

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

CERTIFICATION TEST REPORT

FOR

802.11bgn WLAN MODULE

MODEL NUMBER: DWM-W046

FCC ID: EW4DWMW046 IC: 4250A-DWMW046

REPORT NUMBER: 10J13365-1, Revision A

ISSUE DATE: AUGUST 25, 2010

Prepared for

MITSUMI ELECTRIC CO., LTD. 1601, SAKAI KANAGAWA 243-8533, JAPAN

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



NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
	08/25/10	Initial Issue	T. Chan
	09/08/10	Change Description on Receiver data and Replace the Setup Photos	M Mekuria

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DATE: AUGUST 25, 2010 IC ID: 4250A-DWMW046

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	MITSUMI ELECTRIC CO., LTD. 1601, SAKAI, ATSUGI-SHI KANAGAWA 243-8533	
EUT DESCRIPTION:	802.11bgn WLAN MODULE	
MODEL:	DWM-W046	
SERIAL NUMBER:	100630A0473	
DATE TESTED:	JULY 06 TO AUGUST 12, 2010	
	APPLICABLE STANDARDS	
ST	ANDARD	TEST RESULTS
CFR 47 Pa	art 15 Subpart C	Pass
INDUSTRY CANADA	RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CAN	ADA 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. 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:

Tested By:

THU CHAN ENGINEERING MANAGER COMPLIANCE CERTIFICATION SERVICES MENGISTU MEKURIA 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, 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. 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 an 802.11bgn WLAN module. 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	17.43	55.34
2412 - 2462	802.11g	25.48	353.18
2412 - 2462	HT20	26.24	420.73

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a 175 mm F-Type and 225 mm E-Type antennas with maximum gain of -4.56 dBi and -5.16dBi respectively.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Atheros radio Test (ART), Version0.8 BUILD#119 Art _11n.

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module connected to a host Laptop PC via USB cable.

Upon the preliminary tests of this Chipset, the worst-case data rates used during the tests are as follows:

802.11b Mode (20 MHz BW operation): 11 Mbps, CCK. 802.11g Mode (20 MHz BW operation): 6 Mbps, OFDM. 802.11n HT20 Mode (20 MHz BW operation): MCS0, OFDM.

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

Since the test software designed for the broadband receive mode the receiver test also conducted accordingly.

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DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST						
Description Manufacturer Model Serial Number						
Laptop	Dell	D620	28071776413			
AC/DC Adapter	Dell	LA65NS0-00	CN-0DF263-71615-72M-2925			

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	USB	1	USB	Shielded	.3 m	To remote Laptop			

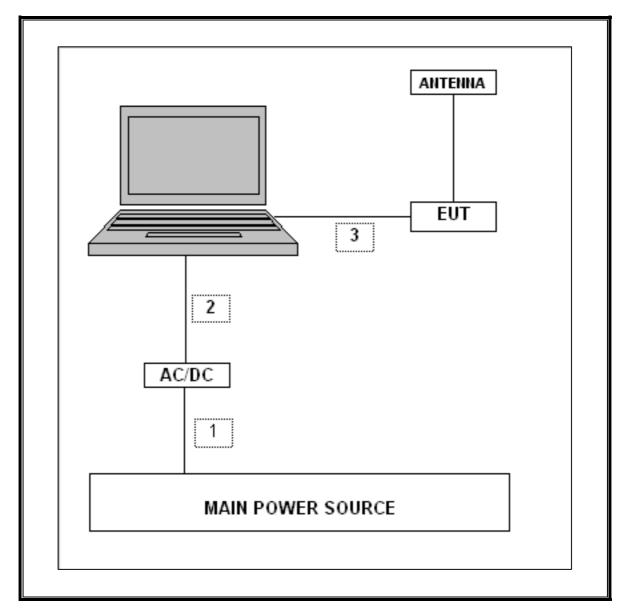
TEST SETUP

The EUT was connected to the laptop via USB cable during the test. Test software exercised the radio card.

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SETUP DIAGRAM FOR LINE CONDUCTION 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							
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	08/24/11			
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/31/10			
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	05/06/11			
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	03/24/11			
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/14/11			
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/14/11			
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07/14/11			
Antenna, Horn, 18 GHz	EMCO	3115	C00945	06/29/11			
Antenna, Horn, 18 GHz	EMCO	3115	C00783	06/29/11			
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/11			
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	NA	01/15/11			
Peak / Average Power Sensor	Boonton	57318	NA	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.

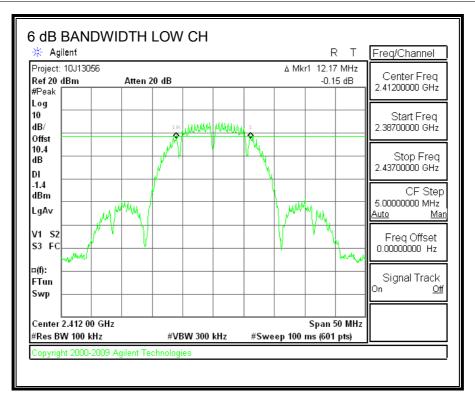
TEST PROCEDURE

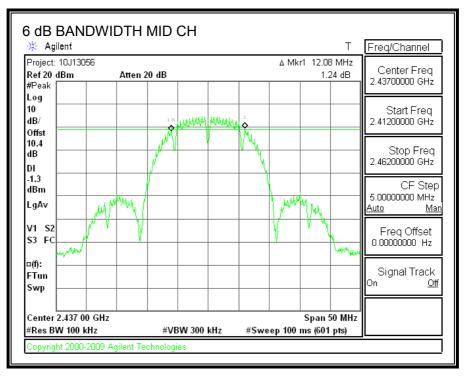
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

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

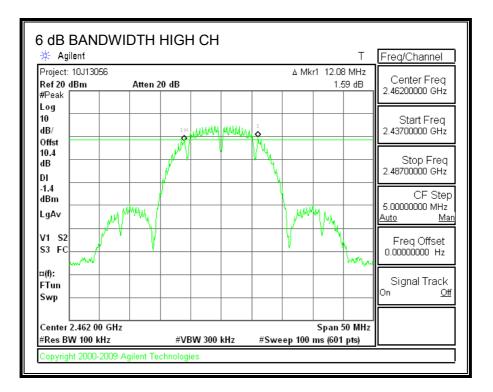
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7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

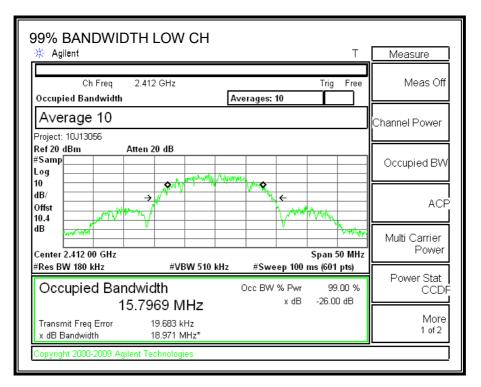
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

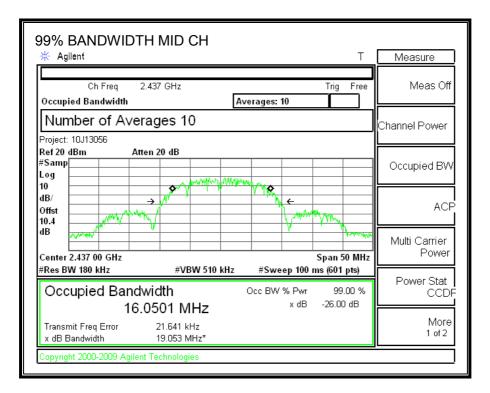
RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	15.7969
Middle	2437	16.0501
High	2462	15.7749

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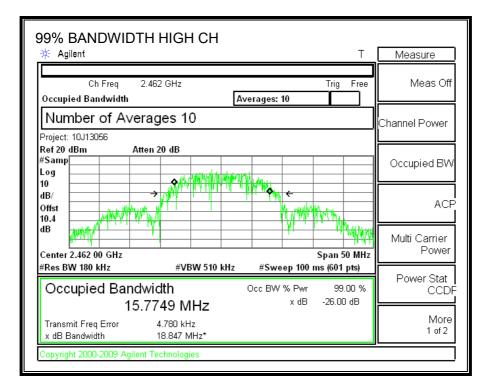
99% BANDWIDTH





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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

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency	Power Meter	Attenuator and	Output	Limit	Margin
		Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	6.906	10.5	17.41	30	-12.59
Middle	2437	6.928	10.5	17.43	30	-12.57
High	2462	5.681	10.5	16.18	30	-13.82

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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

Channel	Frequency	Power Meter	Attenuator and	Output
		Reading	Cable Offset	Power
	(MHz)	(dBm)	(dB)	(dBm)
Low	2412	4.58	10.5	15.08
Middle	2437	4.67	10.5	15.17
High	2462	3.19	10.5	13.69

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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

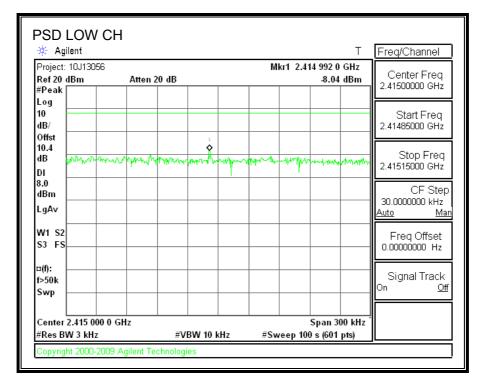
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

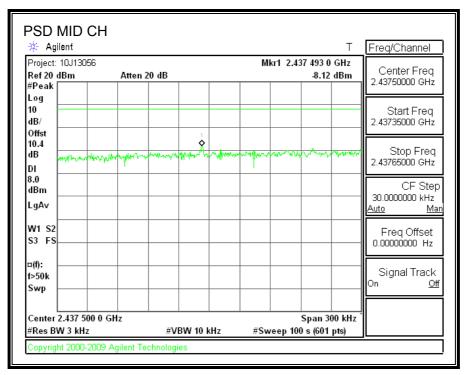
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-8.04	8	-16.04
Middle	2437	-8.12	8	-16.12
High	2462	-7.93	8	-15.93

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POWER SPECTRAL DENSITY





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🔆 Agilent									Т	Freq/Channel
Project: 10J1 Ref 20 dBm #Peak	3056	Atten 2	0 dB			M	kr1 2.46		GHz dBm	Center Freq 2.46255000 GHz
Log 10 dB/										Start Freq 2.46240000 GHz
Offst 10.4 dB <u>_``\w</u> l DI 8.0	where the second	w. from	i Nuviter	an a	no ^r transferte	WAAAAAAA	e-C-alimiten	r hur a	www	2.46270000 GH2
dBm LgAv										CF Step 30.0000000 kHz <u>Auto Mar</u>
W1 S2 S3 FS										Freq Offset 0.00000000 Hz
¤(f): f>50k Swp										Signal Track On <u>Off</u>
Center 2.462 #Res BW 3 I		lz	#V	BW 10 I		#5w	reep 100	Span 3) e /601		

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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

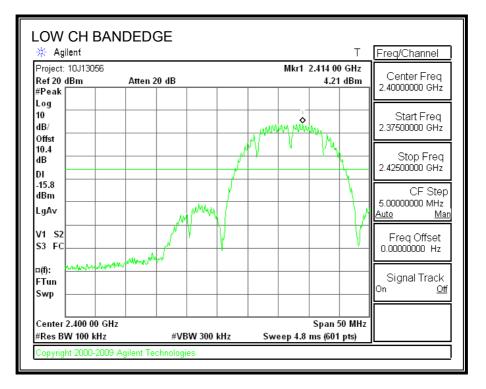
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

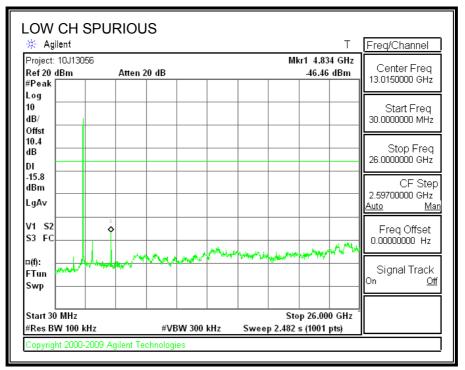
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

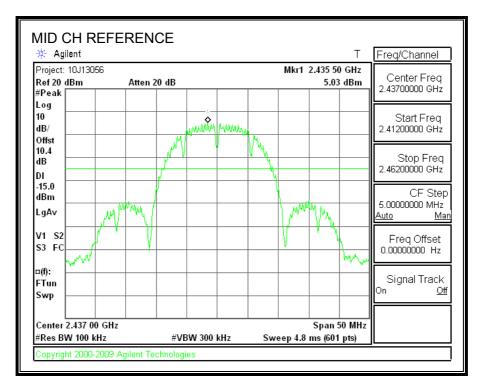




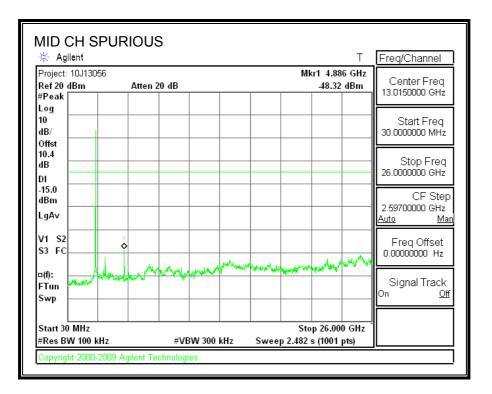
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SPURIOUS EMISSIONS, MID CHANNEL

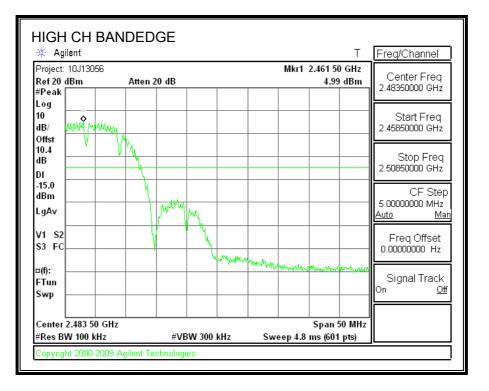


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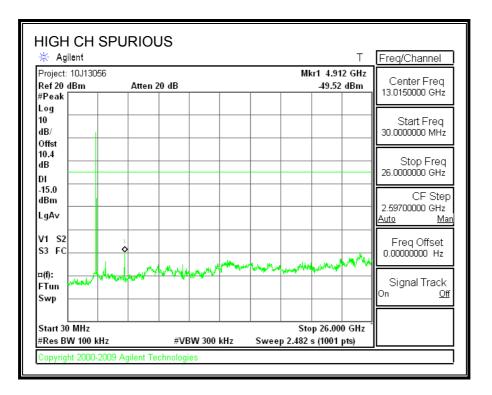


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SPURIOUS EMISSIONS, HIGH CHANNEL



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7.2. 802.11 g 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

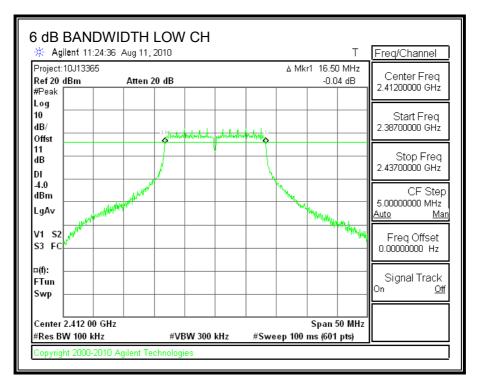
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

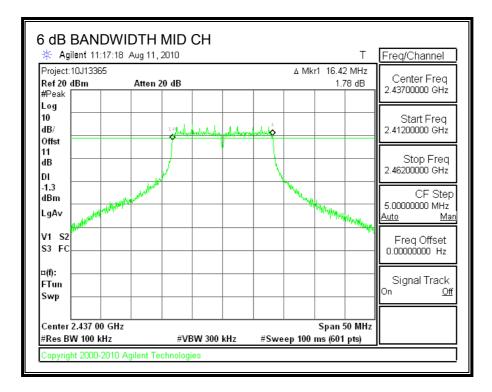
RESULTS

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	16.50	0.5
Middle	2437	16.42	0.5
High	2462	16.42	0.5

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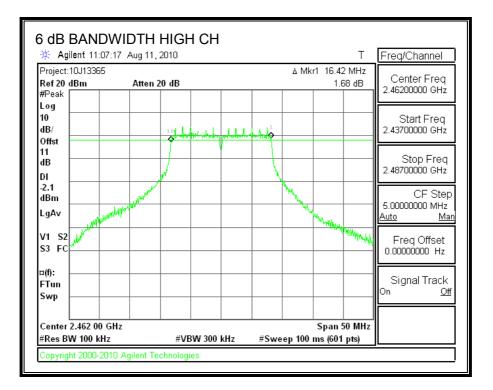
6 dB BANDWIDTH





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7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

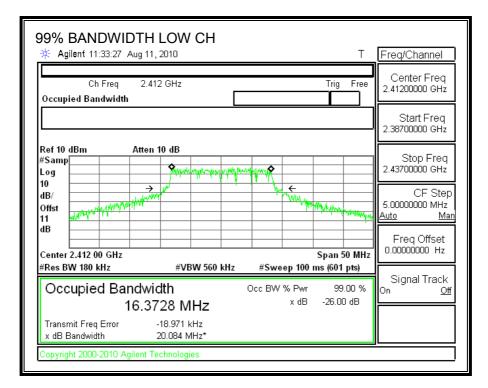
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

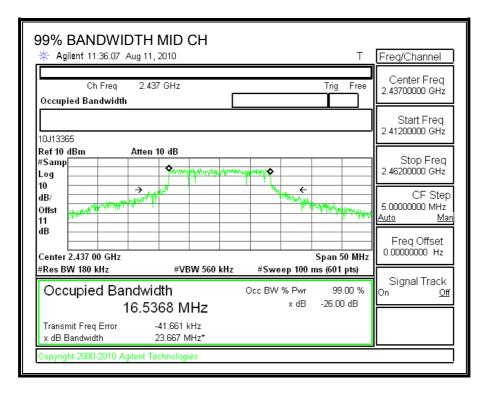
RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.3728
Middle	2437	16.5368
High	2462	16.5304

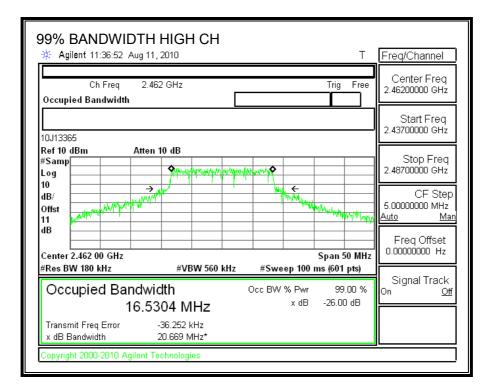
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7.2.3. OUTPUT POWER

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

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency	Power Meter	Attenuator and	Output	Limit	Margin
		Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	12.791	11.0	23.79	30	-6.21
Middle	2437	14.480	11.0	25.48	30	-4.52
High	2462	13.369	11.0	24.37	30	-5.63

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7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency	Power Meter	Attenuator and	Output
		Reading	Cable Offset	Power
	(MHz)	(dBm)	(dB)	(dBm)
Low	2412	2.340	11.0	13.34
Middle	2437	4.392	11.0	15.39
High	2462	3.450	11.0	14.45

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7.2.5. 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

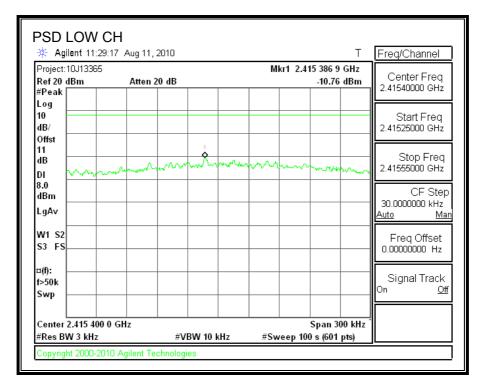
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

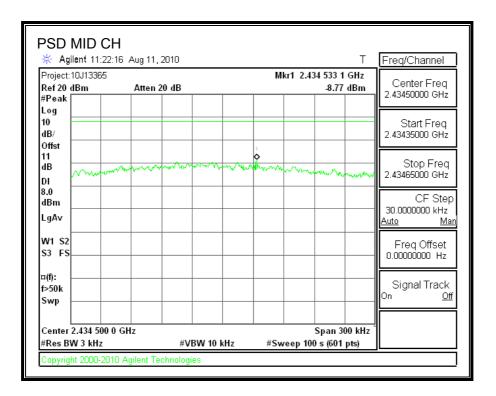
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-10.76	8	-18.76
Middle	2437	-8.77	8	-16.77
High	2462	-9.53	8	-17.53

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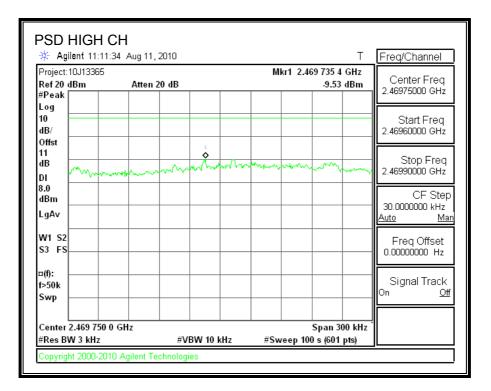
POWER SPECTRAL DENSITY





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7.2.6. 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

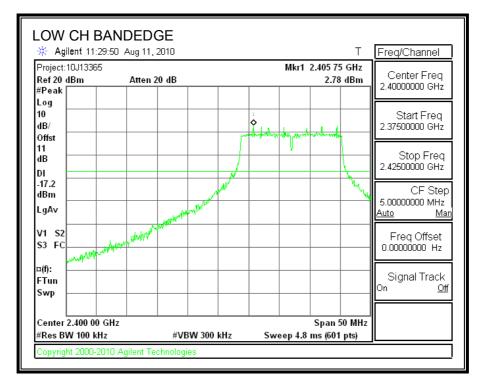
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

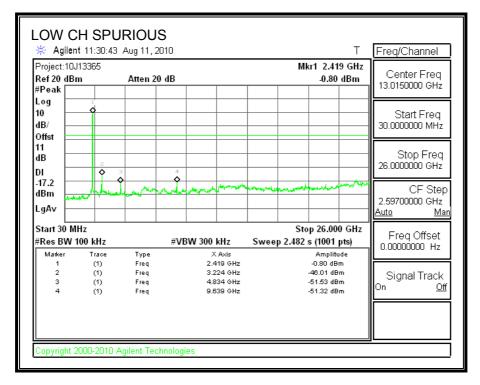
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

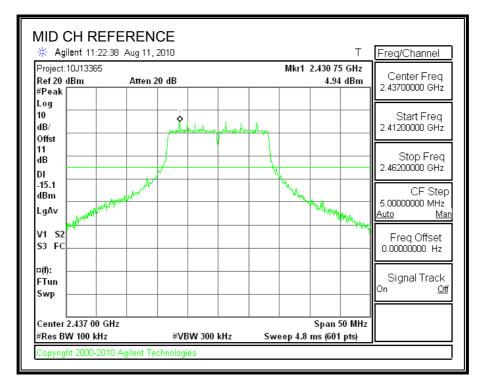


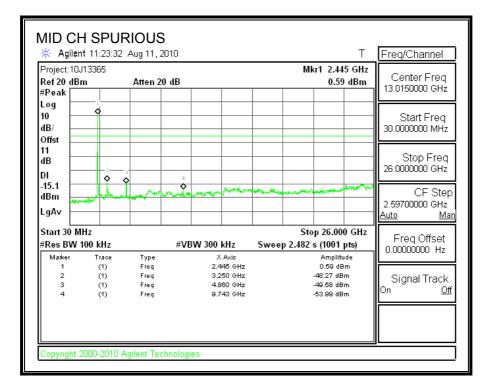


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SPURIOUS EMISSIONS, MID CHANNEL

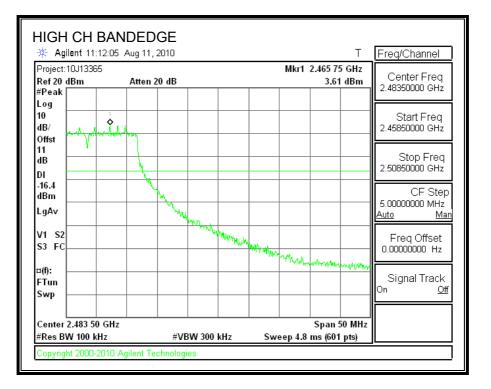


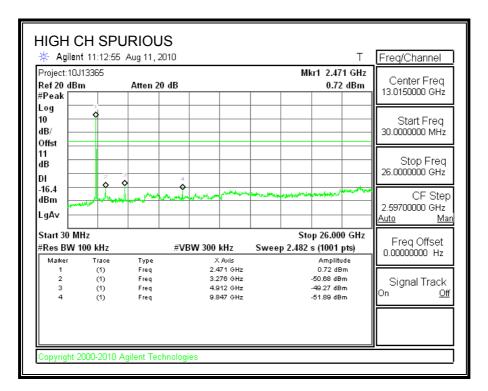


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SPURIOUS EMISSIONS, HIGH CHANNEL





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7.3. 802.11HT 20 MODE IN THE 2.4 GHz BAND

7.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

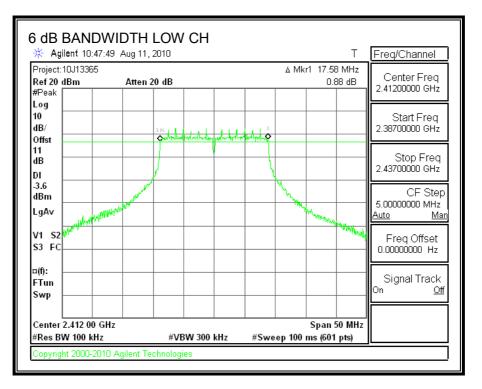
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

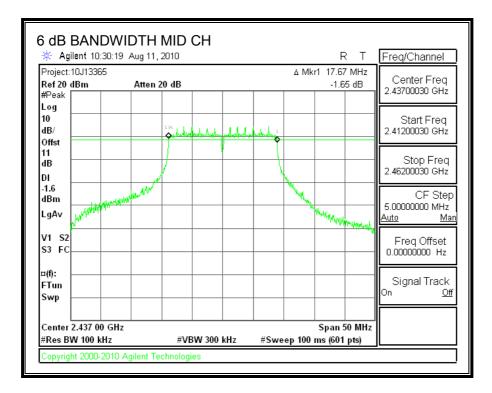
RESULTS

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	17.58	0.5
Middle	2437	17.67	0.5
High	2462	17.58	0.5

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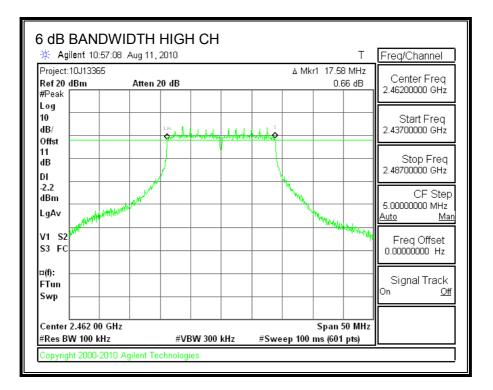
6 dB BANDWIDTH





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7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

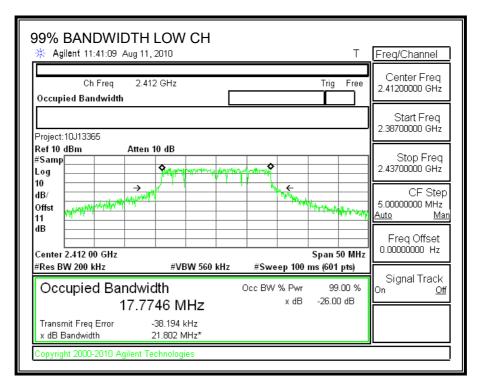
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

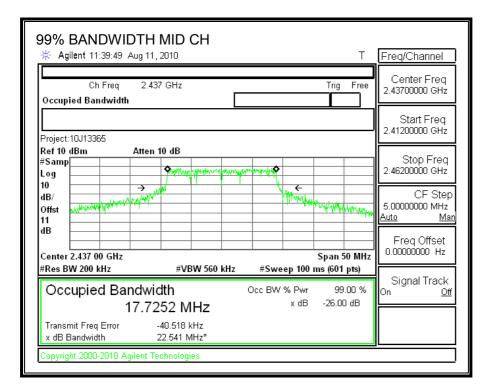
RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	17.7746
Middle	2437	17.7252
High	2462	17.7220

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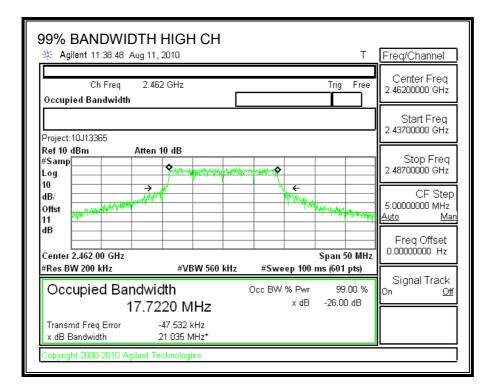
99% BANDWIDTH





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7.3.3. 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

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency	Power Meter	Attenuator and	Output	Limit	Margin
		Reading	Cable Offset	Power		
	(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)
Low	2412	13.400	11.0	24.40	30	-5.60
Middle	2437	15.241	11.0	26.24	30	-3.76
High	2462	14.234	11.0	25.23	30	-4.77

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7.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency	Power Meter	Attenuator and	Output
		Reading	Cable Offset	Power
	(MHz)	(dBm)	(dB)	(dBm)
Low	2412	2.200	11.0	13.20
Middle	2437	4.312	11.0	15.31
High	2462	3.440	11.0	14.44

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7.3.5. 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

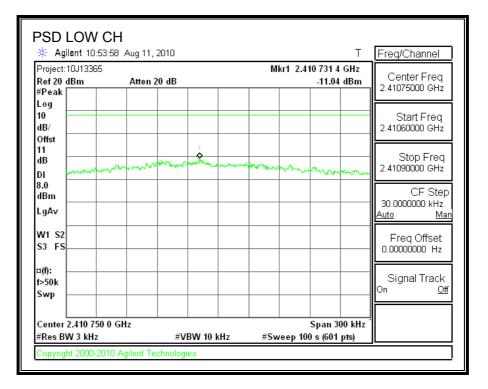
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

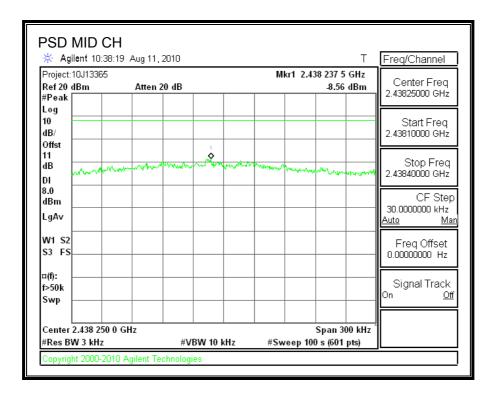
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-11.04	8	-19.04
Middle	2437	-8.56	8	-16.56
High	2462	-10.71	8	-18.71

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POWER SPECTRAL DENSITY





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🔆 Agilent 11:02	2:00 Aug 11, 2010			Т	Freq/Channel
Project:10J13365 Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.4	66 733 9 GHz -10.71 dBm	Center Freq 2.46675000 GHz
Log 10 dB/					Start Freq 2.46660000 GHz
Offst 11 dB DI	an a	1 Money mark	man	we wanter	Stop Freq 2.46690000 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 2.466 750 #Res BW 3 kHz		3W 10 kHz	#Sweep 10	Span 300 kHz 0 s (601 pts)	

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7.3.6. 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

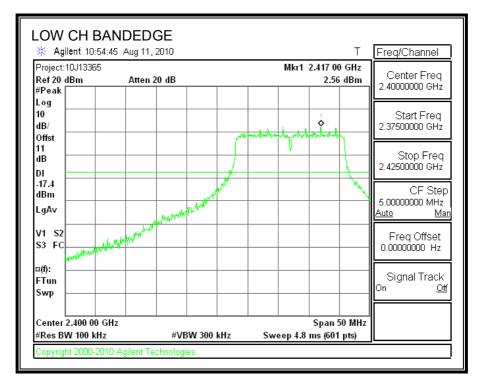
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

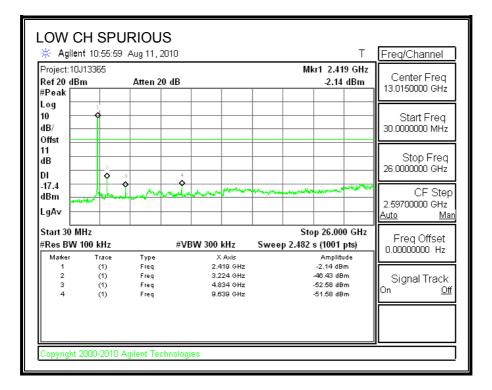
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

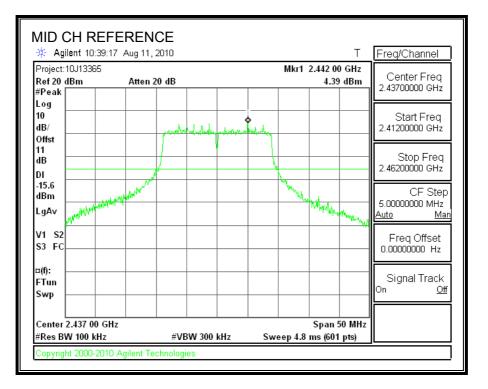


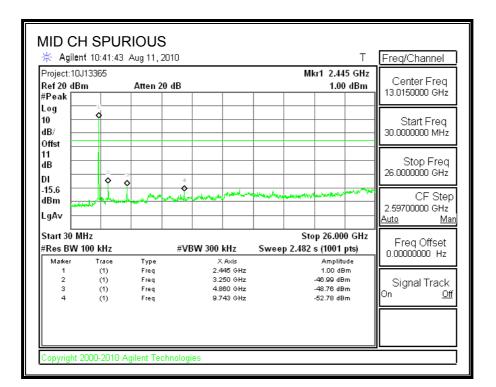


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SPURIOUS EMISSIONS, MID CHANNEL

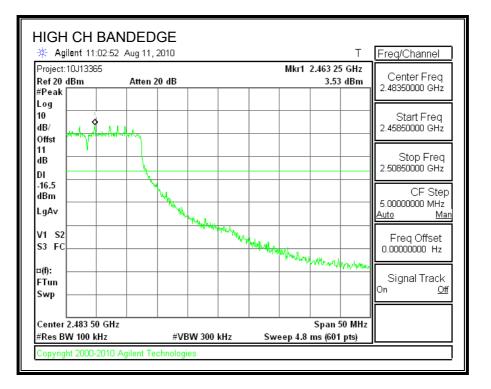


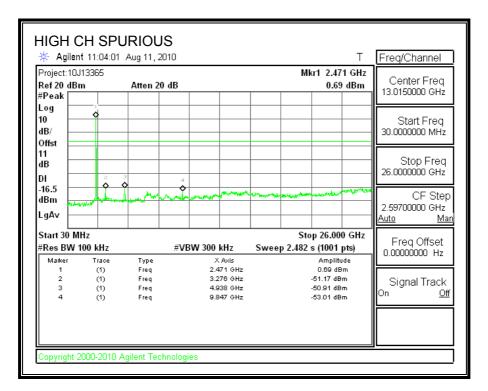


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SPURIOUS EMISSIONS, HIGH CHANNEL





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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

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.

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175 mm F-TYPE ANTENNA

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

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

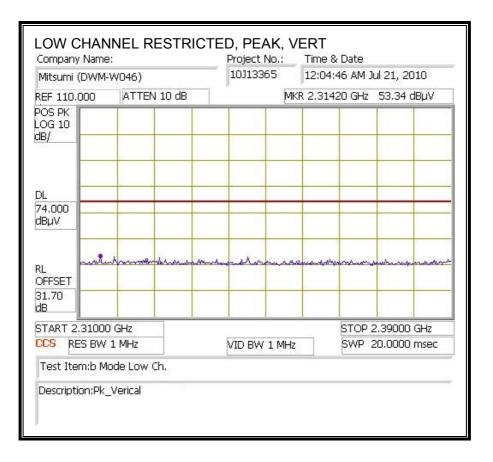
Mitsumi (DW	/M-W046)		10J13365	11:55	11:55:34 PM Jul 20, 2010			
REF 110.000	ATTEN	10 dB	M	IKR 2.375	580 GHz	52.71 0	dBµV	
POS PK .OG 10 #B/								
DL								
	hannen an	Munaamp	<u>senten en e</u>	s.	hanne	-toma	www.www	
31.70 #B								
START 2.310	000 GHz]		-	STOP 2	2.39000	GHz	
C <mark>CS</mark> RES E	W 1 MHz		VID BW 1 MH	z	SWP 2	20.0000	msec	
Test Item:b	Mode Low Ch	- 1.						

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Mitsumi (DWM		10J13365	11:53:19 PM .	
REF 110.000	ATTEN 10 dB	M	KR 2.39000 GHz	40.12 dBµV
POS PK LOG 10 JB/				
DL				
54.000 JBµV				
RL DFFSET				
31.70 dB				
START 2.3100	0 GHz		STOP	2.39000 GHz
CCS RES BW	1 MHz	VID BW 10 H	z SWP	24.00 sec
Test Item:b M	lode Low Ch.			

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

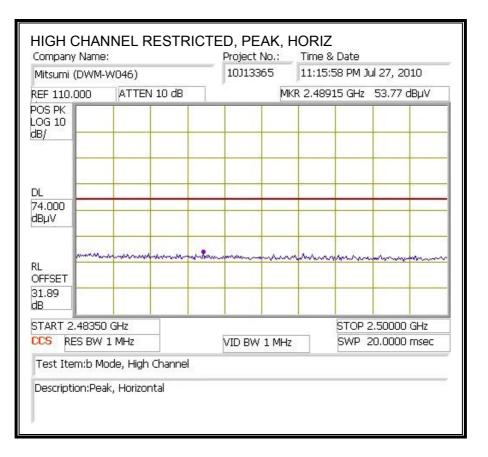


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Mitsumi (DWM-		10J13365	12:06:30 AM Jul 21, 2010			
REF 110.000	ATTEN 10 dB	М	KR 2.38980 GHz	39.80 dBµ\		
POS PK .OG 10 #B/						
)L ;4,000 IВµV						
RL DFFSET 31.70 JB						
START 2.31000		VID BW 10 Hz		2.39000 GHz 24.00 sec		
Test Item:b Mo	ode Low Ch.	L				

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

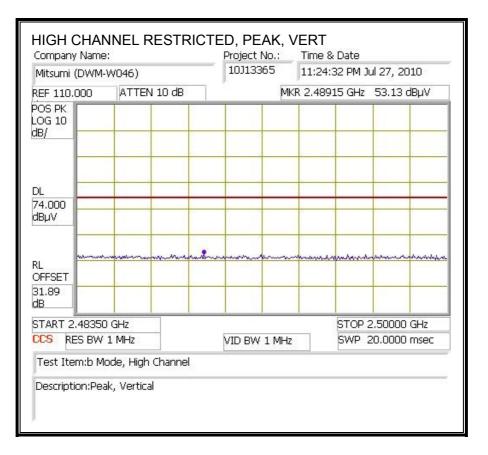


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Mitsumi (DWM-	W046)	10J13365	11:22:25 PM J	ul 27, 2010
REF 110.000	ATTEN 10 dB	M	KR 2.48383 GHz	40.45 dBµV
POS PK LOG 10 JB/				
DL 54.000 JBµV				
RL OFFSET 31.89 dB				
START 2.48350 CCS RES BW		VID BW 10 Hz		2.50000 GHz 5.00 sec
Test Item:b M	ode, High Channe			

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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Mitsumi (DWM	-W046)	10J13365	11:22	11:22:25 PM Jul 27, 2010		
REF 110.000	ATTEN 10 dB	М	KR 2.483	383 GHz	40.45 dBµV	
POS PK .OG 10 JB/						
DL 54.000 48µV						
RL DFFSET 31.89 dB						
START 2.4835		VID BW 10 Hz	:]	_	2.50000 GHz 5.00 sec	
Test Item:b M	1ode, High Channel					

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HARMONICS AND SPURIOUS EMISSIONS

	-		Measurem												
Complia	ance Ce	rtification	Services, Fi	emont	5m Ch	amber									
Compar			Mitsumi												
Project	#:		10J13365												
Date:			July 28, 2010												
l est En Configu	gineer:		Mengistu Me EUT With 175												
Vlode:	ration.		Tx, b Mode		pe rano	einia									
Fest Eq	uipmen	<u>t:</u>													
Horn 1-18GHz Pre-amplifer 1-26															
	5/N: 324	0	• T145 A	Agilent 3	3008A0	05(•				-	FCC 15.209
Hi Frequency Cables 3' cable 22807700 12' cable 2280760				600	20' cable 22807500 HPF Reject						ject Filte	Filter Peak Measurements RBW=VBW=1MHz			
3. c	able 220	307700	▼ 12' ca	able 228	07600	•	20' cab	le 2280	7500			• R_	001		ge Measurements 1MHz ; VBW=10Hz
f GHz	Dist (m)	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 (V/H)
	1 ()	2.0 MHz)	and and a	(III)/III						<u>ubu vini</u>	abavia	abuvin			(1/11)
.824	3.0	49.2	46.5	32.8	5.8	-34.8	0.0	0.0	52.9	50.2	74	54	- 21.1	-3.8	Н
.216	3.0	51.1	48.5	30.5	4.5	-35.1	0.0	0.0	51.0	48.4	74	54	- 23.0	- 5.6	Н
.824 .216	3.0 3.0	48.9 50.5	45.9 48.1	32.8 30.5	5.8 4.5	-34.8 -35.1	0.0 0.0	0.0 0.0	52.6 50.4	49.6 48.0	74 74	54 54	-21.4 -23.6	-4.4 -6.0	v
							0.0	0.0		40.0			-2010		•
		7.0 MHz)													
.874	3.0	45.1	41.2	32.8	5.8	-34.9	0.0	0.0	48.9	45.0	74	54	-25.1	-9.0	H
.249 .874	3.0 3.0	46.6 44.9	42.6 40.5	30.6 32.8	4.6 5.8	-35.1 -34.9	0.0 0.0	0.0 0.0	46.6 48.7	42.6 44.3	74 74	54 54	-27.4 -25.3	-11.4 -9.7	H V
.249	3.0	44.9	40.3	30.6	3.0 4.6	-34.9	0.0	0.0	46./	44.3	74	54 54	-25.5	-9.7	v
	el (2462		260	32.8		-34.9		0.0	46.9	40.7			-27.1	12.2	TT
.924 .283	3.0 3.0	43.1 44.3	36.8 36.1	32.8	59 4.6	-34.9	0.0 0.0	0.0	40.9	40.7	74	54 54	-27.1	-13.3 -17.8	<u>н</u>
.924	3.0	43.5	37.2	32.8	59	-34.9	0.0	0.0	47.3	41.0	74	54	-26.7	-13.0	v
.283	3.0	43.6	34.8	30.6	4.6	-35.1	0.0	0.0	43.7	34.9	74	54	-30.3	- 19.1	v
		l		^			1			1				ĺ	
Rev. 07.22	f Dist	Measurem Distance to Analyzer R		у		Amp D Corr Avg		Corre	ct to 3 mete Strength @			Pk Lim	Peak Fiel	Field Strengt d Strength L . Average L	imit
	AF	Antenna Fa	actor			Peak	Calculate	d Peal	c Field Stre	ngth		Pk Mar	– Margin vs	. Peak Limit	:

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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)

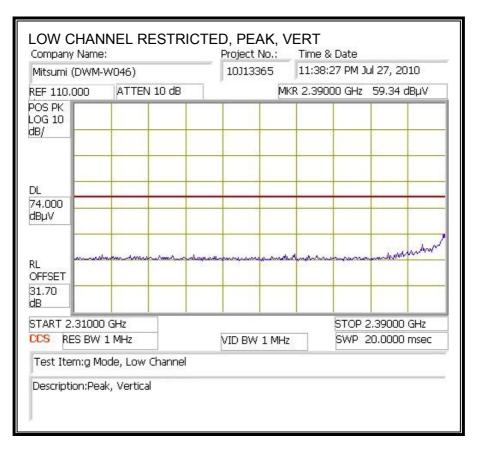
Company Nam	U;		Time & Date				
Mitsumi (DWM	I-W046)	10J13365	11:48:32 PM J	:32 PM Jul 27, 2010 980 GHz 66.98 dBµV			
REF 110.000	ATTEN 10 dB	M	<r 2.38980="" ghz<="" th=""></r>				
POS PK LOG 10 JB/							
DL 74.000							
2.22.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2			-	multime to the second			
31.70 dB							
START 2.3100	0 GHz		STOP	STOP 2.39000 GHz			
CCS RES BW	1 MHz	VID BW 1 MH	SWP :	SWP 20.0000 msec			
Test Item:a N	1ode, Low Channel						
Description:Pe							

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Mitsumi (DWM-	W046)	10J13365	11:46:06 PM Jul 27, 2010				
REF 110.000	ATTEN 10 d	M	KR 2.39000 GHz	48.01 dBµV			
POS PK LOG 10 dB/							
DL 54.000 dBµV							
RL OFFSET 31.70 dB							
START 2.31000 CCS RES BW		VID BW 10 Hz		STOP 2.39000 GHz SWP 24.00 sec			
Test Item:g M	ode, Low Chanr	1					

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

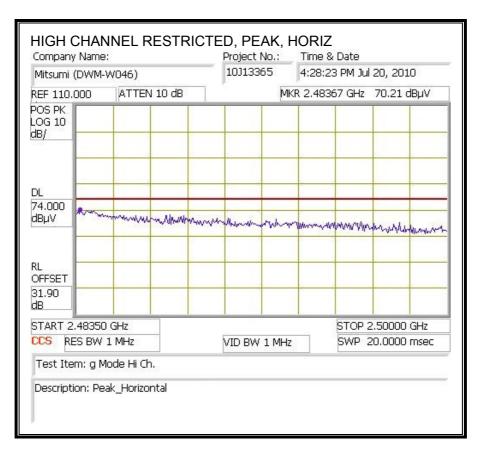


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Mitsumi (DWM-'	W046)		10J13365	J11:30	11:36:24 PM Jul 27, 2010				
REF 110.000	ATTEN 1	.0 dB	1	MKR 2.39	000 GHz	43.65 dBµV			
POS PK .OG 10 JB/							_		
DL 54.000 JBµV									
RL DFFSET									
JB									
START 2.31000 CCS RES BW		VID BW 10 H	STOP 2.39000 GHz SWP 24.00 sec						
Test Item:g Ma	ode, Low Cł	nannel							

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

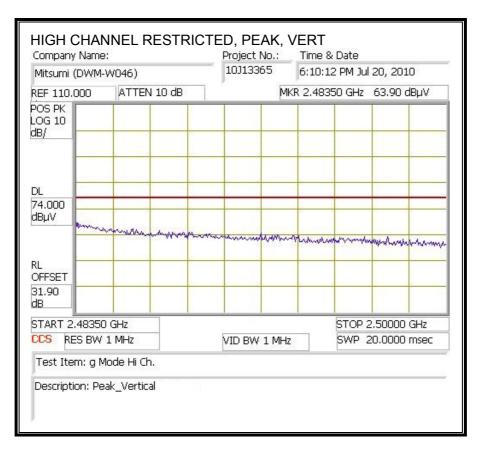


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Mitsumi (DWM-	W046)		10J13365	i	4:25:38 P	M Jul	20, 201	.0	
REF 110.000	ATTEN 10	dB		MKF	R 2.48354	53.48 dBµ∖			
005 PK .0G 10 #B/									
)L i4.000 IВµV									
RL DFFSET				~					
	TART 2.48350 GHz						STOP 2.50000 GHz		
CCS RES BW			VID BW 10	Þ	SWP 5.00 sec				
Test Item: g N	10de Hi Ch.								

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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Mitsumi (DWM-	W046)	10J13365	6:08:03 PM Ju	3:03 PM Jul 20, 2010			
REF 110.000	ATTEN 10 dB	M	<r 2.48350="" ghz<="" th=""><th colspan="3">47.91 dBµ∖</th></r>	47.91 dBµ∖			
POS PK .OG 10 JB/							
DL 54.000 ІВµV							
RL DFFSET 31.90 dB							
START 2.48350 DCS RES BW		VID BW 10 Hz		STOP 2,50000 GHz SWP 5,00 sec			
Test Item: g M	1ode Hi Ch.	L.					

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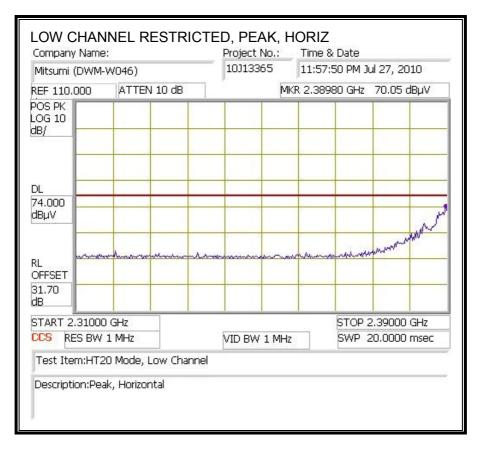
HARMONICS AND SPURIOUS EMISSIONS

	-		Measurem												
Complia	ance Ce	rtification	Services, Fr	emont	5m Ch	amber									
Compan	ıy:		Mitsumi												
roject	#:		10J13365												
Date:			8/12/2010												
Configu	gineer: ration:		Mengistu Mel EUT With 175		ne Ante	nna									
lode:			Tx, g Mode		1										
Fast Fa	uipmen	. .													
estEq	upmen	<u>t:</u>												_	
н	orn 1-	18GHz	Pre-ar	nplifer	1-260	SHz	Pre-am	plifer	26-40GH	z	Ho	orn > 18G	Hz		Limit
T59; S	5/N: 324	5 @3m	T145 A	gilent 3	008A00	05(🖵				-				-	FCC 15.209
Hi Freq	quency Cal	bles				_				, 					
3' 0	cable 2	2807700	12' c	able 2	28076	00	20' ca	ble 22	807500		HPF	Pa	ject Filte	r Peal	k Measurements
													·	RB	W=VBW=1MHz
3' ci	able 228	807700	▼ 12' ca	ble 228	07600	•	20' cab	le 2280	• • • • •			• R_	001		i <u>ge Measurements</u> :1MHz ; VBW=10Hz
1							1			,					IMILE, VEW IOILE
f	Dist		Read Avg.	AF	CL	Amp	D Coit	Fltr	Peak	Avg	Pk Lim			$\operatorname{Avg} \operatorname{Mar}$	Notes
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
ow Chan 824	mel (241) 3.0	2.0 MHz) 52.8	37.2	32.8	5.8	-34.8	0.0	0.0	56.5	40.9	74	54	-17.5	-13.1	Н
.216	3.0	54.5	52.8	30.5	4.5	-35.1	0.0	0.0	54.4	52.7	74	54	-19.6	-13	H
.824 .216	3.0 3.0	51.0 52.6	35.5 50.4	32.8 30.5	5.8 4.5	-34.8 -35.1	0.0 0.0	0.0 0.0	54.7 52.4	39.2 50.3	74 74	54 54	-19.3 -21.6	-14.8 -3.7	v v
		•	504	505	4-2	-00.1	0.0	0.0					-21.0		*
lid Chan .874		7.0 MHz)	31.9	32.8	5.8	-34.9	0.0	0.0	51.1	35.7	74	54	-22.9	-18.3	н
.249	3.0 3.0	47.3 50.3	47.7	32.8	5.6 4.6	-34.9	0.0	0.0	50.3	47.7	74	54	-22.9	-16.3	H
.874	3.0	47.4	31.7	32.8	5.8	-34.9	0.0	0.0	51.2	35.5	74	54	- 22.8	-18.5	v
.249	3.0	48.3	45.1	30.6	4.6	-35.1	0.0	0.0	48.3	45.1	74	54	-25.7	-8.9	v
li Chann	el (2462.	0 MHz)													
.924	3.0	43.1	29.3	32.8	59	-34.9	0.0	0.0	47.0	33.2	74	54	- 27.0	-20.8	H
.283	3.0	45.6	40.0	30.6	4.6	-35.1	0.0	0.0	45.7	40.1	74	54	-28.3	-13.9	H
.924 .283	3.0 3.0	43.3 43.9	30.4 37.4	32.8 30.6	59 4.6	-34.9 -35.1	0.0 0.0	0.0 0.0	47.2 44.1	34.3 37.5	74 74	54 54	-26.8 -29.9	-19.7 -16.5	v
			•												
		L								l					
ev. 07.22	2.09														
	f	Measurem	ent Frequency			Amp	Preamp	Tain				Arra Tim	Average	Field Strengt	h Timit
		Distance to		ý			-		ct to 3 mete	re		0	0	d Strength L	
		Analyzer R				Avg			Strength @					. Average L	
	AF	Antenna F:	-			Peak	-		c Field Stre			-	-	. Peak Limit	
	CL	Cable Los:				HPF	High Pas								
							0								
	0D														

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8.1.3. TRANSMITTER ABOVE 1 GHz FOR HT 20 MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

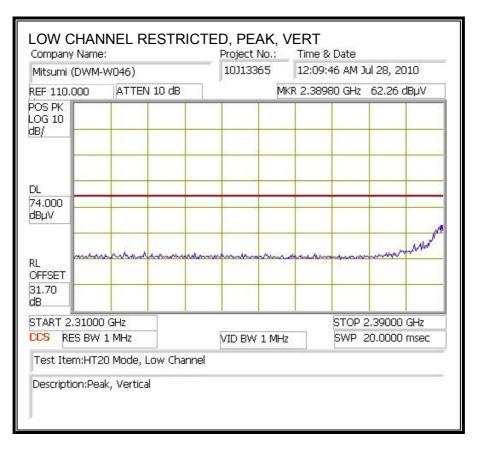


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Mitsumi (DWM-	W046)		10J13365]1	12:00:36 AM Jul 28, 2010				
REF 110.000	ATTEN 10	dB		MKR :	2.39000 GHz	50.41 dBµV			
POS PK LOG 10 dB/							3		
DL 54.000 dBµV									
RL OFFSET 31.70 dB									
	START 2.31000 GHz) Hz		STOP 2.39000 GHz SWP 24.00 sec			
Test Item:HT2	0 Mode, Low	Channel							

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

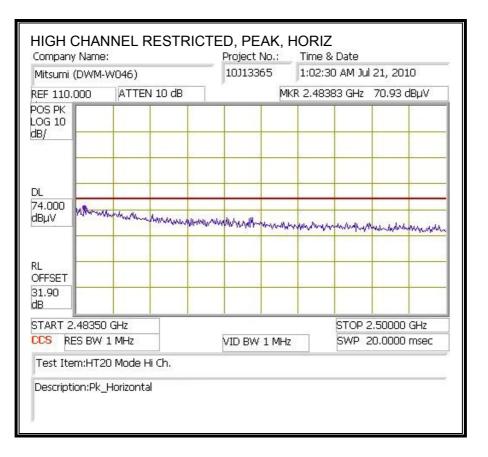


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Mitsumi (DWM-	W046)		10J13365	07:32 AM Jul 28, 2010						
REF 110.000	ATTEN	10 dB	M	1KR 2.39	KR 2.39000 GHz 44.90 dBµV					
POS PK LOG 10 dB/							3			
DL 54.000 dBµV										
RL OFFSET 31.70 dB										
	START 2.31000 GHz			VID BW 10 Hz			STOP 2.39000 GHz SWP 24.00 sec			
Test Item:HT2	0 Mode, L		l							

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

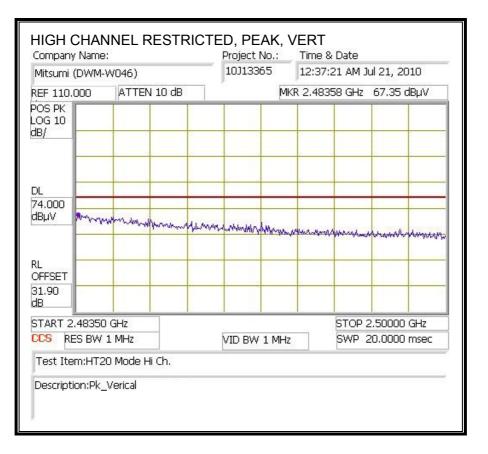


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Mitsumi (DWM-	W046)	10J13365	1:03:57 AM JU	il 21, 2010			
EF 110.000	ATTEN 10 dB	М	KR 2.48350 GHz	8350 GHz - 53,75 dBµ\			
OS PK OG 10 B/							
L 4.000 BµV							
FFSET							
TART 2.48350				STOP 2.50000 GHz			
CCS RES BW		VID BW 10 Hz		SWP 5.00 sec			
Test Item:HT2	W Mode Hi Ch.						

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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Mitsumi (DWM-	in the second second second second	10J13365	12:35:27 AM 3	ul 21, 2010		
EF 110.000	ATTEN 10 dB	M	KR 2.48354 GHz	50.71 dBµ\		
POS PK OG 10 IB/						
L 4.000 ВµV						
FFSET						
TART 2.48350		VID BW 10 Hz		STOP 2.50000 GHz SWP 5.00 sec		
Test Item:HT2	0 Mode Hi Ch.					

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HARMONICS AND SPURIOUS EMISSIONS

	-		Measurem		_										
Complia	ance Ce	rtification	Services, Fr	emont	5m Ch	amber									
Compai			Mitsumi												
Project	#:		10J13365												
Date:			8/12/2010												
l est En Configu	igineer: ration:		Mengistu Mel EUT With 175		ma Anti										
Mode:	ration.		Tx, HT20 Mod		pe Ano	anna									
Fest Fo	uipmen	t.													
		18GHz	Pre-ar	nplifer	1-260	SH7	Pre-am	plifer	26-40GH	7	На	orn > 18G	Hz		Limit
	S/N: 324			Agilent 3										_	FCC 15.209 🗸
	guency Cal	-				•									· ·
		2807700	12' c	able 2	28076	00	20'ca	ole 22	807500		HPF	Re	ject Filte		<u>: Measurements</u> W=VBW=1MHz
3° c	able 228	307700	• 12' ca	ıble 228	07600	•	20' cab	le 228(07500			• R_	001	Avera	<u>ge Measurements</u> 1MHz; VBW=10Hz
f GHz	Dist (m)	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 (V/H)
		2.0 MHz)		ub/m					abuma	abuvin	abavin	and the second		w	(1/11)
.824	3.0	51.4	36.6	32.8	5.8	-34.8	0.0	0.0	55.1	40.3	74	54	-18.9	-13.7	Н
.216	3.0	54.2	52.7	30.5	4.5	-35.1	0.0	0.0	54.1	52.5	74	54	-19.9	-1.5	H
.824 1.216	3.0 3.0	50.1 52.3	36.0 50.2	32.8 30.5	5.8 4.5	-34.8 -35.1	0.0	0.0 0.0	53.8 52.2	39.7 50.1	74	54 54	-20.2 -21.8	-14.3 -3.9	v
							0.0			2011					•••••••••••••••••••••••••••••••••••••••
		7.0 MHz)													
.874 .249	3.0 3.0	48.2 50.5	32.1 48.1	32.8 30.6	5.8 4.6	-34.9 -35.1	0.0 0.0	0.0 0.0	52.0 50.5	35.9 48.1	74 74	54 54	-22.0 -23.5	-18.1 -5.9	н н
.249	3.0	- 10.5 46.6	48.1	30.6	4.0 5.8	-35.1	0.0	0.0	50.5	48.1 36.1	74	54 54	-23.5 -23.7	-39 -179	N N
.249	3.0	48.0	44.8	30.6	4.6	-35.1	0.0	0.0	48.0	44.8	74	54	-26.0	-9.2	v
	1	l													
li Chann 1924	iel (2462. 3.0	0 MHz) 42.9	29.5	32.8	59	-34.9	0.0	0.0	46.8	33.4	74	54	-27.2	-20.6	н
.283	3.0	429	29.5 38.0	32.8	59 4.6	-34.9 -35.1	0.0	0.0	40.8	33.A 38.1	74	54 54	-27.2	-20.6 -15.9	H
.924	3.0	44.3	29.7	32.8	5.9	-34.9	0.0	0.0	48.1	33.6	74	54	-25.9	-20.4	v
.283	3.0	44.8	38.7	30.6	4.6	-35.1	۵0	0.0	44.9	38.8	74	54	- 29.1	-15.2	v
							1								
lev. 07.2	2.09														
	f	Measurem	ent Frequency	у		Amp	Preamp (Gain				Avg Lim	Average F	ield Strengtl	n Limit
	Dist	Distance to				•	-		ct to 3 mete	ers		-	-	i Strength Li	
		Analyzer R				Avg			Strength @					Average Li	
	AF	Antenna F	-			Peak	-		c Field Stre			-	-	Peak Limit	
	CL	Cable Los	5			HPF	High Pas			-			0		
							-								

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