MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE ● BALTIMORE, MARYLAND 21230-3432 ● PHONE (410) 354-3300 ● FAX (410) 354-3313
33439 WESTERN AVENUE ● UNION CITY, CALIFORNIA 94587 ● PHONE (510) 489-6300 ● FAX (510) 489-6372
3162 BELICK STREET ● SANTA CLARA, CALIFORNIA 95054 ● PHONE (408 748-3585 ● FAX (510) 489-6372

July 21, 2011

Carlson Wireless Technologies, Inc.
1385 8th St.
Arcata, CA 95521

Dear Jim Carlson,

Enclosed is the EMC Wireless test report for compliance testing of the Carlson Wireless Technologies, Inc., TrailBlazer ITS, tested to the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 90 Subpart M for Land Mobile Radio Services.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\Carlson Wireless Technologies, Inc.\EMCS31447-FCC90M Rev. 1)

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Electromagnetic Compatibility Criteria Test Report

For the

Carlson Wireless Technologies, Inc.
TrailBlazer ITS

Tested under

The FCC Verification Rules
Contained in Title 47 of the CFR, Part 90, Subpart M
for Private Land Mobile Radio Services

MET Report: EMCS31447-FCC90M Rev. 1

July 21, 2011

Prepared For:
Carlson Wireless Technologies, Inc.
1385 8th St.
Arcata, CA 95521

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

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Tested under

The FCC Verification Rules
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MET Report: EMCS31447-FCC90M Rev. 1

Anderson Soungpanya, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
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 Part 90, Subpart M of the FCC Rules and under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
0	July 12, 2011	Initial issue.
1	July 21, 2011	Revised to reflect engineer corrections.

Table of Contents

All references to section numbers are taken directly from the standard/specification used. Only sections requiring testing or evaluation are included.

List of Tables

List of Figures

List of Plots

List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

Executive Summary

1. Testing Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90, Subpart M and ASTM E2213-03(2010). All tests were conducted using measurement procedure ANSI TIA/EIA-603-A-2010.

Title 47 of the CFR, Part 90, Subpart M, and FCC 04-265 Reference and Test Description	Compliance
2.1046; 90.1215(a) Peak Power Output	Compliant
2.1047(a) Modulation Characteristics	Compliant
2.1049; 90.210 Occupied Bandwidth (Emission Mask)	Compliant
2.1051; 90.210 Spurious Emissions at Antenna Terminals	Compliant
2.1053; 90.210 Radiated Spurious Emissions	Compliant
2.1055(a) (1); 90.213 Frequency Stability over Temperature Variations	Compliant
2.1055(d) (2) Frequency Stability over Voltage Variations	Compliant
90.1217 RF Hazards	Compliant

ASTM E2213-03(2010)	Compliance
8.9.1 *Transmit Power Levels*	Compliant
8.9.2 *Transmit Spectrum Mask*	Compliant
8.9.3 *Spurious Transmissions*	Compliant
8.9.4 *Transmit Center Frequency Tolerance*	Compliant

Equipment Configuration

2. Equipment Configuration

2.1. Overview

MET Laboratories, Inc. was contracted by Carlson Wireless Technologies, Inc. to perform testing on the TrailBlazer ITS under purchase order number 10468.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Carlson Wireless Technologies, Inc., TrailBlazer ITS.

An EMC evaluation to determine compliance of the TB 4.9 with the requirements of Part 90, Subpart M, was conducted. (All references are to the most current version of Title 47 of the Code of Federal Regulations in effect). In accordance with §2.1033, the following data is presented in support of the Certification of the TB4.9. Carlson Wireless Technologies, Inc. should retain a copy of this document and it should be kept on file for at least five years after the manufacturing of the EUT has been **permanently** discontinued. The results obtained relate only to the item(s) tested.

Model(s) Tested:	TrailBlazer ITS	
Model(s) Covered:	TrailBlazer ITS	
EUT Specifications:	Primary Power Source: 100 – 260 VAC	
	FCC ID: OPA-TB59	
	Type of Modulations:	Digital QPSK with OFDM equalization
	Max Output Power:	6.91 dBm
	Equipment Code:	TNB
	EUT Frequency Ranges:	5.875 and 5.905 GHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature (15-35º C):	
	Relative Humidity (30-60%):	
	Barometric Pressure (860-1060 mbar):	
Evaluated by:	Anderson Soungpanya	
Report Date(s):	July 21, 2011	

Channel No.	Frequency range (MHz)	Max. EIRP [1] (dBm)	Channel use
170	5850–5855		Reserved.
172	5855–5865	33	Service Channel. [2]
174	5865–5875	33	Service Channel.
175	5865–5885	23	Service Channel. [3]
176	5875–5885	33	Service Channel.
178	5885–5895	33/44.8	Control Channel.
180	5895–5905	23	Service Channel.
181	5895–5915	23	Service Channel. [3]
182	5905–5915	23	Service Channel.
184	5915–5925	33/40	Service Channel. [4]

[1] An RSU may employ an antenna with a height exceeding 8 meters but not exceeding 15 meters provided the EIRP specified in the table above is reduced by a factor of 20 log(Ht/8) in dB where Ht is the height of the radiation center of the antenna in meters above the roadway bed surface. The EIRP is measured as the maximum EIRP toward the horizon or horizontal, whichever is greater, of the gain associated with the main or center of the transmission beam. The RSU antenna height shall not exceed 15 meters above the roadway bed surface.
[2] Channel 172 is designated for public safety applications involving safety of life and property.
[3] Channel Nos. 174/176 may be combined to create a twenty megahertz channel, designated Channel No. 175. Channels 180/182 may be combined to create a twenty-megahertz channel, designated Channel No. 181.
[4] Channel 184 is designated for public safety applications involving safety of life and property. Only those entities meeting the requirements of §90.373(a) are eligible to hold an authorization to operate on this channel.

Figure 1. FCC Part 90M Channel Plan and Power Limits

2.2. Test Site

All testing was performed at MET Laboratories, Inc., 3162 Belick Street, Santa Clara, CA 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 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.

2.3. Description of Test Sample

The Carlson Wireless Technologies, Inc. TrailBlazer ITS, Equipment Under Test (EUT), is designed to interface fractional T1 POTS and 4 wire, RS232, V.35 and Ethernet 10 BaseT signals unto a carrier in the 5.850-5.925 frequency range. System will operate in point to point or point to multipoint.

2.4. Equipment Configuration

The EUT was set up as outlined in Figure 2, 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	Serial Number
TB	TrailBlazer 5.9GHz System	TrailBlazer ITS	12824

Table 1. Equipment Configuration

2.5. Support Equipment

Carlson Wireless Technologies, Inc. supplied support equipment necessary for the operation and testing of the TrailBlazer ITS. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number
LT	Laptop	Generic	Generic

Table 2. Support Equipment

2.6. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded? (Y/N)	Termination Box ID & Port ID
SC	Serial Port 1	Serial Port interface	1	1	Y	Laptop Serial Port

Table 3. Ports and Cabling Information

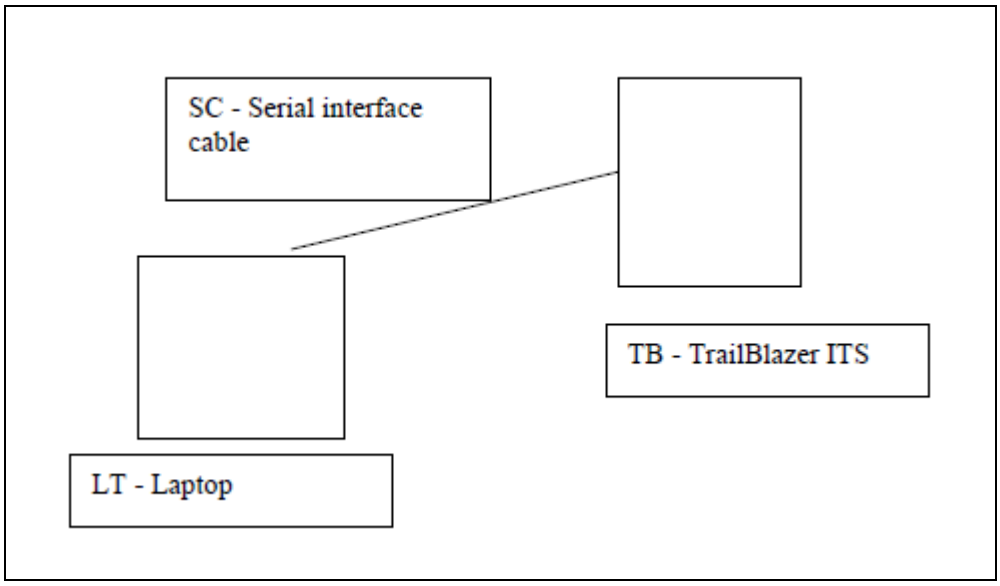


Figure 2. Block Diagram of Test Configuration

2.7. Mode of Operation

The EUT is running a program that simulates the actions of normal data flow. EUT can also be set for continuous transmission.

2.8. Method of Monitoring EUT Operation

The red LED would stop flashing.

2.9. Modifications

2.9.1. Modifications to EUT

No modifications were made to the EUT.

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 Carlson Wireless Technologies, Inc. upon completion of testing.

III. Electromagnetic Compatibility Criteria for Intentional Radiators

3. Electromagnetic Compatibility RF Power Output Requirements

3.1. RF Power Output

Test Requirement(s): **§2.1046 and §90.1215(a) with FCC 04-265**

Test Procedures: As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals using a Spectrum Analyzer.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer via an attenuator to measure the Avg. power. The EUT power was adjusted enough to produce maximum output power as specified in the owner's manual. The output power was then recorded with Avg. reading. Measurements were made at the low & high channels. EUT only uses channel 175 and 181. Reference table below for 20MHz Channels

Test Results: Equipment complies with 47CFR 2.1046 and 90.1215(a) with FCC 04-265.

All RF Power output measurements were direct connection to RF output Terminal of EUT from a Spectrum Analyzer.

Test Engineer(s): Anderson Soungpanya

Test Date(s): 06/20/11

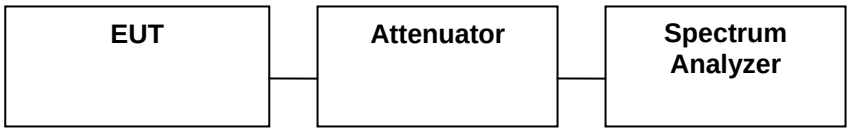
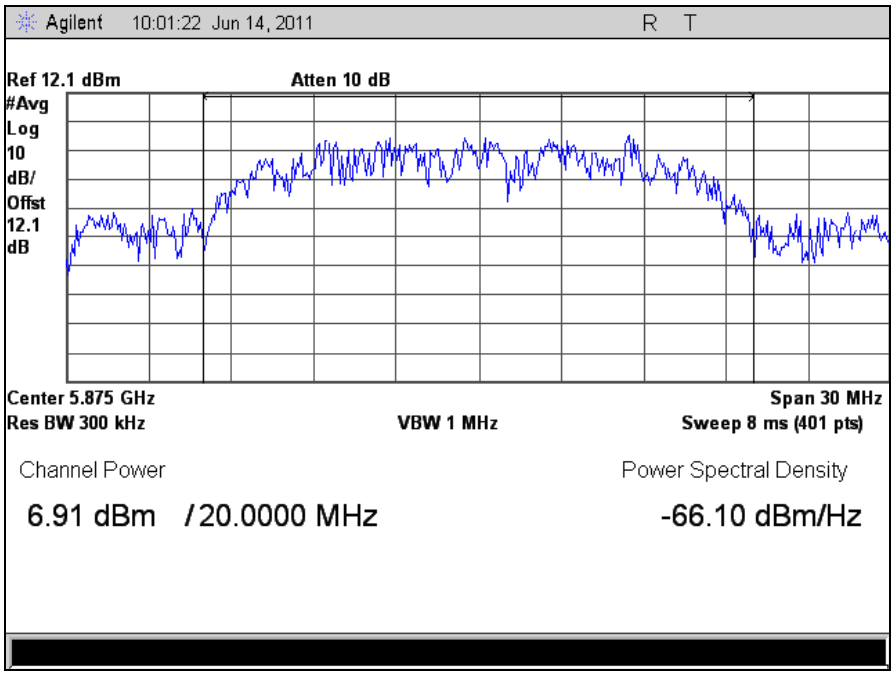


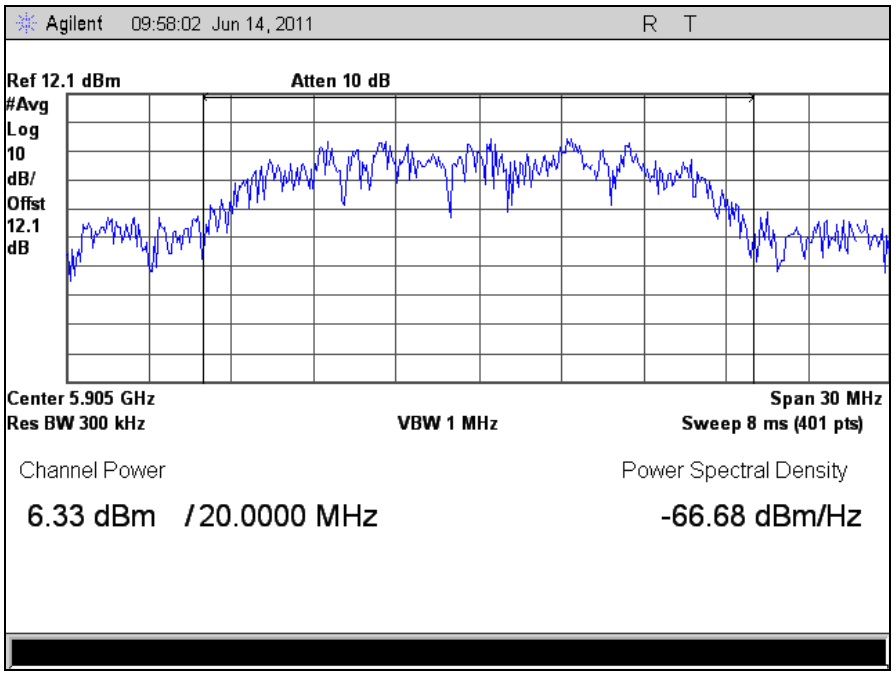
Figure 3. RF Power Output Test Setup

Channels	Frequency MHz	Measured Power dBm	Antenna Gain dBi	EIRP dBm	EIRP Limit dBm
Low	5875	6.91	16	22.91	23
High	5905	6.33	16	22.33	23

Table 4. RF Power Output, Test Results



Plot 1. Output Power, Low Channel



Plot 2. Output Power, High Channel

Electromagnetic Compatibility Occupied Bandwidth Requirements

3.2. Occupied Bandwidth (Emission Mask)

Test Requirement(s): **§2.1049 and §90.210 with FCC 04-265 (Emissions Mask)**

Test Procedures: As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made at the RF output terminals using a Spectrum Analyzer.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer via attenuator. The measured highest Average Power was set relative to zero dB reference. The RBW of the Spectrum Analyzer was set to at least 1% of the channel bandwidth. The EUT power was adjusted at the maximum output power level. Measurements were carried out at Channel 175 and 181.

The Mask was generated from ASTM E2213-03(2010). Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications.

Device Class	Maximum Device Output Power, dBm
A	0
B	10
C	20
D	28.8 or more

Figure 4. DSRC Device Classes and Transmit Power Levels

Class	± 4.5-MHz Offset	± 5.0-MHz Offset	± 5.5-MHz Offset	± 10-MHz Offset	± 15-MHz Offset
Class A	0	-10	-20	-28	-40
Class B	0	-16	-20	-28	-40
Class C	0	-26	-32	-40	-50
Class D	0	-35	-45	-55	-65

Figure 5. DSRC Spectrum Mask Table

Test Results: Equipment falls under Class C and complies with Section 8.92 of ASTM E2213-03(2010). The EUT does not exceed the Emission Masks limit.

The following pages show measurements of Occupied Bandwidth and Emission Mask plots.

Test Engineer(s): Anderson Soungpanya

Test Date(s): 06/20/11

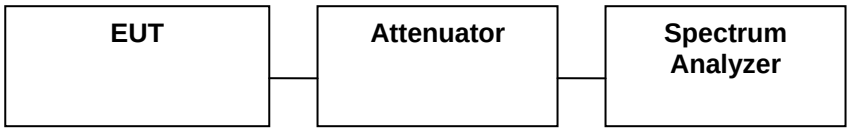
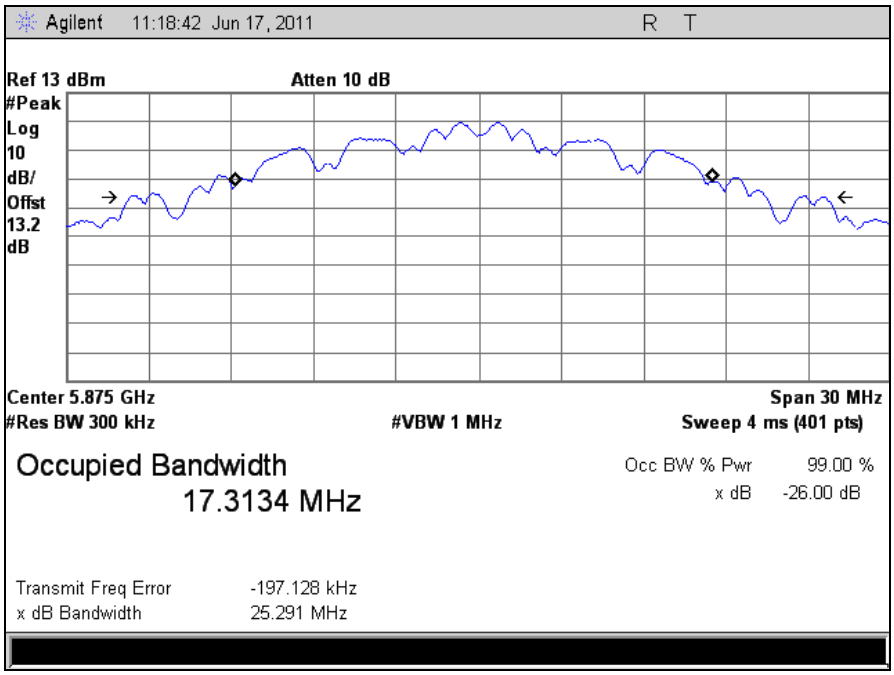
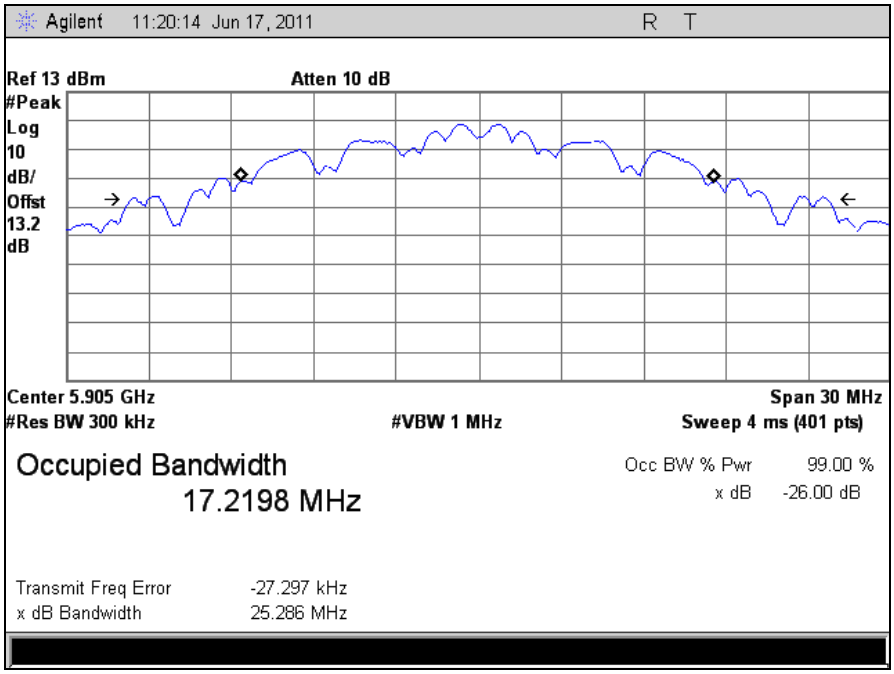


Figure 6. Occupied Bandwidth/Mask Test Setup

Occupied Bandwidth

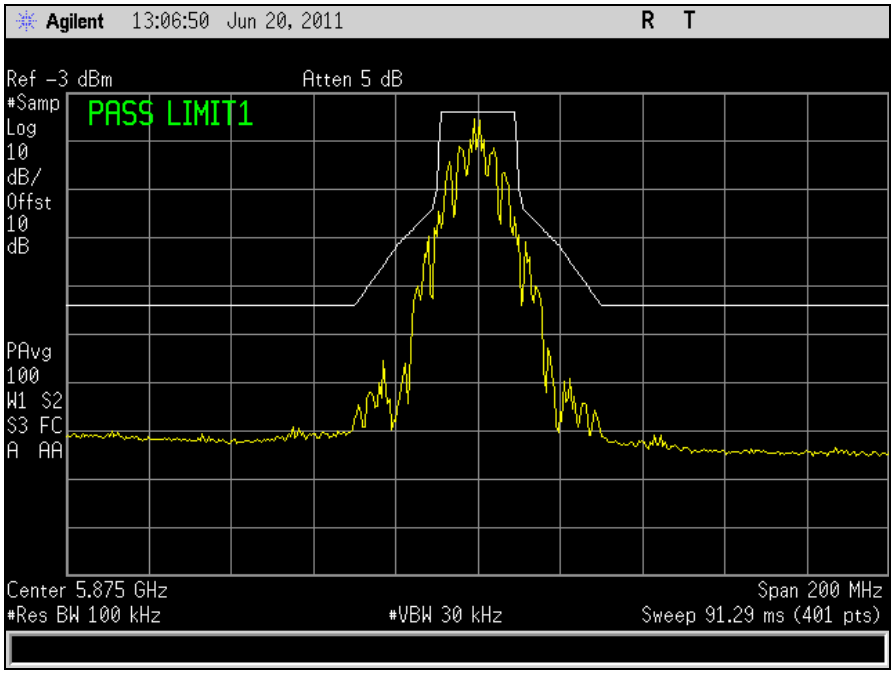


Plot 3. Occupied Bandwidth, Low Channel



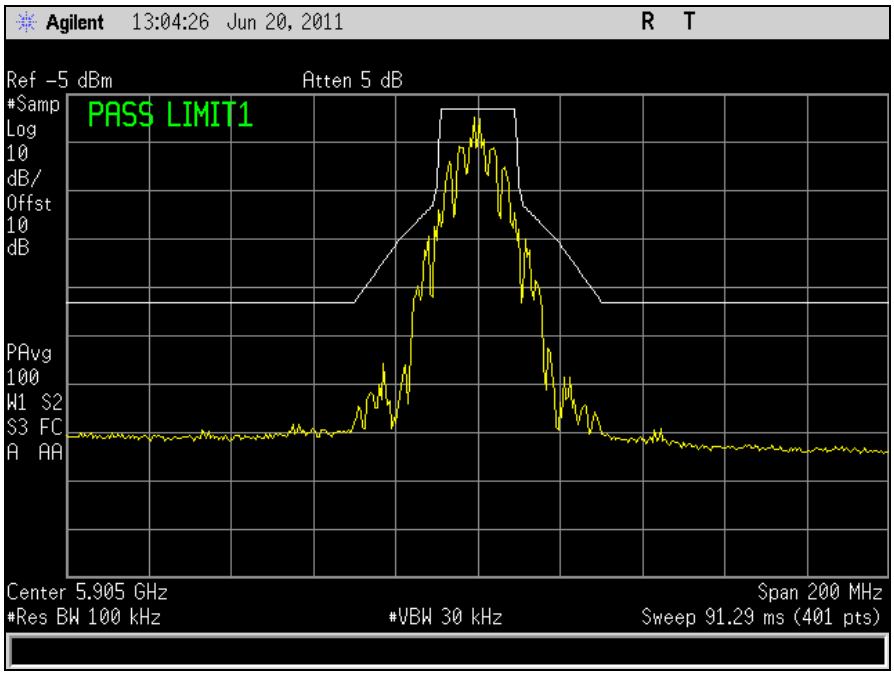
Plot 4. Occupied Bandwidth, High Channel

In-Band Emission Mask

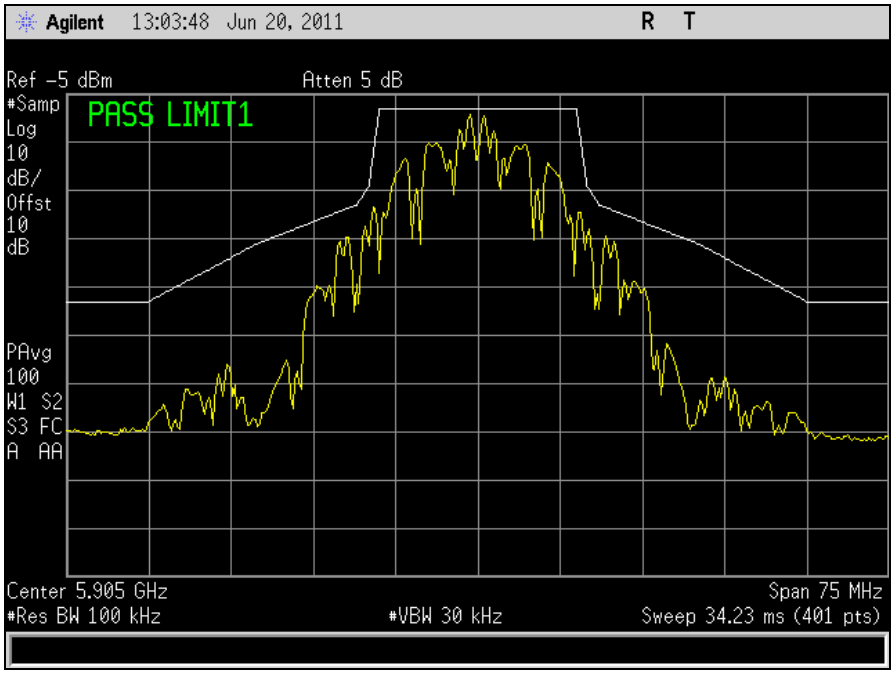


Plot 5. In-Band Emission Mask, Low Channel (200 MHz Span)

Plot 6. In-Band Emission Mask, Low Channel



Plot 7. In-Band Emission Mask, High Channel (200 MHz Span)



Plot 8. In-Band Emission Mask, High Channel

Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements

3.3. Spurious Emissions at Antenna Terminals

Test Requirement(s): **§2.1051 and §90.210 with FCC 04-265**

Test Procedures: As required by 47 CFR 2.1051, *spurious emissions at antenna terminal measurements* were made at the RF output terminals using a Spectrum Analyzer.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer and a Power Meter to monitor the output power level. The Spectrum Analyzer was set to sweep 30 MHz and up to 10th harmonic of the fundamental or 40GHz whichever is the lesser. Measurements were made at channel 171 and 185.

The Conducted Spurious Emissions *Limit* is obtained by the following plots.

Test Results: Equipment complies with Section 2.1051 and 90.210 with FCC 04-265 & ASTM E2213-03(2010).

Test Engineer(s): Anderson Soungpanya

Test Date(s): 06/20/11

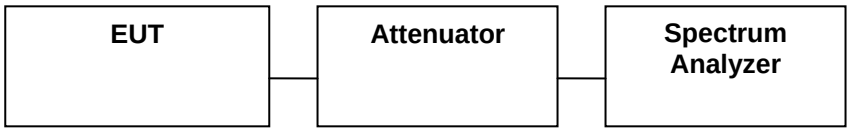
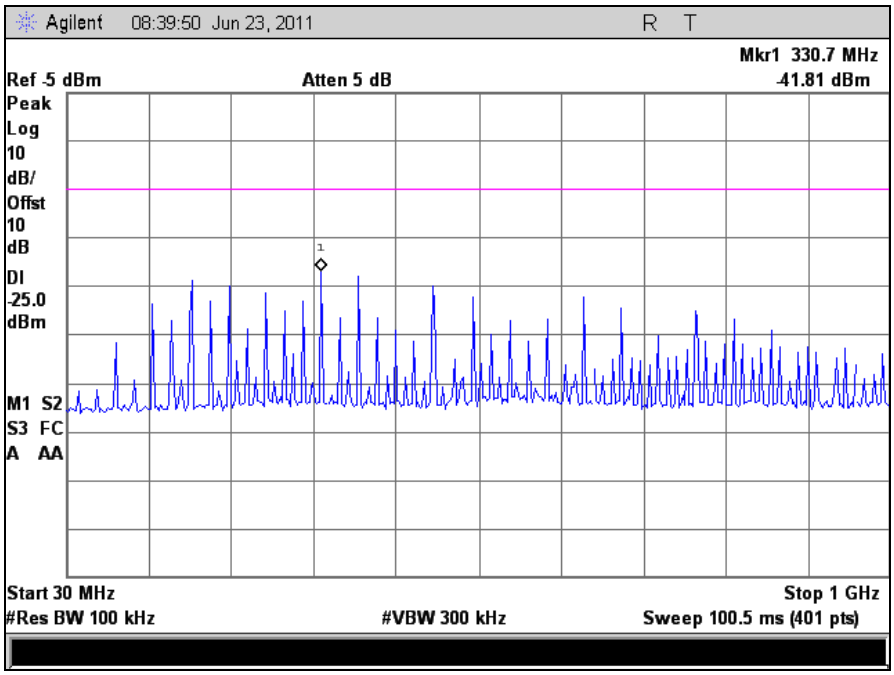
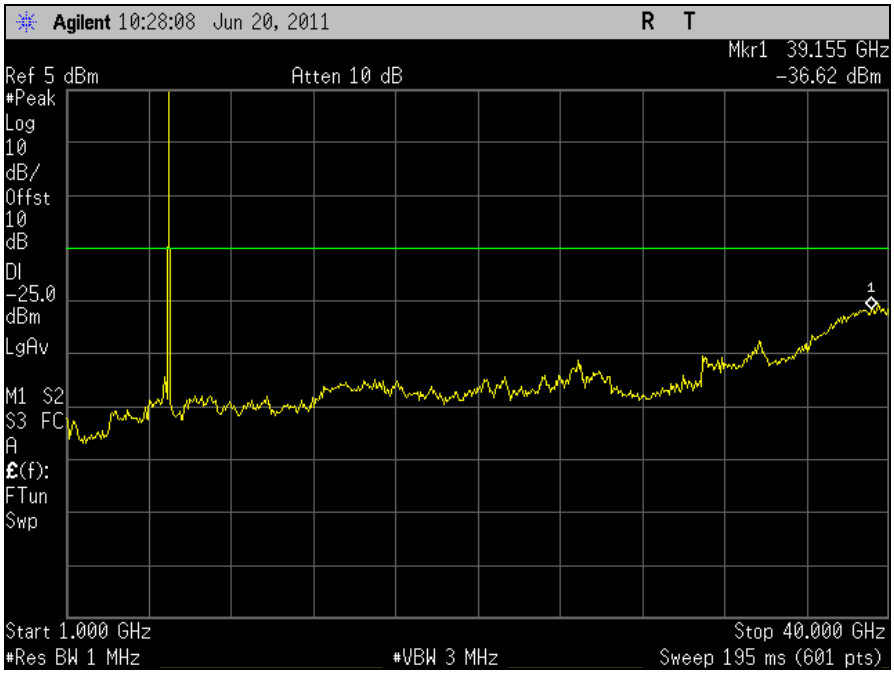


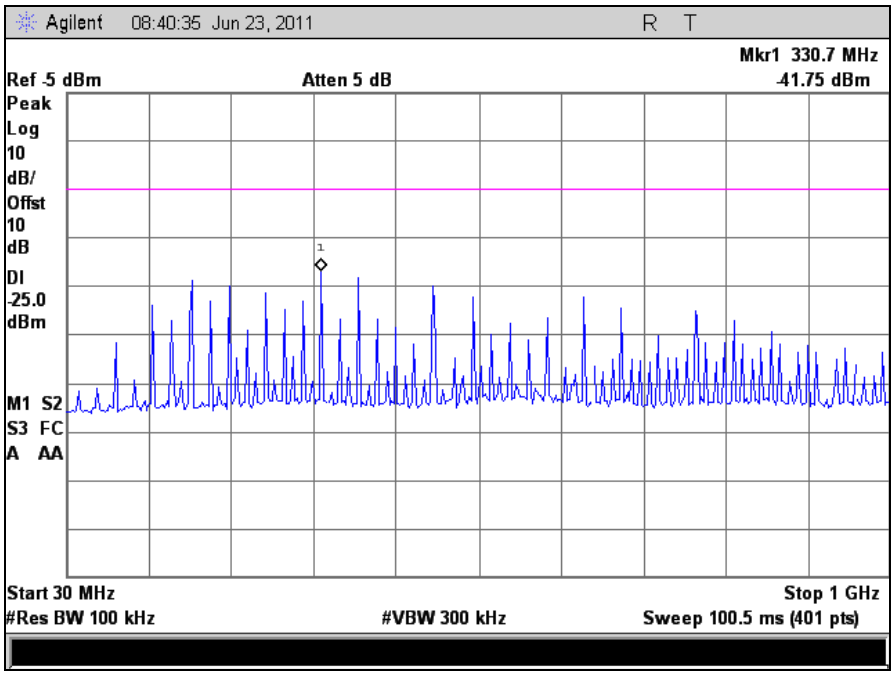
Figure 7. Spurious Emissions at Antenna Terminals Test Setup



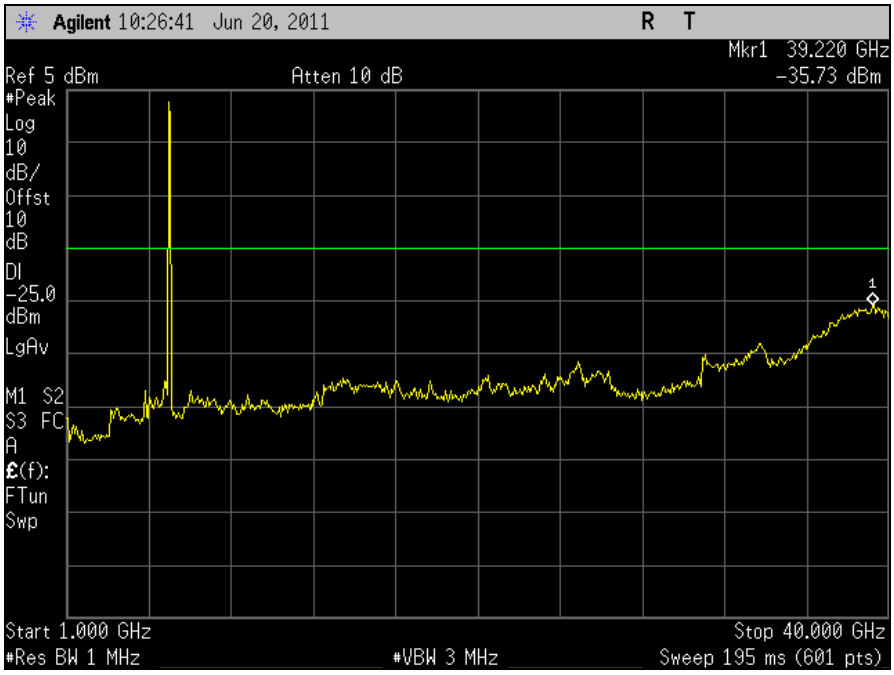
Plot 9. Conducted Spurious Emissions, Low Channel, 30 MHz – 1 GHz



Plot 10. Conducted Spurious Emissions, Low Channel, 1 GHz – 40 GHz



Plot 11. Conducted Spurious Emissions, High Channel, 30 MHz – 1 GHz



Plot 12. Conducted Spurious Emissions, High Channel, 1 GHz – 40 GHz

Electromagnetic Compatibility Radiated Emissions Requirements

3.4. Radiated Emissions

Test Requirement(s): **§2.1053 and §90.210**

Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 10 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360^0 and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10^{th} or 40GHz, which ever was the lesser, were investigated.

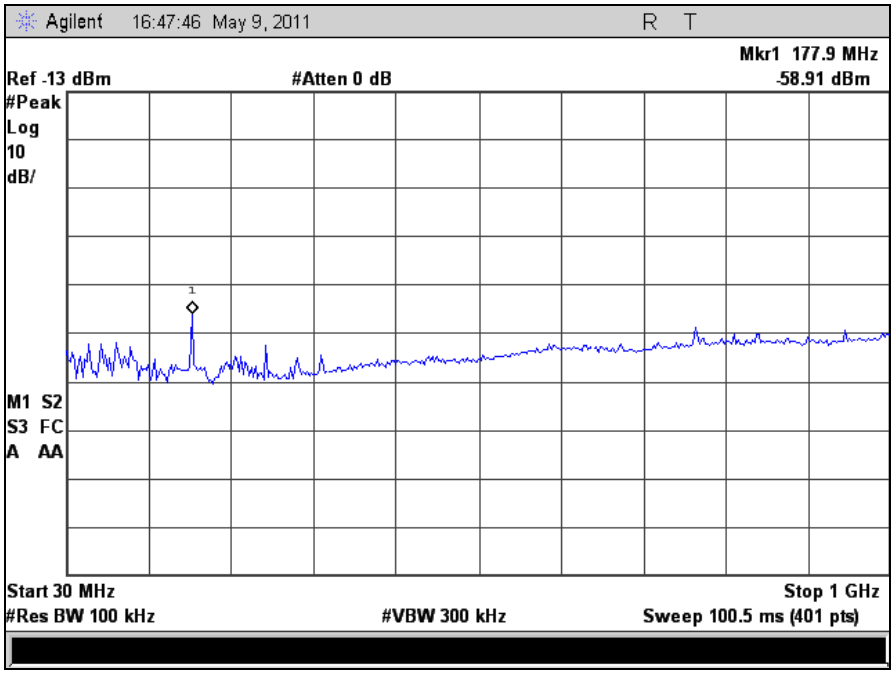
No peaks were found above 18 GHz.

Test Results: Equipment complies with Section 2.1053, 90.210 and ASTM E2213-03(2010).

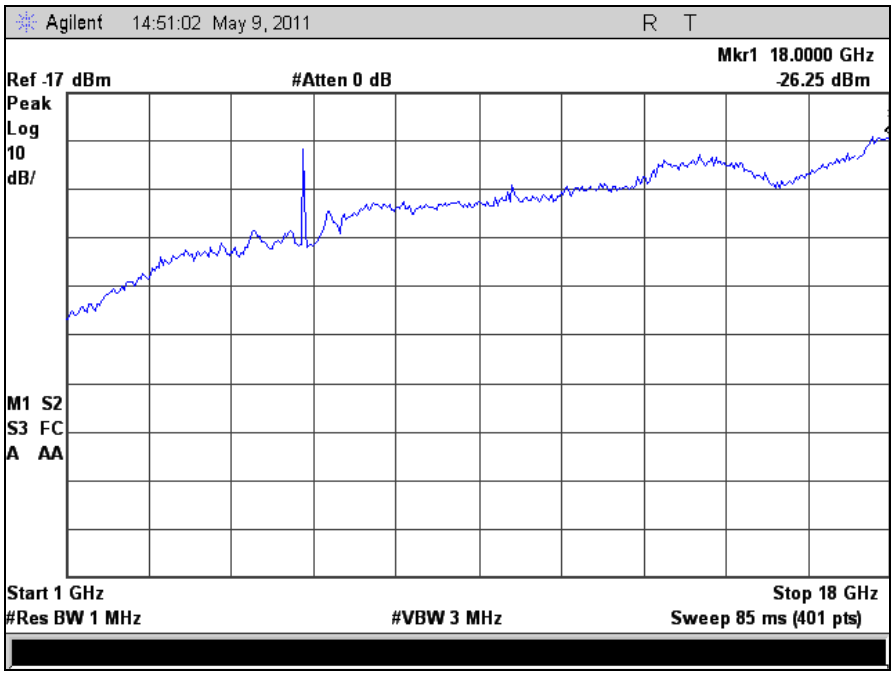
Test Engineer(s): Anderson Soungpanya

Test Date(s): 05/10/11

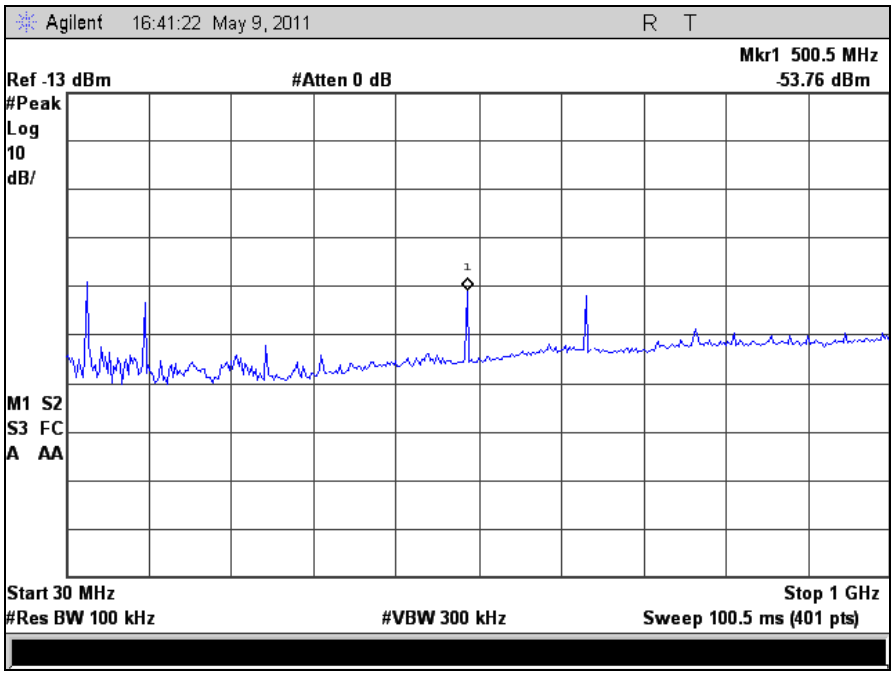
Radiated Emissions Test Results



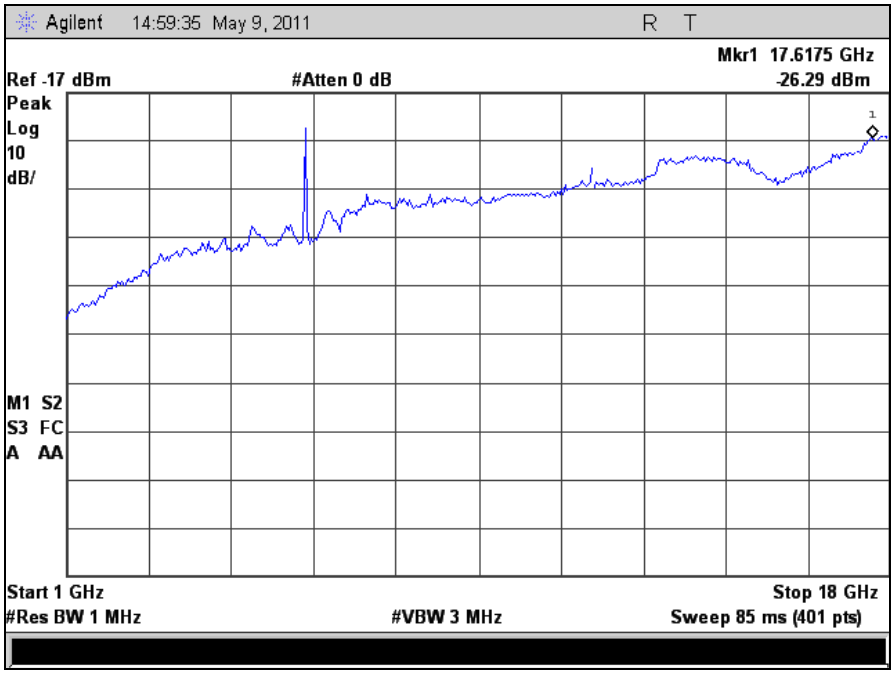
Plot 13. Radiated Spurious Emissions, Low Channel, 30 MHz – 1 GHz



Plot 14. Radiated Spurious Emissions, Low Channel, 1 GHz – 18 GHz



Plot 15. Radiated Spurious Emissions, High Channel 30 MHz – 1 GHz



Plot 16. Radiated Spurious Emissions, High Channel 1 GHz – 18 GHz

Electromagnetic Compatibility Frequency Stability Requirements

3.5. Frequency Stability

Test Requirement(s): **§2.1055 and §90.213**

Test Procedures: As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter.

The EUT was placed in the Environmental Chamber and support equipment are outside the chamber on a table. The EUT was set to transmit a CW signal corresponding to the 20MHz channel of 171 and 185. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations. The 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 -40 to 85^{C}.

Voltage supplied to EUT is 120 VAC reference temperature was done at 20 ^{C}. The voltage was varied by ± 15 % of nominal.

Test Results: Equipment complies with Section 2.1055 and 90.213

Test Engineer(s): Anderson Soungpanya

Test Date(s): 06/22/11

5875 MHz (Low Channel)				
	Voltage (AC)	Temperature (C)	Frequency (MHz)	PPM
Reference	120	85	5875.019300	6.553
	120	80	5875.018300	6.383
	120	70	5875.012100	5.328
	120	60	5875.012200	5.345
	120	50	5874.997400	2.826
	120	40	5874.988500	1.311
	120	30	5874.985800	0.851
	120	20 (Reference)	5874.980800	0.000
	120	10	5874.981900	0.187
5874.980800	120	0	5874.981200	0.068
	120	-10	5874.982100	0.221
	120	-20	5874.981500	0.119
	120	-30	5874.980500	0.051
	120	-40	5874.972300	1.447
	102	20	5874.988300	1.277
	138	20	5874.972300	1.447
5905 MHz (High Channel)				
	Voltage (AC)	Temperature (C)	Frequency (MHz)	PPM
Reference	120	85	5905.124400	7.265
	120	80	5905.114900	5.656
	120	70	5905.111700	5.114
	120	60	5905.109300	4.708
	120	50	5905.097620	2.730
	120	40	5905.092200	1.812
	120	30	5905.082300	0.135
	120	20 (Reference)	5905.081500	0.000
	120	10	5905.081400	0.017
5905.081500	120	0	5905.082300	0.135
	120	-10	5905.083230	0.293
	120	-20	5905.083320	0.308
	120	-30	5905.080320	0.200
	120	-40	5905.072032	1.603
	102	20	5905.073920	1.284
	138	20	5905.069920	1.961

Table 5. Frequency Stability, Test Results

Electromagnetic Compatibility Frequency Stability Requirements

3.6. RF Exposure Requirements

RF Exposure Requirements: **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

RF Radiation Exposure Limit: **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit Calculation: EUT's operating frequencies @ 5875–5905 MHz (20MHz BW) highest conducted power = 6.91 dBm therefore, **Limit for Uncontrolled exposure: 1 mW/cm^2 or 10 W/m^2**

EUT maximum antenna gain = 16 dBi.

Equation from page 18 of OET 65, Edition 97-01

EUT with 16 dBi Antenna

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (1 mW/cm^2)
P = Power Input to antenna (4.91 mW)
G = Antenna Gain (39.81 numeric)

$R = \sqrt{(4.91*39.81)/(4*3.14*1)}$ = **3.94 cm**

$S = (4.91*39.81 / 4*3.14*20.0^2) = (195.43/ 5024)$ = **0.039mW/cm^2**@ 20cm separation

4. 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.

MET Asset #	EQUIPMENT	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2603	HORN ANTENNA	ETS-LINDGREN	3117	5/9/2011	5/9/2012
1S2202	HORN ANTENNA	EMCO	3116	4/23/2010	4/23/2013
1S2583	ANALYZER, SPECTRUM	AGILENT	E4447A	03/18/2011	03/18/2012
1S2460	ANALYZER, SPECTRUM	AGILENT	E4407B	07/13/2010	07/13/2011
1S2482	CHAMBER, 5 METER	PANASHIELD	641431	11/13/2010	11/13/2011
1S2399	TURNTABLE CONTROLLER	SUNOL SCIENCE	SC99V	SEE NOTE	
1S2498	VARIABLE POWER SUPPLY	ISE., INC	5021CT-DVAM	SEE NOTE	
1S2229	TEMPERATURE CHAMBER	TENNY	T6	02/18/2011	02/18/2012
1S2484	BILOG ANTENNA	TESEQ	CBL6112D	2/27/2011	2/27/2012

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

Certification & User's Manual Information

5. Certification Label & User's Manual Information

5.1. Certification 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 M — 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.[1] *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, whichever is applicable.

§ 2.902 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

§ 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.

(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.

5.2. 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 B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) 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 interference when the equipment is operated in a residential 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. 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.

End of Report

