

KTL Test Report: 0R02490.2

Applicant: EXI Wireless Systems Inc.
Suite 100-13551 Commerce Parkway
Richmond, BC
V6V 2L1

**Equipment Under Test:
(E.U.T.)** ECOLITE Controller

FCC ID: HE7 ELC

In Accordance With: **FCC Part 15, Subpart C, Paragraph 15.209**
General Limits For Low Power Transmitters

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

EQUIPMENT: ECOLITE Controller

FCC ID: HE7 ELC

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*EQUIPMENT: ECOLITE Controller**FCC ID: HE7 ELC*

Section 1. Summary Of Test Results

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 FCC Part 15, Subpart C for low power devices. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated Emissions were made on an open area test site.



New Submission



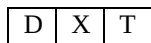
Production Unit



Class II Permissive Change



Pre-Production Unit



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 LAB CODE: 100351-0

TESTED BY: _____ DATE: _____
Kevin Carr, Technologist

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This report applies only to the items tested.

EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

Summary Of Test Data

Name Of Test	Para. No.	Result
Powerline Conducted Emissions	15.207	Complies
Radiated Emissions	15.209	Complies
Occupied Bandwidth	Not Specified	Complies

Footnotes For N/A's:**Test Conditions:**

Indoor Temperature: 24 °C
 Humidity: 35 %

Outdoor Temperature: 24 °C
 Humidity: 35 %

EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

Section 2. General Equipment Specification

Manufacturer: EXI Wireless Systems Inc.

Model No.: ECOLITE Controller

Serial No.: EL002

Date Received In Laboratory: May 25, 2000

KTL Identification No.: Item #1

Frequency Range: 307 kHz

Operating Frequency(ies) of Sample: 307 kHz

Modulation: PWM

Emission Designator: 11K8L1D

Integral Antenna	Yes	No
	☒	☐

Note: *If antenna is not integral to transmitter explain method of attachment and type of unique connector:*

*EQUIPMENT: ECOLITE Controller**FCC ID: HE7 ELC*

Section 3. Powerline Conducted Emissions**Para. No.: 15.207****Test Performed By:** Kevin Carr**Date of Test:** May 30, 2000**Minimum Standard:**

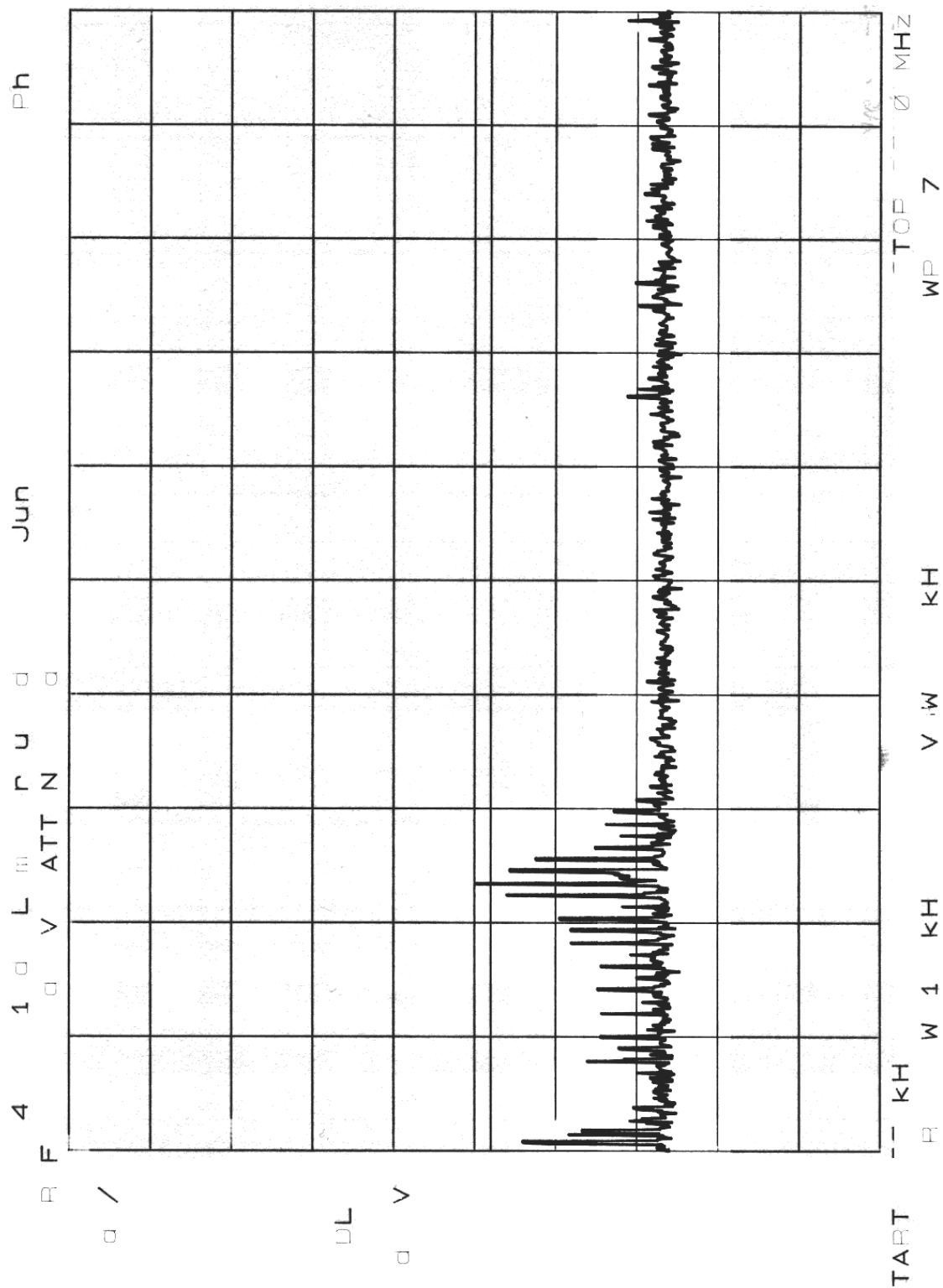
Frequency (MHz)	Maximum Powerline Conducted RF Voltage	
	μV	$\text{dB}\mu\text{V}$
0.45 - 30.0	250	48

Test Results: Complies. See attached graph(s).**Measurement Data:** See attached graph(s).**Method of Measurement:** (Procedure ANSI C63.4-1992)

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak Detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak Detector.

Conductor	Frequency (MHz)	CISPR ($\text{dB}\mu\text{V}$)	Average ($\text{dB}\mu\text{V}$)	BB/NB	BB Corr. (dB)	Result ($\text{dB}\mu\text{V}$)
Phase	7.69	42.1	-1.5	BB	-13	29.1
Neutral	7.69	38.7	-1.6	BB	-13	25.7

EQUIPMENT: ECOLITE Controller
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0 dB/

DL
38
dB V

START 450 KHZ RES BW 1 KHZ VBW 30 KHZ STOP 30 MHz SWB 887 msec

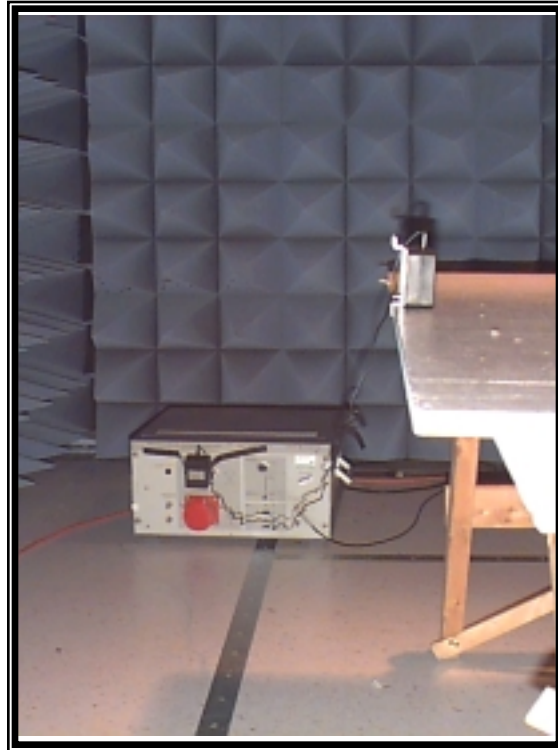
0r02490 REF 90 dB L ter us a ATT 1 dB June 5, 2000 Net al

0 dB/

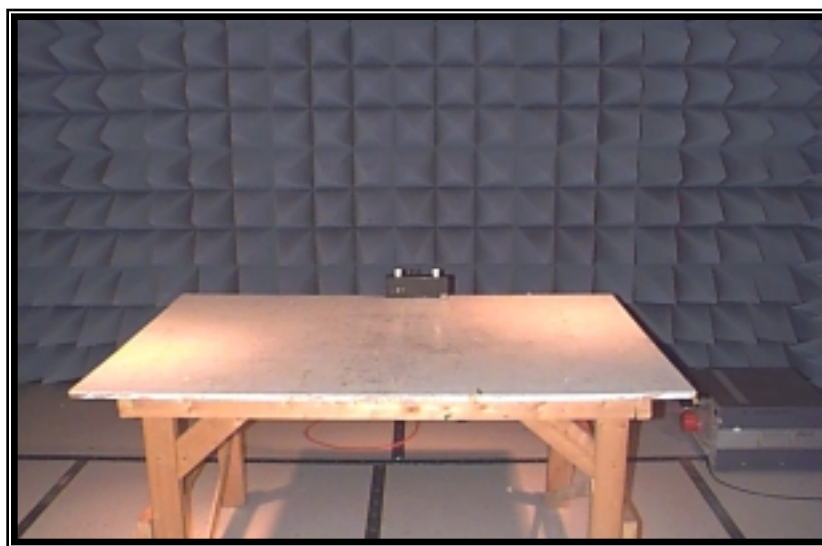
EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

Conducted Photographs (Worst Case Configuration)

Side View



Front View



EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

Section 4. Radiated Emissions

Para. No.: 15.209

Test Performed By: Kevin Carr	Date of Test: June 3, 2000
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Minimum Standard: The field strength of emissions from the device shall not exceed the following limits.

Fundamental (MHz)	Field Strength (μV/m)	Field Strength (dBμV)
0.009 - 0.490	2400/F(kHz) @ 300m	—
0.490 - 1.705	24000/F(kHz) @ 30m	—
1.705 - 30	30 @ 30m	—
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Results: Complies. The worst-case emission level is 5 dB μ V/m @ 30m at 0.921 MHz. This is 23.3 dB below the specification limit.

Measurement Data: (Procedure ANSI C63.4-1992)

*EQUIPMENT: ECOLITE Controller**FCC ID: HE7 ELC***Test Data - Radiated Emissions**

Freq. (MHz)	Ant. *	Pol. (V/H)	RCVD Signal (dBμV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.307	Loop						-9.4	17.9	27.3
0.614	Loop		59.7			-59	0.7	31.8	31.1
0.921	Loop		64.0			-59	5.0	28.3	23.3
1.228	Loop		60.8			-59	1.8	25.8	24.0
1.535	Loop		51.2			-59	-7.8	23.9	31.7
1.842	Loop		45.3			-59	-13.7	29.5	43.2
2.149	Loop		41.8			-59	-17.2	29.5	46.7

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

All emissions except for fundamental were measured at 1m and extrapolated to 30m using an inverse square law extrapolation factor. The fundamental emissions of 307 kHz was measured at 3, 5 and 10m and extrapolated to 300m using an extrapolation factor derived from the measurement data. See attached graph.

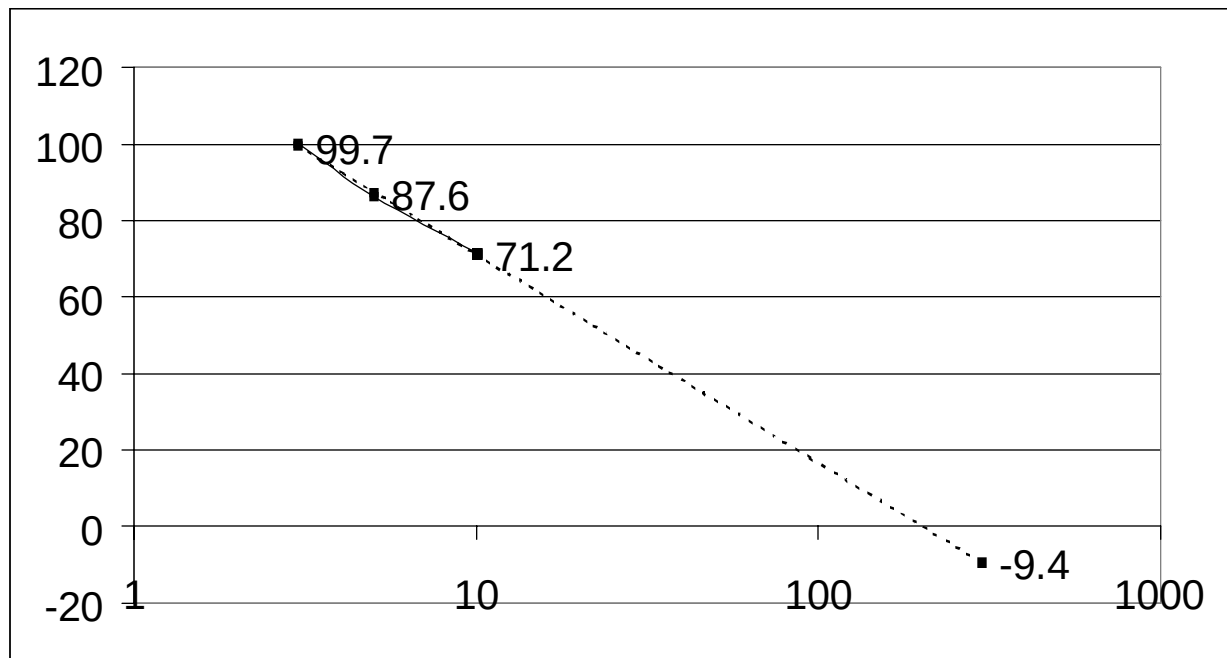
All measurements were made using a CISPR detector. The E.U.T. was tested on 3 axis in order to determine the strongest emissions.

EQUIPMENT: ECOLITE Controller
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Measurement Data: Fundamental at 307 kHz
Measured at 3, 5, and 10 m
and Extrapolated to 300 m

Measurement Distance (m)	Log Measurement Distance	Field Strength (dBuV/m)	Derived Extrapolation (dBuV/m)
3	0.477121255	100.4	99.7
5	0.698970004	86.4	87.6
10	1	71.7	71.2
300	2.477121255		-9.4

SLOPE= -54.5
INTERCEPT= 125.7



EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

Radiated Photographs (Worst Case Configuration)

Front View



EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

Section 5. Occupied Bandwidth

Para. No.: Not Applicable

Test Performed By: Kevin Carr	Date of Test: May 31, 2000
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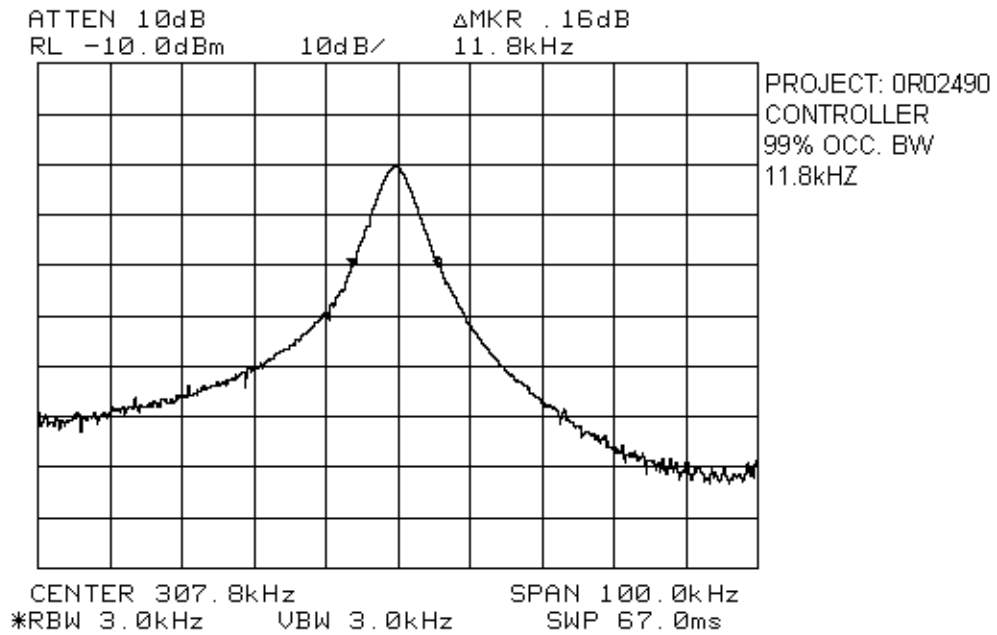
Minimum Standard: Not specified.

Test Results: The 99% power occupied bandwidth is 11.8 kHz.

Measurement Data: See attached graph(s).

EQUIPMENT: ECOLITE Controller

FCC ID: HE7 ELC



EQUIPMENT: ECOLITE Controller
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Section 6. Test Equipment List**Equipment List - Conducted Emissions - Shielded Room #1**

CAL Cycle	Equipment	Manufacturer	Model #	Serial/Asset #	Last Cal.	Next Cal.
1 Year	LISN	Rohde & Schwarz	ESH2-Z5	890485/017	Aug. 24/99	Aug. 24/00
1 Year	Receiver	Rohde & Schwarz	ESH3	892473/002	Nov. 23/99	Nov. 23/00

Equipment List - Radiated Emissions

CAL Cycle	Equipment	Manufacturer	Model #	Serial/Asset #	Last Cal.	Next Cal.
2 Year	Active Loop Antenna	Rohde & Schwarz	HFH2-Z2	FA000631	Feb. 9/00	Feb. 9/02

Cal Cycle	Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett Packard	8564E	3846A01407	May 31/99	May 31/00
1 Year	Spectrum Analyzer-1	Hewlett Packard	8566B	2311A02238	Nov. 6/99	Nov. 6/00
1 Year	Spectrum Analyzer Display-1	Hewlett Packard	8566B	2314A04759	Nov. 6/99	Nov. 6/00

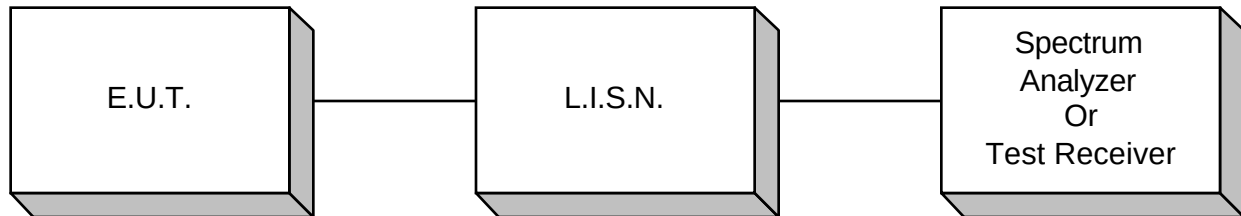
NA: Not Applicable
NCR: No Cal Required
COU: CAL On Use

EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

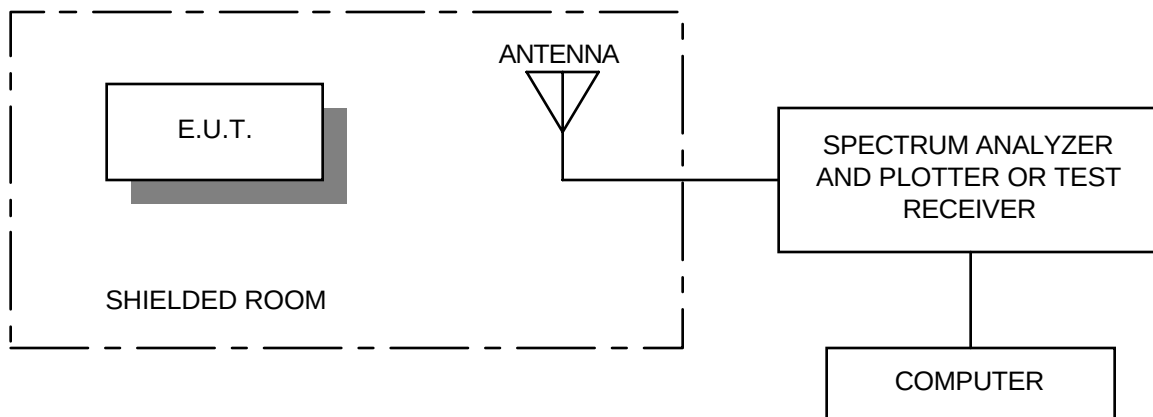
Annex A
Test Diagrams

EQUIPMENT: ECOLITE Controller
FCC ID: HE7 ELC

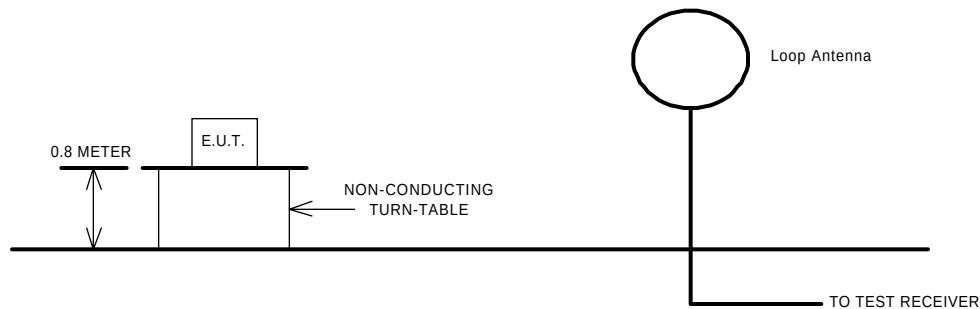
Conducted Emissions



Radiated Prescan



Test Site For Radiated Emissions



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