FCC REPORT

Applicant:	ilumi solutions inc.
Address of Applicant:	17330 Preston Road, Ste. 140A, Dallas, TX 75252, USA
Equipment Under Test (EUT)	
Product Name:	MeshTek Gateway
Model No.:	MTGW01W-X (X can be any letter representing color of the enclosure. MTGW01W is default model no. without -X; it indicates enclosure is of White color)
Trade mark:	MeshTek
FCC ID:	2AEHU-MTGW01W
Applicable standards:	FCC CFR Title 47 Part 15 Subpart B
Date of sample receipt:	09 Aug., 2019
Date of Test:	09 Aug., to 15 Aug., 2019
Date of report issued:	16 Aug., 2019
Test Result:	PASS *

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

Authorized Signature:

Bruce Zhang
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.

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2 Version

Version No.	Date	Description
00	*16 Aug., 2019*	*Original*

Tested by: YT Yang ***Date:*** *16 Aug., 2019*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *16 Aug., 2019*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part 15.107	Pass
Radiated Emission	Part 15.109	Pass

Remark:
Pass: The EUT complies with the essential requirements in the standard.
N/A: The EUT not applicable of the test item.

5 General Information

5.1 Client Information

Applicant:	ilumi solutions inc.
Address of Applicant:	17330 Preston Road, Ste. 140A, Dallas, TX 75252, USA
Manufacturer/Factory:	Ningbo Dongxing Electric Co., Ltd.
Address of Manufacturer/ Factory:	FENGLIN INDUSTRIAL DEVELOPMENT ZONE, QIAO TOU TOWN CIXI, NINGBO, P.R. CHINA 315317

5.2 General Description of E.U.T.

Product Name:	MeshTek Gateway
Model No.:	MTGW01W-X (X can be any letter representing color of the enclosure. MTGW01W is default model no. without -X; it indicates enclosure is of White color)
AC adapter :	Model: RWX-AA050120U Input: AC100-240V 50/60Hz 0.4A Output: DC 5.0V, 1200mA
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

5.3 Test Mode

Operating mode	Detail description
LAN mode	Keep the EUT in LAN mode
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

5.4 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.38 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.36 dB (k=2)

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	PC	OPTIPLEX745	N/A	DoC
DELL	MONITOR	E178FPC	N/A	DoC
DELL	KEYBOARD	SK-8115	N/A	DoC
DELL	MOUSE	MOC5UO	N/A	DoC
HP	Printer	CB495A	05257893	DoC
MERCURY	Wireless router	MW150R	12922104015	FCC ID
NAKAMICHI	Bluetooth earphone	T8	N/A	FCC ID

5.6 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

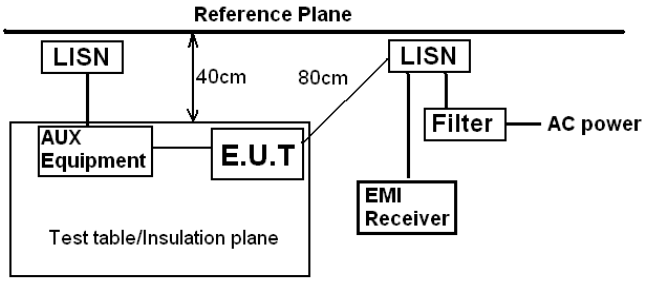
5.8 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-18-2019	03-17-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-21-2018	11-20-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020

Conducted Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-18-2019	03-17-2020
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2019	03-17-2020
LISN	CHASE	MN2050D	1447	03-18-2019	03-17-2020
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2019	07-20-2020
Cable	HP	10503A	N/A	03-18-2019	03-17-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		

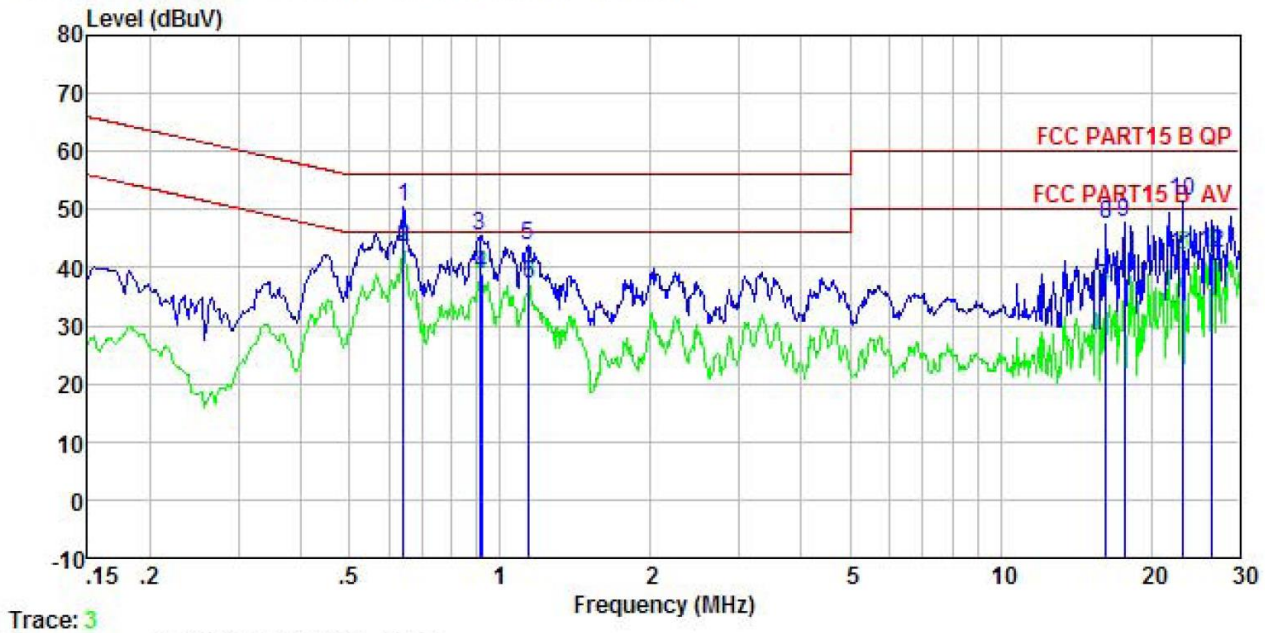
6 Test results and Measurement Data

6.1 Conducted Emission

Test Requirement:	FCC Part 15 B Section 15.107		
Test Method:	ANSI C63.4:2014		
Test Frequency Range:	150kHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9kHz, VBW=30kHz		
Limit:	Frequency range (MHz)	Limit (dBµV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	0.5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*		
Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. 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 refers to the block diagram of the test setup and photographs). 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: 2014 on conducted measurement.		
Test Instruments:	Refer to section 5.10 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

Measurement data:

Product name:	MeshTek Gateway	**Product model:**	MTGW01W
Test by:	YT	**Test mode:**	LAN mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Line
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%

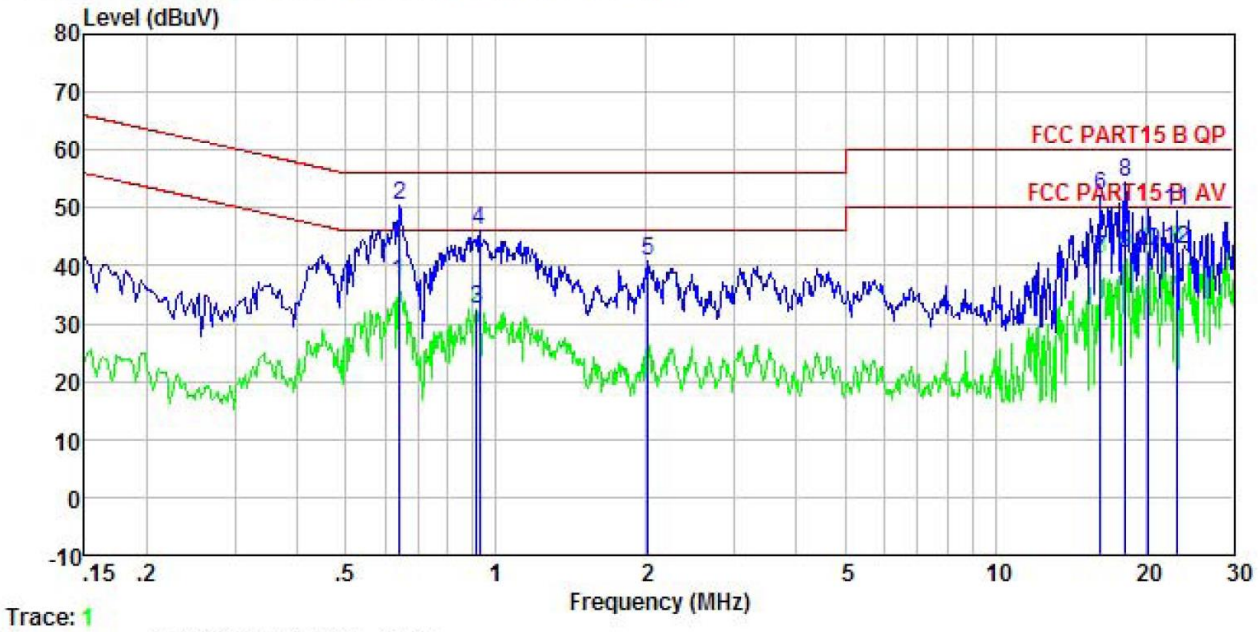


	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.641	40.13	-0.48	10.77	50.42	56.00	-5.58	QP
2	0.641	33.19	-0.48	10.77	43.48	46.00	-2.52	Average
3	0.909	35.18	-0.49	10.84	45.53	56.00	-10.47	QP
4	0.918	28.35	-0.49	10.84	38.70	46.00	-7.30	Average
5	1.135	33.28	-0.48	10.89	43.69	56.00	-12.31	QP
6	1.141	26.71	-0.48	10.89	37.12	46.00	-8.88	Average
7	16.140	26.28	-0.64	10.91	36.55	50.00	-13.45	Average
8	16.226	37.25	-0.64	10.91	47.52	60.00	-12.48	QP
9	17.661	37.30	-0.57	10.92	47.65	60.00	-12.35	QP
10	23.140	41.29	-0.61	10.89	51.57	60.00	-8.43	QP
11	23.140	31.88	-0.61	10.89	42.16	50.00	-7.84	Average
12	26.418	32.20	-0.74	10.87	42.33	50.00	-7.67	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

Product name:	MeshTek Gateway	**Product model:**	MTGW01W
Test by:	YT	**Test mode:**	LAN mode
Test frequency:	150 kHz ~ 30 MHz	**Phase:**	Neutral
Test voltage:	AC 120 V/60 Hz	**Environment:**	Temp: 22.5℃ Huni: 55%



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.637	26.81	-0.30	10.77	37.28	46.00	-8.72	Average
2	0.641	40.04	-0.30	10.77	50.51	56.00	-5.49	QP
3	0.914	22.01	-0.29	10.84	32.56	46.00	-13.44	Average
4	0.928	35.65	-0.29	10.85	46.21	56.00	-9.79	QP
5	2.012	30.23	-0.26	10.96	40.93	56.00	-15.07	QP
6	16.226	41.57	-0.36	10.91	52.12	60.00	-7.88	QP
7	16.226	30.71	-0.36	10.91	41.26	50.00	-8.74	Average
8	18.232	43.83	-0.43	10.92	54.32	60.00	-5.68	QP
9	18.232	31.60	-0.43	10.92	42.09	50.00	-7.91	Average
10	20.270	31.95	-0.51	10.93	42.37	50.00	-7.63	Average
11	23.140	39.31	-0.66	10.89	49.54	60.00	-10.46	QP
12	23.140	32.53	-0.66	10.89	42.76	50.00	-7.24	Average

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss.*

6.2 Radiated Emission

Test Requirement:	FCC Part 15 B Section 15.109
Test Method:	ANSI C63.4:2014
Test Frequency Range:	30MHz to 25000MHz
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver setup:

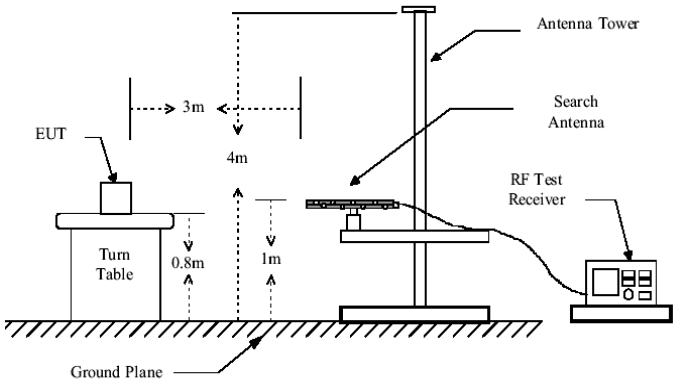
Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	RMS	1MHz	3MHz	Average Value

Limit:

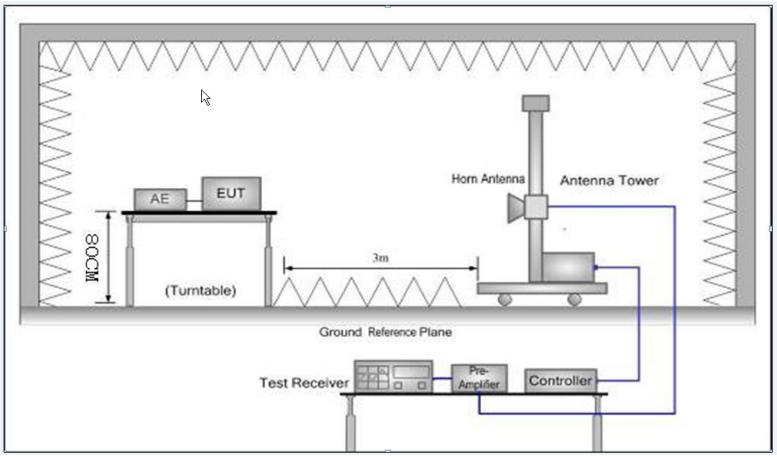
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test setup:

Below 1GHz



Above 1GHz



Test Procedure:

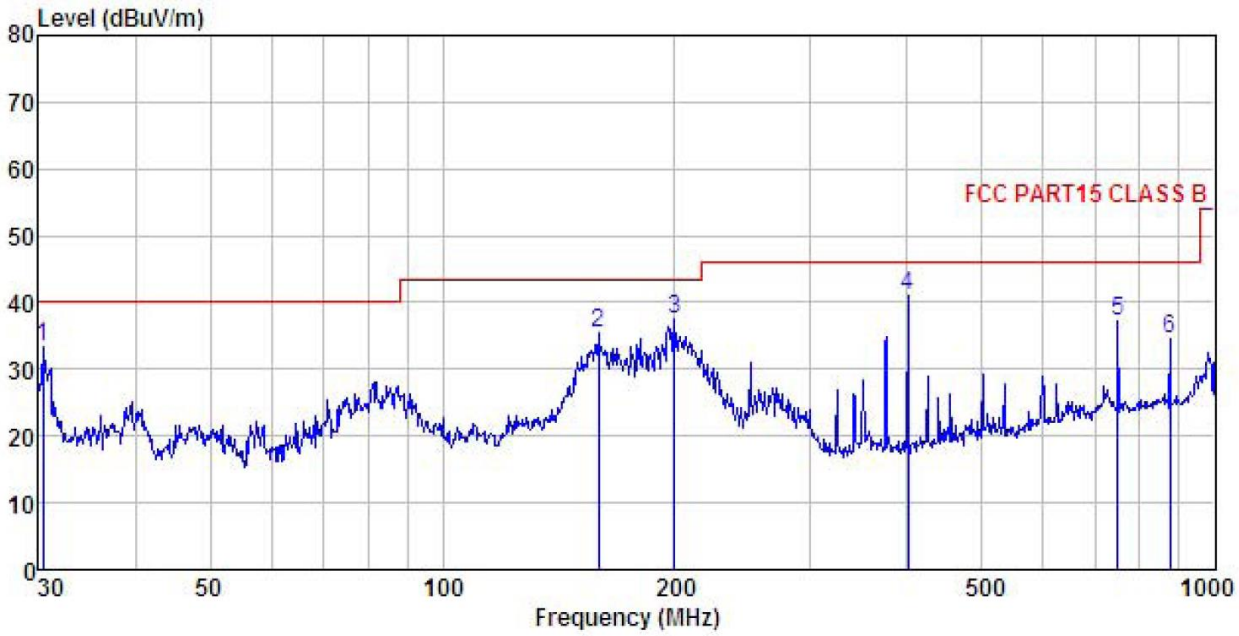
1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. 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. 4. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. 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.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	All of the observed value above 6GHz are the niose floor , which were no recorded

Measurement Data:

Below 1GHz:

Product Name:	MeshTek Gateway	**Product Model:**	MTGW01W
Test By:	YT	**Test mode:**	LAN mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120V/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

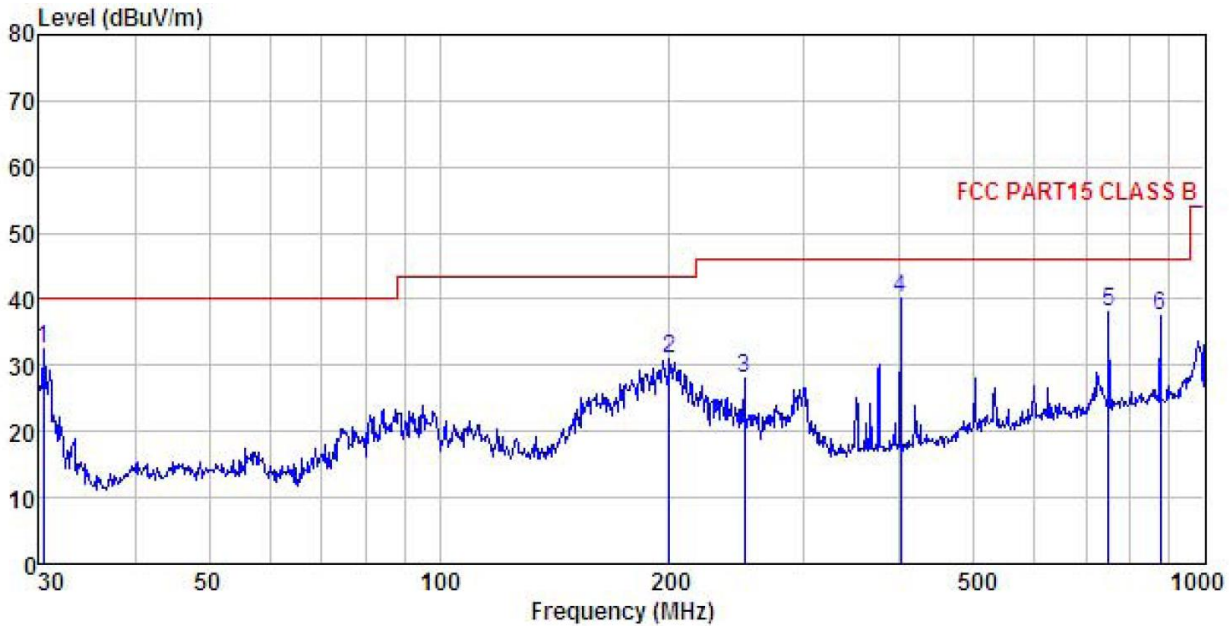


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.424	51.31	11.20	0.78	29.98	33.31	40.00	-6.69	QP
2	159.225	53.28	8.60	2.58	29.14	35.32	43.50	-8.18	QP
3	199.986	52.30	11.30	2.87	28.83	37.64	43.50	-5.86	QP
4	400.432	51.80	14.80	3.08	28.78	40.90	46.00	-5.10	QP
5	750.108	41.68	19.51	4.36	28.48	37.07	46.00	-8.93	QP
6	875.247	37.84	20.60	3.95	27.94	34.45	46.00	-11.55	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	MeshTek Gateway	**Product Model:**	MTGW01W
Test By:	YT	**Test mode:**	LAN mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Horizontal
Test Voltage:	AC 120V/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



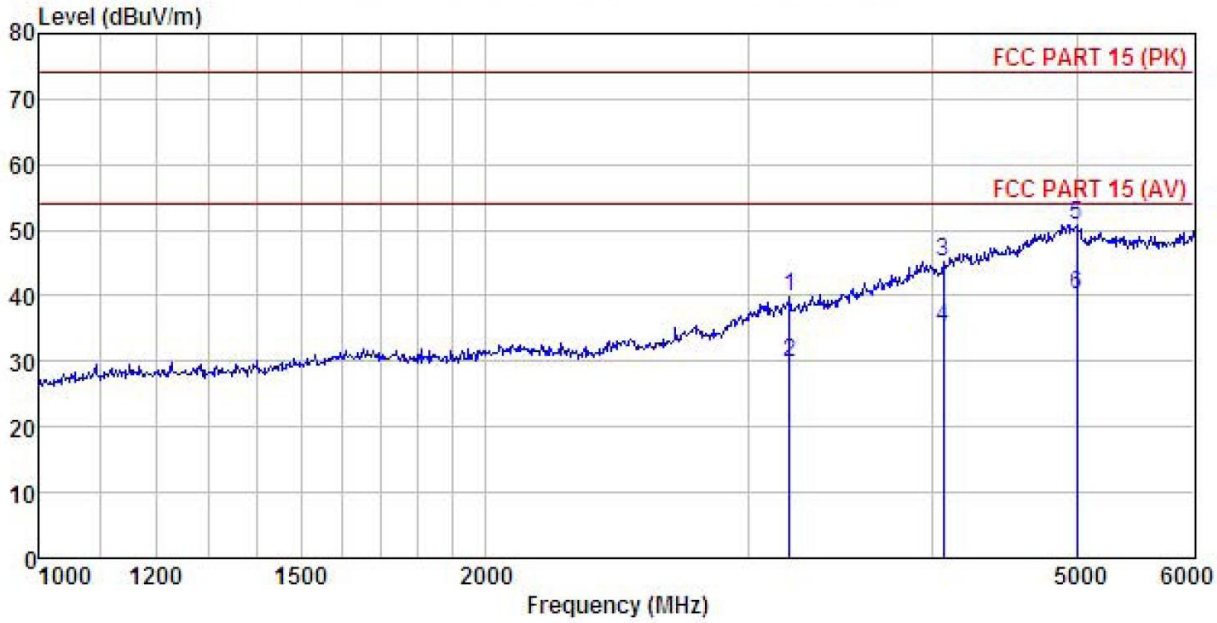
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	30.424	50.46	11.20	0.78	29.98	32.46	40.00	-7.54	QP
2	199.986	45.71	11.30	2.87	28.83	31.05	43.50	-12.45	QP
3	250.301	41.63	12.20	2.81	28.54	28.10	46.00	-17.90	QP
4	400.432	51.17	14.80	3.08	28.78	40.27	46.00	-5.73	QP
5	750.108	42.77	19.51	4.36	28.48	38.16	46.00	-7.84	QP
6	875.247	40.94	20.60	3.95	27.94	37.55	46.00	-8.45	QP

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Above 1GHz:

Product Name:	MeshTek Gateway	**Product Model:**	MTGW01W
Test By:	YT	**Test mode:**	LAN mode
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120V/60Hz	**Environment:**	Temp: 24℃ Huni: 57%

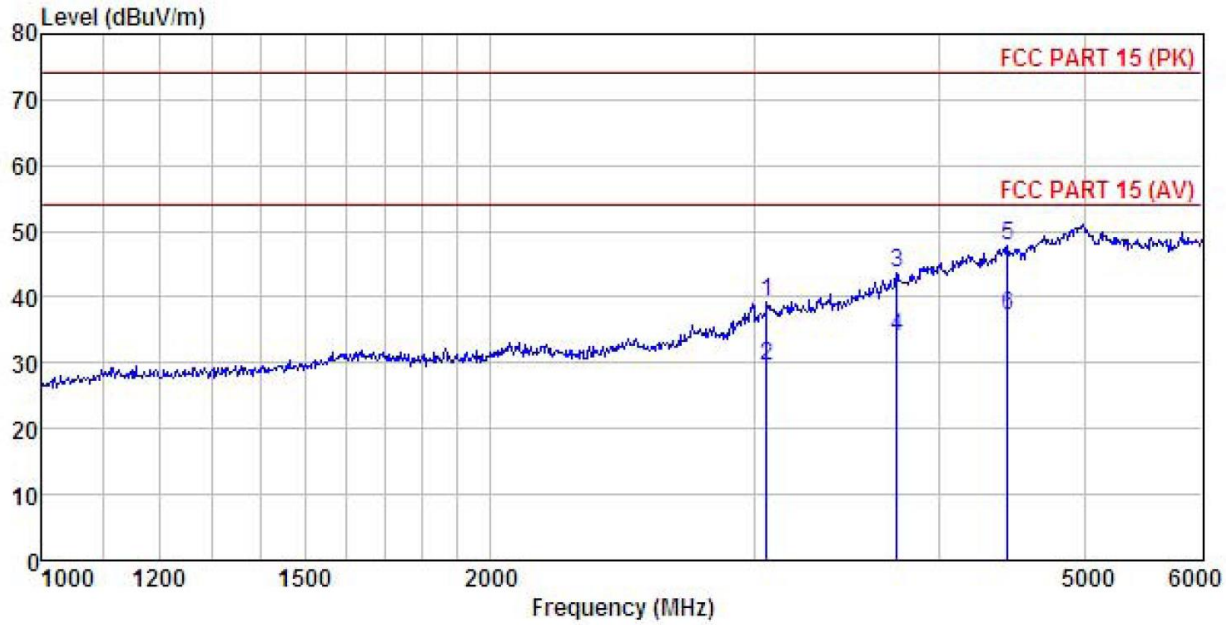


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3201.612	48.60	27.32	5.43	41.41	39.94	74.00	-34.06	Peak
2	3201.612	38.36	27.32	5.43	41.41	29.70	54.00	-24.30	Average
3	4067.389	52.36	28.52	6.20	41.81	45.27	74.00	-28.73	Peak
4	4067.389	42.27	28.52	6.20	41.81	35.18	54.00	-18.82	Average
5	4999.149	53.94	31.80	6.94	41.88	50.80	74.00	-23.20	Peak
6	4999.149	43.25	31.80	6.94	41.88	40.11	54.00	-13.89	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	MeshTek Gateway	**Product Model:**	MTGW01W
Test By:	YT	**Test mode:**	LAN mode
Test Frequency:	1 GHz ~ 6 GHz	**Polarization:**	Horizontal
Test Voltage:	AC 120V/60Hz	**Environment:**	Temp: 24℃ Huni: 57%



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	3061.480	48.13	27.23	5.37	41.48	39.25	74.00	-34.75	Peak
2	3061.480	38.38	27.23	5.37	41.48	29.50	54.00	-24.50	Average
3	3740.903	51.46	27.93	6.02	41.71	43.70	74.00	-30.30	Peak
4	3740.903	41.78	27.93	6.02	41.71	34.02	54.00	-19.98	Average
5	4439.613	53.82	29.18	6.75	42.00	47.75	74.00	-26.25	Peak
6	4439.613	43.26	29.18	6.75	42.00	37.19	54.00	-16.81	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*