Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

Test Report:	6W65294 Issue 2
Applicant:	Medical Intelligence 1170, Chemin Saint-Louis, Sillery (Québec) G1S 1E5, CANADA
Apparatus:	CLM-BRA-001
FCC ID:	TV9-MICLM-C001
In Accordance With:	FCC Part 24 Personal Communications Services Subpart E Broadband PCS
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	Xu Jin, Wireless Specialist
Date:	August 1, 2006
Total Number of Pages:	24

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 24, conducted measurements were performed in accordance with ANSI TIA-603-B-2002. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	CLM-BRA-001
Specification:	FCC Part 24 Subpart E Broadband PCS
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Roman Kuleba, EMC/Wireless Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

COLUMBA Bracelet – Data Terminal Module CLM-BRA-001

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	Base Charger	CLI-073503
2	Wrist strap with piece	CLI0073501
3	Wrist strap with piece	CLI0073502
4	Battery	CLI0073504
5	Battery	CLI0073505
6	Battery	CLI0073506
7	AC AdaptorM/N KA12D090050034U	CLI0073507

The first samples were received on: April 24, 2006

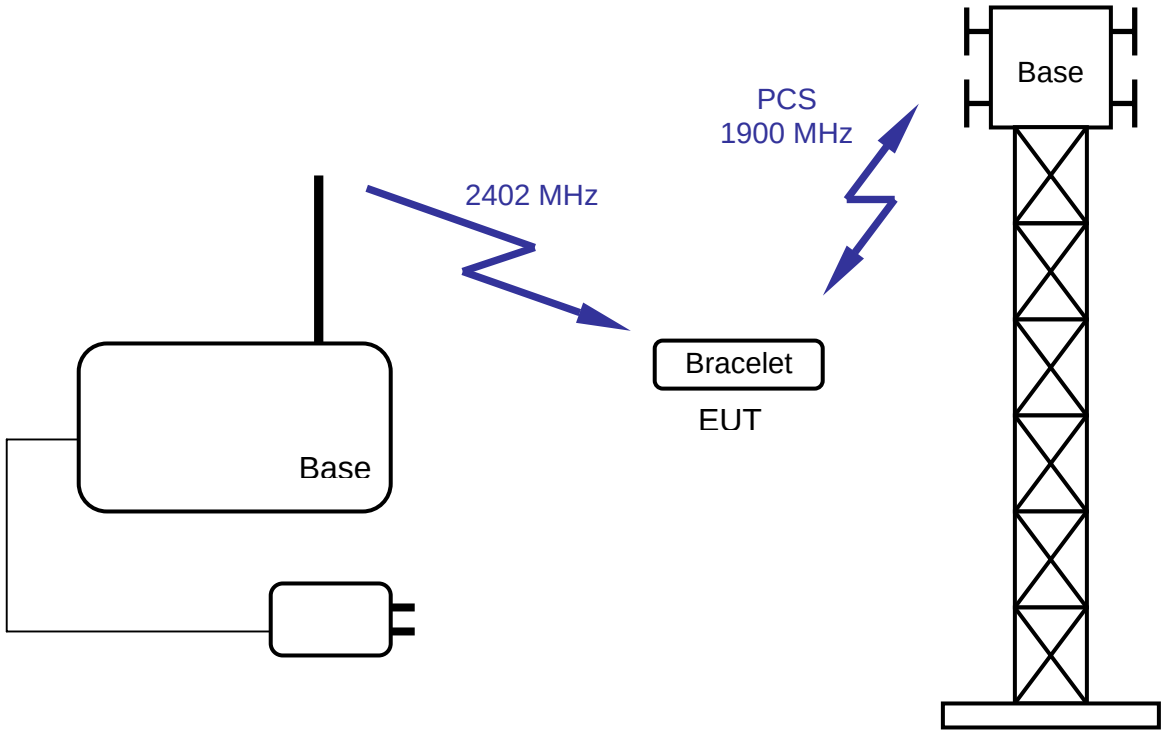
1.3 Theory of Operation

The Columba Bracelet Module is a component of the Columba tracking system for patients suffering from Alzheimer's disease and similar cognitive disorders. The Base and Charger (with 2.4 GHz transmitter) continuously transmits a proximity message at 2.402 GHz, to be detected by a receiver in a bracelet on the patient's wrist. If the patient walks out of the range of the base, the bracelet (after not receiving the proximity message) will detect its position using a built-in GPS-receiver and transmit this information via GSM/GPRS cellular network to the center that is in charge of taking care of the patient.

1.4 Technical Specifications of the EUT

Manufacturer:	Medical Intelligence
Operating Frequency:	1850.2 –1909.8 MHz, (Channel 512 –Channel 810)
Emission Designator:	GXW
Rated Power:	30.0 dBm Conducted
Measured Power:	30.94 dBm EIRP
Modulation:	GSM/GPRS
Antenna Data:	Monopole Integrated on PCB
Power Source:	Internal Battery (Li-Polymer, 3.7 VDC, 570 mAh)

1.5 Block Diagram of the EUT



Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 2 Subpart J, Equipment Authorization Procedures
FCC Part 24 Subpart E, Broadband PCS

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 ºC
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSP	FA001920	March 17/07
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 18/06
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 18/06
0.1 – 1300 MHz Amplifier	Hewlett Packard	8447D	FA001909	COU(2)
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 27/06
Bilog	Schaffner	CBL6112B	FA001504	NCR(1)
Biconical (2) Antenna	EMCO	3109	FA000904	Aug. 26/06
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Aug. 29/06
Horn Antenna #1	EMCO	3115	FA000649	Jan. 12/07
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	July 14/06
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	July 14/06
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	July 14/06
5.0 – 18 GHz Amplifier	Narda	DWT-186N23U40	FA001409	COU(2)
Signal Generator	Rhode & Schwarz	SMR 40	FA001879	July 13/06
Climate Chamber	Thermotron	SM-16C	15649-S	COU(2)
Wireless Communication test set	Agilent	8960 seires 10	991428	Feb 10/08

(1) NCR (No Calibration Required)
(2) COU (Calibrate on Use)

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional Observations

There were no additional observations made during this assessment.

Section 4 : Results Summary

This section contains the following:

FCC Part 24 Subpart E : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N	No : not applicable / not relevant.
Y	Yes : Mandatory i.e. the apparatus shall conform to these tests.
N/T	Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 24 Subpart E : Test Results

Clause	Test Method	Test Description	Required	Result
24.232(c)	2.1046	EIRP Limits	Y	PASS
24.238(b)	2.1049	Occupied bandwidth	Y	PASS
24.238(a)	2.1051	Spurious Emissions at the antenna terminal	N	N/A*
24.238(a)	2.1053	Field strength of spurious radiation	Y	PASS
24.235	2.1055	Frequency stability	Y	PASS

Notes:

* The EUT uses an integrated monopole antenna made on PCB. There are no antenna ports accessible for testing. Only radiated measurement were performed.

Appendix A : Test Results

Clause §24.232 (c) Equivalent Isotropic Radiated Power Limits (EIRP)

§24.232(c) Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

Test Conditions:

Sample Number:	2	**Temperature:**	23°C
Date:	May 10, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: Pass (See enclosed table).

Test Limit: 2.0W (33.0dBm) EIRP

Additional Observations:

The test was conducted using a spectrum analyzer set to Peak Detector mode and RBW/VBW set to 1MHz/3MHz. See Appendix C for test setup.

Maximum RF Output Power:

Channel #	Frequency (MHz)	Peak EIRP (dBm)	Peak EIRP (W)
512	1850.2	30.94	1.24
661	1880.0	30.66	1.16
810	1909.8	26.05	0.40

Clause §24.238 (b) Occupied Bandwidth

§22.917(b) The emission bandwidth is defined as the width of the signal between two points, one below the carrier centre frequency and one above the carrier centre frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

Test Conditions:

Sample Number:	2	**Temperature:**	23°C
Date:	May 12, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: See Attached Plots and Table.

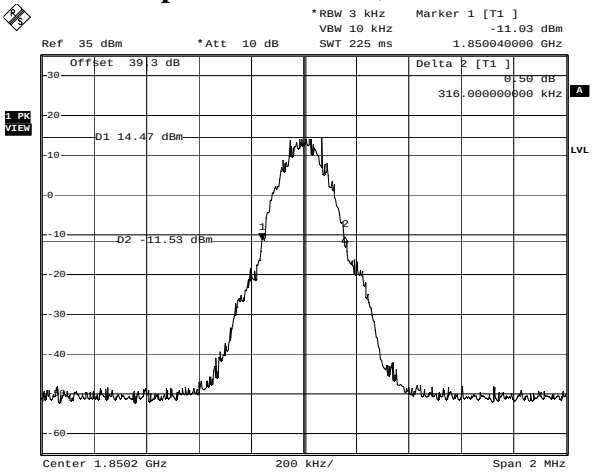
Additional Observations: None.

Occupied Bandwidth Test Data:

Channel #	Frequency (MHz)	26 dB Occupied BW (kHz)	99 % Occupied BW (kHz)
512	1850.2	316	248
661	1880.0	312	248
810	1909.8	316	248

Occupied Bandwidth, continued

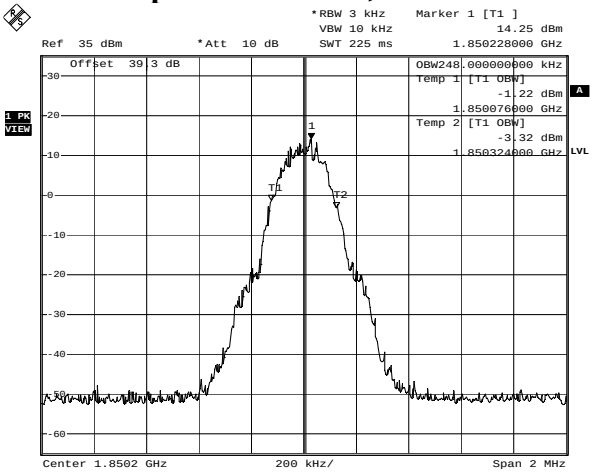
26 dB Occupied Bandwidth, Ch.512



Medical Intelligence

Date: 12.MAY.2006 17:02:29

99 % Occupied Bandwidth, Ch.512

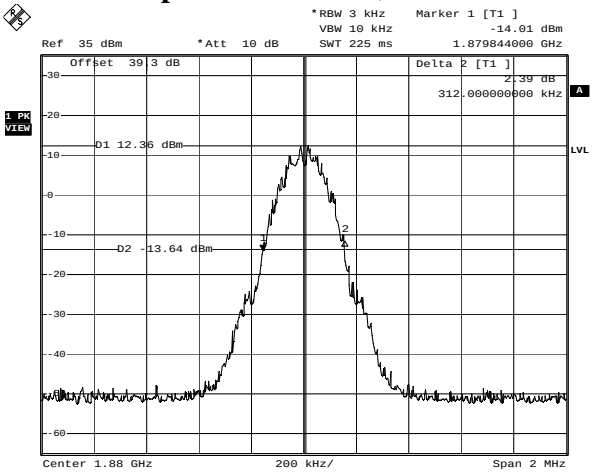


Medical Intelligence

Date: 12.MAY.2006 17:06:33

Occupied Bandwidth, continued

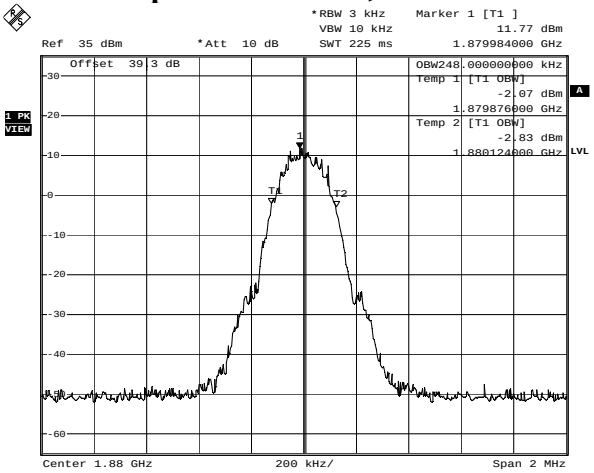
26 dB Occupied Bandwidth, Ch.661



Medical Intelligence

Date: 12.MAY.2006 16:57:15

99 % Occupied Bandwidth, Ch.661

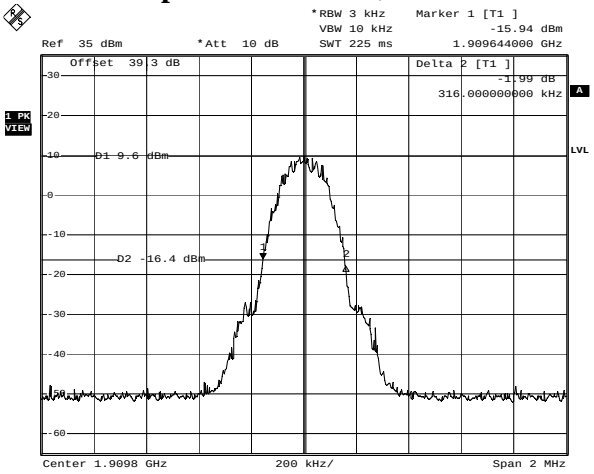


Medical Intelligence

Date: 12.MAY.2006 16:53:21

Occupied Bandwidth, continued

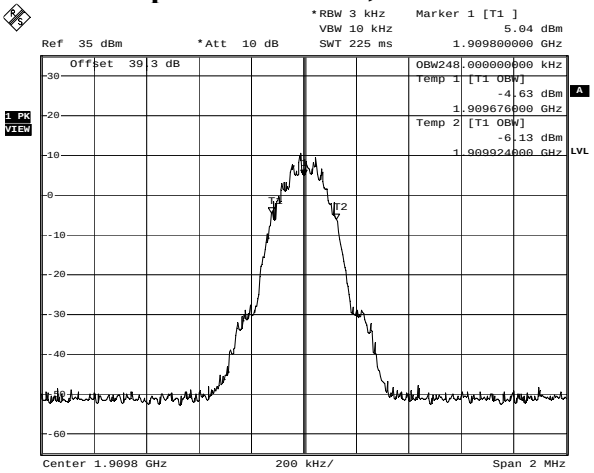
26 dB Occupied Bandwidth, Ch.810



Medical Intelligence

Date: 12.MAY.2006 16:48:49

99 % Occupied Bandwidth, Ch.810



Medical Intelligence

Date: 12.MAY.2006 16:51:27

Clause §24.238 (a) Spurious emissions at the antenna terminal

§24.238(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \cdot \log_{10}(P)$ dB.

Test Conditions:

Sample Number:	2	**Temperature:**	23°C
Date:	May 10, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: N/A.

Additional Observations:

The EUT uses an integrated monopole antenna made on PCB. There are no antenna ports accessible for testing. Only radiated measurement were performed.

Clause §24.238 (a) Field Strength of Spurious Radiation

§24.238(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \cdot \log_{10}(P)$ dB.

Test Conditions:

Sample Number:	2	**Temperature:**	23°C
Date:	May 11-12, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: See Attached Table and Plots for Results.

Additional Observations: The Spectrum was searched from 30MHz to the 10th harmonic.

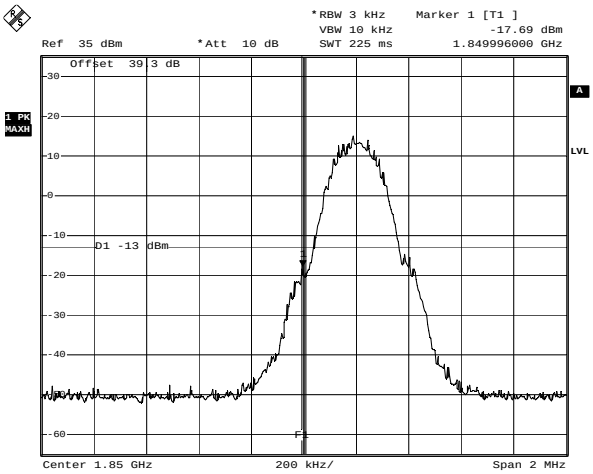
The EUT was measured on three orthogonal axes.

All measurements were performed using a Peak Detector with 100 kHz RBW below 1GHz and a 1 MHz RBW above 1GHz at a distance of 3 meters.

No emissions within 20 dB below the limit was found on frequencies below 1 GHz.

Field Strength of Spurious Radiation, continued

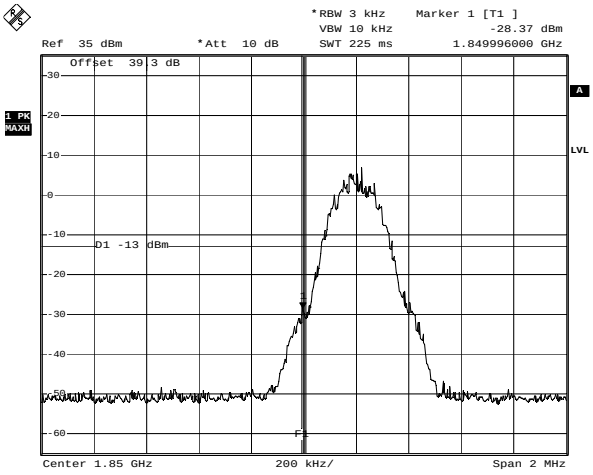
Lower Band Edge, Vertical Polarization
Limit: -13.0 dBm EIRP



Medical Intelligence

Date: 12.MAY.2006 16:18:25

Lower Band Edge, Horizontal Polarization
Limit: -13.0 dBm EIRP

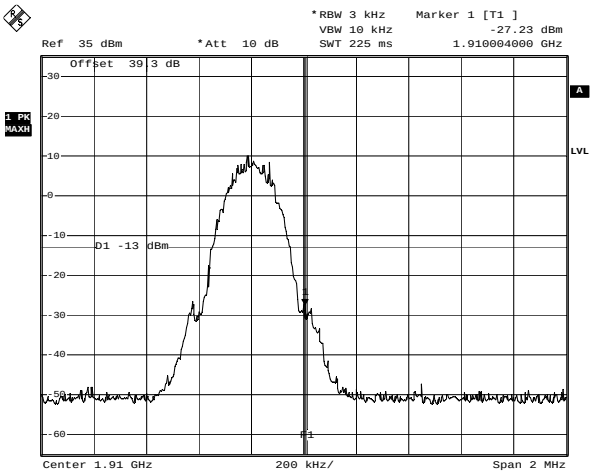


Medical Intelligence

Date: 12.MAY.2006 16:21:46

Field Strength of Spurious Radiation, continued

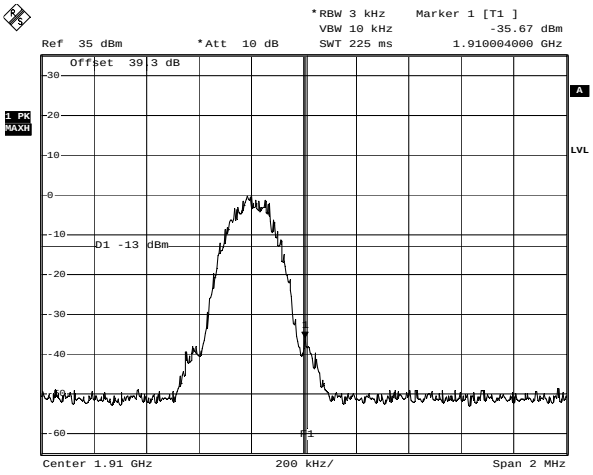
Upper Band Edge, Vertical Polarization
Limit: -13.0 dBm EIRP



Medical Intelligence

Date: 12.MAY.2006 16:33:49

Upper Band Edge, Horizontal Polarization
Limit: -13.0 dBm EIRP



Medical Intelligence

Date: 12.MAY.2006 16:35:56

Field Strength of Spurious Radiation, continued

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBµV)	Sig.Sub. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Cable Loss (dB)	Level (dBm)	Limit (dBm) EIRP	Margin (dB)
5550.6000	Horn1	V	85.6	-107.8	N/A	N/A	N/A	-22.2	-13.0	9.2
5640.0000	Horn1	V	80.6	-107.9	N/A	N/A	N/A	-27.3	-13.0	14.3
5729.4000	Horn1	V	76.8	-107.9	N/A	N/A	N/A	-31.1	-13.0	18.1
7400.8000	Horn1	H	62.5	-106.3	N/A	N/A	N/A	-43.8	-13.0	30.8
7520.0000	Horn1	H	47.7	-106.7	N/A	N/A	N/A	-59.0	-13.0	46.0
7639.0000	Horn1	H	58.1	-106.4	N/A	N/A	N/A	-48.3	-13.0	35.3

Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole

No emissions within 20dB below the limit were found on frequencies below 1 GHz.

Clause §24.235 Frequency Stability

§24.235 Frequency stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Conditions:

Sample Number:	2	**Temperature:**	-20°C to +50°C
Date:	May 10, 2006	**Humidity:**	45 %
Modification State:	0	**Tester:**	Roman Kuleba
		Laboratory:	Ottawa

Test Results: See Enclosed Tables.

Additional Observations: The EUT cannot transmit on temperatures below -20 °C.
The frequency stability is sufficient to ensure that the emission bandwidth stays within the authorized frequency block.

Ambient Temperature: 20 °C

Voltage (V)	Measured Frequency (MHz)	Deviation ppm
3.6	1879.967803000	-0.9
3.9	**1879.969421000**	0.0
4.2	1879.982112000	6.8

Voltage: 3.9 V

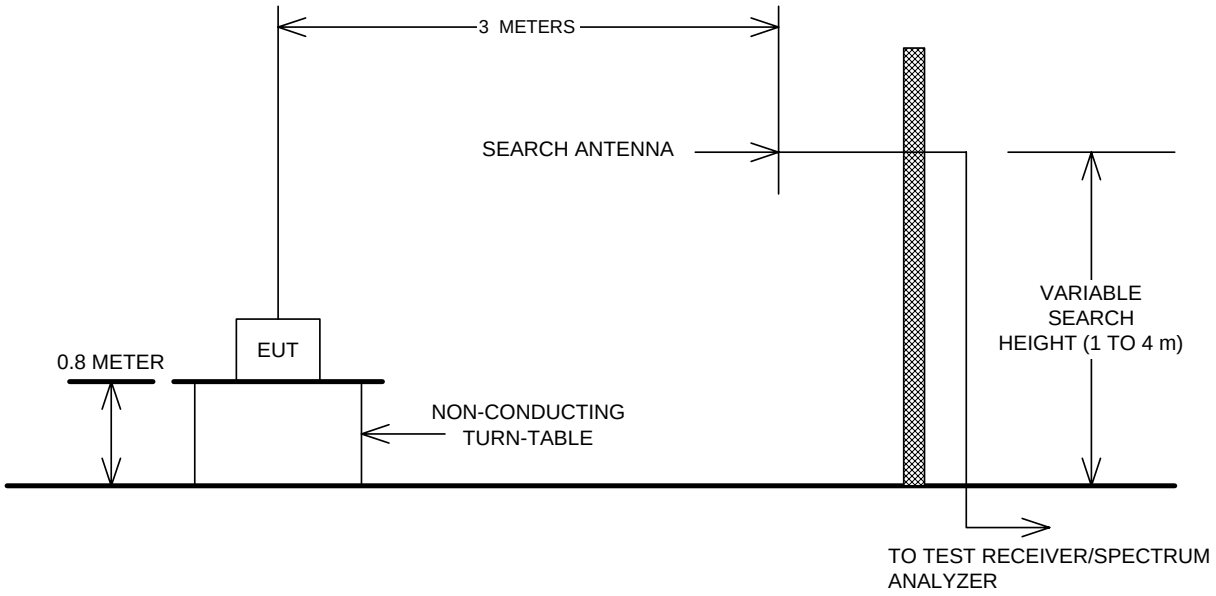
Temperature (°C)	Measured Frequency (MHz)	Deviation ppm
-20	1879.981736000	6.6
-10	1879.980895000	6.1
0	1879.980055000	5.7
10	1879.974738000	2.8
20	**1879.969421000**	0.0
30	1879.970384000	0.5
40	1879.971346000	1.0
50	1879.972309000	1.5

Appendix B : Setup Photographs

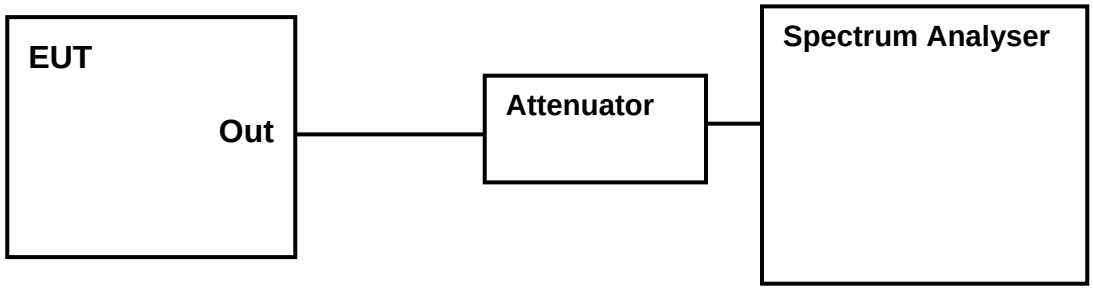
Radiated Spurious Emissions Setup:

Appendix C : Block Diagram of Test Setups

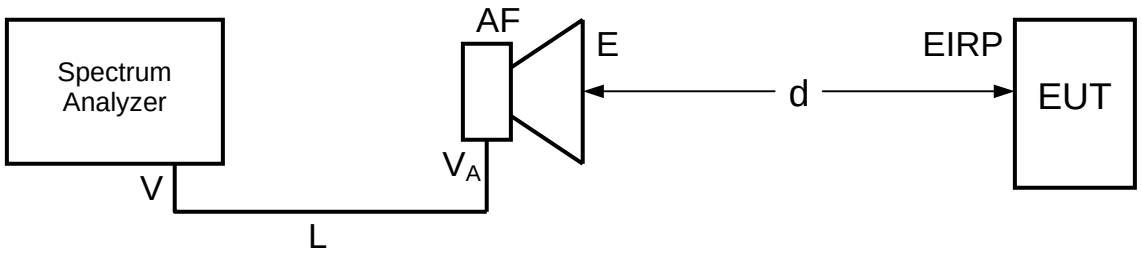
Test Site For Radiated Emissions



Conducted Emissions, Output power, Occupied Bandwidth



EIRP of Radiated Emissions



Determining Off-set Correction Factor (in dB) needed to read EIRP of measured radiated emissions (in dBm) directly on Spectrum Analyzer:

$$E(V/m) = \frac{\sqrt{30 \cdot EIRP(W)}}{d(m)} \Rightarrow E(dB\mu V/m) = 90 + 10 \cdot \log_{10} 30 + EIRP(dBm) - 20 \cdot \log_{10} d(m)$$

$$E(dB\mu V/m) = V(dB\mu V/m) + L(dB) + AF(dB) = P_{Read}(dBm) + 106.99 + L(dB) + AF(dB)$$

$$EIRP(dBm) = P_{Read}(dBm) + 2.22 + L(dB) + AF(dB) + 20 \cdot \log_{10} d(m)$$

$$EIRP(dBm) = P_{Read}(dBm) + \text{Off-set (dB)}$$

$$\text{Off-set (dB)} = 2.22 + L(dB) + AF(dB) + 20 \cdot \log_{10} d(m)$$

EIRP :	Equivalent Isotropically Radiated Power transmitted from EUT
E :	Electric Field Strength measured at distance d from EUT
d :	Distance (m)
V :	Voltage at Spectrum Analyzer Input (dBµV/m)
P_{Read}(dBm) :	Reading on Spectrum Analyzer (dBm)
L :	Cable Loss (dB) obtained by calibration
AF :	Antenna Factor (dB) obtained by calibration
Off-set :	Off-set Correction Factor (in dB) needed to read EIRP of radiated emissions (in dBm) directly on Spectrum Analyzer (value to be added to the reading to get EIRP)

Frequency Stability