

**FCC PART 15 SUBPART C
TEST REPORT**

for

WIRELESS MODULE

Model: ATWINC1500

Prepared for

ATMEL NORWAY AS
VESTRE ROSTEN 79
TRONDHEIM, NORWAY, 7075,

Prepared by: _____

MATT HARRISON

Approved by: _____

JEFF KLINGER

COMPATIBLE ELECTRONICS INC.
20621 PASCAL WAY
LAKE FOREST, CALIFORNIA 92630
(949) 587-0400

DATE: AUGUST 21, 2014

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	19	2	2	2	16	86	127

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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"> • Test Setup Diagrams • Antenna and Amplifier Factors • Radiated and Conducted Emissions Photos
E	Radiated and Conducted Emissions Data Sheets

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FIGURE	TITLE
1	Plot Map And Layout of Test Site Below 1GHz
2	Plot Map And Layout of Test Site Above 1GHz
3	Conducted Emissions Test Setup



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: ATWINC1500
 S/N: N/A

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

Modifications: The EUT was modified in order to comply with specifications. Please see the list of modifications in Appendix B.

Manufacturer: Atmel Norway AS
 Vestre Rosten 79
 Trondheim, Norway, 7075

Test Dates: August 18-22, & October 10, 15, 2014

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

Test Procedure: ANSI C63.4 & C63.10, and KDB 558074 D01 v03r02.



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SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.207
2	Radiated RF Emissions & Harmonics, 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 Level In The Fundamental Emission	Complies with CFR Title 47 Part 15 Subpart C Section 15.247
6	Emissions in Non-Restricted Frequency 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



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Wireless Module Model: ATWINC1500. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10 & C63.4. 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.



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

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 Norway AS

Igor Radutnuy Principal Applications Engineer

Compatible Electronics Inc.

Matt Harrison Test Technician
Jeff Klinger Director of Engineering

2.4 Date Test Sample was Received

The test sample was received on August 18, 2014.

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



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 C63.4 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
ANSI C63.10: 2009	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 D01 v03r02	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247



4. DESCRIPTION OF TEST CONFIGURATION

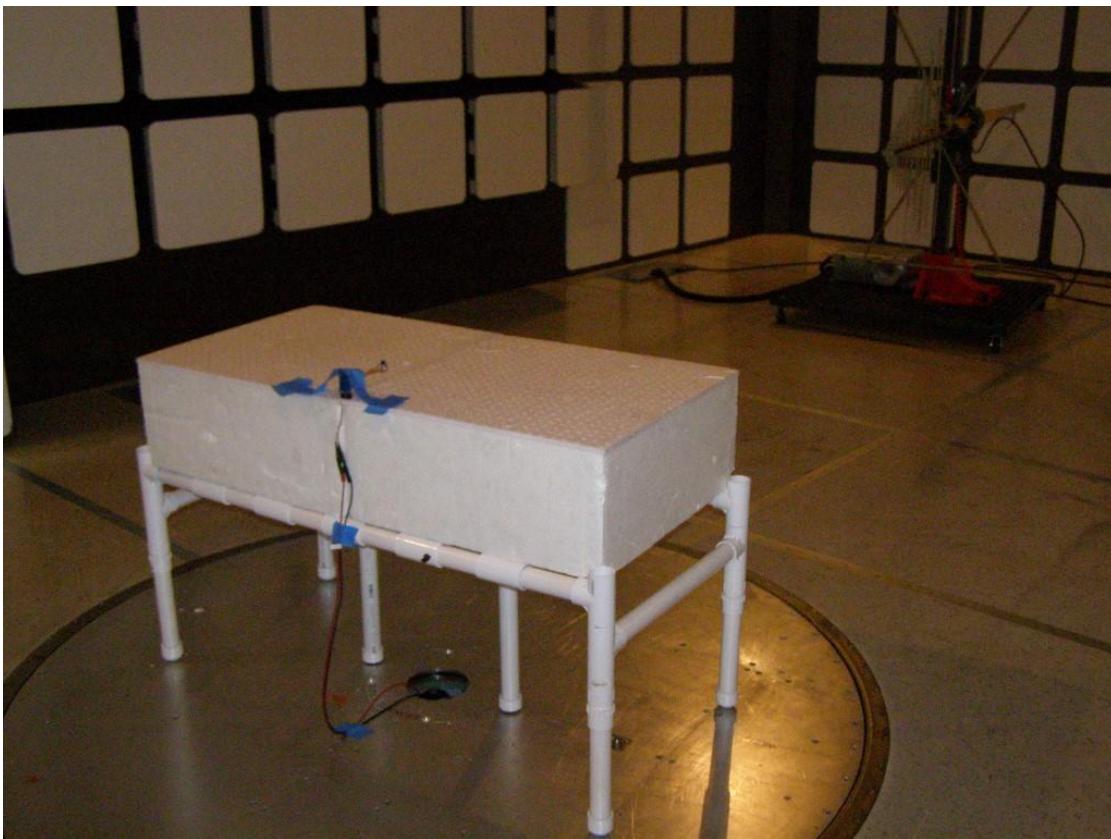
4.1 Description of Test Configuration

The Wireless Module Model: ATWINC1500 (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



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 bundled.

Cable 2

These are 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 cables were not bundled.

Cable 3

This is a 1 meter, foil shielded, USB cable that connects 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	MANUFACTURER	MODEL	SERIAL NUMBER
1	WIRELESS MODULE(EUT)	ATMEL NORWAY AS	ATWINC1500	N/A
2	DC SUPPLY	MPJA	0-30V / 0-5A	017687
3	EUT CONTROL BOARD	ATMEL NORWAY AS	NONE	NONE
4	USB POWER ADAPTER	BELKIN	F8J052	NONE



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	09/19/2013	09/19/2014
Antenna, Loop	Com Power	AL-130	121049	12/06/2013	12/06/2015
Antenna, CombiLog	Com Power	AC-220	25857	5/21/2014	5/21/2015
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	4/24/2015
Pre-Amp, 1-18GHz	Com Power	PAM-118	443011	4/24/2014	4/24/2015
Pre-Amp, 18-40GHz	Com Power	PA-840	181289	6/16/2014	6/16/2015
LISN	Com Power	LI-215	191935	3/17/2014	3/17/2015
RF Peak Power Meter/Analyzer	Boonton	4500A	1282	6/26/2013	6/26/2015
Peak Power Sensor	Boonton	57318	3723	8/19/2014	8/19/2015
High Pass Filter	AMTI Microwave Circuits	H3G020G4	481230	6/4/2014	6/4/2015
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



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, 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.



7. CHARACTERISTICS OF THE TRANSMITTER

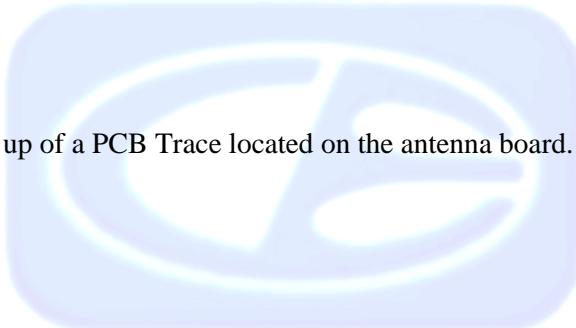
7.1 Channel Number and Frequencies

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 channels.

- 1 == 2412 MHz Low
- 2 == 2417 MHz
- 3 == 2422 MHz
- 4 == 2427 MHz
- 5 == 2432 MHz
- 6 == 2437 MHz
- 7 == 2442 MHz Middle
- 8 == 2447 MHz
- 9 == 2452 MHz
- 10 == 2457 MHz
- 11 == 2462 MHz High

7.2 Antenna

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



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

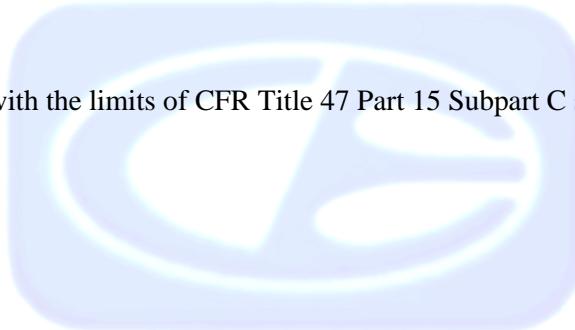
The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for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



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.



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 video bandwidth that is greater than the DTS bandwidth. 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 and VBW 10 kHz. 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.



9. TEST PROCEDURE DEVIATIONS

The test procedures were not deviated from throughout all tests.

10. CONCLUSIONS

The Wireless Module Model: ATWINC1500 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***

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

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 an 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



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***

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

MODIFICATIONS TO THE EUT

The following modifications were made to the EUT during the test in order to comply with FCC 15.205 & 15.209 limits for Harmonic Emissions in Restricted Bands. The modifications were made in such a way that they could be reproduced during manufacturing.

1. The following power levels were used to program the IC:
 - a. 802.11b Mode, Channel 1: Digital Gain set to -6.3dB.
 - b. 802.11b Mode, Channels 2-10: Digital Gain set to -4.3dB.
 - c. 802.11b Mode, Channel 11 Digital Gain set to -2.3dB.
 - d. 802.11g Mode, Channel 1: Digital Gain set to -8dB.
 - e. 802.11g Mode, Channels 2-10: Digital Gain set to -2dB.
 - f. 802.11g Mode, Channel 11 Digital Gain set to -6dB.
 - g. 802.11n Mode, Channel 1: Digital Gain set to -8dB.
 - h. 802.11n Mode, Channels 2-10: Digital Gain set to -2dB.
 - i. 802.11n Mode, Channel 11 Digital Gain set to -6dB.



APPENDIX C***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

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

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Wireless Module
Model: ATWINC1500
S/N: N/A

No additional models were tested.



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

APPENDIX D***DIAGRAMS, FACTORS, CHARTS, AND PHOTOS***

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

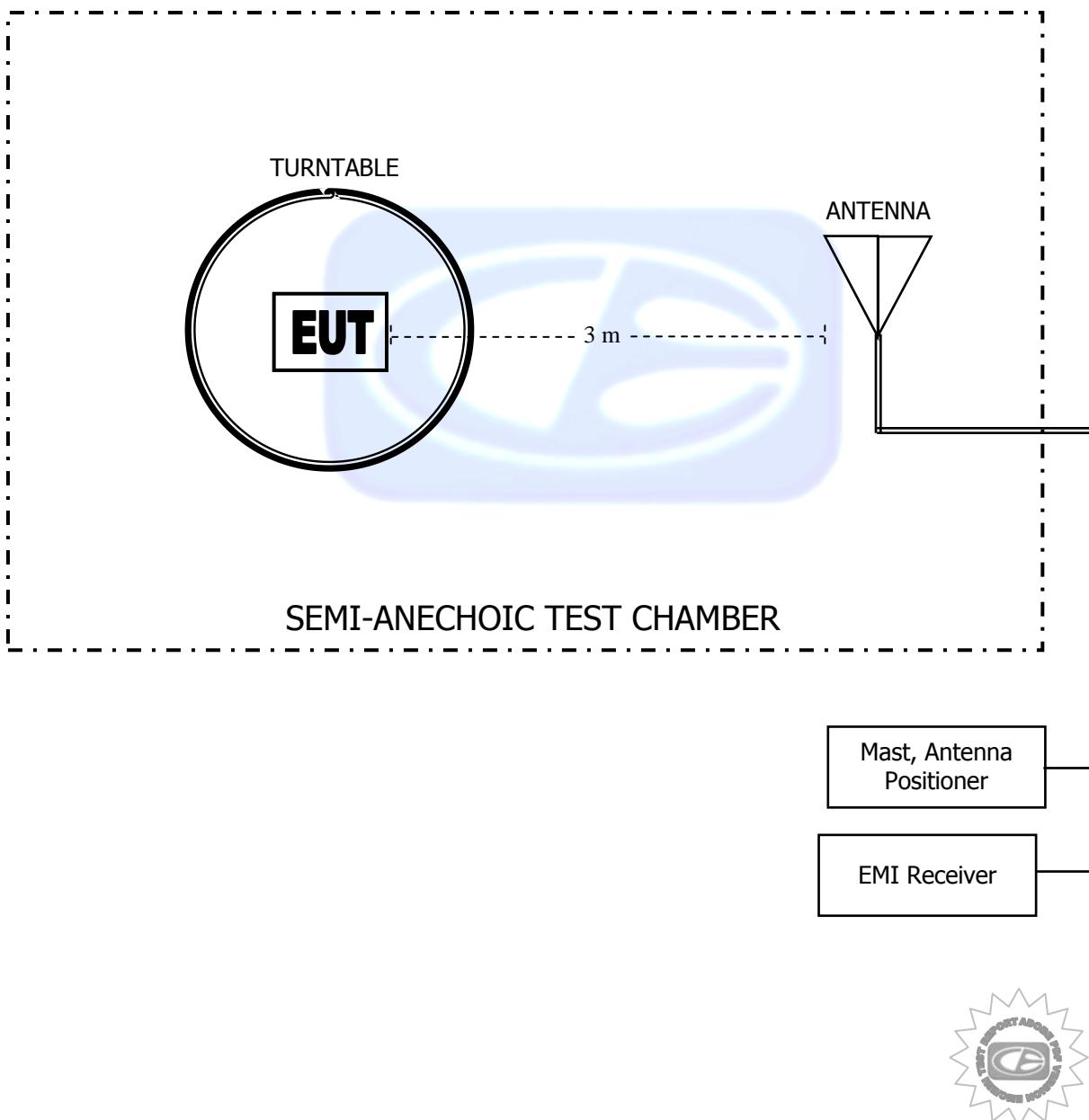
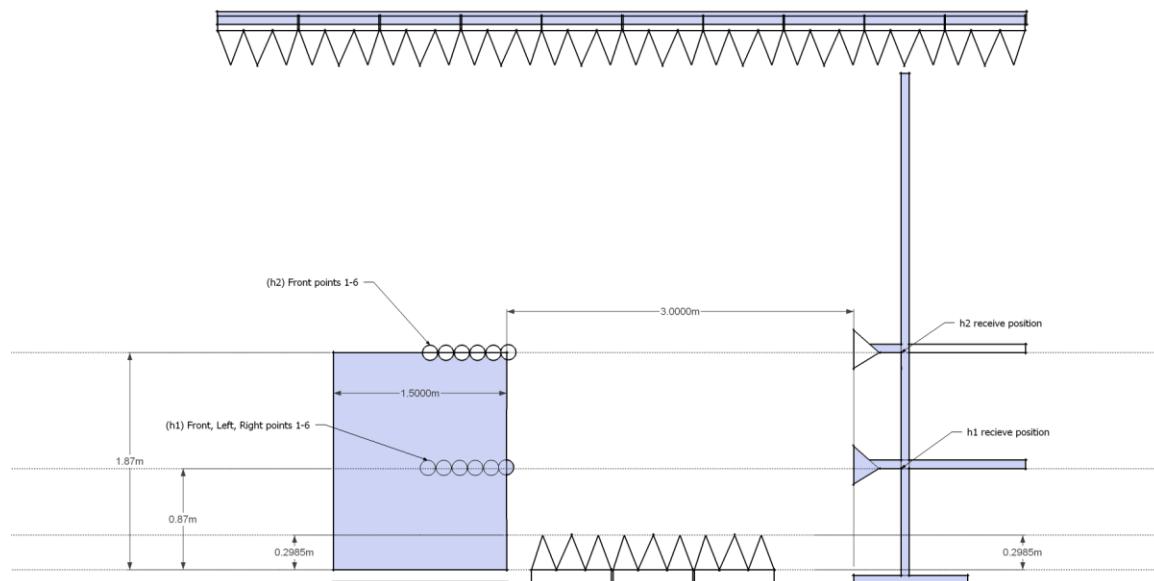
**FIGURE 1: PLOT MAP AND LAYOUT OF TEST SITE
BELOW 1GHZ**

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



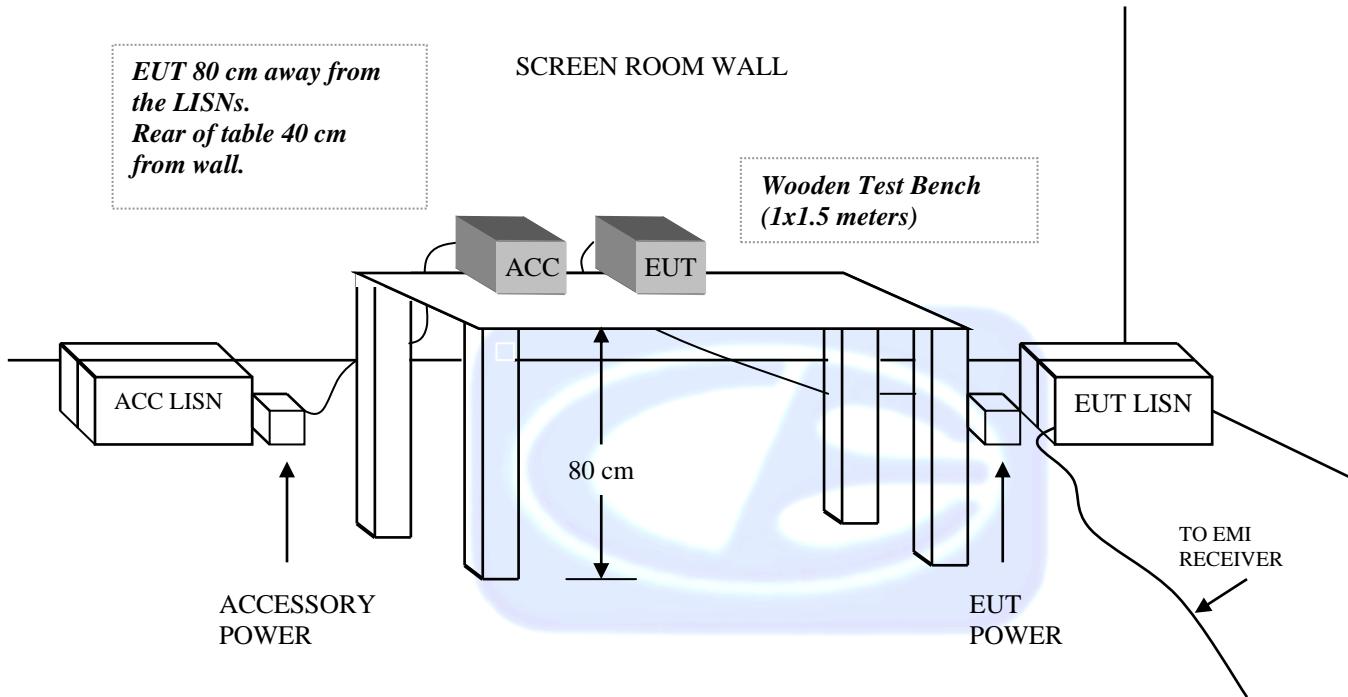
Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

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

FIGURE 3: CONDUCTED EMISSIONS TEST SETUP



Brea Division
 114 Olinda Drive
 Brea, CA 92823
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 2337 Troutdale Drive
 Agoura, CA 91301
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 (949) 589-0700

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

COM-POWER AL-130

LOOP ANTENNA

S/N: 121049

CALIBRATION DUE: DECEMBER 6, 2015

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)	FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (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			



COM-POWER AC-220

LAB R - COMBILOG ANTENNA

S/N: 25857

CALIBRATION DUE: MAY 21, 2015

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.5	160	13.8
35	22.5	180	14.5
40	23.0	200	15.0
45	21.5	250	14.6
50	21.3	300	18.1
60	18.2	400	15.6
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	15.2	900	26.6
140	13.6	1000	28.5



COM-POWER AH-118

HORN ANTENNA

S/N: 071250

CALIBRATION DUE: JULY 1, 2016

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
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



COM-POWER PAM-118

1-18GHz - PREAMPLIFIER

S/N: 443013

CALIBRATION DUE: APRIL 24, 2015

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
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



COM-POWER PAM-118

1-18GHz - PREAMPLIFIER

S/N: 443011

CALIBRATION DUE: April 24, 2015

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
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



COM-POWER PA-840

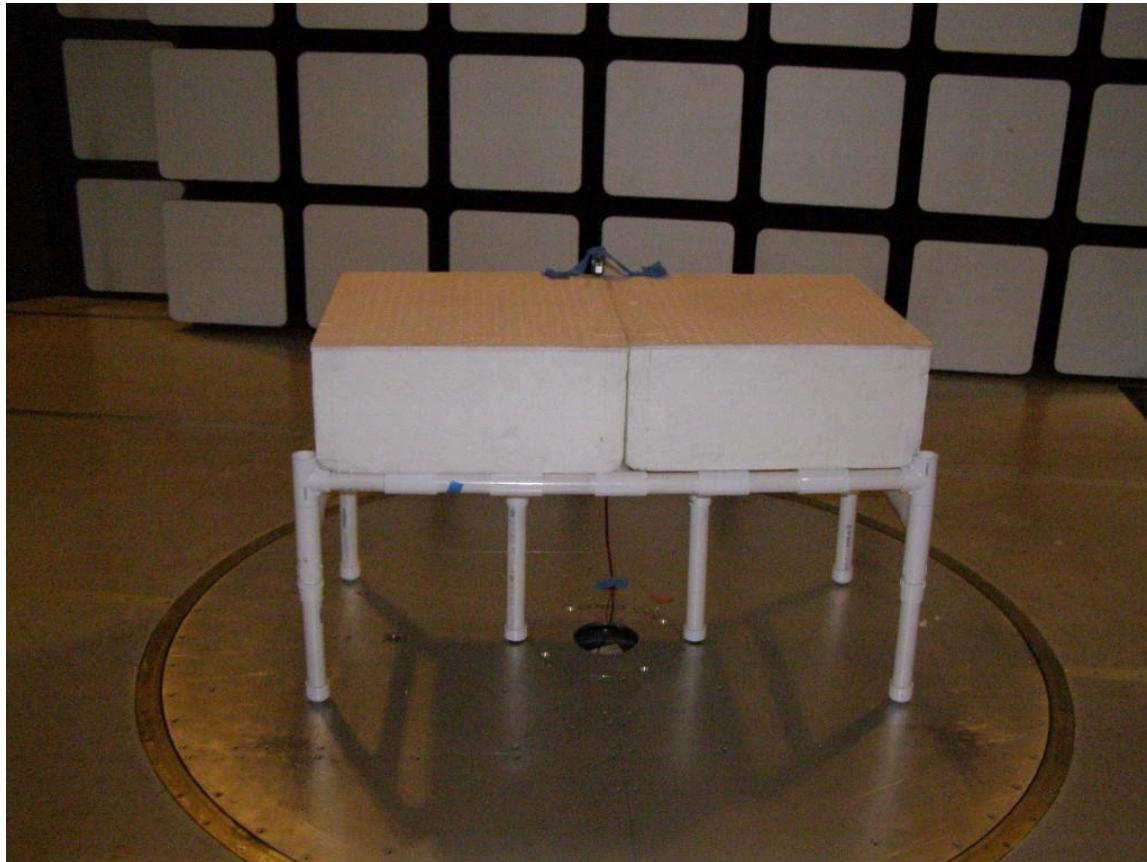
18-40 GHz PREAMPLIFIER

S/N: 181289

CALIBRATION DUE: JUNE 16, 2015

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



**FRONT VIEW**

ATMEL NORWAY AS
WIRELESS MODULE
Model: ATWINC1500
FCC SUBPART C - RADIATED EMISSIONS < 1GHz

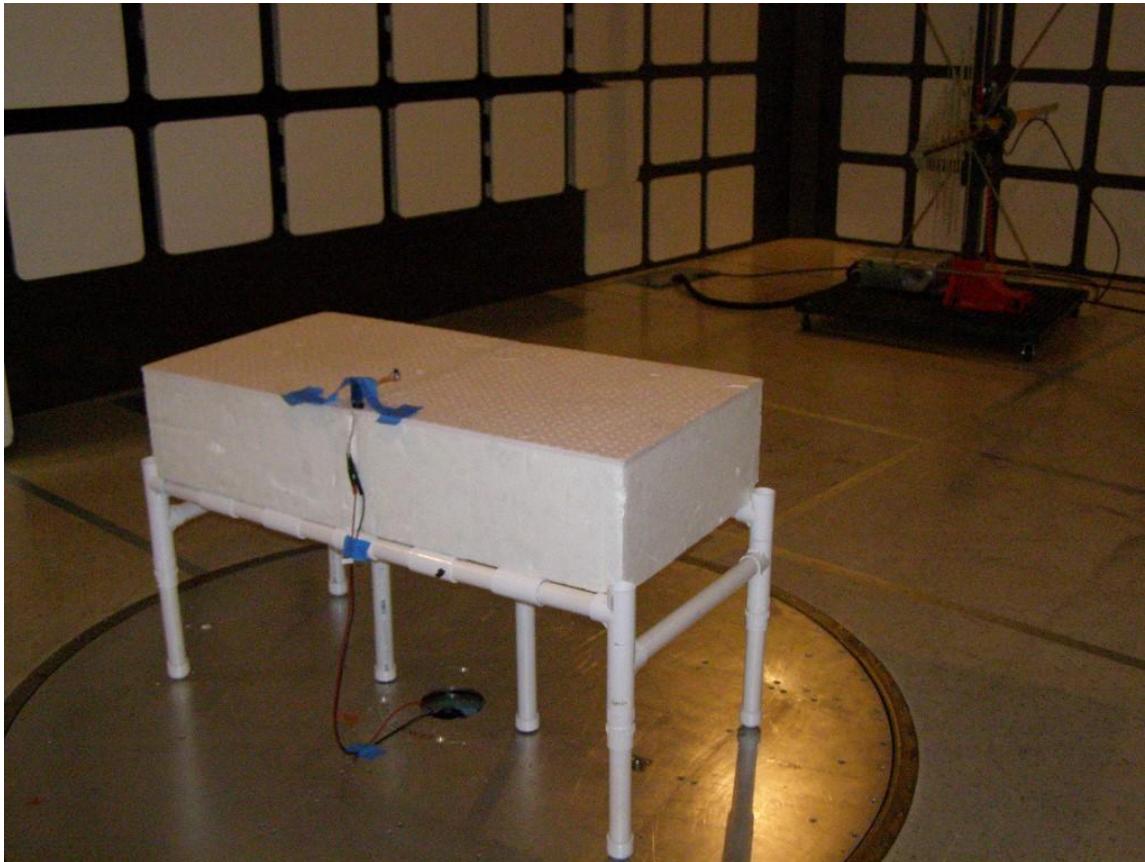
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

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

**REAR VIEW**

ATMEL NORWAY AS
WIRELESS MODULE
Model: ATWINC1500
FCC SUBPART C - RADIATED EMISSIONS < 1GHz

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

Brea Division
114 Olinda Drive
Brea, CA 92823
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Agoura Division
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Agoura, CA 91301
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(949) 589-0700

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

**FRONT VIEW**

ATMEL NORWAY AS
WIRELESS MODULE
Model: ATWINC1500
FCC SUBPART C - RADIATED EMISSIONS > 1GHz

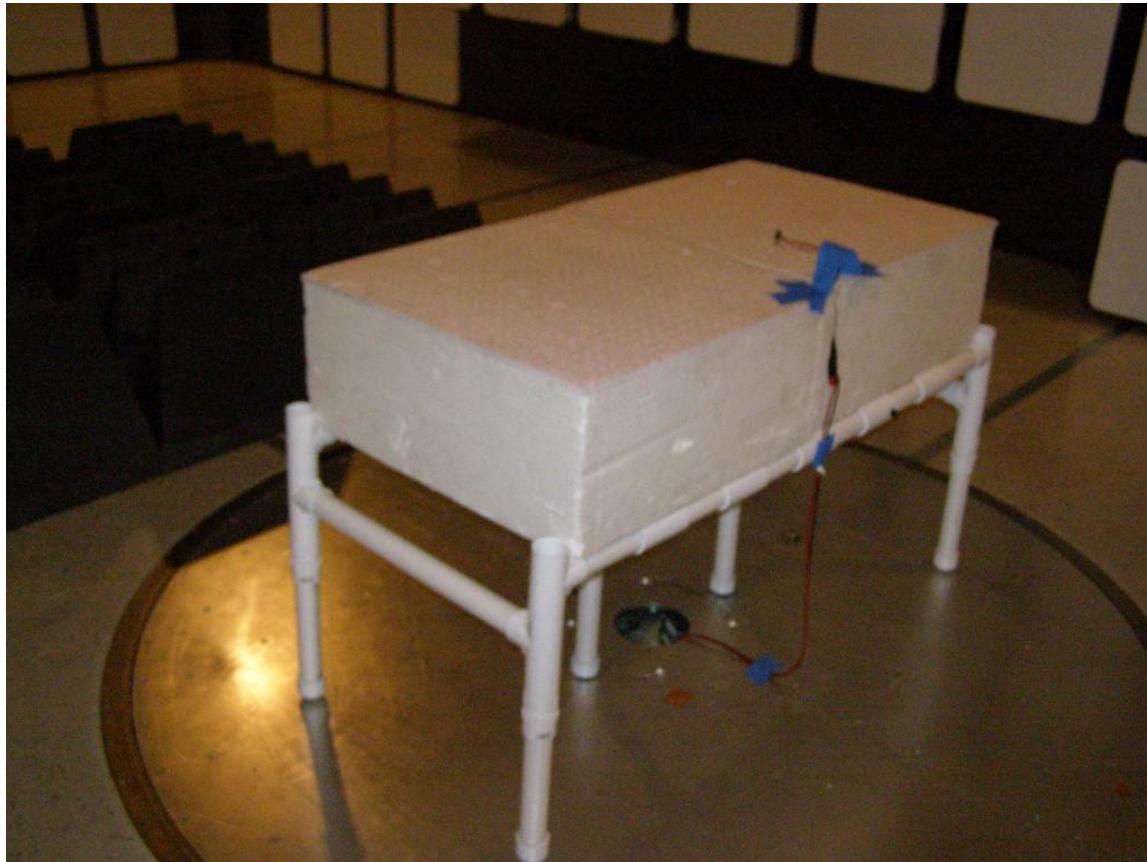
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

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114 Olinda Drive
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Lake Forest Division
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Lake Forest, CA 92630
(949) 587-0400

**REAR VIEW**

ATMEL NORWAY AS
WIRELESS MODULE
Model: ATWINC1500
FCC SUBPART C - RADIATED EMISSIONS > 1GHz

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

Brea Division
114 Olinda Drive
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(949) 589-0700

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

**FRONT VIEW**

ATMEL NORWAY AS
WIRELESS MODULE
Model: ATWINC1500
FCC SUBPART C - CONDUCTED EMISSIONS

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

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114 Olinda Drive
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**REAR VIEW**

ATMEL NORWAY AS
WIRELESS MODULE
Model: ATWINC1500
FCC SUBPART C - CONDUCTED EMISSIONS

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

Brea Division
114 Olinda Drive
Brea, CA 92823
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2337 Troutdale Drive
Agoura, CA 91301
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(949) 587-0400

APPENDIX E***RADIATED EMISSIONS DATA SHEETS***

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

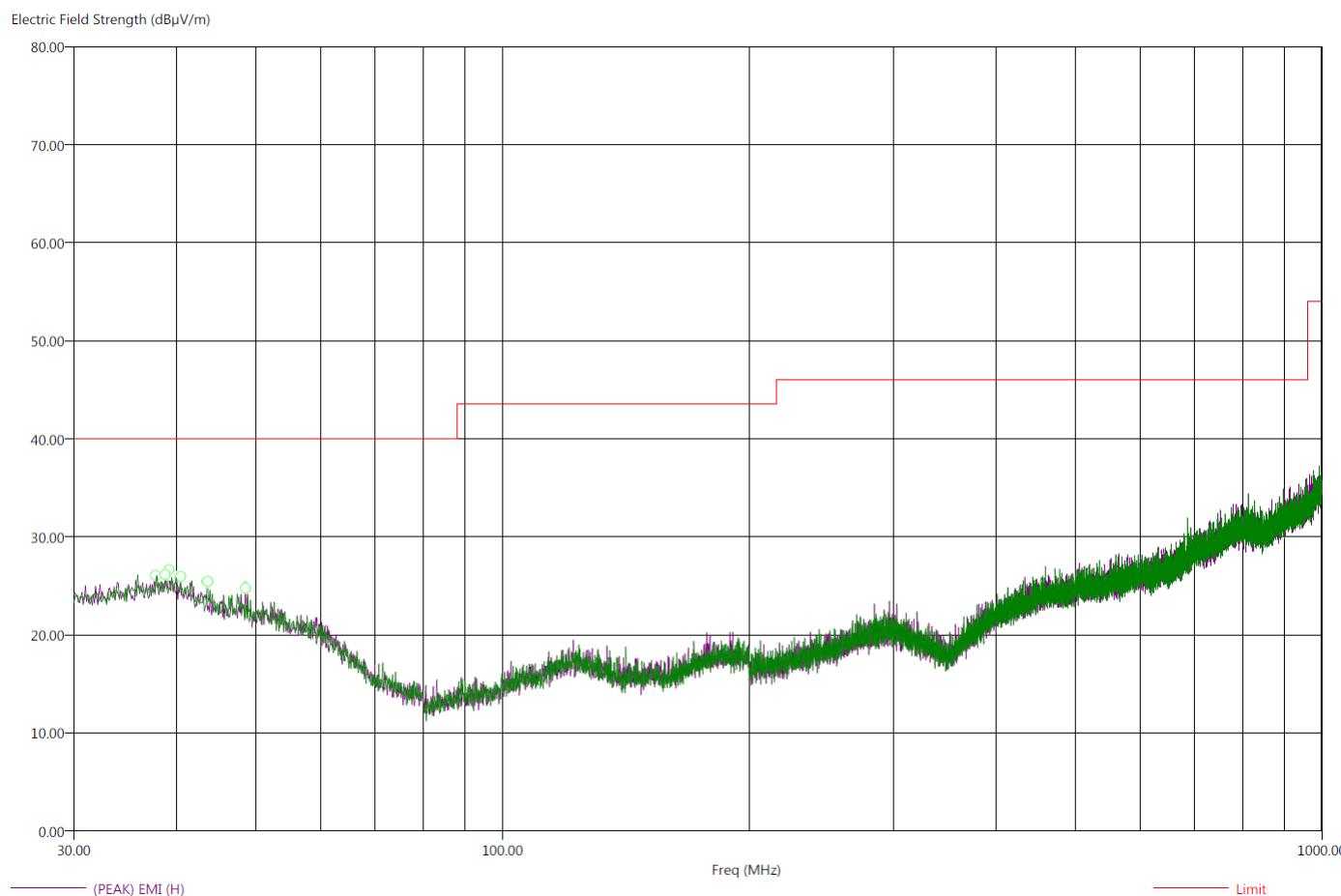
Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

802.11b MODE

Title: FCC 15.209
 File: Radiated Pre-Scan 30-1000Mhz_b.set
 Operator: Matt Harrison
 EUT Type: ATWINC1500.
 EUT Condition: Transmitting @ 802.11b, 2442 MHz, DigGain= -4.3 (Worst Case).
 Comments: Temp: 73f
 Hum: 43%
 3.3VDC

8/21/2014 3:12:33 PM
 Sequence: Preliminary Scan

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



Brea Division	Agoura Division	Silverado Division	Lake Forest Division
114 Olinda Drive Brea, CA 92823 (714) 579-0500	2337 Troutdale Drive Agoura, CA 91301 (818) 597-0600	19121 El Toro Road Silverado, CA 92676 (949) 589-0700	20621 Pascal Way Lake Forest, CA 92630 (949) 587-0400

Title: FCC 15.209
 File: Radiated Final 30-1000Mhz_b.set
 Operator: Matt Harrison
 EUT Type: ATWINC1500.
 EUT Condition: Transmitting @ 802.11b, 2442 MHz, DigGain= -4.3 (Worst Case).
 Comments: Temp: 73f
 Hum: 43%
 3.3VDC

8/21/2014 3:39:53 PM
 Sequence: Final Measurements

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

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dB μ V/m)	(PEAK) EMI (dB μ V/m)	Limit (dB μ V/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer (dB)	Cable(dB)
37.80	-19.71	20.29	25.70	40.00	H	331.25	238.38	22.80	1.19
38.80	-19.49	20.51	26.18	40.00	V	3.75	245.37	22.89	1.24
39.20	-19.43	20.57	26.23	40.00	H	303.75	209.01	22.93	1.26
40.50	-19.51	20.49	26.12	40.00	H	306.50	232.77	22.82	1.22
43.70	-20.68	19.32	24.72	40.00	V	176.75	295.76	21.90	0.84
48.60	-21.63	18.37	24.29	40.00	H	359.50	357.91	21.35	0.24

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

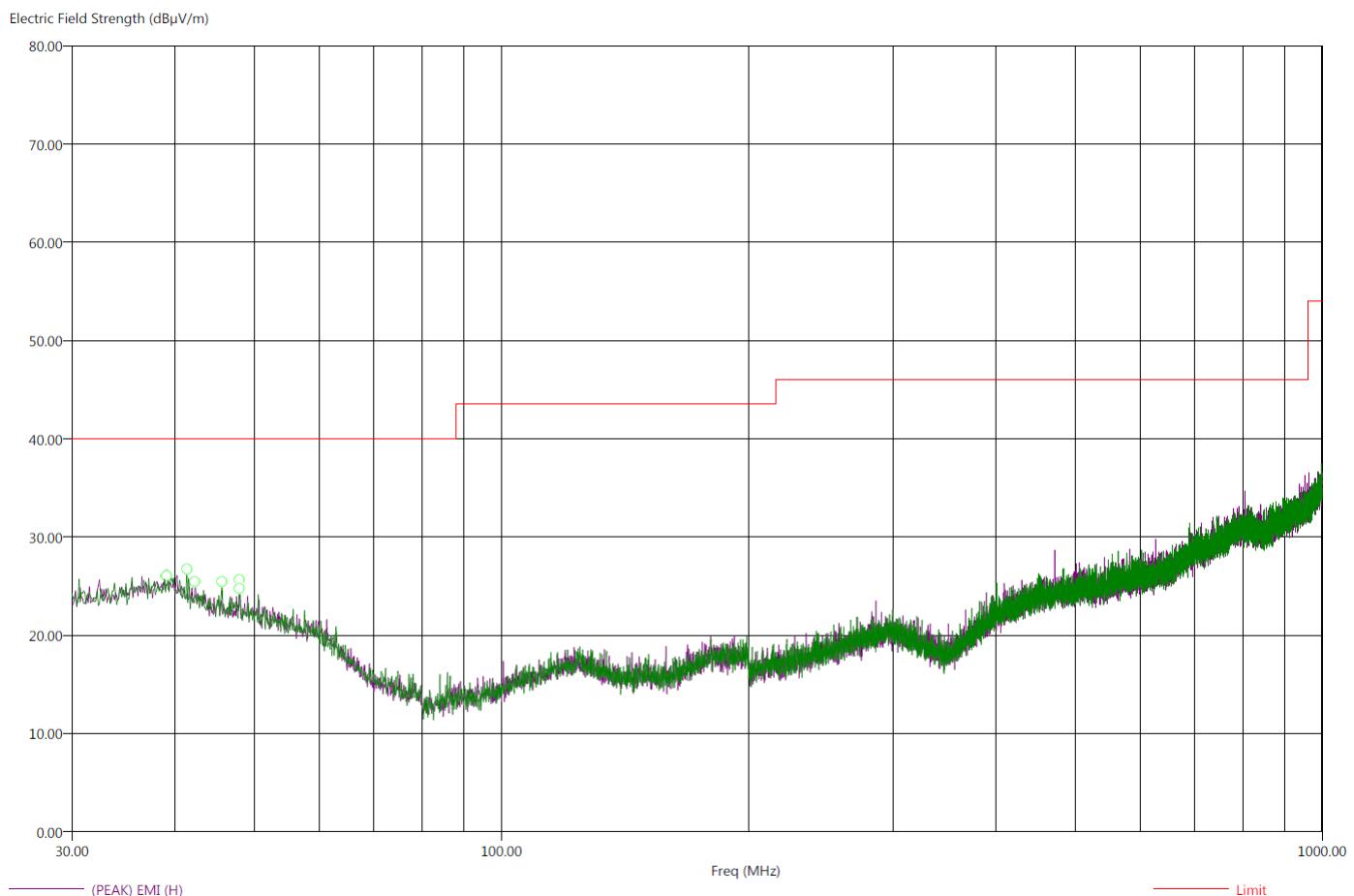


802.11g MODE

Title: FCC 15.209
 File: Radiated Pre-Scan 30-1000Mhz_g.set
 Operator: Matt Harrison
 EUT Type: ATWINC1500.
 EUT Condition: Transmitting @ 802.11g, 2442 MHz, DigGain= -2.
 Comments: Temp: 73f
 Hum: 43%
 3.3VDC

8/21/2014 3:57:55 PM
 Sequence: Preliminary Scan

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



Brea Division	Agoura Division	Silverado Division	Lake Forest Division
114 Olinda Drive Brea, CA 92823 (714) 579-0500	2337 Troutdale Drive Agoura, CA 91301 (818) 597-0600	19121 El Toro Road Silverado, CA 92676 (949) 589-0700	20621 Pascal Way Lake Forest, CA 92630 (949) 587-0400

Title: FCC 15.209
 File: Radiated Final 30-1000Mhz_g.set
 Operator: Matt Harrison
 EUT Type: ATWINC1500.
 EUT Condition: Transmitting @ 802.11g, 2442 MHz, DigGain= -2.
 Comments: Temp: 73f
 Hum: 43%
 3.3VDC

8/21/2014 4:20:20 PM
 Sequence: Final Measurements

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

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dB μ V/m)	(PEAK) EMI (dB μ V/m)	Limit (dB μ V/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer (dB)	Cable(dB)
39.10	-19.46	20.54	25.77	40.00	H	359.00	147.04	22.91	1.25
41.40	-19.73	20.27	26.13	40.00	V	127.50	399.94	22.57	1.12
42.40	-20.22	19.78	25.38	40.00	H	86.75	384.17	22.28	1.00
45.70	-21.22	18.78	23.43	40.00	V	183.00	204.41	21.47	0.59
48.00	-16.26	23.74	27.15	40.00	H	354.00	164.95	21.38	0.32
48.00	-20.51	19.49	25.09	40.00	V	240.50	391.34	21.38	0.33

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



802.11n MODE

Title: FCC 15.209

8/21/2014 2:31:47 PM

File: Radiated Pre-Scan 30-1000Mhz.set

Sequence: Preliminary Scan

Operator: Matt Harrison

EUT Type: ATWINC1500.

EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -2.

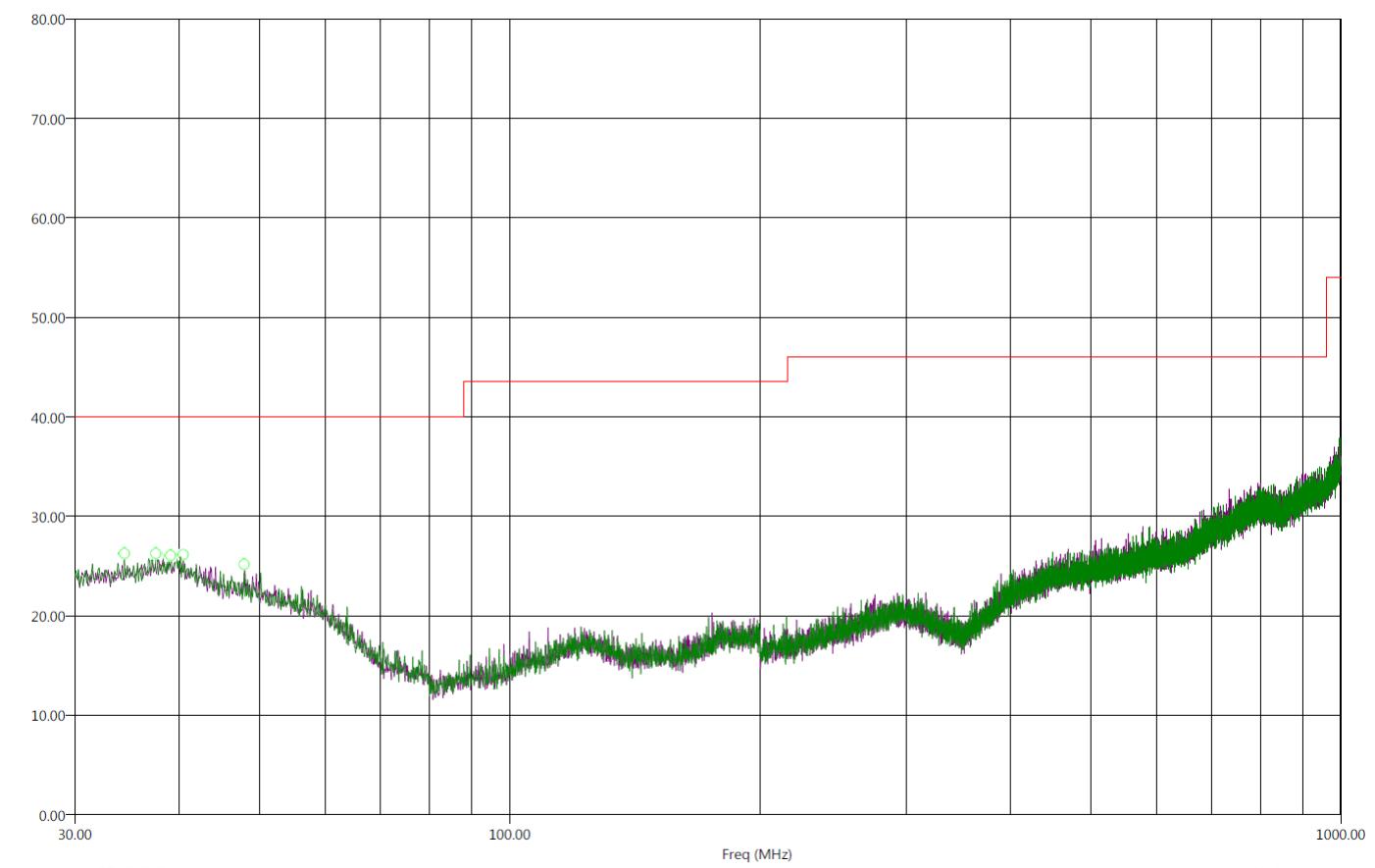
Comments: Temp: 73f

Hum: 43%

3.3VDC

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

Electric Field Strength (dB μ V/m)



(PEAK) EMI (H) (PEAK) EMI (V) Limit

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



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 2337 Troutdale Drive
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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 15.209
 File: Radiated Final 30-1000Mhz.set
 Operator: Matt Harrison
 EUT Type: ATWINC1500.
 EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -2.
 Comments: Temp: 73f
 Hum: 43%
 3.3VDC

8/21/2014 2:54:59 PM
 Sequence: Final Measurements

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

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dB μ V/m)	(PEAK) EMI (dB μ V/m)	Limit (dB μ V/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer (dB)	Cable(dB)
34.40	-20.35	19.65	24.83	40.00	V	339.25	311.10	22.50	0.99
37.60	-19.77	20.23	25.53	40.00	V	238.75	118.86	22.76	1.17
39.00	-19.47	20.53	26.90	40.00	H	322.25	198.38	22.91	1.25
39.10	-19.53	20.47	26.13	40.00	V	314.25	280.53	22.92	1.25
40.50	-19.52	20.48	25.83	40.00	H	98.75	308.89	22.81	1.22
48.00	-16.98	23.02	27.49	40.00	H	212.50	154.50	21.38	0.32

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



CONDUCTED EMISSIONS DATA SHEETS

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

Agoura Division
2337 Troutdale Drive
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(818) 597-0600

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Silverado, CA 92676
(949) 589-0700

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

802.11b MODE

Title: FCC 15.207

File: Conducted Pre-Line.set

Operator: Matt Harrison

EUT Type: Wireless Module, ATWINC1500.

EUT Condition: Transmitting @ 802.11b, 2442 MHz, DigGain= -4.3.

Comments: Connected to Control Board Powered By USB Adapter.

Temp: 74f

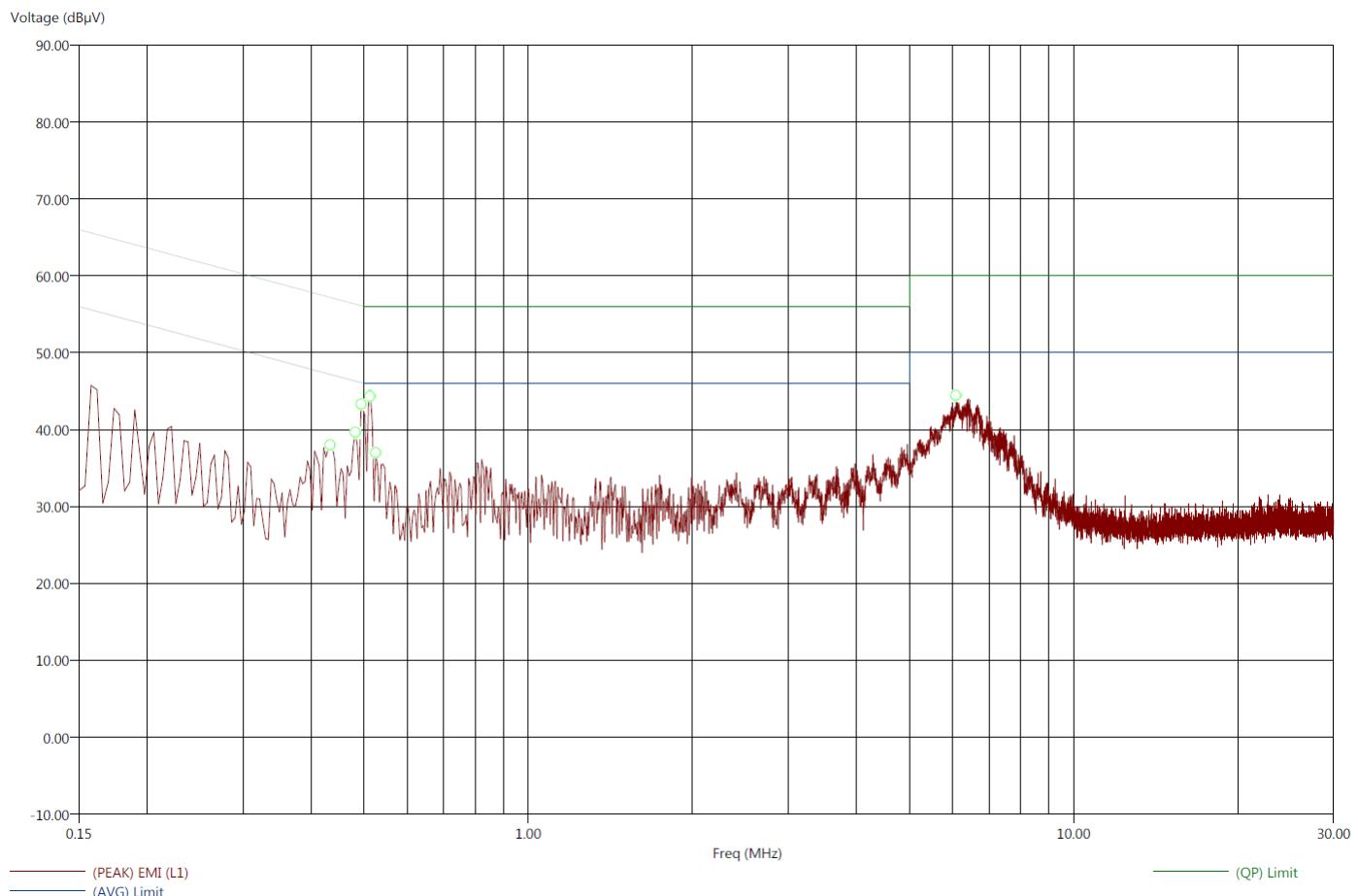
Hum: 48%

USB Adapter: 120V 60Hz

10/10/2014 1:46:26 PM

Sequence: Preliminary Scan

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



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

Title: FCC 15.207
 File: Conducted Final-Line.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11b, 2442 MHz, DigGain= -4.3.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 1:48:57 PM
 Sequence: Final Measurements

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

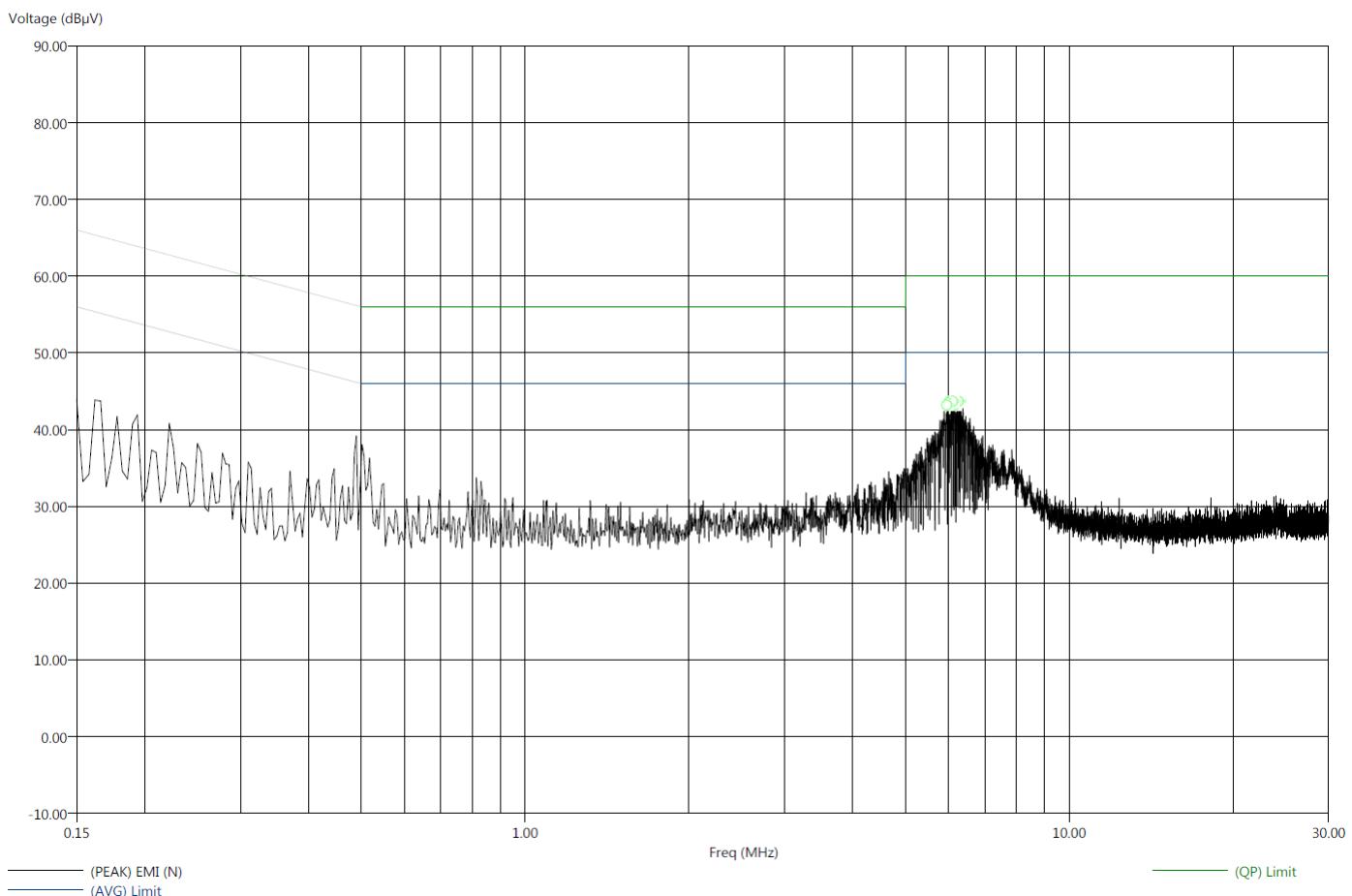
Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBµV)	(QP) EMI (dBµV)	(PEAK) EMI (dBµV)	(AVG) Limit (dBµV)	(QP) Limit (dBµV)	Transducer (dB)	Cable (dB)
0.43	-19.65	-22.30	27.52	34.88	38.21	47.18	57.18	0.04	0.05
0.48	-16.94	-19.65	29.37	36.65	40.14	46.30	56.30	0.04	0.01
0.49	-13.32	-15.91	32.78	40.19	43.27	46.10	56.10	0.04	0.00
0.51	-11.71	-14.02	34.29	41.98	44.81	46.00	56.00	0.04	0.00
0.53	-19.61	-21.82	26.39	34.18	38.43	46.00	56.00	0.04	0.00
6.09	-20.32	-19.13	29.68	40.87	43.36	50.00	60.00	0.04	0.34



Title: FCC 15.207
 File: Conducted Pre-Neutral.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11b, 2442 MHz, DigGain= -4.3.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 1:51:43 PM
 Sequence: Preliminary Scan

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



Brea Division
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 Silverado, CA 92676
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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.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11b, 2442 MHz, DigGain= -4.3.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 1:54:26 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)
5.97	-28.17	-21.07	21.83	38.93	43.07	50.00	60.00	0.03	0.33
5.99	-28.36	-21.47	21.64	38.53	43.66	50.00	60.00	0.03	0.33
6.12	-28.22	-20.62	21.78	39.38	44.28	50.00	60.00	0.03	0.35
6.16	-27.13	-21.21	22.87	38.79	42.91	50.00	60.00	0.03	0.35
6.25	-26.86	-20.66	23.14	39.34	44.16	50.00	60.00	0.03	0.36
6.30	-28.21	-21.63	21.79	38.37	44.34	50.00	60.00	0.03	0.37



802.11g MODE

Title: FCC 15.207

File: Conducted Pre-Line.set

Operator: Matt Harrison

EUT Type: Wireless Module, ATWINC1500.

EUT Condition: Transmitting @ 802.11g, 2442 MHz, DigGain= -2.

Comments: Connected to Control Board Powered By USB Adapter.

Temp: 74f

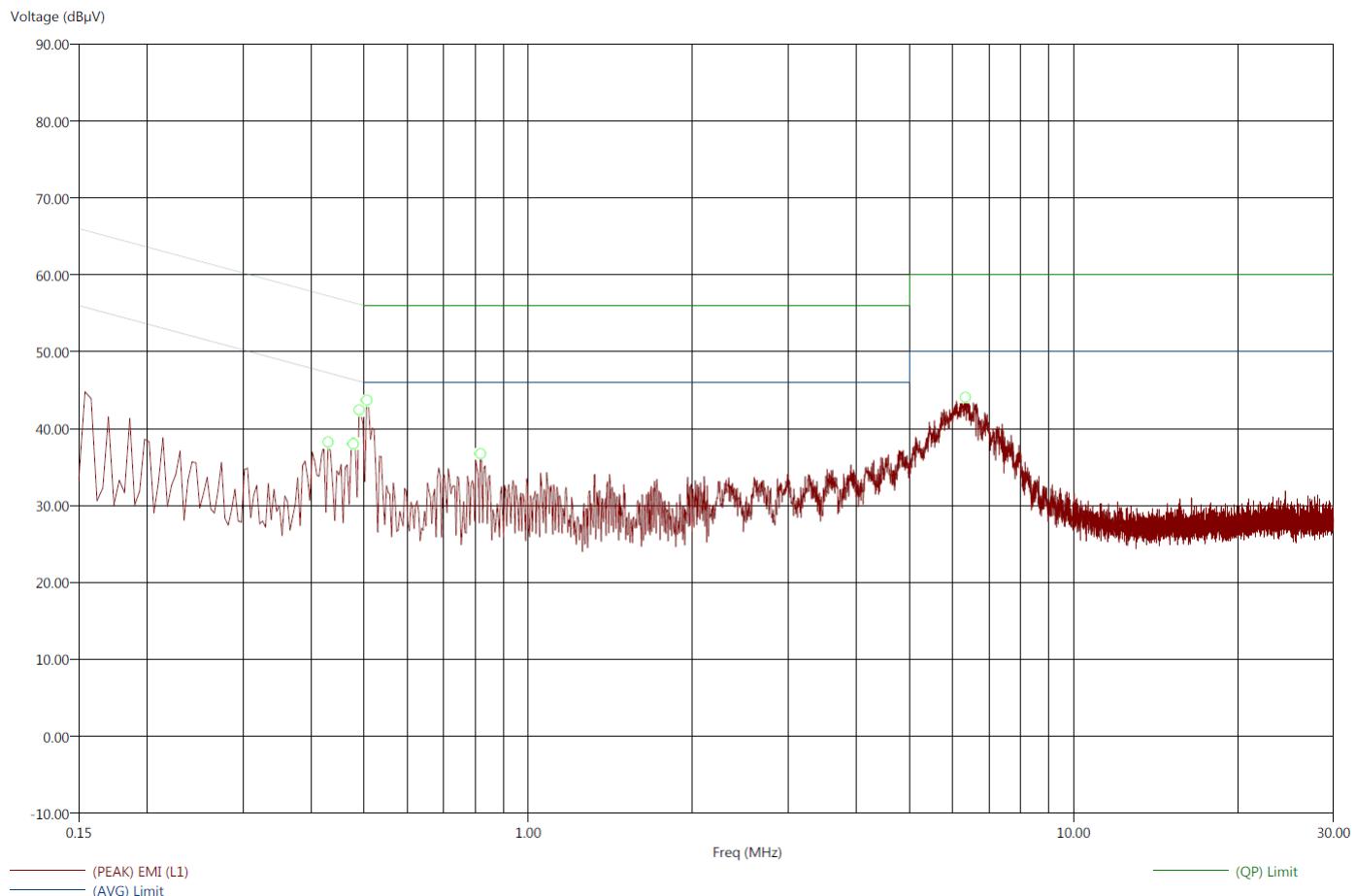
Hum: 48%

USB Adapter: 120V 60Hz

10/10/2014 2:05:14 PM

Sequence: Preliminary Scan

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



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

Title: FCC 15.207
 File: Conducted Final-Line.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11g, 2442 MHz, DigGain= -2.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 2:07:35 PM

Sequence: Final Measurements

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

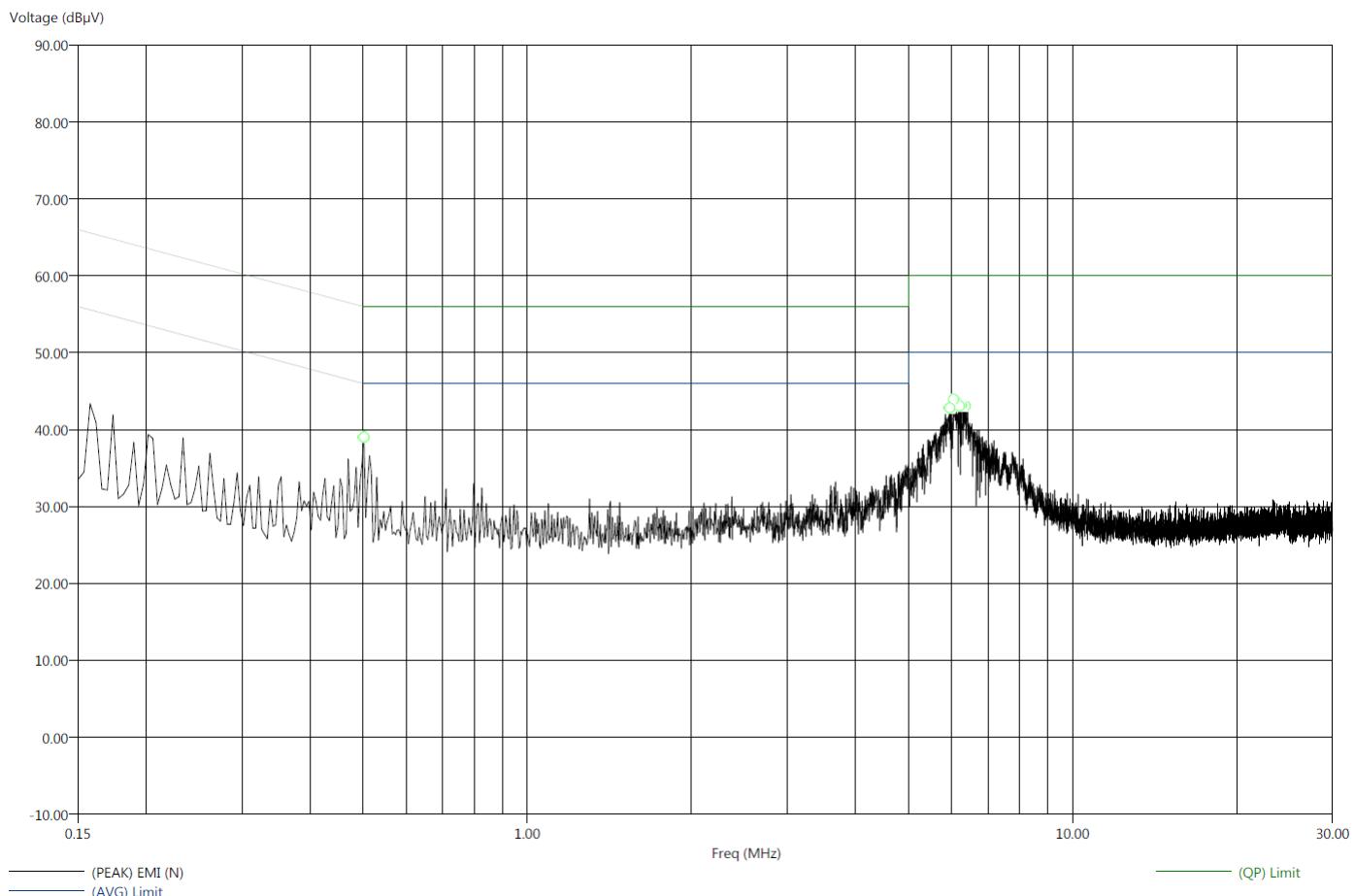
Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dB μ V)	(QP) EMI (dB μ V)	(PEAK) EMI (dB μ V)	(AVG) Limit (dB μ V)	(QP) Limit (dB μ V)	Transducer (dB)	Cable (dB)
0.43	-19.48	-22.22	27.77	35.03	38.89	47.25	57.25	0.04	0.05
0.48	-17.54	-20.12	28.84	36.25	40.07	46.37	56.37	0.04	0.01
0.49	-13.90	-16.20	32.27	39.97	43.18	46.17	56.17	0.04	0.01
0.51	-11.38	-13.65	34.62	42.35	45.57	46.00	56.00	0.04	0.00
0.82	-19.88	-22.41	26.12	33.59	36.13	46.00	56.00	0.04	0.00
6.34	-19.88	-18.28	30.12	41.72	44.47	50.00	60.00	0.04	0.37



Title: FCC 15.207
 File: Conducted Pre-Neutral.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11g, 2442 MHz, DigGain= -2.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 2:10:10 PM
 Sequence: Preliminary Scan

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



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 Agoura, CA 91301
 (818) 597-0600

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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

Title: FCC 15.207
 File: Conducted Final-Neutral.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11g, 2442 MHz, DigGain= -2.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 2:12:58 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)
0.50	-22.09	-19.83	23.91	36.17	39.99	46.00	56.00	0.03	0.00
5.95	-28.70	-22.05	21.30	37.95	43.03	50.00	60.00	0.03	0.33
6.07	-28.41	-20.64	21.59	39.36	43.54	50.00	60.00	0.03	0.34
6.22	-27.02	-20.59	22.98	39.41	43.84	50.00	60.00	0.03	0.36
6.27	-27.77	-21.39	22.23	38.61	43.62	50.00	60.00	0.03	0.36
6.36	-27.89	-21.81	22.11	38.19	42.88	50.00	60.00	0.03	0.37



802.11n MODE

Title: FCC 15.207

File: Conducted Pre-Line.set

Operator: Matt Harrison

EUT Type: Wireless Module, ATWINC1500.

EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -2.

Comments: Connected to Control Board Powered By USB Adapter.

Temp: 74f

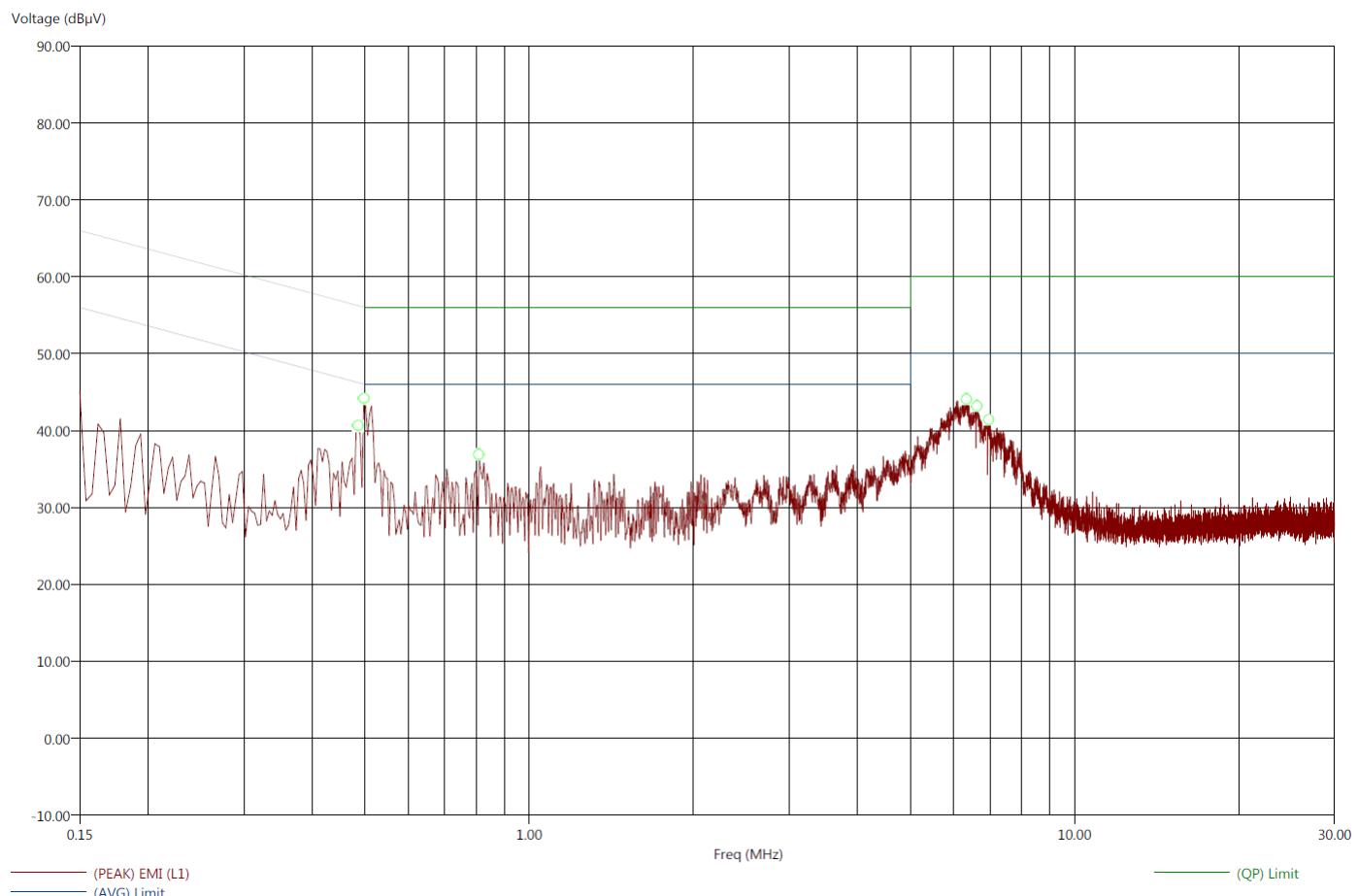
Hum: 48%

USB Adapter: 120V 60Hz

10/10/2014 2:19:16 PM

Sequence: Preliminary Scan

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



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

Title: FCC 15.207
 File: Conducted Final-Line.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -2.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 2:21:49 PM
 Sequence: Final Measurements

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

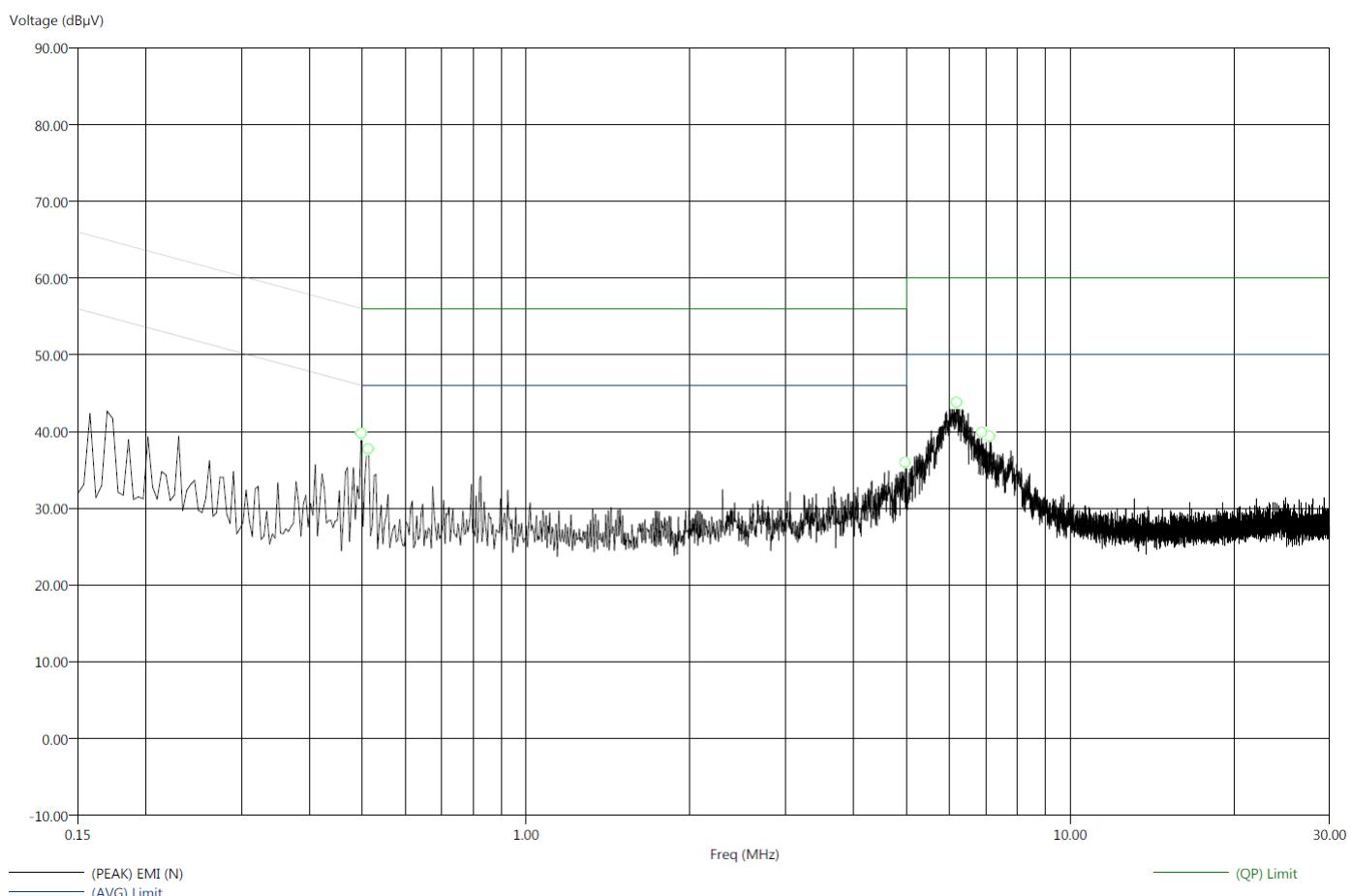
Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dB μ V)	(QP) EMI (dB μ V)	(PEAK) EMI (dB μ V)	(AVG) Limit (dB μ V)	(QP) Limit (dB μ V)	Transducer (dB)	Cable (dB)
0.49	-14.49	-17.20	31.75	39.03	42.12	46.24	56.24	0.04	0.01
0.50	-11.96	-14.70	34.07	41.34	44.38	46.03	56.03	0.04	0.00
0.81	-20.17	-22.65	25.83	33.35	35.90	46.00	56.00	0.04	0.00
6.35	-19.25	-18.37	30.75	41.63	44.74	50.00	60.00	0.04	0.37
6.62	-20.98	-19.00	29.02	41.00	43.19	50.00	60.00	0.04	0.40
6.97	-22.37	-22.11	27.63	37.89	40.90	50.00	60.00	0.04	0.44



Title: FCC 15.207
 File: Conducted Pre-Neutral.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -2.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 2:24:08 PM
 Sequence: Preliminary Scan

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



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

Title: FCC 15.207
 File: Conducted Final-Neutral.set
 Operator: Matt Harrison
 EUT Type: Wireless Module, ATWINC1500.
 EUT Condition: Transmitting @ 802.11n, 2442 MHz, DigGain= -2.
 Comments: Connected to Control Board Powered By USB Adapter.
 Temp: 74f
 Hum: 48%
 USB Adapter: 120V 60Hz

10/10/2014 2:26:38 PM
 Sequence: Final Measurements

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

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dB μ V)	(QP) EMI (dB μ V)	(PEAK) EMI (dB μ V)	(AVG) Limit (dB μ V)	(QP) Limit (dB μ V)	Transducer (dB)	Cable (dB)
0.50	-22.58	-20.23	23.46	35.81	39.87	46.03	56.03	0.03	0.00
0.51	-23.62	-21.85	22.38	34.15	37.98	46.00	56.00	0.03	0.00
4.98	-30.47	-26.42	15.53	29.58	34.61	46.00	56.00	0.03	0.20
6.19	-27.02	-21.00	22.98	39.00	43.09	50.00	60.00	0.03	0.35
6.87	-26.89	-25.89	23.11	34.11	39.00	50.00	60.00	0.03	0.43
7.13	-25.08	-27.37	24.92	32.63	38.03	50.00	60.00	0.03	0.46



DTS BANDWIDTH***DATA SHEETS***

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

802.11b MODE

FCC 15.247

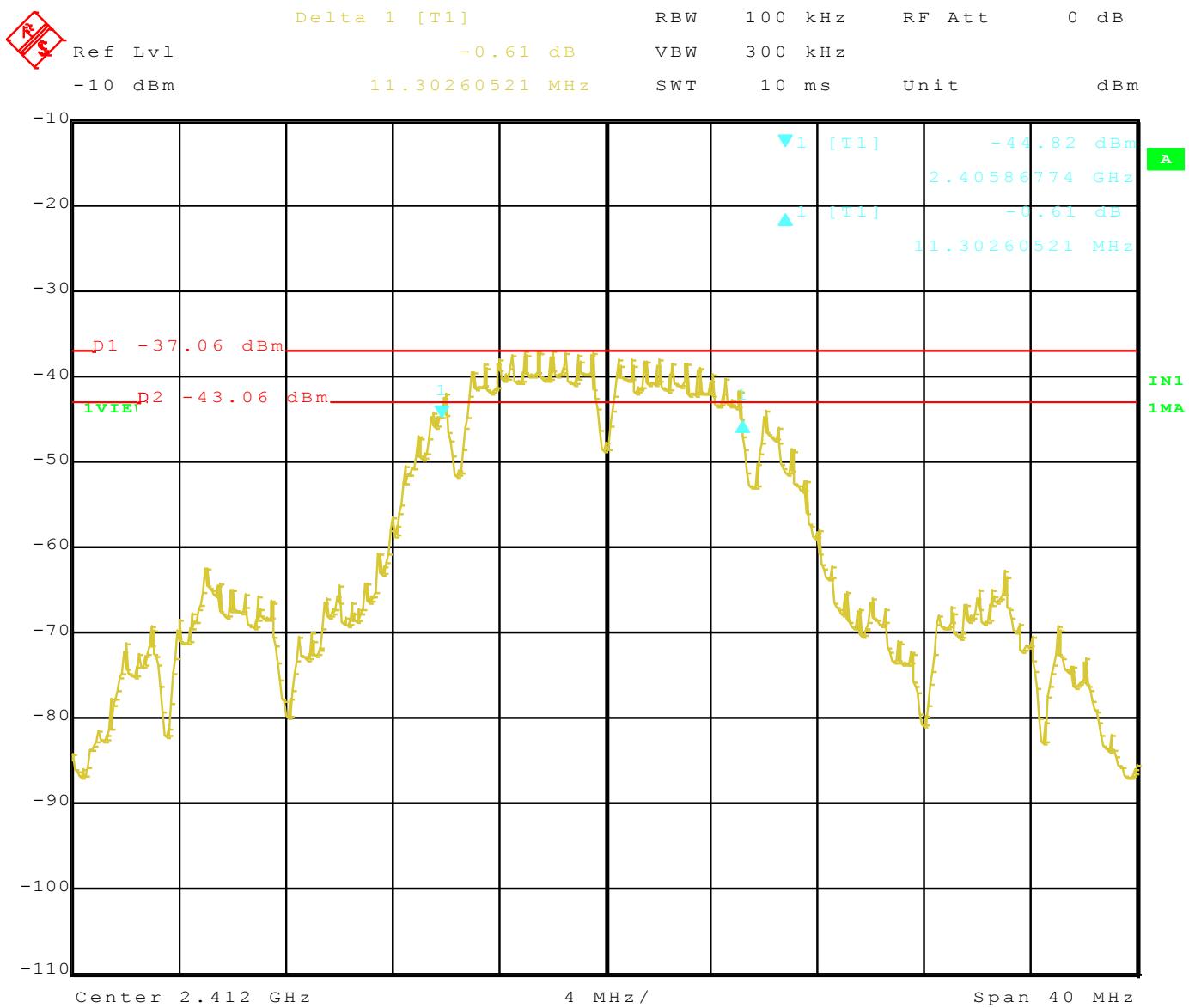
Company: Atmel Norway AS Date: 8/18/2014
 EUT: Modular Transmitter Lab: R
 Model: ATWINC1500 Test ENG: M. Harrison
 Mode: 802.11b

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

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	11302.61	500.00	10802.61	Peak	
2442	11663.33	500.00	11163.33	Peak	
2462	11182.36	500.00	10682.36	Peak	



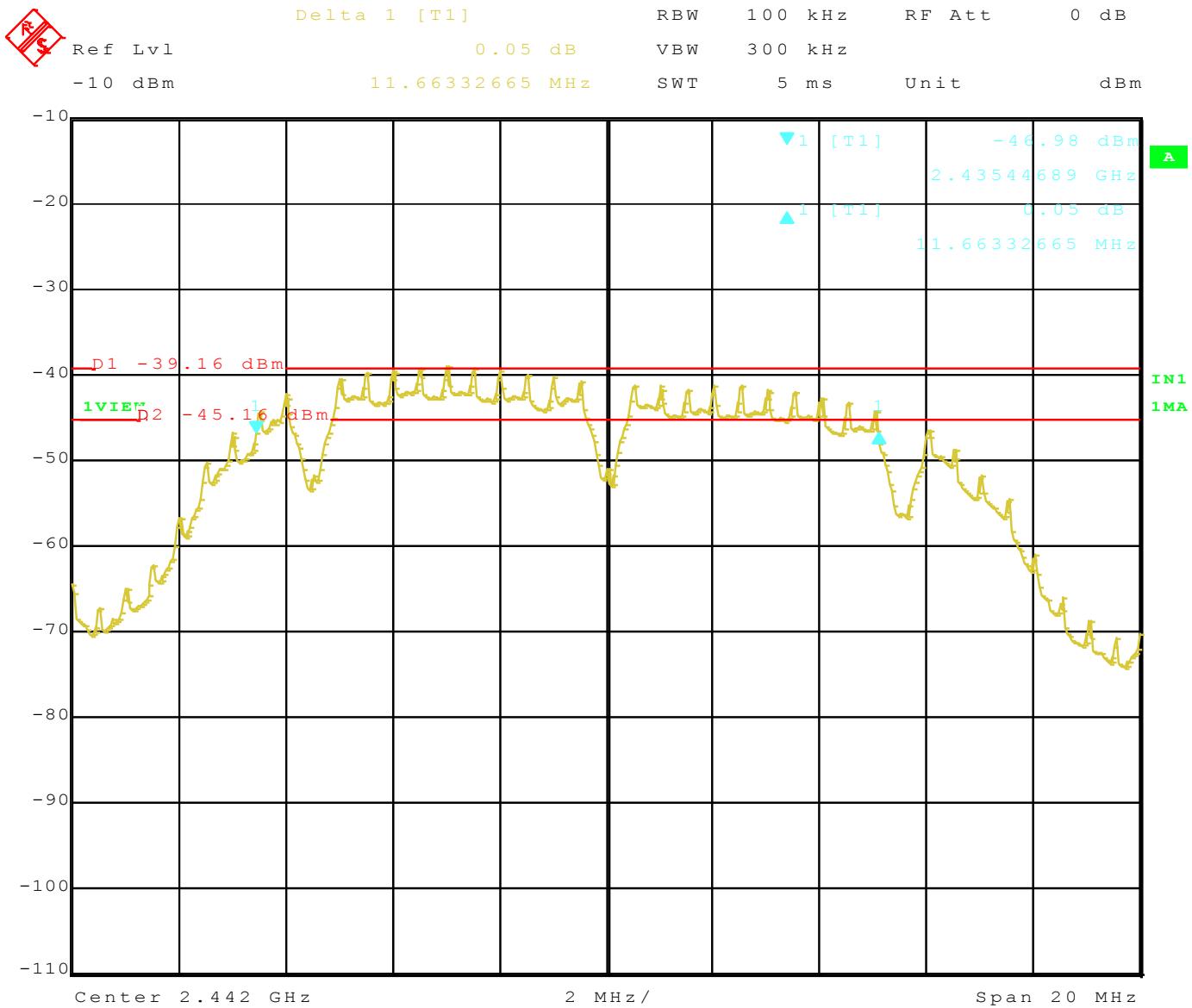


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11b, Low Channel.

Date: 18.AUG.2014 08:14:41



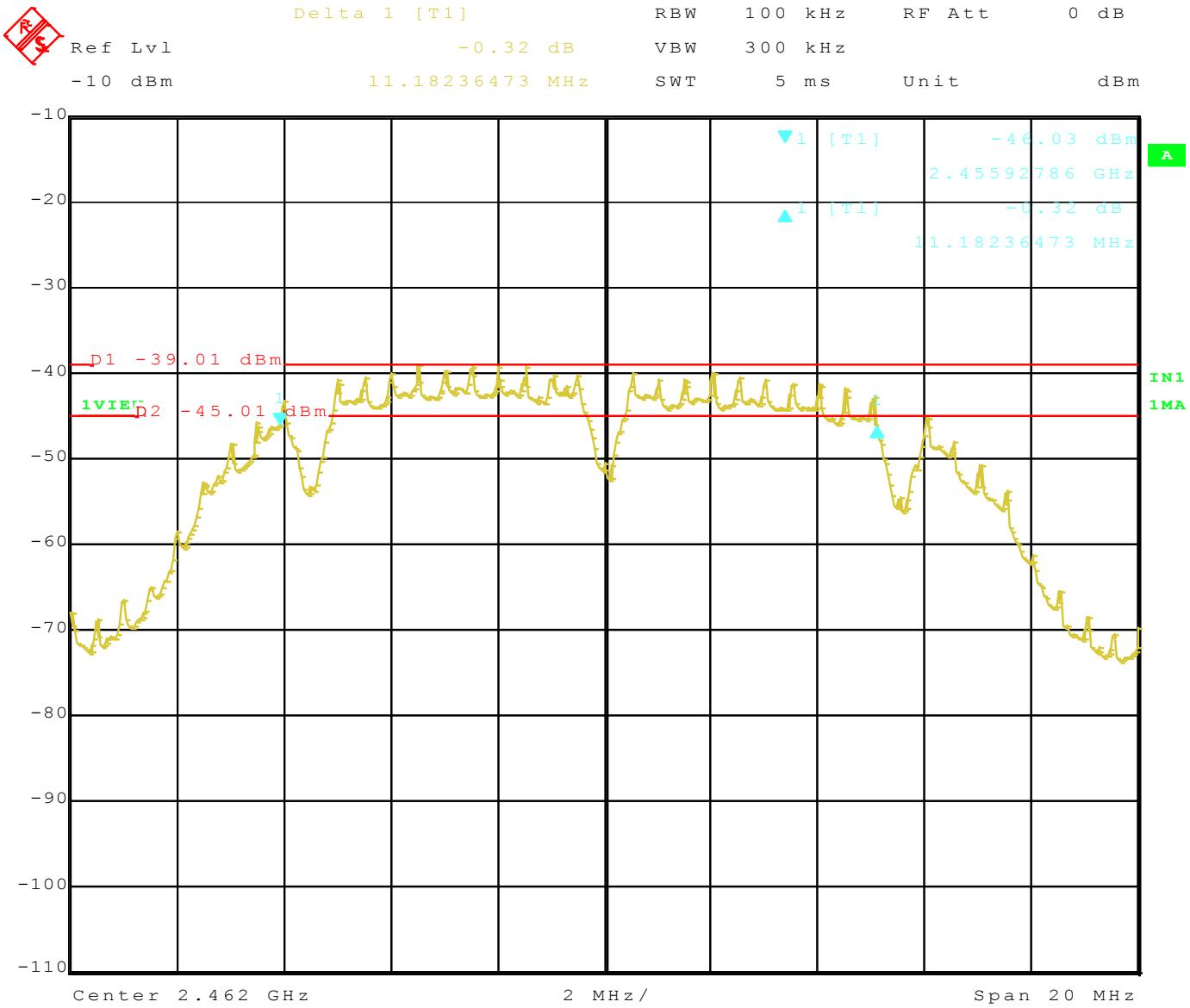


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11b, Middle Channel.

Date: 18.AUG.2014 08:19:58





Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11b, High Channel.

Date: 18.AUG.2014 08:30:06



802.11g MODE

FCC 15.247

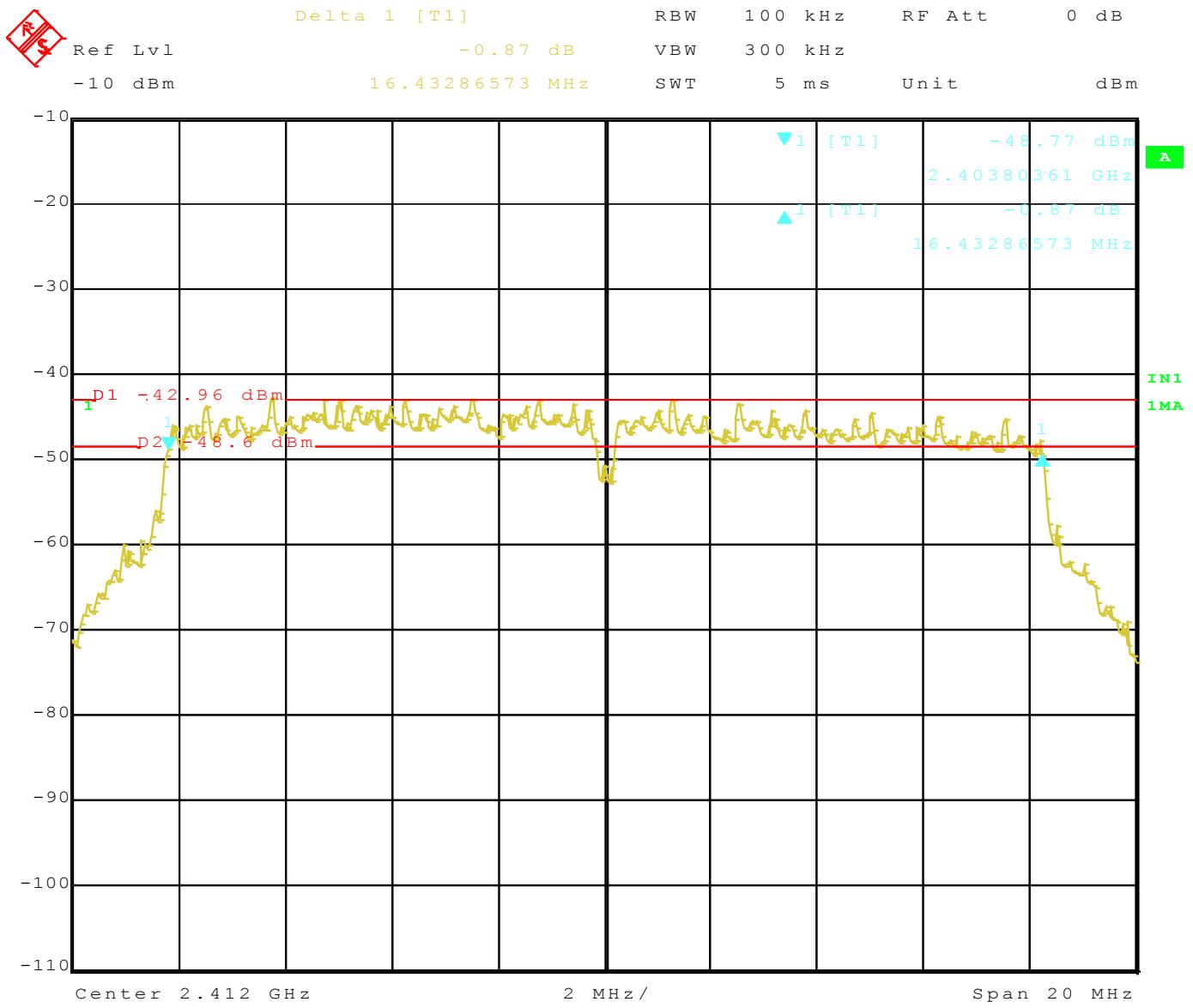
Company:	Atmel Norway AS	Date:	8/18/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison
Mode:	802.11g		

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

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	16432.87	500.00	15932.87	Peak	
2442	15911.82	500.00	15411.82	Peak	
2462	16513.03	500.00	16013.03	Peak	



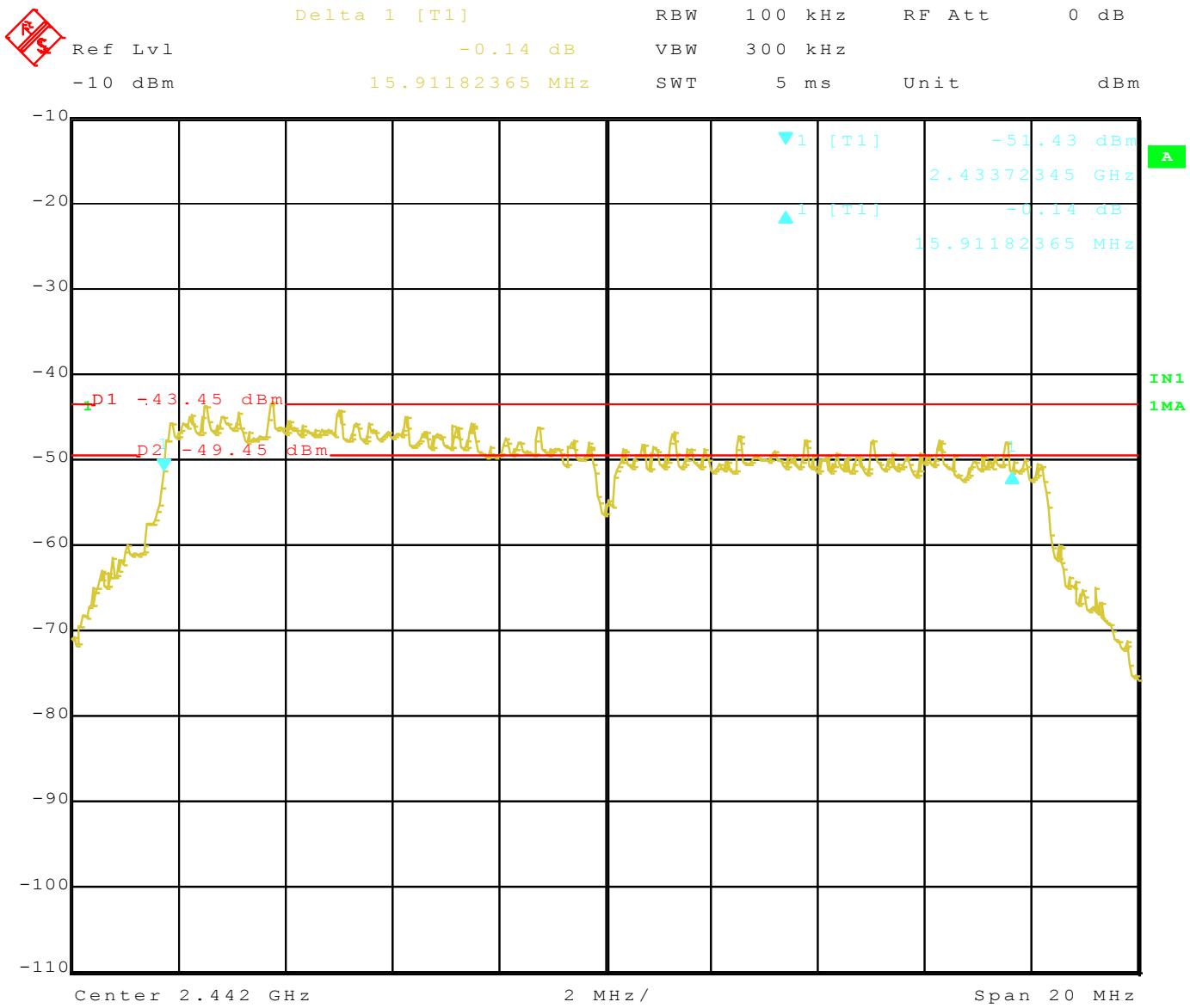


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11g, Low Channel.

Date: 18.AUG.2014 08:33:42



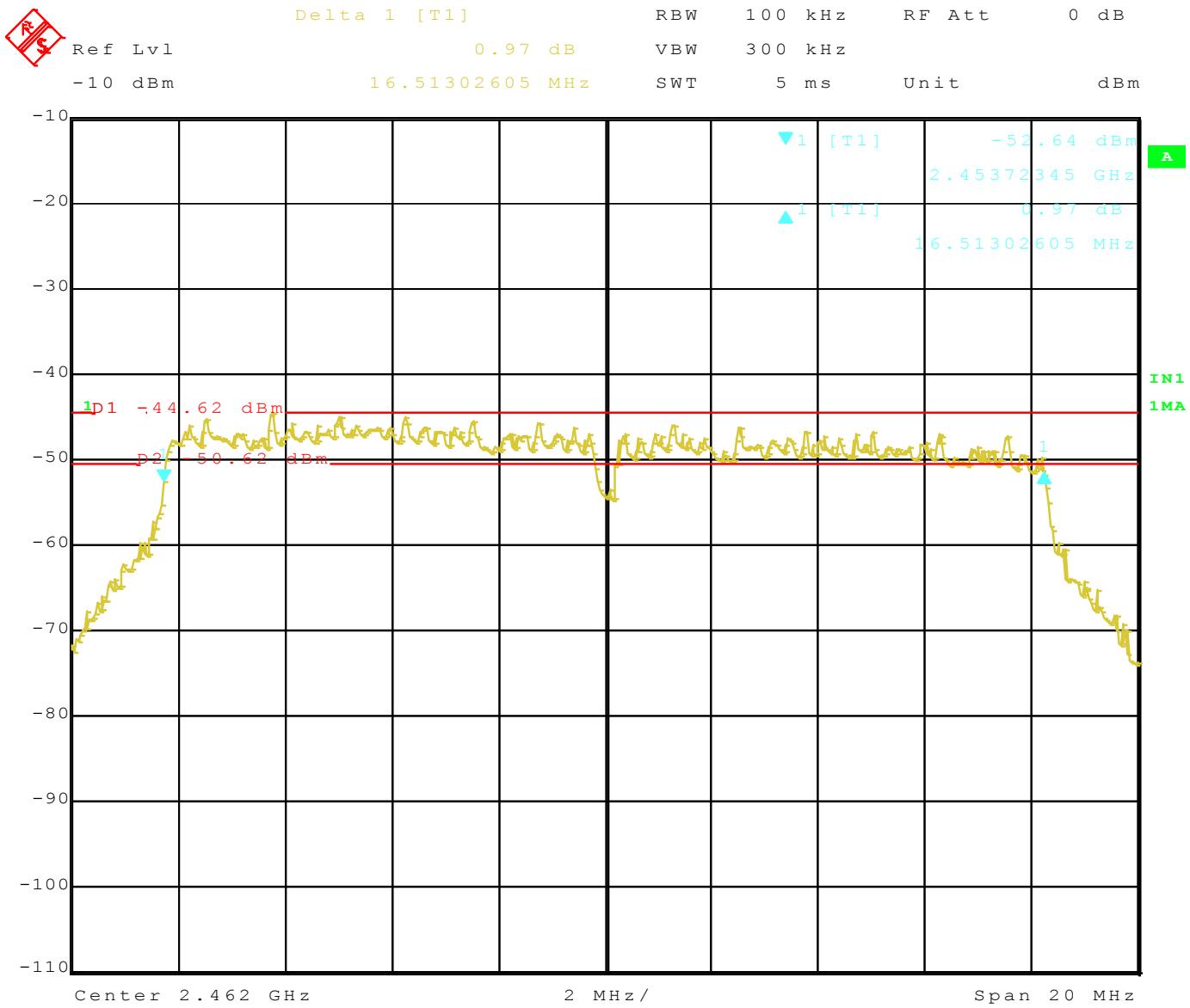


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11g, Mid Channel.

Date: 18.AUG.2014 08:32:11





Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11g, High Channel.

Date: 18.AUG.2014 08:28:25



802.11n MODE

FCC 15.247

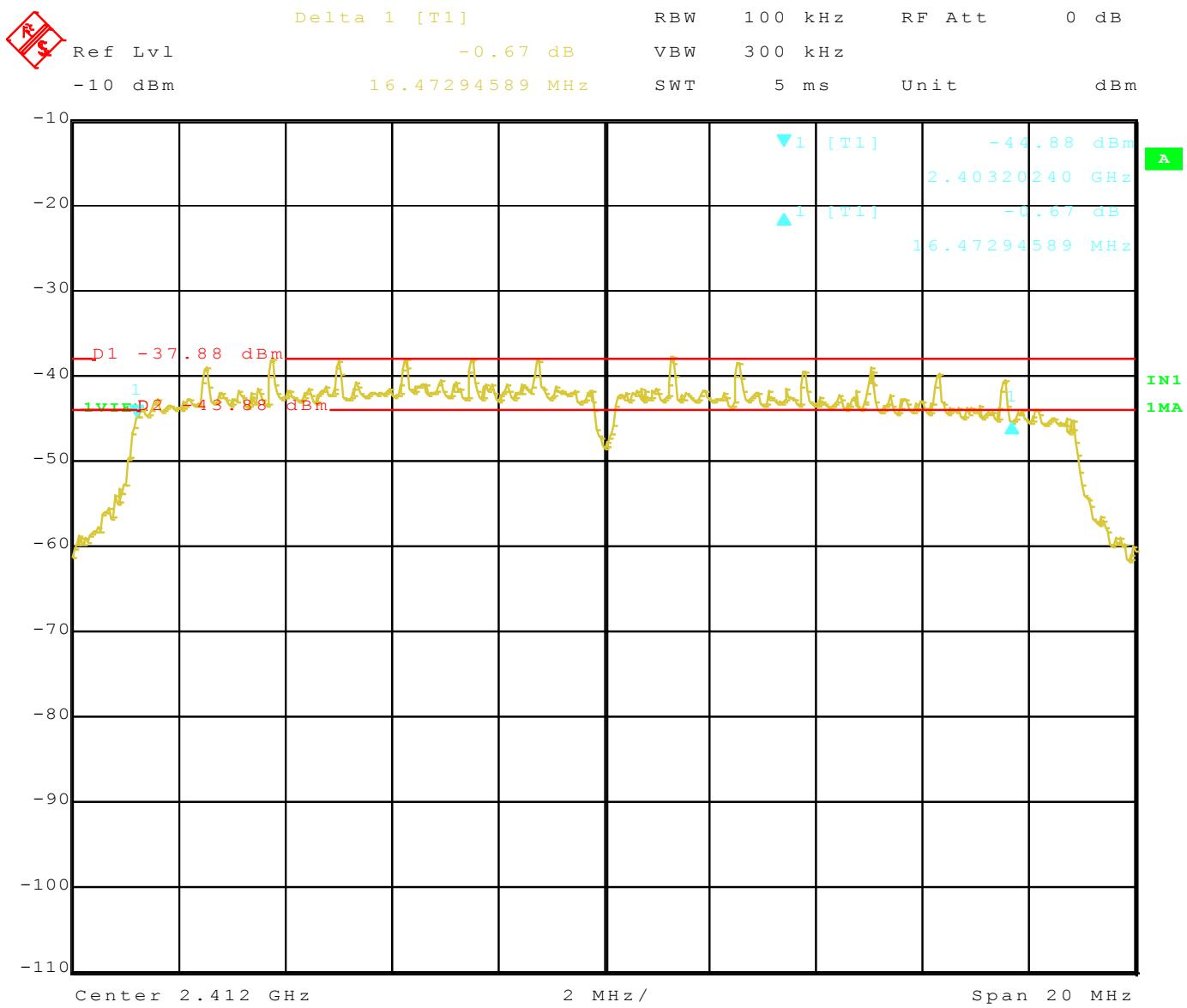
Company: Atmel Norway AS Date: 8/18/2014
 EUT: Modular Transmitter Lab: R
 Model: ATWINC1500 Test ENG: M. Harrison
 Mode: 802.11n

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

DTS Bandwidth

Freq. (MHz)	Measured BW (kHz)	Limit (Min) (kHz)	Margin (kHz)	Peak / QP / Avg	Comments
2412	16472.95	500.00	15972.95	Peak	
2442	16432.87	500.00	15932.87	Peak	
2462	16432.87	500.00	15932.87	Peak	



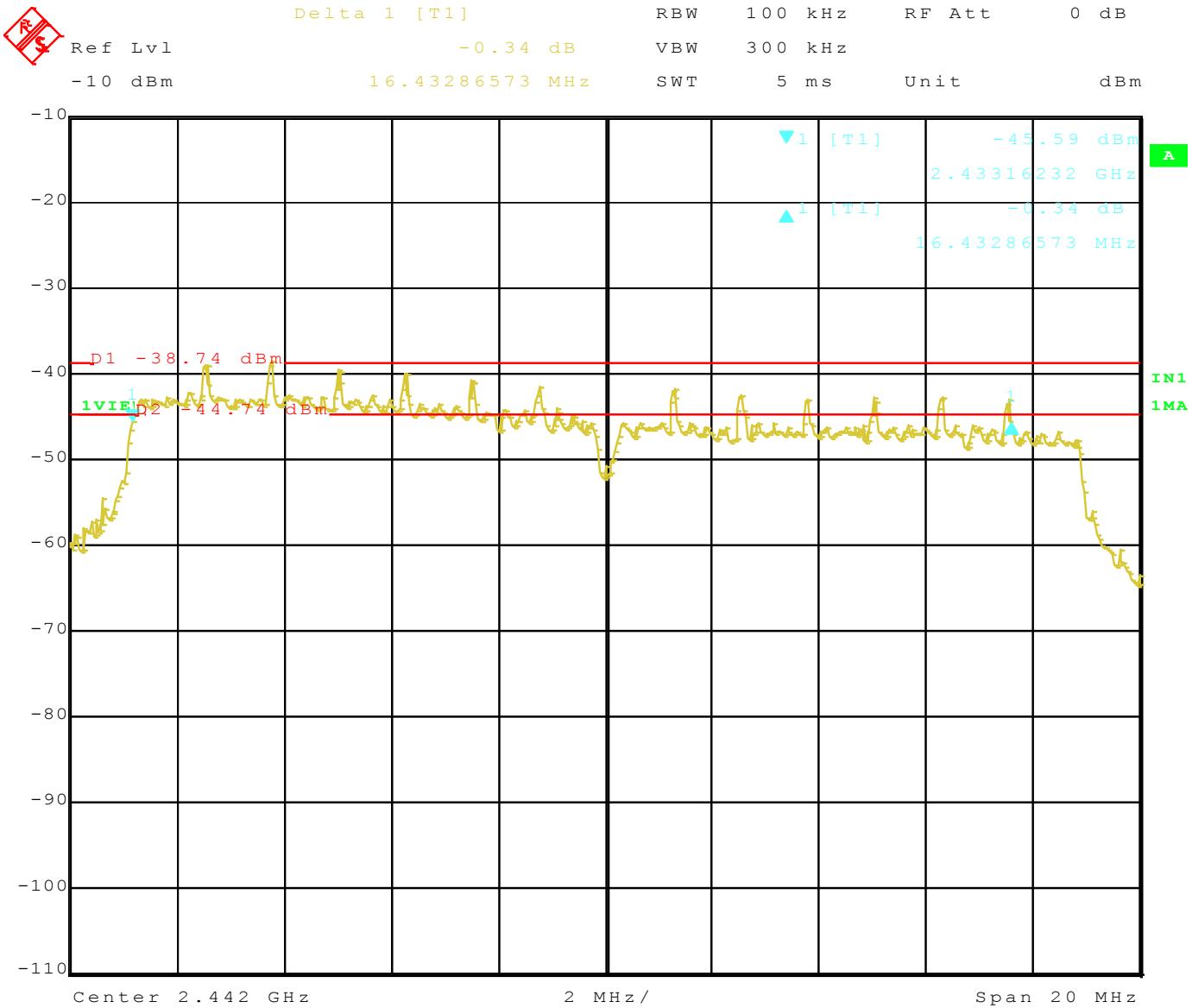


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11n, Low Channel.

Date: 18.AUG.2014 08:36:26



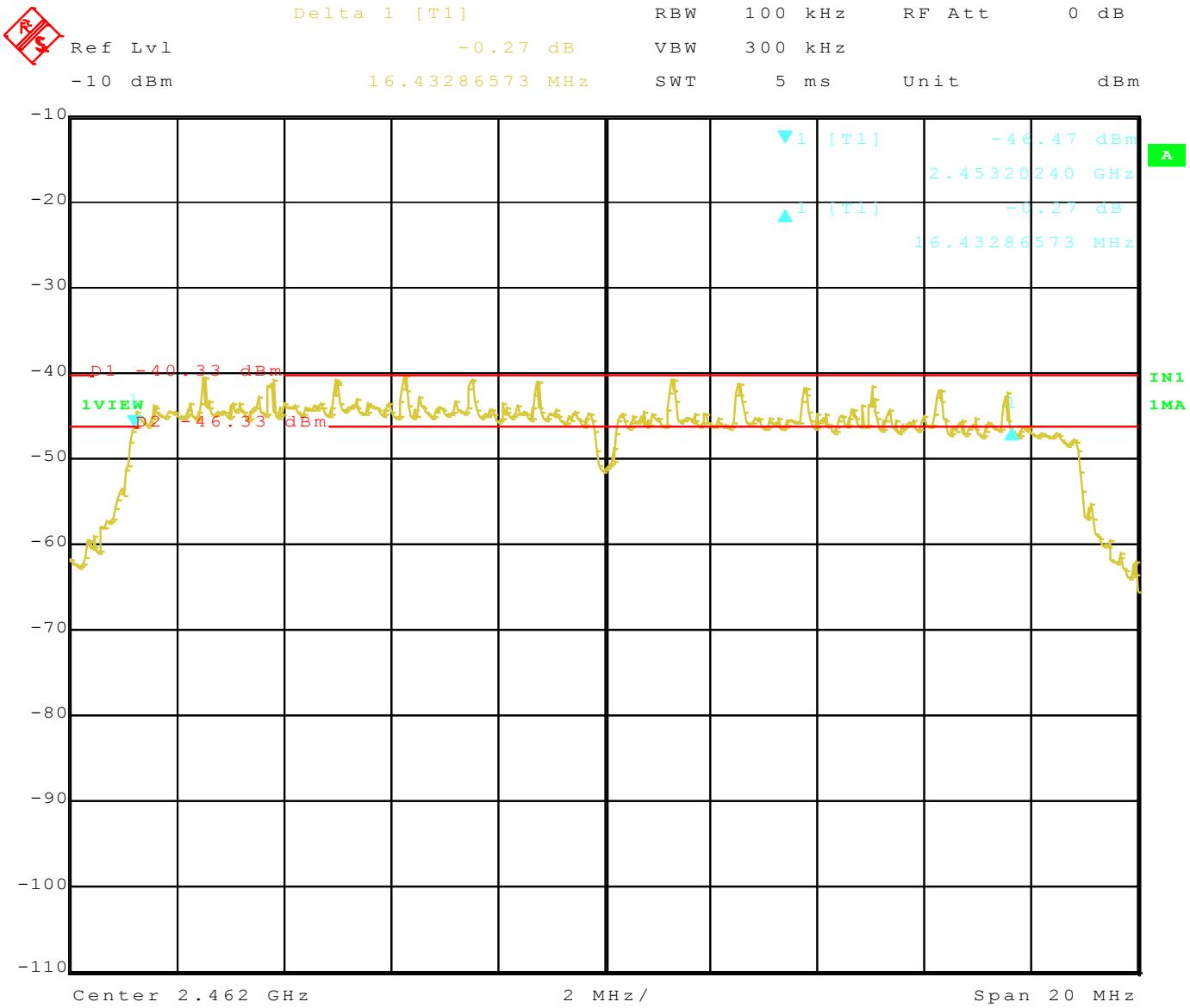


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11n, Mid Channel.

Date: 18.AUG.2014 08:39:26



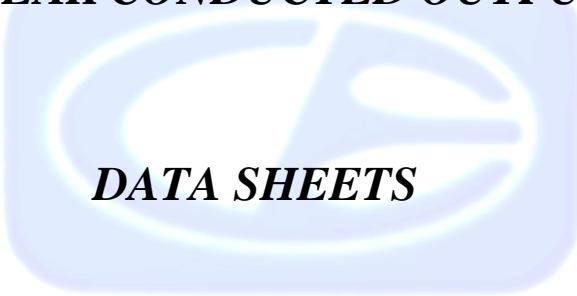


Title: ATCINC1500MR210PA.

Comment A: DTS Bandwidth, 802.11n, High Channel.

Date: 18.AUG.2014 08:41:21



MAXIMUM PEAK CONDUCTED OUTPUT POWER **DATA SHEETS**

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

MAXIMUM PEAK CONDUCTED OUTPUT POWER

802.11b Mode

FCC 15.247

Company:	Atmel Norway AS	Date:	8/21/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison
Mode:	802.11b		

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

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	21.15	30.00	-8.85	Peak	DigGain= -6.3
2442	22.19	30.00	-7.81	Peak	DigGain= -4.3
2462	22.42	30.00	-7.58	Peak	DigGain= -2.3



MAXIMUM PEAK CONDUCTED OUTPUT POWER

802.11g Mode

FCC 15.247

Company:	Atmel Norway AS	Date:	8/21/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison
Mode:	802.11g		

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

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	22.50	30.00	-7.50	Peak	DigGain= -8
2442	23.00	30.00	-7.00	Peak	DigGain= -2
2462	22.75	30.00	-7.25	Peak	DigGain= -6



MAXIMUM PEAK CONDUCTED OUTPUT POWER

802.11n Mode

FCC 15.247

Company:	Atmel Norway AS	Date:	8/21/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison
Mode:	802.11n		

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

Freq. (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	22.30	30.00	-7.70	Peak	DigGain= -8
2442	23.01	30.00	-6.99	Peak	DigGain= -2
2462	22.73	30.00	-7.27	Peak	DigGain= -6



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

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

PEAK POWER SPECTRAL DENSITY

802.11b Mode

FCC 15.247

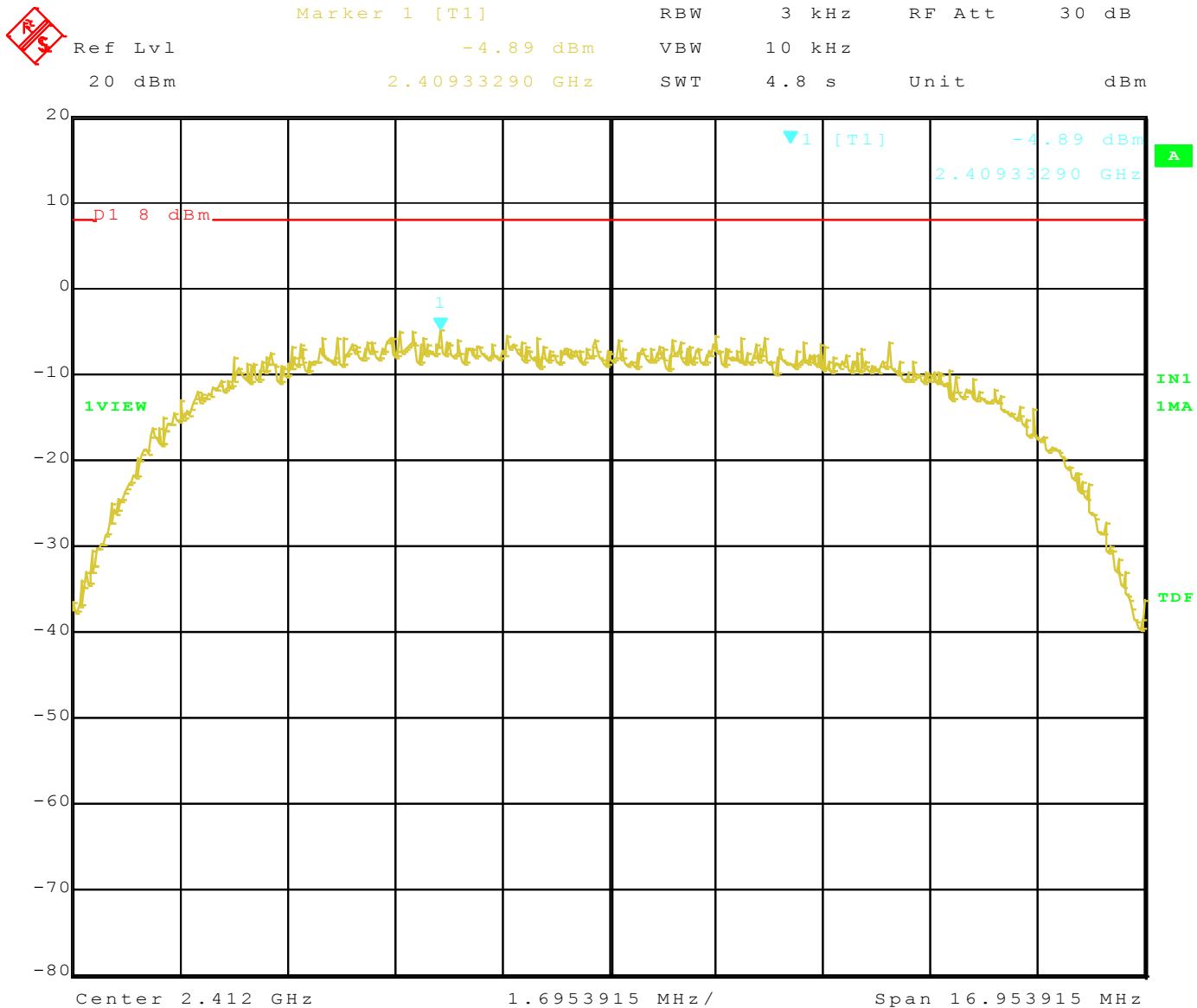
Company: Atmel Norway AS Date: 10/15/2014
 EUT: Modular Transmitter Lab: R
 Model: ATWINC1500 Test ENG: M. Harrison
 Mode: 802.11b

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

DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	-4.89	8.00	-12.89	Peak	DigGain= -6.3
2442	-3.82	8.00	-11.82	Peak	DigGain= -4.3
2462	-2.15	8.00	-10.15	Peak	DigGain= -2.3



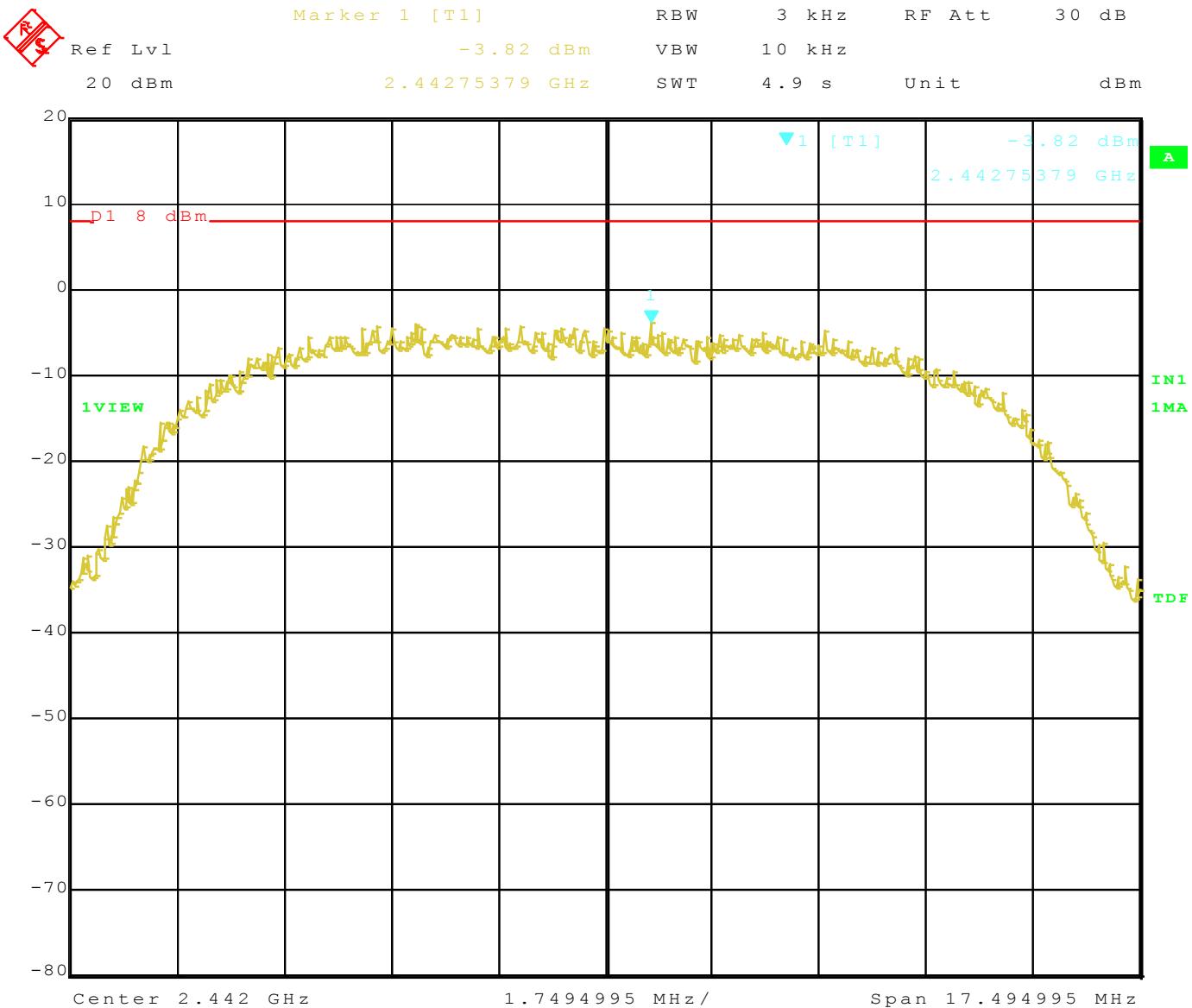


Title: ATWINC1500.

Comment A: PSD, 802.11b, 2412MHz.

Date: 15.OCT.2014 10:26:37





Title: ATWINC1500.

Comment A: PSD, 802.11b, 2442MHz.

Date: 15.OCT.2014 10:27:55

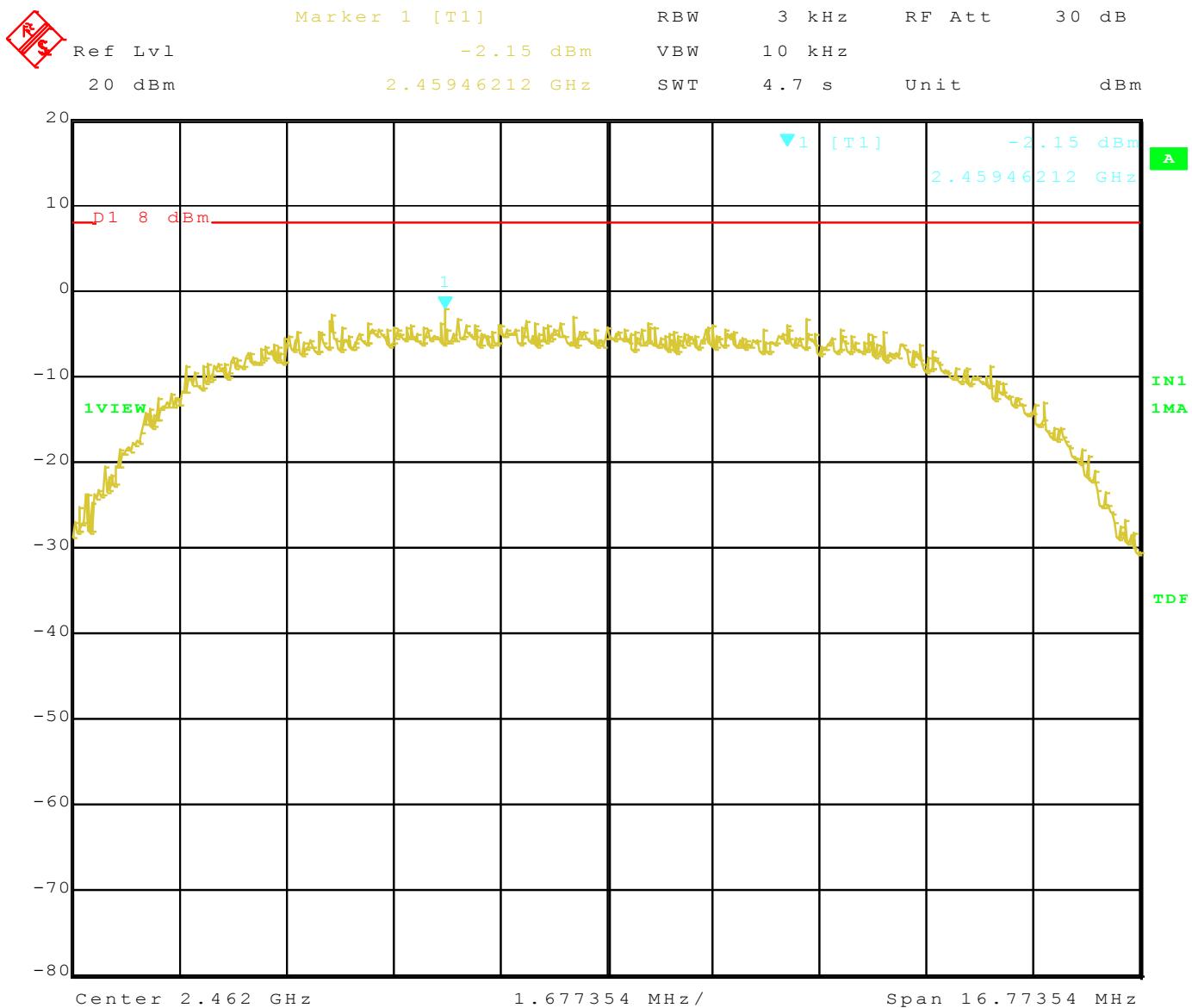


Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

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



Title: ATWINC1500.

Comment A: PSD, 802.11b, 2462MHz.

Date: 15.OCT.2014 10:29:14



PEAK POWER SPECTRAL DENSITY

802.11g Mode

FCC 15.247

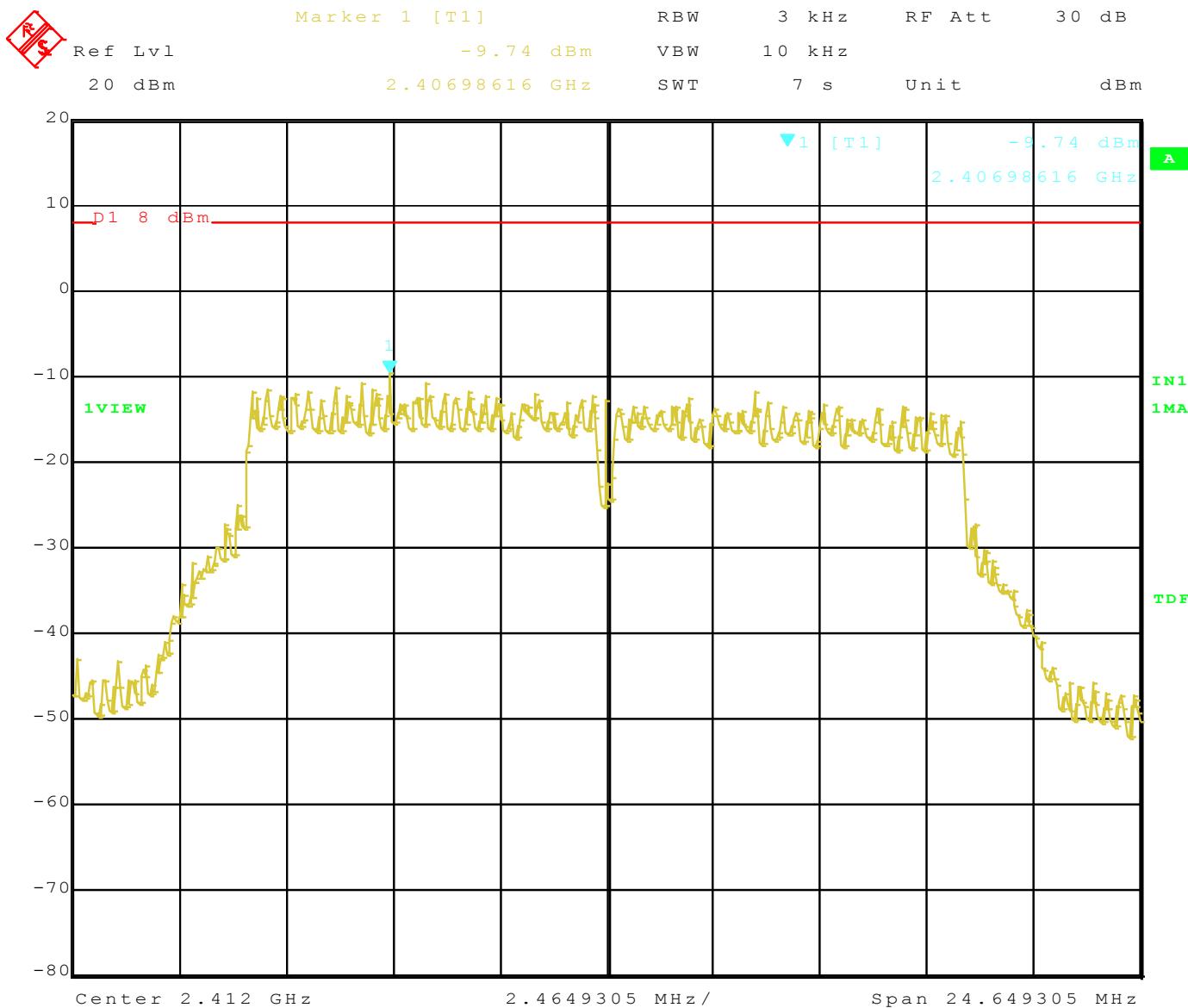
Company: Atmel Norway AS Date: 10/15/2014
 EUT: Modular Transmitter Lab: R
 Model: ATWINC1500 Test ENG: M. Harrison
 Mode: 802.11g

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

DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	-9.74	8.00	-17.74	Peak	DigGain= -8
2442	-5.60	8.00	-13.60	Peak	DigGain= -2
2462	-9.42	8.00	-17.42	Peak	DigGain= -6



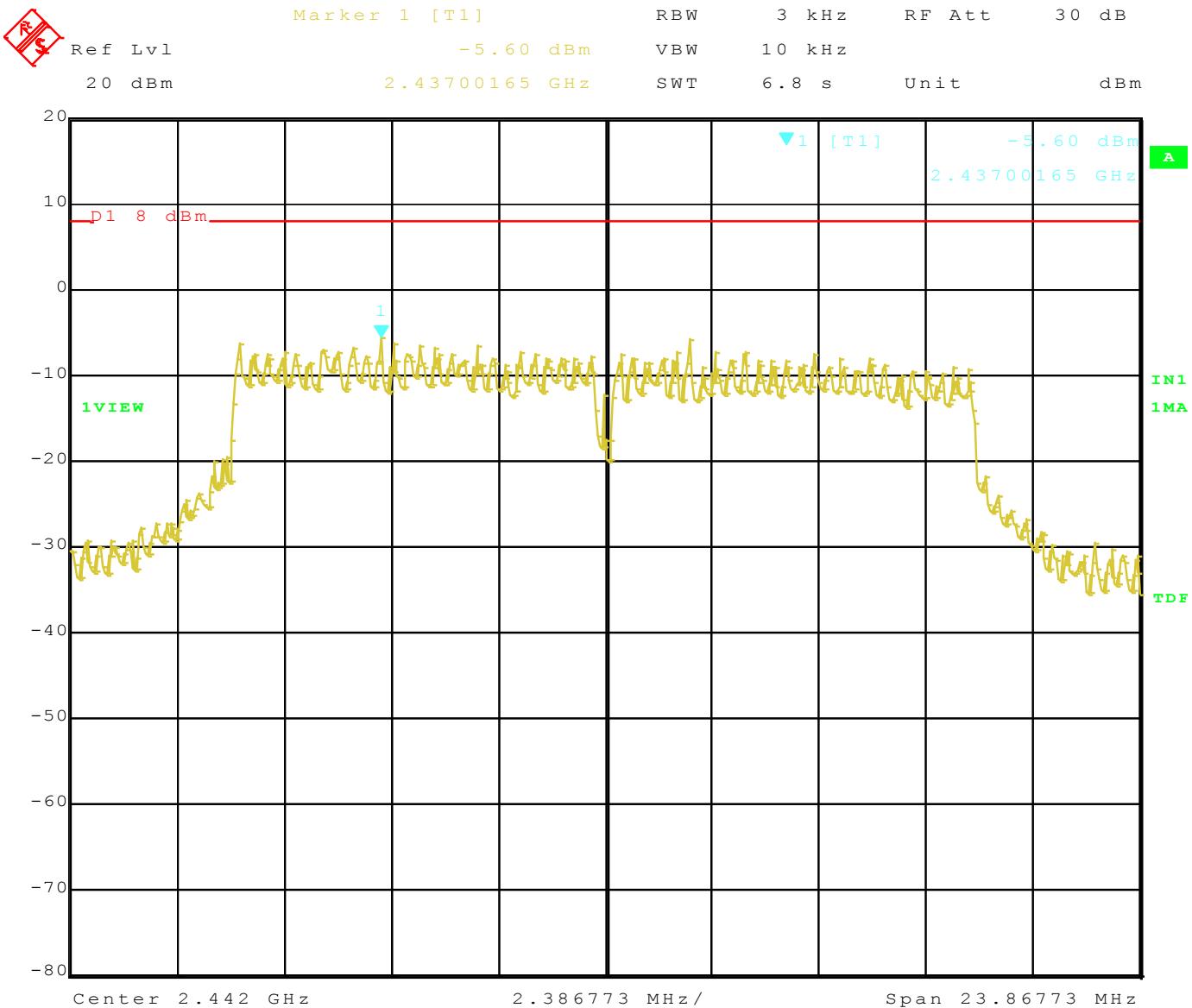


Title: ATWINC1500.

Comment A: PSD, 802.11g, 2412MHz.

Date: 15.OCT.2014 10:33:15



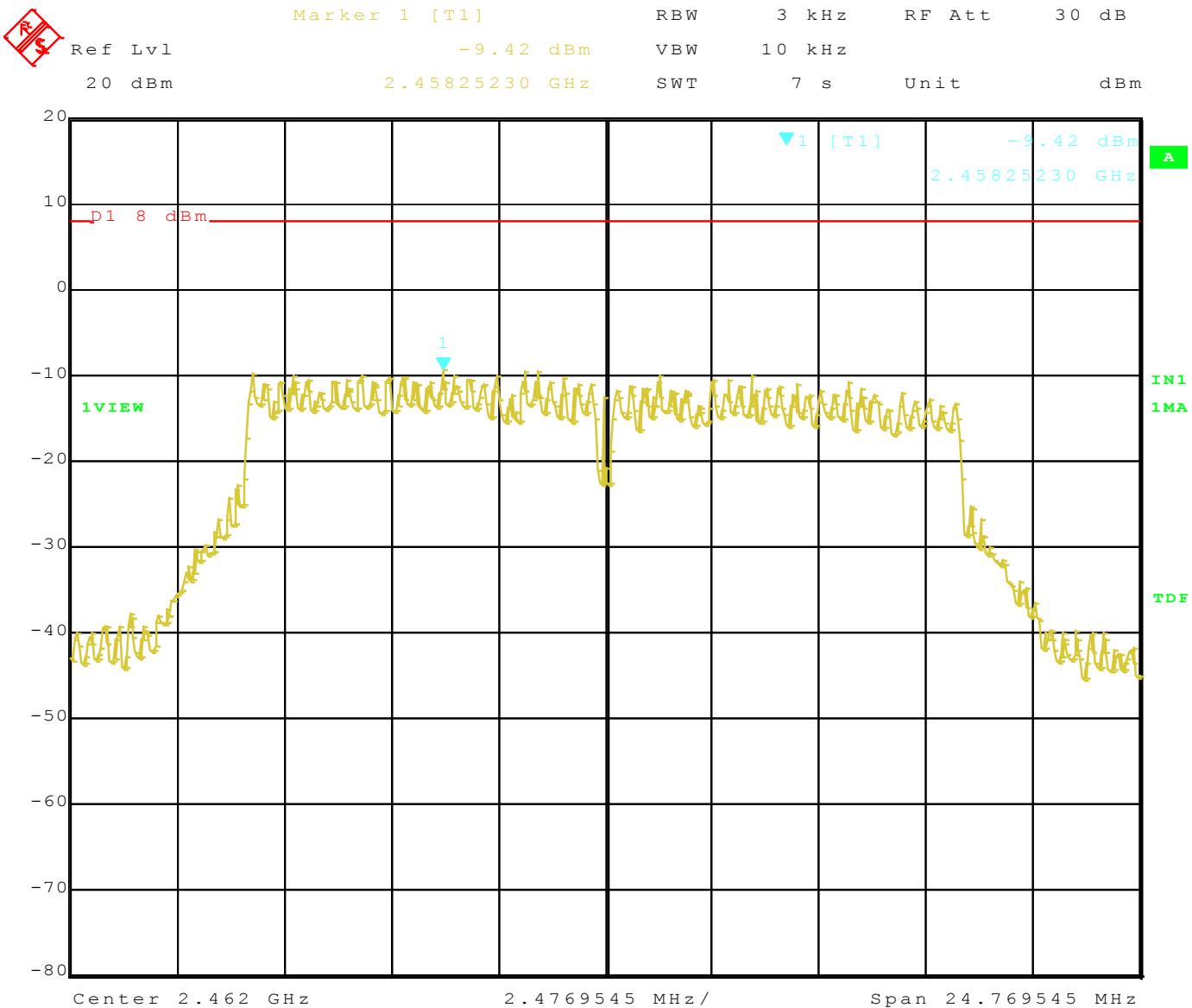


Title: ATWINC1500.

Comment A: PSD, 802.11g, 2442MHz.

Date: 15.OCT.2014 10:34:57





Title: ATWINC1500.

Comment A: PSD, 802.11g, 2462MHz.

Date: 15.OCT.2014 10:36:50



PEAK POWER SPECTRAL DENSITY

802.11n Mode

FCC 15.247

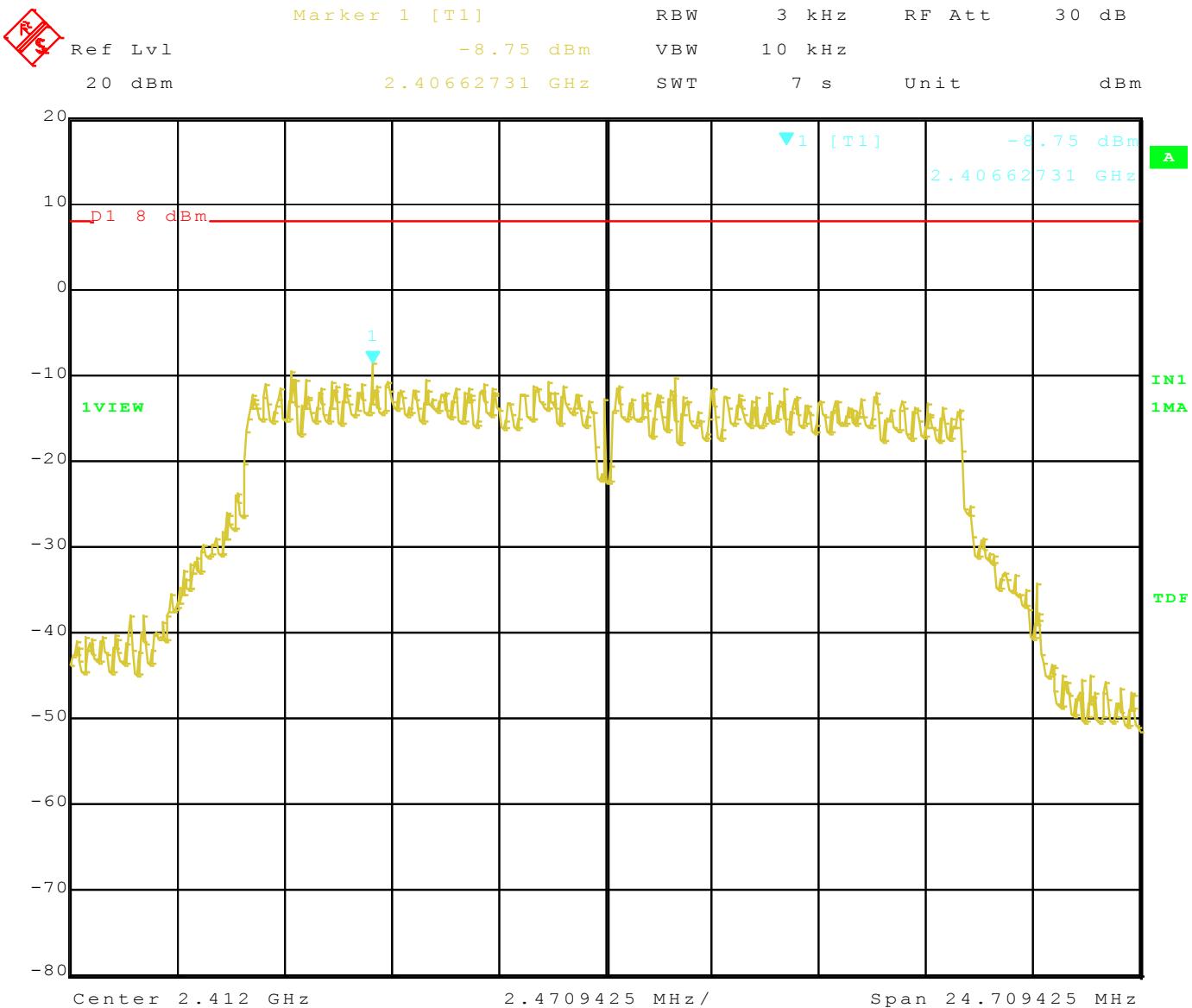
Company: Atmel Norway AS Date: 10/15/2014
 EUT: Modular Transmitter Lab: R
 Model: ATWINC1500 Test ENG: M. Harrison
 Mode: 802.11n

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

DTS Bandwidth

Freq. (MHz)	Peak (dBm)	Limit (dBm)	Margin (dB)	Peak / QP / Avg	Comments
2412	-8.75	8.00	-16.75	Peak	DigGain= -8
2442	-5.05	8.00	-13.05	Peak	DigGain= -2
2462	-8.74	8.00	-16.74	Peak	DigGain= -6



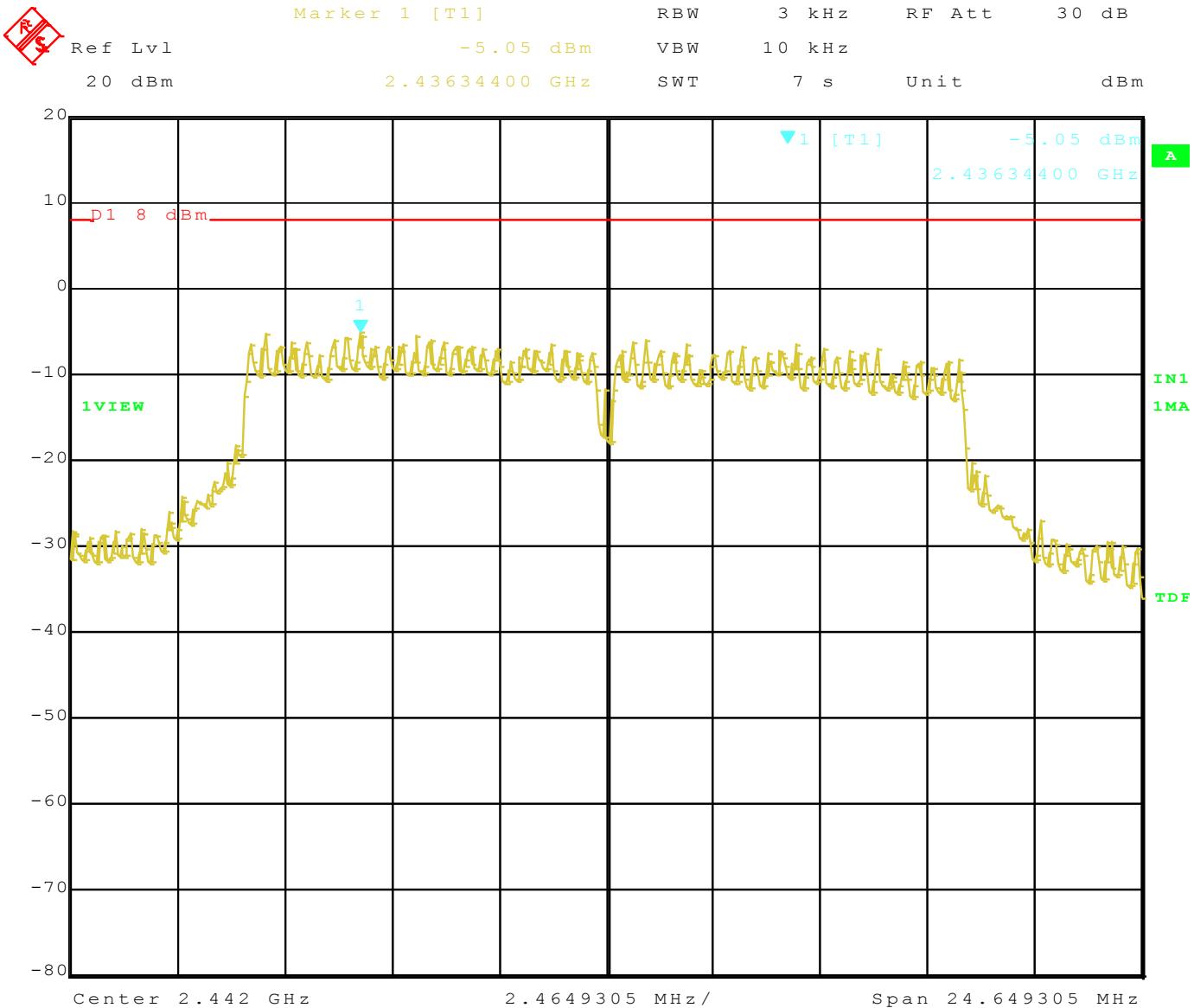


Title: ATWINC1500.

Comment A: PSD, 802.11n, 2412MHz.

Date: 15.OCT.2014 10:40:46



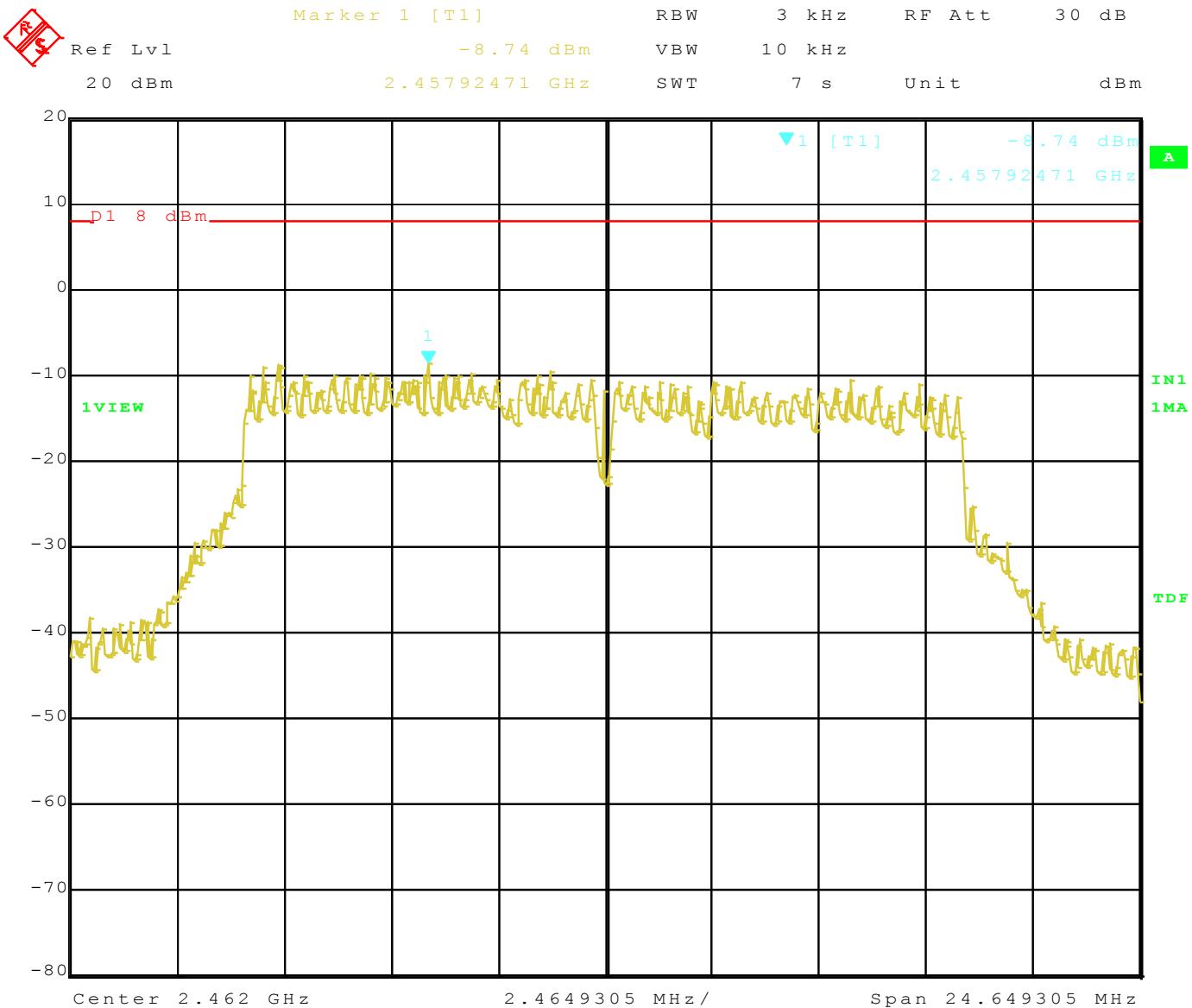


Title: ATWINC1500.

Comment A: PSD, 802.11n, 2442MHz.

Date: 15.OCT.2014 10:44:02





Title: ATWINC1500.

Comment A: PSD, 802.11n, 2462MHz.

Date: 15.OCT.2014 10:45:05



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

DATA SHEETS



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 NON-RESTRICTED FREQUENCY BANDS

802.11b Mode

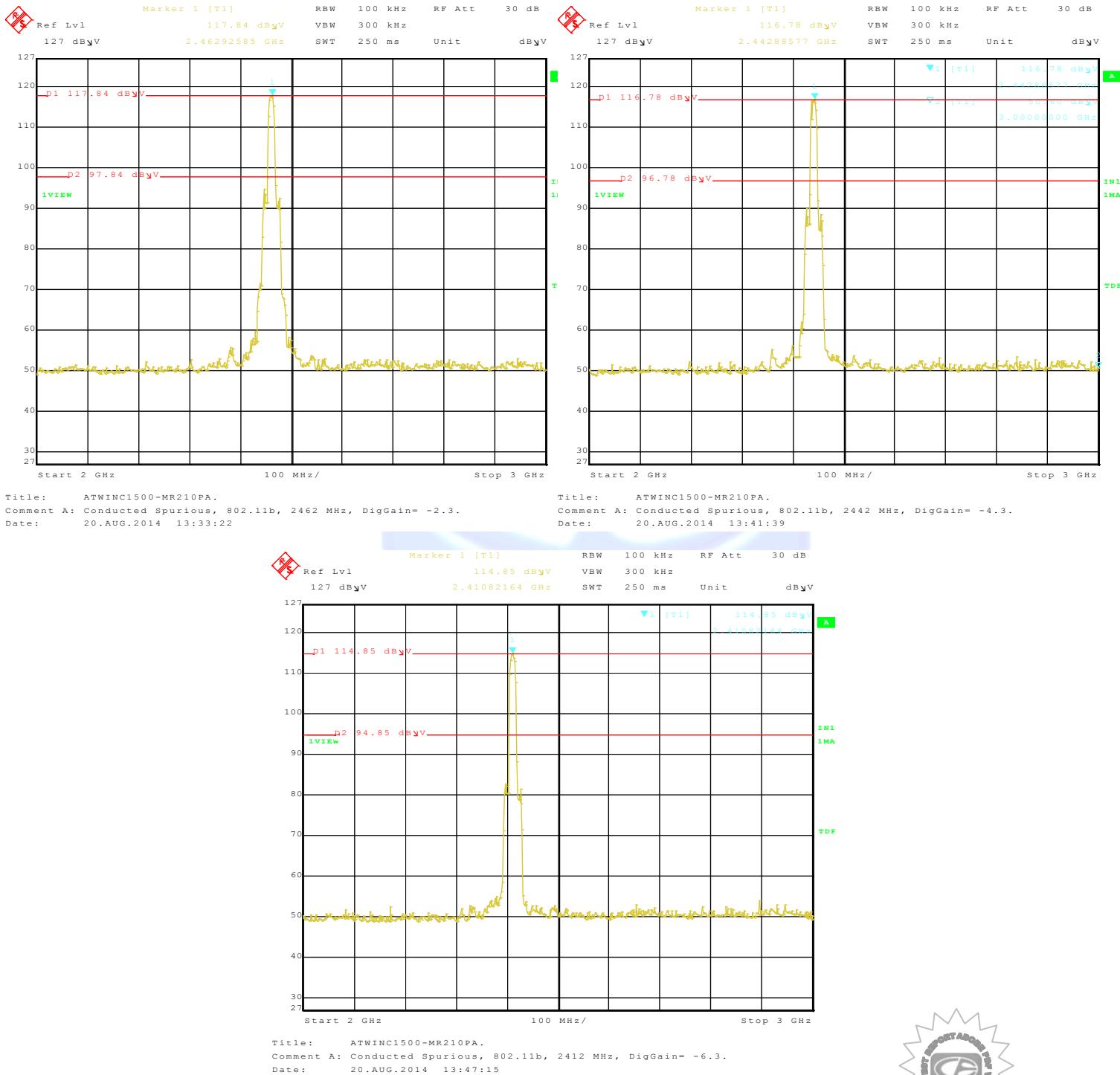
FCC 15.247

Company:	Atmel Norway AS	Date:	8/20/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison

Freq. (MHz)	Level (dBuV)	Limit	Margin	Peak / QP / Avg	Comments
9848.00	82.61	97.84	-15.23	Peak	Channel 11, Dig Gain= -2.3
9768.00	80.88	96.78	-15.90	Peak	Channel 6, Dig Gain= -4.3
9648.00	73.06	94.85	-21.79	Peak	Channel 1, Dig Gain = -6.3



802.11b Mode Reference Level Measurements



HARMONIC EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

802.11g Mode

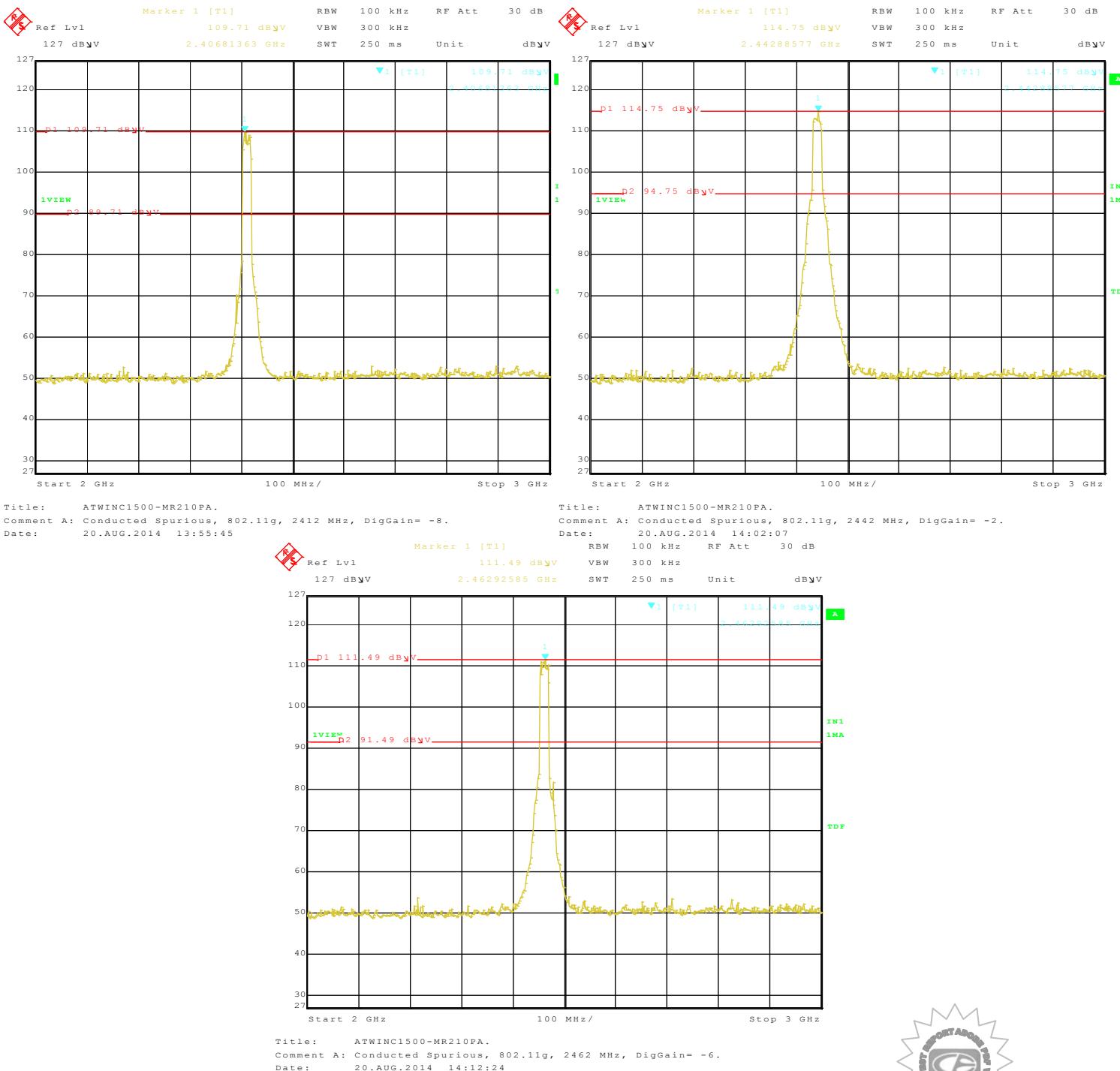
FCC 15.247

Company:	Atmel Norway AS	Date:	8/19/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison

Freq. (MHz)	Level (dBuV)	Limit	Margin	Peak / QP / Avg	Comments
9648.00	78.46	89.71	-11.25	Peak	Channel 1, Dig Gain= -8
9848.00	78.34	91.49	-13.15	Peak	Channel 11, Dig Gain= -6
9768.00	79.44	94.75	-15.31	Peak	Channel 6, Dig Gain= -2



802.11g Mode Reference Level Measurements



HARMONIC EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

802.11n Mode

FCC 15.247

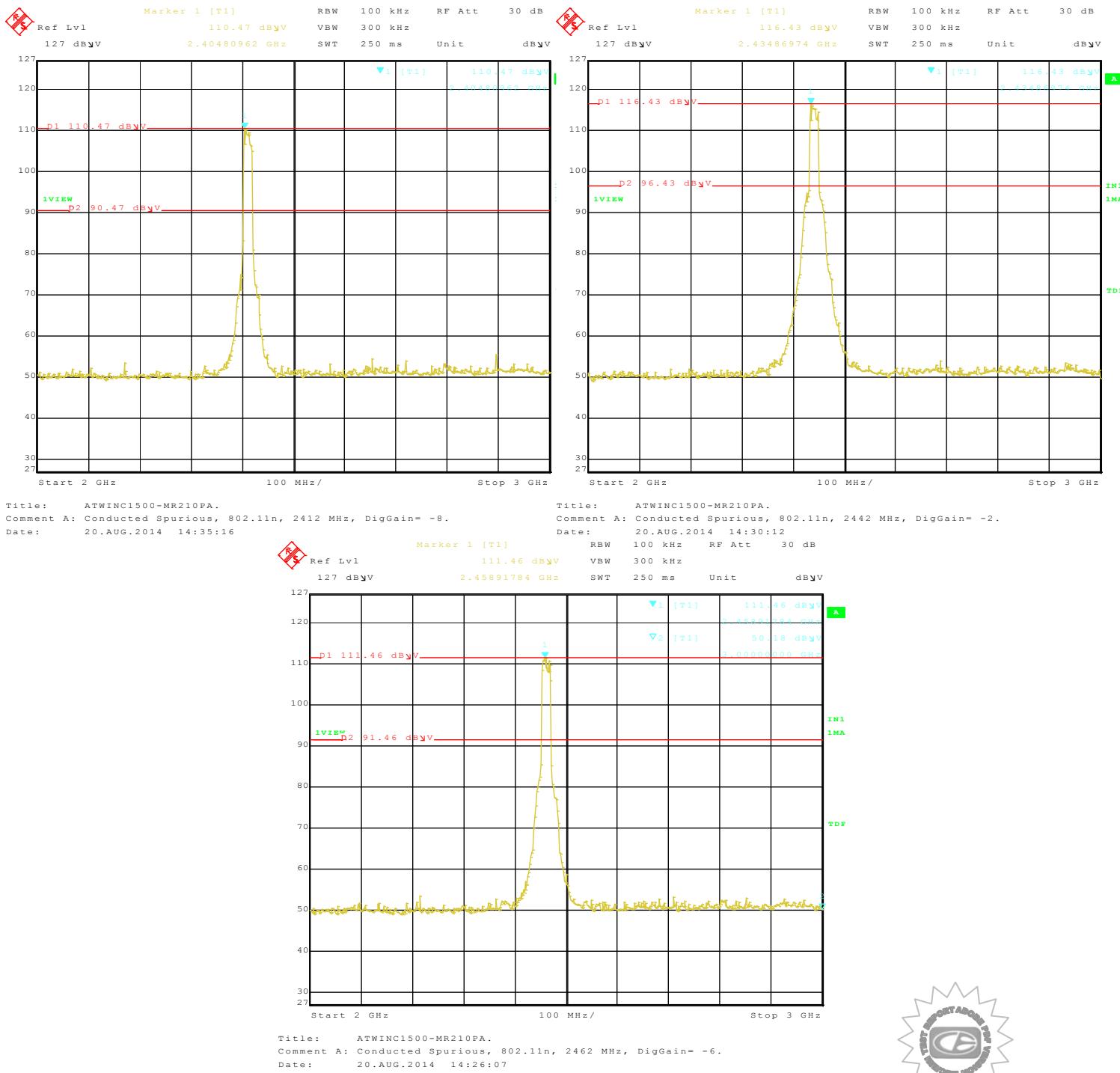
Company:	Atmel Norway AS	Date:	8/19/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	M. Harrison

Freq. (MHz)	Level (dBuV)	Limit	Margin	Peak / QP / Avg	Comments
9648.00	77.65	90.47	-12.82	Peak	Channel 1, Dig Gain= -8
9848.00	78.41	91.46	-13.05	Peak	Channel 11, Dig Gain= -6
9768.00	78.97	96.43	-17.46	Peak	Channel 6, Dig Gain= -2



802.11n Mode

Reference Level Measurements



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



DATA SHEETS



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

802.11b Mode, Low Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/19/2014
 Lab: R
 Test ENG: M. Harrison

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	66.33	V	73.98	-7.65	Peak	1.00	224	In Restricted Band
4824.00	53.71	V	53.98	-0.27	Avg	1.00	224	
12060.00	52.13	V	73.98	-21.85	Peak	2.14	235	In Restricted Band
12060.00	40.67	V	53.98	-13.31	Avg	2.14	235	
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
4824.00	60.67	H	73.98	-13.31	Peak	1.21	320	In Restricted Band
4824.00	48.53	H	53.98	-5.45	Avg	1.21	320	
12060.00	52.66	H	73.98	-21.32	Peak	1.25	167	In Restricted Band
12060.00	41.47	H	53.98	-12.51	Avg	1.25	167	
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

Test distance

3 meter



HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

802.11b Mode, Mid Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/20/2014
 Lab: R
 Test ENG: M. Harrison

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	65.02	H	73.98	-8.96	Peak	1.25	155	In Restricted Band
4884.00	52.44	H	53.98	-1.54	Avg	1.25	155	
7326.00	--	H	73.98	--	Peak	--	--	No Emissions Found
7326.00	--	H	53.98	--	Avg	--	--	In Restricted Band
12210.00	50.56	H	73.98	-23.42	Peak	1.13	360	In Restricted Band
12210.00	38.74	H	53.98	-15.24	Avg	1.13	360	
19536.00	--	H	73.98	--	Peak	--	--	No Emissions Found
19536.00	--	H	53.98	--	Avg	--	--	In Restricted Band
4884.00	65.97	V	73.98	-8.01	Peak	1.25	2.26	
4884.00	53.67	V	53.98	-0.31	Avg	1.25	2.26	In Restricted Band
7326.00	--	V	73.98	--	Peak	--	--	No Emissions Found
7326.00	--	V	53.98	--	Avg	--	--	In Restricted Band
12210.00	52.78	V	73.98	-21.20	Peak	1.19	218	
12210.00	42.70	V	53.98	-11.28	Avg	1.19	218	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



HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

802.11b Mode, High Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/20/2014
 Lab: R
 Test ENG: M. Harrison

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	65.74	H	73.98	-8.24	Peak	1.16	160	In Restricted Band
4924.00	53.52	H	53.98	-0.46	Avg	1.16	160	
7386.00	--	H	73.98	--	Peak	--	--	In Restricted Band
7386.00	--	H	53.98	--	Avg	--	--	No Emissions Found
12310.00	53.98	H	73.98	-20.00	Peak	1.04	207	In Restricted Band
12310.00	43.73	H	53.98	-10.25	Avg	1.04	207	
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	66.54	V	73.98	-7.44	Peak	1.29	232	In Restricted Band
4924.00	53.90	V	53.98	-0.08	Avg	1.29	232	
7386.00	--	V	73.98	--	Peak	--	--	In Restricted Band
7386.00	--	V	53.98	--	Avg	--	--	No Emissions Found
12310.00	51.60	V	73.98	-22.38	Peak	1.38	360	In Restricted Band
12310.00	40.53	V	53.98	-13.45	Avg	1.38	360	
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


 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

802.11g Mode, Low Channel, Horizontal & Vertical

FCC 15.247

Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

Date: 4/11/2014
 Lab: R
 Test ENG: M. Harrison

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	53.23	H	73.98	-20.75	Peak	1.42	198	In Restricted Band
4824.00	38.36	H	53.98	-15.62	Avg	1.42	198	
12060.00	49.31	H	73.98	-24.67	Peak	1.55	212	In Restricted Band
12060.00	36.83	H	53.98	-17.15	Avg	1.55	212	
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	59.79	V	73.98	-14.19	Peak	1.15	2.17	In Restricted Band
4824.00	44.10	V	53.98	-9.88	Avg	1.15	2.17	
12060.00	52.39	V	73.98	-21.59	Peak	1.21	222	In Restricted Band
12060.00	43.89	V	53.98	-10.09	Avg	1.21	222	
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



HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

802.11g Mode, Mid Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/19/2014
 Lab: R
 Test ENG: M. Harrison

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	64.02	H	73.98	-9.96	Peak	1.33	160	In Restricted Band
4884.00	50.13	H	53.98	-3.85	Avg	1.33	160	
7326.00	--	H	73.98	--	Peak	--	--	No Emissions Found
7326.00	--	H	53.98	--	Avg	--	--	In Restricted Band
12210.00	56.89	H	73.98	-17.09	Peak	1.59	212	In Restricted Band
12210.00	44.08	H	53.98	-9.90	Avg	1.59	212	
19536.00	--	H	73.98	--	Peak	--	--	No Emissions Found
19536.00	--	H	53.98	--	Avg	--	--	In Restricted Band
4884.00	65.21	V	73.98	-8.77	Peak	1	219	In Restricted Band
4884.00	51.38	V	53.98	-2.60	Avg	1	219	
7326.00	--	V	73.98	--	Peak	--	--	No Emissions Found
7326.00	--	V	53.98	--	Avg	--	--	In Restricted Band
12210.00	56.11	V	73.98	-17.87	Peak	1	168	In Restricted Band
12210.00	42.55	V	53.98	-11.43	Avg	1	168	
19536.00	--	V	73.98	--	Peak	--	--	No Emissions Found
19536.00	--	V	53.98	--	Avg	--	--	In Restricted Band

Test distance

3 meter



HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

802.11g Mode, High Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/19/2014
 Lab: R
 Test ENG: M. Harrison

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	59.97	H	73.98	-14.01	Peak	1.13	168	In Restricted Band
4924.00	45.21	H	53.98	-8.77	Avg	1.13	168	
7386.00	--	H	73.98	--	Peak	--	--	In Restricted Band
7386.00	--	H	53.98	--	Avg	--	--	No Emissions Found
12310.00	49.66	H	73.98	-24.32	Peak	1.14	173	In Restricted Band
12310.00	37.00	H	53.98	-16.98	Avg	1.14	173	
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	60.36	V	73.98	-13.62	Peak	1.23	231	In Restricted Band
4924.00	45.81	V	53.98	-8.17	Avg	1.23	231	
7386.00	--	V	73.98	--	Peak	--	--	In Restricted Band
7386.00	--	V	53.98	--	Avg	--	--	No Emissions Found
12310.00	50.55	V	73.98	-23.43	Peak	1.19	218	In Restricted Band
12310.00	38.40	V	53.98	-15.58	Avg	1.19	218	
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


 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, Low Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/20/2014
 Lab: R
 Test ENG: M. Harrison

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	53.11	H	73.98	-20.87	Peak	1.00	305	In Restricted Band
4824.00	37.64	H	53.98	-16.34	Avg	1.00	305	
12060.00	48.58	H	73.98	-25.40	Peak	1.85	215	In Restricted Band
12060.00	35.76	H	53.98	-18.22	Avg	1.85	215	
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	58.70	V	73.98	-15.28	Peak	1.06	219	In Restricted Band
4824.00	43.41	V	53.98	-10.57	Avg	1.06	219	
12060.00	52.26	V	73.98	-21.72	Peak	1.50	245	In Restricted Band
12060.00	41.84	V	53.98	-12.14	Avg	1.50	245	
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



HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

802.11n Mode, Mid Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/20/2014
 Lab: R
 Test ENG: M. Harrison

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	63.37	H	73.98	-10.61	Peak	1.15	154	In Restricted Band
4884.00	49.62	H	53.98	-4.36	Avg	1.15	154	
7326.00	--	H	73.98	--	Peak	--	--	No Emissions Found
7326.00	--	H	53.98	--	Avg	--	--	In Restricted Band
12210.00	55.73	H	73.98	-18.25	Peak	1.07	173	In Restricted Band
12210.00	42.92	H	53.98	-11.06	Avg	1.07	173	
19536.00	--	H	73.98	--	Peak	--	--	No Emissions Found
19536.00	--	H	53.98	--	Avg	--	--	In Restricted Band
4884.00	65.21	V	73.98	-8.77	Peak	1.12	231	In Restricted Band
4884.00	50.67	V	53.98	-3.31	Avg	1.12	231	
7326.00	--	V	73.98	--	Peak	--	--	No Emissions Found
7326.00	--	V	53.98	--	Avg	--	--	In Restricted Band
12210.00	56.63	V	73.98	-17.35	Peak	1.32	217	In Restricted Band
12210.00	43.11	V	53.98	-10.87	Avg	1.32	217	
19536.00	--	V	73.98	--	Peak	--	--	No Emissions Found
19536.00	--	V	53.98	--	Avg	--	--	In Restricted Band

Test distance

3 meter



HARMONIC EMISSIONS IN RESTRICTED FREQUENCY BANDS

802.11n Mode, High Channel, Horizontal & Vertical

FCC 15.247

 Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500

 Date: 8/20/2014
 Lab: R
 Test ENG: M. Harrison

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	53.80	H	73.98	-20.18	Peak	1.24	146	In Restricted Band
4924.00	39.81	H	53.98	-14.17	Avg	1.24	146	
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	55.44	V	73.98	-18.54	Peak	1.14	0	In Restricted Band
4924.00	40.60	V	53.98	-13.38	Avg	1.14	0	
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



Brea Division	Agoura Division	Silverado Division	Lake Forest Division
114 Olinda Drive Brea, CA 92823 (714) 579-0500	2337 Troutdale Drive Agoura, CA 91301 (818) 597-0600	19121 El Toro Road Silverado, CA 92676 (949) 589-0700	20621 Pascal Way Lake Forest, CA 92630 (949) 587-0400

***EMISSIONS RADIATED OUTSIDE OF THE FUNDAMENTAL
FREQUENCY BAND AT BAND EDGES***

DATA SHEETS



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

802.11b Mode

BAND EDGES- VERTICAL

FCC 15.247

Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500
 Mode: 802.11b

Date: 8/20/2014
 Lab: R
 Test ENG: Matt Harrison

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

Freq. (MHz)	Level (dB μ V)	Pol	Limit (dB μ V)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2412.00	115.21	V	--	--	Peak	1	30	Fundamental of High Channel
2412.00	--	V	--	--	Avg	--	--	@ 3 meters
								X-Axis, DigGain=-6.3, 11Mbps
2395.94	85.64	V	95.21	-9.57	Delta	1	30	From Peak
2385.71	62.79	V	73.98	-11.19	Peak	1	30	No Marker Delta Method Used
2385.71	49.23	V	53.98	-4.75	Avg	1	30	X-Axis, DigGain=-6.3, 11Mbps
2462.00	115.12	V	--	--	Peak	1	30	Fundamental of High Channel
2462.00	--	V	--	--	Avg	--	--	@ 3 meters
2488.93	66.47	V	73.98	-7.51	Peak	1	30	No Marker Delta Method Used
2488.93	51.02	V	53.98	-2.96	Avg	1	30	X-Axis, DigGain=-2.3, 11Mbps

Test distance

3 meter



BAND EDGES- HORIZONTAL

FCC 15.247

Company: Atmel Norway AS
EUT: Modular Transmitter
Model: ATWINC1500
Mode: 802.11b

Date: 8/20/2014
Lab: R
Test ENG: Matt Harrison

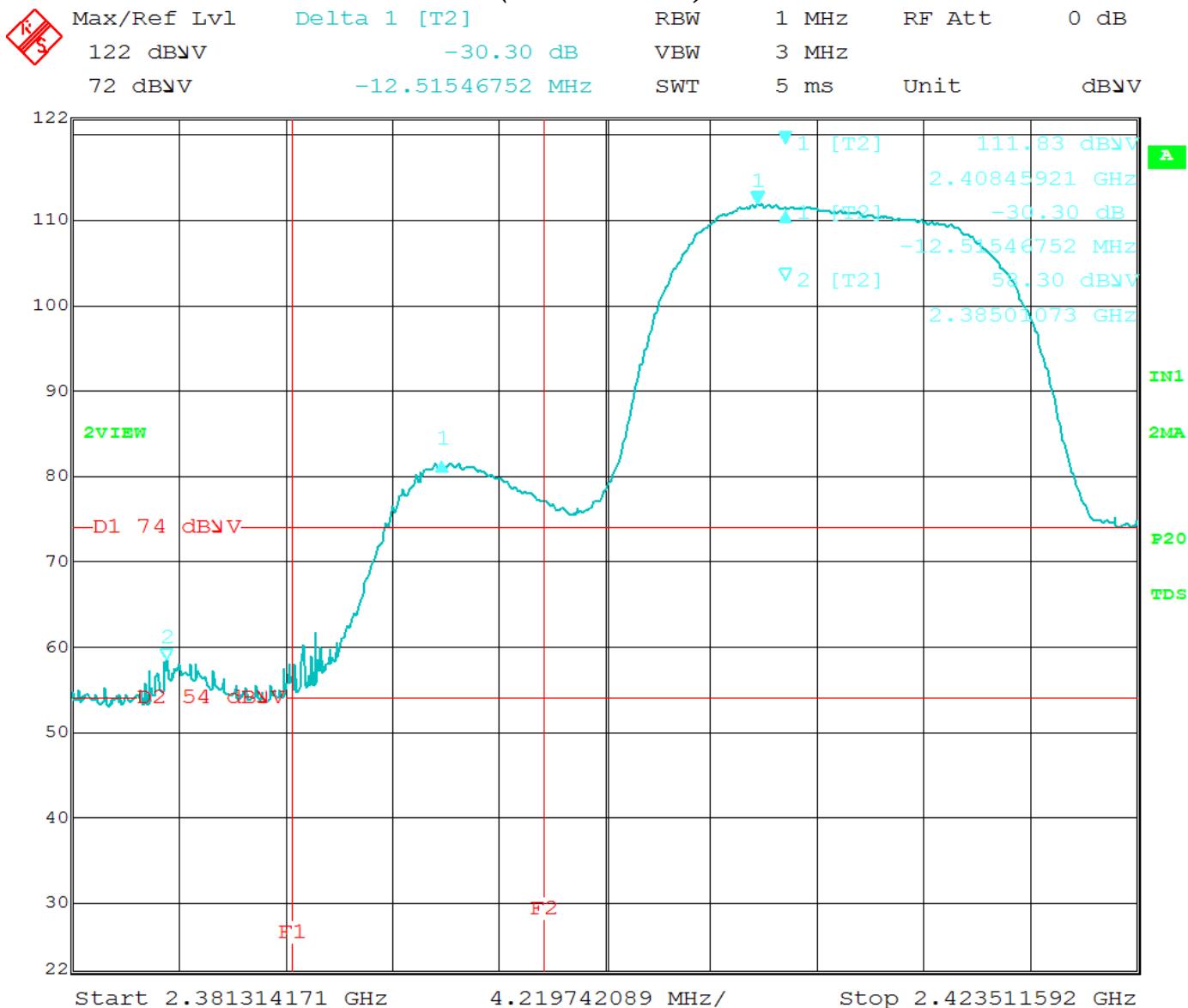
Compatible Electronics, Inc. FAC-3 (Lab R)

Test distance

3 meter



LOWER BAND EDGE (Horizontal)



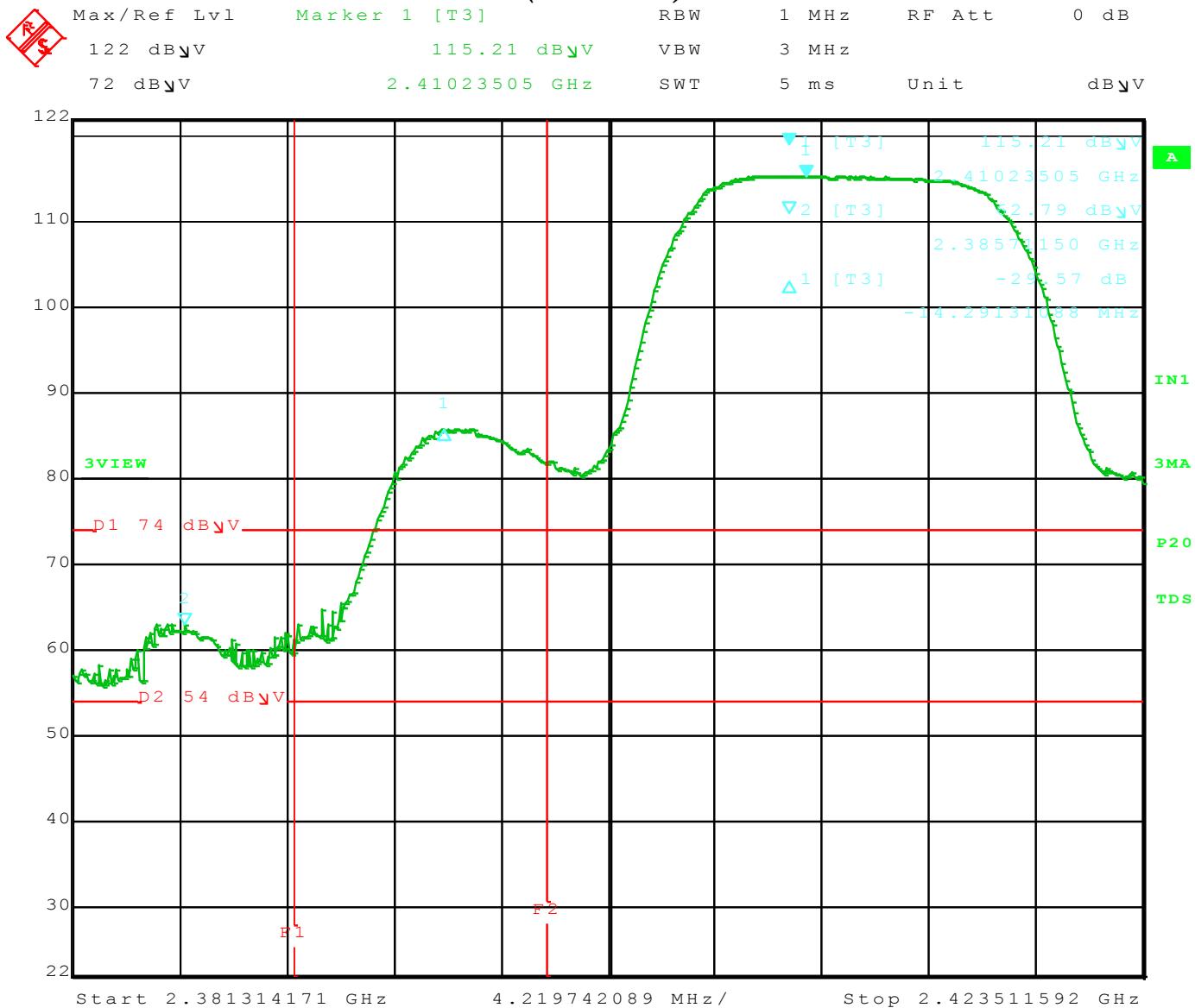
Title: ATWINC1500-MR210PA.

Comment A: Lower Band Edge, 802.11b, Horizontal, X-Axis, DigGain= -6.3

Date: 20.AUG.2014 11:19:20



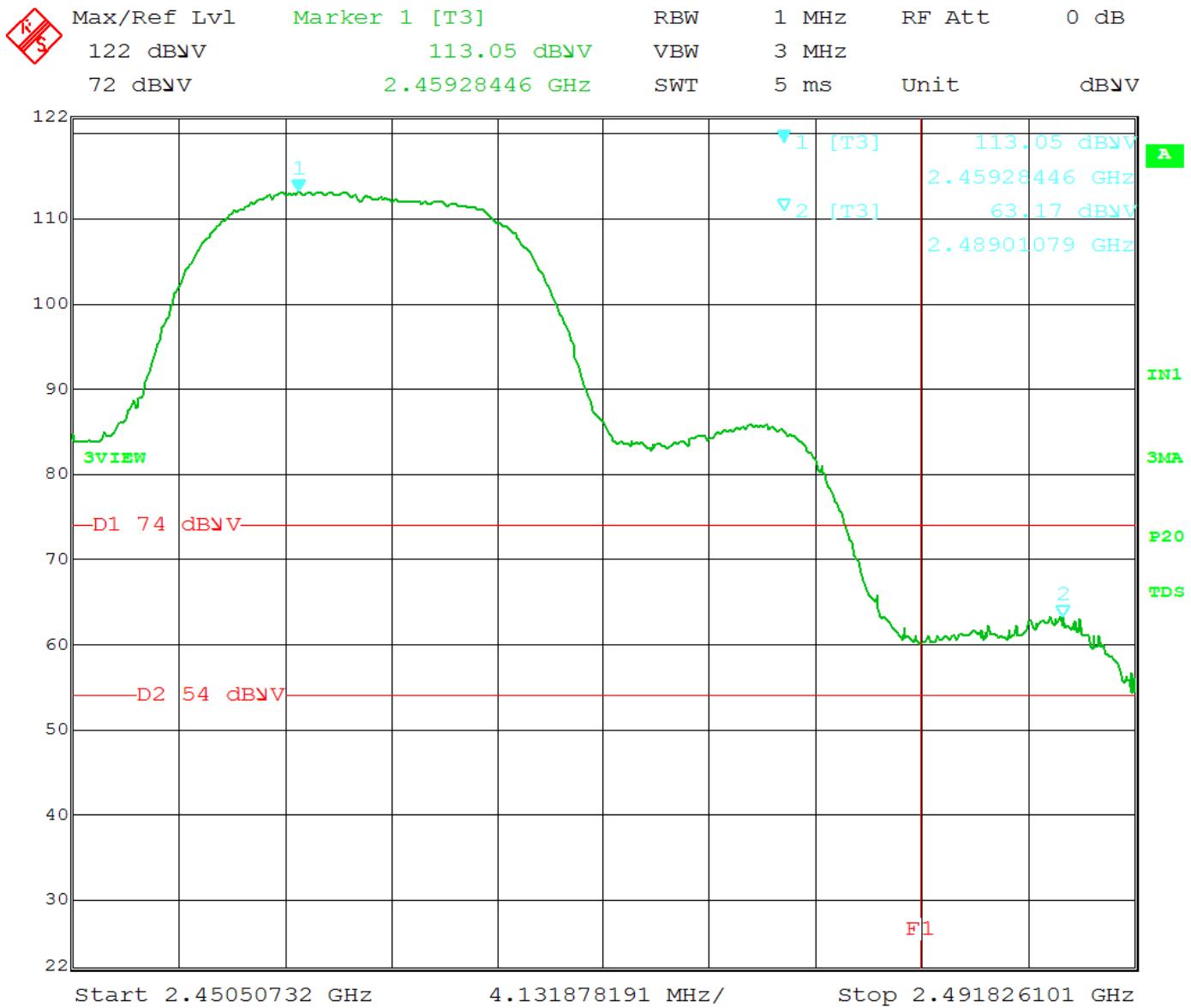
LOWER BAND EDGE (Vertical)



Title: ATWINC1500-MR210PA.
 Comment A: Lower Band Edge, 802.11b, Vertical, X-Axis, DigGain= -6.3
 Date: 20.AUG.2014 11:14:41



UPPER BAND EDGE (Horizontal)



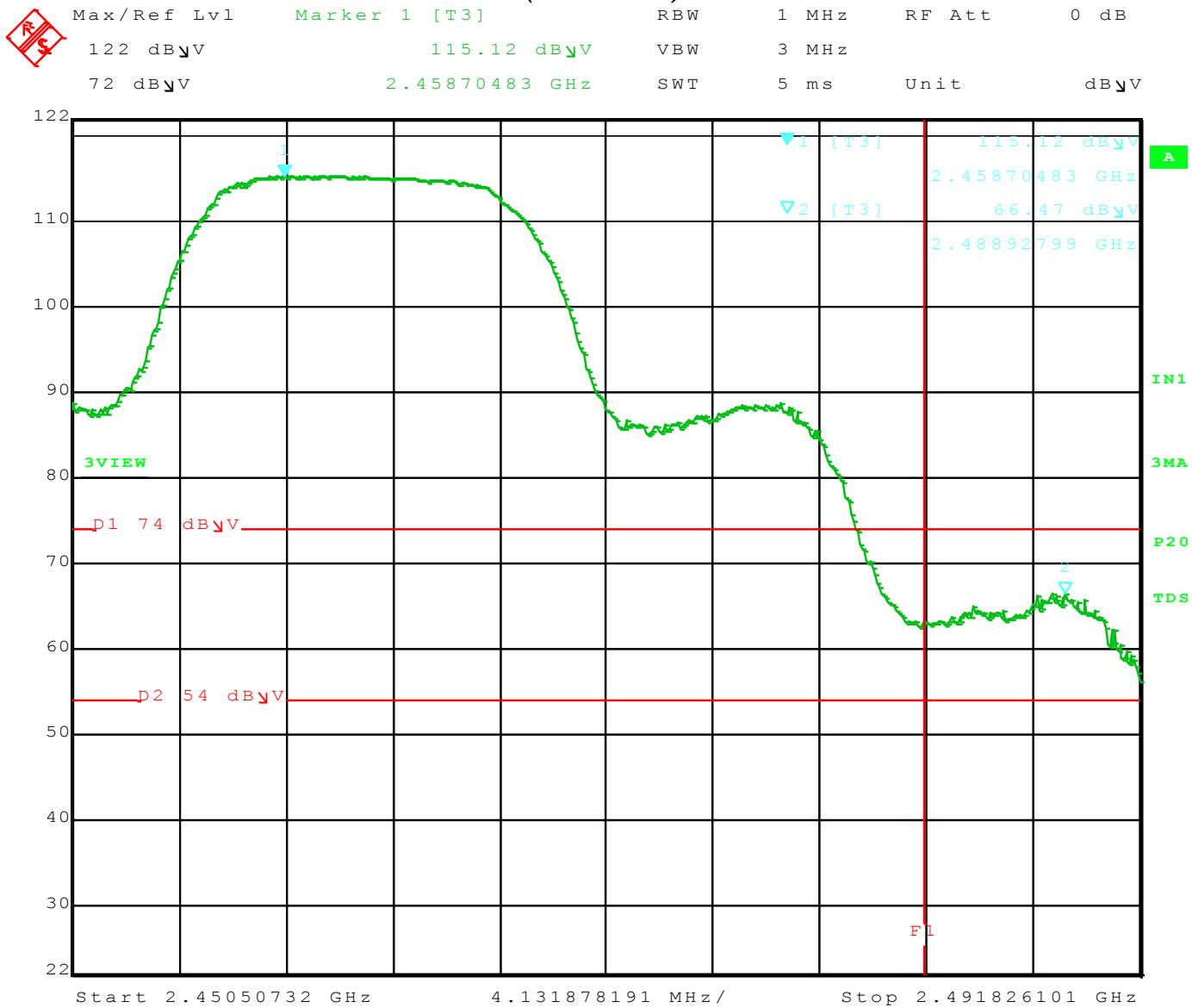
Title: ATWINC1500-MR210PA.

Comment A: Upper Band Edge, 802.11b, Horizontal, X-Axis, DigGain= -2.3

Date: 20.AUG.2014 11:28:29



UPPER BAND EDGE (Vertical)



Title: ATWINC1500-MR210PA.
 Comment A: Upper Band Edge, 802.11b, Vertical, X-Axis, DigGain= -2.3
 Date: 20.AUG.2014 11:33:02



802.11g Mode

BAND EDGES- VERTICAL

FCC 15.247

Company: Atmel Norway AS
EUT: Modular Transmitter
Model: ATWINC1500
Mode: 802.11g

Date: 8/18/2014
Lab: R
Test ENG: Matt Harrison

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

Test distance

3 meter



BAND EDGES- HORIZONTAL

FCC 15.247

Company: Atmel Norway AS Date: 8/18/2014
 EUT: Modular Transmitter Lab: R
 Model: ATWINC1500 Test ENG: Matt Harrison
 Mode: 802.11g

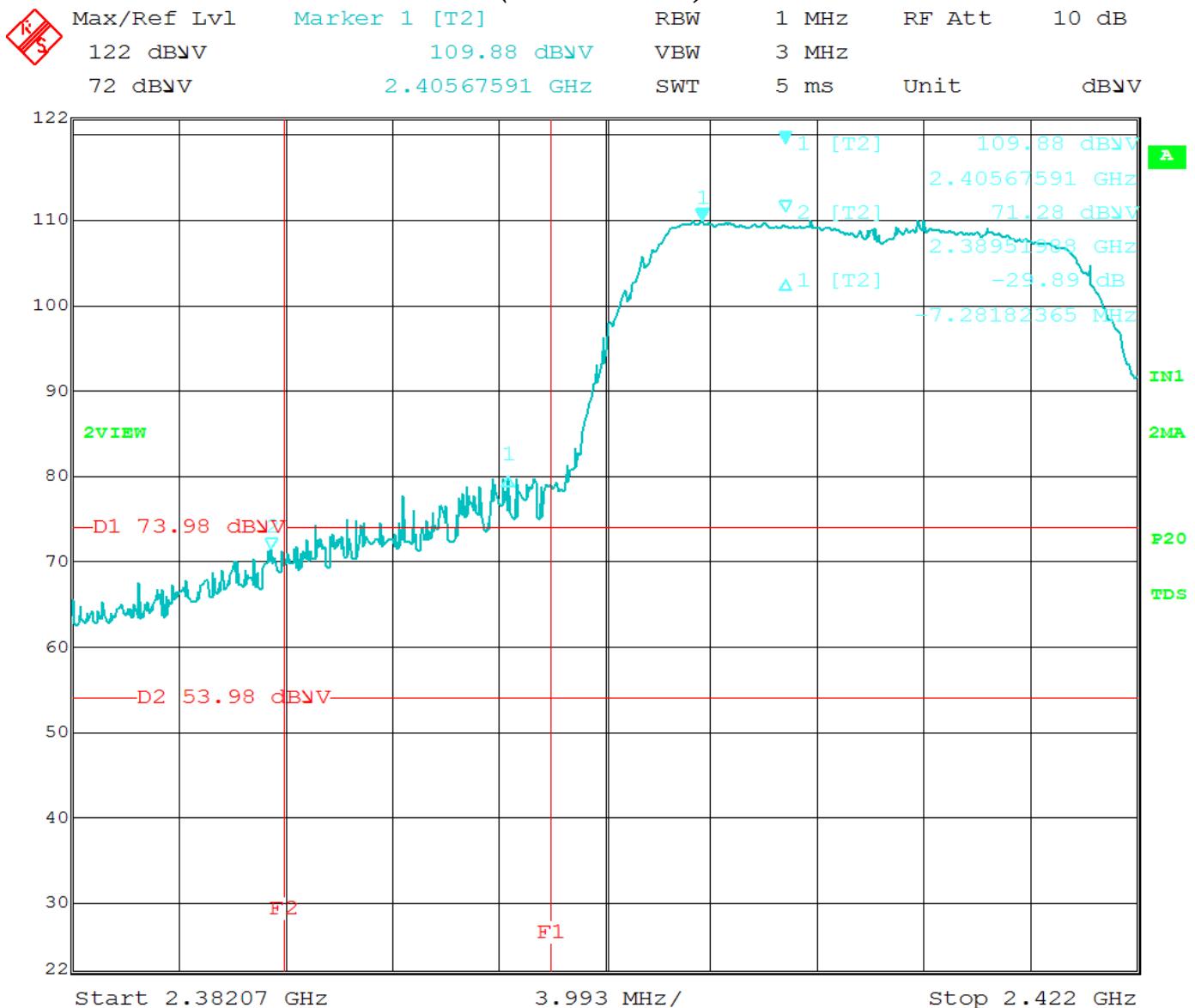
Compatible Electronics, Inc. FAC-3 (Lab R)

Freq. (MHz)	Level (dB μ V)	Pol	Limit (dB μ V)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2412.00	109.88	H	--	--	Peak	1.2	215	Fundamental of High Channel
2412.00		H	--	--	Avg			@ 3 meters
								X-Axis, DigGain=-8, 6Mbps
2398.39	79.99	H	89.88	-9.89	Delta	1.2	215	From Peak
2389.52	71.28	H	73.98	-2.70	Peak	1.2	215	No Marker Delta Method Used
2389.52	51.00	H	53.98	-2.98	Avg	1.2	215	X-Axis, DigGain=-8, 6Mbps
2462.00	108.82	H	--	--	Peak	1.2	211	Fundamental of High Channel
2462.00		H	--	--	Avg			@ 3 meters
2483.57	72.63	H	73.98	-1.35	Peak	1.2	211	No Marker Delta Method Used
2483.57	50.21	H	53.98	-3.77	Avg	1.2	211	X-Axis, DigGain=-6, 6Mbps

Test distance
 3 meter



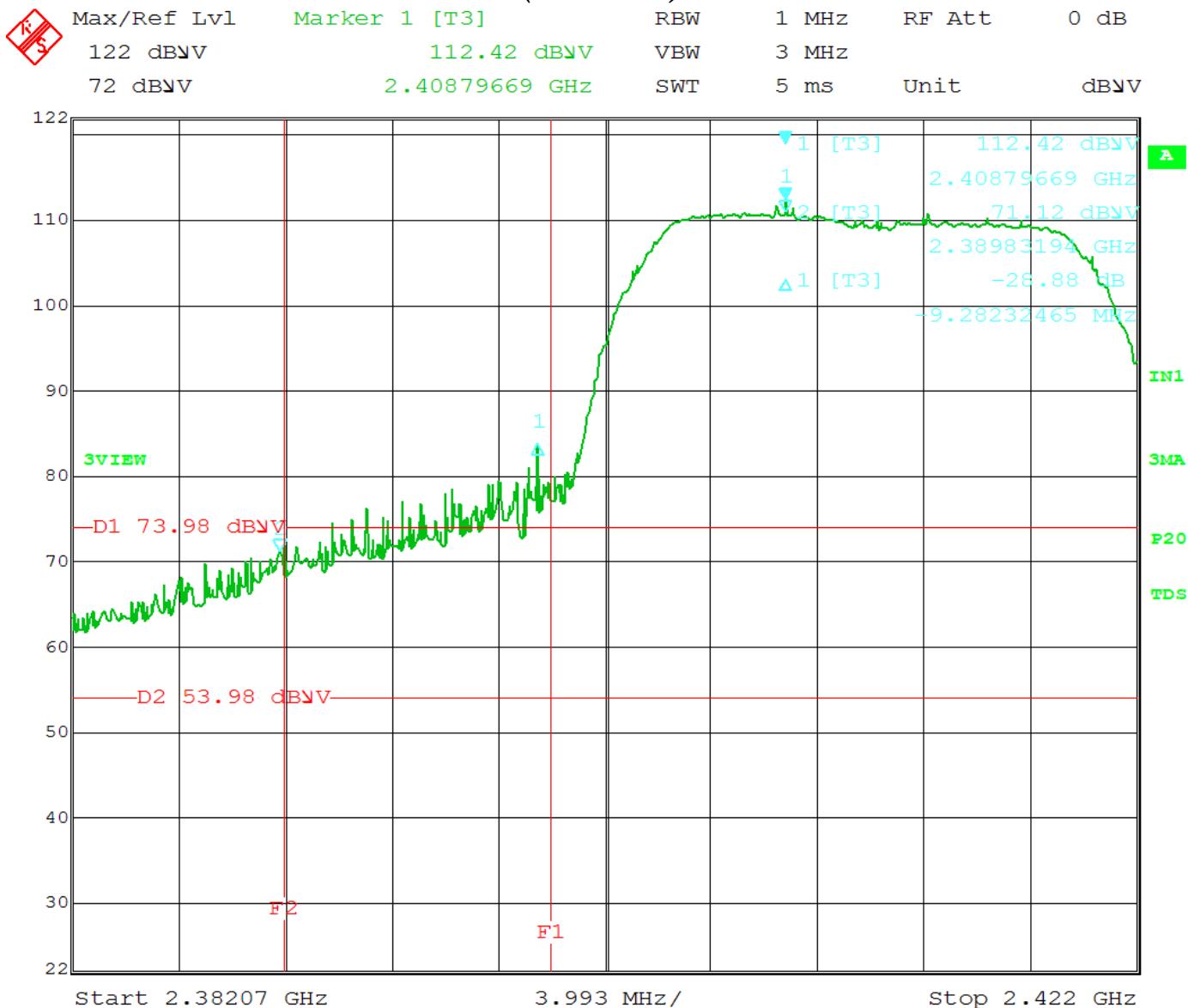
LOWER BAND EDGE (Horizontal)



Title: ATWINC1500-MR210PA. Digital Gain -8.
 Comment A: Lower Band Edge, 802.11g, Horizontal, X-Axis.
 Date: 18.AUG.2014 14:45:13



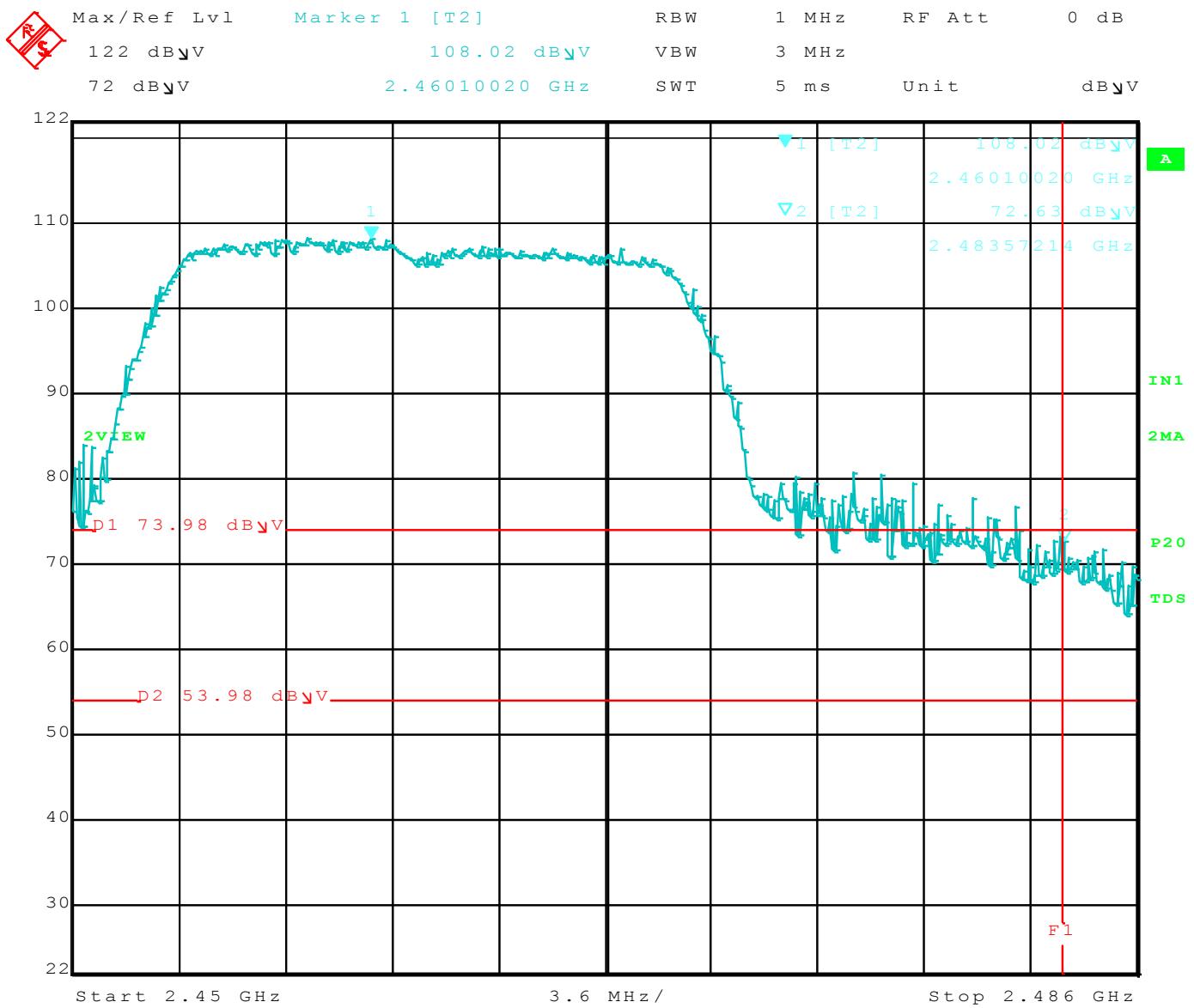
LOWER BAND EDGE (Vertical)



Title: ATWINC1500-MR210PA. Digital Gain -8.
 Comment A: Lower Band Edge, 802.11g, Vertical, X-Axis.
 Date: 18.AUG.2014 14:27:23



UPPER BAND EDGE (Horizontal)



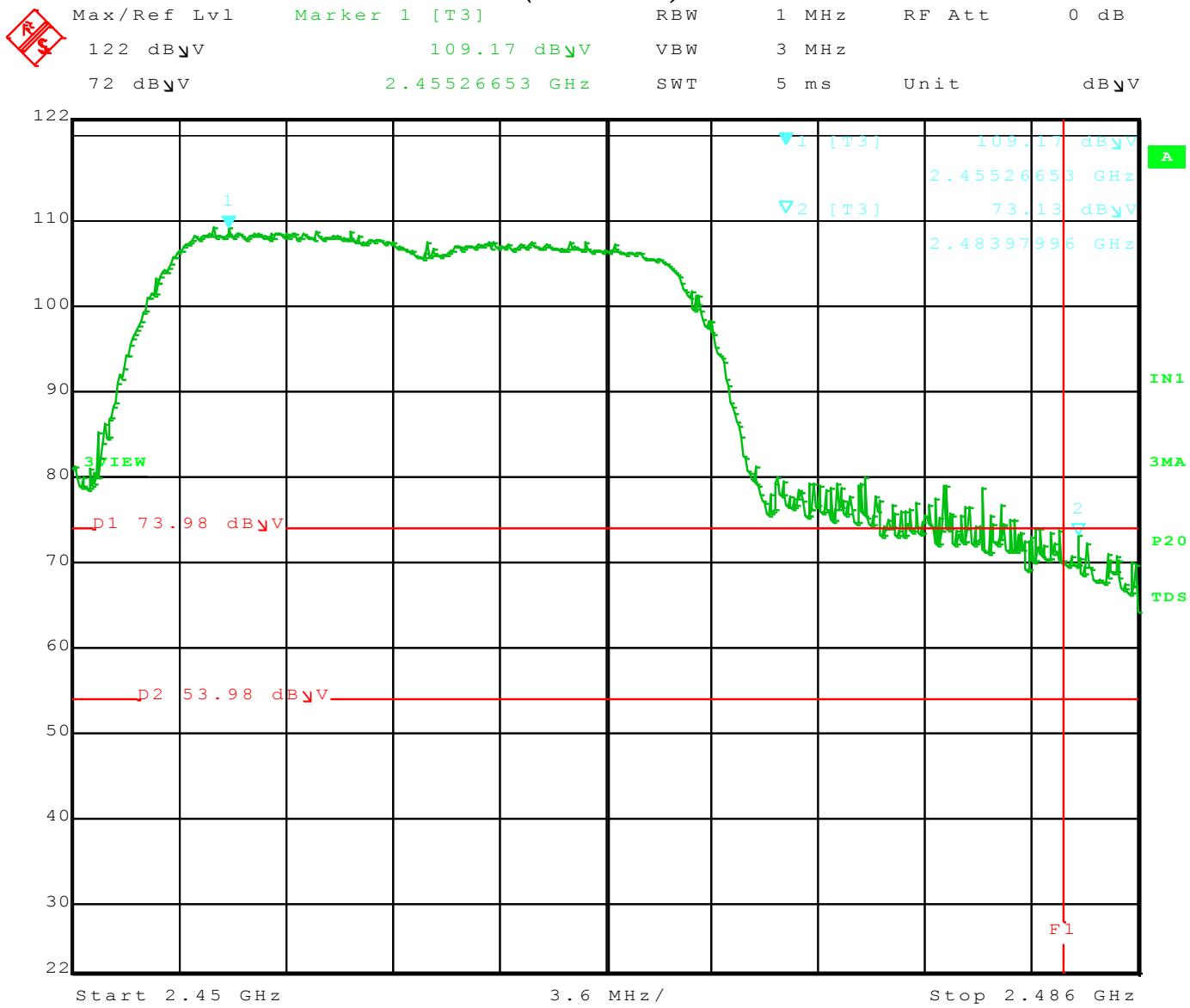
Title: ATWINC1500-MR210PA. Digital Gain -6.

Comment A: Upper Band Edge, 802.11g, Vertical, X-Axis.

Date: 18.AUG.2014 15:39:55



UPPER BAND EDGE (Vertical)



Title: ATWINC1500-MR210PA. Digital Gain -6.
 Comment A: Upper Band Edge, 802.11g, Vertical, X-Axis.
 Date: 18.AUG.2014 15:31:11



802.11N Mode

BAND EDGES- VERTICAL

FCC 15.247

Company:	Atmel Norway AS	Date:	8/18/2014
EUT:	Modular Transmitter	Lab:	R
Model:	ATWINC1500	Test ENG:	Matt Harrison
Mode:	802.11n		

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

Freq. (MHz)	Level (dB μ V)	Pol	Limit (dB μ V)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2412.00	111.46	V	--	--	Peak	1	30	Fundamental of High Channel
2412.00		V	--	--	Avg			@ 3 meters
								X-Axis, DigGain=-8, MCS0
2399.03	81.83	V	91.46	-9.63	Delta	1	30	From Peak
2389.27	72.66	V	73.98	-1.32	Peak	1	30	No Marker Delta Method Used
2389.27	50.74	V	53.98	-3.24	Avg	1	30	X-Axis, DigGain=-8, MCS0
2462.00	109.04	V	--	--	Peak	1	30	Fundamental of High Channel
2462.00	--	V	--	--	Avg			@ 3 meters
2483.50	73.19	V	73.98	-0.79	Peak	1	30	No Marker Delta Method Used
2483.50	50.03	V	53.98	-3.95	Avg	1	30	X-Axis, DigGain=-6, MCS0

Test distance

3 meter



BAND EDGES- HORIZONTAL

FCC 15.247

Company: Atmel Norway AS
 EUT: Modular Transmitter
 Model: ATWINC1500
 Mode: 802.11n

Date: 8/18/2014
 Lab: R
 Test ENG: Matt Harrison

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

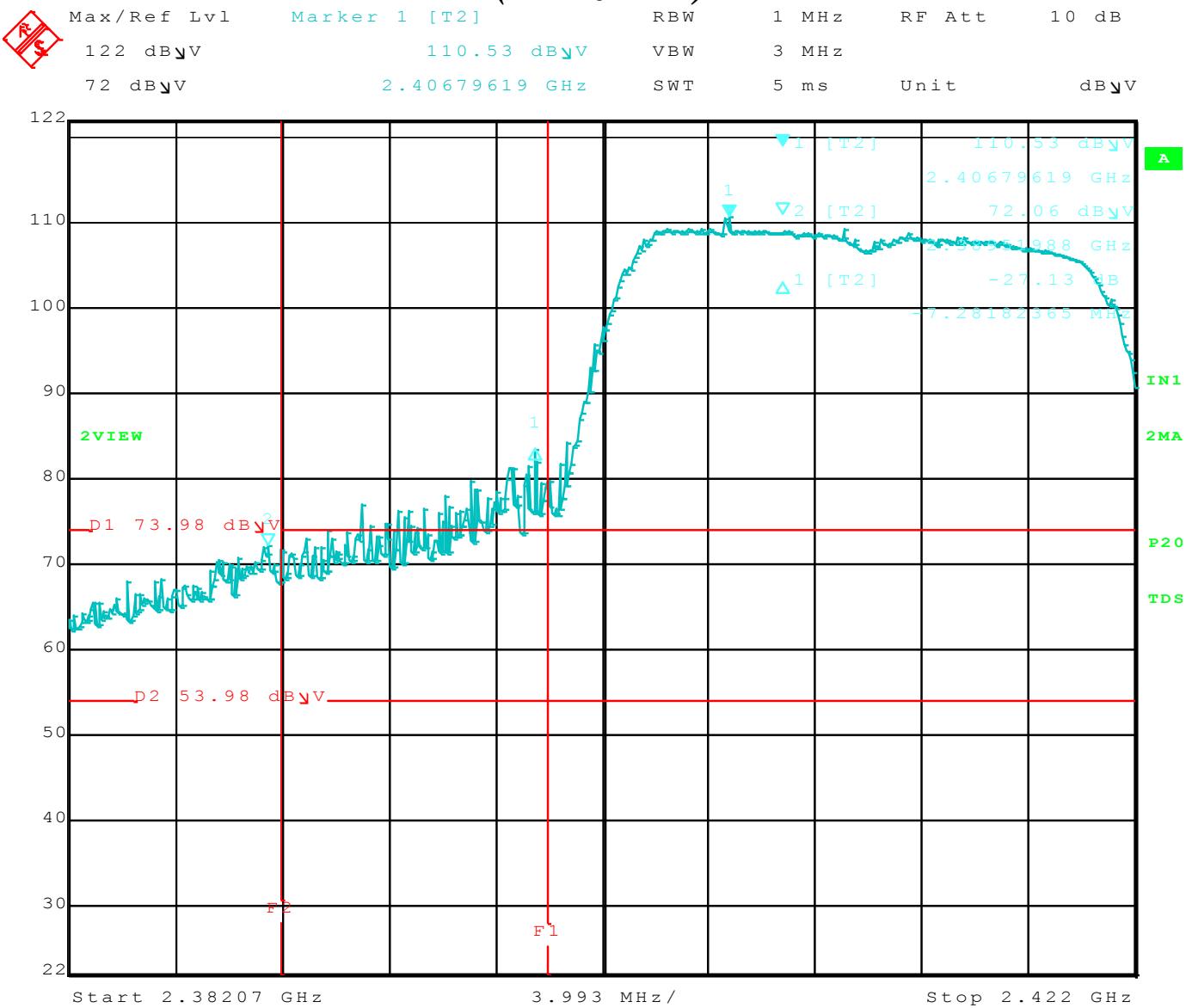
Freq. (MHz)	Level (dB μ V)	Pol	Limit (dB μ V)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2412.00	110.53	H	--	--	Peak	1.2	215	Fundamental of High Channel
2412.00		H	--	--	Avg			@ 3 meters
								X-Axis, DigGain=-8, MCS0
2399.51	83.40	H	90.53	-7.13	Delta	1.2	215	From Peak
2389.52	72.06	H	73.98	-1.92	Peak	1.2	215	No Marker Delta Method Used
2389.52	51.28	H	53.98	-2.70	Avg	1.2	215	X-Axis, DigGain=-8, MCS0
2462.00	108.84	H	--	--	Peak	1.25	215	Fundamental of High Channel
2462.00		H	--	--	Avg			@ 3 meters
2483.55	73.53	H	73.98	-0.45	Peak	1.25	215	No Marker Delta Method Used
2483.55	49.09	H	53.98	-4.89	Avg	1.25	215	X-Axis, DigGain=-6, MCS0

Test distance

3 meter



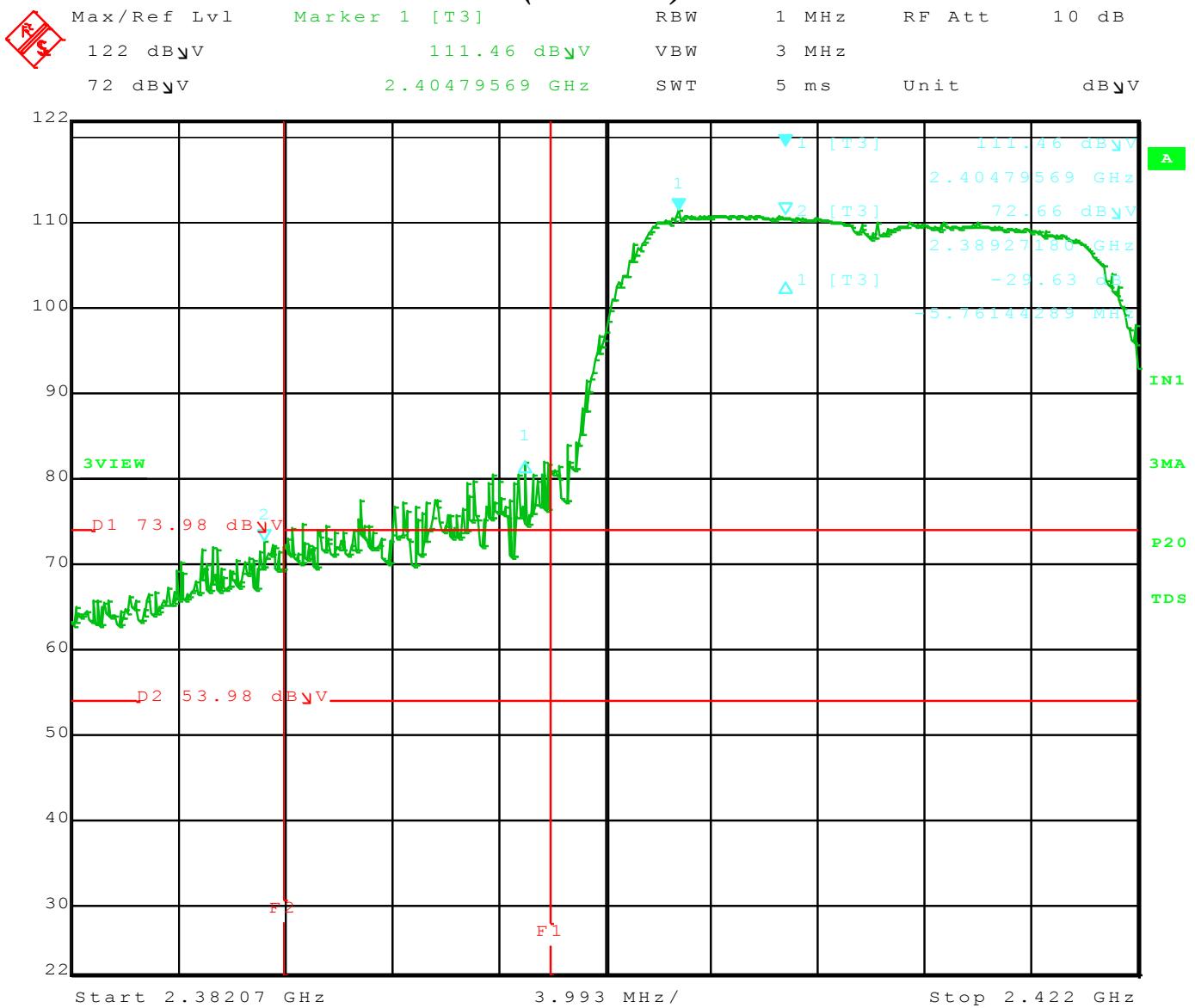
LOWER BAND EDGE (Horizontal)



Title: ATWINC1500-MR210PA. Digital Gain -8.
 Comment A: Lower Band Edge, 802.11n, Horizontal, X-Axis.
 Date: 18.AUG.2014 15:12:43



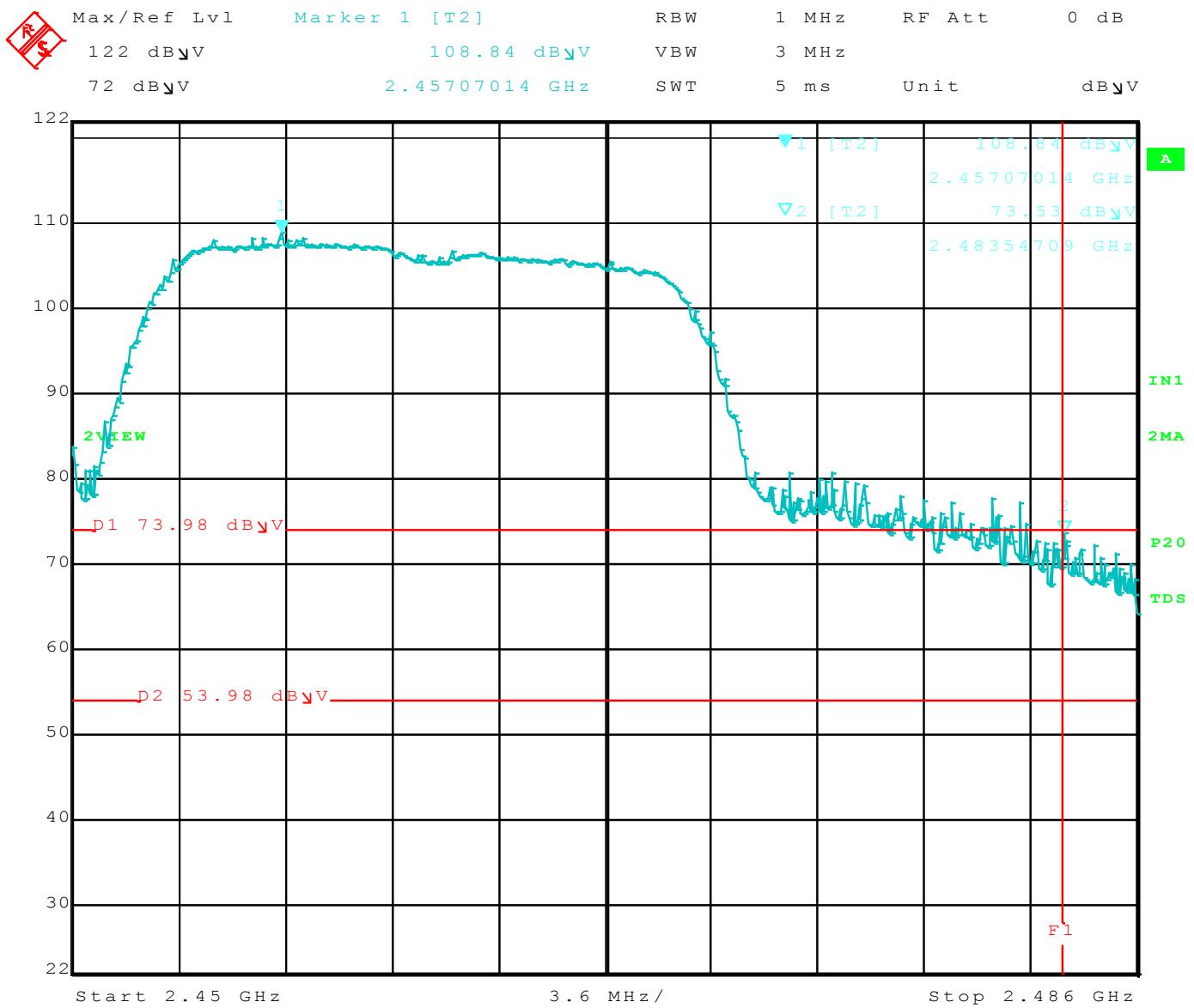
LOWER BAND EDGE (Vertical)



Title: ATWINC1500-MR210PA. Digital Gain -8.
 Comment A: Lower Band Edge, 802.11n, Vertical, X-Axis.
 Date: 18.AUG.2014 15:09:23



UPPER BAND EDGE (Horizontal)



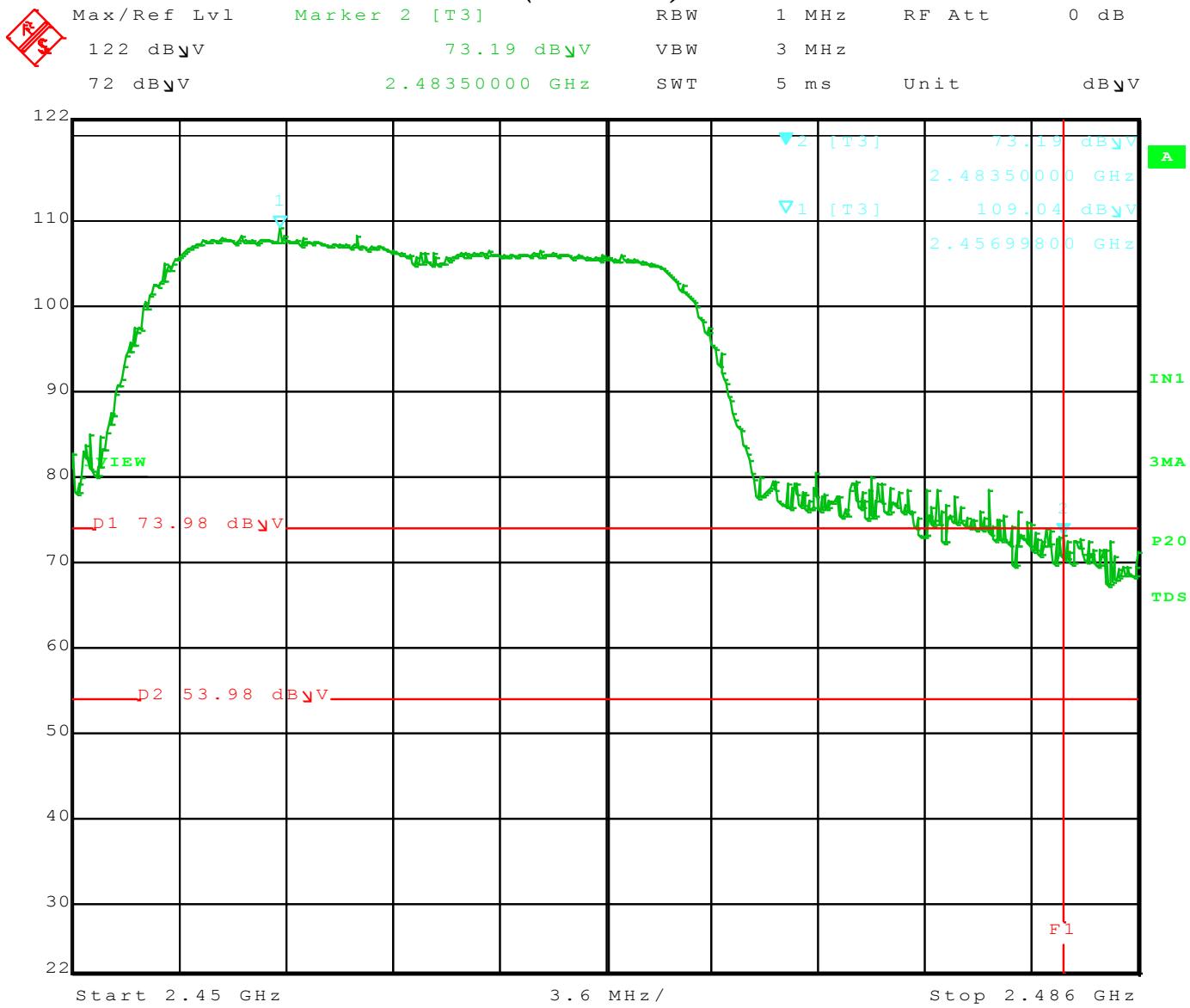
Title: ATWINC1500-MR210PA. Digital Gain -6.

Comment A: Upper Band Edge, 802.11n, Horizontal, X-Axis.

Date: 18.AUG.2014 15:23:59



UPPER BAND EDGE (Vertical)



Title: ATWINC1500-MR210PA. Digital Gain -6.

Comment A: Upper Band Edge, 802.11n, Vertical, X-Axis.

Date: 18.AUG.2014 15:20:25

