FCC PART 15B

TEST REPORT

For

Shanghai Sunmi Technology Co.,Ltd.

Room 605, Block 7, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai 200433 China

FCC ID: 2AH25NK010

Report Type:	Product Type:
Original Report	Keyboard

Test Engineer:	Jett Zhao
Report Number:	RKSA191206001-00A
Report Date:	2019-12-18
Reviewed By:	Oscar Ye EMC Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan,Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Test Model	NK010
Product	Keyboard
Highest Operation Frequency	<108MHz
Rate Voltage	DC 5V

**All measurement and test data in this report was gathered from production sample serial number: 20191206001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2019-12-06)*

Objective

This report is prepared on behalf of Shanghai Sunmi Technology Co.,Ltd. in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15, Class B device.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan,Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test mode: Data transmission

EUT Exercise Software

Special Accessories

`

TFGEN tool
note: the minimum functional interface (I/O) ports that shall be
populated by RJ45 cables, and implementation the minimum functional interface (I/O) ports software is TFGEN tool.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

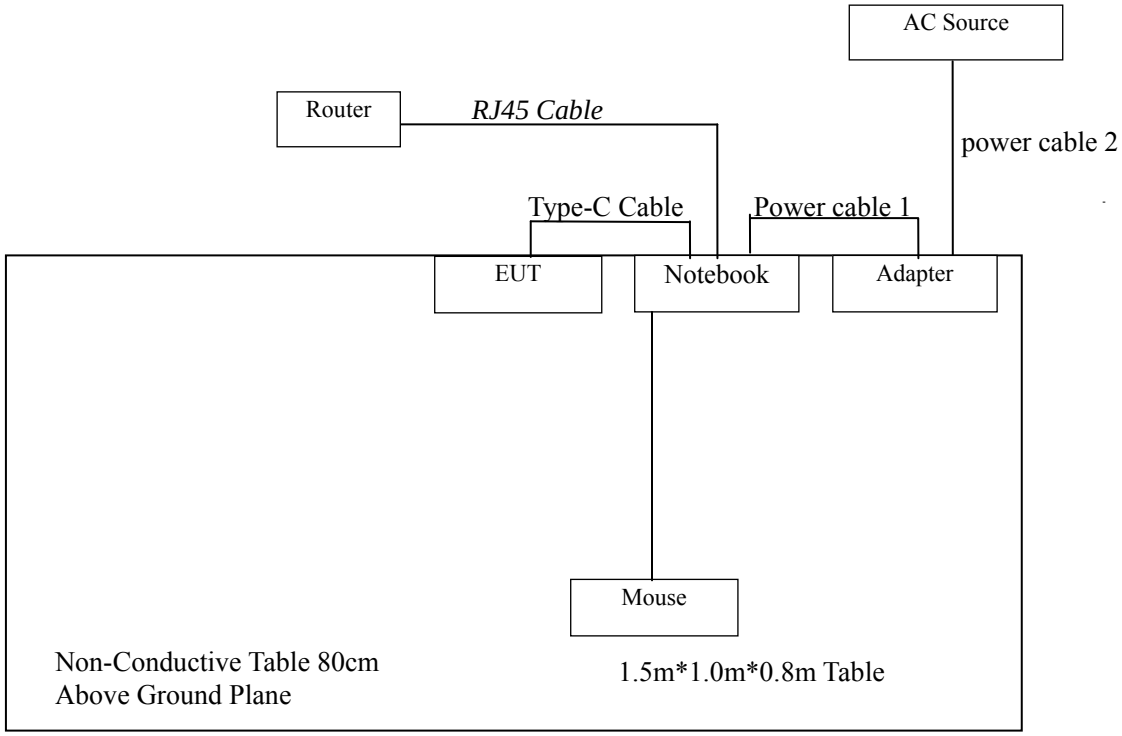
Manufacturer	Description	Model	Serial Number
DELL	Notebook	E6410	3094742521
DELL	Mouse	MS116	884116194743
TP-LINK	Router	EC26CA652860	1153145002998
DELL	Mouse	MS116	2136538

External I/O Cable

Cable Description	Length (m)	From/Port	To
Type-C Cable	1.0	EUT	Notebook
Power Cable 1	1.0	Notebook	Adapter
Power Cable 2	1.0	Adapter	AC Source
RJ45 Cable	10	Notebook	Router

Block Diagram of Radiated Test Setup

Test mode：Data transmission



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant

FCC §15.107 – CONDUCTED EMISSIONS

Applicable Standard

According to FCC§15.107

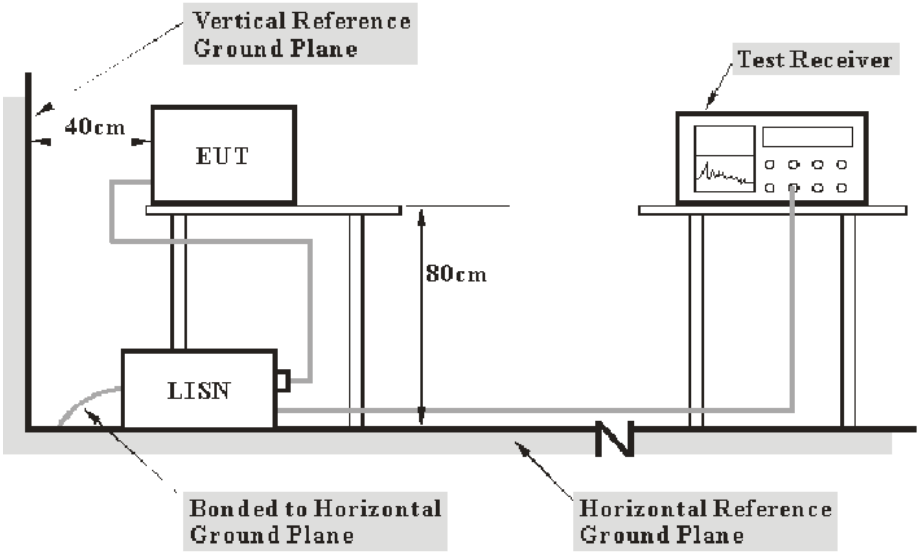
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Item		Measurement Uncertainty	U_{cispr}
AMN	150kHz~30MHz	3.19 dB	3.4 dB

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B limits.

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.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the Adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03 -101746-zn	2019-08-05	2020-08-04
Rohde & Schwarz	LISN	ENV216	3560655016	2019-12-05	2020-12-04
Audix	Test Software	e3	V9	--	--
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-09-08	2020-09-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Factor & Over Limit Calculation

The Corrected Factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7 dB means the emission is 7 dB above the limit. The equation for Over Limit calculation is as follows:

Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Test Data

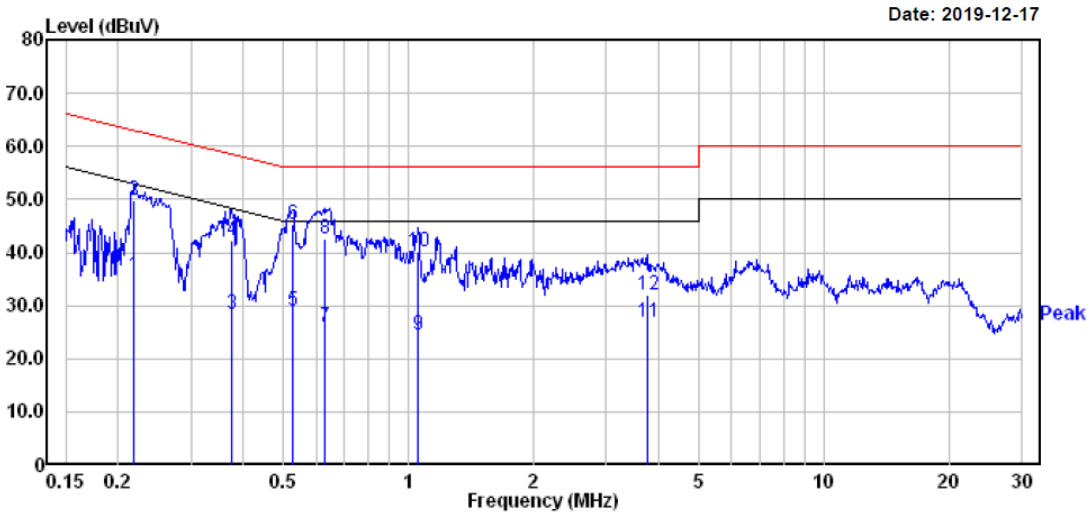
Environmental Conditions

Temperature:	23.5 ℃
Relative Humidity:	51 %
ATM Pressure:	101.1 kPa

The testing was performed by Jett Zhao on 2019-12-17.

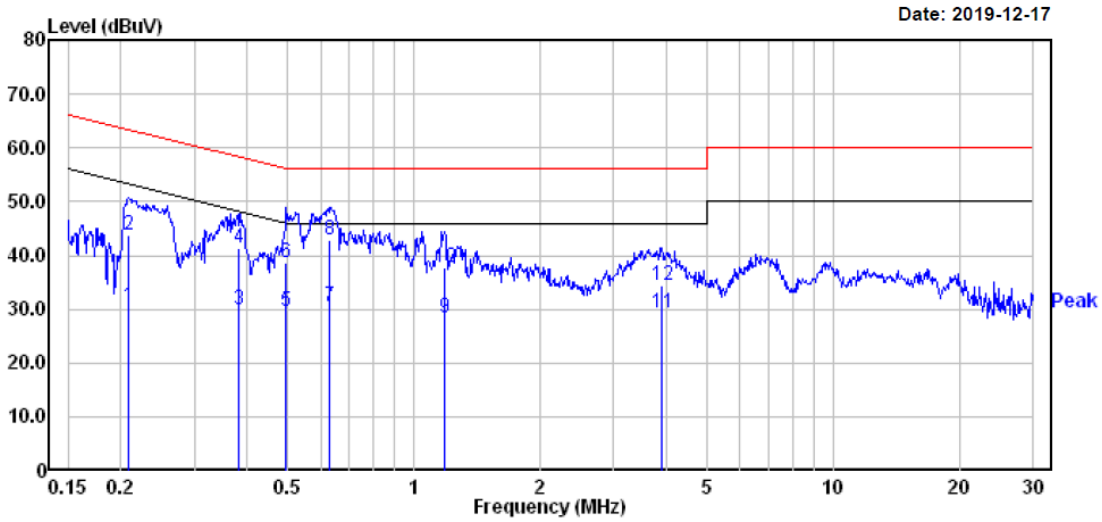
Test mode：Data transmission

Line:



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.219	15.90	19.82	35.72	52.88	-17.16	Average
2	0.219	30.00	19.82	49.82	62.88	-13.06	QP
3	0.377	8.70	19.77	28.47	48.34	-19.87	Average
4	0.377	22.60	19.77	42.37	58.34	-15.97	QP
5	0.527	9.21	19.75	28.96	46.00	-17.04	Average
6	0.527	25.61	19.75	45.36	56.00	-10.64	QP
7	0.630	6.30	19.75	26.05	46.00	-19.95	Average
8	0.630	22.90	19.75	42.65	56.00	-13.35	QP
9	1.054	4.60	19.82	24.42	46.00	-21.58	Average
10	1.054	20.40	19.82	40.22	56.00	-15.78	QP
11	3.779	7.50	19.47	26.97	46.00	-19.03	Average
12	3.779	12.50	19.47	31.97	56.00	-24.03	QP

Neutral:



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.209	10.60	19.82	30.42	53.23	-22.81	Average
2	0.209	24.00	19.82	43.82	63.23	-19.41	QP
3	0.381	9.99	19.77	29.76	48.25	-18.49	Average
4	0.381	21.49	19.77	41.26	58.25	-16.99	QP
5	0.497	9.70	19.76	29.46	46.05	-16.59	Average
6	0.497	18.90	19.76	38.66	56.05	-17.39	QP
7	0.627	10.60	19.75	30.35	46.00	-15.65	Average
8	0.627	23.10	19.75	42.85	56.00	-13.15	QP
9	1.184	8.60	19.81	28.41	46.00	-17.59	Average
10	1.184	17.90	19.81	37.71	56.00	-18.29	QP
11	3.901	9.80	19.47	29.27	46.00	-16.73	Average
12	3.901	14.90	19.47	34.37	56.00	-21.63	QP

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

Measurement Uncertainty

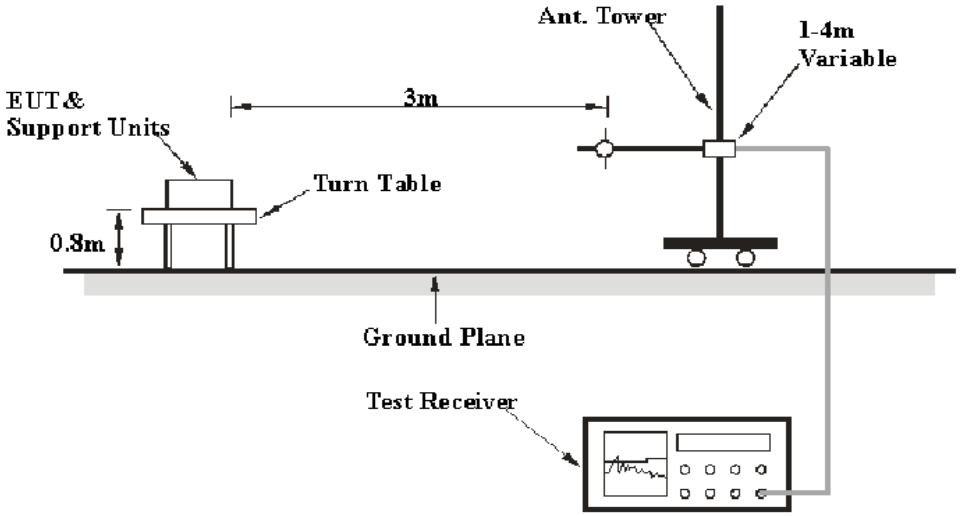
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average) and system repeatability.

Item		Measurement Uncertainty	U_{cispr}
Radiated Emission	30MHz~1GHz	6.11dB	6.3 dB

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

EUT Setup

Below 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

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.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	185700	2019-08-14	2020-08-13
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-05	2020-12-04
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2019-01-09	2022-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	/	/
R&S	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

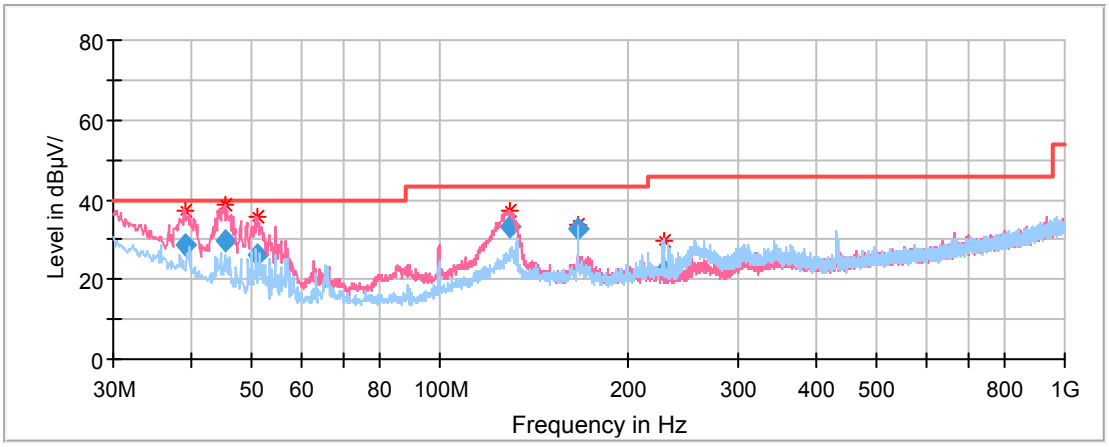
Environmental Conditions

Temperature:	23.2 ℃
Relative Humidity:	51 %
ATM Pressure:	101.1 kPa

The testing was performed by Jett Zhao on 2019-12-14.

Test mode：Data transmission

1) 30MHz ~ 1GHz:



Frequency (MHz)	Quasi-Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.093750	28.80	40.00	11.20	100.0	V	222.0	-10.5
45.398750	29.46	40.00	10.54	100.0	V	242.0	-14.1
50.976250	26.16	40.00	13.84	100.0	V	227.0	-17.6
129.148500	33.18	43.50	10.32	100.0	V	292.0	-11.6
166.022000	32.69	43.50	10.81	100.0	V	27.0	-13.0
228.052150	22.10	46.00	23.90	200.0	H	225.0	-12.2

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