Cert. No. 1152.01
Electrical (EMC)

DATE: 12 February 2007

I.T.L. (PRODUCT TESTING) LTD.

FCC EMC/Radio Test Report

for

Mobile Access Networks

Equipment under test:

RF Booster

1000-iDEN-SMR4E

Written by: _____

D. Shidlowsky, Documentation

Approved by: _____

E. Pitt, Test Engineer

Approved by: _____

I. Raz, EMC Laboratory Manager

Cert. No. 1152.01
Electrical (EMC)

Measurement/Technical Report for

Mobile Access Networks

RF Booster

1000-iDEN-SMR4E

FCC ID:OJFMA1K-IDEN-SMR

12 February 2007

This report concerns: Original Grant __ Class II change: X

Class B verification ___ Class A verification_____Class I change

Equipment type: PCS Licensed Transmitter

Request Issue of Grant:
__**x**__Immediately upon completion of review

Limits used:
CISPR 22 _____ Parts 2; 90 __x

Measurement procedure used is ANSI C63.4-2003.
Substitution Method used as in ANSI/TIA-603-B: 2002

Application for Certification prepared by:
Ishaishou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
e-mail Sraz@itl.co.il

Applicant for this device: (different from "prepared by")
Shai Rachamim
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Ofek 1 Center, Bldg.B
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Fax: +972-4-918-3844
e-mail: ShaiR@mobileaccess.com

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1. General Information

1.1 Administrative Information

Manufacturer:	Mobile Access Networks
Manufacturer's Address:	Ofek 1 Center,Bldg.B Northern Industrial Zone Lod, 71293 Israel Tel: +972-8-918-3888 Fax: +972-8-918-3844
Manufacturer's Representative:	Shai Rachamim
Equipment Under Test (E.U.T):	RF Booster
Equipment Model No.:	1000-iDEN-SMR4E
Equipment Serial No.:	Not Designated
Date of Receipt of E.U.T:	29.01.07
Start of Test:	29.01.07
End of Test:	31.01.07
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 90 Sub-part I, S FCC Part 15 Sub-part B

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

See details Original Grant application.

The changes to the original product are:

PCB has been flattened.

New PA (power output has not changed, does not affect Uplink.)

DC converters (partially.

1.4 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing August 22, 2006).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. Product Labeling

See details in original application.

3. System Test Configuration

3.1 Justification

See details in original application.

Peak Output Power, Occupied Bandwidth, Emission Mask, Spurious Emission at Antenna Terminal, Radiated Spurious Emission and Radiated Emission per FCC Part 15 Sub-part B, were re-tested according to correspondence with Timco (See Appendix B).

3.2 EUT Exercise Software

See details in original application.

3.3 Special Accessories

See details in original application.

3.4 Equipment Modifications

See details in original application.

3.5 Configuration of Tested System

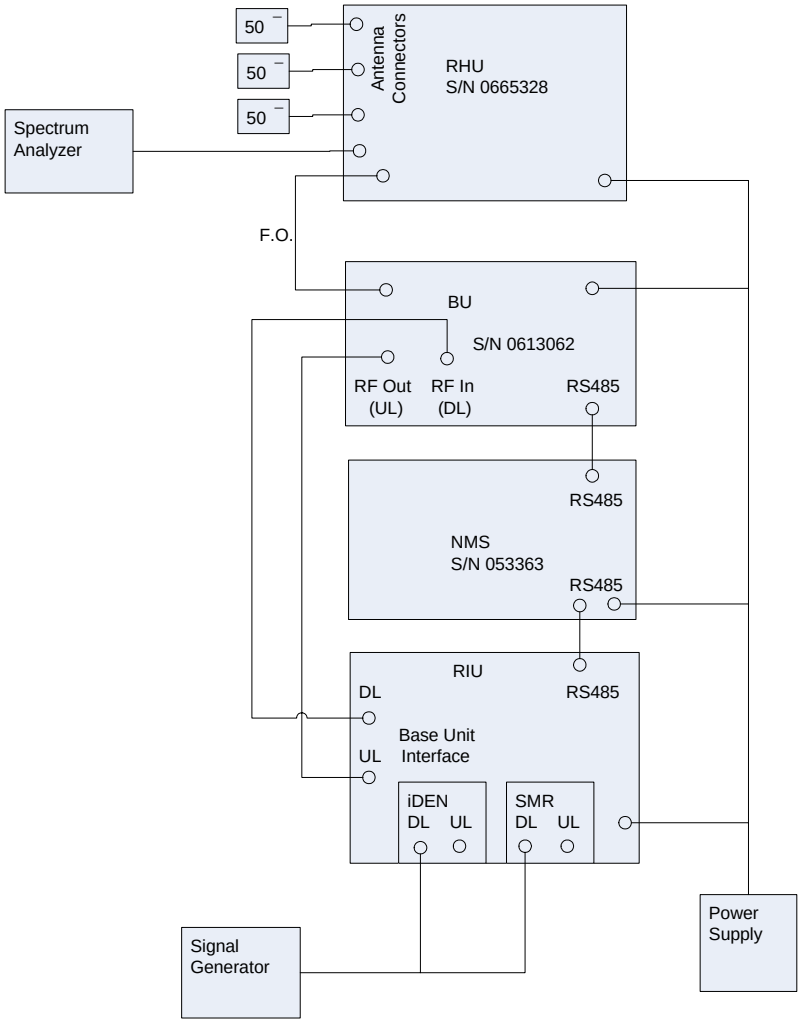

Figure 1. Tests Set-up

4. Block Diagram

4.1 Schematic Block/Connection Diagram

See original application.

4.2 Theory of Operation

See original application.

5. Peak Output Power (iDEN)

5.1 Test procedure

Peak Output Power must not exceed 32 dBm (EIRP – Antenna Gain = 37 – 5 = 32 dBm).

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through a 24 dB external attenuator and an appropriate coaxial cable. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 100 kHz resolution BW. The output power level was measured at 851.0125, 860.00, and 868.9875 MHz.

Type of modulation is 16QAM, Simbol rate is 7.5 ksps.

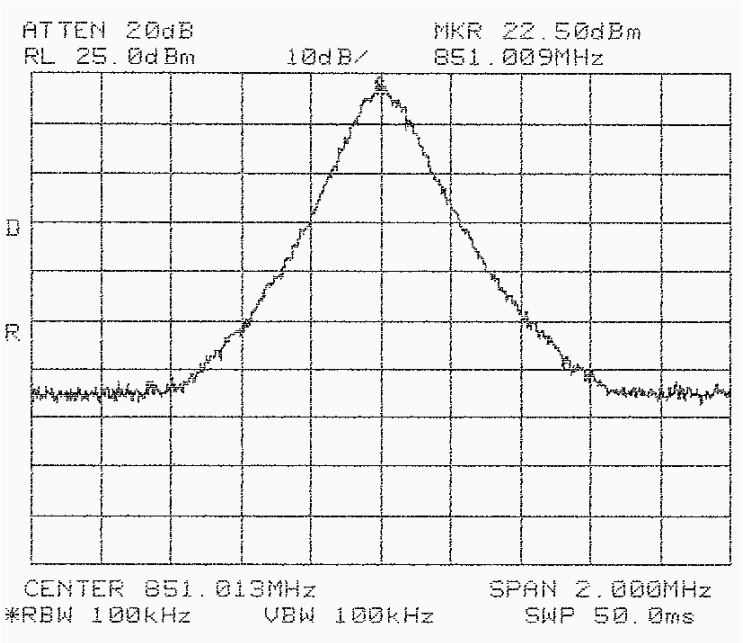

Figure 2.— 851.0125 MHz

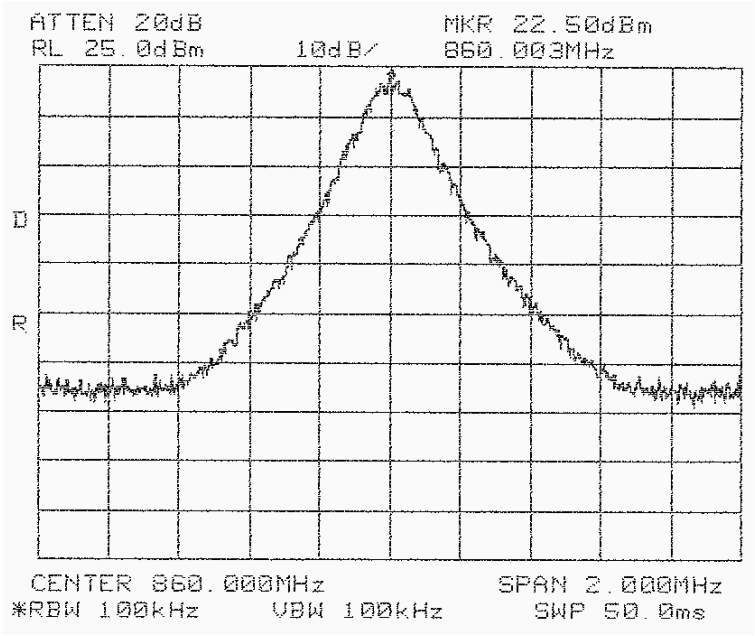

Figure 3.— 860.00 MHz

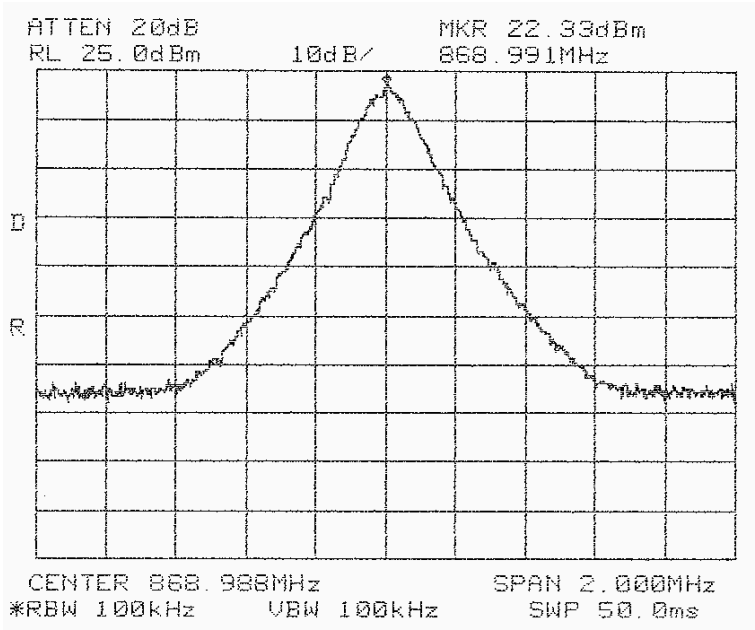

Figure 4.— 868.9875 MHz

5.2 Results table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 90, Section 90.219

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
851.0125	22.50	32.0	-9.50
860.00	22.50	32.0	-9.50
868.9875	22.33	32.0	-9.67

Figure 5 Peak Output Power

JUDGEMENT: Passed by 9.50 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

5.3 Test Equipment Used.

Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 6 Test Equipment Used

6. Occupied Bandwidth (iDEN)

6.1 Test Procedure

The E.U.T. was set to the applicable test frequency with 16QAM modulation.
The E.U.T. antenna terminal was connected to the spectrum analyzer through a 24 dB external attenuator and appropriate coaxial cable. The spectrum analyzer was set to 300 Hz resolution B.W.
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limit, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.
The occupied bandwidth of the E.U.T. at the points of 20 dB below maximum peak power was measured and recorded.
Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

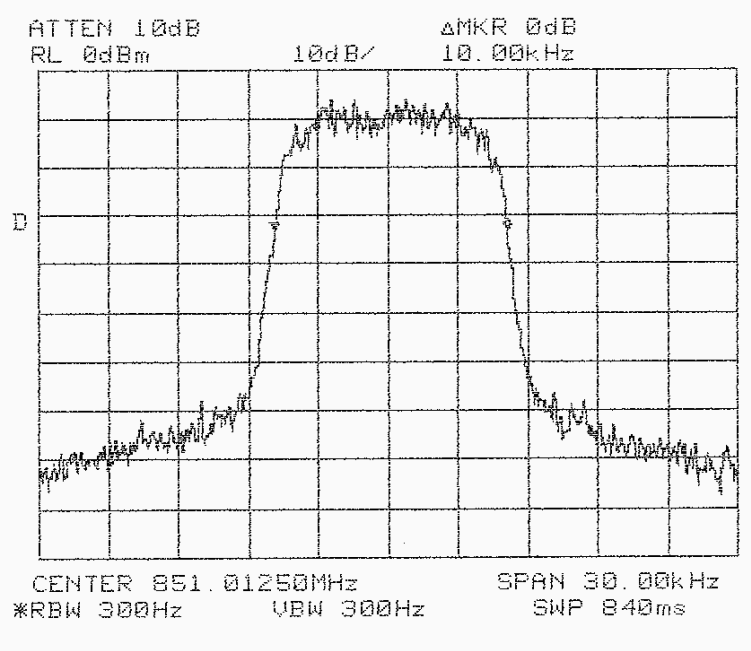

Figure 7.— 851.0125 Input

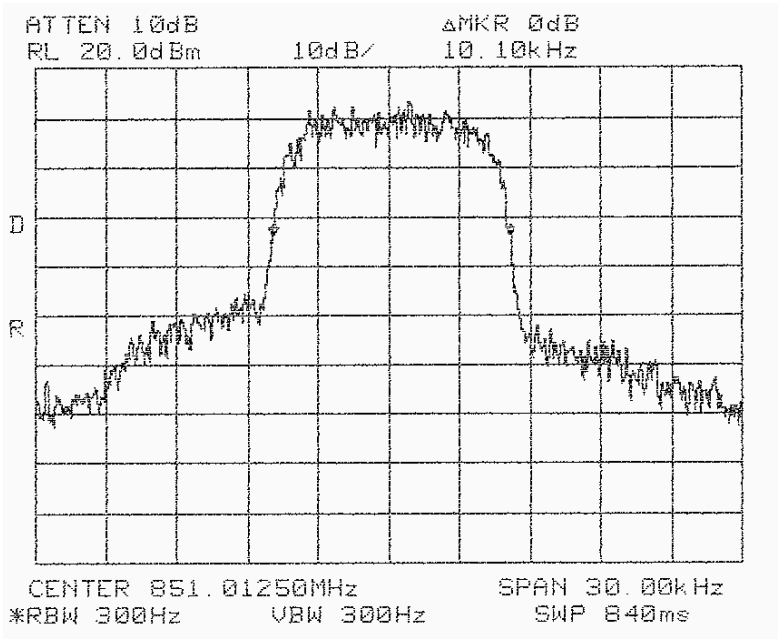

Figure 8.— 851.0125 Output

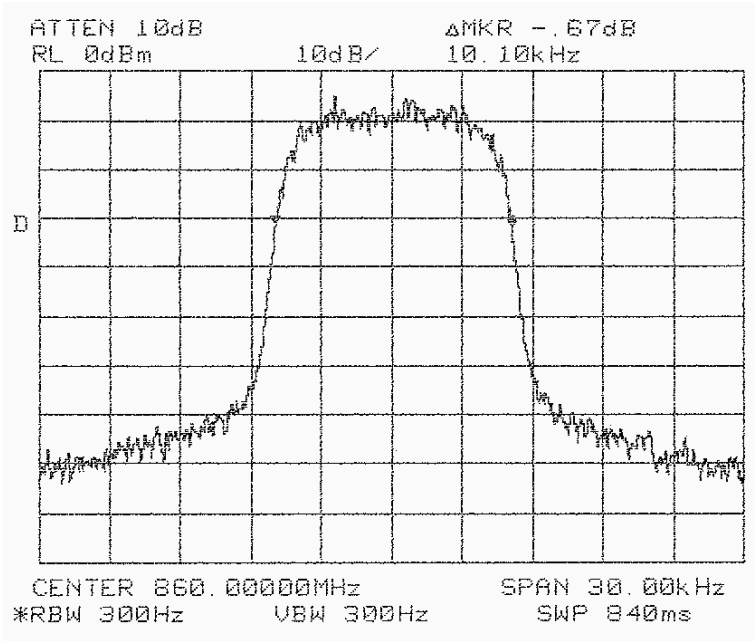

Figure 9.— 860.00 Input

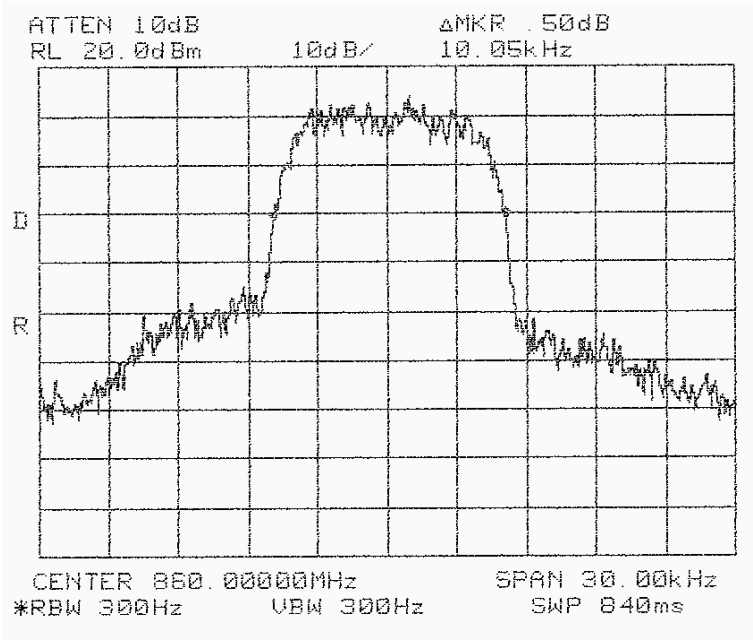

Figure 10.— 860.00 Output

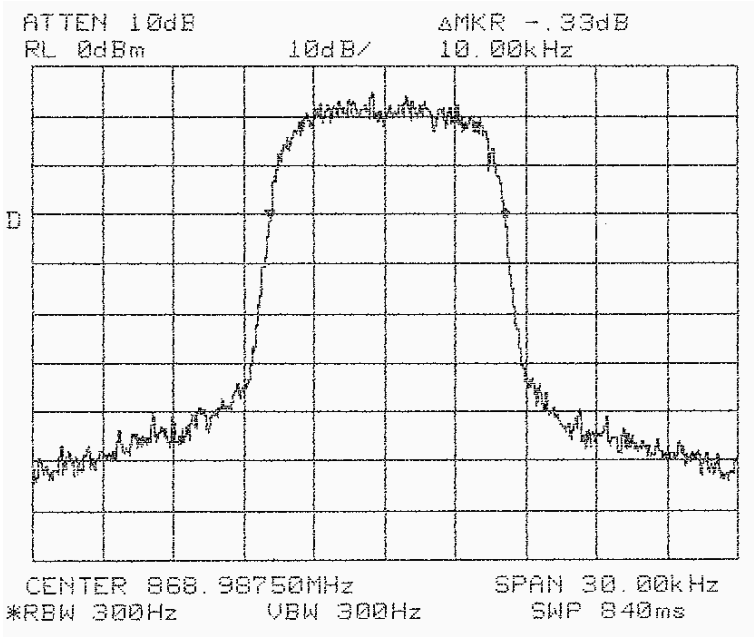

Figure 11.— 868.9875 Input

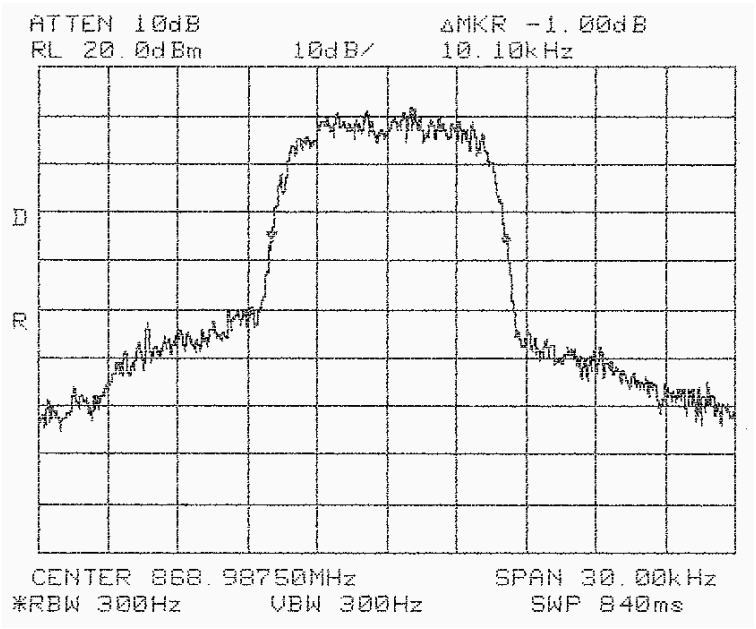

Figure 12.— 868.9875 Output

6.2 Results Table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 2, Section 2.1049; Part 90, Section 90.209

	Operating Frequency	Reading (kHz)
Input	851.0125	10.00
Output	851.0125	10.10
Input	860.00	10.10
Output	860.00	10.05
Input	868.9875	10.00
Output	868.9875	10.10

Figure 13 Occupied Bandwidth

TEST PERSONNEL:

Tester Signature: _____ 25.02.07

Typed/Printed Name: E. Pitt

6.3 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 14 Test Equipment Used

7. Emission Mask (iDEN)

7.1 Test Specification

FCC Part 90 Sub-part I Section 90.210; Part 90 Section 90.691

According to the table in Section 90.210, the following masks shall be used:

For the frequency band 851-854 MHz Mask H

For the frequency band 854-869 MHz Mask G

Also at all frequencies, the E.U.T. must comply with the emission mask in Section 90.691.

7.2 Test Procedure

The E.U.T. was set to the applicable test frequency with 16QAM modulation, Simbol rate of 7.5ksps.
The E.U.T. antenna terminal was connected to the spectrum analyzer through a 24 dB external attenuator and appropriate coaxial cable (0.5 dB cable loss). The spectrum analyzer was set to 300 Hz resolution B.W.

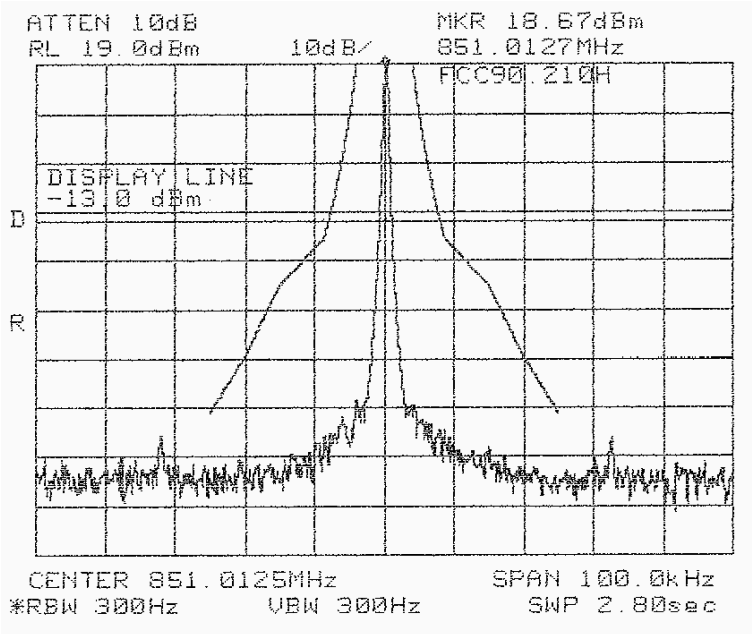

Figure 15.— 851.0125

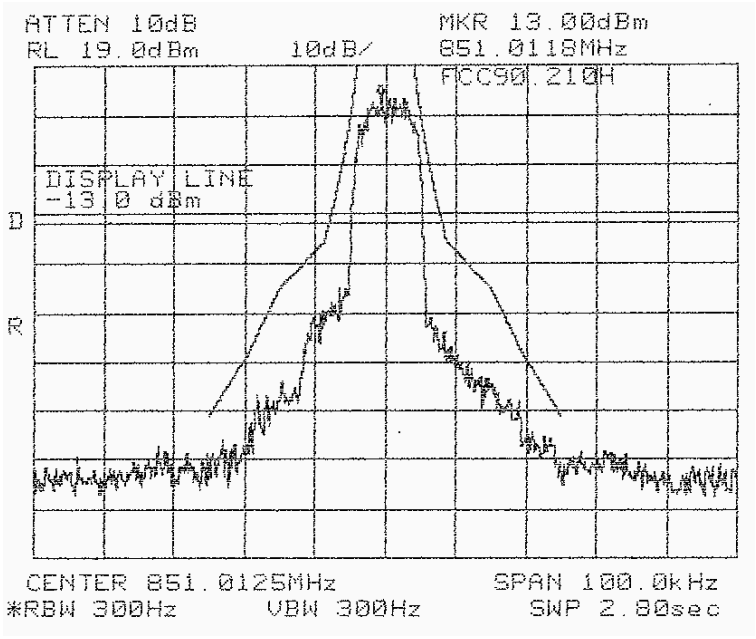

Figure 16.— 851.0125

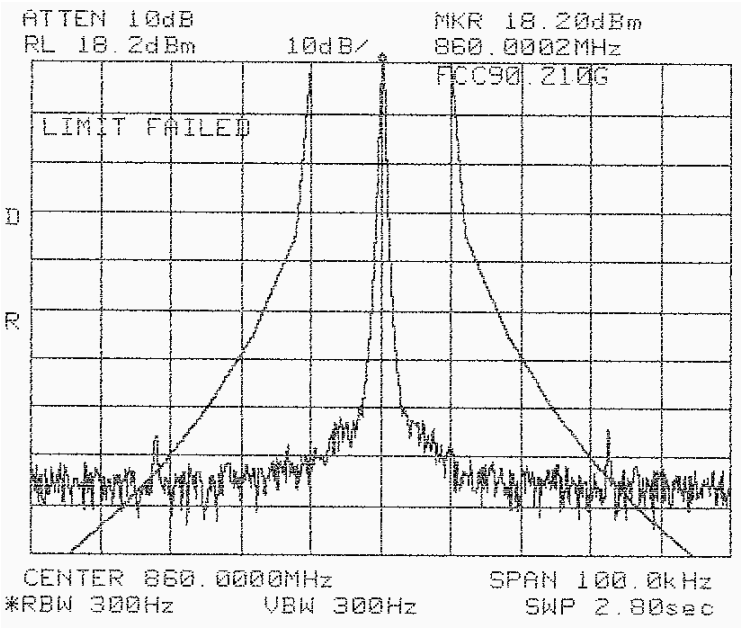

Figure 17.— 860.00

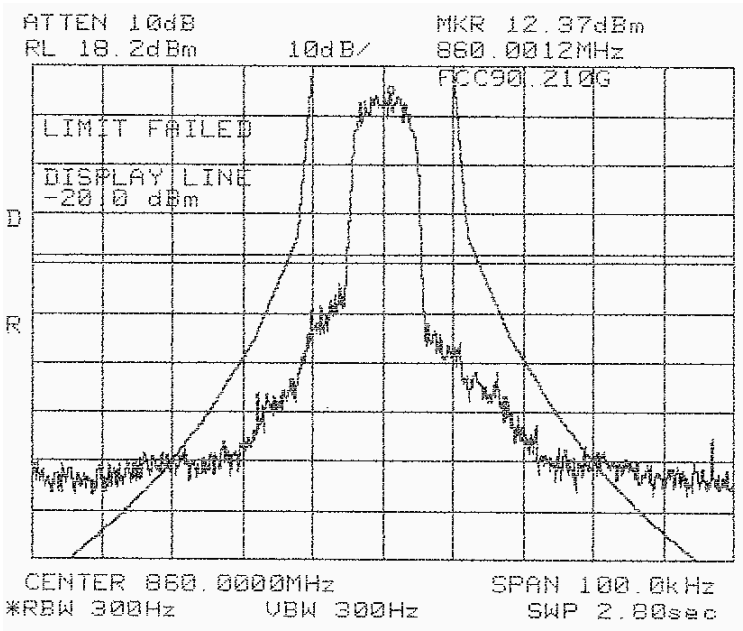

Figure 18.— 860.00

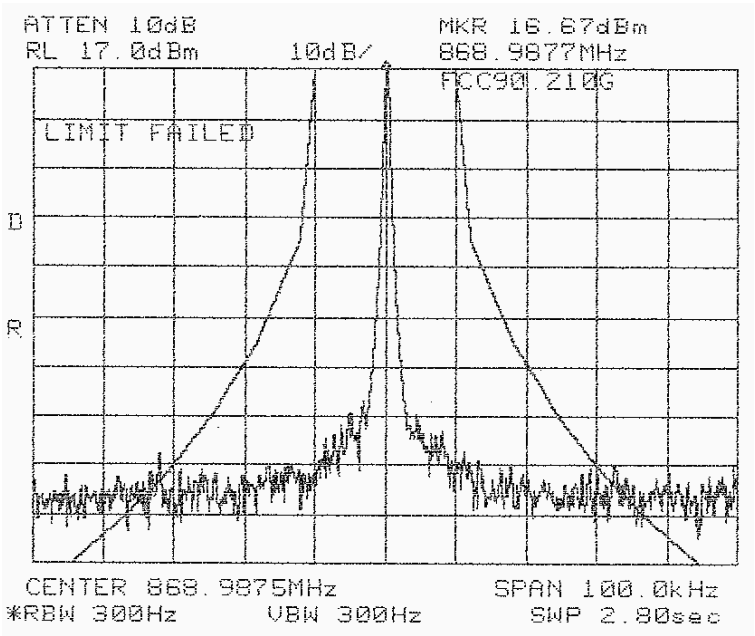

Figure 19.— 868.9875

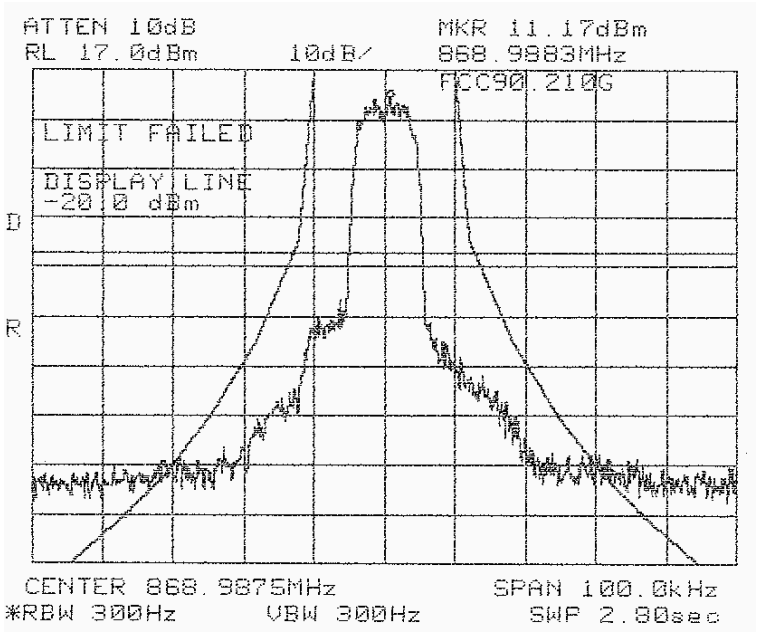

Figure 20.— 868.9875

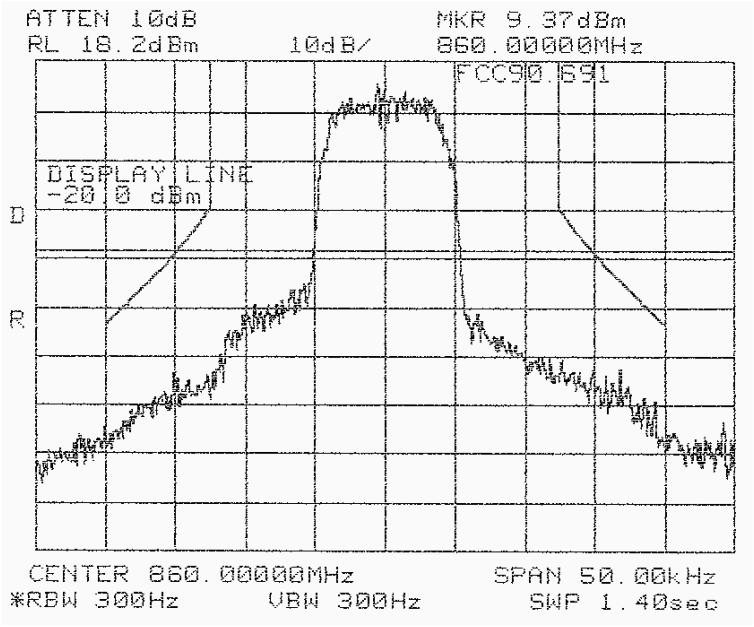

Figure 21.— 868.9875

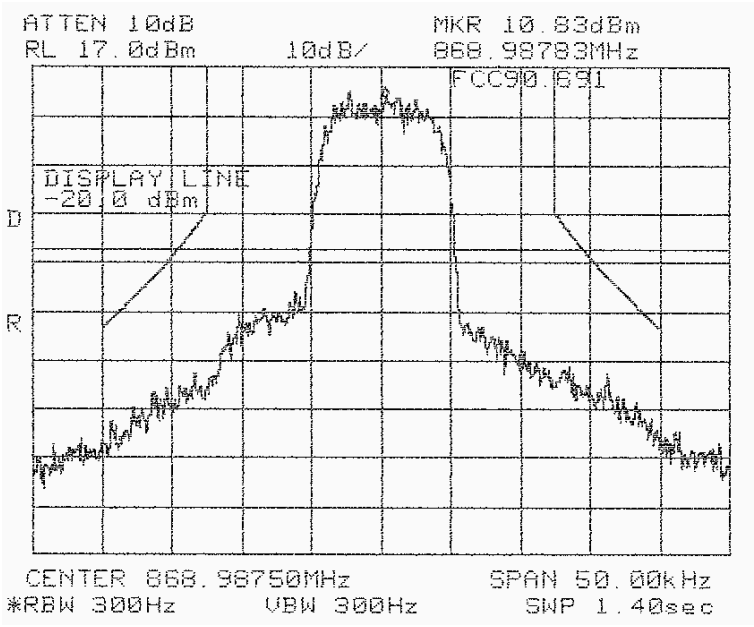

Figure 22.— 868.9875

7.3 Results Table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 90, Section 90.210 G; Part 90, Section 90.210 H; Part 90 Section 691

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: _____ 25.02.07

Typed/Printed Name: E. Pitt

7.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 23 Test Equipment Used

8. 1Out of Band Emissions at Antenna Terminals (iDEN)

8.1 Test Specification

FCC Part 90, Section 90.210

8.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges (851-869 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + log (P) dB, yielding –13dBm. The resolution bandwidth was set to 1.0 kHz for the frequency range 9 kHz – 1 MHz, 100 kHz for the frequency range 1 MHz to 1 GHz, and 1 MHz in the frequency range 1 – 9 GHz. In the band edges, measurement was performed using resolution bandwidth of 10 kHz. Therefore the limit in these ranges = -13 – 10 log 100/10 = 23 dBm.
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (24.5 dB).

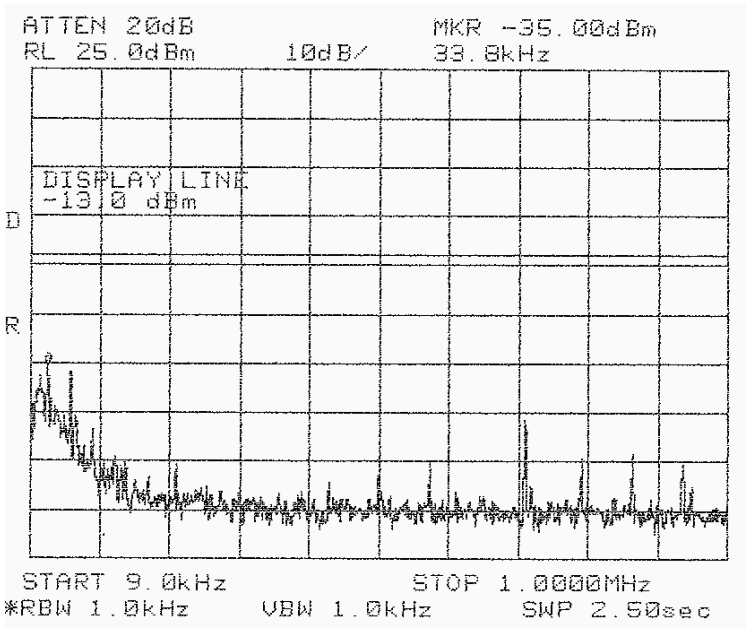

Figure 24.— 851.0125 MHz

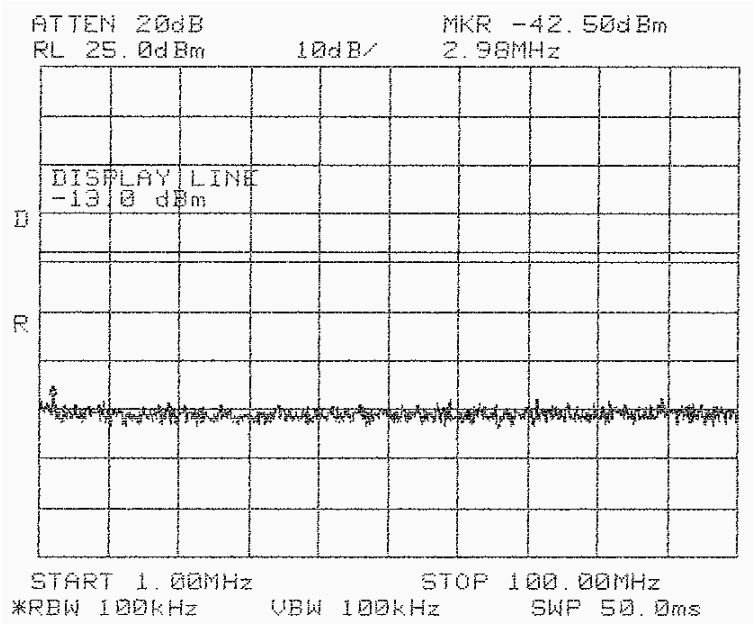

Figure 25.— 851.0125 MHz

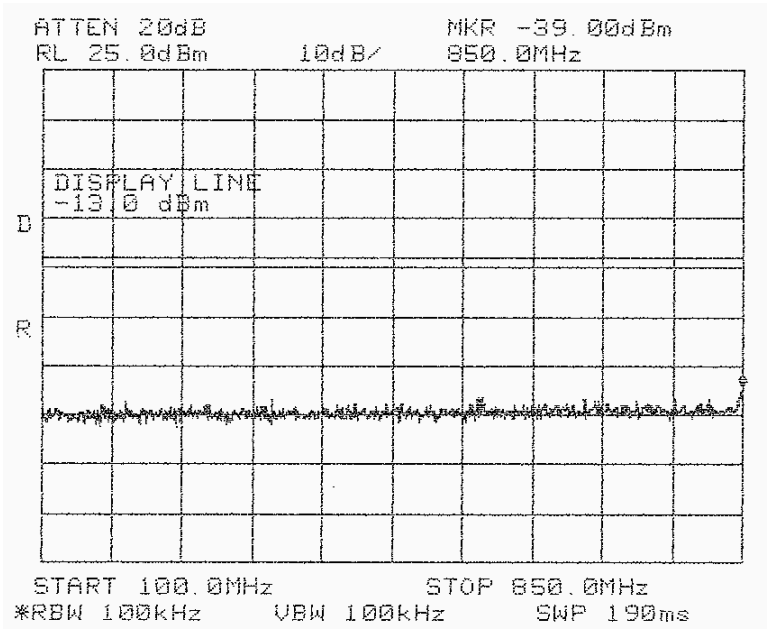

Figure 26.— 851.0125 MHz

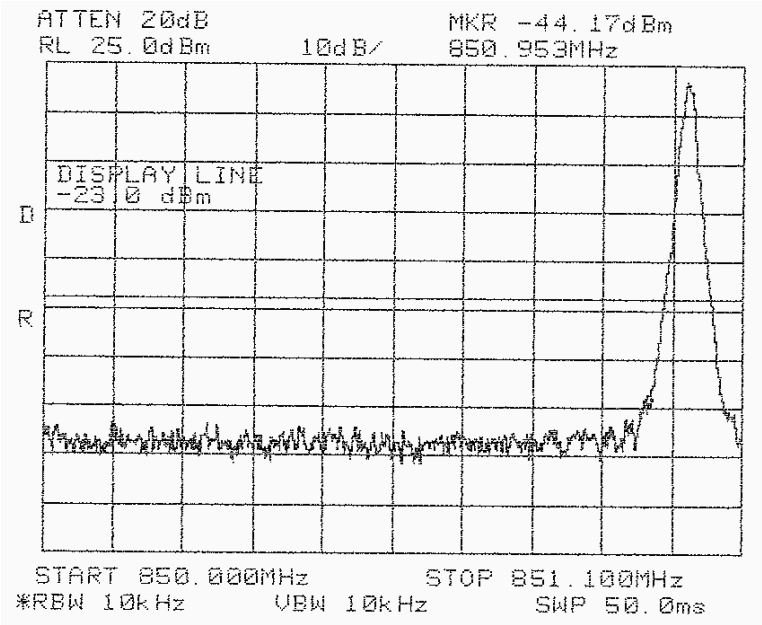

Figure 27.— 851.0125 MHz

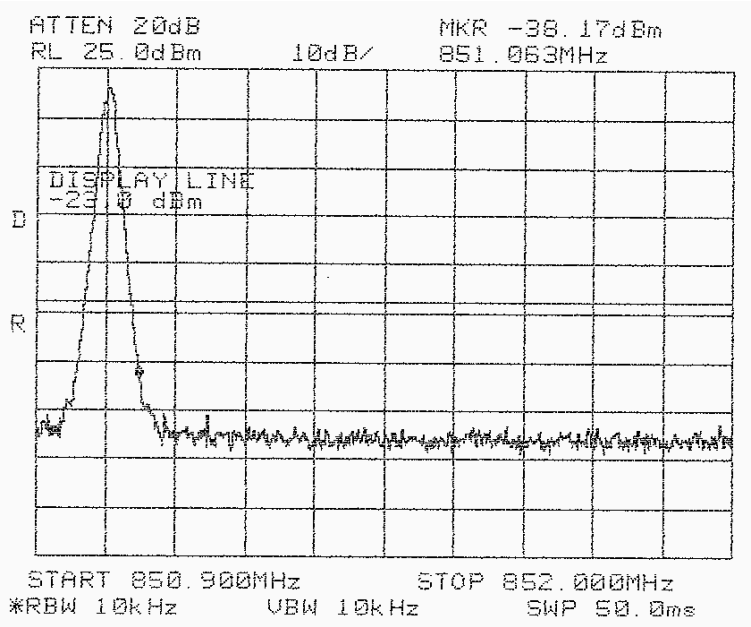

Figure 28.— 851.0125 MHz

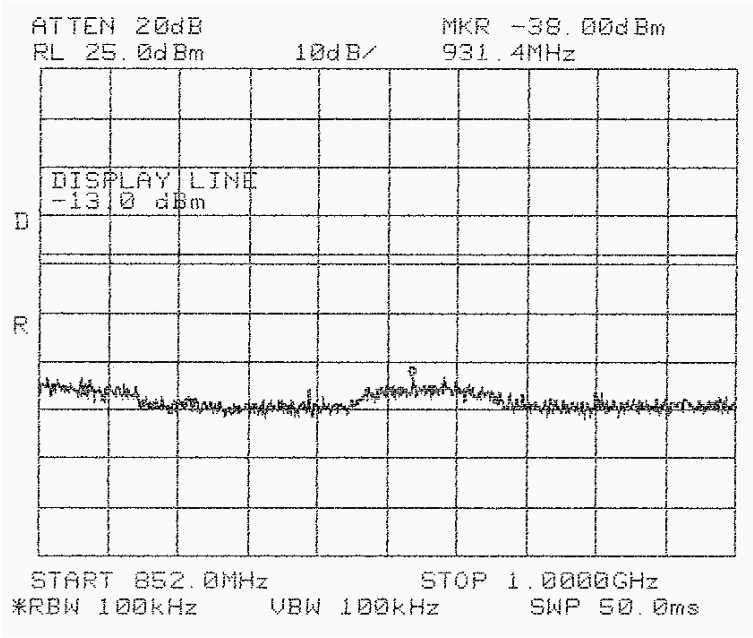

Figure 29.— 851.0125 MHz

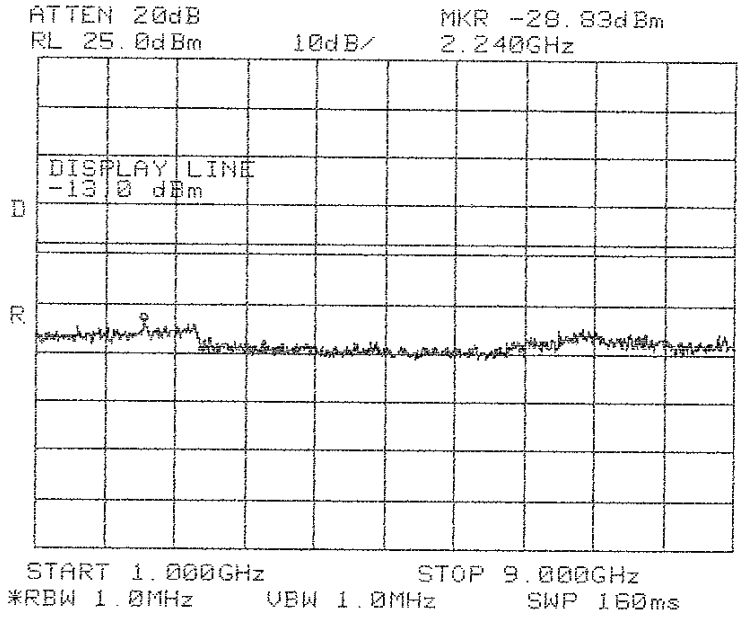

Figure 30.— 851.0125 MHz

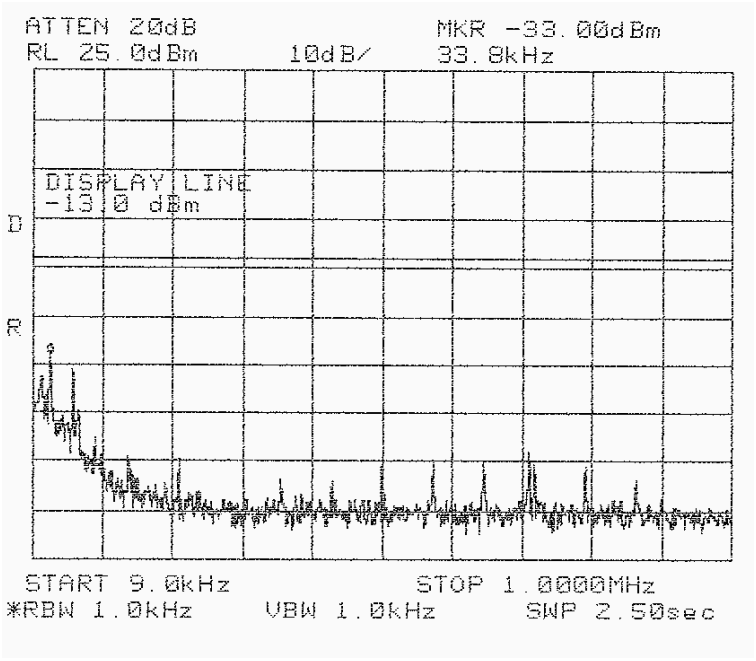

Figure 31.— 860.00 MHz

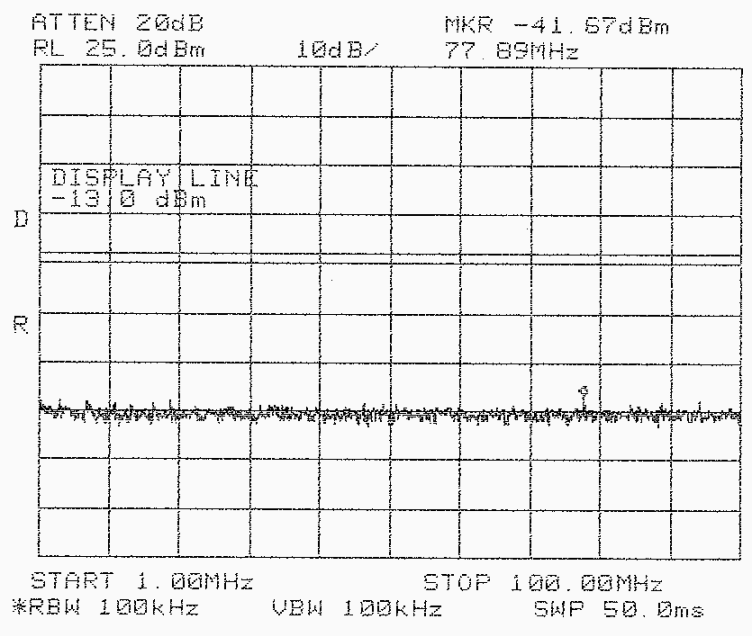

Figure 32.— 860.00 MHz

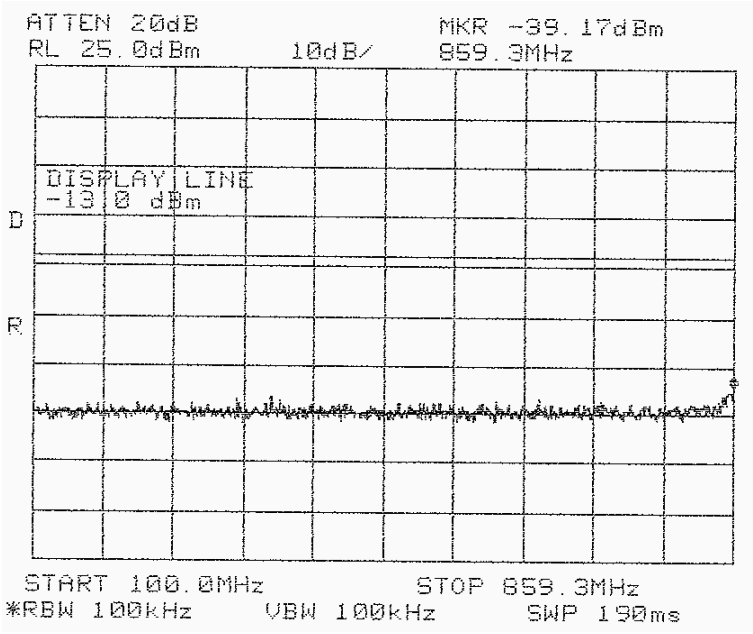

Figure 33.— 860.00 MHz

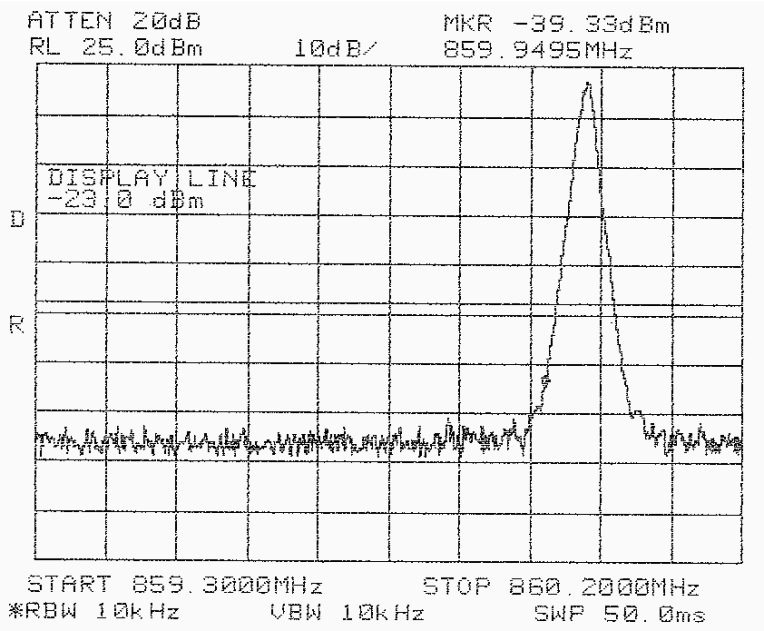

Figure 34.— 860.00 MHz

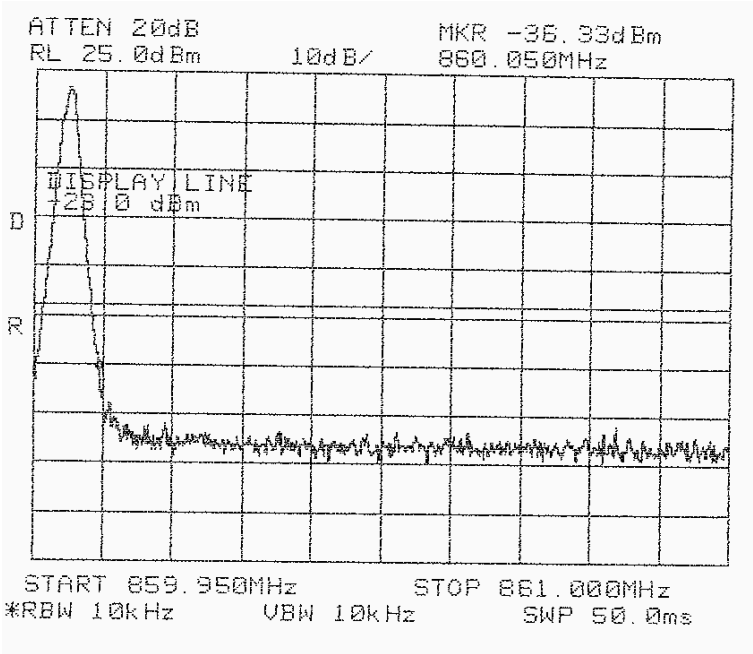

Figure 35.— 860.00 MHz

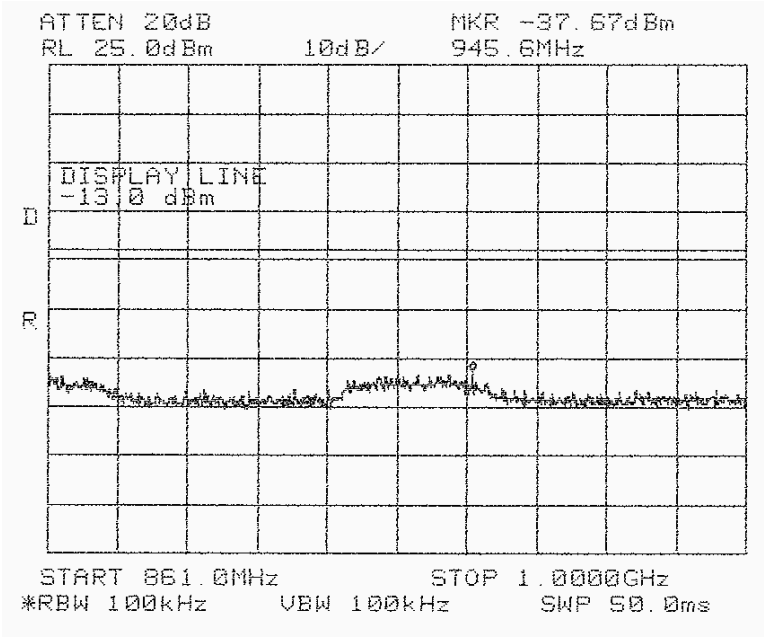

Figure 36.— 860.00 MHz

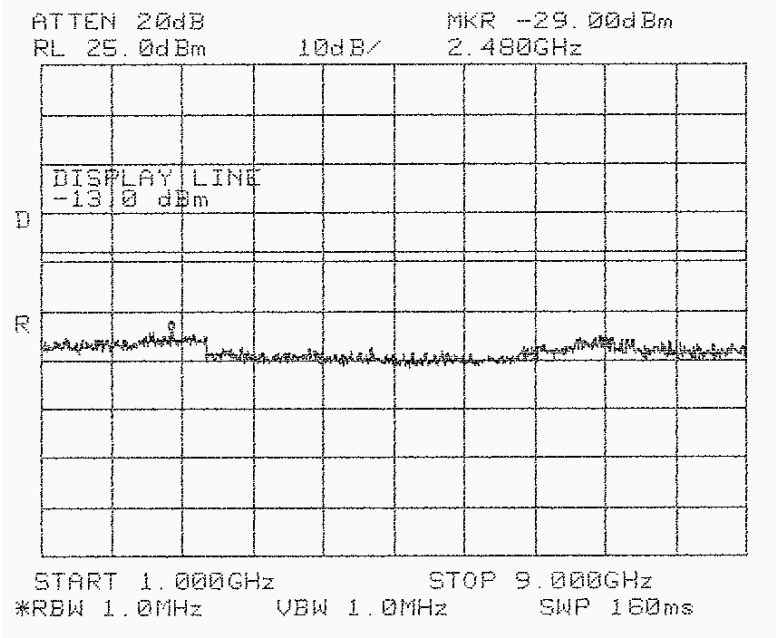

Figure 37.— 860.00 MHz

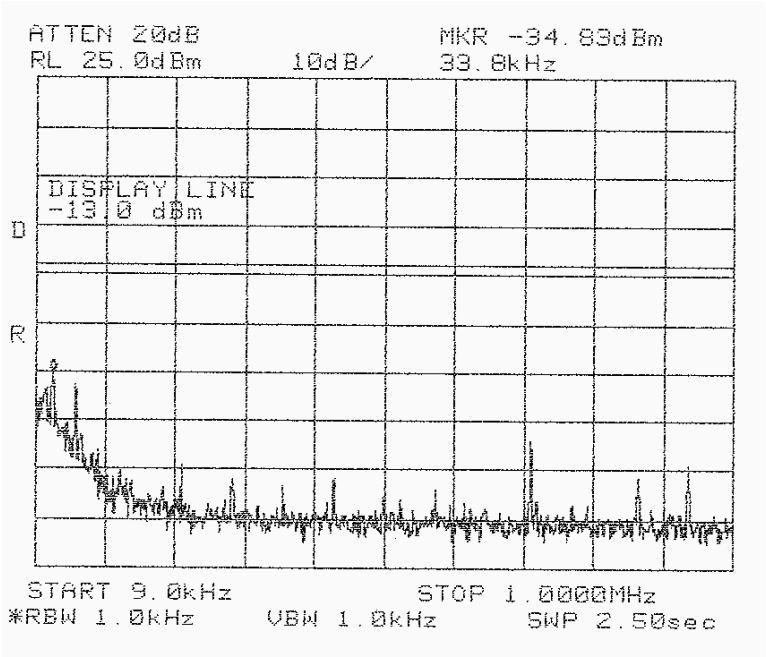

Figure 38.— 868.9875 MHz

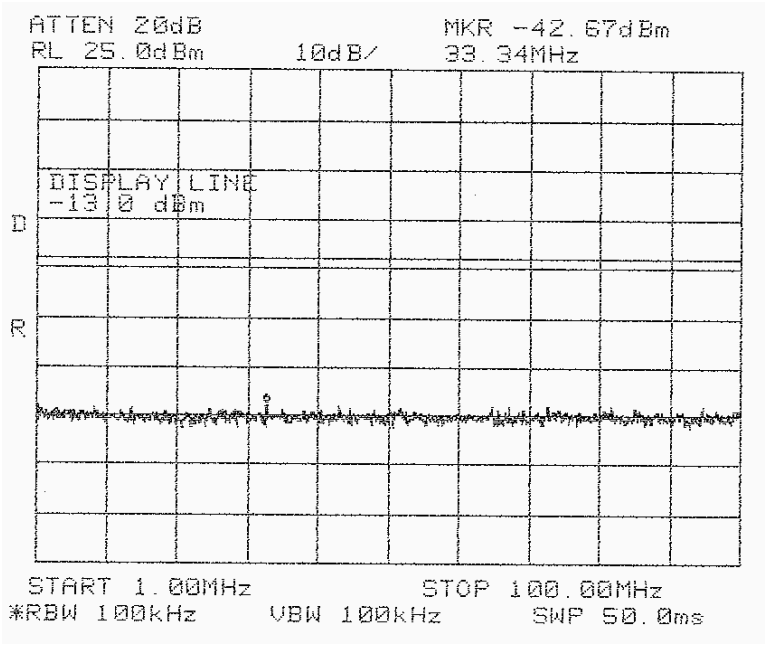

Figure 39.— 868.9875 MHz

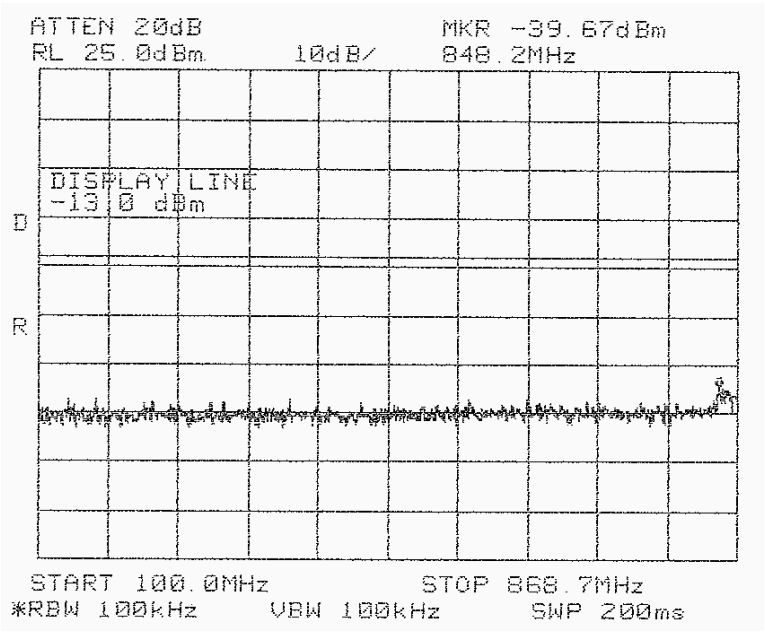

Figure 40.— 868.9875 MHz

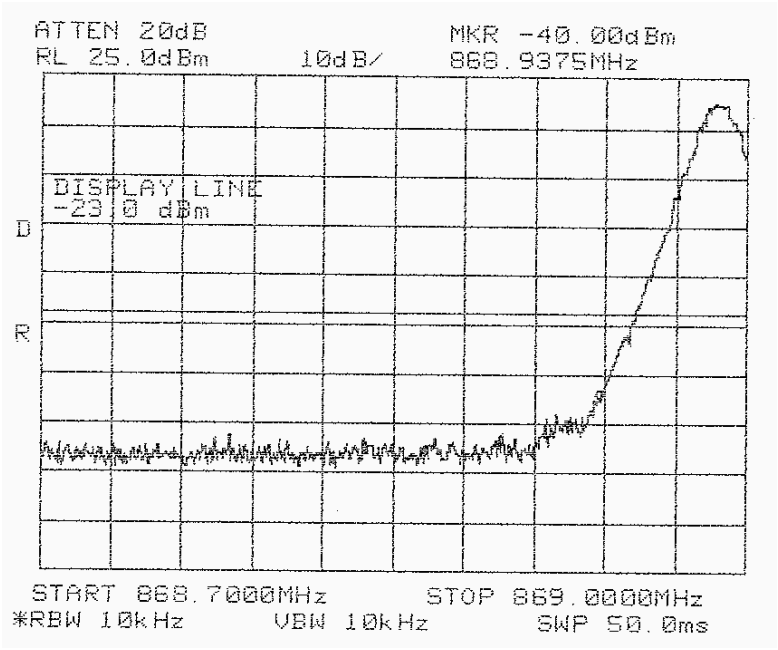

Figure 41.— 868.9875 MHz

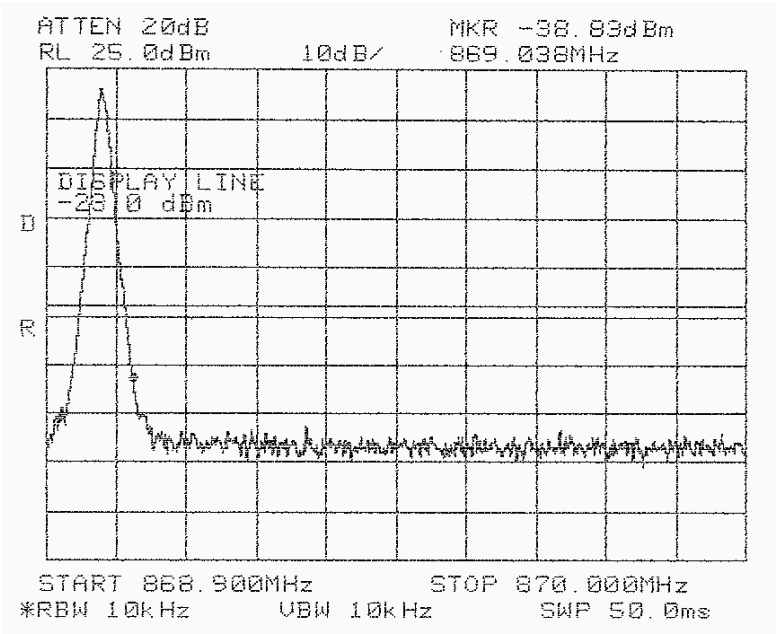

Figure 42.— 868.9875 MHz

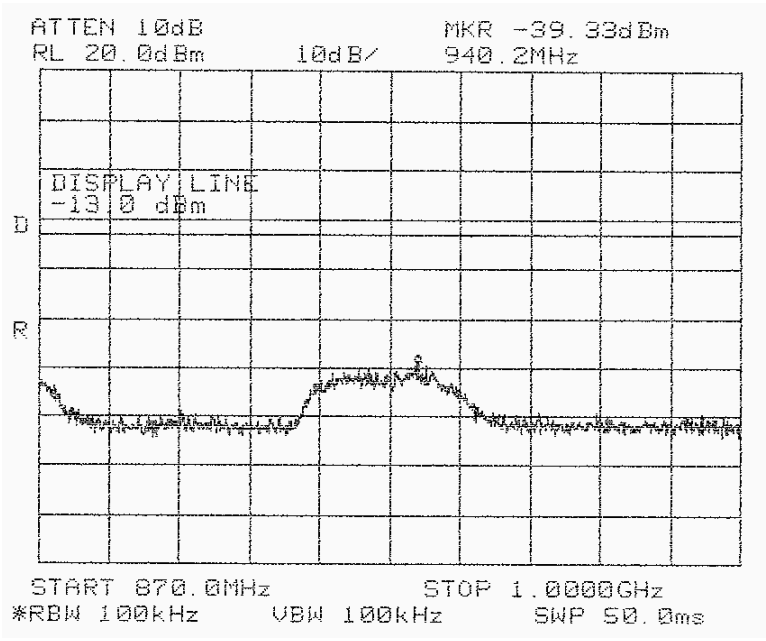

Figure 43.— 868.9875 MHz

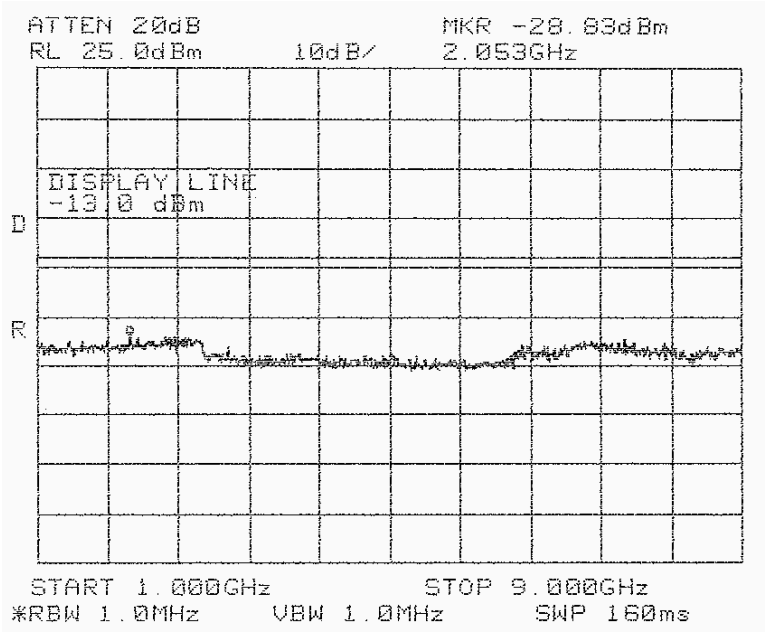

Figure 44.— 868.9875 MHz

8.3 Results table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 90, Section 90.210

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
851.0125	-28.83	-13.0	-15.83
860.00	-29.00	-13.0	-16.00
868.9875	-28.83	-13.0	-15.83

Figure 45 Out of Band Emission Results

JUDGEMENT: Passed by 15.83 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

8.4 Test Equipment Used.

Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 46 Test Equipment Used

9. Out of Band Emissions (Radiated) (iDEN)

9.1 Test Specification

FCC, Part 90, Section 90.210

9.2 Test Procedure

The power of any emission outside of the authorized operating frequency ranges (851-869 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in Figure 3.5.
The frequency range 30 MHz-10 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(b) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P (dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dBi)
P = Equivalent Isotropic Radiated Power.
P_g = Signal Generator Output Level.

9.3 Test Data

JUDGEMENT: Passed

The E.U.T met the requirements of the FCC, Part 90, Section 90.210 specifications.

The signals in the band 30 MHz – 10.0 GHz were below the spectrum analyzer noise level which is at least 20dB below the specification limit.

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

9.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 22, 2006	1 year
RF Section	HP	85420E	3705A00248	November 22, 2006	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 30, 2006	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 16, 2006	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 04, 2005	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 year
Horn Antenna	ARA	SWH-28	1007	December 8, 2006	2 year
Horn Antenna	Narda	V637	0410	December 8, 2006	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	October 16, 2005	1 year
Spectrum Analyzer	HP	8592L	3926A01204	November 21, 2006	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200		N/A	N/A

10. Peak Output Power (SMR)

10.1 Test Specification

FCC Part 90, Section 90.219

10.2 Test procedure

Peak Power Output must not exceed 32 dBm (EIRP – Antenna gain = 37 – 5 = -32 dBm).

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 100 kHz resolution BW. The output power level was measured at 929.0125, 935.00, and 940.087 MHz.

The type of modulation used is FM and the rate of modulation was 1 kHz.

The deviation is:

a. For the frequency ranges 929-935 MHz, and 940-941 MHz, 5 kHz.

b. For the frequency range 935-940 MHz, 2.5 kHz.

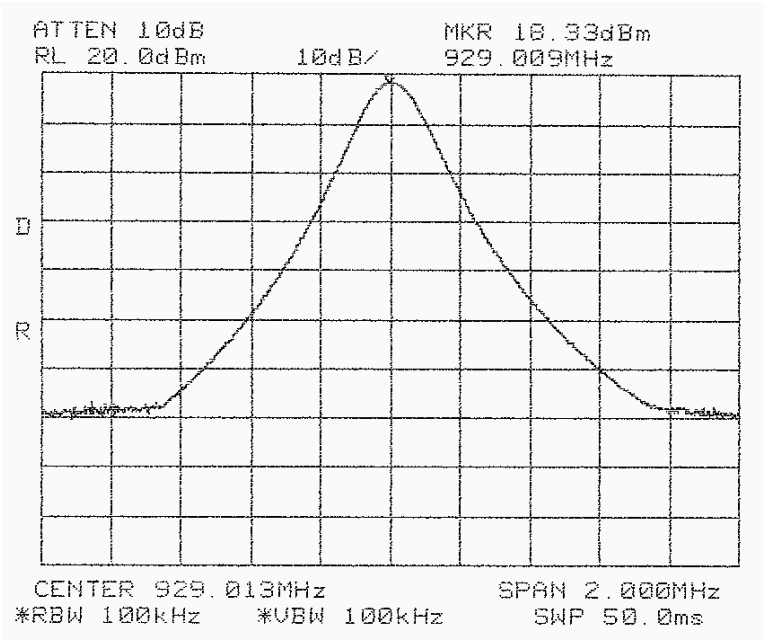

Figure 47.— 929.0125 MHz

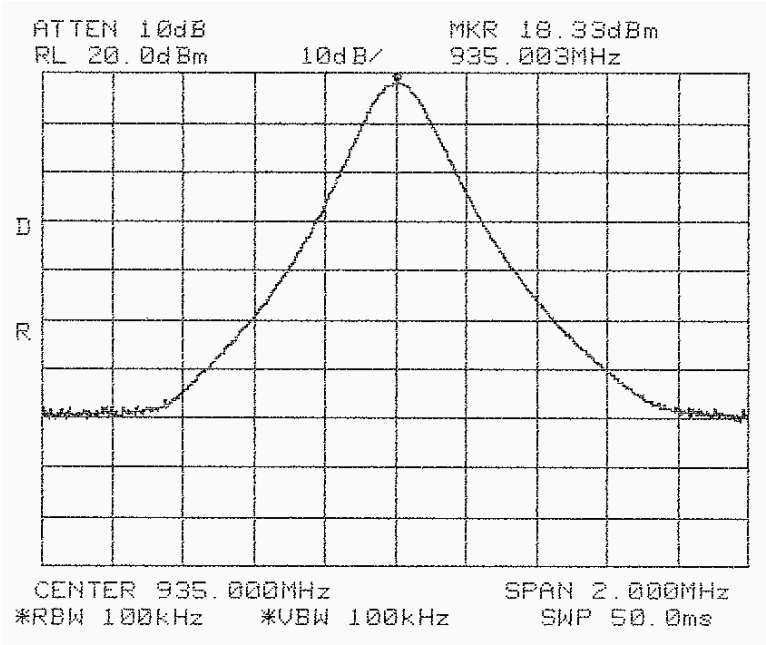

Figure 48.— 930.00 MHz

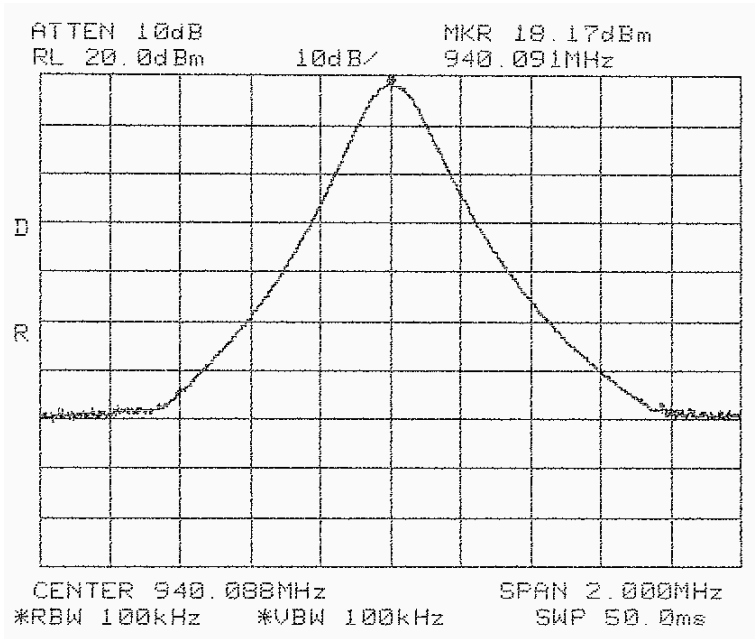

Figure 49.— 940.0875 MHz

10.3 Results table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 90, Section 90.219

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
929.0125	18.33	32.0	-13.67
935.00	18.33	32.0	-13.67
940.0875	18.14	32.0	-13.86

Figure 50 Peak Output Power

JUDGEMENT: Passed by 13.67 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

10.4 Test Equipment Used.

Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 51 Test Equipment Used

11. Occupied Bandwidth (SMR)

11.1 Test Specification

FCC Part 2, Section 2.202, FCC Part90 Section 90.209

11.2 Test Procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (at the output test) and an appropriate coaxial cable. The spectrum analyzer was set to 300 Hz resolution B.W.
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limit, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.
The occupied bandwidth of the E.U.T. at the points of 20 dB below maximum peak power was measured and recorded.
Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

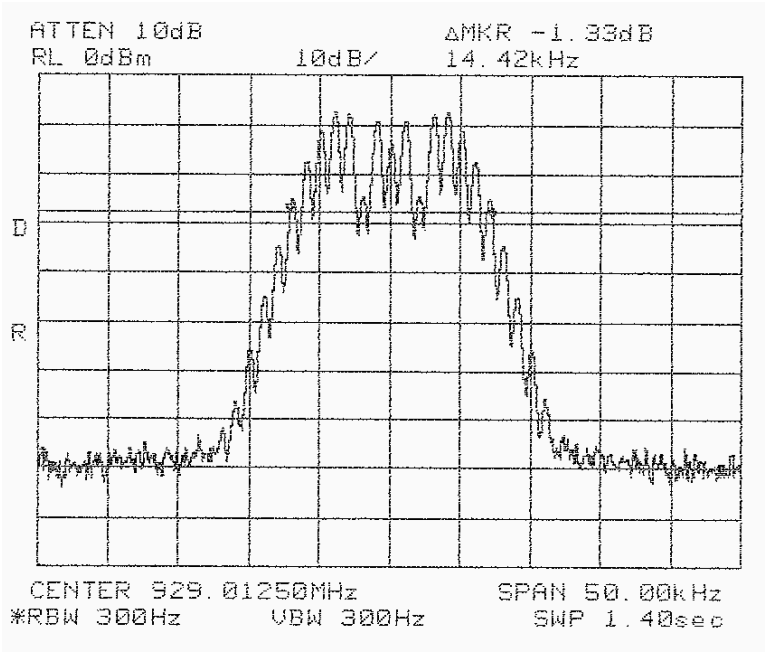

Figure 52.— Input 929.0125 MHz

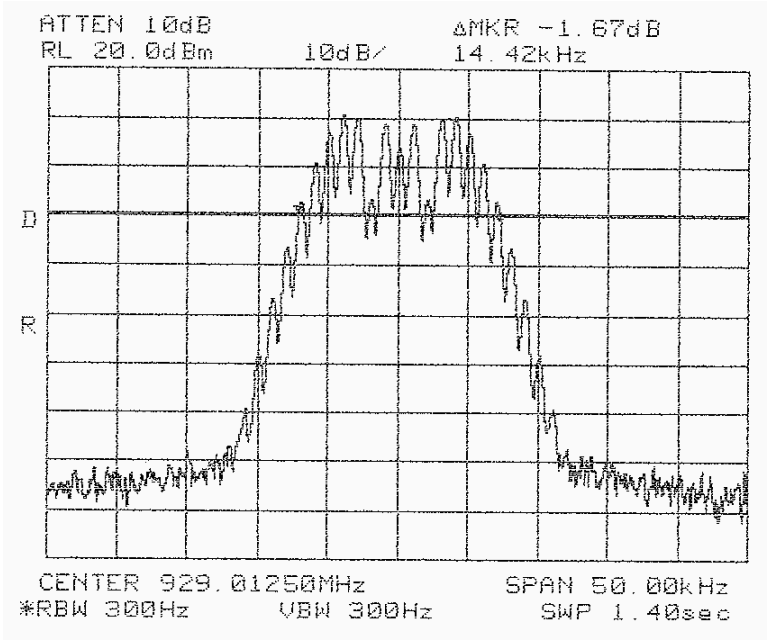

Figure 53.— Output 929.0125 MHz

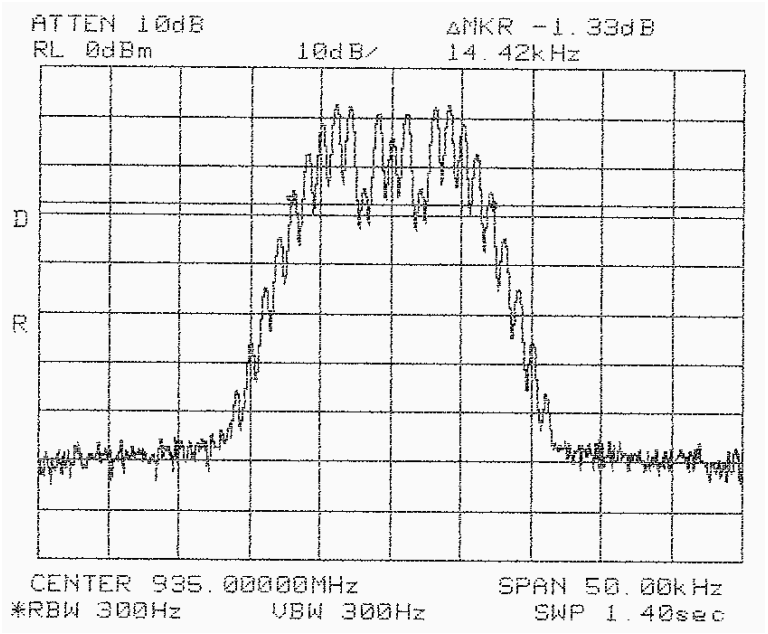

Figure 54.— Input 935.00 MHz

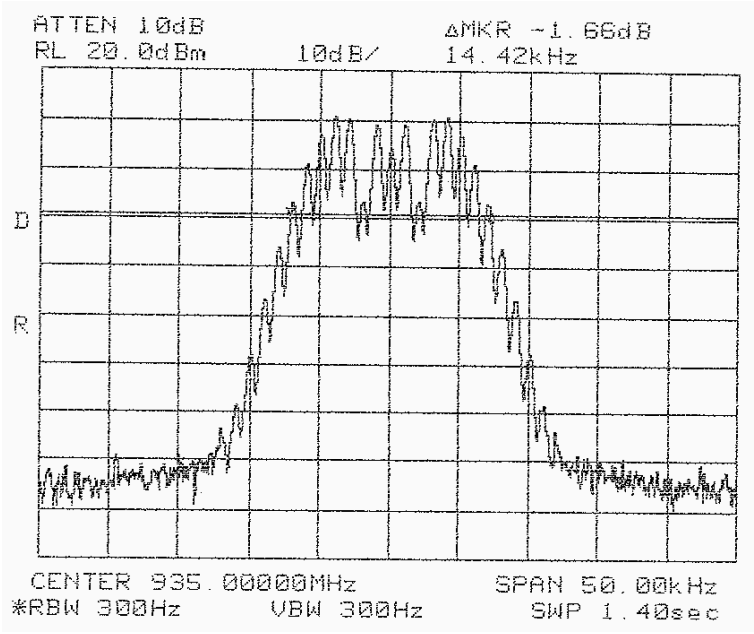

Figure 55.— Output 935.00 MHz

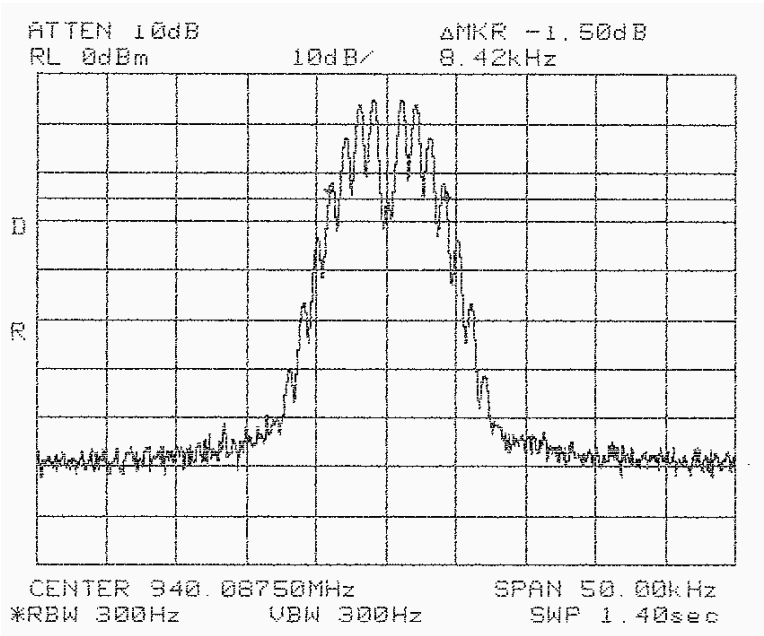

Figure 56.— Input 940.0875 MHz

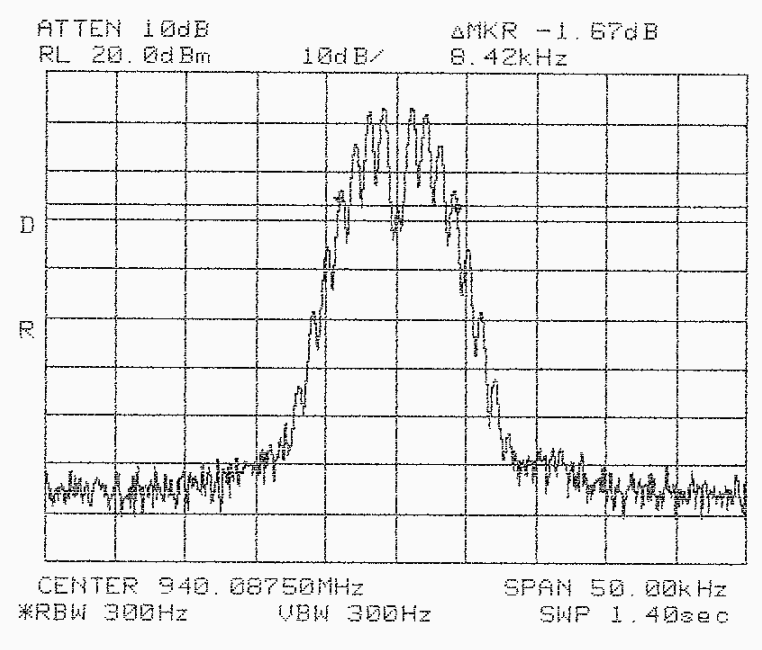

Figure 57.— Output 940.0875 MHz

11.3 Results Table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 2, Section 2.202; FCC Part 90 Section 90.209

	Operating Frequency	Reading (Hz)
Input	929.0125	14.42
Output	929.0125	14.42
Input	935.00	14.42
Output	935.00	14.42
Input	940.0875	8.42
Output	940.0875	8.42

Figure 58 Occupied Bandwidth

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

11.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 59 Test Equipment Used

12. Emission Mask (SMR)

12.1 Test Specification

FCC Part 90, Subpart I Section 90.210; Part 90 Section 90.691
According to the table in this section, the following masks shall be used:

For the frequency bands 929-930 MHz	Mask G
For the frequency bands 930-935 MHz	Mask C
For the frequency bands 935-940 MHz	Mask J
For the frequency bands 940-941 MHz	Mask C

Also, at all frequencies, the E.U.T. must comply with the emission mask in Section 90.691.

12.2 Test Procedure

The E.U.T. was set to the applicable test frequency with frequency modulation, rate of modulation 1 kHz.
The deviation at the frequency ranges 929-935 MHz and 940-941 MHz is 5 kHz.
The deviation at the frequency range 935-40 MHz is 2.5 kHz.
The E.U.T. antenna terminal was connected to the spectrum analyzer through a 24 dB external attenuator and appropriate coaxial cable (0.5 dB cable loss). The spectrum analyzer was set to 300 Hz resolution B.W.

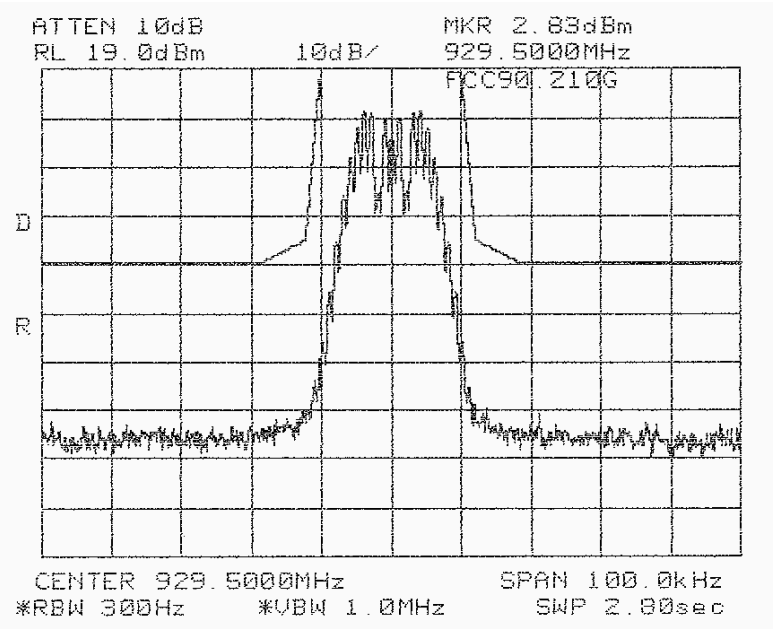

Figure 60.— 929.50

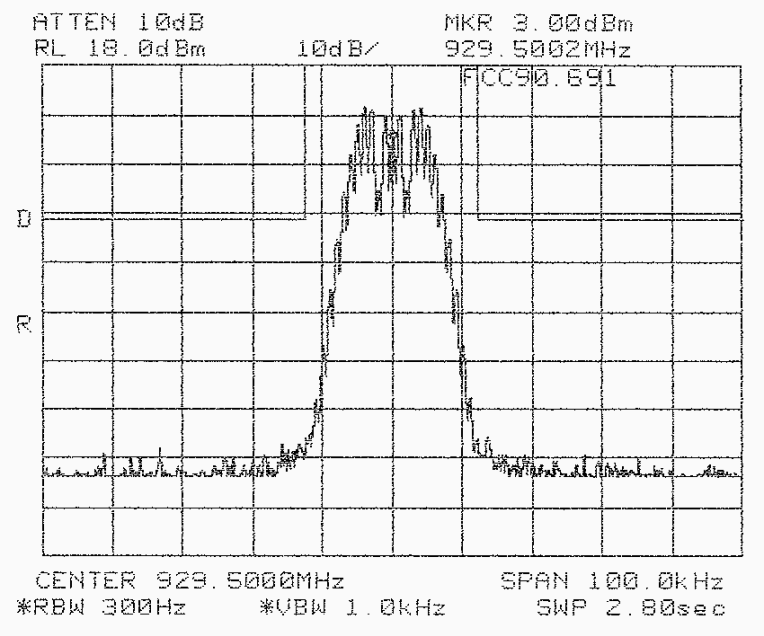

Figure 61.— 929.50

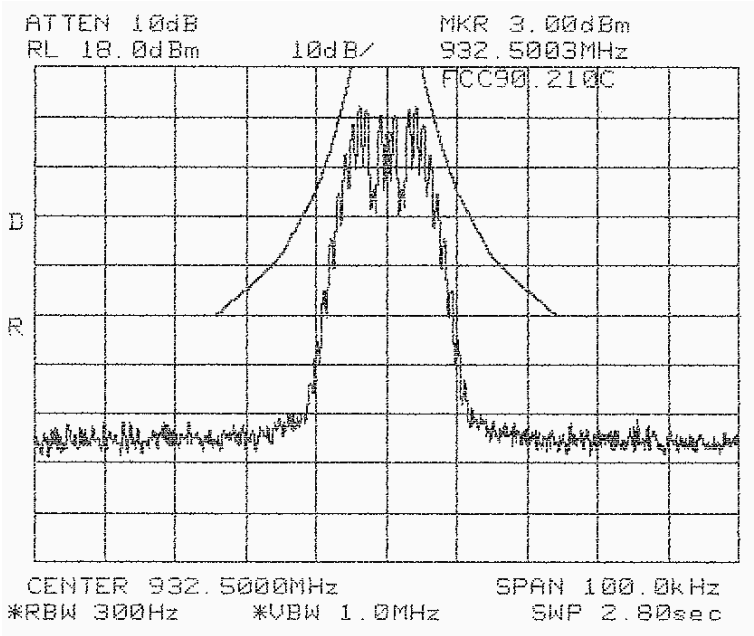

Figure 62.— 932.50

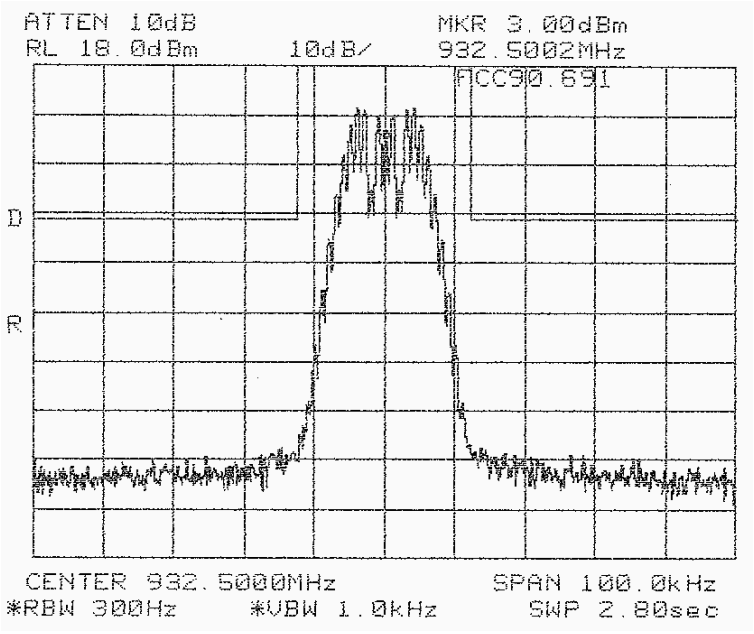

Figure 63.— 932.50

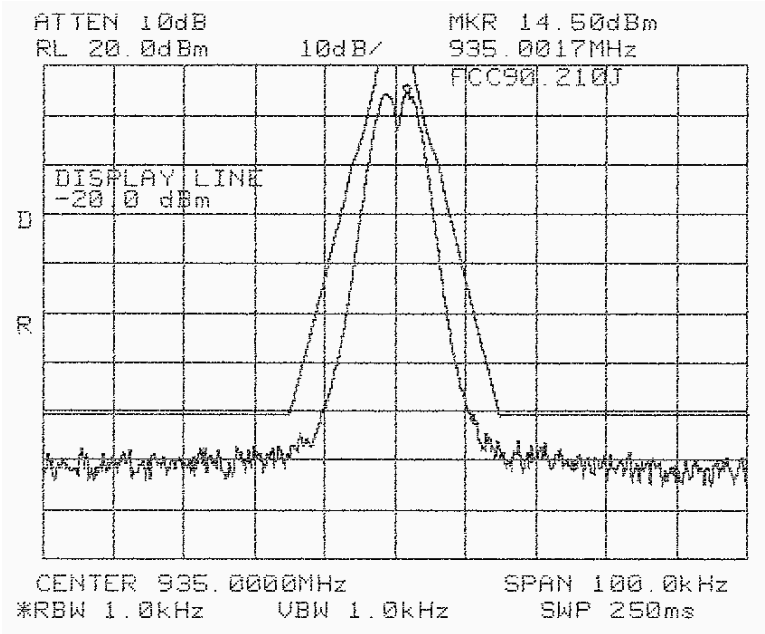

Figure 64.— 935.00

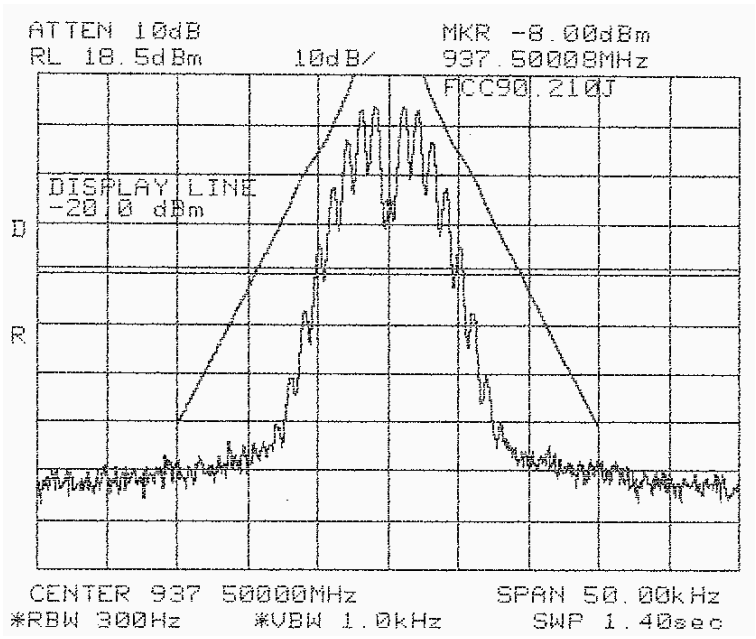

Figure 65.— 937.50

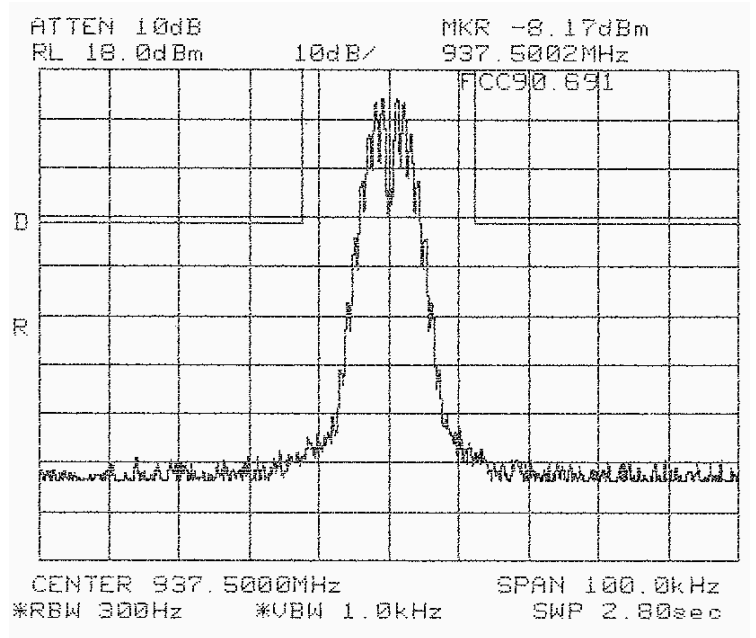

Figure 66.— 937.50

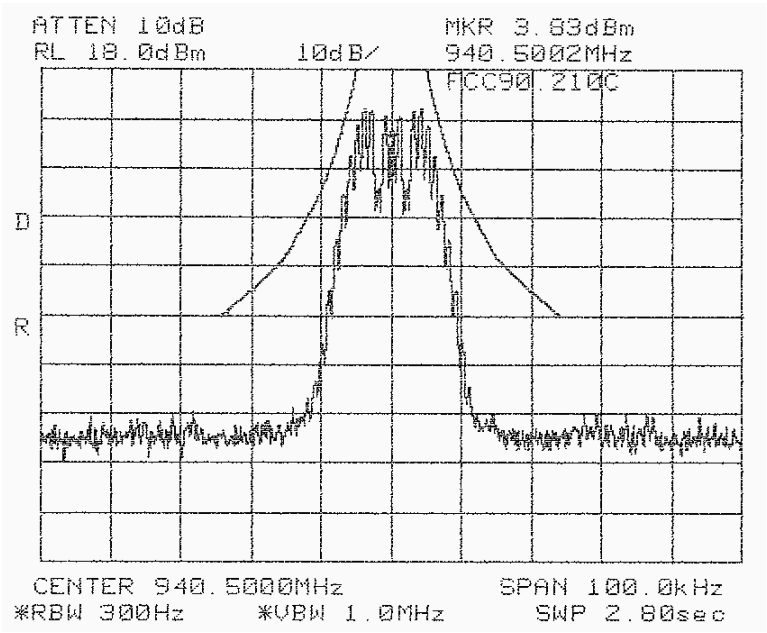

Figure 67.— 940.50

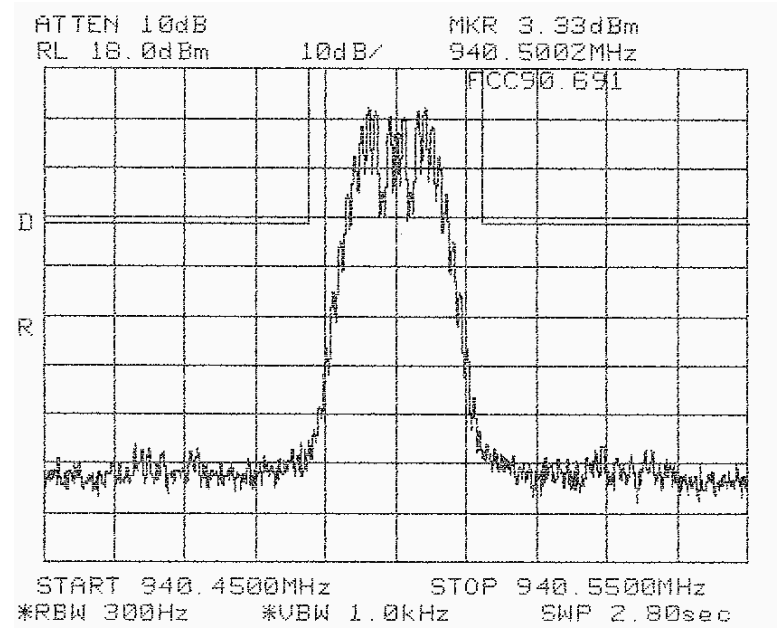

Figure 68.— 940.50

12.3 Results

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 90, Section 90.210 C; Part 90, Section 90.210 G;
FCC Part 90, Section 90.210 J; Part 90 Section 691

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature:  25.02.07

Typed/Printed Name: E. Pitt

12.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 69 Test Equipment Used

13. Out of Band Emissions at Antenna Terminals (SMR)

13.1 Test Specification

FCC Part 90, Section 210

13.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + log (P) dB, yielding –13dBm for the frequency ranges 929-935 and 940-941 MHz and at least 50 + 10 log (P), yielding –20 dBm for the frequency range 935-940 MHz.
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (24.5dB).
In the frequency ranges, where the resolution bandwidth of 10 kHz was used, instead of 100 kHz, the new limit = Lim – 10 log 100/10.

The operating frequencies of 929.0125, 935.00, and 940.0875 MHz were tested.

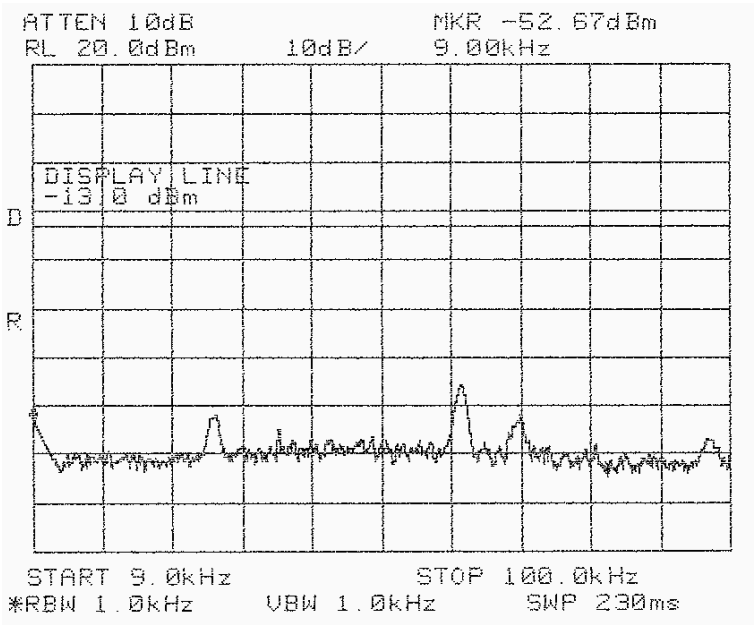

Figure 70.— 929.0125 MHz

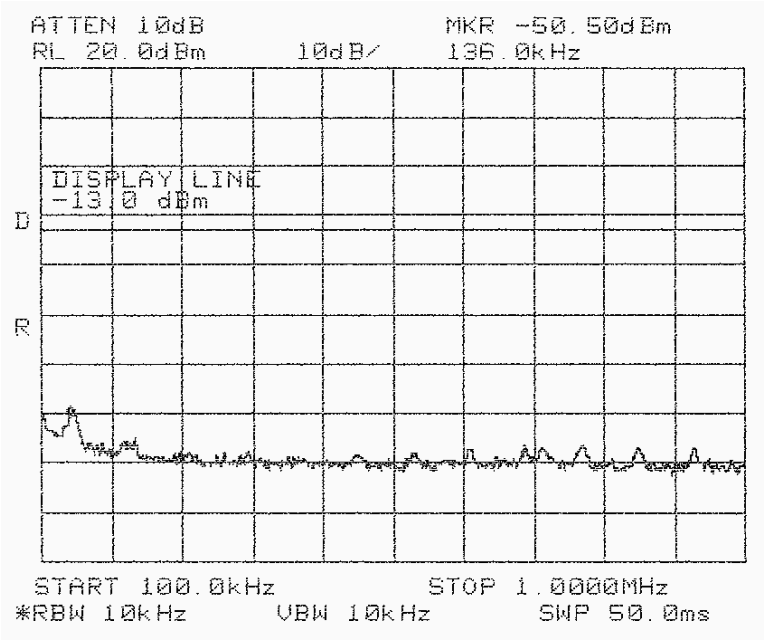

Figure 71.— 929.0125 MHz

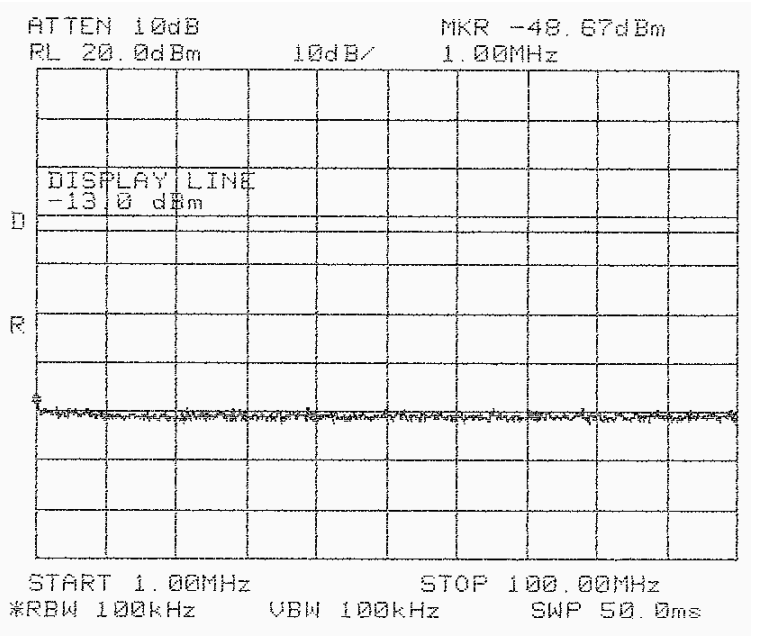

Figure 72.— 929.0125 MHz

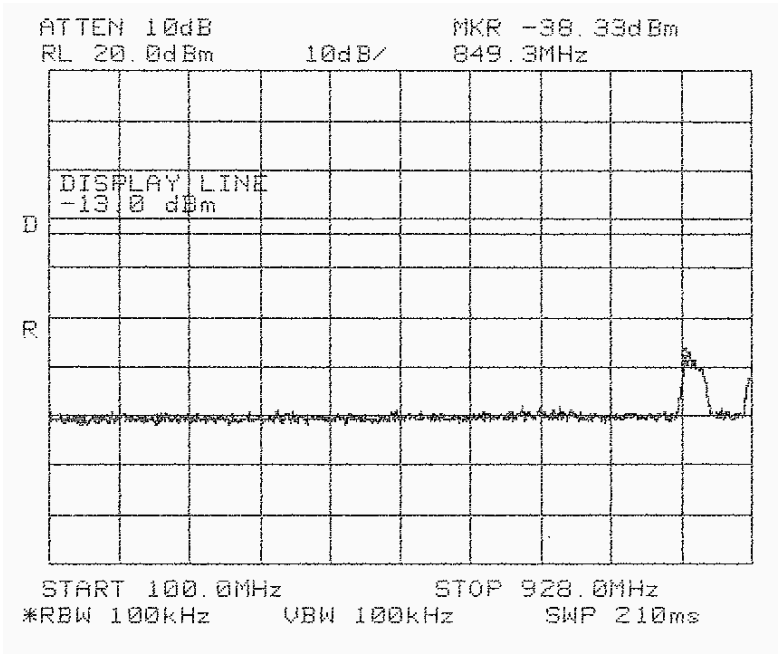

Figure 73.— 929.0125 MHz

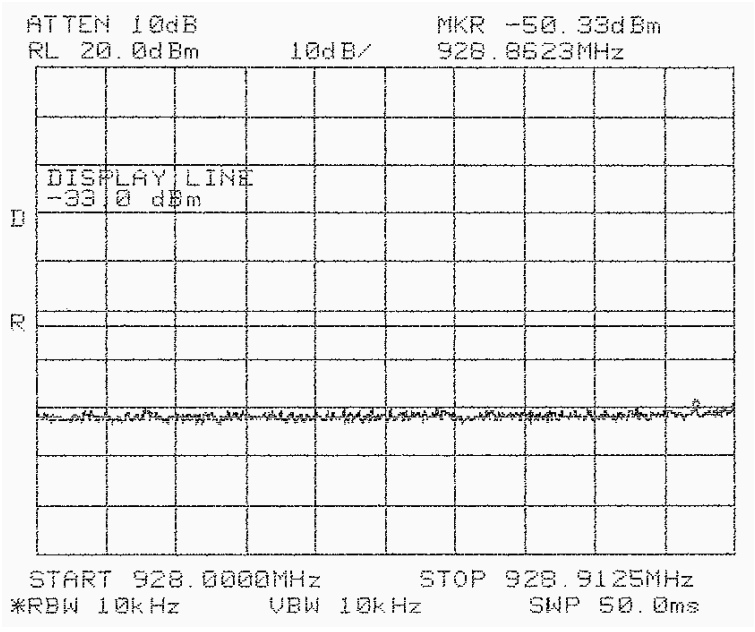

Figure 74.— 929.0125 MHz

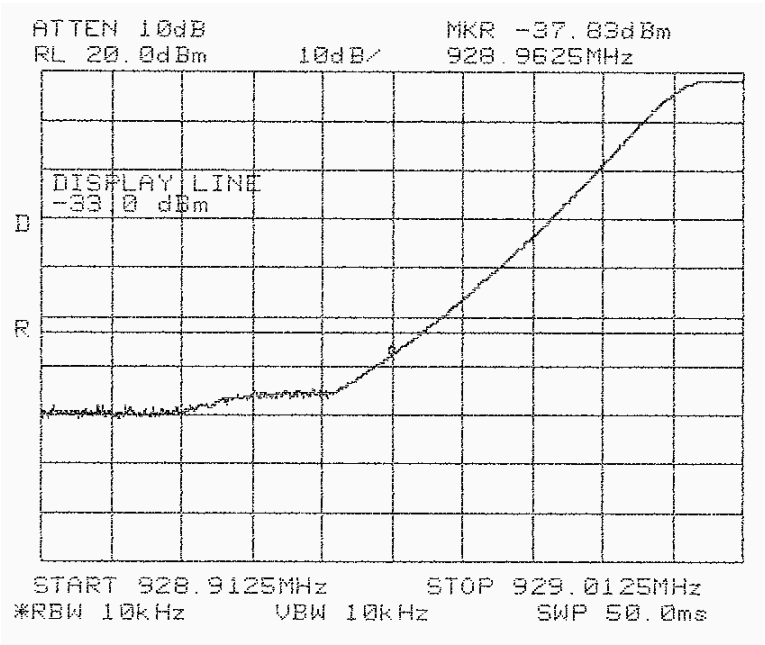

Figure 75.— 929.0125 MHz

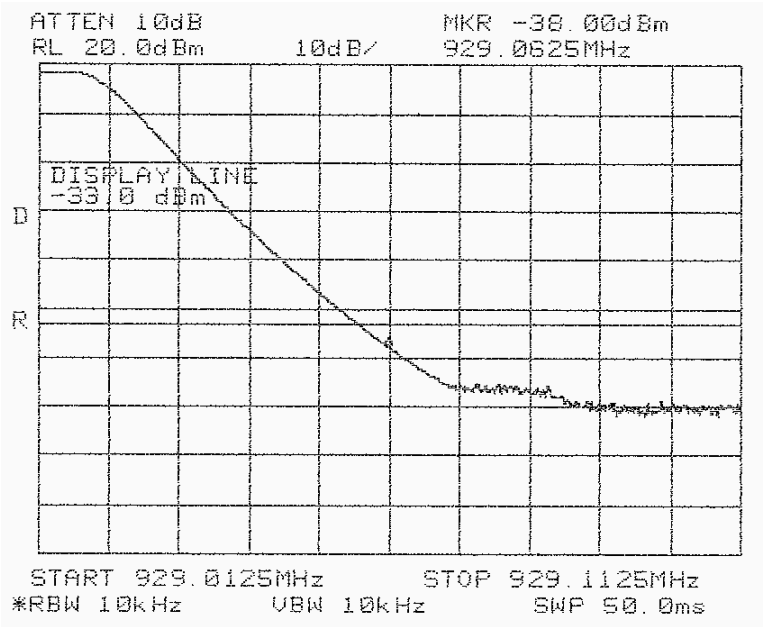

Figure 76.— 929.0125 MHz

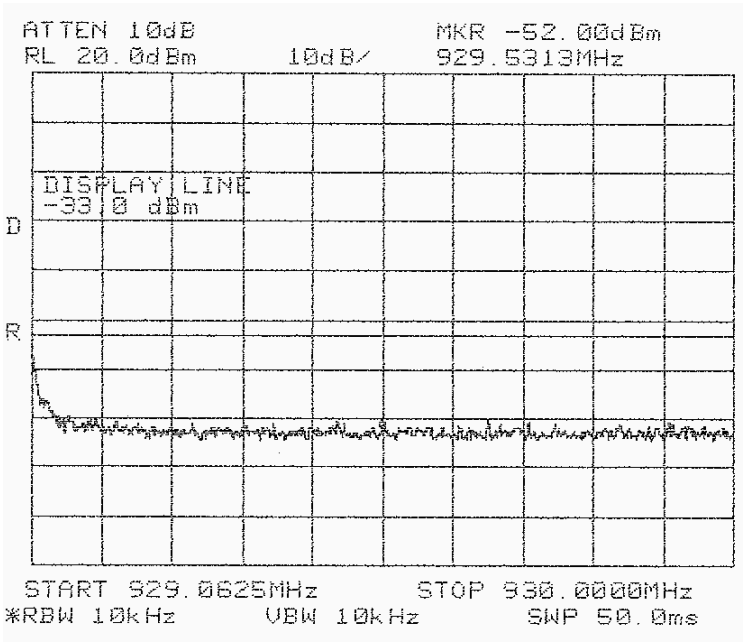

Figure 77.— 929.0125 MHz

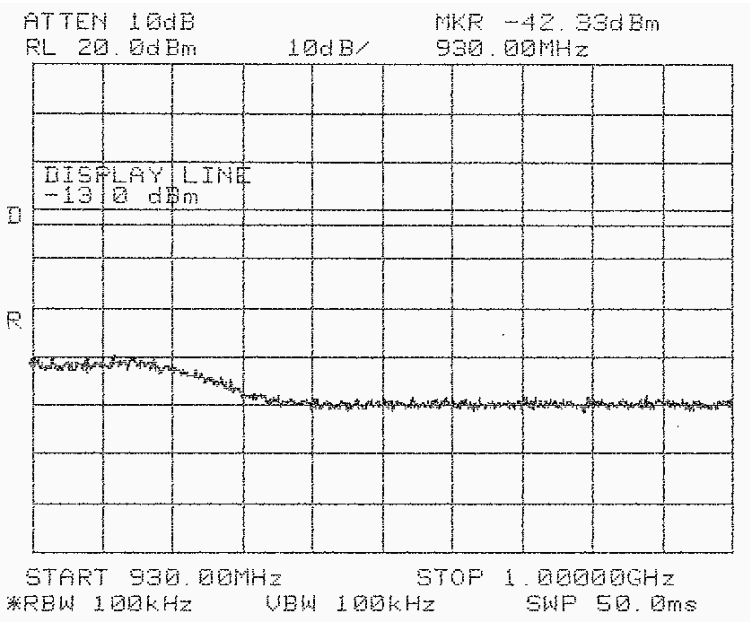

Figure 78.— 929.0125 MHz

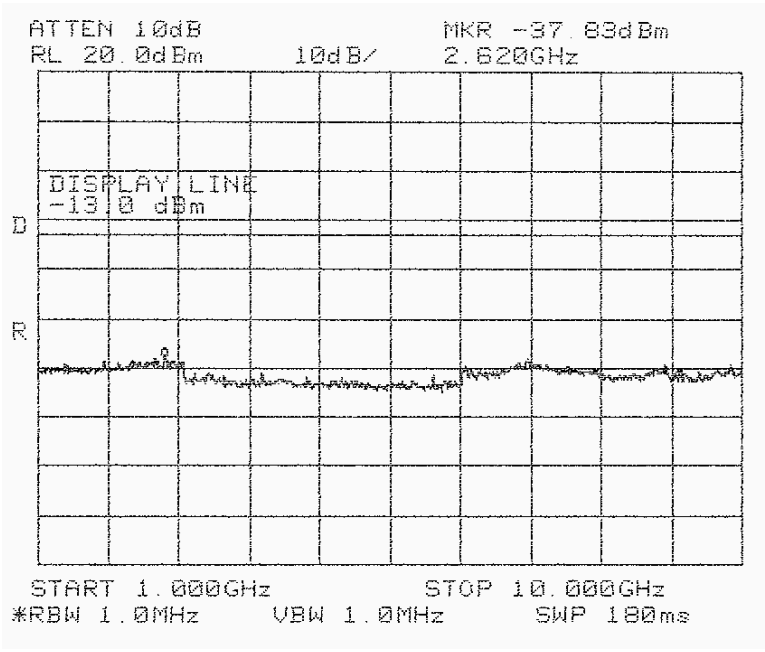

Figure 79.— 929.0125 MHz

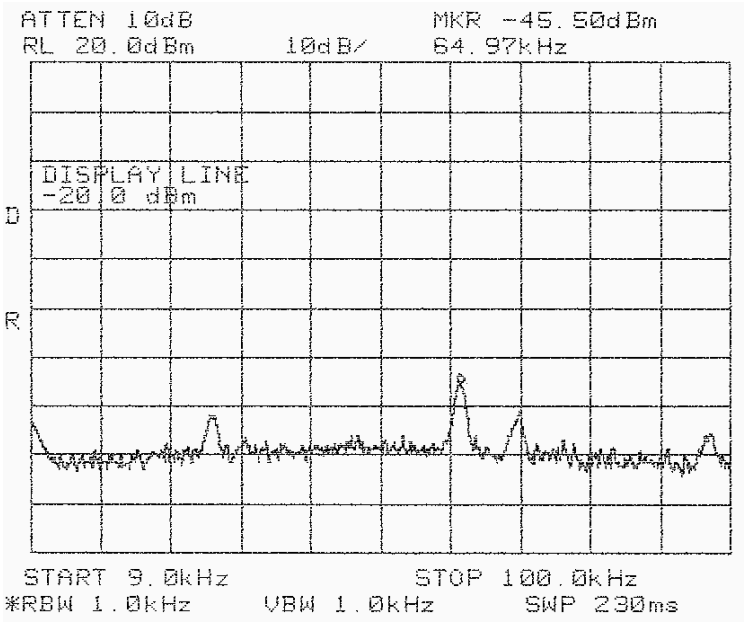

Figure 80.— 935.00 MHz

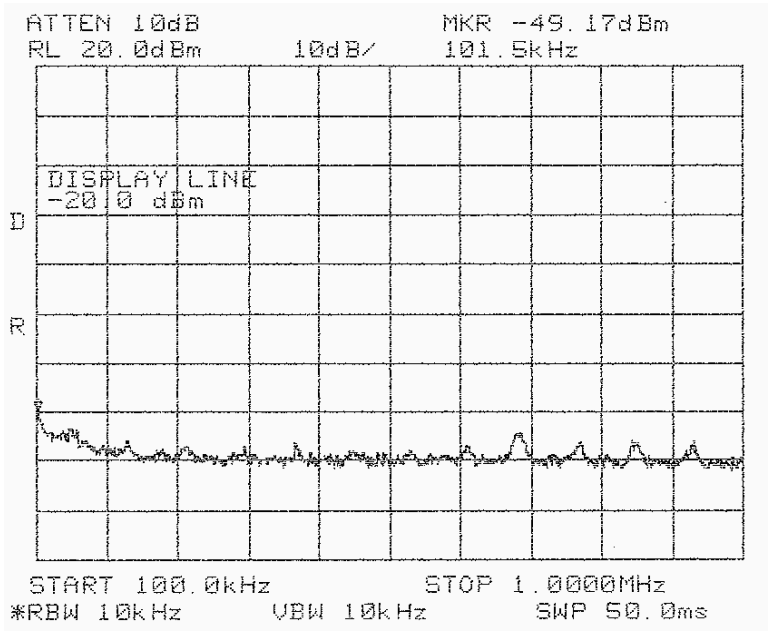

Figure 81.— 935.00 MHz

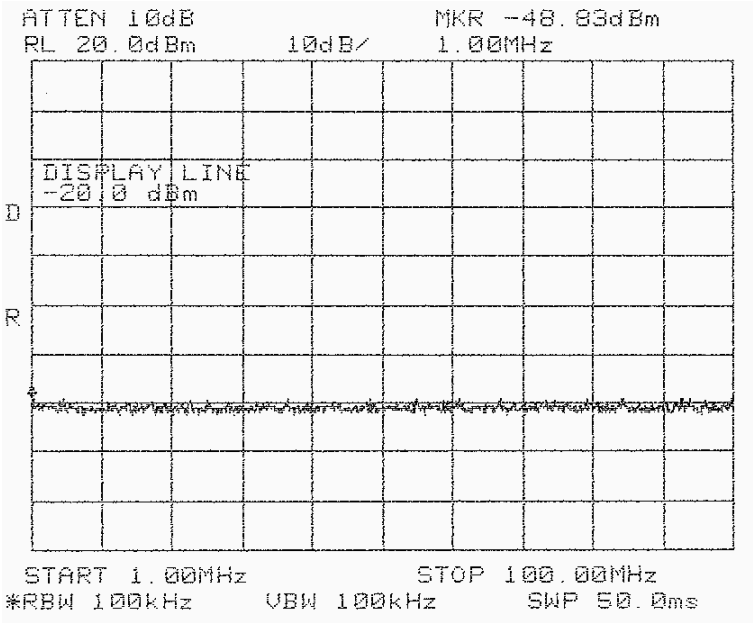

Figure 82.— 935.00 MHz

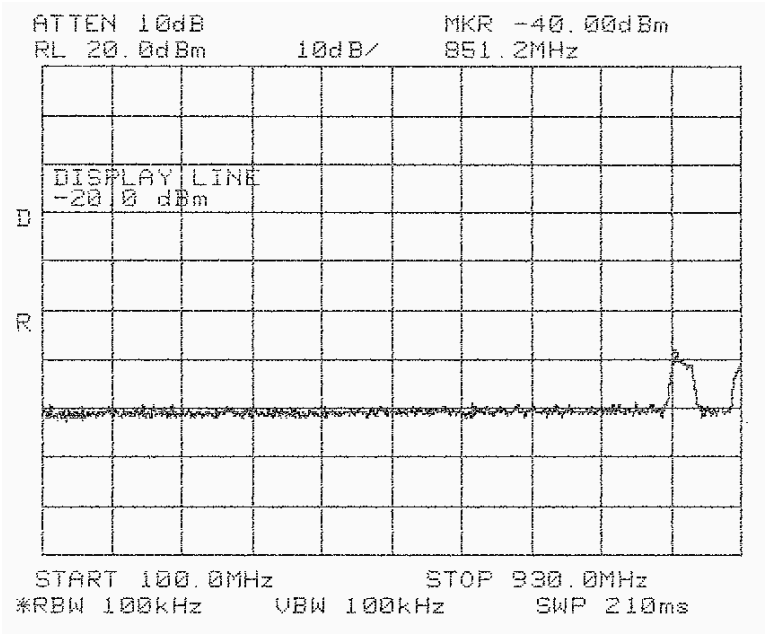

Figure 83.— 935.00 MHz

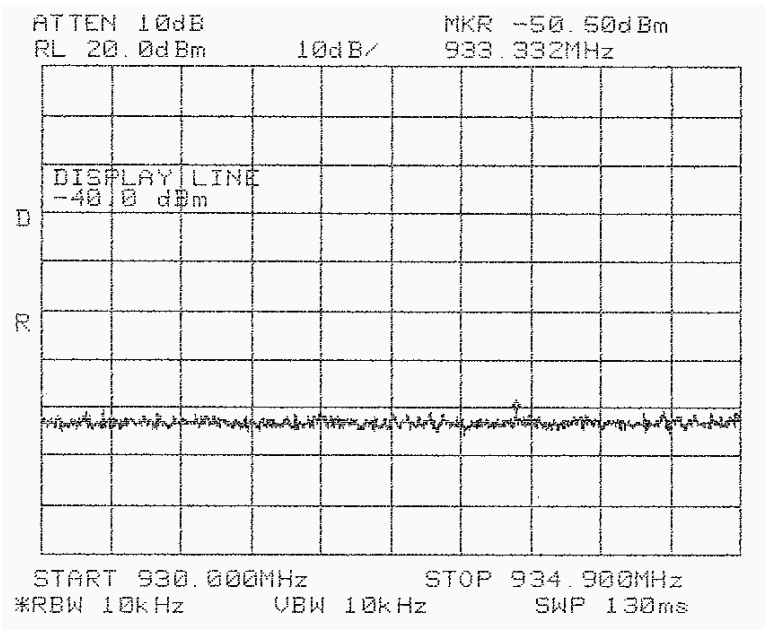

Figure 84.— 935.00 MHz

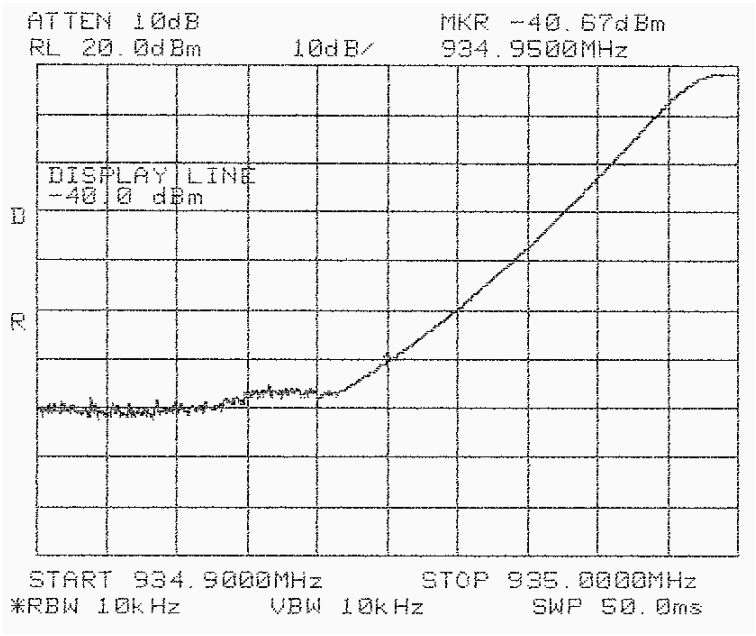

Figure 85.— 935.00 MHz

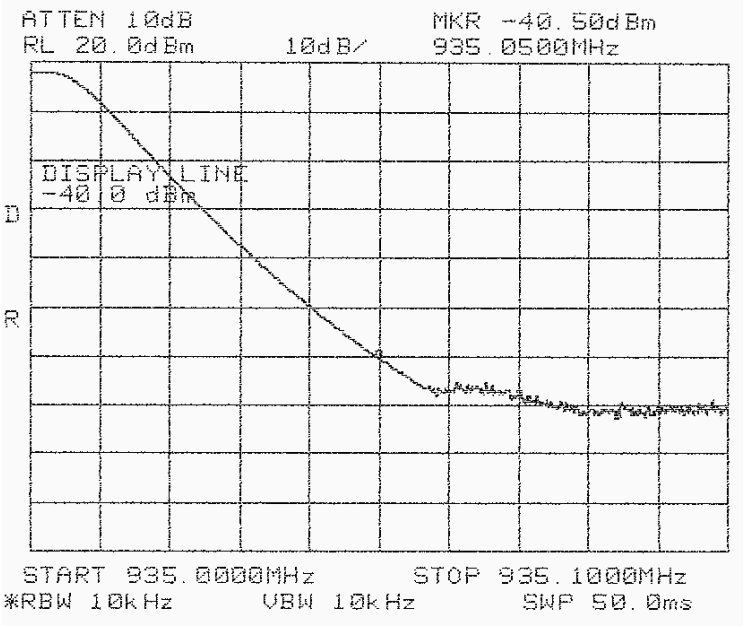

Figure 86.— 935.00 MHz

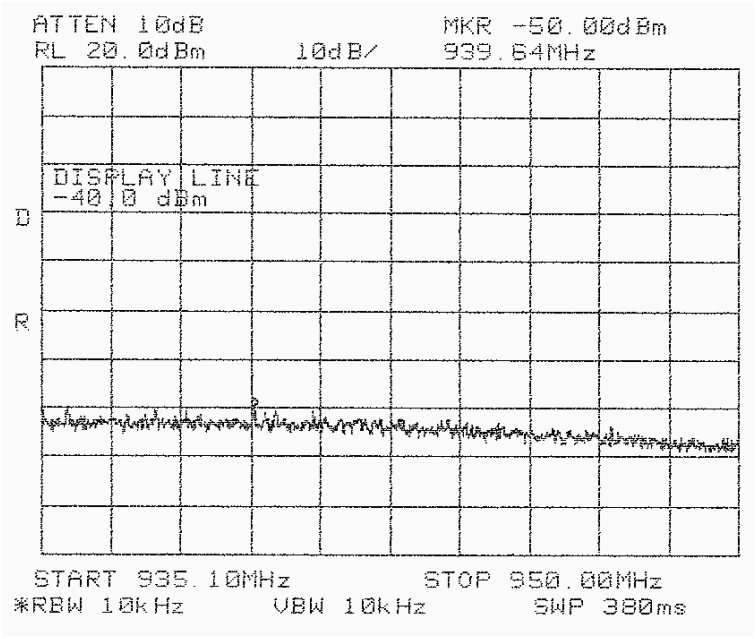

Figure 87.— 935.00 MHz

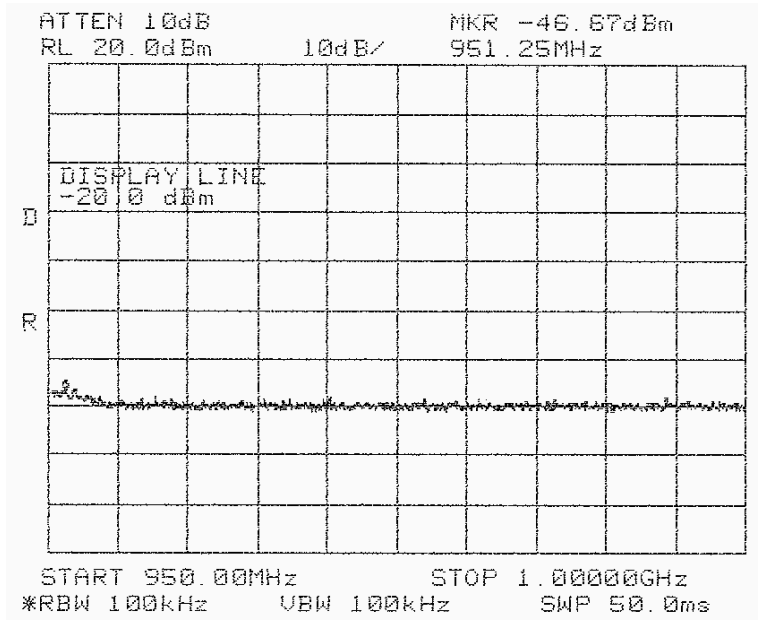

Figure 88.— 935.00 MHz

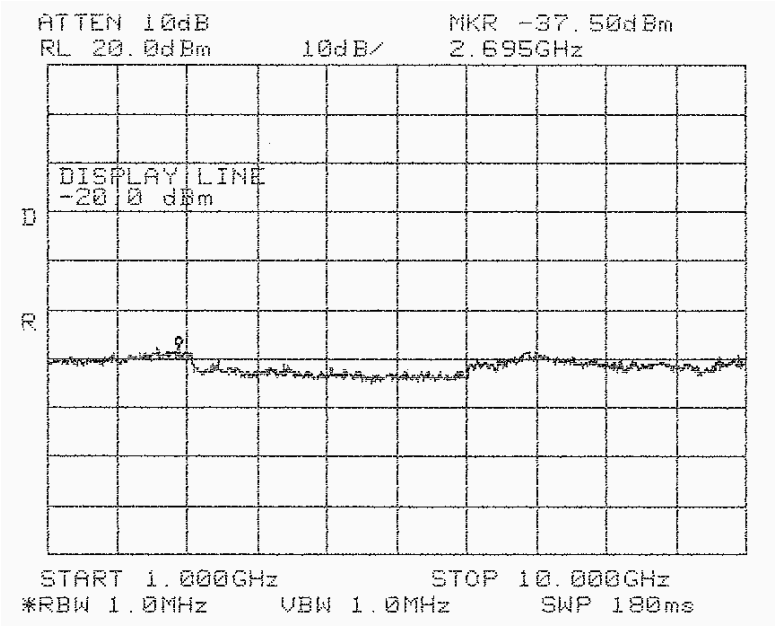

Figure 89.— 935.00 MHz

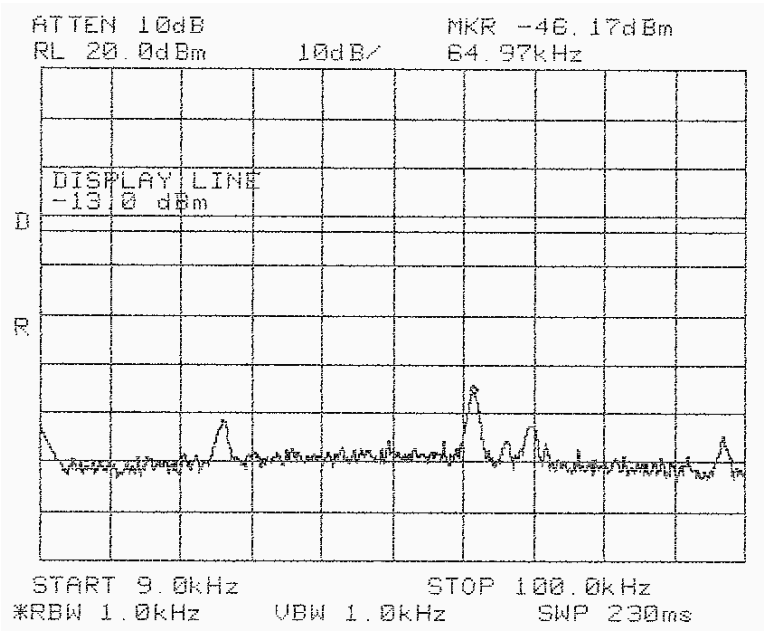

Figure 90.— 940.0875 MHz

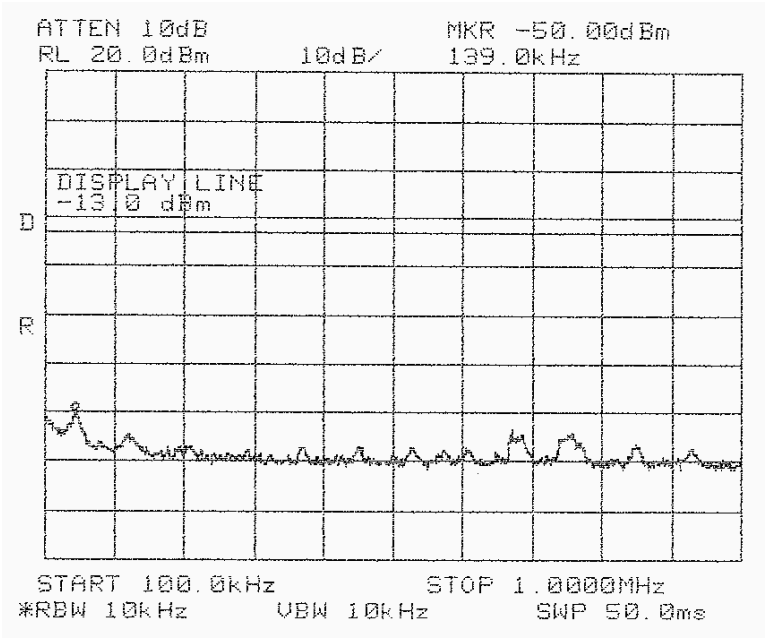

Figure 91.— 940.0875 MHz

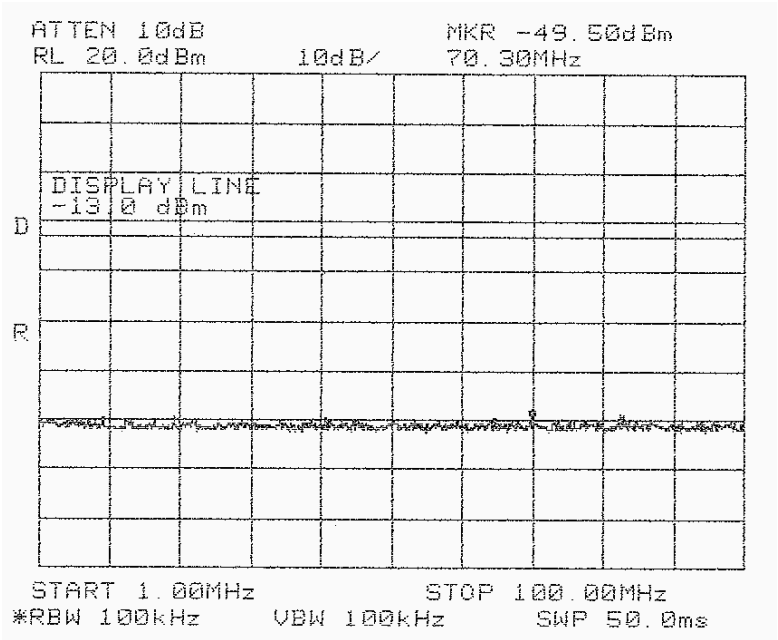

Figure 92.— 940.0875 MHz

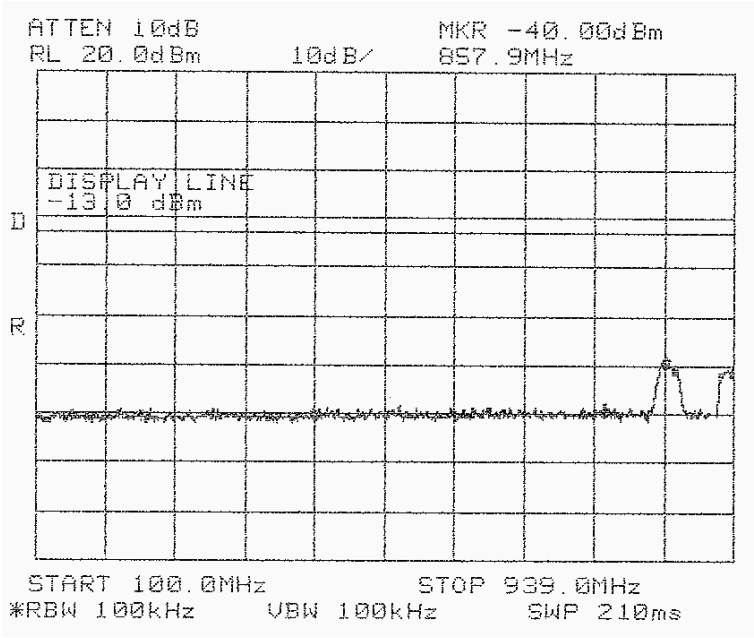

Figure 93.— 940.0875 MHz

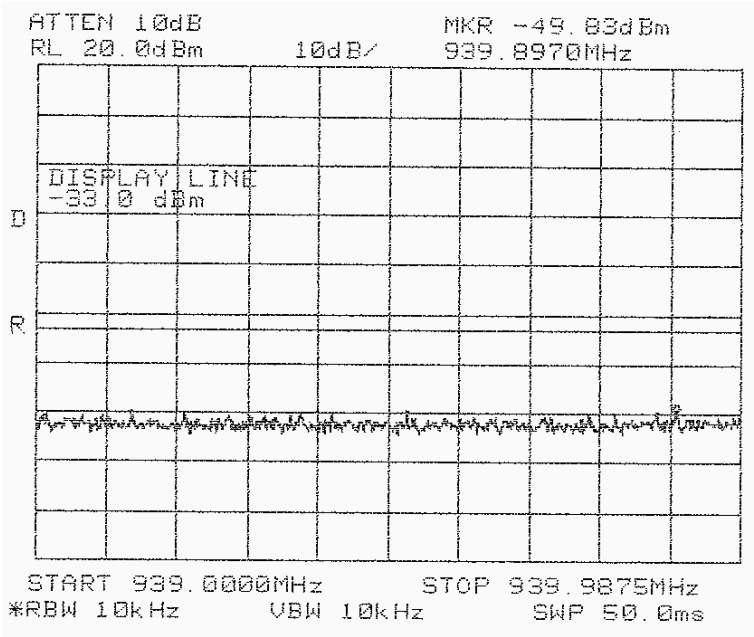

Figure 94.— 940.0875 MHz

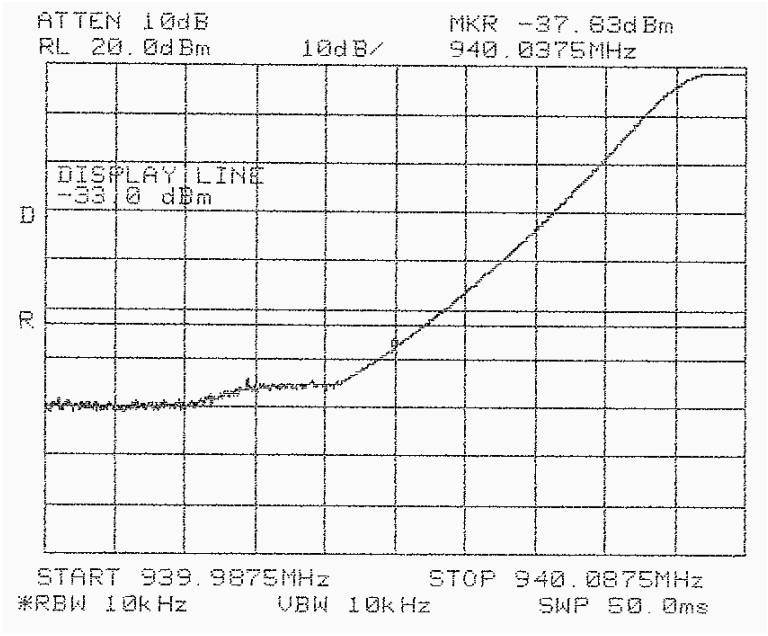

Figure 95.— 940.0875 MHz

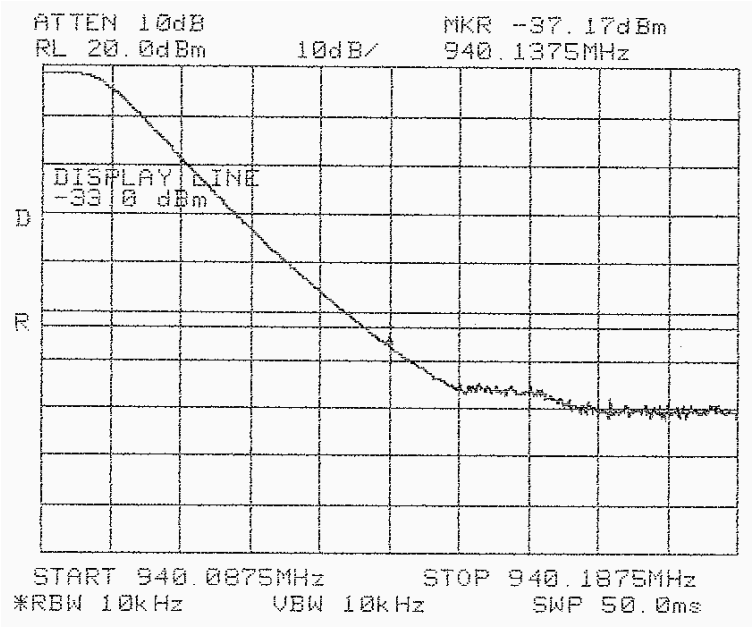

Figure 96.— 940.0875 MHz

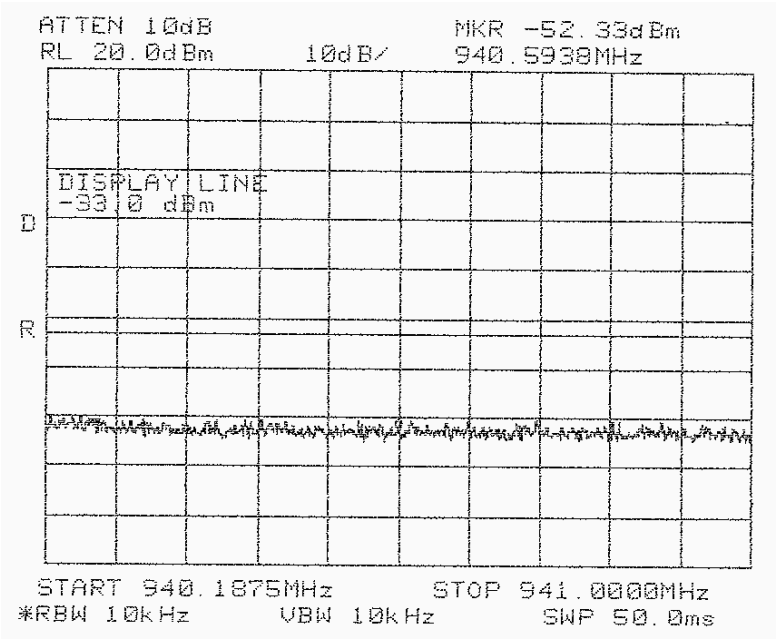

Figure 97.— 940.0875 MHz

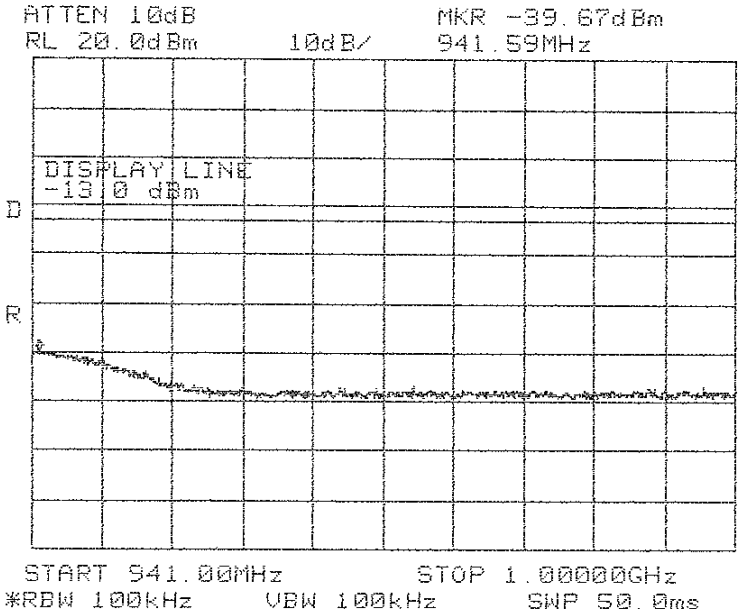

Figure 98.— 940.0875 MHz

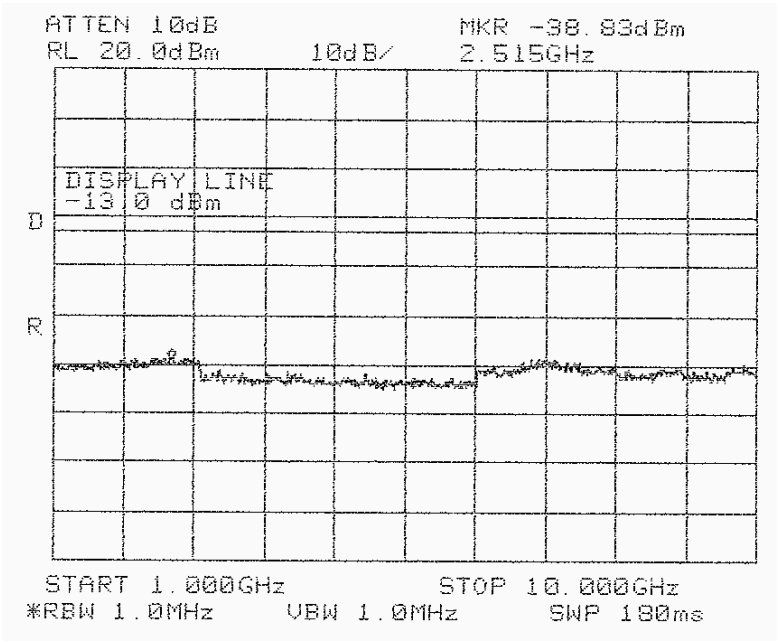

Figure 99.— 940.0875 MHz

13.3 Results table

E.U.T. Description: RF Booster
Model No.: 1000-iDEN-SMR4E
Serial Number: Not Designated
Specification: FCC Part 90, Section 210

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
929.0125	-37.83	-33.0	-4.83
935.00	-40.50	-40.0	-0.5
940.0875	-37.17	-33.0	-4.17

Figure 100 Out of Band Emission Results

JUDGEMENT: Passed by 0.5 dB

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

13.4 Test Equipment Used.

Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	21 November 2006	1 year
Signal Generator	HP	E4432B	GB38450502	10 April 2006	1 year
Power Supply	Horizon Electronics	DHR 3653D-1.0	TE1232	N/A	1 year
Cable	RHOPHASE	KPS-1500	A1675	16 December 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0050	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0202	21 November 2006	1 year
Attenuator	Macom	M3933/24-74N	4106-0211	21 November 2006	1 year

Figure 101 Test Equipment Used

14. Out of Band Emissions (Radiated) (SMR)

14.1 Test Specification

FCC, Part 90, Section 90.210

14.2 Test Procedure

The power of any emission outside of the authorized operating frequency ranges (851-869 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in Figure 3.5.
The frequency range 30 MHz-10 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(c) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
$P(dBm) = P_g(dBm) – Cable\ Loss\ (dB) + Substitution\ Antenna\ Gain\ (dBi)$
P = Equivalent Isotropic Radiated Power.
P_g = Signal Generator Output Level.

14.3 Test Data

JUDGEMENT: Passed

The E.U.T met the requirements of the FCC, Part 90, Section 90.210 specifications.

The signals in the band 30 MHz – 10 GHz were below the spectrum analyzer noise level which is at least 20dB below the specification limit.

TEST PERSONNEL:

Tester Signature: _____ Date: 25.02.07

Typed/Printed Name: E. Pitt

14.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 22, 2006	1 year
RF Section	HP	85420E	3705A00248	November 22, 2006	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 30, 2006	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 16, 2006	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 04, 2005	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 year
Horn Antenna	ARA	SWH-28	1007	December 8, 2006	2 year
Horn Antenna	Narda	V637	0410	December 8, 2006	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	October 16, 2005	1 year
Spectrum Analyzer	HP	8592L	3926A01204	November 21, 2006	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	LaserJet 2200		N/A	N/A

15. Radiated Emission Per FCC Part 15 Sub-Part B Test Data

15.1 Test Specification

30-2000 MHz, FCC Part 15, Subpart B, CLASS A

15.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 4.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in *Figure 1. Tests Set-up*.

The E.U.T. highest frequency source or used frequency is 400 MHz.

The frequency range 30-2000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.
Using a frequency span less than 10 MHz.
Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

The emissions were measured at a distance of 3 meters.

15.3 Test Data

JUDGEMENT: Passed by 10.4 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart B, specification.

In the band 1.0 – 2.0 GHz, the emission levels were more than 20 dB below the specification limit.

The details of the highest emissions are given in *Figure 102* to *Figure 105*.

Radiated Emission

E.U.T Description	RF Booster
Type	1000-iDEN-SMR4E
Serial Number:	Not Designated

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Avg dBuV/m	Av Delta L 2 (dB)	Corr (dB)
1	66.822411	26.1	19.8	-20.2			9.9
2	138.700000	26.8	24.3	-19.2			14.0
3	170.700000	20.4	15.0	-28.5			15.2
4	214.950000	25.4	20.4	-23.1			18.0
5	398.147000	24.7	20.0	-26.0			19.0
6	728.242488	33.3	31.4	-14.6			25.0

Figure 102. Radiated Emission. Antenna Polarization: HORIZONTAL. Detectors: Peak, Quasi-peak

Note: QP Delta refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	RF Booster
Type	1000-iDEN-SMR4E
Serial Number:	Not Designated

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

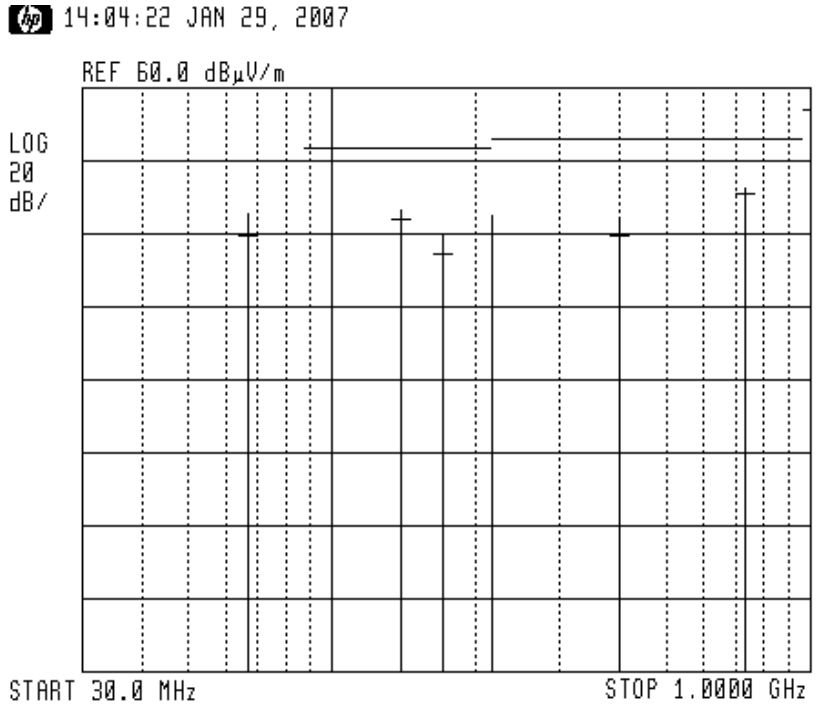

Figure 103. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description RF Booster
Type 1000-iDEN-SMR4E
Serial Number: Not Designated

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Vertical
Antenna: 3 meters distance
Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Signal Number	Frequency (MHz)	Peak dBuV/m	QP dBuV/m	QP Delta L 1 (dB)	Avg dBuV/m	Av Delta L 2 (dB)	Corr (dB)
1	66.828554	26.6	21.3	-18.7			9.9
2	221.847214	29.5	26.4	-19.6			18.4
3	398.147374	34.2	31.4	-14.6			19.0
4	420.264420	34.4	31.8	-14.2			19.4
5	442.385242	33.2	30.1	-15.9			19.6
6	728.251823	38.7	35.6	-10.4			25.0

Figure 104. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	RF Booster
Type	1000-iDEN-SMR4E
Serial Number:	Not Designated

Specification: FCC Part 15, Subpart B, Class A

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

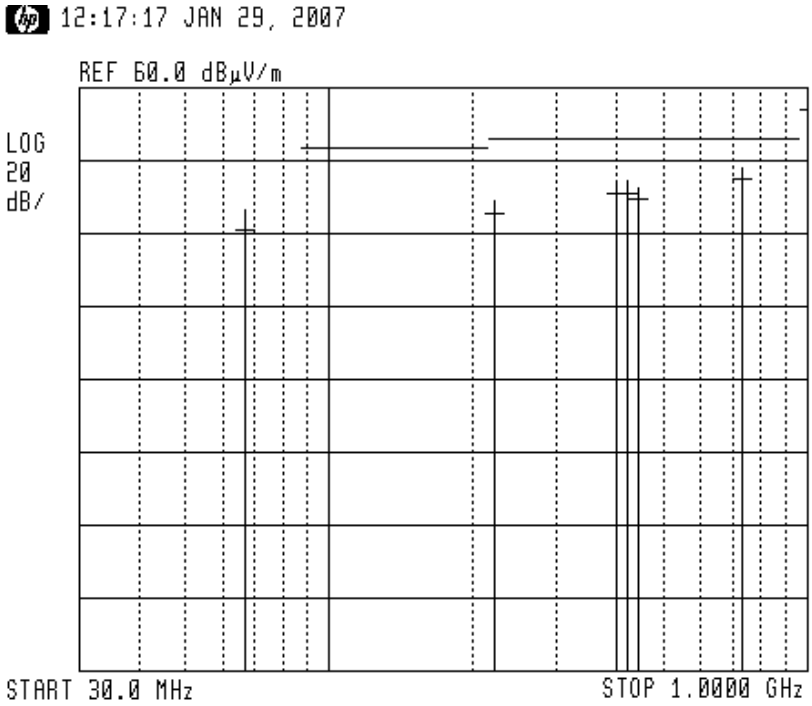

Figure 105. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

15.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	November 22, 2006	1 year
RF Section	HP	85420E	3705A00248	November 22, 2006	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 30, 2006	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	February 04, 2005	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A

15.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

16. APPENDIX A - CORRECTION FACTORS

16.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

16.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

12.6 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

12.7 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. *Antenna serial number is 253.*
2. *The above lists are located in file number SAS3M0.ANT for a 3 meter range.*
3. *The files mentioned above are located on the disk marked "Antenna Factors".*

16.8 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

17. Appendix B Correspondence With Timco

Date: 31.01.2007

To: EMC

Subject: RE: Permissive Change Class II for 2000-CEL-PCSE and 1000-IDEN-SMR- Mobile Access

Hi Shaike,

1. Ok

2. Ok

3.

3.1 Ok

3.2 Ok

4. It appears that you test plan is appropriate for the class permissive changes.

Regards,

Bruno

-----Original Message-----
From: Emc [mailto:emc@itl.co.il]
Sent: Tuesday, January 30, 2007 1:59 AM
To: Bruno Clavier
Subject: Permissive Change Class II for 2000-CEL-PCSE and 1000-IDEN-SMR- Mobile Access

Hi Bruno,

1. In addittion to the current submitted applications for C2PC for the 1000-CELL-PCS4E and 1200-PCS-AO, there are two additional products also having FCC ID # as follows:
   2000-CELL-PCSE: FCC ID OJFMA1K-CELL-PCSE
   1000D-IDEN-SMR: FCC ID OJFMA1K-IDEN-SMR
for which we also would like C2PC.
2.The changes in the two additional products are:
   2.1. For the 2000-CELL- PCSE:
      Using WCDMA modulation instead of CDMA modulation
      PCB has been flattened.
      Output power, amplifiers and optics are the same (relocated). Front end hasn't changed.
      Reduced 2 coaxial cables.
      Reduced power detectors
   2.2. For the 1000D-IDEN-SMR:
      PCB has been flattened.
      New PA (power output hasn't change, doesn't affect Up Link).
      DC converters (partially).

3. The tests that we plan to perform are:

3.1. For the 2000-CELL-PCSE:

Peak Output Power
Occupied Bandwidth
Band Edges
Out of Band at antenna Terminal
Radiated emission per FCC Part 15 Sub-part B

3.2. For the 1000D-IDEN-SMR:

Peak Output Power
Occupied Bandwidth
Emission Mask
Spurious emission at antenna terminal/ radiated spurious
Radiated emission per FCC Part 15 Sub-part B

4. Please verify/comment

Regards

Shaike Raz
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