#### Nemko Test Report:

4L0571RUS1

Applicant:

Andrew Corporation 108 Rand Park Drive Garner, NC 27529

Equipment Under Test: (E.U.T.)

TFAH 80/85/19

In Accordance With:

FCC Part 22, Subpart H Cellular Band Repeaters

**Tested By:** 

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

70-7iilet

Authorized By:

Tom Tidwell, Frontline Group Manager

Date:

9/1/04

Total Number of Pages:53

EQUIPMENT: TFAH 80/85/19

### Test Report No.: 4L0571RUS1

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EQUIPMENT: TFAH 80/85/19

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### Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: TFAH 80/85/19

Serial No.: 043003403

#### 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	$\square$	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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EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

## Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	22.913(a)	500W ERP	Complies
Occupied Bandwidth	22.917(c)	Input/Output	Complies
Spurious Emissions at Antenna Terminals	22.917	-13 dBm	Complies
Field Strength of Spurious Emissions	22.917	-13 dBm E.I.R.P.	Complies
Frequency Stability	22.355	1.5 ppm	NA

**Footnotes:** 

•

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

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## Section 2. General Equipment Specification

Frequency Range: Downlink:   Sequency Range: Uplink:   NA   Type of Modulation and   Designator:   Output Impedance:   So ohms	Supply Voltage Input:	115 Vac		
Frequency Range: Uplink:   NA   Type of Modulation and Designator:   CDMA   GSM   NADC   EDGE   AMPS   (F9W)   (GXW)   (DTW)   (DTW)	Frequency Range: Downlink:	869 – 894 MHz	Z	
Type of Modulation and Designator:CDMA (F9W)GSM (GXW)NADC (D7W)EDGE (F8W, F1D)AMPS (SW, F1D)Output Impedance:50 ohmsRF Output (Rated):Downlink:Modulation Modulation1 Carrier 2 412 Carriers 2 41	Frequency Range: Uplink:	NA		
Output Impedance:     50 ohms       RF Output (Rated):     Downlink:	Type of Modulation and Designator:	CDMA G (F9W) (G	GSM NADC XW) (D7W)	EDGE AMPS (D7W) (F8W, F1D)
<b>RF Output (Rated):</b> Downlink: Modulation 1 Carrier 2 Carriers	Output Impedance:	50 ohms		
A = 1 = 24 04	RF Output (Rated): Downlink:	Modulation	1 Carrier	2 Carriers
Analog 34 24		Analog	34	24
CDMA 28 21.5 GSM 34 24		CDMA	28	21.5
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		EDGE	30.5	24
TDMA 31.5 22.5		TDMA	31.5	22.5
Frequency Translation:F1-F1F1-F2N/A	Frequency Translation:	F1-F1	<b>F1-F2</b>	N/A
		$\bowtie$		
Duplexer Fullband			Duplexer	Fullband
Band Selection:SoftwareChangeCoverage	Band Selection:	Software	Change	<b>Coverage</b>

EQUIPMENT: TFAH 80/85/19

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#### **Description of Operation**

TFAH 80/58/19 is a fiber based tri-band repeater operating in the 800 MHz SMR, the 800 MHz cellular and the 1900 MHz PCS bands

#### System Diagram



EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

### Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 8/30/04

Test Results: Complies.

#### **Test Data:**

Direction	Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)
Downlink	AMPS	24	27
Downlink	CDMA	21.5	24.5
Downlink	GSM	24	27
Downlink	NADC	22	25
Downlink	CDPD	22.5	25.5

**Equipment Used:** 1036-1065-1604-1629

**Measurement Uncertainty:** +/- 1.7 dB

**Temperature:** 25 °C

**Relative Humidity:** 40 %

PARA. NO.: 2.1049

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

#### Section 4. **Occupied Bandwidth**

NAME OF TEST: Occupied Bandwidth

TESTED BY: David Light

## DATE: 8/30/04

**Test Results:** 

Complies.

Test Data:

See attached plots

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### Test Data – Occupied Bandwidth

					Dallas Headquarters:
					802 N. Kealy
					Lewisville, TX 75057
					Tel: (972) 436-9600
					Fax: (972) 436-2667
Nem	nko Dallas, Inc.				
Data Diat	·	0,	auniad Day	ndwidth	
Data Flot		<u>U(</u>	cupieu bai	llawiatii	
Page 1 of	f <u>2</u>				Complete X
Job No.:	4L0571	Date:	8/30/2004		Preliminary:
Specification:	PT22	Temperature(°C):	25		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	CELL BAND AMPLI	IFIER			
Configuration:	TX				
Sample Number:	1				
Location:	Lab 1		RBW: R	efer to plots	Measurement
Detector Type:	Peak		VBW: R	efer to plots	Distance: NA m
			_	<u> </u>	
Test Equipm	ent Used				
Antenna:		Direc	tional Coupler		
Pre-Amp		Direc	Cable #1	1629	
Filter			Cable #2	1027	
Pagaivar:	1026		Cable #2:		
Receiver:	1036				
Attenuator #1	1065		Cable #4:		
Attenuator #2:	1604		Mixer:		
Additional equip	ment used:				
Measurement Un	certainty: +/-1.7	dB			
		Marker 1 [11]		кви	
Ref		11	.45 dBm	VBW	300 Hz Mixer -10 dBm
39.	4 dBm	880.00502	004 MHz	SWT	1.7 s Unit dBm
39.4			0011112	3,11	
30	∣.5 ØB Offs	et			▼1 [T1] 11.45 dBm
					880.00502004 MHz
30			1		1 [T1]0.01 dB
					-10.04008016 kHz
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-10					
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4.0				<b>W</b>	
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	N 1.				\all
-50-1-					
		MAZ MANA 🖡			
<b>VV</b>		an nad			
60.6					
Cent	er 880 MHz		3 k	HZ/	Span 30 kHz
Date:	30.AUG.2	2004 10:48:10			
Notes:	ANALOG OUTPU	T			
	MAX POWER 24	dBm			
	2 kHz Tono - 2 5 k	Hz Deviation			
1	2 KHZ 10HE - 2.5 K	112 Deviation			

EQUIPMENT: TFAH 80/85/19

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#### Test Data – Occupied Bandwidth



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



### Test Report No.: 4L0571RUS1

### Test Data – Occupied Bandwidth

Nemko	Dallas, Inc.	mk	0				Dalla Lew Tel: Fax	as Headquarte 802 N. Kealy isville, TX 750 (972) 436-96 : (972) 436-26	9 <b>75:</b> 957 600 667	
Data Plot			Occ	upied Bai	ndwidth					
Page <u>1</u> of <u>2</u>							Complete	Х		
Job No.: 4L0	571	_	Date:	8/30/2004			Preliminary:			
Specification: PT2 Tested By: Day	2 id Light	Temp Relative F	erature(°C):	25						
E.U.T.: CEL	L BAND AMPLI	FIER	iumuny(%)	40						
Configuration: TX										
Sample Number:	1									
Location:	Lab 1 Peak			RBW: Re	efer to plots		Measurement Distance:	ΝΔ τ	n	
Detector Type.	I Cak			VDW. K	lier to plots		Distance.	10/1 1		
Test Equipment U	Used									
Antenna:			Directio	onal Coupler:	1620					
Pre-Amp:				Cable #1:	1629					
Receiver:	1036			Cable #3:						
Attenuator #1	1065			Cable #4:						
Attenuator #2:	1604			Mixer:						
Measurement Uncertai	inty: +/-1.7 c	lB								
	·	Marker	1 1 1 1 1		квы	माह		- <u>Att</u>	्रात्म	
Ref Lv 40 dB	1 m	880	-7. 1.712364	11 dBm 73 MHz	VBW SWT	30 k 7 m	:Hz M ns Ur	ixer nit	-10 dBm dBm	1
31.1	dB Offs	e t				▼1	[T1]	- 7	<sup>7</sup> .11 dBm	A
30	_					. 1	88	0.7123E	3473 MHz	
							-	1.40501	1002 MHz	
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					uN L					
10		- Maria	M. Marca	Martin	mun	may	m		<sup> </sup>	
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-60 <b>L</b>	880 MH7	I		246	kHz/	I		Span 2	2.46 MH7	1
Date:	30.406 2	004 09	:17:59	240						
Notes: CD	MA OUTPUT									
MA	X POWER 28 d	lBm								

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

#### Test Data – Occupied Bandwidth



 Ballas Headquarters:

 802 N. Kealy

 Lewisville, TX 75057

 Tel: (972) 436-9600

 Fax: (972) 436-2667

Ner	nko Dallas, Ind									
Data Plot	ţ		Occ	upied Ba	ndwidth					
Page <u>2</u> o	f 2									
Job No.:	4L0571		Date: 8/3	0/2004						
Specification:	PT22	Temp	perature(°C): 25							
Tested By:	David Light	Relative	Humidity(%) 40							
E.U.T.:	CELL BAND AM	PLIFIER								
Configuration:	TX									
					RBW	30 1	KHZ R	F Att	211 dB	
Ref	Lvl				VBW	30 H	kHz M	ixer	-10 dBm	1
8.9	3 dBm				SWT	7 r	ns U	nit	dBm	1
8.9										
										A
0										
-10										
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-91.1	ter 880 M		I	246			i	Soan '	2 46 MHz	
			40.00	240	11127			span .	2.40 1112	
Jate:	30.406	.2004 09	19:38							
Notes:	CDMA INPUT									
L										

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### Test Data – Occupied Bandwidth

	Ne	mk	•				Dal Le Te	las Headquar 802 N. Kealy wisville, TX 75 I: (972) 436-9	057 600	
Nen	nko Dallas, Inc						Fa	x: (972) 436-2	667	
Data Plot		<u>.</u>	Occ	cupied Ba	ndwidth					
Page <u>1</u> o	f <u>2</u>			0/00/0004			Complet	e X		
ob No.:	4L0571 PT22	Temp	Date:	8/30/2004			Preliminary	:		
Fested By:	David Light	Relative H	umidity(%)	40						
E.U.T.:	CELL BAND AM	PLIFIER								
Configuration:	TX									
ample Number:	1									
ocation: Detector Type:	Lab 1 Peak			RBW: R VBW: R	efer to plots		Measuremen Distance	t :: NA	m	
				<u>-</u>						
<u>Fest Equipm</u>	ent Used		Directi	onal Couplar:						
re-Amp:			Dilecu	Cable #1:	1629					
filter:				Cable #2:						
Receiver:	1036			Cable #3:						
Attenuator #1	1065			Cable #4:						
Attenuator #2:	1604			Mixer:						
Additional equip Aeasurement Ur	certainty: +/-	7 dB								
~								~		
		Harker	6	48 dBm	KBW VBW	3 K 3 K	HZ RI HZ M	- AII ixer	20 aB −10 dB	m
39.	.4 dBm	880	.137274	-55 MHz	SWT	280 m	is Ur	nit	dBr	m
39.4							1.7.4.7		40.00	Ъ
50		Set				• 1	86	n 13727	7455 MH-	n <mark>A</mark>
30						1	[T1]	-C	1.32 dB	-
				. A IL	MA.A		-27	2.54509	3018 kHz	z
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Cen	ter 880 MH	łz		100	kHz∕			Spa	an 1 MHz	Z
ate:	30.AUG	.2004 10	:09:21							
Notes:	GSM OUTPUT									
	MAX POWER	34 dBm								

EQUIPMENT: TFAH 80/85/19

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#### Test Data – Occupied Bandwidth



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### Test Data – Occupied Bandwidth

							Dali	802 N. Kealv	815.	
$(\mathbf{N})$		$\overline{\mathbf{n}}$					Lev	visville, TX 750	)57	
							Tel	: (972) 436-96	300	
							Fax	(972) 436-26	67	
Nemk	o Dallas, Inc.									
Data Plot			Осс	upied Ba	ndwidth					
Page 1 of 2			<u></u>	upreu 24			Complete	Х		
ob No.: 41	L0571		Date:	8/30/2004			Preliminary:			
pecification: P	T22	Temp	erature(°C):	25			2			
Tested By: D	avid Light	Relative H	Humidity(%)	40						
LU.T.: C	ELL BAND AMPLI	FIER								
onfiguration: T	X									
ample Number:	1									
ocation:	Lab 1			RBW: R	efer to plots		Measurement			
etector Type:	Peak			VBW: R	efer to plots		Distance	NA 1	n	
Cost Fauinmon	t Used									
ntenna:	<u>t Oseu</u>		Directi	onal Coupler:						
re-Amp			Directi	Cable #1	1629					
ilter:				Cable #2:	/					
eceiver:	1036			Cable #3:						
ttenuator #1	1065			Cable #4:						
Attenuator #2:	1604			Mixer:						
dditional equipme	nt used:									
feasurement Uncer	rtainty: +/-1.7	dB								
<b>\$</b>		Marker	1 [[1]]		кви	З К	Hz R	- Att	20 dB	
😽 Ref L	v 1		-1.	07 dBm	VBW	ЗК	Hz M	ixer	–10 dBr	n
39.4	dBm	880	141282	57 MHz	SWT	280 m	ns Ur	nit	dBr	n
39.4 30.	5 dB Offs	e t				▼1	ET 1 1	1		]
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30.6 <b>L</b>				L			I	<u> </u>	<u> </u>	_
Cente	r 880 MHz			100	kHz∕			Spa	n 1 MHz	-
ate:	30.AUG.2	2004 10	:21:24							
Notes: E	DGE OUTPUT									
N	1AX POWER 30.	5 dBm								

EQUIPMENT: TFAH 80/85/19

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#### Test Data – Occupied Bandwidth



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### Test Report No.: 4L0571RUS1

### Test Data – Occupied Bandwidth

(NT)								802 N. Kealy		
UNU	— \` ( ÷	3	$(\cdot)$					Lewisville, TX 75	057	
								Tel: (972) 436-9	600	
Nem	ko Dallas, Inc	_						Fax: (972) 436-2	667	
ata Diat			00	unied Bar	adwidth					
Page 1 of	2		00	<u>cupicu Dai</u>	luwiuii		Comp	lete X		
No ·	41.0571		Date:	8/30/2004			Prelimina	rv.		
cification:	PT22	Tem	nerature(°C):	25			1 reminin			
ted By:	David Light	Relative	Humidity(%)	40						
I.T.:	CELL BAND AM	PLIFIER								
nfiguration:	TX									
nple Number:	1									
ation:	Lab 1			RBW: 11	kHz		Measurem	nent		
ector Type:	Peak			VBW: 11	kHz		Dista	nce: NA	m	
st Equipme	ent Used									
enna:			Direct	ional Coupler:						
-Amp:				Cable #1:	1629					
er:				Cable #2:						
eiver:	1036			Cable #3:						
enuator #1	1065			Cable #4:						
enuator #2:	1604			Mixer:						
litional equipr	ment used:									
asurement Un	certainty: +/-1	.7 dB								
		Marker	1 [T1]		КВМ	1 K	Hz	R⊢ Att	20 dB	5
Ref	∟v1		1	.72 dBm	νвы	1 k	Hz	Mixer	-10 dB	۱m
39.	4 dBm	88	0.01515	531 MHz	SWT	320 m	15	Unīt	dB	5m
3.4 30	.5 dB Off	set				▼1	[T1]		1.72 dB	m
								980.01519	5 <b>5</b> 31 MH	Z
30						⊿1	[T1]	(	.14 dB	_
								-32.56513	3026 kH	z
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+ - ·	30.AUG	.2004 10	1:38:37							
Notes:	TDMA OUTPU	Г								

EQUIPMENT: TFAH 80/85/19

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#### Test Data – Occupied Bandwidth



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Test Report No.: 4L0571RUS1

## Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 8/30/04

Test Results: Complies.

Test Data:

See attached plots

### Test Report No.: 4L0571RUS1

N									Dalla	<b>as Headquarte</b> 802 N. Kealy <i>r</i> isville, TX 750	<b>≱rs:</b> ⊎57	
									Tel: Fax	(972) 436-96 :: (972) 436-26	00 67	
Ner	nko Dallas,	Inc.	Snur	ious Fmi	esions at	Ant	onno T	Forminals				
Page 1 o	f 3		Spur	IOUS LIIII	<u>5510115 at</u>	Am	enna	erminais	Complete	x		
Job No.:	4L0571			Date:	8/30/2004				Preliminary:	<u></u>		
Specification:	PT22		Temp	erature(°C):	25							
Tested By:	David Light		Relative I	lumidity(%)	40							
E.U.T.:	CELL BAND	AMPLIFIE	R									
Configuration:	TX											
Sample Number	: <u>1</u>				DDW	D . f	1		M			
Location: Detector Type:	Lab I Peak				KBW: VBW:	Refer	to plots		Distance	ΝΔ π	n	
Detector Type.	I Cak				VDW.	Refer	to piots		Distance.	<u></u> _		
Test Equipm	ent Used											
Antenna:				Direct	ional Coupler:							
Pre-Amp:					Cable #1:	1	629					
Filter:	1026				Cable #2:							
Attenuator #1	1056				Cable #3:							
Attenuator #2:	1604				Mixer:							
Additional equip	oment used:											
Measurement U	ncertainty:	+/-1.7 dB										
6 Do		IM:	arker	2 [11]			квм	300	Hz RH	- Att	20 dB	
Ref	Lv1			23	.71 dBm	I.	νвμ	300	Hz M	ixer	-10 dBm	ı
39	.4 dBm		865	9.30000	000 MHz		SMT	56	s Ur	nit	dBm	ı
39.4	).5 dв (	⊃ffset				1.		₹2	[T1]	23	.71 dBm	
				LI	. МІГСН	±шк	: P	ASSED	86	9.30000	000 MHz	A
30								▽1	[T1]	9	.63 dBm	1
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-30						N	Yym	h hlu a sh		My wel		
CD C WIN	-northand	num / hu	Man	Million	4 Marco	·	0.4	- when	man.	- www	Mandama	l l
Cen	ter 869	MHz			. 100	кн	z/			Spa	in 1 MHz	
Date:	30.4	NG.201	14 1N	:54:57								
Notes:	LOWER	AND FDC	7									
110105.	2 CHANNE	LS AT 24	Bm EAC	H								
	ANALOG											
•	-											

#### EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1



#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nemko Dallas, Inc.	mko		Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667
Data Plot	Spurious Emissions at A	Antenna T	<u>Ferminals</u>
Page 3 of 3           pb No.:         4L0571           pecification:         PT22           'ested By:         David Light           .U.T.:         CELL BAND AMPLIFIE           configuration:         TX	Date: 8/30/2004 Temperature(°C): 25 Relative Humidity(%) 40 ER		
Ref Lvl	arker 1 []]] 34.19 dBm	КВМ КВМ	1 MHz RF Att 20 dB 1 MHz Mixer –10 dBm
39.4 dBm	874.86973948 MHz	SWT	90 ms Unit dBm
30 - 50 - 50 - 50 - 50 - 50 - 50 - 50 -			IT11       34.19 dBm         874.86973948 MHz         IT11         IT11         874.86973948 MHz         IT11         IT111         IT111         IT111         IT111         IT111
50.6 Start 30 MHz	897	MHz/	Stop 9 GHz
Ate:         30.AUG.201           Notes:         TX 880 MHz @ 34 dB	04 10:51:23 Sm		
The spectrum was sea ANALOG	rched in detail. This plot is a true indi	cation of the o	emissions detected.

### Test Report No.: 4L0571RUS1

Nen	nko Dalla	es, Inc.	<b>nk</b>	0						allas Headquart 802 N. Kealy Lewisville, TX 750 Tel: (972) 436-96 Fax: (972) 436-26	<b>ers:</b> 057 600 667	
Data Plot			Spur	ious Emis	ssions at	Anter	ına T	<b>Ferminal</b>	s			
Page 1 of	f 3		<u></u>						Comp	ete X		
Job No.:	4L0571			Date:	8/30/2004				Prelimina	ry:		
Specification:	PT22		Temp	perature(°C):	25							
Tested By:	David Ligh	ıt	Relative I	Humidity(%)	40							
E.U.T.:	CELL BAI	ND AMPLIF	IER									
Configuration:	TX											
Sample Number:	1											
Location:	Lab 1	_			RBW:	Refer to p	olots		Measurem	ent		
Detector Type:	Peak	_			VBW:	Refer to p	olots		Dista	nce: NA 1	m	
Test Equipm	ent Used											
Antenna:				Directi	onal Coupler:							
Pre-Amp:		_			Cable #1:	162	9					
Filter:		_			Cable #2:							
Receiver:	1036	_			Cable #3:							
Attenuator #1	1065				Cable #4:							
Attenuator #2:	1604				Mixer:							
Additional equip	ment used:											
Measurement Un	certainty:	+/-1.7 d	В									
			Marker	1 [[1]]			кви	30	KHZ	RF Att	20 dB	
Ref	Lv1			8.	.10 dBm	1	νвμ	30	kHz	Mixer	-10 dBm	1
39.	.4 dBm		869	9.700000	00 MHz		SWT	14	ms	Unit	dBr	ı
39.4	15 HB	Offse	s +	1	1	<b>—</b>		<b>T</b> 1	17741		10 dB-	1
30		0110		LI	ИІТ СНІ	ЕСК	: P	ASSED			3.1U abm 1000 Mu-	A
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20												
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10						M	And	a mana	nonal	~~	munde	
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um	mon	mm	Month	angun	minu				1			
-50		<b>v</b> -										
-eo.e												
Cen	ter 86	9 MHz			500	kHz.	/			Spa	an 5 MHz	
Date:	30.	AUG.2	004 09	1:57:40								
Notes:	LOWER	BAND ED	GE									
	2 CHAN	NELS AT 2	1.5 dBm FA	СН								
	CDMA											
I	<u></u>											

### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nerr	) ko Da	llas, Inc.		(0			<b>Dall</b> Lev Tel Faz	as Headq 802 N. Ko visville, T) : (972) 43 k: (972) 43	uarters: ealy K 75057 36-9600 36-2667		
Page <u>2</u> of No.: ification: ed By:	3 4L0571 PT22 David I	ight	<u>Sp</u> T Relati	Date: 8 Date: 8 emperature(°C): 2 ve Humidity(%) 4	/30/2004 5 0	ntenna T	'erminals				
Г.: iguration:	CELL I TX	3AND AMPL	IFIER Marke	r 1 [11]		RBM		Hz	RF Att	20 dB	
Ref 39.	L∨l 4 dE	3m	8	7 93.28000	.80 dBm 000 MHz	VBW SWT	30 k 14 m	:Hz 15	Mixer Unit	–10 dB dB	m m
- <sup>4</sup> 30 30	.5 ¢	B Offs	et	L	IMIT CHE( UBAN	K : Pr <del>}EDG</del>	SSED <sup>V1</sup>	[T1]	893.2800	7.80 dBr 10000 MHz	n ∠
20				1							_
0 0	EW V	w		- Man Maria							1 M
20											
0											_
o o						handy	Manha	under	munu	mune	_
6 Cent	er 8	394 MHz	<u></u>		500	kHz∕			Sp	an 5 MHz	Z
∋: lotes:	UPPE 2 CHA CDMA	O . AUG . 2 R BAND ED NNELS AT	2004 OGE 21.5 dBm	10:02:16 EACH							

#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Ner	NC nko Dallas, Inc.	mk	0			Dalla Lew Tel: Fax	as Headquart 802 N. Kealy visville, TX 750 (972) 436-90 (972) 436-20	ers: 057 600 667		
Data Plot		<u>Spuric</u>	ous Emission	ıs at A	ntenna T	<u>'erminals</u>				
Page <u>3</u> o ob No.: pecification: 'ested By: E.U.T.: Configuration:	f 3 4L0571 PT22 David Light CELL BAND AMPL TX	Temper Relative Huu IFIER	Date: 8/30/200 ature(°C): 25 midity(%) 40	4						
Ref 39.	Lvl 4 dBm	Marker 1 879.	34.06 70174349	dBm MHz	RBW VBW SWT	1 M 1 M 90 m	Hz R Hz M Is U	F Att İxer nit	20 dB -10 dBm dBm	ו ו
30 30 20 10 1VI 0 -10 -10 -10 -20 -30	EH -13 dBm-					▼1	[T1] 8 	3, 79.7017,	4.06 dBm 4349 MHz	1MA
-50 50.6 Star	nt 30 MHz			897	MHz/			Ste	op 9 GHz	
ate: Notes:	30 . AUG . <u>TX 880 MHz @ 2</u> <u>The spectrum was</u>	2004 09: 8 dBm s searched in deta	22 : 16	rue indic	cation of the e	missions dete	cted.			

### Test Report No.: 4L0571RUS1

							Dalla	as Headquar	ters:	
(NI)							1	802 N. Kealy	0.57	
		HILL	$(\cdot)$				Lew	/ISVIIIE, 1 X /5	057	
							Tel:	(972) 436-9 (072) 436-9	600	
Nom	ko Dallas	nc					Fax	(972) 436-2	007	
to Diot	iko Dallas,	Snu:	niona Emi	coiona at A	ntonno 7	Comminala				
Bage 1 of	2	<u>spu</u>	rious Lini	ssions at P	mema	erminais	Comulato	v		
No.	41.0571		Date	8/30/2004			Proliminary:	Λ		
INO.:	4L0371	Tem		30/2004			Fielillillary.			
cincation:	P122	Tem	iperature(°C):	25						
ed By:	David Light	Relative	Humidity(%)	40						
.T.:	CELL BAND	AMPLIFIER								
figuration:	TX									
ple Number:	1		-							
ation:	Lab 1			RBW: R	efer to plots		Measurement			
ector Type:	Peak			VBW: R	efer to plots		Distance:	NA	m	
t Fauinme	ent Used									
enna:	int Useu		Directi	onal Coupler:						
Amp:				Cable #1:	1629					
er:				Cable #2:						
eiver:	1036			Cable #3:						
nuator #1	1065			Cable #4:						
muator #2.	1604			Mixer:						
litional equip	ment used:			witzer.						
asurement Un	certainty:	+/-1 7 dB								
isurenient en		iii iii da								
		Marker	2 [11]		кви	зк	HZ RE	Att	20 dB	
Ў Ref	∟∨1		11.	.34 dBm	VBM	3 k	Hz Mi	xer	-10 dBm	
39.	4 dBm	86	9.700000	00 MHz	SWT	560 m	s Ur	nit	dBm	
3.4 30	5 HB 0	ffsæt				<b>V</b> 0	FT 4 1	1 -		
			LI	МІТ СНЕС	:К : Р	ASSED'	L I I I		1.34 UBIII	A
30						$\nabla 1$	1741	α./ουοι		
						* 1	L I I I	0 0000	3.29 dbm	
							80	9.20000	JUUU MHZ	
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1 V I !	ЕМ					I MI				1MA
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-30									\ <u>\</u>	
-30 <u> </u>									4	
-30 -40									h h	
-30									<u> </u>	
30	al	10 Martine Call a MUN	4.14. Jarrah							
30 40 50	A.M.	while will will	yaha jarah	200						
30 40 50 		MHZ	yuhumahy	200	kHz/			Spa	an 2 MHz	
30 40 50 	.er 869 30.Al	<mark>у Миз Лу Цу М</mark> MHz JG. 2004 10	J. 15:01	200	kHz/			Spa	an 2 MHz	
30 40 50 Cent te: Notes:	Auriju Mu er 869 30. Al LOWER BA	<mark>у Миз ЛуШ и М</mark> MHz JG. 2004 10 <b>ND EDGE - GSM</b>	D:15:01	200	kHz/			Spa	an 2 MHz	

#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nemko Dallas, Inc.	nko		Dallas 8 Lewis Tel: Fax:	<b>5 Headquarters:</b> 02 N. Kealy sville, TX 75057 (972) 436-9600 (972) 436-2667	
Data Plot         Page 2 of 3         Job No.:       4L0571         Specification:       PT22         Tested By:       David Light         E.U.T.:       CELL BAND AMPLIFIER         Configuration:       TX	Spurious Emissions a           Date:         8/30/2004           Temperature(°C):         25           Relative Humidity(%)         40	at Antenna 1 	<u>[erminals</u>		
Mar Ref Lvl 39.4 dBm	%er 1 [11] 8.25 dB 893.80000000 MH	RBW im VBW Iz SWT	3 kH 3 kH 560 ms	z RF Att z Mixer Unit	2U dB -10 dBm dBm
39.4 30.5 dB Offset 30 20 10 1VIEW 0 -10 -20 -30 -40 -50				T11 893.800 T11 893.300	8.25 dBm 00000 MHz 5.81 dBm 00000 MHz 1MA
60.6 Center 894 MHz	20	0 kHz/	0 00 -40 U	S	pan 2 MHz
Notes: 30 . AUG . 2004 Notes: UPPER BAND EDGE - 2 CHANNELS AT 24 dB	10:16:19 GSM m EACH				

#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nemk	o Dallas, Inc.	mk	0			<b>Dall:</b> Lev Tel Fa>	as Headquart 802 N. Kealy visville, TX 750 : (972) 436-96 :: (972) 436-26	ers: 057 600 667		
Data Plot		<u>Spuri</u>	ous Emissio	ns at A	ntenna T	<u>erminals</u>				
Page 3 of 3       ob No.:     4       Specification:     P       Cested By:     D       3.U.T.:     C       Configuration:     T	L0571 T22 David Light ELL BAND AMPLIFII	Temper Relative Hu ER	Date: 8/30/200 rature(°C): 25 midity(%) 40	)4						
Ref L 39.4	۲ vl dBm	1arker 1 880.	34.55 02711423	dBm MHz	КВМ VВМ SMT	1 M 1 M 90 m	Hz RH Hz M s Ur	- Att ixer hit	20 dB -10 dB dB	m m
30 - 30 . 30 - 20 - 20 - 10 - 1 - 20 - 20 - 20 - 20	5 14B Offse 4 4 4 -13 dBm -13 dBm	t 				×1	[T1] 86	3.0.0271	4.55 dBr 1423 MH:	
60.6 Start	30 MHz 30.AUG.20	104 10:	08:10	897	MHz/			St	op 9 GH;	z
Notes: <u>1</u> 1	X 880 MHz @ 34 dl The spectrum was sea	Bm arched in deta	ail. This plot is a	true indio	cation of the er	missions dete	cted.			

### Test Report No.: 4L0571RUS1

		emk	0				Dalla Lew Tel: Fax	<b>Is Headquart</b> 802 N. Kealy isville, TX 750 (972) 436-96 : (972) 436-26	ers: 157 600 667	
Nen Data Plot	nko Dallas,	nc. Spur	ious Emis	sions at A	ntonno 7	Forminals				
Page <u>1</u> of b No.:	f <u>3</u> 4L0571 PT22	Temr	Date:	8/30/2004		<u>er minais</u>	Complete Preliminary:	Х		
ested By: U.T.: onfiguration:	David Light CELL BAND	Relative F	Humidity(%)	40						
mple Number: cation: etector Type:	1 Lab 1 Peak			RBW: <u>R</u> VBW: <u>R</u>	efer to plots		Measurement Distance:	NA 1	n	
est Equipment tenna:	ent Used		Directio	onal Coupler:	1620					
⊱Amp: ter: ceiver: tenuator #1	1036			Cable #1: Cable #2: Cable #3:	1629					
tenuator #1 ditional equip easurement Un	1604 ment used:	+/-1.7 dB		Mixer:						
S Ref 39.	Lvl .4 dBm	Marker 865	2 [11] 5. 9.700000	99 dBm 00 MHz	RBW VBW SWT	3 k 3 k 560 m	Hz RF Hz Mi s Ur	Att xer hit	20 dB -10 dBm dBm	1
9.4 ЗО	).5 dB O	ffset	LII	1IT CHE	ж : Рf	SSED <sup>▼2</sup> ▼1	[T1] 86 [T1] 86	5 9.70000 10 9.20000	.99 dBm 000 MHz .04 dBm 000 MHz	A
20 10 1VI	EW					<u> </u>				1MA
-10					J.	- "U	Ņ	<b>fi</b> 1	ų	
-20	NDEDG				/					
-30				, MA		4	Muy		M	
-50			Mary				V		<b>4</b>	
D. 6	<b>100/100/</b>	MHz		200	kHz/			Soa	n 2 MH7	
te:	30.AU	JG.2004 10	:27:46							
NOTĖS:	2 CHANNEI	ND EDGE EDGE .S AT 22 dBm EAC	H							

#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nemko Dallas, Inc.	<b>nko</b>	Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667
Data Plot         Page 2 of 3         Job No.:       4L0571         Specification:       PT22         Tested By:       David Light       1         E.U.T.:       CELL BAND AMPLIFIER       1         Configuration:       TX       1	Spurious Emissions at Antenna         Date: 8/30/2004         Temperature(°C): 25         Relative Humidity(%) 40	<u>ı Terminals</u> —
Mar Ref Lvl 39.4 dBm	7.73 dBm VB 7.73 dBm VB 893.80000000 MHz SW	W 3 RHZ RF Att 20 dB W 3 KHZ Mixer -10 dBm T 560 ms Unit dBm
30.5 dB Offset 30 20 10 10 1VIEW		PASSED <sup>▼1</sup> [T1] 7.73 dBm BS3.8000000 MHz V2 [T1] 8.29 dBm 893.3000000 MHz 1MA 1MA
-30 -40 -50 60.6 Center 894 MHz	рилини и проседение и просед При проседение и прос	Million Ming Multiply Span 2 MHz
Date: 30.AUG.2004 Notes: UPPER BAND EDGE - 1 2 CHANNELS AT 22 dB	10:28:54 CDGE m EACH	

#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nemko Dallas, Inc.	mko		Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667
Data Plot	Spurious Emissions at A	Antenna T	<b>Ferminals</b>
Page 3 of 3           ob No.:         4L0571           pecification:         PT22           ested By:         David Light           .U.T.:         CELL BAND AMPLII           onfiguration:         TX	Date: 8/30/2004 Temperature(°C): 25 Relative Humidity(%) 40		
Ref Lvl 39.4 dBm	Marker 1 [11] 30.77 dBm 874.86973948 MHz	КВМ VВМ SMT	1 MHz RFAtt 20 dB 1 MHz Mixer –10 dBm 90 ms Unit dBm
30.5 dB Offse 30 20 10 1VIEW 0 -10 -10 -10 -10 -10 -10 -10	> t	anne	I       [T1]       30.77 dBm         B74.86973948 MHz       MHz         I       I         I
-50 50.6 Start 30 MHz ate: 30.AUG.2 Notes: TX 880 MHz @ 30. The spectrum was s	897 004 10:25:04 5 dBm searched in detail. This plot is a true indic	MHz /	Stop 9 GHz

### Test Report No.: 4L0571RUS1

Nen	nko Dallas, Inc							Da L T F	allas Headqu 802 N. Ke ewisville, TX fel: (972) 430 fax: (972) 430	uarters: aly 75057 6-9600 6-2667		
Data Plot		Spur	rious Emi	ssions at A	\nte	nna 7	[erminals]					
Page <u>1</u> of	f <u>3</u>	<u></u>					<u>vi mingio</u>	Comple	ete X			
b No.:	4L0570		Date:	8/30/2004				Preliminar	y:			
ecification:	PT22	Tem	perature(°C):	25								
ested By:	CELL DAND AM	Relative	Humidity(%)	40								
onfiguration:	TX	FLITIER										
nple Number:	1											
ation:	Lab 1			RBW: R	efer to	plots		Measureme	ent			
tector Type:	Peak			VBW: R	efer to	plots		Distan	ce: NA	m		
est Equipme	ent Used		Dimati	onal Countary								
Amp:			Directi	Cable #1:	167	20						
-ruup. er				Cable #2:	102	.)						
ceiver:	1036			Cable #3								
enuator #1	1065			Cable #4								
enuator #2:	1604			Mixer:								
ditional equip	ment used:											
asurement Ur	ncertainty: +/-	1.7 dB										
		Marker	1 1111			квы	1 K	Hz F	RE Att	21	ав	
Ref	Lv1		14.	.60 dBm		νвω	1 K	Hz N	1ixer	- 10	) dBm	
39.	.4 dBm	869	9.400000	DOD MHz		SWT	2.5	s l	Jnit		dBm	
9.4		Ecolot	1	r	<u> </u>		<b>—</b> .					
30		Sel	LI	MIT CHE	ск	: P	SSED <sup>1</sup>			14.60	dBm	A
зо							70	E	169.400		PHZ	
							• 2	L I I J	iea nan	19.97		
20									.000	00000	11112	
20					Ş					1		
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1 V I	EW											1MA
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-50		hundry	hubbergh	martin		- We	all the how have	month	yhund		Unin	
-50 .6 //44,10 Cent	uh laut ter 869 MH		maderalle	100	kHz		llightun	Month	y www s	pan 1	MHz	
-50 .6 <mark>/441</mark> Cent	ter 869 MH	+z .2004 10	1:35:32	100	kHz		ulithe have	May Mon All	S	pan 1	MHz	
te:	ter 869 Mi 30.AUG	+z .2004 10	1:35:32	100	kHz	/	llell have been	hagher All	S	pan 1	MHz	
-50 	ter 869 MH 30 . AUG LOWER BANE 2 CHANNELS	+z .2004 10 EDGE AT 22.5 dBm EA		100	kHz	- \u	lleliph y pre	han the	y ward s	pan 1	MHz	

#### EQUIPMENT: TFAH 80/85/19

### Test Report No.: 4L0571RUS1



#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

Nemko Dallas, Inc.	Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667						
Data Plot	Spurious Emissions a	at Antenna '	<b>Terminals</b>				
Page 3 of 3       ob No.:     4L0570       pecification:     PT22       'ested By:     David Light       .U.T.:     CELL BAND AMPLIFIF       'onfiguration:     TX	Date: 8/30/2004 Temperature(°C): 25 Relative Humidity(%) 40 ER						
Ref Lvl	larker 1 [11] 31.51 dE	RBW 3m VBW	1 M 1 M	Hz RF Hz Mi	Att ixer	20 dB -10 dBm	ı
39.4 dBm 39.4	880.00300601 MH	IZ SWT	90 m:	s Ur	nit	dBr	1 •
30.5 dB Offset			▼1 	[T1] 88	31 0.00300	.51 dBm 601 MHz	A
10 1VIEW							1MA
-10 				nut make			
-30 -40	www.	un dram					
	04 10·26·57	JT U⊟ZZ			510	р з вни	
Notes: TX 880 MHz @ 31.5 c The spectrum was sea TDMA	dBm arched in detail. This plot is a true	indication of the	emissions dete	cted.			

### Test Report No.: 4L0571RUS1

## Section 6. Field Strength of Spurious

NAME OF TEST: Field Stren	PARA. NO.: 2.1053						
TESTED BY: Brian Boyea	DATE: 8/31/04						
Test Results:	Complies.						
Test Data:	There were no emissions detected specification of -13 dBm. The spe harmonic of the carrier (880 MHz full rated power.	within 20 dB of the ectrum was searched to the 10 <sup>th</sup> t) with the amplifier operating at					
Equipment Used: 1304-10	16-1464-1484-1485						
Measurement Uncertainty: +/- 1.7 dB							
Temperature:25 °C	2						
<b>Relative Humidity:</b> 40 %							

#### EQUIPMENT: TFAH 80/85/19

## Test Report No.: 4L0571RUS1

## **Test Setup Photos**



#### EQUIPMENT: TFAH 80/85/19

### Test Report No.: 4L0571RUS1

## Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	07/30/04	07/31/06
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
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1604	ATTENUATOR	NARDA 776B-20	NONE	N/A	N/A
1629	CABLE, 6 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A

EQUIPMENT: TFAH 80/85/19

Test Report No.: 4L0571RUS1

## ANNEX A - TEST DETAILS

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

NAME OF TEST:	RF Power Output	PARA, NO.: 2.1046
	M I Ower Output	

Minimum Standard: Para. No. 22.913(a). The maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 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.

#### Integral Antenna:

If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation GP/4 $\pi$  R<sup>2</sup> = E<sup>2</sup>/120 $\pi$  and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts

E = the maximum measured field strength in V/m

R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to an isotropic radiator

EQUIPMENT: TFAH 80/85/19

Test Report No.: 4L0571RUS1

#### NAME OF TEST: Occupied Bandwidth (Voice & SAT) PARA. NO.: 2.1049

Minimum Standard:22.917(c) The mean power of any emission removed from the<br/>carrier frequency by a displacement frequency ( $f_d$  in kHz) must be<br/>attenuated below the mean power of the unmodulated carrier (P) as<br/>follows:

(i) On any frequency removed from the carrier frequency by more than 12 kHz but not more than 20 kHz:

at least 117 log ( $f_d/12$ )

(ii) On any frequency removed from the carrier frequency by more than 20 kHz, up to the first multiple of the carrier frequency:

at least 100 log ( $f_d/11$ ) dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

#### **Method Of Measurement:**

Spectrum Analyzer Settings:

RBW: 300 Hz VBW: ≥ RBW Span: 100 kHz Sweep: Auto

Input Signal Characteristics (F3E/F3D):

RF level: Maximum recommended by manufacturer AF1 frequency: 6 kHz AF1 level: sufficient to produce 2 kHz deviation AF2 frequency: 2.5 kHz AF2 level: sufficient to produce 12 kHz deviation.

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

#### NAME OF TEST: Occupied Bandwidth (WB Data) PARA. NO.: 2.1049

Minimum Standard:22.917(c) The mean power of any emission removed from the<br/>carrier frequency by a displacement frequency (fd in kHz) must be<br/>attenuated below the mean power of the unmodulated carrier (P) as<br/>follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or  $43 + 10 \log (P) dB$ , whichever is the lesser attenuation.

#### **Method Of Measurement:**

Spectrum Analyzer Settings: RBW: 300 Hz VBW: ≥ RBW Span: 200 kHz Sweep: Auto

Input Signal Characteristics: RF level: Maximum recommended by manufacturer AF1 frequency: 10 kHz, random bit sequence AF1 level: sufficient to produce 8 kHz deviation

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

#### NAME OF TEST: Occupied Bandwidth (ST)PARA. NO.: 2.1049

Minimum Standard:22.917(c) The mean power of any emission removed from the<br/>carrier frequency by a displacement frequency ( $f_d$  in kHz) must be<br/>attenuated below the mean power of the unmodulated carrier (P) as<br/>follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or  $43 + 10 \log (P) dB$ , whichever is the lesser attenuation.

#### **Method Of Measurement:**

Spectrum Analyzer Settings: RBW: 300 Hz VBW: ≥ RBW Span: 200 kHz Sweep: Auto

Input Signal Characteristics: RF level: Maximum recommended by manufacturer AF1 frequency: 10 kHz tone AF1 level: sufficient to produce 8 kHz deviation

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

#### NAME OF TEST: Occupied Bandwidth (Digital Modulation) PARA. NO.: 2.1049

Minimum Standard: Not defined by FCC. Input vs. Output.

#### Method Of Measurement:

Spectrum Analyzer Settings: RBW: CDMA (30 kHz), GSM (30 kHz), NADC (1 kHz) and CDPD (1 kHz) VBW: ≥ RBW Span: As required Sweep: Auto

Input Signal Characteristics: RF level: Maximum recommended by manufacturer

EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

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

Minimum Standard: Para. No. 22.917(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least 43 + 10 log P. This is equivalent to -13 dBm absolute power.

#### Method Of Measurement:

Spectrum Analyzer Settings: RBW: 30 kHz (AMPS). As required for digital modulations. VBW: ≥ RBW Start Frequency: 0 MHz Stop Frequency: 10 GHz Sweep: Auto

EQUIPMENT: TFAH 80/85/19

Test Report No.: 4L0571RUS1

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

Minimum Standard:Para. No. 22.917(e). The mean power of emissions must be<br/>attenuated below the mean power of the unmodulated carrier on<br/>any frequency twice or more than twice the fundamental emission<br/>by at least 43 + 10 log P. This is equivalent to -13 dBm absolute<br/>power.

#### **Test Method:**

The maximum field strength of the spurious emission is measured at a distance of 3 meters. The device under test is then replaced with a substitution antenna of known gain with respect to a  $\frac{1}{4}$  wave dipole antenna. A calibrated signal source is used to feed the substitution antenna. The rf level to the substitution antenna is adjusted to repeat the previously measured field strength. The rf input level to the substitution antenna is the effective radiated power of the spurious emission after any correction for substitution antenna gain against a  $\frac{1}{4}$  wave dipole.

The spectrum is searched to 10 GHz.

#### EQUIPMENT: TFAH 80/85/19

#### Test Report No.: 4L0571RUS1

#### 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.

#### Table C-1

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

#### 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.

EQUIPMENT: TFAH 80/85/19

Test Report No.: 4L0571RUS1

## ANNEX B - TEST DIAGRAMS

## Test Report No.: 4L0571RUS1

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



#### Para. No. 2.1049 - Occupied Bandwidth



### Test Report No.: 4L0571RUS1

#### Para. No. 2.1051 Spurious Emissions at Antenna Terminals



EQUIPMENT: TFAH 80/85/19

### Test Report No.: 4L0571RUS1



#### Nemko Dallas

## FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: TFAH 80/85/19

### Test Report No.: 4L0571RUS1





#### EQUIPMENT: TFAH 80/85/19

### Test Report No.: 4L0571RUS1



EQUIPMENT: TFAH 80/85/19

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Para. No. 2.1055 - Frequency Stability

