Nemko Test Report:	4L0458RUS1
Applicant:	Andrew Corporation
Equipment Under Test: (E.U.T.)	MR853P
In Accordance With:	FCC Part 22, Subpart H Cellular Band Repeaters
Tested By:	Nemko Dallas Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	Tom Tidwell, Frontline Group Manager
Date:	2 August, 2004
Total Number of Pages:	70

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Nemko Dallas

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Section 1.	Summa	ry of Test Res	ults		
Manufacturer	: Andrew Corpo	oration			
Model No.:	MR853P				
Serial No.:	11				
General:	All measurement	s are traceable to	national stan	dards.	
	ere conducted on a sith FCC Part 22, Su		oment for the p	ourpose of demonstrating	
\boxtimes	New Submission			Production Unit	
	Class II Permissiv	e Change		Pre-Production Unit	
	THE TEET DEDO	NDT DEL ATEC ONL	V TO THE IT	EM(C) TECTED	

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: MR853P Test Report No.: 4L0458RUS1

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	22.913(a)	500W ERP	Complies
Occupied Bandwidth (Voice & SAT)	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 The device processes but does not produce a modulated waveform and does not perform any frequency translation.

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

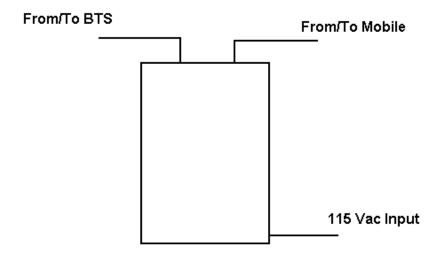
Section 2. General Equipment Specification

Supply Voltage Input:		115 Vac			
Frequency Range:	Downlink:	869 – 894 MI	Hz		
Frequency Range:	Uplink:	824 – 849 MI	Hz		
Type of Modulation and Designator:		CDMA (F9W)	GSM NAI (GXW) (DX		AMPS (F8W, F1D)
Output Impedance:		50 ohms			
Max Input Power:		+10 dBm			
RF Output (Rated):	Downlink: Uplink:	Modulation Analog CDMA GSM EDGE TDMA Modulation Analog CDMA GSM EDGE TDMA	1 Carrier 34 28 34 30.5 31.5 1 Carrier 34 28 34 30.5 31.5	2 Carriers 24 22 24 22.5 23 2 Carriers 24 22 24 22.5 23	4 Carriers 21 19 21 19.5 20 4 Carriers 21 19 21 19 21 19.5 20
Frequency Translation:		F1-F1	F1-	-F2	N/A
Band Selection:		Software	Dupl Cha		Fullband Coverage

Description of Operation

This is a booster operating in the 800 MHz SMR band using two 15 MHz variable bandwidth modules for uplink and downlink.

System Diagram



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FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Section 3. RF Power Output

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

TESTED BY: David Light DATE: 7/28/04

Test Results: Complies.

Test Data:

	Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)
Uplink	AMPS	24	27
Downlink	AMPS	22	25
Uplink	CDMA	24	27
Downlink	CDMA	22.5	25.5
Uplink	GSM	23	26
Downlink	GSM	24	27
Uplink	NADC	22	25
Downlink	NADC	24	27
Uplink	EDGE	22.5	25.5
Downlink	EDGE	23	26

Equipment Used: 1036-1064-1627-1628

Measurement +/- 1.7 dB

Uncertainty:

Temperature: 22 °C

Relative 40 %

Humidity:

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FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth PARA. NO.: 2.1049

TESTED BY: David Light DATE: 7/29/04

Test Results: Complies.

Test Data: See attached plots

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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Data Plot **Occupied Bandwidth** Page <u>1</u> of <u>5</u> Complete Job No.: 4L0458R 7/29/2004 Preliminary: PT22 Specification: Temperature(°C): 22 Tested By: David Light Relative Humidity(%) CELL BAND REPEATER E.U.T.: Configuration: Sample Number: RBW: Refer to plots Lab 1 Location: Measurement Detector Type: Peak VBW: Refer to plots Distance: NA Test Equipment Used Antenna: Directional Coupler: Pre-Amp: Cable #1: 1628 Filter: Cable #2: 1627 Receiver: 1036 Cable #3: Attenuator #1 1064 Cable #4: Attenuator #2: Mixer: Additional equipment used: +/-1.7 dB Measurement Uncertainty: Ref Lvl 40 dBm VBW 3 kHz 20.4 dB Offset 30 A 20 10 -20 -30 1 XI EUA 1 MA -40 -50 -60 Center 835 MHz 100 kHz/ Span 1 MHz RF Att RBW 3 kHz 3 kHz Ref Lvl -50 dBm VBW -50 -60 -70 В -80 -90 -100 -110 -120 -130 -140 2MA - 150 Span 1 MHz 835 MHz Date: 29.JUL.2004 EDGE Notes:

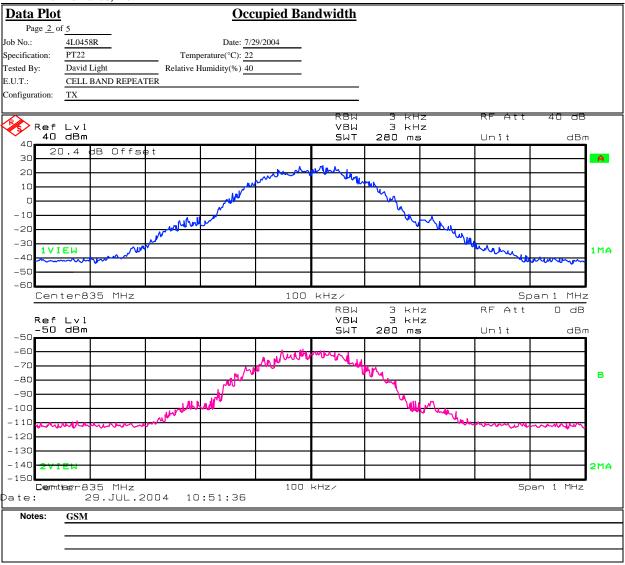
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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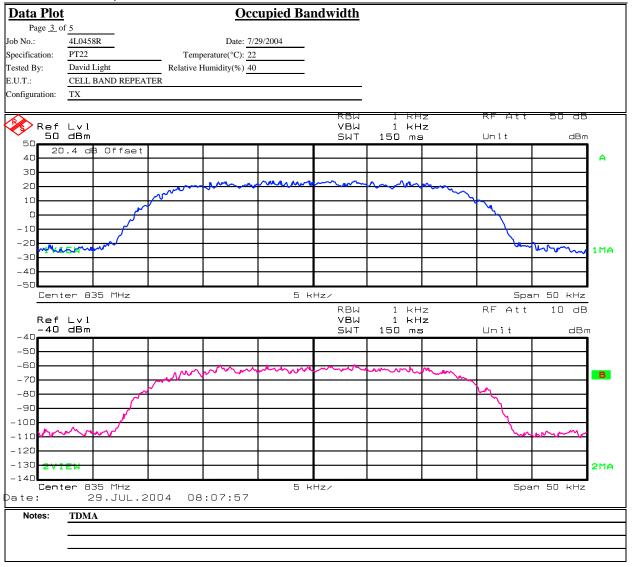
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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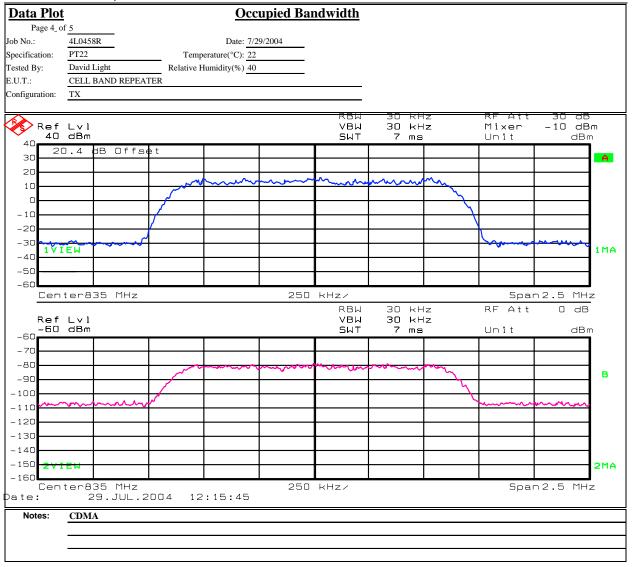
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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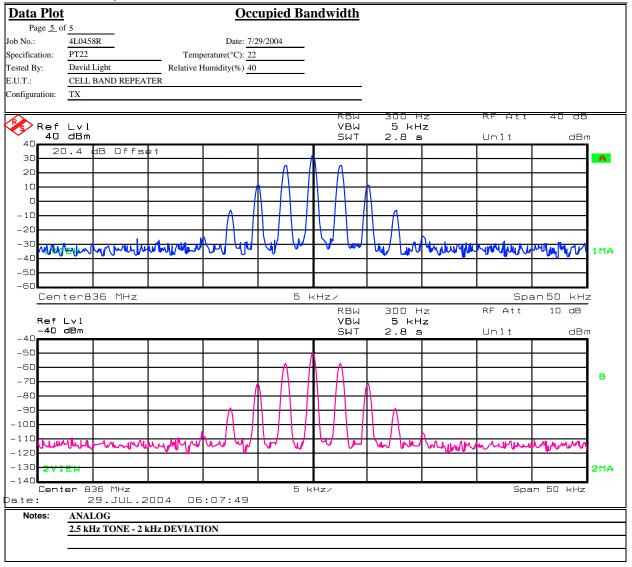
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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Tel: (972) 436-9600 Fax: (972) 436-2667

Data Plot			Occupi	ed Bar	dwidth					
Page 1 o	f <u>5</u>						Complete	X		
Job No.:	4L0458R	I	Date: 7/29	/2004			Preliminary:			
Specification:	PT22	Temperature	e(°C): 22	2			-			
Tested By:	David Light	Relative Humidi								
E.U.T.:	CELL BAND REPEA									
Configuration:	TX									
Sample Number:										
Location:	Lab 1			RRW· Re	fer to plots		Measurement			
Detector Type:	Luo 1				fer to plots		Distance:	NA n	n	
Detector Type.				VBW. KC	ici to piots		Distance.	11771	1	
Test Equipm	ent Used									
Antenna:			Directional C	oupler:						
Pre-Amp:			Ca	ble #1:	1627					
Filter:			Ca	ble #2:	1628					
Receiver:	1036			ble #3:						
Attenuator #1	1064		Ca	ble #4:						
Attenuator #2:				Mixer:						
Additional equip	ment used:			_						
Measurement Un		dB								
	· · ·				RBU	3 KHZ		RF Att	40 dB	
Ref	Lv1				VBW	3 kHz		KF HII	40 06	
40	dBm				SWT	280 ms		Unit	dBm	
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-50										
-60 L Cent	er 880 MHz	<u> </u>		100 H	«Hz /			Sn	an 1 MHz	l
-					RBW	3 kHz		RF Att	0 dB	
Ref	L v 1				VBW	3 kHz				
-50 -50	dBm				SWT	280 ms		Unit	dBm	1
-60										
			-M	7	Mah					
-70			~~~~			Na				В
-80			/~			-				
-90		 	/			1				
-100						_	A.A.			
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-120								VV	,	
-130				ļ						
-140 2V1	_,									2MA
-150	EW									ZIIH
Cemt	teer880 MHz			100	kHz/			Sp	an 1 MHz	·
Date:	29.JUL.2	2004 10:24	:51							
Notes:	EDGE									
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l										

Test Report No.: 4L0458RUS1 **EQUIPMENT: MR853P**

Test Data - Occupied Bandwidth

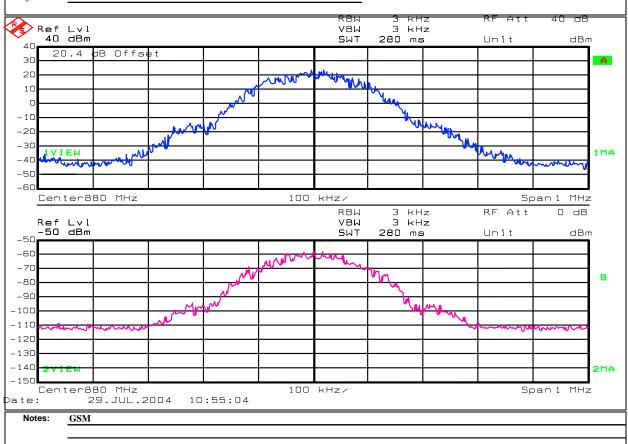


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Occupied Bandwidth Data Plot Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: Ref Lvl VBW 3 kHz 40 dBm 280 ms Unit



EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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Nemko Dallas, Inc. **Data Plot Occupied Bandwidth** Page <u>3</u> of 5 4L0458R Date: 7/29/2004 Job No.: Specification: PT22 Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 40 CELL BAND REPEATER E.U.T.: Configuration: TXRef Lvl 40 dBm VBW 1 kHz 150 ms SWT Un i t dBm 20.4 dB Offset 30 Α 20 10 – 1 C -20 -30 1VIEW 1MA -40 -50 -60 Center 880 MHz 5 kHz/ Span 50 kHz RBW 1 kHz RF Att 10 dB VBW 1 kHz -40 dBm 150 ms SWT Unit dBm -4F -50 -60 harry, -70 -80 -90 -100 -110 -120 2MA -140 Cemter880 MHz : 29.JUL.2004 5 kHz/ Span 50 kHz Date: 07:46:22 Notes: TDMA

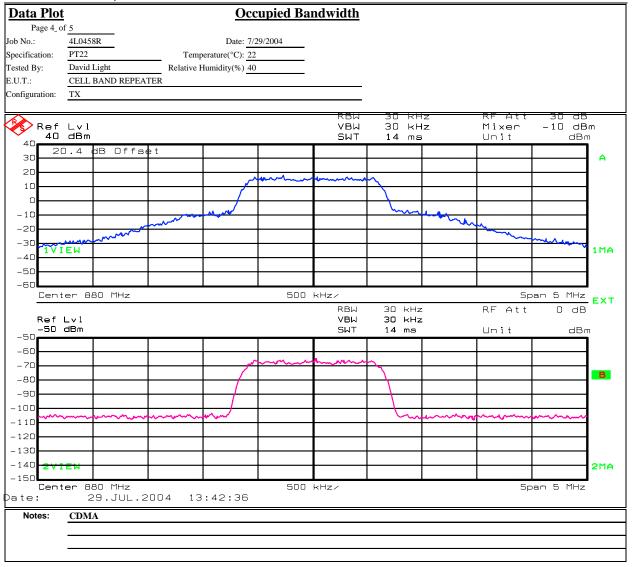
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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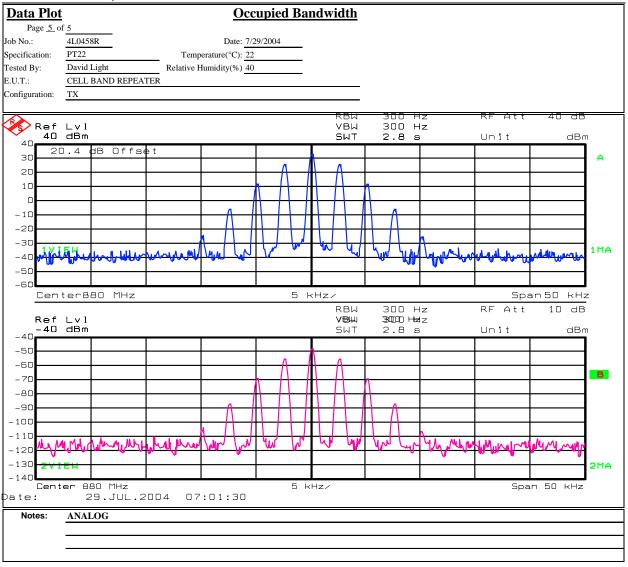
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Occupied Bandwidth



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FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals PARA. NO.: 2.1051

TESTED BY: David Light DATE: 7/29/04

Test Results: Complies.

Test Data: See attached plots

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (Analog)



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Data Plot			Spur	ious Emi	ssions at	Ante	enna T	Ferminals				
Page 1 of	<u>5</u>								Complete	X		
Job No.:	4L0458	R		Date:	7/29/2004				Preliminary:			-
Specification:	PT22		Temp	erature(°C):	22							
Tested By:	David L	ight	Relative H	Iumidity(%)	40							
E.U.T.:	CELL B	AND REPEATE	R									
Configuration:	TX											
Sample Number:	1											
Location:	Lab	1			RBW: I	Refer to	plots		Measurement			
Detector Type:	Peal	k			VBW:	Refer to	plots		Distance:	NA r	n	
Test Equipme	ent Use	<u>d</u>										
Antenna:				Directi	onal Coupler:							
Pre-Amp:					Cable #1:	16	527					
Filter:					Cable #2:	16	528					
Receiver:	103	6			Cable #3:							
Attenuator #1	106	4			Cable #4:							
Attenuator #2:					Mixer:							
Additional equip	ment used	l:										
Measurement Un	certainty:	+/-1.7 dB	_									
(RBW	300	Hz RF	Att	50 dB	
Ref	$L \vee 1$						VBW	300	Hz			
50	dBm						SWT	56	s Ur	nit	dBm	ı
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Cent		869 MHz			100	KHZ	2/			Spa	n 1 MHz	
Date:	25	9.JUL.20	34 07	:06:38								
Notes:		NNEL INTER	MOD									
		n per carrier										
	869.04	and 869.34										

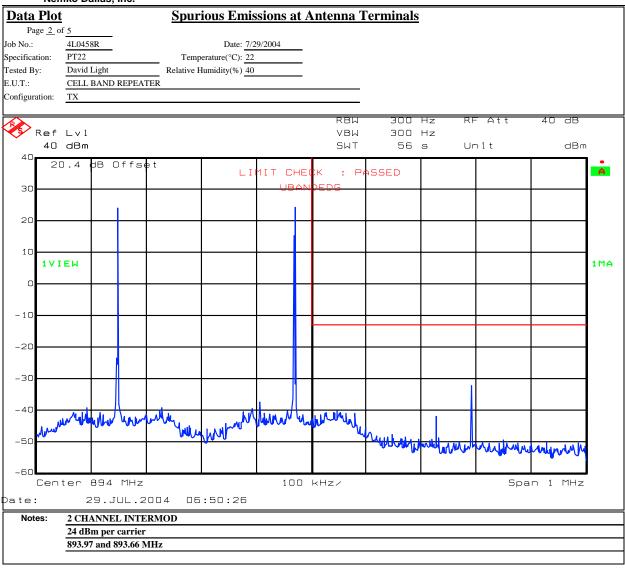
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (Analog)



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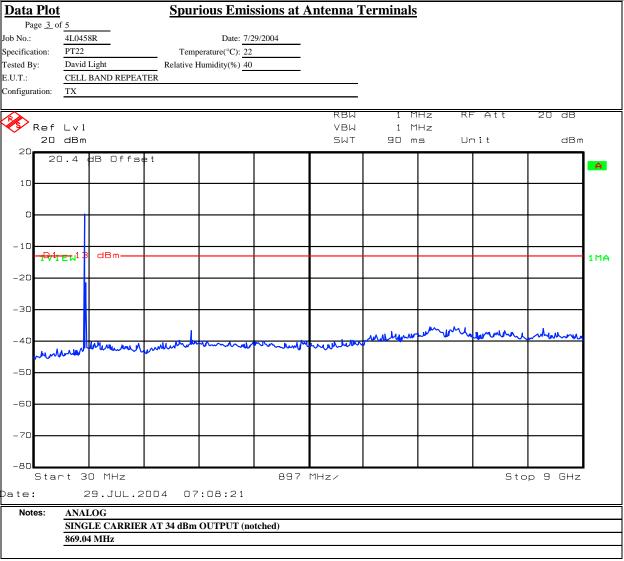
Test Data – Spurious Emissions at Antenna Terminals (Analog)



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The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (Analog)



824.04 and 824.34 MHz

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Fax: (972) 436-2667 Nemko Dallas, Inc. Data Plot **Spurious Emissions at Antenna Terminals** Page <u>1</u> of <u>5</u> Complete Date: 7/29/2004 Preliminary: Job No.: 4L0458R Specification: PT22 Temperature(°C): Tested By: David Light Relative Humidity(%) E.U.T.: CELL BAND REPEATER Configuration: Sample Number: Location: RBW: Refer to plots Measurement Detector Type: Peak VBW: Refer to plots Distance: NA Test Equipment Used Antenna: Directional Coupler: Pre-Amp: Cable #1: 1628 Filter: Cable #2: 1627 Receiver: 1036 Cable #3: Cable #4: Attenuator #1 1064 Mixer: Additional equipment used: Measurement Uncertainty: +/-1.7 dB 40 dB RBW 300 Hz Ref Lvl VBW 300 Hz 40 dBm SWT 56 s Unit dBm 20.4 dB Offset 1IT CHE SSED Α 30 20 10 1 V I E W 1MA -20 -30 -4N -50 -60 824 MHz 100 kHz/ Span 1 MHz Date: 29.JUL.2004 06:17:17 2 CHANNEL INTERMOD Notes: 24 dBm per carrier

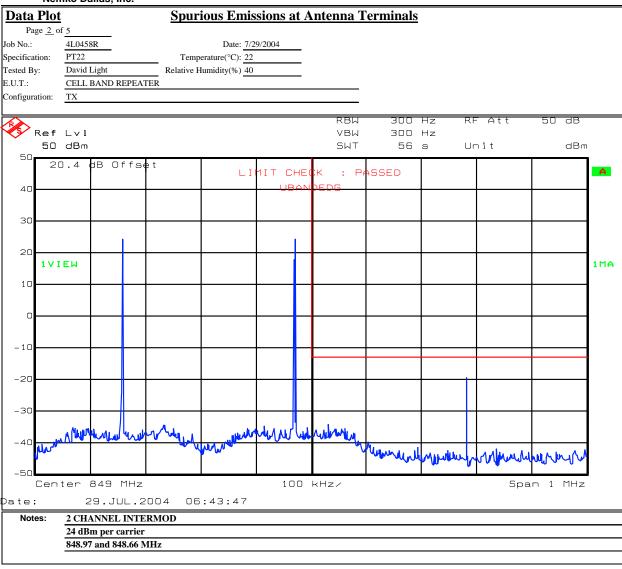
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (Analog)



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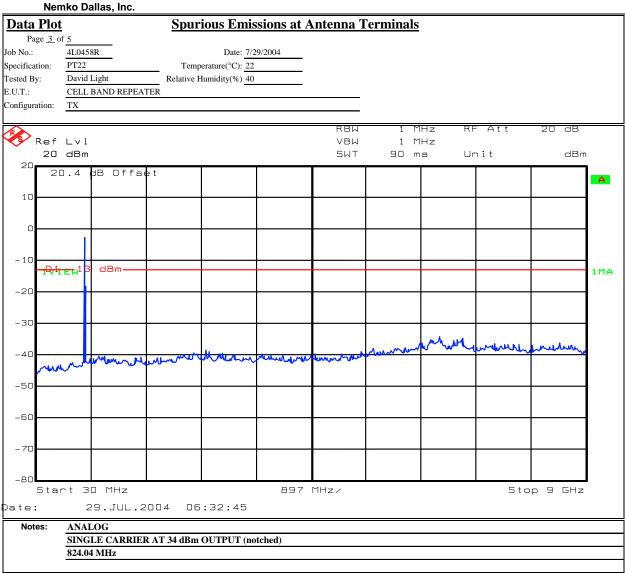


Test Data – Spurious Emissions at Antenna Terminals (Analog)



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The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (CDMA)



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Fax: (972) 436-2667 Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals** Data Plot Page <u>1</u> of <u>5</u> Complete Job No.: 4L0458R Date: 7/29/2004 Preliminary: Specification: PT22 Temperature(°C): 22 Tested By: Relative Humidity(%) David Light CELL BAND REPEATER E.U.T.: Configuration: Sample Number: Location: Lab 1 RBW: Refer to plots Measurement Detector Type: VBW: Refer to plots Distance: NA Peak **Test Equipment Used** Antenna: Directional Coupler: 1627 Pre-Amp: Cable #1: Cable #2: Filter: Receiver: 1036 Cable #3: Attenuator #1 Cable #4: Attenuator #2: Mixer: Additional equipment used: +/-1.7 dB Measurement Uncertainty: RF Att Ref Lvl VBW 30 kHz Mixer -10 dBm 40 dBm SWT 14 ms Unit dBm 20.4 dB Offset Α 1IT CHE : PASSED 30 10 1 V I E W 1MA EXT -20 -30 -40 -50 Center 869 MHz 500 kHz/ Span 5 MHz 29.JUL.2004 13:48:38 Date: 2 CHANNEL INTERMOD 22 dBm/Carrier CDMA

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Spurious Emissions at Antenna Terminals (CDMA)



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Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: RBW Ref Lvl VBW 30 kHz Mixer -10 dBm 40 dBm SWT 14 ms Unit dBm 20.4 dB Offset LIMIT CHE : PASSED A 30 20 1MA EXT - 10 -20 -30 multipultanian -40 -50 Center 894 MHz 500 kHz/ Span 5 MHz 29.JUL.2004 13:01:15 Date: Notes: 2 CHANNEL INTERMOD 22 dBm/Carrier CDMA

Test Data – Spurious Emissions at Antenna Terminals (CDMA)



802 N. Kealy

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Dallas Headquarters:

Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>3</u> of 5 4L0458R Date: 7/29/2004 Job No.: Specification: PT22 Temperature(°C): 22 David Light Relative Humidity(%) 40 Tested By: CELL BAND REPEATER E.U.T.: Configuration: TXRBW 30 dВ Ref Lvl VBW 1 MHz Mixer -10 dBm 40 dBm SWT 90 ms dBm Unit 20.4 dB Offset A 30 20 1 V I E W 1MA EXT -D 1 dBm. -20 -30 -4n -50 -60 897 MHz/ Start 30 MHz Stop 9 GHz Date: 29.JUL.2004 13:45:54 Notes: CDMA SINGLE CARRIER AT 28 dBm OUTPUT 869.7 MHz

The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (CDMA)



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Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals** Data Plot Page <u>1</u> of <u>5</u> Complete Job No.: 4L0458R Date: 7/29/2004 Preliminary: Specification: PT22 Temperature(°C): 22 Tested By: Relative Humidity(%) David Light CELL BAND REPEATER E.U.T.: Configuration: Sample Number: Location: Lab 1 RBW: Refer to plots Measurement Detector Type: VBW: Refer to plots Distance: NA Peak **Test Equipment Used** Antenna: Directional Coupler: Pre-Amp: Cable #1: 1+627 Cable #2: Filter: Receiver: 1036 Cable #3: Attenuator #1 Cable #4: Attenuator #2: Mixer: Additional equipment used: +/-1.7 dB Measurement Uncertainty: 30 dB Ref Lvl VBW 30 kHz Mixer -10 dBm 40 dBm SWT 14 ms Unit dBm 40 20.4 dB Offset SSED Α MIT CHE 30 20 10 1 V I E W 1MA -20 -30 -40 -50 Center 824 MHz 500 kHz/ Span 5 MHz 29.JUL.2004 12:07:53 Date: 2 CHANNEL INTERMOD 824.7 and 826.5 MHz 22 dBm/Carrier CDMA

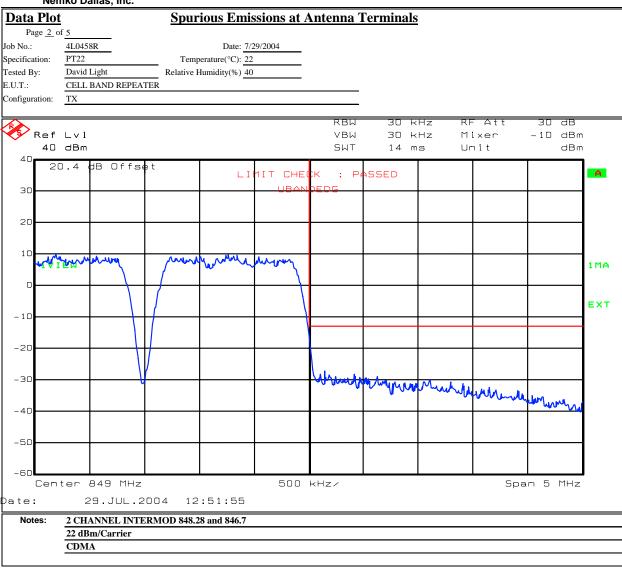
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Spurious Emissions at Antenna Terminals (CDMA)



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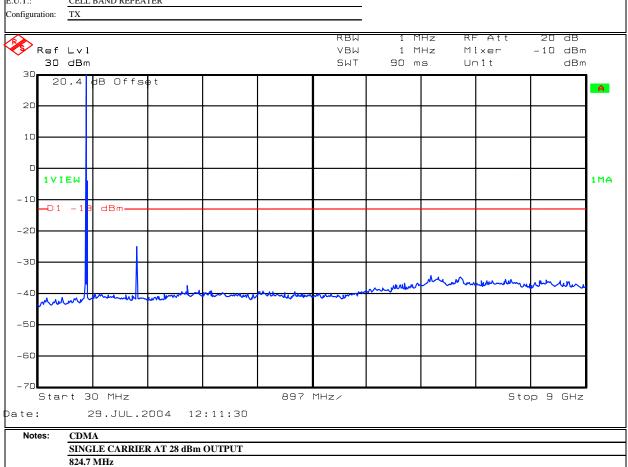
Test Data – Spurious Emissions at Antenna Terminals (CDMA)



Dallas Headquarters: 802 N. Kealy

Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667

Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>3</u> of 5 4L0458R Job No.: Date: 7/29/2004 Specification: PT22 Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 40 CELL BAND REPEATER E.U.T.: Configuration: TXRBL



The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Spurious Emissions at Antenna Terminals (EDGE)



EDGE

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

Fax: (972) 436-2667 Nemko Dallas, Inc. Data Plot **Spurious Emissions at Antenna Terminals** Page <u>1</u> of <u>5</u> Complete Date: 7/29/2004 Preliminary: Job No.: 4L0458R PT22 Specification: Temperature(°C): Tested By: David Light Relative Humidity(%) E.U.T.: CELL BAND REPEATER Configuration: Sample Number: Location: RBW: Refer to plots Measurement Detector Type: Peak VBW: Refer to plots Distance: NA Test Equipment Used Antenna: Directional Coupler: Pre-Amp: Cable #1: 1627 Filter: Cable #2: 1628 Receiver: 1036 Cable #3: Cable #4: Attenuator #1 1064 Mixer: Additional equipment used: Measurement Uncertainty: +/-1.7 dB 40 dB RBW кНz Ref Lvl VBW 3 kHz 40 dBm SWT 560 ms Unit dBm 40 20.4 dB Offset 1IT CHE SSED 30 20 1 V I EW 1MA - 10 -20 -30 Here was the second with the second -50 -60 200 kHz/ Center 869 MHz Span 2 MHz 29.JUL.2004 10:22:02 bate: Notes: 2 CHANNEL INTERMOD 22.5 dBm/Carrier 869.2 and 869.6 MHz

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Spurious Emissions at Antenna Terminals (EDGE)



Dallas Headquarters:

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

Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals Data Plot** Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: 40 dB Ref Lvl VBW 3 kHz 40 dBm SWT 560 ms Unit dBm 20.4 dB Offset 1IT CHE Α SSED 30 20 1 V I EW 1MA -20 -30 -40 Vegen produced person played and general -50 -60 200 kHz/ Center 894 MHz Span 2 MHz 29.JUL.2004 Date: 10:36:16 Notes: 2 CHANNEL INTERMOD 22.5 dBm/Carrier 893.8 and 893.3 MHz EDGE

Test Data – Spurious Emissions at Antenna Terminals (EDGE)



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Tel: (972) 436-9600 Fax: (972) 436-2667

Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>3</u> of 5 4L0458R Job No.: Date: 7/29/2004 Specification: PT22 Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 40 CELL BAND REPEATER E.U.T.: Configuration: TXRBW 30 dB VBW 1 MHz 30 dBm SWT 90 ms dBm Unit 20.4 dB Offset Α 20 1 V I E W 1MA dBm. -20 -30 -40 -50 -60 _ 897 MHz/ Start 30 MHz Stop 9 GHz 29.JUL.2004 10:19:53 Date: 1 EDGE CHANNEL AT 30.5 dBm OUTPUT 869.2 MHz

The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (EDGE)



EDGE

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

Fax: (972) 436-2667 Nemko Dallas, Inc. Data Plot **Spurious Emissions at Antenna Terminals** Page <u>1</u> of <u>5</u> Complete 7/29/2004 Preliminary: Job No.: 4L0458R Date: Specification: Temperature(°C): Tested By: Relative Humidity(%) 45 David Light E.U.T.: CELL BAND REPEATER Configuration: TX Sample Number: Location: Lab 1 RBW: Refer to plots Distance: NA Detector Type: VBW: Refer to plots Peak Test Equipment Used Directional Coupler: Pre-Amp: Cable #1: 1627 Cable #2: Filter: 1628 Receiver: 1036 Cable #3: Cable #4: Attenuator #1 Attenuator #2: Mixer: Additional equipment used: Measurement Uncertainty: +/-1.7 dB Ref Lvl 3 kHz VBM 40 dBm SWT 560 ms Unit dBm 20.4 dB Offse IIT CHE SSED Α 30 10 1MA 1VIEW — 1 C -20 -30 -50 -60 Center 824 MHz 200 kHz/ Span 2 MHz 29.JUL.2004 10:59:54 Date: Notes: 2 CHANNEL INTERMOD 22.5 dBm/Carrier 824.2 and 824.4 MHz

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Spurious Emissions at Antenna Terminals (EDGE)



Dallas Headquarters:

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

Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals Data Plot** Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 45 E.U.T.: CELL BAND REPEATER Configuration: 40 dB RBW Ref Lv1 3 kHz VВW 40 dBm SWT 560 ms Unit dBm 20.4 dB Offset MIT CHE Α : PASSED 30 20 1MA -20 -30 -40 the orthogogath lander when when -50 -60 200 kHz/ Center 849 MHz Span 2 MHz 29.JUL.2004 Date: 10:44:52 Notes: 2 CHANNEL INTERMOD 22.5 dBm/Carrier 848.8 and 848.2 MHz EDGE

Test Data – Spurious Emissions at Antenna Terminals (EDGE)



802 N. Kealy Lewisville, TX 75057

Dallas Headquarters:

Tel: (972) 436-9600 Fax: (972) 436-2667

Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>3</u> of 5 4L0458R Job No.: Date: 7/29/2004 Specification: PT22 Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 45 CELL BAND REPEATER E.U.T.: Configuration: TXRBL 30 dB Ref Lvl VBW 1 MHz 30 dBm SWT 90 ms dBm Unit 20.4 dB Offset A 20 1 V I EW 1 MA - 1C dBm--20 -30 -40 -50 -60 897 MHz/ Start 30 MHz Stop 9 GHz Date: 29.JUL.2004 10:58:28 1 EDGE CHANNEL AT 30.5 dBm OUTPUT 824.2 MHz

The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (GSM)



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

Fax: (972) 436-2667 Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals** Data Plot

Page <u>1</u> (ъ.	7/20/2004			Preliminary	- A		
Job No.:	4L0458R		Date:	7/29/2004			Preliminary	·		
Specification:	PT22		Temperature(°C):	22						
Tested By:	David Light		Relative Humidity(%)	40						
E.U.T.:		D REPEATER								
Configuration:	TX									
Sample Number	r:1									
Location:		_		RBW: R	Refer to plots		Measuremen	t		
Detector Type:		_		VBW: F	Refer to plots		Distance	: NA	m	
Test Equipn	nent Used									
Antenna:		_	Direc	tional Coupler:						
Pre-Amp:				Cable #1:	1627					
Filter:		_		Cable #2:	1628					
Receiver:	1036	_		Cable #3:						
Attenuator #1	1064	_		Cable #4:						
Attenuator #2:		_		Mixer:						
Additional equi	pment used:			_						
Measurement U	-	+/-1.7 dB								
Real Control					RBW		Hz R	- Att	40 dB	
	∟∨ l				VBW		Hz			
	dBm				SWT	560 n	ns U	⊓it	dBm	1
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	iter 869	3 MHz		200	kHz/			Spa	ın 2 MHz	-
		JUL.200	A 10.13.15					,		
Date:	∠∃.	JUL.2UU	4 10:13:15							
Notes:	2 CHANN	EL INTERM	IOD							
		arrier 869.2 a	and 869.6 MHz							
	GSM									

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (GSM)



Dallas Headquarters:

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

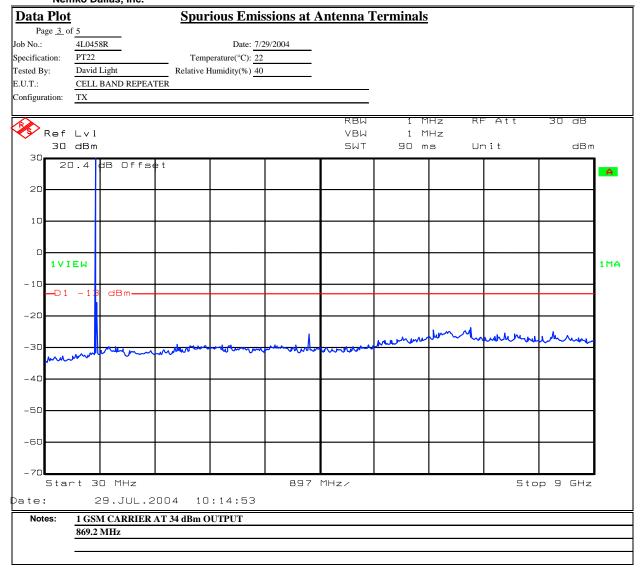
Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals Data Plot** Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: 40 dB RBW Ref Lv1 3 kHz VBW 40 dBm SWT 560 ms Unit dBm 20.4 dB Offset 1IT CHE ASSED Α 30 20 1VIEW 1MA - 10 -20 -30 -40 -50 -60l Center 894 MHz 200 kHz/ Span 2 MHz 29.JUL.2004 10:10:02 Date: Notes: 2 CHANNEL INTERMOD 24 dBm/Carrier 893.7 and 893.3 MHz GSM

Test Data – Spurious Emissions at Antenna Terminals (GSM)



Nemko Dallas, Inc.

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



The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (GSM)



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

Nemko Dallas, Inc. Data Plot **Spurious Emissions at Antenna Terminals** Page <u>1</u> of <u>5</u> Complete 7/29/2004 Preliminary: Job No.: 4L0458R Date: Specification: Temperature(°C): Tested By: Relative Humidity(%) 40 David Light E.U.T.: CELL BAND REPEATER Configuration: TX Sample Number: Location: Lab 1 RBW: Refer to plots Distance: NA Detector Type: VBW: Refer to plots Peak Test Equipment Used Directional Coupler: Pre-Amp: Cable #1: 1627 Cable #2: Filter: 1628 Receiver: 1036 Cable #3: Cable #4: Attenuator #1 Attenuator #2: Mixer: Additional equipment used: Measurement Uncertainty: +/-1.7 dB 3 kHz Ref Lvl VBW 40 dBm SWT 560 ms Unit dBm dB Offs LIMIT CHE SSED Α 30 1 V I EW 1MA - 10 -20 -30 My Complete Company of the property of the pro -50 -60 Center 824 MHz 200 kHz/ Span 2 MHz 29.JUL.2004 09:37:01 Date: Notes: 2 CHANNEL INTERMOD 24 dBm/Carrier 824.2 and 824.85 MHz GSM

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (GSM)



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

Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals Data Plot** Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: 30 dB Ref Lvl VBW 3 kHz 30 dBm SWT 560 ms Unit dBm 20.4 dB Offset 1IT CHE Α SSED 20 10 1 V I EW 1MA -20 -30 -40 -50 -60 200 kHz/ Span 2 MHz Center 849 MHz 29.JUL.2004 09:54:07 Date: Notes: 2 CHANNEL INTERMOD 24 dBm/Carrier 848.8 and 848.3 MHz GSM

Test Data – Spurious Emissions at Antenna Terminals (GSM)



Dallas Headquarters: 802 N. Kealy

Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667

Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>3</u> of 5 4L0458R Job No.: Date: 7/29/2004 Specification: PT22 Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 40 CELL BAND REPEATER E.U.T.: Configuration: TXRBW 30 dB Ref Lvl VBW 1 MHz 30 dBm SWT 90 ms dBm Unit 20.4 dB Offset A 20 1 V I EW 1MA - 1C dBm--20 -30 -40 -50 -60 897 MHz/ Start 30 MHz Stop 9 GHz Date: 29.JUL.2004 09:33:56 1 GSM CARRIER AT 34 dBm OUTPUT 824.2 MHz

The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (TDMA)



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

Ner	nko Da	ıllas, Inc.											
Data Plot			Spur	ious Emi	ssions at	Ante	nna T	Terminals	}				
Page 1 o											ζ		
Job No.:	4L0458	3R		Date:	7/29/2004				Complete Preliminary:				
Specification:	PT22		Temp	erature(°C):									l
Tested By:	David I	Light	Relative I	Humidity(%)	40								
E.U.T.:	CELL	BAND REPEA											
Configuration:	TX												
Sample Number	:1												
Location:	Lab					Refer to			Measurement				
Detector Type:	Pea	ık			VBW:	Refer to	plots		Distance	NA	1	n	
Test Equipm	ent Use	<u>ed</u>											
Antenna:				Directi	ional Coupler:								
Pre-Amp:					Cable #1:	162							
Filter:					Cable #2:		28						
Receiver:	103				Cable #3:								
Attenuator #1	106	<u> </u>			Cable #4:								
Attenuator #2:		,			Mixer:								
Additional equip Measurement Un			1D										
Measurement Of	icertainty		<u></u>										
							RBW	1 k		Αt	t	30 dB	
*	L v l						VBW	1 K				-ID	
30	dBm						SWT	2.5	s ur	nit		dBm	_
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Date:		9.JUL.2		:38:17									
Notes:		NNEL INTE											
	TDM/		9.04 and 869.3	54 MHz									
1	1 17 17 17	•											

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data - Spurious Emissions at Antenna Terminals (TDMA)



Dallas Headquarters:

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

Nemko Dallas, Inc. **Spurious Emissions at Antenna Terminals Data Plot** Page 2 of 5 Job No.: 4L0458R Date: 7/29/2004 PT22 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: 40 dB RBW Ref Lv1 VBW 1 kHz 40 dBm 2.5 s SWT Unit dBm 20.4 dB Offset Α 1IT CHE SSED 20 1VIEW 1MA -20 -30 -40 -50 -60 Center 894 MHz 100 kHz/ Span 1 MHz 29.JUL.2004 07:50:15 Date: Notes: 2 CHANNEL INTERMOD 23 dBm/Carrier 893.97 and 893.66 MHz TDMA

Test Data – Spurious Emissions at Antenna Terminals (TDMA)



Dallas Headquarters: 802 N. Kealy

Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667

Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>3</u> of 5 4L0458R Job No.: Date: 7/29/2004 Specification: PT22 Temperature(°C): 22 David Light Relative Humidity(%) 40 Tested By: CELL BAND REPEATER E.U.T.: Configuration: TXRBL 10 dB Ref Lvl VBW 1 MHz 10 dBm SWT 90 ms dBm Unit 20.4 dB Offset Α dBm--20 1 MA -30 -4C -50 When I'm -60 -70 -80 -9ol Start 30 MHz 897 MHz/ Stop 9 GHz 29.JUL.2004 07:41:59 ate: SINGLE CARRIER AT 31.5 dBm OUTPUT 869.04 MHz

The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Test Data – Spurious Emissions at Antenna Terminals (TDMA)



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

Fax: (972) 436-2667 Nemko Dallas, Inc. Data Plot **Spurious Emissions at Antenna Terminals** Page <u>1</u> of <u>5</u> Complete Job No.: 7/29/2004 Preliminary: ____ 4L0458R Date: Specification: Temperature(°C): David Light Tested By: Relative Humidity(%) 40 E.U.T.: CELL BAND REPEATER Configuration: TXSample Number: Location: Lab 1 RBW: Refer to plots VBW: Refer to plots Detector Type: Distance: NA Peak Test Equipment Used Directional Coupler: Pre-Amp: Cable #1: 1627 Cable #2: Filter: 1628 Receiver: 1036 Cable #3: Cable #4: Attenuator #1 Attenuator #2: Mixer: Additional equipment used: Measurement Uncertainty: +/-1.7 dB Ref Lvl VBW 1 kHz 40 dBm SWT 2.5 s Unit dBm 20.4 dB Offs LIMIT CHE SSED Α 30 1 V I EW 1MA

10 1VIEW 1MA

LOBNDEDG

-20 -30 -40 -50 -60 Center 824 MHz 100 kHz/ Span 1 MHz

Date: 29.JUL.2004 08:04:09

Notes: 2 CHANNEL INTERMOD 23 dBm/Carrier 824.04 and TDMA

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

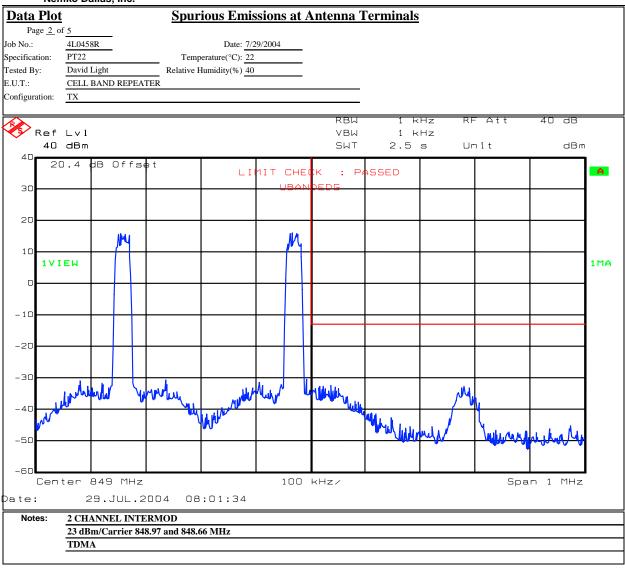
Test Data - Spurious Emissions at Antenna Terminals (TDMA)



Dallas Headquarters:

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

Nemko Dallas, Inc.

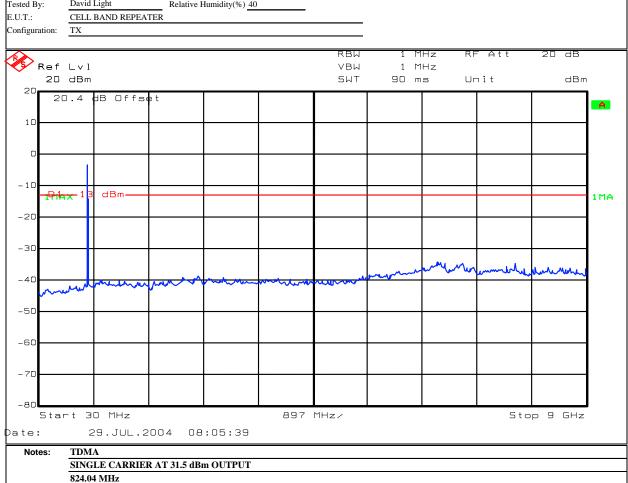


Test Data – Spurious Emissions at Antenna Terminals (TDMA)



Dallas Headquarters: 802 N. Kealy

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



The spectrum was searched in detail on 3 channels. The plot above is indicative of all channels measured.

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Section 6. Field Strength of Spurious

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

TESTED BY: Brian Boyea DATE: 7/29/04

Test Results: Complies.

Test Data: There were no emissions detected above the noise floor which

was at least 20 dB below the specification limit of -13 dBm ERP.

Equipment Used: 1304-1016-1484-1485-1464

Measurement +/- 1.7 dB

Uncertainty:

Temperature: 22 °C

Relative 40 %

Humidity:

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

				F	ERP Substit	ution Ma	thad			
Page 1 o	f 1			<u> </u>	ani Subsut	ution Me	<u>mou</u>	Complete	x	
Job No.:	4L0458R			Date:	7/30/04			Preliminary	X	-
Specification:	CFR 47, Par	rt 22	Tem	perature(°C):				1 Terminary		_
Tested By:	Brian Boyea			Humidity(%)		•				
E.U.T.:	MR803P-		- Kelative	Humanty(70)	43	•				
Configuration:	Uplink	CE					_			
Sample No:	Оринк						_			
Location:	AC 3				RBW:	1 MHz		Measurement		
		-			VBW:		_	Distance:		m
Detector Type:	Peak	-			VBW:	1 MHZ	_	Distance.	3	m
Test Equipm	ent Used									
Antenna:	1304			D	irectional Coupler:					
Pre-Amp:	1016	<u>-</u> '			Cable #1:	1484	_			
Filter:		<u>-</u> '			Cable #2:	1485	_			
Receiver:	795	•			Cable #3:	1483	_			
Attenuator #1		•			Cable #4:		_			
Attenuator #2:		-			Mixer:		_			
Additional equip	ment used:						_			
Measurement Ur	ncertainty:	+/-3.6 dB					_			
-	1.5.	a		D 1			EDD	- EDD	5.1.	
Frequency	Meter	Correction Factor		Pre-Amp Gain	Substitution Antenna Gain	Limit	ERP	ERP	Polarity	Comments
	Reading	ractor		Gain	Antenna Gam	Limit				
(MHz)	(dBm)	(dB)		(dB)	(dB)	(dBm)	(dBm)	(mW)		
1670	-64.3	33.0		32.9	9.4	-13	-54.8	0.000003	Н	Uplink 835 Channel
2505	-63.5	35.5		33	10.1	-13	-50.9	0.000008	Н	1
3340	-65.7	36.3		32.7	10.1	-13	-52.0	0.000006	Н	
4175	-64.2	34.8		33.3	10.3	-13	-52.4	0.00	Н	
5010	-64.3	38.3		32.7	10.3	-13	-48.4	0.000015	Н	
5845	-65.5	37.8		31.7	11.4	-13	-48.0	0.000016	Н	
6680	-65.5	39.2		31.6	11.5	-13	-46.4	0.000023	Н	
7515	-65.8	41.5		32.5	11.3	-13	-45.5	0.000028	Н	
8350	-65.3	42.5		33.6	11.2	-13	-45.2	0.000030	Н	
1670	-63.3	31.0		32.9	9.4	-13	-55.8	0.000003	V	Uplink 835 Channel
2505	-62.7	35.5		33	10.1	-13	-50.1	0.000010	V	Î
3340	-64.5	39.8		32.7	10.1	-13	-47.3	0.000019	V	
4175	-64.7	45.3		33.3	10.3	-13	-42.4	0.00	V	
5010	-64.7	41.3		32.7	10.3	-13	-45.8	0.000027	V	
5845	-64.8	39.8		31.7	11.4	-13	-45.3	0.000030	V	
6680	-65.7	41.3		31.6	11.5	-13	-44.5	0.000036	V	
7515	-66.7	41.8		32.5	11.3	-13	-46.1	0.000025	V	
8350	-65.0	42.8		33.6	11.2	-13	-44.6	0.000035	V	
Notes		•				•	•	•	•	-

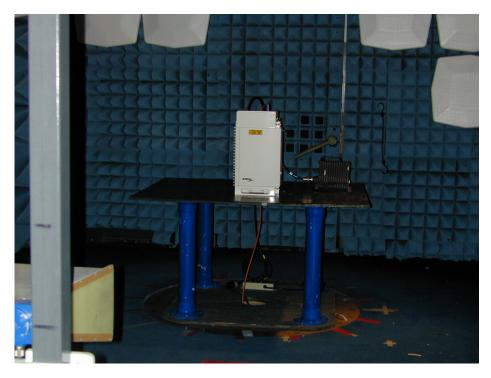
FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

						3.5				
				<u>I</u>	ERP Substit	ution Me	<u>thod</u>			
Page 1 of	f <u>1</u>							Complete	X	_
Job No.:	4L0458R			Date:	7/30/04			Preliminary		_
Specification:	CFR 47, Par	t 22	Temp	perature(°C):	23					
Tested By:	Brian Boyea	ı	Relative I	Humidity(%)	43					
E.U.T.:	MR803P-CE	Ξ					=			
Configuration:	Downlink						=			
Sample No:										
Location:	AC 3				RBW:	1 MHz	_	Measurement		
Detector Type:	Peak				VBW:	1 MHz	=	Distance:	3	<u>8</u> m
Test Equipme	ent Used									
Antenna:	1304			D	irectional Coupler:					
Pre-Amp:	1016				Cable #1:	1484	_			
Filter:					Cable #2:	1485	_			
Receiver:	795				Cable #3:		-			
Attenuator #1					Cable #4:		-			
Attenuator #2:							_			
Additional equip	ment used:				•		-			
Measurement Un		+/-3.6 dB					-			
			-							
Frequency	Meter	Correction		Pre-Amp	Substitution		ERP	ERP	Polarity	Comments
	Reading	Factor		Gain	Antenna Gain	Limit				
(MHz)	(dBm)	(dB)		(dB)	(dB)	(dBm)	(dBm)	(mW)		
1760	-67.8	33.0		32.9	9.4	-13	-58.3	0.000001	Н	Downlink 880 Channel
2640	-63.3	35.5		33.1	10.1	-13	-50.8	0.000008	Н	
3520	-64.0	35.5		32.7	10.7	-13	-50.5	0.000009	Н	
4400	-62.5	34.8		33.4	10.3	-13	-50.8	0.00	Н	
5280	-65.0	38.3		32.3	10.3	-13	-48.7	0.000014	Н	
6160	-64.7	38.7		31.9	11.7	-13	-46.2	0.000024	Н	
7040	-65.3	40.3		32.1	10.9	-13	-46.2	0.000024	Н	
7920	-66.3	41.5		32.9	11.3	-13	-46.4	0.000023	Н	
8800	-65.3	42.2		33.9	11.5	-13	-45.5	0.000028	Н	
1760	-67.5	31.0		32.9	9.4	-13	-60.0	0.000001	V	Downlink 880 Channel
2640	-62.5	35.5		33.1	10.1	-13	-50.0	0.000010	V	
3520	-64.8	43.3		32.7	10.7	-13	-43.5	0.000045	V	
4400	-61.0	45.3		33.4	10.3	-13	-38.8	0.00	V	
5280	-65.5	41.3		32.3	10.3	-13	-46.2	0.000024	V	
6160	-64.5	40.5		31.9	11.7	-13	-44.2	0.000038	V	
7040	-66.0	40.8		32.1	10.9	-13	-46.4	0.000023	V	
7920	-66.3	41.8	İ	32.9	11.3	-13	-46.1	0.000025	V	
8800	-64.8	44.8		33.9	11.5	-13	-42.4	0.000058	V	
Notes	:									_
										_

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Setup Photos – Radiated Spurious Emissions





EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1627	CABLE, 5 ft	MEGAPHASE 10312 1GVT4	N/A	CBU	CBU
1628	CABLE, 6 ft	MEGAPHASE TM26 S1S5 72	N/A	CBU	CBU
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/30/04	07/30/05
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/30/04	07/30/05
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

ANNEX A - TEST DETAILS

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

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.

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as

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.

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as

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

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

Minimum Standard: 22.917(c) The mean power of any emission removed from the

carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as

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

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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

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.

Test Method: The substitution antenna method was used to measure erp of

spurious emissions. This method is described in EIA/TIA 603. The field strength of the emission is measured and recorded. The EUT is then replaced with a substitution antenna of known gain against a dipole. The substitution antenna is fed with a calibrated signal which is adjusted until the previously recorded value is repeated. The erp of the spurious signal is the level required to repeat the previously measured level. If the substitution antenna gain is calibrated and expressed as dBi (referenced to an isotropic radiator instead of a dipole), the result is adjusted by 2.15 dB so

that the result is erp not eirp.

The spectrum is searched to 10 GHz.

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

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.

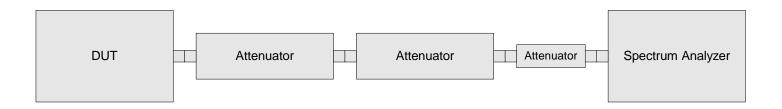
Frequency Stability With Temperature Variation:

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.

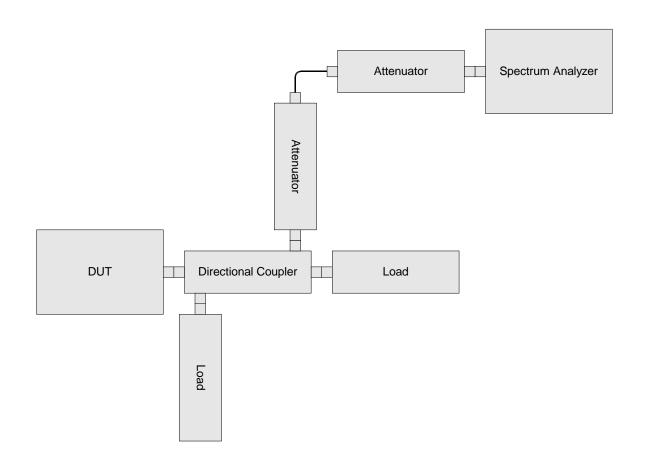
EQUIPMENT: MR853P Test Report No.: 4L0458RUS1

ANNEX B - TEST DIAGRAMS

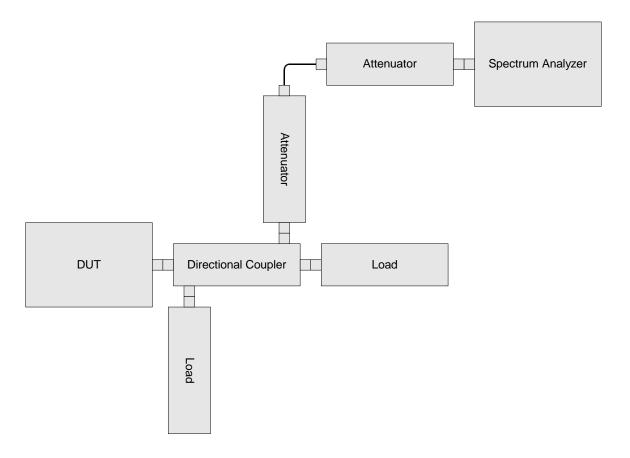
Para. No. 2.1046 - R.F. Power Output

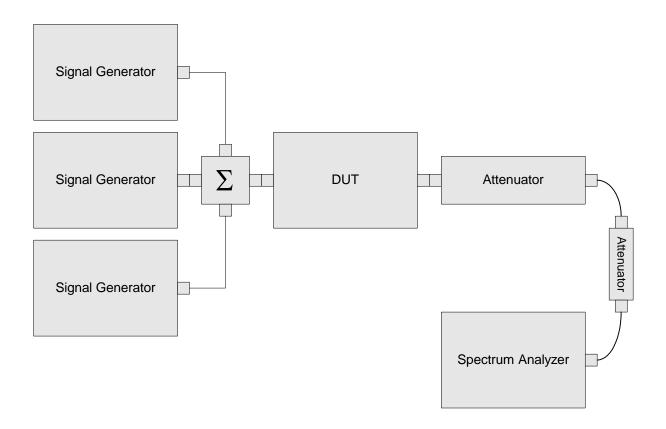


Para. No. 2.1049 - Occupied Bandwidth

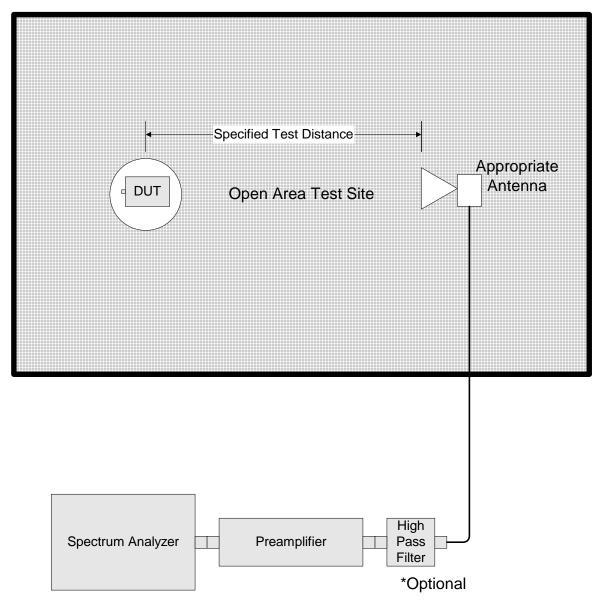


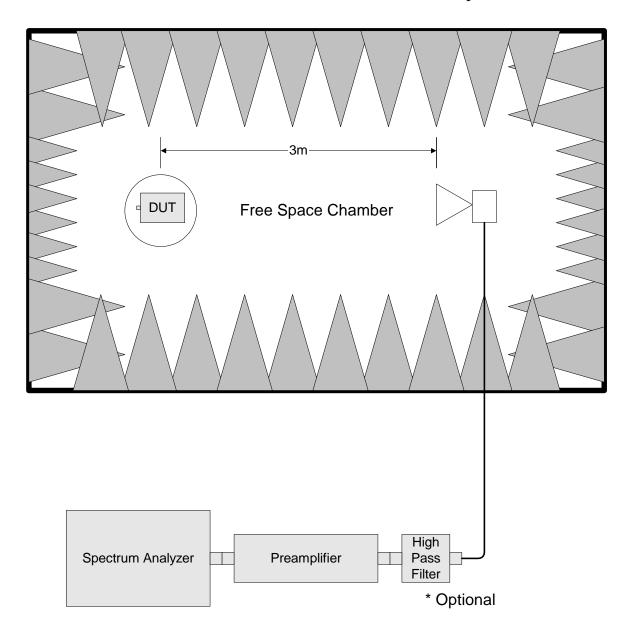
Para. No. 2.1051 Spurious Emissions at Antenna Terminals





Para. No. 2.1053 - Field Strength of Spurious Radiation





Para. No. 2.1055 - Frequency Stability

