

## FCC CFR47 PART 15 SUBPART C

## **CERTIFICATION TEST REPORT**

FOR

## Wi-Fi WIN CARD

## MODEL NUMBER: 0201JVA

## FCC ID: EW4-0201JVA

REPORT NUMBER: 10J13061-1, Revision B

ISSUE DATE: MARCH 08, 2010

Prepared for MITSUMI ELECTRIC CO., LTD. 1601, SAKAI ATSUGI-SHI KANAGAWA, JAPAN, 243-8533

Prepared by COMPLIANCE CERTIFICATION SERVICES 47173 BENICIA STREET FREMONT, CA 94538, U.S.A. TEL: (510) 771-1000 FAX: (510) 661-0888

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NVLAP LAB CODE 200065-0

## **Revision History**

Rev.	lssue Date	Revisions	Revised By
	02/17/2010	Initial Issue	T. Chan
A	03/02/2010	Removed IC ID / RSS standard	T. Chan
В	03/08/2010	Changed EUT Description and revised FCC ID	A. Zaffar

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CON	MPLIA	NCE CERTIFICATION SERVICES FORM NO: CCSUP4701C
471	/3 BEI This	NICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 report shall not be reproduced except in full, without the written approval of CCS.

REPO	DRT NO: 10J13061-1B	DATE: MARCH 08, 2010
EUT:	Wi-Fi WIN CARD	FCC ID: EW4-0201JVA
10.	MAXIMUM PERMISSIBLE EXPOSURE	
11.	SETUP PHOTOS	

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## **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME:	MITSUMI ELECTRIC CO., LTD. 1601, SAKAI ATSUGI-SHI KANAGAWA, JAPAN, 243-8533				
EUT DESCRIPTION:	Wi-Fi WIN CARD				
MODEL:	0201JVA				
SERIAL NUMBER:	001				
DATE TESTED:	FEBRUARY 09 – 10, 2010				
APPLICABLE STANDARDS					
ST	TEST RESULTS				
CFR 47 P	Pass				

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

THU CHAN EMC MANAGER COMPLIANCE CERTIFICATION SERVICES

Tested By:

1 houtson quyin

THANH NGUYEN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://www.ccsemc.com</u>.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

# 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

## 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

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# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a Wi-Fi WIN CARD.

The radio module is manufactured by Atheros.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range Mode		Output Power	Output Power	
(MHz)		(dBm)	(mW)	
2412 - 2462	802.11b	20.53	112.98	
2412 - 2462	802.11g	20.01	100.23	

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the mono-pole antenna with maximum gain is 1.84dBi.

# 5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was ART 6000 Revision 2.3, Build # 21, V 53\_Mecury, Customer Version ANWI BUILD.

# 5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case data rate for each mode is determined to be as follows, based on input from the manufacturer of the radio.

All emissions tests were made with following data rates:

- 802.11b mode, 20 MHz Channel Bandwidth, 11 Mb/s, CCK Modulation.
- 802.11g mode, 20 MHz Channel Bandwidth, 6 Mb/s, OFDM Modulation.

For radiated emissions below 1 GHz the worst-case configuration is determined to be the mode and channel with the highest output power.

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## 5.6. DESCRIPTION OF TEST SETUP

## 5.6.1. Radiated Emissions

### SUPPORT EQUIPMENT (N/A)

PERIPHERAL SUPPORT EQUIPMENT LIST						
Description Manufacturer Model Serial Number						
Evaluation Board	Mitsumi	DWM-J021	N/A			

### I/O CABLES

	I/O CABLE LIST						
Cable	Port	# of	Connector	Cable	Cable	Remarks	
No.		Identica	Туре	Туре	Length		
		Ports					
1	DC	1	Clip	26 AWG	.3m	Postive	
2	DC	1	Clip	26 AWG	.3m	Negative	

### TEST SETUP

For radiated emissions test, the EUT is inserted into a JIG evaluation board and powered by the DC power supply. Test software exercised the radio card. Laptop was used to setup the EUT in accordance to the test requirements.

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### SETUP DIAGRAM FOR RADIATED EMISSIONS TEST



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## 5.6.2. Line Conducted Emissions

#### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description	Manufacturer	Model	Serial Number	FCC ID			
Laptop Latitude D430	Dell	PA-10	Mitsumi P000010233	DoC			
AC/DC Adapter	Dell	PA-1650-05D	CN05U092-71615-519-	DoC			
			3395				
Evaluation Board	Mitsumi	DWM-J021	N/A	N/A			

### I/O CABLES

	I/O CABLE LIST						
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks	
1	AC	1	US115V	Unshielded	1m	N/A	
2	DC	1	DC Plug in	Unshielded	1.5m	N/A	
3	INPUT	1	PCB	Flat Ribbon	.3 m	Insert to laptop	

## TEST SETUP

The EUT is inserted to the JIG test board then plug in the support laptop during the tests. Test software exercised the radio card.

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## SETUP DIAGRAM FOR LINE CONDUCTED EMISSIONS TEST



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# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST						
Description	Manufacturer	Model	Asset	Cal Due		
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	02/04/11		
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	01/14/11		
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	12/16/10		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	04/20/10		
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/10		
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	05/06/11		
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/10		
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/29/10		
Peak Power Meter	Boonton	4541	N/A	01/15/11		
Peak / Average Power Sensor	Boonton	57318	N/A	02/02/11		

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# 7. ANTENNA PORT TEST RESULTS

## 7.1. 802.11b MODE

## 7.1.1. 6 dB BANDWIDTH

## LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

## TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

## <u>RESULTS</u>

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	11.83	0.5
Middle	2437	12.25	0.5
High	2462	12.17	0.5

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## 7.1.2. 99% BANDWIDTH

## LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	15.0866
Middle	2437	14.9536
High	2462	15.4342

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### 99% BANDWIDTH





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99% BANDWIDTH H Agilent 14:58:06 Feb 9, 2010	IGH CH		Т		Vleasure
Ch Freq 2.462 G Occupied Bandwidth	θHz		Trig Fre	e	Meas Off
Designate 10.112061					nnel Power
Ref 20 dBm Atten 20 #Samp Log					ccupied BW
10 dB/ Offst 11 11 11 11 11 11 11 10 10 10					ACF
dB	#VBW 510 kHz	#Swoon	Span 50 Mi	rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr	lulti Carrier Power
Occupied Bandwidtl	<u>- #VBW 510 km2</u> h 2 MЦ <del>-</del> 2	Occ BW % F	<sup>p</sup> wr 99.00 % dB -26.00 dB	۔ ا	Power Stat CCDI
Transmit Freq Error -5.9 x dB Bandwidth 18.1	∠ 1 <b>7117∠</b> 908 kHz 968 MHz*				More 1 of 2
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## 7.1.3. OUTPUT POWER

## LIMITS

FCC §15.247 (b)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

### TEST PROCEDURE

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

### **RESULTS**

Channel	Frequency	Spectrum	Attenuator and	Output	Limit	Margin
		Analyzer Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	9.03	11.5	20.53	30	-9.47
Middle	2437	9.02	11.5	20.52	30	-9.48
High	2462	8.7	11.5	20.20	30	-9.80

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### **OUTPUT POWER**





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Aglient 18:35:	49 Feb 9, 2010			<u> </u>	Freq/Channel
Project: 10J13061 Ref 1.337 dBm #Peak	Atten 20 dB		∆ M Band Pwr	kr1 11.5 MHz 8.70 dBm	Center Freq 2.46200000 GHz
Lin					Start Freq
		M			Stop Erog
					2.52200000 GHz
£LgAv					CF Ste 12.0000000 MHz Auto Ma
/1 S2 53 FC					Freq Offset 0.00000000 Hz
(f):					Signal Track
šwp					
Center 2.462 0 GH	Z		S	Span 120 MHz	

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Agilent 18:35	:49 Feb 9, 2010			T Freq/Channel
Project: 10J13061 Ref 1.337 dBm #Peak	Atten 20 dB		∆ Mkr1 11.5 Mł Band Pwr 8.70 dBm	Hz Center Freq 2.46200000 GHz
		A.		Start Freq 2.40200000 GHz
		$+/\hbar$		Stop Freq 2.52200000 GHz
fLgAv				CF Ste 12.0000000 MHz <u>Auto M</u> a
/1 S2 53 FC				Freq Offset 0.00000000 Hz
a(f): =Tun §wp				Signal Track
Center 2.462 0 GH Res BW 1 MHz	lz	/\ ≭VBW 1 MHz	Span 120 M Sweep 1 ms (601 pts	Hz

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## 7.1.4. AVERAGE POWER

### **LIMITS**

None; for reporting purposes only.

## TEST PROCEDURE

The transmitter output is connected to a power meter.

### **RESULTS**

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	14.10
Middle	2437	13.32
High	2462	13.51

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## 7.1.5. POWER SPECTRAL DENSITY

## LIMITS

FCC §15.247 (e)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

## TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

### **RESULTS**

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-9.02	8	-17.02
Middle	2437	-8.05	8	-16.05
High	2462	-6.60	8	-14.60

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## POWER SPECTRAL DENSITY





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Agilent 15:07:3	8 Feb 9, 2010						Т	Freq/Channel
oject: 10J13061 f 20 dBm eak	Atten 20 dB			м	kr1 2.46	0 427 5 -6.60	GHz dBm	Center Freq 2.46035000 GHz
g								Start Freq 2.46020000 GHz
	mont	h	m	$\sim$	John S	m na	vennam	Stop Freq 2.46050000 GHz
) im Av								CF Ste 30.0000000 kHz Auto M:
1 S2 FS								Freq Offset 0.00000000 Hz
): 50k VP								Signal Track On <u>O</u>
nter 2.460 350 0	GHz #	VBW 10 kl	Hz	#Sw	еер 100	Span 30 ) s <i>(</i> 601	)0 kHz î pts)	

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## 7.1.6. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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## **RESULTS**

#### SPURIOUS EMISSIONS, LOW CHANNEL





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#### SPURIOUS EMISSIONS, MID CHANNEL



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🔅 Agilen	t 14:56:04	Feb 9, 2010				Marker
Project: 10 Ref 20 dBi	J13061 m	Atten 20 d	В	I	Mkr3 3.250 GHz -48.73 dBm	Select Marker
Peak	1					1 2 3
.og 📂	\$					
0 -						Marker Trace
IB/						<u>Auto 1 2</u>
Offst 📃						
1						
iB 🕺						Readout
N P	3					Frequency
129	<b>♀</b>					
iBm		1 month mar	Marrie Marrie Contactor	And reading the second	apply and address of the second second second	Markor Tablo
	and the second	<b>T F</b>				
_gav						
Start 30 M	Hz			S	top 26.000 GHz	
Res BW 1	100 kHz		#VBW 300 kHz	Sweep 2.48	2 s (1001 pts)	Marker All Off
Marker	Trace	Type	X Axis	•	Amplitude	1
1	(1)	Freq	2.445 GHz		4.37 dBm	
2	(1)	Freq	290 MHz		-40.10 dBm	
3	(1)	Freq	3.250 GHz		-48.73 dBm	
						More More
						III 2.42

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#### SPURIOUS EMISSIONS, HIGH CHANNEL



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Project: 10J1306 Ref 20 dBm	1 Atten 2	0 dB		Mkr3 3.2 -49.4	76 GHz 0 dBm	Center Freq
Peak 1						13:0130868 0112
og ☆ 0 B/						Start Freq 30.000000 MHz
I A A A A A A A A A A A A A A A A A A A	3					Stop Freq 26.000000 GHz
14.2 Bm gAv	, in the second se	Marine Marin			pere-hard	CF Ste 2.59700000 GHz <u>Auto M</u> :
tart 30 MHz				Stop 26.0	00 GHz	<b>E 1 0 (1 1 1</b>
Res BW 100 kH	lz	#VBW 300 kH	lz Swee	p 2.482 s (1001	pts)	
Marker Tra 1 (1 2 (1	ice Type ) Freq ) Freq	X Ad 2.471 290	×is GHz IMHz	Ampli 4.76 d -39.48 d	tude Bm Bm	Signal Track
3 (1	) Freq	3.276	i GHz	-49.40 d	Bm	On <u>O</u>

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## 7.2. 802.11g MODE IN THE 2.4 GHz BAND

## 7.2.1. 6 dB BANDWIDTH

### LIMITS

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

### **RESULTS**

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	16.5	0.5
Middle	2437	16.5	0.5
High	2462	16.5	0.5

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#### 6 dB BANDWIDTH

roject: 10J13061		_			∆ Mkr	1 16.50	MHz	
ef 20 dBm <sup>D</sup> eak	Atten 20	dB				0.0	7 dB	Center Freq 2.41200000 GHz
og ) B/		- Sharkan franka	un ortenderstore	Kulunt 2				Start Freq 2.38700000 GHz
1 B I								Stop Freq 2.43700000 GHz
2.8 Bm gA∨	addition and a second second				and the second second	Manyan	MW.	CF Stej 5.0000000 MHz <u>Auto M</u> a
1 S2 3 FC								Freq Offset 0.00000000 Hz
(f): Tun WP								Signal Track On <u>O</u> i
enter 2.412 00 G	Hz				400	Span 5	0 MHz	

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# 7.2.2. OUTPUT POWER

# LIMITS

FCC §15.247 (b)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

# TEST PROCEDURE

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

# **RESULTS**

Channel	Frequency	Spectrum	Attenuator and	Output	Limit	Margin
		Analyzer Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	8.51	11.5	20.01	30	-9.99
Middle	2437	8.44	11.5	19.94	30	-10.06
High	2462	8.06	11.5	19.56	30	-10.44

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#### **OUTPUT POWER**

🔆 Agilent 18:26:2	28 Feb 9, 2010						[Freq/Channel
Project: 10J13061 <b>Ref -0.851 dBm</b> #Peak	Atten 10 dB		E	∆ M Band Pwr	kr1 16. 8.51	5 MHz dBm	Center Freq 2.41200000 GHz
Lin		L	_				Start Freq 2.35200000 GHz
		<u>Nin Inger</u> a					Stop Freq
		1.8	•				CF Step
¥LgA∨		Ĭ					12.0000000 MHz <u>Auto Ma</u>
V1 S2 S3 FC		<b> ,</b>					Freq Offset 0.00000000 Hz
¤(f): FTun			+				Signal Track
Swp			the				
Center 2.412 0 GH: #Dec RW 1 MHz	Z #1	/DW/ 1 MU-		: 	Span 12 ma (60)	20 MHz	

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Agilent 18:23:	DVVER MID 58 Feb 9, 2010	СH	т	Freq/Channel
Project: 10J13061 <b>Ref -1.51 dBm</b> #Peak	Atten 10 dB		∆ Mkr1 16.5 MHz Band Pwr 8.44 dBm	Center Freq 2.43700000 GHz
Lin				Start Freq
				Stop Freq
				2.49700000 GHz
#LgAv				CF Step 12.0000000 MHz <u>Auto Mar</u>
V1 S2 S3 FC				Freq Offset 0.00000000 Hz
¤(f): FTun				Signal Track
Swp		t ha		
Center 2.437 0 GH #Res BW 1 MHz	z #\	/BW 1 MHz	Span 120 MHz Sweep 1 ms (601 pts)	

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	NER HIGH	I CH					
🔆 Agilent 18:19:17	Feb 9, 2010				R	Т	Freq/Channel
Project: 10J13061 <b>Ref -1.089 dBm</b> #Peak	Atten 10 dB			∆ M Band Pwr	kr1 16.5 · 8.06 d	MHz IBm	Center Freq 2.46200000 GHz
Lin							Start Freq 2.4020000 GHz
							Stop Freq 2.52200000 GHz
#LgAv			•				CF Step 12.0000000 MHz Auto Man
V1 S2 S3 FC							Freq Offset 0.00000000 Hz
¤(f): FTun Swp							Signal Track On <u>Off</u>
		1	ha				
Center 2.462 0 GHz #Res BW 1 MHz	#\	/BW 1 MH	z	Sweep 1	Span 120 ms (601	0MHz pts)	
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# 7.2.3. AVERAGE POWER

### **LIMITS**

None; for reporting purposes only.

# TEST PROCEDURE

The transmitter output is connected to a power meter.

#### **RESULTS**

The cable assembly insertion loss of11.5 dB (including 10 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	12.20
Middle	2437	11.88
High	2462	11.80

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# 7.2.4. POWER SPECTRAL DENSITY

# LIMITS

FCC §15.247 (e)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

#### **RESULTS**

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-9.08	8	-17.08
Middle	2437	-9.06	8	-17.06
High	2462	-9.70	8	-17.70

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# POWER SPECTRAL DENSITY

	0.20.20	1 00 0, 20	510							
Project: 1001 Ref 20 dBm #Peak	3061	Atten 2	0 dB			M	kr1 2.41	6 372 1 -9.08	dBm	Center Freq 2.41635000 GHz
Log 10										Start Freq 2.41620000 GHz
onst I1 dB DI ∿∕^	www.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www	humm	n and the	www	~~~~	Anno	herend	Stop Freq 2.41650000 GHz
3.0 dBm ∟gAv										CF Step 30.0000000 kHz <u>Auto Ma</u>
W1 S2 S3 FS										Freq Offset 0.00000000 Hz
¤(f): i>50k Swp										Signal Track On <u>Off</u>
Center 2.416	350 0 GF	lz	#1	BW 10 I	(H-7	#\$14	100 m	Span 30	D0 kHz	

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Freq GHz
Freq I GHz
Freq I GHz
: Ste
) kHz <u>M</u> :
ffset
) Hz
rack
0

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Agilent 15:32:1	8 Feb 9, 2010					T	Freq/Channel
oject: 10J13061 f 20 dBm eak	Atten 20 dB		M	lkr1 2.45	5 121 9 -9.70	GHz dBm	Center Freq 2.45515000 GHz
g							Start Freq 2.45500000 GHz
SI wanthe	m m m	-	monde	handhorma	mon	man	Stop Freq 2.45530000 GHz
m							CF Ste 30.0000000 kHz <u>Auto M</u>
FS							Freq Offset 0.00000000 Hz
): i0k /p							Signal Track On <u>O</u>
nter 2.455 150 0 es BW 3 kHz	GHz #VI	BW 10 kHz	#51	veen 10(	Span 3 ) s <i>(</i> 601	00 kHz î	

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# 7.2.5. CONDUCTED SPURIOUS EMISSIONS

# LIMITS

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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# **RESULTS**

#### SPURIOUS EMISSIONS, LOW CHANNEL



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🌾 Agilen	f 16:25:45	Feb 9, 2010	)			Т	Marker
Project: 10 Ref 20 dBi	J13061 m	Atten 20 d	IB		Mkr4 7.22 -51.01	4 GHz dBm	Select Marker
∮Peak							1 2 3 4
og	Å						
10 -	-ĭ						Marker Trace
IB/ —							<u>Auto 1 2 3</u>
Offst 🚞							
1							Poadout
IB 💍							Freeduoul
л <mark>і</mark>	0	4					Frequency
16.4						with war	
iBm 💾		a martine	Carlos and a strategy		Anna dalata an	-	Marker Table
							On Off
.g~v							
Start 30 M	Hz				Stop 26.00	0 GHz	
Res BW	100 kHz		#VBW 300 kHz	Sweep 2	.482 s (1001	pts)	Marker All Off
Marker	Trace	Type	X Axis	•	Amplit	Jde	
1	(1)	Freq	2.419 GHz		0.08 dE	) m	
2	(1)	Freq	290 MHz		-39.56 dB	'm	
3	(1)	Freq	3.224 GHz		-47.20 dB	m	
4	(1)	Freq	7.224 GHz		-51.01 dB	m	
							More
						I	II 2 nf 2

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#### SPURIOUS EMISSIONS, MID CHANNEL



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ef 20 <u>dBm</u>	9.1		Mbr4 4 960 CH	
Peak 📃	Atten 20	) dB	-51.90 dBm	Center Freq 13.0150000 GHz
og d				
) B/				Start Freq 30.0000000 MHz
ffst 1 B ¢				Stop Freq
I 6.8		and the state of t		
Bm	please and the			2.59700000 GHz
			Ct	
tart 30 MHZ Res BW 100 k	Hz	#VBW 300 kHz	Stop 26.000 GHZ Sweep 2.482 s (1001 pts)	Freq Offset
	асе Туре	X Axis	Amplitude	
Marker Tr	45 5	2.445 GHz	0.57 dBm	
Marker Tr 1 (	1) Freq		-39.15 dBm	Signal Track
Marker Tr 1 ( 2 (	1) Freq 1) Freq	290 MHz		
Marker Tr 1 ( 2 ( 3 (	1) Freq 1) Freq 1) Freq	290 MHz 3.250 GHz	-47.68 dBm	
Marker         Tr           1         (           2         (           3         (           4         (	1) Freq 1) Freq 1) Freq 1) Freq	290 MHz 3.250 GHz 4.860 GHz	-47.68 dBm -51.90 dBm	On <u>O</u>
Marker Tr 1 ( 2 ( 3 ( 4 (	1) Freq 1) Freq 1) Freq 1) Freq	290 MHz 3.250 GHz 4.860 GHz	-47.68 dBm -51.90 dBm	On <u>O</u>
Neo Dil Teo K	ace Type	X Axis 2.445 GHz	Amplitude 0.57 dBm -39 15 dBm	0.00000000

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#### SPURIOUS EMISSIONS, HIGH CHANNEL



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🌾 Agilen	it 15:36:24	Feb 9, 2010	)					T	Marker
Project: 10 Ref 20 dBi	U13061 m	Atten 20	dΒ			Mk	r4 4.91 -51.80	2 GHz dBm	Select Marker
Peak									1 2 3 4
.og	d l								
0	ĭ								Marker Trace
B/									<u>Auto 1 2 3</u>
)ffst ⊨									
1									Doadout
IB 💦									Frequencia
)I 🚺	0	4							riequency
17.4 🚺	- <u>H</u> i-(			and Bernstein				and there	
IBm 💾	and the second	law	and a start		and the second second	AND CASE OF		<u> </u>	Marker Table
									On Of
Start 30 M	Hz					Sto	p 26.00	0 GHz	
Res BW 1	100 kHz		#VBW 300	kHz	Swee	p 2.482 s	s (1001	pts)	Marker All Off
Marker	Trace	Туре	×	. Axis			Amplit	Jde	
1	(1)	Freq	2.4	471 GHz			0.70 dE	) m	
2	(1)	Freq	2	290 MHz			40.35 dB	'm	
3	(1)	Freq	3.2	276 GHz			47.87 dB	m	
4	(1)	Freq	4.9	12 GHz			-51.80 dB	'm	
									More
									2 of 2

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# 8. RADIATED TEST RESULTS

# 8.1. LIMITS AND PROCEDURE

# <u>LIMITS</u>

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

# TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each appplicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

# 8.1.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

# **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**



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)reject: 10.112001			Mlad	2 225 20 CH-	
toject. 10313001 kef 110 dBµ∨ Peak	#Atten 0 d	B		46.24 dBµ∨	Center Freq 2.35000000 GHz
og					Start Eroa
B/					2.31000000 GHz
2.1 B					Stop Freq
1 4.0 Βμ∀					CF Step
gAv	1				8.00000000 MHz <u>Auto Ma</u>
31 V2					Freq Offset 0.00000000 Hz
(f): Tun					Signal Track
owh					
tart 2.310 00 GHz			Stop	2.390 00 GHz	Î

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#### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

Agilent 12:01:	24 Feb 11, 2010			RT	Freq/Channel
roject: 10J13061 e <b>f 110 dB</b> µ∨ Peak	#Atten 0 dB		Mkr1	2.324 96 GHz 56.80 dBµ∨	Center Freq 2.35000000 GHz
>g					Start Freq 2.31000000 GHz
1 3					Stop Freq 2.39000000 GHz
l.0 3μ∨ I <sup>Av</sup>		and the states with	ande la terretaria con	ien als detenden aus	CF Step 8.0000000 MHz <u>Auto Ma</u>
1 V2 3 FC					Freq Offset 0.00000000 Hz
): Tun vp					Signal Track <sup>On <u>Off</u></sup>
art 2.310 00 GHz Res BW 1 MHz	 	BW 1 MHz	Stop Sweep 1.067 n	2.390 00 GHz	

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roject: 10.113061			Mkr1	2 326 24 GHz	
ef 110 dBµ∨ Peak	#Atten 0 d	IB		45.73 dBµ∨	Center Freq 2.35000000 GHz
og D B/					Start Freq 2.31000000 GHz
B					Stop Freq 2.3900000 GHz
4.0 Βμ∨ gAv					CF Step 8.0000000 MHz Auto Ma
1 V2 3 FC					Freq Offset 0.00000000 Hz
(f): Tun wp					Signal Track On <u>Of</u>
tart 2.310 00 GHz		#\/P\W 10 H-	Stop	2.390 00 GHz	

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#### RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

Agrient 13.42			eq/Channel
roject: 10J13061 l <b>ef 110 dB</b> µ∨ Peak <b> </b>	#Atten 0 dB	Mkr1 2.496 617 5 GHz 56.71 dBµ∀ 2	Center Freq 49175000 GHz
og 0 B/		2	Start Freq 48350000 GHz
B		2	Stop Freq 50000000 GHz
4.0 Βμ∨ gAv	and a second product on the Part of Second Second		CF Step 65000000 MHz <u>to M</u> a
1 V2 3 FC			Freq Offset 1.00000000 Hz
(f): Tun wp		Or	Signal Track
	GH7	Stop 2 500 000 0 GHz	

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Duelle etc. 40 14000			ML	0 407 457		
Project: 1031306 Ref 110 dBµ∨	#Atter	0 dB	 WIKI	43.6	roiGnz 63 dBµ∨	Center Freq 2.49175000 GHz
APeak						
0 IB/						Start Freq 2.48350000 GHz
)ffst 2.3						
IB						Stop Freq 2.5000000 GHz
4.0						
IBµ∨			 			1.6500000 MHz
.gAv						<u>Auto Ma</u>
31 ∨2 33 FC	↓ ◆					Freq Offset 0.00000000 Hz
(f):						
Tun Swp						On <u>Off</u>
Start 2.483 500 0	GHz		Sto	p 2.500 000	0 GHz	-

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

	.41 1 65 11, 2010				
roject: 10J13061 <b>ef 110 dB</b> µ∨ Peak	#Atten 0 dB		Mkr1 2.48	%67725GHz 56.03dBµ∀	Center Freq 2.49175000 GHz
og ) B/					Start Freq 2.48350000 GHz
2.3 B					Stop Freq 2.50000000 GHz
l.0 Βμ∨ J <sup>Av</sup>	Alter Marker and Angenerite	for a factor of the second	ana sa	noper flore to a subsection	CF Step 1.6500000 MHz <u>Auto Ma</u>
1 V2 3 FC					Freq Offset 0.00000000 Hz
f): Гun мр					Signal Track On <u>Of</u>
tart 2.483 500 0	GHz		Stop 2.50	0 000 0 GHz	

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			00 700 0 011	
/roject: 10J13061 <b>tef 110 dB</b> μ∨ ⊠eek	#Atten 0 dB	 MKr1 2.4	88 780 0 GHz 43.51 dBµ∀	Center Freq 2.49175000 GHz
og				
0  B/				Start Freq 2.48350000 GHz
Affst 2.3				┣────
B				Stop Freq
4.0				2.0000000 0112
 ΙΒμ∨				CF Step
gAv				<u>Auto Ma</u>
31 V2				Fred Offset
3 FC				0.00000000 Hz
(f):				
Tun				On <u>Of</u>
, mp				┣━━━━━
402 500 0 (	247	 Stop 2.5	00 000 0 GHz	ž

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#### HARMONICS AND SPURIOUS EMISSIONS

Complia	High ance Ce	Frequency rtification (	Measurem Services, Fr	ent emont :	5m Ch	amber									
Compan	ıy:		MITSUMI												
Project #	#:		10J13061												
late: Test En	din e er:		2/11/10 Thanh Monwea												
Configu	ration:		EUT, Test JIG,	Support	Laptor	,									
/lode:			Transmit b mo	de	• •										
est Eq	uipmer	ıt:													
н	orn 1-	18GHz	Pre-an	nplifer	1-26	GHz	Pre-am	plifer	26-40GH	z	H	orn > 180	GHz		Limit
T59; S	S/N: 324	5@3m	- T145 A	gilent 3	008A0	056 🖵				-				-	FCC 15.209 🗸
Hi Freq	quency Ca	bles				_								_	
3' c	cable 2	2807700	12' c	able 2	28076	500	20' ca	ble 22	807500		HPF	Re	ject Filte	r <u>Peal</u> RB	<u>s Measurements</u> W=VBW=1MHz
3' ca	able 22	307700	, 12' ca	ble 228	07600	•	20' cab	le 2280	7500			• R_	001	<ul> <li>Avera RBW=</li> </ul>	ge Measurements 1MHz ; VBW=10Hz
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Сон	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
Harmon	ucs Spu	uious													
.824	3.0	46.3	41.6	32.8	5.8	-34.8	0.0	0.0	50.1	45.4	74	54	-23.9	-8.6	v
.263	3.0	42.6	33.1	35.1	7.2	-34.7	0.0	0.0	50.3	40.8	74	54	-23.7	-13.2	<u>v</u>
.648 2.060	3.0	39.4	30.0	37.1 39 =	8.5	-35.0	0.0	0.0	50.0	40.7	74	54 54	-24.0	-13.3	V Neice Fleen
∡.000 .824	3.0	35.0 44.2	223 39.1	38.5	9.8 5.8	-32.4	0.0	0.0	51.4 47.9	38.2 42.8	74 74	54 54	-22.0 - <b>26.1</b>	-15.8	Ivoise Floor H
.263	3.0	41.3	31.2	35.1	7.2	-34.7	0.0	0.0	49.D	38.9	74	54	-25.0	-15.1	 H
.648	3.0	40.8	32.5	37.1	8.5	-35.0	0.0	0.0	51.4	43.1	74	54	-22.6	-10.9	H
2.060 /fid Ch	3.0	35.2	22.2	38.5	У.8	-32.4	0.0	0.0	51.1	38.0	74	54	-22.9	-10.0	Nuise Floor
<b>.874</b>	3.0	46.1	42.7	32.8	5.8	-34.9	0.0	0.0	49.9	46.5	74	54	-24.1	-75	v
311	3.0	40.8	31.8	35.2	73	-34.7	0.0	0.0	48.6	39.6	74	54	-25.4	-14.4	v
.748	3.0	35.8	25.1	37.2	8.6	-35.0	0.0	0.0	46.5	35.8	74	54	-27.5	-18.2	Noise Floor
311	3.0	43.U 41.5	30.6 29.4	32.8	5.8 7.3	-34.9	0.0	0.0	40.8	40.4	74	54 54	-27.2	-13.6	н
.748	3.0	36.8	26.6	37.2	8.6	-35.0	0.0	0.0	47.5	37.3	74	54	-26.5	-16.7	Noise Floor
ligh Ch											•				
924	3.0	45.5	41.9	32.8	5.9	-34.9	0.0	0.0	49.4	45.7	74	54	-24.6	-8.3	V
386	3.0	42.6	31.5	35.3	7.3	-34.6	0.0	0.0	50.6 40.4	39.4	74	54 54	-23.4	-14.6	V
2.310	3.0	36.0	20.4	38.7	9.9	-35.1	0.0	0.0	52.1	38.2	74		-24.0	-10.0	
924	3.0	44.5	38.1	32.8	5.9	-34.9	0.0	0.0	48.4	42.0	74	54	-25.6	-12.0	Н
.386	3.0	40.8	32.0	35.3	73	-34.6	0.0	0.0	48.7	40.0	74	54	-25.3	-14.0	H
.848	3.0	38.3	24.0	37.2	8.7	-35.1	0.0	0.0	49.1	34.8	74	54	-24.9	-19.2	H Notes Else
∠1U Durjous	Emission	34.8 15	21.8	.38.7	99	-32.4	U.U	0.0	51,0	2911	/4	54	-23.0	-10 <sup>1</sup> 0	Ivoise Floor
.161	3.0	56.5	31.7	24.5	2.6	-36.0	0.0	0.0	47.5	22.8	74	54	-26.5	-31.2	v
593	3.0	54.0	35.2	26.1	3.0	-35.7	0.0	0.0	47.5	28.6	74	54	-26.5	-25.4	v
.862	3.0	49.7	33.6	27.1	3.3	-35.5	0.0	0.0	44.6	28.5	74	54	-29.4	-25.5	V
.009	30	51.8	459	28.1 24.0	3.8 2.4	-35.1	0.0	0.0	4/2 42.0	40.0	/4 74	54 54	-20.8 -32.0	-13.4	 Н
∛o other e	emission	s above system	n noise floor.												
.ev. 11.10	i 0.08 f Dist Read	Measureme Distance to Analyzer R	ent Frequency Antenna eading	7	<u>.</u>	Amp D Corr Avg	Preamp ( Distance Average	Gain Corre Field S	ct to 3 mete Strength @	ers 3 m	<u></u>	Avg Lim Pk Lim Avg Mar	Average F Peak Field Margin vs	ield Strengt I Strength La Average La	h Limit imit imit
	AF	Antenna Fa	ictor			Peak	Calculate	d Peal	c Field Stre	ngth		Pk Mar	Margin vs.	Peak Limit	
	CT	Cable Lage				UDE	Wigh Dog	a Tiltor		0					

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# 8.1.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

# RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



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Project: 10,113061			Mkr1 2	2 330 67 GHz	1
Ref 110 dBµ∨ /Peak □ □	#Atten 0	dB		45.09 dBµ∨	Center Freq 2.35000000 GHz
.og 0 IB/					Start Freq 2.31000000 GHz
2.1 IB					Stop Freq 2.3900000 GHz
i4.0 IBμ∨ .gAv					CF Step 8.00000000 MHz <u>Auto Ma</u>
31 V2 33 FC	•				Freq Offset 0.00000000 Hz
(f): Tun Swp					Signal Track <sup>On <u>Of</u></sup>
Start 2.310 00 GHz		#WDW 10 H-	Stop 2	2.390 00 GHz	

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#### RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

Agilent 14:00:	17 Feb 11, 2010		R I	Freq/Channel
ject: 10J13061 i <b>110 dB</b> µ∨ eak	#Atten 0 dB		Mkr1 2.328 27 GHz 57.86 dBµ∀	Center Freq 2.35000000 GHz
1				Start Freq 2.31000000 GHz
				Stop Freq 2.39000000 GHz
) JV W ghrandrunder	1. Andrey of Westerney and March 19 Mar	or Versilistic signa chamed bor	"Warder de al a construction of the second second	CF Step 8.00000000 MHz <u>Auto Ma</u>
√2 FC				Freq Offset 0.00000000 Hz
ın				Signal Track
Int 2.310 00 GHz	<u> </u>		Stop 2.390 00 GHz	-

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			2 222 00 CU-	
roject: 10013061 ef 110_dBµ∨	#Atten 0 dB	 MKr1	2.322 00 GHz 45.74 dBµ∨	Center Freq
- eak				2:336666666666666
og ) B∕				Start Freq 2.31000000 GHz
ffst 2.1				Stop Frea
				2.39000000 GHz
Bµ∀				CF Step 8.0000000 MHz
1				
1 V2 • • • • • • • • • • • • • • • • • •				Freq Offset 0.00000000 Hz
(f): Tun				Signal Track
wp				
tart 2.310 00 GHz		Stop	2.390 00 GHz	

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#### RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

Agilent 13:49	:14 Feb 11, 2010			RT	Freq/Channel
oject: 10J13061 • <b>f 110 dB</b> µ∨ ′eak	#Atten 0 dB		Mkr1 2.48	Center Freq 2.49175000 GHz	
g					Start Freq 2.48350000 GHz
.3					Stop Freq 2.5000000 GHz
.0 μν Αν μημινου	a she in a she in a she in a she	Agile Antonia and an Incon		unice and the second second second	CF Step 1.6500000 MHz <u>Auto Ma</u>
V2 FC					Freq Offset 0.00000000 Hz
): iun vp					Signal Track On <u>Of</u>
art 2.483 500 0	GHz "		Stop 2.50	00 000 0 GHz	

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²roject: 10J13061 <b>λef 110 dB</b> μ∨ ∕Peak □ □ □	#Atten 0	dB	Mkr1 2.49	Center Freq 2.49175000 GHz	
.og 0 IB/					Start Freq 2.48350000 GHz
B					Stop Freq 2.5000000 GHz
4.0 Βμ√ gAv					CF Step 1.6500000 MHz <u>Auto Ma</u>
1 V2				Å	Freq Offset 0.00000000 Hz
(f): Tun wp					Signal Track
tart 2.483 500 0	GHz	#VBW 10 H7	Stop 2.50	00 000 0 GHz	

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

Aylient 15.55	.04 Feb 11, 2010			RI	Freq/Channel
oject: 10J13061 ≱ <b>f 110 dB</b> µ∨ ?eak	#Atten 0 dB		Mkr1 2.490 5	127 5 GHz 7.36 dBµ∨	Center Freq 2.49175000 GHz
g					Start Freq 2.48350000 GHz
.3					Stop Freq 2.5000000 GHz
.0 βμγ Αν μενολογήσους	and and and and and and a second s	>	mulantipatrante	tration America	CF Step 1.6500000 MHz <u>Auto Ma</u>
V2 FC					Freq Offset 0.00000000 Hz
): iun vp					Signal Track On <u>Of</u>
art 2.483 500 0	GHz		Stop 2.500 (	000 0 GHz	

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			ML-4 2.44	00 207 E CU-	
Project: 10013061 Ref 110 dBµ∨ 4Peak □ □ □	#Atten 0	dB		43.93 dBµ∨	Center Freq 2.49175000 GHz
.og 0  B/					Start Freq 2.48350000 GHz
2.3  B					Stop Freq 2.5000000 GHz
4.0  Βμ∨ gAv					CF Step 1.65000000 MHz <u>Auto Ma</u>
11 V2				↓ ◆	Freq Offset 0.00000000 Hz
(f): Tun /wp					Signal Track On <u>Of</u>
itart 2.483 500 0	GHz	#VBW 10 Hz	Stop 2.50 Sween 1.28	00 000 0 GHz 7 s (601 pts)	

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## HARMONICS AND SPURIOUS EMISSIONS

eer: on: nent:	10J13061 2/11/10 Thanh Nguye EUT, Test JIC Transmit g me	en 1, Support ode	Laptop											
eer: on: nent:	2/11/10 Thanh Nguye EUT, Test JIC Transmit g me	en 4, Support ode	Laptop											
eer: on: <u>nent:</u>	Thanh Nguye EUT, Test JIC Transmit g mo	en 8, Support 5 de	Laptop											
nent:	EUT, Test JIC Transmit g mo	, Support de	Laptop											
<u>nent:</u>	Transmit g m	ode												
nent:	-													
<u>nent:</u>														
Horn 1-18GHz Pre-amplifer 1-26GHz				Pre-amplifer 26-40GHz				orn > 18(	GHz		Limit			
3245 (a) 3 m	- 1145 <i>I</i>	Agilent 3	008A0	056 -				<u> </u>				•	FCC 15.209	
le 22807700	12' 0	able 2	28076	00	20' ca	ble 22	807500		HPF	Re	ject Filte	r <u>Peak</u>	<u>Measurements</u>	
22807700	12' c	ahle 228	07600		20' cab	le 228	07500	i		R	001	Avera	ge Measurements	
				•			•					RBW=	1MHz;VBW=10Hz	
ist Read Pk	Read Avg	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	$\mathbf{Pk} \mathbf{Mar}$	$\operatorname{Avg} \operatorname{Mar}$	Notes	
m) dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)	
Spurious														
			50			0.0	(0.0							
10 44.5	29.3	32.8	5.8	-34.8	0.0	0.0	48.2	33.1	74	54 54	-25.8	-20.9	V Noice Floor	
41.0	26.9	32.8	5.8	-34.8	0.0	0.0	44.7	30.6	74	54	-29.3	-23.4	H	
1.0 38.2	25.1	35.1	7.2	-34.7	0.0	0.0	45.9	32.8	74	54	-28.1	-21.2	Noise Floor	
	ļ							•		•				
LD 43.1	26.8	32.8	5.8	-34.9	0.0	0.0	46.9	30.6	74	54	-27.1	-23.4	<u>v</u>	
LD 44.4	28.6	35.2	73	-34.7	0.0	0.0	52.2	36.4	74	54	-21.8	-17.6	Noise Floor	
10 43.0 10 41.5	26.0	32.8	2.8 73	-34.9	0.0	0.0	40.8	29.8	74 74	54 54	-21.2	-24.2	n Neise Fleer	
	105				0.0	0.0							10150 11001	
41.4	27.1	32.8	59	-34.9	0.0	0.0	45.3	31.0	74	54	- <b>28.7</b>	-23.0	v	
LD 43.7	28.3	35.3	73	-34.6	0.0	0.0	51.7	36.3	74	54	- <b>22.3</b>	-17.7	v	
LD 36.7	23.8	37.2	8.7	-35.1	0.0	0.0	47.5	34.6	74	54	-26.5	-19.4	Noise Floor	
43.5	29.0	32.8	59	-34.9	0.0	0.0	47.4	32.9	74	54	-26.6	-21.1	<u>H</u>	
0 39.7	27.4	37.2	/ J 87	-34.0	0.0	0.0	47.7	37.5	74 74	54 54	-20.3	-10./	n Neise Fleer	
sions above noise	floor.		<b>0.</b> ,	-00-11	0.0						-205	-1/-	T WEST THOT	
						ļ				ļ				
Measurem	ent Frequenc	Amp	Preamp Gain				Avg Lim	Average H	Field Strength	1 Limit				
st Distance t	o Antenna	tenna D Corr			Distance Correct to 3 meters					Pk Lim Peak Field Strength Limit				
ad Analyzer H	leading			Avg	Average Field Strength @ 3 m				Avg Mar	Margin vs	. Average Li	mit		
	actor	Peak Calculat			Calculate	alculated Peak Field Strength			Pk Mar	Margin vs	. Peak Limit			
<ul> <li>Antenna F</li> </ul>						T7 14.								
	Bigs         Bigs           2245 @3m         Cables           c Cables	3245 @3m       T145 //         y Cables       12' c         e 22807700       12' c         22807700       12' c         st       Read Pk         a)       dBuV         dBuV       dBuV         30       42.7         0       44.5         0       41.0         269       38.2         0       41.0         26.9       41.4         0       41.5         0       43.1         26.8       26.9         0       41.5         0       36.7         0       39.7         27.4       36.3         1       36.3         23.9       ions above noise floor.	3245 @3m       T145 Agilent 3         y Cables       12' cable 22         e 22807700       12' cable 22         22807700       12' cable 22         ist       Read Pk         a)       dBuV         dBuV       dBuV         dBuV       dBuV         a)       dBuV         a)       dBuV         a)       44.5         0       41.7         0       41.0         26.9       32.8         0       43.1         26.8       35.2         0       43.1         26.9       35.2         0       41.5         26.0       32.8         0       41.5         26.9       35.2         0       41.5         26.9       35.2         0       41.5         26.9       35.2         0       34.7         28.0       39.7         0       36.3         23.9       37.2         ions above noise floor.         Measurement Frequency         t       Distance to Antenna	3245 @3m       T145 Agilent 3008A0         y Cables       12' cable 22807700         22807700       12' cable 2280760         22807700       12' cable 2280760         ist       Read Pk         a)       dBuV         dBuV       29.3         d11.0       26.8         0       41.7         28.6       35.2 <td< td=""><td>3245 @3m       T145 Agilent 3008A0056         y Cables       12' cable 22807600         22807700       12' cable 22807600         12' cable 22807600       12' cable 22807600         ist       Read Pk         a)       dBuV         dBuV       dBuV         dBuV       dBuV         dBuV       dBuV         dBuV       dBuV         dBuV       dBuV         0       44.5         0       42.7         0       41.0         269       32.8         0       41.0         269       32.8         0       43.1         26.8       34.8         0       41.5         26.9       35.2         7.3       34.7         0       41.5         26.9       35.2         0       41.7         28.3       37.3         0       41.4         28.6       35.2         0       41.5         26.9       35.2         35.1       7.3         0       41.4         28.3       37.3         0       36</td><td>3245 @3m       T145 Agilent 3008A0056         y Cables       22807700         22807700       12' cable 22807600         12' cable 22807600       20' cal         22807700       12' cable 22807600         12' cable 22807600       20' cal         2807700       12' cable 22807600         12' cable 22807600       20' cal         st       Read Pk         BuV       dBuV         dBuV       dBuV         dBuV       dBuV         0       44.5         0       42.7         27.6       35.1         0       41.0         269       32.8         58       -34.8       0.0         0       41.1       26.9       32.8         0       43.1       26.8       32.8       5.8         0       41.5       26.9       35.2       7.3       -34.7       0.0         0       41.5       26.9       35.2       7.3       -34.7       0.0         0       41.5       26.9       35.2       7.3       -34.7       0.0         0       41.5       26.9       35.2       7.3       -34.6       0.0</td><td>T145 Agilent 3008A0056 ,         22807700       20' cable 22         22807700       20' cable 22         22807700       20' cable 22         20' cable 22807600       20' cable 22         12' cable 22807600       20' cable 22         st Read Avg. AF       CL Amp D Corr Fhr         a) dBuV dBuV dB/m dB       dB dB       dB         0       44.5       29.3       32.8       5.8       34.8       0.0       0.0         0       44.5       29.3       32.8       5.8       34.8       0.0       0.0         0       44.5       29.3       32.8       5.8       34.4       0.0       0.0         0       44.5       29.3       32.8       5.8       34.4       0.0       0.0       0.0       0.0       0.0       0.0       0.0       <th< td=""><td>T145 Agilent 3008A0056 ,         22807700         22807700         22807700         22807700         21' cable 22807600         20' cable 22807500         0         0         20' cable 22807500         <th col<="" td=""><td>3245 @3m       T145 Agilent 3008A0056         v Cables       20' cable 22807700       12' cable 22807600       20' cable 22807500         22807700       12' cable 22807600       20' cable 22807500       20' cable 22807500         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg         a)       dBuV       dBuV       dB'm       dB       dB</td><td>TH45 Agilent 3008A0056 ,         2245 @3m       TH45 Agilent 3008A0056 ,         2 Cables       20' cable 22807500       HPF         22807700       12' cable 22807600       20' cable 22807500       HPF         3t       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim         a)       dBuV       dBuV       dB/m       dB       dD       dD       da       dB       dW/m       dW/m       <thd>dB       dW/m       <thd>d</thd></thd></td><td>Tit's Agilent 3008A0056         Cables       20' cable 22807500       12' cable 22807600       20' cable 22807500       HPF       Re         22807700       12' cable 22807600       20' cable 22807500       0       0       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         Spurious      </td><td>TH5 Agilent 3008A0056         Colspan="2"&gt;Presump Gain         22807700       12' cable 22807600       20' cable 22807500         2807700       12' cable 22807600       Presump Call       HPF       Reject Filte         2807700       20' cable 22807500       Presump Call       HPF       Reject Filte         2807700       D Corr       Filt       Peak       Avg       Pk Lim       Avg Lim       Reject Filte         2807500       D       D       Presump Call       Presump Call         Arg D       Colspan= 2807500       Presump Call       Presump Call         Arg D       Corr D       Arg P       Presump Call         Arg D       Arg D</td><td>Read Pk       Read Avg.       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lin       Avg Lin       Pk Mar       Avg Mar         0       12' cable 22807600       12' cable 22807600       20' cable 22807500       12' cable 22807600       12' cable 22807600       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' c</td></th></td></th<></td></td<>	3245 @3m       T145 Agilent 3008A0056         y Cables       12' cable 22807600         22807700       12' cable 22807600         12' cable 22807600       12' cable 22807600         ist       Read Pk         a)       dBuV         dBuV       dBuV         dBuV       dBuV         dBuV       dBuV         dBuV       dBuV         dBuV       dBuV         0       44.5         0       42.7         0       41.0         269       32.8         0       41.0         269       32.8         0       43.1         26.8       34.8         0       41.5         26.9       35.2         7.3       34.7         0       41.5         26.9       35.2         0       41.7         28.3       37.3         0       41.4         28.6       35.2         0       41.5         26.9       35.2         35.1       7.3         0       41.4         28.3       37.3         0       36	3245 @3m       T145 Agilent 3008A0056         y Cables       22807700         22807700       12' cable 22807600         12' cable 22807600       20' cal         22807700       12' cable 22807600         12' cable 22807600       20' cal         2807700       12' cable 22807600         12' cable 22807600       20' cal         st       Read Pk         BuV       dBuV         dBuV       dBuV         dBuV       dBuV         0       44.5         0       42.7         27.6       35.1         0       41.0         269       32.8         58       -34.8       0.0         0       41.1       26.9       32.8         0       43.1       26.8       32.8       5.8         0       41.5       26.9       35.2       7.3       -34.7       0.0         0       41.5       26.9       35.2       7.3       -34.7       0.0         0       41.5       26.9       35.2       7.3       -34.7       0.0         0       41.5       26.9       35.2       7.3       -34.6       0.0	T145 Agilent 3008A0056 ,         22807700       20' cable 22         22807700       20' cable 22         22807700       20' cable 22         20' cable 22807600       20' cable 22         12' cable 22807600       20' cable 22         st Read Avg. AF       CL Amp D Corr Fhr         a) dBuV dBuV dB/m dB       dB dB       dB         0       44.5       29.3       32.8       5.8       34.8       0.0       0.0         0       44.5       29.3       32.8       5.8       34.8       0.0       0.0         0       44.5       29.3       32.8       5.8       34.4       0.0       0.0         0       44.5       29.3       32.8       5.8       34.4       0.0       0.0       0.0       0.0       0.0       0.0       0.0 <th< td=""><td>T145 Agilent 3008A0056 ,         22807700         22807700         22807700         22807700         21' cable 22807600         20' cable 22807500         0         0         20' cable 22807500         <th col<="" td=""><td>3245 @3m       T145 Agilent 3008A0056         v Cables       20' cable 22807700       12' cable 22807600       20' cable 22807500         22807700       12' cable 22807600       20' cable 22807500       20' cable 22807500         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg         a)       dBuV       dBuV       dB'm       dB       dB</td><td>TH45 Agilent 3008A0056 ,         2245 @3m       TH45 Agilent 3008A0056 ,         2 Cables       20' cable 22807500       HPF         22807700       12' cable 22807600       20' cable 22807500       HPF         3t       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim         a)       dBuV       dBuV       dB/m       dB       dD       dD       da       dB       dW/m       dW/m       <thd>dB       dW/m       <thd>d</thd></thd></td><td>Tit's Agilent 3008A0056         Cables       20' cable 22807500       12' cable 22807600       20' cable 22807500       HPF       Re         22807700       12' cable 22807600       20' cable 22807500       0       0       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         Spurious      </td><td>TH5 Agilent 3008A0056         Colspan="2"&gt;Presump Gain         22807700       12' cable 22807600       20' cable 22807500         2807700       12' cable 22807600       Presump Call       HPF       Reject Filte         2807700       20' cable 22807500       Presump Call       HPF       Reject Filte         2807700       D Corr       Filt       Peak       Avg       Pk Lim       Avg Lim       Reject Filte         2807500       D       D       Presump Call       Presump Call         Arg D       Colspan= 2807500       Presump Call       Presump Call         Arg D       Corr D       Arg P       Presump Call         Arg D       Arg D</td><td>Read Pk       Read Avg.       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lin       Avg Lin       Pk Mar       Avg Mar         0       12' cable 22807600       12' cable 22807600       20' cable 22807500       12' cable 22807600       12' cable 22807600       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' c</td></th></td></th<>	T145 Agilent 3008A0056 ,         22807700         22807700         22807700         22807700         21' cable 22807600         20' cable 22807500         0         0         20' cable 22807500         20' cable 22807500         20' cable 22807500         20' cable 22807500         20' cable 22807500 <th col<="" td=""><td>3245 @3m       T145 Agilent 3008A0056         v Cables       20' cable 22807700       12' cable 22807600       20' cable 22807500         22807700       12' cable 22807600       20' cable 22807500       20' cable 22807500         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg         a)       dBuV       dBuV       dB'm       dB       dB</td><td>TH45 Agilent 3008A0056 ,         2245 @3m       TH45 Agilent 3008A0056 ,         2 Cables       20' cable 22807500       HPF         22807700       12' cable 22807600       20' cable 22807500       HPF         3t       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim         a)       dBuV       dBuV       dB/m       dB       dD       dD       da       dB       dW/m       dW/m       <thd>dB       dW/m       <thd>d</thd></thd></td><td>Tit's Agilent 3008A0056         Cables       20' cable 22807500       12' cable 22807600       20' cable 22807500       HPF       Re         22807700       12' cable 22807600       20' cable 22807500       0       0       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         Spurious      </td><td>TH5 Agilent 3008A0056         Colspan="2"&gt;Presump Gain         22807700       12' cable 22807600       20' cable 22807500         2807700       12' cable 22807600       Presump Call       HPF       Reject Filte         2807700       20' cable 22807500       Presump Call       HPF       Reject Filte         2807700       D Corr       Filt       Peak       Avg       Pk Lim       Avg Lim       Reject Filte         2807500       D       D       Presump Call       Presump Call         Arg D       Colspan= 2807500       Presump Call       Presump Call         Arg D       Corr D       Arg P       Presump Call         Arg D       Arg D</td><td>Read Pk       Read Avg.       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lin       Avg Lin       Pk Mar       Avg Mar         0       12' cable 22807600       12' cable 22807600       20' cable 22807500       12' cable 22807600       12' cable 22807600       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' c</td></th>	<td>3245 @3m       T145 Agilent 3008A0056         v Cables       20' cable 22807700       12' cable 22807600       20' cable 22807500         22807700       12' cable 22807600       20' cable 22807500       20' cable 22807500         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg         a)       dBuV       dBuV       dB'm       dB       dB</td> <td>TH45 Agilent 3008A0056 ,         2245 @3m       TH45 Agilent 3008A0056 ,         2 Cables       20' cable 22807500       HPF         22807700       12' cable 22807600       20' cable 22807500       HPF         3t       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim         a)       dBuV       dBuV       dB/m       dB       dD       dD       da       dB       dW/m       dW/m       <thd>dB       dW/m       <thd>d</thd></thd></td> <td>Tit's Agilent 3008A0056         Cables       20' cable 22807500       12' cable 22807600       20' cable 22807500       HPF       Re         22807700       12' cable 22807600       20' cable 22807500       0       0       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         Spurious      </td> <td>TH5 Agilent 3008A0056         Colspan="2"&gt;Presump Gain         22807700       12' cable 22807600       20' cable 22807500         2807700       12' cable 22807600       Presump Call       HPF       Reject Filte         2807700       20' cable 22807500       Presump Call       HPF       Reject Filte         2807700       D Corr       Filt       Peak       Avg       Pk Lim       Avg Lim       Reject Filte         2807500       D       D       Presump Call       Presump Call         Arg D       Colspan= 2807500       Presump Call       Presump Call         Arg D       Corr D       Arg P       Presump Call         Arg D       Arg D</td> <td>Read Pk       Read Avg.       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lin       Avg Lin       Pk Mar       Avg Mar         0       12' cable 22807600       12' cable 22807600       20' cable 22807500       12' cable 22807600       12' cable 22807600       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' c</td>	3245 @3m       T145 Agilent 3008A0056         v Cables       20' cable 22807700       12' cable 22807600       20' cable 22807500         22807700       12' cable 22807600       20' cable 22807500       20' cable 22807500         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg         a)       dBuV       dBuV       dB'm       dB       dB	TH45 Agilent 3008A0056 ,         2245 @3m       TH45 Agilent 3008A0056 ,         2 Cables       20' cable 22807500       HPF         22807700       12' cable 22807600       20' cable 22807500       HPF         3t       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim         a)       dBuV       dBuV       dB/m       dB       dD       dD       da       dB       dW/m       dW/m <thd>dB       dW/m       <thd>d</thd></thd>	Tit's Agilent 3008A0056         Cables       20' cable 22807500       12' cable 22807600       20' cable 22807500       HPF       Re         22807700       12' cable 22807600       20' cable 22807500       0       0       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         st       Read Pk       Read Avg       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lim       Avg Lim         Spurious	TH5 Agilent 3008A0056         Colspan="2">Presump Gain         22807700       12' cable 22807600       20' cable 22807500         2807700       12' cable 22807600       Presump Call       HPF       Reject Filte         2807700       20' cable 22807500       Presump Call       HPF       Reject Filte         2807700       D Corr       Filt       Peak       Avg       Pk Lim       Avg Lim       Reject Filte         2807500       D       D       Presump Call       Presump Call         Arg D       Colspan= 2807500       Presump Call       Presump Call         Arg D       Corr D       Arg P       Presump Call         Arg D       Arg D	Read Pk       Read Avg.       AF       CL       Amp       D Corr       Fltr       Peak       Avg       Pk Lin       Avg Lin       Pk Mar       Avg Mar         0       12' cable 22807600       12' cable 22807600       20' cable 22807500       12' cable 22807600       12' cable 22807600       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' cable 22807600       12' cable 22807500       12' c

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# 8.2. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4701C 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of CCS.

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#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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30-1000Mi Complian	lz Frequ e Certii	iency Meas fication Se	uremen rvices, Fi	t remon	t 5m Ch	amber									
Fest Engr: Date: Project #: Company:		Thanh Ng 02/12/09 10J13061 MITSUM	çuyen [												
Test Targe Modo Ono		Transmit	····												
-	f Dist Read AF CL	Measurem Distance t Analyzer l Antenna F Cable Loss	ent Frequ o Antenr Reading Factor	iency ia	Amp D Corr Filter Corr. Limit	Preamp Distance Filter Ins Calculate Field Stre	Gain Correct ert Loss d Field S ength Lir	to 3 meters trength nit		Margin	Margin vs.	. Limit			
f	Dist	Read	AF	CL	Amp	DCorr	Filter	Согт.	Limit	Margin	Ant. Pol.	Det.	Ant. High	Table Angle	Notes
MHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/OP	cm	Degree	110120
EIIT with I	C nowe	r sımnlv				1									
31.200	3.0	30.1	19.8	0.5	29.7	0.0	0.0	20.7	40.0	-19.3	H	P	100.0	0 - 360	Full Scan
114.603	3.0	31.8	12.7	1.0	29.5	0.0	0.0	16.0	43.5	-27.5	H	Р	100.0	0 - 360	
143.165	3.0	32.2	13.0	1.1	29.3	0.0	0.0	16.9	43.5	-26.6	H	P	100.0	0 - 360	
195.367	3.0	33.2	11.6	1.3	28.9	0.0	0.0	17.2	43.5	- <b>26.3</b>	H	P	100.0	0 - 360	
202.807	3.0	33.0	12.0	1.3	28.9	0.0	0.0	17.4	43.5	-26.1	H	P	100.0	0 - 360	
952.598	3.0	30.0	22.1	3.1	28.5	0.0	0.0	26.8	46.0	-19.2	H	Р	100.0	0 - 360	
35.760	3.0	33.6	17.4	0.5	29.6	0.0	0.0	21.9	40.0	-18.1	V	Р	100.0	0 - 360	
119.404	3.0	35.6	13.6	1.0	29.5	0.0	0.0	20.7	43.5	-22.8	V	P	100.0	0 - 360	
195.367	3.0	37.2	11.6	1.3	28.9	0.0	0.0	21.1	43.5	-22.4	V	P	100.0	0 - 360	
891.876	3.0	29.6	21.5	3.0	28.6	0.0	0.0	25.4	46.0	-20.6	V.	Р	100.0	U - 360	
No other e	mission	s were dete	cted abo	ve sys	tem nois	e floor									

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## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBuV)			
	Quasi-peak	Average		
0.15-0.5	66 to 56 °	56 to 46 "		
0.5-5	56	46		
5-30	60	50		

\* Decreases with the logarithm of the frequency.

#### TEST PROCEDURE

#### ANSI C63.4

#### **RESULTS**

### **6 WORST EMISSIONS**

	CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq.		Closs	Limit	EN_B	Margin		Remark				
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2		
0.17	49.76		32.22	0.00	64.77	54.77	-15.01	-22.55	L1		
0.22	46.72		28.33	0.00	62.74	52.74	-16.02	-24.41	L1		
9.00	29.12		19.10	0.00	60.00	50.00	-30.88	-30.90	L1		
0.17	49.16		32.49	0.00	65.01	55.01	-15.85	-22.52	L2		
0.63	33.42		14.01	0.00	56.00	46.00	-22.58	-31.99	L2		
10.13	31.37		20.51	0.00	60.00	50.00	-28.63	-29.49	L2		
6 Worst I	Data										

#### LINE 1 RESULTS



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#### LINE 2 RESULTS



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#### MAXIMUM PERMISSIBLE EXPOSURE 10.

#### FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	nits for Occupational	I/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4 <i>.89/</i> 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 8
(B) Limits	for General Populati	ion/Uncontrolled Exp	posure	
0.3–1.34	614 824 <i>/</i> f	1.63 2.19/f	*(100) *(180/f <sup>2</sup> )	30 30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

#### TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
30-300	27.5	0.073	0.2	30
1500-100,000			1.0	30

f = frequency in MHz

f = frequency in MHz \* = Plane-wave equivalent power density NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occu-pational/controlled limits apply provided he or she is made aware of the potential for exposure. NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be ex-posed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure.

exposure or can not exercise control over their exposure.

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#### **EQUATIONS**

Power density is given by:

S = EIRP / (4 \* Pi \* D^2)

where

S = Power density in W/m<sup>2</sup> EIRP = Equivalent Isotropic Radiated Power in W D = Separation distance in m

Power density in units of W/m<sup>2</sup> is converted to units of mWc/m<sup>2</sup> by dividing by 10.

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

### LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm<sup>2</sup>

### <u>RESULTS</u>

Band	Mode	Separation	Output	Antenna	IC Power	FCC Power
		Distance	Power	Gain	Density	Density
		(m)	(dBm)	(dBi)	(W/m^2)	(mW/cm^2)
2.4 GHz	b mode	0.20	20.53	1.84	0.34	0.034
2.4 GHz	g mode	0.20	20.01	1.84	0.30	0.030

### 11. SETUP PHOTOS

#### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



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#### RADIATED RF MEASUREMENT SETUP





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### POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





# **END OF REPORT**

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