
FCC Test Report

Report No.: AGC00803201103FE01

FCC ID : ZE9-ST-UCSW

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : Satechi Slim USB-C Wired Keyboard

BRAND NAME : SATECHI

MODEL NAME : ST-UCSW3M (series model please see page 5)

APPLICANT : Sariana LLC

DATE OF ISSUE : Nov. 25, 2020

STANDARD(S) : FCC Part 15 Subpart B

REPORT VERSION : V1.0

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Nov. 25, 2020	Valid	Initial release

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1 VERIFICATION OF CONFORMITY

Applicant	Sariana LLC
Address	7365 Mission Gorge Road Suite G San Diego , CA 92120 U.S.A
Manufacturer	Sariana LLC
Address	7365 Mission Gorge Road Suite G San Diego , CA 92120 U.S.A
Factory	Sariana LLC
Address	7365 Mission Gorge Road Suite G San Diego , CA 92120 U.S.A
Product Designation	Satechi Slim USB-C Wired Keyboard
Brand Name	SATECHI
Test Model	ST-UCSW3M
Series Model	Please see page 5
Difference description	All the same except for the appearance of the size.
Date of test	Nov. 09, 2020 to Nov. 25, 2020
Deviation	None any deviation from the test method.
Condition of Test Sample	Normal
Test Result	Pass

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, the measurement procedure according to ANSI C63.4:2014. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Prepared By



Jack Gui
(Project Engineer)

Nov. 25, 2020

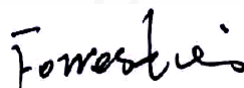
Reviewed By



Calvin Liu
(Reviewer)

Nov. 25, 2020

Approved By



Forrest Lei
(Authorized Officer)

Nov. 25, 2020

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2 SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	Normal operation	V
Note: 1.V means EMI worst mode.		

3 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, $U_c = \pm 3.1$ dB
- Uncertainty of Radiated Emission Below 1GHz, $U_c = \pm 4.0$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 5.4$ dB

Series model
ST-UCSW2M, ST-UCSW1M, ST-UCSW3S, ST-UCSW2S, ST-UCSW1S, ST-UCSW3B, ST-UCSW2B, ST-UCSW1B, ST-UCSW3R, ST-UCSW2R, ST-UCSW1R, ST-UCSW3G, ST-UCSW2G, ST-UCSW1G, ST-UCSW3K, ST-UCSW2K, ST-UCSW1K, ST-UCSW1X, ST-UCSW2X, ST-UCSW3X, ST-UCSW3M-FR, ST-UCSW3M-DE, ST-UCSW3M-ND, ST-UCSW3M-CH, ST-UCSW3M-UK, ST-UCSW3M-RU, ST-UCSW3M-JP, ST-UCSW3M-SC, ST-UCSW2M-FR, ST-UCSW2M-DE, ST-UCSW2M-ND, ST-UCSW2M-CH, ST-UCSW2M-UK, ST-UCSW2M-RU, ST-UCSW2M-JP, ST-UCSW2M-SC, ST-UCSW1M-FR, ST-UCSW1M-DE, ST-UCSW1M-ND, ST-UCSW1M-CH, ST-UCSW1M-UK, ST-UCSW1M-RU, ST-UCSW1M-JP, ST-UCSW1M-SC, ST-UCSWYX-XX

Note:

"Y" is Arabian number 1,2 or 3 and X is English letter means color, XX means layout/country

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4 PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 5V by PC
Working Frequency	24MHz

I/O Port Information (☒ Applicable ☐ Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
Type-C	1	1.56m Unshielded	1

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5 SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
PC	XIAOMI	Boh-WAQ9RP	--	--	--
PC	APPLE	A2179	--	--	--
Adapter(PC)	APPLE	A2164	--	--	1.2m Unshielded

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6 TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

7 TEST EQUIPMENT LIST

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03, 2020	Jul. 02, 2021
Test software	R&S	ES-K1(Ver.V1.7.1)	N/A	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	R&S	ESCI	10096	May 15, 2020	May 14, 2021
Antenna	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
EXA Signal Analyzer	Agilent	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
Test software	FARA	EZ EMC (Ver.RA-03A)	N/A	N/A	N/A
Test software	Tonscend	JS32-re(Ver.2.5)	N/A	N/A	N/A

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8 TEST SUMMARY LIST

Test item	Test Requirement	Test Method	Class/Severity	Result
Conducted Emission	FCC Part 15 Subpart B	ANSI C63.4	Class B	Pass
Radiated Emission	FCC Part 15 Subpart B	ANSI C63.4	Class B	Pass

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9 FCC LINE CONDUCTED EMISSION TEST

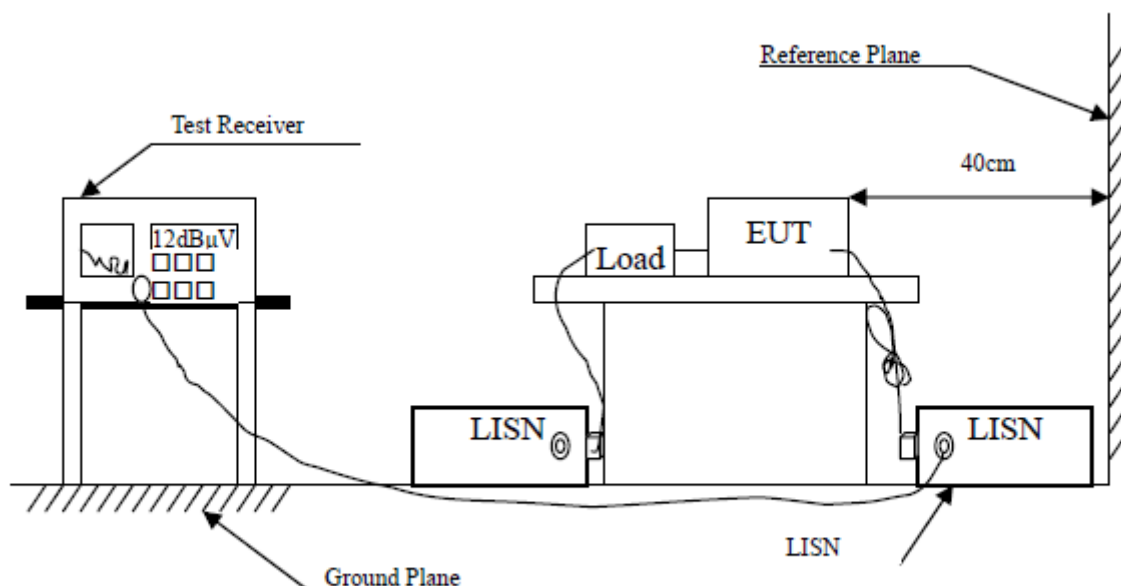
9.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

9.2 BLOCK DIAGRAM OF TEST SETUP



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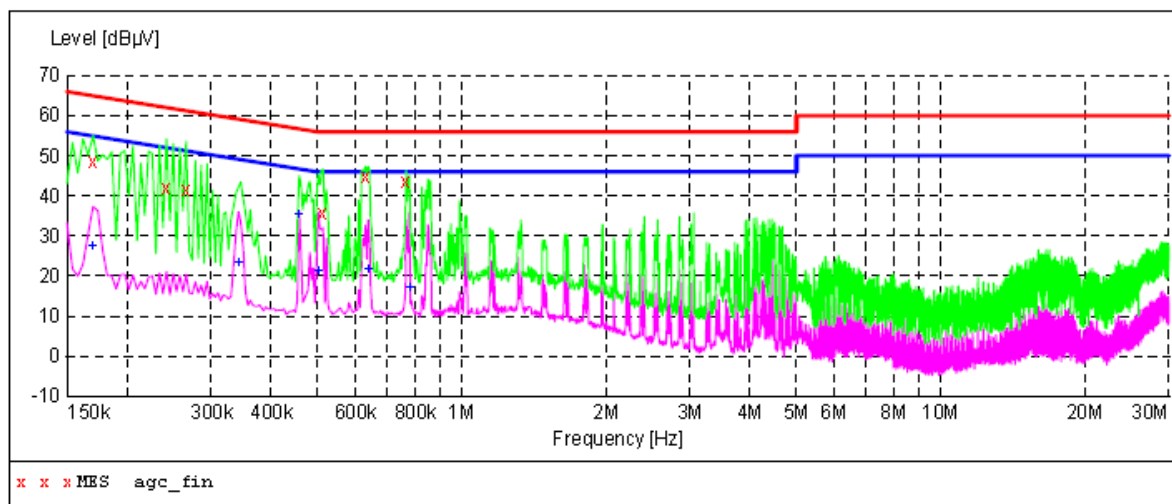
9.3 PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per ANSI C63.4.
- (3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- (4) The EUT was received DC 5V power from adapter which received AC 120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- (5) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- (7) During the above scans, the emissions were maximized by cable manipulation.
- (8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (9) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

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9.4 TEST RESULT OF LINE CONDUCTED EMISSION TEST

Big
LINE CONDUCTED EMISSION TEST-L**MEASUREMENT RESULT: "agc_fin"**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.170000	48.50	11.3	65	16.5	QP	L1
0.242000	42.10	11.3	62	19.9	QP	L1
0.266000	41.50	11.3	61	19.7	QP	L1
0.514000	35.70	11.3	56	20.3	QP	L1
0.630000	44.80	11.3	56	11.2	QP	L1
0.766000	43.50	11.3	56	12.5	QP	L1

MEASUREMENT RESULT: "agc_fin2"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.170000	27.60	11.3	55	27.4	AV	L1
0.342000	23.40	11.3	49	25.8	AV	L1
0.458000	35.50	11.3	47	11.2	AV	L1
0.502000	21.10	11.3	46	24.9	AV	L1
0.638000	21.50	11.3	46	24.5	AV	L1
0.778000	17.00	11.3	46	29.0	AV	L1

RESULT: PASS

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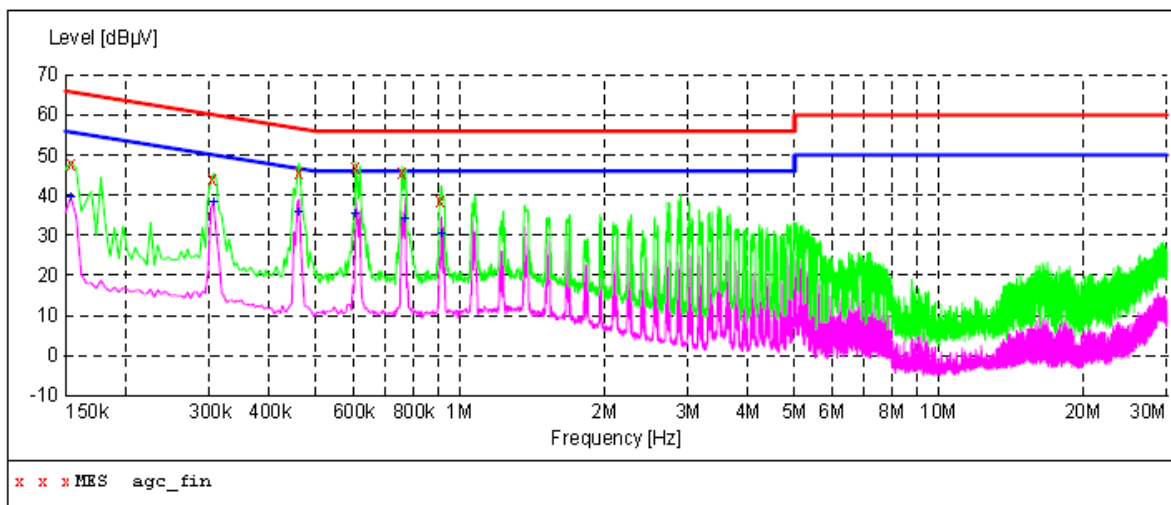
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LINE CONDUCTED EMISSION TEST-N



MEASUREMENT RESULT: "agc_fin"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.154000	47.70	11.3	66	18.1	QP	N
0.306000	43.90	11.3	60	16.2	QP	N
0.462000	45.70	11.3	57	11.0	QP	N
0.606000	47.10	11.3	56	8.9	QP	N
0.758000	45.80	11.3	56	10.2	QP	N
0.914000	38.40	11.3	56	17.6	QP	N

MEASUREMENT RESULT: "agc_fin2"

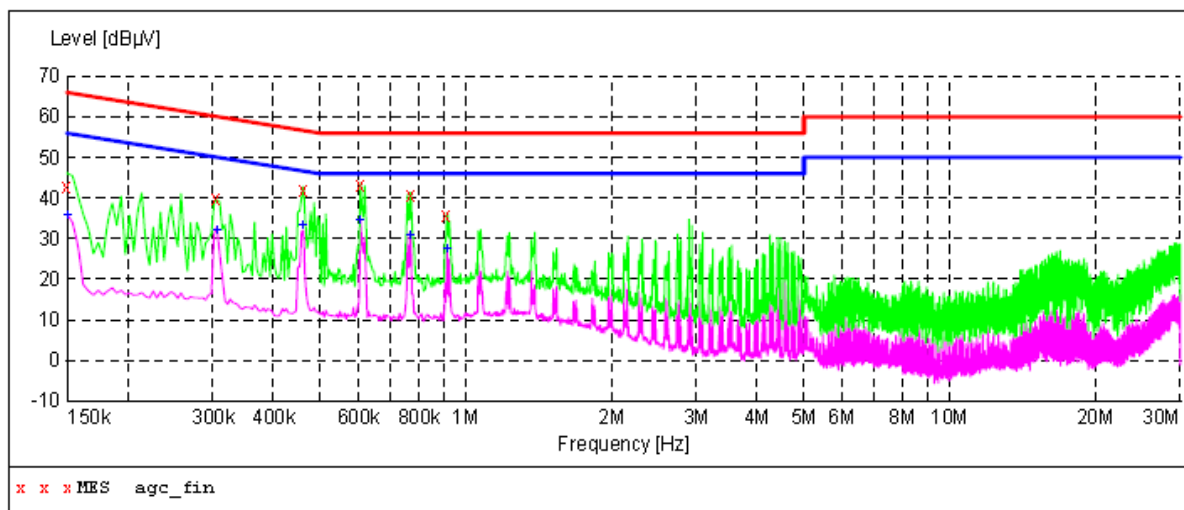
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.154000	39.40	11.3	56	16.4	AV	N
0.306000	38.10	11.3	50	12.0	AV	N
0.462000	35.80	11.3	47	10.9	AV	N
0.606000	35.40	11.3	46	10.6	AV	N
0.770000	33.90	11.3	46	12.1	AV	N
0.914000	30.40	11.3	46	15.6	AV	N

RESULT: PASS

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Small
LINE CONDUCTED EMISSION TEST-L**MEASUREMENT RESULT: "agc_fin"**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	42.80	11.3	66	23.2	QP	L1
0.306000	40.00	11.3	60	20.1	QP	L1
0.462000	42.10	11.3	57	14.6	QP	L1
0.606000	43.00	11.3	56	13.0	QP	L1
0.770000	40.90	11.3	56	15.1	QP	L1
0.914000	35.90	11.3	56	20.1	QP	L1

MEASUREMENT RESULT: "agc_fin2"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	35.90	11.3	56	20.1	AV	L1
0.306000	31.80	11.3	50	18.3	AV	L1
0.462000	33.10	11.3	47	13.6	AV	L1
0.606000	34.40	11.3	46	11.6	AV	L1
0.770000	30.90	11.3	46	15.1	AV	L1
0.914000	27.40	11.3	46	18.6	AV	L1

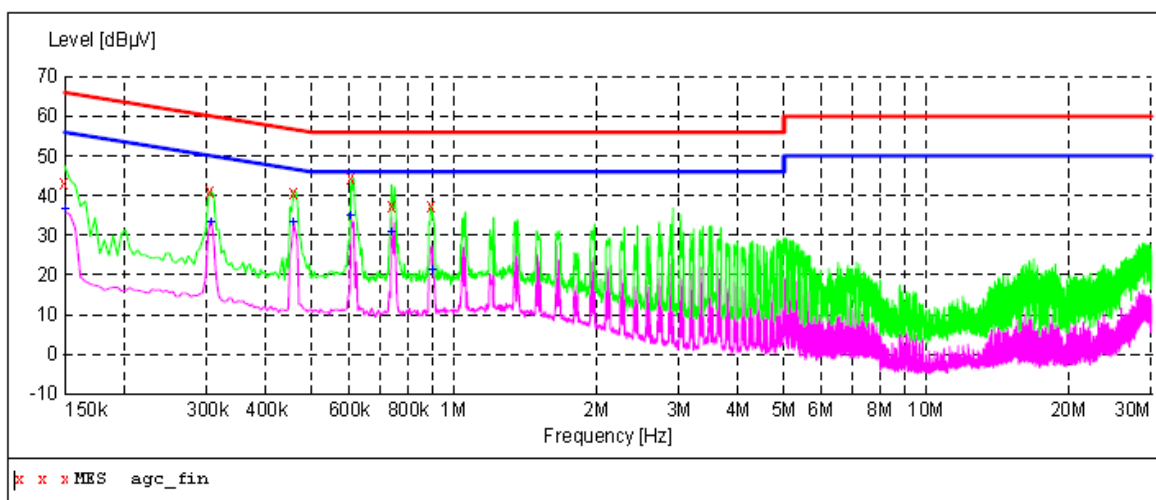
RESULT: PASS

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LINE CONDUCTED EMISSION TEST-N

**MEASUREMENT RESULT: "agc_fin"**

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	43.30	11.3	66	22.7	QP	N
0.306000	41.30	11.3	60	18.8	QP	N
0.458000	40.70	11.3	57	16.0	QP	N
0.606000	44.60	11.3	56	11.4	QP	N
0.738000	37.30	11.3	56	18.7	QP	N
0.898000	37.30	11.3	56	18.7	QP	N

MEASUREMENT RESULT: "agc_fin2"

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
0.150000	36.50	11.3	56	19.5	AV	N
0.306000	33.40	11.3	50	16.7	AV	N
0.458000	33.20	11.3	47	13.5	AV	N
0.606000	34.70	11.3	46	11.3	AV	N
0.738000	30.80	11.3	46	15.2	AV	N
0.898000	21.20	11.3	46	24.8	AV	N

RESULT: PASS

Note:

- Measurement Level(dBuV) = Receiver reading(dBuV)+Tansd(dB)
Transd(dB)=AMN Factor(dB)+Cable Loss(dB)+Attenuation(dB) for Attenuator
Margin= Limit-Level

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10 FCC RADIATED EMISSION TEST

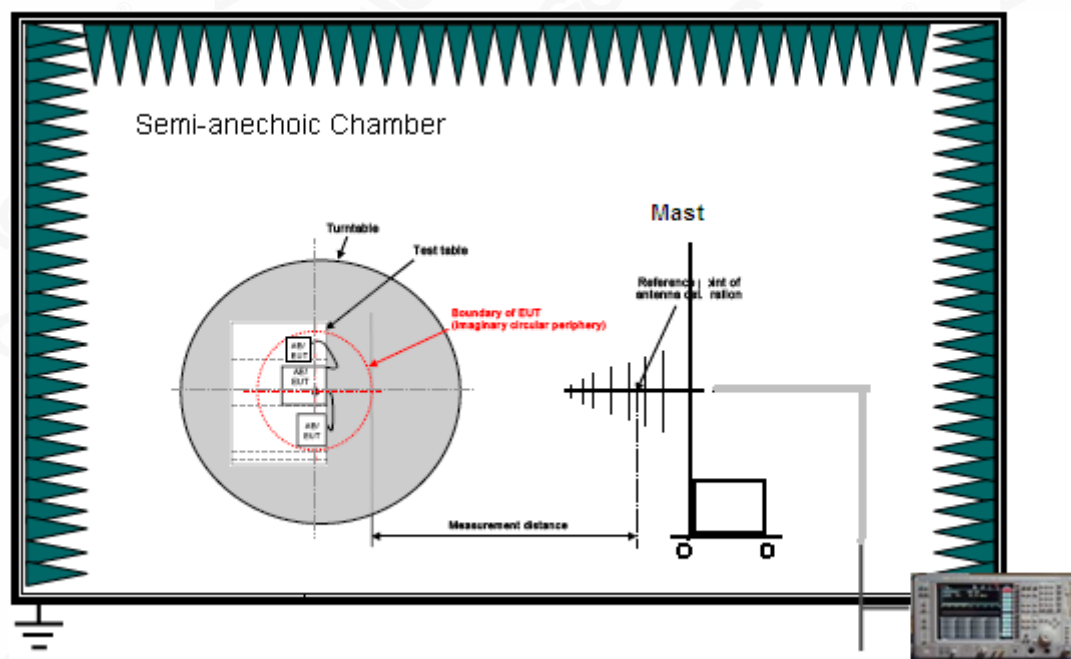
10.1 LIMITS OF RADIATED EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30~88	3	40.0
88~216	3	43.5
216~960	3	46.0
Above 960	3	54.0

Note: The lower limit shall apply at the transition frequency.

10.2 BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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10.3 PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per ANSI C63.4.
- (3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- (4) The EUT connected to the PC and works normally.
- (5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

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10.4 TEST RESULT OF RADIATED EMISSION TEST

Big

Radiated Emission Test at 3m Distance--(30MHz-1000MHz) Horizontal



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		37.7599	16.61	13.85	30.46	40.00	-9.54	peak
2		119.2399	15.96	17.90	33.86	43.50	-9.64	peak
3		156.0999	13.47	19.20	32.67	43.50	-10.83	peak
4		246.3100	13.65	18.55	32.20	46.00	-13.80	peak
5		622.6699	8.00	27.22	35.22	46.00	-10.78	peak
6	*	836.0700	7.18	30.88	38.06	46.00	-7.94	peak

RESULT: PASS

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Radiated Emission Test at 3m Distance--(30MHz-1000MHz) Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	37.7599	22.87	13.85	36.72	40.00	-3.28	QP
2		119.2399	12.86	17.90	30.76	43.50	-12.74	peak
3		165.8000	14.55	18.59	33.14	43.50	-10.36	peak
4		384.0500	5.92	22.42	28.34	46.00	-17.66	peak
5		538.2799	6.67	25.74	32.41	46.00	-13.59	peak
6		741.9800	6.46	29.10	35.56	46.00	-10.44	peak

RESULT: PASS

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Small

Radiated Emission Test at 3m Distance--(30MHz-1000MHz) Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		36.7899	13.24	13.31	26.55	40.00	-13.45	peak
2		150.2800	10.41	19.21	29.62	43.50	-13.88	peak
3		256.9800	9.94	18.36	28.30	46.00	-17.70	peak
4		384.0500	6.99	22.42	29.41	46.00	-16.59	peak
5		486.8700	11.29	24.73	36.02	46.00	-9.98	peak
6	*	806.0000	6.27	30.49	36.76	46.00	-9.24	peak

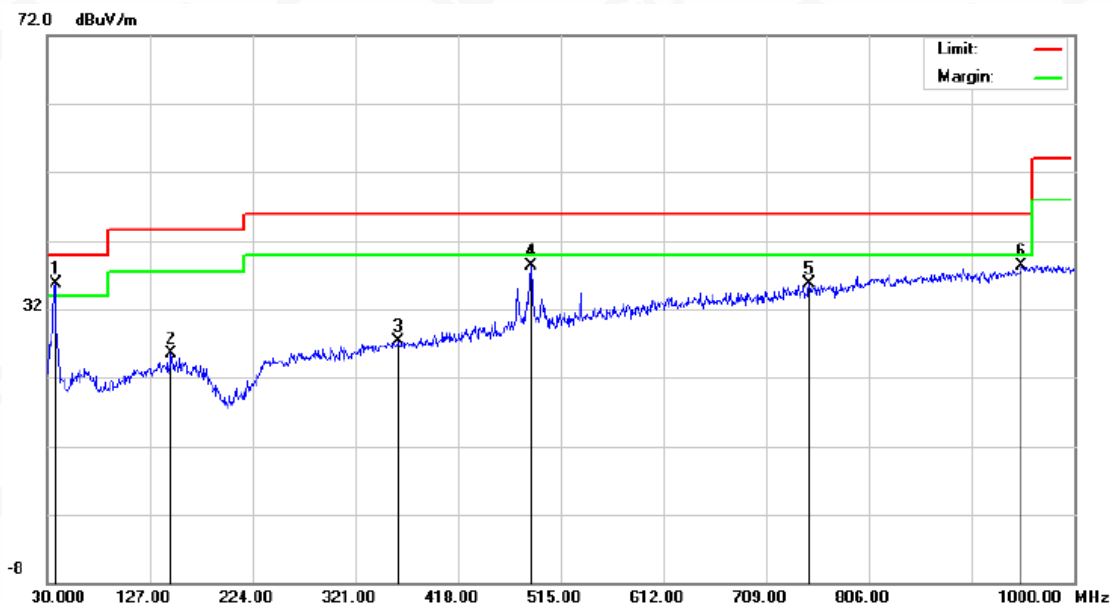
RESULT: PASS

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Radiated Emission Test at 3m Distance--(30MHz-1000MHz) Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	37.7599	21.81	13.85	35.66	40.00	-4.34	peak
2		147.3700	6.20	19.22	25.42	43.50	-18.08	peak
3		361.7400	5.65	21.64	27.29	46.00	-18.71	peak
4		486.8700	13.61	24.73	38.34	46.00	-7.66	peak
5		749.7400	6.37	29.27	35.64	46.00	-10.36	peak
6		950.5299	6.20	32.13	38.33	46.00	-7.67	peak

RESULT: PASS

Note: 1. Measurement = Reading + Factor, Over = Measurement – Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

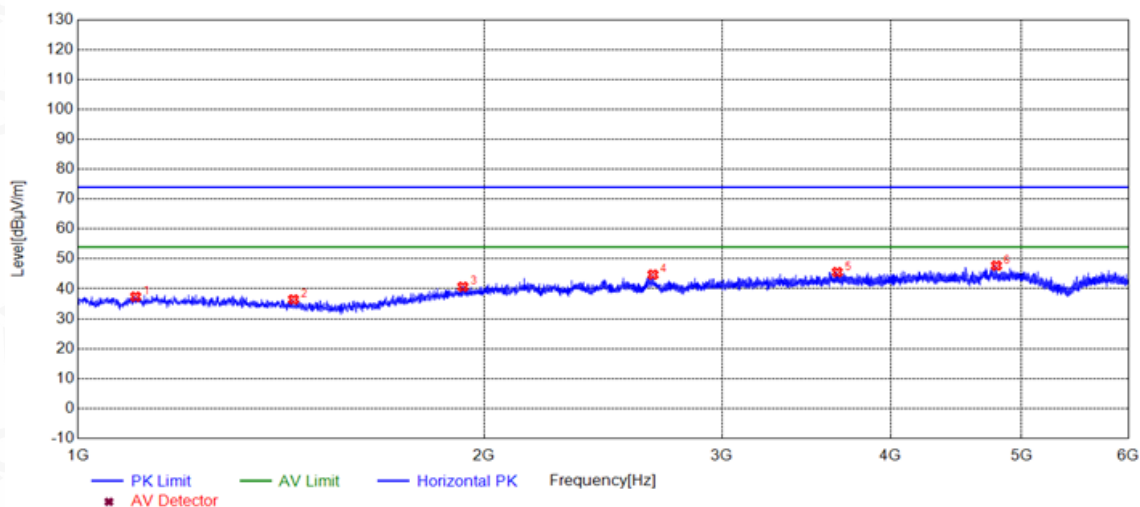
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Big

Radiated Emission Test at 3m Distance-Above 1G –Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1103.5104	37.37	-16.74	74.00	36.63	100	360	Horizontal
2	1444.5445	36.44	-17.08	74.00	37.56	100	260	Horizontal
3	1928.5929	40.69	-12.58	74.00	33.31	100	330	Horizontal
4	2667.1667	44.76	-9.59	74.00	29.24	100	190	Horizontal
5	3652.7653	45.58	-7.26	74.00	28.42	100	270	Horizontal
6	4792.3792	47.76	-4.92	74.00	26.24	100	210	Horizontal

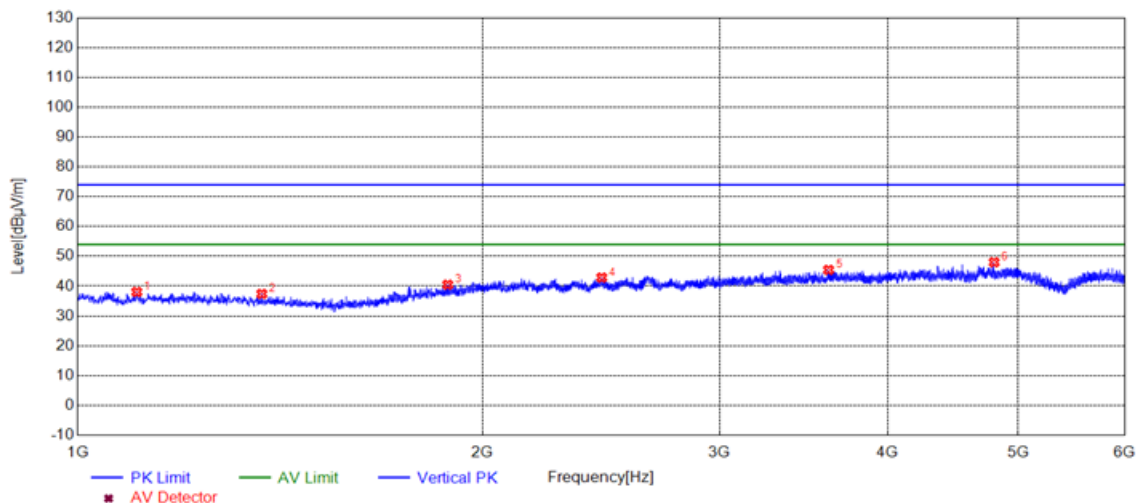
RESULT: PASS

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Radiated Emission Test at 3m Distance Above 1G –Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1106.5107	38.06	-16.74	74.00	35.94	100	0	Vertical
2	1370.5371	37.39	-17.00	74.00	36.61	100	270	Vertical
3	1884.0884	40.48	-13.05	74.00	33.52	100	110	Vertical
4	2452.1452	42.86	-9.92	74.00	31.14	100	60	Vertical
5	3615.7616	45.44	-7.35	74.00	28.56	100	170	Vertical
6	4800.3800	48.00	-4.91	74.00	26.00	100	40	Vertical

RESULT: PASS

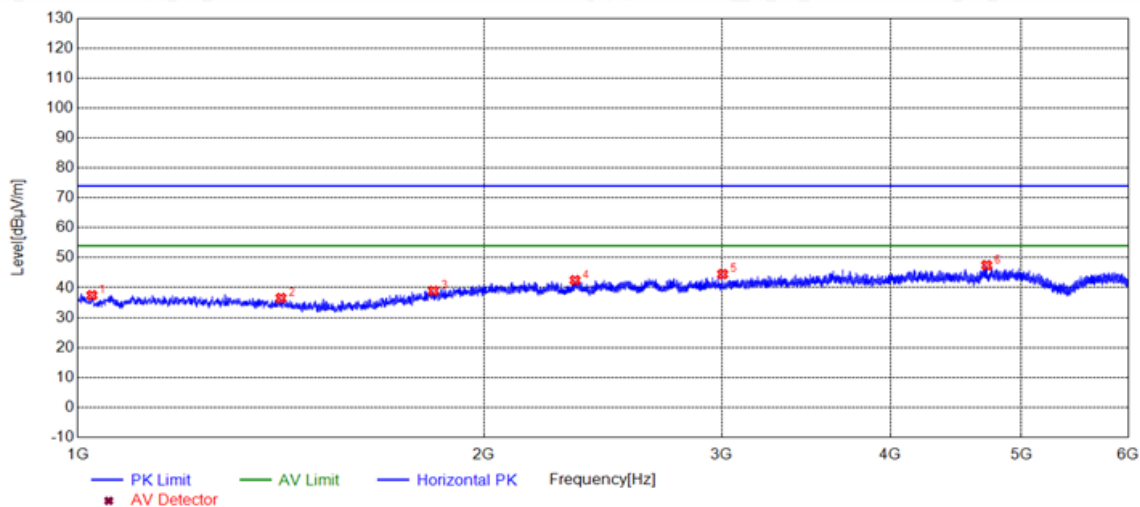
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Small

Radiated Emission Test at 3m Distance-Above 1G –Horizontal



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1024.5025	37.47	-16.66	74.00	36.53	100	350	Horizontal
2	1414.5415	36.55	-17.05	74.00	37.45	100	300	Horizontal
3	1834.5835	38.95	-13.58	74.00	35.05	100	340	Horizontal
4	2336.1336	42.46	-10.41	74.00	31.54	100	100	Horizontal
5	3004.7005	44.52	-9.31	74.00	29.48	100	220	Horizontal
6	4714.8715	47.51	-4.99	74.00	26.49	100	130	Horizontal

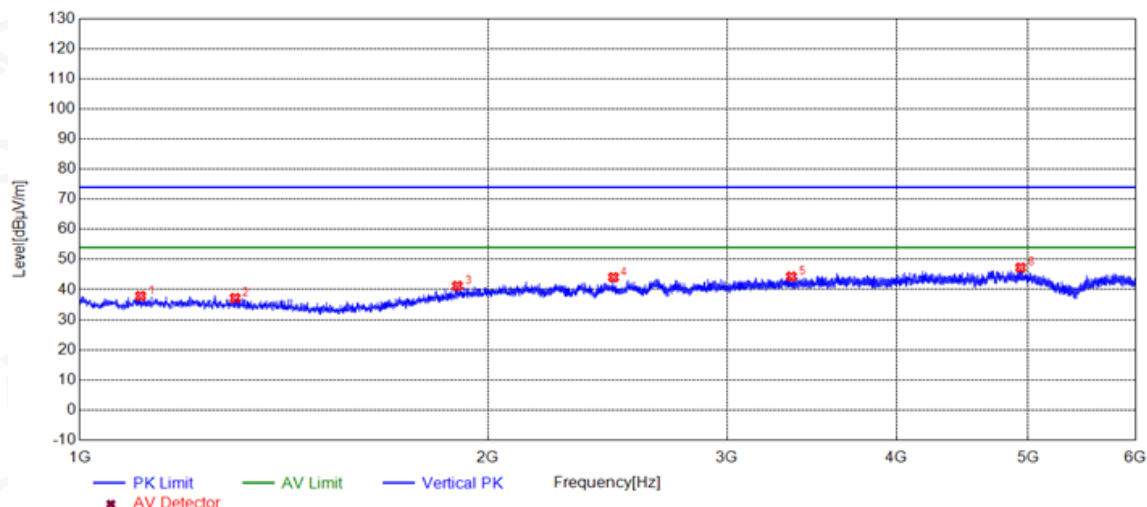
RESULT: PASS

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Radiated Emission Test at 3m Distance Above 1G –Vertical



NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1109.0109	37.87	-16.75	74.00	36.13	100	180	Vertical
2	1302.0302	37.18	-16.94	74.00	36.82	100	290	Vertical
3	1898.5899	41.22	-12.90	74.00	32.78	100	230	Vertical
4	2474.6475	44.07	-9.83	74.00	29.93	100	320	Vertical
5	3347.2347	44.31	-8.13	74.00	29.69	100	310	Vertical
6	4939.8940	47.26	-4.78	74.00	26.74	100	140	Vertical

RESULT: PASS

Note: 1. Emissions range from 6GHz to 12.5GHz have 20dB margin. No recording in the test report.

2. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Measurement.

3. The "Factor" value can be calculated automatically by software of measurement system.

4."Big" Indicates large size keyboard, "Small" Indicates small size keyboard

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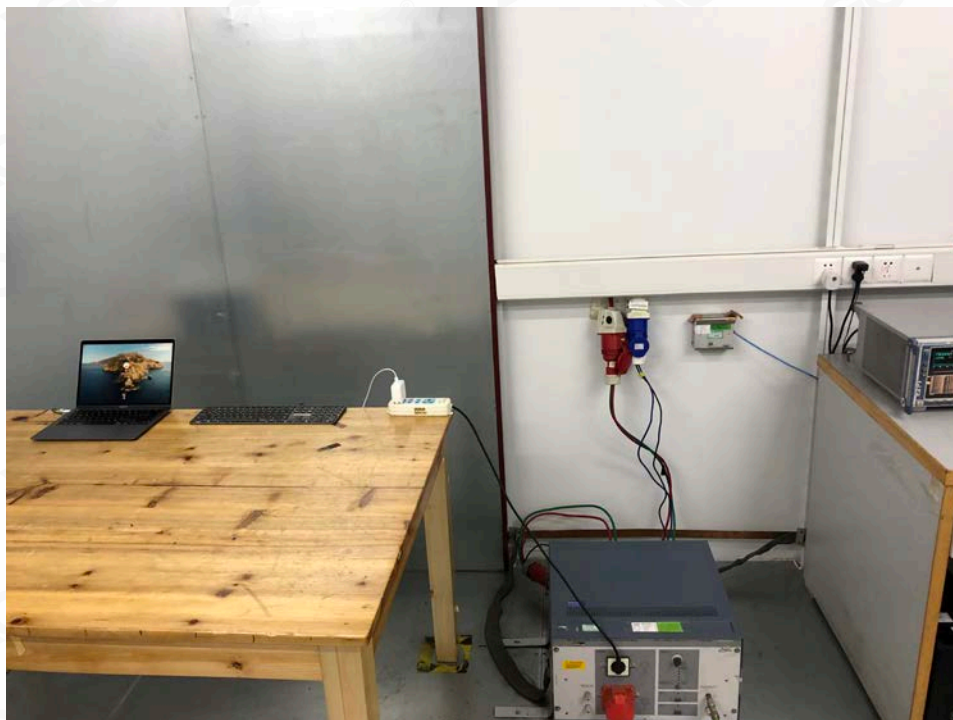
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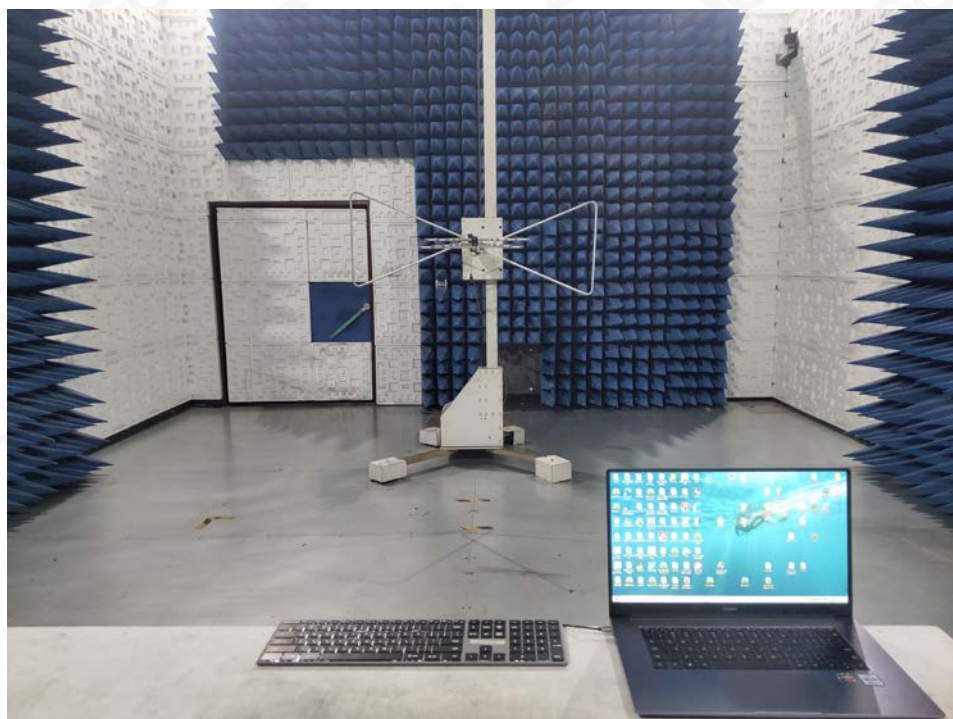


APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP-30MHz-1000MHz

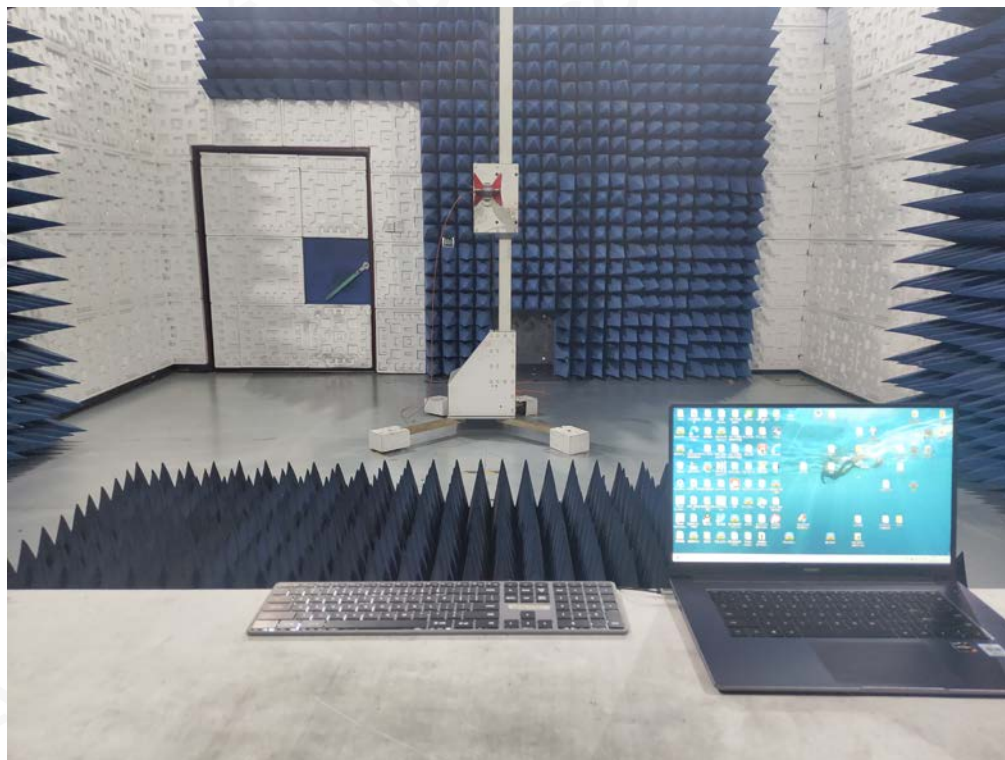


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FCC RADIATED EMISSION TEST SETUP- Above 1G



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APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT-1 Big



ALL VIEW OF EUT-2 Middle



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ALL VIEW OF EUT-3 Small



Big
TOP VIEW OF EUT



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BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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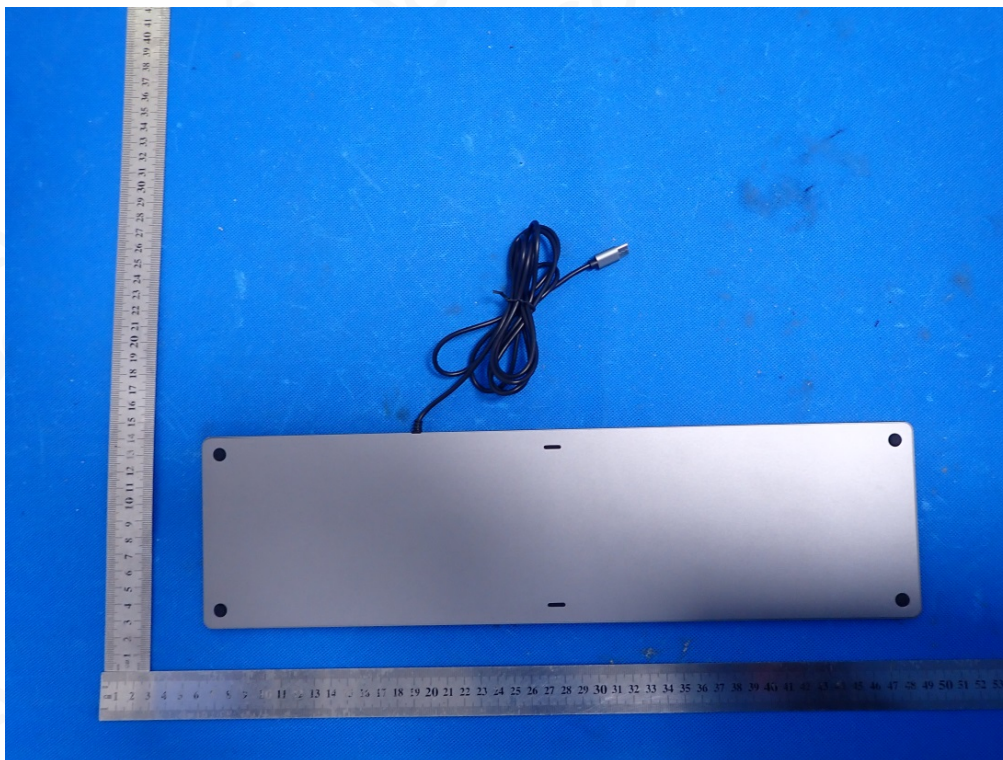
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BACK VIEW OF EUT



LEFT VIEW OF EUT



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