FCC EMC Test Report

Applicant:	SWAGTEK
Address of Applicant:	10205 NW 19th Street, STE 101, Miami, FL33172, USA
Equipment Under Test (EUT)	
Product Name:	4G MiFi
Model No.:	ML10V, KEY, M1000
Trade Mark:	LOGIC, iSWAG, UNONU
FCC ID:	O550002123
Applicable Standards:	FCC CFR Title 47 Part 15B
Date of Sample Receipt:	15 Jun., 2023
Date of Test:	16 Jun., to 04 Jul., 2023
Date of report Issued:	05 Jul., 2023
Test Result:	PASS

Tested by:	June Li ***Test Engineer***	***Date:***	*05 Jul., 2023*
Reviewed by:	Jane Wang ***Project Engineer***	***Date:***	*05 Jul., 2023*
Approved by:	Eric Zhang ***Manager***	***Date:***	*05 Jul., 2023*

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in above the application standard version. Test results reported herein relate only to the item(s) tested.

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1 Version

Version No.	Date	Description
00	*05 Jul., 2023*	*Original*

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3 General Information

3.1 Client Information

Applicant:	SWAGTEK
Address:	10205 NW 19th Street, STE 101, Miami, FL33172, USA
Manufacturer/Factory:	SWAGTEK
Address:	10205 NW 19th Street, STE 101, Miami, FL33172, USA

3.2 General Description of E.U.T.

Product Name:	4G MiFi
Model No.:	ML10V, KEY, M1000
Power Supply:	Rechargeable Li-ion Battery DC4.2V, 3000mAh
Test Sample Condition:	The test samples were provided in good working order with no visible defects.
Remark:	ML10V, KEY, M1000 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being different name and trademark.

3.3 Test Mode

Operating Mode	Detail Description
Working mode	Keep the EUT in Working mode(Worst case)
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.	

3.4 Description of Test Auxiliary Equipment

Manufacturer	Description	Model	S/N	FCC ID/DoC
N/A	N/A	N/A	N/A	N/A

3.5 Description of Cable Used

Cable Type	Description	Length	From	To
N/A	N/A	N/A	N/A	N/A

3.6 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Radiated Emission (30MHz ~ 1GHz) (3m SAC)	3.8 dB
Radiated Emission (1GHz ~ 18GHz) (3m SAC)	3.6 dB
Radiated Emission (30MHz ~ 1GHz) (10m SAC)	3.7 dB

Note: *All the measurement uncertainty value were shown with a coverage k=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.*

3.7 Additions to, Deviations, or Exclusions from the Method

No

3.8 Laboratory Facility

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

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

JianYan Testing Group Shenzhen 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 and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen 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 L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

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

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 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

3.9 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

3.10 Test Instruments List

Radiated Emission(3m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
3m SAC	ETS	9m*6m*6m	WXJ001-1	04-14-2021	04-13-2024
BiConiLog Antenna	Schwarzbeck	VULB9163	WXJ002	02-09-2023	02-08-2024
Horn Antenna	Schwarzbeck	BBHA9120D	WXJ002-2	02-09-2023	02-08-2024
Pre-amplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9743B	WXJ001-2	01-10-2023	01-09-2024
Pre-amplifier (1GHz ~ 18GHz)	SKET	LNPA_0118G-50	WXJ001-3	01-10-2023	01-09-2024
EMI Test Receiver	Rohde & Schwarz	ESRP7	WXJ003-1	01-11-2023	01-10-2024
Spectrum Analyzer	Rohde & Schwarz	FSP 30	WXJ004	01-10-2023	01-09-2024
Coaxial Cable (30MHz ~ 1GHz)	JYTSZ	JYT3M-1G-NN-8M	WXG001-4	01-18-2023	01-17-2024
Coaxial Cable (1GHz ~ 18GHz)	JYTSZ	JYT3M-18G-NN-8M	WXG001-5	01-18-2023	01-17-2024
Band Reject Filter Group	Tonscend	JS0806-F	WXJ089	N/A	
Test Software	Tonscend	TS+	Version: 3.0.0.1		

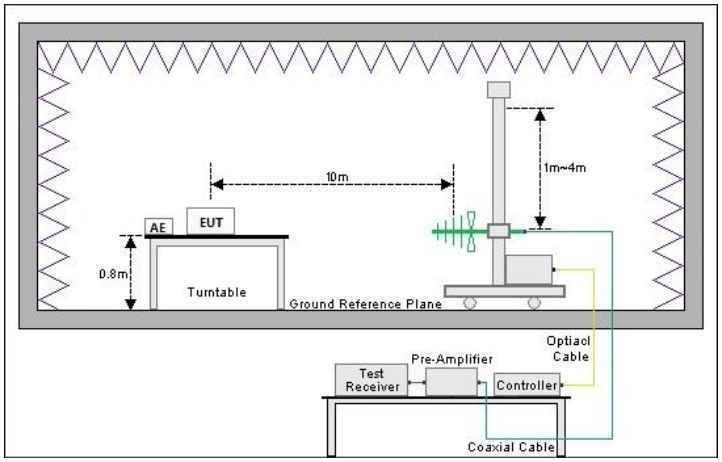
Radiated Emission(10m SAC):					
Test Equipment	**Manufacturer**	**Model No.**	**Manage No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
10m SAC	ETS	RFSD-100-F/A	WXJ090	04-28-2021	04-27-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-1	01-17-2023	01-16-2024
BiConiLog Antenna	SCHWARZBECK	VULB 9168	WXJ090-2	01-10-2023	01-09-2024
EMI Test Receiver	R&S	ESR 3	WXJ090-3	01-10-2023	01-09-2024
EMI Test Receiver	R&S	ESR 3	WXJ090-4	01-11-2023	01-09-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-6	01-10-2023	01-09-2024
Low Pre-amplifier	Bost	LNA 0920N	WXJ090-7	01-10-2023	01-09-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-7	01-18-2023	01-17-2024
Cable	Bost	JYT10M-1G-NN-10M	WXG002-8	01-18-2023	01-17-2024
Test Software	R&S	EMC32	Version: 10.50.40		

4 Measurement Setup and Procedure

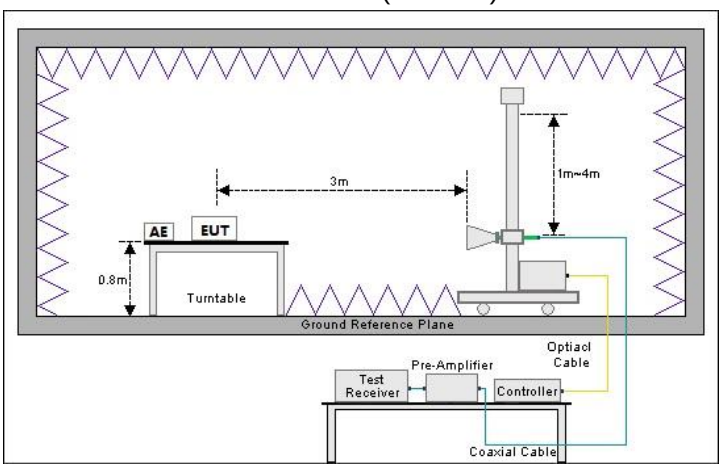
4.1 Test Setup

1) Radiated emission measurement:

Below 1GHz (10m SAC)



Above 1GHz (3m SAC)



4.2 Test Procedure

Test method	Test step
Radiated emission	**For below 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 10 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 10 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. **For above 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working, respectively on 3 axis (X, Y & Z) and considered typical configuration to obtain worst position. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.

5 Test Results

5.1 Summary

5.1.1 Clause and data summary

Test items	Standard clause	Test data	Result
Conducted Emission	Part 15.107	N/A	N/A
Radiated Emission	Part 15.109	See Section 5.2	Pass

Remark:

1. *The EUT is a **Class B** digital device.*
2. *Pass: The EUT complies with the essential requirements in the standard.*
3. *N/A: Not Applicable.*

Test Method:	*ANSI C63.4:2014*

5.1.2 Test Limit

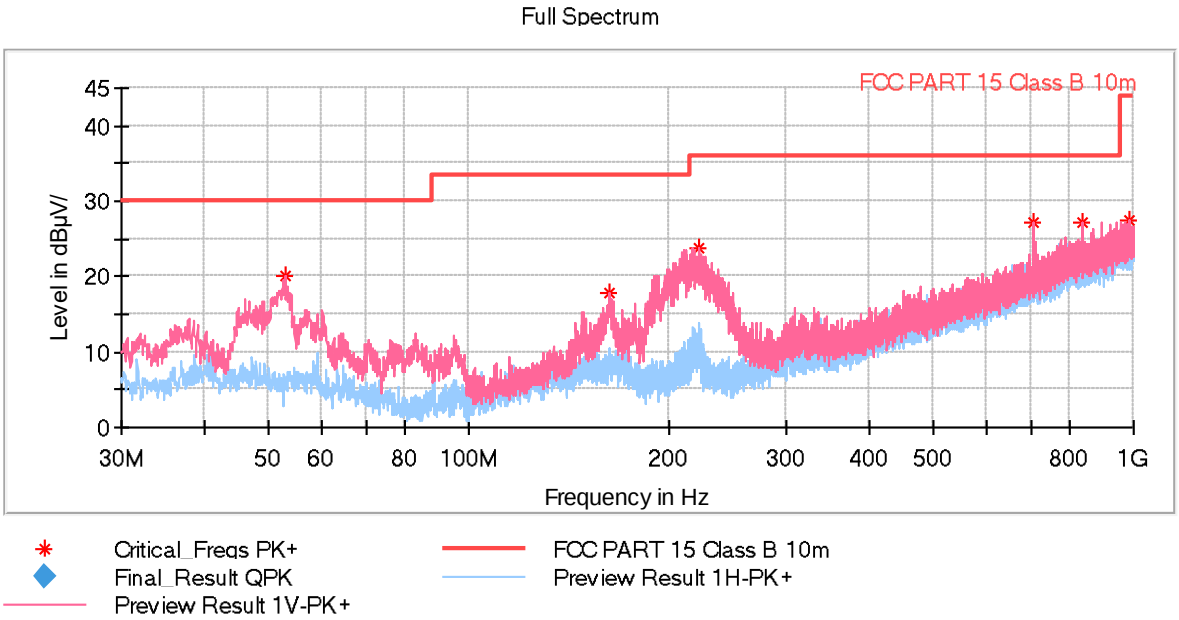
Test items	Limit
Radiated Emission	

Frequency (MHz)	Class A Limit (dBμV/m)		Class B Limit (dBμV/m)	
	Quasi-Peak @ 3m	Quasi-Peak @ 10m	Quasi-Peak @ 3m	Quasi-Peak @ 10m
30 – 88	49.0	39.0	40.0	30.0
88 – 216	53.5	43.5	43.5	33.5
216 – 960	56.0	46.0	46.0	36.0
960 – 1000	60.0	50.0	54.0	44.0
Note: The more stringent limit applies at transition frequencies.				
Frequency	**Class A Limit (dBμV/m) @ 3m**		**Class B Limit (dBμV/m) @ 3m**	
	Average	**Peake**	**Average**	**Peake**
Above 1 GHz	60.0	80.0	54.0	74.0
Note: The measurement bandwidth shall be 1 MHz or greater.				

5.2 Radiated Emission

Below 1GHz:

Product Name:	4G MiFi	**Product Model:**	ML10V
Test By:	June	**Test mode:**	Working mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical & Horizontal
Test Voltage:	DC 4.2V		



Critical_Freqs

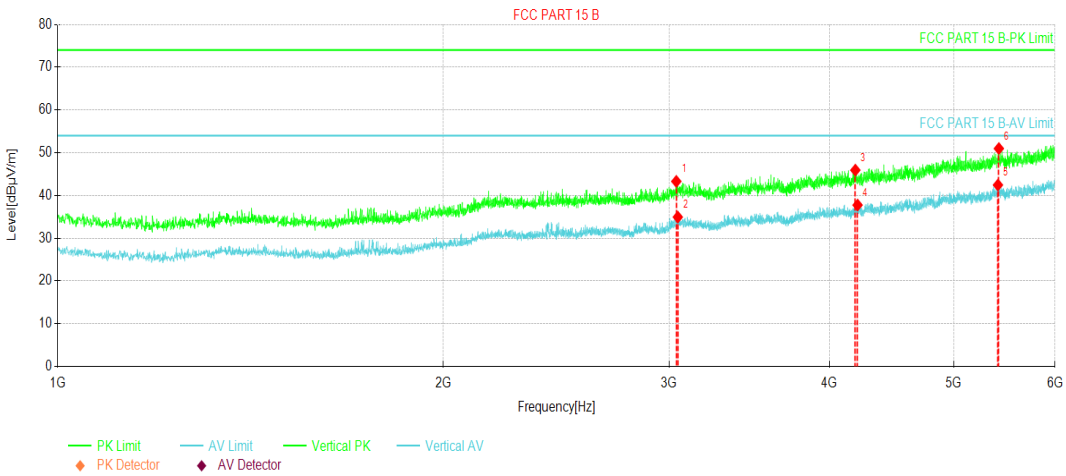
Frequency (MHz)	MaxPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
52.940500	20.07	30.00	9.93	100.0	V	262.0	-15.9
162.793000	17.96	33.50	15.54	100.0	V	246.0	-14.7
222.545000	23.80	36.00	12.20	100.0	V	238.0	-17.2
709.145500	27.06	36.00	8.94	100.0	V	275.0	-4.5
836.555000	27.21	36.00	8.79	100.0	V	23.0	-2.2
983.025000	27.42	44.00	16.58	100.0	V	118.0	0.3

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Above 1GHz:

Product Name:	4G MiFi	**Product Model:**	ML10V
Test By:	June	**Test mode:**	Working mode
Test Frequency:	1000 MHz ~ 6000 MHz	**Polarization:**	Vertical
Test Voltage:	DC 4.2V		

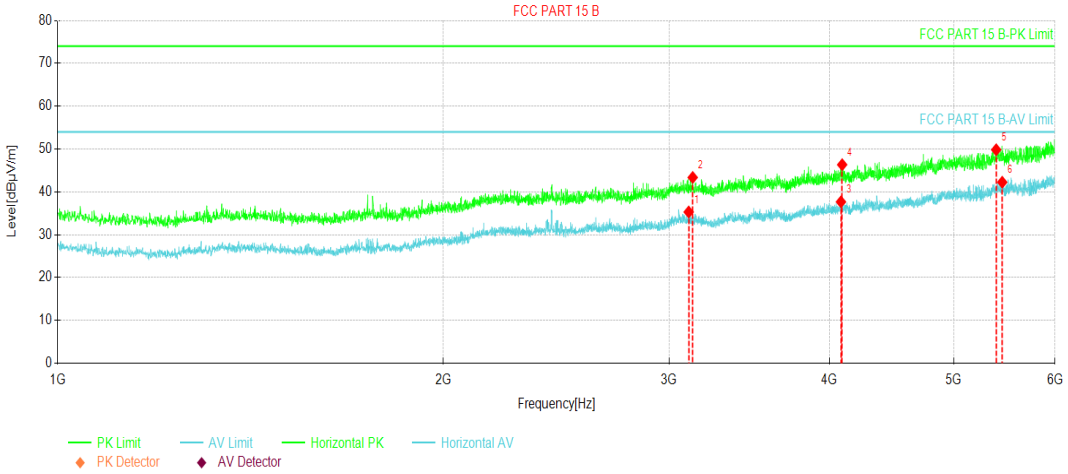


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3038.75	59.55	43.28	-16.27	74.00	30.72	PK	Vertical
2	3046.87	51.12	34.94	-16.18	54.00	19.06	PK	Vertical
3	4191.25	57.33	45.92	-11.41	74.00	28.08	PK	Vertical
4	4208.12	49.10	37.74	-11.36	54.00	16.26	PK	Vertical
5	5415.00	48.96	42.44	-6.52	54.00	11.56	PK	Vertical
6	5423.75	57.48	50.96	-6.52	74.00	23.04	PK	Vertical

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

Product Name:	4G MiFi	**Product Model:**	ML10V
Test By:	June	**Test mode:**	Power on mode
Test Frequency:	1000 MHz ~ 6000 MHz	**Polarization:**	Horizontal
Test Voltage:	DC 4.2V		



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	3106.87	51.62	35.29	-16.33	54.00	18.71	PK	Horizontal
2	3129.37	59.42	43.35	-16.07	74.00	30.65	PK	Horizontal
3	4084.37	49.88	37.66	-12.22	54.00	16.34	PK	Horizontal
4	4093.12	58.55	46.33	-12.22	74.00	27.67	PK	Horizontal
5	5398.12	56.36	49.82	-6.54	74.00	24.18	PK	Horizontal
6	5456.87	48.82	42.24	-6.58	54.00	11.76	PK	Horizontal

Remark:

1. Level = Reading + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

------End of report------