

FCC TEST REPORT
for
Aeon Labs LLC.

Home Energy Meter G2
Model No.: DSB28-ZWUS

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

Prepared By : Anbotek Compliance Laboratory Limited
Address : 1/F, 1 /Building, SEC Industrial Park, No. 4 Qianhai Road,
Nanshan District, Shenzhen, 518054, China
Tel: (86) 755-26066544
Fax: (86) 755-26014772

Report Number : 201205784F
Date of Test : May 15~Jun. 05, 2012
Date of Report : Jun. 06, 2012

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APPENDIX I (Photos of EUT) (5 Pages)

TEST REPORT

Applicant : Aeon Labs LLC.
Manufacturer : Aeon Labs LLC.
EUT : Home Energy Meter G2
Model No. : DSB28-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 :

May 15~Jun. 05, 2012

Andy chen

Prepared by :

(Engineer / Andy Chen)

Jerry Du

Reviewer :

(Project Manager / Jerry Du)

Tom. Chen

Approved & Authorized Signer :

(Manager /Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Home Energy Meter G2

Model Number : DSB28-ZWUS

Test Power Supply : AC 120V, 60Hz

Frequency : 908.42MHz / 908.40MHz

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 : May 15, 2012

Date of Test : May 15~Jun. 05, 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. MEASURING DEVICE AND TEST EQUIPMENT

The following test equipments were used during test:

Equipment	Manufacturer	Model #	Serial #	Data of Cal.	Due Data
EMI Test Receiver	Rohde & Schwarz	ESCI	100119	Apr. 12, 2012	Apr. 12, 2013
EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	Apr. 12, 2012	Apr. 12, 2013
EMI Test Software	SHURPLE	ESK1	N/A	N/A	N/A
Spectrum Analyzer	Agilent	E4407B	3649A03840	Apr. 12, 2012	Apr. 12, 2013
Signal Generator	Rohde & Schwarz	SMR27	100124	Apr. 12, 2012	Apr. 12, 2013
Signal Generator	Rohde & Schwarz	SML03	102319	Apr. 12, 2012	Apr. 12, 2013
AC Power Source	Sepcial power system	YF650	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS21	100218	Apr. 12, 2012	Apr. 12, 2013
Power Meter	Rohde & Schwarz	NRVD	101287	Apr. 12, 2012	Apr. 12, 2013
Coaxial Cable	N/A	N/A	N/A	Apr. 12, 2012	Apr. 12, 2013
Coaxial Cable	N/A	N/A	N/A	Apr. 12, 2012	Apr. 12, 2013
Coaxial Cable	N/A	N/A	N/A	Apr. 12, 2012	Apr. 12, 2013
Universal radio Communication tester	Rohde & Schwarz	CMU200	101724	Apr. 12, 2012	Apr. 12, 2013
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
BiConilog Antenna	ETS-LINDGREN	3142C	00042670	Apr. 12, 2012	Apr. 12, 2013
BiConilog Antenna	ETS-LINDGREN	3142C	00042673	Apr. 12, 2012	Apr. 12, 2013
Loop Antenna	ETS-LINGREN	6502	00071730	Apr. 12, 2012	Apr. 12, 2013
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00035926	Apr. 12, 2012	Apr. 12, 2013
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00041545	Apr. 12, 2012	Apr. 12, 2013
Pre-amplifier	Instruments Corporation	EMC011830	1415261	Apr. 12, 2012	Apr. 12, 2013
RF Switch	CD	RSU-M3	706543	Apr. 12, 2012	Apr. 12, 2013
Thermo-/Hygrometer	N/A	TH01	N/A	Apr. 12, 2012	Apr. 12, 2013
Shielding Room	Zhong Yu Electronic	N/A	N/A	N/A	N/A
3m Anechoic Chamber	Zhong Yu Electronic	N/A	N/A	Apr. 12, 2012	Apr. 12, 2013
RF Cable	NK NETWORKS	M17/74-RG213	CH-NR.32115 (EE170)	Apr. 12, 2012	Apr. 12, 2013
Horn Antenna	Instruments Corporation	GTH-0118	9120D-707	Apr. 12, 2012	Apr. 12, 2013

3. 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:

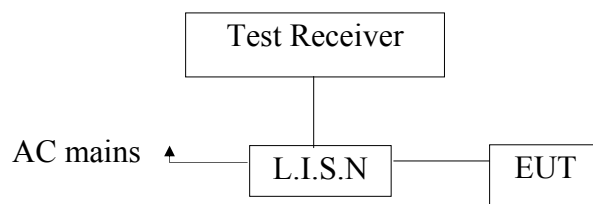
Freq (MHz) METER READING + ACF = FS
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

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.

4. Conducted Limits

4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Home Energy Meter G2)

4.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

EUT : Home Energy Meter G2
Model Number : DSB28-ZWUS
Applicant : Aeon Labs LLC.

4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work and measure it.

4.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 4.6.

4.6. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150KHz to 30 MHz is investigated.

Please refer the following pages.

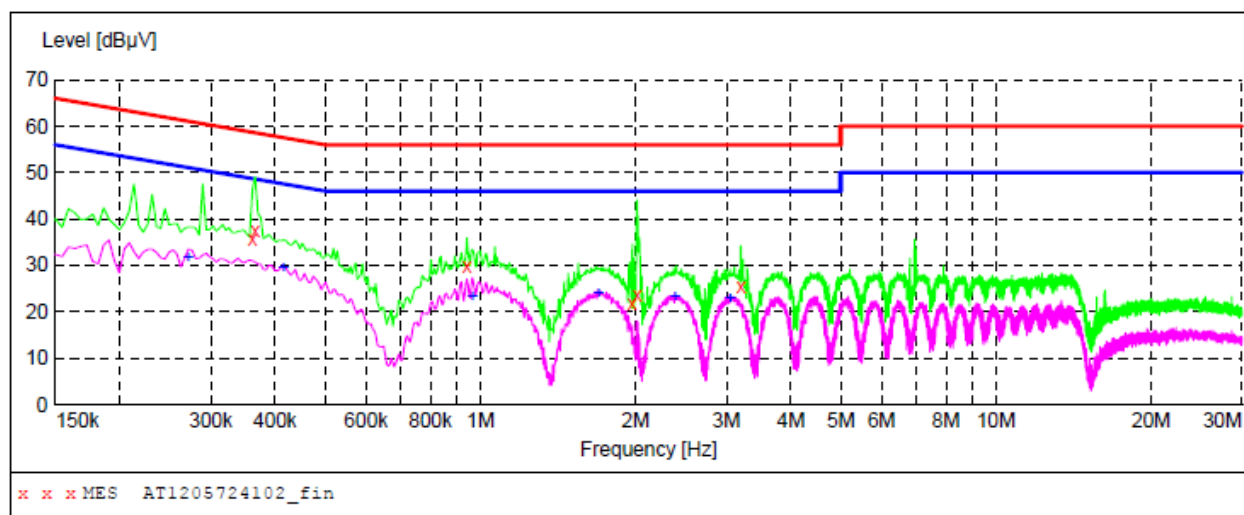
FCC ID: XBADSB28

CONDUCTED EMISSION TEST DATA

EUT: Home Energy Meter G2 M/N: DSB28-ZWUS
 Operating Condition: On
 Test Site: 1# Shielded Room
 Operator: Andy Chen
 Test Specification: AC 120V/60Hz
 Comment: Live Line
 Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K~30M Disturbance Voltages

**MEASUREMENT RESULT: "AT1205724102_fin"**

5/22/2012 7:24PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.361500	35.80	10.1	59	22.9	QP	L1	GND
0.366000	37.50	10.1	59	21.1	QP	L1	GND
0.942000	29.90	10.1	56	26.1	QP	L1	GND
1.972000	21.80	10.3	56	34.2	QP	L1	GND
2.012500	23.60	10.3	56	32.4	QP	L1	GND
3.200500	25.60	10.4	56	30.4	QP	L1	GND

MEASUREMENT RESULT: "AT1205724102_fin2"

5/22/2012 7:24PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.271500	31.80	10.1	51	19.3	AV	L1	GND
0.415500	29.30	10.1	48	18.2	AV	L1	GND
0.964500	23.40	10.2	46	22.6	AV	L1	GND
1.693000	24.10	10.3	46	21.9	AV	L1	GND
2.386000	23.20	10.3	46	22.8	AV	L1	GND
3.047500	22.90	10.4	46	23.1	AV	L1	GND

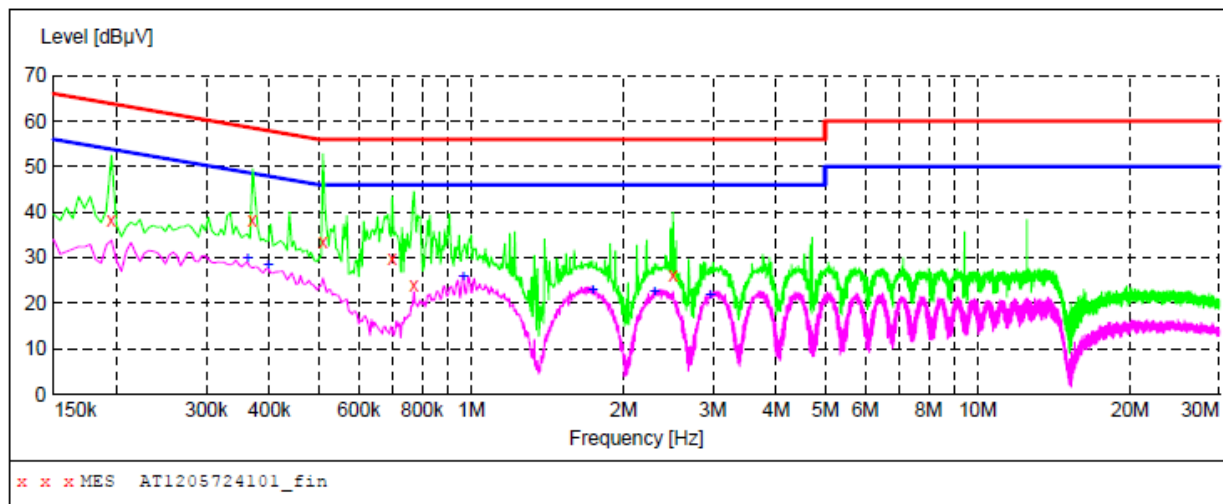
FCC ID: XBADSB28

CONDUCTED EMISSION TEST DATA

EUT: Home Energy Meter G2 M/N: DSB28-ZWUS
 Operating Condition: On
 Test Site: 1# Shielded Room
 Operator: Andy Chen
 Test Specification: AC 120V/60Hz
 Comment: Neutral Line
 Tem:25°C Hum:50%

SCAN TABLE: "Voltage (150K~30M) FIN"

Short Description: 150K-30M Disturbance Voltages

**MEASUREMENT RESULT: "AT1205724101_fin"**

5/22/2012 7:20PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.195000	38.30	10.1	64	25.5	QP	N	GND
0.370500	38.10	10.1	59	20.4	QP	N	GND
0.510000	33.40	10.1	56	22.6	QP	N	GND
0.699000	29.80	10.1	56	26.2	QP	N	GND
0.771000	24.00	10.1	56	32.0	QP	N	GND
2.503000	26.00	10.3	56	30.0	QP	N	GND

MEASUREMENT RESULT: "AT1205724101_fin2"

5/22/2012 7:20PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.361500	29.70	10.1	49	19.0	AV	N	GND
0.397500	28.30	10.1	48	19.6	AV	N	GND
0.964500	25.70	10.2	46	20.3	AV	N	GND
1.738000	22.80	10.3	46	23.2	AV	N	GND
2.300500	22.40	10.3	46	23.6	AV	N	GND
2.962000	21.90	10.4	46	24.1	AV	N	GND

5. Radiation Interference

5.1. Requirements (15.249, 15.209):

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

5.2 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 5.3.

5.3 Test Results

PASS.

The test curves Please refer the following pages.

FCC ID: XBADSB28

Data: (Frequency=908.40MHz)

Horizontal Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamplifier Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
85.87	0.63	8.43	38.79	59.26	29.53	40.00	-10.47	QP
171.97	0.72	10.31	39.40	59.41	31.04	43.50	-12.46	QP
908.40	1.51	29.00	38.52	98.05	90.04	94.0	-3.96	Peak
1,816.80	1.82	28.02	39.21	55.19	45.82	54.0	-8.18	Peak
2,725.20	2.28	33.16	35.16	43.51	43.79	54.0	-10.21	Peak
3,633.60	2.50	33.31	35.02	39.11	39.90	54.0	-14.10	Peak
4,542.00	2.65	34.40	34.77	33.72	36.0	54.0	-18.00	Peak
5,450.40	---	---	---	---	---	---	---	---
6,358.80	---	---	---	---	---	---	---	---
7,267.20	---	---	---	---	---	---	---	---
8,175.60	---	---	---	---	---	---	---	---
9,084.00	---	---	---	---	---	---	---	---

Vertical Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamplifier Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
135.96	0.68	9.19	39.0	57.90	28.77	43.50	-14.73	QP
416.16	0.74	11.95	40.09	54.50	27.10	46.00	-18.90	QP
908.40	1.51	29.00	38.52	97.04	89.03	94.0	-4.97	Peak
1,816.80	1.82	28.02	39.21	55.28	45.91	54.0	-8.09	Peak
2,725.20	2.28	33.16	35.16	42.58	42.86	54.0	-11.14	Peak
3,633.60	2.50	33.31	35.02	38.14	38.93	54.0	-15.07	Peak
4,542.00	2.65	34.40	34.77	32.52	34.80	54.0	-19.20	Peak
5,450.40	---	---	---	---	---	---	---	---
6,358.80	---	---	---	---	---	---	---	---
7,267.20	---	---	---	---	---	---	---	---
8,175.60	---	---	---	---	---	---	---	---
9,084.00	---	---	---	---	---	---	---	---

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.

FCC ID: XBADSB28

Data: (Frequency=908.42MHz)

Horizontal Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
89.10	0.62	8.43	38.79	59.00	29.26	40.00	-10.74	QP
175.00	0.72	10.31	39.40	59.52	31.15	43.50	-12.35	QP
908.42	1.51	29.00	38.52	98.21	90.20	94.0	-3.8	Peak
1,816.84	1.82	28.02	39.21	54.28	44.91	54.0	-9.09	Peak
2,725.26	2.28	33.16	35.16	41.48	41.76	54.0	-12.24	Peak
3,633.68	2.50	33.31	35.02	38.67	39.46	54.0	-14.54	Peak
4,542.10	2.65	34.40	34.77	34.00	36.28	54.0	-17.72	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 dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
131.90	0.68	9.19	39.0	57.80	28.67	43.50	-14.83	QP
416.35	0.74	11.95	40.09	55.65	28.25	46.00	-17.75	QP
908.42	1.51	29.00	38.52	96.05	88.04	94.0	-5.96	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	41.10	41.38	54.0	-12.62	Peak
3,633.68	2.50	33.31	35.02	38.37	39.16	54.0	-14.84	Peak
4,542.10	2.65	34.40	34.77	32.02	34.3	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.

6. Occupied Bandwidth

6.1. 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.

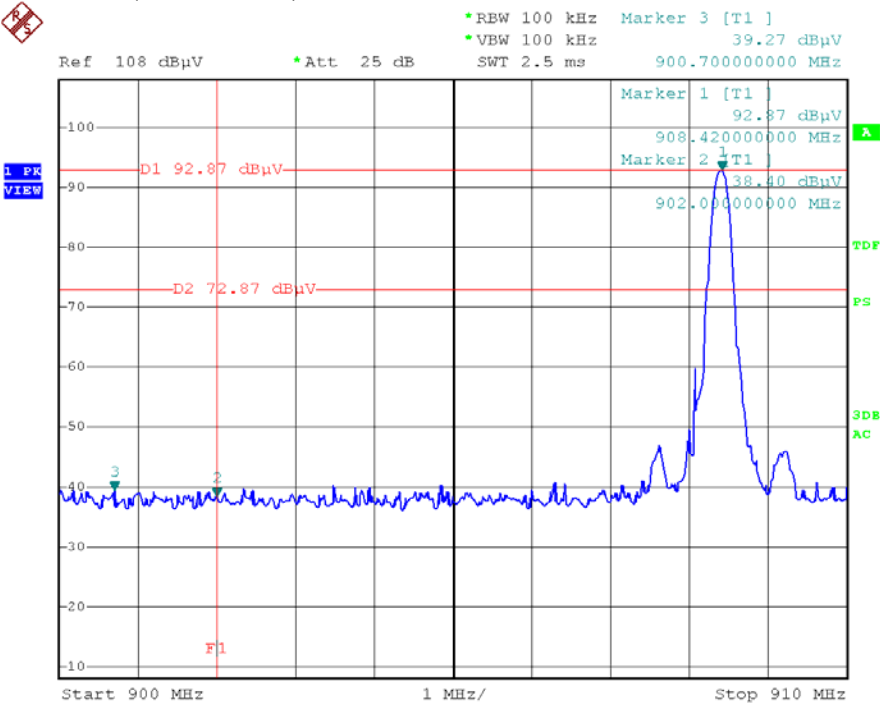
6.2 Test Results

Pass.

Please refer the following plot.

FCC ID: XBADSB28

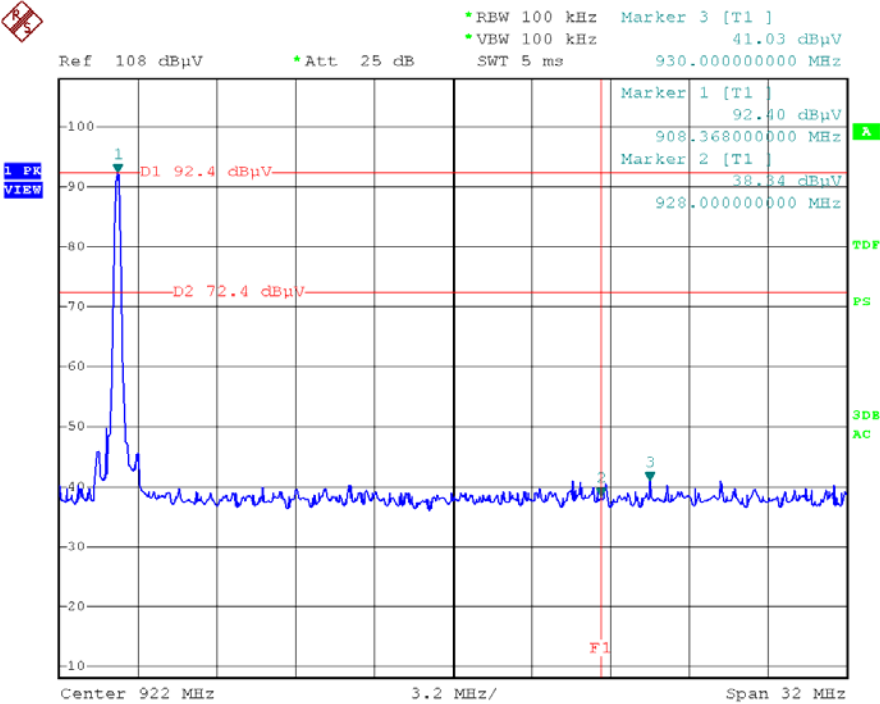
Left Side (908.40MHz)



908.40-Bandedges

Date: 4.JUN.2012 19:46:00

Right Side (908.40MHz)

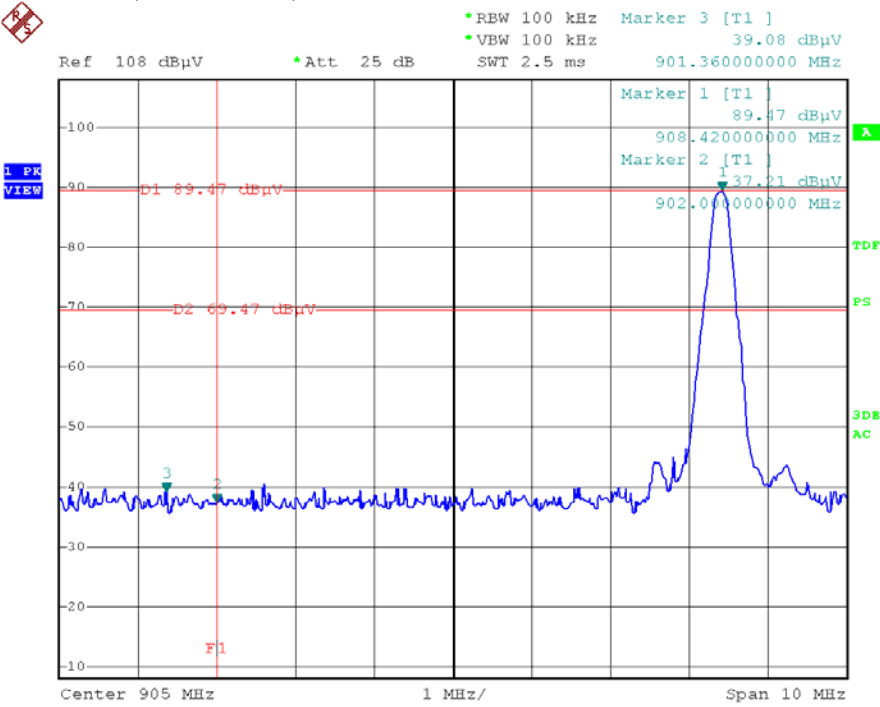


908.40-Bandedges

Date: 4.JUN.2012 19:41:34

FCC ID: XBADSB28

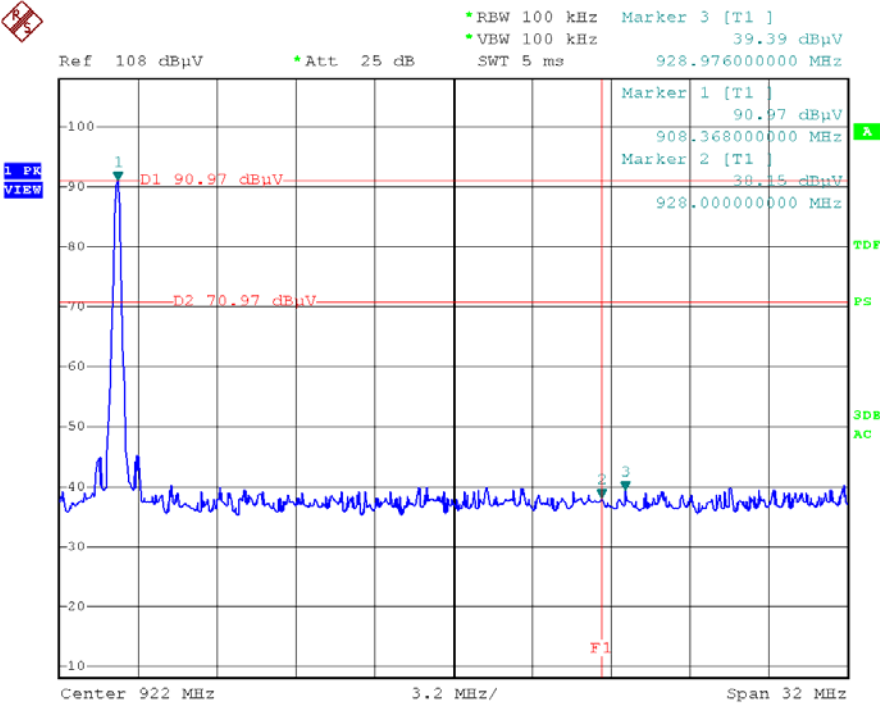
Left Side (908.42MHz)



908.42-Bandedges

Date: 4.JUN.2012 19:32:38

Right Side (908.42MHz)



908.42-Bandedges

Date: 4.JUN.2012 19:36:23