

ENGINEERING TEST REPORT

NUMBER: 4L0483E

ON

Model No.(s):

DS1921G iButton, (w/variants DS1921H, DS1921Z), DS1922L iButton (w/variant DS1922T)
and DS1923 iButton.

**IN ACCORDANCE WITH:
CFR 47, PART 15, SUBPART B,
CLASS B VERIFICATION**

TESTED FOR:

Dallas Semiconductor
4401 S. Beltwood Parkway
Dallas, TX 75244-3292

TESTED BY:

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Lewisville, Texas 75057-3136

APPROVED BY:



Arturo Ruvalcaba, EMC Engineer

DATE:

4/21/05



NVLAP LAB CODE: 100426-0

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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 CFR 47, Part 15, Subpart B for Class B Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-2001.

The equipment was tested for conducted emissions from 0.150 MHz to 30 MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-2001. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

The equipment was tested for radiated emissions from 30 MHz to 1000 MHz in accordance with the requirements of CFR 47, Part 15, Subpart B. Equipment with oscillator frequencies above 107 MHz were tested to the fifth harmonic or in accordance with the requirements of CFR 47, Part 15.33. Frequencies were initially identified in a large shielded room. Amplitude measurements were made on an outdoor Open Area Test Site. Details of the outdoor site are on file with the FCC.

Abstract:

Name of Test	Basic Standard	Results
Conducted Emissions (Mains port)	CFR 47, Part 15, Subpart B, Para. No. 15.107	N/A
Radiated Emissions	CFR 47, Part 15, Subpart B, Para. No. 15.109	Complies
Microwave Radiated Emissions	CFR 47, Part 15, Subpart B, Para. No. 15.109	N/A

Nemko Dallas, Inc.

CFR 47, PART 15, SUBPART B,
CLASS B VERIFICATION
REPORT NO.:4L0483EUS1
EQUIPMENT: DS1921G iButton, (w/variants DS1921H, DS1921Z), DS1922L iButton (w/variant DS1922T) and DS1923 iButton.

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This report applies only to the item/s tested and does not constitute endorsement by the United States of America.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE: **NONE**

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

Manufacturer: Dallas Semiconductor

Name: THERMOCHRON/HYGROCHRON

Model Number: DS1921G iButton, (w/variants DS1921H, DS1921Z), DS1922L iButton (w/variant DS1922T) and DS1923 iButton.

Serial Number: None

Part Number: DS1923-F5 DS1921G-F50

Production Status: Preproduction

E.U.T. Arrival Date: 4/9/2005

Description of E.U.T.:

TEMP LOGGER and TEMP/HUMIDITY LOGGER

Clock, Oscillator, Highest Frequencies Utilized:

4MHz

Modifications Incorporated in E.U.T.:

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

Justification:

The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst-case configuration:
Data Logging Mission

Exercise Program:

The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The EUT was in the following exercise mode:
Data Logging Mission

E.U.T. Photographs:



Section 3. Equipment Configuration

EQUIPMENT CONFIGURATION LIST (HARDWARE/PERIPHERALS):

Place an "*" next to EUT and any item that is part of the EUT.

Item	*	Generic Description	Manufacturer	Model No.	Serial #	Rev.	FCC ID Status ¹
(A)	*	TEMP LOGGER	Dallas Semiconductor	DS1921G-F50			3
(B)		TEMP/HUMIDITY LOGGER	Dallas Semiconductor	DS1923-F5			3
(C)							
(D)							
(E)							
(F)							
(G)							
(H)							
(I)							
(J)							
(K)							
(L)							

¹ **FCC ID STATUS**

- 1. FCC DOC
- 2. FCC A/B Verification
- 3. None - (If performing FCC testing, contact lab manager)
- 4. Certification (include FCC ID in parenthesis)

INTER-CONNECTION CABLES:

Place an "*" next to EUT and any item that is part of the EUT.

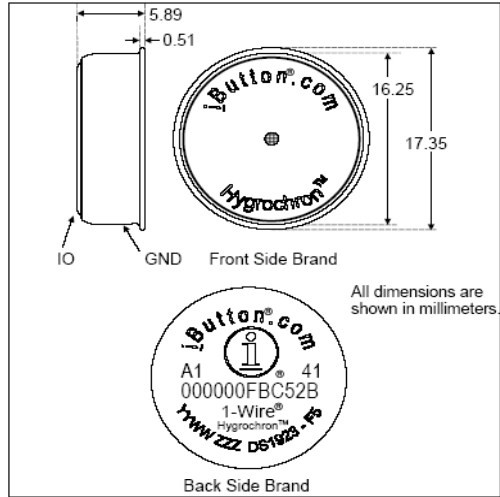
Item	*	Cable Type	Manufacturer	Ln (m)	Term ²	Shield	Qty.
(1)							
(2)							
(3)							
(4)							
(5)							
(6)							
(7)							
(8)							
(9)							
(10)							
(11)							
(12)							
(13)							

² **TERMINATION**

- 1. Peripheral
- 2. Loopback
- 3. EUT
- 4. Resistive
- 5. Remote Equipment
- 6. Other

Equipment Configuration List:

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



Section 4. Conducted Emissions (Mains ports)

Purpose:

The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for conducted disturbance as defined by CFR 47, Part 15, Subpart B, Class B, and Paragraph Number 15.107.

Conducted Emissions testing was not performed for the following reason:

A 3VDC BATTERY POWER THE EUT

Section 5. Radiated Emissions

Purpose:

The tests are intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for radiated emissions as defined by CFR 47, Part 15, Subpart B, Class B, Paragraph Number 15.109.

Specification Limits:

Limits for conducted disturbance at the mains ports

Frequency Range (MHz)	3m Limits (dBuV)	10m Limits Limits (dBuV)
30-88	40	30
88-216	43.5	33.5
216-960	46	36
Above 960	54	44

Method of Measurement (Procedure ANSI C63.4-2001):

The equipment was prescanned in a shielded room using a spectrum analyzer and broadband antenna. A list of frequencies was compiled for investigation in the open field. The equipment was then moved to an open area test site where amplitude measurements were made at a distance of 10 meters. The bandwidth was set to 100 kHz and the detector function was CISPR Quasi-Peak. Any emission within 6 dB of the specification limit is re-measured using a reference tuned dipole antenna per ANSI C63.4.

Any emissions above 1 GHz were measured with a horn antenna and low noise pre-amplifier at a distance of 3 meters.

See Sections 7 and 8

Test # : REHE-01
Tested By: Kevin Rose
Date of Tests: 4/11/2005
Test Conditions:
 Test Voltage: 3 VDC
 Temperature: 21°C
 Humidity: 42%

Test Results:

The E.U.T. complies.

No emissions were detected within 20 db of the limit

TEST EQUIPMENT

Asset Number	Description	Manufacturer	Model Number	Serial Number	Last Cal	Cal Due
1480	Bilog Antenna	Schaffner-Chase	CBL6111C	2572	CalNotReq	N/A
1484	Cable 2.0-18.0 Ghz	Storm	PR90-010-072	N/A	08/26/04	08/26/05
791	PREAMP, 25dB	ICC	LNA25	398	11/12/04	11/12/05
1464	Spectrum analyzer	Hewlett Packard	8563E	3551A04428	07/30/04	07/31/06

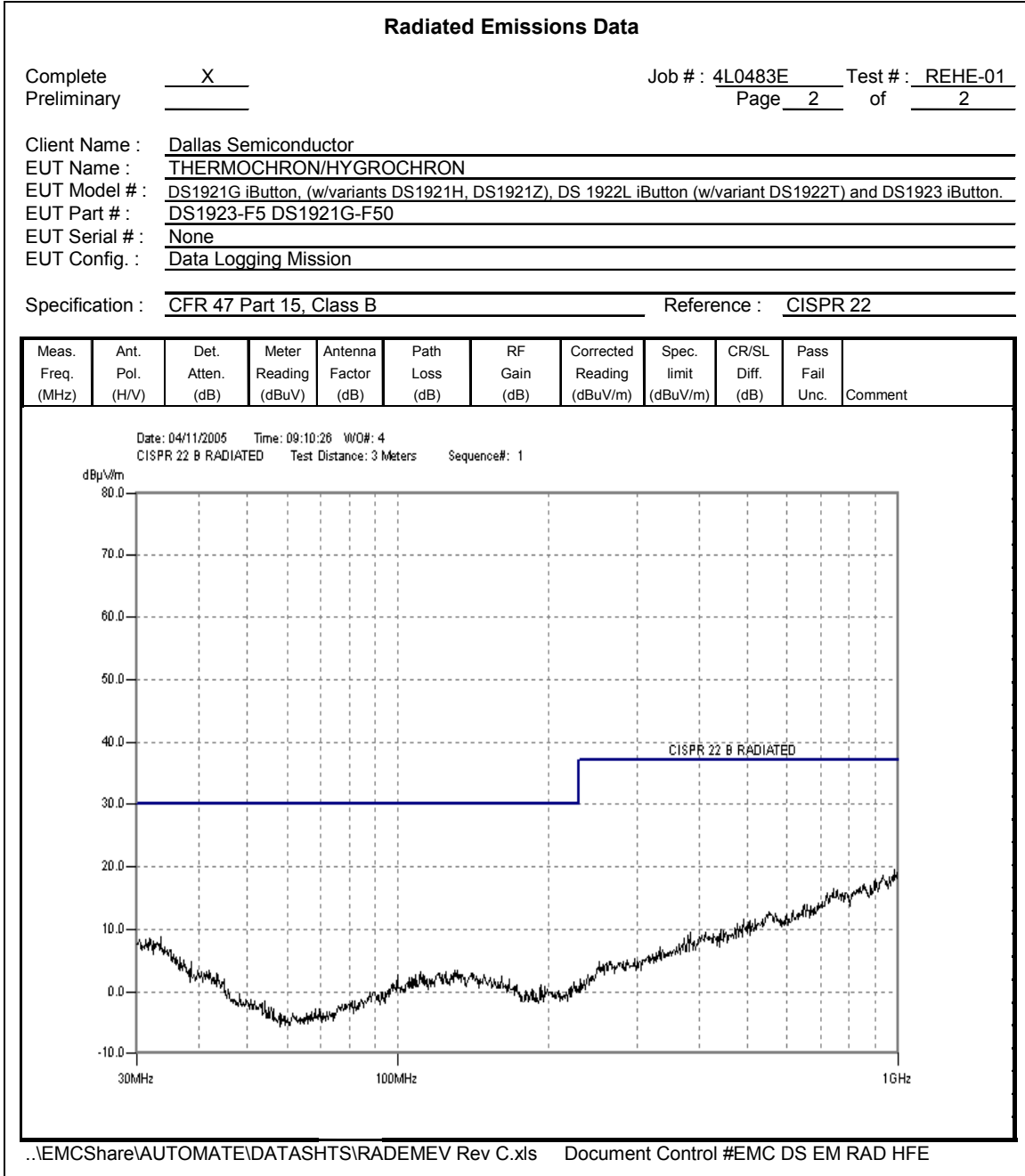
Test Data –Radiated Emissions, Electric Field, Test#REHE-01

Radiated Emissions Data													
Complete	<u> X </u>		Job # : <u>4L0483E</u>				Test # : <u>REHE-01</u>						
Preliminary	<u> </u>		Page <u> 1 </u>				of <u> 2 </u>						
Client Name :	<u> Dallas Semiconductor </u>												
EUT Name :	<u> THERMOCHRON/HYGROCHRON </u>												
EUT Model # :	<u> DS1921G iButton, (w/variants DS1921H, DS1921Z), DS1922L iButton (w/variant DS1922T) and DS1923 iButton. </u>												
EUT Part # :	<u> DS1923-F5 DS1921G-F50 </u>												
EUT Serial # :	<u> None </u>												
EUT Config. :	<u> Data Logging Mission </u>												
Specification :	<u> CFR 47 Part 15, Class B </u>						Reference : <u> CISPR 22 </u>						
Rod. Ant. #:	<u> NA </u>	Temp. (deg. C) :	<u> 21 </u>									Date :	<u> 04/11/05 </u>
Bicon Ant.#:	<u> 760 </u>	Humidity (%) :	<u> 42 </u>									Time :	<u> 13:00 </u>
Log Ant.#:	<u> NA </u>	EUT Voltage :	<u> 3 VDC </u>									Staff :	<u> Kevin Rose </u>
Bilog Ant.#:	<u> NA </u>	EUT Frequency :	<u> NA </u>									Photo ID:	<u> REHE-01 </u>
Dipole Ant.#:	<u> NA </u>	Phase:	<u> NA </u>									Peak Bandwidth:	<u> 100 KHz </u>
Cable#:	<u> 1522 </u>	Location:	<u> AC 3 </u>									Video Bandwidth:	<u> 100 KHz </u>
Preamp#:	<u> 791 </u>	Distance:	<u> 3 METERS </u>										
Limiter#:	<u> NA </u>												
Atten #:	<u> NA </u>												
Detector#:	<u> 1464 </u>												

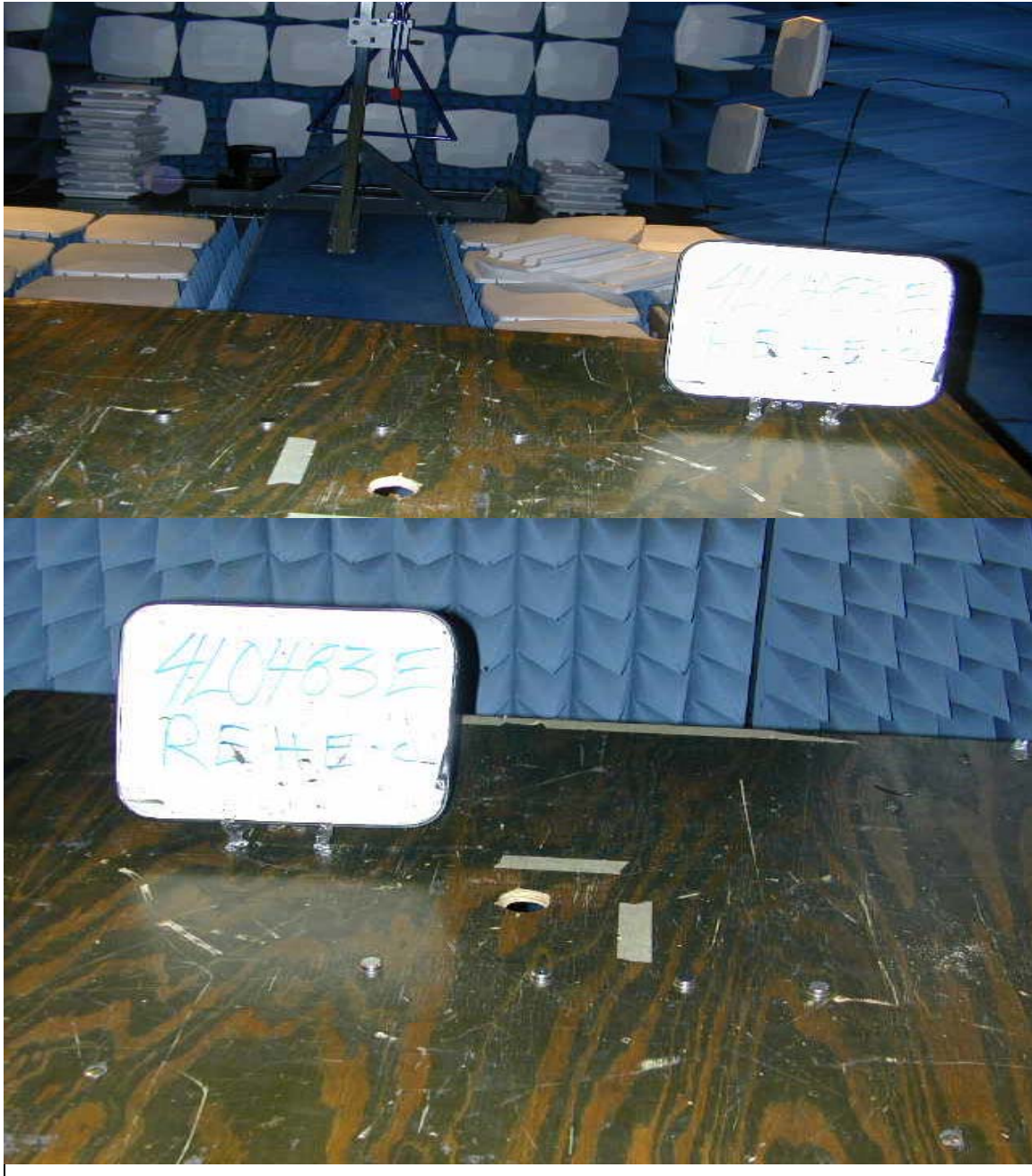
Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	QP readings Comment
Date: 04/11/2005 Time: 09:13:15 WFO#: 4 CISPR 22 B RADIATED Test Distance: 3 Meters Sequence#: 1											

..\EMCShare\AUTOMATE\DATASHTS\RADEMEV Rev C.xls Document Control #EMC DS EM RAD HFE

Test Data Radiated Emissions, Electric Field, Test#REHE-01 Cont.



Test Photographs - Test # REHE-01



Section 6. Microwave Radiated Emissions

Purpose:

The tests are intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for radiated emissions as defined by CFR 47, Part 15, Subpart B, Class B, Paragraph Number 15.109.

Microwave Radiated Emissions testing was not performed for the following reason:

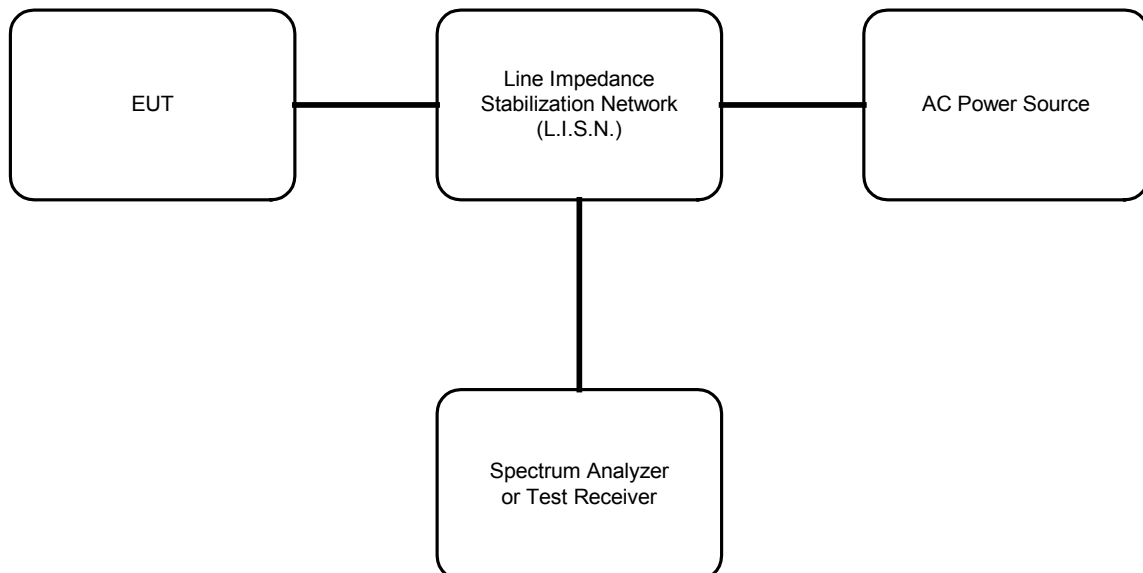
E.U.T. has no clock frequencies above 107MHz

Section 7 Test Methods and Block Diagrams.

Conducted Emissions (Mains Ports)

- Applicable Test Standard: CFR 47, FCC Pt 15, Subpart B
- The test set-up is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Conducted powerline measurements are made from 150 kHz to 30 MHz.
- For each current carrying conductor of each power cord associated with the E.U.T., the emission closest to the limit is recorded.
- Final measurements are 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.

Test Configuration - Powerline Conducted Emissions:



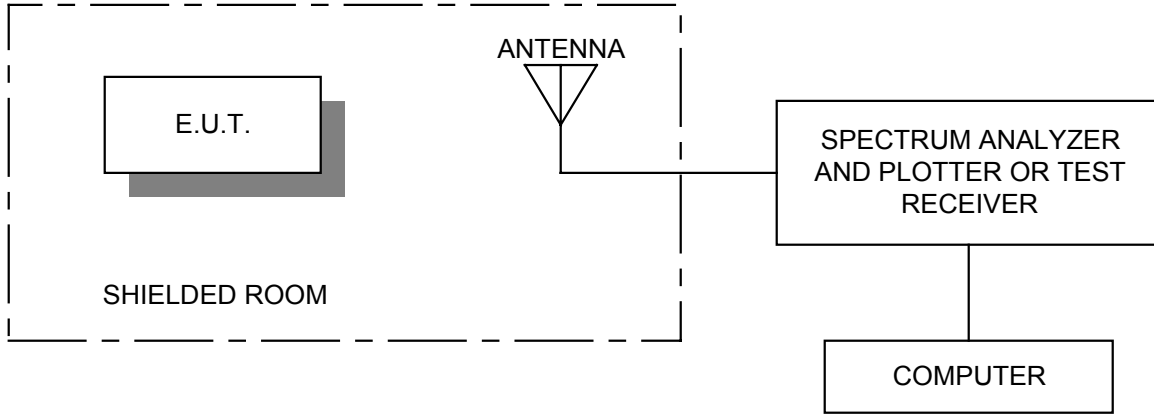
Radiated Emissions

Test Method - Radiated Emissions:

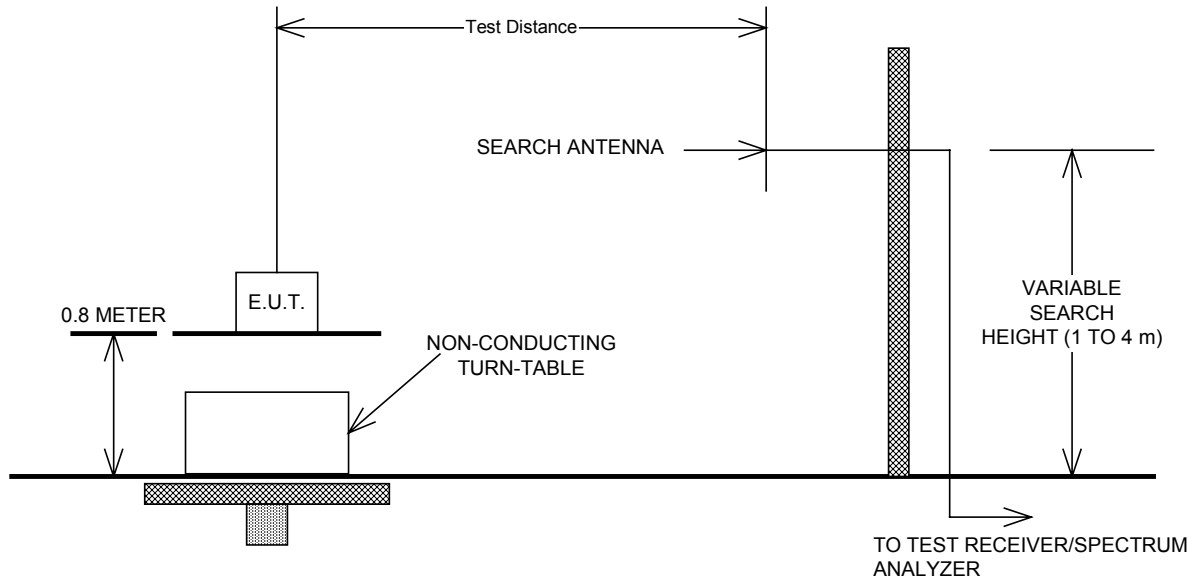
- Applicable Test Standard: CFR47, FCC Pt 15, Subpart B
- The test set-up in the shielded room is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Radiated emissions measurements are made from 30 MHz to 1000 MHz.
- The equipment was prescanned in the shielded room using a spectrum analyzer and broadband antenna to produce a list of frequencies to be investigated in the open area test site.
- The equipment is then set-up on an open area test site.
- Variations in antenna height, antenna polarization, and E.U.T. azimuth are explored to produce the emission that has the highest amplitude relative to the limit.
- The frequencies noted in the preliminary test are investigated on the open-air site where amplitude measurements are made.
- If ambient signal field strength is high at 10 meter, the measurements may be performed at 3 meter and extrapolated to the requisite distance.
- All emissions within ± 5 dB of the limit are re-measured using a dipole antenna.
- If less than six emissions are better than 20 dB below limit, the noise level of the measuring instrument at representative frequencies is also reported.
- Any emissions above 1 GHz are measured using a horn antenna and low noise pre-amplifier.

Test Configuration - Radiated Emissions:

Radiated Pre-scan:



Outdoor Test Site for Radiated Emissions:



Section 8. Labeling Requirements

Your product has successfully complied with 47 CFR, FCC Part 15.B Class B requirements.

FCC Class B Label
This device has been tested and found to comply with Part 15, Class B, of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

In addition to placing the above label on your product, the three items that are required to be included in your product's manual are:

- (1) For a Class B Verified device, the instructions furnished to the user shall include the following or similar statement, placed in a prominent location at the front of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
-

- (2) The user's manual must caution the user that changes or modifications not expressly approved by the party responsible for compliance (you/your company) could void the user's authority to operate the equipment.
- (3) In addition, the instruction manual must include appropriate instructions on the first page of the manual concerning installation of the device or special accessories (special cabling, shields, adapters) that must be used with the device. An appropriate caution statement should warn the user to utilize the special accessories supplied with the equipment for continued FCC compliance.

Please do not hesitate to contact us for future testing or consultation services. Thank you for choosing Nemko Dallas, Inc.