

FCC TEST REPORT  
for  
Aeon Labs LLC.

Repeater  
Model No.: DSD37-ZWUS

Prepared for : Aeon Labs LLC.  
Address : 121 Buckingham drive, unit36 santa claras CA95051 USA

Prepared By : Anbotek Compliance Laboratory Limited  
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Report Number : 201209818F  
Date of Test : Sept. 25~Oct. 15, 2012  
Date of Report : Oct. 15, 2012

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APPENDIX I (External Photos) (2 pages)

APPENDIX II (Internal Photos) (3 pages)

## TEST REPORT

Applicant : Aeon Labs LLC.  
Manufacturer : Aeon Labs LLC.  
EUT : Repeater  
Model No. : DSD37-ZWUS  
Serial No. : N/A  
Rating : AC 120V, 60Hz  
Trade Mark : N/A

## Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.209&15.249

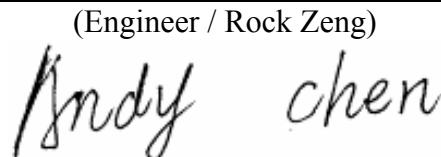
The device described above is tested by Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek Compliance Laboratory Limited

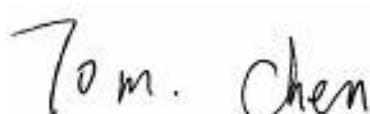
Date of Test : Sept. 25~Oct. 15, 2012



Prepared by : (Engineer / Rock Zeng)



Reviewer : (Project Manager / Andy Chen)



Approved & Authorized Signer : (Manager /Tom Chen)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT : Repeater

Model Number : DSD37-ZWUS

Test Power Supply : AC 120V, 60Hz

Frequency : 908.42MHz

Antenna : Gain is 3dBi  
(The antenna used in this product is Monopole antenna)

Applicant : Aeon Labs LLC.  
Address : 121 Buckingham drive, unit36 santa claras CA95051 USA

Manufacturer : Aeon Labs LLC.  
Address : 121 Buckingham drive, unit36 santa claras CA95051 USA

Date of receiver : Sept. 25, 2012

Date of Test : Sept. 25~Oct. 15, 2012

## 1.2. Description of Test Facility

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

### **CNAS - LAB Code: L3503**

Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

### **FCC-Registration No.: 752021**

Anbotek Compliance Laboratory Limited, 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 our files. Registration 752021, August 20, 2010.

### **IC-Registration No.: 8058A-1**

Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, August 30, 2010.

### **Test Location**

All Emissions tests were performed at

Anbotek Compliance Laboratory Limited. at 1/F, 1 /Building, SEC Industrial Park, No. 4 Qianhai Road, Nanshan District, Shenzhen, 518054, China

## 1.3. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB

## 2. Test Procedure

**GENERAL:** This report shall NOT be reproduced except in full without the written approval of Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

**RADIATION INTERFERENCE:** The test procedure used was ANSI STANDARD C63.4-2009 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

**Example:**

Freq (MHz) METER READING + ACF = FS  
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

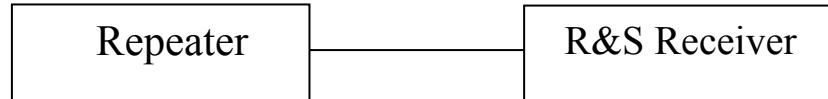
**ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES:** The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

FCC ID: XBADSD37

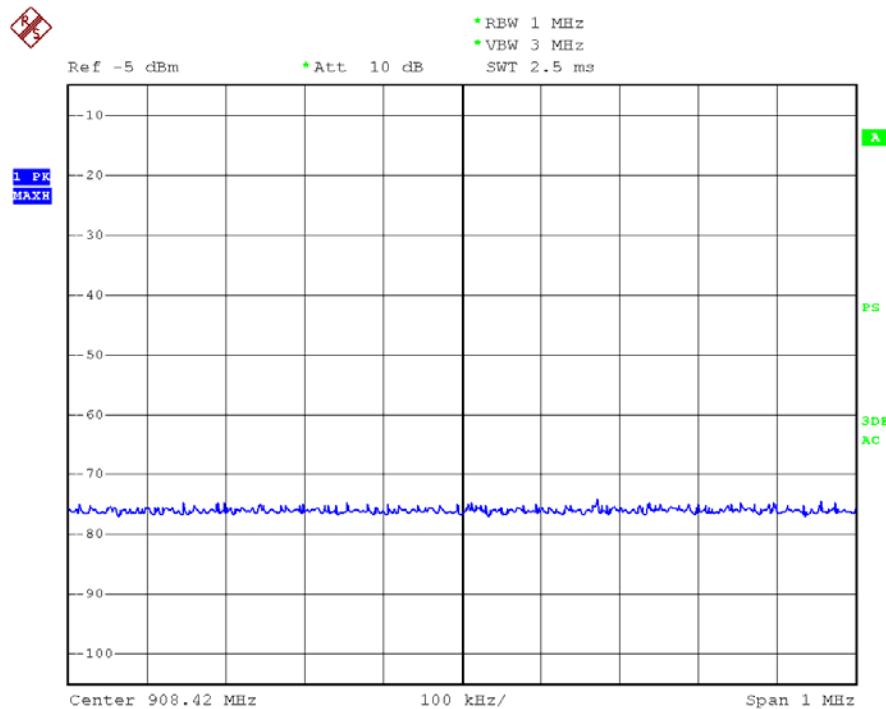
## Test 1:

### Test procedure

First, connect the antenna output to the spectrum analyzer. Switch on the repeater. Without having any Z-wave signal present at the input of the repeater.



Follow are the result.

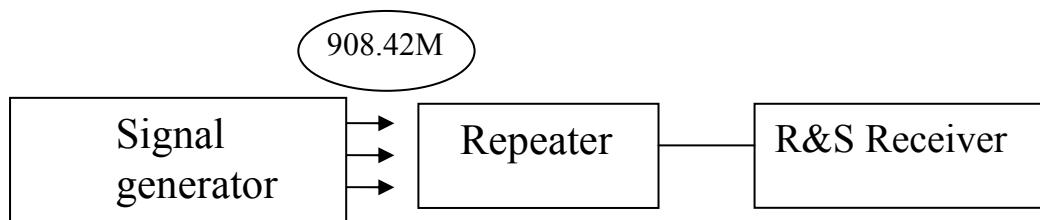


1

Date: 15.OCT.2012 12:36:44

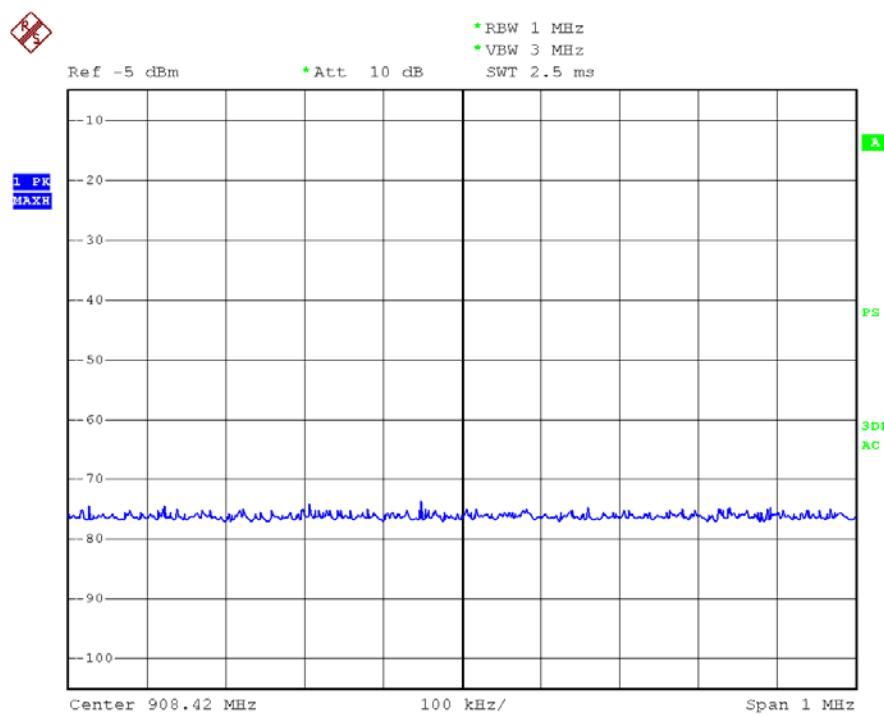
## Test 2:

Generate a signal with a signal generator at 908.42MHz to the RF input of the repeater.



## Test procedure

First: just generate a signal with a signal generator at 908.42MHz to the RF input of the repeater,  
Follow are the result.

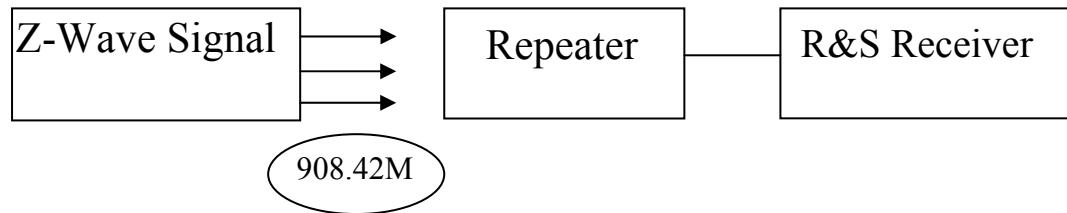


1

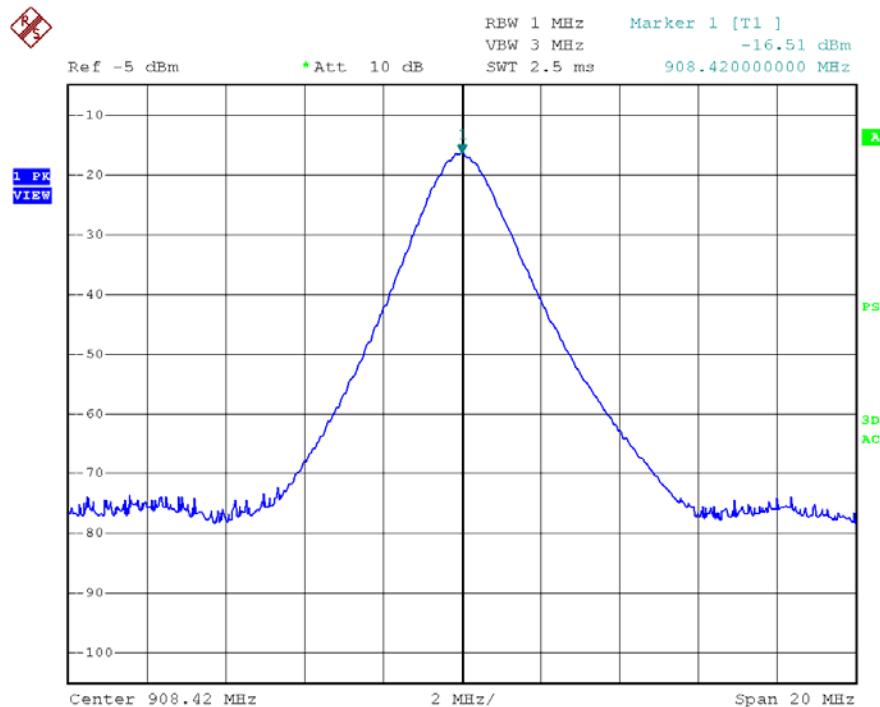
Date: 15.OCT.2012 12:37:11

FCC ID: XBADSD37

Then use the Minimote generate a Z-Wave signal.



Follow are the result.



P

Date: 15.OCT.2012 11:58:26

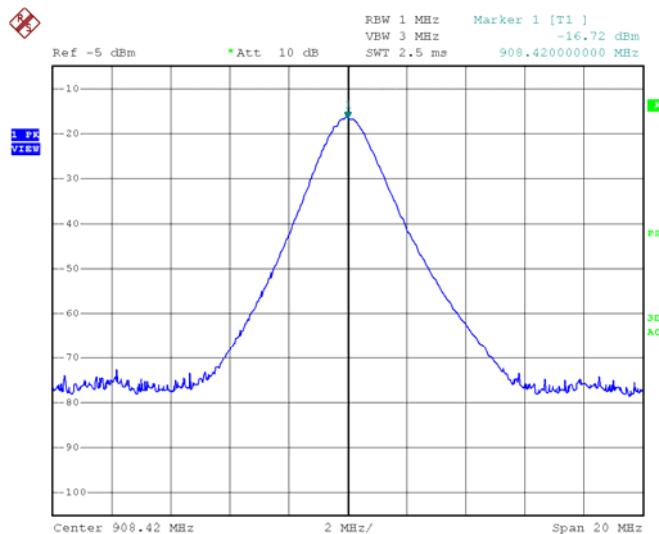
So you can see Repeater just receive signal of Z-Wave.

FCC ID: XBADSD37

**Test 3:**

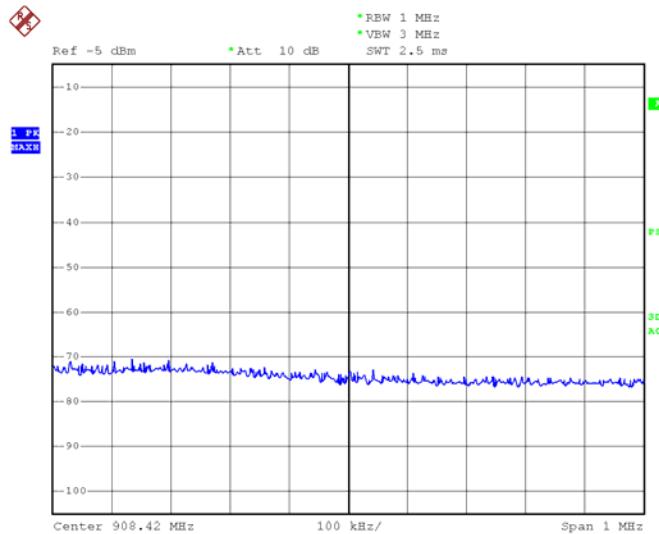
Follow is a modulated carrier being generated by the repeater from a Z-wave input signal that was feed to the RF input of the repeater.

When we open the Z-Wave signal from the Minimote.



P  
Date: 15.OCT.2012 11:59:14

When we close the Z-Wave signal from the Minimote.



2  
Date: 15.OCT.2012 12:37:41

### 3. Radiation Interference

#### 3.1. Requirements (15.249, 15.209):

FIELD STRENGTH of Fundamental: 902-928 MHZ 2.4-2.4835 GHz 94 dB $\mu$ V/m @3m	FIELD STRENGTH of Harmonics 54 dB $\mu$ V/m @3m	S15.209 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz ABOVE 960 MHz	40 dB $\mu$ V/m @3M 43.5 46 54dB $\mu$ V/m
---	---	--	---

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

#### 3.2 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 3.3.

#### Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2012	1 Year
2.	Preamplifier	Instruments corporation	EMC01183 0	980100	July 03, 2012	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 07, 2012	1 Year
4.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

#### 3.3 Test Results

PASS.

The test curves Please refer the following pages.

**Data: (Frequency=908.42MHz)**

Horizontal								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB $\mu$ V	Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Remark
89.10	0.62	8.43	38.79	59.20	30.06	40.00	-9.94	QP
175.00	0.72	10.31	39.40	59.50	30.13	43.50	-13.37	QP
908.42	1.51	29.00	38.52	98.21	91.20	94.0	-2.8	Peak
1,816.84	1.82	28.02	39.21	54.28	43.91	54.0	-10.09	Peak
2,725.26	2.28	33.16	35.16	41.48	40.76	54.0	-13.24	Peak
3,633.68	2.50	33.31	35.02	38.67	39.50	54.0	-14.50	Peak
4,542.10	2.65	34.40	34.77	33.80	36.00	54.0	-18.00	Peak
5,450.52	---	---	---	---	---	---	---	---
6,358.94	---	---	---	---	---	---	---	---
7,267.36	---	---	---	---	---	---	---	---
8,175.78	---	---	---	---	---	---	---	---
9,084.20	---	---	---	---	---	---	---	---

Vertical								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dB $\mu$ V	Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Over Limit dB	Remark
131.90	0.68	9.19	39.0	57.92	29.00	43.50	-14.50	QP
416.35	0.74	11.95	40.09	55.65	28.20	46.00	-17.80	QP
908.42	1.51	29.00	38.52	96.05	88.54	94.0	-5.46	Peak
1,816.84	1.82	28.02	39.21	55.18	45.81	54.0	-8.19	Peak
2,725.26	2.28	33.16	35.16	41.0	41.28	54.0	-12.72	Peak
3,633.68	2.50	33.31	35.02	38.38	39.37	54.0	-14.63	Peak
4,542.10	2.65	34.40	34.77	32.02	34.30	54.0	-19.70	Peak
5,450.52	---	---	---	---	---	---	---	---
6,358.94	---	---	---	---	---	---	---	---
7,267.36	---	---	---	---	---	---	---	---
8,175.78	---	---	---	---	---	---	---	---
9,084.20	---	---	---	---	---	---	---	---

**NOTE: “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.**

## 4. Occupied Bandwidth

### 4.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

#### Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analysis	Agilent	E4407B	US39390582	July 03, 2012	1 Year
2.	Preamplifier	Instruments corporation	EMC01183 0	980100	July 03, 2012	1 Year
3.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Apr. 07, 2012	1 Year
4.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A

Radiation Uncertainty : Ur = 4.3dB

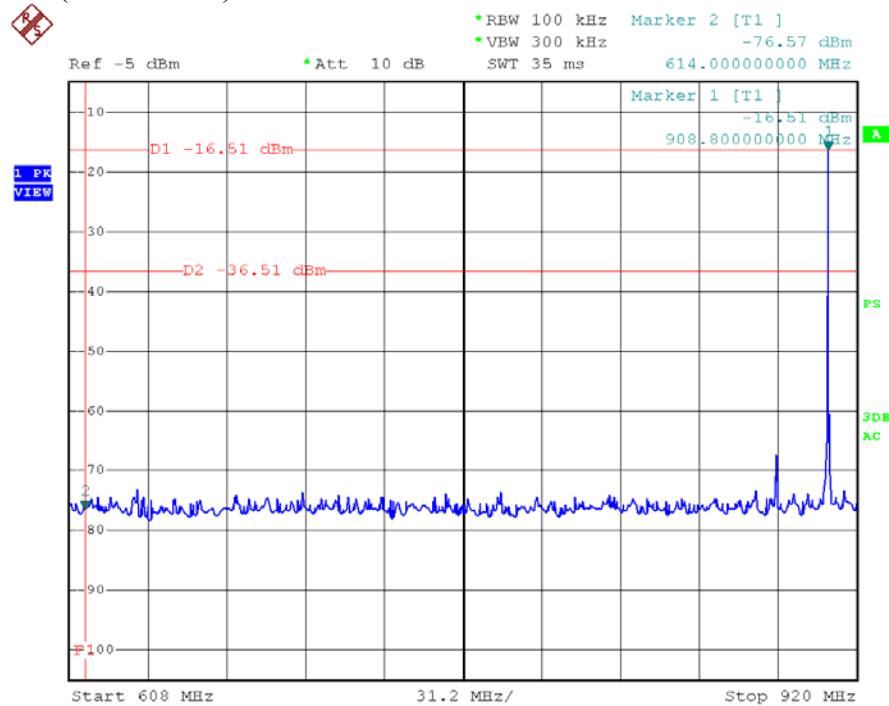
### 4.2 Test Results

Pass.

Please refer the following plot.

FCC ID: XBADSD37

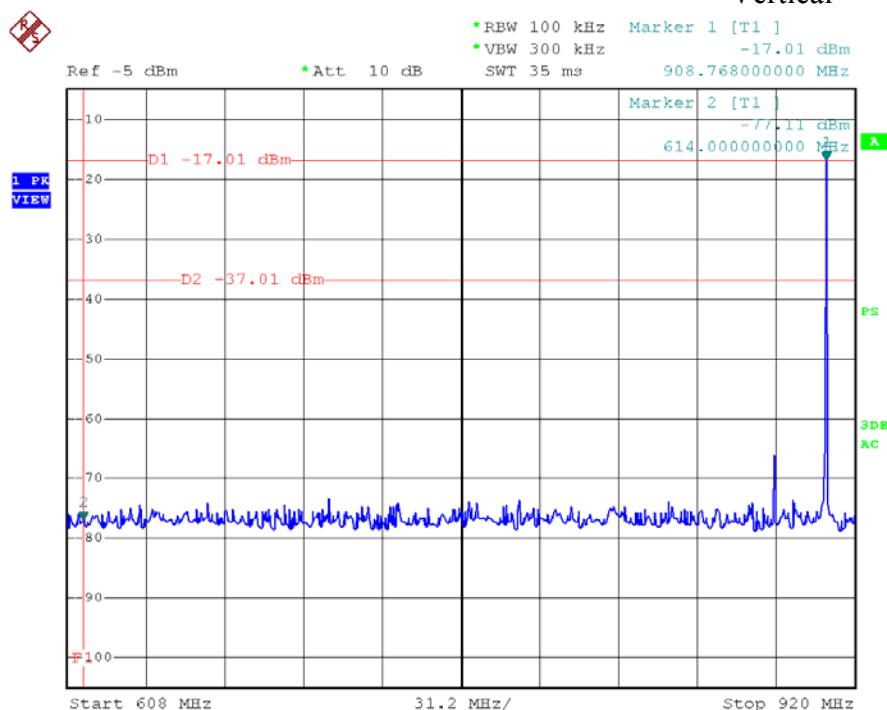
## Left Side (908.42MHz)



L

Date: 15.OCT.2012 12:13:57

## Vertical

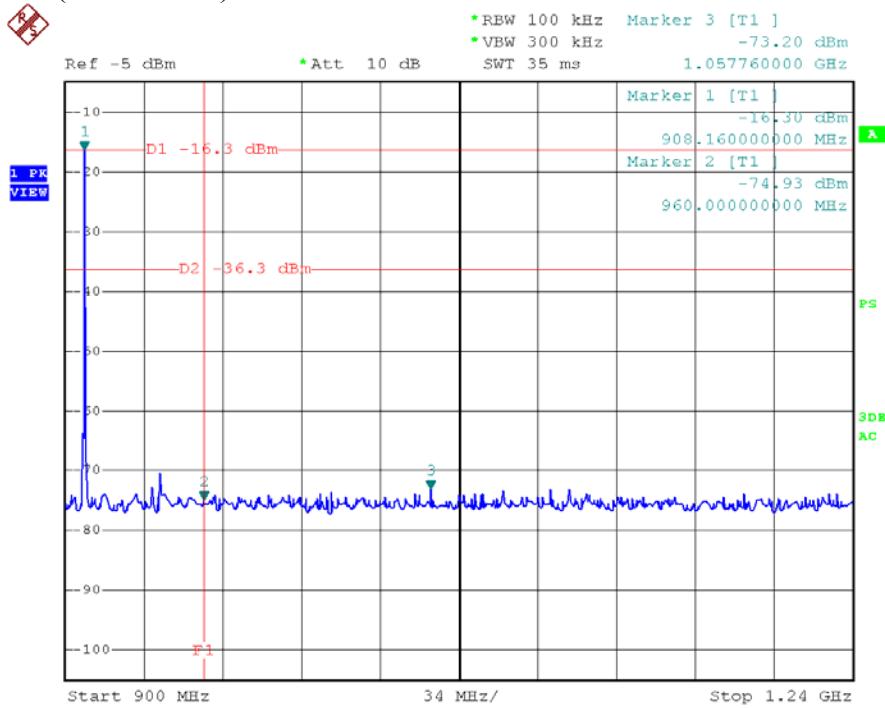


L

Date: 15.OCT.2012 12:15:06

FCC ID: XBADSD37

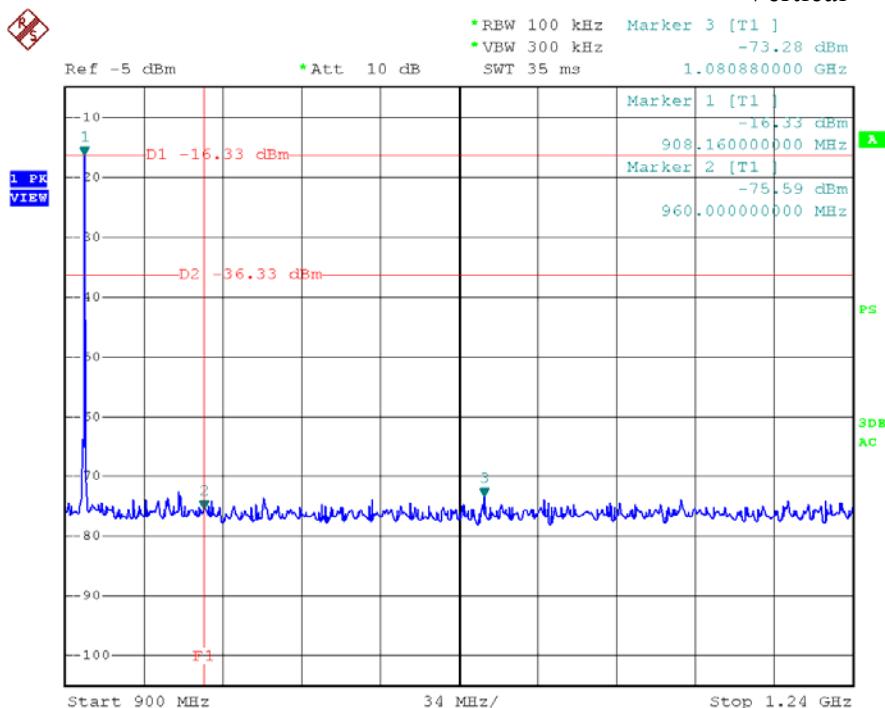
## Right Side (908.42MHz)



H

Date: 15.OCT.2012 12:16:40

## Vertical



H

Date: 15.OCT.2012 12:17:53