

FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 7 CERTIFICATION TEST REPORT

FOR

WIFI MODULE

MODEL NUMBER: DWM-W014

REPORT NUMBER: 07J11256-1

ISSUE DATE: OCTOBER 1, 2007

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

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Revision History

| Issue Rev. Date Revisions | | Revisions | Revised By |
|------------------------------|------------|---------------|--------------|
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1. ATTESTATION OF TEST RESULTS

| CFR | CFR 47 Part 15 Subpart C | | |
|------------------|---|----|--|
| | TEST RESULTS | | |
| | APPLICABLE STANDAR | DS | |
| DATE TESTED: | SEPTEMBER 17 - 21, 2007 | | |
| SERIAL NUMBER: | 00A0968007E0 | | |
| MODEL: | DWM-W014 | | |
| EUT DESCRIPTION: | WIFI MODULE | | |
| COMPANY NAME: | MITSUMI ELECTRIC CO., 1601 SAKAI, ATSUGI-SHI KANAGAWA, 243-8533, JA | | |

RSS-210 Issue 7 Annex 8 and RSS-GEN Issue 2

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. 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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services 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:

Tested By:

MA

MICHAEL HECKROTTE ENGINEERING MANAGER COMPLIANCE CERTIFICATION SERVICES

Junjuntes

VIEN TRAN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

No Non-Compliance Noted

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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 |
|-------------------------------------|----------------|
| Radiated Emission, 30 to 200 MHz | +/- 3.3 dB |
| Radiated Emission, 200 to 1000 MHz | +4.5 / -2.9 dB |
| Radiated Emission, 1000 to 2000 MHz | +4.5 / -2.9 dB |
| Power Line Conducted Emission | +/- 2.9 dB |

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g transceiver operating in the 2400-2484 MHz band.

The radio module is manufactured by Mitsumi Electric Co.

The radio module uses Broadcom chipset.

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 | 18.74 | 74.82 |
| 2412 - 2462 | 802.11g | 19.09 | 81.10 |

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two different antenna types. These are Dipole (MITSUMI_DCA-E04) with gain of 2.21 dBi and Inverted-F (Parrot_PIFA double connect2) with gain of 1.38 dBi, or Inverted-F (Parrot_PIFA connect1) with gain of 1.05 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was BCMWL5.SYS: Ver. 4.10.34.2.

The test utility software used during testing was WL_TOOL: Ver 4.10 R50.0 and epi_ttcp: Ver. 3.8.

5.5. WORST-CASE CONFIGURATION AND MODE

For b and g mode all data were taken at 1Mb/s and 6Mb/s respectively. And the worst-case channel is determined as the channel with the highest output power.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | | |
|--|------|---------|--------------------------|--|--|
| Description Manufacturer Model Serial Number | | | | | |
| Desktop PC | Dell | DHM | FNC491X | | |
| Keyboard | Dell | SK-8110 | CN-07N247-71616-442-OKFL | | |
| Mouse | Dell | M-UR69 | LM3230699 | | |
| Monitor | LG | L1750S | 512MXWE0A763 | | |

I/O CABLES

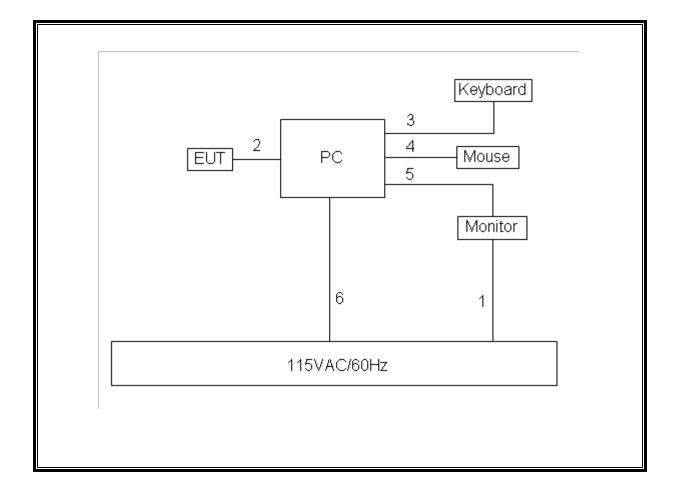
| | I/O CABLE LIST | | | | | | | |
|--------------|----------------|---------------------------|-------------------|---------------|-----------------|-------------------------|--|--|
| Cable No. | Port | # of Identica Ports | Connector Type | Cable Type | Cable Length | Remarks | | |
| 1 | AC | 1 | US 115V | Un-shielded | 2m | N/A | | |
| 2 | 20 Pins | 1 | Ribbon cable | Un-shielded | 0.5m | N/A | | |
| 3 | Keyboard | 1 | PS/2 | Un-shielded | 2m | N/A | | |
| 4 | Mouse | 1 | PS/2 | Shielded | 2m | N/A | | |
| 5 | Video | 1 | Monitor | Un-shielded | 2m | One Ferrite at each end | | |
| 6 | AC | 1 | US 115V | Un-shielded | 2m | N/A | | |

TEST SETUP

During the testing process the EUT was connected to the PC via extender card and the software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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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 | Serial Number | Cal Due | | |
| | | | | | | |
| Spectrum Analyzer | HP | E4446A | US42510266 | 10/18/2007 | | |
| Antenna, Horn 1 ~ 18 GHz | EMCO | 3115 | 6717 | 4/15/2008 | | |
| Preamplifier, 1 ~ 26.5 GHz | HP | 8449B | 3008A00369 | 10/3/2007 | | |
| Peak Power Meter | Agilent | E4416A | GB41291160 | 12/2/2007 | | |
| Peak / Average Power Sensor | Agilent | E9327A | US40440755 | 12/2/2007 | | |
| 30MHz 2Ghz | Sunol Sciences | JB1 Antenna | A121003 | 10/13/2007 | | |
| Quasi-Peak Adaptor | HP | 85650A | 3145A01654 | 1/21/2008 | | |
| SA Display Section 2 | HP | 85662A | 2816A16696 | 4/7/2008 | | |
| SA RF Section, 1.5 GHz | HP | 85680B | 2814A04227 | 1/7/2008 | | |
| Preamp 30-1000MHz | Sonoma | 310N | 185623 | 1/20/2008 | | |
| LISN, 10 kHz ~ 30 MHz | FCC | LISN-50/250-25 | 2023 | 9/15/2008 | | |
| LISN, 10 kHz ~ 30 MHz | Solar | 8012-50-R-24- | 8379443 | 9/15/2008 | | |
| EMI Test Receiver | R & S | ESHS 20 | 827129/006 | 1/27/2008 | | |

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7. CHANNEL TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1.6 dB BANDWIDTH

<u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

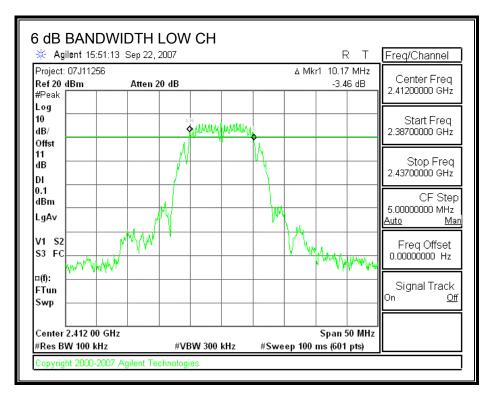
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

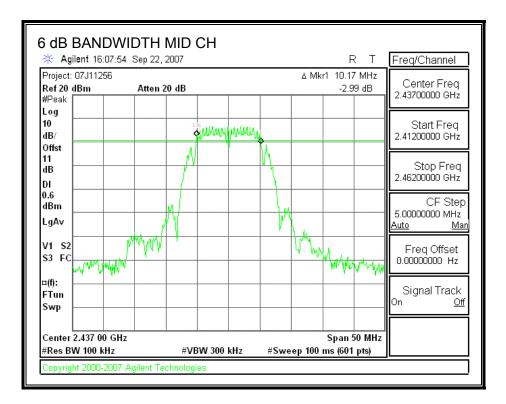
| Channel | Frequency | 6 dB Bandwidth | Minimum Limit |
|---------|-----------|----------------|---------------|
| | (MHz) | (MHz) | (MHz) |
| Low | 2412 | 10.17 | 0.5 |
| Middle | 2437 | 10.17 | 0.5 |
| High | 2462 | 10.17 | 0.5 |

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6 dB BANDWIDTH



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| 🔆 Agilent 16:15:5 | 51 Sep 22, 2007 | | | RT | Freq/Channel |
|--|-----------------|---------|------------|-----------------------------|---------------------------------------|
| Project: 07J11256 Ref 20 dBm #Peak | Atten 20 dB | | ۵ Mk | r1 10.17 MHz -3.23 dB | Center Freq 2.46200000 GHz |
| Log 10 dB/ | 1R AM | мининин | | | Start Freq 2.43700000 GHz |
| Offst 11 dB DI | + | | 4 | | Stop Freq 2.48700000 GHz |
| 0.4 dBm LgAv | M | | M | | CF Step 5.00000000 MHz Auto Mai |
| V1 S2 S3 FC | MAN | | ' 1/4 | Andrewan | Freq Offset 0.00000000 Hz |
| ¤(f): FTun Swp | | | | J | Signal Track On <u>Off</u> |
| Center 2.462 00 GF #Res BW 100 kHz | | 300 kHz | #Sweep 100 | Span 50 MHz ms (601 nts) | |

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7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

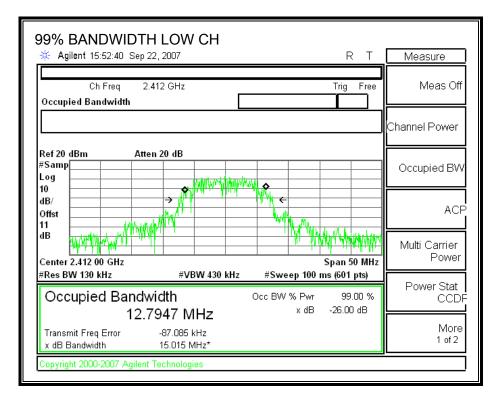
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
| | (MHz) | (MHz) |
| Low | 2412 | 12.7947 |
| Middle | 2437 | 12.5410 |
| High | 2462 | 12.5387 |

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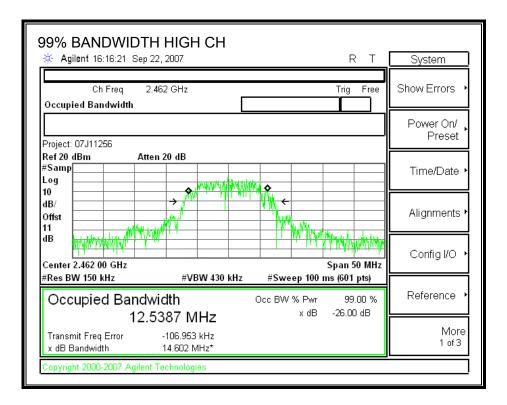
99% BANDWIDTH



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| 99% BANDWIDTH MID CH | System |
|---|---------------------|
| Ch Freq 2.437 GHz Trig Free Occupied Bandwidth | Show Errors 🔸 |
| Project: 07J11256 | Power On/ Preset |
| Ref 20 dBm Atten 20 dB #Samp | Time/Date ▸ |
| dB/ Offst | Alignments • |
| dB Center 2.437 00 GHz Span 50 MHz | Config I/O 🔸 |
| #Res BW 130 kHz #VBW 390 kHz #Sweep 100 ms (601 pts) | |
| Occupied Bandwidth Occ BW % Pwr 99.00 % 12.5410 MHz x dB -26.00 dB | Reference • |
| Transmit Freq Error -16.145 kHz x dB Bandwidth 14.237 MHz* | More 1 of 3 |
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7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

TEST PROCEDURE

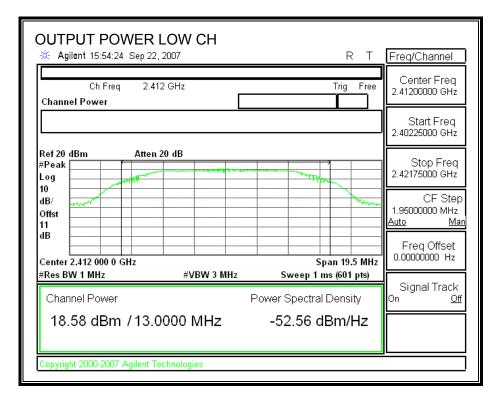
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

RESULTS

| Channel | Frequency | Frequency Output Power Limit | | Margin |
|---------|-----------|------------------------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 18.58 | 30 | -11.42 |
| Middle | 2437 | 18.74 | 30 | -11.26 |
| High | 2462 | 18.33 | 30 | -11.67 |

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OUTPUT POWER



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| OUTPUT POWER N | | RT | Freq/Channel | | |
|--|------------|--|--|--|--|
| Ch Freq 2.437 Channel Power | GHz | Trig Free | Center Freq 2.43700000 GHz | | |
| Project: 07J11256 | | | Start Freq 2.42725000 GHz | | |
| Ref 20 dBm Atten 2 #Peak Log | | | Stop Freq 2.44675000 GHz | | |
| 10 dB/ Offst 11 | | The second secon | CF Step 1.95000000 MHz <u>Auto Man</u> | | |
| dB Center 2.437 000 0 GHz | | Span 19.5 MHz | Freq Offset 0.00000000 Hz | | |
| #Res BW 1 MHz Channel Power | #VBW 3 MHz | Sweep 1 ms (601 pts) Power Spectral Density | Signal Track On <u>Off</u> | | |
| 18.74 dBm / 13.0000 MHz -52.40 dBm/Hz | | | | | |
| Copyright 2000-2007 Agilent Technologies | | | | | |

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| | PUT P ilent 16:16 | - | | - | I CH | | | | | ₹Т | Freq/Chan | nel |
|------------------------------|--|--------|-------|-------|---------|------|--|--------------------|------|---------|---------------------------------|---------------------------|
| Chann | Ch F el Power | • | 2.46 | 2 GHz | | | | | Trig | Free | Center F 2.46200000 | Freq |
| 1 1 | 07J11258 | 6 | | | | | | | | | Start F 2.45225000 | |
| Ref 20 #Peak Log 10 | | | Atten | 20 dB | | W-un | | | | | Stop F 2.47175000 | |
| dB/ Offst 11 | | | | | | | | | | | CF 1.95000000 <u>Auto</u> | Step MHz <u>Man</u> |
| | 2.462 000 |) 0 GI | Hz | | | | | | |).5 MHz | Freq Of 0.00000000 | |
| | w 1 MHz inel Pow | rer | | #\ | /BW 3 N | | | weep 1 Spectral | | • · | Signal T On | rack <u>Off</u> |
| 18. | 18.33 dBm / 13.0000 MHz -52.81 dBm/Hz | | | | | | | | | | | |
| Copyrig | Copyright 2000-2007 Agilent Technologies | | | | | | | | | | | |

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7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 10 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency | Power |
|---------|-----------|-------|
| | (MHz) | (dBm) |
| Low | 2412 | 16.21 |
| Middle | 2437 | 16.24 |
| High | 2462 | 16.15 |

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7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

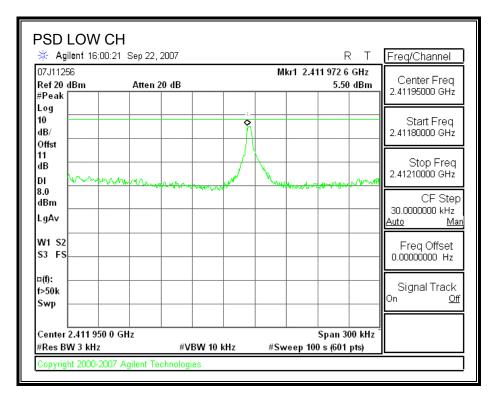
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

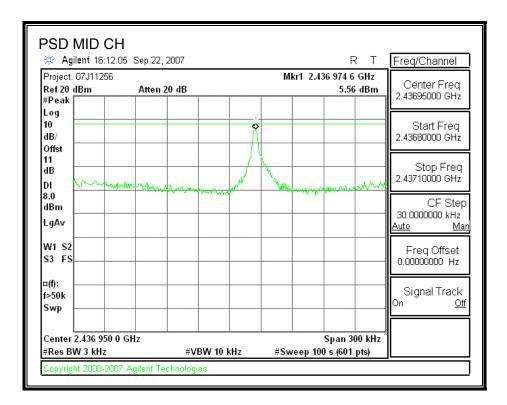
| Channel | Frequency | PPSD | Limit | Margin |
|---------|-----------|-------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 5.50 | 8 | -2.50 |
| Middle | 2437 | 5.56 | 8 | -2.44 |
| High | 2462 | 5.50 | 8 | -2.50 |

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POWER SPECTRAL DENSITY



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| Atten 20 dB | INI | kr1 2.461 974 1 GHz | |
|-----------------------|-----|---|-------------------------------|
| | | 5.50 dBm | Center Freq 2.46195000 GHz |
| | 1 | | |
| | | | Start Freq 2.46180000 GHz |
| | | | Stop Freq 2.46210000 GHz |
| Mar Hunghoring + work | ~~ | Marcovin Markan Marcovin Marcovin Marcovin Markan | CF Step 30.0000000 kHz |
| | | | Auto Ma |
| | | | Freq Offset 0.00000000 Hz |
| | | | Signal Track |
| | | | |
| | | | |

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7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

TEST PROCEDURE

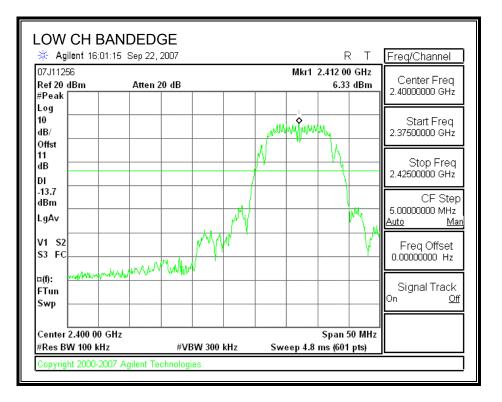
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

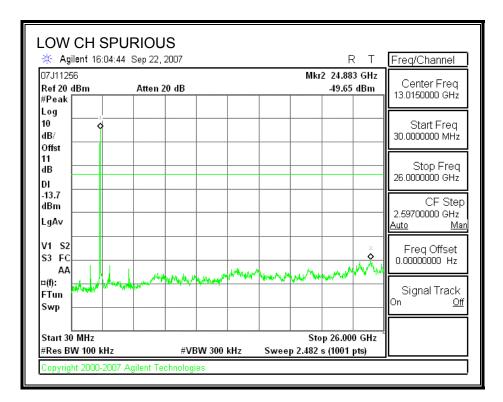
RESULTS

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SPURIOUS EMISSIONS, LOW CHANNEL

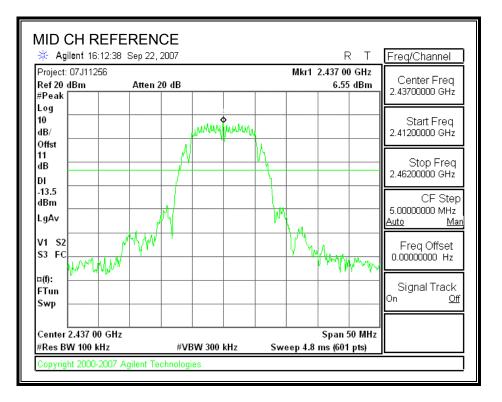


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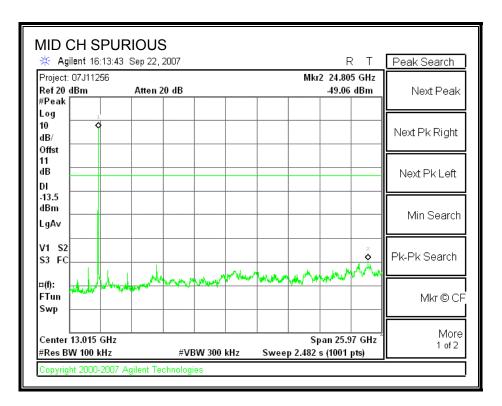


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SPURIOUS EMISSIONS, MID CHANNEL

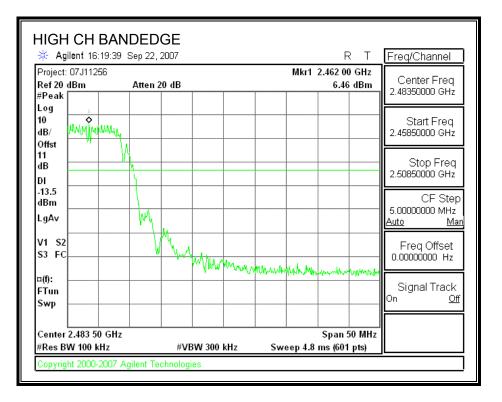


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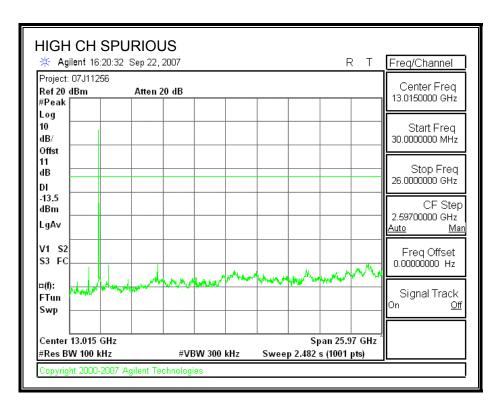


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SPURIOUS EMISSIONS, HIGH CHANNEL



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7.2. 802.11g MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

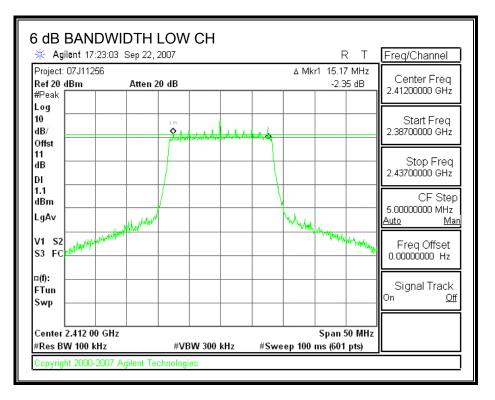
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

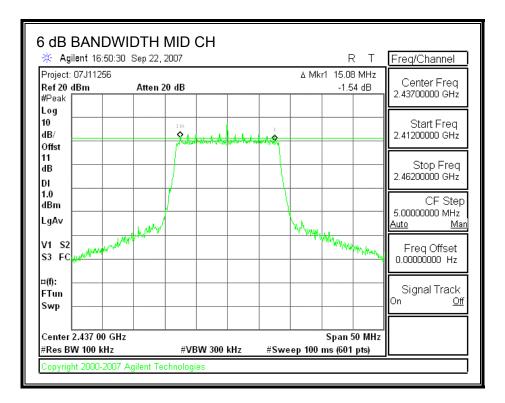
| Channel | Frequency | 6 dB Bandwidth | Minimum Limit |
|---------|-----------|----------------|---------------|
| | (MHz) | (MHz) | (MHz) |
| Low | 2412 | 15.17 | 0.5 |
| Middle | 2437 | 15.08 | 0.5 |
| High | 2462 | 15.08 | 0.5 |

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6 dB BANDWIDTH



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| Project: 07J1125 Ref 20 dBm #Peak | Atten 2 | 20 dB | | | 1.46 dB | Center Freq 2.46200000 GHz |
|---|-----------------------|-------------------|---|--------------|---|--|
| Log 10 dB/ Offst | | IR Anthur Maan | - | 1. Orihan | | Start Freq 2.43700000 GHz |
| 11 dB DI | | | | | | Stop Freq 2.48700000 GHz |
| 1.1 dBm LgAv | | | | - Mue | | CF Step 5.00000000 MHz <u>Auto Mar</u> |
| LgAv V1 S2 S3 FC | states and the second | | | | the the many for the second | Freq Offset 0.00000000 Hz |
| ¤(f): FTun Swp | | | | | | Signal Track On <u>Off</u> |

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7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

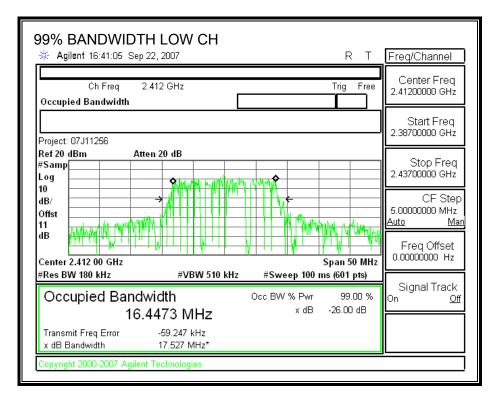
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
| | (MHz) | (MHz) |
| Low | 2412 | 16.4473 |
| Middle | 2437 | 16.4092 |
| High | 2462 | 16.4721 |

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99% BANDWIDTH



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| 99% BANDWIDT | | | RТ | Swe | эөр |
|--|----------------------------|----------------------|-----------------------------|---------------------|-----------------------------------|
| Ch Freq 2 Occupied Bandwidth | .437 GHz | | Trig Free | | ep Time 100.0 ms <u>Man</u> |
| Project: 07J11256 | | | | <u>Single</u> | Sweep <u>Cont</u> |
| Ref 20 dBm Att #Samp | en 20 dB | | | Auto <u>Norm</u> | Sweep Time <u>Accy</u> |
| dB/ Offst 11 dB | | | | On | Gate <u>Off</u> |
| Center 2.437 00 GHz #Res BW 180 kHz | #VBW 510 kH | | Span 50 MHz ns (601 pts) | Gate | Setup ' |
| Occupied Bandv 16. | width 4092 MHz | Occ BW % Pwr x dB | 99.00 % -26.00 dB | | Points 601 |
| Transmit Freq Error x dB Bandwidth | -26.980 kHz 17.569 MHz* | | | | |
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| 99% BANDWIDTH HIGH CH | RT | Freq/Channel |
|--|---|---|
| Ch Freq 2.462 GHz Occupied Bandwidth | Trig Free | Center Freq 2.46200000 GHz |
| Project: 07J11256 | | Start Freq 2.43700000 GHz |
| Ref 20 dBm Atten 20 dB #Samp Log 10 dB/ Offst 11 dB | | Stop Freq 2.48700000 GHz CF Step 5.00000000 MHz <u>Auto Man</u> Freq Offset 0.00000000 Hz |
| Center 2.462 00 GHz #Res BW 180 kHz #VBW 560 kHz | Span 50 MHz Hz #Sweep 100 ms (601 pts) | |
| Occupied Bandwidth 16.4721 MHz | Occ BW % Pwr 99.00 % x dB -26.00 dB | Signal Track On <u>Off</u> |
| Transmit Freq Error-31.632 kHzx dB Bandwidth17.514 MHz* | | |
| Copyright 2000-2007 Agilent Technologies | | |

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7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

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

TEST PROCEDURE

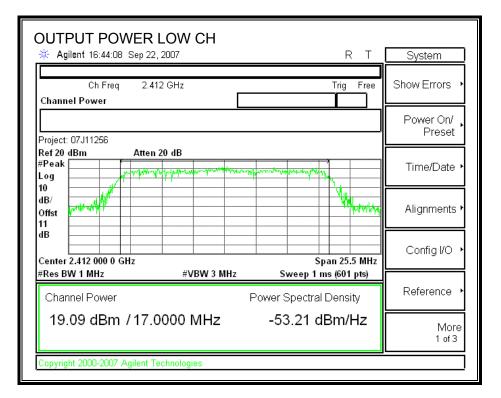
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

RESULTS

| Channel | Frequency | Output Power | Limit | Margin |
|---------|-----------|--------------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 19.09 | 30 | -10.91 |
| Middle | 2437 | 18.88 | 30 | -11.12 |
| High | 2462 | 18.75 | 30 | -11.25 |

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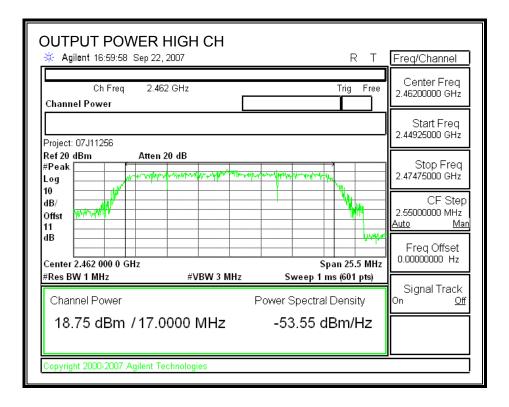
OUTPUT POWER



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| OUTPUT POWER MID CH Agilent 16:53:03 Sep 22, 2007 R T | System |
|--|---------------------|
| Ch Freq 2.437 GHz Trig Free Channel Power | Show Errors |
| Project: 07J11256 | Power On/ Preset |
| Ref 20 dBm Atten 20 dB #Peak Log | Time/Date ▸ |
| 10 dB/ Offst | Alignments 🕨 |
| dB | Config I/O 🔸 |
| #Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts) Channel Power Power Spectral Density | Reference 🕨 |
| 18.88 dBm / 17.0000 MHz -53.43 dBm/Hz | More 1 of 3 |
| Copyright 2000-2007 Agilent Technologies | |

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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

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency | Power |
|---------|-----------|-------|
| | (MHz) | (dBm) |
| Low | 2412 | 15.16 |
| Middle | 2437 | 15.29 |
| High | 2462 | 15.17 |

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7.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

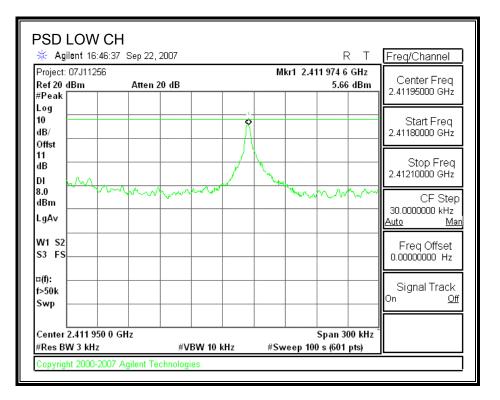
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

| Channel | Frequency | PPSD | Limit | Margin |
|---------|-----------|-------|-------|--------|
| | (MHz) | (dBm) | (dBm) | (dB) |
| Low | 2412 | 5.66 | 8 | -2.34 |
| Middle | 2437 | 5.68 | 8 | -2.32 |
| High | 2462 | 6.05 | 8 | -1.95 |

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POWER SPECTRAL DENSITY



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| | | Mkr1 2.43 | 36 974 1 GHz | Center Freq |
|-------------|--------------------------|-----------|--------------|------------------------------|
| Atten 20 dB | | | 5.68 dBm | 2.43695000 GHz |
| | 1 | | | |
| | Ŷ | | | Start Freq 2.43680000 GHz |
| | $\rightarrow \mathbb{N}$ | | | 2.43000000 0112 |
| | A | | | Stop Freq |
| | J.M. | man | | 2.43710000 GHz |
| manne | ATT | Yow | non | CF Ster |
| | | | | 30.0000000 kHz |
| | | | | <u>Auto Ma</u> |
| | | | | Freq Offset |
| | | | | 0.00000000 Hz |
| | | | | |
| | | | | Signal Track On <u>Of</u> |
| | | | | |
| | | | Span 300 kHz | |
| | Atten 20 dB | 1 | | |

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| Agilent 17:06: Decident: 07.111200 | .00 000 22, 2001 | | R T | Freq/Channel |
|--|------------------|----|----------|-------------------------------|
| Project: 07J11256 Ref 20 dBm #Peak | Atten 20 dB | | 6.05 dBm | Center Freq 2.46195000 GHz |
| Log | | 11 | | _ |
| 10 dB/ | | Ň | | Start Freq 2.46180000 GHz |
| Offst 11 dB | | +/ | | - Stop Freq 2.46210000 GHz |
| DI MAR 8.0 dBm | mannen | | munn | |
| LgAv | | | | Auto Ma |
| W1 S2 S3 FS | | | | Freq Offset 0.00000000 Hz |
| ¤(f): f>50k | | | | Signal Track |
| Swp | | | | |
| | | | | Signal Trac |

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7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

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

TEST PROCEDURE

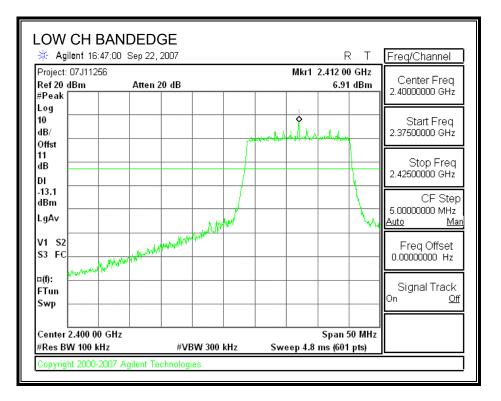
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

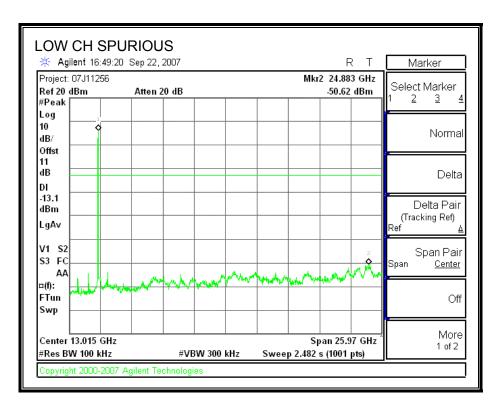
RESULTS

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SPURIOUS EMISSIONS, LOW CHANNEL

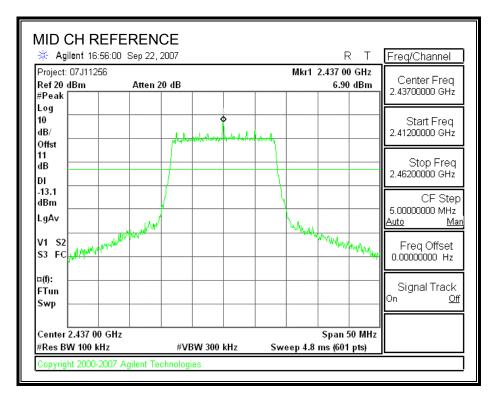


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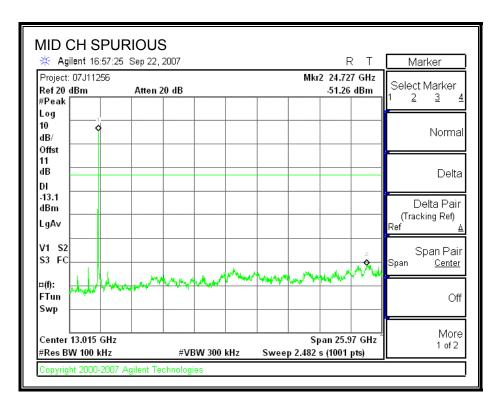


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SPURIOUS EMISSIONS, MID CHANNEL

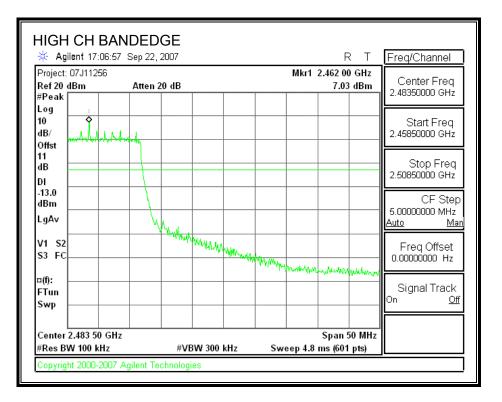


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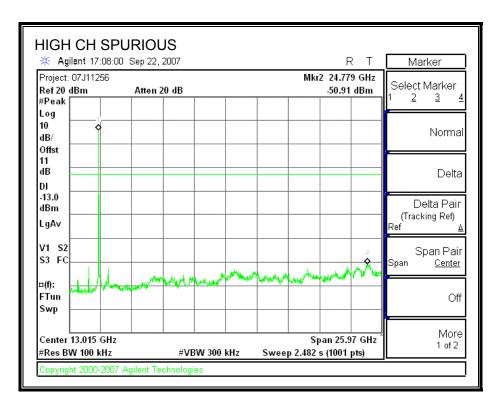


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SPURIOUS EMISSIONS, HIGH CHANNEL



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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

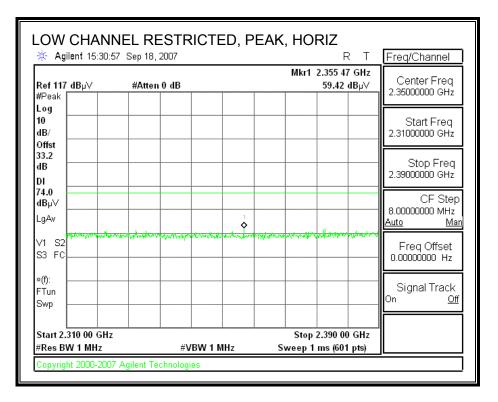
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

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

DIPOLE, 2.21dBi ANTENNA

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

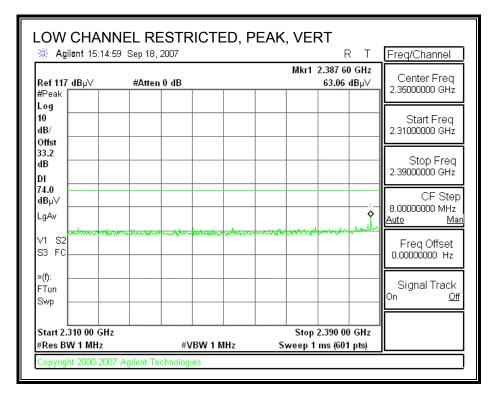


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| 🔆 Agilent 15:31:31 | | D, AVG, HORIZ | Freq/Channel |
|-------------------------------------|-------------|---|--|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.390 00 GHz 46.83 dBµ∀ | Center Freq 2.35000000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.31000000 GHz |
| 33.2 dB | | | Stop Freq |
| DI 54.0 dBµ∀ | | | CF Step 8.0000000 MHz |
| LgAv V1 S2 S3 FC | | | Auto Mar Freq Offset 0.00000000 Hz |
| *(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 F | Stop 2.390 00 GHz Iz Sweep 6.238 s (601 pts) | ļ |

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

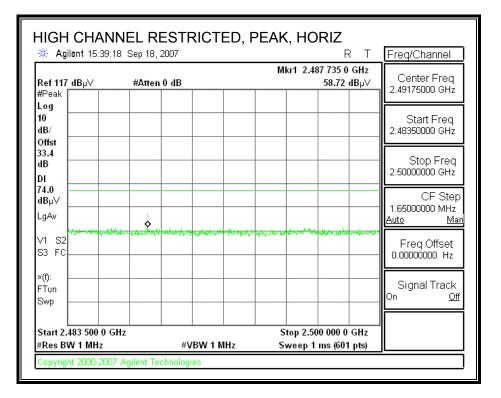


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| Agilent 15:15:34 | EL RESTRICTED Sep 18, 2007 | R T | Freq/Channel |
|-------------------------------------|-------------------------------|--|---|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.390 00 GHz 49.44 dBμ∀ | Center Freq 2.35000000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.31000000 GHz |
| 33.2 dB | | | Stop Freq 2.39000000 GHz |
| DI 54.0 dBµ∨ LgAv | | | CF Step 8.0000000 MHz <u>Auto Mar</u> |
| V1 S2 S3 FC | · · · · · · · · · | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.390 00 GHz Sweep 6.238 s (601 pts) | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

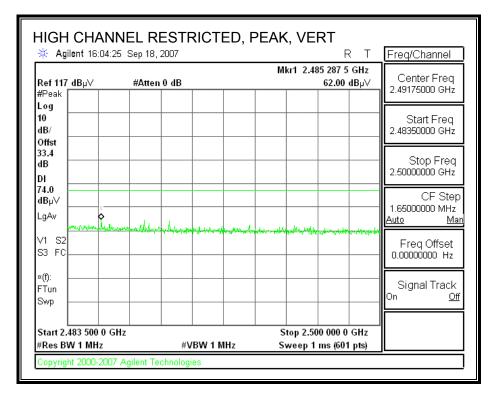


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| ☆ Agilent 15:53:51 Sep 18, 2007 Ref 117 dBµ∨ #Atten 0 dl #Peak | | Mkr1 2.500 | R T 0000 0 GHz 46.68 dBµ∨ | Freq/Channel Center Freq 2.49175000 GHz Start Freq 2.48350000 GHz |
|--|------------|-----------------------------|---------------------------------|---|
| 10 dB/ Offst 33.4 | | | | |
| 33.4 | | | | 1 |
| DI | | | | Stop Freq 2.5000000 GHz |
| 54.0 dBµ∀ LgAv | | | | CF Step 1.65000000 MHz <u>Auto Man</u> |
| V1 S2 | | | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.500 Sweep 1.287 s | | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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| 🔆 Agilent 16:04:43 | | ED, AVG, VERT | Freq/Channel |
|---------------------------------------|---------------|--|--|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.483 500 0 GHz 49.29 dBµ∨ | Center Freq 2.49175000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.48350000 GHz |
| dB | | | - Stop Freq 2.5000000 GHz |
| 54.0 dBµ∨ LgAw | | | CF Step 1.65000000 MHz <u>Auto Mar</u> |
| V1 S2 S3 FC | | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 GH #Res BW 1 MHz | lz #VBW 10 | Stop 2.500 000 0 GHz Hz Sweep 1.287 s (601 pts) | _ |

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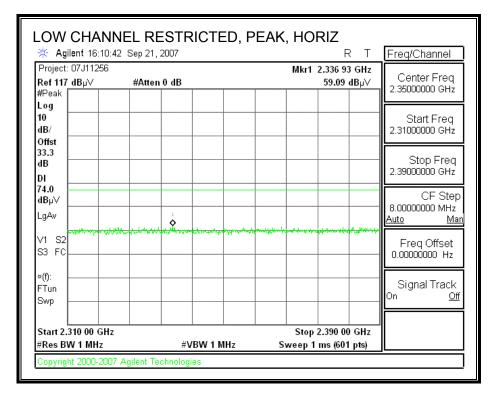
HARMONICS AND SPURIOUS EMISSIONS

| ode: Tx 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna) est Equipment: Pre-amplifer 1-26GHz Pre-amplifer 26-40GHz Horn > 18GHz Limit T144 Miteg 3008A00931 Pre-amplifer 26-40GHz Horn > 18GHz Limit Frequency Cables 2 foot cable 3 foot cable 12 foot cable Peak Measurements Notes 1 Dist Read Pk Read Avg. AF CL Amp D Corr< Fltr | $ \begin{array}{c} \text{pert # 0.7J11256} \\ \text{e: 09/18:07} \\ \text{tr Engineer: Vien Tran} \\ \text{figuration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, \\ \text{de: Tx 11b Mode (with Mitsumi DCA-E04_2 21dBi Antenna)} \\ \text{tr Equipment:} \\ \hline \\ $ | | | | | 5m Ch | amber | | | | | | | | | | |
|--|--|--------------------|--|--|--|--|---|---|---|--|---|--|--|---|--|---|---|
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | Higumation: EUT on JG, Desktop, Mouitor, Key Board, Mouse, de: Tx 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna) triguipment: Pre-amplifer 1-26GHz Pre-amplifer 1-26GHz Horn > 18GHz Limit Tit44 Miteg 3008A00931 Pre-amplifer 26-40GHz Horn > 18GHz Limit Colspan="4">Tit44 Miteg 3008A00931 Pre-amplifer 26-40GHz Horn > 18GHz Limit Trigenery Colles Image: Colspan="4">Image: Colspan="4">Limit Peak Measurements To state and Pk Read Avg AF CL Amp D Corr Fitr Peak Measurements Rew=UMBL Peak Measurements Tit4 Miteg 3008A00931 Image: Colspan="4">Peak Measurements Peak Measurements Tit4 Miteg 3008A00931 Image: Colspan="4">Peak Measurements Tit4 Miteg 3008A00931 Image: Colspan="4">Peak Measurements Tit4 State Colspan="4">Peak Measurements Tit4 State Col | #: 07J1 9/18/07 | 1256 | | | | | | | | | | | | | | |
| And Set Equipment: Pre-amplifer 1-26GHz Pre-amplifer 26-40GHz Horn > 18GHz Limit 173; SN: 6717 @3m T144 Mireq 3008A00931 T144 Mireq 3008A00931 T T FC 15.205 HFrequency Cables 3 foot cable 12 foot cable HPF_4.0GHz Reject Filter Peak Measurements RBW=VBW=IMHz Merce ad Pk Read Avg AF CL Amp D Corr Flt Peak Avg Pk Lim Avg Lim Pk Mar Avg Mar Notes f Dist Read Avg AF CL Amp D Corr Flt Peak Avg Lim Pk Mar Avg Mar Notes gHz mdBnV dBm dB dB dB dB dB dB dB V MBuVm dB V WW WCHANNEL, 2412 MHz Avg A43 325 328 64 366 0.0 0.5 468 35.7 74 54 -27.2 18.3 V WCHANNEL, 2412 MHz | Art Equipment: Horn 1-18GHz Pre-amplifer 1-26 GHz Horn > 18 GHz Limit T144 Miteq 3008A00931 Pre-amplifer 26-40 GHz Horn > 18 GHz Limit C 1144 Miteq 3008A00931 T144 Miteq 3008A00931 Pre-amplifer 26-40 GHz Horn > 18 GHz Limit C 1 144 Miteq 3008A00931 T12 foot cable Peak Measurements Pak Measurements A foot cable Pak Mar Measurements V Claber Peak Mage Mar Motes Mar Mar Mage Mar Motes Mar Mage Mar Motes V Claber Peak Mar Mar Mage Mar Motes V Claber V Claber V Claber V Claber Peak Marg Mar Motes V Baw dBaw dBaw dBa dB dB dB dB dBw/m dBuV/m dBuV/m dBuV/m dB dB V/m dB dB (V/H) V Claber V Claber V Claber V Claber V Claber V Claber V Claber V Cl | ration: | EUT on JI | G, Desktop, | | | | | | | | | | | | | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | i wittstilli D | 0.11 20- | 2.21 | ubi i uit | | | | | | | | | | |
| TT3; S/N: 6717 @3m T144 Miteq 3008A00931 FCC 15.205 HFrequency Cables 2 foot cable 3 foot cable 12 foot cable HPF 4.0GHz Reject Filter Peak Measurements RBW=7BW=1MHz A:5m Chamber HPF 4.0GHz Peak Measurements RBW=7BW=1MHz A:5m Chamber Peak Mag Net sequence Measurements RBW=1MHz MEREW=1MHz OC cor Filtr Peak Mag Ng Linn Nst, Avg Mar Notes GHZ (n) dBuV/m dB | T144 Miteq 3008A00931 FCC 15.205 IFrequency Cables 2 foot cable 12 foot cable HPF_4.0GHz Reject Filter Peak Measurements RBW=VBW=IMHz A foot cable 12 foot cable MPF_4.0GHz Reject Filter Peak Measurements RBW=VBW=IMHz A foot cable A foot cable A foot cable PE Lim A range Measurements RBW=IMHz; VBW=I0Hz f Dist Read Avg A F CL A mp D C orr Fltr Peak Avg Im Avgrage Measurements RBW=IMHz; VBW=I0Hz VEANNEL, 2412 MHz A A for CL A mp D C orr Fltr Peak Avg Im Avg Mar Notes A fibre A fibre A fibre Peak Measurements A fibre A fibre A fibre Avg Mar Notes | | - | Pre-ar | nplifer | 1-260 | SH7 | Pre-am | plifer | 26-40GH | 7 | н | orn > 18(| 3117 | | Limit | |
| 2 foot cable 3 foot cable 12 foot cable HPF Reject Filter Peak Measurements RBW=UBW=1MHz 4 0 4 5 0 0 7 Flt Peak Avg Pk Pin Notes 0 0 0 0 0 0 5 468 35.7 74 54 -27.2 -18.3 V 0 0 0.5 46.8 35.7 74 54 -27.4 18.3 V 284 3.0 43.6 32.2 32.8 6.4 -36.6 0.0 0.5 45.7 33.7 74 54 -27.2 -18.3 V 284 3.0 42.2 30.5 32.8 6.4 -36.6 0.0 0.5 45.7 33.7 74 54 -27.4 -19.8 V 11 3.0 48.2 3.0 3.5 8.4 -36.2 0.0 0.6 56.7 51.4 74 54 -17.3 <td>2 foot cable 3 foot cable 12 foot cable HPF Reject Filter Peak Measurements RBW=VBW=1MHz 4.5m Chamber A.5m Chamber HPF_4.0GHz Image: Comparison of the comparis</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>i io am</td> <td>pinor</td> <td>20 40 01 1</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>-</td> | 2 foot cable 3 foot cable 12 foot cable HPF Reject Filter Peak Measurements RBW=VBW=1MHz 4.5m Chamber A.5m Chamber HPF_4.0GHz Image: Comparison of the comparis | | | | | | | i io am | pinor | 20 40 01 1 | | | | | - | | - |
| Image: Construction Construction Asim Chamber Image: Construction Construtinformation Construtinformation <td>Intervention As model As model</td> <td>juency Cal</td> <td>oles</td> <td></td> <td></td> <td></td> <td></td> <td> </td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td></td> | Intervention As model | juency Cal | oles | | | | | | | | | | | | | <u> </u> | |
| Image: Construction of the system o | A-5m Chamber Peak Average Measurements RBW=1MHz; VBW=10Hz Image Measurements RBW=1MHz; VBW=10Hz Notes HZ (m) dB dB GB O Average Measurements RBW=1MHz; VBW=10Hz VB Average Measurements RBW=1MHz; VBW=10Hz ME Mage Mage Mage Mage Mage Mage Mage Mage | 2 foot | cable | 3 | foot c | able | | 12 | foot c | able | | HPF | Re | ject Filte | | | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | - | | | • | A-5m C | hambe | er 🔽 | | _4.0GHz | • | | Aver | age Measuremei | <u>its</u> |
| W CHANNEL, 2412 MHz Number of the system of the syste | $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | Dist | Read Pk | | AF | | Amp | D Corr | | | | | - | Pk Mar | - | Notes | |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | dBuV | dB/m | dB | dB | dB | dB | dBuV/m | dBuV/m | dBuV/m | dBuV/m | dB | dB | (V/H) | |
| $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $\begin{array}{ c c c c c c c c c c c c c c c c c c c$ | 3.0 | 43.6 | | | | | | | | | | | | | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | 30.5 | 32.8 | 6.4 | -36.6 | 0.0 | 0.5 | 45.7 | 33.7 | 74 | 54 | -28.3 | -20.3 | H | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | 42.2 | 29.8 | | 6.9 | -36.5 | | 6.0 | 46.6 | | | 54 | | | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | | | | | | | | | | | | | | |
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | | | | | | | | | | | | | | |
| CHANNEL, 2462 MHz v | $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | | | | | | | | | | | | | | | | |
| 224 3.0 40.7 30.2 33.4 7.0 -36.5 0.0 0.6 45.2 34.7 7.4 54 -28.8 -19.3 V 186 3.0 51.4 45.3 35.0 8.4 -36.2 0.0 0.6 45.2 34.7 7.4 54 -28.8 -19.3 V 186 3.0 51.4 45.3 35.0 8.4 -36.2 0.0 0.6 59.3 53.2 74 54 -14.7 -0.8 V 24 3.0 40.8 29.8 37.6 12.2 -35.4 0.0 0.9 56.1 45.1 74 54 -17.9 8.9 V 24 3.0 42.2 29.8 33.4 70 -36.5 0.0 0.6 46.7 34.3 74 54 -17.9 .89 V 24 3.0 47.7 41.9 350 8.4 -36.2 0.0 0.6 55.6 49.8 | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | | 29.9 | 37.6 | 12.2 | -35.4 | 0.0 | 0.9 | 56.1 | 45.2 | 74 | 54 | - 17 9 | -8.8 | Н | |
| 186 3.0 51.4 45.3 35.0 8.4 -36.2 0.0 0.6 59.3 53.2 74 54 -14.7 -0.8 V 310 3.0 40.8 29.8 37.6 12.2 -35.4 0.0 0.9 56.1 45.1 74 54 -14.7 -0.8 V 924 3.0 42.2 29.8 33.4 70 -36.5 0.0 0.6 46.7 34.3 74 54 -17.9 8.9 V 924 3.0 47.7 41.9 35.0 8.4 -36.2 0.0 0.6 55.6 49.8 74 54 -17.3 -19.7 H 186 3.0 47.7 41.9 35.0 8.4 -36.2 0.0 0.6 55.6 49.8 74 54 -18.4 4.2 H 310 3.0 41.4 2.92 37.6 12.2 -35.4 0.0 0.9 56.7 74 | $ \begin{array}{ccccccccccccccccccccccccc$ | | | 30.2 | 33.4 | 7.0 | -36.5 | 0.0 | 0.0 | 45.2 | 34.7 | 74 | 54 | -28.8 | -19.3 | v | |
| 124 3.0 42.2 29.8 33.4 7.0 -36.5 0.0 0.6 46.7 34.3 7.4 54 -27.3 -19.7 H 186 3.0 47.7 41.9 35.0 8.4 -36.2 0.0 0.6 55.6 49.8 74 54 -18.4 -4.2 H 310 3.0 41.4 29.2 37.6 12.2 -35.4 0.0 0.9 56.7 44.5 74 54 -17.3 -9.5 H | 14 3.0 42.2 29.8 33.4 7.0 -36.5 0.0 0.6 46.7 34.3 7.4 54 -27.3 -19.7 H 16 3.0 47.7 41.9 35.0 8.4 -36.2 0.0 0.6 55.6 49.8 74 54 -18.4 -4.2 H 10 3.0 41.4 29.2 37.6 12.2 -35.4 0.0 0.9 56.7 44.5 74 54 -18.4 -4.2 H | 3.0 | 51.4 | 45.3 | 35.0 | 8.4 | -36.2 | 0.0 | 0.0 | 59.3 | 53.2 | 74 | 54 | -14.7 | - 0.8 | v | |
| 186 3.0 47.7 41.9 35.0 8.4 -36.2 0.0 0.6 55.6 49.8 74 54 -18.4 -4.2 H 310 3.0 41.4 29.2 37.6 12.2 -35.4 0.0 0.9 56.7 44.5 74 54 -18.4 -4.2 H | 16 3.0 47.7 41.9 35.0 8.4 -36.2 0.0 0.6 55.6 49.8 74 54 -18.4 -4.2 H 10 3.0 41.4 29.2 37.6 12.2 -35.4 0.0 0.9 56.7 44.5 74 54 -18.4 -4.2 H | | | | | | | | | | | | | | | | |
| 310 3.0 41.4 29.2 37.6 12.2 -35.4 0.0 0.9 56.7 44.5 74 54 -17.3 -9.5 H | 10 3.0 41.4 29.2 37.6 12.2 -35.4 0.0 0.9 56.7 44.5 74 54 -17.3 -9.5 H | | | | | | | | | | | | | | | | |
| No other emissions were detected above system noise floor | No other emissions were detected above system noise floor Image: Constraint of the system noise floor Image: Constraint of the system noise floor | | | | | | | | | | | | | | | | |
| | | | No other o | missions were | detected | ahove - | vstem vei | se floor | | | | | | | | | |
| | | | i in a mere | missions were | 20100100 | andve s | ystem no: | | L | | · | | | | <u> </u> | 1 | |
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| | | | mce Ce wy: Mitss # 07JJ 0/18/07 gineer: ration: 1 in 11b in crn 1- in crn 1- in crn 1- in crn 1- in crn 2- in crn 2- in crn 2- in crn 3- in | nce Certification y: Mitsumi Electr #: 07J11256 D/18/07 gineer: Vien Tran ration: EUT on JJ/ Tx 11b Mode (with uipment: orn 1-18GHz S/N: 6717 @3m uency Cables 2 foot cable Dist Read Pk (m) dBuV ANNEL, 2412 MHz 3.0 43.6 3.0 42.5 INNEL, 2437 MHz 3.0 43.6 3.0 42.2 3.0 44.2 3.0 40.8 3.0 40.7 3.0 41.4 3.0 41.4 3.0 41.4 | nce Certification Services, Fr y: Mitsumi Electric Co., LTD #: 07JL1256 D/18/07 gineer: Vien Tran ration: EUT on JIG, Desktop, Tx 11b Mode (with Mitsumi D uipment: orn 118GHz Pre-ar T144 M uency Cables 2 foot cable 2 foot cable 2 foot cable 2 foot cable 30 436 30 422 298 30 464 30 464 30 412 30 464 30 412 30 412 30 414 30 414 30 414 30 414 30 412 30 414 30 30 414 30 30 414 30 30 414 30 30 414 30 414 30 30 30 30 30 30 30 30 30 30 30 30 30 3 | y: Mitsumi Electric Co., LTD #: 07J11256 //18/07 gineer: Vien Tran ration: EUT on JG, Desktop, Monito Fx 11b Mode (with Mitsumi DCA-EO- uipment: orn 1-18GHz Pre-amplifer T144 Miteq 30 uency Cables 2 foot cable 2 foot cable 2 foot cable 2 foot cable 2 foot cable 2 foot cable 2 foot cable 3 foot c 2 foot cable 3 foot c 3 foot c | Ince Certification Services, Fremont 5m Ch wire Mitsumi Electric Co., LTD #: 07J11256 D/18/07 gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key fx 11b Mode (with Mitsumi DCA-E04_2.21 uipment: orn 1-18GHz orn 1-18GHz Pre-amplifer 1-260 S/N: 6717 @3m Dist Read Pk Mead Avg. AF CL (m) dBuV dBuV <td>nce Certification Services, Fremont 5m Chamber y: Mitsumi Electric Co., LTD #: 07JI1256 D/18/07 gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Tx 11b Mode (with Mitsumi DCA-E04_2.21dBi Ant uipment: orn 1-18GHz S/N: 6717 @3m Unercy Cables 2 foot cable 2 foot cable</td> <td>Ince Certification Services, Fremont 5m Chamber w: Mitsumi Electric Co., LTD #: 07J11256 D/18/07 gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Orn 1-18GHz Pre-amplifer 1-26GHz Pre-amplifer 1-26GHz Orn 1-18GHz Pre-amplifer 1-26GHz Orn 1-18GHz Pre-amplifer 1-26GHz Orn 1-18GHz Pre-amplifer 1-26GHz Orn 1144 Miteq 3008A00931 \checkmark Import Colspan="2">Import colspan="2">Import colspan="2" 2 foot cable 3 foot cable Inter Mater and Avg. AF CL Amp Dist Read Pk Read Avg. AF CL Amp Juppende de d</td> <td>nice Certification Services, Fremont 5m Chamber wissumi Electric Co., LTD #: 07JIL256 $0/18/07$ gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Fx 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna) uipment: orn 1-18GHz Pre-amplifer 1-26GHz S/N: 6717 @3m Pre-amplifer 1-26GHz T144 Miteq 3008A00931 uipment: Orn 1-18GHz Pre-amplifer 1-26GHz T144 Miteq 3008A00931 User Cable 12 foot cable Joint Read Pk Read Avg. AF CL Amp Dist Read Pk Read Avg. AF CL Amp D Corr Fltr MIRU, 2412 MHz III 30 42.5 30.5 32.8 6.4 -36.6 0.0 0.5 SINNEL, 2412 MHz III SINNEL, 2423 MHz III SINNEL, 2423 MHz IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</td> <td>Ince Certification Services, Fremont 5m Chamber with sumi Electric Co., LTD #: 07J11256 $0/18/07$ gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, prevident colspan="2">Pre-amplifer 1-26 GHz Pre-amplifer 1-26 GHz Orn 1-18 GHz Pre-amplifer 1-26 GHz Orn 1-18 GHz Pre-amplifer 1-26 GHz Orn 1-18 GHz Pre-amplifer 1-26 GHz Orn 14 Miteq 3008 A00931 Toto cable 3 foot cable 12 foot cable Stot cable 12 foot cable Dist Read Pk Read Avg. AF CL Amp D Corr Fltr Peak Mibu 30 d325 328 64 366 00 05 468 30 42.2 30.5 32.8 64 366 0 30 42.2 29.8</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>nce Certification Services, Fremont 5n Chamber y: Mitsumi Electric Co., LTD #: 07J11256 918:07 gneer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, TS 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna) upment: orn 1-18GHz pinent: p</td> <td>$\begin{array}{c} \mbox{Certification Services, Fremont 5m Chamber} \\ \mbox{with Sumi Electric Co., LTD} \\ \mbox{#: 07J11256} \\ \mbox{J1807} \\ \mbox{gineer: Vien Tran} \\ \mbox{ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, } \\ \mbox{Tx 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna)} \\ \mbox{with Mitsumi DCA-E04_20} \\ with$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c} \mbox{rec} \ \mbox{Certification Services, Fremont 5m Chamber} \\ \mbox{y: Mitsumi Electric Co., LTD} \\ \$</td> <td>$\begin{array}{c} \mbox{Perturbation Services, Fremont 5m Chamber } \\ \mbox{y: Mitsumi Electric Co., LTD } \\ \$</td> | nce Certification Services, Fremont 5m Chamber y: Mitsumi Electric Co., LTD #: 07JI1256 D/18/07 gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Tx 11b Mode (with Mitsumi DCA-E04_2.21dBi Ant uipment: orn 1-18GHz S/N: 6717 @3m Unercy Cables 2 foot cable 2 foot cable | Ince Certification Services, Fremont 5m Chamber w: Mitsumi Electric Co., LTD #: 07J11256 D/18/07 gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Orn 1-18GHz Pre-amplifer 1-26GHz Pre-amplifer 1-26GHz Orn 1-18GHz Pre-amplifer 1-26GHz Orn 1-18GHz Pre-amplifer 1-26GHz Orn 1-18GHz Pre-amplifer 1-26GHz Orn 1144 Miteq 3008A00931 \checkmark Import Colspan="2">Import colspan="2">Import colspan="2" 2 foot cable 3 foot cable Inter Mater and Avg. AF CL Amp Dist Read Pk Read Avg. AF CL Amp Juppende de d | nice Certification Services, Fremont 5m Chamber wissumi Electric Co., LTD #: 07JIL256 $0/18/07$ gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Fx 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna) uipment: orn 1-18GHz Pre-amplifer 1-26GHz S/N: 6717 @3m Pre-amplifer 1-26GHz T144 Miteq 3008A00931 uipment: Orn 1-18GHz Pre-amplifer 1-26GHz T144 Miteq 3008A00931 User Cable 12 foot cable Joint Read Pk Read Avg. AF CL Amp Dist Read Pk Read Avg. AF CL Amp D Corr Fltr MIRU, 2412 MHz III 30 42.5 30.5 32.8 6.4 -36.6 0.0 0.5 SINNEL, 2412 MHz III SINNEL, 2423 MHz III SINNEL, 2423 MHz IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | Ince Certification Services, Fremont 5m Chamber with sumi Electric Co., LTD #: 07J11256 $0/18/07$ gineer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, prevident colspan="2">Pre-amplifer 1-26 GHz Pre-amplifer 1-26 GHz Orn 1-18 GHz Pre-amplifer 1-26 GHz Orn 1-18 GHz Pre-amplifer 1-26 GHz Orn 1-18 GHz Pre-amplifer 1-26 GHz Orn 14 Miteq 3008 A00931 Toto cable 3 foot cable 12 foot cable Stot cable 12 foot cable Dist Read Pk Read Avg. AF CL Amp D Corr Fltr Peak Mibu 30 d325 328 64 366 00 05 468 30 42.2 30.5 32.8 64 366 0 30 42.2 29.8 | $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | nce Certification Services, Fremont 5n Chamber y: Mitsumi Electric Co., LTD #: 07J11256 918:07 gneer: Vien Tran ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, TS 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna) upment: orn 1-18GHz pinent: p | $ \begin{array}{c} \mbox{Certification Services, Fremont 5m Chamber} \\ \mbox{with Sumi Electric Co., LTD} \\ \mbox{#: 07J11256} \\ \mbox{J1807} \\ \mbox{gineer: Vien Tran} \\ \mbox{ration: EUT on JIG, Desktop, Monitor, Key Board, Mouse, } \\ \mbox{Tx 11b Mode (with Mitsumi DCA-E04_2.21dBi Antenna)} \\ \mbox{with Mitsumi DCA-E04_20} \\ with$ | $\begin{array}{c c c c c c c c c c c c c c c c c c c $ | $ \begin{array}{c} \mbox{rec} \ \mbox{Certification Services, Fremont 5m Chamber} \\ \mbox{y: Mitsumi Electric Co., LTD} \\ $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ | $ \begin{array}{c} \mbox{Perturbation Services, Fremont 5m Chamber } \\ \mbox{y: Mitsumi Electric Co., LTD } \\ $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ |

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INVERTED-F, 1.38dBi ANTENNA

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

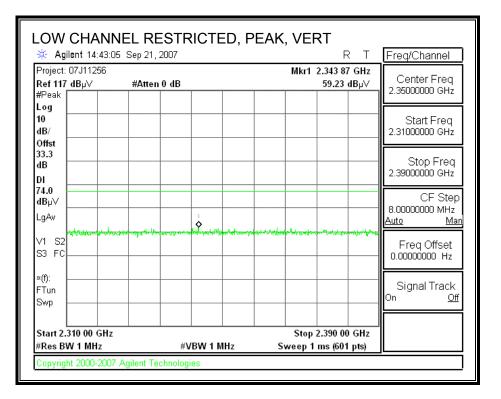


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| LOW CHANN | | D, AVG, HORIZ | Freq/Channel |
|--|----------------|--|--|
| Project: 07J11256 |) Dep 21, 2007 | | |
| Project. 07311256 Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.390 00 GHz 47.74 dBµ∨ | Center Freq 2.35000000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.31000000 GHz |
| 33.3 dB | | | Stop Freq 2.39000000 GHz |
| 54.0 dBµ∀ LgAv | | | CF Step 8.00000000 MHz |
| V1 S2 | | | Auto Man Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.390 00 GHz Sweep 6.238 s (601 pts) | * |

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

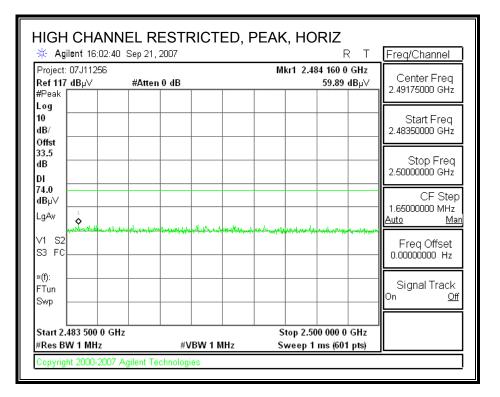


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| LOW CHANNEL RI | | AVG, VERT | T Freq/Channel |
|---|------------|--|--|
| Project: 07J11256 Ref 117 dB µ∨ #Atten #Peak | n 0 dB | Mkr1 2.362 93 46.98 dl | GHz Contor From |
| Log 10 dB/ Offst | | | Start Freq 2.31000000 GHz |
| 33.3 dB DI | | | Stop Freq 2.39000000 GHz |
| 54.0 dBμV LgAv | | | CF Step 8.00000000 MHz <u>Auto Man</u> |
| V1 S2 | | 1 • | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.390 00 (Sweep 6.238 s (601 pt | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

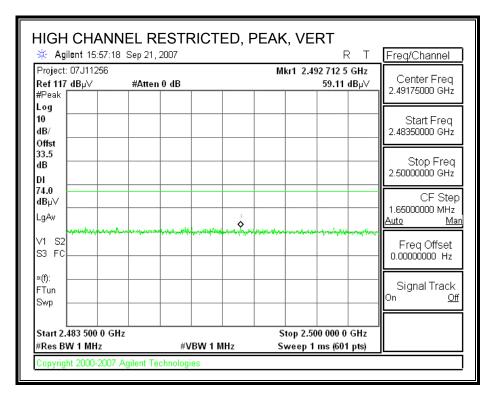


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| | RESTRICTED, | - | |
|--|-------------|---|--------------------------------------|
| 🔆 Agilent 16:02:59 Se | p 21, 2007 | RT | Freq/Channel |
| #Peak | Atten 0 dB | Mkr1 2.483 610 0 GHz 47.82 dBµ∨ | Center Freq 2.49175000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.48350000 GHz |
| 33.5 dB | | | Stop Freq 2.50000000 GHz |
| 54.0 dBμV LgAv | | | CF Step 1.6500000 MHz Auto Mar |
| V1 S2 S3 FC | | | Freq Offset 0.00000000 Hz |
| »(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.500 000 0 GHz Sweep 1.287 s (601 pts) | 2 Automatic |
| #Res BW 1 MHz Copyright 2000-2007 Agile | | Sweep 1.287 s (601 pts) | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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| | | TED, AVG, V | | |
|--|---------------------|-------------|---|--|
| 🔆 Agilent 15:57:18 | Sep 21, 2007 | | RT | Freq/Channel |
| Project: 07J11256 Ref 117 dB µ∨ #Peak | #Atten 0 dB | Mkı | 1 2.483 582 5 GHz 47.56 dBμ∀ | Center Freq 2.49175000 GHz |
| Log 10 dB/ Offst | | | | Start Freq 2.48350000 GHz |
| 33.5 dB | | | | Stop Freq 2.5000000 GHz |
| 54.0 dBµ∨ LgAv | | | | CF Step 1.6500000 MHz Auto Man |
| V1 S2 S3 FC | | | | <u>Auto Man</u> Freq Offset 0.0000000 Hz |
| »(f): FTun Swp | | | | Signal Track |
| Start 2.483 500 0 GHz #Res BW 1 MHz | #VBW * | | op 2.500 000 0 GHz p 1.287 s (601 pts) | |
| Copyright 2000-2007 A | gilent Technologies | | | |

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HARMONICS AND SPURIOUS EMISSIONS

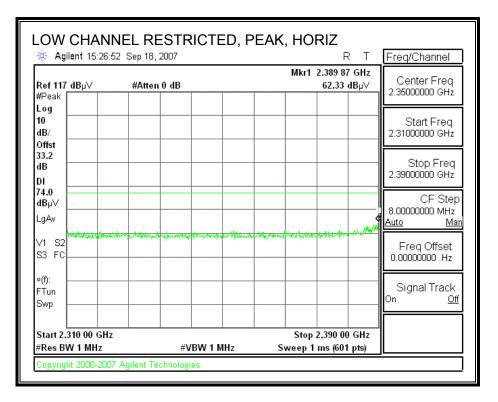
| | | | Services, Fr | emont | 3m Ch | amber | | | | | | | | | |
|----------------|-------------------------------|------------------|---------------------------|--------------|-------------------|----------------|-----------------------|------------|-----------------------------|--------------|----------|----------|----------------|----------------------------|---|
| oject≠ | y: Mits #: 07J] 1/21/07 | | ic Co., LTD | | | | | | | | | | | | |
| est Eng | gineer: | Vien Tran | | | | _ | | | | | | | | | |
| | | | G, Desktop, Parrot_PIF | | | | | na) | | | | | | | |
| | uipmen | | _ | | | | - | | | | | | | | |
| | | <u></u> 18GHz | Pre-ar | nplifer | 1-260 | SHz | Pre-am | plifer | 26-40GH | - | н | orn > 18 | GH7 | | Limit |
| | | 310 @3m | | Agilent 3 | | | | | | - | | | | - | FCC 15.205 🖵 |
| | uency Cal | | | | | | | | | | | | | <u> </u> | |
| | 2 foot | | 3 | foot d | able | | 121 | foot c | able | | HPF | R | eject Filte | | k Measurements |
| Frar | nk 17707 | 79007 | - | | | - | Chin 20 | 035400 |)1 | HPF | F_4.0GHz | • | | Avera | W=VBW=1MHz age Measurements =1MHz ; VBW=10Hz |
| f | Dist | Read Pk | Read Avg. | AF | CL | Amp | D Corr | Fltr | Peak | Avg | Pk Lim | Avg Lim | Pk Mər | Avg Mar | Notes |
| GHz | (m) | dBuV | dBuV | dB/m | dB | dB | dB | dB | 1 | - | dBuV/m | dBuV/m | 1 | dB | (V/H) |
| OW CH/ 284 | ANNEL, 3.0 | 2412 MHz 46.7 | 33.6 | 33.2 | 33 | -34.8 | 0.0 | 0.5 | 48.9 | 35.8 | 74 | 54 | -25.1 | -18.2 | v |
| 284 | 3.0 | 48.3 | 40.5 | 33.2 | 3.3 | -34.8 | 0.0 | 0.5 | 50 <i>5</i> | 42.7 | 74 74 | 54 | -23.5 | -11.3 | Н |
| ID CHA 874 | NNEL, 2 3.0 | 437 MHz 45.0 | 32.9 | 33.7 | 35 | -34.9 | 0.0 | 0.6 | 48.0 | 35.9 | 74 | 54 | -26.0 | -18.1 | v |
| 874 311 | 3.0 | 45.0 | 329 | 35.2 | 3.5 4.0 | -34.9 | 0.0 | 0.0 6.0 | 48.0 52.1 | 35.9 41.7 | 74 74 | 54 54 | -26.0 | -18.1 -12.3 | v V |
| 874 | 3.0 | 46.8 | 38.2 | 33.7 | 3.5 | -34.9 | 0.0 | 6.0 | 49.8 | 41.2 | 74 | 54 | -24.2 | -12.8 | H |
| 311 I CHANI | 3.0 NEL, 246 | 48.9 2 MHz | 41.5 | 35.2 | 4.0 | -34.7 | 0.0 | 0.0 | 54.1 | 46.7 | 74 | 54 | -19.9 | -7.3 | Н |
| 924 | 3.0 | 45.5 | 32.7 | 33.8 | 35 | -34.9 | 0.0 | 6.0 | 48.6 | 35.8 | 74 | 54 | -25.4 | -18.2 | v |
| 386 | 3.0 | 47.8 | 38.5 | 35.2 | 4.0 | -34.6 | 0.0 | 6.0 | 53.0 | 43.7 | 74 | 54 | -21.0 | -10.3 | v |
| 924 386 | 3.0 3.0 | 46.6 48.8 | 33.7 36.9 | 33.8 35.2 | 3 <i>5</i> 4.0 | -34.9 -34.6 | 0.0 0.0 | 0.0 0.0 | 49.7 54.0 | 36.8 42.1 | 74 74 | 54 54 | -24.3 -20.0 | -17.2 -11.9 | H |
| | | -0.0 | 303 | 2024 | | -54.0 | 0.0 | 0.0 | | 74.1 | /4 | | -40.0 | -11.3 | п |
| | | No other e | missions were | detected | l above s | ystem noi | ise floor | | | | | | | | |
| | f | | ent Frequency | у | | Amp | Preamp (| | | | | - | - | Field Strengt | |
| | | Distance to | | | | | | | ct to 3 mete | | | Pk Lim | | d Strength L | |
| | | Analyzer R | - | | | Avg Doole | - | | Strength @ - Eicld Stree | | | - | - | . Average L Deals Limit | |
| | AF | Antenna Fa | | | | Peak HPF | Calculate High Pas | | c Field Stre | ngth | | rk Mar | iviargin vs | . Peak Limi | L . |
| | CL | Cable Loss | | | | | | | | | | | | | |

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

DIPOLE, 2.21dBi ANTENNA

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

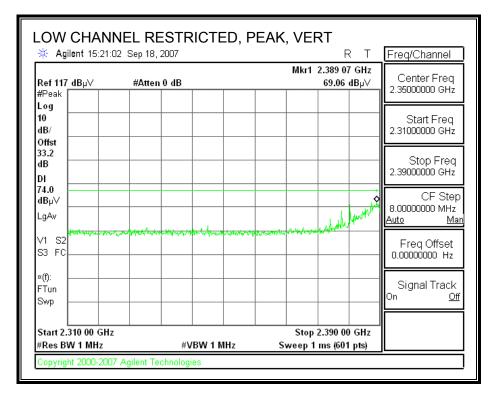


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| 🔆 Agilent 15:27:3 | | FED, AVG | | R T Freq/Channel |
|-------------------------------------|-------------|----------|-----------------------------------|---------------------------------|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | | Mkr1 2.390 0 48.15 | 0 GHz dBµ√ 2.35000000 GHz |
| Log 10 dB/ Offst | | | | Start Freq 2.31000000 GHz |
| 33.2 dB | | | | Stop Freq |
| DI 54.0 dBµ∨ LqAw | | | | CF Step 8.0000000 MHz |
| V1 S2 | | | | Freq Offset 0.00000000 Hz |
| *(f): FTun Swp | | | | Signal Track |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 1 | 10 Hz Sv | Stop 2.390 0 /eep 6.238 s (601 | |

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

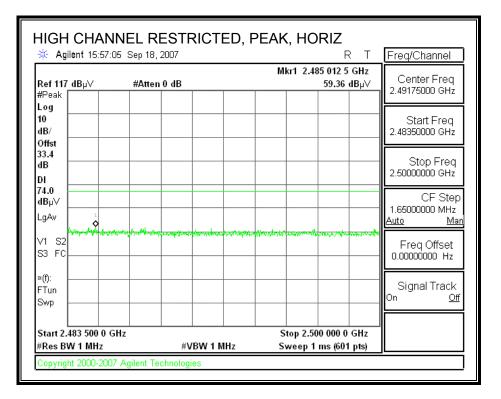


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| 🔆 Agilent 15:21:4 | 2 Sep 18, 2007 | R | T Freq/Channel |
|-------------------------------------|----------------|--|---|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.390 00 52.79 d | Contor Frog |
| Log 10 dB/ Offst | | | Start Freq 2.31000000 GHz |
| dB | | | Stop Freq 2.39000000 GHz |
| 54.0 dBµ√ LgAv | | | CF Step 8.0000000 MHz <u>Auto Mar</u> |
| ∨1 S2 S3 FC | | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 | Stop 2.390 00 - Hz Sweep 6.238 s (601 p | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

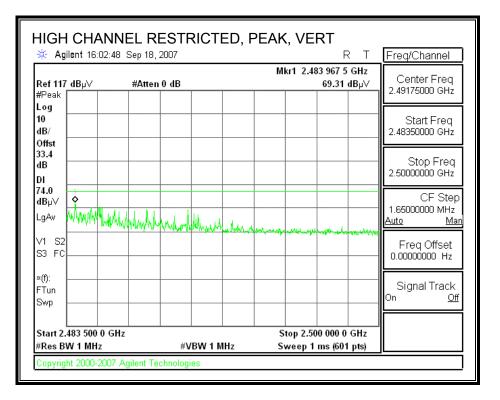


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| HIGH CHAN | NEL RESTRICTE | ED, AVG, HORIZ | Freq/Channel |
|--------------------------------------|------------------|--|---------------------------------------|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.483 500 0 GHz 46.94 dBµ∨ | Center Freq 2.49175000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.48350000 GHz |
| 33.4 dB | | | - Stop Freq 2.5000000 GHz |
| 54.0 dBµ∨ LgAv | | | CF Step 1.65000000 MHz Auto Mar |
| V1 S2 S3 FC | | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 0 #Res BW 1 MHz | GHz #VBW 10 I | Stop 2.500 000 0 GHz Hz Sweep 1.287 s (601 pts) | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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| 🔆 Agilent 16:03:2 | NEL RESTRICTE 0 Sep 18, 2007 | , , , R T | Freq/Channel |
|--------------------------------------|---------------------------------|--|---|
| Ref 117 dBµ∨ #Peak | #Atten 0 dB | Mkr1 2.483 555 0 GHz 50.47 dBμ∀ | Center Freq 2.49175000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.48350000 GHz |
| 33.4 dB | | | - Stop Freq 2.5000000 GHz |
| DI 54.0 dBµ√ LgAv | | | CF Step 1.6500000 MHz <u>Auto Mar</u> |
| V1 S2 S3 FC | ····· | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 G #Res BW 1 MHz | Hz #VBW 10 F | Stop 2.500 000 0 GHz Iz Sweep 1.287 s (601 pts) | ļ |

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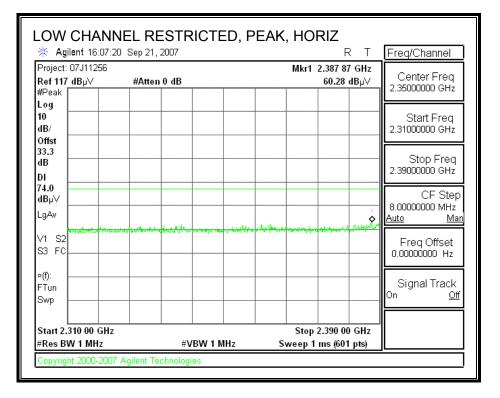
HARMONICS AND SPURIOUS EMISSIONS

| Configu Mode: ´ | ration: | Mode (with | G, Desktop, 1 Mitsumi D(| CA-E04 | _2.21 | dBi Ant | enna) | | | | | | | | |
|--------------------|----------------------|------------------|-----------------------------|----------------------|-------------|----------------|------------|------------|--------------|--------------|----------|-----------|----------------|----------------|------------------------------------|
| | lorn 1- S/N: 671 | 18GHz | Pre-an | nplifer liteq 300 | | | Pre-am | plifer | 26-40GH | z | H | orn > 180 | SHz | | Limit FCC 15.209 |
| | | _ | • | med 200 | 10A003 | 5 | | | | | | | | • | • |
| HIFred | quency Cal 2 foot | | 3 | foot c | able | | 12 | foot c | able | | HPF | Re | ject Filte | | <u>Measurements</u> W=VBW=1MHz |
| | | | | | | - | A-5m C | hambe | er 🔽 | HP | F_4.0GHz | • | | - Avera | ge Measurements 1MHz ; VBW=10Hz |
| f | Dist | Read Pk | Read Avg. | AF | CL | Amp | D Согг | 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) |
| 20W CH 284 | IANNEL, | 2412 MHz 40.3 | 29.9 | 32.8 | 6.4 | -36.6 | 0.0 | 0.5 | 43.5 | 33.1 | 74 | 54 | -30.5 | -20.9 | v |
| .236 | 3.0 | 39.2 | 29.4 | 34.9 | 8.4 | -36.2 | 0.0 | 0.0 | 46.9 | 37.1 | 74 | 54 | -27.1 | -16.9 | H |
| | | 437 MHz | 20 / | | <i>(</i> 0 | | | 0.6 | | | | | 20.7 | | |
| .874 .311 | 3.0 3.0 | 39.9 48.4 | 29.6 34.9 | 33.4 35.0 | 6.9 8.4 | -36.5 -36.2 | 0.0 0.0 | 6.0 6.0 | 44.3 56.2 | 34.0 42.7 | 74 74 | 54 54 | -29.7 -17.8 | -20.0 -11.3 | v |
| 2.185 | 3.0 | 46.4 | 34.9 29.8 | 35.0 37.6 | 6.4 12.2 | -30.2 -35.4 | 0.0 | 0.0 | 56.1 | 42./ | 74 | 54 54 | -17.8 -17.9 | -11-5 | v |
| .874 | 3.0 | 40.8 | 29.3 | 33.4 | 6.9 | -36.5 | 0.0 0.0 | 0.6 | 45.2 | 33.7 | 74 | 54 | -28.8 | -20.3 | H |
| 311 | 3.0 | 42.8 | 31.8 | 35.0 | 8.4 | -36.2 | 0.0 | 0.6 | 50.6 | 39.6 | 74 | 54 | -23.4 | -14.4 | H |
| 2.185 | 3.0 | 40.2 | 29.0 | 37.6 | 12.2 | -35.4 | 0.0 | 0.9 | 55.5 | 44.3 | 74 | 54 | -18.5 | -9.7 | H |
| II CHAN 1924 | INEL, 246 3.0 | 2 MHz 40.3 | 29.8 | 33.4 | 7.0 | -36.5 | 0.0 | 0.6 | 44.8 | 34.3 | 74 | 54 | -29.2 | -19.7 | v |
| .924 7.386 | 3.0 | 40.3 | 29.8 35.8 | 33.A 35.0 | 7.0 8.4 | -36.5 | 0.0 0.0 | 0.0 | 44.8 57.6 | 43.7 | 74 | 54 54 | -29.2 -16.4 | -19.7 | v |
| 2.310 | 3.0 | 49./ 39.6 | 29.4 | 37.6 | 12.2 | -35.4 | 0.0 | 0.9 | 54.9 | 43.7 | 74 | 54 54 | -10,4 | -103 | v |
| 924 | 3.0 | 41.2 | 29.3 | 33.4 | 7.0 | -36.5 | 0.0 | 0.6 | 45.7 | 33.8 | 74 | 54 | -28.3 | -20.2 | Ĥ |
| 386 | 3.0 | 42.5 | 31.4 | 35.0 | 8.4 | -36.2 | 0.0 | 0.6 | 50.4 | 39.3 | 74 | 54 | -23.6 | -14.7 | Н |
| 2.310 | 3.0 | 40.0 | 28.9 | 37.6 | 12.2 | -35.4 | 0.0 | 0.9 | 55.3 | 44.2 | 74 | 54 | -18.7 | - 9.8 | Н |
| | | Nacilia | | • مد ماد | -h | | | ļ | | | | | | | |
| | | No other e | missions were | actected | above s | ystem noi | ise 1100r | I | I | | l | | | L | |
| | | | | | | | | | | | | | | | |

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INVERTED-F, 1.38dBi ANTENNA

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

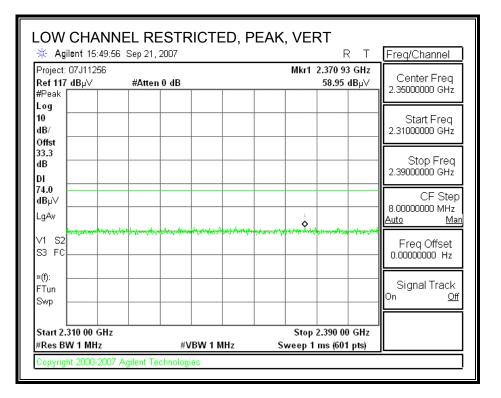


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| | | Mkr1 2 | R T 2.390 00 GHz 48.19 dBµ∨ | Ereq/Channel Center Freq 2.35000000 GHz Start Freq 2.31000000 GHz |
|--|------------|-----------------------|-----------------------------------|---|
| Ref 117 dBµ∀ #Atten 0 dE #Peak Log 10 dB/ Offst 33.3 | 3 | Mkr1 2 | | 2.35000000 GHz Start Freq |
| 10 dB/ Offst 33.3 | | | | |
| 33.3 | | | | |
| DI | | | | Stop Freq 2.39000000 GHz |
| 54.0 dBµV LgAv | | | | CF Step 8.0000000 MHz Auto Man |
| V1 S2 S3 FC | | | | Freq Offset 0.00000000 Hz |
| *(f): FTun Swp | | | | Signal Track On <u>Off</u> |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2 Sweep 6.238 | 2.390 00 GHz s (601 pts) | |

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

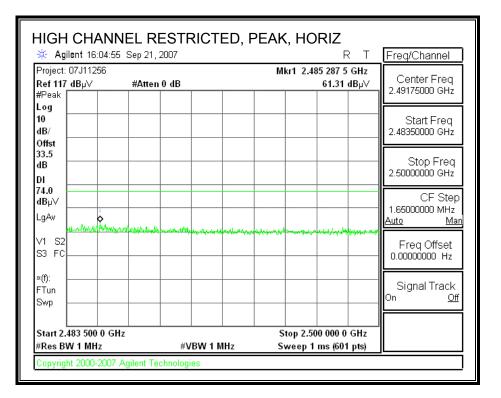


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| | ESTRICTED, 1 2007 | R T | Freq/Channel |
|---|----------------------|--|--|
| Project: 07J11256 Ref 117 dBµ∨ #Atten #Peak | | Mkr1 2.359 07 GHz 46.97 dBµ∨ | Center Freq 2.35000000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.31000000 GHz |
| 33.3 dB DI | | | - Stop Freq 2.39000000 GHz |
| 54.0 dBμV LgAv | | | CF Step 8.00000000 MHz <u>Auto Man</u> |
| V1 S2 S3 FC | | 1 • | Freq Offset 0.00000000 Hz |
| »(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.310 00 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.390 00 GHz Sweep 6.238 s (601 pts) | _ |

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

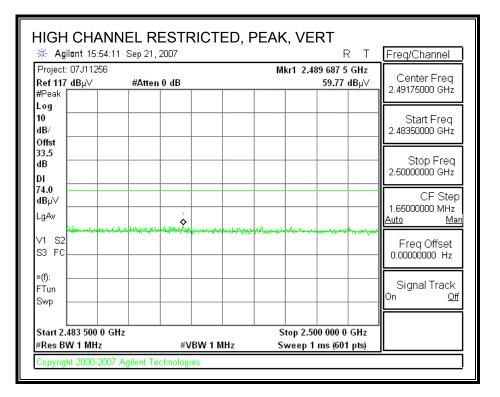


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| HIGH CHANNEL F Agilent 16:05:12 Sep 21 | - | AVG, HORIZ | Freq/Channel |
|--|------------|---|---|
| Project: 07J11256 Ref 117 dB μ∨ #Atte #Peak | n0dB | Mkr1 2.483 500 0 GHz 48.17 dBµ∀ | Center Freq 2.49175000 GHz |
| Log 10 dB/ Offst | | | Start Freq 2.48350000 GHz |
| 33.5 dB DI | | | Stop Freq 2.5000000 GHz |
| 54.0 dBµ∨ LgAv | | | CF Step 1.6500000 MHz <u>Auto Mar</u> |
| V1 S2 S3 FC | | | Freq Offset 0.00000000 Hz |
| *(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 GHz #Res BW 1 MHz | #VBW 10 Hz | Stop 2.500 000 0 GHz Sweep 1.287 s (601 pts) | |

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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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| * Agilent 15:54:37 | | ED, AVG, VERT | T Freq/Channel |
|--|---------------|---|---|
| Project: 07J11256 Ref 117 dB µ∨ #Peak | #Atten 0 dB | Mkr1 2.483 775 0 GF 47.59 dB | Contor Eroa |
| Log 10 dB/ Offst | | | Start Freq 2.48350000 GHz |
| dB | | | Stop Freq 2.5000000 GHz |
| 54.0 dBµ∨ LgAv | | | CF Step 1.65000000 MHz <u>Auto Ma</u> |
| V1 S2 S3 FC | | | Freq Offset 0.00000000 Hz |
| ×(f): FTun Swp | | | Signal Track On <u>Off</u> |
| Start 2.483 500 0 GF #Res BW 1 MHz | lz #VBW 10 | Stop 2.500 000 0 GH Hz Sweep 1.287 s (601 pts) | |

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HARMONICS AND SPURIOUS EMISSIONS

| <u>est Eq</u> | uipmen | <u>t:</u> | | | | | | | | | | | | | |
|---------------|---------------------|--|-----------------|--------------|------------|-------------------------------------|------------|------------------------------|--|--------------|----------|--------------------|------------------------|--|-------------------------------------|
| | | 18GHz | Pre-ar | <u> </u> | | | Pre-am | plifer | 26-40GH | | H | Horn > 18GHz Limit | | | |
| | | 310 @3m | ▼ T145 A | gilent | 3008A0 | 05(🖵 | | | | - | | | | - | FCC 15.205 |
| | uency Cal 2 foot | | 3 | footo | able | | 12 | foot c | able | | HPF | Re | eject Filte | | <u>k Measurements</u> W=VBW=1MHz |
| Fra | nk 17707 | 79007 | | | | - | Chin 20 | 035400 |)1 🔽 | HPF | F_4.0GHz | • | | ▼ Avera | nge Measurements MHz ; VBW=10Hz |
| f | Dist | | Read Avg. | AF | CL | Amp | D Corr | Fltr | Peak | Avg | Pk Lim | - | 1 | Avg Mar | Notes |
| GHz OW CH | (m) ANNEL, | dBuV 2412 MHz | dBuV | dB/m | dB | dB | dB | dB | dBuV/m | dBuV/m | dBuV/m | dBuV/m | dB | dB | (V/H) |
| 284 | 3.0 | 44.9 | 33.4 | 33.2 | 3.3 | -34.8 | 0.0 | 0.5 | 47.1 | 35.6 | 74 | 54 | -26.9 | -18.4 | V T |
| 284 ID CHA | 3.0 NNEL.2 | 46.3 437 MHz | 34.4 | 33.2 | 3.3 | -34.8 | 0.0 | 0.5 | 48.5 | 36.6 | 74 | 54 | -25.5 | -17.4 | Н |
| 374 | 3.0 | 45.3 | 32.8 | 33.7 | 3.5 | -34.9 | 0.0 | 0.6 | 48.3 | 35.8 | 74 | 54 | -25.7 | -18.2 | v |
| 311 374 | 3.0 3.0 | 46.3 46.6 | 34.1 33.8 | 35.2 33.7 | 4.0 3.5 | -34.7 -34.9 | 0.0 0.0 | 0.0 0.0 | 51.5 49.6 | 39.3 36.8 | 74 74 | 54 54 | -22.5 -24.4 | -14.7 -17.2 | V н |
| 311 | 3.0 | 40.0 | 33.8 34.9 | 35.2 | 3.5 4.0 | -34.9 | 0.0 | 0.0 0.0 | 49.0 52.9 | 40.1 | 74 74 | 54 54 | -24.4 -21.1 | -17.2 | H |
| | NEL, 246 | | | | | | | | | | | | | | |
| 924 386 | 3.0 3.0 | 45.5 46.6 | 33.0 34.4 | 33.8 35.2 | 3.5 4.0 | -34.9 -34.6 | 0.0 0.0 | 0.0 0.0 | 48.6 51.8 | 36.1 39.6 | 74 74 | 54 54 | -25.4 -22.2 | -17.9 -14.4 | v v |
| 924 | 3.0 | 45.7 | 33.2 | 33.8 | 3.5 | -34.9 | 0.0 | 0.0 0.0 | 48.8 | 36.3 | 74 | 54 | -25.2 | -17.7 | Ĥ |
| 386 | 3.0 | 48.0 | 35.7 | 35.2 | 4.0 | -34.6 | 0.0 | 0.0 | 53.2 | 40.9 | 74 | 54 | -20.8 | -13.1 | Н |
| | | No other e | missions were | detected | ahove s | vstem noi | se floor | | | | | | | | |
| | | Measureme Distance to Analyzer R Antenna Fa Cable Loss | eading ictor | 7 | | Amp D Corr Avg Peak HPF | Average | Correc Field S ed Peal | ct to 3 mete Strength @ c Field Stre | 3 m | | Pk Lim Avg Mar | Peak Fiel Margin vs | Field Streng d Strength L : Average L : Peak Limi | imit imit |

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8.2. RECEIVER ABOVE 1 GHz

8.2.1. RECEIVER ABOVE 1 GHz IN THE 2.4 GHz BAND

DIPOLE, 2.21dBi ANTENNA

| Company: Mi Project #: 07 Date: 09/19/0 Cest Enginee Configuration Mode: Rx Mi Cest Equipmed Horn * T73; S/N: 67 Hi Frequency (2 foc f Dis | 07J1125 /07 eer: Tha on: EUT Mode (v <u>ment:</u> 1 1-18G 6717 @: | 56 anlı Nguy T on JIG, with Mits GHz 3m - | ren , Desktop, umi_CA-F Pre-a T144 | Monito | ole 2.2 | e 1 dBi Ai | ntenna) | plifer | 26-40GH | z | Н | orn > 180 | бНz | | Limit |
|--|--|--|--|--------------------------------|------------|----------------|------------|------------|----------------|----------------|------------------------------------|--------------|----------------|--------------------|--|
| Configuration Adde: Rx Ma Cest Equipme Horn T73; S/N: 67 HiFrequency (2 foc | on: EUT Mode (v <u>ment:</u> 1 1-18G 6717 @3 vy Cables - | T on JIG, with Mits GHz 3m | , Desktop, umi_CA-H Pre-a T144 | 204_Dip mplifer Miteq 30 | ole 2.2 | e 1 dBi Ai | ntenna) | plifer | 26-40GH | z | H | orn > 180 | GHz | | Limit |
| Horn Horn T73; S/N: 67 Hi Frequency (2 foc | <u>ment:</u> 1-18G 6717 @3 | GHz 3m ┏┏┏┏┏┏┏┏┏ | Pre-a | mplifer Miteq 30 | 1-260 | GHz | | plifer | 26-40GH | z | Н | orn > 180 | SHz | | Limit |
| T73; S/N: 67 | 6717 @3 | 3m 🖵 | T144 | Miteq 30 | | | Pre-am | plifer | 26-40GH | z | Н | orn > 180 | SHz | | Limit |
| Hi Frequency (| y Cables i | | | | 08A009 | 31 🖵 | | | | | Pre-amplifer 26-40GHz Horn > 18GHz | | | | |
| 2 foo | | ole T | ; | 3 foot c | | | | | | | | | - | RX RSS 210 🖵 | |
| f Dis | | • | | | able | | 12 | foot c | able | | HPF | Re | ject Filte | | <u> Measurements</u> |
| f Dis | | | | | | • | A-5m C | hambe | er 🔽 | | | • | | RB <u>Avera</u> | W=VBW=1MHz ge Measurements 1MHz ; VBW=10Hz |
| | | | Read Avg | | CL | Amp | D Corr | Fltr | Peak | Avg | Pk Lim | ÷ | | Avg Mar | Notes |
| GHz (m) 158 3.0 | | iBuV 63.0 | dBuV 51.4 | dB/m 24.4 | dB 3.2 | dB -39.3 | dB 0.0 | dB 0.0 | dBuV/m 51.3 | dBuV/m 39.7 | dBuV/m 74 | dBuV/m 54 | dB -22.7 | dB -14.3 | (V/H) V |
| 417 3.0 | 0.1 | 56.4 | 53.5 | 25.3 | 35 | -38.9 | 0.0 | 0.0 | 46.4 | 43.4 | 74 | 54 | - 27.6 | - 10.6 | v |
| 000 3.0 | 0.1 | 57.3 | 49.3 | 30.0 | 53 | -37 <i>A</i> | 0.0 | 0.0 | 55.3 | 47.2 | 74 | 54 | -18.7 | - 6.8 | V |
| D33 3.D | | 58.6 | 56.1 | 23.9 | 3.0 | -39.4 | 0.0 | 0.0 | 46.1 | 43.6 | 74 | 54 | -27.9 | -10,4 | H |
| <i>5</i> 58 3.0 .000 3.0 | | 54.1 55.1 | 52.3 46.9 | 25.8 30.0 | 3.7 5.3 | -38.7 -37.4 | 0.0 0.0 | 0.0 0.0 | 44.9 53.0 | 43.2 44.9 | 74 74 | 54 54 | -29.1 -21.0 | -10.8 -9.1 | H H |
| | N | le other em | issions wer | e detected | l above s | | ise floor | | | | | | | | |
| f | Ма | | it Frequenc | | | Amp | Preamp (| Tain | | | | Arra Tim | Amore de T | ield Strengt | L. T |
| I Dist | | stance to A | • | y | | | - | | t to 3 mete | ers | | - | - | i Strength L | |
| | | alyzer Rea | | | | Avg | | | trength @ | | | | | Average L | |
| AF | | tenna Fac | tor | | | Peak | | | Field Stre | ngth | | Pk Mar | Margin vs | . Peak Limit | |
| CL | . Cal | ble Loss | | | | HPF | High Pas | s Filter | | | | | | | |

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INVERTED-F, 1.38dBi ANTENNA

| | - | | Measurem | lent | | | | | | | | | | | |
|----------------|------------|------------------------|----------------------|--------------|------------|----------------|------------|----------------|--------------|--------------|----------|-----------|----------------|---------------|-----------------------|
| omplia | ance Ce | ertification \$ | Services | | | | | | | | | | | | |
| ompar | ıy: Mits | umi Electri | ic Co., LTD | | | | | | | | | | | | |
| | #: 07J] | | | | | | | | | | | | | | |
| | - | er 21, 2007 | | | | | | | | | | | | | |
| | | Ninous Da EUT on H(| voudi G, Desktop, | Monite | w Ko | r Boord | Mouro | | | | | | | | |
| | | | rot PIFA D | | | | | 1.386 | lBi Antenı | ia) | | | | | |
| | | | - | | | - | | | | / | | | | | |
| fest Eq | uipmen | . <u>t:</u> | | | | | | | | | | | | | |
| н | orn 1. | 18GHz | Pre-ar | nplifer | 1.26 | GH7 | Pre-am | plifer | 26-40GH | 7 | н | orn > 180 | GH7 | | Limit |
| | | | | | | | | | | | | | | | DV DCC 240 |
| T120; | S/N: 29 | 310 @3m | T145 A | Agilent 3 | 3008A0 | 05(- | | • RX RSS 210 • | | | | | | | |
| Hi Fred | quency Cal | bles | | | | | | | | | | | | | |
| | 2 foot | cable | 3 | 6 foot c | able | | 12 | foot c | able | | HPF | Pa | eject Filte | Pea | <u>k Measurements</u> |
| | | | | | abie | | | | | | | | geetrinte | RE | 3W=VBW=1MHz |
| Fra | nk 17707 | 79007 | - | | | - | Chin 20 |)035400 | 01 🚽 | | | - | | | age 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 |
| GHz | (m) | dBuV | dBuV | dB/m | dB | dB | dB | dB | dBuV/m | dBuV/m | dBuV/m | dBuV/m | dB | dB | (V/H) |
| .128 | 3.0 | 55.7 | 52.3 | 28.3 | 1.9 | -36.1 | 0.0 | 0.0 | 49.9 | 46.5 | 74 | 54 | -24.1 | -75 | v |
| 1.128 1.367 | 3.0 | 55./ 54.0 | 513 | 28.3 | 2.1 | -30.1 | 0.0 | 0.0 | 49.9 | 46.7 | 74 74 | 54 54 | -24.1 -24.6 | -73 | v V |
| l .607 | 3.0 | 50.0 | 44.9 | 30.1 | 2.2 | -35.7 | 0.0 | 0.0 | 46.6 | 41.6 | 74 | 54 | -27.4 | -12.4 | v |
| 2.039 | 3.0 | 48.1 | 40.8 | 31.6 | 2.5 | -35.4 | 0.0 | 0.0 | 46.8 | 39.6 | 74 | 54 | -27.2 | -14.4 | v |
| 3.000 | 3.0 | 51.4 | 42.7 | 32.8 | 2.9 | -35.2 | 0.0 | 0.0 | 52.0 | 43.2 | 74 | 54 | -22.0 | -10.8 | v |
| 1.175 | 3.0 | 57.1 | 55.2 | 28.5 | 2.0 | -36.0 | 0.0 | 0.0 | 51.6 | 49.6 | 74 | 54 | -22.4 | -4.4 | Н |
| 1.415 | 3.0 | 51.2 | 47.0 | 29.4 | 2.1 | -35.8 | 0.0 | 0.0 | 46.9 | 42.7 | 74 | 54 | - 27.1 | -113 | H |
| 512 | 3.0 | 50.9 | 46.5 | 29.8 | 2.2 | -35.8 | 0.0 | 0.0 | 47.1 | 42.7 | 74 | 54 | -26.9 | -11.3 | H |
| .656 .895 | 3.0 3.0 | 50.3 51.8 | 44.5 | 30.3 31.2 | 2.3 2.4 | -35.7 -35.5 | 0.0 0.0 | 0.0 0.0 | 47.2 49.9 | 41.4 45.7 | 74 74 | 54 54 | -26.8 -24.1 | -12.6 -8.3 | H H |
| .895 .991 | 3.0 | 49.4 | 47.6 44.4 | 31.2 | 2.4 2.5 | -35.5 | 0.0 | 0.0 | 49.9 48.0 | 45./ 43.0 | 74 | 54 54 | -24.1 -26.0 | -8-3 | H |
| | | | | | | | | | | | | | | | |
| Ve other (| emission | s were detecte | ed above systen | n noise fl | loor | | | | | | L | | | | L |
| | | | | | | | | | | | | | | | |
| | f | Measureme | ent Frequency | У | | Amp | Preamp (| Gain | | | | Avg Lim | Average I | Field Streng | th Limit |
| | Dist | Distance to | Antenna | | | D Corr | Distance | Corre | ct to 3 met | ers | | Pk Lim | Peak Fiel | d Strength I | limit |
| | Read | Analyzer R | eading | | | Avg | Average | Field S | Strength @ | 3 m | | Avg Mar | Margin vs | . Average I | limit |
| | AF | Antenna Fa | actor | | | Peak | Calculate | ed Peal | k Field Stre | ngth | | Pk Mar | Margin va | . Peak Limi | it |
| | CL | Cable Loss | 1 | | | HPF | High Pas | s Filter | | | | | | | |
| | | | | | | | | | | ength | | Pk Mar | Margin vs | . Peak Limi | t |

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8.3. WORST-CASE BELOW 1 GHz

DIPOLE, 2.21dBi ANTENNA

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

| HORIZO | ONTAL | | | | | | | |
|---------------------------------|---|--|---|--|--|---|--------------------------------------|---------------|
| | | Ē | | | 47173 Fremor Tel: (| lance Ce Benicia it, CA S (510) 77 (510) 66 | a Stree 94538 71-1000 | |
| Data# | : <mark>19</mark> Fi | le#: 30 |)-1000 2 | A.EMI | Date: | 09-19-2 | 2007 T | ime: 14:37:55 |
| Test Proje Compa | guration:: : : | Thanh 07J112 Mitsun EUT or | Nguyen 256 ni 1 JIG, 1 cst-case | Desktop, | , KB, MG Dipole : | • | | ı |
| | | | | | | _ | | Page: 1 |
| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | | |
| | MHz | dBuV | db | dBuV/m | dBuV/m | db | | - |
| 1 2 3 4 5 6 7 | 182.290 295.780 342.340 439.340 567.380 766.230 887.480 | 51.49 48.10 51.43 49.72 44.30 37.63 | -14.95 -12.41 -11.22 -8.83 -6.03 -2.50 | 36.54 35.69 40.21 40.89 38.27 35.13 | 43.50 46.00 46.00 46.00 46.00 46.00 | -6.96 -10.31 -5.79 -5.11 -7.73 -10.87 | Peak Peak Peak Peak Peak | |

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

| VERTI | CAL | | | | | | | | |
|----------------------------|--|-------------------------------------|--|----------------------------------|---------------------------|----------------------------------|------------------------------|-------------|--|
| | | E | | | 47173 Fremon Tel: (| | 1 Street 94538 71-1000 | on Services | |
| Data# | : 20 Fi | le#: 30 | -1000 7 | .EMI | Date: | 09-19-2 | 2007 Time | : 14:31:53 | |
| Test Proje Compa | ny: : guration:: : : | Thanh 07J112 Mitsum EUT on | Nguyen 56 i JIG, I st-case |)esktop, | , KB, Mo Dipole 2 | | | | |
| | | Read | | | Limit | Over | | Page: 1 | |
| | Freq | Level | Factor | Level | | Limit | | | |
| | MHz | dBuV | dB | dBuV/m | $\overline{dBuV/m}$ | db | | | |
| 1 2 3 4 5 6 | 182.290 240.490 392.780 439.340 584.840 869.050 | 53.10 53.54 49.06 49.07 | -14.48 -10.08 -8.83 -5.68 | 38.62 43.46 40.23 43.39 | 46.00 | -7.38 -2.54 -5.77 -2.61 | Peak Peak Peak Peak | | |

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INVERTED-F, 1.38dBi ANTENNA

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

| Event Compliance Certification Services 47173 Benicia Street Premont, CA 94538 Tei (510) 771-1000 Fax: (510) 761-0088 Zata#: 23 File#: 30-1000 A.EMI Date: 09-19-2007 Time: 15:27:18 Condition: FCC CLASS-B HORIZONTAL Est Operator:: Thanh Nguyen Project f: :: 07J11256 Date: 09-19-2007 Time: 15:27:18 Configuration:: FUT on JIG, Desktop, KB, Mouse, & LCD Mode :: :: fx worst-case with Inverted F_1.38dBi antenna Target: :: FCC Class B Page: 1 Yarget: Yarget: Yarget Yarget: Yarget Yarget: Yarget: Yarget Yarget Yarget: Yarget: Yarget Yarget <th>HORIZONTAL</th> <th></th> <th></th> <th></th> | HORIZONTAL | | | |
|---|--|--|--|--|
| Condition: FCC CLASS-B HORIZONTAL Test Operator:: Thanh Nguyen Project #: 07J11256 Company: : Mitsumi Configuration:: EUT on JIG, Desktop, KB, Mouse, & LCD Mode : : Tx worst-case with Inverted F_1.38dBi antenna Target: : FCC Class B Page: 1 Page: 1 Page: 1 Page: 1 Page: 1 NHz dBuV dB dBuV/m dBuV/m dB 1 31.940 38.86 -6.60 32.26 40.00 -7.74 Peak 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | ICE Inc | 47173 Benicia Street Fremont, CA 94538 Tel: (510) 771-1000 | |
| Test Operator:: Thanh Nguyen Project #: : 07J11256 Company: : Mitsumi Configuration:: EUT on JIG, Desktop, KB, Mouse, & LCD Mode : : Tx worst-case with Inverted F_1.38dBi antenna Target: : PCC Class B Page: 1 Page: 1 Page: 1 Page: 1 Page: 1 NHz dBuV dB dBuV/m dBuV/m dB 1 31.940 38.86 -6.60 32.26 40.00 -7.74 Peak 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | Data#: 23 H | 'ile#: 30-1000 A.EMI | Date: 09-19-2007 Time: 15:27:18 | |
| Read Limit Over Freq Level Factor Level Line Limit Remark MHz dBuV dB dBuV/m dBuV/m dB dB 1 31.940 38.86 -6.60 32.26 40.00 -7.74 Peak 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | Test Operator: Project #: Company: Configuration: Mode : | : Thanh Nguyen : 07J11256 : Mitsumi : BUT on JIG, Desktop : Tx worst-case with | | |
| Freq Level Factor Level Line Limit Remark MHz dBuV dB dBuV/m dBuV/m dB dBuV/m dB 1 31.940 38.86 -6.60 32.26 40.00 -7.74 Peak 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | | 2 | |
| MHz dBuV dB dBuV/m dBuV/m dB 1 31.940 38.86 -6.60 32.26 40.00 -7.74 Peak 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | Free | | | |
| 1 31.940 38.86 -6.60 32.26 40.00 -7.74 Peak 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | · | | |
| 2 120.210 46.93 -13.31 33.63 43.50 -9.88 Peak 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | MH2 | dBuV dB dBuV/m | dBuV/m dB | |
| 3 216.240 49.01 -15.29 33.72 46.00 -12.28 Peak 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | | | |
| 4 381.140 52.24 -10.31 41.93 46.00 -4.07 Peak 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | | | |
| 5 584.840 47.99 -5.68 42.31 46.00 -3.69 Peak 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | | | |
| 6 775.930 43.58 -2.39 41.19 46.00 -4.81 Peak | | | | |
| | | | | |
| 7 870.330 43.76 -1.38 42.38 46.00 -3.62 Peak | | | | |
| | 7 870.990 | 43.76 -1.38 42.38 | 46.00 -3.62 Peak | |
| | | | | |
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SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

| VERTI | CAL | | | | | | | |
|---------------------------------|---|--|--|----------------------------------|------------------------------------|--------------------------------------|-------------|--|
| | |). • | | 47173 Fremor Tel: (| Benicia 1t, CA 9 (510) 73 | 1 Street 94538 | on Services | |
| Data# | : 26 Fi | le#: 30-100 | 0 A.EMI | Date: | 09-19-3 | 2007 Time | 9: 15:34:36 | |
| Test (Proje Compa: | Operator:: ct #: : ny: : guration:: : : | CLASS-B VER Thanh Nguy 07J11256 Mitsumi BUT on JIG Tx worst-c FCC Class | en , De <i>s</i> ktop ase with | | | | ma | |
| | | Read | | Timit | Over | | Page: 1 | |
| | Freq | Level Fact | or Level | | | Remark | | |
| | MHz | dBuV | dB dBuV/m | \overline{dBuV}/m | db | | | |
| 1 2 3 4 5 6 7 | 94.990 232.730 392.780 453.890 526.640 | 41.08 -6. 52.87 -18. 46.67 -14. 45.54 -10. 48.65 -8. 46.04 -6. 46.44 -3. | 29 34.58 75 31.92 08 35.46 44 40.21 87 39.17 | 43.50 46.00 46.00 46.00 | -14.08 -10.54 -5.79 -6.83 | Peak Peak Peak Peak Peak | | |

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9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

| Frequency of Emission (MHz) | Conducted L | imit (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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

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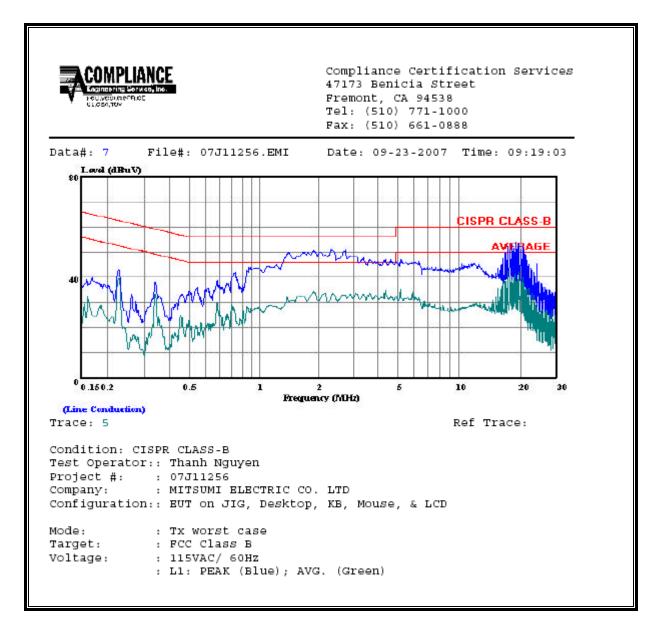
T.

<u>6 WORST EMISSIONS</u>

| Freq. | | Reading | | Closs | Limit | EN_B | Marg | ;in | Remark |
|-----------|-----------|-----------|-----------|-------|-------|-------|---------|--------|--------|
| (MHz) | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB) | QP | AV | QP (dB) | AV(dB) | L1/L2 |
| 1.53 | 49.43 | | 31.50 | 0.00 | 56.00 | 46.00 | -6.57 | -14.50 | L1 |
| 2.42 | 50.96 | | 33.44 | 0.00 | 56.00 | 46.00 | -5.04 | -12.56 | L1 |
| 18.92 | 53.86 | | 49.57 | 0.00 | 60.00 | 50.00 | -6.14 | -0.43 | L1 |
| 1.50 | 50.79 | | 35.65 | 0.00 | 56.00 | 46.00 | -5.21 | -10.35 | L2 |
| 2.81 | 51.24 | | 34.86 | 0.00 | 56.00 | 46.00 | -4.76 | -11.14 | L2 |
| 18.23 | 44.90 | | 37.57 | 0.00 | 60.00 | 50.00 | -15.10 | -12.43 | L2 |
| 6 Worst I | Data I | | | | | | | | |

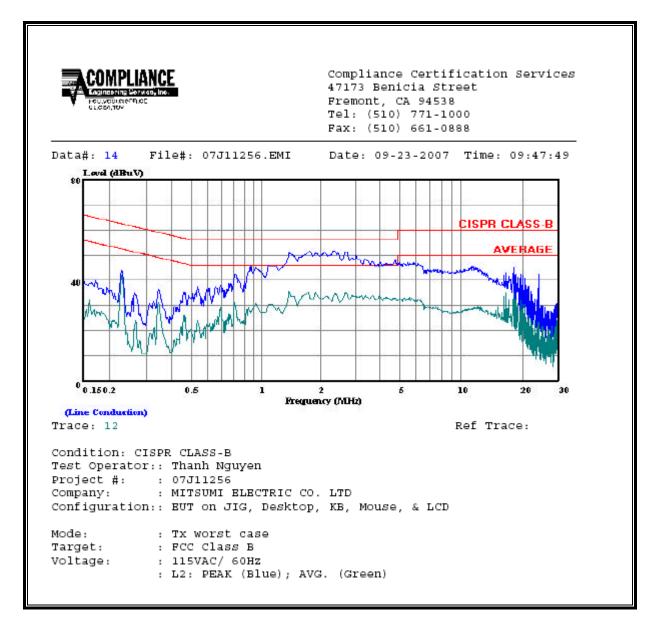
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LINE 1 RESULTS



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LINE 2 RESULTS



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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) | Magnetic field strength (A/m) | Power density (mW/cm²) | Averaging time (minutes) |
|------------------------------------|-------------------------------------|-------------------------------------|----------------------------|-----------------------------|
| (A) Lim | its for Occupational | /Controlled Exposu | res | |
| 0.3–3.0 3.0–30 30–300 | 614 1842/f 61.4 | 1.63 4.89/f 0.163 | *(100) *(900/f²) 1.0 | 6 |
| 30–300 300–1500 1500–100,000 | | | f/300 5 | 6 |
| (B) Limits | for General Populati | on/Uncontrolled Exp | posure | |
| 0.3–1.34 1.34–30 | 614 824/f | 1.63 2.19/f | *(100) *(180/f²) | 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 1500–100,000 | 27.5 | 0.073 | 0.2 f/1500 1.0 | 30 30 30 |

f = frequency in MHz

f = frequency in MHz
 * = Plane-wave equivalent power density
 NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/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 exposed, 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.

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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 ²) | 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> ^{0.5} | 0.0042f ^{0.5} | 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 ^{1.2} |
| 150 000–300 000 | 0.158f ^{0.5} | 4.21 x 10 ⁻⁴ f ^{0.5} | 6.67 x 10 ⁻⁵ f | 616 000 /f ^{1.2} |

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

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

- A power density of 10 W/m² is equivalent to 1 mW/cm².
 A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

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CALCULATIONS

Given

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

S = E ^ 2 / 3770

where

and

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:

 $d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$

where

d = MPE distance in cm P = Power in dBm G = Antenna Gain in dBi S = Power Density Limit in mW/cm²

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/cm² is converted to units of W/m² by multiplying by a factor of 10.

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LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

(MPE distance equals 20 cm)

DIPOLE, 2.21dBi ANTENNA

| Mode | Band | MPE | Output | Antenna | FCC Power | IC Power |
|------|---------|----------|--------|---------|-----------|----------|
| | | Distance | Power | Gain | Density | Density |
| | | (cm) | (dBm) | (dBi) | (mW/cm^2) | (W/m^2) |
| WLAN | 2.4 GHz | 20.0 | 18.74 | 2.21 | 0.02 | 0.25 |

INVERTED-F, 1.38dBi ANTENNA

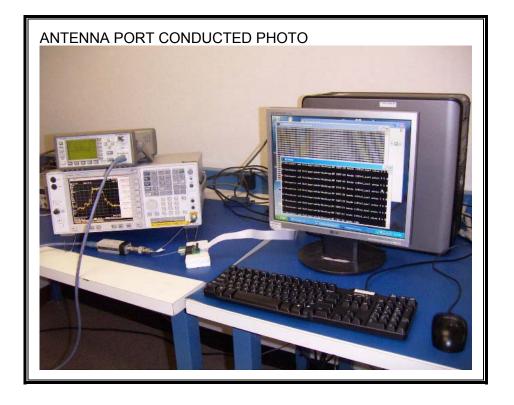
| Mode | Band | MPE | Output | Antenna | FCC Power | IC Power |
|------|---------|----------|--------|---------|-----------|----------|
| | | Distance | Power | Gain | Density | Density |
| | | (cm) | (dBm) | (dBi) | (mW/cm^2) | (W/m^2) |
| WLAN | 2.4 GHz | 20.0 | 19.09 | 1.38 | 0.02 | 0.22 |

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

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11. SETUP PHOTOS

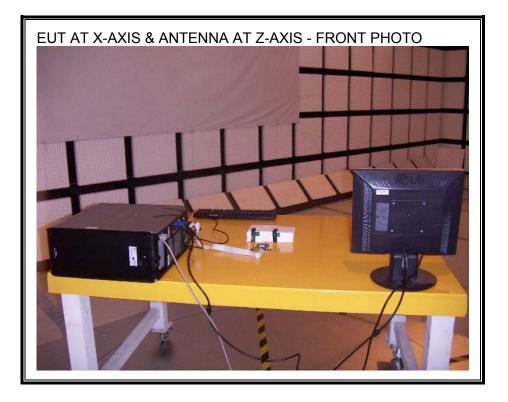
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



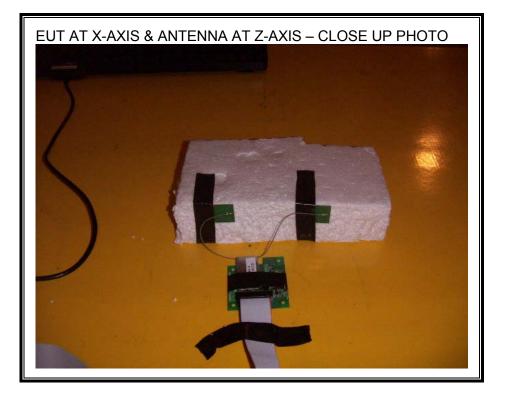
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RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

DIPOLE, 2.21dBi ANYENNA_WORST-CASE CONFIGURATION

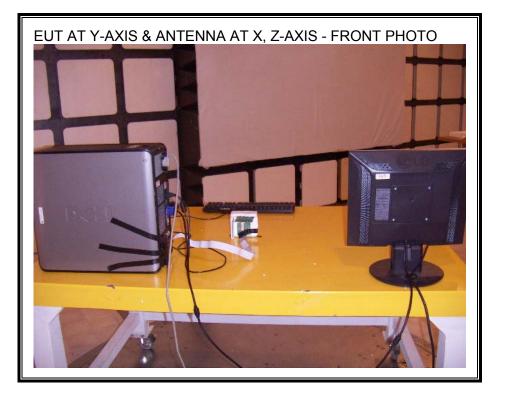


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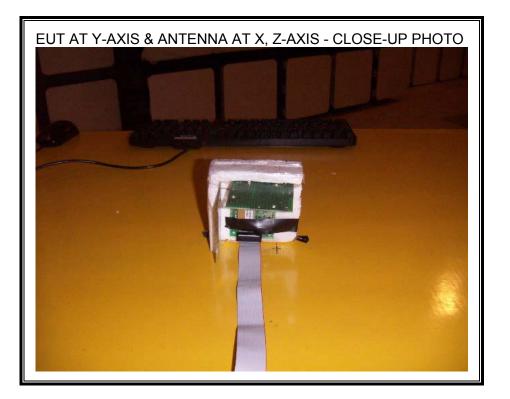


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INVERTED-F, 2.21dBi ANTENNA_WORST-CASE CONFIGURATION



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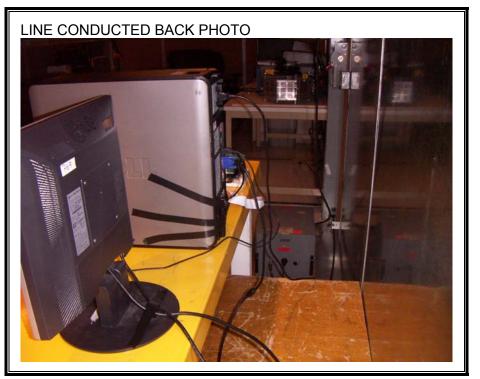


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POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



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END OF REPORT

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