Assessment of Compliance

with

Respect to FCC Rules &
Regulations Parts 2 and 22

NeoPoint Inc.
NeoPoint 1600 (Updated Version)
Dual Mode 800 MHz Phone
AMPS/CDMA

September
1999

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Engineering Report

Subject: **Assessment of Compliance with Respect to FCC Rules & Regulations Parts 2 and 22**

FCC ID: **N5WNP16PSBDMHJKH2**

Equipment: **Dual Mode 800 MHz Phone, AMPS/CDMA**

Model: **NeoPoint 1600 (Updated Version)**

Client: **NeoPoint, Inc.**
4225 Executive Square
Suite 600
La Jolla, CA, 92037
USA

Project #: NEOB-NEOPOINT-1600-3299

Prepared By: APREL Laboratories,
Regulatory Compliance Division

Approved by: _____ Date: Nov. 8, 1999

Jay Sarkar
Director, Standards & Certification

Released by: _____ Date: Nov 8/99

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REGISTERED PROFESSIONAL ENGINEER J. J. Wojcik PROVINCE OF ONTARIO

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FCC ID:	**N5WNP16PSBDMHJKH2**
Applicant:	NeoPoint, Inc.
Equipment:	Dual Mode 800 MHz Phone, AMPS/CDMA
Model:	NeoPoint 1600 (Updated Version)
Standard:	FCC Rules and Regulations Part 2 & 22

ENGINEERING SUMMARY

This report contains the results of the selected tests performed on an updated version of a Dual Mode 800 MHz Phone, AMPS/CDMA. The measurements were carried out in accordance with FCC Rules and Regulations Part 2 and Part 22.

The following measurements were performed to demonstrate continuing compliance:

1. RF Power as Radiated (ERP)

2. Field Strength of Spurious Radiation.

Based on the measurement results, it is certified that the updated version of the product also meets the requirements as set forth in the above specifications for certification.

SAR Engineering Report in accordance with the commissions rule and regulations, FCC part 2.10191 and 2.1093 is presented in a separate report with this submission.

Summary of the Results

Test Description	Page No.	Test Set-up Figure No.	Results Summary
RF Power Output as Radiated Ref. Paragraph 2.985(a) Part 22.913(a)	8	1	**Passed**
Field Strength of Spurious Radiation Ref. Paragraph 2.993 & Part 22.917(e)	13	2	**Passed**
SAR (RF exposure rules) Ref. Paragraph 2.1091, 2.1093	N/A	N.A	**Passed**

FCC SUBMISSION INFORMATION

FCC ID:	**N5WNP16PSBDMHJKH2**
Electronic Serial Number:	N/A
Equipment:	Dual Mode 800 MHz Phone, AMPS/CDMA
Model:	NeoPoint 1600 (Updated Version)
For:	Certification
Applicant:	NeoPoint, Inc. 4225 Executive Square Suite 600 La Jolla, CA, 92037 USA
Manufacturer:	NeoPoint, Inc. 4225 Executive Square Suite 600 La Jolla, CA, 92037 USA
Evaluated by:	APREL Laboratories 51 Spectrum Way Nepean, Ontario Canada K2R 1E6

FCC ID: N5WNP16PSBDMHJKH2

MANUFACTURER'S DATA

Equipment Type:	Dual Mode 800 MHz Phone, AMPS/CDMA
Model:	NeoPoint 1600 (Updated Version)
Electronic Serial Number:	N/A
Reference:	FCC Rules and Regulations Parts 2 and Part 22
Manufacturer:	NeoPoint, INC.
Power Source:	7.6 VDC Battery
Development Stage of Unit:	Production

GENERAL SPECIFICATIONS

1.	Frequency Range:	824.04 – 848.97 MHz (Transmitter) 869.04 – 893.97 MHz (Receiver)
2.	Rated Transmitted Output Power:	27 dBm AMPS, (0.5W) 26 dBm CDMA (0.398W)
6.	Type of Modulation:	FM/CDMA
7.	Antenna Impedance	50 Ω

CHANNELS TESTED

	CDMA		AMPS
Channel	# 1013 (Lo)	824.700 MHz	#991(Lo) 824.04 MHz
Channel	#383 (M)	836.490 MHz	#383(M) 836.49 MHz
Channel	#777 (H)	848.310 MHz	#799(H) 848.97 MHz

INTRODUCTION

General

This report describes the results of the tests conducted on a Dual Mode 800 MHz Phone, AMPS/CDMA, model NeoPoint 1600 **(Updated Version)** manufactured by NeoPoint, INC..

Test Facility

The tests were performed for NeoPoint, Inc. by APREL Laboratories at APREL's EMI facility located in Nepean, Ontario, Canada. The laboratory operates an (3m and 10m) Open Area Test Site (OATS). The measurement facility is calibrated in accordance with ANSI C63.4-1992.

A description of the measurement facility in accordance with the radiated and AC line conducted test site criteria per ANSI C63.4-1992 is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations.

APREL's registration number is 31040/SIT (1300F2)

APREL is accredited by Standard Council of Canada, under NAPTO program (ISO Guide 25). APREL is also accredited by Industry Canada (formerly DOC) and recognised by the Federal Communications Commissions (FCC).

Standard

The evaluation and analysis were conducted in accordance with FCC Rules and Regulations Parts 2 and 22.

Test Equipment

The test equipment used during the evaluation is listed in Appendix A. Calibration of all test equipment's are performed at 12 months intervals. All equipment used is calibrated or verified in accordance with the intent of AQAP-6/MIL-STD-45662.

Environmental Conditions

Measurements were conducted in open area test site.

- Temperature: 17 °C ± 2
- Relative Humidity: 30 - 50 %
- Air Pressure: 101 kPa ± 3

FCC ID: N5WNP16PSBDMHJKH2

TEST RESULTS

FOR

Dual Mode 800 MHz AMPS/CDMA

Model: NeoPoint 1600
(Updated Version)

NeoPoint, Inc.

Test: **RF Power Output as Radiated (ERP)**

Ref.: **FCC Part 2 paragraph 2.985(a) and Part 22 paragraph 22.913(a)**

Criteria: The effective radiated power of the mobile transmitter must not exceed 7 Watts. The equipment must employ means to limit the power to the minimum necessary to maintain successful communications. Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in 2.983(d)(5).

Set-up: See Figure No. 1.

Equipment: See Appendix A.

Procedure: RF Power Measurement by Radiated Method (ERP):

Test site: The radiated RF power measurement was taken at APREL Laboratory's open area test site (OATS). This open area test site is calibrated to ANSI C63.4 document and a description of the measurement facility is on file with the Federal Communications Commission and is in compliance with the requirement of Section 2.948 of the Commissions rules and regulations.(FCC File No.: 31040/SIT)

The test was set-up as illustrated in Fig.1. The mobile was configured to operate at maximum power (power level 0) with carrier unmodulated for AMPS. The equipment under test was placed on a turntable positioned 3 meters away from the calibrated receiving antenna, which in turn was connected to the spectrum analyzer.

For each transmitter frequency, the receiver signal was **maximised** by rotating the turntable and adjusting the height of the receiving antenna. To obtain the actual ERP, the mobile was replaced by a half-wave vertically polarised antenna, RF power amplifier and signal generator. The center of the dipole antenna was placed in the same location as the mobile. The signal generator level was adjusted until the reading on the spectrum analyzer was identical to that obtained when the mobile was on the turntable. The output of power amplifier was disconnected from the dipole

and connected to an RF power meter. **The effective radiated power was read directly form the power meter**.

The process was repeated for CDMA and the mobile was CDMA modulated.

Results: **PASSED.** See Table 1, Table 2.

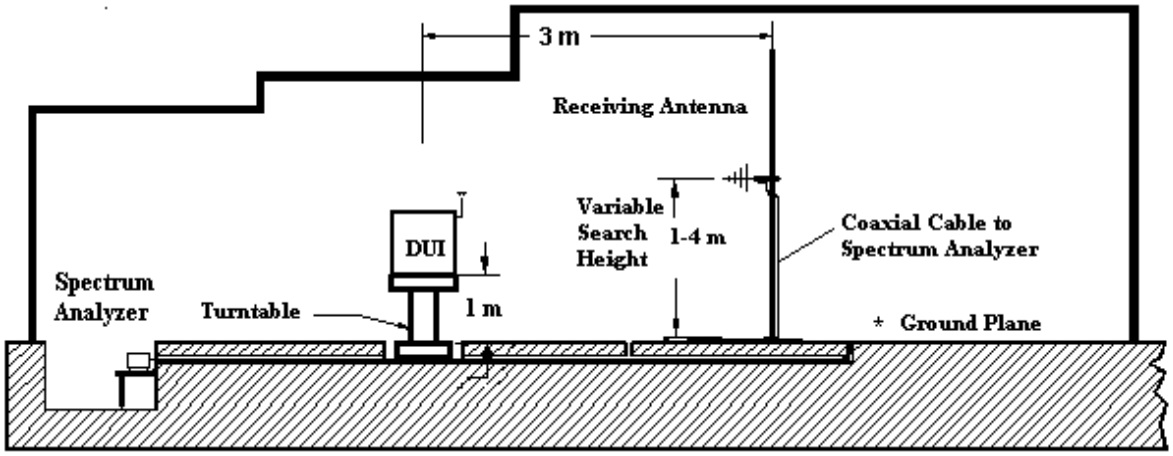


Figure 1.a Test Set Up for the Radiated Power (ERP) Measurement in OATS (not to scale)

Fig. 1.b APREL's OATS (Open Area Test Site)

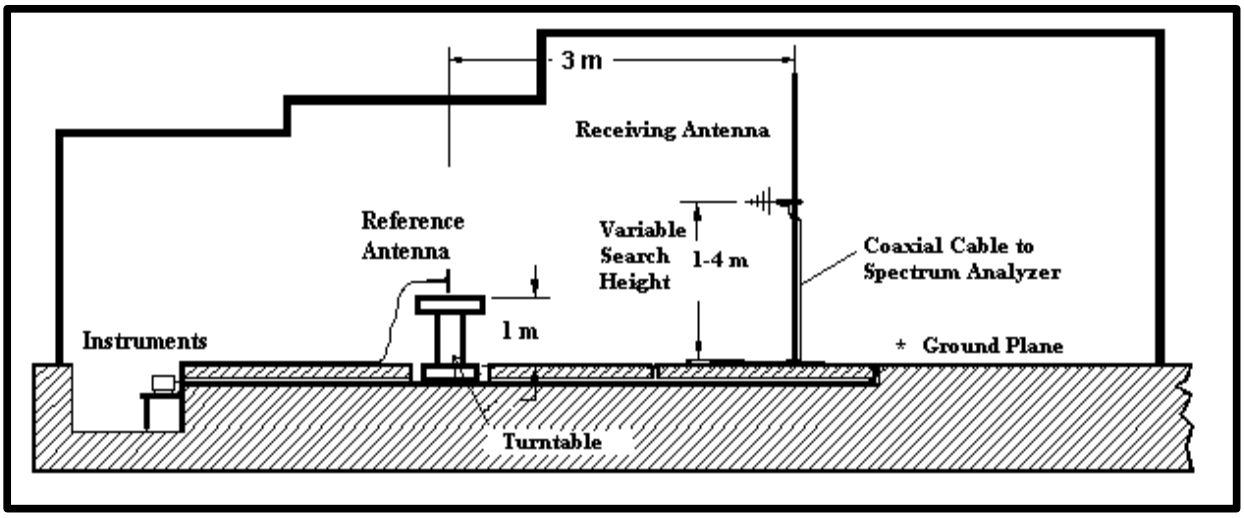


Figure 1.c Test Set Up for the Radiated Power (ERP) Measurement in OATS(not to scale)
The EUT is Replaced by Reference Dipole Antenna.

Table 1.
RF Output Power Measurement
ERP
AMPS

Channel No.	Nominal Transmit Frequency	Manufacturer's Rated Output Power (Power Level: 0)	Measured Output Power ERP (Power Level: 0)	ERP (Power Level: 0)
	(MHz)	(W)	(dBm)	(W)
799	848.97	0.5	26.4	0.437
383	836.49	0.5	26.3	0.427
991	824.04	0.5	26.1	0.407

Table 2.
RF Output Power Measurement
ERP
CDMA

Channel No.	Nominal Transmit Frequency	Manufacturer's Rated Output Power (Power Level: 0)	Measured Output Power ERP (Power Level: 0)	ERP (Power Level: 0)
	(MHz)	(W)	(dBm)	(W)
777	848.31	0.398	25.3	0.339
383	836.49	0.398	25.0	0.316
1013	824.70	0.398	25.1	0.324

Test performed by: ***HY*** Date: ***Sep 29, 1999***

Test: **Field Strength of Spurious Radiation**

Ref.: **FCC Part 22 subpart H, Paragraph 22.917(e) and Part 2.993**

Criteria: On any frequency twice or more than twice the fundamental frequency of the mobile, the mean power of spurious emissions shall be attenuated below the power of the unmodulated carrier by at least 43 + 10 log (P) dB.

This was calculated to be 84.6 dBμV/m at 3 meters.

Set-up: See Figure No. 2.

Procedure: The final measurements were taken at APREL Laboratory's open area test site (OATS) measurement facility. This open area test site is calibrated to ANSI C63.4 document and a description of the measurement facility is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations. (FCC File No.: 31040/SIT).

The mobile was configured to operate at maximum power with appropriate modulation. The mobile was keyed on channel 383 (836.49 MHz).

Prior to final measurements in the OATS, preliminary radiated spurious emissions were scanned in a shielded enclosure at a distance of 1 m using a broadband Discone antenna and horn antenna in order to determine the characteristic frequencies of the field strength of spurious emissions. Based on this information, measurements were performed in the OATS at these characteristic frequencies using calibrated antennas.

The transmitter output was fed to a Spectrum Analyzer and the output power was noted for reference. A 50 Ω dummy load was attached to the antenna connector. All field strength measurements were made with spectrum analyzer and the appropriate calibrated antenna for the frequency range of 9 kHz up to 10^{th} harmonics of the transmit frequency (See equipment list for the calibrated antenna used).

The equipment under test was placed on a turntable positioned 3 meters away from the calibrated receiving antenna, which in turn was connected to the spectrum analyzer. For each identified frequency, the received signal was maximised by the

positioning of the turntable and the height of the antenna. The process was repeated for both horizontal and vertical polarization.

Information submitted includes the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antenna.

Measurements given in the spurious emissions test result tables contain: analyzer reading, correction factor, and final reading. The final field strength level are derived from the analyzer measurement and the correction factor (antenna factor and cable loss) as shown in the following example:

Sample Calculation (not actual measurement):

A. Spectrum analyzer reading (Direct measurement)

At 966.87 MHz a spurious level of 35.0 dBµV @ 3 meters is measured.

B. Correction factor (antenna factor and cable loss)

Cable loss: 2.4 dB
Antenna factor: 23 dB
Total Correction Factor: 2.4 + 23 = 25.4 dB/m

C. Final Reading (Field Strength of spurious emission)

C=A+B
C= 35.0 dBµV + 25.4 dB
C= 60.4 dBµV/m @ 3 meters

D. The criteria level.

The field intensity which would be produced by the transmitter carrier operating into a half-wave dipole antenna (gain of 1.64), at a distance of 3 m was calculated using the following formula:

$$\text{Field Strength of carrier (dB}\mu\text{V/m)} = 10\log_{10}\left(\frac{PtG}{4\pi r^2}\right) + 146 \text{ dB}$$

Pt is transmitter power, 0.389 Watts
G is gain, 1.64

r is distance, 3 meters

Field Strength of carrier = 124.6 dBµV/m

D = Field Strength of carrier - (43 + (10 log P))
D = 124.6 dBµV/m - (43 + (10 log 0.5))
D = 84.6 dBµV/m @ 3 meters

Criteria (reference) level at 3 meters from 0.389 Watts into half-wave dipole antenna is 84.6 dBµV/m

E = Margin (spurious emission below the reference level)

E = D - C
E = 84.6 dBµV/m –60.4 dBµV/m
E = 24.2 dB (This is not actual reading, but an sample to show the calculation)

The above calculation is shown for AMPS. Similarly it can be shown for CDMA, the criteria is 84.6 dBµV/m at 3 meters.

Results: **PASSED.** See Tables 3,4,5 and 6.

Table 3
Spurious Emission Levels
AMPS
Channel No.: 383
Transmitter Frequency: 836.49 MHz
Power Level: 0
Antenna Polarization: Horizontal
R.B.: 30 kHz

Frequency (MHz)	Measured Level (dBµV)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Criteria Level (dBµV/m)	Margin (dB)
	"A"	"B"	"C"	"D"	"E"
966.87	24.3	25.4	49.7	84.6	34.9
1672.98	14.5	30.3	44.8	84.6	39.8

No other spurious were detected.

Table 4
Spurious Emission Levels
AMPS
Channel No.: 383
Transmitter Frequency: 836.49 MHz
Power Level: 0
Antenna Polarization: Vertical
R.B.: 30 kHz

Frequency (MHz)	Measured Level (dBµV)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Criteria Level (dBµV/m)	Margin (dB)
	"A"	"B"	"C"	"D"	"E"
966.87	33.5	25.4	58.9	84.6	25.7
1672.98	15.0	30.3	45.3	84.6	39.3

No other spurious were detected.

Table 5
Spurious Emission Levels
CDMA
Channel No.: 383
Transmitter Frequency: 836.49 MHz
Power Level: 0
Antenna Polarization: Horizontal
R.B.: 1 MHz

Frequency (MHz)	Measured Level (dBµV)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Criteria Level (dBµV/m)	Margin (dB)
	"A"	"B"	"C"	"D"	"E"
966.87	24.7	25.4	50.1	84.6	34.5

No other spurious were detected.

Table 6
Spurious Emission Levels
CDMA
Channel No.: 383
Transmitter Frequency: 836.49 MHz
Power Level: 0
Antenna Polarization: Vertical
R.B.: 1 MHz

Frequency (MHz)	Measured Level (dBµV)	Correction Factor (dB/m)	Field Strength (dBµV/m)	Criteria Level (dBµV/m)	Margin (dB)
	"A"	"B"	"C"	"D"	"E"
966.87	34.0	25.4	59.4	84.6	25.2

No other spurious were detected.

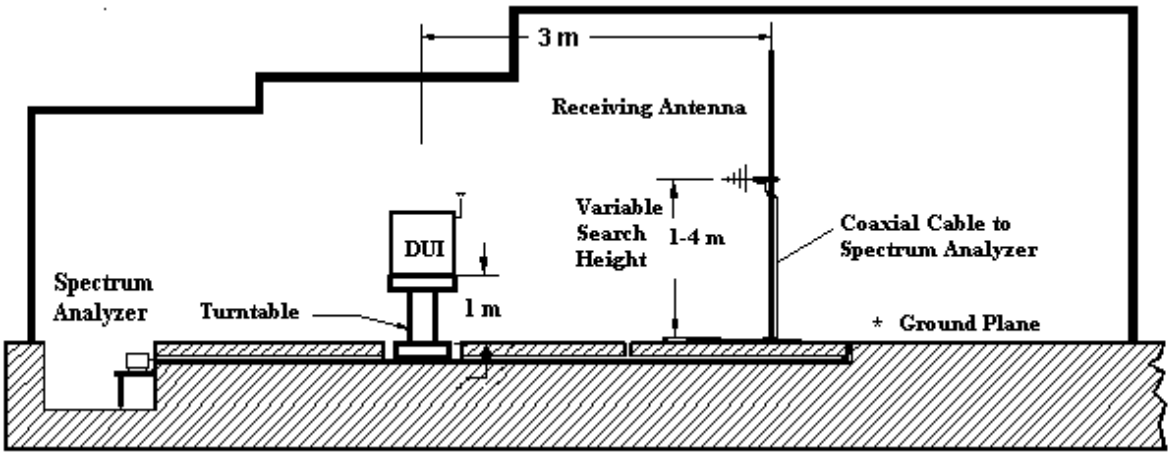


Fig. 2.a: Test set up for the radiated emission measurement in OATS (not to scale)

Fig. 2.b APREL's OATS(Open Area Test Site)

APPENDIX A

List of Test Equipment

FCC ID: N5WNP16PSBDMHJKH2

List of Equipment

Description	Manufacturer	Model #	Asset #	Cal . Due Data
Spectrum Analyzer	Tektronix	492	100949	Jan 11, 2000
Spectrum Analyzer	Anritsu	MS2661C	N/A	July 15, 2000
20 dB Attenuator	Narda	4779-20	301370	May 18, 2000
Signal Generator	Hewlett-Packard	HP 8662A	100456	Jun 28, 2000
Signal Generator	Hewlett-Packard	HP 8340B	100955	Sep 4, 2000
RF Power Amplifier	Amplifier Research	25W100M	100735	Oct 2, 2000
10 dB Attenuator	Narda	4779-10	301370	May 4, 2000
800MHz Dipole	APREL Inc.	D-8355	N/A	Jun 16, 2000
Bi-conical Antenna	Eaton	94455-1	100156	July 21, 2000
Log-Periodic Antenna	APREL Inc.	ALP1	100761	July 21, 2000
Double Ridged Guided Horn Antenna	APREL Inc.	A1	100400	July 21, 2000
Turntable with Controller	EMCO	1060-1.241	100506	CNR
Computer Controlled Antenna Position Mast	EMCO	1051-12	100507	CNR
OATS	APREL Inc.	3m & 10m	N/A	N/A
Shielded Room	Universal Shielding	6/15/87	101329	May 1, 2000
Environmental Chamber with Micro Tenn Programmable Computer	Tenney	TR14-3	100636	Sep 19, 2000
Digital Multimeter	Fluke	8010A	---	Sep 11, 2000

APPENDIX B

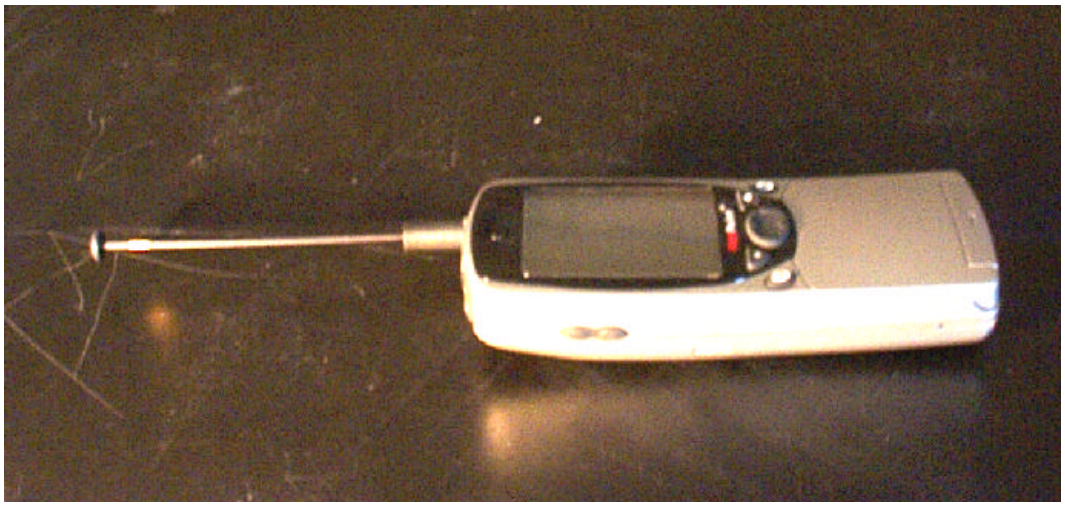
Photographs

FCC ID: N5WNP16PSBDMHJKH2

NeoPoint 1600 (Updated Version)

NeoPoint 1600 (Updated Version)

NeoPoint 1600 (Updated Version)



NeoPoint 1600 (Updated Version)

NeoPoint 1600 (Updated Version)

APREL's 10 metre Open Area Test Site is fully protected against climatic changes. The site is used for studies on electromagnetic radiation and for antenna calibration, and was developed as the most advanced structure of this type in North America. All laboratory instruments, a turntable and cables are located below a perforated metal ground plane, while the building itself is constructed with specially formed fibreglass modules.

Shown is one of two complete SAR (Specific Absorbtion Rate) labs at APREL. These are used for dosimetry measurements, as well as for near-field antenna design studies. APREL was the first fully independent (and ISO Guide 25 accredited) organization to offer SAR expertise .

Spectrum Sciences™ Institute is an almost 30,000 sq. ft facility nestled in 18 acres of treed land known as Spectrum Sciences™ Park, and located in Ottawa- Canada's high-tech hot-spot.

The current building consists of:

- **the Technology Gallery and Conference facility**
- **APREL Laboratories and NCL Calibration Labs**
- **Spectrum Sciences™ Institute offices**
- **"Incubation" offices**

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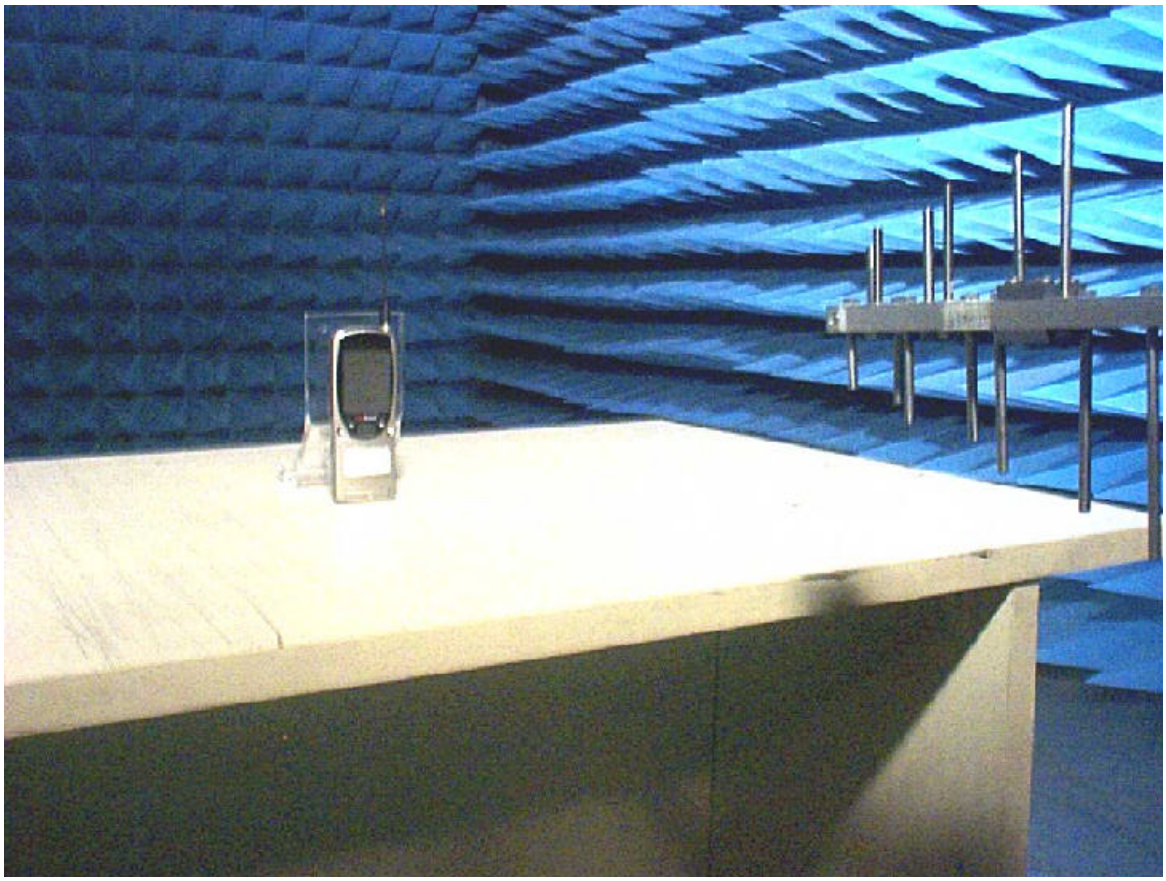

Signature of Spurious Radiation in Shielded Room

Reference Dipole Antenna Used for ERP Measurement