

**FCC PART 15 SUBPART C SECTION 15.247  
TEST REPORT***for***WIRELESS MODULE****Model: ATWINC1510-MR210PB**

Prepared for

**ATMEL CORPORATION**  
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LAKE FOREST, CA 92630

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DATE: SEPTEMBER 8, 2015

|       | REPORT<br>BODY | APPENDICES |          |          |          |          | TOTAL      |
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**LIST OF APPENDICES**

| APPENDIX | TITLE                                                                                                                                                                                                 |
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| A        | Laboratory Accreditations and Recognitions                                                                                                                                                            |
| B        | Modifications to the EUT                                                                                                                                                                              |
| C        | Additional Models Covered Under This Report                                                                                                                                                           |
| D        | Diagrams, Factors, Charts, and Photos <ul style="list-style-type: none"><li>• Test Setup Diagrams</li><li>• Antenna and Amplifier Factors</li><li>• Radiated and Conducted Emissions Photos</li></ul> |
| E        | Radiated and Conducted Emissions Data Sheets                                                                                                                                                          |

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| 1      | Plot Map And Layout of Test Site Below 1GHz |
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## GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Device Tested: Wireless Module  
Model: ATWINC1510-MR210PB  
S/N: None

Product Description: The EUT is an 802.11b, g, and n Wireless Shielded Module.

Modifications: The EUT was not modified in order to comply with specifications.

Manufacturer: Atmel Corporation  
1 Spectrum Pointe Dr., Suite 225  
Lake Forest, CA 92630

Test Dates: June 26, August 19, and September 1, 2, 2015

Test Specifications: EMI requirements  
CFR Title 47, Part 15 Subpart C Sections 15.205, 15.207, 15.209, & 15.247.

Test Procedure: ANSI C63.10, and KDB 558074 D01 v03r03.



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## SUMMARY OF TEST RESULTS

| TEST | DESCRIPTION                                                              | RESULTS                                                                            |
|------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 1    | Conducted RF Emissions,<br>150 kHz - 30 MHz                              | Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.207          |
| 2    | Radiated RF Emissions & Harmonics,<br>9 kHz – 25,000 MHz                 | Complies with the limits of CFR Title 47 Part 15 Subpart C Sections 15.205, 15.209 |
| 3    | DTS Bandwidth                                                            | Complies with CFR Title 47 Part 15 Subpart C Section 15.247                        |
| 4    | Maximum Peak Conducted Output Power                                      | Complies with CFR Title 47 Part 15 Subpart C Section 15.247                        |
| 5    | Maximum Peak Power Spectral Density<br>Level In The Fundamental Emission | Complies with CFR Title 47 Part 15 Subpart C Section 15.247                        |
| 6    | Emissions in Non-Restricted Frequency<br>Bands (in 100kHz Bandwidth)     | Complies with CFR Title 47 Part 15 Subpart C Section 15.247                        |
| 7    | Emissions in the Restricted Bands                                        | Complies with CFR Title 47 Part 15 Subpart C Section 15.205                        |



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## 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Wireless Module Model: ATWINC1510-MR210PB. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT (equipment under test) hereafter, are within the specification limits defined by the Code of Federal Regulations Title 47, Part 15 Subpart C sections 15.207, 15.205, 15.209 and 15.247.



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**2. ADMINISTRATIVE DATA****2.1 Location of Testing**

The tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, California 92630.

**2.2 Traceability Statement**

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

**2.3 Cognizant Personnel**

Atmel Corporation

Igor Radutnuy Staff Applications Engineer

Compatible Electronics Inc.

Torey Oliver Test Technician

Matt Harrison Lab Manager

Jeff Klinger Director of Engineering

**2.4 Date Test Sample was Received**

The test sample was received on June 26, 2015.

**2.5 Disposition of the Test Sample**

The test sample remains at Compatible Electronics as of the date of this test report.

**2.6 Abbreviations and Acronyms**

The following abbreviations and acronyms may be used in this document.

|       |                                                     |
|-------|-----------------------------------------------------|
| RF    | Radio Frequency                                     |
| EMI   | Electromagnetic Interference                        |
| EUT   | Equipment Under Test                                |
| P/N   | Part Number                                         |
| S/N   | Serial Number                                       |
| HP    | Hewlett Packard                                     |
| ITE   | Information Technology Equipment                    |
| CML   | Corrected Meter Limit                               |
| LISN  | Line Impedance Stabilization Network                |
| NVLAP | National Voluntary Laboratory Accreditation Program |
| CFR   | Code of Federal Regulations                         |
| PCB   | Printed Circuit Board                               |
| TX    | Transmit                                            |
| RX    | Receive                                             |



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**3. APPLICABLE DOCUMENTS**

The following documents are referenced or used in the preparation of this Test Report.

| SPEC                     | TITLE                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------|
| CFR Title 47, Part 15    | FCC Rules – Radio frequency devices (including digital devices)                                               |
| ANSI C63.10:<br>2013     | American National Standard for Testing Unlicensed Wireless Devices                                            |
| KDB 558074 D01<br>v03r03 | Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 |



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#### 4. DESCRIPTION OF TEST CONFIGURATION

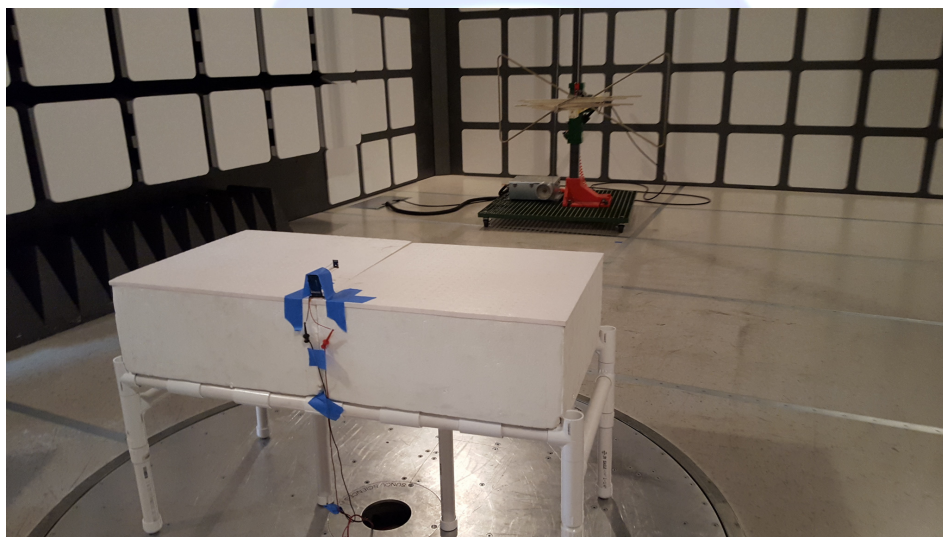
##### 4.1 Description of Test Configuration

The Wireless Module Model: ATWINC1510-MR210PB (EUT) was setup in a tabletop configuration. The EUT was powered by a DC Supply (for Conducted Emissions the EUT was connected to a USB Power Adapter). The EUT was continuously transmitting a data stream. The EUT was checked in all axes and the X-Axis was found to be the worst case.

The voltage was varied  $\pm 15\%$  and the transmitting signal amplitude and frequency did not vary.

It was determined that the emissions were at their highest level when the EUT was transmitting in the configuration described above for Radiated Emissions. The final radiated data was taken in the above configuration. Please see Appendix E for the test data.

##### 4.1.1 Photograph Test Configuration



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**4.1.2 Cable Construction and Termination****Cable 1**

This is a 2 meter, un-shielded, round cable that connects the EUT to the DC Power Supply. The cable is hardwired into the EUT and has a banana connector at the DC Supply end. The cable was not bundle.

**Cable 2**

This is a 10 centimeter, un-shielded, round cables that connect the EUT to the EUT Control Board. The cable is hardwired into both ends of the cable. The cable was not bundle.

**Cable 3**

This is a 1 meter, foil shielded, USB cable that connect the EUT to the USB Power Adapter. The cable is hardwired into both ends of the cable. The cable was not bundled. The shield of the cable was terminated at the connectors.



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**5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT****5.1 EUT and Accessory List**

| # | EQUIPMENT TYPE                          | MANU-FACTURER     | MODEL              | SERIAL NUMBER |
|---|-----------------------------------------|-------------------|--------------------|---------------|
| 1 | WIRELESS MODULE(EUT)                    | ATMEL CORPORATION | ATWINC1510-MR210PB | N/A           |
| 2 | DC SUPPLY                               | MPJA              | 0-30V / 0-5A       | 017687        |
| 3 | EUT CONTROL BOARD                       | ATMEL CORPORATION | NONE               | NONE          |
| 4 | USB POWER ADAPTER (CONDUCTED EMISSIONS) | BELKIN            | F8J052             | NONE          |



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**5.2 EMI Test Equipment**

| EQUIPMENT TYPE                | MANUFACTURER              | MODEL NUMBER | SERIAL NUMBER | CAL. DATE  | CAL. DUE DATE |
|-------------------------------|---------------------------|--------------|---------------|------------|---------------|
| Computer                      | Compatible Electronics    | NONE         | NONE          | N/A        | N/A           |
| EMI Receiver                  | Rohde & Schwarz           | ESIB40       | 100172        | 9/5/2014   | 9/5/2015      |
| Antenna, Loop                 | Com Power                 | AL-130       | 121049        | 12/06/2013 | 12/06/2015    |
| Antenna, CombiLog             | Com Power                 | AC-220       | 25857         | 5/21/2014  | 5/21/2016     |
| Antenna, Horn 1-18GHz         | Com Power                 | AH-118       | 071250        | 7/1/2014   | 7/1/2016      |
| Antenna, Horn 18-26 GHz       | Com Power                 | AH-826       | 081033        | NCR        | NCR           |
| Pre-Amp, 1-18GHz              | Com Power                 | PAM-118      | 443013        | 4/24/2014  | 4/24/2016     |
| Pre-Amp, 1-18GHz              | Com Power                 | PAM-118      | 443011        | 4/24/2014  | 4/24/2016     |
| Pre-Amp, 18-40GHz             | Com Power                 | PA-840       | 181289        | 6/16/2014  | 6/16/2016     |
| LISN                          | Com Power                 | LI-215       | 191937        | 4/16/2015  | 4/16/2016     |
| RF Peak Power Meter/Analyzer  | Boonton                   | 4500A        | 1282          | 12/2/2014  | 12/2/2015     |
| Peak Power Sensor             | Boonton                   | 57318        | 3723          | 12/2/2014  | 12/2/2015     |
| High Pass Filter              | AMTI Microwave Circuits   | H3G020G4     | 481230        | 6/4/2014   | 6/4/2016      |
| Mast, Antenna Positioner      | Sunol Science Corporation | TWR 95-4     | 020808-3      | N/A        | N/A           |
| Antenna Mast                  | Sunol Science Corporation | TWR 95-4     | 020808-3      | N/A        | N/A           |
| Turntable                     | Sunol Science Corporation | FM 2001      | N/A           | N/A        | N/A           |
| Mast and Turntable Controller | Sunol Science Corporation | SC104V       | 020808-1      | N/A        | N/A           |

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**6. TEST SITE DESCRIPTION****6.1 Test Facility Description**

Please refer to section 2.1 and the figures in Appendix D of this report for test location.

**6.2 EUT Mounting, Bonding and Grounding**

The EUT was mounted on a 1.0 by 1.5 by 0.8 meter high non-conductive table for below 1GHz and 1.5 meters high for above 1GHz, which was placed on the ground plane.

The EUT was not grounded.

**6.3 Facility Environmental Characteristics**

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.



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## 7. CHARACTERISTICS OF THE TRANSMITTER

### 7.1 Channel Number and Frequencies

There are a total of 11 channels. The low channel is at 2412.0 MHz and the high channel is at 2462.0 MHz. There is approximately 5 MHz separation between. The EUT has two modes of operation; Normal Current and Low Current. Below are the channels and power settings:

| Normal Current             | b Mode | g Mode  | n Mode    |
|----------------------------|--------|---------|-----------|
| 1 == 2412 MHz DigGain= -9  |        | DG= -12 | DG= -13.5 |
| 2 == 2417 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 3 == 2422 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 4 == 2427 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 5 == 2432 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 6 == 2437 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 7 == 2442 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 8 == 2447 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 9 == 2452 MHz DigGain= -8  |        | DG= -7  | DG= -8    |
| 10 == 2457 MHz DigGain= -8 |        | DG= -7  | DG= -8    |
| 11 == 2462 MHz DigGain= -8 |        | DG= -10 | DG= -11   |

Modulation Types Used:

802.11b: DQPSK, DBPSK, CCK

802.11g/n: OFDM /64-QAM, 16-QAM, QPSK, BPSK

### 7.2 Antenna

The antenna is made up of a PCB Trace located on the antenna board.



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**8. TEST PROCEDURES**

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

**8.1 RF Emissions****8.1.1 Conducted Emissions Test**

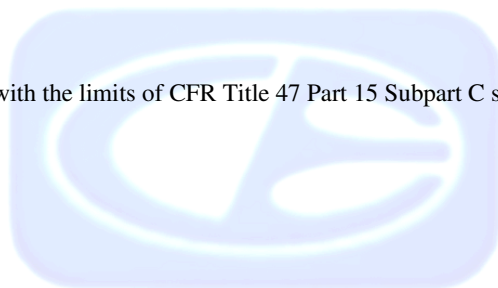
The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT received its power through the LISN, which was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.

**Test Results:**

The EUT complies with the limits of CFR Title 47 Part 15 Subpart C section 15.207.



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### 8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The R&S receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps. Amplifiers were used to increase the sensitivity of the instrument. There were two Microwave Preamplifier used for frequencies above 1 GHz.

For spurious emissions the quasi-peak detector was used for frequencies below 1GHz and the average detector was used for frequencies above 1 GHz.

For the radiated Harmonic emissions and Band Edges a linear average detector was used.

The measurement bandwidths and transducers used for the radiated emissions test were:

| FREQUENCY RANGE (MHz) | TRANSDUCER          | EFFECTIVE MEASUREMENT BANDWIDTH |
|-----------------------|---------------------|---------------------------------|
| .009 to .150          | Active Loop Antenna | 200 Hz                          |
| .150 to 30            | Active Loop Antenna | 9 kHz                           |
| 30 to 1000            | Combilog Antenna    | 100 kHz                         |
| 1000 to 25000         | Horn Antenna        | 1 MHz                           |

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4, EN 50147-2, and CISPR 22. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters in both vertical and horizontal polarizations (for E field radiated field strength).

#### Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart C sections 15.205, 15.209 and 15.247.



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**8.1.3 DTS Bandwidth**

The DTS Bandwidth was measured directly connected to the EMI Receiver using a RBW of 100 kHz and a VBW of 300 kHz. A peak detector and a max hold trace were used with auto sweep time. The trace was allowed to fully maximize. We measured the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. The automatic bandwidth measurement capability of the EMI Receiver was employed using the n dB bandwidth mode with n set to 6 dB. The final qualification data sheets are located in Appendix E.

**Test Results:**

The EUT complies with Part 15, Subpart C, Section 15.247.

**8.1.4 Maximum Peak Conducted Output Power**

The maximum peak conducted output power was measured using a Peak Power Meter. The Peak Power Meter used a resolution bandwidth that is greater than the DTS bandwidth and a video bandwidth greater than 3 x RBW. The final qualification data sheets are located in Appendix E.

**Test Results:**

The EUT complies with Part 15 Subpart C, Section 15.247.

**8.1.5 Maximum Peak Power Spectral Density Level In The Fundamental Emission**

The Maximum Peak Power Spectral Density Level in the Fundamental Emission was measured directly connected to the EMI Receiver. Tuned to the center frequency of the DTS channel and set the span to 1.5 times the DTS bandwidth. RBW was set to 3 kHz > 100kHz and VBW 3 \* RBW. A peak detector was used with the sweep time set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level within the RBW. The final qualification data sheets are located in Appendix E.

**Test Results:**

The EUT complies with Part 15, Subpart C, Section 15.247.



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**8.1.6 Emissions in Non-Restricted Frequency Bands (in 100kHz Bandwidth)**

The Emissions in Non-Restricted Frequency Bands (in 100kHz Bandwidth) measurements were performed using the EMI Receiver directly connected to the EUT. A reference level was established by setting the instrument center frequency to DTS channel center frequency. The span was set to  $\geq 1.5$  times the DTS bandwidth. The RBW was 100 kHz and VBW 300 kHz. A peak detector was used with a sweep time set to auto. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the level and 20dB below that was the reference level. For Emission Level Measurement the center frequency and span were set to encompass the frequency range to be measured. RBW was set to 100 kHz and VBW to 300 kHz. A peak detector was used with a sweep time set to auto. The number of measurement points were greater than span/RBW. A max hold trace was used and allowed to fully stabilize. The peak marker function was used to determine the maximum amplitude level. The final qualification data sheets are located in Appendix E.

**Test Results:**

The EUT complies with Part 15, Subpart C, Section 15.247.

**8.1.7 Emissions in the Restricted Bands (Radiated)**

The Emissions in the Restricted Bands measurement was performed using the EMI Receiver at a 3-meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E.

**Test Results:**

The EUT complies with Part 15 Subpart C, Section 15.205.

**8.1.8 Emissions Radiated Outside of the Fundamental Frequency Band**

The Band Edge measurement was performed using the EMI Receiver at a 3-meter test distance to obtain the final test data. The low and high channels were tuned to during the low and high band edge tests. The final qualification data sheets are located in Appendix E.

**Test Results:**

The EUT complies with Part 15 Subpart C, Section 15.247.



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**9. TEST PROCEDURE DEVIATIONS**

The test procedures were not deviated from throughout all tests.

**10. CONCLUSIONS**

The Wireless Module Model: ATWINC1510-MR210PB meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart C sections 15.205, 15.207, 15.209 and 15.247.



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**APPENDIX A**

***LABORATORY ACCREDITATIONS AND  
RECOGNITIONS***



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## LABORATORY ACCREDITATIONS AND RECOGNITIONS

NVLAP LAB CODES 200063-0,  
200528-0, 200527-0

For US, Canada, Australia/New Zealand, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 and ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

**NVLAP listing links**Agoura Division - <http://ts.nist.gov/Standards/scopes/2000630.htm>Brea Division - <http://ts.nist.gov/Standards/scopes/2005280.htm>Silverado/Lake Forest Division - <http://ts.nist.gov/Standards/scopes/2005270.htm>**ANSI listing**

CETCB

<https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4>

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

We are also certified/listed for IT products by the following country/agency:

**VCCI Listing, from VCCI site**[Enter "Compatible" in search form](http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html) [http://www.vcci.or.jp/vcci\\_e/activity/registration/setsubi.html](http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html)**FCC Listing, from FCC OET site**[FCC test lab search](https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>

Compatible Electronics IC listing can be found at:

<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home>

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**APPENDIX B**

***MODIFICATIONS TO THE EUT***



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## MODIFICATIONS TO THE EUT

There were no modifications made during testing.



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**APPENDIX C**

***ADDITIONAL MODELS COVERED  
UNDER THIS REPORT***



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## ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Wireless Module  
Model: ATWINC1510-MR210PB  
S/N: None

No additional models were tested.



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**APPENDIX D**

***DIAGRAMS, FACTORS, CHARTS, AND PHOTOS***



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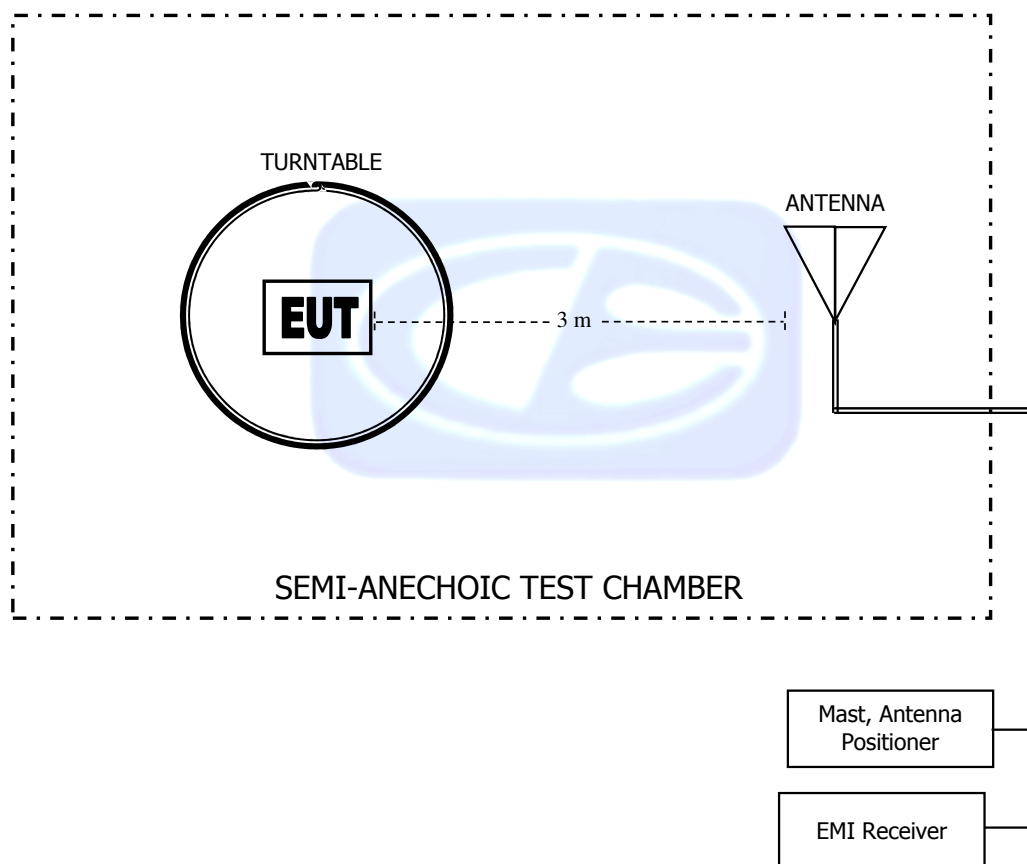
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**FIGURE 1: PLOT MAP AND LAYOUT OF TEST SITE  
BELOW 1GHZ**



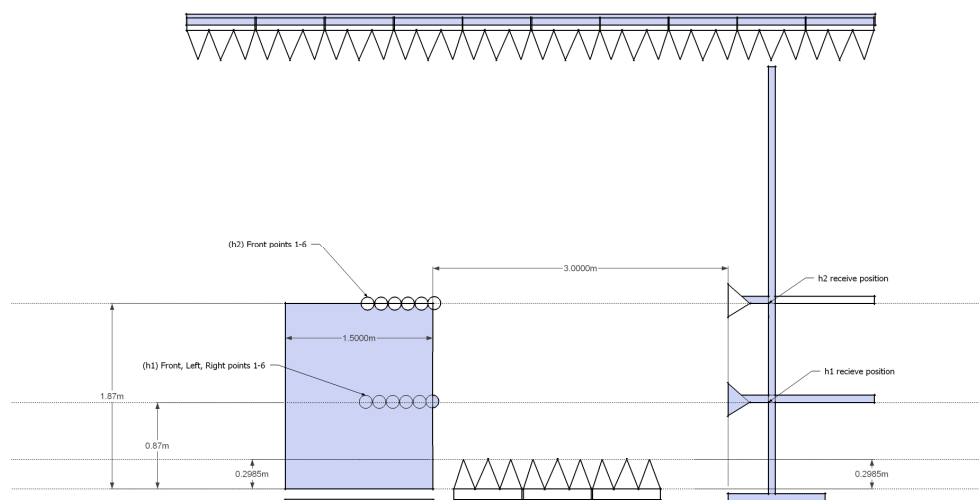
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## **FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ**



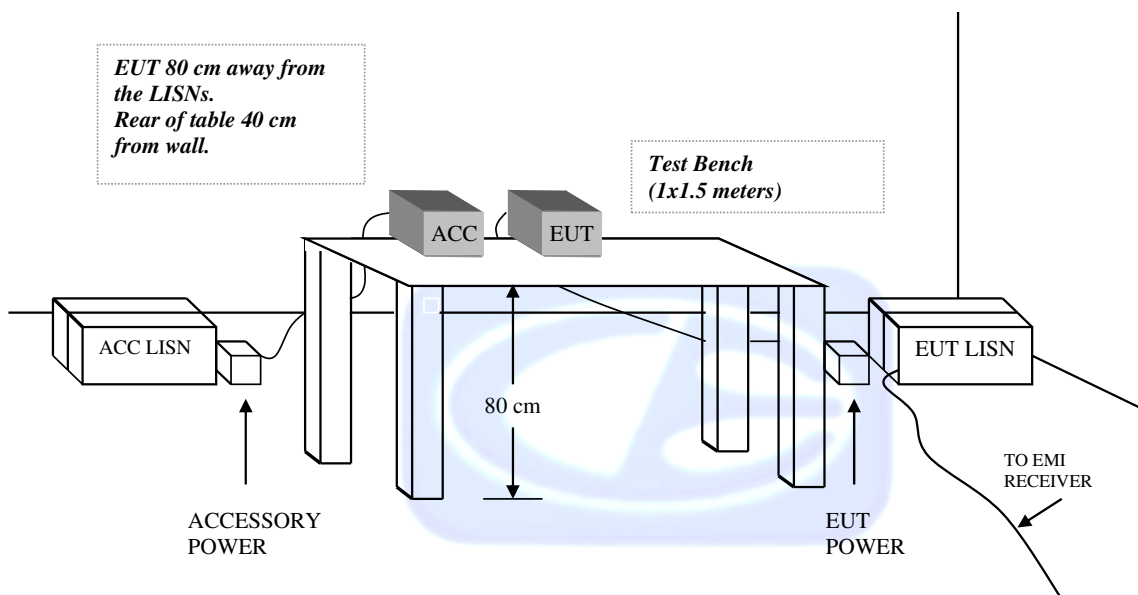
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**FIGURE 3: CONDUCTED EMISSIONS TEST SETUP**



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**COM-POWER AL-130****LOOP ANTENNA**

S/N: 121049

CALIBRATION DUE: DECEMBER 6, 2015

| FREQUENCY<br>(MHz) | MAGNETIC<br>(dB/m) | ELECTRIC<br>(dB/m) | FREQUENCY<br>(MHz) | MAGNETIC<br>(dB/m) | ELECTRIC<br>(dB/m) |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| 0.009              | -34.64             | 16.86              | 0.8                | -36.32             | 15.18              |
| 0.01               | -34.78             | 16.72              | 0.9                | -36.22             | 15.28              |
| 0.02               | -35.91             | 15.59              | 1.0                | -36.22             | 15.28              |
| 0.03               | -35.48             | 16.02              | 2.0                | -35.91             | 15.59              |
| 0.04               | -35.82             | 15.68              | 3.0                | -35.91             | 15.59              |
| 0.05               | -36.49             | 15.01              | 4.0                | -36.01             | 15.49              |
| 0.06               | -36.30             | 15.20              | 5.0                | -35.80             | 15.70              |
| 0.07               | -36.43             | 15.07              | 6.0                | -36.00             | 15.50              |
| 0.08               | -36.30             | 15.20              | 7.0                | -35.90             | 15.60              |
| 0.09               | -36.39             | 15.11              | 8.0                | -35.70             | 15.80              |
| 0.1                | -36.41             | 15.09              | 9.0                | -35.70             | 15.80              |
| 0.2                | -36.61             | 14.89              | 10.0               | -35.60             | 15.90              |
| 0.3                | -36.63             | 14.87              | 15.0               | -36.52             | 14.98              |
| 0.4                | -36.52             | 14.99              | 20.0               | -35.75             | 15.75              |
| 0.5                | -36.63             | 14.87              | 25.0               | -37.78             | 13.72              |
| 0.6                | -36.62             | 14.88              | 30.0               | -38.62             | 12.88              |
| 0.7                | -36.53             | 14.97              |                    |                    |                    |

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COM-POWER AC-220

LAB R - COMBILOG ANTENNA

S/N: 25857

CALIBRATION DUE: MAY 21, 2016

| FREQUENCY (MHz) | FACTOR (dB) | FREQUENCY (MHz) | FACTOR (dB) |
|-----------------|-------------|-----------------|-------------|
| 30              | 22.5        | 160             | 13.3        |
| 35              | 22.5        | 180             | 15.0        |
| 40              | 23.0        | 200             | 14.6        |
| 45              | 21.5        | 250             | 16.5        |
| 50              | 21.3        | 300             | 18.1        |
| 60              | 18.2        | 400             | 19.4        |
| 70              | 13.2        | 500             | 21.4        |
| 80              | 11.6        | 600             | 21.6        |
| 90              | 11.9        | 700             | 23.7        |
| 100             | 12.6        | 800             | 26.0        |
| 120             | 15.1        | 900             | 26.6        |
| 140             | 13.6        | 1000            | 28.5        |



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**COM-POWER AH-118****HORN ANTENNA****S/N: 071250****CALIBRATION DUE: JULY 1, 2016**

| <b>FREQUENCY (MHz)</b> | <b>FACTOR (dB)</b> | <b>FREQUENCY (MHz)</b> | <b>FACTOR (dB)</b> |
|------------------------|--------------------|------------------------|--------------------|
| 1000                   | 30.1               | 9500                   | 44.2               |
| 1500                   | 29.2               | 10000                  | 43.4               |
| 2000                   | 31.6               | 10500                  | 44.6               |
| 2500                   | 35.5               | 11000                  | 45.1               |
| 3000                   | 33.7               | 11500                  | 45.7               |
| 3500                   | 36.0               | 12000                  | 46.2               |
| 4000                   | 35.4               | 12500                  | 45.4               |
| 4500                   | 35.5               | 13000                  | 44.8               |
| 5000                   | 40.1               | 13500                  | 46.7               |
| 5500                   | 37.8               | 14000                  | 47.8               |
| 6000                   | 39.0               | 14500                  | 46.4               |
| 6500                   | 39.9               | 15000                  | 47.2               |
| 7000                   | 40.4               | 15500                  | 45.5               |
| 7500                   | 44.4               | 16000                  | 45.0               |
| 8000                   | 44.1               | 16500                  | 44.5               |
| 8500                   | 43.1               | 17000                  | 47.0               |
| 9000                   | 43.0               | 17500                  | 47.8               |
|                        |                    | 18000                  | 44.2               |

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**COM-POWER PAM-118****1-18GHz - PREAMPLIFIER****S/N: 443013****CALIBRATION DUE: APRIL 24, 2016**

| <b>FREQUENCY<br/>(MHz)</b> | <b>FACTOR<br/>(dB)</b> | <b>FREQUENCY<br/>(MHz)</b> | <b>FACTOR<br/>(dB)</b> |
|----------------------------|------------------------|----------------------------|------------------------|
| 500                        | 26.2                   | 5500                       | 25.3                   |
| 1000                       | 25.6                   | 6000                       | 25.0                   |
| 1100                       | 25.9                   | 6500                       | 24.7                   |
| 1200                       | 25.9                   | 7000                       | 23.6                   |
| 1300                       | 26.3                   | 7500                       | 23.3                   |
| 1400                       | 26.5                   | 8000                       | 23.7                   |
| 1500                       | 26.3                   | 8500                       | 24.0                   |
| 1600                       | 26.1                   | 9000                       | 24.3                   |
| 1700                       | 26.2                   | 9500                       | 24.1                   |
| 1800                       | 26.3                   | 10000                      | 23.7                   |
| 1900                       | 25.8                   | 11000                      | 24.2                   |
| 2000                       | 26.0                   | 12000                      | 23.2                   |
| 2500                       | 26.0                   | 13000                      | 22.8                   |
| 3000                       | 25.8                   | 14000                      | 22.6                   |
| 3500                       | 25.9                   | 15000                      | 22.9                   |
| 4000                       | 26.4                   | 16000                      | 22.3                   |
| 4500                       | 26.0                   | 17000                      | 22.6                   |
| 5000                       | 25.6                   | 18000                      | 23.9                   |



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(949) 587-0400

**COM-POWER PAM-118****1-18GHz - PREAMPLIFIER**

S/N: 443011

CALIBRATION DUE: April 24, 2016

| <b>FREQUENCY<br/>(MHz)</b> | <b>FACTOR<br/>(dB)</b> | <b>FREQUENCY<br/>(GHz)</b> | <b>FACTOR<br/>(dB)</b> |
|----------------------------|------------------------|----------------------------|------------------------|
| 0.500                      | 27.2                   | 7.000                      | 23.8                   |
| 1.000                      | 26.6                   | 7.500                      | 23.9                   |
| 1.500                      | 27.0                   | 8.000                      | 24.4                   |
| 2.000                      | 27.0                   | 8.500                      | 25.2                   |
| 2.500                      | 27.4                   | 9.500                      | 26.2                   |
| 3.000                      | 27.6                   | 10.000                     | 25.8                   |
| 3.500                      | 27.5                   | 11.000                     | 25.5                   |
| 4.000                      | 27.3                   | 12.000                     | 25.4                   |
| 4.500                      | 27.3                   | 13.000                     | 25.1                   |
| 5.000                      | 27.5                   | 14.000                     | 24.6                   |
| 5.500                      | 26.3                   | 15.000                     | 24.1                   |
| 6.000                      | 26.1                   | 16.000                     | 25.1                   |
| 6.500                      | 25.4                   | 17.000                     | 25.2                   |
|                            |                        | 18.000                     | 24.4                   |



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**COM-POWER PA-840****18-40 GHz PREAMPLIFIER****S/N: 181289****CALIBRATION DUE: JUNE 16, 2016**

| <b>FREQUENCY (MHz)</b> | <b>FACTOR (dB)</b> | <b>FREQUENCY (MHz)</b> | <b>FACTOR (dB)</b> |
|------------------------|--------------------|------------------------|--------------------|
| <b>18000</b>           | 29.4               | <b>31500</b>           | 28.2               |
| <b>19000</b>           | 28.8               | <b>32000</b>           | 28.6               |
| <b>20000</b>           | 30.5               | <b>32500</b>           | 28.8               |
| <b>21000</b>           | 31.4               | <b>33000</b>           | 28.2               |
| <b>22000</b>           | 31.2               | <b>33500</b>           | 27.7               |
| <b>23000</b>           | 30.1               | <b>34000</b>           | 27.2               |
| <b>24000</b>           | 30.3               | <b>34500</b>           | 28.2               |
| <b>25000</b>           | 29.8               | <b>35000</b>           | 27.3               |
| <b>26000</b>           | 30.5               | <b>35500</b>           | 27.2               |
| <b>26500</b>           | 30.7               | <b>36000</b>           | 27.2               |
| <b>27000</b>           | 30.8               | <b>36500</b>           | 27.5               |
| <b>27500</b>           | 30.2               | <b>37000</b>           | 27.0               |
| <b>28000</b>           | 30.1               | <b>37500</b>           | 26.7               |
| <b>28500</b>           | 30.2               | <b>38000</b>           | 26.2               |
| <b>29000</b>           | 30.1               | <b>38500</b>           | 26.5               |
| <b>29500</b>           | 29.8               | <b>39000</b>           | 26.3               |
| <b>30000</b>           | 29.2               | <b>39500</b>           | 26.9               |
| <b>30500</b>           | 28.4               | <b>40000</b>           | 27.6               |
| <b>31000</b>           | 29.8               |                        |                    |

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**FRONT VIEW**

ATMEL CORPORATION  
WIRELESS MODULE  
Model: ATWINC1510-MR210PB  
FCC SUBPART C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



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Agoura Division  
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Agoura, CA 91301  
(818) 597-0600

Silverado Division  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400



**REAR VIEW**

ATMEL CORPORATION  
WIRELESS MODULE  
Model: ATWINC1510-MR210PB  
FCC SUBPART C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



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**Lake Forest Division**  
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(949) 587-0400



**FRONT VIEW**

ATMEL CORPORATION  
WIRELESS MODULE  
Model: ATWINC1510-MR210PB  
FCC SUBPART C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



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(949) 587-0400



**REAR VIEW**

ATMEL CORPORATION  
WIRELESS MODULE  
Model: ATWINC1510-MR210PB  
FCC SUBPART C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



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Lake Forest Division  
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(949) 587-0400



**FRONT VIEW**

ATMEL CORPORATION  
WIRELESS MODULE  
Model: ATWINC1510-MR210PB  
FCC SUBPART C - CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



---

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**REAR VIEW**

ATMEL CORPORATION  
WIRELESS MODULE  
Model: ATWINC1510-MR210PB  
FCC SUBPART C - CONDUCTED EMISSIONS

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



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**APPENDIX E**

***RADIATED EMISSIONS DATA SHEETS***



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**Brea Division**  
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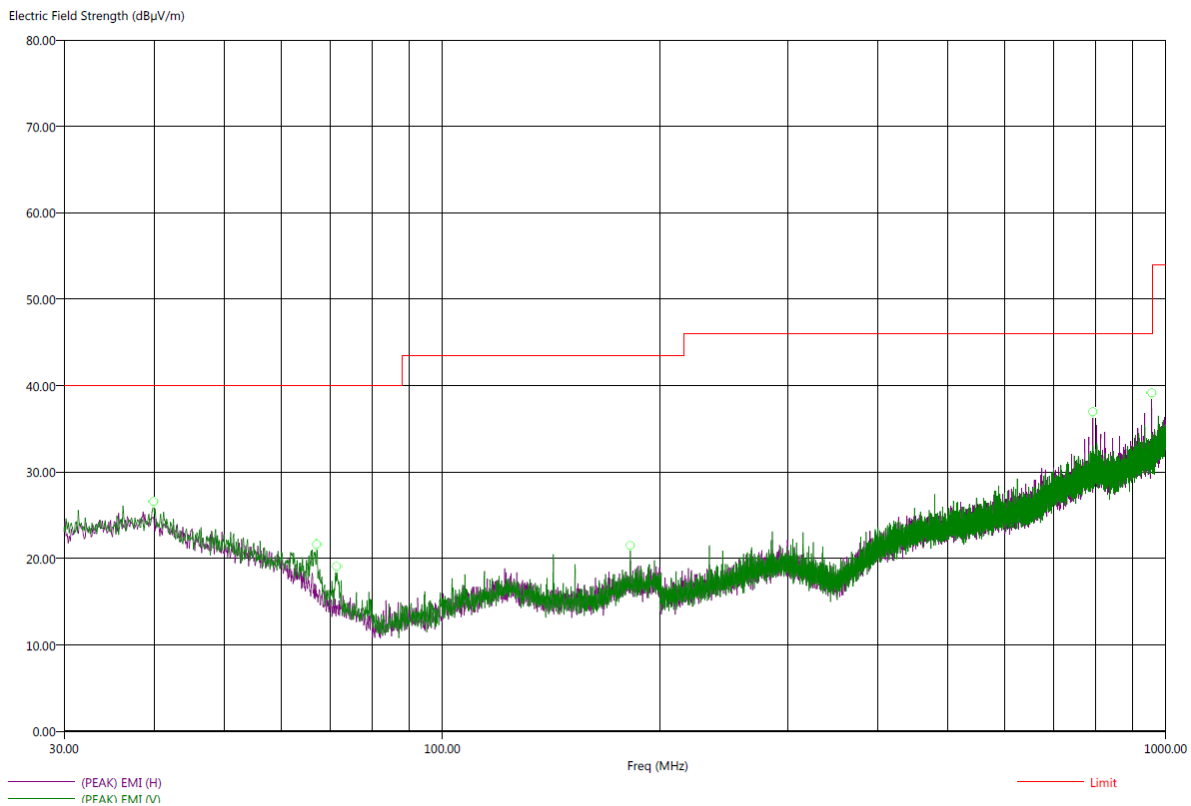
**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
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**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

Title: FCC 15.209  
File: Radiated Pre-Scan 30-1000Mhz\_n.set  
Operator: Matt Harrison  
EUT Type: ATWINC1510B.  
EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -8.  
Comments: Temp: 73f  
Hum: 43%  
3.3VDC

6/26/2015 10:54:48 AM  
Sequence: Preliminary Scan

**Compatible Electronics, Inc. FAC-3 (Lab R)**

*This was worst case for all modes and channels*

*There were no radiated emissions besides harmonics found between 9kHz-30 MHz or 1GHz-25GHz.*



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(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
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(949) 587-0400

Title: FCC 15.209  
File: Radiated Final 30-1000Mhz\_g.set  
Operator: Matt Harrison  
EUT Type: ATWINC1510B.  
EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -8  
Comments: Temp: 73f  
Hum: 43%  
3.3VDC

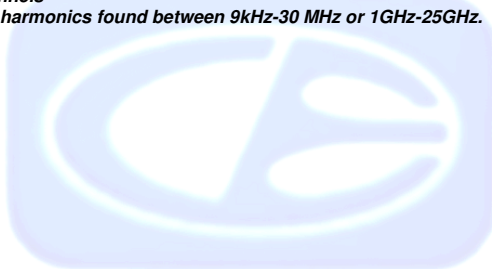
6/26/2015 11:05:23 AM  
Sequence: Final Measurements

**Compatible Electronics, Inc. FAC-3 (Lab R)**

| Freq (MHz) | (QP)<br>Margin<br>(dB) | (QP) EMI<br>(dBµV/m) | (PEAK)<br>EMI<br>(dBµV/m) | Limit<br>(dBµV/m) | Pol | Ttbl Agl<br>(deg) | Twr Ht<br>(cm) | Transducer<br>(dB) | Cable(dB) |
|------------|------------------------|----------------------|---------------------------|-------------------|-----|-------------------|----------------|--------------------|-----------|
| 39.90      | -19.69                 | 20.31                | 25.47                     | 40.00             | V   | 167.25            | 257.59         | 23.00              | 1.30      |
| 67.10      | -24.40                 | 15.60                | 21.18                     | 40.00             | V   | 161.25            | 149.00         | 14.62              | 0.79      |
| 71.50      | -26.52                 | 13.48                | 19.39                     | 40.00             | V   | 242.25            | 113.77         | 12.96              | 0.65      |
| 182.00     | -26.15                 | 17.37                | 22.21                     | 43.52             | V   | 166.75            | 110.07         | 14.96              | 1.29      |
| 793.70     | -12.75                 | 33.25                | 37.42                     | 46.00             | H   | 252.50            | 113.29         | 25.86              | 3.26      |
| 956.40     | -6.85                  | 39.15                | 41.73                     | 46.00             | H   | 281.25            | 166.91         | 27.11              | 3.59      |

*This was worst case for all modes and channels*

*There were no radiated emissions besides harmonics found between 9kHz-30 MHz or 1GHz-25GHz.*



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**APPENDIX E**

***CONDUCTED EMISSIONS DATA SHEETS***



---

**Brea Division**  
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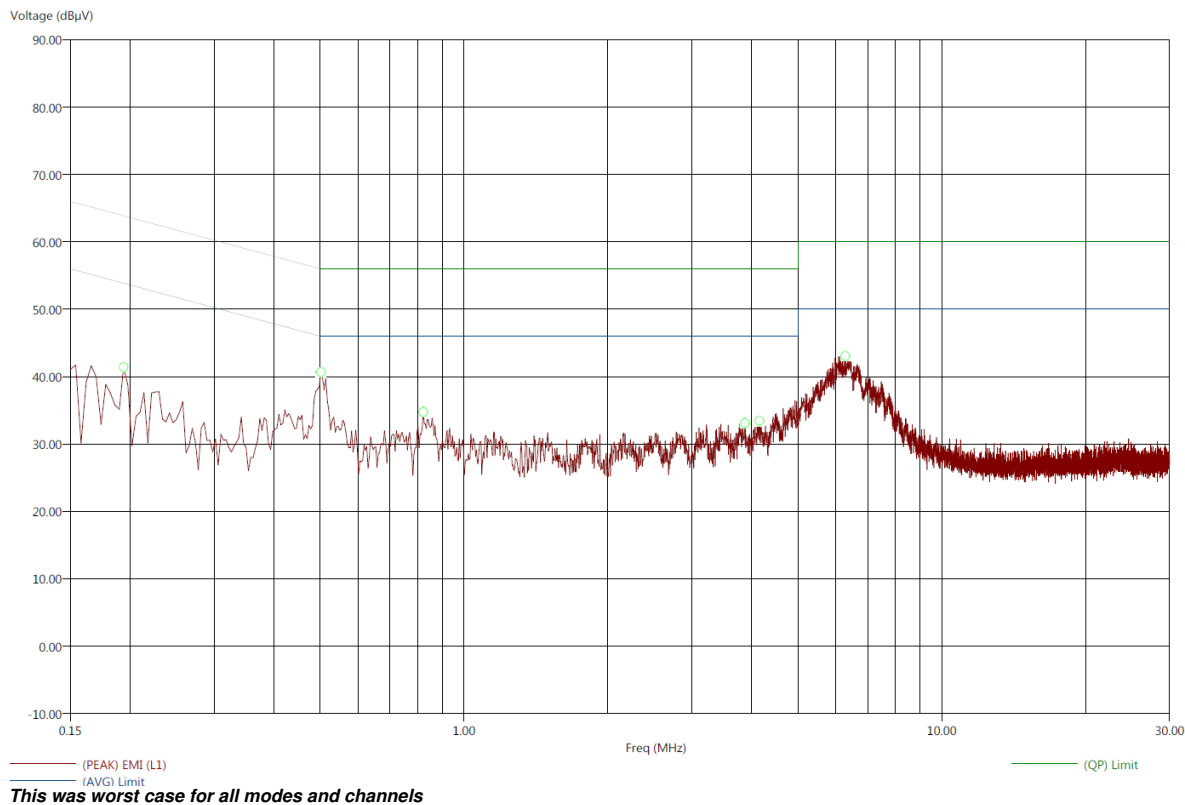
**Agoura Division**  
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**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

Title: FCC 15.207  
File: Conducted Pre-Line\_n.set  
Operator: Matt Harrison  
EUT Type: ATWILC1510B.  
EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -8.  
Comments: Connected to Control Board Powered By USB Adapter.  
Temp: 74f  
Hum: 48%  
USB Adapter: 120V 60Hz

7/10/2015 2:14:26 PM  
Sequence: Preliminary Scan

**Compatible Electronics, Inc. FAC-3 (LAB R)**

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**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

Title: FCC 15.207  
File: Conducted Final-Line\_n.set  
Operator: Matt Harrison  
EUT Type: ATWILC1510B.  
EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -8.  
Comments: Connected to Control Board Powered By USB Adapter.  
Temp: 74f  
Hum: 48%  
USB Adapter: 120V 60Hz

7/10/2015 2:19:40 PM  
Sequence: Final Measurements

**Compatible Electronics, Inc. FAC-3 (LAB R)**

| Freq<br>(MHz) | (AVG)<br>Margin<br>AVL<br>(dB) | (QP)<br>Margin<br>QPL<br>(dB) | (AVG)<br>EMI<br>(dBμV) | (QP)<br>EMI<br>(dBμV) | (PEAK)<br>EMI<br>(dBμV) | (AVG)<br>Limit<br>(dBμV) | (QP) Limit<br>(dBμV) | Transducer<br>(dB) | Cable<br>(dB) |
|---------------|--------------------------------|-------------------------------|------------------------|-----------------------|-------------------------|--------------------------|----------------------|--------------------|---------------|
| 0.19          | -35.32                         | -28.69                        | 18.54                  | 35.17                 | 40.37                   | 53.86                    | 63.86                | 0.32               | 0.29          |
| 0.50          | -17.37                         | -18.18                        | 28.63                  | 37.82                 | 42.74                   | 46.00                    | 56.00                | 0.07               | 0.00          |
| 0.82          | -24.62                         | -26.23                        | 21.38                  | 29.77                 | 34.74                   | 46.00                    | 56.00                | 0.06               | 0.00          |
| 3.88          | -27.32                         | -28.84                        | 18.68                  | 27.16                 | 31.22                   | 46.00                    | 56.00                | 0.07               | 0.23          |
| 4.15          | -25.60                         | -26.91                        | 20.40                  | 29.09                 | 32.54                   | 46.00                    | 56.00                | 0.07               | 0.22          |
| 6.29          | -21.51                         | -21.00                        | 28.49                  | 39.00                 | 42.30                   | 50.00                    | 60.00                | 0.06               | 0.37          |

*This was worst case for all modes and channels*



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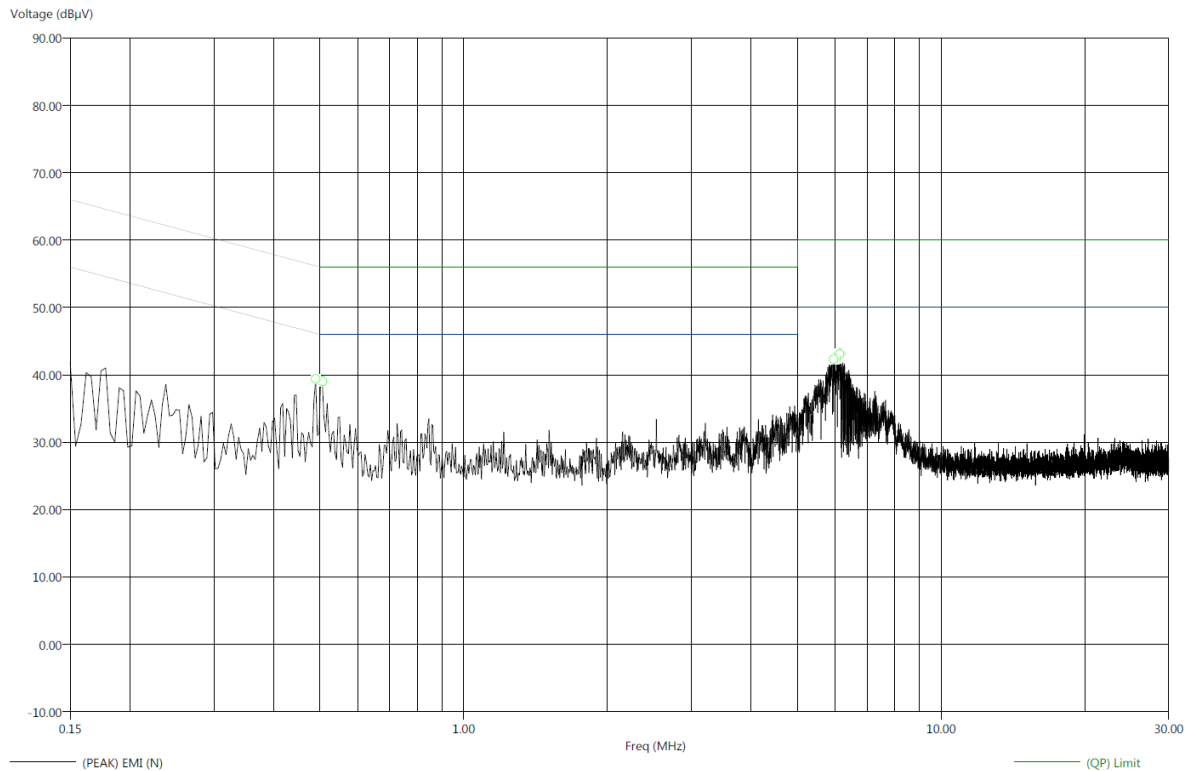
**Agoura Division**  
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**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

Title: FCC 15.207  
File: Conducted Pre-Neutral\_n.set  
Operator: Matt Harrison  
EUT Type: ATWILC1000B.  
EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -7.  
Comments: Connected to Control Board Powered By USB Adapter.  
Temp: 74f  
Hum: 48%  
USB Adapter: 120V 60Hz

7/10/2015 2:24:35 PM  
Sequence: Preliminary Scan

**Compatible Electronics, Inc. FAC-3 (LAB R)**

***This was worst case for all modes and channels***



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**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

Title: FCC 15.207  
File: Conducted Final-Neutral\_n.set  
Operator: Matt Harrison  
EUT Type: ATWILC1000B.  
EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -7.  
Comments: Connected to Control Board Powered By USB Adapter.  
Temp: 74f  
Hum: 48%  
USB Adapter: 120V 60Hz

7/10/2015 2:27:42 PM  
Sequence: Final Measurements

**Compatible Electronics, Inc. FAC-3 (LAB R)**

| Freq (MHz) | (AVG) Margin AVL (dB) | (QP) Margin QPL (dB) | (AVG) EMI (dBμV) | (QP) EMI (dBμV) | (PEAK) EMI (dBμV) | (AVG) Limit (dBμV) | (QP) Limit (dBμV) | Transducer (dB) | Cable (dB) |
|------------|-----------------------|----------------------|------------------|-----------------|-------------------|--------------------|-------------------|-----------------|------------|
| 0.49       | -23.24                | -23.40               | 22.93            | 32.77           | 39.56             | 46.17              | 56.17             | 0.06            | 0.01       |
| 0.51       | -20.17                | -19.53               | 25.83            | 36.47           | 41.23             | 46.00              | 56.00             | 0.06            | 0.00       |
| 5.97       | -30.38                | -23.25               | 19.62            | 36.75           | 42.21             | 50.00              | 60.00             | 0.07            | 0.33       |
| 6.04       | -30.67                | -23.16               | 19.33            | 36.84           | 42.36             | 50.00              | 60.00             | 0.07            | 0.34       |
| 6.13       | -28.45                | -21.81               | 21.55            | 38.19           | 42.75             | 50.00              | 60.00             | 0.07            | 0.35       |
| 6.15       | -28.25                | -21.83               | 21.75            | 38.17           | 43.17             | 50.00              | 60.00             | 0.07            | 0.35       |

*This was worst case for all modes and channels*



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***DTS BANDWIDTH***



---

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## 802.11b MODE

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510B-MR210PB  
Mode: 802.11b

Date: 9/1/2015  
Lab: R  
Test ENG: Torey Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

DTS Bandwidth

| Freq. (MHz) | Measured<br>BW (kHz) | Limit<br>Min<br>(kHz) | Margin<br>(kHz) | Peak / QP<br>/ Avg | Comments |
|-------------|----------------------|-----------------------|-----------------|--------------------|----------|
| 2412        | 12.12                | 500.00                | 11624.25        | Peak               |          |
| 2442        | 12.22                | 500.00                | 11724.45        | Peak               |          |
| 2462        | 12.22                | 500.00                | 11724.45        | Peak               |          |

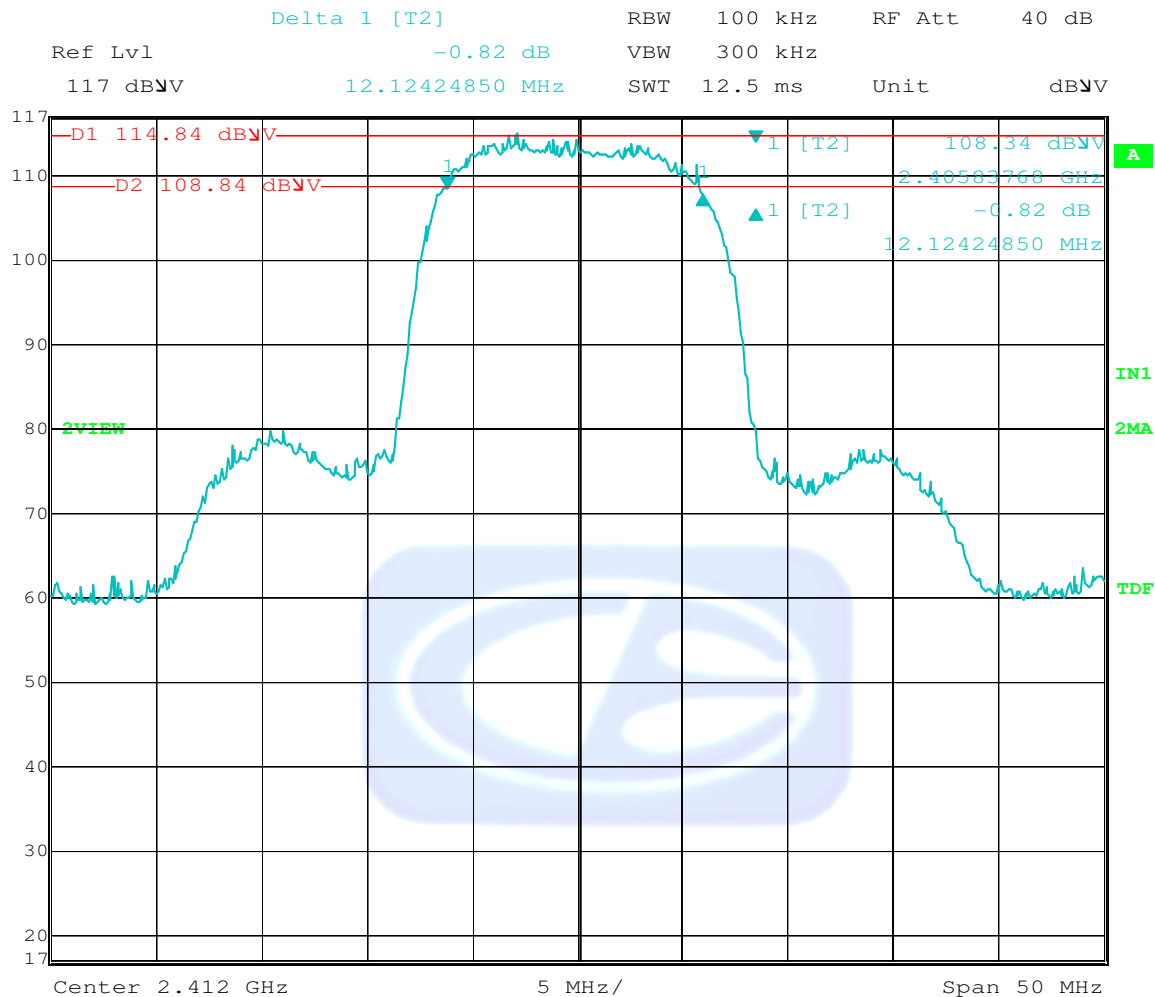


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(949) 587-0400



Title: ATWINC1510B-MR210PB  
Comment A: DTS Bandwidth Low Channel 2412Mhz B mode  
Date: 2.SEP.2015 01:13:59

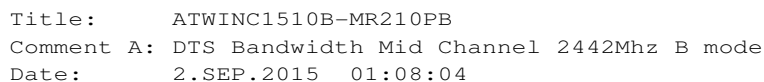


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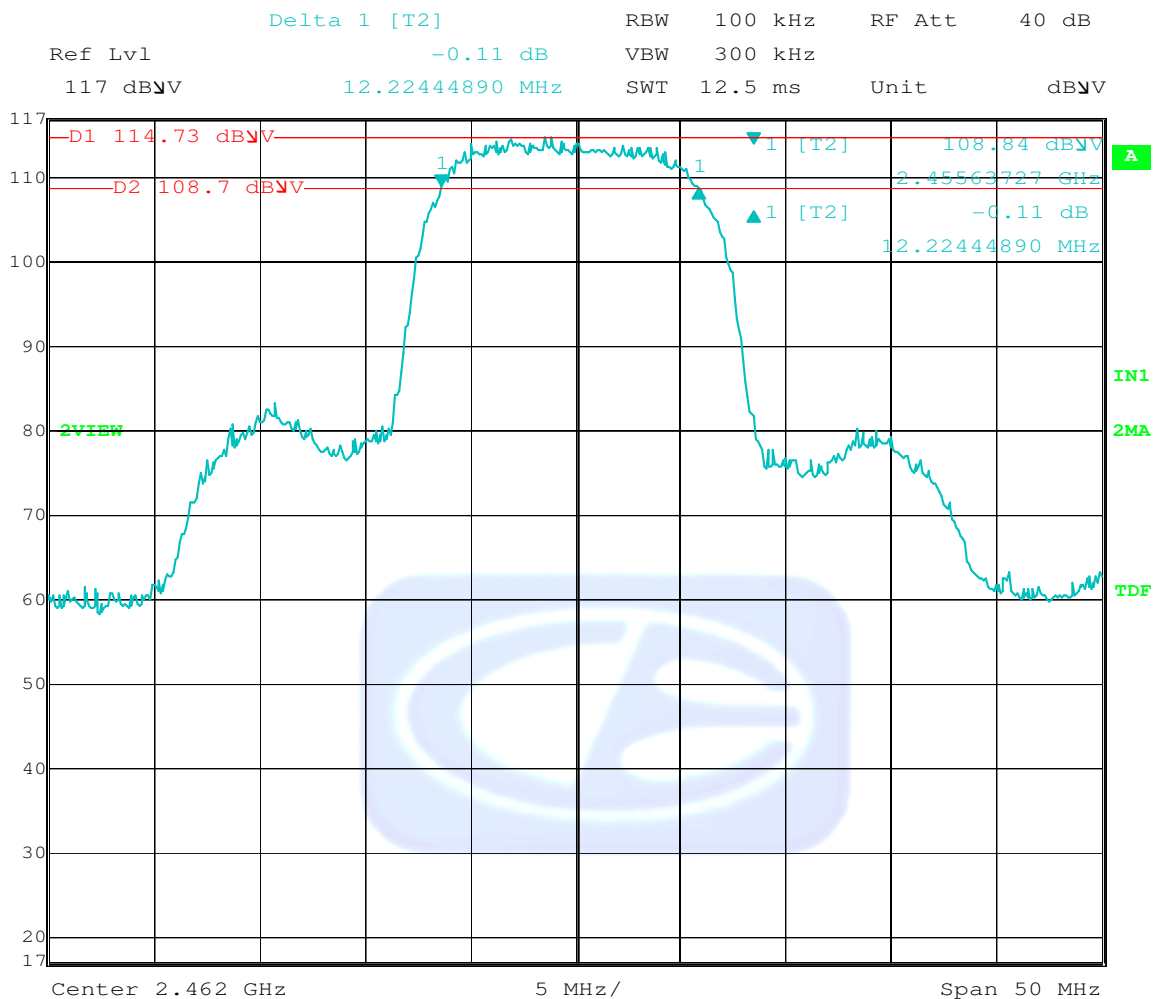
**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

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(949) 587-0400



**Lake Forest Division**  
**20621 Pascal Way**  
**Lake Forest, CA 92630**  
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Title: ATWINC1510B-MR210PB  
Comment A: DTS Bandwidth High Channel 2462Mhz B mode  
Date: 2.SEP.2015 00:59:31



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(949) 587-0400

## 802.11g MODE

**FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/1/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | Torey Oliver |
| Mode:    | 802.11g             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

DTS Bandwidth

| Freq. (MHz) | Measured BW (MHz) | Limit Min (kHz) | Margin (kHz) | Peak / QP / Avg | Comments |
|-------------|-------------------|-----------------|--------------|-----------------|----------|
| 2412        | 16.53             | 500.00          | 16033.07     | Peak            |          |
| 2442        | 16.33             | 500.00          | 15832.67     | Peak            |          |
| 2462        | 16.33             | 500.00          | 15832.67     | Peak            |          |

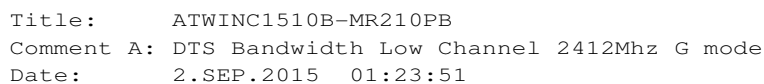


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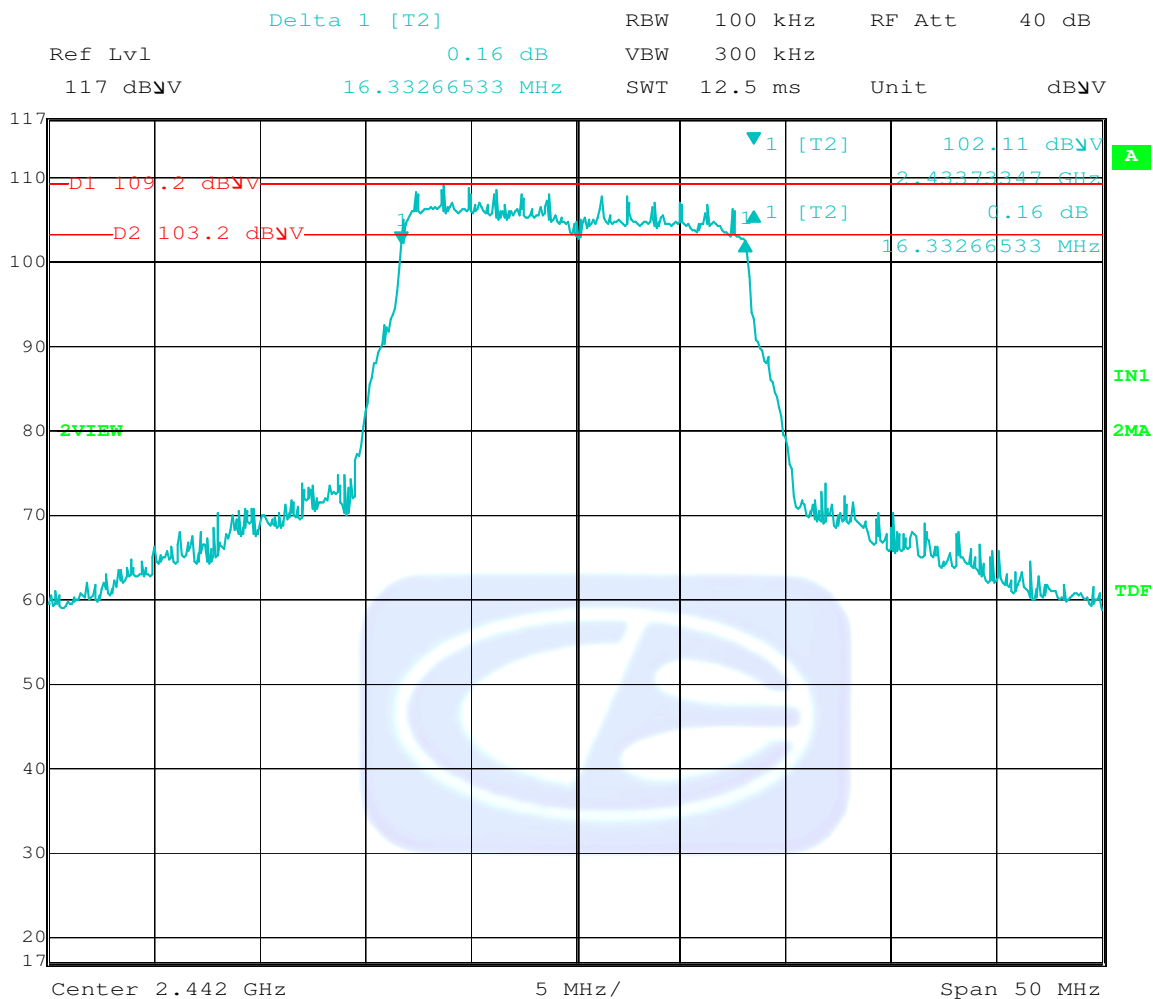
**Agoura Division**  
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**Lake Forest Division**  
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**Lake Forest, CA 92630**  
**(949) 587-0400**



Title: ATWINC1510B-MR210PB  
Comment A: DTS Bandwidth Mid Channel 2442Mhz G mode  
Date: 2.SEP.2015 01:25:53

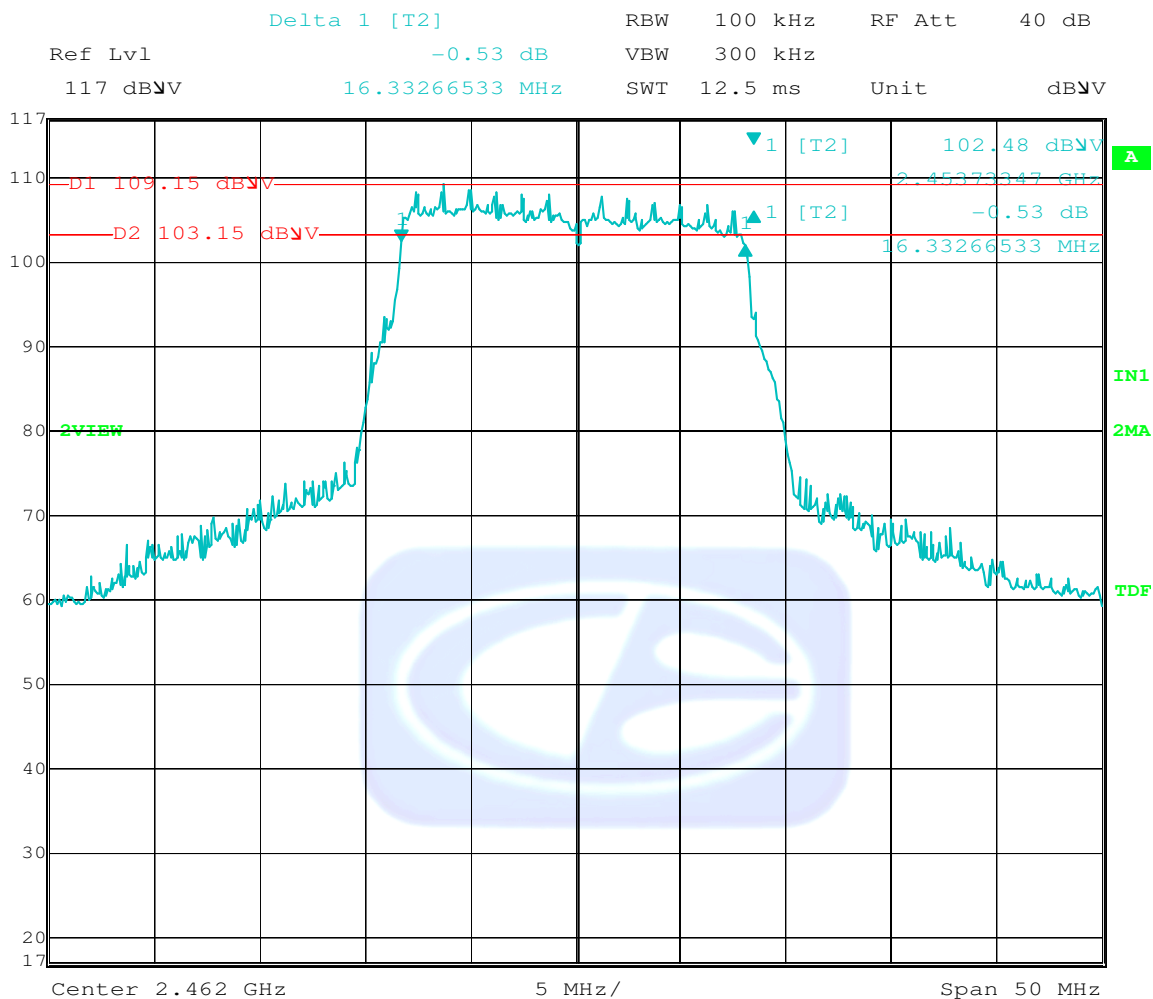


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**Lake Forest Division**  
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Lake Forest, CA 92630  
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Title: ATWINC1510B-MR210PB  
Comment A: DTS Bandwidth High Channel 2462Mhz G mode  
Date: 2.SEP.2015 01:28:51



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## 802.11n MODE

**FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/1/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | Torey Oliver |
| Mode:    | 802.11n             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

DTS Bandwidth

| Freq. (MHz) | Measured BW (MHz) | Limit (kHz) | Margin (kHz) | Peak / QP / Avg | Comments |
|-------------|-------------------|-------------|--------------|-----------------|----------|
| 2412        | 17.54             | 500.00      | 17035.07     | Peak            |          |
| 2442        | 17.54             | 500.00      | 17035.07     | Peak            |          |
| 2462        | 17.54             | 500.00      | 17035.07     | Peak            |          |

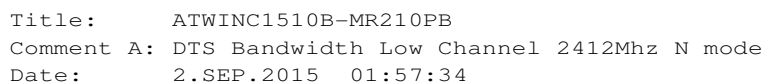


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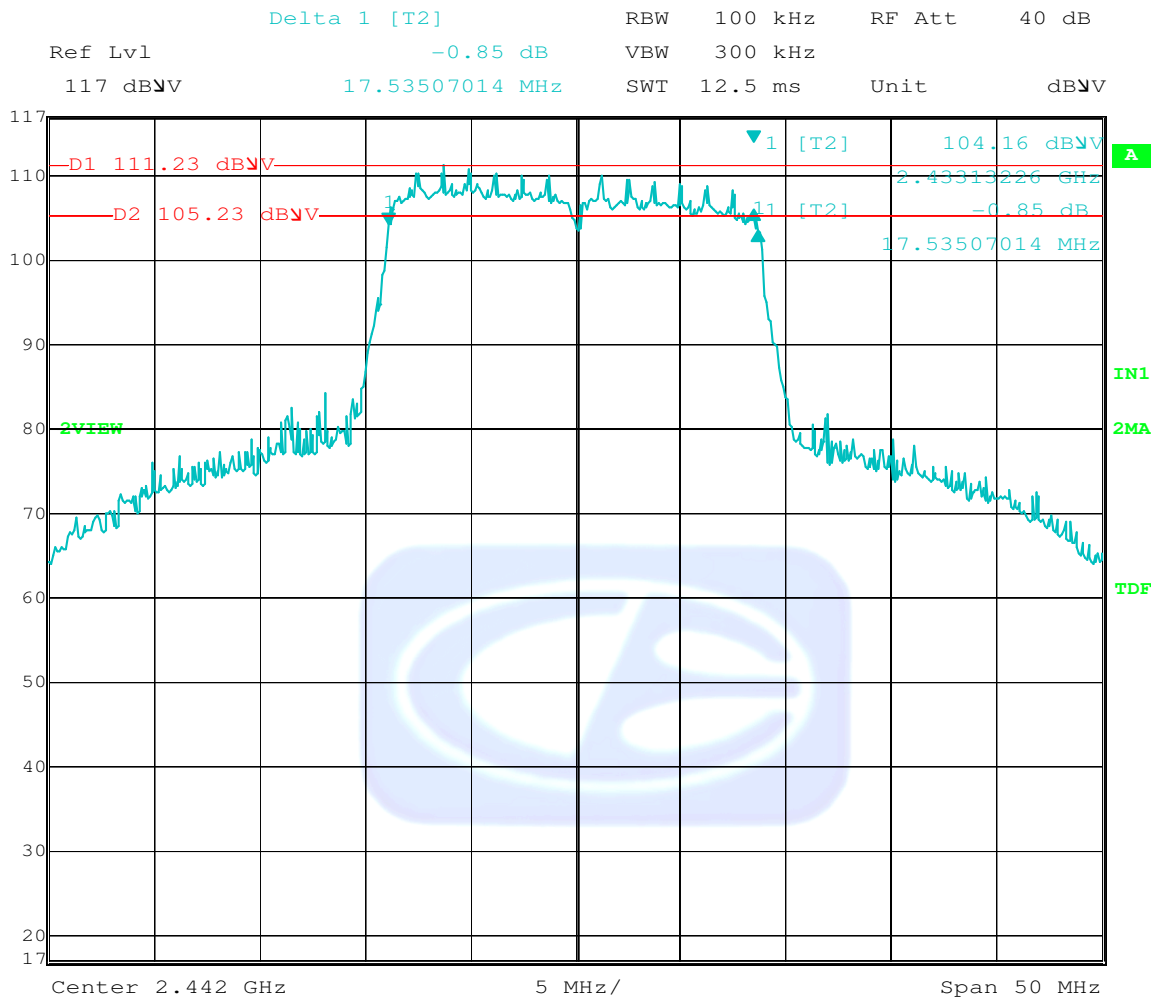
**Agoura Division**  
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**(949) 587-0400**



Title: ATWINC1510B-MR210PB  
Comment A: DTS Bandwidth Mid Channel 2442Mhz N mode  
Date: 2.SEP.2015 01:51:03

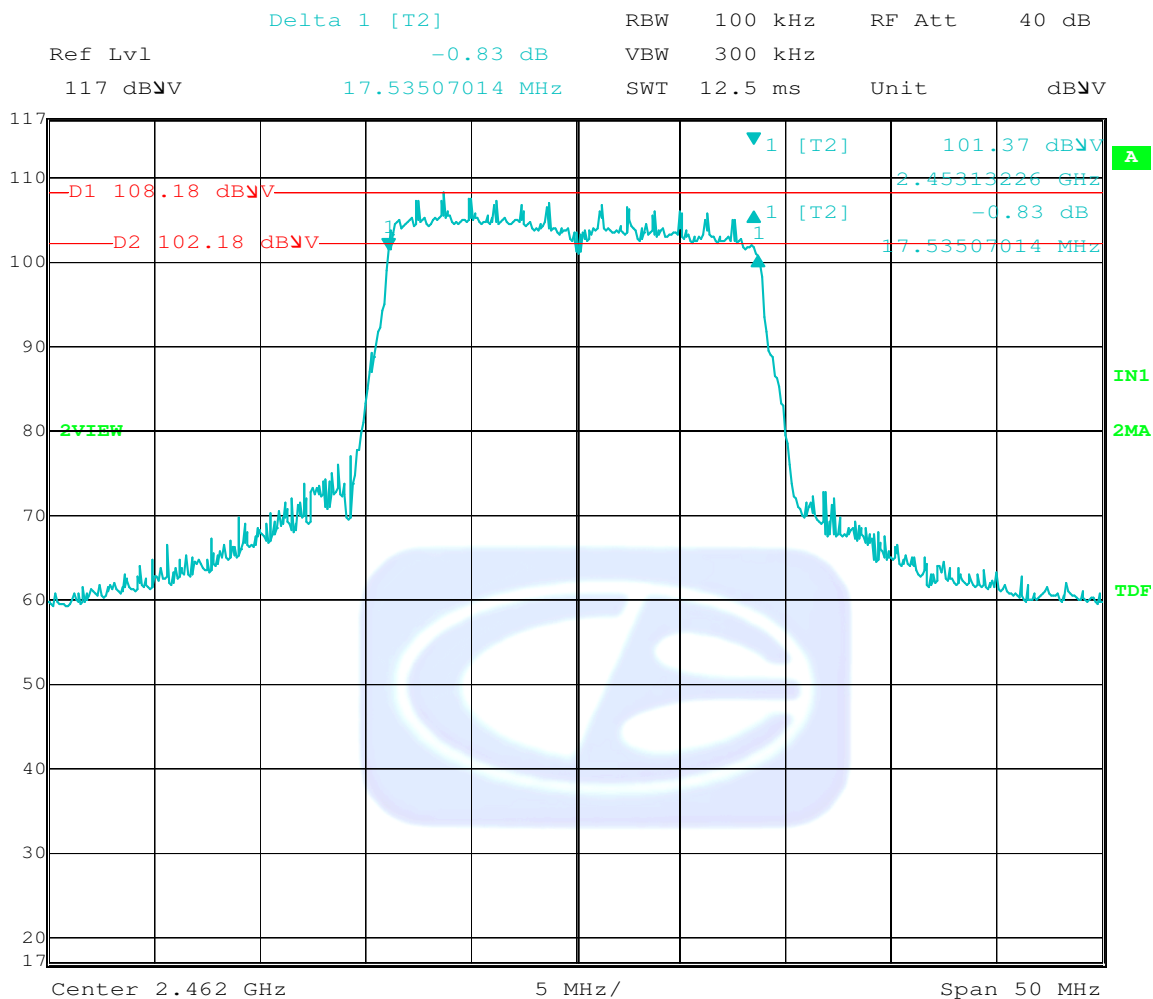


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Title: ATWINC1510B-MR210PB  
Comment A: DTS Bandwidth High Channel 2462Mhz N mode  
Date: 2.SEP.2015 01:35:38



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***MAXIMUM PEAK CONDUCTED OUTPUT POWER***

***DATA SHEETS***



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**MAXIMUM PEAK CONDUCTED OUTPUT POWER****802.11b Mode****FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510B-MR210PB | Test ENG: | Torey Oliver |
| Mode:    | 802.11b             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Peak / QP / Avg | Comments    |
|-------------|-------------|-------------|-------------|-----------------|-------------|
| 2412        | 16.83       | 30.00       | -13.17      | Avg             | DigGain= -9 |
| 2442        | 17.71       | 30.00       | -12.29      | Avg             | DigGain= -8 |
| 2462        | 17.73       | 30.00       | -12.27      | Avg             | DigGain= -8 |



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**MAXIMUM PEAK CONDUCTED OUTPUT POWER****802.11g Mode****FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | Torey Oliver |
| Mode:    | 802.11g             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Peak / QP / Avg | Comments     |
|-------------|-------------|-------------|-------------|-----------------|--------------|
| 2412        | 10.94       | 30.00       | -19.06      | Avg             | DigGain= -12 |
| 2442        | 15.81       | 30.00       | -14.19      | Avg             | DigGain= -7  |
| 2462        | 12.97       | 30.00       | -17.03      | Avg             | DigGain= -10 |



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**MAXIMUM PEAK CONDUCTED OUTPUT POWER****802.11n Mode****FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | Torey Oliver |
| Mode:    | 802.11n             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBm) | Limit (dBm) | Margin (dB) | Peak / QP / Avg | Comments       |
|-------------|-------------|-------------|-------------|-----------------|----------------|
| 2412        | 20.66       | 30.00       | -9.34       | Peak            | DigGain= -13.5 |
| 2442        | 23.15       | 30.00       | -6.85       | Peak            | DigGain= -8    |
| 2462        | 22.28       | 30.00       | -7.72       | Peak            | DigGain= -11   |



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***MAXIMUM PEAK POWER SPECTRAL DENSITY LEVEL IN THE  
FUNDAMENTAL EMISSION***

***DATA SHEETS***



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## PEAK POWER SPECTRAL DENSITY

### *802.11b Mode*

**FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510B-MR210PB | Test ENG: | Torey Oliver |
| Mode:    | 802.11b             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

DTS Bandwidth

| Freq. (MHz) | Peak (dBm) | Limit (dBm) | Margin (dB) | Peak / QP / Avg | Comments     |
|-------------|------------|-------------|-------------|-----------------|--------------|
| 2412        | -0.61      | 8.00        | -8.61       | Peak            | DigGain = -9 |
| 2442        | -0.07      | 8.00        | -8.07       | Peak            | DigGain = -8 |
| 2462        | -0.27      | 8.00        | -8.27       | Peak            | DigGain = -8 |

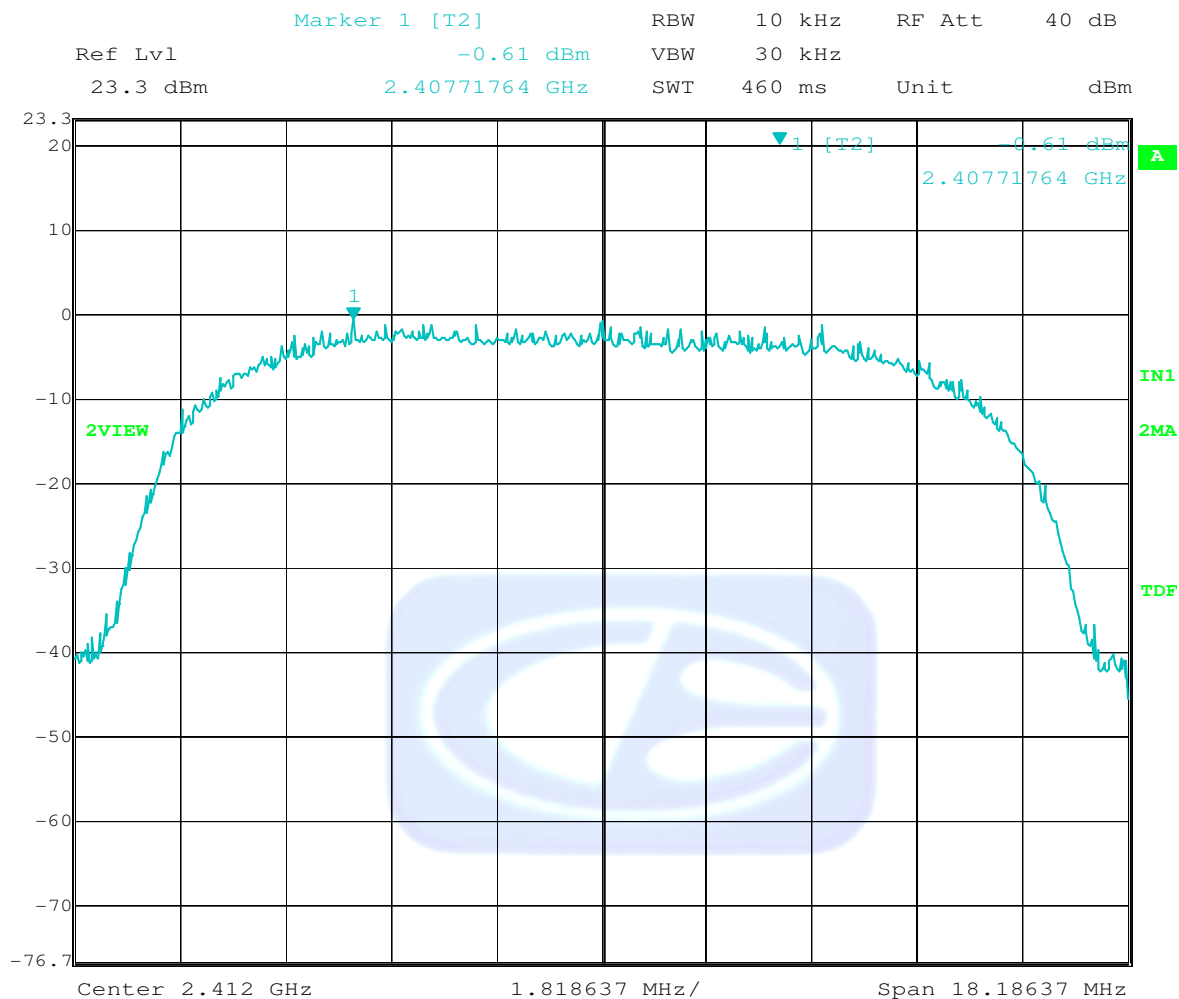


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density Low Channel B Mode  
Date: 2.SEP.2015 18:35:08

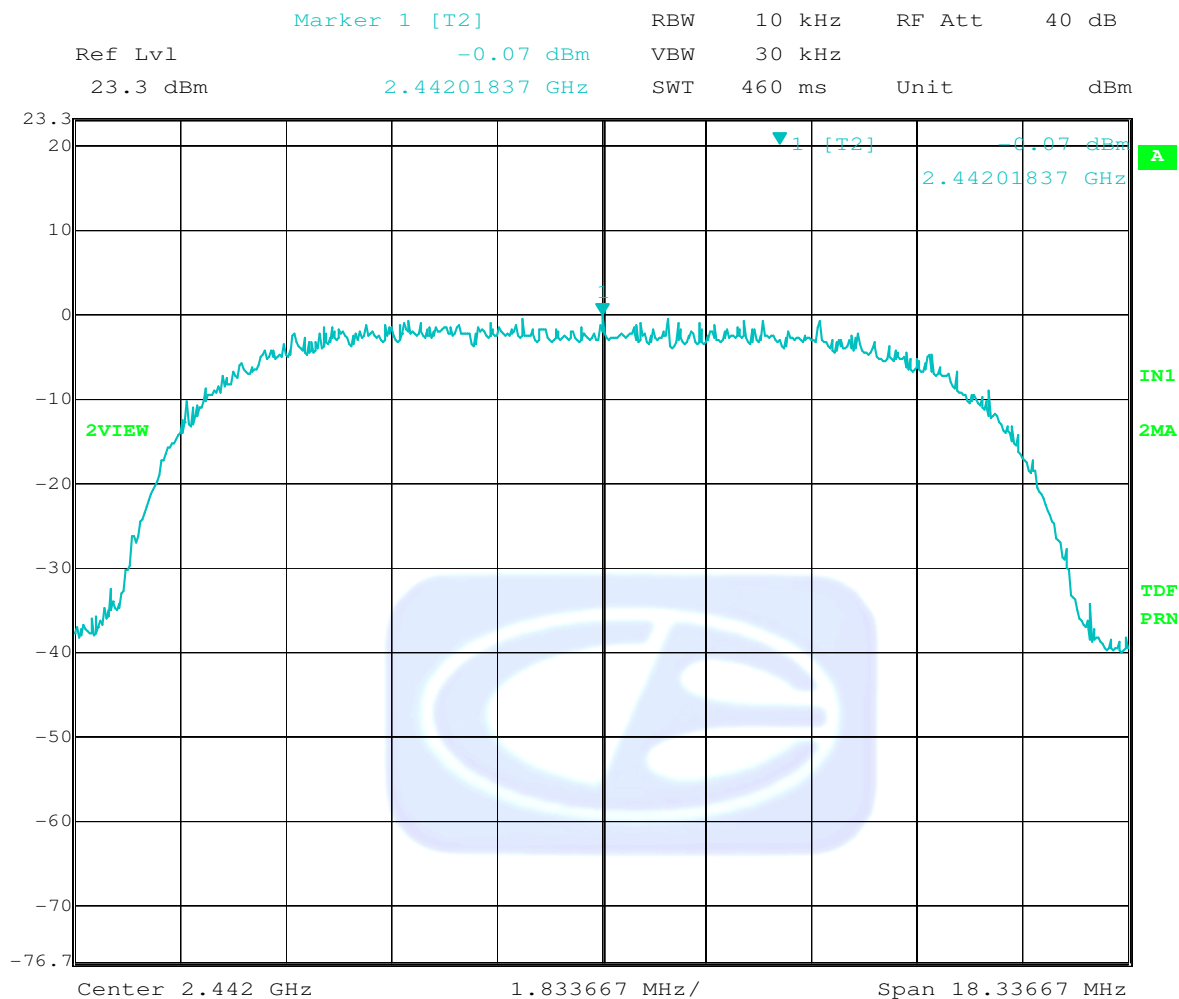


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density Mid Channel B Mode  
Date: 2.SEP.2015 18:18:36

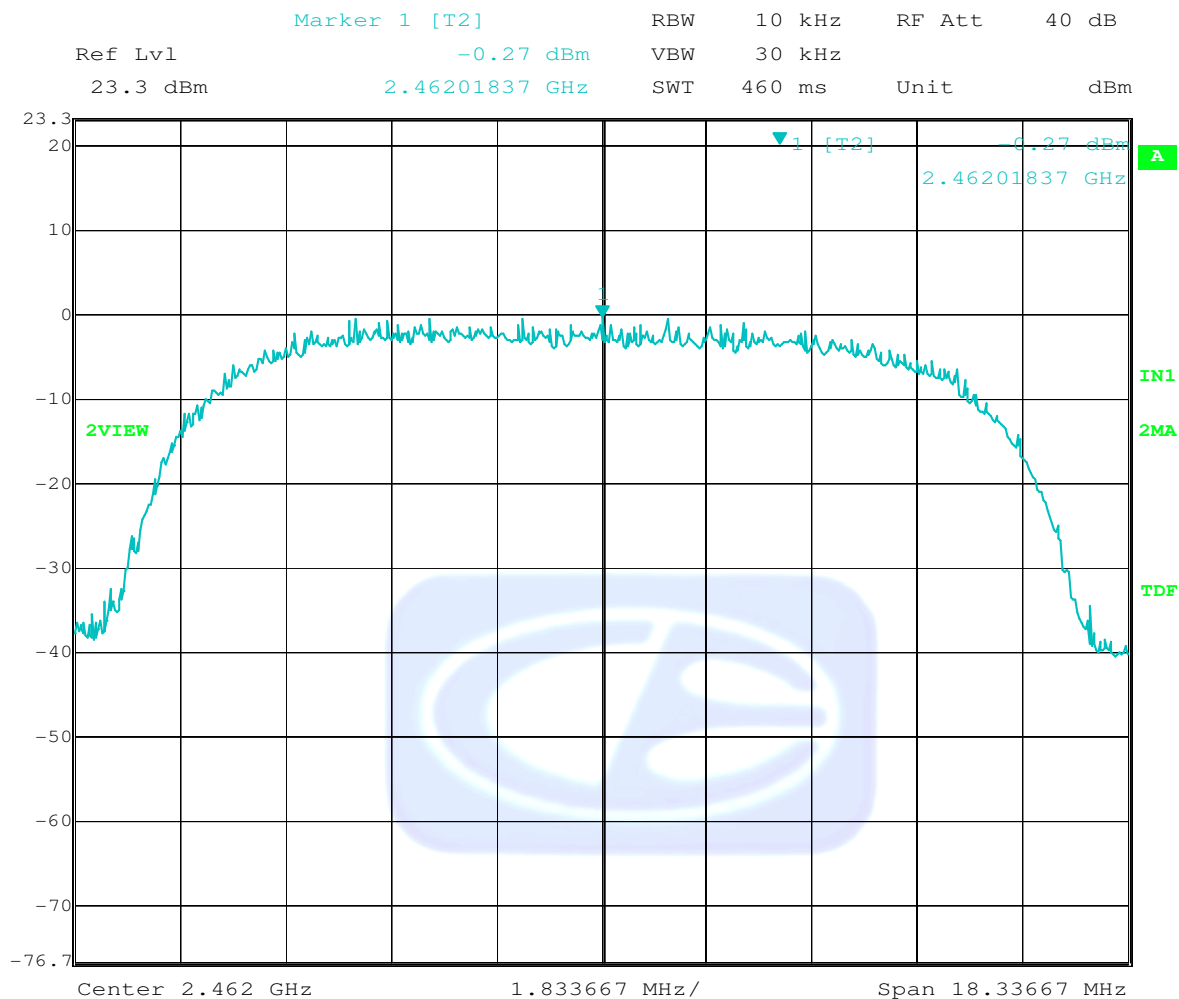


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Title: ATWINC1510B-MR210PB  
 Comment A: Power Spectral Density High Channel B Mode  
 Date: 2.SEP.2015 18:20:20



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## PEAK POWER SPECTRAL DENSITY

### *802.11g Mode*

**FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | Torey Oliver |
| Mode:    | 802.11g             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

DTS Bandwidth

| Freq. (MHz) | Peak (dBm) | Limit (dBm) | Margin (dB) | Peak / QP / Avg | Comments     |
|-------------|------------|-------------|-------------|-----------------|--------------|
| 2412        | -5.89      | 8.00        | -13.89      | Peak            | DigGain= -12 |
| 2442        | -1.88      | 8.00        | -9.88       | Peak            | DigGain= -7  |
| 2462        | -5.89      | 8.00        | -13.89      | Peak            | DigGain= -10 |

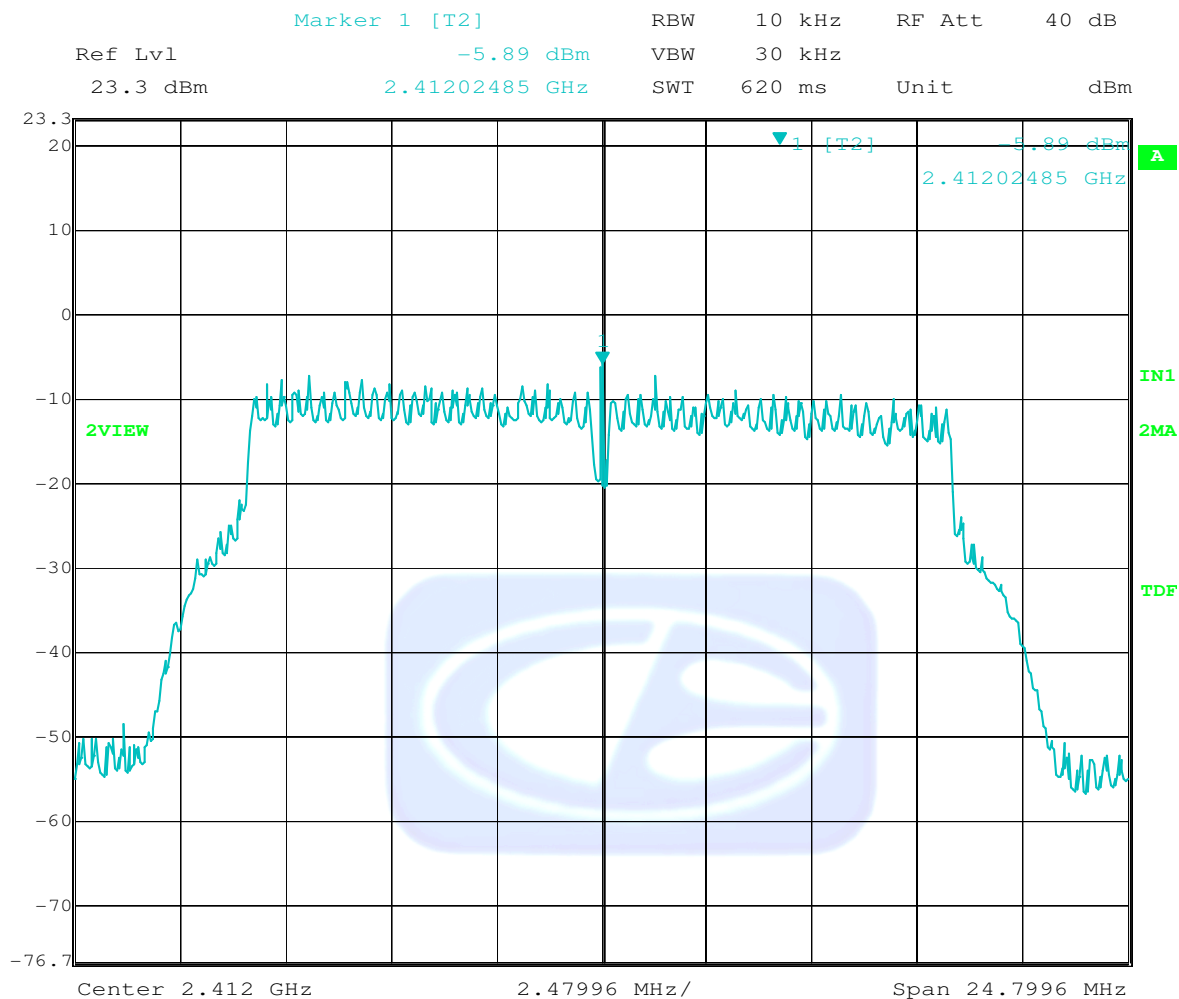


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density Low Channel G Mode  
Date: 2.SEP.2015 18:37:31

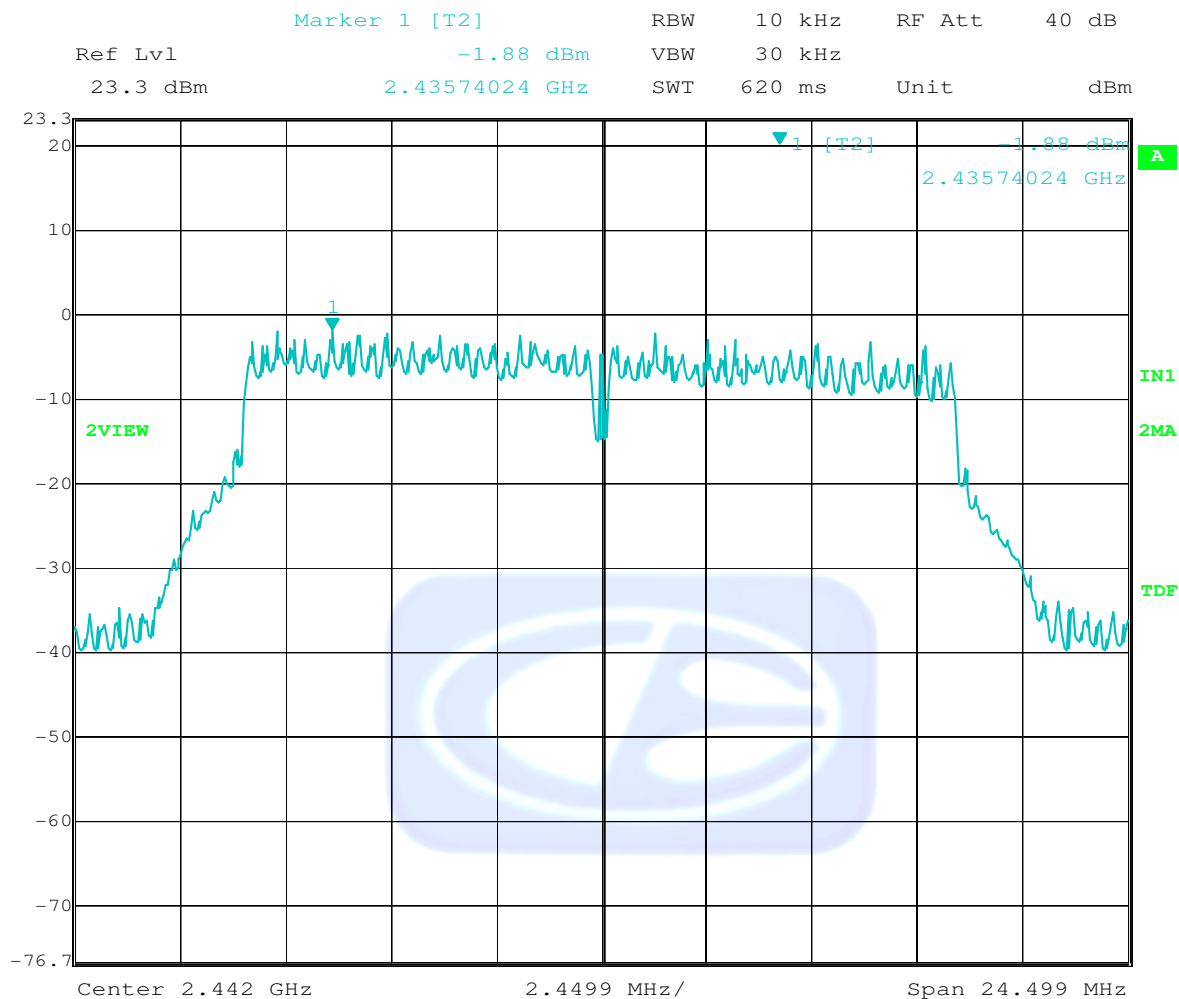


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density Mid Channel G Mode  
Date: 2.SEP.2015 18:45:14

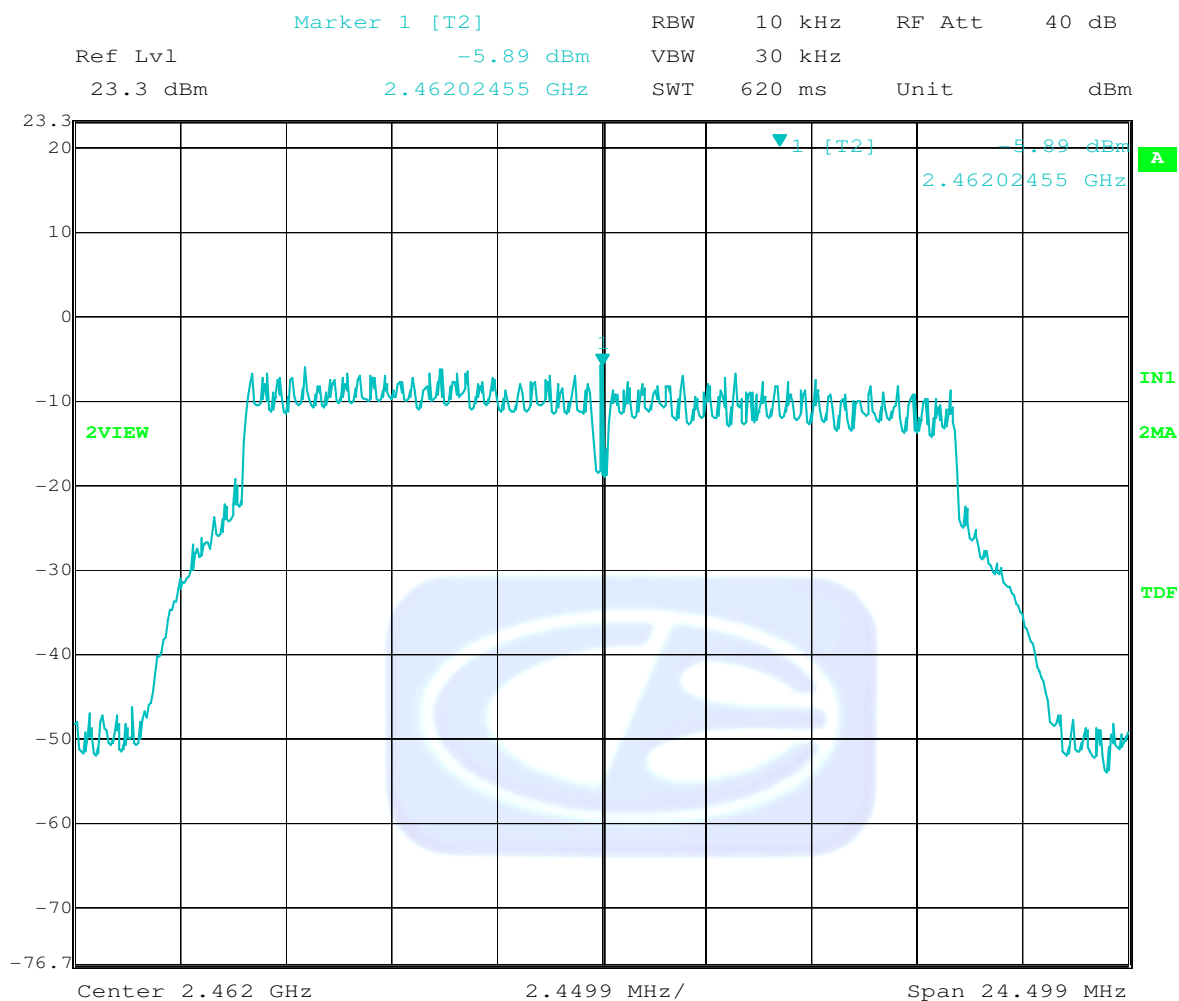


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density High Channel G Mode  
Date: 2.SEP.2015 18:51:27



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## PEAK POWER SPECTRAL DENSITY

### *802.11n Mode*

**FCC 15.247**

|          |                     |           |              |
|----------|---------------------|-----------|--------------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015     |
| EUT:     | Modular Transmitter | Lab:      | R            |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | Torey Oliver |
| Mode:    | 802.11n             |           |              |

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

DTS Bandwidth

| Freq. (MHz) | Peak (dBm) | Limit (dBm) | Margin (dB) | Peak / QP / Avg | Comments        |
|-------------|------------|-------------|-------------|-----------------|-----------------|
| 2412        | -6.08      | 8.00        | -14.08      | Peak            | DigGain = -13.5 |
| 2442        | -3.66      | 8.00        | -11.66      | Peak            | DigGain = -8    |
| 2462        | -6.14      | 8.00        | -14.14      | Peak            | DigGain = -11   |

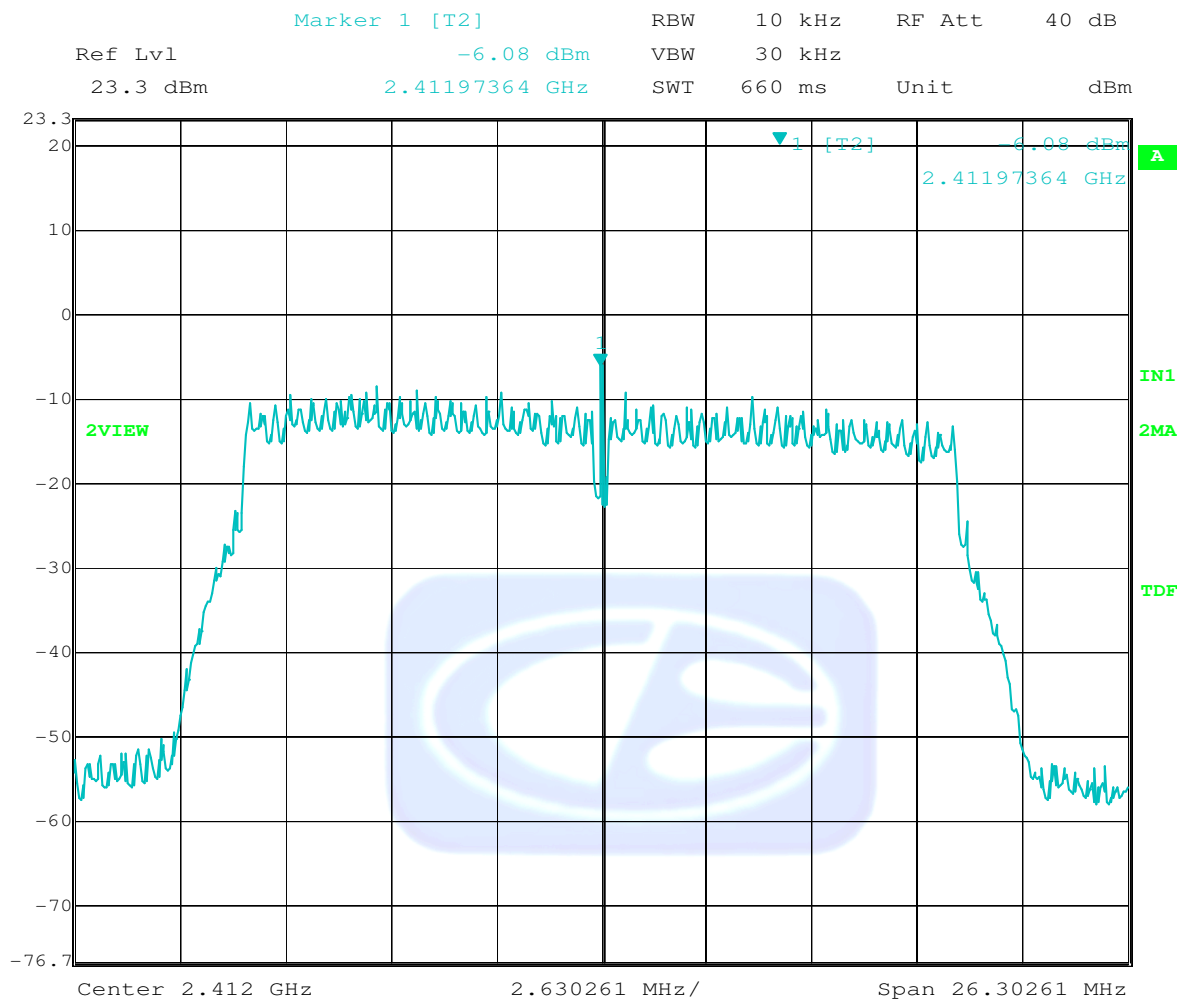


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density Low Channel N Mode  
Date: 2.SEP.2015 19:08:37

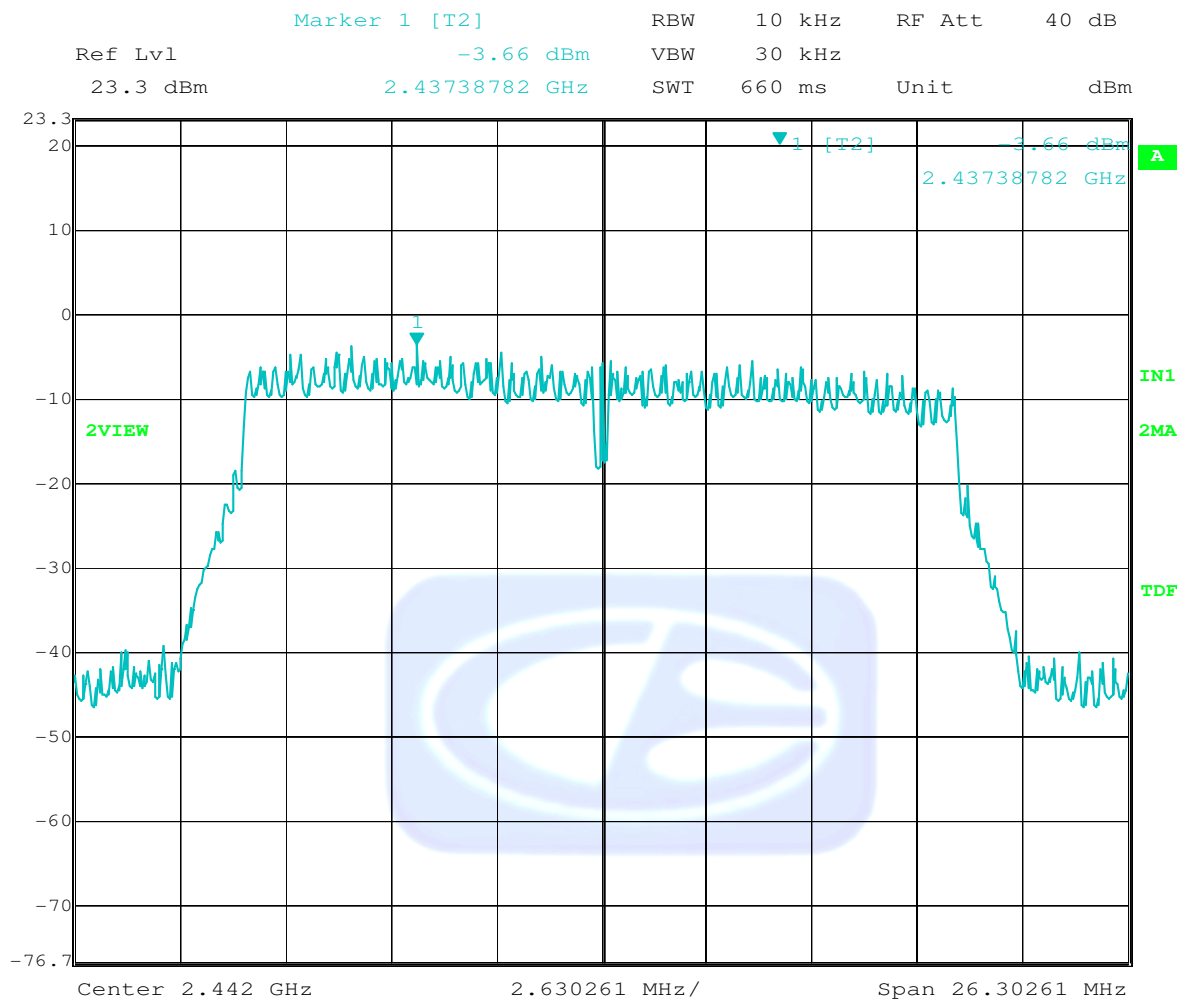


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density Mid Channel N Mode  
Date: 2.SEP.2015 19:02:55

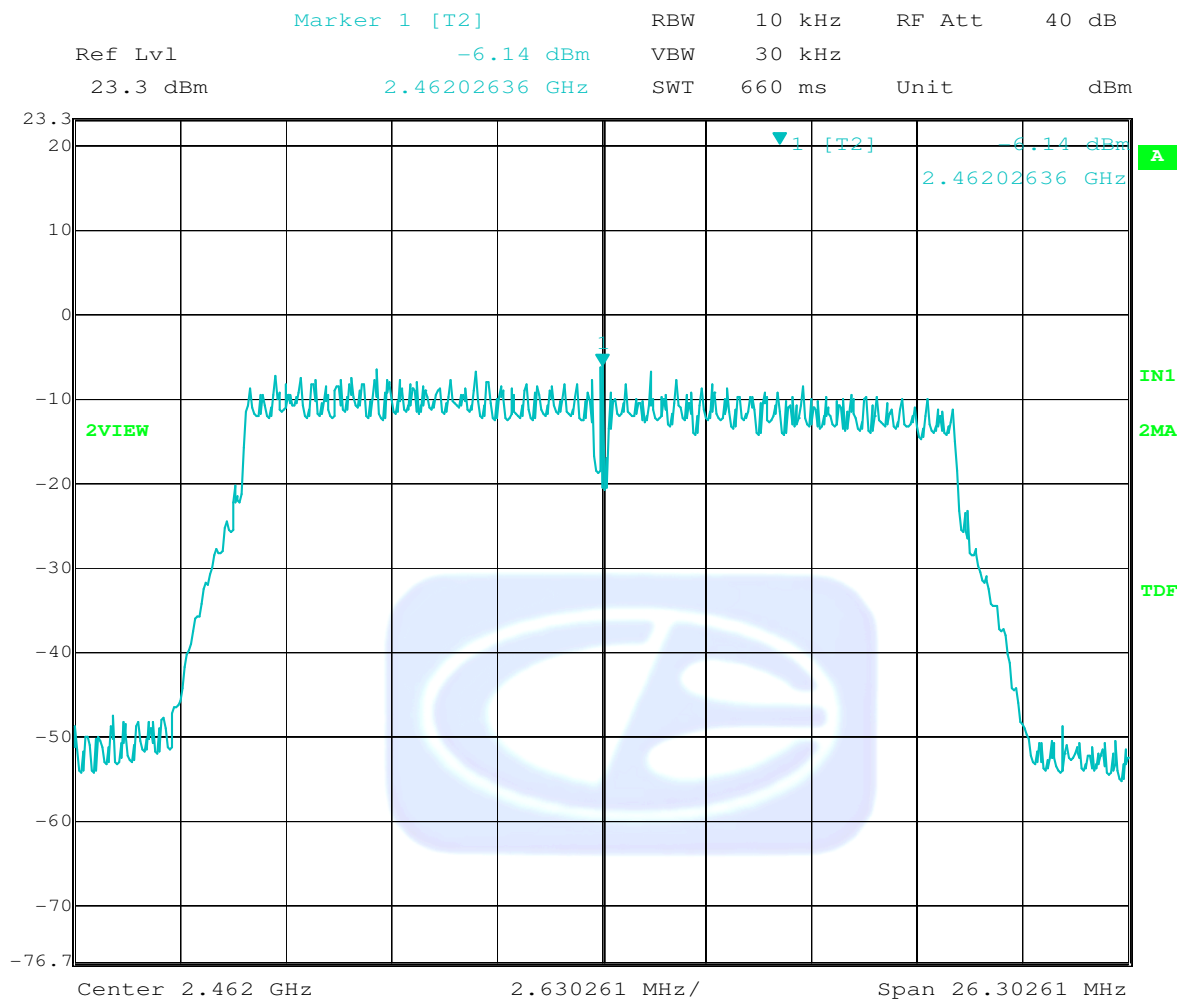


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Title: ATWINC1510B-MR210PB  
Comment A: Power Spectral Density High Channel N Mode  
Date: 2.SEP.2015 19:00:16



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***HARMONIC EMISSIONS IN NON-RESTRICTED FREQUENCY  
BANDS (IN 100KHZ BANDWIDTH) / CONDUCTED***

***DATA SHEETS***



---

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## ***HARMONIC EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS***

### ***802.11b Mode***

**FCC 15.247**

Company: Atmel Corporation Date: 9/2/2015  
EUT: Modular Transmitter Lab: R  
Model: ATWINC1510-MR210PB Test ENG: T. Oliver

| Freq. (MHz) | Level (dBuV) | Limit | Margin | Peak / QP / Avg | Comments     |
|-------------|--------------|-------|--------|-----------------|--------------|
| 9848        | 68.17        | 95.59 | -27.42 | Peak            | High Channel |
| 9768        | 67.81        | 95.49 | -27.68 | Peak            | Mid Channel  |
| 9648        | 66.55        | 95.44 | -28.89 | Peak            | Low Channel  |

Worst case for all b mode measurements



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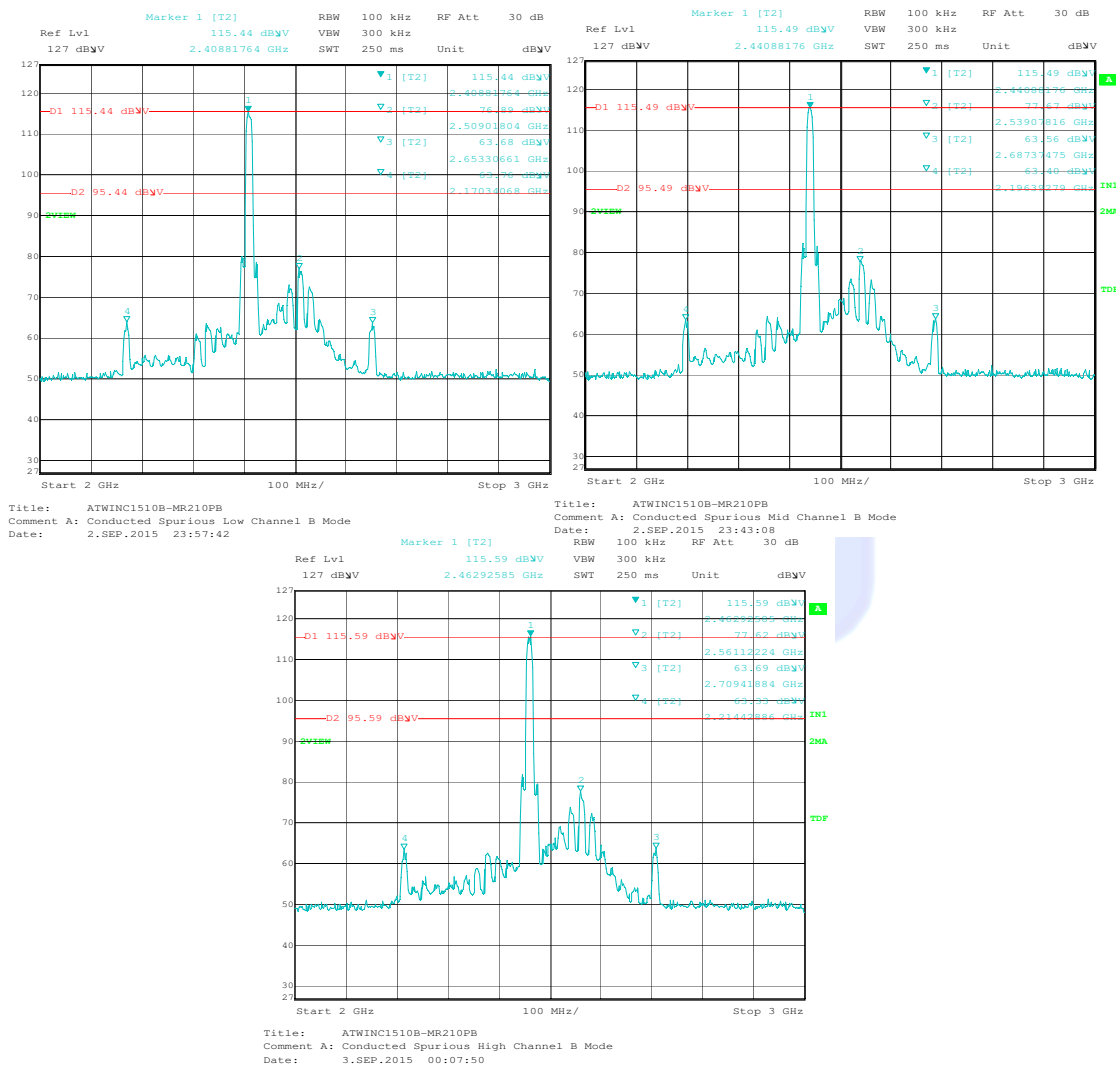
**Agoura Division**  
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## 802.11b Mode

### Reference Level Measurements



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## ***HARMONIC EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS***

### ***802.11g Mode***

**FCC 15.247**

|          |                     |           |           |
|----------|---------------------|-----------|-----------|
| Company: | Atmel Corporation   | Date:     | 9/2/2015  |
| EUT:     | Modular Transmitter | Lab:      | R         |
| Model:   | ATWINC1510-MR210PB  | Test ENG: | T. Oliver |

| Freq. (MHz) | Level (dBuV) | Limit | Margin | Peak / QP / Avg | Comments     |
|-------------|--------------|-------|--------|-----------------|--------------|
| 9848.00     | 71.72        | 89.88 | -18.16 | Peak            | High Channel |
| 9648.00     | 67.81        | 90.11 | -22.30 | Peak            | Low Channel  |
| 9768.00     | 69.05        | 92.20 | -23.15 | Peak            | Mid Channel  |

Worst case for all g mode measurements



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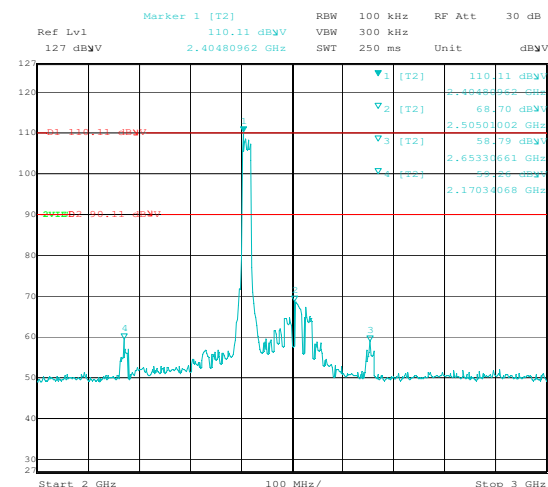
**Agoura Division**  
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Agoura, CA 91301  
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Silverado, CA 92676  
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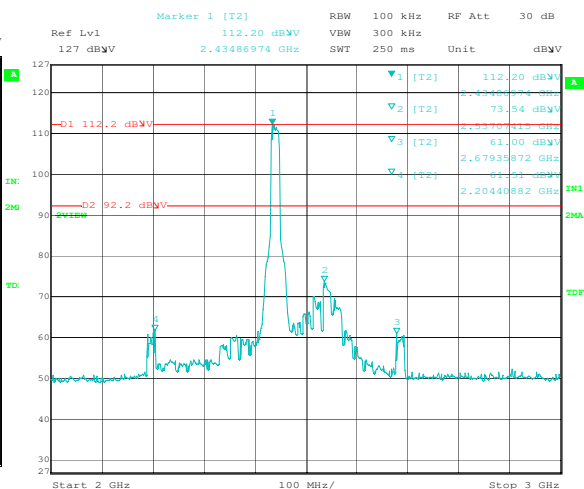
**Lake Forest Division**  
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## 802.11g Mode

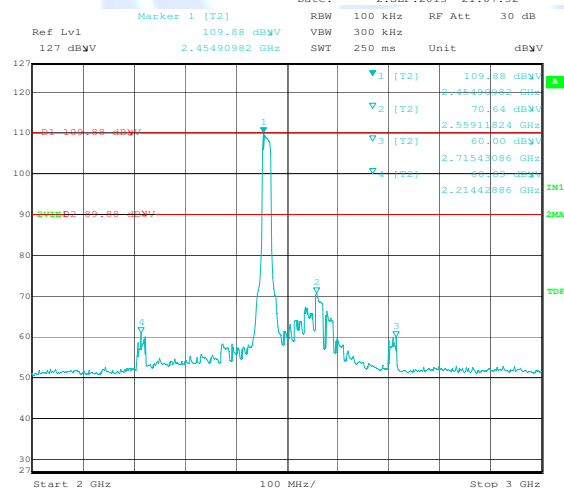
### Reference Level Measurements



Title: ATWINC1510B-MR210PB  
Comment A: Conducted Spurious Low Channel G Mode  
Date: 2.SEP.2015 23:25:45



Title: ATWINC1510B-MR210PB  
Comment A: Conducted Spurious Mid Channel G Mode  
Date: 2.SEP.2015 21:07:52



Title: ATWINC1510B-MR210PB  
Comment A: Conducted Spurious High Channel G Mode  
Date: 2.SEP.2015 23:14:30



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## ***HARMONIC EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS***

### ***802.11n Mode***

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510-MR210PB

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

| Freq. (MHz) | Level (dBuV) | Limit | Margin | Peak / QP / Avg | Comments     |
|-------------|--------------|-------|--------|-----------------|--------------|
| 9848.00     | 72.27        | 88.66 | -16.39 | Peak            | High Channel |
| 9648.00     | 68.55        | 90.95 | -22.40 | Peak            | Low Channel  |
| 9768.00     | 70.04        | 94.65 | -24.61 | Peak            | Mid Channel  |



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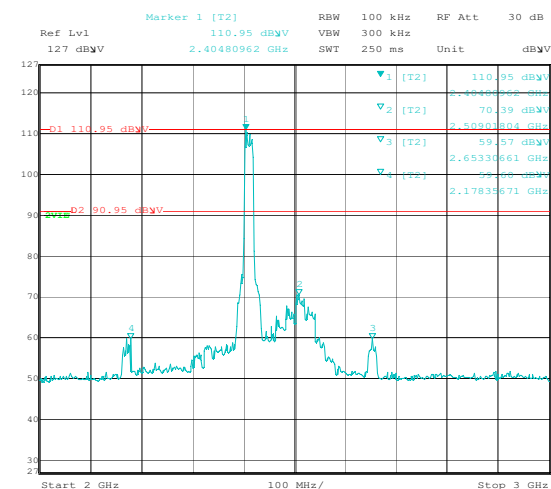
**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

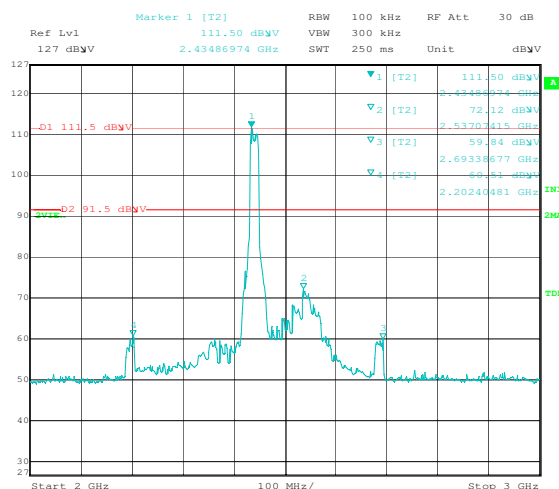
**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## 802.11n Mode

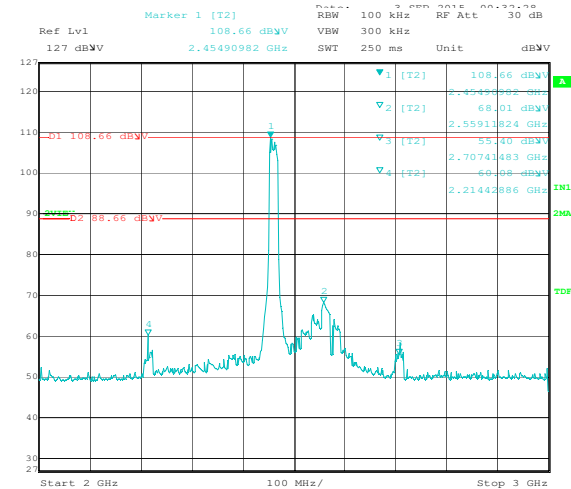
### Reference Level Measurements



Title: ATWINC1510B-MR210PB  
Comment A: Conducted Spurious Low Channel N Mode  
Date: 3.SEP.2015 00:41:27



Title: ATWINC1510B-MR210PB  
Comment A: Conducted Spurious Mid Channel N Mode  
Date: 3.SEP.2015 00:42:19



Title: ATWINC1510B-MR210PB  
Comment A: Conducted Spurious High Channel N Mode  
Date: 3.SEP.2015 00:22:28



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***EMISSIONS IN RESTRICTED FREQUENCY BANDS (RADIATED  
FIELD STRENGTH)  
DATA SHEETS***



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## ***HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS***

### ***802.11b Mode, Low Channel, Horizontal & Vertical***

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11b, DigGain= -9

Date: 8/19/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBuV) | Pol<br>(v/h) | Limit | Margin | Peak / QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments           |
|----------------|-----------------|--------------|-------|--------|--------------------|-----------------------|-------------------------|--------------------|
| 4824.00        | 54.02           | H            | 73.98 | -19.96 | Peak               | 2.00                  | 219                     | In Restricted Band |
| 4824.00        | 39.39           | H            | 53.98 | -14.59 | Avg                | 2.00                  | 219                     |                    |
| 12060.00       | 64.00           | H            | 73.98 | -9.98  | Peak               | 1.90                  | 318                     | In Restricted Band |
| 12060.00       | 52.00           | H            | 53.98 | -1.98  | Avg                | 1.90                  | 318                     |                    |
| 14472.00       | 63.73           | H            | 73.98 | -10.25 | Peak               | 1.82                  | 357                     | In Restricted Band |
| 14472.00       | 50.82           | H            | 53.98 | -3.16  | Avg                | 1.82                  | 357                     |                    |
| 19296.00       | --              | H            | 73.98 | --     | Peak               | --                    | --                      | In Restricted Band |
| 19296.00       | --              | H            | 53.98 | --     | Avg                | --                    | --                      | No Emissions Found |
| 4824.00        | 52.73           | V            | 73.98 | -21.25 | Peak               | 1.68                  | 222                     | In Restricted Band |
| 4824.00        | 38.30           | V            | 53.98 | -15.68 | Avg                | 1.68                  | 222                     |                    |
| 12060.00       | 63.40           | V            | 73.98 | -10.58 | Peak               | 1.99                  | 274                     | In Restricted Band |
| 12060.00       | 51.56           | V            | 53.98 | -2.42  | Avg                | 1.99                  | 274                     |                    |
| 14472.00       | 63.34           | V            | 73.98 | -10.64 | Peak               | 1.37                  | 121                     | In Restricted Band |
| 14472.00       | 50.56           | V            | 53.98 | -3.42  | Avg                | 1.37                  | 121                     |                    |
| 19296.00       | --              | V            | 73.98 | --     | Peak               | --                    | --                      | In Restricted Band |
| 19296.00       | --              | V            | 53.98 | --     | Avg                | --                    | --                      | No Emissions Found |

Test distance  
3 meter



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**Lake Forest Division**  
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(949) 587-0400

## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11b Mode, Mid Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11b, DigGain= -8

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 4884.00     | 54.34        | H         | 73.98 | -19.64 | Peak            | 1.13            | 0                 |                    |
| 4884.00     | 39.86        | H         | 53.98 | -14.12 | Avg             | 1.13            | 0                 | In Restricted Band |
| 7326.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 7326.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |
| 12210.00    | 61.98        | H         | 73.98 | -12.00 | Peak            | 1.94            | 335               |                    |
| 12210.00    | 48.28        | H         | 53.98 | -5.70  | Avg             | 1.94            | 335               | In Restricted Band |
| 19536.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 19536.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |
| 4884.00     | 54.87        | V         | 73.98 | -19.11 | Peak            | 2.29            | 224               |                    |
| 4884.00     | 40.76        | V         | 53.98 | -13.22 | Avg             | 2.29            | 224               | In Restricted Band |
| 7326.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 7326.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |
| 12210.00    | 64.05        | V         | 73.98 | -9.93  | Peak            | 2.04            | 262               |                    |
| 12210.00    | 51.75        | V         | 53.98 | -2.23  | Avg             | 2.04            | 262               | In Restricted Band |
| 19536.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 19536.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |

Test distance  
3 meter



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**Silverado Division**  
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**Lake Forest Division**  
20621 Pascal Way  
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(949) 587-0400

## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11b Mode, High Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11b, DigGain= -8

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 4924.00     | 51.99        | H         | 73.98 | -21.99 | Peak            | 1.01            | 36                | In Restricted Band |
| 4924.00     | 38.82        | H         | 53.98 | -15.16 | Avg             | 1.01            | 36                |                    |
| 7386.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 7386.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emission Found  |
| 12310.00    | 60.18        | H         | 73.98 | -13.80 | Peak            | 1.21            | 200               | In Restricted Band |
| 12310.00    | 47.60        | H         | 53.98 | -6.38  | Avg             | 1.21            | 200               |                    |
| 19696.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 19696.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 22158.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 22158.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 4924.00     | 50.71        | V         | 73.98 | -23.27 | Peak            | 2.12            | 234               | In Restricted Band |
| 4924.00     | 37.85        | V         | 53.98 | -16.13 | Avg             | 2.12            | 234               |                    |
| 7386.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 7386.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emission Found  |
| 12310.00    | 64.39        | V         | 73.98 | -9.59  | Peak            | 1.14            | 275               | In Restricted Band |
| 12310.00    | 51.75        | V         | 53.98 | -2.23  | Avg             | 1.14            | 275               |                    |
| 19696.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 19696.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 22158.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 22158.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |

Test distance  
3 meter



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## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11g Mode, Low Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11g, DigGain=-12

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 4824.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 4824.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 12060.00    | 62.79        | H         | 73.98 | -11.19 | Peak            | 2.06            | 344               | In Restricted Band |
| 12060.00    | 53.37        | H         | 53.98 | -0.61  | Avg             | 2.06            | 344               |                    |
| 14472.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 14472.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 19296.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 19296.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 4824.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 4824.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 12060.00    | 60.38        | V         | 73.98 | -13.60 | Peak            | 2.07            | 265               | In Restricted Band |
| 12060.00    | 48.88        | V         | 53.98 | -5.10  | Avg             | 2.07            | 265               |                    |
| 14472.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 14472.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 19296.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 19296.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |

Test distance  
3 meter



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**Silverado Division**  
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**Lake Forest Division**  
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(949) 587-0400

## ***HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS***

### ***802.11g Mode, Mid Channel, Horizontal & Vertical***

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11g, DigGain= -7

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 4884.00     | 53.40        | H         | 73.98 | -20.58 | Peak            | 1.99            | 228               | In Restricted Band |
| 4884.00     | 38.62        | H         | 53.98 | -15.36 | Avg             | 1.99            | 228               |                    |
| 7326.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 7326.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |
| 12210.00    | 60.93        | H         | 73.98 | -13.05 | Peak            | 1               | 186               | In Restricted Band |
| 12210.00    | 47.85        | H         | 53.98 | -6.13  | Avg             | 1               | 186               |                    |
| 19536.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 19536.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |
| 4884.00     | 53.15        | V         | 73.98 | -20.83 | Peak            | 2.2             | 228               | In Restricted Band |
| 4884.00     | 37.89        | V         | 53.98 | -16.09 | Avg             | 2.2             | 228               |                    |
| 7326.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 7326.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |
| 12210.00    | 64.76        | V         | 73.98 | -9.22  | Peak            | 1.07            | 263               | In Restricted Band |
| 12210.00    | 51.67        | V         | 53.98 | -2.31  | Avg             | 1.07            | 263               |                    |
| 19536.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | No Emissions Found |
| 19536.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | In Restricted Band |

Test distance  
3 meter



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## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11g Mode, High Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11g, DigGain=-10

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq. (MHz) | Level (dBuV) | Pol (v/h) | Limit | Margin | Peak / QP / Avg | Ant. Height (m) | Table Angle (deg) | Comments           |
|-------------|--------------|-----------|-------|--------|-----------------|-----------------|-------------------|--------------------|
| 4924.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 4924.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 7386.00     | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 7386.00     | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 12310.00    | 60.93        | H         | 73.98 | -13.05 | Peak            | 1.87            | 358               | In Restricted Band |
| 12310.00    | 48.16        | H         | 53.98 | -5.82  | Avg             | 1.87            | 358               |                    |
| 19696.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 19696.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 22158.00    | --           | H         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 22158.00    | --           | H         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 4924.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 4924.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 7386.00     | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 7386.00     | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 12310.00    | 63.67        | V         | 73.98 | -10.31 | Peak            | 2.1             | 292               | In Restricted Band |
| 12310.00    | 49.63        | V         | 53.98 | -4.35  | Avg             | 2.1             | 292               |                    |
| 19696.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 19696.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |
| 22158.00    | --           | V         | 73.98 | --     | Peak            | --              | --                | In Restricted Band |
| 22158.00    | --           | V         | 53.98 | --     | Avg             | --              | --                | No Emissions Found |

Test distance  
3 meter



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## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11n Mode, Low Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11n, DigGain= -13.5

Date: 9/2/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBuV) | Pol (v/h) | Limit | Margin | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments           |
|----------------|-----------------|-----------|-------|--------|-----------------------|-----------------------|-------------------------|--------------------|
| 4824.00        | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 4824.00        | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 12060.00       | 62.03           | H         | 73.98 | -11.95 | Peak                  | 2.05                  | 17                      | In Restricted Band |
| 12060.00       | 53.44           | H         | 53.98 | -0.54  | Avg                   | 2.05                  | 17                      |                    |
| 14472.00       | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 14472.00       | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 19296.00       | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 19296.00       | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 4824.00        | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 4824.00        | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 12060.00       | 58.78           | V         | 73.98 | -15.20 | Peak                  | 2.15                  | 268                     | In Restricted Band |
| 12060.00       | 46.22           | V         | 53.98 | -7.76  | Avg                   | 2.15                  | 268                     |                    |
| 14472.00       | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 14472.00       | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 19296.00       | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 19296.00       | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |

Test distance  
3 meter



**Brea Division**  
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**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11n Mode, Mid Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11n, DigGain= -8

Date: 9/1/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBuV) | Pol (v/h) | Limit | Margin | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments           |
|----------------|-----------------|-----------|-------|--------|-----------------------|-----------------------|-------------------------|--------------------|
| 4884.00        | 47.10           | H         | 73.98 | -26.88 | Peak                  | 1.6                   | 182                     | In Restricted Band |
| 4884.00        | 31.44           | H         | 53.98 | -22.54 | Avg                   | 1.6                   | 182                     |                    |
| 7326.00        | 51.88           | H         | 73.98 | -22.10 | Peak                  | 4.00                  | 210                     |                    |
| 7326.00        | 39.08           | H         | 53.98 | -14.90 | Avg                   | 4.00                  | 210                     | In Restricted Band |
| 12210.00       | 57.41           | H         | 73.98 | -16.57 | Peak                  | 1.04                  | 344                     | In Restricted Band |
| 12210.00       | 43.56           | H         | 53.98 | -10.42 | Avg                   | 1.04                  | 344                     |                    |
| 19536.00       | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | No Emissions Found |
| 19536.00       | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | In Restricted Band |
| 4884.00        | 44.79           | V         | 73.98 | -29.19 | Peak                  | 2.55                  | 236                     | In Restricted Band |
| 4884.00        | 31.32           | V         | 53.98 | -22.66 | Avg                   | 2.55                  | 236                     |                    |
| 7326.00        | 52.25           | V         | 73.98 | -21.73 | Peak                  | 1.38                  | 188                     |                    |
| 7326.00        | 39.07           | V         | 53.98 | -14.91 | Avg                   | 1.38                  | 188                     | In Restricted Band |
| 12210.00       | 59.88           | V         | 73.98 | -14.10 | Peak                  | 2.01                  | 267                     | In Restricted Band |
| 12210.00       | 45.90           | V         | 53.98 | -8.08  | Avg                   | 2.01                  | 267                     |                    |
| 19536.00       | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | No Emissions Found |
| 19536.00       | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | In Restricted Band |

Test distance  
3 meter



**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

### 802.11n Mode, High Channel, Horizontal & Vertical

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510PB  
Mode: 802.11n, DigGain= -11

Date: 9/1/2015  
Lab: R  
Test ENG: T. Oliver

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBuV) | Pol (v/h) | Limit | Margin | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments           |
|----------------|-----------------|-----------|-------|--------|-----------------------|-----------------------|-------------------------|--------------------|
| 4924.00        | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 4924.00        | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 7386.00        | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 7386.00        | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 12310.00       | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 12310.00       | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 19696.00       | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 19696.00       | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 22158.00       | --              | H         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 22158.00       | --              | H         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 4924.00        | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 4924.00        | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 7386.00        | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 7386.00        | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 12310.00       | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 12310.00       | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 19696.00       | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 19696.00       | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |
| 22158.00       | --              | V         | 73.98 | --     | Peak                  | --                    | --                      | In Restricted Band |
| 22158.00       | --              | V         | 53.98 | --     | Avg                   | --                    | --                      | No Emissions Found |

Test distance  
3 meter



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**Lake Forest Division**  
20621 Pascal Way  
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***EMISSIONS RADIATED OUTSIDE OF THE FUNDAMENTAL  
FREQUENCY BAND AT BAND EDGES***

***DATA SHEETS***



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**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
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2337 Troutdale Drive  
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19121 El Toro Road  
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**Lake Forest Division**  
20621 Pascal Way  
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(949) 587-0400

**802.11b Mode****BAND EDGES- VERTICAL****FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510B-MR210PB  
Mode: 802.11b

Date: 8/19/2015  
Lab: R  
Test ENG: Matt Harrison

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBμV) | Pol | Limit<br>(dBμV) | Margin<br>(dB) | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments                          |
|----------------|-----------------|-----|-----------------|----------------|-----------------------|-----------------------|-------------------------|-----------------------------------|
| 2412.00        | 111.64          | V   | --              | --             | Peak                  | 1.6                   | 360                     | Fundamental of High Channel       |
|                |                 |     |                 |                |                       |                       |                         | <b>X-Axis, DigGain=-9, 11Mbps</b> |
| 2396.09        | 87.19           | V   | 91.64           | -4.45          | Delta                 | 1.6                   | 360                     | From Peak                         |
|                |                 |     |                 |                |                       |                       |                         |                                   |
| 2385.19        | 64.58           | V   | 73.98           | -9.40          | Peak                  | 1.6                   | 360                     | No Marker Delta Method Used       |
| 2385.19        | 46.57           | V   | 53.98           | -7.41          | Avg                   | 1.6                   | 360                     | <b>X-Axis, DigGain=-9, 11Mbps</b> |
|                |                 |     |                 |                |                       |                       |                         |                                   |
| 2462.00        | 113.38          | V   | --              | --             | Peak                  | 1.29                  | 276                     | Fundamental of High Channel       |
|                |                 |     |                 |                |                       |                       |                         |                                   |
| 2488.00        | 62.60           | V   | 73.98           | -11.38         | Peak                  | 1.29                  | 276                     | No Marker Delta Method Used       |
| 2488.00        | 47.00           | V   | 53.98           | -6.98          | Avg                   | 1.29                  | 276                     | <b>X-Axis, DigGain=-8, 11Mbps</b> |
|                |                 |     |                 |                |                       |                       |                         |                                   |

Test distance  
3 meter



**Brea Division**  
114 Olinda Drive  
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19121 El Toro Road  
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(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## BAND EDGES- HORIZONTAL

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510B-MR210PB  
Mode: 802.11b

Date: 8/19/2015  
Lab: R  
Test ENG: Matt Harrison

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBμV) | Pol | Limit<br>(dBμV) | Margin<br>(dB) | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments                          |
|----------------|-----------------|-----|-----------------|----------------|-----------------------|-----------------------|-------------------------|-----------------------------------|
| 2412.00        | 109.38          | H   | --              | --             | Peak                  | 1.6                   | 130                     | Fundamental of High Channel       |
|                |                 |     |                 |                |                       |                       |                         | <b>X-Axis, DigGain=-9, 11Mbps</b> |
| 2396.75        | 84.00           | H   | 89.38           | -5.38          | Delta                 | 1.6                   | 130                     | From Peak                         |
|                |                 |     |                 |                |                       |                       |                         |                                   |
| 2383.92        | 60.97           | H   | 73.98           | -13.01         | Peak                  | 1.6                   | 130                     | No Marker Delta Method Used       |
| 2383.92        | 43.36           | H   | 53.98           | -10.62         | Avg                   | 1.6                   | 130                     | <b>X-Axis, DigGain=-9, 11Mbps</b> |
|                |                 |     |                 |                |                       |                       |                         |                                   |
| 2462.00        | 110.18          | H   | --              | --             | Peak                  | 2                     | 128                     | Fundamental of High Channel       |
|                |                 |     |                 |                |                       |                       |                         |                                   |
| 2486.90        | 60.18           | H   | 73.98           | -13.80         | Peak                  | 2                     | 128                     | No Marker Delta Method Used       |
| 2486.90        | 45.32           | H   | 53.98           | -8.66          | Avg                   | 2                     | 128                     | <b>X-Axis, DigGain=-8, 11Mbps</b> |
|                |                 |     |                 |                |                       |                       |                         |                                   |

Test distance  
3 meter



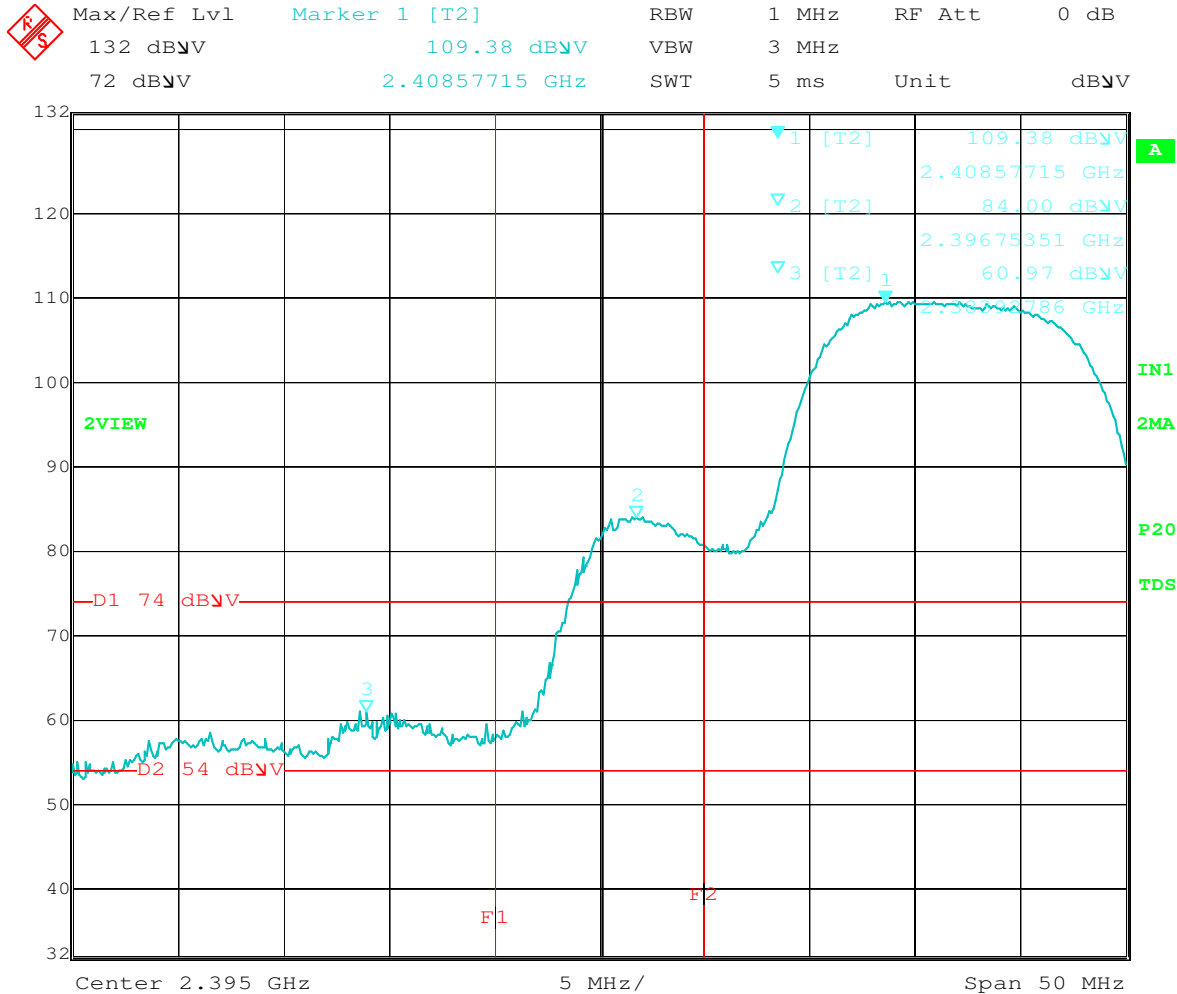
Brea Division  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

Agoura Division  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

Silverado Division  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## LOWER BAND EDGE (Horizontal)



Title: ATWINC1510.  
 Comment A: LBE, b mode, Horizontal.  
 Date: 19.AUG.2015 08:09:26



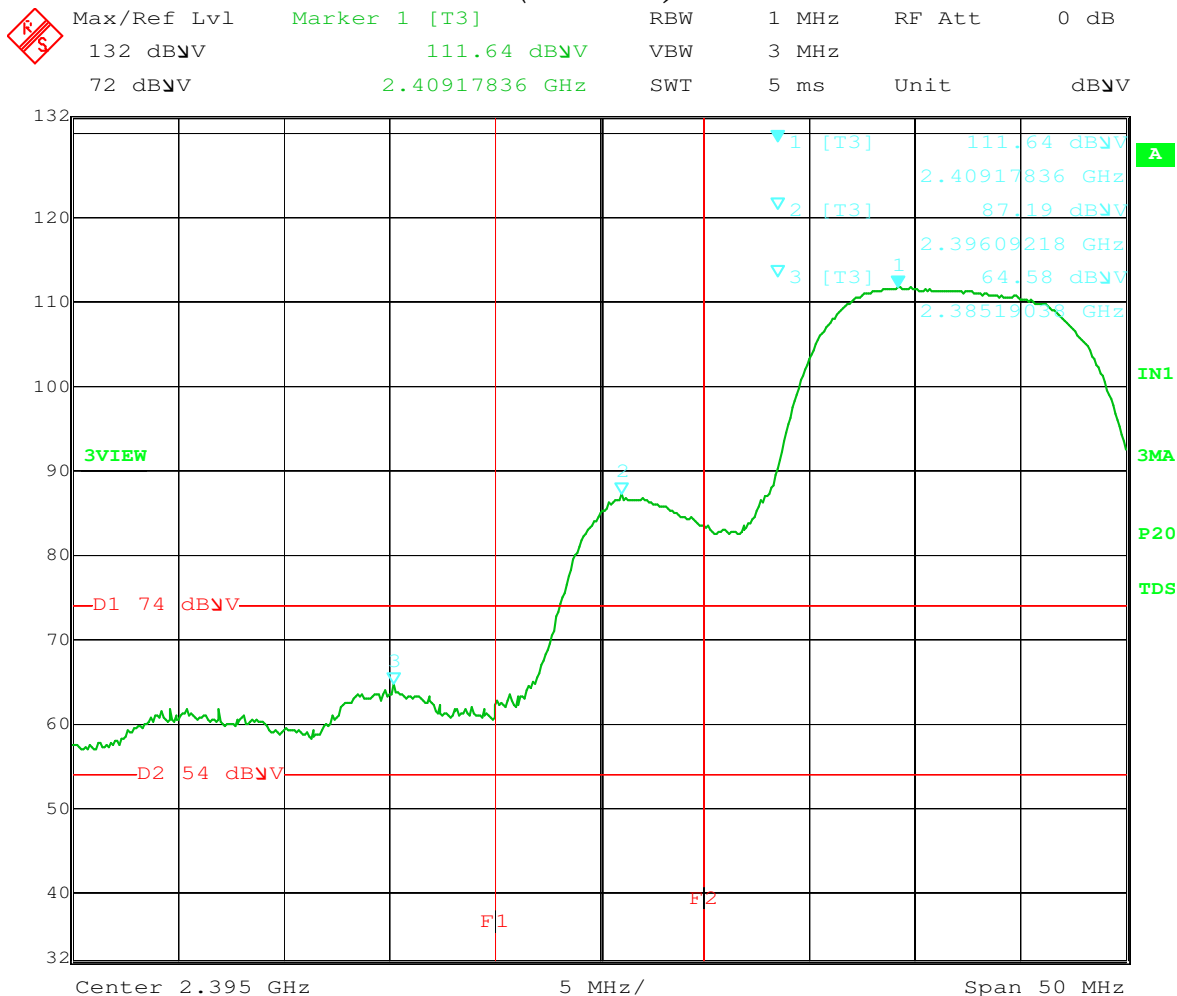
Brea Division  
 114 Olinda Drive  
 Brea, CA 92823  
 (714) 579-0500

Agoura Division  
 2337 Troutdale Drive  
 Agoura, CA 91301  
 (818) 597-0600

Silverado Division  
 19121 El Toro Road  
 Silverado, CA 92676  
 (949) 589-0700

Lake Forest Division  
 20621 Pascal Way  
 Lake Forest, CA 92630  
 (949) 587-0400

## LOWER BAND EDGE (Vertical)



Title: ATWINC1510-MR210PB.  
Comment A: LBE, b mode, Vertical.  
Date: 19.AUG.2015 08:17:23



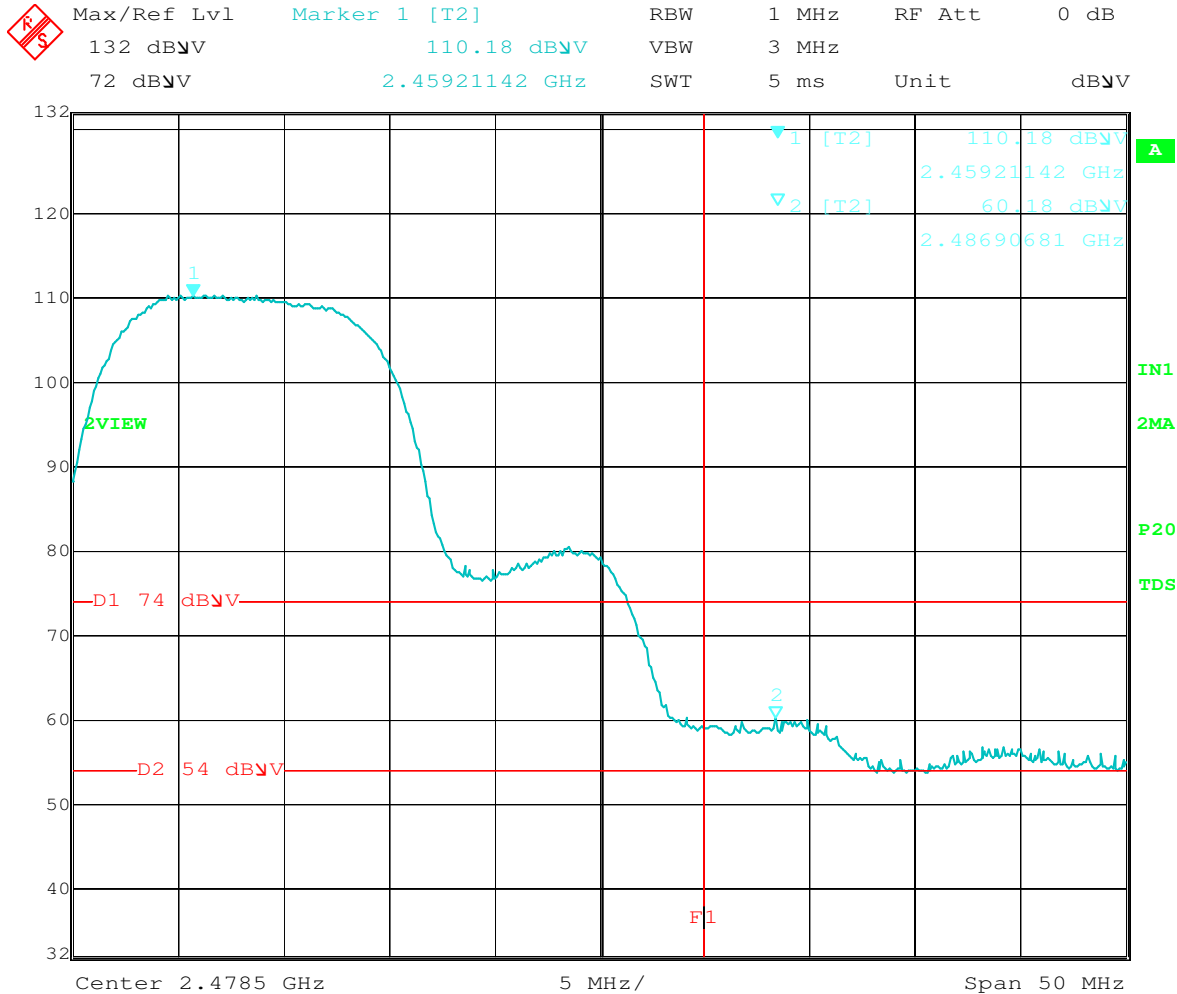
**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
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2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

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(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## UPPER BAND EDGE (Horizontal)



Title: ATWINC1510-MR210PB.  
Comment A: UBE, b mode, Horizontal.  
Date: 19.AUG.2015 09:43:23



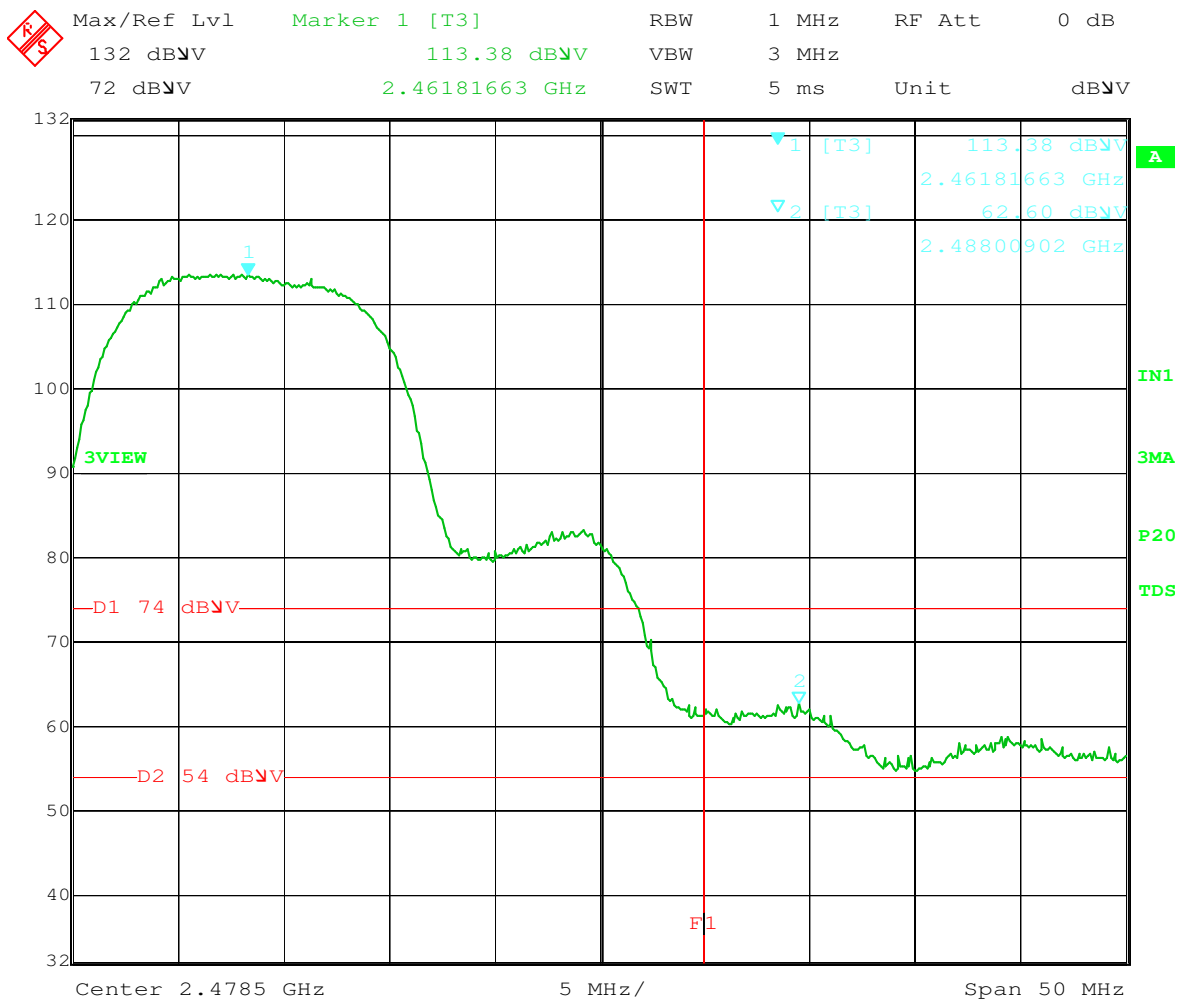
Brea Division  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

Agoura Division  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

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19121 El Toro Road  
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(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## UPPER BAND EDGE (Vertical)



Title: ATWINC1510-MR210PB.  
Comment A: UBE, b mode, Vertical.  
Date: 19.AUG.2015 09:39:37



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Silverado Division  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

**802.11g Mode****BAND EDGES- VERTICAL****FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510-MR210PB  
Mode: 802.11g

Date: 8/19/2015  
Lab: R  
Test ENG: Matt Harrison

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBμV) | Pol | Limit<br>(dBμV) | Margin<br>(dB) | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments                           |
|----------------|-----------------|-----|-----------------|----------------|-----------------------|-----------------------|-------------------------|------------------------------------|
| 2412.00        | 107.26          | V   | --              | --             | Peak                  | 1.58                  | 0                       | Fundamental of High Channel        |
|                |                 |     |                 |                |                       |                       |                         | <b>X-Axis, DigGain=-12, 6Mbps</b>  |
| 2399.25        | 83.91           | V   | 87.26           | -3.35          | Delta                 | 1.58                  | 0                       | From Peak                          |
|                |                 |     |                 |                |                       |                       |                         |                                    |
| 2389.79        | 73.12           | V   | 73.98           | -0.86          | Peak                  | 1.58                  | 0                       | <b>No Marker Delta Method Used</b> |
| 2389.79        | 50.01           | V   | 53.98           | -3.97          | Avg                   | 1.58                  | 0                       | <b>X-Axis, DigGain=-12, 6Mbps</b>  |
|                |                 |     |                 |                |                       |                       |                         |                                    |
| 2462.00        | 108.73          | V   | --              | --             | Peak                  | 1.26                  | 283                     | Fundamental of High Channel        |
|                |                 |     |                 |                |                       |                       |                         |                                    |
| 2483.70        | 71.32           | V   | 73.98           | -2.66          | Peak                  | 1.26                  | 283                     | <b>No Marker Delta Method Used</b> |
| 2483.70        | 48.28           | V   | 53.98           | -5.70          | Avg                   | 1.26                  | 283                     | <b>X-Axis, DigGain=-10, 6Mbps</b>  |
|                |                 |     |                 |                |                       |                       |                         |                                    |

Test distance  
3 meter



**Brea Division**  
114 Olinda Drive  
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19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## BAND EDGES- HORIZONTAL

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510-MR210PB  
Mode: 802.11g

Date: 8/19/2015  
Lab: R  
Test ENG: Matt Harrison

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBμV) | Pol | Limit<br>(dBμV) | Margin<br>(dB) | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments                          |
|----------------|-----------------|-----|-----------------|----------------|-----------------------|-----------------------|-------------------------|-----------------------------------|
| 2412.00        | 104.68          | H   | --              | --             | Peak                  | 1.6                   | 132                     | Fundamental of High Channel       |
|                |                 |     |                 |                |                       |                       |                         | <b>X-Axis, DigGain=-12, 6Mbps</b> |
| 2399.69        | 81.22           | H   | 84.68           | -3.46          | Delta                 | 1.6                   | 132                     | From Peak                         |
| 2389.79        | 71.06           | H   | 73.98           | -2.92          | Peak                  | 1.6                   | 132                     | No Marker Delta Method Used       |
| 2389.79        | 47.71           | H   | 53.98           | -6.27          | Avg                   | 1.6                   | 132                     | <b>X-Axis, DigGain=-12, 6Mbps</b> |
| 2462.00        | 106.25          | H   | --              | --             | Peak                  | 1.36                  | 169                     | Fundamental of High Channel       |
| 2483.70        | 69.73           | H   | 73.98           | -4.25          | Peak                  | 1.36                  | 169                     | No Marker Delta Method Used       |
| 2483.70        | 46.24           | H   | 53.98           | -7.74          | Avg                   | 1.36                  | 169                     | <b>X-Axis, DigGain=-10, 6Mbps</b> |

Test distance  
3 meter



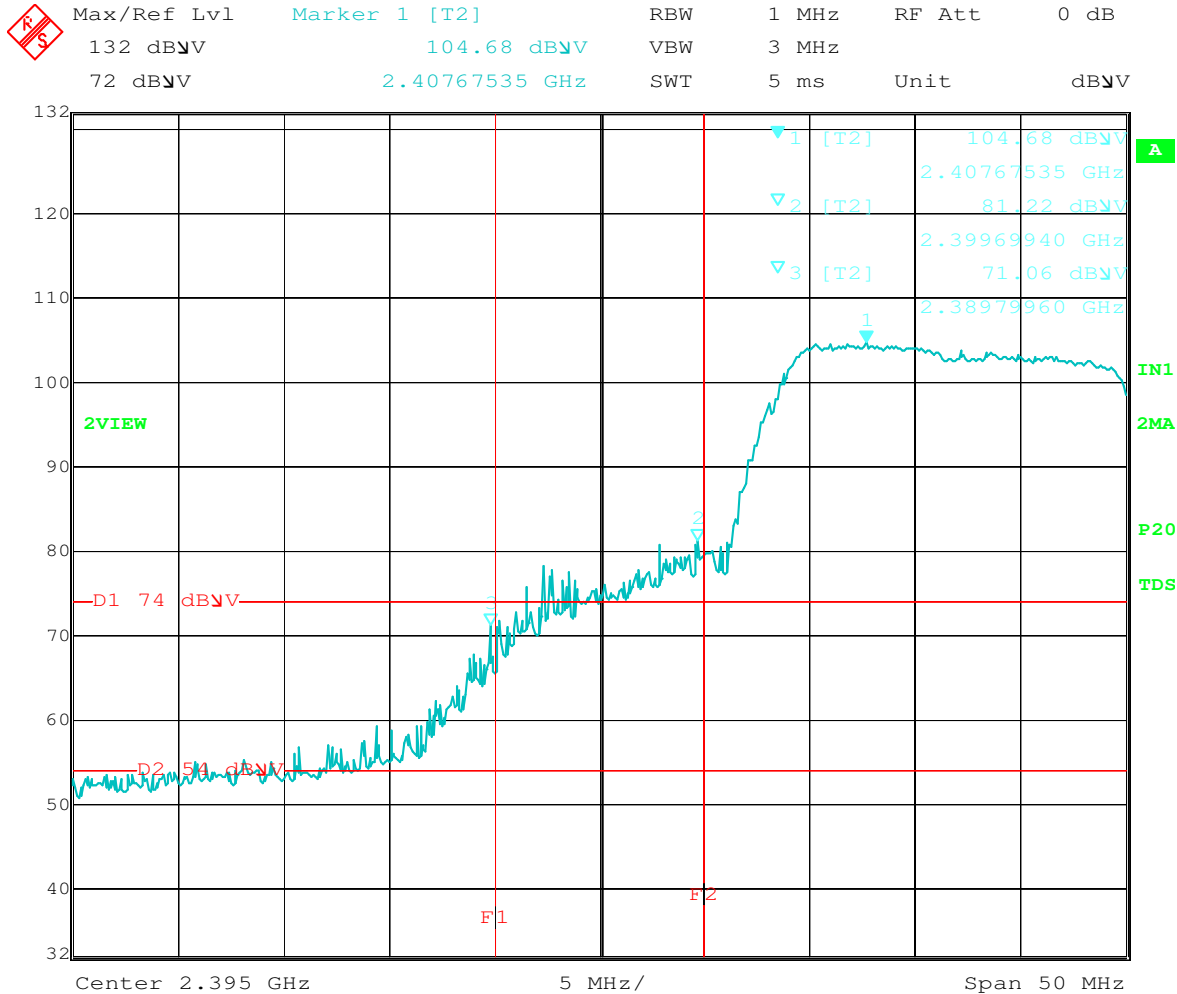
Brea Division  
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Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## LOWER BAND EDGE (Horizontal)



Title: ATWINC1510-MR210PB.  
Comment A: LBE, g mode, Horizontal.  
Date: 19.AUG.2015 08:42:38



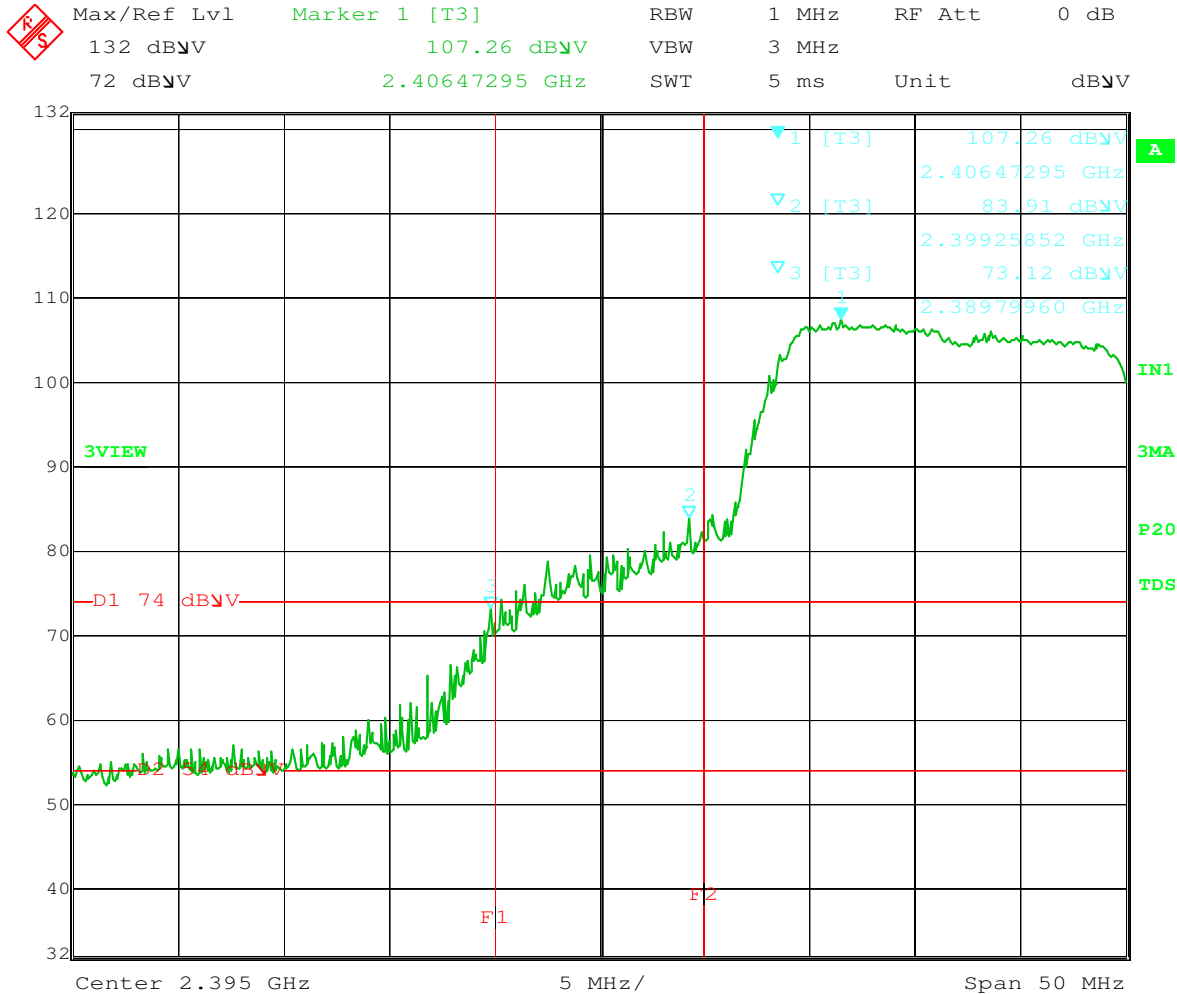
Brea Division  
114 Olinda Drive  
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Agoura Division  
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(818) 597-0600

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(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
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## LOWER BAND EDGE (Vertical)



Title: ATWINC1510-MR210PB.  
Comment A: LBE, g mode, Vertical.  
Date: 19.AUG.2015 08:40:21



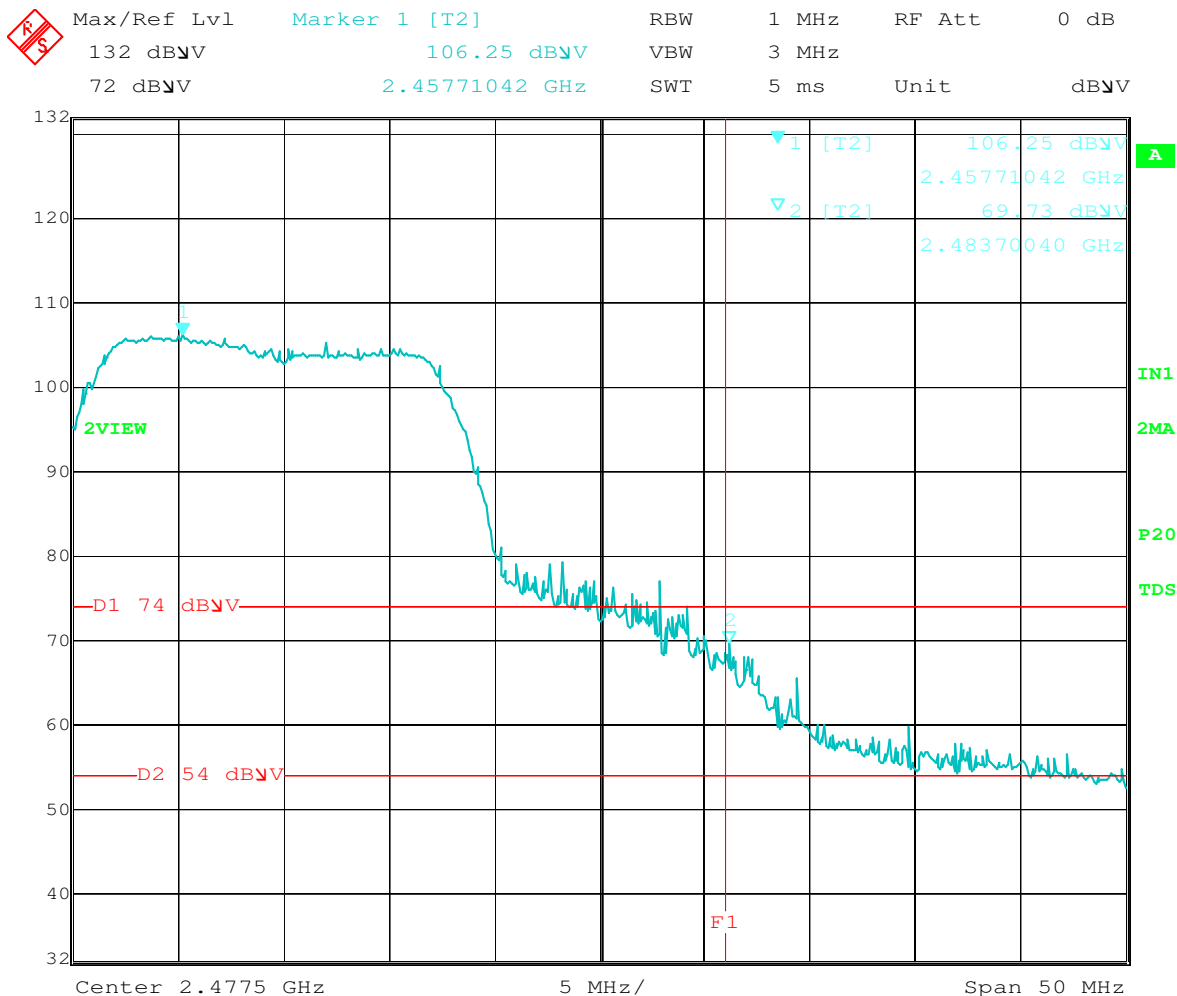
Brea Division  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

Agoura Division  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

Silverado Division  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## UPPER BAND EDGE (Horizontal)



Title: ATWINC1510-MR210PB.  
Comment A: UBE, g mode, Horizontal.  
Date: 19.AUG.2015 09:27:21



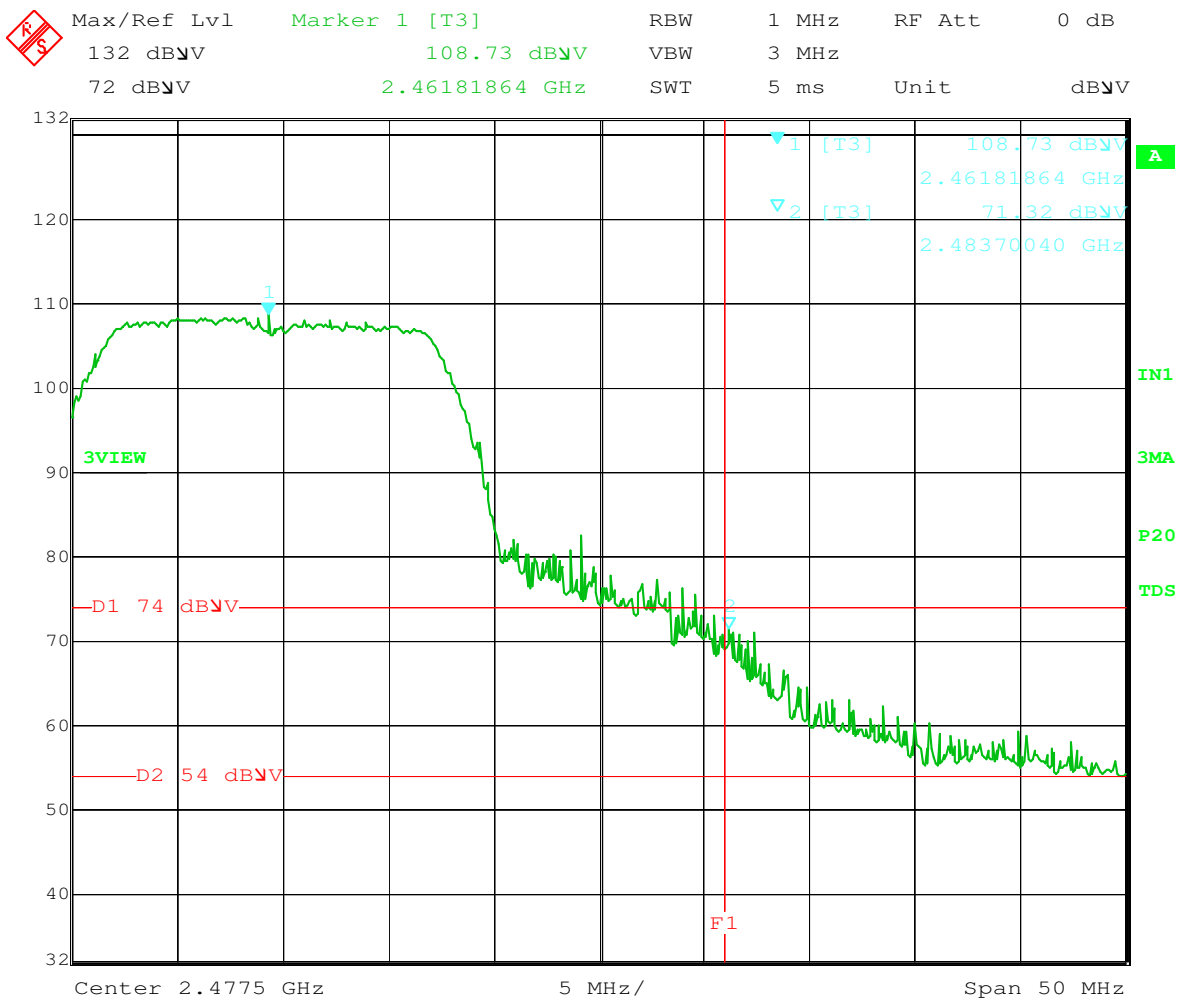
**Brea Division**  
114 Olinda Drive  
Brea, CA 92823  
(714) 579-0500

**Agoura Division**  
2337 Troutdale Drive  
Agoura, CA 91301  
(818) 597-0600

**Silverado Division**  
19121 El Toro Road  
Silverado, CA 92676  
(949) 589-0700

**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## UPPER BAND EDGE (Vertical)



Title: ATWINC1510-MR210PB.  
Comment A: UBE, g mode, Vertical.  
Date: 19.AUG.2015 09:34:12



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114 Olinda Drive  
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Silverado Division  
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Silverado, CA 92676  
(949) 589-0700

Lake Forest Division  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

**802.11n Mode****BAND EDGES- VERTICAL****FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510-MR210PB  
Mode: 802.11n

Date: 8/19/2015  
Lab: R  
Test ENG: Matt Harrison

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBμV) | Pol | Limit<br>(dBμV) | Margin<br>(dB) | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments                           |
|----------------|-----------------|-----|-----------------|----------------|-----------------------|-----------------------|-------------------------|------------------------------------|
| 2412.00        | 105.91          | V   | --              | --             | Peak                  | 1.6                   | 0                       | Fundamental of High Channel        |
|                |                 |     |                 |                |                       |                       |                         | <b>X-Axis, DigGain=-13.5, MCS0</b> |
| 2398.65        | 81.40           | V   | 85.91           | -4.51          | Delta                 | 1.6                   | 0                       | From Peak                          |
| 2389.79        | 70.13           | V   | 73.98           | -3.85          | Peak                  | 1.6                   | 0                       | <b>No Marker Delta Method Used</b> |
| 2389.79        | 48.94           | V   | 53.98           | -5.04          | Avg                   | 1.6                   | 0                       | <b>X-Axis, DigGain=-13.5, MCS0</b> |
| 2462.00        | 107.76          | V   | --              | --             | Peak                  | 1.27                  | 285                     | Fundamental of High Channel        |
| 2484.40        | 69.15           | V   | 73.98           | -4.83          | Peak                  | 1.27                  | 285                     | <b>No Marker Delta Method Used</b> |
| 2484.40        | 45.96           | V   | 53.98           | -8.02          | Avg                   | 1.27                  | 285                     | <b>X-Axis, DigGain=-11, MCS0</b>   |

Test distance  
3 meter



**Brea Division**  
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**Silverado Division**  
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**Lake Forest Division**  
20621 Pascal Way  
Lake Forest, CA 92630  
(949) 587-0400

## BAND EDGES- HORIZONTAL

**FCC 15.247**

Company: Atmel Corporation  
EUT: Modular Transmitter  
Model: ATWINC1510-MR210PB  
Mode: 802.11n

Date: 8/19/2015  
Lab: R  
Test ENG: Matt Harrison

**Compatible Electronics, Inc. FAC-3 ( Lab R )**

| Freq.<br>(MHz) | Level<br>(dBμV) | Pol | Limit<br>(dBμV) | Margin<br>(dB) | Peak /<br>QP /<br>Avg | Ant.<br>Height<br>(m) | Table<br>Angle<br>(deg) | Comments                           |
|----------------|-----------------|-----|-----------------|----------------|-----------------------|-----------------------|-------------------------|------------------------------------|
| 2412.00        | 104.62          | H   | --              | --             | Peak                  | 1.58                  | 130                     | Fundamental of High Channel        |
|                |                 |     |                 |                |                       |                       |                         | <b>X-Axis, DigGain=-13.5, MCS0</b> |
| 2399.65        | 78.62           | H   | 84.62           | -6.00          | Delta                 | 1.58                  | 130                     | From Peak                          |
|                |                 |     |                 |                |                       |                       |                         |                                    |
| 2390.00        | 69.48           | H   | 73.98           | -4.50          | Peak                  | 1.58                  | 130                     | <b>No Marker Delta Method Used</b> |
| 2390.00        | 47.14           | H   | 53.98           | -6.84          | Avg                   | 1.58                  | 130                     | <b>X-Axis, DigGain=-13.5, MCS0</b> |
|                |                 |     |                 |                |                       |                       |                         |                                    |
| 2462.00        | 104.64          | H   | --              | --             | Peak                  | 1.7                   | 135                     | Fundamental of High Channel        |
|                |                 |     |                 |                |                       |                       |                         |                                    |
| 2483.80        | 68.48           | H   | 73.98           | -5.50          | Peak                  | 1.7                   | 135                     | <b>No Marker Delta Method Used</b> |
| 2483.80        | 44.78           | H   | 53.98           | -9.20          | Avg                   | 1.7                   | 135                     | <b>X-Axis, DigGain=-11, MCS0</b>   |
|                |                 |     |                 |                |                       |                       |                         |                                    |

Test distance  
3 meter



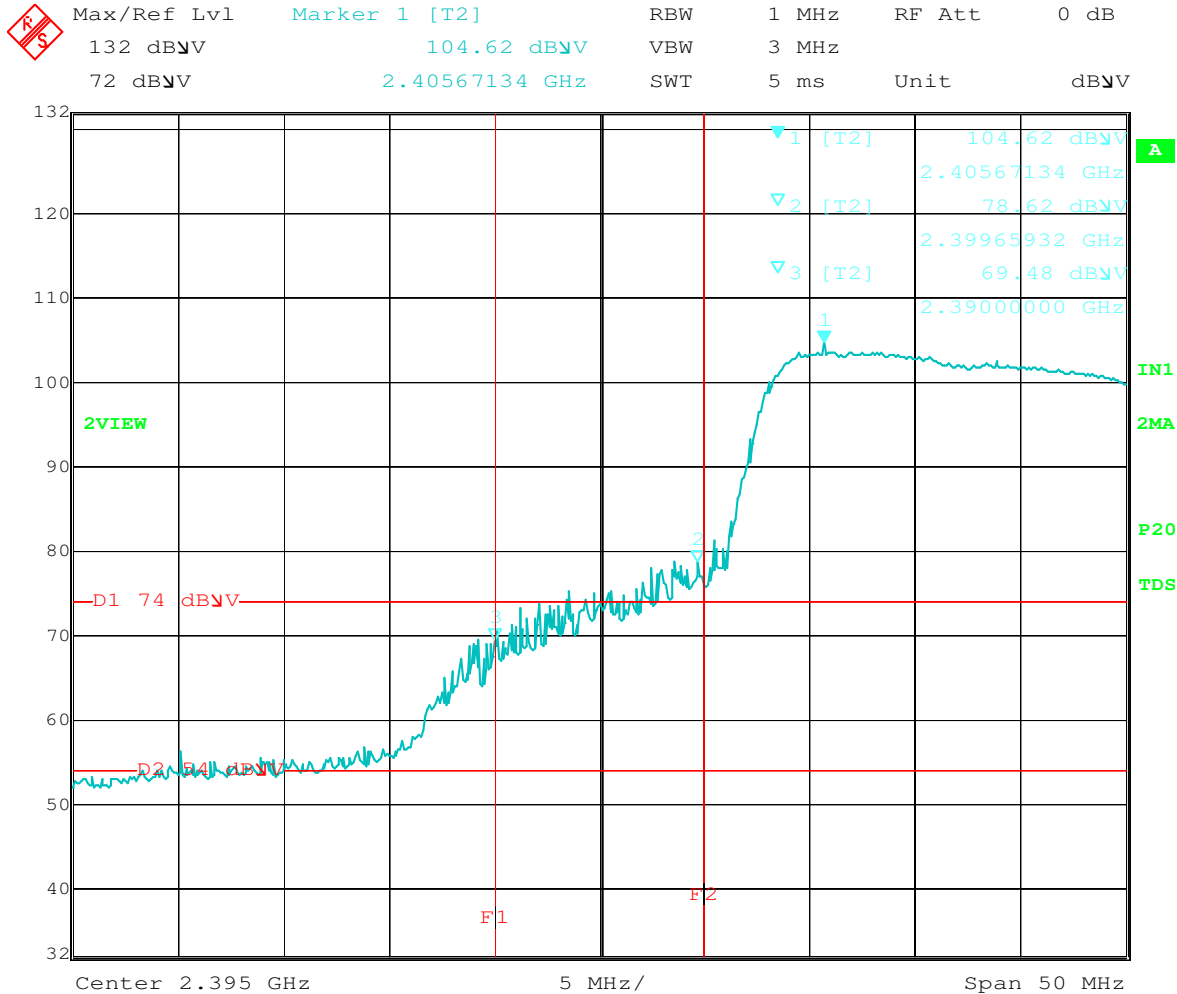
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## LOWER BAND EDGE (Horizontal)



Title: ATWINC1510-MR210PB.  
Comment A: LBE, n mode, Horizontal.  
Date: 19.AUG.2015 08:48:49



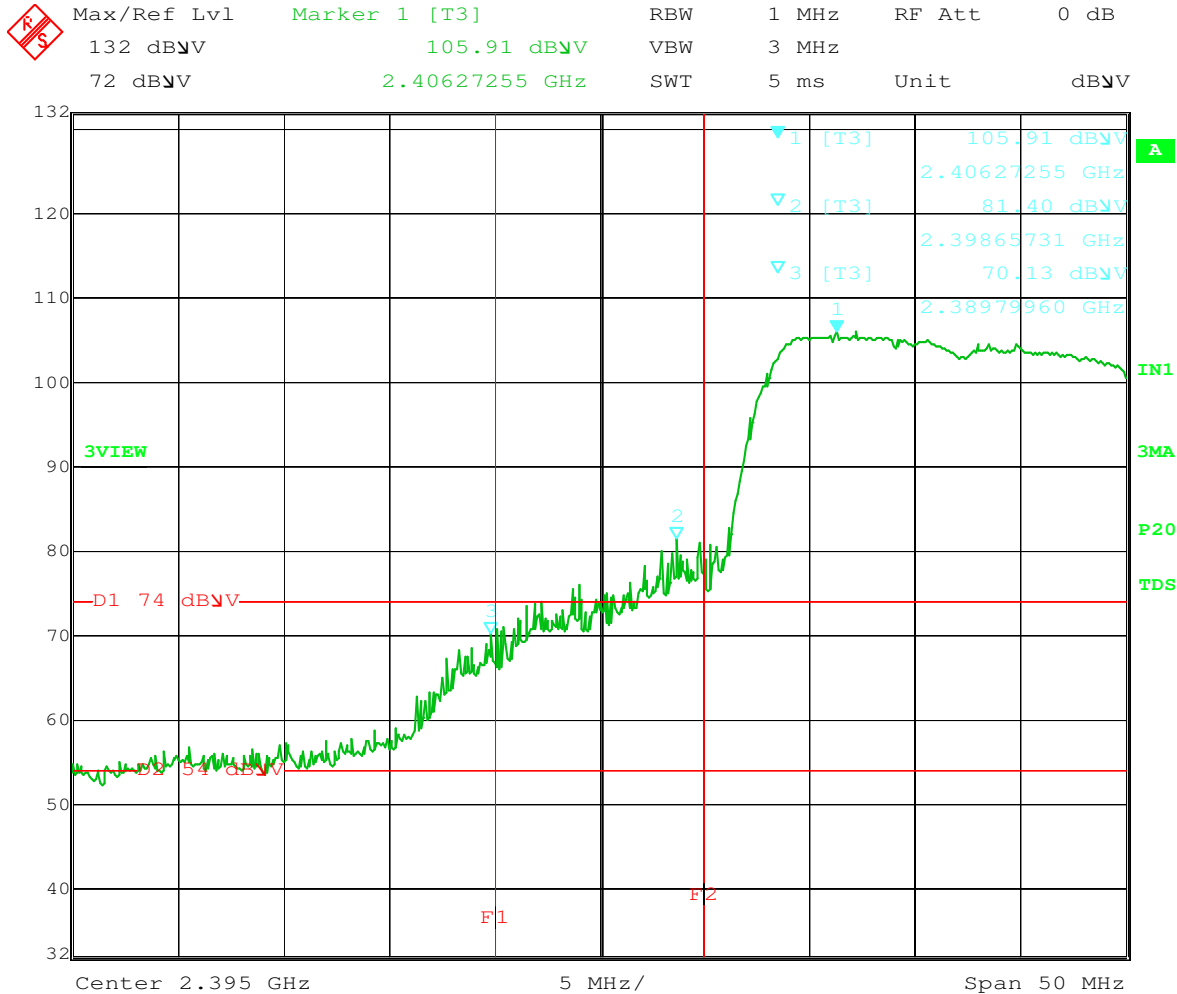
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## LOWER BAND EDGE (Vertical)



Title:    ATWINC1510-MR210PB.  
Comment A: LBE, n mode, Vertical.  
Date:    19.AUG.2015    08:52:55



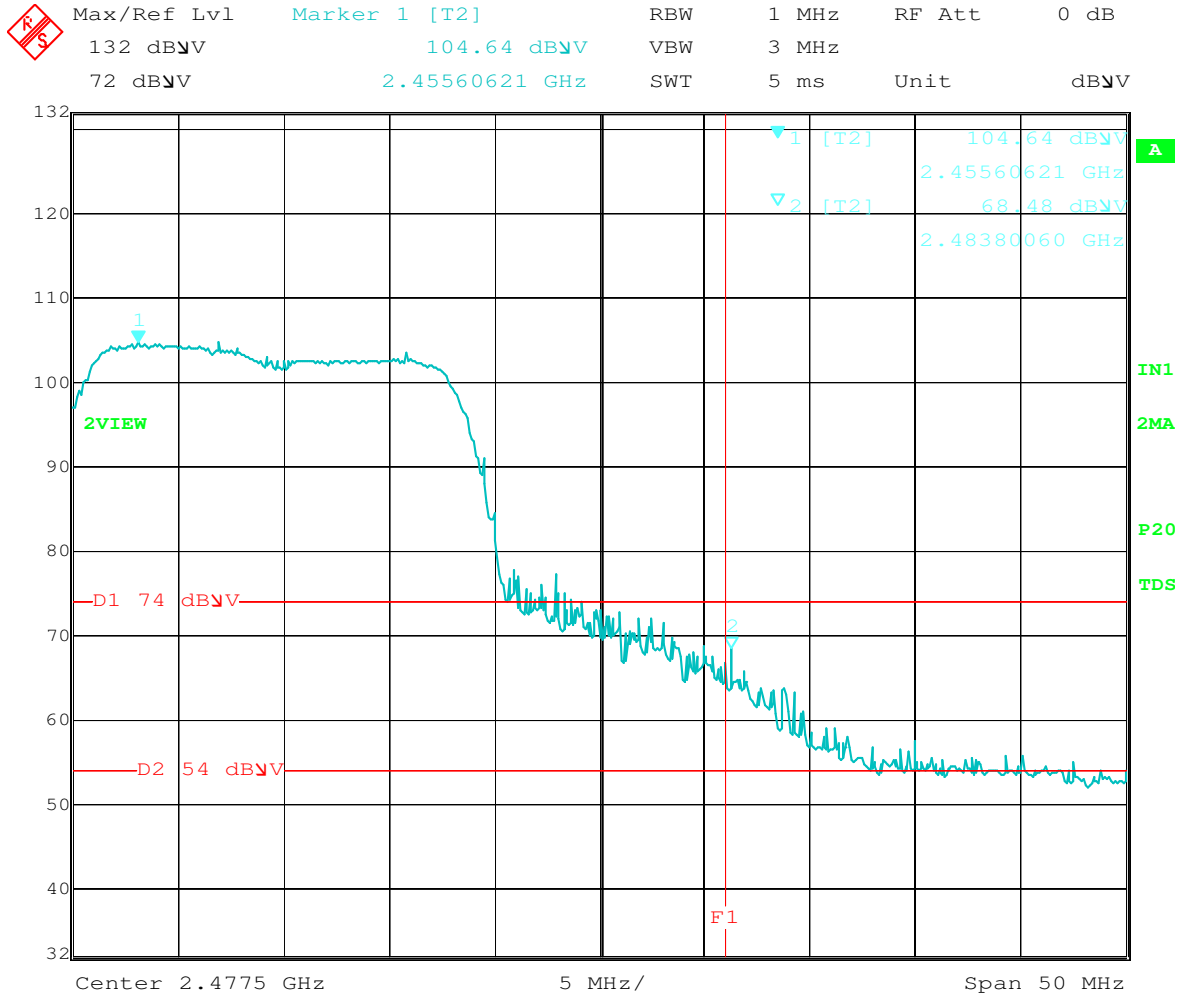
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**Agoura Division**  
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## UPPER BAND EDGE (Horizontal)



Title: ATWINC1510-MR210PB.  
Comment A: UBE, n mode, Horizontal.  
Date: 19.AUG.2015 09:23:02



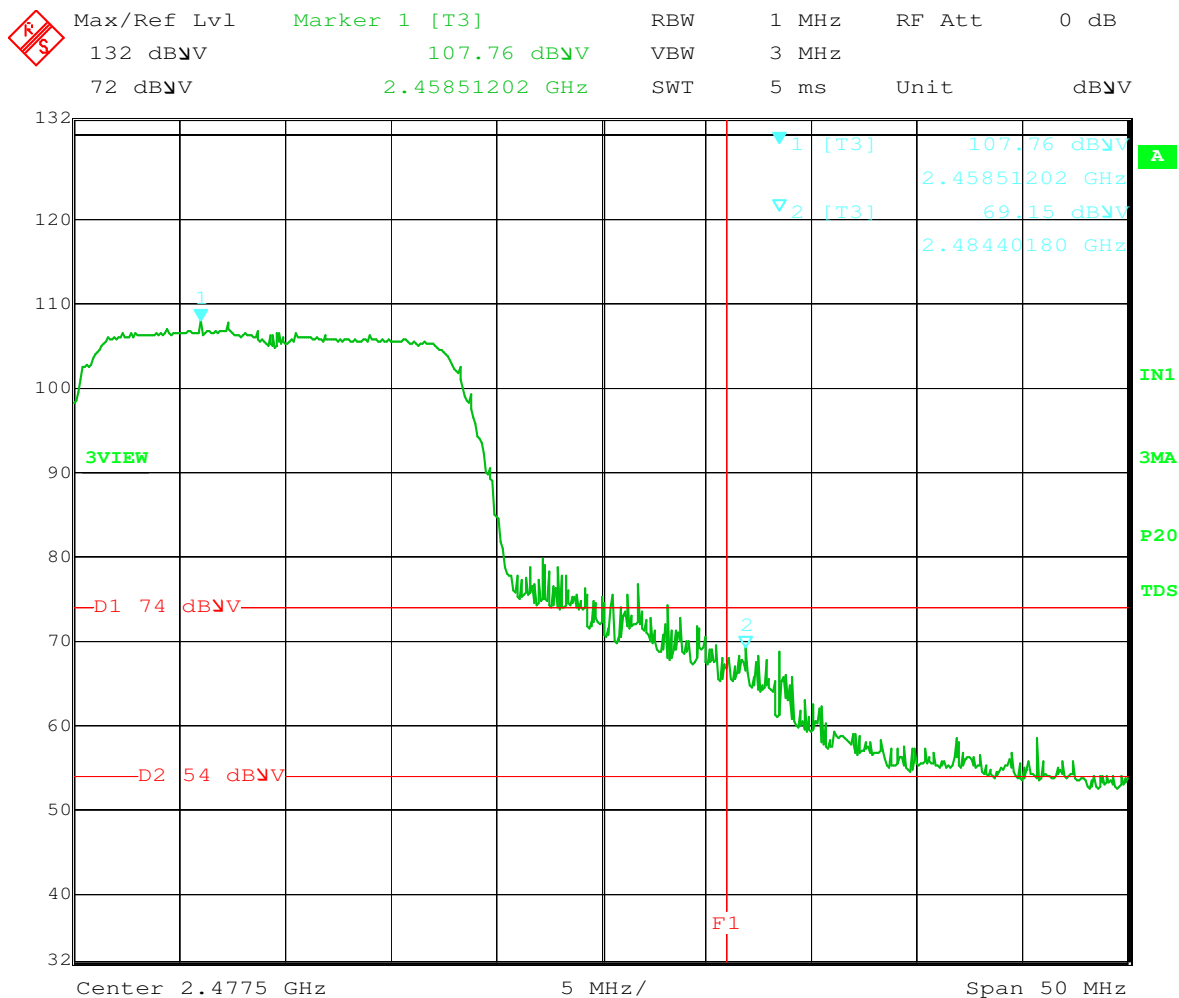
**Brea Division**  
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## UPPER BAND EDGE (Vertical)



Title: ATWINC1510-MR210PB.  
 Comment A: UBE, n mode, Vertical.  
 Date: 19.AUG.2015 09:13:39



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