



TEST REPORT

REPORT NUMBER: I23W00025-EMC-Rev2

ON

Type of Equipment: Cash Drawer Driver Trigger

Type of Designation: NC030

Brand Name: SUNMI

Manufacturer: Shanghai Sunmi Technology Co.,Ltd.

ACCORDING TO

Subpart B, PART 15, RADIO FREQUENCY DEVICES, ANSI C63.4-2014,
ICES-003 Issue 7

Chongqing Academy of Information and Communications Technology

Month date, year

Aug16, 2023

Signature



Xiang Luoyong

Director

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.



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Revision Version

Report Number	Revision	Date	Memo
I23W00025-EMC	00	2023-07-25	Initial creation of test report
I23W00025-EMC	01	2023-08-09	--
I23W00025-EMC	02	2023-08-16	--

Chongqing Academy of Information and Communication Technology

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1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
FCC Registration Number:	CN1239
Address:	No.19 East Road, Xiantao Big-data Valley, Yubei District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

1.2. Testing Environment

Normal Temperature:	15-35°C
Relative Humidity:	25-75%RH

1.3. Project data

Testing Start Date:	2023-06-08
Testing End Date:	2023-07-21

1.4. Signature



2023-08-16

Li Runhao
(Prepared this test report)

Date

2023-08-16

Bai Qingqing
(Reviewed this test report)

Date

2023-08-16

**Xiang Luoyong Director of the
laboratory (Approved this test report)**

Date

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2. Client Information

2.1. Applicant Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505, No.388 Song Hu Road, Yang Pu District, Shanghai, China
City:	Shanghai
Country:	China
Telephone:	18826519551
Fax:	N/A
Email:	chenxuanfei@sunmi.com
Contact Person:	chenxuanfei

2.2. Manufacturer Information

Company Name:	Shanghai Sunmi Technology Co.,Ltd.
Address /Post:	Room 505, No.388 Song Hu Road, Yang Pu District, Shanghai, China
City:	Shanghai
Country:	China
Telephone:	18826519551
Fax:	N/A
Email:	chenxuanfei@sunmi.com
Contact Person:	chenxuanfei

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3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	Cash Drawer Driver Trigger
Model name	NC030
Brand name	SUNMI

Note: Photographs of EUT are shown in ANNEX B of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
S1	N/A	MAX_CashBox_BT _MB_V2.0	N/A	2023-05-31

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	dB*
CC01	Adapter	TPA-23A050200UU01
EA01	CashBox	NC020
AE1	NoteBook PC	ThinkPad X1 Carbon
AE2	Mobile Phone	HUAWEI MATE40

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC CFR Part 15, Subpart B	Radio frequency devices	October 01, 2021
ANSI C63.4	Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
ICES-003	Information Technology Equipment (Including Digital Apparatus)-Limits and Methods of Measurement	Issue 7

5. Test Equipment Utilized

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Interval	Cal.Due Date
1	Test Receiver	ESR 3	101382	03	3.48 SP2	R&S	1 year	2023-01-29 2024-01-28
2	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	1 year	2023-06-29 2024-06-28
3	Ultra-wideband Log Periodic Antenna	VULB9163	9163-586	--	--	Schwarzbeck	2 years	2022-10-29 2024-10-28
4	Double Ridged Guide Antenna	9120D	1083	--	--	R&S	2 years	2022-12-15 2024-12-14
5	2-Line V-Network	ENV216	102368	--	--	R&S	1 year	2023-05-28 2024-05-27
6	Test Receiver	ESU 40	100350	01	4.43 SP3	R&S	1 year	2023-06-29 2024-06-28

Test software

No.	Name	version	SN	Manufacture
1	EMC32 (RE Below 1GHz)	V9.26.01	--	R&S
2	EMC32 (RE Above 1GHz)	V 10.20.01	--	R&S
3	EMC32 (CE)	V 10.40.10	--	R&S

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6. Test Results

6.1. Summary of Test Results

FCC Rules	Name of Test	Result
15.109	Radiated Emission	Pass
15.107	AC Conducted Emission	Pass
Note: N/A means not applicable. The NC030, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing. We tested the working mode and reflected the result in the report.		

7. Test Results

7.1. Radiated Emission

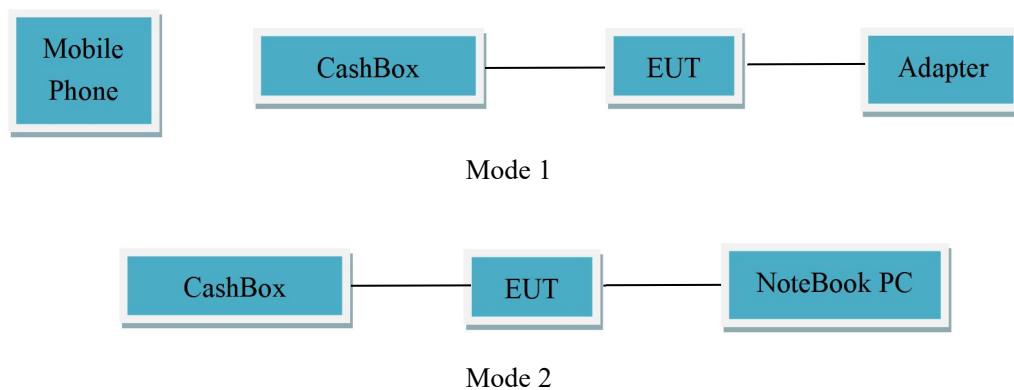
Specifications:	15.109
Date of Tests	2023-07-18
Test conditions:	Ambient Temperature:24.9°C Relative Humidity:56% Air pressure: 97.9kPa
Operation Mode	30MHz-18GHz frequency range: Mode 1: Working mode+ EA01+ CC01+ AE2 Mode 2: Working mode+ EA01+ AE1
Test Results:	Pass
Note: The worst case of radiated emission for 30MHz-1GHz is Mode 2 and for 1GHz -18GHz is Mode 2.	

Limit Level Construction (Except for Class A digital devices):

Frequency Range (MHz)	Quasi-Peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Frequency Range (MHz)	Peak (dBuV/m)	Average (dBuV/m)
Above 1000	74	54

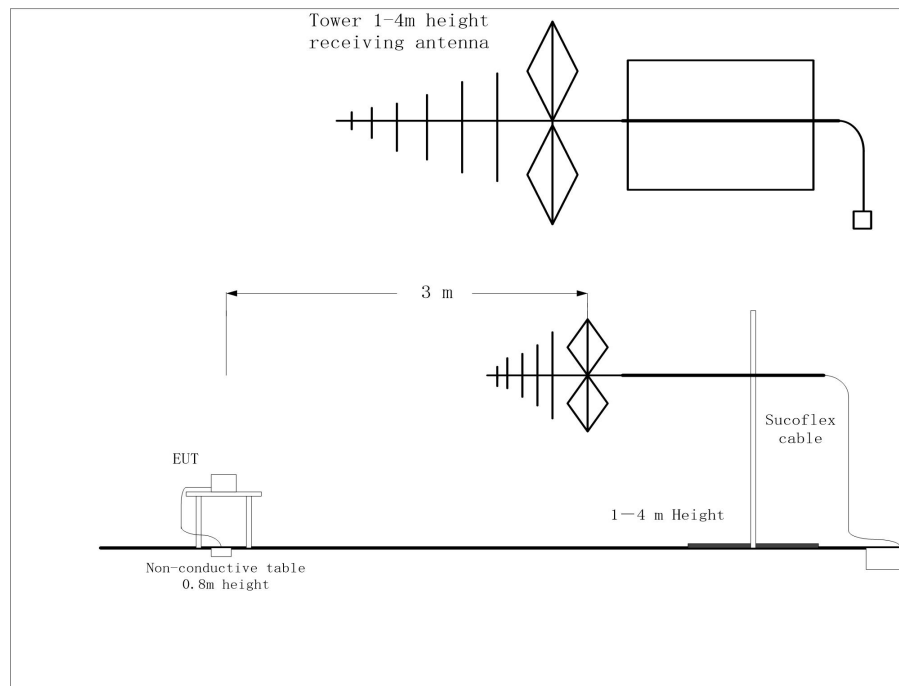
EUT Setup:



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Test Method:

For 30-1000MHz, the EUT was placed on the top of a rotating 0.8-m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement. Tested in accordance with the procedures of ANSI C63.4-2014, section 8.3.

For 1000-18000MHz, the maximal emission value was acquired by adjusting the antenna height, and the table was rotated 360 degrees to determine the maximum value of the field strength.

Uncertainty Measurement:

The measurement uncertainty (30MHz-150MHz) is 3.79 dB (k=2).

The measurement uncertainty (150MHz-1000MHz) is 3.51dB (k=2).

The measurement uncertainty (1000MHz-6000MHz) is 4.84 dB (k=2).

The measurement uncertainty (6000MHz-18000MHz) is 4.54 dB (k=2).

Test Result:

A “reference path loss” is established and Corr is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

Corr (dB/m) = Cable loss (dB) + Antenna Factor (dB/m) -Preamplifier gain (dB)

Result (dBμV/m) =PMea (dBμV) + Corr (dB/m)

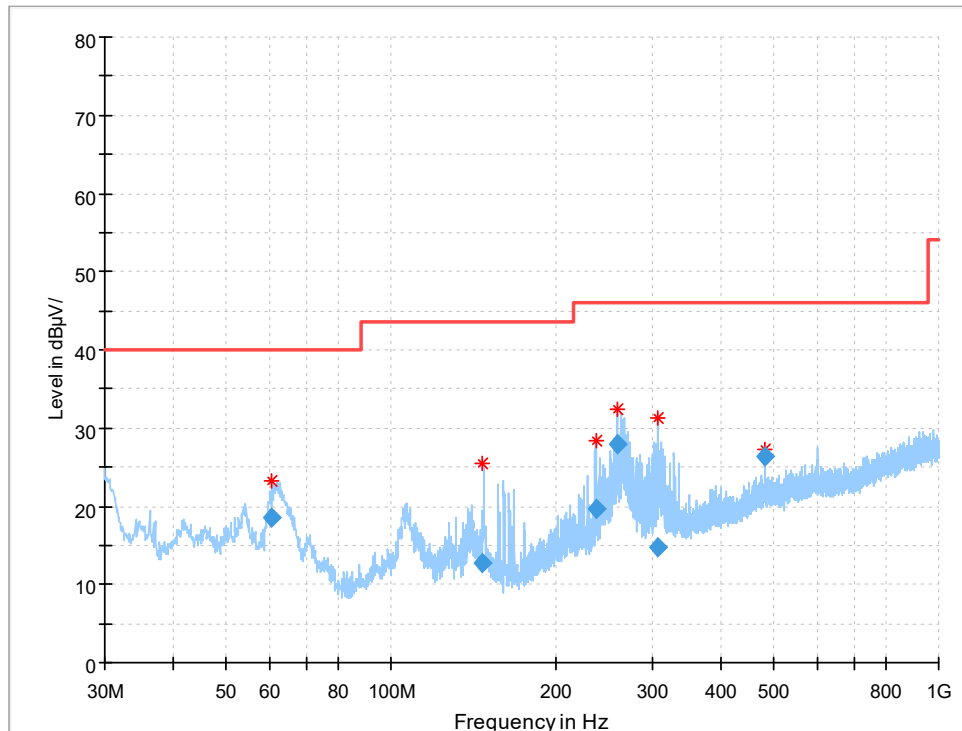
Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz-40GHz is more than 20dB below the limit are not report.

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Test Data



RE 30MHz-1GHz Mode 2

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
60.560440	18.63	40.00	21.37	100.0	V	249.0	-12.1
147.093760	12.70	43.50	30.80	100.0	V	62.0	-16.3
236.714720	19.65	46.00	26.35	200.0	H	208.0	-11.9
259.657080	27.95	46.00	18.05	100.0	H	130.0	-11.1
307.063600	14.74	46.00	31.26	200.0	H	357.0	-9.7
480.016000	26.37	46.00	19.63	100.0	H	38.0	-5.6

Corr.(dB)=Cable loss -Antenna Factor

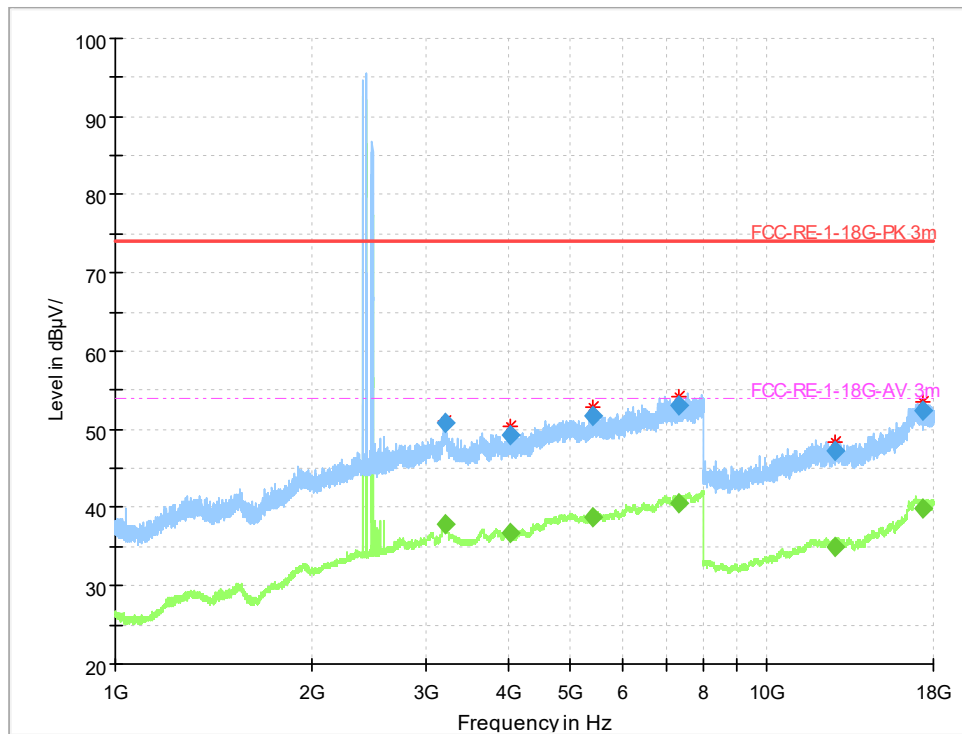
Test result=Test receiver value-Corr.(dB)

Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.

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RE 1GHz-18GHz Mode 2-H

Note: The signal that over the limit is the BLE emitted by the EUT.

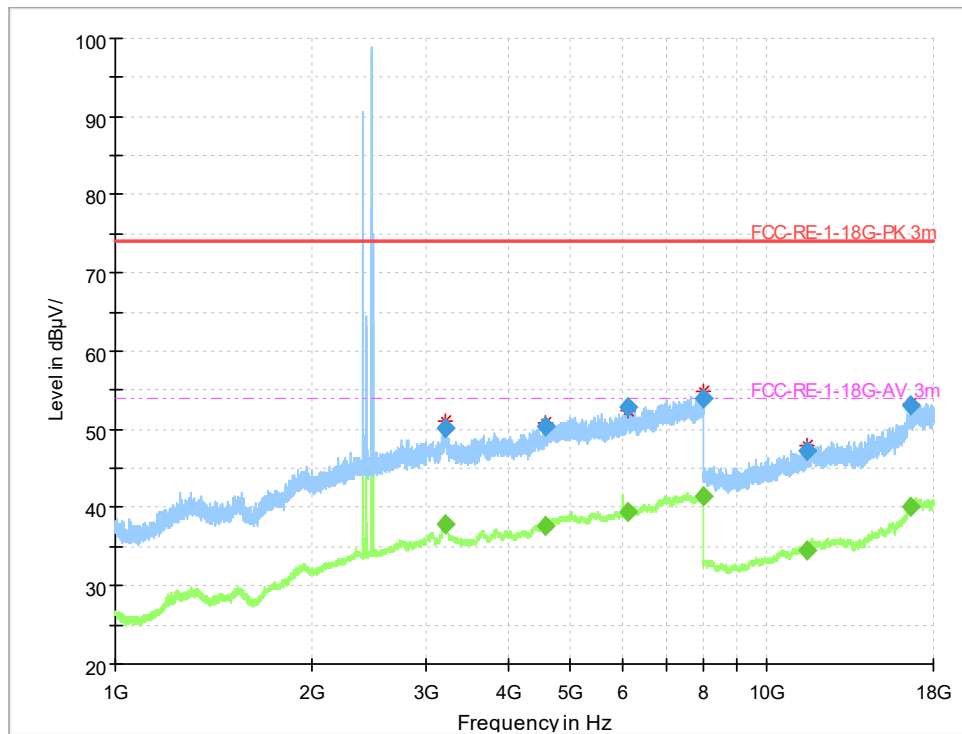
Final_Result 1

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3201.308750	50.89	---	74.00	23.11	500.0	1000.000	206.0	H	221.0	14.4
3201.308750	---	37.92	54.00	16.08	500.0	1000.000	206.0	H	221.0	14.4
4027.576250	---	36.65	54.00	17.35	500.0	1000.000	100.0	H	337.0	13.1
4027.576250	49.20	---	74.00	24.80	500.0	1000.000	100.0	H	337.0	13.1
5388.216250	---	38.76	54.00	15.24	500.0	1000.000	115.0	H	337.0	16.5
5388.216250	51.69	---	74.00	22.31	500.0	1000.000	115.0	H	337.0	16.5
7314.198750	53.18	---	74.00	20.82	500.0	1000.000	185.0	H	221.0	20.0
7314.198750	---	40.60	54.00	13.40	500.0	1000.000	185.0	H	221.0	20.0
12685.371250	47.35	---	74.00	26.65	500.0	1000.000	115.0	H	138.0	15.2
12685.371250	---	35.08	54.00	18.92	500.0	1000.000	115.0	H	138.0	15.2
17391.696250	52.48	---	74.00	21.52	500.0	1000.000	211.0	H	142.0	21.7
17391.696250	---	39.88	54.00	14.12	500.0	1000.000	211.0	H	142.0	21.7

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RE 1GHz-18GHz Mode 2-V

Note: The signal that over the limit is the BLE emitted by the EUT.

Final_Result 2

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3202.823750	50.12	---	74.00	23.88	500.0	1000.000	115.0	V	344.0	14.4
3202.823750	---	37.86	54.00	16.14	500.0	1000.000	115.0	V	344.0	14.4
4584.112500	---	37.60	54.00	16.40	500.0	1000.000	206.0	V	219.0	14.8
4584.112500	50.29	---	74.00	23.71	500.0	1000.000	206.0	V	219.0	14.8
6103.862500	52.84	---	74.00	21.16	500.0	1000.000	115.0	V	261.0	18.2
6103.862500	---	39.52	54.00	14.48	500.0	1000.000	115.0	V	261.0	18.2
7980.518750	53.95	---	74.00	20.05	500.0	1000.000	215.0	V	334.0	21.2
7980.518750	---	41.41	54.00	12.59	500.0	1000.000	215.0	V	334.0	21.2
11493.170000	47.27	---	74.00	26.73	500.0	1000.000	206.0	V	234.0	12.8
11493.170000	---	34.46	54.00	19.54	500.0	1000.000	206.0	V	234.0	12.8
16570.316250	---	40.15	54.00	13.85	500.0	1000.000	185.0	V	358.0	21.6
16570.316250	53.10	---	74.00	20.90	500.0	1000.000	185.0	V	358.0	21.6

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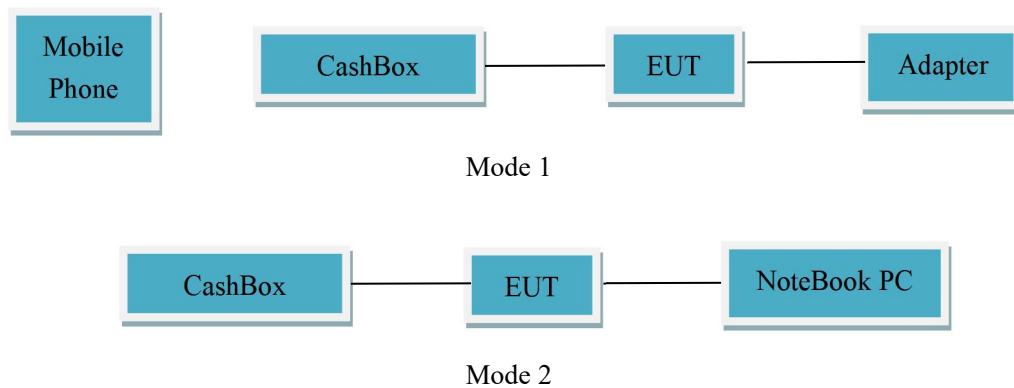
7.2. Conducted Emission

Specifications:	15.107
Date of Tests	2023-06-08
Test conditions:	Ambient Temperature:23.3°C Relative Humidity:51% Air pressure: 98.4kPa
Operation Mode	Mode 1: Working mode+ EA01+ CC01+ AE2 Mode 2: Working mode+ EA01+ AE1
Test Results:	Pass
Note: The worst case of AC conducted emission is Mode 2.	

Limit Level Construction:

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency		

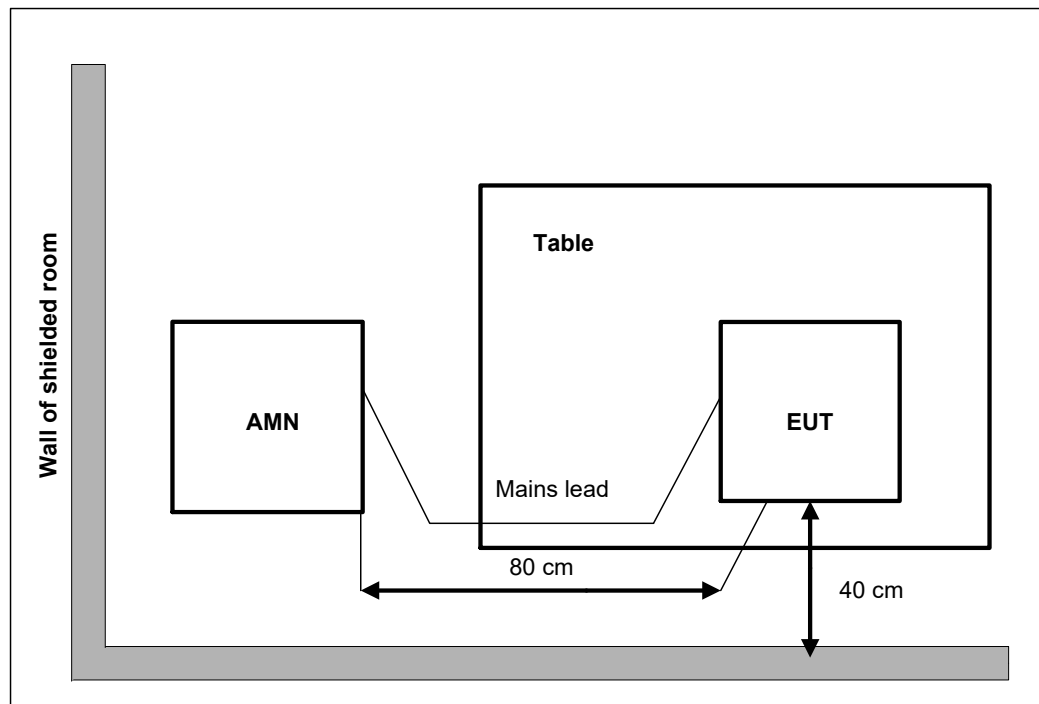
EUT Setup:



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Test Method:

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies with the band 150 kHz to 30MHz shall not exceed the limits. Both lines of the power mains connected to the EUT were checked for maximum conducted interference. Tested in accordance with the procedures of ANSI C63.4-2014, section 7.

Uncertainty Measurement:

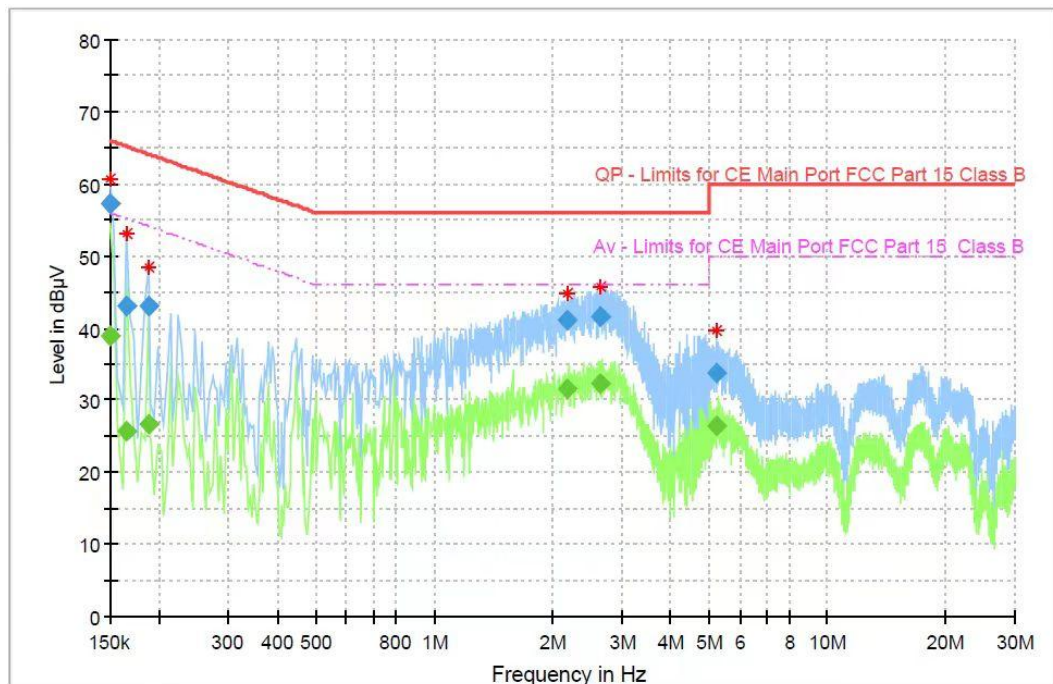
The measurement uncertainty (150kHz-30MHz) is 1.97 dB (k=2).

Test Data

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CE 150kHz-30MHz Mode 2

Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150000	---	38.82	15000	9.000	L1	ON	9.6	17.18	56.00
0.150000	57.21	---	15000	9.000	L1	ON	9.6	8.79	66.00
0.164925	---	25.69	15000	9.000	L1	ON	9.6	29.53	55.21
0.164925	43.01	---	15000	9.000	L1	ON	9.6	22.20	65.21
0.187313	---	26.64	15000	9.000	L1	ON	9.6	27.52	54.16
0.187313	43.15	---	15000	9.000	L1	ON	9.6	21.00	64.16
2.183531	---	31.52	15000	9.000	N	ON	9.7	14.48	46.00
2.183531	41.05	---	15000	9.000	N	ON	9.7	14.95	56.00
2.642475	---	32.39	15000	9.000	N	ON	9.7	13.61	46.00
2.642475	41.56	---	15000	9.000	N	ON	9.7	14.44	56.00
5.243156	---	26.38	15000	9.000	N	ON	9.8	23.62	50.00
5.243156	33.81	---	15000	9.000	N	ON	9.8	26.19	60.00

L1 and N is all have been tested, the result of them is synthesized in the above data diagram.

Emission level(quasi-peak or Average peak)(dBμV)=Raw value by receiver(dBμV) + Corr(Insertion loss+ cable loss) (dB)

The raw value is used to calculate by software which is not shown in the sheet.

Margin (dB) =limit value(dBμV) – emission level(dBμV).

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Annex A EUT Photos

See the document" I23W00025-External Photos".

See the document" I23W00025-Internal Photos".

Test photo See the in document" I23W00025_EMC Test Setup Photos".

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ANNEX B Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

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