

**COMPLIANCE WORLDWIDE INC.
TEST REPORT 196-07**

In Accordance with the Requirements of
**Federal Communications Commission
CFR 47 Part 95, Subpart H
Low Power Licensed Radio Communication Devices
Wireless Medical Telemetry Service Transceiver
In the bands 1395-1400 and 1427-1432 MHz**

Issued to
**Philips Medical Systems
3000 Minuteman Drive
Andover, MA 01810
978-659-2800**

for

**M2638A 1.4 GHz WMTS ITS Radio Module
with Dual Band Antenna, Part # M3002-66493**

FCC ID: PQC-WMTS-MODULE

Report Issued on May 18, 2007

Tested by



Brian F. Breault

Reviewed by



Larry K. Stillings

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1. Scope

This test report certifies that the Philips M2638A 1.4 GHz WMTS ITS Radio Module with Dual Band Antenna, Part # M3002-66493, as tested, meets the Federal Communications Commission CFR 47, PART 95 requirement. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

2. Product Details

- 2.1 Manufacturer:** Philips Medical Systems
- 2.2 Model Number:** M2638A 1.4 GHz WMTS ITS Radio Module
with Dual Band Antenna, Part # M3002-66493
- 2.3 Serial Number:** Not Specified
- 2.4 Description of EUT:** Radio modules for 1.4 GHz telemetry system with alternate dual-band antenna.
Operating Frequencies: 1395.9, 1397.5, 1399.1, 1427.9, 1429.5, 1431.1 MHz.
- 2.5 Power Source:** DC 12 volts – From external power supply.
- 2.6 EMC Modifications:** None

3. Product Configuration

3.1. Operational Characteristics & Software

The M2638A and MDL4851A are ITS (Instrument Telemetry System) radio modules designed to be mounted on the MPXX family of patient monitors (an MP50 is used in this test plan). The M2638A operates in the 1.4 GHz WMTS band and the MDL4851A operates in the 2.4 GHz ISM band. Both modules combine the radio module with the system PCA, which is the interface for data and power from the Patient Monitor to which it connects, is a single housing, M8003-45201. It can be connected to the MPXX series of monitors through a short pigtail “Y” cable. The pigtail cable has a round DIN connector which plugs into the 12V/LAN/Serial port on the MPXX monitor. On the ITS module end, the cable has an RJ45 plug for data and a 5 mm coaxial power connector for the 12 V DC power input. For the Spurious Radiated Emissions testing, the connections to the ITS for power and data are made through the custom cable, Item E in the System Configuration Block Diagram in Section 4.4 due to the MP50 being a Class A device and it is required that the transmitter portion be Class B compliant.

An MP50 Patient Bedside Monitor will be connected to the ITS modules. The MP50 will have an ECG simulator connected to generate the patient physiological data signals.

3. Product Configuration (continued)

3.2. EUT Hardware

Blk Diag #	Manufctr	Model/Part # / Options	Serial Number	Input Voltage	Frq (Hz)	Description/Function
1	Philips	M2638A/ MDL4851A Equivalent to M4851- 60001	DE505Y0033	+12 V	DC	2.4 GHz ROW ITS Radio Module
2	Philips	M2638A	NSN	+12 V	DC	1.4 GHz WMTS ITS Radio Module
17	Philips	M3002-66493	NSN	NA	NA	Dual band PCB antenna

3.3. EUT Hardware/Software/Firmware Revision Level

EUT Model#	PCA#	Description	HW	SW	FW
MDL4851A	NA	2.4 GHz ITS ROW radio module	unknown	unknown	A.01.03
MDL4851A	M8090-66491	Data/Power PCA	unknown	unknown	Unknown
M2638A	M4840-63100	1.4 GHz WMTS Radio PCA Set	Unknown	Unknown	unknown

3.4. EUT Cables/Transducers

Blk Diag Ltr	Manufacturer	Model/Part #	Length (m)	Shield Y/N	Description/Function
NA	OEM-unknown	M8058-61001	0.1	N	6 conductor ribbon cable-internal
C	OEM-unknown		0.3	N	Data/power pigtail cable from Bedside monitor to the radio module
E	Philips R&D	N/A	0.9	N	Data/power assembly-provided by PMD R&D- custom cable connecting Optical isolator DB9 to the ITS through a "Y" cable with additional leads from the ITS to the +12 V DC supply

3.5. Support Equipment

Blk Diag #	Manufctr	Model/Part # Options	Serial Number	Input Voltage	Input Frq.	Description/Function
3	HP	6205C	2411A-08043	104-127 V	48-440 Hz	Power Supply for ITS Radio Module
4	Philips	M4852A/ 862232/ NA Ref #453564039961	US52400262	48 V	DC	2.4 GHz ROW Access Point
5	Philips	M4843AA/ 862232/ NA Ref #453564036551	RO71000231	48 V	DC	1.4 GHz WMTS Access Point
6	Philips	M4844A/ 862114/ NA	US34300035	100-240 V	50-60 Hz	Philips Telemetry II Synchronization box
7	Power Dsine	M4845A/ 862152/ NA	MO438680955 7276003	100-240 V	50-60 Hz	Power-Over-Ethernet hub
8	Cisco	2950 Catalyst	F0C0816X1S4	100-240 V	50-60 Hz	10/100 Base-T switch
9	Philips	M3171A/ 862117	756005AG- 520D03	100-240 V	50-60 Hz	Access Point Controller

3. Product Configuration (continued)

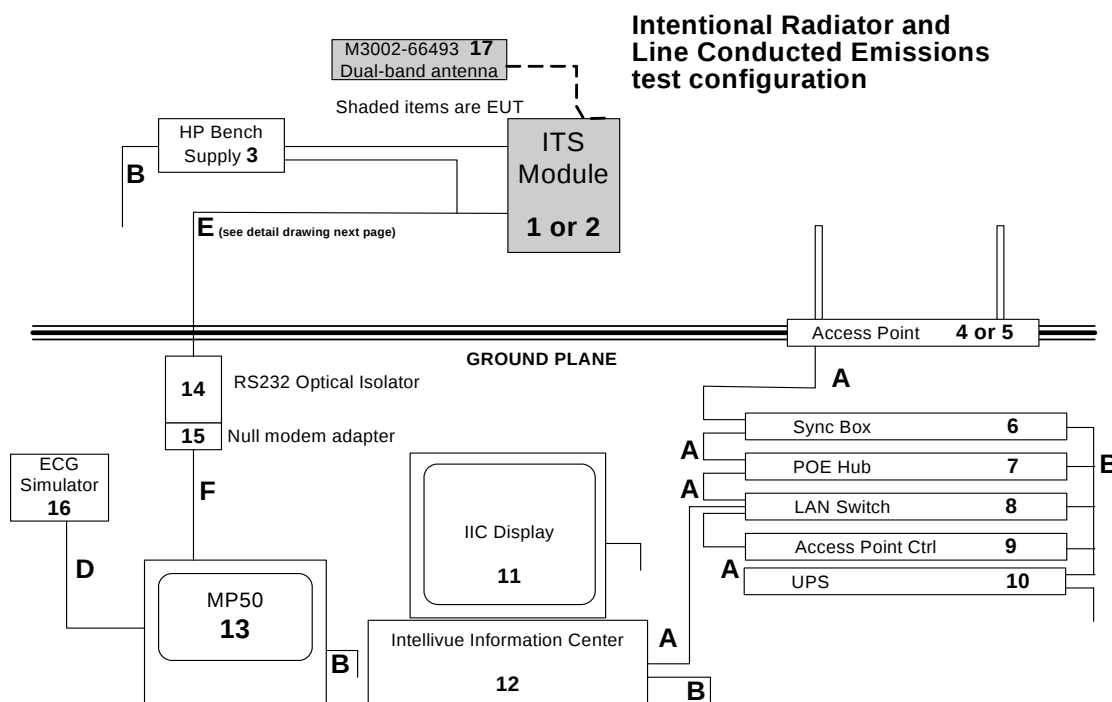
3.5. Support Equipment (continued)

Blk Diag #	Manufctr	Model/Part # Options	Serial Number	Input Voltage	Input Frq.	Description/Function
10	Tripplite	SMART500RT1U		120 V	60 Hz	UPS
11	HP	109P20/74H	47517133	100-240 V	50-60 Hz	Display for IntelliVue Information Center
12	Philips	M3167-60003	USU32301H2	100-240 V	50-60 Hz	INTELLIVUE Information Center (HP PC)
13	Philips	MP50	DE44010453	100-240 V	50-60 Hz	Bedside Patient Monitor
14	BB electronics	9POP4	NA	15 V	DC	RS 232 optical isolator
15	NA	NA	NA	NA	NA	Null modem adapter
16	Bio-Tek	Lionheart 2	125006	9 V	DC	Multi-parameter patient simulator

3.6. Support Equipment Cables/Transducers

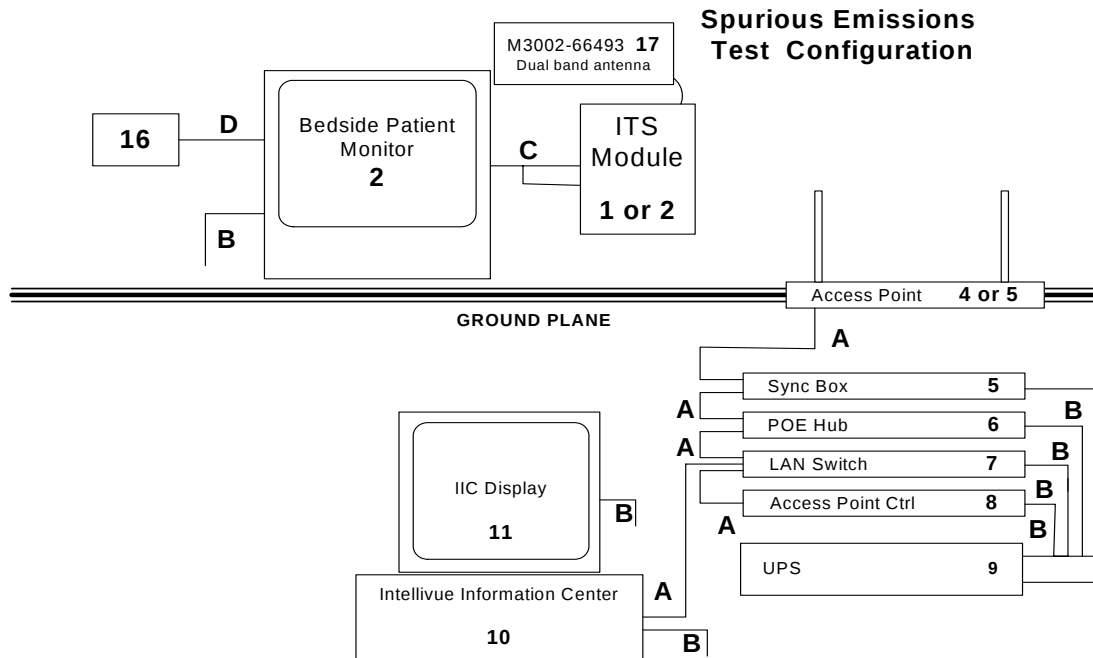
Blk Diag Ltr	Manufctr	Model/Part #	Length (m)	Shield Y/N	Description/Function
A	N/A	N/A	Various	N	Category 5 UTP LAN cable
B	N/A	N/A	2	N	AC power cords
D	Philips		2	N	ECG lead set

3.7. Block Diagram 1 – Intentional Radiator and Line Conducted Configuration

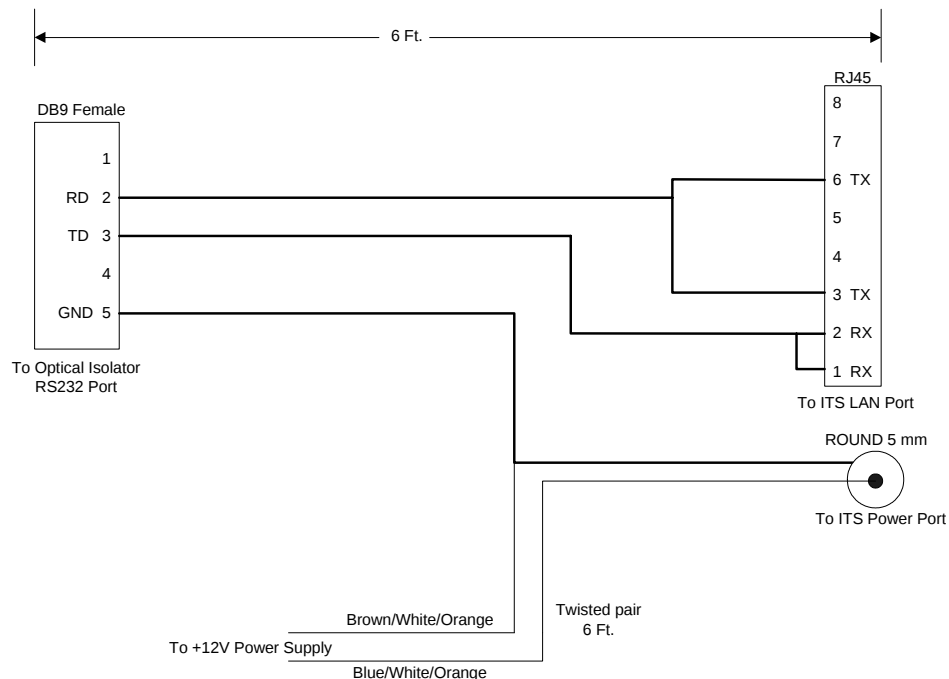


3. Product Configuration (continued)

3.8. Block Diagram 2 – Spurious Emissions Configuration



3.9. Detail drawing for Cable E in Section 3.7 System Configuration Block Diagram



4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due
EMI Receiver	Hewlett Packard	8546A	3650A00360	3/14/2008
Spectrum Analyzer	Hewlett Packard	8593E	3829A03887	3/8/2008
Microwave Preamp	Hewlett Packard	8449B	3008A01323	9/21/2008
Bilog Antenna	Com-Power	AC220	25509	7/31/2007
Horn Antenna	Electro-Metrics	EM-6961	6337	8/25/2007
LISN	EMCO	3825/2	9109-1860	1/11/2008

4.2. Measurement & Equipment Setup

Test Date:	May 16, 2007
Test Engineer:	Brian Breault
Normal Site Temperature (15 - 35°C):	24.0
Relative Humidity (20 -75%RH):	33%
Frequency Range:	30 MHz to 16 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	120 kHz - 30 MHz to 1 GHz
	1 MHz - Above 1 GHz
EMI Receiver Avg Bandwidth:	300 kHz - 30 MHz to 1 GHz
	3 MHz - Above 1 GHz
Detector Function:	Peak, QP - 30 MHz to 1 GHz
	Peak, Avg - Above 1 GHz
	Unless otherwise specified.

4.3. Test Procedure

All references to CFR 47 PART 95, Subpart H - Wireless Medical Telemetry Service (WMTS) - refer to the 10-1-05 edition.

The test methods used to generate the data in this test report is in accordance with ANSI C63.4: 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

In accordance with ANSI C63.4-2003, section 13.1.4.1, c, the device under test was rotated through three orthogonal axes to determine which attitude produced the highest emission relative to the limit. The attitude that produced the highest emission relative to the limit was used for all radiated emission measurements.

4.4. Measurement Uncertainty

The following uncertainties are expressed for an expansion/coverage factor of K=2.

RF Frequency	$\pm 1 \times 10^{-8}$
Radiated Emission of Transmitter	± 4.55 dB
Radiated Emission of Receiver	± 4.55 dB
Temperature	$\pm 0.91^{\circ}$ C
Humidity	$\pm 5\%$

5. Choice of Equipment for Test Suits

5.1 Choice of Model

This test report is based on the test samples supplied by the manufacturer and are reported by the manufacturer to be equivalent to the production units.

5.2 Presentation

This test sample was tested complete with all required ancillary equipment. Refer to Section 3 of this report for product equipment configuration.

5.3 Choice of Operating Frequencies

The choice of operating frequencies selected for the testing outlined in this report was based on the lowest and highest operating frequencies in each of the two bands utilized by the device under test. The frequencies selected were 1395.8 MHz, 1399.1 MHz, 1427.9 MHz and 1431.1 MHz.

6. Measurement Summary

Transmitter Test Requirement	FCC Requirement	Test Report Section	Result	Comment
Product Labeling	95.1109(b)	N/A	N/A	See exhibits FCC label sample and label location.
Emission Type	95.115(c)	N/A	N/A	Transmits Data and ECG Waveform
Frequency Stability	95.115(e)	N/A	N/A	Data Provided By Philips Medical
RF Safety	95.1125	N/A	N/A	Statement and Technical Basis
Radiated Field Strength of Fundamental	95.115(a)(2)	7.1	Compliant	
Radiated Field Strength of Harmonics	95.115(a)(2)	7.2	Compliant	
Occupied Bandwidth	95.1111(a)(2)	7.3	Compliant	
Band Edge Measurements	95.1115(b)(2)	7.4	Compliant	
Spurious Radiated Emissions	95.115(b)	7.5	Compliant	
Conducted Emissions	15.207	7.6	Compliant	
Determination of Average Factor	15.35 (c)	7.7		Meets requirement

7. Measurement Data

7.1. Radiated Field Strength of Fundamental

Requirement: In the 1395–1400 MHz and 1427–1429.5 MHz bands, the maximum allowable field strength is 740 mV/m (117.4 dB μ V/m), as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth.

Channel	Freq (MHz)	Peak Amp (dB μ V/m)	Avg Amp (dB μ V/m)	Avg Limit (dB μ V/m)	Avg Margin (dB)
1	1395.9	104.8	67.6	117.4	-49.8
3	1399.1	106.3	69.1	117.4	-48.3
4	1427.9	106.4	69.3	117.4	-48.1
6	1431.1	106.5	69.3	117.4	-48.1

7.1.1. Channel 1



196-07 Rad. Field Strength of Fundamental - Chan 1

FREQ 1.396 GHz
PEAK 104.8 dB μ V
QP NOT SELECTED
AVG 67.6 dB μ V

LOG REF 110.0 dB μ V

5

dB/

#ATN

30 dB

MA SB

SC FC

ACORR

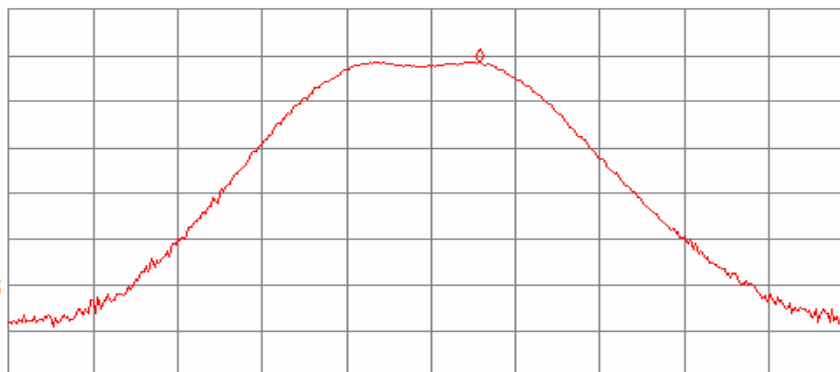
CENTER 1.395900 GHz

L #JF BW 1.0 MHz

#AVG BW 3 MHz

SPAN 5.000 MHz

SWP 20.0 msec



7. Measurement Data (continued)

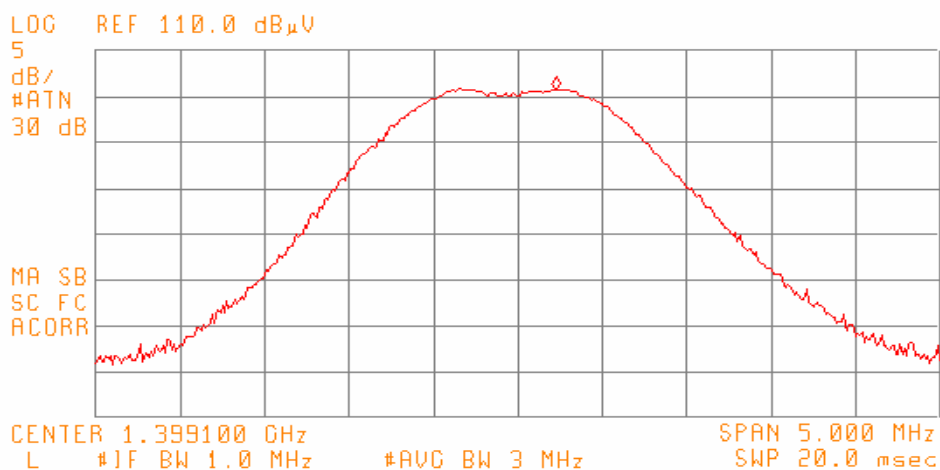
7.1. Radiated Field Strength of Fundamental (continued)

7.1.2. Channel 3



196-07 Rad. Field Strength of Fundamental - Chan 3

FREQ 1.399 GHz
PEAK 106.3 dB μ V
QP NOT SELECTED
AVG 69.1 dB μ V



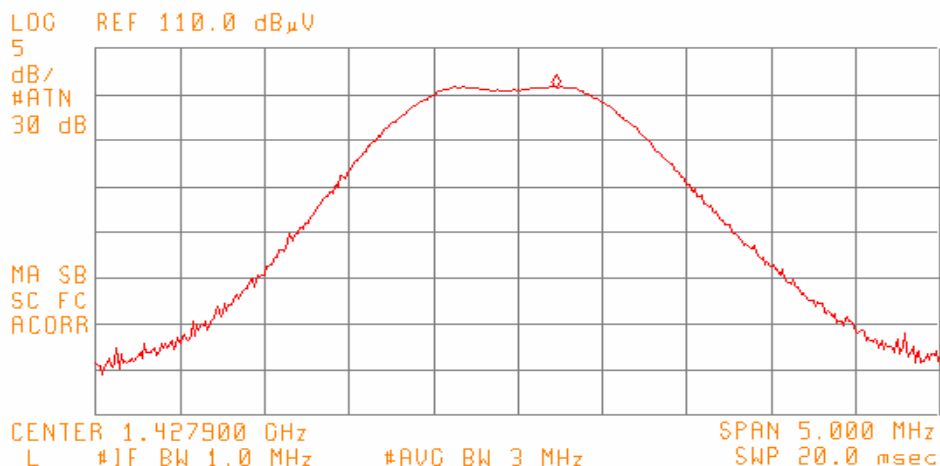
7.1.3. Channel 4



196-07 Rad. Field Strength of Fundamental - Chan 4

CENTER
1.427900 GHz

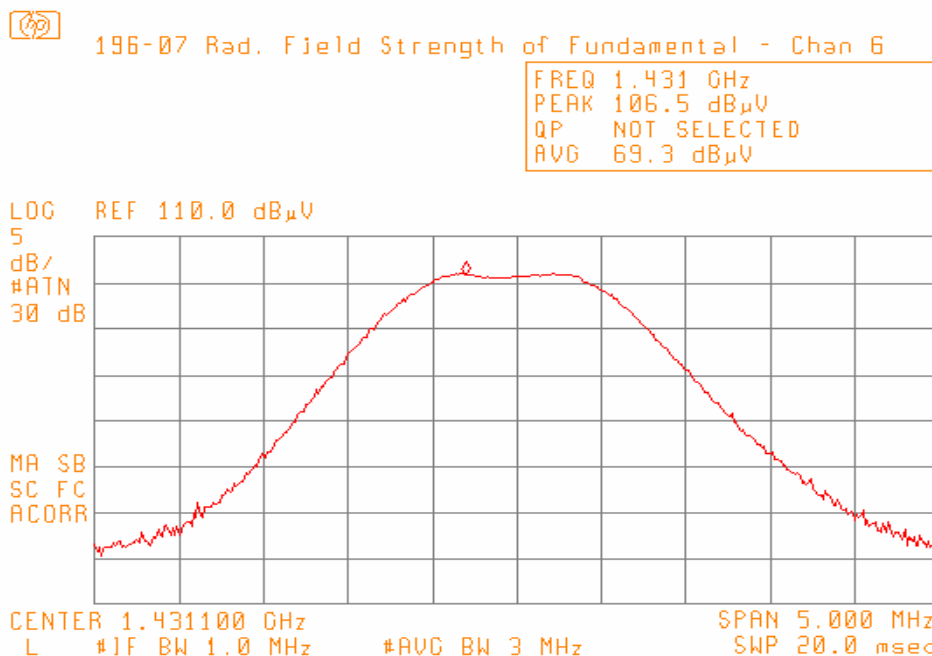
FREQ 1.428 GHz
PEAK 106.4 dB μ V
QP NOT SELECTED
AVG 69.3 dB μ V



7. Measurement Data (continued)

7.1. Radiated Field Strength of Fundamental (continued)

7.1.4. Channel 6



Note: Due to the low duty cycles, the difference between the peak to average measurements of the fundamental frequencies are greater than 20 dB. However, the peak emissions do not exceed the average limit.

With respect to the spurious emissions tabled on the following pages, the peak values do not exceed the average limits by more than 20 dB

7. Measurement Data (continued)

7.2. Radiated Field Strength of Harmonics

7.2.1. Channel 1, 1395.9 MHz

Frequency (MHz)	Amplitude (dBμV)		Corr. Fact. (dB)	Amplitude (dBμV/m)		Avg Limit	Margin (dB)	Ant Pol	Ant Ht	TT Pos	Result
	Peak	Avg		Peak	Avg			H/V	cm	Deg	
2791.800 ¹	58.33	38.33	-3.96	54.37	34.37	54	-19.63	H	115	44	Passed
4187.700 ¹	48.60	28.60	1.45	50.05	30.05	54	-23.95	H	116	42	Passed
5583.600	49.49	29.49	3.80	53.29	33.29	54	-20.71	H	115	42	Passed
6979.500	47.69	27.69	7.72	55.41	35.41	54	-18.59	Noise Floor			Passed
8375.400 ¹	49.11	29.11	8.40	57.51	37.51	54	-16.49	Noise Floor			Passed
9771.300	49.44	29.44	8.21	57.65	37.65	54	-16.35	Noise Floor			Passed
11167.200 ¹	48.11	28.11	11.35	59.46	39.46	54	-14.54	Noise Floor			Passed
12563.100 ¹	48.18	28.18	16.02	64.20	44.20	54	-9.80	Noise Floor			Passed
13959.000	48.33	28.33	19.38	67.71	47.71	54	-6.29	Noise Floor			Passed

¹ Frequency falls within the Restricted Bands of Operation. See FCC Part 15, Section 15.205 for additional information.

7.2.2. Channel 3, 1399.1 MHz

Frequency (MHz)	Amplitude (dBμV)		Corr. Fact. (dB)	Amplitude (dBμV/m)		Avg Limit	Margin (dB)	Ant Pol	Ant Ht	TT Pos	Result
	Peak	Avg		Peak	Avg			H/V	cm	Deg	
2798.200 ¹	53.14	33.14	-3.99	49.15	29.15	54	-24.85	H	113	45	Passed
4197.300 ¹	48.33	28.33	0.77	49.10	29.10	54	-24.90	H	115	285	Passed
5596.400	49.64	29.64	3.76	53.40	33.40	54	-20.60	H	113	45	Passed
6995.500	47.49	27.49	8.57	56.06	36.06	54	-17.94	Noise Floor			Passed
8394.600 ¹	47.91	27.91	8.86	56.77	36.77	54	-17.23	Noise Floor			Passed
9793.700	49.28	29.28	9.49	58.77	38.77	54	-15.23	Noise Floor			Passed
11192.800 ¹	48.92	28.92	14.16	63.08	43.08	54	-10.92	Noise Floor			Passed
12591.900 ¹	48.04	28.04	16.08	64.12	44.12	54	-9.88	Noise Floor			Passed
13991.000	48.04	28.04	19.18	67.22	47.22	54	-6.78	Noise Floor			Passed

¹ Frequency falls within the Restricted Bands of Operation. See FCC Part 15, Section 15.205 for additional information.

7. Measurement Data (continued)

7.2. Radiated Field Strength of Harmonics (continued)

7.2.3. Channel 4, 1427.9 MHz

Frequency (MHz)	Amplitude (dBμV)		Corr. Fact. (dB)	Amplitude (dBμV/m)		Avg Limit	Margin (dB)	Ant Pol	Ant Ht	TT Pos	Result
	Peak	Avg		Peak	Avg			H/V	cm	Deg	
2855.800 ¹	48.46	28.46	-3.87	44.59	24.59	54	-29.41	H	117	44	Passed
4283.700 ¹	47.14	27.14	0.94	48.08	28.08	54	-25.92	H	113	46	Passed
5711.600	47.72	27.72	3.29	51.01	31.01	54	-22.99	H	114	44	Passed
7139.500	48.69	28.69	7.56	56.25	36.25	54	-17.75	Noise Floor			Passed
8567.400	49.17	29.17	8.49	57.66	37.66	54	-16.34	Noise Floor			Passed
9995.300	48.70	28.70	10.52	59.22	39.22	54	-14.78	Noise Floor			Passed
11423.200 ¹	47.50	27.50	14.40	61.90	41.90	54	-12.10	Noise Floor			Passed
12851.100	48.76	28.76	17.13	65.89	45.89	54	-8.11	Noise Floor			Passed
14279.000	48.46	28.46	20.53	68.99	48.99	54	-5.01	Noise Floor			Passed

¹ Frequency falls within the Restricted Bands of Operation. See FCC Part 15, Section 15.205 for additional information.

7.2.4. Channel 6, 1431.1 MHz

Frequency (MHz)	Amplitude (dBμV)		Corr. Fact. (dB)	Amplitude (dBμV/m)		Avg Limit	Margin (dB)	Ant Pol	Ant Ht	TT Pos	Result
	Peak	Avg		Peak	Avg			H/V	cm	Deg	
2862.200 ¹	55.90	35.90	-4.00	51.90	31.90	54	-22.10	H	114	50	Passed
4293.300 ¹	53.49	33.49	1.04	54.53	34.53	54	-19.47	H	115	45	Passed
5724.400	48.23	28.23	3.51	51.74	31.74	54	-22.26	H	114	44	Passed
7155.500	47.61	27.61	8.35	55.96	35.96	54	-18.04	Noise Floor			Passed
8586.600	49.69	29.69	8.52	58.21	38.21	54	-15.79	Noise Floor			Passed
10017.700	48.60	28.60	10.88	59.48	39.48	54	-14.52	Noise Floor			Passed
11448.800 ¹	48.73	28.73	14.46	63.19	43.19	54	-10.81	Noise Floor			Passed
12879.900	48.61	28.61	17.14	65.75	45.75	54	-8.25	Noise Floor			Passed
14311.000	48.82	28.82	20.67	69.49	49.49	54	-4.51	Noise Floor			Passed

¹ Frequency falls within the Restricted Bands of Operation. See FCC Part 15, Section 15.205 for additional information.

7. Measurement Data (continued)

7.3. Occupied Bandwidth

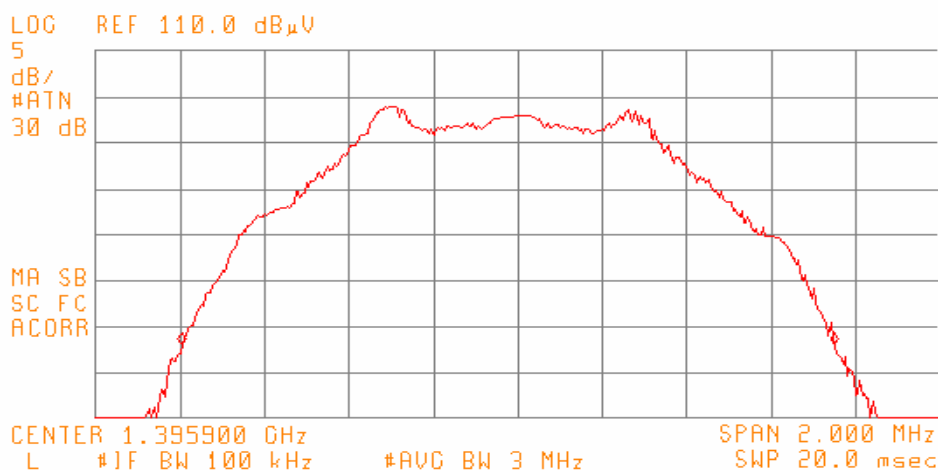
Channel	Freq (MHz)	Occupied Bandwidth (MHz)	Channel	Freq (MHz)	Occupied Bandwidth (MHz)
1	1395.9	1.545	4	1427.9	1.530
3	1399.1	1.555	6	1431.1	1.430

7.3.1. Channel 1, 1395.9 MHz



196-07 Occupied Bandwidth - Chan 1

ACTV DET: PEAK
MEAS DET: PEAK AVG
MKRΔ 1.545 MHz
.15 dB



7. Measurement Data (continued)

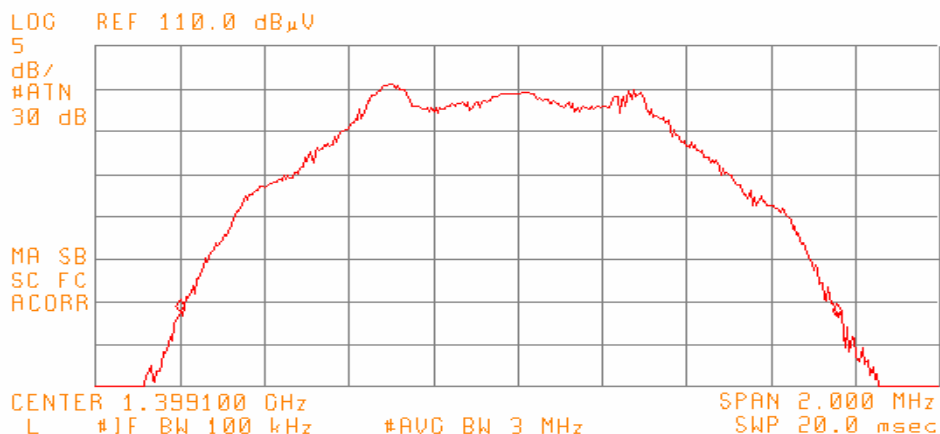
7.3. Occupied Bandwidth (continued)

7.3.2. Channel 3, 1399.1 MHz



196-07 Occupied Bandwidth - Chan 3

ACTV DET: PEAK
MEAS DET: PEAK AVG
MKRΔ 1.555 MHz
-.51 dB

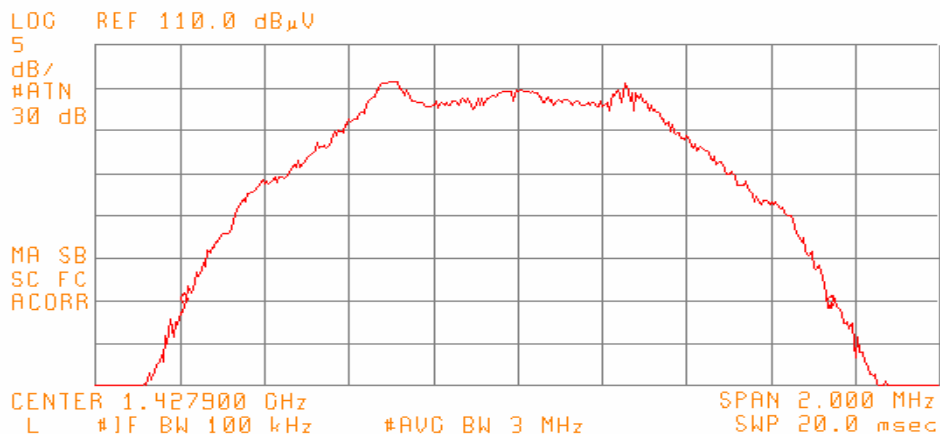


7.3.3. Channel 4, 1427.9 MHz



196-07 Occupied Bandwidth - Chan 4

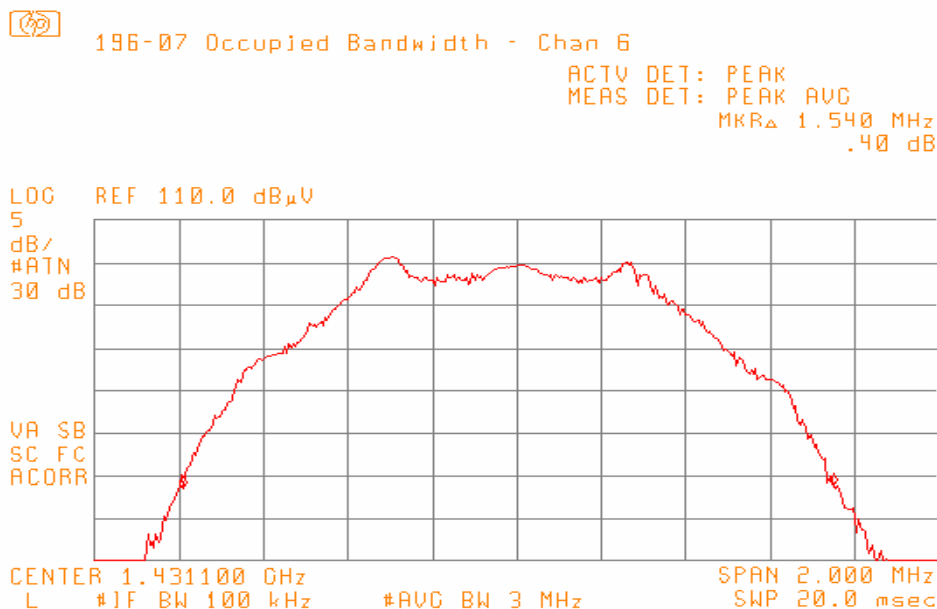
ACTV DET: PEAK
MEAS DET: PEAK AVG
MKRΔ 1.530 MHz
-.33 dB



7. Measurement Data (continued)

7.3. Occupied Bandwidth (continued)

7.3.4. Channel 6, 1431.1 MHz



7.4. Band Edge

Requirement: The band edge measurements were made in accordance with FCC Publication Number 913591: Measurement of Radiated Emissions at the Edge of the Band for a Part 15 RF Device.

Channel	Signal Peak			Band Edge		
	Freq (MHz)	Peak Amp (dBμV/m)	Avg Amp (dBμV/m)	Freq (MHz)	Delta Value (dB)	Avg Amp (dBμV/m)
1	1395.9	104.8	67.6	1395	-48.99	18.61
3	1399.1	106.3	69.1	1400	-50.48	18.62
4	1427.9	106.4	69.3	1427	-52.28	17.02
6	1431.1	106.5	69.3	1432	-51.48	17.82

7. Measurement Data (continued)**7.5. Spurious Radiated Emissions****7.5.1. Regulatory Limit: FCC Part 15, Class B, Quasi-Peak**

Frequency Range (MHz)	Distance (Meters)	Limit (dBµV/m)
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
960 to 1000	3	54.0

7.5.2. Measurement & Equipment Setup

Test Date:	05/07/2007
Test Engineer:	Robert J. McCall
Site Temperature (°C):	20.9
Relative Humidity (%RH):	31
Frequency Range:	30 MHz to 1 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	120 kHz
EMI Receiver Avg Bandwidth:	300 kHz
Detector Functions:	Peak and Quasi-Peak.
Antenna Height:	1 to 4 meters

7.5.3. Test Procedure

Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

7.5.4. Notice: Radiated Emissions > 1 GHz

There were no measurable emissions above 1 GHz other than the transmit frequencies.

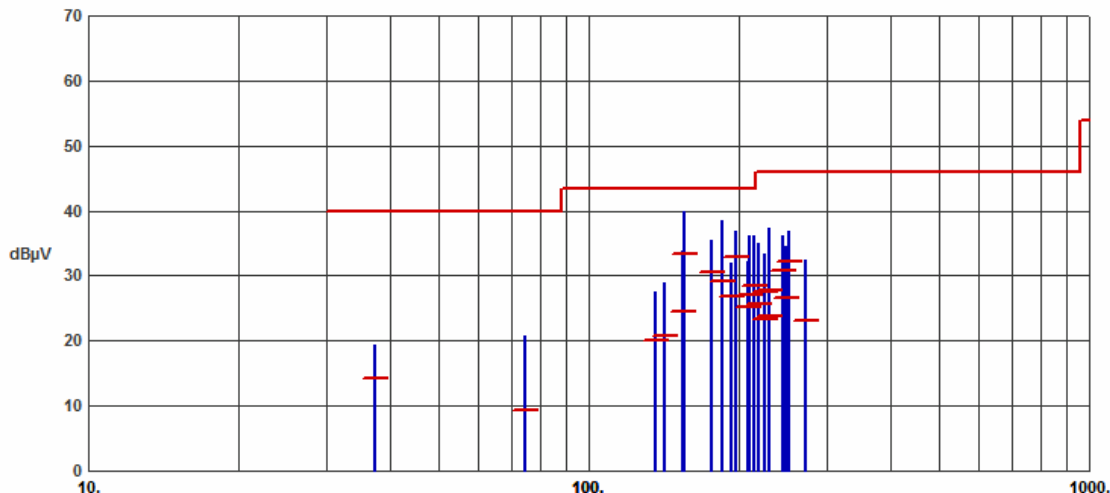
7. Measurement Data (continued)

7.5. Spurious Radiated Emissions (continued)

7.5.5. Horizontal Polarity

Test No.: 196-07, Radiated Emissions - Horizontal Polarity

FCC, Class B



Frequency (MHz)	Pk Amp (dBμV/m)	QP Amp (dBμV/m)	QP Limit (dBμV/m)	Margin (dB)	Ant Ht (cm)	Table (Deg)	Comments
37.3675	19.47	14.22	40.00	-25.78	N/A	N/A	
74.5926	20.67	9.29	40.00	-30.71	N/A	N/A	
135.4728	27.59	19.97	43.50	-23.53	N/A	N/A	
141.6830	29.04	20.83	43.50	-22.67	N/A	N/A	
154.0957	33.90	24.43	43.50	-19.07	N/A	N/A	
155.5158	39.94	33.34	43.50	-10.16	N/A	N/A	
176.2523	35.39	30.67	43.50	-12.83	N/A	N/A	
184.6084	38.56	29.26	43.50	-14.24	N/A	N/A	
192.3541	32.06	26.79	43.50	-16.71	N/A	N/A	
196.9794	36.89	32.81	43.50	-10.69	N/A	N/A	
207.9197	32.28	25.23	43.50	-18.27	N/A	N/A	
210.2316	36.28	27.15	43.50	-16.35	N/A	N/A	
214.2527	36.12	28.51	43.50	-14.99	N/A	N/A	
218.0005	34.90	25.75	46.00	-20.25	N/A	N/A	
218.5786	34.83	25.58	46.00	-20.42	N/A	N/A	
224.0648	33.37	27.48	46.00	-18.52	N/A	N/A	
225.2384	31.48	23.37	46.00	-22.63	N/A	N/A	
229.6542	32.60	23.81	46.00	-22.19	N/A	N/A	
230.1006	37.41	27.83	46.00	-18.17	N/A	N/A	
244.2338	36.18	30.73	46.00	-15.27	N/A	N/A	
247.9690	34.54	26.59	46.00	-19.41	N/A	N/A	
251.1310	36.94	32.21	46.00	-13.79	N/A	N/A	
270.9957	32.47	23.19	46.00	-22.81	N/A	N/A	

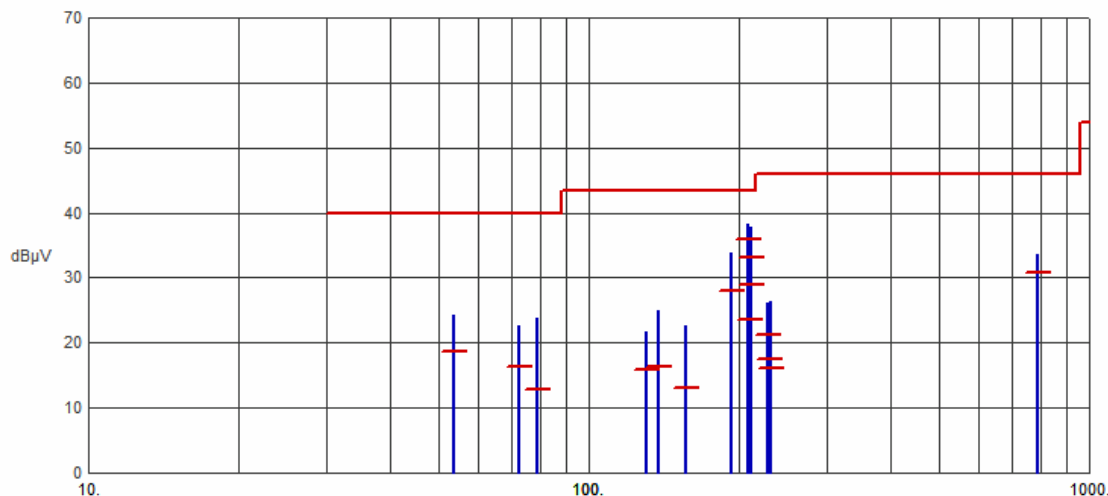
7. Measurement Data (continued)

7.5. Spurious Radiated Emissions (continued)

7.5.6. Vertical Polarity

Test No.: 196-07, Radiated Emissions - Vertical Polarity

FCC, Class B



Frequency (MHz)	Pk Amp (dBμV/m)	QP Amp (dBμV/m)	QP Limit (dBμV/m)	Margin (dB)	Ant Ht (cm)	Table (Deg)	Comments
53.8504	24.16	18.60	40.00	-21.40	N/A	N/A	
72.4785	22.69	16.44	40.00	-23.56	N/A	N/A	
79.0147	23.77	12.93	40.00	-27.07	N/A	N/A	
129.9867	21.80	15.96	43.50	-27.54	N/A	N/A	
138.0483	24.90	16.25	43.50	-27.25	N/A	N/A	
155.9216	22.61	12.97	43.50	-30.53	N/A	N/A	
192.3780	33.94	27.96	43.50	-15.54	N/A	N/A	
207.3674	38.24	35.91	43.50	-7.59	N/A	N/A	
209.9320	33.97	23.59	43.50	-19.91	N/A	N/A	
210.8162	37.81	33.04	43.50	-10.46	N/A	N/A	
211.1072	37.05	28.91	43.50	-14.59	N/A	N/A	
228.1094	26.05	21.22	46.00	-24.78	N/A	N/A	
228.6960	26.10	17.57	46.00	-28.43	N/A	N/A	
230.7497	26.35	16.18	46.00	-29.82	N/A	N/A	
786.4379	33.57	30.76	46.00	-15.24	N/A	N/A	

7. Measurement Data (continued)

7.6. Conducted Emissions

7.6.1. Regulatory Limit: EN55022, Class B

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56 ¹	56 to 46 ¹
0.50 to 5.0	56	46
0.50 to 30	60	50

¹ The limit decreases linearly with the logarithm of the frequency.

7.6.2. Measurement & Equipment Setup

Test Date:	05/07/2007
Test Engineer:	Robert J. McCall
Site Temperature (°C):	24.3
Relative Humidity (%RH):	20
Frequency Range:	0.15 MHz to 30 MHz
EMI Receiver IF Bandwidth:	9 kHz
EMI Receiver Avg Bandwidth:	30 kHz
Detector Functions:	Peak, Quasi-Peak. & Average

7.6.3. Test Procedure

Test measurements were made in accordance with CISPR 22, Section 9: Method of measurement of conducted disturbance at mains terminals and telecommunication ports and ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

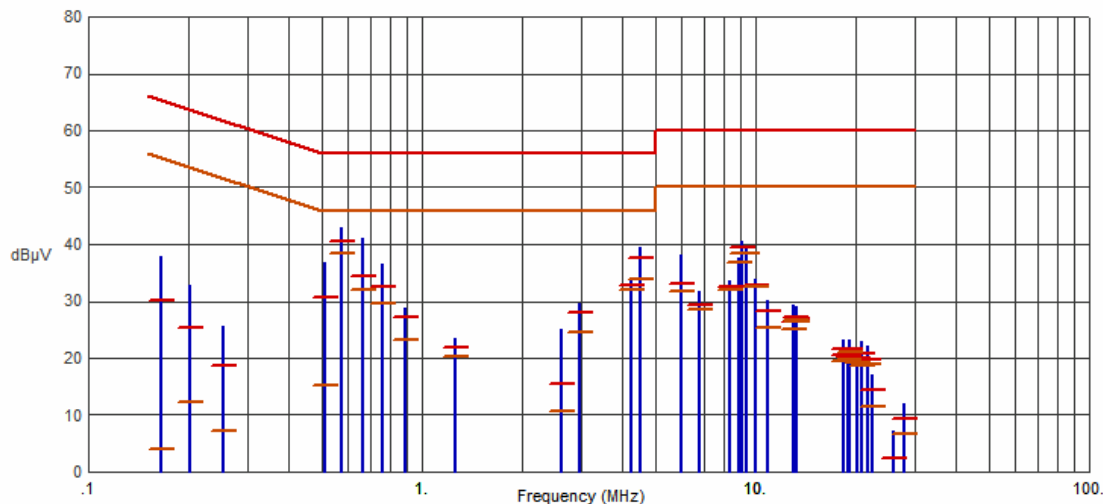
7. Measurement Data (continued)

7.6. Conducted Emissions (continued)

7.6.4. 120 Volts AC – Phase (Power Supply to WMTS ITS Radio Module)

Test No.: 196-07, 120 Volts, 60 Hz Phase

FCC, Class B



Frequency (MHz)	Pk Amp (dBμV)	QP Amp (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Avg Amp (dBμV)	Avg Limit (dBμV)	Avg Margin (dB)	Comments
.1657	37.92	30.12	65.17	-35.05	4.08	55.17	-51.09	
.2016	32.77	25.28	63.54	-38.26	12.23	53.54	-41.31	
.5092	36.89	30.54	56.00	-25.46	15.32	46.00	-30.68	
.5737	42.87	40.48	56.00	-15.52	38.35	46.00	-7.65	
.6665	41.03	34.43	56.00	-21.57	31.95	46.00	-14.05	
.7579	36.64	32.41	56.00	-23.59	29.49	46.00	-16.51	
.8956	28.74	27.18	56.00	-28.82	23.28	46.00	-22.72	
2.9823	29.72	27.89	56.00	-28.11	24.45	46.00	-21.55	
4.2301	34.25	32.70	56.00	-23.30	31.87	46.00	-14.13	
4.5187	39.35	37.47	56.00	-18.53	33.85	46.00	-12.15	
5.9598	38.17	32.98	60.00	-27.02	31.86	50.00	-18.14	
6.8234	31.72	29.23	60.00	-30.77	28.63	50.00	-21.37	
8.3619	33.64	32.42	60.00	-27.58	31.87	50.00	-18.13	
8.9397	37.65	36.87	60.00	-23.13	36.82	50.00	-13.18	
9.1310	40.58	39.57	60.00	-20.43	38.51	50.00	-11.49	
9.4189	39.15	38.50	60.00	-21.50	38.29	50.00	-11.71	
9.9977	33.79	32.91	60.00	-27.09	32.51	50.00	-17.49	
10.8613	30.16	28.20	60.00	-31.80	25.38	50.00	-24.62	
12.9755	29.44	26.51	60.00	-33.49	25.12	50.00	-24.88	
13.1689	28.91	27.25	60.00	-32.75	26.56	50.00	-23.44	
13.2643	29.16	26.99	60.00	-33.01	26.35	50.00	-23.65	
18.8395	21.71	20.26	60.00	-39.74	19.61	50.00	-30.39	
19.2248	23.22	21.68	60.00	-38.32	21.06	50.00	-28.94	
20.8578	22.86	20.68	60.00	-39.32	18.79	50.00	-31.21	
21.7231	22.14	19.86	60.00	-40.14	18.85	50.00	-31.15	
22.3981	17.19	14.52	60.00	-45.48	11.52	50.00	-38.48	
28.0017	12.05	9.26	60.00	-50.74	6.59	50.00	-43.41	

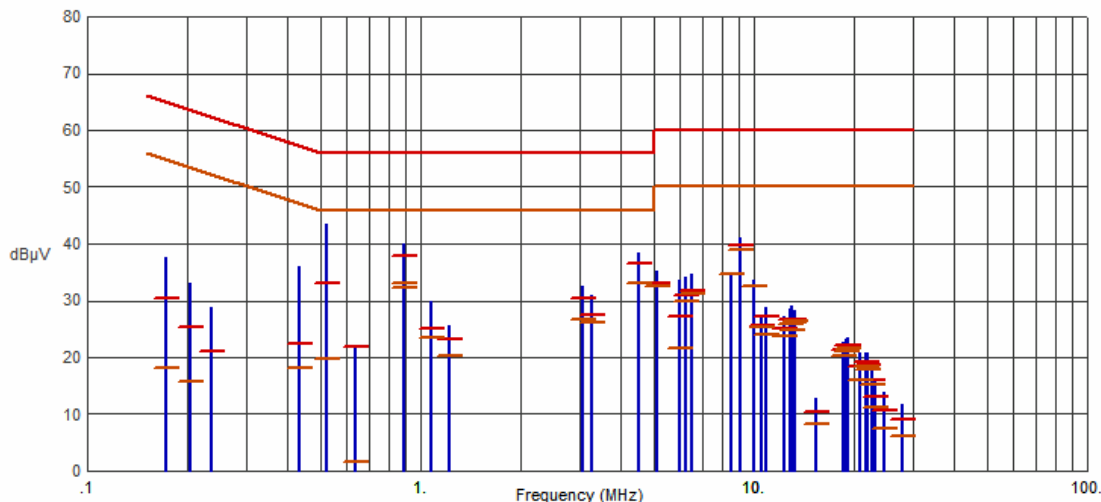
7. Measurement Data (continued)

7.6. Conducted Emissions (continued)

7.6.5. 120 Volts AC - Neutral (Power Supply to WMTS ITS Radio Module)

Test No.: 196-07, 120 Volts, 60 Hz Neutral

FCC, Class B



Frequency (MHz)	Pk Amp (dBμV)	QP Amp (dBμV)	QP Limit (dBμV)	QP Margin (dB)	Avg Amp (dBμV)	Avg Limit (dBμV)	Avg Margin (dB)	Comments
.1729	37.67	30.36	64.82	-34.46	18.11	54.82	-36.71	
.2349	28.72	20.94	62.27	-41.33	-0.34	52.27	-52.61	
.5239	43.46	32.94	56.00	-23.06	19.82	46.00	-26.18	
.6401	21.92	21.92	56.00	-34.08	1.56	46.00	-44.44	
.8953	40.13	37.96	56.00	-18.04	32.94	46.00	-13.06	
.8957	39.76	37.85	56.00	-18.15	32.18	46.00	-13.82	
1.0788	29.91	25.19	56.00	-30.81	23.49	46.00	-22.51	
1.2151	25.62	23.28	56.00	-32.72	20.28	46.00	-25.72	
3.0766	32.47	30.41	56.00	-25.59	26.64	46.00	-19.36	
3.2580	30.84	27.44	56.00	-28.56	26.13	46.00	-19.87	
4.5200	38.44	36.41	56.00	-19.59	32.97	46.00	-13.03	
5.0956	35.19	33.17	60.00	-26.83	32.42	50.00	-17.58	
6.2503	34.06	31.00	60.00	-29.00	29.98	50.00	-20.02	
6.5363	34.69	31.71	60.00	-28.29	31.15	50.00	-18.85	
8.5544	34.98	34.72	60.00	-25.28	34.54	50.00	-15.46	
9.1327	41.16	39.79	60.00	-20.21	38.98	50.00	-11.02	
9.9974	33.59	32.49	60.00	-27.51	32.43	50.00	-17.57	
10.5745	27.13	25.69	60.00	-34.31	25.45	50.00	-24.55	
10.8613	28.85	27.15	60.00	-32.85	24.07	50.00	-25.93	
12.8793	28.41	26.57	60.00	-33.43	25.87	50.00	-24.13	
12.9769	29.14	26.67	60.00	-33.33	24.78	50.00	-25.22	
13.1680	28.18	26.78	60.00	-33.22	26.23	50.00	-23.77	
13.2650	28.26	26.34	60.00	-33.66	26.31	50.00	-23.69	
18.9354	23.13	22.06	60.00	-37.94	21.12	50.00	-28.88	
19.2240	23.48	22.09	60.00	-37.91	21.66	50.00	-28.34	
22.0100	20.67	18.73	60.00	-41.27	17.95	50.00	-32.05	
28.0008	11.82	8.98	60.00	-51.02	6.15	50.00	-43.85	

7. Measurement Data (continued)

7.7. Determination of Average Factor

7.7.1. 1.3959 GHz

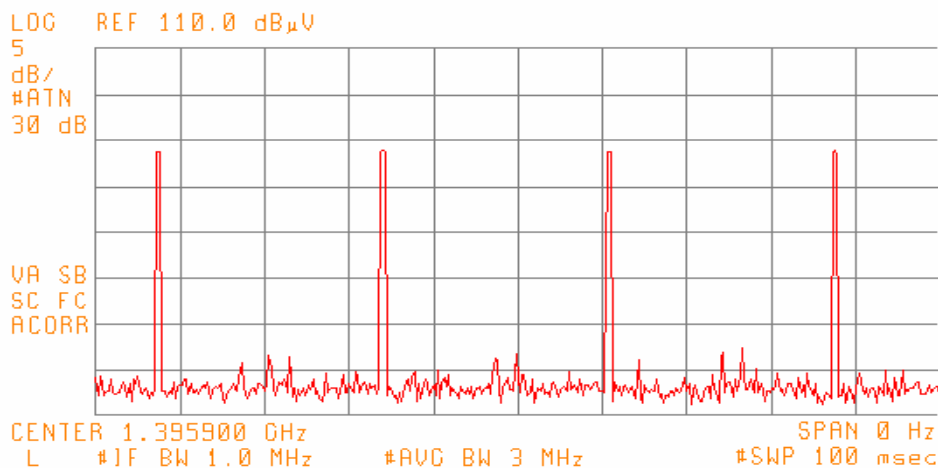
Maximum Duration of 1 cycle: 100 ms
 Number of pulses per period: 4
 Single pulse width: 0.450 ms
 Total On-Time in 1 cycle: 1.80 ms
 On-Time divided by cycle: $1.80 \text{ ms} / 100 \text{ ms} = 0.018$
 Average Factor: $20 \times \log(0.018) = -34.89 \text{ dB}$
 FCC and IC maximum allowed average factor is -20dB .

7.7.1.1. Number of pulses in 100 mSec



196-07 Number of Pulses Per period - Chan 1

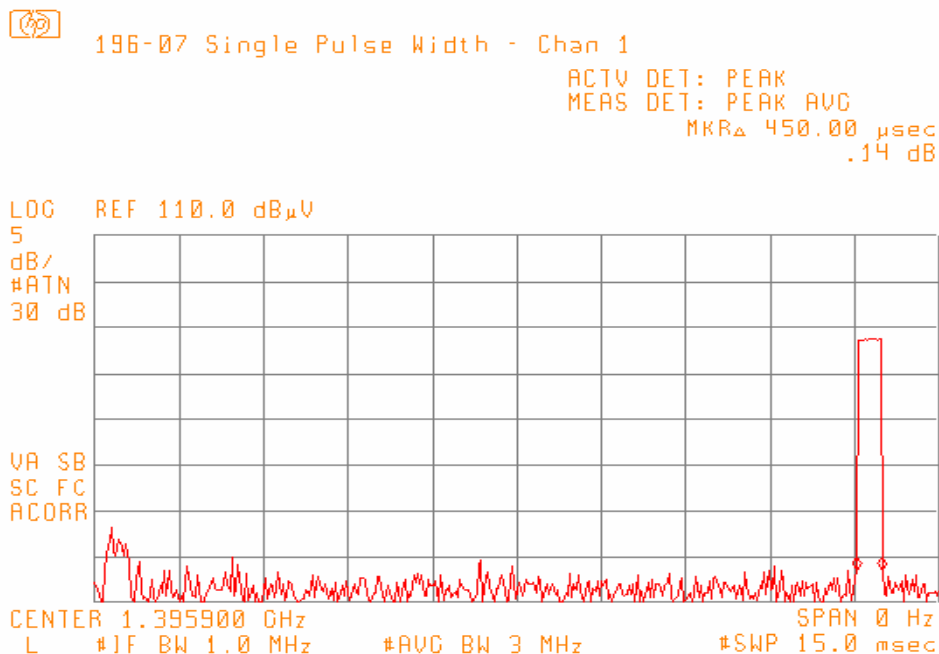
ACTV DET: PEAK
 MEAS DET: PEAK AVG



7. Measurement Data (continued)

7.7. Determination of Average Factor (continued)

7.7.1.2. Pulse Width



Note: The DUT Channel 1 measurement data is documented in this report. However, channels 3, 4 and 6 were measured and yielded similar results.