

FCC PART 15.247

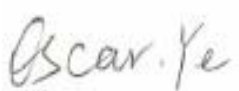
TEST REPORT

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: 2AH25D2SLITE

Report Type: CIIPC Report	Product Type: POS System
Test Engineer:	<u>Carry Cai</u> 
Report Number:	<u>RKSA200623003-00A</u>
Report Date:	<u>2020-07-01</u>
Reviewed By:	<u>Oscar Ye</u>  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

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
MEASUREMENT UNCERTAINTY	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION	5
DESCRIPTION OF TEST CONFIGURATION	5
EQUIPMENT MODIFICATIONS	5
EUT EXERCISE SOFTWARE	6
SUPPORT EQUIPMENT LIST AND DETAILS	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP	7
SUMMARY OF TEST RESULTS	8
TEST EQUIPMENT LIST	9
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	10
APPLICABLE STANDARD	10
EUT SETUP	10
EMI TEST RECEIVER SETUP.....	10
TEST PROCEDURE	11
FACTOR & OVER LIMIT CALCULATION.....	11
TEST RESULTS SUMMARY	11
TEST DATA	11
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	16
APPLICABLE STANDARD	16
EUT SETUP	16
EMI TEST RECEIVER SETUP.....	16
TEST PROCEDURE	16
CORRECTED AMPLITUDE & MARGIN CALCULATION	17
TEST RESULTS SUMMARY	17
TEST DATA	18

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Tested Model	L1552
Series Model	L1551, L3552
Product Type	POS System
Power Supply	DC 24V from Adapter
RF Function	2.4G Wi-Fi, BLE
Operating Band/Frequency	2.4G Wi-Fi: 2412-2462MHz BLE: 2402-2480MHz
Channel Number	2.4G Wi-Fi: 11, BLE: 40
Channel Separation	2.4G Wi-Fi: 5MHz, BLE: 2MHz
Modulation Type	Wi-Fi: OFDM,DSSS; BLE: GFSK
Antenna Type	Wi-Fi/BLE: FPC Antenna
Maximum Antenna Gain	Wi-Fi/BLE: 1.86 dBi

Adapter Information:

Model: CYZS36-240150

Input: AC100-240V 50/60Hz 1.5A

Output: 24V, 1.5A

Note: The model difference was explained in the declaration letter.

*All measurement and test data in this report was gathered from production sample serial number: 20200320002.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2020-03-20)

Objective

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

The tests were performed in order to determine Compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

This is a CIIPC report base on the original report RKSA200320002-00A with FCC ID: 2AH25D2SLITE which was granted on 2020-06-02, the differences between the original device and the current one are as follows:

1. Add a new model of adapter and this change will affect conducted emissions and radiation spurious testing (below 1GHz), other data were referred to the original report.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS and FCC Part 15B JAB Submittal with FCC ID: 2AH25D2SLITE.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 15.247 Meas Guidance v05r02.

All 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.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

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

Description of Test Configuration

Test channel list is as below:

For 802.11b, 802.11g and 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For BLE mode, EUT was tested with channel 0, 19 and 39.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	...	...
...	...	...	...
...	...	...	...
18	2438	38	2478
19	2440	39	2480

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test tool: cmd command.

Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	Power Level
802.11b	1 Mbps	16
802.11g	6 Mbps	13
802.11n-HT20	MCS0	13
BLE	1Mbps	Default

Support Equipment List and Details

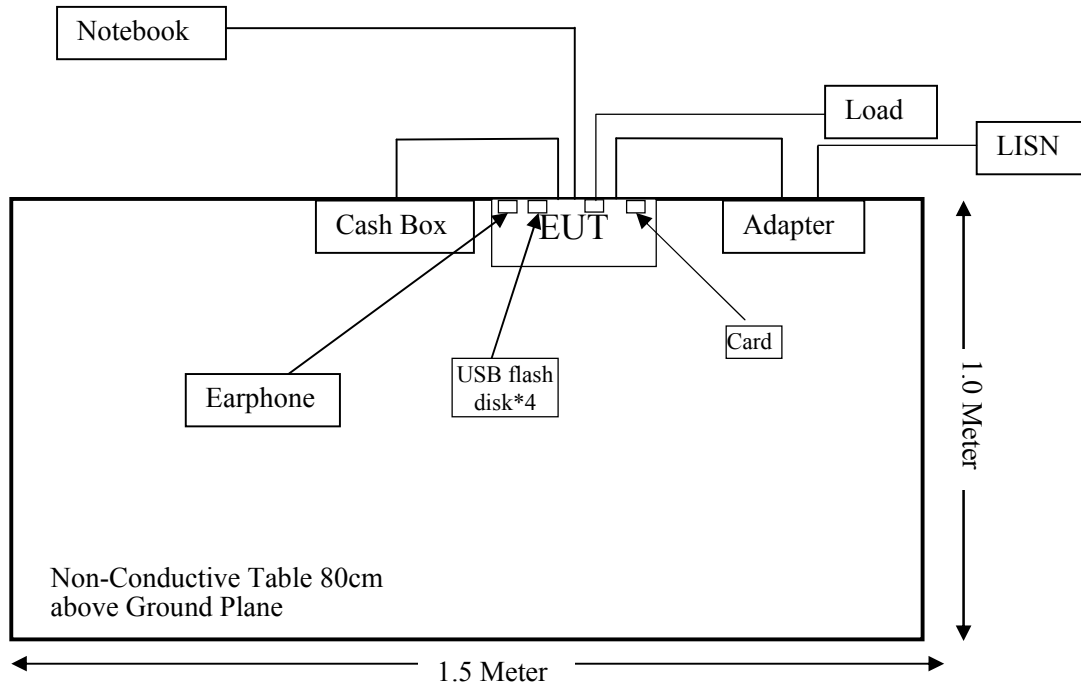
Manufacturer	Description	Model	Serial Number
/	Cash Box	/	/
DELL	Notebook	GX620	D65874152
/	USB flash disk*4	/	/
HUAWEI	Earphone	AM116	/
/	Card	/	/
/	Load	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Power Cable	1.0	EUT	Adapter
Type-C Cable	3.0	EUT	Notebook
Cable	1.0	EUT	Cash Box
Cable	3.0	EUT	Load

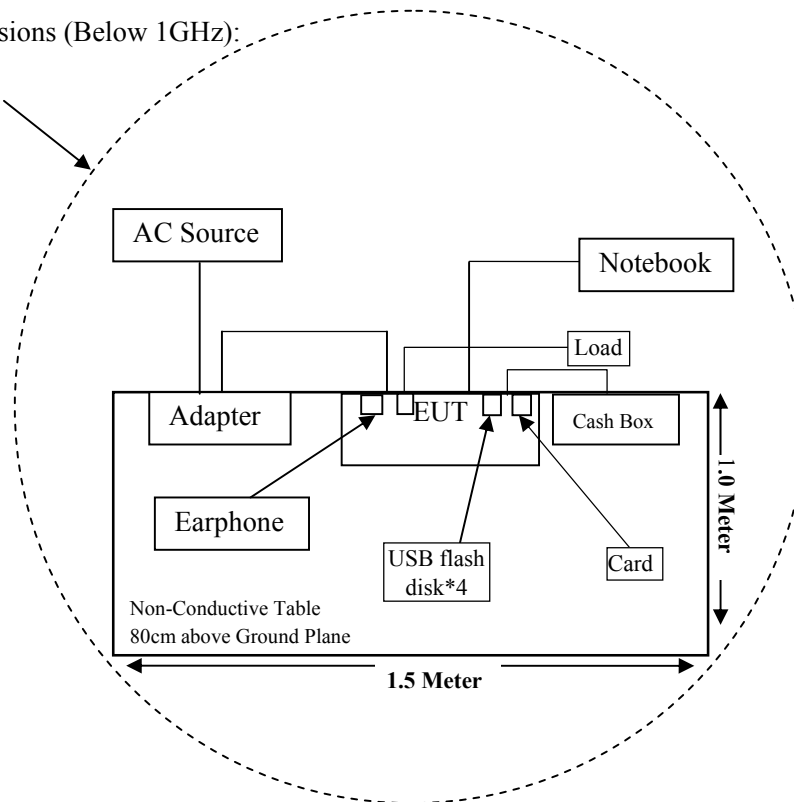
Block Diagram of Test Setup

For Conducted Emissions:



For Radiated Emissions (Below 1GHz):

Turntable
2m Diameter



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.207 (a)	AC Line Conducted Emissions	Compliant
FCC §15.209, §15.205 & §15.247(d)	SPURIOUS EMISSIONS	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-11-30	2020-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2019-12-26	2022-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	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
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03 -101746-zn	2019-07-11	2020-07-10
Rohde & Schwarz	LISN	ENV216	3560655016	2019-11-30	2020-11-29
Audix	Test Software	e3	V9	/	/
Rohde & Schwarz	Pulse limiter	ESH3-Z2	0357.8810.54	2019-08-10	2020-08-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-15	2020-08-14

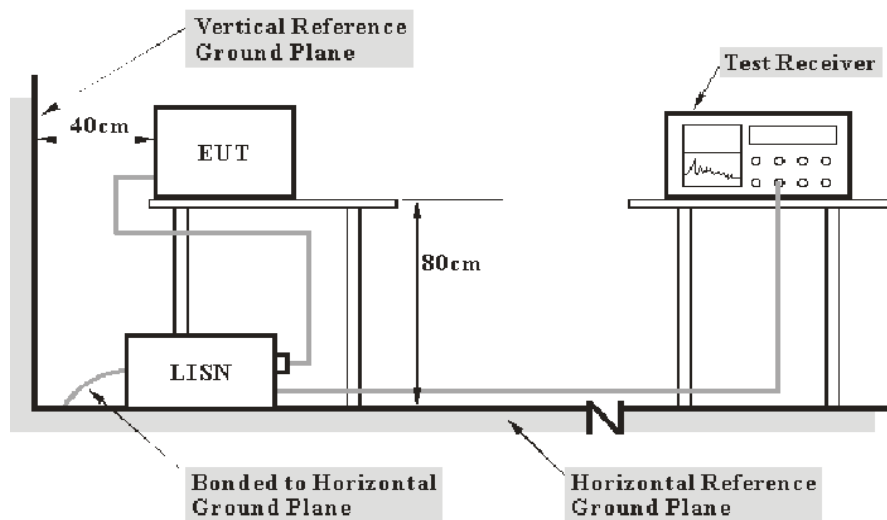
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

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 C63.10-2013. The related limit was specified in FCC Part 15.207.

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

ANSI C63.10-2013 clause 6.2

During the conducted emission test, the EUT 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.

Factor & Over Limit Calculation

The 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 Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

Environmental Conditions

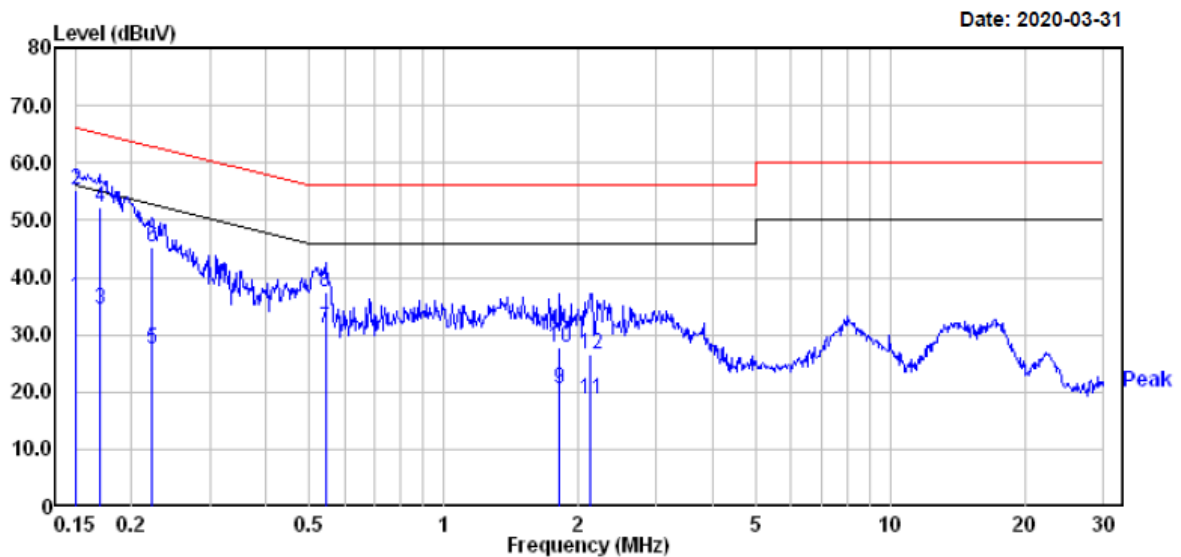
Temperature:	22.5 °C
Relative Humidity:	51 %
ATM Pressure:	101.1 kPa

The testing was performed by Carry Cai on 2020-03-31.

Test Result: Compliant.

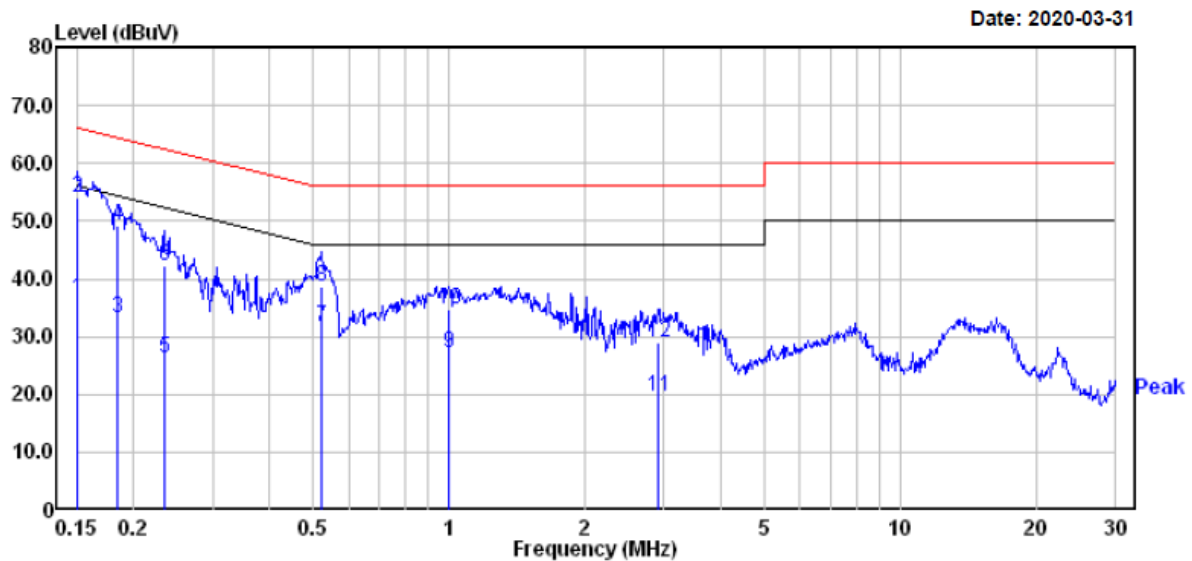
For Wi-Fi Mode:

EUT operation mode: Transmitting in 802.11g mode low channel (worst case)

AC 120V/60 Hz, Line

	Freq	Read		Limit	Over	
	MHz	Level	Factor	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.150	16.60	19.82	36.42	56.00	-19.58 Average
2	0.150	35.50	19.82	55.32	66.00	-10.68 QP
3	0.169	14.50	19.83	34.33	54.99	-20.66 Average
4	0.169	32.50	19.83	52.33	64.99	-12.66 QP
5	0.222	7.80	19.82	27.62	52.74	-25.12 Average
6	0.222	25.50	19.82	45.32	62.74	-17.42 QP
7	0.544	11.20	19.75	30.95	46.00	-15.05 Average
8	0.544	17.80	19.75	37.55	56.00	-18.45 QP
9	1.819	0.69	19.84	20.53	46.00	-25.47 Average
10	1.819	7.99	19.84	27.83	56.00	-28.17 QP
11	2.133	-1.00	19.73	18.73	46.00	-27.27 Average
12	2.133	6.70	19.73	26.43	56.00	-29.57 QP

AC 120V/60 Hz, Neutral



		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	16.60	19.82	36.42	56.00	-19.58	Average
2	0.150	34.30	19.82	54.12	66.00	-11.88	QP
3	0.184	13.41	19.82	33.23	54.28	-21.05	Average
4	0.184	29.31	19.82	49.13	64.28	-15.15	QP
5	0.234	6.30	19.82	26.12	52.30	-26.18	Average
6	0.234	22.30	19.82	42.12	62.30	-20.18	QP
7	0.524	11.91	19.75	31.66	46.00	-14.34	Average
8	0.524	19.01	19.75	38.76	56.00	-17.24	QP
9	1.000	7.50	19.82	27.32	46.00	-18.68	Average
10	1.000	15.00	19.82	34.82	56.00	-21.18	QP
11	2.915	0.20	19.46	19.66	46.00	-26.34	Average
12	2.915	9.40	19.46	28.86	56.00	-27.14	QP

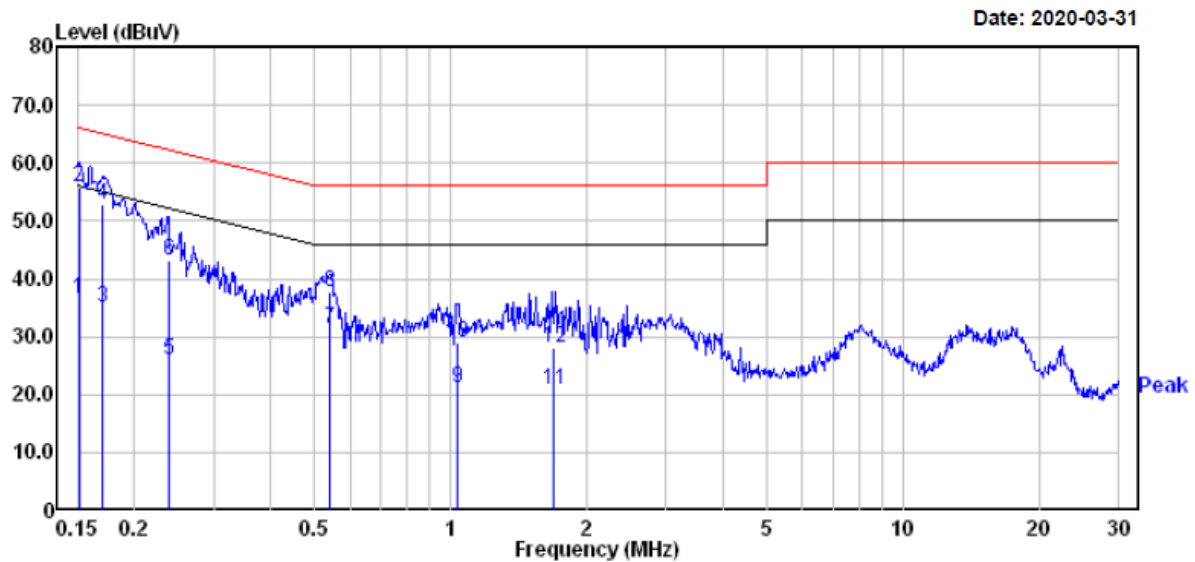
Note:

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

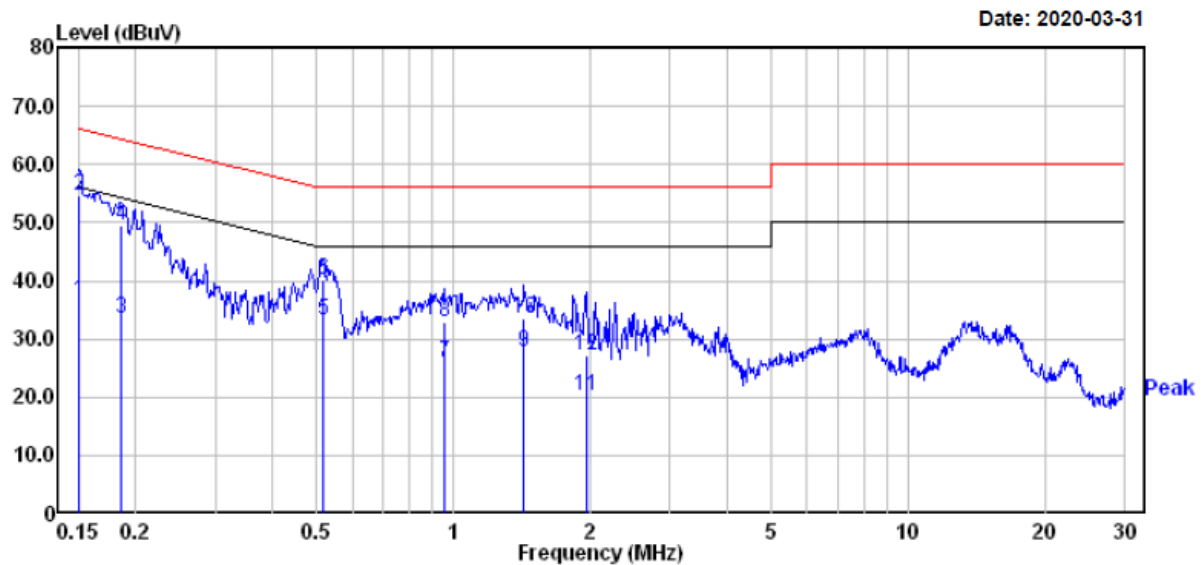
2) Over Limit (dB) = Read level (dBuV) + Factor (dB) - Limit (dBuV)

For BLE Mode:

EUT operation mode: Transmitting in high channel (worst case)

AC 120V/60 Hz, Line

	Freq	Read		Limit	Over	
	MHz	Level	Factor	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.151	16.80	19.82	36.62	55.96	-19.34 Average
2	0.151	36.00	19.82	55.82	65.96	-10.14 QP
3	0.170	15.10	19.83	34.93	54.94	-20.01 Average
4	0.170	33.00	19.83	52.83	64.94	-12.11 QP
5	0.238	6.10	19.82	25.92	52.17	-26.25 Average
6	0.238	23.20	19.82	43.02	62.17	-19.15 QP
7	0.541	11.71	19.75	31.46	46.00	-14.54 Average
8	0.541	18.11	19.75	37.86	56.00	-18.14 QP
9	1.032	1.20	19.82	21.02	46.00	-24.98 Average
10	1.032	9.10	19.82	28.92	56.00	-27.08 QP
11	1.698	1.10	19.84	20.94	46.00	-25.06 Average
12	1.698	8.20	19.84	28.04	56.00	-27.96 QP

AC 120V/60 Hz, Neutral

		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	16.80	19.82	36.62	56.00	-19.38	Average
2	0.150	34.80	19.82	54.62	66.00	-11.38	QP
3	0.185	13.71	19.82	33.53	54.24	-20.71	Average
4	0.185	29.81	19.82	49.63	64.24	-14.61	QP
5	0.518	13.30	19.76	33.06	46.00	-12.94	Average
6	0.518	20.30	19.76	40.06	56.00	-15.94	QP
7	0.953	6.20	19.78	25.98	46.00	-20.02	Average
8	0.953	13.20	19.78	32.98	56.00	-23.02	QP
9	1.433	7.81	19.83	27.64	46.00	-18.36	Average
10	1.433	13.81	19.83	33.64	56.00	-22.36	QP
11	1.959	0.30	19.83	20.13	46.00	-25.87	Average
12	1.959	7.40	19.83	27.23	56.00	-28.77	QP

Note:

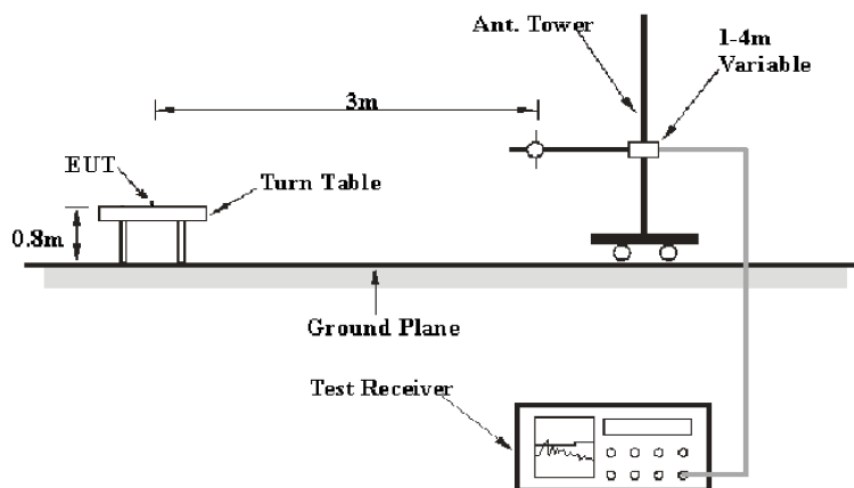
- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
- 2) Over Limit (dB) = Read level (dBUV) + Factor (dB) - Limit (dBUV)

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1 GHz.

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

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

Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz.

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 (dBμV/m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

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

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data**Environmental Conditions**

Temperature:	23.1 °C
Relative Humidity:	48 %
ATM Pressure:	101.1kPa

The testing was performed by Carry Cai on 2020-04-14.

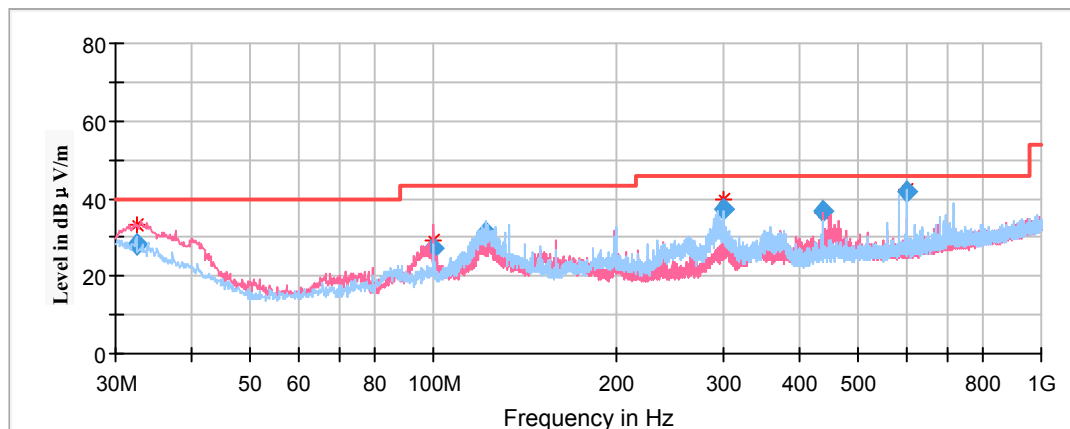
Test Result: Compliant.

EUT operation mode: Transmitting

For Wi-Fi Mode:

Spurious Emission Test:**30MHz-1GHz:**

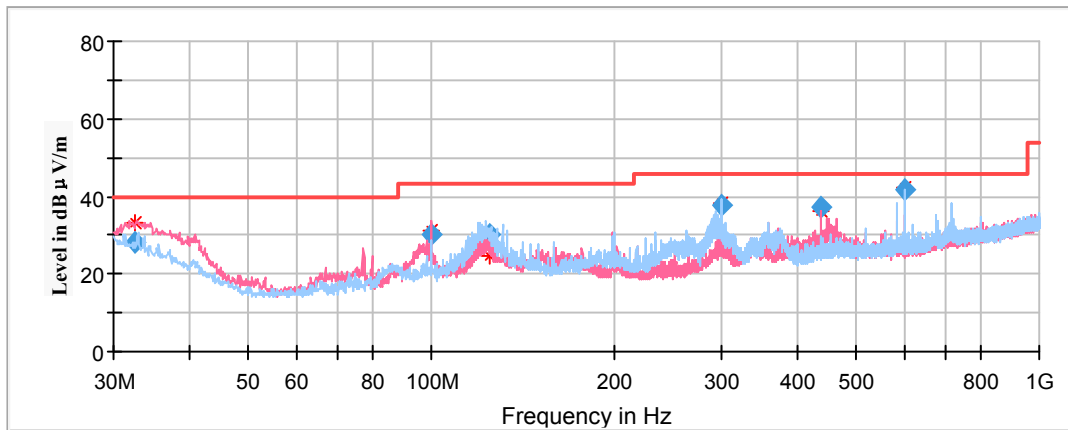
Pre-scan with 802.11b, 802.11g and 802.11n-HT20 modes of operation in the X,Y and Z axes of orientation, the worst case **low channel of 802.11g mode in Z-axis of orientation** was recorded



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
32.63	27.98	100	V	300	-5.7	40.00	12.02
99.95	27.22	100	V	107	-14.9	43.50	16.28
122.21	31.11	100	H	66	-11.3	43.50	12.39
300.02	37.22	100	H	258	-10.5	46.00	8.78
437.45	36.98	100	V	357	-7.6	46.00	9.02
600.00	41.74	100	H	46	-5.2	46.00	4.26

For BLE Mode:**Spurious Emission Test:****30MHz-1GHz**

(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the Z axis of orientation was recorded)



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
32.63	28.23	100	V	294	-5.7	40.00	11.77
100.02	30.02	100	V	160	-14.9	43.50	13.48
124.27	30.02	100	H	62	-11.4	43.50	13.48
300.02	37.54	100	H	285	-10.5	46.00	8.46
437.46	37.39	100	V	0	-7.6	46.00	8.61
600.01	41.80	100	H	47	-5.2	46.00	4.20

Declarations

1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

6: This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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