulating frequency from 3000 Hz to 30,000 Hz and observe the change in output while maintaining a constant audio input level.

Nemko USA

FCC PART 22, SUBPART H 800 MHz CELLULAR SUBSCRIBER UNITS TEST REPORT NO.: 4L0194RUS3

NAME OF TEST: Modulation Limiting PARA. NO.: 2.1047

Minimum Standard: No specific requirement expressed in the FCC Rules.

The levels of the modulating signals should be set to the values specified below and should be maintained within $\pm 10\%$ of these values.

Voice: ±12 kHz SAT: ±2 kHz Wideband Data: ±8 kHz ST: ±8 kHz

Method Of Measurement:

Voice: A 1 kHz audio tone is injected at levels between -45 and +20 dBVrms. The peak deviation is noted. This is repeated with a 300 Hz tone and a 3 kHz tone. A plot showing the family of curves is presented.

SAT: A SAT tone is generated by the mobile station and the peak deviation is measured.

Wideband Data: Wideband data is generated by the mobile station and the peak deviation is measured.

ST: ST data is generated by the mobile station and the peak deviation is measured.

NAME OF TEST: Occupied Bandwidth (Voice & SAT) 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: Occupied Bandwidth (WBD & SAT) 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.: 2.1051

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.: 2.1053

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.

Nemko USA

FCC PART 22, SUBPART H 800 MHz CELLULAR SUBSCRIBER UNITS TEST REPORT NO.: 4L0194RUS3

NAME OF TEST: Frequency Stability

PARA. NO.: 2.1055

Minimum Standard: Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

Freq. Range (MHz)	Mobile > 3 W	Mobile \leq 3 W
821 to 896	2.5	2.5

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:

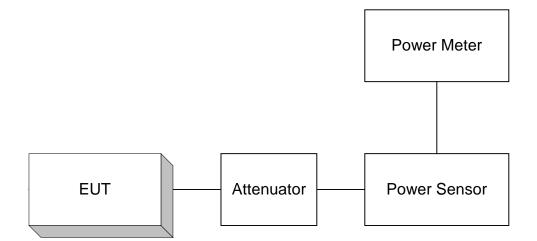
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

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.

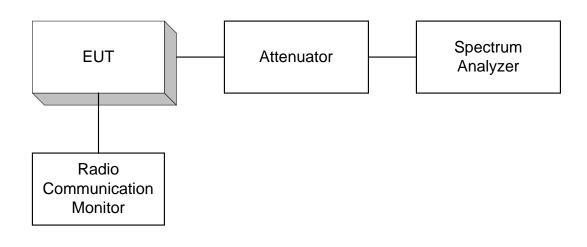
For devices that use complex digital modulation and cannot produce an unmodulated rf signal, the device is placed into call mode with a test set and the frequency error and rho parameters are recorded at each temperature and voltage variation.

ANNEX B - TEST DIAGRAMS

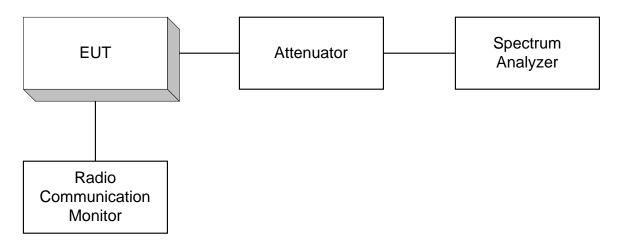
Para. No. 2.1046 - R.F. Power Output



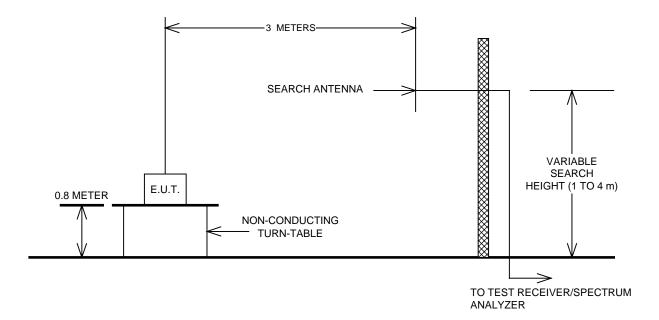
Para. No. 2.1049 - Occupied Bandwidth



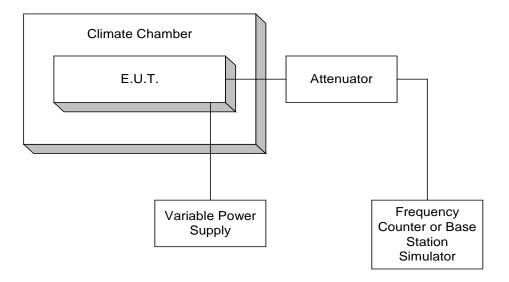
Para. No. 2.1051 Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation



Para. No. 2.1055 - Frequency Stability



Para. No. 2.1045 – Audio Frequency Response, Audio Low Pass Filter Response And Modulation Limiting

