

Nemko Test Report No.:	4L0664RUS1
Applicant:	Communication Components, Inc. 89 Leuning Street Second Floor Hackensack, NJ 07606

**Equipment Under Test:** 

In Accordance With:

FCC Part 24, Subpart E Broadband PCS Amplifiers

DAC-1819-125

Tested By:

Nemko Dallas Inc. 802 N. Kealy Lewisville, Texas 75057-3136

Jo-Till

Tom Tidwell, Frontline Group Manager

Date:

Authorized By:

11/11/04

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## Nemko Dallas

EQUIPMENT: DAC-1819-125

## Section 1. Summary of Test Results

Manufacturer: Communication Components

Model No.: DAC-1819-125

Serial No.: G006267

#### 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.

$\square$	New Submission	$\square$	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

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## Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	24.232	100W	Complies
Occupied Bandwidth	24.238	Input/Output	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Complies
Frequency Stability	24.235		NA

# Measurement uncertainty for each test configuration is expressed to 95% probability.

# Section 2. General Equipment Specification

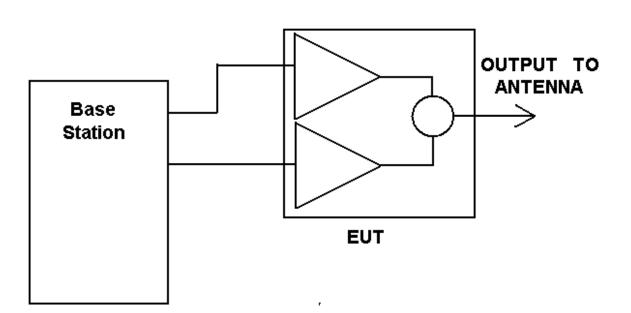
Supply Voltage Input:	-	28 Vdc			
Frequency Bands:	Downlink:	Block A: Block D Block B: Block E Block F : Block C	1930 – 1945 1945 – 1950 1950 – 1965 1965 – 1970 1970 – 1975 1975 – 1990	MHz MHz MHz MHz	
Frequency Bands:	Uplink:	Block A Block B: Block C Block D Block E: Block F :	1850 – 1865 1865 – 1870 1870 – 1885 1885 – 1890 1890 – 1895 1895 – 1910	MHz MHz MHz MHz	
Type of Modulation and Designator:		CDMA (F9W)		SM (W)	EDGE (G7W)
Output Impedance:		50 ohms			
RF Output (Rated):	Uplink	Per channel: Total:			
RF Output (Rated):	Downlink	Per channel: Total: Power output ne 1989.8 MHz (Bat GSM or EDGE n	125 W eds to be lower ndedges) to ach		
Frequency Translation	:	F1-F1		-F2	N/A
Band Selection:		Software	Dup	lexer	Fullband

## FCC PART 24, SUBPART E BROADBAND PCS REPEATERS TEST REPORT NO.: **4L0664RUS1**

#### **Description of EUT**

The device is a base station amplifier operating in the PCS band utilizing GSM and GSM EDGE technology. Each input outputs 62.5 Watts single carrier only and input into a combiner prior to output. The device is rated at 125 Watts combined power.

#### **System Diagram**



# Section 3. RF Power Output

NAME OF TEST:	<b>RF</b> Power Output
---------------	------------------------

PARA. NO.: 2.1046

TESTED BY: David Light

DATE: 10/26/04

Test Results: Complies.

#### Measurement Data:

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	GSM	NA	NA
Downlink	GSM	48	52
Uplink	GSM EDGE	NA	NA
Downlink	GSM EDGE	48	52

Note – The device was tested at 125 Watts max power to compensate for any insertion loss prior to antenna input. The rf output power at the antenna port after losses will never be more than that required to produce 100 W eirp.

#### **Reduced Power measurements at Band Edges**

	Modulation Type	Single Channel Output Power (1930.2MHz)	Single Channel Output Power (1989.8MHz)
Downlink	EDGE	36.1 dBm	36.0 dBm
Downlink	GSM	33.2 dBm	33.6 dBm

Equipment Used: 1036-1064-1055-1626

Measurement Uncertainty: +/- 1.7 dB

**Temperature:** 22 °C

**Relative Humidity:** 40%

# Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE:10/26/04

Test Results:	Complies.
lest Results:	Complies

**Test Data:** See attached plot(s).

## FCC PART 24, SUBPART E BROADBAND PCS REPEATERS TEST REPORT NO.: **4L0664RUS1**

## EQUIPMENT: DAC-1819-125

# Test Data – Occupied Bandwidth



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

	nko Dallas, Inc.									
Data Plot			Occ	upied Bai	ndwidth					
Page 1 o	of <u>4</u>						Compl	ete X		
Job No.:	4L0664R		Date:	0/26/2004			Prelimina	ry:		
Specification:	PT 24	Temp	erature(°C):	25						
Tested By:	David Light	Relative H	Iumidity(%)	45						
E.U.T.:	DAC-1819-125									
Configuration:	TX FULL POWER									
Sample Number										
Location:	Lab 1			RBW: 3			Measurem			
Detector Type:	Peak			VBW: 3	kHz		Distan	ce: NA	m	
Test Equipm	ent Used									
Antenna:			Directio	onal Coupler:	1055					
Pre-Amp:				Cable #1:	1626					
Filter:				Cable #2:						
Receiver:	1036			Cable #3:						
Attenuator #1	1064			Cable #4:						
Attenuator #2:				Mixer:						
Additional equip										
Measurement U	ncertainty: +/-1.7 c	IB								
<u> </u>		Delta 1	[[1]]		квм	3 1	≺Hz	RF Att	40 dB	
Ref	Lvl		Ο.	18 dB	VВЫ	З І	≺Hz			
55	dBm	290	.581162	32 kHz	SWT	280 r	ms	Unit	dBr	r
55	1.1 dB Offs	<b>b</b> +				▼1	5743			1
50		5 L				• 1	[T1]	1.9598		A
						1	[T1]		0,18 dB	
40						▲ <sup>1</sup>			3032 MUZ	
				Multim	hing					
30			N,	-	<sup>i</sup> u	M				
20 <u>1 V I</u>	EW		1/40/			Ŭ,				1MA
			المر ا			W.W.				
10			V							-
		1 M					Myr.			
0		Mark In								
		M <sup>N</sup>					M	4.4		
-10	h all the	<u> </u>					-		-	-
	. I. MARINE V							Valde	Aldantill	
-20	~Imp Unit Market							Marine Vinte	- WWWW	
-30									_	
-40										
-45 Cen	ter 1.96 GH	7		100	kHz∕				an 1 MHz	-
				100				500		
Date:	26.0CT.2		:22:32							
Notes:	OUTPUT, GSM EI	JGE, 62.5 wat	ts							
1										

#### Test Data – Occupied Bandwidth



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

Nen	nko Dallas, Inc.						. ,			
Data Plot			Occ	upied Ba	ndwidth					
Page 2 o										
Job No.:	4L0664R	Date: 10/26/2004								
Specification:	PT 24	Temperature(°C): 25								
Tested By:	David Light	Relative Humidity(%) 45								
E.U.T.:	DAC-1819-125									
Configuration:	TX FULL POWER									
Ref		Delta 1		0.0 10	КВМ	З К		- Att	4U dB	
~	dBm	200	.581162	98 dB	VBW SWT	З К 280 m		nit	dBr	
55			.001102	32 KHZ		200 11			ubi	-
4 : 50	.1 dB Offse	e t				▼1	[ ] 1 ]	13	.48 dBm	A
50								1.95985	070 GHz	
						▲1	[T1]	- 1	.98 dB	
40								0.58116	<del>232 kHz</del>	
				N.,	M					
30				nh V	<u>41 m</u>					
20 1 1 1	EW		m		Ŵ	\ <u></u>				1 MA
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10						<u>م</u>				
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- 10		JW V								
		N	V			- V	Y Y			
-20							V.			
		·						Maria		
. Ash	mount							Window	helm Meda	
-30									and all all all	<u>r</u>
-40										
-45										
Cen	ter 1.96 GH:	Z		100	kHz∕			Spa	n 1 MHz	
Date:	26.OCT.2	004 15	:24:02							
Notes:	INPUT, GSM EDG									
Notes:	IN UI, GOM EDG	E .								
1										

## Test Data – Occupied Bandwidth

Nemko Dallas, Inc.	<b>mko</b>			Lew Tel:	is Headquar 802 N. Kealy isville, TX 75 (972) 436-9 : (972) 436-2	057 600		
<u>Data Plot</u>	Occ	upied Ban	<u>dwidth</u>					
Page 3 of 4   Job No.: 4L0664R   Specification: PT 24   Tested By: David Light   E.U.T.: DAC-1819-125   Configuration: TX FULL POWER	Date: 10 Temperature(°C): 25 Relative Humidity(%) 45	/26/2004						
R A	Delta 1 (TT)		RBM	з к		F Att	40 dB	
Ref Lvl		29 dB	VBW	3 k				
55 dBm 55	278.557114	-23 kHz	SWT	280 m	s U	nit	dBm	
41.1 dB Offse 40 40 30 20 1VIEH 10 -10 -20			Meley Joy	Va Va Va Va Va	W U			1 MA
-20 -30 -40 -45 Center 1.96 GH:	z	100 -	Hz/				an 1 MHz	
ate: 26.0CT.2								
Notes: OUTPUT, GSM, 62								

## Test Data – Occupied Bandwidth

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

Ner	nko E	Dallas,	Inc.						x. (372) 430	2001		
Test Plot					Occ	upied B	<u>Bandwidth</u>					
Page 4 c												
Job No.:	4L06	64R			Date: 10	/26/2004	_					
Specification:	PT 24				perature(°C): 25		_					
Tested By:	_	d Light		Relative	Humidity(%) 45		_					
E.U.T.:	-	-1819-12										
Configuration:	TXF	ULL PO	WER									
K A				Marker	1 [11]		КВМ	Зк	Hz	RF Att	40 dB	
Ref						71 dBr		ЗК				
	dBr	۱			1.959860	172 GHz	z SWT	280 m	ıs	Unit	dBr	ו
55 4	1.1	dB C	lffse	e t				<b>v</b> <sub>1</sub>	[T1]	1	0.71 dBm	
50										1.9598		A
								1	[T1]		0.29 dB	
40							_			278.5571	1423 KHz	-
30						1.10						-
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			hall	v						<b>N</b> N I		
-30	Mil	mh	Ann				_			"yhered	Julyumala	
-40												
-45												
	ter	1.96	6 GHz	2		100	) kHz/			Sp	an 1 MHz	-
Date:		26.0	ст. 2	NN4 15	5:10:26							
Notes:		UT, GSI										
		,										
1												

# Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 10/26/04

Test Results: Complies.

**Test Data:** See attached plot(s).

The spectrum was searched from 30 MHz to 20 GHz. Worst-case emissions were reported.

# Test Data – Spurious Emissions at Antenna Terminals

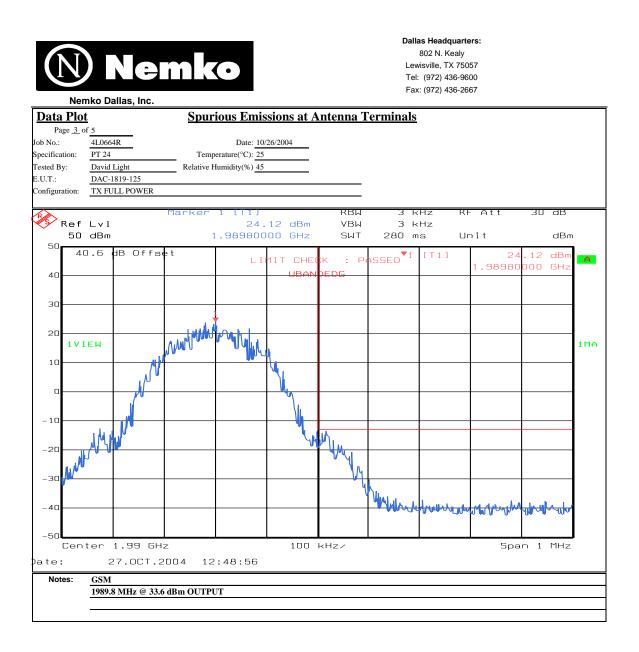
								as Headquarte 802 N. Kealy		
		ШK	$\bullet$					/isville, TX 7505 (972) 436-960		
								: (972) 436-266		
Nen	nko Dallas, Inc.									
Data Plot		<u>Spur</u>	ious Emis	sions at A	Antenna T	<u>[erminals]</u>				
Page 1 of			D	0/06/2004			Complete			
Job No.: Specification:	4L0664R PT 24	Temr	Date: erature(°C):	25			Preliminary:			
Tested By:	David Light	-	Iumidity(%)							
E.U.T.:	DAC-1819-125									
Configuration:	TX FULL POWER									
Sample Number:				DDW 4						
Location: Detector Type:	Lab 1 Peak			RBW: <u>3</u> VBW: 3			Measurement Distance:			
Detector Type.	- I Cuk			<u>, , , , , , , , , , , , , , , , , , , </u>	KIIZ		Distance			
Test Equipm	ent Used									
Antenna:			Directio	onal Coupler:	1055					
Pre-Amp: Filter:				Cable #1: Cable #2:	1626					
Receiver:	1036			Cable #2:						
Attenuator #1	1064			Cable #4:						
Attenuator #2:				Mixer:						
Additional equip Measurement Un		σι								
Weasurement On	+/-1.7									
Ref	1 v 1	Marker	1 [T1] 22.	99 dBm	КВМ КВМ	з н З н	HZ RE	- Att	30 dB	
	dBm	1	.930200		SWT	280 m		nit	dBm	
50 40	).6 dB Offe	ie t			1	▼1	[T1]	22	.99 dBm	
			LI	МІТ СНЕ	СК : Р	ASSED 1		1.93020		A
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30										
20 1 V I	EU.									110
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				$\mathbb{N}$	W			1.11	M	
-20				M					W.	
-30									Y.	
-30									<b>V</b> Y	
-40 -4	H. A. Miller	Internet							, v	
-40040			also al							
-50										
	ter 1.93 GH	Iz		100	kHz/			Spa	n 1 MHz	-
Date:	27.OCT.	2004 12	:44:13							
Notes:	GSM									
	1930.2 MHz @ 33.	2 dBm OUTPU	JT							

## Test Data – Spurious Emissions at Antenna Terminals



		allas, Inc.	<b>C</b>	· E			· · · · · · · · · · · · · · · · · · ·				
Data Plot			<u>Spur</u>	<u>ious Emis</u>	sions at A	ntenna 1	erminals				
Page <u>2</u> o	-										
Job No.:	4L066		T	Date: 10/	26/2004						
Specification:	PT 24			erature(°C): 25							
Tested By: E.U.T.:	David	1819-125	Relative F	Aumidity(%) 45							
	-										
Configuration:	TX F	ULL POWER				<u> </u>					
			Marker	2 [11]		RBM	З К	Hz RF	- Att	30 dB	
Ref	Lv1			35.	67 dBm	VBW	зк	Hz			
50	dBm		1	.931200	IOO GHz	SWT	840 m	s Ur	nit	dBm	
50 41	).6	dB Offse	• †				₹2	[T1]	35	.67 dBm	
40				LI	MIT CHE	(к : Ре	ASSED'	[]]]	1.93120		A
40							√1	[T1]	36		
30						<b>س</b> ر	Щ.		1.93030	900 GH2	
									p	ų	
20 1 V I	E11										1MA
10											1116
										4	
0						M	V.			M	
	IDED					N	- <b>4</b>		<b>P</b>		
-20	DED	Ĩ				(	U		(	V	
								M			
-30		hamm						All A			
-40 <b>Mah</b>	mh	hamm	mann	u when	Mar C						
-50 <b>L</b> Cen	ter	1.93 GHz	2		300	kHz∕			Spa	n 3 MHz	I
Date:	2	27.OCT.2	004 12	:46:41							
Notes:	1930.	3 AND 1931.2	MHz AT 62.5	WATTS EA	CH - 125 WA	ITS COMPO	SITE POWE	R			
	GSM										
1											

#### Test Data – Spurious Emissions at Antenna Terminals



#### Test Data – Spurious Emissions at Antenna Terminals



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

Nemko Dallas, Inc. Test Plot: Spurious Emissions at Antenna Terminals Page <u>4</u> of <u>5</u> 4L0664R Job No.: Date: 10/26/2004 Specification: PT 24 Temperature(°C): 25 Tested By: David Light Relative Humidity(%) 45 E.U.T.: DAC-1819-125 Configuration: TX FULL POWER RВМ RF Att 30 dB КНZ Ref Lvl L I 1 J 34.40 dBm νвы 3 kHz 1.98880000 GHz 50 dBm SWT 840 ms Unit dBm 50 40.6 dB Offset 40 dBr [ T 1 ] 3. A ИІТ СНЕ SSED L I : P 40 LIBA 60 dB 1.98970 000 GHz 30 20 1 MA 1 C С - 10 -20 -30 Under Mary Marine manne hilling n Ma -40 -50 Center 1.99 GHz 300 kHz/ Span 3 MHz ate: 27.OCT.2004 12:51:36 1989.7 AND 1988.8 MHz AT 62.5 WATTS EACH - 125 WATTS COMPOSITE POWER Notes: GSM

## Test Data – Spurious Emissions at Antenna Terminals

	Dallas, Inc.					Lev Tel Fa:	as Headqu 802 N. Kea visville, TX : (972) 436 k: (972) 436	aly 75057 -9600		
st Plot:		Spuri	ious Emis	sions at A	Antenna T	erminals				
ification: P1 ed By: Da T.: D.	0664R r 24 avid Light AC-1819-125 X FULL POWER	-	Date: 11/2 erature(°C): 22 fumidity(%) 40	5/2004						
		Marker	1 [[1]]	70 - ID	КВМ			RF Att	30 dB	
Ref L 50 dl		966	-15. .953907	78 dBm 82 MHz	VBW SWT	300 k 27 m		Unit	dBr	ı
40 . ( 40 30 20 1VIEF		t				•1	[]]]	- 15		11
.0 0 .0 	13 dBm				Lev M J. Aur Mar 1-14	Ar -14		Johnshul	1	
	hter for a la contra	<u></u>	₩₩₩₩₩ ₩ ₩ ₩	<b>ζοικ-Ι</b> Δ.Ιζ <i>Ι</i> σ.Ι <sub>Ι</sub>			ina (b app			
50 <b>L</b> Start	30 MHz	<u> </u>	:26:50	97 1	MHz/			Sto	pp 1 GHz	,
Notes: T	X 62.5 WATTS A1		.20.30							

## Test Data – Spurious Emissions at Antenna Terminals



Test Plot		<u>Spuri</u>	ous Emi	ssions at A	ntenna T	erminals				
Page <u>5</u> o										
Job No.:	4L0664R		Date: 11	/5/2004						
Specification:	PT 24		rature(°C): 22							
Tested By:	David Light	Relative H	umidity(%) 40							
E.U.T.:	DAC-1819-125									
Configuration:	TX FULL POWE	R								
k D		Marker	1 [1]		кви	1 1~	Hz	RF Att	20 dB	
📎 Ref				.42 dBm	VBW	1 1				
	dBm	3	.921843	369 GHz	SWT	7.5 m	IS	Unit	dBm	ı
40 40	).6 dB Of	fset				▼1	[T1]	- 1	6.42 dBm	A
								3.9218	4369 GHz	H
30										
20										
10				-						
1 V I	EW									1 MA
0			_							
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	-13 dBm-								1	
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-20	nettomenter	hurann	- man	-	Jus and have a					
-30										
-40									_	
-50										
-60										
	rt 1 GHz			300	MHz/			St	op 4 GHz	-
Date:	05.NOV	.2004 10	:15:35							
Notes:		tput - 62.5 Watts @								
10103.	Shigie Gowi Ou	iput - 02.5 walls	2 1900 MINZ							
	-									

## Test Data – Spurious Emissions at Antenna Terminals



Test Plot		Spur	ious Emis	ssions at A	Antenna T	<b>Ferminals</b>				
Page <u>5</u> o							-			
Job No.:	4L0664R		Date: 11							
Specification:	PT 24		perature(°C): 22							
Tested By: E.U.T.:	David Light	Relative	Humidity(%) 40							
E.U.I.: Configuration:	DAC-1819-125 TX FULL POWER									
configuration.	TATULETOWER									
<b>K</b>		Marker	1 [[1]]		КВМ	1 1		RF Att	10 dB	
Ref				79 dBm	VBW		1Hz			
30 <b>.</b>	dBm	13	8.906583	17 GHz	SWT	5 m	ıs	Unit	dBm	1
42	2.6 dB Offs	se t				▼1	[T1]	-20		A
20								13.90658	3317 GHz	_
20										1
10										
0		-								
1 V I	EW									1 MA
- 10										
	-13 dBm									
-20			1							
Melen	low when he	undure	munch	monum	handha	normalin	Maran	menun	unduran	
-30										
-40										
-40										
50										
-50										
-60					1					
-70	ter 13.9078		-	1~	IHz/	1	1			J
				1 1	INZ/			Spar	10 MHz ר	
Date:	05.NOV.		:34:23							
Notes:	Single GSM carri	er - 1960 MHz	@ 62.5 Watts							

# Test Data – Spurious Emissions at Antenna Terminals

	aka Dallaa Ina								
ta Plot	nko Dallas, Inc.	Snu	rious Emi	ssions at /	ntenna 7	Forminals	,		
Page <u>1</u> of	f 5	<u>opu</u>	110us Linn	<u>5510115 at r</u>		<u>i ci initiale</u>	Complete	e X	
lo.:	4L0664R		Date:	10/26/2004			Preliminary		
fication:	PT 24	Tem	perature(°C):				, i continuit de la contention de la conte		
d By:	David Light		Humidity(%)						
с.:	DAC-1819-125								
guration:	TX FULL POWER								
le Number:	1								
ion:	Lab 1		-	RBW: 3	kHz		Measuremen	t	
tor Type:	Peak			VBW: 3	kHz		Distance	NA :	m
Equipmo	ent Used								
nna:			Directi	ional Coupler:	1055				
mp:				Cable #1:	1626				
:				Cable #2:					
ver:	1036			Cable #3:					
uator #1	1064			Cable #4:					
uator #2: ional equip	mont wood.			Mixer:					
urement Un		7 dB							
urement on									
>		Marker	1 (11)		КВМ	З К		- Att	4U dB
Ref				.95 dBm	VBW	3 k			
55 <b></b>	dBm		1.930199	BUU GHZ	SWT	5	s Ur	nit	dBm
41	.1 dB Off:	∋et	L T				[T1]	21	.95 dBm
50			L 1		, <del>K</del> . : F1	HISED		1.93019	900 GHz
40									
30									
30						, Mr.	ML.		
	Eμ					harde	ML		
	Eμ					Martin	My why		
20 <u>1 V I</u>	ЕМ	+			, AL	marin	My why	K.	
20 <u>1 V I</u>	ЕН				, Mu	Martin	and the state	4 by	
20 <u>1 V I</u>	ЕМ				pi./#	Martin	My My	4	
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1 <b>VI</b>	<u>Е</u> ₩				, Mi Ju	Ma Mr.	and the star	l boy	
						pha Mr	My My		
	EW NDEDG					phone in the	Me any		
						phante	and the start		 /\u/\
				- Marine - M			and the state		MU Ling
10 0				Marul					M.M.
				Mr. W					Mr.
		- to Asic Applied		1 March					Mr. Markey
				MANU MANU					M.M.
				Mr.ul					M.M.
				100	KHZ/			Spa	n 1 MHz

## Test Data – Spurious Emissions at Antenna Terminals



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

Nen	n <mark>ko D</mark> a	las, Inc.						. ,			
Data Plot			Spur	ious Emis	sions at A	Antenna T	<b>Ferminals</b>				
Page 2 o											
Job No.:	4L06641	R		Date: 10/	/26/2004						
Specification:	PT 24			erature(°C): 25							
Tested By:	David L	\$	Relative H	Iumidity(%) 45							
E.U.T.:	DAC-18										
Configuration:	TX FUL	L POWER									
			Marker	2 [11]		квм	ЗК	Hz RF	- Att	4U dB	
Ref	∟v l				70 dBm	VBW	Зk				
55	dBm		1	.930300	00 GHz	SWT	840 m	s Ur	nit	dBm	ı
55 43	1.1 0	B Offse	e t				▼2	[T1]	36	.70 dBm	1
50				<u> </u>	MIT CHE	CK : P(	NSSED ~		1.93030	000 GHz	A
							$\nabla_1$	[T1]	36		
40						1			1.93827	756 GHz	
						, N	ML.		Ι Λ	Μ.	
30						- M	<u> </u>		N <sup>°</sup>	74	
							4		لر	Υ.	
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		Linum	Acabian Ida	Mumul	well			000			
-30											
										1	
-40											
-45	top 1	.93 GH:	7		200	kHz/			500	.n 3 MHz	J
				50.05	JUU	11127			υμα	11 3 11172	
Date:		7.0CT.2		:52:25	OII 105 1000			D			
Notes:	1930.3 EDGE	AND 1931.2	MHZ AT 62.5	WATTS EA	CH - 125 WA	TTS COMPC	SITE POWE	к			
	EDGE										

# Test Data – Spurious Emissions at Antenna Terminals

Ner		llas, Inc.	mk				Lev Tel Fax	as Headqu 802 N. Ke visville, TX : (972) 436 k: (972) 436	aly 75057 6-9600		
Data Plot	-		<u>Spur</u>	ious Emis	sions at A	Antenna T	<b>Terminals</b>				
Page <u>3</u> o Job No.: Specification: Tested By: E.U.T.: Configuration:	4L0664 PT 24 David L DAC-18	ight	-	Date: $10.$ erature(°C): $25$ lumidity(%) $45$							
Ref			Marker	1 [71]	47 dBm	КВМ УВМ	з к З к	Hz Hz	RF Att	4U dB	
55	dBm		1	.989800		SML	5		Unit	dBm	1
55 50 41	1.1 0	B Offse	e t				▼1	[T1]	2	2.47 dBm	A
40					UBAN	DEDG			1.9898	10000 GHz	
	EW	Aľ	Mun Mun		L.N						1MA
0											
-20	my					Mr. Uni	Marcallan			J	
-30 -40 -45											
	ter 1	.99 GH;	<u> </u>		100	kHz∕			Sp	an 1 MHz	
Date:		7.OCT.2	004 08	:57:05							
Notes:	EDGE 1989.8		dBm OUTPU	JT							

## Test Data – Spurious Emissions at Antenna Terminals



Test Plot:		allas, Inc.	Spur	ious Emis	sions at A	ntenna T	<b>Terminals</b>				
Page 4 of			<u>o pur</u>								
Job No.:	4L066	4R		Date: 10/	/26/2004						
Specification:	PT 24			erature(°C): 25							
Tested By:	David	÷	Relative H	Humidity(%) 45							
E.U.T.:		1819-125									
Configuration:	TX FU	JLL POWER									
R .			Marker			КВМ	З К		F Att	4U dB	
Kef					43 dBm	VBW	З К				
55	dBm			.988800	IOO GHZ	SWT	840 m	s U	nit	dBm	
50 4 1	. 1	dB Offse	e t		ИІТ СНЕС	K : P(	SSED <sup>72</sup>	[T1]	34	.43 dBm	A
00					iii onet				1.98880	000 GHz	
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-20			m w	Ĩ .	U	MA.					
-20			" Jul			"Il mi					
-30						White	abullance	hourse	millionaural	Maria	
-30											
10											
-40											
-45 <b>L</b> Cent	er	1.99 GH:	z		300	kHz∕			Spa	n 3 MHz	
Date:	2	27.OCT.2	004 09	:04:54							
Notes:		.7 AND 1988.8			CH - 125 WA	TTS COMPO	DSITE POWF	R			
	EDG			L1							
1											

## Test Data – Spurious Emissions at Antenna Terminals



<b>Test Plot:</b>			Spur	ious Emis	sions at A	ntenna T	<u>'erminals</u>				
Page <u>5</u> o	f <u>5</u>										
lob No.:	4L066	4R		Date: 11/	5/2004						
Specification:	PT 24			perature(°C): 22							
Tested By:	·			Humidity(%) 40							
E.U.T.:	-	1819-125									
Configuration:	TX FU	JLL POWER									
k D			Marker	1 [[1]]		КВМ	300 k	Hz R	⊢ Att	20 dB	
🥙 Ref				-25.	11 dBm	VBW	300 k				
	dBm		1		00 GHz	SWT	27 m	ıs U	nit	dBr	n
40 40	).6	dB Offs€	e t				▼1	[T1]	-25	5.11 dBm	A
									1.00000	000 GHz	
30											
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1 V I	EΜ										1 MA
0									-	_	
-10											
—D 1	-13	dBm——									-
-20											
20											1
-30		John Marine	The methy	1 Internetion	manda	mer man	Languardur	mound	unhadion	undnehen	
-30 0000											
-40											
-50											
-60						L					J
		0 MHz			97 1	ĭHz∕			Sto	op 1 GHz	
Date:	C	)5.NOV.2	004 10	:25:06							
Notes:	-	2.5 WATTS A	T 1960 MHz								
	EDG	E									

## Test Data – Spurious Emissions at Antenna Terminals



Test Plot:		<u>Spuri</u>	Spurious Emissions at Antenna Terminals										
Page <u>5</u> of							-						
ob No.:	4L0664R		Date: 11	/5/2004									
pecification:	PT 24		Temperature(°C): 22										
ested By:	David Light	Relative Hu	midity(%) 40										
.U.T.:	DAC-1819-125												
Configuration:	TX FULL POWER												
		Marker 1	(11)		КВМ	1 1~	IHZ	RF Att	20 dB				
Ref	Lv1			17 dBm	VBW		1Hz						
40	dBm	з.	921843	69 GHz	SWT	7.5 m	s	Unit	dBr	n			
40	.6 dB Offs	- d t				▼1	5743		- 4 - 10	1			
40		Jer				*1	[[]]	-1	7.17 dBm 4369 GHz	A			
30								5.5210	4309 682	_			
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20													
10 1 V I	<b>F</b> 11									1 1 1 0			
1 V 1										1MA			
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-10		_											
	-13 dBm								1				
20			14						Τ.				
-20	manun	amulat	han	- Verando	Contraction of the second		armond	mander					
-30													
-40		_								-			
-50										_			
20													
6.0													
-60 <b>L</b>	t 1 GHz			300	MHz /			S+	op 4 GHz				
		0004 40	<b>.</b>	550				50					
ate:	05.NOV.		21:44										
Notes:	Single EDGE car	rier - 1960 MHz (	@ 62.5 Watt	s									

## Test Data – Spurious Emissions at Antenna Terminals



Test Plot:	nko Dallas, Inc.	Spur	ious Emis	sions at A	ntenna T	<b>Terminals</b>				
Page 5 o		<u></u>								
Job No.: Specification:	4L0664R PT 24	Temp	Date: 11/2 perature(°C): 22	5/2004						
Tested By:	David Light	Relative I	Humidity(%) 40							
E.U.T.:	DAC-1819-125									
Configuration:	TX FULL POWER									
r A		Marker	1 [[1]]		КВМ	1 M	Hz RI	- Att	10 dB	
Ref				52 dBm	VBW		Hz			
30 30	dBm	13	3.909809	52 GHz	SWT	5 m	s Ur	пit	dBm	l.
42	2.6 dB Offs	et.				▼1	[T1] 1	-21 3.90980	.62 dBm 1962 GHz	A
20 ——										
10										
0 1 V I	EW									1 MA
- 10										
	-13 dBm									
-20 Milun	mahanna	mound	man	honorb	Umple	MANNA MA	umm	hund	man	
-30										
-40										
-50										
-60										
-70	l ter 13.9078	1 1563 64		1 M	Hz/	I	l	L Spar	l 10 MHz	
Date:	05.NOV.:		:35:53						. 10 1112	
Notes:	Single EDGE carr	ier - 1960 MH:	z @ 62.5 Watts							

# Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 10/27/04

Test Results: Complies.

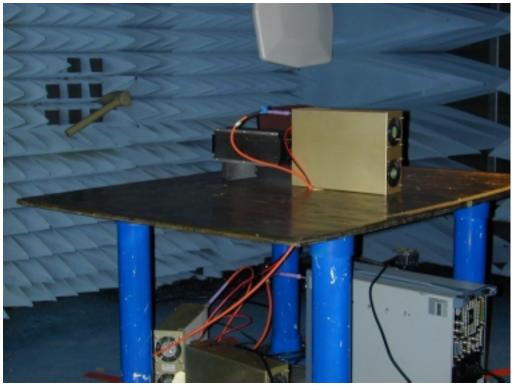
Test Data:See attached table.

## **Test Data - Radiated Spurious Emissions**

Ner	) R	em , Inc.	ko		Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667				
			Field S	trength of S	<b>purious</b> 1	Emissions			
Page <u>1</u> o	of <u>1</u>						Complete	Х	
Job No.:	4L0664R		Date:	10/27/04			Preliminary		
Specification:	PT24		Temperature(°C):	22					
Tested By:	Tom Tidwel		Relative Humidity(%)	45					
E.U.T.:	DAC-1819-					-			
Configuration:	TX FULL P	OWER AT BAND	CENTER			-			
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			Cable #1:	1485	-			
Filter:	1482			Cable #2:	1484	-			
Receiver:	1036			Cable #3:		-			
Attenuator #1				Cable #4:		-			
Attenuator #2:				Mixer:		-			
Additional equi	oment used:					_			
Measurement U	ncertainty:	+/-1.7 dB							
Frequency	Meter	Correction	Pre-Amp	Substitution	<b></b>	EIRP	EIRP	Polarity	Comments
	Reading	Factor	Gain	Antenna Gain	Limit				
(MHz)	(dBm)	(dB)	(dB)	(dBi)	(dBm)	(dBm)	( <b>mW</b> )		
0000	22.0	40.4		10.1	12	15.4			
3920	-32.9	40.4	33	10.1	-13	-15.4	0.03	V V	
5880	-35.7	38.5	31.9	11.2	-13	-17.9	0.02		
7840	-38.7	40.4	32.9	11.6	-13	-19.6	0.01	V V	
13720 3920	-58.2	47.6 34.3	32.8	12.6 8.0	-13	-30.8 -26.7	0.00	V H	
5880	-30.0	36.0	31.9	9.1	-13	-20.7	0.00	H H	
7840	-31.7	39.8	31.9	9.1	-13	-18.5	0.01	H H	
9800	-50.8	42.6	34.5	9.4	-13	-20.5	0.01	н	
13720	-59.0	50.8	32.8	10.3	-13	-31.4	0.00	н Н	
10120	-57.0	50.0	52.8	10.4	-15	-50.0	0.00	11	
		<u> </u>				1			
Notes	5:		1						
	-								1

The spectrum was searched from 30 MHz to 20 GHz. All detected emissions were reported.

# Photographs of Test Setup





# Section 7. Test Equipment List

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	07/30/04	07/31/06	
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04	
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05	
1482	Band Pass Filter	K & L 11SH10-4000/T12000-0/0	2	Cal B4 Use	N/A	
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06	
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A	
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU	N/A	
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	CBU	N/A	
1058	DUAL DIRECTIONAL COUPLER	HEWLETT PACKARD 11692D	1212A03366	CBU	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	10/27/03	10/27/04	
1195	ANTENNA, BICONICAL	A.H. SYSTEMS SAS-200/542	235	07/09/04	07/09/05	
1983	CABLE	KTL Site A OATS	N/A	03/11/04	03/11/05	
1626	CABLE, 5 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A	

# **ANNEX A - TEST DETAILS**

#### 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:

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

#### NAME OF TEST: Occupied Bandwidth

#### PARA. NO.: 2.1047

**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:

#### <u>CDMA</u>

Spectrum analyzer settings: RBW: 30 kHz VBW: ≥ RBW Span: 5 MHz Sweep: Auto Mask: Set markers to -26 dB from peak of CW.

#### <u>GSM</u>

RBW: 3 kHz VBW: ≥ RBW Span: 2 MHz Sweep: Auto Mask: Set markers to -26 dB from peak of CW.

#### <u>NADC</u>

RBW: 1 kHz VBW: ≥ RBW Span: 1 MHz Sweep: Auto Mask: Set markers to -26 dB from peak of CW.

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

Minimum Standard: licensee's Para. No.24.238(a). On any frequency outside a

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:

#### <u>CDMA</u>

RBW: 1 MHz (> 1 MHz from Band Edge) RBW: 30 kHz (< 1MHz from Band Edge) VBW: ≥ RBW Sweep: Auto Video Avg: 6 Sweeps

#### <u>GSM</u>

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

## NADC

RBW: 1 MHz (> 1 MHz from Band Edge) RBW: 3 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:

The antenna substitution method was used. This method is described in EIA/TIA 603B.

#### 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:

#### Frequency Stability With Voltage Variation

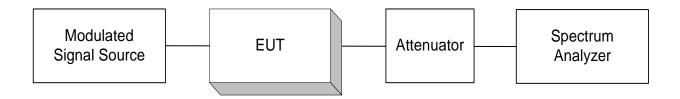
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. 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

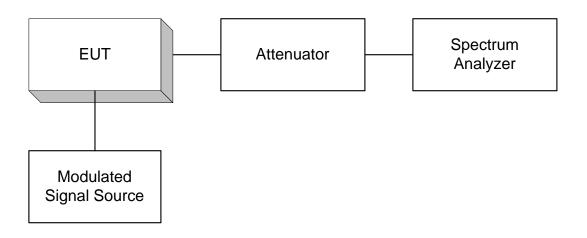
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

# **ANNEX B - TEST DIAGRAMS**

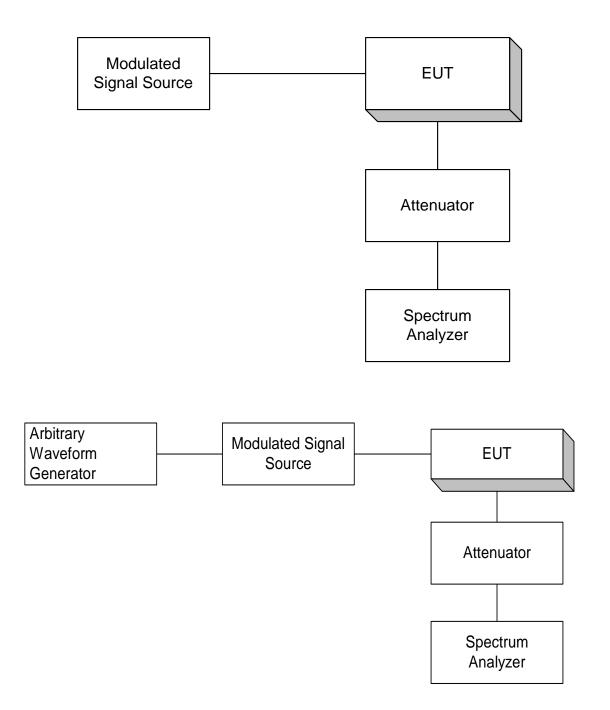
## Para. No. 2.985 - R.F. Power Output



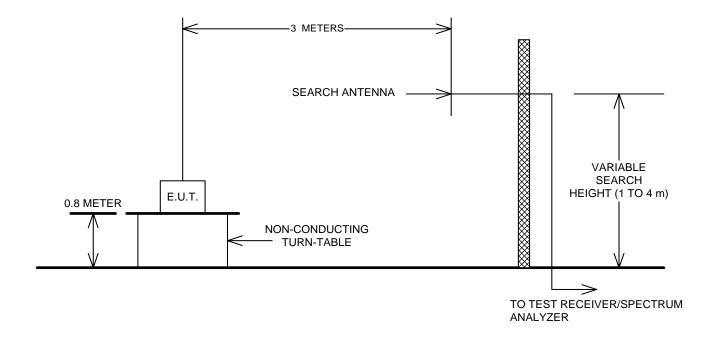
#### Para. No. 2.989 - Occupied Bandwidth



## Para. No. 2.991 Spurious Emissions at Antenna Terminals



## Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

