KTL Test Report:	8O01293
Applicant:	CIAS Elettronica S.r.l. Via Durando 38 20158 Milano Italy
Equipment Under Test: (E.U.T.)	Field Disturbance Sensor, Model: ERMO-482
FCC ID:	OIFERMO-482
In Accordance With:	**FCC Part 15, Subpart C** For Operation Within The Bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, 24075-24175 MHz Intentional Radiators Used As Field Disturbance Sensors Excluding Perimeter Protection Systems
Tested By:	KTL Ottawa Inc. 3325 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	
	T. Tidwell, Laboratory Manager
Date:	
Total Number of Pages:	32

Table of Contents

Section 1. Summary of Test Results

Manufacturer: CIAS Elettronica

Model No.: ERMO-482

Serial No.: TX-15183

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 15.245. 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

F	D	S

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: _____
Russell Grant, Technologist

Summary Of Test Data

Name of Test	Paragraph Number	Results
Radiated Emissions	15.231(b)	Complies
Powerline Conducted Emissions	15.207	Complies

Footnotes For N/A's:

Test Conditions:

Indoor	Temperature:	24 °C
	Humidity:	30 %
Outdoor	Temperature:	Not Applicable
	Humidity:	Not Applicable

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

General Equipment Information

Frequency Range: 10.525 GHz Fixed

Operating Frequency(ies) of Sample: 10.525 GHz

Type of Emission: Carrier On/Off Modulation

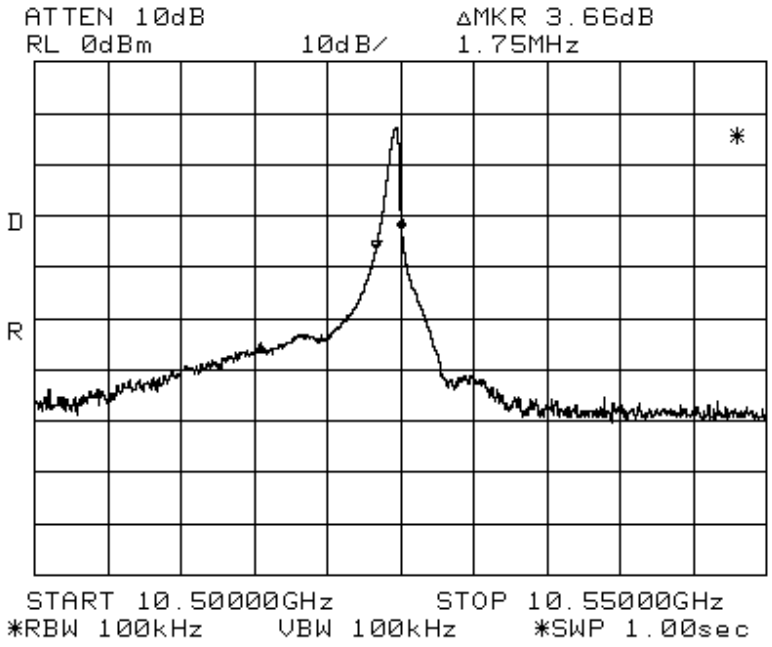
Emission Designator: 1M92P0N

Supply Power Requirement: 12 Vdc or 120 V / 16.5 VAC Wall Plug Power Supply

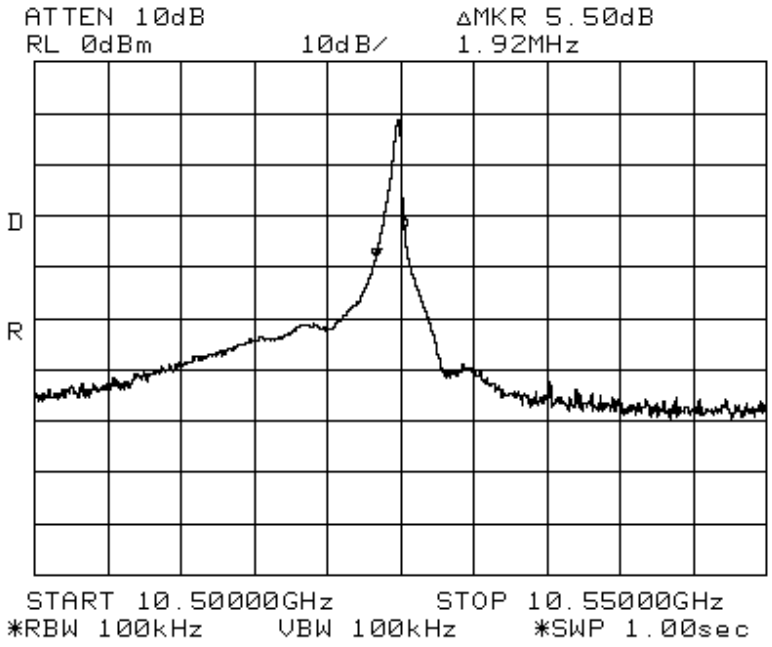
Duty Cycle Calculation:

Channel 1:	20 log (166/332)	=	-6.0 dB
Channel 2:	20 log (101/200)	=	-5.9 dB
Channel 3:	20 log (73/143)	=	-5.8 dB
Channel 4:	20 log (47/91)	=	-5.7 dB

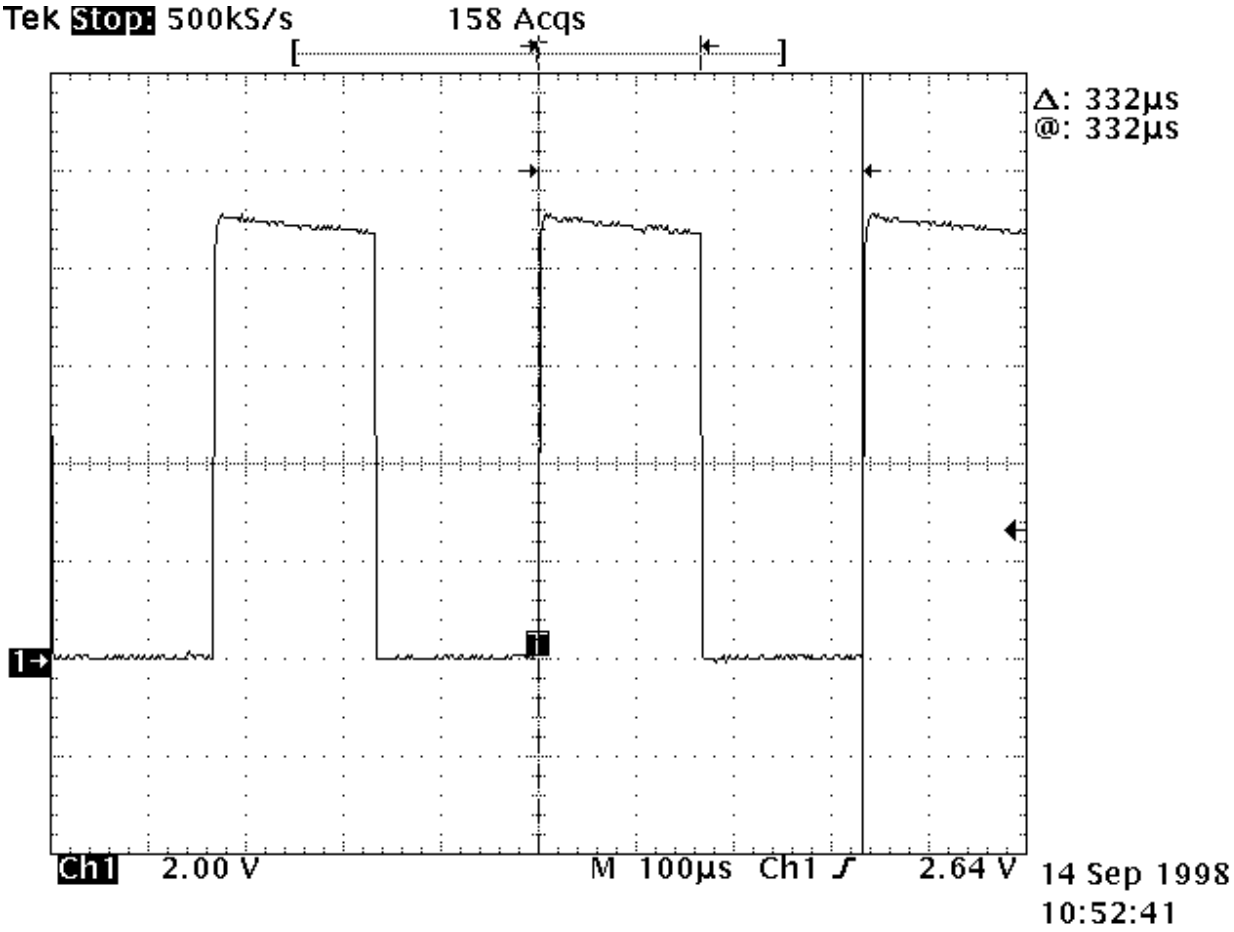
Channel 1: 99% Bandwidth Plot



Channel 4: 99% Bandwidth Plot

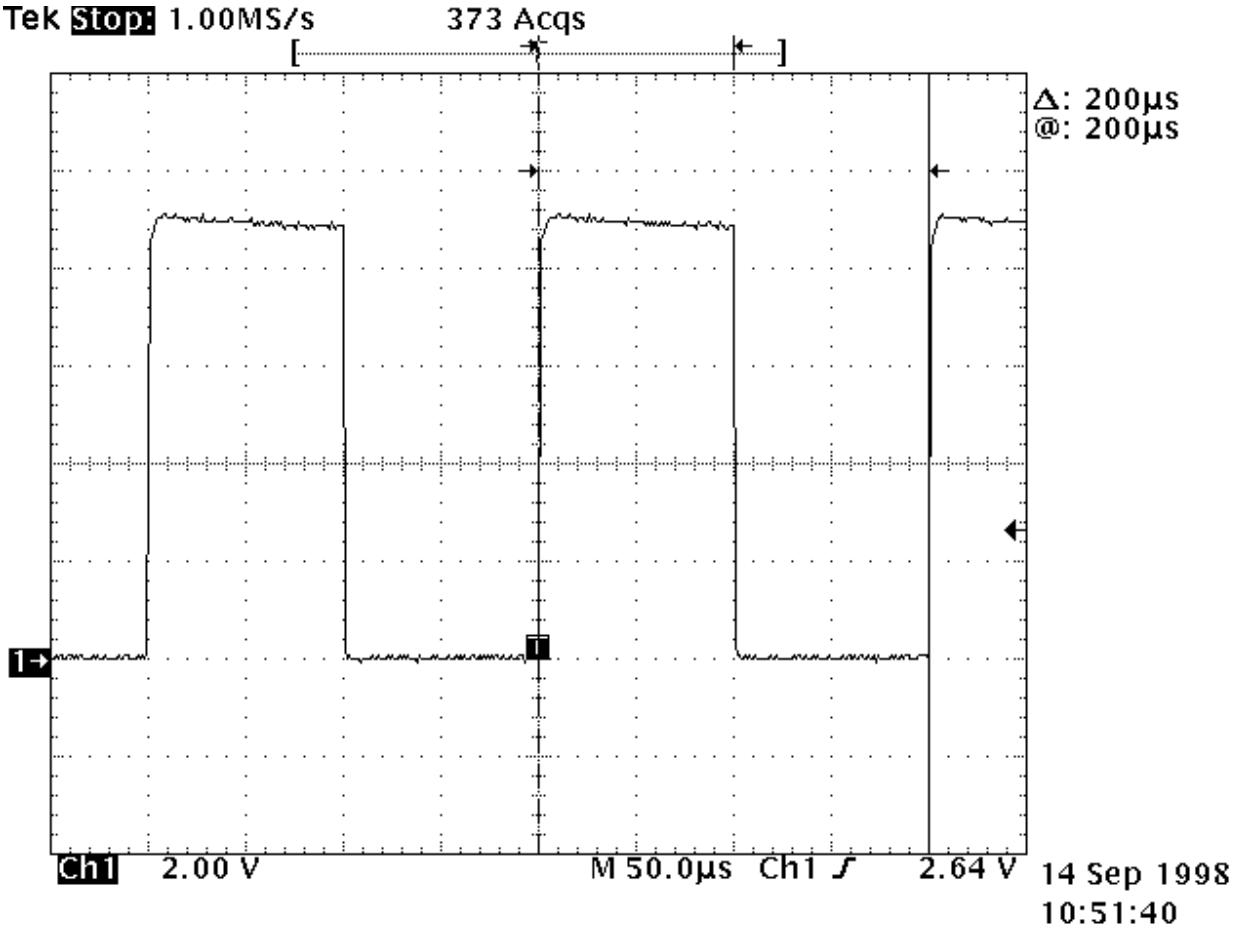


Channel 1: Pulse



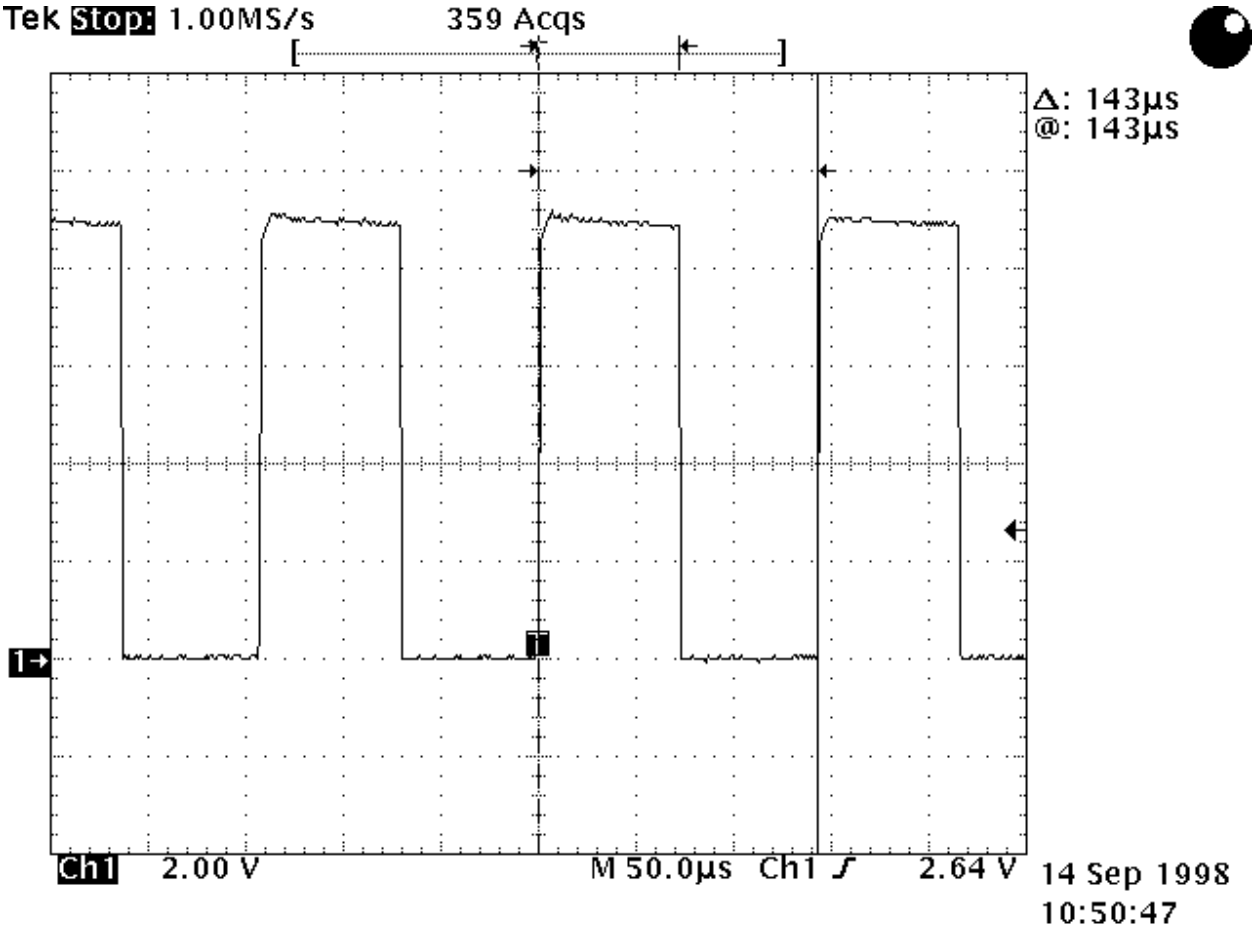
Note: τ = 166 µs
T = 332 µs
PRF = 3012 pps

Channel 2: Pulse



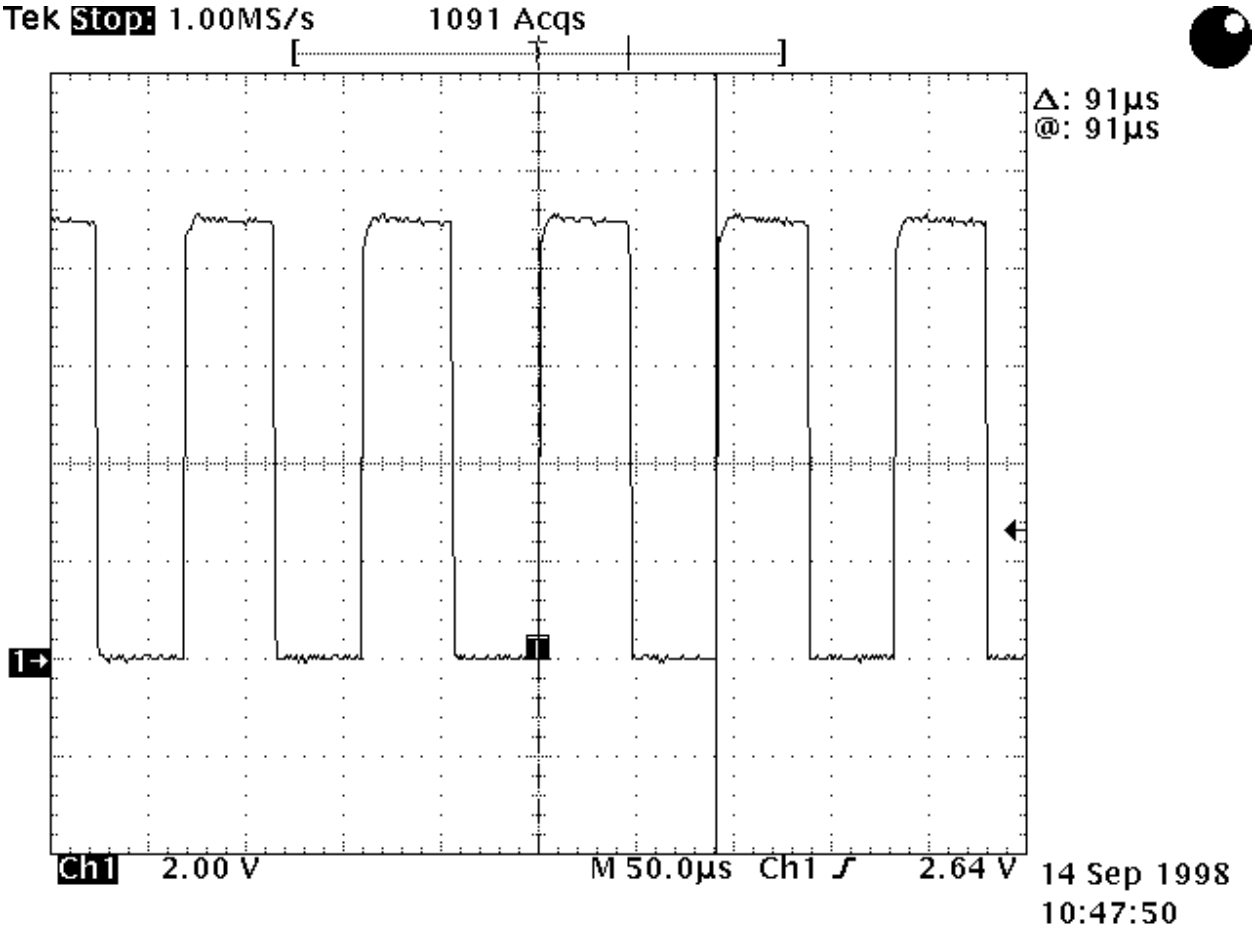
Note: τ = 101 µs
T = 200 µs
PRF = 5000 pps

Channel 3: Pulse



Note: τ = 73 µs
T = 143 µs
PRF = 6993 pps

Channel 4: Pulse



Note: τ = 47 µs
T = 91 µs
PRF = 10989 pps

Description of E.U.T.

The E.U.T. is a 10.525 GHz field disturbance sensor consisting of a separate transmitter and receiver.

Modifications Incorporated in E.U.T.

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

Theory of Operation

The E.U.T. is a 10.525 GHz field disturbance sensor consisting of a separate transmitter and receiver. This equipment is designed for outdoor use. The transmitter and receiver use high gain parabolic antennas. In a typical installation the transmitter is set up on a direct line of site with the receiver over the protected area. The system is used to reveal the presence of a body moving within the sensitive area. The transmitter operates continuously. There are four switch selectable channels which enable operation at 3012 pps, 5000 pps, 6993 pps and 10989 pps.

Justification

The E.U.T. was configured for testing as per typical installation.

The following combinations were investigated to establish worst case configuration:

(1) Transmitter vertically mounted as per user instructions.

Exercise Program

Not Applicable

Exercise mode:

(1) Channel 1: 166 μs pulse @ 3012 pps

(2) Channel 4: 47 μs pulse @ 10989 pps

Section 3. Equipment Configuration

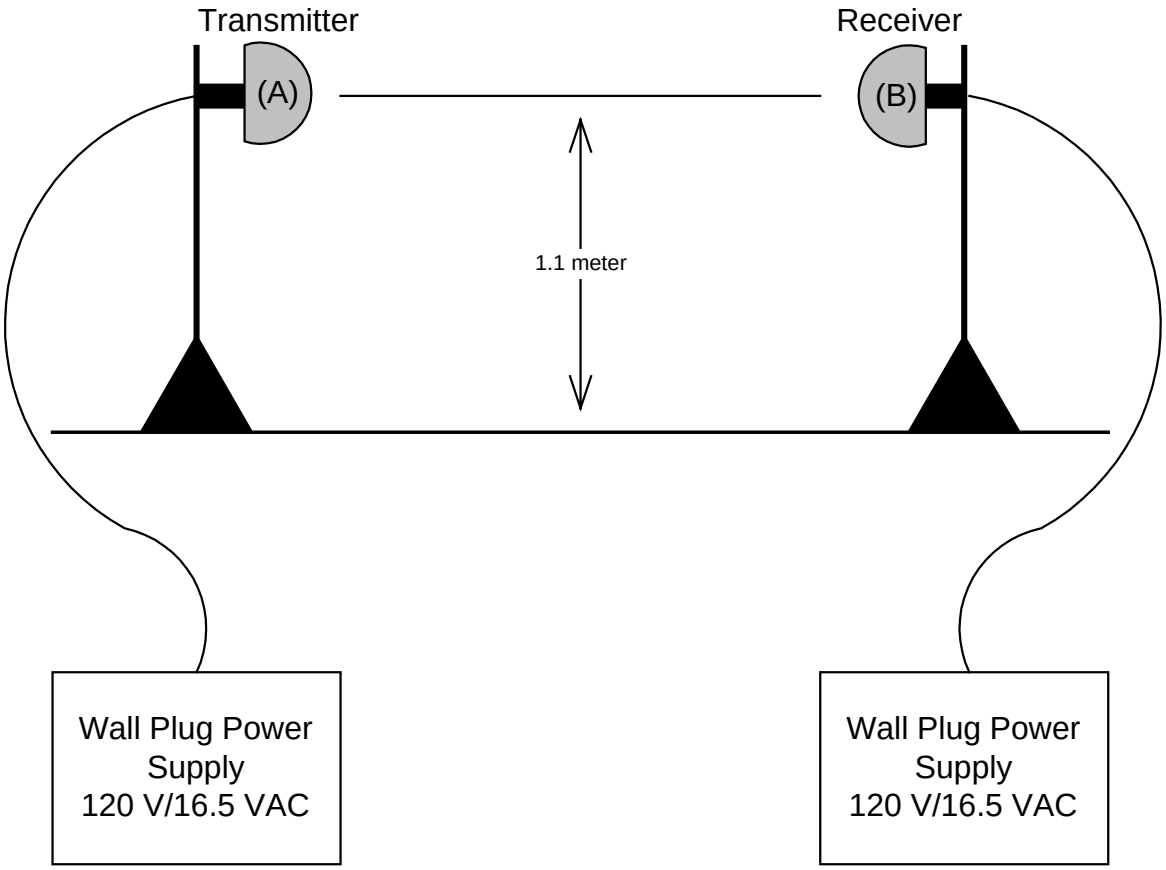
Equipment Configuration List:

Item	Description	Model No.	Serial.	Rev.
(A)	Transmitter	IW-200A	TX15183	
(B)	Receiver	IW-200A	RX15183	

Inter-connection Cables:

Item	Description	Length (m)
(1)	Power Cable	2.0
(2)	Power Cable	2.0

Configuration of the Equipment Under Test (E.U.T)



Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.245
TESTED BY: Russell Grant	DATE: September 14, 1999

Minimum Standard: See Annex B

Test Results: Complies. The worst-case emission level is 117.5dBµV/m @ 3m at 10.525 GHz. This is 10.5 dB below the specification limit.

Test Data: See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 3 MHz.

In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

Test Data - Radiated Emissions

Test Distance (meters) : 3		Range:	Receiver: 8565E	RBW(kHz): 1000		Detector: Peak		
Freq. (GHz)	**Ant. ***	**Pol. (V/H)**	**RCVD Signal (dBµV/m)**	**Ant. Factor (dB)****	**Dist. Corr. (dB)**	**Field Strength (dBµV/m)**	**Limit (dBµV/m)**	**Margin (dB)**
Channel 1: Measurement Data								
10.525	3/0.25	V	76.8	40.2	0.0	117.0	128.0	11.0
10.525	3/0.25	H	76.8	40.2	0.0	117.0	128.0	11.0
21.05	3/0.25	V	41.0	40.6	-21.6	60.0	77.5	17.5
21.05	3/0.25	H	41.0	40.6	-21.6	60.0	77.5	17.5
31.575	3/0.25	H	<28.0	44.1	-21.6	50.5	77.5	27.0
42.1	3/0.25	H	<35.0	39.9	-21.6	53.3	77.5	24.2
52.65	3/0.25	H	<39.0	41.8	-21.6	<59.2	77.5	18.3
Channel 4: Measurement Data								
10.525	3/0.25	V	77.3	40.2	0.0	117.0	128.0	10.5
10.525	3/0.25	H	77.0	40.2	0.0	117.0	128.0	10.8
21.05	3/0.25	V	43.5	40.6	-21.6	60.0	77.5	15.0
21.05	3/0.25	H	43.5	40.6	-21.6	60.0	77.5	15.0
31.575	3/0.25	H	<28.0	44.1	-21.6	50.5	77.5	27.0
42.1	3/0.25	H	<35.0	39.9	-21.6	53.3	77.5	24.2
52.65	3/0.25	H	<39.0	41.8	-21.6	<59.2	77.5	18.3

Notes:
All measurements are peak. Average readings are approximately 6 dB low as per duty cycle calculation.
* Includes Cable Loss

Radiated Photographs (Worst Case Configuration)

Front View

Section 5. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: Russell Grant	DATE: September 14, 1999

Minimum Standard:

Frequency(MHz)	**Maximum Powerline Conducted RF Voltage**	
	µV	**dBµV**
0.45 - 30.0	250	48

Test Results: Complies. See attached graphs and table.

Test Data: See attached table and graphs.

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.

Broadband emissions are identified by switching the receiver detector function from Quasi-Peak to Average. If the amplitude of the emission drops by 6 dB or more then the emission is classified as broadband and the Quasi-Peak level is reduced by a factor of 13 dB.

All emissions within 10 dB of limit have been recorded.

Measurement Data:

Conductor	Frequency (MHz)	CISPR (dBµV)	Average (dBµV)	BB/NB	BB [illegible]ion (dB)	Result (dBµV)

NOT APPLICABLE

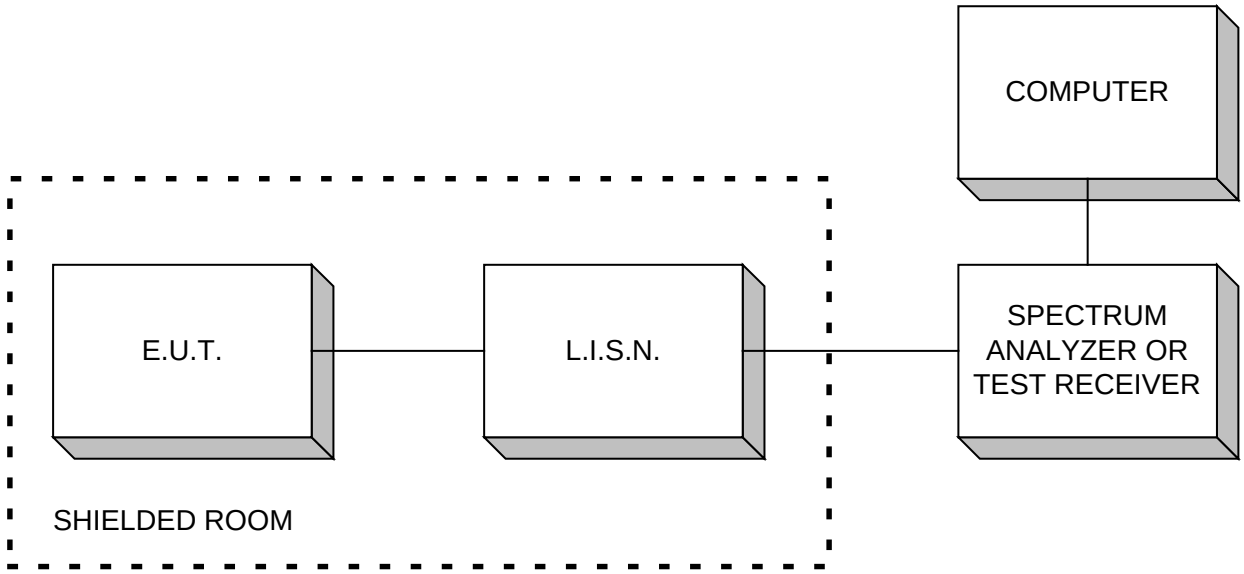
INSERT GRAPHS

Conducted Photographs (Worst Case Configuration)

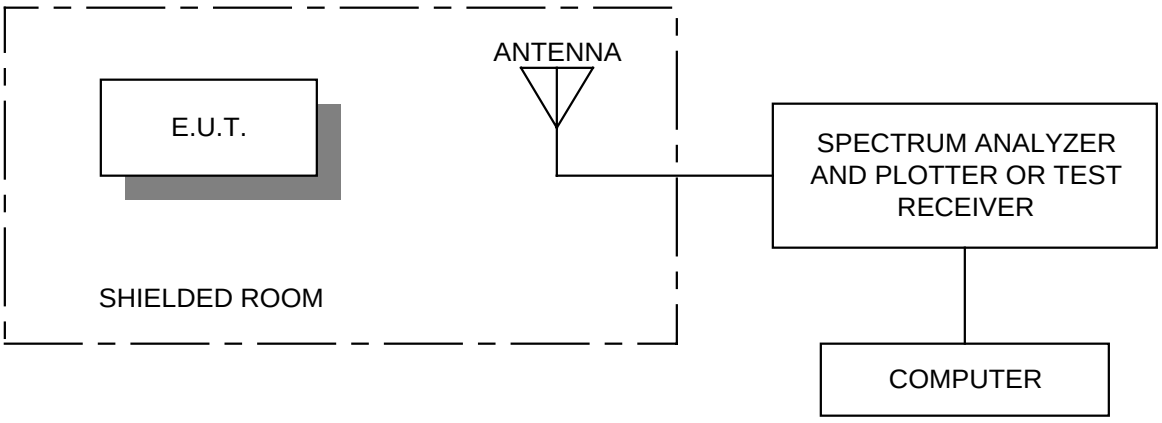
Front View

Section 6. Block Diagrams

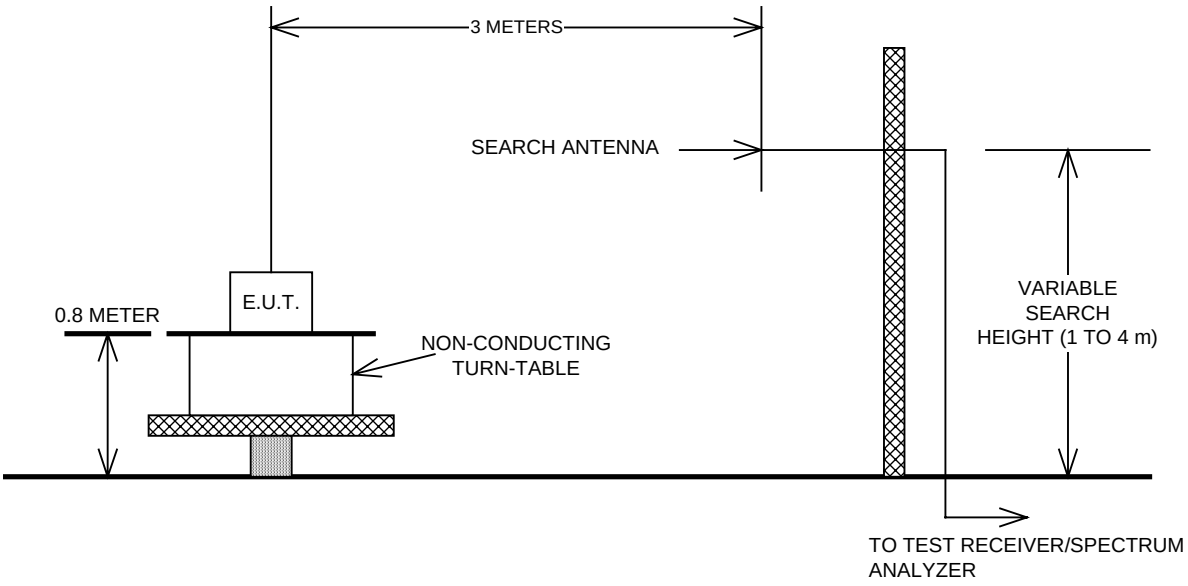
Conducted Emissions



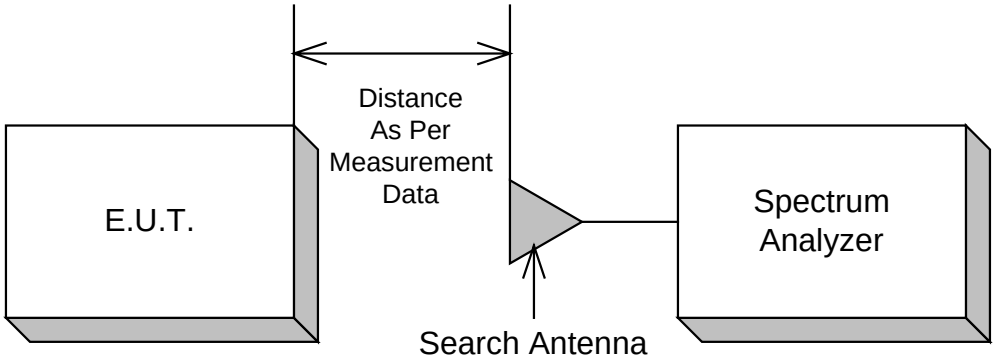
Radiated Prescan



Outdoor Test Site For Radiated Emissions



Indoor Measurement Setup for Emissions Above 10 GHz



Section 7. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	Oct. 22/98	Oct. 22/99	
1 Year	Spectrum Analyzer-**1**	Hewlett Packard	8566B	2311A02238	Oct. 22/98	Oct. 22/99	
1 Year	Spectrum Analyzer Display-**1**	Hewlett Packard	8566B	2314A04759	Oct. 22/98	Oct. 22/99	
1 Year	LISN	Tegam	95300-50	T-12855/56	July 24/98	July 24/99	
1 Year	LISN(peripheral)	Tegam	95300-50	T-109014/15	July 24/98	July 24/99	
2 Year	Horn Antenna	EMCO #2	3115	4336	Oct. 30/97	Oct. 30/99	
3 Year	Standard Gain Horn	Electro-Metrics	SH-50/60-1	FA000479	July 29/97	July 29/00	
3 Year	Standard Gain Horn	Electro-Metrics	SH-50/60-2	FA000485	July 29/97	July 29/00	
3 Year	Standard Gain Horn	Millitech	SGH-19-RP000	021	Apr. 25/97	Apr. 25/00	
3 Year	Millimeter Wave Mixer	Hewlett Packard	11970V	2521A01150	Feb. 25./97	Feb. 25./00	

NA: Not Applicable
NCR: No Cal Required

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			

ANNEX B

RADIATED EMISSION LIMITS

Radiated Emission Limits

§15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz and 24075-24175 MHz.

(a) Operation under the provision of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength Of Fundamental (millivolts/meter)	Field Strength of Harmonics (millitvolts/meter)
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	2500	25.0

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:

(i) For field disturbance sensors designed for use only within a building or to open building doors, 25 mV/m.

(ii) For all other field disturbance sensors, 7.5 mV/m.

(iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands fully comply with the limits given in §15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment; vehicles such as fork-lifts that are intended primarily for use indoors or for very specialized operations. Or railroad locomotives, railroad cars and other equipment which travel on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g. putting a vehicle in reverse gear, activating a turn signal, etc.).

§15.245, continued

(2) Field strength limits are specified at a distance of 3 meters.

(3) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(4) The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

§15.209 Radiated Emission Limits, General Requirements

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (millivolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	2400/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3