

Nemko Test Report: 6L0102RUS1

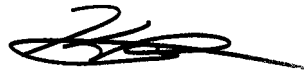
Applicant: Communication Components, Inc.

**Equipment Under Test:
(E.U.T.)** MCPB-850-200

In Accordance With: **FCC Part 22, Subpart H**
Cellular Band Amplifiers

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, TX
75057-3136

Authorized By:

A handwritten signature in black ink, appearing to read 'Kevin Rose', with a stylized flourish at the end.

Kevin Rose Wireless Engineer

Date: April 3, 2006

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EQUIPMENT: **MCPB-850-200**Test Report No.: 6L0102RUS1

Section 1. Summary of Test ResultsManufacturer: **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 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".

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EQUIPMENT: **MCPB-850-200**Test Report No.: 6L0102RUS1

Summary Of Test Data

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

Footnotes

:

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

.

EQUIPMENT: **MCPB-850-200**

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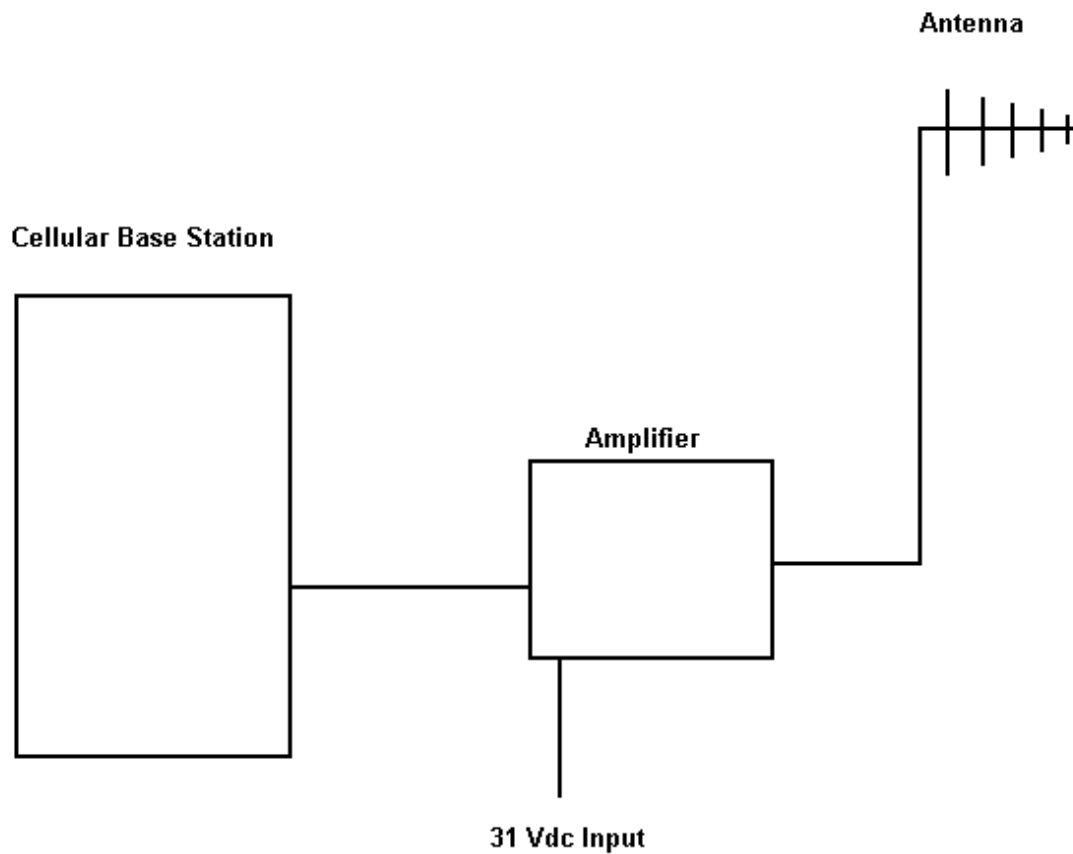
Section 2. General Equipment Specification

Supply Voltage Input:	31 Vdc				
Frequency Range:	869 – 894 MHz				
Type of Modulation and Designator:	CDMA & WCDMA (F9W) ☒	GSM (GXW) ☒	NADC (DXW) ☒	EDGE (G7W) ☒	AMPS (F8W, F1D) ☒
Output Impedance:	50 ohms				
Rated Output Power:	53 dBm 200 Watts				
RF Output (Rated):	200 Watts composite				
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



EQUIPMENT: **MCPB-850-200**

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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.**Test Data:**

	Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)
	GSM	50.1	53.1
	EDGE	50.0	53.0
	UMTS	49.9	52.9
	CDMA	50.2	53.2
	TDMA	50.1	53.1
	Analog	50.0	53.0

Maximum output power for lowest and highest GSM/EDGE frequencies (869.2 & 893.8 MHz) shall be no greater than 1 watt to comply with bandedge requirements.

Maximum output power for lowest and highest CDMA carriers (ch 1013 and 777) shall be no greater than 200 mW to comply with bandedge requirements.

Equipment Used: 1659-1082-1054-1064-1065**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 22 °C**Relative Humidity:** 45 %

EQUIPMENT: **MCPB-850-200**Test Report No.: 6L0102RUS1

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 27 March 2006

Test Results: **Complies.****Test Data:** **See attached plots****Equipment Used:** **1659-1082-1054-1064-1065****Measurement** **+/- 1.6 dB**
Uncertainty:**Temperature:** **22 °C****Relative** **45 %**
Humidity:

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

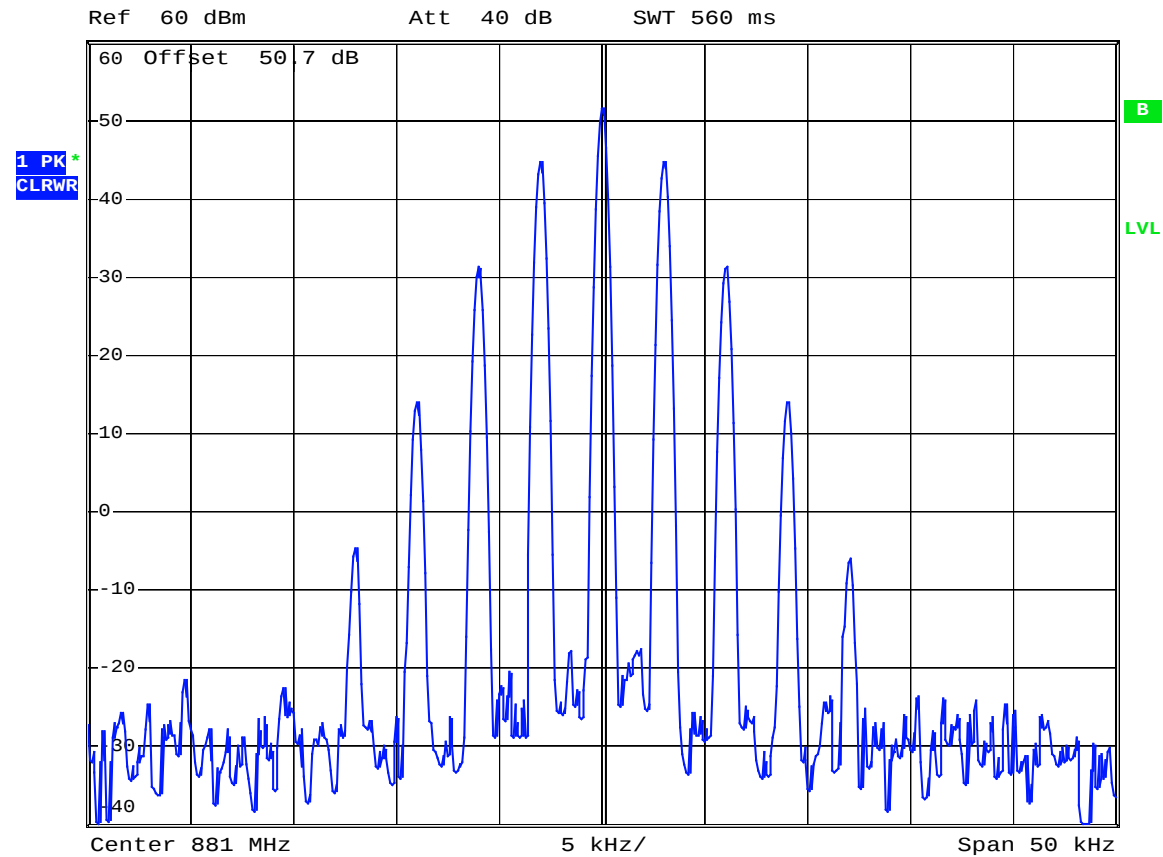
Analog
Output



* RBW 300 Hz

* VBW 30 kHz

SWT 560 ms



Date: 27.MAR.2006 09:54:00

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

Analog Input

**FREQUENCY SPAN**

50 kHz

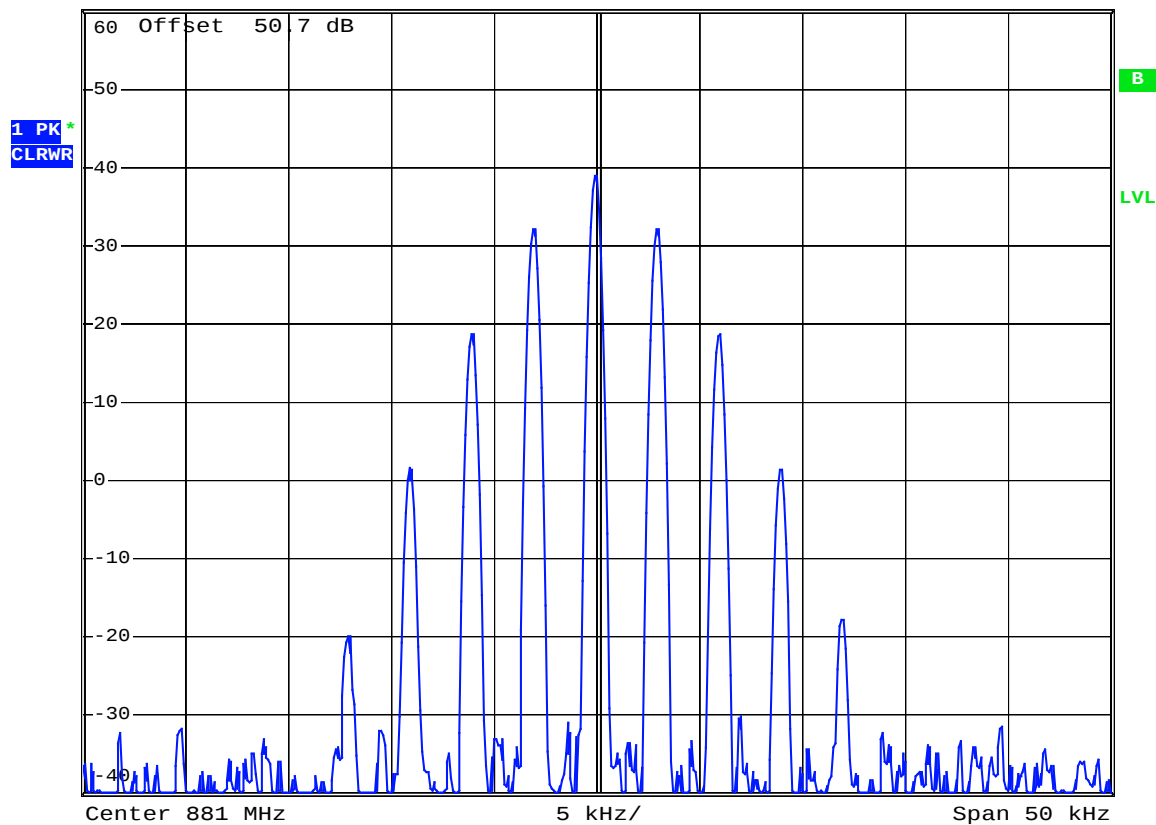
Ref 60 dBm

Att 40 dB

* RBW 300 Hz

* VBW 30 kHz

SWT 560 ms



Date: 27.MAR.2006 10:28:03

EQUIPMENT: **MCPB-850-200**

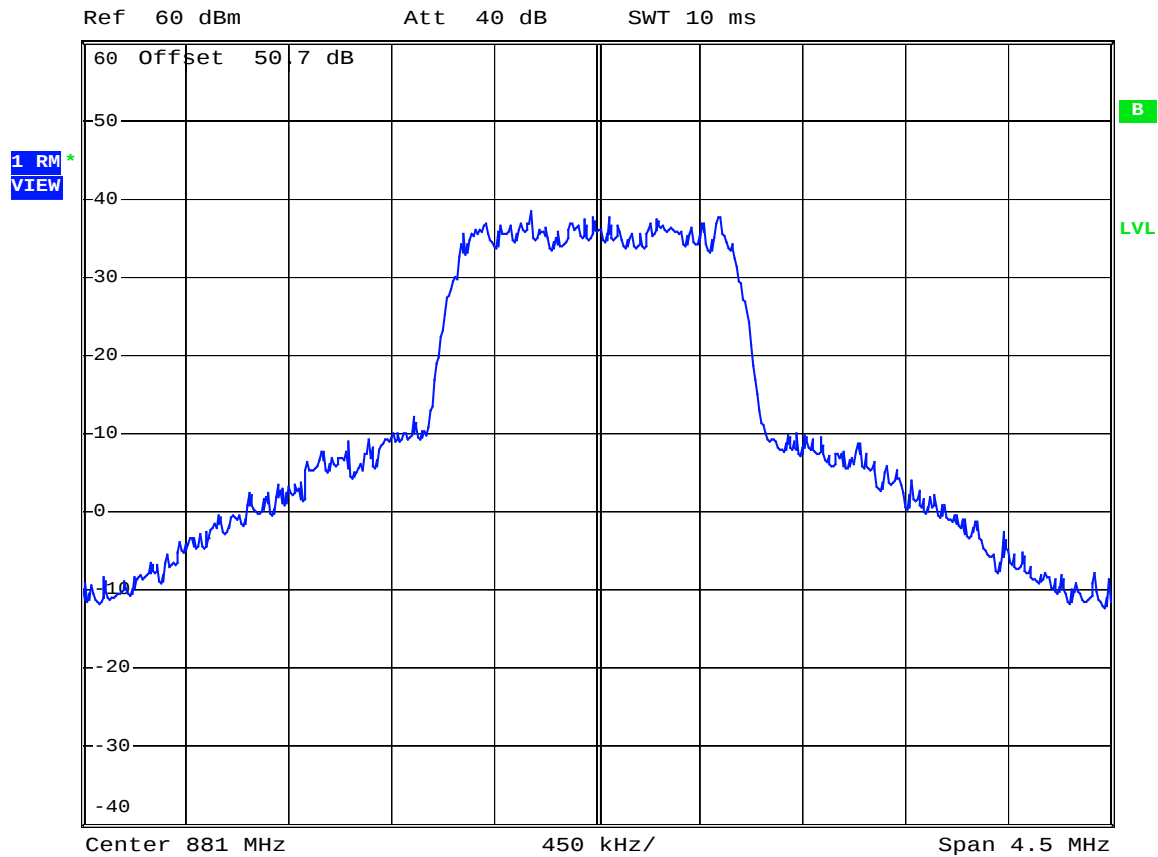
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

CDMA Output



* RBW 30 kHz
VBW 30 kHz
SWT 10 ms



Date: 27.MAR.2006 10:08:41

EQUIPMENT: **MCPB-850-200**

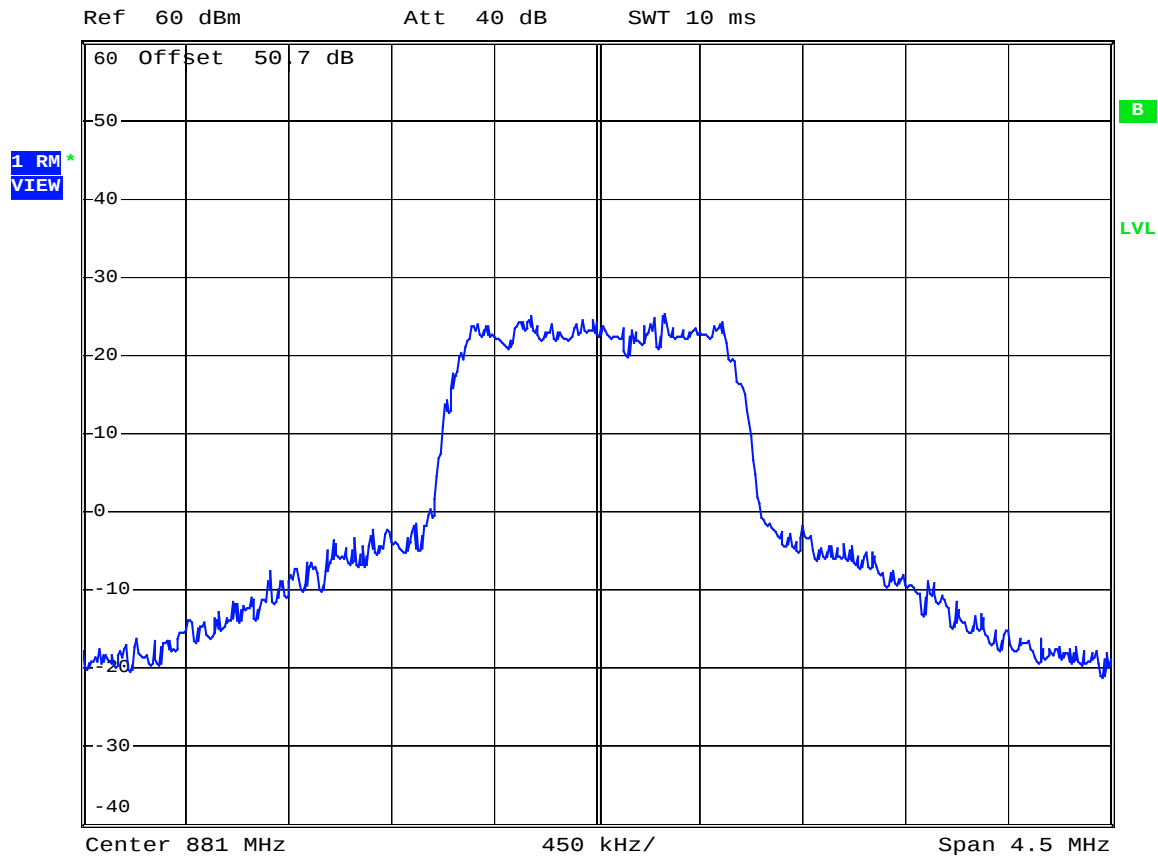
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

CDMA Input



* RBW 30 kHz
VBW 30 kHz
SWT 10 ms



Date: 27.MAR.2006 10:26:28

EQUIPMENT: **MCPB-850-200**

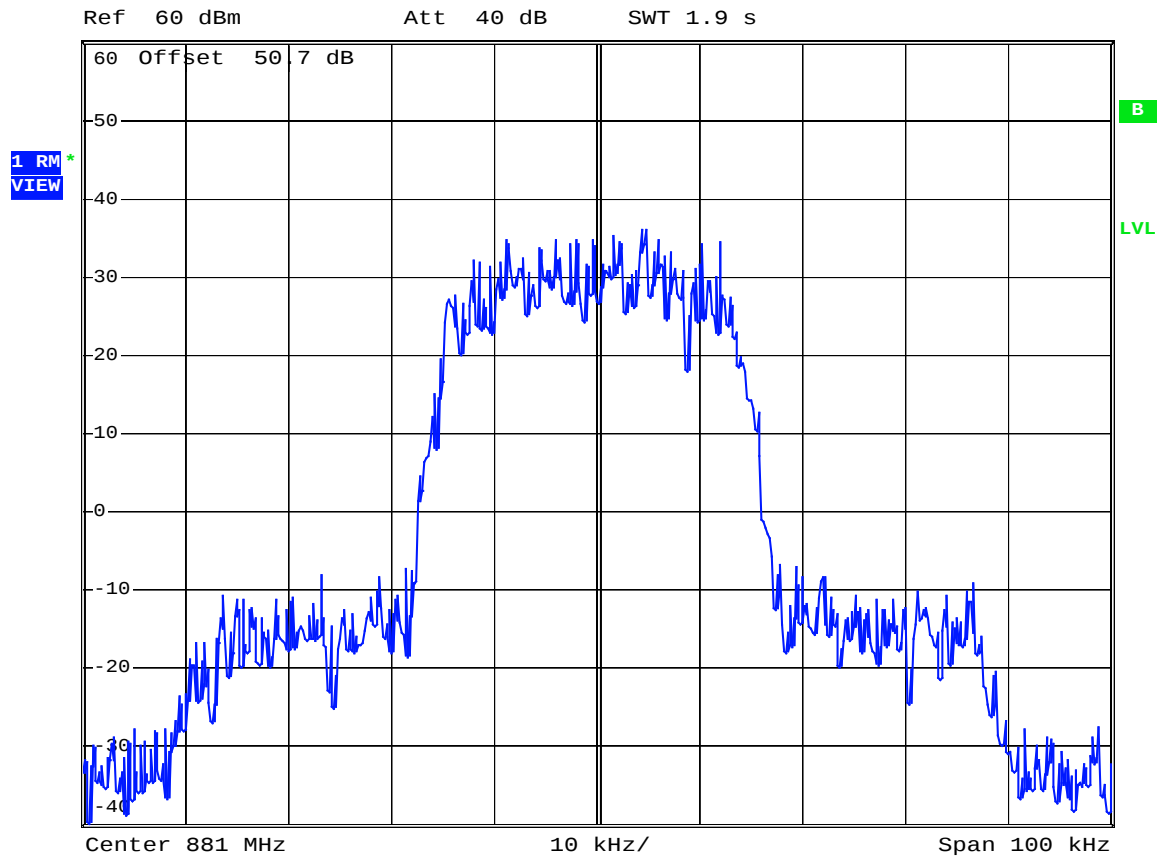
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

TDMA Output



* RBW 300 Hz
VBW 300 Hz
SWT 1.9 s



Date: 27.MAR.2006 10:10:48

EQUIPMENT: **MCPB-850-200**

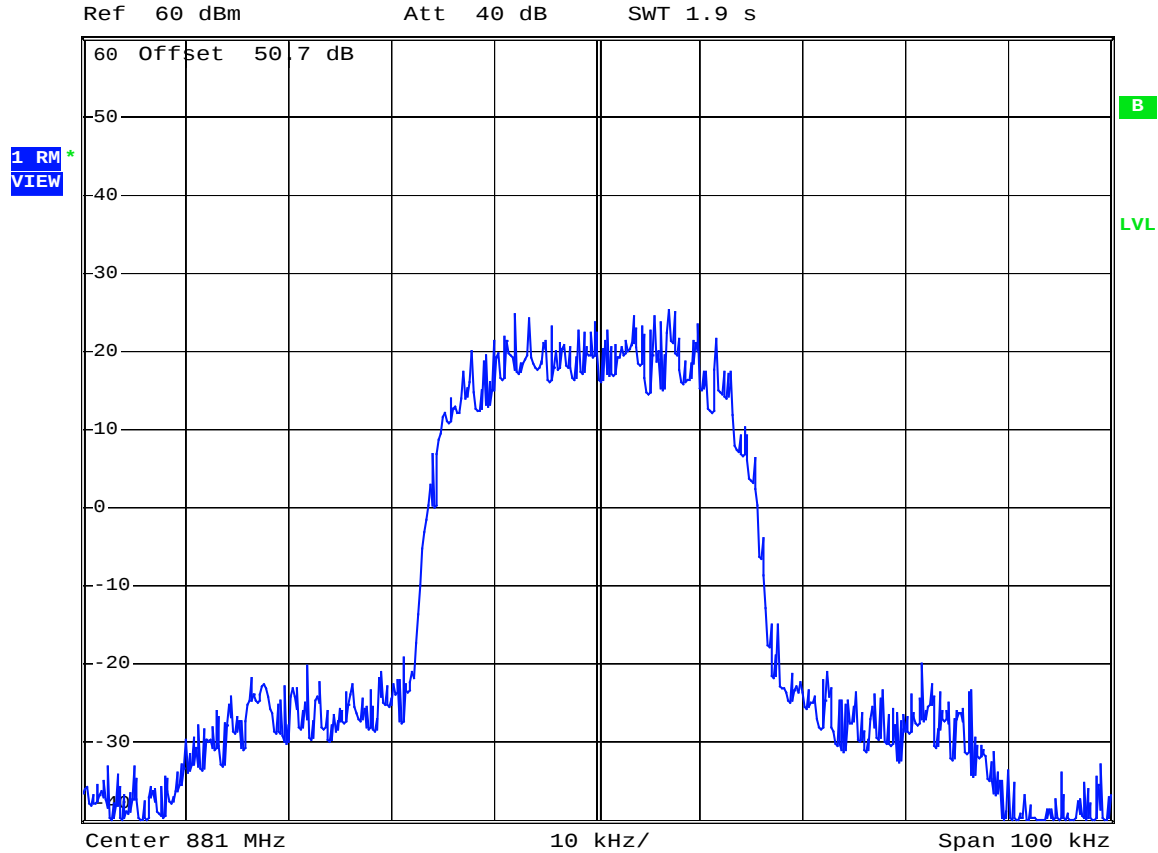
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

TDMA Input



* RBW 300 Hz
VBW 300 Hz
SWT 1.9 s



Date: 27.MAR.2006 10:25:02

EQUIPMENT: **MCPB-850-200**

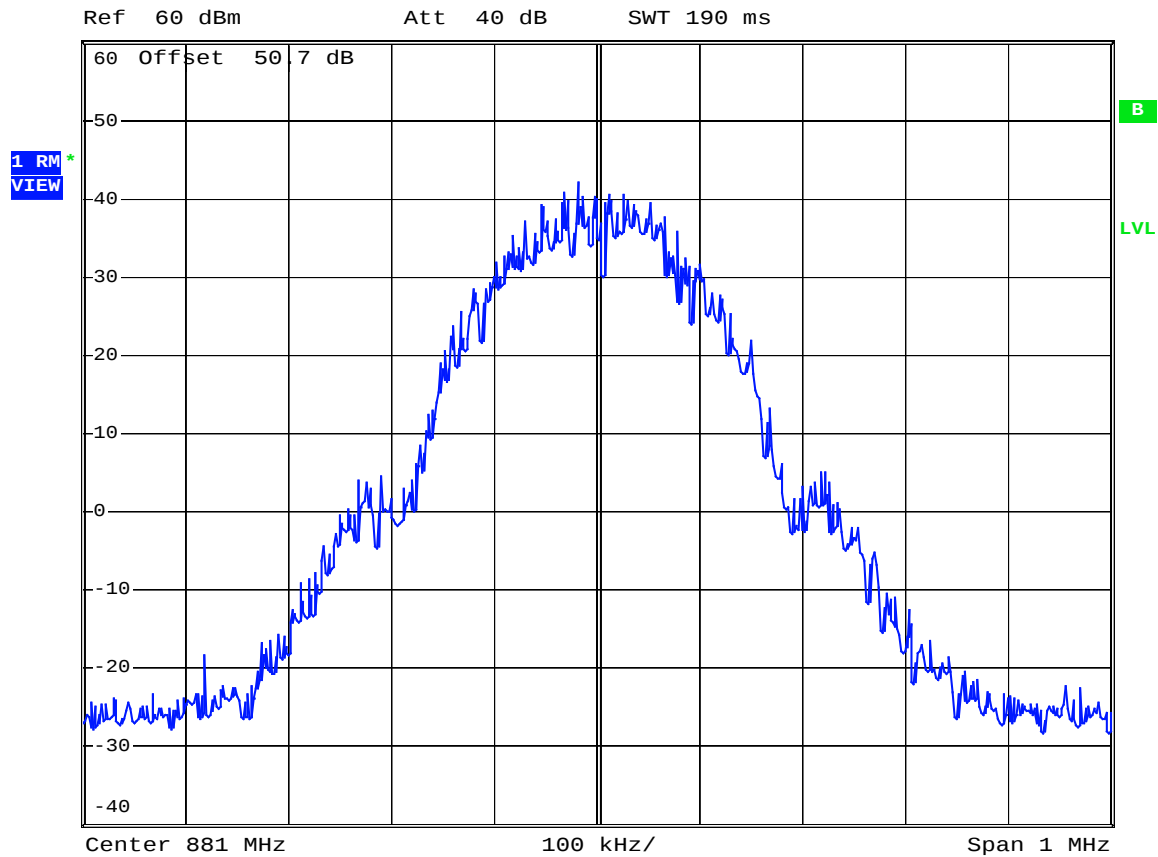
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

GSM Output



* RBW 3 kHz
VBW 3 kHz
SWT 190 ms



Date: 27.MAR.2006 10:13:07

EQUIPMENT: **MCPB-850-200**

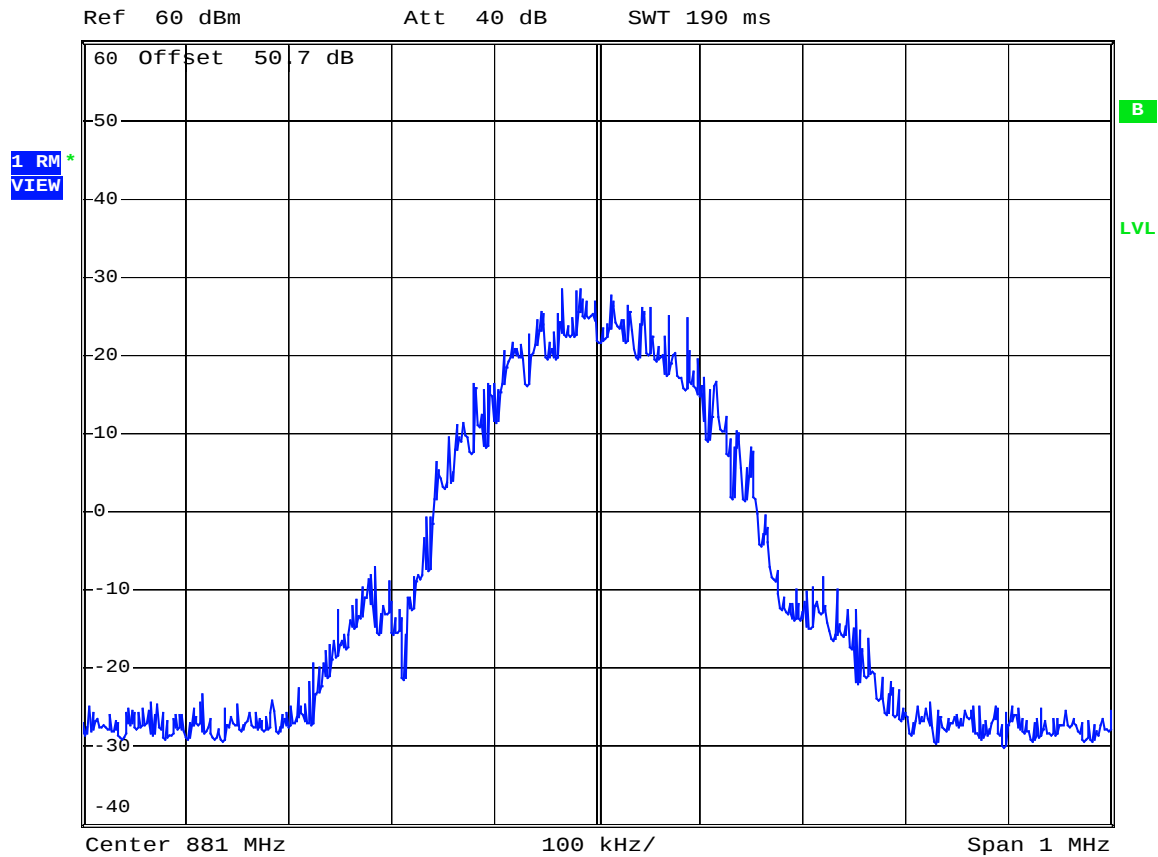
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

GSM Input



* RBW 3 kHz
VBW 3 kHz
SWT 190 ms



Date: 27.MAR.2006 10:23:40

EQUIPMENT: **MCPB-850-200**

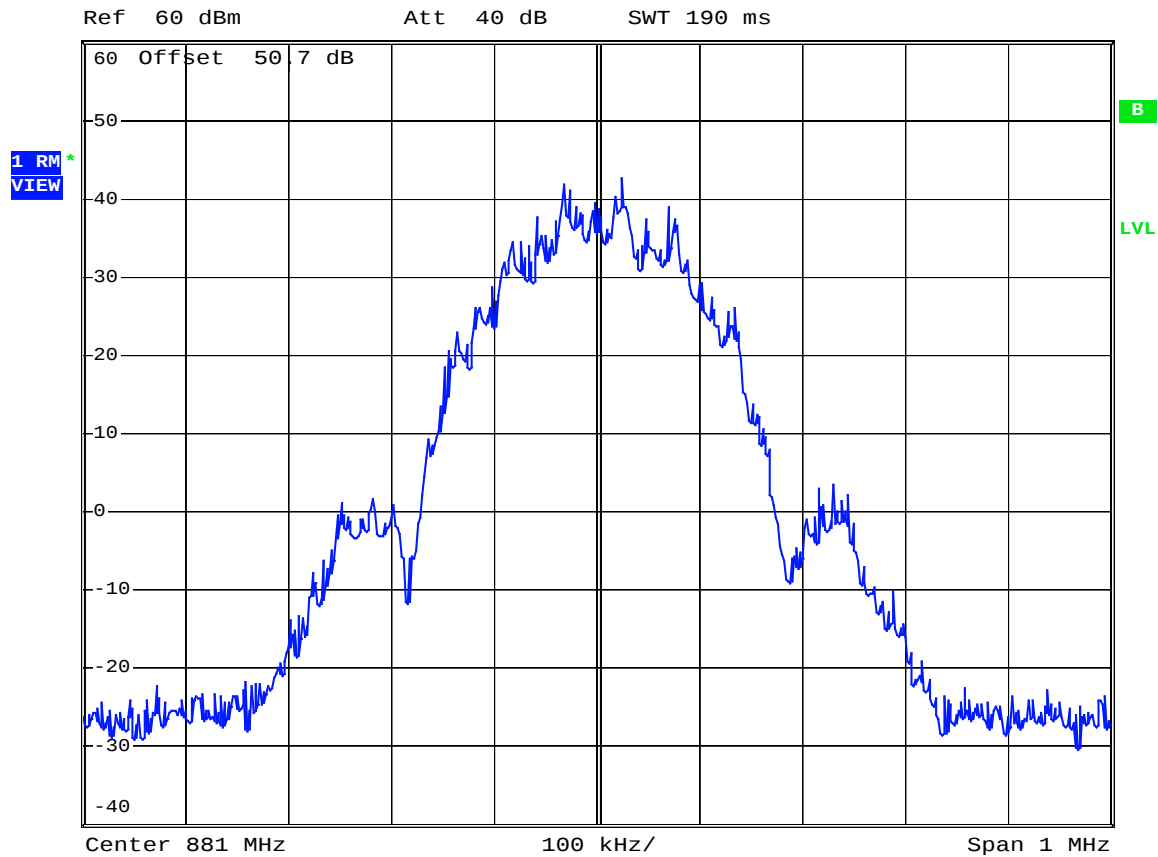
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

EDGE Output



* RBW 3 kHz
VBW 3 kHz
SWT 190 ms



Date: 27.MAR.2006 10:14:55

EQUIPMENT: **MCPB-850-200**

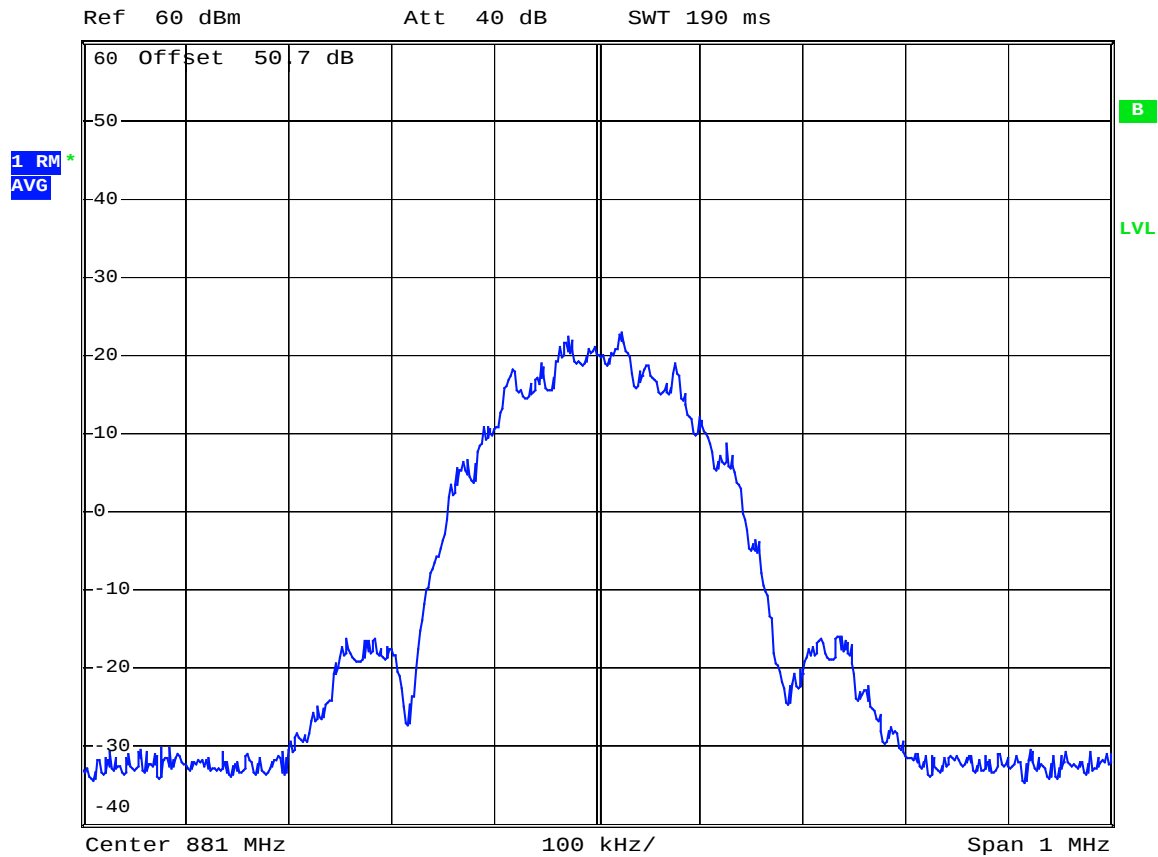
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

EDGE Input



* RBW 3 kHz
VBW 3 kHz
SWT 190 ms



Date: 27.MAR.2006 10:22:51

EQUIPMENT: **MCPB-850-200**

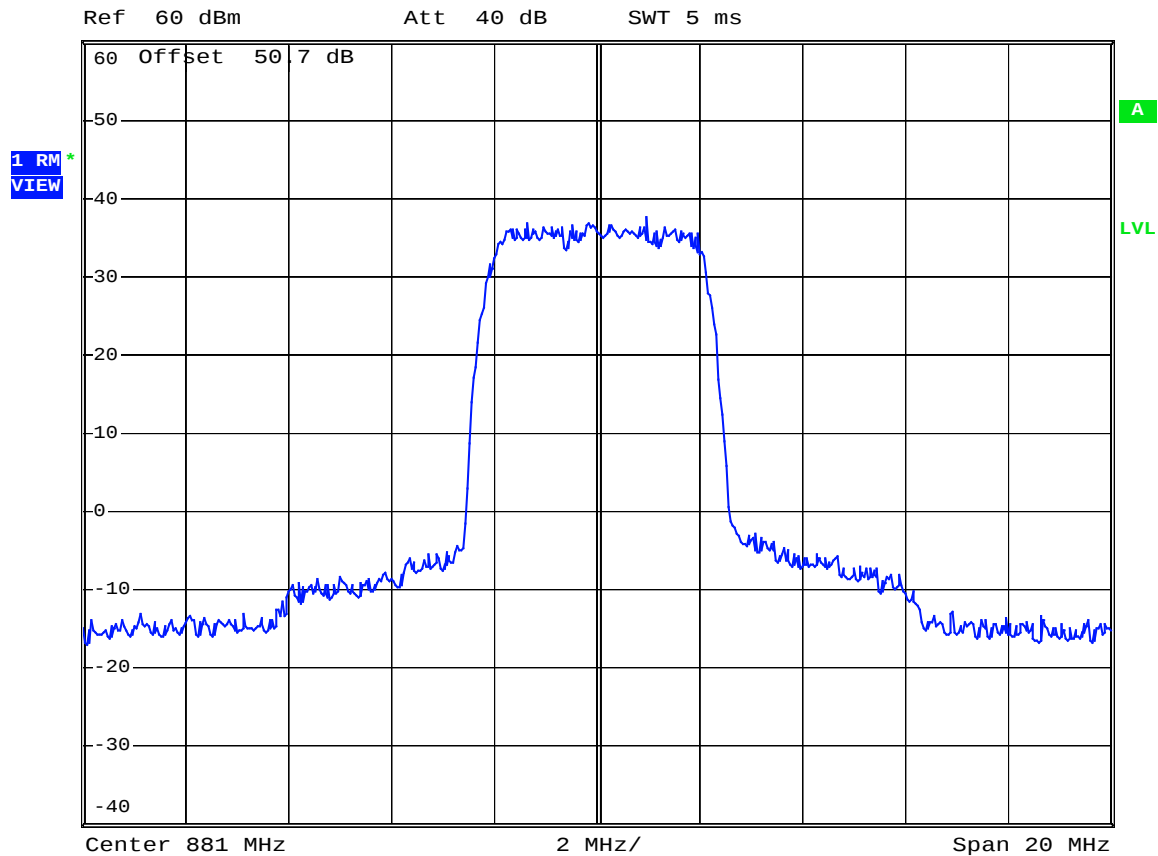
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

UMTS Output



* RBW 100 kHz
VBW 100 kHz
SWT 5 ms



Date: 29.MAR.2006 11:32:10

EQUIPMENT: **MCPB-850-200**

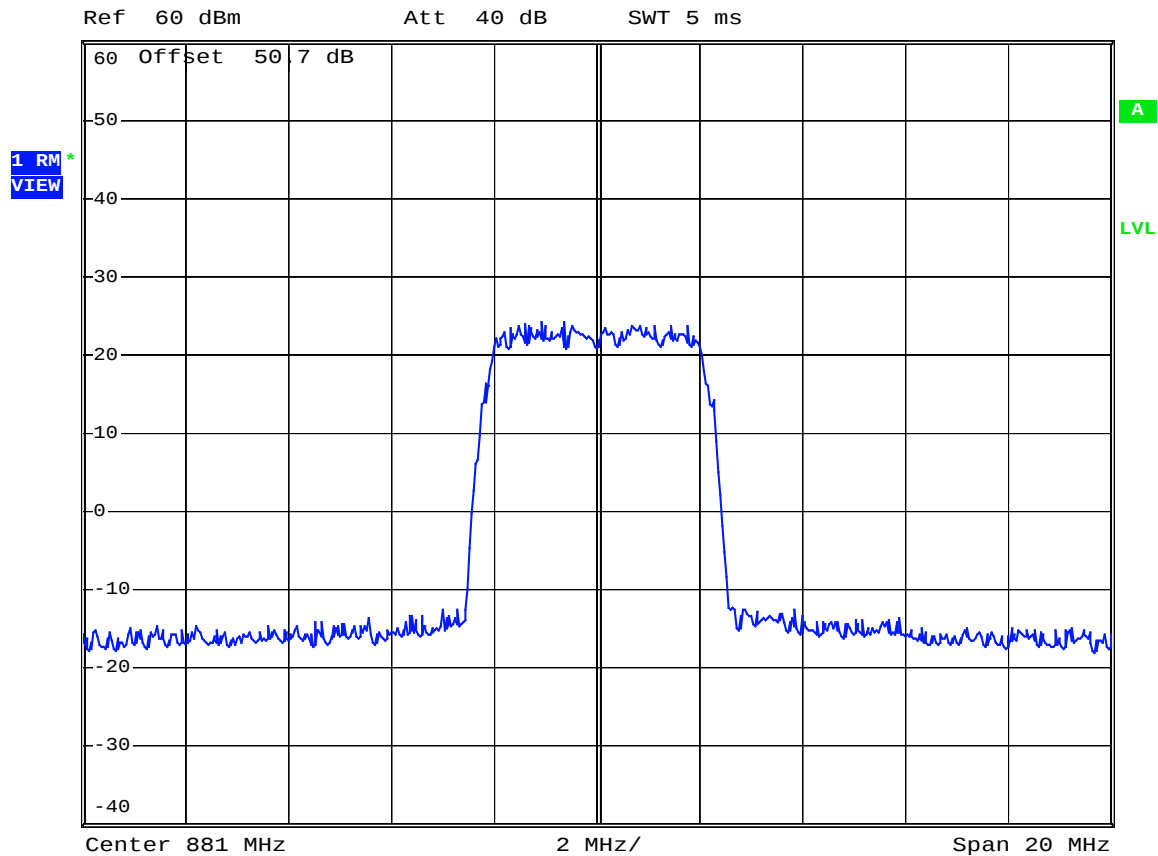
Test Report No.: 6L0102RUS1

Test Data – Occupied Bandwidth

UMTS Input



* RBW 100 kHz
VBW 100 kHz
SWT 5 ms



Date: 29.MAR.2006 11:33:29

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..

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

GSM LOWER BANDEDGE

869.3 AND 869.8 MHz

100 WATTS EACH

**CENTER FREQUENCY**

869 MHz

*RBW 3 kHz

Marker 1 [T1]

VBW 3 kHz

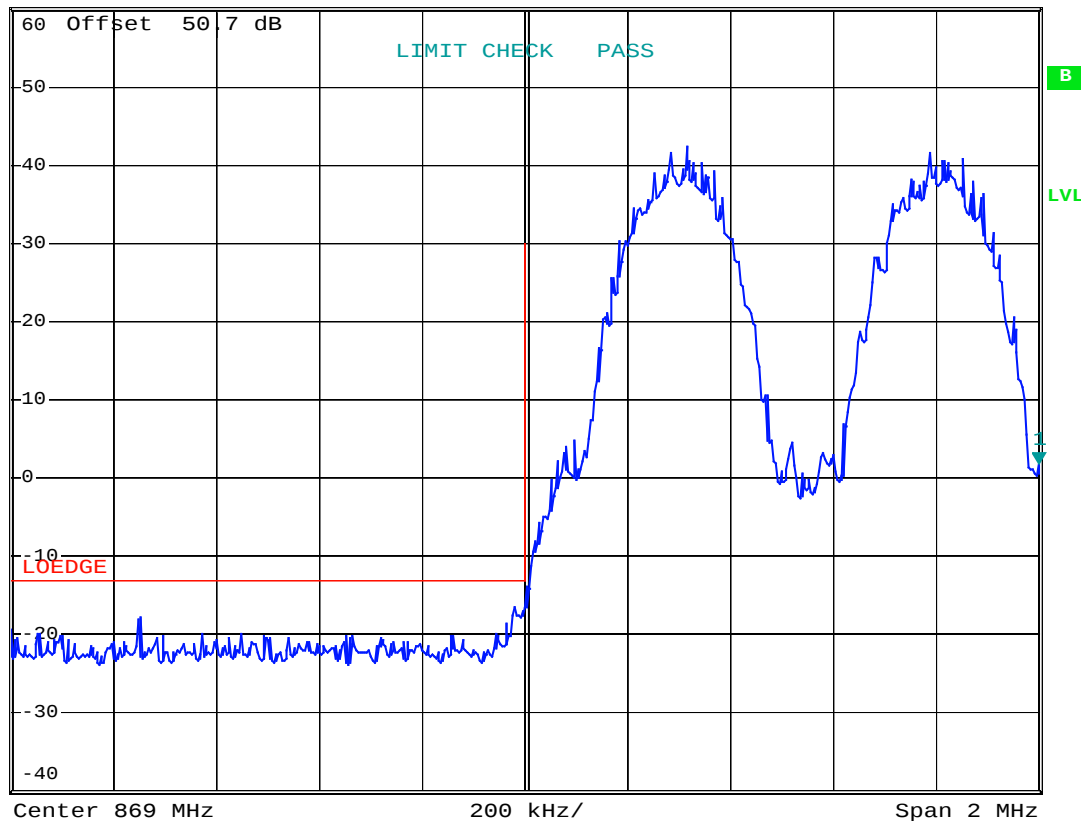
1.87 dBm

Ref 60 dBm

Att 40 dB

SWT 225 ms

870.000000000 MHz

1 PK
VIEW

Date: 31.JAN.2006 12:26:31

EQUIPMENT: **MCPB-850-200**

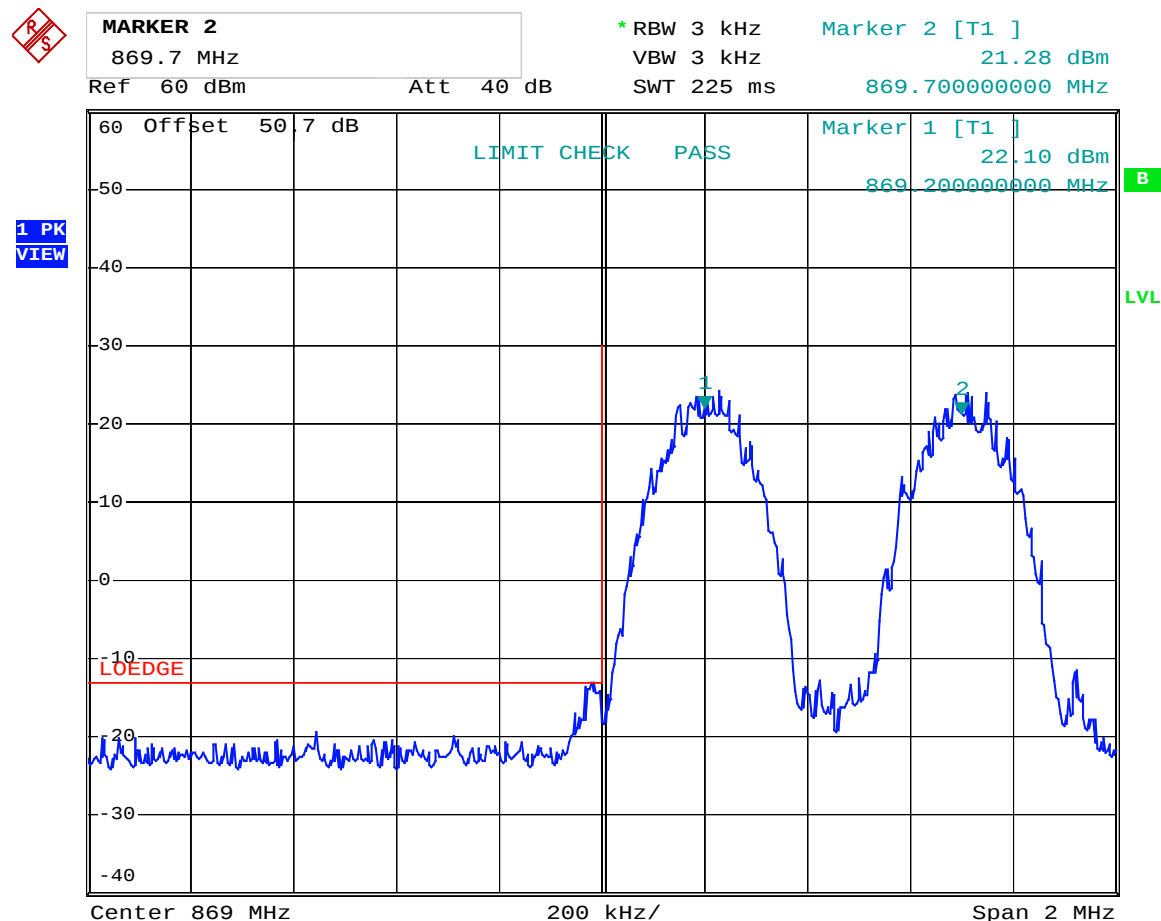
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

GSM LOWER BANDEDGE

869.2 AND 869.7 MHz

1 WATT EACH



Date: 31.JAN.2006 12:29:25

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

GSM UPPER BANDEDGE

893.2 AND 893.7 MHz

100 WATTS EACH

**MARKER 2**

893.7 MHz

Ref 60 dBm

Att 40 dB

*RBW 3 kHz

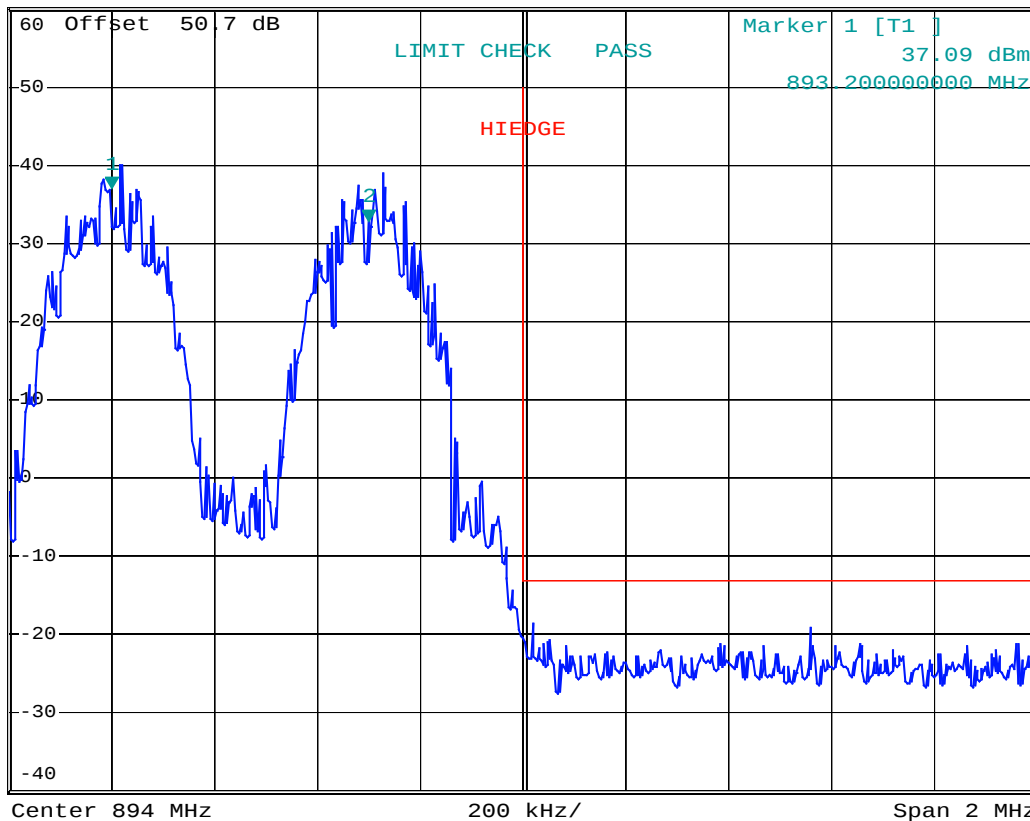
VBW 3 kHz

SWT 225 ms

Marker 2 [T1]

32.84 dBm

893.700000000 MHz

**1 PK
VIEW**

Date: 27.MAR.2006 11:38:48

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

GSM UPPER BANDEDGE

893.3 AND 893.8 MHz

1.25 WATTS EACH (31 DBM)

**MARKER 2**

893.8 MHz

Ref 60 dBm

Att 40 dB

*RBW 3 kHz

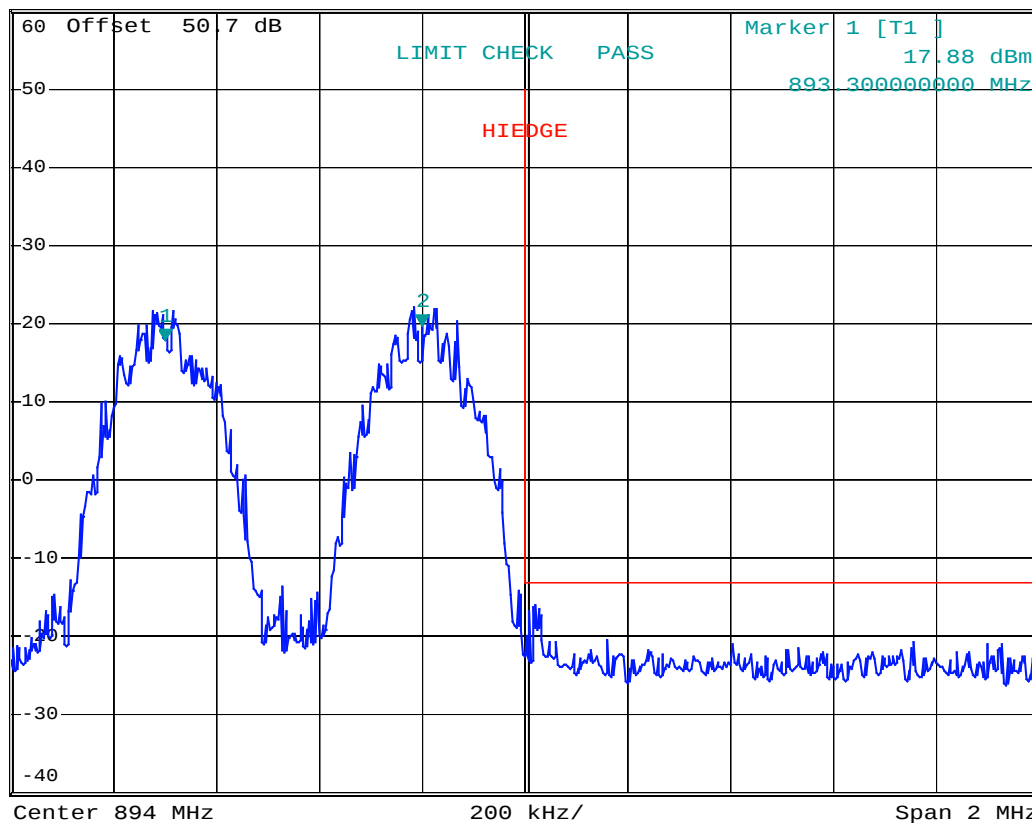
VBW 3 kHz

SWT 225 ms

Marker 2 [T1]

19.83 dBm

893.800000000 MHz

**1 PK
VIEW**

Date: 27.MAR.2006 11:44:15

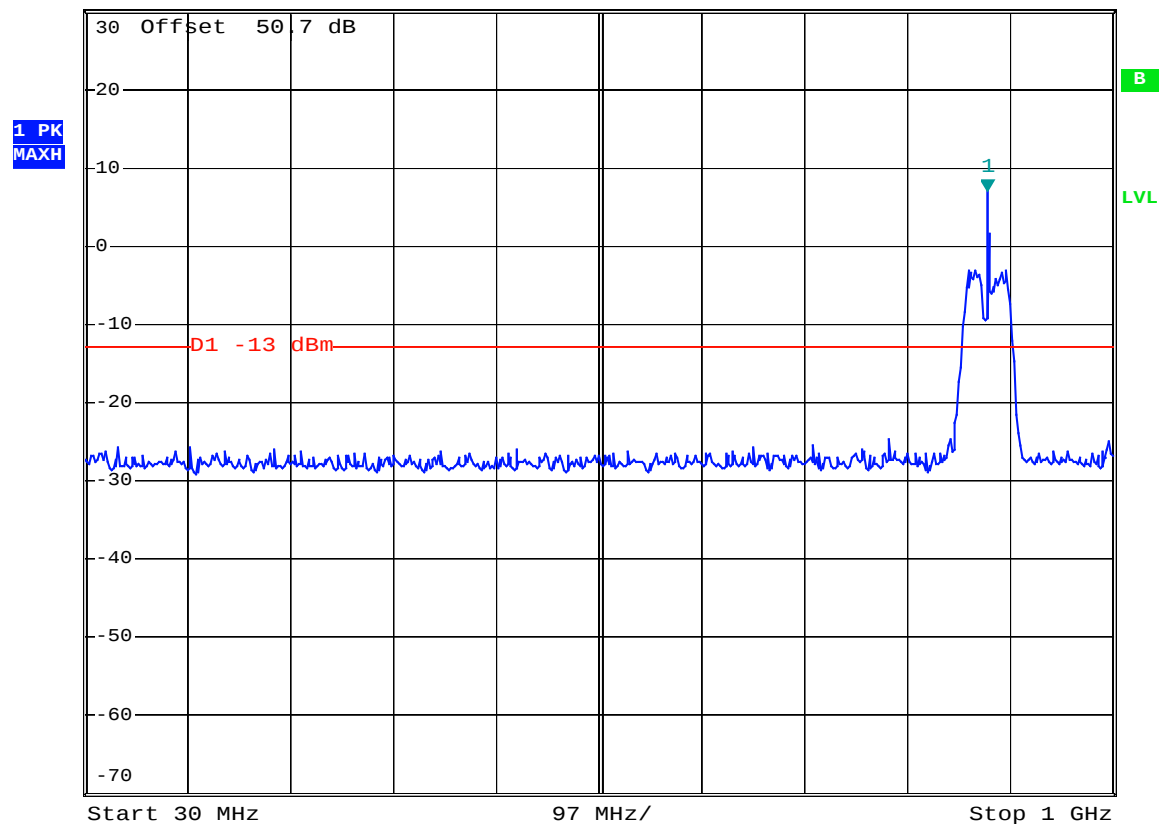
Test Data – Spurious Emissions at Antenna Terminals

GSM

Center Channel (Notched)



* RBW 1 MHz Marker 1 [T1]
VBW 1 MHz 7.01 dBm
SWT 5 ms 881.000000000 MHz



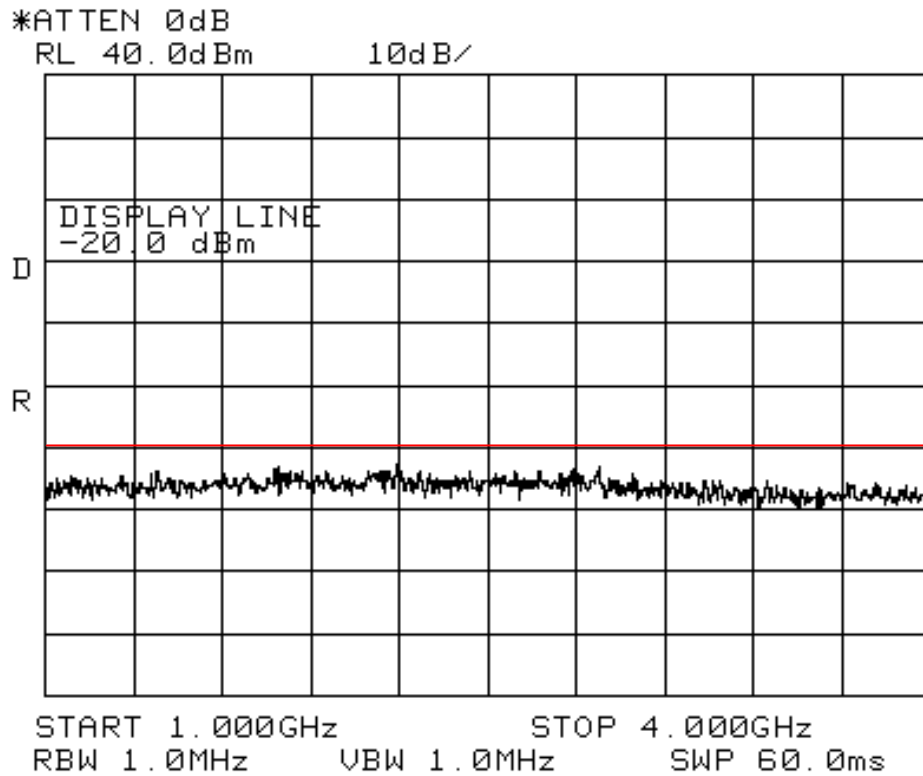
Date: 27.MAR.2006 14:26:39

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

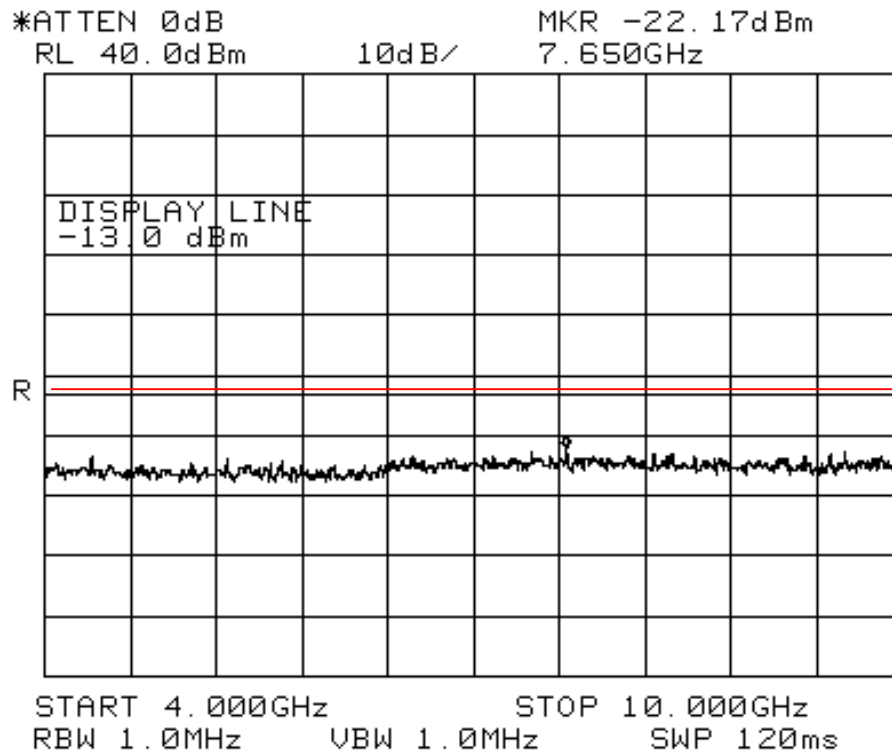
Test Data – Spurious Emissions at Antenna Terminals

GSM



Test Data – Spurious Emissions at Antenna Terminals

GSM



EQUIPMENT: **MCPB-850-200**

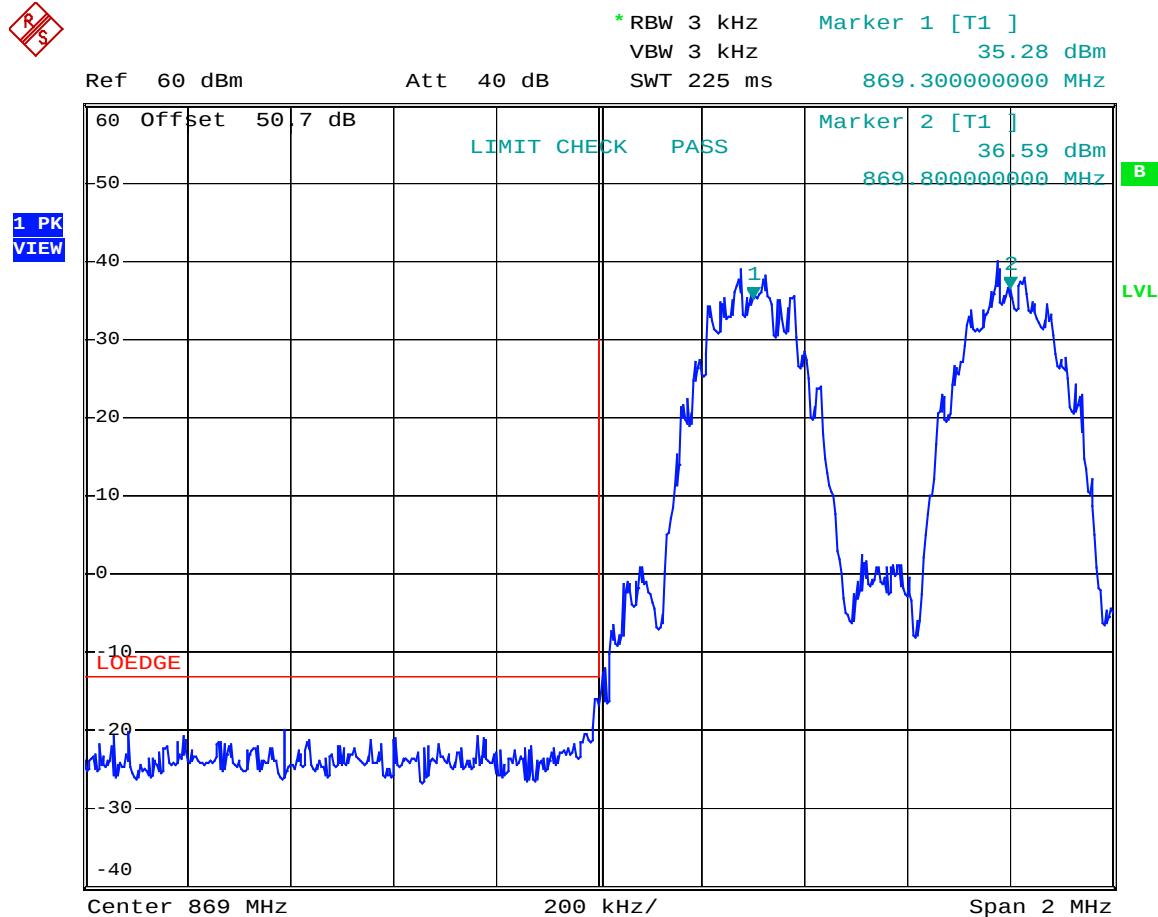
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE LOWER BANDEDGE

869.3 AND 869.8 MHz

100 WATTS EACH



Date: 24.MAR.2006 10:58:01

EQUIPMENT: **MCPB-850-200**

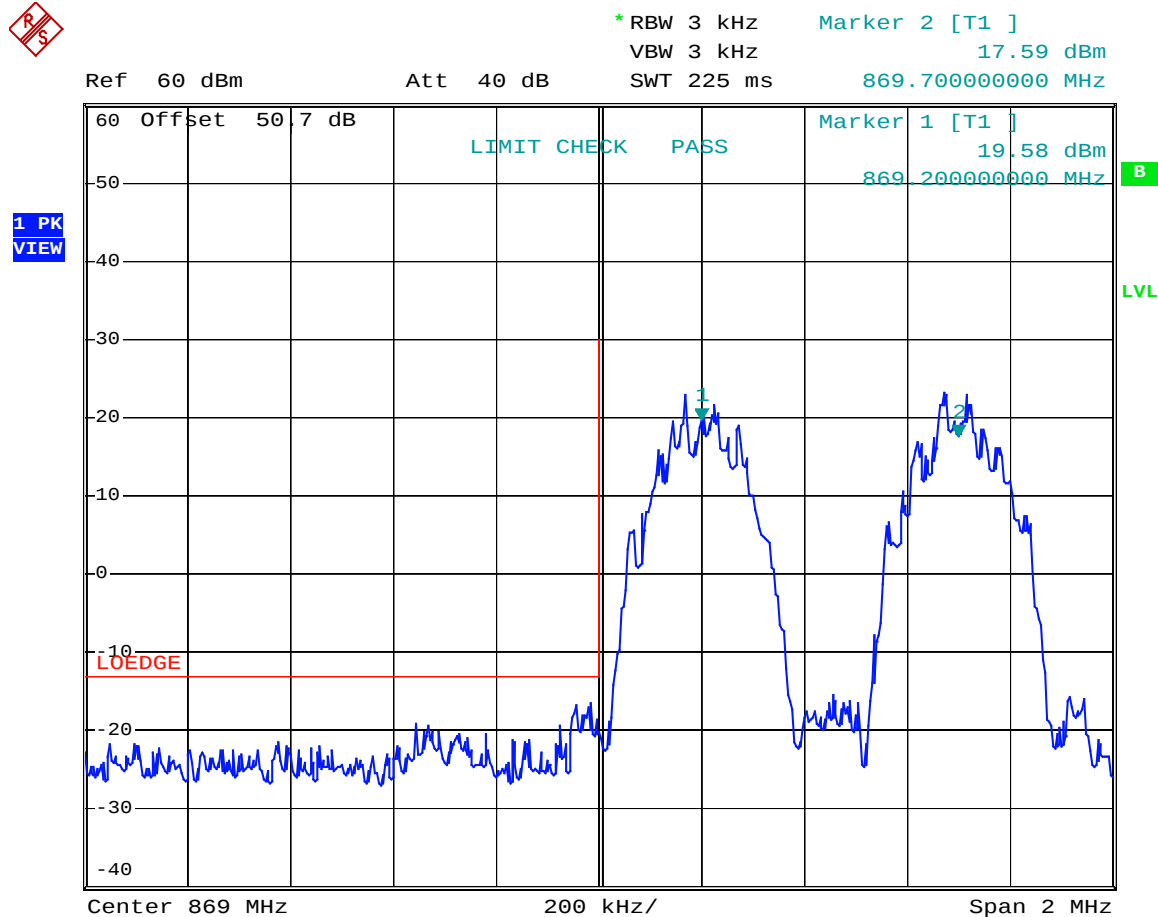
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE LOWER BANDEDGE

869.2 AND 869.7 MHz

1 WATTS EACH



Date: 31.JAN.2006 12:35:48

EQUIPMENT: **MCPB-850-200**

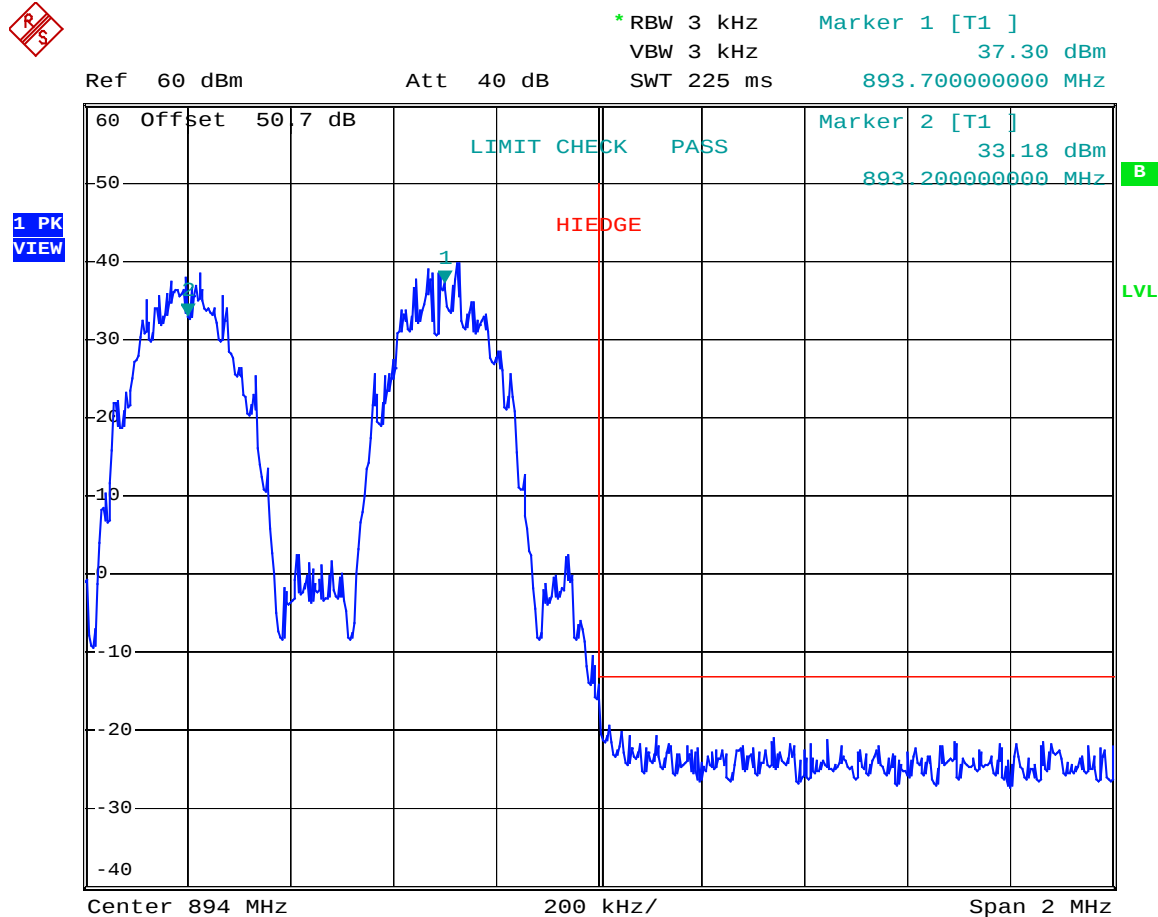
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE UPPER BANDEDGE

893.2 AND 893.7 MHz

100 WATTS EACH



Date: 27.MAR.2006 11:48:37

EQUIPMENT: **MCPB-850-200**

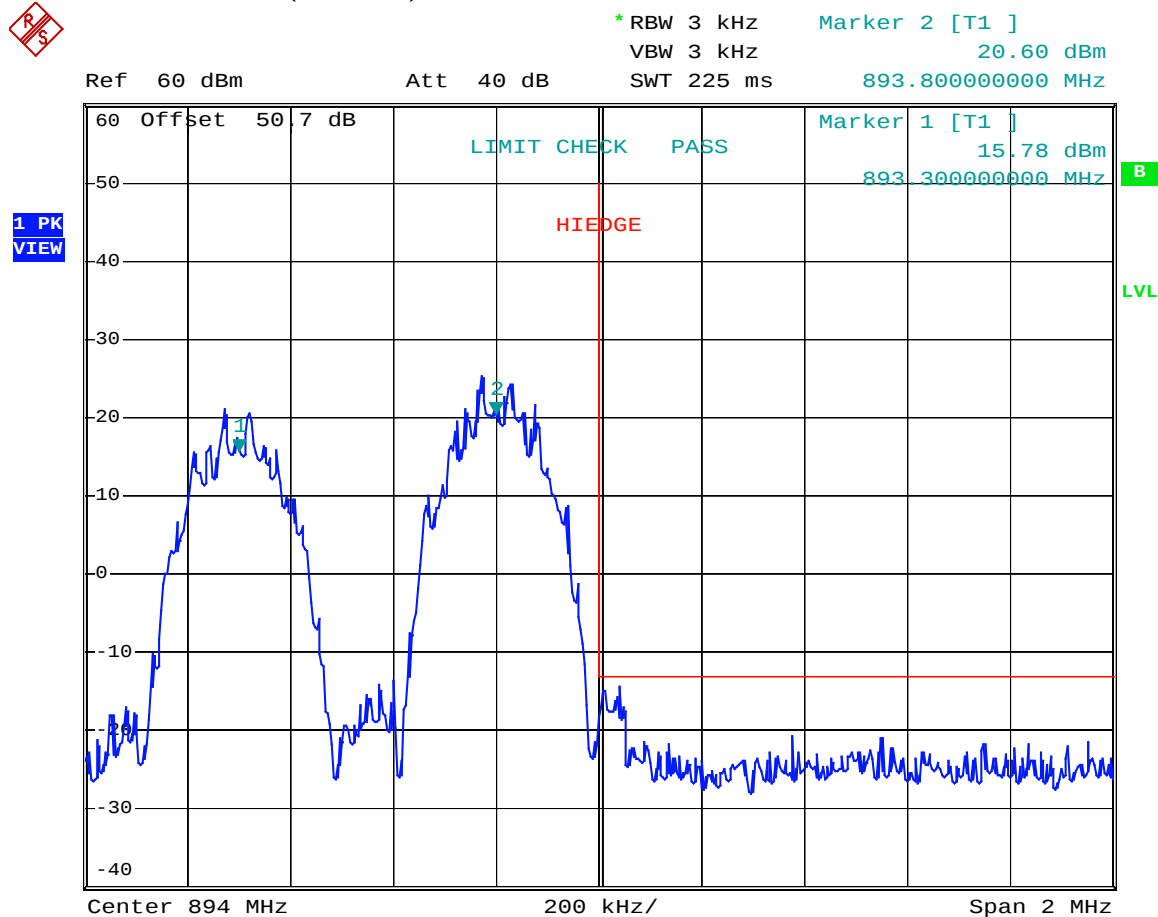
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE UPPER BANDEDGE

893.3 AND 893.8 MHz

1.25 WATTS EACH (31 DBM)



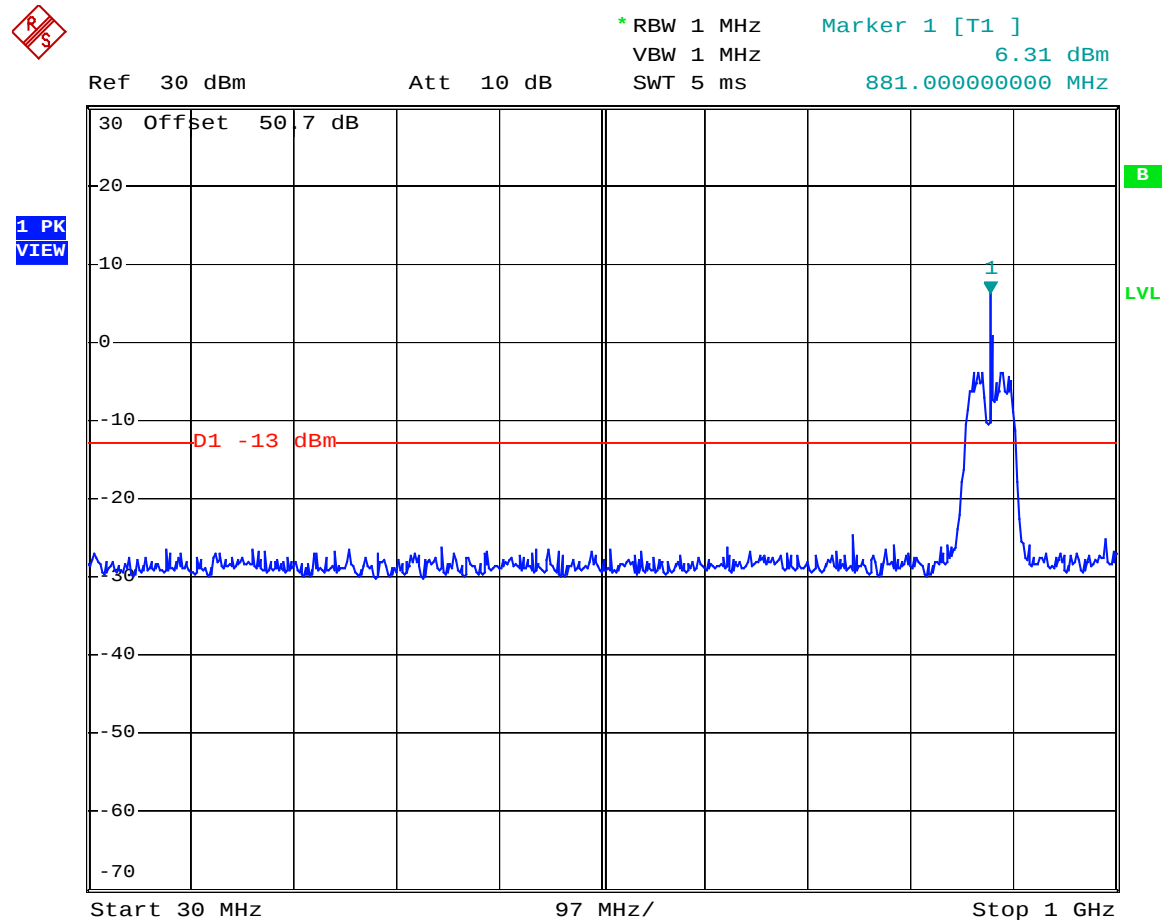
Date: 27.MAR.2006 11:46:45

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE



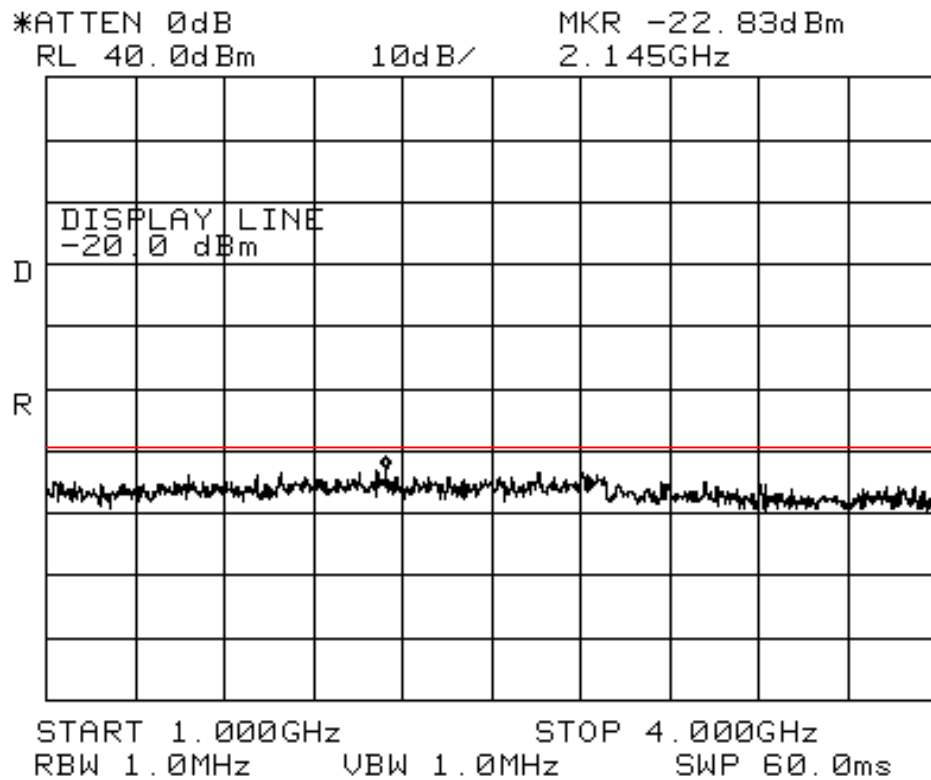
Date: 27.MAR.2006 14:28:16

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE

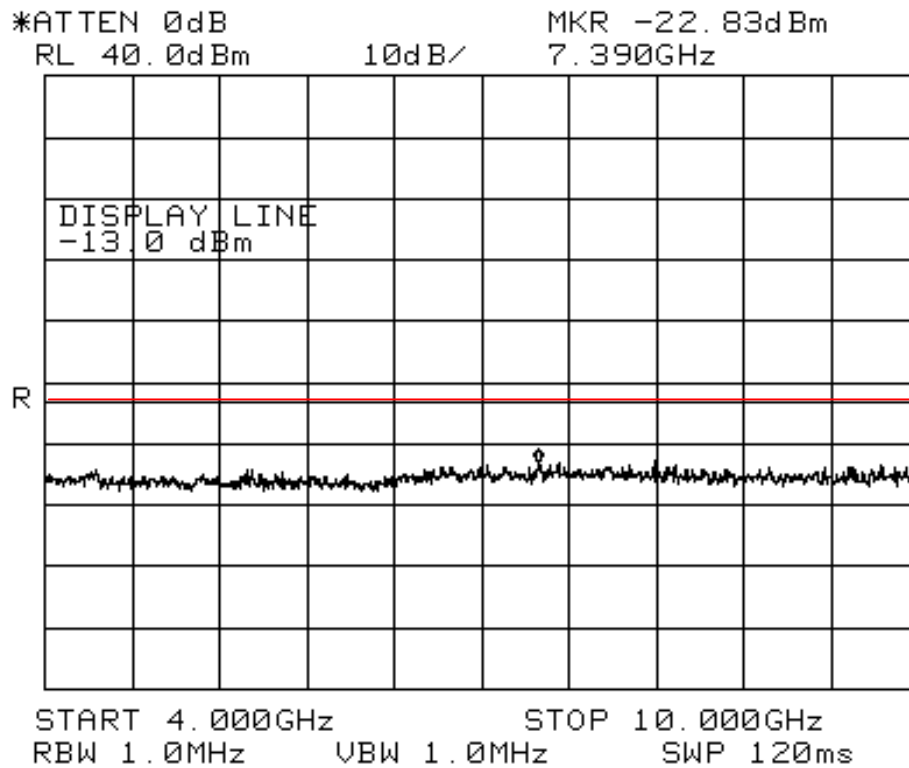


EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

EDGE



EQUIPMENT: **MCPB-850-200**

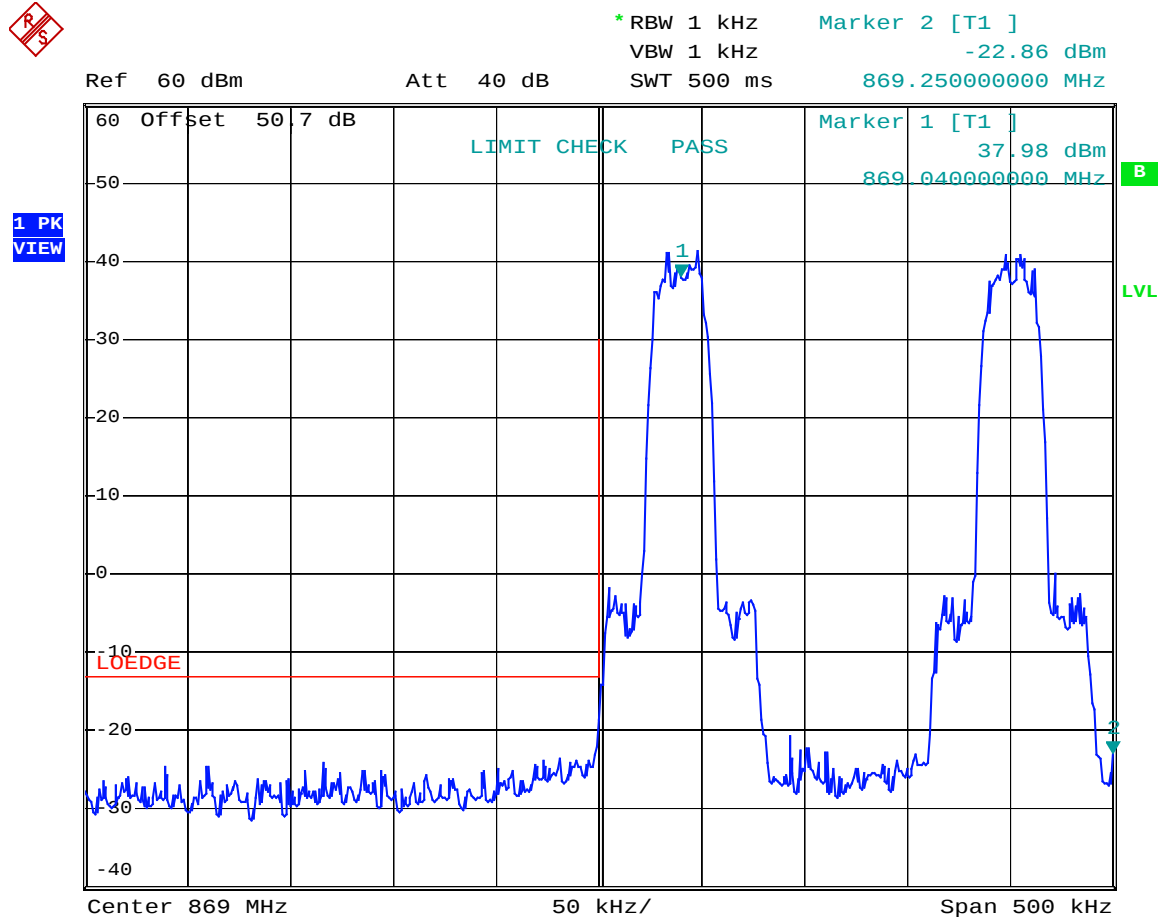
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

TDMA LOWER BANDEDGE

869.04 AND 869.20 MHz

100 WATTS EACH



Date: 24.MAR.2006 11:02:45

EQUIPMENT: **MCPB-850-200**

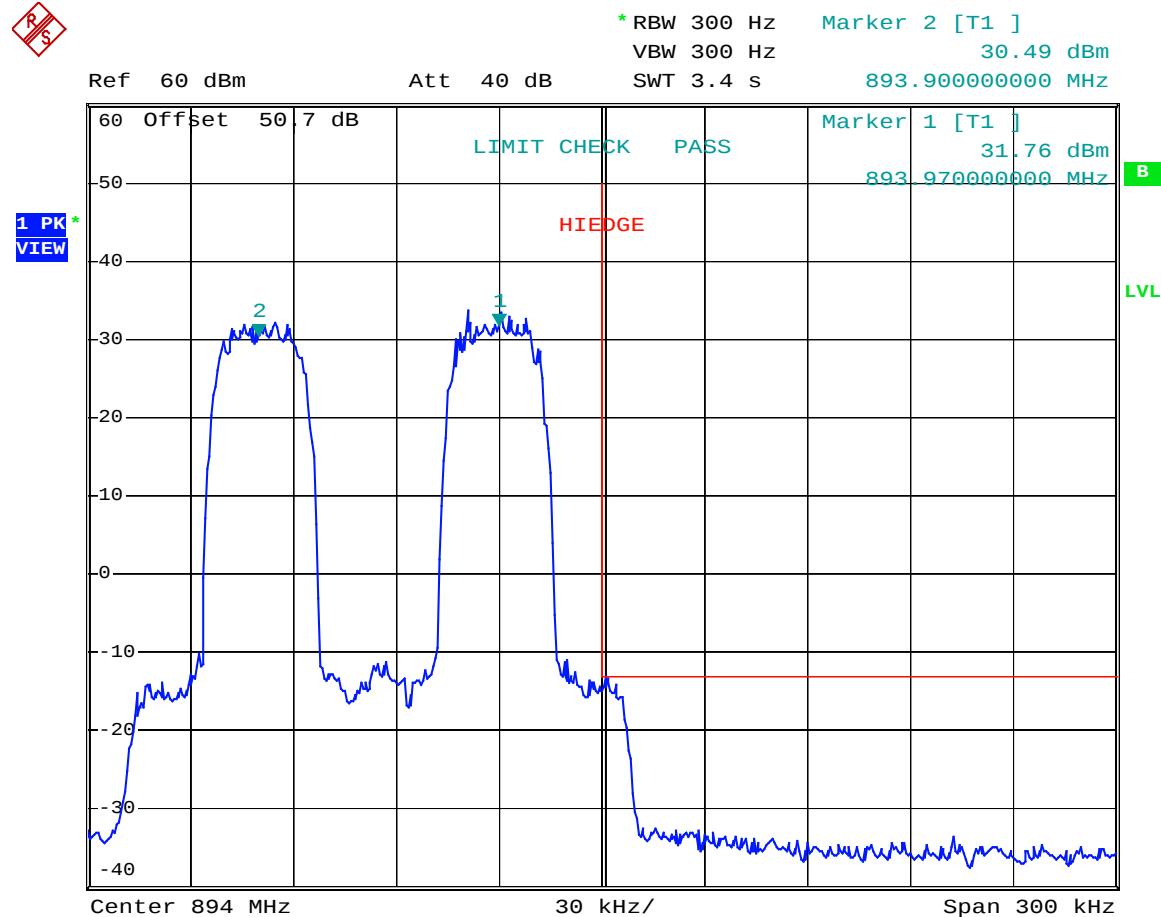
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

TDMA LOWER BANDEDGE

893.9 AND 893.97 MHz

100 WATTS EACH



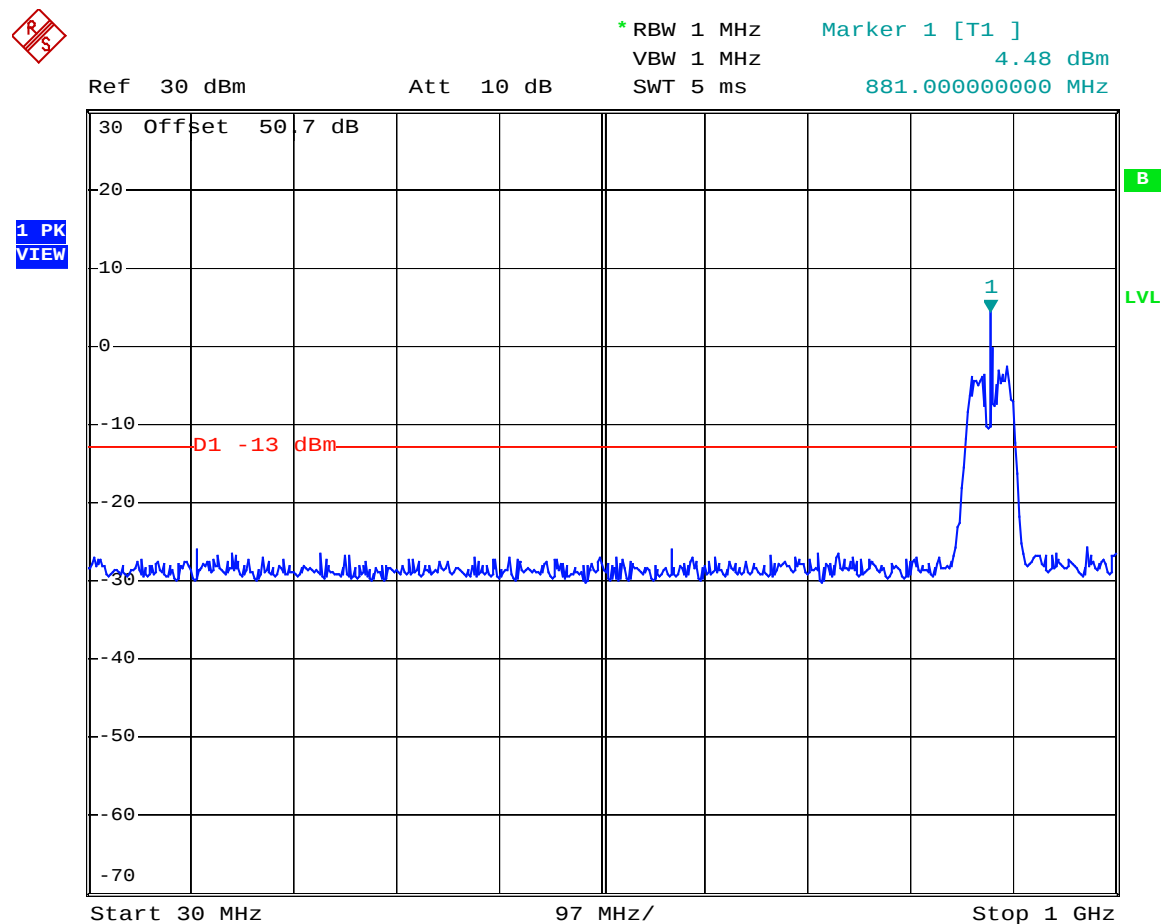
Date: 27.MAR.2006 12:03:05

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

TDMA



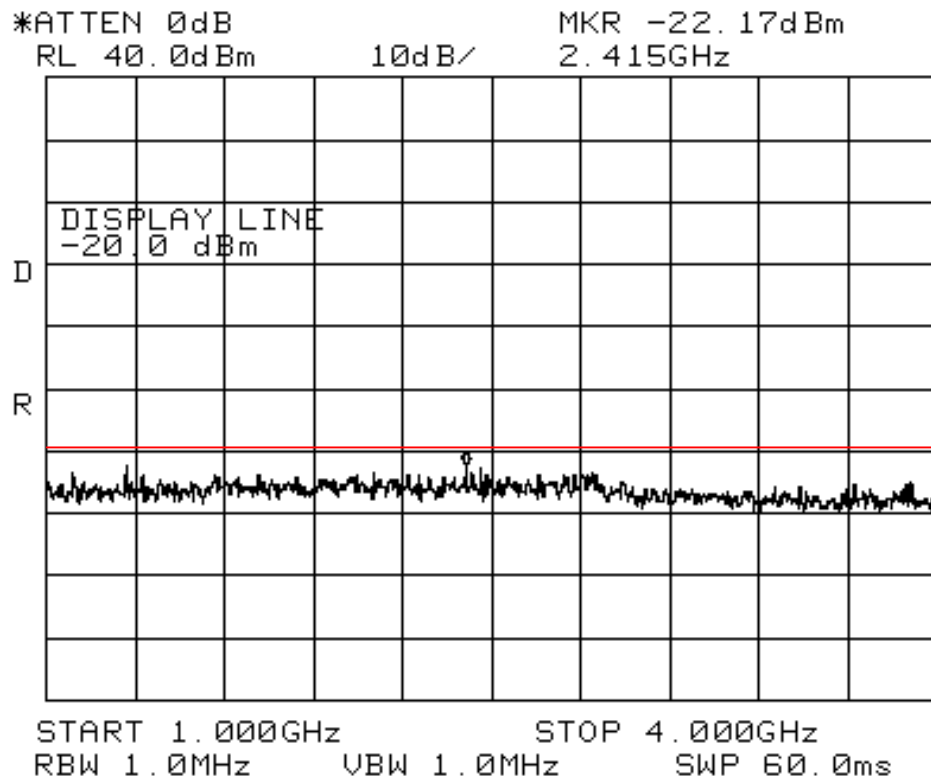
Date: 27.MAR.2006 14:29:10

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

TDMA

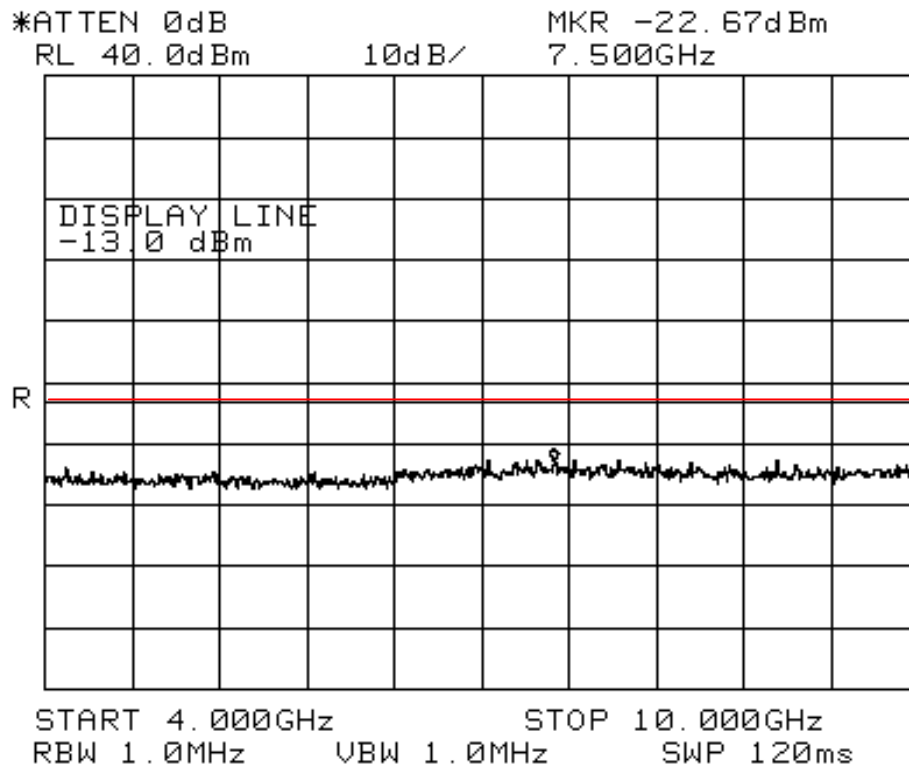


EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

TDMA



EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

CDMA LOWER BANDEDGE

869.7 MHz (LOWEST CHANNEL)

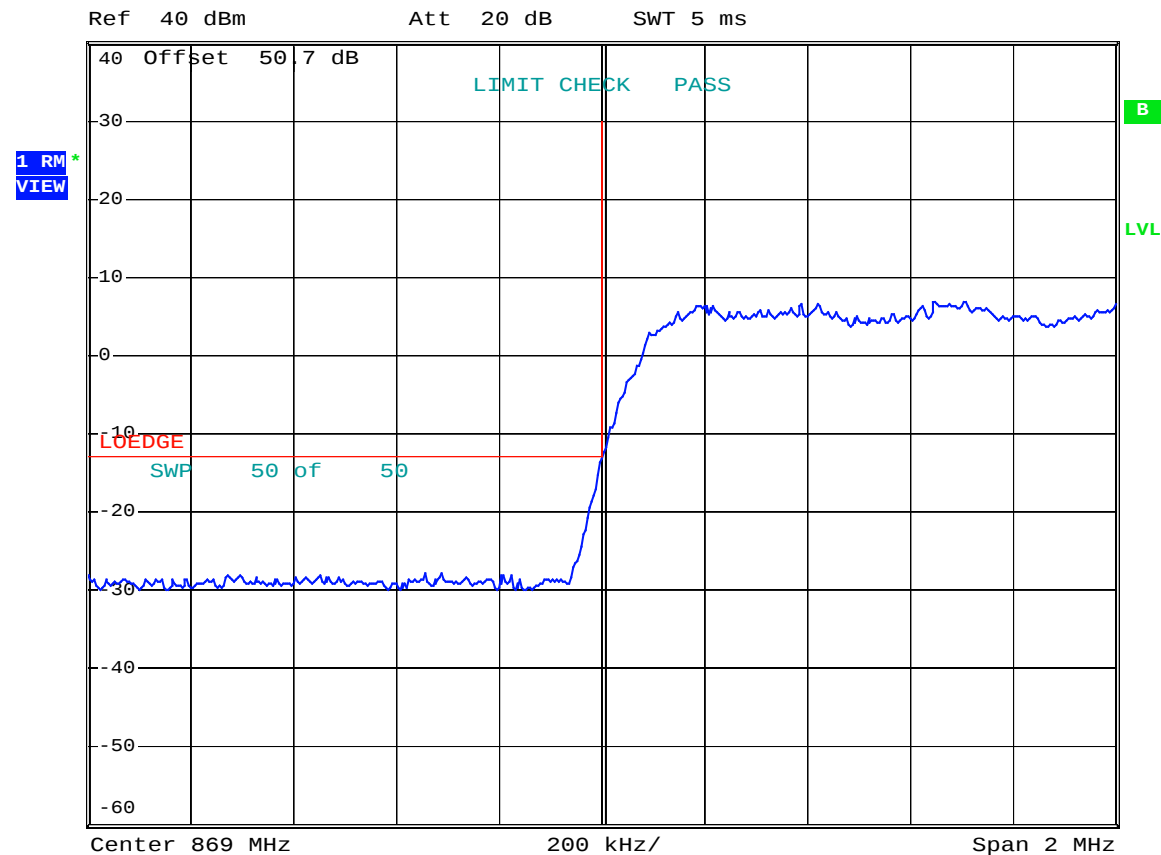
200 mW SINGLE CARRIER



* RBW 30 kHz

VBW 30 kHz

SWT 5 ms



Date: 24.MAR.2006 11:14:36

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

CDMA LOWER BANDEDGE

IM FREQUENCIES 871.6 & 874 MHz

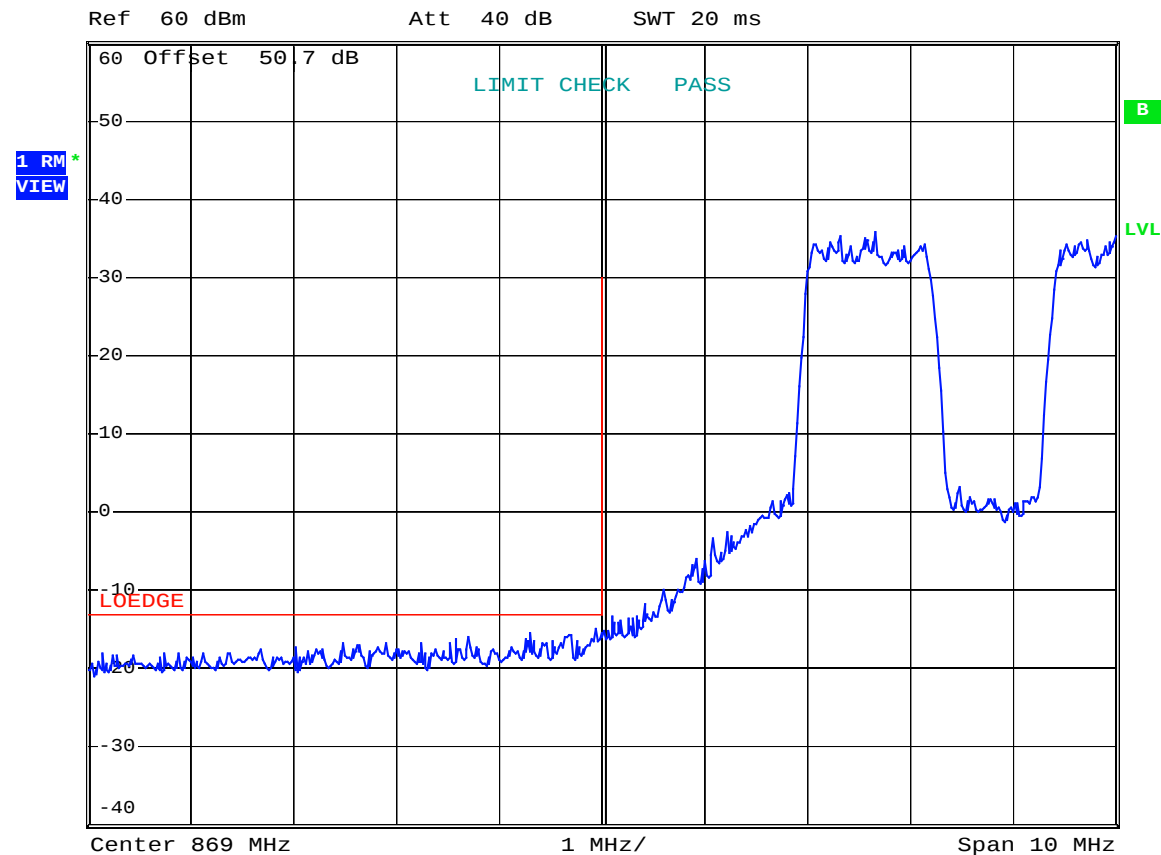
TWO 100 WATT CARRIERS



*RBW 30 kHz

*VBW 30 kHz

SWT 20 ms



Date: 27.MAR.2006 09:36:34

EQUIPMENT: **MCPB-850-200**

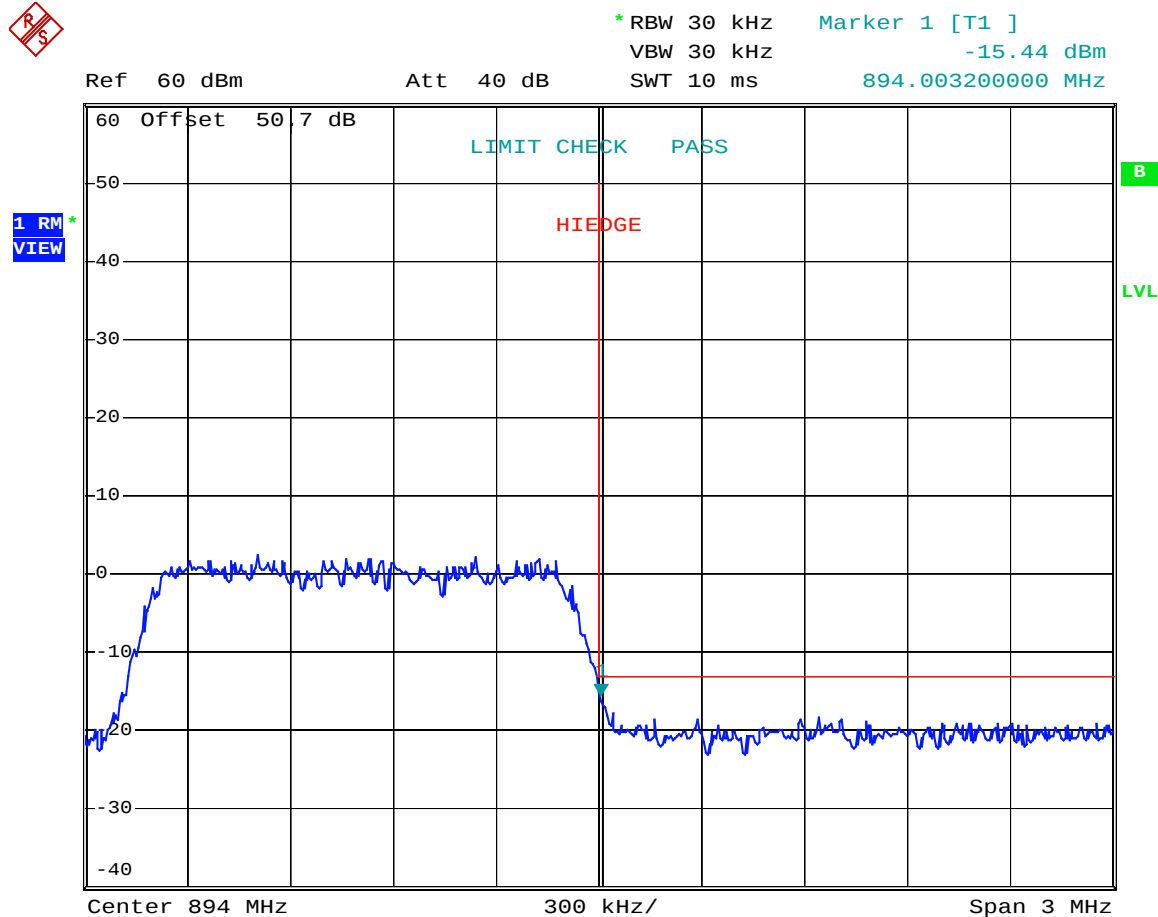
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

CDMA UPPER BANDEDGE

893.31 MHz (HIGHEST CHANNEL)

80 mW SINGLE CARRIER



Date: 27.MAR.2006 12:08:08

EQUIPMENT: **MCPB-850-200**

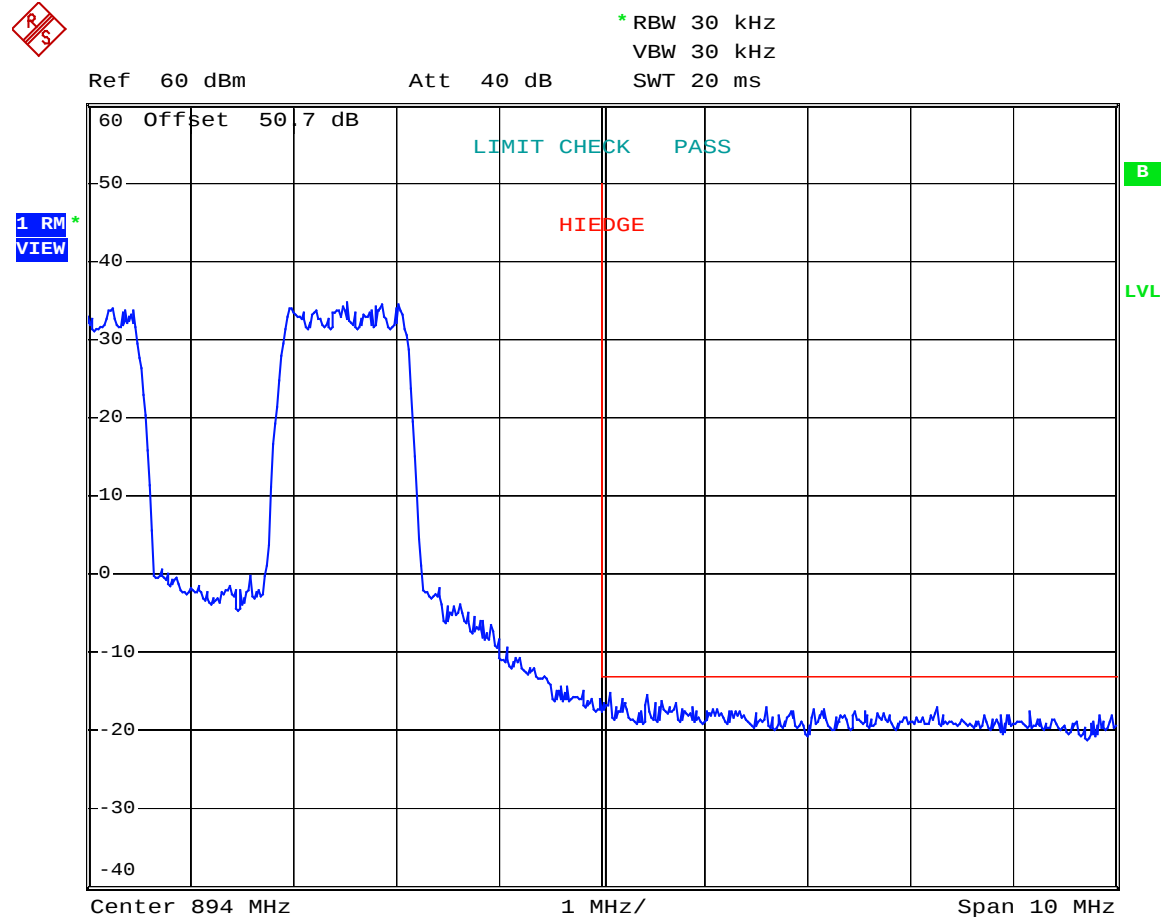
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

CDMA UPPER BANDEDGE

IM FREQUENCIES 888.9 & 891.5 MHz

TWO 100 WATT CARRIERS



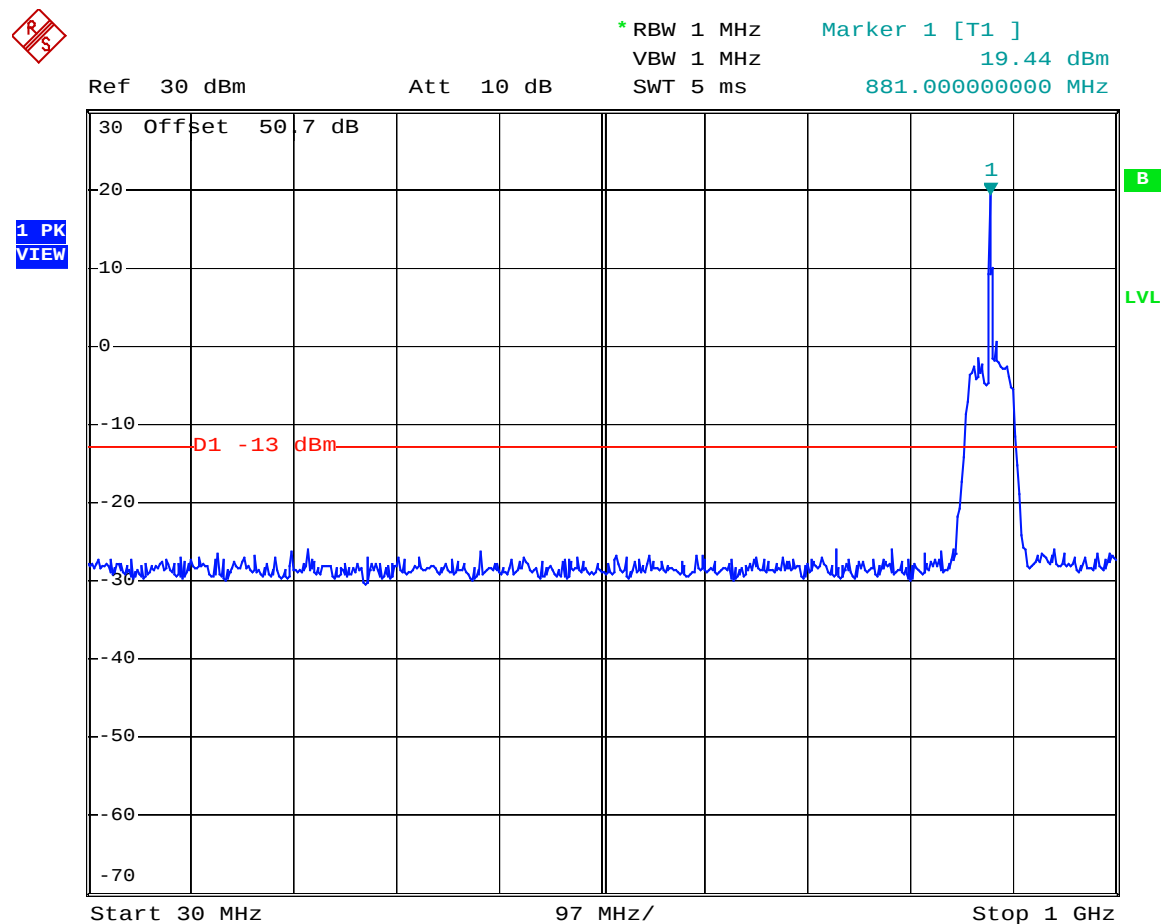
Date: 27.MAR.2006 12:18:50

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

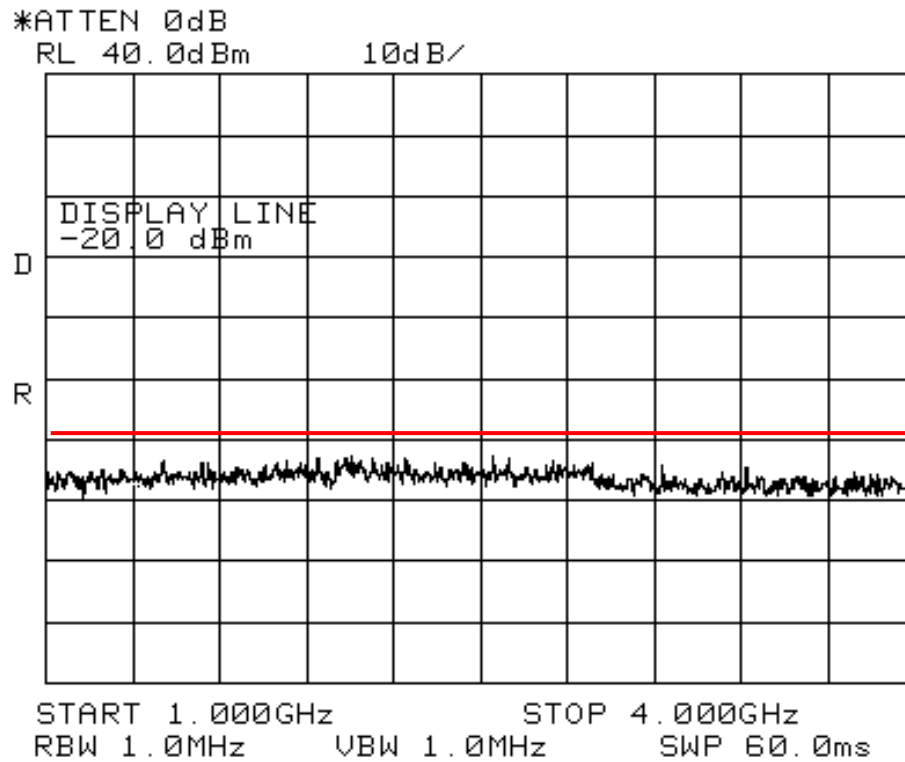
CDMA



Date: 27.MAR.2006 14:30:05

Test Data – Spurious Emissions at Antenna Terminals

CDMA

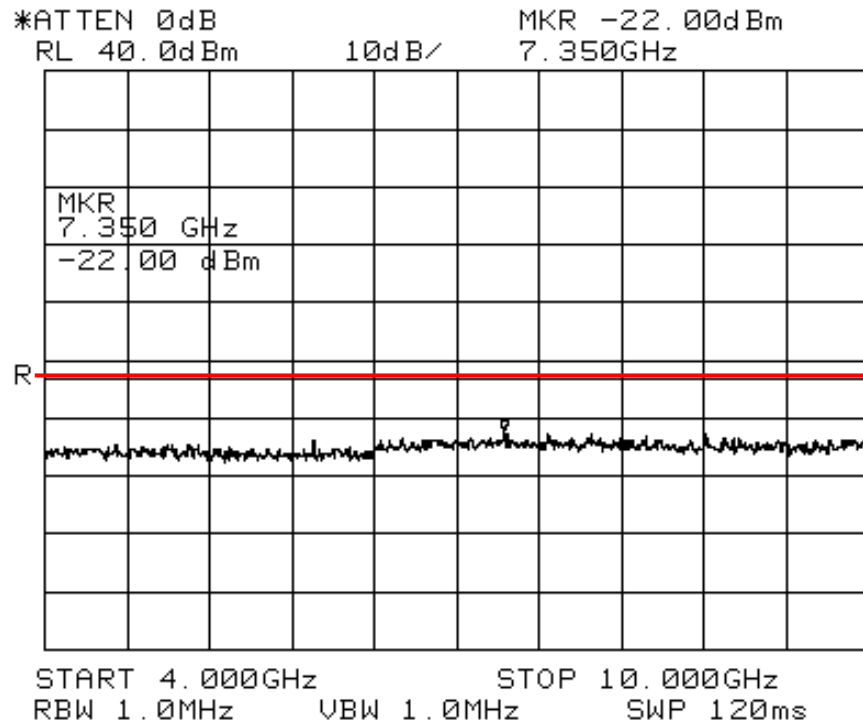


EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

CDMA



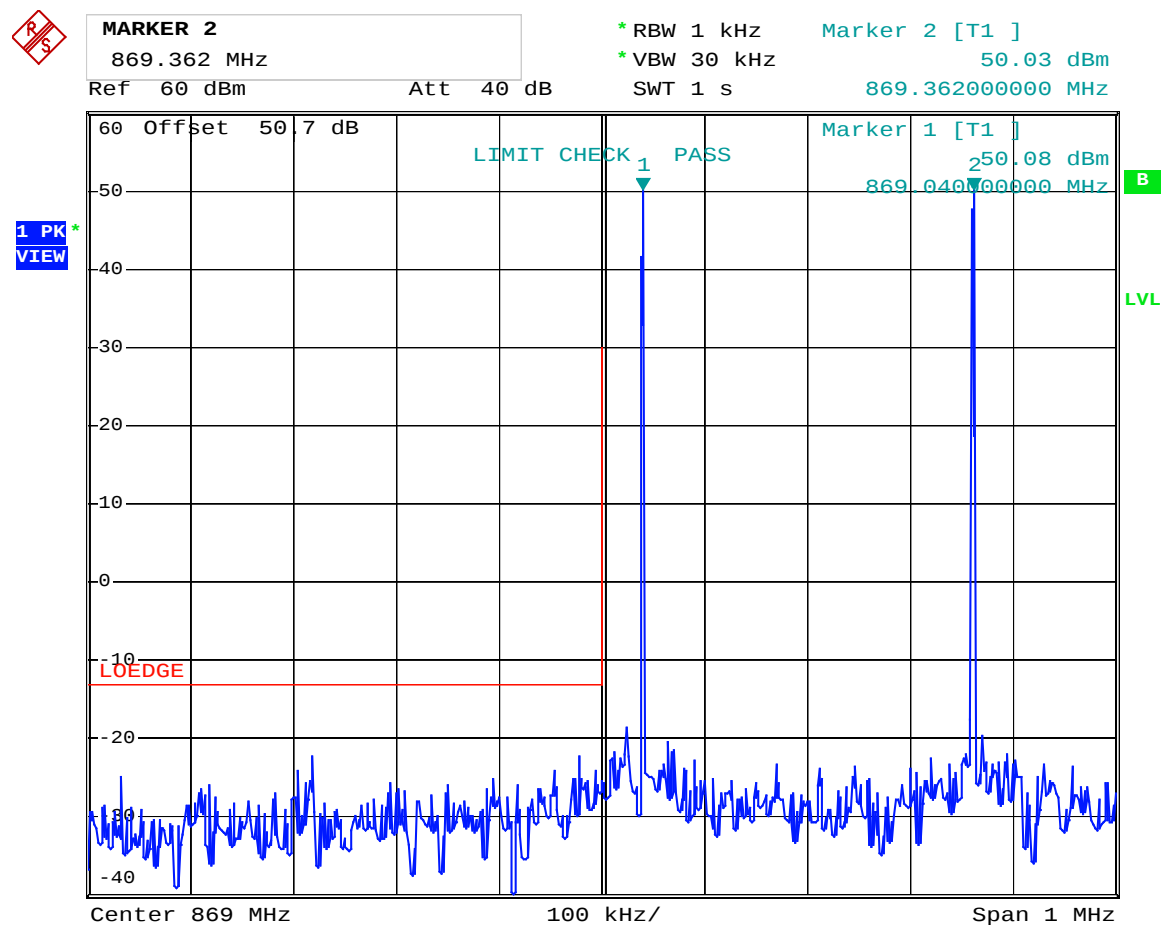
EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

Analog

2 CARRIERS AT 100 WATTS EACH



Date: 27.MAR.2006 09:47:23

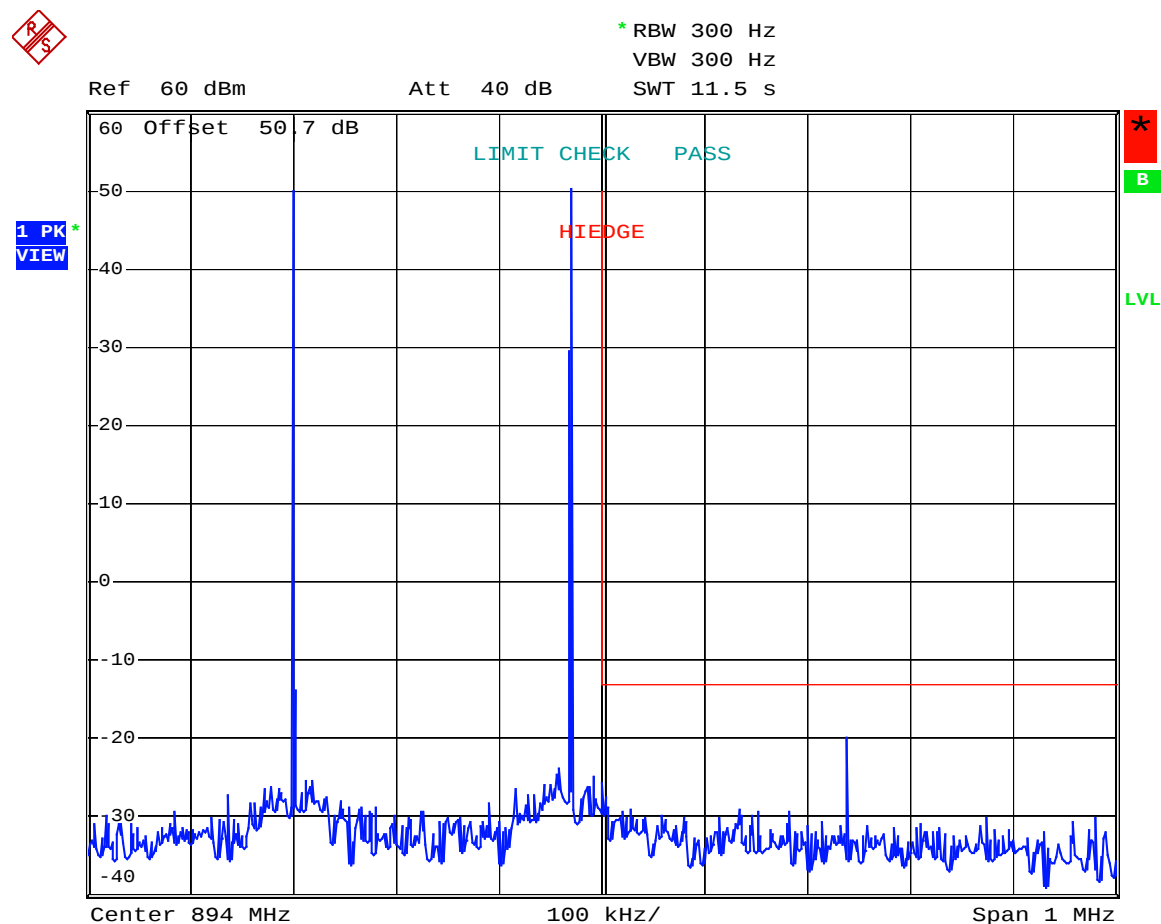
EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

Analog

2 CARRIERS AT 100 WATTS EACH



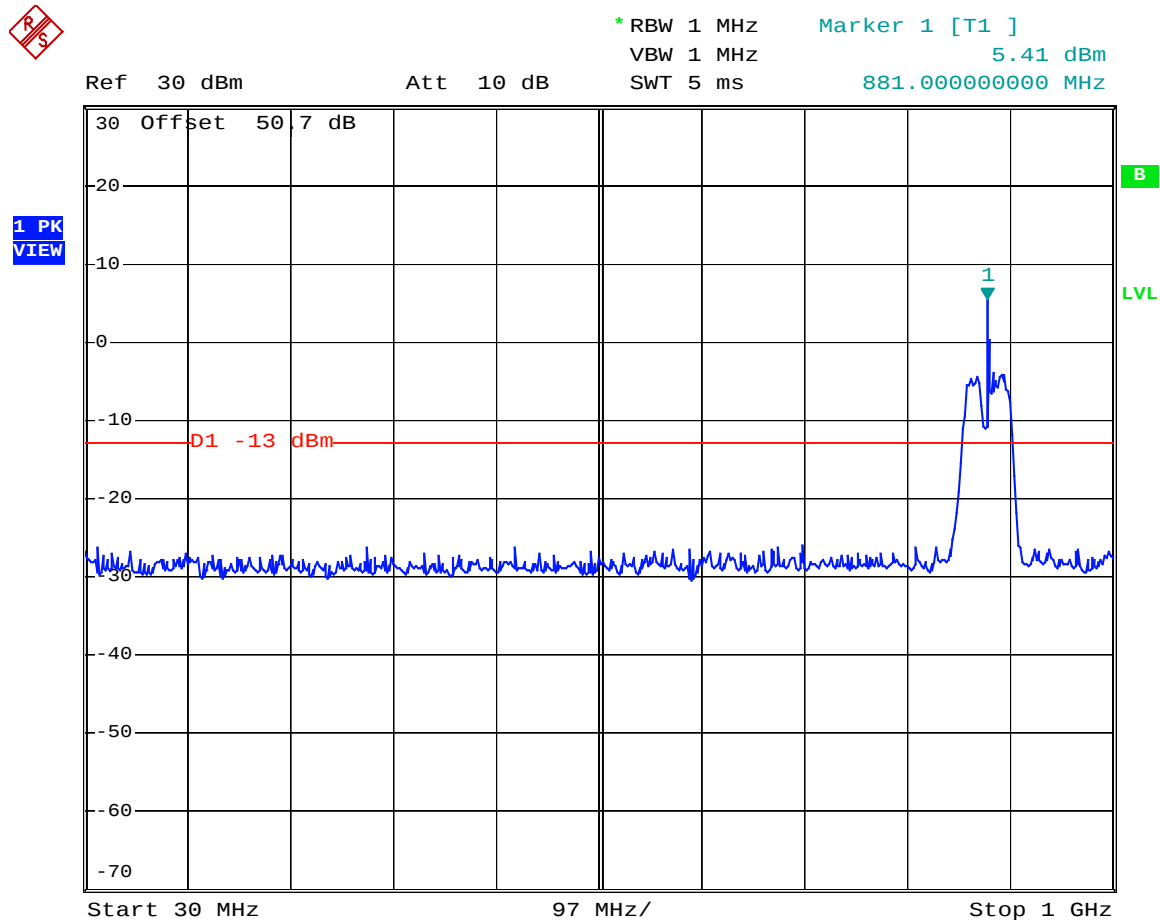
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EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

Analog



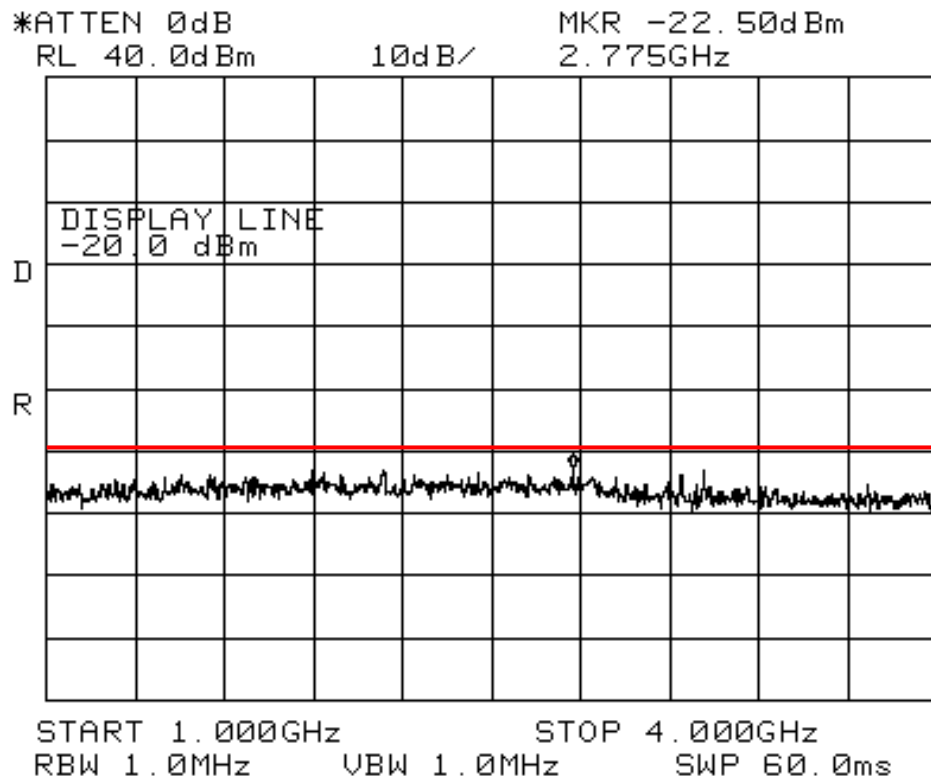
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EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

Analog

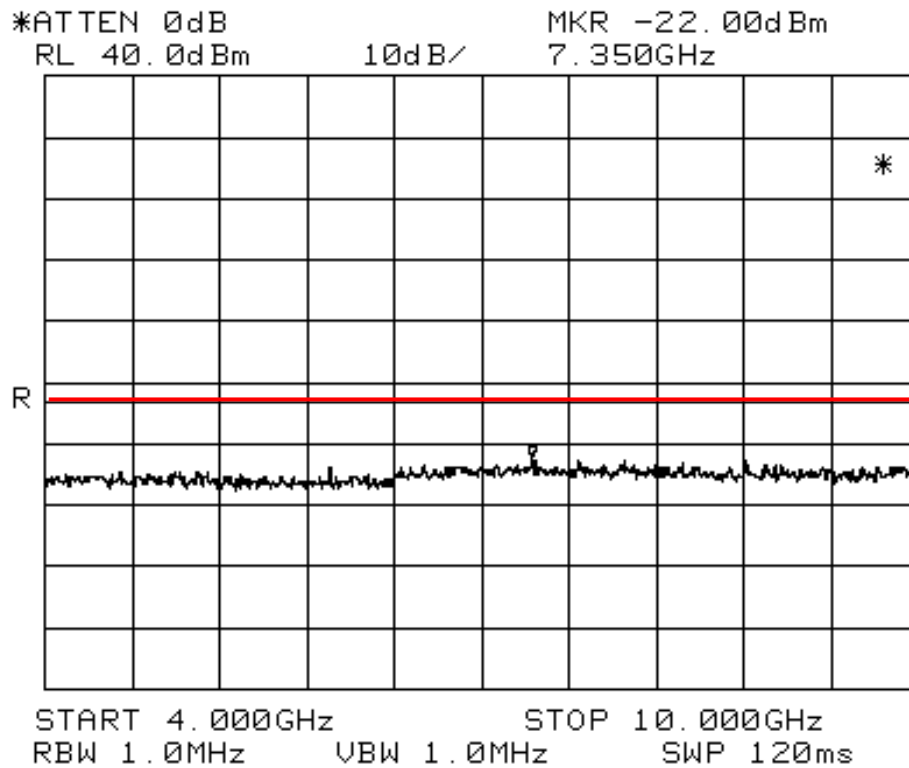


EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

Analog



EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

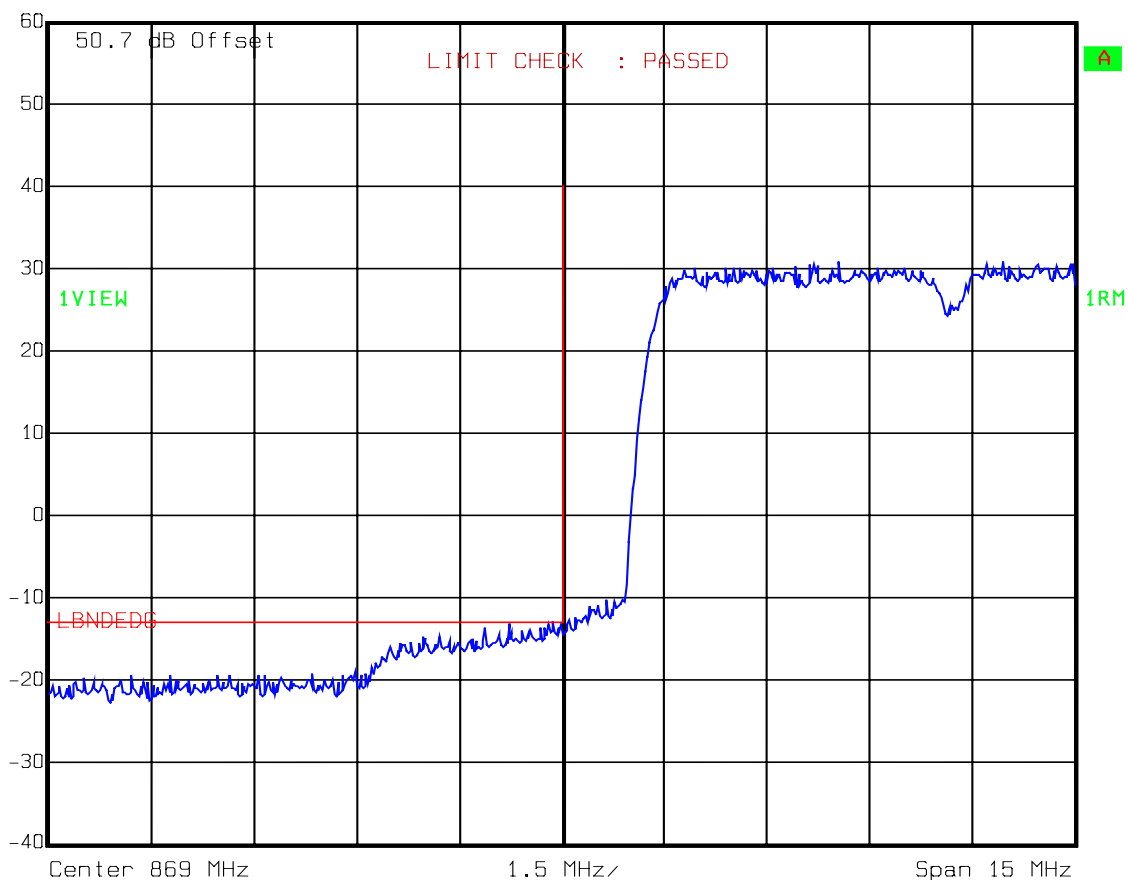
Test Data – Spurious Emissions at Antenna Terminals

UMTS



Ref Lvl
60 dBm

RBW 50 kHz RF Att 30 dB
VBW 500 kHz
SWT 15 ms Unit dBm

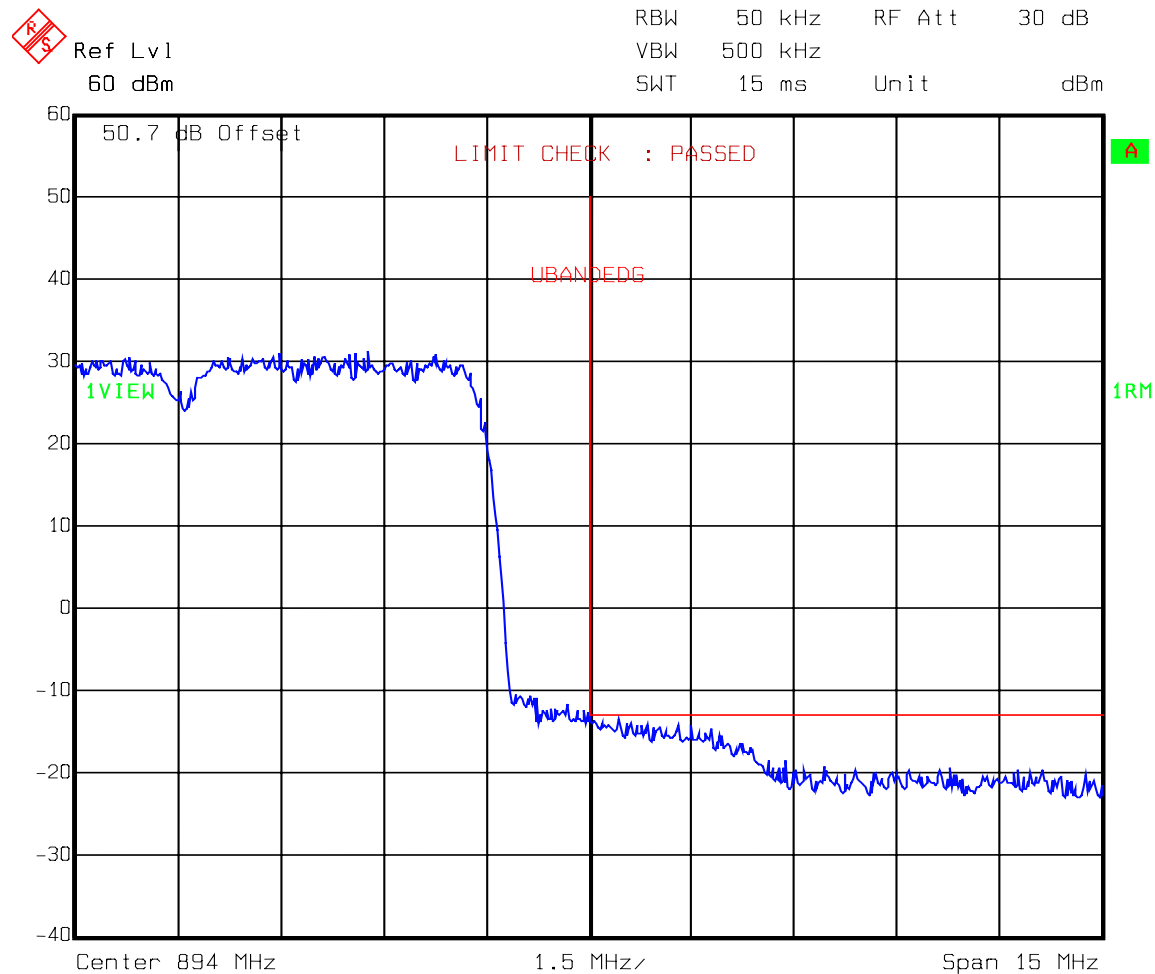


Date: 28.MAR.2006 10:24:03

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals



Date: 28.MAR.2006 10:30:21

Test Data – Spurious Emissions at Antenna Terminals

UMTS



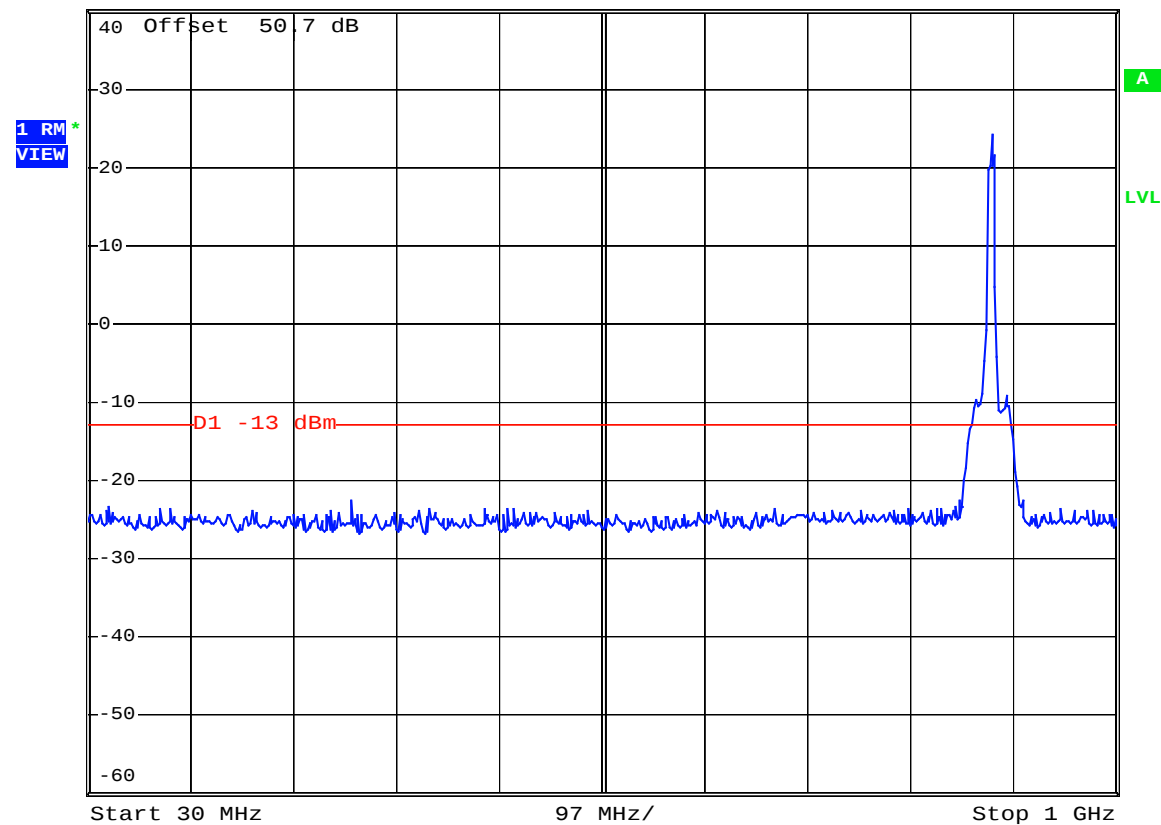
* RBW 1 MHz

VBW 1 MHz

SWT 5 ms

Ref 40 dBm

Att 20 dB



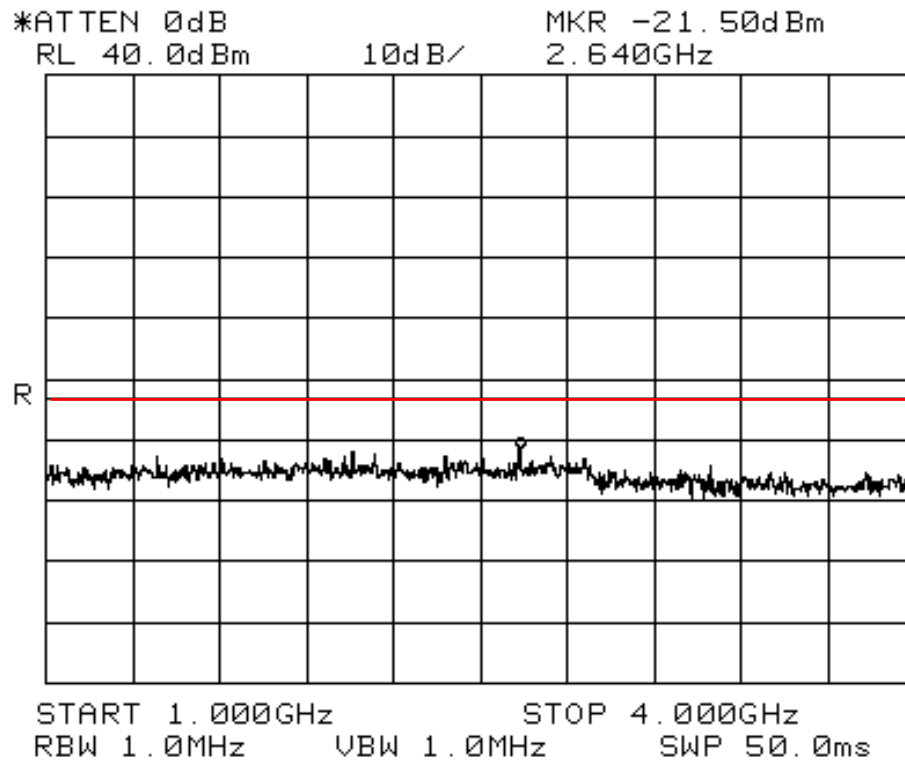
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EQUIPMENT: **MCPB-850-200**

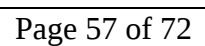
Test Report No.: 6L0102RUS1

Test Data – Spurious Emissions at Antenna Terminals

UMTS



UMTS



EQUIPMENT: **MCPB-850-200**Test Report No.: 6L0102RUS1

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	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 %**

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

Test Data – Field Strength of Spurious Emissions

Field Strength of Spurious Emissions										
Page <u>1</u> of <u>1</u>						Complete <u>X</u>				
Job No.: 6L0102		Date: 3/30/06				Preliminary _____				
Specification: Part 2		Temperature(°C): <u>22</u>								
Tested By: David Light		Relative Humidity(%) <u>45</u>								
E.U.T.: MCPB-850-200										
Configuration: Tx full power at mid band										
Sample No: <u>1</u>										
Location: <u>AC 3</u>		RBW: <u>1 MHz</u>		Measurement						
Detector Type: <u>Peak</u>		VBW: <u>1 MHz</u>		Distance: <u>3 m</u>						
Test Equipment Used										
Antenna: <u>993</u>		Directional Coupler: _____								
Pre-Amp: <u>1016</u>		Cable #1: <u>1484</u>								
Filter: <u>1481</u>		Cable #2: <u>1485</u>								
Receiver: <u>1464</u>		Cable #3: _____								
Attenuator #1: _____		Cable #4: _____								
Attenuator #2: _____		Mixer: _____								
Additional equipment used: _____										
Measurement Uncertainty: <u>+/-1.7 dB</u>										
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										

Photos – Field Strength of Spurious Emissions



EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

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 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: **MCPB-850-200**

Test Report No.: 6L0102RUS1

NAME OF TEST: Occupied Bandwidth

PARA. NO.: 2.1049

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

Method Of Measurement:

Spectrum Analyzer Settings:

RBW: CDMA (30 kHz), GSM (3 kHz), NADC (1 kHz) and CDPD (1 kHz)

VBW: $\geq$ RBW

Span: As required

Sweep: Auto

Input Signal Characteristics:

RF level: Maximum recommended by manufacturer

EQUIPMENT: **MCPB-850-200**

Test Report No.: 6L0102RUS1

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: $\geq$ 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 (5×10^{-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)

$R = 3\text{m}$ (Measurement Distance)

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

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

For emissions > 1 GHz:

$G = 1$ (Isotropic Gain)

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

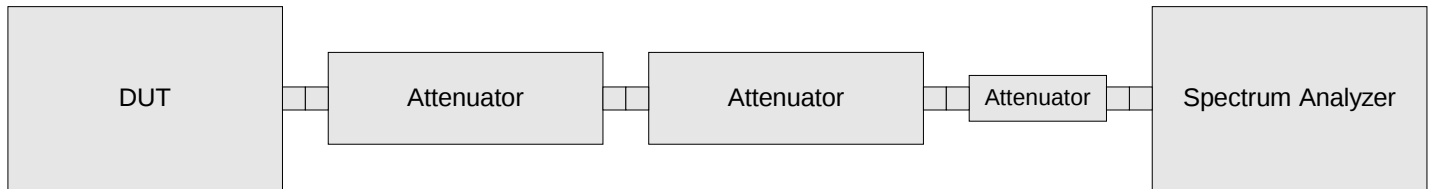
$R = 3\text{m}$ (Measurement Distance)

$$E = 84.4 - 20 \log \sqrt{1.64} = 82.3 \text{ dB}\mu\text{V / m@3m}$$

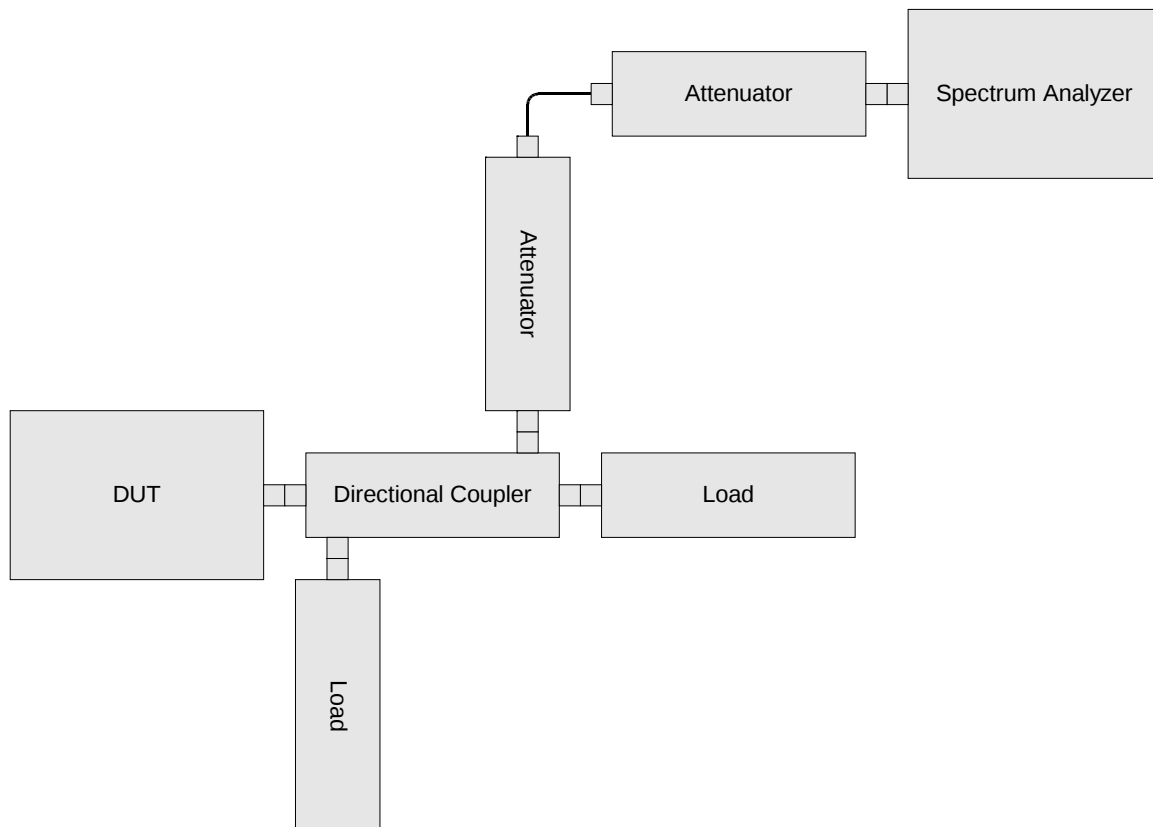
The spectrum is searched to 10 GHz.

ANNEX B - TEST DIAGRAMS

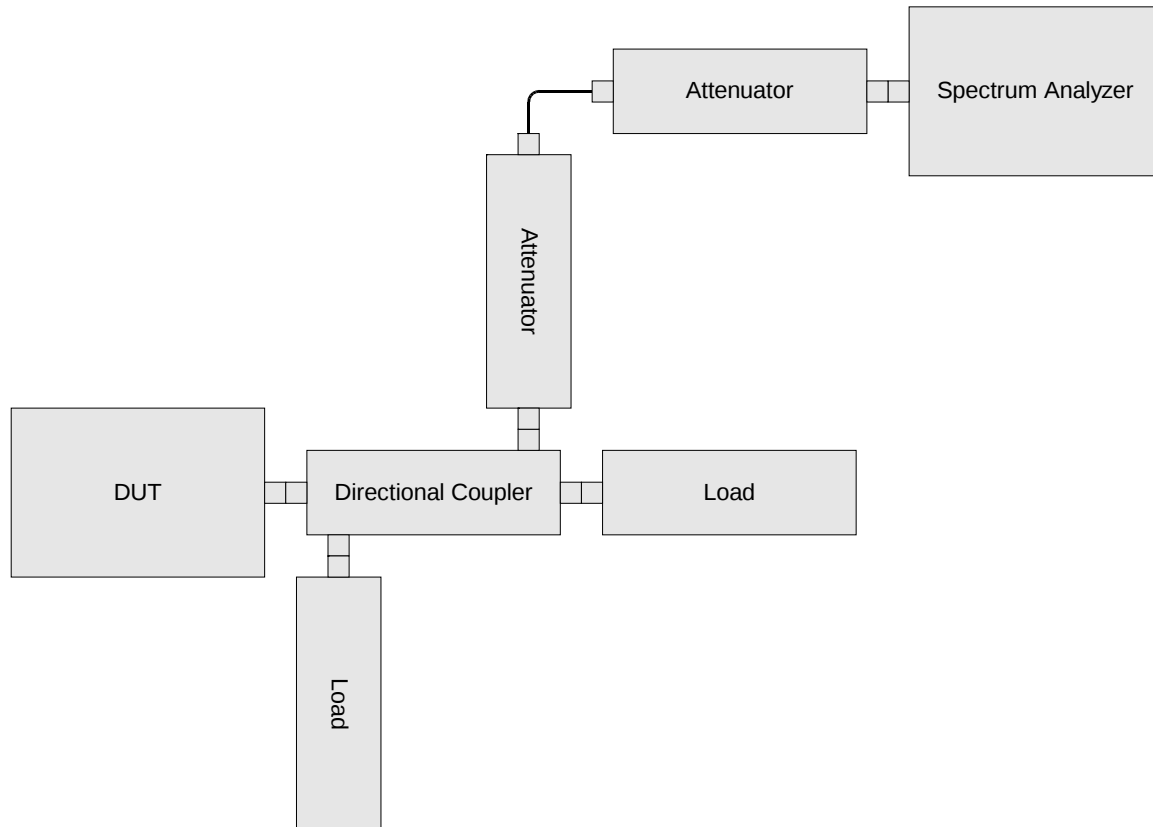
Para. No. 2.1046 - R.F. Power Output

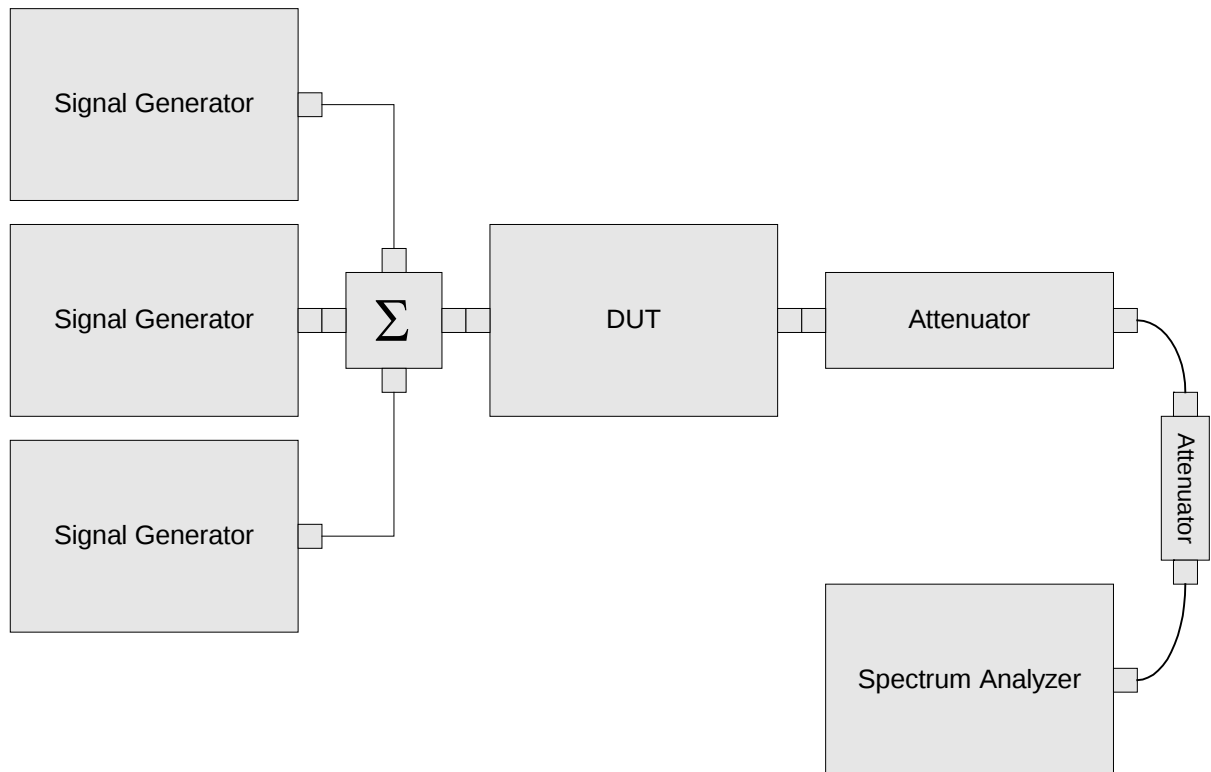


Para. No. 2.1049 - Occupied Bandwidth



Para. No. 2.1051 Spurious Emissions at Antenna Terminals





Para. No. 2.1053 - Field Strength of Spurious Radiation

