

Company: Actiontec Electronics Inc

Test of: WCB6240Q
To: FCC CFR 47 Part 15 Subpart C 15.247 (DTS) +
Industry Canada RSS-247 Issue 1

Report No.: ATEC09-U5b Radiated Rev C

RADIATED TEST REPORT



RADIATED TEST REPORT

FROM



Test of: Actiontec Electronics Inc WCB6240Q
to

To: FCC CFR 47 Part 15 Subpart C 15.247 (DTS) +
Industry Canada RSS-247 Issue 1

Test Report Serial No.: ATEC09-E5b Radiated Rev C

This report supersedes: ATEC09-E5b Radiated Rev B

Note: this report is one of a set of three reports that together address the requirements for certification purposes

| Report Number | Test Report Type |
|-------------------|---|
| ATEC09-U5a, b | 2.4 GHz Conducted & Radiated Test Reports |
| ATEC09-U8a, b | 5 GHz (non-DFS) Conducted, Radiated Test Reports |
| ATEC09-U11a, b, c | 5 GHz (DFS) Conducted, Radiated, DFS Test Reports |
| ATEC09-U2 | FCC Part 15B / ICES-003 Test Report |

Applicant: Actiontec Electronics Inc
760 N Mary Avenue
Sunnyvale California 94085
USA

Product Function: Gigabit Wireless Router

Issue Date: 24th November 2015

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com



MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

Table of Contents

| | |
|---|-----------|
| 1. ACCREDITATION, LISTINGS & RECOGNITION | 4 |
| 1.1. TESTING ACCREDITATION..... | 4 |
| 1.2. RECOGNITION | 5 |
| 1.3. PRODUCT CERTIFICATION | 6 |
| 2. DOCUMENT HISTORY | 7 |
| 3. TEST RESULT CERTIFICATE | 8 |
| 4. REFERENCES AND MEASUREMENT UNCERTAINTY | 9 |
| 4.1. Normative References | 9 |
| 4.2. Test and Uncertainty Procedure | 10 |
| 5. PRODUCT DETAILS AND TEST CONFIGURATIONS | 11 |
| 5.1. Technical Details | 11 |
| 5.2. Scope Of Test Program | 12 |
| 5.3. Equipment Model(s) and Serial Number(s) | 15 |
| 5.4. Antenna Details | 15 |
| 5.5. Cabling and I/O Ports | 15 |
| 5.6. Test Configurations..... | 16 |
| 5.7. Equipment Modifications | 16 |
| 5.8. Deviations from the Test Standard | 16 |
| 6. TEST SUMMARY | 17 |
| 7. TEST EQUIPMENT CONFIGURATION(S) | 18 |
| Radiated Emissions - 3m Chamber | 18 |
| 8. TEST RESULTS | 20 |
| 8.1. Emissions | 20 |
| 8.1.1. <i>Radiated Emissions</i> | 20 |
| 8.1.1.1. Restricted Band Emissions | 20 |
| 8.1.1.2. Restricted Band-Edge Emissions | 26 |
| A. APPENDIX - GRAPHICAL IMAGES | 39 |
| A.1. Emissions | 40 |
| A.1.1. <i>Radiated Emissions</i> | 40 |
| A.1.1.1. Restricted Band Emissions | 40 |
| A.1.1.2. Restricted Band-Edge Emissions | 44 |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2005. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

1.2. RECOGNITION

MiCOM Labs, Inc has widely recognized wireless testing capabilities. Our international recognition includes Conformity Assessment Body designation by APEC MRA countries. MiCOM Labs test reports are accepted globally.

| Country | Recognition Body | Status | Phase | Identification No. |
|-----------|--|--------|------------|---|
| USA | Federal Communications Commission (FCC) | TCB | - | US0159 Listing #: 102167 |
| Canada | Industry Canada (IC) | FCB | APEC MRA 2 | US0159 Listing #: 4143A-2 4143A-3 |
| Japan | MIC (Ministry of Internal Affairs and Communication) | CAB | APEC MRA 2 | RCB 210 |
| | VCCI | -- | -- | A-0012 |
| Europe | European Commission | NB | EU MRA | NB 2280 |
| Australia | Australian Communications and Media Authority (ACMA) | CAB | APEC MRA 1 | US0159 |
| Hong Kong | Office of the Telecommunication Authority (OFTA) | CAB | APEC MRA 1 | |
| Korea | Ministry of Information and Communication Radio Research Laboratory (RRL) | CAB | APEC MRA 1 | |
| Singapore | Infocomm Development Authority (IDA) | CAB | APEC MRA 1 | |
| Taiwan | National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI) | CAB | APEC MRA 1 | |
| Vietnam | Ministry of Communication (MIC) | CAB | APEC MRA 1 | |

EU MRA – European Union Mutual Recognition Agreement.

NB – Notified Body

APEC MRA – Asia Pacific Economic Community Mutual Recognition Agreement. Recognition agreement under which test lab is accredited to regulatory standards of the APEC member countries.

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

2. DOCUMENT HISTORY

| Document History | | |
|------------------|--------------------------------|---|
| Revision | Date | Comments |
| Draft | 12 th October 2015 | |
| Draft #2 | 19 th October 2015 | |
| Rev A | 27 th October 2015 | Initial Release |
| | | |
| Draft #3 | 12 th November 2015 | <p>The initial program (Rev A) for 802.11n HT-40 was not tested for band-edge as the device only operated on the mid channel (2437 MHz).</p> <p>As a result of the manufacturer introducing additional frequencies for HT-40 operational mode radiated band-edge measurements were required</p> |
| Rev B | 16 th November 2015 | 2 nd document release |
| Rev C | 24 th November 2015 | Corrected radiated emission margin table |
| . | | |
| . | | |

In the above table the latest report revision will replace all earlier versions.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 8 of 56

3. TEST RESULT CERTIFICATE

Manufacturer: Actiontec Electronics Inc
760 N Mary Avenue
Sunnyvale California 94085
USA

Tested By: MiCOM Labs, Inc.
575 Boulder Court
Pleasanton
California 94566 USA

Model: WCB6240Q

Telephone: +1 925 462 0304
Fax: +1 925 462 0306

Type Of Equipment: 802.11a/b/g/n/ac Wireless Router

S/N's: GWXA5360700016

Test Date(s): 29th – 30th September 2015

Website: www.micomlabs.com

STANDARD(S)

TEST RESULTS

**FCC CFR 47 Part 15 Subpart C 15.247 (DTS)
Industry Canada RSS-247 Issue 1**

EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs, Inc.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

| REF. | PUBLICATION | YEAR | TITLE |
|------|------------------------|---------------------|---|
| I | KDB 662911 | Oct 31 2013 | Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band |
| II | KDB 558074 D01 v03r03 | 9th June 2015 | Guidance for performing compliance measurements on Digital Transmission Systems (DTS) operating under section 15.247. |
| III | A2LA | June 2015 | R105 - Requirement's When Making Reference to A2LA Accreditation Status |
| IV | ANSI C63.10 | 2013 | American National Standard for Testing Unlicensed Wireless Devices |
| V | ANSI C63.4 | 2009 | American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| VI | CISPR 22 | 2008 | Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement |
| VII | ETSI TR 100 028 | 2001-12 | Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics |
| VIII | FCC 47 CFR Part 15.247 | 2014 | Radio Frequency Devices; Subpart C – Intentional Radiators |
| IX | ICES-003 | Issue 5 2012 | Spectrum Management and Telecommunications; Interference-Causing Equipment Standard. Information Technology Equipment (ITE) – Limits and methods of measurement. |
| X | M 3003 | Edition 3 Nov. 2012 | Expression of Uncertainty and Confidence in Measurements |
| XI | RSS-247 Issue 1 | May 2015 | Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices |
| XII | RSS-Gen Issue 4 | November 2014 | General Requirements and Information for the Certification of Radiocommunication Equipment |
| XIII | KDB 644545 D03 v01 | August 14th 2014 | Guidance for IEEE 802.11ac New Rules |
| XIV | FCC 47 CFR Part 2.1033 | 2014 | FCC requirements and rules regarding photographs and test setup diagrams. |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

| Details | Description |
|--------------------------------------|---|
| Purpose: | Test of the Actiontec Electronics Inc WCB6240Q to FCC CFR 47 Part 15 Subpart C 15.247 (DTS) + Industry Canada RSS-247 Issue 1 |
| Applicant: | Actiontec Electronics Inc 760 N Mary Avenue Sunnyvale California 94085 USA |
| Manufacturer: | As Applicant |
| Laboratory performing the tests: | MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA |
| Test report reference number: | ATEC09-U5b Radiated |
| Date EUT received: | 15 th September 2015 |
| Standard(s) applied: | FCC CFR 47 Part 15 Subpart C 15.247 (DTS) Industry Canada RSS-247 Issue 1 |
| Dates of test (from - to): | 22 nd – 30 th September 2015 |
| No of Units Tested: | 2 |
| Type of Equipment: | 802.11a/b/g/n/ac Wireless Router |
| Product Family Name: | 802.11ac Wireless 4-Port Ethernet Bridge with Optional MoCA |
| Model(s): | Tested Device: WCB6240Q + WEB6040Q |
| Location for use: | Indoor |
| Declared Frequency Range(s): | 2400 - 2483.5 MHz |
| Primary function of equipment: | Wireless Access Point and Ethernet Router |
| Secondary function of equipment: | Optional Cable MoCA Bridge |
| Type of Modulation: | Per 802.11 –CCK, BPSK, QPSK, DSSS, OFDM |
| EUT Modes of Operation: | 802.11b/g/HT-20/HT-40; |
| Declared Nominal Output Power (Ave): | +25 dBm |
| Transmit/Receive Operation: | Transceiver - Half Duplex |
| Rated Input Voltage and Current: | AC/ DC adaptor (adaptor sold with unit) 12Vdc, 2A |
| Operating Temperature Range: | Declared Range 0°C to 40°C |
| ITU Emission Designator: | 802.11b 10M1G1D 802.11g 16M6D1D 802.11n – HT-20 17M5D1D 802.11n – HT-40 36M2D1D |
| Equipment Dimensions: | 9 x 1.5 x 5.75 inches |
| Weight: | 1.1 lbs |
| Hardware Rev: | AM3 |
| Software Rev: | 1.1.01.19ya |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

5.2. Scope Of Test Program

Actiontec Electronics Inc WCB6240Q

The scope of the test program was to test the Actiontec Electronics Inc WCB6240Q configurations in the frequency ranges 2400 - 2483.5 MHz; for compliance against the following specification:

FCC CFR 47 Part 15 Subpart C 15.247 (DTS)

Radio Frequency Devices; Subpart C – Intentional Radiators

Industry Canada RSS-247 Issue 1

Digital Transmission Systems (DTSs), Frequency Hopping System (FHSs) and Licence-Exempt Local Area Network (LE-LEN) Devices

Manufacturers Declaration of Similarity

FCC ID: LNQWXB6X40Q

IC ID: 2496A-WXB6X40Q

Actiontec Models: WxB6x40Q

Product Similarities:

Actiontec Models: WCB6240Q and WEB6040Q To whom it may concern: We, Actiontec Electronics, Inc., hereby to declare the mentioned two models have electrically identical Wireless circuitry with the same electromagnetic emissions and electromagnetic compatibility characteristics. Descriptions of the differences between these two models are as follows;

WCB6240Q – 802.11ac Wireless 4-Port Ethernet Bridge with Bonded MoCA

WEB6040Q – 802.11ac Wireless 4-Port Ethernet Bridge without MoCA.

Actiontec Electronics Inc WCB6240Q



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

Actiontec Electronics Inc WCB6240Q



This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

5.3. Equipment Model(s) and Serial Number(s)

| Type (EUT/Support) | Equipment Description (Including Brand Name) | Mfr | Model No. | Serial No. |
|--------------------|---|-----------|------------|-------------------------|
| EUT | Wireless Router | Actiontec | WCB6240Q | GWXA5360700016 |
| EUT | Power Adapter 100 - 240Vac 50/60Hz 0.7A 12 Vdc 2.0 A | Actiontec | WA-24Q12FU | DJ87714D14043198 400 |
| Support | Laptop PC | IBM | Thinkpad | None |

5.4. Antenna Details

| Type | Manufacturer | Model | Family | Gain (dBi) | BF Gain | Dir BW | X-Pol | Frequency Band (MHz) |
|----------|--------------|------------------------|--------|------------|---------|--------|-------|----------------------|
| integral | Galtronics | Custom PCB SMT | Dipole | 3.1 | - | 360 | Y | 2400 - 2483.5 |
| integral | Galtronics | Custom Internal Cabled | Dipole | 3.1 | - | 360 | Y | 2400 - 2483.5 |
| integral | Galtronics | Custom PCB SMT | Dipole | 4.5 | 1.8 | 360 | Y | 5725 - 5850 |
| integral | Galtronics | Custom Internal Cabled | Dipole | 4.5 | 1.8 | 360 | Y | 5725 - 5850 |

BF Gain - Beamforming Gain
 Dir BW - Directional BeamWidth
 X-Pol - Cross Polarization

5.5. Cabling and I/O Ports

| Port Type | Max Cable Length | # Of Ports | Screened | Conn Type | Data Type |
|-----------|------------------|------------|----------|-----------|-------------|
| Ethernet | 100m GbE LAN | 4 | N | RJ45 | Packet Data |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

5.6. Test Configurations

Results for the following configurations are provided in this report:

| Operational Mode(s) (802.11a/b/g/n/ac) | Data Rate with Highest Power MBit/s | Channel Frequency (MHz) | | |
|---|--|------------------------------------|------------|-------------|
| | | Low | Mid | High |
| 2400 - 2483.5 MHz | | | | |
| 802.11b | 1 | 2,412.00 | 2,437.00 | 2,462.00 |
| 802.11g | 6 | 2,412.00 | -- | 2,462.00 |
| 802.11n HT-20 | 6.5 | 2,412.00 | -- | 2,462.00 |

*NOTE: No 802.11n HT-40 band-edge results are included in this report as the WCB6240Q transmits on a single channel frequency at 2437 MHz. Results for HT-40 mid-channel operation are included in the conducted test report, see ATEC09-U5a 'Equipment Modifications'.

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 17 of 56

6. TEST SUMMARY

List of Measurements

| Test Header | Result | Data Link |
|---|-----------|---------------------------|
| 15.247(d) Emissions | - | - |
| (2) Radiated Emissions | - | - |
| (i) 15.205 Restricted Band Emissions | Complies | View Data |
| (ii) 15.205 Restricted Band-Edge Emissions | Complies | View Data |
| (3) 15.209 Digital Emissions (0.03 - 1 GHz) | Complies* | - |

*Results included in the ATEC09-U2 Part 15B Unintentional Radiators

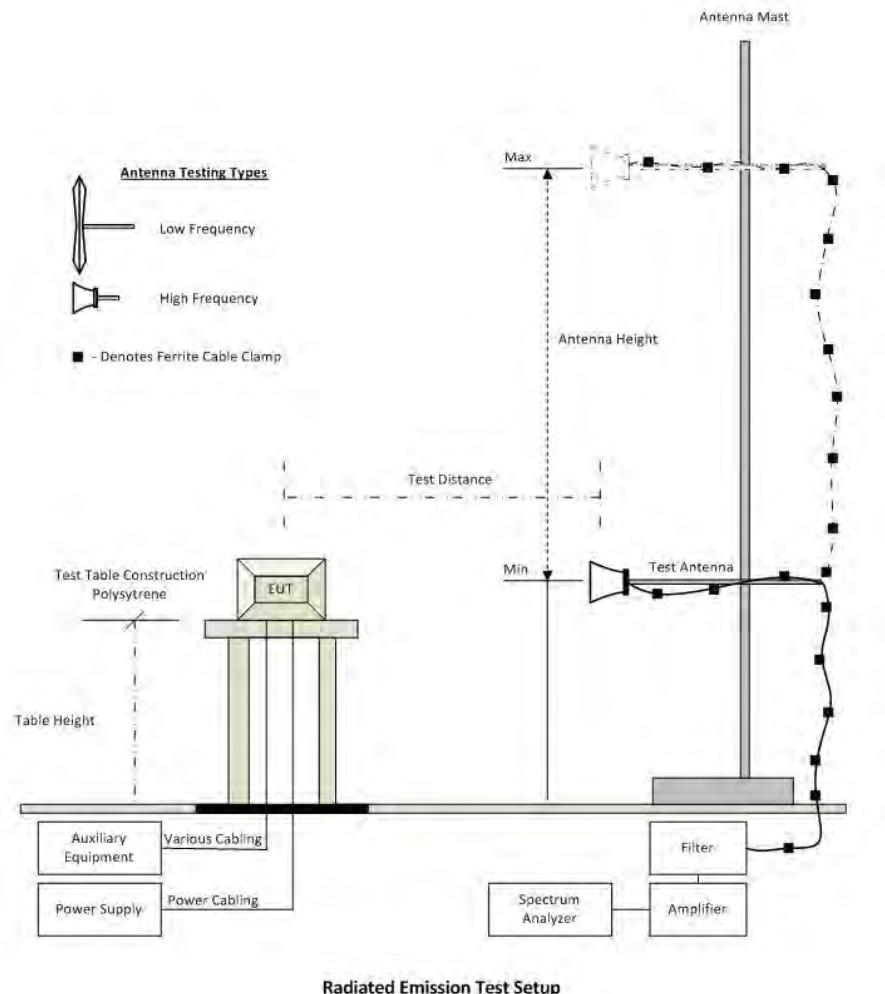
This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

7. TEST EQUIPMENT CONFIGURATION(S)

Radiated Emissions - 3m Chamber

The following tests were performed using the conducted test set-up shown in the diagram below.

1. Spurious Emissions
2. Restricted Band-Edge Emissions
3. Radiated Digital Emissions (0.03 – 1 GHz)



A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 19 of 56

| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|--------|---|----------------------|--|-----------|----------------------|
| 158 | Barometer/Termometer | Control Company | 4196 | E2846 | 04 Dec 2015 |
| 170 | Video System Controller for Semi Anechoic Chamber | Panasonic | WV-CY101 | 04R08507 | Not Required |
| 287 | Rohde & Schwarz 40 GHz Receiver | Rhode & Schwarz | ESIB40 | 100201 | 27 Aug 2016 |
| 396 | 2.4 GHz Notch Filter | Microtronics | BRM50701 | 001 | 18 Aug 2016 |
| 399 | ETS 1-18 GHz Horn Antenna | ETS | 3117 | 00154575 | 10 Nov 2015 |
| 406 | Amplifier for Radiated Emissions | MiCOM Labs | 40dB 1 to 18GHz Amp | 0406 | 28 May 2016 |
| 410 | Desktop Computer | Dell | Inspiron 620 | WS38 | Not Required |
| 411 | Mast/Turntable Controller | Sunol Sciences | SC98V | 060199-1D | Not Required |
| 412 | USB to GPIB Interface | National Instruments | GPIB-USB HS | 11B8DC2 | Not Required |
| 413 | Mast Controller | Sunol Science | TWR95-4 | 030801-3 | Not Required |
| 415 | Turntable Controller | Sunol Sciences | Turntable Controller | None | Not Required |
| 416 | Gigabit ethernet filter | ETS-Lingren | Gigafoil 260366 | None | Not Required |
| 447 | Rad Emissions Test Software | MiCOM | Rad Emissions Test Software Version 1.0.73 | 447 | Not Required |
| 480 | Cable - Bulkhead to Amp | SRC Haverhill | 157-157-3050360 | 480 | 11 Aug 2016 |
| 481 | Cable - Bulkhead to Receiver | SRC Haverhill | 151-151-3050787 | 481 | 11 Aug 2016 |
| 482 | Cable - Amp to Antenna | SRC Haverhill | 157-157-3051574 | 482 | 11 Aug 2016 |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

8. TEST RESULTS

8.1. Emissions

8.1.1. Radiated Emissions

8.1.1.1. Restricted Band Emissions

| Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions (Restricted Bands) | | | |
|---|---|----------------------------|-------------|
| Standard: | FCC CFR 47 Part 15 Subpart C 15.247 (DTS) | Ambient Temp. (°C): | 20.0 - 24.5 |
| Test Heading: | Radiated Spurious and Band-Edge Emissions | Rel. Humidity (%): | 32 - 45 |
| Standard Section(s): | 15.205, 15.209 | Pressure (mBars): | 999 - 1001 |
| Reference Document(s): | See Normative References | | |

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)

Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Radiated Spurious and Band-Edge Measurement were per the Radiated Test Set-up specified in this document.

Limits for Restricted Bands

Peak emission: 74 dBuV/m

Average emission: 54 dBuV/m

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR - FO

where:

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL - AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

Example:

Given receiver input reading of 51.5 dBmV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength (FS) of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dBmV/m}$$

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:

Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

48 dBmV/m = 250 mV/m

Restricted Bands of Operation (15.205)

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| Frequency Band | | | |
|-------------------|---------------------|---------------|-------------|
| MHz | MHz | MHz | GHz |
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | Above 38.6 |
| 13.36-13.41 | | | |

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

- (1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.
- (2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.
- (3) Cable locating equipment operated pursuant to §15.213.
- (4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.
- (5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

- (6) Transmitters operating under the provisions of subparts D or F of this part.
 - (7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.
 - (8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).
 - (9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).
- (e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 23 of 56

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|--------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT20 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2412.00 | Data Rate: | 6.500 MBit/s |
| Power Setting: | 23 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| #1 | 3856.60 | 53.33 | 3.23 | -10.81 | 45.75 | Peak (Scan) | Vertical | 100 | 110 | -- | -- | |
| #2 | 3856.60 | 53.33 | 3.23 | -10.81 | 45.75 | Peak (NRB) | Vertical | 100 | 110 | -- | -- | Pass |
| #3 | 3856.60 | 57.17 | 3.23 | -10.81 | 49.59 | Max Avg | Vertical | 188 | 35 | 54.0 | -4.4 | Pass |
| #4 | 3856.60 | 60.06 | 3.23 | -10.81 | 52.48 | Max Peak | Vertical | 188 | 35 | 74.0 | -21.5 | Pass |
| #5 | 3856.60 | 56.09 | 3.23 | -10.81 | 48.51 | Max Avg | Horizontal | 100 | 33 | 54.0 | -5.5 | Pass |
| #6 | 3856.60 | 59.24 | 3.23 | -10.81 | 51.66 | Max Peak | Horizontal | 100 | 33 | 74.0 | -22.3 | Pass |
| #7 | 7713.66 | 53.04 | 4.41 | -6.85 | 50.60 | Max Avg | Horizontal | 100 | 43 | 54.0 | -3.4 | Pass |
| #8 | 7713.66 | 56.66 | 4.41 | -6.85 | 54.22 | Max Peak | Horizontal | 100 | 43 | 74.0 | -19.8 | Pass |
| #9 | 7713.66 | 28.12 | 4.41 | -6.85 | 25.68 | Max Avg | Vertical | 196 | 277 | 54.0 | -28.3 | Pass |
| #10 | 7713.66 | 39.71 | 4.41 | -6.85 | 37.27 | Max Peak | Vertical | 196 | 277 | 74.0 | -36.7 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 24 of 56

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|--------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT20 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2437.00 | Data Rate: | 6.50 MBit/s |
| Power Setting: | 23 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| #1 | 2270.38 | 36.83 | 2.66 | -12.14 | 27.35 | Max Avg | Vertical | 100 | 78 | 54.0 | -26.7 | Pass |
| #2 | 2270.38 | 48.37 | 2.66 | -12.14 | 38.89 | Max Peak | Vertical | 100 | 78 | 74.0 | -35.1 | Pass |
| #3 | 3856.67 | 48.69 | 3.23 | -10.81 | 41.11 | Peak (Scan) | Vertical | 198 | 185 | -- | -- | |
| #4 | 3856.67 | 48.69 | 3.23 | -10.81 | 41.11 | Peak (NRB) | Vertical | 198 | 185 | -- | -- | Pass |
| #5 | 3856.67 | 56.82 | 3.23 | -10.81 | 49.24 | Max Avg | Vertical | 188 | 33 | 54.0 | -4.8 | Pass |
| #6 | 3856.67 | 59.52 | 3.23 | -10.81 | 51.94 | Max Peak | Vertical | 188 | 33 | 74.0 | -22.1 | Pass |
| #7 | 7334.83 | 36.24 | 4.28 | -7.24 | 33.28 | Max Avg | Vertical | 144 | 168 | 54.0 | -20.7 | Pass |
| #8 | 7334.83 | 47.64 | 4.28 | -7.24 | 44.68 | Max Peak | Vertical | 144 | 168 | 74.0 | -29.3 | Pass |
| #9 | 7334.83 | 45.75 | 4.28 | -7.24 | 42.79 | Peak (Scan) | Vertical | 100 | 215 | -- | -- | |
| #10 | 7334.83 | 45.75 | 4.28 | -7.24 | 42.79 | Peak (NRB) | Vertical | 100 | 215 | -- | -- | Pass |
| #11 | 7713.54 | 60.17 | 4.41 | -6.85 | 57.73 | Max Avg | Vertical | 196 | 74 | 54.0 | -3.7 | Pass |
| #12 | 7713.54 | 61.87 | 4.41 | -6.85 | 59.43 | Max Peak | Vertical | 196 | 74 | 74.0 | -14.6 | Pass |
| #13 | 7713.54 | 54.80 | 4.41 | -6.85 | 52.36 | Max Avg | Horizontal | 100 | 43 | 54.0 | -1.6 | Pass |
| #14 | 7713.54 | 57.69 | 4.41 | -6.85 | 55.25 | Max Peak | Horizontal | 100 | 43 | 74.0 | -18.8 | Pass |
| #15 | 7713.54 | 44.94 | 4.41 | -6.85 | 42.50 | Peak (Scan) | Vertical | 198 | 237 | -- | -- | |
| #16 | 7713.54 | 44.94 | 4.41 | -6.85 | 42.50 | Peak (NRB) | Vertical | 198 | 237 | -- | -- | Pass |
| #17 | 9779.56 | 44.63 | 5.25 | -6.18 | 43.70 | Peak (Scan) | Vertical | 200 | 185 | -- | -- | |
| #18 | 9779.56 | 35.22 | 5.25 | -6.18 | 34.29 | Max Avg | Vertical | 116 | 135 | 54.0 | -19.7 | Pass |
| #19 | 9779.56 | 47.71 | 5.25 | -6.18 | 46.78 | Max Peak | Vertical | 116 | 135 | 74.0 | -27.2 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 25 of 56

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|---------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT20 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2462.00 | Data Rate: | 6.5.00 MBit/s |
| Power Setting: | 23 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| #1 | 2184.37 | 47.68 | 2.64 | -12.56 | 37.76 | Peak (Scan) | Vertical | 159 | 166 | -- | -- | |
| #2 | 2184.37 | 37.70 | 2.64 | -12.56 | 27.78 | Max Avg | Vertical | 138 | 151 | 54.0 | -26.2 | Pass |
| #3 | 2184.37 | 49.39 | 2.64 | -12.56 | 39.47 | Max Peak | Vertical | 138 | 151 | 74.0 | -34.5 | Pass |
| #4 | 7440.32 | 45.65 | 4.30 | -7.13 | 42.82 | Peak (Scan) | Vertical | 151 | 349 | -- | -- | |
| #5 | 7440.32 | 35.99 | 4.30 | -7.13 | 33.16 | Max Avg | Vertical | 103 | 103 | 54.0 | -20.8 | Pass |
| #6 | 7440.32 | 47.89 | 4.30 | -7.13 | 45.06 | Max Peak | Vertical | 103 | 103 | 74.0 | -28.9 | Pass |
| #7 | 7713.22 | 62.37 | 4.41 | -6.85 | 59.93 | Max Avg | Vertical | 195 | 76 | 54.0 | -5.9 | Pass |
| #8 | 7713.22 | 63.65 | 4.41 | -6.85 | 61.21 | Max Peak | Vertical | 195 | 76 | 74.0 | -12.8 | Pass |
| #9 | 7713.22 | 45.70 | 4.41 | -6.85 | 43.26 | Peak (Scan) | Vertical | 200 | 349 | -- | -- | |
| #10 | 7713.22 | 45.70 | 4.41 | -6.85 | 43.26 | Peak (NRB) | Vertical | 200 | 349 | -- | -- | Pass |
| #11 | 9743.89 | 35.37 | 5.35 | -6.24 | 34.48 | Max Avg | Horizontal | 154 | 178 | 54.0 | -19.5 | Pass |
| #12 | 9743.89 | 47.36 | 5.35 | -6.24 | 46.47 | Max Peak | Horizontal | 154 | 178 | 74.0 | -27.5 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

8.1.1.2. Restricted Band-Edge Emissions

Complied Summary of Radiated Band-Edge Results

NOTE:

Legacy modes 802.11b/g could only operate on a single chain at any given time therefore each chain was tested separately, 802.11n operates on both channels simultaneously

| Galtronics Custom PCB SMT | | Band-Edge Freq | Peak (Limit 74.0dB μ V/m) | Average (Limit 54.0dB μ V/m) | Power Setting |
|---------------------------|---------------------------|----------------|----------------------------------|-------------------------------------|---------------|
| Operational Mode | Operating Frequency (MHz) | MHz | dB μ V/m | dB μ V/m | |
| 802.11b | 2412.00 | 2390.00 | 63.69 | 51.41 | 25.00 |
| 802.11g | 2412.00 | 2390.00 | 70.50 | 52.41 | 23.00 |
| 802.11n HT-20 | 2412.00 | 2390.00 | 61.70 | 49.08 | 25.00 |
| 802.11n HT-40 | 2422.00 | 2390.00 | 68.68 | 53.77 | 25.00 |
| 802.11b | 2462.00 | 2483.50 | 61.44 | 50.98 | 25.00 |
| 802.11g | 2462.00 | 2483.50 | 43.68 | 33.83 | 25.00 |
| 802.11n HT-20 | 2462.00 | 2483.50 | 73.48 | 53.67 | 25.00 |
| 802.11n HT-40 | 2452.00 | 2483.50 | 72.82 | 50.92 | 25.00 |

2nd Antenna Chain (Legacy b/g only)

| Galtronics Custom PCB SMT | | Band-Edge Freq | Peak (Limit 74.0dB μ V/m) | Average (Limit 54.0dB μ V/m) | Power Setting |
|---------------------------|---------------------------|----------------|----------------------------------|-------------------------------------|---------------|
| Operational Mode | Operating Frequency (MHz) | MHz | dB μ V/m | dB μ V/m | |
| 802.11b | 2412.00 | 2390.00 | 63.98 | 51.53 | 25.00 |
| 802.11g | 2412.00 | 2390.00 | 66.95 | 48.57 | 25.00 |
| 802.11b | 2462.00 | 2483.50 | 56.41 | 45.11 | 25.00 |
| 802.11g | 2462.00 | 2483.50 | 56.32 | 45.12 | 25.00 |



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 27 of 56

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11b |
| Antenna Gain (dBi): | 3.10 | Modulation: | CCK |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2412.00 | Data Rate: | 1.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| #1 | 2364.57 | 73.12 | 2.70 | -12.13 | 63.69 | Max Peak | Vertical | 151 | 158 | 74.0 | -10.3 | Pass |
| #2 | 2375.39 | 60.76 | 2.70 | -12.05 | 51.41 | Max Avg | Vertical | 151 | 158 | 54.0 | -2.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 28 of 56

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11g |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2412.00 | Data Rate: | 6.00 MBit/s |
| Power Setting: | 23 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| #1 | 2389.64 | 79.73 | 2.69 | -11.92 | 70.50 | Max Peak | Vertical | 151 | 158 | 74.0 | -3.5 | Pass |
| #2 | 2390.00 | 61.64 | 2.69 | -11.92 | 52.41 | Max Avg | Vertical | 151 | 158 | 54.0 | -1.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 29 of 56

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|---------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT-20 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2412.00 | Data Rate: | 6.50 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| #1 | 2375.39 | 58.43 | 2.70 | -12.05 | 49.08 | Max Avg | Vertical | 151 | 158 | 54.0 | -4.9 | Pass |
| #2 | 2375.93 | 71.04 | 2.70 | -12.04 | 61.70 | Max Peak | Vertical | 151 | 158 | 74.0 | -12.3 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 30 of 56

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|---------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT-40 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2422.00 | Data Rate: | 6.50 MBit/s |
| Power Setting: | 25 | Tested By: | JH |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| #1 | 2375.39 | 53.77 | 2.70 | -12.05 | 44.42 | Max Avg | Vertical | 151 | 158 | 54.0 | -9.58 | Pass |
| #2 | 2375.93 | 71.04 | 2.70 | -12.04 | 59.34 | Max Peak | Vertical | 151 | 158 | 74.0 | -14.66 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 31 of 56

| | | | |
|--|---------------------------|------------------------|-------------|
| Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions | | | |
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11b |
| Antenna Gain (dBi): | 3.10 | Modulation: | CCK |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2462.00 | Data Rate: | 1.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

| **Antenna:** | Galtronics Custom PCB SMT | **Variant:** | 802.11b |
| **Antenna Gain (dBi):** | 3.10 | **Modulation:** | CCK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 98 |
| **Channel Frequency (MHz):** | 2462.00 | **Data Rate:** | 1.00 MBit/s |
| **Power Setting:** | 25 | **Tested By:** | SB |

| Test Measurement Results | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------|----------------|----------------|------------|--------------------|--------------------|------------------|--------|---------|--------------------|--------------------|------------|------------|----|---------|-------|------|--------|-------|---------|------------|-----|-----|------|------|------|----|---------|-------|------|--------|-------|----------|------------|-----|-----|------|-------|------|
| <table border="1"><thead><tr><th>Num</th><th>Frequency MHz</th><th>Raw dBμV</th><th>Cable Loss</th><th>AF dB</th><th>Level dBμV/m</th><th>Measurement Type</th><th>Pol</th><th>Hgt cm</th><th>Azt Deg</th><th>Limit dBμV/m</th><th>Margin dB</th><th>Pass /Fail</th></tr></thead><tbody><tr><td>#1</td><td>2483.50</td><td>59.89</td><td>2.73</td><td>-11.64</td><td>50.98</td><td>Max Avg</td><td>Horizontal</td><td>141</td><td>195</td><td>54.0</td><td>-3.0</td><td>Pass</td></tr><tr><td>#2</td><td>2486.30</td><td>70.35</td><td>2.73</td><td>-11.64</td><td>61.44</td><td>Max Peak</td><td>Horizontal</td><td>141</td><td>195</td><td>74.0</td><td>-12.6</td><td>Pass</td></tr></tbody></table> | Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail | #1 | 2483.50 | 59.89 | 2.73 | -11.64 | 50.98 | Max Avg | Horizontal | 141 | 195 | 54.0 | -3.0 | Pass | #2 | 2486.30 | 70.35 | 2.73 | -11.64 | 61.44 | Max Peak | Horizontal | 141 | 195 | 74.0 | -12.6 | Pass |
| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #1 | 2483.50 | 59.89 | 2.73 | -11.64 | 50.98 | Max Avg | Horizontal | 141 | 195 | 54.0 | -3.0 | Pass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #2 | 2486.30 | 70.35 | 2.73 | -11.64 | 61.44 | Max Peak | Horizontal | 141 | 195 | 74.0 | -12.6 | Pass | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Test Notes: ethernet cable connected to laptop (outside)



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 32 of 56

Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11g |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2462.00 | Data Rate: | 6.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| #1 | 2500.03 | 52.56 | 2.73 | -11.61 | 43.68 | Max Peak | Horizontal | 141 | 195 | 74.0 | -30.3 | Pass |
| #2 | 2500.16 | 42.71 | 2.73 | -11.61 | 33.83 | Max Avg | Horizontal | 141 | 195 | 54.0 | -20.2 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 33 of 56

Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|---------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT-20 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2462.00 | Data Rate: | 6.50 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| #1 | 2483.50 | 62.58 | 2.73 | -11.64 | 53.67 | Max Avg | Horizontal | 141 | 195 | 54.0 | -0.3 | Pass |
| #2 | 2484.83 | 82.39 | 2.73 | -11.64 | 73.48 | Max Peak | Horizontal | 141 | 195 | 74.0 | -0.5 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 34 of 56

| | | | |
|--|---------------------------|------------------------|---------------|
| Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions | | | |
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11n HT-40 |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2452.00 | Data Rate: | 6.50 MBit/s |
| Power Setting: | 25 | Tested By: | JH |

| **Antenna:** | Galtronics Custom PCB SMT | **Variant:** | 802.11n HT-40 |
| **Antenna Gain (dBi):** | 3.10 | **Modulation:** | OFDM |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 98 |
| **Channel Frequency (MHz):** | 2452.00 | **Data Rate:** | 6.50 MBit/s |
| **Power Setting:** | 25 | **Tested By:** | JH |

| Test Measurement Results | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------|----------------|----------------|------------|--------------------|--------------------|------------------|--------|---------|--------------------|--------------------|------------|------------|----|---------|-------|------|--------|-------|---------|------------|-----|-----|------|--------|------|----|---------|-------|------|--------|-------|----------|------------|-----|-----|------|--------|------|
| <table border="1"><thead><tr><th>Num</th><th>Frequency MHz</th><th>Raw dBμV</th><th>Cable Loss</th><th>AF dB</th><th>Level dBμV/m</th><th>Measurement Type</th><th>Pol</th><th>Hgt cm</th><th>Azt Deg</th><th>Limit dBμV/m</th><th>Margin dB</th><th>Pass /Fail</th></tr></thead><tbody><tr><td>#1</td><td>2483.50</td><td>50.92</td><td>2.73</td><td>-11.64</td><td>44.01</td><td>Max Avg</td><td>Horizontal</td><td>141</td><td>195</td><td>54.0</td><td>-11.99</td><td>Pass</td></tr><tr><td>#2</td><td>2484.83</td><td>72.82</td><td>2.73</td><td>-11.64</td><td>63.91</td><td>Max Peak</td><td>Horizontal</td><td>141</td><td>195</td><td>74.0</td><td>-10.09</td><td>Pass</td></tr></tbody></table> | Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail | #1 | 2483.50 | 50.92 | 2.73 | -11.64 | 44.01 | Max Avg | Horizontal | 141 | 195 | 54.0 | -11.99 | Pass | #2 | 2484.83 | 72.82 | 2.73 | -11.64 | 63.91 | Max Peak | Horizontal | 141 | 195 | 74.0 | -10.09 | Pass |
| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #1 | 2483.50 | 50.92 | 2.73 | -11.64 | 44.01 | Max Avg | Horizontal | 141 | 195 | 54.0 | -11.99 | Pass | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| #2 | 2484.83 | 72.82 | 2.73 | -11.64 | 63.91 | Max Peak | Horizontal | 141 | 195 | 74.0 | -10.09 | Pass | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 35 of 56

2nd Antenna Chain

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11b |
| Antenna Gain (dBi): | 3.10 | Modulation: | CCK |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2412.00 | Data Rate: | 1.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| #1 | 2382.42 | 73.28 | 2.69 | -11.99 | 63.98 | Max Peak | Vertical | 141 | 157 | 74.0 | -10.0 | Pass |
| #2 | 2384.59 | 60.81 | 2.68 | -11.96 | 51.53 | Max Avg | Vertical | 141 | 157 | 54.0 | -2.5 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 36 of 56

2nd Antenna Chain

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11g |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2412.00 | Data Rate: | 6.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| #1 | 2390.00 | 57.80 | 2.69 | -11.92 | 48.57 | Max Avg | Vertical | 141 | 157 | 54.0 | -5.4 | Pass |
| #2 | 2390.00 | 76.18 | 2.69 | -11.92 | 66.95 | Max Peak | Vertical | 141 | 157 | 74.0 | -7.1 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 37 of 56

2nd Antenna Chain

Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11b |
| Antenna Gain (dBi): | 3.10 | Modulation: | CCK |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2462.00 | Data Rate: | 1.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| #1 | 2483.50 | 54.02 | 2.73 | -11.64 | 45.11 | Max Avg | Horizontal | 141 | 195 | 54.0 | -8.9 | Pass |
| #2 | 2488.03 | 65.31 | 2.73 | -11.63 | 56.41 | Max Peak | Horizontal | 141 | 195 | 74.0 | -17.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 38 of 56

2nd Antenna Chain

Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions

| | | | |
|---------------------------------|---------------------------|------------------------|-------------|
| Antenna: | Galtronics Custom PCB SMT | Variant: | 802.11g |
| Antenna Gain (dBi): | 3.10 | Modulation: | OFDM |
| Beam Forming Gain (Y): | Not Applicable | Duty Cycle (%): | 98 |
| Channel Frequency (MHz): | 2462.00 | Data Rate: | 6.00 MBit/s |
| Power Setting: | 25 | Tested By: | SB |

Test Measurement Results

| Num | Frequency MHz | Raw dB _P V | Cable Loss | AF dB | Level dB _P V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB _P V/m | Margin dB | Pass /Fail |
|-----|---------------|-----------------------|------------|--------|---------------------------|------------------|------------|--------|---------|---------------------------|-----------|------------|
| #1 | 2483.50 | 54.03 | 2.73 | -11.64 | 45.12 | Max Avg | Horizontal | 141 | 195 | 54.0 | -8.9 | Pass |
| #2 | 2500.29 | 65.20 | 2.73 | -11.61 | 56.32 | Max Peak | Horizontal | 141 | 195 | 74.0 | -17.7 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 39 of 56

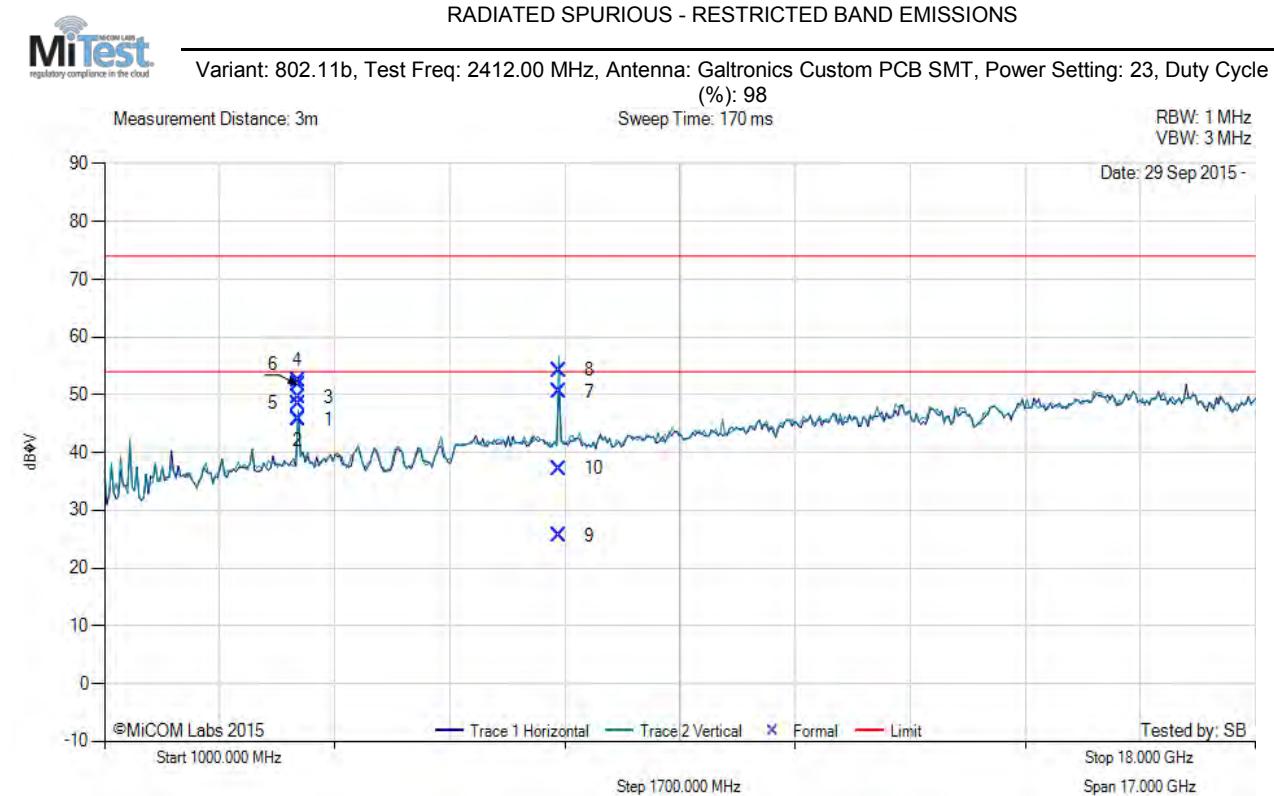
A. APPENDIX - GRAPHICAL IMAGES

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.1. Emissions

A.1.1. Radiated Emissions

A.1.1.1. Restricted Band Emissions



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 3856.60 | 53.33 | 3.23 | -10.81 | 45.75 | Peak (Scan) | Vertical | 100 | 110 | -- | -- | |
| 2 | 3856.60 | 53.33 | 3.23 | -10.81 | 45.75 | Peak (NRB) | Vertical | 100 | 110 | -- | -- | Pass |
| 3 | 3856.60 | 57.17 | 3.23 | -10.81 | 49.59 | Max Avg | Vertical | 188 | 35 | 54.0 | -4.4 | Pass |
| 4 | 3856.60 | 60.06 | 3.23 | -10.81 | 52.48 | Max Peak | Vertical | 188 | 35 | 74.0 | -21.5 | Pass |
| 5 | 3856.60 | 56.09 | 3.23 | -10.81 | 48.51 | Max Avg | Horizontal | 100 | 33 | 54.0 | -5.5 | Pass |
| 6 | 3856.60 | 59.24 | 3.23 | -10.81 | 51.66 | Max Peak | Horizontal | 100 | 33 | 74.0 | -22.3 | Pass |
| 7 | 7713.66 | 53.04 | 4.41 | -6.85 | 50.60 | Max Avg | Horizontal | 100 | 43 | 54.0 | -3.4 | Pass |
| 8 | 7713.66 | 56.66 | 4.41 | -6.85 | 54.22 | Max Peak | Horizontal | 100 | 43 | 74.0 | -19.8 | Pass |
| 9 | 7713.66 | 28.12 | 4.41 | -6.85 | 25.68 | Max Avg | Vertical | 196 | 277 | 54.0 | -28.3 | Pass |
| 10 | 7713.66 | 39.71 | 4.41 | -6.85 | 37.27 | Max Peak | Vertical | 196 | 277 | 74.0 | -36.7 | Pass |

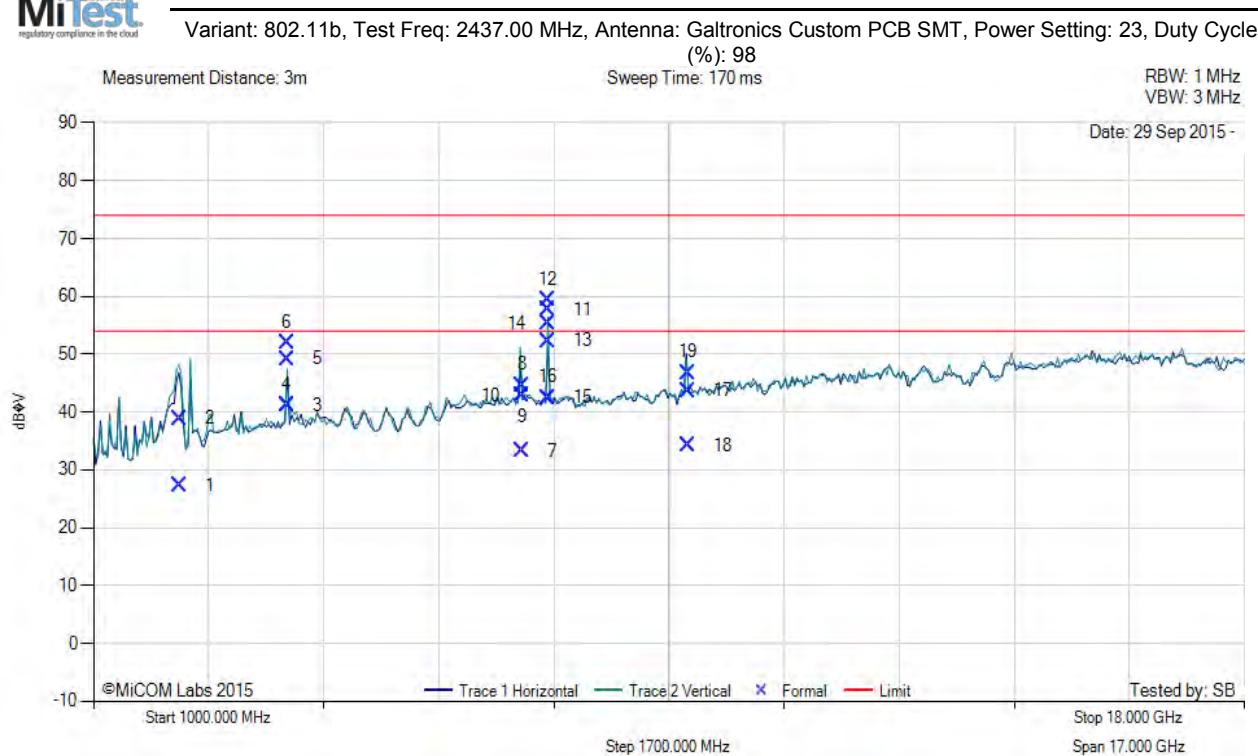
Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2270.38 | 36.83 | 2.66 | -12.14 | 27.35 | Max Avg | Vertical | 100 | 78 | 54.0 | -26.7 | Pass |
| 2 | 2270.38 | 48.37 | 2.66 | -12.14 | 38.89 | Max Peak | Vertical | 100 | 78 | 74.0 | -35.1 | Pass |
| 3 | 3856.67 | 48.69 | 3.23 | -10.81 | 41.11 | Peak (Scan) | Vertical | 198 | 185 | -- | -- | |
| 4 | 3856.67 | 48.69 | 3.23 | -10.81 | 41.11 | Peak (NRB) | Vertical | 198 | 185 | -- | -- | Pass |
| 5 | 3856.67 | 56.82 | 3.23 | -10.81 | 49.24 | Max Avg | Vertical | 188 | 33 | 54.0 | -4.8 | Pass |
| 6 | 3856.67 | 59.52 | 3.23 | -10.81 | 51.94 | Max Peak | Vertical | 188 | 33 | 74.0 | -22.1 | Pass |
| 7 | 7334.83 | 36.24 | 4.28 | -7.24 | 33.28 | Max Avg | Vertical | 144 | 168 | 54.0 | -20.7 | Pass |
| 8 | 7334.83 | 47.64 | 4.28 | -7.24 | 44.68 | Max Peak | Vertical | 144 | 168 | 74.0 | -29.3 | Pass |
| 9 | 7334.83 | 45.75 | 4.28 | -7.24 | 42.79 | Peak (Scan) | Vertical | 100 | 215 | -- | -- | |
| 10 | 7334.83 | 45.75 | 4.28 | -7.24 | 42.79 | Peak (NRB) | Vertical | 100 | 215 | -- | -- | Pass |
| 11 | 7713.54 | 60.17 | 4.41 | -6.85 | 57.73 | Max Avg | Vertical | 196 | 74 | 54.0 | -3.7 | Pass |
| 12 | 7713.54 | 61.87 | 4.41 | -6.85 | 59.43 | Max Peak | Vertical | 196 | 74 | 74.0 | -14.6 | Pass |
| 13 | 7713.54 | 54.80 | 4.41 | -6.85 | 52.36 | Max Avg | Horizontal | 100 | 43 | 54.0 | -1.6 | Pass |
| 14 | 7713.54 | 57.69 | 4.41 | -6.85 | 55.25 | Max Peak | Horizontal | 100 | 43 | 74.0 | -18.8 | Pass |
| 15 | 7713.54 | 44.94 | 4.41 | -6.85 | 42.50 | Peak (Scan) | Vertical | 198 | 237 | -- | -- | |
| 16 | 7713.54 | 44.94 | 4.41 | -6.85 | 42.50 | Peak (NRB) | Vertical | 198 | 237 | -- | -- | Pass |
| 17 | 9779.56 | 44.63 | 5.25 | -6.18 | 43.70 | Peak (Scan) | Vertical | 200 | 185 | -- | -- | |

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



Title: Actiontec Electronics Inc WCB6240Q
To: FCC Part 15.247 (DTS) + IC RSS-247 Issue 1
Serial #: ATEC09-U5b Radiated Rev B
Issue Date: 24th November 2015
Page: 42 of 56

| | | | | | | | | | | | | |
|----|---------|-------|------|-------|-------|----------|----------|-----|-----|------|-------|------|
| 18 | 9779.56 | 35.22 | 5.25 | -6.18 | 34.29 | Max Avg | Vertical | 116 | 135 | 54.0 | -19.7 | Pass |
| 19 | 9779.56 | 47.71 | 5.25 | -6.18 | 46.78 | Max Peak | Vertical | 116 | 135 | 74.0 | -27.2 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS



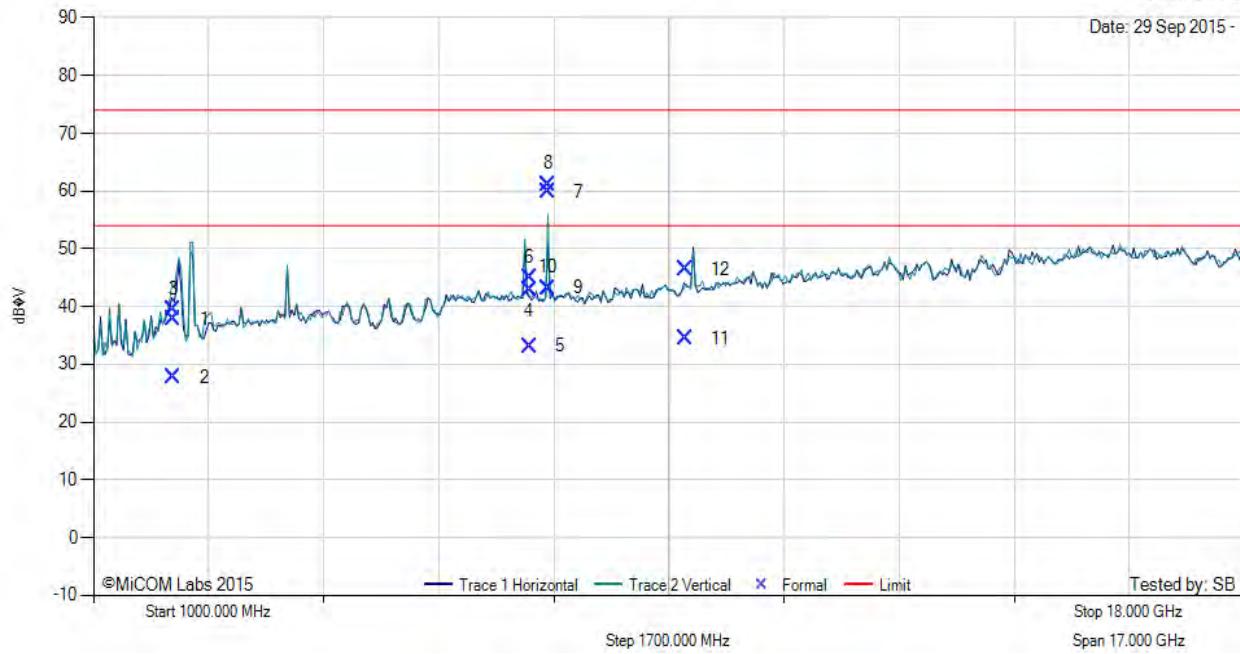
Variant: 802.11b, Test Freq: 2462.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 23, Duty Cycle (%) 98

Measurement Distance: 3m

Sweep Time: 170 ms

RBW: 1 MHz
VBW: 3 MHz

Date: 29 Sep 2015 -



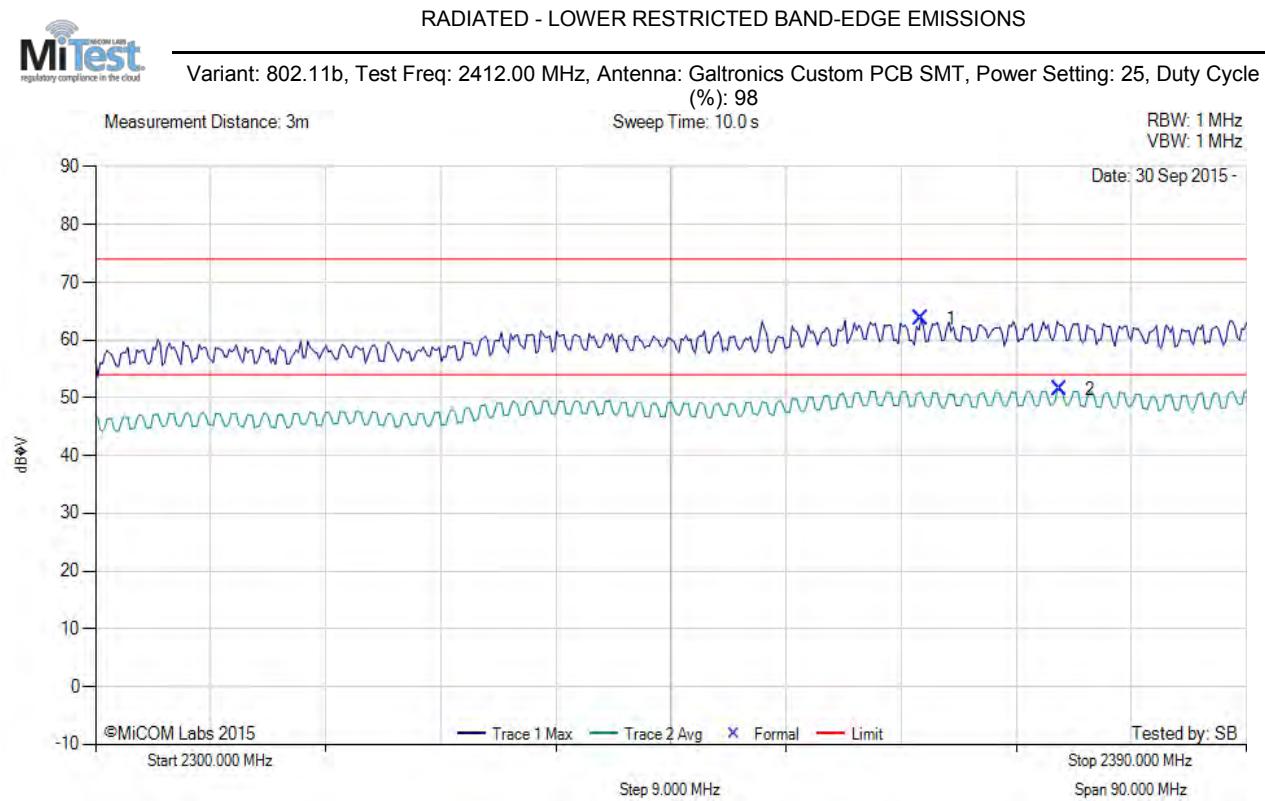
| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2184.37 | 47.68 | 2.64 | -12.56 | 37.76 | Peak (Scan) | Vertical | 159 | 166 | -- | -- | |
| 2 | 2184.37 | 37.70 | 2.64 | -12.56 | 27.78 | Max Avg | Vertical | 138 | 151 | 54.0 | -26.2 | Pass |
| 3 | 2184.37 | 49.39 | 2.64 | -12.56 | 39.47 | Max Peak | Vertical | 138 | 151 | 74.0 | -34.5 | Pass |
| 4 | 7440.32 | 45.65 | 4.30 | -7.13 | 42.82 | Peak (Scan) | Vertical | 151 | 349 | -- | -- | |
| 5 | 7440.32 | 35.99 | 4.30 | -7.13 | 33.16 | Max Avg | Vertical | 103 | 103 | 54.0 | -20.8 | Pass |
| 6 | 7440.32 | 47.89 | 4.30 | -7.13 | 45.06 | Max Peak | Vertical | 103 | 103 | 74.0 | -28.9 | Pass |
| 7 | 7713.22 | 62.37 | 4.41 | -6.85 | 59.93 | Max Avg | Vertical | 195 | 76 | 54.0 | -5.9 | Pass |
| 8 | 7713.22 | 63.65 | 4.41 | -6.85 | 61.21 | Max Peak | Vertical | 195 | 76 | 74.0 | -12.8 | Pass |
| 9 | 7713.22 | 45.70 | 4.41 | -6.85 | 43.26 | Peak (Scan) | Vertical | 200 | 349 | -- | -- | |
| 10 | 7713.22 | 45.70 | 4.41 | -6.85 | 43.26 | Peak (NRB) | Vertical | 200 | 349 | -- | -- | Pass |
| 11 | 9743.89 | 35.37 | 5.35 | -6.24 | 34.48 | Max Avg | Horizontal | 154 | 178 | 54.0 | -19.5 | Pass |
| 12 | 9743.89 | 47.36 | 5.35 | -6.24 | 46.47 | Max Peak | Horizontal | 154 | 178 | 74.0 | -27.5 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

A.1.1.2. Restricted Band-Edge Emissions



| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|-----|---------------|----------|------------|--------|--------------|------------------|----------|--------|---------|--------------|-----------|------------|
| 1 | 2364.57 | 73.12 | 2.70 | -12.13 | 63.69 | Max Peak | Vertical | 151 | 158 | 74.0 | -10.3 | Pass |
| 2 | 2375.39 | 60.76 | 2.70 | -12.05 | 51.41 | Max Avg | Vertical | 151 | 158 | 54.0 | -2.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - LOWER RESTRICTED BAND-EDGE EMISSIONS



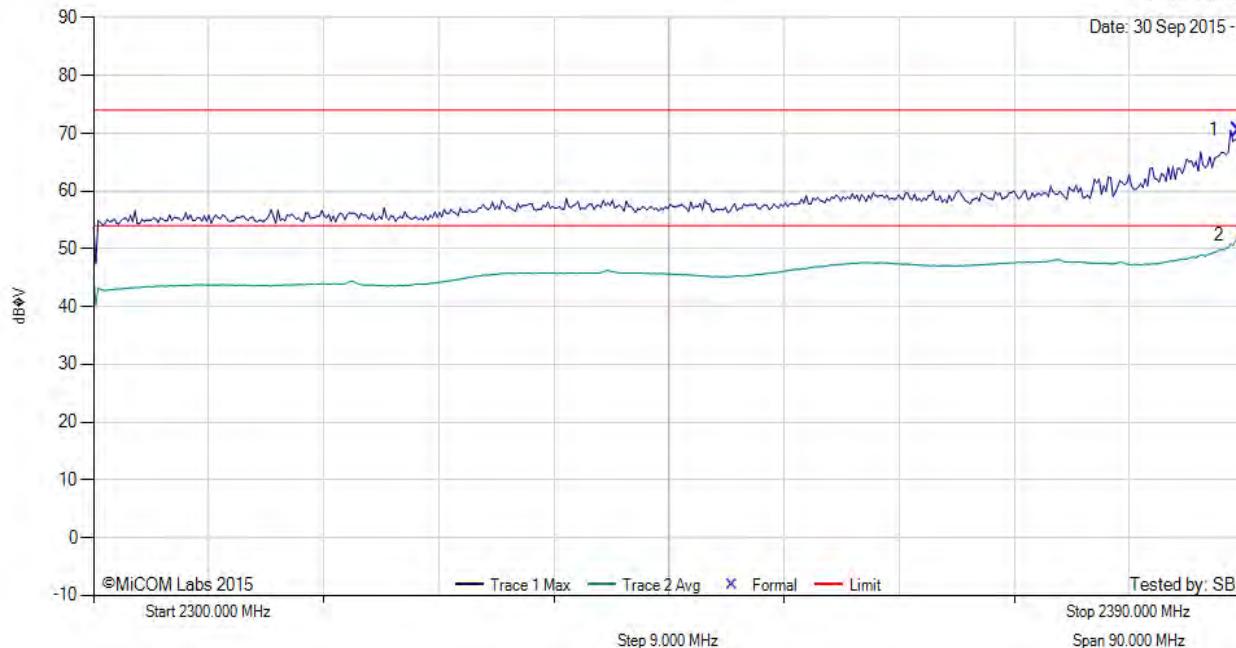
Variant: 802.11g, Test Freq: 2412.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 23, Duty Cycle (%) 98

Measurement Distance: 3m

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz

Date: 30 Sep 2015 -



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| 1 | 2389.64 | 79.73 | 2.69 | -11.92 | 70.50 | Max Peak | Vertical | 151 | 158 | 74.0 | -3.5 | Pass |
| 2 | 2390.00 | 61.64 | 2.69 | -11.92 | 52.41 | Max Avg | Vertical | 151 | 158 | 54.0 | -1.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - LOWER RESTRICTED BAND-EDGE EMISSIONS

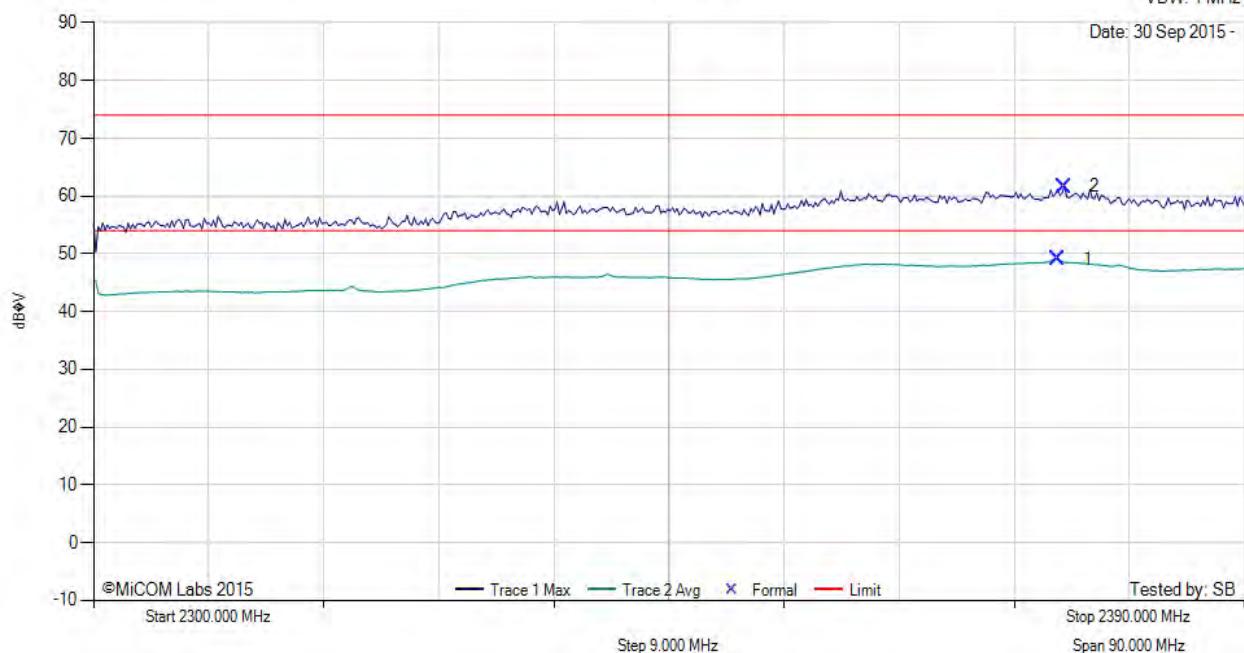


Variant: 802.11n HT-20, Test Freq: 2412.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98

Measurement Distance: 3m

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz



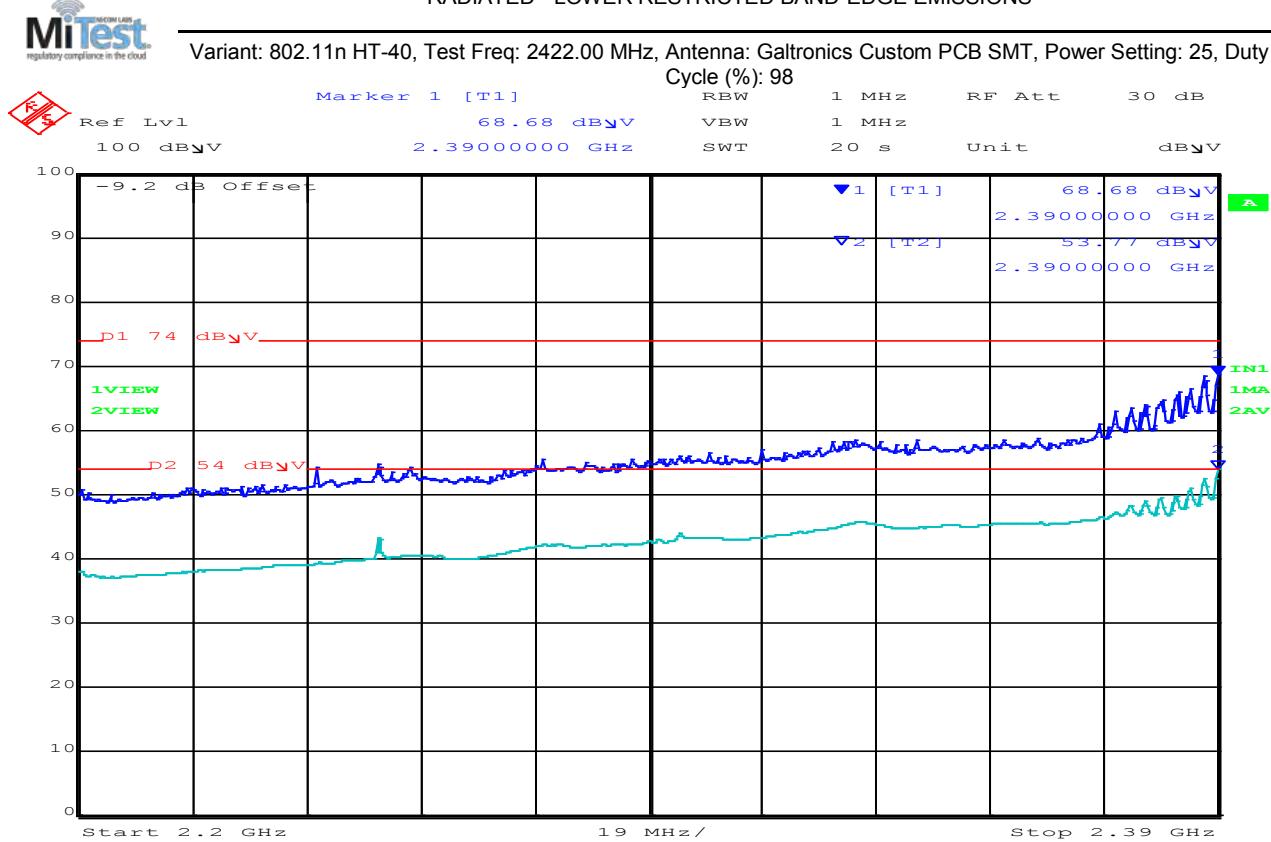
| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| 1 | 2375.39 | 58.43 | 2.70 | -12.05 | 49.08 | Max Avg | Vertical | 151 | 158 | 54.0 | -4.9 | Pass |
| 2 | 2375.93 | 71.04 | 2.70 | -12.04 | 61.70 | Max Peak | Vertical | 151 | 158 | 74.0 | -12.3 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - LOWER RESTRICTED BAND-EDGE EMISSIONS



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| 1 | 2390.0 | 53.77 | 2.70 | -12.05 | 44.42 | Max Avg | Vertical | 151 | 158 | 54.0 | -9.58 | Pass |
| 2 | 2390.0 | 68.68 | 2.70 | -12.04 | 59.34 | Max Peak | Vertical | 151 | 158 | 74.0 | -14.66 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MICOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS

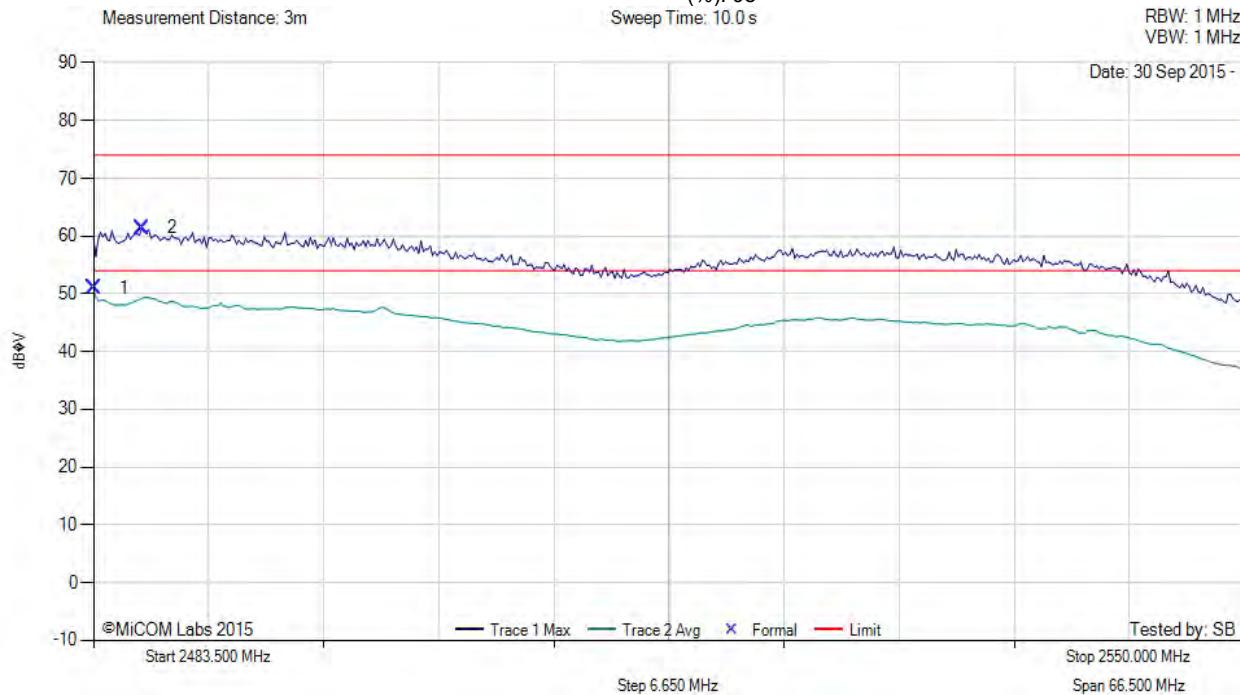


Variant: 802.11b, Test Freq: 2462.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle

(%): 98

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2483.50 | 59.89 | 2.73 | -11.64 | 50.98 | Max Avg | Horizontal | 141 | 195 | 54.0 | -3.0 | Pass |
| 2 | 2486.30 | 70.35 | 2.73 | -11.64 | 61.44 | Max Peak | Horizontal | 141 | 195 | 74.0 | -12.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS



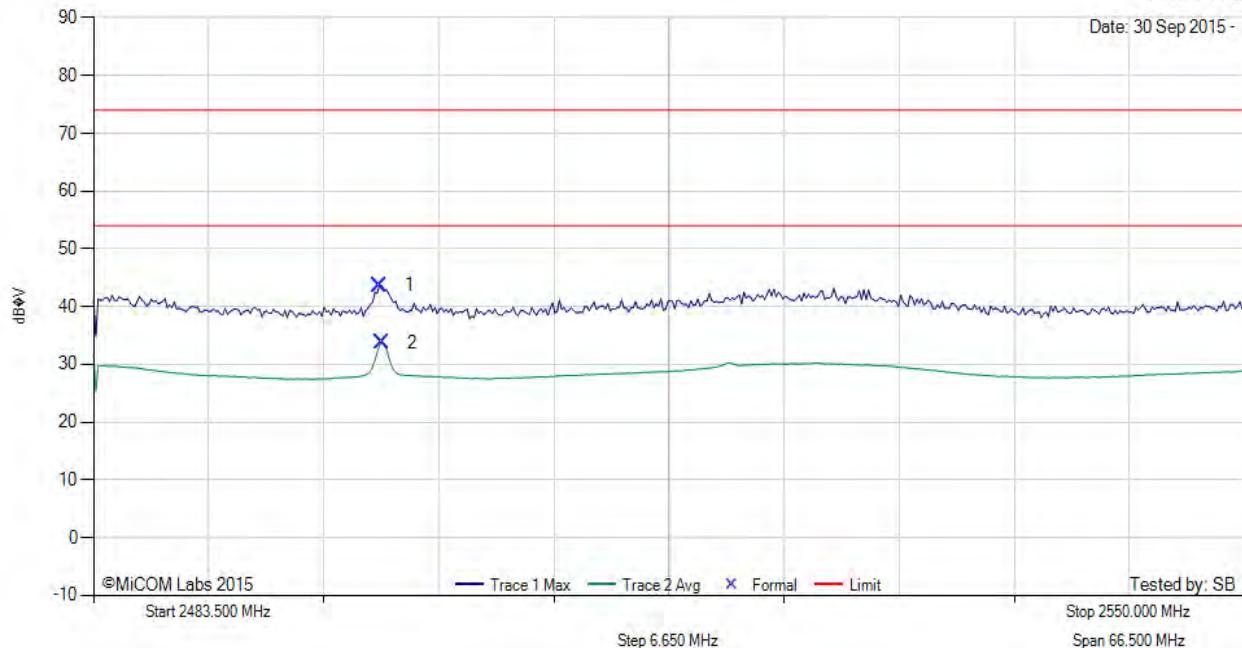
Variant: 802.11g, Test Freq: 2462.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98

Measurement Distance: 3m

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz

Date: 30 Sep 2015 -



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2500.03 | 52.56 | 2.73 | -11.61 | 43.68 | Max Peak | Horizontal | 141 | 195 | 74.0 | -30.3 | Pass |
| 2 | 2500.16 | 42.71 | 2.73 | -11.61 | 33.83 | Max Avg | Horizontal | 141 | 195 | 54.0 | -20.2 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

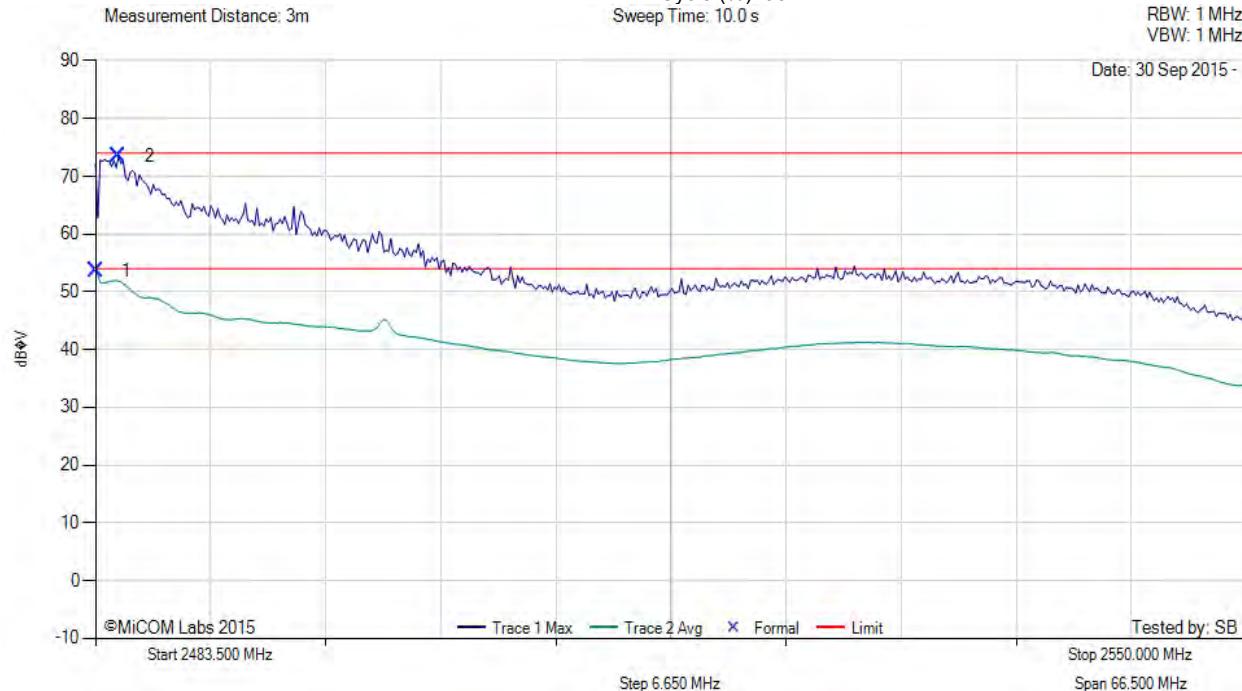
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS



Variant: 802.11n HT-20, Test Freq: 2462.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2483.50 | 62.58 | 2.73 | -11.64 | 53.67 | Max Avg | Horizontal | 141 | 195 | 54.0 | -0.3 | Pass |
| 2 | 2484.83 | 82.39 | 2.73 | -11.64 | 73.48 | Max Peak | Horizontal | 141 | 195 | 74.0 | -0.5 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

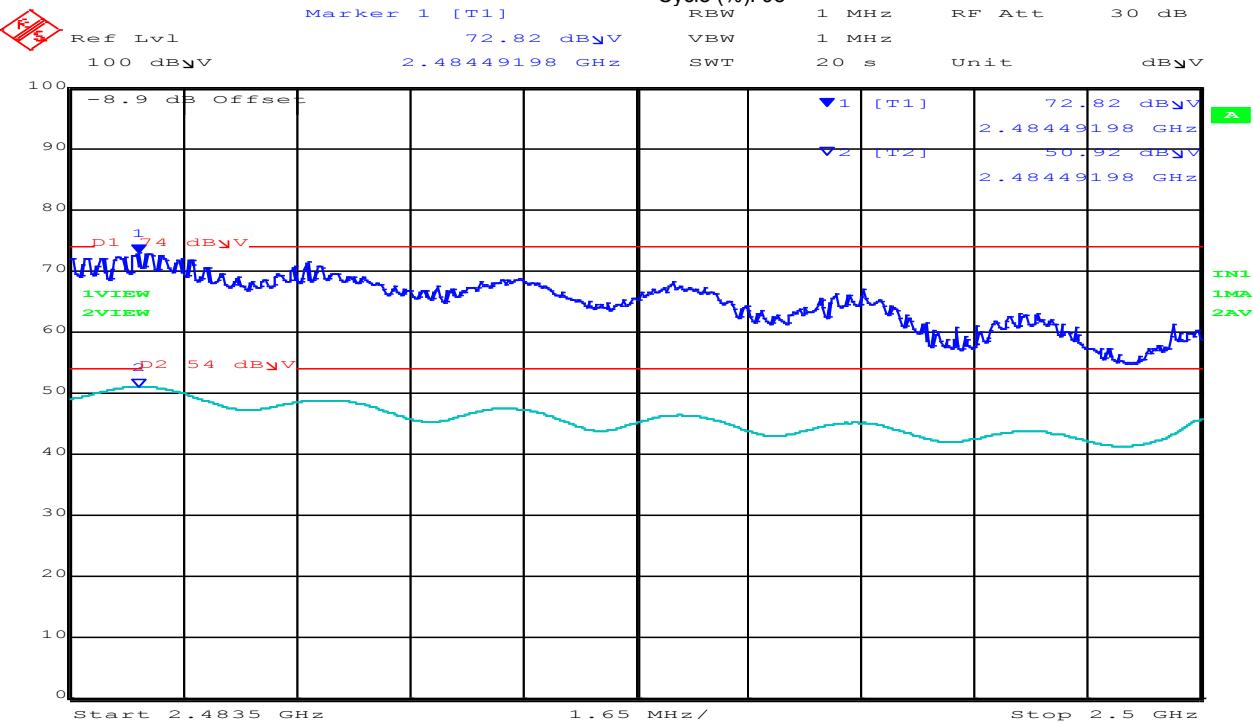
[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS



Variant: 802.11n HT-40, Test Freq: 2452.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2484.50 | 50.92 | 2.73 | -11.64 | 42.01 | Max Avg | Horizontal | 141 | 195 | 54.0 | -11.99 | Pass |
| 2 | 2484.50 | 72.82 | 2.73 | -11.64 | 63.91 | Max Peak | Horizontal | 141 | 195 | 74.0 | -10.09 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS



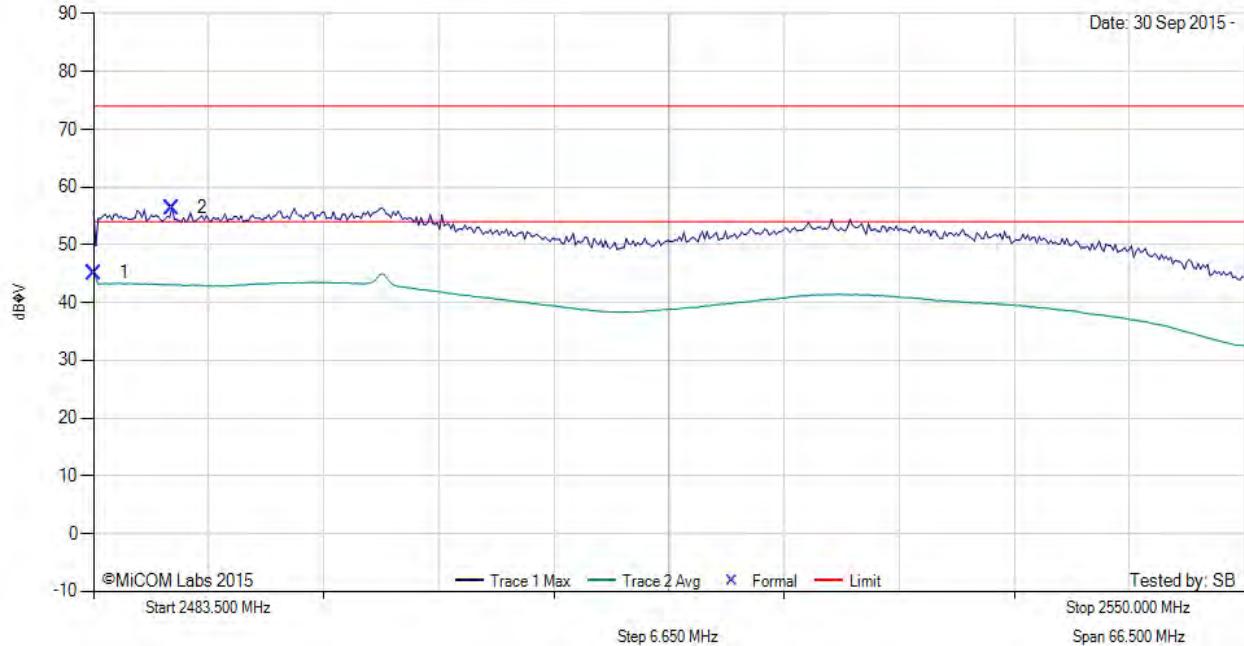
Variant: 802.11b, Test Freq: 2462.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98

Measurement Distance: 3m

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz

Date: 30 Sep 2015 -



| Num | Frequency MHz | Raw dBµV | Cable Loss | AF dB | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
|-----|---------------|----------|------------|--------|--------------|------------------|------------|--------|---------|--------------|-----------|------------|
| 1 | 2483.50 | 54.02 | 2.73 | -11.64 | 45.11 | Max Avg | Horizontal | 141 | 195 | 54.0 | -8.9 | Pass |
| 2 | 2488.03 | 65.31 | 2.73 | -11.63 | 56.41 | Max Peak | Horizontal | 141 | 195 | 74.0 | -17.6 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS



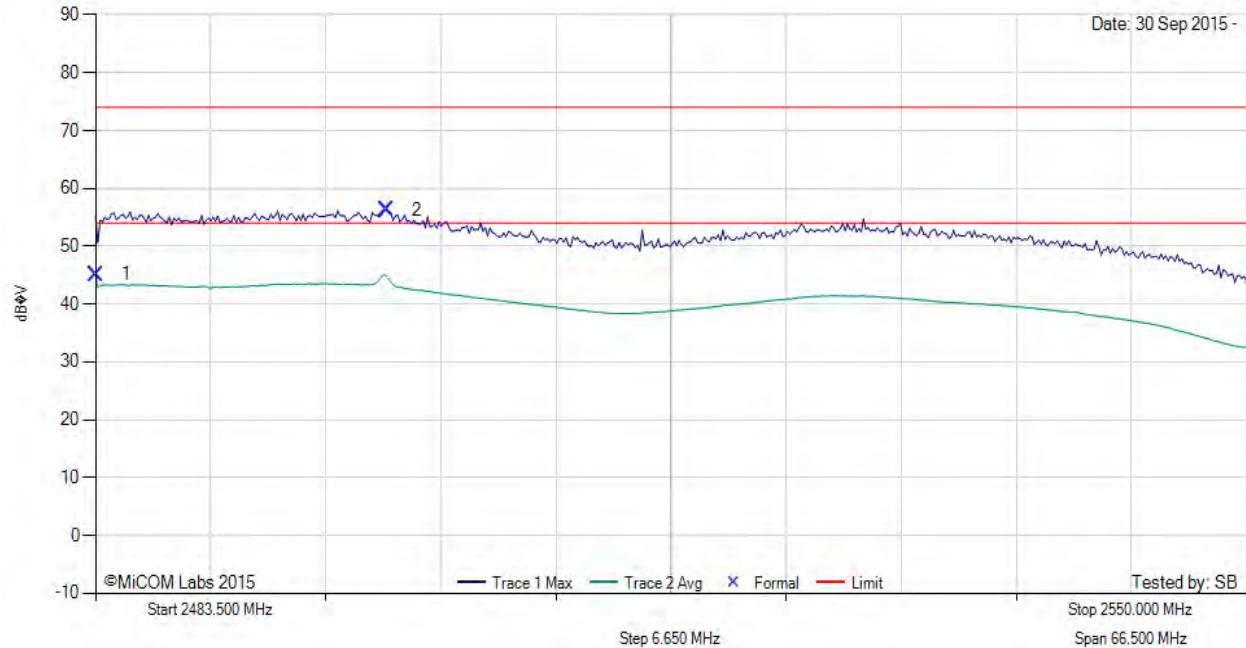
Variant: 802.11g, Test Freq: 2462.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98

Measurement Distance: 3m

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz

Date: 30 Sep 2015 -



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|------------|--------|---------|--------------------|-----------|------------|
| 1 | 2483.50 | 54.03 | 2.73 | -11.64 | 45.12 | Max Avg | Horizontal | 141 | 195 | 54.0 | -8.9 | Pass |
| 2 | 2500.29 | 65.20 | 2.73 | -11.61 | 56.32 | Max Peak | Horizontal | 141 | 195 | 74.0 | -17.7 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

RADIATED - LOWER RESTRICTED BAND-EDGE EMISSIONS

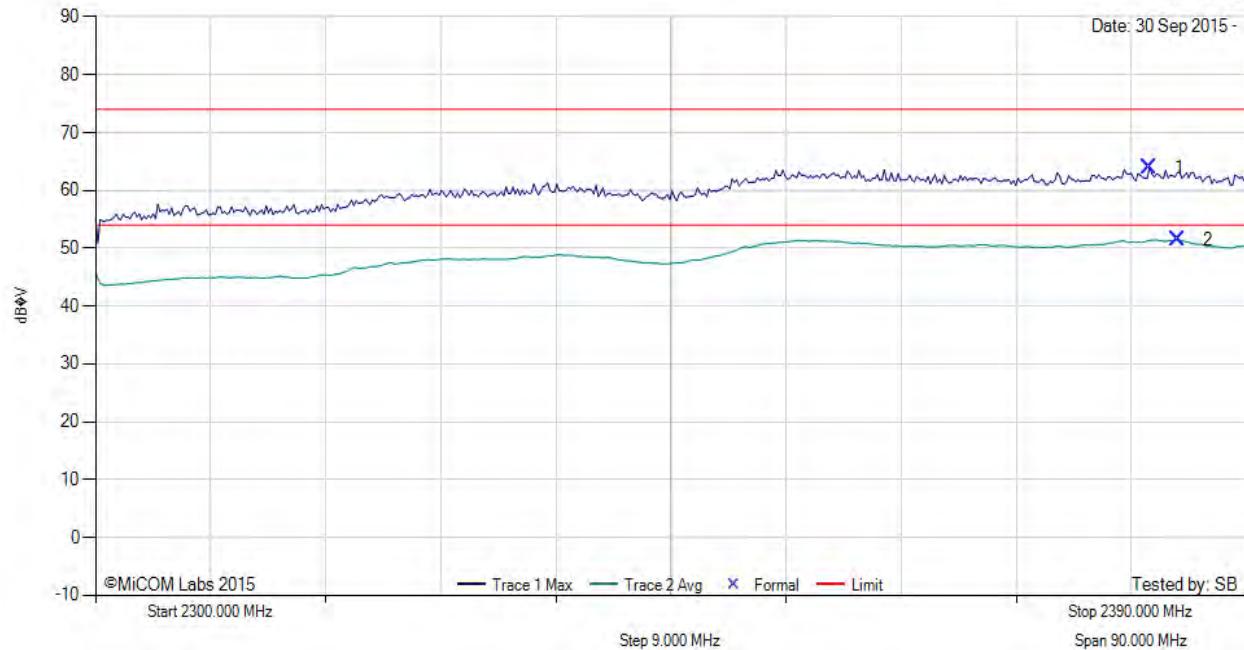


Variant: 802.11b, Test Freq: 2412.00 MHz, Antenna: Galtronics Custom PCB SMT, Power Setting: 25, Duty Cycle (%): 98

Measurement Distance: 3m

Sweep Time: 10.0 s

RBW: 1 MHz
VBW: 1 MHz



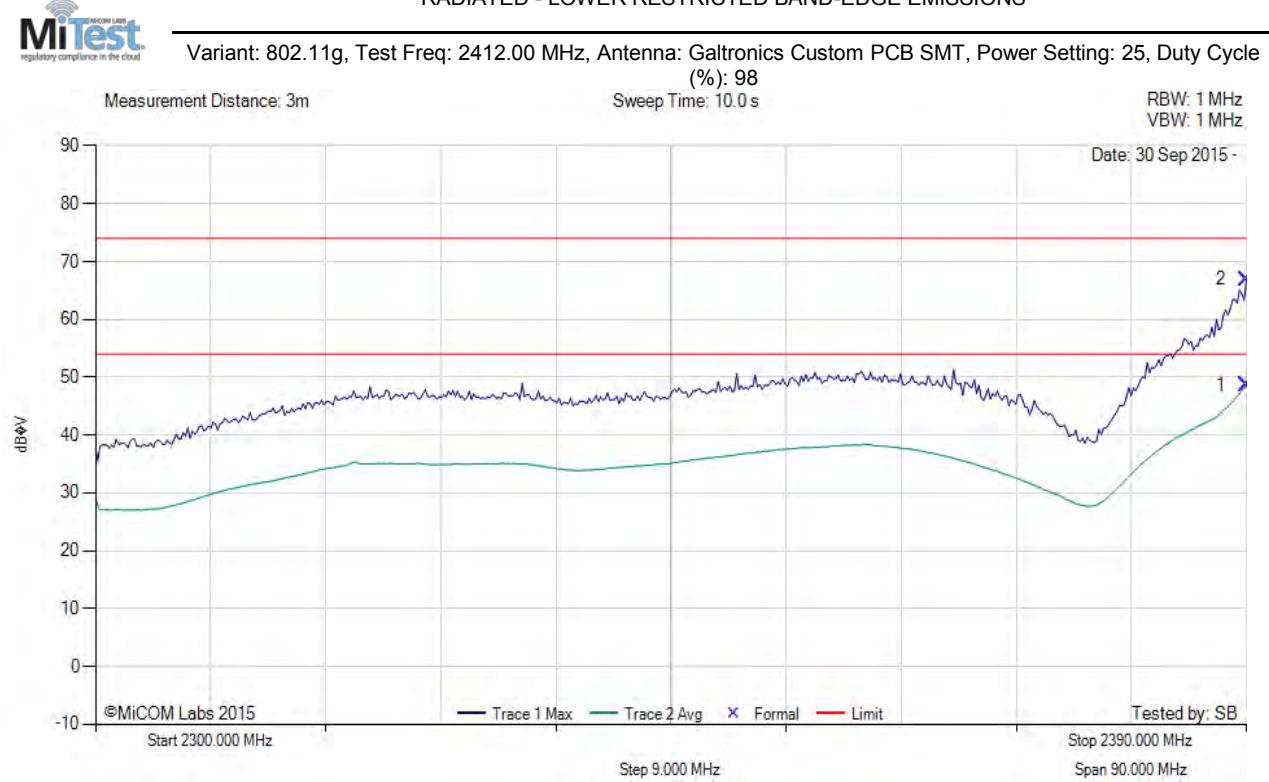
| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| 1 | 2382.42 | 73.28 | 2.69 | -11.99 | 63.98 | Max Peak | Vertical | 141 | 157 | 74.0 | -10.0 | Pass |
| 2 | 2384.59 | 60.81 | 2.68 | -11.96 | 51.53 | Max Avg | Vertical | 141 | 157 | 54.0 | -2.5 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.

RADIATED - LOWER RESTRICTED BAND-EDGE EMISSIONS



| Num | Frequency MHz | Raw dB μ V | Cable Loss | AF dB | Level dB μ V/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dB μ V/m | Margin dB | Pass /Fail |
|-----|---------------|----------------|------------|--------|--------------------|------------------|----------|--------|---------|--------------------|-----------|------------|
| 1 | 2390.00 | 57.80 | 2.69 | -11.92 | 48.57 | Max Avg | Vertical | 141 | 157 | 54.0 | -5.4 | Pass |
| 2 | 2390.00 | 76.18 | 2.69 | -11.92 | 66.95 | Max Peak | Vertical | 141 | 157 | 74.0 | -7.1 | Pass |

Test Notes: ethernet cable connected to laptop (outside)

[back to matrix](#)

This test report may be reproduced in full only. The document may only be updated by MiCOM Labs personnel. All changes will be noted in the Document History section of the report.



575 Boulder Court
Pleasanton, California 94566, USA
Tel: +1 (925) 462 0304
Fax: +1 (925) 462 0306
www.micomlabs.com