

# FCC REPORT

**Applicant:** Aclarity, LLC

**Address of Applicant:** 13061 E. Jenan Dr Scottsdale, AZ 85259, USA

## Equipment Under Test (EUT)

**Product Name:** Energy Assistant

**Model No.:** RCS-J34B

**Trade mark:** Aclarity, LLC

**FCC ID:** G9ORCS-J34B

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.231:2010

**Date of sample receipt:** Mar. 19, 2012

**Date of Test:** Mar. 21, to Apr.09 , 2012

**Date of report issue:** Apr.10, 2012

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Stephen Guo  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of CCIS International Electrical Approvals or testing done by CCIS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by CCIS International Electrical Approvals in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only."

## 2 Version

Version No.	Date	Description
00	Apr.10, 2012	Original

**Prepared By:**

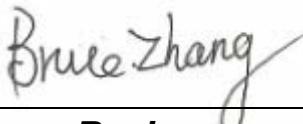


**Date:**

Apr.10, 2012

**Project Engineer**

**Check By:**



**Date:**

Apr.10, 2012

**Reviewer**

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Conducted emissions	15.207	Pass
Field strength of the fundamental signal	15.231 (e)	Pass
Spurious emissions	15.231 (b)/15.209/15.205	Pass
20dB Bandwidth	15.231 (c)	Pass
Dwell time	15.231 (e)	Pass
Silent Period	15.231 (e)	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

Applicant:	A clarity, LLC
Address of Applicant:	13061 E. Jenan Dr Scottsdale, AZ 85259, USA
Manufacturer/ Factory:	Dongguan Richtek Electronics Co.,Ltd.
Address of Manufacturer/ Factory:	No.11 Kuiqing Road, Qingxi Town, Dongguan City, China.

### 5.2 General Description of E.U.T.

Product Name:	Energy Assistant
Model No.:	RCS-J34B
Trade mark:	A clarity, LLC
Operation Frequency:	433.92MHz
Modulation type:	ASK
Antenna Type:	Internal antenna
Antenna gain:	8dBi
Power supply:	Rechargeable Li-ion Battery DC 3.7V 1200mAh 4.4Wh ; Switching Power Supply Model:S005SU0500060 Input:AC100-240V 50/60Hz 1500mA Output: DC 5.0V 600mA

### 5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation.					
<b>Pre-Test Mode:</b>						
CCIS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:						
Axis	X	Y	Z			
Field Strength(dBuV/m)	75.07	79.75	79.21			
<b>Final Test Mode:</b>						
According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup": Y axis (see the test setup photo)						

## 5.4 Identification of Accessory Equipment

None.

## 5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 817957**

China Certification & Inspection Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in out files. Registration 817957, February 27, 2012

● **Industry Canada (IC)**

The 3m Semi-anechoic chamber of China Certification & Inspection Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

## 5.6 Test Location

All tests were performed at:

China Certification & Inspection Services Co., Ltd.

Address: 1st Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

## 5.7 Other Information Requested by the Customer

None.

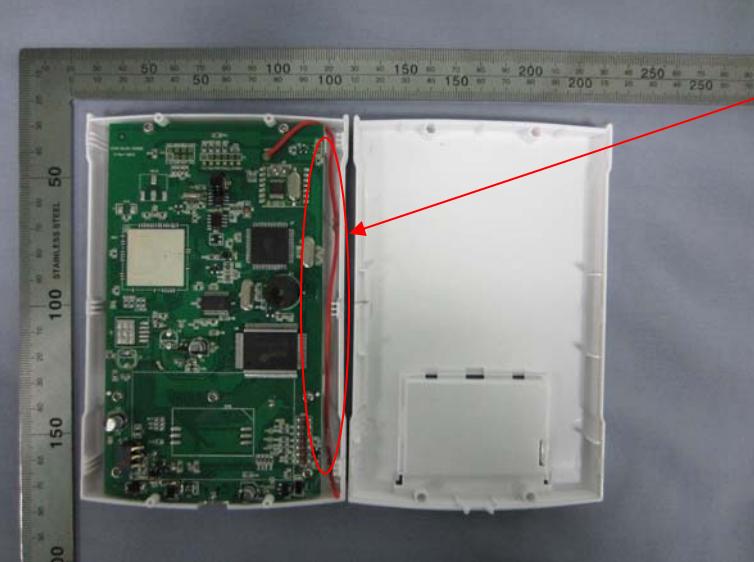
## 5.8 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	June 16 2011	June 16 2012
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	June 09 2011	June 09 2012
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	June 09 2011	June 09 2012
4	Amplifier(10KHz-1.3GHz)	HP	8447D	CCIS0003	Aug. 03 2011	Aug. 03 2012
5	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	Aug. 05 2011	Aug. 05 2012
6	Spectrum analyzer	Rohde & Schwarz	FSP	CCIS0023	June 22 2011	June 22 2012

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	June. 16 2011	June.16 2012
2	LISN	CHASE	MN2050D	CCIS0074	Apr. 14 2012	Apr. 14 2013

## 6 Test results and Measurement Data

### 6.1 Antenna requirement:

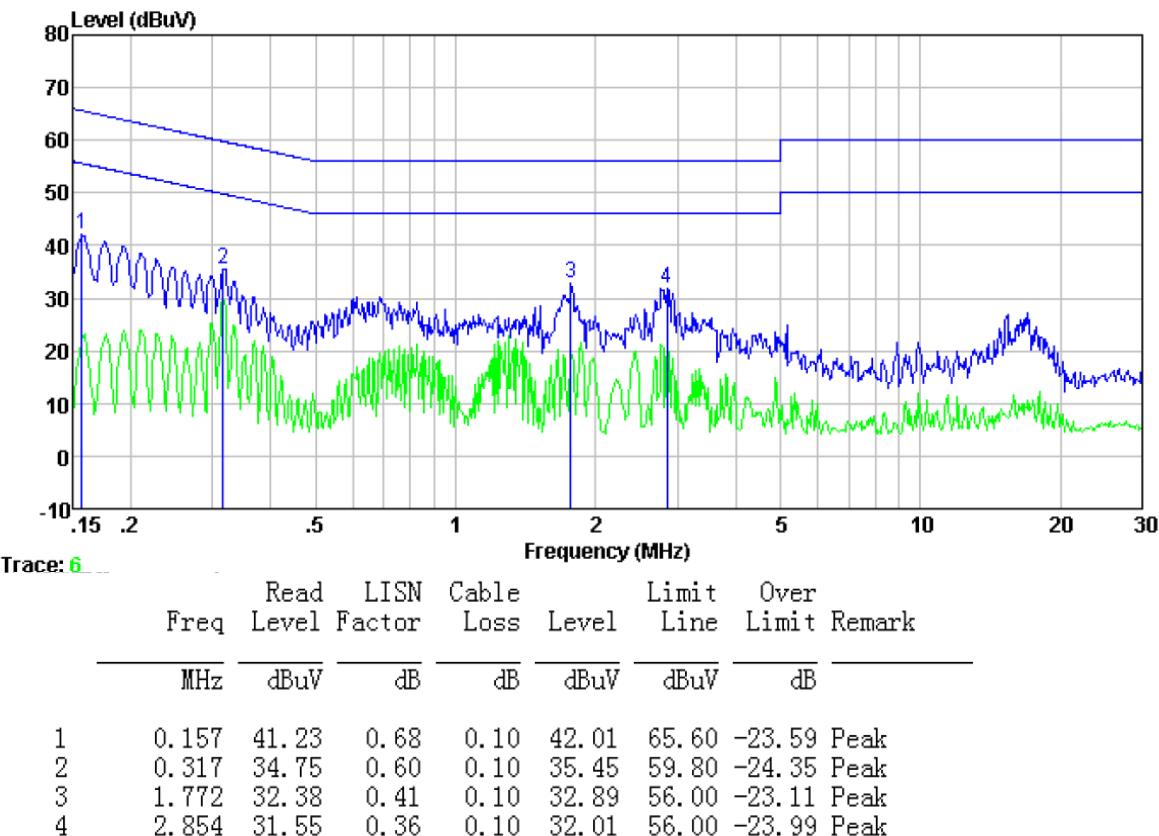
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement:	<p><i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i></p>
E.U.T Antenna:	
<p>The EUT make use of an internal monopole antenna, The typical gain of the antenna is 8dBi.</p> 	

## 6.2 Conducted Emissions

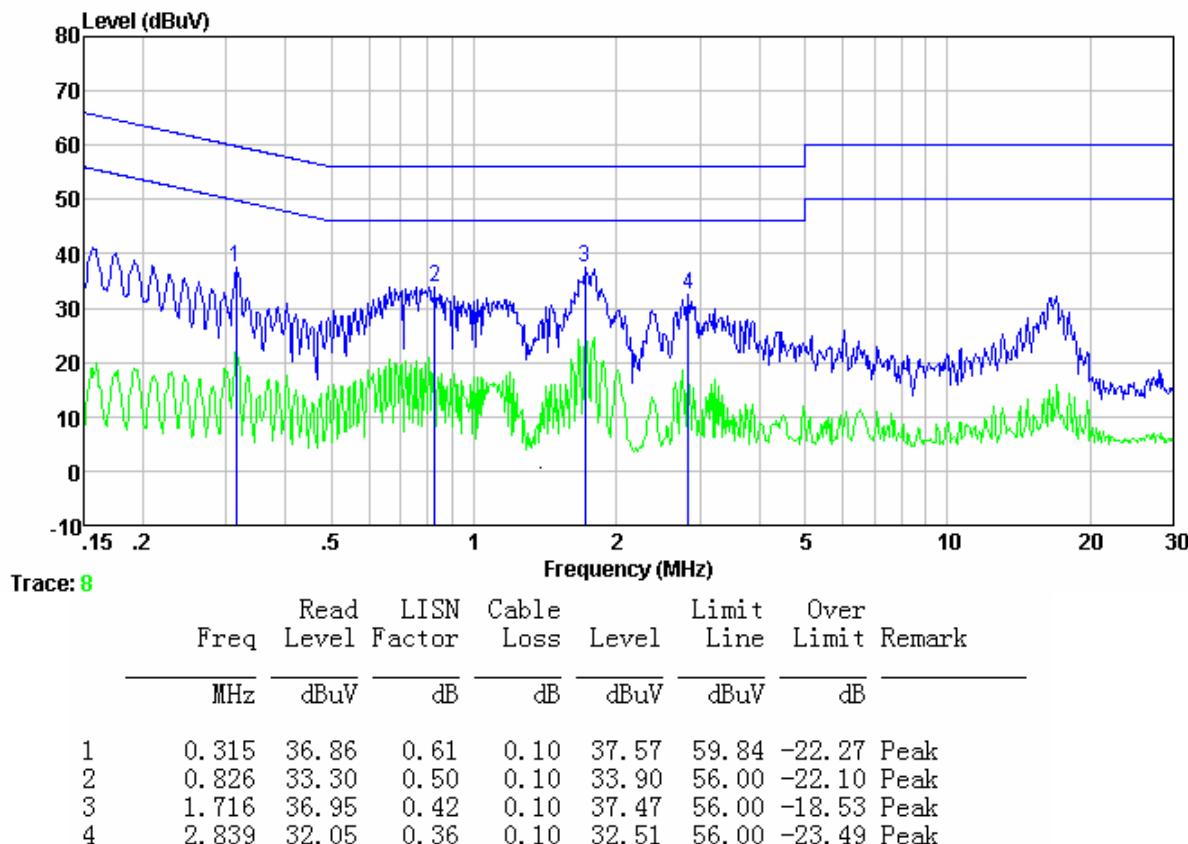
Test Requirement:	FCC Part15C Section 15.207																
Test Method:	ANSI C63.4:2003																
Test Frequency Range:	150kHz to 30MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9kHz, VBW=30kHz																
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dB<math>\mu</math>V)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>0.5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>			Frequency range (MHz)	Limit (dB $\mu$ V)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	0.5-30	60	50
Frequency range (MHz)	Limit (dB $\mu$ V)																
	Quasi-peak	Average															
0.15-0.5	66 to 56*	56 to 46*															
0.5-5	56	46															
0.5-30	60	50															
Test setup:	<p>Reference Plane</p> <p>LISN</p> <p>40cm</p> <p>80cm</p> <p>AUX Equipment</p> <p>E.U.T</p> <p>Test table/Insulation plane</p> <p>EMI Receiver</p> <p>Filter</p> <p>AC power</p> <p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>																
Test procedure	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). They provide a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003</li> <li>4. On conducted measurement.</li> </ol>																
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar											
Measurement Record:						Uncertainty: $\pm 3.45$ dB											
Test Instruments:	Refer to section 6 for details																
Test mode:	Refer to section 5.3 for details																
Test results:	Pass																

### Measurement data:

Line:



Neutral:

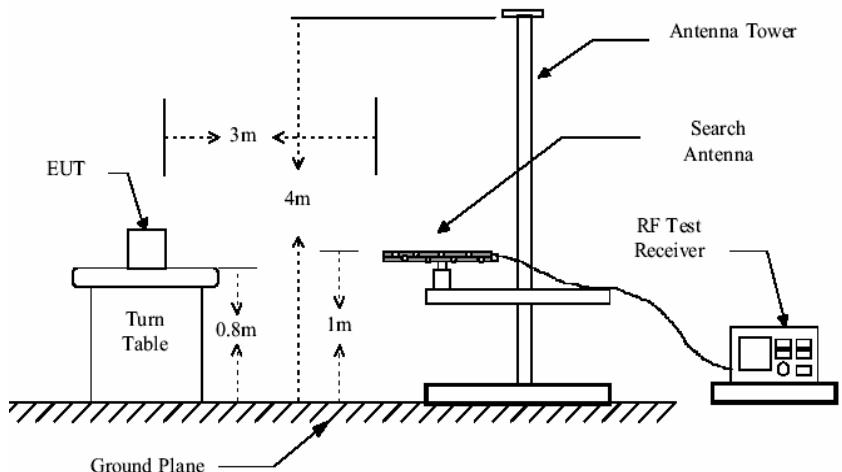
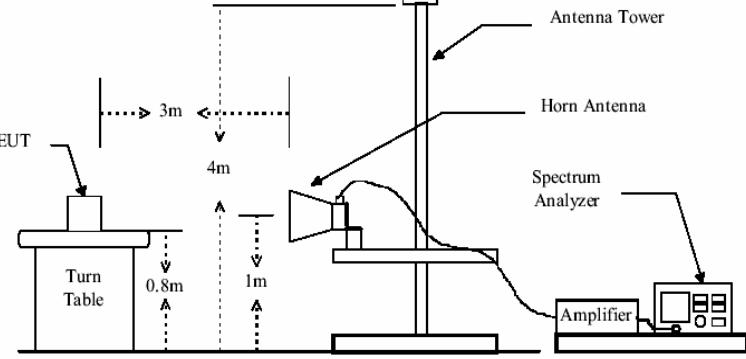


Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

## 6.3 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.231(e) and 15.209																									
Test Method:	ANSI C63.4:2003																									
Test Frequency Range:	30MHz to 5000MHz																									
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																									
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value						
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Above 1GHz	Peak	1MHz	3MHz	Peak Value																						
Limit: (Field strength of the fundamental signal)	<table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>433.92 MHz</td><td>72.87</td><td>Average Value</td></tr> <tr> <td></td><td>92.87</td><td>Peak Value</td></tr> </tbody> </table>					Frequency	Limit (dBuV/m @3m)	Remark	433.92 MHz	72.87	Average Value		92.87	Peak Value												
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	92.87	Peak Value																								
Limit: (Spurious Emissions)	<table border="1"> <thead> <tr> <th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr> <tr> <td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr> <tr> <td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr> <tr> <td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr> <tr> <td>Above 1GHz</td><td>54.0</td><td>Average Value</td></tr> <tr> <td></td><td>74.0</td><td>Peak Value</td></tr> </tbody> </table> <p>Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.</p>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value		74.0	Peak Value
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Above 1GHz	54.0	Average Value																								
	74.0	Peak Value																								
Test Procedure:	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li> </ol>																									

Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

## Measurement Data

### 6.3.1 Field Strength Of The Fundamental Signal

#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.92	90.24	15.49	1.32	27.38	79.67	92.87	-13.20	Horizontal
433.92	90.32	15.49	1.32	27.38	79.75	92.87	-13.12	Vertical

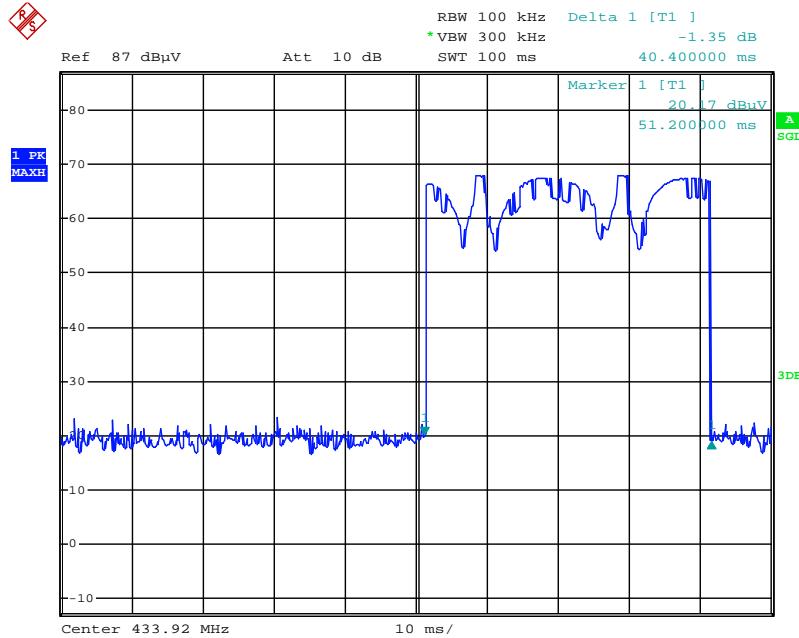
#### Average value:

Frequency (MHz)	Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.92	79.67	-7.87	71.80	72.87	-1.07	Horizontal
433.92	79.75	-7.87	71.88	72.87	-0.99	Vertical

#### Average value:

Calculate Formula:	Average value=Peak value + Duty Cycle Factor
	Duty cycle factor=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	Ton time = 40.4ms
	T period =100ms
	Duty cycle=40.40%
	Duty Cycle Factor = 20 log(Duty cycle)= -7.87

Test plot as follows:



Date: 31.MAR.2012 03:13:27

## 6.3.2 Spurious Emissions

Below 1GHz:									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Detector	Polarization
260.14	46.75	12.16	0.95	26.40	33.46	43.00	-9.54	QP	Horizontal
574.63	48.11	18.00	1.63	27.78	39.96	46.00	-6.04	QP	Horizontal
867.80	53.22	20.78	2.12	27.43	48.69	52.87	-4.18	Peak	Horizontal
150.01	34.07	8.28	0.61	26.81	16.15	43.00	-26.85	QP	Vertical
383.93	34.64	14.68	1.22	27.07	23.47	46.00	-22.53	QP	Vertical
867.80	53.62	20.78	2.12	27.43	49.09	52.87	-3.78	Peak	Vertical

**Above 1GHz:**

<b>Peak value:</b>								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1301.70	52.32	25.52	2.75	34.58	46.01	74.00	-27.99	Horizontal
1735.60	53.24	25.04	3.25	34.66	46.87	74.00	-27.13	Horizontal
2169.50	48.32	27.66	3.65	34.76	44.87	74.00	-29.13	Horizontal
2603.40	49.63	27.80	3.97	34.90	46.50	74.00	-27.50	Horizontal
3037.30	52.34	28.59	4.40	35.01	50.32	74.00	-23.68	Horizontal
1301.70	49.35	25.52	2.75	34.58	43.04	74.00	-30.96	Vertical
1735.60	53.65	25.04	3.25	34.66	47.28	74.00	-26.72	Vertical
2169.50	51.27	27.66	3.65	34.76	47.82	74.00	-26.18	Vertical
2603.40	49.32	27.80	3.97	34.90	46.19	74.00	-27.81	Vertical
3037.30	48.35	28.59	4.40	35.01	46.33	74.00	-27.67	Vertical

<b>Average value:</b>						
Frequency (MHz)	Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1301.70	46.01	-7.87	38.14	54.00	-15.86	Horizontal
1735.60	46.87	-7.87	39.00	54.00	-15.00	Horizontal
2169.50	44.87	-7.87	37.00	54.00	-17.00	Horizontal
2603.40	46.50	-7.87	38.63	54.00	-15.37	Horizontal
3037.30	50.32	-7.87	42.45	54.00	-11.55	Horizontal
1301.70	43.04	-7.87	35.17	54.00	-18.83	Vertical
1735.60	47.28	-7.87	39.41	54.00	-14.59	Vertical
2169.50	47.82	-7.87	39.95	54.00	-14.05	Vertical
2603.40	46.19	-7.87	38.32	54.00	-15.68	Vertical
3037.30	46.33	-7.87	38.46	54.00	-15.54	Vertical

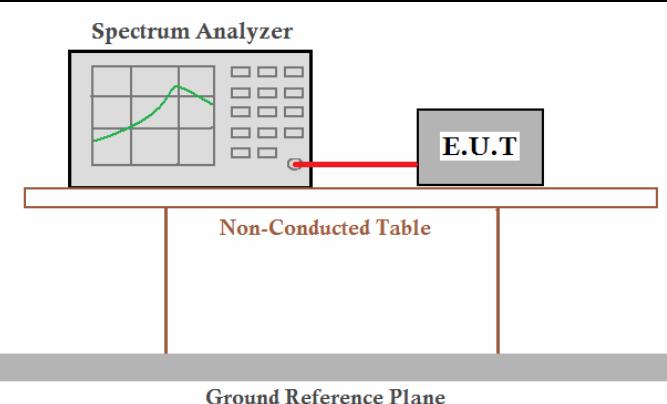
Remark:

Average Limit = Peak Limit -20dB

Average value=Peak value + Duty cycle factor

Duty cycle factor=20 log (Duty cycle)

## 6.4 20dB Bandwidth

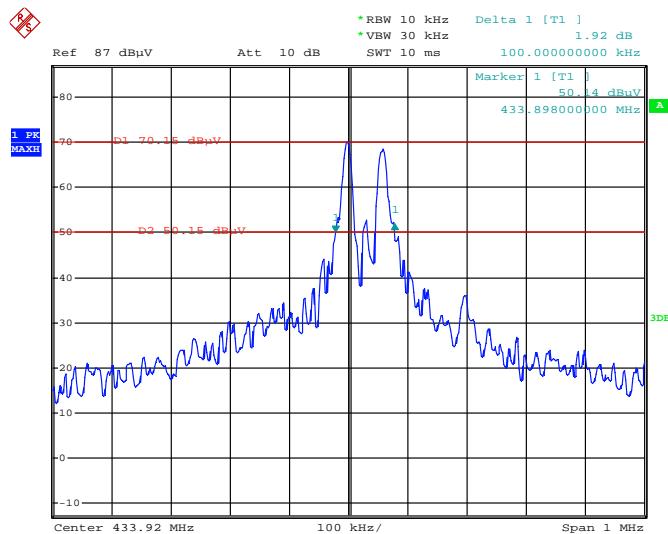
Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=10KHz, VBW=30KHz, detector: Peak
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points.</li> <li>4. Read 20dB bandwidth.</li> </ol>
Test setup:	
Test mode:	Refer to section 5.3 for details
Test Instruments:	Refer to section 4.7 for details
Test results:	Passed

### Measurement Data

20dB bandwidth (MHz)	Limit (MHz)	Results
0.100	1.0848	Pass

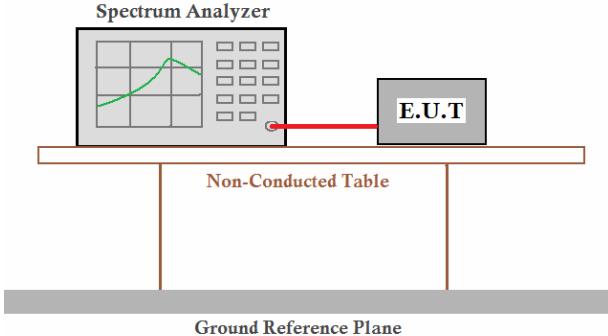
Note: Limit= Fundamental frequency $\times$ 0.25% = 433.92 $\times$ 0.25% = 1.0848MHz

Test plot as follows:



Date: 31.MAR.2012 02:59:37

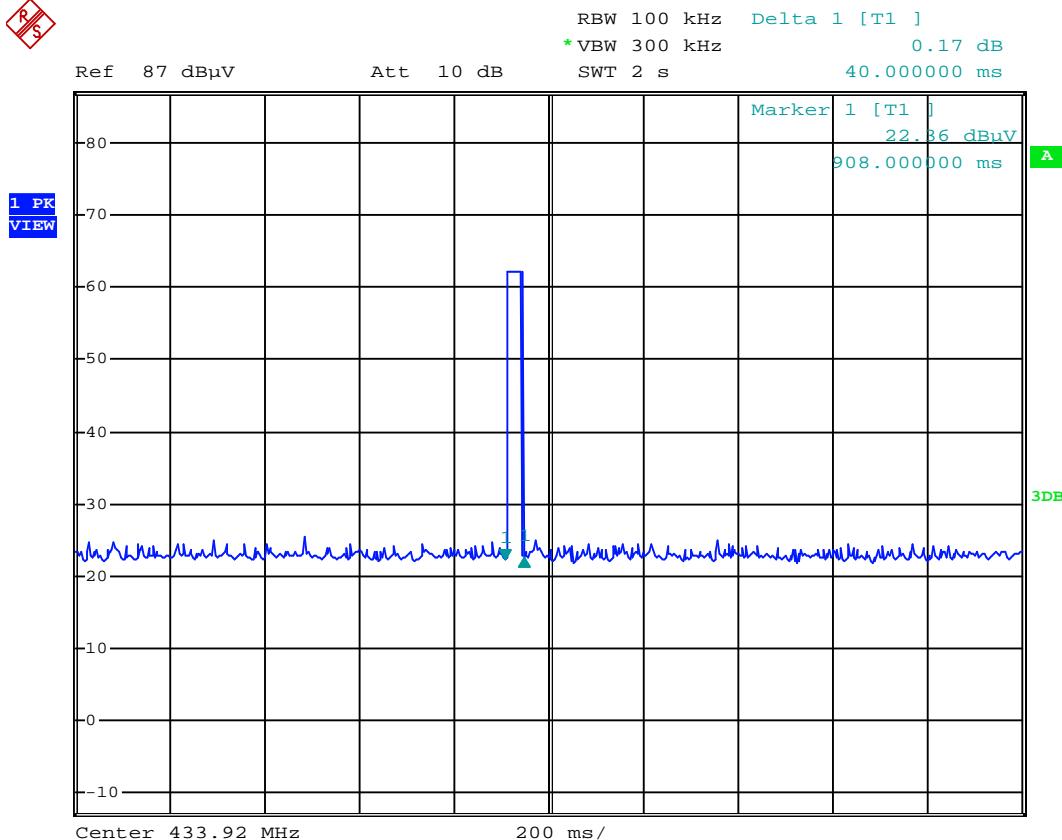
## 6.5 Dwell time:

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	Not more than 1 seconds
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Single scan the transmit, and read the transmission time.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a coaxial cable. The E.U.T is placed on a Non-Conducted Table. The entire setup is positioned above a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.7 for details
Test results:	Passed

### Measurement data:

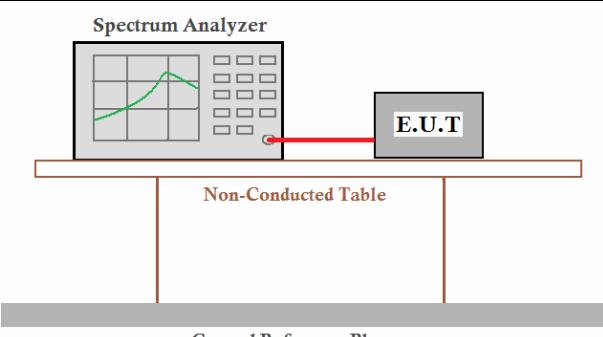
Dwell time (second)	Limit (second)	Result
0.040	<1.0	Pass

Test plot as follows:



Date: 9.APR.2012 05:42:22

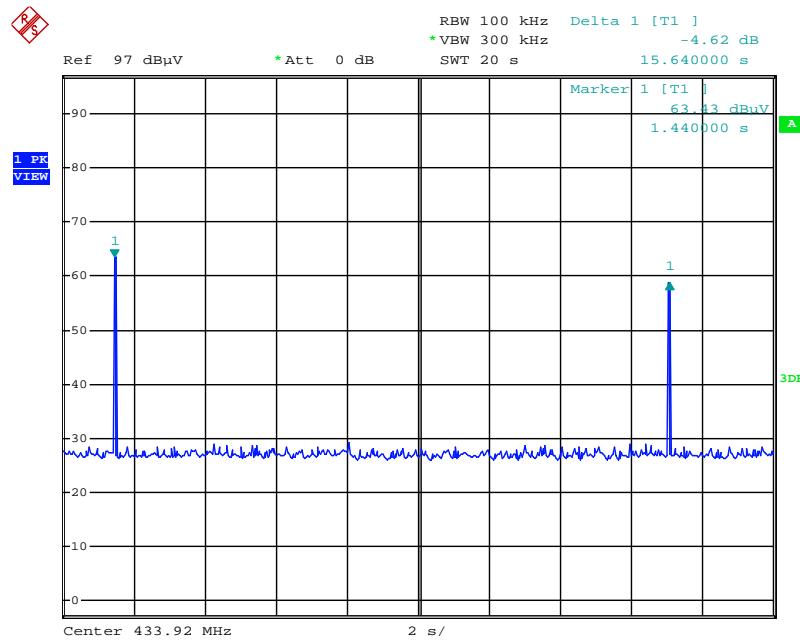
## 6.6 Silent period:

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=100KHz, VBW=300KHz, span=0Hz, detector: Peak
Limit:	at least 30 times the duration of the transmission and more than 10 seconds
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Single scan the transmit, and read the transmission time.</li> </ol>
Test setup:	
Test Instruments:	Refer to section 4.7 for details
Test results:	Passed

### Measurement data:

Silent period (second)	Limit (second)	Result
15.64	>10	Pass

Test plot as follows:



Date: 7.APR.2012 10:56:33