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

August 25, 2005

Japan Radio Co., Ltd.
2-1-4 Fukuoka, Kamifukuoka-shi
Saitama, 356-0011, Japan

Dear Kiyohito Kobayashi,

Enclosed is the EMC test report for compliance testing of the Tomen Electronics Corporation, JRC FWA System - Type W-Access Point <EL2> as tested to the requirements of Title 47 of the CFR, Part 101.

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.

Sarah Kitlowski
Documentation Department

Reference: (\Tomen Electronics Corporation\ JRC FWA System - Type W-Access Point <EL2> \ EMC17225B-FCC101)

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

Electromagnetic Compatibility Criteria Test Report

For the

Tomen Electronics Corporation
JRC FWA System - Type W- Access Point <EL2>

Tested under

FCC Certification Rules
Title 47 of the CFR, Part 101

MET Report: EMC17225B-FCC101

August 25, 2005

Prepared For:

Japan Radio Co., Ltd.
2-1-4 Fukuoka, Kamifukuoka-shi
Saitama, 356-0011, Japan

Prepared By:
MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, MD 21230

Electromagnetic Compatibility Criteria
Test Report

For the

Tomen Electronics Corporation
JRC FWA System - Type W- Access Point <EL2>

Tested Under

FCC Certification Rules
Title 47 of the CFR, Part 101, for Intentional Radiators

Liming Xu
Electromagnetic Compatibility Lab

Sarah Kitlowski
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 15, §101 of the FCC Rules under normal use and maintenance.

Kevin Mehaffey
Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	August 25, 2005	Initial Issue.

Table of Contents

List of Tables

List of Figures

List of Photographs

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
dBµV	**D**eci-**B**els above one **micro V**olt
dBµV/m	**D**eci-**B**els above one **micro V**olt **per m**eter
DC	**D**irect **C**urrent
DCF	**D**istance **C**orrection **F**actor
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
H	Magnetic Field
GHz	**G**iga **H**ertz
Hz	**H**ertz
ICES	**I**nterference-**C**ausing **E**quipment **S**tandard
kHz	**k**ilo**h**ertz
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	**micro H**enry
µF	**micro F**arad
µs	**micro s**econds
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare

1.0 Requirements Summary

Reference	Description	Compliance
Title 47 of the CFR, Part 101, Subpart C & G, §101.107 , 101.507	Frequency Stability	Compliant
Title 47 of the CFR, Part 101, Subpart C, §101.109	Emission & Bandwidth	Compliant
Title 47 of the CFR, Part 101, Subpart C, §101.111	Emission Limitations	Compliant
Title 47 of the CFR, Part 15, Subpart G, §101.111	Spurious Emissions - Conducted	Compliant
Title 47 of the CFR, Part 15, Subpart G, §101.111	Spurious Emissions - Radiated	Compliant
Title 47 of the CFR, Part 101, Subpart C & G, §101.113, 101.513	Transmitter Power Limitations	Compliant
Title 47 of the CFR, Part 15, Subpart G, §101.141	Modulation	Compliant
Title 47 of the CFR, Part 15, Subpart C & G, §101.115, 101.517	Directional Antenna	Compliant

Table 1. Requirements Summary of EMC Part 15.101 ComplianceTesting

2.0 Equipment Configuration

2.1 Overview

An EMC evaluation to determine compliance of the Tomen Electronics Corporation, JRC FWA System - Type W- Access Point <EL2> with the requirements of Part 15, §15.101 was performed. 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 Tomen Electronics Corporation JRC FWA System - Type W- Access Point <EL2>. Tomen Electronics Corporation should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the JRC FWA System - Type W- Access Point <EL2> has been **permanently** discontinued.

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.101, in accordance with Tomen Electronics Corporation, purchase order number AT04201118. All tests were conducted using measurement procedure ANSI C63.4-1992.

Model(s) Tested:	JRC FWA System - Type W- Access Point <EL2>	
Model(s) Covered:	JRC FWA System - Type W- Access Point <EL2>	
EUT Specifications:	**Primary Power:**	-48 VDC
	FCC ID:	CKENTG335-EL2
	Equipment Code:	TNB
	RF Power Output:	EIRP:0.63W (QPSK) ; 0.35W (16QAM)
	Equipment Frequency Range:	25.011GHz-24.236GHz
	Modulation Type:	QPSK and 16QAM
Analysis:	The results obtained relate only to the item(s) tested.	
Evaluated by:	Liming Xu	
Date(s):	05/02/05	

2.2 Test Site

All testing was performed at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, MD 21230. 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. 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 JRC FWA System - Type W- Access Point <EL2>, Equipment Under Test (EUT) is a broadband wireless point-to-multipoint (PTMP) and point-to-point (PTP) communication system operating at 24-26 GHz that provides high-speed IP access using time division duplex (TDD), and adaptive modulation.

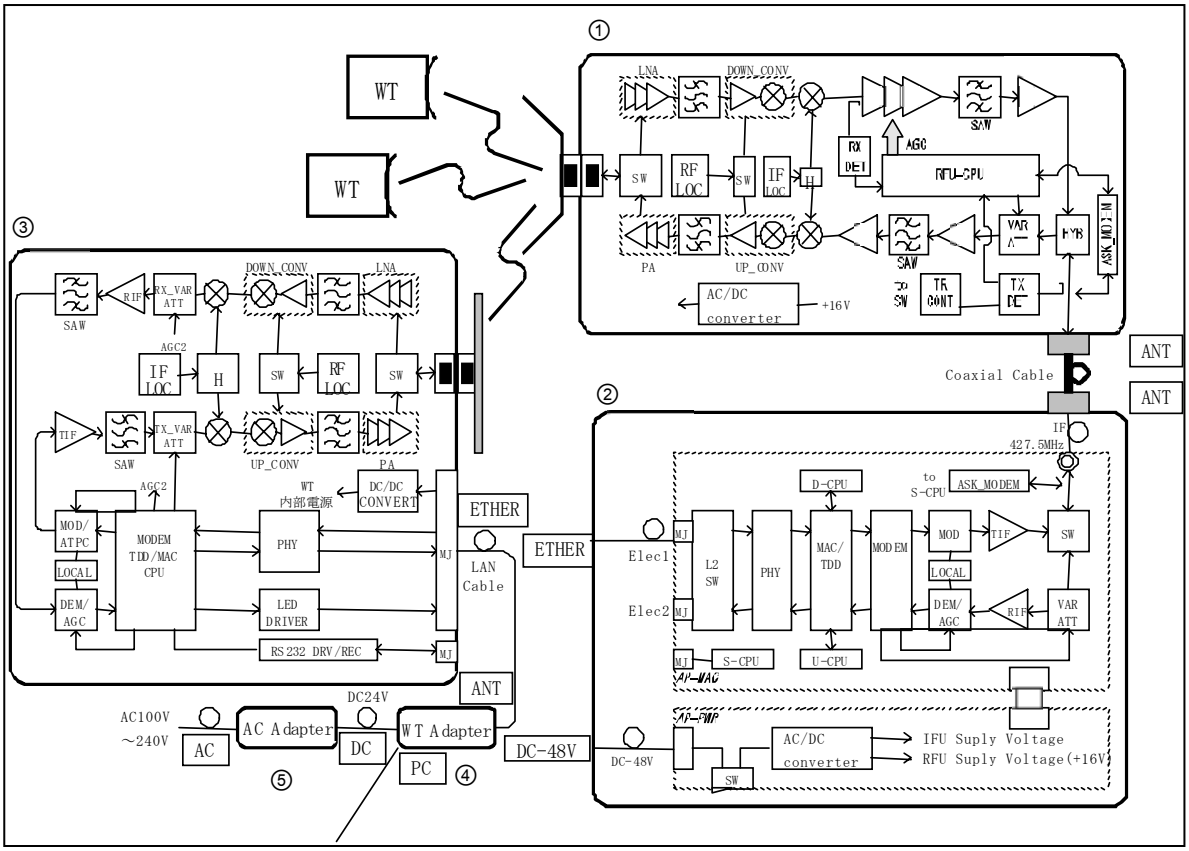


Figure 1. Block Diagram of Test Configuration

2.4 Equipment Configuration

The EUT was set up as outlined in Figure 1. All equipment incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Serial Number
1	TYPEW- ACCESS POINT -RFU	NTG-335-EL2	NJVW000004T
2	TYPEW- ACCESS POINT -IFU	NTJ-111	NJVW000004T
3	TYPEW-WIRELESS TERMINAL	NTG-337-EL2	NJJW000004T
4	WIRELESS TERMINAL-ADAPTER	NQD-2049	N/A
5	AC-ADAPTER	NBG-317	N/A

Table 2. Equipment Configuration

2.5 Support Equipment

Support equipment was not necessary for the operation and testing of the EUT.

2.6 Ports and Cabling Information

Ref. ID	Port Name on EUT	Cable Description	Qty.	Length (m)	Shielded (Y/N)
1	ANT	Coaxial Cable	1	3	Yes
2	ANT	Coaxial Cable	1	3	Yes
2	DC-48V	Power supply cable	1	2	No
2	ETHER	Ethernet Cable	1	10	No
3	ETHER	Ethernet Cable	1	2	No
4	ANT	Ethernet Cable	1	2	No
4	PC	Ethernet Cable	1	10	No
4	DC	Power supply cable(DC)	1	1.8	No
5	DC	Power supply cable(DC)	1	1.8	No
5	AC	Power supply cable(AC)	1	1.8	No

Table 3. Ports and Cabling Information

2.7 Mode of Operation

The Point-to-multipoint (PTMP) system is comprised of two sub-systems; the Access Point (AP) serves as the hub unit connects to a wide area network, and the Wireless Terminal serves as the remote unit and connects to a local network.

Modulation types are QPSK and 16QAM. The modulation rate may be fixed or adaptive.

In normal operating mode the connections to the equipment are Ethernet. Management interfaces are available for management purposes.

2.8 Method of Monitoring EUT Operation

Visual indication of link status is given by LEDs on the Wireless Terminal Interface Unit. A flashing green "ETHER" LED and absence of a red "ALM" LED indicate that an RF is established and traffic is passing between the Wireless Terminal and associated Access Point.

If appropriately connected to Ethernet-enabled network devices (i.e. PCs) the connection state can be determined by a number of methods including using the PING command.

Remote monitoring is available through a management application.

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 Tomen Electronics Corporation upon completion of testing.

3.0 Electromagnetic Compatibility Criteria for Intentional Radiators

3.1 Emission and Bandwidth

Test Requirement: **§ 101.109:** (c) The maximum bandwidth which will be authorized per frequency assigned is set out in the table that follows.

Frequency band (MHz)	Maximum authorized band-width
928 to 929	25 kHz 156
932 to 932.5, 941 to 941.5	12.5 kHz 156
932.5 to 935, 941.5 to 944	200 kHz 1
952 to 960	200 KHz 156
1,850 to 1,990	10 MHz 1
2,110 to 2,130	3.5 MHz
2,130 to 2,150	800 or 1600 KHz 1
2,150 to 2,160	10 MHz
2,160 to 2,180	3.5 MHz
2,180 to 2,200	800 or 1600 KHz 1
2,450 to 2,483.5	625 KHz 2
2,483.5 to 2,500	800 KHz
3,700 to 4,200	20 MHz
5,925 to 6,425	30 MHz 1
6,425 to 6,525	25 MHz
6,525 to 6,875	10 MHz 1
10,550 to 10,680	5 MHz 1
10,700 to 11,700	40 MHz 1
12,200 to 12,7008	500 megahertz
13,200 to 13,250	25 MHz
17,700 to 18,140	220 MHz 1
18,140 to 18,142	2 MHz
18,142 to 18,580	6 MHz
18,580 to 18,820	20 MHz 1
18,820 to 18,920	10 MHz
18,920 to 19,160	20 MHz 1
19,160 to 19,260	10 MHz
19,260 to 19,700	220 MHz 1
21,200 to 23,600	50 MHz 14
24,250 to 25,250	40 MHz 7
27,500 to 28,350	850 MHz
29,100 to 29,250	150 MHz
31,000 to 31,075	75 MHz
31,075 to 31,225	150 MHz
31,225 to 31,300	75 MHz

38,600 to 40,000	50 MHz 7
Above 40,000	(3)

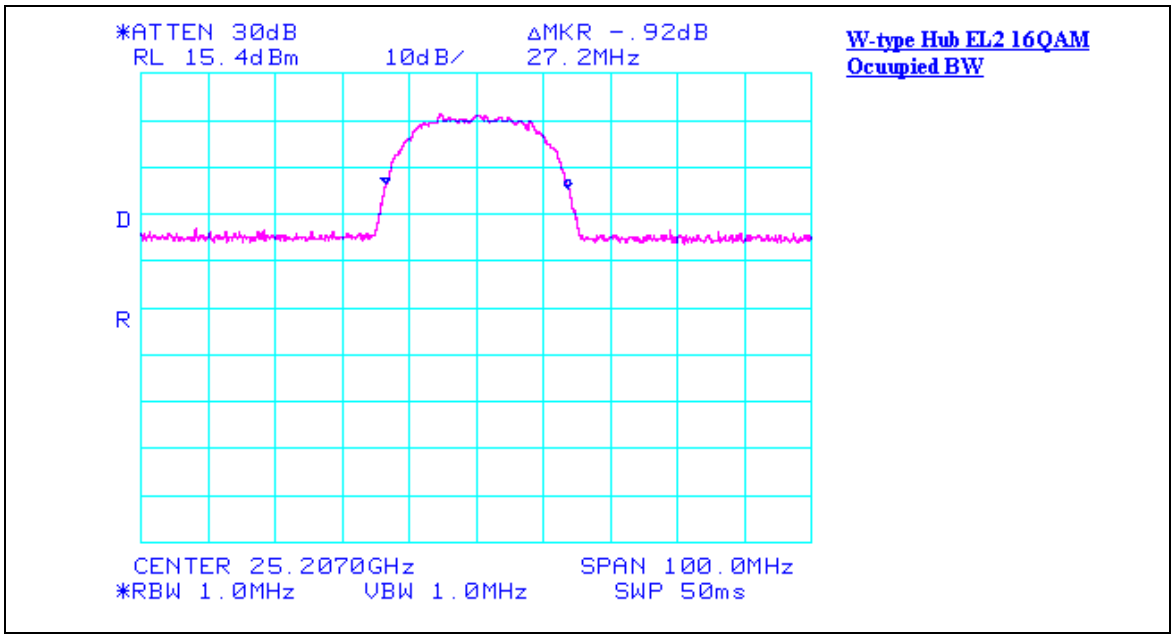
1 The maximum bandwidth that will be authorized for each particular frequency in this band is detailed in the appropriate frequency table in § 101.147. If contiguous channels are aggregated in the 928–928.85/952–952.85/956.25–956.45 MHz, the 928.85–929/959.85–960 MHz, or the 932–932.5/941– 941.5 MHz bands, then the bandwidth may exceed that which is listed in the table.

Results: The EUT was found compliant with the requirement(s) of this section.

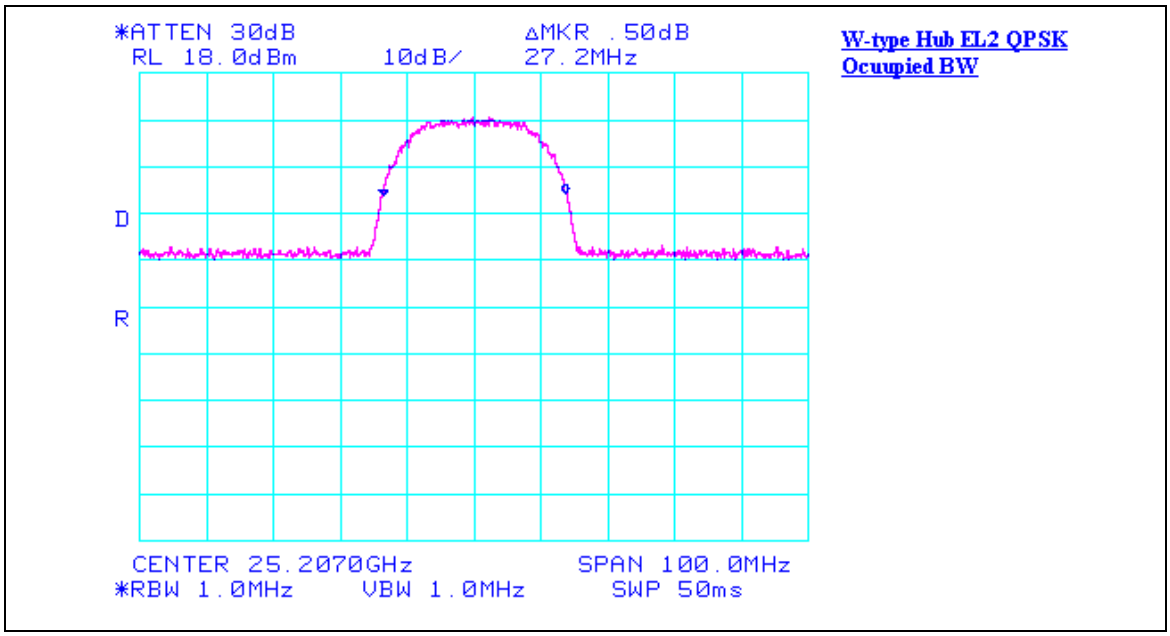
Test Engineer(s): Liming Xu

Test Date(s): 05/02/05

Bandwidth Test Results



Plot 1. Bandwidth Test Results (16QAM)



Plot 2. Bandwidth Test Results (QPSK)

3.2 Emission Limitations, Conducted and Radiated Spurious Emissions

Test Requirement(s): **§101.111(a):** The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with (a)(2)(iv).

Test Procedure: The emission mask for LMDS and the 24 GHz Service shall use the equation in paragraph (a)(2)(iv) of this section and apply it only to the band edge of each block of spectrum, but not to subchannels established by licensees. The value of P in the equation is the percentage removed from the carrier frequency and assumes that the carrier frequency is the center of the actual bandwidth used. The emission mask can be satisfied by locating a carrier of the subchannel sufficiently far from the channel edges so that the emission levels of the mask are satisfied. The LMDS or 24 GHz emission mask shall use a value B (bandwidth) of 40 MHz, for all cases even in the case where a narrower subchannel is used (for instance the actual bandwidth is 10 MHz) and the mean output power used in the calculation is the sum of the output power of a fully populated channel. For block assigned channels, the out-of-band emission limits apply only outside the assigned band of operation and not within the band.

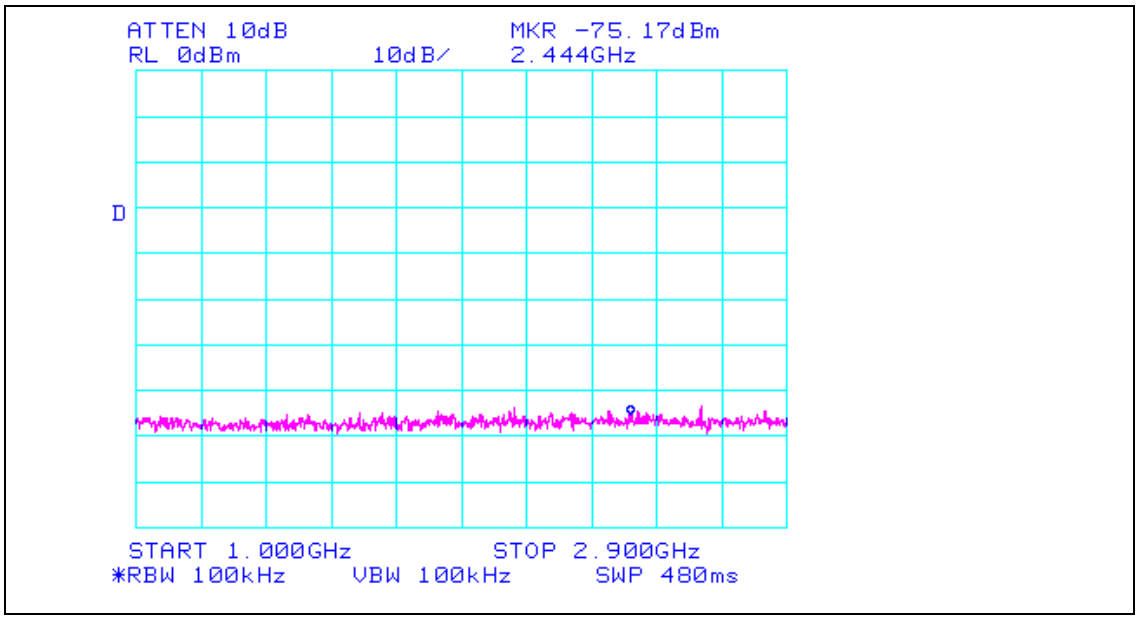
Results: The EUT was found compliant with the requirement(s) of this section.

Test Engineer(s): Liming Xu

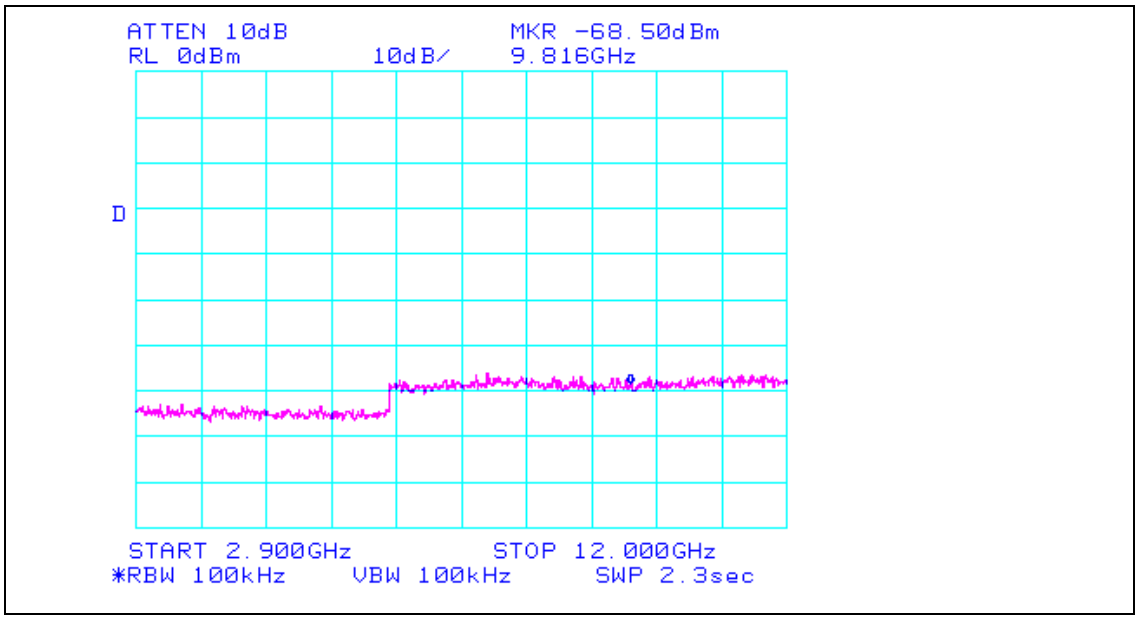
Test Date(s): 05/02/05

Emission Limitation Test Results

Conducted Spurious Emissions



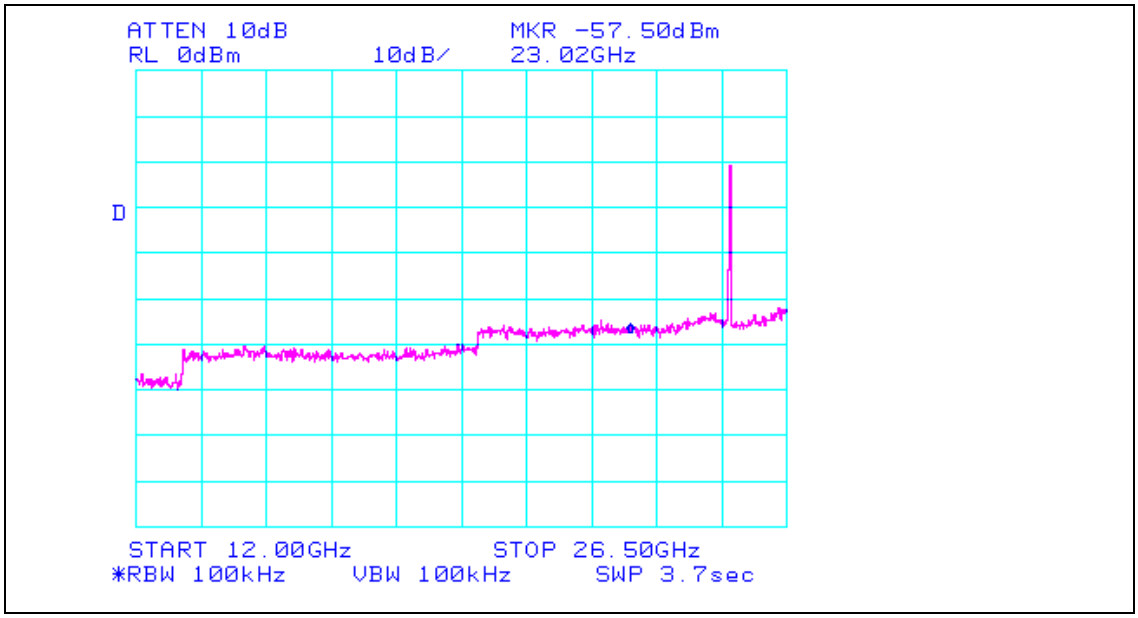
Plot 3. Conducted Spurious Emissions, Test Results (1GHz 2.9GHz)



Plot 4. Conducted Spurious Emissions, Test Results (2.9GHz - 12GHz)

Emission Limitation Test Results

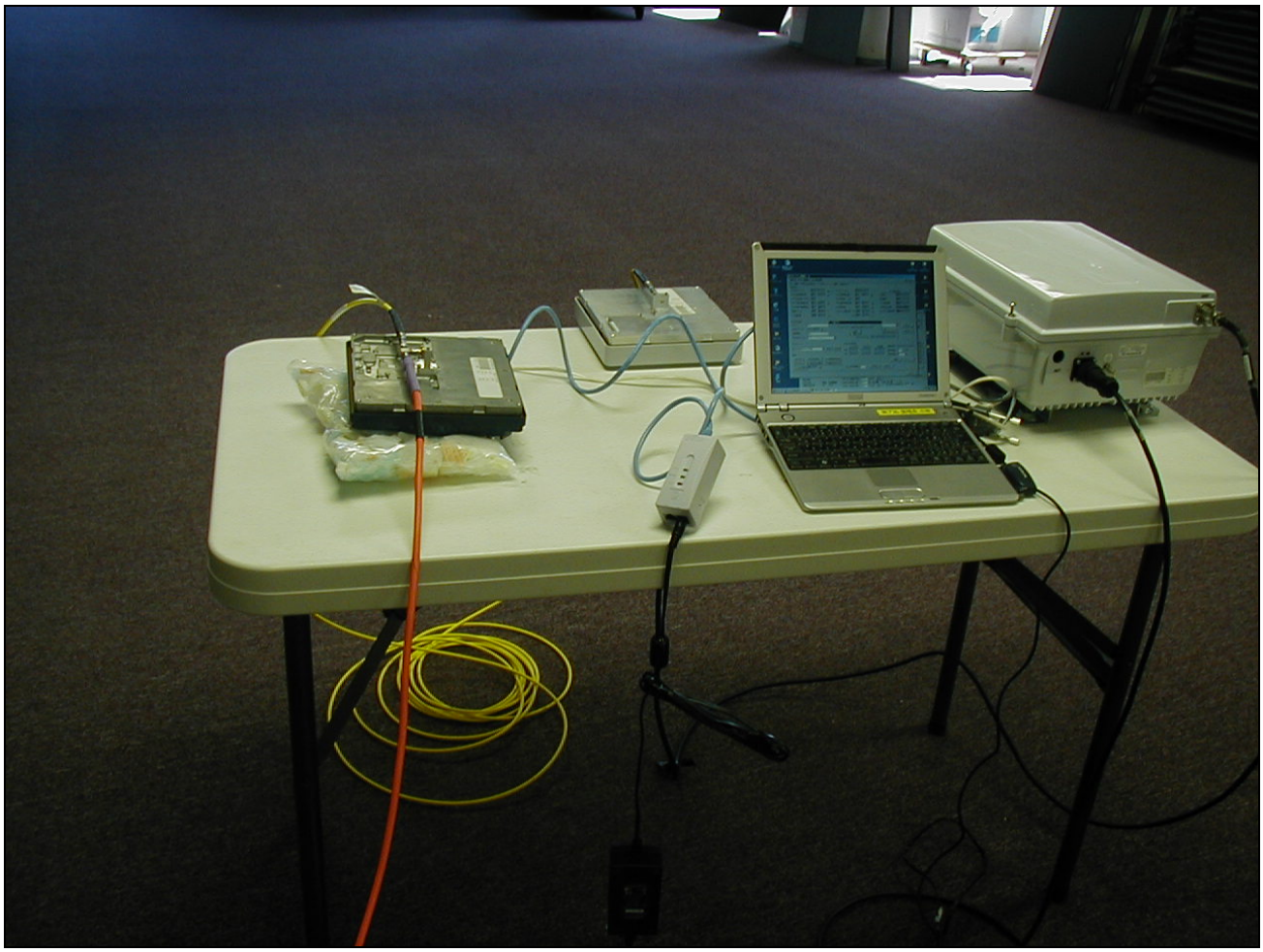
Conducted Spurious Emissions



Plot 5. Conducted Spurious Emissions, Test Results (12GHz - 26.5 GHz)

Emission Limitation Test Results

Conducted Spurious Emissions



Photograph 1. Conducted Spurious Emissions, Test Set-up

Emission Limitation Test Results

Radiated Spurious Emissions

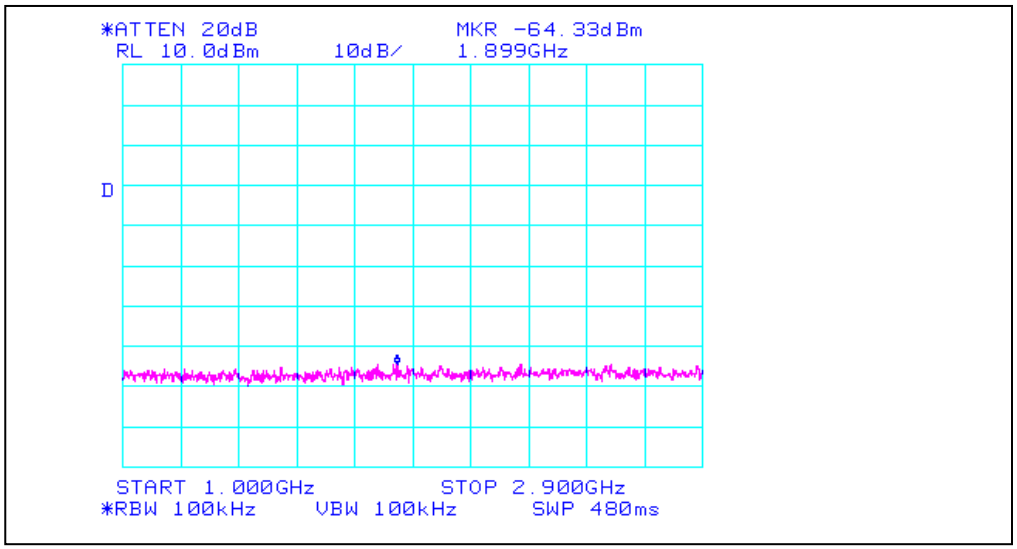
Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected Amplitude (dBuv)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuv)	Limit (dBuv)	Margin (dB)
31.600	3.4	H	70.00	11.70	6.55	1.32	0.00	19.57	40.00	-20.43
31.600	1	V	70.00	25.56	6.18	1.32	0.00	33.07	40.00	-6.93
37.480	2.8	H	70.00	7.80	8.65	1.41	0.00	17.86	40.00	-22.14
37.480	1	V	0.00	21.59	8.10	1.41	0.00	31.10	40.00	-8.90
92.600	2.3	H	0.00	10.00	7.11	2.21	0.00	19.32	43.50	-24.18
92.600	1	V	0.00	17.04	7.24	2.21	0.00	26.50	43.50	-17.00
150.000	1.9	H	0.00	16.58	8.10	2.65	0.00	27.33	43.50	-16.18
150.000	1	V	0.00	19.49	8.20	2.65	0.00	30.34	43.50	-13.17
480.000	1.4	H	0.00	13.32	17.00	4.38	0.00	34.70	46.00	-11.30
480.000	1	V	0.00	16.91	17.50	4.38	0.00	38.79	46.00	-7.21
500.000	1.5	H	0.00	13.42	17.10	4.44	0.00	34.96	46.00	-11.04
500.000	1	V	0.00	13.32	17.50	4.44	0.00	35.26	46.00	-10.74

Table 4. Radiated Spurious Emissions, Test Results

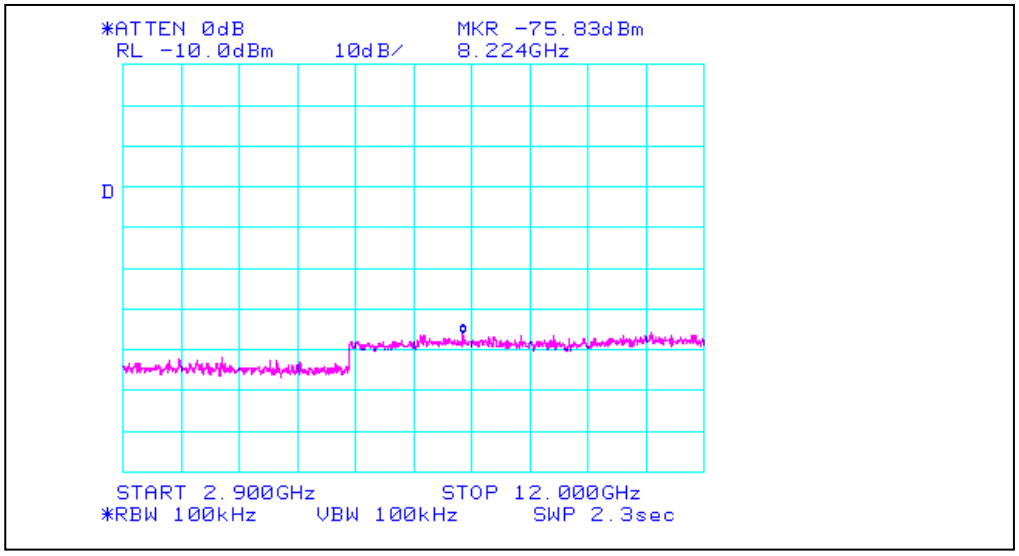
Note : The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

Emission Limitation Test Results

Radiated Spurious Emissions



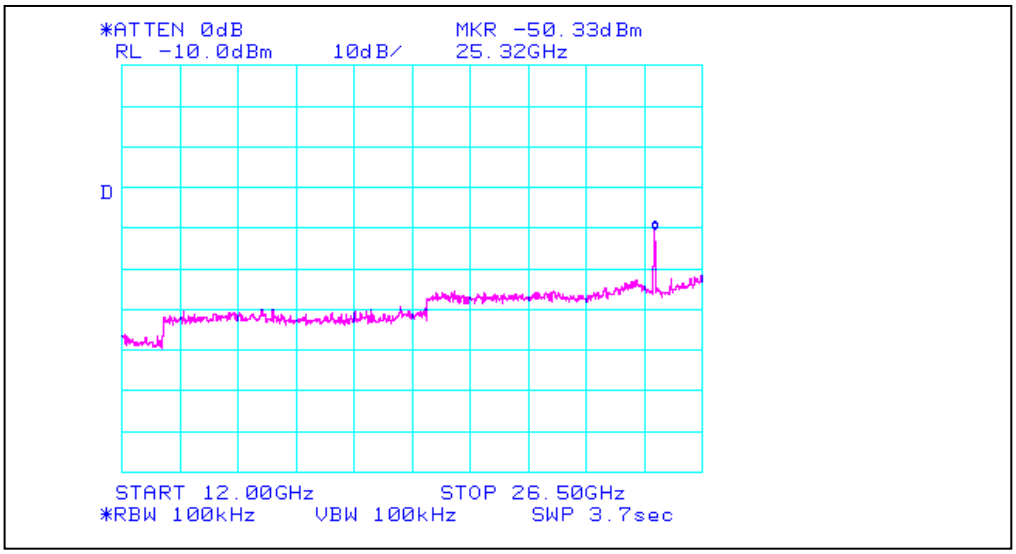
Plot 6. Radiated Spurious Emissions, Test Results (1.0GHz - 2.9GHz)



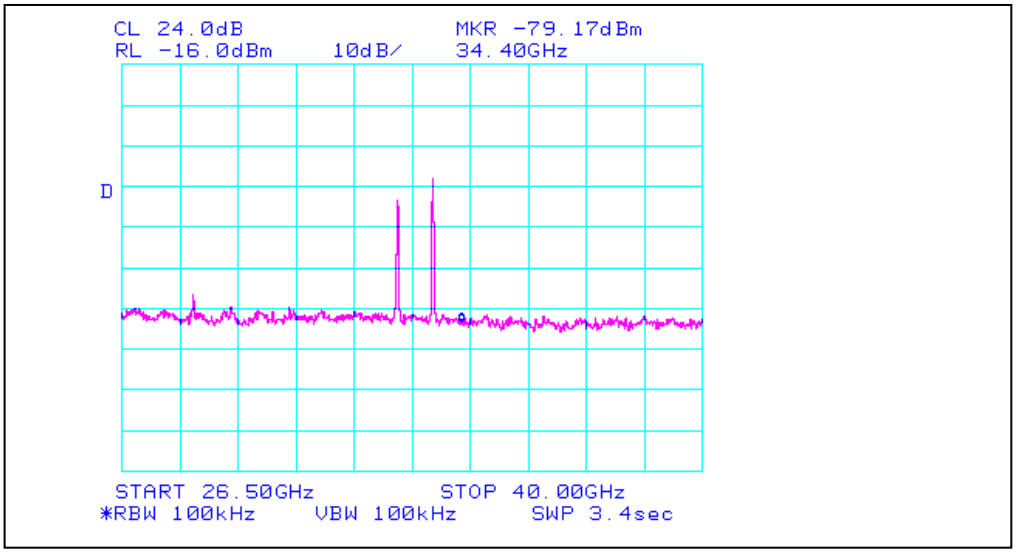
Plot 7. Radiated Spurious Emissions, Test Results (2.9GHz - 12.0GHz)

Emission Limitation Test Results

Radiated Spurious Emissions



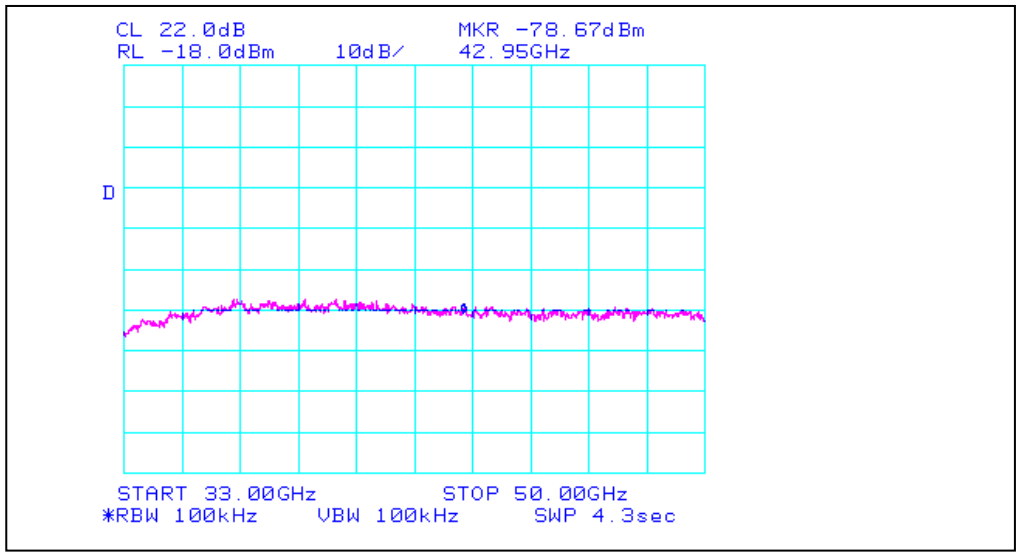
Plot 8. Radiated Spurious Emissions, Test Results (12.0 GHz – 26.5GHz)



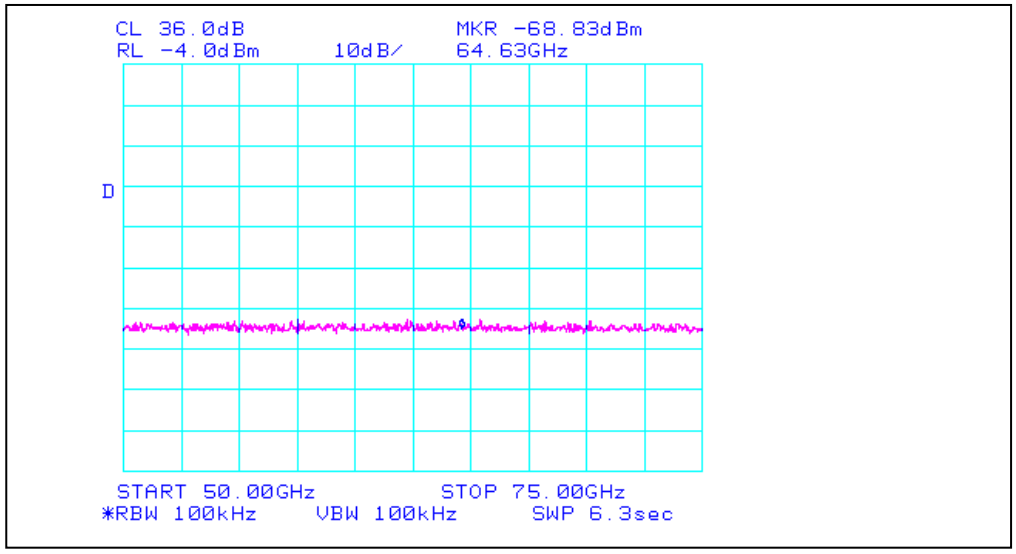
Plot 9. Radiated Spurious Emissions, Test Results (26.5GHz - 40GHz)

Emission Limitation Test Results

Radiated Spurious Emissions



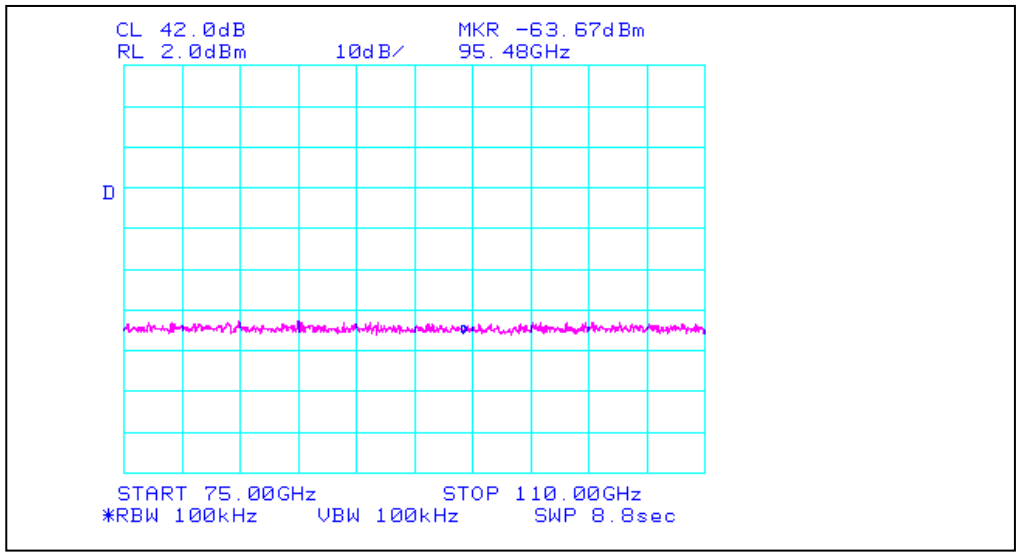
Plot 10. Radiated Spurious Emissions, Test Results (33.0GHz - 50GHz)



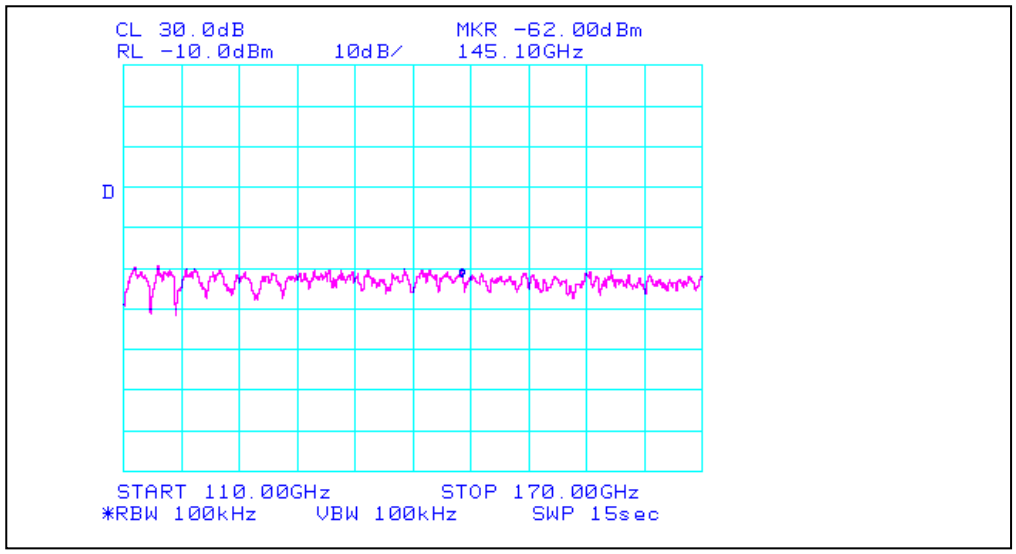
Plot 11. Radiated Spurious Emissions, Test Results (50.0GHz - 75.0GHz)

Emission Limitation Test Results

Radiated Spurious Emissions



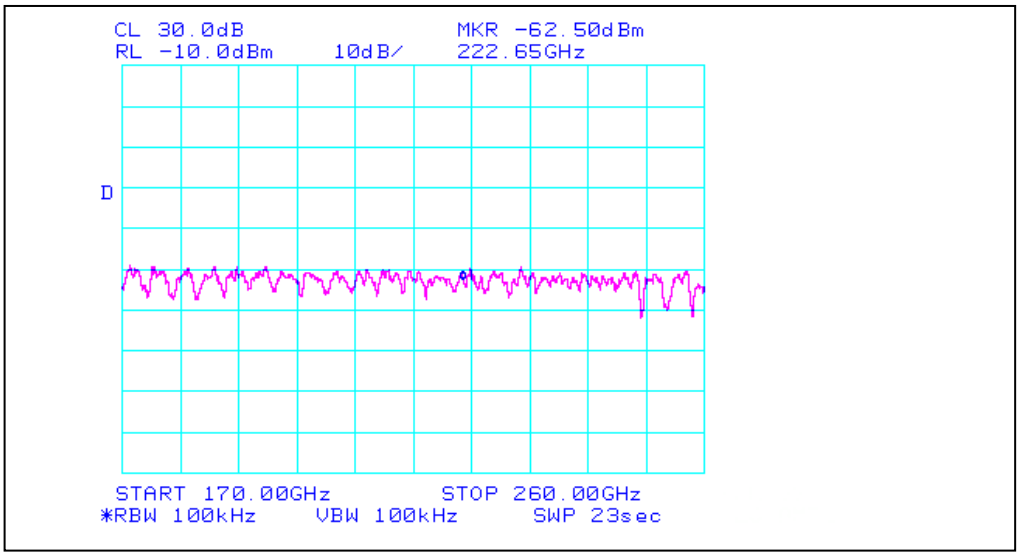
Plot 12. Radiated Spurious Emissions, Test Results (75.0GHz - 110.0GHz)



Plot 13. Radiated Spurious Emissions, Test Results (110.0GHz - 170.0GHz)

Emission Limitation Test Results

Radiated Spurious Emissions



Plot 14. Radiated Spurious Emissions, Test Results (170.0GHz - 260.0GHz)

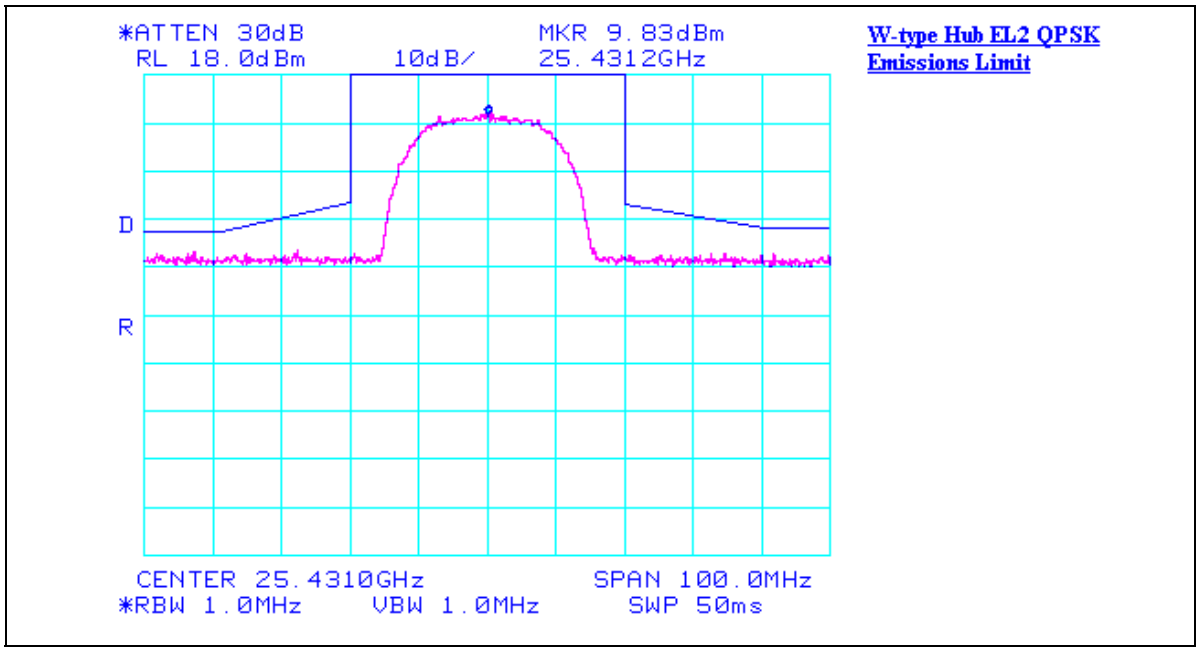
Note: There are no detectable emissions up to 260GHz.

Emission Limitation Test Results

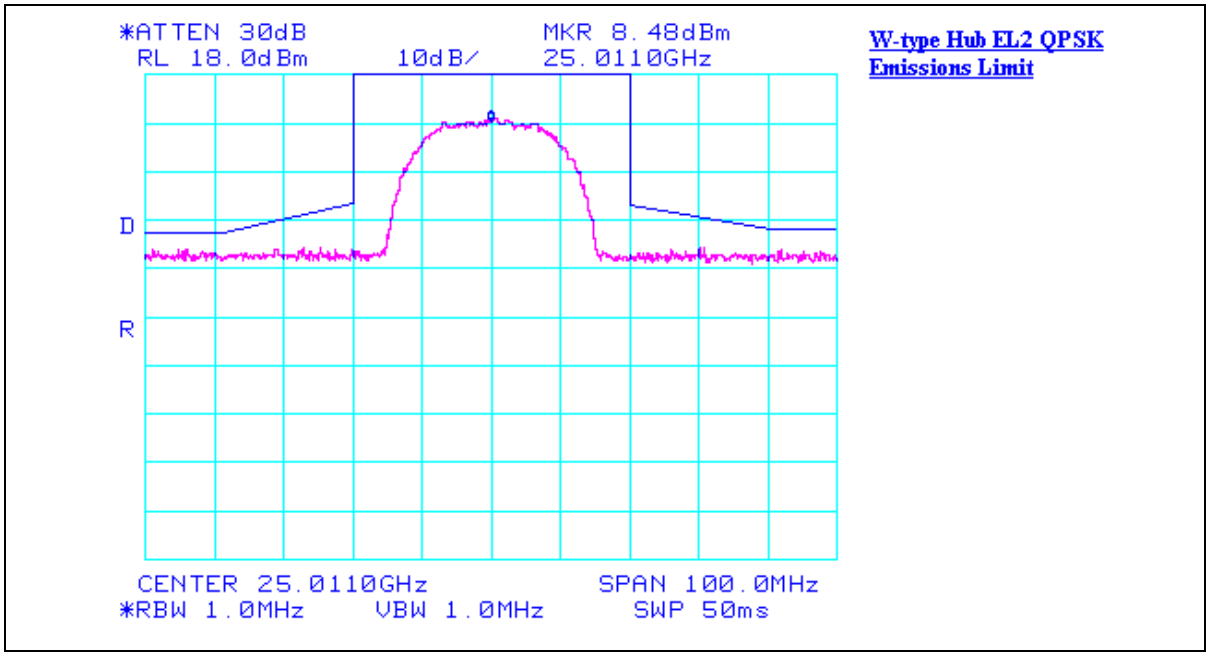
Radiated Spurious Emissions

Photograph 2. Radiated Spurious Emissions, Test Set-up

Emission Limitation Test Results

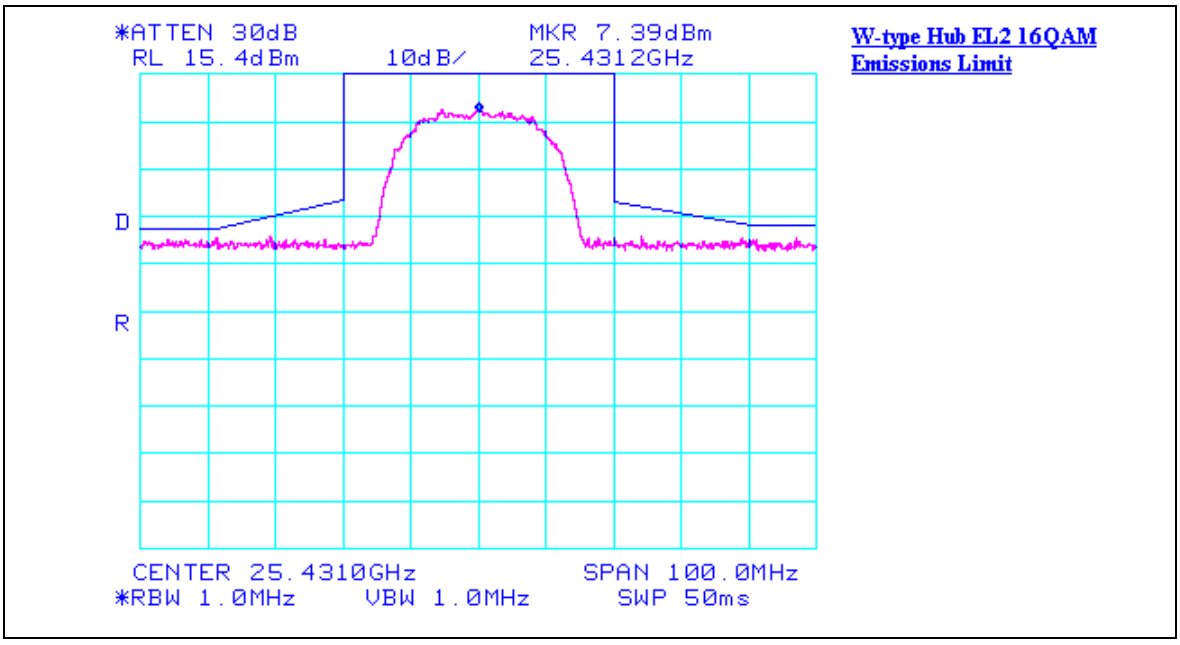


Plot 15. Emission Limitation Test Results (QPSK)

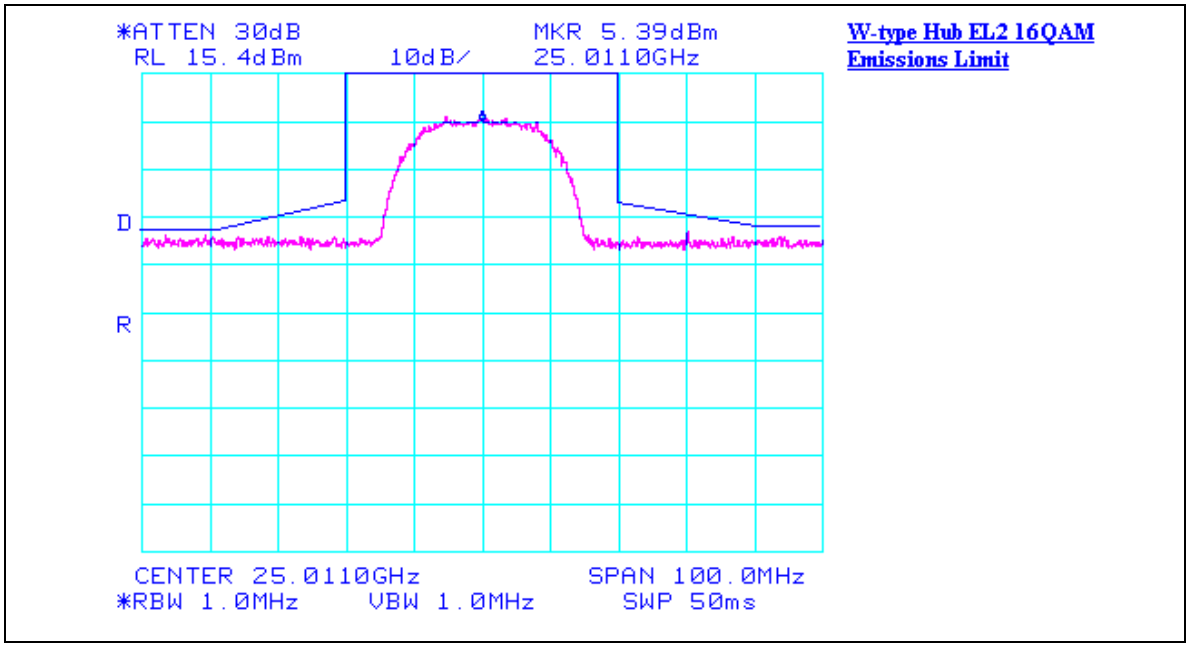


Plot 16. Emission Limitation Test Results (QPSK)

Emission Limitation Test Results



Plot 17. Emission Limitation Test Results (16QAM)



Plot 18. Emission Limitation Test Results (16QAM)

3.3 Transmitter Power Limitations

Test Requirement(s): **§ 101.113:** The output power of a transmitter on any authorized frequency in this service may not exceed the following:

Frequency band (MHz) (EIRP)	Maximum allowable EIRP 12	
	Fixed 1 ,2 (dBW)	Mobile (dBW)
928.0–929.0(2)	+17	
932.0–932.5(2)	+17	
932.5–935.0	+40	
941.0–941.5(2)	+30	+14
941.5–944.0	+40	
952.0–960.0(2)	+40	+14
1,850–1,990	+45	
2,110–2,150	+45	
2,150–2,180 3	+45	
2,180–2,200	+45	
2,450–2,500	+45	
2,500–2,686		
2,686–2,690	+45	
3,700–4,200	+55	
5,925–6,425	+55	
6,425–6,525		+35
6,525–6,875	+55	
10,550 to 10,600 5	+55	
10,600 to 10,680 5	+40	
10,700–11,700	+55	
12,200–12,700 11	+50	
12,700–13,200 4	+50	
13,200–13,250 4	+55	
14,200–14,400	+45	
17,700–18,600	+55	
18,600–18,800 6	+35	
18,800–19,700	5 +55	
21,200–23,600 10	+55	
24,250–25,250	5 +55	
27,500–28,350 9	+55	
29,100–29,250	(7)	
31,000 to 31,075 8, 9	30 dBW/MHz	30 dBW/MHz
31,075 to 31,225 8, 9	30 dBW/MHz	30 dBW/MHz
31,225 to 31,300 8, 9	30 dBW/MHz	30 dBW/MHz
38,600–40,000	+55	

Test Procedure: As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals using an attenuator and spectrum analyzer. This test was performed with carrier modulated by continuous phase modulation signal.

Plots of the RF output Power level of the modulated carrier, as measured at the FR output terminals of the EUT appear on the following pages (the readings appear on the plots should add 2.5 dB loss on the cable and fixture).

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

Test Engineer(s): Liming Xu

Test Date(s): 05/02/05

Transmission Power Limitation Test Results

EUTs	Power meter reading(dBm)	Frequency (GHz)
WT Low Channel QPSK/16QAM	13.66/11.03	25.011
WT Middle Channel QPSK/16QAM	13.86/11.29	25.207
WT High Channel QPSK/16QAM	13.96/11.38	25.431

Figure 2. Transmission Power Limitations Test Results

3.4 Modulation

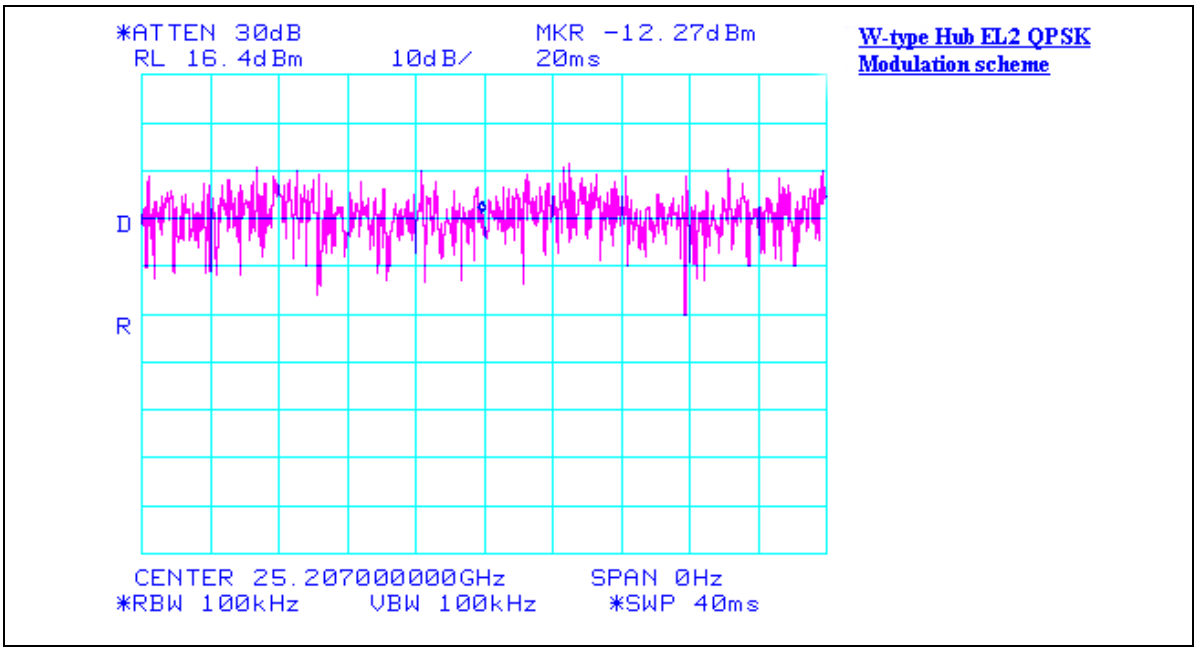
Test Requirements: **§101.141(a):** Microwave transmitters employing digital modulation techniques.

Test Results The EUT was found compliant with the requirement(s) of this section.

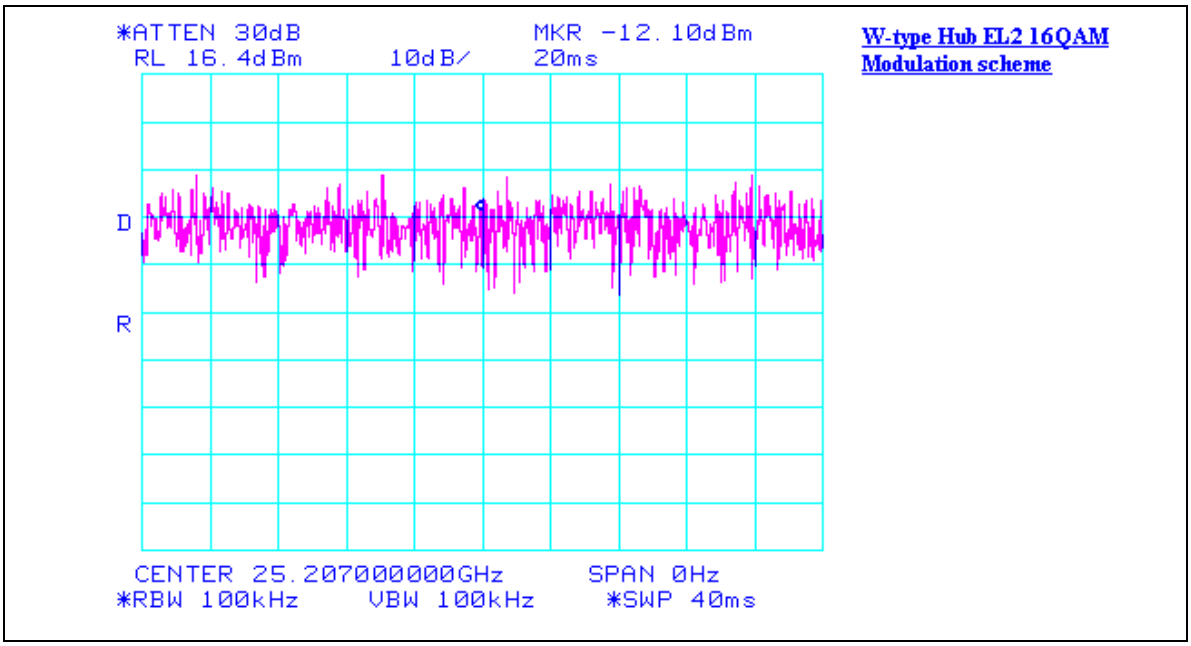
Test Engineer: Liming Xu

Test Date: 05/02/05

Modulation Test Results



Plot 19. Modulation Test Results (QPSK)



Plot 20. Modulation Test Results (16QAM)

3.5 Frequency Stability

Frequency Stability over Temperature Variations

Test Requirements: §2.1055(a)(1)

Test Procedures: As required by §2.1055(a)(1) of CFR 47, *frequency tolerance measurements* were made over the temperature range of -30˚C to +50˚C. The frequency measurements were made using direct input to a spectrum analyzer. Climatic control was accomplished using an environmental simulation chamber. The temperature was first lowered to -30˚C and then raised hourly in 10˚ increments. The unit remained in the chamber during temperature transitions and during the measurement process.

Test Results: Frequency tolerance of carrier signal: 0.001% Per Pt.101.107(a) for a temperature variation from - 30˚C to + 50˚C at normal supply voltage.

Temperature (˚C)	Carrier Frequency (GHz)	Frequency Deviation (KHz)	Deviation Limit (KHz)
-30	24.142987	2 *	241
-20	24.142987	2 *	241
-10	24.142987	2 *	241
0	24.142987	2 *	241
+10	24.142987	2 *	241
+20	24.142999	0 *	241
+30	24.142999	0 *	241
+40	24.142999	0 *	241
+50	24.142999	0 *	241

Table 5. Carrier Frequency Deviations due to Temperature Instability

* The frequency deviation is less than 2 KHz,
* There is no detectable frequency variation when the frequency counter was set to 1kHz resolution.
* The unit meets the requirements of 2.1055 (a)(1)

Test Engineer: Liming Xu

Test Date: 04/19/2005

Frequency Stability over Voltage Variations

Test Requirements: §2.1055(d)(1)

Test Procedures: As required by §2.1055(d)(1) of CFR 47, *frequency tolerance measurements* were made over changes in the supply voltage to the EUT from 85% to 115% of the nominal supply voltage using a variable transformer to vary the AC supply. The frequency measurements were made using direct input to a spectrum analyzer.

Test Results: Frequency tolerance of carrier signal: 0.001% Per Pt.101.107 for a variation in primary voltage from 85% to 115% of the rated supply.

Percentage of Rated Supply	DC/AC Voltage (V)	Carrier Frequency (GHz)	Frequency Deviation (Hz)	Deviation Limit (kHz)
85%	40.0/102	24.05008	50 *	241
100%	48.0/110	24.05008	50 *	241
115%	56.0/138	24.05008	50 *	241

Table 6. Carrier Frequency Deviations Due to Voltage Variations

* The frequency deviation is less than 50 Hz,
* There is no detectable frequency variation when the frequency counter was set to 50Hz resolution.

The EUT meets the requirements of 2.1055 (d)(1)

Test Engineer: Liming Xu

Test Date: 04/18/2005

3.6 Directional Antenna

Test Requirements: **§ 101.517:** (a) Transmitting antennas may be omnidirectional or directional, consistent with coverage and interference requirements.

(b) The use of horizontal or vertical plane wave polarization, or right hand or left hand rotating elliptical polarization must be used to minimize harmful interference between stations.

(c) Directive antennas must be used at all DEMS User Stations and may be elevated no higher than necessary to assure adequate service.

Test Results: The EUT compliant with the requirement(s) of this section.

Test Engineer: Liming Xu

Test Date: 05/11/2005

Directional Antenna Test Results

	W-TYPE			
	AP			
	SECTRAL HORN	SECTRAL HORN	OMNI	OMNI
POLARIZATION	V	H	V	H
FREQUENCY	24.0GHZ-26.5GHZ	24.0GHZ-26.5GHZ	24GHZ-26.7GHZ	24GHZ-26.7GHZ
VSWR(MAX)	1.5	1.5	1.4	1.4
GAIN(MIN)[DBI]	15	15	6	6
BEAMWIDTH[DEG]	90	90	360	360

Table 7. Directional Antenna Test Results

3.7 MPE Calculation

The MPE calculation for JRC W type Hub(28mW conducted power) and antenna gain 15dBi (31.6 numeric gain) @ 20cm:

$Pd = PG/ 4pi*R^2$
$= (28 \times 31.6)/12.566* (20)^2$
$= (884.8)/12.566x\ 400$
$= 0.176\ mW/cm^2$

***Pd = power density in mW/cm^2**
*** G = Antenna numeric gain (31.6); Log G = g/10 (g = 15).**
*** P = Conducted RF power to antenna (28 mW).**
*** R = Minimum allowable distance.(20 cm)**

***The power density Pd =0.176 mW/cm^2 is less than 1 mW/cm^2 (listed MPE limit)**

Notice in the User manual
FCC Radio-Frequency Exposure Statement
This equipment generates and radiates radio-frequency energy. In order to comply with FCC radio-frequency radiation exposure guidelines for an uncontrolled environment, this equipment has to be installed and operated while maintaining a minimum body to antenna distance of 20 cm based on continuous exposure of 30 minutes.

4.0 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.

All Tests					Test Date(s): 04/22/2005-05/11/2005
MET Asset #	**Nomenclature**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1T4300	SEMI-ANECHOIC CHAMBER # 1	EMC TEST SYSTEMS	NONE	03-MAY-03	03-APR-06
1T4303	ANTENNA: BILOG	SCHAFNER-CHASE EMC	CBL6140A	13-MAY-04	13-MAY-05
1T2665	ANTENNA; HORN	EMCO	3115	28-MAR-05	28-MAR-06
1T2511	ANTENNA; HORN	EMCO	3115	28-JUN-04	28-JUN-05
1T4351	SPECTRUM ANALYZER	AGILENT	E7405A	28-SEP-04	28-SEP-05
1T4302	EMI RECEIVER	HEWLETT PACKARD	85462A	18-OCT-04	18-OCT-05
1T4320	UNIVERSAL RADIO COMMUNICATION TESTER	RHODE AND SCHWARZ	CMU200	09-AUG-04	09-AUG-07
1T4453	VECTOR SIGNAL GENERATOR	RHODE & SCHWARZ	SMIQ03	23-FEB-05	23-FEB-06
1T4356	POWER SEVSOR	HEWLETT PACKARD	8485D	04-OCT-04	04-OCT-05
1T4476	POWER METER	HEWLETT PACKARD	EPM-442A	05-MAR-05	05-MAR-06
1T4080	SPECTRUM ANALYZER W/ MEMORY MODULE	HEWLETT PACKARD	8563A	16-JUL-04	16-JUL-05
1T4323	HARMONIC MIXER	HEWLETT PACKARD	11970 (18-110 GHZ)	SEE NOTE	
Ø	HARMONIC MIXER	OLESON MICROWAVE LABS	M06HWD (110-170GHZ)	SEE NOTE	
Ø	HARMONIC MIXER	OLESON MICROWAVE LABS	M04HWD (170-260GHZ)	SEE NOTE	

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