Industrial Internet Innovation Center (Shanghai) Co.,Ltd.

SRD TEST REPORT

PRODUCT	POS System
BRAND	SUNMI
MODEL	L15A2,L15B2
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
FCC ID	2AH25T3PRO
IC	22621-T3PRO
ISSUE DATE	December 17, 2024
STANDARD(S)	FCC Part15E, RSS-Gen Issue 5, RSS-247 Issue 3

Prepared by: ***Tao Lingyan*** **Reviewed by:** ***Yang Fan*** **Approved by:** ***Zhang Min***

CONTENTS

1. Summary of Test Report

1.1 Test Standard(s)

No.	Test Standard	Title	Version
1	FCC Part15E	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	--
2	RSS-Gen Issue 5	General Requiremsents For Compliance Of Radio Apparatus	2021
3	RSS-247 Issue 3	Digital Transmission Systems (Dtss), Frequency Hopping Systems (Fhss) And Licence-Exempt Local Area Network (LE-LAN) Devices	2023

1.2 Reference Documents

No.	Test Standard	Title	Version
1	ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
2	KDB 789033 D02 General UNII Test Procedures New Rules v02r01	Guidelines For Compliance Testing Of Unlicensed National Information Infrastructure (U-Nii) Devices (Part 15, Subpart E)	--
Note: KDB 789033 D02 General UNII Test Procedures New Rules v02r01 is not A2LA certified.			

1.3 Summary of Test Results

No.	Measurement Items	FCC Rules	IC Rules	Verdict
1	Duty cycle	15.407(a)	RSS-247 6.2.4.2	Pass (Note 3)
2	Maximum Output Power	15.407(a)	RSS-247 6.2.4.2	Pass (Note 3)
3	Power Spectral Density	15.407(a)	RSS-247 6.2.4.2	Pass (Note 3)
4	6dB Occupied Bandwidth	15.407(e)	RSS-247 6.2.4.2	Pass (Note 3)
5	99% Occupied Bandwidth	15.407(e)	RSS-GEN 6.7	Pass (Note 3)
6	Band edge compliance	15.407(b)	RSS-247 6.2.4.3	Pass (Note 3)
7	Transmitter Spurious Emission-Conducted	15.407	RSS-247 6.2.4.3	Pass (Note 3)
8	Transmitter Spurious Emission - Radiated	15.407/15.205/15.209	RSS-247 6.2, RSS-Gen 8.9,8.10	Pass
9	AC Powerline Conducted Emission	15.207	RSS-GEN 8.8	Pass
10	Frequency Stability	15.407(g)	RSS-GEN 8.11	N/A
11	Antenna requirement	15.203/15.247(c)	RSS Gen 6.8, RSS-247 5.4	Pass (Note 2)
Note 1: The L15A2,L15B2 manufactured by Shanghai Sunmi Technology Co.,Ltd. is a variant product for testing. This project is a variant project based on the original report I23W00036-WIFI 5.8G-Rev2 with below changes:				

SOFTWARE MODIFICATIONS:

Other changes detailed: The original operating system is Android, and the new system has both Android and windows, which can be switched by app. Operating system changes do not affect RF/EMC performance.

HARDWARE MODIFICATION:

Components on PCB changes:

1) Main Board:Delete MIPI to eDP IC U5201 and its peripheral devices.
2) IO Board: Add Q0703 for second cash box and its peripheral devices.

According to the Product Change Description We tested the radiated spurious emission in the original report, and the test data of the worst mode was recorded in this report.

There are two configurations S03aa Main Supply-L15A2 (With Printer) & S04aa Secondary Supply-L15B2 (Without Printer). The description of the differences between S03aa and S04aa is as follows.

EUT ID	SN or IMEI	Model	Printer
S03aa	TP02E4AT40024	L15A2	80 Printer
S04aa	TR02E4AV40026	L15B2	N/A

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.

Note 2:

Bluetooth used a FPC antenna with max Gain 3.5/3.0 dBi that complied with 15.203 Requirements.

Note 3:

The test verdict of this item come from the original report.

1.4 Data Provided by Applicant

No.	Item(s)	Data
1	Antenna gain of EUT	Ant1:3.5 Ant2:3.0
Note: The data of antenna gain is provided by the Antenna specification may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.		

2. General Information of The Laboratory

2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4，No. 766，Jingang Road，Pudong，Shanghai，China
Telephone	021-68866880
FCC Registration No.	708870
FCC Designation No.	CN1364
IC Designation No.	10766A
CAB identifier	CN0067

2.2 Laboratory Environmental Requirements

Temperature	15℃~35℃
Relative Humidity	25%RH~75%RH
Atmospheric Pressure	86kPa~106kPa

2.3 Project Information

Project Manager	Gao Hongning
Test Date	November 14, 2024 to December 10, 2024

3. General Information of The Customer

3.1 Applicant

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
Telephone	+86 17302160204

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
Telephone	+86 17302160204

4. General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product Name	POS System
Model name	L15A2,L15B2
Date of Receipt	S03aa/S04aa: November 14, 2024
EUT ID*	S03aa/S04aa
SN/IMEI	S03aa: TP02E4AT40024 S04aa: TR02E4AV40026
Supported Radio Technology and Bands	Wi-Fi 2.4G:802.11b/g/n/ax Wi-Fi 5G U-NII-1/ U-NII-2a/U-NII-2c/U-NII-3:802.11a/n/ac/ax Wi-Fi 6E U-NII-5/U-NII-6/U-NII-7/U-NII-8:802.11ax
Hardware Version	6490Coreboard_MB_V3.0
Software Version	3.0.0
FCC ID	2AH25T3PRO
IC	22621-T3PRO
NOTE1： EUT ID is the internal identification code of the laboratory. NOTE2: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.	

4.2 Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
CA03	Adapter	CYSE65-240250	Jiangsu Chenyang Electron Co.,Ltd. Input:100-240V~50/60Hz 1.7A Output: 24.0V⎓2.5A 60.0W
UA03	AC Cable	N/A	N/A
NOTE1: AE ID is the internal identification code of the laboratory.			

4.3 Additional Information

WLAN Frequency	UNII 3: 5725MHz-5850MHz
Occupied Channel Bandwidth	20 MHz for Wi-Fi (802.11 a/n/ac/ax) 40 MHz for Wi-Fi (802.11 n/ac/ax) 80 MHz for Wi-Fi(802.11 ac/ax)
WLAN type of modulation	OFDM

Test frequency list:

UNII-5, UNII-6, UNII-7 and UNII-8:

20MHz Channel	20MHz Center Frequency	40MHz Channel	40MHz Center Frequency	80MHz Channel	80MHz Center Frequency	160MHz Channel	160MHz Center Frequency
/	5935	/		/	/	/	/
1	5955	3	5965	7	5985	15	6025
5	5975						
9	5995	11	6005				
13	6015						
17	6035	19	6045	23	6065		
21	6055						
25	6075	27	6085				
29	6095						
33	6115	35	6125	39	6145	47	6185
37	6135						
41	6155	43	6165				
45	6175						
49	6195	51	6205	55	6225		
53	6215						
57	6235	59	6245				
61	6255						
65	6275	67	6285	71	6305	79	6345
69	6295						
73	6315	75	6325				
77	6335						
81	6355	83	6365	87	6385		
85	6375						
89	6395	91	6405				
93	6415						
97	6435	99	6445	103	6465	111	6505
101	6455						
105	6475	107	6485				
109	6495						
113	6515	115	6525	119	6545		
117	6535						
121	6555	123	6565				

125	6575						
129	6595	131	6605	135	6625	143	6665
133	6615						
137	6635	139	6645				
141	6655						
145	6675	147	6685	151	6705		
149	6695						
153	6715	155	6725				
157	6735						
161	6755	163	6765	167	6785	175	6825
165	6775						
169	6795	171	6805				
173	6815						
177	6835	179	6845	183	6865		
181	6855						
185	6875	187	6885				
189	6895						
193	6915	195	6925	199	6945	207	6985
197	6935						
201	6955	203	6965				
205	6975						
209	6995	211	7005	215	7025		
213	7015						
217	7035	219	7045				
221	7055						
225	7075	227	7085	/	/	/	/
229	7095						
233	7115	/	/				

Note: This report is for WLAN UNII-5, UNII-6, UNII-7 and UNII-8 only.

5 Test Configuration Information

5.1 Laboratory Environmental Conditions

5.1.1 Permanent Facilities

Relative Humidity	Min. = 45 %, Max. = 55 %		
Atmospheric Pressure	101kPa		
Temperature	Normal	Minimum	Maximum
	25℃	0℃	40℃
Working Voltage of EUT	Normal	Minimum	Maximum
	24V	25.2V	22.8V

5.2 Test Equipments Utilized

5.2.1 Radiated Emission Test System

No.	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMU200	123126	V5.2.1	B12	R&S	2024-10-9	1 Year
2	Universal Radio Communication Tester	CMW500	104178	V3.7.20	1206.0600.00	R&S	2024-10-9	1 Year
3	EMI Test Receiver	ESU40	100307	V5.1-24-3	01	R&S	2023-12-19	1 Year
4	TRILOG Broadband Antenna	VULB9163	01345	N/A	N/A	Schwarzbeck	2024-03-29	1 Year
5	Double- ridged Waveguide Antenna	ETS-3117	00135890	N/A	N/A	ETS	2024-03-16	1 Year
6	EMI Test Software	EMC32 V10.35.02	N/A	V10.35.02	N/A	R&S	N-A	N/A
7	Horn Antenna	3160-09	LM6321	N/A	N/A	R&S	2024-08-3	1 Year
8	Horn Antenna	3160-10	LM5942	N/A	N/A	R&S	2024-08-3	1 Year
9	Loop Antenna	AL-130R	121083	N/A	N/A	COM-POWER	2024-08-31	1 Year

10	Preamplifier	SCU08F1	8320024	N/A	N/A	R&S	2024-10-09	1 Year
11	Preamplifier	SCU18	10155	N/A	N/A	R&S	2024-10-09	1 Year
12	Preamplifier	SCU26	10025	N/A	N/A	R&S	2024-10-09	1 Year
13	Preamplifier	SCU40	10020	N/A	N/A	R&S	2024-10-09	1 Year
14	2-Line V-Network	ENV216	101380	N/A	N/A	R&S	2023-12-19	1 Year
15	EMI Test Software	EMC32 V10.35.02	N/A	N/A	N/A	R&S	N/A	N/A
16	Test Receiver	ESCI	101235	V5.1-24-3	0	R&S	2023-12-19	1 Year
17	Antenna Tower	TPMDC-LF	N/A	N/A	N/A	Top Precision	N/A	N/A
18	Antenna Tower	TPMDC-HF	N/A	N/A	N/A	Top Precision	N/A	N/A

5.2.3 Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω
Temperature	Min. = 15 ℃, Max. = 35 ℃

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (9.8 meters×6.7 meters×6.7 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz

5.3 Measurement Uncertainty

Measurement Uncertainty of Conduction test

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Emission Bandwidth	5150-5850MHz	95%	±1.9%
Maximum Conduct Output Power	5150-5850MHz	95%	± 1.18 dB
Power Spectral Density	5150-5850MHz	95%	±0.98 dB
Band Edge Measurements	5150-5850MHz	95%	±1.21dB
Unwanted Emissions Measurement	9kHz-40GHz	95%	9kHz-7GHz:±1.21dB 7GHz-40GHz: ±3.31dB

Frequency Stability	5150-5850MHz	95%	±1.9%

Measurement Uncertainty of Radiation test

Measurement Items	**Uncertainty(dB)**
Radiated Emission 30MHz-1000MHz	±5.10
Radiated Emission 1000MHz-18000MHz	±5.66
Radiated Emission 18000MHz-40000MHz	±5.22
AC Powerline Conducted Emission	±4.38
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of *k*=2.	

6 Measurement Results

6.1 Undesirable Emissions (Radiated Band Edge)

6.1.1 Measurement Limit

Below 1G:

Frequency of emission (MHz)	Field strength(dBμV/m)	Measurement distance(m)
0.009-0.490	129-94	3
0.490-1.705	74-63	3
1.705-30	70	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: for frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m

Above 1G, non-restricted band:

Standard	Limit
15.407(b)	EIRP ＜-27dBm/MHz
RSS-247 6.2	EIRP ＜-27dBm/MHz

Above 1G, Restricted band:

Standard	Limit	
15.407(b)	EIRP ＜-27dBm/MHz	
15.209	Peak	74dBμV/m
	Average	54dBμV/m
RSS-247 6.2	EIRP ＜-27dBm/MHz	
RSS-Gen 8.9	Peak	74dBμV/m
	Average	54dBμV/m

EIRP[dBm] = E[dBμV/m] + 20 log (d[m]) − 104.7

E[dBμV/m] = EIRP[dBm] - 20 log (d[m]) + 104.7

E[dBμV/m] = EIRP[dBm] + 95.2 = 68.2， for d = 3m

6.1.2 Test procedures

The measurement is made according to KDB 789033

Set the spectrum analyzer in the following:

Procedure for Unwanted Emissions Measurements below 1000 MHz:

a) Follow the requirements in II.G.3. “General Requirements for Unwanted Emissions Measurements.”

b) Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

Detector: Peak and Quasi-Peak

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz:

a) Follow the requirements in II.G.3, "General Requirements for Unwanted Emissions Measurements."

b) Maximum emission levels are measured by setting the analyzer as follows:

(i) RBW = 1 MHz.

(ii) VBW ≥ 3 MHz.

(iii) Detector = Peak.

(iv) Sweep time = auto.

(v) Trace mode = max hold.

(vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50% duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

Procedures for Average Unwanted Emissions Measurements above 1000 MHz:

a) Follow the requirements in section II.G.3., "General Requirements for Unwanted Emissions Measurements."

b) Average emission levels shall be measured using one of the following two methods.

c) Method AD (Average Detection): Primary method

(i) RBW = 1 MHz.

(ii) VBW ≥ 3 MHz.

(iii) Detector = power averaging (rms), if span/(# of points in sweep) ≤ RBW/2. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.

(iv) Averaging type = power averaging (rms)

As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

(v) Sweep time = auto.

(vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—rather than turning on and off with the transmit cycle, at least 100 traces shall be averaged.)

(vii) If tests are performed with the EUT transmitting at a duty cycle less than 98%, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

If power averaging (rms) mode was used in step (iv) above, the correction factor is 10 log (1/x), where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB must be added to the measured emission levels.

If linear voltage averaging mode was used in step (iv) above, the correction factor is 20 log (1/x), where

x is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB must be added to the measured emission levels.

If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning on and off with the transmit cycle, no duty cycle correction is required for that emission.

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. Below 18GHz , the measurement antenna was placed at a distance of 3 meters from the EUT. Above 18GHz , the measurement antenna was placed at a distance of 1 meter from the EUT. During the tests, the antenna height varied from 1m to 4m and the EUT azimuth were varied from 0° to 360° in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Remark:

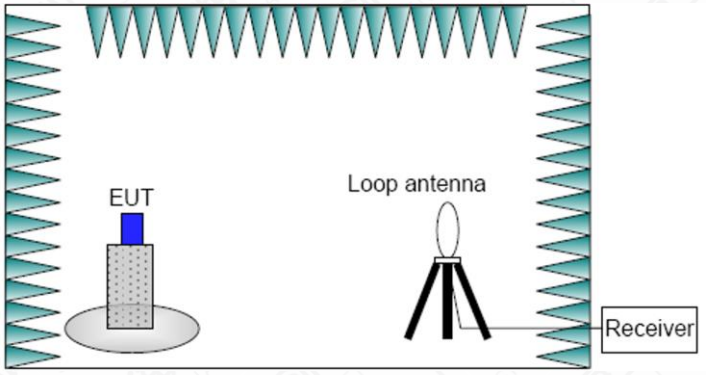
1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level is lower than AV limit, the AV test can be elided

Note:

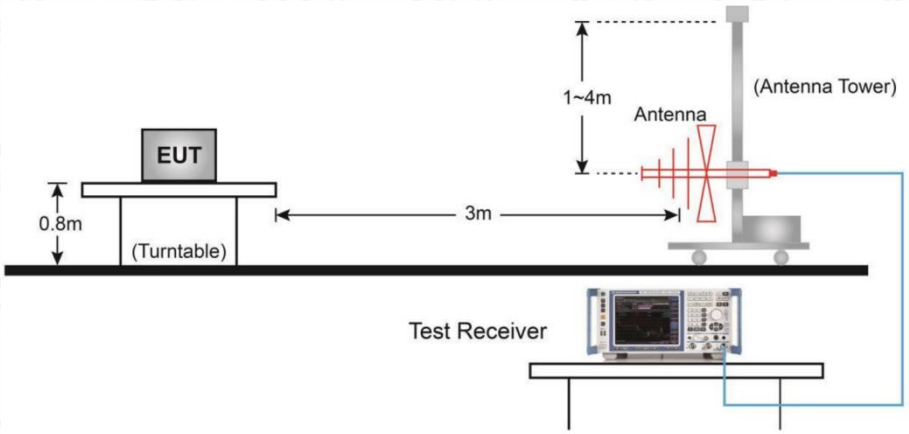
1. The out-of- limit signal in the picture is the main frequency signal.
2. Only data in worst mode is provided.
3. The test data below 30MHz is more than 20dB lower than the limit value, so it is not provided in the report.
4. Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.

6.1.3 Test Setup

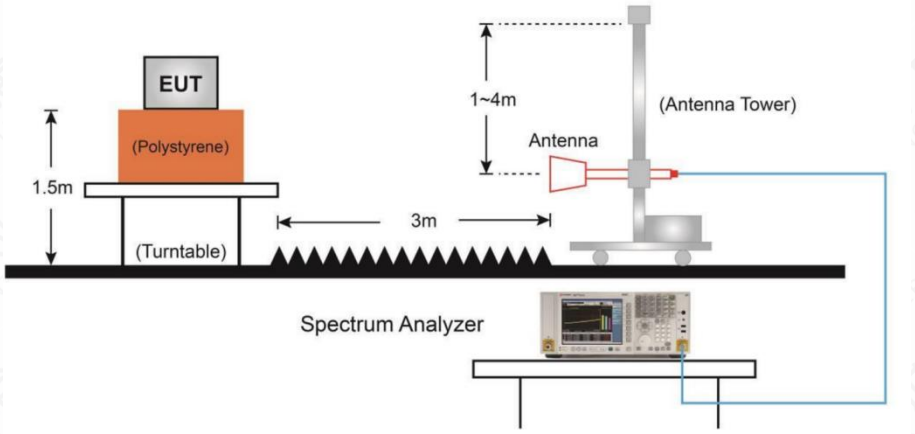
Below 30MHz Test Setup



Below 1GHz Test Setup



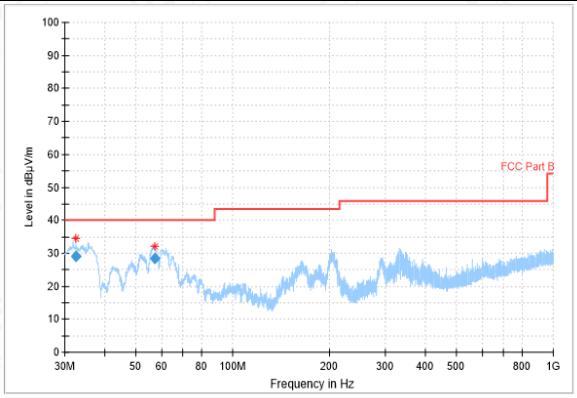
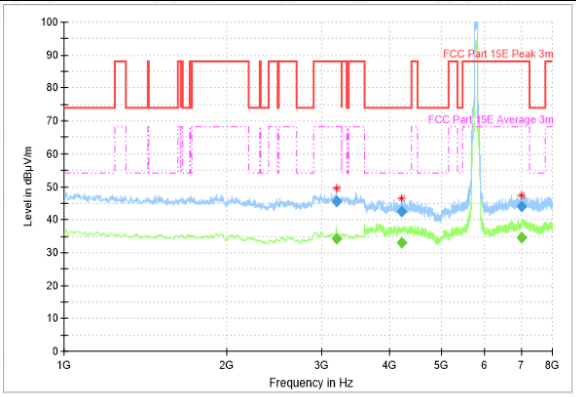
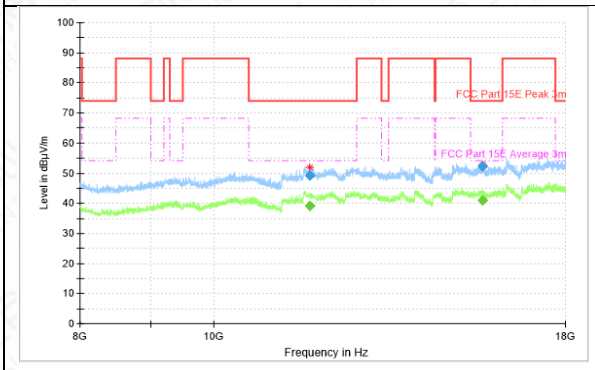
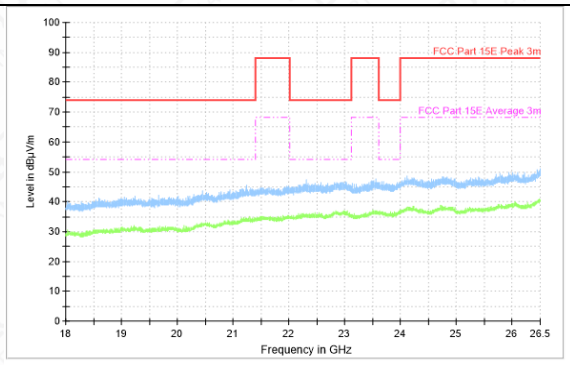
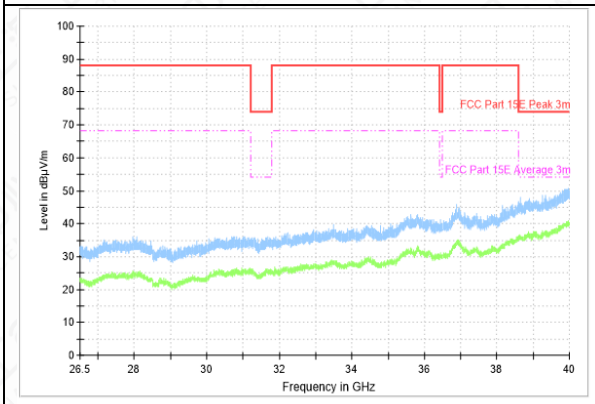
Above 1GHz Test Setup



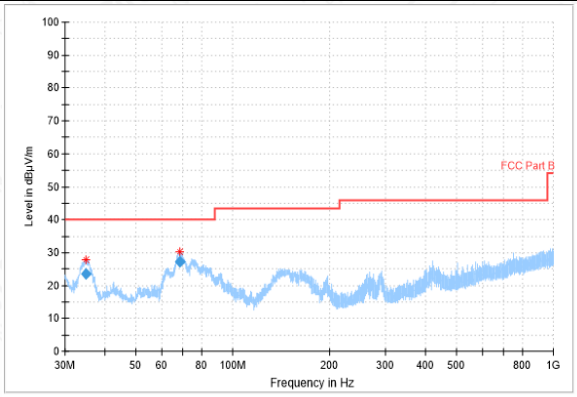
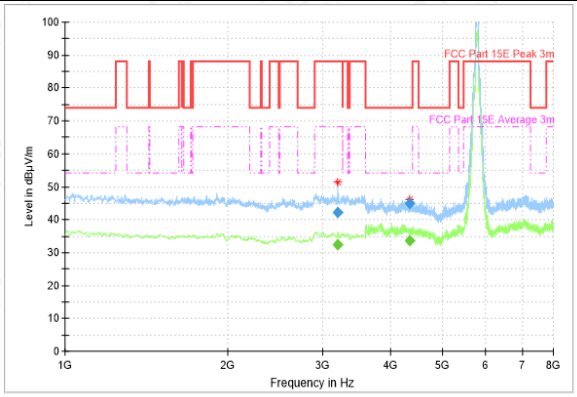
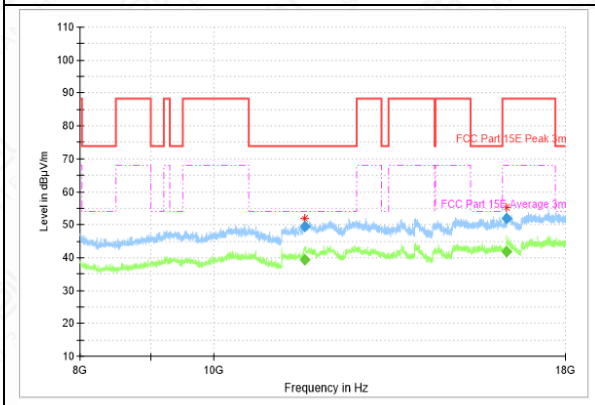
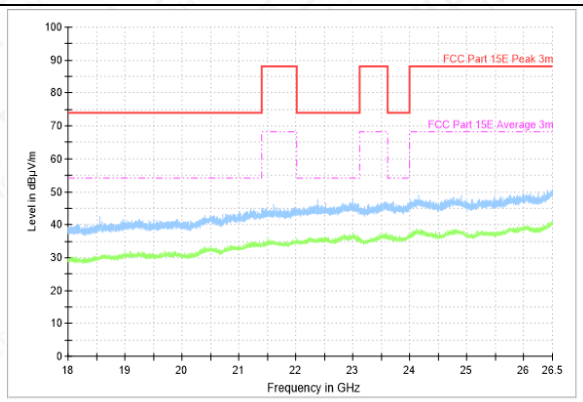
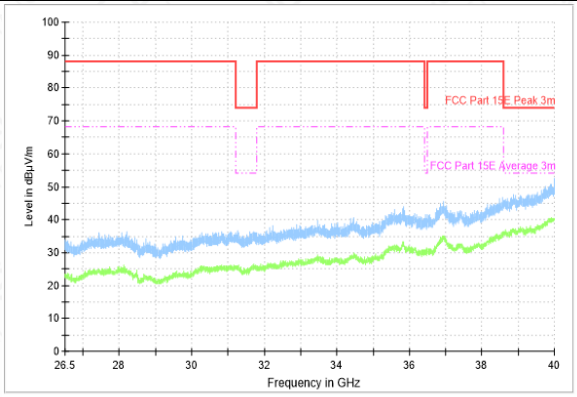
6.1.4 Measurement Results

Mode	Channel	Frequency Range	Conclusion
11AX	114	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P

Mainly Supply (S03aa)

RSE-11AX(80M)-CH155-30MHz-1GHz	RSE-11AX(80M)-CH155-1GHz-8GHz
	
RSE-11AX(80M)-CH155-8GHz-18GHz	**RSE-11AX(80M)-CH155-18GHz-26.5GHz**
	
RSE-11AX(80M)-CH155-26.5GHz-40GHz	**/**
	**/**

Secondary supply (S04aa)

RSE-11AC(80M)-CH155-30MHz-1GHz	RSE-11AC(80M)-CH155-1GHz-8GHz
	
RSE-11AC(80M)-CH155-8GHz-18GHz	RSE-11AC(80M)-CH155-18GHz-26.5GHz
	
RSE-11AC(80M)-CH155-26.5GHz-40GHz	/
	/

Note:

1. The out-of- limit signal in the picture is the main frequency signal.
2. Only data in worst mode is provided.
3. The test data below 30MHz is more than 20dB lower than the limit value, so it is not provided in the report.

Mainly Supply (S03aa)

RSE-11AX(80M)-CH155-30MHz-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
32.4	28.96	-16	44.96	11.04	40.00	V
57.2	28.51	-12	40.51	11.49	40.00	V

RSE-11AX(80M)-CH155-1GHz-8GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
3190.4	45.47	0	45.47	42.73	88.20	V
4203.4	42.37	1	41.37	31.63	74.00	V
7015.4	44.01	4	40.01	44.19	88.20	H

RSE-11AX(80M)-CH155-1GHz-8GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
3190.4	34.37	0	34.37	33.83	68.20	V
4203.4	33.12	1	32.12	20.88	54.00	V
7015.4	34.67	4	30.67	33.53	68.20	H

RSE-11AX(80M)-CH155-8GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
11736.6	49.38	10	39.38	24.62	74.00	H
15660.6	52.29	15	37.29	21.71	74.00	H

RSE-11AX(80M)-CH155-8GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
11736.6	39.16	10	29.16	14.84	54.00	H
15660.6	40.91	15	25.91	13.09	54.00	H

Secondary supply (S04aa)

RSE-11AC(80M)-CH155-30MHz-1GHz

Frequency (MHz)	QuasiPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
34.9	23.61	-15	38.61	16.39	40.00	H
68.4	27.13	-15	42.13	12.87	40.00	H

RSE-11AC(80M)-CH155-1GHz-8GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
3197.6	42.16	0	42.16	46.04	88.20	V
4331.8	44.83	1	43.83	29.17	74.00	V

RSE-11AC(80M)-CH155-1GHz-8GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
3197.6	32.37	0	32.37	35.83	68.20	V
4331.8	33.54	1	32.54	20.46	54.00	V

RSE-11AC(80M)-CH155-8GHz-18GHz

Frequency (MHz)	MaxPeak(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
11637.8	49.48	10	39.48	24.52	74.00	H
16301.2	51.96	16	35.96	36.24	88.20	H

RSE-11AC(80M)-CH155-8GHz-18GHz

Frequency (MHz)	Average(dBμV/m)	ARpl (dB)	PMea (dBμV/m)	Margin(dB)	Limit(dBμV/m)	Polarity
11637.8	39.37	10	29.37	14.63	54.00	H
16301.2	41.66	16	25.66	26.54	68.20	H

6.2 Undesirable Emissions (Radiated Band Edge)

6.2.1 Measurement Limit

Above 1G, non-restricted band

Standard	Limit
15.407(b)	EIRP ＜-27dBm/MHz
RSS-247 6.2	EIRP ＜-27dBm/MHz

Above 1G, Restricted band

Standard	Limit	
15.407(b)	EIRP ＜-27dBm/MHz	
15.209	Peak	74dBμV/m
	Average	54dBμV/m
RSS-247 6.2	EIRP ＜-27dBm/MHz	
RSS-Gen 8.9	Peak	74dBμV/m
	Average	54dBμV/m

EIRP[dBm] = E[dBμV/m] + 20 log (d[m]) − 104.7

E[dBμV/m] = EIRP[dBm] - 20 log (d[m]) + 104.7

E[dBμV/m] = EIRP[dBm] + 95.2 = 68.2， for d = 3m

6.2.2 Test Procedure

The measurement is made according to KDB 789033.

Marker-Delta Method: The marker-delta method, as described in ANSI C63.10, can be used to perform measurements of the radiated unwanted emissions level of emissions provided that the 99% occupied bandwidth of the fundamental is within 2 MHz of the authorized band-edge.

Procedure for peak unwanted emissions measurements above 1000 MHz

The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:

a) Follow the requirements in 12.7.4.

b) Peak emission levels are measured by setting the instrument as follows:

1) RBW = 1 MHz.

2) VBW ≥ [3 × RBW].

3) Detector = peak.

4) Sweep time = auto.

5) Trace mode = max hold.

6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately 1 / D, where D is the duty cycle. For example, at 50% duty cycle, the measurement time will increase by a factor of two, relative to measurement time for continuous transmission.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1 MHz.

b) Video bandwidth:

1) If the EUT is configured to transmit with $D \geq 98\%$, then set VBW ≤ RBW / 100 (i.e., 10 kHz), but not less than 10 Hz.

2) If the EUT *D* is < 98%, then set VBW ≥ 1 / *T*, where *T* is defined in item a1) of 12.2.

c) Video bandwidth mode or display mode:

1) The instrument shall be set with video filtering applied in the power domain. Typically, this requires setting the detector mode to RMS (power averaging) and setting the average-VBW type to power (rms).

2) As an alternative, the instrument may be set to linear detector mode. Video filtering shall be applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode to accomplish this. Others have a setting for average-VBW type, which can be set to "voltage" regardless of the display mode.

d) Detector = peak.

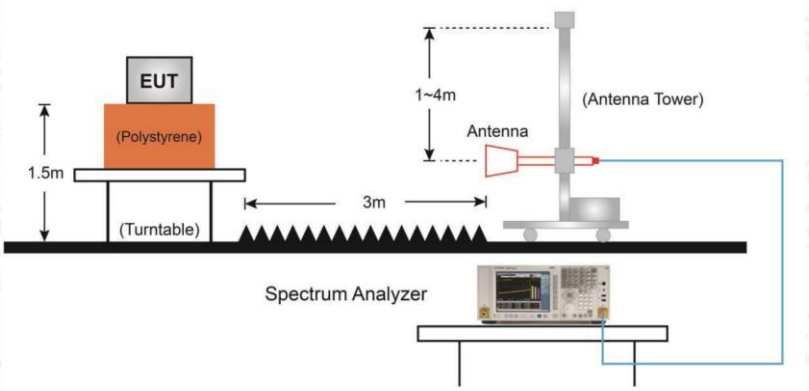
e) Sweep time = auto.

f) Trace mode = max hold.

g) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/*x*, where *D* is the duty cycle. For example, use at least 200 traces if the duty cycle is 25%. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 50 traces should be averaged.)

The measurement was applied in a fully anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna. Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. During the tests, the antenna height varied from 1m to 4m and the EUT azimuth were varied from 0° to 360° in order to identify the maximum level of emissions from the EUT. In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

6.2.3 Test Setup

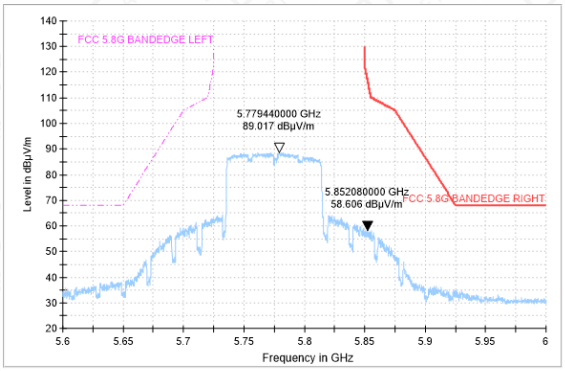
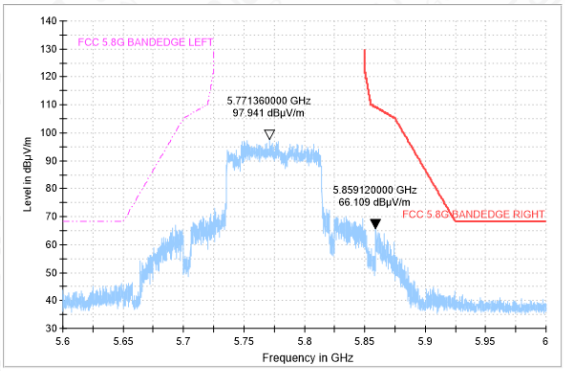


6.2.4 Measurement Result

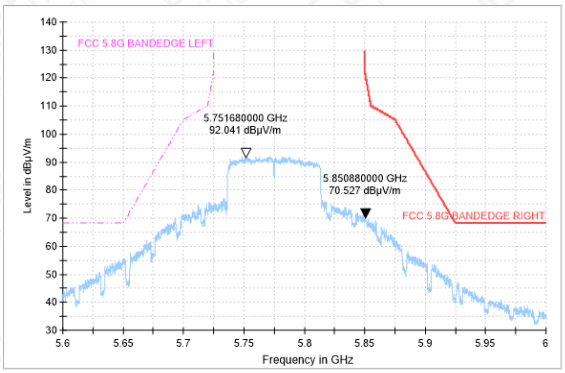
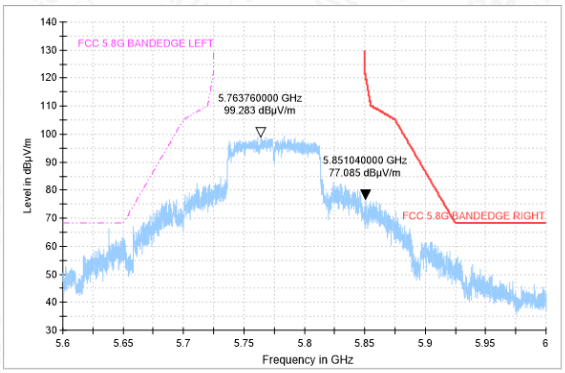
Mode	Channel	Conclusion
802.11ax	155	P

Test graphs as below:

Mainly Supply(S03aa)

BANDEDGE-11AX(80M)-CH155-AV	BANDEDGE-11AX(80M)-CH155-PK
	

Secondary Supply(S04aa)

BANDEDGE-11AC(80M)-CH155-AV	BANDEDGE-11AC(80M)-CH155-PK
	

Note: Only data in worst mode is provided.

6.3 AC Powerline Conducted Emission

6.3.1 Limit Level Construction

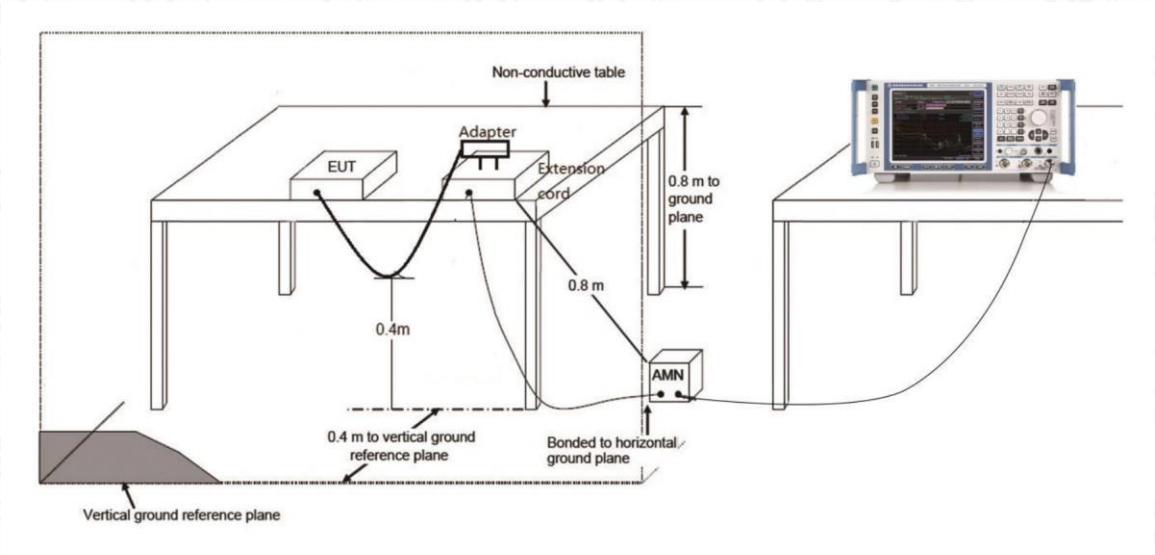
Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

6.3.2 Method of Measurement: ANSI C63.10-2013-clause 6.2

1. The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.
2. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.
3. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.
4. If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.36 Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

6.3.3 Test Setup



6.3.4 Test Condition

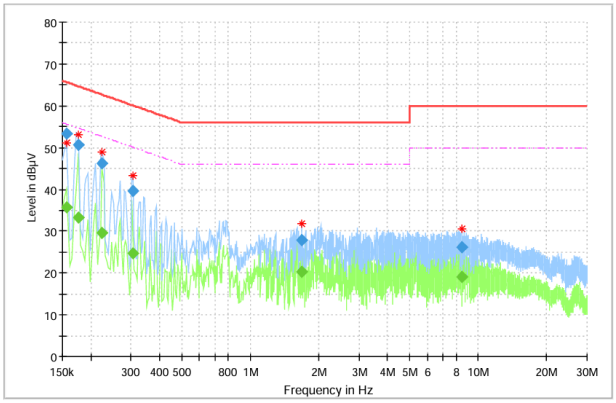
Voltage（V）	Frequency（Hz）
120	60

6.3.5 Measurement limit

(Quasi-peak-average Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	66 to 56	56 to 46	P
0.5 to 5	56	46	
5 to 30	60	50	
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.			

6.3.6 Measurement Result

11a-CDD CH5745	/
	/

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas.Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.157463	---	35.63	55.60	19.97	15000.0	9.000	L1	ON	10.0
0.157463	53.36	---	65.60	12.23	15000.0	9.000	L1	ON	10.0
0.176119	---	33.19	54.67	21.48	15000.0	9.000	L1	ON	10.0
0.176119	50.58	---	64.67	14.08	15000.0	9.000	L1	ON	10.0
0.224625	---	29.64	52.65	23.01	15000.0	9.000	L1	ON	10.1
0.224625	46.14	---	62.65	16.50	15000.0	9.000	L1	ON	10.1
0.306713	---	24.64	50.06	25.42	15000.0	9.000	L1	ON	10.2
0.306713	39.52	---	60.06	20.54	15000.0	9.000	L1	ON	10.2
1.683544	27.83	---	56.00	28.17	15000.0	9.000	N	ON	9.8
1.683544	---	20.38	46.00	25.62	15000.0	9.000	N	ON	9.8
8.474419	26.19	---	60.00	33.81	15000.0	9.000	L1	ON	9.8
8.474419	---	19.16	50.00	30.84	15000.0	9.000	L1	ON	9.8

Note:All modes have been tested and only the worst mode is recorded in the report.

Annex A: Revised History

Version	Revised Content
V0	Initial

Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

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*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 20th day of September 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2025

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

END OF REPORT