

TEST REPORT

Project No.: TM-2408000338P**Applicant:** Razer Inc.**Address:** 9 Pasteur, Suite 100, Irvine, CA 92618, USA.**Manufacturer:** Razer Inc.**Address:** 9 Pasteur, Suite 100, Irvine, CA 92618, USA.**Equipment Under Test (EUT):****Name:** Universal Dock**Brand Name:** RAZER;**Model No.:** RC21-0229**Added Model(s):** RC21-0229xxxx-xxxx (x can be 0-9 or A-Z for marketing purpose)**Standards:**

EN 55032: 2015 + A11: 2020+ A1: 2020, Class B	CISPR 32: 2015 + A1: 2019
BS EN 55032: 2015 + A11: 2020+ A1: 2020	AS/NZS CISPR 32: 2015 + A1: 2020
EN IEC 61000-3-2: 2019 + A1: 2021	BS EN IEC 61000-3-2: 2019 + A1: 2021
EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022	BS EN 61000-3-3: 2013 + A1: 2019 + A2: 2021
EN 55035: 2017 + A11: 2020	BS EN 55035: 2017 + A11: 2020
IEC 61000-4-2: 2008 / EN 61000-4-2: 2009	IEC 61000-4-6: 2013 + COR1: 2015 / EN 61000-4-6: 2014 + AC: 2015
IEC 61000-4-3: 2020 (Ed. 4.0) / EN IEC 61000-4-3: 2020	IEC 61000-4-8: 2009 / EN 61000-4-8: 2010
IEC 61000-4-4: 2012 / EN 61000-4-4: 2012	IEC 61000-4-11: 2020 + COR1: 2020 + COR2: 2022 (Ed. 3.0) / EN IEC 61000-4-11: 2020 + AC: 2022-10
IEC 61000-4-5: 2014 + A1: 2017 / EN 61000-4-5: 2014 + A1: 2017	

Date of Sample Receipt : August 23, 2024**Date of Test :** August 29, 2024 ~ September 3, 2024**Date of Issue :** October 1, 2024**Remarks:**

This test report can be used for CE and UKCA marking application which is based on equivalent requirements between UK and EU. It is appropriate using designated standards to provide presumption of conformity with GB law.

This report shall not be reproduced except in full, without approval of the Compliance Certification Services Inc. in writing.

This document may be altered or revised by Compliance Certification Services Inc. personnel only. The applicant should not use it to claim product endorsement by TAF or any other Government agencies.

Disclaimer

Variants information between/among model numbers / trademarks is provided by the applicant, test results of this test report are applicable to the sample EUT received of main test model name.

Approved By

Jason Lee (Section Manager)

Date

October 1, 2024



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留 90 天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com.tw/Terms-and-Conditions> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com.tw/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Revision History			
Revision	Report Number	Description	Issue Date
00	TMXD2408002986DE	Original.	October 1, 2024

Note:



Contents

1. GENERAL DESCRIPTION	4
1.1 GENERAL DESCRIPTION OF EUT	4
1.2 DETAILS OF EUT	4
1.3 DESCRIPTION OF SUPPORT UNITS	5
1.4 I/O PORT DESCRIPTION	5
1.5 DECISION OF TEST MODE	6
1.6 THE FINAL TEST MODE OF THE EUT.....	6
1.7 CONFIGURATION OF TESTED SYSTEM	7
1.8 OPERATION PROCEDURE	7
1.9 SUMMARY OF RESULTS.....	8
1.10 REPORTING STATEMENTS OF CONFORMITY	8
1.11 DEVIATION	8
2. EMISSION.....	9
2.1 LIMIT	9
2.2 CONDUCTED EMISSION	11
2.3 RADIATED EMISSION	15
3. HARMONICS	21
3.1 TEST INSTRUMENTS.....	21
3.2 MEASUREMENT DATA	22
4. FLICKER.....	25
4.1 TEST INSTRUMENTS.....	25
4.2 MEASUREMENT DATA	26
5. IMMUNITY	27
5.1 STANDARD PERFORMANCE CRITERIA DESCRIPTION	27
5.2 SPECIAL PERFORMANCE CRITERIA DESCRIPTION	28
5.3 TEST OF IEC/EN 61000-4-2.....	34
5.4 TEST OF IEC/EN IEC 61000-4-3.....	39
5.5 TEST OF IEC/EN 61000-4-4.....	42
5.6 TEST OF IEC/EN 61000-4-5.....	43
5.7 TEST OF IEC/EN 61000-4-6.....	44
5.8 TEST OF IEC/EN 61000-4-8.....	46
5.9 TEST OF IEC/EN IEC 61000-4-11.....	47
APPENDIX	48
PHOTOGRAPH OF TESTING GENERAL SET-UP	48
PHOTOGRAPHS OF EUT UNIT.....	59

1. General Description

1.1 General Description of EUT

Name of EUT	Universal Dock
Brand Name	RAZER; 
Model No.(s)	RC21-0229
Added Model(s)	RC21-0229xxxx-xxxx (x can be 0-9 or A-Z for marketing purpose)
Variant Description	For marketing purpose

EUT Description

Model	Product No.	Difference	Tested (Check)
RC21-0229	RC21-02290100	With LED board	☒
	RC21-02290200	EUT are same, except the color/the external and without LED board	☐

1.2 Details of EUT

EUT Power Rating	20V/12.5A from Adaptor
Adaptor Manufacturer	Shenzhen Honor Electronic Co Ltd
Adaptor Model Number	ADS-260NY-19-3 200250E
Adaptor Power Rating	Input: 100-240V~ 50/60Hz Output: 20VDC, 12.5A
Highest internal frequency	12800MHz

Accessories Cable List

Cable Type	Core	Length	Category	Shielding/Non-shielding
Thunderbolt 5 Cable	N/A	0.8m	N/A	Shielding
AC Power Cord	N/A	1.8m	N/A	Non-shielding
DC Power Cable	2	1.0m	N/A	Non-shielding

1.3 Description of Support Units

Peripherals Devices

No.	PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
1	Earphone & Microphone	INTOPIC	JAZZ-M281	24022901
2-4	USB HDD	Transcend	TS1TSJ25M3G	N/A
5	Printer	HP	SNPRB-1202-01	CN54K182FD
6	Earphone & Microphone	INTOPIC	JAZZ-379	220805002
7	Monitor	GIGABYTE	M28U	N/A
8	USB HDD	Transcend	TS1TSJ25MC	N/A
9	Notebook	Razer	RZ09-0509	N/A
10	Monitor	GIGABYTE	M28U	N/A
11	SD Card	Transcend	N/A	N/A
12	Monitor	GIGABYTE	M28U	SN21490B004523
13	Server PC	Dell	T3610	57TT032

Support Equipment Used in Tested Cable

No.	Cable Type	Core	Length	Shielding/Non-shielding
1	Audio (Combo)	N/A	1.8m	Non-shielding
2-4	USB-A	N/A	1.4m	Shielding
5	USB	N/A	1.8m	Shielding
6	Earphone & Microphone	N/A	1.8m	Non-shielding
7	Thunderbolt	N/A	1.0m	Shielding
8	USB-C	N/A	0.6m	Shielding
9	Thunderbolt 5	N/A	0.8m	Shielding
10	Thunderbolt	N/A	1.0m	Shielding
11	SD	N/A	N/A	N/A
12	Thunderbolt	N/A	1.0m	Shielding
13	LAN	N/A	20m	Non-shielding

1.4 I/O Port Description

I/O Port Types	Q'TY
1. Thunderbolt 5 Port (for Host Port)	1
2. Thunderbolt 5 Port	3
3. USB-C 10G Port	1
4. USB-A 10G Port	2
5. LAN Port (up to 1Gbps)	1
6. SD 4.0 Card Socket	1
7. Audio (Combo) Port	1

1.5 Decision of Test Mode

The test configuration/ modes are as the following:

Conduction Modes (Power port):

1	Type C DATA R/W	100VAC, 50Hz
2	TBT5-1 (3840*2160@144Hz) + TBT5-2 (3840*2160@144Hz) + TBT5-3 (3840*2160@144Hz)	100VAC, 50Hz
3	TBT5-1 (3840*2160@144Hz) + TBT5-2 (3840*2160@144Hz) + TBT5-3 (3840*2160@144Hz)	230VAC, 50Hz
4	TBT5-1 (1920*1200@144Hz) + TBT5-2 (1920*1200@144Hz) + TBT5-3 (1920*1200@144Hz)	100VAC, 50Hz
5	TBT5-1 (1600*1200@144Hz) + TBT5-2 (1600*1200@144Hz) + TBT5-3 (1600*1200@144Hz)	100VAC, 50Hz
6	TBT5-1 (1280*1024@144Hz) + TBT5-2 (1280*1024@144Hz) + TBT5-3 (1280*1024@144Hz)	100VAC, 50Hz
7	TBT5-1 (800*600@144Hz) + TBT5-2 (800*600@144Hz) + TBT5-3 (800*600@144Hz)	100VAC, 50Hz

Conduction Modes (Wired network ports):

1	10Mbps
2	100Mbps
3	1Gbps

Radiation Modes:

1	Type C DATA R/W	100VAC, 50Hz
2	TBT5-1 (3840*2160@144Hz) + TBT5-2 (3840*2160@144Hz) + TBT5-3 (3840*2160@144Hz) TBT5-1 (3840*2160@144Hz) + TBT5-2 (3840*2160@144Hz) + TBT5-3 (3840*2160@144Hz) / 1-6GHz	230VAC, 50Hz
3	TBT5-1 (1920*1200@144Hz) + TBT5-2 (1920*1200@144Hz) + TBT5-3 (1920*1200@144Hz)	100VAC, 50Hz
4	TBT5-1 (1600*1200@144Hz) + TBT5-2 (1600*1200@144Hz) + TBT5-3 (1600*1200@144Hz)	100VAC, 50Hz
5	TBT5-1 (1280*1024@144Hz) + TBT5-2 (1280*1024@144Hz) + TBT5-3 (1280*1024@144Hz)	100VAC, 50Hz
6	TBT5-1 (800*600@144Hz) + TBT5-2 (800*600@144Hz) + TBT5-3 (800*600@144Hz)	100VAC, 50Hz

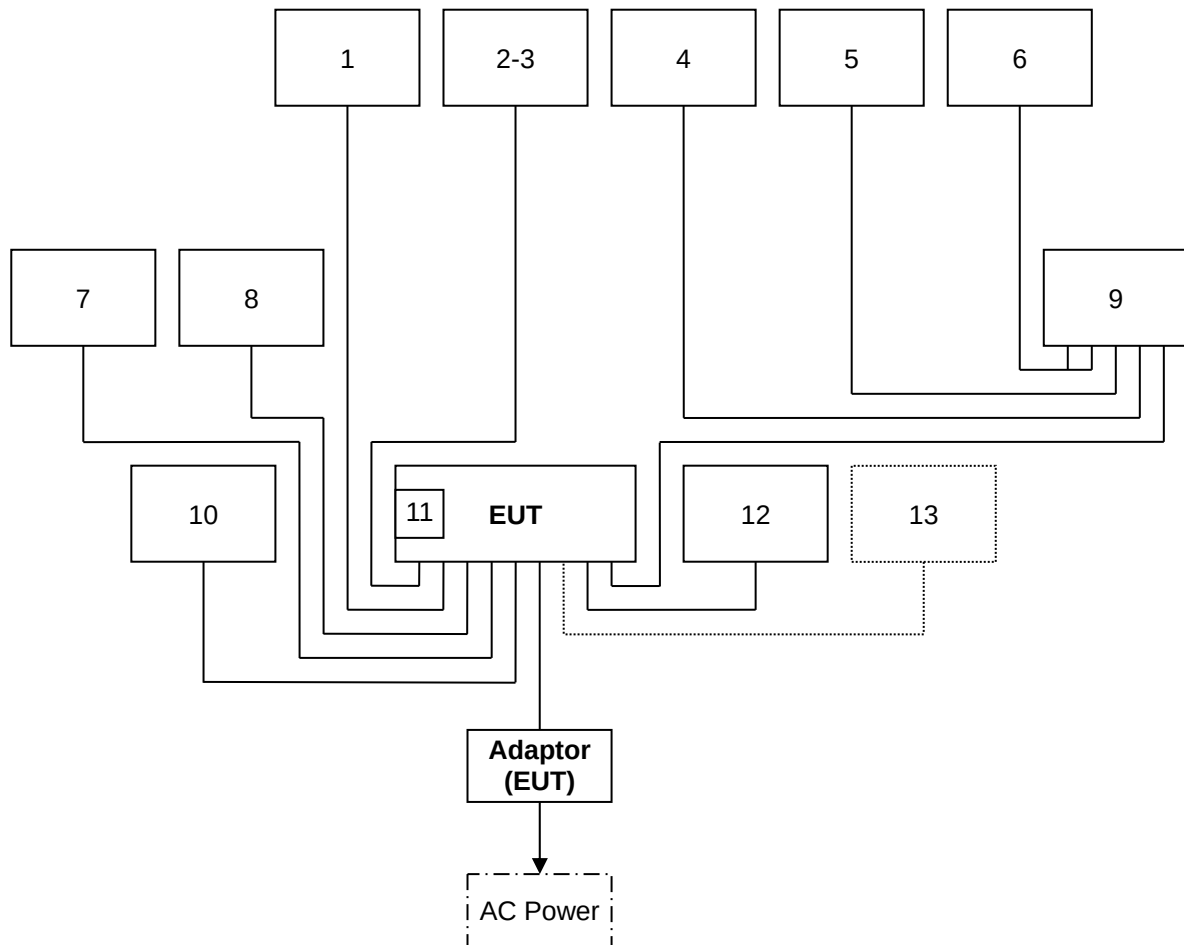
1.6 The Final Test Mode of the EUT

After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode	
Conducted Emission	Mode 3
ISN	Mode 1
Radiated Emission Below 1GHz	Mode 2
Radiated Emission Above 1GHz	Mode 2
Harmonics & Flicker	Mode 2
Immunity	Mode 2

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

1.7 Configuration of Tested System



1.8 Operation Procedure

1. Windows 10 boots system.
2. Run colorbarmove.mp4 to activate all peripherals for test EUT.
3. Run Winemc.exe and choose "D:/ & E:/ & F:/ & G:/ & H:/" to test EUT.
4. Run Lantest20.exe in excess of 10 % and sustain that level for a minimum of 250 ms.
5. Run Media Player.exe to play audio 1KHz sound.

1.9 Summary of Results

Emission		
Standard	Test Type	Result
EN 55032: 2015 + A11: 2020 + A1: 2020	Conducted Emission	PASS
BS EN 55032: 2015 + A11: 2020 + A1: 2020	ISN	PASS
CISPR 32: 2015 + A1: 2019	Radiated Emission	PASS
AS/NZS CISPR 32: 2015 + A1: 2020		
EN IEC 61000-3-2: 2019 + A1: 2021	Harmonic current emissions	PASS
BS EN IEC 61000-3-2: 2019 + A1: 2021		
EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022	Voltage changes, voltage fluctuations & flicker	PASS
BS EN 61000-3-3: 2013 + A1: 2019 + A2: 2021		

Immunity			
Standard	Test Type	Result	Performance Criteria
IEC 61000-4-2: 2008 / EN 61000-4-2: 2009	ESD	PASS	B
IEC 61000-4-3: 2020 (Ed. 4.0) / EN IEC 61000-4-3: 2020	RS	PASS	A
IEC 61000-4-4: 2012 / EN 61000-4-4: 2012	EFT	PASS	B
IEC 61000-4-5: 2014 + A1: 2017 / EN 61000-4-5: 2014 + A1: 2017	Surge	PASS	B
IEC 61000-4-6: 2013 + COR1: 2015 / EN 61000-4-6: 2014 + AC: 2015	CS	PASS	A
IEC 61000-4-8: 2009 / EN 61000-4-8: 2010	PFMF	N/A	A
IEC 61000-4-11: 2020 + COR1: 2020 + COR2: 2022 (Ed. 3.0) / EN IEC 61000-4-11: 2020 + AC: 2022-10	DIP	PASS	C/C/B

1.10 Reporting Statements of Conformity

The conformity statement in this report is based solely on the test results, measurement uncertainty is excluded.

1.11 Deviation

No deviation from the mentioned test methods and applicable standards.

2.EMISSION

2.1 Limit

Maximum permissible level of Line Conducted Emission

FREQUENCY (MHz)	Class A(dBuV)		Class B(dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

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

Maximum permissible level of Common Mode Conducted Emission (Asymmetric Mode)

Class A

FREQUENCY (MHz)	Voltage Limit(dBuV)		Current Limit(dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	97 - 87	84 - 74	53 - 43	40 - 30
0.5 - 30.0	87	74	43	30

Class B

FREQUENCY (MHz)	Voltage Limit(dBuV)		Current Limit(dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 - 74	74 - 64	40 - 30	30 - 20
0.5 - 30.0	74	64	30	20

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

Maximum permissible level of Radiated Emission measured at 10 meter

FREQUENCY (MHz)	Class A(dBuV/m)	Class B(dBuV/m)
	Quasi - peak	Quasi - peak
30 - 230	40	30
230 - 1000	47	37

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

Maximum permissible level of Radiated Emission measured at 3 meter

Frequency range (MHz)	Class A(dBuV/m)	Class B(dBuV/m)
	Quasi - peak	Quasi - peak
30 - 230	50	40
230 - 1000	57	47

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

Limits above 1 GHz

Limits for radiated disturbance of Class A ITE at a measurement distance of 3m

Frequency range (GHz)	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 - 3	60	80
3 - 6	60	80

Note: The lower limit applies at the transition frequency.

Limits for radiated disturbance of Class B ITE at a measurement distance of 3m

Frequency range (GHz)	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 - 3	54	74
3 - 6	54	74

Note: The lower limit applies at the transition frequency.

Requirements for radiated emissions from FM receivers

Frequency range (MHz)	Measurement				Class B Limit dB(μV/m)
	Facility	Distance (m)	Detector type / Bandwidth	Fundamental	Harmonics
30 - 230	OATS/SAC	10	Quasi Peak / 120 kHz	50	42
230 - 300					42
300 - 1000					46
30 - 230	OATS/SAC	3	Quasi Peak / 120 kHz	60	52
230 - 300					52
300 - 1000					56

These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits

Note: SAC: Semi Anechoic Chamber

OATS: Open Area Test Site

2.2 Conducted Emission

2.2.1 Test Instruments

Conducted Emission Room # A					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Pulse Limiter	Schwarzbeck	VTSD 9561-F	BNC#211	03/18/2024	03/17/2025
BNC CABLE	EMEC	EMG178	BNC#A9	03/18/2024	03/17/2025
EMI Test Receiver	R&S	ESCI	101201	08/13/2024	08/12/2025
ISN	Teseq	ISN T800	29449	07/08/2024	07/07/2025
LISN	Schwarzbeck	NNLK 8129	8129-286	06/24/2024	06/23/2025
LISN(EUT)	Schwarzbeck	NSLK 8127	8127526	06/24/2024	06/23/2025
Thermo-Hygro Meter	Wisewind	201A	SD-R038	06/26/2024	06/25/2025
Test S/W	EZ-EMC Ver.CCS-03A1				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					
Measurement Uncertainty of Conducted Emission					
Expanded uncertainty Ulab (k=2) of Conducted Emission is 2.8 dB.					
Expanded uncertainty Ulab (k=2) of ISN Conducted Emission is 3.1 dB.					
Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Conducted Emission measurement is 3.8 dB.					
Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of ISN Conducted Emission measurement is 5.0 dB.					

2.2.2 Measurement Level Calculation

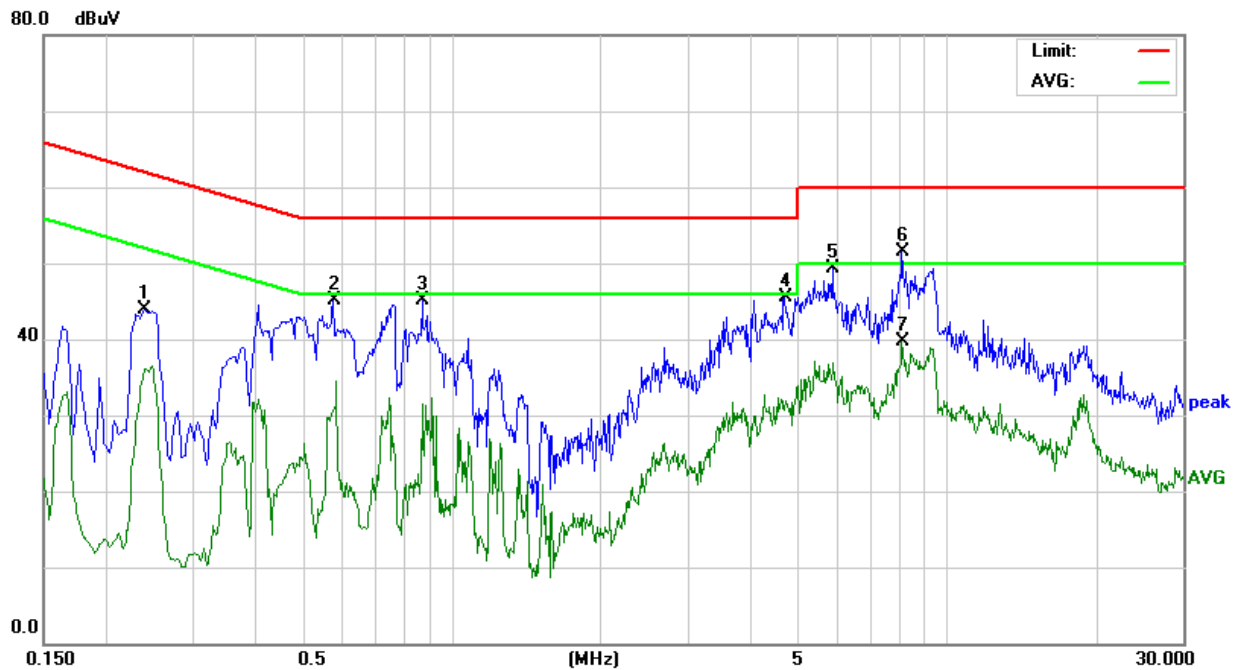
Factor = LISN insertion loss + Cable loss + Pulse Limiter insertion loss

Measurement Level = Reading Level + Factor

Over (Margin) = Measurement Level – Limit

2.2.3 Measurement Data (CE)

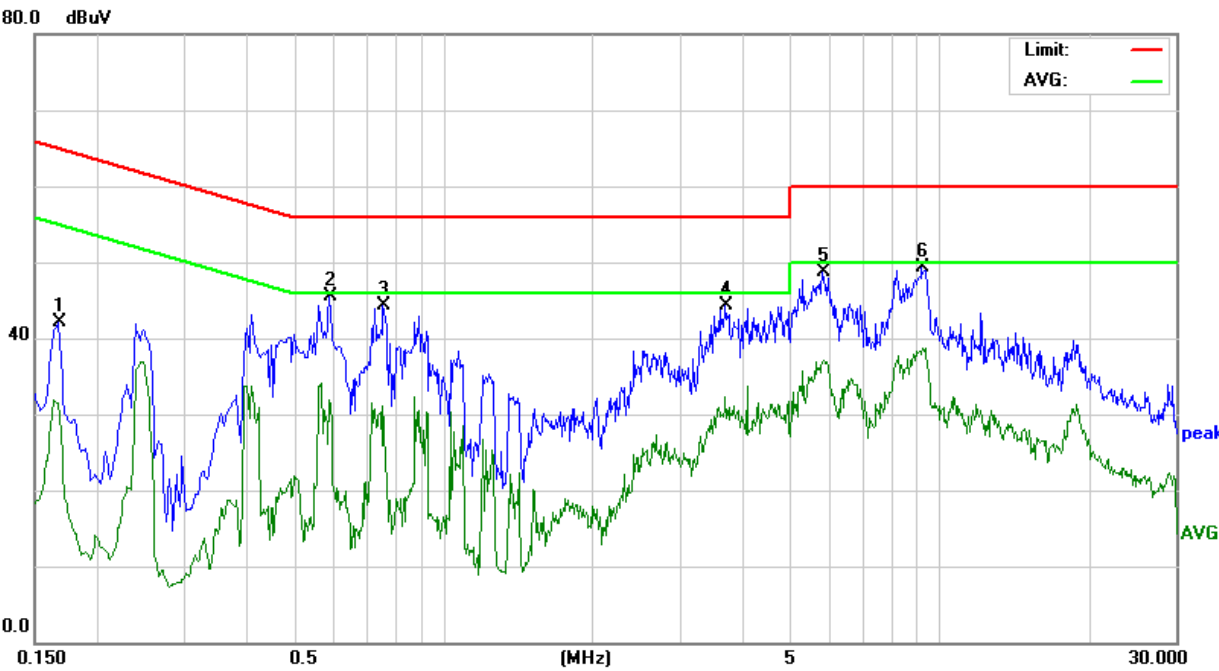
Model No.	RC21-0229	6dB Bandwidth	9 kHz
Environmental Conditions	23.9°C, 59% RH	Test Mode	Mode 3
Tested by	James Chou	Phase	L1
Standard	EN 55032 CLASS B	Test Date	2024/8/29



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.2400	33.82	10.14	43.96	62.09	-18.13	P	L1
0.5775	35.01	10.17	45.18	56.00	-10.82	P	L1
0.8745	34.86	10.22	45.08	56.00	-10.92	P	L1
4.7040	34.96	10.45	45.41	56.00	-10.59	P	L1
5.8875	38.85	10.51	49.36	60.00	-10.64	P	L1
8.1465	40.96	10.59	51.55	60.00	-8.45	P	L1
8.1465	29.14	10.59	39.73	50.00	-10.27	A	L1

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Model No.	RC21-0229	6dB Bandwidth	9 kHz
Environmental Conditions	23.9°C, 59% RH	Test Mode	Mode 3
Tested by	James Chou	Phase	L2
Standard	EN 55032 CLASS B	Test Date	2024/8/29

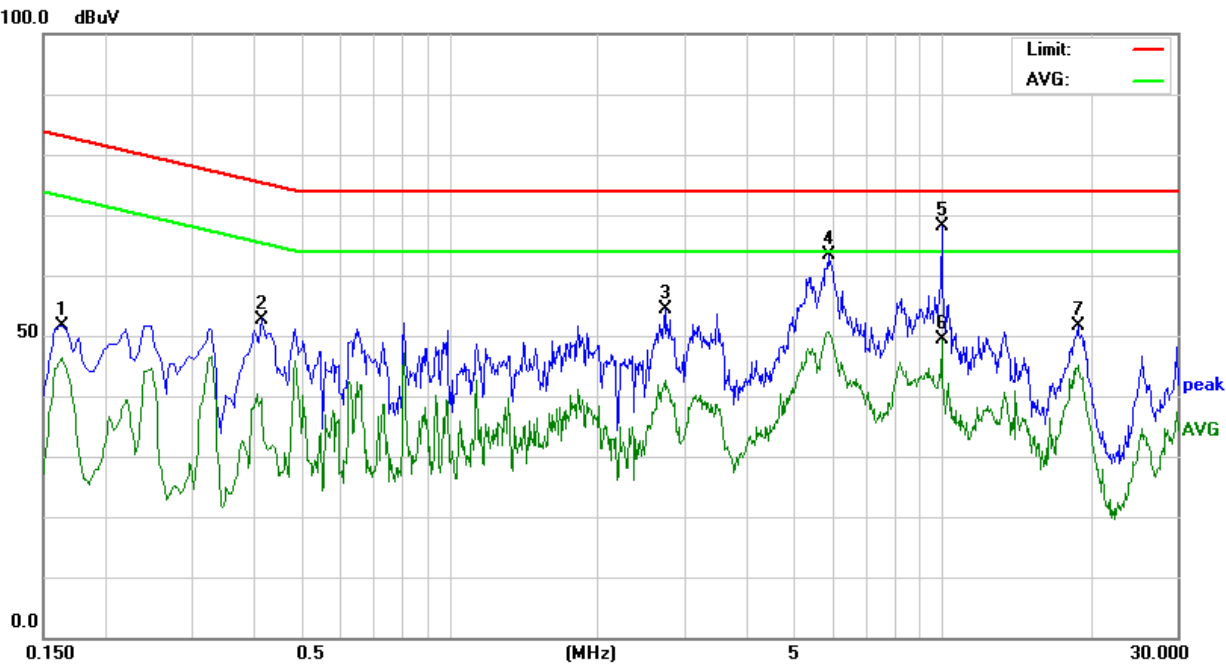


Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1680	32.00	10.11	42.11	65.05	-22.94	P	L2
0.5910	35.39	10.15	45.54	56.00	-10.46	P	L2
0.7575	34.20	10.19	44.39	56.00	-11.61	P	L2
3.7185	33.92	10.36	44.28	56.00	-11.72	P	L2
5.8200	38.27	10.46	48.73	60.00	-11.27	P	L2
9.2175	38.64	10.58	49.22	60.00	-10.78	P	L2

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

2.2.4 Measurement Data (ISN)

Model No.	RC21-0229	6dB Bandwidth	9 kHz
Environmental Conditions	23.9°C, 59% RH	Test Mode	Mode 1
Tested by	James Chou	Test Date	2024/8/29
Standard	EN 55032 CLASS B		



Conducted Emission Readings						
Frequency Range Investigated				150 kHz to 30 MHz		
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)
0.1635	31.51	20.24	51.75	83.28	-31.53	P
0.4155	32.82	19.93	52.75	75.54	-22.79	P
2.7420	34.48	19.86	54.34	74.00	-19.66	P
5.8695	43.50	19.87	63.37	74.00	-10.63	P
10.0050	48.19	19.95	68.14	74.00	-5.86	P
10.0050	29.45	19.95	49.40	64.00	-14.60	A
18.8925	31.49	20.14	51.63	74.00	-22.37	P



2.3 Radiated Emission

2.3.1 Test Instruments

Below 1GHz

10M Chamber					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESCI	100961	2024/04/29	2025/04/28
EMI Test Receiver	R&S	ESCI	100962	2024/05/08	2025/05/07
Pre-Amplifier	HP	8447D	2944A08150	2024/04/21	2025/04/20
Pre-Amplifier	HP	8447D	2944A07754	2024/04/21	2025/04/20
Bilog Antenna with 5dB Attenuator	TESEQ	CBL 6112D	31674	2024/02/19	2025/02/18
Bilog Antenna with 5dB Attenuator	TESEQ	CBL 6112D	31675	2024/03/08	2025/03/07
Cable	Huber Suhner	SUCOFLEX 104PEA	33948/4PEA	2024/04/21	2025/04/20
Cable	Huber Suhner	SUCOFLEX 104PEA	33949/4PEA	2024/04/21	2025/04/20
Cable	Huber Suhner	SUCOFLEX 104PEA	330029	2024/04/21	2025/04/20
Cable	Huber Suhner	SUCOFLEX 104PEA	24813	2024/04/21	2025/04/20
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
AC power source	APE	AFC-130	991259	N.C.R	N.C.R
Test S/W	EZ_EMCC(C&C-4Ant)				
Testing Site : No.139,Wugong Rd.,Wugu Dist.,New Taipei City 24886,Taiwan.					
Measurement Uncertainty of Radiated Emission					
Expanded uncertainty Ulab (k=2) of Radiated Emission is 4.41 dB.(30MHz-1000MHz)					
Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Radiated Emission measurement is 5.22 dB.(30MHz-1000MHz)					



Above 1GHz

Chamber # E					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250297	2024/07/18	2025/07/17
Cable	Huber Suhner	SUCOFLEX 104PEA	33945	2024/04/21	2025/04/20
Cable	Huber Suhner	SUCOFLEX 104PEA	329383	2024/04/21	2025/04/20
High Pass Filters	Titan Microwave	T04H3000180007 0S01	22011402-4	2024/06/12	2025/06/11
Pre-Amplifier	EMCI	EMC118A45SE	980820	2024/04/21	2025/04/20
Pre-Amplifier	EMCI	EMC184045SE	980872	2023/12/25	2024/12/24
Horn Antenna	RF SPIN	DRH18-E	210301A18ES	2024/01/24	2025/01/23
Horn Antenna	SCHWARZBECK	BBHA 9170	1134	2023/12/13	2024/12/12
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Antenna Tower	Sunol Sciences	TLT2	031010-5	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	031010-1	N.C.R	N.C.R
AC power source	APE	AFC-130	991259	N.C.R	N.C.R
Test S/W	EZ_EMC(C&C-4Ant)				
Testing Site : No.139,Wugong Rd.,Wugu Dist.,New Taipei City 24886,Taiwan.					
Measurement Uncertainty of Radiated Emission					
Expanded uncertainty (k=2) of Radiated Emission measurement is 4.97 dB.(1-6GHz)					
Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Radiated Emission measurement is 5.18 dB.(1-6GHz)					

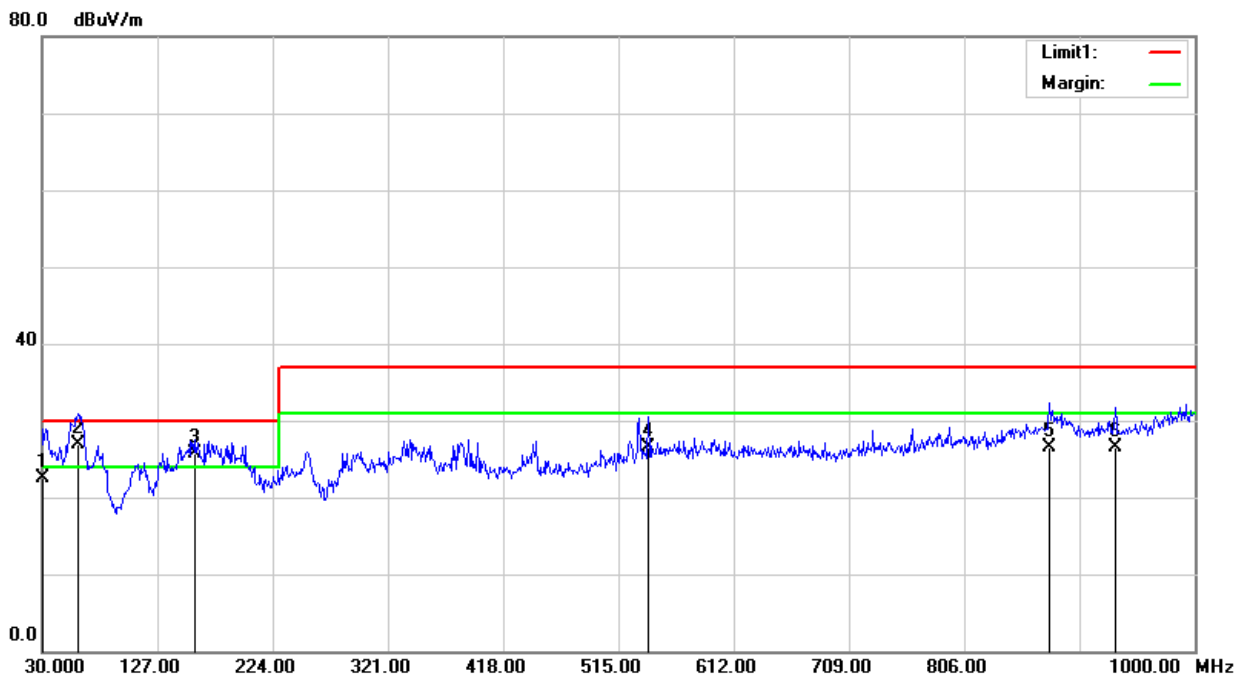
2.3.2 Measurement Level Calculation

Correction Factor = Antenna Factor + Cable loss- Amplifier Gain
Measurement Level = Reading Level + Correction Factor
Over (Margin) = Measurement Level – Limit

2.3.3 Measurement Data

Below 1GHz

Model No.	RC21-0229	Test Mode	Mode 2
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Lowka Chen
Standard	EN 55032 CLASS B	Test Date	2024/9/3

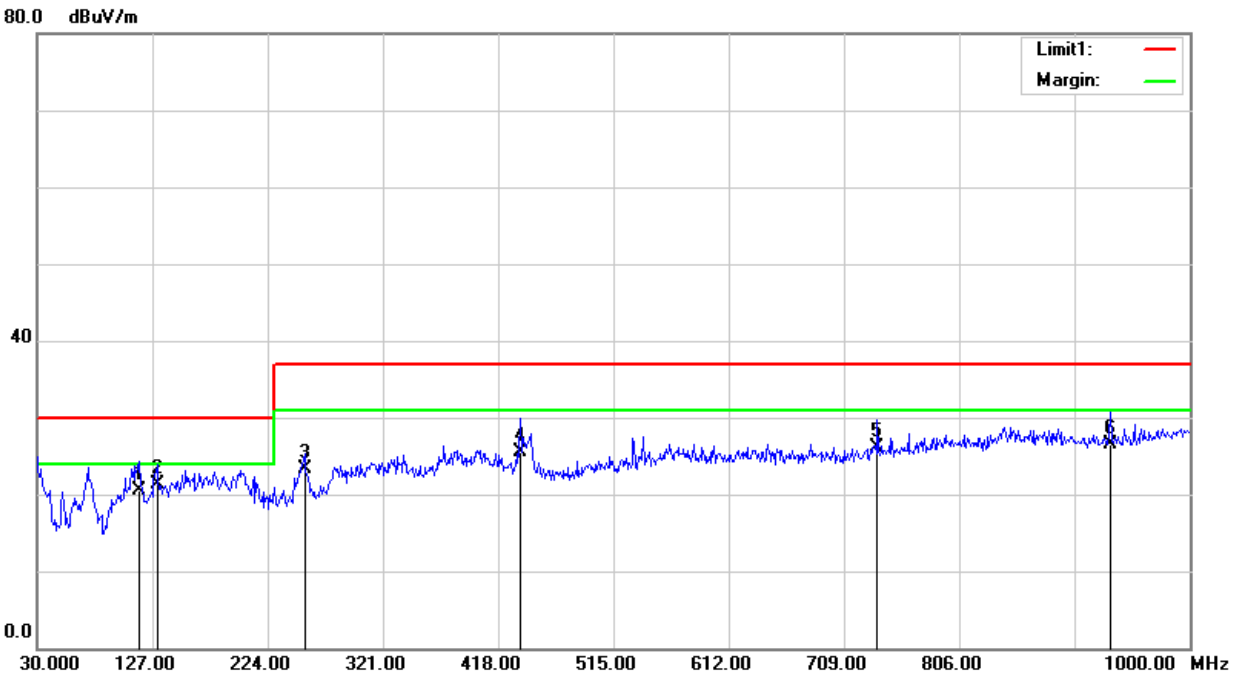


Radiated Emission Readings									
Frequency Range Investigated					30 MHz to 1000 MHz at 10m				
Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark	Pol. (H/V)
30.0000	24.89	-2.39	22.50	30.00	-7.50	200	359	Q	V
60.0700	41.25	-14.38	26.87	30.00	-3.13	200	109	Q	V
158.0400	34.80	-9.13	25.67	30.00	-4.33	100	142	Q	V
540.2200	25.87	0.71	26.58	37.00	-10.42	200	0	Q	V
877.7800	21.71	4.77	26.48	37.00	-10.52	128	0	Q	V
933.0700	21.18	5.41	26.59	37.00	-10.41	400	4	Q	V

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.



Model No.	RC21-0229	Test Mode	Mode 2
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Lowka Chen
Standard	EN 55032 CLASS B	Test Date	2024/9/3

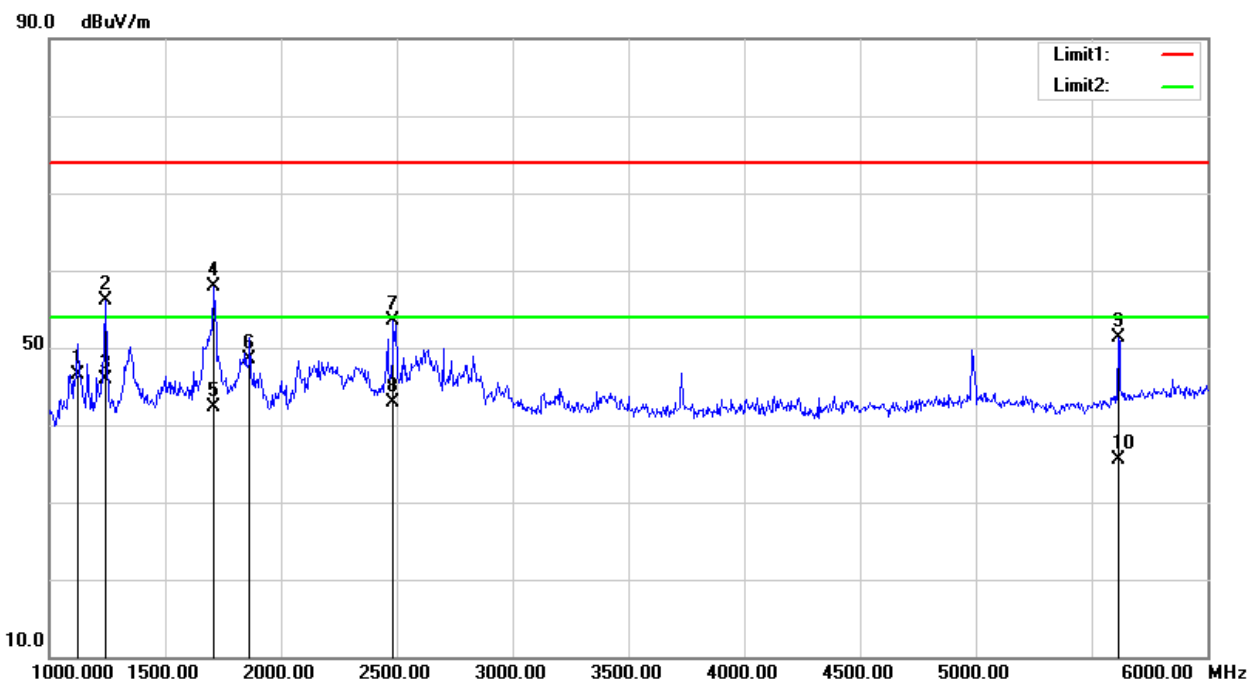


Radiated Emission Readings									
Frequency Range Investigated					30 MHz to 1000 MHz at 10m				
Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark	Pol. (H/V)
115.3600	29.16	-8.66	20.50	30.00	-9.50	400	99	Q	H
130.8800	29.79	-8.54	21.25	30.00	-8.75	200	207	Q	H
255.0400	29.24	-5.99	23.25	37.00	-13.75	400	56	Q	H
436.4300	28.23	-2.75	25.48	37.00	-11.52	200	99	Q	H
737.1300	25.05	1.10	26.15	37.00	-10.85	400	142	Q	H
933.0700	23.15	3.43	26.58	37.00	-10.42	400	0	Q	H

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.

Above 1GHz

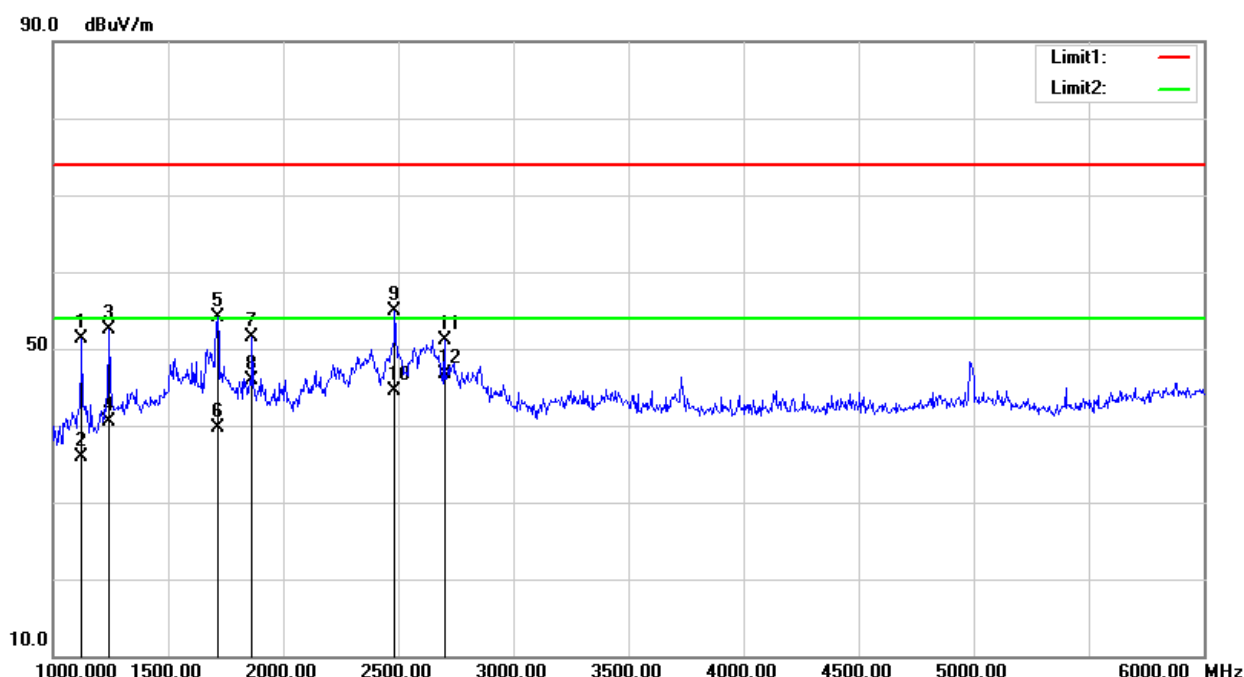
Model No.	RC21-0229	Test Mode	Mode 2
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical	Antenna Distance	3m
Highest frequency generated or used	12800MHz	Upper frequency	6000MHz
Detector Function	Peak and average.	Tested by	Lowka Chen
Standard	EN 55032 CLASS B	Test Date	2024/9/3



Radiated Emission Readings									
Frequency Range Investigated				Above 1GHz at 3m					
Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark	Pol. (H/V)
1125.000	54.76	-8.19	46.57	74.00	-27.43	100	123	P	V
1240.000	64.06	-7.87	56.19	74.00	-17.81	200	245	P	V
1240.000	53.75	-7.87	45.88	54.00	-8.12	200	245	A	V
1710.000	64.92	-6.98	57.94	74.00	-16.06	100	19	P	V
1710.000	49.19	-6.98	42.21	54.00	-11.79	100	19	A	V
1865.000	55.18	-6.61	48.57	74.00	-25.43	100	189	P	V
2485.000	58.11	-4.66	53.45	74.00	-20.55	100	303	P	V
2485.000	47.53	-4.66	42.87	54.00	-11.13	100	303	A	V
5615.000	48.59	2.80	51.39	74.00	-22.61	100	19	P	V
5615.000	32.77	2.80	35.57	54.00	-18.43	100	19	A	V

Note: 1. P= Peak Reading; A= Average Reading.

Model No.	RC21-0229	Test Mode	Mode 2
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	1 MHz
Antenna Pole	Horizontal	Antenna Distance	3m
Highest frequency generated or used	12800MHz	Upper frequency	6000MHz
Detector Function	Peak and average.	Tested by	Lowka Chen
Standard	EN 55032 CLASS B	Test Date	2024/9/3



Radiated Emission Readings									
Frequency Range Investigated				Above 1GHz at 3m					
Frequency (MHz)	Reading (dBuV)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark	Pol. (H/V)
1125.000	59.45	-8.19	51.26	74.00	-22.74	100	0	P	H
1125.000	44.17	-8.19	35.98	54.00	-18.02	100	0	A	H
1245.000	60.46	-7.88	52.58	74.00	-21.42	100	207	P	H
1245.000	48.45	-7.88	40.57	54.00	-13.43	100	207	A	H
1715.000	61.08	-6.95	54.13	74.00	-19.87	100	235	P	H
1715.000	46.75	-6.95	39.80	54.00	-14.20	100	235	A	H
1865.000	58.18	-6.61	51.57	74.00	-22.43	100	283	P	H
1865.000	52.48	-6.61	45.87	54.00	-8.13	100	283	A	H
2485.000	59.60	-4.66	54.94	74.00	-19.06	200	321	P	H
2485.000	49.26	-4.66	44.60	54.00	-9.40	200	321	A	H
2700.000	54.90	-3.72	51.18	74.00	-22.82	100	339	P	H
2700.000	50.52	-3.72	46.80	54.00	-7.20	100	339	A	H

Note: 1. P= Peak Reading; A= Average Reading.



3.Harmonics

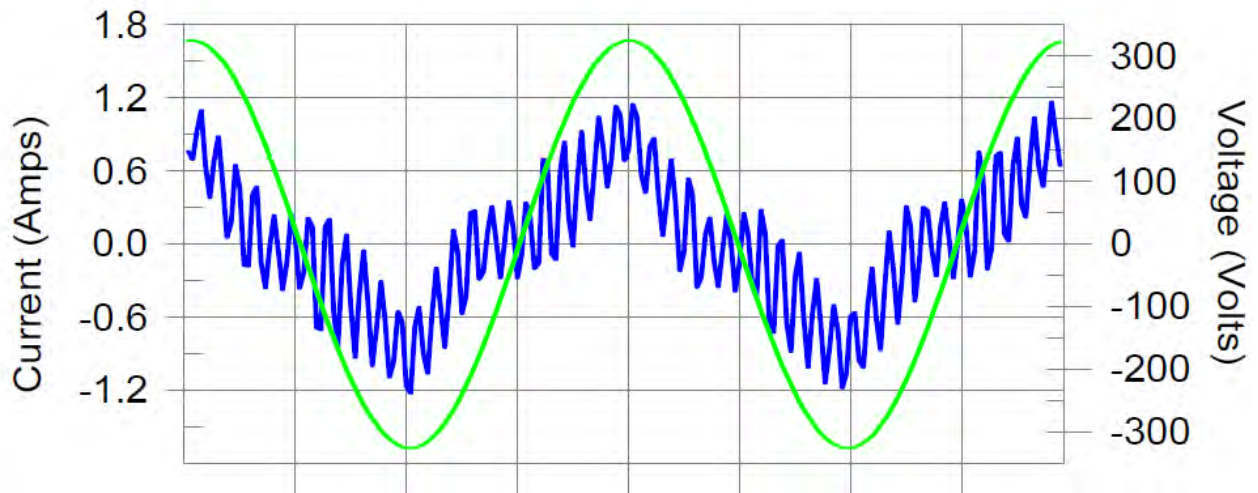
3.1 Test Instruments

Immunity A					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
5kVA Power Source	Teseq	NSG 1007-5	1537A01296	01/04/2024	01/03/2025
Signal Conditioning Unit	Teseq	CCN 1000-1	1846A01831	01/04/2024	01/03/2025
Test Software	WIN2100V4 Ver. 4.22				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

3.2 Measurement Data

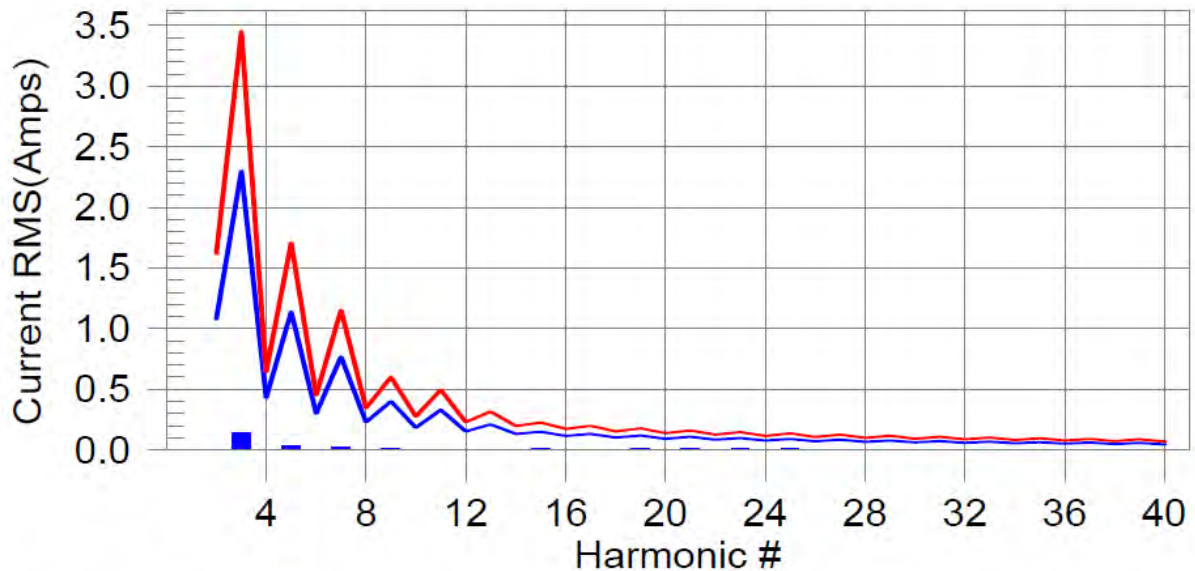
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H25-9.1% of 150% limit, H25-13% of 100% limit



Test Result: Pass Source qualification: Normal
THC(A): 0.151 I-THD(%): 32.3 POHC(A): 0.021 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	229.86	Frequency(Hz):	50.00
I_Peak (Amps):	1.372	I_RMS (Amps):	0.572
I_Fund (Amps):	0.466	Crest Factor:	2.429
Power (Watts):	104.4	Power Factor:	0.799

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.006	1.080	0.5	0.006	1.620	0.4	Pass
3	0.141	2.300	6.1	0.143	3.450	4.2	Pass
4	0.004	0.430	N/A	0.004	0.645	N/A	Pass
5	0.037	1.140	3.2	0.038	1.710	2.2	Pass
6	0.002	0.300	N/A	0.003	0.450	N/A	Pass
7	0.022	0.770	2.8	0.023	1.155	2.0	Pass
8	0.002	0.230	N/A	0.003	0.345	N/A	Pass
9	0.006	0.400	1.6	0.007	0.600	1.1	Pass
10	0.002	0.184	N/A	0.003	0.276	N/A	Pass
11	0.005	0.330	1.6	0.006	0.495	1.2	Pass
12	0.003	0.153	N/A	0.003	0.230	N/A	Pass
13	0.003	0.210	N/A	0.004	0.315	N/A	Pass
14	0.002	0.131	N/A	0.003	0.197	N/A	Pass
15	0.010	0.150	6.6	0.011	0.225	4.7	Pass
16	0.002	0.115	N/A	0.003	0.173	N/A	Pass
17	0.004	0.132	N/A	0.005	0.198	N/A	Pass
18	0.002	0.102	N/A	0.003	0.153	N/A	Pass
19	0.007	0.118	5.7	0.007	0.178	4.1	Pass
20	0.003	0.092	N/A	0.003	0.138	N/A	Pass
21	0.010	0.107	9.1	0.010	0.161	6.4	Pass
22	0.003	0.084	N/A	0.003	0.125	N/A	Pass
23	0.008	0.098	8.3	0.009	0.147	5.9	Pass
24	0.003	0.077	N/A	0.003	0.115	N/A	Pass
25	0.012	0.090	13.0	0.012	0.135	9.1	Pass
26	0.003	0.071	N/A	0.004	0.107	N/A	Pass
27	0.003	0.083	N/A	0.004	0.125	N/A	Pass
28	0.005	0.066	8.3	0.006	0.099	6.1	Pass
29	0.004	0.078	N/A	0.004	0.116	N/A	Pass
30	0.005	0.061	N/A	0.005	0.092	N/A	Pass
31	0.005	0.073	7.6	0.006	0.109	5.5	Pass
32	0.003	0.058	N/A	0.004	0.086	N/A	Pass
33	0.004	0.068	N/A	0.004	0.102	N/A	Pass
34	0.002	0.054	N/A	0.003	0.081	N/A	Pass
35	0.004	0.064	N/A	0.005	0.096	N/A	Pass
36	0.002	0.051	N/A	0.003	0.077	N/A	Pass
37	0.003	0.061	N/A	0.004	0.091	N/A	Pass
38	0.003	0.048	N/A	0.003	0.073	N/A	Pass
39	0.004	0.058	N/A	0.004	0.087	N/A	Pass
40	0.002	0.046	N/A	0.003	0.069	N/A	Pass



Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	229.86	Frequency(Hz):	50.00
I_Peak (Amps):	1.372	I_RMS (Amps):	0.572
I_Fund (Amps):	0.466	Crest Factor:	2.429
Power (Watts):	104.4	Power Factor:	0.799

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.032	0.460	7.02	OK
3	0.149	2.068	7.23	OK
4	0.018	0.460	3.89	OK
5	0.100	0.919	10.84	OK
6	0.029	0.460	6.26	OK
7	0.028	0.690	4.01	OK
8	0.009	0.460	1.98	OK
9	0.026	0.460	5.71	OK
10	0.008	0.460	1.76	OK
11	0.014	0.230	6.01	OK
12	0.014	0.230	6.28	OK
13	0.011	0.230	4.99	OK
14	0.005	0.230	2.29	OK
15	0.010	0.230	4.29	OK
16	0.005	0.230	2.33	OK
17	0.006	0.230	2.70	OK
18	0.011	0.230	4.86	OK
19	0.009	0.230	3.72	OK
20	0.024	0.230	10.25	OK
21	0.012	0.230	5.15	OK
22	0.004	0.230	1.75	OK
23	0.010	0.230	4.24	OK
24	0.004	0.230	1.86	OK
25	0.013	0.230	5.49	OK
26	0.003	0.230	1.21	OK
27	0.006	0.230	2.78	OK
28	0.003	0.230	1.35	OK
29	0.005	0.230	2.21	OK
30	0.005	0.230	2.20	OK
31	0.005	0.230	2.36	OK
32	0.003	0.230	1.20	OK
33	0.004	0.230	1.69	OK
34	0.002	0.230	1.08	OK
35	0.006	0.230	2.61	OK
36	0.003	0.230	1.38	OK
37	0.004	0.230	1.60	OK
38	0.003	0.230	1.34	OK
39	0.007	0.230	2.94	OK
40	0.015	0.230	6.65	OK



4.Flicker

4.1 Test Instruments

Immunity A					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
5kVA Power Source	Teseq	NSG 1007-5	1537A01296	01/04/2024	01/03/2025
Signal Conditioning Unit	Teseq	CCN 1000-1	1846A01831	01/04/2024	01/03/2025
Test Software	WIN2100V4 Ver. 4.22				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					



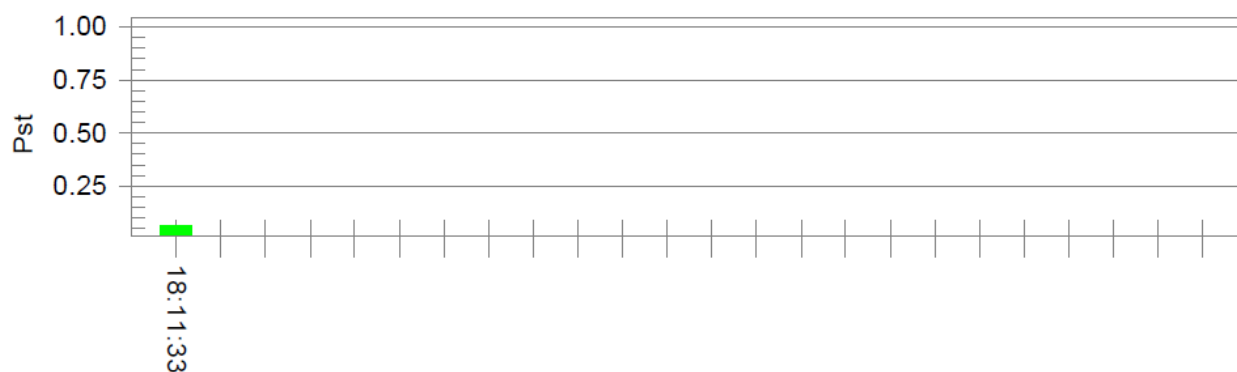
4.2 Measurement Data

Test Result: Pass

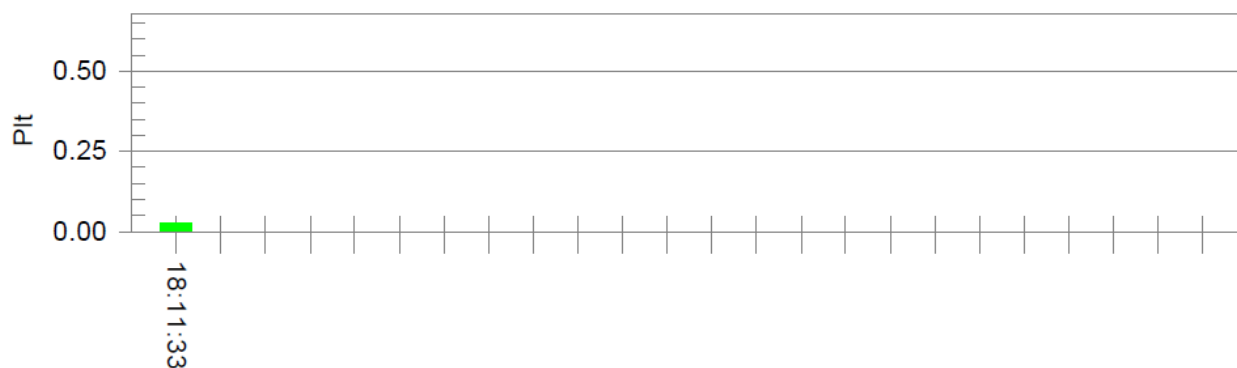
Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 229.67

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.064

Highest Plt (2 hr. period): 0.028

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

5. IMMUNITY

5.1 STANDARD PERFORMANCE CRITERIA DESCRIPTION

- Criterion A - The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion C - Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

5.2 SPECIAL PERFORMANCE CRITERIA DESCRIPTION

5.2.1 Performance Criteria Description for Print function

Criterion A - Apply criterion A as defined in 8.2. Additionally, the following shall not occur as a consequence of the application of the disturbance:

- change of operating state;
- unintended pausing of the print operation;
- a change of print quality or legibility, as appropriate to the test pattern;
- change of character font;
- unintended line feed;
- unintended page feed;
- paper feed failure.

Criterion B - Apply criterion B as defined in 8.3 with the following specifics and additional limitations. Paper feed failures are allowed only if, after removal of the jammed sheets, the job is automatically recovered and there is no loss of printed information. Any low-quality print output caused by the application of the disturbance shall not continue beyond the sheet of media being printed, or beyond the typical length of a finished page or sheet printed from continuous roll media. False indicators are permitted during the test provided that a normal operator response to that false indicator is simple (such as pressing a button). False indicators are not acceptable if they would cause the user to discard printing supplies such as ink, toner or paper, when those supplies are actually not empty or faulty. Any false indicator shall either clear automatically or after the operator's response. After the disturbance, the print function may print the remainder of the print job at a quality level within the manufacturer's specifications. Alternately, the print function may halt processing of a print job as a result of the disturbance, but only if the operator is capable of reprinting the job (for example, a fax printing job where the image to be printed still resides in local memory). Automatically restarting the print job from the beginning is also acceptable. In any scenario, the pairing of front and back images during double-sided printing shall be correct.

Criterion C - Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

5.2.2 Performance Criteria Description for Scan function

Criterion A - Apply criterion A as defined in 8.2. Additionally, the following shall not occur as a consequence of the application of the test:

- change of settings, such as which side(s) of the page to be scanned, colour or monochrome, and resolution;
- corruption of the image, for example stretching, compressing or change in colour;
- paper feed failures;
- errors in the reading of bar codes.

Criterion B - Apply criterion B as defined in 8.3 with the following specifics and additional limitations.

- Document feed failures are allowed only if the original documents are undamaged and, after removal of the jammed sheets, the job is automatically recovered and there is no loss of scanned information.
- During the test, the representation of the image shall not be degraded such that reading mistakes occur.

Criterion C - Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

5.2.3 Performance Criteria Description for Display and display output function

Criterion A - Apply criterion A as defined in 8.2. Additionally, an increase in any degradation greater than just perceptible by observation of the image shall not occur as a consequence of the application of the test.

Examples of such degradations are:

- superimposed patterning;
- positional disturbances due to synchronisation errors;
- geometric distortion;
- change of contrast or brightness;
- picture artefacts;
- freezing or disturbance of motion;
- image loss;
- video data or decoding errors.

Criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

Criterion C - Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

5.2.4 Performance Criteria Description for Musical tone generating function

- Criterion A - Performance criterion A is subdivided according to the type of equipment and its use. Three subgroups corresponding to different equipment types are defined in Table E.1 and have corresponding performance criteria A1, A2 and A3. The relevant subgroup shall be selected by the manufacturer in accordance with the product specification. The description of criteria A1, A2 and A3 are presented in Table E.2.
- Criterion B - During the test, degradation of performance beyond that defined in criterion A1 of Table E.2 is allowed. However, sudden amplification of tone to a level that exceeds the expected level by more than 6 dB is not allowed. After the test, normal operation of the EUT shall be self-recovered. In the case of unintended tone holding caused by a MIDI protocol communication error, the EUT can be re-initialised by the operation of the controls by the user controls in accordance with the manufacturer's instructions. Due to the nature of the MIDI protocol, it is necessary to modify the performance criterion B to allow user intervention when the unintended tone holding is caused by a missing MIDI communication error (for example missing a 'NOTE OFF' message).
- Criterion C - Degradation of the performance beyond that defined in criterion A1 of Table E.2 is permitted provided that the normal operation of the EUT can be restored after the test by operator intervention. However, sudden amplification of tone to a level that exceeds the expected level by more than 6 dB is not allowed.

5.2.5 Performance Criteria Description for Networking function

Criterion A - Where relevant, during the application of the test the network function shall, as a minimum, operate ensuring that:

- established connections shall be maintained throughout the application of the test;
- no change of operational state or corruption of stored data occurs;
- no increase in error rate above the figure defined by the manufacturer occurs. The manufacturer should select the most appropriate performance measurement criteria for the product or system, for example bit error rate, block error rate;
- no request for retry above the figure defined by the manufacturer;.
- the data transmission rate does not reduce below the figure defined by the manufacturer;
- no protocol failure occurs;
- the audio noise level at a two-wire analogue interface (supporting telephony) shall satisfy the requirements of Table G.3. The audio level measurements shall be performed at the demodulated frequency of the disturbance using a narrowband filter with a 3 dB bandwidth of 100 Hz using the method defined in table clause G.1.4. See G.6.1. As described in the example given in J.3.5 the networking function is monitored during testing using direct functions specified elsewhere in this document. If needed to verify the operation of the protocol, the following functions shall be verified as described in Table H.1 when performing the additional spot frequency tests contained in Clause 5:
- ability to establish a connection,
- ability to clear a connection.

Where an EUT has supervisory functions they shall not be affected. Elements that should be monitored include, but are not limited to:

- alarms,
- signalling lamps,
- printer output errors,
- network traffic rates,
- network monitor errors,
- measured network parameters.

Criterion B - Established connections shall be maintained throughout the test, or shall self-recover in a way and timescale that is imperceptible to the user.

The error rate, request for retry and data transmission rates may be degraded during the application of the test. Degradation of the performance as described in criterion A is permitted, provided that the normal operation of the EUT is self-recoverable to the condition established prior to the application of the test. Where required, as defined in Clause 5, the acceptable operation of the function shall be verified at the completion of the test as described in Table H.1, by confirming the following:

- the EUT's ability to establish a connection,
- the EUT's ability to clear a connection.

During surge testing disconnection is allowed on the analogue/digital data port being tested. If the EUT is a supervisory equipment, it shall not impact the normal operation of the network being monitored. In addition, any supervisory functions impacted during the period of the test shall return to the state prior to the test. Elements to consider include:

- alarms,
- signalling lamps,
- printer output,
- network traffic rates,
- network monitoring. is used as intended.

Criterion C - Degradation of performance as described in criteria A and B is permitted provided that the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test, or can be restored after the test by the operator.

5.2.6 Performance Criteria Description for Audio output function

- Criterion A - The interference ratio (electrical or acoustic) shall meet the limits in column 3; or,
the acoustic level of the demodulated audio shall be less than the limits in column 4; or,
the digitally coded level of demodulated audio shall be less than limits in column 5; or,
the analogue level of the demodulated audio shall be less than the limits in column 6.
- Criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion C - Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

5.2.7 Performance Criteria Description for Telephony function

Function to be exercised	Performance criteria		
	A	B	C
Establish new communication	At the additional spot frequency tests a, c	Performed before and after the application of the test or disturbance	Performed before and after the application of the test or disturbance
Maintain established communication	Yes In addition, the requirements of Annex G for the audio output function shall be satisfied c	Yes b	No
Terminate established communication	At the additional spot frequency tests a, c	Performed before and after the application of the test or disturbance	Performed before and after the application of the test or disturbance

Communication refers to a telephone call or other form of voice connection.

a Applicable to TTE with a dial function that provides dedicated emergency service/safety of life call capability. Where the EUT does not provide this functionality, this limitation shall be stated in the equipment user manual.

b Communication shall be established prior to the application of the disturbance, the communication shall be maintained and the quality of that communication (for example, volume setting, the level of background noise) shall be maintained after completion of the test or disturbance.

c Where defined in Clause 5 (for the tests in Table 1 to Table 4), these functional tests shall be performed during the additional spot frequency tests.



5.3 Test of IEC/EN 61000-4-2

5.3.1 Test Instruments

Immunity Shielded Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Aneroid Barometer	SATO	7610-20	89090	07/23/2024	07/22/2025
ESD Simulator	Teseq	NSG 438	1581	07/03/2024	07/02/2025
Thermo-Hygro Meter	Wisewind	201A	SD-S041	12/12/2023	12/11/2024
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.3.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
18.5 °C	45 %RH	1008 hpa

5.3.3 Results of Electrostatic Discharge Test (ESD)

Model No.	: RC21-0229
Tested By	: Jacky Lin
Tested Date	: August 30, 2024
Test Mode	: Mode 2
Basic Standard	: IEC/EN 61000-4-2
Discharge Impedance	: 330 ohm / 150 pF
Discharge Voltage	: Air Discharge: $\pm 2, 4, 8$ kV Contact Discharge: $\pm 2, 4$ kV HCP/VCP: $\pm 2, 4$ kV
Polarity	: Positive/Negative
Number of Discharge	: 10 times at each test point
Discharge Mode	: Single Discharge
Discharge Period	: 1 second

A.Observations:

Test points: 1. Front side. 2. Back side. 3. Left side. 4. Right side.
5. Top side. 6. Bottom side.

Direct Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
2, 4, 8 (Air.)	+/-	2~4	N/A	No discharge point
2, 4 (Cont.)	+/-	1~5	A	N/A

Remark: A: No degradation of performance or loss of function
N/A: Not Applicable.

B.Observations:

Test points: 1. Front side. 2. Back side. 3. Left side. 4. Right side.

Indirect Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
2, 4	+/-	1~4	A	A

Remark: A: No degradation of performance or loss of function.

ESD Test point

Front

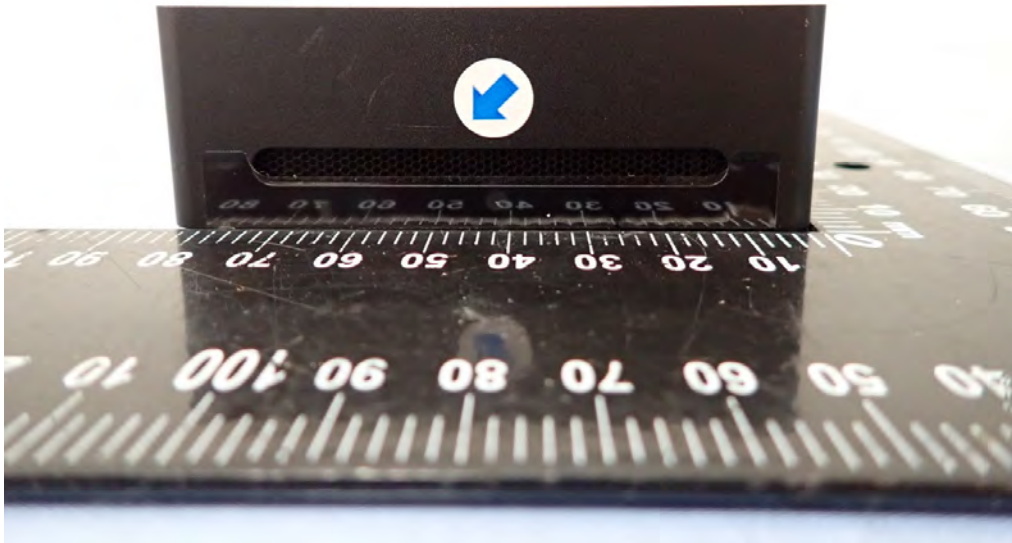


Back

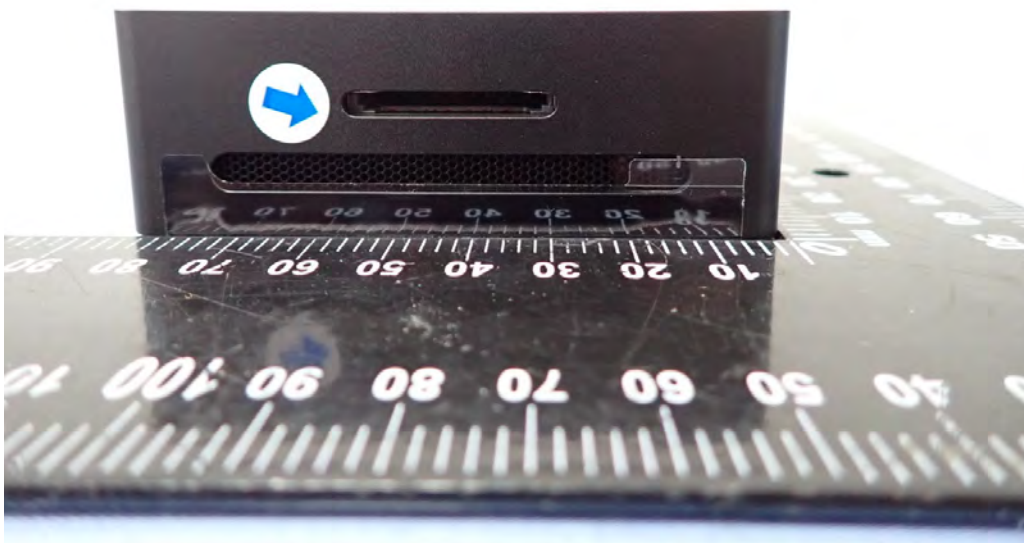


Air Discharge: 
Contact Discharge: 

Left

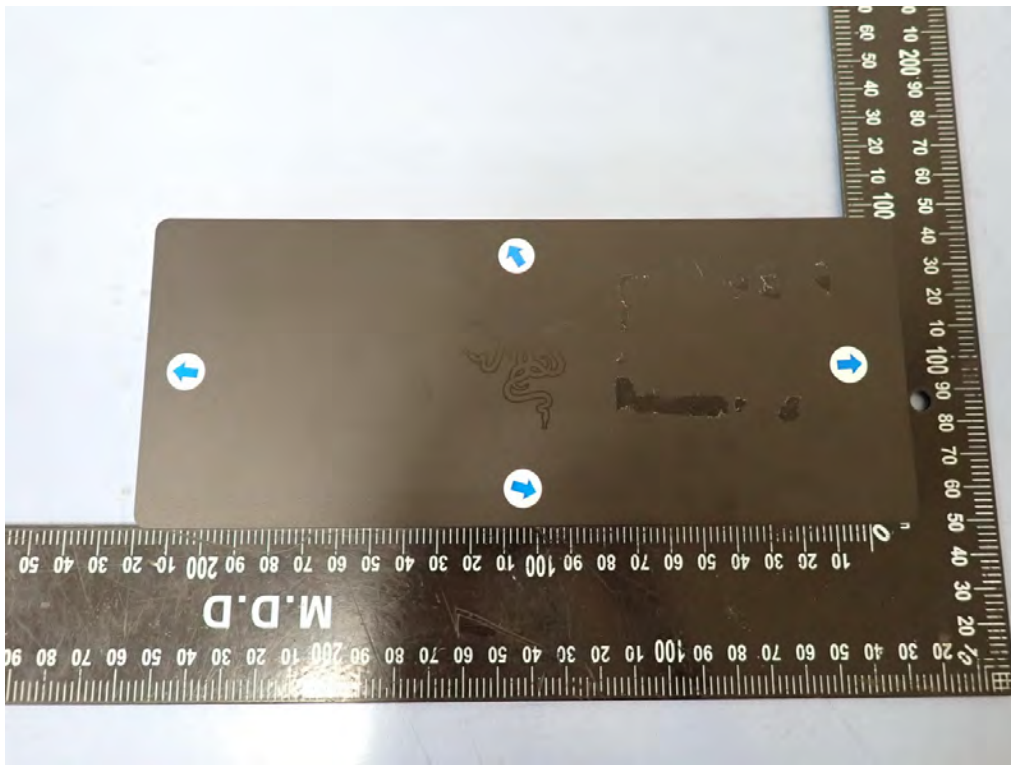


Right



Air Discharge: 
Contact Discharge: 

Top



Air Discharge: 

Contact Discharge: 

5.4 Test of IEC/EN IEC 61000-4-3

5.4.1 Test Instruments

844 RS Chamber					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Electric Field Probe	AR	FL7006	0356656	03/06/2024	03/07/2025
Field of Calibration	CCS	Chamber#RS	80-1000MHz	02/16/2024	02/15/2025
RF Power Meter	Boonton	4242	17419	01/29/2024	01/28/2025
Power Sensor	Boonton	51011A-EMC	36833	01/29/2024	01/28/2025
Power Sensor	Boonton	51011A-EMC	36834	01/29/2024	01/28/2025
Thermo-Hygro Meter	Wisewind	N/A	SD-S019	09/21/2023	09/20/2024
Broadband Antenna	AR	AT1080	311819	N.C.R	N.C.R
Power Amplifier	Teseq	CBA1G-600D	1098099	N.C.R	N.C.R
Analog Signal Generator	Agilent	E8257D	MY48051214	05/28/2024	05/27/2025
Field of Calibration	CCS	Chamber#RS	1000-6000MHz	02/15/2024	02/14/2025
Microwave Antenna	Schwarzbeck	STLP 9149	767	N.C.R	N.C.R
Power Amplifier	Teseq	CBA6G-100D	1087370	N.C.R	N.C.R
Sound Level Calibrator	B&K	4231	3010869	07/17/2024	07/16/2025
Audio Bandpass Amp.	CCSRF	ABT-F	007	04/15/2024	04/14/2025
Test Software	EmcwareVer. 3.2 / CISPR 35 ABT Test (V-093)				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.4.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
19.5 °C	47 %RH	1005 hpa

5.4.3 Results of Radiated Radio Frequency Electromagnetic (RS)

Model No. : RC21-0229
 Tested By : James Chou
 Tested Date : August 30, 2024
 Test Mode : Mode 2
 Basic Standard : IEC/EN IEC 61000-4-3
 Frequency range : 80 MHz - 1000 MHz
 Frequency range : 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz ($\pm 1\%$)
 Field strength : 3 V/m
 Modulation : 80% AM (1kHz)
 Frequency step : 1 % of the preceding frequency
 Polarity of Antenna : Horizontal and Vertical
 Dwell Time : 3 seconds
 Test distance : 3 m

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	80 - 1000	Vertical/Horizontal	A	0 degree
2	80 - 1000	Vertical/Horizontal	A	90 degree
3	80 - 1000	Vertical/Horizontal	A	180 degree
4	80 - 1000	Vertical/Horizontal	A	270 degree

Remark: A: No degradation of performance or loss of function.

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	0 degree
2	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	90 degree
3	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	180 degree
4	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	270 degree

Remark: A: No degradation of performance or loss of function.

Model No. : RC21-0229
 Tested By : James Chou
 Tested Date : August 30, 2024
 Test Mode : Mode 2 (Audio out)
 Basic Standard : IEC/EN IEC 61000-4-3
 Frequency range : 80 MHz - 1000 MHz
 Frequency range : 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz ($\pm 1\%$)
 Field strength : 3 V/m
 Modulation : 80% AM (1kHz)
 Frequency step : 1 % of the preceding frequency
 Polarity of Antenna : Horizontal and Vertical
 Dwell Time : 3 seconds
 Test distance : 3 m

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	80 - 1000	Vertical/Horizontal	A	0 degree
2	80 - 1000	Vertical/Horizontal	A	90 degree
3	80 - 1000	Vertical/Horizontal	A	180 degree
4	80 - 1000	Vertical/Horizontal	A	270 degree

Remark: A: No degradation of performance or loss of function.

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	0 degree
2	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	90 degree
3	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	180 degree
4	1800, 2600, 3500, 5000 ($\pm 1\%$)	Vertical/Horizontal	A	270 degree

Remark: A: No degradation of performance or loss of function.

5.5 Test of IEC/EN 61000-4-4

5.5.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Capacitive Clamp	EMC-Partner	CN-EFT1000	589	02/20/2024	02/19/2025
EMC Immunity Tester	EMC Partner	TRANSINT 2000	1117	02/20/2024	02/19/2025
Test Software	GenecsVer. 3.27				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.5.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
19.9 °C	49 %RH	1004 hpa

5.5.3 Results of Electrical Fast Transient (EFT)

Model No. : RC21-0229
 Tested By : James Chou
 Tested Date : August 30, 2024
 Test Mode : Mode 2
 Basic Standard : IEC/EN 61000-4-4
 Test Voltage : AC Input: ± 1 kV
 Signal/Comm. : ± 0.5 kV
 Polarity : Positive/Negative
 Impulse Frequency : 5 kHz
 Tr/Th : 5/50ns
 Burst : 15ms/300ms

Observation:

Test Point	Polarity	Test Level (kV)	Results
L	+/-	1	A
N	+/-	1	A
PE	+/-	1	A
L-N	+/-	1	A
L-PE	+/-	1	A
N-PE	+/-	1	A
L-N-PE	+/-	1	A
RJ45	+/-	0.5	A

Remark: A: No degradation of performance or loss of function.

5.6 Test of IEC/EN 61000-4-5

5.6.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
CDN	EMC-Partner	CDN-UTP8	1502	02/20/2024	02/19/2025
EMC Immunity Tester	EMC Partner	TRANSINT 2000	1117	02/20/2024	02/19/2025
Test Software	GenecsVer. 3.27				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.6.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
19.9 °C	49 %RH	1004 hpa

5.6.3 Results of Surge Test

Model No. : RC21-0229
 Tested By : Jacky Lin
 Tested Date : August 30, 2024
 Test Mode : Mode 2
 Basic Standard : IEC/EN 61000-4-5
 Test Rate : 1 pulse every minute
 No. of Tests : 5 positive and 5 negative pulses
 Waveform : 1.2/50μs (8/20μs)

Observation Description

AC input line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
L – N	0, 90, 180, 270	+/-	1	A
L – PE	0, 90, 180, 270	+/-	2	A
N – PE	0, 90, 180, 270	+/-	2	A

Remark: A: No degradation of performance or loss of function.

Signal line:

Test Rate : 1 pulse every minute
 No. of Tests : 5 positive and 5 negative pulses
 Waveform : 10/700μs (5/320μs)

Observation Description

Signal line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
RJ45	No phase angle (degree)	+/-	1	B

Remark: B: During the test, data accessing via RJ45 was paused. It could become normal after test stopped.



5.7 Test of IEC/EN 61000-4-6

5.7.1 Test Instruments

CS Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Attenuator	EMCI	SA3NL	10006F	N.C.R	N.C.R
CDN	Teseq	CDN M016	35820	11/30/2023	11/29/2024
CDN	SCHAFFNER	CDN M325	17457	11/30/2023	11/29/2024
CDN	Teseq	CDN T400A	25674	11/30/2023	11/29/2024
CDN	Teseq	CDN T8-10	40378	07/15/2024	07/14/2025
Compact Immunity Test System	TESEQ	NSG 4070B-35	39581	10/12/2023	10/11/2024
Sound Level Calibrator	B&K	4231	3010869	07/17/2024	07/16/2025
Power Module	G.R.A.S.	12AK	35913	N/A	N/A
Bandpass Filter	CCSRF	35-01	SD-S018	N/A	N/A
RF Counter	Agilent	53210A	MY50000797	04/12/2024	04/11/2025
Audio Bandpass Amp.	CCSRF	ABT-CB	007	04/15/2024	04/14/2025
Test Software	NSG 4070 Control Program Version: V1.2.0 / CISPR 35 ABT Test (V-090)				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.7.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
20.4 °C	52 %RH	1001 hpa

5.7.3 Results of Immunity to Conducted Disturbances (CS)

Model No. : RC21-0229
Tested By : James Chou
Tested Date : August 30, 2024
Test Mode : Mode 2
Basic Standard : IEC/EN 61000-4-6
Frequency range : 0.15 MHz -10 MHz
Field strength : 3 Vrms
Frequency range : 10 MHz - 30 MHz
Field strength : 3 V to 1Vrms
Frequency range : 30 MHz - 80 MHz
Field strength : 1 Vrms
Modulation : 80% AM, 1 kHz Sinewave
Frequency step : 1 % of the preceding frequency
Dwell Time : 3 seconds
Coupling Method : CDN-M3; CDN-T8

Cable Description	Frequency (MHz)	Observation
AC input	0.15 – 80	A

Signal Ports

Cable Description	Frequency (MHz)	Observation
RJ45	0.15 – 80	A

Remark: A: No degradation of performance or loss of function.

Model No. : RC21-0229
Tested By : James Chou
Tested Date : August 30, 2024
Test Mode : Mode 2 (Audio out)
Basic Standard : IEC/EN 61000-4-6
Frequency range : 0.15 MHz -10 MHz
Field strength : 3 Vrms
Frequency range : 10 MHz - 30 MHz
Field strength : 3 V to 1Vrms
Frequency range : 30 MHz - 80 MHz
Field strength : 1 Vrms
Modulation : 80% AM, 1 kHz Sinewave
Frequency step : 1 % of the preceding frequency
Dwell Time : 3 seconds
Coupling Method : CDN-M3; CDN-T8

Cable Description	Frequency (MHz)	Observation
AC input	0.15 – 80	A

Signal Ports

Cable Description	Frequency (MHz)	Observation
RJ45	0.15 – 80	A

Remark: A: No degradation of performance or loss of function.

5.8 Test of IEC/EN 61000-4-8

5.8.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due

Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan

5.8.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
N/A	N/A	N/A

5.8.3 Result of Immunity to Power Frequency Magnetic Field

Model No. : N/A
 Tested By : N/A
 Tested Date : N/A
 Test Mode : N/A
 Basic Standard : IEC/EN 61000-4-8
 Power Frequency : 50 Hz
 Magnetic Field : 1 A/m(r.m.s)
 Coil Orientation : X, Y, Z Axis
 Observation : N/A

Remark: N/A: There is no any sensitive part for magnetic field test. Applicable only to equipment containing susceptible to magnetic field.

5.9 Test of IEC/EN IEC 61000-4-11

5.9.1 Test Instruments

Immunity Shielded Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
AC/DC Clamp Meter	Lutron	CM-9930R	I.200121	03/08/2024	03/07/2025
EMC Immunity Tester	EMC Partner	TRANSINT 2000	1117	02/20/2024	02/19/2025
Test Software	GenecsVer. 3.27				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.9.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
20.1 °C	49 %RH	1000 hpa

5.9.3 Results of Voltage Dips Immunity Test

Model No. : RC21-0229
 Tested By : James Chou
 Tested Date : August 30, 2024
 Test Mode : Mode 2
 Basic Standard : IEC/EN IEC 61000-4-11
 EUT Rated Voltage : 230 Volts.
 Reduction Voltage : 30, >95 % Ut
 Phase Angle : 0,180 degree
 Total events : 3 dropouts
 Event interval : 10 seconds

Test Power: 230Vac, 50Hz			
Environmental phenomena	Test specification (% reduction)	Duration (in periods of the rated frequency)	Observation
Voltage Interruptions	>95	250	B
Voltage dips	30	25	A
	>95	0.5	A

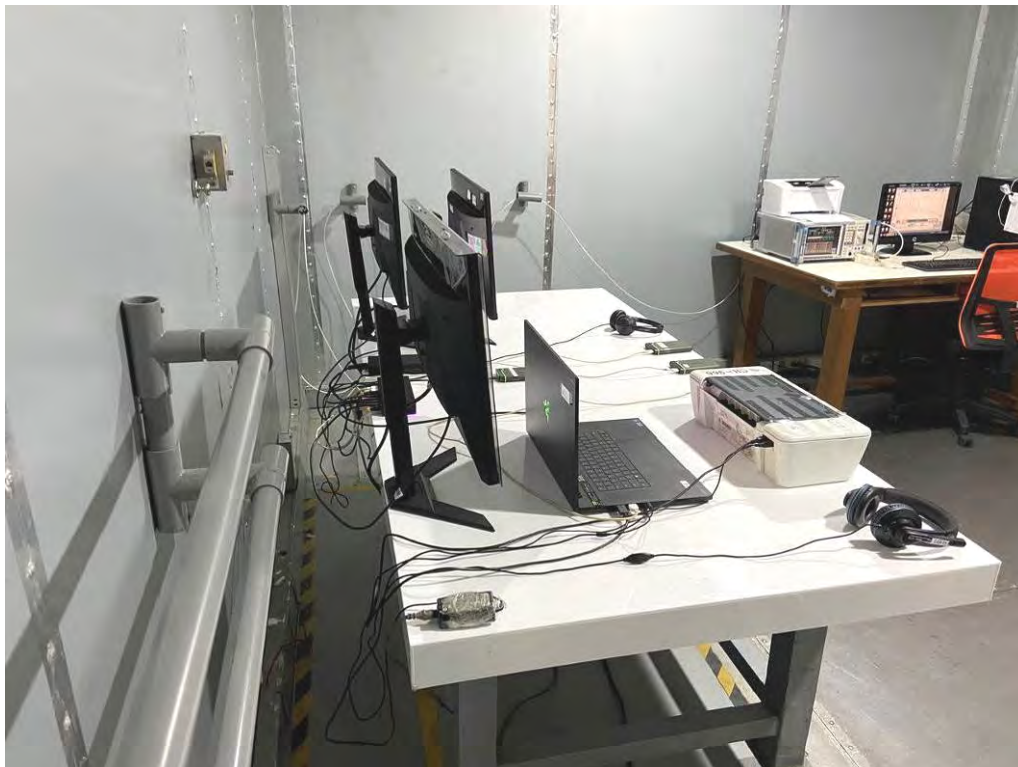
Test Power: 230Vac, 60Hz			
Environmental phenomena	Test specification (% reduction)	Duration (in periods of the rated frequency)	Observation
Voltage Interruptions	>95	300	B
Voltage dips	30	30	A

Remark: A: No degradation of performance or loss of function.
 B: EUT shut down, but it could recover automatically afterwards.

APPENDIX

Photograph of Testing General Set-up

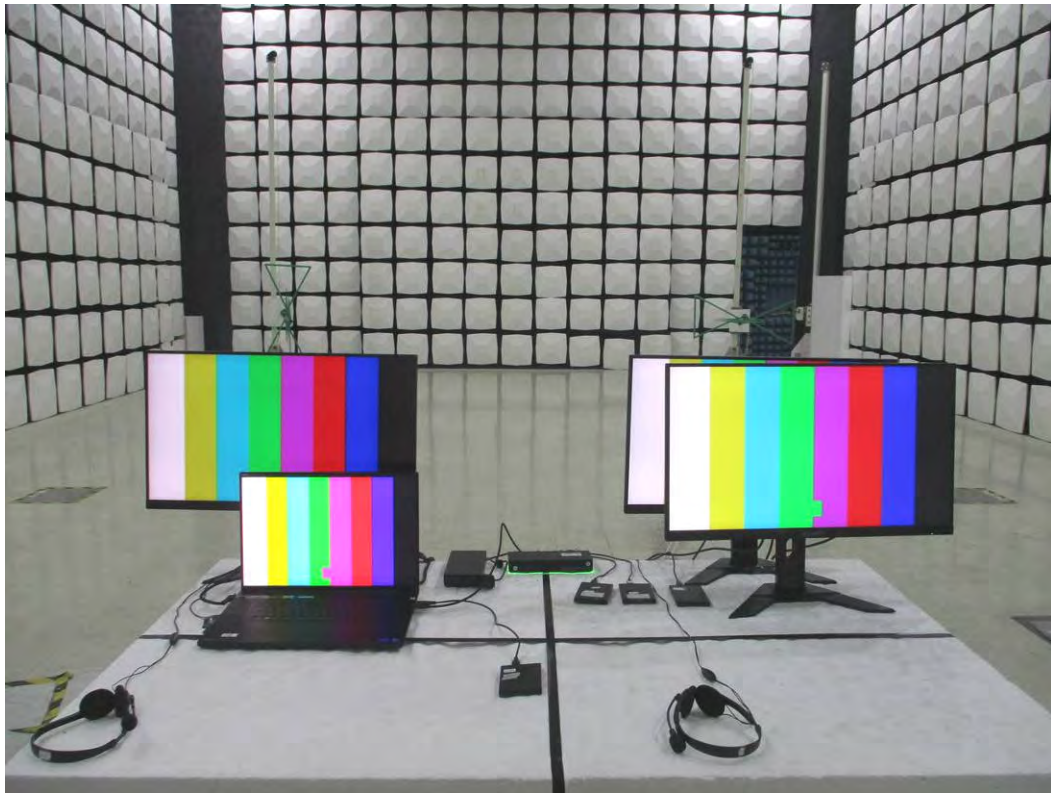
CE Testing Set-up



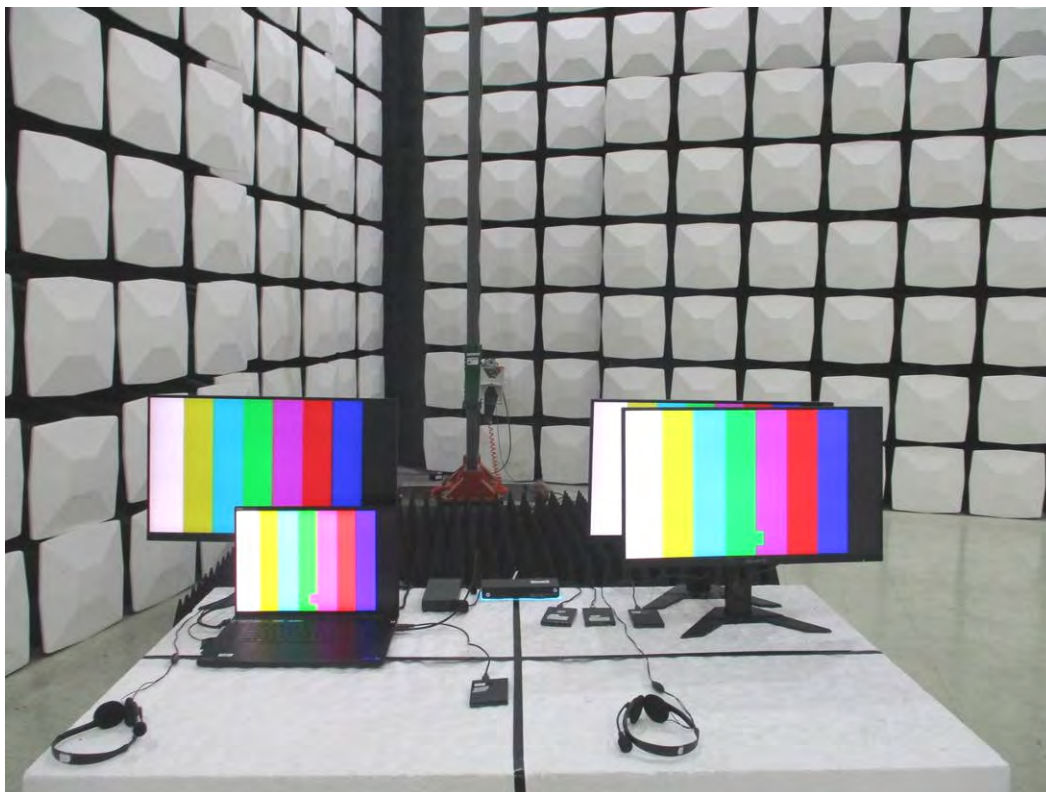
ISN Testing Set-up (10Mbps & 100Mbps & 1Gbps)



RE Testing Set-up Below 1GHz



Above 1GHz



HARMONIC & FLICKER Testing Set-up



ESD Testing Set-up



RS Testing Set-up



RS Testing Set-up (Audio out)



EFT Testing Set-up



EFT For I/O Testing Set-up



Surge Testing Set-up



Surge For I/O Testing Set-up



CS Testing Set-up



CS For I/O Testing Set-up



CS Testing Set-up (Audio out)



CS For I/O Testing Set-up (Audio out)

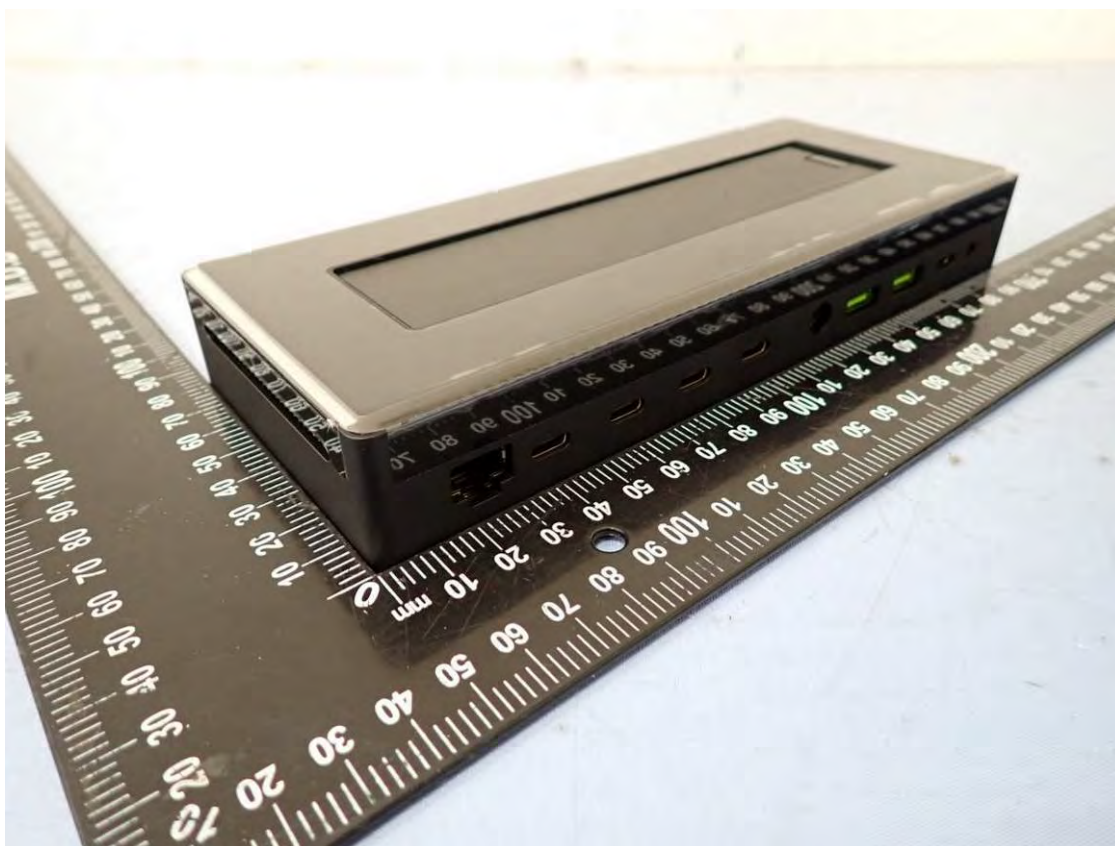


DIP Testing Set-up

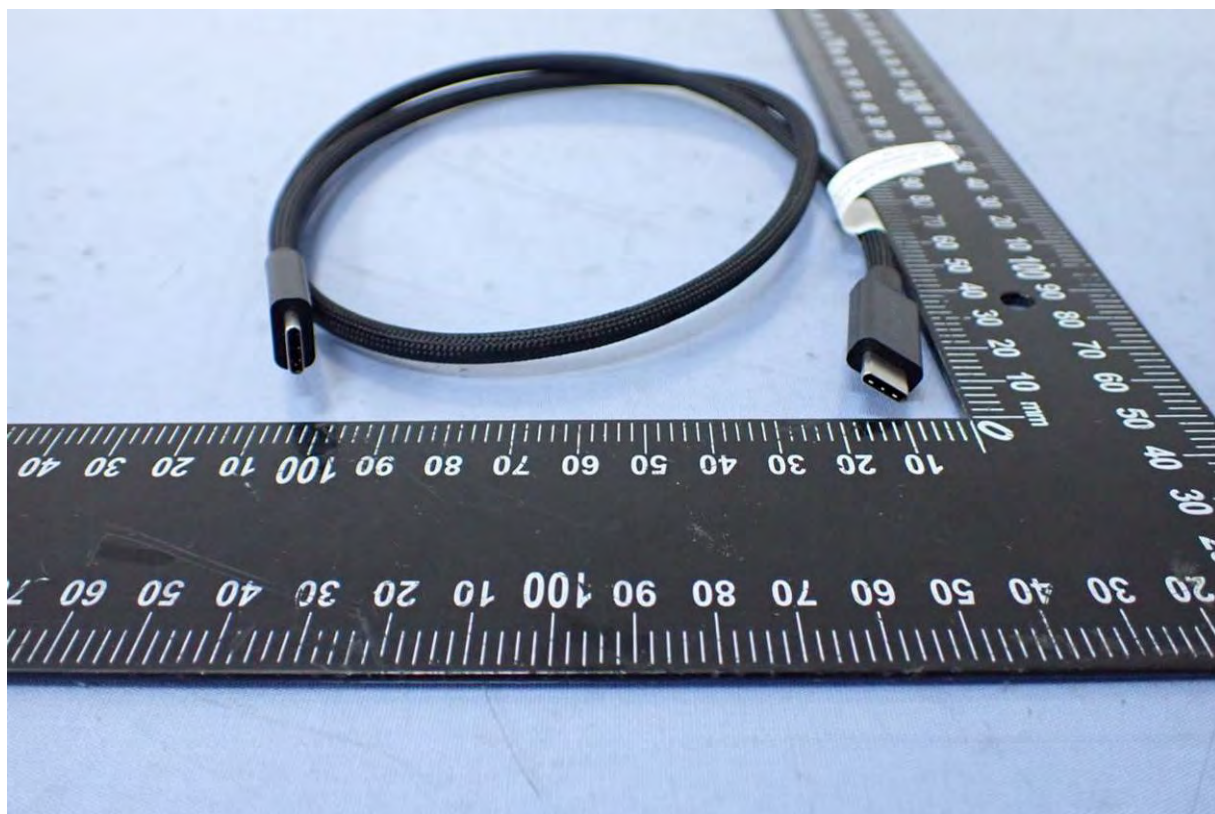


**Photographs of EUT Unit
Exterior**

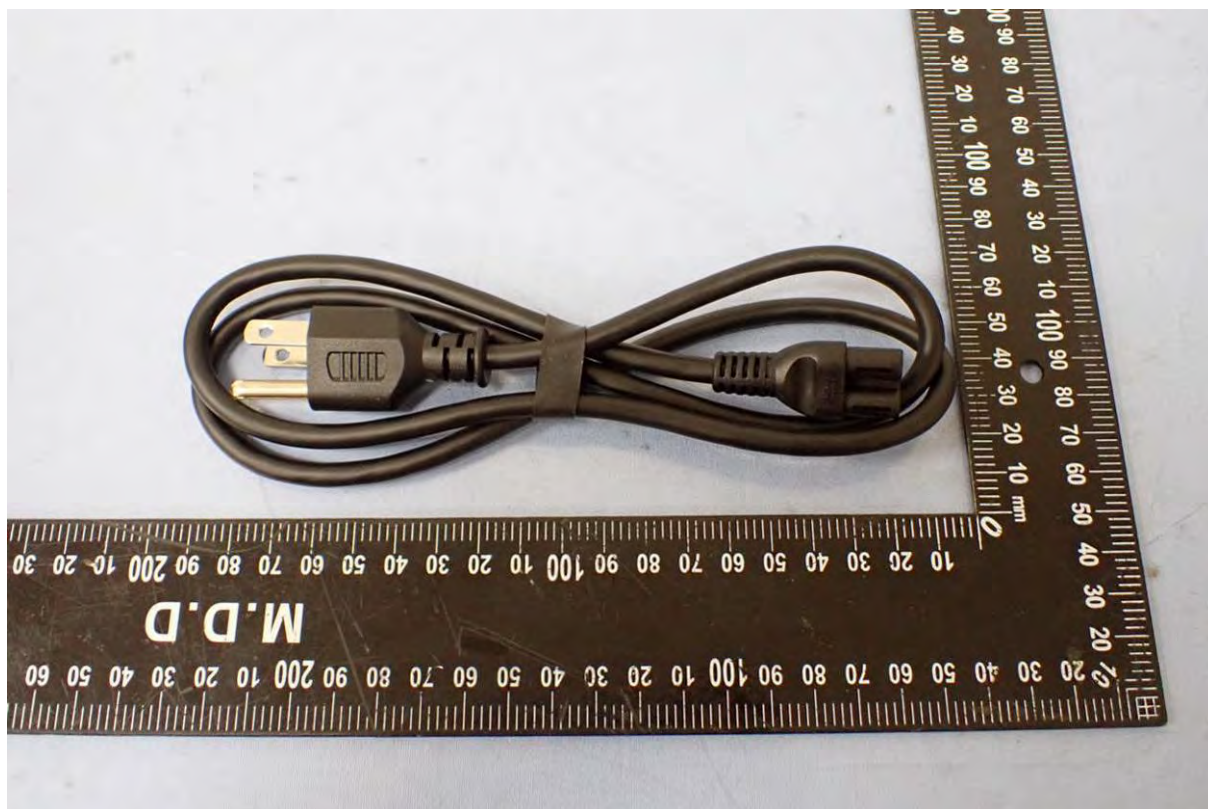
With LED Board





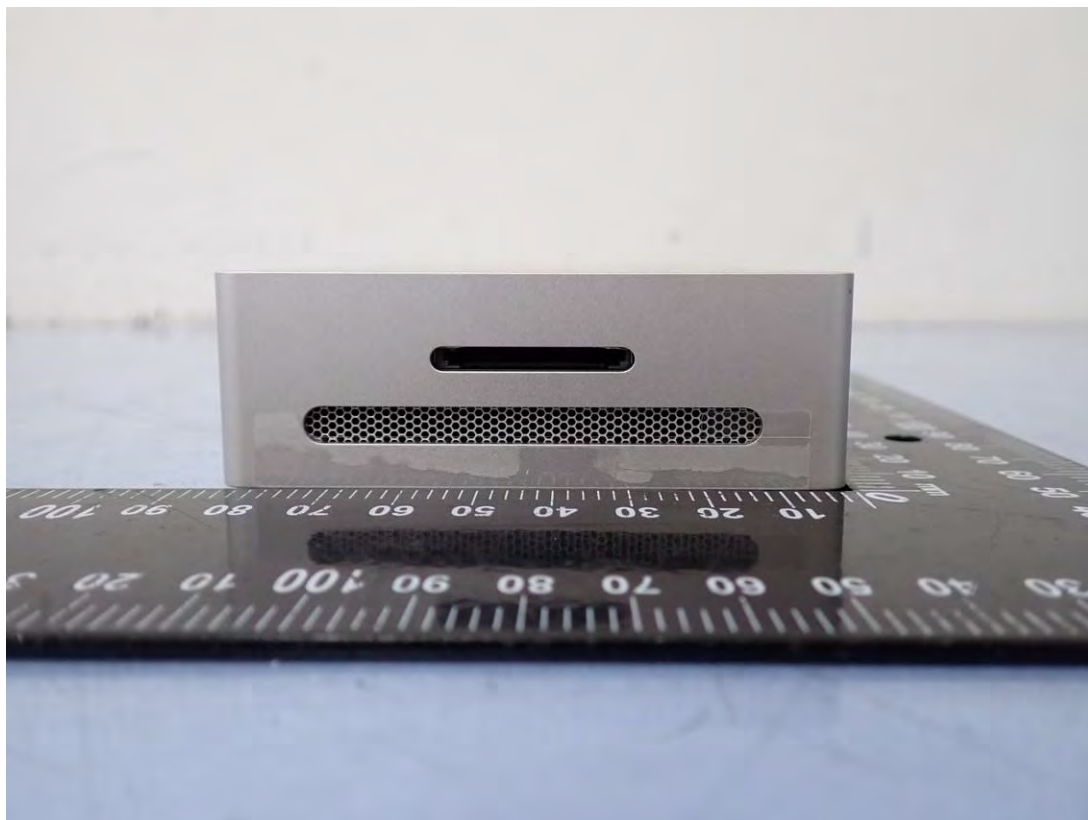
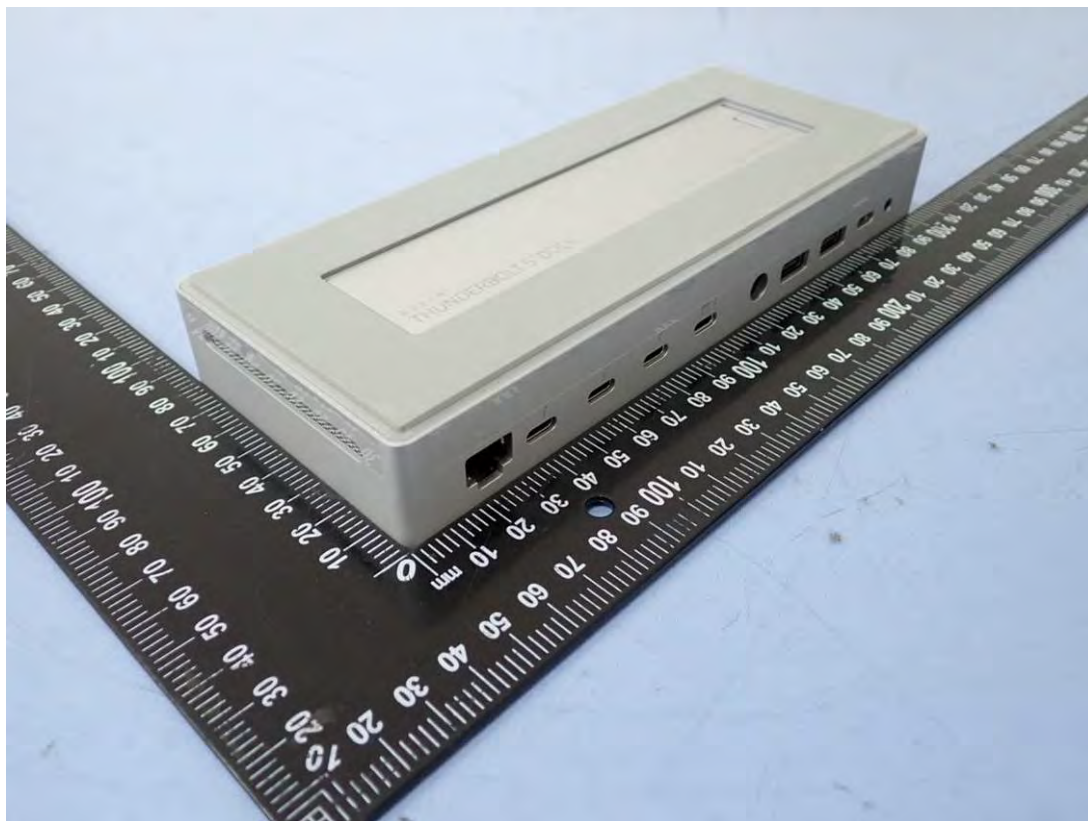


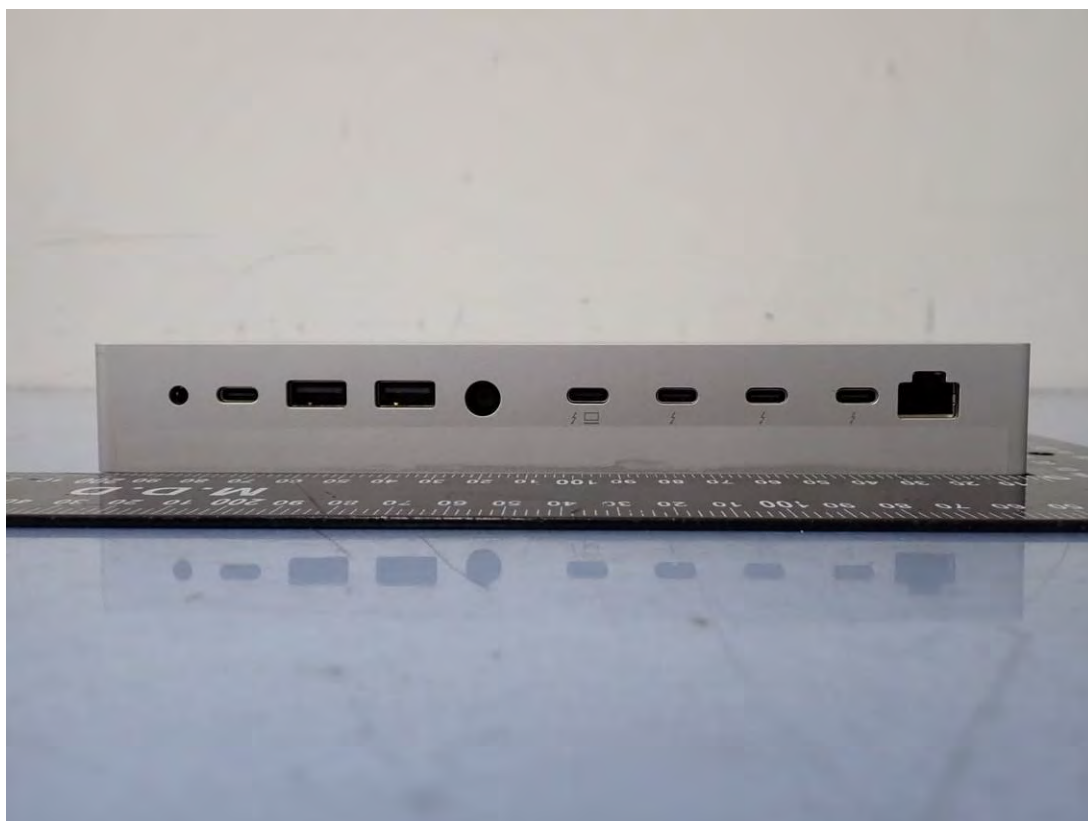




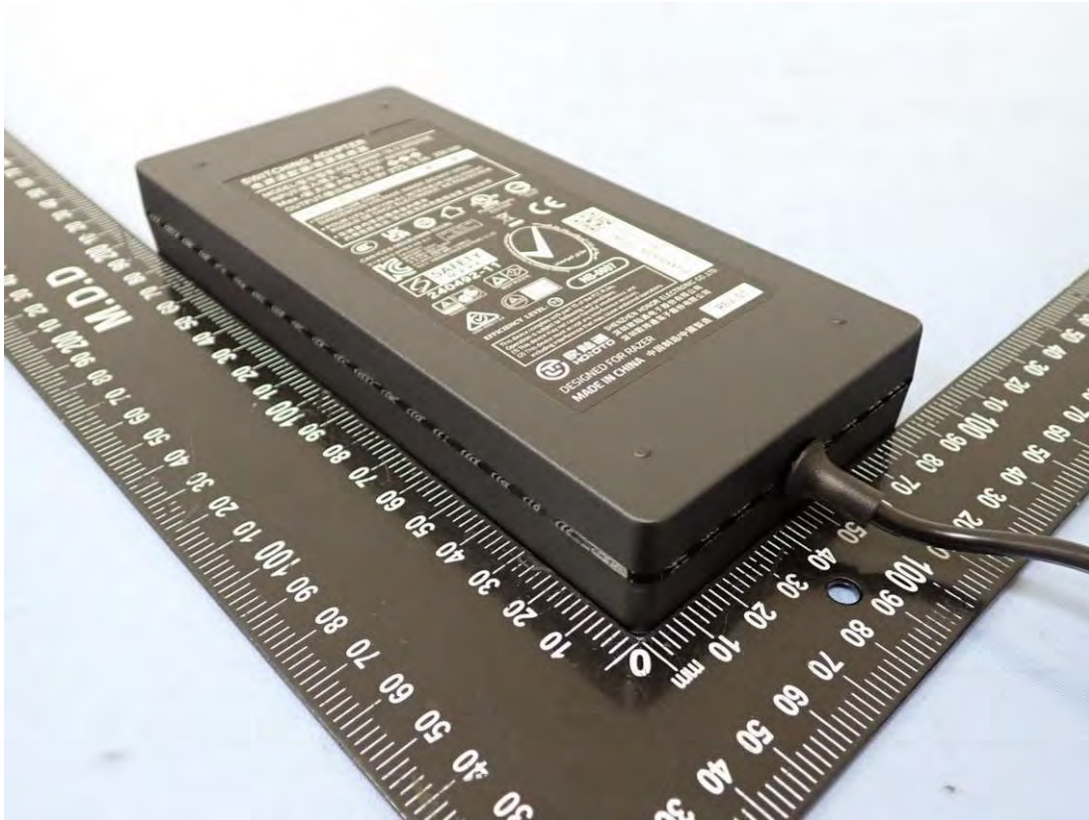
Without LED Board













**** End of Report ****