KTL Test Report:	9R02321
Applicant:	EXI Wireless Systems Inc. Suite 100-13551 Commerce Parkway Richmond, BC V6V 2L1
Equipment Under Test: (E.U.T.)	Infant Tag
FCC ID:	HE7ETG
In Accordance With:	**FCC Part 15, Subpart C** For Low Power Transmitters Operating Periodically In The Band 40.66 - 40.77 MHz And Above 70 MHz
Tested By:	KTL Ottawa Inc. 3325 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	
	R. Grant, Wireless Group Manager
Date:	
Total Number of Pages:	18

Table of Contents

Section 1. Summary of Test Results

Manufacturer: EXI Wireless Systems Inc.

Model No.: None

Serial No.: None

Date Received In Laboratory: March 22, 2000

KTL Identification No.: Item #9 & #10

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.231. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☒ New Submission ☐ Production Unit

☐ Class II Permissive Change ☒ Pre-Production Unit

D	S	C

Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP®

NVLAP LAB CODE: 100351-0

TESTED BY: _____ DATE: _____
Kevin Carr, Technologist

Summary Of Test Data

Name of Test	Paragraph Number	Results
Transmission Requirements	15.231(a)	Not Applicable
Radiated Emissions	15.231(b)	Not Applicable
Occupied Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	Not Applicable
Periodic Alternate Field Strength Requirements	15.231(e)	Complies
Powerline Conducted Emissions	15.207	Not Applicable

Footnotes For N/A's:

15.207	Battery Powered
15.231(d)	Does Not Operate In 40.66-40.70 MHz Band
15.231(b)(a)	Applicant Meets 15.231(e) Requirements

Test Conditions:

Indoor	Temperature:	27 °C
	Humidity:	35 %
Outdoor	Temperature:	20 °C
	Humidity:	35 %

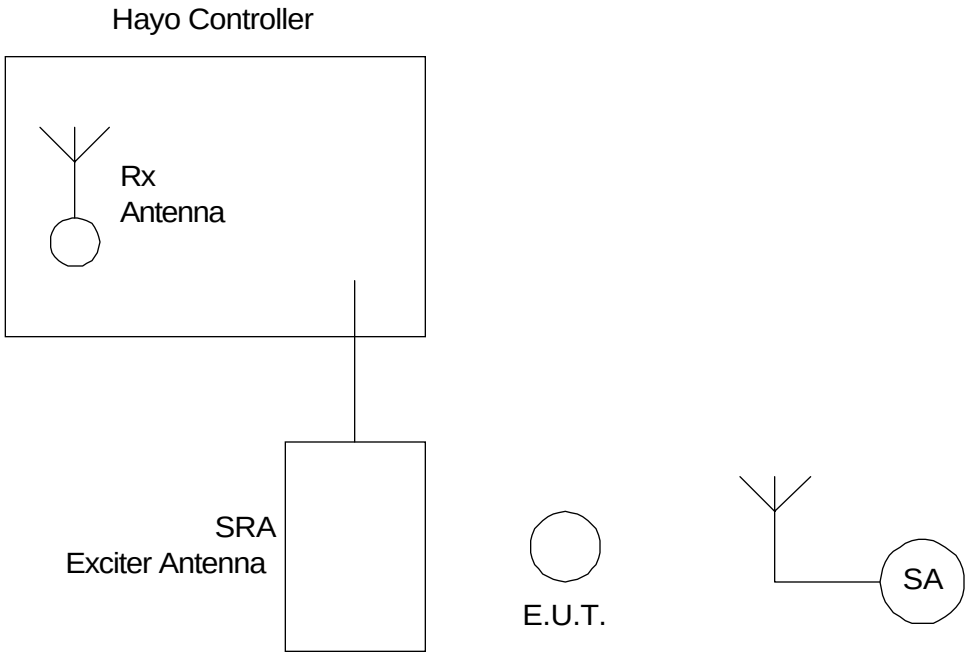
Section 2. Equipment Under Test (E.U.T.)

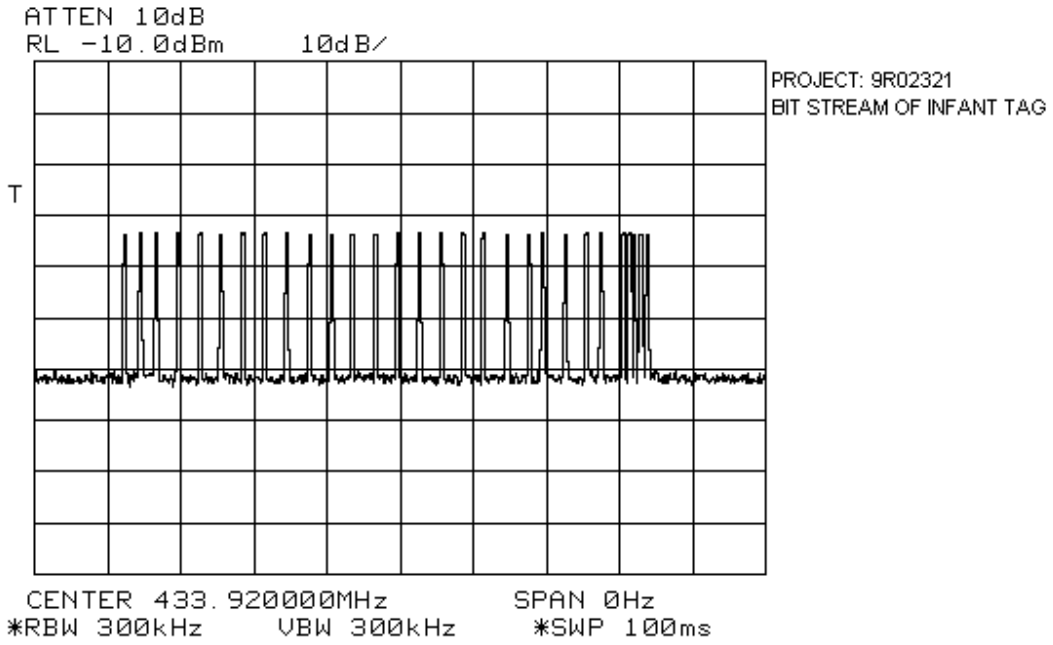
General Equipment Information

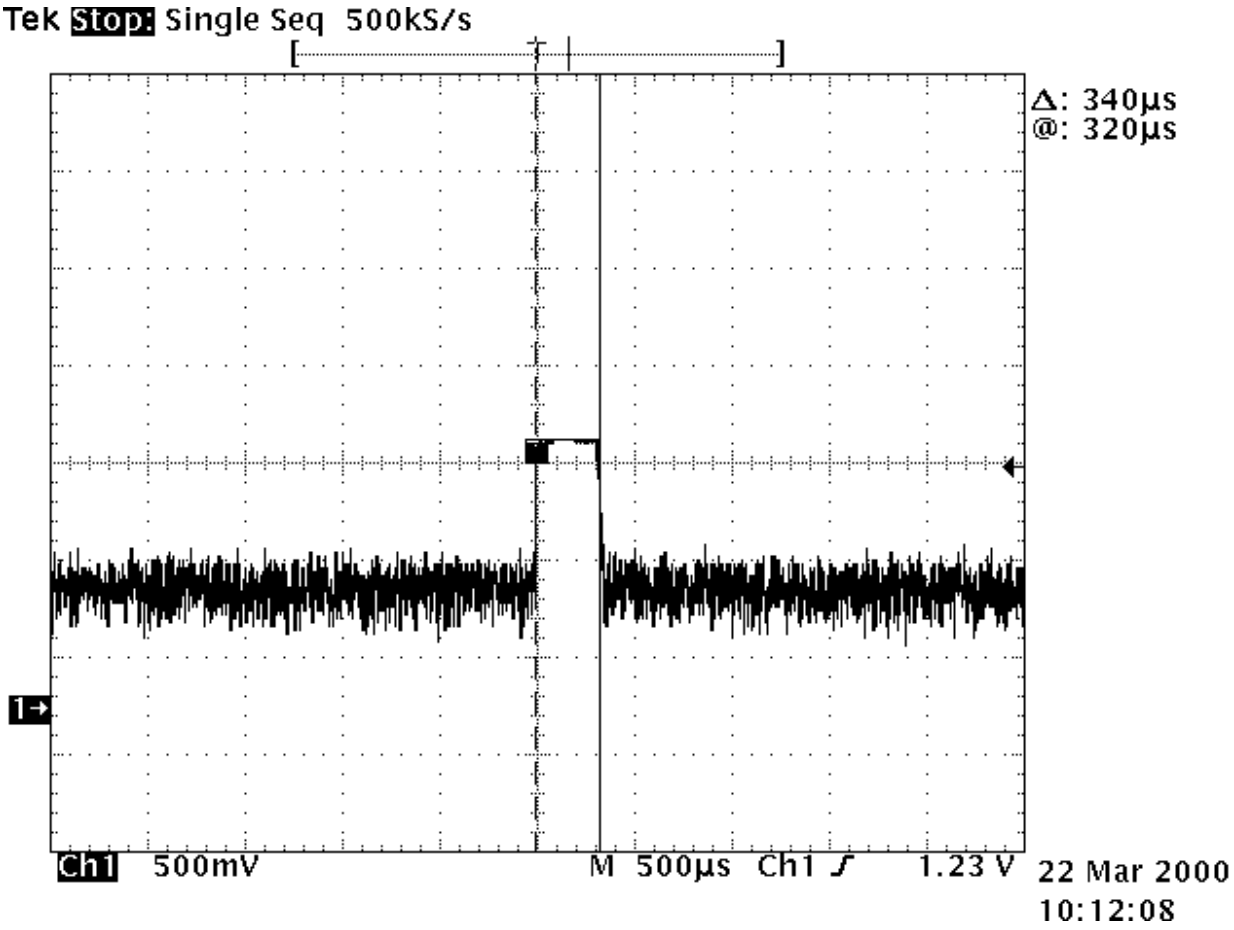
Frequency Range:	433.92 (Fixed)
Operating Frequency(ies) of Sample:	433.92 (Fixed)
Type of Emission:	Pulse Amplitude Modulation
Emission Designator:	69K2K1D
Supply Power Requirement:	3 Vdc Battery
Duty Cycle Calculation:	$20 \text{ Log} \left(\frac{0.340x28}{100} \right) = 20.4 \text{ dB}$

Configuration of the Equipment Under Test

Occupied Bandwidth & Duty Cycle




ATTEN 10dB
RL -10.0dBm
10dB/
PROJECT: 9R02321
BIT STREAM OF INFANT TAG
T
CENTER 433.920000MHz
SPAN 0Hz
*RBW 300kHz
VBW 300kHz
*SWP 100ms


Tek Stop: Single Seq 500kS/s
Δ: 340µs
@: 320µs
Ch1 500mV
M 500µs Ch1 ƒ 1.23 V
22 Mar 2000
10:12:08

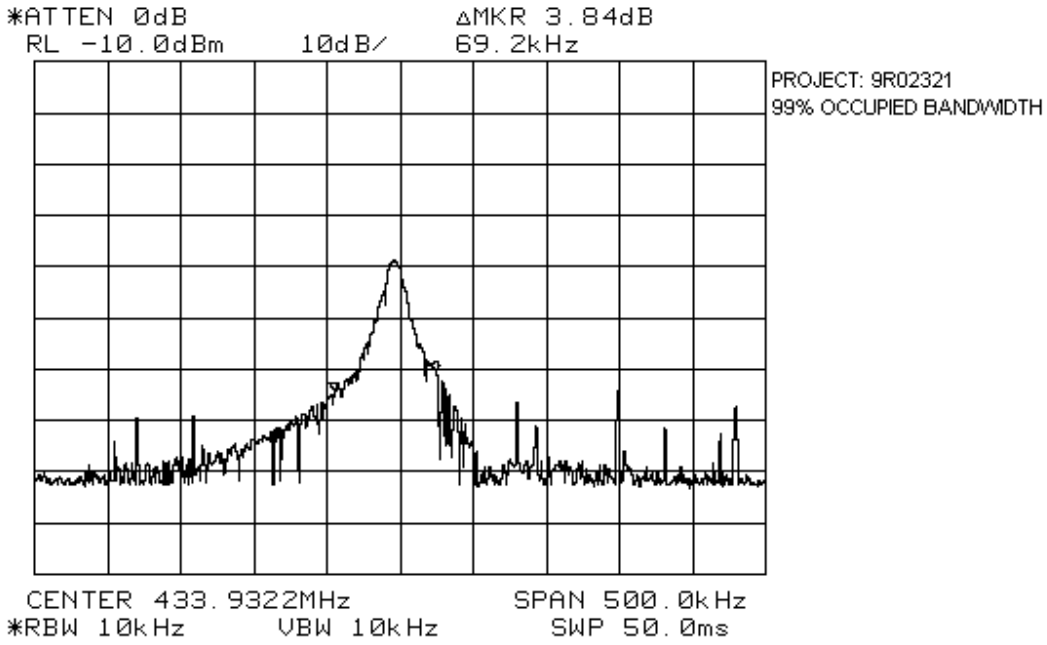
Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.231(c)
TESTED BY: Kevin Carr	DATE: March 22, 2000

Minimum Standard: 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Results: Complies. See attached graph.

Test Data: See attached graph.


*ATTEN 0dB
ΔMKR 3.84dB
RL -10.0dBm
10dB/
69.2kHz
PROJECT: 9R02321
99% OCCUPIED BANDWIDTH
CENTER 433.9322MHz
SPAN 500.0kHz
*RBW 10kHz
VBW 10kHz
SWP 50.0ms

Section 4. Periodic Alternate Field Strength Requirements

NAME OF TEST: Periodic Alternate Field Strength Requirements	PARA. NO.: 15.231(e)
TESTED BY: Kevin Carr	DATE: March 22, 2000

Minimum Standard:

15.231(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following.

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	1,000	100
70 - 130	500	50
130 - 174	500 to 1,500	50 to 150
174 - 260	1,500	150
260-470	1,500 to 5,000	150 to 500
Above 470	5,000	500

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Test Results:

Complies.

The worst case emission is 34.4 dBµV/m @ 3m at 867.77 MHz. This is 18.5 dB below the specification limit.

Test Data:

See attached table.

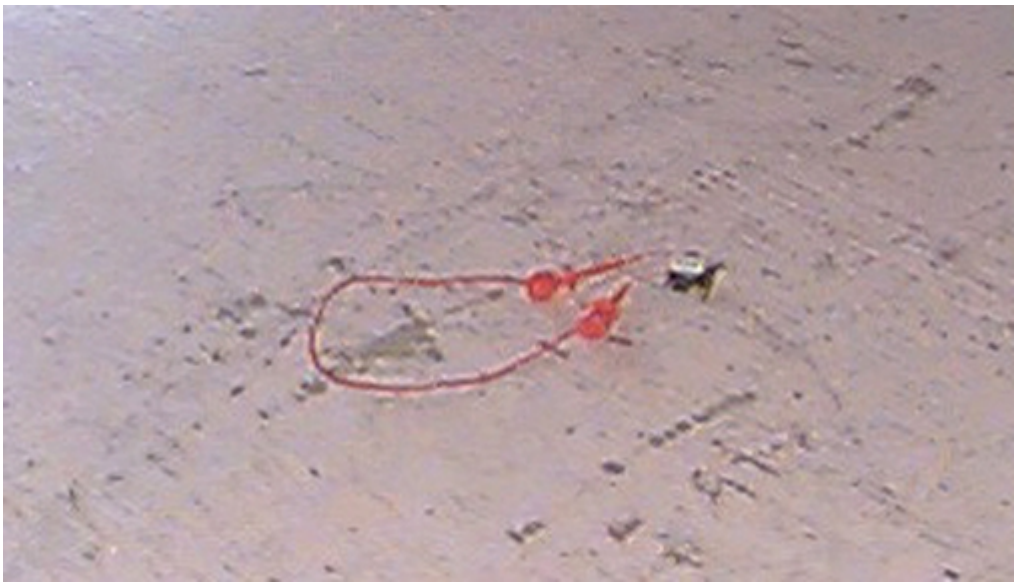
Test Data - Periodic Alternate Field Strength Requirements

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP		RBW: 100 kHz / 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Duty Cycle (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
433.92	E/D4	V			39.3	25.9		-20	45.2	72.9	27.7
433.88	E/D4	H			43.8	25.9		-20	49.7	72.9	23.2
867.77	E/D4	V			17.3	34.4		-20	31.7	52.9	21.2
867.77	E/D4	H			20.0	34.4		-20	34.4	52.9	18.5
1301.7	Hrn2	V			19.3	29.4		-20	28.7	52.9	24.2
1301.7	Hrn2	H			19.2	29.4		-20	28.6	52.9	24.3
1735.5	Hrn2	V			46.7	32.1	-46.4	-20	12.4	52.9	40.5
1735.5	Hrn2	H			44.2	32.1	-46.4	-20	9.9	52.9	43.0
2169.4	Hrn2	V			48.3	34.4	-47.5	-20	15.2	52.9	37.7
2169.4	Hrn2	H			46.0	34.4	-47.5	-20	12.9	52.9	40.0
2603.3	Hrn2	V			50.8	36.0	-47.8	-20	19.0	52.9	33.9
2603.3	Hrn2	H			48.0	36.0	-47.8	-20	16.2	52.9	36.7
3037.2	Hrn2	V			44.7	37.6	-47.5	-20	14.8	52.9	38.1
3037.2	Hrn2	H			41.3	37.6	-47.5	-20	11.4	52.9	41.5
3471.1	Hrn2	V			55.0	40.4	-47.2	-20	28.2	52.9	24.7
3471.1	Hrn2	H			52.0	40.4	-47.2	-20	25.2	52.9	27.7
3905.0	Hrn2	V			52.7	41.3	-46.6	-20	27.4	52.9	25.5
3905.0	Hrn2	H			51.2	41.3	-46.6	-20	25.9	52.9	27.0
4338.9	Hrn2	V			48.7	41.8	-45.9	-20	24.6	52.9	28.3
4338.9	Hrn2	H			48.5	41.8	-45.9	-20	24.4	52.9	28.5

Notes:
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Re-measured using dipole antenna.
** Includes cable loss when amplifier is not used.
*** Includes cable loss.
( ) Denotes failing emission level.
N.D. = Not Detected

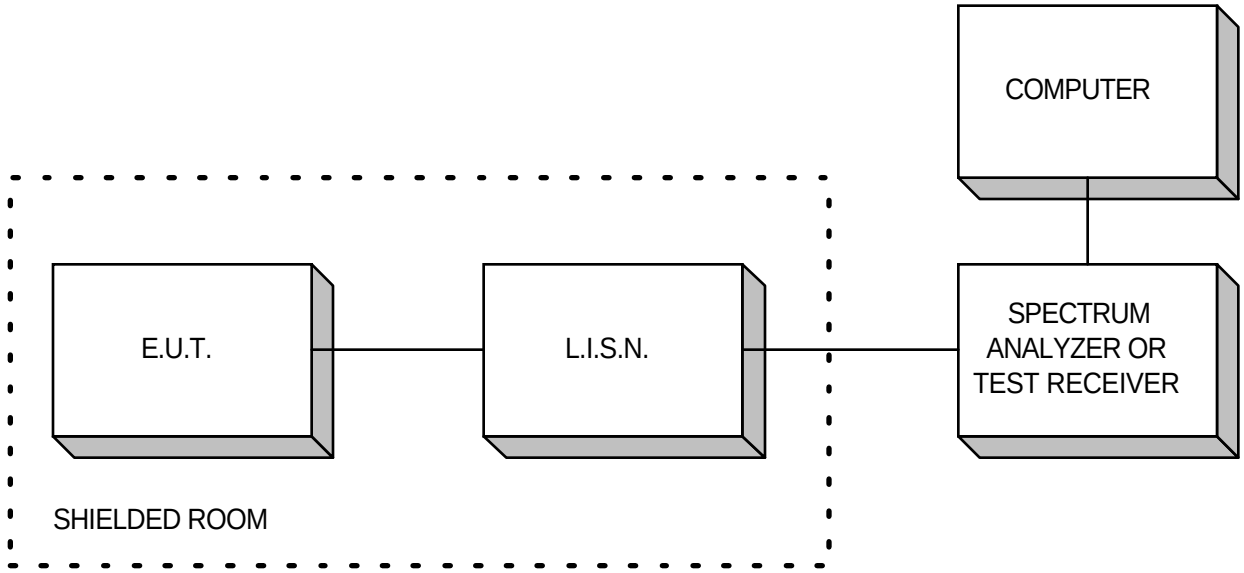
Setup Photographs

Front View

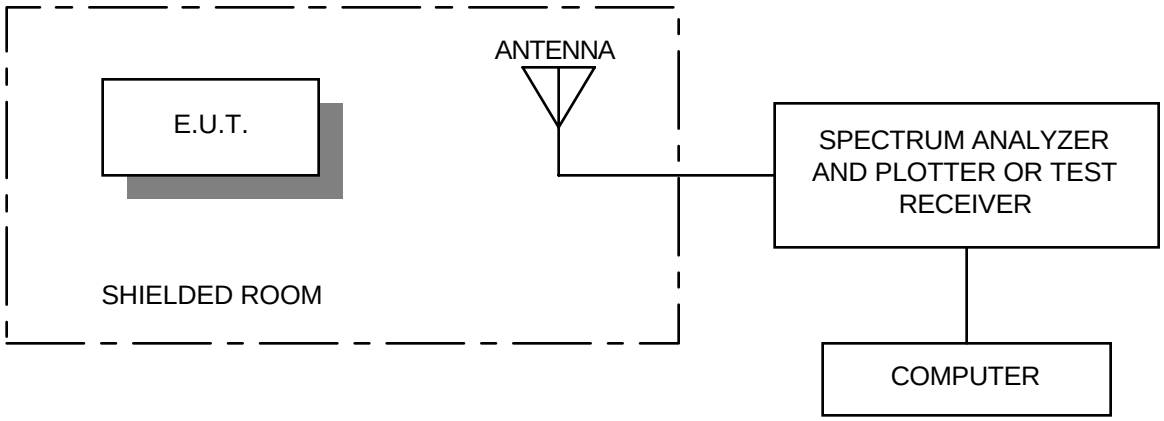


Section 5. Block Diagrams

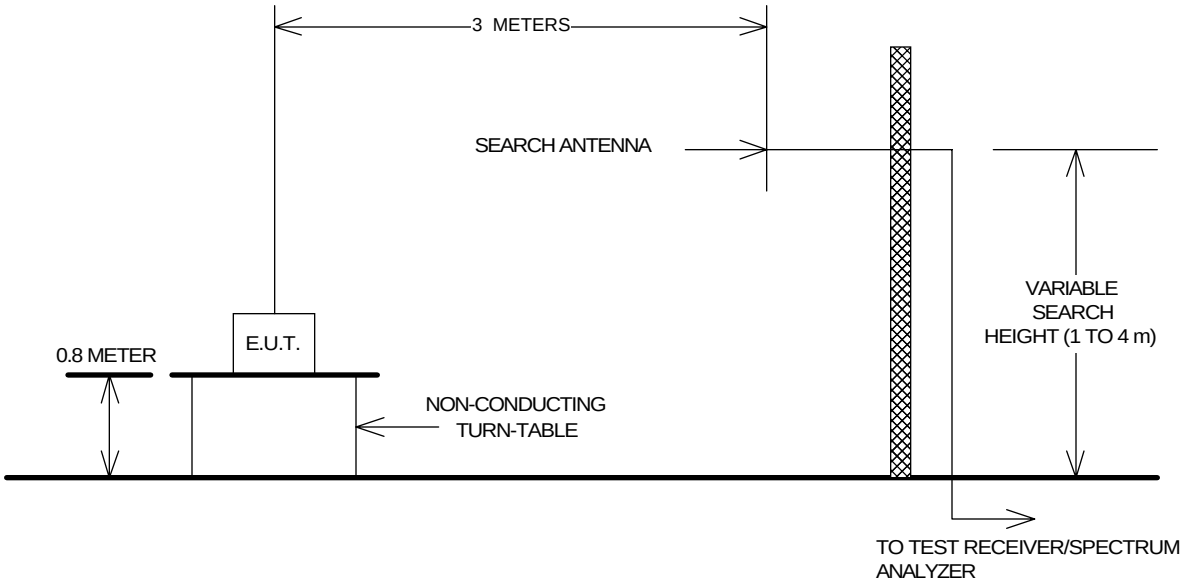
Conducted Emissions



Radiated Prescan

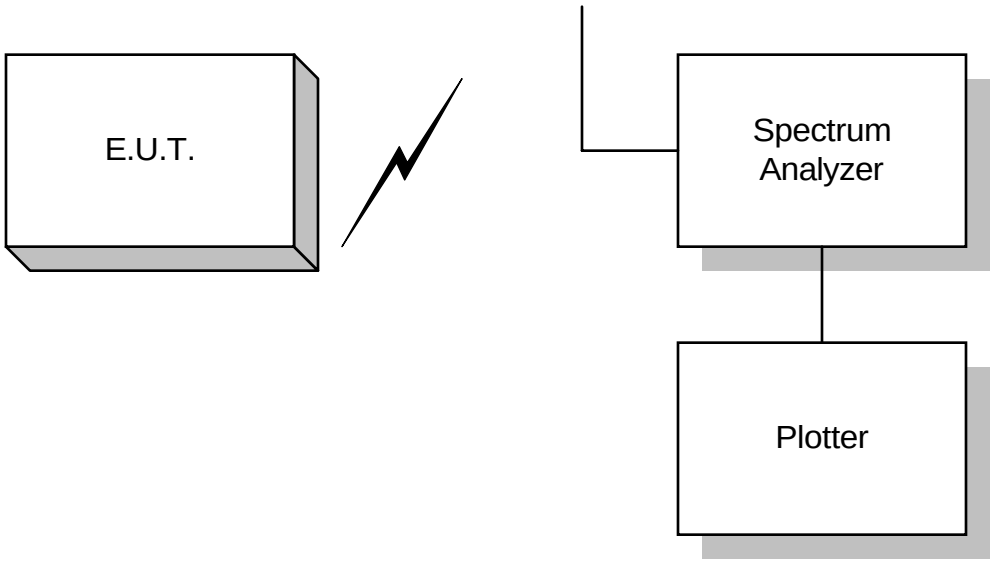


Outdoor Test Site For Radiated Emissions



The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.

Occupied Bandwidth



Section 6. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	June 16/99	June 16/00
	Power Supply	Astron	VS-50M	8405071	NCR	NCR
1 Year	Horn Antenna	EMCO #2	3115	4336	Nov. 11/99	Nov. 11/00
1 Year	Dipole Antenna Set	EMCO #2	3121C	FA001349	Apr. 5/99	Apr. 5/00
1 Year	RF AMP	Aventek	AWT-8035	FA001428	Jan. 7/00	Jan. 7/01

NA: Not Applicable
NCR: No Cal Required
COU: CAL On Use

ANNEX A

RESTRICTED BANDS

Section A Restricted Bands of Operation

(a) Except as shown in paragraph (d) of this section , only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.49 - 0.51	16.69475-16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425-16.80475	960-1240	7.25-7.75
3.020 - 3.026	25.5-25.67	1300-1427	8.025-8.5
4.125 - 4.128	37.5-38.25	1435-1626.6	9.0-9.2
4.17725 - 4.17775	73-74.6	1645.5-1646.5	9.3-9.5
4.20725 - 4.20775	74.8-75.2	1660-1710	10.6-12.7
6.215 - 6.218	108-121.94	1718.8-1722.2	13.25-13.4
6.31175 - 6.31225	123-138	2220-2300	14.47-14.5
8.291 - 8.294	149.9-150.05	2310-2390	15.35-16.2
8.362 - 8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625 - 8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425 - 8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29 - 12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975 - 12.52025	240-285	3345.8-3358	36.43-36.5
12.57675 - 12.57725	322-335.4	3600-4400	Above 38.6
13.36 - 13.41			