Nemko Test Report:	6L0102RUS2
Applicant:	Communication Components, Inc.
Equipment Under Test: (E.U.T.)	MCPB-850-200
FCC ID:	
In Accordance With:	**FCC Part 90, Subpart I** Amplifier
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	 Kevin Rose Wireless Engineer
Date:	April 3, 2006

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Communication Components, Inc.

Model No.: MCPB-850-200

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 90, Subpart I.

☒ 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".

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	90.205		Complies
Audio Frequency Response	TIA EIA-603.3.2.6	N/A	N/A
Audio Low-Pass Filter Response	TIA EIA-603.3.2.6	N/A	N/A
Modulation Limiting	TIA EIA-603.3.2.6	N/A	N/A
Occupied Bandwidth	90.210	Plots	Complies
Spurious Emissions at Antenna Terminals	90.210	Mask	Complies
Field Strength of Spurious Emissions	90.210	Mask	Complies
Frequency Stability	90.213		NA
Transient Frequency Behavior	90.214	N/A	N/A

Footnotes For N/A's:

(1) Since the E.U.T. does not contain modulation circuitry modulation testing was not performed.
(2) Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not performed.

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Section 2. General Equipment Specification

Transmitter

Supply Voltage Input:	31 Vdc
Frequency Range:	851 to 868 MHz
Tunable Bands:	Full band coverage

Type(s) of Modulation:

F3E (Voice)	F1D	iDEN (GXW)	D7W (QAM)	Other
☒	☒	☒	☐	☐

Output Impedance:	50 ohms
RF Power Output (rated):	200 Watts Composite
Operator Selection of Operating Frequency:	None
Power Output Adjustment Capability:	None

Frequency Translation:

F1-F1	F1-F2	N/A
☒	☐	☐

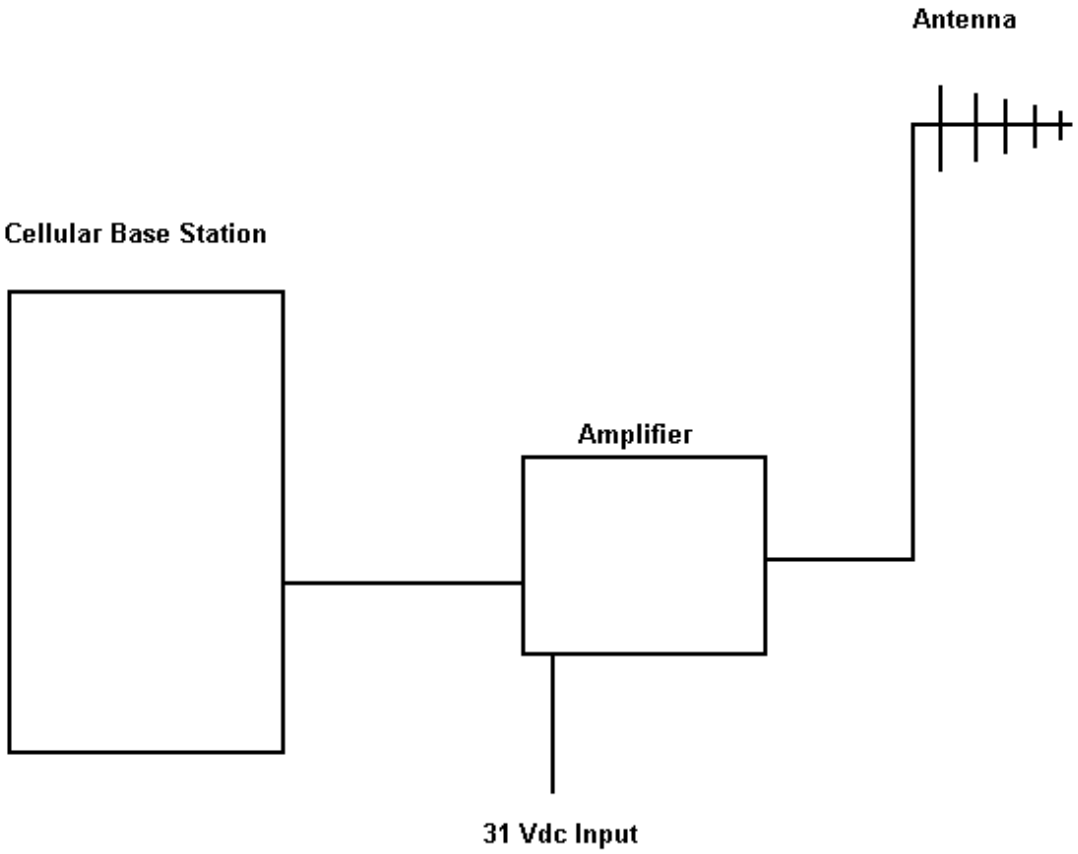
Band Selection:

Software	Duplexer Change	Fullband Coverage
☐	☐	☒

Description of EUT

This is a single directional 200 watt amplifier operating in the 800 MHz cellular band.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 24 March 2006

Test Results: Complies.

Measurement Data:

Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)
iDEN	50.1	53.1
Analog	50.0	53.0

Amplifier was tested on three channels. Worst-case data presented

Equipment Used: 1659-1082-1054-1064-1065

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 45 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 28 March 2006

Test Results: Complies.

Test Data: See attached plots

Equipment Used: 1659-1082-1054-1064-1065

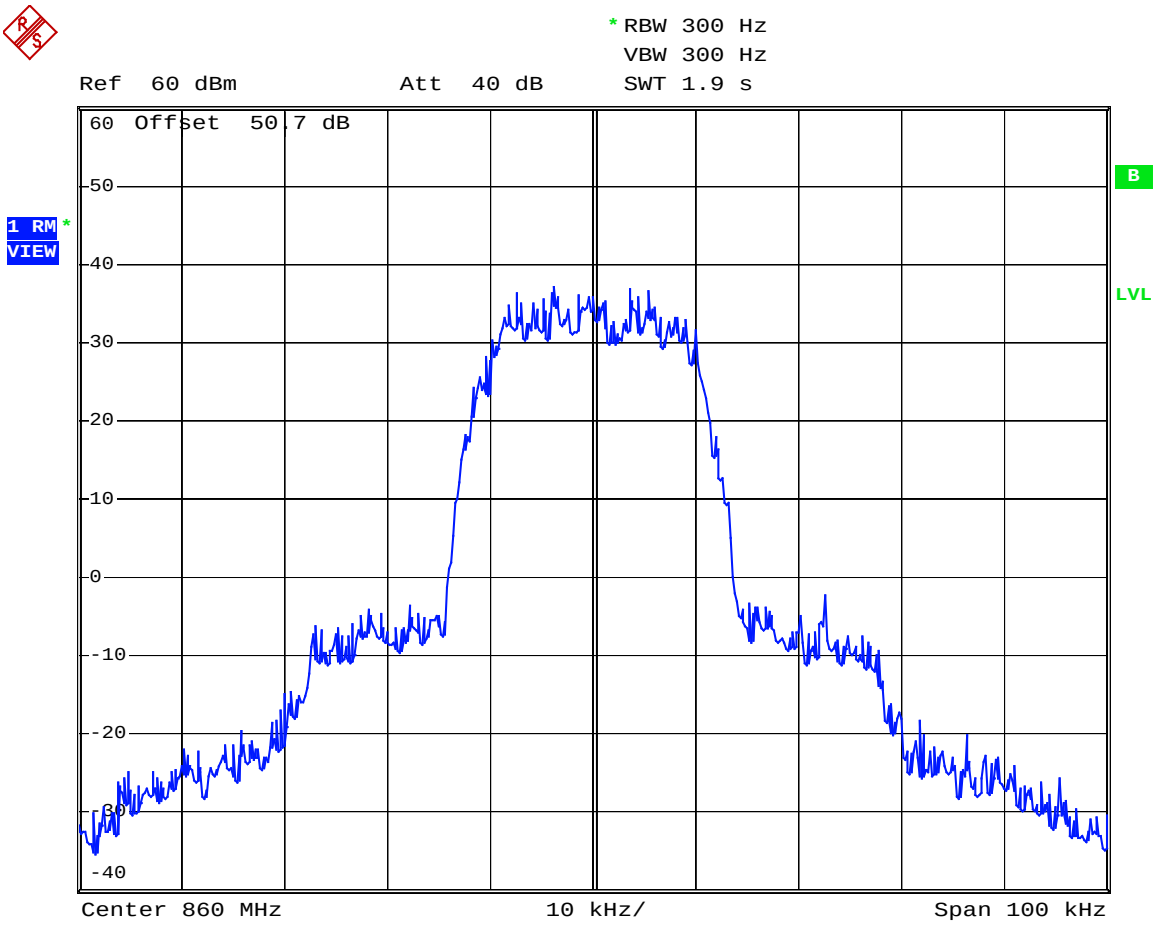
Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 45 %

Test Data – Occupied Bandwidth

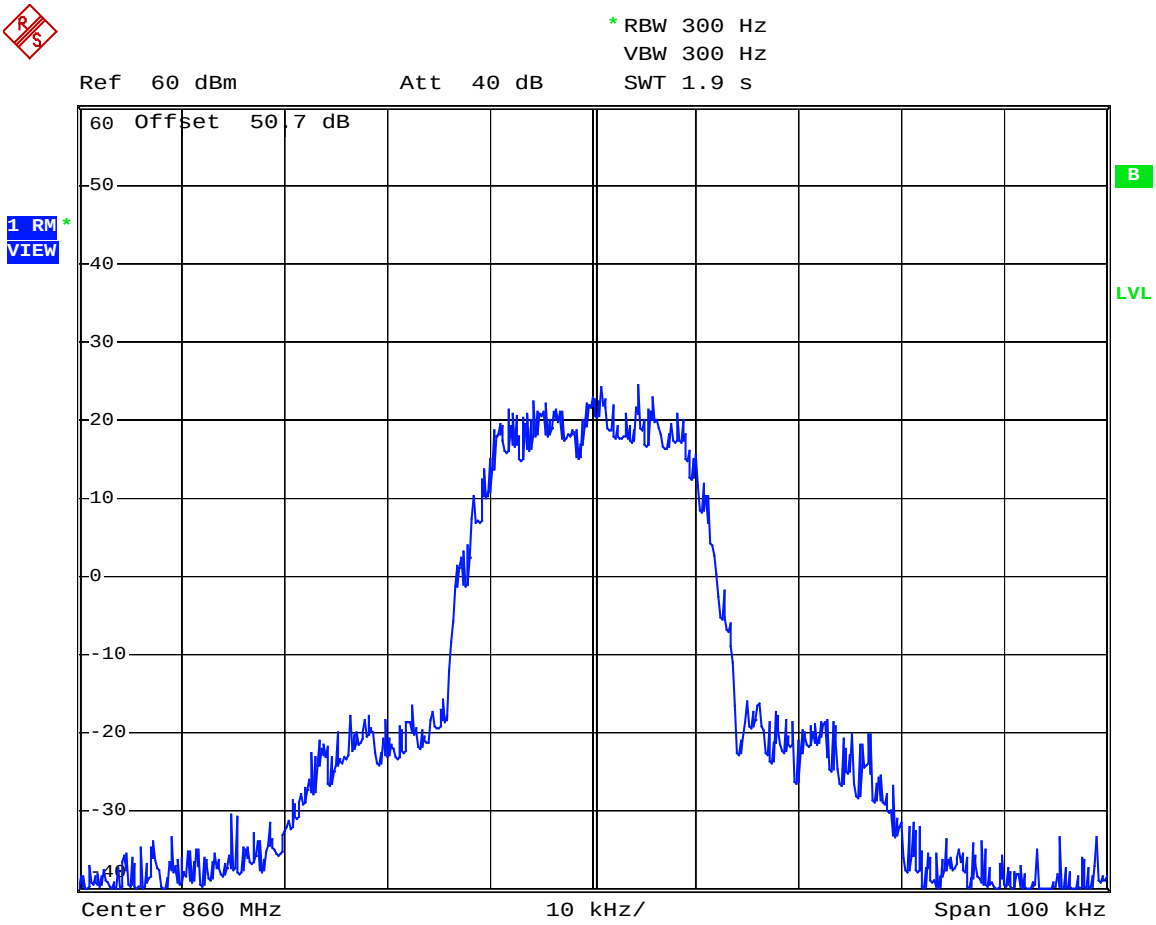
iDEN output



Date: 28.MAR.2006 17:25:14

Test Data – Occupied Bandwidth

iDEN input



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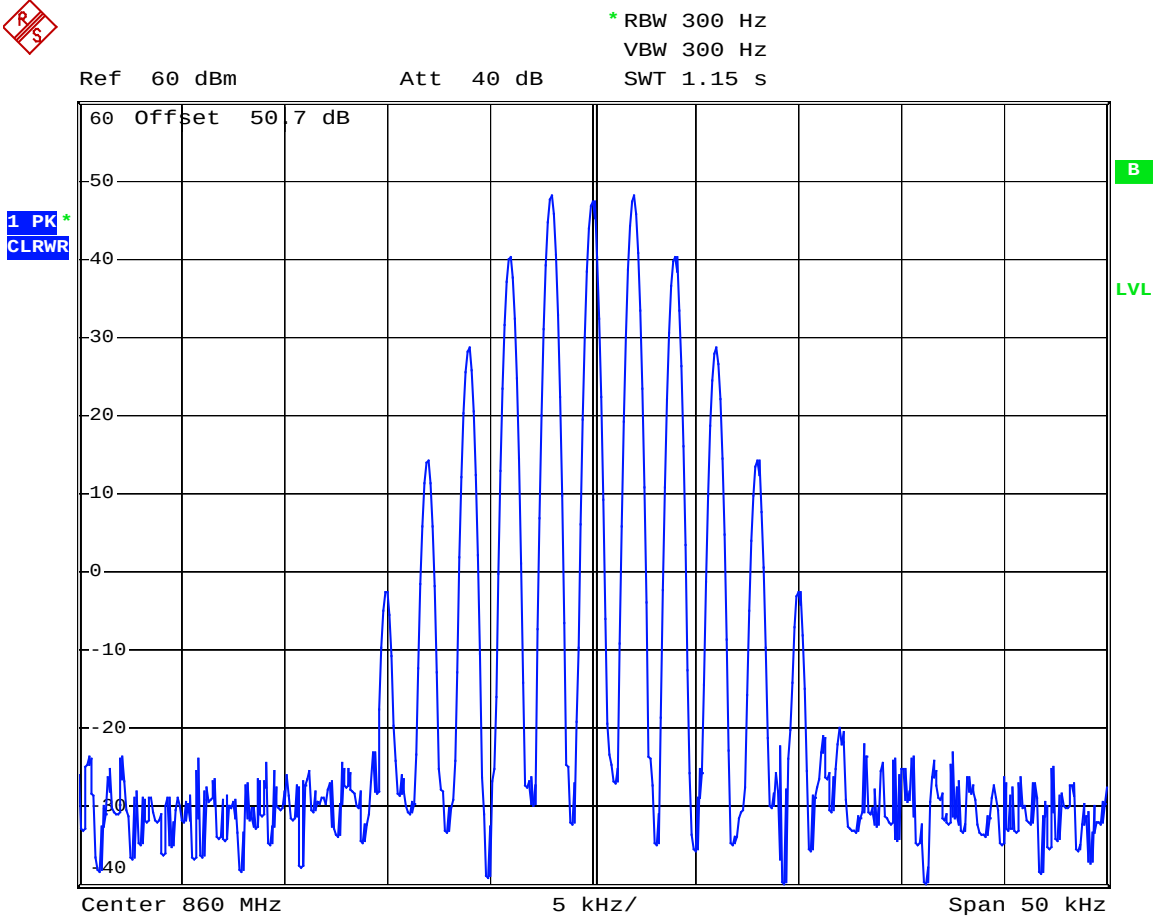
Test Data – Occupied Bandwidth

Analog Output



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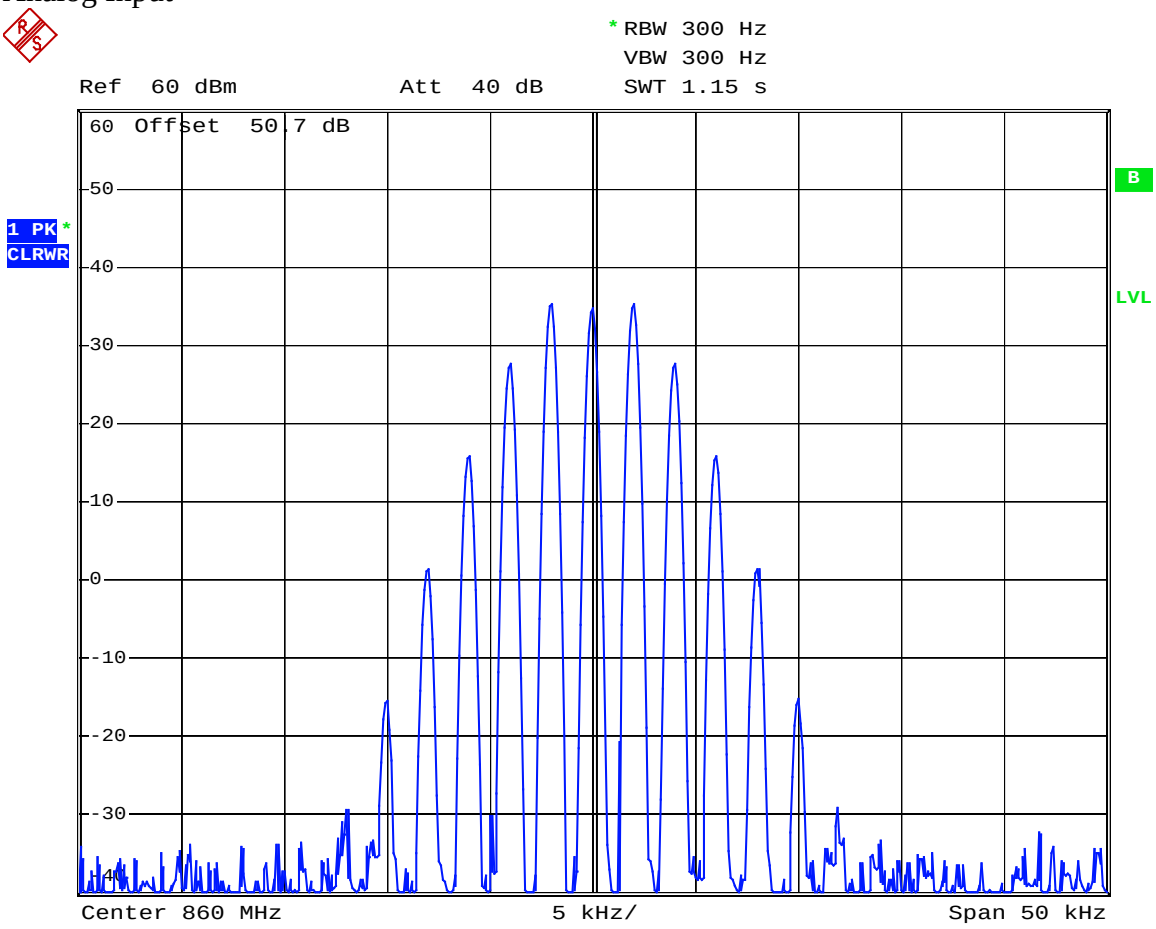
Test Data – Occupied Bandwidth

Analog Input



Date: 29.MAR.2006 09:48:50

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 28 March 2006

Test Results: Complies.

Test Data: See attached plots

Equipment Used: 1659-1464-1082-1058-1054-1055-1064-1065

Measurement Uncertainty: +/- 1.6 dB

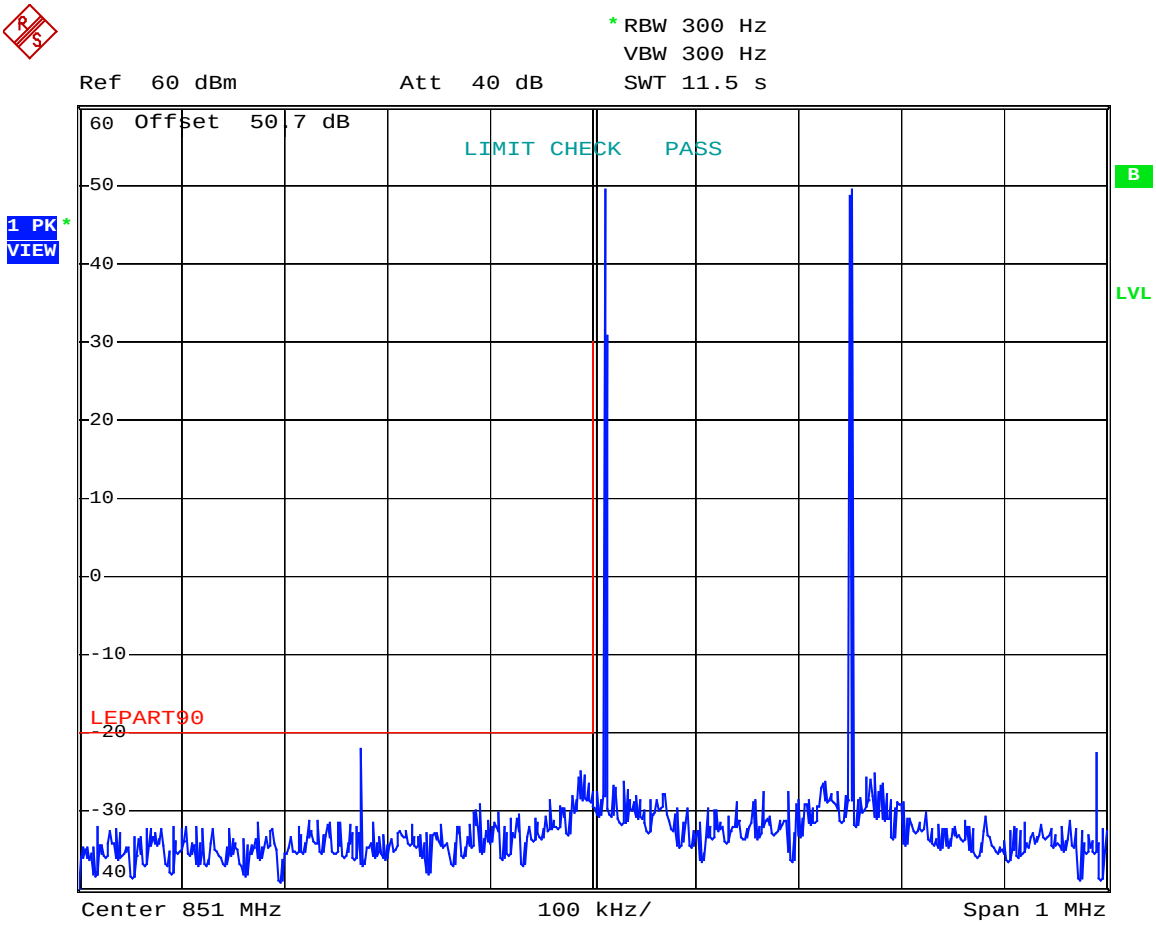
Temperature: 22 °C

Relative Humidity: 45 %

Note: The amplifier was tested on three channels. Data presented is representative of noise floor readings on all channels..

Test Data – Spurious Emissions at Antenna Terminals

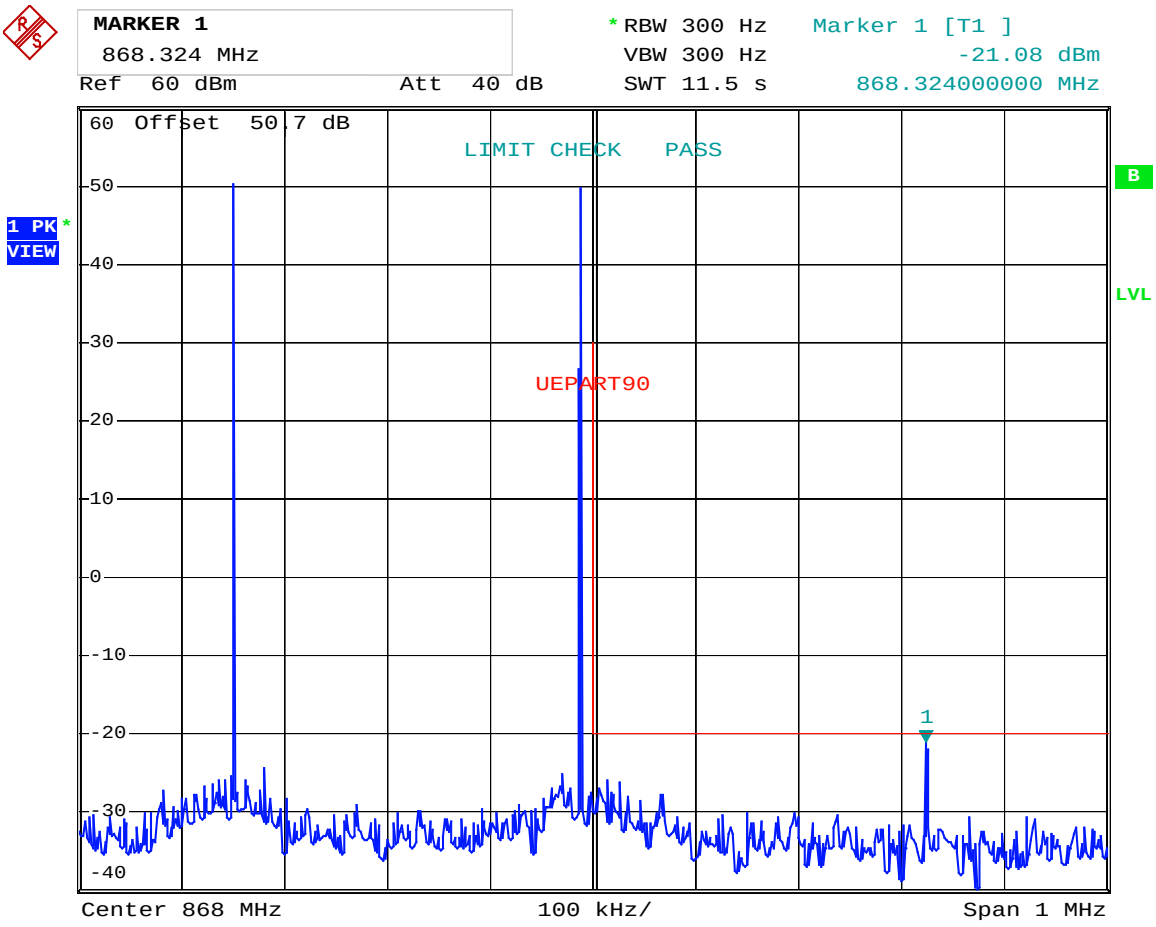
ANALOG LOWER
TWO CARRIERS AT 100 WATTS EACH



Date: 28.MAR.2006 10:12:49

Test Data – Spurious Emissions at Antenna Terminals

ANALOG UPPER
TWO CARRIERS AT 100 WATTS EACH



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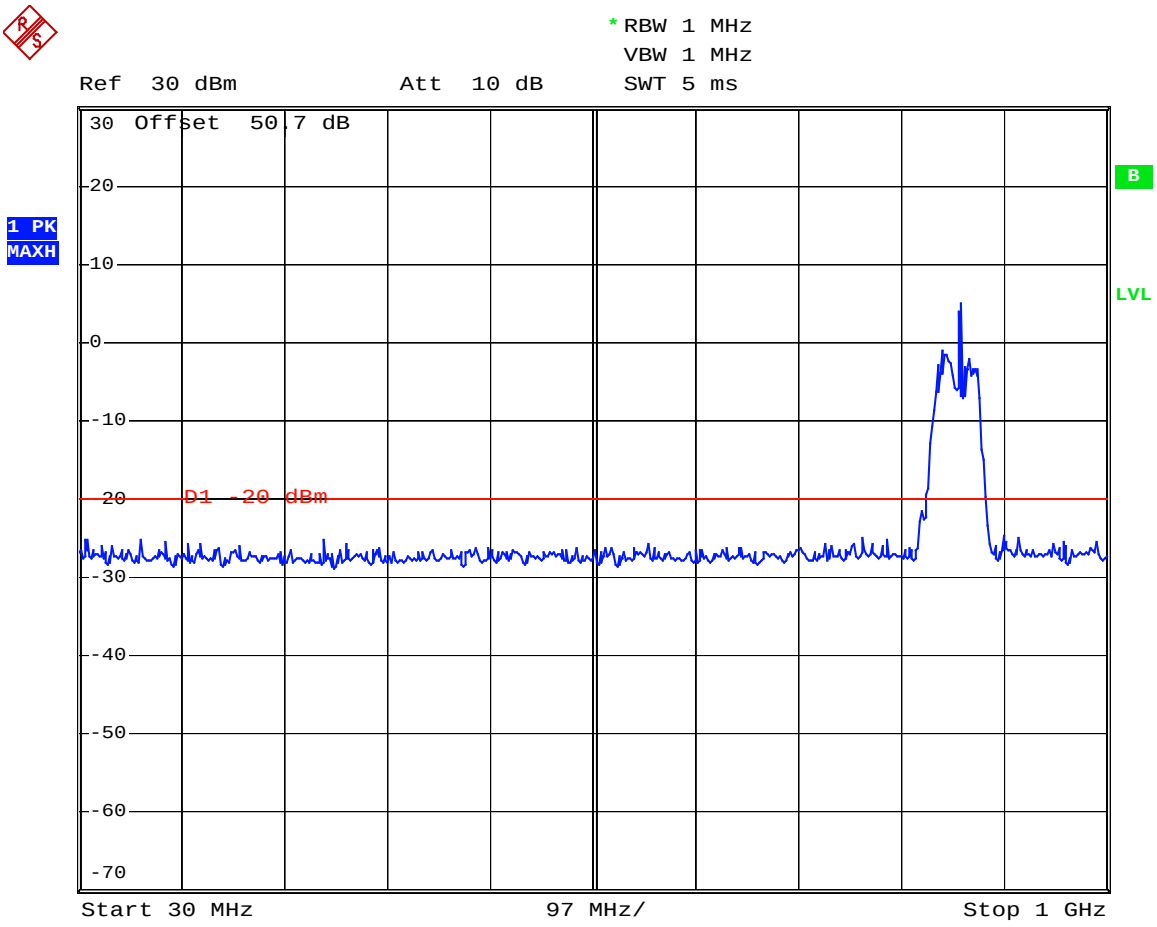
Test Data – Spurious Emissions at Antenna Terminals

Analog



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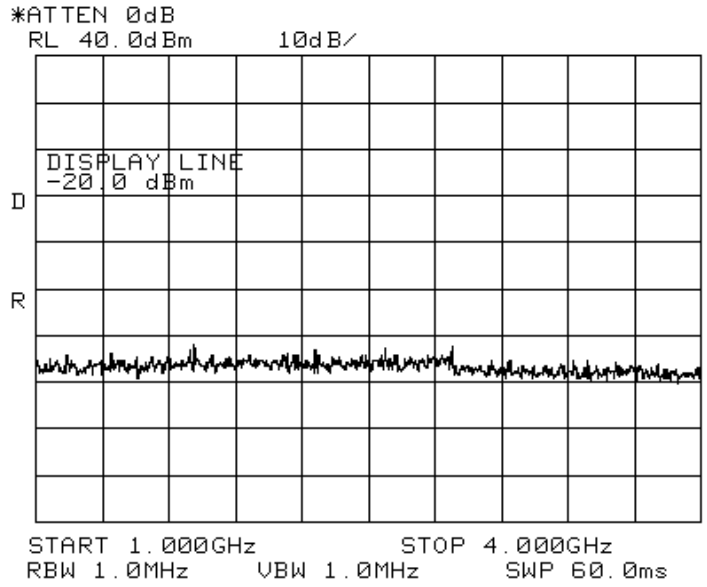
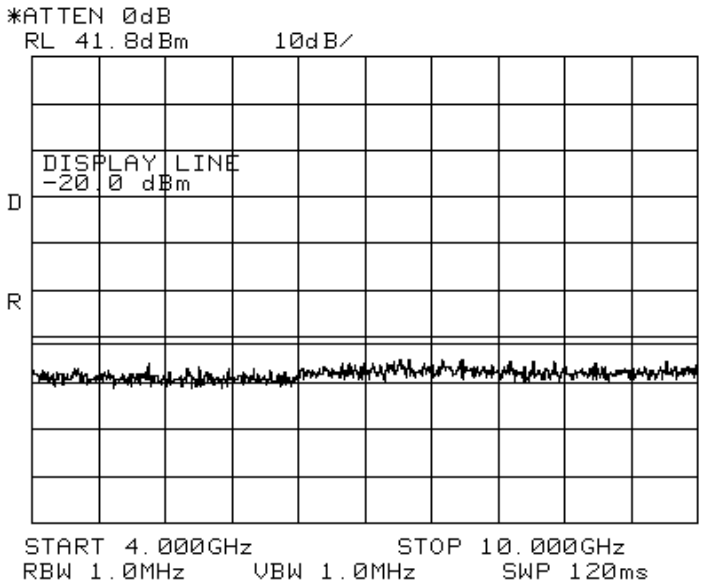
Test Data – Spurious Emissions at Antenna Terminals

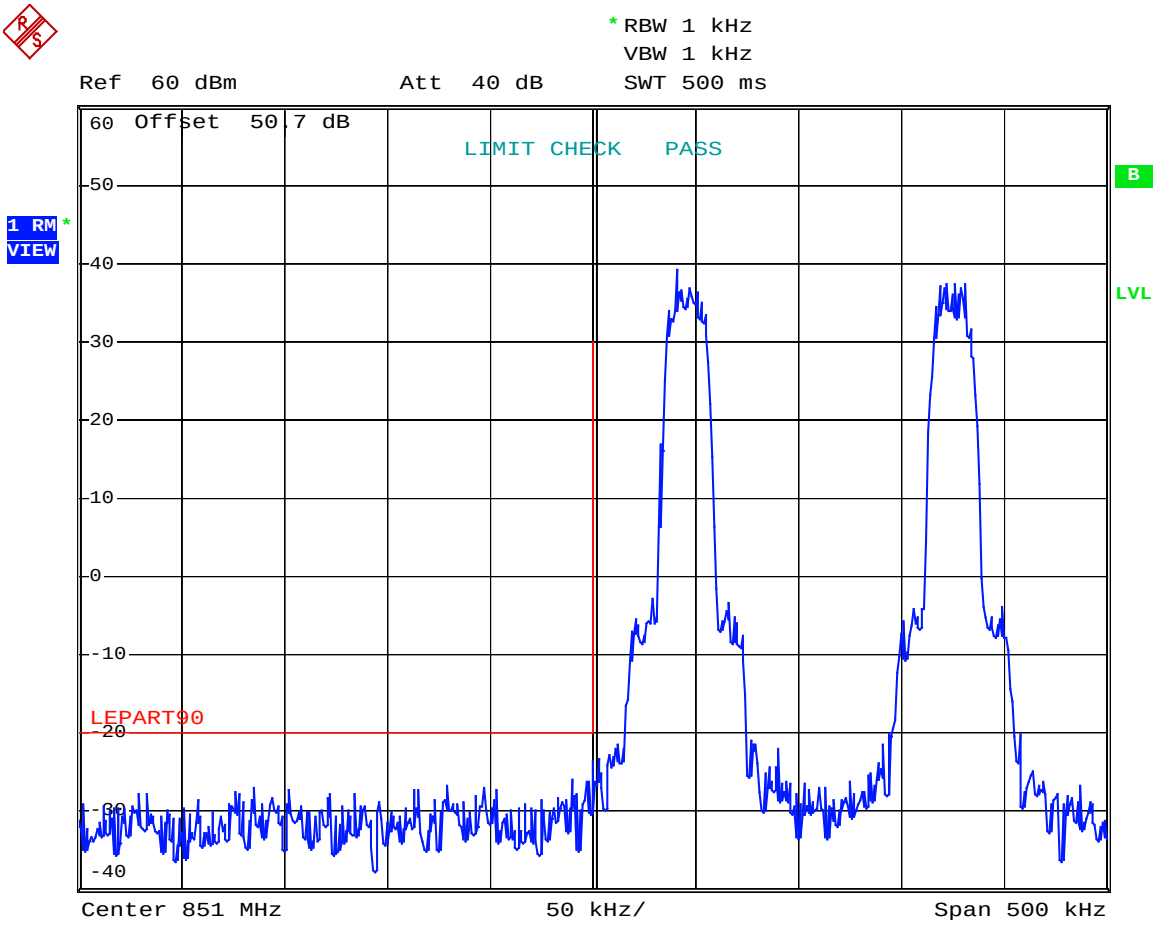
Analog Continued





Test Data – Spurious Emissions at Antenna Terminals

iDEN Lower
100 Watts each



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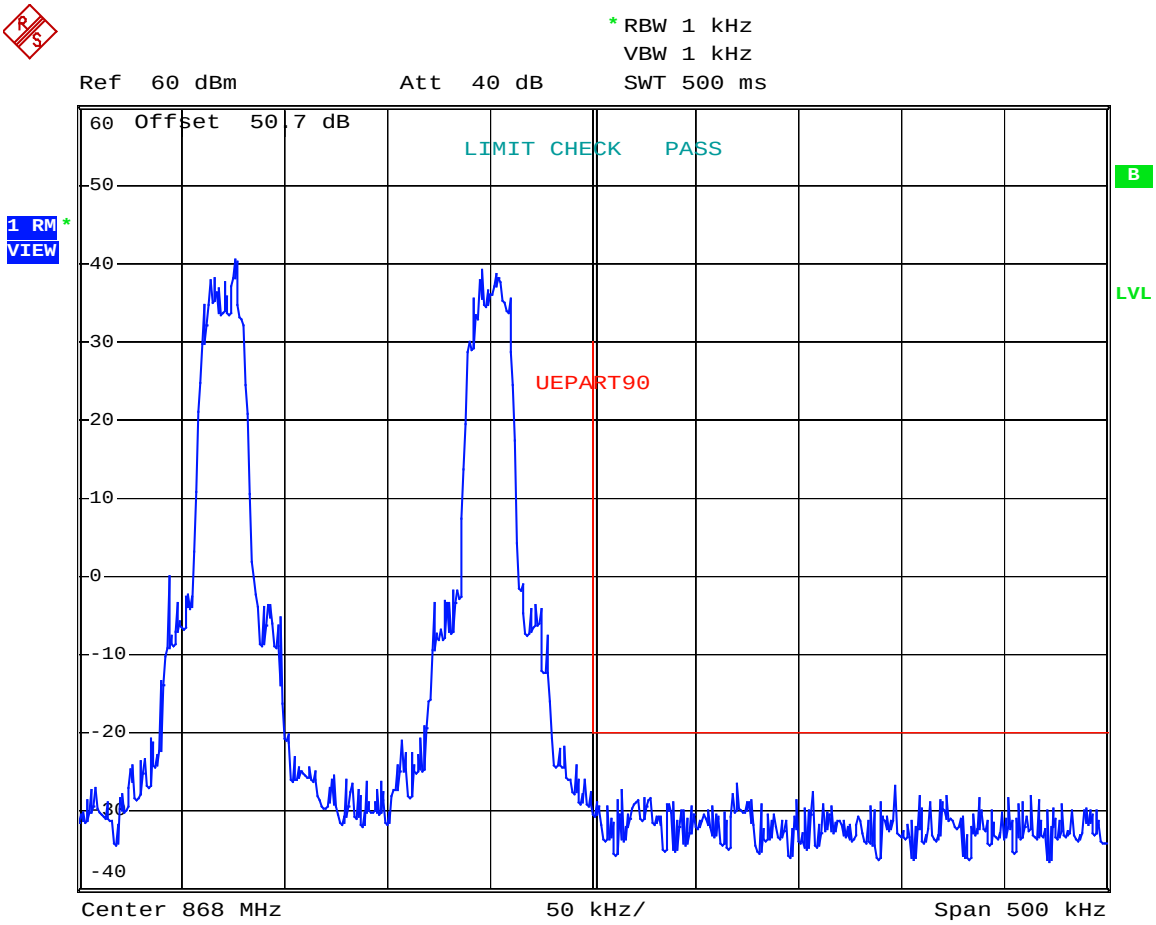
Test Data – Spurious Emissions at Antenna Terminals

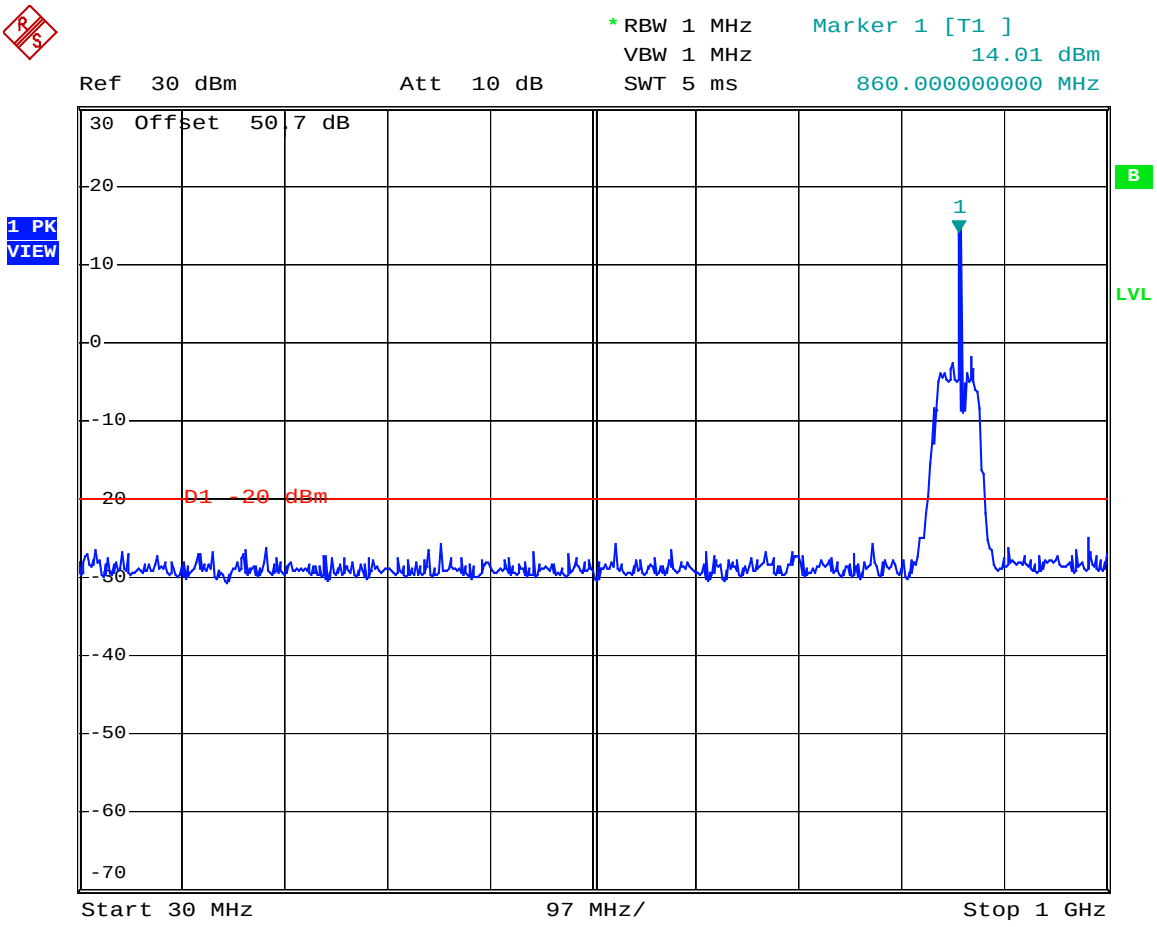
iDEN Upper
100 Watts each



Date: 28.MAR.2006 17:23:05

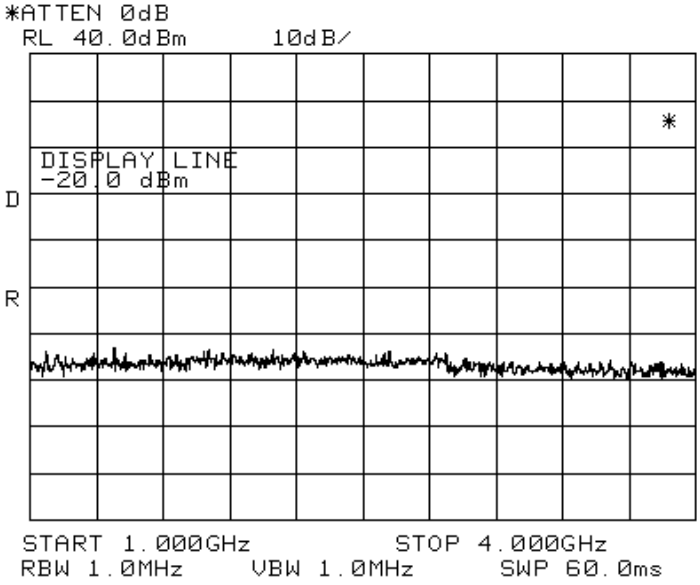
Test Data – Spurious Emissions at Antenna Terminals

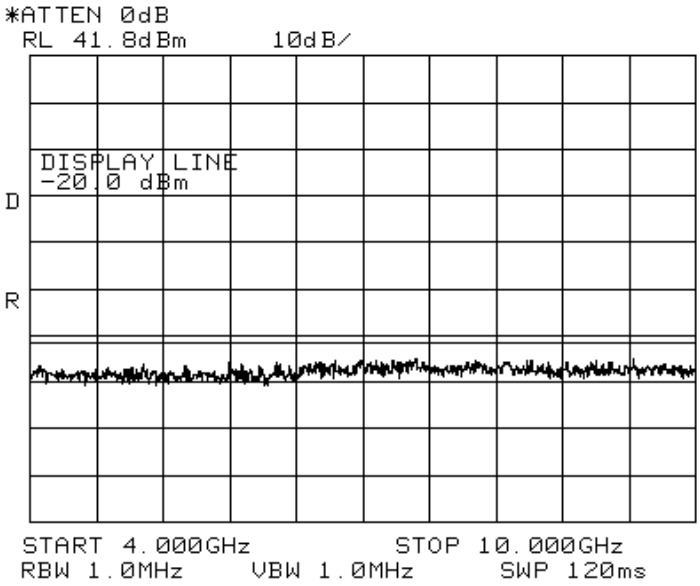
iDEN



Test Data – Spurious Emissions at Antenna Terminals

iDEN continued





Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1053
TESTED BY: David Light	DATE: 30 March 2006

Test Results: Complies.

Test Data: See attached table.

Equipment Used: 1464-1484-1485-1016-993-759-760-791

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

Test Data - Radiated Emissions

Field Strength of Spurious Emissions

Page 1 of 1 Complete X

Job No.: 6L0102 Date: 3/30/06 Preliminary

Specification: Part 2 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 45

E.U.T.: MCPB-850-200

Configuration: Tx full power at mid band

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement

Detector Type: Peak VBW: 1 MHz Distance: 3 m

Test Equipment Used

Antenna: 993 Directional Coupler:

Pre-Amp: 1016 Cable #1: 1484

Filter: 1481 Cable #2: 1485

Receiver: 1464 Cable #3:

Attenuator #1 Cable #4:

Attenuator #2: Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
1762	-31.0	31.1		31.8	8.4		-23.3	0.0047	V	
2643	-34.5	36.9		32.8	9.3		-21.1	0.0078	V	
3524	-37.0	42.5		32.7	10.2		-17.1	0.0197	V	
4405	-50.0	45.8		31.5	10.1		-25.6	0.0027	V	
5286	-64.0	42.0		32.3	10.7		-43.6	0.0000	V	
6167	-63.5	40.2		31.1	11.3		-43.1	0.0000	V	
7048	-67.0	40.8		31.6	11.7		-46.2	0.0000	V	
7929	-69.0	41.6		34	11.2		-50.2	0.0000	V	
8810	-66.0	41.2		34	11.8		-47.1	0.0000	V	
1762	-28.0	33.5		31.8	8.4		-17.9	0.0163	H	
2643	-39.0	33.6		32.8	9.3		-28.9	0.0013	H	
3524	-41.0	33.9		32.7	10.2		-29.7	0.0011	H	
4405	-48.0	34.9		31.5	10.1		-34.5	0.0004	H	
5286	-64.0	38.1		32.3	10.7		-47.5	0.0000	H	
6167	-66.0	37.4		31.1	11.3		-48.4	0.0000	H	
7048	-66.0	39.4		31.6	11.7		-46.6	0.0000	H	
7929	-69.0	40.4		34	11.2		-51.4	0.0000	H	
8810	-65.0	41.4		34	11.8		-45.9	0.0000	H	

Notes: **Searched spectrum from 30 MHz to 9 GHz**

Photographs of Test Setup

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/10/06	01/10/07
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/29/04	03/29/06
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1058	DUAL DIRECTIONAL COUPLER	HEWLETT PACKARD 11692D	1212A03366	CBU	N/A
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	CBU	N/A
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU	N/A
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	CBU	N/A
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	CBU	N/A
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/01/05	08/02/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/05	11/12/06
791	PREAMP, 25dB	ICC LNA25	398	11/12/05	11/12/06
760	Antenna biconical	Electro Metrics MFC-25	477	08/04/05	08/04/06
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	08/04/05	08/04/06

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output	**PARA. NO.: 2.985**

Minimum Standard: Para. No. 90.205(a). The maximum allowable station ERP is dependent upon the stations HAAT and required service area and will be authorized in accordance with Table 1 of 90.205(d).

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

NAME OF TEST: Spurious Emissions at Antenna Terminals PARA. NO.: 2.991

Test Method: RBW: 1% of emission bandwidth in the 0 - 1 GHz range.
1 MHz at frequencies above 1 GHz.

VBW: $\Rightarrow$ RBW

The spectrum is searched up to 10 times the fundamental frequency.

NAME OF TEST: Occupied Bandwidth **PARA. NO.: 2.989**

Minimum Standard: Para. No. 90.210, see table 1 below for applicable mask.

Table 1

Frequency Band (MHz)	Mask for equipment with Low Pass Filter	Mask for equipment without Low Pass Filter
Below 25	A or B	A or C
25 - 50	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

NAME OF TEST: Field Strength of Spurious **PARA. NO.: 2.993**

Minimum Standard: Para. No. 90.210, see table 1 for applicable mask.

Calculation of Field Strength Limit

An example of attenuation requirement of 50 + 10 Log P is equivalent to -20 dBm (1×10^{-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)

$$E = \frac{\sqrt{30GP}}{R} = \text{E} = \frac{\sqrt{30 \text{ x } 1.64 \text{ x } 10^{-5}}}{3} = 0.00739 \text{ V / m} = 77.4 \text{ dB}\mu\text{V / m}$$

For emissions > 1 GHz:

G = 1 (Isotropic Gain)
$P = 1 \times 10^{-5}$ Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

$$E = 77.4 - 20Log\sqrt{1.64} = 75.2 dB\mu V / m@3m$$

MASK	Spurious Limit	FS Limit Below 1 GHz	FS Limit Above 1 GHz
A,B,C,G,H,I	-13dBm	84.4 dBμV/m@3m	82.2 dBμV/m@3m
D,J	-20dBm	77.4 dBμV/m@3m	75.2 dBμV/m@3m
E,F,K	-25dBm	72.4 dBμV/m@3m	70.2 dBμV/m@3m

NAME OF TEST: Frequency Stability **PARA. NO.: 2.995**

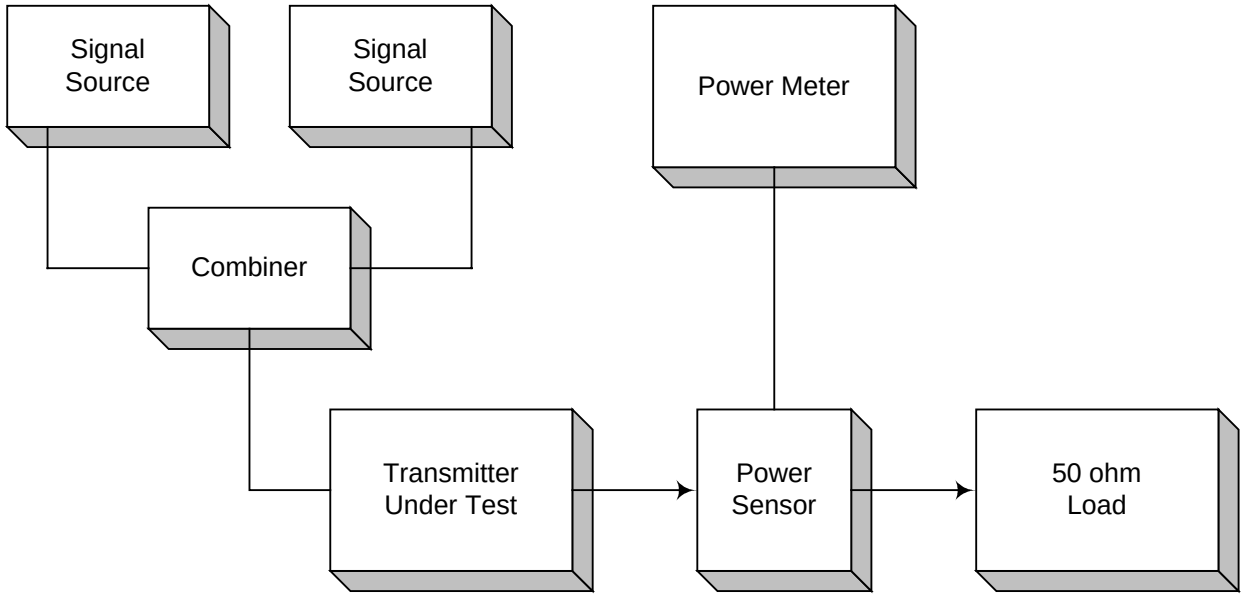
Minimum Standard: Para. No. 990.213. The transmitter carrier frequency shall remain within the assigned frequency below in ppm.

Table 2

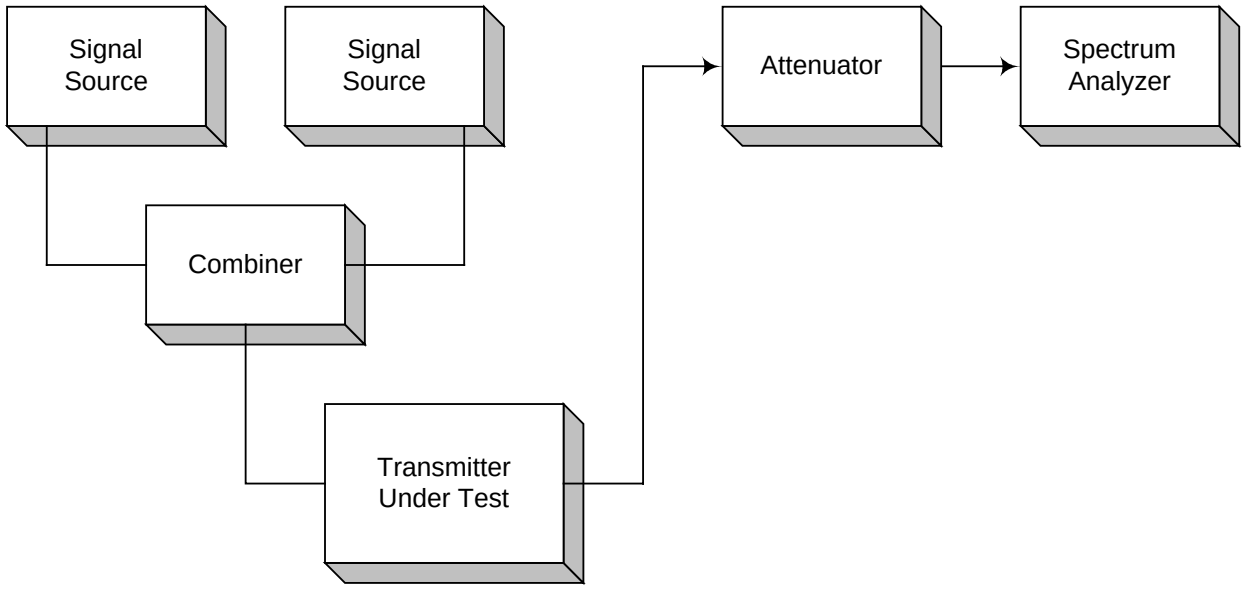
Frequency Band (MHz)	Fixed And Base Stations	Mobile Stations	
		> 2 Watts o/p pwr	< 2 Watts o/p pwr
Below 25	100	100	200
25 - 50	20	20	50
72 - 76	5	-	50
150 - 174	5	5	5
220 - 222	0.1	1.5	1.5
421 - 512	2.5	5	5
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	15
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
869 - 901	0.1	1.5	1.5
902 - 928	2.5	2.5	2.5
929 - 930	1.5	-	-
935 - 940	0.1	1.5	1.5
1427 - 1435	300	300	300
Above 2450	-	-	-

ANNEX B - TEST DIAGRAMS

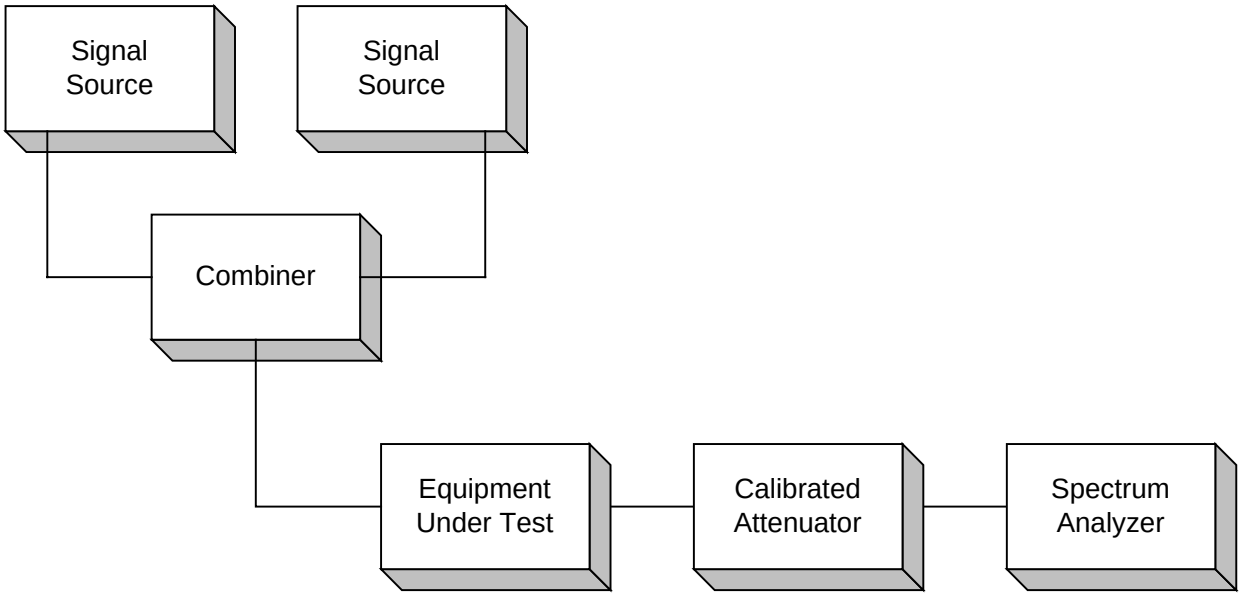
Para. No. 2.985 - R.F. Power Output



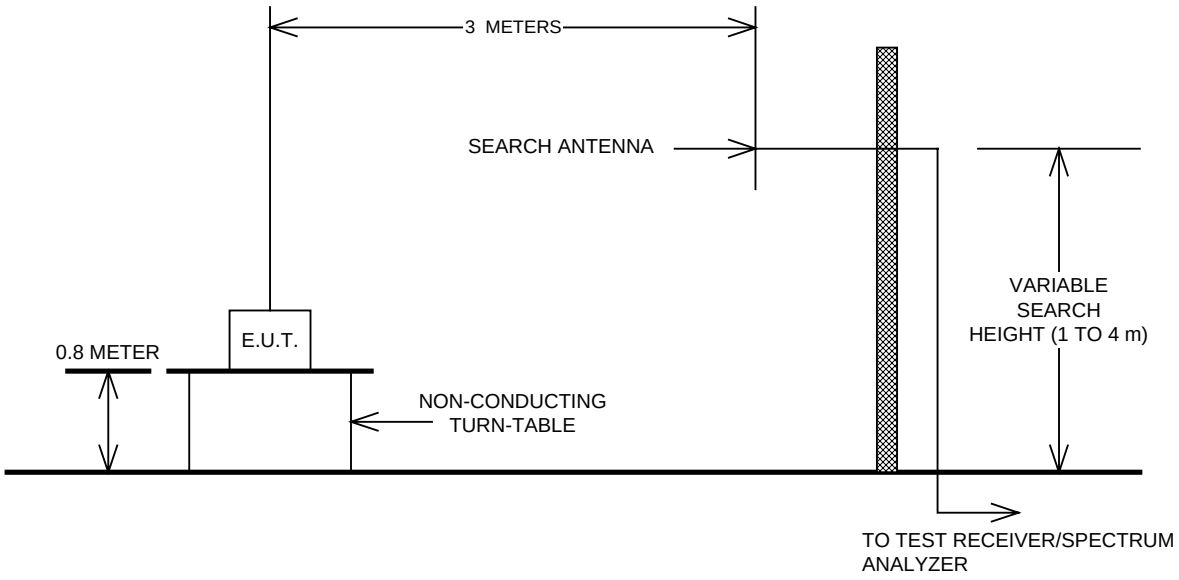
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability