

FCC PART 15B

TEST REPORT

For

Shanghai Sunmi Technology Co.,Ltd.

Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China

FCC ID: 2AH25T5940

Report Type: CIIPC Report	Product Name: Wireless data POS System
Report Number:	RKSA240109002-00A
Report Date:	2024-03-12
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DOCUMENT HISTORY

Revision	Release Date	Report Number
R1V1	2021-05-31	RKSA210422002-00F
R1V2	2024-03-12	RKSA240109002-00A

FILING DESCRIPTION

Report Number	Information about Changes
RKSA210422002-00F	First Release
RKSA240109002-00A	Adapter, LCD, Stepping Motor, Scan Engine, Modify part of the circuit

Note:

This is a CIIPC report application based on RKSA210422002-00F, grant date: 7/20/2021, the details as below:

For version B-B:

1. Delete an adapter: UC13US.
2. Add an LCD, its model is HS55ET16T6F, the supplier is Huashi Opto-Electronic Co., Ltd. and the specification is 5.45inch.
3. Add a stepping motor, its model is 15BY25-098, the supplier is SHENZHEN YOFON ELECTRONIC CO., LTD and the specification is 5Vdc.
4. Add a scan engine, its model is NG004, the supplier is shanghai Sunmi Technology Co.,Ltd. and the specification is 3.3Vdc.
5. Modify part of the circuit which not affect RF performance

The above changes affect EMC performance, so we retested Conducted Emissions and Radiated Emissions below 1GHz and updated test photos and EUT photo.

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Tested Model:	T5940
Product Name:	Wireless data POS System
Power Supply:	DC 7.7 V from battery and DC 5.0V from adapter
★Highest Operation Frequency:	5825 MHz

Adapter Information:

Model: TPA-23A050200UU01

Input: AC100-240V 50/60Hz, 0.3A

Output: 5.0V, 2000mA

Note: The highest operation frequency was provided by the applicant.

All measurement and tested data in this report was gathered from production sample serial number: RKSA240109002-1 (Assigned by BACL (Kunshan). The EUT supplied by the applicant was received on 2024-01-09.)

Objective

This report is prepared for *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.

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) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No.: CN5055.

Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the product as specified in CISPR 16-4-2. This uncertainty represents expanded uncertainty expressed at 95.45% confidence level using a coverage factor of k=2.

If U_{lab} is less than or equal to U_{cispri} , then: – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit.

$$u_c(y) = \sqrt{\sum_i c_i^2 u^2(x_i)}$$

Measurement		U_{cispri}	$U_{\text{lab}} = 2 u_c(y)$
Conducted disturbance at AC mains and other port power using a V-AMN	(9 kHz to 150 kHz)	3.8 dB	2.79 dB
	(150 kHz to 30 MHz)	3.4 dB	2.79 dB
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1 000 MHz)	6.3 dB	4.61 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB	4.52 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB	5.39 dB

SYSTEM TEST CONFIGURATION

Justification

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

Test mode 1: Display + Audio out + Camera on + Print + Charging

Test mode 2: Data transmission

Equipment Software

No software was used to test.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

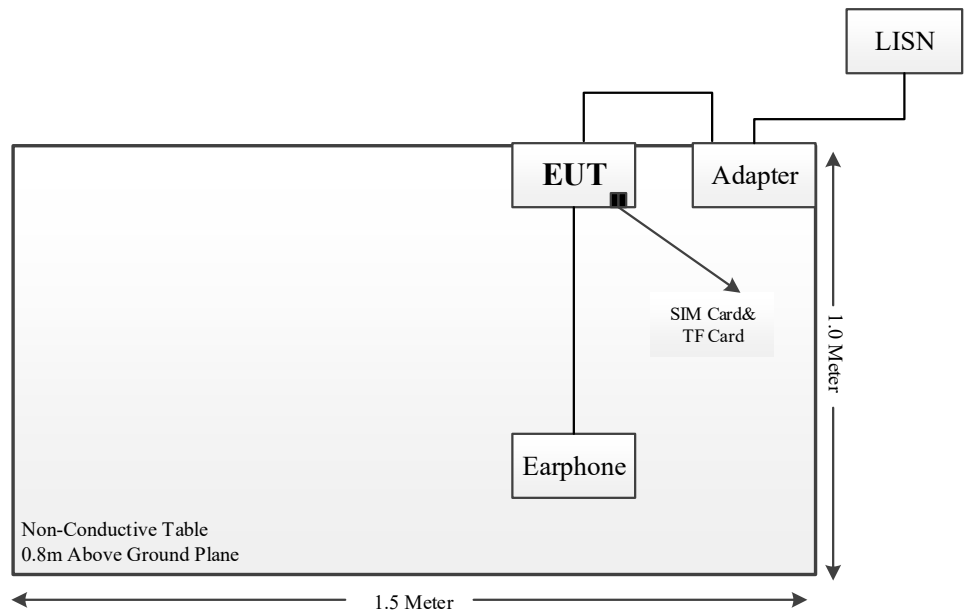
Manufacturer	Description	Model	Serial Number
R&S	SIM card	FLONLV1	/
Lenovo	Notebook	ZQ-202000905OLIT	003290000000003AA658
TP-LINK	Router	TL-WDR5620	1188431022424
/	Mouse	/	/
/	Earphone	/	/
SanDisk	TF card	/	/

External I/O Cable

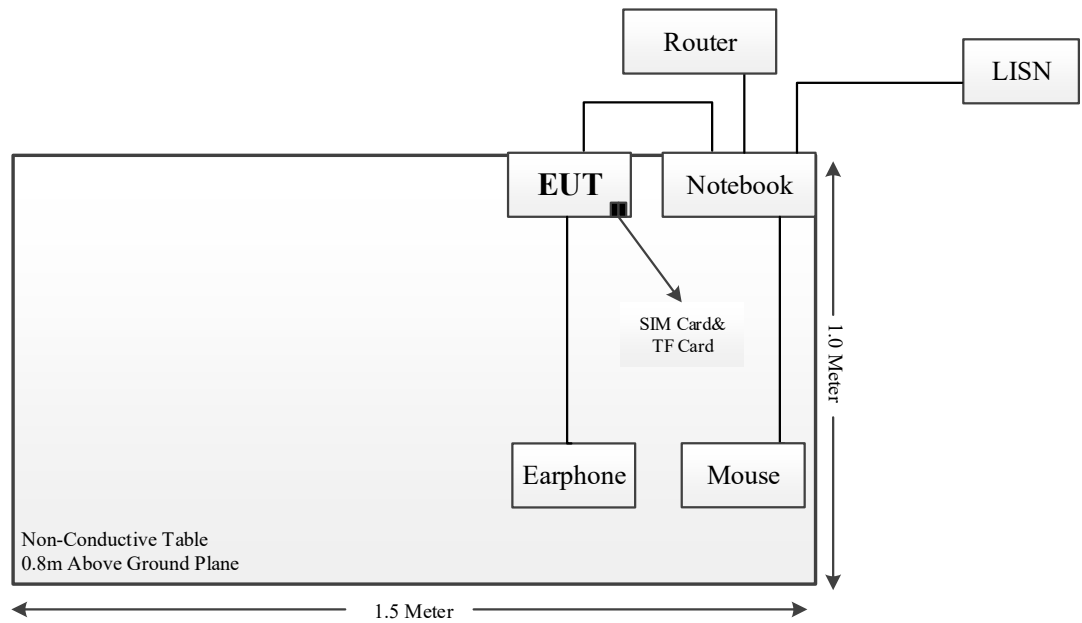
Cable Description	Length (m)	From Port	To Port
Power Cable	1.5	AC Source	Adapter
USB Cable	1.2	Adapter/ Notebook	EUT
Audio Cable	1.0	EUT	Earphone
RJ45	5.0	Router	Notebook

Block Diagram of Test Setup

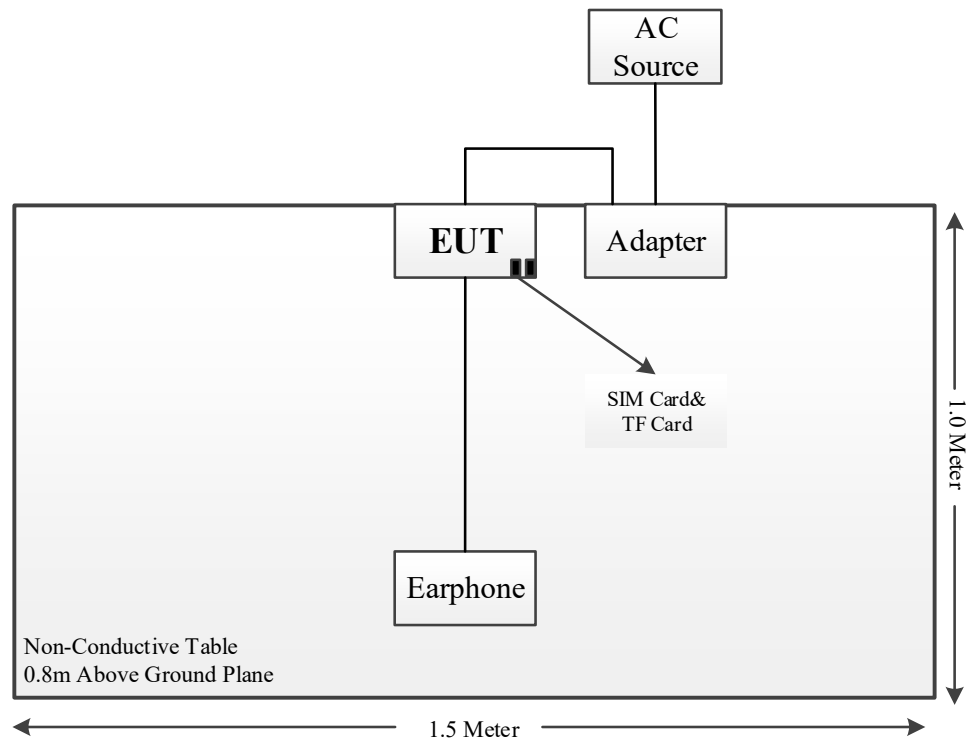
Conducted Emissions
Test mode 1:



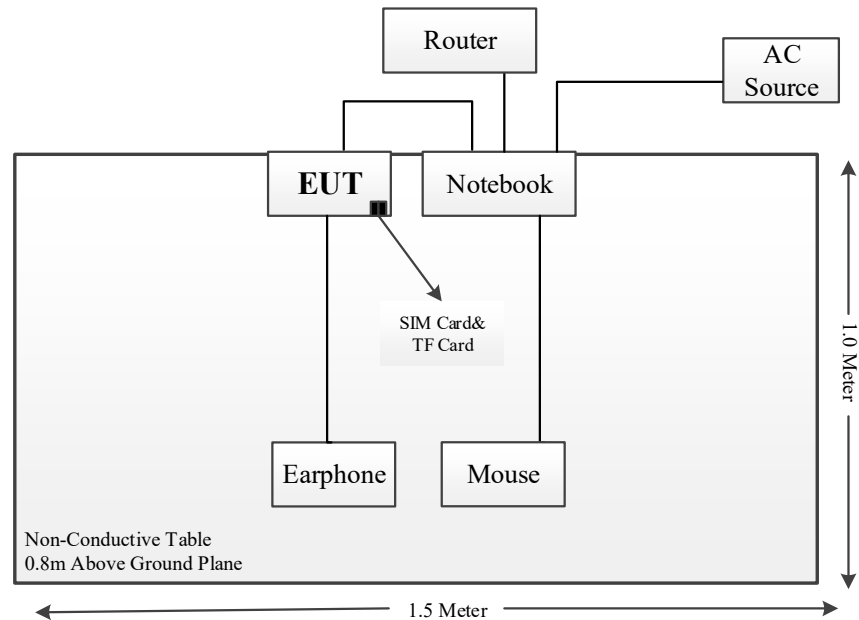
Test mode 2:



Radiated Emissions
Test mode 1:



Test mode 2:



TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions					
Rohde & Schwarz	EMI Test Receiver	ESR3	101746	2023-05-23	2024-05-22
Rohde & Schwarz	LISN	ENV216	101115	2023-05-23	2024-05-22
Rohde & Schwarz	Pulse Limiter	ESH3-Z2	0357.8810.54	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2023-05-23	2024-05-22
Audix	Test Software	e3	V9	N/A	N/A
Radiated Emissions Chamber 1# (30 MHz to 1 GHz)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2023-05-23	2024-05-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Sonoma Instrument	Amplifier	310N	171205	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-8	008	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2023-05-23	2024-05-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2023-05-23	2024-05-22
Rohde & Schwarz	Test Software	EMC32	100361	N/A	N/A

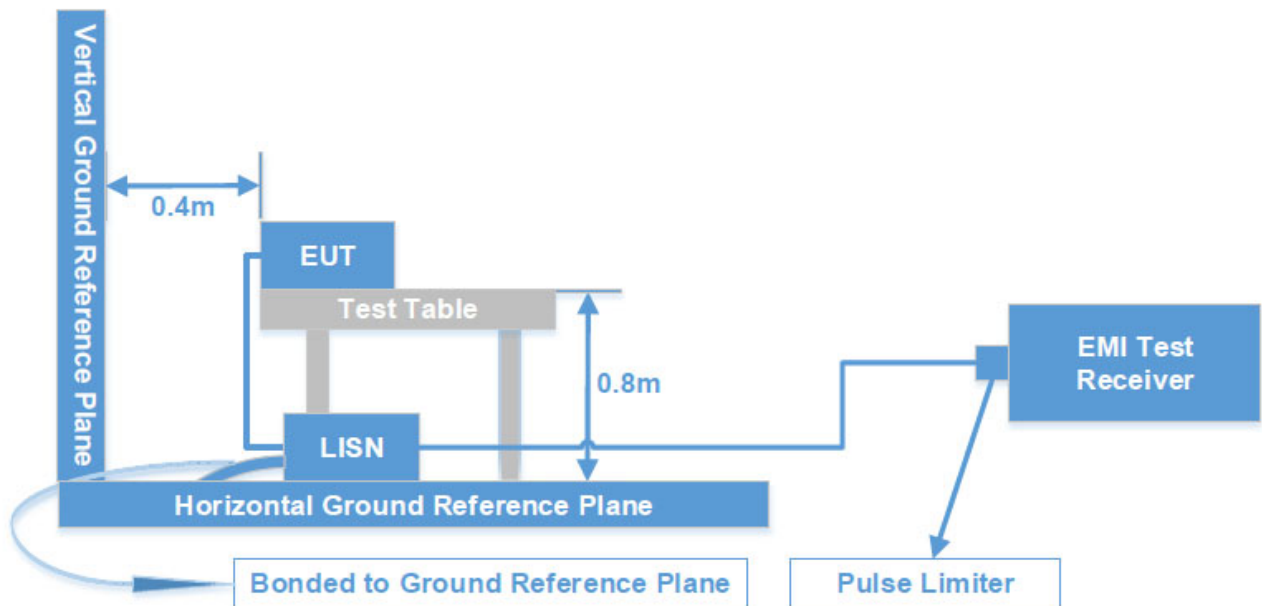
Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

SUMMARY OF TEST RESULTS

RULE PART	DESCRIPTION OF TEST	RESULTS
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant

FCC §15.107 - CONDUCTED EMISSIONS

Test System Setup



The measurement procedure of test setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 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	RBW	VBW
150 kHz – 30 MHz	9 kHz	30 kHz

Test Procedure

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

If the maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

Level & Over Limit Calculation

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

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

Level (dB μ V) = Read level (dB μ V) + Factor (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:

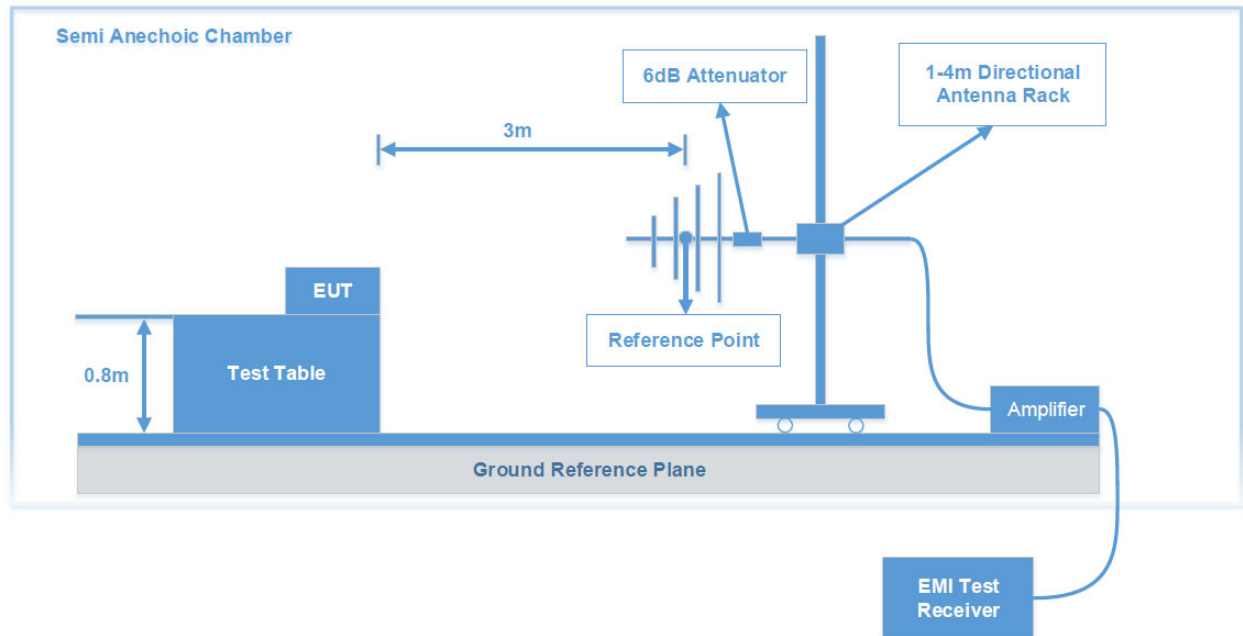
Over Limit (dB) = Level (dB μ V) - Limit (dB μ V)

Test Data: See EXHIBIT A

FCC §15.109 - RADIATED EMISSIONS

Test System Setup

Below 1 GHz:



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 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	VBW
30 MHz – 1000 MHz	120 kHz	300 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure that the EUT complied with all installation combinations.

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 6 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

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)

Note: The QuasiPeak (dBμV/m), MaxPeak (dBμV/m), Average (dBμV/m) which shown in the data table are all Corrected Amplitude.

Test Data: See EXHIBIT A

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT B - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT C - EUT INTERNAL PHOTOGRAPHS.

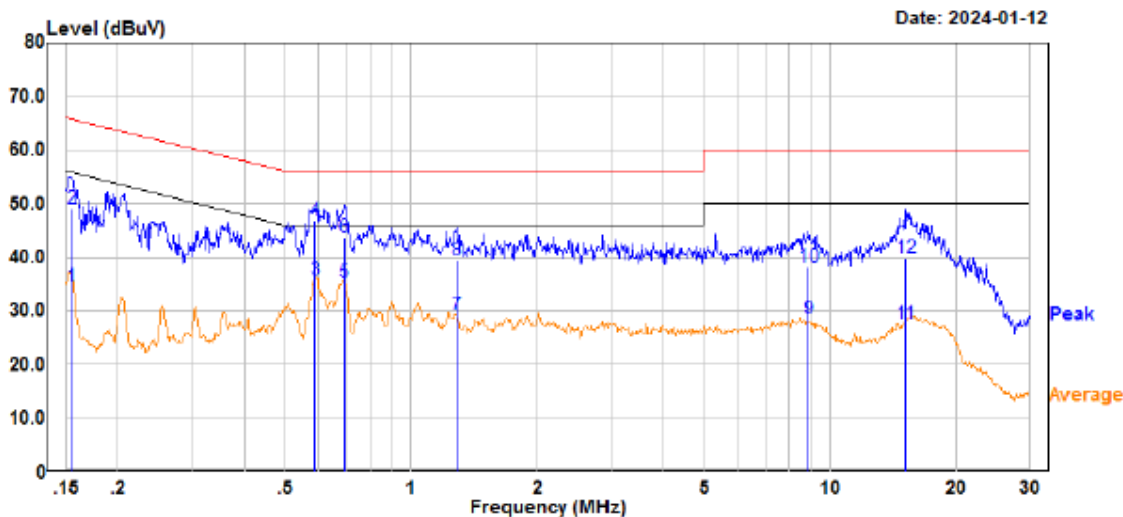
TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT G - TEST SETUP PHOTOGRAPHS.

EXHIBIT A - TEST DATA

CONDUCTED EMISSIONS

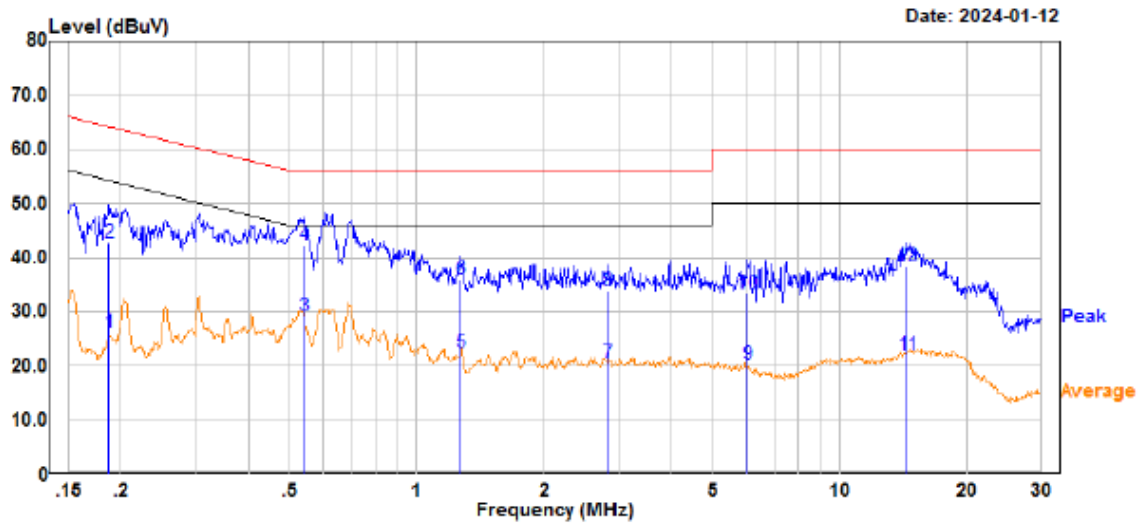
Test mode 1:



Trace: 1

Site : CE
 Condition : limit\CE limit\FCC PART 15B\FCC PART 15B CLASS B QP.csv Line
 : DET:Peak
 Project No : RKSA240109002
 Model : T5940
 Phase : L
 Voltage : 120V/60Hz
 Mode : Mode 1
 Test Equipment : ENV216,ESR
 Temperature : 23.1℃
 Humidity : 33%
 Atmospheric pressure: 102.1kPa
 Test Engineer : Aaron

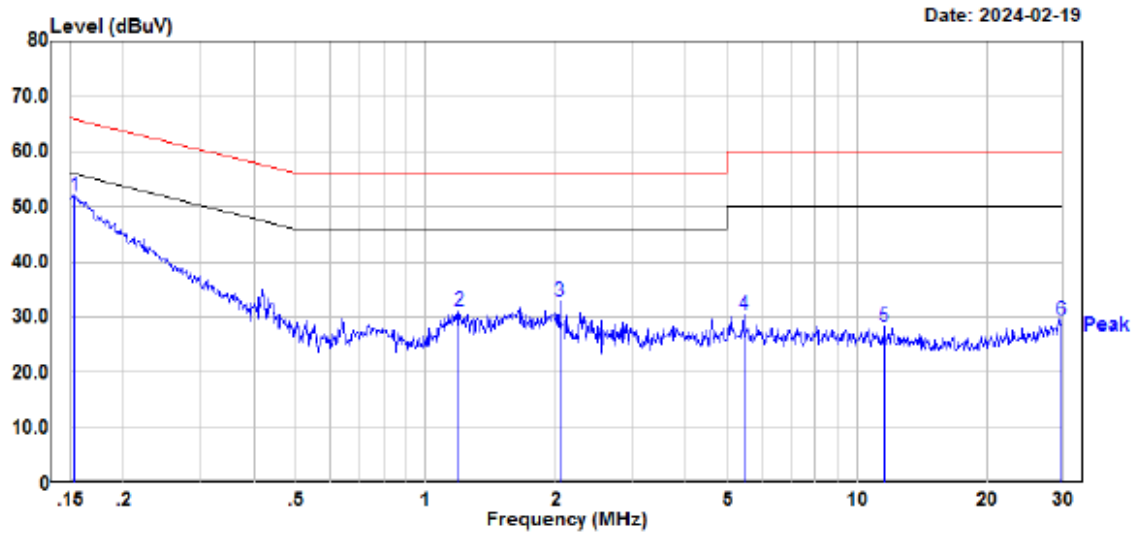
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.155	14.59	19.90	34.49	55.75	-21.26	Average
2	0.155	29.09	19.90	48.99	65.75	-16.76	QP
3	0.591	15.70	20.09	35.79	46.00	-10.21	Average
4	0.591	26.90	20.09	46.99	56.00	-9.01	QP
5	0.693	15.30	20.07	35.37	46.00	-10.63	Average
6	0.693	23.80	20.07	43.87	56.00	-12.13	QP
7	1.285	9.40	19.91	29.31	46.00	-16.69	Average
8	1.285	19.40	19.91	39.31	56.00	-16.69	QP
9	8.891	8.31	20.10	28.41	50.00	-21.59	Average
10	8.891	18.21	20.10	38.31	60.00	-21.69	QP
11	15.080	7.80	19.80	27.60	50.00	-22.40	Average
12	15.080	20.20	19.80	40.00	60.00	-20.00	QP



Site : CE
 Condition : limit\CE limit\FCC PART 15B\FCC PART 15B CLASS B QP.csv Line
 : DET:Peak
 Project No : RKSA240109002
 Model : T5940
 Phase : N
 Voltage : 120V/60Hz
 Mode : Mode 1
 Test Equipment : ENV216,ESR
 Temperature : 23.1°C
 Humidity : 33%
 Atmospheric pressure: 102.1kPa
 Test Engineer : Aaron

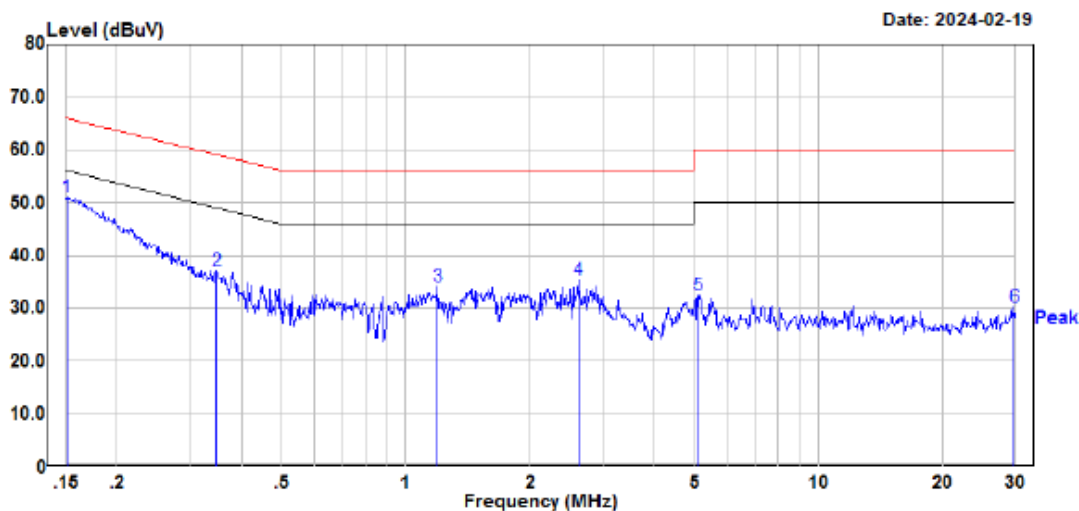
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBUV	dB	dBUV	dBUV	dB	
1	0.188	6.29	19.94	26.23	54.14	-27.91	Average
2	0.188	22.89	19.94	42.83	64.14	-21.31	QP
3	0.543	9.20	20.10	29.30	46.00	-16.70	Average
4	0.543	22.20	20.10	42.30	56.00	-13.70	QP
5	1.273	2.60	19.91	22.51	46.00	-23.49	Average
6	1.273	16.10	19.91	36.01	56.00	-19.99	QP
7	2.839	0.30	20.25	20.55	46.00	-25.45	Average
8	2.839	13.60	20.25	33.85	56.00	-22.15	QP
9	6.057	0.00	20.27	20.27	50.00	-29.73	Average
10	6.057	13.00	20.27	33.27	60.00	-26.73	QP
11	14.418	2.09	19.83	21.92	50.00	-28.08	Average
12	14.418	18.69	19.83	38.52	60.00	-21.48	QP

Test mode 2:



Site : CE
 Condition : limit\CE limit\FCC PART 15B\FCC PART 15B CLASS B QP.csv Line
 : DET:Peak
 Project No : RKSA240109002
 Model : T5940
 Phase : L
 Voltage : 120V/60Hz
 Mode : Mode 2
 Test Equipment : ENV216,ESR
 Temperature : 23.1℃
 Humidity : 33%
 Atmospheric pressure: 102.1kPa
 Test Engineer : Aaron

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.154	32.16	19.89	52.05	65.79	-13.74	Peak
2	1.193	11.24	19.87	31.11	56.00	-24.89	Peak
3	2.043	12.63	20.21	32.84	56.00	-23.16	Peak
4	5.455	10.27	20.29	30.56	60.00	-29.44	Peak
5	11.521	8.44	19.96	28.40	60.00	-31.60	Peak
6	29.555	9.50	20.01	29.51	60.00	-30.49	Peak



Site : CE
 Condition : limit\CE limit\FCC PART 15B\FCC PART 15B CLASS B QP.csv Line
 : DET:Peak
 Project No : RKSA240109002
 Model : T5940
 Phase : N
 Voltage : 120V/60Hz
 Mode : Mode 2
 Test Equipment : ENV216,ESR
 Temperature : 23.1℃
 Humidity : 33%
 Atmospheric pressure: 102.1kPa
 Test Engineer : Aaron

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	31.06	19.89	50.95	65.96	-15.01	Peak
2	0.348	16.98	20.04	37.02	59.00	-21.98	Peak
3	1.193	14.20	19.87	34.07	56.00	-21.93	Peak
4	2.622	15.03	20.24	35.27	56.00	-20.73	Peak
5	5.113	12.14	20.30	32.44	60.00	-27.56	Peak
6	29.851	10.22	20.01	30.23	60.00	-29.77	Peak

NOTE: If all maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

RADIATED EMISSIONS

Test mode 1:

Common Information

Project No:RKSA240109002

EUT Model:T5940

Test Mode:Mode 1

Standard:FCC Part 15B

Test Equipment:ESCI、JB3、310N

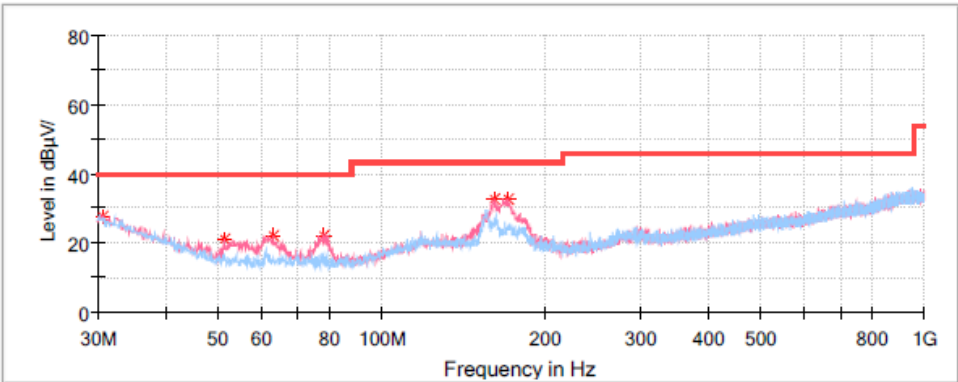
Temperature:16.4℃

Humidity:46%

Barometric Pressure:102.2kPa

Test Engineer:Joe Zhang

Test Date:2024/2/20



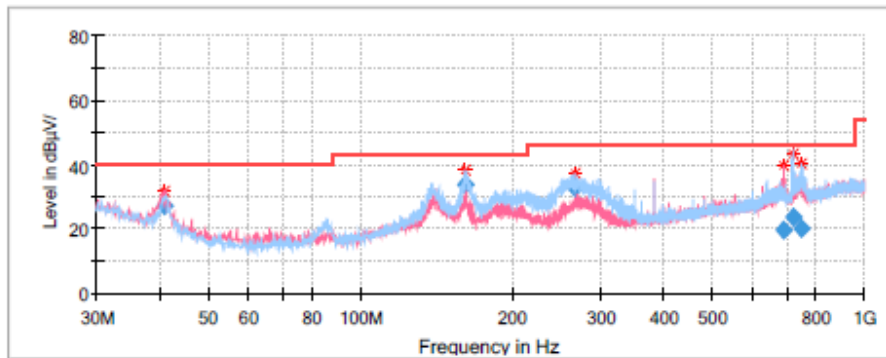
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.727500	27.57	40.00	12.43	100.0	V	119.0	-4.9
51.340000	20.98	40.00	19.02	100.0	V	99.0	-16.8
63.222500	21.89	40.00	18.11	100.0	V	0.0	-17.3
78.136250	22.12	40.00	17.88	200.0	V	64.0	-17.4
161.313750	32.71	43.50	10.79	100.0	V	0.0	-12.6
170.892500	32.75	43.50	10.75	100.0	V	358.0	-12.9

Test mode 2:

Common Information

Project No: RKSA240109002
EUT Model: T5940
Test Mode: Mode 2
Standard: FCC Part 15B
Test Equipment: ESCI, JB3, 310N
Temperature: 16.2°C
Humidity: 52%
Barometric Pressure: 102.1kPa
Test Engineer: Joe Zhang
Test Date: 2024/2/20

**Final Result**

Frequency (MHz)	QuasiPeak (dBμ V/m)	Limit (dBμ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.790000	27.32	40.00	12.68	100.0	V	103.0	-11.7
160.950000	33.46	43.50	10.04	200.0	H	24.0	-12.6
266.310000	32.53	46.00	13.47	100.0	H	74.0	-12.0
690.200000	19.52	46.00	26.48	200.0	V	282.0	-2.6
720.030000	23.45	46.00	22.55	200.0	H	312.0	-2.2
750.340000	20.03	46.00	25.97	200.0	V	282.0	-1.9

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with “★”.
2. The test data was only valid for the test sample(s).
3. 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.
4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor $k=2$ with the 95.45% confidence interval.

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