



**MET Laboratories, Inc.** *Safety Certification - EMI - Telecom Environmental Simulation*  
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587-3201 • PHONE (510) 489-6300 • FAX (510) 489-6372

## **Electromagnetic Compatibility Criteria Test Report**

For the

**Core Analog Inc.  
Core Racing System**

Tested under  
**The FCC Certification Rules Contained in Title 47 of the CFR, Part 15, Subpart C  
For Certification as a Intentional Radiator**

**MET Report: EMCS16827-FCC225**

August 2, 2005

**Prepared For:**

**Core Analog Inc.  
28241 Crown Valley Parkway, Suite F444  
Laguna Niguel, California 92677**

**Prepared By:**  
**MET Laboratories, Inc.**  
33439 Western Ave.  
Union City, California 94587



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**MET Report: EMCS16827-FCC225**

Kerwinn Corpuz  
Project Engineer, Electromagnetic Compatibility Lab

Cheryl Anicete  
Documentation Department

**Engineering Statement:** The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Title 47 of the CFR, Part 15, Subpart C for Certification as a Intentional Radiator and Part 15, Subpart B for a Class B Unintentional Radiator under normal use and maintenance.

Tony Permsombut,  
Manager, Electromagnetic Compatibility Lab



Core Analog Inc.  
Core Racing System

Electromagnetic Compatibility  
CFR Title 47, Part 15, Subpart C

## Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	August 2, 2005	Initial Issue.



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## List of Terms and Abbreviations

<b>AC</b>	Alternating Current
<b>ACF</b>	Antenna Correction Factor
<b>Cal</b>	Calibration
<b>d</b>	Measurement Distance
<b>dB</b>	Deci Bels
<b>dB<math>\mu</math>V</b>	Deci-Bels above one <b>micro</b> Volt
<b>dB<math>\mu</math>V/m</b>	Deci-Bels above one <b>micro</b> Volt <b>per</b> meter
<b>DC</b>	Direct Current
<b>DCF</b>	Distance Correction Factor
<b>E</b>	Electric Field
<b>DSL</b>	Digital Subscriber Line
<b>ESD</b>	Electrostatic Discharge
<b>EUT</b>	Equipment Under Test
<b>f</b>	Frequency
<b>FCC</b>	Federal Communications Commission
<b>H</b>	Magnetic Field
<b>GHz</b>	Giga Hertz
<b>Hz</b>	Hertz
<b>ICES</b>	Interference-Causing Equipment Standard
<b>kHz</b>	kilohertz
<b>kPa</b>	kilopascal
<b>kV</b>	kilo Volt
<b>LISN</b>	Line Impedance Stabilization Network
<b>MHz</b>	MegaHertz
<b><math>\mu</math>H</b>	<b>micro</b> Henry
<b><math>\mu</math>F</b>	<b>micro</b> Farad
<b><math>\mu</math>s</b>	<b>micro</b> seconds
<b>RF</b>	Radio Frequency
<b>RMS</b>	Root-Mean-Square



## 1. Testing Summary

Title 47 of the CFR, Part 15, Subpart C, Reference and Test Description	Results	Comments
15.207(a) FCC Part 15 Intentional Radiator, Sections: Conducted Emission Limits	Compliant	N/A
15.225(a) Field Strength Limit within the band 13.553 – 13.567 MHz	Compliant	N/A
15.225(b) Field Strength Limit within the band 13.410 – 13.553 MHz and 13.567 – 13.710 MHz	N/A	EUT does not operate in this band.
15.225(c) Field Strength Limit within the band 13.110 – 13.410 MHz and 13.710 – 14.010 MHz	N/A	EUT does not operate in this band.
15.225(d) Outside-Band Field Strength Limit per 15.209	Compliant	N/A
15.225(e) Frequency Tolerance of the Carrier	Compliant	N/A

**Table 1. Summary of Test Results**



## 2. Equipment Configuration

### 2.1. Overview

MET Laboratories, Inc. was contracted by Core Analog Inc. to perform testing on the Core Racing System, under Core Analog Inc. purchase order number CA100001.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Core Analog Inc., Core Racing System.

In accordance with §2.955(a) (3), the following data is presented in support of the verification of the Core Analog Inc. Core Racing System. Core Analog Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Core Racing System has been **permanently** discontinued, as per §2.955(b).

The results obtained relate only to the item(s) tested.

<b>Model(s) Tested:</b>	Core Racing System
<b>Model(s) Covered:</b>	CRSV10
<b>EUT Specifications:</b>	Primary Power: 5Vdc from HOST
	Secondary Power: N/A
	Highest Clock Frequency: 13.56 MHz
<b>FCC ID:</b>	TJO-CORECRSV10
<b>Evaluated by:</b>	Kerwinn Corpuz
<b>Date(s):</b>	July 19, 2005

### 2.2. Test Site

All testing was performed at MET Laboratories, Inc., 4855 Patrick Henry Drive, Building 6, Santa Clara, California 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories. In accordance with §2.948(d), MET Laboratories has been accredited by the National Voluntary Laboratory Accreditation Program (Lab Code: 100273-0).

### 2.3. Description of Test Sample

The Core Racing System, Equipment Under Test (EUT), portable RFID timing system with attached loop antenna for detecting RC vehicles on a racing track that operates in the 13.56 MHz and powered from a laptop with 5 Vdc.





## 2.4. Equipment Configuration

The EUT was set up as outlined in Figure 1, Block Diagram of Test Setup. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Rev. #
A	Core Racing System	N/A	N/A	N/A	1.7
B	Loop Antenna	N/A	N/A	N/A	N/A

Table 2. Equipment Configuration

## 2.5. Support Equipment

Core Analog Inc. supplied support equipment necessary for the operation and testing of the Core Racing System. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
C	Laptop	Dell	PP01L	N/A
D	DC PWR Supply	HP	6236B	N/A
H	AC-DC PWR Supply	Dell	PA-2	N/A

Table 3. Support Equipment

- \* The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.

## 2.6. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded (Yes/No)	Termination Box ID & Port ID
1	A, USB Port	USB Cable	1	1	Yes	C, USB Port

Table 4. Ports and Cabling Information

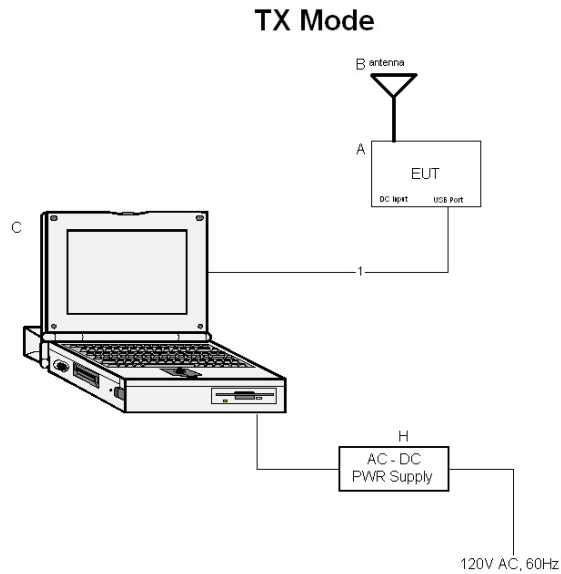


Figure 1. Block Diagram of Test Configuration (Radiated Emissions)

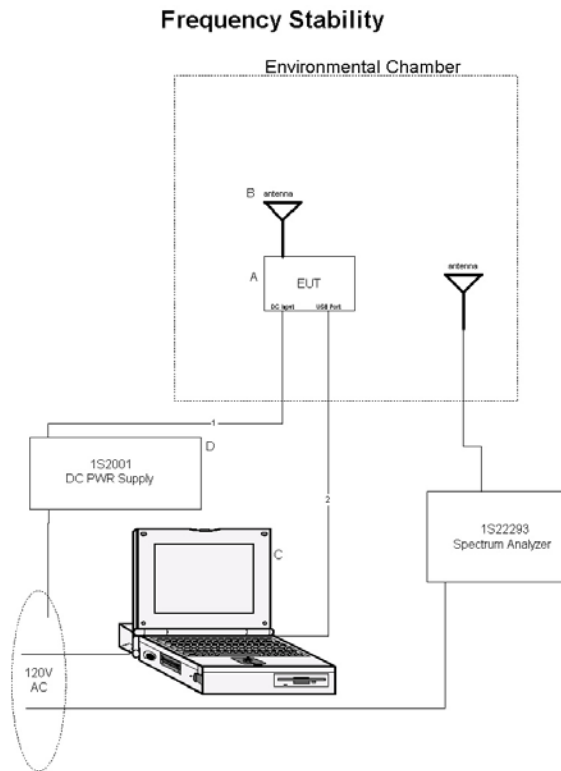


Figure 2. Block Diagram of Test Configuration (Frequency Stability)



## **2.7. Mode of Operation**

The EUT was operated in the following manner:

A laptop was connected to the radio (EUT) to control the transmitter, ON or OFF, using Xterm software. The EUT's operating frequency is fixed at 13.56 MHz.

## **2.8. Method of Monitoring EUT Operation**

Performance of the EUT was monitored in the following manner:

A Spectrum Analyzer was used to monitor the EUT's carrier transmission.

## **2.9. Modifications**

### **2.9.1. Modifications to EUT**

To comply with Conducted Emissions Voltage, Part 15.207, these modifications are required.

- 1) A Ferrite ring, Amidon Associates Inc., part number: FT-240-43, is to be installed at laptop's power supply with 8 turns. One at AC cord and one at DC cord.
- 2) A Ferrite ring, Amidon Associates Inc., part number: FT-140-43, is to be installed to USB cable near the radio with 8 turns.
- 3) Applied 50 ohms resistor surface mount between the RF output and ground.

### **2.9.2. Modifications to Test Standard**

No modifications were made to the test standard.

## **2.10. Disposition of EUT**

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Core Analog Inc. upon completion of testing.



### 3. Electromagnetic Compatibility Emission Criteria

#### 3.1. Conducted limits

**Test Requirement(s):** **15.207(a)**, Except as shown in paragraphs (b) and (c) of this section\*, charging, AC adapters or battery eliminators the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the Table 5, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Note: \*Testing is applicable except to carrier current systems operating as intentional radiators on frequencies below 30 MHz, containing their fundamental emission within the frequency band 535–1705 kHz and intended to be received using a standard AM broadcast receiver, or devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines *15.207 (b)*, or for an intentional radiator that is designed to be connected to the public utility (AC) power line *15.207 (c)*.

Frequency range (MHz)	Conducted Limits (dB $\mu$ V)	
	Quasi-Peak	Average
0.15- 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50
* — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz.		

**Table 5. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.207(a)**



**Test Procedure:** The EUT was set to transmit and placed on a 0.8 m-high wooden table inside a semi-anechoic chamber. The EUT is situated such that the back of the EUT was 0.4 m from the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The laptop (EUT is powered 5Vdc from the laptop) is powered from a 50  $\Omega$ /50  $\mu$ H Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements are made in accordance with ANSI C63.4-2003 with peak detector. All peak emissions within 6 dB of the limit were remeasured using a quasi-peak and average detector as appropriate.

**Test Results:** The EUT was found compliant with Part 15.207 requirement(s) of this section.

**Test Engineer(s):** Kerwinn Corpuz

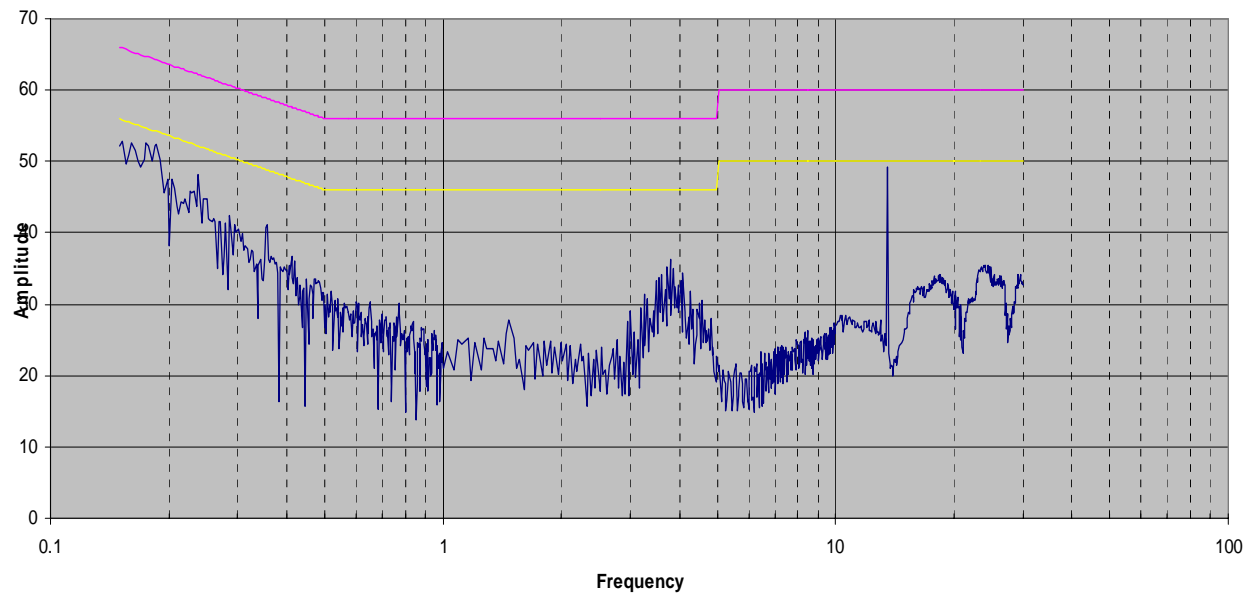
**Test Date(s):** July 19, 2005



**15.207 (a) Conducted Emissions - Voltage, Worst Case Emissions, AC Power, Phase Line, 120Vac, 60Hz**

Frequency (MHz)	Quasi-Peak Amplitude (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Quasi-Peak Margin (dB $\mu$ V)	Average Amplitude (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Average Margin (dB $\mu$ V)
0.186	46.2	64.21	-18.01	33.4	54.21	-20.81
0.238	33.3	62.17	-28.87	30.3	52.17	-21.87
* 13.56	48.6	60	-11.4	48.6	50	-1.4

Note: \* - At this frequency, the measured conducted emissions exhibits a margin of compliance that is less than 3dB below the specification limit.



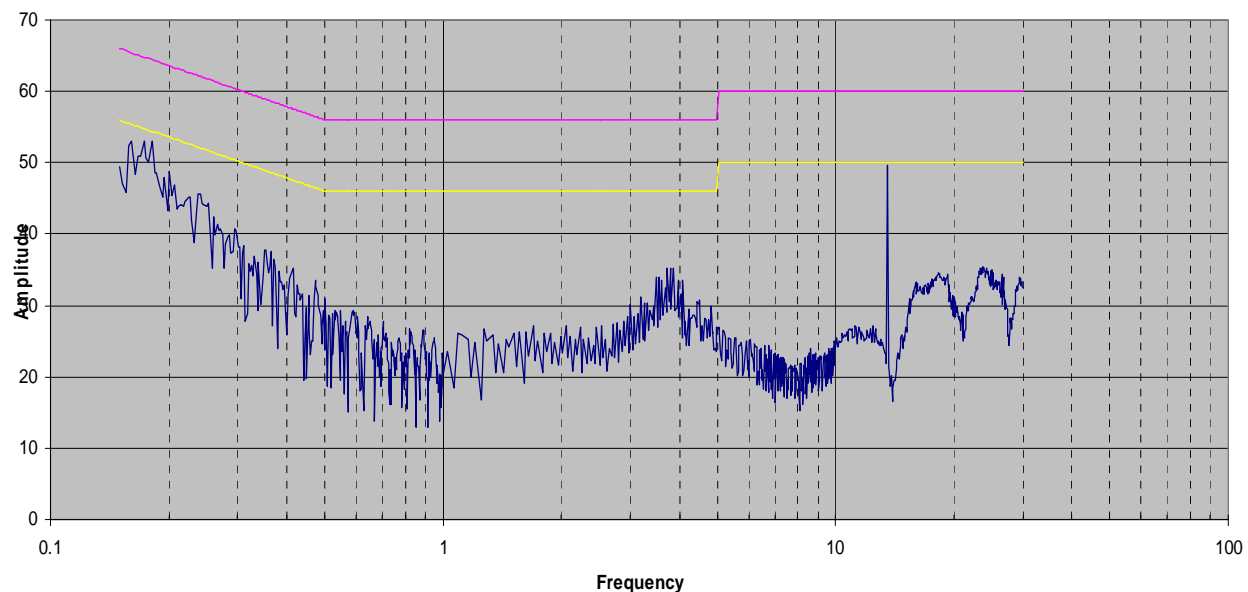
**Conducted Emission Limits, Phase Line Plots with peak detector**



**15.207 (a) Conducted Emissions - Voltage, Worst Case Emissions, AC Power, Neutral Line, 120Vac, 60Hz**

Frequency (MHz)	Quasi-Peak Amplitude (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Quasi-Peak Margin (dB $\mu$ V)	Average Amplitude (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Average Margin (dB $\mu$ V)
0.178	47.1	64.58	-17.48	37.7	54.58	-16.88
0.241	38.5	62.06	-23.56	28.5	52.06	-23.56
* 13.56	48.8	60	-11.2	48.8	50	-1.2

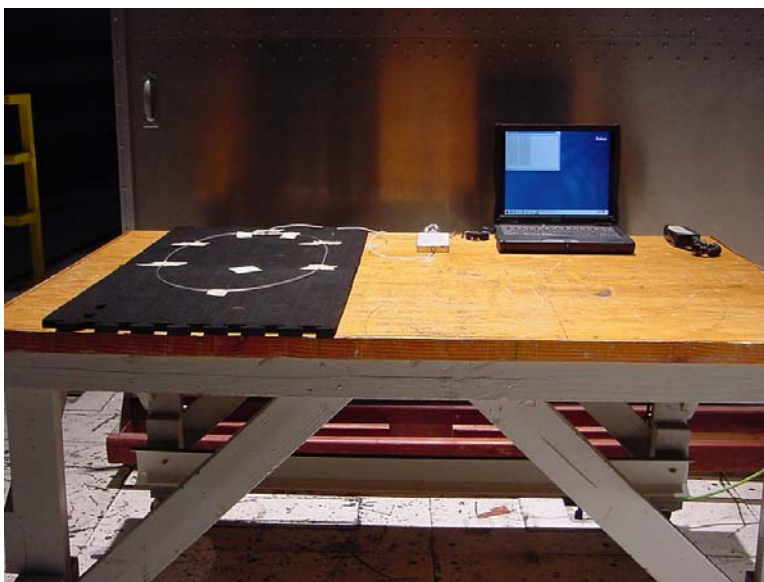
Note: \* - At this frequency, the measured conducted emissions exhibits a margin of compliance that is less than 3dB below the specification limit.



**Conducted Emission Limits, Neutral Line Plots with peak detector**



## Conducted Emissions Test Setup



**Photograph 1. Conducted Emissions Test Setup**





### 3.2. Radiated Emission Limits

**Test Requirement(s):** **15.225 (a)** The field strength of any emissions within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

**15.225 (b)** Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

**15.225 (c)** Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

**15.225 (d)** The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in Sec. 15.209.

**15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 6.

Frequency (MHz)	§ 15.209(a), Radiated Emission Limits (dBµV)
1.705 - 30	48.62 @ 10m
30 - 88	40.00 @ 3m
88 - 216	43.50 @ 3m
216 - 960	46.00 @ 3m
Above 960	54.00 @ 3m

**Table 6. Radiated Emissions Limits Calculated from FCC Part 15, 15.209 (a)**

**Test Procedure:**

**6 MHz to 30 MHz:** The EUT was set to transmit and placed on a 0.8m-high wooden table inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4: 2003 were used. The loop antenna was located 10 m from the EUT with extrapolation from 30 m. Measurements were conducted with the loop antenna at coaxial (parallel orientation) and planar (perpendicular orientation).

**For emissions within the band measurement,** the Spectrum analyzer RBW was set to 1 kHz and VBW was set to 3 kHz and offset of 34.7 dB to compensate the antenna factor and cable loss. The extrapolation from 30 m to 10 m has been added to the mask limit for 13.553 – 13.567 MHz.

$$\text{Extrapolation} = \log_{20} (10 / 30) = 19.1 \text{ dB}$$

**For emissions below 30 MHz outside the band measurement,** the Spectrum analyzer RBW and VBW was set to 10 kHz. The extrapolation from 30 m to 10 m has been added to the limit.



**30 MHz and up to 10<sup>th</sup> harmonic of the highest operating frequency:** A antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

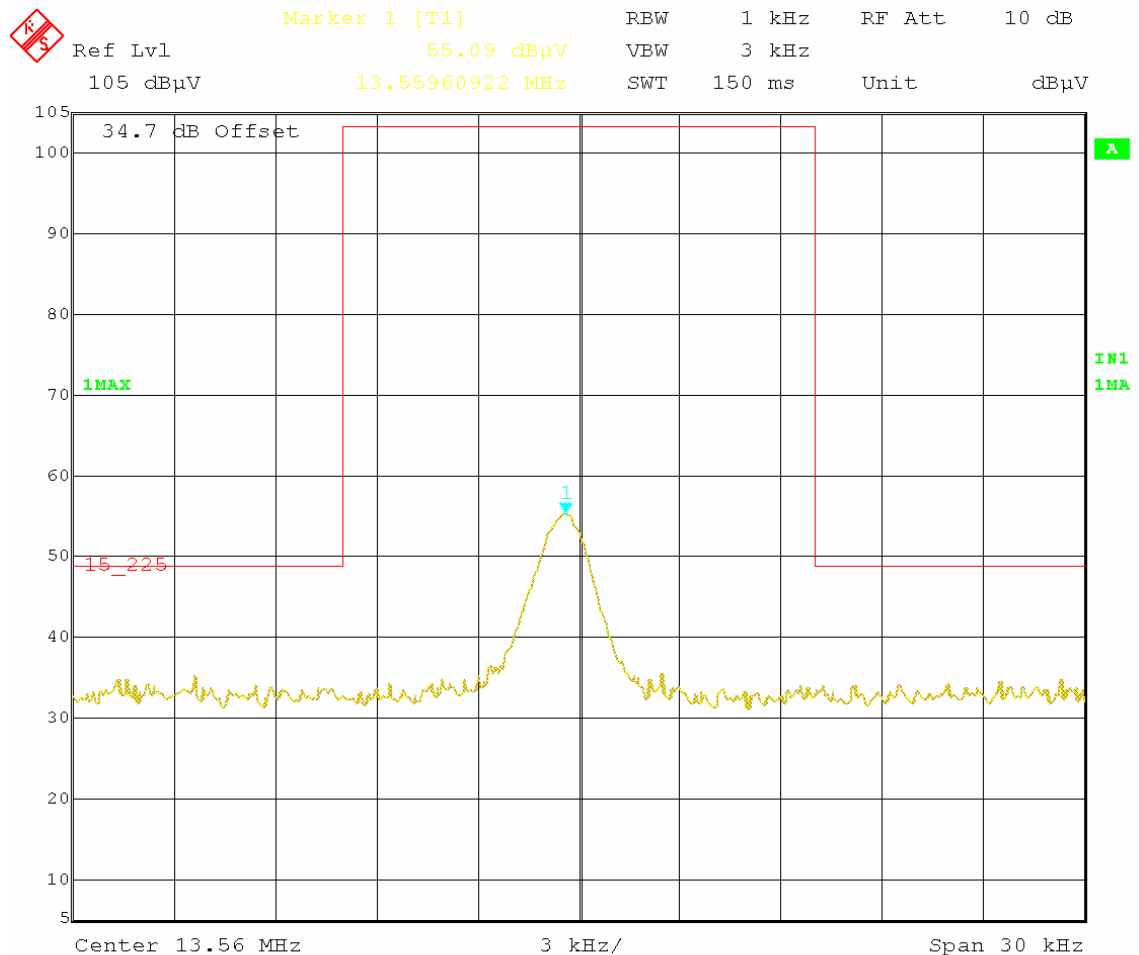
**Test Results:** The EUT was found compliant with Part 15.225 (a) and (d) requirement(s) of this section.

**Test Engineer(s):** Kerwinn Corpuz

**Test Date(s):** March 22, 2005



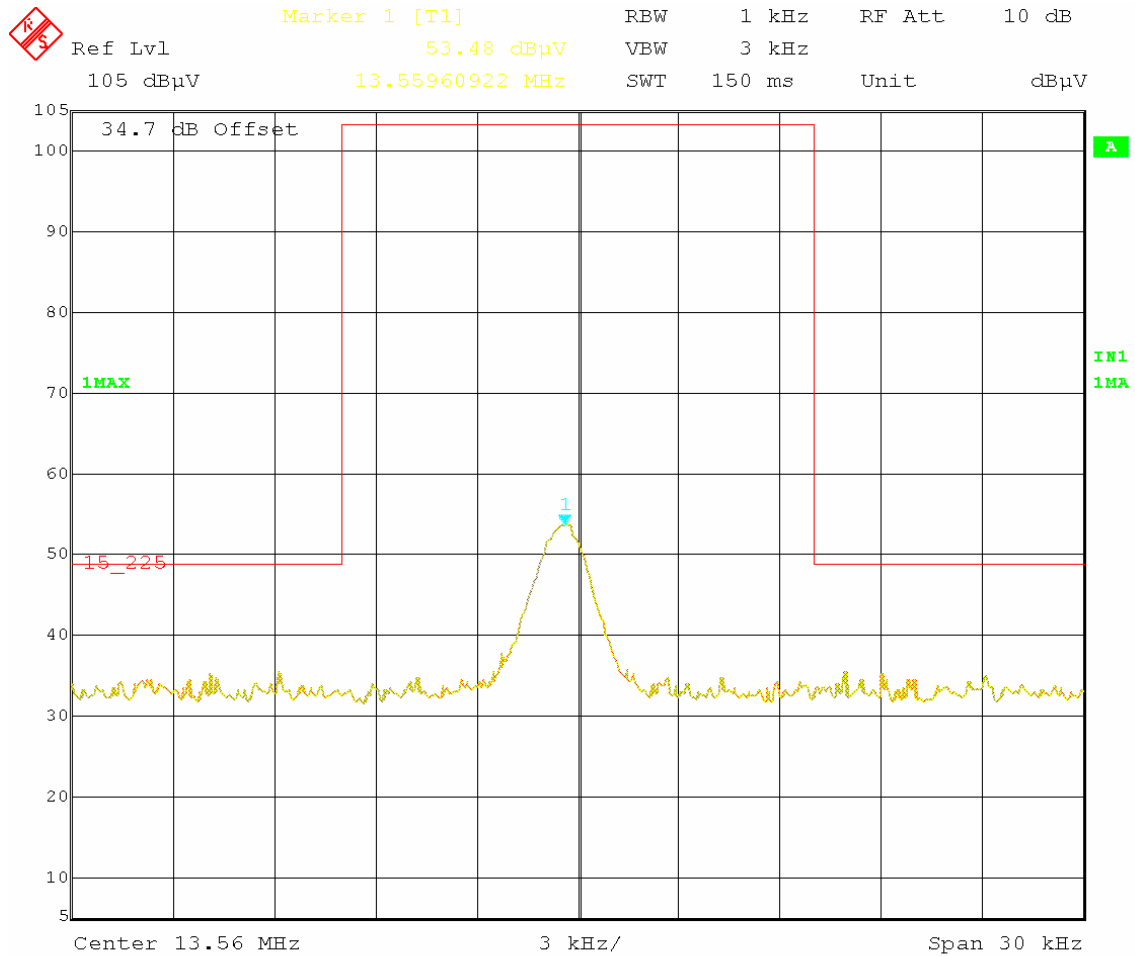
## Radiated Emissions – Section 15.225 (a) Test Results



Passive Loop at coaxial (parallel orientation)



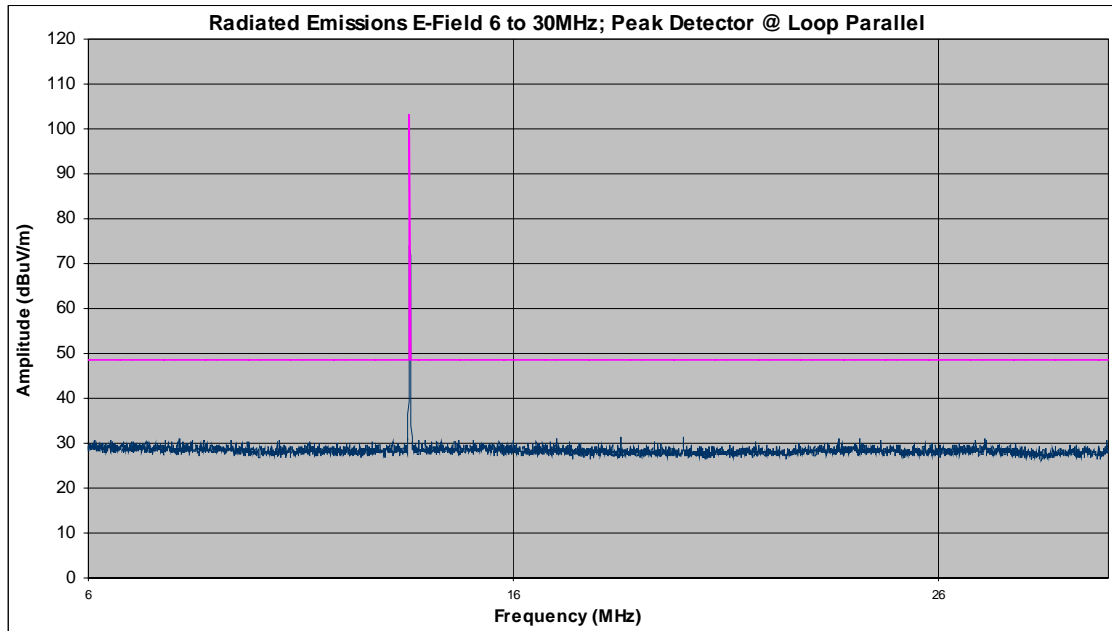
## Radiated Emissions – Section 15.225 (a) Test Results



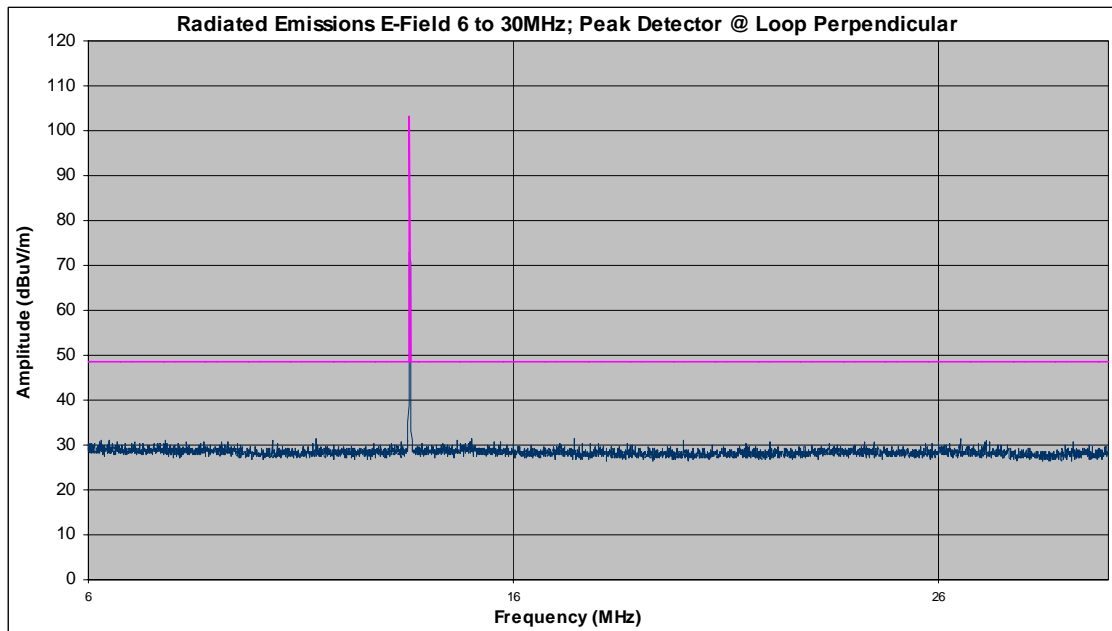
Passive Loop at planar (perpendicular orientation)



## Radiated Emissions – Section 15.225 (d), below 30 MHz outside band Test Results



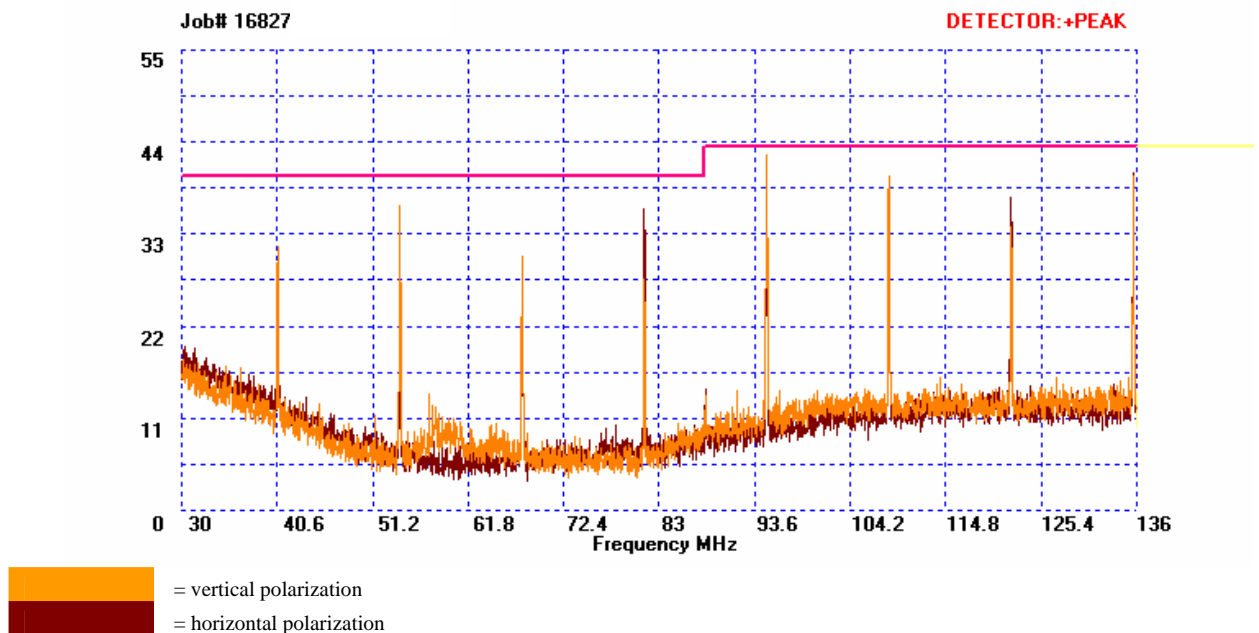
**Passive Loop at coaxial (parallel orientation)**



**Passive Loop at planar (perpendicular orientation)**

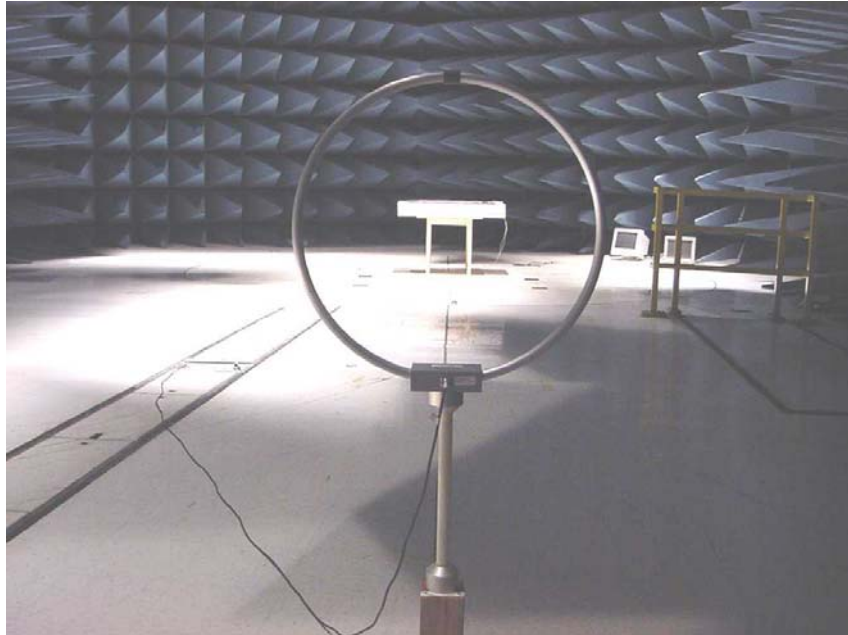


## Radiated Emissions – Section 15.225 (d), above 30 MHz outside band Test Results

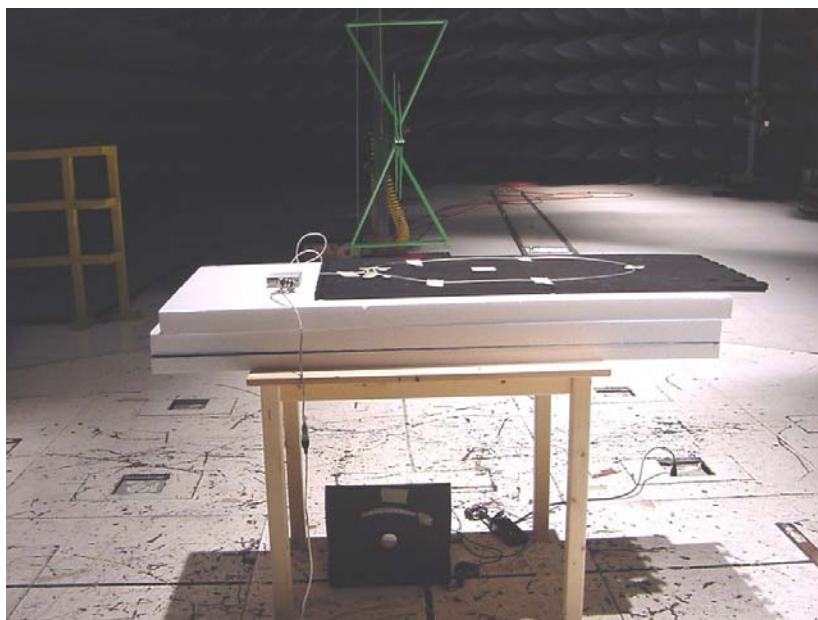


Frequency (MHz)	Antenna Polarity (H/V)	EUT Azimuth (Degrees)	Antenna HEIGHT (m)	QP Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB/m)	Cable Loss (dB)	QP Corrected Amplitude (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)
94.92	V	336	1	29.44	11.16	1.654	42.26	43.50	-1.24
108.48	V	0	1	25.2	12.72	1.825	39.74	43.50	-3.76
54.24	V	109	1	27.8	7.00	1.205	36.01	40.00	-4.00
81.36	H	170	3.88	27.6	8.00	1.492	37.09	40.00	-2.91
108.48	H	150	3.05	27.21	11.99	1.825	41.03	43.50	-2.47
135.6	H	2.28	2.46	26.9	12.21	2.096	41.20	43.50	-2.30

## Spurious Emission Limits Test Setup



**Below 30 MHz Setup**



**Above 30 MHz Setup**

**Photograph 2. Spurious Emission Limits Test Setup**



#### 4. Frequency Stability

**Test Requirement(s):**     **15.225(e)** The frequency tolerance of the carrier signal shall be maintained within +/-0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

**Test Procedure:**             Measurements are in accordance with Part 2.1055. The EUT was placed in the Environmental Chamber and support equipments are outside the chamber on a table. Set the RBW = VBW = 100 Hz to Spectrum Analyzer. The SPAN was set to 5 kHz to show the frequency values in hertz from the Spectrum Analyzer. The EUT was set to transmit in the operating frequency range. Frequency drift was investigated for every 10°C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -20° to 50°C.

**Test Results:**                 The EUT was found compliant with Part 15.225 (e) requirement(s) of this section.

**Test Engineer(s):**             Kerwinn Corpuz

**Test Date(s):**                 January 24, 2005





## Frequency Stability – Section 15.225 (e) Test Results

**Limit:** 0.01% of the carrier center frequency and must not drift greater than 1,356 Hz.

**Reference Freq.:** 13.559584 MHz (fix channel) at 20°C

Temperature (Celsius)	Measured Freq (MHz)	Drift (%)	Drift (Hz)
50	13.559450	-0.00099	-134
40	13.559492	-0.00068	-92
30	13.559517	-0.00049	-67
20	Reference		
10	4980.018512	0.00024	33
0	4980.027129	0.00049	67
-10	4980.040420	0.00080	108
-20	4980.046356	0.00092	125

**Table 6. Temperature Vs. Frequency Test Results**

**Reference:** 5Vdc at 20°Celsius

**Freq.** = 13.559584 MHz at 20°C

Measured Voltage(dc)	Measured Freq (MHz)	Drift (%)	Drift (Hz)
4.3	13.559642	0.00043	58

**Table 7. Frequency Vs. Voltage Test Results**

Note: Measured voltage end point is 4.2Vdc.



## Frequency Stability Test Setup



**Photograph 3. Frequency Stability Test Setup**



## 5. Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

Test Name: Conducted Emissions			Test Date(s): 07/19/05		
MET Asset #	Nomenclature	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2109	Spectrum Analyzer	Hewlett Packard	8546A	7/18/05	7/18/06
1S2108	RF Filter Section	Hewlett Packard	85640A	7/18/05	7/18/06
1S2263	Semi-Anechoic Chamber	Rantec	N/A	7/26/04	8/26/05
1S2372	LISN	FCC	N/A	2/9/05	2/9/06
Test Name: Spurious Radiated Emissions			Test Date(s): 03/22/05		
MET Asset #	Nomenclature	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2406	Spectrum Analyzer	Hewlett Packard	8591E	10/2/04	10/2/05
1S2421	EMI Receiver	Rohde & Schwarz	ESIB 7	2/9/05	2/9/06
1S2404	Passive Loop	EMCO	6512	6/30/05	6/30/06
1S2184	Bilog Antenna	Chase	CBL6112A	1/12/05	1/12/06
1S2263	Semi-Anechoic Chamber	Rantec	N/A	7/26/04	8/26/05
1S2438	Transient Limiter	Hewlett Packard	11947A	9/15/05	9/15/06
Test Name: Frequency Stability			Test Date(s): 01/24/05		
1S2293	Spectrum Analyzer	Hewlett Packard	8564E	09/30/04	09/30/05
1S2001	DC Power Supply	Hewlett Packard	6236B	See Note	
1S2229	Environmental Chamber	Tenny	Tenny Six	10/21/04	10/21/05
1S2408	Near-Field Probe	ETS	901	See Note	
1S2417	MultiMeter	Fluke	179	12/28/04	12/28/05

Note: Functionally verified test equipment is verified using calibrated instrumentation at the time of testing.



## 6. Compliance Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

### § 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) *The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.



**§ 2.803 Marketing of radio frequency devices prior to equipment authorization.**

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
  - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
  - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing;*
  - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
  - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a provision that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.



**The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:**

**§ 2.901 Basis and Purpose**

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.<sup>1</sup> *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.*
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

**§ 2.948 Description of measurement facilities.**

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
  - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
    - (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
    - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

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<sup>1</sup> In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart C (of Part 15), which deals with unintentional radiators.



- (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

**§ 2.955 Retention of records.**

- (a) For each equipment subject to verification, the responsible party, as shown in §2.909 shall maintain the records listed as follows:
  - (1) A record of the original design drawings and specifications and all changes that have been made that may affect compliance with the requirements of §2.953.
  - (2) A record of the procedures used for production inspection and testing (if tests were performed) to insure the conformance required by §2.953. (Statistical production line Emission testing is not required.)
- (b) The records listed in paragraph (a) of this section shall be retained for two years after the manufacture of said equipment item has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the manufacturer or importer is officially notified that an investigation or any other administrative proceeding involving his equipment has been instituted.

**§ 2.956 FCC inspection and submission of equipment for testing.**

- (a) Each responsible party shall upon receipt of reasonable request:
  - (1) Submit to the Commission the records required by §2.955.
  - (2) Submit one or more sample units for measurements at the Commission's Laboratory.
    - (i) Shipping costs to the Commission's Laboratory and return shall be borne by the responsible party.
    - (ii) In the event the responsible party believes that shipment of the sample to the Commission's Laboratory is impractical because of the size or weight of the equipment, or the power requirement or for any other reason, the responsible party may submit a written explanation why such shipment is impractical and should not be required.





## 6.1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

### § 15.19 Labeling requirements.

(a) *In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

- (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.*

- (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

*This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.*

- (3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 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.*

- (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

- (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

### § 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



**The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart C — Unintentional Radiators:**

**§ 15.105 Information to the user.**

- (a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

*Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.*

- (b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text 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 power line and ground at the power terminal. The lower limit applies at the band edges.*



Core Analog Inc.  
Core Racing System

Electromagnetic Compatibility  
Compliance Information  
CFR Title 47, Part 15, Subpart C

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# End of Report