



Electrical (EMC)

DATE: 06 November 2001

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

EMC Test

for

Nexus Telocation Systems Ltd.

Equipment under test:

Remote Mobile Unit

NXRMU52000-3*

* See customer's statement on page 6.

Approved by:  _____

I. Raz, EMC Laboratory Manager

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This report relates only to items tested.



Electrical (EMC)

Measurement/Technical Report for Nexus Telocation Systems Ltd.

Remote Mobile Unit

NXRMU52000-3

FCC ID: L45-RMU17UHF-NXUS

06 November 2001

This report concerns: Original Grant Class II change

Class B verification Class A verification Class I change

Equipment type: Radio Telemetry Transmitter

Request Issue of Grant:
 Immediately upon completion of review

Limits used:
CISPR 22 Part 15

Measurement procedure used is ANSI C63.4-1992.

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")
Avi Zippori
Nexus Telocation Systems Ltd.
1 Korazin St.
Givatayim 53583
Israel
Tel: +972-3-572-3111
Fax: +972-3-571-9698
e-mail: aviz@nexus.co.il

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1. General Information

1.1 Administrative Information

Manufacturer: Nexus Telocation Systems Ltd.

Manufacturer's Address: 1Korazin St.
Givatayim
Israel 53583
Tel: +972-3-903-2288
Fax: +972-3-903-2299

Manufacturer's Representative: Avi Zippori

Equipment Under Test (E.U.T): Remote Mobile Unit

Equipment Model No.: NXRMU52000-3 (See customer's statement on following page).

Equipment Serial No.: Not designated

Date of Receipt of E.U.T: 27.08.01

Start of Test: 27.08.01

End of Test: 29.08.01

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

Test Specifications: See Section 2



18 October 2001

1 KORAZIN ST.
GIVATAYIM, 53583
ISRAEL.
Tel: 972-3-5723111
Fax: 972-3-5719698

DECLARATION

I HEREBY DECLARE THAT THE FOLLOWING PRODUCTS:

NXRMU52000-3

**ARE IDENTICAL ELECTRONICALLY, PHYSICALLY, AND
MECHANICALLY TO:**

RMU 1.7

**Please relate to the all (from an EMC point of view) as the same
product.**

Thank you,
Avi Zipori,

A. Zipori
Engineering manager,
"NEXUS – Telocation Systems".

Tel:+972-3-5723123

1.2 Product Description

The E.U.T is named RMU (Remote Mobile Unit). The RMU is a Frequency Hopping transmitter coupled with a paging receiver. The receiver's task is to receive synchronization messages. The Frequency Hopping transmitter transmits data or messages. Some of the messages are locatable.

The transmitter is capable of operating within a frequency band of 902.2-927.8 MHz. The transmitter utilizes 1.92 MHz bandwidth within the operational band. The 1.92 MHz consists of 64 hopping channels, 30 kHz each, with pseudo-random order of frequency hopping. All the frequencies that are generated in the RMU use TCXO (Temperature compensated crystal oscillator) reference of 9.6MHz. The modulation technique is DBPSK with a 200 BPS. All the other E.U.T. characteristics are provided within the appropriate tests description.

The E.U.T. obtains its power from the 12V battery of the vehicle.

There are several versions of the Remote Mobile Unit available. Each version occupies 1.92MHz within the 902.2-927.8MHz frequency range.

Following is our correspondence with Tom Phillips of the FCC regarding the different versions.

From: Tom Phillips [tphillips@fcc.gov]

To: emc@itl.co.il

Subject: Re Spread Spectrum For Intentional Radiator

Date: 01 November 2001


Dear Mr. Raz,

CKC is correct. You may certify the device under one FCC ID.

>>> EMC <emc@itl.co.il> 10/31/01 03:32AM >>>

Dear Mr. Phillips,

1. The main characteristics of the subject product are:
 - a. Spread spectrum (hopping), 902-928Mhz frequency range.
 - b. Designed to comply with Part15, Section 15.247.
 - c. Mobile (installed on vehicles).
 - d. Maximum R.F. power output: 1 W

- 
2. The manufacturer plans to use several versions, each will cover a segment of 2MHz within the 902-928MHz range.
 3. Our testing was performed at the lower, center, and upper edges of the 902-928MHz range, in order to cover the full frequency range.
 4. Frequency control in all versions is achieved via software programming.
All hardware circuitry is identical.
 5. We were in touch with CKC (U.S.A.) to approve this product under the TCB Route.
They informed us:
 - a. It cannot be approved under the TCB Route.
 - b. A single FCC ID No. could be used for the above versions.

My Question:

Please verify that CKC's interpretation concerning a single FCC ID No. is OK.

Best regards

Shaik Raz

EMC Laboratory Manager

EMC Laboratory

ITL (Product Testing) Ltd.

Kfar Bin Nun

Israel

Tel: +972-8-9797799

Fax: +972-8-9797702

Email: sraz@itl.co.il

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.4 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 March 9, 2001).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

The other tests in this report were performed at the Nexus Telocation Systems Ltd. facility, Givatayim, Israel.

1.5 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-1992. In accordance with Paragraph 5.4.6.2 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. Product Labeling

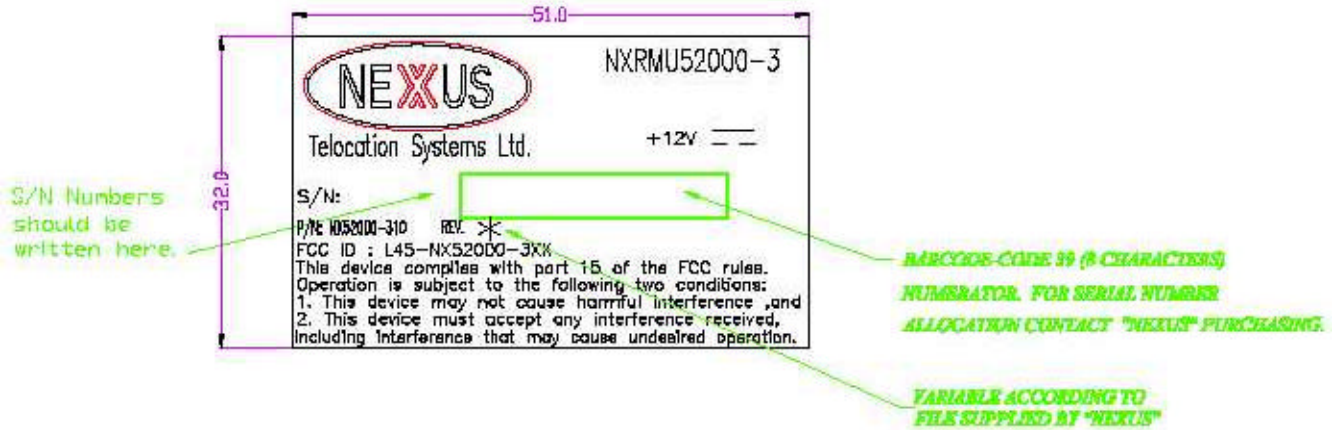


Figure 1. FCC Label

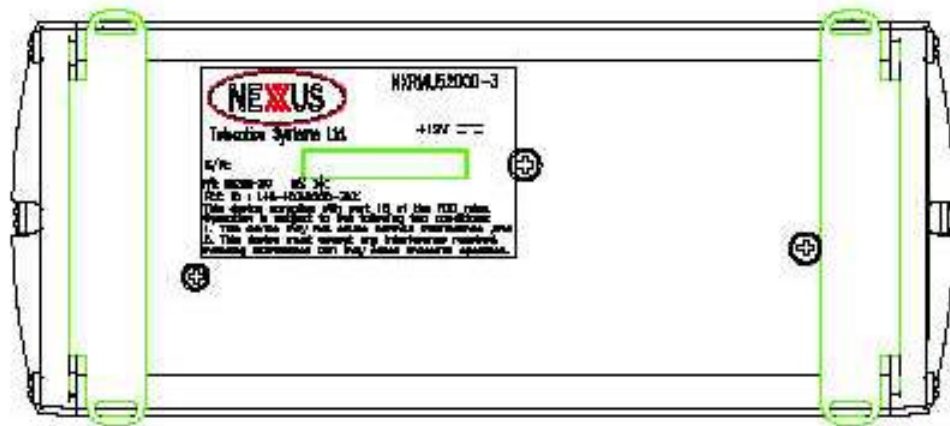


Figure 2. Location of Label on EUT

3. System Test Configuration

3.1 Justification

The E.U.T. was operated in two modes:

1. “Active Transmit” mode through the serial input op code.
2. “Receive” mode, activating the paging receiver.

During these two modes, the potential sources of emissions are active.

The E.U.T. output power is not programmable, and therefore it is tested while transmitting in a full 1watt peak output power.

3.2 EUT Exercise Software

The E.U.T. exercise program used in the testing procedures was the product’s standard ASIC operational firmware. The program was configured to operate the E.U.T.

3.3 Special Accessories

No special accessories were needed to achieve compliance.

3.4 Equipment Modifications

No equipment modifications were necessary.

3.5 Configuration of Tested System

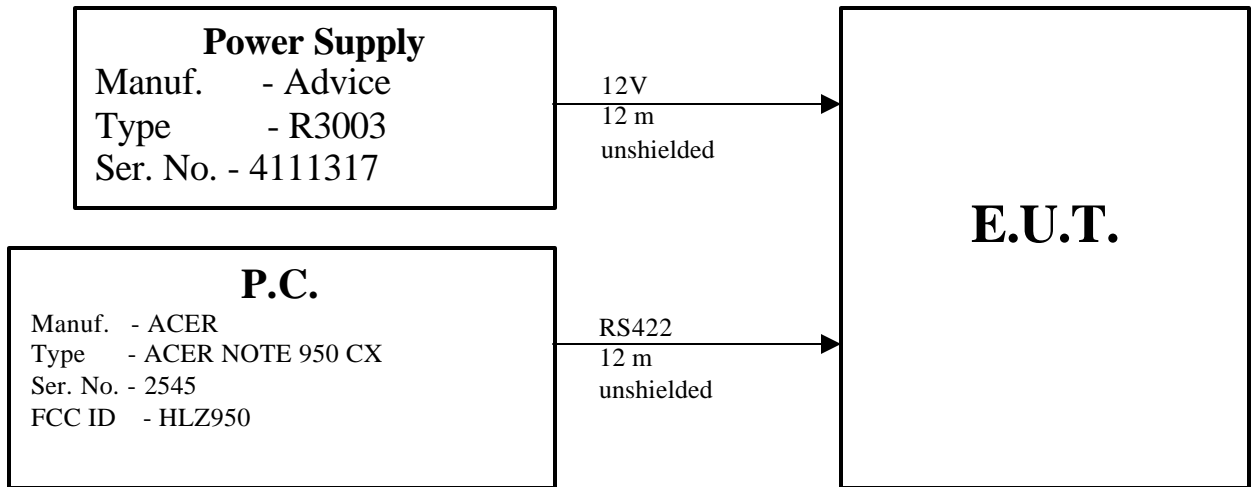


Figure 3. Configuration of Tested System



4. Block Diagram

4.1 *Schematic Block/Connection Diagram*

Intentionally blank for reasons of confidentiality.

Figure 4. Block Diagram

4.2 Theory of Operation

4.2.1. RMU components

4.2.1.1. Power Supply

The RMU operates on the 12 Volt external car's battery with a build-in backup battery that maintains the critical tasks in case the car battery is disconnected. The backup battery consists of 4 internal prismatic NiMH batteries packed as a single set. Upon external power-failure, the RMU draws the power from its internal battery.

4.2.1.2. Transmitter

The transmitter has three building blocks:

PLL (phase lock loop) based on a fractional frequency synthesizer.

DBPSK modulator.

RF amplifier.

4.2.1.3. Modulator

The modulator is a DBPSK modulator with 200 bps data rate. The modulation is carried out by generating a short pulsed frequency shift via the fractional synthesizer which ramps the phase.

The base-band ASIC implements the modulator. There is no specific RF modulator device.

This technique provides low phase noise and low spurious level.

4.2.1.4. Power Amplifier

A monolithic power amplifier is used to amplify the signal up to 30dbm. The amplifier gain is about 23db. It draws about 600 mA from the internal 5V supply.

4.2.1.5. Paging Receiver

The paging receiver is a standard paging receiver with double-conversion superhetrodyne receiver's architecture. The receiver operates in UHF band (929 to 931 MHz). The receiver is synthesized, & uses an external antenna, which is followed by a two-stage RF amplifier.

The UHF paging receiver uses the fractional synthesizer, which generates the first local oscillator. First IF of the receiver is at 45 MHz and the second IF is at 455kHz. An IF processor IC includes the second mixer, second LO, IF amplifier and limiter, and FSK (frequency shift keying) demodulator.

4.2.1.6. ASIC (application specific integral circuit)

The ASIC chip enclosure consists of an 80 pins package which includes the ASIC core, a 8051 low power CPU, PROM (programmable read only memory) containing the firmware and RAM (random access memory). This chip includes an external bus connection for interfacing external devices to the CPU (such as E2PROM [electrically erasable PROM], another CPU or any input/output device).

4.2.1.7. Inputs and outputs Interfaces

The RMU interfaces with the existing car alarm inputs by a signal line indicating when unauthorized use of the vehicle is made, and outputs for connecting or disconnecting electric elements in the car.

4.2.1.8 Serial interface

A RS422 communication port is available either for maintenance or for connection to a car alarm.

5. Radiated Measurement Photos



Figure 5. Radiated Emission Test. Front



Figure 6. Radiated Emission Test. Side

6. Radiated Emission, Below 1 GHz Transmit Mode

6.1 Test Specification

30-1000 MHz, F.C.C., Part 15, Subpart C

6.2 Test Procedure

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 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 3.1.

The frequency range 30-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emission levels for other frequencies were compared to the fundamental carrier level and the requirement of Section 15.249 (c).

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.

6.3 **Measured Data**

JUDGEMENT: Passed by 9.8 dB μ V/m

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification. The worst cases were:

for 902.2 MHz, 9.8 dB at 902.00 MHz frequency, vertical polarization.

for 915.0 MHz, 12.7 dB at 962.99 MHz frequency, vertical polarization

for 927.8 MHz, 11.0 dB at 928.00 MHz frequency, vertical polarization

The details of the highest emissions are given in Figure 7 to Figure 18.

TEST PERSONNEL:

Tester Signature: 

Date: 15.11.01

Typed/Printed Name: Y. Mordukhovitch

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal

Frequency range: 30 MHz to 300 MHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 902.2 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
37.99	20.1	16.9	13.6	40.0	-23.1
74.15	17.0	12.0	10.3	40.0	-28.0
115.52	19.5	14.5	13.3	43.5	-29.0
164.96	21.8	16.5	15.4	43.5	-27.0
265.35	33.3	27.4	21.4	46.0	-18.6
270.40	34.5	28.2	21.5	46.0	-17.8
274.69	34.9	28.7	21.7	46.0	-17.4

**Figure 7. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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 Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 902.2 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
335.39	31.4	25.6	16.1	46.0 *	-20.4
406.17	26.6	19.2	18.6	46.0 *	-26.8
613.48	38.9	33.4	22.5	46.0 *	-12.6
902.00	88.3	85.8	27.1	95.8**	-10.0
902.20	116.1	115.8	27.1	N/A ***	
928.00	35.1	30.0	27.6	95.8**	-65.8
969.39	39.1	34.0	28.4	54.0*	-20.0

**Figure 8. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

*Note: It is the specified limit for QP detector at 3m distance for Frequency Restricted Band according to FCC Part15, Subpart C.

**Note: The limit for field strength outside of Frequency Restricted Band is at least 20 dB below the field strength at the operating frequency 902.2 MHz. The limit is 95.8 dB μ V/m.

***Note: The standard has no field limit for the operating frequency.

Radiated Emission

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 902.2 MHz

Frequency (MHz)	Peak Amp (dBμV/m)	QP Amp (dBμV/m)	Correction (dB)	Specification (dBμV/m)	Margin (dB μV/m)
37.98	21.8	16.5	13.6	40.0	-23.5
114.83	21.6	15.8	13.3	43.5	-27.7
165.48	21.4	16.3	15.4	43.5	-27.2
263.56	30.3	24.5	21.4	46.0	-21.5
269.67	32.7	27.4	21.5	46.0	-18.6
270.75	32.5	26.9	21.6	46.0	-19.1
272.64	31.8	26.7	21.6	46.0	-19.3

**Figure 9. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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 Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 902.2 MHz

Frequency (MHz)	Peak Amp (dBμV/m)	QP Amp (dBμV/m)	Correction (dB)	Specification (dBμV/m)	Margin (dB μV/m)
330.98	23.2	17.6	15.9	46.0 *	-28.4
406.25	24.6	20.0	18.6	46.0*	-26.0
611.41	37.1	31.2	22.4	46.0*	-14.8
902.00	100.2	97.9	27.1	107.7**	-9.8
902.20	127.8	127.7	27.1	N/A ***	
928.00	45.2	39.8	27.6	107.7**	-67.9
960.47	44.3	39.0	28.2	54.0*	-15.0

**Figure 10. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

*Note: It is the specified limit for QP detector at 3m distance for Frequency Restricted Band according to FCC Part15, Subpart C.

**Note: The limit for field strength outside of Frequency Restricted Band is at least 20 dB below the field strength at the operating frequency 902.2 MHz. The limit is 107.7 dBμ V/m.

***Note: The standard has no field limit for the operating frequency.

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 915.0 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
37.84	19.7	14.3	13.7	40.0	-25.7
74.27	17.5	11.9	10.3	40.0	-28.1
130.30	19.9	14.6	13.9	43.5	-28.9
170.04	26.3	21.0	15.5	43.5	-22.5
257.38	33.4	27.5	21.1	46.0	-18.5
262.00	34.7	28.7	21.3	46.0	-17.3
276.85	34.1	28.1	21.8	46.0	-17.9

**Figure 11. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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 Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 915.0 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V/m)
335.30	28.9	22.6	16.1	46.0 *	-23.4
409.73	31.8	23.9	18.6	46.0 *	-22.1
613.74	38.6	33.2	22.5	46.0 *	-12.8
902.00	39.2	33.9	27.1	96.8 **	-62.9
914.99	117.1	116.8	27.4	N/A ***	
928.00	38.3	33.0	27.6	96.8 **	-63.8
990.43	38.5	32.8	28.7	54.0*	-21.2

**Figure 12. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

*Note: It is the specified limit for QP detector at 3m distance for Frequency Restricted Band according to FCC Part15, Subpart C.

**Note: The limit for field strength outside of Frequency Restricted Band is at least 20 dB below the field strength at operating frequency 915.0 MHz. The limit is 96.8 dB μ V/m.

***Note: The standard has no field limit for the operating frequency.

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 915.0 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
114.81	20.0	14.6	13.3	43.5	-28.9
130.71	19.8	14.8	14.0	43.5	-28.7
156.53	21.5	16.0	15.2	43.5	-27.5
165.58	21.2	16.1	15.4	43.5	-27.4
262.89	30.7	24.7	21.3	46.0	-21.3
263.91	31.0	25.2	21.4	46.0	-20.8
284.85	30.9	25.4	22.2	46.0	-20.6

**Figure 13. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: 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 Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 915.0 MHz

Frequency (MHz)	Peak Amp (dBμV/m)	QP Amp (dBμV/m)	Correction (dB)	Specification (dBμV/m)	Margin (dB μV/m)
334.26	24.7	18.0	16.0	46.0 *	-28.0
409.78	27.5	22.3	18.6	46.0 *	-23.7
609.09	38.0	32.5	22.4	46.0 *	-13.5
902.00	48.0	42.8	27.1	107.3 **	-64.5
914.99	127.6	127.3	27.4	N/A ***	
928.00	48.8	43.4	27.6	107.3**	-63.9
962.99	45.7	41.3	28.2	54.0 *	-12.7

**Figure 14. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

*Note: It is the specified limit of field strength for QP detector at frequency restricted band at 3m distance according to FCC Part15, Subpart C.

**Note: The limit for field strength outside of Frequency Restricted Band is at least 20 dB below the field strength at operating frequency 915 MHz. The limit is 107.3 dBμV/m.

***Note: The standard has no field limit for the operating frequency.

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 927.8 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V/m)
37.96	20.0	14.5	13.7	40.0	-25.5
74.98	18.0	13.2	10.3	40.0	-26.8
115.34	19.4	14.4	13.3	43.5	-29.1
156.85	21.2	16.1	15.2	43.5	-27.4
172.88	25.2	19.5	15.7	43.5	-24.0
278.36	34.6	29.2	21.8	46.0	-16.8
282.60	32.8	27.6	22.0	46.0	-18.4

**Figure 15. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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 Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
 Test Distance: 3 meters Detector: Peak, Quasi-peak
 Operating Frequency: 927.8 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
334.90	32.8	26.1	16.1	46.0 *	-19.9
409.52	34.5	28.0	18.6	46.0 *	-18.0
613.97	37.2	31.6	22.5	46.0 *	-14.4
902.00	35.9	30.7	27.1	94.8 **	-64.1
927.80	114.9	114.8	27.6	N/A ***	
928.00	88.9	83.2	27.6	94.8 **	-11.6
966.19	37.4	32.4	28.3	54.0*	-21.6

**Figure 16. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

*Note: It is the specified limit for QP detector at 3m distance for Frequency Restricted Band according to FCC Part15, Subpart C.

**Note: The limit of field strength outside of Frequency Restricted Band is at least 20 dB below the field strength at operating frequency 927.8 MHz. The limit is 94.8 dB μ V/m.

***Note: The standard has no field limit for the operating frequency.

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 927.8 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
38.16	21.9	16.6	13.6	40.0	-23.4
74.18	17.7	11.7	10.3	40.0	-28.3
115.05	19.4	14.4	13.3	43.5	-29.1
149.98	22.6	16.4	15.0	43.5	-27.1
156.80	21.1	16.2	15.2	43.5	-27.3
267.80	31.2	25.0	21.5	46.0	-21.0
278.16	34.2	27.5	21.8	46.0	-18.5

**Figure 17. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: 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 Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical

Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 927.8 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB μ V/m)
334.59	25.9	20.2	16.1	46.0 *	-25.8
409.59	29.9	23.8	18.6	46.0 *	-22.2
611.69	35.1	31.5	22.4	46.0 *	-14.5
902.00	42.4	37.2	27.1	106.8 **	-69.6
927.80	127.2	126.8	27.6	N/A ***	
928.00	100.8	95.8	27.6	106.8 **	-11.0
962.23	45.2	39.5	28.2	54.0 *	-14.5

**Figure 18. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

*Note: It is the specified limit for QP detector at 3m distance for Frequency Restricted Band according to FCC Part15, Subpart C.

**Note: The limit for field strength outside of Frequency Restricted Band is at least 20 dB below the field strength at operating frequency 927.8 MHz. The limit is 106.8 dB μ V/m.

***Note: The standard has no field limit for the operating frequency.

6.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 30,2000	1 year
RF Section	HP	85420E	3427A00103	November 30,2000	1 year
Antenna Bioconical HP	ARA	BCD 235/B	1041	April 01, 2001	1 year
Antenna –Log Periodic	ARA	LPD-2010/A	1038	March 29, 2001	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	ThinkJet 2225	2738508357.0	N/A	N/A

6.5 *Field Strength Calculation*

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

$$[\text{dB}\mu\text{v}/\text{m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

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

No external pre-amplifiers are used.

7. Radiated Emission, Above 1 GHz Transmit Mode

7.1 Radiated Emission Above 1 GHz

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, 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 3.1.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emission levels for other frequencies were compared to the fundamental carrier level and the requirement of Section 15.249 (c).

In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements and a High Pass Filter were used. The test distance was 3 meters.

In the frequency range 2.9-9.1 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

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.)

7.2 Test Data

JUDGEMENT: Passed by 1.6 dB μ V/m

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification. The worst cases were:

for 902.2 MHz, 4.5 dB at 1804.4 MHz frequency, vertical polarization.

for 915.0 MHz, 9.0 dB at 2745.00 MHz frequency, vertical polarization

for 927.8 MHz, 1.6 dB at 2783.40 MHz frequency, vertical polarization

The details of the highest emissions are given in Figure 19 to Figure 42.

TEST PERSONNEL:

Tester Signature: 

Date: 15.11.01



Typed/Printed Name: Y. Mordukhovitch

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 902.2 MHz

Freq.	Avg. Amp	Correction HPF	Correction Antenna and Cable	Avg. Det. Spec.	Final Result FR(A)	Avg. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note *	(dB)
1804.40	38.6	1.6	38.7	54.0	40.2	-13.8
2706.60	42.4	1.7	44.0	54.0	44.1	-9.9

**Figure 19. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

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.

Note*: In the frequency range from 1 GHz to 2.9 GHz, the final result of field strength was calculated directly by the EMI Receiver HP85420E software by using disks for antenna and cable correction factors, and using the following equation:

$$FR(A) = AVG + HPF$$

Where:

FR(A) (dB μV/m) is the final result of field strength for average detector,

AVG (dB μV/m) is the average detector measurement,

HPF (dB) is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 902.2 MHz

Freq.	Peak Amp	Correction HPF	Correction Antenna and Cable	Peak Det. Spec.	Final Result FR(P)	Peak Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note *	(dB)
1804.4	51.3	1.6	38.7	74.0	52.9	-21.1
2706.6	55.3	1.7	44.0	74.0	57.0	-17.0

**Figure 20. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

Note *: In the frequency range from 1.0 GHz to 2.9 GHz, the final result of field strength is calculated by the EMI Receiver HP 85420E software, using disks for antenna and cable corrections factors and the following equation:

$$FR(P) \text{ (dB}\mu\text{V/m)} = \text{Peak} + \text{HPF}$$

Where:

- FR(P) is the final result of peak detector field strength,.
- Peak (dBμV/m) is the peak detector measurement,
- HPF is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 902.2 MHz

Freq. (MHz)	Peak Amp (dBμV)	Correction Factors			Peak. Specification (dB μV/m)	Peak Final Result FR (P)* (dB μV/m) See Note *	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3608.80	36.1	33.7	2.2	30.5	74.0	41.5	-32.5
4511.00	40.9	35.2	2.4	30.5	74.0	48.0	-26.0
5413.20	36.1	36.6	2.6	30.3	74.0	45.0	-29.0
7217.60	38.8	38.9	3.2	29.8	74.0	51.1	-22.9
8119.8	37.3	40.0	4.0	29.9	74.0	51.4	-22.6
9022.0	36.5	40.8	4.4	30.0	74.0	51.7	-22.3

**Figure 21. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

Note *: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result.

Peak is peak detector measurement.

AF is antenna factor.

CF is cable factor.

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 902.2 MHz

Freq. (MHz)	Avg Amp (dBμV)	Correction Factors			AVG Specification (dB μV/m)	AVG Final Result FR (A) (dB μV/m) See Note *	AVG Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3608.80	23.4	33.7	2.2	30.5	54.0	28.8	-25.2
4511.00	37.5	35.2	2.4	30.5	54.0	44.6	-9.4
5413.20	25.9	36.6	2.6	30.3	54.0	34.8	-19.2
7217.60	28.7	38.9	3.2	29.8	54.0	41.0	-13.0
8119.8	26.0	40.0	4.0	29.9	54.0	40.1	-13.9
9022.0	25.0	40.8	4.4	30.0	54.0	40.2	-13.8

**Figure 22. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = AVG + AF + CF - PF$$

Where: FR(A) is final average detector result.

AVG is average detector measurement.

AF is antenna factor.

CF is cable factor.

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 902.2 MHz

Freq.	Avg. Amp	Correction HPF	Correction Antenna and Cable	Avg. Det. Spec.	Final Result FR(A)	Avg. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note *	(dB)
1804.4	47.9	1.6	38.7	54.0	49.5	-4.5
2706.6	44.1	1.7	44.0	54.0	45.8	-8.2

**Figure 23. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Average**

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.

Note*: In the frequency range from 1 GHz to 2.9 GHz, the final result of field strength was calculated directly by the EMI Receiver HP85420E software by using disks for antenna and cable correction factors, and the following equation:

$$FR(A) = AVG + HPF$$

Where :

FR(A) (dB μV/m) is the final result of field strength for average detector

AVG (dB μV/m) is the average detector measurement

HPF (dB) is the high pass filter attenuation

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 902.2 MHz

Freq.	Peak Amp	Correction HPF	Correction Antenna and Cable	Peak. Det. Spec.	Final Result FR(P)	Peak. Margin
(MHz)	(dBµV/m)	(dB)	(dB)	(dBµV/m)	(dB µV/m) See Note *	(dB)
1804.4	54.5	1.6	38.7	74.0	56.1	-17.9
2706.6	56.7	1.7	44.0	74.0	58.4	-15.6

Figure 24. Radiated Emission. Antenna Polarization: VERTICAL. Detector: 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.

Note*: In the frequency range from 1.0 GHz to 2.9 GHz, the final result of field strength is calculated by the EMI Receiver HP 85420E software by using disks for antenna and cable correction factors, and the following equation:

$$FR(P) \text{ (dB}\mu\text{V/m)} = \text{Peak} + \text{HPF}$$

Where:

FR(P) is the final result of peak detection field strength,
 Peak (dBµV/m) is the peak detector measurement,
 HPF is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 902.2 MHz

Freq. (MHz)	Peak Amp (dB μ V)	Correction Factors			Peak. Specification (dB μ V/m)	Peak Final Result FR (P) (dB μ V/m) See Note *	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3608.80	39.0	33.7	2.2	30.5	74.0	44.4	-29.6
3680.30	42.0	33.9	2.2	30.5	74.0	47.6	-26.4
3692.60	37.9	33.9	2.2	30.5	74.0	43.5	-30.5
4511.50	39.6	35.2	2.4	30.5	74.0	46.7	-27.3
5413.90	35.5	36.6	2.6	30.3	74.0	44.4	-29.6
8119.80	39.0	40.0	4.0	29.9	74.0	53.1	-20.9
9022.00	37.0	40.8	4.4	30.0	74.0	52.2	-21.8

**Figure 25. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result,
 Peak is peak detector measurement,
 AF is antenna factor,
 CF is cable factor,



PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 915.0 MHz

Freq. (MHz)	Avg Amp (dBµV)	Correction Factors			AVG Specification (dB µV/m)	AVG Final Result FR (A)* (dB µV/m) See Note *	AVG Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3608.80	28.2	33.7	2.2	30.5	54.0	34.0	-20.0
3680.30	27.3	33.9	2.2	30.5	54.0	32.9	-21.1
3692.60	26.7	33.9	2.2	30.5	54.0	32.3	-21.7
4511.50	33.0	35.2	2.4	30.5	54.0	40.1	-13.9
5413.90	26.4	36.6	2.6	30.3	54.0	35.3	-18.7
8119.80	26.0	40.0	4.0	29.9	54.0	40.1	-13.9
9022.00	25.1	40.8	4.4	30.0	54.0	40.3	-13.7

**Figure 26. Radiated Emission. Antenna Polarization: VERTICAL
 Detector: Average**

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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = AVG + AF + CF - PF$$

Where: FR(A) is average detector result,

AVG is average detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.



Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 915 MHz

Freq.	Avg. Amp	Correction HPF	Correction Antenna and Cable	Avg. Det. Spec.	Final Result FR(A)	Avg. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note *	(dB)
1830.00	36.3	1.6	39.0	54.0	37.9	-16.1
2745.10	42.6	1.7	44.3	54.0	44.3	-9.7

**Figure 27. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

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.

Note*: In the frequency range from 1 GHz to 2.9 GHz, the final result of field strength was calculated directly by the EMI Receiver HP85420E software, using disks for antenna and cable correction factors , and the following equation:

$$FR(A) = AVG + HPF$$

Where:

FR(A) is the final result for average detector

AVG (dB μV/m) is the average detector measurement

HPF (dB) is the high pass filter attenuation

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C:
 Class B

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 915 MHz

Freq.	Peak Amp	Correction HPF	Correction Antenna and Cable	Peak Det. Spec.	Final Result FR(P)	Peak. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note *	(dB)
1830.00	49.1	1.6	39.0	74.0	50.7	-13.3
2745.10	55.7	1.7	44.3	74.0	57.4	-16.6

**Figure 28. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

Note*: In the frequency range from 1.0 GHz to 2.9 GHz, the final result of field strength is calculated by the software of the EMI Receiver HP 85420E, and using the disks for antenna and cable correction factors, and the following equation:

$$FR(P) = Peak + HPF$$

Where:

FR(P) is the final result of peak detector field strength,

Peak is the peak detector measurement,

HPF is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 915 MHz

Freq. (MHz)	Peak Amp (dBμV)	Correction Factor			Peak. Specification (dB μV/m)	Peak Final Result FR (P) (dB μV/m) See Note *.	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3603.00	36.7	33.7	2.2	30.5	74.0	42.1	-31.9
3660.00	35.1	33.8	2.2	30.5	74.0	40.6	-33.4
4575.00	41.9	35.4	2.4	30.5	74.0	49.2	-24.8
7320.00	39.4	39.0	3.2	29.8	74.0	51.8	-22.2
8235.00	38.5	40.1	4.0	29.9	74.0	52.7	-21.3
9150.00	36.2	40.9	4.4	30.0	74.0	51.5	-22.5

**Figure 29. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result,

Peak is peak detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal

Frequency range: 2.9 GHz to 9.3 GHz

Test Distance: 3 meters

Detector: Average

Operating Frequency: 915 MHz

Freq. (MHz)	Avg Amp (dBμV)	Correction Factors			AVG Specification (dB μV/m)	AVG Final Result FR (A) (dB μV/m) See Note *.	AVG Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3603.00	26.6	33.7	2.2	30.5	54.0	32.0	-22.0
3660.00	23.7	33.8	2.2	30.5	54.0	29.2	-24.8
4575.00	36.4	35.4	2.4	30.5	54.0	43.7	-10.3
7320.00	29.3	39.0	3.2	29.8	54.0	41.7	-12.3
8235.00	25.9	40.1	4.0	29.9	54.0	40.1	-13.9
9150.00	25.1	40.9	4.4	30.0	54.0	40.4	-13.6

**Figure 30. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = AVG + AF + CF - PF$$

Where: FR(A) is final average detector result,

AVG is average detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Average
Operating Frequency: 915 MHz

Freq.	Avg. Amp	Correction HPF	Correction Antenna and Cable	Avg. Det. Spec.	Final Result FR(A)	Avg. Margin
(MHz)	(dB μ V/m)	(dB)	(dB)	(dB μ V/m)	(dB μ V/m) See Note *.	(dB)
1830.00	38.1	1.6	39.0	54.0	39.7	-14.3
2745.00	43.3	1.7	44.3	54.0	45.0	-9.0

**Figure 31. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Average**

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.

Note*: In the frequency range from 1 GHz to 2.9 GHz, the final result of field strength was calculated directly by the EMI Receiver HP85420E software, using the disks for antenna and cable correction factors and the following equation:

$$FR(A) = AVG + HPF$$

Where :

FR(A) is the final result for average detector

AVG (dB μ V/m) is the average detector measurement

HPF (dB) is the high pass filter attenuation

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 915 MHz

Freq. (MHz)	Peak Amp (dBµV/m)	Correction HPF (dB)	Correction Antenna and Cable (dB)	Peak Det. Spec. (dBµV/m)	Final Result FR(P) (dB µV/m) See Note*.	Peak. Margin (dB)
1830.00	50.3	1.6	39.0	74.0	51.9	-22.1
2745.00	55.8	1.7	44.3	74.0	57.5	-16.5

Figure 32. Radiated Emission. Antenna Polarization: VERTICAL. Detector: 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.

Note*: In the frequency range from 1.0 GHz to 2.9 GHz, the final result of field strength is calculated directly by the EMI Receiver HP 85420E software and using disks for antenna and cables correction factors and the following equation:

$$FR(P) = Peak + HPF$$

Where:

FR(P) is the final result of peak detector field strength,

Peak (dBµV/m) is the peak detector measurement,

HPF is the high pass filter attenuation

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 915 MHz

Freq. (MHz)	Peak Amp (dBμV)	Correction Factor			Peak. Specification ** (dB μV/m)	Peak Final Result FR (P) (dB μV/m) See Note *.	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3660.00	35.0	33.8	2.2	30.5	74.0	40.5	-33.5
4575.00	36.5	35.4	2.4	30.5	74.0	43.8	-30.2
7320.00	39.5	39.0	3.2	29.8	74.0	51.9	-22.1
8235.00	36.5	40.1	4.0	29.9	74.0	50.7	-23.3
9150.00	36.9	40.9	4.4	30.0	74.0	52.2	-21.8

**Figure 33. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

Note*: In the frequency range above 2.9 GHz, the field strength is manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result,
 Peak is peak detector measurement,
 AF is antenna factor,
 CF is cable factor,
 PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 915 MHz

Freq. (MHz)	AVG Amp (dBμV)	Correction Factors			AVG Specification (dB μV/m)	AVG Final Result FR (A) (dB μV/m) See Note*.	AVG Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3660.00	23.6	33.8	2.2	30.5	54.0	28.9	-25.1
4575.00	26.2	35.4	2.4	30.5	54.0	33.5	-20.1
7320.00	28.8	39.0	3.2	29.8	54.0	41.2	-12.8
8235.00	26.0	40.1	4.0	29.9	54.0	40.2	-13.8
9150.00	25.0	40.9	4.4	30.0	54.0	40.3	-13.7

**Figure 34. Radiated Emission. Antenna Polarization: VERTICAL
 Detector: Average**

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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = AVG + AF + CF - PF$$

Where: FR(A) is average detector result,

AVG is average detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 927.8 MHz

Freq.	Avg. Amp	Correction HPF	Correction Antenna and Cable	Avg. Det. Spec.	Final Result FR(A)	Avg. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note *.	(dB)
1855.60	39.6	1.6	39.2	54.0	41.3	-12.7
2783.40	46.5	1.7	44.5	54.0	48.2	-5.8

**Figure 35. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Average**

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.

Note*: In the frequency range from 1 GHz to 2.9 GHz, the final result of field strength was calculated directly by the EMI Receiver HP85420E software, using disks for antenna and cable correction factors and the following equation:

$$FR(A) = AVG + HPF$$

Where:

FR(A) is the final result for average detector,

AVG (dB μV/m) is the average detector measurement,

HPF (dB) is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 927.8 MHz

Freq.	Peak Amp	Correction HPF	Correction	Peak Det. Spec.	Final Result FR(P)	Peak. Margin
(MHz)	(dBμV/m)	(dB)	Antenna and Cable (dB)	(dBμV/m).	(dB μV/m) See Note *.	(dB)
1855.60	51.3	1.6	39.2	74.0	52.9	-21.1
2783.40	56.9	1.7	44.5	74.0	58.6	-25.4

**Figure 36. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

Note*: In the frequency range from 1.0 GHz to 2.9 GHz, the final result of field strength is calculated directly by the EMI Receiver HP 85420E software using disks for antenna and cable correction factors and the following equation:

$$FR(P) \text{ (dB}\mu\text{V/m)} = \text{Peak} + \text{HPF}$$

Where:

FR(P) is the final result of peak detector field strength,

Peak (dBμV/m) is the peak detector measurement,

HPF is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 9.3GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 927.8 MHz

Freq. (MHz)	Peak Amp (dBμV)	Correction Factors			Peak. Specification ** (dB μV/m)	Peak Final Result FR (P)* (dB μV/m) See Note *.	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3600.00	34.9	33.7	2.2	30.5	74.0	40.3	-33.7
3711.20	39.0	33.9	2.2	30.5	74.0	44.6	-29.4
4639.00	40.8	35.5	2.4	30.5	74.0	48.2	-25.8
6494.60	36.9	38.1	3.0	30.1	74.0	47.9	-26.1
7422.40	38.7	39.2	3.2	29.8	74.0	51.3	-22.7
8350.20	36.8	40.0	4.0	29.9	74.0	50.9	-23.1
9278.00	37.3	41.0	4.4	30.0	74.0	52.7	-21.3

**Figure 37. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result,
 Peak is peak detector measurement,
 AF is antenna factor,
 CF is cable factor,
 PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal

Frequency range: 2.9 GHz to 9.3 GHz

Test Distance: 3 meters

Detector: Average

Operating Frequency: 927.8 MHz

Freq. (MHz)	AVG Amp (dBμV)	Correction Factors			AVG Specification (dB μV/m)	AVG Final Result FR (A) (dB μV/m) See Note *.	AVG Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3600.00	23.4	33.7	2.2	30.5	54.0	28.8	-25.2
3711.20	27.5	33.9	2.2	30.5	54.0	33.1	-20.9
4639.00	35.8	35.5	2.4	30.5	54.0	43.1	-10.9
6494.60	28.0	38.1	3.0	30.1	54.0	39.0	-15.0
7422.40	26.6	39.2	3.2	29.8	54.0	39.2	-14.8
8350.20	25.8	40.0	4.0	29.9	54.0	39.9	-14.1
9278.00	25.0	41.0	4.4	30.0	54.0	40.4	-13.6

**Figure 38. Radiated Emission. Antenna Polarization: AVERAGE.
 Detector: 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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = AVG + AF + CF - PF$$

Where: FR(A) is final average detector result,

AVG is average detector measurement,

AF is antenna factor,



CF is cable factor.

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 927.8 MHz

Freq.	Avg. Amp	Correction HPF	Correction Antenna and Cable	Avg. Det. Spec.	Final Result FR(A)	Avg. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m)	(dB μV/m) See Note*.	(dB)
1855.60	43.3	1.6	39.2	54.0	44.9	-9.1
2783.40	50.7	1.7	44.5	54.0	52.4	-1.6

**Figure 39. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Average**

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.

Note*: In the frequency range from 1 GHz to 2.9 GHz, the final result of field strength was calculated directly by the EMI Receiver HP85420E software, and using disks for antenna and cable correction factors and the following equation:

$$FR(A) = AVG + HPF$$

Where :

FR(A) (dB μV/m) is the final result for average detector,
 AVG (dB μV/m) is the average detector measurement,
 HPF (dB) is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 927.8 MHz

Freq.	Peak Amp	Correction HPF	Correction Antenna and Cable	Peak Spec.	Final Result FR(P)	Peak. Margin
(MHz)	(dBμV/m)	(dB)	(dB)	(dBμV/m).	(dB μV/m) See Note *.	(dB)
1855.60	52.3	1.6	39.2	74.0	53.9	-20.1
2783.40	59.0	1.7	44.5	74.0	60.7	-13.3

Figure 40. Radiated Emission. Antenna Polarization: VERTICAL. Detector: 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.

Note*: In the frequency range from 1.0 GHz to 2.9 GHz, the final result of field strength is calculated by the EMI Receiver HP 85420E software using disks for antenna and cable correction factors and the following equation:

$$FR(P) \text{ (dB}\mu\text{V/m)} = \text{Peak} + \text{HPF}$$

Where:

FR(P) is the final result of peak detection field strength,

Peak (dBμV/m) is the peak detector measurement,

HPF is the high pass filter attenuation.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 927.8 MHz

Freq. (MHz)	Peak Amp (dBμV)	Correction Factors			Peak. Specification (dB μV/m)	Peak Final Result FR (P) (dB μV/m) See Note *.	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3711.20	39.5	33.9	2.2	30.5	74.0	45.1	-28.9
4639.00	36.8	35.5	2.4	30.5	74.0	44.2	-29.8
6494.60	36.0	36.1	3.0	30.1	74.0	47.0	-27.0
7422.40	38.9	39.2	3.2	29.8	74.0	51.5	-22.5
8350.20	37.5	40.0	4.0	29.9	74.0	51.6	-22.4
9278.0	38.0	41.0	4.4	30.0	74.0	53.4	-20.6

**Figure 41. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result,

Peak is peak detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.

Radiated Emission Above 1 GHz

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 9.3 GHz
 Test Distance: 3 meters Detector: Average
 Operating Frequency: 927.8 MHz

Freq. (MHz)	AVG Amp (dBμV)	Correction Factors			AVG Specification (dB μV/m)	AVG Final Result FR (A) (dB μV/m) See Note*.	AVG Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3711.20	28.1	33.9	2.2	30.5	54.0	33.7	-20.3
4639.00	29.9	35.5	2.4	30.5	54.0	37.3	-16.7
6494.60	25.1	38.1	3.0	30.1	54.0	36.1	-17.9
7422.40	27.8	39.2	3.2	29.8	54.0	40.4	-13.6
8350.20	26.0	40.0	4.0	29.9	54.0	40.1	-13.9
9278.0	25.0	41.0	4.4	30.0	54.0	40.4	-13.6

**Figure 42. Radiated Emission. Antenna Polarization: VERTICAL
 Detector: Average**

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.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = AVG + AF + CF - PF$$

Where: FR(A) is average detector result,

AVG is average detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.

7.3 Test Instrumentation Used, Radiated Measurements Above 1 GHz

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
Receiver	HP	85422E	3411A00102	November 30, 2000	1 year
RF Section	HP	85420E	3427A00103	November 30, 2000	1 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001.0	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet2225	2738508357.0	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253.0	January 31,2001	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	002	March 30, 2001	1 year
1 GHz High Pass Filter	Technion Haifa	915-HPF	01	May, 2, 2001	1 year
Spectrum Analyzer	HP	8592L	3745A08184	January 31,2001	1 year

8. Radiated Emission, Receive Mode

8.1 Test Specification

30-5000 MHz, F.C.C., Part 15, Subpart B

8.2 Test Procedure

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 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 3.1.

The frequency range 30-1000 5MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of emission were compared to Class B requirements of Section 15.109.

In the frequency range 0.03-2.9 GHz, a computerized EMI receiver complying to CISPR 16-1 requirements was used. The test distance was 3 meters.

In the frequency range 2.9-5 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

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.

8.3 **Measured Data**

JUDGEMENT: Passed by 1.1 dB μ V/m

The EUT met the requirements of the F.C.C. Part 15, Subpart B, specification. The worst cases were:

for 929.5 MHz, 3.0 dB at 884.50 MHz frequency, vertical polarization.

for 931.5 MHz, 1.1 dB at 2882.54 MHz frequency, vertical polarization.

The details of the highest emissions are given in Figure 43 to Figure 74.

TEST PERSONNEL:

Tester Signature:  Date: 15.11.01

Typed/Printed Name: Y. Mordukhovitch

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal

Frequency range: 30 MHz to 300 MHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 929.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
46.48	18.0	13.1	12.1	40.0	-26.9
85.39	17.9	12.4	11.0	40.0	-27.6
125.48	20.3	14.7	13.8	43.5	-28.8
185.33	22.3	17.3	16.4	43.5	-26.2
214.46	24.6	19.2	18.3	43.5	-24.3
264.40	27.8	22.5	21.4	46.0	-23.5

**Figure 43. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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.

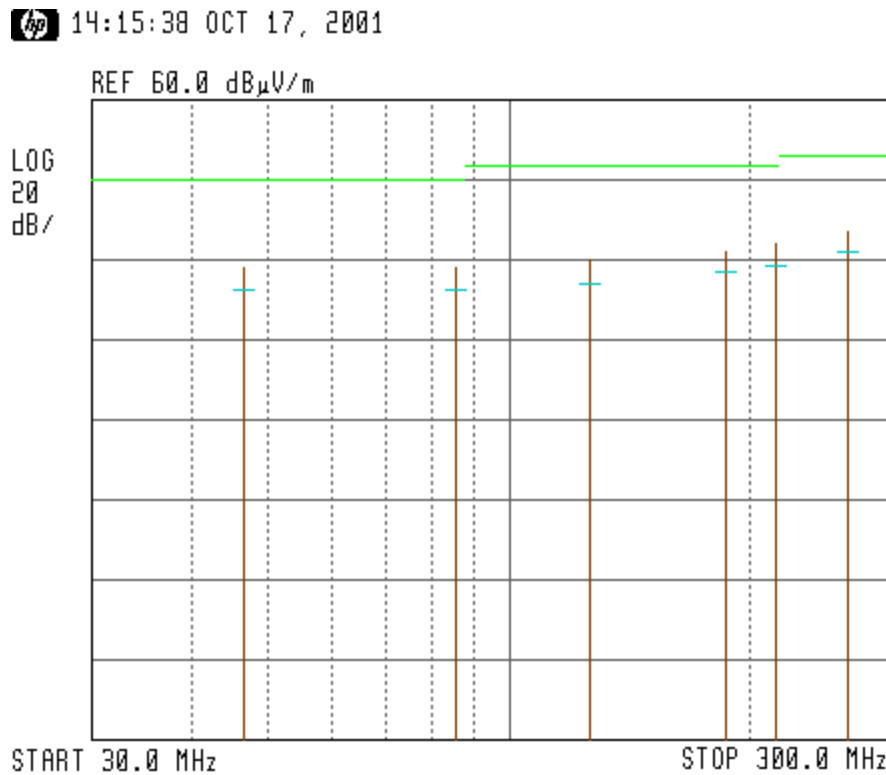
Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal
Test Distance: 3 meters
Operating Frequency: 929.5 MHz

Frequency range: 30 MHz to 300 MHz
Detector: Peak, Quasi-peak



**Figure 44. 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 μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal

Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 929.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
326.90	22.8	17.0	15.8	46.0	-29.0
388.83	24.7	19.6	18.1	46.0	-26.4
420.80	25.4	20.2	18.8	46.0	-25.8
488.82	26.1	21.1	19.7	46.0	-24.9
525.77	27.8	21.9	20.5	46.0	-24.1
587.86	28.9	23.8	21.9	46.0	-22.2
884.50	45.2	42.2	26.8	46.0	-3.8

**Figure 45. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Peak, Quasi-peak**

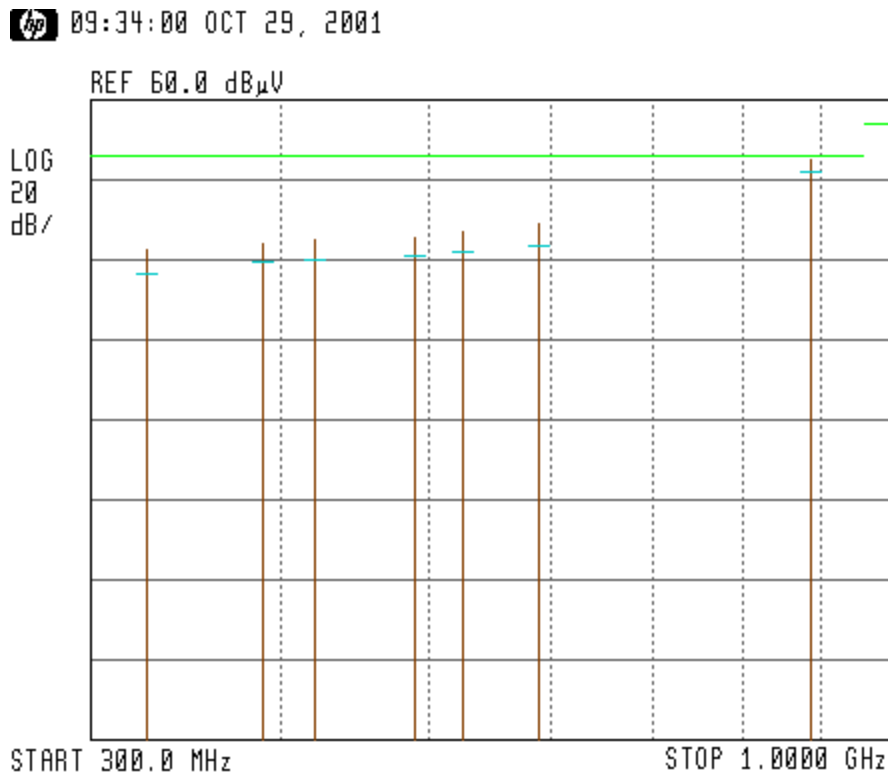
Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal
Test Distance: 3 meters
Operating Frequency: 929.5 MHz

Frequency range: 300 MHz to 1 GHz
Detector: Peak, Quasi-peak



**Figure 46. 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 μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Average
Operating Frequency: 929.5 MHz

Frequency (MHz)	Average Amplitude (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1018.92	28.4	31.8	54.0	-25.6
1499.83	33.3	36.4	54.0	-20.7
1769.00	35.5	38.4	54.0	-18.5
1993.99	40.4	40.5	54.0	-13.6
2653.50	41.9	43.7	54.0	-12.1
2878.33	46.8	45.1	54.0	-7.2

**Figure 47. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Average**

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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Peak
Operating Frequency: 929.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1018.92	41.7	31.8	74.0	-32.3
1499.83	46.3	36.4	74.0	-27.7
1769.00	48.8	38.4	74.0	-25.2
1993.99	51.9	40.5	74.0	-22.1
2653.50	55.3	43.7	74.0	-18.7
2878.33	57.8	45.1	74.0	-16.2

**Figure 48. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

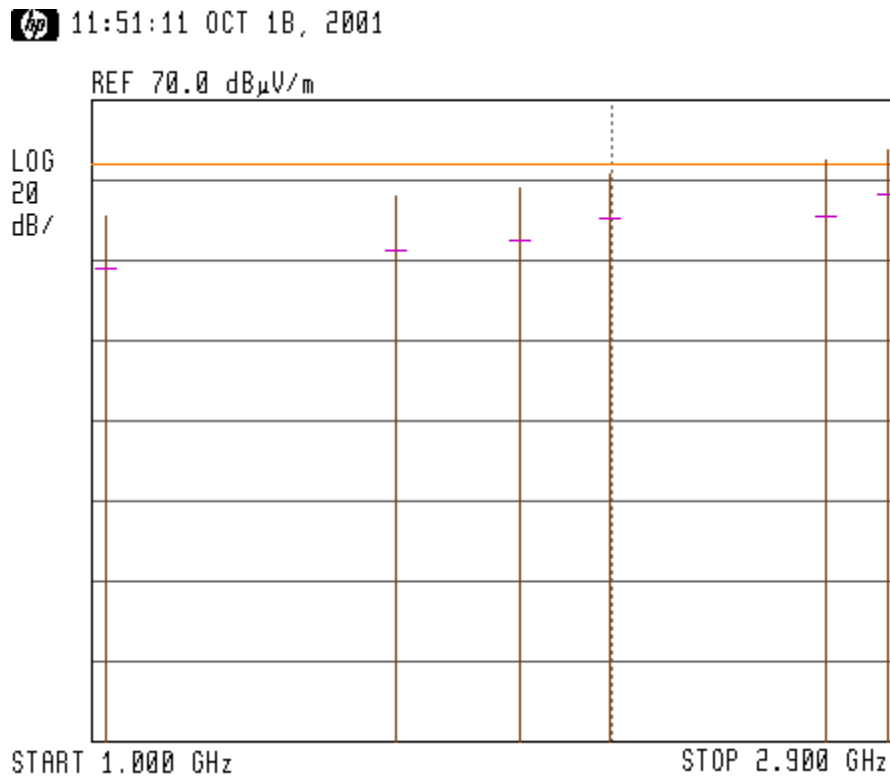
Antenna Polarization: Horizontal

Frequency range: 1 GHz to 2.9 GHz

Test Distance: 3 meters

Detector: Peak, Average

Operating Frequency: 929.5 MHz



**Figure 49. Radiated Emission. Antenna Polarization: HORIZONTAL
Detectors: Peak, Average**

Note:

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

Radiated Emission

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 5.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 929.5 MHz

Freq. (MHz)	Peak Reading (dBμV)	Correction Factors			Avg Specification (dB μV/m)	Peak Result (dB μV/m)	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3200.00	37.2	33.1	2.0	30.5	54.0	42.5	-11.5
3538.01	36.4	33.6	2.2	30.5	54.0	41.7	-12.3
3800.00	33.8	34.0	2.4	30.5	54.0	39.7	-14.3
4100.00	34.7	34.5	2.5	30.5	54.0	41.2	-12.8
4422.50	37.8	35.1	2.6	30.5	54.0	45.0	-9.0
4800.00	33.6	35.8	3.0	30.4	54.0	42.0	-12.0

**Figure 50. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

Frequency range: 30 MHz to 300 MHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 929.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
42.87	18.3	13.5	12.6	40.0	-26.5
85.19	18.2	12.6	11.0	40.0	-27.4
118.27	21.3	14.9	13.5	43.5	-28.6
185.87	27.0	18.2	16.4	43.5	-25.3
217.52	28.1	20.0	18.5	46.0	-26.0
278.42	27.7	22.9	21.8	46.0	-23.1

**Figure 51. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

Frequency range: 30 MHz to 300 MHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 929.5 MHz

12:34:20 OCT 17, 2001

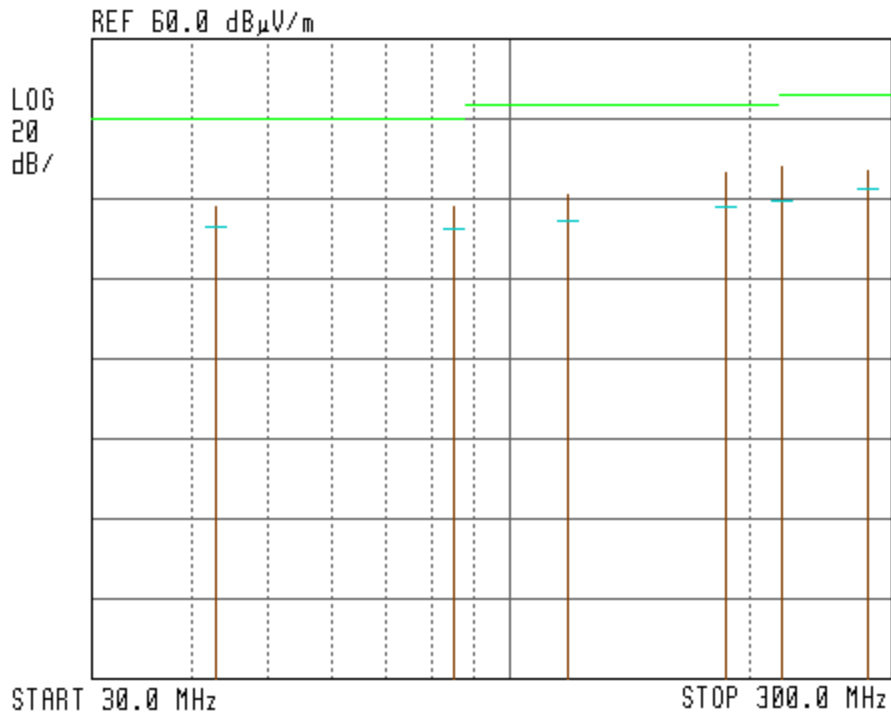


Figure 52. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

- 1. Horizontal axis shows logarithmic frequency scale.*
- 2. The vertical axis shows amplitude (in dB μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 929.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
320.09	21.6	16.5	15.5	46.0	-29.5
385.08	24.6	19.4	17.9	46.0	-26.6
416.17	25.8	20.1	18.7	46.0	-25.9
477.09	25.7	21.1	19.6	46.0	-24.9
518.92	26.8	21.6	20.3	46.0	-24.4
578.89	28.6	23.4	21.7	46.0	-22.6
884.50	46.4	43.0	26.8	46.0	-3.0

**Figure 53. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Peak, Quasi-peak**

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

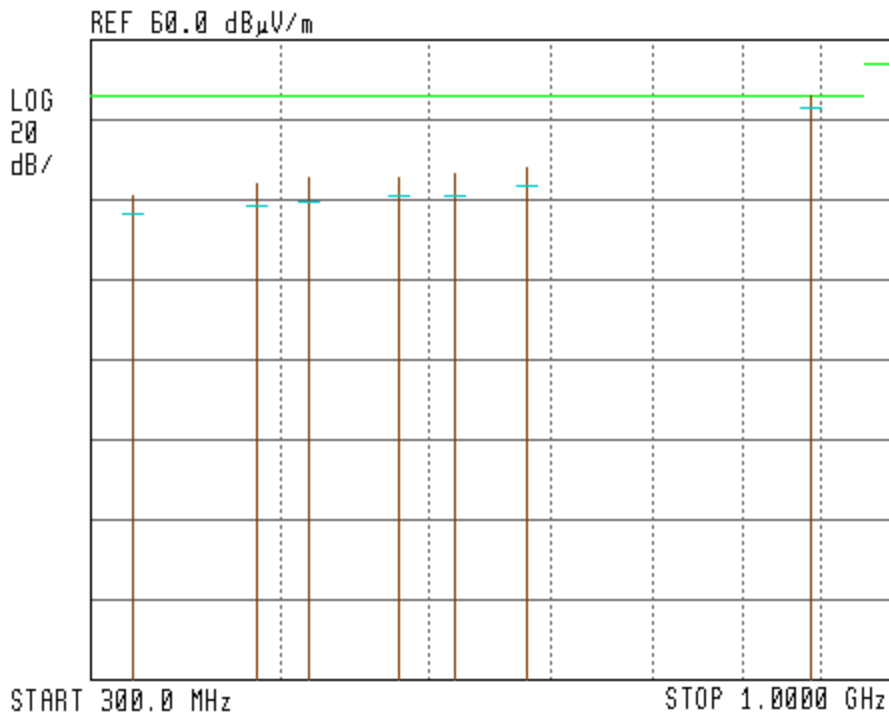
Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 929.5 MHz

16:04:12 OCT 17, 2001



**Figure 54. 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 μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Average
Operating Frequency: 929.5 MHz

Frequency (MHz)	Average Amplitude (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1119.96	29.5	32.8	54.0	-24.5
1500.00	33.3	36.4	54.0	-20.7
1769.00	35.5	38.4	54.0	-18.5
1994.77	44.3	40.5	54.0	-9.7
2653.50	42.5	43.7	54.0	-11.5
2879.21	50.1	45.1	54.0	-3.9

**Figure 55. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Average**

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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Peak
Operating Frequency: 929.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1119.96	43.6	32.8	74.0	-30.4
1500.00	46.4	36.4	74.0	-27.6
1769.00	48.8	38.4	74.0	-25.2
1994.77	53.4	40.5	74.0	-20.6
2653.50	54.9	43.7	74.0	-19.1
2879.21	59.4	45.1	74.0	-14.6

**Figure 56. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

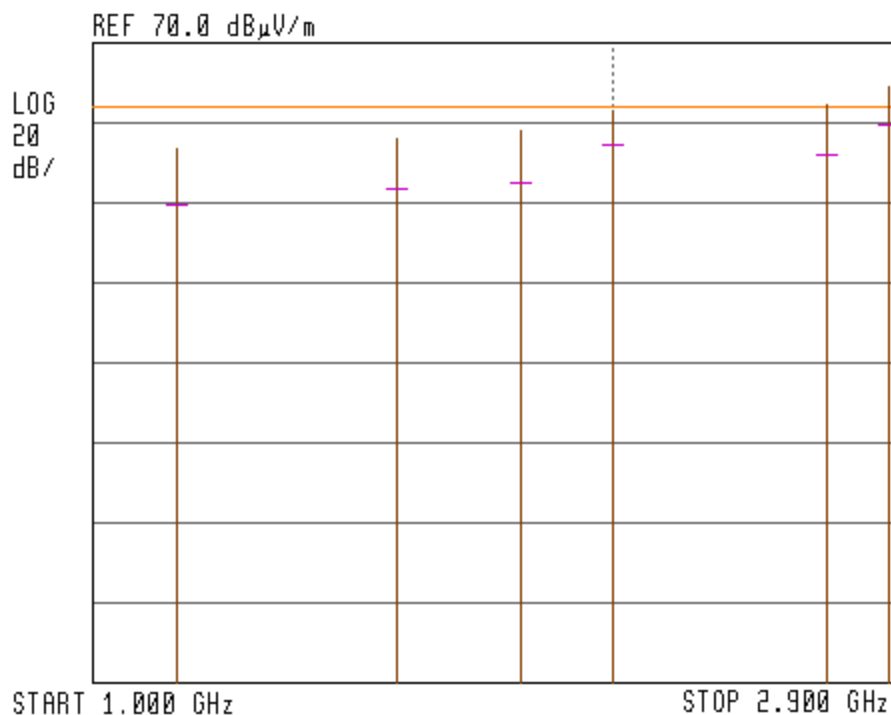
Frequency range: 1 GHz to 2.9 GHz

Test Distance: 3 meters

Detector: Peak, Average

Operating Frequency: 929.5 MHz

11:08:34 OCT 18, 2001



**Figure 57. Radiated Emission. Antenna Polarization: VERTICAL
Detectors: Peak, Average**

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. Average detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 5.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 929.5 MHz

Freq. (MHz)	Peak Reading (dB μ V)	Correction Factors			Avg Specification (dB μ V/m)	Peak Result (dB μ V/m)	Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Pream p PF (dB)			
3200.00	37.2	33.1	2.0	30.5	54.0	42.8	-11.2
3538.01	38.0	33.6	2.2	30.5	54.0	43.3	-10.7
3800.00	33.9	34.0	2.4	30.5	54.0	39.8	-14.2
4100.00	34.7	34.5	2.5	30.5	54.0	41.2	-12.8
4422.01	35.7	35.1	2.6	30.5	54.0	42.9	-11.1
4800.00	33.6	35.8	3.0	30.4	54.0	42.0	-12.0

**Figure 58. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 30 MHz to 300 MHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 931.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
45.04	18.9	13.4	12.3	40.0	-26.6
85.11	17.2	12.4	11.0	40.0	-27.6
128.23	21.0	15.2	13.9	43.5	-28.3
174.32	21.8	16.6	15.8	43.5	-26.9
219.00	26.4	19.8	18.6	46.0	-26.2
279.07	28.4	23.0	21.9	46.0	-23.0

**Figure 59. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal

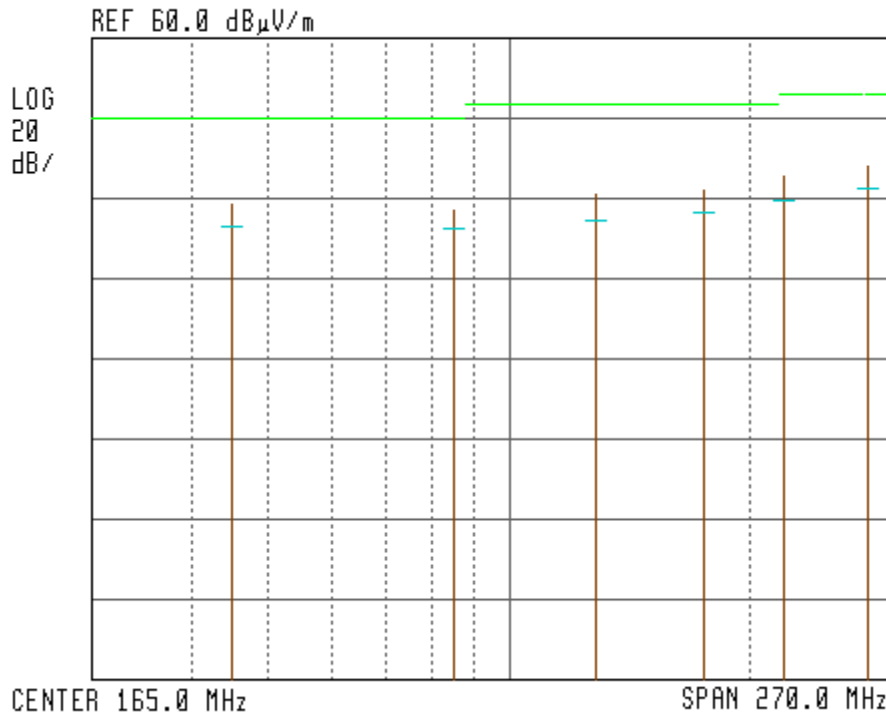
Frequency range: 30 MHz to 300 MHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 931.5 MHz

13:39:05 OCT 17, 2001



**Figure 60. 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 μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 300 MHz to 1 GHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 931.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
311.90	21.7	16.4	15.2	46.0	-29.6
379.09	24.1	19.1	17.7	46.0	-26.9
415.88	25.2	20.2	18.7	46.0	-25.8
486.96	26.5	21.2	19.7	46.0	-24.8
518.90	27.3	21.8	20.3	46.0	-24.2
578.88	28.5	23.5	21.7	46.0	-22.5
886.50	43.8	40.8	26.8	46.0	-5.2

**Figure 61. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Peak, Quasi-peak**

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal

Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 931.5 MHz

16:55:22 OCT 17, 2001

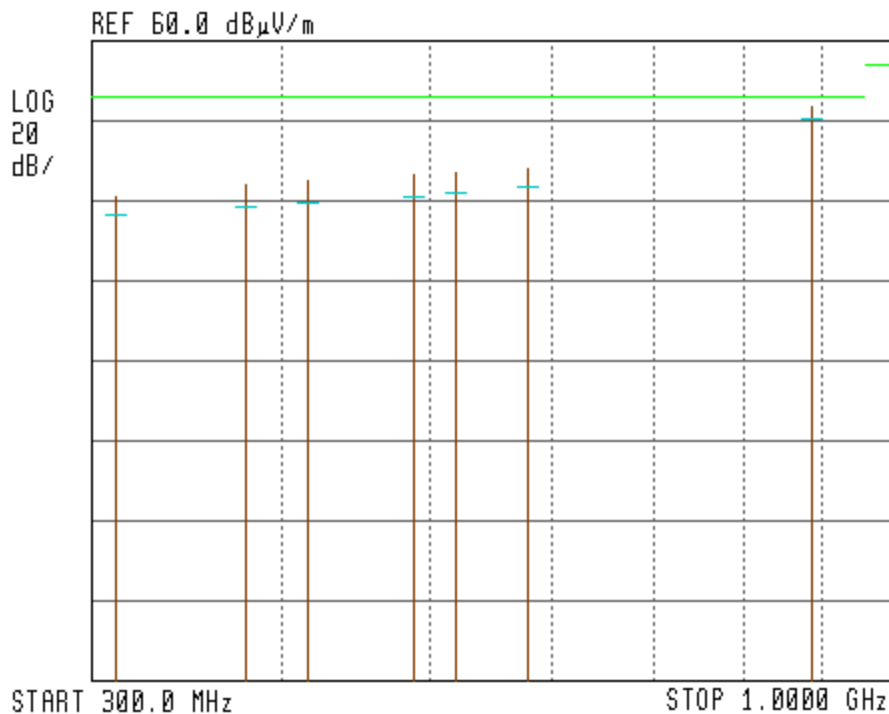


Figure 62. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detectors: Peak, Quasi-peak

Note:

1. Horizontal axis shows logarithmic frequency scale.
2. The vertical axis shows amplitude (in dB μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Average
Operating Frequency: 931.5 MHz

Frequency (MHz)	Average Amplitude (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1010.00	28.5	31.7	54.0	-25.5
1500.00	33.5	36.4	54.0	-20.5
1773.00	35.7	38.5	54.0	-18.3
1996.86	40.4	40.6	54.0	-13.6
2659.50	42.5	43.7	54.0	-11.5
2883.56	48.2	45.2	54.0	-5.8

**Figure 63. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Average**

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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B:
Class B

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Peak
Operating Frequency: 931.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1010.00	42.0	31.7	74.0	-32.0
1500.00	46.4	36.4	74.0	-27.6
1773.00	48.9	38.5	74.0	-25.1
1996.86	52.5	40.6	74.0	-21.5
2659.50	56.5	43.7	74.0	-17.5
2883.56	59.2	45.2	74.0	-14.8

**Figure 64. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

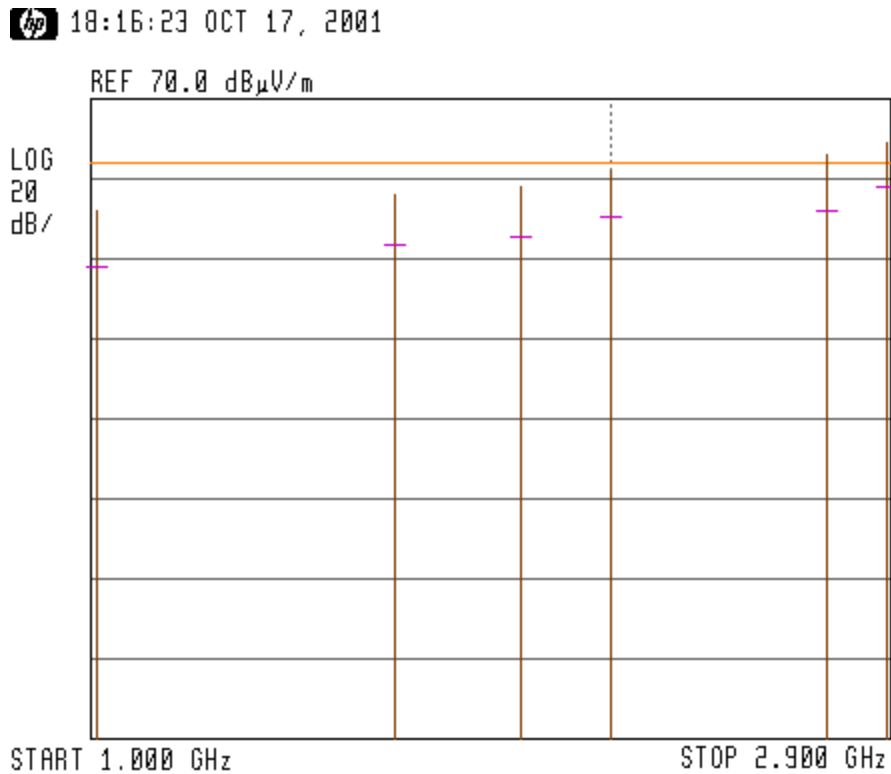
Antenna Polarization: Horizontal

Frequency range: 1 GHz to 2.9 GHz

Test Distance: 3 meters

Detector: Peak, Average

Operating Frequency: 931.5 MHz



**Figure 65. Radiated Emission. Antenna Polarization: HORIZONTAL
Detectors: Peak, Average**

Note:

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



Radiated Emission

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 5.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 931.5 MHz

Freq. (MHz)	Peak Amp (dBμV)	Correction Factor			Avg Specification (dB μV/m)	Peak Result (dB μV/m)	Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3200.00	37.2	33.1	2.0	30.5	54.0	42.8	-11.2
3546.01	36.8	33.6	2.2	30.5	54.0	42.3	-11.7
3800.00	33.9	34.0	2.4	30.5	54.0	39.8	-14.2
4100.00	34.7	34.5	2.5	30.5	54.0	41.2	-12.8
4432.51	37.2	35.1	2.6	30.5	54.0	44.4	-9.6
4800.00	33.6	35.8	3.0	30.4	54.0	42.0	-12.0

**Figure 66. Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical Frequency range: 30 MHz to 300 MHz
Test Distance: 3 meters Detector: Peak, Quasi-peak
Operating Frequency: 931.5 MHz

Frequency	Peak Amp	QP Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB)
44.80	18.4	13.3	12.3	40.0	-26.7
83.97	23.5	12.6	10.9	40.0	-27.4
125.90	19.7	14.6	13.8	43.5	-28.9
178.91	21.6	16.7	16.0	43.5	-26.8
217.82	24.8	19.6	18.5	46.0	-26.4
274.88	28.0	22.7	21.7	46.0	-23.3

**Figure 67. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

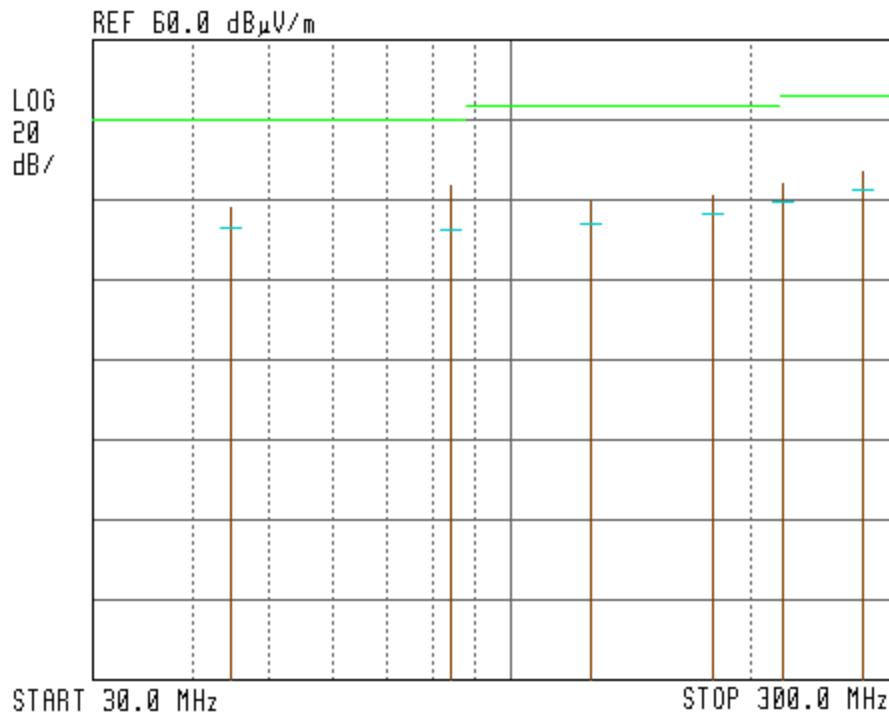
Frequency range: 30 MHz to 300 MHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 931.5 MHz

12:54:32 OCT 17, 2001



**Figure 68. 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 μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 931.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	QP Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
316.01	21.5	16.6	15.3	46.0	-29.4
379.05	23.9	19.1	17.7	46.0	-26.9
425.17	26.0	20.5	18.8	46.0	-25.5
476.12	26.9	21.1	19.5	46.0	-24.9
515.97	28.2	21.6	20.3	46.0	-24.4
579.09	28.0	23.4	21.7	46.0	-22.6
886.50	44.3	43.8	26.8	46.0	-2.2

**Figure 69. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Peak, Quasi-peak**

Radiated Emission

E.U.T Description Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

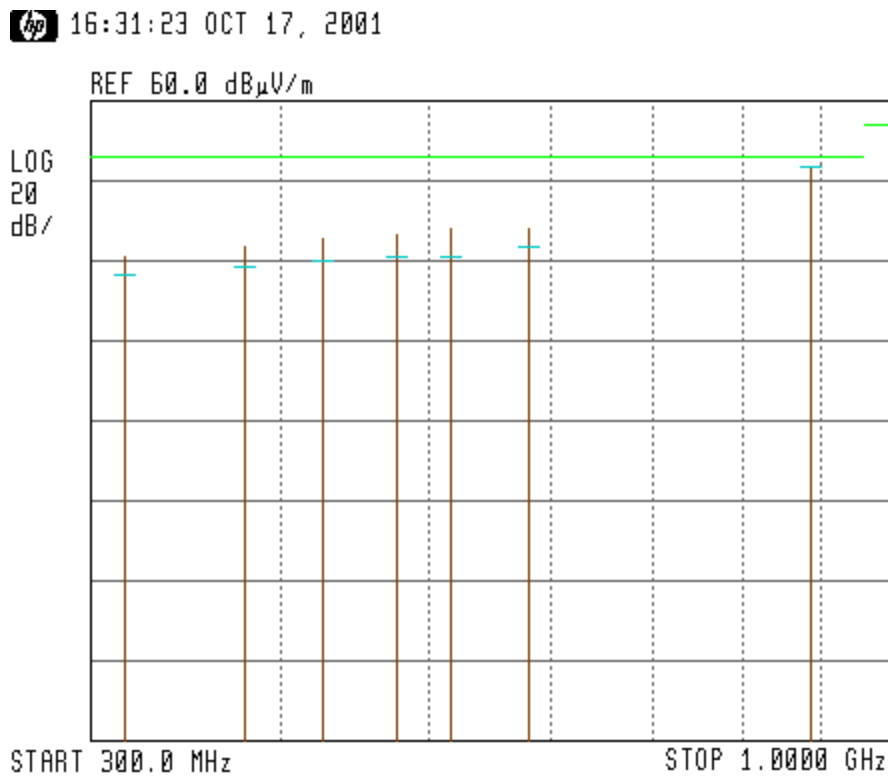
Antenna Polarization: Vertical

Frequency range: 300 MHz to 1 GHz

Test Distance: 3 meters

Detector: Peak, Quasi-peak

Operating Frequency: 931.5 MHz



**Figure 70. 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 μ V/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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical

Frequency range: 1 GHz to 2.9 GHz

Test Distance: 3 meters

Detector: Average

Operating Frequency: 931.5 MHz

Frequency (MHz)	Average Amplitude (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1010.01	28.5	31.7	54.0	-25.5
1499.92	33.5	36.4	54.0	-20.5
1773.00	35.7	38.5	54.0	-18.3
1995.84	43.1	40.5	54.0	-10.9
2659.50	42.9	43.7	54.0	-11.1
2882.54	52.9	45.2	54.0	-1.1

**Figure 71. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Average**

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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Peak
Operating Frequency: 931.5 MHz

Frequency (MHz)	Peak Amp (dB μ V/m)	Correction (dB)	Specification (dB μ V/m)	Margin (dB)
1010.01	43.8	31.7	74.0	-30.2
1499.92	46.5	36.4	74.0	-27.5
1773.00	48.3	38.5	74.0	-25.7
1995.84	53.2	40.6	74.0	-20.8
2659.50	55.7	43.7	74.0	-18.3
2882.54	60.8	45.2	74.0	-13.2

**Figure 72. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: 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 Remote Mobile Unit
Type NXRMU52000-3
Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

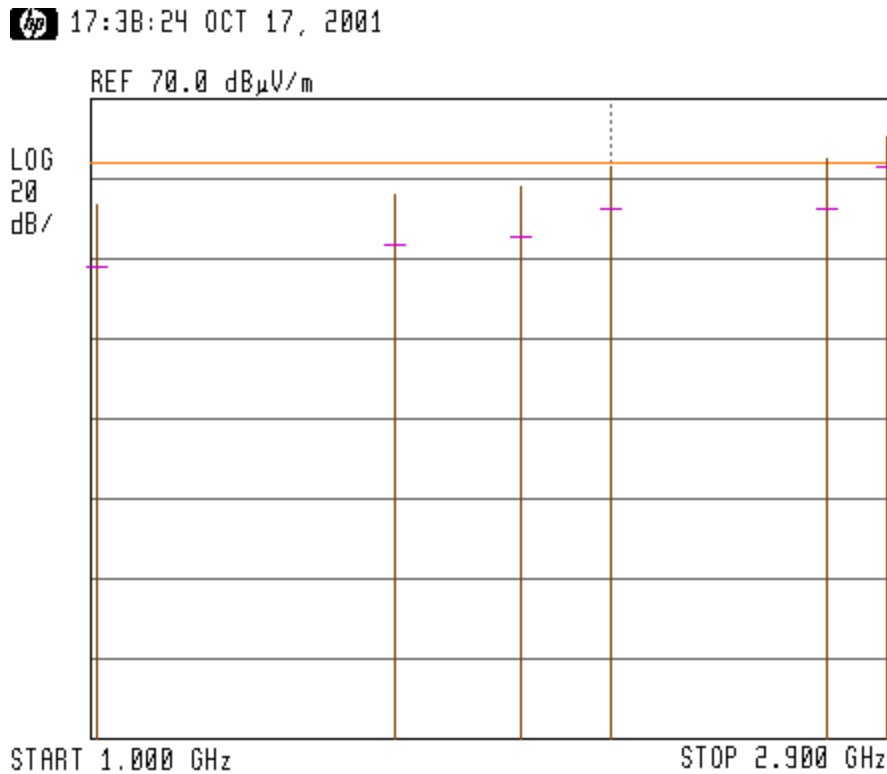
Antenna Polarization: Vertical

Frequency range: 1 GHz to 2.9 GHz

Test Distance: 3 meters

Detector: Peak, Average

Operating Frequency: 929.5 MHz



**Figure 73. Radiated Emission. Antenna Polarization: VERTICAL
Detectors: Peak, Average**

Note:

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



Radiated Emission

E.U.T Description Remote Mobile Unit
 Type NXRMU52000-3
 Serial Number: Not designated

Specification: F.C.C., Part 15, Subpart B

Antenna Polarization: Vertical Frequency range: 2.9 GHz to 5.0 GHz
 Test Distance: 3 meters Detector: Peak
 Operating Frequency: 931.5 MHz

Freq. (MHz)	Peak Reading (dB μ V)	Correction Factor			Avg Specification (dB μ V/m)	Peak Result (dB μ V/m)	Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Preamp PF (dB)			
3200.00	37.2	33.1	2.0	30.5	54.0	42.5	-11.5
3546.00	36.4	33.6	2.2	30.5	54.0	41.7	-12.3
3800.00	33.8	34.0	2.4	30.5	54.0	39.7	-14.3
4100.00	34.7	34.5	2.5	30.5	54.0	41.2	-12.8
4432.51	36.9	35.1	2.6	30.5	54.0	43.1	-10.9
4800.00	33.7	35.8	3.0	30.4	54.0	42.1	-11.9

**Figure 74. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: 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.

8.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	November 30,2000	1 year
RF Section	HP	85420E	3427A00103	November 30,2000	1 year
Antenna Bioconical HP	ARA	BCD 235/B	1041	April 01, 2001	1 year
Antenna –Log Periodic	ARA	LPD-2010/A	1038	March 29, 2001	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	ThinkJet 2225	2738508357.0	N/A	N/A
Antenna-Log Periodic	A.H.System	SAS-200/511	253.0	January 31,2001	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS- 0411N313	002	March 30, 2001	1 year
Spectrum Analyzer	HP	8592L	3745A08184	January 31,2001	1 year

8.5 Field Strength Calculation For the Frequency Range 30 MHz-2.9 GHz

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

$$[\text{dB}\mu\text{v}/\text{m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

FS: Field Strength [dB μ v/m]

RA: Receiver Amplitude [dB μ v]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

No external pre-amplifiers are used.

8.6 Field Strength Calculation For the Frequency Range 2.9 GHz-5.0 GHz

In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$\text{Peak Result} = \text{Peak} + \text{AF} + \text{CF} - \text{PF}$$

Where: Peak result is final peak detector result.

Peak is peak detector measurement.

AF is antenna factor.

CF is cable factor.

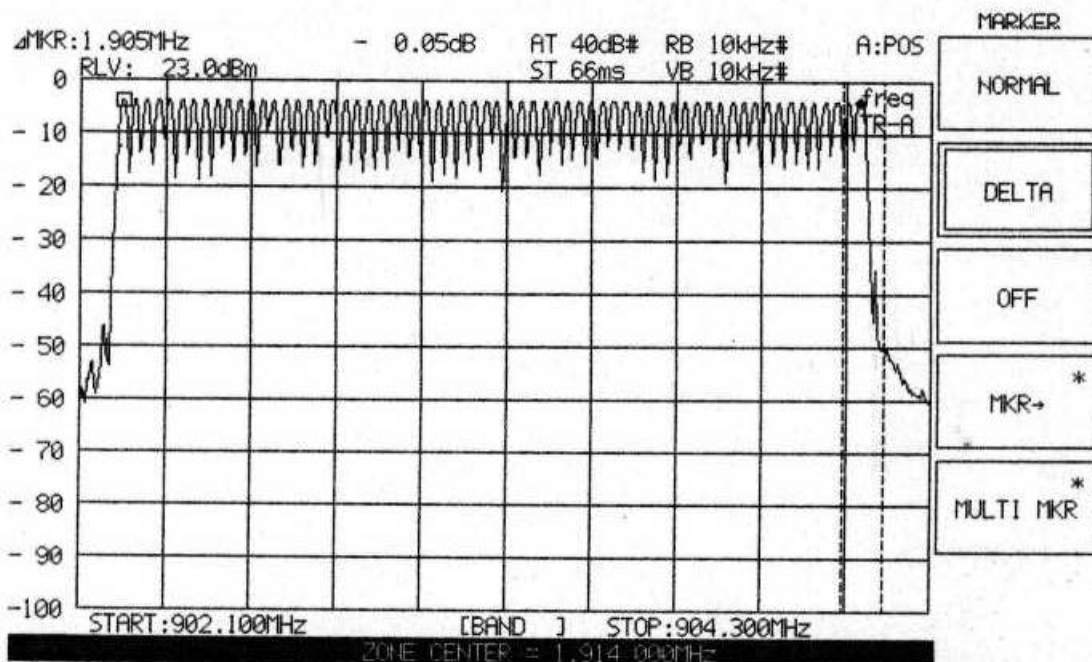
PF is preamplifier factor.

9. Frequency-Hopping - Number of Hopping Channels Usage Test Test procedure

[In Accordance with Section 15.247 (a) (1) (i)]

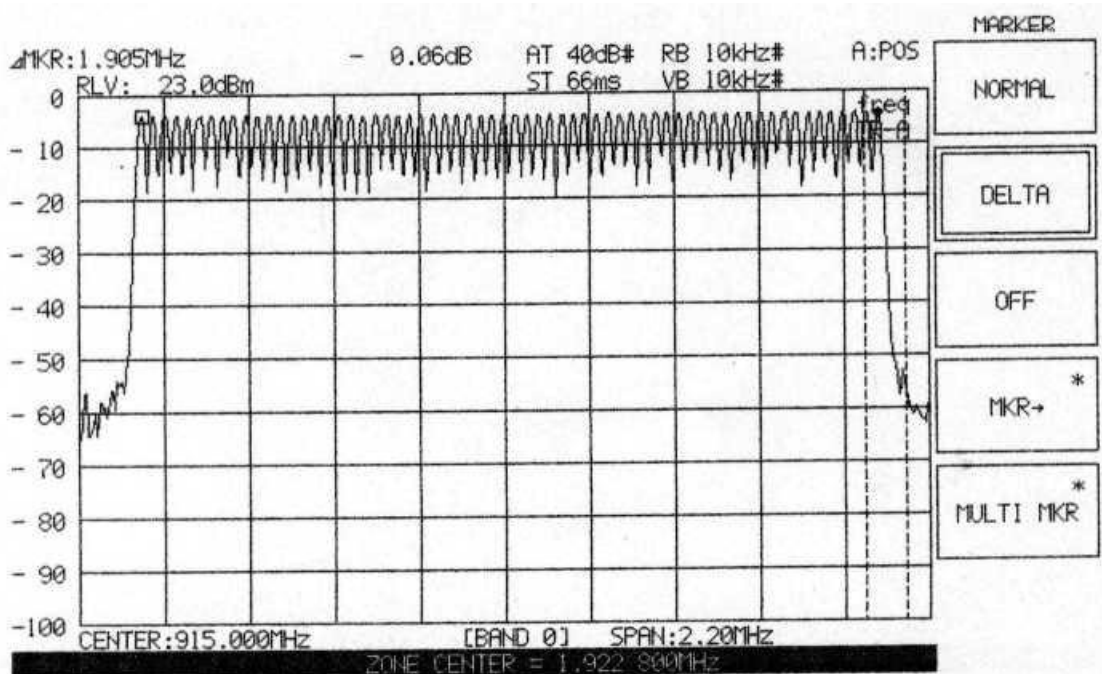
The E.T.U. antenna was removed and output was connected to the Spectrum Analyzer through a 10 dB attenuator. Special attention was taken to prevent Spectrum Analyzer RF input overload.

The Spectrum Analyzer was set to a 10 kHz resolution BW. The number of hopping channels (at least 50 channels) was measured.



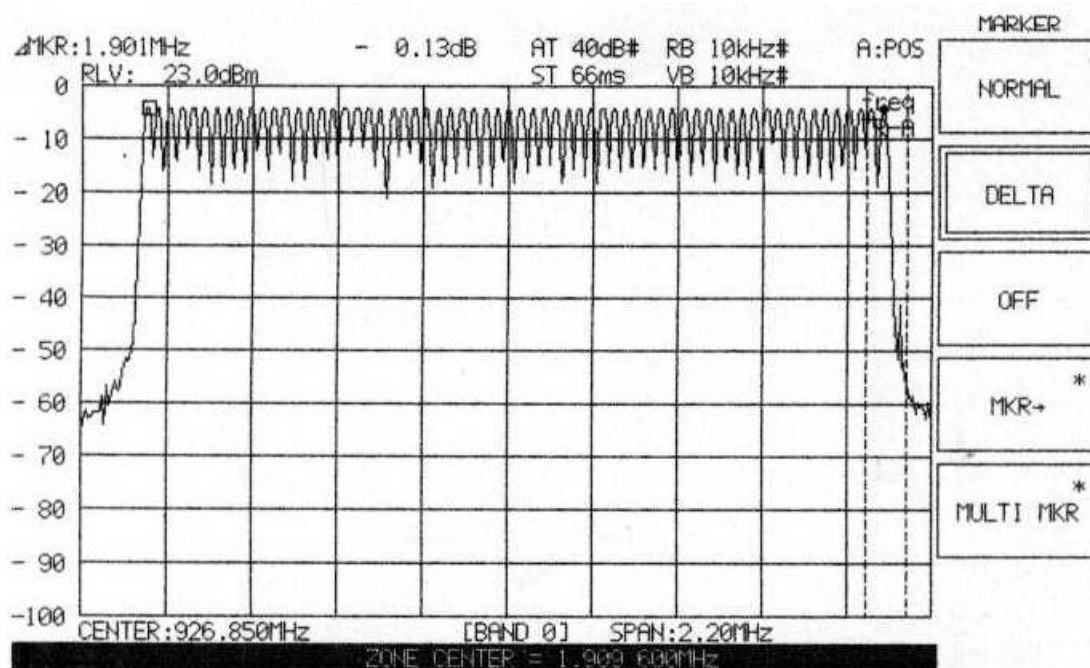
Number of Hopping Channels 902.2 MHz

Figure 75.



Number of Hopping Channels 915 MHz

Figure 76.



Number of Hopping channels 927.8 MHz

Figure 77.

9.1 Number of Hopping Channels Results Table

E.U.T. description: Remote Mobile Unit
TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (a) (1) (i)

Operation Frequency (MHz)	Reading No. of Channels	Specification No. of Channels	Margin No. of Channels
902.2	64	50	14
915.0	64	50	14
927.8	64	50	14

Figure 78 Number of Hopping Channels

JUDGEMENT:

Passed by 14 Channels.

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori

9.2 Test Equipment Used.

Number of Hopping Channels Test

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.7.2001	1 year
Attenuator 10dB	Radiall	R41471000	None	2.5.2001	1 year

Figure 79 Test Equipment Used

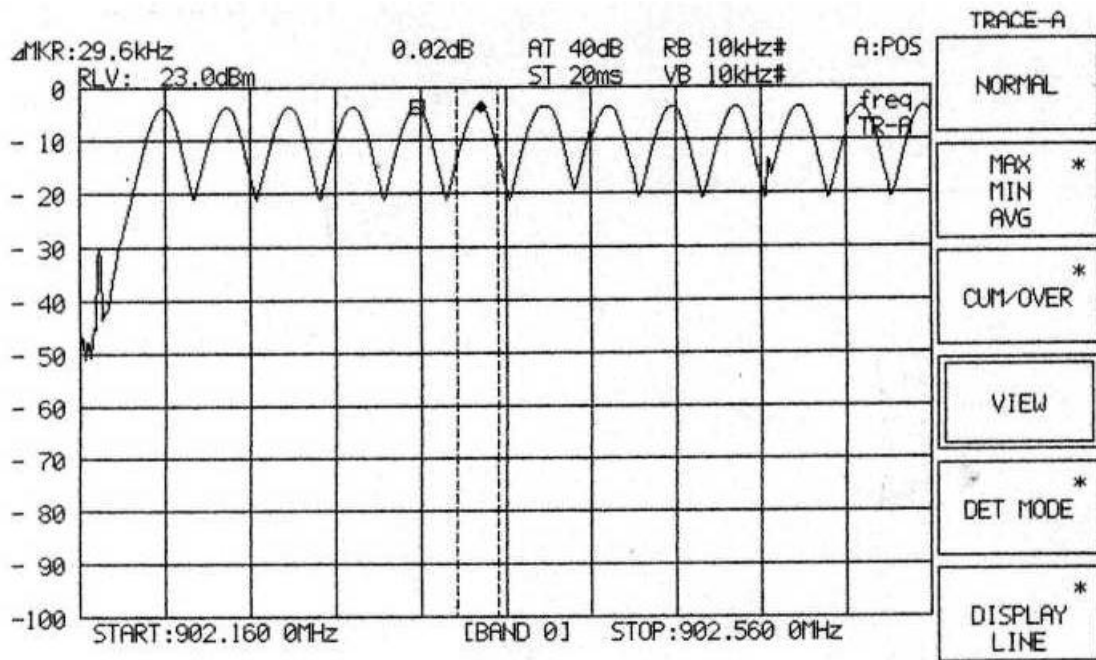
10. Frequency-Hopping-Hopping Channels Separation Test

[In Accordance With Section 15.247 (a) (1)]

10.1 Test procedure

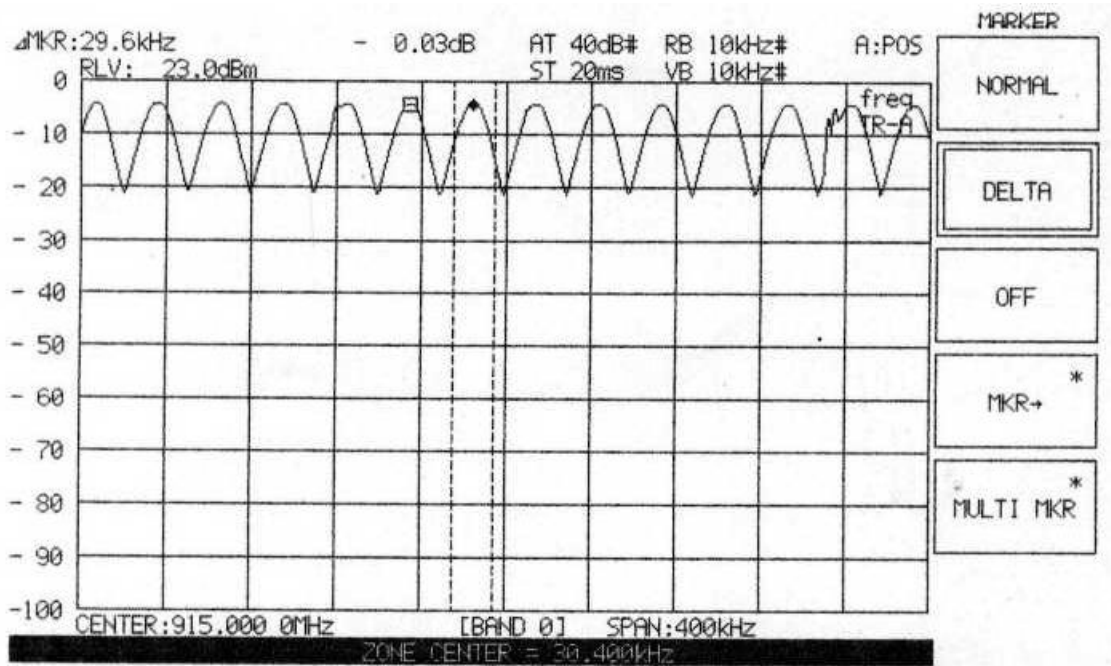
The E.T.U. antenna was removed and output was connected to the Spectrum Analyzer through a 10 dB attenuator. Special attention was taken to prevent of Spectrum Analyzer RF input overload.

The Spectrum Analyzer was set to a 3 kHz resolution BW. The carrier frequencies separated (minimum 25kHz) was measured,

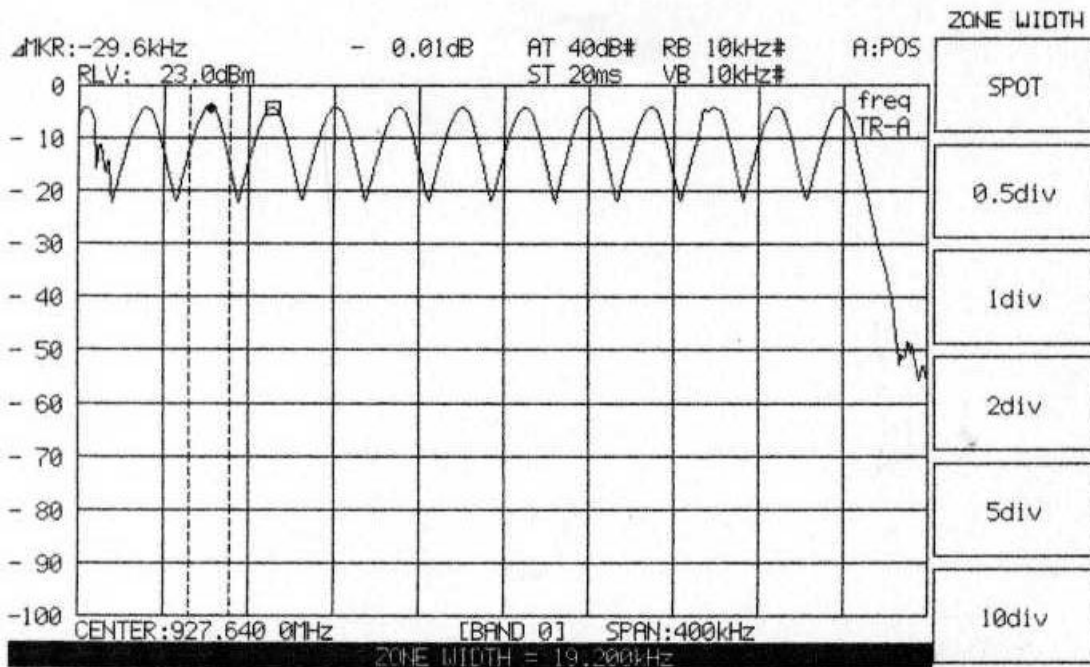


Hopping Channels Separation In 902.2 MHz

Figure 80



Hopping Channels Separation In 915 MHz
Figure 81



Hopping Channels Separation In 927.8 MHz
Figure 82



10.2 Carrier Frequencies Separated Results Table

E.U.T. description: Remote Mobile Unit
TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (a) (1)

Operation Frequency (MHz)	Reading (kHz)	Specification (kHz)	Margin (kHz)
902.2	29.6	25	4.6
915.0	29.6	25	4.6
927.8	29.6	25	4.6

Figure 83 Hopping Channels Separation

JUDGEMENT: Passed by 4.6 kHz.

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori



10.3 Test Equipment Used.

Hopping Channels separation Test

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.07.2001	1 year
Attenuator 10dB	Radiall	R41471000	None	2.5.2001	1 year

Figure 84 Test Equipment Used

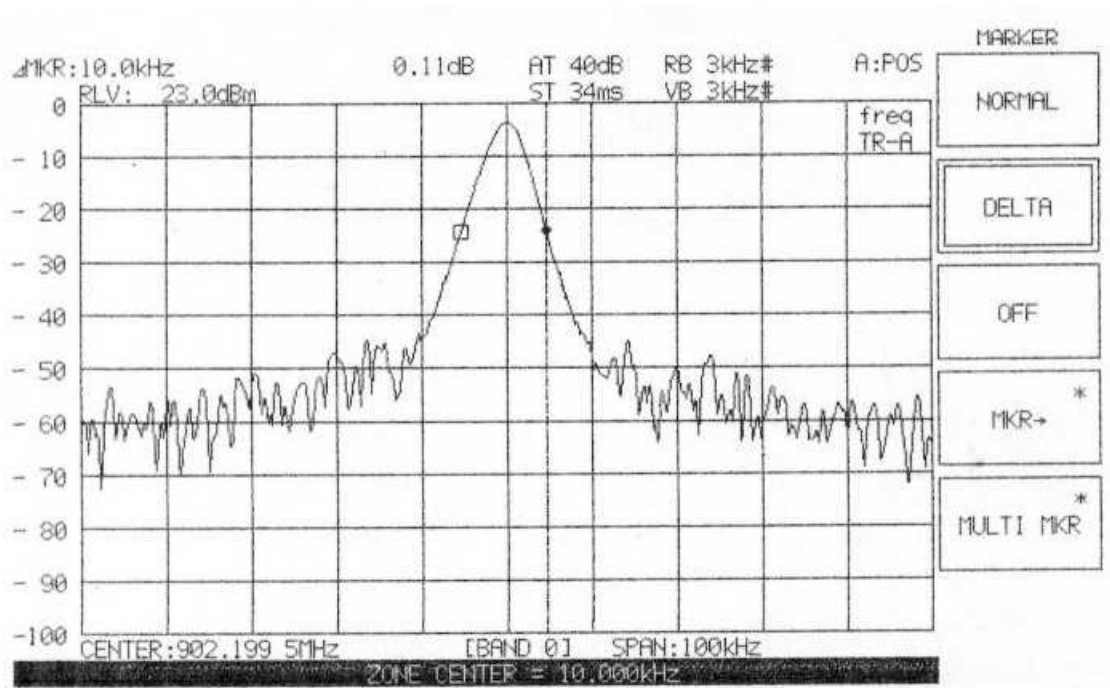
11. Frequency –Hopping-20dB Bandwidth Test

[In Accordance With Section 15.247 (a) (1) (i)]

11.1 Test procedure

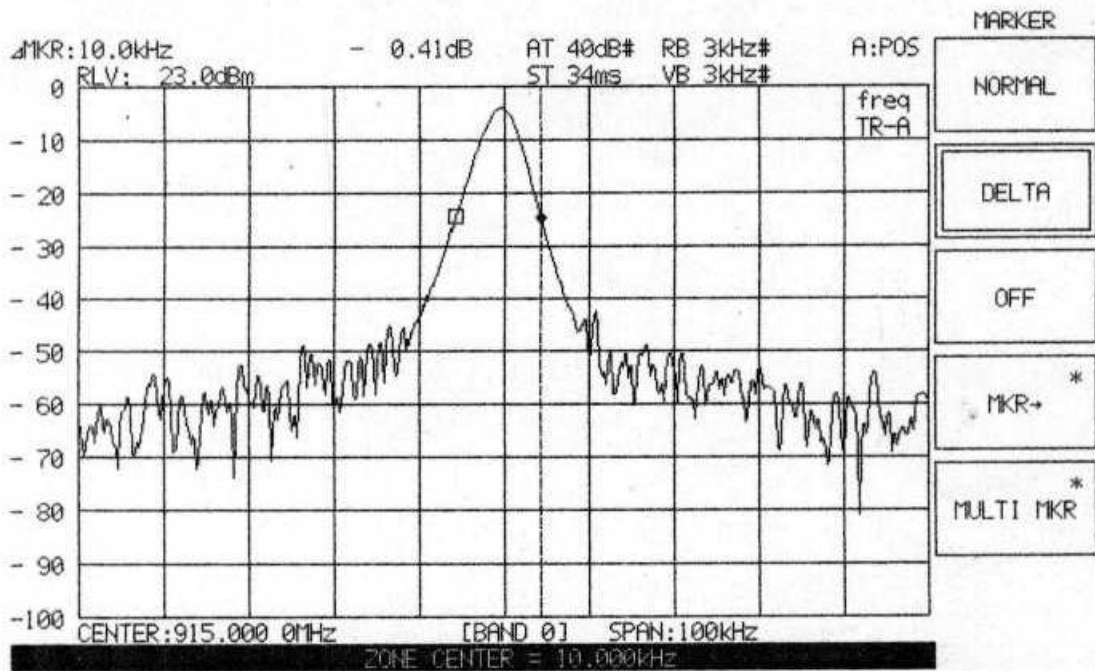
The E.T.U. antenna was removed and output was connected to the Spectrum Analyzer through a 10 dB attenuator. Special attention was taken to prevent of Spectrum Analyzer RF input overload.

The Spectrum Analyzer was set to a 3 kHz resolution BW .The 20dB bandwidth of hopping channel was measured.



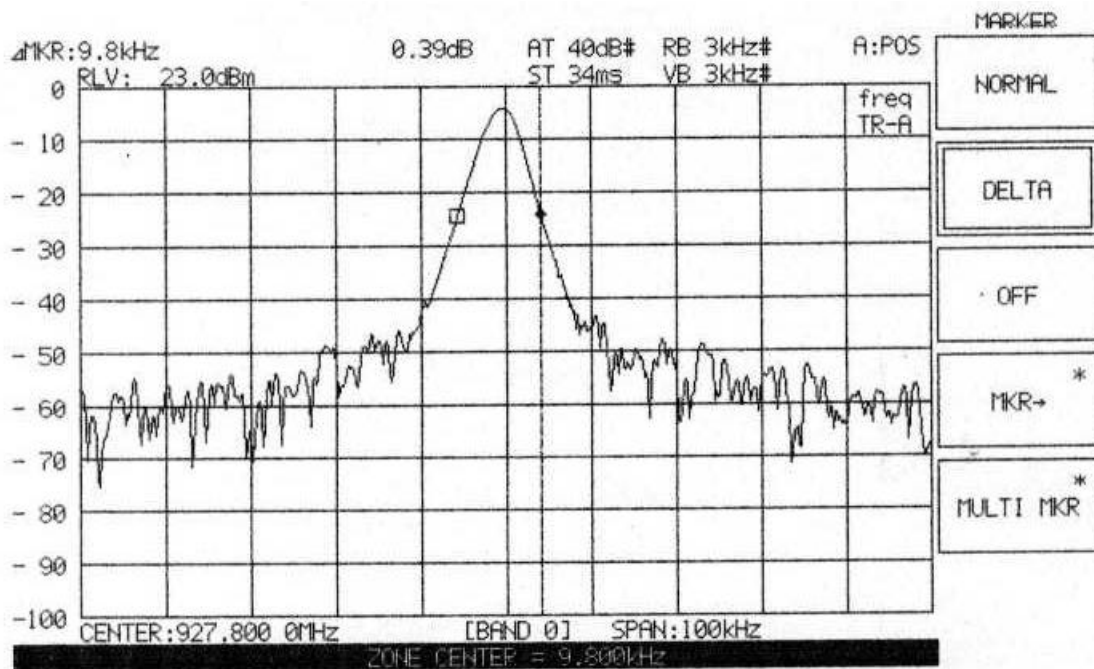
Hopping Channels 20dB Bandwidth 902.2 MHz

Figure 85



Hopping Channels 20dB Bandwidth 915 MHz

Figure 86



Hopping Channels 20dB Bandwidth 927.8 MHz

Figure 87



11.2 Hopping Channels 20dB Bandwidth Results Table

E.U.T. description: Remote Mobile Unit
TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (a) (1) (i)

Operation Frequency (MHz)	Reading (kHz)	Specification (kHz)	Margin (kHz)
902.2	10	25	15
915.0	10	25	15
927.8	9.8	25	15.2

Figure 88 Hopping Channels 20dB Bandwidth

JUDGEMENT: Passed by 15 kHz.

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori

11.3 Test Equipment Used.

Hopping Channels 20dB Bandwidth Test

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.07.2001	1 year
Attenuator 10dB	Radiall	R41471000	None	2.5.2001	1 year

Figure 89 Test Equipment Used

12. Frequency-Hopping- Time of Occupancy Test

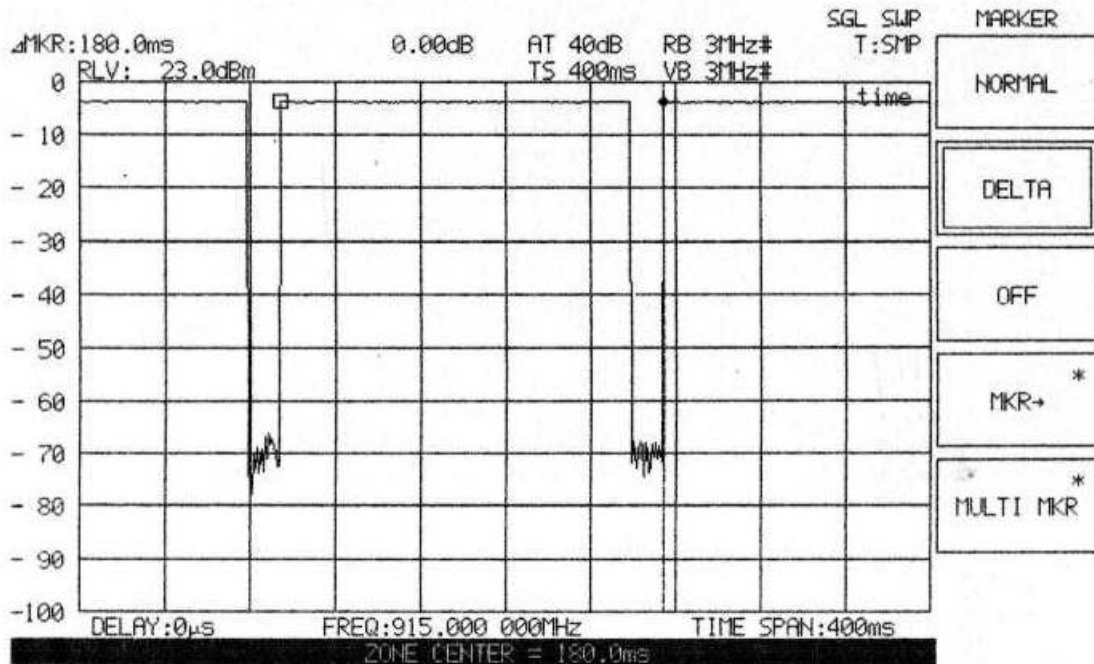
[In Accordance With Section 15.247(a) (1) (i)]

12.1 Test procedure

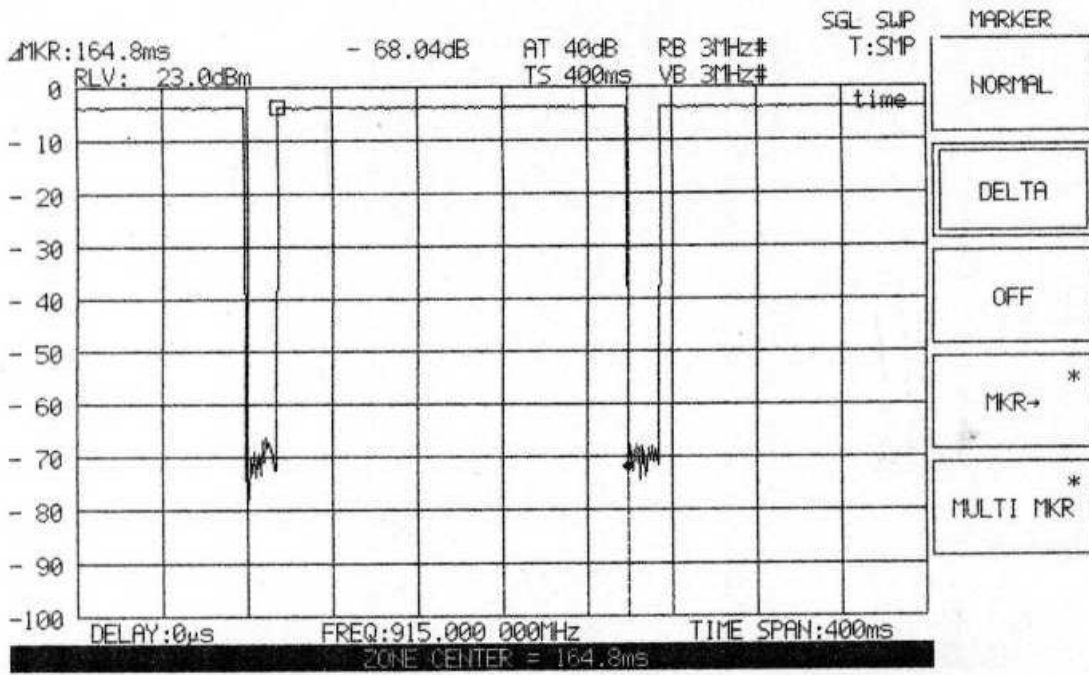
The E.T.U. antenna was removed and output was connected to the Spectrum Analyzer through a 10 dB attenuator. Special attention was taken to prevent of Spectrum Analyzer RF input overload.

The Spectrum Analyzer was set to a 3 MHz resolution BW. The time of occupancy was measured.

This test was performed in order to prove that the average time of occupancy on any frequency is not greater than 0.4 seconds within a 20 second period.



Hop's Transmission Time
Figure 90



Hop's Dwell Time
Figure 91

12.2 Frequency-Hopping- Time of Occupancy Results

E.U.T. description: Remote Mobile Unit

TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (a) (1) (i)

RMU hopping transmitter uses 64 channels. Each channel is 30 kHz S. The hopping frequencies are selected from a pseudo-randomly ordered list.

On the average, each channel is used equally.

The hop dwell time is 180 milliseconds, of which 165 milliseconds is used for transmission and 15 milliseconds is guard time.

Each transmission uses 21 hop frequencies, selected randomly from a list of 64 frequencies.

The total transmission time at 21 frequencies is:

$$0.18 * 21 = 3.78 \text{sec}$$

The transmission period at 64 frequencies is:

$$3.78 * 3 = 11.34 \text{sec}$$

Each frequency is used within 20 sec period:

$$20 : 11.34 = 1.76 \text{ times (i.e. twice)}$$

The average time of occupancy on any frequency within 20 sec period is

$$0.18 * 2 = 0.36 \text{sec} (0.04 \text{sec less than } 0.4 \text{sec}).$$

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori

12.3 Test Equipment Used.

Frequency-Hopping- Time of Occupancy

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.07.2001	1 year
Attenuator 10dB	Radiall	R41471000	None	2.5.2001	1 year

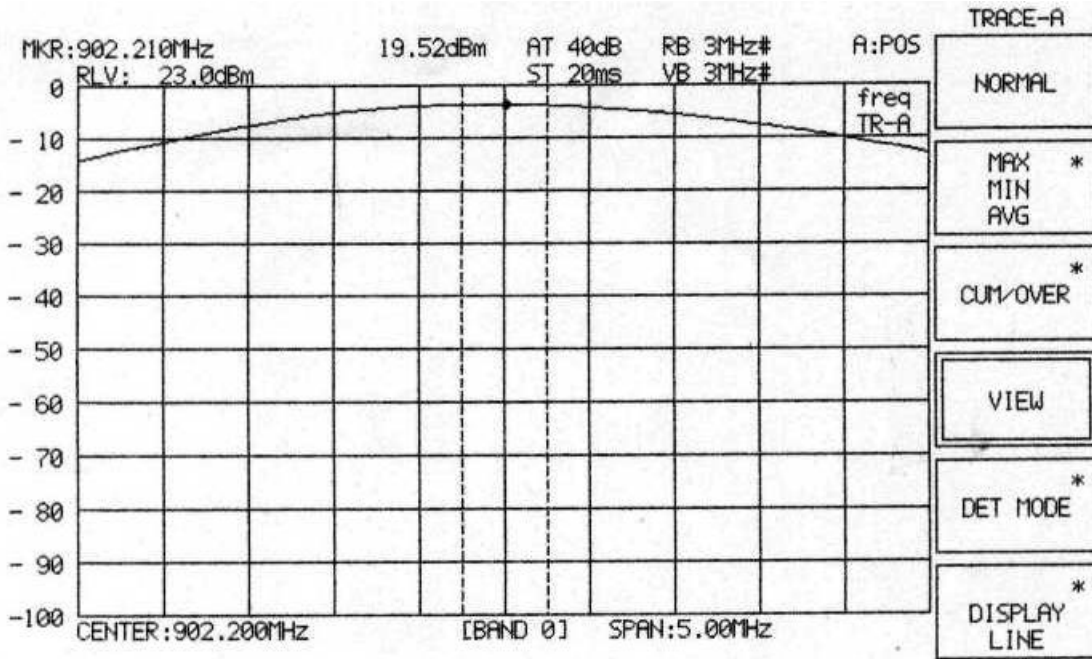
Figure 92 Test Equipment Used

13. Maximum Peal Output Power Test

[In Accordance With Section 15.247(b) (2)]

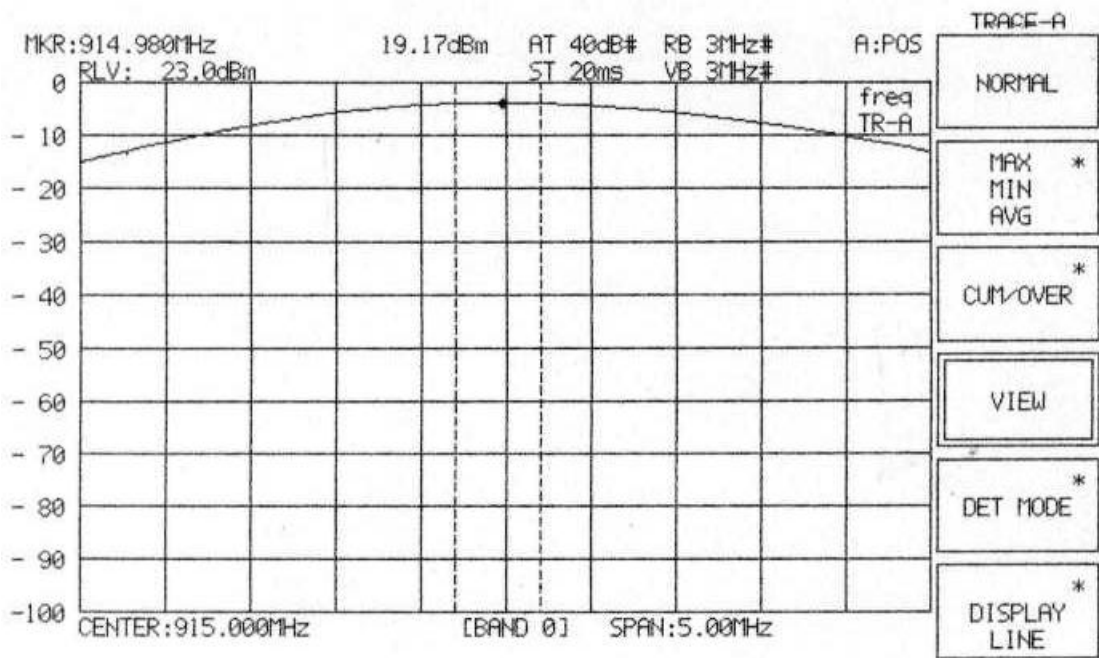
13.1 Test procedure

The E.U.T. antenna was removed and output was connected to the Spectrum Analyzer through a 10 dB attenuator. Special attention was taken to prevent the Spectrum Analyzer RF input overload. The Spectrum Analyzer was set to 3 MHz resolution BW. Peak power level was measured at the selected operational frequencies.

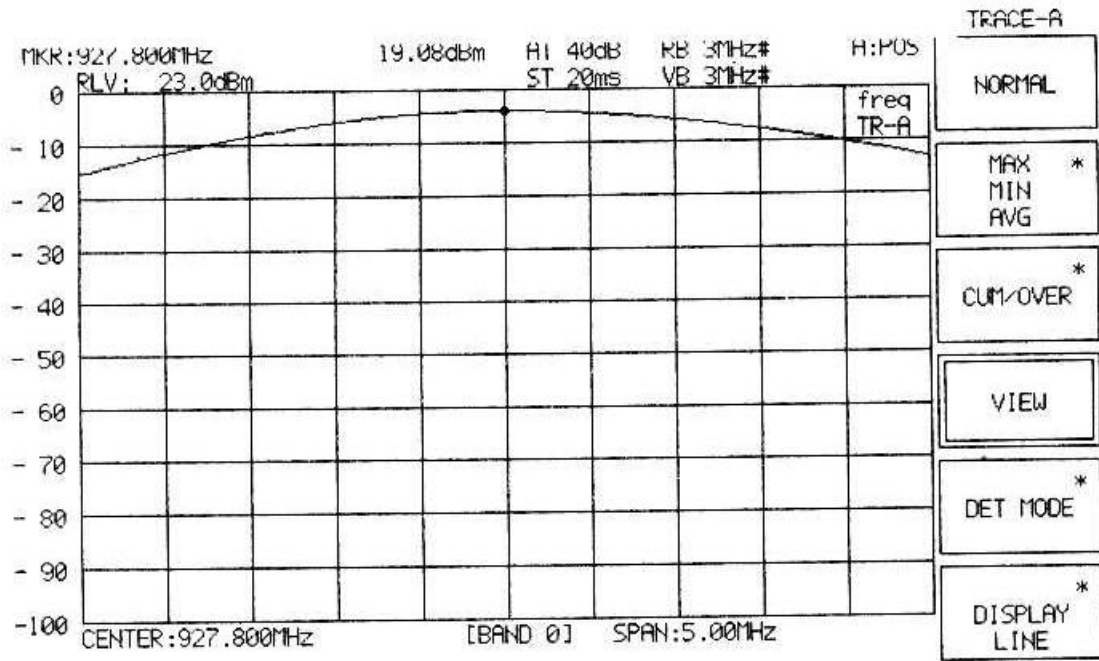


Maximum Power Output 902.2MHz

Figure 93



Maximum Power Output 915MHz
Figure 94



Maximum Power Output 927.8MHz
Figure 95



13.2 Maximum Peak Power Output Results Table

E.U.T. description: Remote Mobile Unit
TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (b) (2)

Operation Frequency (MHz)	Reading (dBm)	Final Result (dBm)	Specification (dBm)	Margin (dB)	Cable Attenuation (dB)
902.2	19.52	29.57	30	0.43	10.05
915.0	19.17	29.22	30	0.78	10.05
927.8	19.08	29.13	30	0.87	10.05

Figure 96 Test Equipment Used

JUDGEMENT: Passed by 0.43 dB.

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori

13.3 Test Equipment Used.

Maximum Power Output Test

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.07.2001	1 year
Attenuator 10dB	Radiall	R41471000	None	2.5.2001	1 year

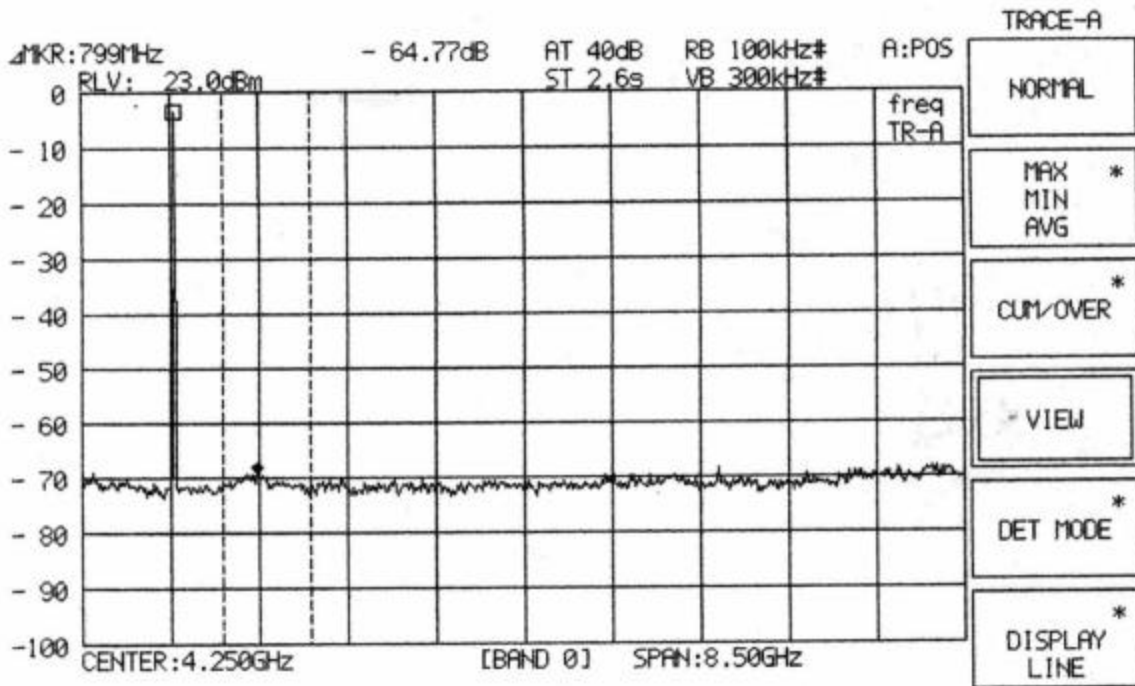
Figure 97 Test Equipment Used

14. Peak Power Output Out of 902-928MHz Band

[In Accordance With Section 15.247(c)]

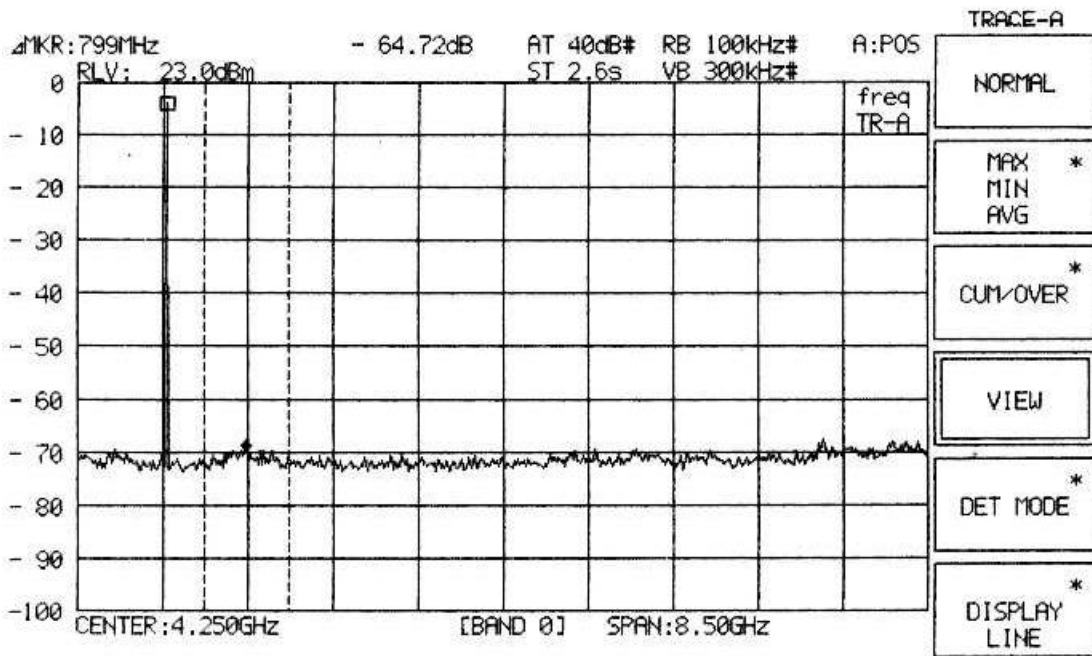
14.1 Test procedure

The E.U.T. antenna was removed and the output was connected to the Spectrum Analyzer through a 10 dB attenuator. The spectrum analyzer was set to 100 kHz resolution BW. Frequency range from 10 kHz to 8.5 GHz was scanned. Level of spectrum components out of the 902-928 MHz was measured at the selected operation frequencies.

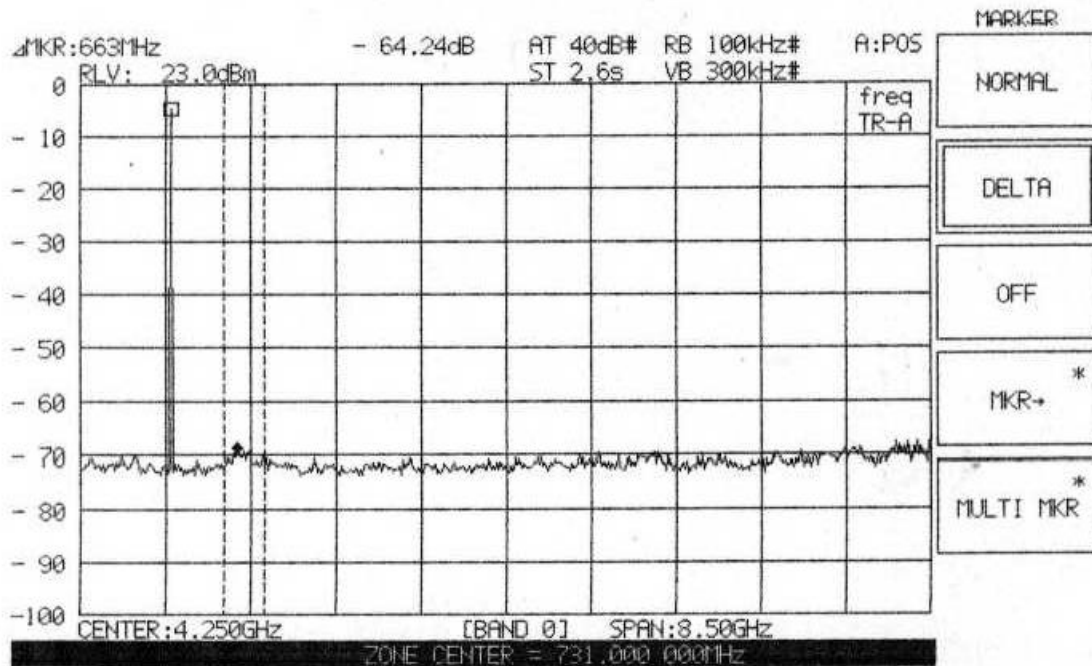


Peak Power Output of 902.2MHz

Figure 98



Peak Power Output of 915MHz
Figure 99



Peak Power Output of 927.8MHz
Figure 100

14.2 Peak power Output Out of 902-928 MHz Band Results Table

E.U.T. description: Remote Mobile Unit
TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (c)

Operation Frequency (MHz)	Reading (dBc)	Specification (dBc)	Margin (dB)
902.2	-64.77	-20	46.77
915.0	-64.72	-20	46.72
927.8	-64.24	-20	46.24

Figure 101 Peak Power Output of 902-928MHz Band

JUDGEMENT:

Passed by 46.24 dB.

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori

14.3 Test Equipment Used.

Peak Power Output of 902-928MHz Band Test

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.07.2001	1 year
10 dB Attenuator	Radiall	R41471000	None	2.5.2001	1 year

Figure 102 Test Equipment Used

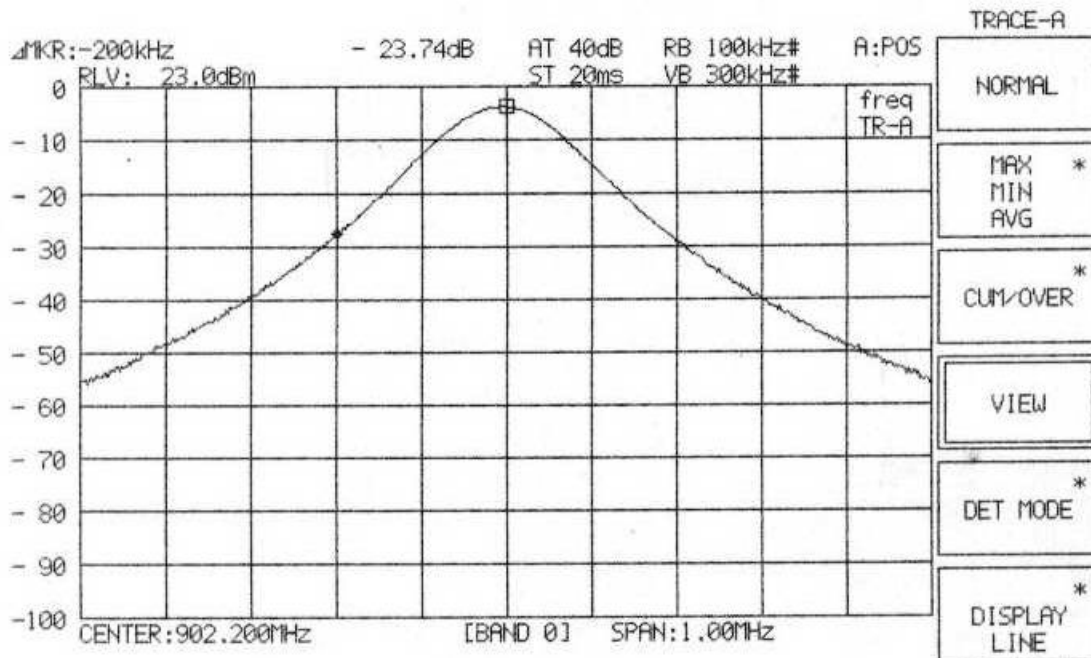
15. Band Edge Spectrum

[In Accordance With Section 15.247 (c)]

15.1 Test procedure

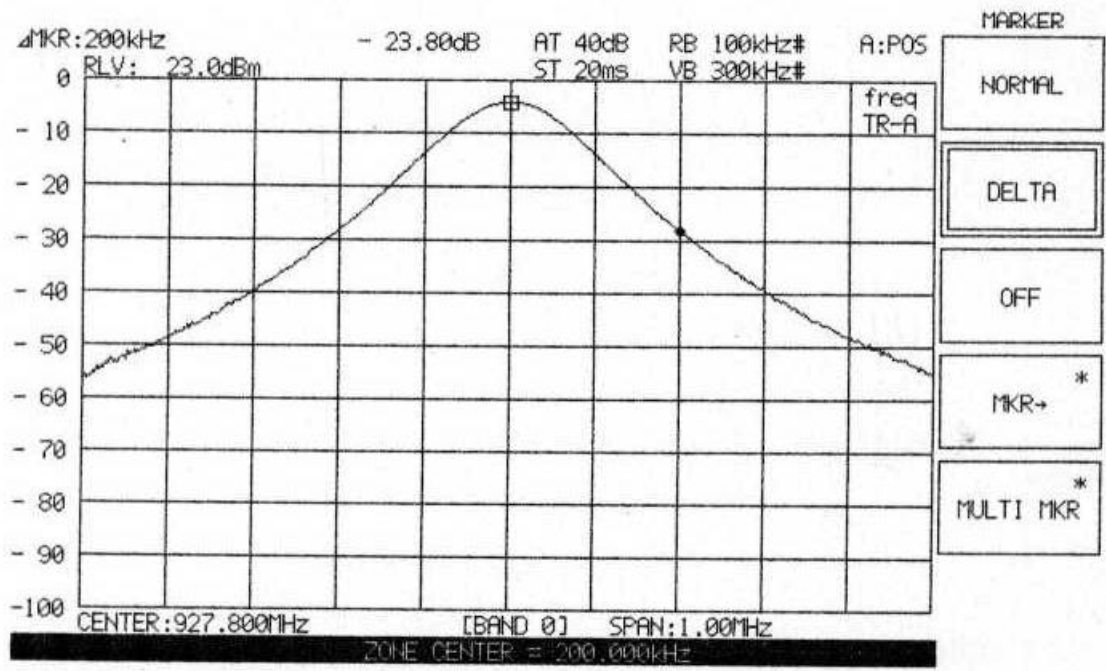
Enclosed are spectrum analyzer plots for the lowest operational frequency (902.2 MHz) and the highest operational frequency (927.8 MHz) in which the E.U.T. is planned to be used.

The E.U.T. antenna's was removed and the output was connected to the Spectrum Analyzer through a 10 dB attenuator. The spectrum analyzer was set to 100 KHz resolution BW. Maximum power level below 902 MHz and above 928 MHz was measured, relative to the power level at 902.2 MHz and 927.8 MHz correspondingly.



Band Edge spectrum of 902.2MHz

Figure 103



Band Edge Spectrum of 927.8MHz

Figure 104

15.2 Band Edge Spectrum Results Table

E.U.T. description: Remote Mobile Unit
TYPE: NXRMU52000-3

Specification: F.C.C. Part 15.247 (c) Class B

Operation Frequency	Band Edge Frequency	Spectrum Level	Specification	Margin
(MHz)	(MHz)	(dBc)	(dBc)	(dB)
902.2	902	-23.74	-20	3.74
927.8	928	-23.80	-20	3.80

Figure 105 Band Edge Spectrum

JUDGEMENT:

Passed by 3.74 dB.

TEST PERSONNEL:

Tester Signature: A. Zippori

Date: 15.11.01

Typed/Printed Name: A. Zippori

15.3 Test Equipment Used.

Band Edge Spectrum Test

Instrument	Manufacture	Model	Serial Number	Calibration	
				Last Calibr.	Period
Spectrum Analyzer	Anritzu	MS 2602A	MT12370	10.07.2001	1 year
10 dB Attenuator	Radiall	R41471000	None	2.5.2001	1 year

Figure 106 Test Equipment Used



16. Antenna Gain

The antenna implemented in the device is a $\frac{1}{2}$ wave center fed dipole antenna, connected to power amplifier output by 1 meter cable. A theoretical upper limit of the gain of dipole antenna is (2.5dBi). Then considering cable length attenuation and theoretical dipole the gain of the antenna is estimated to be maximum 2 dBi.

17. R.F Exposure/Safety

The E.U.T. is a mobile unit for application of transmitting position and identification information to central data collection offices. The distance between the E.U.T. and the general population is at least 0.2 meter.

Calculation of Maximum Permissible Exposure (MPE)
Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 915 MHz

$$S = \frac{915}{1500} = 0.61 \frac{mW}{cm^2}$$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t - Transmitted Power 1000mw (Peak)

G_t - Antenna Gain, 1.58(2dBi)

R - Distance from Transmitter using 20cm worst case for mobile units.

(c) The peak power density is :

$$S_p = \frac{10^3 \times 1.58}{4\pi(20)^2} = 0.315 \frac{mW}{cm^2}$$

(d) The duty cycle of transmission is $165/180 = 0.917$.

The average power over 30 minutes is:

$$P_{AV} = 1000 \times 0.917 = 917mW$$

(e) The averaged power density (over 30 minutes) of the E.U.T. is:

$$S_{AV} = \frac{917 \times 1.58}{4\pi(20)^2} = 0.288 \frac{mW}{cm^2}$$

(f) This is below the FCC limit.

18. Photographs of Tested E.U.T.

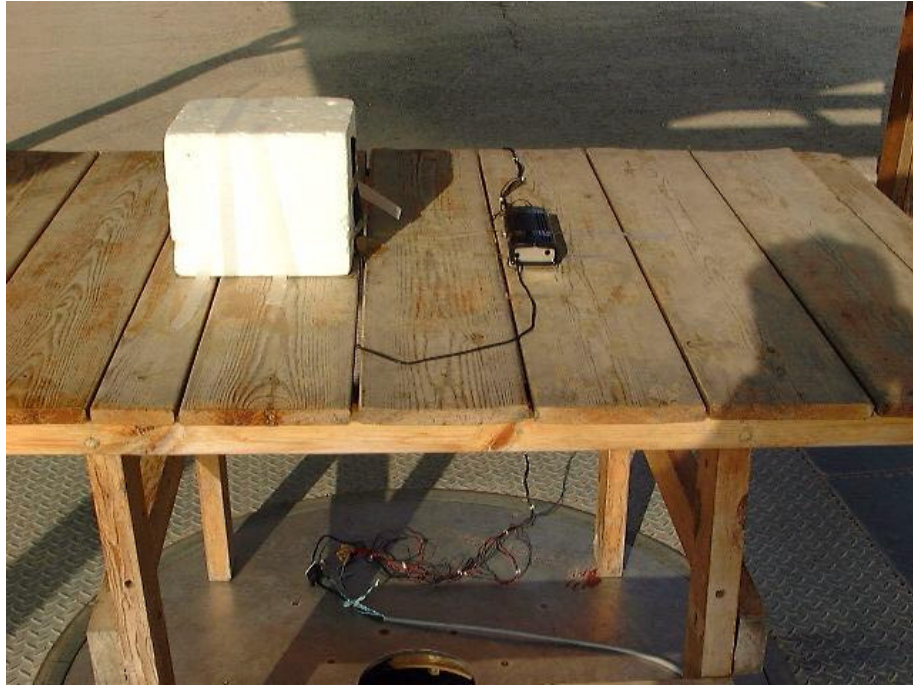


Figure 107 Top View



Figure 108 Side View



Figure 109 Printed Circuit Side 1 with Shields

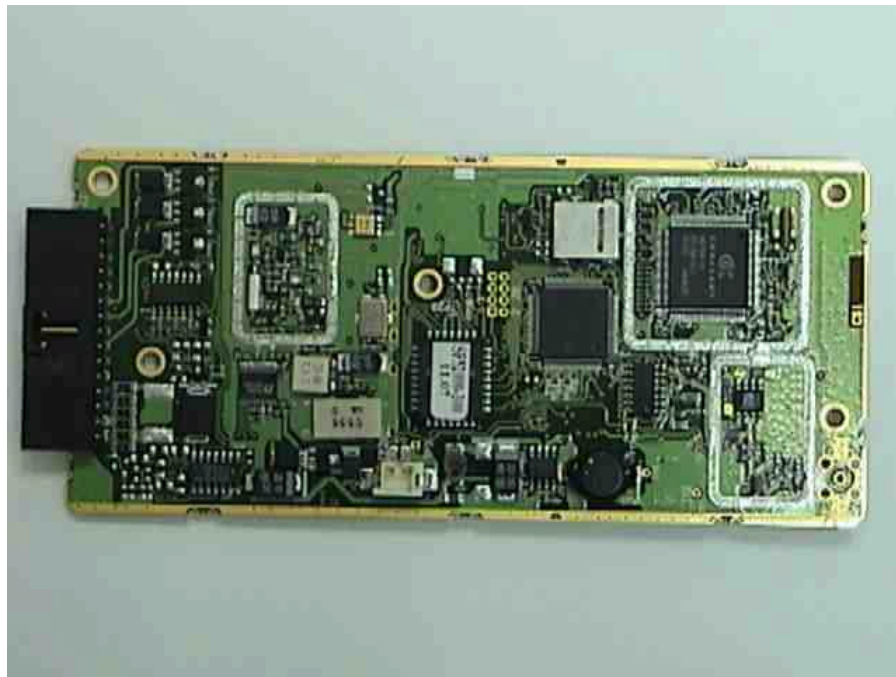


Figure 110 Printed Circuit Side 1 Without Shields



Figure 111 Printed Circuit Side 2



Figure 112 Top View Closed Cover

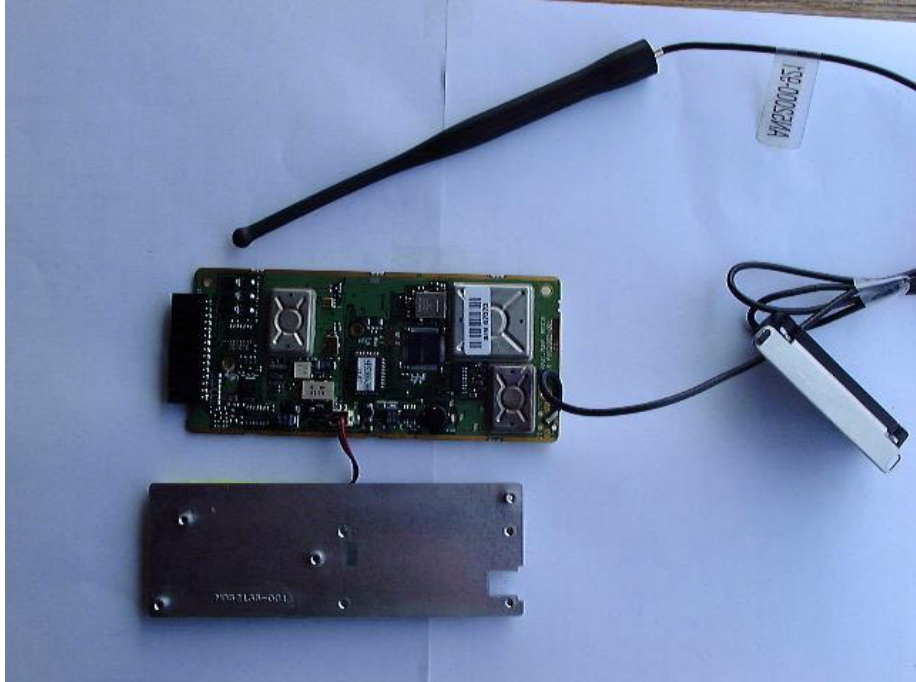


Figure 113 Top View Open Cover

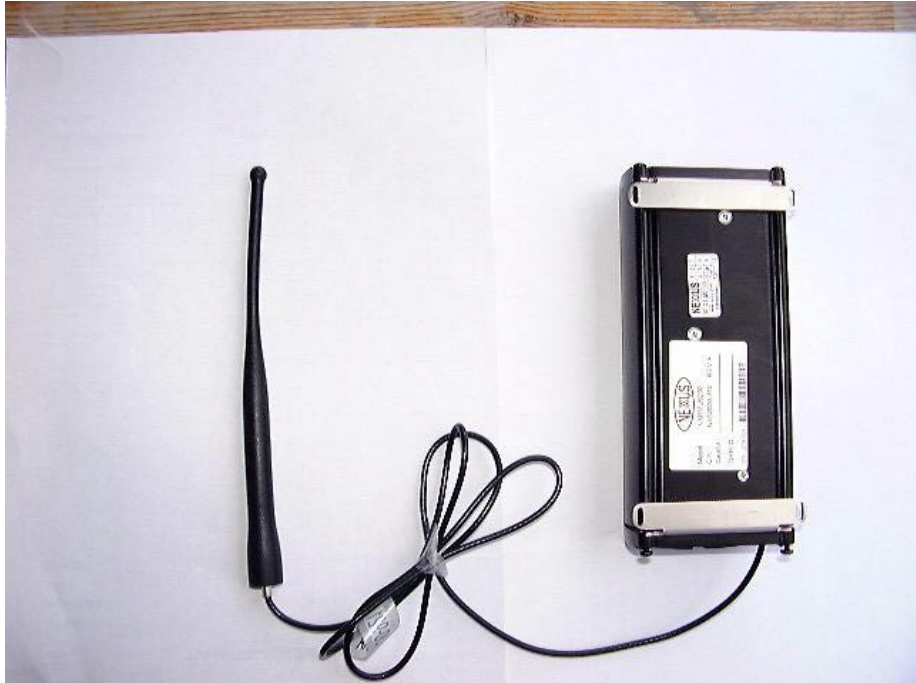


Figure 114 Bottom View Closed Cover

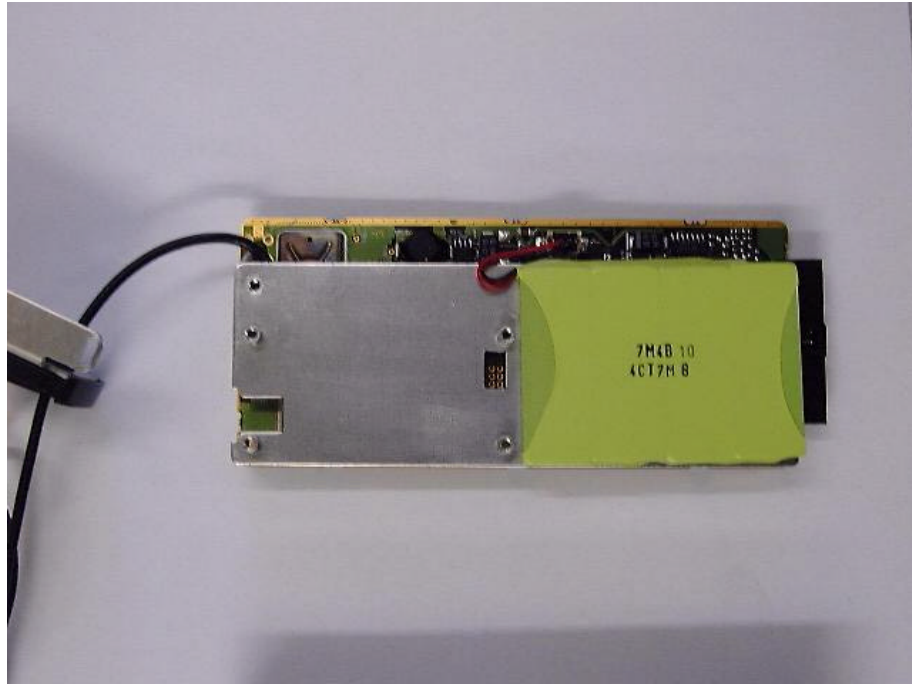


Figure 115 Bottom View Open Cover

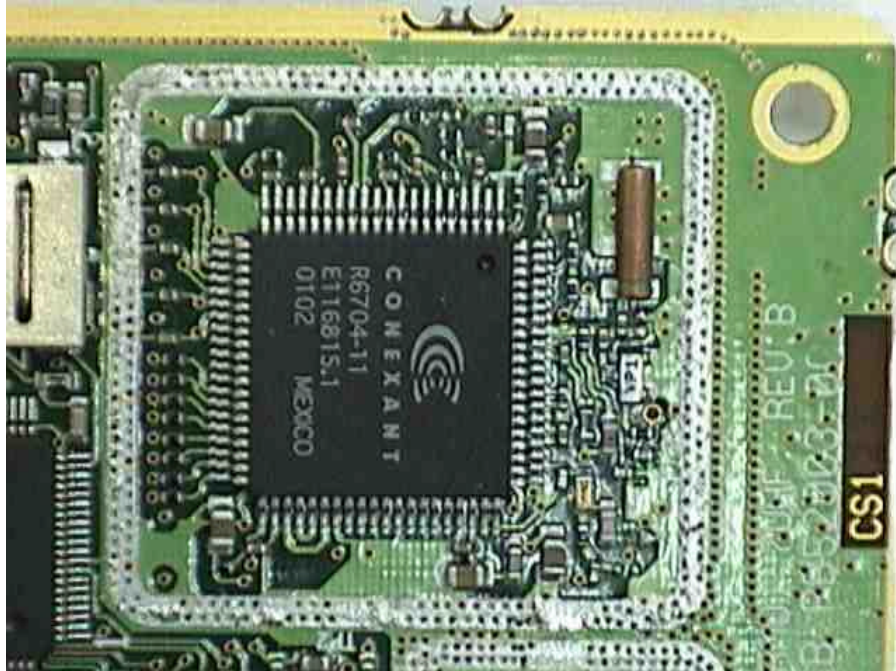


Figure 116 Close-up Area Under Shield

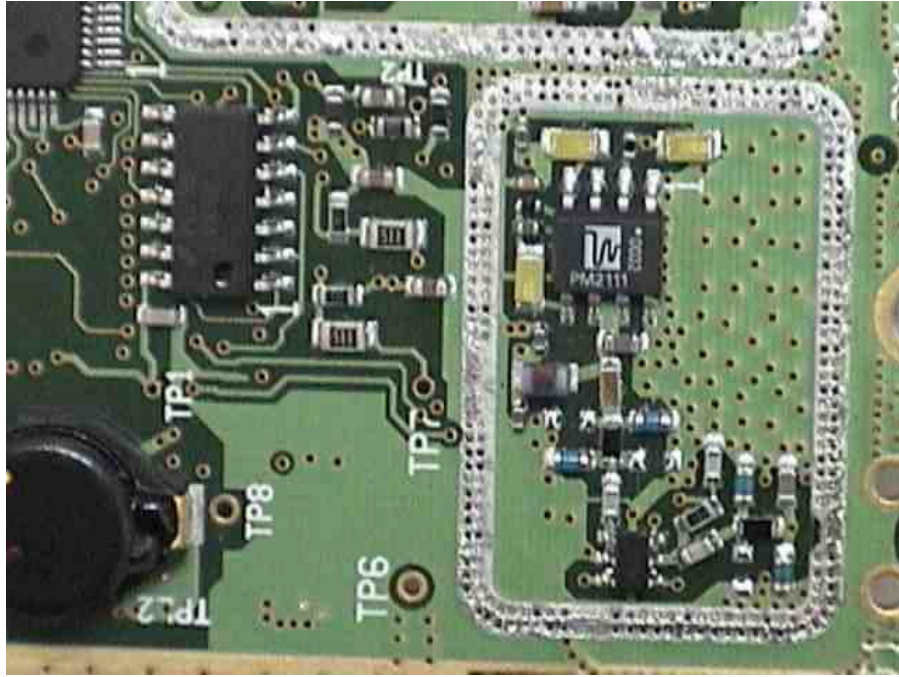


Figure 117 Close-up Area Under Shield

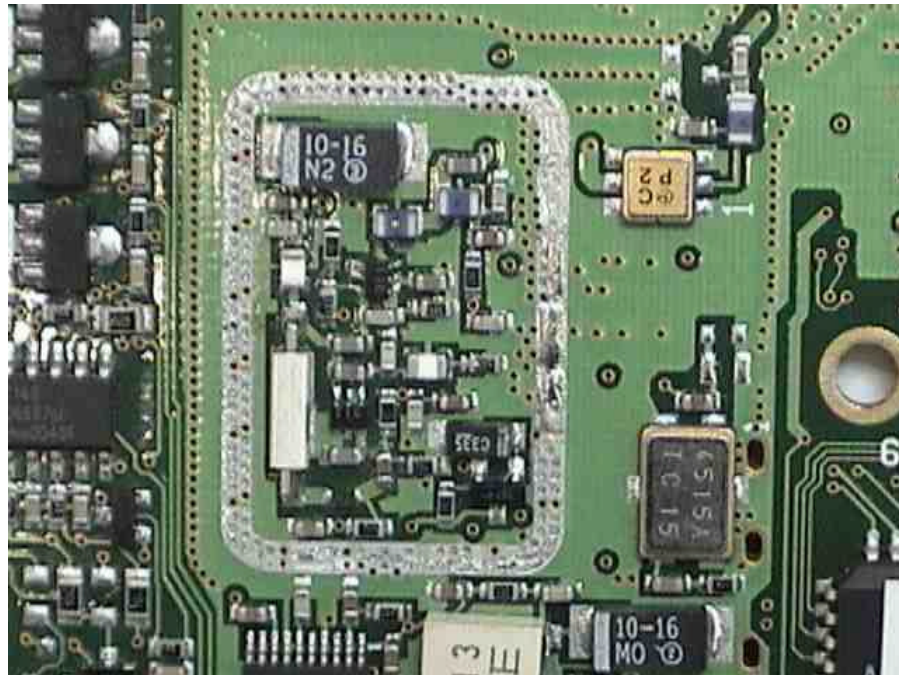


Figure 118 Close-up Area Under Shield