

DATE: 11 August 2008

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

FCC Radio Test Report

for

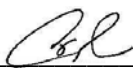
Mobile Access Networks

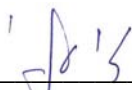
Equipment under test:

**Mobile Telephone In-Building
Distribution System**

1000-SMR-PCSE

Written by: 
D. Shidlow, Documentation

Approved by: 
A. Sharabi, Test Engineer

Approved by: 
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

Measurement/Technical Report for
Mobile Access Networks
Mobile Telephone In-Building Distribution System

1000-SMR-PCSE

FCC ID:OJFMA1K-SMR-PCS

11 August 2008

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

Equipment type: PCS Licensed Transmitter

Limits used:
47CFR Parts 2; 24; 90

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

Application for Certification prepared by:	Applicant for this device: (different from "prepared by")
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1. General Information

1.1 Administrative Information

Manufacturer: Mobile Access Networks

Manufacturer's Address: 8391 Old Courthouse Rd.
Suite #300
Vienna, VA 22182
U.S.A.
Tel: +1-541-758-2880
Fax: +1-703-848-0260

Manufacturer's Representative: Steve Blum

Equipment Under Test (E.U.T): Mobile Telephone In-Building
Distribution System

Equipment Model No.: 1000-SMR-PCSE

Equipment Serial No.: 0821635

Date of Receipt of E.U.T: 30.06.08

Start of Test: 30.06.08

End of Test: 08.07.08

Test Laboratory Location: I.T.L (Product Testing) Ltd.
Kfar Bin Nun,
ISRAEL 99780

Test Specifications: FCC Part 24
FCC Part 90

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**

The Wireless Network System provides coverage by routing RF signals from BTS (base transmit station) units, through optic fibers to remote areas where the signals are converted back to RF and interfaced to antennas covering the remote area. All system elements can be remotely controlled and monitored from a single location.

The system consists of the following elements:

Radio Interface Unit (RIU) – Provides interface up to BTS units. Connections can be simplex or duplex. RIU contain three slots in which BTS Conditioner (BTSC) and/or BDA Conditioner (BDAC) modules can be inserted in any combination. RIU output signal is automatically adjusted to respond to a range of BTS output power levels. This significantly reduces or eliminates the need for extensive manual site measurements and adjustments required to provide the optimal input to the Base Unit.

Radio Interface Unit Lite (RIU Lite) – A compact version of RIU, contain internal fixed BTS/BDA Conditioner.

Base Unit (BU) – Convert the RF signal received from the RIU to an optic signal that is then split and routed via optic fiber to Remote Hub Units located in remote locations.

Remote Hub Units (RHUs) – Convert the optic signal to an RF signal and feeds it to the antennas in the remote areas in order to provide the required coverage. The RHU provides coax connections to up to four antennas. The RHU filters and amplifiers the optic signal received from the BU according to the service it supports.

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 December 12, 2003). 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. System Test Configuration

2.1 *Justification*

This unit was originally authorized under FCC ID: OJFMA1000.

Due to the change of the power amplifiers from those manufactured by Raytone to amplifiers, 1 manufactured by Anadigics and the other manufactured by RF Micro Devices, Inc in order to allow 20 dBm transmission power and a change of the DC/DC converter for the new power amplifiers, the following tests were performed:

- Peak Output Power (PCS CDMA; PCS GSM)
- Occupied Bandwidth (PCS CDMA; PCS GSM)
- Out of Band Emissions at Antenna Terminals (PCS CDMA; PCS GSM)
- Band Edge Spectrum (PCS CDMA; PCS GSM)
- Spurious Radiated Emissions (PCS CDMA)
- Peak Output Power (SMR)
- Occupied Bandwidth (SMR)
- Emission Mask (SMR)
- Out of Band Emissions at Antenna Terminals (SMR)
- Out of Band Emissions (Radiated) (SMR)

2.2 *EUT Exercise Software*

See details in original application.

2.3 *Special Accessories*

No special accessories were needed in order to achieve compliance.

2.4 *Equipment Modifications*

See details in original application.

2.5 Configuration of Tested System

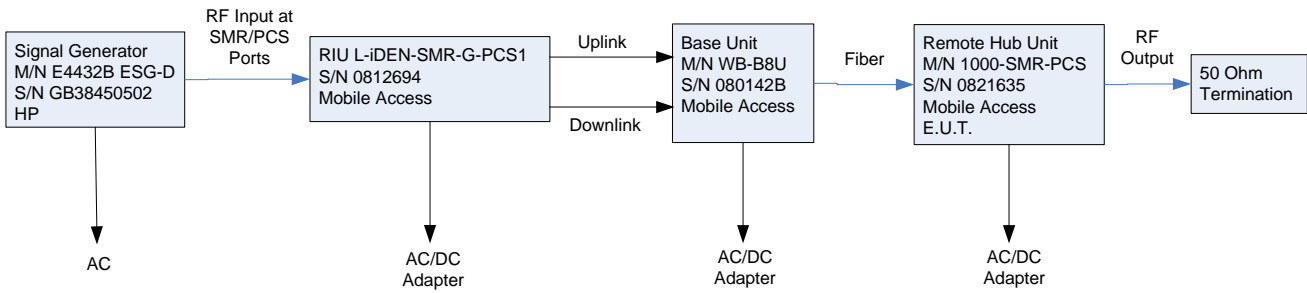


Figure 1. Radiated Tests Set-up

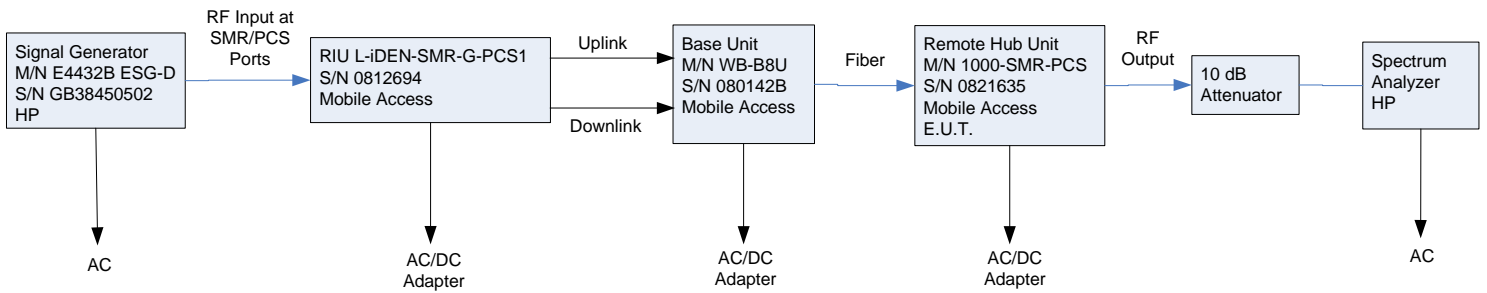


Figure 2. Conducted Tests Set-up

3. Peak Output Power (PCS CDMA)

3.1 Test Specification

FCC Part 24, Sub-part E Section 232; Part 2 Section 1046

3.2 Test procedure

Peak Power Output must not exceed 100 Watts (50dBm)

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (10 dB) and an appropriate coaxial cable (1 dB). The E.U.T. RF output was **CDMA** modulated. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 2.0 MHz RBW. The output power level was measured at 1932.50, 1960.00, and 1987.50 MHz.

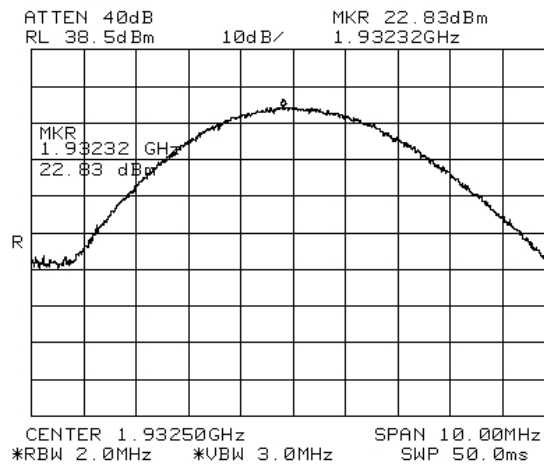


Figure 3.— 1932.50 MHz

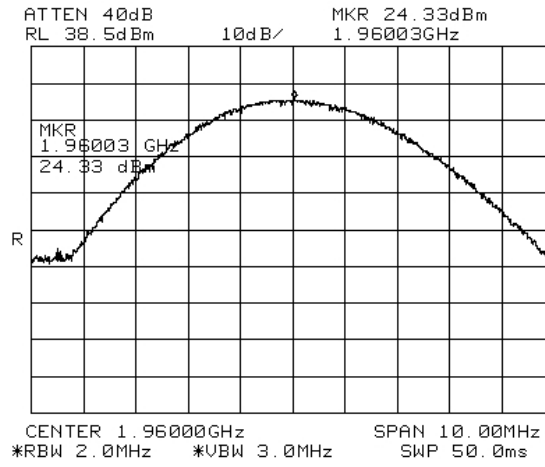


Figure 4.— 1960.00 MHz

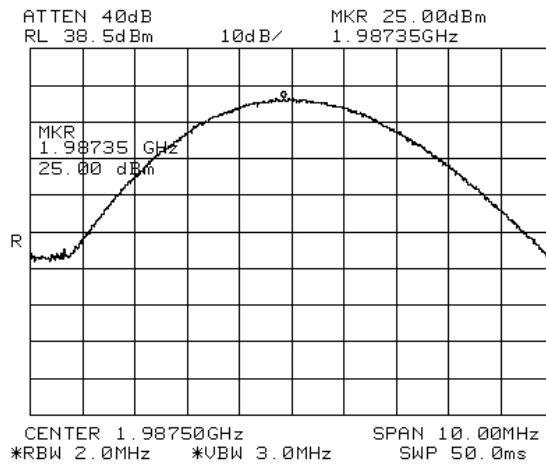


Figure 5.— 1987.50 MHz

3.3 Results table

E.U.T. Description: Mobile Telephone In-Building Distribution System

Model No.: 1000-SMR-PCSE

Serial Number: 0821635

Specification: FCC Part 24, Sub-part E, Section 232, FCC Part 2, Section 1046

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
1932.50	22.83	50.0	-27.17
1960.00	24.33	50.0	-25.67
1987.50	25.00	50.0	-25.00

Figure 6 Peak Output Power

JUDGEMENT: Passed by 25.00 dB

TEST PERSONNEL:

Tester Signature: 

Date: 11.08.08

Typed/Printed Name: A. Sharabi

3.4 Test Equipment Used.

Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	November 14, 2007	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 7 Test Equipment Used

4. Occupied Bandwidth (PCS CDMA)

4.1 Test Specification

FCC Part 2, Section 1049

4.2 Test Procedure

The E.U.T. was set to the applicable test frequency with CDMA modulation. 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 100 kHz 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 point 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.

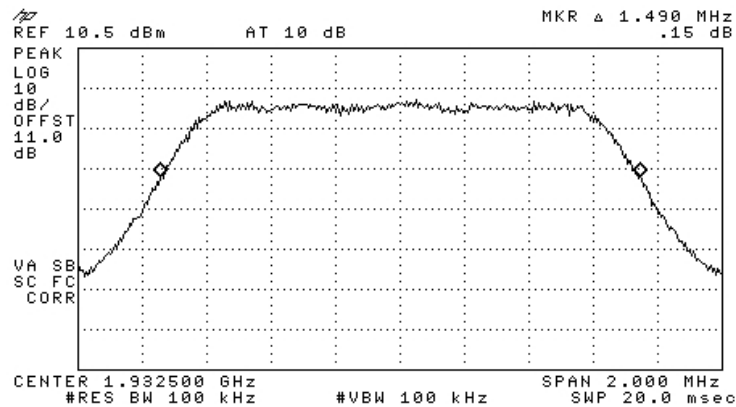


Figure 8.— Input 1932.50 MHz

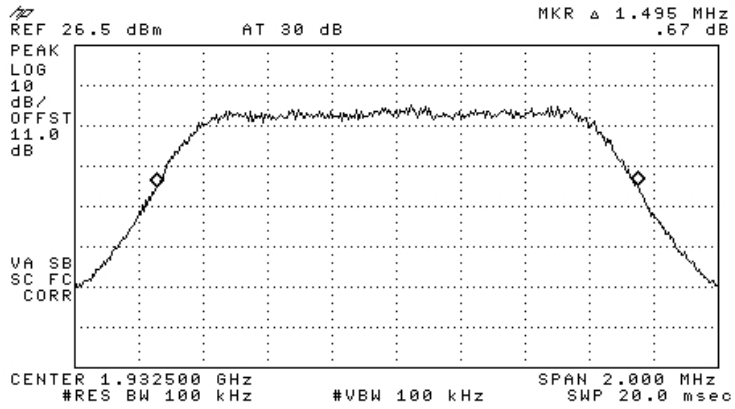


Figure 9.— Output 1932.50 MHz

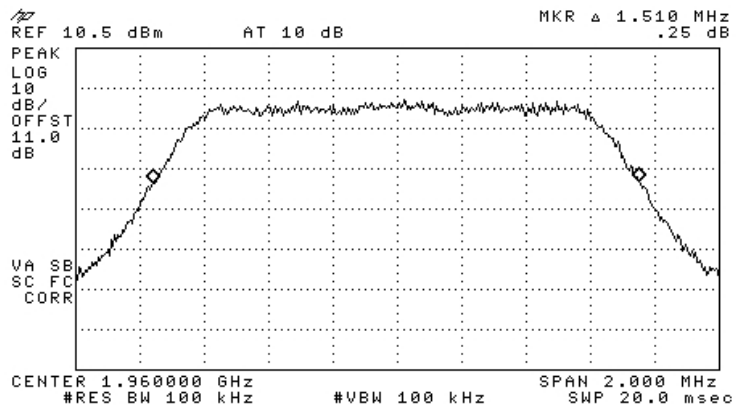


Figure 10.— Input 1960.00 MHz

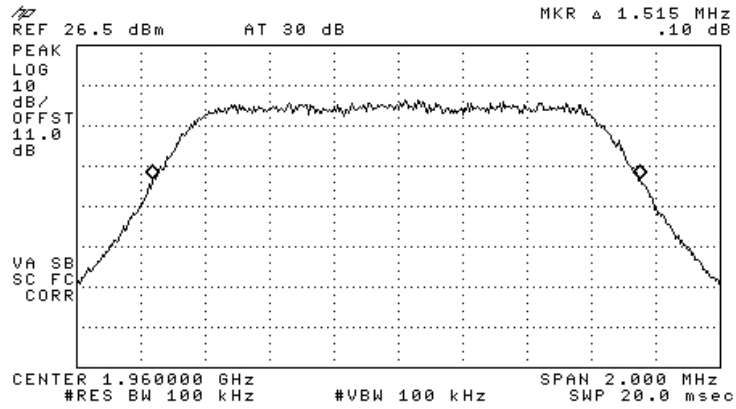


Figure 11.— Output 1960.00 MHz

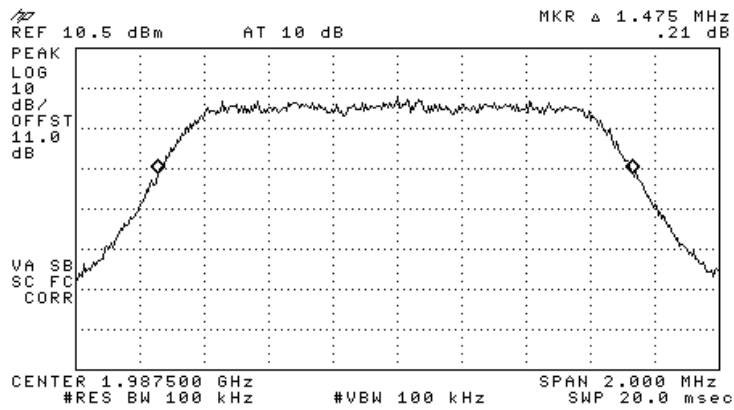


Figure 12.— Input 1987.50 MHz

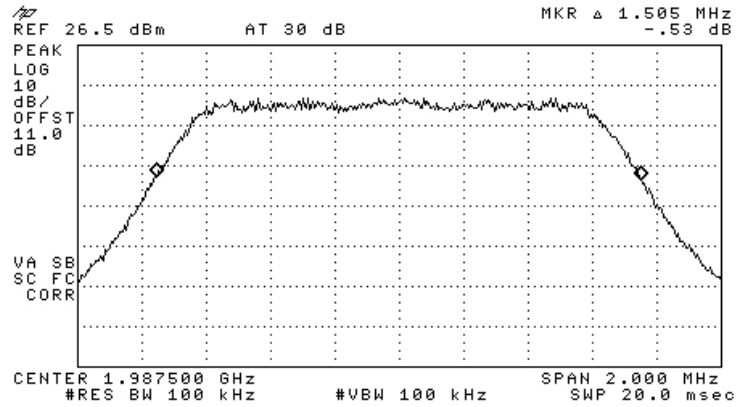


Figure 13.— Output 1987.50 MHz

4.3 Results Table

E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 2, Section 1049

	Operating Frequency	Reading (MHz)
Input	1932.50	1.490
Output	1932.50	1.495
Input	1960.00	1.510
Output	1960.00	1.515
Input	1987.50	1.475
Output	1987.50	1.505

Figure 14 Occupied Bandwidth

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

4.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 15 Test Equipment Used

5. Out of Band Emissions at Antenna Terminals (PCS CDMA)

5.1 Test Specification

FCC Part 24, Sub-part E, Section 238; FCC Part 2.1051

5.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges (1930-1990 MHz) must be attenuated below the transmitting power (P) by a factor of at least $43 + \log(P)$ dB, yielding -13dBm .

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (11.0 dB).

The spectrum analyzer was set to 100 kHz R.B.W.

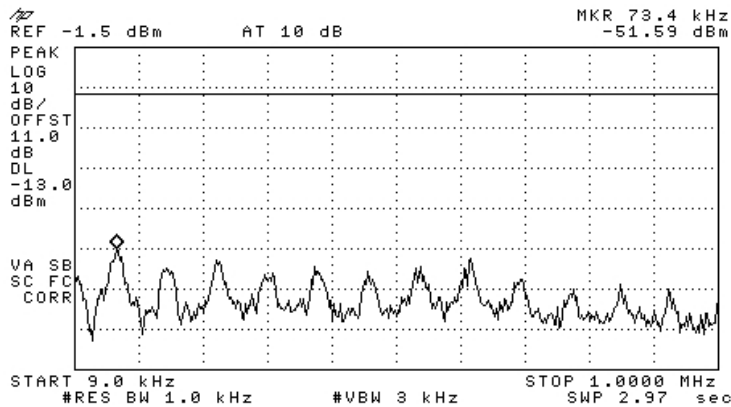


Figure 16.— 1932.50 MHz

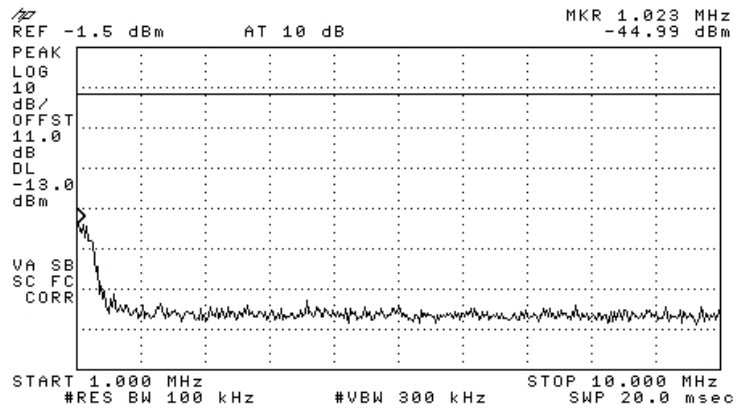


Figure 17.— 1932.50 MHz

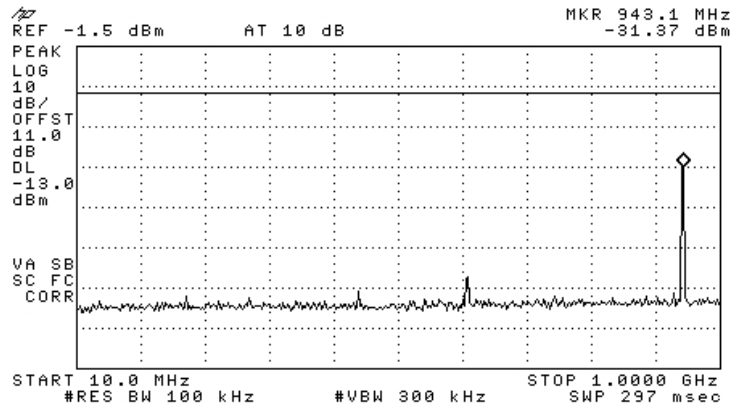


Figure 18.— 1932.50 MHz

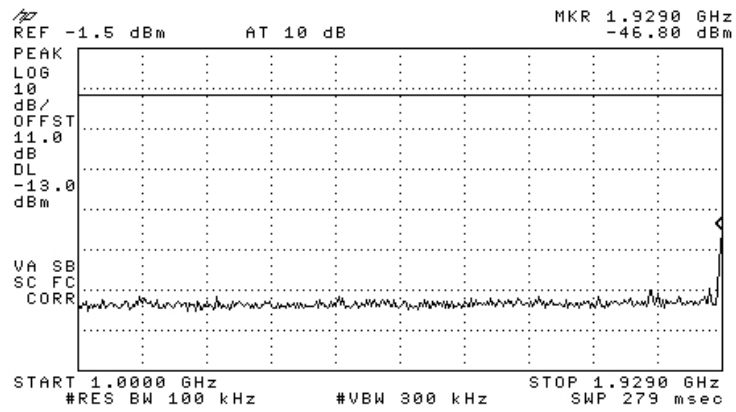


Figure 19.— 1932.50 MHz

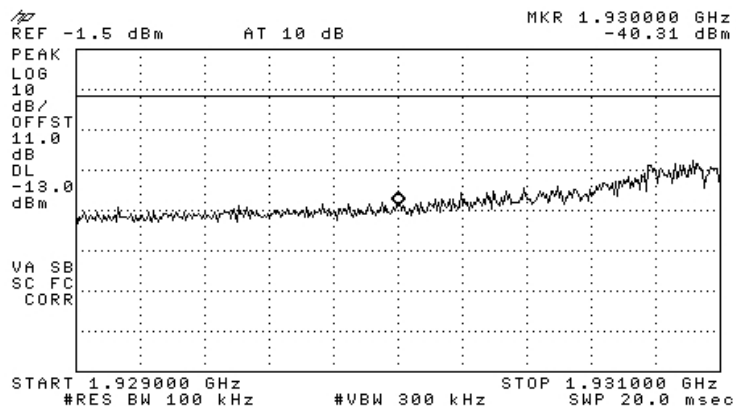


Figure 20.— 1932.50 MHz

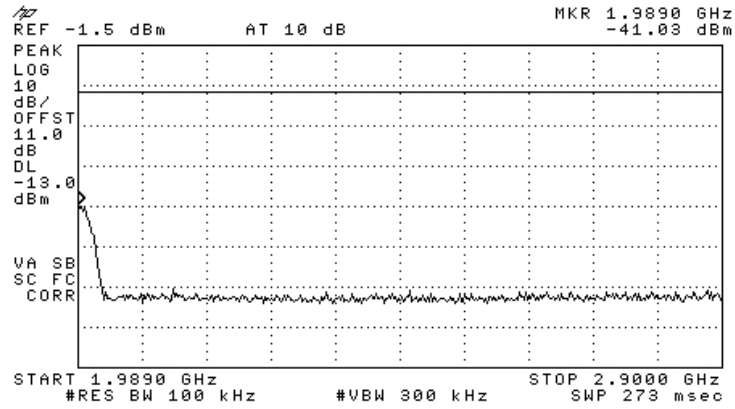


Figure 21.— 1932.50 MHz

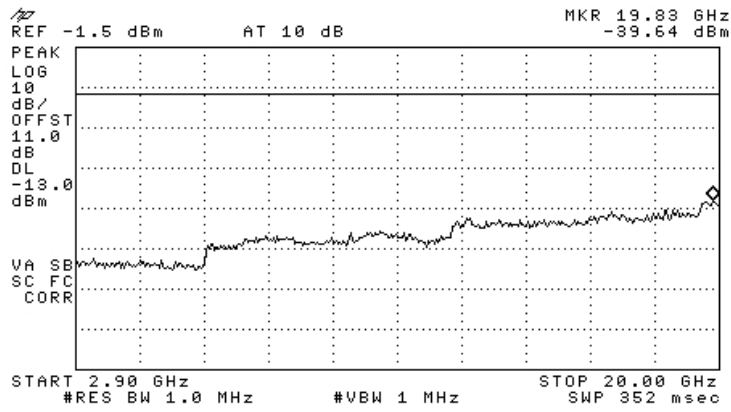


Figure 22.— 1932.50 MHz

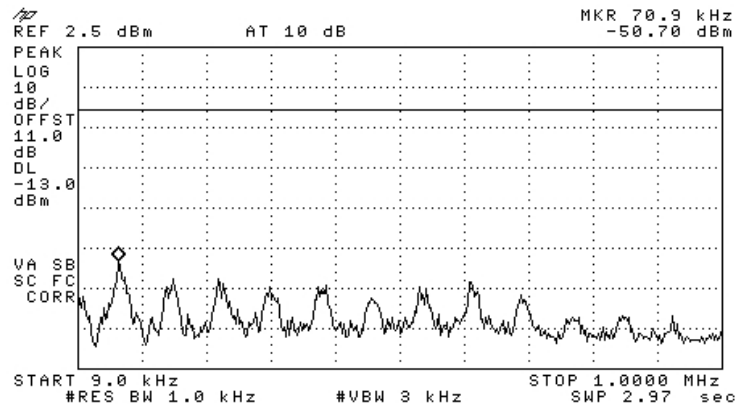


Figure 23.— 1960.00 MHz

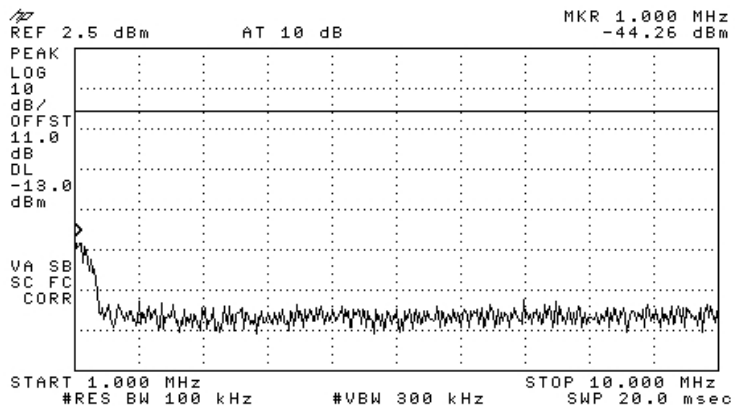


Figure 24.— 1960.00 MHz

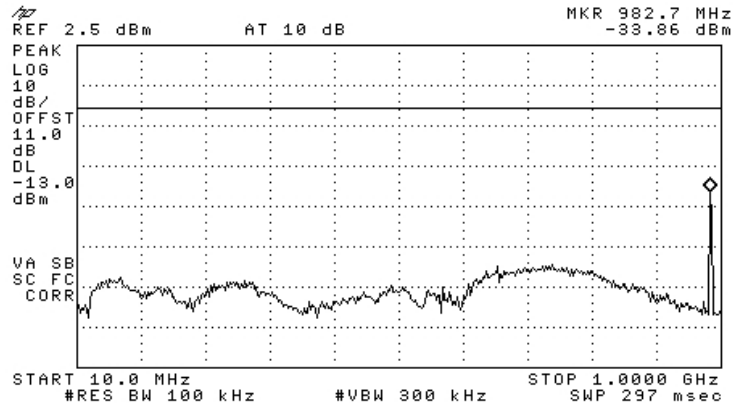


Figure 25.— 1960.00 MHz

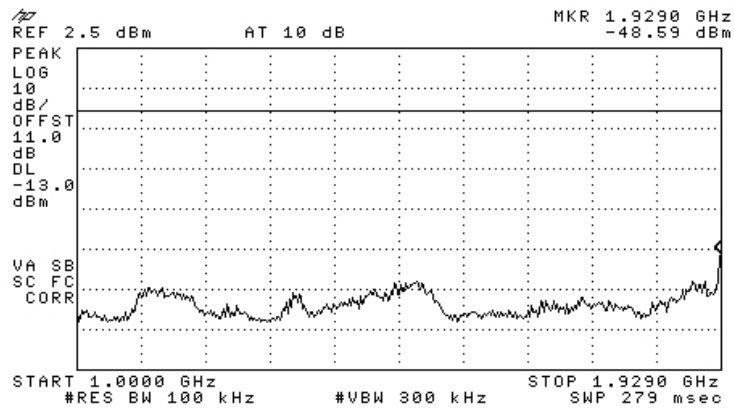


Figure 26.— 1960.00 MHz

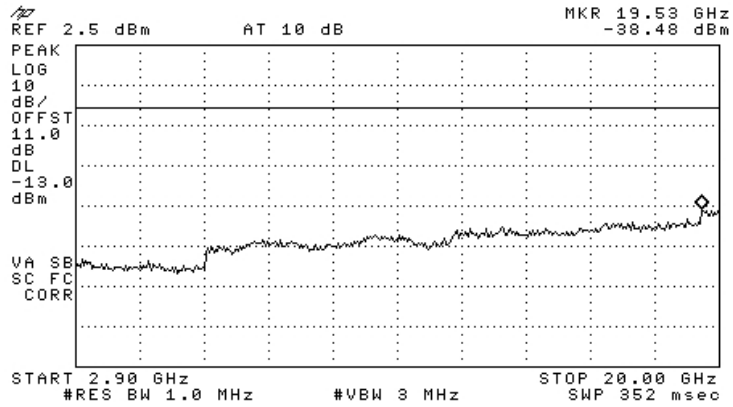


Figure 29.— 1960.00 MHz

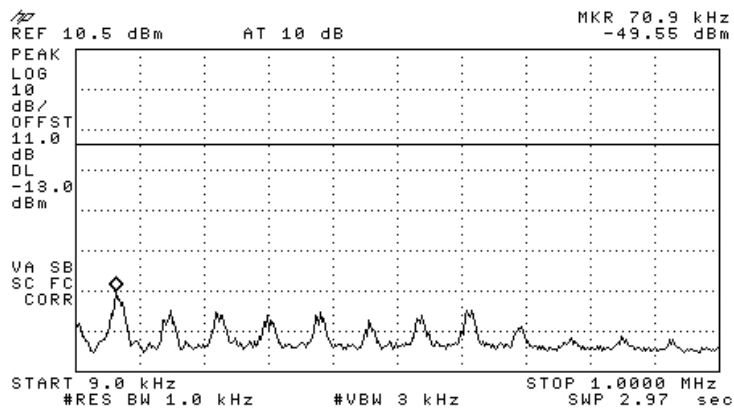


Figure 30.— 1987.50 MHz

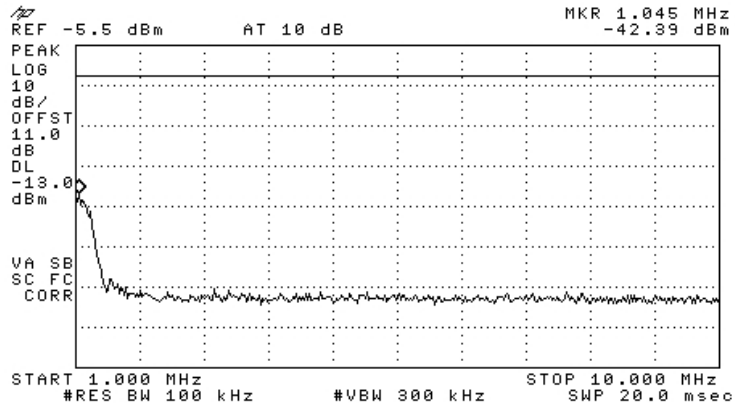


Figure 31.— 1987.50 MHz

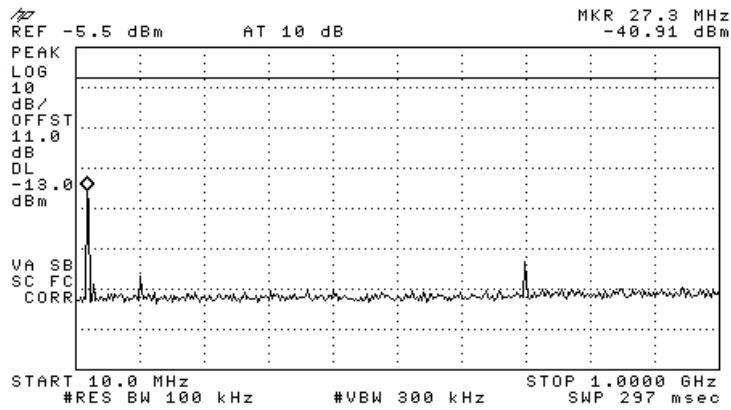


Figure 32.— 1987.50 MHz

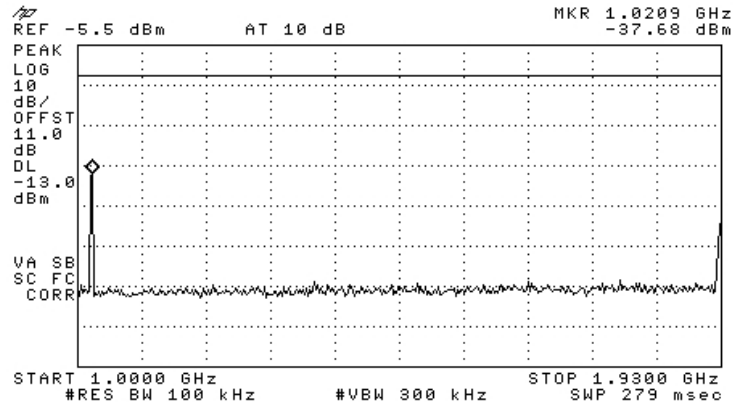


Figure 33.— 1987.50 MHz

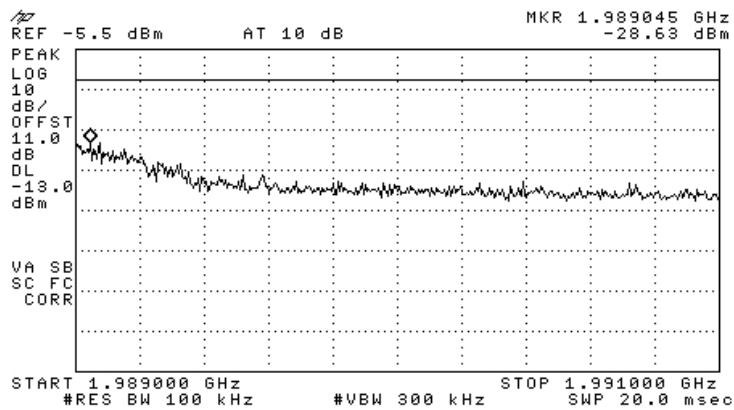


Figure 34.— 1987.50 MHz

5.3 Results table

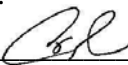
E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 24, Sub-part E, Section 238; Part 2 Section 1051

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
1932.50	-31.37	-13.0	-44.37
1960.00	-33.86	-13.0	-46.86
1987.50	-28.63	-13.0	-41.63

Figure 37 Out of Band Emission Results

JUDGEMENT: Passed by 41.63 dB

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

5.4 Test Equipment Used.

Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 38 Test Equipment Used

6. Band Edge Spectrum (PCS CDMA)

6.1 Test Specification

FCC Part 24, Sub-part E, Section 238; FCC Part 2.1051

6.2 Test procedure

Enclosed are spectrum analyzer plots for the lowest operation frequency (1932.5 MHz) and the highest operation frequency (1987.5MHz) in which the E.U.T. is planned to be used.

The power of any emission outside of the authorized operating frequency ranges (1930.0-1990.0 MHz) must be attenuated below the transmitting power (P) by a factor of at least $43 + \log(P)$ dB, yielding -13dBm.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (11.0 dB).

The spectrum analyzer was set to 100 kHz R.B.W.

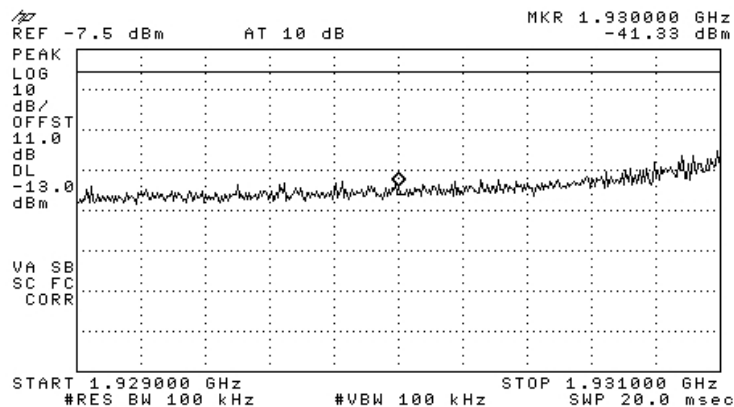


Figure 39.— 1932.50 MHz

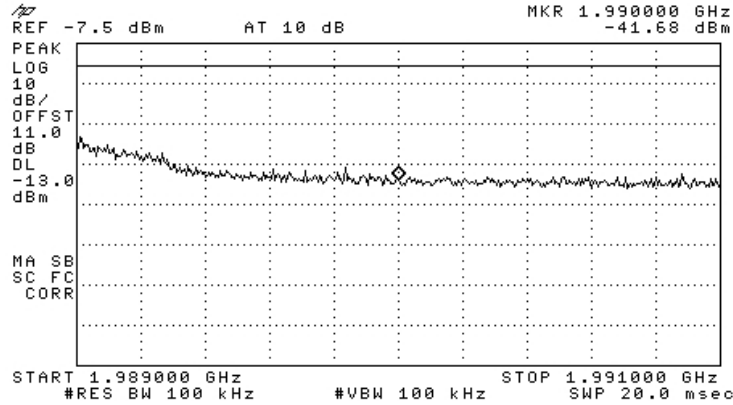


Figure 40.— 1987.50 MHz

6.3 Results table


E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 24, Sub-part E, Section 238; Part 2 Section 1051

Operation Frequency (MHz)	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
1932.50	1930.00	-41.33	-13.0	-28.33
1987.50	1990.00	-41.68	-13.0	-28.68

Figure 41 Band Edge Spectrum Results

JUDGEMENT: Passed by 28.33 dB

TEST PERSONNEL:

Tester Signature:  _____

Date: 24.07.08

Typed/Printed Name: A. Sharabi

6.4 Test Equipment Used.

Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 42 Test Equipment Used

7. Spurious Radiated Emission (PCS CDMA)

7.1 Test Specification

FCC, Part 24, Sub-part E Section 235, FCC Part 2.1053

7.2 Test Procedure

The test method was based on ANSI/TIA-603-B: 2002, Section 2.2.12
Unwanted Emissions: Radiated Spurious.

The power of any emission outside of the authorized operating frequency ranges (1930-1950 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, 0.8 meters above the ground. The configuration tested is shown in Figure 1.

The frequency range 9 kHz-20 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 $0-360^\circ$, 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:
 $P_d(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dB)}$

P_d = Dipole equivalent power (result).

P_g = Signal generator output level.

The E.U.T. was operated at the frequency of 1960.00 MHz.

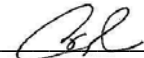
Carrier Frequency	Antenna Pol.	Maximum Peak Level	Signal Generator RF Output	Cable Loss	Antenna Gain	Effective Radiated Power Level	Spec.	Margin
(MHz)		(dB μ V/m)	(dBm)	(dB)	(dBm)	(mW)	(mW)	(mW)
3928.0	V	57.54	-45.94	2.6	8.7	-39.84	-13	-26.84
3928.0	H	56.17	-48.31	2.6	8.7	-42.21	-13	-29.21
5880.0	V	58.96	-44.7	4.1	10.4	-38.40	-13	-25.40
5880.0	H	57.43	-46.25	4.1	10.4	-39.95	-13	-26.95

7.3 Test Results

JUDGEMENT: Passed by 25.4 mW

The E.U.T met the requirements of the FCC, Part 24, Sub-part E, Section 235; FCC Part 2.1053 specifications.

TEST PERSONNEL:

Tester Signature:  Date: 24.07.08

Typed/Printed Name: A. Sharabi

7.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 12, 2007	1 year
RF Section	HP	85420E	3427A00103	November 12, 2007	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 4, 2007	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
Spectrum Analyzer	HP	8592L	3926A01204	March 5, 2008	1 year
Amplifier	Narda	DBS0411N313	013	January 9, 2008	1 year
Signal Generator	HP	83731D	US37100653	November 19, 2006	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 16, 2008	2 year

8. Peak Output Power (PCS GSM)

8.1 Test Specification

FCC Part 24, Sub-part E Section 232; Part 2 Section 1046

8.2 Test procedure

Peak Power Output must not exceed 100 Watts (50dBm)

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (10 dB) and an appropriate coaxial cable (1 dB). The E.U.T. RF output was GSM modulated. Special attention was taken to prevent Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 2.0 MHz RBW. The output power level was measured at 1932.50, 1960.00, and 1987.50 MHz.

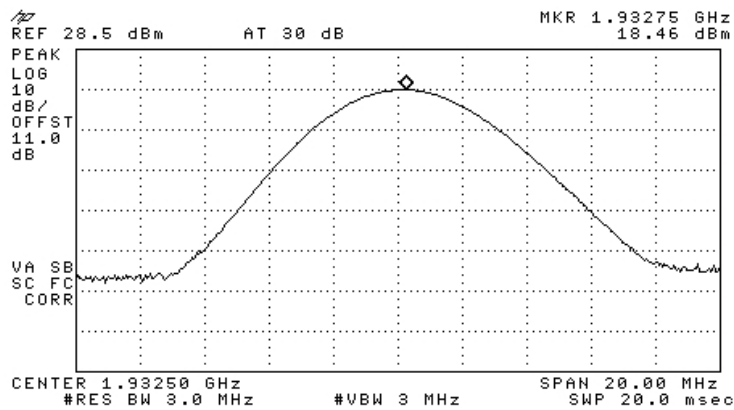


Figure 43.— 1932.50 MHz

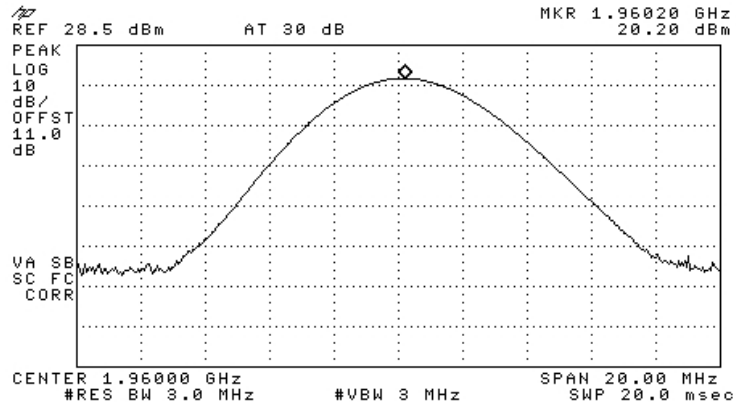


Figure 44.— 1960.00 MHz

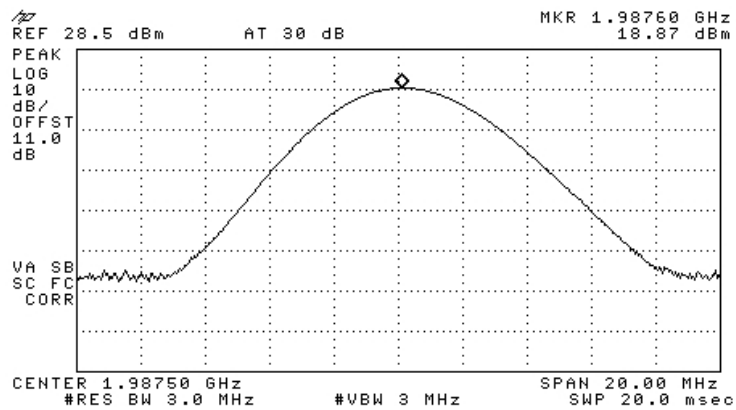


Figure 45.— 1987.50 MHz

8.3 Results table

E.U.T. Description: Mobile Telephone In-Building Distribution System

Model No.: 1000-SMR-PCSE

Serial Number: 0821635

Specification: FCC Part 24, Sub-part E, Section 232, FCC Part 2, Section 1046

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
1932.50	18.46	50.0	-31.54
1960.00	20.20	50.0	-29.80
1987.50	18.87	50.0	-31.13

Figure 46 Peak Output Power

JUDGEMENT: Passed by 31.13 dB

TEST PERSONNEL:

Tester Signature: _____

Date: 24.07.08

Typed/Printed Name: A. Sharabi

8.4 Test Equipment Used.

Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 47 Test Equipment Used

9. Occupied Bandwidth (PCS GSM)

9.1 Test Specification

FCC Part 2, Section 1049

9.2 Test Procedure

The E.U.T. was set to the applicable test frequency with GSM modulation. 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 100 kHz 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 point 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.

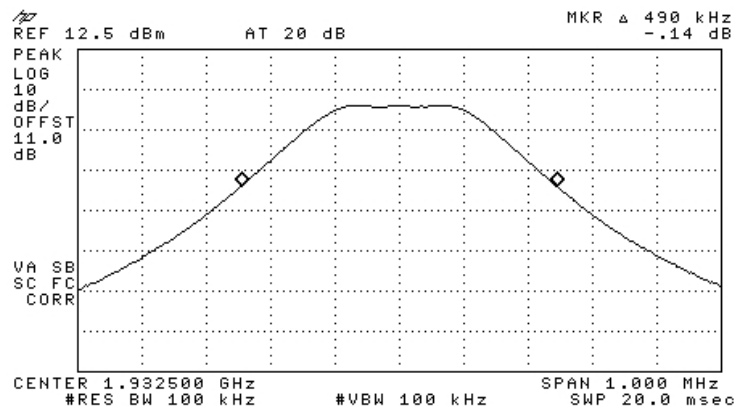


Figure 48.— Input 1932.50 MHz

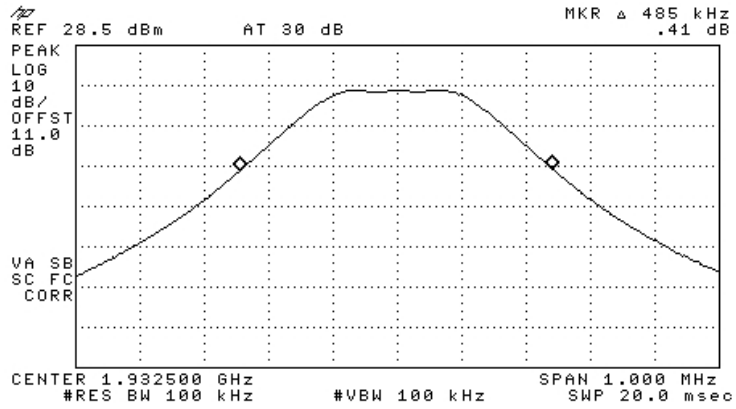


Figure 49.— Output 1932.50 MHz

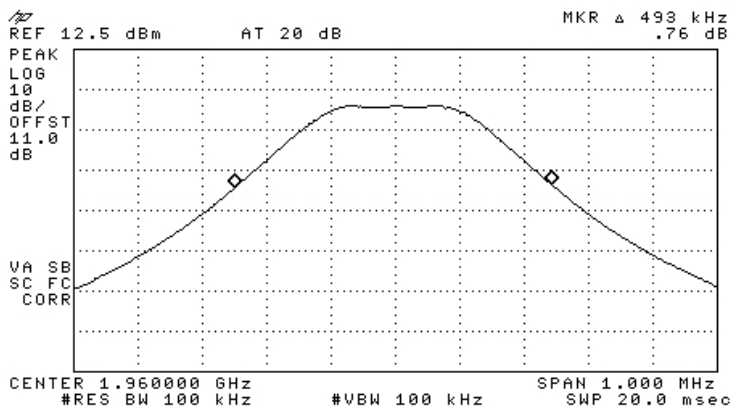


Figure 50.— Input 1960.00 MHz

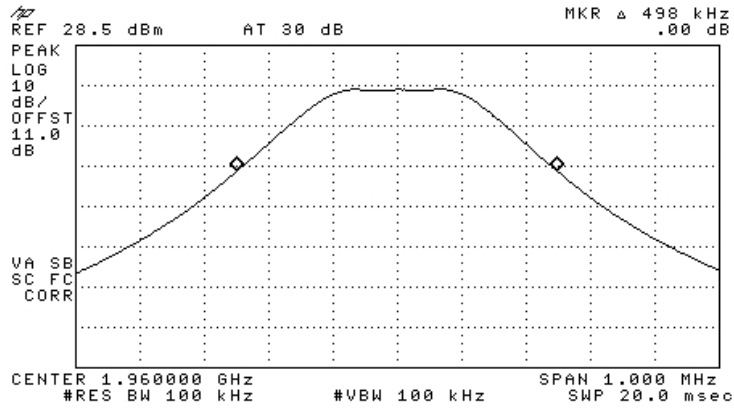


Figure 51.— Output 1960.00 MHz

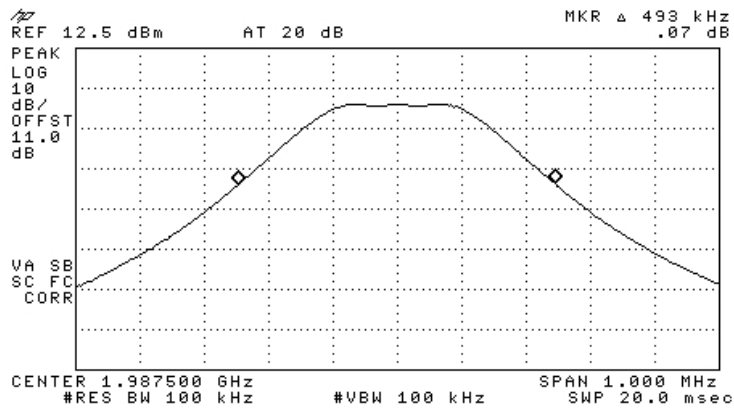


Figure 52.— Input 1987.50 MHz

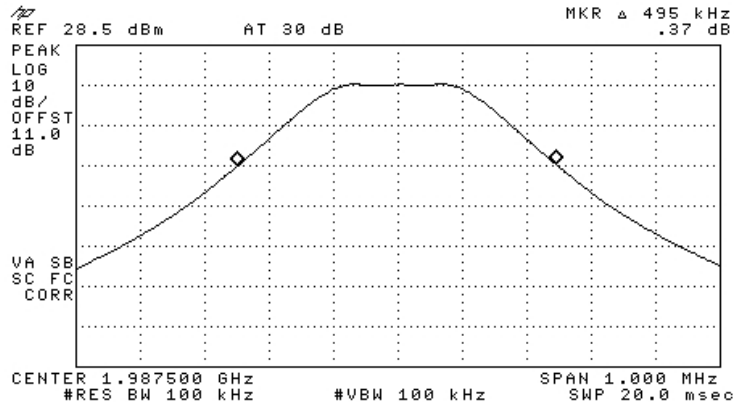


Figure 53.— Output 1987.50 MHz

9.3 Results Table

E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 2, Section 1049

	Operating Frequency	Reading (MHz)
Input	1932.50	0.490
Output	1932.50	0.485
Input	1960.00	0.493
Output	1960.00	0.498
Input	1987.50	0.493
Output	1987.50	0.495

Figure 54 Occupied Bandwidth

TEST PERSONNEL:

Tester Signature: _____

Date: 24.07.08

Typed/Printed Name: A. Sharabi

9.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 55 Test Equipment Used

10. Out of Band Emissions at Antenna Terminals (PCS GSM)

10.1 Test Specification

FCC Part 24, Sub-part E, Section 238; FCC Part 2.1051

10.2 Test procedure

The power of any emission outside of the authorized operating frequency ranges (1930-1990 MHz) must be attenuated below the transmitting power (P) by a factor of at least $43 + \log(P)$ dB, yielding -13dBm .

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (11.0 dB).

The spectrum analyzer was set to 100 kHz R.B.W.

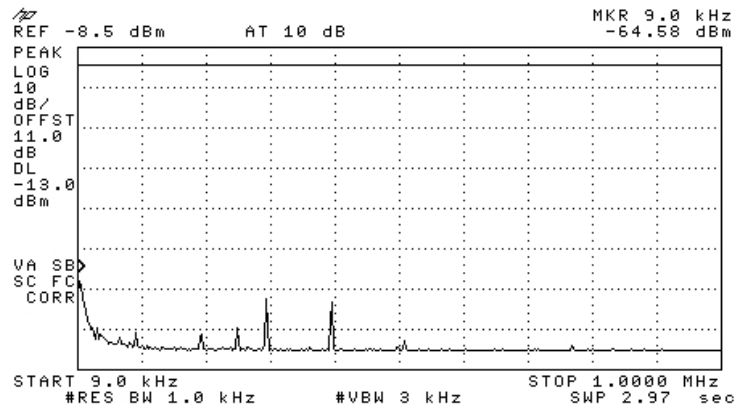


Figure 56.— 1932.50 MHz

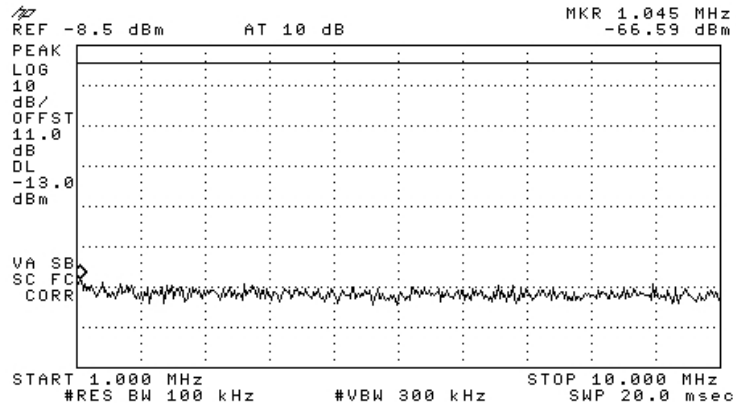


Figure 57.— 1932.50 MHz

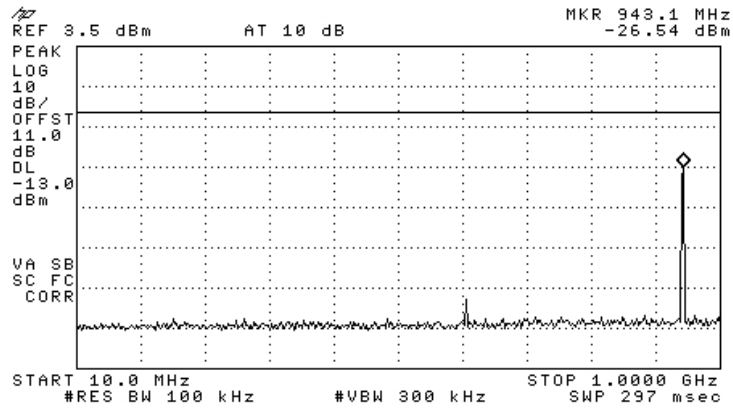


Figure 58.— 1932.50 MHz

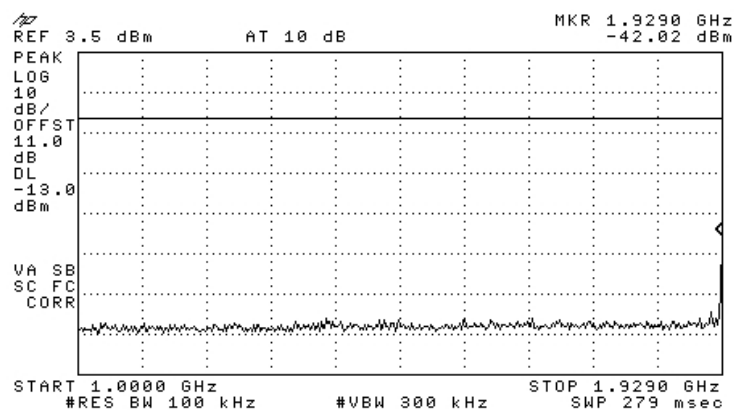


Figure 59.— 1932.50 MHz

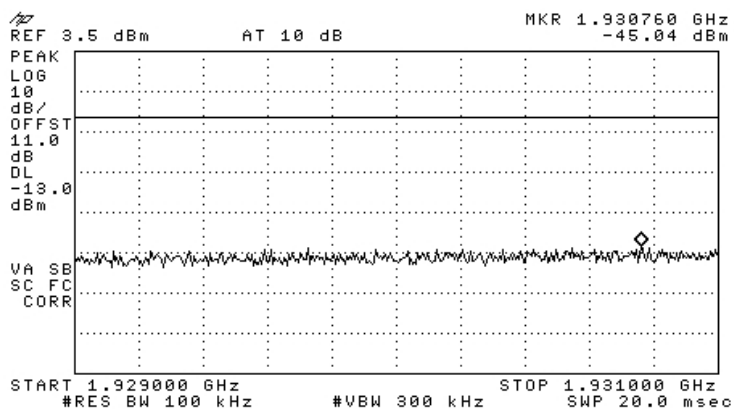


Figure 60.— 1932.50 MHz

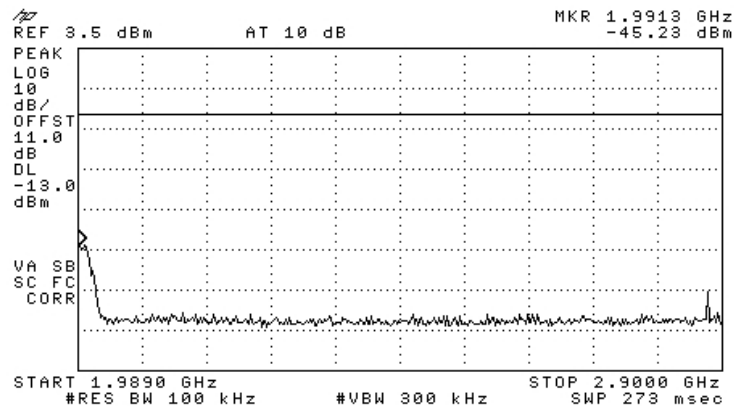


Figure 61.— 1932.50 MHz

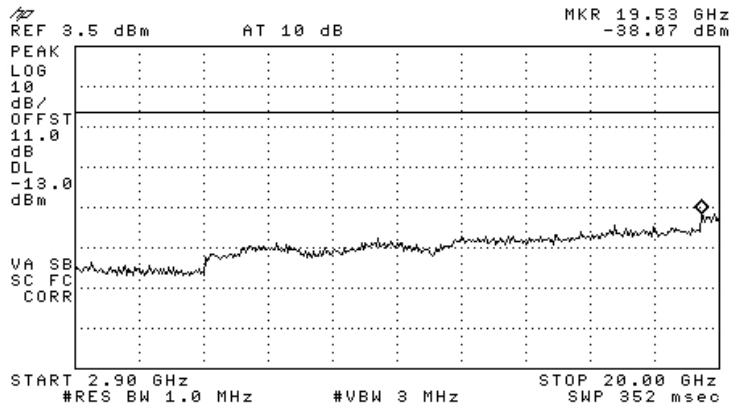


Figure 62.— 1932.50 MHz

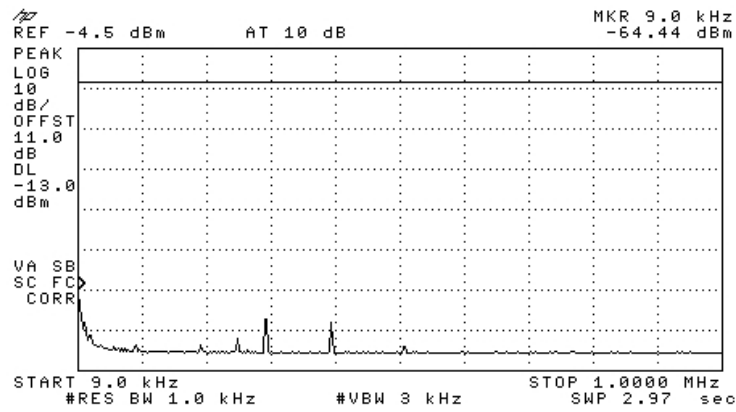


Figure 63.— 1960.00 MHz

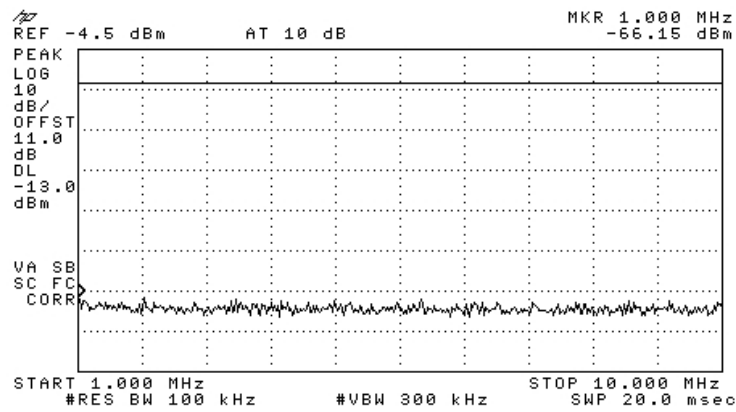


Figure 64.— 1960.00 MHz

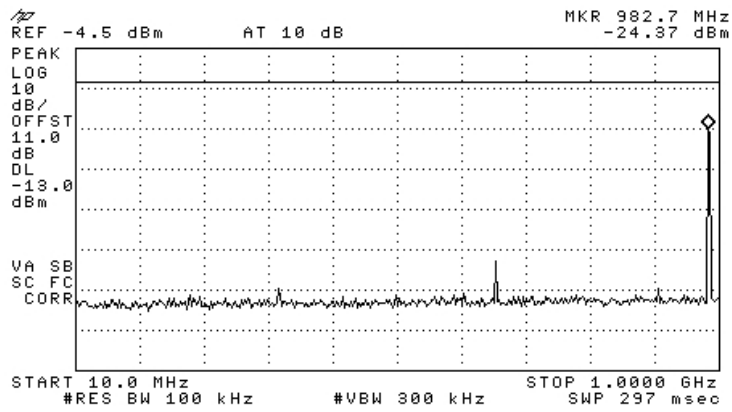


Figure 65.— 1960.00 MHz

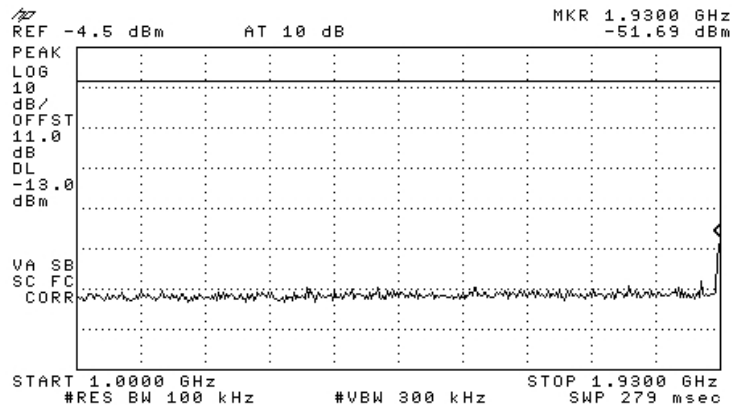


Figure 66.— 1960.00 MHz

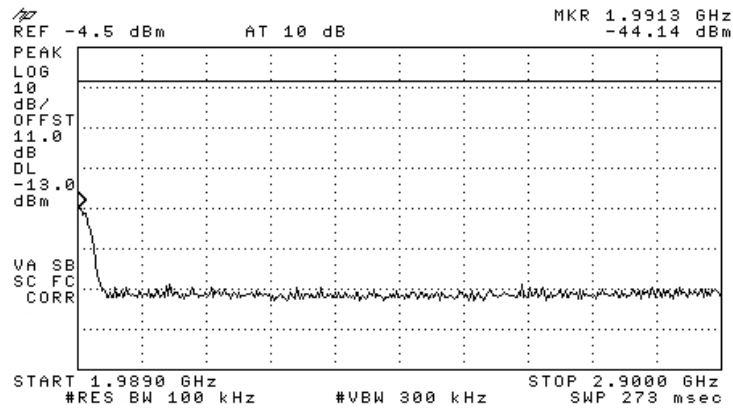


Figure 67.— 1960.00 MHz

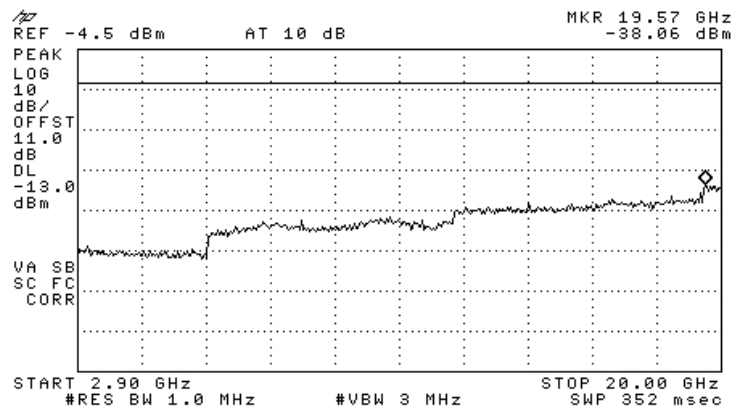


Figure 68.— 1960.00 MHz

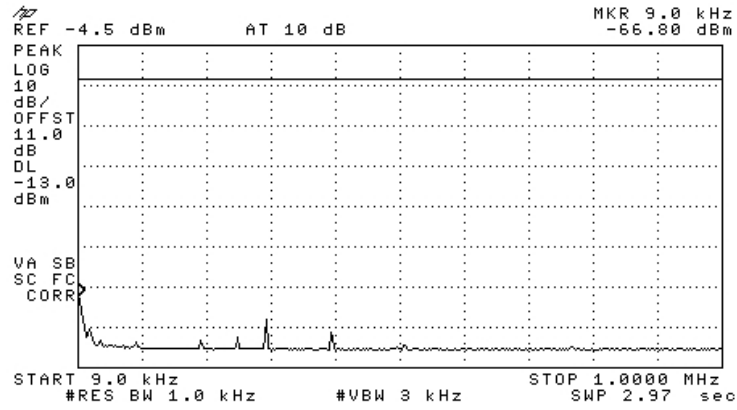


Figure 69.— 1987.50 MHz

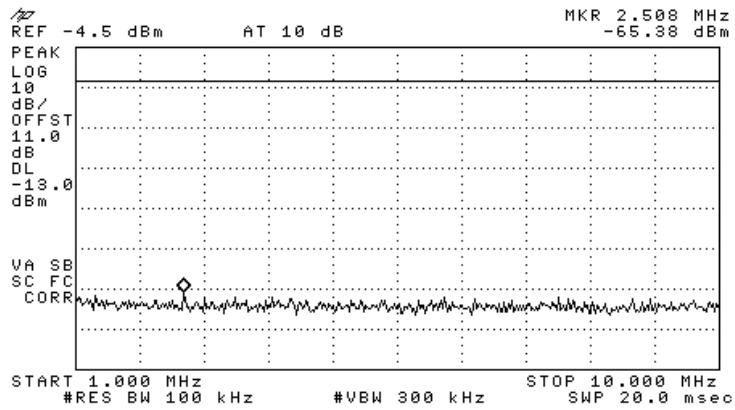


Figure 70.— 1987.50 MHz

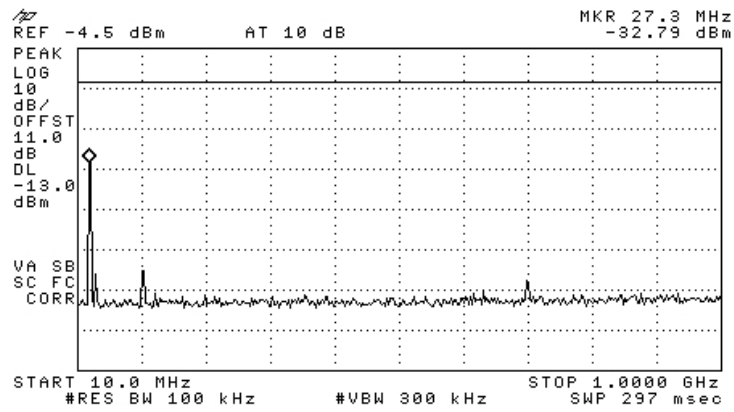


Figure 71.— 1987.50 MHz

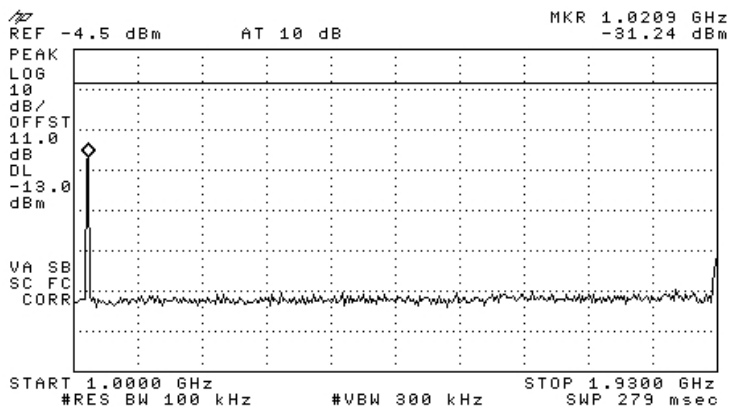


Figure 72.— 1987.50 MHz

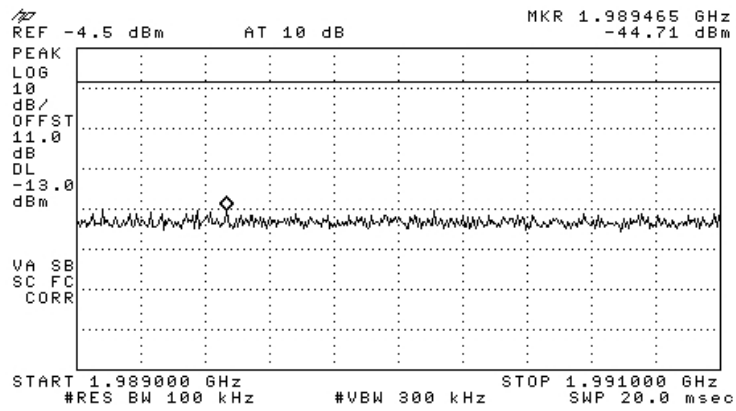


Figure 73.— 1987.50 MHz

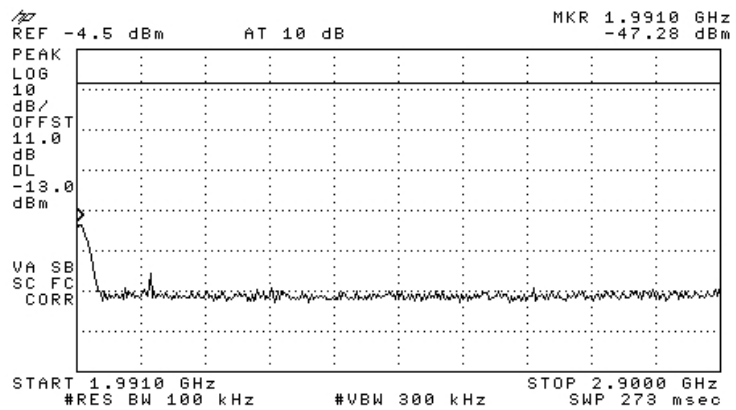


Figure 74.— 1987.50 MHz

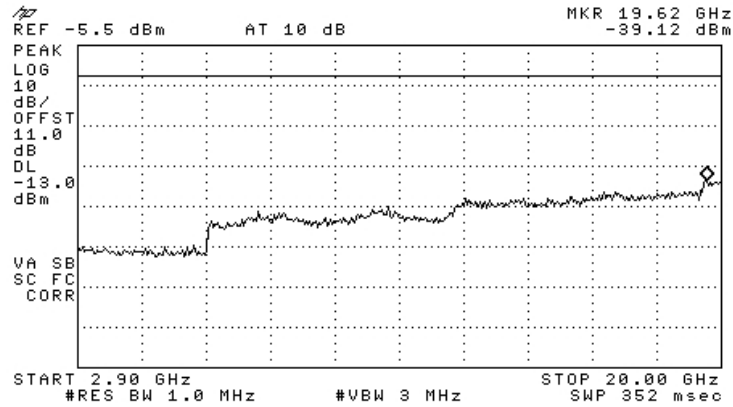


Figure 75.— 1987.50 MHz

10.3 Results table

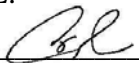
E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 24, Sub-part E, Section 238; Part 2 Section 1051

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
1932.50	-26.54	-13.0	-39.54
1960.00	-24.37	-13.0	-37.37
1987.50	-31.24	-13.0	-44.24

Figure 76 Out of Band Emission Results

JUDGEMENT: Passed by 37.37 dB

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

10.4 Test Equipment Used.

Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 77 Test Equipment Used

11. Band Edge Spectrum (PCS GSM)

11.1 Test Specification

FCC Part 24, Sub-part E, Section 238; FCC Part 2.1051

11.2 Test procedure

Enclosed are spectrum analyzer plots for the lowest operation frequency (1930.2 MHz) and the highest operation frequency (1989.8MHz) in which the E.U.T. is planned to be used.

The power of any emission outside of the authorized operating frequency ranges (1930.0-1990.0 MHz) must be attenuated below the transmitting power (P) by a factor of at least $43 + \log(P)$ dB, yielding -13 dBm.

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (11.0 dB).

The spectrum analyzer was set to 10 kHz R.B.W.

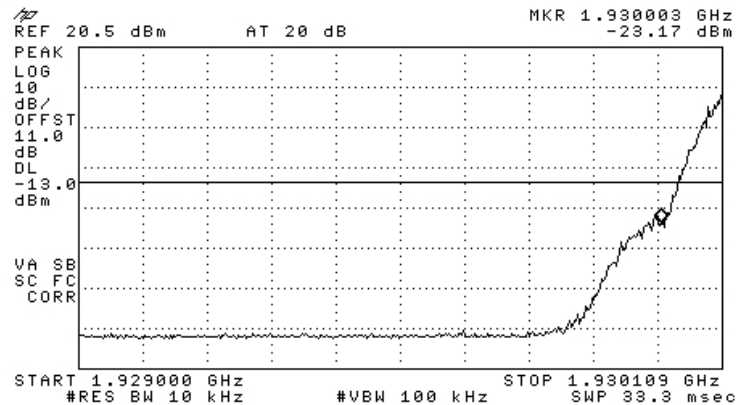


Figure 78.— 1932.50 MHz

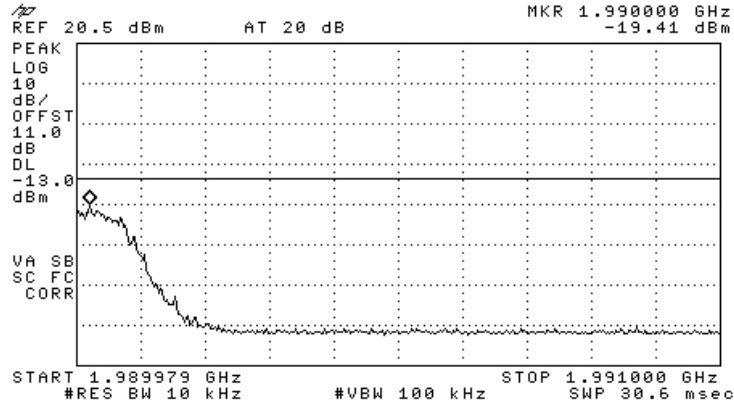


Figure 79.— 1987.50 MHz

11.3 Results table

E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 24, Sub-part E, Section 238; Part 2 Section 1051

Operation Frequency (MHz)	Band Edge Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
1932.50	1930.00	-23.17	-13.0	-10.17
1987.50	1990.00	-19.41	-13.0	-6.41

Figure 80 Band Edge Spectrum Results

JUDGEMENT: Passed by 6.41 dB

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

11.4 Test Equipment Used.

Band Edge Spectrum

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year

Figure 81 Test Equipment Used

12. Peak Output Power (SMR)

12.1 Test Specification

FCC Part 90, Section 90.219

12.2 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 a 10 dB external attenuator and an appropriate coaxial cable (cable Loss = 0.3 dB). 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 940.9875 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.

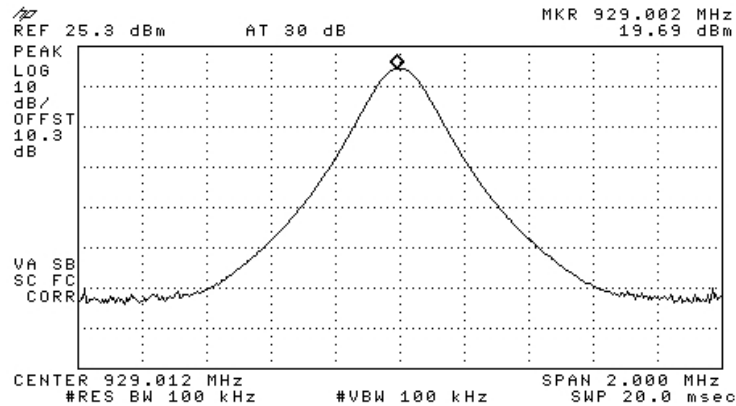


Figure 82.— 929.012 MHz

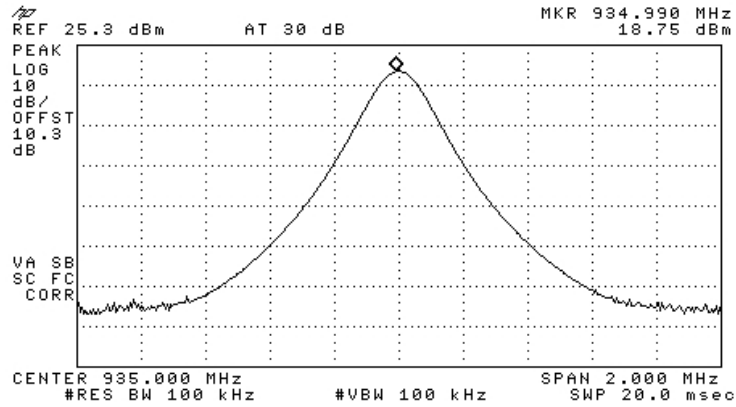


Figure 83.— 935.000 MHz

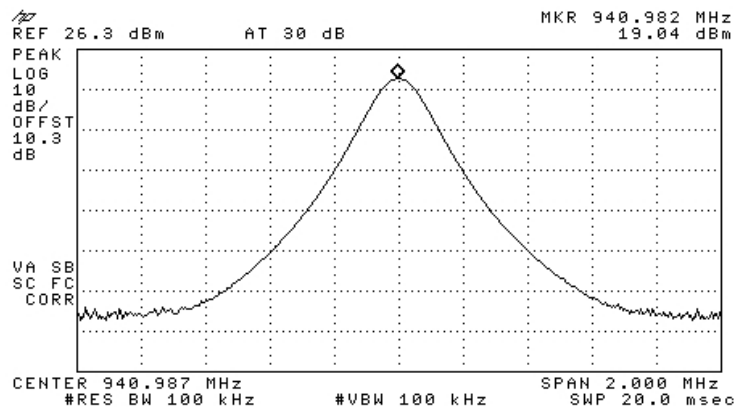


Figure 84.— 940.987 MHz

12.3 Results table

E.U.T. Description: Mobile Telephone In-Building Distribution System

Model No.: 1000-SMR-PCSE

Serial Number: 0821635

Specification: FCC Part 90, Section 90.219

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
929.012	19.69	32.0	-12.31
935.000	18.75	32.0	-13.25
940.987	19.04	32.0	-12.96

Figure 85 Peak Output Power

JUDGEMENT: Passed by 12.31 dB

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

12.4 Test Equipment Used.

Peak Output Power

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year

Figure 86 Test Equipment Used

13. Occupied Bandwidth (SMR)

13.1 Test Specification

FCC Part 2, Section 2.202, FCC Part 90 Section 90.209

13.2 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 a 10 dB external attenuator (at the output test) and an appropriate coaxial cable (Cable Loss = 0.3 dB). 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.

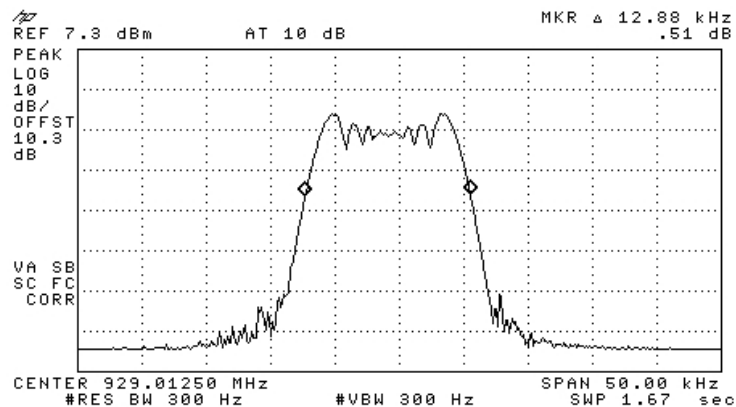


Figure 87.— Input 929.0125 MHz

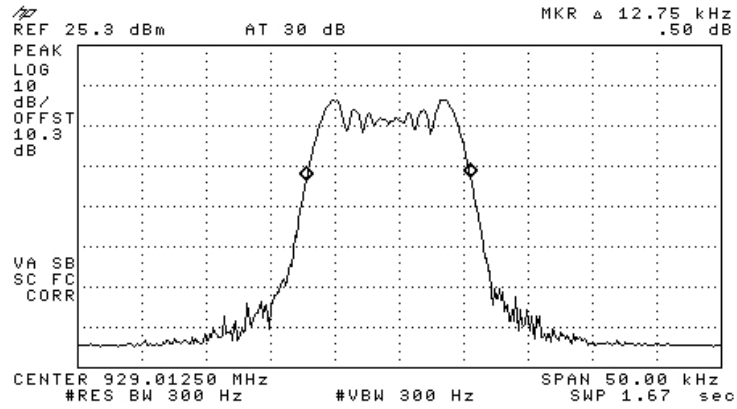


Figure 88.— Output 929.0125 MHz

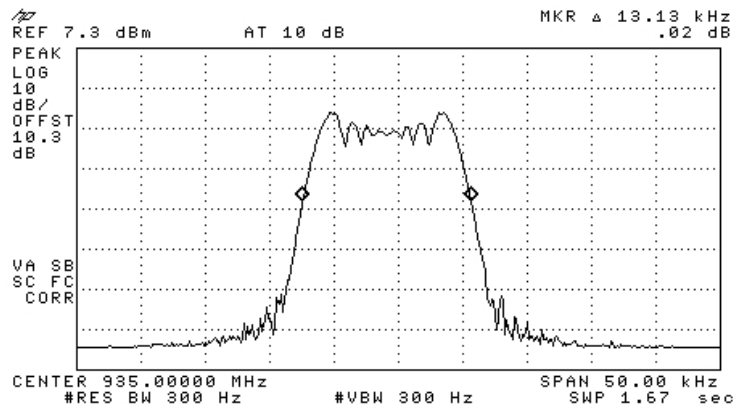


Figure 89.— Input 935.0000 MHz

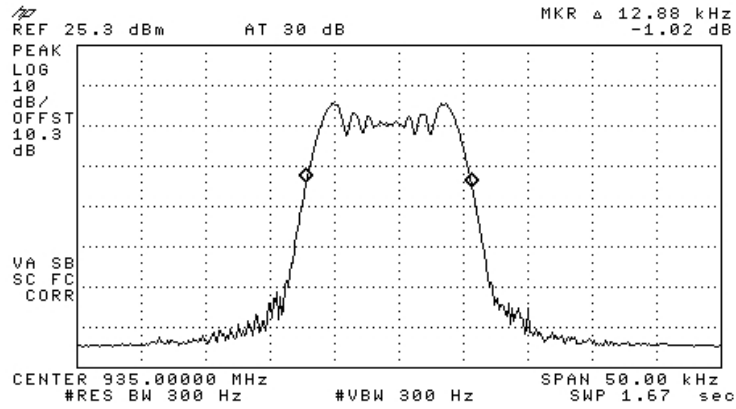


Figure 90.— Output 935.0000 MHz

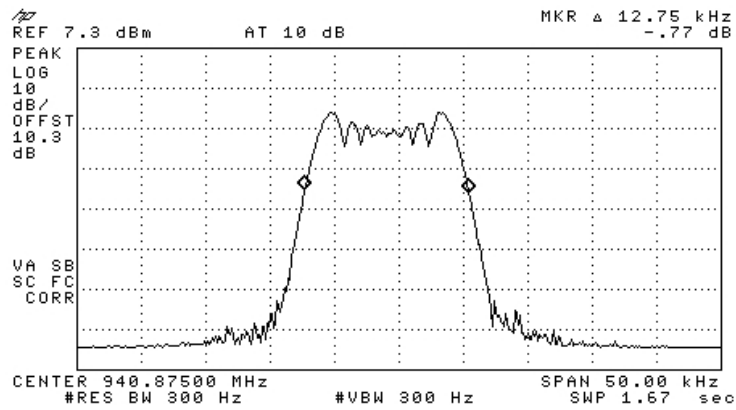


Figure 91.— Input 940.9875 MHz

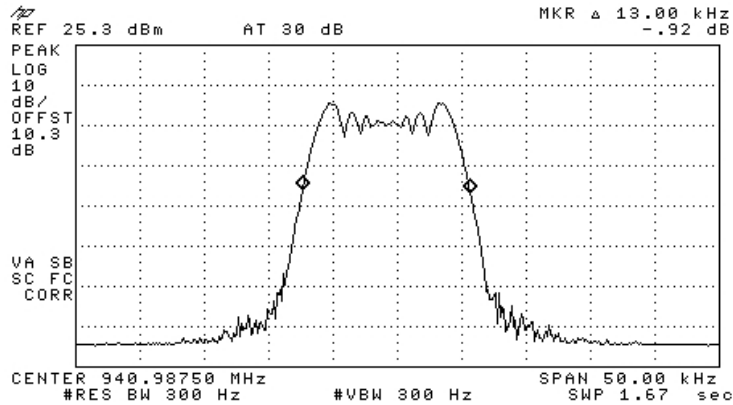


Figure 92.— Output 940.9875 MHz


13.3 Results Table

E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 2, Section 2.202; FCC Part 90 Section 90.209

	Operating Frequency	Reading (kHz)
Input	929.0125	12.88
Output	929.0125	12.75
Input	935.0000	13.13
Output	935.0000	12.88
Input	940.9875	12.75
Output	940.9875	13.00

Figure 93 Occupied Bandwidth

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

13.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B	GB38450502	28 May 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year

Figure 94 Test Equipment Used

14. Emission Mask (SMR)

14.1 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.

14.2 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 10 dB external attenuator and appropriate coaxial cable (0.3 dB cable loss). The spectrum analyzer was set to 300 Hz resolution B.W.

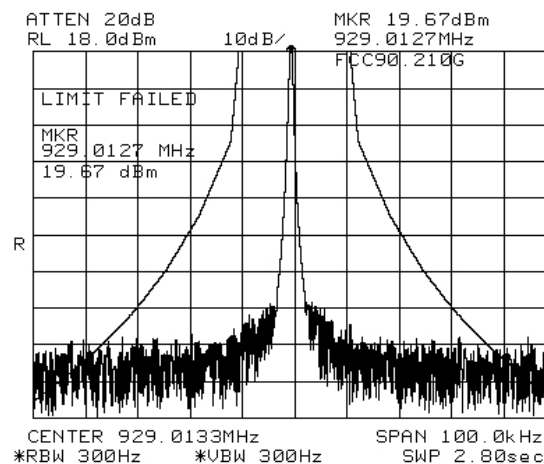


Figure 95.— 929.0133

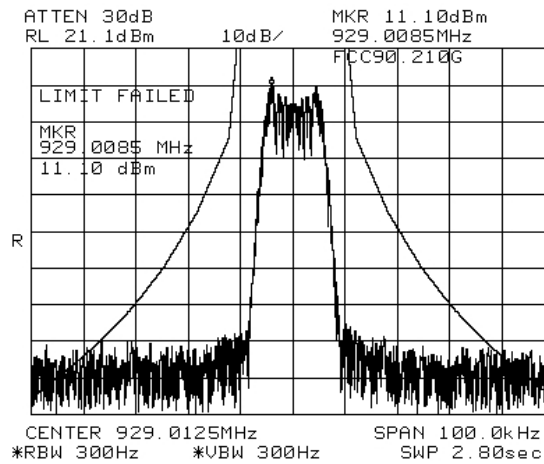


Figure 96.— 929.0125

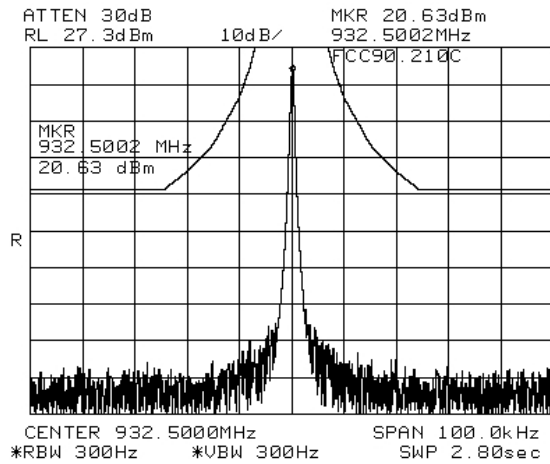


Figure 97.— 932.5000

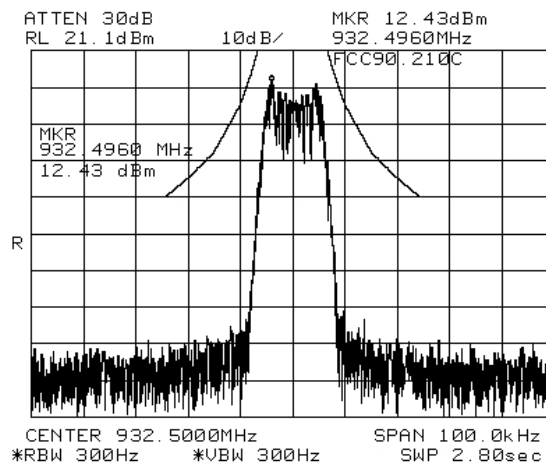


Figure 98.— 932.5000

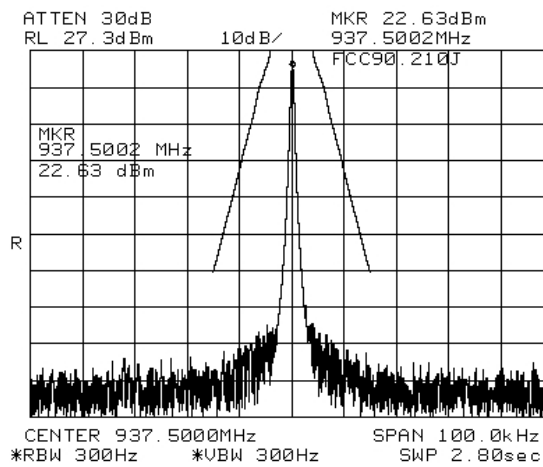


Figure 99.— 937.5000

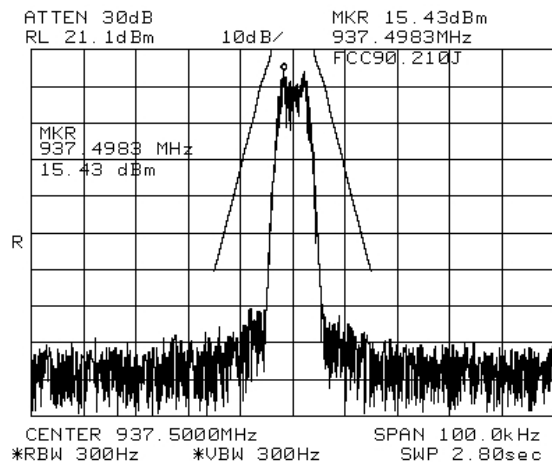


Figure 100.— 937.5000

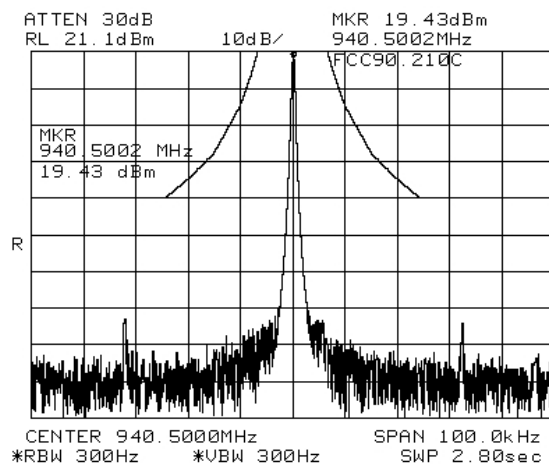


Figure 101.— 940.5000

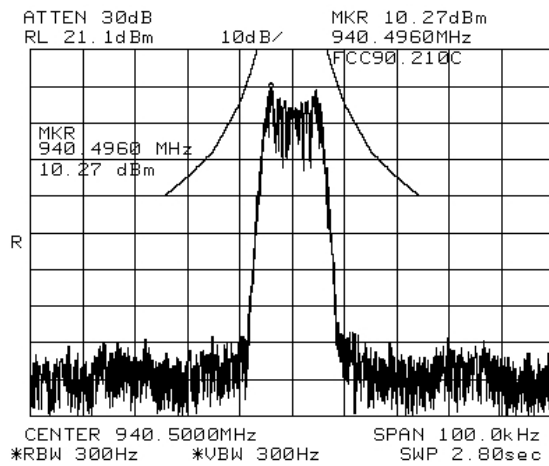


Figure 102.— 940.5000

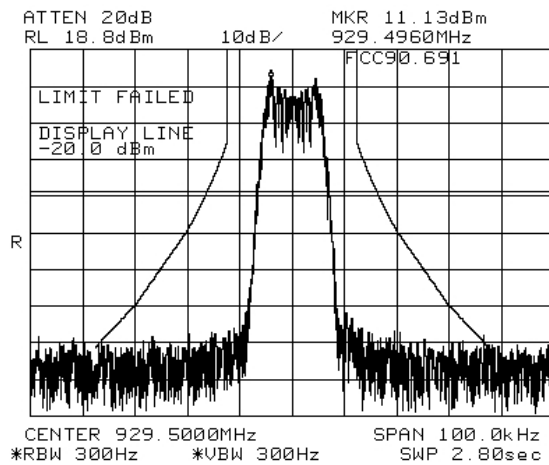


Figure 103.— 929.5000

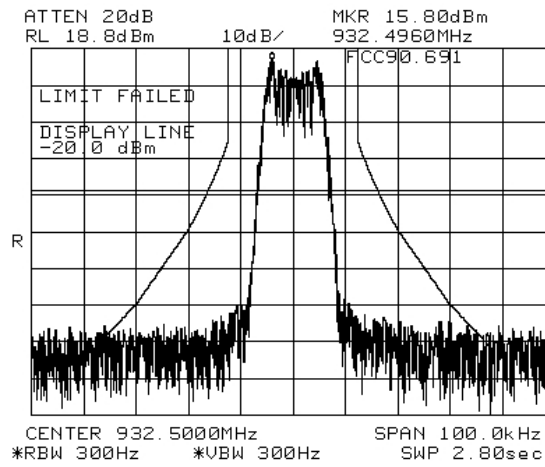


Figure 104.— 932.5000

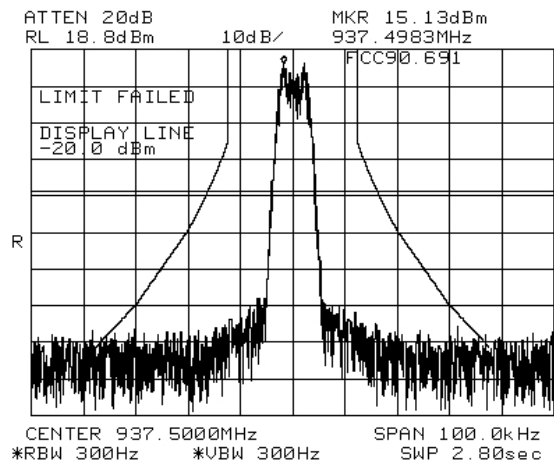


Figure 105.— 937.5000

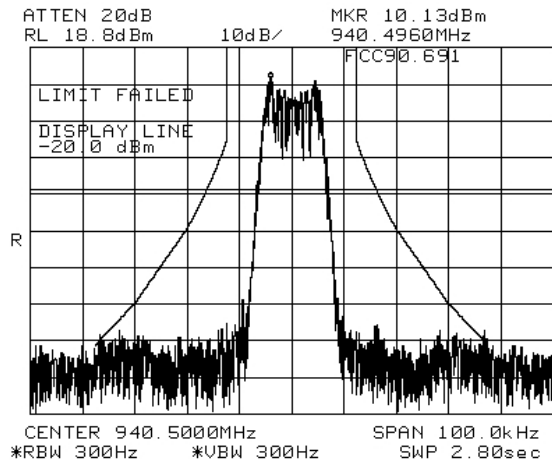


Figure 106.— 940.5000

14.3 Results

E.U.T. Description: Mobile Telephone In-Building Distribution System


Model No.: 1000-SMR-PCSE

Serial Number: 0821635

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: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

14.4 Test Equipment Used.

Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8564E	3442A00275	November 14, 2007	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year

Figure 107 Test Equipment Used

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

15.1 Test Specification

FCC Part 90, Section 210

15.2 Test procedure

The power of any emission outside of the authorized bandwidth must be attenuated below the transmitting power (P) by a factor of at least $43 + 10\log(P)$ dB, yielding -13dBm for the frequency ranges 929-935 and 940-941 MHz and at least $50 + 10\log(P)$, yielding -20dBm for the frequency range 935-940 MHz.

The E.U.T. antenna terminal was connected to the spectrum analyzer through a 10 dB external attenuator and an appropriate coaxial cable (Cable Loss = 0.3dB).

In the frequency ranges, where the resolution bandwidth of 10 kHz was used, instead of 100 kHz, the new limit = $\text{Lim} + 20\log(10/100)$.

The operating frequencies of 929.0125, 935.00, and 940.9875 MHz were tested.

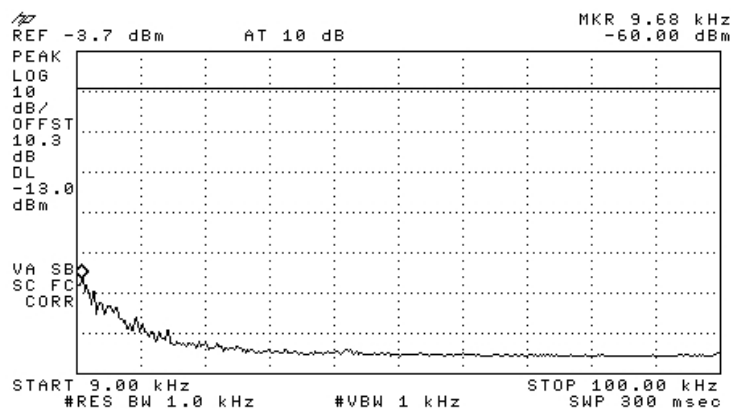


Figure 108.— 929.0125 MHz

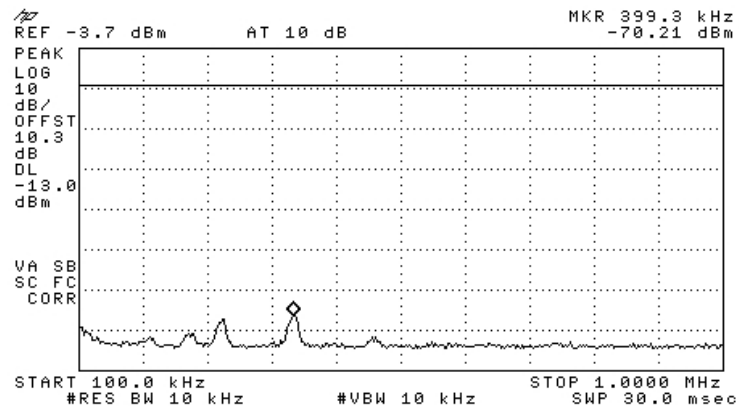


Figure 109.— 929.0125 MHz

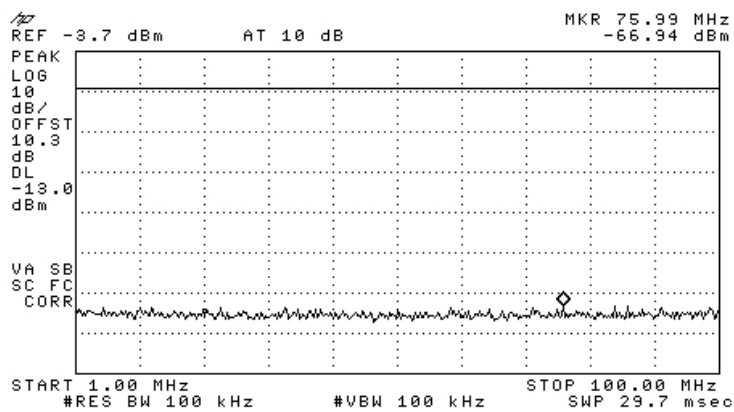


Figure 110.— 929.0125 MHz

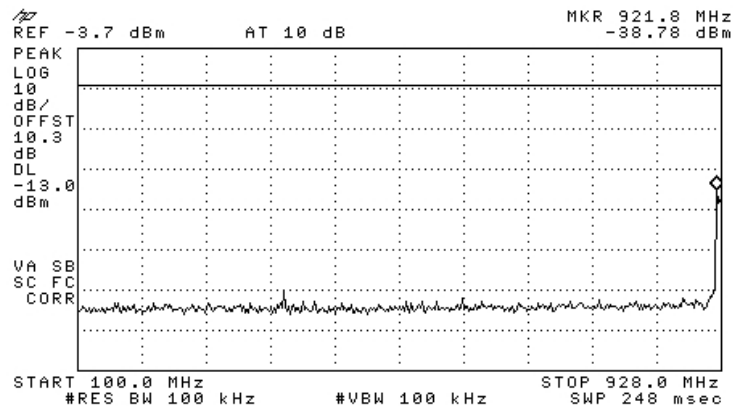


Figure 111.— 929.0125 MHz

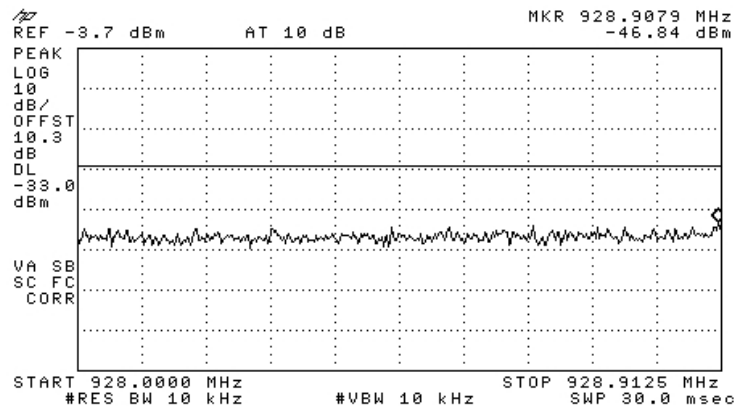


Figure 112.— 929.0125 MHz

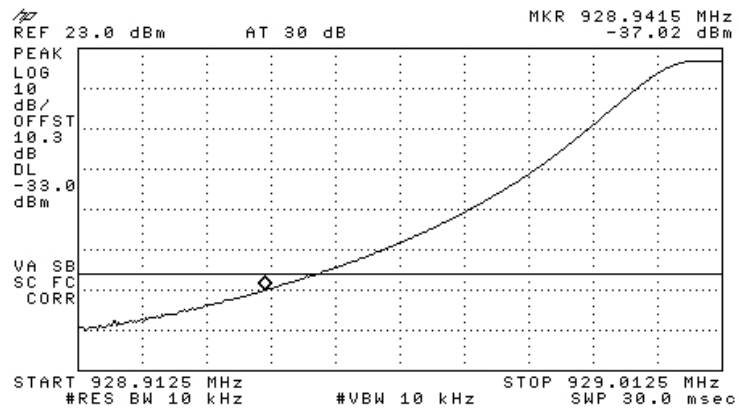


Figure 113.— 929.0125 MHz

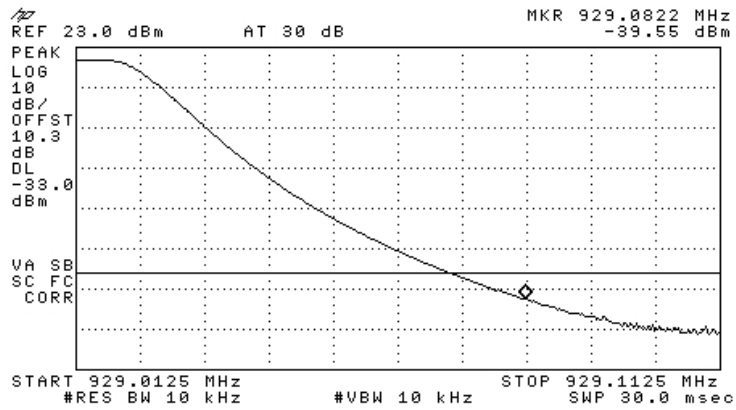


Figure 114.— 929.0125 MHz

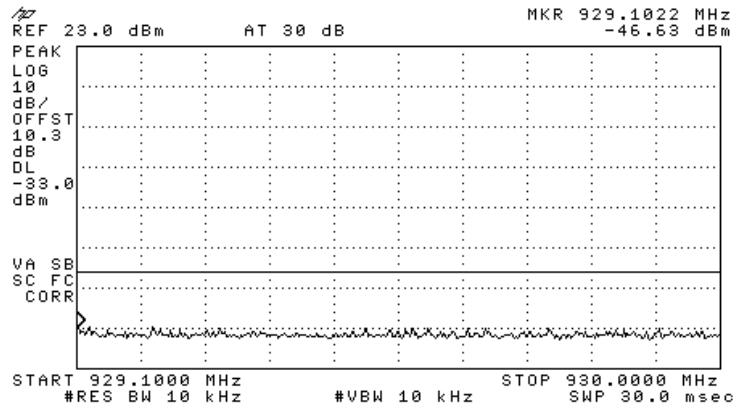


Figure 115.— 929.0125 MHz

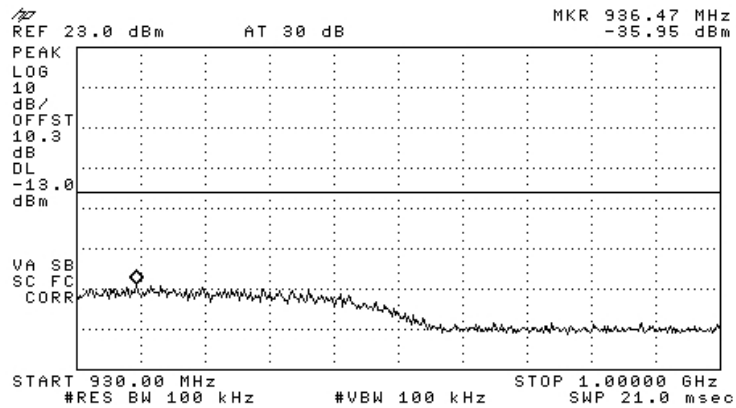


Figure 116.— 929.0125 MHz

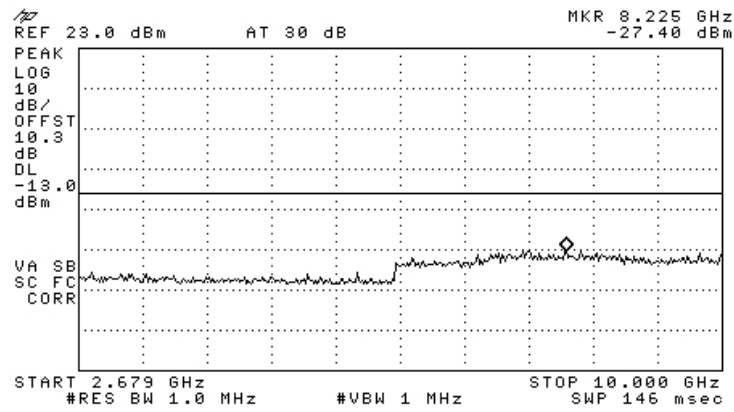


Figure 117.— 929.0125 MHz

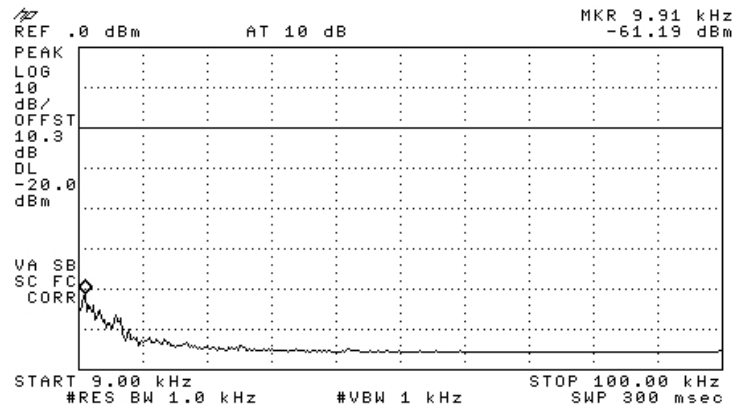


Figure 118.— 935.00 MHz

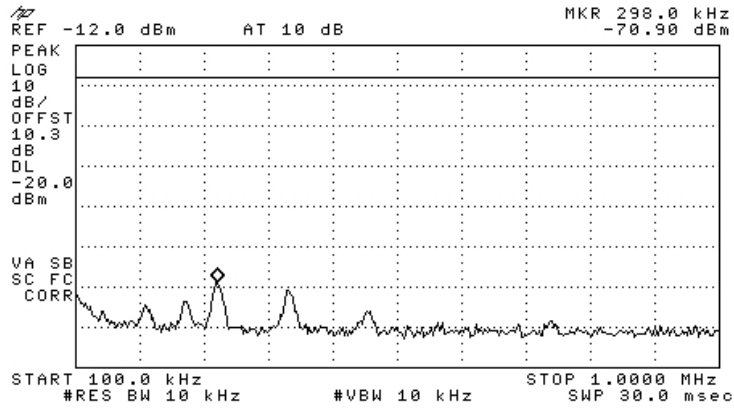


Figure 119.— 935.00 MHz

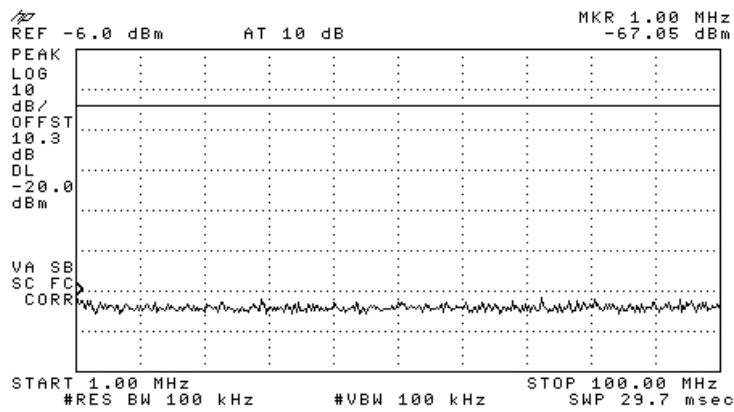


Figure 120.— 935.00 MHz

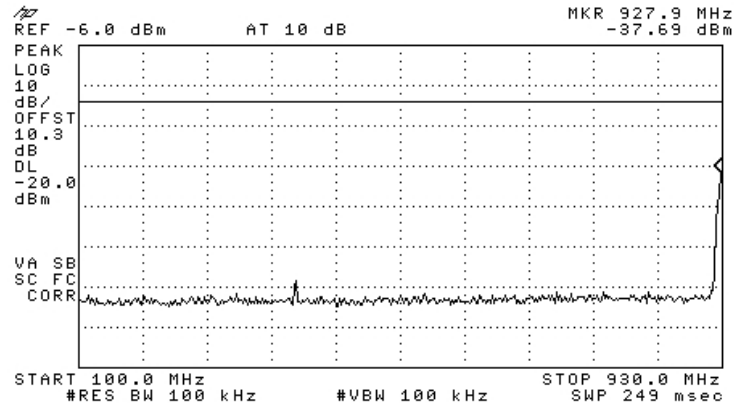


Figure 121.— 935.00 MHz

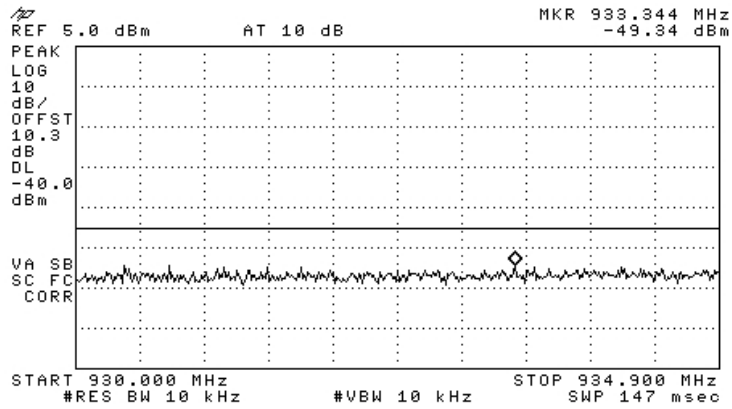


Figure 122.— 935.00 MHz

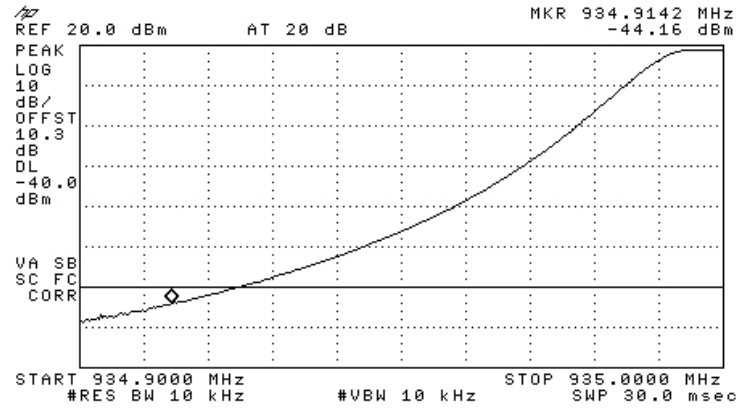


Figure 123.— 935.00 MHz

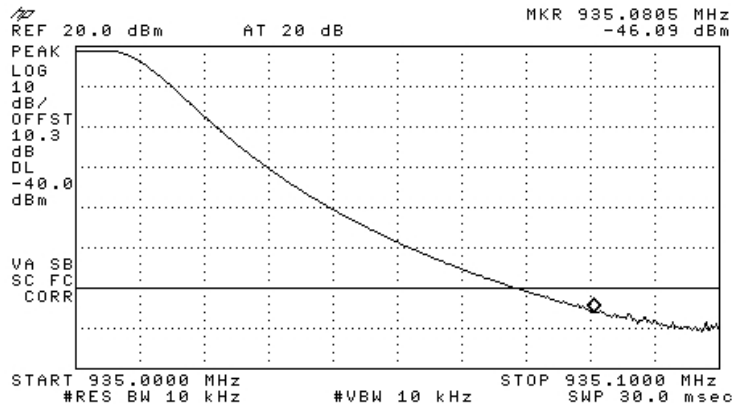


Figure 124.— 935.00 MHz

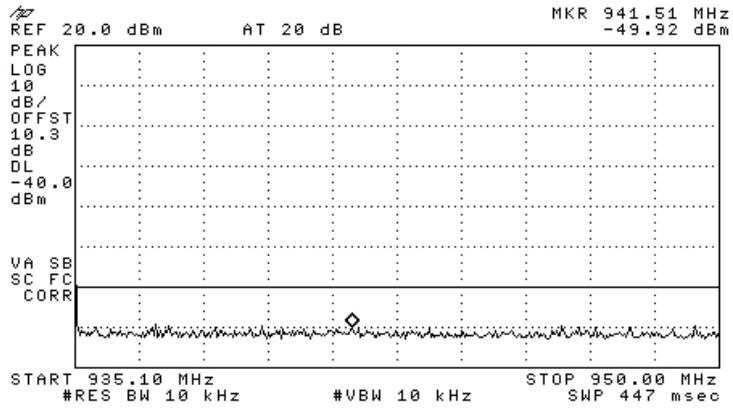


Figure 125.— 935.00 MHz

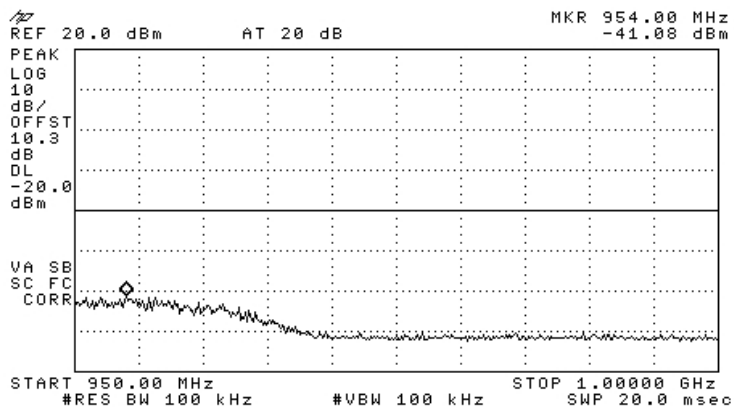


Figure 126.— 935.00 MHz

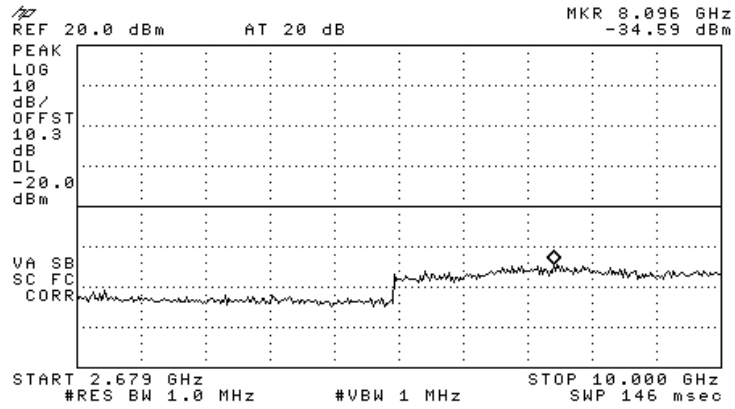


Figure 127.— 935.00 MHz

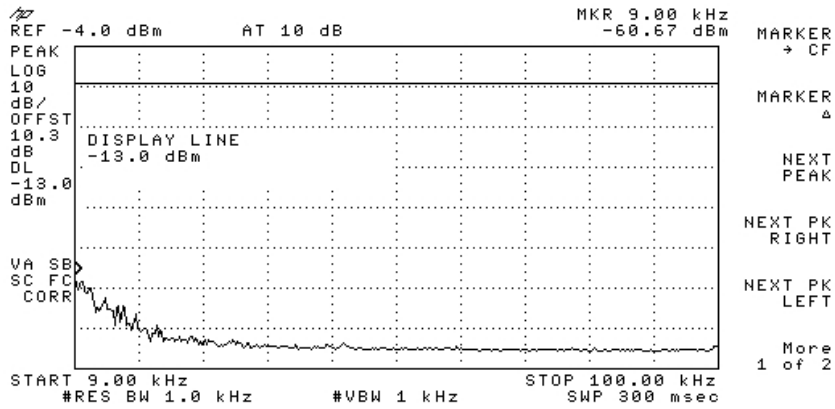


Figure 128.— 940.9875 MHz

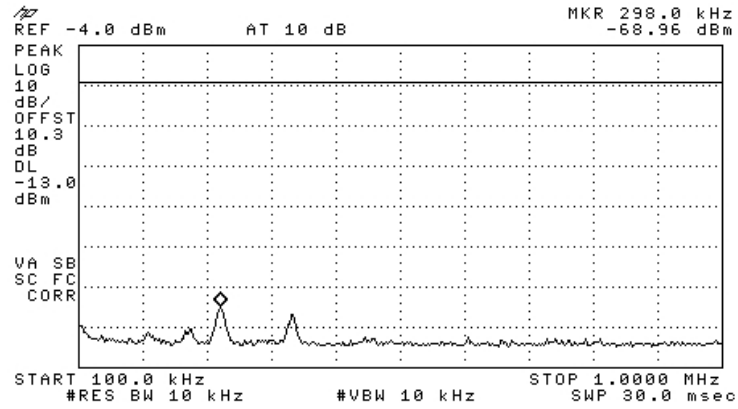


Figure 129.— 940.9875 MHz

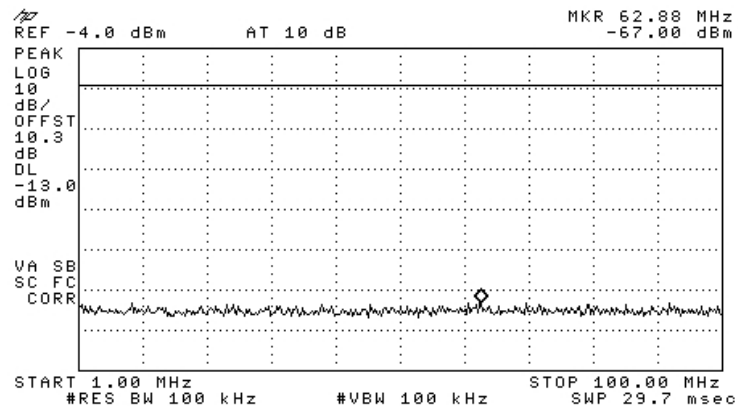


Figure 130.— 940.9875 MHz

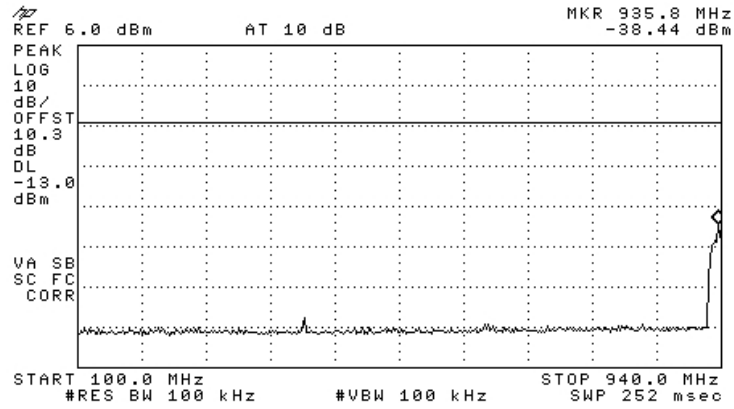


Figure 131.— 940.9875 MHz

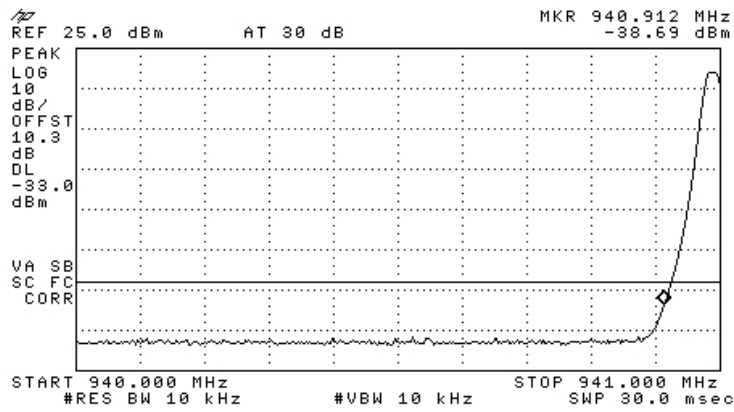


Figure 132.— 940.9875 MHz

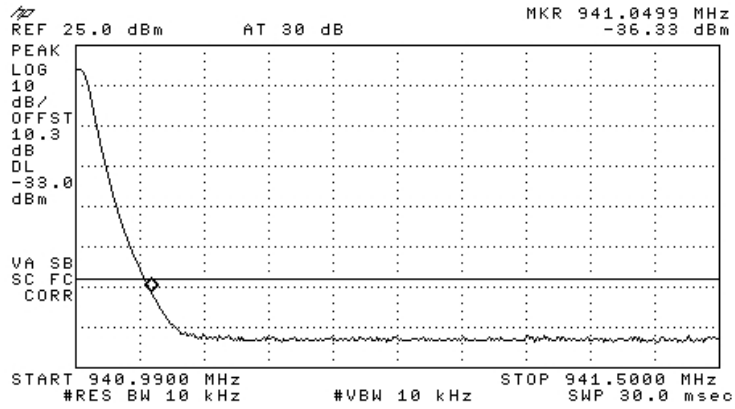


Figure 133.— 940.9875 MHz

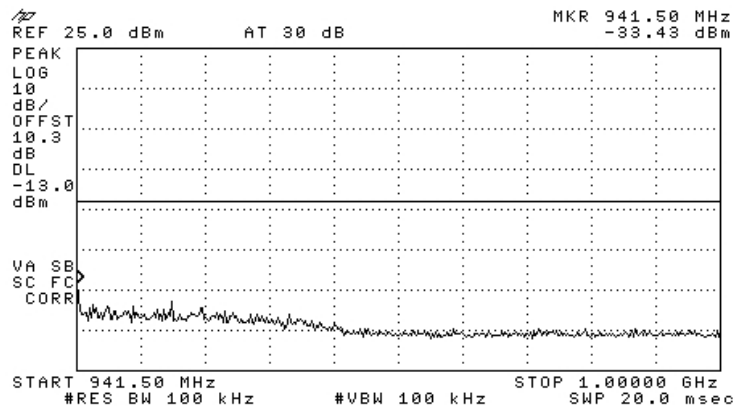


Figure 134.— 940.9875 MHz

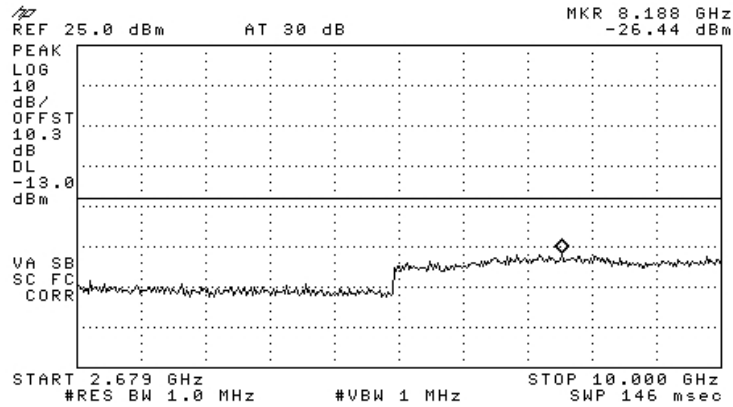


Figure 135.— 940.9875 MHz

15.3 Results table

E.U.T. Description: Mobile Telephone In-Building Distribution System
 Model No.: 1000-SMR-PCSE
 Serial Number: 0821635
 Specification: FCC Part 90, Section 210

Operation Frequency (MHz)	Reading (dBm)	Specification (dBm)	Margin (dB)
929.0125	-37.02	-33.0	-4.02
935.0000	-44.16	-40.0	-4.16
940.0875	-36.33	-33.0	-3.33

Figure 136 Out of Band Emission Results

JUDGEMENT: Passed by 3.33 dB

TEST PERSONNEL:

Tester Signature: 

Date: 11.08.08

Typed/Printed Name: A. Sharabi

15.4 Test Equipment Used.

Out of Band Emission at Antenna Terminals

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	HP	8592L	3826A01204	March 5, 2008	1 year
Signal Generator	HP	E4432B ESG-D	GB38450502	28 May 2008	1 year
Cable	Rhophase	KPS-5000-KPS	A1674	February 8, 2008	1 year
Attenuator	HP	8491A	58267	30 June 2008	1 year

Figure 137 Test Equipment Used

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

16.1 Test Specification

FCC, Part 90, Section 90.210

16.2 Test Procedure

The power of any emission outside of the authorized bandwidth 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, 0.5 meters above the ground. The configuration tested is shown in Figure 1.

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 $0-360^\circ$, 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:

$$P(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dBi)}$$

P = Equivalent Isotropic Radiated Power.

P_g = Signal Generator Output Level.

The E.U.T. was tested at the operating frequency of 929.00 MHz.

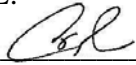
Carrier Frequency	Antenna Pol.	Maximum Peak Level	Signal Generator RF Output	Cable Loss	Antenna Gain	Effective Radiated Power Level	Spec.	Margin
(MHz)		(dB μ V/m)	(dBm)	(dB)	(dBm)	(mW)	(mW)	(mW)
1857.9	H	41.8	-59.3	4.9	7.0	-57.2	-13.0	-44.2
1857.9	V	43.8	-56.2	4.9	7.0	-54.1	-13.0	-41.1
2787.0	H	48.3	-50.5	7.4	8.4	-49.5	-13.0	-36.5
2787.0	V	49.1	-47.9	7.4	8.4	-48.1	-13.0	-35.1

16.3 Test Data

JUDGEMENT: Passed by 35.1 mW

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

TEST PERSONNEL:

Tester Signature: 

Date: 24.07.08

Typed/Printed Name: A. Sharabi

16.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 12, 2007	1 year
RF Section	HP	85420E	3427A00103	November 12, 2007	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	February 4, 2007	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
Spectrum Analyzer	HP	8592L	3926A01204	March 5, 2008	1 year
Amplifier	Narda	DBS0411N313	013	January 9, 2008	1 year
Signal Generator	HP	83731D	US37100653	November 19, 2006	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 16, 2008	2 year

16. APPENDIX A - CORRECTION FACTORS

16.5 Correction factors for CABLE
from EMI receiver
to test antenna
at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)	FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3	1200.0	7.3
20.0	0.6	1400.0	7.8
30.0	0.8	1600.0	8.4
40.0	0.9	1800.0	9.1
50.0	1.1	2000.0	9.9
60.0	1.2	2300.0	11.2
70.0	1.3	2600.0	12.2
80.0	1.4	2900.0	13.0
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		

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".

16.6 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.*

16.7 Correction factors for CABLE
from spectrum analyzer
to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

- 1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.*
- 2. The cable is used for measurements above 2.9 GHz.*
- 3. The overall length of the cable is 10 meters.*

16.8 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".

16.9 Correction factors for Double-Ridged Waveguide Horn

**Model: 3115, S/N 29845
at 3 meter range.**

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENN A Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			