Applicant:	Allen Telecom Systems
Equipment Under Test: (E.U.T.)	MR803P
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, RF Group Manager
Date:	6/8/01
Total Number of Pages:	62

1L0016RUS1

NEMKO Test Report:

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FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

Section 1.	Summary of Test Results								
Manufacturer	Allen Telecom System								
Model No.:	MR803P								
Serial No.:	None								
	All measurements are traceal re conducted on a sample of the the FCC Part 22, Subpart H.								
	New Submission			Production Unit					
	Class II Permissive Change			Pre-Production Unit					

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".

NATVÓ

NVLAP LAB CODE: 100426-0

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FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	22.913(a)	500W ERP	1 W	Complies
Occupied Bandwidth (Voice & SAT)	22.917(c)	Mask	Plots	Complies
Occupies Bandwidth (Wideband Data)	22.917(d)	Mask	Plots	Complies
Occupied Bandwidth (ST)	22.917(d)	Mask	Plots	Complies
Occupied Bandwidth (Digital)	None	None	Plots	Complies
Spurious Emissions at Antenna Terminals	22.917	-13 dBm	> -13 dBm	Complies
Field Strength of Spurious Emissions	22.917	-13 dBm E.I.R.P.	> -13 dBm	Complies
Frequency Stability	22.355	1.5 ppm	N/A	N/A

Footnotes: Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not measured.

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

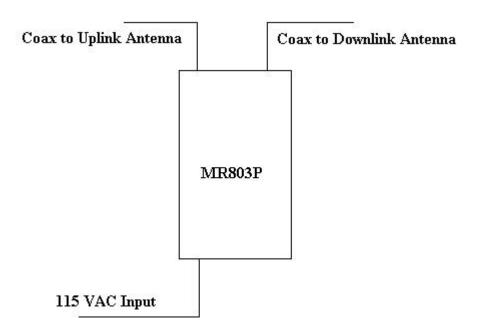
Section 2. General Equipment Specification

Supply Voltage Input:		120 Vac		
Frequency Range:	Downlink:	869 – 894 MHz		
Frequency Range:	Uplink:	824 – 849 MHz		
Type of Modulation and Designator:		CDMA GSM (F9W) (GXW)	NADC (DXW)	CDPD AMPS (F9W) (F8W, F1D)
Output Impedance:		50 ohms		
RF Output (Rated):	Downlink: Uplink:	Total:	1 W 1 W	
Frequency Translation:		F1-F1	F1-F2	N/A
Band Selection:		Software	Duplexer Change	Fullband Coverage

Description of Operation

The device is a variable bandwidth cellular band repeater capable of covering the entire 25 MHz band.

System Diagram



FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

Section 3. RF Power Output

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

TESTED BY: Chinda PoyTom Tidwell DATE: 4/11/01

Test Results: Complies.

Test Data:

	Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)
Uplink	AMPS	25.75	28.75
Downlink	AMPS	25.25	28.25
Uplink	CDMA	24.5	27.5
Downlink	CDMA	26.2	29.2
Uplink	NADC	26.5	29.5
Downlink	NADC	27	30

Equipment Used: 1036-1082-1064-1065

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative 50 %

Humidity:

Section 4. Occupied Bandwidth

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

TESTED BY: Chinda PoyTom Tidwell DATE: 4/10/01

Test Results: Complies.

Test Data: See attached plots

Equipment Used: 1036-1082-1064-1065

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative 50 %

Humidity:

Test Data – Occupied Bandwidth- Voice

Data Plot	Occu	pied Ban	dwidth Aı	nalog							
Page 1 o								Complete			
Job No.:	1L0016	5R		Date: 4/10/	01			Preliminary	X		
Specification:	2.1049		Temper	ature(°C): 22							
Tested By:	Chinda F	oy	Relative Hu	midity(%) <u>50</u>							
E.U.T.:	MR803P	1									
Configuration:	Tx Full F	Power									
Sample Number:											
Location:	Lab 1					efer to plots					
Detector Type:	Peak	<u> </u>			VBW: R	efer to plots					
Test Equipm	ent Used	<u>l</u>									
Antenna:				Direction	al Coupler:						
Pre-Amp:					Cable #1:	1082					
Filter:					Cable #2:						
Receiver:	1036				Cable #3:						
Attenuator #1	1065				Cable #4:						
Attenuator #2:	1064				Mixer:						
Additional equip	ment used:										
Measurement Un	certainty:	+/-3.6 dB	_								
/ S						RBW		Hz Rf	Att	30 dB	
	∟∨l					VBW	500				
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Notes:	Output	Signal Voice	and SAT								
	UPLIN	K									

Test Data - Occupied Bandwidth- Voice

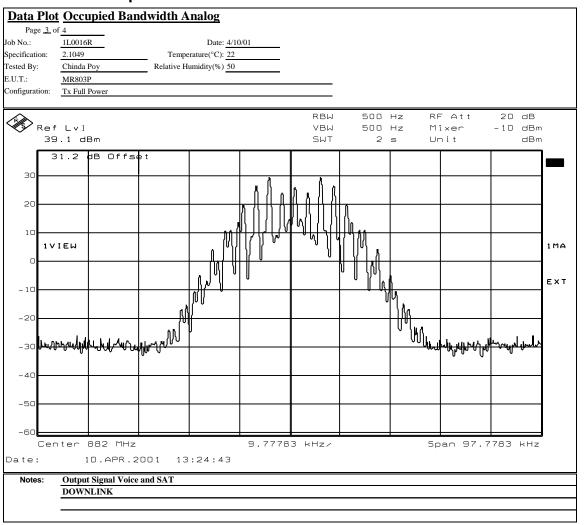


Dallas Headquarters:

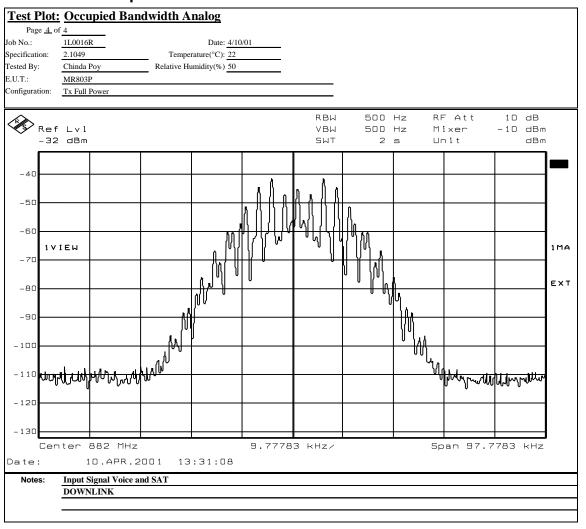
802 N. Kealy Lewisville, TX 75057 Tel: (972) 436-9600 Fax: (972) 436-2667

Nemko Dallas, Inc. Data Plot Occupied Bandwidth Analog Job No.: 1L0016R Date: 4/10/01 Specification: 2.1 Temperature(°C): 22 Relative Humidity(%) 50 Tested By: Chinda Poy E.U.T.: MR803P Configuration: Tx Full Power RBW 500 Hz RF Att 10 dB Ref Lvl VBW 500 Hz -32 dBm SWT 2 s Unit dBm -50 -60 1 V I E W 1 MA EXT -80 -90 My Mary Mary Mary Color -120 -130 Center 837 MHz 9.777832031 kHz/ Span 97.77832031 kHz 10.APR.2001 10:00:31 Date: Input Signal Voice and SAT Notes: UPLINK

Test Data - Occupied Bandwidth- Voice



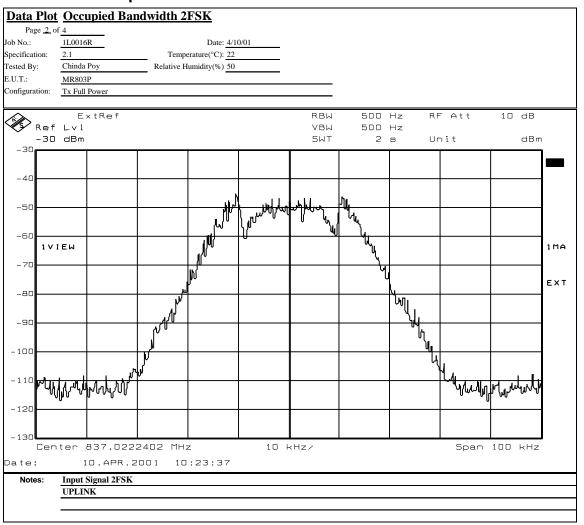
Test Data - Occupied Bandwidth - Voice



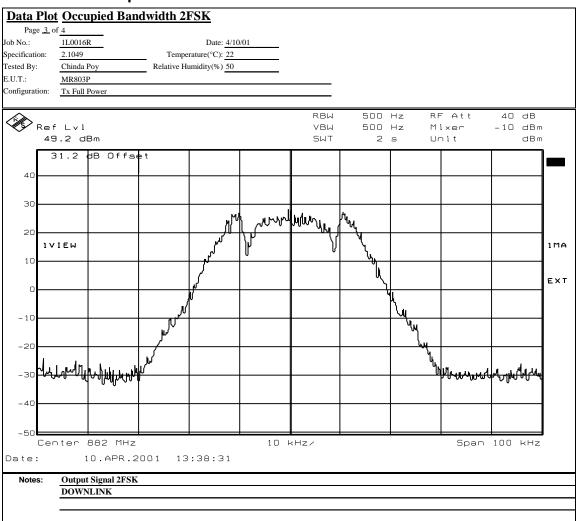
Test Data - Occupied Bandwidth - 2FSK

Data Plot	Occup	ied Ban	dwidth 2	FSK_								
Page 1 o							Complete					
Job No.:	1L0016R			Date: 4/1	0/01			Prelimina	y X			
Specification:	2.1049		Tempe	erature(°C): 22								
Tested By:	Chinda Po	y	Relative H	umidity(%) <u>50</u>								
E.U.T.:	MR803P											
Configuration:	Tx Full Po	wer										
Sample Number:												
Location:	Lab 1	_				lefer to plots						
Detector Type:	Peak	_			VBW: <u>I</u>	defer to plots						
Test Equipm	ent Used											
Antenna:		_		Direction	onal Coupler: _							
Pre-Amp:	Cable #1: 1082											
Filter:		_			Cable #2:							
Receiver:	1036	_			Cable #3:							
Attenuator #1	1065	_			Cable #4:							
Attenuator #2:	1064				Mixer:							
Additional equip												
Measurement Ur	icertainty:	+/-3.6 dI	<u> </u>									
Ref	E×t	Ref				RBW	500		RF Att	40 dB		
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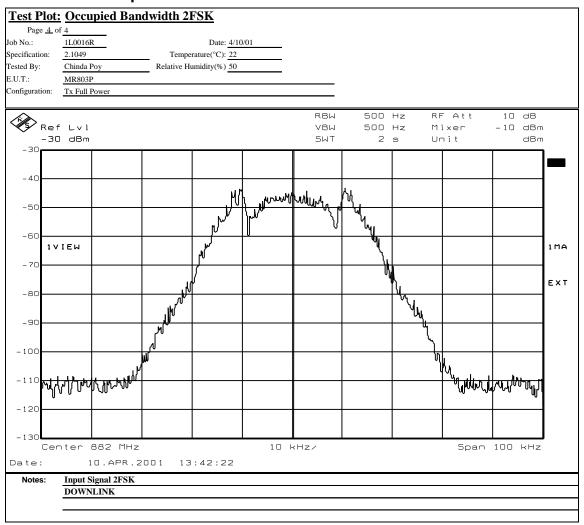
Test Data - Occupied Bandwidth- 2FSK



Test Data - Occupied Bandwidth- 2FSK



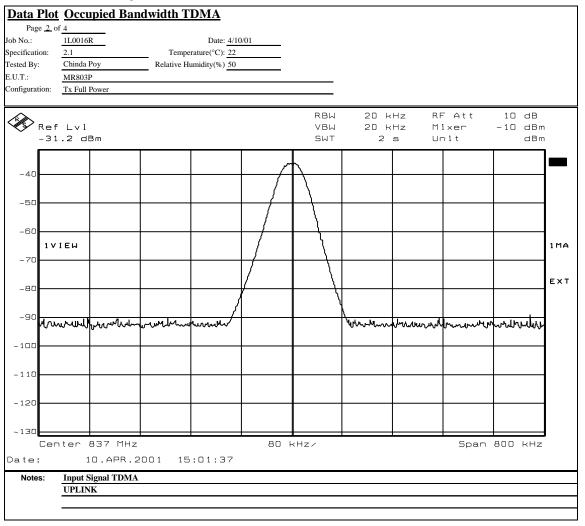
Test Data - Occupied Bandwidth- 2FSK



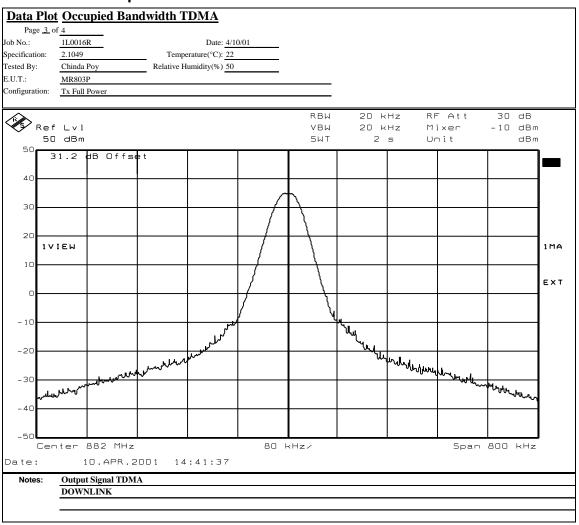
Test Data – Occupied Bandwidth - TDMA

Data Plot	Occu	pied Ban	dwidth T	<u>DMA</u>								
Page 1 of							Complete X Preliminary					
Job No.:	1L001	5R		Date: 4/10	/01			Prelimi	inary			
Specification:	2.1049		Tempe	rature(°C): 22								
Tested By:	Chinda F	Poy		midity(%) 50								
E.U.T.:	MR803F)										
Configuration:	Tx Full I	Power										
Sample Number:	S01											
Location:	Lab 1	I			RBW: I	Refer to plots						
Detector Type:	Peak				VBW:	Refer to plots						
Test Equipme	ent Used	l										
Antenna:		='		Direction	nal Coupler: _							
Pre-Amp:					Cable #1:	1082						
Filter:					Cable #2:							
Receiver:	1036				Cable #3:							
Attenuator #1	1065				Cable #4:							
Attenuator #2:	1064				Mixer:							
Additional equip	ment used	:			_							
Measurement Un		+/-3.6 dI	3			_						
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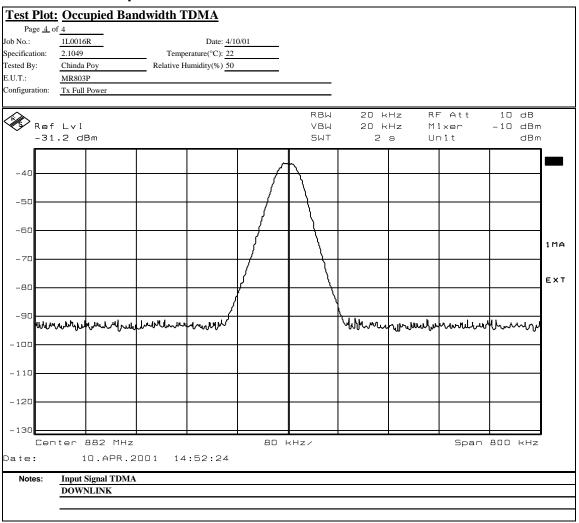
Test Data - Occupied Bandwidth- TDMA



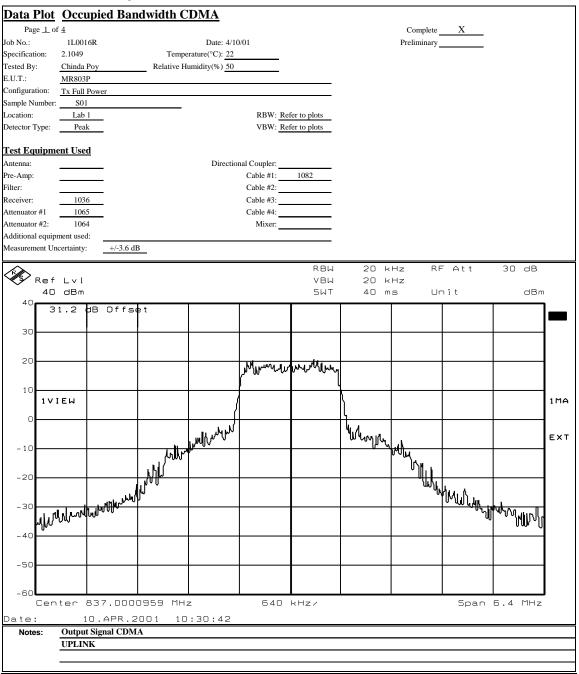
Test Data - Occupied Bandwidth- TDMA



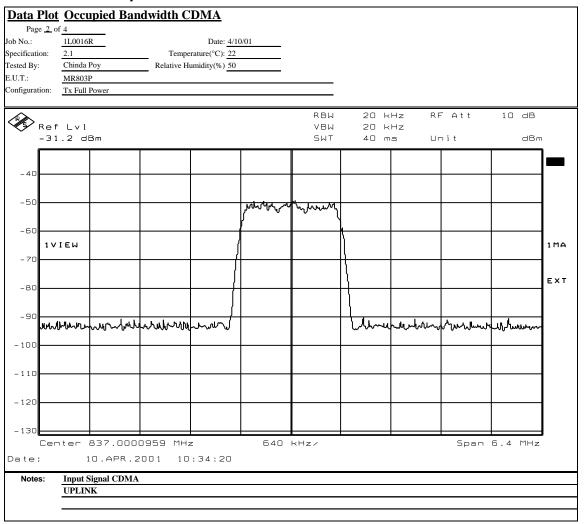
Test Data - Occupied Bandwidth- TDMA



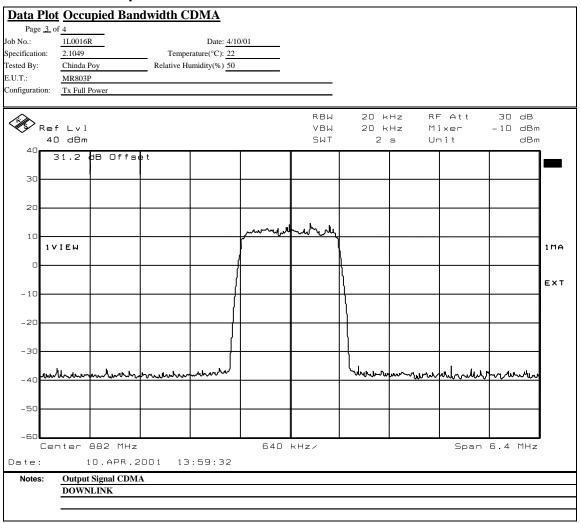
Test Data - Occupied Bandwidth - CDMA



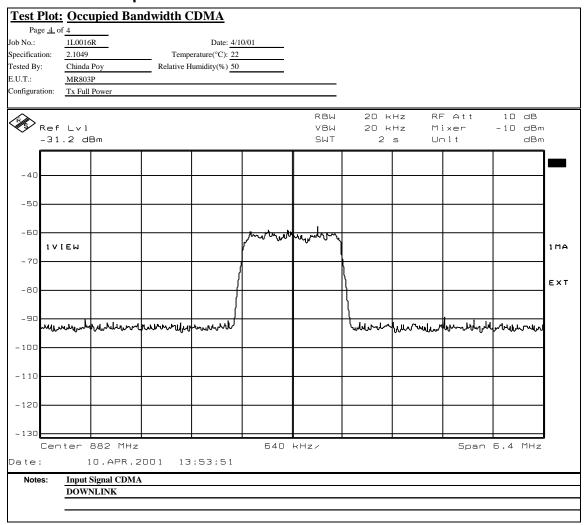
Test Data - Occupied Bandwidth- CDMA



Test Data - Occupied Bandwidth- CDMA



Test Data - Occupied Bandwidth- CDMA



FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

Section 5. Spurious Emissions at Antenna Terminals

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

TESTED BY: Chinda poyTom Tidwell DATE: 4/11/01

Test Results: Complies.

Test Data: See attached plots

Equipment Used: 1036-1064-1065-1082

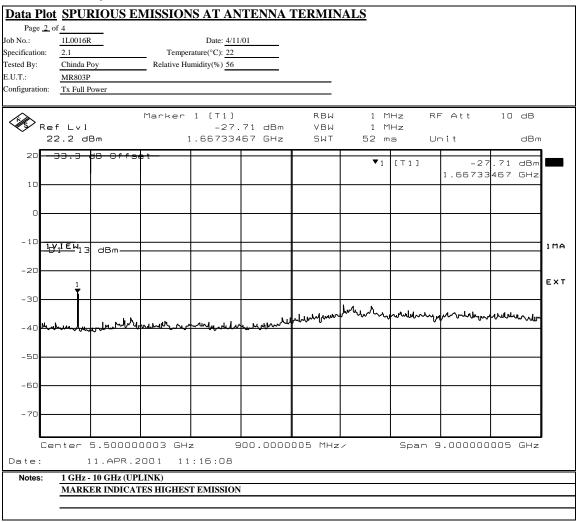
Measurement Uncertainty: +/- 1.6 dB

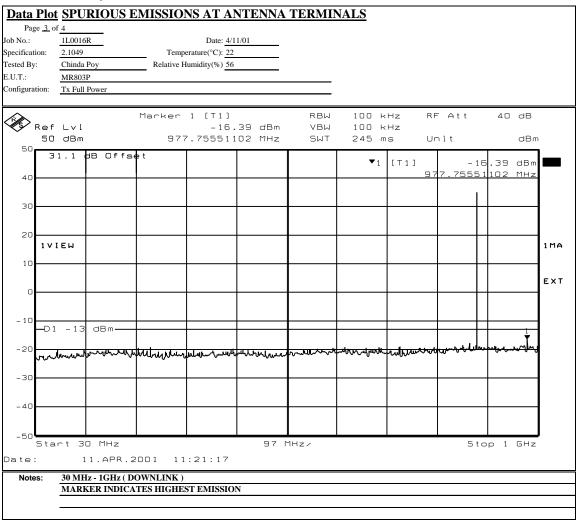
Temperature: 22 °C

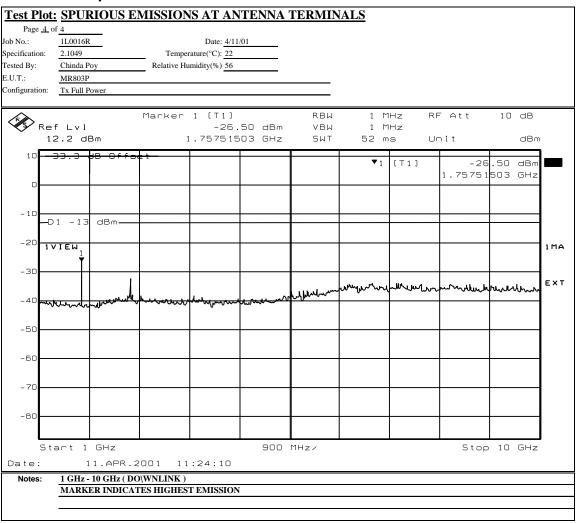
Relative 50 %

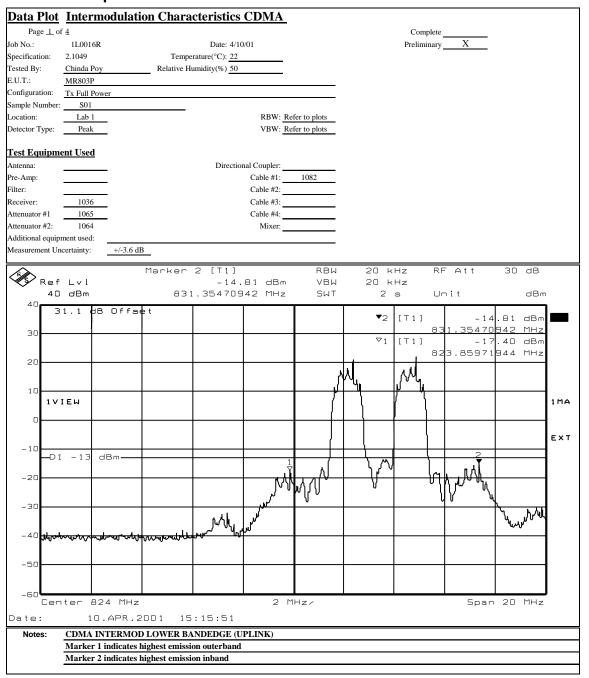
Humidity:

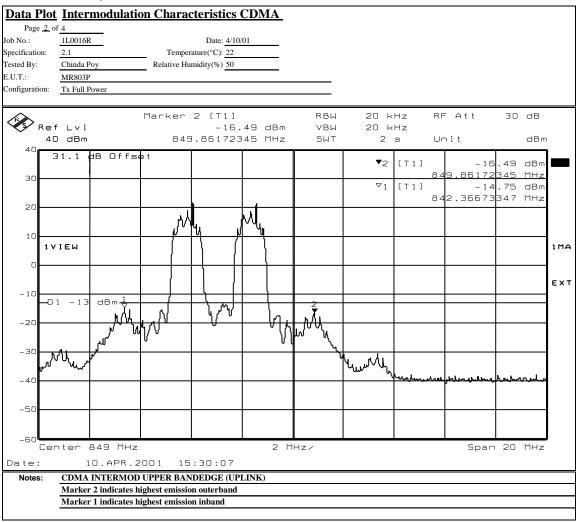
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Page 1 of							Co	mplete_		_			
lo.:	1L001	6R		Date: 4/1	1/01			Preli	minary _	X	_		
ification:	2.1049		Temp	erature(°C): 22									
d By:	Chinda	Poy	Relative H	Iumidity(%) <u>56</u>									
Γ.:	MR803	P											
iguration:	Tx Full	Power											
le Number:	S01												
tion:	Lab				RBW: Re	efer to plots							
ctor Type:	Pea					efer to plots							
tor Type.		<u> </u>			12 <u></u>	ici to pioto							
Equipm	ent Use	<u>d</u>											
nna:				Direction	onal Coupler:								
Amp:					Cable #1:	1082							
:					Cable #2:								
iver:	103	6			Cable #3:								
uator #1	106	5			Cable #4:								
uator #2:	106	4			Mixer:	,							
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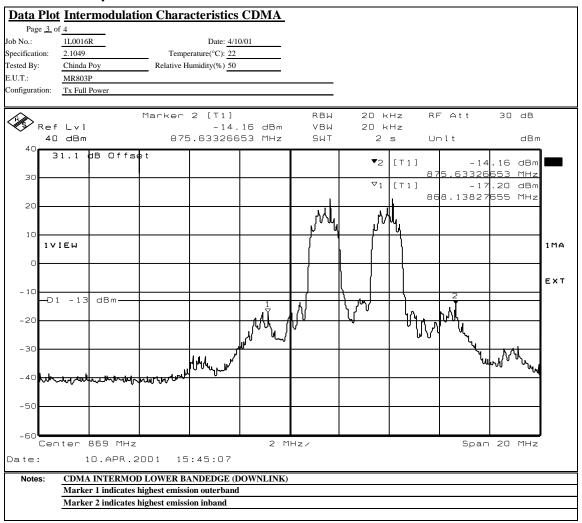


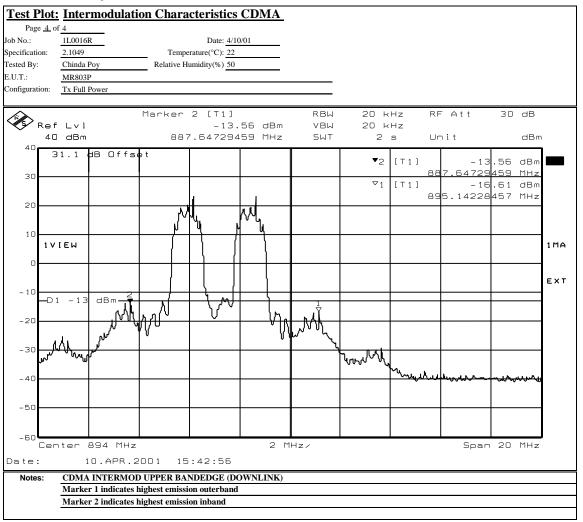




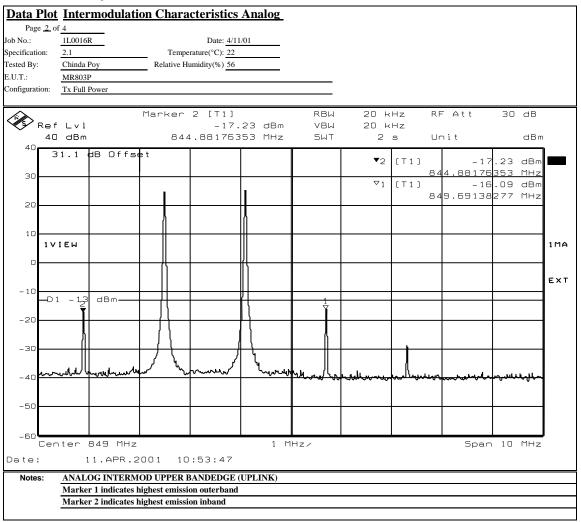


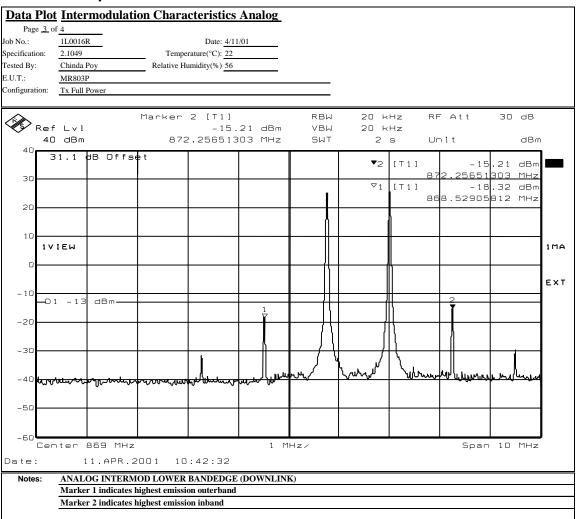


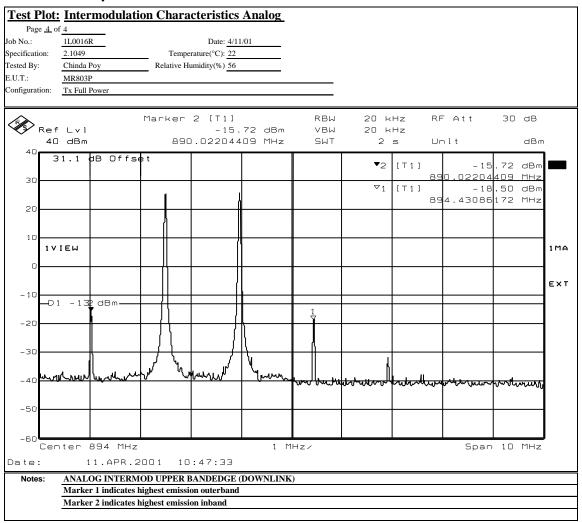


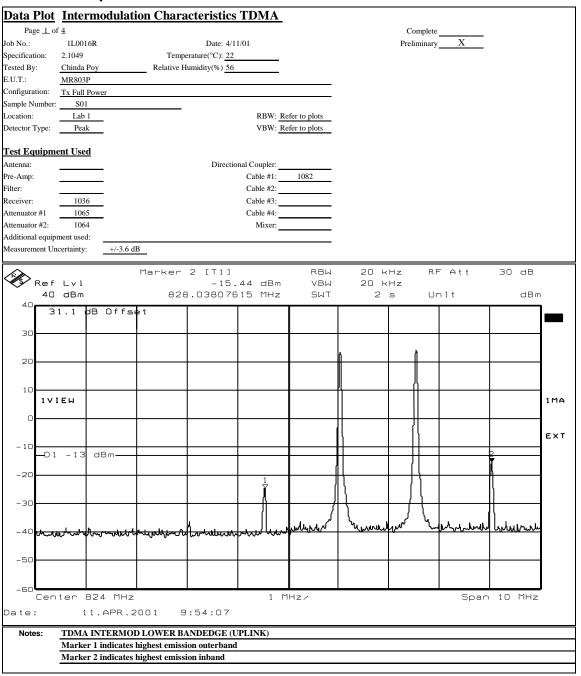


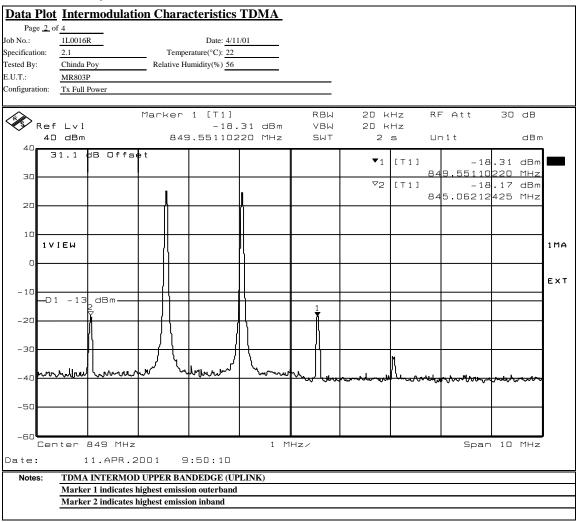
Data Plot	Inte	rmodulati	ion Chara	cteristics	Analog						
Page <u>1</u> o	f <u>4</u>							Comple	te		
Job No.:	1L00	16R		Date: 4/1	1/01			Prelimina	ry X		
Specification:	2.1049		Tempe	erature(°C): 22							
Tested By:	Chinda	Poy		umidity(%) 56							
E.U.T.:	MR803	SP.	_								
Configuration:	Tx Full	Power									
Sample Number	_										
Location:	Lab	1			RBW: Re	efer to plots					
Detector Type:	Pea	ık				efer to plots					
Test Equipm	ont Hea	nd.									
Antenna:	ciii Osc	<u>.u</u>		Directio	nal Coupler:						
Pre-Amp:				Directio		1082					
Filter:					Cable #2:	1002					
Receiver:	103	16			Cable #3:						
Attenuator #1	106				Cable #4:						
Attenuator #2:	106				Mixer:						
Additional equip					Wilker.						
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∜ §∕ Ref	∟∨1			-14.	21 dBm	VBW	20 k	Hz			
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Cen		824 MHz			1 M	HZ/			Spar	n 10 MHz	
Date:	1	1.APR.2	001 10	:28:00							
Notes:	ANAL	OG INTERM	OD LOWER	BANDEDGE	(UPLINK)						
	Marke	er 1 indicates	highest emissi	on outerband							
	Marke	er 2 indicates	highest emissi	on inband				<u> </u>			

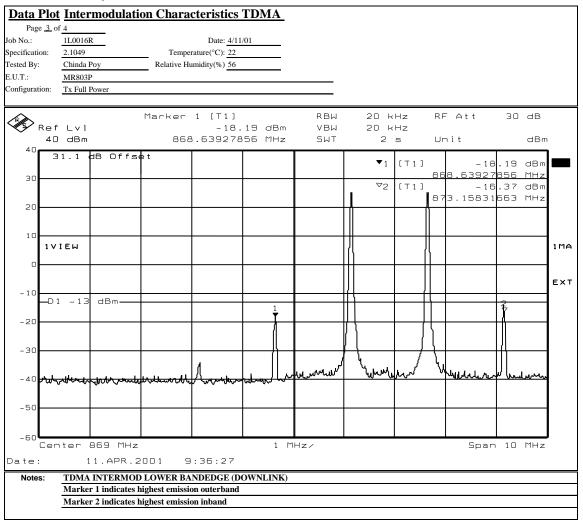


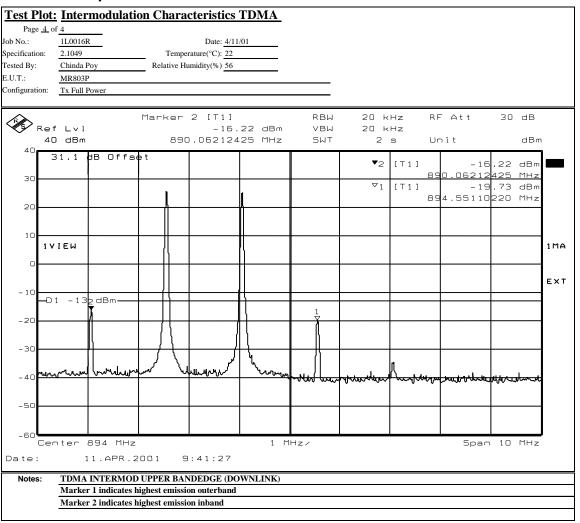












Section 6. Field Strength of Spurious

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

TESTED BY: Chinda PoyTom Tidwell DATE: 4/11/01

Test Results: Complies.

Test Data: See attached table.

Equipment Used: 1016-1464-1043-1484-1485

Measurement Uncertainty: +/- 3.6 dB

Temperature: 22 °C

Relative 50 %

Humidity:

Test Data – Field Strength of Spurious Emissions

Field Strength of Spurious Emissions									
Page <u>1</u> o	f <u>2</u>			Complete					
Job No.:	1L0016R	Date: 4/11/01		Preliminary	X				
Specification:	Part 22	Temperature(°C): 22							
Tested By:	Chinda Poy	Relative Humidity(%) 56							
E.U.T.:	MR803P			_					
Configuration:	Tx Full Power			_					
Sample No:	S01								
Location:	AC 3	RBW:	1 MHz	Measurement					
Detector Type:	Peak	VBW:	1 MHz	Distance:	3 m				
Test Equipme	ent Used								
Antenna:		Directional Coupler:		_					
Pre-Amp:	1016	Cable #1:	1043	_					
Filter:		Cable #2:	1484	_					
Receiver:	1464	Cable #3:	1485	_					
Attenuator #1		Cable #4:		_					
Attenuator #2:		Mixer:		_					
Additional equip	ment used:			_					
Measurement Un	certainty:	+/-3.6 dB		_					

Frequency	Meter Reading	Correction Factor	Pre-Amp Gain	Substitution Antenna Gain	ERP	ERP	Polarity	Comments
(MHz)	(dBm)	(dB)	(dB)	(dBd)	(dBm)	(mW)		
1762	-59.2	29.9	32.9	6.4	-55.9	0.000003	V	Downlink / NF
2643	-59.8	35.6	33.3	8.0	-49.6	0.000011	V	Downlink / NF
3524	-60.5	40.4	33.6	8.0	-45.7	0.000027	V	Downlink / NF
4405	-61.7	42.8	33.2	7.9	-44.1	0.000039	V	Downlink / NF
5286	-62.5	40.6	32.8	9.1	-45.6	0.000027	V	Downlink / NF
6167	-62.2	37.9	32	9.5	-46.8	0.000021	V	Downlink / NF
7048	-62.7	39.4	33.2	10.0	-46.5	0.000022	V	Downlink / NF
7929	-62.0	40.4	33.4	9.4	-45.5	0.000028	V	Downlink / NF
8810	-60.8	40.3	34.7	9.9	-45.3	0.000030	V	Downlink / NF
1700	50.5	22.7	22.0	6.4	52.4	0.000005	***	Downlink / NF
1762	-59.5 -58.7	32.7 34.6	32.9 33.3	6.4 8.0	 -53.4 -49.4	0.000005	H H	Downlink / NF
2643				8.0		0.000011	Н	
3524	-61.0	34.3	33.6		-52.3	0.000006		Downlink / NF
4405	-61.0	35.2	33.2	7.9 9.1	 -51.1	0.000008	H H	Downlink / NF Downlink / NF
5286	-62.3	36.3	32.8	,,,,	-49.8	0.000011	H	_ , , , , , , , , , , , , , , , , , , ,
6167	-62.2	36.6	32	9.5	-48.1	0.000015		Downlink / NF
7048	-61.2	38.7	33.2	10.0	-45.7	0.000027	H	Downlink / NF
7929	-60.8	39.8	33.4	9.4	-45.0	0.000032	H	Downlink / NF
8810	-62.0	41.8	34.7	9.9	-44.9	0.000032	Н	Downlink / NF
Notes:	Downlink	881 MHz						

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

Test Data – Field Strength of Spurious Emissions

		Field Strength of Spuriou	s Emissions
Page 2 o	f <u>2</u>		Complete
Job No.:	1L0016R	Date: 4/11/01	Preliminary X
Specification:	Part 22	Temperature(°C): 22	
Tested By:	Chinda Poy	Relative Humidity(%) 56	
E.U.T.:	MR803P		
Configuration:	Tx Full Power		
Sample No:	S01		

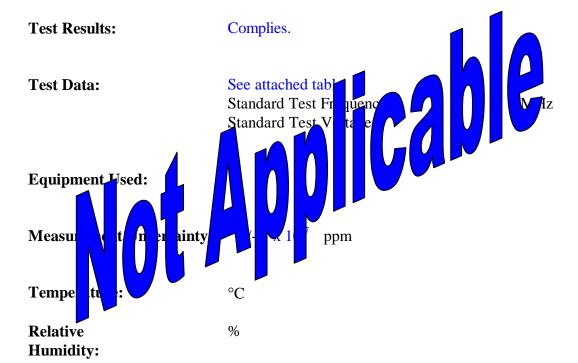
Frequency	Meter	Correction		Pre-Amp	Substitution	ERP	ERP	Polarity	Comments
(MHz)	Reading (dBm)	Factor (dB)		Gain (dB)	Antenna Gain (dBd)	(dBm)	(mW)		
1674	-60.2	29.9		32.9	6.4	-56.9	(/	V	Uplink / NF
					8.0		0.000002	V	
2511	-59.5	35.6	-	33.3		-49.3	0.000012		Uplink / NF
3348	-61.0	37.1		33.6	8.1	-49.4	0.000011	V	Uplink / NF
4185	-60.5	42.8		33.2	7.9	-43.0	0.000050	V	Uplink / NF
5022	-62.7	40.6		32.8	9.1	-45.8	0.000026	V	Uplink / NF
5859	-61.7	38.5		32	9.1	-46.1	0.000024	V	Uplink / NF
6696	-62.0	38.3		33.2	10.1	-46.8	0.000021	V	Uplink / NF
7533	-62.5	40.4		33.4	9.4	-46.0	0.000025	V	Uplink / NF
8370	-61.5	41.6		34.7	9.7	-44.9	0.000033	V	Uplink / NF
1674	-59.7	32.7		32.9	6.4	-53.6	0.000004	Н	Uplink / NF
2511	-60.3	34.6		33.3	8.0	-51.0	0.000008	Н	Uplink / NF
3348	-61.2	35.8		33.6	8.1	-50.9	0.000008	Н	Uplink / NF
4185	-61.5	35.2		33.2	7.9	-51.6	0.000007	Н	Uplink / NF
5022	-62.5	36.3	i	32.8	9.1	-50.0	0.000010	Н	Uplink / NF
5859	-62.8	36.0		32	9.1	-49.7	0.000011	Н	Uplink / NF
6696	-61.7	37.8		33.2	10.1	-46.9	0.000020	Н	Uplink / NF
7533	-62.3	39.8		33.4	9.4	-46.5	0.000022	Н	Uplink / NF
8370	-62.0	42.2		34.7	9.7	-44.8	0.000033	Н	Uplink / NF
8370		42.2	10.1.1	34.7	9.7	-44.8	0.000033	Н	U

Notes: Scanned spectrum to the 10th harmonic of carrier

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability PARA. NO.: 2.1055

TESTED BY: Tom Tidwell DATE:



EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

Section 8. Test Equipment List

ASSET	Description	Manufacturer Model Number	Serial Number	Cal. Date	Cal. Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	06/14/99	06/14/01
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01	01/02/02
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	05/23/00	05/23/01
1016	AMPLIFIER	HEWLETT PACKARD 8449A	2749A00159	05/24/00	05/24/01
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01	01/02/02
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	05/25/00	05/25/01
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	05/25/00	05/25/01

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

ANNEX A - TEST DETAILS

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.

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 $GP/4\pi$ $R^2 = E^2/120\pi$ 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: MR803P PROJECT NO.: 1L0016RUS1

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.

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

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

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

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

NEMKO Dallas

FCC PART 22, SUBPART H CELLULAR BAND REPEATERS

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

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: MR803P PROJECT NO.: 1L0016RUS1

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

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.

Calculation Of Field Strength Limit:

An example of attenuation requirement of 43 + 10 Log P is equivalent to -13 dBm (5 x 10^{-5} Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

 $GP/4\pi R^2 = E^2/120\pi$

For emissions ≤ 1 GHz:

G = 1.64 (Dipole Gain)

 $P = 10^{-5}$ Watts (Maximum spurious output power)

R = 3m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$

$$E = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V/m} = 84.4 \text{ dB} \text{mV/m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)

 $P = 1 \times 10^{-5}$ Watts (Maximum spurious output power)

R = 3m (Measurement Distance)

$$E = 84.4 - 20 Log \sqrt{1.64} = 82.3 dB \, \text{mV} / m@3m$$

The spectrum is searched to 10 GHz.

EQUIPMENT: MR803P PROJECT NO.: 1L0016RUS1

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:

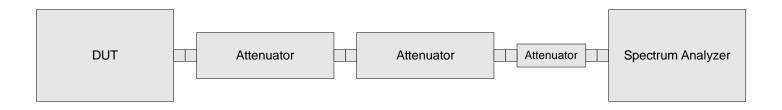
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the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

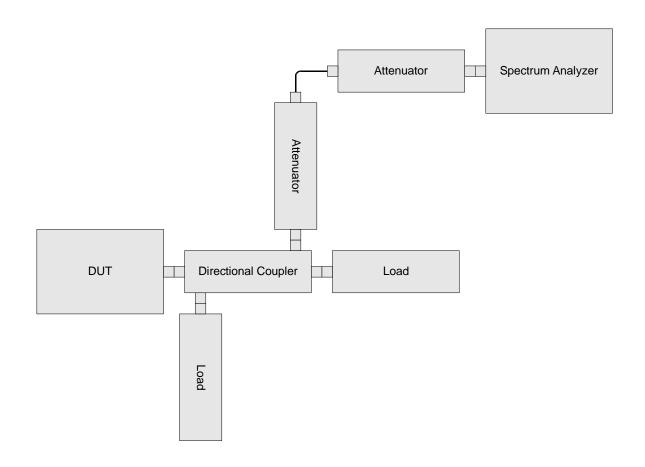
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

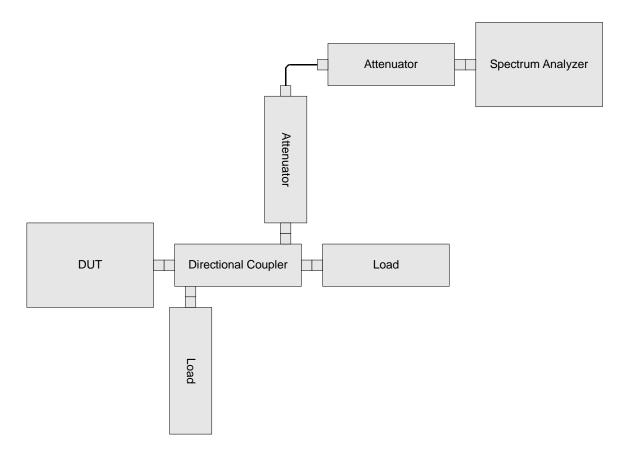
Para. No. 2.1046 - R.F. Power Output

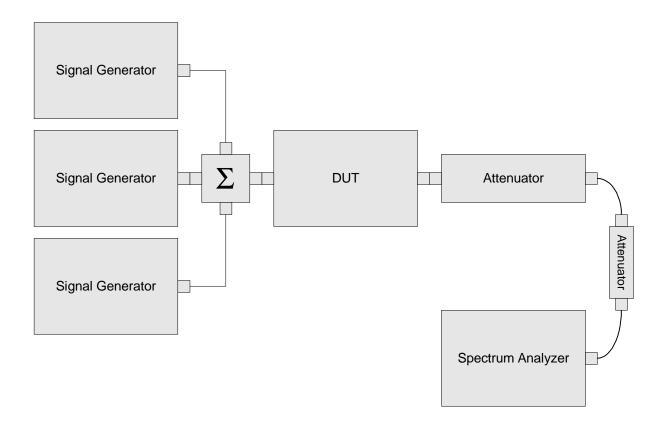


Para. No. 2.1049 - Occupied Bandwidth

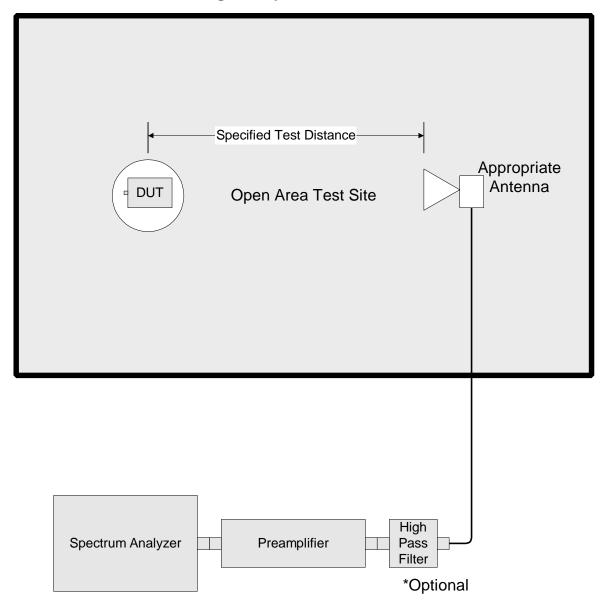


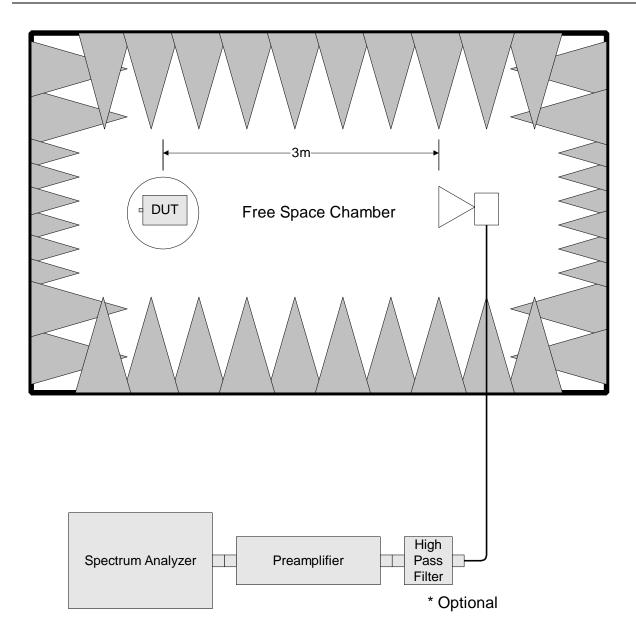
Para. No. 2.1051 Spurious Emissions at Antenna Terminals





Para. No. 2.1053 - Field Strength of Spurious Radiation





Para. No. 2.1055 - Frequency Stability

