

# FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 7

**CERTIFICATION TEST REPORT** 

FOR

WIRELESS LAN MODULE

MODEL NUMBER: DWM-W015

FCC ID: EW4DWMW015 IC: 4250A-DWMW015

REPORT NUMBER: 08J12039-1

**ISSUE DATE: AUGUST 30, 2008** 

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

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

(R)

NVLAP LAB CODE 200065-0

# **Revision History**

Rev.	lssue Date	Revisions	Revised By
	08/30/08	Initial Issue	T. Chan
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Page 2 of 2

# TABLE OF CONTENTS

1.	ATTES	STATION OF TEST RESULTS	5
2.	TEST	METHODOLOGY	6
3.	FACIL	ITIES AND ACCREDITATION	6
4.	CALIB	BRATION AND UNCERTAINTY	6
4	.1. N	AEASURING INSTRUMENT CALIBRATION	6
4		NEASUREMENT UNCERTAINTY	
5.	EQUIF	PMENT UNDER TEST	7
5	.1. C	DESCRIPTION OF EUT	7
5	.2. N	MAXIMUM OUTPUT POWER	7
5	.3. L	DESCRIPTION OF AVAILABLE ANTENNAS	7
5	. <i>4.</i> S	SOFTWARE AND FIRMWARE	7
5	.5. V	VORST-CASE CONFIGURATIONS	7
5	.6. D	DESCRIPTION OF TEST SETUP	8
6.	TEST	AND MEASUREMENT EQUIPMENT1	2
7.		NNA PORT TEST RESULTS1	3
7	.1. 8	302.11 MODE1	13
	7.1.1.	6 dB BANDWIDTH	
	7.1.2. 7.1.3.	99% BANDWIDTH	
	7.1.4.	POWER SPECTRAL DENSITY1	9
	7.1.5.	CONDUCTED SPURIOUS EMISSIONS2	
7	.2. 8 7.2.1.	202.11b MODE	
	7.2.1.	99% BANDWIDTH	
	7.2.3.	OUTPUT POWER	
	7.2.4. 7.2.5.	POWER SPECTRAL DENSITY	
7		302.11g MODE	
'	7.3.1.	6 dB BANDWIDTH	37
	7.3.2.	99% BANDWIDTH	
	7.3.3. 7.3.4.	OUTPUT POWER4 POWER SPECTRAL DENSITY4	
	7.3.5.	CONDUCTED SPURIOUS EMISSIONS	
8.	RADIA	ATED TEST RESULTS4	9
8	.1. L	IMITS AND PROCEDURE	19
8		RANSMITTER ABOVE 1 GHz	
	8.2.1.	802.11 MODE5	50

Page 3 of 3

	.2. 802.11b MODE .3. 802.11g MODE	
8.3.	RECEIVER ABOVE 1 GHz	
8.4.	WORST-CASE BELOW 1 GHz	84
9. AC	POWER LINE CONDUCTED EMISSIONS	100
	MAXIMUM PERMISSIBLE EXPOSURE	402
10. I		

Page 4 of 4

# **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME:	MITSUMI ELECTRIC CO., LTD. 1601, SAKAI, ATSUGI-SHI KANAGAWA, JAPAN
EUT DESCRIPTION:	WIRELESS LAN MODULE
MODEL:	DWM-W015
802.11 EUT:	* Radiated: _ AAAmPP3BG135, Tyco Antenna _ AAAmPP3EH513, Foxconn Antenna * Conducted: AAAmPP3CH327
802.11b/g EUT:	* Radiated: _ AAAmPP3BG572, Tyco Antenna _ AAAmPP3EH069, Foxconn Antenna * Conducted: AAAmPP3CH207
DATE TESTED:	AUGUST 24 - 28, 2008

APPLICABLE STANDARDS					
STANDARD	TEST RESULTS				
CFR 47 Part 15 Subpart C	Pass				
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass				
INDUSTRY CANADA RSS-GEN Issue 2	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. 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. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES Tested By:

VIEN TRAN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

Page 5 of 5

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

# 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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

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

Page 6 of 6

# 5. EQUIPMENT UNDER TEST

# 5.1. DESCRIPTION OF EUT

The EUT is an 802.11 and 802.11 b/g portable game machines with Wireless LAN.

The radio module is manufactured by Mitsumi Electric Co., Ltd.

# 5.2. MAXIMUM OUTPUT POWER

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

Frequency Band	Mode	Output Power	Output Power
(MHz)		(dBm)	(mW)
2412 - 2472	802.11	2.93	2.0
2412 - 2462	802.11b	7.65	5.8
2412 - 2462	802.11g	12.31	17.0

# 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two different types of antennas, with a maximum gain of 0.879 dBi for Foxconn antenna (Dipole) and 0.80 dBi for Tyco antenna (PIFA).

# 5.4. SOFTWARE AND FIRMWARE

For 802.11 EUT: The test utility software that was used was WM TEST.

For 802.11bg EUT: The EUT driver and utility software installed in the host support equipment during testing was Atheros Radio Test 6000, revision 2.2 build #8, V53\_mercury.

# 5.5. WORST-CASE CONFIGURATIONS

The worst-case data rate for each mode is determined to be as follows, based on preliminary tests of the chipset utilized in this radio.

All final tests in the 802.11 mode were made at 2 Mb/s. All final tests in the 802.11b mode were made at 1 Mb/s. All final tests in the 802.11g mode were made at 6 Mb/s.

The worst-position was the EUT with highest emissions. To determine the worst-case, the EUT was investigated for X, Y, Z, and mobile position, the worst-position was turned out to be a mobile position.

For AC line conducted and radiated emissions below 1 GHz. To determine the worst-case, the EUT was investigated with four different AC/DC adapters, and the worst-case configuration is turned out to be a Mitsumi AC/DC adapter.

Page 7 of 7

# 5.6. DESCRIPTION OF TEST SETUP

### FOR 802.11 EUT

#### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST					
Description Manufacturer Model Serial Number					
AC Adapter	Mitsumi	WAP-002	Sample #2		

### I/O CABLES

	I/O CABLE LIST							
Cable No.	Port	# of Identic Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	DC	1	DC	Un-shileded	1m	2-PRONG		

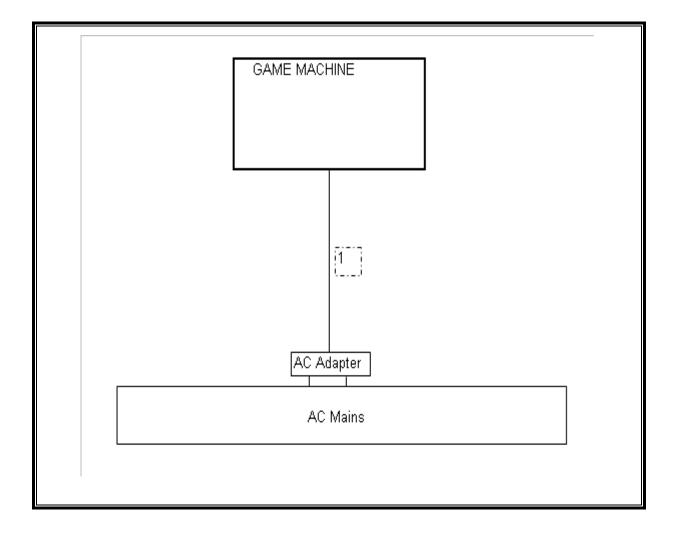
### TEST SETUP

The EUT is a stand alone unit during the test. Test software exercised the radio card.

Page 8 of 8

# SETUP DIAGRAM FOR TESTS

### FOR RADIATED TEST



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Page 9 of 9

# FOR 802.11b/g EUT

#### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST						
Description Manufacturer Model Serial Number						
Laptop	HP	6710b	CNU80800TB			
AC Adapter	HP	PA-1900-18H2	W97950ELLV10VM			
EUT AC Adapter	Mitsumi	WAP-002	Sample 2			
USB Adapter Board	Nintendo	NA	NA			

# I/O CABLES

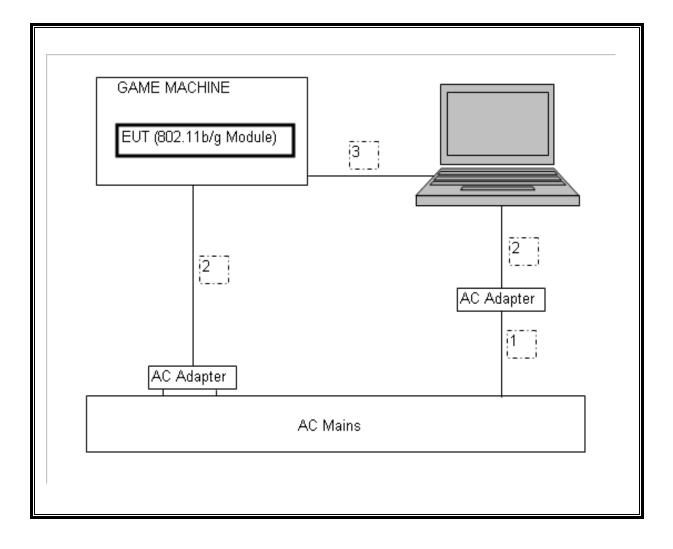
	I/O CABLE LIST							
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	AC	1	US 115V	Un-shielded	2m	No		
2	DC	2	DC	Un-shielded	2m	No		
3	USB	1	USB	Un-shielded	2m	Yes		
4	USB	1	SPI-USB	Un-shielded	0.3m	Yes		

## TEST SETUP

The EUT is connected to a host laptop computer via a USB adapter board during the tests. Test software exercised the radio card.

Page 10 of 10

# SETUP DIAGRAM FOR TESTS



Page 11 of 11

# 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		
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	06/12/09		
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	06/12/09		
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	05/09/09		
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/08		
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/25/08		
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	01/27/09		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	08/07/09		
Antenna, Horn, 18 GHz	ETS	3117	C01006	04/15/09		
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/03/09		
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	10/13/08		
Peak Power Meter	Agilent / HP	E4416A	C00963	12/02/08		
Peak / Average Power Sensor	Agilent	E9327A	C00964	12/02/08		
Antenna, Horn 26 ~ 40 GHz	ARA	MWH-2640/B	C01009	04/13/09		
4.0 GHz High Pass Filter	Micro Tronics	HPM13351	N/A	N/A		
2.4 - 2.5 Reject Filter	Micro Tronics	BRM50702	N/A	N/A		

Page 12 of 12

# 7. ANTENNA PORT TEST RESULTS

# 7.1. 802.11 MODE

# 7.1.1. 6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.247 (a) (2), IC RSS-210 A8.2 (a) & LP0002 §3.10.1 (6) (6.2.1) The minimum 6 dB bandwidth shall be at least 500 kHz.

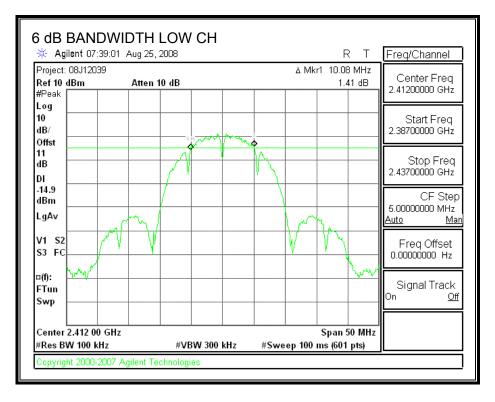
# TEST PROCEDURE

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.

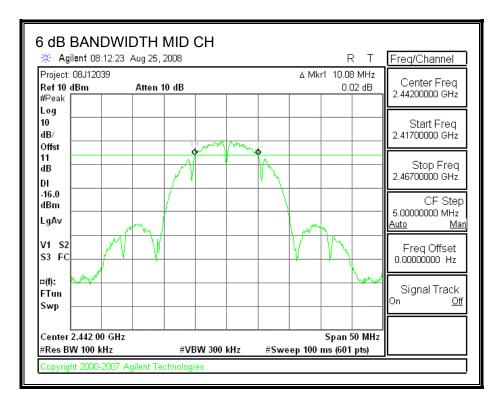
### RESULTS

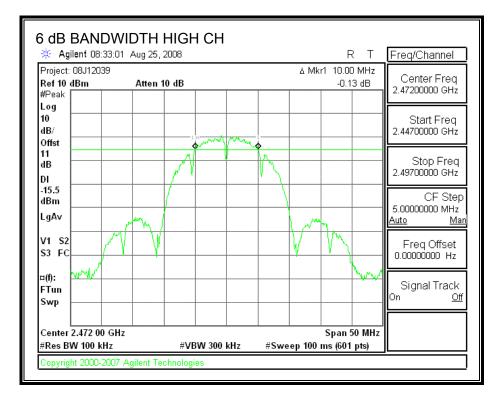
Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	10.08	0.5
Middle	2442	10.08	0.5
High	2472	10.00	0.5

# 6 dB BANDWIDTH



Page 13 of 13





Page 14 of 14

# 7.1.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

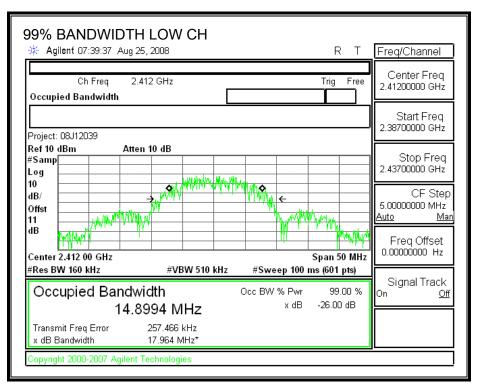
### TEST PROCEDURE

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.

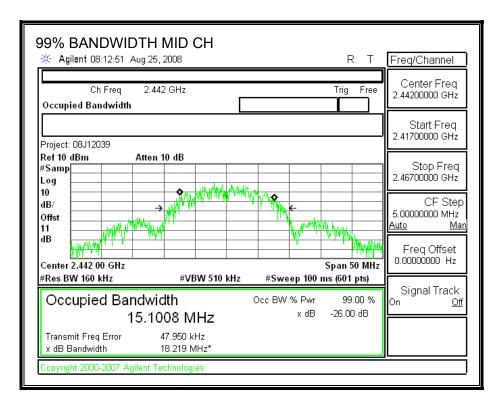
#### RESULTS

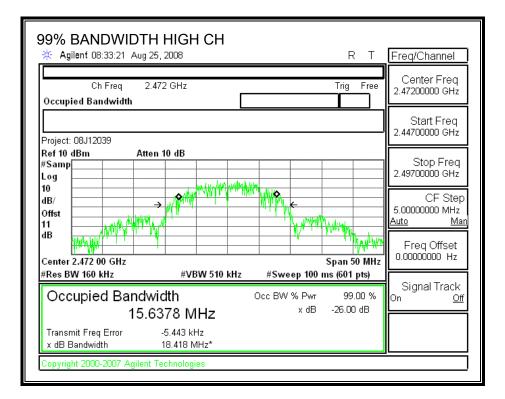
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	14.8994
Middle	2442	15.1008
High	2472	15.6378

#### 99% BANDWIDTH



Page 15 of 15





Page 16 of 16

# 7.1.3. OUTPUT POWER

## LIMITS

FCC §15.247 (b), IC RSS-210 A8.4, LP0002 § 3.10.1 (2) (2.3); (3) (3.1.1) The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

## TEST PROCEDURE

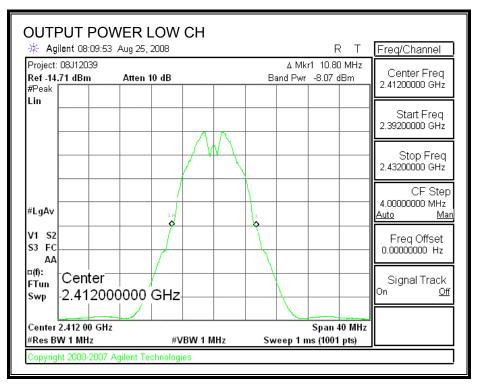
Peak power is measured using the Channel bandwidth Alternative peak output power procedure

Channel	Frequency	Spectrum	Attenuator and	Output	Limit	Margin
		Analyzer Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	-8.07	11	2.93	30	-27.07
Middle	2442	-8.95	11	2.05	30	-27.95
High	2472	-8.78	11	2.22	30	-27.78

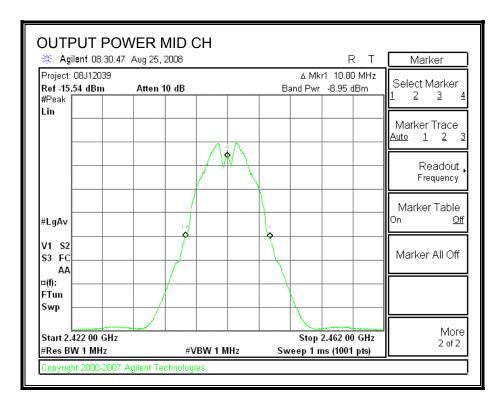
specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003

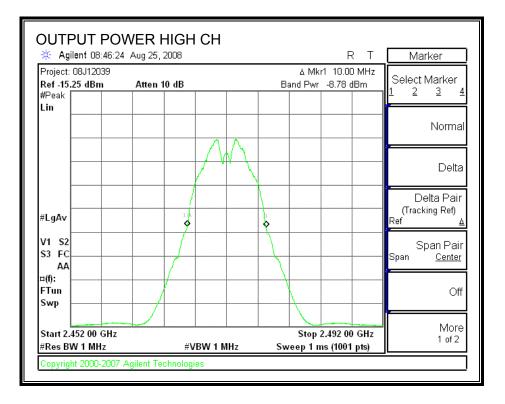
### **RESULTS**

### OUTPUT POWER



Page 17 of 17





Page 18 of 18

# 7.1.4. POWER SPECTRAL DENSITY

### <u>LIMITS</u>

# FCC §15.247 (e), IC RSS-210 A8.2 (b), 3.10.1 (6) (6.2.2)

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.

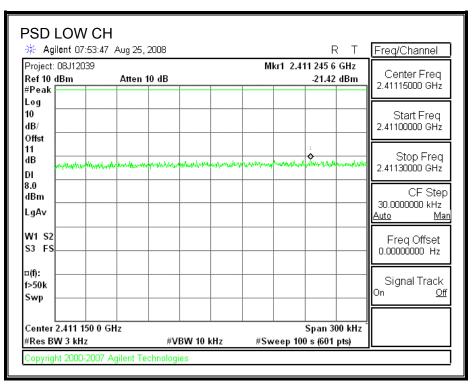
### TEST PROCEDURE

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.

## <u>RESULTS</u>

Channel	Frequency	equency PPSD		Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-21.42	8	-29.42
Middle	2442	-22.84	8	-30.84
High	2472	-21.77	8	-29.77

# POWER SPECTRAL DENSITY



Page 19 of 19

Project: 08J12039			Mkr1 2.44	42 811 9 GHz	Freq/Channel
Ref 10 dBm #Peak	Atten 10 dB			-22.84 dBm	Center Freq 2.44290000 GHz
Log 10					Start Freq
dB/					2.44275000 GHz
Offst 11 dB		here the state of the second	where we are a straight	1-2013-downodelian-downor	Stop Freq 2.44305000 GHz
DI					CF Ster 30.000000 kHz
LgAv					<u>Auto Ma</u>
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track On <u>Of</u>
Center 2.442 900	0 GHz			Span 300 kHz î	

	ilent 08:3		.09 20,	2000				kr1 2.47			Freq/Channel
Project: Ref 10 ( #Peak		9	Atten ′	10 dB				Kr1 2.47	-21.77		Center Freq 2.47265000 GHz
Log 10 dB/ Offst											Start Freq 2.47250000 GHz
11 dB DI	dyrthnoghanth	perduckto	fter the second	Monum	an an short	hadenser	town of the second	1 An an	vergniskiljer	uht/energhan	Stop Freq 2.47280000 GHz
8.0 dBm LgA∨											CF Step 30.0000000 kHz <u>Auto Ma</u>
W1 S2 S3 FS											Freq Offset 0.00000000 Hz
¤(f): f>50k Swp											Signal Track On <u>Of</u>
	2.472 65 W 3 kHz	0 0 GH	z	#V	BW 10 I	(H7	#5w	/eep 100	Span 30 ) s <i>(</i> 601		

Page 20 of 20

# 7.1.5. CONDUCTED SPURIOUS EMISSIONS

### <u>LIMITS</u>

FCC §15.247 (d), IC RSS-210 A8.5, LP0002 § 3.10.1 (5) Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

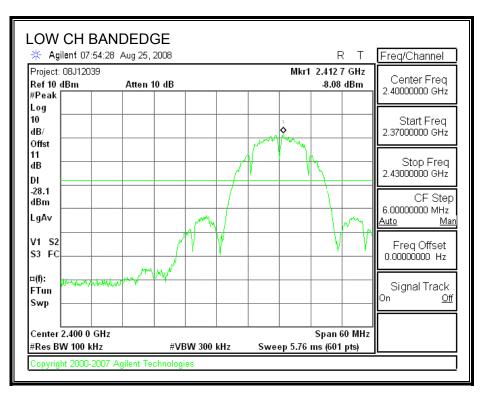
#### TEST PROCEDURE

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.

#### **RESULTS**

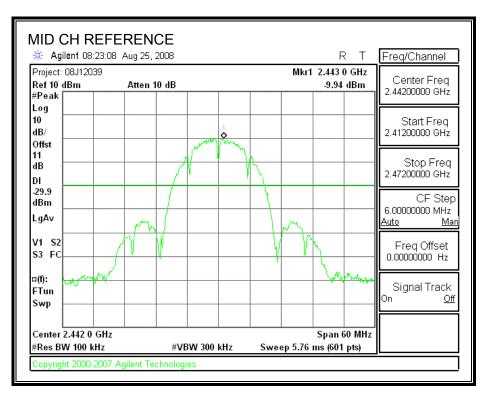
### SPURIOUS EMISSIONS, LOW CHANNEL



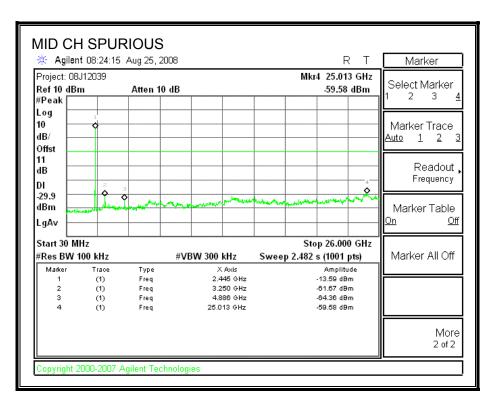
Page 21 of 21

		Aug 25, 2008	3			F		Marker
Project: 08 Ref 10 dBu Peak		Atten 10 d	B		Mk	.r2 3.22 -60.14		Select Marker 1 <u>2 3</u>
.og								Marker Trace <u>Auto</u> 12
								Readout Frequency
)  28.1  Bm			- A CONTRACTOR OF THE ACTION	with when much		han haled	ww	Marker Table
_gAv ├─								<u>On Of</u>
Start 30 M					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
Manker 1 2	Trace (1) (1)	Type Freq Freq	X Axis 2.419 GH: 3.224 GH:	-		Amplitu 10.62 dB 60.14 dB	'm	
								More 2 of 2

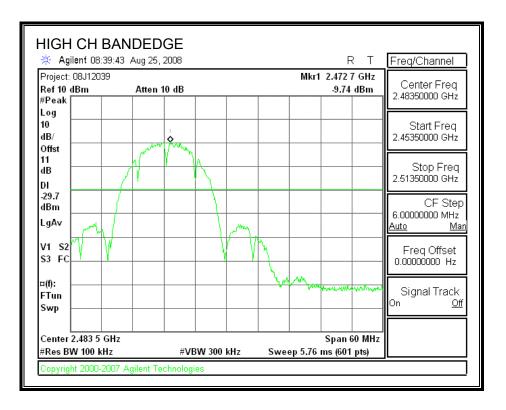
#### SPURIOUS EMISSIONS, MID CHANNEL



Page 22 of 22



#### SPURIOUS EMISSIONS, HIGH CHANNEL



Page 23 of 23

🌾 Agilen	f 08:43:21	Aug 25, 2008	3			F	х Т	Marker
Project: 08 Ref 10 dBi Peak		Atten 10 d	B		Mkr	3 24.98 -59.61		Select Marker 1 2 <u>3</u> 4
_og								Marker Trace <u>Auto 1</u> 2
	2						3	Readout Frequency
29.7 IBm		+ march	A A AND AND A AND	- Maluna Mara		اری <del>م</del> اریخ است. ا	~~~	Marker Table <u>On Of</u>
LLL Start 30 M Res BW ≦			#VBW 300 kHz	 Europ		p 26.00		Marker All Off
Marker 1 2 3	Trace (1) (1) (1) (1)	Type Freq Freq Freq	X Axis 2.471 GH: 3.302 GH: 24.987 GHz	z		Amplitu 11.96 dB 60.56 dB 59.61 dB	ude im im	
								More 2 of 2

Page 24 of 24

# 7.2. 802.11b MODE

# 7.2.1. 6 dB BANDWIDTH

## **LIMITS**

FCC §15.247 (a) (2), IC RSS-210 A8.2 (a) & LP0002 §3.10.1 (6) (6.2.1) The minimum 6 dB bandwidth shall be at least 500 kHz.

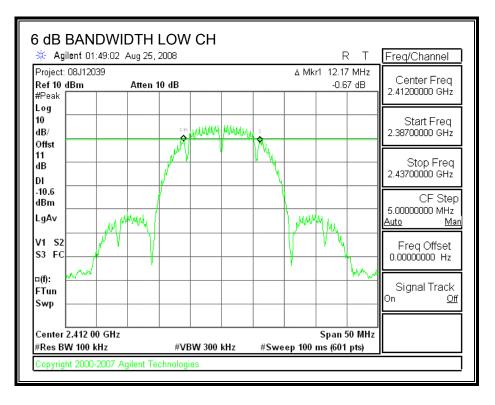
# TEST PROCEDURE

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.

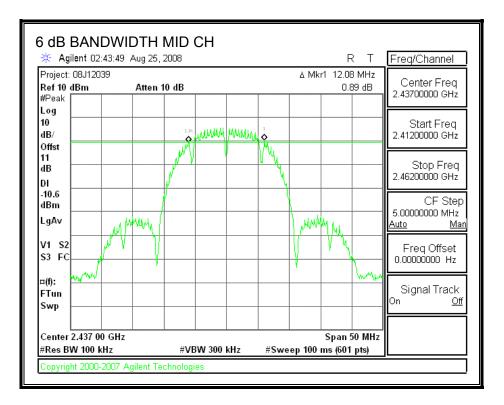
#### **RESULTS**

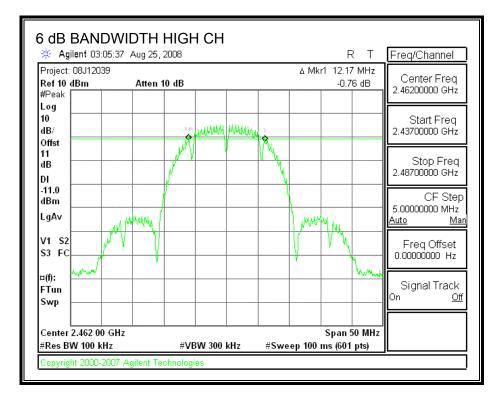
Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	12.17	0.5
Middle	2437	12.08	0.5
High	2462	12.17	0.5

### 6 dB BANDWIDTH



Page 25 of 25





Page 26 of 26

# 7.2.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

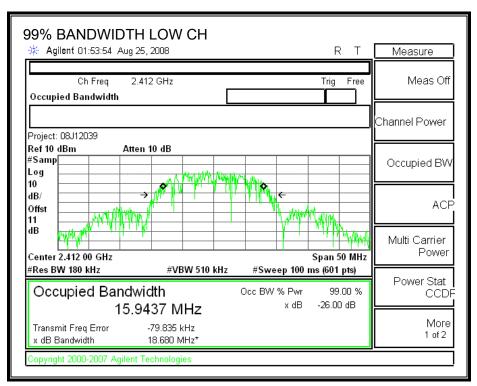
### TEST PROCEDURE

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.

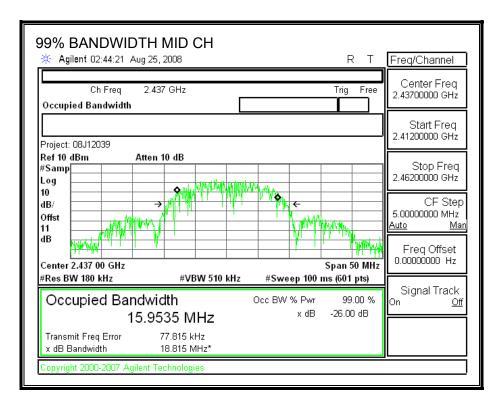
#### RESULTS

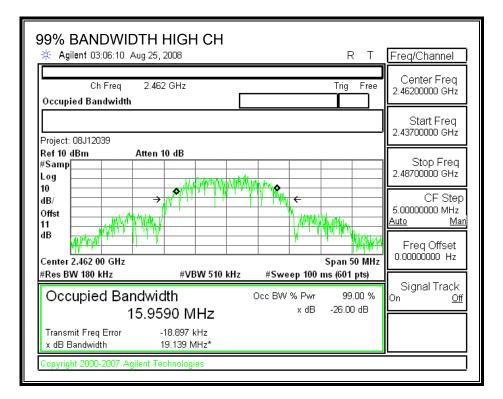
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	15.9437
Middle	2437	15.9535
High	2462	15.959

#### 99% BANDWIDTH



Page 27 of 27





Page 28 of 28

# 7.2.3. OUTPUT POWER

## LIMITS

FCC §15.247 (b), IC RSS-210 A8.4, LP0002 § 3.10.1 (2) (2.3); (3) (3.1.1) The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

## TEST PROCEDURE

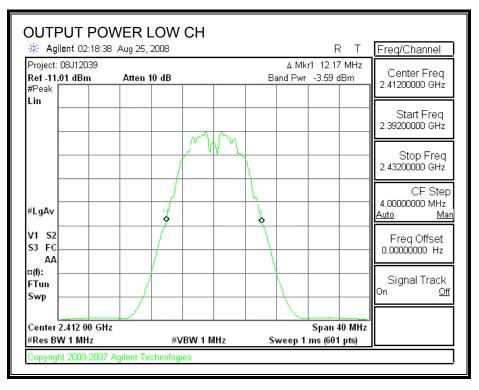
Peak power is measured using the Channel bandwidth Alternative peak output power procedure

Channel	Frequency	Spectrum	Attenuator and	Output	Limit	Margin
		Analyzer Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	-3.59	11	7.41	30	-22.59
Middle	2437	-3.35	11	7.65	30	-22.35
High	2462	-3.56	11	7.44	30	-22.56

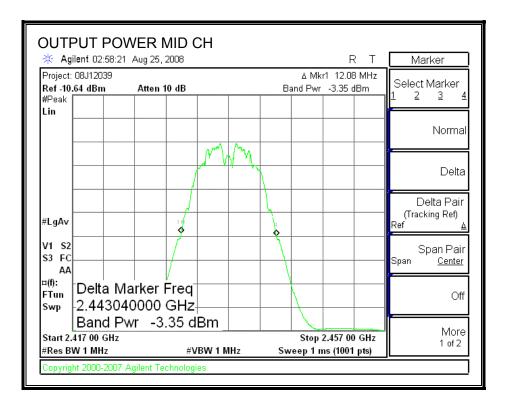
specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003

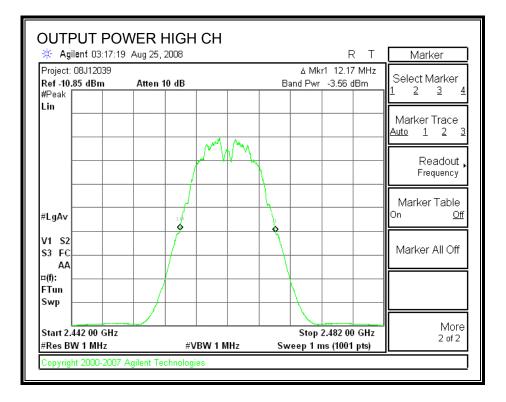
# **RESULTS**

### OUTPUT POWER



Page 29 of 29





Page 30 of 30

# 7.2.4. POWER SPECTRAL DENSITY

### <u>LIMITS</u>

# FCC §15.247 (e), IC RSS-210 A8.2 (b), 3.10.1 (6) (6.2.2)

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.

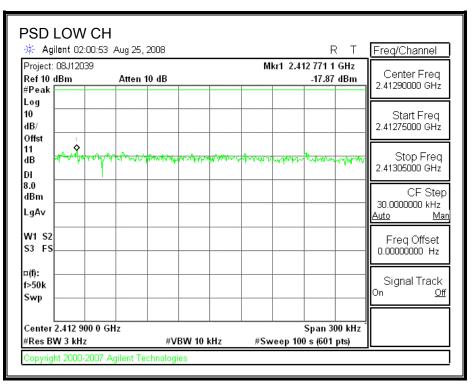
### TEST PROCEDURE

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.

## <u>RESULTS</u>

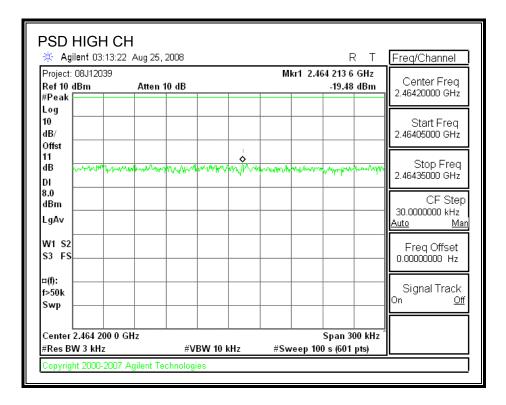
Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-17.87	8	-25.87
Middle	2437	-17.61	8	-25.61
High	2462	-19.48	8	-27.48

# POWER SPECTRAL DENSITY



Page 31 of 31

	D	Atten	40.10					6 492 0	Center Freq	
Ref10d #Peak <mark></mark> ⊨	BM	Aπen						-17.61	abm	2.43635000 GHz
Log 10 dB/										Start Freq 2.43620000 GHz
Offst 11 dB ∛ DI	whysethered	and the set of the set	an a	y-my-m	way' vy may	*****	Papalahan	grown	Long the	Stop Freq 2.43650000 GHz
8.0 dBm										CF Step 30.000000 kHz
LgAv W1 S2										Auto <u>Ma</u> Freq Offset
S3 FS_ ⊐(f): _										0.00000000 Hz
f>50k Swp –										Signal Track On <u>Of</u>



Page 32 of 32

# 7.2.5. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.247 (d), IC RSS-210 A8.5, LP0002 § 3.10.1 (5) Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

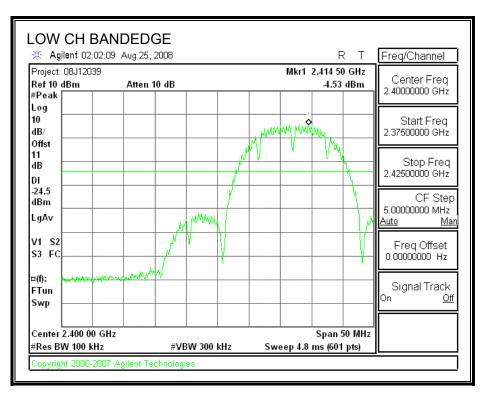
#### TEST PROCEDURE

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.

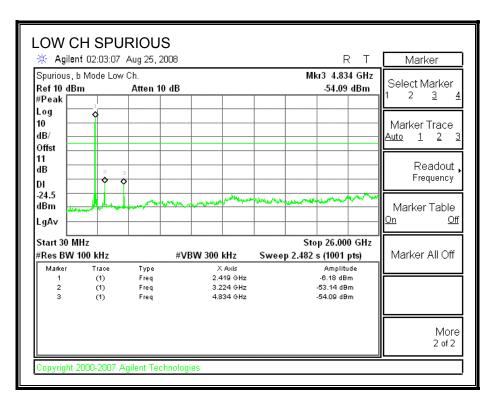
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

#### **RESULTS**

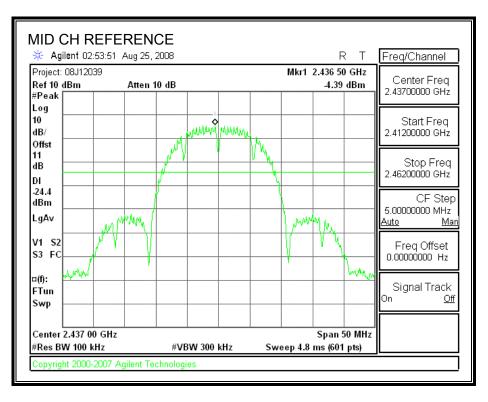
### SPURIOUS EMISSIONS, LOW CHANNEL



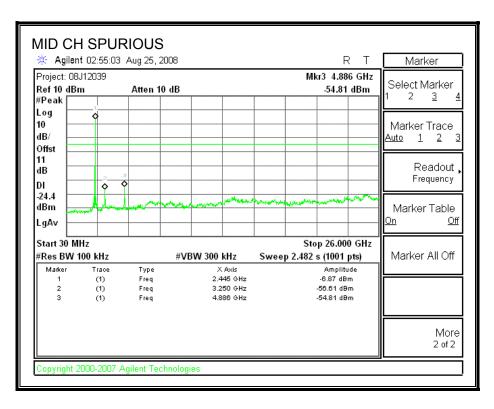
Page 33 of 33



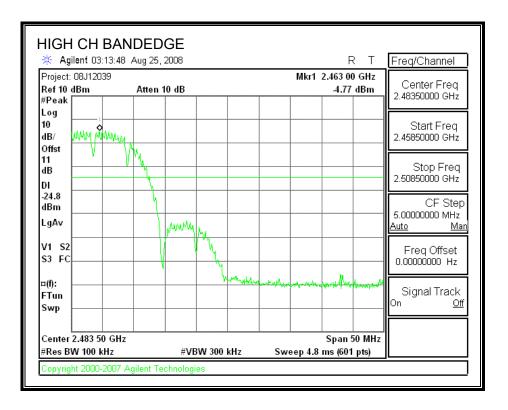
#### SPURIOUS EMISSIONS, MID CHANNEL



Page 34 of 34



#### SPURIOUS EMISSIONS, HIGH CHANNEL



Page 35 of 35

Start 30 MHz     Stop 26.000 GHz       #Res BW 100 kHz     #VBW 300 kHz     Sweep 2.482 s (1001 pts)       Marker     Trace     Type     X Axis     Amplitude       1     (1)     Freq     2.471 GHz     -6.26 dBm       2     (1)     Freq     3.276 GHz     -59.95 dBm       3     (1)     Freq     4.912 GHz     -65.42 dBm	-		Aug 25, 200	18					ξТ	Marke	r
Image: Stop 26.000 GHz   Marker Trace     Marker Table   Marker Table     On   Marker Table     On   Marker Table     Start 30 MHz   #VBW 300 kHz   Sweep 2.482 s (1001 pts)     Marker Tice   Avis     Marker Tice   Avis     Marker Tice   Marker All Off     Marker Tice   Sweep 2.482 s (1001 pts)     Marker Tice   Avis     Marker Tice   Avis     Stort 30 MHz   #VBW 300 kHz     Sweep 2.482 s (1001 pts)   Marker All Off     Marker Tice   Avis     Avis   Avis     Stop 26.000 GHz   Marker All Off     Marker Tice   Tice     Marker Tice   Avis     Marker Tice   Avis     Marker Tice   Avis     Stop 26.000 GHz   Marker All Off     Marker Tice   Avis     Marker Tice   Avis     Marker All Off   Marker All Off     Marker Tice   Avis     Marker Tice   Avis     Marker All Off   Marker All Off     Marker   Freq <tr< th=""><th>Ref 10 dBr</th><th></th><th>Atten 10 o</th><th>IB</th><th></th><th></th><th>Mk</th><th></th><th></th><th></th><th></th></tr<>	Ref 10 dBr		Atten 10 o	IB			Mk				
10 Marker Trace   dB/ Marker Trace   0 offst Marker Trace   11 Readout   dB Readout   DI P   24.8 Marker Table   0 marker Marker Table   0 marker Trace   1 marker Trace   1 marker Trace   2 marker Trace   2 marker Trace   3 marker Stop 26.000 GHz   1 marker Marker All Off   1 marker Trace   2 marker Trace   3 marker Stop 26.000 GHz   3 marker Marker All Off   Marker Stop 26.000 GHz   Marker Marker All Off   Marker Trace   3 marker Trace   3 marker Trace   3 marker Stop 26.000 GHz   Marker Marker All Off   Marker Marker All Off   Marker Stop 26.000 GHz   Marker Marker   1 marker Trace   3 marker Trace   3 marker Stop 26.000 GHz   Marker Marker   Marker Marker   Marker Marker		1								۱ <u>۲</u>	2 4
11 Image: start 30 MHz Stop 26.000 GHz Marker Table On   24.8 Image: start 30 MHz WBW 300 kHz Stop 26.000 GHz   #Res BW 100 kHz #VBW 300 kHz Sweep 2.482 s (1001 pts)   Image: start 30 MHz Trace Type   XAvis Amplitude   1 (1) Freq   2 (1) Freq   3 (1) Freq   3 (1) Freq   4.912 GHz -55.42 dBm   More Marker	10 –	<b>~</b>									
dB   Image: Constraint of the second secon											
DI -24.8 dBm LgAv Start 30 MHz #Res BW 100 kHz 1 (1) Freq 2 (1) Freq 3 (1) Freq 3 (1) Freq 4.912 OHz Marker 2.4271 GHz -55.42 dBm Marker 2.4271 GHz -55.42 dBm Marker 2.4271 GHz -55.42 dBm Marker 2.4271 GHz -55.42 dBm Marker All Off Marker All Off Ma			3								
dBm Marker Table   LgAv Stop 26.000 GHz   #Res BW 100 kHz #VBW 300 kHz Sweep 2.482 s (1001 pts)   Marker Trace Type XAxis   1 (1) Freq 2.471 GHz   2 (1) Freq 3.276 GHz   3 (1) Freq 4.912 GHz   -55.42 dBm Mor		2	II I							Пеци	ency
LgAv     Stop 26.000 GHz       gAv     Stop 26.000 GHz       #Res BW 100 kHz     #VBW 300 kHz     Sweep 2.482 s (1001 pts)       Marker     Trace     Type     XAxis       1     (1)     Freq     2.471 GHz     -6.26 dBm       2     (1)     Freq     3.276 GHz     -59.95 dBm       3     (1)     Freq     4.912 GHz     -65.42 dBm	JD		1 mar	way and the second	and wanted	ali bershe baby prov	water and	فهنديها	~~~	Markor T	ahlo
#Res BW 100 kHz     #VBW 300 kHz     Sweep 2.482 s (1001 pts)     Marker All Off       Marker     Trace     Type     XAvis     Amplitude       1     (1)     Freq     2.471 GHz     -6.26 dBm       2     (1)     Freq     3.276 GHz     -59.96 dBm       3     (1)     Freq     4.912 GHz     -55.42 dBm											able <u>Off</u>
#Res BW 100 kHz     #VBW 300 kHz     Sweep 2.482 s (1001 pts)     Marker All Off       Marker     Trace     Type     X Axis     Amplitude       1     (1)     Freq     2.471 GHz     -6.26 dBm       2     (1)     Freq     3.276 GHz     -59.96 dBm       3     (1)     Freq     4.912 GHz     -55.42 dBm	Start 30 M	Hz					Sto	p 26.00	0 GHz		
1 (1) Freq 2.471 GHz -6.25 dBm 2 (1) Freq 3.276 GHz -59.95 dBm 3 (1) Freq 4.912 GHz -55.42 dBm	#Res BW 100 kHz			#VBW 300 kHz Sweep				•	Marker A	ll Off	
2 (1) Freq 3.278 GHz .59.95 dBm 3 (1) Freq 4.912 GHz .55.42 dBm MOT											
3 (1) Freq 4.912 GHz -55.42 dBm											
											More
2 012											2 of 2

Page 36 of 36

# 7.3. 802.11g MODE

# 7.3.1. 6 dB BANDWIDTH

# <u>LIMITS</u>

FCC §15.247 (a) (2), IC RSS-210 A8.2 (a) & LP0002 §3.10.1 (6) (6.2.1) The minimum 6 dB bandwidth shall be at least 500 kHz.

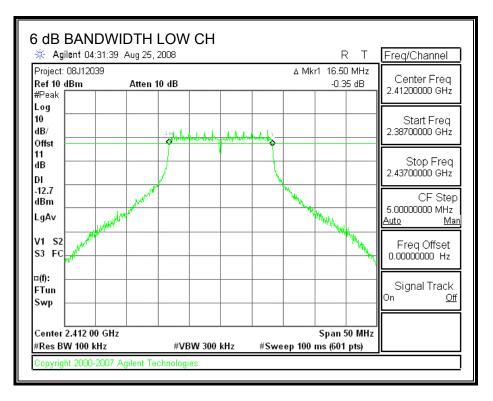
# TEST PROCEDURE

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.

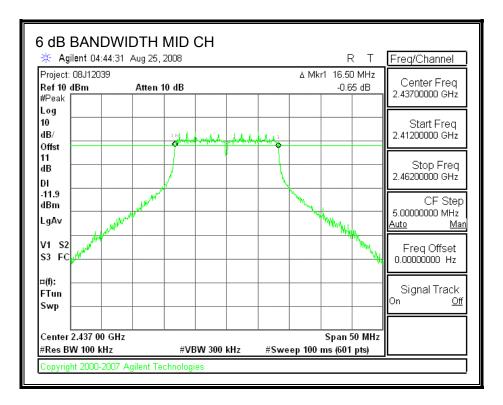
Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	16.50	0.5
Middle	2437	16.50	0.5
High	2462	16.50	0.5

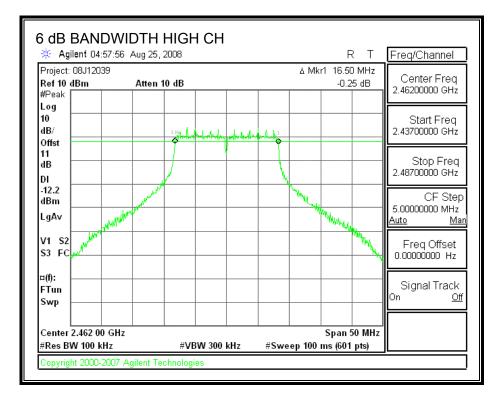
### RESULTS

# 6 dB BANDWIDTH



Page 37 of 37





Page 38 of 38

# 7.3.2. 99% BANDWIDTH

# LIMITS

None; for reporting purposes only.

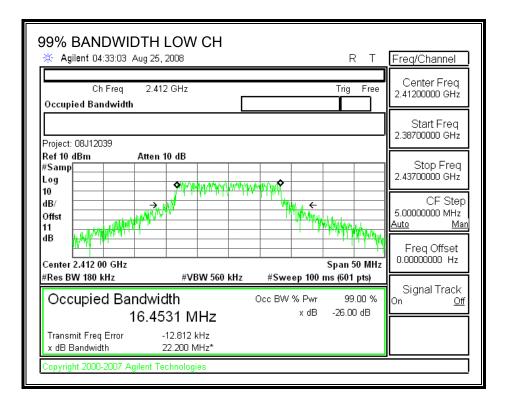
### TEST PROCEDURE

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.

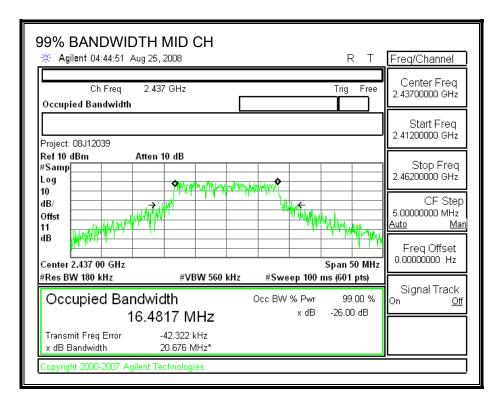
### **RESULTS**

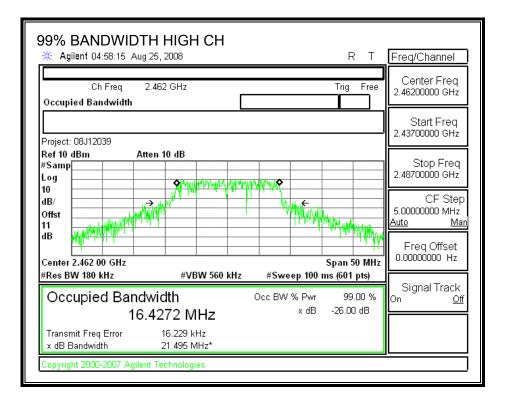
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.4531
Middle	2437	16.4817
High	2462	16.4272

#### 99% BANDWIDTH



Page 39 of 39





Page 40 of 40

# 7.3.3. OUTPUT POWER

# LIMITS

FCC §15.247 (b), IC RSS-210 A8.4, LP0002 § 3.10.1 (2) (2.3); (3) (3.1.1) The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

### TEST PROCEDURE

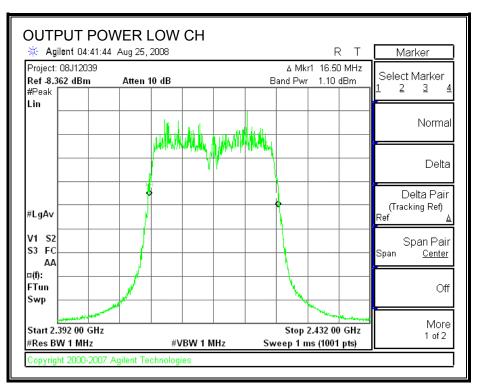
Peak power is measured using the spectrum analyzer's internal channel power integration

Channel	Frequency	Spectrum	Attenuator and	Output	Limit	Margin
		Analyzer Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	1.10	11	12.10	30	-17.90
Middle	2437	1.25	11	12.25	30	-17.75
High	2462	1.31	11	12.31	30	-17.69

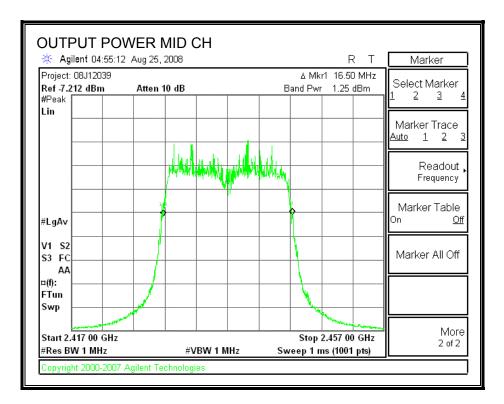
function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

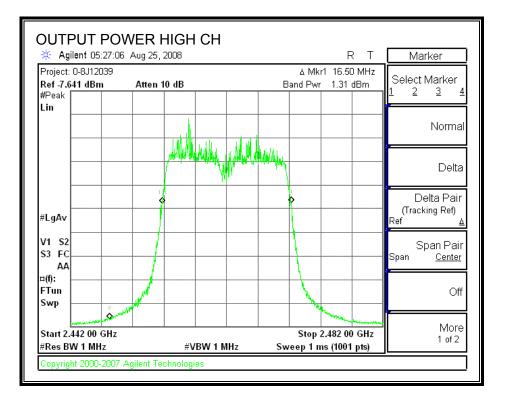
### **RESULTS**

#### OUTPUT POWER



Page 41 of 41





Page 42 of 42

# 7.3.4. POWER SPECTRAL DENSITY

# **LIMITS**

FCC §15.247 (e), IC RSS-210 A8.2 (b), 3.10.1 (6) (6.2.2) 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

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-20.31	8	-28.31
Middle	2437	-19.33	8	-27.33
High	2462	-18.21	8	-26.21

"Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

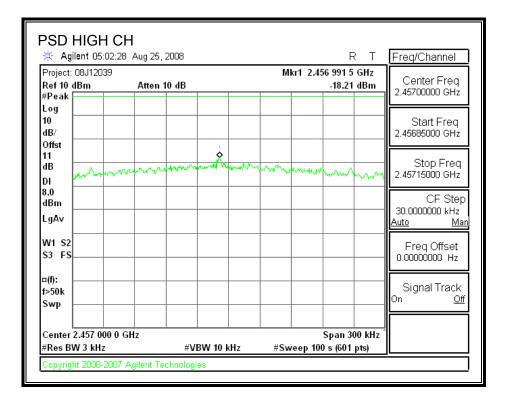
# **RESULTS**

POWER SPECTRAL DENSITY

PSD LOW C			-	. т	
🔆 Agilent 04:38:	:09 Aug 25, 2008			R T	Freq/Channel
Project: 08J12039 Ref 10 dBm #Peak	Atten 10 dB		Mkr1 2.404 765 0 -20.31		Center Freq 2.40475000 GHz
Log 10 dB/ Offst					Start Freq 2.40460000 GHz
11	manutoun	www.	mmun	m	Stop Freq 2.40490000 GHz
8.0 dBm LgAv					CF Step 30.0000000 kHz <u>Auto Man</u>
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.404 750 ( #Res BW 3 kHz		/ 10 kHz ==	Span 3 ≠Sweep 100 s (601		
Copyright 2000-200	07 Agilent Technologies		·		

Page 43 of 43

Project: 08J12039			Mkr1 2.43	33 867 1 GHz	Center Freq
Ref 10 dBm #Peak	Atten 10 dB			-19.33 dBm	2.43385000 GHz
Log 10					
dB/					Start Freq 2.43370000 GHz
Offst 11		1			
	monormonor	10 months	monorm	mon	Stop Freq 2.43400000 GHz
DI	• • • •				2.43400000 GHz
dBm					CF Step 30.0000000 kHz
LgAv					Auto Ma
W1 S2					Freq Offset
S3 FS					0.00000000 Hz
¤(f):					
f>50k					Signal Track
Swp					
Center 2.433 850	0 GHz			Span 300 kHz	
#Res BW 3 kHz		'BW 10 kHz	#Sweep 10	•	



Page 44 of 44

# 7.3.5. CONDUCTED SPURIOUS EMISSIONS

# LIMITS

FCC §15.247 (d), IC RSS-210 A8.5, LP0002 § 3.10.1 (5) Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

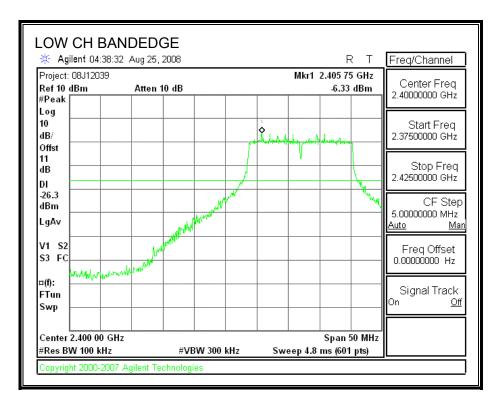
### **TEST PROCEDURE**

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.

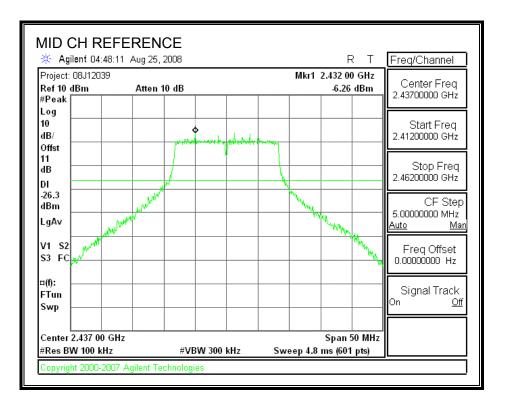
#### RESULTS

#### SPURIOUS EMISSIONS, LOW CHANNEL



🤄 Agilen	it 04:39:19	Aug 25, 200	8				F	х т	Marker
Project: 08 Ref 10 dBi ¢Peak [		Atten 10 d	В			Mk	12 3.22 -49.78		Select Marker 1 <u>2 3</u>
.og	1 O								Marker Trace Auto 1 2
11 1B 01	2 \$								Readout Frequency
26.3  ── IBm	and all and a second		الله بعنور) بالله من <mark>المعالي المعار المعالمي</mark>	on the second	۲		and the second		Marker Table <u>On Of</u>
Start 30 M Res BW 1			#VBW 300	kHz	Swee	Sto p 2.482 s	p 26.00 s (1001		Marker All Off
Marker 1 2	Trace (1) (1)	Type Freq Freq	2.3	Axis 93 GHz 24 GHz			Amplitu 10.38 dB 49.78 dB	'm	
									More 2 of 2

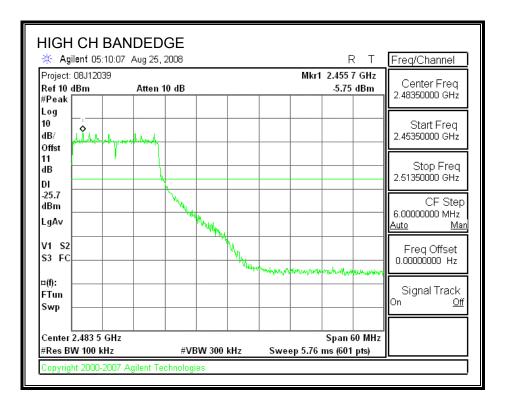
#### SPURIOUS EMISSIONS, MID CHANNEL



Page 46 of 46

🌾 Agilen	f 04:48:58	Aug 25, 2008	}			F	<u>к т</u>	Marker
Project: 08 Ref 10 dBi ¢Peak [		Atten 10 d	B		Mk	48.23		Select Marker 1 <u>2 3</u>
.og	1 •							Marker Trace <u>Auto 1</u> 2
IB	2 ◆							Readout Frequency
26.3 — IBm — ₋gAv —	-to Andrew	have been and the second			langed mar mark	n han start and a	~~~	Marker Table <u>On Of</u>
Start 30 M Res BW			#VBW 300 kH	z Swe	Sto ep 2.482 s	p 26.00 s (1001		Marker All Off
Marker 1 2	Trace (1) (1)	Type Freq Freq	X Ax 2.419 3.250	GHz		Amplitu 10.04 dB 48.23 dB	m	
								More 2 of 2

#### SPURIOUS EMISSIONS, HIGH CHANNEL



Page 47 of 47

		Aug 25, 20	08						RΤ	Marker
Project: 08 Ref 10 dBr		Atten 10	dB				Mk	a2 3.27 -52.11	76 GHz dBm	Select Marker
Peak										1 <u>2 3</u>
.og	ð									Marilian Transs
1B/										Marker Trace
)ffst										<u>Auto 1 2 3</u>
1										
ив ⊢	2									Readout
										Frequency
25.7										
18m —	Ada	1 and the party	Martin	mont	and the second	www.wilson	the sport of the second	ولانت بجليهما	www.	Marker Table
·····	w									
.gAv										<u>On Of</u>
Start 30 M	Hz						Sto	p 26.00	0 GHz	
Res BW 1	100 kHz		#VBW	300 ki	Hz	Swee	p 2.482			Marker All Off
Marker	Trace	Туре		XA	xis			Amplit	·	
1	(1)	Freq		2.471	1 GHz			-10.05 dE		
2	(1)	Freq		3.276	3 GHz			-52.11 dE	)m	
										h tor
										More
										2 of 2

Page 48 of 48

# 8. RADIATED TEST RESULTS

# 8.1. LIMITS AND PROCEDURE

# <u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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.

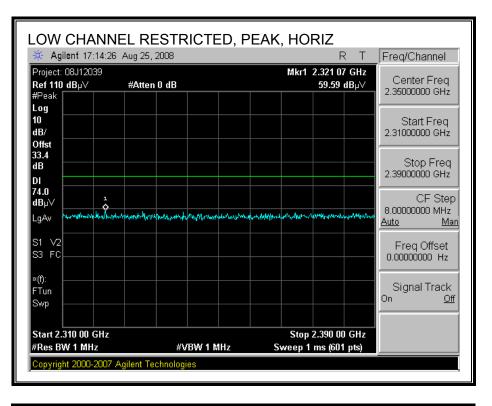
Page 49 of 49

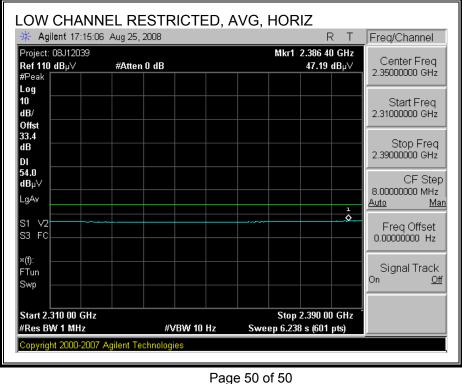
# 8.2. TRANSMITTER ABOVE 1 GHz

# 8.2.1. 802.11 MODE

### FOXCONN ANTENNA

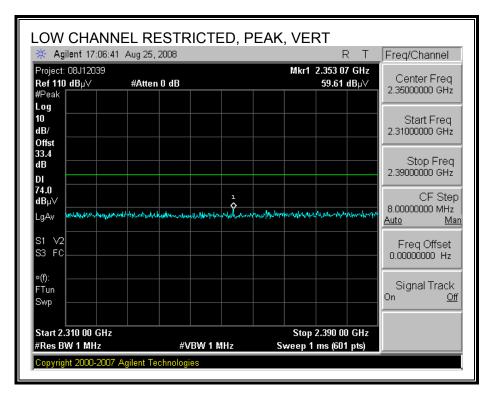
### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

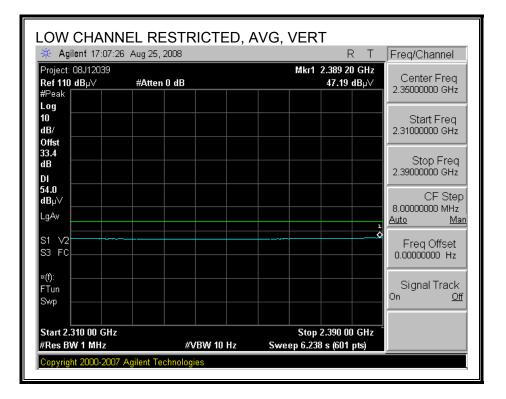




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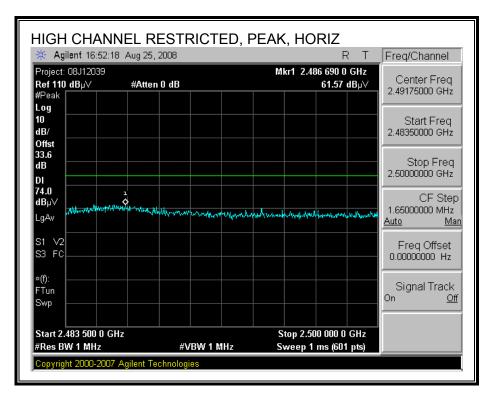
#### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

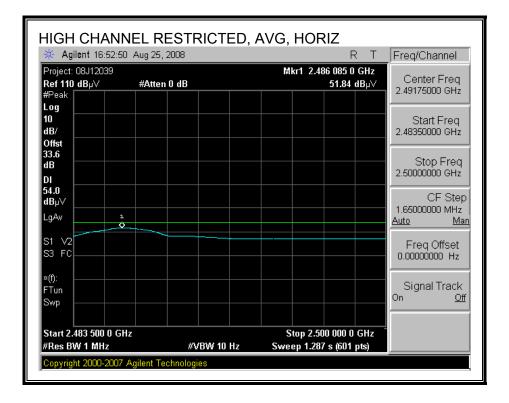




Page 51 of 51

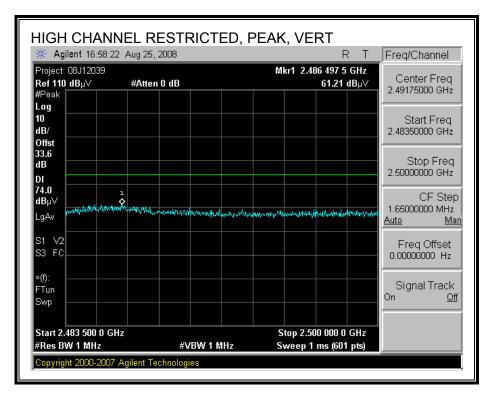
# **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

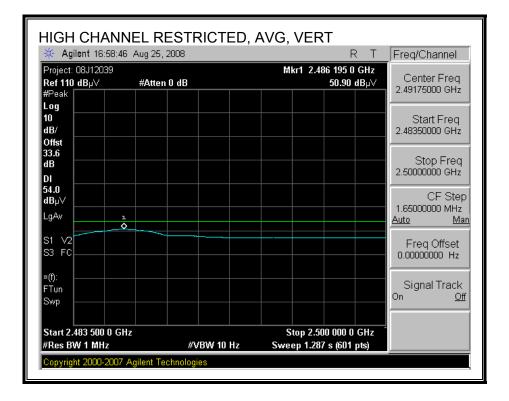




Page 52 of 52

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





Page 53 of 53

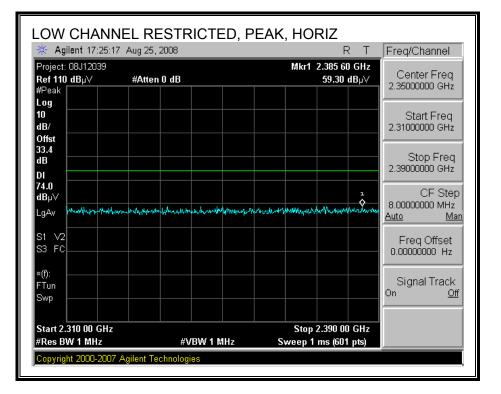
# HARMONICS AND SPURIOUS EMISSIONS

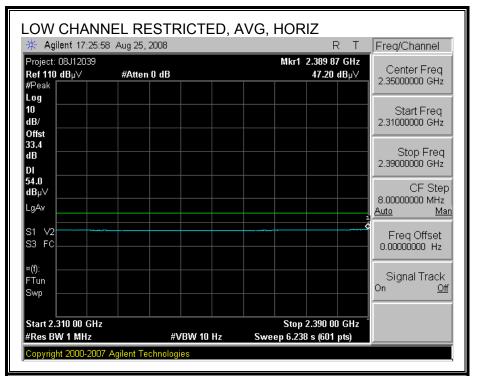
Com Proj Date Test Con Mod	npany ect # e: 8/2 t Eng figura le: T	nce C y: NIN : 08J :7/200 gineer ation: 'x On,	ertificati NTENDC J12039 IS : Willian EUT on .802.11	ion S( ) n Zhu dy	0		5m Ch	amber									
Т	Ho 120; \$	S/N: 2	-18GHz 9310 @3r		Pre-ar	nplifer 9 8449B	1-260	GHz •	Pre-am	plifer	26-40GH	z •	Н	orn > 18	GHz	•	Limit FCC 15.205
	2		ables t cable 079008	•	3	foot c	able	T	12 C-5m C	foot c hamb		HP	HPF F_4.0GHz	<b>R</b> €	eject Filto	RB	<u>k Measurements</u> W=VBW=1MHz 1 <u>ge Measurements</u> =1MHz ; VBW=10Hz
i GJ		Dist (m)	Read dBu		Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
			MHz	<u> </u>	ubu v	uD/m	<u></u>				abu vini	ubu v/m	abu v/m				((),11)
4.824		3.0	47.8		39.9	32.3	2.8	-34.8	0.0	0.0	48.6	40.7	74	54	-25.4	-13.3	v
4.824		3.0	44.8	1	35.7	32.3	2.8	-34.8	0.0	0.0	45.6	36.5	74	54	-28.4	-17.5	H
			MHz				• •									100	
4.884 4.884		3.0 3.0	43.8		33.3	32.3 32.3	2.8 2.8	-34.8 -34.8	0.0 0.0	0.0 0.0	44.8 46.4	34.2 38.1	74 74	54 54	-29.2 -27.6	-19.8 -15.9	H V
			MHz				0	-3430								-100	
4.944		3.0	45.3		36.3	32.4	2.8	-34.8	0.0	0.0	46.4	37.3	74	54	-27.6	-16.7	v
4944		3.0	42.8		32.4	32.4	2.8	-34.8	0.0	6.0	43.8	33.5	74	54	-30.2	-20.5	Н
No m	ore si	ignal fi	ound			<u> </u>		<u>.</u>	<u>.</u>		<u>I</u>		<u>I</u>	<u> </u>			

Page 54 of 54

# TYCO ANTENNA

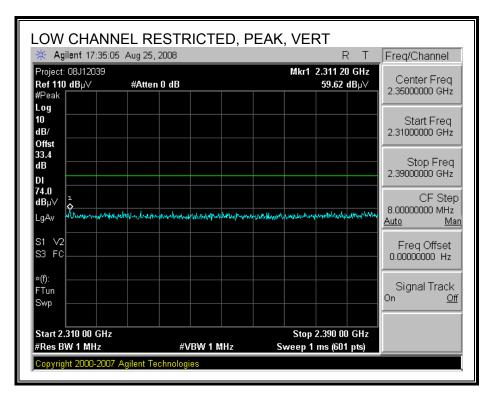
#### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

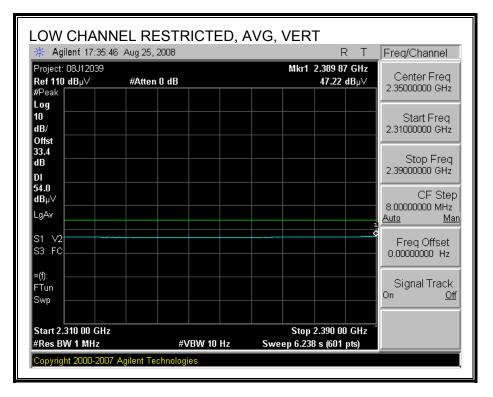




Page 55 of 55

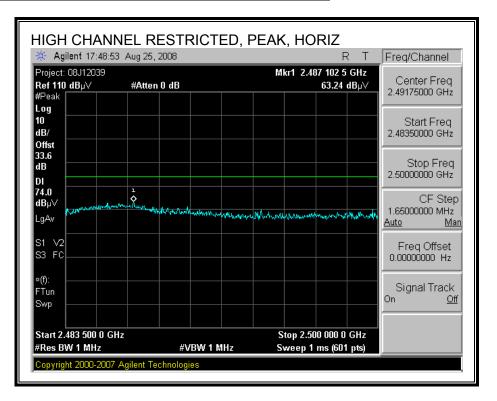
# **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

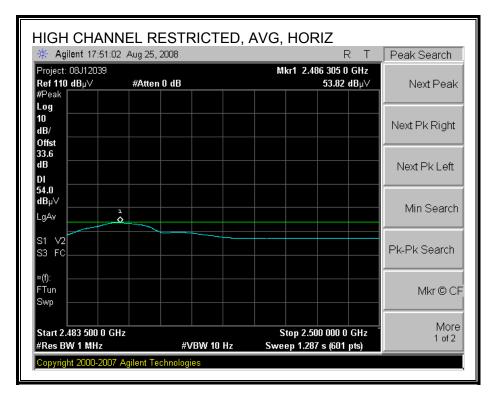




Page 56 of 56

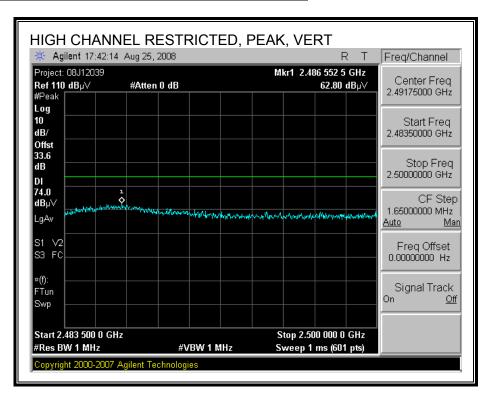
#### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

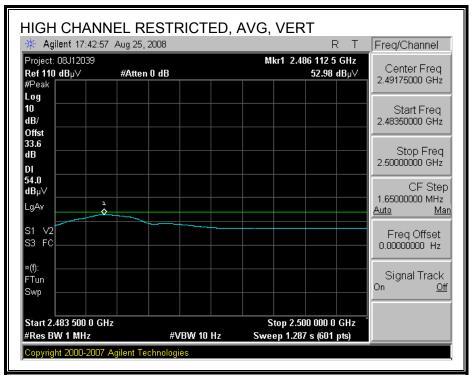




Page 57 of 57

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





Page 58 of 58

### HARMONICS AND SPURIOUS EMISSIONS

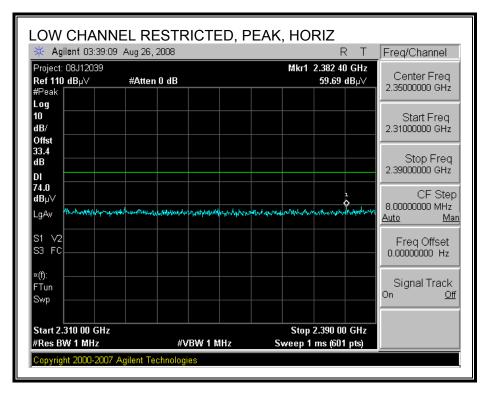
Compan Project # Date: 8/2 Test En; Configu	nce Ce y: NIN #: 08JJ 27/2008 gineer: ration: 1 fx On, 3	rtification FENDO 2039 William Zl EUT only 802.11 Mo	0		5m Ch	lamber									
	•	_					_								
н	orn 1-	18GHz	Pre-ar	nplifer	1-260	GHz	Pre-am	plifer	26-40GH	z	н	orn > 18	GHz		Limit
T120;	S/N: 293	310 @3m	🗸 T34 HI	P 8449B		-				•				-	FCC 15.205 🗸
I Hi Fren	uency Cal	les					1							_	
	2 foot		3	) foot c	able		12	foot c	able		HPF	Re	eject Filte		<u>k Measurements</u> 3W=VBW=1MHz
Tha	nh 1770	79008	•			•	C-5m C	:hamb	er 🗸		F_4.0GHz	•			<u>age Measurements</u> =1MHz ; VBW=10Hz
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	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)
Low Ch.	. 2412 I	/IHz													
4.824	3.0	44.2	33.9	32.3	2.8	-34.8	0.0	0.0	45.D	34.7	74	54	-29.0	-19.3	v
4.824 Mid Ch.	3.0	44 <i>5</i>	38.6	32.3	2.8	-34.8	QO	<b>6.</b> 0	45.3	39.4	74	54	-28.7	-14.6	H
1/11d Ch. 4.884	3.0	44.6	39.8	32.3	2.8	-34.8	0.0	0.6	45.5	40.7	74	54	-28.5	-13.3	Н
4.884	3.0	42.9	37.7	32.3	2.8	-34.8	0.0	0.0	43.8	38.6	74	54	-30.2	-15.4	v
High Ch	. 2472	MHz				<b>•</b>									9
4.944	3.0	44.5	37.1	32.4	2.8	-34.8	0.0	6.0	45.5	38.1	74	54	-28.5	-15.9	v
4.944	3.0	44.2	36.8	32.4	2.8	-34.8	0.0	6.0	45.2	37.8	74	54	-28.8	-16.2	Н
No more s	ng ndi Wi		<u>I</u>	<u>.</u>	<u>.</u>		I	1	1	1	<u>.</u>	1	<u>.</u>	1	1

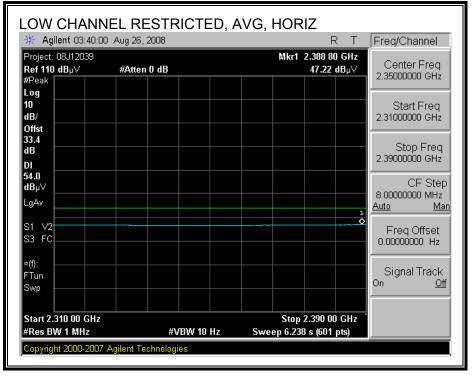
Page 59 of 59

# 8.2.2. 802.11b MODE

#### **FOXCONN ANTENNA**

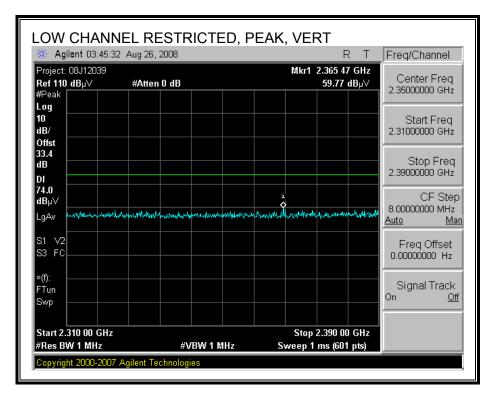
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

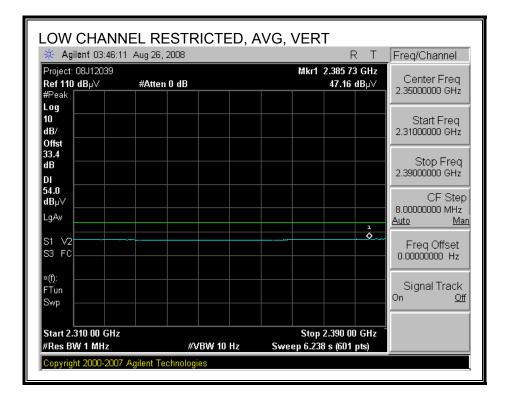




Page 60 of 60

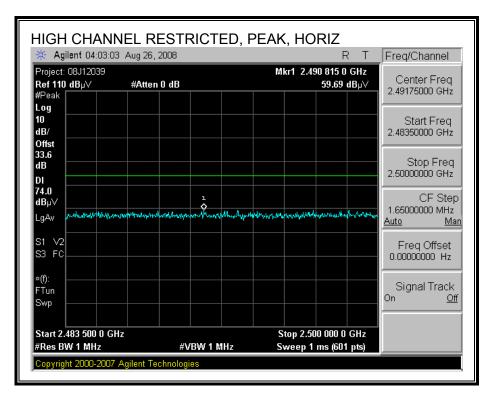
# **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

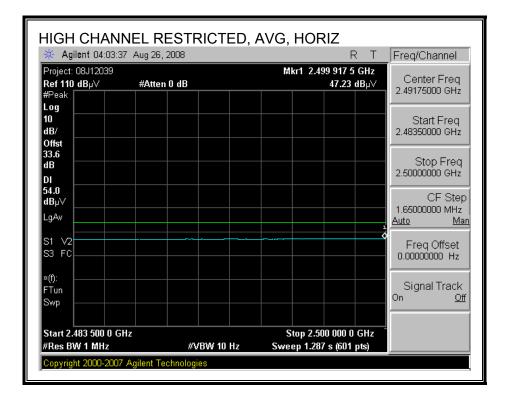




Page 61 of 61

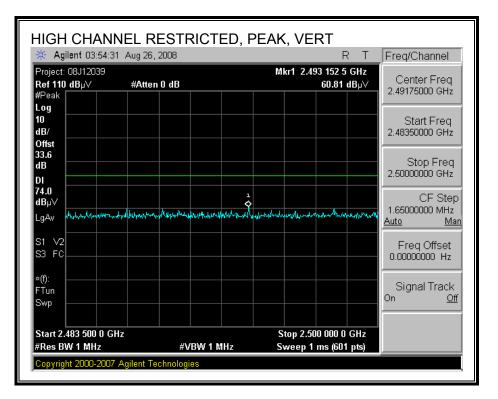
# **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

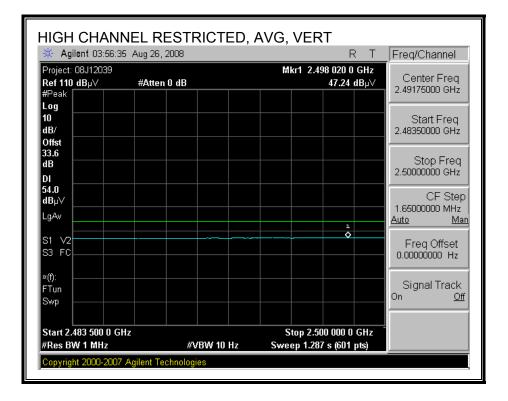




Page 62 of 62

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





Page 63 of 63

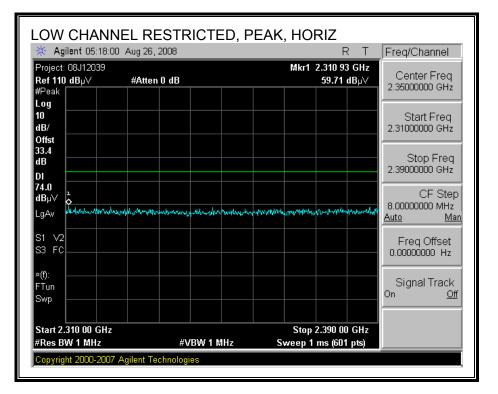
# HARMONICS AND SPURIOUS EMISSIONS

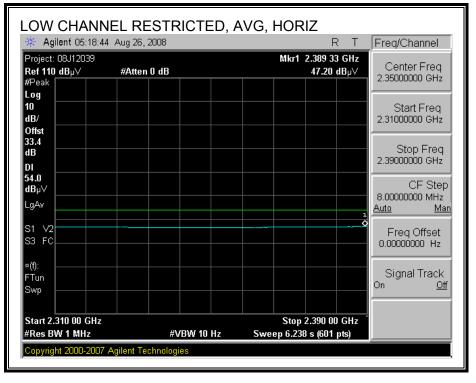
Comp Projec Date: Test F Config Mode	liance ( any: NI t #: 08 8/26/20 Enginee guration	Certification NTENDO J12039 08 r: William Z r: William Z r: EUT with : a, b Mode	y Measuren Services, Fr huang support equi	emont :	5m Ch	amber										
	Horn 1-18GHz Pre-amplifer 1-26GHz Pre-amplifer 26-40GHz Horn > 18GHz Limit															
T12	0; S/N: 2	29310 @3m	т34 Н	P 8449B		-				•				-	FCC 15.205	
		Cables ot cable 7079008	•	) foot c	able	•	12 foot cable			HP					<u>Peak Measurements</u> RBW=VBW=1MHz <u>Average Measurements</u> RBW=1MHz ; VBW=10Hz	
f GHz			Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
	h. 2412	/ :	- and a state of the state of t		<u></u>					abu v/m		abu v/m	<u> </u>		(1/11)	
4.824	3.0		39.7	32.3	2.8	-34.8	0.0	0.0	45.9	40.5	74	54	- <b>28.1</b>	-13.5	v	
4.824	3.0		38.2	32.3	2.8	-34.8	Q.O	6.0	45.3	39.0	74	54	-28.7	-15.0	H	
Mid C 4.874	h. 243 3.0		32.9	32.3	2.8	-34.8	0.0	0.6	43.8	33.8	74	54	-30.2	-20.2	Н	
4.874	3.0		32.9	32.3	2.8 2.8	-34.8	0.0	0.0	43.8	38.3	74 74	54 54	-30.2	-20.2	N N	
High (	Ch. 246	2 MHz		¢				1				<b>*</b>				
4.924	3.0		40.7	32.4	2.8	-34.8	QO	6.0	47.0	41.7	74	54	-27.0	-12.3	V	
4.924	3.0 e signal		35.0	32.4	2.8	-34.8	0.0	0.6	44.5	36.0	74	54	-29.5	-18.0	Н	
			.l	J			Å		1			<u>ــــــــــــــــــــــــــــــــــــ</u>	<u>ا</u>			

Page 64 of 64

# TYCO ANTENNA

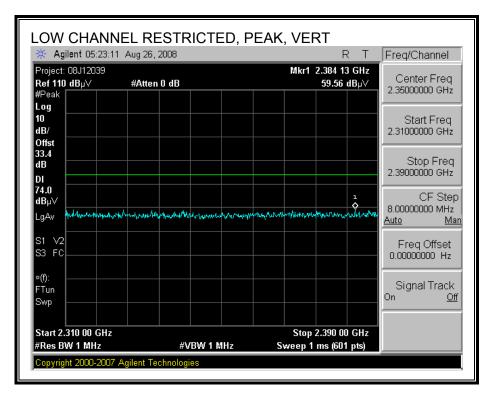
#### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

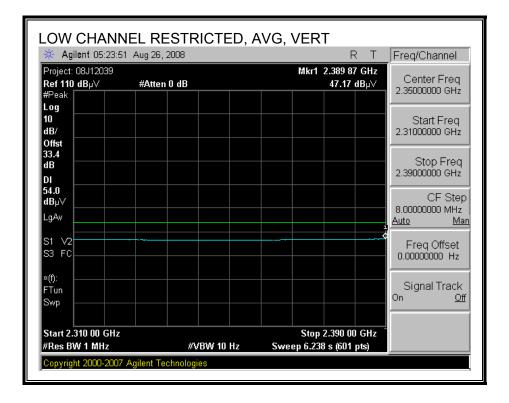




Page 65 of 65

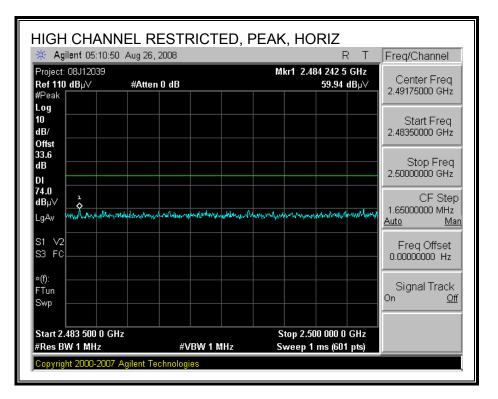
# **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

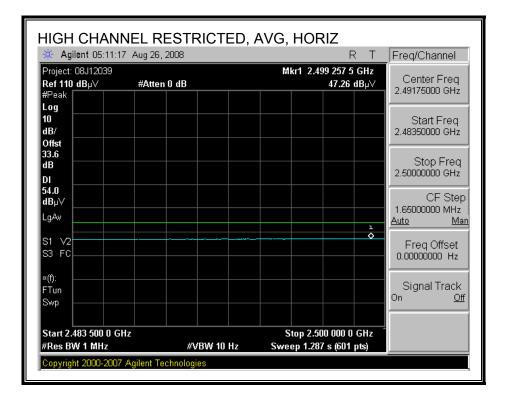




Page 66 of 66

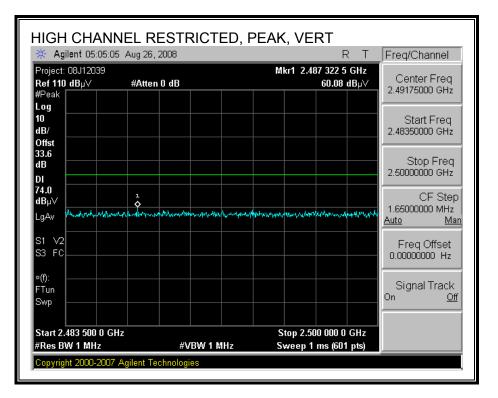
# **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

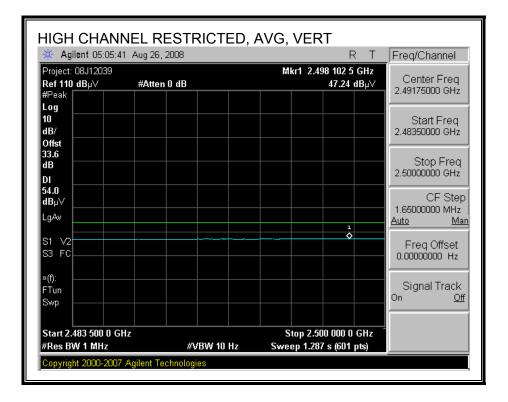




Page 67 of 67

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





Page 68 of 68

### HARMONICS AND SPURIOUS EMISSIONS

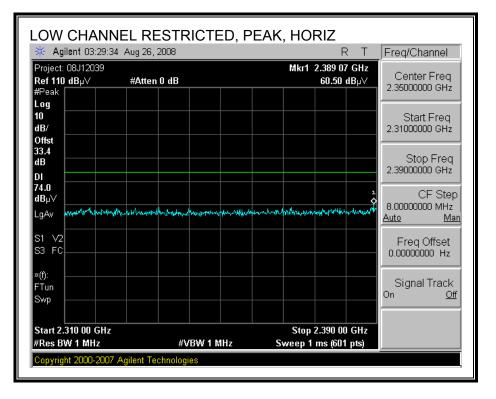
Compa Projec Date: 3 Test E Config Mode:	iance Ce my: NIN t #: 08J 3/26/200 ngineer:	ertification TENDO 12039 8 William Zł EUT with s b Mode	' Measuren Services, Fi wang upport equi	emont :	5m Ch	amber										
	Horn 1-	18GHz	Pre-a	mplifer	1-260	GHz	Pre-am	plifer	26-40GH	z	н	orn > 180	GHz		Limit	
	Horn 1-18GHz     Pre-amplifer 1-26GHz     Pre-amplifer 26-40GHz     Horn > 18GHz     Limit       T120; S/N: 29310 @3m     T34 HP 8449B     FCC 15.205     FCC 15.205										FCC 15.205					
	Hi Frequency Cables			3 foot cable				12 foot cable			HPF_4.0GHz			Peak Measurements RBW=VBW=1MHz       Average Measurements RBW=1MHz; VBW=10Hz		
f		1	Read Avg.	1	CL	Amp	D Corr		Peak	Avg		<u> </u>		Avg Mar		
GHz	/	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)	
	h. 2412 ] 3.0	· · · · · · · · · · · · · · · · · · ·	AF (			<b>A</b> 4 0	0.0	6.0	453	A	74		20.0	197	v	
4.824 4.824	3.0	44.3 42.0	35.6 29.6	32.3 32.3	2.8 2.8	-34.8 -34.8	0.0 0.0	0.0 0.0	45.1 42.8	36.4 30.5	74	54 54	-28.9 -31.2	-17.6 -23.5	H H	
	h. 2437]															
4.874	3.0	43.3	34.5	32.3	2.8	-34.8	Q.O	0.0	44.2	35.4	74	54	- <b>29.8</b>	-18.6	Н	
4.874	3.0	43.1	32.3	32.3	2.8	-34.8	0.0	0.0	44.0	33.2	74	54	-30.0	- <b>20.8</b>	v	
	<sup>th.</sup> 2462	· · · · · · · · · · · · · · · · · · ·														
4.924	3.0	43.5	31.6	32.4	2.8	-34.8	0.0	0.0	44.5	32.6	74	54	-29.5	-21.4	V	
4.924	3.0 signal for	42.9 und	32.7	32.4	2.8	-34.8	0.0	0.0	43.9	33.6	74	54	-30.1	-20.4	H V	
													A	A		

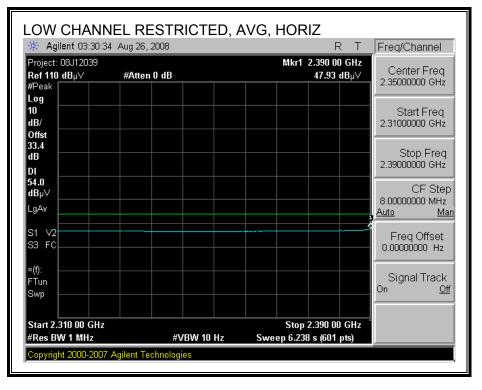
Page 69 of 69

# 8.2.3. 802.11g MODE

#### **FOXCONN ANTENNA**

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

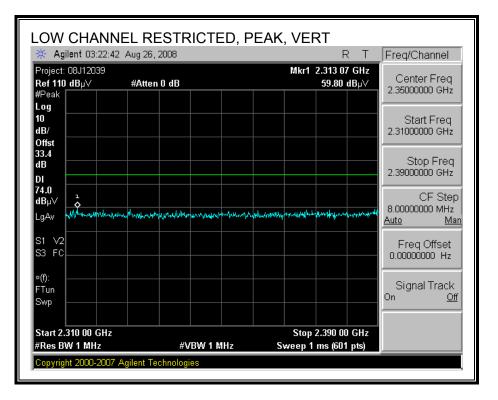


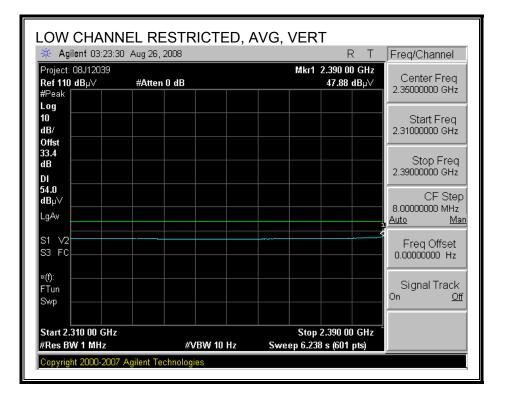


Page 70 of 70

COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4031B 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.

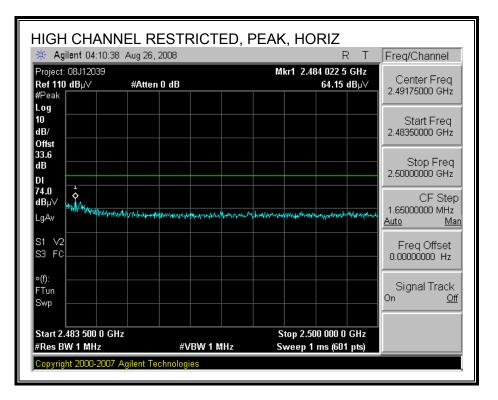
#### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

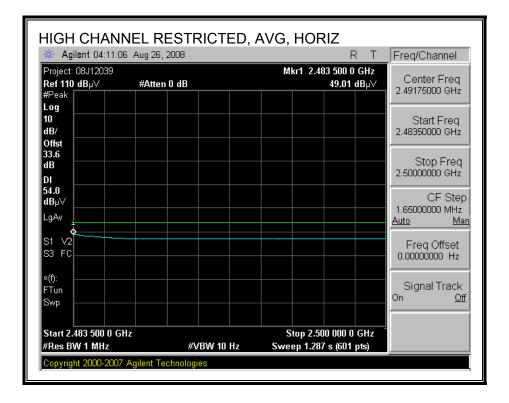




Page 71 of 71

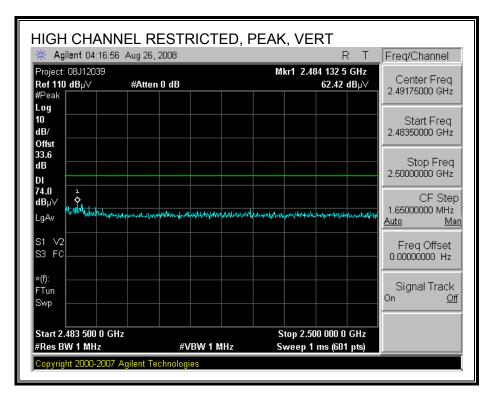
# **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

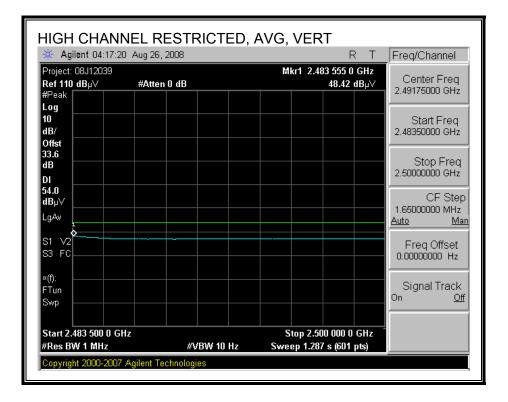




Page 72 of 72

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





Page 73 of 73

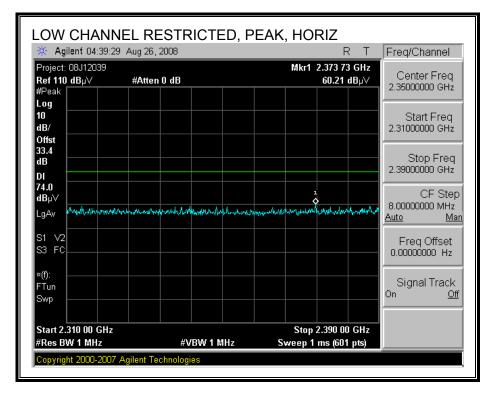
#### HARMONICS AND SPURIOUS EMISSIONS

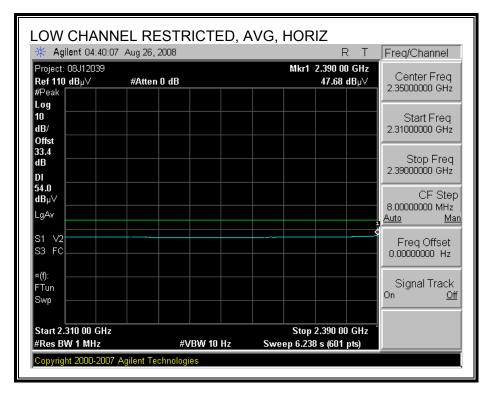
Compa Projec Date: 3 Test E Config Mode:	liance C any: NIN t #: 08J 8/26/200 Engineer guration: : Tx On,	ertification ITENDO I12039 IS : William Zl EUT with s g Mode	/ Measurem Services, Fr wang upport equip	emont :	5m Ch	amber									
T120	D; S/N: 29	-18GHz )310 @3m		nplifer 9 8449B		GHz •	Pre-am	plifer	26-40GH	z •	Н	orn > 18(	GHz	•	Limit FCC 15.205
	equency C. <mark>2 foot</mark> ranh 177	t cable	3	foot c	able	T	12 C-5m C	foot c Thamb		HP	HPF F_4.0GHz	Re	eject Filte	RB	<u>k Measurements</u> W=VBW=1MHz age Measurements =1MHz ; VBW=10Hz
f GHz	Dist	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	
	: (m) h. 2412	1	aBuv	aB/m	aв	aв		aB	aBu v/m	aBu v/m	aBu v/m	aBuv/m	<u> (UB</u>		(V/H)
4.824	3.0	43.9	29.4	32.3	2.8	-34.8	0.0	0.0	44.7	30.2	74	54	-29.3	-23.8	v
4.824	3.0	42.5	29.6	32.3	2.8	-34.8	Q.O	6.0	43.3	30.4	74	54	-30.7	-23.6	Н
	h. 2437					A4 C									
4.874 4.874	3.D 3.D	43.5	29.9 29.5	32.3 32.3	2.8 2.8	-34.8 -34.8	0.0 0.0	0.0 0.0	44.A 43.A	30.8 30.4	74 74	54 54	-29.6 -30.6	-23.2 -23.6	H V
	Ch. 2462				-0										•
4.924	3.0	42.9	30.6	32.4	2.8	-34.8	0.0	6.0	43.9	31.6	74	54	-30.1	-22.4	V
4.924	3.0	42.5	29.5	32.4	2.8	-34.8	Q.O	6.0	43.4	30.4	74	54	-30.6	-23.6	Н
<u>10 more</u>	e signal fo	<u>und</u>	<u> </u>						<u> </u>			I	<u> </u>		1

Page 74 of 74

# TYCO ANTENNA

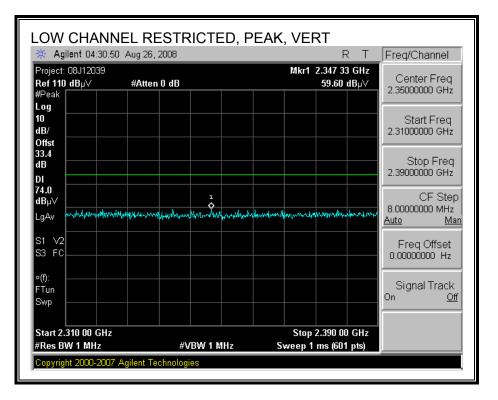
#### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

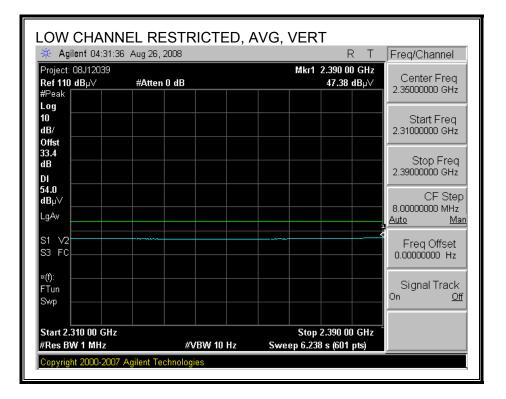




Page 75 of 75

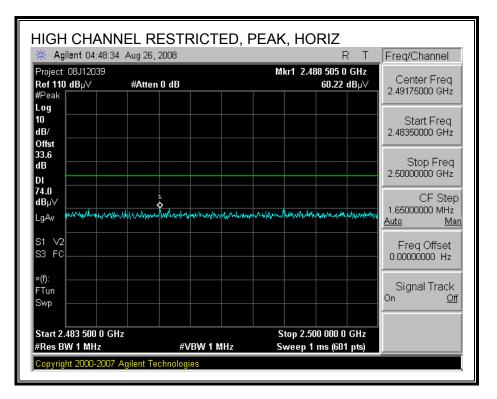
#### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

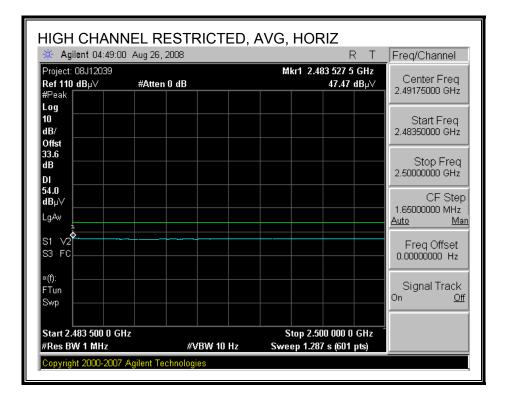




Page 76 of 76

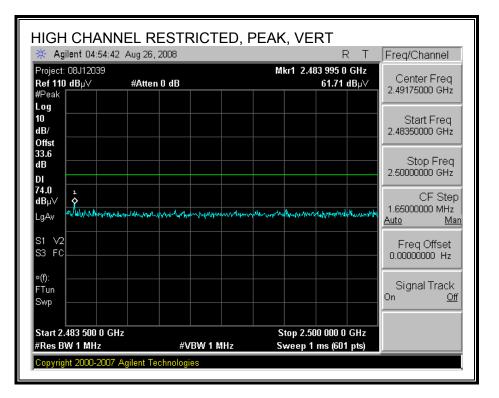
# **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

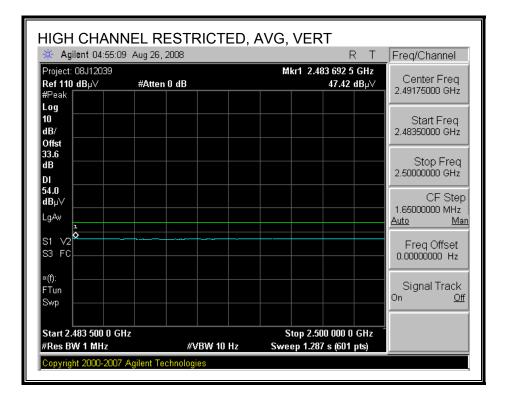




Page 77 of 77

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





Page 78 of 78

#### HARMONICS AND SPURIOUS EMISSIONS

Comp Projec Date: Test I Config Mode	liance C any: NH et #: 08, 8/26/200 Engineer guration:	98 :: William Zh : EUT with s , g Mode	Services, Fr uang	emont :	5m Ch	amber									
	Horn 1	-18GHz	Pre-ar	nplifer	1-260	GHz	Pre-am	plifer	26-40GH	Iz	н	orn > 18	GHz		Limit
		9310 @3m		P 8449B		•				•				-	FCC 15.205
	requency C 2 foo hanh 177	t cable	3	l foot c	able	•	12 C-5m C	foot c Thamb		HP	HPF F_4.0GHz	Re	eject Filte	RB	<u>k Measurements</u> W=VBW=1MHz s <u>ge Measurements</u> =1MHz ; VBW=10Hz
f GHz		Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
	z (m) .h. 2412		aBuv	aB/m	aв	(LB	<u>as</u>	aв	aBu v/m	dBuv/m	dBuv/m	dBu v/m	(LB	œ	(V/H)
4.824	3.0	41.7	29.8	32.3	2.8	-34.8	Q.O	0.6	42.5	30.6	74	54	-31.5	-23.4	v
4.824	3.0	42.3	29.5	32.3	2.8	-34.8	0.0	6.0	43.2	30.3	74	54	-30.8	-23.7	H
Mid C 4.874	h. 2437	43.3	30.1	32.3	2.8	-34.8	0.0	0.6	44.2	31.0	74	54	-29.8	-23.0	Н
4.874	3.0	42.2	29.5	32.3	2.8	-34.8	0.0	0.0	43.1	30.4	74	54	-30.9	-23.6	v
	Ch. 2462	·····													
4.924	3.0 3.0	42.7	30.8 29.3	32.4 32.4	2.8 2.8	-34.8 -34.8	0.0 0.0	0.0 0.0	43.7 43.4	31.8 30.3	74 74	54 54	-30.3 -30.6	-22.2 -23.7	V H
	e signal fi														

Page 79 of 79

# 8.3. RECEIVER ABOVE 1 GHz

# 802.11 MODE

# **FOXCONN ANTENNA**

Con	npliaı	~		<sup>,</sup> Measurem Services, Fr		5m Ch	amber									
			TENDO													
		: 08J]														
		7/2008	William Zh	nong												
			EUT only	luang												
	~			de, worst ca	se											
Tes	t Equ	ipmen	<u>t:</u>													
	Test Equipment:     Horn 1-18GHz   Pre-amplifer 1-26GHz   Pre-amplifer 26-40GHz   Horn > 18GHz   Limit															
Гт	T120; S/N: 29310 @3m v T34 HP 8449B v RX RSS 210 v															
<u> </u>	T120; S/N: 29310 @3m   T34 HP 8449B   RX RSS 210     H Frequency Cables   Image: Cables   Image: Cables															
L H	li Frequ	iency Cal	oles —													
		2 foot	cable	3	foot c	able		12	foot d	able		HPF	D.	ject Filte	Peal	a Measurements
														Jeerrine	RB	W=VBW=1MHz
	Than	h 1770	79008	-			•	C-5m C	hamb	er 🗸			-		<b>T</b>	ge Measurements
															RBW=	1MHz; VBW=10Hz
	f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
G	Hz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
1.04	2	3.0	46.9	33.5	25.9	1.3	-38.2	0.0	0.0	35.9	22.5	74	54	-38.1	-31.5	v
1.18		3.0	49.3	38.3	26.4	1.4	-38.0	0.0	0.0	39.1	28.1	74	54	-34.9	-25.9	v
1.20		3.0 3.0	53.3 49.1	36.3 40.6	26.5 25.9	14	-38.0 -38.2	0.0 0.0	0.0 0.0	43.2 38.1	26.2 29.6	74 74	54 54	-30.8 -35.9	-27.8 -24.4	H
1.04		3.0	49.1 51.2	40.0	25.9	1.5	-38.0	0.0	0.0	41.0	29.0 33.4	74	54	-35.9 -33.0	-24.4	Н
1.20		3.0	50.5	42.2	26.5	1.4	-38.0	0.0	0.0	40.4	32.0	74	54	-33.6	-22.0	H
No n	ıore si	gnal for	nd													

Page 80 of 80

# **TYCO ANTENNA**

Complia	~	Frequency artification				5m Ch	amber									
Compan Project #	~															
Date: 8/2																
		William Zł EUT only	uang													
		EUI omy 802.11 Mo	de. w	orst ca	se											
	,		,													
<u>Test Eq</u>	uipmen	. <u>t:</u>														
н	orn 1-	18GHz		Pre-ar	nplifer	1-260	GHz	Pre-am	plifer	26-40GH	z	н	orn > 18	GHz		Limit
T120;	T120; S/N: 29310 @3m T34 HP 8449B   T120; S/N: 29310 @3m RX RSS 210															
Hi Freq	uency Ca	bles —					_									
	2 foot	cable		3	foot c	able		12	foot d	able		HPF	D.	eject Filte	Peal	k Measurements
														geerrine	RB	W=VBW=1MHz
Tha	nh 1770	79008	-				•	C-5m C	hamb	er 🗸			-			ge Measurements
								I		_	1 1				KBW=	1MHz; VBW=10Hz
f	Dist	Read Pk	Rea	d Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
GHz	(m)	dBuV	ď	BuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
1.040	3.0	50.7		85.4	25.9	13	-38.2	0.0	0.0	39.7	24.4	74	54	-34.3	- <b>29.6</b>	V
1.180	3.0 3.0	50.1 48.8		19.0 15.8	26.4 26.5	1.4 1.4	-38.0 -38.0	0.0 0.0	0.0 0.0	39.8 38.7	28.8 25.7	74 74	54 54	-34.2 -35.3	-25.2 -28.3	v
1.040	3.0	49.1		0.6	25.9	13	-38.2	0.0	0.0	38.1	29.6	74	54 54	-35.5	-20-3	H
1.180	3.0	49.4		1.8	26.4	1.4	-38.0	0.0	0.0	39.2	31.6	74	54	-34.8	-22.4	Н
1.200	3.0	48.7	4	10.9	26.5	1.4	-38.0	0.0	0.0	38.6	30.8	74	54	-35.4	-23.2	Н
No more s	ignal for	und	L					<u> </u>		<u>_</u>				<u> </u>	<u> </u>	

Page 81 of 81

# 802.11bg MODE

# **FOXCONN ANTENNA**

Compan Project : Date: 8/ Test En Configu Mode: 1	ance Ce ny: NIN #: 08JJ /27/2008 ngineer: ration: 1 Rx On, 3	rtification FENDO (2039 8 William Zl EUT with s 802.11 b/g	y Measure: Services, I uuang support equ Mode, wor	'remont ipment	5m Ch	amber									
<u>Test Eq</u>	uipmen	<u>t:</u>													
н	orn 1-	18GHz	Pre-a	mplifer	1-260	GHz	Pre-am	plifer	26-40GH	Iz	н	orn > 18	GHz		Limit
T120;	S/N: 29	310 @3m	▼ T34 I	IP 8449B		-				•				•	RX RSS 210 🗸
	Hi Frequency Cables       2 foot cable     3 foot cable       Thanh 177079008     •						12 C-5m C	foot c hamb			HPF	<b>R</b> e ▼	eject Filte	RB	<u>k Measurements</u> W=VBW=1MHz 1ge Measurements 11MHz ; VBW=10Hz
f	Dist		Read Avg	. AF	CL	Amp	D Сон	Fltr	Peak	Avg			1	Avg Mar	Notes
GHz	(m)	dBuV	dBuV	dB/m		dB	dB	dB	dBuV/m		dBuV/m			dB	(V/H)
1.062	3.0	64.0	44.5	26.0	13	-38.2	0.0	0.0	53.1	33.6	74	54	-20.9	-20.4	V
1.273 1.330	3.0 3.0	52.3 54.7	37.3 40.4	26.7 27.0	1.4 1.4	-37.9 -37.8	0.0 0.0	0.0 0.0	42.6 45.3	27.6 31.0	74 74	54 54	-31.4 -28.7	-26.4 -23.0	v v
1.865	3.0	53.8	40.4 37.1	28.9	1.4	-37.0	0.0	0.0	43.5	30.7	74	54	-26.0	-23.0	v
1.062	3.0	63.0	42.8	26.0	13	-38.2	0.0	0.0	52.1	31.9	74	54	-21.9	-22.1	H
1.273	3.0	49.6	36.1	26.7	1.4	-37.9	0.0	0.0	<b>39</b> 9	26.3	74	54	-34.1	-27.7	Н
1.330	3.0	54.8	39.0	27.0	1.4	-37.8	0.0	0.0	45.4	29.6	74	54	-28.6	-24.4	H
1.865 No more s	3.0	50.3	35.9	28.9	1.7	-37.1	0.0	0.0	43.9	29.5	74	54	-30.1	-24.5	H
			.&			ā			.A		λ			±	

Page 82 of 82

# **TYCO ANTENNA**

Compa Projec Date: 3 Test E Config	iance Ce ny: NIN t #: 08J 3/27/2004 ngineer: uration:	ertification TENDO 12039 3 William Zi EUT with s	/ Measurem Services, Fr wang upport equij Mode, wors	emont : pment	5m Ch	amber									
<u>Test E</u>	quipmen	. <u>t:</u>													
	lorn 1-	18GHz	Pre-ar	nplifer	1-260	GHz	Pre-am	plifer	26-40GH	Iz	н	orn > 18	GHz		Limit
T120	Horn 1-18GHz     Pre-amplifer 1-26GHz     Pre-amplifer 26-40GHz     Horn > 18GHz     Limit       T120; S/N: 29310 @3m     T34 HP 8449B     T34 HP 8449B     RX RSS 210     RX RSS 210														
L Hi Fr	equency Ca	bles								 					
	Hi Frequency Cables     3 foot cable     12 foot cable     HPF     Reject Filter     Peak Measurements RBW=/VBW=1MHz														
Т	anh 1770	79008	•			·	C-5m C	hamb	er 🗸	1		•		Avera	ig <u>e Measurements</u> 1MHz ; VBW=10Hz
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	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)
1.063	3.0	60.8	42.7	26.0	13	-38.2	0.0	0.0	49.9	31.8	74	54	-24.1	-22.2	v
1.330	3.0	52.8	37.5	27.0	1.4	-37.8	0.0	0.0	43.4	28.1	74	54	-30.6	-25.9	V
1.457 1.865	3.0 3.0	51.9 51.2	38.4 36.7	27.4 28.9	1.5 1.7	-37.6 -37.1	0.0 0.0	0.0 0.0	43.2 44.8	29.7 30.3	74 74	54 54	-30.8 -29.2	-24.3 -23.7	v
1.063	3.0	65.1	44.5	26.0	13	-38.2	0.0	0.0	54.2	33.6	74	54	-19.8	-20.4	Н
1.330	3.0	62.1	38.1	27.0	1.4	-37.8	0.0	0.0	52.7	28.7	74	54	-21.3	-25.3	Н
1.457	3.0	49.8	36.2	27.4	15	-37.6	0.0	0.0	41.1	27.5	74	54	- <b>32.9</b>	- <b>26.5</b>	Н
1.865	3.0	48.5	35.2	28.9	1.7	-37.1	0.0	0.0	42.0	28.8	74	54	- <b>32.0</b>	-25.2	Н
No more	signal for	und	L	<u> </u>					<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u> </u>	

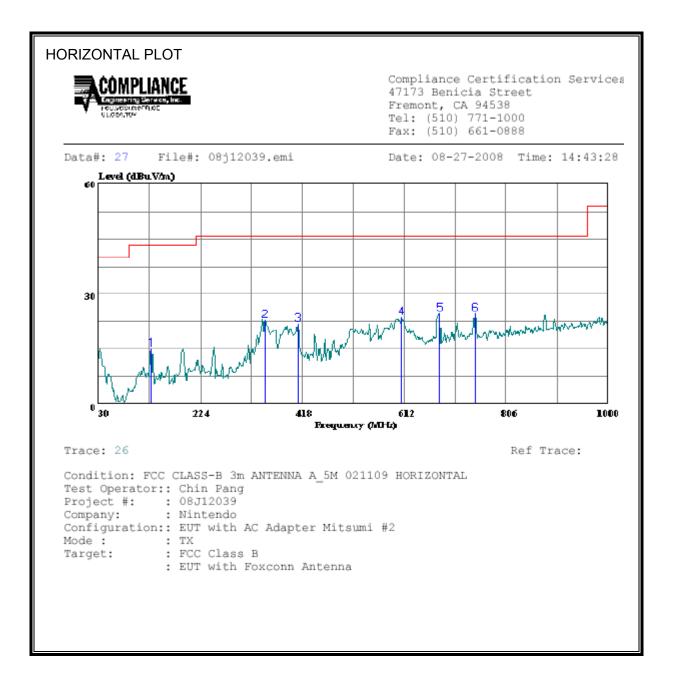
Page 83 of 83

# 8.4. WORST-CASE BELOW 1 GHz

### 802.11 MODE

#### EUT WITH FOXCONN ANTENNA AND MITSUMI AC ADAPTER

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

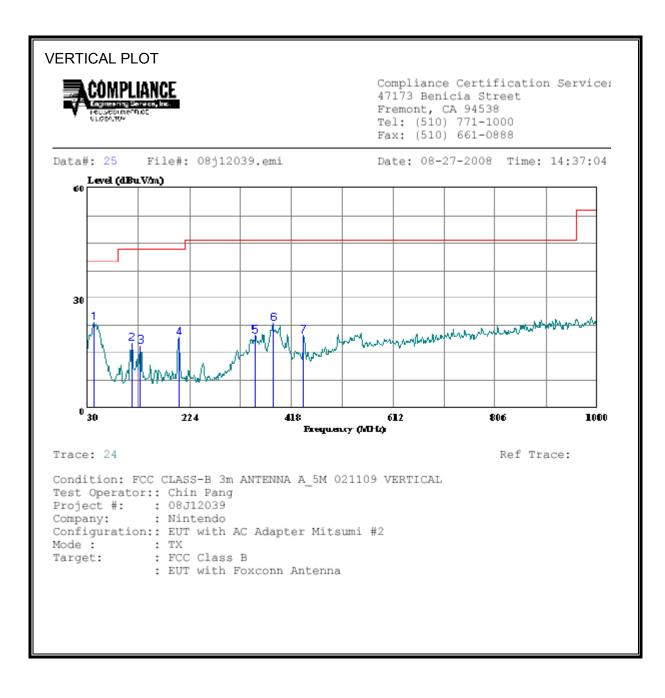


Page 84 of 84

HORIZO	NTAL DATA						
	Freq MHz	Read Level dBuV		Level dBuV/m	Line	Over Limit dB	Remark
1 2 3 4 5 6	130.880 347.190 410.240 606.180 678.930 746.830	36.94 34.24 31.96 31.41	-14.12 -12.35 -8.39 -6.76	22.82 21.89 23.57 24.65	46.00 46.00 46.00 46.00	-23.18 -24.11 -22.43 -21.35	Peak Peak Peak Peak

Page 85 of 85

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



COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4031B 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.

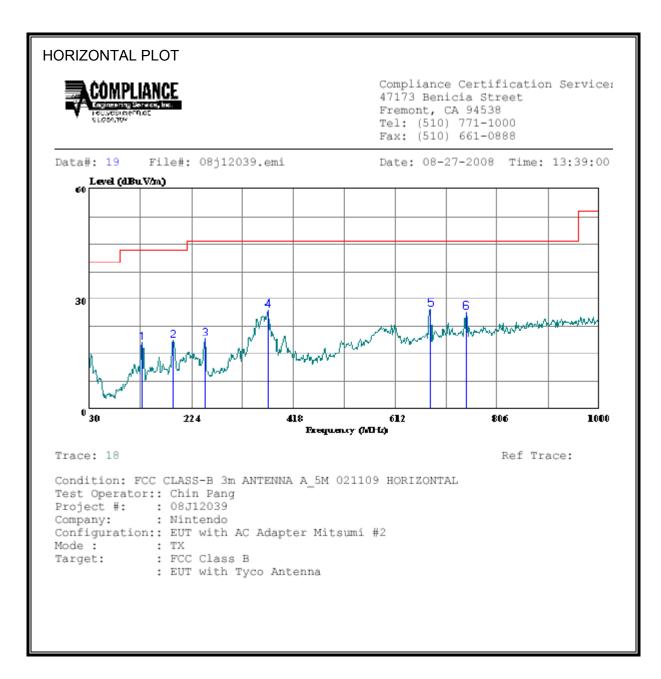
Page 86 of 86

VERT	VERTICAL DATA												
		Read			-	Over	-						
	Freq	Level	Factor	Level	Line	Limit	Remark						
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB							
1	41.640	41.45	-18.06	23,39	40.00	-16.61	Peak						
2	114.390	35,92	-18.33	17.59	43.50	-25,91	Peak						
3	130.880	34.65	-17.84	16.81	43.50	-26.69	Peak						
4 5	203.630	36.82	-17.55	19.27	43.50	-24.23	Peak						
	349.130	33,91	-14.07	19.84	46.00	-26.16	Peak						
6	383.080	36.22	-13.09	23.13	46.00	-22.87	Peak						
7	441.280	31,31	-11.46	19.85	46.00	-26.15	Peak						

Page 87 of 87

#### EUT WITH TYCO ANTENNA AND MITSUMI AC ADAPTER

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

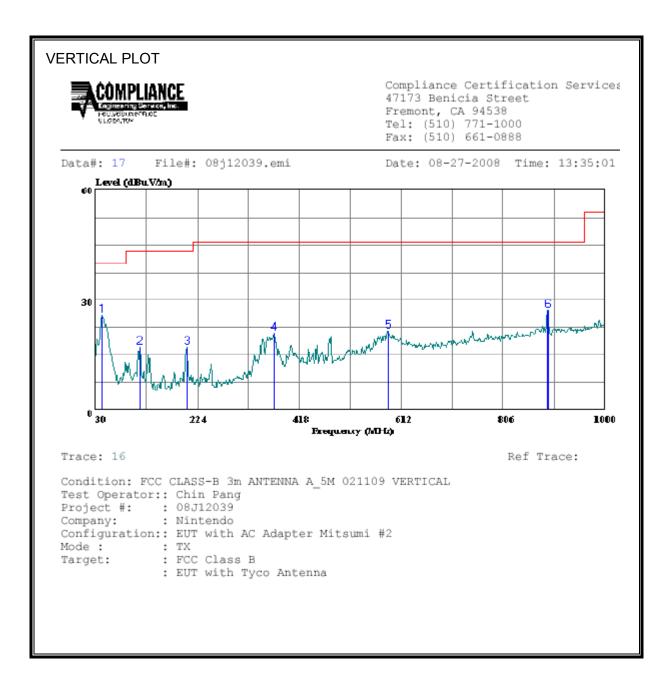


Page 88 of 88

HORIZO	NTAL DATA						
	Freq	Read Level	Factor	Level	Limit Line		Remark
-	MHz	dBuV		dBuV/m		dB	
1 2 3 4 5 6		37.11 36.88 40.67 34.05	-18.39 -17.76 -13.53 -6.76	18.72 19.12 27.14 27.29	43.50 46.00 46.00 46.00	-25.21 -24.78 -26.88 -18.86 -18.71 -19.62	Peak Peak Peak Peak

Page 89 of 89

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



Page 90 of 90

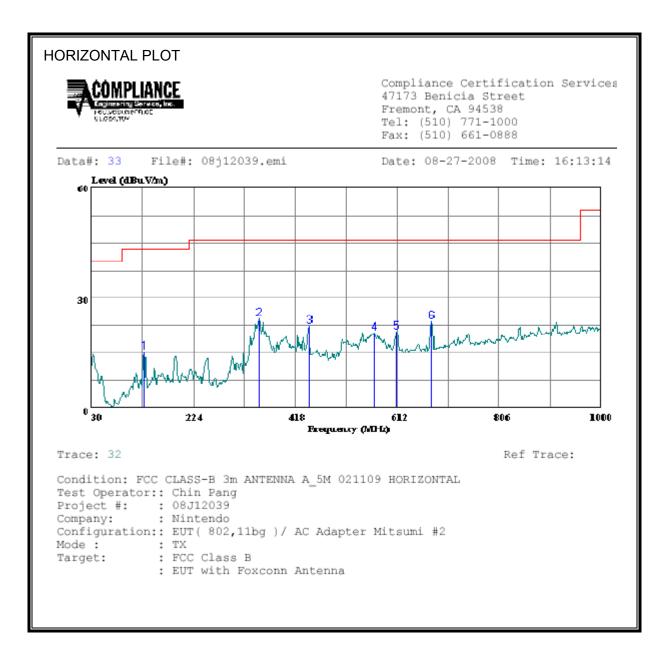
VERTICA	AL DATA						
	Freq	Read Level	Factor	Level		Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 2 3 4 5 6	41.640 114.390 203.630 368.530 586.780 890.390	35.60 34.80 34.62 30.33	-18.33 -17.55 -13.53 -8.72	17.27 17.25 21.09 21.61	43.50 43.50 46.00 46.00	-26.23 -26.25 -24.91	Peak Peak Peak Peak

Page 91 of 91

#### 802.11bg MODE

#### **EUT WITH FOXCONN ANTENNA AND MITSUMI AC ADAPTER**

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



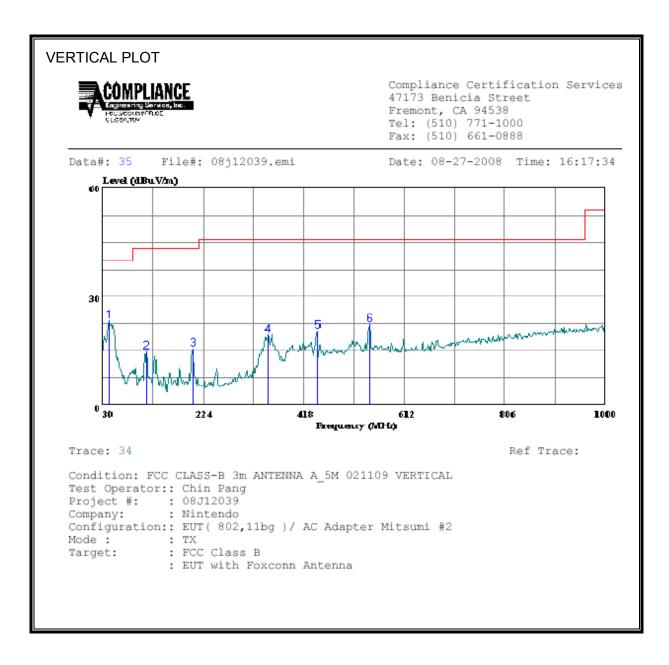
COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4031B 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of CCS.

Page 92 of 92

HORI	ZONTAL DA	ΑТА						
	Freq	Read Level dBuV			Limit Line dBuV/m	Limit	Remark	
1 2 3 4 5 6	130.880 349.130 444.190 567.380 611.030 676.990	38.58 33.78 29.58 28.97	-14.07 -11.39 -8.98 -8.27	24.51 22.39 20.60 20.70	46.00 46.00 46.00 46.00		Peak Peak Peak Peak	

Page 93 of 93

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



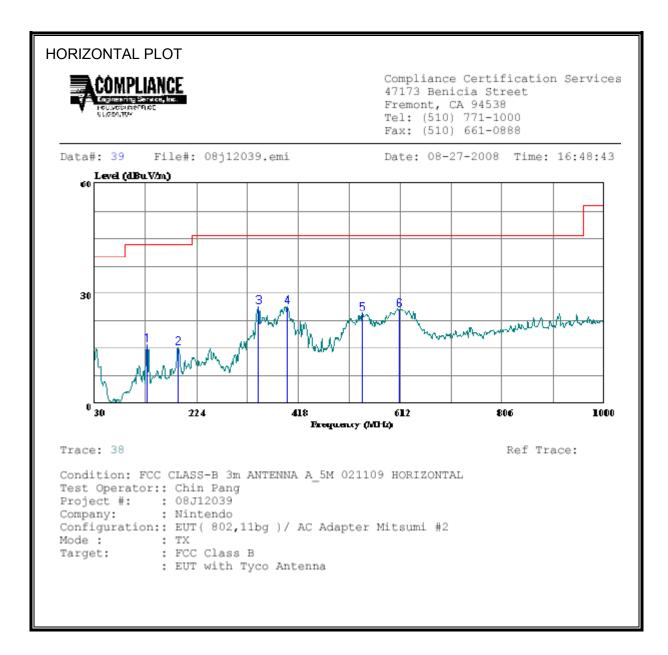
Page 94 of 94

VERTI	VERTICAL DATA												
	Freq	Read Level	Factor	Level		Over Limit	Remark						
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB							
1 2 3 4 5 6	41.640 114.390 203.630 349.130 444.190 546.040	33.02 33.17 33.52 32.01	-18.33 -17.55 -14.07 -11.39	15.62 19.45 20.62	43.50 43.50 46.00 46.00	-16.54 -28.81 -27.88 -26.55 -25.38 -23.71	Peak Peak Peak Peak						

Page 95 of 95

#### EUT WITH TYCO ANTENNA AND MITSUMI AC ADAPTER

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



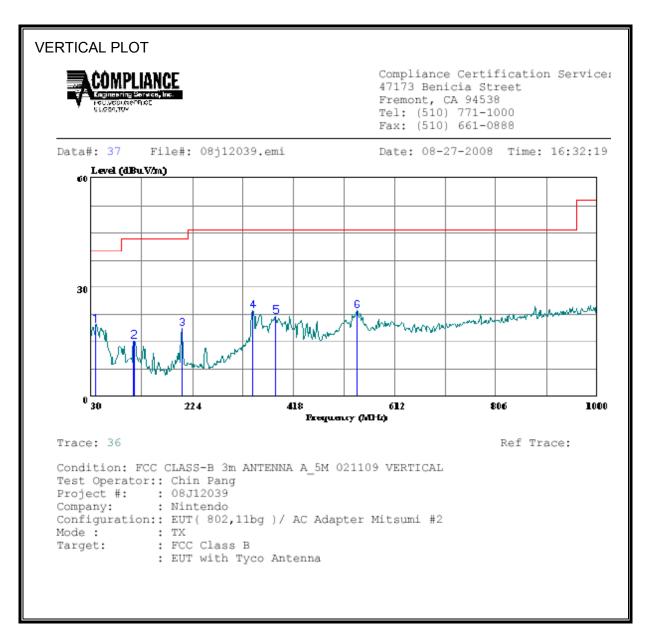
COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4031B 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of CCS.

Page 96 of 96

HORIZONTAL DATA										
	Freq	Read Level		Level	Limit Line					
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB				
1	130.880	33,91	-17.84	16.07	43.50	-27.43	Peak			
2	189.080	33,69	-18.39	15.30	43.50	-28.20	Peak			
3	342.340	40.72	-14.28	26.44	46.00	-19.56	Peak			
4	397.630	39,10	-12.69	26.41	46.00	-19.59	Peak			
5	538,280	34.06	-9.39	24.67	46.00	-21.33	Peak			
6	611.030	34.09	-8,27	25.82	46.00	-20.18	Peak			

Page 97 of 97

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



Page 98 of 98

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line		Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1 2 3 4 5 6	38.730 111.480 203.630 339.430 383.080 538.280	34.21 36.15 37.97 35.15	-16.61 -18.88 -17.55 -14.38 -13.09 -9.39		43.50 43.50 46.00 46.00	-20.24 -28.17 -24.90 -22.41 -23.94 -22.35	Peak Peak Peak Peak

Page 99 of 99

# 9. AC POWER LINE CONDUCTED EMISSIONS

# LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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**

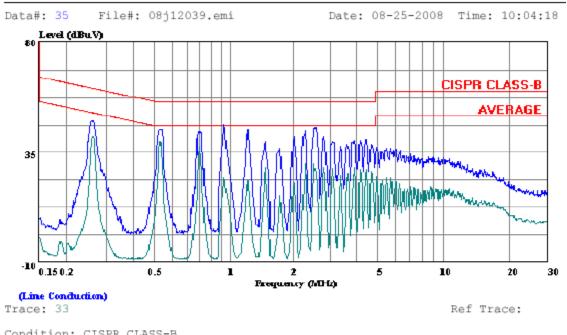
	CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark	
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2	
0.26	48.13		41.33	0.00	61.43	51.43	-13.30	-10.10	L1	
0.54	44.68		39.41	0.00	56.00	46.00	-11.32	-6.59	L1	
2.69	45.21		30.37	0.00	56.00	46.00	-10.79	-15.63	L1	
0.27	52.38		43.26	0.00	61.21	51.21	-8.83	-7.95	L2	
0.54	50.10		41.81	0.00	56.00	46.00	-5.90	-4.19	L2	
1.08	51.70		40.76	0.00	56.00	46.00	-4.30	-5.24	L2	
6 Worst I	Data									

Page 100 of 100

#### LINE 1 RESULTS

# 

Compliance Certification Services 47173 Benicia Street Fremont, CA 94538 Tel: (510) 771-1000 Fax: (510) 661-0888

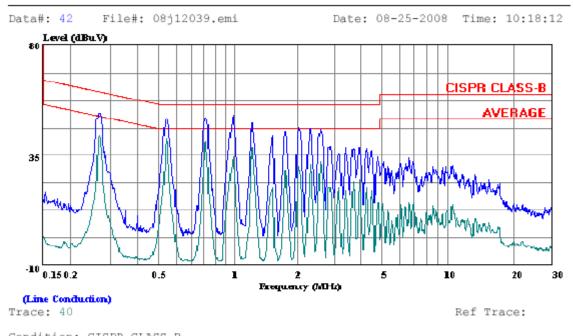


Condition: CIS	Ft	C CLASS-B
Test Operator:	:	Chin Pang
Project #:	:	08J12039
Company:	:	Nintendo/Mitsumi
Configuration:	:	EUT ( 802.11) With AC Adapter
Mode:	:	Pinging
Target:	:	FCC Class B
Voltage:	:	115VAC / 60 Hz
	:	L1: Peak ( Blue ), Average ( Green )
	:	AC Adapter: Mitsumi #2, Model: WAP-002

Page 101 of 101

#### LINE 2 RESULTS

Compliance Certification Services 47173 Benicia Street Fremont, CA 94538 Tel: (510) 771-1000 Fax: (510) 661-0888



Condition: CISP	R CLASS-B
Test Operator::	Chin Pang
Project #: :	08J12039
Company: :	Nintendo/Mitsumi
Configuration::	EUT ( 802.11) With AC Adapter
Mode: :	Pinging
Target: :	FCC Class B
Voltage: :	115VAC / 60 Hz
:	L2: Peak ( Blue ), Average ( Green )
:	AC Adapter: Mitsumi #2, Model: WAP-002

Page 102 of 102

#### 10. MAXIMUM PERMISSIBLE EXPOSURE

#### 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)	h strength /mW/co		Averaging time (minutes)	
(A) Lim	its for Occupational	/Controlled Exposu	res		
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f2) 1.0 f/300 5	6 6 6 8	
(B) Limits	for General Populati	on/Uncontrolled Exp	oosure		
0.3–1.34 1.34–30	614 824/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/cm²)	Averaging time (minutes)
30–300 300–1500	27.5	0.073	0.2 f/1500	30 30
1500–100,000			1.0	30

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-tion to the state of the here the exposure also apply in situations when an individual is transient through a location where occu-tion to the state of the here the exposure also apply in situations.

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 or can not exercise control over their exposure.

Page 103 of 103

# IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

# Table 5

Exposure Limits for Persons Not Classed As RF and Microwave Ex-
posed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m <sup>2</sup> )	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/f	2.19/ <i>f</i>		6
10–30	28	2.19/f		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> <sup>0.5</sup>	0.0042f <sup>0.5</sup>	f/150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 /f <sup>1.2</sup>
150 000–300 000	0.158f <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> f <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> f	616 000 /f <sup>1.2</sup>

\* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.

- 2. A power density of  $10 \text{ W/m}^2$  is equivalent to  $1 \text{ mW/cm}^2$ .
- A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

Page 104 of 104

# CALCULATIONS

Given

 $E = \sqrt{(30 * P * G)} / d$ 

and

S = E ^ 2 / 3770

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

d = 0.282 \* 10 ^ ((P + G) / 20) / √ S

where

d = MPE distance in cm P = Power in dBm G = Antenna Gain in dBi S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

 $S = 0.0795 * 10^{(P + G)} / 10) / (d^2)$ 

The power density in units of mW/cm<sup>2</sup> is converted to units of W/m<sup>2</sup> by multiplying by a factor of 10.

Page 105 of 105

# LIMITS

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

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m<sup>2</sup>

### **RESULTS**

(MPE distance equals 20 cm)

Mode	Band	MPE	Output	Antenna	FCC Power	IC Power
		Distance	Power	Gain	Density	Density
		(cm)	(dBm)	(dBi)	(mW/cm^2)	(W/m^2)
WLAN	802.11	20.0	2.93	0.88	0.00	0.00
WLAN	802.11b/g	20.0	12.31	0.88	0.00	0.04

Page 106 of 106