

FCC Part 15B

Measurement and Test Report

For

Nanjing IOT Sensor Technology Co., Ltd.

NO.12, Mozhou East Road, Nanjing, PRC.

FCC ID: 2ADLSWLGW-G11002

Test Rule(s): FCC Part 15 Subpart B

Product Description: Gateway

Tested Model: WL-ZGWMDPB-G110-02

Report No.: STR14118109I-3

Tested Date: 2014-11-11 to 2014-12-09

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Nanjing IOT Sensor Technology Co., Ltd.
Address of applicant: NO.12, Mozhou East Road, Nanjing, PRC.

Manufacturer: Nanjing IOT Sensor Technology Co., Ltd.
Address of manufacturer: NO.12, Mozhou East Road, Nanjing, PRC.

General Description of EUT	
Product Name:	Gateway
Trade Name:	Wulian
Model No.:	WL-ZGWMDPB-G110-02
Adding Model(s):	WL-ZGWMDPB-G110-xx ; WL-ZGWMDPW-G110-02 WL-ZGWMDPW-G110-xx (xx denotes 80~99)
<i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model WL-ZGWMDPB-G110-02, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	AC 100-240V Adapter:DC5V
Rated Current:	/
Rated Power:	/
Power Adapter Model:	WEF0500200A1BA
Lowest Internal Frequency:	32.768KHz
Highest Internal Frequency:	32MHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the Nanjing IOT Sensor Technology Co., Ltd in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. 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 and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Operation	/
TM2	/	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Router	BILLION	BiPAC 7300NX R3	/
Notebook	ASUS	X42J	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
RJ45	2.85	Unshielded	Without Ferrite

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

3. Conducted Emissions

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

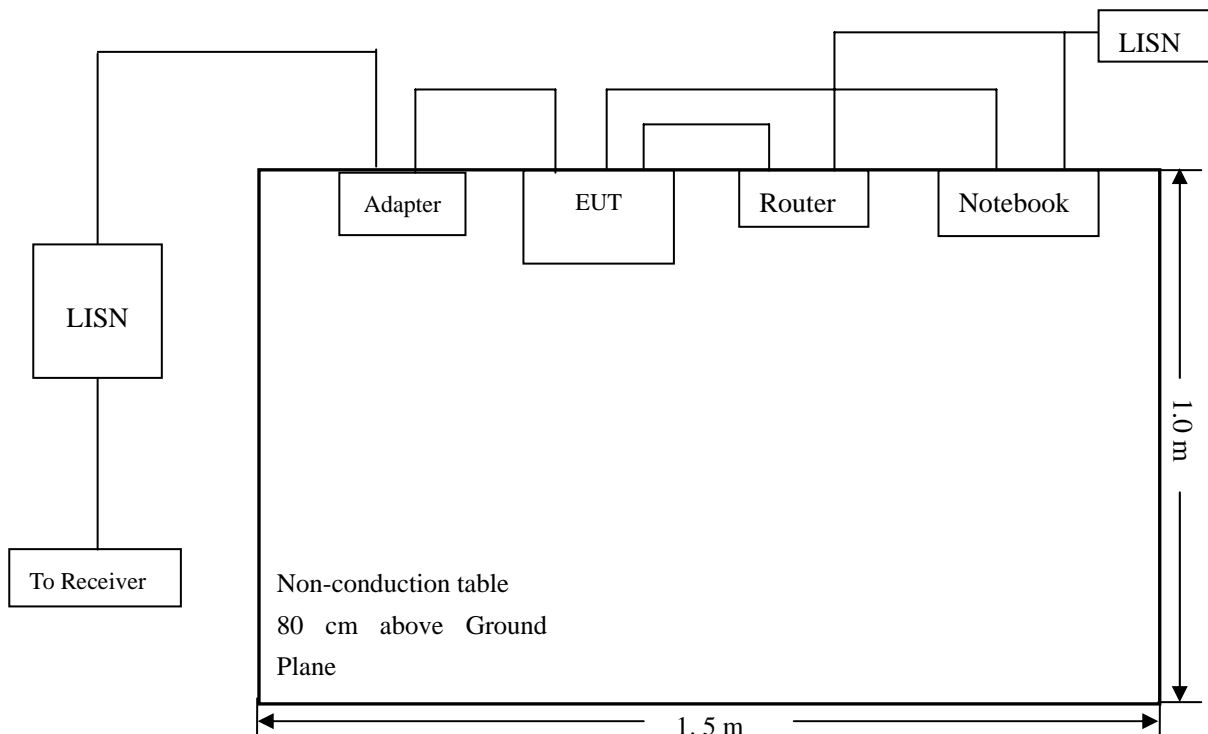
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

3.3 Test Procedure

Test is conducting under the description of ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

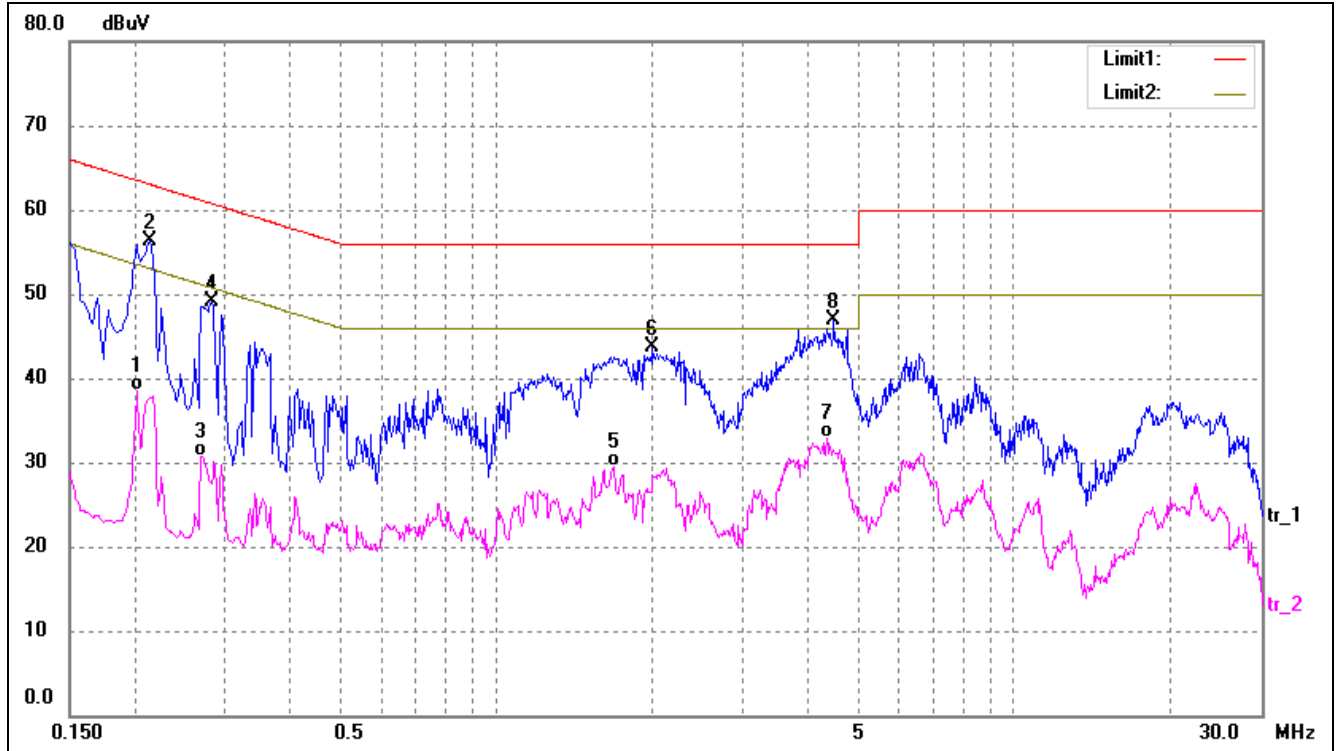
-6.82 dB at **0.2140MHz** in the *Neutral, Peak* detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

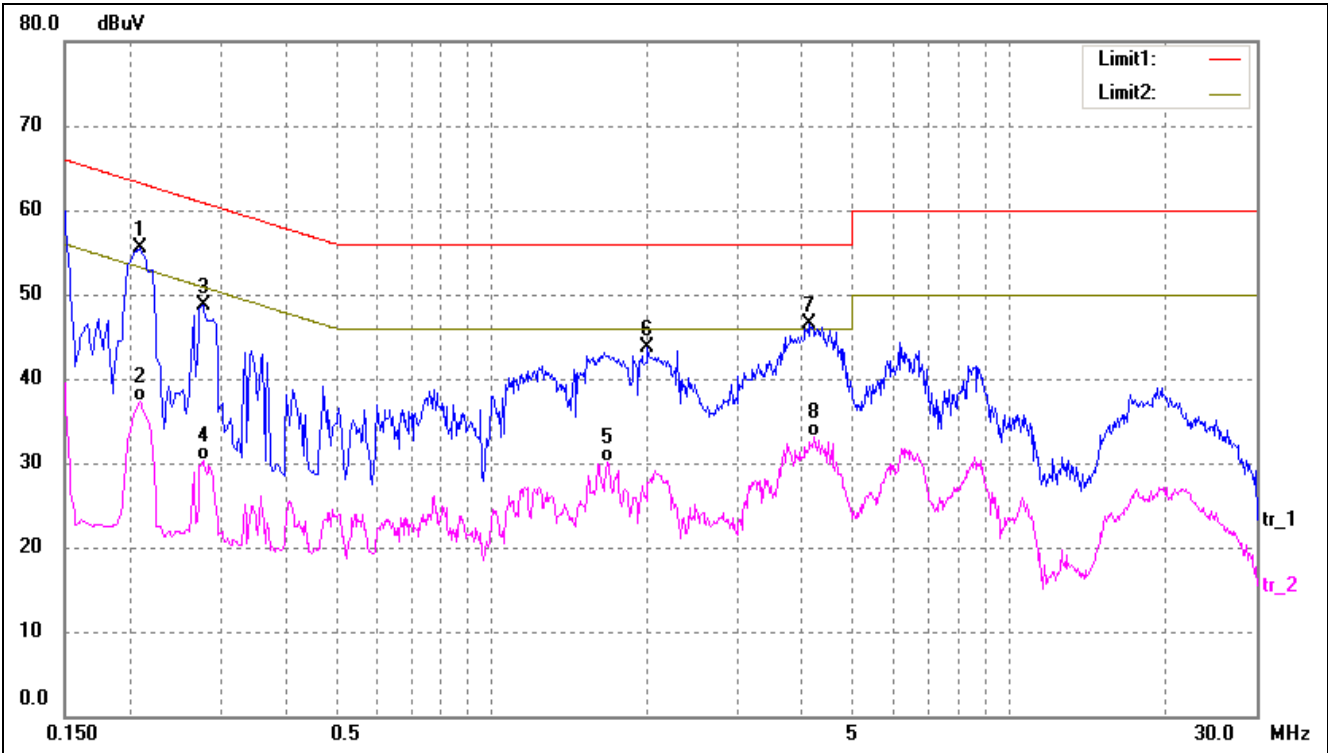
EUT: Gateway
 Tested Model: WL-ZGWMDPB-G110-02
 Operating Condition: TM1
 Comment: Adapter DC5V

Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.2020	28.97	9.50	38.47	53.53	-15.06	AVG
2	0.2140	46.73	9.50	56.23	63.05	-6.82	peak
3	0.2700	21.25	9.50	30.75	51.12	-20.37	AVG
4	0.2820	39.63	9.50	49.13	60.76	-11.63	peak
5	1.6940	19.56	10.00	29.56	46.00	-16.44	AVG
6	2.0060	33.63	10.00	43.63	56.00	-12.37	peak
7	4.3460	22.97	10.00	32.97	46.00	-13.03	AVG
8	4.4980	36.90	10.00	46.90	56.00	-9.10	peak

Test Specification: Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.2100	45.91	9.50	55.41	63.21	-7.80	peak
2	0.2100	27.90	9.50	37.40	53.21	-15.81	AVG
3	0.2780	39.28	9.50	48.78	60.88	-12.10	peak
4	0.2780	20.76	9.50	30.26	50.88	-20.62	AVG
5	1.6780	20.01	10.00	30.01	46.00	-15.99	AVG
6	2.0100	33.66	10.00	43.66	56.00	-12.34	peak
7	4.1300	36.53	10.00	46.53	56.00	-9.47	peak
8	4.2060	23.09	10.00	33.09	46.00	-12.91	AVG

4. Radiated Emissions

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

4.2 Test Equipment List and Details

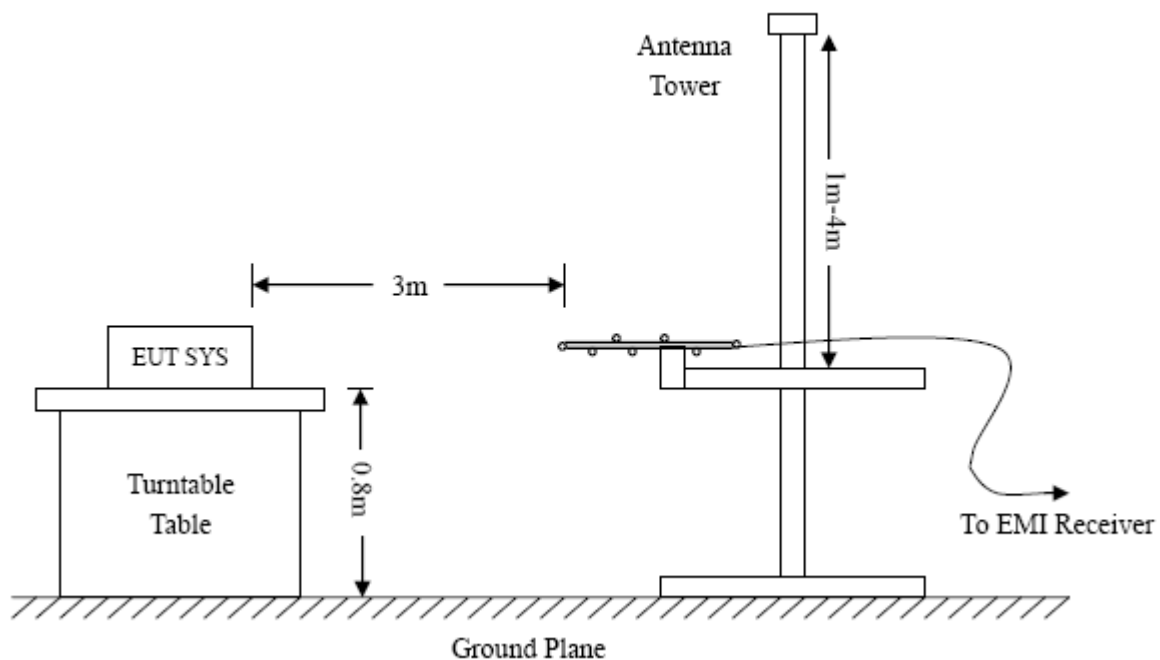
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.4 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

Frequency :Above 1GHz

RBW=1MHz,

VBW=3MHz(Peak), 10Hz(AV)

Sweep time= Auto

Trace = max hold

Detector function = peak, AV

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

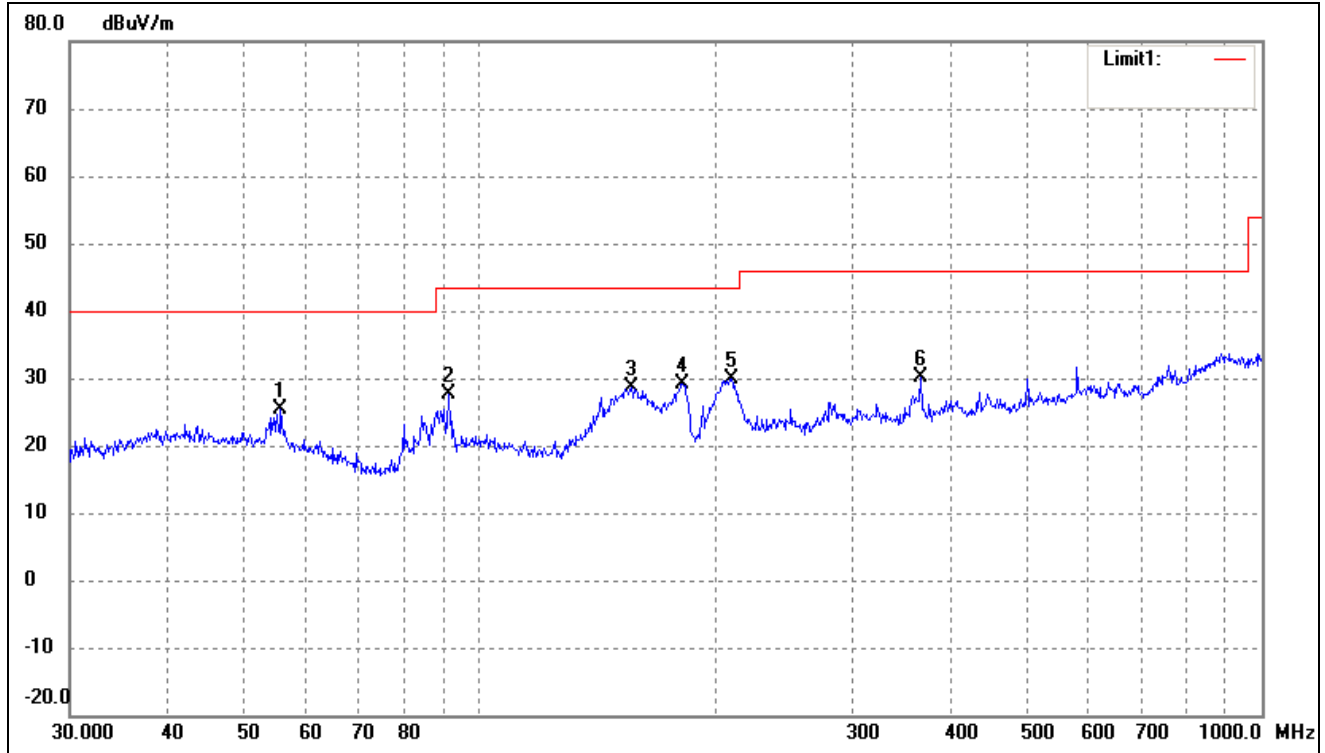
4.7 Summary of Test Results/Plots

According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.08 dB at 323.3204 MHz in the Horizontal polarization, 9 kHz to 1 GHz, 3Meters

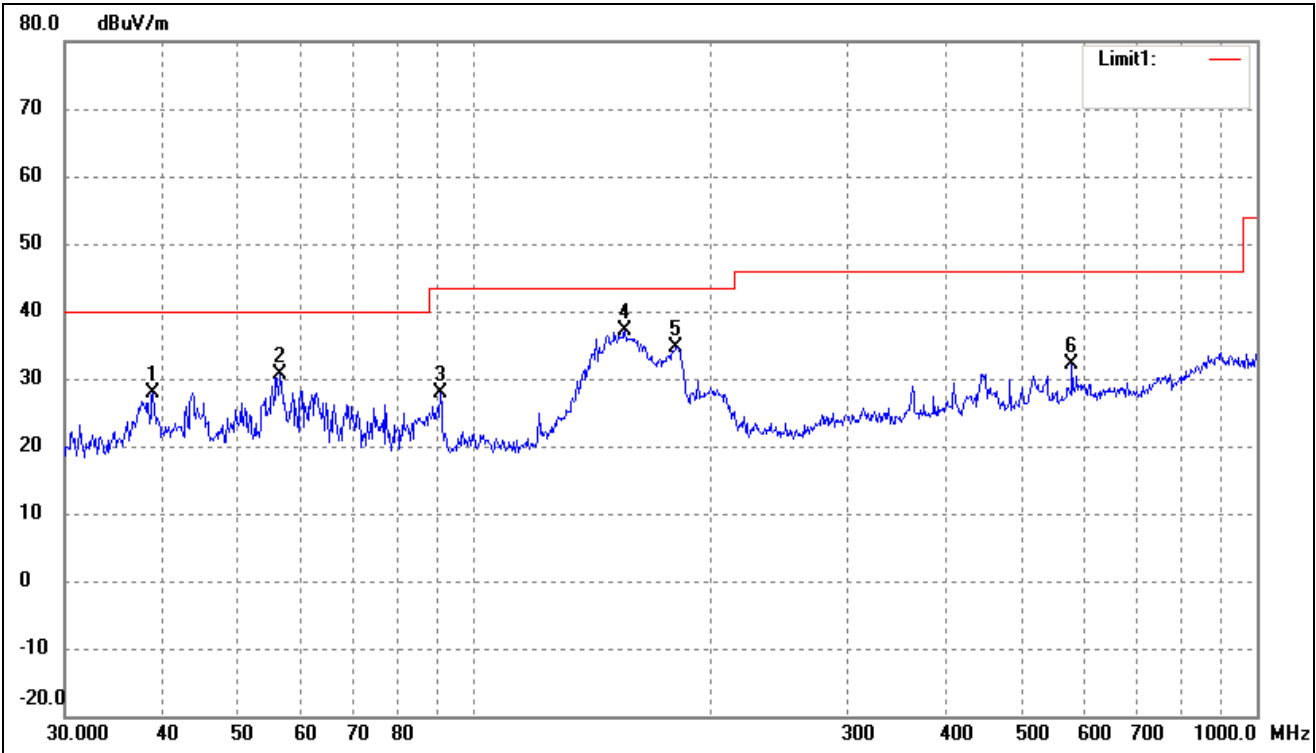
Plot of Radiated Emissions Test Data

EUT: Gateway
 Tested Model: WL-ZGWMDPB-G110-02
 Operating Condition: TM1
 Comment: Adapter DC5V
 Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	55.8047	19.59	5.75	25.34	40.00	-14.66	136	150	peak
2	91.4949	23.70	3.99	27.69	43.50	-15.81	21	100	peak
3	156.4578	25.99	2.58	28.57	43.50	-14.93	98	120	peak
4	181.9202	26.28	2.84	29.12	43.50	-14.38	229	100	peak
5	210.0482	25.56	4.39	29.95	43.50	-13.55	329	100	peak
6	366.8231	20.98	9.22	30.20	46.00	-15.80	301	100	peak

Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	38.8879	18.92	9.06	27.98	40.00	-12.02	135	100	peak
2	56.5929	24.86	5.68	30.54	40.00	-9.46	98	100	peak
3	90.5374	24.05	3.75	27.80	43.50	-15.70	231	100	peak
4	155.9101	34.46	2.57	37.03	43.50	-6.47	158	100	peak
5	181.2834	31.81	2.81	34.62	43.50	-8.88	325	100	peak
6	580.7026	19.50	12.59	32.09	46.00	-13.91	125	100	peak

Note: The measurements greater than 20dB below the limit from 9kHz to 30MHz and test data are not provided.

***** END OF REPORT *****